

## Glen Sannox & 802 Monthly Report – [June 2022]

### 1.0 General

#### Executive Summary

This evaluation of the progress achieved on Glen Sannox, conducted four months after the revised level 0 program's implementation, determined that it is too early to say whether the greater efficiency now witnessed in production output can be maintained in support of the programme. The project is still behind schedule due to the slow turnaround of outstanding design detail, completion of background outfitting and high levels of rework caused by inconsistent working practices. Closure of final design gaps is needed, which at this late stage of the project remains a significant risk to the project.

Delivery dates, 801: Between March and May 2023 and for 802: Between October and December 2023.

Outstanding Owners' observation issues and technical design office queries remain under the scrutiny of senior management, the rate of close out has slowed largely due to the ongoing design review process, material procurement and subsequent works to make good.

The level of completion reported by FMPG against Glen Sannox is 70 percent and 45 percent for hull 802, ref May 30<sup>th</sup>, 2022, FMPG progress update.

Both projects are operating safely with no major issues emerging.

This period's observed production output is higher than at any point in the previous twelve months. However, the rate of installed pipe spools and cable lengths remains significantly lower than what could be achieved if long-standing design issues were addressed earlier in the project. Work is currently underway to reinstall the legacy cabling that was removed in February 2022, as well as to complete the remaining ship wide cable installation. Progress is slow, and it remains to be seen whether the installation contractor can meet the program's objectives. The cable terminations and equipment electrical reconnections meet the requirements of the commissioning programme. However, there is a strong argument that the cable pulling balance between non-critical passenger accommodation areas and critical machinery spaces should be adjusted to favour the latter. The Shipyard programme is clear in its intention to work both areas simultaneously. Nevertheless, the overall completion achievement currently reported as 16% overall should be seen as a significant ongoing risk. .

Following completion of this work, the shore power link will be reconnected, powering both the emergency and 240-volt switchboards. After vessel docking is completed, mainline commissioning will begin in mid-August 2022.

Commissioning has commenced and is moving in the right direction, although the start has been slower than planned.

Although not identified on the critical path, interior and exterior passenger decks have also become the focus of recent work acceleration. External scupper drain lines previously on hold and unnecessarily delayed because of outstanding design input are now completed without

the need such input. Background services of potable water now transit most key accommodation areas on decks 5, 6 and 7, the majority of which has now been partially pressure tested. Installation of architectural paneling bounding officer cabins on deck 7 is almost complete. Spiral and rectangular HVAC ducting installation is also nearly completed in all accommodation areas.

The vessel's turn on the berth has made it possible to complete the remaining external hull hot works that must be completed prior to the vessel's arrival in dock. Uncertainty exists regarding the remaining scope of work, so it is likely that hot work will continue right up to the vessel's departure.

Outstanding Owners' observation issues and technical design office queries remain under the scrutiny of senior management. The shipyard reaffirmed its intention to deliver a fully compliant vessel (801) that meets the intent of the building specification.

Yard progress reporting is to be brought further in line with mainstream shipbuilding standards by the end of July 2022. When extended 'S' curve detail for pipes, cables and navigation & communication installations will be routinely reported.

Looking forward, Glen Sannox remains on schedule to depart for the first of two dry docking periods (15<sup>th</sup> July 2022), the first of which is scoped over a 21-day period. Initially, it was envisioned that the vessel would proceed under tow with navigation lighting powered by an external power supply. The vessel's emergency generator and power distribution systems are now sufficiently complete (achieved via acceleration measures) for the vessel to generate its own power for safety and navigational lighting. This is the first time in the project that a major milestone in the commissioning programme will have been reached.

## Owners' Observation Reports 801

The information below has been updated in conjunction with FMPG to reflect the joint review conducted during this reporting period. Significant efforts have been made to ensure that the scope of all issues, as well as the cost of implementation and the impact on the programme, are fully understood.

<b>OOB Status</b>	<b>All categories</b>	<b>Category 1</b>	<b>Category 2</b>
Total Raised	605	368	224
Total Closed	442	262	177
Total committed	52	42	9
Total to close when work complete	64	49	10
Total still to resolve	47	15	28

**Cat 1** - Items, which relate to Safety, Quality, Maintainability and Specification requirements.

**Cat 2** - Item, which relate to poor design, quality or production.

## Key Challenges for the Shipyard

Key known Challenges for the shipyard to meet the programme:

- Installation and termination of the ship's cables.
- Completion of pipework to meet commissioning dates, including addressing pipe clashes.
- Close out of OORs.
- Closure of design gaps.
- Delivery and completion of production drawings and accuracy of production drawings.

