



Appendix 6-A: Methodology Statement for Post-Lay and Remedial Mattress Placement



METHODOLOGY STATEMENT
Champlain Hudson Power Express
EM&CP Submission
Post-Lay and Remedial Mattress Placement
(<150 ft Water Depth)
(Lake Champlain Segment)



SUBMITTED TO:

NKT HV CABLES AB.

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Table of Contents

List of Definitions	5
List of Terms and Abbreviations	5
1 Introduction	6
1.1 Project Introduction	6
1.2 Purpose of Document	6
1.3 Regulatory Compliance / Notifications / Liaison	6
2 Scope of Work	7
2.1 Cable Protection Requirements – Lake Champlain Segment	7
2.2 Articulated Concrete Mattresses	7
2.3 Installation Windows	8
2.4 Installation Types	8
2.4.1 Pre-Cable Lay Mattresses	8
2.4.2 Post-Lay Cable Mattresses	9
2.4.3 Remedial Protection Mattresses	10
2.5 Installation Locations	10
2.6 Installation Pattern	10
2.7 Installation Campaigns	11
2.7.1 Pre-Lay Mattress Installation Campaign	11
2.7.2 Post-Lay and Remedial Mattress Installation Campaign	11
3 Project Mobilization	11
3.1 Staten Island Yard	11
3.2 Wilcox Dock	11
3.3 Mattress Fabrication – Tomkins Cove, NY	12
3.4 Mattress Crane Barge	12
3.5 Mattress Feeder Barge (MFB)	13
4 Installation Methodology	14
4.1 Diver Assisted Installation	14
4.1.1 Diver Assisted Installation – Overview	14
4.1.2 Diver Assisted Installation – Installation Platform (MCB & MFB)	14
4.1.3 Anchoring Operations	14
4.1.4 Diver Assisted Installation – Required Equipment	16
4.1.4.1 Mattress Handling Frame	16
4.1.4.2 Mattress Deployment Spread	17
4.1.4.3 Diving Spread	17
4.1.5 Diver Assisted Installation – Mattress Deployment and Verification	17
5 Lake Weather Conditions / Operational Weather Limits	18
6 Environmental Protection Measures	19
6.1 Oil Pollution Prevention	19
6.2 Solid Waste Management	19
6.3 Wastewater Management	20
7 Documentation	20
8 Work Completion and Deliverables	20
9 List of Appendices	21
Appendix 1 - Submar Articulated Concrete Mattress Shop Drawings	22
Appendix 2 - Articulated Concrete Mattress Lifting Plan	26

Appendix 3 - Tomkins Cove Laydown Yard Site Plan	27
Appendix 4 - Wilcox Dock Laydown Yard Site Plan	28

Table of Figures

FIGURE 1 - PRE-LAY MATTRESSES ARRANGEMENT OVER EXISTING UTILITY	9
FIGURE 2. POST-LAY MATTRESSES ARRANGEMENT OVER EXISTING UTILITY	9
FIGURE 3. PICTORIAL DEPICTION OF REMEDIAL MATTRESSES	10
FIGURE 4 - CMI MARINE YARD, STATEN ISLAND, NY	11
FIGURE 5 - WILCOX DOCK, PLATTSBURGH, NY	12
FIGURE 6. ANCHOR PATTERN AT CROSSING LOCATION	15
FIGURE 7. MATTRESS INSTALLATION LIFTING FRAME	16
FIGURE 8. INDICATIVE AS-BUILT DRAWING	21

List of Definitions

Definition	Description
Employer	CHPE, LLC. (Champlain Hudson Power Express, LLC.)
Contractor	NKT (Nordiske Kabel Traadfabriker)
Sub-Contractor	CMI (Caldwell Marine International)

List of Terms and Abbreviations

Term	Definition
ADCI	Association of Diving Contractors International
CHPE	Champlain Hudson Power Express
CTV	Crew Transfer Vessel
LARS	Launch and Recovery System
LNМ	Local Notice to Mariners
MCB	Mattress Crane Barge
MFB	Mattress Feeder Barge
MOC	Management of Change
MP	Mile Post
MWS	Marine Warranty Surveyor
RPL	Route Position List
SLD	Sea Level Datum
TBT	Toolbox Talk

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 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 post-lay and remedial, articulated concrete mattresses within the Lake Champlain section of the project. It is the duty of the Managers, Officers, Crew of Caldwell Marine International (CMI) and our Subcontractors to familiarize themselves with, and to apply the methodologies outlined in this document.

This document is provided specifically as a means and methods statement for the diver assisted installation of post-lay and remedial, articulated concrete mattress cable protection in Lake water depth of <150ft.

1.3 Regulatory Compliance / Notifications / Liaison

- The project tasks within this scope will be performed in strict compliance to the Federal and Local Permits for the CHPE project.
- The crossing protection measures will be installed in accordance with the respective permits, site crossing agreements and the 'Engineer of Record' drawings. Notifications will be issued to asset owners / operators in accordance with defined requirements of each Site Crossing Agreement.
- Local Notice to Mariners (LNM) will be issued prior to the start of the marine field operations. Daily work location, minimum passing clearance request and all other relevant information will be broadcast via marine VHF radio.
- CMI vessels will be properly registered, operational personnel will be properly trained and certified to perform their required tasks.
- CMI equipment will be tested prior to usage to ensure fitness for purpose.
- All rigging shall be certified and will be inspected prior to each use. Items that are found to have defects will be removed from service.
- Dive equipment will be properly inspected prior to use. All required certifications will be in-date at the time of equipment use.
- Dive planning and operations will be performed in accordance with the current edition of 'CMI Dive Procedures & Safe Practices Manual', included in Appedix 5-A Attachement 7, as well as International Consensus Standards for Commercial Diving and Underwater Operations (A.D.C.I, 6.4 Edition).
- Copies of Project Permits will be available for reference aboard the MCB.
- Commercial passes will be procured for all CMI Tugs, Barges and chartered vessels that will transit through the Champlain Canal.

- Courtesy notifications will be provided to emergency services and law enforcement that are local to project operational sites.
- Daily Operational Reports (DORs) will be provided to update operational progress.

2 Scope of Work

2.1 Cable Protection Requirements – Lake Champlain Segment

Protection requirements for CHPE Lake Champlain cabling are governed by the following:

- CHPE Project permitting:
 - a. CHPE cables require protection in Lake water depth of 150ft **SEE NOTE* or less.
 - i. Where cable depth of lowering is utilized as protection, USACE permitting requires the following:

Burial Depth in feet	Inside Shipping Channels or Narrows		Outside Shipping Channels or Narrows	
	In rock	Elsewhere	In rock	Elsewhere
USACE Permit Requirement				
Lake Champlain (in less than 150 feet water depth)	6	8	-	4
 - ii. Where concrete mattresses are utilized as cable protection:
 - Installed mattresses shall have a minimum thickness of 12 inches.
 - CMI will optimize mattress installation such that mattresses are closely abutted against their neighbors.
 - In cases where the desired zero separation cannot be attained, CMI will employ a maximum separation distance criteria between adjacent concrete block components of 5".
 - b. In Lake water depths of greater than 150ft **SEE NOTE* cables may be surface laid without any additional protection.

***NOTE:** Water depth are referenced to Lower Lake Level (93.0ft NGVD29) as per NOAA charting for Lake Champlain waters.

- Signed Utility Crossing Agreements provide details of requirements that are specific to the subject site and underlying utility. Crossing agreement stipulations may include:
 - a. Anchor / plow exclusion zones
 - b. Crossing protection design & specifications / quality of materials used therein.
 - c. A requirement for physical separation between the CHPE cables and the subject underlying utility
 - d. Minimum crossing angle between CHPE cable route and path of underlying utility
 - e. Notification schedule with respect to CHPE operational activities in vicinity of subject utility
 - f. Attendance of utility operator representatives during CHPE construction period

2.2 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 Appendix 1.

2.3 Installation Windows & Work Hours

There are no Work in Water window restrictions for articulated concrete mattress installation activities in Lake Champlain. CMI intends to work extended hours shifts (12-hr typical), with optional 24-hour operations as necessary. The work is intended to be performed 7 days per week, including weekends, and state & federal holidays.

2.4 Installation Types

Along the course of Lake Champlain, articulated mattresses will be installed to provide different protective functions. Whilst the function is always to safeguard the integrity of installed assets (co-located infrastructure) 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 following subsections.

Planned Mattress Installation – Utility Crossings / Other Areas

Lake Champlain 'Route Planning' identifies (e.g., utility crossings, field splice deployment sites, final landing approaches etc.) where plow operations will not occur and installation of mattresses or other works shall be performed.

Signed crossing agreements and 'Engineer of Record' drawings provide clear indication regarding the geographical locations and physical extents where mattress installation shall be performed.

2.4.1 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 methodology was provided in Segment 18A for Pre-Lay Mattress Installation in Lake Champlain. Example is shown in below figure:

