

NEW MURABBA

PEP

Project Execution Plan

NMDC-HKR-ARC-PEP-000001

HKR ARCHITECTS

Project Execution Plan

NMDC-HKR-ARC-PEP-000001

Rev	Author	Date	Revision Comments

Design Team Lead

HKR Architects



Document Approval


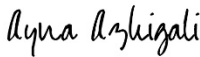

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Table of Contents

1. Introduction
2. Project overview
 - 2.1. NMDC Background
 - 2.2. Mukaab District Background & Vision
 - 2.3. Mukaab Overview
3. Team Organisation
4. Resource Deployment and Distribution
5. Scope
 - 5.1. Outline Scope
 - 5.2. Scope Work Stages
 - 5.3. Disciplines of Scope
 - 5.4. Project Specific design and approval process.
 - 5.5. Scoring Card Process
6. Communication Procedures
7. Document Control
 - 7.1. Information Naming and Filing
 - 7.2. Checking Procedures
 - 7.3. Incoming Documentation
 - 7.4. Outgoing Documentation
 - 7.5. Email Filing
 - 7.6. Document Management Platform
 - 7.7. Client Project Protocols

8. Inclusions and Exclusions of Services

8.1. Inclusions

8.2. Exclusions

9. Detail Design Schedule and Schedule Management

10. Cost Management

11. Value Engineering

12. Deliverables List of Documents for stages 3B to 3D

13. Strategy for Kit of parts management

13.1. Team Structure for Industrialized Construction Approach and Design of Construction System 1 (CS1)

13.2. The Industrialized Construction Design Process

13.3. Key Requirements for an Industrialized Construction Approach

14. Quality Management

15. BIM Management

Appendix A – Subconsultants Team Structure

Appendix B – Stage 3A Design Review CRS

Appendix C – Scope of works broken down by discipline

Appendix D – List of documents for stages 3B to 3D

Appendix E – Design Gates Score Sheet Sample

Appendix F – Detail Design Schedule and Schedule Management (Various):

- Basis of Schedule
- Design Baseline Primavera
- Resource Deployment Schedules

1. Introduction

This project execution plan (PEP) sets out the strategy for managing the Mukaab Residential Assets project, describing the procedures that will be adopted for an actionable project implementation and successful delivery. It is based on the deliverables requirement as outlined in the Short Form Design Services Agreement and supporting documents.

Much of the information required to execute the project is/will also be included within other referring documents. As such, this PEP seeks to avoid excessive duplication of existing information by summarising in a concise manner key concepts and ideas and referencing back to each respective document or appendix, where the information is laid out more extensively.

2. Project Overview

The description of the project in this section is an excerpt from the short form agreement 4800000652: Mukaab 3B - 3D Asset Design.

3. Team Organisation

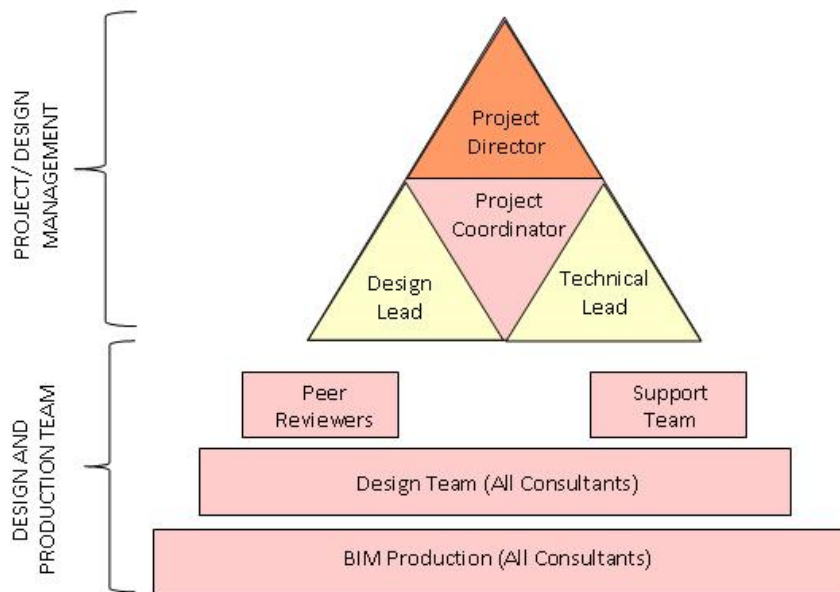
HKR will act as Lead Design Consultant (LDC) on Mukaab Residential Assets. The LDC will manage the delivery of all design consultants contract deliverables. To understand how the LDC structure works we have included an explanatory diagram below.