- Availability of experienced supervisors.
- Shortage of experience trades.
- Availability of materials.
- Lack of familiarity with final stages of finishing the vessels, surveys, documentation, certification.

## 2.0 Changes to Site Supervision Team

A CalMac Master and Chief Engineer have now joined the site team as of the 23<sup>rd</sup> of June 2022, the core head count is now seven.

## 3.0 Design Changes Approved

Ongoing design changes affecting the constructability of the vessels design are driven exclusively within the Shipyard process to meet regulatory and contracted specification requirements and are not driven by CMAL request for change. All are related to outstanding technical queries and previously unidentified works. Closure of final design gaps is needed, which at this late stage of the project remains a significant risk to the project.

## 4.0 Agreed Changes to Delivery Date

Updated programme delivery dates are set out in section one above.

## 5.0 Agreed Changes to Price

(Note of changes; changes to be authorised & recorded in Contract Variation Register)

## 6.0 Changes Awaiting the Owner's Approval

(Note of changes outstanding for approval by the Owner in excess of Buyer's Representative authority as stated in Consultancy Agreement Cl. 3.4)

## 7.0 Surveys / Inspections

Verification surveys of the as-built standard are listed below. Too few call outs are currently made at this late stage of either project.

No	Survey/Inspection	Comments
	<b>Week 22</b>	
1	801 – Fire Insulation survey with MCA in various 06/07dk areas	Accepted
2	802 – Starboard side fender belting welding (part survey) with Lloyds	Accepted
3	802 – Unit erection joints forward bow units with Lloyds	Accepted
4	801 – Survey of planned AXILOCK S type changeout to EDPM FP	Accepted
5	<b>Week 23</b>	
6	802 – Unit erection joint forward bow units, survey with Lloyds	Accepted
7	801 – Starboard side-shell fairing survey with Lloyds	Accepted
8	801 – 07dk positioning of P-S external Crews handrails	Accepted
9	801 – 07dk Aft cabin behind linings survey	Accepted
10	801 – 07dk Emergency generator space part survey pre insulation	Accepted
11	801 – Bridge Top handrails and lighting supports and their positions	Accepted
12	802 – 05dk Aft below window pre-paint survey with Lloyds	Accepted
	<b>Week 24</b>	
13	802 – Aluminium Unit A8-5 survey with Lloyds	Accepted
14	801 – Starboard side-shell fairing survey with Lloyds.	Accepted
15	801 – 07dk inspection of cabin wet unit areas to allow linings to be fitted.	Accepted
16	801 – 06dk Port AC room pre insulation part survey to allow progress.	Accepted

No	Survey/Inspection	Comments
17	801 – 07dk Emergency generator space part survey pre insulation	Accepted
18	802 – 05dk Aft below window pre-paint/blast survey.	Accepted
19	801 – [redacted] presenting 690V breaker setting injection tests (random)	Accepted
20	801 – [redacted] setting up for Ductor tests on all MCC boards	Accepted
21	801 – Mechanical Installation Inspection of Sea Water Cooling System	Rejected
22	801 – Stern tube lubrication line flushing	Accepted
23	801 – Final Internal Inspection of Emergency Alt Fuel tank	Accepted

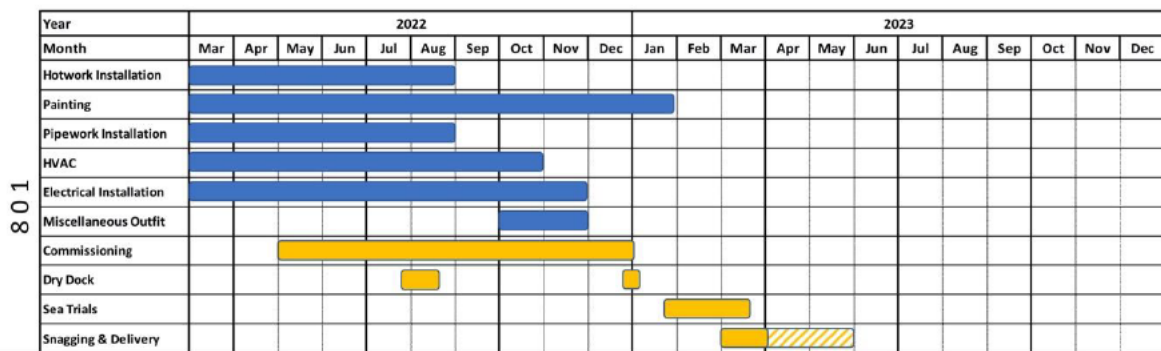
## 8.0 Progress Against Programme – Glen Sannox & Hull 802

CD Programme



### Level 0 - Programme

Date: 23/03/2022



Reference - March 2022 FMPG Project Report

The 801 project is making progress toward its objectives. However, completing background outfitting and pre-commissioning activities remains intensely time-consuming.