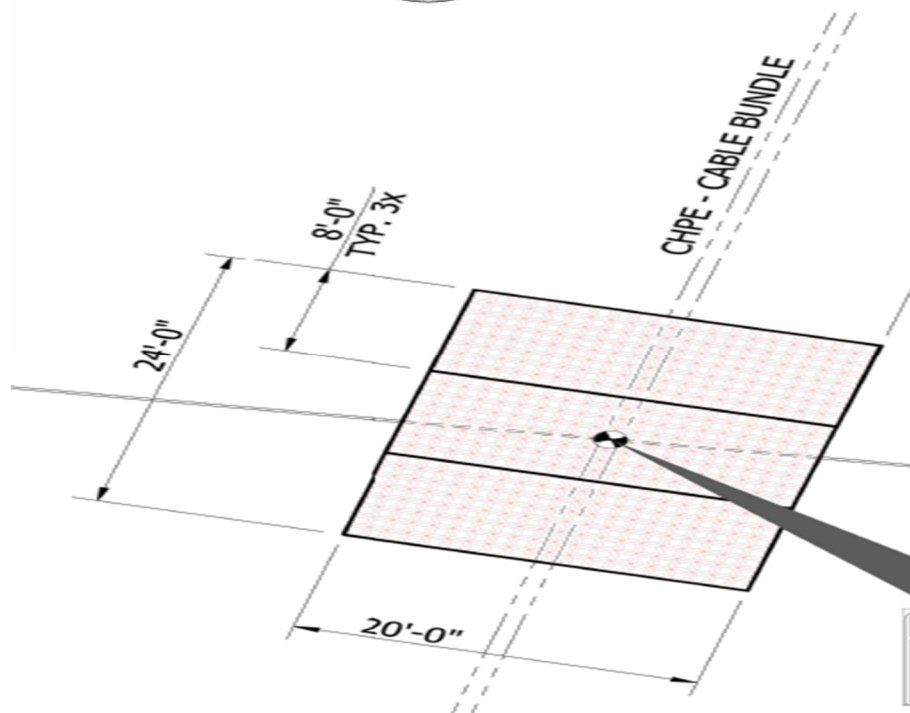


Figure 1 - Pre-lay mattresses arrangement over existing utility

2.4.2 Post-Lay Cable 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 lakebed. Example is shown in below figure:

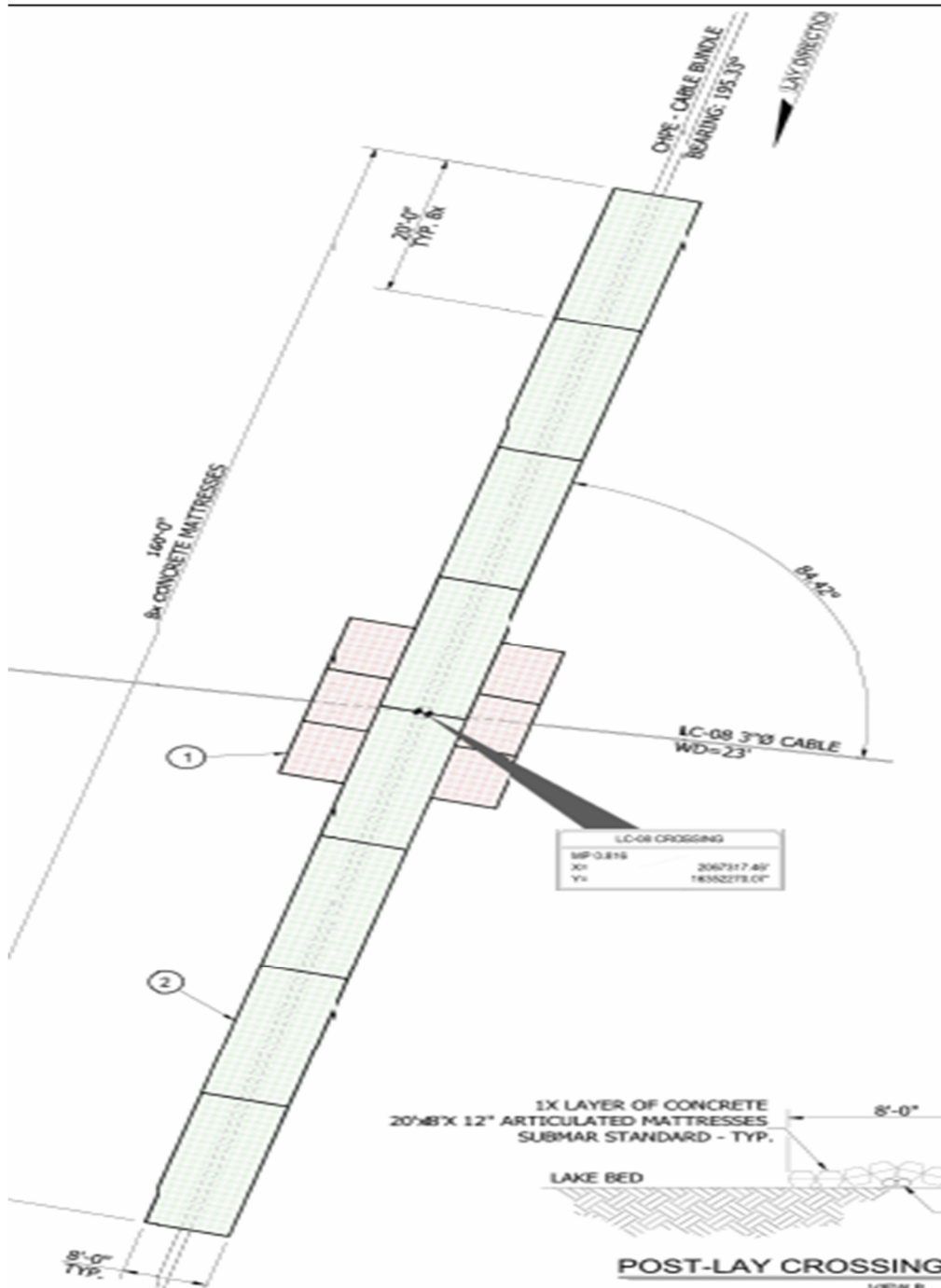


Figure 2. Post-lay mattresses arrangement over existing utility

2.4.3 Remedial Protection Mattresses

Remedial protection mattresses (remedial mattresses) are to be installed anywhere along the route where depth of lowering or remedial depth of lowering of the cables has not been able to reach the required 4' depth of lowering coverage in water depths of less than 150 ft. This is as shown in below figure:

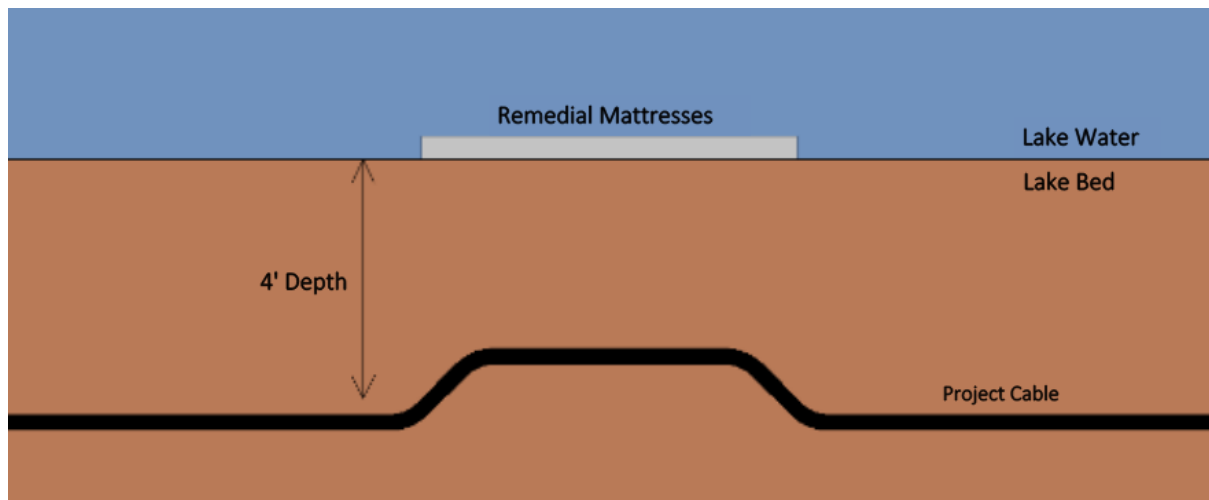


Figure 3. Pictorial depiction of remedial mattresses

Remedial mattresses shall be used once the cable depth of lowering becomes less than 4 feet. If the depth of lowering of 4 feet is regained, the remedial mattresses are no longer required.

2.5 Installation Locations

The quantity of crossing locations, the exact, detailed location for mattress installation and the number of mattresses to be used at each location (post-lay installation) are to be installed in accordance with the signed crossing agreements and 'Engineer of Record' drawings.

Post-lay/remedial mattress installation locations are to be anywhere that utility crossing protection is required and anywhere that the project cable is less than the required depth of lowering of 4 feet in less than 150-ft of water depth.

2.6 Installation Pattern

Pattern of protection measures for utility crossings are 'site-specific' and subject to:

- Compliance with Project permitting requirements.
- The approval of owners / operators of the underlying utility.
- Any further requirements of CHPE LLC., Project insurers, & NKT.

Fully defined crossings will be installed per signed crossing agreements and the 'Engineer of Record' drawings.

2.7 Installation Campaigns

2.7.1 Pre-Lay Mattress Installation Campaign

Pre-lay mattress method statement has been covered in Segment 18A EM&CP

2.7.2 Post-Lay and Remedial Mattress Installation Campaign

During this campaign, two mattresses types (post-lay and remedial) will be utilized.

- Post-lay mattresses are to be installed over the installed project cable in the Lake Champlain section of the route. These will correspond with the locations at which the pre-lay mattresses were performed under Segment 18A and in accordance with the signed crossing agreements and 'Engineer of Record' drawings.
- Remedial mattresses are to be performed in the Lake Champlain section of the route at locations at which depth of lowering to 4 feet cannot be achieved.

3 Project Mobilization

3.1 Staten Island Yard

CMI's waterfront yard at Staten Island, New York (See Figure 8) will serve as the primary location for mobilization of marine and support assets for Lake Champlain mattress installation tasks.

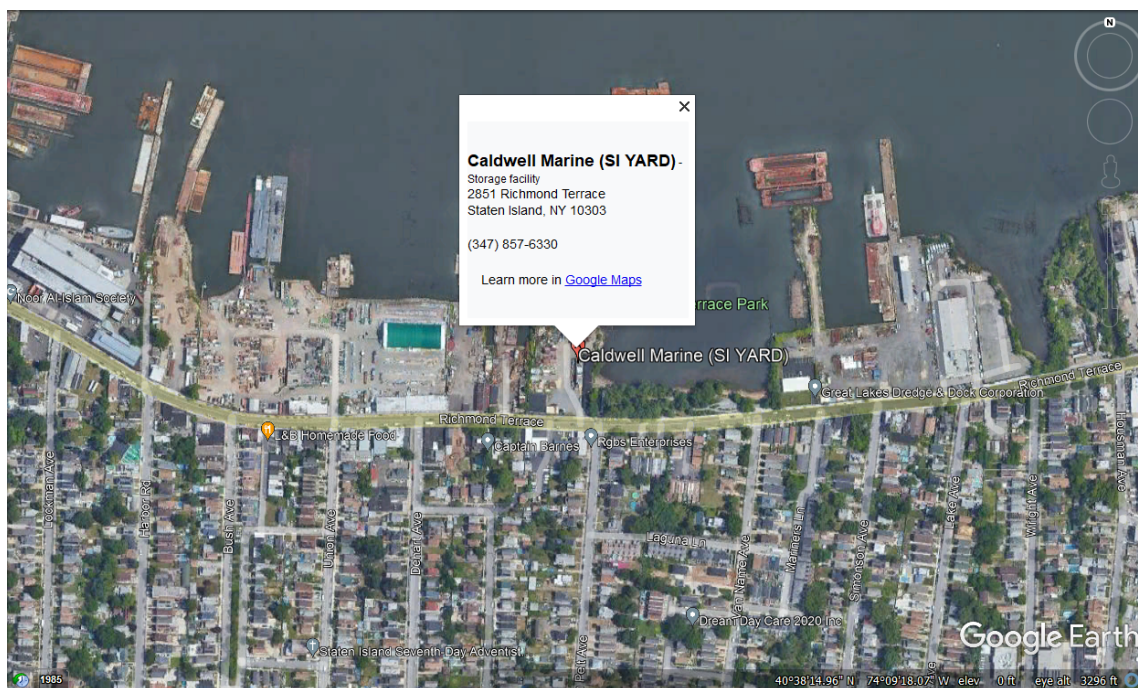


Figure 4 - CMI Marine Yard, Staten Island, NY

3.2 Wilcox Dock

CMI has selected Wilcox Dock, Plattsburgh, New York (Figure 9) as an operational base in Lake Champlain. This facility will be used as a centrally located marine yard in support of the CHPE project.

