Gordon Knaggs & Associates
Confidential Report

Examination of a broken timber board fabric from the Crash Deck Structure at Cross Cove, Sceilg Mhichíl.

TITLE: **Examination of a broken timber board fabric from Crash Deck Structure at Cross Cove, Sceilg Mhichíl.**

TO: **Office of Public Works, Attn: Mr Fergus Mc Cormick, Senior Architect**

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REPORT BY: **Gordon Knaggs F.I.W.Sc.**

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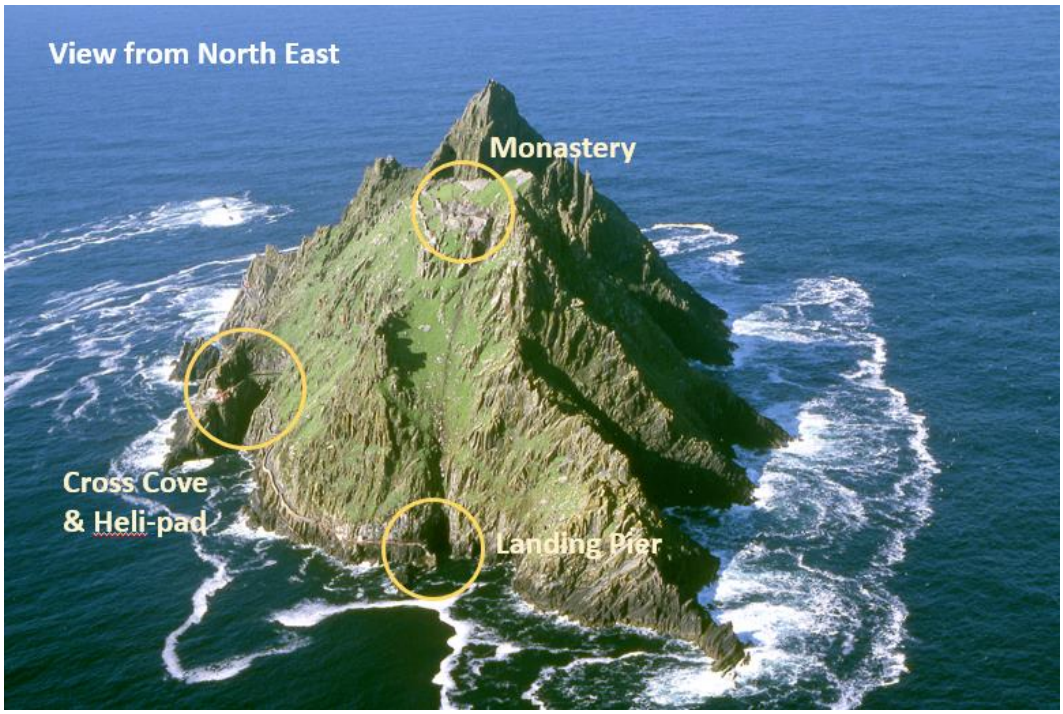


Image: Elevated view of Sceilg Mhichíl
Cross Cove Crash Deck – Site Context

Introduction and Context

Gordon Knaggs & Associates, Consultant Timber Technologists were contacted by OPW on April 30th 2024 to assess the condition of a sample of broken timber board comprising part of the deck fabric of a Crash Deck Structure located at Cross Cove on Sceilg Mhichíl.

The boarding was damaged as a result of rockfall. OPW retrieved the sample of broken boarding on April 18th during the first site inspection of the 2024 season. OPW have provided the following information and facilitation in respect of preparation of this report:

- May 01st 2024 - Preliminary briefing on phone
- May 01st 2024 - Issue of photography dated April 18th and 24th of sample of as found boarding broken by rockfall on site. (sample located at mid span)
- May 01st 2024 - Issue of video file and photography dated April 24th of decayed boarding removed in-situ from the exposed seaward edge. (bottom of pitch/end condition)

- Briefing Meeting at 1GQ held on May 02nd 2024 including:
  -detailed review of OPW photography and videos
  -examination of physical timber sample retrieved from site on April 24th (seaward edge condition)
  In attendance were:
  - Gordon Knaggs, Gordon Knaggs & Associates
  - Fergus McCormick, Senior Architect – OPW Killarney District
  - Eugene Boyle, Architect – OPW Killarney District
  - Kate Dowling, Architect – OPW Killarney District.