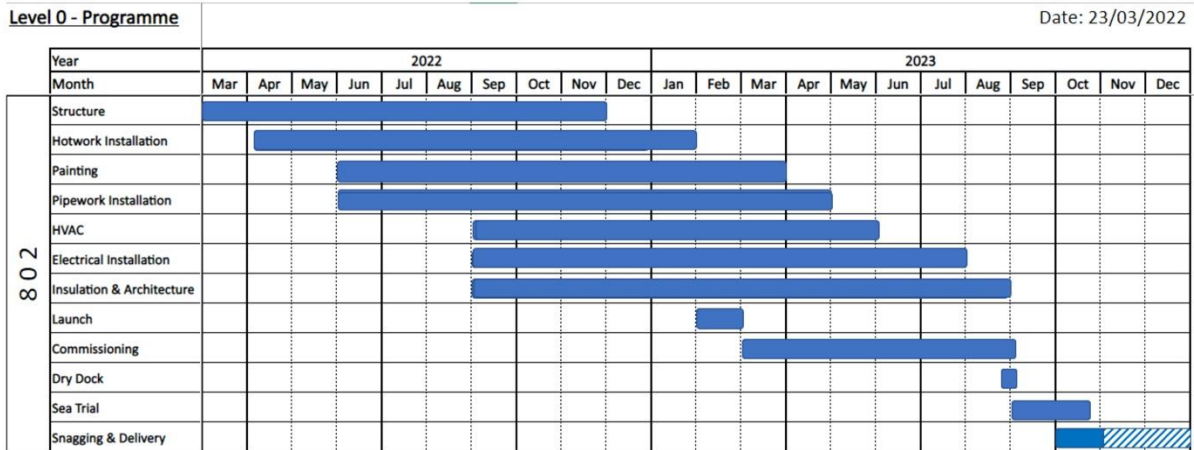
Commissioning has commenced and is moving in the right direction, although the start has been slower than planned.

The total float of the project and how it relates to the critical path must now be carefully managed especially during the three-week docking period.



## Progress Against Programme - 802

802 Cardinal Date Programme



Reference - March 2022 FMPG Project Report

The 802 project is moving towards achieving its objectives. The majority of work focus remains structural, higher levels of outfitting await the outcome of the detailed model.

### Inspection Call Outs

The frequency with which inspections are called are made to verify completed production works, remains concerningly low. This should be seen as a significant KPI and now as a potential risk that flags the volume of work that has still to be completed. The majority of inspections calls made this period are against first fix background outfitting installation for cable containment and Class/thermal insulation installation. No call are yet made to inspect any completed system on board.

### Vessel Positioning

The vessel's turn on the berth has made it possible to complete the remaining hot work associated with the side shell fairing and shell belting attachment (rubbing strips) unfinished from the April 2021 milestone. Improved access to the forward and aft mooring decks also supports completion of the Panama eye installation. All other hot work attached to the exterior shell of the vessel is scheduled to be completed prior to the vessel's departure from the shipyard. Uncertainty exists regarding the remaining scope of work, so it is likely that this scope will continue until the vessel's departure.

