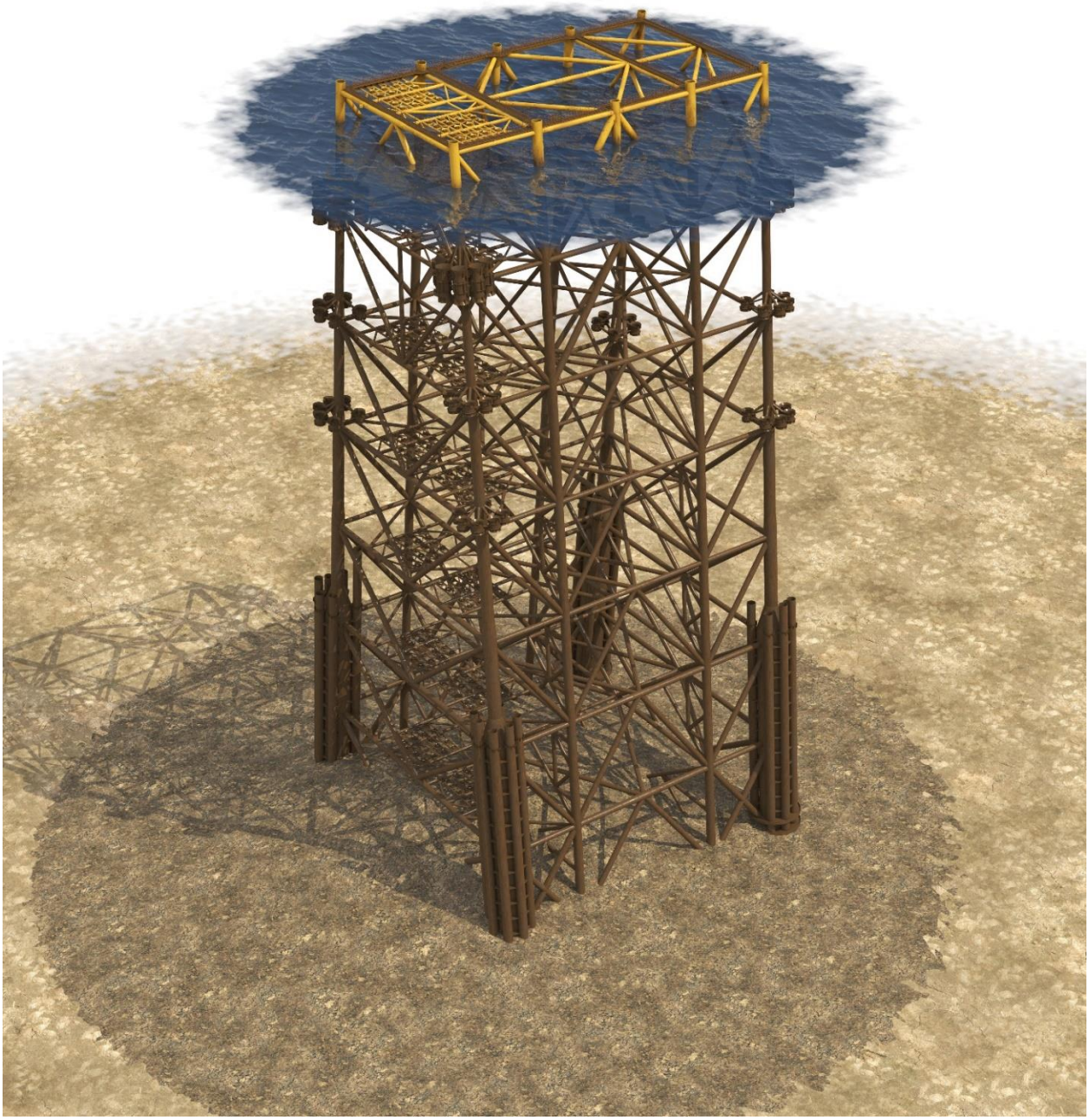
Heather Alpha Platform
Upper Jacket
Decommissioning Programme



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FIGURES AND TABLES

ABBREVIATION	EXPLANATION
~; <; >	Approximate; Less than; More than
BEIS	Department for Business, Energy & Industrial Strategy
COABIS	Component Orientated Anomaly Based Inspection System™ (database)
CNRI	CNR International (U.K.) Limited
DP	Dynamic Positioning
EnQuest	EnQuest Heather Limited
EU	European Union
FishSAFE	The FishSAFE database contains a host of oil & gas structures, pipelines, and potential fishing hazards. This includes information and changes as the data are reported for pipelines and cables, suspended wellheads pipeline spans, surface & subsurface structures, safety zones & pipeline gates (www.fishsafe.eu) FishSAFE is a PC-based safety device that provides the skipper of a fishing vessel with detailed information about subsea obstruction and provides a timely warning of any nearby oil and gas related infrastructure that may pose a snagging hazard and potentially result in the damage or loss of the fishing gear or even the vessel.
FPSO	Floating Production Storage & Offloading Vessel
GBS	Gravity Based Structure
GMG	Global Marine Group
Heather	Heather Alpha
HSE	Health and Safety Executive
HSEA	Health, Safety, Environment and Assurance
ICES	International Council for the Exploration of the Sea
in	inch
jacket	substructure that supports topsides
Jacket footings	Part of jacket or substructure resting on the seabed up to the highest point of the piles, or a part of the steel installation that is so closely connected as to present major engineering problems in being severed (Refer [3]).
km	Kilometre
LAT	Lowest Astronomical Tide
m	Metre(s)
m^2	Square Metre(s)
m^3	Cubic Metre(s)
m/s	Metres per second
MBES	Multi-Beam Echo Sounder (which is a sonar-based seabed imaging system)
MEOH	Methanol
MPA	Marine Protected Area
N,S,E,W	North, South, East, West
n/a	Not Applicable
NFFO	National Federation of Fishermen's Organisations
NIFPO	Northern Ireland Fish Producers Organisation
NORM	Naturally Occurring Radioactive Material
NSTA	North Sea Transition Authority
OBM	Oil Based Mud
OPEP	Oil Pollution Emergency Plan

ABBREVIATION	EXPLANATION
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning, a department of BEIS (Department for Business, Energy and Industrial Strategy)
OSPAR	Oslo Paris Convention
PL	Pipeline Identification numbers (UK)
PL9	Heather Alpha 16" Gas Export Pipeline
Platform	Installation, typically comprising topsides and jacket
PON	Petroleum Operations Notification
Saturation or sat diving	Saturation diving, also known as mixed-gas diving, is the highest level of commercial diving, working in depths greater than 164 feet (50 meters). Saturation diving is diving for periods long enough to bring all tissues into equilibrium with the partial pressures of the inert components of the breathing gas. It is a diving technique that allows divers working at great depths to reduce the total time spent undergoing decompression.
SFF	Scottish Fishermen's Federation
SLV	Single Lift Vessel
SSCV	Semi-Submersible Crane Vessel
Taqa	Taqa Europa B.V.
Te	Tonne
Topsides	Upper part of a platform that in the case of Heather includes accommodation, drilling facilities, and process facilities to process oil and gas from the reservoir
Total	Total Exploration & Production UK Limited
UK	United Kingdom
UKCS	United Kingdom Continental Shelf
UKOOA	UK Offshore Operators Association
Upper jacket	The part of the jacket connected to, but above the jacket footings
WGS84	World Geodetic System 1984
WI	Water Injection
yr	Year

1. EXECUTIVE SUMMARY

1.1 Decommissioning Programme

This document presents the Heather Alpha (referred to as Heather) upper jacket Decommissioning Programme.

The jacket footings, topsides and pipeline infrastructure covered by notices under Section 29 of the Petroleum Act 1998 are subject to separate Decommissioning Programmes. The Heather topsides Decommissioning Programme was approved 22 July 2021. The Decommissioning Programmes for the pipeline infrastructure and jacket footings will be submitted at a later stage.

As the mass of the Heather jacket is larger than 10,000 tonnes and due to complexities associated with complete removal, the Heather jacket is a candidate for derogation from the requirements of OSPAR Decision 98/3 [3]. This Decommissioning Programme concerns removal of the upper jacket, whereby the jacket will be severed between 74 m and 84 m below Lowest Astronomical Tide ('LAT') with the upper section (upper jacket) being removed. The water depth is ~143 m.

The removal of the topsides and upper jacket will not preclude available decommissioning options for the Heather jacket footings.

Although decommissioning of the Heather upper jacket is being treated in this document as part of the Heather project, EnQuest will continue to explore cost saving synergies with other projects.

1.2 Requirement for Decommissioning Programme

Installations: In accordance with the Petroleum Act 1998, EnQuest Heather Limited (as operator of the Heather field), and on behalf of the Section 29 notice holders (Table 1.4.3), is applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for removal of the Heather upper jacket as detailed in Section 2 of this document. Partner Letters of Support will be provided directly to OPRED.