Equipment will be mobilized to Wilcox Dock in the early phases of the CHPE Project. This location will serve multiple support functions including, but not limited to:

- Mobilization of & support of operational vessels for Utility Crossing Protection
- Personnel transfer staging point (primary)

NOTE: Other locations will be used when transit distance to / from Wilcox Dock is deemed excessive

- Emergency personnel transfer point.

NOTE: The Project HASP will identify other locations for use when transit distance to Wilcox Dock is deemed excessive

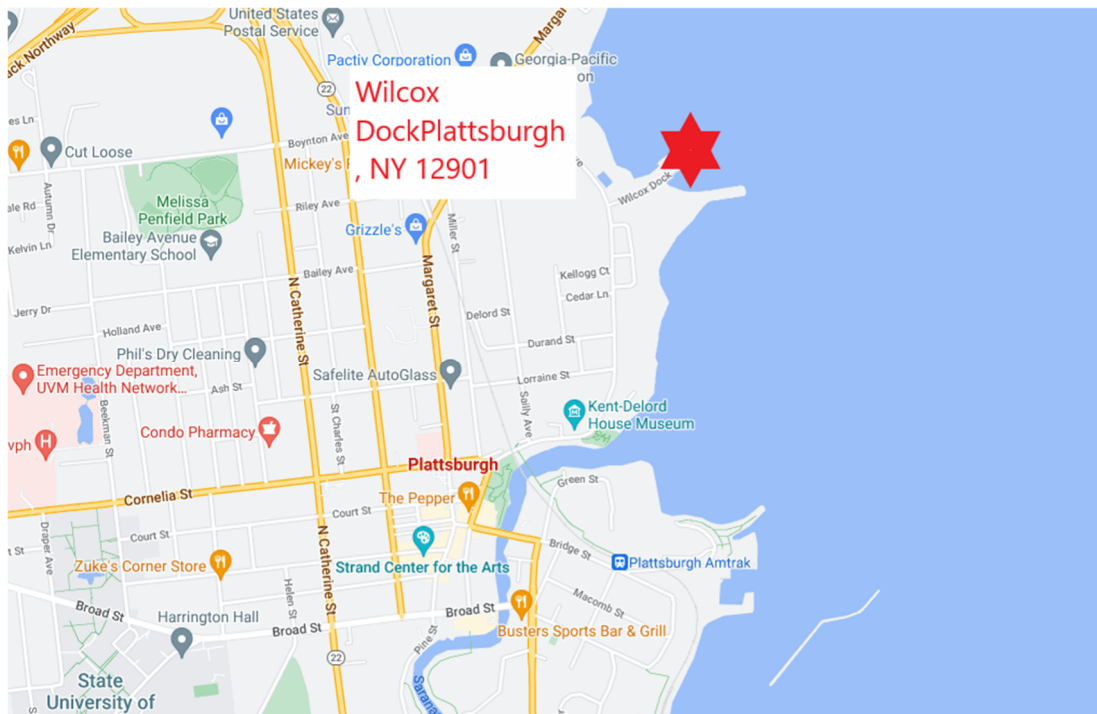


Figure 5 - Wilcox Dock, Plattsburgh, NY

3.3 Mattress Fabrication – Tomkins Cove, NY

Mattress have been fabricated in the project laydown in Tomkins Cove, NY.

3.4 Mattress Crane Barge

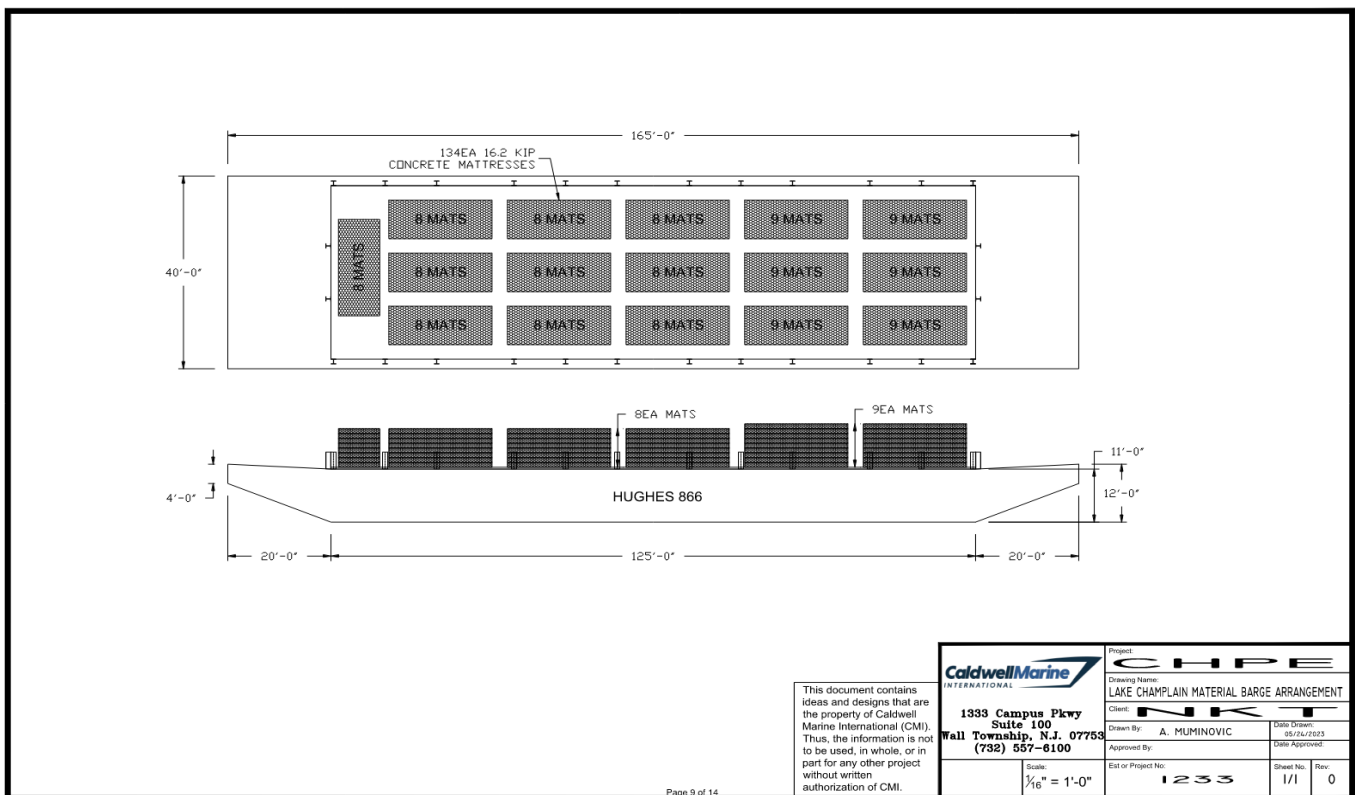
A Mattress Crane Barge (MCB) will be mobilized in support of mattress installation tasks in the waters of Lake Champlain. This vessel will be the primary operational platform for mattress installation. Provisional dimensions for this barge are 190ft (57.9m) in length x 60.0ft (18.3m) in Beam x 7ft (2.1m) in Depth. See Appendix 4 for further detail.

3.5 Mattress Feeder Barge (MFB)

The Mattress Feeder Barge (MFB) (Figure 12) will carry mattress stock to perform Lake Champlain post-lay and remedial mattress installations. The MFB will then be restocked from Tomkins Cove and/or Wilcox Dock as required to continue mattress installation. The MFB quantity of concrete mattresses will be regularly replenished. The feeder barge will be a deck barge with dimensions that are NY State Canal compliant. Provisional dimensions for this barge are 180ft (54.9m) in Length x 40ft (12.2m) in Beam x 12ft (3.7m) in depth. The MFB will be provisionally equipped with (See Appendix 4):

- Regulation lights and shapes
- Emergency tow line & rigging
- Deck pad-eyes & mattress lashings – in accordance with lashing plan
- Mooring lines & fendering

An independent marine surveyor will perform a 'Trip-in-Tow' inspection prior to the towed passage to the Lake Champlain cable grounds. Towed passage will be conducted in strict adherence to the terms and conditions indicated on the 'Trip-in-Tow' certificate and in coordination with the canal authority.



The MCB will require various support work boats, crew boats and support tugs. All vessels will be licensed, insured, and USCG inspected that are dedicated to the operational support of the MCB and MFB. Tugs will have an adequate bollard pull / horsepower rating to competently maneuver the MCB and MFB and the dimensions will be compliant with the limitations set forth for passage by the NY State Canal.

4 Installation Methodology

A diver assisted installation methodology will be implemented to perform the safe and effective installation of articulated concrete mattresses.

4.1 Diver Assisted Installation

4.1.1 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.

4.1.2 Diver Assisted Installation – Installation Platform (MCB & MFB)

Diver assisted installation will be planned with the provisional dimensions provided above to ensure that the necessary deck space is available for the dive spread, support equipment, dive ladder and launch location.

4.1.3 Anchoring Operations

Anchoring operations may be required where spuds are not suitable for purpose to provide stability and positioning for the barge. Anchors must be positioned at pre-designed locations at the crossings to be a safe distance from other installed utilities as well as the project cable once installed. Anchors will not be allowed to be carried over third party assets unless securely stowed.

Anchor plans will be developed 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.

