



**Malachy Walsh and Partners**  
Engineering and Environmental Consultants

**WOODBROOK LANDFILL  
COAST PROTECTION**

**PART 8 PLANNING REPORT**

**FOR**

**DÚN LAOGHAIRE-RATHDOWN  
COUNTY COUNCIL**



Comhairle Contae County Council



**DOCUMENT CONTROL SHEET**

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## 1.0 INTRODUCTION

South of Woodbrook Golf Club Co. Dublin is an area of shoreline that was formerly used as an historic site. The exact period of operation of the landfill is not known, however, it is known that it was closed in 1968. The shoreline in this area is eroding resulting in the deposition of landfill material onto the beach fronting this area. Concerns have been expressed about the situation for some time. The DLRCC Coastal Defence Strategy Study recommended in 2110 that this material should be removed or prevented from falling into the sea. Fehily Timoney and Company (FT) was commissioned by DLRCC to undertake both the Tier 1 and Tier 2 risk assessment stages of the EPA Code of Practice. The results of the risk assessments indicate that the site is a “Class C – Low Risk” site and recommended long term coastal erosion protection.

A further report prepared by MWP outlined two feasible coastal protection options that could be used. A preferred option has now been selected and this report is a summary of the main features of the proposed development, comprising the construction of coast protection to some 300m of coastal frontage. **Figure 1.1** shows a location plan for the proposed works. A number of reports, figures, drawings and assessments accompany this report including:

- **Planning drawings.** Planning drawings outlining the proposed method of coast protection and cliff stabilisation are given in Appendix A. These drawings have been prepared following a number of appraisals and assessments outlined below and in appendices to these documents. The appraisals and assessments concluded that the preferred method of preventing further loss of landfill material would be to construct a rock revetment to prevent erosion of the lower half of the cliff and to re-grade the cliff above to a long term stable slope and to place the cliff material from the re-grading onto the cliff top behind and cover with top soil. The structure is to include an access path along the cliff behind the works and an access down onto the beach north of the works. The planning drawings are included as **Appendix A**.
- **Tier 2 Risk Assessment** of a site in accordance with the Environmental Protection Agency (EPA) Code of Practice (CoP) (2007): Environmental Risk Assessment for Unregulated Waste Disposal Sites. A Tier 2 site investigation and geophysical assessment of the site was undertaken in July/August 2016 to confirm the type of and depth of waste and to assess potential groundwater contamination. The site investigation comprised the drilling of six boreholes across the site. Three ground water monitoring boreholes were installed which included one borehole for dual leachate and gas monitoring, one borehole for groundwater monitoring and one borehole for gas monitoring. The Tier 2 Risk Assessment report is included in **Appendix B**.
- **A remediation options appraisal** was undertaken for the site in 2016/2017. The final report in March 2017 concluded that the likely most cost effective method of preventing the loss of material from the frontage was by means of a mix of coast protection and cliff stabilisation

works. This appraisal also concluded that the material in the landfill was for the most part construction waste and posed a relatively low risk. However, an apparently isolated pocket of asbestos containing material was noted towards the northern end of the site. This report included a site investigation over the full extent of the historic landfill to establish the likely risk from potential contaminants and to assist in estimating the total volume of landfill type material on site. The assessment undertaken acknowledged the overall coastal defence context of the area as detailed in the **Dun Laoghaire Rathdown Coastal Defence Strategy Study**. The report also included Tier 2 and Tier 3 assessments in relation to the landfill material based on the findings of the site investigation. The remediation options appraisal report is included as **Appendix C**.

