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Foreshore Section,
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Department of Housing, Local Government and Heritage,
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Newtown Road, Wexford,
Y35 AP90.

22/07/2022

RE: Glencarriff FS006970 Dredging - RFI Response Cover Letter

[redacted]

On the 23rd of February 2022 we submitted a revised Natura Impact Statement (NIS) and Archecological Impact Assessment (AIA) for the proposed works.

The following is a summary of the revisions to these documents:

- The NIS and AIA have been updated with the correct site dimensions.
- The NIS has been updated to take into account the concerns raised in relation to flora and fauna.
- We accept the conditions in relation to underwater archaeology and have updated the AIA to include them.
- Risks due to invasive species have now been addressed in the NIS.
- In combination effects have been further addressed in the NIS.
- A suitably qualified ecologist has been included in the mitigation measures.

Best regards,

[redacted]

[redacted]
CEng MIEI

ENGINEERING AND ENVIRONMENTAL CONSULTANTS

Malachy Walsh and Partners
Engineering and Environmental Consultants

Natura Impact Statement (NIS)

Glengarriff Pontoon Dredging, Glengarriff, Cork

ISSUE FORM	
Project number	19505
Document number	6002
Document revision	C
Document title	Glengarriff Pontoon Dredging, Glengarriff, Cork
Document status	Final
Document prepared by	FD/HD
Document checked by	HD (MWP 19-08-2019); EL (MWP 23-02-2022)

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1 SUMMARY OF FINDINGS

1.1 NATURA IMPACT STATEMENT

Project Title	Glengarriff Pontoon Dredging, Glengarriff, Cork
Project Proponent	Cork County Council
Project Location	Located just outside Glengarriff village on the Beara Peninsula in County Cork. Site is approximately 75km west of Cork City and 10km north of Bantry.
Natura Impact Statement	In cases where an Appropriate Assessment is required a Natura Impact Statement (NIS) is prepared. This is a report based on a scientific examination of evidence and data, carried out by competent persons with the aim of identifying and classifying any implications of a proposal, either individually, or in combination with other plans or projects, on Natura 2000 sites in view of the conservation objectives of the sites
Conclusion	In conclusion, provided the recommended mitigation measures are implemented in full, which relate primarily to the protection of otter and harbour seal, and the prevention of spread of invasive species, it is not expected that the proposal to carry out dredging works at Glengarriff Pontoon will result in any adverse residual impacts on the Natura 2000 site considered in this NIS, namely: • Glengarriff Harbour & Woodlands SAC (000090)

2 INTRODUCTION

Appropriate Assessment is the consideration of the impact on the integrity of the Natura 2000 site of the project, either alone or in combination with other plans or projects, with respect to the site's ecological structure and function, and conservation objectives. Additionally, mitigation of these effects can be considered. A Screening for Appropriate Assessment was completed and determined the need for full Appropriate Assessment (see **Appendix 2**).

In cases where an Appropriate Assessment is required a Natura Impact Statement (NIS) shall be prepared and shall include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for Natura 2000 sites in the view of the conservation objectives of the site. The aim of the assessment is to provide a sufficient level of information to the competent authority on which to base their appropriate assessment of the plan or project. The plan or project should be fully described particularly in relation to the aspects that could interact with the surrounding environment. The proposed dredging works for Glengarriff pontoon are fully described in **Section 4.3** below.

The focus of the assessment is to determine whether the proposed dredging works at the pontoon at Glengarriff Pier, Glengarriff, Co. Cork will have a significant negative impact on the features of interest of the Natura 2000 site i.e. habitats and species. This assessment identifies the environmental aspects of the project that will interact with the ecological requirements or sensitivities of the habitats and species, and in this case these relate mainly to potential impacts to marine water quality, marine mammals including otter and harbour seal, and impacts potentially arising from invasive species during the proposed dredging works, as well as potential in-combination effects throughout the undertaking of the project.

The 'test' of the assessment is whether the plan or project will have an adverse effect on the integrity of the Natura 2000 site. Where potentially significant effects are identified proven mitigation measures will be recommended.

This report was authored by [redacted] (MSc) with input from [redacted] BSc.). Fergus is an environmental scientist with an MSc in environmental protection and management and has over 3 years' experience in environmental consultancy and appropriate assessment. Hazel is an ecologist with over six years' experience with MWP in ecological surveying, ecological impact assessment and the Appropriate Assessment process.

3 METHODOLOGY

3.1 APPROPRIATE ASSESSMENT GUIDANCE

This Natura Impact Statement has been undertaken in accordance with the following guidance:

- DoEHLG Circular NPWS 1/10 & PSSP 2/10 Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.
- DoEHLG (2010) Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Department of the Environmental Heritage and Local Government.

- European Commission (2018) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

Further information is available at:

- http://ec.europa.eu/environment/nature/legislation/habitatsdirective/
- http://www.npws.ie/planning/appropriateassessment/

The aim of the assessment is to provide a sufficient level of information to the competent authority on which to base their appropriate assessment of the plan or project.

3.2 DESK STUDY

In order to complete the Natura Impact Statement certain information on the existing environment is required. A desk study was carried out to collate available information on the subject site's natural environment. This comprised a review of the following publications, data and datasets:

- OSI Aerial photography and 1:50000 mapping
- National Parks and Wildlife Service (NPWS)
- National Biodiversity Data Centre (NBDC) (on-line map-viewer)
- BirdWatch Ireland (BWI) data
- Geological Survey Ireland (GSI) area maps
- Environmental Protection Agency (EPA) water quality data
- Joint Nature Conservation Council (JNCC)
- Other information sources and reports footnoted in the course of the report

3.3 FIELD SURVEYS

3.3.1 Marine Surveys

A number of marine surveys were completed by specialist marine consultancies including Hydrographic Surveys Ltd. and IWDG Consulting (Irish Whale and Dolphin Group). Surveys were used to inform the screening for Appropriate Assessment and the Natura Impact Statement.

- Site Investigation Survey including Bathymetric and Topographic Survey (Hydrographic Surveys Ltd., 2019)
- Marine Mammal Risk Assessment (MMRA) (Berrow, 2019)

3.3.1.1 Site Investigation Survey including Bathymetric and Topographic Survey

A site investigation survey comprising bathymetric and topographic survey and surface marine grab sampling was undertaken by Hydrographic Surveys Ltd. and Priority Geotechnical Ltd. in the area around Glengarriff Pier and pontoon. Surface sediment grab samples, taken via Van Veen grab sampler, were collected at three locations (G1, G2 and G3) in October 2018 for the analysis of organics and contaminants (Hydrographic Surveys Ltd.).

3.3.1.2 Marine Mammal Risk Assessment (MMRA)

A risk assessment of the proposed works to marine mammals was carried out by the Irish Whale and Dolphin Group (IWDG) based on a review of available literature and data sources (Berrow, 2019).

3.3.2 Terrestrial Ecological Surveys

An otter survey was undertaken in inner Glengarriff Harbour on the 11th April 2019 on an ebbing tide from mid to low tide. The otter survey was undertaken following methodology outlined in 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes' (NRA, 2009). Evidence of otter (live animals, spraints, prints, resting places) was searched for along the coastline from 'Bamboo Park' in the east to west of Glengarriff pier including the outlet of the Reenmeen West River into Glengarriff Harbour and the small islets around the pier including Bush, Friar's and Bark Islands. The southern side of Bark Island was not accessible due to dense vegetation and steep shoreline.

Evidence of otter, if present, was recorded and photographed and the position recorded using a Garmin eTrex 10 GPS/GNSS receiver.

Figure 1. Area of shoreline encompassed by the otter survey conducted on 11/01/2019

Waterbird counts were also undertaken in early 2019 by a Malachy Walsh and Partners staff ecologist at low and rising tides.

3.4 ASSESSMENT OF POTENTIALLY SIGNIFICANT EFFECTS

As set out in the NPWS guidance, the task of establishing whether a plan or project is likely to have an effect on a Natura 2000 site(s) is based on a preliminary impact assessment using available information and data, including that outlined above, and other available environmental information, supplemented as necessary by local site information and ecological surveys. This is followed by a determination of whether there is a risk that the effects identified could be significant. The precautionary principal approach is required.

Once the potential impacts that may arise from the proposal are identified the significance of these is assessed through the use of key indicators in the screening process:

- Habitat loss
- Habitat alteration
- Habitat or species fragmentation
- Disturbance and/or displacement of species
- Water quality and resource.

3.5 BRIEF OVERVIEW OF SCREENING FOR APPROPRIATE ASSESSMENT

A screening for Appropriate Assessment was carried out for the proposal. The full screening for Appropriate Assessment report is available in **Appendix 2**. The test for the screening for Appropriate Assessment is to assess, in view of best scientific knowledge, if the proposal, individually or in combination with other plans/projects is likely to have a significant effect on a Natura 2000 site. If there are any significant, potentially significant, or uncertain effects, it will be necessary to proceed to Appropriate Assessment and submit a NIS. Adopting the precautionary principal in identifying potentially affected European sites, all SACs and SPAs within the potential zone of influence of the proposal site were included.

The "zone of influence" for a project is the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities (CIEEM, 2018). This is likely to extend beyond the site where there are ecological or hydrological connection(s) beyond the site boundaries.

The subject site and a distance of 15km is recommended as a potential zone of influence (Scott Wilson et al., 2006). However, National Parks and Wildlife Service (NPWS) guidance (NPWS, 2009) advises that this zone of influence be assessed on a case-by-case basis with consideration of the nature, size, and location of the projects, the sensitivities of the ecological receptors and the potential for cumulative effects. As such, Natura 2000 sites beyond 15km may also be considered based on the potential for an ecological and/or hydrological connection to the project site, bearing in mind the precautionary principal and using the Source-Pathway-Receptor framework.

Following this, the potential impacts associated with the proposal will be identified before an assessment is made of the likely significance of these impacts.

Designated SAC and SPA sites within the potential zone of influence, or the zone of potential significant impact influence of the proposal site, including their proximity are outlined in **Table 1** Error! Reference source not found.below.

Figure 2 below shows the location of these designated sites.

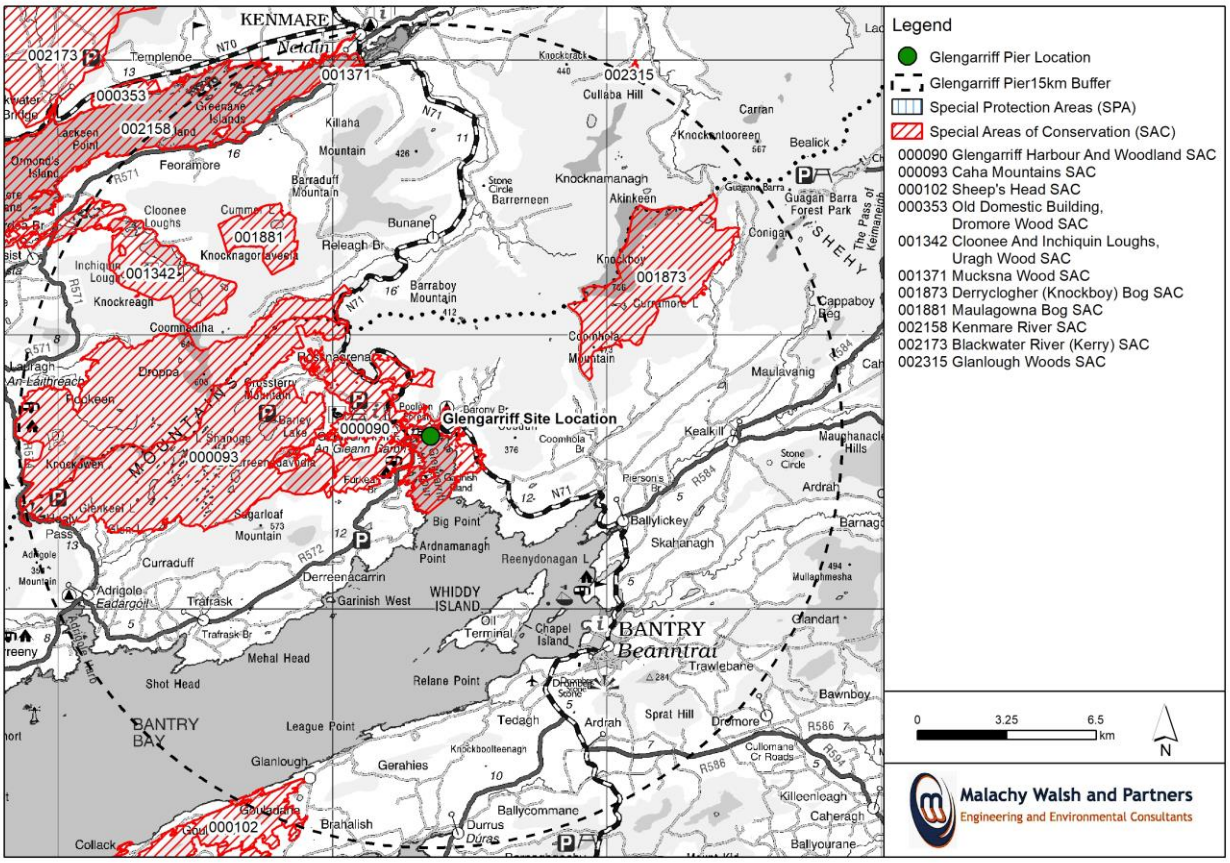

Figure 2 Natura 2000 sites located within the zone of influence of the site.

Table 1. Natura 2000 sites within 15km radius of the proposal site

No.	Designated Site	Site Code	Proximity of site to nearest point of designated site
1	Glengarriff Harbour & Woodlands SAC	000090	Proposed works located within the SAC.
2	Caha Mountains SAC	000093	Located 0.8km southwest of the subject site
3	Derryclogher (Knockboy) Bog SAC	001873	Located 6.3km northeast of the subject site
4	Maulagowna Bog SAC	001881	Located 8.2km northwest of the subject site
5	Clonee & Inchiquin Loughs SAC	001342	Located 8.6km northwest of the subject site
6	Glanlough Woods SAC	002315	Located 14.9km northeast of the subject site
7	Sheep's Head SAC	000102	Located 13.8km southwest of the subject site
8	Kenmare River SAC	002158	Located 13km west of the subject site

3.6 CONCLUSIONS OF THE SCREENING FOR APPROPRIATE ASSESSMENT

Potential impacts on seven of the eight Natura 2000 sites which occur within the likely zone of impact have been screened out due to a lack of credible or tangible source-pathway-receptor links between these sites and the proposal site. The comprehensive reasoning for this conclusion is available in the screening for Appropriate Assessment appended to this report (**Appendix 2**).

The screening assessment concluded that water quality, species disturbance and/or displacement, habitat/species fragmentation, and potential in-combinations effects could not be ruled out for the Glengarriff Harbour and Woodlands SAC and therefore further assessment is required for this Natura 2000 site.

The focus of this NIS is to determine whether the proposed development will have a significant negative impact on the qualifying features (i.e. features of interest of the Natura 2000 site or reason for designation) of this Natura 2000 site.

This NIS identifies the environmental aspects of the project which may lead to significant impacts, and which may interact with the ecological requirements or sensitivities of the qualifying features of the Natura 2000 site listed in **Section 3.6** above. These aspects are primarily related to marine water quality, species disturbance and/or displacement impacts, potential impacts arising from invasive species and potential in-combinations effects associated with the proposed dredging operations. The test of the assessment is whether the project will have 'an adverse effect on the integrity of the site'. Where potentially significant effects are identified, proven mitigation measures will be recommended.

4 DESCRIPTION OF THE PROJECT

4.1 BRIEF PROJECT DESCRIPTION, PURPOSE AND SITE LOCATION

Glengarriff Pier is located in Glengarriff Harbour just outside the village of Glengarriff on the Beara Peninsula in County Cork. The subject site is located approximately 75km west of Cork City and approximately 10km north of Bantry. The pier is accessed by a local road off the N71 national road heading east out of the village (see **Figure 3** below).

Figure 3. Location of Glengarriff Pier and Pontoon (Source: https://www.bing.com/maps/aerial accessed 09/08/2019)

Glengarriff pontoon is located adjacent to Glengarriff Pier. It is used by leisure and commercial users including passenger ferries to Garinish Island. The pontoon itself is connected via a walkway to Glengarriff Pier. The pontoon grounds and twists at low tide. Proposed dredging works aim to stop the current grounding and twisting and increase the amenity value of the pontoon. Proposed works include:

- The removal and replacement of the pontoon
- Disconnection and reconnection of power and water supplies to the pontoon
- Dredging of material at the location of the pontoon and the area immediately adjacent to a depth of -5.0mODM (proposed dredge footprint is approx. 815m^2)
- Disposal of dredged to an off-site licenced waste facility.

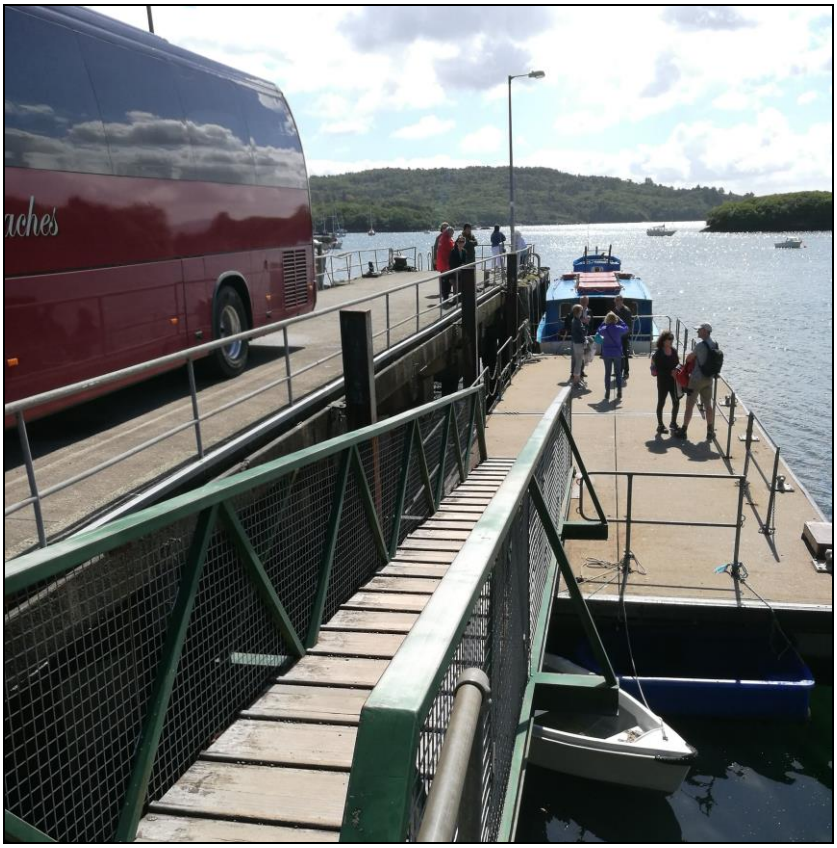

Plate 1. View of pontoon looking south-east from the gangway at Glengarriff Pier

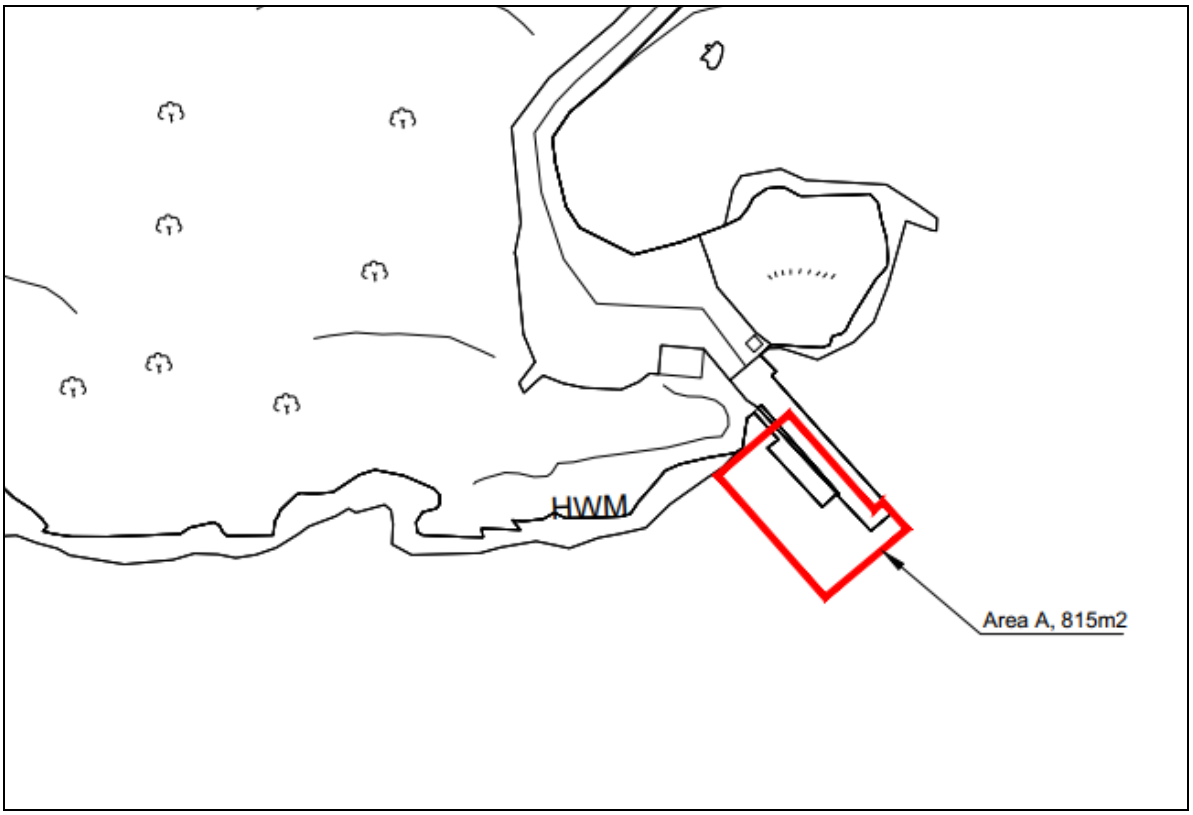

Figure 4. Glengarriff Pontoon approximate dredge footprint

4.2 DESCRIPTION OF THE SITE

The proposed site of works is situated just outside the village of Glengarriff on the south coast of County Cork. Glengarriff is a coastal tourist centre, located on the N71 National Route between Kenmare and Bantry, overlooking the cove of Glengarriff Harbour. The harbour is comprised of approximately 4km^2 of sheltered waters set back from the more exposed coastal waters of Bantry Bay.

The subject area is located within the Electoral Division (ED) of Kilcaskan (CSO Area Code ED 18041). CSO data indicates that, in 2016, this ED had a total population of 755 person's resident[1]. The proposed site of works is situated in the townland of Monteensudder. Bedrock at the location and throughout the surrounding area is classified as 'Purple & Green Sandstone & Siltstone'. Soil type on the landward side of the pier is classified as 'Rock' and 'Peat'. The dominant Corine Landcover Category (2018) around Glengarriff Harbour in the general surrounding area is 'Broad-leaved forests' with 'Peat bogs' also occurring on the headland to the south-west of the pier.

Compliance with the reporting requirements of the Water Framework Directive (Directive 2000/60/EC) obliges each Member State to publish reports providing summary information about individual water bodies relating to their status, risks and objectives. Within this reporting framework, the site is located adjacent to the 'Glengarriff_SC_010' sub-catchment. Glengarriff Pier and pontoon is located within Glengarriff Harbour, which has a Transitional Waterbody WFD Status 2010-2015 of 'Unassigned'. Glengarriff Harbour has been assigned a Transitional Waterbodies Risk category of 'not at risk' and Transitional Water Quality 2010-2012 of 'Unpolluted'[2]. Glengarriff Harbour is designated as 'surface waters in shellfish areas' (IE_SW_170_0400)'. Further out from the harbour, 'Outer Bantry Bay' has been assigned a Coastal Waterbody WFD status of 'High'.

A review of species records held by the NBDC for the general area, including from the National Invasive Species Database, determined that records for both giant knotweed (*Fallopia sachalinensis*) and Himalayan knotweed (*Persicaria wallichii*) exist in the vicinity of the junction between the pier access road and the N71, approximately 100m north of the proposed works area. There are no other records for non-native species (terrestrial or marine) available for the area.

4.2.1 Site Investigation Survey including Bathymetric and Topographic Survey

The bathymetry survey conducted by Hydrographic Services Ltd. indicates that depths recorded in the vicinity of the pier and pontoon ranged from approximately -2.1ODM (eastern side of the pier) to approximately -4.3ODM (western side of the pier) (Hydrographic Surveys Ltd.).

Figure 5 below outlines the results of chemical analysis of the three surface-sediment grab samples taken within the proposal area.

[1] http://census.cso.ie [accessed 19/08/19]

[2] https://gis.epa.ie/EPAMaps/ [accessed 19/08/19]

Client: Priority Geotechnical Ltd			**Chemtest Job No.:**		18-35374	18-35374	18-35374
Quotation No.:			**Chemtest Sample ID.:**		723347	723348	723349
			Sample Location:		G1	G2	G3
			Sample Type:		SOIL	SOIL	SOIL
			Date Sampled:		31-Oct-2018	31-Oct-2018	31-Oct-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	51	65	58
Arsenic	U	2450	mg/kg	1.0	23	15	17
Barium	U	2450	mg/kg	10	36	16	17
Cadmium	U	2450	mg/kg	0.10	0.67	0.93	1.1
Chromium	U	2450	mg/kg	1.0	32	34	36
Molybdenum	U	2450	mg/kg	2.0	5.6	14	16
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0
Copper	U	2450	mg/kg	0.50	200	44	52
Mercury	U	2450	mg/kg	0.10	0.19	0.15	0.18
Nickel	U	2450	mg/kg	0.50	32	29	32
Lead	U	2450	mg/kg	0.50	49	27	34
Selenium	U	2450	mg/kg	0.20	1.2	2.5	3.0
Zinc	U	2450	mg/kg	0.50	330	210	210
Mineral Oil	N	2670	mg/kg	10	84	< 10	< 10
Total TPH >C5-C40	N	2670	mg/kg	10	120	< 10	< 10
Dibutyl Tin	N	2730	µg/kg	10	< 10	< 10	< 10
Tributyl Tin	N	2730	µg/kg	10	< 10	< 10	< 10

Figure 5. Results of chemical analysis of surface sediment grab samples (G1, G2 and G3) (Hydrographic Surveys Ltd.)

4.2.2 Terrestrial Ecological Surveys

No otters were observed during the course of the otter survey carried out on-site in April 2019. While not unexpected as otters are mainly active during dusk and nighttime, a desk-top study determined that there have been a number of sightings of live otter in inner Glengarriff Harbour. Additionally, a sighting of an otter was made east of Bush Island during a bird survey for Malachy Walsh and Partners on 28th January 2019. The otter survey yielded abundant evidence of otter activity across the study area.

One potential holt was recorded on the shoreline at the eastern end of the study area near 'Bamboo Park', approximately 270m north-east of the pier on the opposite side of the harbour. This feature consisted of a tunnel into soft sediments overlying the bedrock under a tree. Additional evidence of otter in the form of spraints was also recorded close by. No other holt features were recorded within the study area, including the islets located offshore of the pier, during this survey.

Numerous couches and temporary resting place features were recorded across the study area, including within the vicinity of the pier. In addition, couch and temporary resting place features were recorded on all three islets just offshore of Glengarriff Pier suggesting that these areas are regularly used as feeding and resting areas. Spraints and sprainting sites were frequently recorded within the survey area, often in association with the other features above. Spraints were also found on the pier structure including a large accumulation comprising fish scales, bones and crab fragments on a concrete beam under the main concrete slab of the pier (see **Plate 2** below).

Plate 2. Accumulation of otter spraints recorded on concrete beam of pier structure during otter survey

Based on the results of the otter survey, it is considered that inner Glengarriff Harbour is highly suitable for otter. The evidence suggests that otters are active in all parts of the inner harbour including on the pier with temporary resting places recorded very close to the structure. Landscape features that increase the suitability of the area for otter includes two rivers, the Glengarriff and the Reenmeen West, which enter the bay to the west and east of the pier, respectively. In addition, there is an abundance of suitable foraging habitat and numerous areas for otters to rest and shelter with dense woodland and scrub coming right down to the inter-tidal zone at many locations across the study area and harbour. Furthermore, un-inhabited islets with dense undergrowth located just off-shore of the pier (particularly Friar Island and Bark Island) provide ideal foraging and resting habitat for otters free of disturbance.

During the otter survey, the presence of rhododendron (*Rhododendron ponticum*) was recorded at various locations outside the works footprint in the general area surrounding Glengarriff Pier.

The otter survey summary report, including more detailed survey results, is included in **Appendix 2**.

4.3 CHARACTERISTICS OF THE PROJECT

Table 2 provides a summary of the characteristics of the project. The proposal has been confirmed with the project engineer.

Table 2. Summary of Project Characteristics

Size, scale, area, land-take	Glengarriff pontoon is located adjacent to Glengarriff Pier just outside Glengarriff village. The proposed dredge works will be restricted to the existing pontoon footprint and the immediate surrounding dredge pocket. The total proposed dredge footprint is approximately 815m^2. The proposed works overlap with the Glengarriff Harbour and Woodland SAC (000090). There will be no land-take within the SAC.
Details of physical changes that will take place during the various stages of implementing the proposal	Proposed works include: • The removal and replacement of the pontoon • Disconnection and reconnection of power and water supplies to the pontoon • Dredging of material at the location of the pontoon and the area immediately adjacent to a depth of -5mODM (proposed total dredge footprint is approx. 815m^2) • Disposal of dredged materials to an off-site licenced waste facility. Initial works will require the removal and storage on-site of the existing pontoon. This will be done using a crane or excavator. Dredging works will be carried out by a long reach excavator operating from a barge or from land as necessary. Spoil will be loaded onto trucks and will then be taken off-site to a licenced waste facility. Once dredging works are complete, the barge (if required) and excavator will leave the site. The pontoon, removed at the project commencement, will be returned to its original location.
Description of resource requirements for the construction/operation and decommissioning of the proposal (water resources, construction material, human presence, etc)	The equipment and resources required for the works will include: • Crane for removing and reinstating pontoon • Barge to facilitate dredging, if required • Safety boat • A long-reach excavator • On-site personnel • Trucks: These vehicles would be used to bring construction materials to site and to remove any dredge spoil from site. These vehicles will also be used to relocate the pontoon.
Description of timescale for the various activities that will take place as a result of implementation (including likely start and finish date)	• Proposed works should take approximately 2 weeks in total (including 1 week approx. for set set-up and demobilisation and 1 week approx. for dredging activity) • Likely start date will be dependent on seasonal constraints.
Description of wastes arising and other residues (including quantities) and their disposal	• Dredge spoil will be the only significant waste generated on site. This spoil will be removed from the site and disposed of at a licenced waste facility. • Fuel/oil/lubricants associated with the excavator, truck and barge, if required. • Wastes will not be left on or adjacent to the pier. • All waste will be removed off site to an appropriate licenced waste facility.

Identification of wastes arising and other residues (including quantities) that may be of particular concern in the context of the Natura 2000 network	• A portion of dredge material is considered marginally contaminated. Marine sediment sample parameters that lie within Class 2 include arsenic, cadmium, nickel and zinc. One sample exceeded the upper guidance limit for copper (Class 3). With the exception of arsenic, cadmium, copper, nickel and zinc all other parameters are below the lower Irish action limit within the proposed dredge area. All dredge spoil will be removed from site for disposal at an off-site licenced waste facility. • Fuels and oils will be present which pose a risk to Natura 2000 sites were a fuel spill or oil leak to occur. All fuels/oils will be stored within the temporary site compound.
Description of any additional services required to implement the project or plan, their location and means of construction	• A temporary site compound will be located adjacent to the Glengarriff pier.

4.4 IDENTIFICATION OF OTHER PROJECTS OR PLANS OR ACTIVITIES

4.4.1 Plans

As part of the desktop, current and/or recent plans relevant to the subject site including at county level and local area level were identified. These included:

- Draft Cork County Development Plan 2022 - 2028
- Cobh and West Cork Municipal District Local Area Plan 2017
- North and West Cork Strategic Plan 2002 – 2020

4.4.1.1 EPA Licensed Activities

A search of the EPA's on-line mapping system determined that there are no IPPC, IPC, IEL or waste licensed facilities within a 5km radius of the subject site which encompasses Glengarriff Harbour area[3].

A licensed wastewater treatment plant is located in Glengarriff village (Agglomeration PE of 500 to 1,000) (Licence No. D0471). The existing treatment plant is located 250m west of the pier, between the main road and the shoreline. The treatment process is a primary sedimentation system (septic tank) with a primary emission point located within inner Glengarriff Harbour. The septic tank has a capacity of 209m^3, which equates to a design PE of 1,000. A review of the EPA website determined that in 2020 this plant had an agglomeration PE of 802. The current compliance status of this plant is not available on the EPA website. The Water Services Authority (WSA) has plans for a proposed new WWTP which will cater for a population equivalence of 2,500[4].

4.4.1.2 Current/Outstanding Grants of Planning Permission

There are several townlands surrounding inner Glengarriff Harbour, taken to comprise the harbour area inside Garinish Island. On the basis of the minor scale of the proposed works, it is considered that other proposed or permitted developments in this area of the harbour are the most likely to have the potential to interact with the proposed pontoon works via potential in-combination water quality effects.

[3] EPA Maps [accessed 18/02/2022]

[4] http://www.epa.ie/licences/lic_eDMS/090151b2804f35a8.pdf [accessed 19/08/2019]

A search of current planning applications (within the last 5 years) within these townlands of Monteensudder (within which the subject site is located), Reenmeen West, Reenmeen East, Dromgarriff, Cappyaughna, Shrone and Inchintaggart was carried out using the Cork County Council online planning system. This search determined that there are 23 granted/outstanding planning applications mainly relating to the construction and/or alteration of residential dwellings, retention permission applications, alteration of a commercial premises and renovation and refurbishment works to Glengarriff Castle to comprise a residential dwelling including installation of a wastewater treatment plant[5].

4.4.1.3 Local Surrounding Land-use/Other On-going Activities within Glengarriff Harbour

Glengarriff Pier is located within the village of Glengarriff. The pier is the base for a number of leisure and commercial vessels including passenger ferries to Garinish Island. There is a possibility that leisure/commercial boat activity and other on-going pier operations may occur at the same time as the proposed works. A shellfish fishery operates within the greater harbour area.

With regard to land-use in the general Glengarriff Harbour area, some low-intensity agriculture occurs; however, agriculture is not a dominant feature of the surrounding landscape. Other land-use comprise amenity and recreational activities such as local sports grounds and Glengarriff Golf Club which is located on the eastern side of the harbour.

In light of the characteristics of the subject site and its surrounds as outlined in **Section 4.2** above, and considering the size and scale of the proposal as outlined in **Section 4.3** above, it is concluded that wastewater treatment, existing pier operations and to a lesser extent aquaculture, agriculture and amenity land-use in the area comprise the activities with the most potential to cause or initiate point or diffuse pollution sources, with which the proposed works could interact synergistically to create cumulative or in-combination water quality and/or species disturbance or displacement impacts. There is potential for interaction between the aforementioned activities and the proposal, therefore the potential for in-combination effects on the receiving environment must be assessed. This aspect will be considered in **Section 5.3** below.

5 IDENTIFICATION OF NATURA 2000 SITES

5.1 NATURA 2000 SITES

It has been concluded during the screening stage that the proposed works may potentially impact on one Natura 2000 site located within 15km of the proposal site, namely:

- Glengarriff Harbour and Woodland SAC (000090)

When Natura 2000 sites are selected for stage 2 assessment, then all the qualifying features of conservation interest must be included in that stage of the assessment. However, when assessing impact, qualifying features are only considered relevant where a credible or tangible source-pathway-receptor link exists between the proposed development and a protected species or habitat type. In order for an impact to occur there must be a risk initiated by having a 'source' (e.g. dredging activity), a 'receptor' (e.g. a protected species or habitat), and an impact pathway between the source and the receptor (e.g. a waterbody). Identifying a risk that could, in theory, cause an impact

[5] http://maps.corkcoco.ie/planningenquiryv3/MainFrames.aspx [accessed 19/08/2019]

does not automatically mean that the risk event will occur, or that it will cause or create an adverse impact. However, identification of the risk does mean that there is a latent possibility of ecological or environmental damage occurring, with the level and significance of the impact depending upon the nature of the risk, the extent of the exposure to the risk and the characteristics of the receptor.

Therefore, bearing in mind the scope, scale, nature and size of the project, its location relative to the distribution of the species and habitats listed and the degree of connectedness that exists between the project and the potential receptors, it is considered that not all of them are within the likely zone of impact of the proposal. An evaluation based on these factors to determine which species and habitats are the plausible ecological receptors for potential impacts of the unmitigated proposal has been conducted in **Section 4.4.1.2** below**.** This evaluation has determined that certain QIs (listed in **Table 3** below) should be selected for further assessment as plausible ecological receptors.

