# Base Load Power Hub (BLPH)

## CONSTRUCTION METHOD

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# Table of contents


1 INTRODUCTION ..... 6

1.1 PROJECT OVERVIEW ..... 6

1.1.1 Project Location ..... 6

1.1.2 Project Concept ..... 7

2 DOCUMENT SCOPE ..... 9

2.1 REFERENCES ..... 9

2.2 DEFINITIONS AND ABBREVIATIONS ..... 9

3 ROLES AND RESPONSIBILITIES ..... 10

3.1 Project Manager ..... 10

3.2 Project Control Manager ..... 10

3.3 Project Quality Manager ..... 11

3.4 Project HSE Manager ..... 12

3.5 Project Engineering Manager ..... 12

3.6 Project Procurement Manager ..... 14

3.7 Construction Manager ..... 15

3.8 Project Commissioning Manager ..... 16

3.9 Project Interface Manager ..... 17

3.10 Onboarding new project team members ..... 17

4 Fabrication Philosophy ..... 18

5 Yard preparation ..... 20

5.1 Assembly indoor area ..... 20

5.2 Assembly outdoor area ..... 21

6 Erection area ..... 22

7 Assembly of steel ..... 24

7.1 Primary, secondary and nodes ..... 24

7.2 Secondary ..... 25

7.3 Floor positioning: ..... 27
7.4 painting ..... 29
8 Erection of blocks ..... 30
8.1 Lower deck ..... 30
8.2 Upper deck ..... 32
8.3 Transition Piece ..... 33
8.4 Pau structure ..... 33
8.5 Piping ..... 33
8.6 PackageS ..... 33
8.7 Caisson ..... 33

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# List of Figures

Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map ..... 6
Figure 2 - Wind Park Details ..... 7
Figure 3 – BLPH Concept ..... 7

# List of tables

Table 1 - Reference Documents..... Errore. Il segnalibro non è definito.
Table 2 - Definitions and Abbreviations ..... Errore. Il segnalibro non è definito.

# List of Attachments

Attachment 1

# 1 INTRODUCTION

## 1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

### 1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

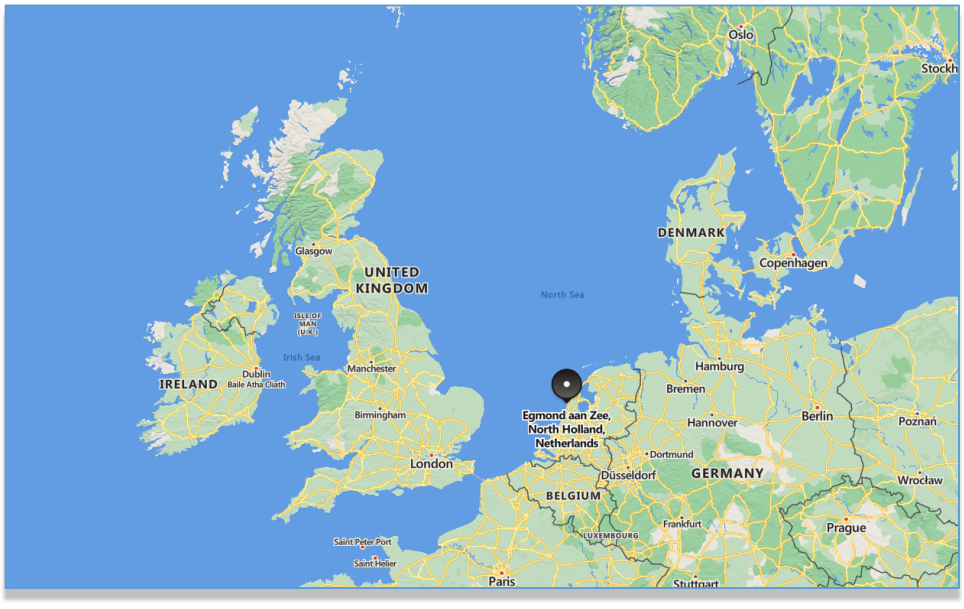



*Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map*

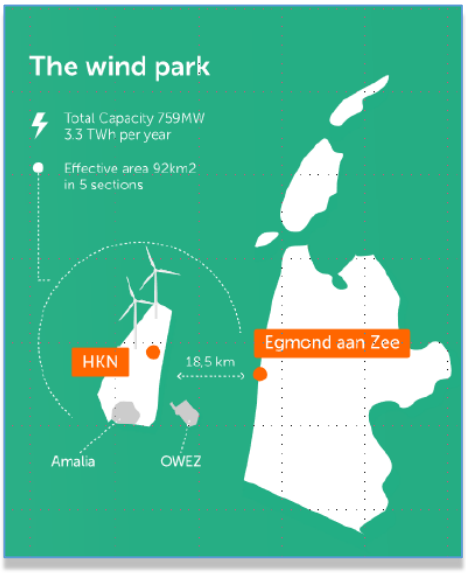



*Figure 2 - Wind Park Details*

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

### 1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

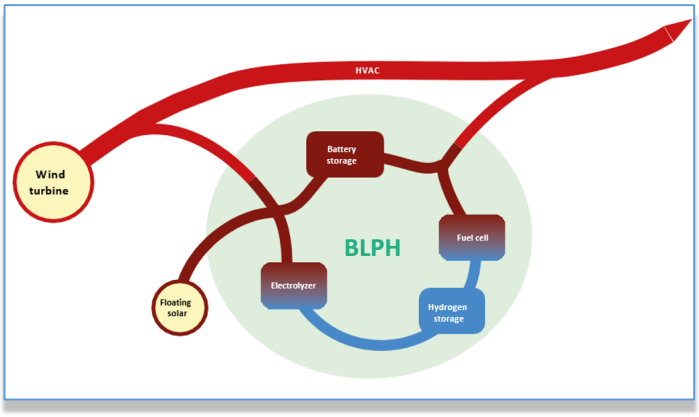



*Figure 3 – BLPH Concept*

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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# 2 DOCUMENT SCOPE

Scope of the Construction Method is to identify and define the sequence to how the CONTRACTOR intends to construct every major component or module shall be provided. This will include a description of the construction activities and supporting sketches and drawings.

Method statements, as described above, shall also be provided for the offshore hook up and offshore construction work.

The document will use also as guideline along the project for all parties involves.

In the following sections will describe the following arguments part of the construction execution during the assembly, erection of the BLPH module.

## 2.1 REFERENCES

| Doc. No. | Description |
|---|---|
| 123A90-PML-CON-PL-04000 | CONSTRUCTION EXECUTION PLAN |
| 123A90-PML-CON-PL-04000 | ALL ATTACHEMENT OF THE CONSTRUCTION EXECUTION PLAN |
| | |

*Table 1 - Reference Documents*

## 2.2 DEFINITIONS AND ABBREVIATIONS

| | |
|---|---|
| COMPANY or Client (CPY): | Crosswind |
| CONTRACTOR (CTR): | ROSETTI MARINO S.p.A. |
| PROJECT: | HOLLANDSE KUST NOORD WIND PARK Project |

*Table 2 - Definitions and Abbreviations*

# 3 ROLES AND RESPONSIBILITIES

The CONTRACTOR herein identifies the Project's key persons that will be part of the Project Management Team (hereinafter PMT)and that will be the principal responsible for the success of the Project.

## 3.1 PROJECT MANAGER

The CONTRACTOR's Project Manager has direct line responsibility for the safe and timely performance of all WORKS under the Contract in accordance with the applicable specifications.

The Project Manager responsibilities include but are not limited to:

Continuous management, reporting and control of the Works in accordance with the

Project Execution Plan and all other requirements of the Contract.

Interface with the other Company's contractors involved in the Project.

Contractor internal coordination between Contractor departments involved in the Project execution.

Contractor management and coordination of all its subcontractors and vendors providing services and/or materials for the Project.

Implementation of an effective Quality Management System in accordance with the requirements of the Contract.

Implementation of an effective Health, Safety & Environmental Management System in accordance with the requirements of the Contract.

Encourages co-operation organization within his organisation and towards the other functions and Group Companies.

## 3.2 PROJECT CONTROL MANAGER

The CONTRACTOR's Project Control Manager is responsible to guarantee a high level of Project Control by way of effective planning using various established techniques, proper monitoring of the various activities through controlled feedback and predefined communication procedures, with the purpose of improving the latest development techniques.

The aim of the Project Control function is to monitor all identified Project targets within pre-defined limits of the schedule, budget costs and quality and inform the management about its current status and expected development.

The mission and responsibilities of the Project Control Manager are, but not limited to:

Draw Project weekly and monthly reports

Collect progress documents related subcontracting activities

Control work progress status reports

Take part and co-operate with the Project Manager in the arrangement of the Kick-off meeting

Co-operate with the Project Manager as to the preparation of Project initial plans, as far as the following is concerned:

Initial planning;

Procurement Plan;

Take part in the most significant project meetings

Propose and arrange possible re-scheduling upon instruction of the Project Manager

Co-operate with the Project Manager in preparing the Close-Out Report

Prepare the Work Packages considering the relevant physical quantities involved, and gather the progress data to fill in Work Packages.

A dedicated Project Control Plan will be issued in order to define a consistent method of planning, measuring and reporting work progress in line with CLIENT project control management.

