Appendix E: NKT CHPE Hudson Mattressing Method Statement

CHPE Hudson Mattressing Method Statement

Indicative Method Statement
Champlain-Hudson Power Express

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Client	CHPE
Contractor	NKT

List of Terms and Abbreviations

Term	Definition
CHPE	Champlain – Hudson Power Express
CO	Crane Operator

CTV	Crew Transfer Vessel
DF	Deck Foreman
DP	Dynamic Positioning
DPO	Dynamic Positioning Officer
FE	Field Engineer
JS	Jointing Supervisor
LARS	Launch and Recovery System
MCB	Mattressing Crane Barge
MOC	Management of Change
MWS	Marine Warranty Surveyor
OCM	Offshore Construction Manager
PE	Project Engineer
ROV	Remotely Operated Vehicle
SS	Shift Supervisor
TBT	Tool Box Talk
TP	Task Plan

1 Introduction

1.1 Project Introduction

As part of the Champlain Hudson Power Express (CHPE) project, articulated concrete mattresses will be used to provide protection to both existing utilities as well as the cable to be installed during the course of the project.

These mattresses form part of the protection of the installed project cable and are to be used both for existing utility crossings and well as for remedial works in any location at which the required burial depth has not been achieved.

1.2 Purpose of Document

This document details the methodology to be used for the safe installation of the articulated concrete mattresses within the Hudson River section of the project. Two methodologies are considered in this document; ROV installation and diver assisted installation. This document is for information and indicative purposes only with the final detailed methodologies being produced by the installing entity. However, the installation methodologies used by the installing entity will differ in detail but the overall operation will remain as detailed herein.

The contents of this document will also form part of the Technical Specification against which potential subcontractors will evaluate the work and make bids.

2 Scope of Work

2.1 Articulated Concrete Mattresses

To ensure that suitable protection is afforded to both the existing utilities to be crossed as well as the project cable to be installed, articulated concrete mattresses are to be placed. These mattresses are 20’ long, 8’ wide and 12” thick, as shown in below figure:

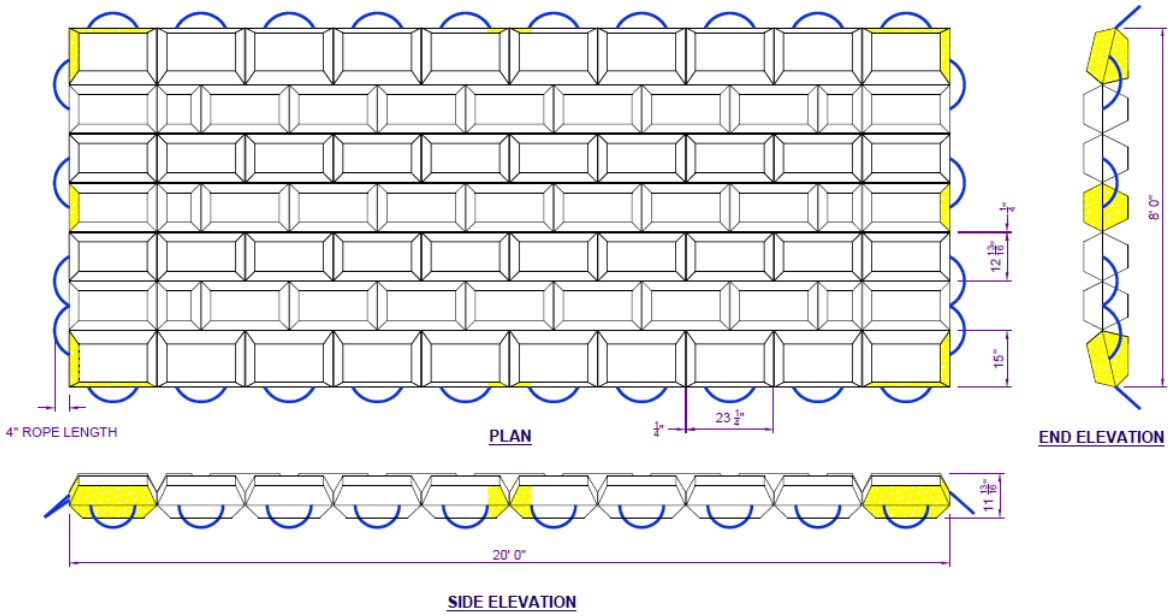


Figure 1 Indicative articulated concrete mattress dimensions

Drawings of the concrete mattresses to be installed (inclusive of weights and material densities) are included as Appendix 1.

2.2 Installation Windows

Installation windows are set by the authorities and are defined in the permit as:

Upper Hudson Route:

- Cementon to New Hamburg: Aug 1 – Oct 15 (76 days)
- New Hamburg to Stony Point: Sep 15 – Nov 30 (77 days)

Lower Hudson Route:

- Rockland Lake State Park to Harlem River; Jul 1 – Oct 31 (123)

Articulated mattress installation activities will take place during these windows unless otherwise agreed with authorities, in which case these windows may be extended.

2.3 Installation Types

Along the course of the Hudson river, articulated mattresses will be installed to provide different protective functions. Whilst the function is always to safe-guard the integrity of installed assets as well as the project cable, and the installation methodology remains the same, the difference

in these installation types impacts the campaign in which they are installed. The three installation types are detailed in the below subsections.

2.3.1 Pre-Cable Lay Mattresses

Pre-cable lay (pre-lay) mattresses are installed before the cable laying activities take place. These are laid in locations over which the project cables will cross existing utilities to provide protection and separation to both cables. This is as shown in below figure:

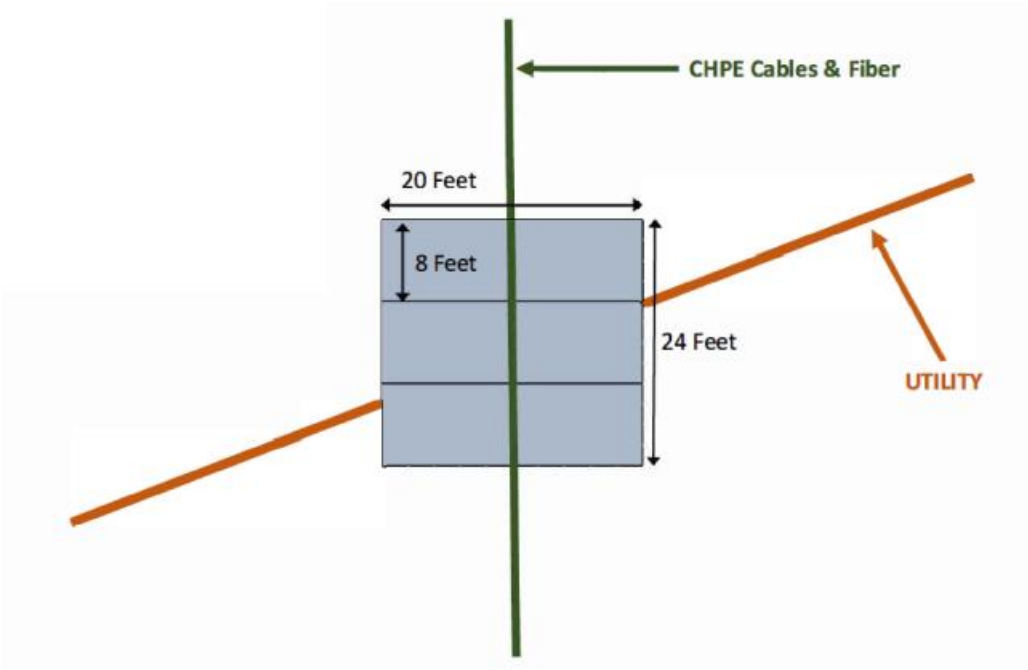


Figure 2 Indicative arrangement of pre-lay mattresses over existing utility

Note: The utility to be crossed is either on the river bed surface or buried underneath and that the above mattress arrangement is indicative and for visual representation purposes only, actual arrangements will be defined during agreements with utility owners.

2.3.2 Post-Cable Lay Mattresses

Post-cable lay (post-lay) mattresses are used to cover the project cable at locations at which it has been laid over the top of the pre-lay mattresses as these locations cannot be protected by means of lowering the cable into the riverbed. This is as shown in below figure:

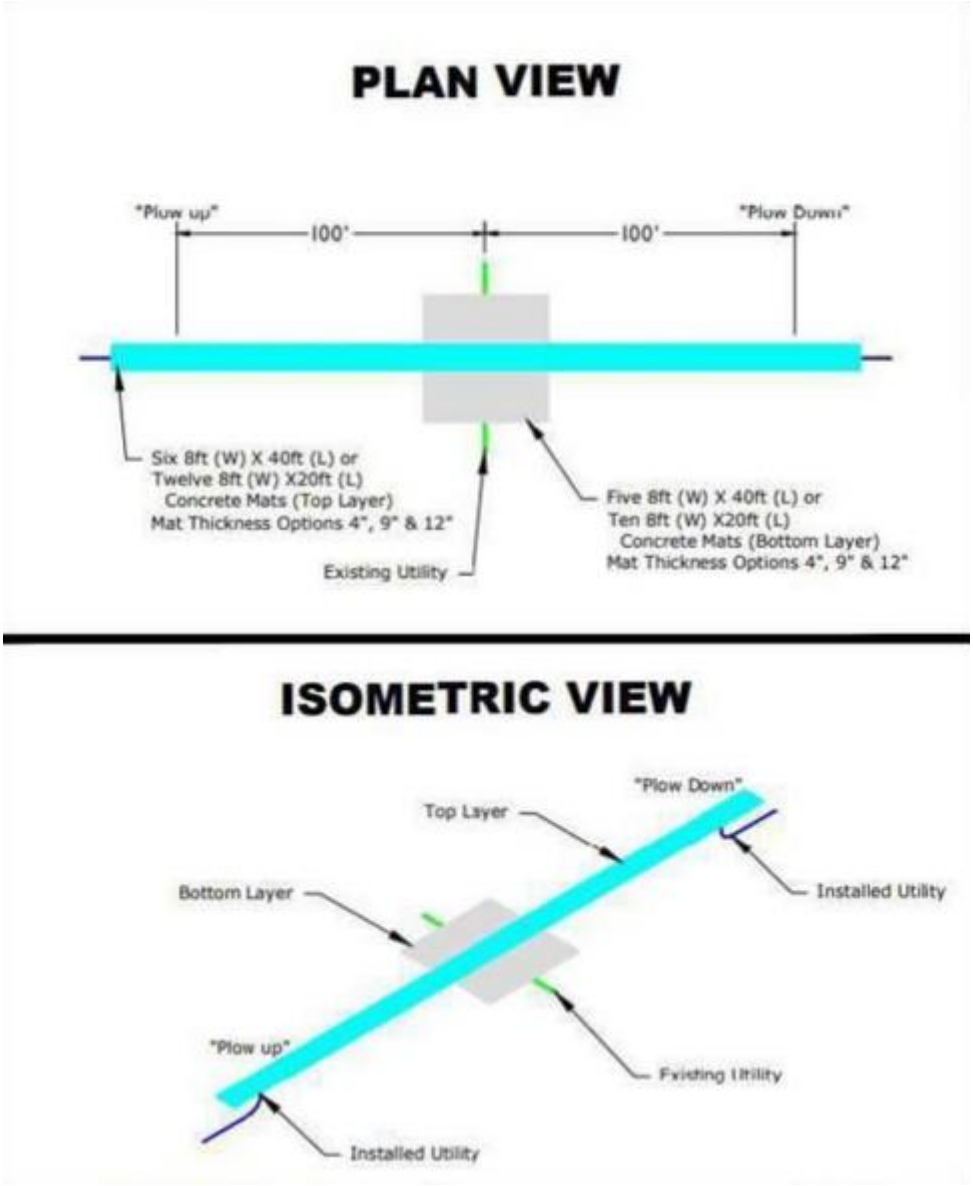


Figure 3 Indicative arrangement of post-lay mattressing over project cable

Note: As with the pre-lay mattress figure, the above mattress arrangement is indicative and for visual representation purposes only, actual arrangements will be defined during agreements with utility owners as well as operational criteria, such as the distance over which the cable can be lowered to depth.