- **A coast protection/cliff stabilisation options report** was prepared in 2017 to assess various coast protection/cliff stabilisation methods of preventing the escape of landfill materials from the cliff face using such means. The report concluded that there were two methods worthy of further examination. Firstly, the full height of the cliff could be protected using a rock/ concrete armour revetment, or, the lower half of the cliff protected and the top half of the cliff re-graded. The second option would be preferred as it would encroach less on the beach in front and would result in the use of a smaller scale revetment. However, it depended on the feasibility of placing material from the cliff face within the overall site. This report has been included as **Appendix D**.
- **Site investigation, sampling and analyses and assessment of material near cliff face** undertaken earlier in 2018 confirmed that it was feasible to proceed with the preferred option. The investigations and analyses were undertaken to confirm the feasibility and cost effectiveness of the preferred option and to reduce the risk of encountering material that might require removal from site during the construction of the works. The findings of the investigation and assessment are included as **Appendix E**.

Following the selection of the preferred option a number of further assessments were undertaken. These include:

- **A screening for Appropriate Assessment** was undertaken in relation to the potential impacts of the proposed works on Natura 2000 sites. This concluded that impacts were not significant and that a Natura Impact Statement was not required for the works. The screening report is included as **Appendix F**.
- **An architectural heritage impact assessment report** was undertaken of the proposed works. This report concluded that while the works will cause loss of some of the surviving fabric associated with Cork Abbey Gate Lodge and the original 19th century coastal railway line and its associated infrastructure and protective structures is significant, permanent and irreversible, the impact is to be understood in the context of the inevitable loss of all of this

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fabric in time as a result of continuing erosion if no work is undertaken at the site. This report is included as **Appendix G**.

- **An archaeological impact assessment** was undertaken of the proposed works. This assessment concluded that archaeological monitoring is required of excavations associated with the proposed works with the proviso to resolve fully (avoid or preserve by record) any material observed at that point. Such monitoring will be focused on the excavation of the toe area of the revetment and should not be required during works on the cliff face or along the cliff top as both these areas are parts of the landfill site. The assessment is included as **Appendix H**.
- **Topographic, bathymetric and tidal surveys** were undertaken at the Woodbrook landfill frontage to inform the design and to provide input to the modelling of coastal processes. The cover report relating to this data is included as **Appendix I**.
- **A coastal process modelling report** in relation to the potential impacts of the proposed works on broader coastal processes has been prepared. The modelling found that impacts on sediment transport in the area will not be such as to be significant. They will be localised to the area immediately in front of and just north of the protection works. This assessment is included as **Appendix J**.