### Hull 801 Outfitting Works

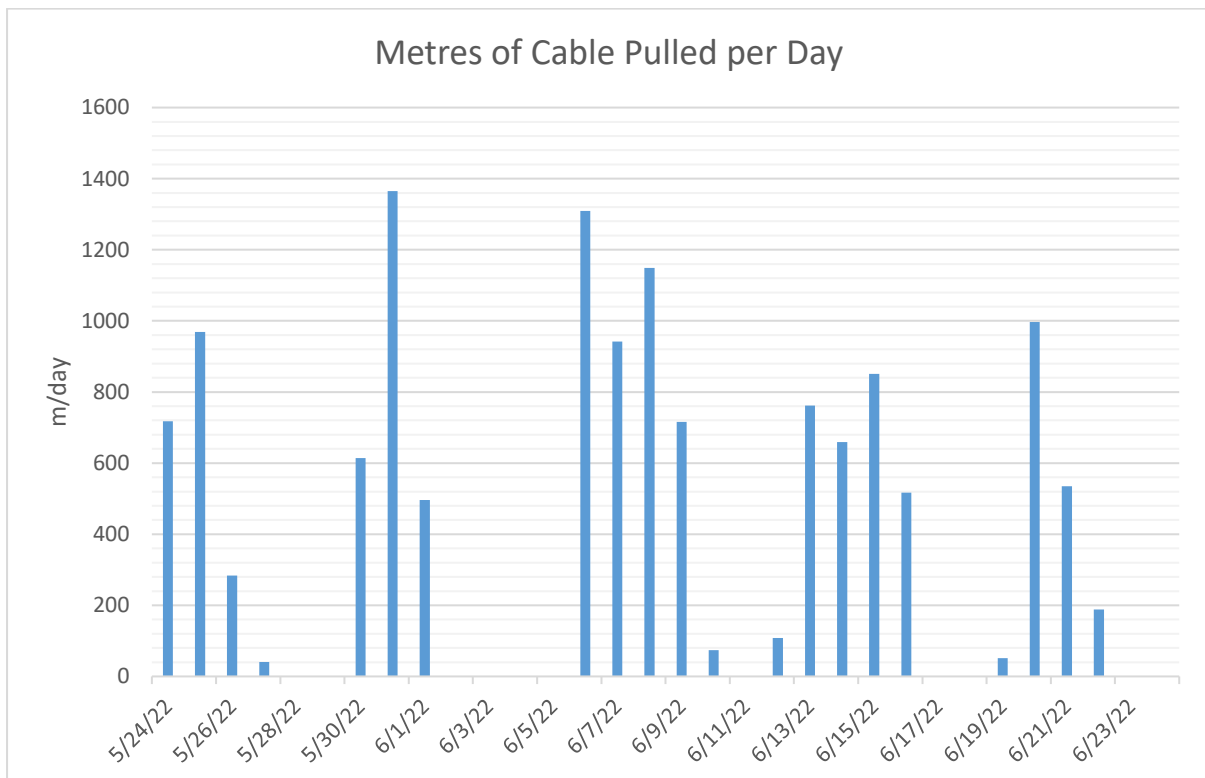
#### Electrical

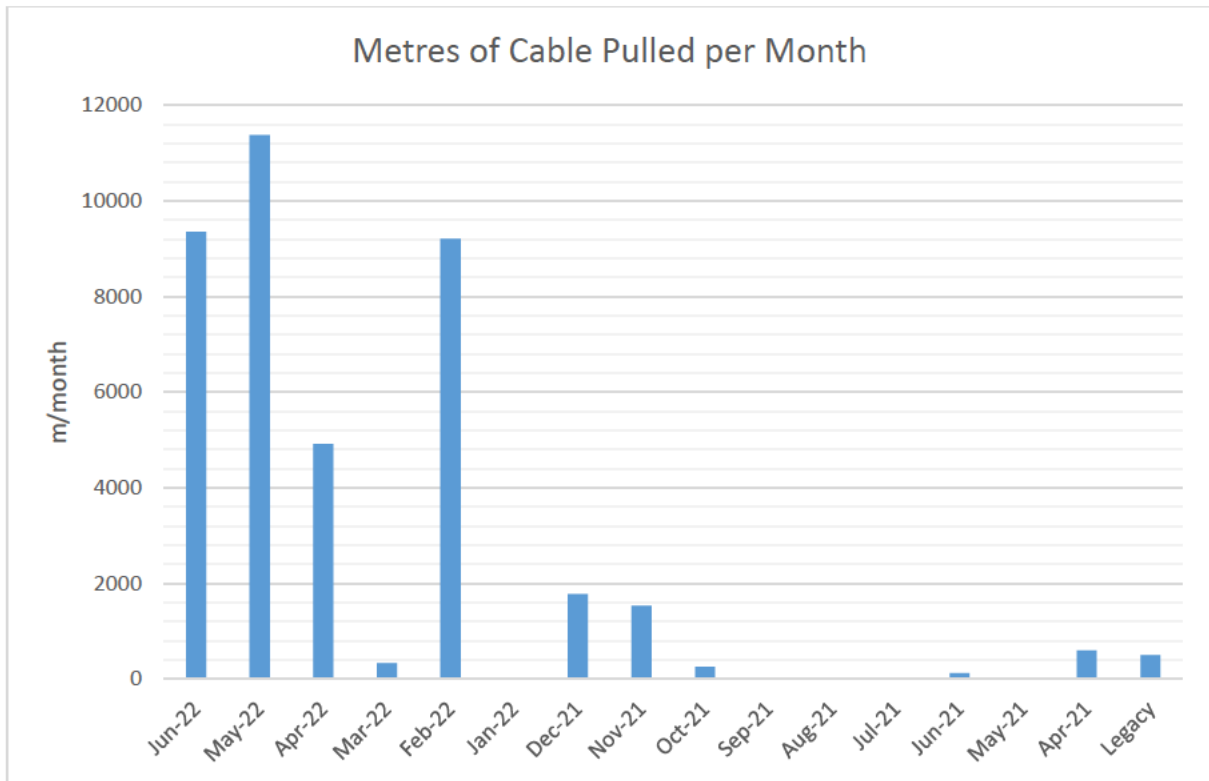
Cable pulling has continued throughout the vessel in both the machinery and passenger accommodation areas. The shipyard reports that 39,975m of cable has been installed out of a total of 242,856m, representing a 16 percent completion level. A total of 2,403m was drawn in machinery spaces and 6,933m in passenger accommodation areas. With the exception of the jacket water preheaters, main and auxiliary engine pre lubrication pumps, gearbox hydraulic pumps, lubricating oil and diesel oil purifiers, and engine fuel oil booster pumps, the