An overview of the basic crossing design is provided as Appendix 2.

2.3.3 Remedial Protection Mattresses

Remedial protection mattresses (remedial mattresses) are to be installed anywhere along the route at which the cable has not been able to be lowered to the required 7' coverage. This is as shown in below figure:

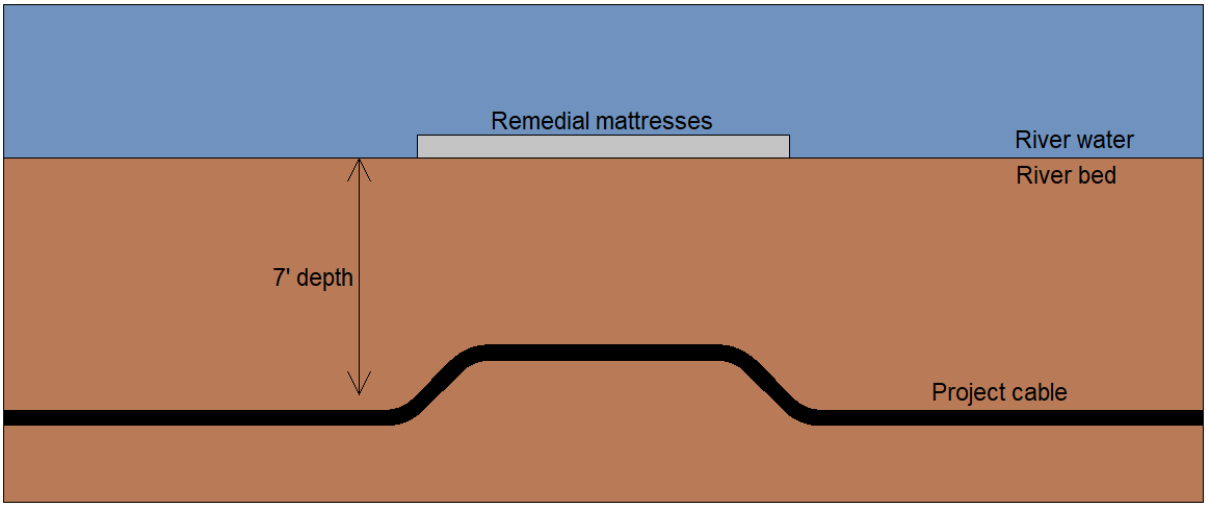


Figure 4 Indicative remedial mattressing drawing

As shown in the indicate drawing, remedial mattresses are to be used once the cable depth of lowering becomes less than 7 feet. It can be seen that once the depth of 7 feet is regained, the remedial mattresses are no longer required.

2.4 Installation Locations

Installation locations are to be anywhere that a utility crossing is required and anywhere that burial of the project cable is less than 7 feet. Provisionally, the utility crossings identified are:

- 76 in Upper Hudson
- 20 in Lower Hudson

The exact detailed location for mattress installation and the number of mattresses to be used at each location (pre-lay plus post-lay) are to be informed by the crossing agreements made with the utility owners.

Remedial mattresses to be used at locations where depth of project cable burial is less than 7 feet will be determined following post-installation survey. This survey information will be relayed to the mattress installer as soon as possible so as to be able to complete remedial mattressing during the allowed working windows.

Based on assessment of the route, available data and analysis of the project cable burial techniques, the estimates for remedial mattressing requirement is:

- 500 in the Upper Hudson
- 100 in the Lower Hudson

These numbers are subject to change and only once project cable installation has been completed and surveyed will the actual number become calculable.

2.5 Installation Campaigns

Mattress installation campaigns will be performed during 2023, 2024 and 2025:

2.5.1 2023 Mattress Installation Campaign

The 2023 campaign will consist only of pre-lay mattresses over utilities in the Upper Hudson section of the route. Because of this, a high degree of certainty will be known about both the number of mattresses to be installed as well as the location during this campaign once the utility crossing agreements are finalised.

2.5.2 2024 Mattress Installation Campaign

During the 2024 campaign, all three mattressing types (pre-lay, post-lay and remedial) will be performed.

- Pre-lay mattresses will be installed at utility crossings in the Lower Hudson section of the route in accordance with the utility crossing agreements.
- Post-lay mattresses are to be installed over the installed project cable in the Upper Hudson section of the route. These will be at the locations at which the pre-lay mattressing was performed in 2023.
- Remedial mattressing is to be performed in the Upper Hudson section of the route at locations at which burial is less than 7 feet as determined by post-installation cable survey.

2.5.3 2025 Mattress Installation Campaign

Two mattressing types (post-lay and remedial) are to be performed during the 2025 campaign:

- Post-lay mattresses are to be installed over the installed project cable in the Lower Hudson section of the route. These will be at the locations at which the pre-lay mattressing was performed in 2024.
- Remedial mattressing is to be performed in the Lower Hudson section of the route at locations at which burial is less than 7 feet as determined by post-installation cable survey.

3 Project Management

Project management for the mattress installation workscope will be provided by installing entity and supervised by NKT. NKT remain responsible for the overall mattress installation works.

3.1 Organisational Structure

The overall structure of the mattressing installation project will be as per the below figure:

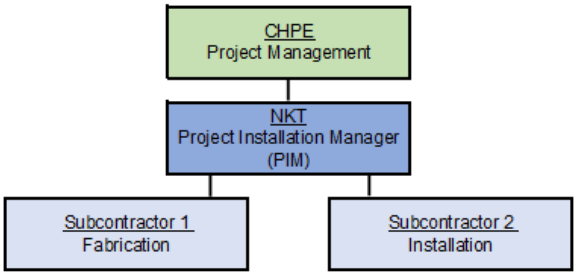


Figure 5 Overall Mattressing Project Structure

The structure to be used during the operations will be as per the below figure:

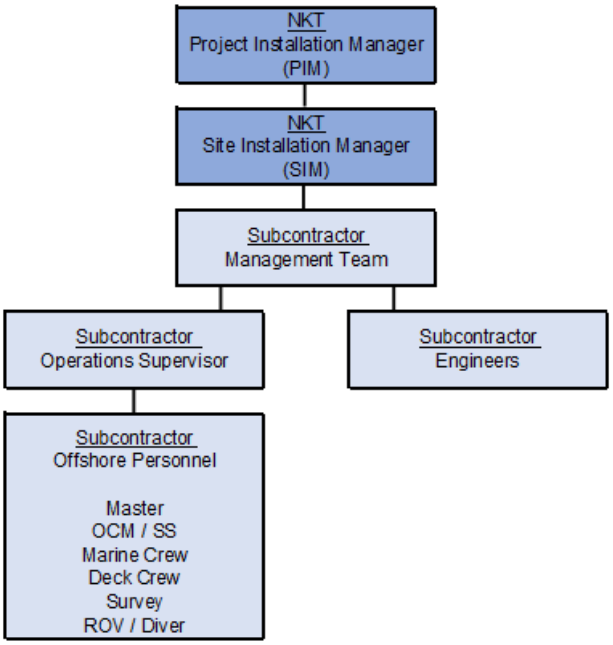


Figure 6 Mattress Installation Operations Organogram

3.2 Health, Safety and Environmental

During the execution of the project NKT will have Project HSE managers and advisors (specialists) coordinating safety, health and welfare of the people and environment. For a successful project, it is important to work proactive with safety and to ensure that risks during the entire project are properly controlled and kept as low as reasonable practicable. The HSE resources will develop HSE plans for the project in accordance with contractual requirements as well as all applicable laws and regulations. They will also monitor that plans, procedures

and guidelines are implemented and that investigations are performed when incidents and deviations occur.

3.3 Subcontractor Management

The interface with all installation subcontractors is handled by the Project Installation Manager. The PIM is also handling the interface with the Marine Engineers, Installation Engineering and Cable Engineering department (if applicable). Supporting the PIM is the contract manager in the project, installation controller and procurement department, who has specialists within each field of offshore operations. In large projects and during the most intense phases of the installation projects it is common a deputy PIM supports.

A pre-requisite for all contracts with subcontractors is that they are qualified according to our internal NKT procurement standards. The qualification process contains validating the suitability of the subcontractor in several different areas including audits and the qualification has to be renewed within a given time interval.

NKT has a long experience of managing subcontractors and within the company there is a lesson learned process to gather all lessons learned from previous projects with the same subcontractor. This allows for an information transfer between projects and benefit from the fact that several installation projects with subcontractors are ongoing simultaneously.

3.3.1 On-board Representatives

For all offshore operations executed by a subcontractor, two NKT representatives will be present onboard to supervise the works. These personnel will usually be Site Managers or Project Engineers but may be other positions with suitable offshore experience.

The NKT representatives will on board the vessels:

- Supervise the operation
- Give instructions to subcontractor
- Work as the main contact for communication with the subcontractor’s on-board personnel
- Communicate with the on-board Employer representatives
- Ensure that the works is carried out in a safe manner
- Write daily progress reports and communicate with the land based project organisation
- Ensure that all HSE standards and regulations are followed on the vessel
- Report incidents to land base organisation and on-board Employer representatives

4 Installation Methodology

In order to perform the safe and effective installation of articulated mattresses, two methodologies can be considered. It should be noted however, that although the methodologies of mattress installation may differ, the end result on the riverbed will be the same and there is no additional environmental impact with either solution.

4.1 Remotely Operated Vehicle (ROV) Installation

4.1.1 ROV Installation – Overview

Using the ROV installation methodology, the articulated mattresses will be installed in position using a specially designed and outfitted ROV integrated to a mattress deployment frame. Control of this vehicle will be by operators located onboard the deployment vessel and verification of the mattress frame position and the position of the final installed mattress will be performed with survey equipment mounted on the vehicle.

With this technique there is no requirement for divers to be in the water.

An indicative task plan for the ROV mattress installation operation is provided as Appendix 2.

4.1.2 ROV Installation – Installation Platform (Mattressing Crane Barge, MCB)

For ROV mattress installation, the platform will either be a DP vessel, or a custom barge with a DP system. Selection of the vessel or barge will be made against the following criteria:

- **Draft** – a suitable draft is required for the locations along the river at which mattresses are to be installed. As it is not known where remedial mattresses may be required, the vessel must be able to access all locations along the route.
- **Station keeping** – due to the currents in the Hudson, the vessel must have sufficient station keeping abilities to hold position in any current that could be encountered along the route.
- **Deck space** – sufficient deck space is required to locate the ROV spread, maintenance containers and sufficient mattresses so as to minimise the number of mattress reloading operations required.
- **Crane / LARS** – overboarding of the ROV with attached mattress deployment frame and mattress to be installed will be performed by either the vessel crane or a dedicated launch and recovery system (LARS) if available.
- **Power availability** – the ROV system and associated equipment will require either power from the vessel itself or space on the back deck to position generators, in which case fuel will be needed either from the vessel or in onboard bunkers.
- **Personnel capacity** – the installation operations will require a variety of specialist personnel, including project crew, ROV crew, survey personnel an marine crew. There must be sufficient space on board the vessel to either accommodate these personnel or to allow them to be brought out by CTV each shift.