## 3.3 PROJECT QUALITY MANAGER

The CONTRACTOR's Project Quality Manager and its Team are fully committed to:

Ensure that the Quality System procedures and all the documents issued are in compliance with the project;

Ensure that the organization on-site complies with the Quality System and the project;

Prepare the Project Quality Plan and the quality related project procedures and work instructions.

Liaise with the Client and subcontractors, together with the Project Manager as to all quality-related aspects.

Prepare and/or to verify the quality-related documents to be included in the material requisition of supply.

Verify, comment and approve supplier's quality-related documents.

Develop an internal audits plan as well as a plan of eventual audits to be carried out on the main Project Processes and at subcontractors' and vendors' premises.

Verify that the Quality Plan is implemented and effective in all the work sites.

Request any possible corrective actions; follow the relevant implementation by cooperating with the Project Manager (PM) and the Project Engineering Manager (PEM) in the resolution of contractual nonconformities, deviation and concession requests.

Handle the project quality control reporting to the PM, highlighting criticalities whenever quality-related problems arise.

Verify, during the different work phases, the execution of inspections as required by the ITP.

Interface with and supervise the quality control inspectors' activities both at yard and at vendors' and subcontractors' premises.

Co-ordinate, all the activities needed for products final testing.

Liaise with the Client Quality Rep, Inspectors, the CVA (Certified Verification Agent) as to all Quality Assurance and Quality Control-related activities.

Ensure that Client's Inspectors, the CVA Representatives are duly notified in advance to witness those specific operations and test according to the approved Inspection and Test Plans.

Make sure that the quality record books and the final dossier are prepared in compliance with the project requirements and the corporate standard.

## 3.4 PROJECT HSE MANAGER

The CONTRACTOR's Project HSE Manager and its Team are fully committed to:

Facilitate implementation of the Project HSE plans, project specific procedures and to revise them when necessary.

Identify and evaluate risks and propose preventive measures.

Review and approve Subcontractors HSE plans when such plans must comply with the Project HSE plan; perform Subcontractors HSE audits and inspections.

Ensure HSE program is comprehensive and effective in communication of hazards and preventive measures to be taken to ensure safe construction and actions to be taken in an emergency.

Review the organization and implementation of information and training on HSE relative to the site activities (such as toolbox talks, work permits etc.).

Supervise the installation in respect of all safety and environmental protection measures.

Ensure regular monitoring and inspections to detect potential hazards.

Stop any work whose execution is deemed dangerous or likely to imperil the health and safety of personnel.

Perform reporting and investigation (or assist with) of accidents, incidents and near misses and ensure that all accidents, incidents, and near misses are reported.

Maintain records of all accident reports and investigations on site and monitor remedial actions being implemented because of accident investigation.

Participate in the weekly coordination meetings with all construction supervisory staff and subcontractors representatives to discuss safety.

Conduct the induction meeting for all new employees (including subcontractors).

## 3.5 PROJECT ENGINEERING MANAGER

The CONTRACTOR's Project Engineering Manager will be responsible of the design of the Project.

Project Engineering Manager will be responsible to ensure all project needs are effectively and timely and result in a pro-active and added value cooperation to confirm an integrated engineering team.

Unless agreed otherwise, Project Engineering Manager is the point of contact for CLIENT and all other contractors and/or third parties selected by CLIENT for all kind of engineering support is may needed.

The CONTRACTOR's Project Engineering Manager and its Team are fully committed to:

Manage the scope of contract relevant to Engineering, ensuring the performance of the activities in compliance with contractual and legal requirements, engineering best practices, timing, QHSE requirements and budget.

Ensure the respect of the global engineering budget, to manage with the support of Engineering Project Controlling, the definition of the estimation to completion and to verify the correct structure of the engineering team workforce; to report promptly any potential gap from the budget, suggesting corrective actions to the Project Manager.

To promote alternative technical solutions that can generate advantages for both CLIENT and CONTRACTOR.

Co-ordinate the resources in the execution of the Engineering and to manage the relationship with Client and other external parties; to ensure the integration with other services/department involved to the Project;

Ensure the management and the approval of incoming and outgoing engineering documentation, and to co-ordinate the Document Controller in filing, communication and transmission to the personnel involved, keeping proper records through documents lists;

Ensure and co-ordinate design review, verification and validation CONTRACTOR's Project Engineering Manager liaise with CONTRACTOR's Construction Manager and CONTRACTOR's Q-HSE Manager to guarantee the best in class services in full respect of the Q-HSE rules.

The Project Engineering Team shall support the Construction Team during fabrication, construction, mechanical completion and commissioning phases.

The main objectives of the Project Engineering Teams are:

Assess CLIENT documentation and/or perform a site survey to understand the existing scenario

Define the engineering requirements prior to commencing the fabrication works

Define the assembly areas, assembly sequences, lifting and handling Engineering, load out studies, and erection

Develop the standards, procedures, and method statements to perform the fabrication Activities

Develop all documentation to perform the fabrication activities, i.e.

- Workshop spools drawings, structural drawings, piping supports, shop drawings, piping isometrics
- calculations; structural analyses; stress analyses
- pre-fabrication feasibility and piping assembly;
- Constructability and erection sequence
- Load-out and transportation and installation requirements;

Issue as-built documentation

Support the Project Team during the process for selection of the best sub-contractors for fabrication activities

Support the Project Manager, the PQM, and the Construction Manager in solving nonconformities identified during the construction phase proposing and carrying out suitable actions for their resolution

Encourage cooperation and teamwork within his organization and towards the other functions and Group Companies

The CONTRACTOR's Project Engineering Manager shall also manage changes and shall be involved timely in the decision-making process.

## 3.6 PROJECT PROCUREMENT MANAGER

The CONTRACTOR's Project Procurement Manager and its Team will be responsible of the Procurement activities for the Project.

The CONTRACTOR's Project Procurement Manager and its Team are fully committed to:

Collaborate with the Project Manager based on contractual requirements of the Clients, in elaborating the project procedures and project documents (Purchase Order and other forms) that are needed to manage the procurement activities, in compliance with the project requirements;

Prepare the project's vendor list, interacting with the Suppliers Qualification & Evaluation Function, starting from the contractual vendor list. Submit it to the Project Manager and to the Procurement Manager for approval;

Ensure the execution of the criticality rating process for materials by collaborating with the Project Team Members according to their responsibilities;

Collaborate with the Project Team in defining the strategy and planning of the procurement activities taking part in the compiling of the relative works program (Project Procurement Plan and Contract Master Schedule). Prepare, with the collaboration of functional responsible, the estimation of necessary man-hours for procurement, subcontracting, expediting and logistic activities, submitting them to Procurement & Logistics Service Director;

Collaborate in the elaboration of the Subcontracting Plan supporting the Project Team (especially PEM and CM) in the definition of the main subcontracts and acting as an interface with the Subcontract Responsible with regard to PO issuing, criticalities and budgets.

Collaborate with the Project Manager and PCM in defining the Project Budget for material purchasing and Procurement, subcontracting, expediting and logistics activities (manhours).

Act as interface, within the Project Team, with the Procurement & Logistics Service and the relative Functions, for the coordination of all procurement activities (from the issue of Material Requisition up to the delivery at site) notifying the Project Manager about possible criticalities and proposing alternative solutions;

Monitor and approve the issuing of the project Request for Quotation on Athena and sign the final Economical Bid Evaluation, before submitting them to the PM for approval;

Support the Project Manager during Project Coordination Meetings with the Client acting as an interface for all the aspects related to Procurement;

Giving priority to the management activities, can cover also the role of buyer. In this case, the final EBE relevant to those bids that have been followed by him, shall be signed by the Procurement Manager.

Collaborate with the Project Manager in compiling claims and/or formulating proposals relevant to the variations to be submitted to the Client, for all the aspects that concern procurements, subcontracting,

expediting and logistic, in collaboration with the Procurement & Logistics Service Functional Managers, if needed;

Collaborate with the Procurement Manager and Project Manager in defining strategies to manage the relationship with project suppliers in terms of changes to the order, penalties on deliveries, possible charges to supplies, resolution of controversies.

Ensure the updating of the Project Procurement Plan/Subcontracting Plan by collecting information about criticalities and delays from suppliers and other Team Members;

Monitor and solicit the progress of the bidding phase, ensuring the transmission of the information to the Project Team and helping in re-planning the activities when needed;

Monitor and solicit the expediting activities, ensuring the transmission of the information to the Project Team and helping in re-planning the activities when needed;

Revise the estimation for the Procurement & Logistic Service man-hours, submitting them to the Procurement & Logistic Director and to the PM and PCM, on monthly bases;

Support the Project Manager in the compilation of the Close Out Report.

## 3.7 CONSTRUCTION MANAGER

The CONTRACTOR's Construction Manager will direct, coordinate and control all construction activities related to the project, according to CLIENT rules, corporate standards and contractual conditions as far as Quality and HSE are concerned and to ensure that scheduled targets relevant to delivery terms and costs are met.

