



Core Hole Investigation Steel Sheet Pile Survey - Supplement Skerries Pier



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Executive Summary

The pier fill material was found to be level with the underside of the concrete slab at all 5 investigation locations. There was no evidence that the concrete slab is unsupported in any of the locations and there is no visible sign of subsidence or cracking to the deck.

It is reasonable to assume that the concrete deck slab remains fully supported by the fill material within the pier.

The underwater survey report assessed that the steel piles are in critical condition, but at present the concrete deck remains capable of carrying vehicular traffic. Loading of the edges of the pier directly on the sheet piles should be avoided until repairs or replacement has been carried out.

Recommendations

It would be recommended that the current vehicle restrictions to the West End of the Pier remain in place.

However, it was observed during the investigation that this might not be practical due to fishing operations, so implementing a restricted weight to the pier with barriers / demarcation to prevent loading within 1.5m of the edge of the pier might be considered.

In the short term, localised patching of the holes at the base of the sheet piles and placement of concrete or grout to the base of the piles would be recommended to prevent further loss of pile integrity and fill material until more permanent remedial works can be carried out.



1. Introduction & Methodology

Introduction

Following an Underwater Survey of the Steel sheet piles at Skerries harbour, carried out in December 2021, Norfolk Marine Ltd were engaged to carry out a core hole investigation of the pier deck and fill material. The core hole investigation was carried out on 17/12/2021.

The works involved drilling a number of holes through the concrete slab of the deck to determine the condition of the pier fill material beneath.

The previous underwater survey identified numerous defects to the steel piles, particularly at the MLWS level, where accelerated low water corrosion was evident. A large number of the steel piles had significant holes at this level or advanced loss of material section thickness. The location of the core investigation holes was selected to correspond to the known defect areas.

The objective of the investigation was to assess whether the core fill material within the pier had been lost through the open holes at the bottom of the piles and subsequent settlement had occurred, resulting in the concrete slab becoming suspended.

The findings of the investigation would assist in the council engineers in assessing the structural integrity of the pier deck and implementing restrictions on the access to the pier by vehicular traffic.

This report supplements the underwater survey report 21-018/UI01 which should be used for reference.

Methodology

The locations of the core holes were selected and marked on the pier surface, to correspond piles where defects were previously found.

A hydraulic coring rig was secured to the concrete deck and the hole drilled through the deck slab before the core section was removed.

Operations were carried out from the pier, using a mobile trailer unit.