5.1.1 Glengarriff Harbour & Woodlands SAC (000090)

5.1.1.1 Description of the Natura 2000 Site

Located to the south and north-west of Glengarriff Village in west Cork, this site consists of a glacial valley opening out into a sheltered bay with rocky islets. The valley contains old oak woodland and alluvial forest. The underlying rock of the area is Old Red Sandstone, with the soil varying from acid brown earths to alluvial brown earths and peat (NPWS, 2013).

Glengarriff woodland consists of a sizeable area of broadleaved semi-natural woodland comprised of oak (*Quercus* sp.) and Holly (*Ilex aquifolium*), with much Downy Birch (*Betula pubescens*) and Rowan (*Sorbus aucuparia*). Wet woodland occurs along parts of the Canrooska and Glengarriff rivers. This is dominated by willows (mainly *Salix cinerea* subsp. *oleifolia*) and Downy Birch, with Alder (*Alnus glutinosa*) also frequent. In addition to the woodlands, the harbour is of great interest. This sheltered inlet of Bantry Bay has a rocky shore vegetated with brown seaweeds. The inlet also features rocky islets. Overall, the site supports a diversity of fauna.

The rocky islets in the harbour support the largest colony of Common Seals (*Phoca vitulina*) in the south-west of Ireland (maximum count of 151 in the all-Ireland survey of 2003). This legally protected species is listed on Annex II of the E.U. Habitats Directive. Summer roosts for Lesser Horseshoe Bat (*Rhinolophus hipposideros*), also an Annex II species, have been found in three buildings within the SAC boundary. Bats have also been confirmed hibernating in one of the buildings. This site is of international importance for both summer roosting and hibernating Lesser Horseshoe Bats. Given the combination of winter, summer and foraging sites, the site is one of the most important for the species in the south-west. The woods, and the river flowing through it, are home to a range of other mammal species, including Otter (*Lutra lutra*) (listed in Annex II of the E.U. Habitats Directive). Kerry Slug (*Geomalacus maculosus*), a legally protected species listed on Annex II of the E.U. Habitats Directive, also occurs within the site.

The harbour supports mariculture (rope grown mussels) and tourism industries (boats visiting Garinish Island). Neither activity appears to have affected seal numbers, although increased disturbance may pose a threat. This site is of importance because it is the only sizeable area of old oak woodland remaining in west Cork and is considered second only to Killarney as an example of Oceanic Sessile Oak/Holly woodlands. Furthermore, the site supports populations of a number of animal species listed on Annex II of the Habitats Directive (NPWS, 2013).

Conservation objectives for Glengarrif Harbour and Woodlands SAC were obtained from the following source:

NPWS (2015) Conservation Objectives: Glengarriff Harbour and Woodland SAC 000090. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

5.1.1.2 Identification of Potential for Significant Effects to Qualifying Features

The following table **(Table 3)** lists the qualifying features of the Glengarriff Harbour and Woodland SAC and evaluates through a scientific examination of evidence and data whether or not these features should or should not be selected for further assessment in the NIS. The qualifying features that are selected for further assessment are discussed further in the section followed by an assessment of potentially significant effects arising from the proposal.

Table 3. Qualifying features of Glengarriff Harbour & Woodlands SAC selected for further assessment – Source: NPWS (2015) Conservation Objectives: Glengarriff Harbour and Woodland SAC 000090. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Qualifying Feature	Potential for Effects	Rationale
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	*Yes*	• No spatial overlap with this habitat therefore no potential for direct habitat impacts. • However, works will take place within the SAC and invasive terrestrial plant species are known to occur outside but in close proximity to the proposed works area. • Construction activity (use/movement of plant) has potential to result in the introduction and/or spread of invasive species. • Precautionary principal.
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]	*Yes*	• No spatial overlap with this habitat therefore no potential for direct habitat impacts. • However, works will take place within the SAC and invasive terrestrial plant species are known to occur outside but in close proximity to the proposed works area. • Construction activity (use/movement of plant) has potential to result in the introduction and/or spread of invasive species. • Precautionary principal.
Geomalacus maculosus (Kerry Slug) [1024]	*No*	• Nature and location of the works (dredging in marine zone) • Habitats at proposal site not suitable for this terrestrial species • No potential for significant disturbance or displacement effects
Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303]	*No*	• Nature and location of the works (dredging in marine zone) • Small scale of the works • Works will be restricted to daytime hours • No potential for significant disturbance or

Qualifying Feature	Potential for Effects	Rationale
		displacement effects
Lutra lutra (Otter) [1355]	*Yes*	• Habitats at and within the vicinity of the proposal site are suitable for otter • Previous species records and otter survey results indicate that otter are active in the vicinity of the proposed works • Potential exists for direct/indirect disturbance/displacement impacts to otter during the works
Phoca vitulina (Harbour Seal) [1365]	*Yes*	• Habitats at and within the vicinity of the proposal site are suitable for harbour seal • Previous species records for harbour seal in the vicinity of Glengarriff Pier • Potential exists for direct/indirect disturbance/displacement impacts to harbour seal during the works

5.1.1.3 Qualifying Features Selected for Further Assessment

5.1.1.3.1 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]

This habitat-type is defined in the interpretation manual of EU habitats as 'acidophilous *Quercus petraea* woods with low, low-branched trees with many ferns, mosses, lichens and evergreen bushes.' (EC, 2013). A review of the Conservation Objectives for the SAC determined that the SAC encompasses a substantial area of this Annex I woodland type. A total area of 127.5Ha of this habitat-type has been mapped within the SAC in the Glengarriff Woods Nature Reserve as part of the National Survey of Native Woodlands (NSNW) (Perrin et al., 2008). The closest mapped area of this habitat-type to Glengarriff Pier is located approximately 0.9km to the west of the pier (see **Figure 6**). The full extent of this habitat-type within the SAC has not been mapped and it occurs elsewhere within the site (NPWS, 2015). Co

The conservation objective for the Glengarriff Harbour and Woodland SAC in relation to 'Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles' is to maintain the favourable conservation condition of the habitat, as defined by specific attributes and targets (see **Table 4**) (NPWS, 2015). The latest overall assessment of conservation status for this habitat is 'Bad' (NPWS, 2019).

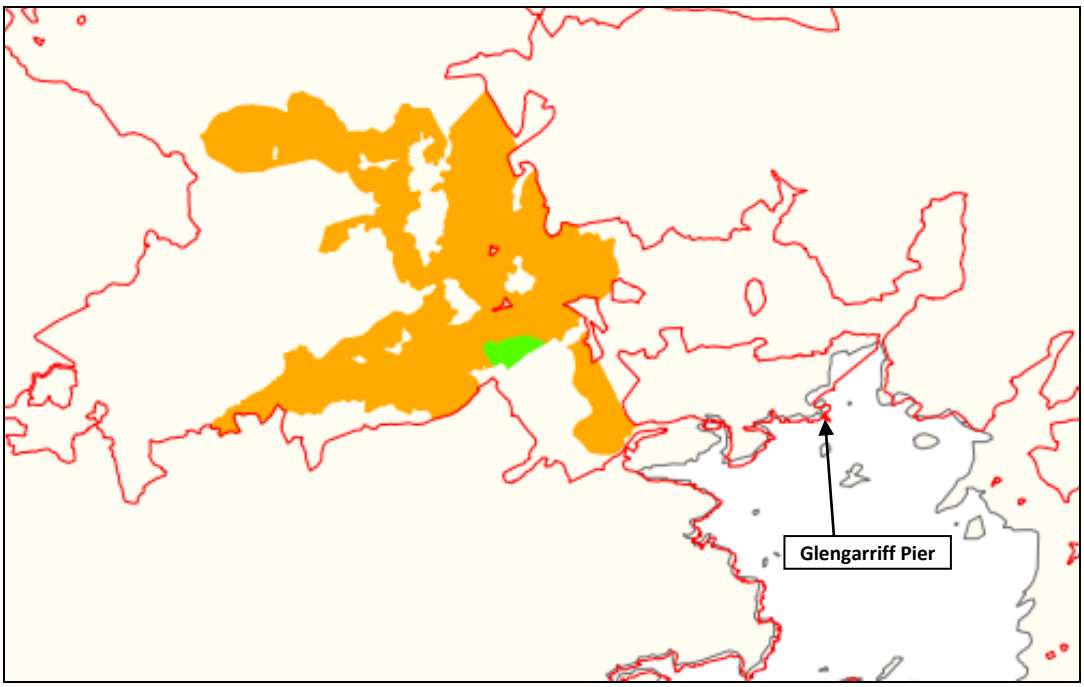

Figure 6. Mapped extent of old oak woodland within the Glengarriff Harbour and Woodland SAC (NPWS, 2015)

Table 4. Specific conservation objective Attributes and Targets for old oak woodlands in Glengarriff Harbour and Woodland SAC (000090)

Attribute	Measure	Target
Habitat area	Hectares	Area stable or increasing, subject to natural processes.
Habitat distribution	Occurrence	No decline.
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and “small” woods at least 3ha in size.
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi mature trees and shrubs; and well-developed herb layer.
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types.
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy
Woodland structure: dead wood	m^3 per hectare; number per hectare	At least $30m^3$/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter
Woodland structure: veteran trees	Number per hectare	No decline
Woodland structure:	Occurrence	No decline

Attribute	Measure	Target
indicators of local distinctiveness		
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including oak (*Quercus petraea*) and birch (*Betula pubescens*
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control

5.1.1.3.2 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]

Alluvial forests are typically dominated by alder (*A. glutinosa*) and ash (*F. excelsior*), often with willows (*Salix* sp.) and sometimes pedunculate oak (*Quercus robur*) and are distributed along rivers and on lake shores. This habitat-type is an EU priority Annex I habitat. This habitat occurs on heavy soils which are periodically inundated by the annual rise in river levels, but which are otherwise well-drained and aerated during low water levels. Gallery forests of willows can occur along river channels and occasionally on river islands where tree roots are almost continuously submerged (NPWS, 2019).

The extent of this habitat within the SAC has not been calculated. It is described as being present in the vicinity of the confluence of the Canrooska and Glengarriff rivers and along a stretch of the Coomarkane River (NPWS, 2015). There are no watercourses, and thus potentially suitable areas for this habitat to occur, in the vicinity of Glengarriff Pier. The closest watercourse (Reenmeen West) is located in excess of 0.4km to the east.

The conservation objective for the Glengarriff Harbour and Woodland SAC in relation to 'Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]' is to maintain the favourable conservation condition of the habitat, as defined by specific attributes and targets (see **Table 5**) (NPWS, 2015). The latest overall assessment of conservation status for this habitat is 'Bad' (NPWS, 2019).

Table 5. Specific conservation objective Attributes and Targets for alluvial woodland in Glengarriff Harbour and Woodland SAC (000090)

Attribute	Measure	Target
Habitat area	Hectares	Area stable or increasing, subject to natural processes.
Habitat distribution	Occurrence	No decline.
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size.
Woodland structure: cover and height	Percentage and metres	Diverse structure with a relatively clos canopy containing mature trees; subcanopy layer with semi mature tre

Attribute	Measure	Target
		and shrubs; and well-developed herb layer.
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types.
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes occur in adequate proportions to ensure survival of woodland canopy
Hydrological regime: Flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation
Woodland structure: dead wood	m^3 per hectare; number per hectare	At least $30m^3$/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)
Woodland structure: veteran trees	Number per hectare	No decline
Woodland structure: indicators of local distinctiveness	Occurrence	No decline
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover not less than 95%
Vegetation composition: typical species	Occurrence	A variety of typical native species present, depending on woodland type, including alder (*Alnus glutinosa*), willows (*Salix* spp.), ash (*Fraxinus excelsior*) and birch (*Betula pubescens*)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control

5.1.1.3.3 Otter (*Lutra lutra*)

Otter are widespread in Ireland throughout freshwater and coastal habitats with their preferred habitat including good vegetation cover. Otters are largely solitary animals, occurring at low population densities. They are highly territorial towards members of the same sex, so although this means ranges of males and females can overlap; it has implications for the number of otters which will potentially occupy a given stretch of waterway. Home ranges can comprise 20km of watercourse for females and in excess of 32km for males. A key requirement of potential territory is a sufficient source of prey. Otters feed primarily on fish and the amount of time spent in different parts of their home-range is related to the abundance of prey.

Otters are mainly nocturnal creatures and so require safe refuges, known as holts, in which to rest during the day. These holts are the main den sites and are often situated underground along a river bank or under tree roots. An otter's territory will typically contain several holts as well as temporary resting sites, known as couches. These are above-ground lying-up areas concealed within vegetation and often linked to a nearby watercourse by a regularly used track. Therefore, the presence of

freshwater, a sufficient prey-base and suitable sites for holts/couches are key factors in determining otter distribution. In Ireland the latest overall assessment of conservation status for this species is 'Favourable' (NPWS, 2019b).

The conservation objective for the Glengarriff Harbour and Woodland SAC in relation to otter is to maintain the species favourable conservation condition, as defined by specific attributes and targets. **Figure 6** below shows the extent of otter commuting habitat within Glengarriff Harbour as per Conservation Objective mapping for the SAC.

Table 4 below outlines the attributes and targets for otter based on the conservation objectives which have been prepared for Glengarriff Harbour and Woodland SAC (NPWS, 2015).

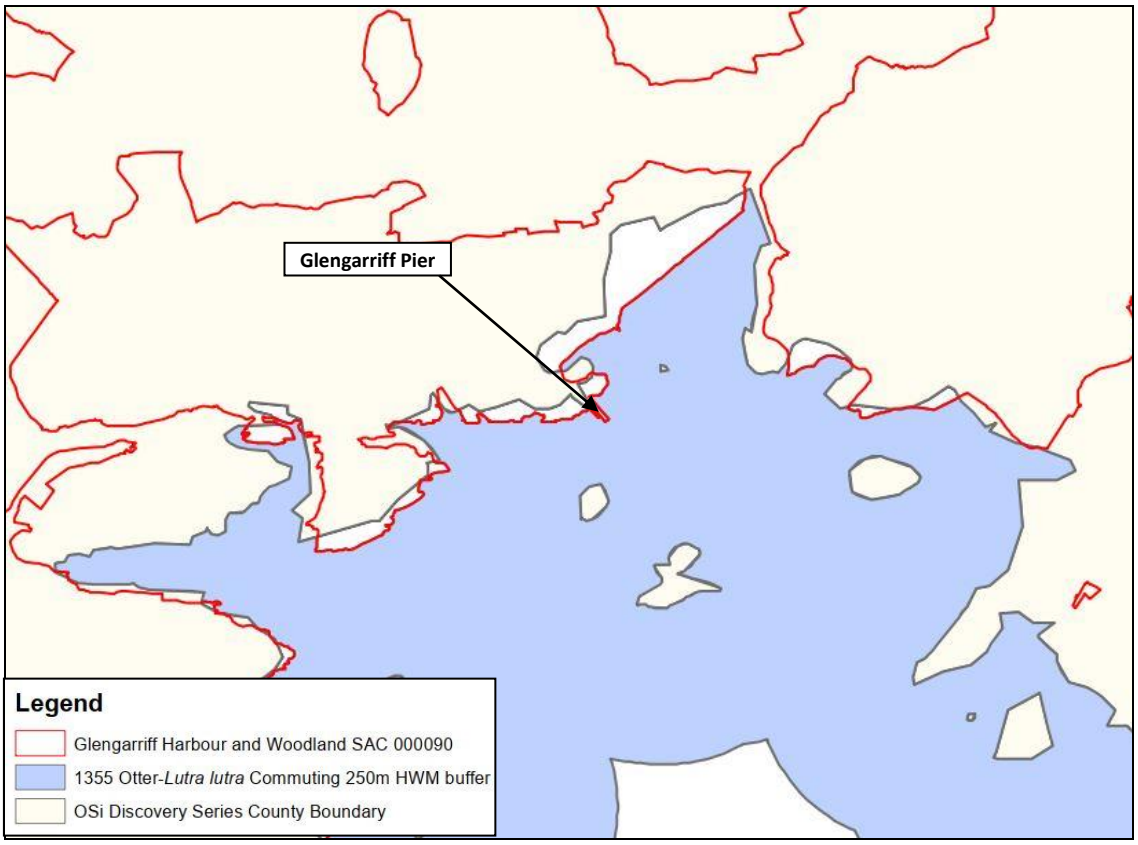

Figure 7. Extent of otter commuting habitat within the vicinity of Glengarriff Pier in the Glengarriff Harbour and Woodland SAC (NPWS, 2015)

Table 6. Specific conservation objective Attributes and Targets for otter in Glengarriff Harbour and Woodland SAC (000090)

Attribute	Measure	Target
Distribution	Percentage positive survey sites	No significant decline
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 56ha
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 137ha
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped a calculated as 23.5km
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 2ha
Couching sites and holts	Number	No significant decline

Attribute	Measure	Target
Fish biomass available	Kilograms	No significant decline
Barriers to connectivity	Number	No significant increase.

The most recent assessment for this species determined that the 10km grid square, V95, in which the proposed development is located, is included within the current known range and distribution for this species (NPWS, 2019b). A review of otter records held by the NBDC and available on-line determined that there are several records for otter within the vicinity of Glengarriff Pier. These relate to sightings of live animals[6]. During an otter survey conducted within inner Glengarriff Harbour in support of this application, abundant evidence of otter activity was found in the vicinity of the pontoon, the surrounding shoreline and nearby off-shore islands. Based on this evidence otter are likely to occur in the vicinity of the works and so could be susceptible to direct/indirect disturbance/displacement impacts as a result of the proposal.

5.1.1.3.4 Harbour Seal (*Phoca vitulina*)

Harbour seals can be found in both in-shore and off-shore waters. In Ireland, the species distribution is concentrated mainly along the west coast, although some areas along the south and east coast are also included. Harbour seals, also known as common seals, are associated with sheltered bays and coastline as well as estuaries. They occupy traditional 'haul-out' sites, typically inter-tidal areas, for resting, moulting, breeding and other social activities. The breeding season of harbour seal commences in May and lasts until approximately July (NPWS, 2019b). Seals rely on sound to navigate, communicate and interpret sensory cues. Seals hearing ranges from 75Hz to 75kHz in water and 75Hz to 30kHz out of water (DAHG, 2014). During the most recent assessment of conservation status for Ireland's species, the overall assessment for harbour seal was found to be 'Favourable' (NPWS, 2019b).

Glengarriff Harbour is a very important site for harbour seals with the SAC encompassing several resting, breeding and moulting sites within its boundary. Heardman et al. (2006) as cited in Berrow (2019) carried out a review of survey data from Glengarriff Harbour over the period 1985 to 2004 and reported peak counts of between 135 and 403 individuals. There has been a significant increase in harbour seal counts over this period with most seals hauled out to the east of Garinish Island and on rocks close to the eastern and western shores of the outer harbour (Heardman et al., 2006 as cited in Berrow, 2019). Seals occurred throughout the year with peak counts always recorded between August and September. Harbour seal pups occurred in June and July. Harbour seals are also frequently recorded hauled out outside the harbour throughout inner Bantry Bay (Cronin et al., 2004 as cited in Berrow, 2019). Harbour seals have the potential to occur in the vicinity of the works and so could be susceptible to direct/indirect disturbance/displacement impacts as a result of the proposal.

The conservation objective for the Glengarriff Harbour and Woodland SAC in relation to harbour seal is to maintain the species favourable conservation condition, as defined by specific attributes and targets (NPWS, 2015). **Figure 7** below shows the extent of harbour seal habitat, including breeding, resting and moulting sites within the vicinity of Glengarriff Pier in Glengarriff Harbour and Woodland SAC.

[6] https://maps.biodiversityireland.ie/Map [accessed 19/08/2019]

Table 5 below outlines the attributes and targets for harbour seal based on the conservation objectives which have been prepared for Glengarriff Harbour and Woodland SAC (NPWS, 2015).

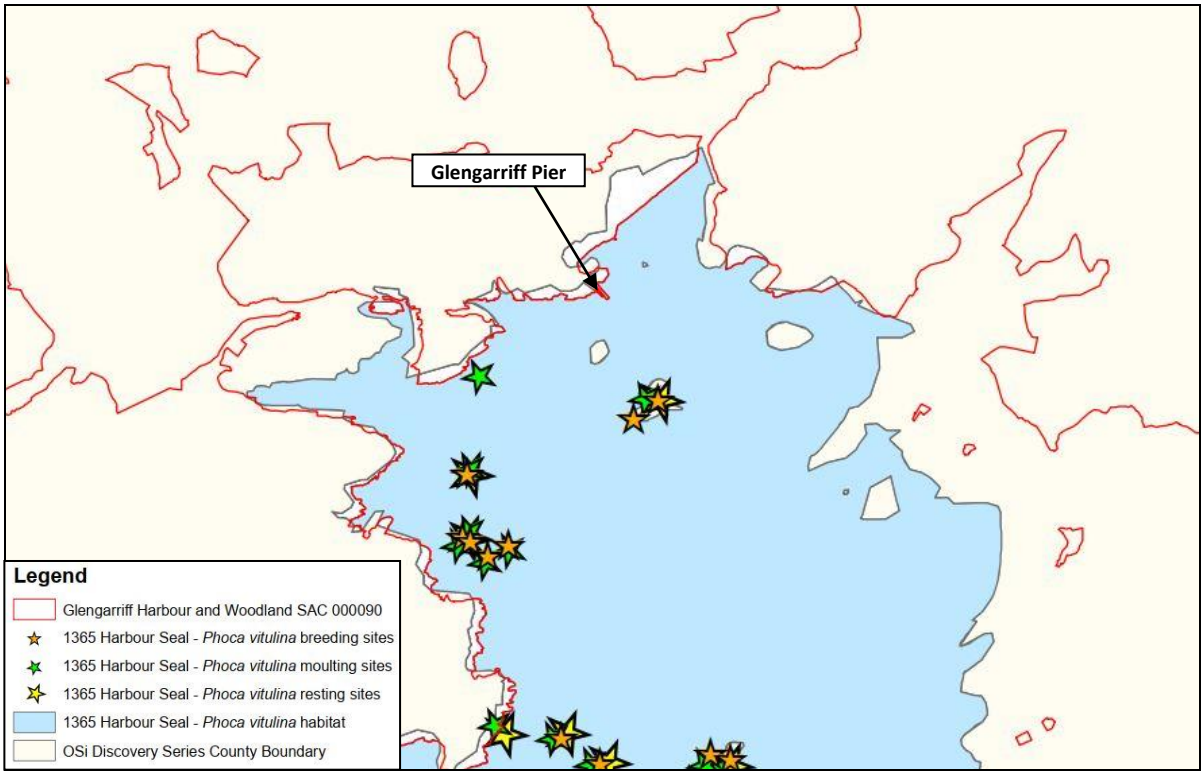

Figure 8. Extent of harbour seal habitat, including breeding, resting and moulting sites within the vicinity of Glengarriff Pier in Glengarriff Harbour and Woodland SAC (NPWS, 2015).

Table 7. Specific conservation objective Attributes and Targets for harbour seal in Glengarriff Harbour and Woodland SAC (000090)

Attribute	Measure	Target
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use
Breeding behaviour	Breeding sites	The breeding sites should be maintained in a natural condition
Moulting behaviour	Moult haul-out sites	The moult haul-out sites should be maintained in a natural condition
Resting behaviour	Resting haul-out sites	The resting haul-out sites should be maintained in a natural condition
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the harbour seal population at the site

6 ASSESSMENT OF POTENTIALLY SIGNIFICANT IMPACTS

This section considers the habitats and species identified in the preceding section together with any potential impacts and determines whether the proposed works are likely to adversely affect the integrity of the Glengarriff Harbour and Woodland SAC. There follows an evaluation of significance of potential impacts of the proposed project on the qualifying features that have been selected for impact assessment.

The likelihood of adverse effects from the project was determined based on a number of indicators including:

- Habitat loss and/or alteration
- Water quality
- Disturbance and/or displacement of species
- Habitat or species fragmentation

The likelihood of significant in-combination effects is assessed in **Section 5.3** below.

6.1 WATER QUALITY

There are several aspects of the proposal which could potentially result in impairment of marine water quality within the Glengarriff Harbour and Woodland SAC. Potential water quality effects arising as a result of the proposal include increases in the volume of sediment suspended in the water column, resulting in increased turbidity and sedimentation, and an increased risk of release of contaminants into the marine environment from either benthic sediments or anthropogenic sources. These impacts are considered to have the most potential to occur during dredging activity. Use of a barge, if required, and long-reach excavator within the marine waters of the SAC also poses a risk of introduction of invasive marine species to the area.

Dredging of the seabed (approx. dredge footprint 815m^2) in the immediate vicinity of the pontoon will be carried out by a long-reach excavator operating from either a barge or from land. Spoil removed will be transported to a waiting truck for removal off-site. Disturbance and removal of the bed during dredging activity will result in an increase in suspended sediment concentration and turbidity in the general area. There is also the potential for accidental spillage of material while being transported to the truck. Any sediment which does become re-suspended into the water column through these activities will eventually settle out resulting in sedimentation in either the general area or potentially elsewhere due to dispersion as a result of natural tidal processes within the area.

With regards to re-suspension of material during dredging activity, it is estimated that a relatively low percentage volume of sediment will be lost to the water column given the small scale and nature of the works. While dredging will result in an increase in turbidity levels this impact will be temporary and is expected to be localised to the dredge pocket and surrounding area. It is predicted that the greatest increase in suspended sediment concentration will occur in the immediate vicinity of the proposed dredge area. Some of this re-suspended material may move with currents eventually settling out within the surrounding estuary. Concentrations of suspended sediment are expected to lower significantly with distance from the dredging operation as material naturally settles out.

In summary, the works will result in localised disturbance of sediment on the seabed within the vicinity of the pontoon as a result of dredging activity. Any sediment which does become re-suspended during dredging or transfer to the trucks will either settle out in the area of the pier or will disperse on the ebbing tide eventually settling out of suspension.

Disturbance of the seabed during dredging has the potential to result in the release of contaminants or harmful substances from substrates, particularly silts and clays, to the aquatic environment. Mobilisation of chemicals/toxins previously deposited on the seafloor and released into the water column via disturbance (dredging) can have negative consequences for water quality and marine ecosystems. According to Cronin *et al.* (2006), marine sediments are not, in themselves, polluting substances. Rather, they can be a sink for contaminants that end up in harbours and ports mainly from anthropogenic sources such as sewage discharges, marine traffic, industrial wastewater and historically poor environmental management (Cronin *et al.* 2006).

There are no current or historic heavy industries, boat building or repair activities associated with Glengarriff Pier. The principal sources of pollutants at the site would potentially be hydrocarbons associated with vessels, machinery and equipment. The substances that are considered of most concern for the marine environment are those with combined properties of persistence, toxicity and liability to bio-accumulate (PTB). Typically, the most important contaminants associated with dredged material from a water quality perspective include organotin compounds, heavy metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) and oils. The Marine Institute (MI) provide Upper and Lower action levels to assess the suitability of sediments for disposal at sea. These values do not apply directly in this case given that dredged material will be removed to an off-site facility. However, they can provide some indication of the level of contamination that is acceptable in the small-scale dispersal of secondary sediment.

With regards to the potential release of contaminants from sediments into the surrounding environment, it is noted that the material to be dredged has been determined, following sampling, to be marginally contaminated with arsenic, cadmium, nickel and zinc. One of the sampling stations was heavily contaminated with copper.

Arsenic values were between the lower and upper guidance levels at all stations ranging from 17mg/kg to 23mg/kg. None of the sampling stations exceeded the upper Irish action level for arsenic of 70mg/kg. Arsenic can occur naturally within bedrock; therefore, sediments within the dredge site are not considered to pose any risk of significant adverse effects to marine water quality. Cadmium exceeded the lower Irish action level of 0.7mg/kg at two of the three sampling stations. None of the sampling stations exceeded the upper Irish action level for cadmium of 4.2mg/kg. Nickel exceeded the lower Irish action level of 21mg/kg at all three sampling stations. None of the sampling stations exceeded the upper Irish action level for nickel of 60mg/kg. Zinc exceeded the lower Irish action level of 160mg/kg at all three sampling stations. None of the sampling stations exceeded the upper Irish action level for zinc of 410mg/kg. Copper values exceeded the lower guidance level of 40mg/kg at two of the three sampling stations. Cooper exceeded the upper guidance level of 110mg/kg at one sampling station (G1) (Hydrographic Surveys Ltd.).

In summary, the majority of the parameters tested in the three samples were not found to exceed the lower guidance limits set by the Marine Institute (MI) for disposal at sea. Sediment sampled from

stations G2 and G3 did however exceed the lower guidance limits for arsenic, cadmium, nickel and zinc. Based on these results the sediments sampled from G2 and G3 can be considered Class 2 sediments. Class 2 sediments hold contaminant concentrations between Level 1 and Level 2 and are considered marginally contaminated (Cronin *et al*., 2006).

Sediment sampled from station G1 exceeded the MI lower guidance limits for arsenic, nickel and zinc. This sample also exceeded the upper Irish action limit for copper. Based on the results the sediment sampled from station G1 can be considered Class 3 sediment. Class 3 sediments hold contaminant concentrations between Level 2 and Level 3 and are considered heavily contaminated (Cronin *et al*., 2006) with regards to disposal of dredge spoil at sea.

In relation to the potential for impairment of marine water quality as a result of release of contaminants from sediments it is noted that all dredge spoil is to be removed and transported off-site for disposal at a licenced waste facility. There will be no disposal of dredge spoil within Glengarriff Harbour or within the boundary of the Glengarriff Harbour and Woodland SAC.

With regards to fuels/oils, the presence of a barge, if used, will increase the risk of fuel/oil spill into surrounding waters were an accidental spillage to occur. Similarly, the use of a long-reach excavator and trucks within/in close proximity to the marine zone could potentially lead to pollution of the aquatic environment and subsequent adverse impacts to qualifying features.

With regard to use of the equipment and a barge, if required, standard best construction practice guidelines will be adhered to such that the risk posed by such substances to the marine environment is minimised. It is noted that any fuel/oils will be securely stored in the temporary site compound and there will be no re-fuelling of machinery within the marine zone. In the normal course of events, significant fuel leaks are not a common occurrence. Given the minor scale and the temporary duration of the works, the risk of pollution of marine waters with fuel or oils from the project which could result in significant water quality impacts within the SAC is considered low. However, mitigation in relation to use of fuels is recommended on a precautionary basis with regard to protection of marine water quality within the SAC.

With regard to invasive species, vessel movements in marine and estuarine systems are the primary pathway to transport marine species to areas outside of their natural range, via the primary vectors of water held on and within vessel compartments (ballast water, bilge water etc.) and external and internal biofouling (hulls, internal niches and vessel equipment)[7]. Use of a barge, if required, and an excavator within the marine zone of the SAC introduces the potential risk of introduction of marine invasive species into the area in the absence of suitable controls and preventative measures. This poses a risk to marine water quality.

In Ireland, a number of marine invasive species of concern have been identified including species which are already established or are considered to have the potential to become established. Some of these species are known to produce chemicals/toxins which affect local water quality with implications for other marine species[8].

[7] https://reabic.net/journals/mbi/2019/4/MBI_2019_Cunningham_etal.pdf (Accessed 21/02/2022)

[8] http://invasivespeciesireland.com/species-accounts/established/marine/didemnum-spp (Accessed 22/02/2022)

Due to the nature of the works and the location within the Glengarriff Harbour and Woodland SAC, mitigation measures in relation to biosecurity and invasive species are recommended in **Section 7** below.

With regard to the operational phase of the project, the proposed works are being undertaken to prevent the pontoon from twisting and grounding at low tide and improve the amenity value of the existing structure. Following dredging works, the pontoon will be reinstated to its original location. Existing levels of activity are not expected to significantly increase following re-instatement of the pontoon after the works. Therefore, the proposed works are not considered to have any potential for significant water quality impacts following the construction phase.

Bearing the above factors in mind, significant water quality impacts to the Glengarriff Harbour and Woodland SAC are not expected to occur as a result of the proposal. However, based on the precautionary principle, mitigation measures regarding protection of water quality are recommended and are included in **Section 7** below.

6.2 DISTURBANCE AND/OR DISPLACEMENT OF SPECIES

6.2.1 Harbour Seal (*P. vitulina*)

Glengarriff Harbour and Woodland SAC is designated to protect the breeding and resting places of harbour seal. The main threats to harbour seal, defined as being of medium importance, are fishing and harvesting of aquatic resources and seismic explorations/explosions. Illegal taking of marine fauna, marine water pollution, noise nuisance/pollution, changes in abiotic conditions, marine and freshwater aquaculture and outdoor sports/recreational activities are considered to be of low importance (NPWS, 2019b)

"*Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters*", produced by the DAHG in 2014, has outlined several specific maritime activities that are sources of introduced sound and which potentially pose risks to marine mammals, although in any case sound-producing activities may be variable and case-specific. These activities include dredging, drilling, pile driving, geophysical acoustic surveys and blasting, (DAHG, 2014).

Potentially significant impacts to marine mammals associated with anthropogenic sources of sound underwater in general may include the following, according to the DAHG (2014):

- Physical (Non-auditory):
    - Damage to body tissue
    - Induction of gas embolism or decompression sickness
- Physical (Auditory):
    - Gross damage to ears
    - Permanent threshold shift (PTS) in hearing
    - Temporary threshold shift (TTS) in hearing
- Perceptual:
    - Masking of communication, other biologically important sounds
    - Interference with ability to acoustically interpret environment
- Behavioural:
    - Gross interruption of normal behaviour

  - Behaviour modified
  - Displacement from an area (short or long term)
  - Disruption of social bonds, including mother-young associations
- Chronic/Stress:
  - Increased vulnerability to disease
  - Increased potential for impacts from negative in-combination effects
  - Sensitisation to sound
  - Habituation to sound
- Indirect Effects:
  - Reduced availability of prey
  - Increased vulnerability to predation
  - Behavioural changes leading to physical damage and/or physiological effects

According to the MMRA produced in support of this application, harbour seals have been found to occur throughout the year in Glengarriff Harbour with peak counts always recorded between August and September. Harbour seal pups were found to be present in the months of June and July (Berrow, 2019). Given that the proposal site is located within the SAC and considering their mobile nature and the regularity of previous sightings, harbour seals have the potential to occur in the vicinity of Glengarriff Pier during the works.

According to the MMRA, the ambient noise level in Glengarriff Harbour is not known; however, it is expected to be dominated by environmental noise (e.g. tidal movement of water and sediment, and wind and wave noise) and local small vessel traffic. While sound exposure levels from dredging operations are thought to be below that expected to cause injury to a marine mammal, disturbance, from the noise generated by dredging, from the physical presence of the dredger, and possibly from the increased water turbidity in the area of operations have the potential to cause lower-level disturbance, masking or behavioural impacts (DAHG, 2014). In relation to disturbance via increased traffic, the presence of a barge and excavator may lead to a minor localised increase in vessel traffic and associated noise. However, the presence of an additional small vessel and the associated low-frequency noise produced is very unlikely to have a significant impact on harbour seals. In the area harbour seals in particular have been shown to exhibit a very high tolerance to chronic noise.

With regards to noise impacts, according to the MMRA, localised disturbance to marine mammals in the works area may occur during operations, but will be limited by:

- The inshore location of the site, close to the harbour entrance. Any marine mammals recorded will be accommodated to human activities. Noise transmission to the wider bay is very unlikely.
- The very shallow nature of the dredging site.
- The regular transit of fishing and recreational vessels.
- The relatively short duration of the planned activity of 1-2 weeks.
- Although pupping by harbour seals occurs between June and July the potential disturbance is very low and localised and will not affect pupping or haul out sites (Berrow, 2019).

Considering this, although seals may be exposed to some disturbance if they are in the water near the dredging operations, this is not expected to cause significant disturbance. While there may be

temporary disturbance to seals in the harbour, they are likely to recover from any temporary disturbance within hours or days (Berrow, 2019).

According to the MMRA, the risk of injury or mortality to harbour seal is considered extremely low despite the possibility of exposure to dredging operations. Seals at Glengarriff are regularly exposed to small vessels and are aware of their presence. The dredging excavator will be situated on land or on a barge and only the bucket will enter the water. Therefore, the risk of injury or mortality is non-existent. The chance of releasing dredged material on top of a marine mammal is non-existent as the dredge material will be removed from the site (Berrow, 2019).

With regard to disruption of life cycle of marine mammals in the area, this is considered extremely low. At Glengarriff, dredging activity could cause displacement of harbour seals from the immediate area. However, any effect would be temporary given the short time scale of the project (approximately 1 week). Any effect is likely to be localized and of short duration. Seals are also able to avoid the area by hauling out away from the site vicinity.

Despite the relatively short time period and small scale associated with the proposed works, it is considered that based on the precautionary principle, wi*thout mitigation*, there is potential for direct disturbance/displacement effects to harbour seal as a result the proposal, and thus migration is recommended in **Section 7** below.

With regard to the potential for indirect disturbance/displacement impacts to harbour seal, it is noted that potential impairment of marine water quality/habitat and potential impacts on the prey resource for harbour seal as a result of the proposed works could cause adverse effects to the harbour seal population within the SAC.