In conjunction with public, stakeholder and regulatory consultation, this Decommissioning Programme document is submitted in compliance with national and international regulations and OPRED guidance notes [2]. The schedule outlined in this document is for a 6-year period to remove the upper jacket down to the top of the jacket footings and return it to shore for recycling, and earliest disposal due to begin in 2025.

1.3 Introduction

The Heather platform is in block 2/5 of the United Kingdom Continental Shelf (UKCS) and is a fixed and fully integrated installation consisting of a modular topside providing manned production, drilling, and utilities facilities and an 8-leg piled steel jacket with a mass of 20,534 Te. The Heather field is located approximately 94km NE of Shetland in a water depth of ~143m.

The Heather platform was installed in 1977, with first oil being produced on 6th October 1978.

Decommissioning of the Heather topsides and pipelines (PL9, PL352, PL9A and the umbilical) associated with Heather will be subject to separate Decommissioning Programmes. The Heather Topsides Decommissioning Programme was approved 22 July 2021.

A Cessation of Production application for Heather was accepted by the Oil and Gas Authority on 18th June 2020.

For steel substructures weighing more than 10,000 tonnes in air (excluding the topside) this means that the 'footings' may be left in place. The footings are that part of the jacket, and associated closely

connected parts, that are below the tops of the steel piles that connect the jacket to the seabed.

The Heather substructure is a steel jacket that weighs more than 10,000 tonnes in air, being a weight of 20,534 tonnes and along with the Section 29 holders EnQuest believes that there is a case to be made for derogating the jacket footings from the requirements of OSPAR Decision 98/3. This Decommissioning Programme is concerned with removal of the upper jacket. It is supported by an environmental appraisal in section 4.

The fate of the jacket footings will be agreed through a separate Decommissioning Programme in due course, and until that point the height of the footings that will be left *in-situ* has been determined as between 74 m and 84 m below LAT.

1.4 Heather - Overview

1.4.1 Installation

Table 1.4.1: Installation being decommissioned			
Field(s):	Heather	**Production Type**	Oil
Water Depth (m)	~143m	**UKCS Block**	2/5
Distance to median (km)	~50km (Norway)	**Distance from nearest UK coastline**	~94km NE of Shetland
Surface Installations			
Number	**Type**	**Mass (Note 1)**	
1	Jacket	Upper jacket 7,928 Te	
Drill Cuttings pile[1]			
Number of Piles	1	**Total Estimated Volume (m^3)**	57,240
NOTE 1. Estimated mass of upper jacket includes a nominal 816 Te of marine growth respectively. Total mass of the jacket including the footings is 21,080 Te.			

1.4.2 Drill Cuttings

Table 1.4.2: Drill cuttings pile information		
Location of Pile Centre (Latitude/Longitude)	**Seabed Area (m^2)**	**Estimated volume of cuttings (m^3)**
Offset 6m North from the platform centreline	50,400m^2	57,240m^3

During the early years of the Heather platform operations, drill cuttings were discharged to the seabed via a drill cuttings caisson. The accumulation of the drill cuttings during this period has resulted in resulted in the burial of all the jacket bottom plan members at 142 m below LAT.

Multibeam echosounder ('MBES') mapping of the Heather drill cuttings pile has recorded the highest point of the pile at a depth of 125 m below LAT. This would indicate the pile height reaches approximately 17 m above seabed. The volume and footprint of pile has been calculated to be 57,240 m^3 and 50,400 m^2, respectively.

[1] Volume of drill cuttings pile based upon Heather Pre-Decommissioning survey conducted in 2020.

Based on historical records, the volumetric make-up of the cuttings pile is comprised layers of oil and water-based drill cuttings plus other deposits of various sizes. Estimates of the proportion cuttings associated with oil-based muds range from 20% to 47% for the Heather cuttings pile.

The surface of Heather cuttings pile is generally covered in mussel shells of varying densities. The periphery of the cuttings pile starts to see a gradient of decreasing mussel shell thickness and density.

In addition to the mussel cover, stony coral (*Lophelia pertusa*) rubble is also present throughout the cuttings pile. Inside the jacket structure satellite colonies are found on the cuttings pile itself along with occasional clumps of live mussels.

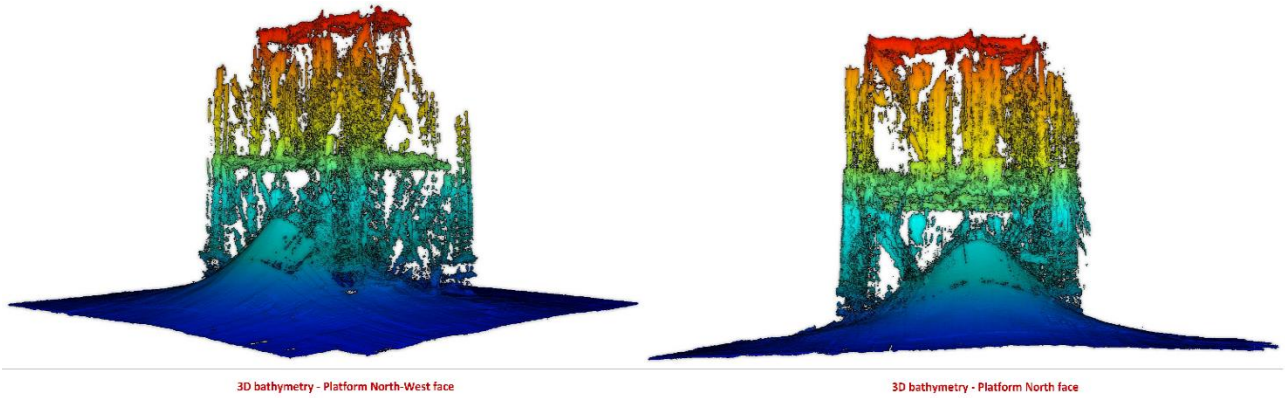


Figure 1.4.1: Drill cuttings pile – side views of MBES data (2018)

This information has been provided for context only. The decommissioning proposals for the drill cuttings will be addressed in the Decommissioning Programme for the jacket footings.