Investigation Location Skerries Pier

Date of Investigation 17/12/2021

Conditions General – Dry, Clear
Wind – Light
Temp - 8°C



2. Location Plan

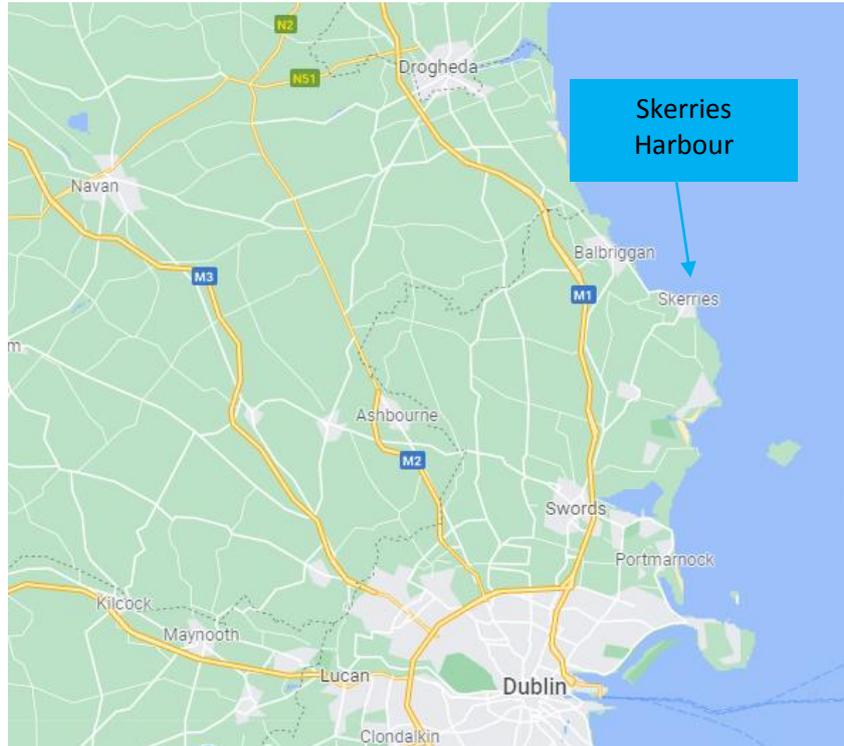


Fig 2.1 – Location Plan

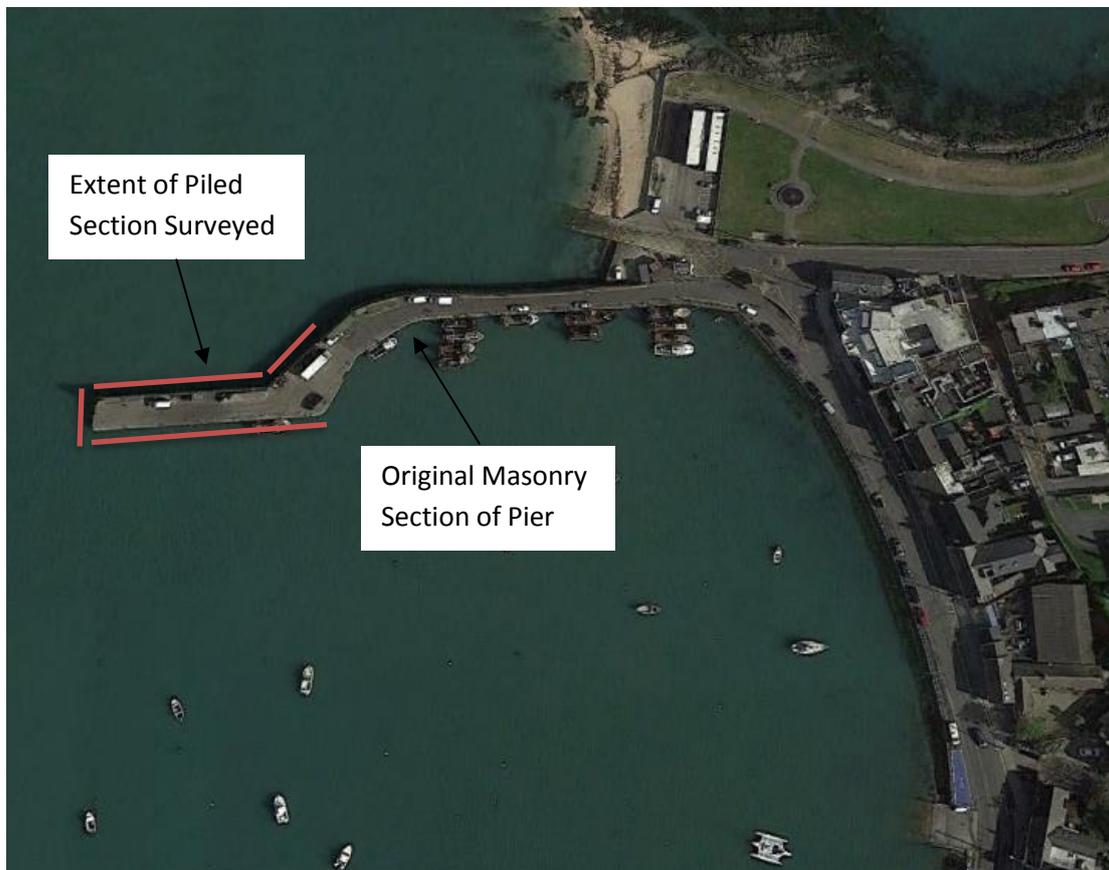


Fig 2.2 – Skerries Pier Layout



3. Details of Structure

3.1 Description

The concrete deck is of poured in-situ concrete construction. A concrete capping beam surrounds the deck and is situated above the steel piles. As reported, following the underwater survey, there was no evidence of subsidence in the concrete deck and no significant cracks or damage.