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

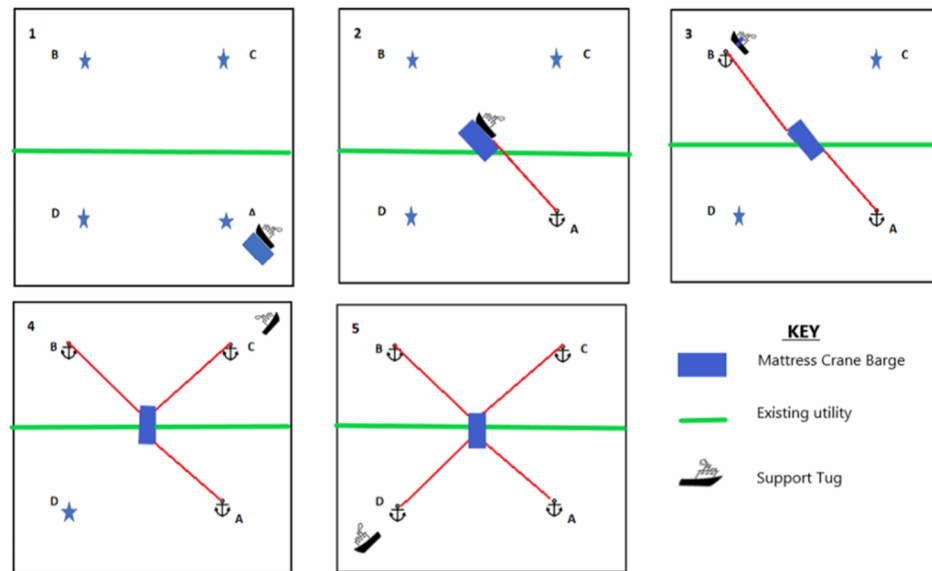


Figure 6. Anchor Pattern at Crossing Location

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 may 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. With all anchors connected, the installation barge can slowly take up tension on the lines, carefully monitoring to ensure none of the anchors are slipping. By adjusting on the anchor wire winches, the barge will maneuver 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. Anchor deployment and anchor recovery will be executed in accordance with an activity specific task plan.

Anchor deployment & recovery operations require good collaboration between the MCB survey team, support tugs, winch operators, and the MCB deck team.

The crew will verify the operational readiness of all essential equipment personnel and a Toolbox Talk will be conducted prior to commencement of anchoring and subsequent site operations. The topics covered during the Toolbox Talk will be adequate to ensure all parties are fully conversant with site conditions, procedural steps, operational risks, planned mitigations and their respective roles.

4.1.4 Diver Assisted Installation – Required Equipment

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

4.1.4.1 Mattress Handling Frame

To lift the mattresses overboard and to the lakebed, 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:

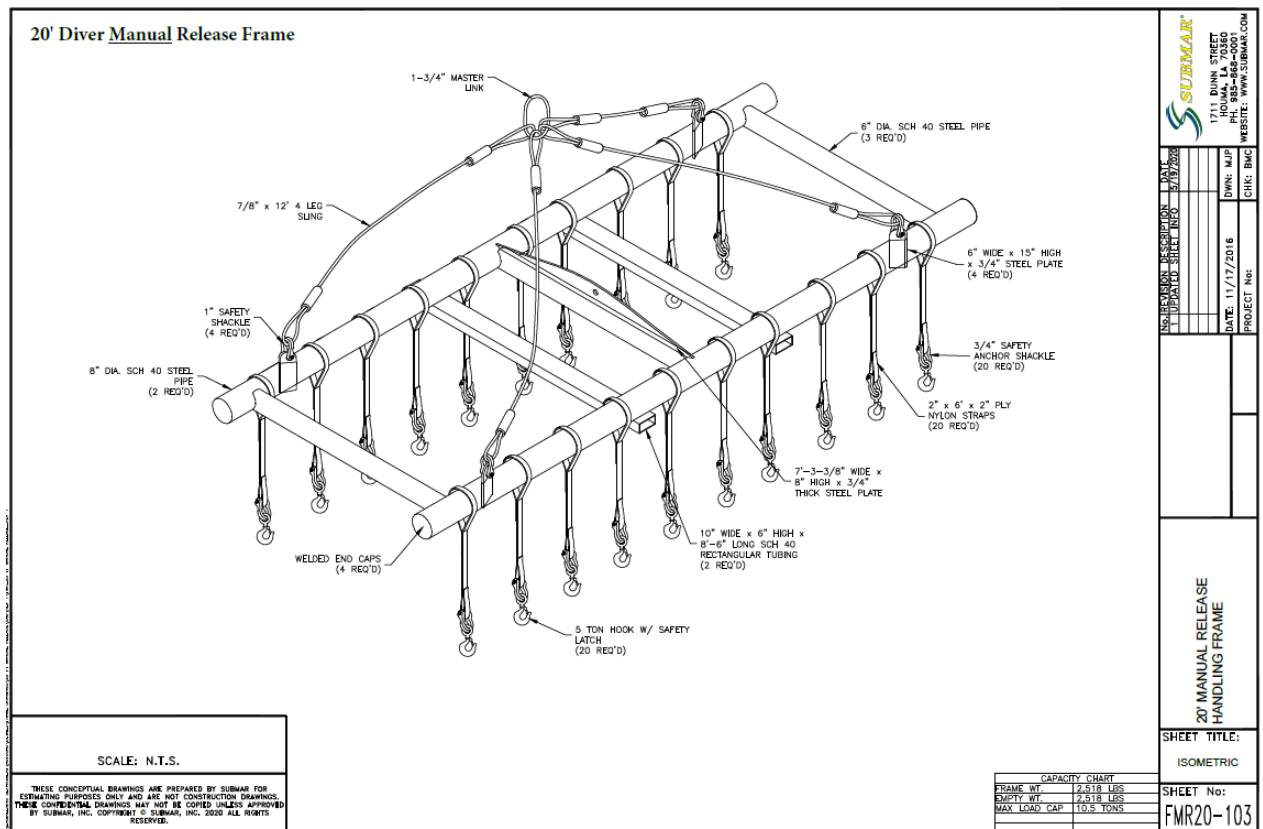


Figure 7. Mattress Installation Lifting Frame

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. The positioning of the mattress frame and the attached mattress, prior to lowering, will be executed using an integrated Ultra-Short Baseline (USBL) system. Procedures are further detailed in 4.1.5, below.

For safe release of the mattress on the lakebed, the diver will perform the following sequence for each lifting strap.

- Release the lifting frame buckled end of strap from the mattress side rope.
- Resecure the free strap end to the lifting frame.

- c. Verify that strap cannot snag on mattress during the subsequent frame recovery process.
- d. Observe all straps during frame recovery process and instruct surface personnel to 'ALL STOP' if any problem(s) is/are noted.

4.1.4.2 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 sea fastened to the deck of the installation spread.

The crane / frame set-up will be used during all operation cycles including mattress loading on barge, mattress deployment and placement on lakebed, and recovery of empty frame to barge for reloading. This crane shall have sufficient capacity to safely lift and deploy the frame and mattresses to the required outboard radius.

4.1.4.3 Diving Spread

The diving spread shall have all equipment required for the safe launch and recovery of divers into the water. This will, at a minimum, consist of:

- Diver control containers
- Surface supplied air-supply system
- Diver equipment storage container
- Dive ladders

4.1.5 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.

Vessels will be set up and holding stations at a location at which multiple mattress installation points can be reached by the deck crane, 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 work scope of each station and any health and safety points.

The Deck Team will prepare all the required rigging and mattress frame ready for use. 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 out boarded with special care being taken so as not to lift the frame and mattress over the top of the diver in the standby position.

With the Deck Superintendent 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 near the approximate installation location. This location will be communicated to the crane operator by the onboard survey crew and/or dive supervisor. The survey crew will be monitoring the position of the mattress frame using the USBL beacons affixed to adjacent corners of the mattress lifting frame.

When the crane has come to a controlled stop near the position of the intended placement of the post-lay mattress, the diver will move in from the stand-by location and contact the frame and mattress. The diver will communicate directly with the dive supervisor who will confirm the position information from the onboard survey crew. Minor positional adjustments can and will be made prior to final lowering and mattress frame release.

Once the mattress frame is lowered into position, the crane operator will maintain tension on the mattress frame. Onboard survey will record the position of the mattress frame and 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 lakebed until the rigging between the mattress and frame becomes slack. The diver 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 diver. Once the mattress frame is released, the diver will stand on each corner of the placed mattress so that the onboard survey crew can document the positions from the USBL beacon affixed to the diver. If necessary, CMI may elect to deploy ROV to assist in mattress placement verification. These positions will then inform where the mattress corners are and therefore where the mattress is. The mattress frame is then recovered to deck ready to load the next mattress.

5 Lake Weather Conditions / Operational Weather Limits

Lake Weather Conditions

The following meteorological factors apply to Lake Champlain waters:

Location:	Lake waters are categorized as ‘inland’. NOTE: The Lake does feature some comparatively large expanses of open water where wave heights may be elevated due to wind ‘fetch’
Tidal effect:	No observable tidal effect, however, Lake water levels are subject to seasonal variation.
Current strength / Direction:	Under normal conditions, Lake waters flow from south (Whitehall) to North (Richelieu River entrance). This ‘general direction of flow can be temporarily affected, or even reversed, by wind effect.
Ice:	Lake water is fresh not salt. Meteorological records indicate that Lake Champlain waters are subject to freezing during colder winters.

Monitoring of Site Weather Conditions & Forecasts

During the operational periods for the MCB, the MCB Barge Superintendent / appointed alternate will monitor the current and forecast weather conditions for operational work sites and vessel transit routes. The MCB Superintendent will notify the attending NKT Representative if a temporary suspension of project activities is required due to weather (actual or forecast).

The MCB Superintendent's primary weather forecast resource will be NOAA Marine Weather.com (Governmental). The MCB Superintendent will typically also review web-based, non-governmental resources which may include:

- <https://www.windy.com>
- <https://www.buoyweather.com/>
- <https://www.windalert.com>
- <https://climeradar.com>

Recording of Site Weather Conditions

Site weather conditions will be recorded in a dedicated section of the MCB Daily Report. Recorded values will either be derived from:

- a. Local observation, or
- b. Download from a local registered NOAA weather observation station (airport or similar)

Operational Weather Limits

Wind:	OSHA safety rules for crane operations dictate a max. wind strength of 25mph
Current Strength:	Maximum current strength 2 knots. As noted above, Lake waters are non-tidal, we do not anticipate current strengths to even approach this limit.
Sea / Swell Height:	ANCHOR SETTING: A maximum limit of 1m will apply. MATTRESS SETTING: Work may be deferred / suspended at the discretion of MCB Superintendent & Dive Supervisor, these parties will use a limit of 0.5m as a reference baseline. NOTE: The MCB crane is not heave-compensated; barge movement must be minimized to ensure that undersea movement of suspended mattress product does not exceed a safe working value.