- Further Instructions
  -it was agreed to progress a detailed analysis of the timber sample provided and prepare a preliminary report.
  -it was agreed that on completion of the initial report, that a site visit will be facilitated by OPW to facilitate a site inspection of the overall Crash Deck Structure and for a supplementary developed report to be prepared.

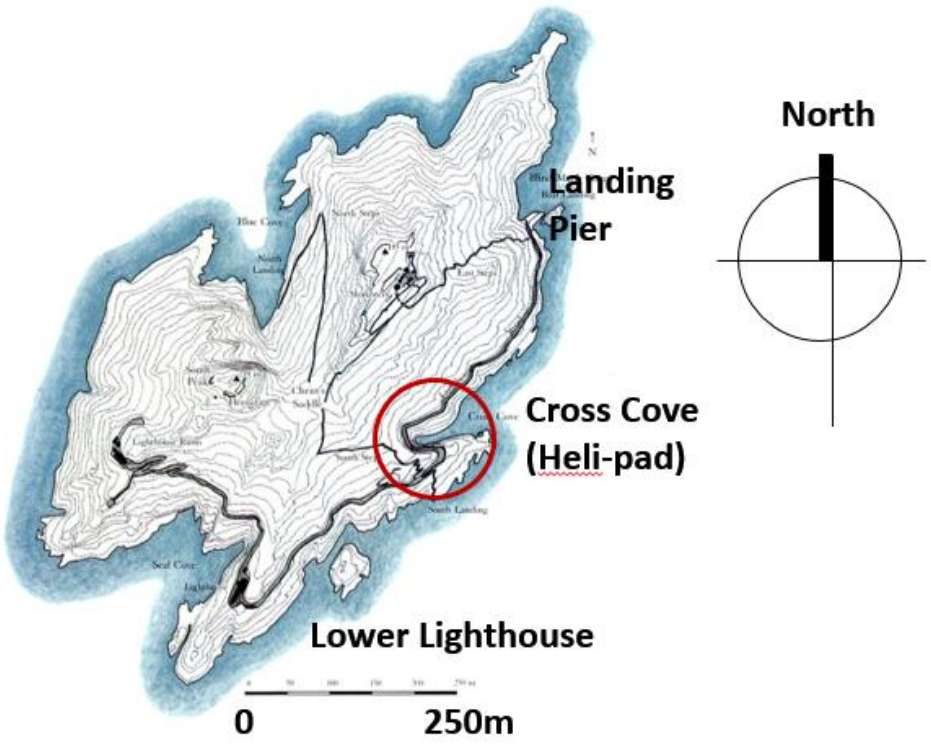


Image: Site Map of Sceilg Mhichíl
Cross Cove Crash Deck - Site Location and Context

Summary.

A sample of a broken timber deck boarding from the Crash Deck at Cross Cove on Sceilg Mhicíl, Co. Kerry, was received.
This sample was examined, the species identified, and the fungal attack assessed.
This board has suffered considerable decay and weathering, has lost most of its strength, and is unfit for continued use.