majority of cables required to support the initial commissioning programme are now pulled in zone 2 machinery spaces. The majority of remote sensor points, remotely actuated valves, and noncritical services remain unconnected and require to be completed.

Area	Zone	Pulled June 2022 (Metres)	Total Pulled (Metres)	Total To Complete Installation (Metres)
Machinery Spaces	2	829	2,592	33,160
LNG Tank Space	3	561	3,109	31,546
Forward Machinery	4	714	5,094	13,154
Bow Thrust	5	206	923	9,180
Deck 4-5	6	688	1,306	38,856
Funnel Uptakes	7	93	319	2,897
Deck 6	8	3,314	6,138	23,374
Deck 7	9	1,754	9,468	23,724
Bridge Top	10	1,177	9,740	25,298

Cable termination and end connection glanding are also in progress and are reported to be roughly in line with the number of cables pulled. The electrical contractor now employs twenty technicians who work in day and night shifts. Working days in June are generally reported as Monday through Friday. This is expected to rise in July.





Equipment positioning in the emergency alternator space is now finalised for the transformer and local distribution boxes. Cable routing and terminations are ongoing in the main, auxiliary and emergency generator spaces. The electrical distribution on deck seven has progressed to the point where background sign off is now in place allowing architectural panelling can now be installed.

### Wheelhouse Windows

The decision to reduce the dimension of the 'T' profile flat bar stiffening around the window openings has yet to be acted upon. Completion of the outstanding welding of the port side mullions has also to acted upon.

### Clam Shell Doors

Under the guidance of the makers technician, fine tuning of the door hinge geometry is now complete, both doors now open fully. Hot work continues to fix hinge foundation points.

### LNG Bunker Tank Valve Attachments

Work by the [redacted] technician to install new equipment (control valves) in the Tank Connection Space (TCS) of Glen Sannox is ongoing, the same work on Hull 802 is rescheduled because of availability of spare gear and has yet to be started.

### 801 Bridge External walkways

Work is ongoing.

### 801 – Mechanical Completion in Support of Commissioning

No	Issue
1.	Flushing of the stern tubes and associated pipe work is underway.
2.	Completion of the lube oil transfer piping system awaits last

No	Issue
	remaining pipe spools to be delivered to the yard.
3.	Tank level gauge attachments not yet received by the yard.
4.	Sea Water system pipe installation scope now completed by the contractor; remaining works needed in support of mechanical completion are being progressed by the yard.
5.	HT/LT Cooling system installation scope nearing completion by the contractor, borescope images of pipe work cleanliness sighted 17th June, particulate contamination clear. The yard will now move to complete the installation prior to pickling and flushing.
6.	Main air start system missing spool pieces still required.
7.	Emergency Generator fuel oil system upstream of the service tank now tested.
8.	Work continues to complete the remaining system installation in both main funnel areas.
9.	Ballast system pipe installation continues, shell mounted overboard still to fit.
10.	AXILOCK discussion still ongoing, decision to change out 166 couplings fitted in the forward part of the vessel looks to have been made by the yard.
11.	Glycol system has not progressed this period.
12.	Chilled water, extent of current installation under review
13.	[redacted] will attend the yard 4th – 6th July to oversee verification of the safety setting of the emergency generator, before first start up
14.	[redacted] technicians continue to perform pre-commissioning works in support of the 690V switchboard. [redacted] technicians have completed the set-up of the communications interface.