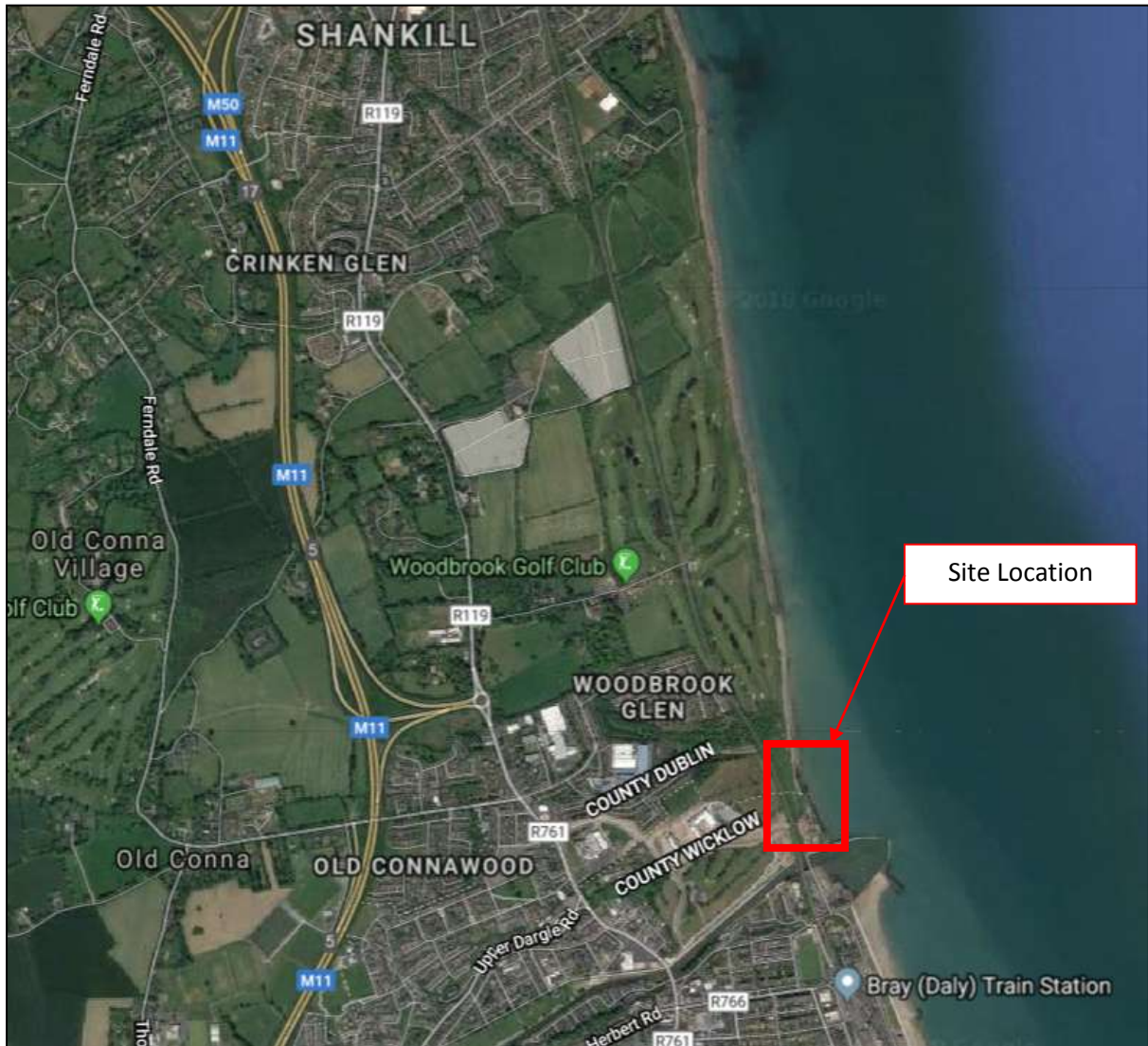


Figure 1.1 - Location Plan for Proposed Works



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## 2.0 DESIGN SOLUTION

### General

Ongoing erosion and cliff instability is causing the landfill material to fall into the sea. This material is taken and spread along the shore by waves and tides with adverse environmental impacts. It has been determined that there is a need for long-term coastal protection along the cliff face of the historic landfill site. The preferred option selected was to 'Protect the toe of the existing cliff and stabilize the cliff face by re-grading'.

### Description

This solution consists of the placing of an armourstone revetment at the toe of the cliff and stabilising the cliff face above by re-grading to a long term stable slope. This solution would require the removal of landfill material from the cliff face and the deposition of this material on site to the rear of the re-graded cliff edge. The re-graded face would be protected up to the height of wave run-up by gabion mattress and top soiling and seeding above this. This solution will prevent contaminated material reaching the foreshore. It is proposed to maintain beach access by means of a path along the cliff top and a set of access steps down through the revetment at the northern end.

For greater detail please refer to:

- Appendix A - Planning Drawings;
- Appendix D - Coast Protection Options Report (May 2017)
- Appendix E - Soil Sampling at Cliff Face (2018)

The following photograph was taken in Duncannon, Co. Wexford. It gives a finished example of a similar coastal protection revetment structure. The works in Duncannon included rock armour used to protect the toe of the cliff with a vegetated, sloped cliff face above.



**Figure 2.1 - Example of similar coastal protection works at Duncannon, Co. Wexford.**

### 3.0 CONSTRUCTION METHODOLOGY

The construction methodology for the proposed works will include the following.

#### **Site Access:**

- Site access for plant and personnel will be made via the harbour road, off Strand Road R766 in Bray;
- There is a slope down to the beach at the southern end of the site. Works, such as the placement of gravel, may be required to make this access point suitable for vehicular use;
- Rock armour or concrete armour units will be brought to site via either the road or the sea;
- Other material will be imported to the site by truck.