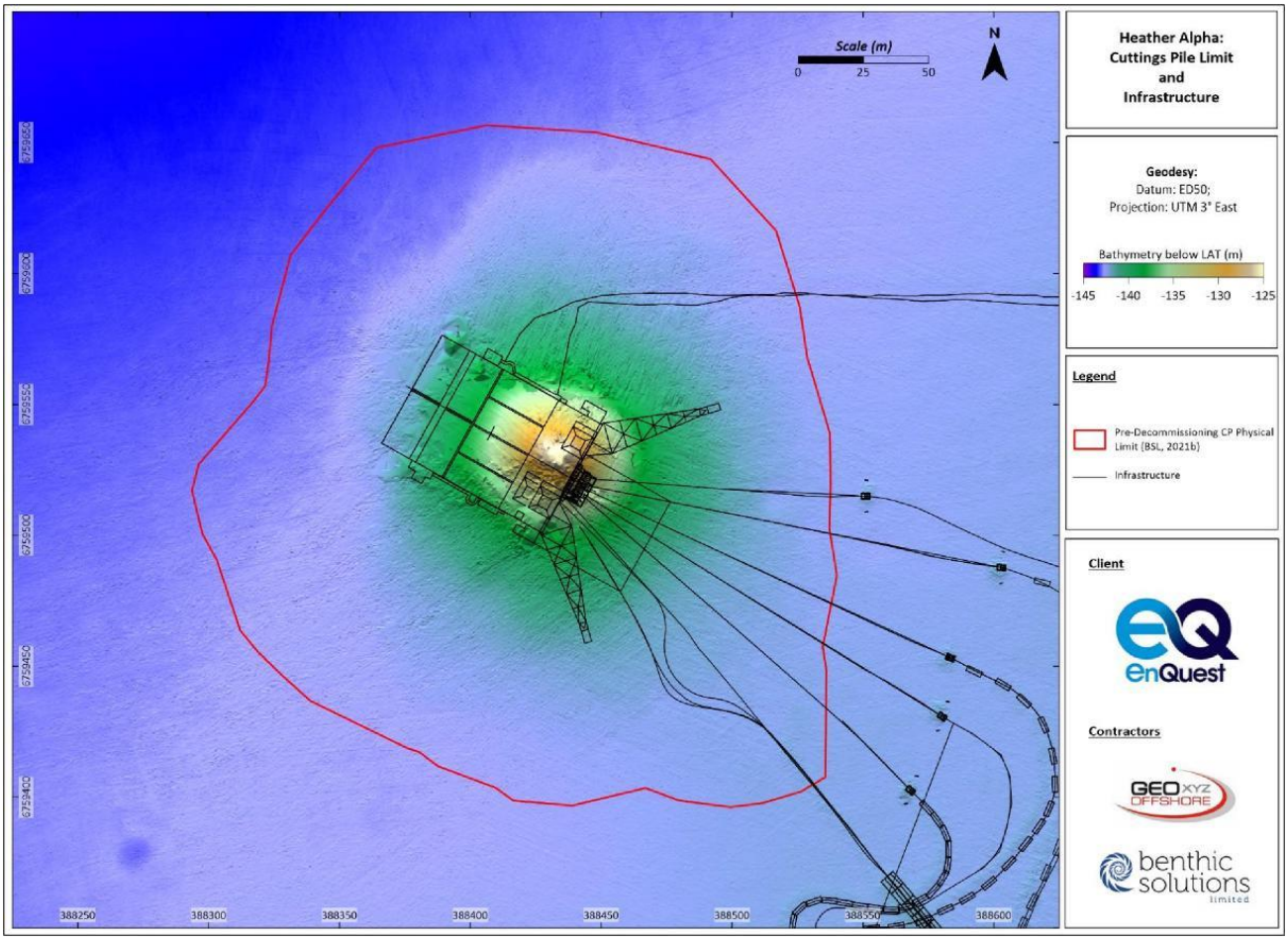


Figure 1.4.2: Drill cuttings pile – plan view of MBES data (2021)

1.4.3 Section 29 holders

Table 1.4.3: Installation Section 29 notice holder details		
Section 29 Notice Holder	**Registration Number**	**Equity Interest**
EnQuest Heather Limited	02748866	37.50%
Ithaca Oil and Gas Limited	01546623	31.25%
BG Great Britain Limited	00909162	31.25%

Table 1.4.4: Broom riser Section 29 notice holder details		
Section 29 Notice Holder	**Registration Number**	**Equity Interest**
EnQuest Heather Limited	02748866	63.0%
Ithaca Epsilon Limited	05979869	8.0%
Molgrowest (I) Limited	SC278868	26.0%
Molgrowest (II) Limited	04922555	3.0%
NOTE 1. Details of the Section 29 Holders for the Broom partners is included for information only. Letters of support will not be required. Please refer section 1.2.		

1.5 Summary of proposed Decommissioning Programme

Table 1.5.1: Summary of Decommissioning Programme	
Proposed Decommissioning Solution	**Reason for Selection**
1. Upper jacket	
Removal of the upper jacket and recycling. The upper jacket will be removed to a height between 74 m and 84 m below LAT (Figure C.3.1) with the jacket footings remaining *in-situ*. The upper jacket will be taken to shore for recycling with small quantities of material (<1%) potentially destined to landfill. The exact height of severance is subject to commercial agreements that will be influenced by technical constraints, issues of cross bracing design, cutting technology, structural integrity concerns and lift vessel capacity. Permit applications required for work associated with removal of the jacket will be submitted to the regulator as required. OPRED will be notified once the severance height is known.	Meets regulatory requirements and maximises opportunity for re-use or recycling of materials. Complies with the requirements of OSPAR Decision 98/3.
2. Risers	
Removal of the risers PL9, PL352 and ESDV umbilical down to the top of the footings and recycling. The Heather risers will be removed to a height between 74 m and 84 m below LAT in line with the upper jacket with the lower part of the risers remaining *in-situ*. The upper part of the risers will be taken to shore for recycling with small quantities of material (<1%) potentially destined to landfill. The exact height of severance is subject to commercial agreements. Proposals for the sections of the risers connected to the lower jacket will be addressed in the Decommissioning Programme for the lower jacket. **PL9** - remove upper riser, severing it at a height between 74 m and 84 m below Lowest Astronomical Tide ('LAT') with the lower part remaining *in-situ* until the fate of the jacket footings has been decided. **PL352** - remove upper riser, severing it at a height between 74 m and 84 m below LAT with the lower part remaining *in-situ* until the fate of the jacket footings has been decided. **ESDV umbilical** - remove the umbilical down to the point where it is buried in drill cuttings. Remove umbilical and leave remainder *in situ*. Permit applications required for work associated with removal of the jacket will be submitted to the regulator as required.	Meets regulatory requirements.
3. Wells	
Covered by Heather topsides Decommissioning Programme.	
4. Interdependencies	
An assessment of alternative use has been made for the Heather platform and there were no options that were considered economically viable. Due to timescales of decommissioning, separate Decommissioning Programmes will be submitted in due course for the jacket footings and pipeline infrastructure. The topsides Decommissioning Programme was approved 22 July 2021. No third-party infrastructure will be affected as a result of the decommissioning proposals. The jacket footings will be subject to a separate Decommissioning Programme. The removal of the topsides and upper jacket will not preclude available decommissioning options for the Heather jacket footings. The drill cuttings will not be affected by the proposals for decommissioning the upper jacket.	