There are a number of benefits of this structure for the client:

- There is single point accountability
- The correct skill set in managing the design process
- Integrated, collaborative working, leads to a high quality design product
- Leaner project management requirement
- Consultants share risk with Client

Particularly we also show the role of Peer Reviewer and Local Liaison in this diagram. The Peer Reviewer teams are our internal specialists for structures and MEP who shall review our consultants' design. The local liaison deals with local authority matters and feeds information back into the team.

Executing the role of Lead Design Consultant requires HKR to put in place an experienced management team and systems to organize and direct the Design process. The function of the LDC is to manage the direction of travel of the Design through all stages in close collaboration with all client stakeholders. The LDC is an extension of the Client body, charged with responsibility to correctly interpret the Stakeholders requirements and drive the myriad of sub-consultants to deliver the desired outcome at each stage of the project. Over the years HKR has developed a unique team structure to facilitate effective collaborative design of large complex projects that involve cross office working with stakeholders, agents and subconsultants alike. This structure is reflected in the team organograms.



Above: Organogram showing organisational relationship between HKR's design management team, and the overall design production team including all consultants.

The Project Director (Jerry Ryan) has an overarching role of responsibility for the Mukaab Project delivery. The Project Coordination Director (Kola Ojeyomi) plays a central role in the project management process, being a constant liaison between the project director, HKR's technical and

design leads, and the client body. Jerry and Kola will dedicate themselves to the role of Project Leadership for the duration of the design process.

Throughout the duration of the project, there will be two further Directors allocated to the project full time, Design Director and Technical Director. From our experience, projects benefit greatly with the involvement of a Technical Director at Concept Stage. Some of the early decisions must be fully appraised from a perspective of deliverability and constructability. Equally at Detail Design Stage the involvement of the design director in component or element design is critical to ensure the continuity and delivery of the early design intent. How often has a great design been 'lost in translation' in the execution of details! HKR Design director (Joao Ornelas) has over 15 years of experience delivering both large and small scale projects and a proven track record of delivering mixed use schemes for both public and private sector client bodies. HKR Technical Director (Ayna Azhigali) has extensive experience of working in a multi-disciplinary design environment and focusses on efficient delivery of detail design and construction packages. The entire HKR team, at all levels, are very Knowledgeable in BIM and are advocates of HKR protocols and procedures.

The Project Coordinator together with the Project Director lead the implementation of the integrated planning systems and administrative protocols. The Project Coordinator is supported by an Assistant Project Coordinator who in turn is supported by a Programmer, Document Controller and Administrative Support where deemed necessary.

The Project Coordinator and Assistant Project Coordinator are not integrated into the Design process which allows them to focus on the management of the project. They will capture on a daily basis , from Stakeholder Meetings, workshops, design reviews, cost reviews the key strategic actions communicating with the relevant consultants, pursuing information, drawings or reports to ensure momentum is maintained. 'Hot topics' are identified and processed quickly without impacting the program. While monthly reports are important in terms of recording past or projecting future activities, the daily interaction of the Project Coordination team with the Designers is crucial. It will be focused, demanding immediate actions of Designers or Stakeholders. All comments received through minutes of meetings, email or formal correspondence are recorded, responsibility for actioning is assigned and the central action tracker circulated for information / action.

Above: Organogram showing design team structure including all consultants.

While the Design Director in conjunction with the Technical Director have responsibility to advance the stage 3 design, the matrix of Project Director / Design Director / Technical Director and Project Coordinator work as one to ensure that the design energies are focused and productive.

- Refer to Appendix A for discipline specific team organisation chart.