As well as the risk posed to harbour seal by use of fuels, oil etc within or in proximity to the marine zone, it is noted also that marine invasive species, if introduced as a result of the works, have the potential to disrupt normal ecosystem functioning and marine food chains via several mechanisms including the out-competing of native species and adverse effects on water quality. Therefore, it is recommended that certain mitigation measures are implemented in relation to protection of water quality and the marine environment, and biosecurity to ensure that significant effects on harbour seal which could adversely affect the integrity of the SAC are avoided. These are outlined below in **Section 7** below.

Given the minor footprint of the proposed dredge area, the highly temporary nature of proposed dredging activity and the localised impacts which are expected in relation to turbidity etc, it is not considered that dredging works at the pier have the potential to result in significant impacts on water quality and harbour seal fish prey populations within the harbour. However, on a precautionary basis, mitigation measures in relation to seasonal and other time constraints for dredging works are recommended in **Section 7** below to reduce potential impacts on prey fish for harbour seal.

6.2.2 Otter (*L. Lutra*)

The main threats to this species from the proposal are direct disturbance/displacement effects associated with fugitive noise emissions from dredging activity, use of plant and human presence

during the works and indirect disturbance/displacement of otter should the proposal lead to a reduction in marine water quality/alteration of marine habitat and/or prey availability.

The otter survey carried out in the vicinity of the proposed area of works determined that otters are active around Glengarriff Pier and in the environs of Glengarriff Harbour (refer to **Appendix 2** for otter survey summary report).

With regards to potential direct disturbance/displacement of foraging or commuting otter due to fugitive noise emissions associated with the works such as from increased human activity, or any plant, vehicles or the barge vessel, if required, it is considered that any otters which may be present in the surrounding area are likely to comprise part of the resident local population given otter's territorial nature. Therefore, these individuals are likely habituated to some degree of disturbance given the level of otter foraging activity recorded in the vicinity of the pier, as evidenced during the field survey, and the level of existing recreational and commercial activities that take place at the pier on a daily basis.

Were otters to occur in the vicinity of the pier at the time of the works, bearing in mind that the works will be restricted to normal working hours and will take place over a short duration of 1-2 weeks, it is considered that at most any disturbance/displacement impacts to otter will be temporary and will not be significant, with regards to either the resident otter population or vagrant individuals, were they to occur. Furthermore, existing levels of vessel activity are not expected to increase considerably following completion of dredging works and reinstatement of the pontoon. Therefore, significant disturbance/displacement impacts to otter from fugitive noise/human activity during any phase of the project are not expected to occur.

With regards to potential disturbance/displacement of otter or their breeding or resting sites it is noted that potential holts or other temporary resting sites were not identified within the proposal site or its immediate vicinity. Only one potential holt was identified during the survey. This was recorded on the shoreline at the eastern end of the study area near 'Bamboo Park', approximately 270m north-east of the pier on the opposite side of the harbour. Several potential temporary resting sites were identified within the area surrounding the pier, the closest of which were located approximately 50m north of the pier in an area of wooded shoreline. Given these findings, and bearing in mind the location, small scale and temporary nature of the works (1-2 weeks), significant disturbance/displacement of otter or their breeding or resting sites is not envisaged as a result of the proposal; however, based on the precautionary principal mitigation measures are recommended with regards to otter. These are outlined in **Section 6** below.

With regards to the potential for indirect disturbance/displacement effects to otter as a result of the works, similar impacts to those identified and discussed above in **Section 6.2.1** in relation to harbour seal (potential impacts to marine water quality, impacts on the prey resource available to otter) are considered. As for harbour seal, mitigation measures in relation to protection of water quality, biosecurity and reducing impacts on prey species for otter are recommended in **Section 7** below.

6.3 HABITAT LOSS AND ALTERATION

Glengarriff Harbour and Woodland SAC is designated for two terrestrial habitat-types, namely the woodland habitats 'Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]' and 'Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]', as identified in **Section 4.4.3** above.

The proposed works will be restricted to the pier and the dredge pocket comprising the pontoon footprint and minor area of shoreline immediately adjacent. There will be loss of marine sediment material at the location of the dredge site; however, this habitat is not a qualifying habitat for the SAC.

While construction activity will take place partially within the SAC boundary, neither of the qualifying habitats for the SAC occur within the footprint of the proposed works. As there is no spatial overlap between the proposed works and either Annex I habitat, direct habitat impacts are not envisaged.

With regard to potential indirect alteration of Annex I habitats (e.g. via potential spread of invasive species as a result of the works), while invasive plant species have been recorded in the general vicinity of the pier and shoreline (see **Section 4.2**), it is noted that the closest terrestrial area of the SAC within which either Annex I terrestrial habitat could potentially occur lies in excess of 0.4km from the proposed works area.

Bearing the above factors in mind, it is objectively concluded that significant effects on either 'Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]' or 'Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]' which could adversely affect the integrity of the Glengarriff Harbour and Woodland SAC are not predicted as a result of the proposal.

However, due to the location of the works within the SAC and the presence of terrestrial invasive plant species outside but within close proximity to the proposed works area, based on the precautionary principal, mitigation measures in relation to construction activity, biosecurity and invasive species are recommended in order to minimise risk of accidental spread of invasives within the SAC boundary (see **Section 7** below).

6.4 HABITAT OR SPECIES FRAGMENTATION

Habitat fragmentation has been defined as 'reduction and isolation of patches of natural environment' (Hall et al., 1997 cited in Franklin et al., 2002) usually due to an external disturbance such that an alteration of the spatial composition of a habitat occurs that alters the habitat and 'create[s] isolated or tenuously connected patches of the original habitat' (Wiens, 1989 cited in Franklin et al., 2002). This results in spatial separation of habitat units which had previously been in a state of greater continuity. Adverse effects of habitat fragmentation on species/populations can include increased isolation which can detrimentally impact on their resilience or robustness potentially altering species abundance and leading to a reduction in overall diversity.

As stated previously, the proposed works at Glengarriff will be relatively small in scale and be undertaken over a relatively short period of time (1-2 weeks). Given the nature and location of the works at Glengarriff Pier, significant habitat or species fragmentation within the SAC is not envisaged

as a result of the proposed dredging. However, on a precautionary basis, mitigation is recommended in **Section 7** below in relation to protection of marine water quality, protection of marine mammals, biosecurity and prevention of spread of invasive species.

7 MITIGATION

With regards to the proposal, the following mitigation measures are recommended:

7.1 ECOLOGIST/ECOLOGICAL CLERK OF WORKS (ECOW)

- A suitably qualified ecologist/ECoW, ideally familiar with the sensitivities of the site, should brief the contractor staff prior to the commencement of works via a 'toolbox talk'.
- As part of this, all contractor staff will be briefed on the importance of site biosecurity and the specific measures which are required to prevent the introduction/spread of invasive species (See **Section 7.5** below for more information).
- As part of this, site staff will be briefed at a high-level on the types of invasive species which could occur and the ways in which they can be inadvertently transported. Staff will be directed to ID guides and information leaflets on the most unwanted species which will be clearly displayed within the site compound and which will help inform staff of their responsibility in preventing spread of species[9].

7.2 GENERAL WATER QUALITY PROTECTION MEASURES

- Dredging is to be undertaken in a manner that reduces the volume of sediment that escapes into the water column and becomes suspended.
- Overflow of dredge material from either the excavator bucket or trucks should be avoided.
- Care should be taken to ensure a minimum amount of spillage from the excavator bucket while transporting spoil to trucks.
- It is recommended that appropriate fuel management measures are put in place.
- A fuel management plan should be prepared and implemented by the contractor prior to the commencement of works so as to minimise any potential risk to the environment as a result of fuel/oil spill.

7.3 PROTECTION OF HARBOUR SEAL

To prevent indirect impacts to harbour seal via potential impacts on prey fish populations in the harbour, it is recommended that dredging activity should not occur between the months of March and May, inclusive, to avoid impacts on migrating salmonid fish species. Similarly, dredging during night high tides should be avoided to minimise impacts on night-time migrating fish.

In-line with NPWS guidance and the MMRA for the proposed works, it is recommended that a suitably qualified and experienced marine mammal observer (MMO)[10] is present for the duration of the proposed works to implement NPWS Guidelines. This observer will determine the presence or absence of marine mammals in the area and will log all relevant events using standardised data

[9] https://invasivespeciesireland.com/what-can-i-do/check-clean-dry/; Invasive Species Ireland

[10] In the context of this guidance a qualified marine mammal observer (MMO) is defined as a visual observer who has undergone formal marine mammal observation and distance estimation training (JNCC MMO training course or equivalent) and also has a minimum of 6 weeks full-time marine mammal survey experience at sea over a 3-year period in European waters.

forms (DAHG, 2014). The use “ramp up” procedures for noise and vibration emitting operations will also be implemented into the operation.

The NPWS recommend a distance of 500m radial distance of the dredging sound source in water depths of <200m (NPWS 2014) on commencement. The MMRA, prepared in support of this application, recommends a Mitigation Zone of 200m is sufficient given the limited sound exposure of even large-scale dredging operations (McKeown 2017 as cited in Berrow, 2019). If a significant negative change in behaviour is recorded such as rapid movement away from vessel or distress then the MMO should have the authority to cease operations until the exposed animal is clear of the site (Berrow, 2019).

As per the MMRA, the following mitigation measures are proposed to minimise the potential impacts on marine mammals, including harbour seal, and to allow animals move away from the dredging area:

1. All personnel will be appropriately trained about environmental issues prior to the start of the operation.
2. All equipment will be in good condition to avoid spillage or discharge of oil, smoke and excessive noise.
3. Refuelling will be carried out by competent and trained people away from any environmentally sensitive areas; and dredger to be moored up securely.
4. An appropriate waste container will be placed to collect waste before the final disposal by authorised company and hazardous material storage areas will be identified, labelled, and properly marked and fitted with spill containment systems.
5. Excavators and barges will be checked for any fuel/oil leaks on a regular basis by the crew.
6. Any spills we be reported immediately to the site agent/authorities.
7. In the event of a major spill due to damage to the dredger. Locate and isolate, inform harbour authorities, Project manager and environmental agency.
8. A dedicated Marine Mammal Observer will conduct a 30 minute watch for marine mammals within 500m of the excavator prior to start up. If a seal or cetacean (or otter) is sighted within 100m of the excavator, start-up must be delayed until the animal is observed to move outside the mitigation zone or the 15 minutes has passed without the animal being sighted within the mitigation zone.
9. The excavator will be started at lowest revs of the pump, with pump revs increased over a 15 minute period to allow wildlife an opportunity to move further away from the vessel prior to the pumps reaching full power.

7.4 PROTECTION OF OTTER

In order to minimise any potential disturbance/displacement impacts to otter as a result of the proposal it is recommended that all dredging activity is carried out during daylight hours as otters are mainly active at night and are therefore less likely to be present within the subject area during daytime dredging operations.

To prevent indirect impacts to otter via potential impacts on prey fish populations in the harbour, it is recommended that dredging activity should not occur between the months of March and May, inclusive, to avoid impacts on migrating salmonid fish species. Similarly, dredging during night high tides should be avoided to minimise impacts on night-time migrating fish.

The following mitigation measures are also recommended for otter in line with the guidance document '*Guidelines for Treatment of Otters Prior to the Construction of National Road Schemes*' (NRA, 2008):

- A pre-construction survey for otter should be carried out by a suitably qualified ecologist prior to the commencement of any works to search for signs of otter activity in the vicinity of the works, in particular any breeding and/or resting sites. Otter breeding may take place at any season of the year, so breeding activity at holts will need to be determined on a case by case basis.
- Where potential holts are identified, a period of monitoring over several days (e.g. five or more days of checking activity at the holt either with sticks or with sand pads to identify footprints) may be required to determine whether holts are active, inactive or disused. Otters do not tolerate disturbance at or near holts that are in active use.
- If a period of time has elapsed between the recommended pre-construction survey and commencement of the works, a further inspection of the development area, immediately prior to the works, should be carried out to ensure that no new holts have been created in the intervening period and to check if any of the previously identified holts are in active use by breeding females or have otter cubs present.

With regards to site works in the vicinity of active otter holts (where identified):

- No works should be undertaken within 150m of any holts at which breeding females or cubs are present. Following consultation with NPWS, works closer to such breeding holts may take place provided appropriate mitigation measures are in place, e.g. screening and/or restricted working hours on site.
- No wheeled or tracked vehicles (of any kind) should be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence.
- The prohibited working area associated with otter holts should, where appropriate, be fenced with temporary fencing prior to any possibly invasive works. Appropriate awareness of the purpose of the enclosure should be conveyed through notification to site staff and sufficient signage should be placed on each exclusion fence. All contractors or operators on site should be made fully aware of the procedures pertaining to each affected holts.
- Where holts are present in close proximity to invasive construction works but are determined not to require destruction, construction works may commence once recommended alternative mitigation measures to address otters have been complied with.

7.5 SITE BIOSECURITY

No non-native or invasive species were identified within the works footprint; however, best practice biosecurity measures should be implemented to reduce the likelihood of invasive species being introduced or spread within the SAC.

- A suitably qualified ecologist or member of contractor staff is to be appointed as site biosecurity officer with responsibility to oversee the implementation of all biosecurity measures on-site.

- Staff will be directed to immediately notify the site manager and biosecurity officer in the event of any concerns regarding implementation of site biosecurity measures and where the possible presence of invasive species on-site has been identified.

The following best-practice guidance was reviewed with regard to recommended biosecurity measures on-site:

- Biosecurity – Water Users – Leisure and Industrial Crafts (Invasive Species Ireland)[11]
- Water Users Code of Practice – Invasive Species Ireland[12]
- Disinfection of Boats and Boating Equipment – Inland Fisheries Ireland and CAISIE[13]
- Marine Biosecurity Planning – Guidance for producing site and operation-based plans for preventing the introduction of non-native species (SNH, 2014)
- Kelly, J. and Maguire, C.M. (2009). Marina Operators Code of Practice. Prepared for NIEA and NPWS as part of Invasive Species Ireland[14]
- Minchin, D.M. and Nunn, J.D. (2013) Rapid assessment of marinas for invasive alien species in Northern Ireland[15]

The following biosecurity measures are recommended in relation to the proposal and general work activity, use and movement of plant and machinery on land:

- All PPE will be visually inspected and any attached vegetation or debris removed. PPE and tools will remain on site for the duration of construction. Work boots will be dipped in or scrubbed with a disinfectant solution and thoroughly dried afterwards before being used on the site for the first time.
- Plant owners and operators must certify that their equipment is clean and free from invasive species or vector material prior to being brought to site.
- All machinery or equipment entering site will be clean and will be visually inspected for plant material, soil etc prior to entry. Any machinery or equipment coming from another construction site must be power washed/steam washed and visually inspected before entering the site.
- Construction activity and movement of plant and machinery are to be restricted to the footprint of the works area comprising the pier, temporary site compound and access road to the pier. There is to be no movement of plant and machinery outside these areas.

[11] Available at Leisure and Industrial Crafts – Invasive Species Ireland (Accessed 22/02/2022)

[12] Available at Water_Users_CoP.pdf (invasivespeciesireland.com) (Accessed 22/02/2022)

[13] Available at Layout 1 (fisheriesireland.ie) (Accessed 22/02/2022)

[14] Marina_Operators_CoP-.pdf (invasivespeciesireland.com) (Accessed 23/02/2022)

[15] https://invasivespeciesireland.com/wp-content/uploads/2017/01/marina_report_final.pdf (Accessed 23/02/2022)

The following biosecurity measures are recommended in relation to the use of a barge to facilitate dredging, if required.

Prior to being brought to site:

- Biosecurity information on the barge vessel to be used including anti-fouling maintenance history and sites/regions visited since last anti-fouling applied should be gathered prior to procurement.
- The vessel owner and operator must certify that the vessel including on-board equipment is clean and free from invasive species or vector material, and must maintain and provide records, if required, on steps taken to ensure that the vessel is clean.
- The vessel used should generally be subject to standard cleaning and disinfection procedures for motorised watercraft, as per IFI guidance[12].
- The vessel used should have been subject to appropriate antifouling techniques that adhere to the craft manufacturers recommendations to prevent build-up of organisms. The vessel used should be subject to yearly removal of fouling.

Antifouling paints are designed to present marine organisms with a barrier to prevent settlement. These compounds are sometimes toxic to humans, aquatic organisms and terrestrial species and care should be taken to follow the guidelines stipulated by the manufacturer at all times.

Once on-site the following measures are recommended in relation to the use of a barge:

- A rapid visual inspection of the vessel should be carried out by the biosecurity officer and the biofouling logbook (if available) should be checked on entering site. If the vessel is found to have visible biofouling it should be immediately directed to a quarantine site or nearest haul out and wash down facilities.
- Untreated bilge water should be discharged in a responsible manner. Bilge water will contain toxic substances and also may contain the microscopic organisms or life cycle stages that are harmful to native ecosystems.

8 ASSESSMENT OF POTENTIALLY SIGNIFICANT IN-COMBINATION EFFECTS

Projects/activities that could act in-combination with the proposed works to cause in-combination effects on water quality and/or disturbance/displacement effects include the normal day-to-day operations at Glengarriff Pier, as well as other activities, as outlined in **Section 4.3.1** above.

In terms of the proposals potential to cause in-combination effects on water quality as a result of interaction with activities in the area, it has been determined in **Section 5.1** above that significant water quality impacts are not predicted as a result of the proposal. Dredging activity will be minor in scale, will be temporary in nature and will be restricted to a limited dredge footprint of approximately 815m^2. Therefore, as significant water quality impacts from the proposal are not predicted, it is determined that there is no potential for significant in-combination effects on water quality as a result of interaction with existing activities in the area.

With regards to the potential for in-combination effects causing species disturbance/displacement the proposal is not considered to have any potential for significant disturbance/displacement

impacts to any of the qualifying interest species for which the Glengarriff Harbour and Woodland SAC is designated.

Bearing in mind the minor scale and temporary, localised nature of the proposal, no significant in-combination effects are envisaged, as a result of the programme of works described in **Section 4.3** above.

9 RESIDUAL IMPACTS

Provided that the recommended mitigation measures are implemented in full, significant residual impacts are not predicted as a result of the proposal. Thus, it is objectively concluded that the proposed works will not adversely affect the integrity of the Natura 2000 site which is the focus of this assessment, namely:

- Glengarriff Harbour & Woodlands SAC (000090)

10 CONCLUSION

- The proposed project has the potential (*without mitigation measures*) to impact negatively on the Glengarriff Harbour & Woodlands SAC
- The main potential impacts on this protected site are the risk of water quality effects, risk posed by invasive species and/or direct/indirect disturbance/displacement of otter and harbour seal due mainly to underwater noise emissions from dredging and to a lesser extent the increase in human activity associated with the works
- Mitigation measures proposed include the employment of a marine mammal observer (MMO), the implementation of best practice guidelines in relation to managing the risk to marine mammals from man-made sources of underwater noise, protection of water quality including use of fuels/oils and minimising release of sediments to the aquatic environment during removal from site and biosecurity measures in relation to preventing the introduction and spread of invasive species.
- Provided the proposed mitigation measures are fully and adequately implemented during the construction phase of the proposed development, no significant direct, indirect or in-combination effects on the integrity of the Natura 2000 site considered in this assessment are likely to occur.

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Appendix 1

Stages of Appropriate Assessment

Stage 1 - Screening

This is the first stage of the Appropriate Assessment process and that undertaken to determine the likelihood of significant impacts as a result of a proposed project or plan. It determines need for a full Appropriate Assessment.

If it can be concluded that no significant impacts to Natura 2000 sites are likely then the assessment can stop here. If not, it must proceed to Stage 2 for further more detailed assessment.

Stage 2 - Natura Impact Statement (NIS)

The second stage of the Appropriate Assessment process assesses the impact of the proposal (either alone or in combination with other projects or plans) on the integrity of the Natura 2000 site with respect to the conservation objectives of the site and its ecological structure and function. This is a much more detailed assessment that Stage 1. A Natura Impact Statement containing a professional scientific examination of the proposal is required and includes any mitigation measure to avoid, reduce or offset negative impacts.

If the outcome of Stage 2 is negative i.e. adverse impacts to the sites cannot be scientifically ruled out, despite mitigation, the plan or project should proceed to Stage 3 or be abandoned.

Stage 3 - Assessment of alternative solutions

A detailed assessment must be undertaken to determine whether alternative ways of achieving the objective of the project/plan exists.

Where no alternatives exist the project/plan must proceed to Stage 4.

Stage 4 - Assessment where no alternative solutions exist and where adverse impacts remain

The final stage is the main derogation process examining whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project to adversely affect a Natura 2000 site where no less damaging solution exists.

Appendix 2

Screening for Appropriate Assessment

Malachy Walsh and Partners
Engineering and Environmental Consultants

Screening for Appropriate Assessment

Glengarriff Pontoon Dredging, Glengarriff, Cork

ISSUE FORM	
Project number	19505
Document number	6004
Document revision	B
Document title	Screening for Appropriate Assessment: Glengarriff Pontoon Dredging, Glengarriff, Cork
Document status	Final
Document prepared by	CH/FD/HD
Document checked by	HD (MWP 19-08-2019); EL (MWP 23-02-2022)

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1 SUMMARY OF FINDINGS

1.1 SCREENING FOR APPROPRIATE ASSESSMENT

Project Title	Glengarriff Pontoon Dredging, Glengarriff, Cork
Project Proponent	Cork County Council
Project Location	Located just outside Glengarriff village on the Beara Peninsula in County Cork. Site is approximately 75km west of Cork City and 10km north of Bantry.
Screening for Appropriate Assessment	The screening for Appropriate Assessment is undertaken to determine the potential for likely significant effects of proposed dredging works at Glengarriff Pontoon either individually, or in combination with other plans or projects, in view of the conservation objectives of certain Natura 2000 Sites.
Conclusion	It has been objectively concluded during the screening process that significant effects on the following Natura 2000 sites as a result of the proposal are not considered likely: • Caha Mountains SAC (000093) • Derryclogher (Knockboy) Bog SAC (001873) • Maulagowna Bog SAC (001881) • Clonee & Inchiquin Loughs SAC (001342) • Glanlough Woods SAC (002315) • Sheep's Head SAC (000102) • Kenmare River SAC (002158) It cannot be objectively concluded, at this stage, that significant adverse effects to the following site will not occur: • Glengarriff Harbour & Woodlands SAC (000090) Therefore, it is necessary to proceed to Appropriate Assessment and as such a Natura Impact Statement is required for this site.

2 INTRODUCTION

2.1 PURPOSE OF ASSESSMENT

This screening for Appropriate Assessment has been undertaken to determine the potential for significant effects of proposed dredging works at Glengarriff Pontoon, Glengarriff, County Cork, on nearby sites with European conservation designations (i.e. Natura 2000 Sites).

This screening for Appropriate Assessment has been undertaken by staff ecologists from Malachy Walsh and Partners Engineering and Environmental Consultants. A number of marine surveys were completed by specialist marine consultancies including Hydrographic Surveys Ltd. and IWDG Consulting (Irish Whale and Dolphin Group).

2.2 LEGISLATIVE CONTEXT

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (2009/147/EC)[1] seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs). It is the responsibility of each member state to designate SACs and SPAs, both of which form part of Natura 2000, a network of protected sites throughout the European Community. Further information is available at:

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/

http://www.npws.ie/planning/appropriateassessment/

2.3 STAGES OF APPROPRIATE ASSESSMENT

The Appropriate Assessment process is a four-stage process with issues and tests at each stage. The purpose of the screening assessment is to record in a transparent and reasoned manner the likely effects on Natura 2000 sites of a proposed development. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required. The stages are set out in **Appendix 1**.

3 ASSESSMENT METHODOLOGY

3.1 APPROPRIATE ASSESSMENT GUIDANCE

This screening for Appropriate Assessment, or Stage 1, has been undertaken in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC, 2001) and the European Commission Guidance 'Managing Natura 2000 Sites' (EC, 2018) and on guidance prepared by the NPWS (DoEHLG, 2009). This guidance stipulates that if there are any significant, potentially significant, or uncertain effects, it will be necessary to proceed to Appropriate Assessment and submit a Natura Impact Statement (NIS).

A plan or project can only be authorized by a competent authority if it has made certain that it will not adversely affect the integrity of the Natura 2000 sites relevant to the particular project. This can only be the case where "no reasonable scientific doubt remains as to the absence of such effects"[2].

[1] This is the codified version of Directive 79/409/EEC as amended (see http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm)

[2] European Court of Justice Case C-127/02 Landelijke Vereniging tot Behoud van de Waddenzee

3.2 DESK STUDY

In order to complete the screening for Appropriate Assessment certain information on the existing environment is required. A desk study was carried out to collate available information on the subject site's natural environment. This comprised a review of the following publications, data and datasets:

- OSI Aerial photography and 1:50000 mapping
- National Parks and Wildlife Service (NPWS)
- National Biodiversity Data Centre (NBDC) (on-line map-viewer)
- BirdWatch Ireland
- Geological Survey Ireland (GSI) area maps
- Environmental Protection Agency (EPA) water quality data
- Joint Nature Conservation Council (JNCC)
- Other information sources and reports footnoted in the course of the report

3.3 FIELD SURVEYS

3.3.1 Marine Surveys

A number of marine surveys were completed by specialist marine consultancies including Hydrographic Surveys Ltd. and IWDG (Irish Whale and Dolphin Group) Consulting. Surveys were used to inform the screening for Appropriate Assessment.

- Site Investigation survey including Bathymetric and Topographic Survey (Hydrographic Surveys Ltd., 2019)
- Marine Mammal Risk Assessment (MMRA) (Berrow, 2019)

3.3.1.1 Site Investigation Survey including Bathymetric and Topographic Survey

A site investigation survey comprising bathymetric and topographic survey and surface marine grab sampling was undertaken by Hydrographic Surveys Ltd. and Priority Geotechnical Ltd. in the area around Glengarriff Pier and pontoon. Surface sediment grab samples, taken via Van Veen grab sampler, were collected at three locations (G1, G2 and G3) in October 2018 for the analysis of organics and contaminants. See Appendix 3 for more information.

3.3.1.2 Marine Mammal Risk Assessment (MMRA)

A risk assessment of the proposed works to marine mammals was carried out by the Irish Whale and Dolphin Group (IWDG) based on a review of available literature and data sources (Berrow, 2019). See Appendix 4 for more information.

3.3.2 Terrestrial Ecology Surveys

An otter survey was undertaken in inner Glengarriff Harbour on the 11th April 2019 on an ebbing tide from mid to low tide. The otter survey was undertaken following methodology outlined in 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes' (NRA, 2009). Evidence of otter (live animals, spraints, prints, resting places) was searched for along the coastline from 'Bamboo Park' in the east to west of Glengarriff Pier including the outlet of the Reenmeen West River into Glengarriff Harbour and the small islets around the pier including Bush, Friar's and Bark Islands. The southern side of Bark Island was not accessible due to dense vegetation and steep shoreline.

Evidence of otter, if present, was recorded and photographed and the position recorded using a Garmin eTrex 10 GPS/GNSS receiver. Please see **Appendix 5** for more information on the otter survey undertaken.

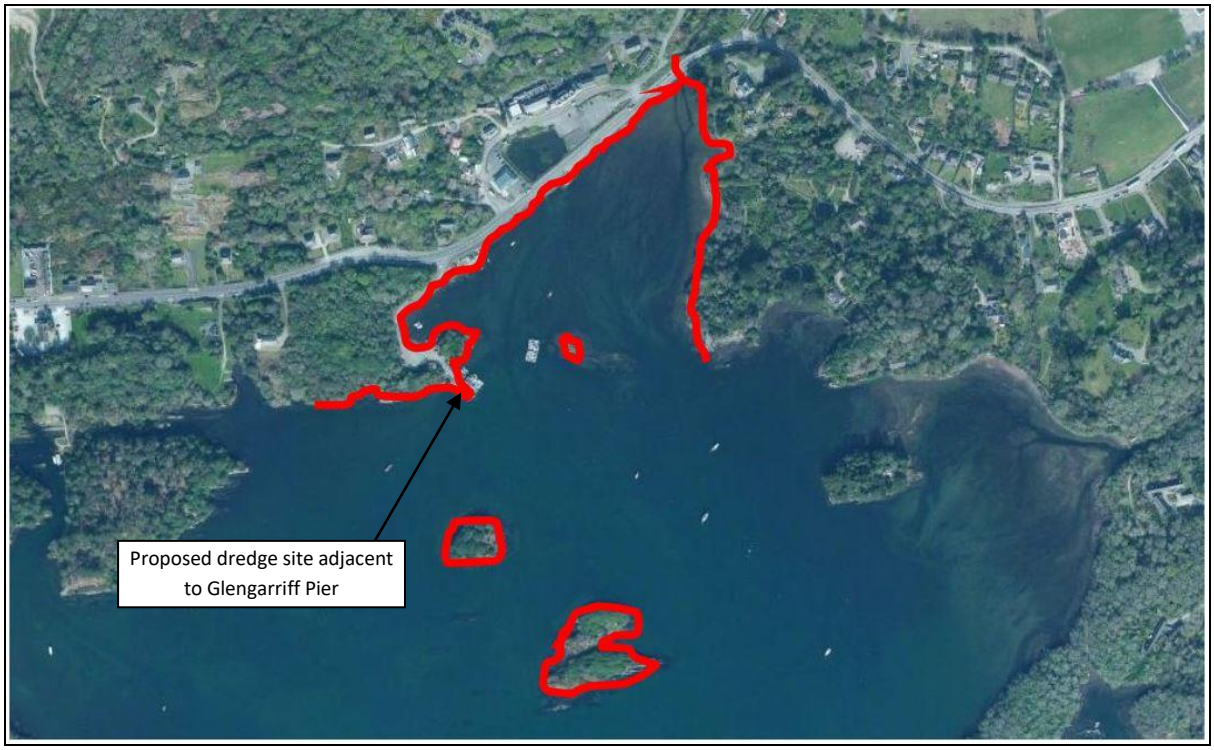

Figure 1. Area of shoreline encompassed by the otter survey conducted on 11/04/2019

Waterbird counts were also undertaken by a Malachy Walsh and Partners staff ecologist at low and rising tides on the 28th January 2019.

3.4 SCREENING FOR APPROPRIATE ASSESSMENT

As set out in the NPWS guidance (DoEHLG, 2009), the task of establishing whether a plan or project is likely to have an effect on a Natura 2000 Site is based on a preliminary impact assessment using available information and data, including that outlined above, and other available environmental information, supplemented as necessary by local site information and ecological surveys. This is followed by a determination of whether there is a risk that the effects identified could be significant. The precautionary principal approach is required.

Once the potential impacts that may arise from the proposal are identified the significance of these is assessed through the use of key indicators:

- Habitat loss
- Habitat alteration
- Habitat or species fragmentation
- Disturbance and/or displacement of species
- Water quality.

Guidance stipulates that if there are any significant, potentially significant, or uncertain effects, it will be necessary to proceed to Appropriate Assessment and submit an NIS.

4 SCREENING FOR APPROPRIATE ASSESSMENT

Screening for Appropriate Assessment (Stage 1) determines the need for a full Appropriate Assessment (Stage 2) and consists of a number of steps, each of which is addressed in the following sections of this report:

4.1 Establish whether the proposed works are necessary for the management of a Natura 2000 Site

4.2 Description of the proposed works *(dredging at the location of Glengarriff Pontoon)*

4.3 Identification of Natura 2000 Sites potentially affected

4.4 Identification and description of potential individual and cumulative impacts of the proposed works

4.5 Assessment of the significance of the impacts on the integrity of Natura 2000 Sites

4.6 Conclusion of the screening stage

4.1 MANAGEMENT OF NATURA 2000 SITES

The proposal is not connected with or necessary to the conservation management of a Natura 2000 Site.

4.2 DESCRIPTION OF THE PROJECT/SITE

4.2.1 Brief Project Description, Purpose and Site Location

Glengarriff Pier is located in Glengarriff Harbour just outside the village of Glengarriff on the Beara Peninsula in County Cork. The subject site is located approximately 75km west of Cork City and approximately 10km north of Bantry. The pier is accessed by a local road off the N71 national road heading east out of the village (see **Figure 2** below).

Figure 2. Location of Glengarriff Pier and Pontoon (Source: https://www.bing.com/maps/aerial accessed 09/08/2019)

Glengarriff pontoon is located adjacent to Glengarriff Pier. It is used by leisure and commercial users including passenger ferries to Garinish Island. The pontoon itself is connected via a walkway to Glengarriff Pier (see Plate 1 below). The pontoon grounds and twists at low tide. Proposed dredging works aim to stop the current grounding and twisting of the pontoon and increase the amenity value of the pontoon. Proposed works include:

- The removal and replacement of the pontoon
- Disconnection and reconnection of power and water supplies to the pontoon
- Dredging of material at the location of the pontoon and the area immediately adjacent to a depth of -5mODM (proposed dredge footprint is approx. 815m^2)
- Disposal of dredged materials to an off-site licenced waste facility.

Plate 1. View of pontoon looking south-east from the gangway at Glengarriff Pier

4.2.2 Description of the Site

The proposed site of works is situated just outside the village of Glengarriff on the south coast of County Cork. Glengarriff is a coastal tourist centre, located on the N71 National Route between Kenmare and Bantry, overlooking the cove of Glengarriff Harbour. The harbour is comprised of approximately 4km^2 of sheltered waters set back from the more exposed coastal waters of Bantry Bay.

The subject area is located within the Electoral Division (ED) of Kilcaskan (CSO Area Code ED 18041). CSO data indicates that, in 2016, this ED had a total population of 755 person's resident[3]. The proposed site of works is situated in the townland of Monteensudder. Bedrock at the location and throughout the surrounding area is classified as 'Purple & Green Sandstone & Siltstone'. Soil type on the landward side of the pier is classified as 'Rock' and 'Peat'. The dominant Corine Landcover Category (2018) around Glengarriff Harbour in the general surrounding area is 'Broad-leaved forests' with 'Peat bogs' also occurring on the headland to the south-west of the pier.

Compliance with the reporting requirements of the Water Framework Directive (Directive 2000/60/EC) obliges each Member State to publish reports providing summary information about individual water bodies relating to their status, risks and objectives. Within this reporting framework, the site is located adjacent to the 'Glengarriff_SC_010' sub-catchment. Glengarriff Pier and pontoon is located within Glengarriff Harbour, which has a Transitional Waterbody WFD Status 2010-2015 of 'Unassigned'. Glengarriff Harbour has been assigned a Transitional Waterbodies Risk category of 'not at risk' and Transitional Water Quality 2010-2012 of 'Unpolluted'[4]. Glengarriff Harbour is designated as 'surface waters in shellfish areas' (IE_SW_170_0400)'. Further out from the harbour, 'Outer Bantry Bay' has been assigned a Coastal Waterbody WFD status of 'High'.

A review of species records held by the NBDC for the general area, including from the National Invasive Species Database, determined that records for both giant knotweed (*Fallopia sachalinensis*) and Himalayan knotweed (*Persicaria wallichii*) exist in the vicinity of the junction between the pier access road and the N71, approximately 100m north of the proposed works area.

4.2.2.1 Site Investigation Survey including Bathymetric and Topographic Survey

The bathymetry survey conducted by Hydrographic Services Ltd. indicates that depths recorded in the vicinity of the pier and pontoon ranged from approximately -2.1ODM (eastern side of the pier) to approximately -4.3ODM (western side of the pier) (Hydrographic Surveys Ltd.).

4.2.2.2 Terrestrial Ecological Surveys

No otters were observed during the course of the otter survey carried out on-site in April 2019. While not unexpected as otters are mainly active during dusk and at night, a desk-top study determined that there have been a number of sightings of live otter in inner Glengarriff Harbour. Additionally, a sighting of an otter was made east of Bush Island during a bird survey for Malachy Walsh and Partners on 28th January 2019. The otter survey yielded abundant evidence of otter activity across the study area.

[3] http://census.cso.ie [accessed 19/08/19]

[4] https://gis.epa.ie/EPAMaps/ [accessed 19/08/19]

One potential holt was recorded on the shoreline at the eastern end of the study area near 'Bamboo Park', approximately 270m north-east of the pier on the opposite side of the harbour. This feature consisted of a tunnel into soft sediments overlying the bedrock under a tree. Additional evidence of otter in the form of spraints was also recorded close by. Numerous couches and temporary resting place features, and sprainting sites were recorded across the study area, including within the immediate vicinity of the pier.

During the otter survey, the presence of rhododendron (*Rhododendron ponticum*) was recorded at various locations outside the works footprint in the general area surrounding Glengarriff Pier.

4.2.3 Characteristics of the Project

The proposal is described in Error! Reference source not found.**Table 1** below and has been confirmed with the project engineer.