1.6 Field Location including field layout and adjacent facilities

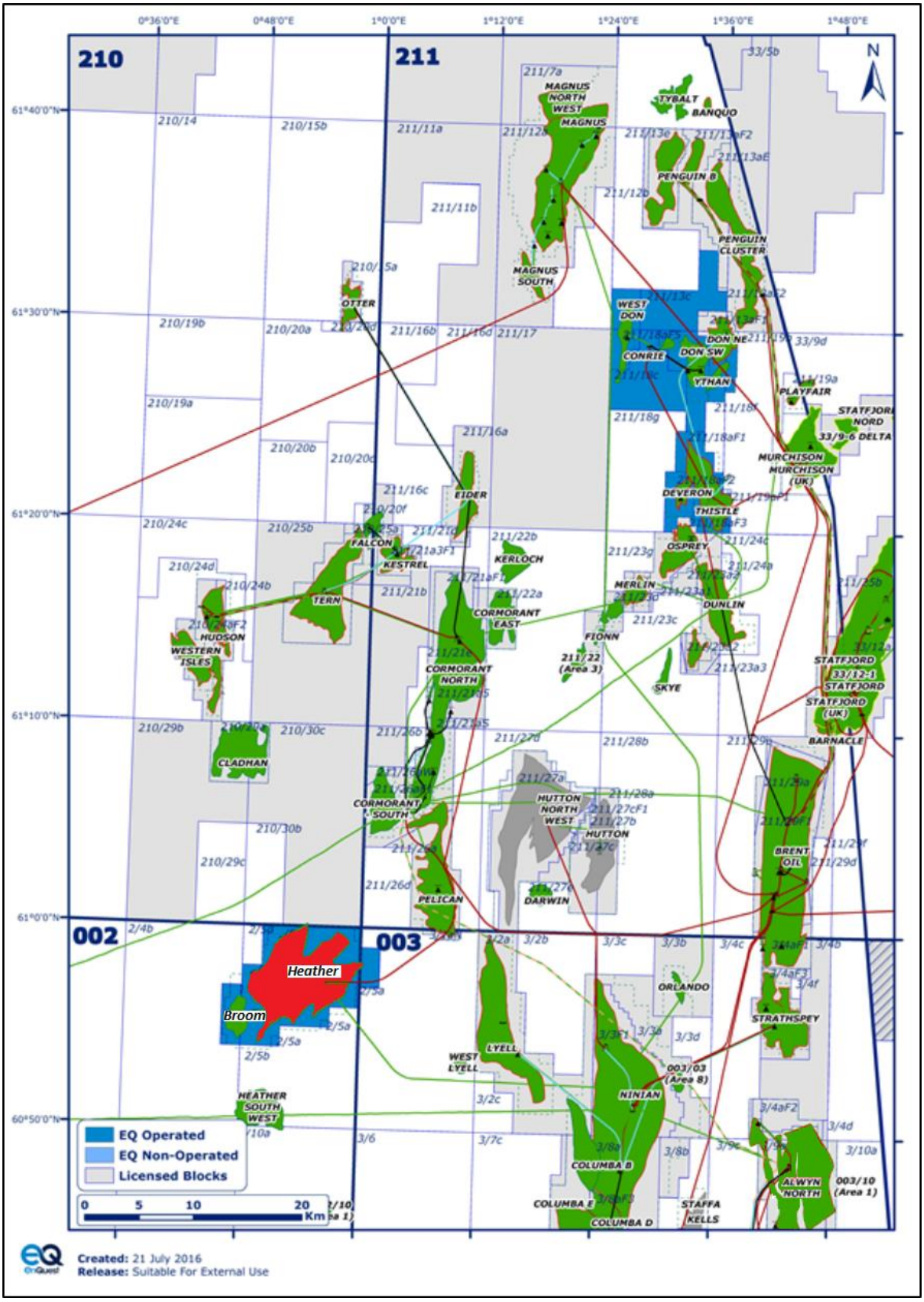


Figure 1.6.1: Heather Field location in UKCS

Table 1.6.1: Adjacent facilities					
Owner	**Name**	**Type**	**Direction & distance to**	**Information**	**Status**
Dana Petroleum	Western Isles	FPSO	NNW, 31km		Operational
Taqa	Tern	Fixed Steel Platform	NNW, 36km		Operational
Taqa	Cormorant North	Fixed Steel Platform	N, 34km		Operational
Taqa	Cormorant Alpha	Fixed Steel Platform	NNE, 18km		Operational
CNRI	Ninian Northern	Jacket only	E, 27km		Decommissioned
CNRI	Ninian Central	Fixed GBS	E, 31km		Operational
CNRI	Ninian Southern	Fixed Steel Platform	ESE, 32km		Operational
Taqa	PL4 (36in Oil)	PL4 (36in Cormorant to Sullom Voe Pipeline)	NW, 10km		Operational
Total	PL1526 (12in Oil)	PL1526 (12in Alwyn to Cormorant Oil Export Pipeline)	NE, 11km		Operational
EnQuest	PL10 (36in Oil)	PL10 (36in Ninian Central to Grutwick Main Oil Line)	SSE, 12km		Operational
CNRI	PL2473 (12" Ninian South to Lyell B PL)	PL2473 & PL9 crossing	ESE, 22km	PL2743 over PL9	Operational
CNRI	PL869A (Lyell 10" MEOH PL)	PL869A & PL9 crossing	E, 23km	PL869A over PL9	Not in use
CNRI	PL864A Lyell 12" WI PL)	PL864A & PL9 crossing	E, 23km	PL864A over PL9	Operational
CNRI	PL866A (Lyell 8" Test PL)	PL866A & PL9 pipeline crossing	E, 24km	PL866A over PL9	Not in use
Impacts of decommissioning proposals					
There are no direct impacts on adjacent facilities from the decommissioning works associated with removal of the Heather upper jacket.					

1.7 Industrial Implications

It is EnQuest's intention to develop a contract strategy and Supply Chain Action Plan that will result in an efficient and cost-effective execution of the decommissioning works. The Heather upper jacket Decommissioning Programme will be managed by EnQuest to ensure safe, efficient, and legally compliant delivery of the various elements of the decommissioning scope. The intention is to make efficient use of the supply chain to generate value through the application of knowledge, innovation, and technology, explore collaboration opportunities and to employ best practice in the management of the supply chain to deliver a cost effective and reliable service. Where appropriate existing framework agreements may be used for decommissioning activities.

2. DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Installation: Upper jacket

Table 2.1.1: Surface facilities information					
Name	Facility Type	Location	Upper jacket		
		WGS84 Decimal WGS84 Decimal Minute	Weight (Te)	No of Legs	Number of Piles
Heather Alpha	Fixed Steel Jacket	60.953705° N 00.938692° E 60° 57.2223′ N 00° 56.3215′ E	7,928	8 (+2)[2]	n/a

NOTE
1. Mass of upper jacket includes a nominal 816 Te of marine growth. Total mass = 7,112 + 816 = 7,928 Te.
2. Eight full legs and two part-legs mid-span in the longitudinal frames.

2.1.1 Jacket description

The Heather jacket is a tubular steel jacket that has eight full legs and two-part legs mid-span in the longitudinal frames. The jacket is piled at the four corner legs with six raking piles per leg. There are 24 piles that are driven through pile guides into the seabed and grouted into pile sleeves. There are no piles on Frames 2, 3 or 4. The piles are 60 inch outside diameter (1524 mm OD) with 2½ inch (63.5 mm) wall thickness, and 96 m long. Pile guides at ~ 6.09 m below LAT were removed but otherwise all the pile guides below the waterline remain on the jacket.

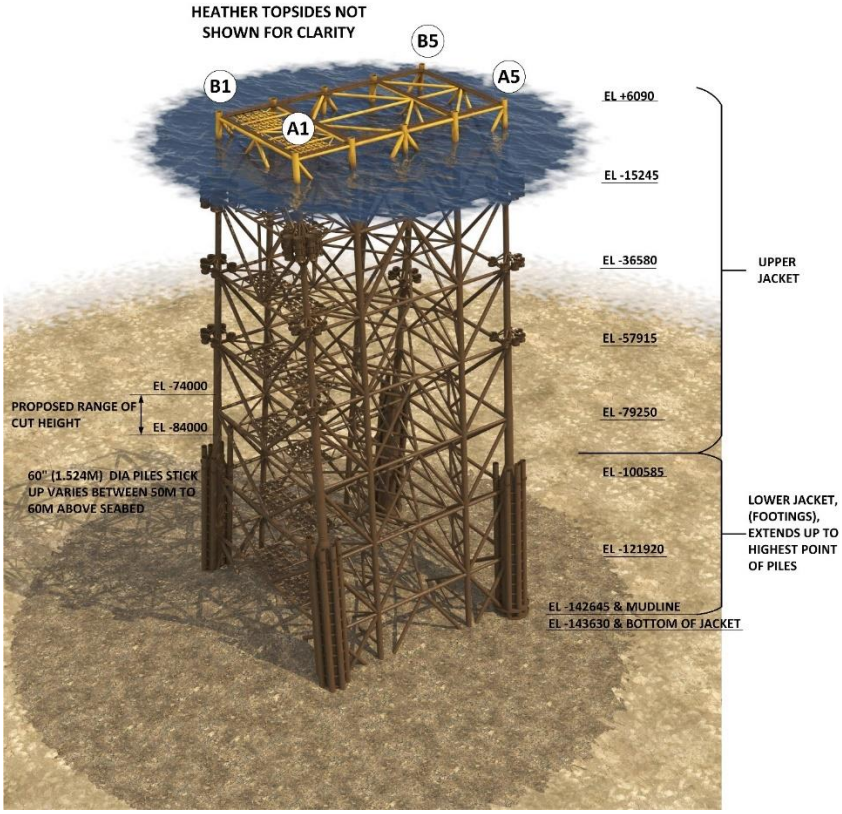


Figure 2.1.1: Schematic of Heather jacket

Please refer Appendix C for schematics of the jacket structure.

2.1.2 Current condition

The Heather jacket was installed in 1977 with an original design life of 20 years. It has now been in place for ~45 years.

As required under Health and Safety Executive ('HSE') legislation, the jacket has been subjected to a rolling programme of underwater inspection including visual survey, flooded member detection, Non-Destructive Testing ('NDT') and cathodic protection polarity checks. The purpose of this has been to ensure that the jacket remains structurally sound and able to withstand the natural environmental forces to which it is exposed offshore. All the raw data and results of these surveys are held on a COABIS database.

To aid the upending and on bottom stability of the jacket, several jacket members were designed to be flooded during installation, but several additional members have also become flooded because of accumulated damage in the conductor guide framing at around 15 m below LAT. Further, Leg B2 was flooded when its lower diaphragm hit a boulder and ruptured during the final stages of installation of the jacket.

Structural modifications undertaken on the jacket after its installation include:

- removal of the temporary buoyancy tanks.
- removal of a couple of redundant structural members.
- some caissons have been removed or replaced.
- some boat fenders removed; and,
- some jacket members have been flooded to reduce hydrostatic stresses.

The major structural damage on Heather jacket is located primarily at the horizontal bracing level 15 m below LAT, and several subsea repair clamps have been installed.

Overall, it is concluded that the overall structural integrity of the jacket would likely be adequate for sectional removal but would unlikely support removal in a single piece. Fatigue damage at the 15 m plan level may determine the subsea cutting plan and viable lift sizes.