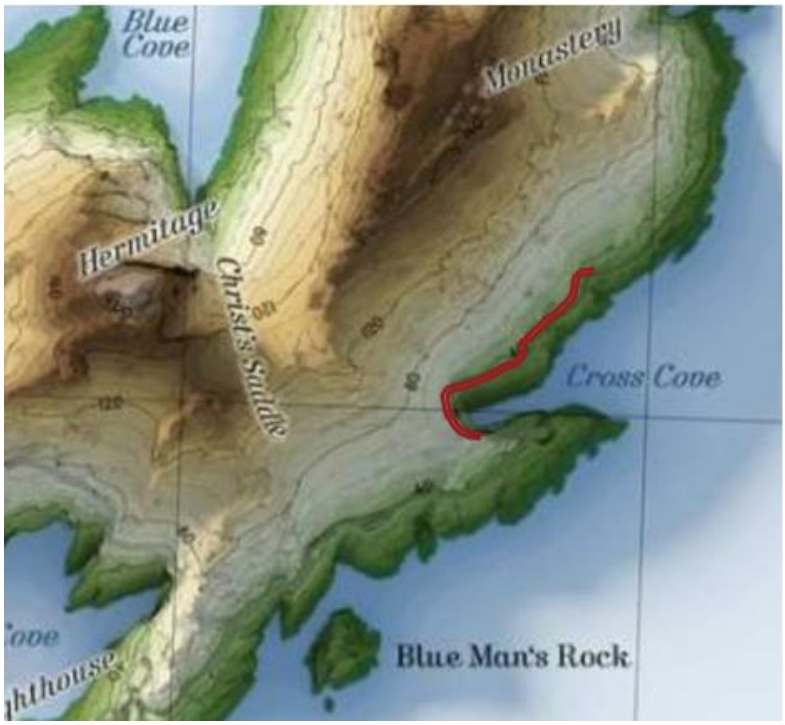
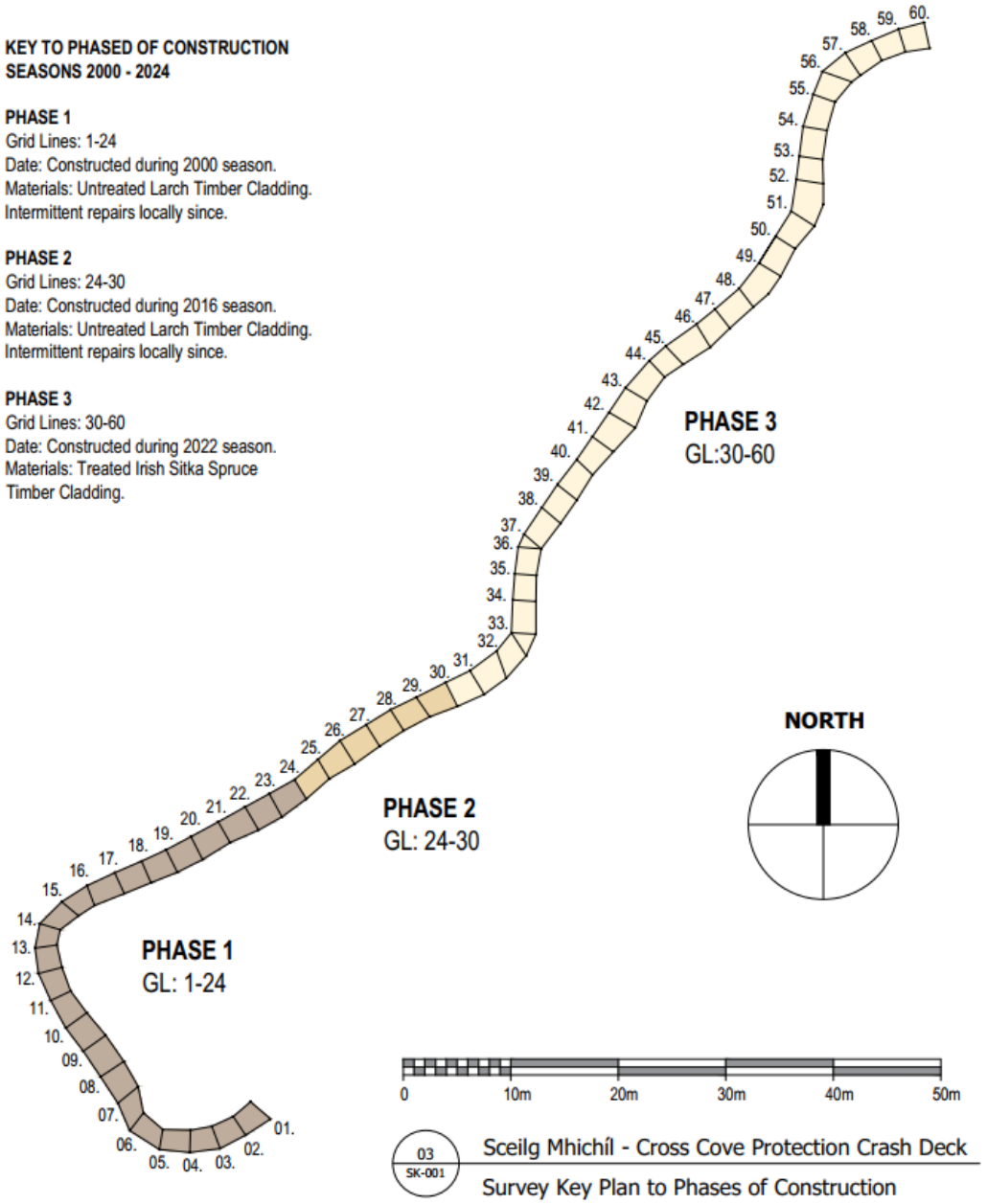


Image: Site Map of Sceilg Mhichíl
Cross Cove Crash Deck - Footprint of Crash Deck Structure shown in red.