Table 1. Summary of Project Characteristics

Size, scale, area, land-take	Glengarriff pontoon is located adjacent to Glengarriff Pier just outside Glengarriff village. The proposed dredge works will be restricted to the existing pontoon footprint and the immediate surrounding dredge pocket. The total proposed dredge footprint is approximately 815m^2. The proposed works overlap with the Glengarriff Harbour and Woodland SAC (000090). There will be no land-take within the SAC.
Details of physical changes that will take place during the various stages of implementing the proposal	Proposed works include: • The removal and replacement of the pontoon • Disconnection and reconnection of power and water supplies to the pontoon • Dredging of material at the location of the pontoon and the area immediately adjacent to a depth of -5mODM (proposed total dredge footprint is approx. 815m^2) • Disposal of dredged materials to an off-site licenced waste facility. Initial works will require the removal and storage on-site of the existing pontoon. This will be done using a crane or excavator. Dredging works will be carried out by a long reach excavator operating from a barge or from land as necessary. Spoil will be loaded onto trucks and will then be taken off-site. Once dredging works are complete, the barge (if required) and excavator will leave the site. The pontoon, removed at the project commencement, will be returned to its original location.
Description of resource requirements for the construction/operation and decommissioning of the proposal (water resources, construction material, human presence, etc)	The equipment and resources required for the works will include: • Crane for removing and reinstating pontoon • Barge to facilitate dredging, if required • Safety boat • A long-reach excavator • On-site personnel • Trucks: These vehicles would be used to remove dredge spoil from the site. These vehicles will also be used to relocate the pontoon.

Description of timescale for the various activities that will take place as a result of implementation (including likely start and finish date)	• Proposed works should take approximately 2 weeks in total (including 1 week approx. for set set-up and demobilisation and 1 week approx. for dredging activity) • Likely start date will be dependent on seasonal constraints.
Description of wastes arising and other residues (including quantities) and their disposal	• Dredge spoil will be the only significant waste generated on site. This spoil will be removed from the site and disposed of at an off-site licenced waste facility. • Fuel/oil/lubricants associated with the excavator, truck and barge, if required. • Wastes will not be left on or adjacent to the pier. • All waste will be removed off site to an appropriate disposal site.
Identification of wastes arising and other residues (including quantities) that may be of particular concern in the context of the Natura 2000 network	• A portion of dredge material is considered marginally contaminated. Marine sediment sample parameters that lie within Class 2 include arsenic, cadmium, nickel and zinc. One sample exceeded the upper guidance limit for copper (Class 3). With the exception of arsenic, cadmium, copper, nickel and zinc all other parameters are below the lower Irish action limit within the proposed dredge area. All dredge spoil will be removed from site for disposal at an off-site licensed waste facility. • Fuels and oils will be present which pose a risk to Natura 2000 sites were a fuel spill or oil leak to occur. All fuels/oils will be stored within the temporary site compound.
Description of any additional services required to implement the project or plan, their location and means of construction	• A temporary site compound will be located adjacent to Glengarriff Pier.

4.2.4 Identification of Other Projects or Plans or Activities

4.2.4.1 Plans

As part of the desktop, current and/or recent plans relevant to the subject site including at county level and local area level were identified. These included:

- Draft Cork County Development Plan 2022 - 2028
- Cobh and West Cork Municipal District Local Area Plan 2017
- North and West Cork Strategic Plan 2002 – 2020

4.2.4.2 EPA Licensed Activities

A search of the EPA's on-line mapping system determined that there are no IPPC, IPC, IEL or waste licensed facilities within a 5km radius of the subject site which encompasses the Glengarriff Harbour area[5].

[5] EPA Maps [accessed 18/02/2022]

A licensed wastewater treatment plant is located in Glengarriff village (Agglomeration PE of 500 to 1,000) (Licence No. D0471). The existing treatment plant is located 250m west of the pier, between the main road and the shoreline. The treatment process is a primary sedimentation system (septic tank) with a primary emission point located within inner Glengarriff Harbour. The septic tank has a capacity of 209m^3, which equates to a design PE of 1,000. A review of the EPA website determined that in 2020 this plant had an agglomeration PE of 802. The current compliance status of this plant is not available on the EPA website. The Water Services Authority (WSA) has plans for a proposed new WWTP which will cater for a population equivalence of 2,500[6].

4.2.4.3 Current/Outstanding Grants of Planning Permission

There are several townlands surrounding inner Glengarriff Harbour, taken to comprise the harbour area inside Garinish Island. On the basis of the minor scale of the proposed works, it is considered that other proposed or permitted developments in this area of the harbour are the most likely to have the potential to interact with the proposed pontoon works via potential in-combination water quality effects.

A search of current planning applications (within the last 5 years) within these townlands of Monteensudder (within which the subject site is located), Reenmeen West, Reenmeen East, Dromgarriff, Cappyaughna, Shrone and Inchintaggart was carried out using the Cork County Council online planning system. This search determined that there are 23 granted/outstanding planning applications mainly relating to the construction and/or alteration of residential dwellings, retention permission applications, alteration of a commercial premises and renovation and refurbishment works to Glengarriff Castle to comprise a residential dwelling including installation of a wastewater treatment plant[7].

4.2.4.4 Local Surrounding Land-use/Other On-going Activities within Glengarriff Harbour

Glengarriff Pier is located within the village of Glengarriff. The pier is the base for a number of leisure and commercial vessels including passenger ferries to Garinish Island. There is a possibility that leisure/commercial boat activity and other on-going pier operations may occur at the same time as the proposed works. A shellfish fishery operates within the greater harbour area.

With regard to land-use in the general Glengarriff Harbour area, some low-intensity agriculture occurs; however, agriculture is not a dominant feature of the surrounding landscape. Other land-use comprise amenity and recreational activities such as local sports grounds and Glengarriff Golf Club which is located on the eastern side of the harbour.

In light of the characteristics of the subject site and its surrounds as outlined in **Section 4.2.2** above, and considering the size and scale of the proposal as outlined in **Section 4.2.3** above, it is concluded that wastewater treatment, existing pier operations and to a lesser extent aquaculture, agriculture and amenity land-use in the area comprise the activities with the most potential to cause or initiate point or diffuse pollution sources, with which the proposed works could interact synergistically to create cumulative or in-combination water quality and/or species disturbance or displacement impacts. As there is potential for interaction between the aforementioned activities and the

[6] http://www.epa.ie/licences/lic_eDMS/090151b2804f35a8.pdf [accessed 19/08/2019]
[7] http://maps.corkcoco.ie/planningenquiryv3/MainFrames.aspx [accessed 19/08/2019]

proposal, the potential for cumulative impacts on the receiving environment must be assessed. This aspect will be considered in section 4.5.7 below.

4.3 IDENTIFICATION OF NATURA 2000 SITES

4.3.1 Zone of Impact Influence

As described above, the test for the screening for Appropriate Assessment is to assess, in view of best scientific knowledge, if the development, individually or in combination with other plans or projects is likely to have a significant effect on any Natura 2000 site. If there are any significant, potentially significant, or uncertain effects, it will be necessary to proceed to Appropriate Assessment and submit an NIS. National guidance recommends that a list is compiled of all Natura 2000 sites within what is described as a 'likely zone of impact of [a] plan or project' (DoEHLG, 2009, p.32) and which may, or ultimately may not, be impacted upon by the proposal. In the case of plans, it is recommended that this zone extends out for a distance of 15km (Scott Wilson *et al*., 2006, cited in DoEHLG, 2009). With regard to projects, such as the proposal considered in this report, the guidance goes on to state, as follows:

> *For projects, the distance could be much less than 15km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size, and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects.* (DoEHLG, 2009)

The Natura 2000 sites within this 'likely zone of impact' and their qualifying features of conservation interest are identified in **Sections 4.3.2** and **4.3.3,** below, and the conservation objectives of the sites are described in accordance with the guidance. Following this, the potential impacts associated with the proposal will be identified before an assessment is made of the likely significance of effects. If, at the end of the screening process, it cannot be objectively concluded that no significant effects are likely or, if the screening stage concludes that there is uncertainty about the significance of the effects, it will be necessary to proceed to Stage 2 Appropriate Assessment.

4.3.2 Identification of Natura 2000 Sites

Adopting the precautionary principle in identifying potentially affected European sites, it has been decided to include all SACs and SPAs within 15km of the proposal site. No European sites outside of this distance are considered to be within the likely zone of impact of the proposal.

Table 2 below lists designated Natura 2000 sites within 15km or the zone of influence of the proposal site including their proximity. A map showing these designated sites in relation to the proposal is provided in **Appendix 2**.

Table 2. Natura 2000 sites within 15km radius of the site

No.	Designated Sites	Site Code	Proximity of subject site to nearest point of designated site
1	Glengarriff Harbour & Woodlands SAC	000090	Proposed works overlap with SAC
2	Caha Mountains SAC	000093	0.8km southwest of proposal site
3	Derryclogher (Knockboy) Bog SAC	001873	6.3km northeast of proposal site
4	Maulagowna Bog SAC	001881	8.2km northwest of proposal site
5	Clonee & Inchiquin Loughs SAC	001342	8.6km northwest of proposal site

No.	Designated Sites	Site Code	Proximity of subject site to nearest point of designated site
6	Glanlough Woods SAC	002315	14.9km northeast of proposal site
7	Sheep's Head SAC	000102	13.8km southwest of proposal site
8	Kenmare River SAC	002158	13km north of proposal site

4.3.3 Characteristics of Natura 2000 Sites

Table 3 lists the qualifying features of conservation interest for the SACs and SPA sites that lie within 15km of the proposal site. Information pertaining to designated sites is from site synopses, conservation objectives and other information available on www.npws.ie.

Table 3. Natura 2000 sites with qualifying features of conservation interest

No.	Natura 2000 Sites	Qualifying Interests/Special Conservation Interests
1	Glengarriff Harbour & Woodlands SAC (000090)	- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae*) [91E0] - *Geomalacus maculosus* (Kerry Slug) [1024] - *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] - *Lutra lutra* (Otter) [1355] - *Phoca vitulina* (Harbour Seal) [1365]
2	Caha Mountains SAC (000093)	- Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] - Natural dystrophic lakes and ponds [3160] - Northern Atlantic wet heaths with *Erica tetralix* [4010] - European dry heaths [4030] - Alpine and Boreal heaths [4060] - Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] - Blanket bogs (* if active bog) [7130] - Siliceous scree of the montane to snow levels *(*Androsacetalia alpinae and Galeopsietalia ladani*)* [8110] - Calcareous rocky slopes with chasmophytic vegetation [8210] - Siliceous rocky slopes with chasmophytic vegetation [8220] - *Geomalacus maculosus* (Kerry Slug) [1024] - *Trichomanes speciosum* (Killarney Fern) [1421]
3	Derryclogher (Knockboy) Bog SAC (001873)	- Blanket bogs (* if active bog) [7130]
4	Maulagowna Bog SAC (001881)	- Blanket bogs (* if active bog) [7130]
5	Clonee & Inchiquin Loughs SAC (001342)	- Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] - Northern Atlantic wet heaths with *Erica tetralix* [4010] - European dry heaths [4030] - Siliceous rocky slopes with chasmophytic vegetation

No.	Natura 2000 Sites	Qualifying Interests/Special Conservation Interests
		[8220] - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] - *Geomalacus maculosus* (Kerry Slug) [1024] - *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] - *Trichomanes speciosum* (Killarney Fern) [1421] - *Najas flexilis* (Slender Naiad) [1833]
6	Glanlough Woods SAC (002315)	- *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]
7	Sheep's Head SAC (000102)	- Northern Atlantic wet heaths with *Erica tetralix* [4010] - European dry heaths [4030] - *Geomalacus maculosus* (Kerry Slug) [1024]
8	Kenmare River SAC (002158)	- Large shallow inlets and bays [1160] - Reefs [1170] - Perennial vegetation of stony banks [1220] - Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] - Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] - Mediterranean salt meadows (Juncetalia maritimi) [1410] - Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] - Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] - European dry heaths [4030] - *Juniperus communis* formations on heaths or calcareous grasslands [5130] - Calaminarian grasslands of the Violetalia calaminariae [6130] - Submerged or partially submerged sea caves [8330] - *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014] - *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] - *Lutra lutra* (Otter) [1355] - *Phoca vitulina* (Harbour Seal) [1365]

4.3.4 Conservation Objectives

According to the Habitats Directive, the *conservation status of a natural habitat* will be taken as 'favourable' within its biogeographic range when:

- Its natural range and areas it covers within that range are stable or increasing, and
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- The conservation status of its typical species is favourable as defined below.

According to the Habitats Directive, the conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' within its biogeographic range when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Conservation objectives for each site are available on www.npws.ie. These have been accessed for the sites listed in the tables above on the 17/02/2022.

Site specific and detailed conservation objectives were available for all sites, as follows:

- Glengarriff Harbour & Woodlands SAC (000090) – Version 1. Produced 11/05/2015
- Caha Mountains SAC (000093) – Version 1. Produced 11/08/2016
- Derryclogher (Knockboy) Bog SAC (001873) – Version 1. Produced 16/05/2017
- Maulagowna Bog SAC (001881) – Version 1. 16/05/2017
- Glanlough Woods SAC (002315) – Version 1. Produced 28/09/2018
- Kenmare River SAC (002158) – Version 1. Produced 25/04/2013
- Clonee & Inchiquin Loughs SAC (001342) – Version 1. Produced 14/11/2019
- Sheep's Head SAC (000102) – Version 1. Produced 05/03/2021

All conservation objectives together with other designated site information are available on http://www.npws.ie/protectedsites.

NPWS Conservation Plans were available as follows:

- Maulagowna Bog cSAC (001881) Conservation Plan 2006 – 2011
- Derryclogher (Knockboy) Bog cSAC (001873) Conservation Plan 2006 – 2011

4.4 IDENTIFICATION OF POTENTIAL IMPACTS

Potential likely ecological impacts arising from the project are identified in this section.

Description of elements of the project likely to give rise to potential ecological impacts.	Construction Phase • Dredging of marine sediments at and around the existing pontoon • Use of plant, equipment and vehicles including potentially a barge to facilitate dredging works • Increase in human presence • Use of oils/fuels/lubricants etc • The dredge site is partially located within a Natura 2000 site; however, there will be no land-take associated with the works. Operational Phase • No ecological impacts predicted
Describe any likely direct, indirect or secondary ecological impacts of the project (either alone or in combination with other plans or projects) by virtue of: • *Size and scale;* • *Land-take;* • *Distance from Natura 2000 Site or key features of the Site;* • *Resource requirements;* • *Emissions;* • *Excavation requirements;* • *Transportation requirements;* • *Duration of construction, operation, etc.; and* • *Other.*	Construction Phase • Loss of marine sediment material and associated infauna at the location of the dredge site • Potential for spread of invasive species • Potential for water quality/aquatic habitat effects including - Increased turbidity - Sedimentation - Pollution of marine environment • Potential for species disturbance/displacement effects via - Potential adverse impacts to water quality, prey resources - Noise emissions to air and water - Vessel movements, if barge required Operational Phase • No ecological impacts predicted

4.5 ASSESSMENT OF SIGNIFICANCE OF POTENTIAL EFFECTS

This section considers the list of sites identified in **Section 4.3.2** above, together with the potential ecological impacts identified in the previous section and determines whether the project is likely to have significant effects on any Natura 2000 sites.

When assessing impact, Natura 2000 sites are only considered relevant where a credible or tangible source-pathway-receptor link exists between the proposed development and a protected species or habitat type. In order for an impact to occur there must be a risk initiated by having a 'source' (e.g. marine dredging), a 'receptor' (e.g. a protected habitat/species and/or the habitats on which they depend), and an impact pathway between the source and the receptor (e.g. a waterbody which connects the proposal site to the protected species or habitats).

An evaluation based on these factors to determine which species and habitats are the plausible ecological receptors for potential impacts of the proposed programme of works is conducted in

Sections 4.5.1 and **4.5.2** below. The evaluation takes cognisance of the scope, scale, nature and size of the project, its location relative to the Natura 2000 sites listed in **Table 2** above, and the degree of connectedness that exists between the project and each Natura 2000 site's potential ecological receptors.

4.5.1 Natura 2000 sites outside the zone of potential impact influence

With regards to the proposal, it is considered that the project does not include any element that has the potential to significantly alter the conservation objectives for which certain Natura 2000 sites, listed in **Table 2** above, are designated. It is considered that these Natura 2000 sites are outside the zone of potential impact influence of the proposal due to the absence of plausible impact pathways and/or the attenuating effect of the distance intervening. Therefore, it is objectively concluded that significant impacts on these sites are not reasonably foreseeable as a result of the programme of works described at **Section 4.2.3.** These sites, which are listed in **Table 4** below, along with their distance and the rationale for exclusion, will not be considered further in this document.

Table 4. Natura 2000 sites identified as being outside the zone of potential impact influence

Natura 2000 Site	Site Code	Rationale for exclusion from assessment
Caha Mountains SAC	000093	- Designated for a range terrestrial and freshwater habitats and species - Intervening distance of c.0.8km - Nature and location of the works - No plausible impact pathway - Significant impacts not likely
Derryclogher (Knockboy) Bog SAC	001873	- Designated for terrestrial habitat - Intervening distance of c.6.3km - Nature and location of the works - No plausible impact pathway - Significant impacts not likely
Maulagowna Bog SAC	001881	- Designated for terrestrial habitat - Intervening distance of c.8.2km - Nature and location of the works - No plausible impact pathway - Significant impacts not likely
Clonee and Inchiquin Loughs SAC	001342	- Designated for a range terrestrial and freshwater habitats and species - Intervening distance of c.8.6km - Nature and location of the works - No plausible impact pathway - Significant impacts not likely
Kenmare River SAC	002158	- Designated for a range of marine, coastal and terrestrial habitats and species - Intervening linear distance of c.13km, intervening marine distance of approximately 50km comprising length of Bantry Bay) - Dilution effects of coastal marine zone - Nature and location of the works - Significant impacts not likely
Sheep's Head SAC	000102	- Designated for terrestrial habitats and Kerry Slug

Natura 2000 Site	Site Code	Rationale for exclusion from assessment
		- Intervening distance of c.13.8km - Nature and location of the works - No plausible impact pathway - Significant impacts not likely
Glanlough Woods SAC	002315	- Designated for lesser horseshoe bat - Intervening distance of c.14.9km - Nature and location of the works - No plausible impact pathway - Significant impacts not likely

4.5.2 Natura 2000 sites within the zone of potential impact influence

Of the designated sites listed in **Table 2** above one is considered to have the potential to be impacted as a result of the proposal. There is potential for habitat impacts, water quality and/or species disturbance/displacement impacts within Glengarriff Harbour and Woodland SAC as a result of the proposal. Therefore, the assessment of significance of potential effects that follows focuses on this designated site.

The likelihood of significant effects to this Natura 2000 site from the project was determined based on a number of indicators including:

- Water quality
- Habitat loss/alteration
- Disturbance and/or displacement of species
- Habitat or species fragmentation

The likelihood of significant cumulative/in-combination effects is assessed in **Section 4.5.7** below.

4.5.3 Water Quality

There are several aspects of the proposal which could potentially result in impairment of marine water quality within Glengarriff Harbour. These impacts are considered to have the most potential to occur during dredging activity.

Dredging of the seabed (approx. dredge footprint 815m^2) in the immediate vicinity of the pontoon will be carried out by a long-reach excavator operating from either a barge or from land. This activity will result in an increase in suspended sediment concentration in the water column through disturbance of the bed which will result in increased turbidity in the general area. Furthermore, any sediment which does become re-suspended into the water column will eventually settle out resulting in sedimentation in either the general area or potentially elsewhere due to dispersion as a result of natural tidal processes within the area.

Disturbance of the seabed during dredging has the potential to result in the release of contaminants to the aquatic environment where such substances are found to occur in marine sediments. The presence of a barge, if used, will increase the risk of fuel/oil spill into surrounding waters were an accidental spillage to occur. Similarly, the use of lubricants and other such substances in close

proximity to the marine zone could potentially lead to pollution of the aquatic environment and subsequent adverse impacts to qualifying features.

Use/movement of equipment, material and a barge, if required, within/adjacent to the marine zone potentially poses a risk of introduction and spread of invasive species. There is, therefore, potential for indirect water quality effects within the SAC.

It is considered that there is potential for significant water quality effects, or significant water quality effects cannot be ruled out, within the Glengarriff Harbour and Woodland SAC.

4.5.4 Habitat Loss and Alteration

Glengarriff Harbour and Woodland SAC is designated for two terrestrial habitat-types, namely the woodland habitats 'Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]' and 'Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]', as identified in **Section 4.4.3** above.

The proposed works will be restricted to the pier and the dredge pocket comprising the pontoon footprint and minor area of shoreline immediately adjacent. . There will be loss of marine sediment material at the location of the dredge site; however, this habitat is not a qualifying habitat for the SAC.

Neither of the qualifying habitats for the SAC occur within the footprint of the proposed works. As there is no spatial overlap between the proposed works and either Annex I habitat, direct habitat impacts are not envisaged.

However, construction activity will take place partially within the SAC. Bearing in mind the presence of terrestrial invasive plant species outside but within close proximity to the proposed works area, based on the precautionary principal, there is potential for accidental spread or introduction of invasive species. Thus, there is, albeit limited potential for indirect alteration of qualifying habitats located elsewhere within the SAC and at a remove from the works area, or indirect alteration of qualifying habitats cannot be ruled out at this stage, for the Glengarriff Harbour and Woodland SAC, and thus further assessment is required.

4.5.5 Disturbance and/or Displacement of Species

Glengarriff Harbour and Woodland SAC is designated for the protection of the following species:

- *Geomalacus maculosus* (Kerry Slug) [1024]
- *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]
- *Lutra lutra* (Otter) [1355]
- *Phoca vitulina* (Harbour Seal) [1365]

4.5.5.1 Kerry Slug

Kerry slug is a species of terrestrial gastropod mollusc. Historically, the Kerry slug has been considered to be restricted to areas of Kerry and West Cork where it occurs most commonly in either of two broad habitat types in circumstances where humidity is high, namely broadleaved woodland or on rocky outcrops associated with heath or blanket bog.

The habitats present within the subject area do not comprise suitable habitat for this species comprising the shoreline and marine zone around Glengarriff pontoon within Glengarriff Harbour. Bearing this factor in mind, it is considered that the proposal does not have any potential to result in significant disturbance/displacement impacts to this species. It is objectively concluded that significant disturbance/displacement impacts to Kerry slug are not likely to occur as a result of the proposal considered in this report.

4.5.5.2 Lesser Horseshoe Bat

The lesser horseshoe bat is a long-lived species of mammal with a complex social life. It is the only member of the Rhinolophidae occurring in Ireland (NPWS, 2013). Like all species of bat, lesser horseshoe bats typically select different types of roosts at different times of the year corresponding with particular phases in their life cycle. This species shows a particular affinity for old buildings during the summer months while underground sites, such as caves, are often utilised during hibernation (NPWS, 2013). Within the SAC, lesser horseshoe bat occurs throughout the general Glengarriff area, with the SAC encompassing both summer and winter roosts and roost-associated potential foraging habitat (NPWS, 2013b).

Given the nature and location of the works, which will be restricted to the existing pontoon and dredge footprint on the shoreline of the harbour, and that all works will be carried out during daytime hours, it is considered that the proposal does not have any potential to result in significant disturbance/displacement impacts to this species. It is objectively concluded that significant disturbance/displacement impacts to lesser horseshoe bat are not likely to occur as a result of the proposal considered in this report.

4.5.5.3 Otter

Otters are a semi-aquatic species native to Ireland. They are found in a variety of aquatic habitats such as lakes, rivers, streams, estuaries, marshland, canals and along the coast, with a preference for areas with good vegetation cover. Otter has a widespread distribution throughout Ireland. The most recent assessment for this species determined that the 10km grid square, V95, in which the proposed development is located, is included within the current known range and distribution for this species (NPWS, 2013).

During an otter survey conducted within inner Glengarriff Harbour in support of this application, abundant evidence of otter activity was found in the vicinity of the pontoon, the surrounding shoreline and nearby off-shore islands. Based on this evidence otter are likely to occur in the vicinity of the works and so could be susceptible to direct and indirect disturbance/displacement impacts as a result of the proposal.

It is considered that there is potential for significant disturbance/displacement effects, or significant disturbance/displacement effects to otter cannot be ruled out at this stage, within the Glengarriff Harbour and Woodland SAC.

4.5.5.4 Harbour Seal

Harbour seals can be found in both in-shore and off-shore waters. In Ireland, the species distribution is concentrated mainly along the west coast, although some areas along the south and east coast are also included. Harbour seals, also known as common seals, are associated with sheltered bays and coastline as well as estuaries. They occupy traditional 'haul-out' sites, typically inter-tidal areas, for

resting, moulting, breeding and other social activities. During the most recent assessment of conservation status for Ireland's species, the overall assessment for harbour seal was found to be 'Favourable' (NPWS, 2013).

Glengarriff Harbour is a very important site for harbour seals. Glengarriff Harbour and Woodland SAC encompasses several harbour seal resting, breeding and moulting sites within its boundary. Bearing these factors in mind, it is considered that there is potential for significant disturbance/displacement effects, or significant disturbance/displacement effects to harbour seal cannot be ruled out at this stage, within the Glengarriff Harbour and Woodland SAC.

4.5.6 Habitat or Species Fragmentation

Habitat fragmentation can be described as discontinuities in an organism's preferred habitat. This can result in species fragmentation through fragmentation of the population. There is potential for habitat/species fragmentation impacts, or habitat/species fragmentation impacts cannot be ruled out at this stage, within Glengarriff Harbour and Woodland SAC.

4.5.7 Cumulative Impacts (In-Combination Effects)

Activities that could potentially interact with the proposal to result in cumulative water quality or species disturbance/displacement impacts are considered to include primarily wastewater treatment in Glengarriff and day-to-day pier activities such as operation of commercial and recreational vessels. Other land-use activities identified in Section 4.2.4 above, such as agriculture and aquaculture are also considered to have potential to result in in-combination effects with the proposal.

It is considered that there is potential for cumulative water quality/species disturbance/displacement impacts as a result of interaction between the proposal and these activities, or cumulative water quality/species impacts cannot be ruled out at this stage, within the Glengarriff Harbour and Woodland SAC, and thus further assessment is required.

4.6 CONCLUSION OF SCREENING STAGE

In conclusion, to determine the potential impacts, if any, of the proposed works at Glengarriff pontoon on nearby Natura 2000 sites, a screening process for Appropriate Assessment was undertaken. The proposed works are within 15km of eight Natura 2000 sites.

It has been objectively concluded during the screening process that there will be no significant impacts to the following sites as a result of the proposed works:

- Caha Mountains SAC (000093)
- Derryclogher (Knockboy) Bog SAC (001873)
- Maulagowna Bog SAC (001881)
- Clonee & Inchiquin Loughs SAC (001342)
- Glanlough Woods SAC (002315)
- Sheep's Head SAC (000102)
- Kenmare River SAC (002158)

It has been objectively concluded that the proposal to undertake dredging works at Glengarriff pontoon could have significant effects, or significant effects cannot be ruled out at this stage, on one Natura 2000 site, namely Glengarriff Harbour and Woodland SAC. Further assessment is required to determine whether the project is likely to adversely affect the integrity of the site.

The recommendation of the screening process is to proceed to Stage 2; Statement for Appropriate Assessment, for one Natura 2000 site, namely:

- Glengarriff Harbour and Woodland SAC (000090)

5 REFERENCES

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Appendix 1

Stages of Appropriate Assessment

Stage 1 - Screening

This is the first stage of the Appropriate Assessment process and that undertaken to determine the likelihood of significant impacts as a result of a proposed project or plan. It determines need for a full Appropriate Assessment.

If it can be concluded that no significant impacts to Natura 2000 Sites are likely then the assessment can stop here. If not, it must proceed to Stage 2 for further more detailed assessment.

Stage 2 - Natura Impact Statement (NIS)

The second stage of the Appropriate Assessment process assesses the impact of the proposal (either alone or in combination with other projects or plans) on the integrity of the Natura 2000 Site with respect to the conservation objectives of the site and its ecological structure and function. This is a much more detailed assessment that Stage 1. A Natura Impact Statement containing a professional scientific examination of the proposal is required and includes any mitigation measure to avoid, reduce or offset negative impacts.

If the outcome of Stage 2 is negative i.e. adverse impacts to the sites cannot be scientifically ruled out, despite mitigation, the plan or project should proceed to Stage 3 or be abandoned.

Stage 3 - Assessment of alternative solutions

A detailed assessment must be undertaken to determine whether alternative ways of achieving the objective of the project/plan exists.

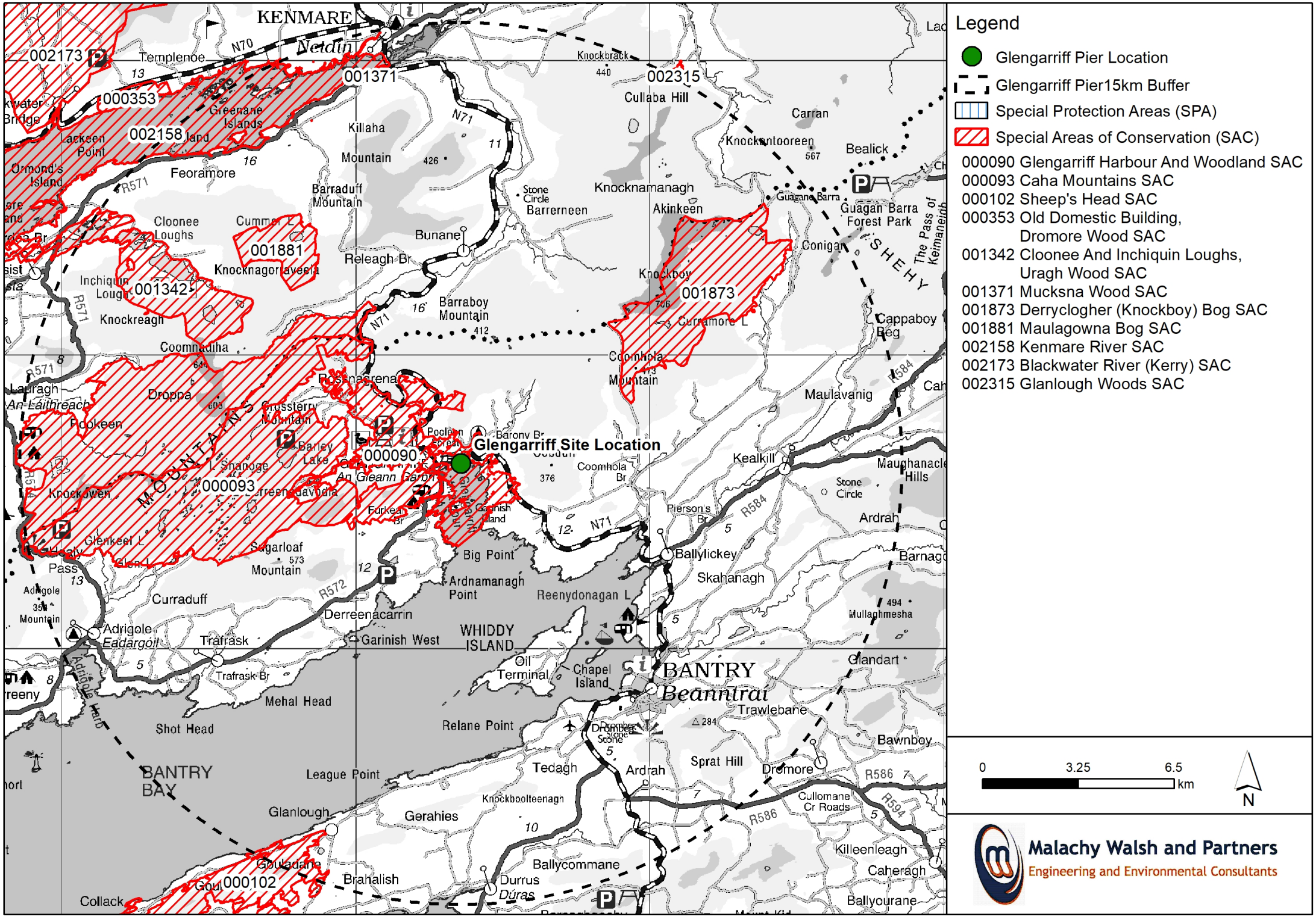
Where no alternatives exist the project/plan must proceed to Stage 4.

Stage 4 - Assessment where no alternative solutions exist and where adverse impacts remain

The final stage is the main derogation process examining whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project to adversely affect a Natura 2000 Site where no less damaging solution exists.

Appendix 2

Figures



Legend

- Glengarriff Pier Location
- Glengarriff Pier15km Buffer
- Special Protection Areas (SPA)
- Special Areas of Conservation (SAC)

000090 Glengarriff Harbour And Woodland SAC
000093 Caha Mountains SAC
000102 Sheep's Head SAC
000353 Old Domestic Building, Dromore Wood SAC
001342 Cloonee And Inchiquin Loughs, Uragh Wood SAC
001371 Mucksna Wood SAC
001873 Derryclogher (Knockboy) Bog SAC
001881 Maulagowna Bog SAC
002158 Kenmare River SAC
002173 Blackwater River (Kerry) SAC
002315 Glanlough Woods SAC

0 3.25 6.5 km

N

Malachy Walsh and Partners
Engineering and Environmental Consultants

Appendix 3

Site Investigation Survey Report

Hydrographic Surveys Ltd.

Site Surveys and Investigations at Courtmacsherry, Glengarriff and Reen Draft Report

Rev.01

03/01/2019

Client:
Cork County Council

Consulting Engineer:
Malachy Walsh and Partners

REPORT CONTROL SHEET

Client	Cork County Council					
Consulting Engineer	Malachy Walsh and Partners					
Project Name	Site Surveys and Investigations at Courtmacsherry, Glengarriff and Reen					
Report Name	Site Surveys and Investigations at Courtmacsherry, Glengarriff and Reen Report					
Project Number	PH18033					
This Report Comprises of	TOC	Text	No. of Volume	No. of Appendices	Drawings	Electronic data
	1	10	1	2	3	*.pdf *.xyz *.xlsx

Revision	**Status**	**Author(s)**	**Approved by**	**Issue Date**
Rev.00	Provisional (to be updated with final environmental test results)	HP	JBJ	13/12/2018
Rev.01	Addition of Courtmacsherry, Reen surface grab samples	HP	JBJ	03/01/2019

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1. Introduction

Hydrographic Surveys Ltd. (herein referred to as HSL) was appointed by Malachy Walsh on behalf of Cork County Council to conduct a site investigation survey at three locations in West Cork; Courtmacsherry, Glengarriff and Reen.

The site investigation compromised of single beam bathymetry, GNSS topographic surveying, surface marine grab sampling and trial pitting.

The works are to inform dredging works at the harbours/piers, required to ensure their amenity and commercial value.

1.1 Survey Time and Date

The following **Table 1** details the dates for which activities were undertaken.

Survey Area	Date	First Line start
Glengarriff	31/10/2018	Single Beam Bathymetry, Surface Grab Sampling and Topographic Survey
Courtmacsherry	08/11/2018	Trial Pitting and Topographic Survey
Reen	08/11/2018	Trial Pitting, Surface Grab Sampling and Topographic Survey
Courtmacsherry	16/11/2018	Single Beam Bathymetry
Reen	03/12/2018	Single Beam Bathymetry
Glengarriff	03/12/2018	Surface Grab Sampling
Reen	03/12/2018	Surface Grab Sampling

Table 1: Survey date summary table.

2. Survey Methodology

2.1 Single Beam Bathymetry

2.1.1 Survey Line Spacing

The West Cork Sites were surveyed using a 5m grid line spacing orientated at approximately right angles to the coastline. Surveys areas were established by scaling the survey area images provided along with the survey specification.

The survey area was extended where necessary to cover the channel areas adjacent to the survey area.

2.1.2 Tide Recording

A Valeport Tidemaster tide gauge was used to record tide values during the survey period. The tide gauge readings were calibrated by measuring from a quayside TBM (ODM) to the waterline over varying tidal conditions. The tide gauge was set to record data every 5 minutes. The standard deviation of tide gauge readings was recorded across the survey period to ensure instrument integrity.

The time on the tide gauge was checked against the survey computer and was set so that it is reading the same time as the computer.

2.1.3 Echosounder

An Odom Hydrotrac 200kHz single frequency echosounder and transducer was used to record bathymetric soundings. A bar check was used to set draft and sound velocity within the echosounder settings. All power and gain settings within the echosounder were adjusted to suit each individual site and setup.

Calibration of the Odom Hydrotrac echosounder was conducted via the bar-check method. The bar-check was carried out at the beginning and end of each survey. The bar-check depth range was extended to at least 90% of the maximum depth to be measured at the survey area. The bar-check was undertaken in suitably calm locations to ensure reliability of readings. The bar was placed at precise 1 / 2m intervals below water level throughout the water column. Care was taken to ensure the vessel was on an even keel while the bar check was being carried out to reduce error. The bar check was recorded on the analogue trace.

2.1.4 Navigation

An Ag132 GPS with differential corrections (OmniSTAR satellite) was used for the surveys. The DGPS receivers provided sub decimetre accuracy. The antenna was positioned over the transducer with zero layback.

The navigation system was interfaced to Hypack survey software for logging and for online guidance.

2.2 Topographic Survey

For the topographical survey a Trimble R6 receiver, affixed to a carbon fibre adjustable survey pole and connected to a TSC3 handheld logger was used. The receiver received GNSS corrections through the Trimble VRS Now correction stream.

The survey was carried out across the designated survey area with quay level, mooring posts, ladders, quay ramps etc. measured.

The topographical survey data is supplied along with this report in AutoCAD and in tabular format. The AutoCAD data includes points and 3D polylines where appropriate. Each item has been assigned separate layers in the format "HSL-Topo -Quay-Wall, HSL-Topo -Quay-Ramp etc.".