4.1.3 ROV Installation – Required Equipment

The equipment required to be mobilised onto the vessel for use during the ROV mattress installation campaign is:

4.1.3.1 ROV and Associated Spread

The ROV unit itself will need to be mobilised onto the vessel and have a dedicated storage location on deck to seafasten during transit. An indicative ROV mattress installation tool is as shown in below figure:

Figure 7 Indicative ROV Mattress Deployment Frame

The ROV tool will be equipped with remotely controlled hydraulic releases which will allow detachment from the mattress once it is correctly in position. In addition to this there are thrusters so provide small positioning movements to the mattress and survey equipment which facilitates accurate positioning of the tool and mattress as well as visual and sonar imaging of the surrounding area for aid in accurate installation.

In addition to the deployment tool, ancillary equipment which will be required are:

- Control umbilical
- Control cabin
- Maintenance and spares workshop

4.1.3.2 ROV and Mattress Deployment Equipment

Depending on what is already available on the vessel to be used or what needs to be mobilised, the following equipment may also be required:

- LARS – a deployment a-frame with associated hydraulic power unit
- Crane – either a fixed pedestal or mobile crane with sufficient space for seafastening

An indicative deck layout for the vessel, mobilised equipment and mattresses is as shown in below figure:

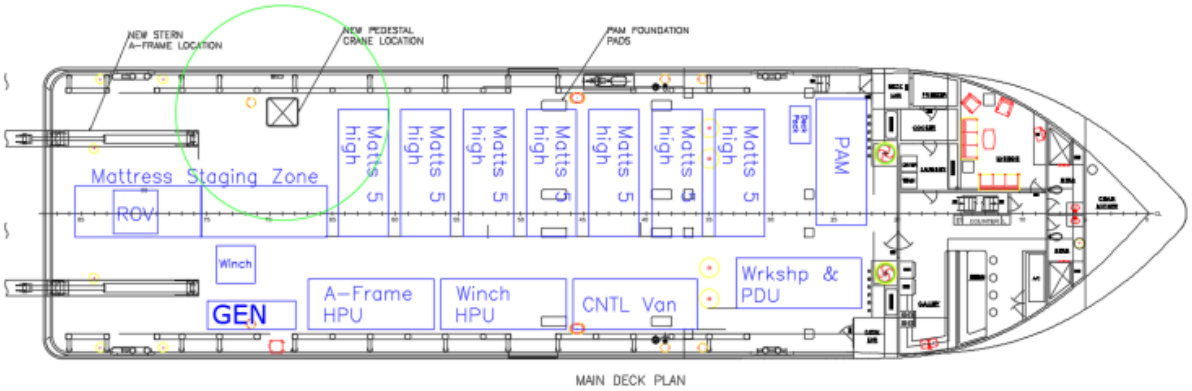


Figure 8 Indicative ROV Mattress Deployment Spread Deck Layout

Note: The above spread is for visual representation purposes only and shows the main equipment items and mattress on-deck storage.

4.1.4 ROV Installation – Setting Up At Location

Prior to the installation of the mattresses, a detailed plan of deployment will be generated. This will used the information from the crossing agreements as well as any available data from the project cable depth survey to form a plan of installation, minimising transit distances as far as possible.

A list of all the mattresses to be deployed per load-out will be delivered to the offshore team along with the details of the mattresses to be installed and drawings with tolerances of the final installed configuration. Confirmation will be made by the offshore team that this information is received and that the schedule will be followed.

The vessel will proceed to the first installation location and set up on DP, ready for operations. The deployment location for the mattress to be overboarded will be offset from the final installation location by an approximate distance of 30 feet so as to avoid the risk of dropped objects onto the installation locations. Once the mattress is approximately 5 feet from the river bed the vessel will slowly move into position with micro adjustments being made to the mattress position by the thrusters on the mattress frame.

4.1.5 ROV Installation – Mattress Deployment

Once the installation vessel is set up on DP in the correct location and ready to begin operations, the mattress installation supervisor will begin preparations for the mattress deployment.

Pre-operation checks will be made inclusive of:

- Weather conditions
- Any nearby operations or vessels that may cause interference
- Equipment status
- Personnel readiness to begin

When all conditions are assessed as being suitable to begin operations, a pre-start meeting will be held with all involved personnel providing the details of the work to be undertaken, the workscopes of each station and any health and safety points.

The vessel will then move into position with the ROV deployment zone offset from the mattress installation location by approximately 30 feet. Confirmation will be made that all stations are ready to begin.

Using tag-lines to control the load, the crane will lift the mattress deployment ROV from deck and over the top of the mattress to be deployed. The ROV will be lowered to a suitable height from deck (approximately 3 feet) so that connection can be made between the ROV and the frame.

Suitably rated and certified slings will be used to sling the loop-eyes of the mattress to the ROV. One of the sling ends will be attached to a hard point on the ROV with the other attached to the Hydraulic release mechanism. When attachment is confirmed and personnel are standing by ready to resume, the ROV with mattress attached will be lifted ready for overboarding. The tag lines will be released from the ROV and it will be slowly slewed out over the vessel side by the crane to the deployment position.

The ROV and mattress are then lowered through the splash zone and to a depth of approximately 5 feet into the water, clear of the splash zone. In-water checks will be made by the ROV crew to ensure that all ROV systems are functioning correctly. Once the ROV has been checked and is functional the crane will continue to lower the mattress through the water column to an approximate height of 5 feet from the river bed bottom. The vessel will then move on DP towards the deployment position.

Once the deployment position has been reached, the ROV will make small positional adjustments using its thrusters and as informed by the onboard sensors and positioning systems. When the mattress is aligned to the correct position, the crane will slowly come down on the line and the mattress will lay into position. The ROV survey systems will then verify that the alignment and positioning is correct and once this is confirmed the hydraulic release mechanisms on the ROV will be operated. When it is confirmed that the hydraulic release mechanisms have operated correctly, the mattress frame will be slowly raised with specific attention being paid to the weight on the crane hook as well as the ROV onboard instrumentation to ensure that the mattress is properly released from the frame.

When the ROV is approximately 5 feet clear from the installed mattress, the vessel will move on DP taking the mattress frame offline of the installation location. The crane will then recover the mattress frame to deck ready to be reloaded for the next mattress deployment.

4.1.6 ROV Installation – Deployment Verification

The positioning of the mattress will be verified by the use of the ROV onboard cameras, sonar sensors and positioning beacons.

In addition, the survey screen which will be visible to all relevant stations will be marked with the position of the utility (if applicable), the route line, the mattresses placed and the locations of mattresses to be placed. By utilising this visible system, all stations will be able to immediately see what the status of the mattress installation is.

An example of the survey screen is as shown in the below figure:

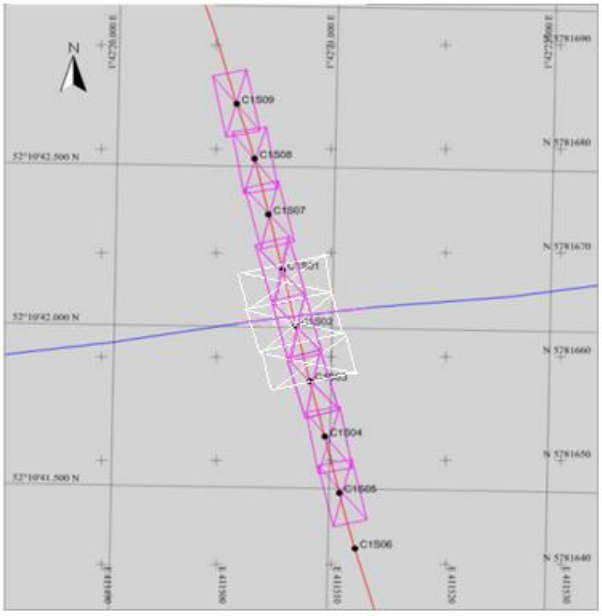


Figure 9 Indicative Mattress Installation Survey Screen

Note: This is indicative of what will be visible on the survey screen and is for illustrative purposes only. In this example, the blue line is the utility to be crossed, the red line is the project cable, the white mattresses are the pre-lay mattresses and the blue mattresses ae the post-lay

4.2 Diver Assisted Installation

4.2.1 Diver Assisted Installation – Overview

The diver assisted installation of the articulated concrete mattresses will use a barge or vessel with associated marine and operations crew as well as divers in the water for the deployment and positioning operations.

An indicative task plan for the diver assisted mattress installation operation is provided as Appendix 3.

4.2.2 Diver Assisted Installation – Installation Platform (Mattressing Crane Barge, MCB)

Diver assisted installation will require there to be a barge or vessel with capacity to accommodate the mattress deployment spread in addition to the diver spread and associated survey spread. Selection of the vessel or barge will be made against the following criteria:

- **Draft** – a suitable draft is required for the locations along the river at which mattresses are to be installed. As it is not known where remedial mattresses may be required, the vessel must be able to access all locations along the route.
- **Station keeping** – due to the currents in the Hudson, the vessel must have sufficient station keeping abilities to hold position in any current that could be encountered along the route, in the case of a barge this could also consist of anchors and spuds.

- **Deck space** – sufficient deck space is required to locate the dive spread, maintenance containers and sufficient mattresses so as to minimise the number of mattress reloading operations required.
- **Crane / LARS** – overboarding of the mattress deployment frame and mattress to be installed will be performed by either the vessel crane or a dedicated launch and recovery system (LARS) if available.
- **Dive launch location** – sufficient space will be needed on the deck to allow the divers to deploy in and out of the water without being in a position clashing with the mattress overboarding.
- **Personnel capacity** – the installation operations will require a variety of specialist personnel, including project crew, dive crew, survey personnel an marine crew. There must be sufficient space on board the vessel to either accommodate these personnel or to allow them to be brought out by CTV each shift.

4.2.3 Anchoring Operations

In the event that a barge is selected as the installation platform, anchoring operations will be required to provide stability and positioning for the barge. Anchors must be positioned at pre-designed locations at the crossings so as to be a safe distance from other installed utilities as well as the project cable once installed.

Anchor plans will be drafted for each crossing location and the anchors will be pre-set at the designed locations by a support tug prior to the arrival of the main installation spread. These patterns will be verified as stable and suitable by means of suitable analysis software.

A drawing of a typical anchor pattern will be as per below figure:

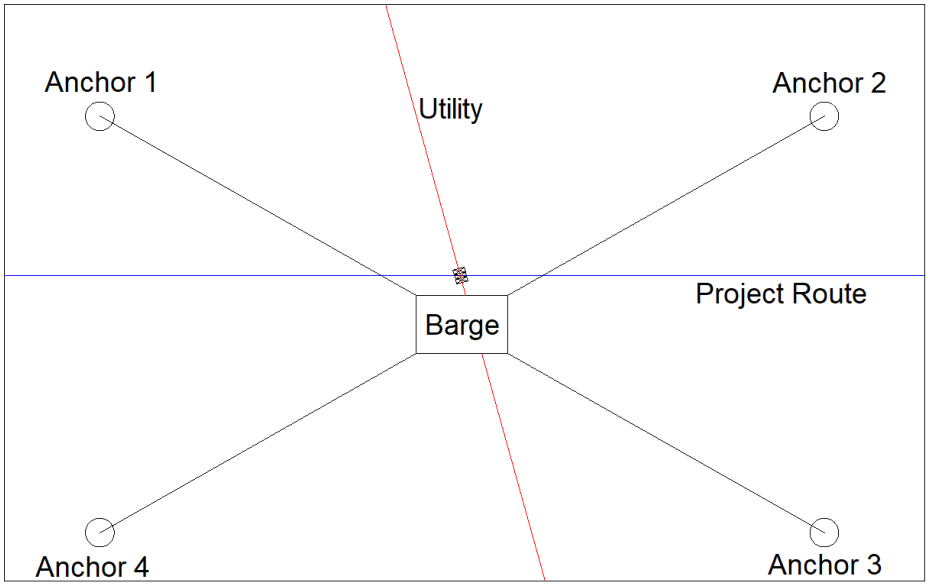


Figure 10 Indicative Anchor Pattern at Crossing Location

Note: This anchor pattern is indicative only and is presented for illustration. Actual anchor patterns will be engineered and produced specifically for each location.