Both Design Director and Technical director will manage 4 teams of designers, with each team being dedicated to a specific aspect of the design. The four teams being:

- Project-wide MEP coordination
- Project-wide Structural coordination
- Project-wide sustainability Champion
- Project-wide façade coordination

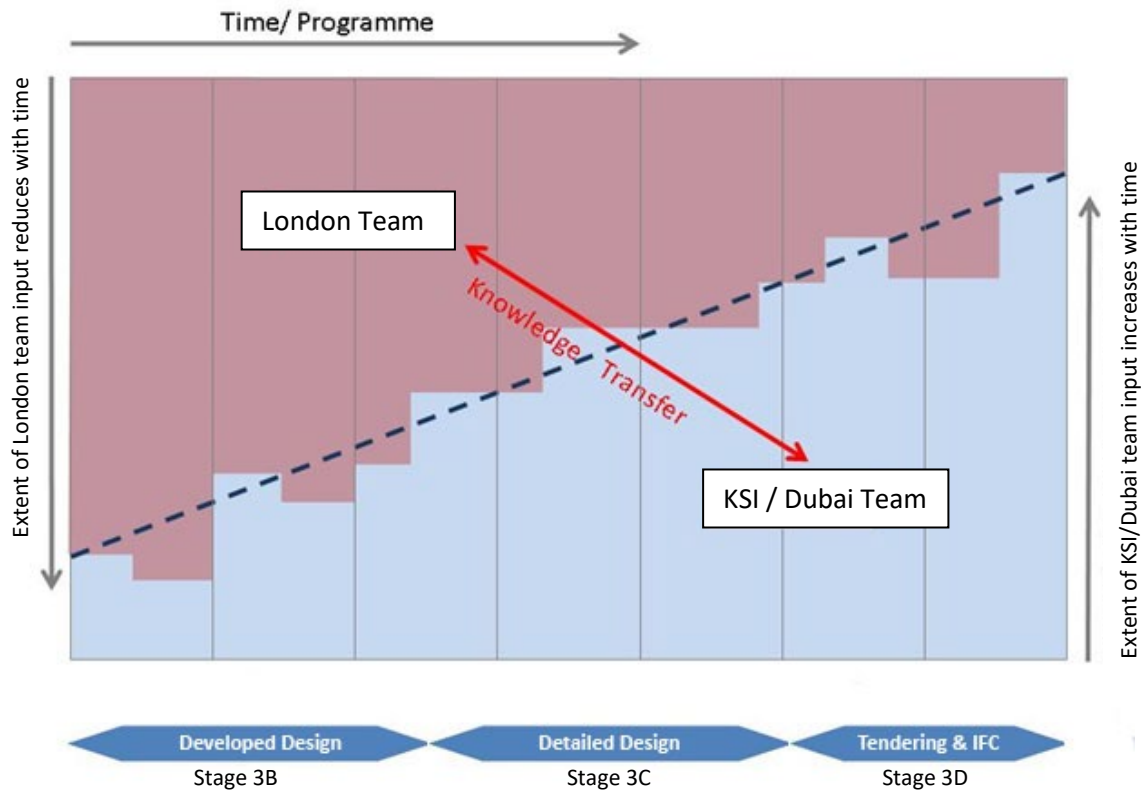
At the time of writing, not all information relating to the ground floor design, masterplan interface or modular consultancy were available. In light of this, we anticipate the formation of further teams to address additional project information.

All design teams supported by a singular Project BIM team, ensuring the output of all assets is fully coordinated. The BIM team will work Closely with the QA/QC lead picking up any design inconsistencies and reporting back to the project Coordinator.

Above: Organogram for HKR design Structure.

4. Resource Deployment and Distribution

HKR operate as one office with two principal design hubs located in London and KSA/Dubai. This protocol is designed to ensure all the requisite sectoral skillsets are available to the project.



Above: Gradual transition between London team and KSA team across stage 3

Knowledge transfer is not just about systems but more importantly, people. HKR envisage that the Stage 3B will be executed principally from our London office. HKR together with structural and MEP engineers will create a project base office, where the whole team of architects and engineers will be fully designated to work on NMDC.

The team will be supported as deemed necessary by our Dubai/KSA office. After the first two months as we move into Stage 3C when the level of coordination with sub-consultants and Stakeholders intensifies, majority of work will be produced in Dubai/KSA office and team members from London office will move to work in Dubai/KSA office. Key personnel will be available to NMDC within 24 hours' notice in Mukaab District if required. As described earlier we will have a local Liaison Director in Mukaab District, NMDC throughout the Design process. All

our Consultants are Dubai/KSA Based. We will also be employing local talents whom we will train during the work on the project.