2.3 Grab Sampling Survey

The locations for the grab sampling were designated by the survey specification document. No specific coordinates were given for the grab sampling locations, locations were taken from the images accompanying the survey specification document.

A total of 6 grab samples were specified including 3 locations at Glengarrif, 2 locations at Courtmacsherry, 1 location at Reen.

Please see **APPENDIX A: DRAWINGS** for location maps showing the location of the 6 no. samples. The 6 sampling locations were sampled at the following coordinates;

Easting [ITM]	Northing [ITM]	Location	Sample Name	Date of Sampling
493515	556348	Glengarriff	G1	31/10/2018
493538	556335	Glengarriff	G2	31/10/2018
493555	556316	Glengarriff	G3	31/10/2018
519011	531327	Reen	R1	03/12/2018
550783	542866	Courtmacsherry	C1	03/12/2018
550792	542901	Courtmacsherry	C2	03/12/2018

Table 2: Grab Sample survey locations

2.3.5 Sample Acquisition

The surface sediment samples were taken via a stainless steel Van Veen grab sampler. Sample material was handled via latex gloves and placed directly into the appropriate sample containers. These samples were fast track couriered in a cool box directly to the certified laboratory Chemtest UK for geochemical analysis.

2.3.6 List of equipment used

Navigation – Trimble Ag132 GPS with differential correction (OmniSTAR satellite)

Bathymetry – Odom Hydrotrac, single frequency echosounder

Tide - Valeport Tidemaster tide gauge

Topography - Trimble R6 GNSS receiver with RTK corrections (Trimble VRS Now)

Grab Samples - Van Veen grab sampler

2.4 Trial Pits

HSL utilised Priority Geotechnical Ltd. (PGL) to conduct the trial pitting element of this project. PGL used a 360-track excavator and an experienced geologist to supervise the trial pitting.

Both the Reen and Courtmacsherry trial pits were dug on 8th November 2018 at low water using a 360-track excavator.

For the trial pits at Reen the location R2 (renamed TP02) located to the south off the pier could not be accessed due to the pier and tide obstructing the excavator movement.

The R2 trial pit (renamed TP02) was relocated to the north of the pier close to R1 (renamed TP01).

The majority of the two trial pits at the Reen location compromised of loose gravel material. This material was not suitable for environmental analysis due to the lack of fine material. At a depth of 2.7m on both trial pits a transition into finer material was noted. At this depth samples were taken and sent for environmental analysis. The maximum depth of 3.5m bgl was not achievable at these locations due to collapse of the sidewall of the trial pits because of the unconsolidated nature of the material in the upper 2.7m bgl.

At the Courtmacsherry location the trial pit was sampled at depths of surface (0 – 0.4), 0.5m bgl, 1.0 – 1.5m bgl and 1.5 – 2.0m bgl. Additional depths could not be achieved due to water ingress into the trial pit and collapse of the trial pit structure.

Easting [ITM]	Northing [ITM]	Ground Surface [ODM]	Location	Trial Pit Number	Date of Sampling
519043.89	531305.68	-0.96	Reen	TP01	08/11/2018
519048.54	531299.13	-0.40	Reen	TP02	08/11/2018
550774.97	542831.66	-0.73	Courtmacsherry	TP03	08/11/2018

Table 3: Trial pit location details

3. Results

The results of the bathymetry and topographical survey are presented as AutoCAD drawings and in tabular csv format along with this report.

3.1 Environmental Sampling

All grab sampling and trial pitting was carried out to the specification as outlined to HSL in the survey specification document.

The sediment sampling results are given in APPENDIX B of this report.

3.2 Radioactive Contamination

Samples are currently being analysed for each of the 3 survey areas by the RPII using High Resolution Gamma Spectrometry.

NB: This report will be updated following receipt of the radioactivity analysis.

APPENDIX A: DRAWINGS

Drawing Number	Description	Scale
PH18033_D01	Bathymetry and Topographic Survey Results – Glengarriff	1:400 at A1
PH18033_D02	Bathymetry and Topographic Survey Results – Reen	1:400 at A1
PH18033_D03	Bathymetry and Topographic Survey Results – Courtmacsherry	1:400 at A1

550700 E

550750 E

550800 E

550850 E

550900 E

542950 N

542900 N

542850 N

542800 N

SITE:

COURTMACSHERRY PIER AND PONTOON

Sheet Title:

BATHYMETRIC AND TOPOGRAPHIC SURVEY AT COURTMACHERRY PIER

CLIENT:

Cork County Council

CONSULTING ENGINEER:

Malachy Walsh and Partners

SURVEYED BY:

HYDROGRAPHIC SURVEYS LTD
The Cobbles
Crosshaven
Co. Cork

JOB NUMBER:

PH18031

DRAWING NUMBER:

PH18031_D01

DRAWN BY:

Hugh Power

SURVEY DATE(S):

16th November 2018

SCALE:

1:400 ON A1

APPROVED:

J.B.J.

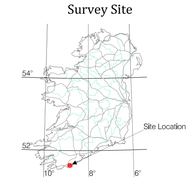
REVISION:

Rev.00

MEMOIR:

1. Constructed on Irish Transverse Mercator.
2. Horizontal control by D.G.P.S.
3. Soundings in metres and decimetres reduced to OD Malin

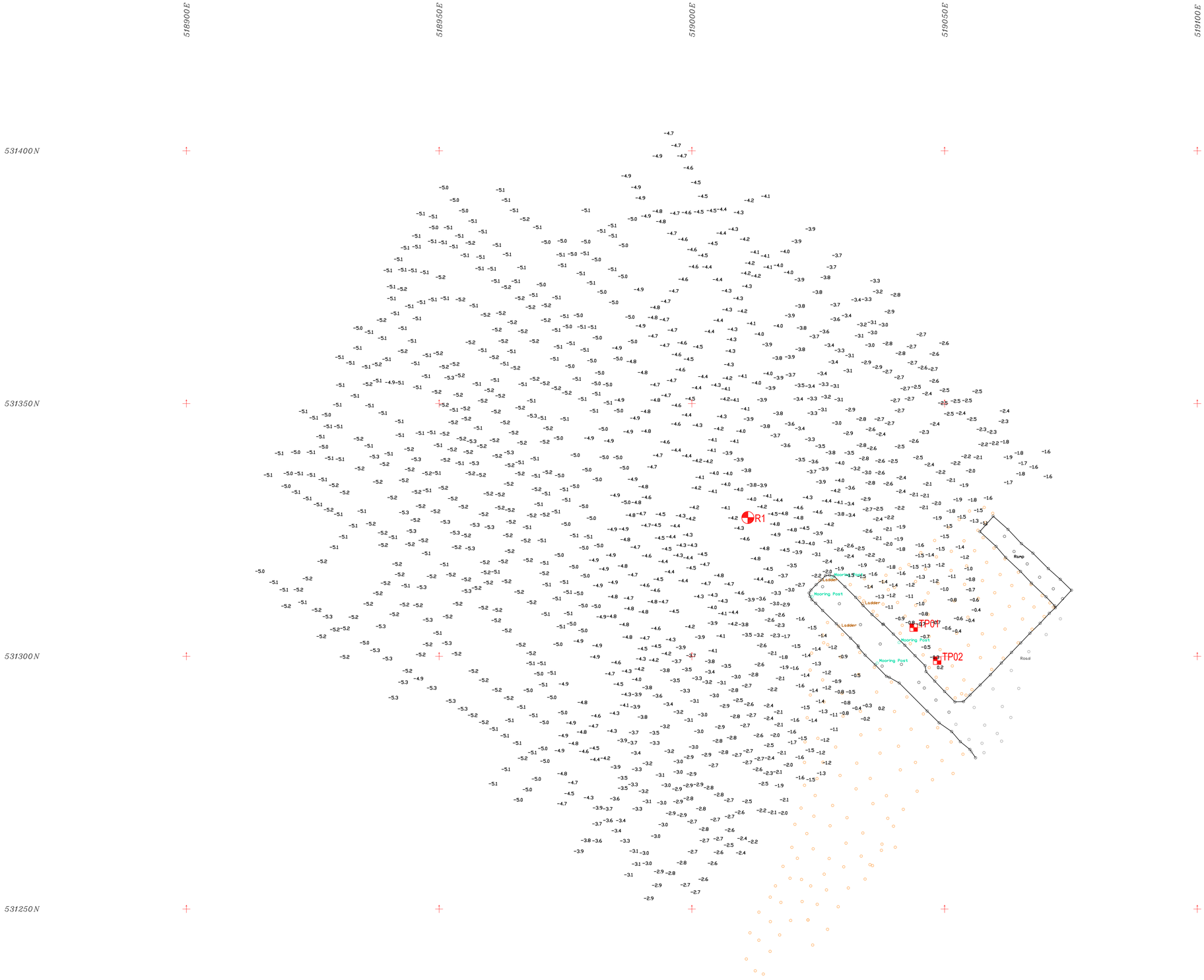
Survey Site



PRODUCED BY:

HYDROGRAPHIC SURVEYS LTD
The Cobbles
Crosshaven
Co. Cork
tel: +353 21 4831184
e: info@hydrosurvey.com

Hydrographic Surveys Ltd.



SITE:

REEN PIER

Sheet Title:

BATHYMETRIC AND TOPOGRAPHIC SURVEY AT REEN PIER

CLIENT:

Cork County Council

CONSULTING ENGINEER:

Malachy Walsh and Partners

SURVEYED BY:

HYDROGRAPHIC SURVEYS LTD
The Cobbles
Crosshaven
Co. Cork

JOB NUMBER:

PH18031

DRAWING NUMBER:

PH18031_D02

DRAWN BY:

Hugh Power

SURVEY DATE(S):

16th November 2018

SCALE:	APPROVED:
1:400 ON A1	J.B.J.

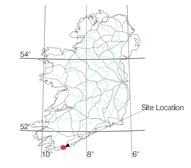
REVISION:

Rev.00

MEMOIR:

1. Constructed on Irish Transverse Mercator.
2. Horizontal control by D.G.P.S.
3. Soundings in metres and decimetres reduced to OD Malin

Survey Site



PRODUCED BY:

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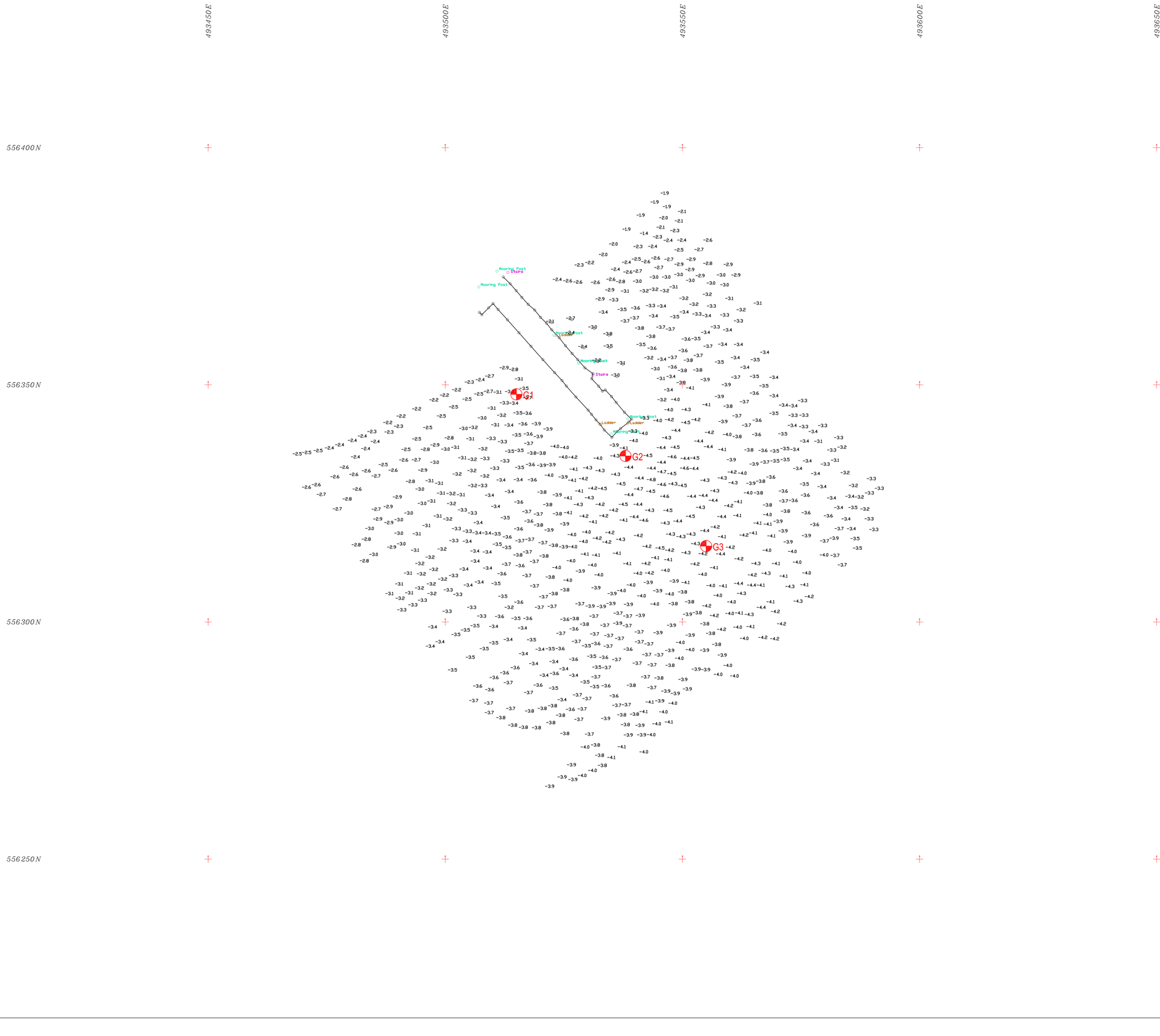
Hydrographic Surveys Ltd.



SITE:

GLENGARRIFF PIER

Sheet Title:

BATHYMETRIC AND TOPOGRAPHIC SURVEY AT GLENGARRIFF PIER

CLIENT:

Cork County Council

CONSULTING ENGINEER:

Malachy Walsh and Partners

SURVEYED BY:

HYDROGRAPHIC SURVEYS LTD
The Cobbles
Crosshaven
Co. Cork

JOB NUMBER:

PH18031

DRAWING NUMBER:

PH18031_D03

DRAWN BY:

Hugh Power

SURVEY DATE(S):

31st October 2018

SCALE:

1:400 ON A1

APPROVED:

J.B.J.

REVISION:

Rev.00

MEMOIR:

1. Constructed on Irish Transverse Mercator.
2. Horizontal control by D.G.P.S.
3. Soundings in metres and decimetres reduced to OD Malin

Survey Site

PRODUCED BY:

HYDROGRAPHIC SURVEYS LTD
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Hydrographic Surveys Ltd.

APPENDIX A: ENVIRONMENTAL TESTING RESULTS

Chemtest
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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	18-39343-1
Initial Date of Issue:	03-Jan-2019
Client	Priority Geotechnical Ltd
Client Address:	Unit 12 Owenacurra Business Park Midleton County Cork Ireland
Contact(s):	[redacted]
Project	PH18031 Reen

Quotation No.:		**Date Received:**	13-Dec-2018
Order No.:	11249	**Date Instructed:**	13-Dec-2018
No. of Samples:	1		
Turnaround (Wkdays):	7	**Results Due:**	21-Dec-2018
Date Approved:	03-Jan-2019		

Approved By:

[redacted]

Details: [redacted]aboratory Manager

Results - 2 Stage WAC

Project: PH18031 Reen

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-39343								
Chemtest Sample ID:	741563								
Sample Ref:									
Sample ID:	R1								
Sample Location:									
Top Depth(m):									
Bottom Depth(m):									
Sampling Date:	03-Dec-2018								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			0.29	3	5	6
Loss On Ignition	2610	U	%			0.90	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				8.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.0050	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0061	0.0028	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.017	0.0019	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.015	0.0059	< 0.050	0.073	0.5	10	70
Copper	1450	U	0.0099	0.0027	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0068	0.0021	< 0.050	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0067	< 0.0010	0.013	0.010	0.1	0.5	7
Zinc	1450	U	0.0063	< 0.0010	< 0.50	< 0.50	4	50	200
Chloride	1220	U	660	41	1300	1300	800	15000	25000
Fluoride	1220	U	0.27	0.11	< 1.0	1.3	10	150	500
Sulphate	1220	U	160	12	310	340	1000	20000	50000
Total Dissolved Solids	1020	N	1600	110	3200	3400	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	12	12	< 50	120	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	8.7

Leachate Test Information	
Leachant volume 1st extract/l	0.333
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.263

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	18-39335-1
Initial Date of Issue:	02-Jan-2019
Client	Priority Geotechnical Ltd
Client Address:	Unit 12 Owenacurra Business Park Midleton County Cork Ireland
Contact(s):	[redacted]
Project	PH18031 Reen

Quotation No.:		**Date Received:**	13-Dec-2018
Order No.:	11249	**Date Instructed:**	13-Dec-2018
No. of Samples:	1		
Turnaround (Wkdays):	5	**Results Due:**	19-Dec-2018
Date Approved:	02-Jan-2019		

Approved By:

[redacted]

Details: [redacted] Technical Manager

Results - Soil

Project: PH18031 Reen

Client: Priority Geotechnical Ltd			**Chemtest Job No.:**		18-39335
Quotation No.:			**Chemtest Sample ID.:**		741512
			Client Sample ID.:		R1
			Sample Type:		SOIL
			Date Sampled:		03-Dec-2018
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected
Moisture	N	2030	%	0.020	7.5
Arsenic	U	2450	mg/kg	1.0	3.4
Barium	U	2450	mg/kg	10	< 10
Cadmium	U	2450	mg/kg	0.10	< 0.10
Chromium	U	2450	mg/kg	1.0	13
Molybdenum	U	2450	mg/kg	2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	2.6
Copper	U	2450	mg/kg	0.50	12
Mercury	U	2450	mg/kg	0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	23
Lead	U	2450	mg/kg	0.50	9.3
Selenium	U	2450	mg/kg	0.20	< 0.20
Zinc	U	2450	mg/kg	0.50	44
Mineral Oil	N	2670	mg/kg	10	< 10
Total TPH >C6-C40	U	2670	mg/kg	10	< 10
Dibutyl Tin	N	2730	µg/kg	10	< 10
Tributyl Tin	N	2730	µg/kg	10	< 10

Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2730	Organo-Leads	Organo-Leads	Solvent extraction / GCMS detection

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Key

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N	Unaccredited
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SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
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U/S	Unsuitable Sample
N/E	not evaluated
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>	"greater than"

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A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
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D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

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customerservices@chemtest.com

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Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	18-39255-1
Initial Date of Issue:	03-Jan-2019
Client	Priority Geotechnical Ltd
Client Address:	Unit 12 Owenacurra Business Park Midleton County Cork Ireland
Contact(s):	Colette Kelly
Project	PH18031 Court Mac Sherry

Quotation No.:		**Date Received:**	13-Dec-2018
Order No.:	11249	**Date Instructed:**	13-Dec-2018
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	21-Dec-2018
Date Approved:	03-Jan-2019		

Approved By:

[redacted]

Details: [redacted] Laboratory Manager

Results - 2 Stage WAC

Project: PH18031 Court Mac Sherry

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-39255								
Chemtest Sample ID:	741200								
Sample Ref:							**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:									
Sample Location:	C1								
Top Depth(m):									
Bottom Depth(m):									
Sampling Date:	03-Dec-2018								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			0.45	3	5	6
Loss On Ignition	2610	U	%			4.1	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				8.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.026	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0060	0.0027	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.030	0.0049	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	0.00013	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.016	0.0049	< 0.050	0.067	0.5	10	70
Copper	1450	U	0.0099	< 0.0010	< 0.050	< 0.050	2	50	100
Mercury	1450	U	0.0038	< 0.00050	0.0073	0.0064	0.01	0.2	2
Molybdenum	1450	U	0.053	0.0066	0.10	0.14	0.5	10	30
Nickel	1450	U	0.0016	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	0.0028	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.018	0.0018	0.035	0.045	0.1	0.5	7
Zinc	1450	U	0.016	0.0013	< 0.50	< 0.50	4	50	200
Chloride	1220	U	1400	100	2700	3100	800	15000	25000
Fluoride	1220	U	0.46	0.16	< 1.0	2.1	10	150	500
Sulphate	1220	U	240	22	460	580	1000	20000	50000
Total Dissolved Solids	1020	N	2900	200	5700	6600	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	9.0	8.2	< 50	83	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	23

Leachate Test Information	
Leachant volume 1st extract/l	0.299
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.294

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: PH18031 Court Mac Sherry

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-39255								
Chemtest Sample ID:	741201								
Sample Ref:									
Sample ID:									
Sample Location:	C2								
Top Depth(m):									
Bottom Depth(m):									
Sampling Date:	03-Dec-2018								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			< 0.20	3	5	6
Loss On Ignition	2610	U	%			2.9	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				8.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0034	0.0016	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.012	0.0030	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	0.00011	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.013	0.0059	< 0.050	0.071	0.5	10	70
Copper	1450	U	0.0041	< 0.0010	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.059	0.010	0.11	0.18	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	0.0021	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.011	< 0.0010	0.021	0.019	0.1	0.5	7
Zinc	1450	U	0.0080	0.0012	< 0.50	< 0.50	4	50	200
Chloride	1220	U	1200	78	2300	2700	800	15000	25000
Fluoride	1220	U	0.40	0.14	< 1.0	1.8	10	150	500
Sulphate	1220	U	190	18	360	470	1000	20000	50000
Total Dissolved Solids	1020	N	2500	160	4700	5600	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	10	12	< 50	120	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	25

Leachate Test Information	
Leachant volume 1st extract/l	0.292
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.300

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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Report Information

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UKAS TESTING
2183

Final Report

Report No.:	18-39250-1
Initial Date of Issue:	21-Dec-2018
Client	Priority Geotechnical Ltd
Client Address:	Unit 12 Owenacurra Business Park Midleton County Cork Ireland
Contact(s):	[redacted]
Project	PH18031 Court Mac Sherry

Quotation No.:		**Date Received:**	13-Dec-2018
Order No.:	11249	**Date Instructed:**	13-Dec-2018
No. of Samples:	2		
Turnaround (Wkdays):	5	**Results Due:**	19-Dec-2018
Date Approved:	21-Dec-2018		

Approved By:

[redacted]

Details: [redacted] Laboratory Manager

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Results - Soil

Project: PH18031 Court Mac Sherry

Client: Priority Geotechnical Ltd			**Chemtest Job No.:**		18-39250	18-39250
Quotation No.:			**Chemtest Sample ID.:**		741178	741179
			Sample Location:		C1	C2
			Sample Type:		SOIL	SOIL
			Date Sampled:		03-Dec-2018	03-Dec-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	24	30
Arsenic	U	2450	mg/kg	1.0	13	14
Barium	U	2450	mg/kg	10	17	18
Cadmium	U	2450	mg/kg	0.10	< 0.10	< 0.10
Chromium	U	2450	mg/kg	1.0	8.9	9.0
Molybdenum	U	2450	mg/kg	2.0	< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0
Copper	U	2450	mg/kg	0.50	4.1	4.7
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	9.8	10
Lead	U	2450	mg/kg	0.50	7.7	7.0
Selenium	U	2450	mg/kg	0.20	0.20	< 0.20
Zinc	U	2450	mg/kg	0.50	21	21
Mineral Oil	N	2670	mg/kg	10	< 10	< 10
Total TPH >C6-C40	U	2670	mg/kg	10	< 10	< 10
Dibutyl Tin	N	2730	µg/kg	10	< 10	< 10
Tributyl Tin	N	2730	µg/kg	10	< 10	< 10

Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2730	Organo-Leads	Organo-Leads	Solvent extraction / GCMS detection

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Final Report

Report No.:	18-36335-1
Initial Date of Issue:	27-Nov-2018
Client	Priority Geotechnical Ltd
Client Address:	Unit 12 Owenacurra Business Park Midleton County Cork Ireland
Contact(s):	[redacted]
Project	PH18031 Court MacSherry

Quotation No.:		**Date Received:**	20-Nov-2018
Order No.:	11249	**Date Instructed:**	20-Nov-2018
No. of Samples:	4		
Turnaround (Wkdays):	5	**Results Due:**	26-Nov-2018
Date Approved:	27-Nov-2018		

Approved By:

[redacted]

Details: [redacted] Laboratory Manager

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Results - Soil

Project: PH18031 Court MacSherry

Client: Priority Geotechnical Ltd			**Chemtest Job No.:**		18-36335	18-36335	18-36335	18-36335
Quotation No.:			**Chemtest Sample ID.:**		727678	727679	727680	727681
			Sample Location:		TP03	TP03	TP03	TP03
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.5	0.0	1.0	1.5
			Bottom Depth (m):			0.4	1.5	2.0
			Date Sampled:		08-Nov-2018	08-Nov-2018	08-Nov-2018	08-Nov-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	26	24	27	26
Arsenic	U	2450	mg/kg	1.0	9.4	11	13	10
Barium	U	2450	mg/kg	10	110	87	53	14
Cadmium	U	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chromium	U	2450	mg/kg	1.0	11	14	14	8.2
Molybdenum	U	2450	mg/kg	2.0	3.0	< 2.0	< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	U	2450	mg/kg	0.50	17	34	53	5.5
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	25	22	20	9.8
Lead	U	2450	mg/kg	0.50	8.0	9.9	19	6.8
Selenium	U	2450	mg/kg	0.20	0.22	0.25	< 0.20	< 0.20
Zinc	U	2450	mg/kg	0.50	40	47	72	19
Mineral Oil	N	2670	mg/kg	10	< 10	32	< 10	< 10
Total TPH >C6-C40	U	2670	mg/kg	10	< 10	45	< 10	< 10
Dibutyl Tin	N	2730	µg/kg	10	< 10	< 10	< 10	< 10
Tributyl Tin	N	2730	µg/kg	10	< 10	< 10	< 10	< 10

Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2730	Organo-Leads	Organo-Leads	Solvent extraction / GCMS detection

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Final Report

Report No.:	18-36332-1
Initial Date of Issue:	29-Nov-2018
Client	Priority Geotechnical Ltd
Client Address:	Unit 12 Owenacurra Business Park Midleton County Cork Ireland
Contact(s):	[redacted]
Project	PH18031 Court MacSherry
Quotation No.:	
Order No.:	11249
No. of Samples:	4
Turnaround (Wkdays):	7
Date Approved:	29-Nov-2018
Approved By:	

Date Received:	20-Nov-2018
Date Instructed:	20-Nov-2018
Results Due:	28-Nov-2018

[redacted]

Details: Robert Monk, Technical Manager

Results - 2 Stage WAC

Project: PH18031 Court MacSherry

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-36332								
Chemtest Sample ID:	727659								
Sample Ref:							**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:									
Sample Location:	TP03								
Top Depth(m):	0.5								
Bottom Depth(m):									
Sampling Date:	08-Nov-2018								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			2.3	3	5	6
Loss On Ignition	2610	U	%			4.6	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				8.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.057	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0025	0.0042	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.026	0.015	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.0030	0.0011	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0061	0.0047	< 0.050	< 0.050	2	50	100
Mercury	1450	U	0.0013	< 0.00050	0.0025	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.040	0.0090	0.077	0.13	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	0.0017	0.0031	< 0.010	0.029	0.5	10	50
Antimony	1450	U	0.0028	0.0018	< 0.010	0.019	0.06	0.7	5
Selenium	1450	U	0.0030	0.0012	< 0.010	0.014	0.1	0.5	7
Zinc	1450	U	0.011	0.0018	< 0.50	< 0.50	4	50	200
Chloride	1220	U	42	6.6	81	110	800	15000	25000
Fluoride	1220	U	0.44	0.39	< 1.0	3.9	10	150	500
Sulphate	1220	U	560	63	1100	1300	1000	20000	50000
Total Dissolved Solids	1020	N	720	91	1400	1700	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	20	11	< 50	120	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	24

Leachate Test Information	
Leachant volume 1st extract/l	0.294
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.225

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: PH18031 Court MacSherry

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-36332								
Chemtest Sample ID:	727660								
Sample Ref:									
Sample ID:									
Sample Location:	TP03								
Top Depth(m):	0.0								
Bottom Depth(m):	0.4								
Sampling Date:	08-Nov-2018								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			3.9	3	5	6
Loss On Ignition	2610	U	%			5.5	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			39	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			13	100	--	--
pH	2010	U				8.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.048	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0065	0.0030	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.016	0.0075	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.021	0.0078	< 0.050	0.10	0.5	10	70
Copper	1450	U	0.0083	0.0056	< 0.050	< 0.050	2	50	100
Mercury	1450	U	0.0045	0.00098	0.0088	0.016	0.01	0.2	2
Molybdenum	1450	U	0.050	0.0069	0.098	0.15	0.5	10	30
Nickel	1450	U	0.0012	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	0.0020	0.0014	< 0.010	0.015	0.06	0.7	5
Selenium	1450	U	0.011	0.0016	0.022	0.033	0.1	0.5	7
Zinc	1450	U	0.0093	0.0025	< 0.50	< 0.50	4	50	200
Chloride	1220	U	1800	190	3600	4800	800	15000	25000
Fluoride	1220	U	0.82	0.38	1.6	4.6	10	150	500
Sulphate	1220	U	330	53	650	1000	1000	20000	50000
Total Dissolved Solids	1020	N	3800	370	7400	9800	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	15	8.6	< 50	97	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	17

Leachate Test Information	
Leachant volume 1st extract/l	0.314
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.315

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: PH18031 Court MacSherry

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-36332								
Chemtest Sample ID:	727661								
Sample Ref:							**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:									
Sample Location:	TP03								
Top Depth(m):	1.0								
Bottom Depth(m):	1.5								
Sampling Date:	08-Nov-2018								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			0.68	3	5	6
Loss On Ignition	2610	U	%			3.4	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			8.6	100	--	--
pH	2010	U				8.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.042	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0091	0.0023	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.16	0.13	< 0.50	1.3	20	100	300
Cadmium	1450	U	0.00035	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.037	0.016	0.072	0.20	0.5	10	70
Copper	1450	U	0.035	0.014	0.068	0.069	2	50	100
Mercury	1450	U	0.0010	< 0.00050	0.0019	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.17	0.023	0.33	0.51	0.5	10	30
Nickel	1450	U	0.0015	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	0.0038	0.0014	< 0.010	0.019	0.06	0.7	5
Selenium	1450	U	0.017	0.0020	0.033	0.050	0.1	0.5	7
Zinc	1450	U	0.015	0.0061	< 0.50	< 0.50	4	50	200
Chloride	1220	U	3000	320	5900	8500	800	15000	25000
Fluoride	1220	U	0.63	0.28	1.2	3.5	10	150	500
Sulphate	1220	U	460	64	900	1400	1000	20000	50000
Total Dissolved Solids	1020	N	6100	580	12000	17000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	34	14	67	180	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	21

Leachate Test Information	
Leachant volume 1st extract/l	0.304
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.346

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: PH18031 Court MacSherry

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-36332								
Chemtest Sample ID:	727662								
Sample Ref:							**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:									
Sample Location:	TP03								
Top Depth(m):	1.5								
Bottom Depth(m):	2.0								
Sampling Date:	08-Nov-2018								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			0.31	3	5	6
Loss On Ignition	2610	U	%			1.7	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			8.6	100	--	--
pH	2010	U				8.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.048	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0087	0.0019	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.026	0.018	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	0.00014	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.039	0.014	0.075	0.19	0.5	10	70
Copper	1450	U	0.046	0.0056	0.088	0.099	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.038	0.0031	0.073	0.11	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	0.0016	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.015	0.0010	0.029	0.040	0.1	0.5	7
Zinc	1450	U	0.012	0.0027	< 0.50	< 0.50	4	50	200
Chloride	1220	U	2700	170	5100	7100	800	15000	25000
Fluoride	1220	U	0.57	0.22	1.1	2.9	10	150	500
Sulphate	1220	U	400	34	760	1100	1000	20000	50000
Total Dissolved Solids	1020	N	5300	410	10000	15000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	9.3	10	< 50	100	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	26

Leachate Test Information	
Leachant volume 1st extract/l	0.290
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.378

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Chemtest
The right chemistry to deliver results

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	18-35375-1
Initial Date of Issue:	21-Nov-2018
Client	Priority Geotechnical Ltd
Client Address:	Unit 12 Owenacurra Business Park Midleton County Cork Ireland
Contact(s):	[redacted]
Project	PH18031 Glengarriff

Quotation No.:		**Date Received:**	13-Nov-2018
Order No.:	11249	**Date Instructed:**	13-Nov-2018
No. of Samples:	3		
Turnaround (Wkdays):	7	**Results Due:**	21-Nov-2018
Date Approved:	21-Nov-2018		

Approved By:

[redacted] Technical Manager

Results - 2 Stage WAC

Project: PH18031 Glengarriff

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-35375								
Chemtest Sample ID:	723350								
Sample Ref:									
Sample ID:									
Sample Location:	G1								
Top Depth(m):									
Bottom Depth(m):									
Sampling Date:	31-Oct-2018								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			5.5	3	5	6
Loss On Ignition	2610	U	%			11	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			81	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			24	100	--	--
pH	2010	U				9.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.12	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.021	0.0046	< 0.050	0.070	0.5	2	25
Barium	1450	U	0.022	0.0075	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	0.00018	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.051	0.012	0.083	0.18	0.5	10	70
Copper	1450	U	0.033	0.012	0.053	0.052	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.079	0.012	0.13	0.22	0.5	10	30
Nickel	1450	U	0.0023	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	0.0020	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.028	0.0030	0.045	0.068	0.1	0.5	7
Zinc	1450	U	0.056	0.011	< 0.50	< 0.50	4	50	200
Chloride	1220	U	3800	450	6100	9600	800	15000	25000
Fluoride	1220	U	0.48	0.21	< 1.0	2.4	10	150	500
Sulphate	1220	U	970	110	1600	2400	1000	20000	50000
Total Dissolved Solids	1020	N	8500	780	14000	20000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	18	9.2	< 50	100	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	46

Leachate Test Information	
Leachant volume 1st extract/l	0.204
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.276

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: PH18031 Glengarriff

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-35375								
Chemtest Sample ID:	723351								
Sample Ref:									
Sample ID:									
Sample Location:	G2								
Top Depth(m):									
Bottom Depth(m):									
Sampling Date:	31-Oct-2018								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			16	3	5	6
Loss On Ignition	2610	U	%			26	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			3.1	100	--	--
pH	2010	U				7.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.030	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.023	0.0042	< 0.050	0.073	0.5	2	25
Barium	1450	U	0.020	0.011	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	0.00028	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.071	0.022	< 0.050	0.29	0.5	10	70
Copper	1450	U	< 0.0010	0.031	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.13	0.032	0.087	0.47	0.5	10	30
Nickel	1450	U	0.0020	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.039	0.0054	0.026	0.11	0.1	0.5	7
Zinc	1450	U	0.057	0.023	< 0.50	< 0.50	4	50	200
Chloride	1220	U	4800	740	3200	14000	800	15000	25000
Fluoride	1220	U	0.47	0.29	< 1.0	2.9	10	150	500
Sulphate	1220	U	1200	170	790	3500	1000	20000	50000
Total Dissolved Solids	1020	N	9800	1300	6600	28000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	17	9.8	< 50	100	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	68

Leachate Test Information	
Leachant volume 1st extract/l	0.000
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.345

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: PH18031 Glengarriff

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-35375								
Chemtest Sample ID:	723352								
Sample Ref:									
Sample ID:									
Sample Location:	G3								
Top Depth(m):									
Bottom Depth(m):									
Sampling Date:	31-Oct-2018								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			7.8	3	5	6
Loss On Ignition	2610	U	%			22	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			140	100	--	--
pH	2010	U				7.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.012	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.024	0.0042	< 0.050	0.074	0.5	2	25
Barium	1450	U	0.024	0.0093	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	0.00019	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.077	0.027	0.052	0.33	0.5	10	70
Copper	1450	U	0.086	0.015	0.058	0.17	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.091	0.023	0.061	0.33	0.5	10	30
Nickel	1450	U	0.0027	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.039	0.0046	0.026	0.11	0.1	0.5	7
Zinc	1450	U	0.059	0.015	< 0.50	< 0.50	4	50	200
Chloride	1220	U	5100	640	3400	14000	800	15000	25000
Fluoride	1220	U	0.39	0.23	< 1.0	2.3	10	150	500
Sulphate	1220	U	1400	160	930	3800	1000	20000	50000
Total Dissolved Solids	1020	N	10000	1200	7000	28000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	18	8.6	< 50	92	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	67

Leachate Test Information	
Leachant volume 1st extract/l	0.000
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.335

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2810	Polychlorinated Biphenyls (PCB) as Aroclors in Soils by GC-ECD	Polychlorinated Biphenyls expressed as an Aroclor (normally reported as *Aroclor 1242)	Extraction of a soil sample, as received, into hexane/acetone (50:50) followed by gas chromatography (GC) using mass spectrometric (MS) detection for identification of polychlorinated biphenyls and electron capture detection (ECD) for quanitation if present.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