The mission and responsibilities of the Construction Manager are but not limited to:

Liaise with CLIENT's organization at yard as to aspects related to construction activities and to keep the PM informed

Supervise the construction activities, carried out both from internal staff and subcontractors, ensuring the coordination among prefabrication, erection, commissioning, yard logistic, guaranteeing an efficient and effective use of human resources and equipment given to him;

Verify that workers employed by both the Company and any Subcontractor are informed and trained in order to carry out the jobs in a safety way

Monitor the Construction progress, informing permanently the Project Manager upon it, upon the possible problems detected and to propose preventive, corrective and improvement actions

Support the Project Manager and the PQM in solving non-conformities identified during construction phase proposing and carrying out suitable actions for their resolution

Co-operate with Company HSE Function in the implementation of Company HSE-related rules

Implementation of an effective Quality Management System in accordance with the requirements of the Contract

Implementation of an effective Health, Safety & Environmental Management System in accordance with the requirements of the Contract

## 3.8 PROJECT COMMISSIONING MANAGER

The CONTRACTOR's Project Commissioning Manager and its Team, are fully committed to:

Take part, during the Project Execution Plan drafting phase, in the definition of the Project strategy, by becoming the reference as to all the aspects related to Mechanical Completion, Precommissioning and Commissioning activities;

Arrange, together with the Project Team, the Project overall planning as to every aspect dealing with Mechanical Completion, Precommissioning and Commissioning activities;

Prepare, together with Project Specialist Leaders, subcontract specifications by defining the scope of work of the different companies as to Mechanical Completion, Precommissioning and Commissioning activities;

Prepare, together with the Project Engineering Manager, the Design Documents List of documents related to Mechanical Completion and Commissioning activities, including the definition of the relevant milestones;

Define the plan and sequences of commissioning activities, by identifying internal and/or external resources (contracting companies and Vendors' personnel) and/or assets necessary for the execution of activities in compliance with contractual requirements and with the project plan;

Define, together with the Project Engineering Manager, the list of critical supplies for which the Commissioning Manager is required to witness the Factory Acceptance Test;

Take part in engineering, either developed internally or supplied by Client, from the very first steps, by liaising with the Project Engineering Manager and the Engineering Service as to explanations, changes and/or optimizations aimed at the definition of increasingly correct commissioning sequences;

Take part in Constructability Meetings so as to highlight, since the very first stages of the Project up to the construction phase, the obligations to be fulfilled as to commissioning activities, in order to optimize activities themselves, prevent any operational problems and foster a safe execution; said obligations shall be acknowledged starting from the engineering phases;

Define, together with Project Specialist Leaders, the list of materials needed for the execution of commissioning activities, and to prepare the relevant purchase request in accordance with the commissioning activities schedule;

Support, from a technical/operational and HSE point of view, the Construction Manager during Mechanical Completion, Pre-commissioning and Commissioning activities, by previously notifying any possible criticalities;

Keep informed, with the support of the Construction Manager, the Project Engineering Manager and/or the Project Specialist Leader of the Engineering Service as to any technical issues possibly arising;

Co-operate with the Project Quality Manager in liaising with the Client, by becoming the main technical reference as to all Commissioning-related and product performance problems;

Prepare the Close Out Report, with reference to the Mechanical Completion,

Pre-commissioning and Commissioning sections, by cooperating with the Project Quality Manager and the Construction Manager.

## 3.9 PROJECT INTERFACE MANAGER

The CONTRACTOR will appoint a Project Interface Manager to facilitate and improve the communication with Client and all other Contractors selected by Client as well as third parties involved into the Project.

The mission and responsibilities of the Project Interface Manager are but not limited to:

Develop the Project Interface Management Plan

Play an active role in managing and keeping updated the interface management tools

Support the Project Manager to identify the map of the stakeholders and the associated communication workflow

Define, communicate and monitor the communication work process and tools to the CONTRACTOR's Project Team and the Project's stakeholders to ensure a fair, active and effective communication

Avoid potential disputes between various project stakeholders.

Provide an escalation route for issues that cannot be closed between the direct parties involved.

Highlight any potential implications of interface issues such as schedule delays etc. to the Project Management team.

Reduce risk by minimizing the possibility of miscommunication along with use of incorrect data and assumptions.

Provide a tracking and recording mechanism for Issues occurs and help ensure a robust audit trail for the Project.

## 3.10 ONBOARDING NEW PROJECT TEAM MEMBERS

The integration process of new project team members is considered of primary importance to the CONTRACTOR. CONTRACTOR shall implement a new team member induction program for each execution site and phase. The induction program is an important process for bringing staff into an organization. Personnel introduction includes information on the working environment and the set-up of the employee within the organization and will include the following:

A safety briefing, including: office layout and facilities local to place of work, Medical emergency, evacuation, environmental and Hazard and near miss reporting;

introduction to project team members – CONTRACTOR's, Principle Subcontractor's and Company personnel as necessary;

Project briefing: Scope of Work, project status, IT systems, etc.

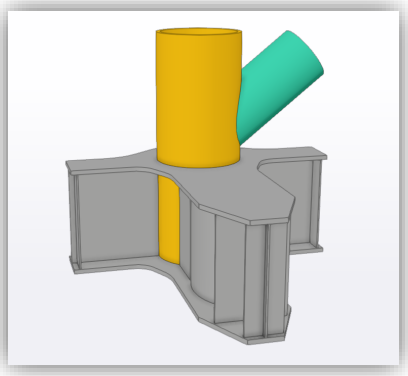
# 4 FABRICATION PHILOSOPHY

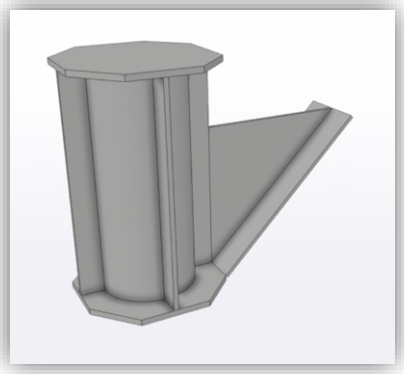
The fabrication process has been strategically planned to maximize activities during the initial phase, thereby reducing the workload for the subsequent phase at the yard. This approach is aimed at adhering to the schedule.

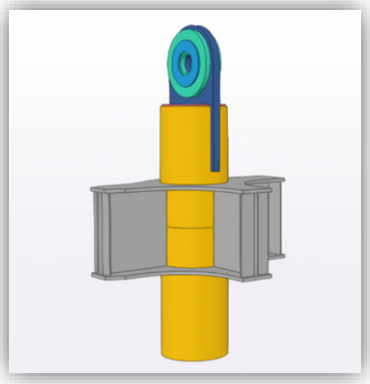
The Web Plate Girder (WPG) will be fabricated by Rosetti Marino's subcontractor. This includes the integration of secondary nodes, shifting some common assembly tasks to the fabrication stage. This strategy minimizes the need for welding and erection joints during assembly.

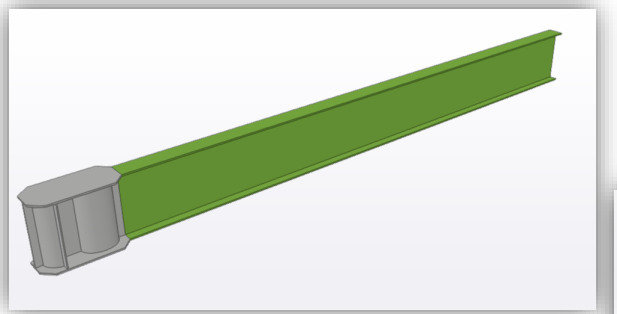
Below are the instructions provided to the subcontractor on how to fabricate the item during the fabrication phase:

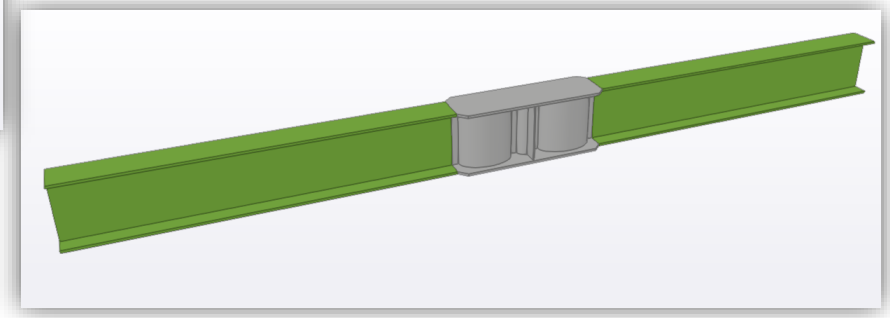
1. The WPG should be integrated with floor nodes as shown in the accompanying pictures.
2. Secondary nodes should be left free for other connections. This is to ensure that any necessary adjustments during assembly can be made while maintaining the dimensions as per the specifications.