The thickness of the deck or reinforcement detail etc was not known.

3.2 Recorded Information

No previous information was provided prior to the inspection.

The general layout drawing shown in Appendix A shows an indicative view of the pier arrangement and the core hole locations.



4. Investigation Findings

4.1 Concrete Deck Slab

The concrete slab that forms the deck was found to have a nominal thickness of 200mm. The concrete is in good condition with no significant defects noted.

There is no subsidence or significant cracks anywhere on the piled section of the pier that was accessible.

Steel reinforcement mesh was found within the cored holes which appeared to be a mesh sheet of approximately 8mm. The steel was in good condition with no corrosion visible within the core hole. The mesh is located in the middle of the slab thickness.



Fig 4.1.1 - General Deck Concrete Slab Condition



Fig 4.1.2 - Typical Concrete Condition



Fig 4.1.3 - Concrete Slab Thickness



Fig 4.1.4 - Typical Core Section Removed



Fig 4.1.5 - Steel Mesh Reinforcement Visible in Slab



Fig 4.1.6 - Steel Mesh Reinforcement Visible in Slab



4.2 Pier Fill Material

Hole No.	Fill Level	Fill Material
1	Level with Soffit of Slab	40-60mm crushed stone with no discernible fines present.
2	Level with Soffit of Slab	40mm crushed stone with smaller grade present
3	Level with Soffit of Slab	40mm crushed stone with smaller grade present
4	Level with Soffit of Slab	25-30mm crushed stone with smaller grade and fines present
5	Level with Soffit of Slab	40mm crushed stone with smaller grade and fines present

The fill material was found to be level with the underside of the concrete slab at all 5 hole locations. There was no evidence of settlement or subsidence in the fill material supporting the concrete slab.

The fill material varied slightly between the investigation locations with a smaller stone and fines material present, particularly at locations 4 & 5. Hole no. 1 has a slightly larger stone with no fines material visible. There was no evidence that material has washed out so this could just be variations in the fill loads during construction.

The fill material is currently fully supporting the concrete slab with no evidence of suspension found in any location.

During the underwater inspection, the fill material found to the rear of the defective sheet piles was a 500 – 600mm rounded river boulder type stone with no small grade stone or fines material present. The fill material found within the cored holes in the concrete deck slab was a smaller graded crushed stone with fines material present in places.

As no construction records or drawings are available, the original fill materials, sequence, levels etc are not known. It is likely that a larger stone, as found during the underwater survey, was used at lower levels and a smaller stone used at higher levels.

It is also not known if there is any separation / blinding layer between the different fill materials found. It is likely that there is some barrier to prevent the smaller material found at deck level from falling / washing through the larger stone beneath.



Hole 1



Fig 4.2.1 - Fill material within hole No. 1



Fig 4.2.2 - Core section removed



Hole 2



Fig 4.2.3 - Fill material within hole No. 2



Fig 4.2.4 - Core section removed

Hole 3



Fig 4.2.5 - Fill material within hole No. 3



Fig 4.2.6 - Typical Slab Condition (Hole No. 3)



Hole 4



Fig 4.2.7 - Fill material within hole No. 4



Fig 4.2.8 - Hole No. 4 location and removed core



Hole 5



Fig 4.2.9 - Fill material within hole No. 5



Fig 4.2.10 - Mesh Reinforcement visible within Hole No. 5



5. Conclusions and Recommendations

Conclusions

The pier fill material was found to be level with the underside of the concrete slab at all 5 investigation locations. There was no evidence that the concrete slab is unsupported in any of the locations and there is no visible sign of subsidence or cracking to the deck.