6 Environmental Protection Measures

6.1 Oil Pollution Prevention

Please see dedicated SOPEP document in Appendix 4 of Lake Champlain Submarine Cable Installation Method Statement.

An Emergency Notification Flowchart on board mattress support vessels provide notification requirement and contact details in the event of emergency situations and incidents:

- The MCB will carry emergency 'spill kit(s)'
- MCB fuel stocks onboard will be kept to a practical minimum.
- MCB fuel storage vessels will feature double-wall construction.
- As an emergency contingency measure CMI has pre-arranged that US Ecology, a US based Oil Spill Removal Organization (OSRO) will be available on 'call-out' basis to provide professional clean-up support. For further details, please see: <https://www.usecology.com/>.

6.2 Solid Waste Management

Disposal of waste into Lake waters is strictly prohibited by local, State & Federal law.

- Crews and contractors will be notified accordingly at the Project 'Kick-Off Meeting' and daily shift change / TBT meetings.
- New crew members/ contractors will be notified during the project and vessel familiarization processes.

The MCB will be mobilized with waste containment bins, these bins will feature closeable lids and heavy grade, disposable plastic liners. Bin liners will be replaced regularly and filled bags will be transported to shore for proper disposal at an approved facility.

NOTE: For concrete mattress installation operations our planning measures do not anticipate any requirement to handle ‘contaminated’ waste. CMI will consult with US Ecology if this circumstance should unexpectedly arise.

6.3 Wastewater Management

- Disposal of untreated wastewater into Lake waters is strictly prohibited by local, State & Federal law.
- Crews and contractors will be notified accordingly at the Project ‘Kick-Off Meeting’.
- New crew members/ contractors will be notified during the project and vessel familiarization processes.

The MCB will be equipped with portable toilet units that will be sourced from a local provider.

- Soiled / clean portable toilet units will be transferred by means of crew transfer vessel / work vessels.
- Portable toilet change-out / clean-out service will be performed by the local service provider at the operational base located at Wilcox Dock, Plattsburgh, NY.

7 Documentation

Daily Report: The Project Manager will submit a signed daily field report to Client representative within 24 hours of completion of the work on the applicable day.

- Daily reports will be used to record all pertinent details of PLGR operation including:
 - Locations where debris recovered
 - Photos and description of debris recovered
 - Locations of clump weights on periphery of swath where ‘peel-back’ operations were conducted
 - Record and receipts indicating ‘proper disposal’ of debris
 - Tool Box Talks

Accident and Incident Reporting:

- Reporting to record the following:
 - There will be compliance with Federal, State & Local laws and Project Permit requirements with respect to notification of authorities.
 - Attending Client Representative(s) will be notified of an accident as soon as is practically feasible.
 - Incident investigation-data and witness statements to be gathered pertaining to the accident and a formal report will be generated.
 - Mitigation measures and recommendations resulting from the accident investigation will be implemented to prevent future occurrences.

8 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 to provide as-built documentation. 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. Additionally, the USBL system will provide real-time

confirmation of mattress placement. Screen captures will be utilized to document the as-built conditions of mattress installation with positional information from the USBL.

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

- As-built documentation for all mattress installations detailing location data and drawings.
- Raw and processed survey data
- Minutes from all operational meetings and toolbox talks
- Video footage recorded during the works.

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

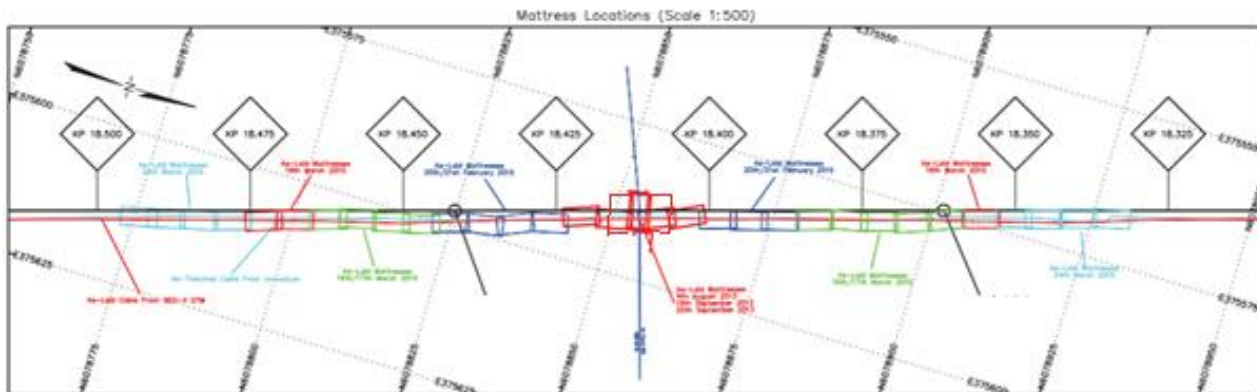


Figure 8. Indicative As-Built Drawing

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

9 List of Appendices

Appendix 1 – Submar Articulated Concrete Mattress Shop Drawings

Appendix 2 – Articulated Concrete Mattress Lifting Plan

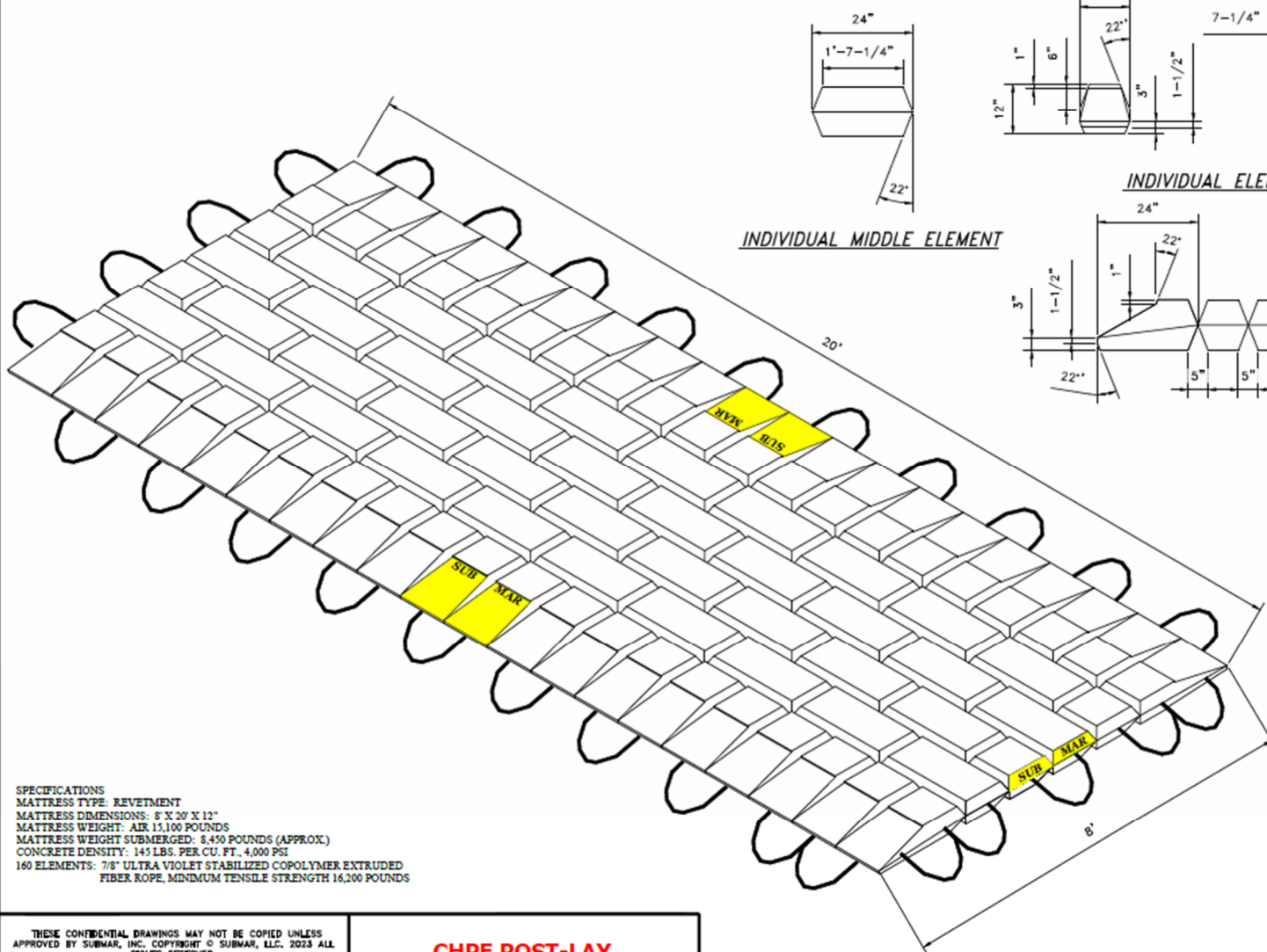
Appendix 3 – Tomkins Cove Laydown Yard Site Plan

Appendix 4 – Wilcox Dock Laydown Yard Site Plan

Appendix 1 - Submar Articulated Concrete Mattress Shop Drawings

DOC# SMD-120820-ST

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SPECIFICATIONS
MATTRESS TYPE: REVETMENT
MATTRESS DIMENSIONS: 8' X 20' X 12"
MATTRESS WEIGHT: AIR 15,100 POUNDS
MATTRESS WEIGHT SUBMERGED: 8,450 POUNDS (APPROX.)
CONCRETE DENSITY: 145 LBS. PER CU. FT., 4,000 PSI
160 ELEMENTS: 7/8\"

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CHPE POST-LAY
SCALE: N.T.S.