Above: Key senior personnel remain on the project as resource focus shift from London to KSA

When tender stage commences HKR will ensure key designers are involved in the Supervision team where they will review shop drawings and ensure the design integrity of the construction works.

We use our cloud server infrastructure for sharing / transferring information between HKR offices and inter alia with Consultant's offices. This system not only permits sharing of Information but maintains control over remotely located members of the project team.

- Refer to Appendix F: Detail Design Schedule and Schedule Management (Various)

5. Scope

5.1 Outline Scope

Scope of Work as per appendix 8A of the Agreement Contract is as follows. HKR's scope of work is related to the residential building assets (Coastal and Urban) and the spaces and different functions that are planned within the plots of these buildings (e.g., retail and commercial). The Mukaab District design shall incorporate all core and specialist design disciplines and categories as required to meet the objectives and NMDC procedures for 3B-3D, including:

- Agnostic Modular Design / Industrialised Construction
- Architectural Design Works
- Interior Architecture Design Works
- Retail and Food and Beverage (F&B) Works
- Acoustics
- Signage and Way Finding
- Geotechnical Engineering
- Structural Engineering
- Mechanical Engineering
- Electrical Engineering including Extra Low Voltage (ELV) Systems
- Infrastructure within Assets
- Vertical Transportation
- External Works
- Fire Safety Engineering
- Security
- Mobility
- Earthworks
- Wet Infrastructure Utilities
- Water Features
- Dry Infrastructure Utilities
- Solid Waste Management

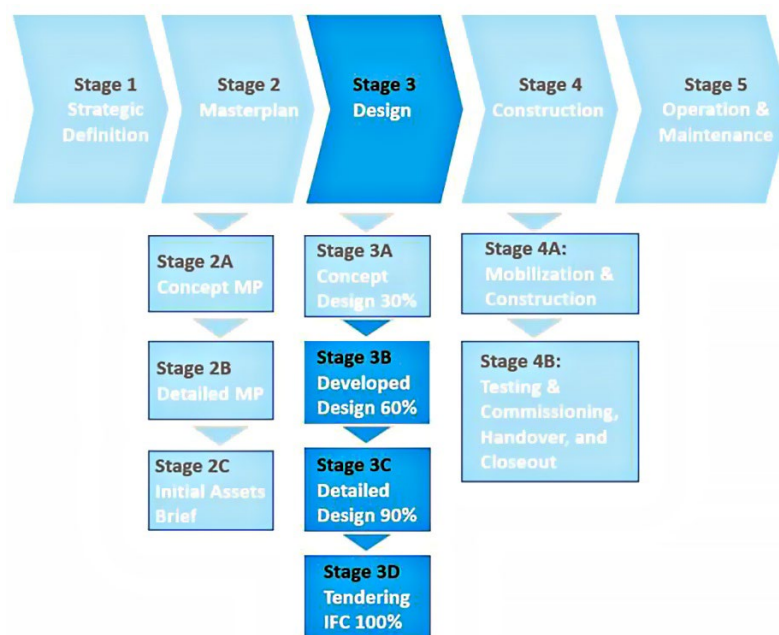
In addition to these, the following discipline specialists will be appointed by HKR. The appointment of the specialist disciplines providers listed below will be (subject to the approval in writing from The Employer):

- Fire & Life Safety (KSA Civil Defence approved specialist)
- Façade and BMU
- Specialist Lighting (Internal/External/Landscaping)
- BIM Modelling
- Sustainability LEED Energy Thermal Modelling
- Sustainability LEED Water Modelling
- LEED Daylighting Modelling
- LEED / Sustainability
- Environmental Impact Assessment (EIA)
- Traffic Impact Assessment (TIA)
- Irrigation Design
- Tech. & Digital

Note: Duplicate items of specialist design were removed from the original 8A list, where these are already indicated in the first scope list above.

5.2 Scope Work Stages

Before describing the scope of work in more detail, it is important to identify the work stage(s) to which the scope relates to. HKR is required to provide the 3B Developed Design, 3C Detailed Design, and 3D Tendering and IFC design stages for all design disciplines required for the Mukaab and in accordance with the 'NMDC plan of work' shown in the diagram below:



Stage 3A – Concept Design

Concept design have been completed and approved with pending comments. HKR have reviewed the design and are currently working with the client to close out outstanding comments. HKR is responsible for incorporating and closing out outstanding 3A comments at work stage 3B.