Figure 2.1.2: Heather jacket being fabricated at McDermott Scotland, Ardersier

Figure 2.1.3: Heather jacket launch from McDermott Intermac 600

2.2 Wells

n/a

2.3 Inventory Estimates

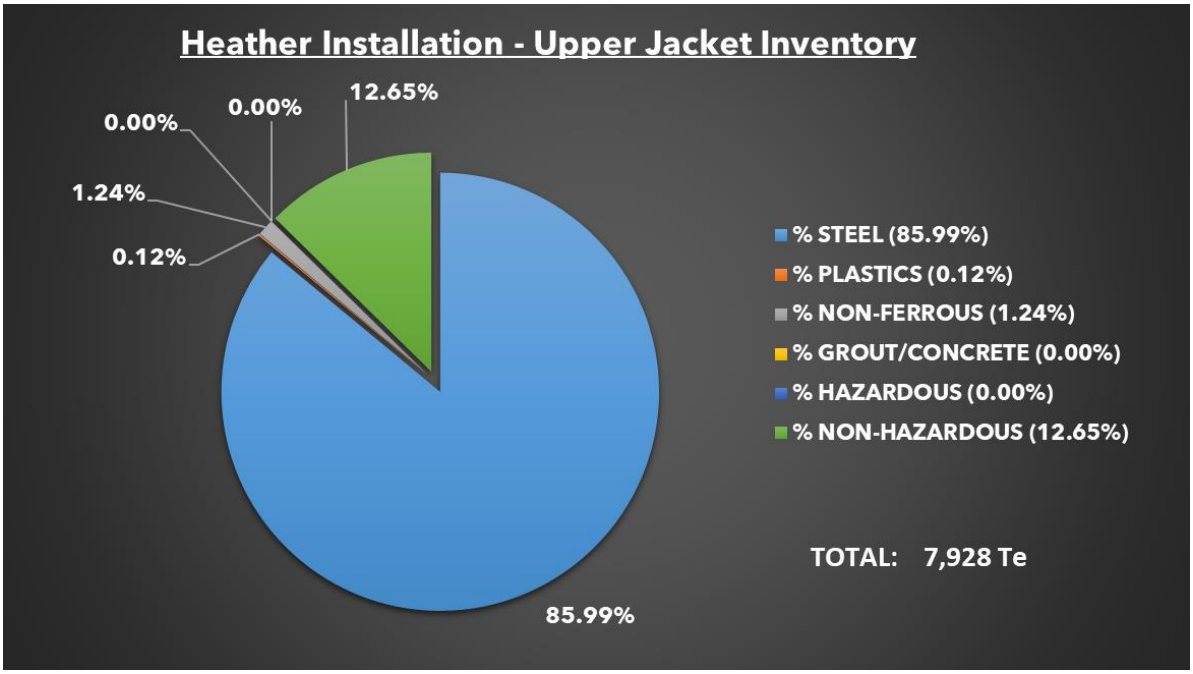


Figure 2.3.1: Pie-chart of estimated material inventory for Heather upper jacket[2][3]

[2] Non-hazardous material includes the timber launch rails and nominal quantity of marine growth (816 Te);
[3] Excludes drill cuttings.

3. REMOVAL AND DISPOSAL METHODS

3.1 Use of Waste Framework Directive

Waste will be dealt with in accordance with the Waste Framework Directive. Waste generated during decommissioning will be segregated by type and periodically transported to shore in an auditable manner through licensed waste contractors. Steel and other recyclable metal are estimated to account for the greatest proportion of the materials inventory. Where necessary, hazardous waste resulting from the dismantling of the jacket shall be pre-treated to reduce its hazardous properties or, in some cases, render it non-hazardous prior to recycling or landfilling. Under the Landfill Directive, pre-treatment will be necessary for most hazardous wastes which are destined to be disposed of to landfill sites. Other non-hazardous waste which cannot be reused or recycled will be disposed of to a landfill site. OPRED to be informed once a disposal yard has been selected.

Geographic locations of potential disposal yard options may require the consideration of Trans Frontier Shipment of Waste ('TFSW'), including hazardous materials. Early engagement with the relevant waste regulatory authorities will ensure that any issues with TFSW are addressed.

3.2 Upper Jacket/ Substructure

3.2.1 Opportunities for re-use

The re-use of an installation, pipelines or parts thereof is first in the order of preferred decommissioning options but given the age of the Heather installation and infrastructure it is unlikely that re-use opportunities would be realised.

Options for re-use and alternative use were considered at the option screening stage in the decommissioning planning for both the installation and pipelines. The Heather facilities were installed in 1977 and by the time of removal they will be approaching 50 years of service. It was concluded that re-use of the Heather installation would not be a realistic option for a number of reasons:

- Significantly past original design life;
- Structural integrity concerns, particularly with jacket;
- High operating and maintenance costs, future reliability and likely obsolescence of equipment and uncertainty around future levels of support from original equipment manufacturers;
- Unlikely to meet current design and certification standards, for example wooden accommodation and helideck;
- Process compatibility at new location would need to be ensured;
- Uncertainty about level of dismantling required to remove the facilities if single lift removal was not feasible;
- Suitability of jacket for new location, for example, water depth, environmental conditions, and fatigue life;
- Scope, schedule, and cost of refurbishment;
- Relative economics of re-use against new build.

No opportunities have been identified for the continued use of the Heather platform for the production or export of oil or gas. The foregoing reasons are such that neither the platform nor the field would be suitable for use in carbon capture, use and storage ('CCUS') programmes. All other

possible non-oil and gas uses for the platform[4], at its present location or at another site, would be technically infeasible or economically unviable. It is therefore concluded that the Heather platform must be decommissioned.

3.2.2 Whole jacket removal

Removal of the jacket by re-float has been considered, with the principle of this concept being that additional buoyancy would be installed to lift the jacket. This would be achieved by attaching buoyancy tanks, a vessel or sophisticated barge to the jacket. The buoyancy tank method has been used only once to date, for the Frigg Drilling Platform 2 ('DP2') jacket in the Norwegian sector, but on that occasion the fit-up tolerances were a particular challenge, and diver intervention was needed. In addition, inshore the seabed needed extensive preparation with supports and anchors needing to be installed before the jacket could be set down in about 90 m of water for dismantlement. With the versatility and lifting capability of marine construction vessels increasing, removal using buoyancy would appear to offer no advantages over the alternatives available – the piles would still need to be cut and the seabed and drill cuttings excavated, and so this option for removal has been discounted. The non-viability of this approach was confirmed by separate study [1].

The physical dimensions and mass are such that the whole jacket it is too big to be handled as a single unit using existing technology. That is, the whole jacket cannot be removed as a single unit – either by Semi-Submersible Crane Vessel ('SSCV') or by using a Single Lift Vessel ('SLV') with current crane capacity at the required operating radius, and the jacket is too wide to be lifted by the SLV. This means that it would need to be split into parts to be removed. Depending on the method used, removal of the upper jacket would be a first stage in removing the whole jacket.

3.2.3 Upper jacket/substructure decommissioning overview

Table 3.2.1: Jacket/substructure

Name of jacket/substructure	Substructure weight (Te)	Date installed	Seeking derogation from OSPAR Decision 98/3 (Yes/No)
Heather Alpha Platform	7,693 (upper)	1977	No

Removal of the upper jacket would be technically feasible, and this has been demonstrated for similar-sized structures in the past. Removal of the upper jacket will not prejudice the ability to decommission the footings, including removal, sometime in future.

The height at which the jacket will be severed (between 74 m and 84 m below LAT, Figure C.3.1) will be subject to agreement with the removal contractor. Providing a range would allow the removal contractor to optimise the cut, reducing the technical complexity of the operation by eliminating the need to cut through the piles and pile guides, K-joints, internal stiffeners, etc.

Should any conductors remain, they will be cut such that the height will not be higher than the highest part of the jacket footings at least until the fate of the jacket footings has been determined.

[4] Examples might include scientific research station, weather station, or wind turbine.

3.2.4 Upper jacket / substructure removal methods

Table 3.2.2: Heather jacket removal method	
1) Single Lift Vessel ☑; 2) Semi-Submersible Crane Vessel ☑; 3) Hybrid ☑; 4) Piece small ☑; 5) Other (e.g. Buoyancy Tanks) ☑;	
Method	**Description**
Removal of upper jacket as a single unit	Removal of the upper jacket as a single unit down to top of jacket footings and transport to an onshore decommissioning facility to be broken up for recycling, or disposal.
Removal of upper jacket piece-small	Removal of the upper jacket in smaller sections down to top of footings between El. -74 m and El. -84 m using a smaller capacity SSCV (than capable of removing the upper jacket as a single unit) and transport to an onshore decommissioning facility to be broken up for recycling, or disposal.
Removal of the upper jacket using buoyancy	Temporary buoyancy tanks would be attached to the upper jacket which would then be severed from the jacket footings and towed to an inshore location for further dismantlement using crane vessels.
Proposed removal method and disposal route	**Removal of upper jacket as a single unit using either an SLV or an SSCV followed by recovery to shore for reuse, recycling, and finally disposal to landfill as appropriate. A final decision on the removal method will be made following a commercial tendering process.** **Tenderers will be asked to nominate onshore reception facilities, in the United Kingdom, Europe or internationally, that are compatible with the tenderer's proposed removal methods. Discussions with the tenderer will also be undertaken to determine the optimum severance elevation. The exact height of severance is subject to commercial agreements that will be influenced by technical constraints, issues of cross bracing design, cutting technology, structural integrity concerns and lift vessel capacity. "OPRED to be informed of removal method and disposal route.**

3.3 Well Decommissioning

n/a

3.4 Drill cuttings

n/a

3.5 Waste streams

Table 3.5.1: Waste stream management methods	
Waste stream	**Removal and disposal method**
Marine growth	Where necessary and practicable, to allow access, some marine growth will be removed offshore under a Marine License application. The remainder will be brought to shore and disposed of according to guidelines and company policies.
Original paint coating	The presence of lead-based paints will be identified as these may generate toxic fumes or dust if flame-cutting, grinding or blasting is used so appropriate safety measures will be taken. Painted items will be disposed of with consideration given to any toxic components.
NORM	The Radiation Protection Supervisor will offshore undertake Tests for NORM in the risers. and recorded. Any NORM encountered onshore will be dealt with and

Table 3.5.1: Waste stream management methods	
Waste stream	**Removal and disposal method**
	disposed of in accordance with guidelines and company policies and under appropriate permit.
Onshore dismantling sites	Appropriate licensed sites will be selected. Dismantling site must demonstrate proven disposal track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver re-use and recycling options. If a non-UK yard is selected, appropriate Trans-frontier Shipment of Waste licences will be applied for. OPRED to be informed once a disposal yard has been selected.