INDIVIDUAL ELEMENT

INDIVIDUAL MIDDLE ELEMENT



1711 DUNN STREET
HOUMA, LA 70360
PH. 883-868-0001
WEBSITE: WWW.SUBMAR.COM

NO.	REVISION DESCRIPTION	DATE
1	ISSUED DESIGN INFO	8/12/2022
2	REVISED WEIGHTS	1/17/2023
3	UPDATED SHEET INFO	2/16/2023

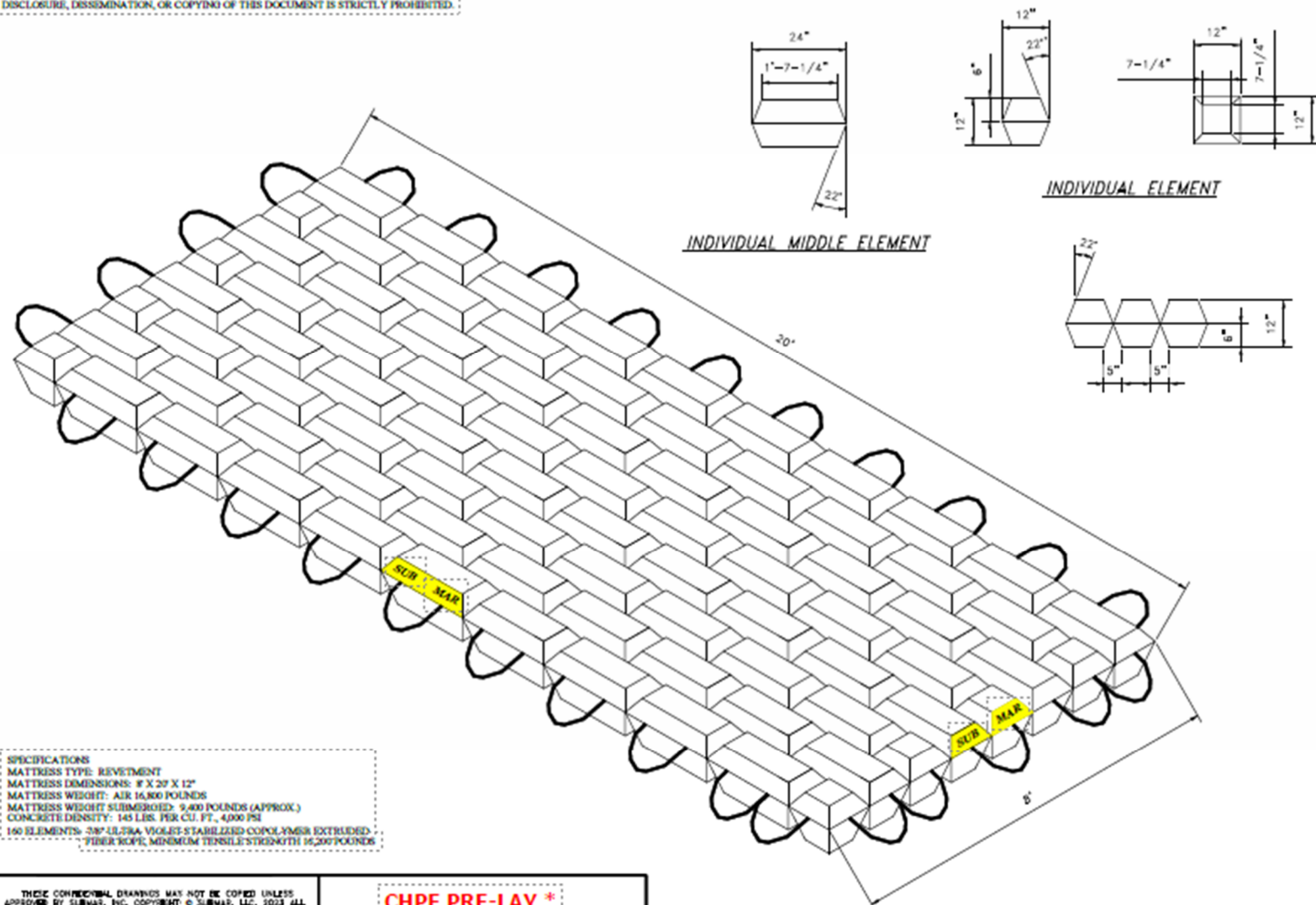
DATE: 5/9/2022	DWN: MJP	CHK: JNF
----------------	----------	----------

8' x 20' x 12"
CONCRETE MATTRESS
W/ TAPERED EDGES /
STAGGERED

SHEET TITLE:
12\"

SHEET No:
SM-12-TES

DOC# SMD-12012-S
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SPECIFICATIONS
MATTRESS TYPE: REVELMENT
MATTRESS DIMENSIONS: 8' X 20' X 12"
MATTRESS WEIGHT: AIR 16,000 POUNDS
MATTRESS WEIGHT SUBMERGED: 9,400 POUNDS (APPROX.)
CONCRETE DENSITY: 145 LBS. PER CU. FT., 4,000 PSI
160 ELEMENTS- 3/8" ULTRA VIOLET STABILIZED COPOLYMER EXTRUDED
FIBER ROPE, MINIMUM TENSILE STRENGTH 16,200 POUNDS

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CHPE PRE-LAY *

* MAY ALSO BE USED FOR REMEDIAL MATTRESSING



1711 DUNN STREET
HOUMA, LA 70360
PH: 985-866-0001
WEBSITE: WWW.SUBMAR.COM

NO. 12012-S
SUBMIT DESCRIPTION
SUBMIT DATE
SUBMIT TIME
SUBMIT SHEET INFO
DATE: 10/5/2022
DWG: MJF
CHK: JMF

8' X 20' X 12"
CONCRETE MATTRESS
STAGGERED

SHEET TITLE:
8x20x12" MAT -
STAGGERED

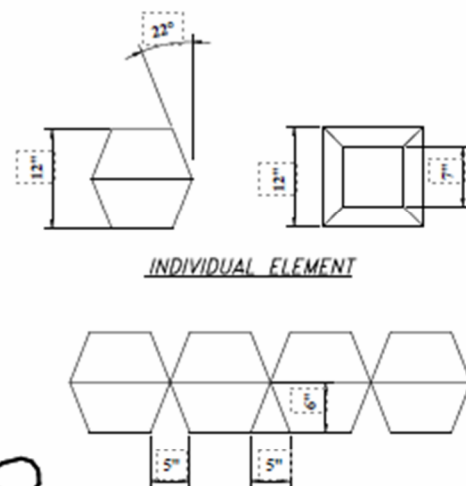
SHEET No:
SM-82012-S

SPECIFICATIONS
MATTRESS TYPE: REVETMENT
MATTRESS DIMENSIONS: 8' X 20' X 12"
MATTRESS WEIGHT: AIR 13,200 POUNDS
MATTRESS WEIGHT SUBMERGED: 7,519 POUNDS (APPROX.)
CONCRETE DENSITY: 145 LBS. PER CU. FT., 4,000 PSI
160 ELEMENTS, 50# ILLTRA VIOLET STABILIZED COPOLYMER EXTRUDED.
FIBER ROP, MINIMUM TENSILE STRENGTH 9,500 POUNDS

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SCALE: N.T.S.

* MAY ALSO BE USED FOR REMEDIAL MATTRESSING



1711 DUNN STREET
HOUMA, LA 70360
PH. 985-669-0001
#2B5112: WWW.SUBMAR.COM

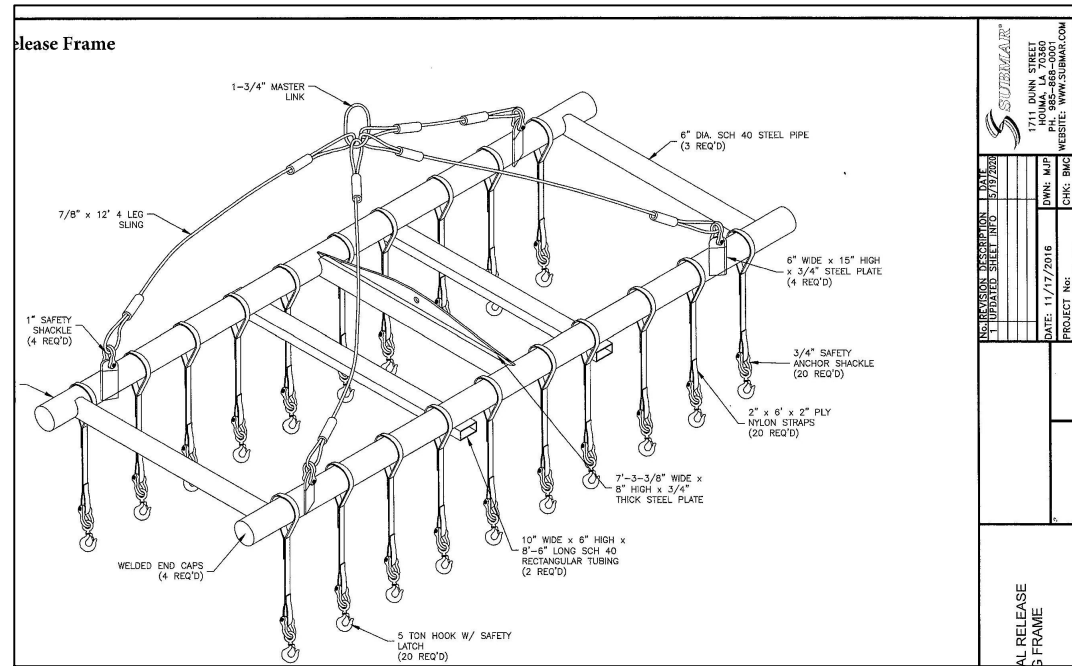
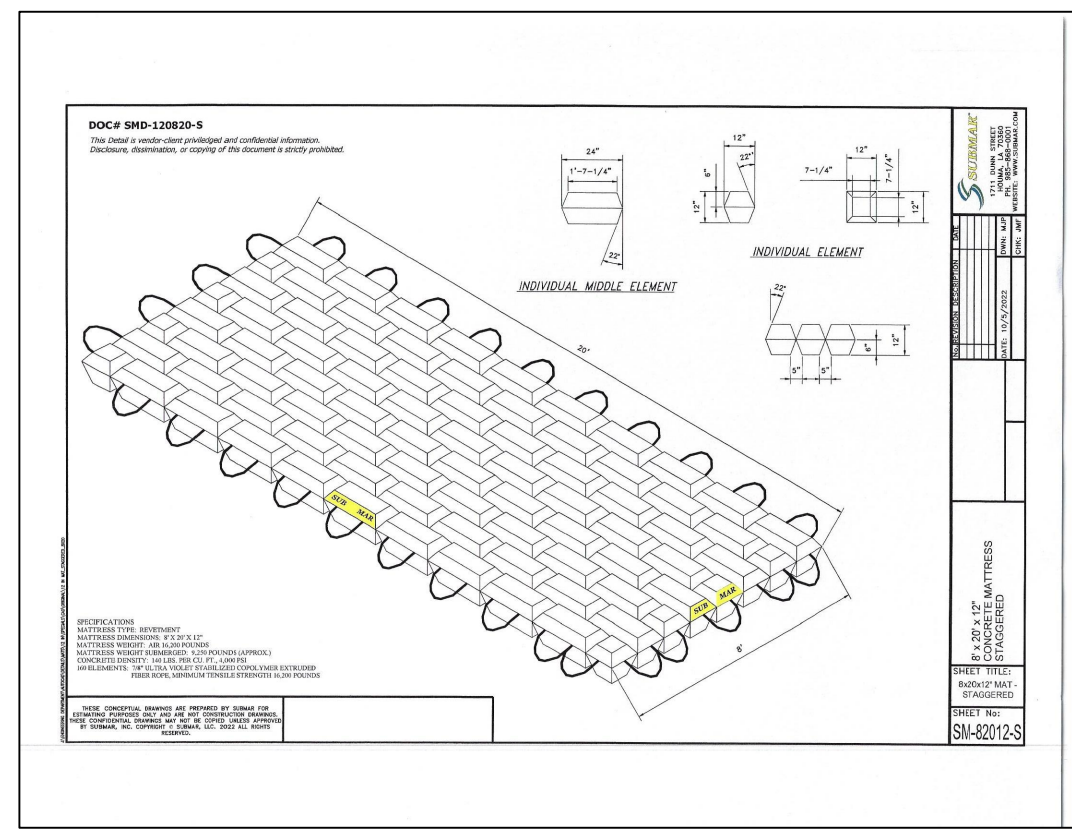
NO.	REVISION DESCRIPTION	DATE	DWNG: MJP
1	UPDATED SHEET INFO	7/8/2025	CMK: JMF
2	UPDATED SHEET INFO	7/8/2025	