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Recommendations

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Appendix A – Layout Drawing

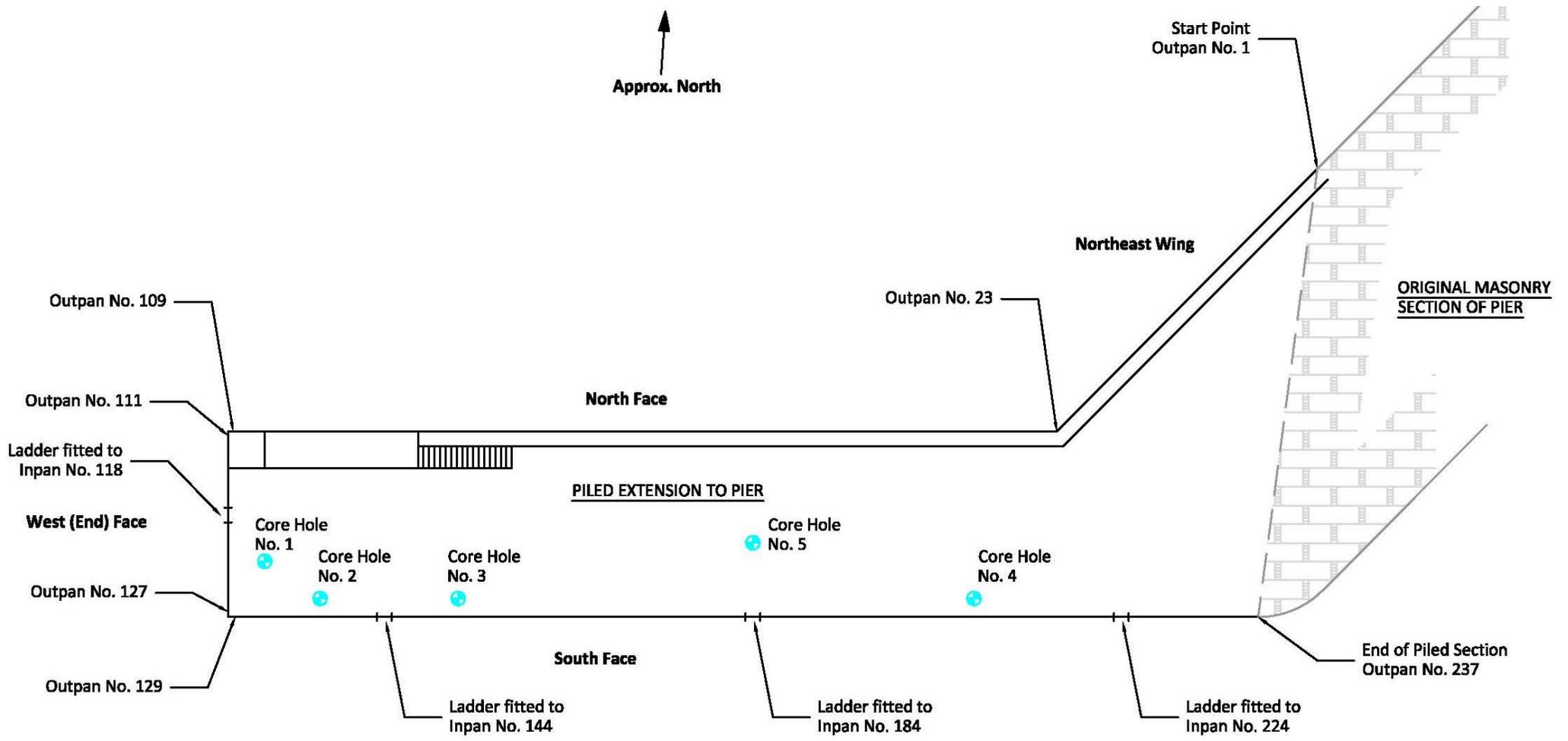


Fig A1 – Core Hole Location Layout