#### **Site Clearance:**

Once the contractor takes over the site, they will commence with site clearance and preparation works. This will include the following:

- Site compound set up at a suitable location e.g. offices, waste disposal bins, fuel bund;
- Site security set-up e.g. gates, fencing, signage;
- Clearance of surface debris;
- Preparation of surfaces for vehicular use e.g. compacted clause 804.

#### **Excavation Works:**

Excavation works required will include:

- Re-grading the existing cliff to a more stable slope of 1:2. Excavated cliff material will be deposited on the landward side of the cliff crest;
- Excavation at the toe of the cliff to construct the base of the proposed revetment. Some excavated beach material will be reused in the revetment; the remainder will be deposited on the seaward side of the revetment;
- Unacceptable excavated material will be removed from site and disposed to an appropriately licensed site.

#### **Coastal Protection Works:**

- Excavated beach material will form the core of the new revetment;
- High specification geo textile will be laid on top of the core fill to protect it from loss of fines;
- Imported 0.4T armourstone will form the revetment under-layer;
- Imported 4T armourstone or suitably sized concrete armour units will form the revetment primary armour layer;
- Selected larger rocks/concrete armour units will be placed at the front of the revetment toe;
- The crest level of the primary armour of the revetment will be at approximately +5mODM (approximately 4m above the existing beach level);
- The toe will be buried some 1.5m into the beach;

- Gabion mattresses will be installed on the stabilised cliff face, above the armourstone revetment crest to protect cliff erosion due to wave run-up.

**Landfill Material Storage Works:**

- Excavated landfill material will be deposited to the rear of the cliff face at agreed locations.
- The material will be covered in a layer of topsoil and grass seeded.

**Plant, Labour and Equipment**

- Excavators for excavation and deposition of materials, likely 2-4 excavators on site, two on the beach and two on the cliff;
- Trucks to deliver materials to site, likely 10 deliveries per day;
- Dump trucks to move material along the beach front, 1 no. dump truck
- Personnel for placing of geotextile;

**Timescale**

- The duration of the works will be approximately 16 weeks.

## 4.0 KEY QUANTITIES

The construction will consist of in the main:

- Rock Armour/Concrete units;
- Excavation/deposition of cliff material;
- Geotextiles;
- Gabion matressing;
- Top soil and grass seeding;
- Access path material;
- Concrete access steps

### Rock

Rock is used to protect the base of the cliff. The median rock size, M50, is 4,000kg for the outer (primary) layer and 0.4T for the under layer. Concrete Armour units may be used as an alternative. If used their size will be less than individual rock units.

### Geotextile

The revetment will include a geotextile layer beneath the rock layers to reduce the risk of loss of fine material from behind.

### Key Quantities

**Table 3.1 Key Quantities - Summary**

<u>Item</u>	<u>Units</u>	<u>Quantity</u>
Excavation of Cliff Material.	m3	5,000
Imported Armourstone	m3	12,000
Geotextile Filter Layer	m2	3,000
Gabion Matressing	m2	600
Top soil and grass seeding	m2	1,500

## APPENDIX A – PLANNING DRAWINGS

## **APPENDIX B – TIER 2 RISK ASSESSMENT (DECEMBER 2017)**

## **APPENDIX C - REMEDIATION OPTIONS REPORT (MARCH 2017)**



## **APPENDIX D - COAST PROTECTION OPTIONS REPORT (MAY 2017)**

## **APPENDIX E - SOIL SAMPLING AT CLIFF FACE (2018)**

## **APPENDIX F - SCREENING FOR APPROPRIATE ASSESSMENT**

## **APPENDIX G - ARCHITECTURAL HERITAGE IMPACT ASSESSMENT REPORT**

## **APPENDIX H - ARCHAEOLOGICAL IMPACT ASSESSMENT**

## **APPENDIX I - TOPOGRAPHIC, BATHYMETRIC AND TIDAL SURVEYS**

## **APPENDIX J - COASTAL PROCESSES MODELLING REPORT**