SUBMAR STANDARD MAT
DETAIL - 8'X20'

SHEET TITLE:
12" CONCRETE
MATTRESS

SHEET No:
SMD-120820

Appendix 2 - Articulated Concrete Mattress Lifting Plan



Region: Lake Champlain and Hudson River
Job: CHPE ACM Placement

CRANE LIFT CALCULATION SHEET

Date: 7/7/2023

Type of Crane: Manitowoc 888 Series 2 with 179,100 lb Counterweight

Radius	62	FT	(Maximum)
Boom Length	120	FT	
Outrigger Configuration	Extended Tracks	FT	
Barge List	5°	Degrees	
Capacity @ Radius & List:	68,000	Lbs	

Line Pull: Single Part Line Pull 29,500 X 3 Line Parts = Line Pull 88,500 (lbs)

(Note: actual horseblock may have greater number of line parts, thus increasing LINE PULL.)
(Note: The line pull is not the crane capacity)

Load:

Cable type/dia:	1.0	Boom Tip	500	Lbs
Length (ft):	70	Hookblock:	4,000	Lbs (Max.)
Pounds/ft:	2.13	Cable below boom tip:	447	Lbs
No. of Wire Falls:	3			
		Subtotal:	5,023	Lbs

Add for rigging below boom tip:

Misc. Rigging		Two ways:	0.00	Lbs
Elliptical Hook	20.00	Four ways:	200.00	Lbs
Shackles	30.00	Picking beam:	4,000.00	Lbs
Misc. Connections	200.00	Misc. (just to the left):	0.00	Lbs
ACM Frame	1,200.00			
	0.00	Subtotal:	5,630.00	Lbs
	0.00	Weight of Load:	16,500	Lbs

Total weight from above = 27,153 Lbs

Crane Capacity (from above) = 68,000 Lbs

% of Max. Capacity = 39.93%

*Total weight of the pick must be less than the crane's capacity at the picking radius.

Manitowoc Cranes, Inc.

Manitowoc, Wisconsin 53401, U.S.A.

Liftcrane Boom Capacities

888 SERIES 2

Boom No. 225 With Open Throat Top

179,100 Lb. Crane Counterweight

44,000 Lb. Carbody Counterweight

28 Ft. 2 in. Crawlers Extended

Crawler Machine On A Barge

0 Degree Thr 3 Degree Machine List

No Travel - 360 Degree Rating

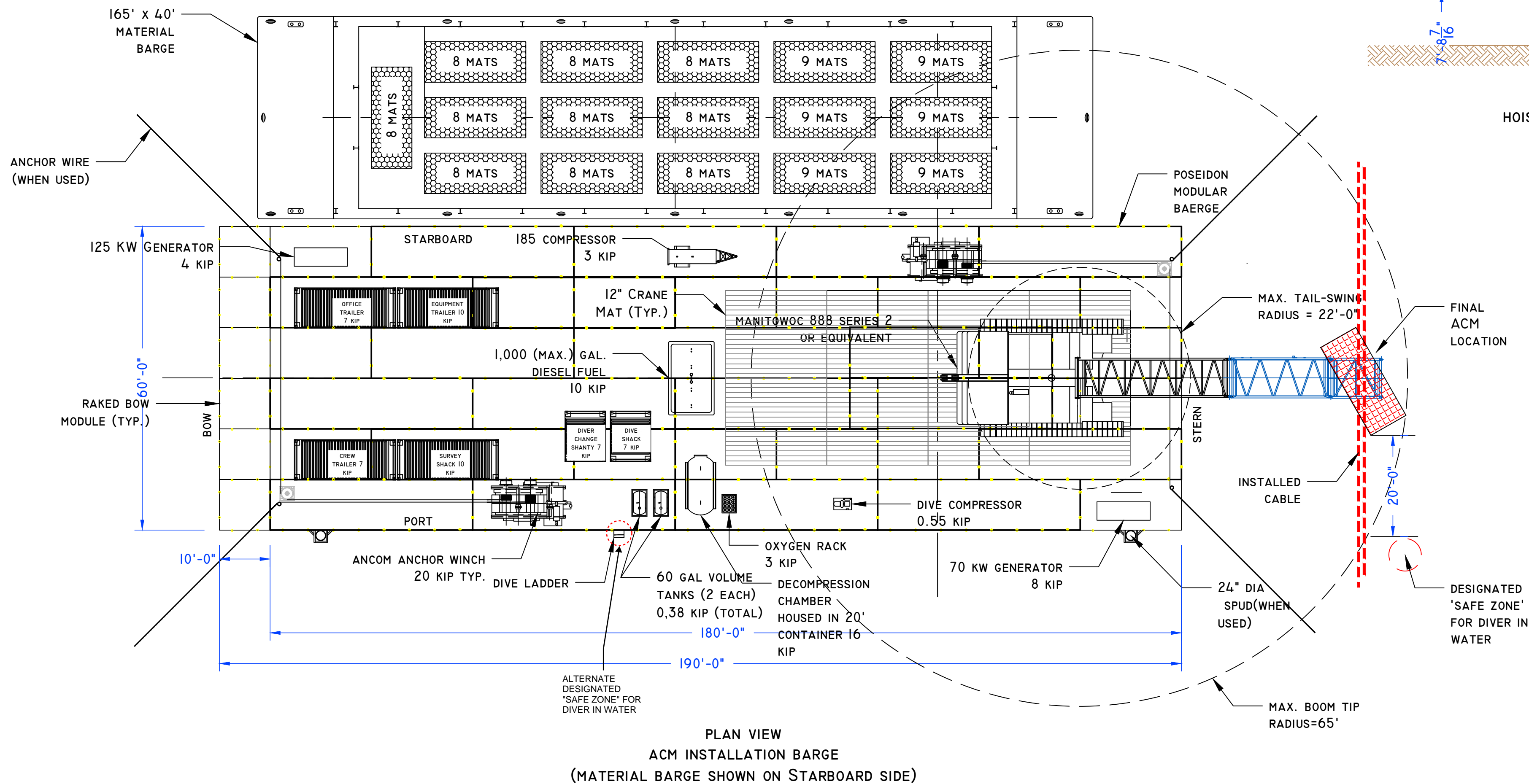
Oper. Radius Feet	Boom Angle Deg.	Boom Pitch Deg.	0 Degree List Booms Capacity Pounds	1 Degree List Booms Capacity Pounds	2 Degree List Booms Capacity Pounds	3 Degree List Booms Capacity Pounds	Open Radius Feet
25	82.5	126.0	242,000 *	217,000 *	192,000 *	167,000 *	25
30	81.5	126.0	242,000 *	217,000 *	192,000 *	167,000 *	30
35	80.5	126.0	242,000 *	217,000 *	192,000 *	167,000 *	35
40	79.6	125.2	238,000 *	213,000 *	188,000 *	163,000 *	40
45	78.6	124.3	234,000 *	209,000 *	184,000 *	159,000 *	45
50	77.6	123.5	230,000 *	205,000 *	180,000 *	155,000 *	50
55	76.6	122.6	226,000 *	201,000 *	176,000 *	151,000 *	55
60	75.6	121.7	222,000 *	197,000 *	172,000 *	147,000 *	60
65	74.6	120.8	218,000 *	193,000 *	168,000 *	143,000 *	65
70	73.6	119.9	214,000 *	189,000 *	164,000 *	139,000 *	70
75	72.6	119.0	210,000 *	185,000 *	160,000 *	135,000 *	75
80	71.6	118.1	206,000 *	181,000 *	156,000 *	131,000 *	80
85	70.6	117.2	202,000 *	177,000 *	152,000 *	127,000 *	85
90	69.6	116.3	198,000 *	173,000 *	148,000 *	123,000 *	90
95	68.6	115.4	194,000 *	169,000 *	144,000 *	119,000 *	95
100	67.6	114.5	190,000 *	165,000 *	140,000 *	115,000 *	100
105	66.6	113.6	186,000 *	161,000 *	136,000 *	111,000 *	105
110	65.6	112.7	182,000 *	157,000 *	132,000 *	107,000 *	110
115	64.6	111.8	178,000 *	153,000 *	128,000 *	103,000 *	115
120	63.6	110.9	174,000 *	149,000 *	124,000 *	99,000 *	120

R180-A, 1-24-001.