Prior to the installation barge arriving on location, the support tug will deploy each of the anchors to the riverbed and set them. The tug will then apply force to them to verify that they

are set correctly and in the correct direction. Buoys will be attached to the anchors so that the connection rigging can be recovered.

The main installation barge will arrive on location, towed by another supporting tug and be guided into the approximate set-up location. The second support tug will assist in running out the anchor wires from the installation barge to the pre-set anchor location and will make the connection between the wire and anchor. This will repeat for each of the pre-set anchors.

With all anchors connected, the installation barge will slowly take up tension on the lines, carefully monitoring to ensure none of the anchors are slipping. By making adjustments on the anchor wire winches, the barge will manoeuvre into the correct position for mattress installation.

During the mattress installation operations all the anchor wire tensions will be carefully monitored to ensure stability of the barge.

4.2.4 Diver Assisted Installation – Required Equipment

The equipment required to be mobilised onto the vessel for use during the diver assisted mattress installation campaign is:

4.2.4.1 Mattress Handling Frame

In order to lift the mattresses overboard and to the riverbed, a mattress handling frame is required. This frame will attach to the mattress loops with suitable (diver releasable) rigging to allow the mattress to be safely lifted from deck and into position.

A typical mattress installation frame is as shown in the below figure:

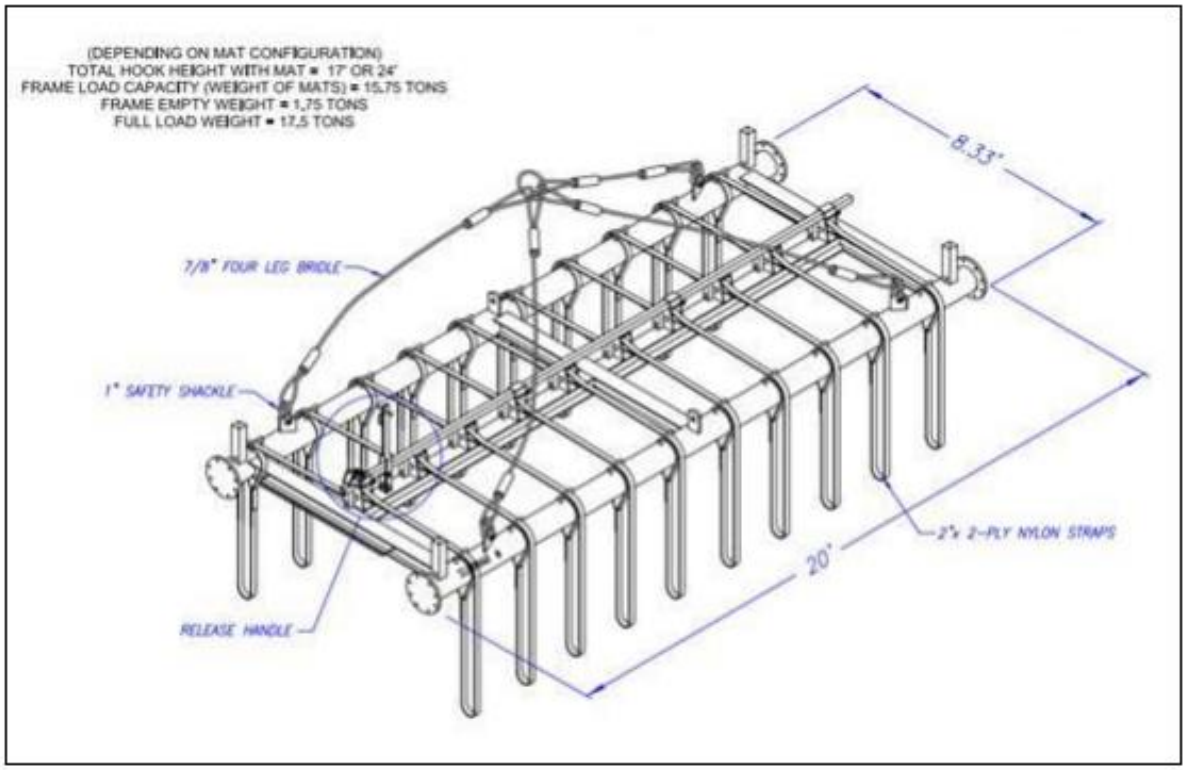


Figure 11 Mattress Installation Lifting Frame

The mattress installation lifting frame does not itself have any ability to make positional adjustments, however, it can be handled by divers who will move and rotate it as may be required.

4.2.4.2 Mattress Deployment Spread

The mattress frame will be lifted by means of a crane. This crane can either be a pedestal mounted crane or otherwise a crawler crane suitably seafastened to the deck of the installation spread.

This crane must have sufficient capacity to safely lift and deploy the frame and mattresses to the required outboard radius.

4.2.4.3 Diving Spread

The diving spread must have all equipment required for the safe launch and recovery of divers into the water. This will consist of:

- Diver launch and recovery position
- Diver control cabin
- Surface fed air-supply system
- Diver equipment storage container

An indicative deck layout for the diver assisted mattress installation vessel is as shown in the below figure:

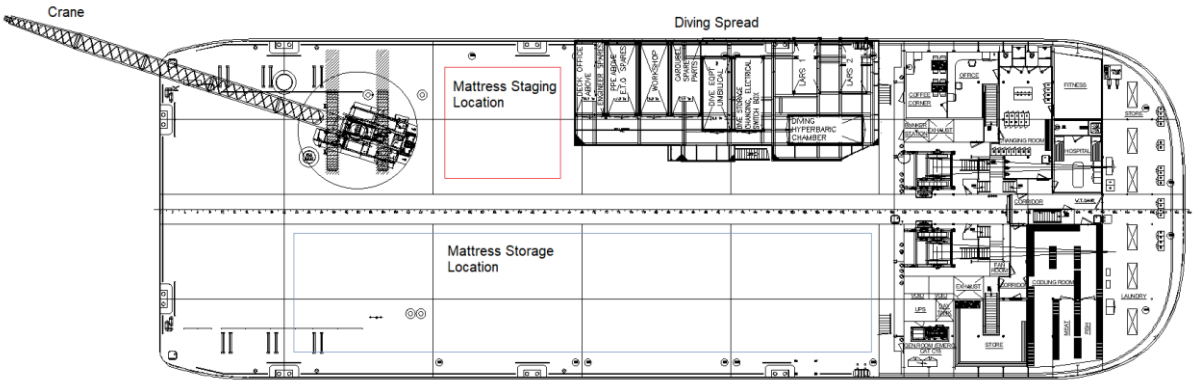


Figure 12 Indicative Diver Assisted Mattress Installation Spread

Note: The above spread is for visual representation purposes only and shows the main equipment items and mattress on-deck storage.

4.2.5 Diver Assisted Installation – Mattress Deployment and Verification

Once the installation vessel is in the correct location and ready to begin operations, the mattress installation supervisor will begin preparations for the mattress deployment.

Vessel will be set up and holding station at a location at which multiple mattress installation points can be reached by the deck crane, so as to eliminate the requirement for vessel movements whilst divers are in the water.

Pre-operation checks will be made inclusive of:

- Weather conditions
- Any nearby operations or vessels that may cause interference
- Equipment status
- Personnel readiness to begin

When all conditions are assessed as being suitable to begin operations, a pre-start meeting will be held with all involved personnel providing the details of the work to be undertaken, the workscopes of each station and any health and safety points.

The Deck Team will prepare all the required rigging and mattress frame ready for use. In the meantime, the divers will deploy into the water and stand-by at a pre-agreed safe location, prior to launch of the frame and mattress.

The frame will be lifted by the crane over the top of the first mattress to be installed and will be connected by the Deck Team using suitable rigging. The frame will then be lifted and outboarded with special care being taken so as not to lift the frame and mattress over the top of the divers in the water.

With the Deck Foreman monitoring, the frame and mattress will be lowered into the water and through the splash zone in a single continuous motion. The crane can then slew the frame and mattress in water to the approximate installation location.

When the crane has come to a controlled stop, the divers will move in from the stand-by location and make contact with the frame and mattress. The divers will communicate directly with the crane operator to make minor positional adjustments prior to lowering and mattress locating.

The divers will confirm that the mattress is in the correct location and that it is safe for the crane to come down on the line. The crane will lower the mattress to the riverbed until the rigging between the mattress and frame becomes slack. The divers will confirm that the mattress positioning is correct and will release the rigging between the frame and mattress.

Once confirmed that the rigging is released, the crane will slowly come up on the line until the frame is clear above the divers. Without ever going underneath the lifted frame, the divers will relocate to the safe stand-by position.

The mattress frame is then recovered to deck ready to load the next mattress.

Correct position of the mattress is determined by the diver locating to each corner for the survey system to take a position. These positions will then inform where the mattress corners are and therefore where the mattress is.

5 Work Completion and Deliverables

Following the successful completion of the mattress installation works at a specific location, verification will be made of the overall accuracy of the installation with data being gathered in order to provide as built documentation. In the case of the ROV installation, the ROV will be used to perform the as-built survey. In the case of diver assisted installation, the divers will be used to record footage and to take fixes on the locations of the mattresses.

As part of the final package, the following items will be delivered:

- As-built documentation for all installations detailing location data and drawings
- Raw and processed survey data
- Minutes from all operational meetings and tool box talks
- Video footage recorded during the course of the works

The below figure indicates the type of drawing to be delivered as included in the as-built documentation:

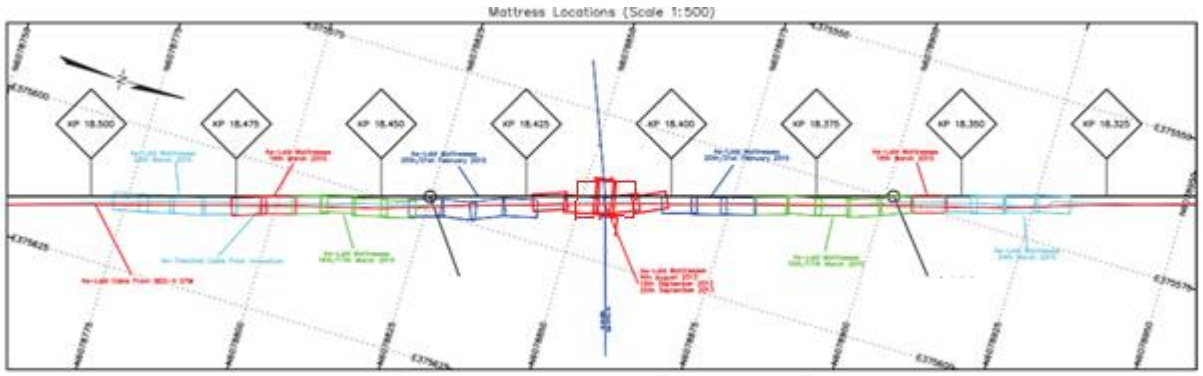


Figure 13 Indicate As-Built Drawing

Note: The above drawing is indicative of the kind of drawing and information included in the mattressing as-built drawings. Actual content will depend on client and regulatory requirements.