Examination.

The sample of board, 350mm long with a broken end, and a nominal 125x50mm in section, was received on 2nd. May 2024. This was extremely weathered in appearance, with erosion of the earlywood of the wide annual rings – see Figure 1. Extensive algal and lichen growth was present on the original surfaces – see Figure 2. The core of the section was extensively decayed, with a relatively intact surface skin – see Figure 3. Samples of the strands on the decayed surface were microscopically examined and identified as fungal hyphae rather than being of plant roots. Thin sections were prepared from the relatively sound skin and also microscopically examined. The species present was identified as Douglas fir, *Pseudotsuga menziesii.*



Discussion.

OPW have advised that Crash Deck structures have been implemented in a series of phases at Cross Cove since 2000. The timber deck materials utilised in the first phase in 2000 and its subsequent extension in 2016 were stated to be of Larch. This material is advised as being typically of 50mm in thickness.

Timber boarding fabric has been intermittently replaced over the years in response to damage from rockfall events, weathering/decay and associated maintenance considerations. It is possible that localised repairs have been undertaken in alternative timber species of similar durability.

The Crash Deck structure at Cross Cove was extended further in 2022, utilising sustainable sourced Irish grown Sitka Spruce as the decking material. This material is advised as being typically of 75mm in thickness.

Image: Cross Cove Crash Deck – Location of board damaged by rockfall.

In relation to the sample of boarding provided by OPW, I understand that its location is within the first phase of construction from 2000 and that these crash deck boards were originally specified and described as being of Larch.

Two species of larch are grown in Ireland, European larch, *Larix decidua*, and Japanese larch, *Larix kaempferi* (hybrids between European and Japanese larch, similar in character to Japanese larch are also planted). It is generally recognised that European larch is more durable than Japanese larch, but these species cannot be distinguished on the basis of their anatomical characteristics.

With reference to the individual sample provided by OPW, the species present here, Douglas fir, is similar in gross characteristics and colour to larch, and is of similar durability. EN 350-2 – Durability of wood and wood-based products – natural durability of solid wood - Part 2 classifies wood species according to their durability. Larch & Douglas fir are classed as 3-4, moderately durable or slightly durable.

Note that the durability rating refers solely to the heartwood. Sapwood, the outer pale part of the log, is rated as non-durable or perishable in all wood species. Note also that Japanese larch is widely regarded as being of lesser durability than European larch.

EN 460 – Durability of wood and wood-based products – Natural durability of solid wood- guide to the durability requirements for wood to be used in hazard classes - indicates that for hazard class 3 (above ground, not covered) the wood species used should be of durability class 3 or better. This suggests that both Larch and Douglas fir heartwood would be suitable for use in a situation such as is present here but if untreated, as appears to be the situation here, the inclusion of untreated sapwood (albeit forming a small proportion of the cross-section of any individual board) would lead to a reduced service life

The considerable erosion of the less dense earlywood portion of the growth rings at the end grain, and the extensive algal and lichen growth, suggests that this sample of board has been in service for a considerable time, possibly since the construction of the first phase of the Crash Deck during 2000, but this cannot be determined with any certainty.

The pattern of decay, with a relatively sound surface skin which in service would have concealed the decayed core on a visual examination, is most unusual. Such a pattern can sometimes be seen in timber which has received a surface treatment with preservative, but I understand that no such treatment was applied.

An examination should be carried out to determine the extent of decay in the other boards in the structure, and to identify if other species are present.

If the boards are to be replaced by the same species, I would recommend that:-

1. The boards should receive pressure treatment with a water-borne copper-based preservative. (boards should be dried before treatment)

2. Any cut ends or drill holes should be re-treated.

3. A space of 4-6mm should be left between adjacent boards to minimise the lodging of rainwater.

4. All top ends of boards should be kept clear of the rock face.

Figure 1. End-grain, showing wide rings and erosion of the early wood.

Figure 2. Surface growth of algae and lichen.

Figure 3. Severe decay in core of board, with relatively intact surface layer.