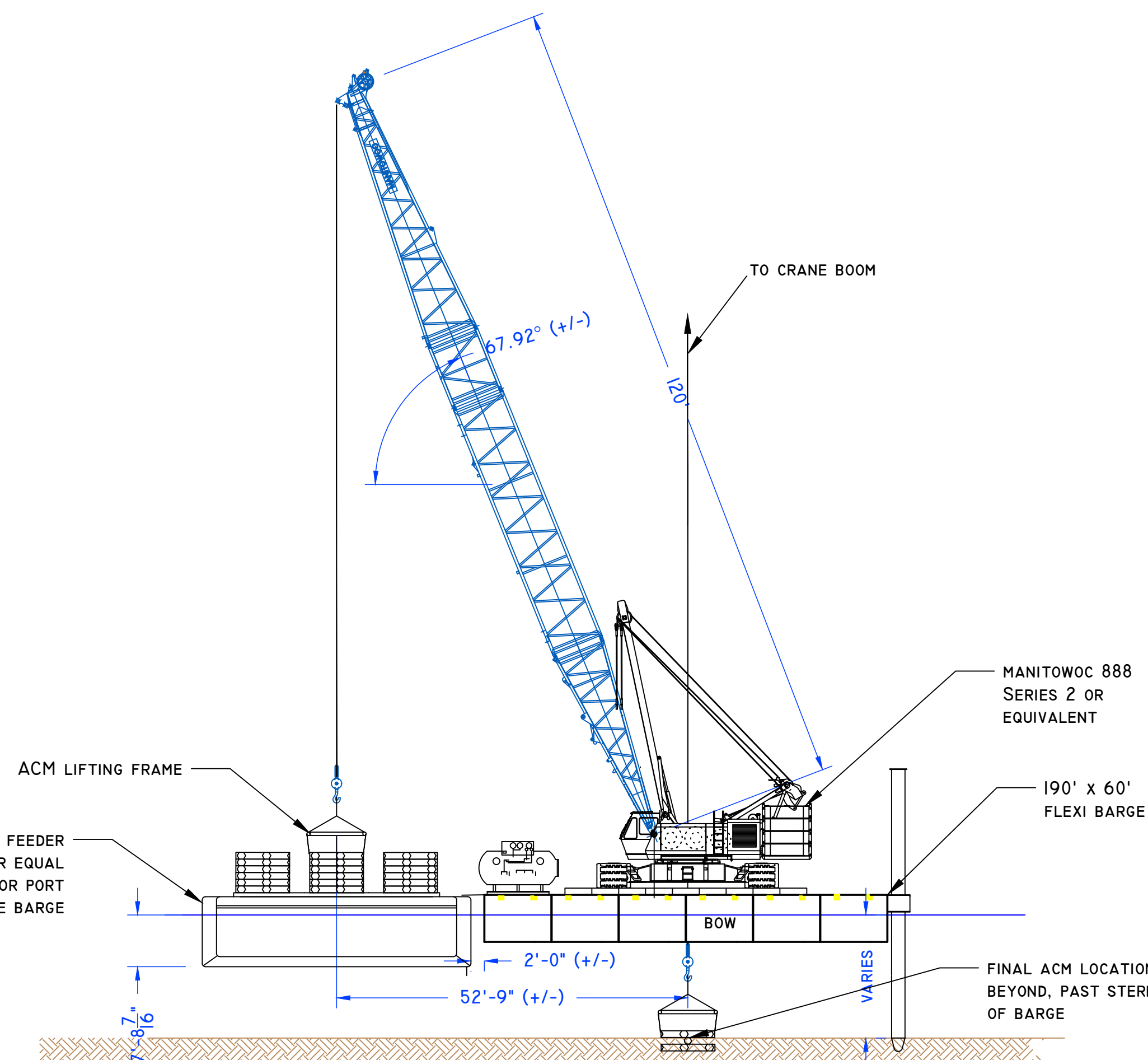
Page 6 of 20

- DECK LOADS**
1. DECOMPRESSION CHAMBER CONTAINER - 15 KIP
 2. DIVER'S CHANGEW SHANTY - 7 KIP
 3. DIVE SHACK - 10 KIP
 4. DIVER'S OXYGEN AND SGTANDBY AIR - 3 KIP
 5. DECOMPRESSION CHAMBER - 16 KIP
 6. SURVEY SHACK - 10 KIP
 7. CREW TRAILER - 7 KIP
 8. OFFICE CONTAINER - 7 KIP
 9. EQUIPMENT/TOOL TRAILER - 10 KIP
 10. ANCOM ANXCHOR WINCHS - 20 KIP EACH
 11. 185 COMPRESSOR - 3 KIP
 12. 125 KW GENERATOR - 4 KIP
 13. 70 KW GHENERATOR - 8 KIP
 14. DIESEL FULE TANK - 10 KIP
 15. CRANE - 420 KIP
 16. CRANE MATS - 168 KIP

- DIVE EQUIPMENT**
LISTED BELOW FOR DECOMPRESSION DIVES
SHALLOW WATER DIVES WILL NOT REQUIRE ALL
EQUIPMENT LISTED OR SHOWN
1. AIR COMPRESSORS - PRIMARY AIR (2)
 2. EMERGENCY AIR BOTTLES
 3. OXYGEN BOTTLES
 4. DIVE MANIFOLD
 5. PNEUMFATHOMETER
 6. VOLUME TANK - SURFACE DIVERS
 7. VOLUME TANK - DECOMPRESSION CHAMBER
 8. FULL SET OF DECK WHIPS
 9. DIVE RADIOS (3 MIN)
 10. DIVE UMBILICALS (2 MIN)
 11. HELMETS AND DRESS
 12. KNIVES AND DIVE HARNESSSES
 13. DIVER'S CHANGE SHANTY
 14. DIVE CONTROL SHACK
 15. DIVE SUIT HOT WATER HEATERS
 16. DIVE LADDER



PLAN VIEW
ACM INSTALLATION BARGE
(MATERIAL BARGE SHOWN ON STARBOARD SIDE)



PROFILE VIEW FROM STERN OF BARGE
HOISTING OF ACM FROM MATERIAL BARGE DECK TO CABLE LOCATION
(MATERIAL BARGE SHOWN ON STARBOARD SIDE)

ACM Lifting Procedure

1. The crane barge is positioned and secured in place by spuds and/or anchors.
2. Material barge is towed in and placed alongside crane barge.
 - a. Anchor wires that might interfere with barge placement are lowered.
 - b. Material barge is tied alongside the cane barge.
 - c. Anchor wires are pulled tight.
3. The ACM lifting frame is rigged to the crane hook and hoisted from the deck.
4. Crane is rotated transverse to barges and positioned over the selected ACM.
5. Deck crew attaches all frame lifting straps to the ACM by use of shackles.
6. ACM is hoisted until clear of its stack and load is rotated across the barge deck.
7. The load is lowered into water near its final location on the bottom.
8. Divers and/or ROV assist in guidance of ACM to its correct location as its lowered to the bottom.
9. Divers and/or ROV assist in any necessary adjustment of the ACM's final location.
10. Divers remove the lifting straps from the ACM and the frame is hoisted to the surface.
11. Crane swings the lifting frame across the barge deck to a location above the next ACM to be hoisted.

No.	REVISION.	DATE	BY
1	CRANE TRACK ORIENTATION & LOAD POSITION	9/13/23	WMP

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Caldwell Marine International 1333 Campus Parkway Wall Township, N.J. 07753 (732) 557-6100	Project: CHAMPLAIN-HUDSON POWER EXPRESS Drawing Name: ACM INSTALLATION BARGE AND LIFTING PLAN Client: NKT/DTI Drawn By: WMP Approved By: WMP Project No.: PROJ NO. Date Drawn: 07/07/23 Date Approved: Sheet No.: 1 Rev: 1
--	---

Appendix 3 - Tomkins Cove Laydown Yard Site Plan



REFERENCE NOTES:

1. FIRE EXTINGUISHERS (F) ARE LOCATED NEAR FUEL STORAGE AREAS AND WITHIN THE JOB TRAILER.
2. FIRST AID KIT (FA), SPILL KIT (SK) AND AUTOMATED EXTERNAL DEFIBRILLATOR (AED) ARE LOCATED WITHIN THE JOB TRAILER.

 1333 Campus Pkwy Suite 100 Wall Township, N.J. 07753 (732) 657-6100		Project: CHPE Drawing Name: TOMPKINS COVE LAYDOWN YARD SITE PLAN	
		Client: D. PALERMO	Date Drawn: 5/10/2023
Scale: 1" = 80'		Est or Project No: 1229	Date Approved:
		Sheet No: 1/1	Rev: 0

Appendix 4 - Wilcox Dock Laydown Yard Site Plan

SITE EQUIPMENT		
EQUIPMENT	QTY	DESCRIPTION
OFFICE TRAILER	1	10X40
OFFICE TRAILER	2	8X20
TOOL CONTAINERS	2	GENERAL TOOLS
PORTABLE TOILETS	2	PERSONNEL FACILITIES
SPILL KITS	2	
FIRST AID KITS	3	BASIC SUPPLY
O2 & ACETYLENE CAGE	1	TANK STORAGE

CHAIN LINK CONTSTRUCTION FENCE AS REQ'D, LOCATION TBD

SWING (DOUBLE) GATE AS REQ'D LOCATION TBD

316.00

PARKING AREA

FIELD OFFICES
(2) 8'x20'
(1) 12'x40'

200.00

Electric hookup w/ Meter

Power run along offices/ trailers

BATHROOMS

STORAGE CONTAINERS

WILCOX DOCK LAYDOWN AREA
60,000 SF (APPROX.)

20.00

MANITOWAC CRANE 888 (230t) OR SIMILAR

CAT 938 LOADER OR SIMILAR

LOADING/ UNLOADING ZONE

Vehicle access routes

MATRESS FEEDER BARGE
40X180

180.00

40.00

GENERAL NOTES

1. SITE PLAN IS FOR GENERAL PURPOSES ONLY.
THE CONTRACTOR MAY RELOCATE CRANES, EQUIPMENT, MATERIALS AS REQUIRED.

2. THE CONTRACTOR IS REQUIRED TO COMPLY WITH ALL INDUSTRY STANDARD SAFETY PROCEDURES, OSHA PROVISIONS AND OTHER APPLICABLE SAFETY REQUIREMENTS.

REVISIONS	BY	CHKD	DATE
ADDITIONAL INFO	OP	DE	5/9/23

Caldwell
Marine International, LLC

LAY DOWN YARD WILCOX DOCK			
CONTRACT ID: LAKE CHAMPLAIN POWER EXPRESS		PROPERTY OWNER: NEW YORK STATE CANAL CORPORATION	
PRIME CONTRACTOR: CALDWELL MARINE INTERNATIONAL, LLC		DATE: 01/09/23	
1323 CAMPUS PARKWAY (P) 732.557.6100		DRAWN BY: DM	
WALL TOWNSHIP, NJ 07753 (F) 732.736.8924		CHECKED BY: GNG	
SCALE: NTS		DRAWING NO: YARD-1	