6 List of Appendices

Appendix 1 Articulated Concrete Mattresses

Appendix 2 Basic Crossing Design Drawing

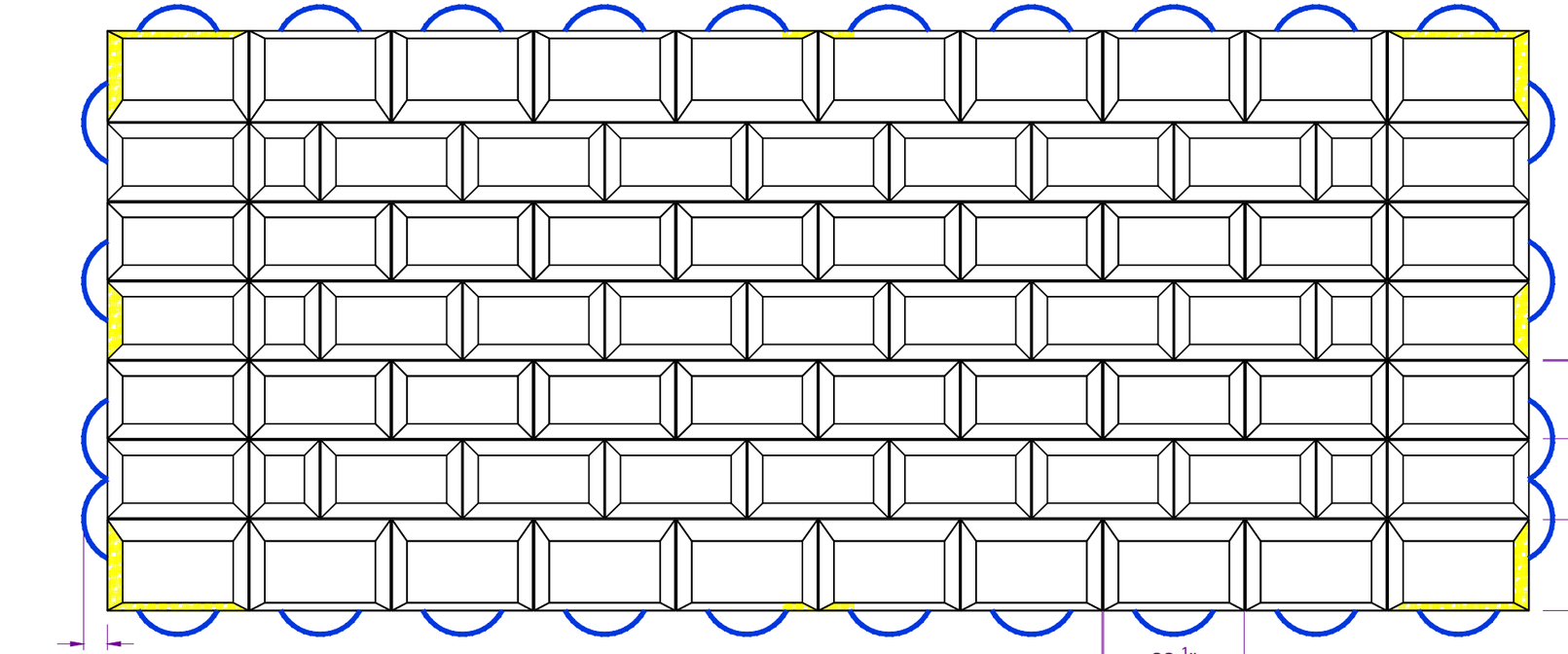
Appendix 3 Task Plan – ROV Mattress Deployment Operation

Appendix 4 Task Plan – Diver Assisted Mattress Installation Operation

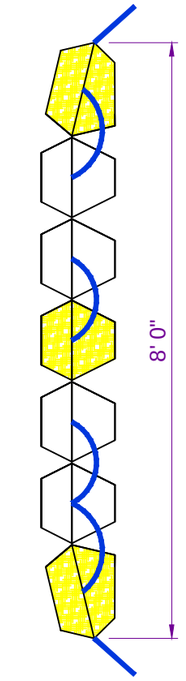
Table of Modifications

Rev.	Date	Prepared by	Description
A	2023-MAY-08	Brain, Mark John	First issue of document
1	2023-MAY-10	Brain, Mark John	Revised following comments

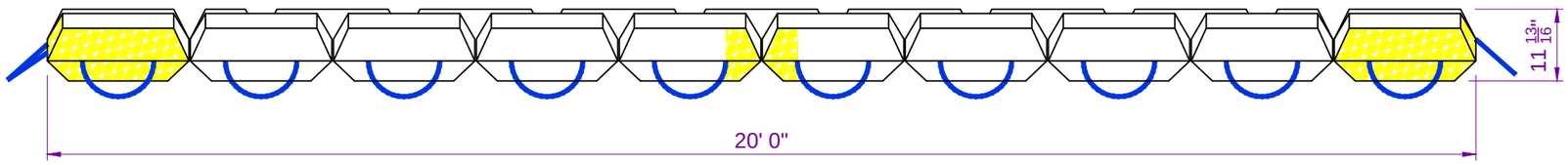
Appendix 1 Articulated Concrete Mattresses



PLAN



END ELEVATION



SIDE ELEVATION

NOTES

1. ALL DIMENSIONS IN FEET & INCHES UNO.
2. ROPE TO BE 3/4" Ø POLYPROPYLENE COMPLYING WITH EN.ISO.1346:2012 (OR LOCAL EQUIVALENT), AND UV STABILISED AGAINST SOLAR DEGRADATION, MINIMUM MBL 12103 lbs.
3. MATTRESS LIFT SAFETY RATIO = 7.9 : 1 (LIFTING ON 20ft SIDES USING 8No. LIFT POINTS PER SIDE).
4. CONCRETE MEETING ACI 318 (OR LOCAL EQUIVALENT), NORMAL WEIGHT DENSITY150 lbs/ft³, WITH A MINIMUM 28 DAY CYLINDER COMPRESSIVE STRENGTH OF 5800 PSI.
5. MATTRESS WEIGHT IN AIR = 14815 lbs / 6720kgs APPROXIMATELY.
6. MATTRESS WEIGHT IN WATER = 8490 lbs / 3850kgs APPROXIMATELY.
7. CORNER BLOCKS AND CENTRE LINE END BLOCKS TO BE PAINTED YELLOW.

REV	DATE	REVISION	DRN	CHK
A2	14.04.23	ROPE LENGTH REDUCED	DJB	RC
A1	12.04.23	ROPE LENGTH REDUCED	DJB	-
A	06.04.23	ISSUED WITH QUOTATION	DJB	GT

SPS
web: www.sps-gb.com
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email: enquiries@sps-gb.com

CLIENT: NKT

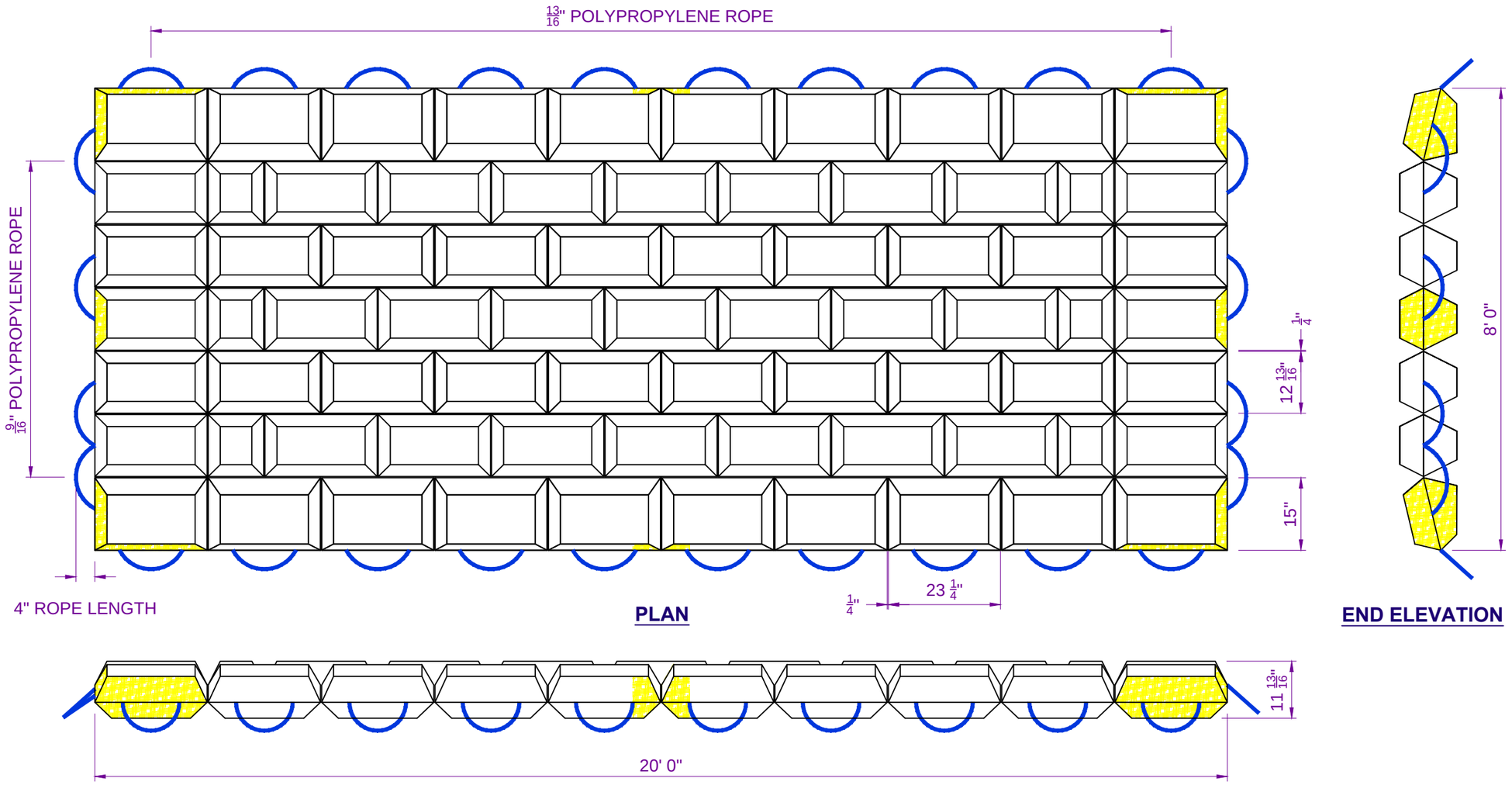
PROJECT: CHPE

PROJECT DOCUMENT No: SPS.DR.QI.552.03

TITLE: FLEXIMAT 20' x 8' x 12"

Rev: A2

SCALE: 1:25 @ A3



PLAN

END ELEVATION

SIDE ELEVATION

NOTES

1. ALL DIMENSIONS IN FEET & INCHES UNO.
2. ROPE TO BE 13/16" Ø POLYPROPYLENE COMPLYING WITH EN.ISO.1346:2012 (OR LOCAL EQUIVALENT), AND UV STABILISED AGAINST SOLAR DEGRADATION, MINIMUM MBL 15127 lbs.
3. SINGLE MATTRESS LIFT SAFETY RATIO = 16.3 : 1 (LIFTING ON 20ft SIDES USING 8No. LIFT POINTS PER SIDE).
4. DOUBLE MATTRESS LIFT SAFETY RATIO = 8.17 : 1 (LIFTING ON 20ft SIDES USING 8No. LIFT POINTS PER SIDE).
5. CONCRETE MEETING ACI 318 (OR LOCAL EQUIVALENT), NORMAL WEIGHT DENSITY150 lbs/ft³, WITH A MINIMUM 28 DAY CYLINDER COMPRESSIVE STRENGTH OF 5800 PSI.
6. MATTRESS WEIGHT IN AIR = 14815 lbs / 6720kgs APPROXIMATELY.
7. MATTRESS WEIGHT IN WATER = 8490 lbs / 3850kgs APPROXIMATELY.
8. CORNER BLOCKS AND CENTRE LINE END BLOCKS TO BE PAINTED YELLOW.