Table 3.5.2: Inventory disposition			
Inventory	**Total inventory (Te)**	**Planned tonnage to shore (Te)**	**Planned left *in situ* (Te)**
Heather upper jacket	7,928	7,928[5]	0

Table 3.5.3: Re-use, recycle & disposal aspirations for recovered material			
Inventory	**Re-use**	**Recycle**	**Disposal (e.g. Landfill)**
Heather upper jacket	<5%	>90%	<10%

All recovered material will be transported onshore for re-use, recycling, or disposal. It is not possible to predict the market for reusable materials with any confidence so the figures in Table 3.5.3 are aspirational.

[5] Includes a nominal 816 Te of marine growth. Total mass = 7,112 + 816 = 7,928 Te.

4. ENVIRONMENTAL APPRAISAL OVERVIEW

4.1 Impact management

Environmental sensitivities are listed in Appendix A.1. There will be some planned environmental impacts arising from decommissioning of the Heather upper jacket. Long-term environmental impacts from the decommissioning operations are expected to be low. Incremental cumulative impacts and trans-boundary effects associated with the planned decommissioning operations are also expected to be low. The lower jacket will be subject of a separate Decommissioning Programme and remain *in situ* pending a future comparative assessment.

Table 4.1.1: Environmental impact management

Activity	Main Impacts	Management
Upper jacket removal	Removal of the upper jacket will require cutting of the structure above the footings and lifting activities using a large lift vessel. The principal impacts will include: • physical presence of vessels and equipment. • energy use and atmospheric emissions. • underwater noise from vessels. • noise from cutting operations. • discharges to the marine environment from vessels. • generation of waste materials. Risks of additional impact will include: • disturbance to the seabed from potential dropped objects. • accidental releases of hydrocarbons to the marine environment. • disruption to fishing or shipping during vessel transits.	The impacts associated with removal operations are expected to be short-term, localised and of low significance provided the proposed mitigation measures are in place. Activities will be planned to be executed as efficiently as possible, minimising cutting to reduce potential noise impacts. The contractors' capability, processes and procedures will be subject to audit and evaluation as part of the selection process. Vessels will be audited as part of selection and premobilisation and marine assurance standards will be adhered to. Vessels will be managed to minimise durations and on-board operational practices will address fuel efficiency, noise management, and minimise waste. DP vessels will be used in preference over vessels with anchors, however in the event such vessels are required, anchoring procedures will be developed. Risk assessments will be undertaken for the work at key stages throughout planning and execution. As part of the OPEP, specialist oil spill management and response services will be in place, to minimise impacts from potential releases to the marine environment. The waste hierarchy will be followed and only if other options are not possible will waste material be sent to landfill. EnQuest will monitor the performance of the contractors throughout operational activities. EnQuest will comply with EU and UK waste legislation and the requirements of duty of care. The assessment of potential cumulative impacts concludes that these are not anticipated to be significant.
Lower jacket *in situ*	• physical presence of decommissioned infrastructure • disruption to fishing or shipping during vessel transits.	The UK Hydrographic Office and Kingfisher will be made aware of the presence of remaining footings, and these will be marked on Admiralty charts.

5. INTERESTED PARTY CONSULTATIONS

5.1 Overview

EnQuest has consulted a wide range of interested parties during the decommissioning planning stages and compilation of the Decommissioning Programme. The feedback that has been provided as a result of the initial consultations is presented below.

5.2 Consultation summary

Table 5.2.1 will be updated when the UK consultation phase is completed.

Table 5.2.1: Summary of stakeholder comments		
Stakeholder	**Comment**	**Response**
SFF	The fishing industry would require over trawl surveys to be carried out on any decommissioned field to prove the area is safe for fishing to continue.	Noted.
PUBLIC	Public stakeholder event held on 2nd November 2021. Key stakeholder comments from the event: • How will EnQuest prevent disturbance to Kittiwakes; • How will the jacket be marked once topsides removed; • What are the targets for re-use.	A bird management plan will be established, current monitoring is based on anecdotal evidence and to date has not indicated presence of nests on the asset. There are a number of mitigations, e.g. if there is sufficient steel to locate a navigational aid. Alternatively cardinal buoys will be considered. EnQuest are actively exploring opportunities for re-use. Recognising that it is too late once items have been categorised as "waste" and the importance of circular economy is being discussed.
CONSULTATIONS		
Stakeholder	**Comment**	**Response**
GMG		
NFFO		
NIFPO		
SFF		
Public		

6. PROGRAMME MANAGEMENT

6.1 Project Management and Verification

An EnQuest project management team will manage the operations of competent contractors selected for all decommissioning activities. The team will ensure the decommissioning is executed safely, in accordance with legislation and EnQuest HSEA Policy and Principles.

6.2 Post-Decommissioning Debris Clearance and Verification

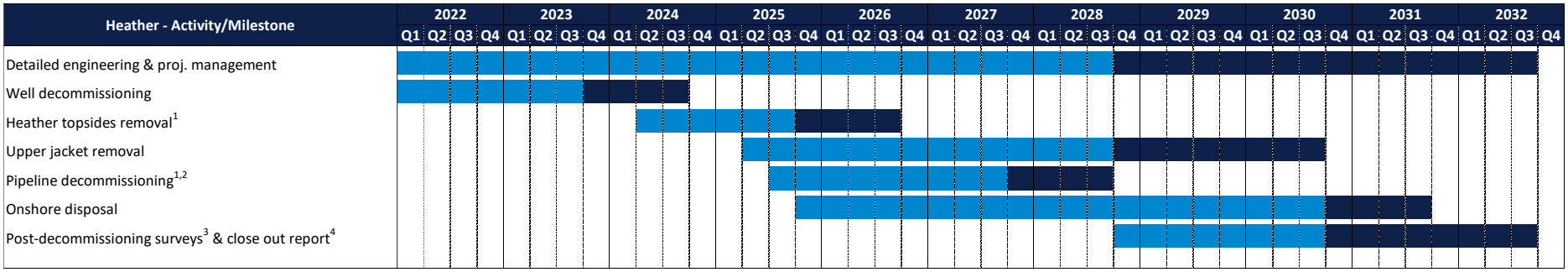
Once it has been removed to the top of the footings, an 'as-built' jacket survey will be carried out to confirm the height at which the jacket has been severed is in accordance with the approved decommissioning programme.

This Decommissioning Programme covers removal of the Upper Jacket. Post decommissioning debris surveys and seabed verification will be described in the jacket footings Decommissioning Programmes and the pipeline infrastructure Decommissioning Programme.

6.3 Schedule

A proposed schedule is provided in Figure 6.3.1. The activities are subject to the acceptance of the Decommissioning Programme presented in this document and any unavoidable constraints (e.g. vessel availability) that may be encountered while executing the decommissioning activities. Therefore, activity schedule windows have been included to account for this uncertainty.

The commencement of offshore decommissioning activities will depend on commercial agreements and commitments.



Notes / Key

Earliest potential activity

Activity window to allow commercial flexibility associated with well decommissioning and decommissioning activities;

1. Pipeline & topsides decommissioning subject to separate Decommissioning Programmes. The topsides' Decommissioning Programme was approved 22 July 2021;
2. Pipeline decommissioning indicative only and subject to change; synergies with other assets to be explored;
3. Post decommissioning surveys to follow completion of decommissioning activities;
4. Close out report within 1 year of completion of offshore activities although an interim report maybe required should onshore disposal activities have not been completed.

Figure 6.3.1: Gantt-chart of project plan

6.4 Interim monitoring and evaluation

Following removal of the Heather topsides there may be a period before the upper jacket is removed. During this time, the jacket will remain above sea level marked by a Navigational Aid that complies with BEIS standard marking schedule requirements. Throughout this phase of decommissioning and following completion the existing 500 m zone will remain in place. The Heather Consent to Locate will be revised to reflect the change to the installation. Once the upper jacket has been removed, the jacket footings will be marked on FishSAFE. The UK Hydrographic Office and Kingfisher will be made aware of the presence of remaining footings, and these will be marked on Admiralty charts.