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Chemtest Ltd.
Depot Road
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CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	18-35374-1
Initial Date of Issue:	19-Nov-2018
Client	Priority Geotechnical Ltd
Client Address:	Unit 12 Owenacurra Business Park Midleton County Cork Ireland
Contact(s):	[redacted]
Project	P18031 Glengarriff

Quotation No.:		**Date Received:**	13-Nov-2018
Order No.:	11249	**Date Instructed:**	13-Nov-2018
No. of Samples:	3		
Turnaround (Wkdays):	5	**Results Due:**	19-Nov-2018
Date Approved:	19-Nov-2018		

Approved By:

[redacted]

Details: [redacted] Laboratory Manager

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Results - Soil

Project: P18031 Glengarriff

Client: Priority Geotechnical Ltd			**Chemtest Job No.:**		18-35374	18-35374	18-35374
Quotation No.:			**Chemtest Sample ID.:**		723347	723348	723349
			Sample Location:		G1	G2	G3
			Sample Type:		SOIL	SOIL	SOIL
			Date Sampled:		31-Oct-2018	31-Oct-2018	31-Oct-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	51	65	58
Arsenic	U	2450	mg/kg	1.0	23	15	17
Barium	U	2450	mg/kg	10	36	16	17
Cadmium	U	2450	mg/kg	0.10	0.67	0.93	1.1
Chromium	U	2450	mg/kg	1.0	32	34	36
Molybdenum	U	2450	mg/kg	2.0	5.6	14	16
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0
Copper	U	2450	mg/kg	0.50	200	44	52
Mercury	U	2450	mg/kg	0.10	0.19	0.15	0.18
Nickel	U	2450	mg/kg	0.50	32	29	32
Lead	U	2450	mg/kg	0.50	49	27	34
Selenium	U	2450	mg/kg	0.20	1.2	2.5	3.0
Zinc	U	2450	mg/kg	0.50	330	210	210
Mineral Oil	N	2670	mg/kg	10	84	< 10	< 10
Total TPH >C5-C40	N	2670	mg/kg	10	120	< 10	< 10
Dibutyl Tin	N	2730	µg/kg	10	< 10	< 10	< 10
Tributyl Tin	N	2730	µg/kg	10	< 10	< 10	< 10

Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2730	Organo-Leads	Organo-Leads	Solvent extraction / GCMS detection

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Report Information

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I/S	Insufficient Sample
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N/E	not evaluated
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>	"greater than"

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The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

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Email: info@chemtest.com

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2183

Final Report

Report No.:	18-35373-1
Initial Date of Issue:	23-Nov-2018
Client	Priority Geotechnical Ltd
Client Address:	Unit 12 Owenacurra Business Park Midleton County Cork Ireland
Contact(s):	Colette Kelly
Project	PH18031 Reen

Quotation No.:		**Date Received:**	13-Nov-2018
Order No.:	11249	**Date Instructed:**	13-Nov-2018
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	21-Nov-2018
Date Approved:	23-Nov-2018		

Approved By:

[redacted]

Details: [redacted] Technical Manager

Results - 2 Stage WAC

Project: PH18031 Reen

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-35373								
Chemtest Sample ID:	723345								
Sample Ref:							**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Sample ID:									
Sample Location:	TP01								
Top Depth(m):	2.70								
Bottom Depth(m):									
Sampling Date:	08-Nov-2018								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			1.5	3	5	6
Loss On Ignition	2610	U	%			1.9	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			21	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			6.6	100	--	--
pH	2010	U				9.9	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.030	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.011	0.0026	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.025	0.0038	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	0.00070	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.032	0.0034	0.063	0.082	0.5	10	70
Copper	1450	U	0.011	0.0017	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.33	0.026	0.65	0.77	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	0.0032	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.017	0.0011	0.034	0.038	0.1	0.5	7
Zinc	1450	U	0.013	0.0024	< 0.50	< 0.50	4	50	200
Chloride	1220	U	2200	200	4400	5400	800	15000	25000
Fluoride	1220	U	0.54	0.13	1.1	2.0	10	150	500
Sulphate	1220	U	340	32	670	830	1000	20000	50000
Total Dissolved Solids	1020	N	4600	310	9000	10000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	12	7.6	< 50	84	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	15

Leachate Test Information	
Leachant volume 1st extract/l	0.320
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.294

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: PH18031 Reen

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-35373								
Chemtest Sample ID:	723346								
Sample Ref:									
Sample ID:									
Sample Location:	TP02								
Top Depth(m):	2.70								
Bottom Depth(m):									
Sampling Date:	08-Nov-2018								
Determinand	**SOP**	**Accred.**	**Units**				**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%			1.1	3	5	6
Loss On Ignition	2610	U	%			5.1	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				11.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.024	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0083	0.0036	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.028	0.0061	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	0.00038	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.026	0.0026	0.052	0.065	0.5	10	70
Copper	1450	U	0.0093	0.0040	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.19	0.017	0.38	0.46	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	0.0043	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0085	0.0010	0.017	0.023	0.1	0.5	7
Zinc	1450	U	0.012	0.0034	< 0.50	< 0.50	4	50	200
Chloride	1220	U	1200	140	2400	3200	800	15000	25000
Fluoride	1220	U	0.53	0.13	1.1	2.0	10	150	500
Sulphate	1220	U	270	36	540	750	1000	20000	50000
Total Dissolved Solids	1020	N	2700	200	5400	6200	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	11	8.5	< 50	88	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	9.5

Leachate Test Information	
Leachant volume 1st extract/l	0.332
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.292

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2810	Polychlorinated Biphenyls (PCB) as Aroclors in Soils by GC-ECD	Polychlorinated Biphenyls expressed as an Aroclor (normally reported as *Aroclor 1242)	Extraction of a soil sample, as received, into hexane/acetone (50:50) followed by gas chromatography (GC) using mass spectrometric (MS) detection for identification of polychlorinated biphenyls and electron capture detection (ECD) for quanitation if present.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
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UKAS TESTING
2183

Final Report

Report No.:	18-35372-1
Initial Date of Issue:	21-Nov-2018
Client	Priority Geotechnical Ltd
Client Address:	Unit 12 Owenacurra Business Park Midleton County Cork Ireland
Contact(s):	Colette Kelly
Project	PH18031 Reen

Quotation No.:		**Date Received:**	13-Nov-2018
Order No.:	11249	**Date Instructed:**	13-Nov-2018
No. of Samples:	2		
Turnaround (Wkdays):	5	**Results Due:**	19-Nov-2018
Date Approved:	21-Nov-2018		

Approved By:

[redacted]

Details: [redacted] Technical Manager

Results - Soil

Project: PH18031 Reen

Client: Priority Geotechnical Ltd			**Chemtest Job No.:**		18-35372	18-35372
Quotation No.:			**Chemtest Sample ID.:**		723343	723344
			Sample Location:		TP01	TP02
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.70	2.70
			Date Sampled:		08-Nov-2018	08-Nov-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	13	10
Arsenic	U	2450	mg/kg	1.0	7.8	13
Barium	U	2450	mg/kg	10	26	13
Cadmium	U	2450	mg/kg	0.10	0.67	0.19
Chromium	U	2450	mg/kg	1.0	8.1	14
Molybdenum	U	2450	mg/kg	2.0	< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	4.0	< 2.0
Copper	U	2450	mg/kg	0.50	8.3	58
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	17	23
Lead	U	2450	mg/kg	0.50	13	17
Selenium	U	2450	mg/kg	0.20	< 0.20	0.34
Zinc	U	2450	mg/kg	0.50	78	94
Mineral Oil	N	2670	mg/kg	10	330	150
Total TPH >C6-C40	U	2670	mg/kg	10	470	210
Dibutyl Tin	N	2730	µg/kg	10	< 10	< 10
Tributyl Tin	N	2730	µg/kg	10	< 10	< 10

Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2730	Organo-Leads	Organo-Leads	Solvent extraction / GCMS detection

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customerservices@chemtest.com

Appendix 4

Marine Mammal Risk Assessment

MARINE MAMMAL RISK ASSESSMENT OF PROPOSED DREDGING AT THREE SITES IN WEST CORK

Prepared by
Dr Simon Berrow

IWDG Consulting, Merchants Quay, Kilrush, Co Clare

1 | INTRODUCTION

The Irish Whale and Dolphin Group (IWDG) were contracted by the engineering and environmental consultants Malachy Walsh and Partners to carry out a Marine Mammal Risk Assessment of the proposed dredging operations at three sites in Co Cork. The proposed works are scheduled for Courtmacsherry, Reen Pier in Castlehaven and Glengarriff. This assessment is to be carried out in accordance with "Guidance to manage the risk to marine mammals from manmade sounds sources in Irish Waters" published by the NPWS (2014).

2 | LEGAL STATUS

Irish cetaceans and pinnipeds are protected under national legislation and under a number of international directives and agreements which Ireland is signatory to. All cetaceans as well as grey and harbour seals are protected under the Wildlife Act (1976) and amendments (2000, 2005, 2010 and 2012). Under the act and its amendments it is an offence to hunt, injure or wilfully interfere with, disturb or destroy the resting or breeding place of a protected species (except under license or permit). The act applies out to the 12 nml limit of Irish territorial waters.

All cetaceans and pinnipeds are protected under the EC Habitats Directive. All cetaceans are included in Annex IV of the Directive as species 'in need of strict protection'. Under this Directive, the harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*) are designated Annex II species which are of community interest and whose conservation requires the designation of special areas of conservation.

Ireland is also signatory to conservation agreements such as the Bonn Convention on Migratory Species (1983), the OSPAR Convention for the Protection of the Marine Environment of the northeast Atlantic (1992) and the Berne Convention on Conservation of European Wildlife and Natural Habitats (1979).

In 2007, the National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage and the Gaeltacht produced a '*Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish*

Waters (NPWS, 2007). These were subsequently reviewed and amended to produce '*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters*' (NPWS, 2014) which include mitigation measures specific to dredging. The guidelines recommend that listed coastal and marine activities (including dredging) be subject to a risk assessment for anthropogenic sound-related impacts on relevant protected marine mammal species to address any area-specific sensitivities, both in timing and spatial extent, and to inform the consenting process.

Once the listed activity has been subject to a risk assessment, the regulator may decide to refuse consent, to grant consent with no requirement for mitigation, or to grant consent subject to specified mitigation measures.

3 | METHODS

This risk assessment was based on a review of the available literature and data sources. Maps of the distribution of cetacean sightings adjacent to each site were prepared using data from the Irish Whale and Dolphin Group's casual sightings database (IWDG, accessed 19 November 2018). A literature review of potential impacts of dredging was carried out to assess risk.

4 | BASELINE ENVIRONMENT

4.1 | Courtmacsherry

Courtmacsherry is a seaside village located approximately 30 miles/50km (by road) southwest of Cork. The village runs west to east along the southern shore of Courtmacsherry Bay with a pier, slipway and pontoon for sea access in the centre of the village. Courtmacsherry Estuary SAC (Site code 001230) includes 10 marine and coastal habitats as qualifying interests but no marine mammals.

4.1.1 | Cetaceans

To date, 582 validated cetacean records of a total of 8,449 individuals were available from the area of interest were available for this assessment. Most records were of harbour porpoise (223 or 35% of all records), followed by common dolphin (114/18%). Fin and minke whales were also frequently reported with lesser numbers of bottlenose dolphin and humpback whale (Table 1). In addition Risso's dolphin were also recorded making a total of seven species, reflecting the high diversity and productivity of this area (Table 1).

Harbour porpoise (Phocoena phocoena)

Harbour porpoise are the most widespread and abundant cetacean species in inshore Irish waters, with highest abundances in the Irish Sea and off the southwest coasts (Berrow et al. 2010) and occur in all months. Harbour porpoise were sighted throughout the area of interest with large concentrations off the Old Head of Kinsale around 10km from the mouth of Courtmacsherry estuary (Figure 1), presumably foraging in areas of strong tidal currents frequent off the Old Head of Kinsale. Sightings also occurred at the mouth of Courtmacsherry estuary, but not near the dredge site.

Table 1. Cetacean sightings (including IWDG downgrades) recorded off Courtmacsherry from 2000-2018

Species	Number of sightings (individuals)	% of total
Harbour Porpoise	223 (1361)	35.1
Common dolphin	114 (6005)	17.9
Fin whale	74 (254)	11.6
Minke whale	60 (127)	9.5
Bottlenose dolphin	17 (181)	2.7
Humpback whale	17 (35)	2.7
Risso's dolphin	5 (36)	0.8
Dolphin possibly harbour porpoise	8 (59)	1.2
Dolphin sp.	19 (215)	3.0
Patterned dolphin	1 (2)	0.1
Sei/Fin/Blue	4 (6)	0.6
Large whale	26 (46)	4.1
Whale sp.	11 (25)	1.7
Cetacean sp.	3 (17)	0.5
Basking shark	53 (256)	8.3
Total	**635**	**100**

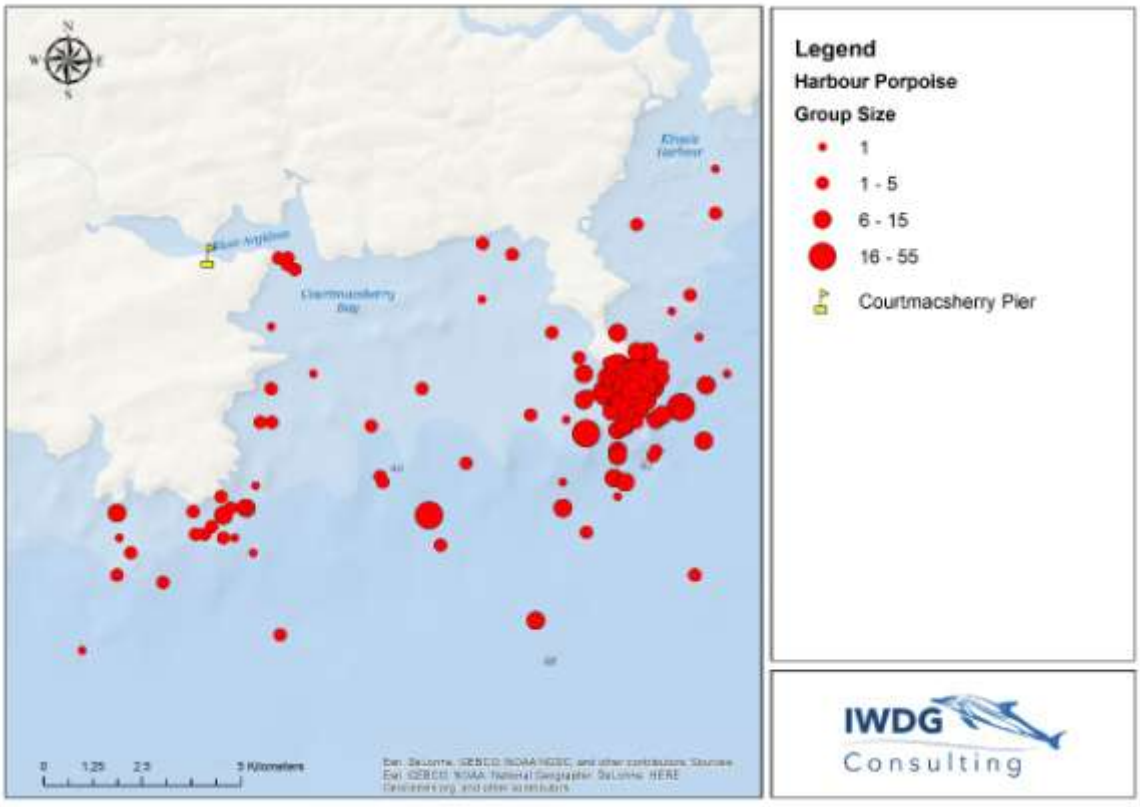


Figure 1. Sighting records of harbour porpoise (from IWDG accessed November 2018)

Common dolphin (Delphinus delphis)

Common dolphins are distributed around the entire Irish coast but highest concentrations occur off the south west and west coasts (Berrow et al. 2010) from July to April, with only May and June with no records. However, in the winter large numbers of common dolphins enter the Celtic Sea to feed on schools of pelagic fish such as herring and sprat. Common dolphin were sighted mainly off Old Head of Kinsale and in offshore waters. They have been reported in adjacent waters to Coutrtmacsherry but not near the estuary, nor adjacent to the dredge site (Figure 2).

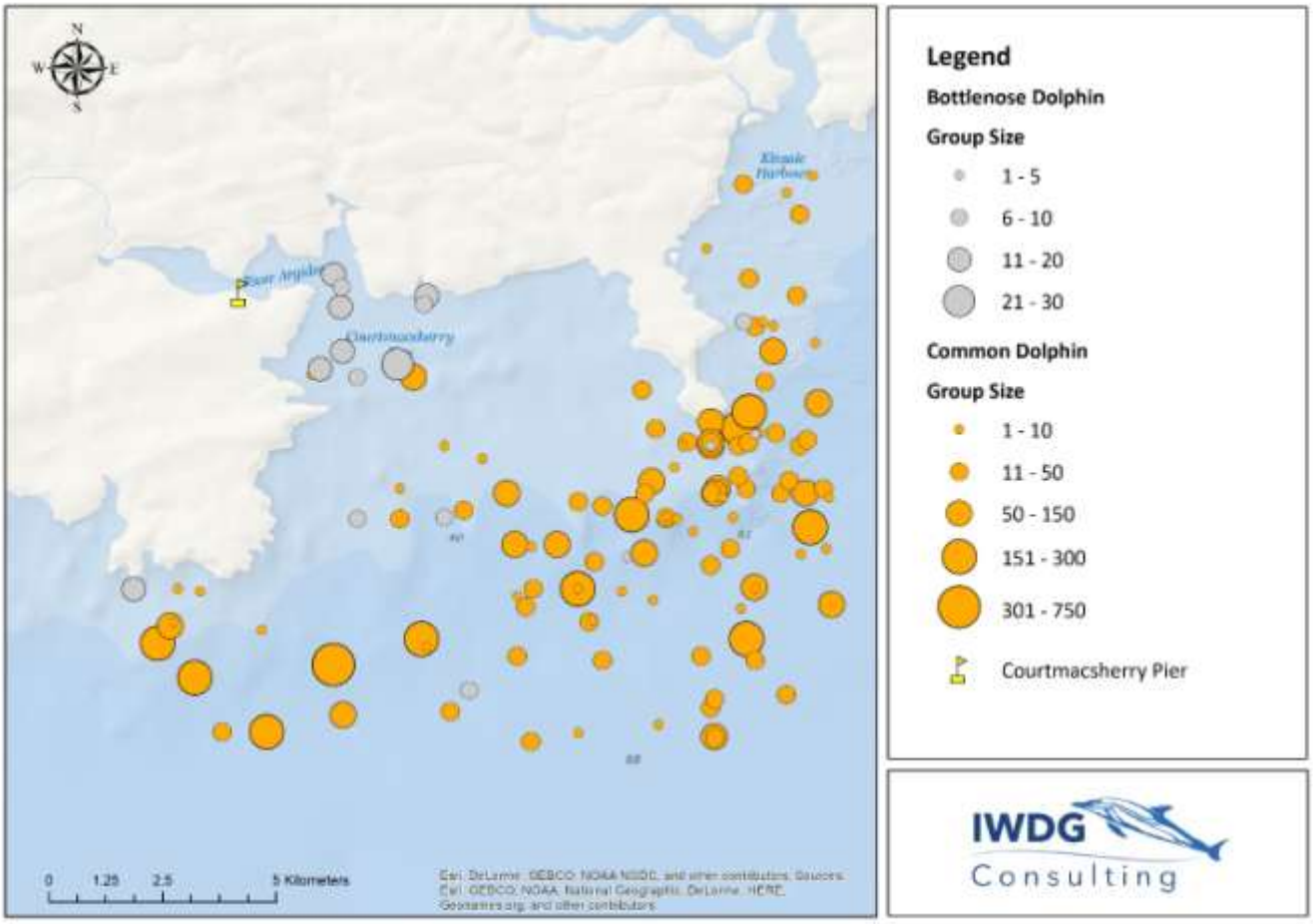


Figure 2. Sighting records of common and bottlenose dolphins (from IWDG accessed November 2018)

Bottlenose dolphin (Tursiops truncatus)

Bottlenose dolphins are not that frequently recorded off the south coast of County Cork but have occasionally been recorded in the mouth of Courtmacsherry estuary (Figure 2) around 2.5km from the proposed dredging works. Bottlenose dolphins are widespread and relatively abundant off the Irish coast with most sightings along the western seaboard (Berrow *et al.* 2010). Recent genetic evidence (Mirimin *et al.* 2011) suggests the existence of three discrete populations of bottlenose dolphins in Ireland: the Shannon Estuary, an inshore population and an offshore population that ranges from the Bay of Biscay and the Azores (Louis *et al.* 2014). The inshore population is highly mobile and photo-identification has shown individuals recorded off Co Wexford to be part of this population (O'Brien et al. 2009).

Risso's dolphin (Grampus griseus)

Risso's dolphins in Ireland are patchily distributed around the Irish coast but seem to favour islands, especially off West Kerry, Galway and the Saltee Islands (Berrow et al. 2010). Risso's dolphin were sighted in adjacent waters but not near the dredge site (Figure 3). Sightings of unidentified dolphins also occurred at the mouth of Courtmacsherry estuary around 2.5km from the proposed dredging works, but not near the dredge site.

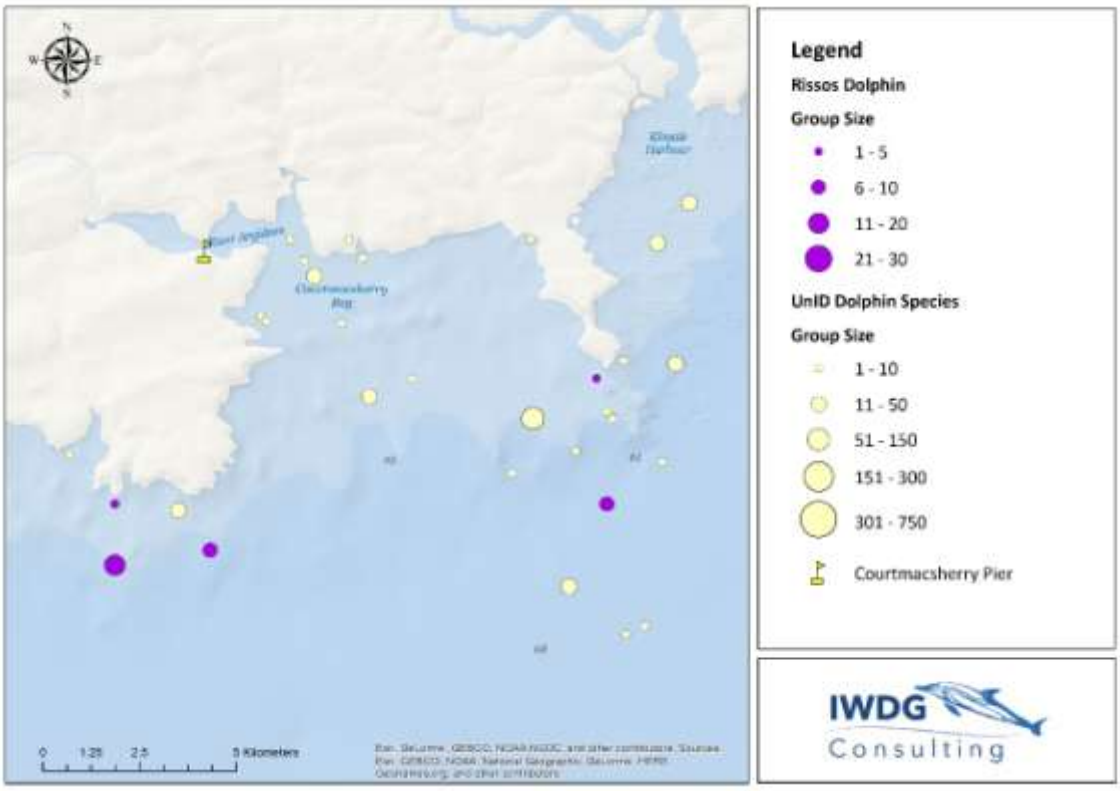


Figure 3. Sighting records of Risso's and other unidentified dolphin species (from IWDG accessed November 2018)

Minke whale (Balaenoptera acutorostrata)

Minke whales are widespread and abundant in inshore Irish waters from May to October (Berrow et al. 2000) and into December. The summer distribution tends to be concentrated around southwest Ireland. Minke whales were regularly recorded in the area especially off the Old Head of Kinsale and Seven Heads (Figure 4). One sightings occurred at the mouth of Courtmacsherry estuary but not near the dredge site.

Humpback whale (Megatera novaengliae)

Humpback whales are regularly recorded off the south coast of Ireland especially during winter (Ryan et al. 2015). The same individual humpback whales are recorded each year and spend many months feeding on pelagic schooling fish such as herring and sprat. Sightings are concentrated offshore largely in waters >50m water depth which is around 6.5km from the mouth of Courtmacsherry estuary and were not recorded near the

mouth of Courtmacsherry estuary (Figure 4). Nearly all sightings were of single individuals sighted during January and February.

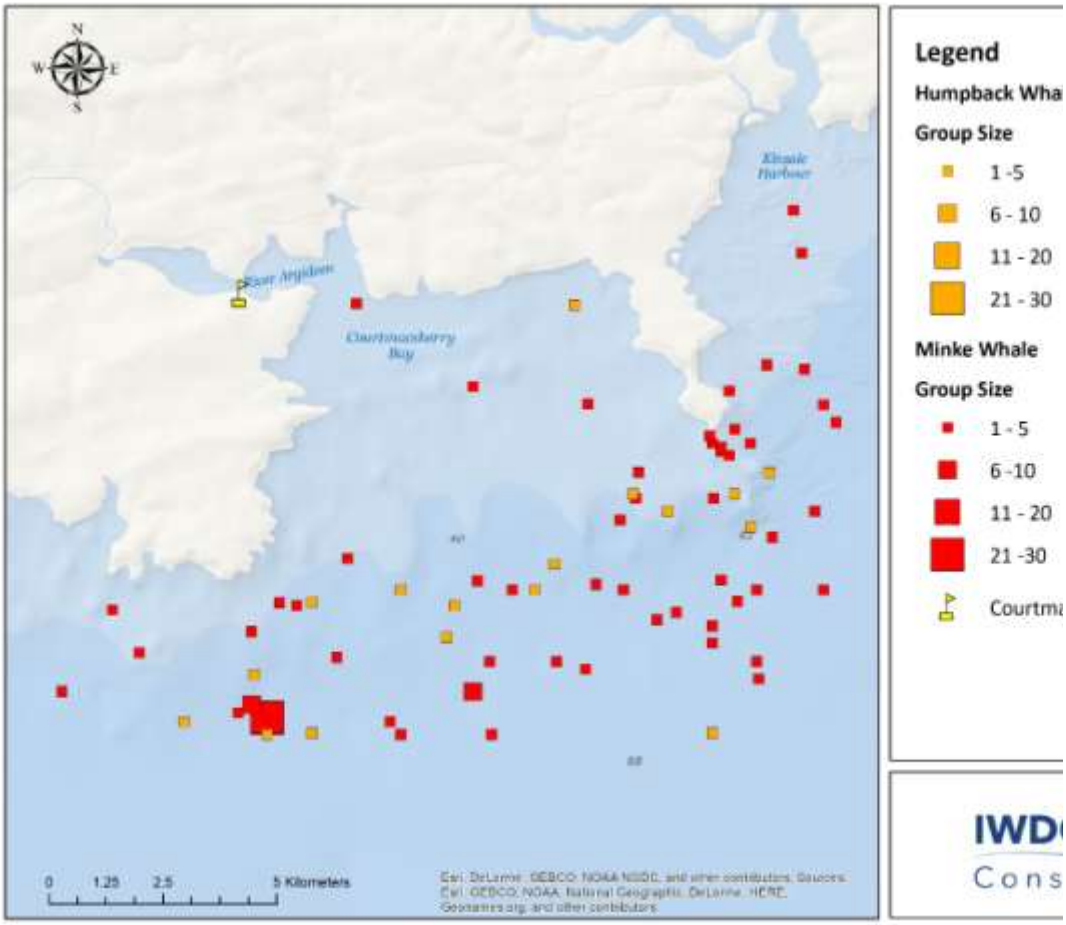


Figure 4. Sighting records of minke and humpback whale (from IWDG accessed November 2018)

Fin whale (Balaenoptera physalus)

Fin whales are regularly recorded off the south coast of Ireland especially during winter (Berrow et al. 2010) but records occur from July to February. Whooley et al. (2011) showed using photo-identification that it was the same individual fin whales returning each year to the south coast and they stayed in coastal waters for many months feeding on pelagic schooling fish such as herring and sprat. Timing of their easterly movement through the winter seemed to coincide with herring moving inshore to spawn. Sightings are concentrated offshore largely in waters >50m water depth around 6.5km from the mouth of Courtmacsherry estuary and were not recorded near the mouth of Courtmacsherry estuary (Figure 5). Most, if not all, large whale sightings were most likely also fin whales.

Basking shark

There were 53 sightings of basking sharks comprising a total of 256 individuals, but this total was inflated of reports of 100 individuals off the Old Head of Kinsale (Figure 6). They are widespread and occur also at the mouth of Courtmacsherry estuary. Basking sharks typically feed along tidal fronts and eddies where they zooplankton prey is concentrated (Simms 2008).

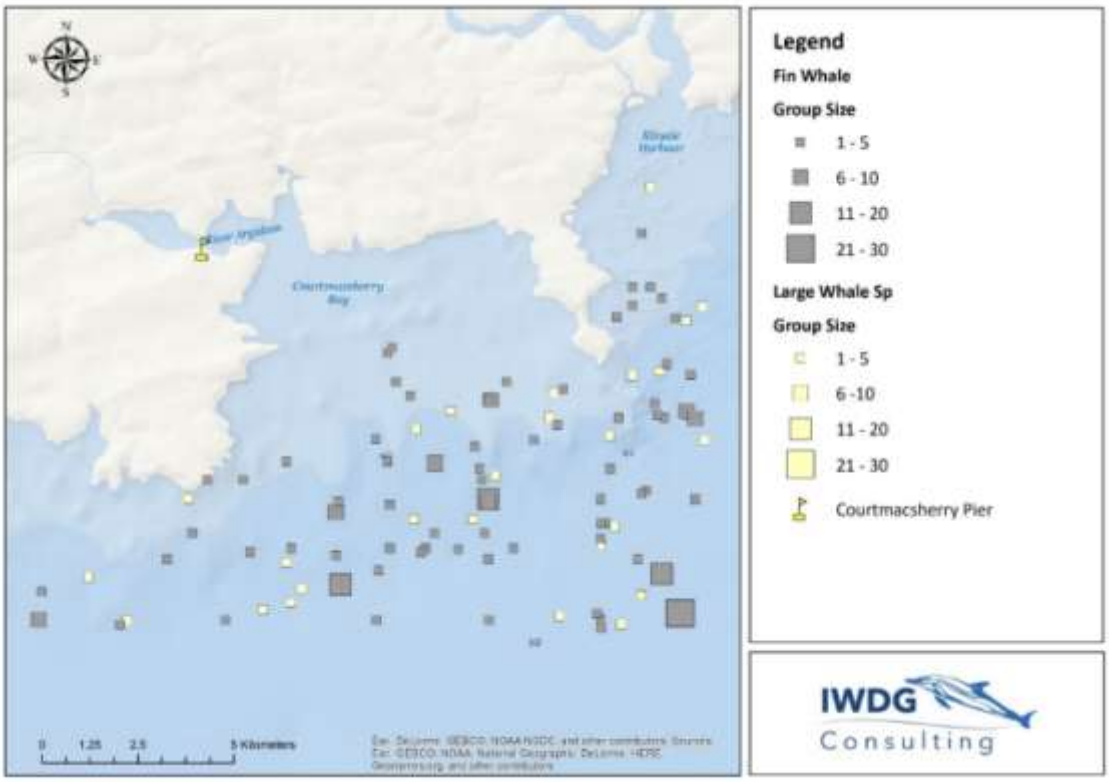


Figure 5. Sighting records of fin whale (from IWDG accessed November 2018)

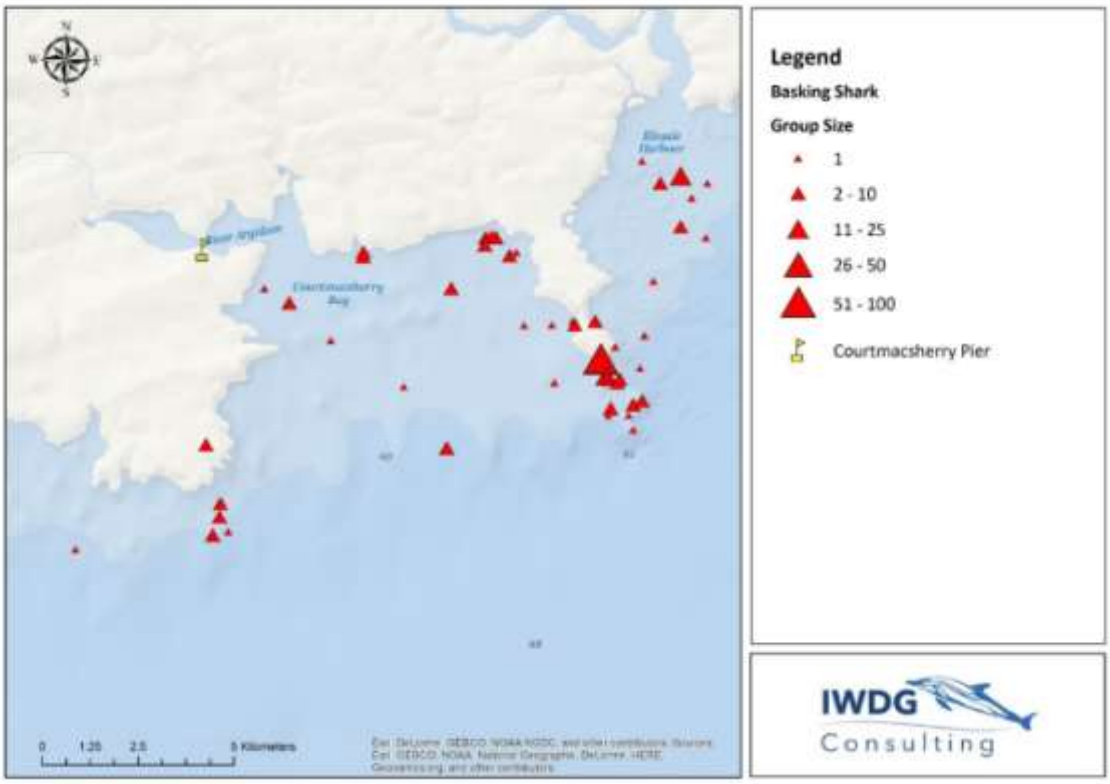


Figure 6. Sighting records of basking sharks (from IWDG accessed November 2018)

4.1.2| Pinnipeds

Grey and harbour seals are distributed around the entire Irish coast with grey seals being more abundant along the western seaboard (Cronin *et al.* 2004; O'Cadhla *et al.* 2007; O'Cadhla and Strong 2007).

Harbour Seal (Phoca vitulina)

There were no harbour seal haul-out or breeding sites recorded near Courtmacsherry during the National Parks and Wildlife Service (NPWS) surveys during 2002 or 2003. The closest record was of 10 individuals in Kinsale Harbour (Cronin et al. 2004) (Figure 7). Harbour seals are faithful to their breeding and haul out sites and do not travel great distances, thus we would not expect any harbor seals to be present at the site.

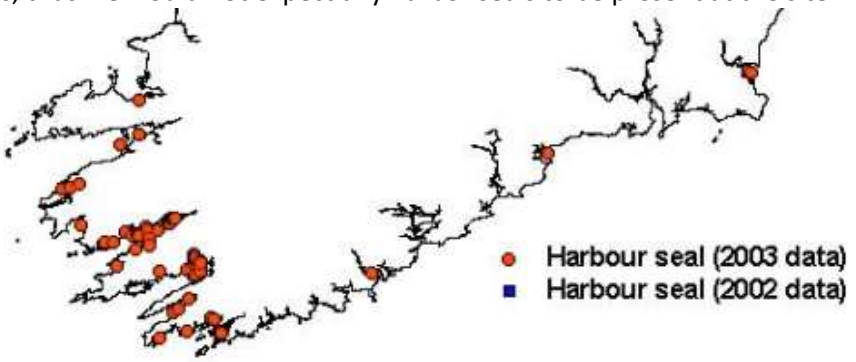


Figure 7. Map of the locations of groups of harbour seals recorded on the south coast of Ireland, August 2003 (from Cronin et al., 2004).

Grey Seal (Halichoerus grypus)

There were no grey seal haul-out or breeding sites recorded near Courtmacsherry (O'Cadhla *et al.*, 2007) (Figure 8). There are a small number of pupping sites to the west of Courtmacsherry, of 1-2 individiuals (O'Cadhla *et al.*, 2007). The largest colony in the southwest in Roaringwater Bay, which is an SAC, but is over 60km from the proposed dredge site. O'Cadhla and Strong (2007) reported single animals hauled out between Dunowen and Coolim Cliffs during a survey of moulting sites.