REV	DATE	REVISION	DRN	CHK
A	14.04.23	ISSUED WITH QUOTATION	DJB	RC

SPS
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email: enquiries@sps-gb.com

CLIENT: NKT

PROJECT: CHPE

PROJECT DOCUMENT No: SPS.DR.QI.552.03

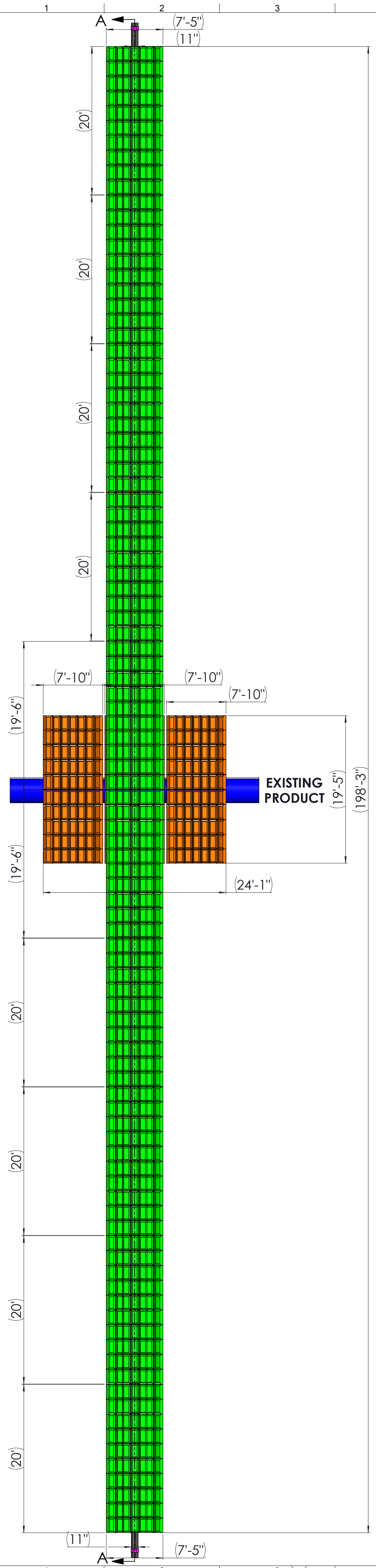
Rev: A

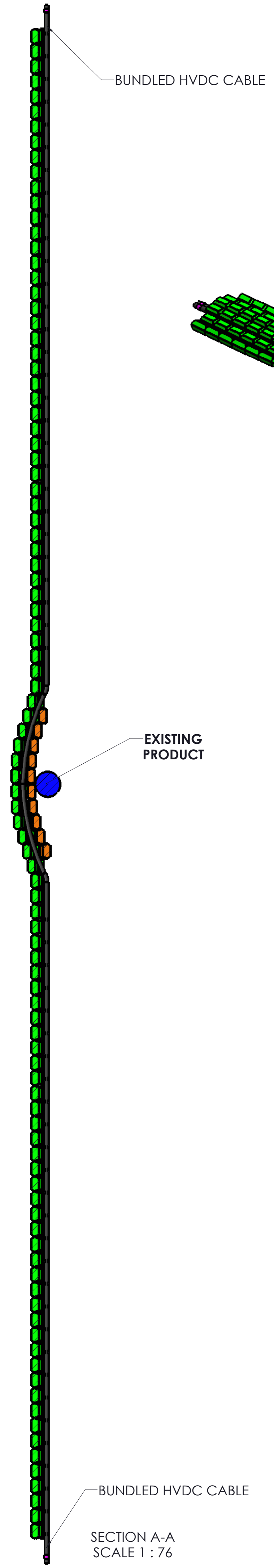
SCALE: 1:25 @ A3

TITLE: FLEXIMAT 20' x 8' x 12" c/w UPGRADED ROPE

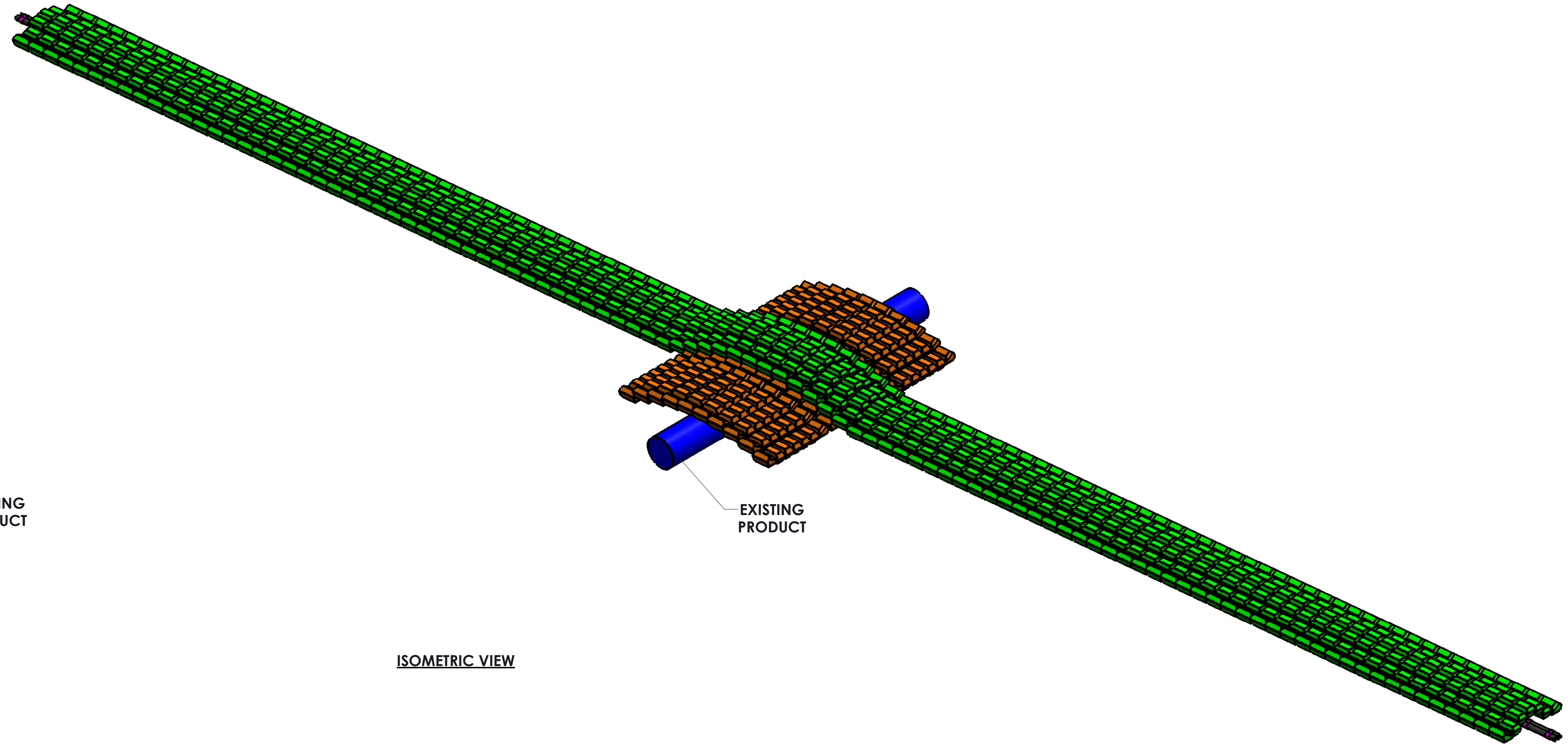
Appendix 2 Basic Crossing Design Drawing

Rev.	CN No.	Description	Revised By	Reviewed By	Approved By	Approved Date
A	-	FIRST ISSUE	AC	MJB	MJB	10-05-2023





SECTION A-A
SCALE 1 : 76



ISOMETRIC VIEW

NOTES :-

1. DIMENSIONS ARE IN FOOT AND INCHES
2. ALL DIMAENSIONS ARE APPROXIMATE. IT MIGHT VARY SLIGHTLY DEPENDING UPON THE ACTUAL INSTALLATION CONDITION.
3. POLYPROPYLENE ROPE USE FOR INSTALLATION NOT SHOWN
4. 3 OFF MATTERESSES SIZE - 20' X 8' X 12" (SHOWN IN ORANGE) ARE PRE LAY MATTRESSES AND 10 OFF MATTERESSES SIZE - 20' X 8' X 12" (SHOWN IN GREEN) ARE POST LAY MATTRESSES.
5. EXISTING PRODUCT IS SHOWN FOR REFERENCE ONLY. IT IS NOT TO ITS SIZE AND SHAPE.
6. MATTRESSES WEIGHT IN AIR
   1 OFF MATTRESS WEIGHT = 14815 LBS / 6720 KG
   PRE LAY MATTRESSES WEIGHT = **3 X 14815 LBS / 6720 KG = 44445 LBS / 20160 KG**
   POST LAY MATTRESSES WEIGHT = **10 X 14815 LBS / 6720 KG = 148150 LBS / 67200 KG**
7. MATTRESSES WEIGHT IN WATER
   1 OFF MATTRESS WEIGHT = 8490 LBS / 3850 KG
   PRE LAY MATTRESSES WEIGHT = **3 X 8490 LBS / 3850 KG = 25470 LBS / 11550 KG**
   POST LAY MATTRESSES WEIGHT = **10 X 8490 LBS / 3850 KG = 84900 LBS / 38500 KG**

NKT HV Cables AB	OFFSHORE CROSSING - CHAMPLAIN				Scale: 1:150	View	Sheet Size: A0
					State: Approved	Rel. Phase Code: -	
					General Tolerance: SS-ISO 2768-mK SS-EN-ISO 13920-BF		
	Drawn By: AC	Reviewed By: MJB	Approved By: MJB	Approved Date: 10-05-2023	Sheet No.: 1/1	Drawing No.: 1GG0117991	Rev.: A

Appendix 3 Task Plan – ROV Mattress Deployment Operation

Task Plan :	**Title:** ROV Mattress Installation	**Task Plan Rev:** 0	**Date:** 06MAY2023
Employer: CHPE	**Project:** Champlain-Hudson Power Express		**Worksite:** Hudson River
Operational Procedure Number:		**Procedure Title:** CHPE Hudson Mattressing Method Statement	

Max. Operational Weather Criteria :

- Current: x [knts]
- Wave height Hs: x [m]
- Wind force: x [m/s]

Safety Concerns:

- Lifting operations
- Hose management
- Manual handling

Initial Status :

- All equipment and mattresses needed for the operation are mobilized onto the installation spread
- Vessel has arrived at location and is cleared to begin operations

References:

[01] CHPE Hudson Mattressing Method Statement
[02] Relevant HIRA
[03] Operational JSA
[04] Management of Change Procedure
[05] Project Offshore HSE Plan

Task Plan Summary:

- **Task 1-1:** Vessel set-up on location
- **Task 1-2:** Deployment and installation of mattresses
- **Task 1-3:** Post-installation survey works

Note:

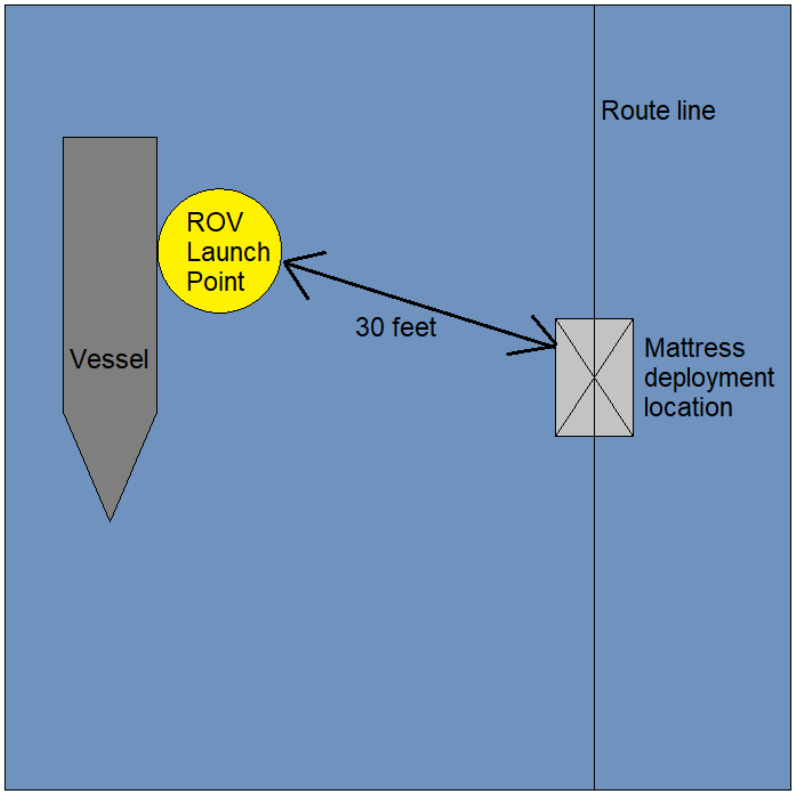
- This task-plan is indicative only, actual task-plans to be generated by installing party

Distribution list:

☒ OCM	☒ 2 x DF	☒ FE	☒ Survey	☐ JS	☒ Employer
☒ SS	☐ Lay Tech	☐ PE	☒ ROV	☒ Bridge	☒ MWS

Rev	Revision Date	Description
0	06 May 2023	First draft

Task Plan ROV Mattress Installation				
Item	**TASK 1-1: Vessel set-up on location**	**Ref.**	**Resp.**	**Chk.**
HSE	Prior to the commencement of mattress installation operations, including the vessel set-up on location, all involved personnel must have received a project and operation briefing as well as a review of the operation specific risk-assessment. A job safety assessment (JSA) must be performed for specific tasks identified in this task-plan. Any required changes to this task-plan due to changes or differences in circumstances must follow the agreed management of change procedure and be accompanied by a suitable risk assessment.		OCM	
Pre	The purpose of this task-plan is to detail the steps and operations to be undertaken to safely and effectively set-up the mattress installation vessel on location ready to begin mattress deployment operations. Prerequisites that must be met prior to undertaking the steps below are: • Weather must be assessed and a suitable window available for the intended operation • Data is loaded and correctly displaying to all stations on the navigation screens		OCM	
TBT	**TOOL BOX TALK** A tool box talk must be held with all personnel involved in the operation: • Bridge crew, including DPO • Shift supervisor • ROV equipment operating crew • Survey • Deck team		SS	
OPERATION				
1	Vessel arrives at work location and comes to a controlled stop at location offset from first deployment location (not above cable route)		SS	
2	Vessel sets up on DP, ensuring all DP checks are made and are satisfactory		DPO	
3	The first mattress deployment location is identified on navigation screen and communicated to all stations		Survey	

Task Plan ROV Mattress Installation				
Item	**TASK 1-1: Vessel set-up on location**	**Ref.**	**Resp.**	**Chk.**
4	Vessel moves in towards first deployment location on DP and comes to a controlled stop with the ROV launch point approximately 30 feet from the first mattress deployment location:  		SS	
5	Survey confirm that vessel is in the correct location ready to overboard ROV and mattresses		Survey	
6	All stations confirm readiness to begin installation operations.		SS	
End of TASK 1-1: Vessel set-up on locations				

Task Plan ROV Mattress Installation				
Item	**TASK 1-2: Deployment and installation of mattresses**	**Ref.**	**Resp.**	**Chk.**
HSE	Prior to the commencement of mattress installation operations, all involved personnel must have received a project and operation briefing as well as a review of the operation specific risk-assessment. A job safety assessment (JSA) must be performed for specific tasks identified in this task-plan. Any required changes to this task-plan due to changes or differences in circumstances must follow the agreed management of change procedure and be accompanied by a suitable risk assessment.		OCM	
Pre	The purpose of this task-plan is to detail the steps and operations to be undertaken to safely and effectively undertake the mattress deployment operations. Prerequisites that must be met prior to undertaking the steps below are: • Weather must be assessed and a suitable window available for the intended operation • Data is loaded and correctly displaying to all stations on the navigation screens • Vessel is in correct position for deployment (as per previous task plan) • ROV system is functional and all checks completed • Deck team ready and standing by for operations		OCM	
TBT	**TOOL BOX TALK** A tool box talk must be held with all personnel involved in the operation: • Bridge crew, including DPO • Shift supervisor • ROV equipment operating crew • Survey • Deck team		SS	
	PREPARATION			
1	Confirm that all sensors on the ROV are working and feeds are live and being recorded by the survey system.		ROV	
2	Communications check with all stations, confirming readiness to begin operations		SS	
3	Ensure all ROV lifting rigging is correctly attached and as per lifting drawing		DF	
4	Ensure all mattress attachment rigging is in place ready for use and as per lifting drawing		DF	

Task Plan ROV Mattress Installation				
Item	**TASK 1-2: Deployment and installation of mattresses**	**Ref.**	**Resp.**	**Chk.**
OPERATION – Pre-Survey				
5	Crane is guided by Deck Foreman into position ready for connection to the ROV		DF	
6	Crane is connected to the ROV dedicated lifting point and all lifted to extend rigging (no tension on lines) Rigging inspected to ensure all is correct and no damage present		DF	
7	Seafastening of the ROV to deck is released		DF	
8	Crane raises the line lifting the ROV to approximately 1 foot off of the ground (test lift) ROV inspected for any potential dropped objects		DF	
9	Crane lifts ROV to suitable height for slewing and under guidance from the Deck Foreman, slews the ROV outboard to the deployment position. Hoses running to the ROV are checked as being clear with no tension but no excessive slack		DF	
10	All stations confirm readiness to deploy ROV into the water		SS	
11	Crane comes down on the line, lowering the ROV through the splash zone in a controlled manner until ROV and lifting rigging are completely below the splash zone Crane comes to a controlled stop on the line		CO	
12	ROV performs in-water checks, ensuring all systems are functional		ROV	
13	ROV is further lowered into the water column until approximately 5 feet clear of the seabed		ROV	
14	All stations confirm readiness to move the vessel to start of pre-survey run line		SS	
15	Vessel moves on DP so that ROV position is over the start of the pre-survey run line		DP	
16	Survey confirm position is correct to begin pre-survey		Survey	
17	Range and bearing is given to DPO to begin vessel move, keeping the ROV over the pre-survey run line, speed is informed by ROV and Survey departments.		SS	
18	ROV makes micro-adjustments using thrusters whilst progressing along the line		ROV	
19	Survey team notify all stations when the last 20 feet of the pre-survey run line has been reached		Survey	

Task Plan ROV Mattress Installation				
Item	**TASK 1-2: Deployment and installation of mattresses**	**Ref.**	**Resp.**	**Chk.**
20	Vessel slows and comes to a controlled stop at end of pre-survey run line		SS	
21	Survey confirm that all required data has been correctly received and recorded and no further pre-survey runs are required		Survey	
22	Vessel moves offline from the route run line to original position offset by approximately 30 feet		SS	
23	All stations confirm readiness to recover ROV to deck		SS	
24	ROV is lifted through the water column and through the splash zone, coming to a controlled stop when fully clear of the water		CO	
25	Visual inspection of the ROV is performed to ensure it is safe and clear to bring back on board		DF	
26	[If required] Deck Foreman guides the crane to slew the ROV inboard and to the ROV storage location on deck		DF	
27	[If required] The ROV is slowly lowered to deck, adjusted into the correct position by the deck crew		DF	
28	[If required] Weight is fully taken off the crane line and lowered to a position that the hook can be disconnected from the ROV lifting rigging		DF	
29	[If required] ROV is detached from the crane hook and crane is slewed to it's safe storage position		DF	
30	[If required] ROV is secured to deck with correct seafastening		DF	
OPERATION – Mattress Installation				
31	[If required] Crane is guided by Deck Foreman into position ready for connection to the ROV		DF	
32	[If required] Crane is connected to the ROV dedicated lifting point and all lifted to extend rigging (no tension on lines) Rigging inspected to ensure all is correct and no damage present		DF	
33	[If required] Seafastening of the ROV to deck is released		DF	
34	[If required] Crane raises the line lifting the ROV to approximately 1 foot off of the ground (test lift) ROV inspected for any potential dropped objects		DF	
35	Under guidance of the Deck Foreman, crane lifts the ROV and locates into the loading position for the mattress to be installed		DF	
36	ROV and mattress frame is held in position approximately 3 feet above the mattress to be installed whilst rigging connection to the mattress is made		DF	
37	Using the correct rigging, mattress is attached to the ROV by the hydraulic release mechanisms		ROV	

Task Plan ROV Mattress Installation				
Item	**TASK 1-2: Deployment and installation of mattresses**	**Ref.**	**Resp.**	**Chk.**
38	Mattress number is recorded for record keeping and as-builts		SS	
39	Crane raises the line lifting the ROV and mattress to approximately 1 foot off of the ground (test lift) ROV and mattress inspected for any potential dropped objects		DF	
40	Crane lifts ROV and mattress to suitable height for slewing and under guidance from the Deck Foreman, slews the ROV and mattress outboard to the deployment position. Hoses running to the ROV are checked as being clear with no tension but no excessive slack		DF	
41	All stations confirm readiness to deploy ROV and mattress into the water		DF	
42	Crane comes down on the line, lowering the ROV and mattress through the splash zone in a controlled manner until ROV and mattress and lifting rigging are completely below the splash zone Crane comes to a controlled stop on the line		DF	
43	ROV performs in-water checks, ensuring all systems are functional		ROV	
44	ROV and mattress is further lowered into the water column until approximately 5 feet clear of the seabed		ROV	
45	All stations confirm readiness to move the vessel to the mattress installation location		SS	
46	Vessel moves on DP so that ROV and mattress position is over the mattress deployment location		SS	
47	Survey confirm that the deployment position is correct		Survey	
48	ROV uses thrusters to make micro-adjustments to the orientation and position of the mattress to ensure deployment in the correct position		ROV	
49	ROV onboard sonar and positioning sensors ensure that mattress is in correct position		ROV	
50	ROV supervisors guides crane to come down on the line, deploying the mattress to the riverbed and taking slack off to the attachment rigging		ROV	
51	ROV supervisor confirms with Survey that mattress is in correct position and clear for release		ROV	
52	ROV mattress release mechanism is activated and mattress release system confirmed as having opened correctly		ROV	
53	Crane comes up slowly on the line whilst ROV team monitor the mattress to ensure no snagging as the rigging releases		CO	
54	ROV is lifted approximately 5 feet clear of the installed mattress		ROV	

Task Plan ROV Mattress Installation				
Item	**TASK 1-2: Deployment and installation of mattresses**	**Ref.**	**Resp.**	**Chk.**
55	Vessel moves offline from the installation location to original position offset by approximately 30 feet		SS	
56	All stations confirm readiness to recover ROV to deck		SS	
57	ROV is lifted through the water column and through the splash zone, coming to a controlled stop when fully clear of the water		DF	
58	Visual inspection of the ROV is performed to ensure it is safe and clear to bring back on board		DF	
59	Deck Foreman guides the crane to slew the ROV inboard and to the next mattress to be installed		DF	
End of TASK 1-2: Deployment and installation of mattresses				