Upon completion of the topsides removal activities the upper jacket will remain in place until it is removed. Studies will be undertaken to understand the integrity status of the jacket while it remains *in-situ* and demonstrate that the structure's integrity can be maintained until the upper jacket is removed, and until the fate of the jacket footings is known (section 6.6). The outcomes of the studies will be shared with OPRED.

EnQuest will develop maintenance and monitoring procedures that will include remote monitoring, periodic maintenance and testing of the Navigational Aids in compliance with the Heather Consent to Locate. The design, manufacture, installation, and maintenance of the navigational aids will be assured via an independent verification scheme and will be further defined in the Safety Case.

6.5 Costs

Decommissioning costs will be provided separately to OPRED.

6.6 Post-decommissioning monitoring and evaluation

The footings that are left in place following the completion of the Upper Jacket Decommissioning Programme will remain the property and responsibility of the Section 29 holders identified in section 1.4 and will be subject to a separate decommissioning programme. Unless agreed otherwise in advance with OPRED, EnQuest will remain the focal point for this, including any change in ownership.

After approval of the jacket footings Decommissioning Programme EnQuest will carry out a environmental survey, centred on the Heather jacket area. A copy of the survey results will be provided to OPRED.

Once the wider Heather area has been decommissioned the plans for legacy and liability management will be documented and described in more detail in the final close out report.

6.7 Close Out

After the upper jacket has been removed, OPRED will be notified, and a decommissioning close out report will be submitted within 1 year following completion of offshore decommissioning activities although an interim report may be required should onshore disposal activities not have been completed.

Any variances from the approved Decommissioning Programme will be explained in the close out report.

7. REFERENCES

[1] Atkins (2020) Heather Decommissioning Project Heather Jacket Removal Feasibility Study, M3524-ATK-HEA-DN-0000-REP-0003;

[2] OPRED (2018) Guidance Notes, Decommissioning of Offshore Oil and Gas Installations and Pipelines under the Petroleum Act 1998, Version 6, Department of Business, Energy, and Industrial Strategy. Weblink last 19 May 2021: OPRED Guidance Notes

[3] OSPAR (1998) Decision 98/3 on the Disposal of Disused Offshore Installations. Weblink last accessed 01 April 2020: https://www.ospar.org/documents?d=32646

APPENDIX A HEATHER BASELINE ENVIRONMENT

Appendix A.1 Summary of characteristics & sensitivities

Table A.1.1: Summary of environmental characteristics and sensitivities
Physical Environment: Heather is in Block 02/05 of the NNS in water depth of approximately 145m. Mean residual currents for the field are 0.12m/s, with direction of residual water movement generally to the south or east. Prevailing winds are from the south-west or north-north-east.
Seabed Sediments and Contamination: Sediments in the NNS are predominantly sand and muddy sand and in the vicinity of Heather comprise of sand and gravelly sand. Multi-Beam Echo Sounder identifies a drill cuttings pile below the platform, and historical records of some OBM discharge will likely result in elevated levels of hydrocarbon contamination above background in the vicinity of platform.
Fish: Heather is in spawning grounds for Norway pout, saithe and cod (Jan to Apr), haddock (Feb to May), whiting (Feb to June) and sandeel over winter months; and in nursery grounds for anglerfish, blue whiting, European hake, haddock, herring, ling, mackerel, Norway pout, sandeel, spurdog and whiting (throughout the year).
Benthic Communities: The area is dominated by species characteristic of fine sediments and benthic communities typical of the NNS. It is expected that elevated levels of hydrocarbons close to the platform will lead to modified communities of hydrocarbon tolerant species. No evidence of OSPAR threatened or declining species have been identified in the area. Deep sea sponge aggregations which are listed as a Priority Marine Feature, are known to occur within the field area.
Plankton: Phytoplankton and zooplankton communities are typical of the north and central North Sea with seasonality in abundance.
Seabirds: The following species have been recorded in the wider area: Fulmar, European Storm Petrel, Gannet, Kittiwake, Gulls, Gannet, Skua, Tern. Seabird sensitivity in the Heather area is low throughout the year. Heather is located approximately 94km from the nearest coast and is remote for sensitive seabird breeding areas on the coast.
Marine Mammals: Harbour porpoise and minke whale have been recorded in the vicinity of Heather in moderate densities in July with harbour porpoise in low densities in May and August. Grey and harbour seals may be encountered but are unlikely to be in great numbers, since the platform is located approximately 94km NE of Shetland.
Conservation Designations: The closest designated conservation sites to Heather are the Pobie Bank Reef Sites of Community Importance (49km south-west) and the Fetlar to Haroldswick MPA (95km south-west).
Commercial Fisheries: The project area lies within ICES rectangle 50F0. Commercial fishing activity within this area is high in comparison with other areas. Landings are a combination of demersal, pelagic and shellfish species representing 0.4% of total UK fishing effort in 2017.
Shipping: Shipping density within the area is low, with any traffic associated with oil and gas developments or cargo vessels.
Other Offshore Industries: Heather is in the Northern North Sea oil and gas development area with several fields nearby.
Other Users of the Sea: The closest submarine telecommunication cable is 107km from Heather. The area is used by Ministry of Defence for military training, however the work will be undertaken within the 500 m exclusion zone, so the impact will be limited. There are no known wrecks in the area.