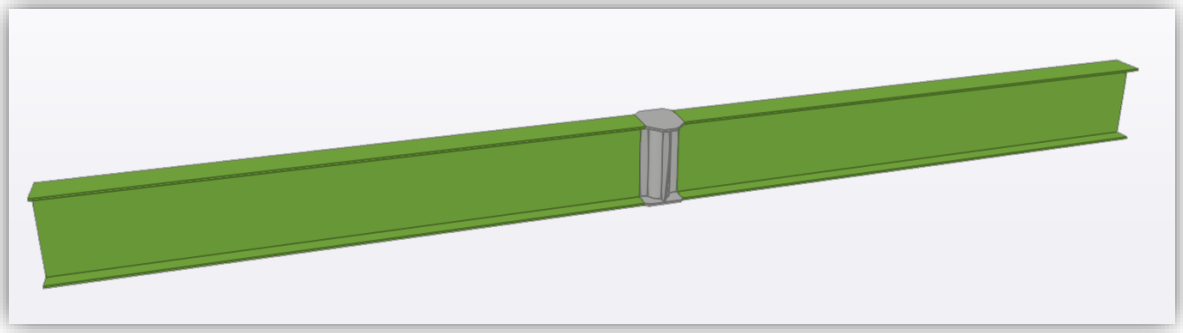












All secondary and tertiary commercial beams will be procured from the vendor, already cut to the specifications outlined in the drawings, including any required notching.

Primary items will be delivered with steel preparation already completed. All other beams will undergo preparation during the assembly phase. This approach ensures that the primary components are ready for immediate integration, while secondary elements are tailored and adjusted as needed during assembly, optimizing the construction workflow.

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# 5 YARD PREPARATION

The Yard Engineer, guided by inputs from the Construction Manager, has prepared comprehensive information for the assembly process. This includes the creation of dedicated totems, positioning of concrete blocks in the erection area, arrangement of spreader beams, and other essential structures to ensure accurate weighing before load-out.

## 5.1 ASSEMBLY INDOOR AREA



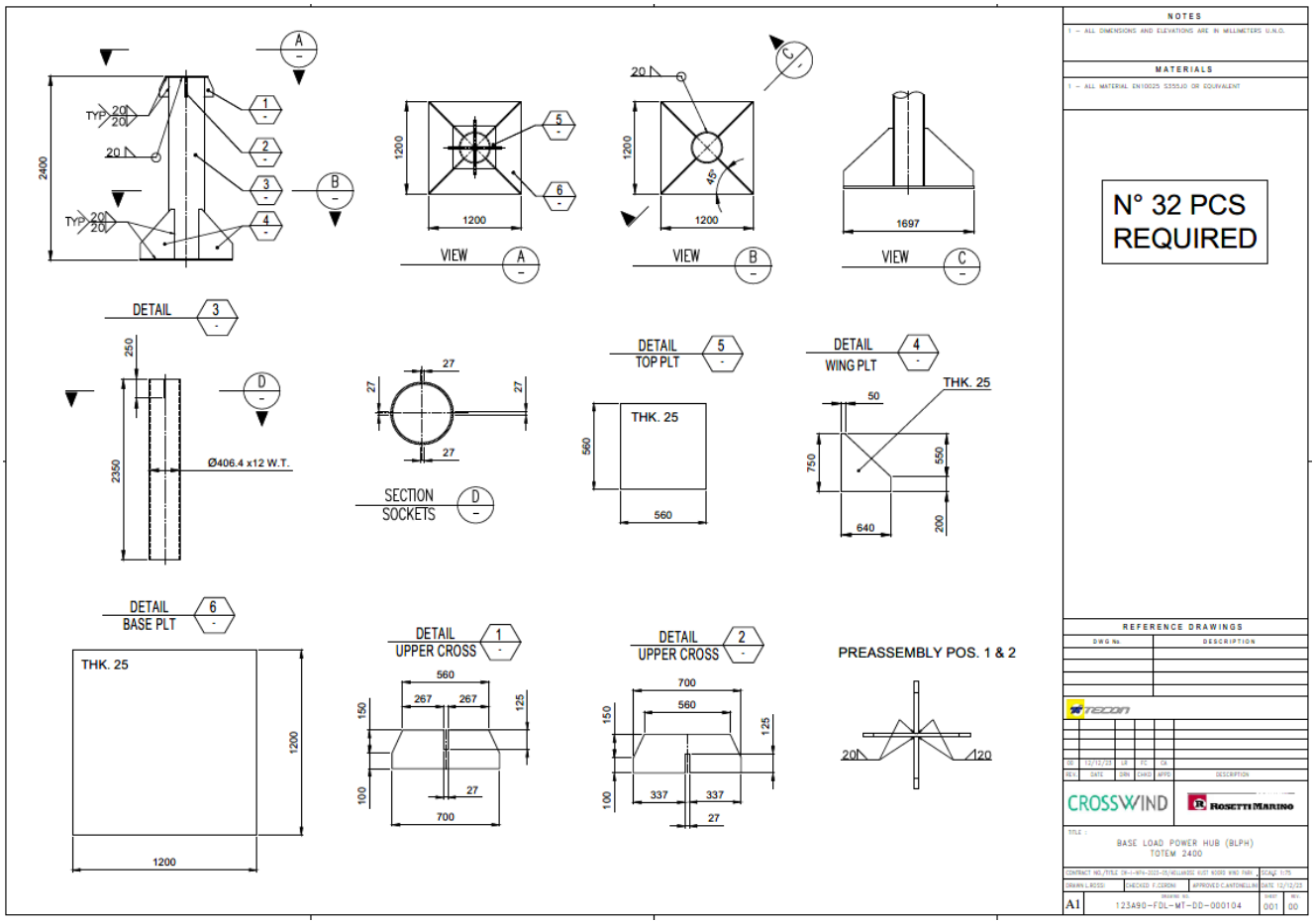

As depicted in the schema above, prior to initiating any assembly activities, all main totems will be strategically placed on the ground. This is to delineate the area and facilitate the positioning of nodes, primary, secondary, and tertiary beams, including the flooring.

The main totems, as shown in the schema, represent the minimum required to ensure smooth transportation of components from the assembly area to the painting shop and ultimately to the final erection area on the concrete blocks.

Additional totems will be employed during the assembly as temporary supports to ensure safe fit-up and welding operations.

The totems will be securely anchored during movement using a "bio-bio" system, which involves a plate or angle bar welded onto the totem and fastened to main structures. Below is a typical example developed for this project.

Before commencing any activity, after the totems are positioned, their elevations from the ground will be checked to ensure uniformity across all contact points. This step is crucial to maintain consistency and accuracy throughout the assembly process.




## 5.2 ASSEMBLY OUTDOOR AREA

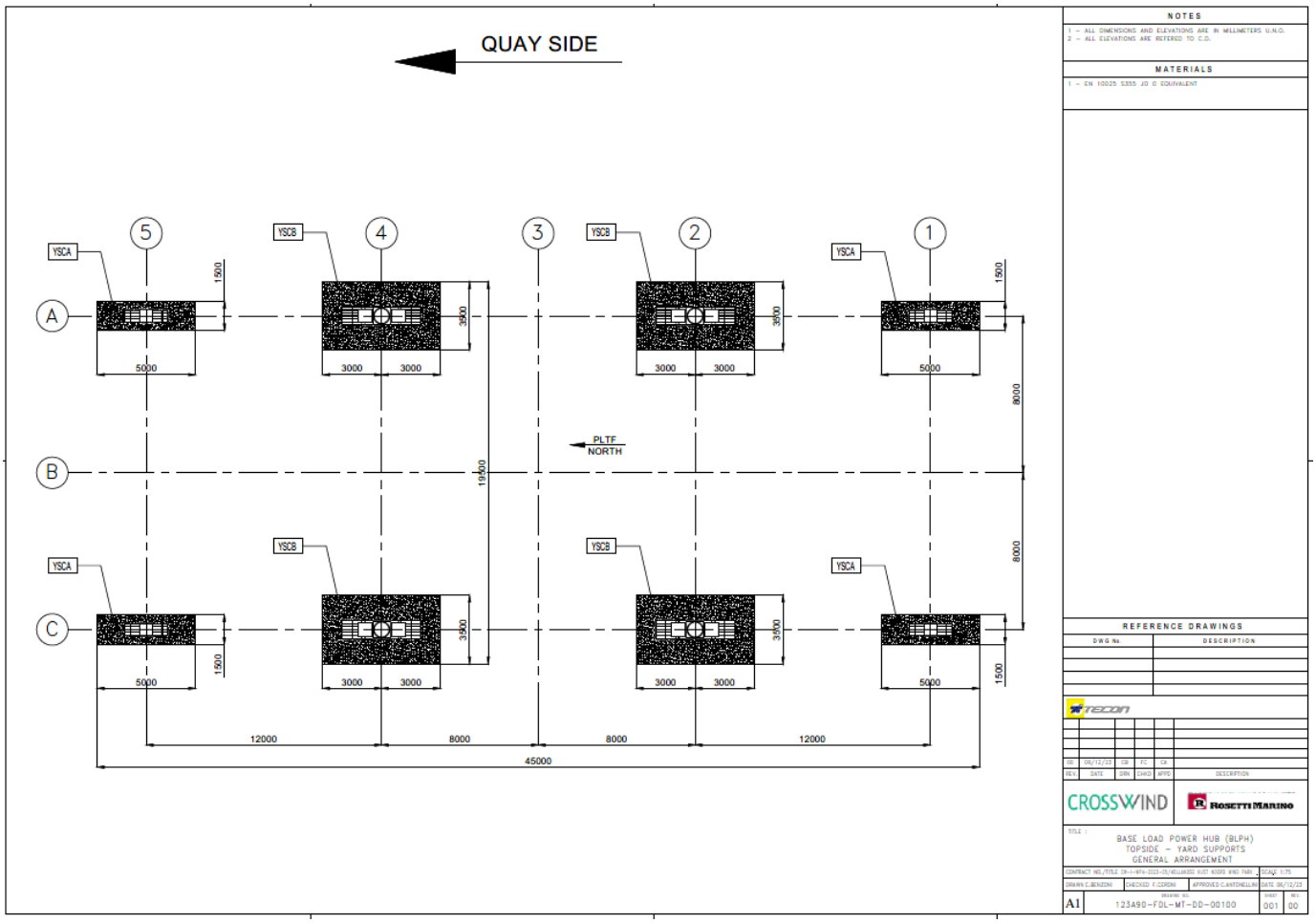
The approach in the outdoor assembly area mirrors that of the indoor area, with the primary difference being in the handling of items. While overhead cranes are utilized indoors, dedicated mobile cranes are employed for outdoor operations. This adjustment accommodates the different environmental and spatial constraints encountered in outdoor settings.