- See Appendix B for stage 3A Design Review CRS and response to comments.

Stage 3B – Developed Design

At this stage, the space/program and design approach must meet all the requirements of Client. HKR will prepare developed design including coordinated drawings, developed specifications, developed capital cost estimate and lifecycle cost, including Design Risk Assessment and Design Interface matrix between various stakeholders of the project as per the requirements mentioned in “Mukaab Residential Assets Stage 3B-3D Design”. At this stage 60% of the design deliverables are to be completed.

At a very high level, the design team is to deliver the Concept Design intent with as little deviation as possible from the original Concept Design vision. In the meantime, through careful consideration and coordination of the stage 3A design and comments, the design team may encounter refinements and improvements in efficiency, innovation, sustainability, buildability or cost. These will be duly tabled with the client for discussion/approval following the clients own change management and review procedures.

The Mukaab development principles will underpin the remaining design development of work stage 3. All of the principles will have been considered and partly incorporated during stage 3A. Many of the decisions relating to principles of Nature, Smart infrastructure, Mobility, Community living and Logistics, have now been fixed into the design as these would have been required to be locked in at masterplan level. These will continue to interface with the design development during the remaining stages. The principles of Liveability, Sustainability , Supply Chain and Technology are much more pertinent to stages 3B to 3D, and will be key drivers in the refinement of the design.

HKR will immediately commence work in a proactive manner to assess existing design and see if any of the optimisation and improvement are required in addition to implementation and confirmation of Code A’s comments as well as all Code B’s comments and responses to be segregated and declared and implemented. All will be presented in tabulated form and a continuation of the existing design CRS template.

- See Appendix B for stage 3A Design Review CRS and response to comments.

HKR will commence detail research of the selected by NMDC IC/MMC manufacture systems and prepare detail presentation documents with comparisons, advantage-disadvantages, cost

evaluations, schedule evaluations, establishing commonalities and concluding into a universal design.

HKR will work with the multi-disciplinary team and participate in the development of the building's systems and budget. HKR will convene regular formal Design Team Meetings as well as individual discipline workshops at the location of their core team to achieve a coordinated approach to the design.

Following the issue of preliminary drawings and the production of separate discipline drawings by sub-consultants, HKR will commence "bulk" coordination. We will work with the Structure and Services sub-consultants to develop and plan the spatial requirements, structural zones, etc. to optimize the positions and arrangements of the Structural & Service Systems with due regard to cost, operational & statutory requirements.

During this stage HKR will be responsible for coordinating the designs for MEP, Structure & Services requirements as set out by the sub-consultants. This work will involve a very close and proactive relationship with the sub-consultants.

Stage 3B Cost Plan

HKR will work with a Cost Consultant, who will be required to develop an elemental cost plan and estimate of the design during this design stage. Any overrun of costs will be identified and a Value Engineering workshop will be convened by HKR.

- Procedures:

- NMDC-NCC-PRC-001_02.00 - Cost Estimation Procedure

- NMDC-NCE-MNL-001_01.00 Cost Estimation Manual

- NMDC-NEN-PRC-007_01.00 Value Engineering Procedure

Stage 3B Deliverables

The deliverables of the stage 3B will include all documents outlined in scope of services for stage 3B in "Mukaab Residential Assets Stage 3B-3D Design" scope of Services.

Special attention will be given to development of industrialized construction system, where Design and Technical director will be working closely together to identify the best solutions in collaboration with selected IC/MMC manufactures.

The completion of Developed Design represents a key milestone and defines the principles, systems and strategies of all aspects of the project going forward. The Developed Design Report produced at this stage is a key deliverable and will be submitted one week in advance of the

Review, enabling the Client to comprehend the documentation prior to the commencement of the review process.

The Consultant shall prepare a Developed Design report for presentation and delivery to the Client.

The Developed Design Report will include a section for all disciplines. The Report will follow the requirement and format provided in NMDC-NEN-PRC-005 (Stage Deliverables Procedure).