APPENDIX B PUBLIC NOTICE & CONSULTEE CORRESPONDENCE

Appendix B.1 Public Notices

APPENDIX C JACKET SCHEMATICS

Appendix C.1 Jacket gridlines 1 & 5

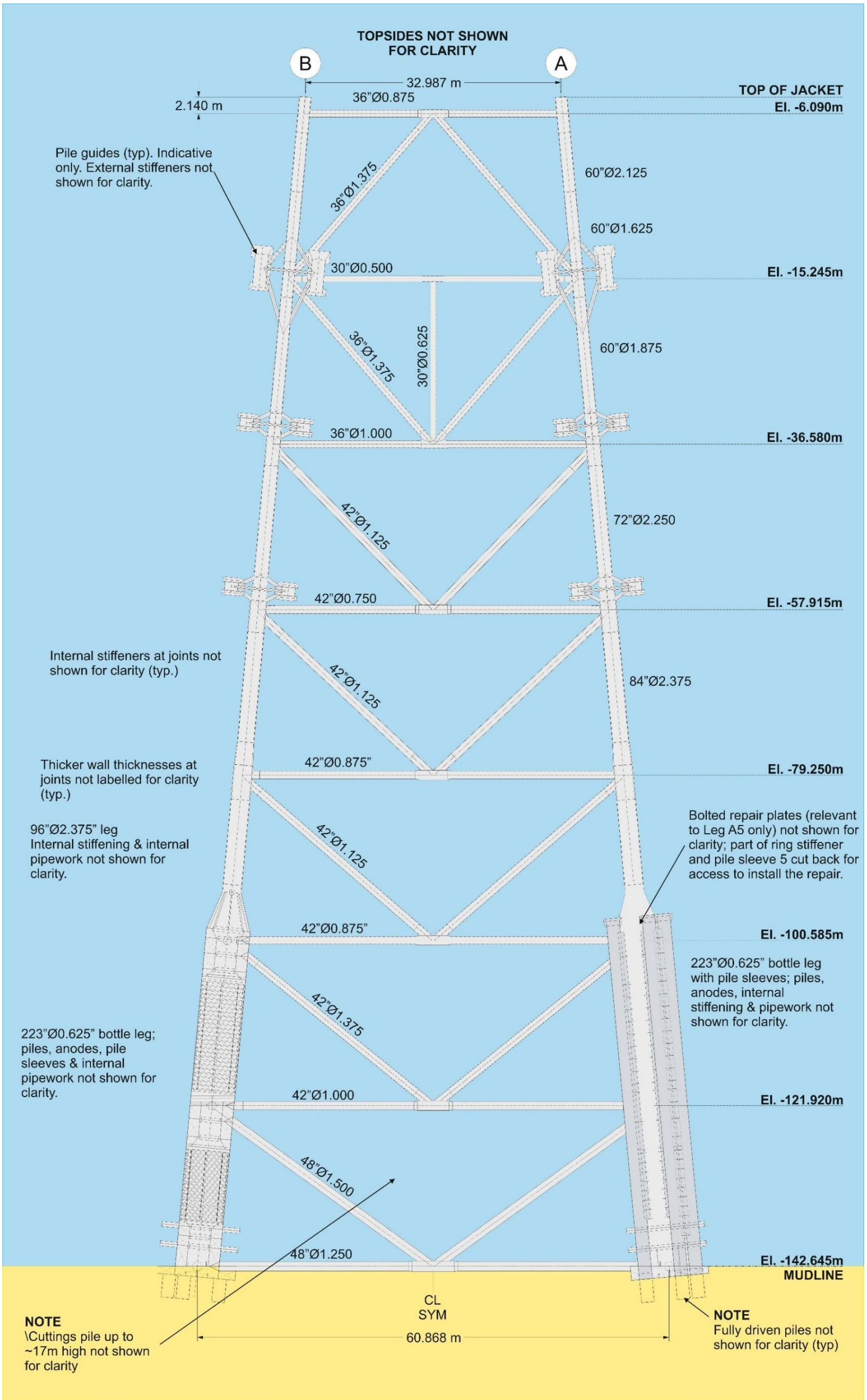


Figure C.1.1: Elevation on gridlines 1 & 5 with pile guides & sleeves indicated

Appendix C.2 Jacket gridlines A & B

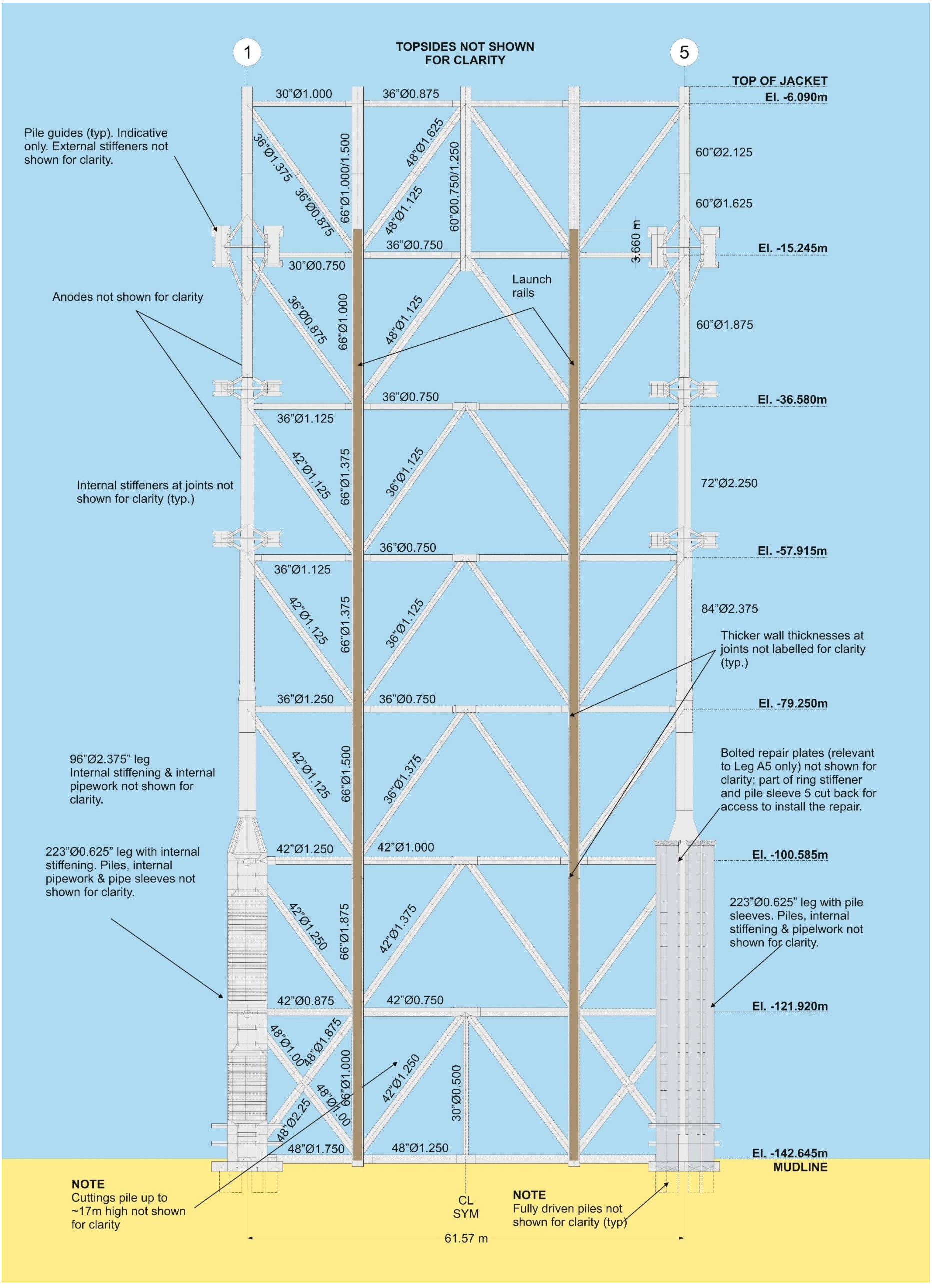


Figure C.2.1: Elevation on gridlines A & B with pile guides & sleeves indicated

Appendix C.3 Heather jacket cut range

Heather cut range:

- highest pile head at approx. -85m LAT
- water depth -143m LAT
- complexity of cutting jacket at launch truss nodes
- cost differential may be material (NB also avoids inshore sectioning)
- improved access and less congested cut at ~-76m
- meets IMO -55m clear draft requirement
- plan level at -79.25m LAT offers more coherent *in situ* package

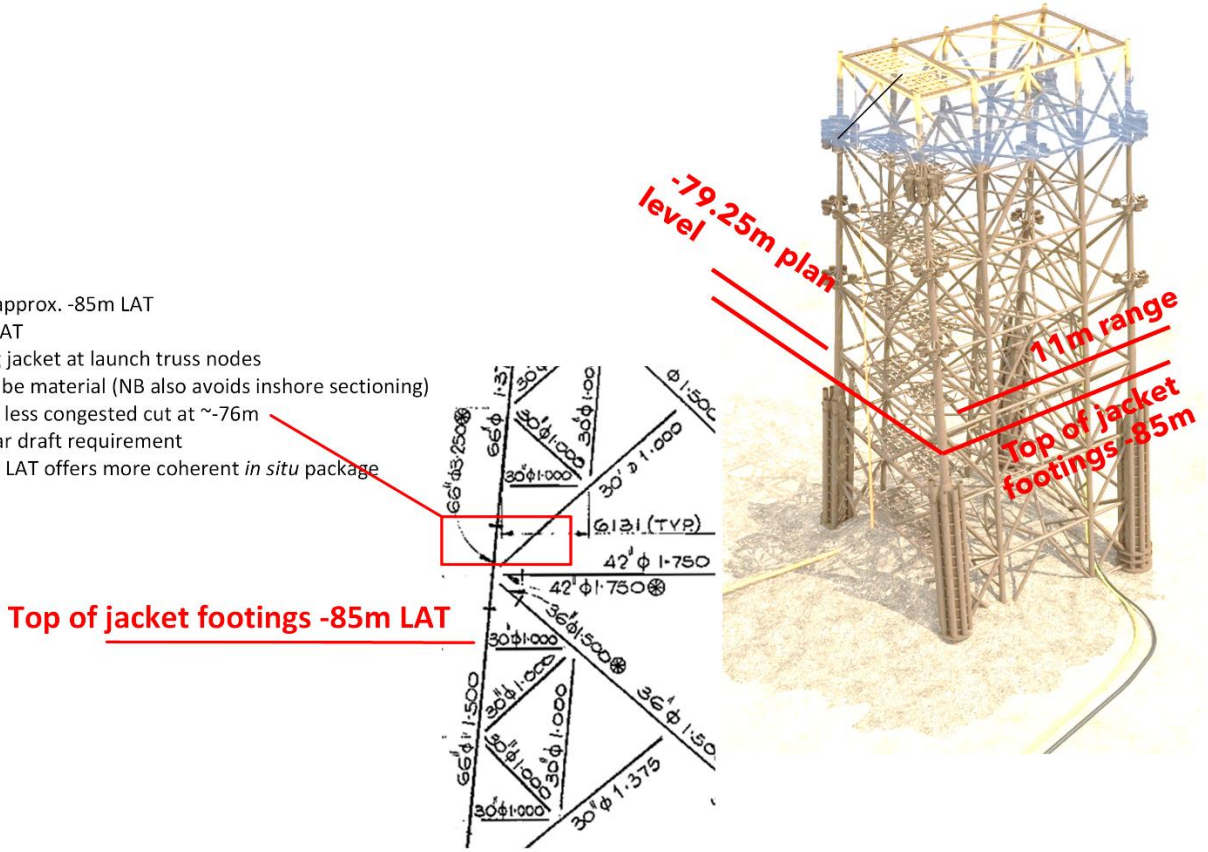


Figure C.3.1: Heather jacket severance location