

# Kilmun Pier- Construction Method Statement

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## Pile Installation

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## Document Information

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## Document Controls and Verification

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## 1. Introduction

This method statement is an exemplar document to outline the worst-case scenario for the barge-based installation of steel tubular monopiles at Kilmun Pier in compliance with **BS EN 1997 (Eurocode 7)**.

The monopiles will be driven through soft material down to rock and rock-anchored using an internal steel tube grouted into a predrilled socket, to ensure structural integrity and long-term performance.

## 2. Scope of Works

- Mobilisation and positioning of marine equipment
- Handling and vertical alignment of monopiles
- Driving of monopiles through soft strata and eating into bedrock
- Drilling of internal rock socket
- Installation and grouting of internal steel tubes
- Final QA/QC inspection and reporting

## 3. Standards and Specifications

All work shall comply with the following standards:

- **BS EN 1997-1:2004+A1:2013** – Eurocode 7: Geotechnical Design – Part 1
- **BS EN 1090-2:2018** – Execution of Steel Structures
- **BS EN ISO 17660-1** – Welding of Reinforcing Steel
- **BS EN 12716** – Grouting for Geotechnical Works
- **BS EN ISO 9001** – Quality Management Systems

## 4. Materials

### 4.1 Outer Monopiles

- Diameter: Ø1220 mm
- Wall thickness: 25 mm
- Steel grade: S460
- Manufactured and CE-marked per BS EN 1090-1

### 4.2 Internal Pin Tubes

- Diameter: 914 mm
- Wall thickness: 22mm
- Steel grade: S460
- Length: 12m (6m into rock and 6m into the steel pile)

### 4.3 Grout

- Marine-grade, non-shrink, cementitious grout
- Compressive strength  $\geq$  40 MPa (28 days)

## 5. Equipment and Plant

- Marine barge with spud legs or jack-up system
- Crawler or pedestal crane, securely positioned on a barge,
- Vibro-hammer
- Hydraulic impact hammer if required
- DTH drill or rotary drilling rig
- Grout mixer and pump
- Survey instruments

## **6. Methodology**

### **6.1 Mobilisation and Positioning**

- Bring and anchor barge at the installation point
- Deploy spud legs or jack-up system to fix barge position
- Verify barge position

### **6.2 Pile Handling and Alignment (5no of piles)**

- Lift and lower monopile through pile gate or guide
- Align pile vertically using survey equipment

### **6.3 Driving Through Soft Soil (5no of piles)**

- Drive pile through soft soil (Sandy GRAVEL and Sandy Gravelly Silt with pockets of CLAY) using vibro-hammer
- If rock level is uncertain, switch to impact hammer to confirm refusal level
- Monitor and log driving data in accordance with BS EN 1997

### **6.4 Drilling Internal Rock Socket (5 no)**

- Position drill inside monopile
- Borehole depth per design (6 m into rock)
- Clean with water/air flushing
- Confirm verticality and full depth

### **6.5 Internal Steel Tube for rock socket Installation (5no)**

- Insert internal steel tube with spacer to guarantee central position
- Place grout using tremie method from bottom up
- Record grout volume and confirm no air voids
- Allow grout to cure (minimum 48 hours unless otherwise approved)

## **6.6 QA and Verification**

- As-built pile data recorded (depth, position, verticality)
- Grout cube tests in accordance with BS EN 12390-3
- QA reports submitted weekly

## **7. Health, Safety, and Environment (HSE)**

- All personnel trained in marine operations and site inducted
- PPE to be worn at all times
- Emergency response plan in place
- Appropriate environmental controls to be used for example: silt curtains, spill kits, grout waste capture
- Compliance with CDM Regulations (UK).

## **8. Programme**

- Pile installation: estimated as 2.0 days per pile
- Work timed for weather windows and tide schedules: TBC
- Contingency included for tool failure and rock refusal: estimated as 5 days