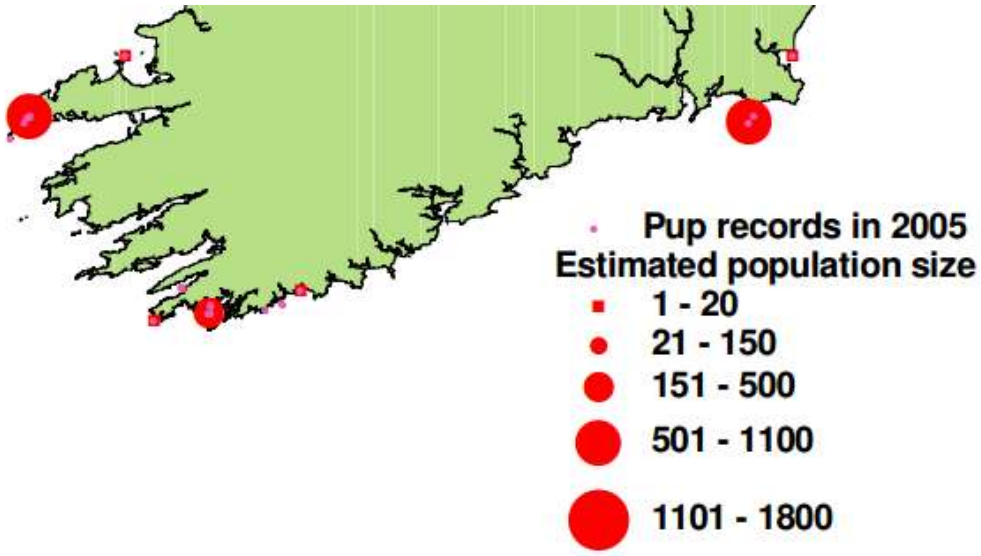


Figure 8. Map of the locations of grey seals pupping locations recorded on the south coast of Ireland in 2005 (from O'Cadhla et al., 2007).

4.1.3 Ambient Noise

There are no ambient noise levels recorded at the site are not known. The nearest measured site is Cork Harbour (Sutton et al. 2014) but as Cork is a busy shipping port, these measurements are not considered relevant to Courtmacsherry. Ambient noise off Courtmacsherry is expected to be dominated by environmental noise (e.g. tidal movement of water and sediment, and wind and wave noise) and local small vessel traffic when it occurs.

4.2. | Reen Pier and Castlehaven

Reen Pier is in Castlehaven across from Castletownshend and also near the fishing port of Union Hall. It is a base for a number of commercial fishing and charter vessels and also Atlantic Sea Kayaking and Cork Whale Watch.

4.2.1 | Cetaceans

To date, there are 808 validated cetacean records available from the area of interest. Most records were of common dolphin (216 or 24.4% of all records) and minke whale (209 or 24% of all records) followed closely harbour porpoise (171 or 23%) and fin whale with 96 records (11%). Another four species including humpback whale, bottlenose and Risso's dolphin and a single sighting of killer whales, reflecting the high diversity and productivity of this area (Table 2).

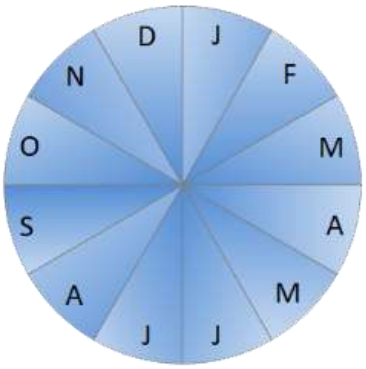
Table 2. Cetacean sightings (including IWDG downgrades) recorded off Reen Pier from 2000-2018

Species	Number of sightings (individuals)	% of total
Common dolphin	216 (12754)	24.4
Minke whale	209 (807)	23.6
Harbour Porpoise	171 (1021)	19.3
Fin whale	96 (310)	10.8
Humpback whale	33 (66)	3.7
Bottlenose dolphin	21 (160)	2.4
Risso's dolphin	14 (82)	1.6
Killer whale	1 (5)	0.1
Large whale	13 (23)	1.5
Dolphin possibly harbour porpoise	11 (53)	1.4
Sei/Fin/Blue	7 (15)	0.8
Whale sp.	3 (5)	0.3
Dolphin sp.	3 (18)	0.3
Cetacean sp.	2 (11)	0.2
Basking shark	77 (345)	8.7
Leatherback turtle	7 (7)	0.8
Turtle sp.	1 (1)	0.1
Total	**885 (15683)**	**100**

Harbour porpoise (Phocoena phocoena)

Harbour porpoise were sighted throughout the area of interest with concentrations at the entrance to Castlehaven, with some individuals moving up the estuary and occurred adjacent to the proposed dredge site (Figure 9).

Harbour porpoise have been recorded in every month.



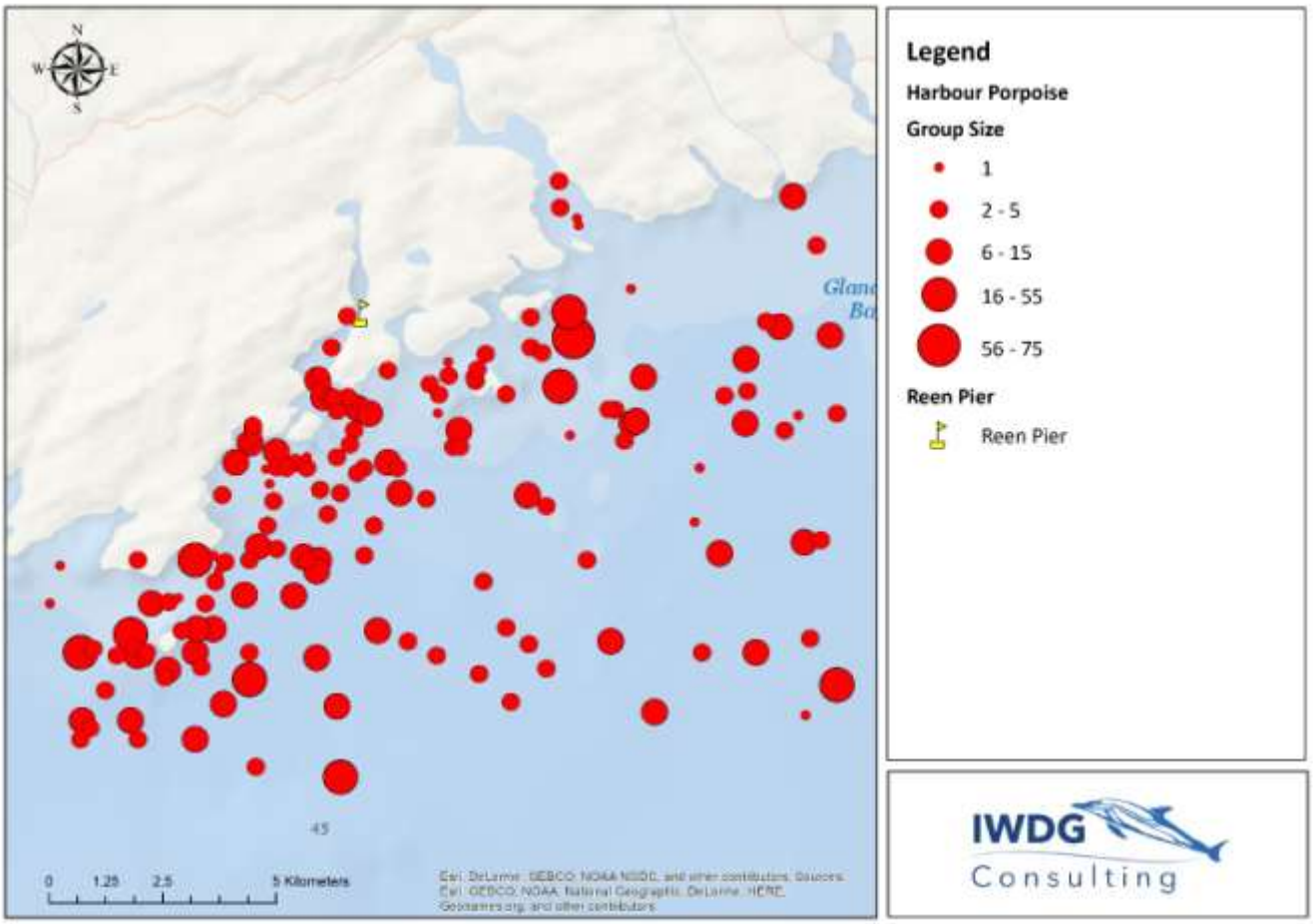
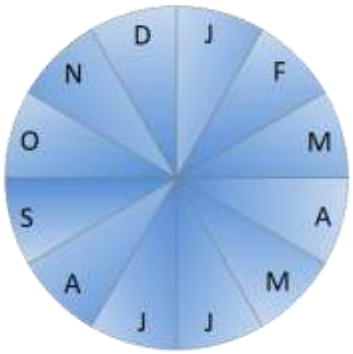


Figure 9. Sighting records of harbour porpoise (from IWDG accessed November 2018)

Common dolphin (Delphinus delphis)

Common dolphin were the most frequently recorded species and were sighted throughout the area of interest (Figure 10) and were sighted at the entrance to Castlehaven, with some individuals moving up the estuary and adjacent to the proposed dredge site.

Common dolphin have been recorded in every month.



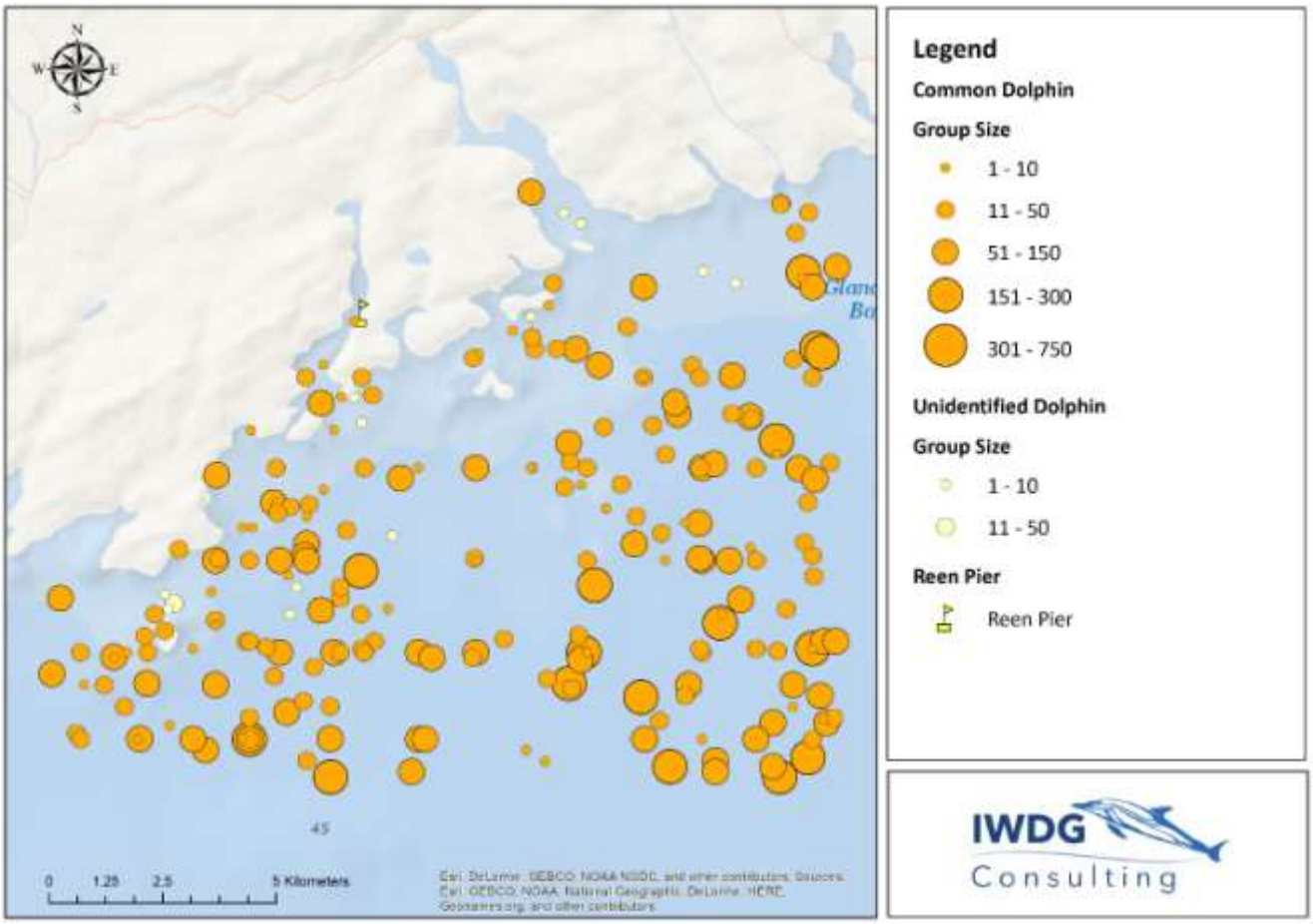
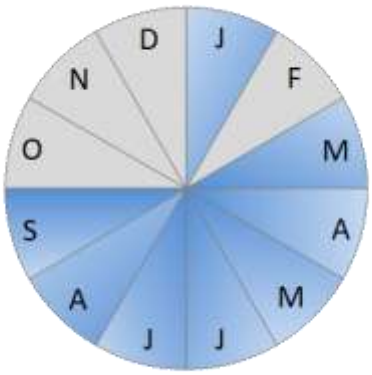


Figure 10. Sighting records of common and unidentified dolphins (from IWDG accessed November 2018)

Bottlenose dolphin (Tursiops truncatus)

Bottlenose dolphins are infrequently recorded off the south coast of Cork but have been recorded along the coast adjacent to Castlehaven, with some individuals moving up the estuary and adjacent to the proposed dredge site (Figure 11) (Figure 2) around 2.5km from the proposed dredging works.

Bottlenose dolphin were reported from March to September and in January.



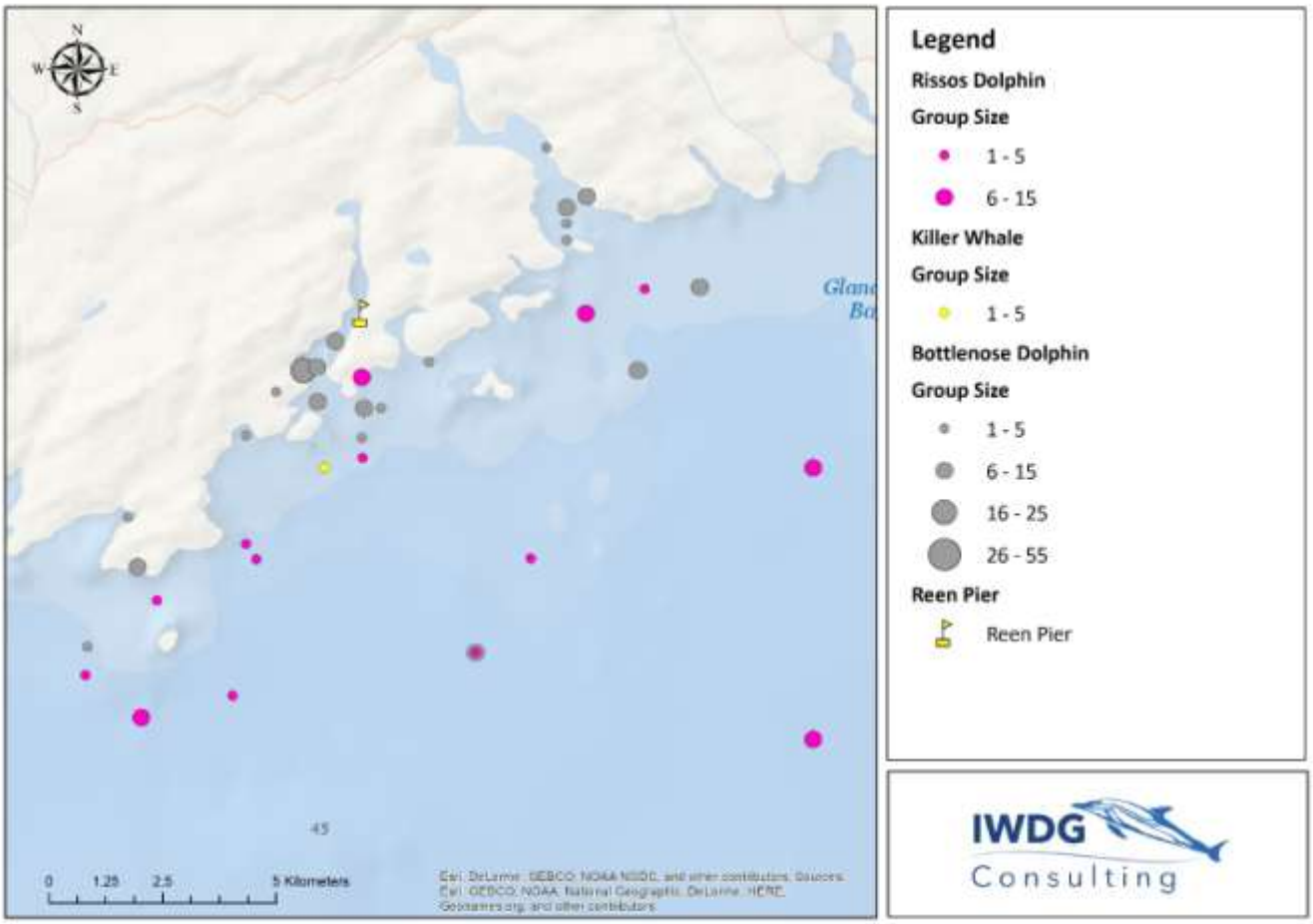


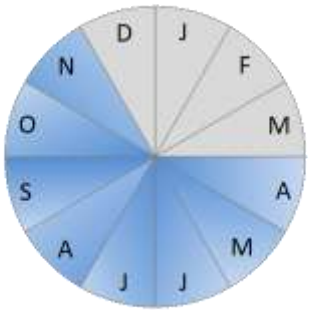
Figure 11. Sighting records of bottlenose and Risso's dolphin and killer whale (from IWDG accessed November 2018)

Risso's dolphin (Grampus griseus) and Killer whale (*Orcinus orca*)

Risso's dolphin were sighted in adjacent waters (Figure 11) including near the entrance to Castlehaven. There was one sighting of killer whales, near the entrance to Castlehaven (Figure 11)

Minke whale (Balaenoptera acutorostrata)

Minke whales are widespread and abundant in inshore Irish waters from May to October (Berrow et al. 2000). The summer distribution tends to be concentrated around southwest Ireland. Minke whales were the most frequently sighted baleen whale and second most frequently recorded species in the area of interest. They were recorded throughout the area with larger group sizes offshore (Figure 12).



Minke whale were reported from April to November

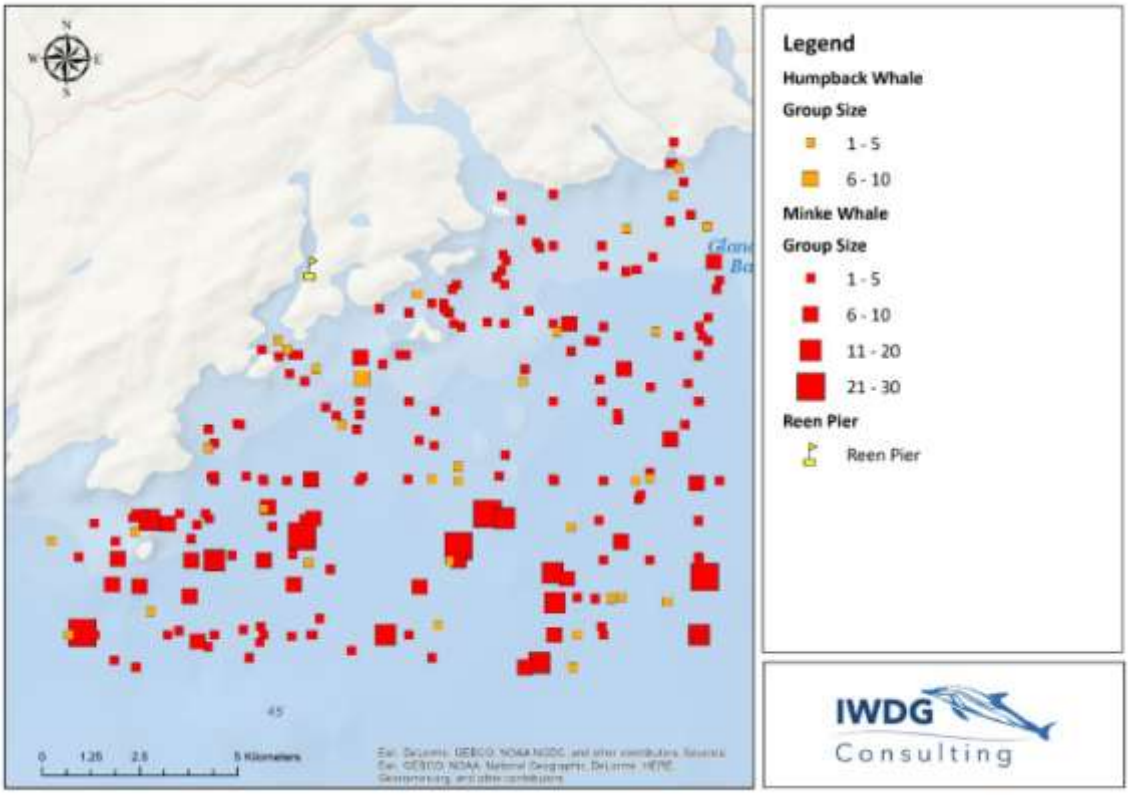
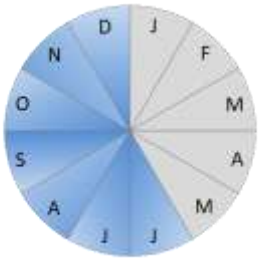


Figure 12. Sighting records of minke and humpback whale (from IWDG accessed November 2018)

Humpback whale (Megatera novaengliae)

Humpback whales are regularly recorded off the south coast of Ireland especially during winter (Ryan et al. 2015). The same individual humpback whales are recorded each year and spend many months feeding on pelagic schooling fish such as herring and sprat. Humpback whales are widespread and abundant in inshore Irish waters from May to October (Berrow et al. 2000). The summer distribution tends to be concentrated around southwest Ireland. Humpback whales were regularly recorded throughout the area of interest (Figure 12) and in most months of the year.

Fin whale (Balaenoptera physalus)



Fin whales are regularly recorded off the south coast of Ireland especially during winter (Berrow et al. 2010). Whooley et al. (2011) showed using photo-identification that it was the same individual fin whales returning each year to the south coast and they stayed in coastal waters for many months feeding on pelagic schooling fish such as herring and sprat. Fin whales were regularly recorded throughout the area of interest, but more offshore than humpback whales (Figure 13). Fin whales were reported from June to December.

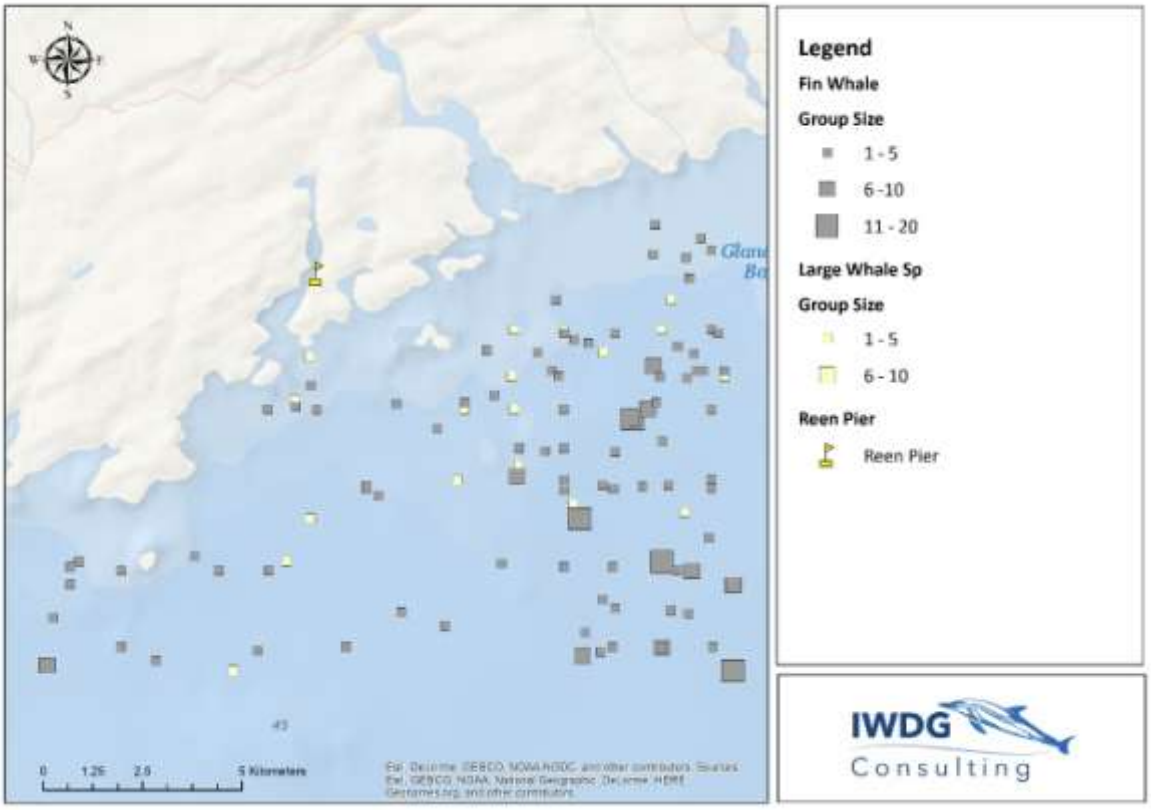


Figure 13. Sighting records of fin and large whale (from IWDG accessed November 2018)

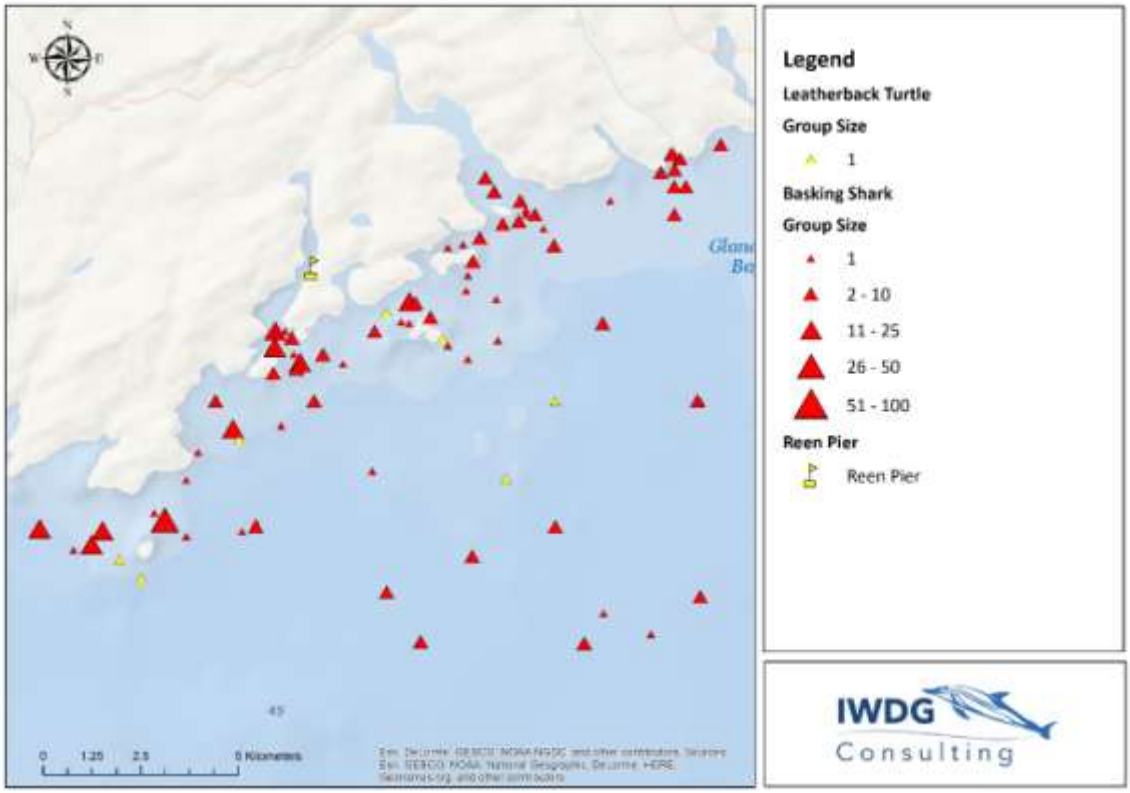
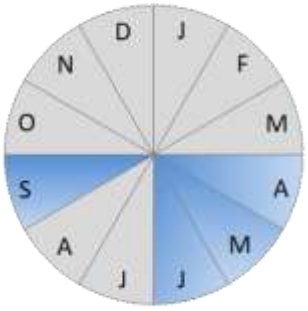


Figure 14. Sighting records of basking shark and leatherback turtle (from IWDG accessed November 2018)

Basking shark and turtles

There were 77 sightings of basking sharks comprising a total of 345 individuals (Figure 14). They are widespread, especially along the coast and occur at the mouth of Castlehaven. Basking sharks were reported from April to June and once in September.



Turtles were recorded on 8 occasions, with 7 positively identified as leatherback turtle (*Dermochelys coriacea*) (Figure 14).

4.1.2| Pinnipeds

Harbour Seal (Phoca vitulina)

There were no harbour seal haul-out or breeding sites recorded near Reen Pier during the National Parks and Wildlife Service (NPWS) surveys during 2002 or 2003 (Figure 7).

Grey Seal (Halichoerus grypus)

Grey seal breeding sites do occur near Reen Pier with 1 individual recorded from Rabbitt Island at the mouth of Castlehaven and 6 each of High and Low Islands (O'Cadhla *et al.*, 2007) (Figure 8). There are a small number of 1-2 individuals between Castlehaven and Roaringwater Bay (O'Cadhla *et al.*, 2007). The largest colony in the southwest in Roaringwater Bay, which is an SAC, but is over 20km from the proposed dredge site. O'Cadhla and Strong (2007) reported 1-2 animals hauled out between Horse and High Islands during a survey of moulting sites.

4.2.3 Ambient Noise

The ambient noise levels at the site are not known. Ambient noise off Reen pier and in Castlehaven is expected to be dominated by environmental noise (e.g. tidal movement of water and sediment, and wind and wave noise) and limited small vessel traffic, mainly in the summer.

4.3. | Glengarriff Harbour

Glengarriff is a small seaside village located approximately 55 miles/90km (by road) west of Cork city. It is a busy tourist town with trips to Garnish Island and local fishing and aquaculture also occurs. The area is designated as a Special Area of Conservation (interests Glengarriff Harbour and Woodland SAC, Site code 000090) with otter and harbor seal as qualifying interests.

4.3.1 | Cetaceans

To date, 65 validated cetacean records were available and one basking shark record from Glengarriff Harbour and inner Bantry Bay (Table 3). Most records were of bottlenose dolphin (18 or 28% of records), followed by harbour porpoise and minke whale (both with 11 or 17% of records). Another four species including common, white-sided and Risso's dolphin and long-finned pilot whale, were also recorded reflected the relatively high diversity and productivity of this area (Table 3).

Table 3. Cetacean sightings (including IWDG downgrades) recorded off Glengariff Harbour from 2000-2018

Species	Number of sightings (individuals)	% of total
Bottlenose dolphin	18 (204)	27.7
Harbour Porpoise	11 (28)	16.9
Minke whale	11 (27)	16.9
Common dolphin	7 (475)	10.8
Long-finned pilot whale	5 (12)	7.7
Risso's dolphin	1 (1)	1.5
Atlantic white-sided dolphin	1 (1)	1.5
Dolphin possibly harbour porpoise	6 (26)	9.2
Dolphin sp.	4 (37)	6.1
Basking shark	1 (2)	1.5
Total	**66 (811)**	**100**

Bottlenose dolphin (Tursiops truncatus)

Bottlenose dolphins are frequently recorded in inner Bantry Bay and have also been recorded in Glengarriff harbour and off Garinish Island, just over 1km from the dredging site (Figure 15). They can be recorded in any month.

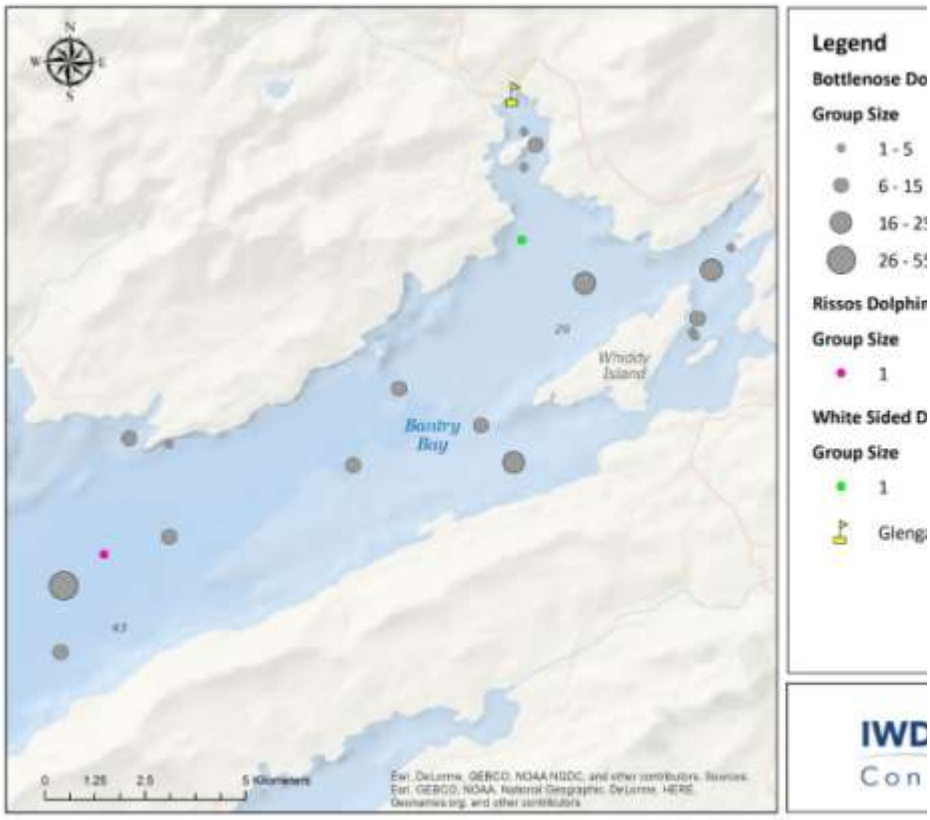


Figure 15. Sighting records of bottlenose, white-sided and Risso's dolphins (from IWDG accessed November 2018)

Risso's dolphin (Grampus griseus) and Atlantic white-sided dolphin (Lagenorhynchus acutus)

Risso's dolphin and Atlantic white-sided dolphin were recorded only once in the inner Bantry Bay near Glengariff Harbour (Figure 15). Risso's dolphins in Ireland are patchily distributed around the Irish coast but are frequently recorded around Dursey Island at the mouth of Bantry Bay (Berrow et al. 2010).

Minke whale (Balaenoptera acutorostrata)

Minke whales were regularly recorded in the Inner Bantry Bay and one sightings occurred within Glengarriff Harbour, within 1km of the proposed dredging site (Figure 16).

Harbour porpoise (Phocoena phocoena)

Harbour porpoise were sighted throughout inner Bantry Bay and within Glengarriff Harbour, within 1km of the proposed dredging site (Figure 16).