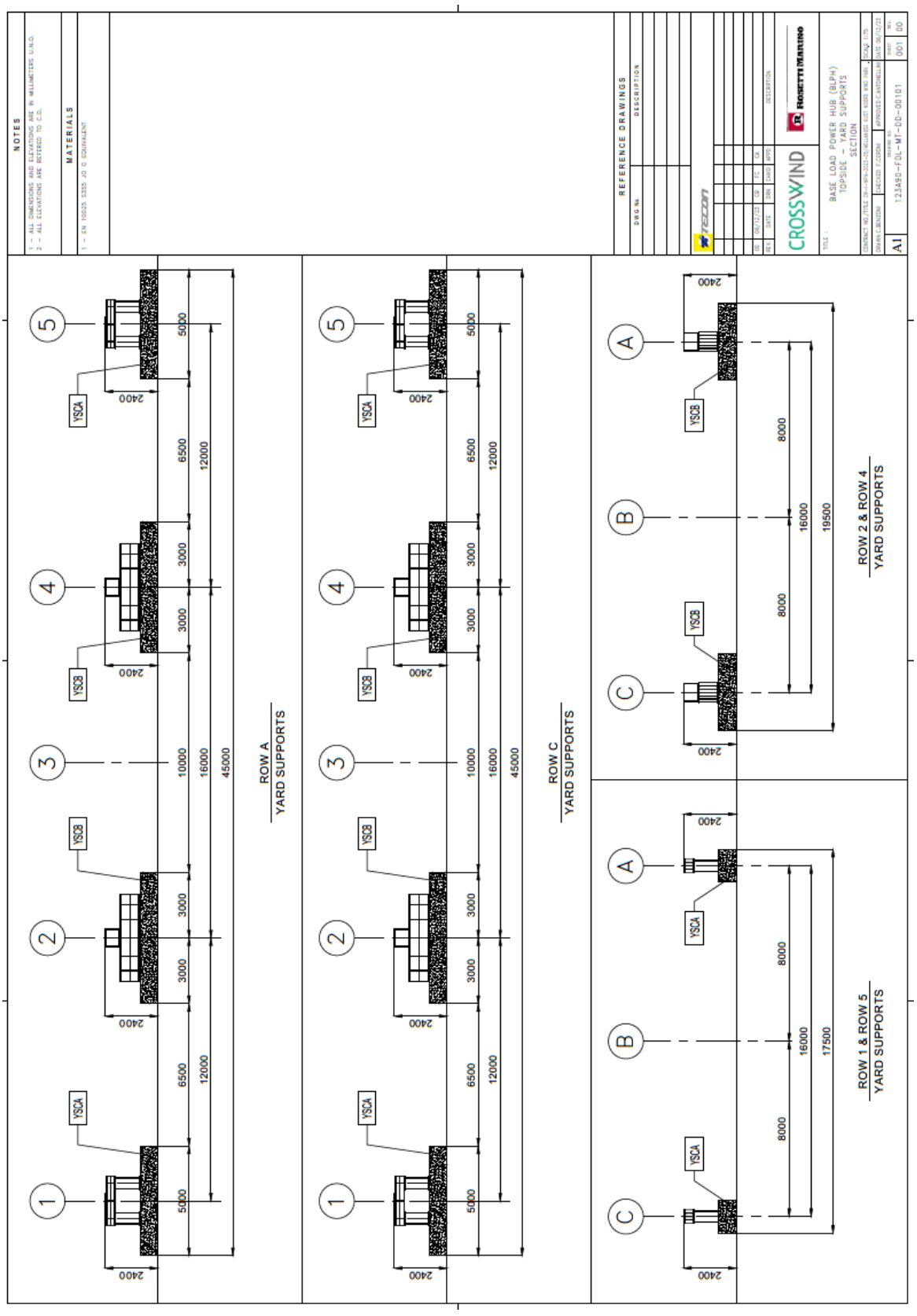
# 6 ERECTION AREA

Following the painting process, the blocks LDN and LDS will be strategically placed on the pre-positioned concrete blocks in the designated final area. Below is the detailed setup required to accurately position the lower deck in its final location, including the methodology to be used for weighing:

1. **Positioning Strategy**: The lower deck will be carefully aligned and positioned on the concrete blocks, ensuring stability and precision in its final location.
2. **Weighing Concept**: A specific procedure will be implemented for weighing the structure, taking into account the unique characteristics of the outdoor environment and the positioning of the blocks. This process will be critical for verifying the load and ensuring structural integrity.

The outdoor assembly and erection areas are designed to facilitate efficient and safe handling of large components, with each step meticulously planned to adhere to project specifications and safety standards.

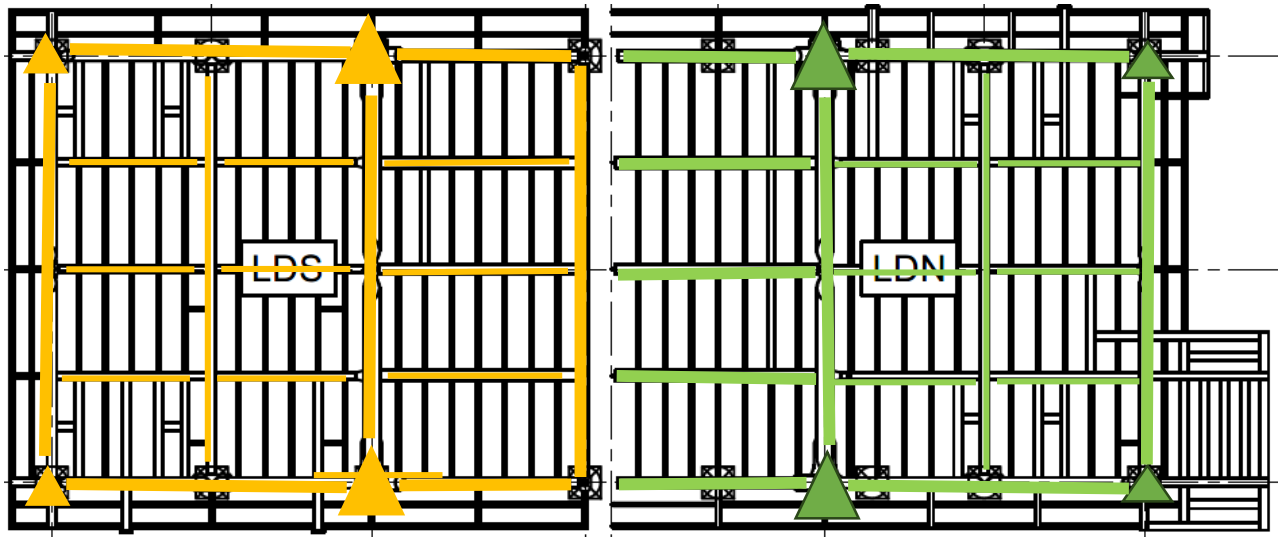





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# 7 ASSEMBLY OF STEEL

## 7.1 PRIMARY, SECONDARY AND NODES



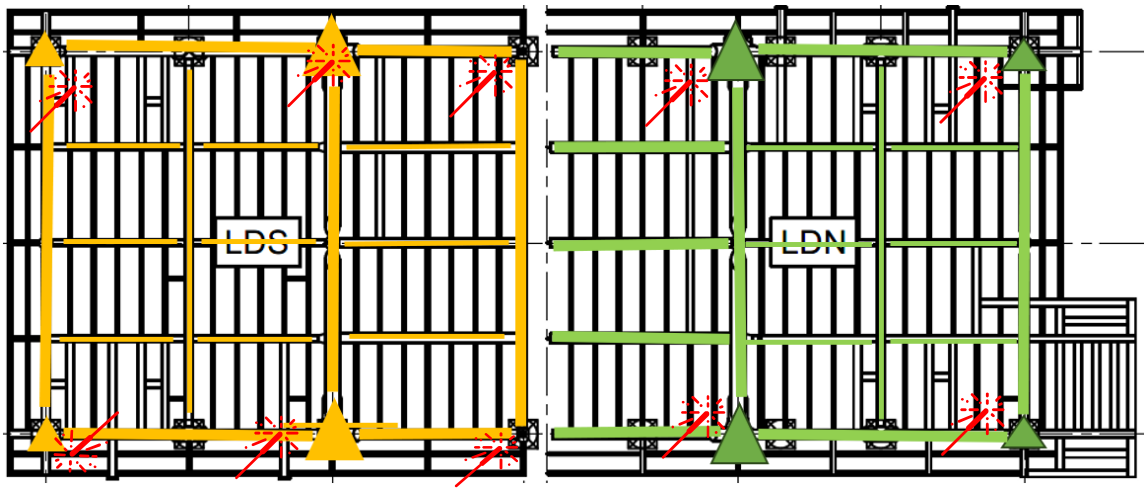

The primary activities begin with the positioning of the main nodes and Web Plate Girders (WPG), as illustrated in the provided diagrams (marked with triangles and lines). This initial setup forms a basic square structure, allowing for the verification of squaring by measuring the diagonals and ensuring the accuracy of the fit-ups.