Task Plan ROV Mattress Installation				
Item	**TASK 1-3: Post-installation survey works**	**Ref.**	**Resp.**	**Chk.**
HSE	Prior to the commencement of the post-installation survey works, all involved personnel must have received a project and operation briefing as well as a review of the operation specific risk-assessment. A job safety assessment (JSA) must be performed for specific tasks identified in this task-plan. Any required changes to this task-plan due to changes or differences in circumstances must follow the agreed management of change procedure and be accompanied by a suitable risk assessment.		OCM	
Pre	The purpose of this task-plan is to detail the steps and operations to be undertaken to safely and effectively perform the post-installation survey works of the installed mattresses. Prerequisites that must be met prior to undertaking the steps below are: • Weather must be assessed and a suitable window available for the intended operation • Data is loaded and correctly displaying to all stations on the navigation screens • Installed mattress positions and numbers are available for comparison		OCM	
TBT	**TOOL BOX TALK** A tool box talk must be held with all personnel involved in the operation: • Bridge crew, including DPO • Shift supervisor • ROV equipment operating crew • Survey • Deck team		SS	
PREPARATION				
1	Confirm that all sensors on the ROV are working and feeds are live and being recorded by the survey system.		ROV	
2	Communications check with all stations, confirming readiness to begin operations		SS	
3	Ensure all ROV lifting rigging is correctly attached and as per lifting drawing		DF	
OPERATION – Post-Installation Survey				
4	[If required] Crane is guided by Deck Foreman into position ready for connection to the ROV		DF	

Task Plan ROV Mattress Installation				
Item	**TASK 1-3: Post-installation survey works**	**Ref.**	**Resp.**	**Chk.**
5	[If required] Crane is connected to the ROV dedicated lifting point and all lifted to extend rigging (no tension on lines) Rigging inspected to ensure all is correct and no damage present		DF	
6	[If required] Seafastening of the ROV to deck is released		DF	
7	Crane raises the line lifting the ROV to approximately 1 foot off of the ground (test lift) ROV inspected for any potential dropped objects		DF	
8	Crane lifts ROV to suitable height for slewing and under guidance from the Deck Foreman, slews the ROV outboard to the deployment position. Hoses running to the ROV are checked as being clear with no tension but no excessive slack		DF	
9	All stations confirm readiness to deploy ROV into the water		SS	
10	Crane comes down on the line, lowering the ROV through the splash zone in a controlled manner until ROV and lifting rigging are completely below the splash zone Crane comes to a controlled stop on the line		CO	
11	ROV performs in-water checks, ensuring all systems are functional		ROV	
12	ROV is further lowered into the water column until approximately 5 feet clear of the seabed		ROV	
13	All stations confirm readiness to move the vessel to start of post-survey run line		SS	
14	Vessel moves on DP so that ROV position is over the start of the post-survey run line		DP	
15	Survey confirm position is correct to begin post-survey		Survey	
16	Range and bearing is given to DPO to begin vessel move, keeping the ROV over the post-survey run line, speed is informed by ROV and Survey departments.		SS	
17	ROV makes micro-adjustments using thrusters whilst progressing along the line		ROV	
18	Survey team notify all stations when the last 20 feet of the post-survey run line has been reached		Survey	
19	Vessel slows and comes to a controlled stop at end of post-survey run line		SS	
20	Survey confirm that all required data has been correctly received and recorded and no further post-survey runs are required		Survey	

Task Plan ROV Mattress Installation				
Item	**TASK 1-3: Post-installation survey works**	**Ref.**	**Resp.**	**Chk.**
21	Management team verifies that all mattresses are installed as they should be and no remedial actions are required		SS	
22	Vessel moves offline from the route run line to original position offset by approximately 30 feet		SS	
23	All stations confirm readiness to recover ROV to deck		SS	
24	ROV is lifted through the water column and through the splash zone, coming to a controlled stop when fully clear of the water		CO	
25	Visual inspection of the ROV is performed to ensure it is safe and clear to bring back on board		DF	
26	[If required] Deck Foreman guides the crane to slew the ROV inboard and to the ROV storage location on deck		DF	
27	[If required] The ROV is slowly lowered to deck, adjusted into the correct position by the deck crew		DF	
28	[If required] Weight is fully taken off the crane line and lowered to a position that the hook can be disconnected from the ROV lifting rigging		DF	
29	[If required] ROV is detached from the crane hook and crane is slewed to it's safe storage position		DF	
30	[If required] ROV is secured to deck with correct seafastening		DF	
End of TASK 1-3: Post-installation survey works				

Task Plan Completion Certificate			
Task Plan :	**Title:** ROV Mattress Installation	**Task Plan Rev:** 0	**Date:** 06MAY2023
Employer: CHPE	**Project:** Champlain-Hudson Power Express		**Worksite:** Hudson River
Operational Procedure Number:		**Procedure Title:** CHPE Hudson Mattressing Method Statement	
Task Plan Summary: • **Task 1-1:** Vessel set-up on location • **Task 1-2:** Deployment and installation of mattresses • **Task 1-3:** Post-installation survey works		**Completed + Signature:** ☐ ☐ ☐	
Hold Points: •		**Completed + Signature:** ☐	
Management of Change (if any): •		**Approved:** ☐	
As Build Data + Format:			
Notes:			

Function	Date	Name	Signature
SS Day			
SS Night			
OCM			

Appendix 4 Task Plan – Diver Assisted Mattress Installation Operation

Task Plan :	**Title:** Diver Assisted Mattress Installation	**Task Plan Rev:** 0	**Date:** 08MAY2023
Employer: CHPE	**Project:** Champlain-Hudson Power Express		**Worksite:** Hudson River
Operational Procedure Number:		**Procedure Title:** CHPE Hudson Mattressing Method Statement	

Max. Operational Weather Criteria :

- Current: x [knts]
- Wave height Hs: x [m]
- Wind force: x [m/s]

Safety Concerns:

- Lifting operations
- Divers in water
- Manual handling

Initial Status :

- All equipment and mattresses needed for the operation are mobilized onto the installation spread
- Vessel has arrived at location and is cleared to begin operations

Task Plan Summary:

- **Task 2-1:** Diver assisted mattress installation

References:

[01] CHPE Hudson Mattressing Method Statement
[02] Relevant HIRA
[03] Operational JSA
[04] Management of Change Procedure
[05] Project Offshore HSE Plan

Note:

- This task-plan is indicative only, actual task-plans to be generated by installing party
- In the case that an anchor barge is to be used, task-plan will be updated to reflect

Distribution list:

☒ OCM	☒ 2 x DF	☒ FE	☒ Survey	☐ JS	☒ Employer
☒ SS	☐ Lay Tech	☐ PE	☒ ROV	☒ Bridge	☒ MWS

Rev	Revision Date	Description
0	08 May 2023	First draft

Task Plan Diver Assisted Mattress Installation				
Item	**TASK 2-1: Deployment and installation of mattresses**	**Ref.**	**Resp.**	**Chk.**
HSE	Prior to the commencement of mattress installation operations, all involved personnel must have received a project and operation briefing as well as a review of the operation specific risk-assessment. A job safety assessment (JSA) must be performed for specific tasks identified in this task-plan. Any required changes to this task-plan due to changes or differences in circumstances must follow the agreed management of change procedure and be accompanied by a suitable risk assessment.		OCM	
Pre	The purpose of this task-plan is to detail the steps and operations to be undertaken to safely and effectively undertake the mattress deployment operations. Prerequisites that must be met prior to undertaking the steps below are: • Weather must be assessed and a suitable window available for the intended operation • Data is loaded and correctly displaying to all stations on the navigation screens • Vessel is in correct position for deployment • Diving systems are functional and all checks completed • Deck team ready and standing by for operations		OCM	
TBT	**TOOL BOX TALK** A tool box talk must be held with all personnel involved in the operation: • Bridge crew, including DPO • Shift supervisor • Dive team • Survey • Deck team		SS	
PREPARATION				
1	Confirm that all dive systems are operations and it is safe to deploy divers into the water		Dive	
2	Communications check with all stations, confirming readiness to begin operations		SS	
3	Ensure all mattress frame lifting rigging is correctly attached as per lifting drawing		DF	
4	Ensure all mattress attachment rigging is in place ready for use and as per lifting drawing		DF	

Task Plan Diver Assisted Mattress Installation				
Item	**TASK 2-1: Deployment and installation of mattresses**	**Ref.**	**Resp.**	**Chk.**
OPERATION – Mattress Installation				
5	Divers are deployed into the water and stationed at a pre-determined safe location away from the crane lifting path		Dive	
6	Divers confirm that they are safe and ready to begin operations		Dive	
7	Crane is guided by Deck Foreman into position ready for connection to the mattress frame		DF	
8	Crane is connected to the mattress frame dedicated lifting point and all lifted to extend rigging (no tension on lines) Rigging inspected to ensure all is correct and no damage present		DF	
9	Seafastening of the mattress frame to deck is released		DF	
10	Crane raises the line lifting the mattress frame to approximately 1 foot off of the ground (test lift) mattress frame inspected for any potential dropped objects		DF	
11	Under guidance of the Deck Foreman, crane lifts the mattress frame and locates into the loading position for the mattress to be installed		DF	
12	Mattress frame is held in position approximately 3 feet above the mattress to be installed whilst rigging connection to the mattress is made		DF	
13	Using the correct rigging, mattress is attached to the mattress frame		DF	
14	Mattress number is recorded for record keeping and as-builts		SS	
15	Crane raises the line lifting the frame and mattress to approximately 1 foot off of the ground (test lift) Frame and mattress inspected for any potential dropped objects		DF	
16	Crane lifts frame and mattress to suitable height for slewing and under guidance from the Deck Foreman, slews the frame and mattress outboard to the deployment position. Note that the load path of the frame and mattress must not go over the divers in water		DF	
17	All stations confirm readiness to deploy frame and mattress into the water		DF	
18	Crane comes down on the line, lowering the frame and mattress through the splash zone in a controlled manner until frame and mattress and lifting rigging are completely below the splash zone Crane comes to a controlled stop on the line		CO	

Task Plan Diver Assisted Mattress Installation				
Item	**TASK 2-1: Deployment and installation of mattresses**	**Ref.**	**Resp.**	**Chk.**
19	Frame and mattress is further lowered into the water column until approximately 5 feet clear of the seabed		CO	
20	All stations confirm readiness to move frame into deployment position		SS	
21	Crane slews frame and mattress slowly until approximately positioned in final deployment location		CO	
22	When confirmed as safe to do so, divers approach the frame and make contact with it and the mattress		Dive	
23	Divers rotate and align the frame and mattress to the correct lowering position		Dive	
24	Divers instruct the crane to slowly come down on the line		Dive	
25	Divers monitor the frame and mattress lowering on the line and until the mattress is on the riverbed and rigging between the mattress and mattress frame has lost tension		Dive	
26	Divers confirm that the mattress is in the correct position		Dive	
27	Rigging between the frame and mattress is disconnected		Dive	
28	When the rigging has been fully disconnected, the divers confirm that the frame is ready for recovery		Dive	
29	Divers move offline to safe standby position		Dive	
30	Frame is slewed off of the route line to location safe for recovery		CO	
31	Frame is lifted through the water column and through the splash zone, coming to a controlled stop when fully clear of the water		CO	
32	Visual inspection of the frame is performed to ensure it is safe and clear to bring back on board		DF	
33	Deck Foreman guides the crane to slew the frame inboard and to the next mattress to be installed		DF	
End of TASK 2-1: Deployment and installation of mattresses				

Task Plan Completion Certificate			
Task Plan :	**Title:** Diver Assisted Mattress Installation	**Task Plan Rev:** 0	**Date:** 08MAY2023
Employer: CHPE	**Project:** Champlain-Hudson Power Express		**Worksite:** Hudson River
Operational Procedure Number:		**Procedure Title:** CHPE Hudson Mattressing Method Statement	
Task Plan Summary: • **Task 2-1:** Deployment and installation of mattresses •		**Completed + Signature:** ☐	
Hold Points: •		**Completed + Signature:** ☐	
Management of Change (if any): •		**Approved:** ☐	
As Build Data + Format:			
Notes:			

Function	Date	Name	Signature
SS Day			
SS Night			
OCM			