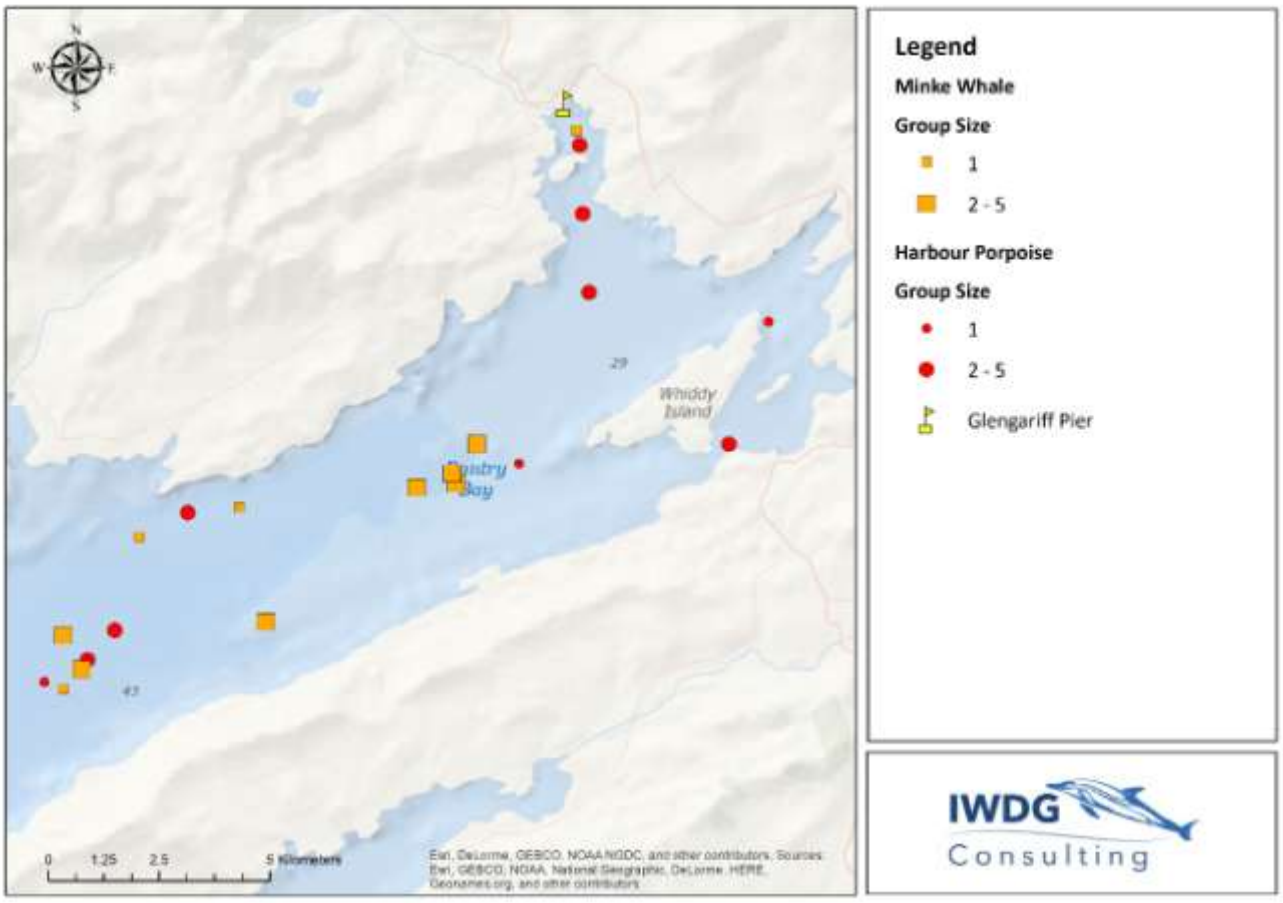


Figure 16. Sighting records of harbour porpoise and minke whale (from IWDG accessed November 2018)

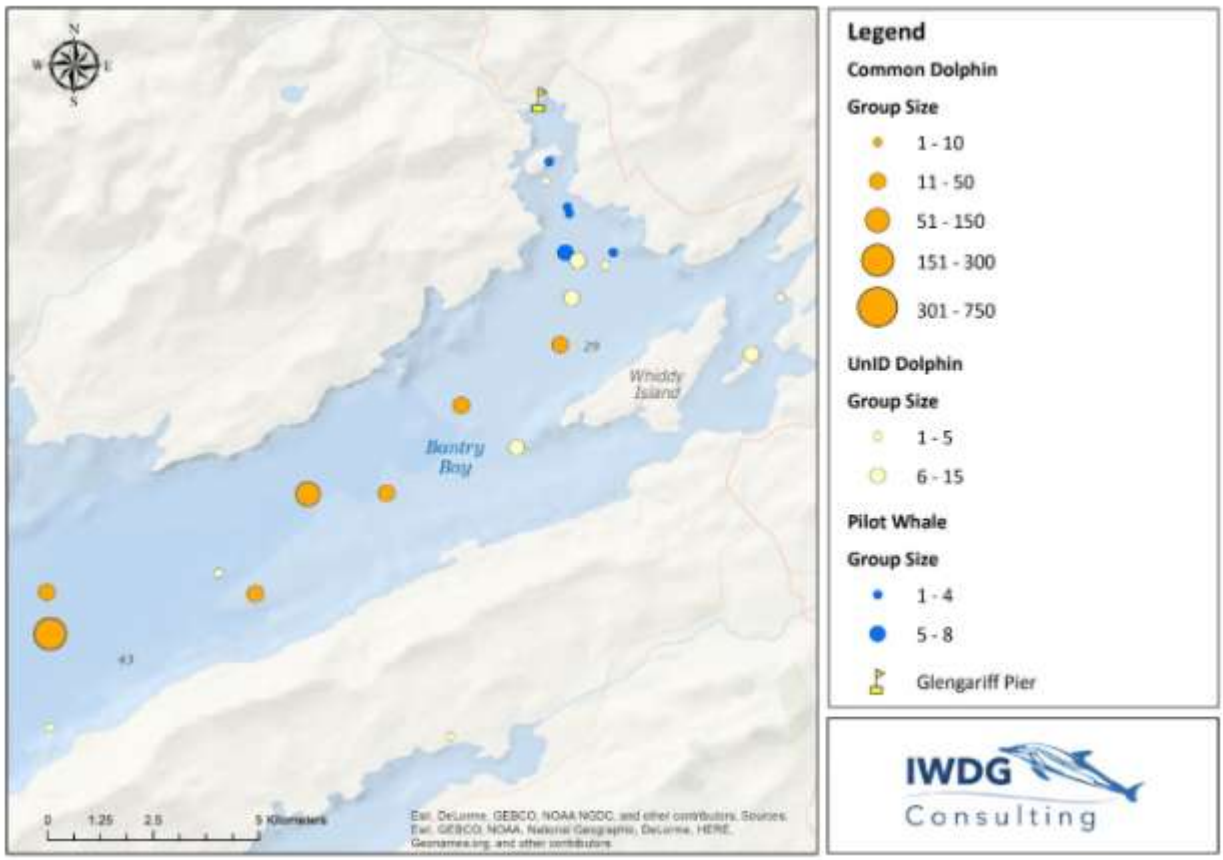


Figure 17. Sighting records of common and bottlenose dolphins (from IWDG accessed November 2018)

Common dolphin (Delphinus delphis)

Common dolphin were sighted in Inner Bantry Bay and at the mouth of Glengarriff Harbour, but not near the proposed dredge site (Figure 17).

Long-finned pilot whales (Globicephala melas)

Bantry Bay is one of the few sites in Ireland where long-finned whales are regularly recorded, probably due to its deep water and wide bay. Some of these pilot whales stranded but most sightings were not reported stranded and thus probably left the bay. However, the presence of long-finned pilot whale which typically live off the shelf edge in waters >1000m is considered unusual. They have been reported off Garnish Island in Glengarriff Harbour (Figure 17)

4.1.2| Pinnipeds

Harbour Seal (Phoca vitulina)

Glengarriff Harbour is a very important site for harbor seals. They are also frequently recorded hauled out outside the harbour throughout inner Bantry Bay (Cronin *et al.,* 2004). The harbour is designated as an SAC for harbour seals with 67 reported by Cronin et al. (2004) on Garinish Island and 97 on Whiddy Island.

Heardman *et al.* (2006) carried out a review of survey data from Glengarriff Harbour over the period 1985 to 2004 and reported peak counts of between 135 and 403 individuals. There has been a significant increase in harbor seal counts over this period at a rate of around 13 per annum, with most seals hauled out to the east of Garinish Island and on rocks close to the eastern and western shores of the outer harbour (Heardman *et al.,* 2006). Seals occurred throughout the year with peak counts were always recorded between August and September. Harbour seal pups occurred in June and July.

Grey Seal (Halichoerus grypus)

There were no grey seal haul-out or breeding sites recorded near Glengarriff Harbour (O'Cadhla *et al.*, 2007) (Figure 8). There are a small number of pupping sites to the south in Dunmanus Bay and the largest colony in the southwest in Roaringwater Bay, which is an SAC, but is over 70km by sea from the proposed dredge site (O'Cadhla *et al.*, 2007). O'Cadhla and Strong (2007) reported 1-2 individuals hauled out around Roaringwater and Dunmanus Bays during a survey of moulting sites but none in Bantry Bay.

4.3.3 Ambient Noise

The ambient noise levels at the site are not known. Ambient noise in Glengarriff Harbour is expected to be dominated by environmental noise (e.g. tidal movement of water and sediment, and wind and wave noise) and local small vessel traffic.

5 IMPACT ASSESSMENT

5.1 | Description of Activities

Dredging Operations

Dredging at all sites will be carried out with a long arm excavator operated both from shore and on a barge if necessary. Dredged material will not be disposed of at sea but will be sent to landfill or in the case of Reen Pier reused at The League, a spit <1km from the dredge site.

Dredging at each site is likely to last 1-2 weeks and though not planned it could be simultaneous at each site. However as the sites are all some distance apart there is no issue regarding cumulative impacts.

5.1.1 Courtmacsherry Pier & Pontoon

Proposed operations at Courtmacsherry consist of:

- Removal of pontoon followed by replacement of the pontoon
- Dredging of the channel and immediately around the pontoon (without interfering with the structural integrity of the pier and slipway) to a depth to be determined based on survey of the adjacent channel.
- Disposal of dredged materials on land.

5.1.2 Reen Pier

Proposed operations at Reen Pier consist of:

• Dredging on the seaward, western and northern sides of the pier (without interfering with the structural integrity of the pier or slipway to North) to a depth of to be determined based on survey of the adjacent channel.
• Reuse of the dredged materials at The League, the spit north of the pier.

5.1.3 Glengarrif

Proposed operations at Glengarriff consist of:

• Removal of pontoon followed by replacement of the pontoon
• Dredging of the channel and immediately around the pontoon (without interfering with the structural integrity of the pier) to a depth of to be determined based on survey of the adjacent seabed
• Disposal of dredged materials on land.

5.2 Dredging Impacts

Literature Review

The NPWS '*Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters – January 2014*' recommends that listed coastal and marine activities, including dredging, undergo a risk assessment for anthropogenic sound-related impacts on relevant protected marine mammal species to address any area-specific sensitivities, both in timing and spatial extent, and to inform the consenting process. It is required that such an assessment must competently identify the risks according to the available evidence and consider (i) direct, (ii) indirect and (iii) cumulative effects of anthropogenic sound (NPWS, 2014).

A risk assessment, following NPWS Guidelines, was conducted based on the published literature, data from the IWDG sightings databases and knowledge of the study area.

5.2.1 Dredging Impacts

While sound exposure levels from dredging operations are thought to be below that expected to cause injury to a marine mammal, disturbance, from the noise generated by dredging, from the physical presence of the dredger, and possibly from the increased water turbidity in the area of operations have the potential to cause lower level disturbance, masking or behavioural impacts (NPWS, 2014). The presence of a barge with long arm digger may also lead to a very localised increase in vessel traffic and associated noise. Small work vessels produce low frequency sounds. The presence of an additional small vessel and the associated noise produced, is very unlikely to have a significant impact on marine mammals.

Cetaceans

There have been few studies on the effects of marine dredging (Thomsen *et al*. 2006; Nowacek *et al.* 2007). Richardson *et al*. (1995) identified only two studies on the effects of dredging on marine mammals and both were on large baleen whales (bowhead and northern right whales). Both Odontocetes (toothed whales) and Mysticetes (baleen whales) have been recorded regularly at the proposed dredging and dump site so here we considered the effects on both groups as well as seals.

Baleen whales

During a controlled exposure experiment on Bowhead whales received broadband levels of <113 – 131 dB re 1 µPa (<11 – 30 dB above ambient) from a suction dredge were created leading to weak and inconspicuous avoidance, however the low frequency components were under-represented. Off the southeast coast of the US Northern Right whales exposed to intensive dredging by noisy hopper dredges apparently show some tolerance of this noise (cited in Richardson *et al*. 1995). The best documented case of long-term change by baleen whales is from Baja California where Gray whales breeding in lagoons subjected to industrial activities, including dredging were virtually absent during years with shipping which led to the suggestion that the constant dredging may have been the main source of disturbance (cited in Richardson *et al*. 1995). Marine mammals are often seen in close proximity to human activity and exhibit some tolerance to anthropogenic noise and other stimuli (Richardson *et al*. 1995). Baleen whales use shipping lanes and feed in rich fishing grounds occupied by large fishing vessels.

Odontocetes

Belugas, which are toothed odontocetes, showed less reaction to stationary dredges than moving barges in the Mackenzie estuary, Canada and it was concluded that passage of belugas along a shoreline was temporarily blocked by a dredging operation involving frequent barge traffic but not by a dredging operation with little barge traffic (cited in Richardson *et al*. 1995). More recently, Diederichs *et al*. (2010) through the use of acoustic monitoring with click detectors, showed that porpoises temporarily avoided an area where sand extraction took place off the Island of Sylt in Germany. The authors found that when the dredging vessel was closer than 600m to the monitoring location, it took three times longer before a porpoise was again detected compared with times without sand extraction. However, all of these studies only considered dredging and not the dumping of dredged material. Odontocetes are often even more tolerant of shipping noise, being repeatedly exposed to many vessels, small and large. Thus dredging seems to have less effect on marine mammals than moving sound sources although avoidance behaviour of whales exposed to high levels of activity have been documented. Reactions, when measured have only occurred when received sound levels are well above ambient levels.

Seals

Although there are fewer studies on pinnipeds or odontocetes these animals do tolerate considerable noise from such sources (Richardson *et al*. 1995). OSPAR (2008) suggested that the dumping of dredge materials are largely irrelevant with respect to environmental impact and the issue is confined to disturbance due to underwater noise emission during the dumping process and during the transport (ship noise). Pinnipeds also exhibit much tolerance and often haul out on man-made structures where there is considerable human activity. This exposure may lead to some chronic exposure to man-made noise, with which they tolerate. Ecological or physiological requirements may leave some marine mammals with no choice but to remain in these areas and continue to become chronically exposed to the effects of noise. In areas with repeated exposure, mammals may become habituated with a decline in avoidance responses and thus become less sensitive to noise and disturbance (Richardson *et al*. 1995). Seals may be exposed to disturbance if they are in the water near the dredging operations.

5.2.2 Increased vessel traffic

There might be a very small increase in marine based vessel traffic. Barges might need to be positioned at some sites if dredging cannot be achieved from land but this will involve very limited vessel movement over a short (1-2 week period).

6 IMPACT ASSESSMENT

Acoustic disturbance

6.1 Noise associated with dredging

The potential for disturbance to marine mammals is greatest when elevated levels of underwater noise are considered. Marine mammals, especially cetaceans, have well developed acoustic capabilities and are sensitive to sound at much higher frequencies than humans (Richardson *et al.* 1995). They are less sensitive to the lower frequencies but there is still great uncertainty over the effects of sound pressure levels on marine mammals and thus the assessment of its impact. Sources of noise include that generated by the vessel during dredging and transiting to and from the dump site, the noise generated by dredging and that generated during dumping.

Received levels of dredging noise by marine mammals can exceed ambient levels to considerable distances depending on the type of dredger used (Richardson *et al*. 1995). Hopper dredges produced broadband sound between 20-1000 Hz and the highest levels occurred during loading. Evans (2000) suggested dredging activities produce sounds varying from 172-185 db re 1 µPa at 1 metre over the broadband range 45 Hz to 7 kHz but there have been no studies examining the reaction of odontocetes to this activity. Audiograms for bottlenose dolphins show peak sensitivity between 50-60 kHz and no sensitivity below 2 kHz and above around 130 Khz (Richardson *et al.* 1995). Because of rapid attenuation of low frequencies in shallow water dredge noise normally is undetectable underwater at ranges beyond 20-25km (Richardson *et al.* 1995). The effects of low frequency (4-8 kHz) noise level and duration in causing threshold shifts in bottlenose dolphins were predicted by Mooney *et al.* (2009). They found that if the Sound Exposure Level was kept constant significant shifts were induced by longer duration exposures but not for shorter exposures.

Todd *et al*. (2014) reviewed the impacts of dredging on marine mammals and suggested a back-calculated source level of 163 dB re 1 mPa at 1 metre (bandwidth ¼ 20 Hz–100 kHz) for a backhoe dredging operation off the Shetlands of 179 dB re 1 mPa at 1 metre (bandwidth ¼ 3 Hz – 20 kHz). A second study estimated a source level of 179 dB re 1 mPa at 1 metre (bandwidth ¼ 3 Hz – 20 kHz) but used different scaling. Despite these elevated levels, they are mainly low frequency and below the peak frequency for echolocation and sound pressure would attenuate quickly.

NPWS (2014) identify increased sound pressure levels above ambient do occur due to dredging which could be detected up to 10km from shore. These levels are thought to potentially cause masking or behavioural effects but are not thought to cause injury to a marine mammal. There is no guidance on the effects of noise generated by dumping of dredge material on marine mammals.

6.2 Noise associated with shipping

Shipping produces low broadband and “tonal” narrowband sounds. The primary sources are propeller cavitation and singing and propulsion of other machinery (Richardson *et al*. 1995). For large and medium vessels tones dominate up to around 50Hz and broadband components may extend to 100Hz.

Many odontocetes show considerable tolerance to vessel traffic. Sini *et al.* (2005) showed bottlenose dolphins resident in the Moray Firth generally exhibited a positive reaction to medium (16-30m) and large vessels (>30m)

and showed some evidence of habituation. Buckstaff (2004) suggested an exposure level of 110-120 dB from vessel noise solicited no observable effect on bottlenose dolphins. A similar exposure level solicited minor changes in orientation behaviour and locomotion changes in minke whales, a small baleen whale (Palka and Hammond 2001). Fin whales are thought to avoid ships by slight changes in heading or by increasing the duration and speed of underwater travel but continued to call in the presence of vessel noise (Richardson et al. 1995). Harbour porpoise are frequently observed near vessels but tend to change behaviour and move away and this avoidance may occur up to 1-1.5km from a ship but is stronger with 400m (cited from Richardson *et al.* 1995). Seals show considerable tolerance to vessel activity but this does not exclude the possibility that it has an effect.

6.2 Physical Disturbance

The risk of injury or mortality is considered extremely low as i) there are unlikely to be any marine mammals in the areas and in the immediate vicinity of the vessel and ii) only at Glengarriff is there a chance that marine mammals will be exposed the dredging operation. Seals especially at Glengarriff are exposed to small vessels on a regular basis and would be aware of their presence. The dredger will be land-based or on a barge and only the bucket will enter the water and thus the risk of injury or mortality is non-existent. The chance of actually releasing dredged material on top of a marine mammal is non-existent as the dredger material will be removed from the site.

6.1 Potential disturbance to life-cycle

The risk of disrupting the life cycle of marine mammals in the area is considered extremely low. There are no marine mammals at the dredge sites and only at Glengarriff is their potential for exposure of marine mammals to activity associated with the dredging operation. At Glengarriff, the activity of a dredger could cause temporary displacement from the immediate area but is extremely unlikely as all records of marine mammals are ≥1km from the dredged site and any effect, if it occurs at all, would only occur during short (approximately 5-10 days). Any effect is likely to be very localized and of short-duration. Seals, are able to avoid the area by hauling out which are plentiful.

7 | Mitigation Measures

Potential mitigation measures during the dumping operation are limited. Similar activities both nationally and internationally have been monitored through the provision of a Marine Mammal Observer (MMO) who ensures that there are no marine mammals within a pre-agreed distance prior to dumping during daylight hours.

There is very little exposure of marine mammals to proposed dredging operations in Courtmacsherry or Reen Pier in Castlehaven as marine mammals do not occur at the dredge site, therefore **no mitigation is necessary**.

At Glengarriff where harbor seals occur throughout the year it is recommended that an **MMO is present to implement NPWS Guidelines**. The National Parks and Wildlife Service recommend a distance of 500m radial distance of the dredging sound source in water depths of <200m (NPWS 2014) on commencement. We recommend a Mitigation Zone of 200m is sufficient given the limited sound exposure of even large scale dredging operations (McKeown 2017). If a significant negative change in behaviour is recorded such as rapid movement away from vessel or distress then the MMO should have the authority to cease operations until the exposed animal is clear of the site.

7.1 Disturbance

If disturbance could potentially occur (e.g. Glengarriff Harbour) the most effective way of mitigating the potential effects of disturbance is through the provision of an MMO ensuring no marine mammals are present within an agreed buffer zone.

7.2 Collision, injury and mortality

There is no risk of collision or injury to marine mammals.

7.3 Disruption of normal behaviour

There is no risk of disturbance to marine mammals at Courtmacsherry or in Castlehaven. In Glengarriff where a small potential risk may occur, dredging activity is of short duration (1-2 weeks) and any displacement will be short term. Pre, during and post dredge monitoring would allow for an assessment of any disruption and if it is evident then the level can be quantified. Post-dredge monitoring would also provide a means to establish if disruption occurred and how long it takes for animals to return to an area and resume site usage.

8 | NPWS Assessment Criteria

8.1 Courtmacsherry

1. Do individuals or populations of marine mammal species occur within the proposed area?

There are a variety of marine mammal species recorded in the adjacent area, especially harbour porpoise, common, bottlenose and Risso's dolphin and minke, fin and humpback whales. There are no known pupping and haul out sites for grey or harbor seals at the dredge site.

2. Is the plan or project likely to result in death, injury or disturbance of individuals?

The proposed activity will not cause injury or death or disturbance.

3. Is it possible to estimate the number of individuals of each species that are likely to be affected?

No abundance estimates for cetaceans are available abundance in adjacent waters is high, especially for common dolphins, harbour porpoise and fin and minke whales. All populations of marine mammals are part of a larger population and very mobile.

4. Will individuals be disturbed at a sensitive location or sensitive time during their life cycle?

No marine mammals will be exposed to the dredging activity and thus there is no sensitive time that can be impacted.

5. Are the impacts likely to focus on a particular section of the species' population, e.g., adults vs. juveniles, males vs. females?

No marine mammals will be exposed to the dredging activity.

6. Will the plan or project cause displacement from key functional areas, e.g., for breeding, foraging, resting or migration?

While harbour porpoise, dolphins some whales frequently and regularly occur in the general vicinity area in small numbers there may be temporary disturbance to these but they are accommodated to human activities and are likely to not be affected. Large baleen whales occur during winter and roam over a wide area during this period.

7. How quickly is the affected population likely to recover once the plan or project has ceased?

There will be no disturbance of marine mammals due to dredging

8.2 Reen Pier

1. Do individuals or populations of marine mammal species occur within the proposed area?

There are a variety of marine mammal species recorded in the area, especially harbour porpoise, common and Risso's dolphin and minke, fin and humpback whales. There are no known pupping and haul out sites for grey or harbor seals at the dredge site but there are haul out and pupping sites for grey seal at the mouth of the haven.

2. Is the plan or project likely to result in death, injury or disturbance of individuals?

The proposed activity will not cause injury or death or disturbance.

3. Is it possible to estimate the number of individuals of each species that are likely to be affected?

No abundance estimates for cetaceans are available abundance in adjacent waters is high, especially for common dolphins, harbour porpoise and fin and minke whales. All populations of marine mammals are part of a larger population and very mobile.

4. Will individuals be disturbed at a sensitive location or sensitive time during their life cycle?

No marine mammals will be exposed to the dredging activity and thus there is no sensitive time that can be impacted.

5. Are the impacts likely to focus on a particular section of the species' population, e.g., adults vs. juveniles, males vs. females?

No marine mammals will be exposed to the dredging activity.

6. Will the plan or project cause displacement from key functional areas, e.g., for breeding, foraging, resting or migration?

While harbour porpoise, dolphins some whales frequently and regularly occur in the general vicinity area in small numbers there may be temporary disturbance to these but they are accommodated to human activities and are likely to not be affected. Large baleen whales occur during winter and roam over a wide area during this period.

7. How quickly is the affected population likely to recover once the plan or project has ceased?

There will be no disturbance of marine mammals due to dredging.

8.3 Glengarriff

1. Do individuals or populations of marine mammal species occur within the proposed area?

There are a variety of marine mammal species recorded in the area, especially harbour porpoise, bottlenose dolphin and minke, whale. There is an important resident population of harbor seals which use Glengarriff Harbour for pupping, resting and moulting.

2. Is the plan or project likely to result in death, injury or disturbance of individuals?

The project will not cause injury or death but could lead to local disturbance, from noise associated with the project.

Noise Impact

The activities proposed during this project consist of dredging operations. It is unlikely any noise generated will be capable of causing permanent or temporary hearing injury to a marine mammal. Localised disturbance to marine mammals in the works area may occur during operations, but is limited by:

- The inshore location of the site, close to the harbour entrance. Any marine mammals recorded will be accommodated to human activities. Noise transmission to the wider bay is very unlikely.
- The very shallow nature of the dredging site.
- The regular transit of fishing and recreational vessels.
- The relatively short duration of the planned activity of 1-2 weeks.
- Although pupping by harbour seals occurs between June and July the potential disturbance is very low and localised and will not affect pupping or haul out sites.

3. Is it possible to estimate the number of individuals of each species that are likely to be affected?

Cronin et al. (2004) reported 67 harbour seals on Garinish Island in August 2003. Heardman *et al.* (2006) reported peak counts of between 135 and 403 individuals over the period 1985 to 2004. Only a small number of these seals may be exposed to disturbance if they are in the water near the dredging operations.

4. **Will individuals be disturbed at a sensitive location or sensitive time during their life cycle?**

There is no need to restrict the timing of the dredging operation. Although pupping by harbour seals occurs between June and July the potential disturbance is very low and localised and will not affect pupping or haul out sites.

5. **Are the impacts likely to focus on a particular section of the species' population, e.g., adults vs. juveniles, males vs. females?**

Harbour seals pup between June and July but they will not be exposed to disturbance as the pupping and haul out sites are >1km from the proposed dredged site.

6. **Will the plan or project cause displacement from key functional areas, e.g., for breeding, foraging, resting or migration?**

Harbour seals may potentially be disturbed from any key functional sites very near the dredge site but none are known and would likely be restricted to opportunistic foraging. Only a small number of these seals may be exposed to disturbance if they are in the water near the dredging operations.

7. **How quickly is the affected population likely to recover once the plan or project has ceased?**

While there may be temporary disturbance to seals in the harbour they are likely to recover from any temporary disturbance within hours or days.

9 | Mitigation

Timing of Dredging

Harbour seals and to a much lesser extent bottlenose dolphins and harbour porpoise in Glengarriff Harbour can potentially be affected by the proposed operations and all three species are listed on Annex II of the EU Habitats Directive. Harbour seals are resident in Glengarriff Harbour so there is no time of year where they are less exposed to risk. There is no seasonal pattern for the occasional occurrence of bottlenose dolphins or harbour porpoise in the harbour, thus the very risk limited is not restricted to any month of the month year. Thus we recommend that dredging can take place at any time.

Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters

We recommend a Marine Mammal Observer (MMO) is present during dredging operations in Glengarriff Harbour to implement NPWS Guidelines. The mitigation measures recommended by the NPWS are for the presence of a trained and experienced MMO and the use of "ramp up" procedures for noise and vibration emitting operations. The proposed mitigation measures (Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters) recommended by the Department of Arts, Heritage and the Gaeltacht in 2014 are designed to mitigate any possible effects.

The following mitigation measures are proposed to minimise the potential impacts on marine mammals and to allow animals move away from the area of dredging operations:

1. All personnel will be appropriately trained about environmental issues prior to the start of the operation.
2. All equipment will be in good condition to avoid spillage or discharge of oil, smoke and excessive noise.
3. Refuelling will be carried out by competent and trained people away from any environmentally sensitive areas; and dredger to be moored up securely.
4. An appropriate waste container will be placed to collect waste before the final disposal by authorised company and hazardous material storage areas will be identified, labelled, and properly marked and fitted with spill containment systems;
5. Excavators and barges will be checked for any fuel / oil leaks on a regular basis by the crew.
6. Any spills we be reported immediately to the site agent/authorities
7. In the event of a major spill due to damage to the dredger. Locate and isolate, inform harbour authorities, Project manager and environmental agency.
8. A dedicated Marine Mammal Observer will conduct a 30 minute watch for marine mammals within 500m of the excavator prior to start up. If a seal or cetacean (or otter) is sighted within 100m of the excavator, start-up must be delayed until the animals is observed to move outside the mitigation zone or the 15 minutes has passed without the animal being sighted within the mitigation zone.
9. A dedicated Marine Mammal Observer will conduct a watch for marine mammals prior to disposal at sea. If a seal or cetacean (or otter) is sighted within 50m of the vessel once it has reached the dump site, disposal must be delayed until the animal(s) are observed to move outside this mitigation zone or the 15 minutes has passed without the animal(s) being sighted within the mitigation zone.
10. The excavator will be started at lowest revs of the pump, with pump revs increased over a 15 minute period to allow wildlife an opportunity to move further away from the vessel prior to the pumps reaching full power.

9.1| Residual Impacts

With implementation of the above mitigation measures at Glengarriff Harbour, there will be no negative residual impacts from the proposed dredging works on marine mammals in the area.

10 | SUMMARY

The waters around all three sites in west Cork proposed for dredging campaigns are important for marine mammals, including the regular occurrence of harbour porpoise and common and bottlenose and minke, fin and humpback whales. No cetacean is exposed to risk though harbour porpoise and bottlenose dolphin may occur in Glengarriff Harbour harbour porpoise in Castlehaven, but even if they do occur the risk of disturbance is extremely low. Harbour seals are resident in Glengarriff Harbour, which is a designated SAC for this species, and haul out in large numbers on Garinish Island.

There is no exposure to marine mammals at Courtmacsherry or Reen Pier and no mitigation is required.

Although the risk of disturbance to seals at Glengarriff is very low we recommend no restrictions in timing to dredging at this site as seals are resident, but the provision of an MMO during dredging at this site will ensure even harbour seals in the water near the dredging site and not hauled out are not at risk.

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Appendix 5

Glengarriff Otter Survey Report

Otter Survey Summary - Glengarriff, Co. Cork

Survey Details

Surveyor: John Deasy

Date: 11/04/2019 Time: 1130 - 1700

Weather: Hazy sunshine, cloud 8/8, wind F1 SE, dry, visibility good

Tide (Castletownbere): HW 09:35 LW 16:02 Neap - 3 days

Methodology

The otter survey was undertaken following methodology outlined in *'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*' (NRA, 2009). Evidence of otter (live animals, spraints, prints, resting places) was searched for along the coastline from the 'Bamboo Park' in the east to west of Glengarriff pier including the outlet of the Reenmeen West River into Glengarriff Harbour and the small islets around the pier including Bush, Friar's and Bark islands. The southern side of Bark Island was not accessible due to dense vegetation and steep shoreline. Evidence of otter, if present ,was recorded and photographed and the position recorded using a Garmin eTrex 10 GPS/GNSS receiver.

Results

- Desktop review

A number of records of otter exist on the National Biodiversity Data Centre database for the inner part of Glengarriff Harbour near the pier, including records of sightings of live animals (Table 1).

Table 1: Records for otter held by the National Biodiversity Data Centre for inner Glengarriff Habour.

Date	Grid Reference	Evidence	Notes	Record Type
30/06/1980	V929563	Spraint and Mucous	Potential holt in tree roots (near bridge over Glengarriff River)	Otter Survey of Ireland 1982
12/02/2017	V932562	Live animal	-	Casual Record
03/06/2015	V931560	Live animal	-	Casual Record
12/06/2015	V936564	Live animal	-	Casual Record
12/06/2015	V937564	Live animal	-	Casual Record

- Field Survey

The results of the field survey are presented in Table 2 overleaf.

Table 2: Results of field surveys for otter around Glengarriff pier undertaken on 11th April 2019.

ID No	Easting (ITM)	Northing (ITM)	Location	Feature	Notes	Photos
1	493790	556725	Mainland	Spraint	Count of 5 spraints on boulder at edge of Reenmeen West River upstream of bridge over N71.	121654, 121659 and 121722
2	493782	556416	Mainland	Spraint	Multiple spraints on tuft of red fescue (Fish scales, crab fragments, mucous). Access to undergrowth beyond.	122808, 122822
3	493793	556415	Mainland	Potential holt	Tunnel into soft sediments overlying bedrock under tree roots.	123335, 123400 and 123414
4	493797	556393	Mainland	Spraint	Count of 4 old spraints on patch of red fescue and sea pink.	123715, 123838
5	493550	556492	Mainland	Spraint	Count of 1 old spraint on fishing gear pier.	125249, 125253
6	493505	556409	Mainland	Potential temporary resting place	Eroded depression in soft sediment under Rhododendron bush.	130720
7	493519	556412	Mainland	Spraint and temp. resting place	Multiple spraints on bank under Rhododendron with worn paths to sea. Fish bones and crab fragment contents. Worn path to intertidal.	131601, 131732, 132100 and 132138
8	493537	556407	Mainland	Spraint	Count of 7 spraints.	-
9	493531	556406	Mainland	Spraint and resting place	Large accumulation of spraints (fish bones, crab fragments) under dense Rhododendron cover. Paths leading to dense undergrowth and to intertidal.	132907, 132923 and 133059
10	493534	556352	Mainland	Spraint	Large accumulation of spraints (fish scales, bones and crab fragments) on concrete beam on pier under main concrete slab of pier next to new galvanised steps.	133704
11	493398	556341	Mainland	Spraint	Multiple spraints (fish bones, scales and crab fragments) on rock outcrop.	132907

ID No	Easting (ITM)	Northing (ITM)	Location	Feature	Notes	Photos
12	493391	556341	Mainland	Spraint and temp. resting place	Multiple spraints (fish bones, scales and crab fragments) near rock outcrop and salt marsh vegetation.	135527, 135533
13	493353	556337	Mainland	Spraint	Count of 5 spraint (mainly crab fragments) on rock outcrop.	140133
14	493645	556399	Bush Island	Spraint and couch	Multiple spraints, couch in grass and paths into dense undergrowth.	151046, 144229, 144539
15	493645	556399	Bush Island	Spraint	Count of 3 spraints.	144804
16	493650	556391	Bush Island	Spraint	Count of 2 spraints on tuft of grass.	144323
17	493564	556189	Friar's Island	Spraint	Multiple spraints on shoreline with path into dense bracken.	151059, 151108
18	493556	556191	Friar's Island	Spraint, couch and drying place	Multiple spraints on area of well flattened bracken.	151334, 151351
19	493536	556191	Friar's Island	Spraint and temp. resting place	Multiple spraints and worn ground on bank feature under dense Rhododendron. 'Well' feature adjacent.	151546 to 152031
20	493653	556089	Bark Island	Spraint	Count of 6 spraints on grassy tuft on west side of shoreline and path into dense Rhododendron growth.	153359, 153406
21	493700	556090	Bark Island	Spraint and temp. resting place	2 piles of multiple spraints and three well worn shallow depression hover features in dense Rhododendron.	153758 to 154058
22	493342	556346	Mainland	Spraint and temp. resting place	Large hollow c. .5m diameter and 1 m deep in sediment shoreline with multiple fresh spraints on small cobble at entrance.	163923, 163947 and 164013

Summary

An otter survey was undertaken in inner Glengarriff Habour on the 11th April 2019 on an ebbing tide from mid to low tide. Weather conditions were suitable and the preceding days had been dry meaning any recent otter evidence was unlikely to have been washed away.

No live animals were observed during the course of the survey. While not unexpected as otters are mainly active during the dusk and night time, there have been a number of sightings of live otter in inner Glengarriff Habour (Table 1) and a sighting of an otter was made east of Bush Island during a bird survey for MWP on 28th Janurary 2019 by David Rees.

There was abundant evidence of otter presence across the study area.

- Holts

One potential holt (ID 3 in Table 2) was recorded at the eastern end of the study area along the shoreline near the 'Bamboo Park'. This feature consisted of a tunnel into soft sediments overlying the bedrock on the shoreline under a tree. Additional otter evidence (spraints) was recorded close by.

No other holt features were recorded within the study area including on the islets offshore of the pier during this survey.

- Couches and Potential temporary resting place

Numerous couch and temporary resting place features were recorded across the study area. Notably, these features were found in the immediate vicinity of the pier;

1) On the shoreline/ area of scrub/rhododendron behind the ticket office for the Garnish Island ferry (ID 7 and 9 in Table 2),

2) On the shoreline west of the pier (ID 22 in Table 2)

In addition couch and temporary resting place features were recorded on all three islets just offshore of Glengarriff pier. The evidence suggests that these areas are regularly used as feeding and resting areas. Disturbance levels were low at all three islands with only evidence of a small garden shed and mooring at Bark Island (the furthest from the pier) indicating it is infrequently visited by humans.

- Spraints and Sprainting Sites

Spraints and sprainting sites were frequently recorded within the survey area, often in association with the other features above. Spraints were also found on the pier structure.

In summary, inner Glengarriff Harbour is highly suitable for otter. The evidence suggests that otter are active in all parts of the inner harbour including on the pier and temporary resting places recorded very close to the pier. Features that make the area suitable for otters includes two rivers, the Glengarriff and the Reenmeen West entering the bay to the west and east of the pier,

respectively. In addition, there is abundant suitable foraging habitat and numerous areas for otters to rest and shelter with dense woodland and scrub coming right down to the intertidal zone at many locations across the study area and harbour. Furthermore, uninhabited islets with dense undergrowth just offshore of the pier (particularly Friar's and Bark Islands) provide ideal habitat for otters to feed and rest on without disturbance.