The process continues with the sequential installation of each WPG, methodically building up the primary structure. Before proceeding to the welding phase, a crucial step is the preliminary dimensional control, known as the intermediate dimensional check. This check is essential to ensure that the assembly aligns with the project specifications.

If the results of the dimensional control are satisfactory and meet the criteria set out in the dimensional check, the Construction Manager (CM) will give approval for the Sub-Contractor (S-CTR) to begin welding activities. Welding starts from the boundary joints and progresses to other main internal joints, following a systematic and structured approach to ensure structural integrity and adherence to design specifications.

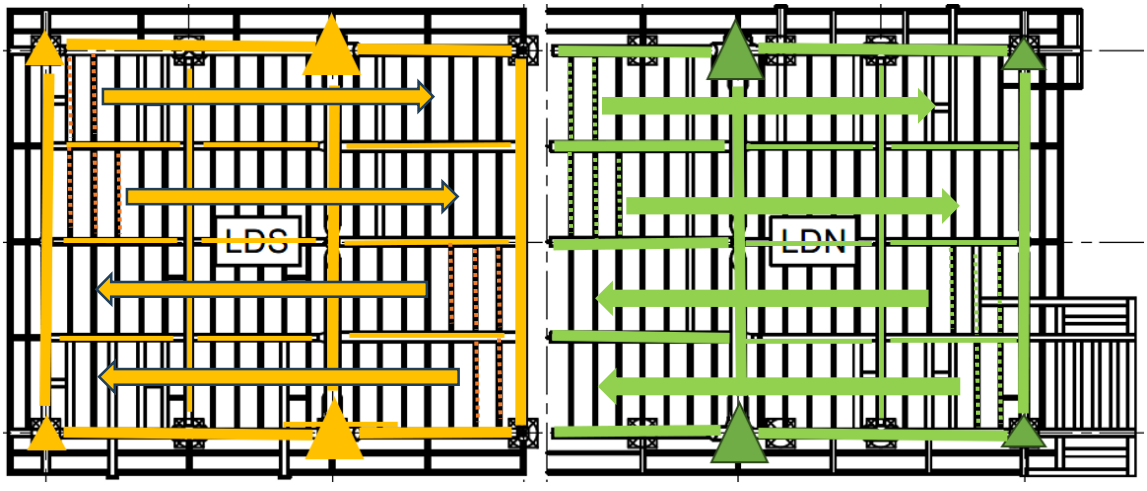
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Simultaneously with the commencement of the initial welding activities, the installation of secondary beams will continue. This parallel process is aimed at achieving the completion of the blocks. The diagram below provides a visual representation of this phase, illustrating the systematic integration of secondary beams into the overall structure. This approach ensures a cohesive and efficient progression of the construction process, aligning the welding activities with the structural assembly to optimize the workflow and meet project timelines.

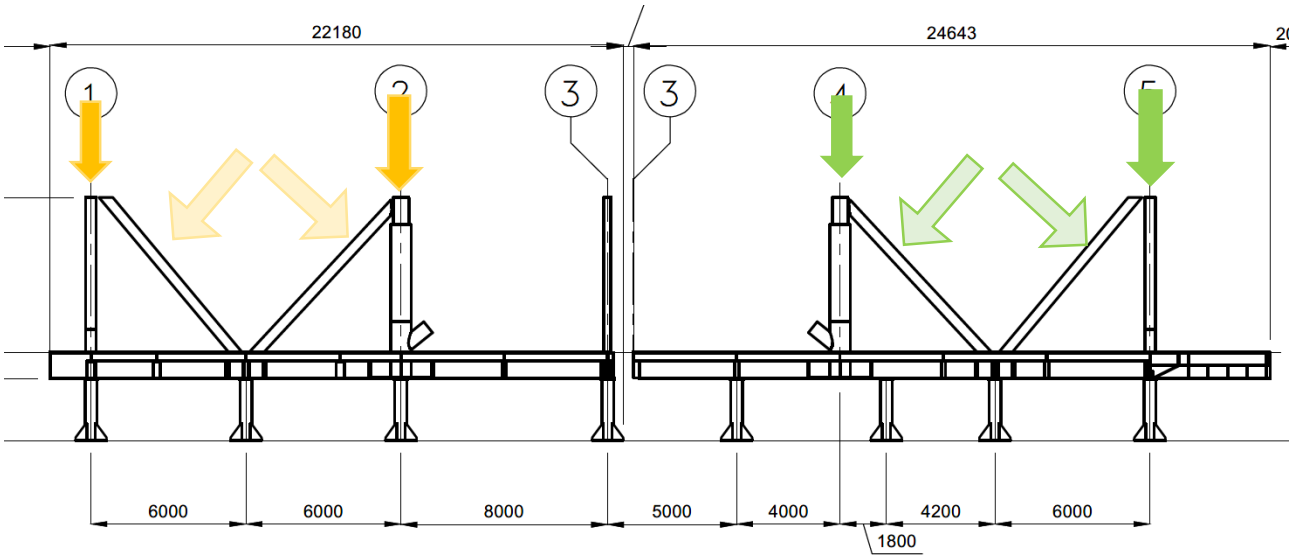
## 7.2 SECONDARY




The assembly process is progressing, and in accordance with the specifications, Non-Destructive Testing (NDT) controls will commence. These controls are essential to ensure the quality and integrity of all completed weld joints.

Simultaneously, as the handling of secondary beams continues, the installation of floor joints can begin wherever they are complete. A critical step before commencing welding is the inspection of all columns and diagonals to verify their verticality and any tilt. Typically, the installation priority is given to the columns, with the diagonals being installed subsequently.

Refer to the illustration below for a visual representation of this process. This illustration provides a clear overview of the sequence and methodology of the assembly, ensuring a systematic approach to the construction and quality control phases.




Once all areas, even if only partially, have been completed for welding and have undergone Ultrasonic Testing (UT) and Magnetic Particle Testing (MT), the installation of flooring plates in the required areas will begin. This phase involves fit-up preparations across the entire area in readiness for welding.

Typically, based on the results of the intermediate dimensional control, it is advisable to place concrete blocks over the plates.

This measure is taken to prevent deformation of the steel caused by the intense pull of the welding process.

These concrete blocks act as a stabilizing force, countering the potential warping or bending of the steel plates during the welding phase.

This precaution ensures that the plates remain flat and aligned with the beams beneath them, maintaining the structural integrity and precision of the assembly.

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## 7.3 FLOOR POSITIONING:




Once the entire floor is covered with plates, an evaluation will be conducted to determine the optimal placement of concrete blocks.

These blocks are essential for maintaining the flatness of the deck during the welding process. It's important to strategically position these blocks where necessary to counteract any potential warping or deformation of the plates.

At the connection point between the lower deck's south and north sections, the plates will not be installed immediately. Instead, this area will be left open until the erection phase is nearing completion.

Only then will the welding of the joint beams at this connection point be carried out, followed by the installation of the remaining plates.

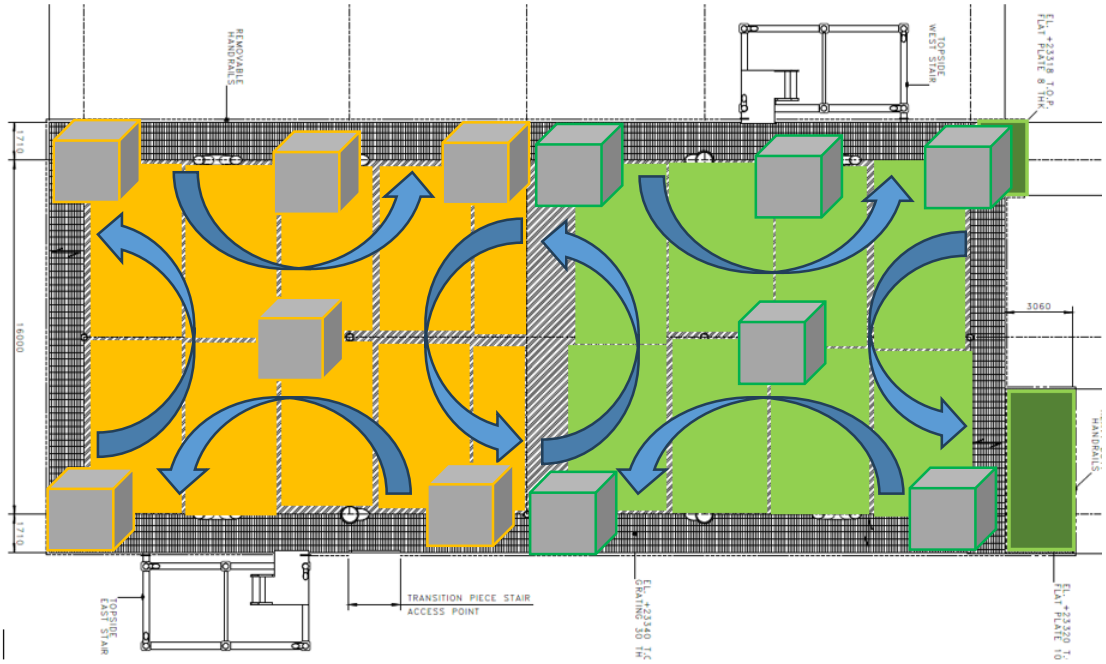
After these steps are completed, painting of the newly installed areas will follow.