### 801 Structural Hot Work

Work continues focusing on the remaining ad hoc structural works on all decks such as the starboard side-shell fairing, belting-fenders, Panama eyes, side openings needed to fit spray removal ventilation grills as well as fitment of the handrails in way of the steering gear walkways.

### 801 – Machinery Spaces 801

The installation of general service air distribution and the remotely actuated cross-over valves between the sea water cross-over and the ballast main has been the primary focus during this reporting period. There is a design review underway that calls into question the current sizing of the main engine fuel oil booster pumps. More information will be provided as it becomes available. The ongoing fuel transfer and booster pump modifications, which are being driven by class acceptance issues, have only resulted in the fabrication of the newly dimensioned equipment seats. Several surveys have been conducted in collaboration with the yard in order to focus attention on key outstanding components of issues raised under the OOR system. Poorly positioned valves and access to maintain equipment and perform routine watchkeeping duties all necessitate a significant amount of corrective work.

### 801 - Accommodation Outfitting



Work currently focuses on the installation of insulation of deck 6 groundings in way of window boxes. Vertical paneling on deck 7 is progressing on both the port and starboard sides of the passageway. Panels are being cored on site, A class insulation is ongoing on decks 7 (rework) and 6 (new insulation). Doors continue to be fitted on deck 3 at port and starboard L11 positions and on 02dk provision store areas.

## **801 HVAC Installation**

The first fix is now largely complete on decks 5,6 and 7. 6 & 7; the standard of installation remains satisfactory.

## **Hull 802**

### **Block Fabrication**

1. Consolidation work to complete erection joints of Bow Units 49/50/51 continues.
2. Deck five aluminium unit A6/5 erection onboard continues also now continues.
3. The three units forming block A8/5 have now been surveyed.
4. Fit up now complete for the port and starboard 'A' frame brackets.
5. Construction of the Forward Mooring area bulwark units 87/88 continues.
6. Fitting of Panama eyes now underway
7. Fabrication of aluminium unit A7-6 has started.

## **802 Hot Works**

Structural Works Continue in the following areas:

1. Many more sub-assemblies have been lifted onboard pre fitted with pipe penetration compensation pieces already fitted despite the review process currently underway with the principal design contractor.
2. Ongoing modifications to bulkhead L11 are in progress.
3. Erection joint program continues for units A3-5 & A4/5.
4. Fitting of bimetallic interface joint to base of unit A6/5 in progress.
5. Prep-work continues base areas of Unit A4-5/A5-5/A6-5
6. Construction of units 85/86 is ongoing.
7. Unit A7-5 x3 lifted onto the vessel.
8. Fabrication of unit A9-5 nearing completion, awaiting call for survey.
9. Fabrication of unit A10-5 nearing completion, awaiting call for survey.
10. Units A5-6 now part lifted on to vessel
11. Unit A6-5 lifted onboard vessel.

## **9.0 Next Stage Payment Due**

n/a

## **10.0 Forthcoming Period Events**

## 11.0 Tests & Trials Due

### Glen Sannox

Description	Date
Summer Docking	15 July to 07 August 2022
Winter Docking	23 Jan to 31 January 2023
Sea Trials	24 to 25 January 2023

## 12.0 Risk Register Update – Glen Sannox

The risk register update shared as part of the May FMPG project report does not consider the significant threats posed by the continued risk of late cable installation (pulling/packing/termination). Consideration is only given to the reinstatement of the 27km of legacy cables removed from the vessel in February 2022. No consideration is given to the main body of cable installation that extends ship wide, totalling 200km. The current rate at which cable is pulled presents a serious threat to the project. The same concern also extends to the threat posed by the time scale to manufacture and install the remaining pipe spools needed to complete the essential systems of hull 801, ref May 2022 FMPG Project Report.

## 13.0 Safety & Environmental

No issue to report this period

Print Name: [redacted]

Signature: [redacted]

Date: [07 July 2022]