This phased approach ensures that structural integrity is maintained throughout the construction process and allows for precise alignment and fitting of all components, especially at critical junctions like the connection between the south and north sections of the lower deck.

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Here below an idea to how normally we proceed positioning the concrete block to control and to prevent the effects of "wingspan".




At the conclusion of the welding process, and once all Non-Destructive Testing (NDT) results are deemed satisfactory, the concrete blocks used for maintaining flatness will be removed. This will pave the way for the final dimensional control to be conducted.

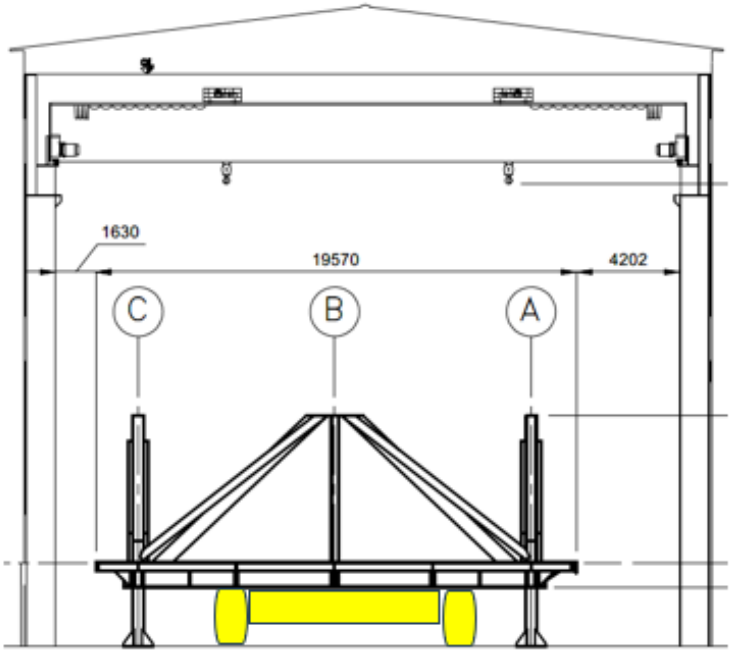
A comprehensive final inspection will then be carried out jointly by key parties, including the Construction Manager (CM), Construction Supervisor, Quality Control team, and the Painting Inspector. Following this

inspection, the CM will issue an internal release note, which may include a list of punch items that need to be addressed. Subsequently, the blocks will be moved, one by one, to the painting shop.

## 7.4 PAINTING

Upon the completion of the painting cycle, another inspection will be conducted to finalize the release of this phase. Throughout the painting process, regular checks will be made by the inspector to ensure the integrity and quality of the painting cycle.

For the transportation of the blocks from each assembly location, Rosetti Marino's trailers will be utilized. This ensures efficient and safe movement of the blocks to the painting shop, facilitating a smooth continuation of the construction process.




The construction approach for the upper deck will follow the same philosophy as the lower deck, with the notable exception that elevation installation is not required, given that it is the topmost floor of the module.

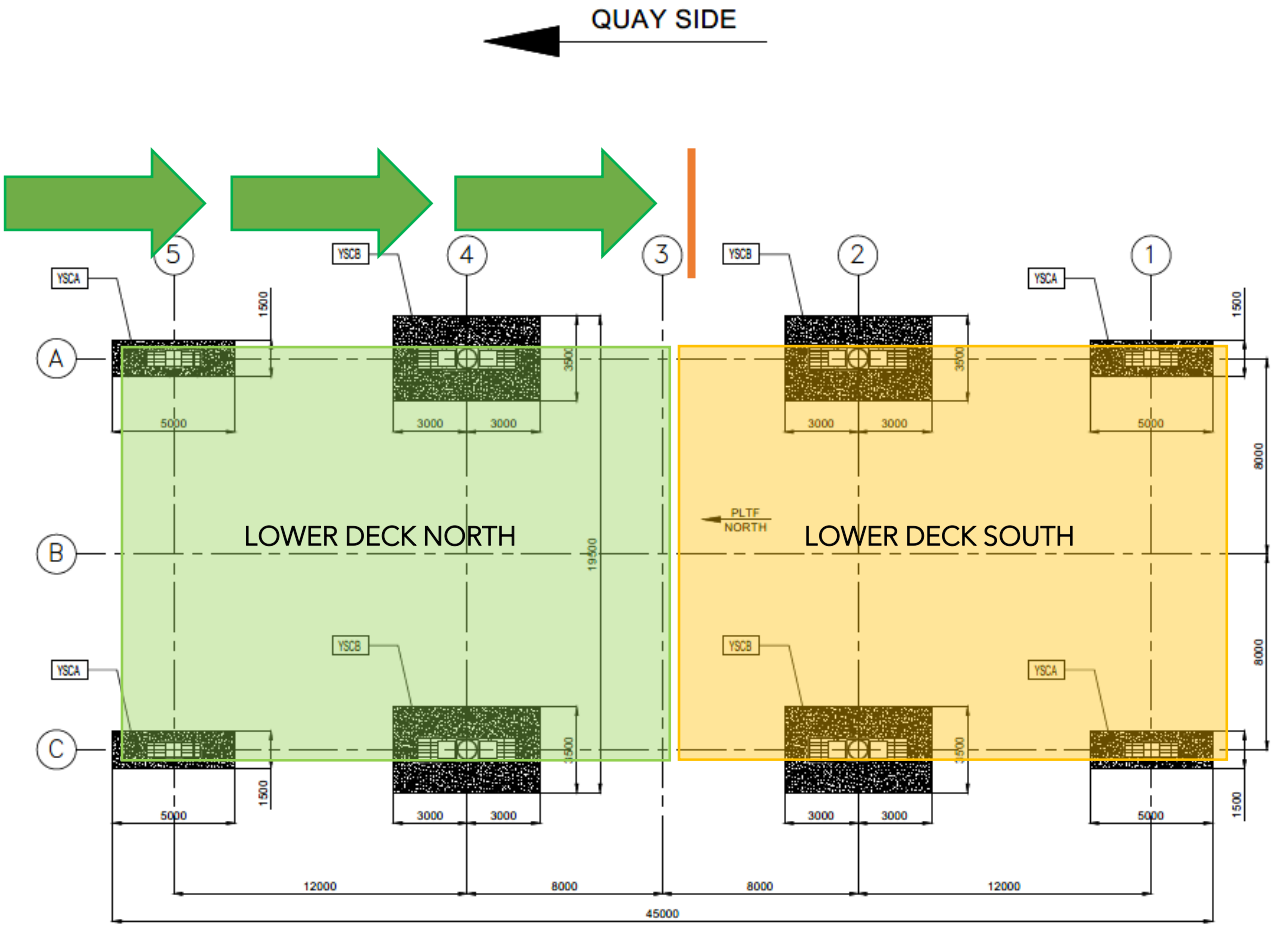
On this upper deck, various equipment and vessels, along with their respective structures, will be installed. Detailed descriptions of these installations will be provided subsequently.

Once the painting of the lower deck blocks is complete, they will be positioned in the erection area. This area is strategically located over the final supports, which are planned to be situated in the central part of the yard. This placement facilitates efficient and safe handling during the final assembly and integration of the upper deck components.

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# 8 ERECTION OF BLOCKS

## 8.1 LOWER DECK




Following the successful connection of the two lower decks, work will proceed to assemble the lower deck north with the lower deck south. This phase includes the installation of the floor plates.

During this process, temporary grating will be put in place. This serves as a precautionary measure to ensure safety and accessibility across the decks. Additionally, either temporary safeguarding or the final handrails will be installed, depending on the stage of construction and the specific safety requirements at that time.

Once these steps are completed, the module will be prepared to receive the shelters, which are to be positioned at the elevation level EL.+23310. This preparation involves ensuring that all structural and safety measures are in place to accommodate the installation and integration of the shelters onto the module. The focus will be on ensuring that the module is structurally sound, safe, and ready for the next phase of construction.

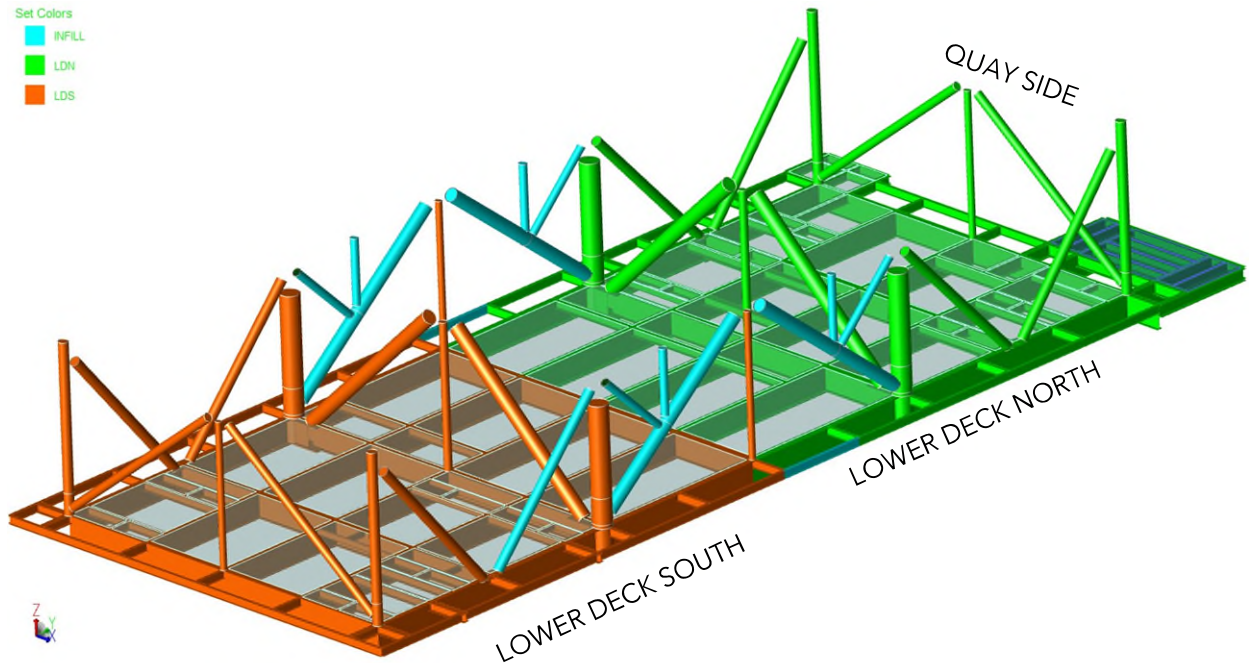
After the connection between the two lower deck's how work will commence to assemble the lower deck north with the lower deck south, including the floor plates.

Temporary grating will be installed, safeguard or final handrail will be installed and we prepare the module to receive the shelters positioned on the El.+ 23310.

Being in the similar scenario as below, final erection position, we'll install grating other minor structures.

The below diagonal colored in "light blue" will be installed after closure of the pancake, considered to install them after the installation of equipment. Decision on installation of the diagonal could be changed along with the updating of the project.

For certain period (where upper deck will be under painting and connection of two blocks), will have the opportunity to install majority of the packages.



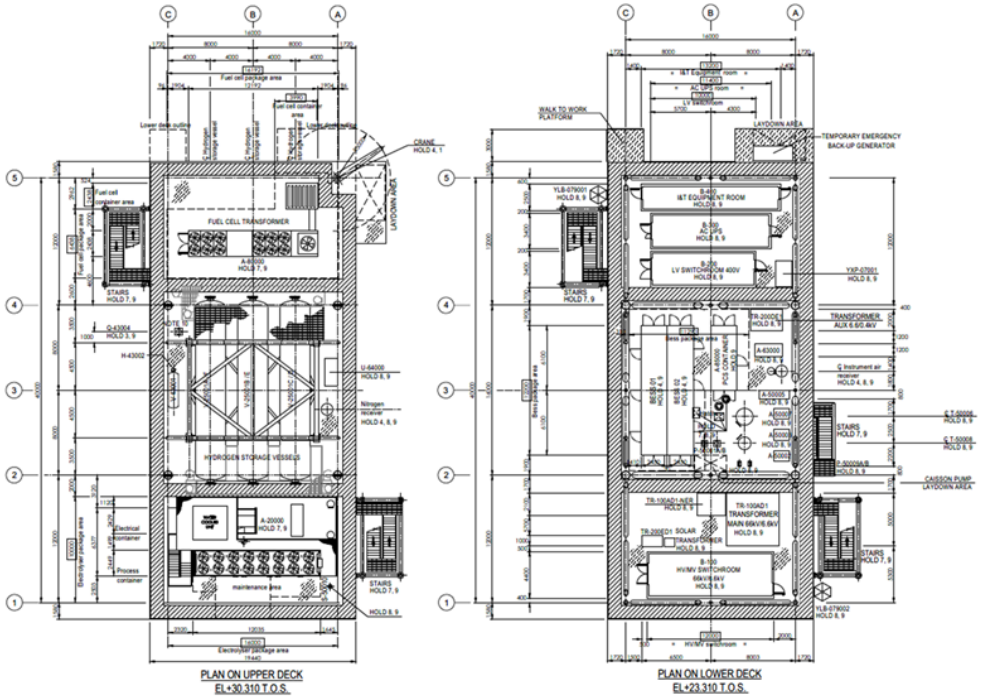

In the following picture you can see how the decks are arranged.

On the lower deck we have many packages HV, MV, LV, BESS, Water System and Transformers, those will install before to install the upper deck or in case of delay are foreseen the light blue diagonal to lift/shift them from west/east side.

On top of the upper deck, we'll have Fuel Cell, Electrolyzer and the Hydrogen vessel shared in two floors.

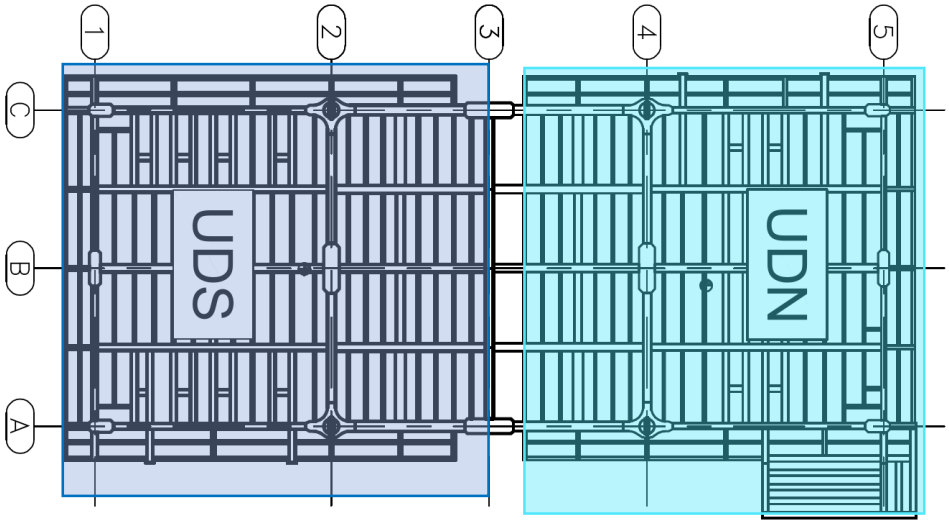
Here below the plot plan of LOWER and UPPER:

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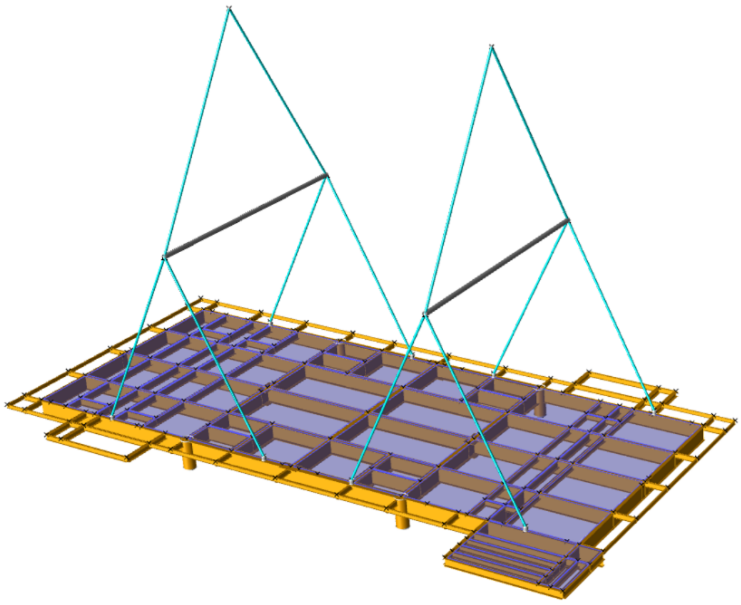

## 8.2 UPPER DECK

The Upper Deck will be assembled as per schedule in an outdoor area and with the same philosophy as described above for the Lower Deck.




When the Upper Deck will be ready, after painting and assembling, CM will assess the readiness achieved and with the Yard Eng. Method will be finalized the preparedness of Upper Deck prior to lift.

As today the study for the upper's lift on the lower is foreseen to have the scenario as shown in the below picture:



## 8.3 TRANSITION PIECE

Information will share with next revision.

## 8.4 PAU STRUCTURE

Information will share with next revision.

## 8.5 PIPING

Information will share with next revision.

## 8.6 PACKAGES

Information will share with next revision.

## 8.7 CAISSON

Information will share with next revision.