The Developed Design report shall include commercial report and draft tender documents for all major disciplines, including sustainability to be provided for the base building design elements to demonstrate the quality and selection of materials, basic finishes, equipment's and proposed systems to best demonstrate the design intent for the project. HKR propose that the Technical Team will work in parallel with the design team to develop draft Tender documents. In our experience these two functions work together but under separate leadership.

Stage 3C – Detailed Design

Following the approval of the Developed Design by the Client, HKR will proceed to the Detailed Design Stage 3C. By this time, we will have clearly established the Developed Design layouts and defined the appearance of the project; internal layouts with outline finishes schedules will be developed and the project Cost Plan will be established at the completion of Developed Design stage. The commencement of Detailed Design Stage is triggered by sign-off and approval of the Developed Design by the Client.

During Detailed Design (Stage 3C) the design reaches the level of refinement and coordination necessary for the development of final detailed drawings for Construction and Tender documents.

Based upon the approved Developed Design Documents, cost plan and any adjustments to the program, schedule or budget authorized by the Client, the Lead Consultant will prepare the Detail Design Drawings such that they fix and finalize the size and character of the Project. At this stage 90% of the design deliverables are to be completed.

At the beginning of Technical Design, HKR will incorporate the selected systems, materials and equipment into the frozen design and will continue to evaluate the design through VE workshops by making sure that design and eventual operation of the asset more efficient without compromising on the asset's essential performance, quality, and maintainability. The design will be developed during this stage to provide a set of documents suitable for Contractor's to prepare bids, including a full specification of the works. Early works packages will be accelerated to provide tender/ bidding documents ahead of the main schedule/programme and when deemed necessary in advance of the Design Review and Approval process.

At the commencement of this phase HKR will also use the checked and collated Developed Design documents to produce a full Mock-up book of all intended Architectural Construction Drawings. This will be drawn up at A3 (half scale) and will be fully cross-referenced to ensure that all areas are fully drawn at the appropriate scale without repetition.

During the Detail Design Stage, HKR will coordinate with the sub-consultants in achieving the Client's Programme; complete scheduling of all finishes and other key architectural components; identify key typical details for all major architectural systems and prepare a second draft of the final specification.

Specifications will be based on the CSI's Standard Master Format which refers to the British & American Standards. The Standard Master Format has been widely used on many projects especially in the Middle East. This specification has also recently been thoroughly updated to reflect availability of materials and components with equivalence to the specified products. We will employ a materials research and specification coordination specialist, who will ensure that the materials selected comply with Sustainable KPI's and will coordinate a consistent approach across the project with the specification writer.

At the commencement of the project, a Common Data Environment and Electronic Document Management System will be established by NMDC Information Management Team. HKR's Project Task Information Manager will lead the Coordination of same once established. In the Detail Design Stage, the framework of the documentation and drawing system will be completed with relevant information. As each of the project's main components achieves detail design completion, HKR will composite the information electronically and in hard copy to verify full completion and that all necessary information to proceed to Construction Drawings is available.

Stage 3C Cost Plan

The Cost Plan will be updated at the end of Detail Design to verify that the cost of the project is aligned with the budget. As required, a VE workshop will be convened to align the design with the budget and HKR will carry out a stage QA/QC audit, before final stage invoicing occurs, rectifying any discrepancies, errors and/or omissions prior to final issue of the Tender Documents.

Stage 3C Deliverables

The deliverables of the stage 3C will include all documents outlined in scope of services for stage 3C in "Mukaab Residential Assets Stage 3B-3D Design" scope of Services and NMDC-NEN-PRC-005 (Stage Deliverables Procedure).

HKR will develop a construction system in collaboration with selected IC/MMC manufacture and deliver the drawings to LOD 300. Particular attention will be paid for to ratify the interfaces between various components potentially delivered by several manufactures as well as the interfaces between offsite and onsite works.

HKR will further develop and review in collaboration with selected IC / MMC manufacturers 3D construction sequence diagrams incorporating the IC / MMC systems, including but not limit to consideration for Supply Chain, Manufacturing, Logistics (Delivery route, crane capacity, crane position, storage) and Installation.

Stage 3D - Tender and IFC

HKR will be responsible for completion of all Tender Document packages, to allow sequencing of trades, as required by the master construction programme prepared by the Client. The tender process will allow for the advanced issue of the structural package to allow the early works packages to proceed on site. As well as preparing drawings to enable building Mock -ups of the IC and MMC components to ensure quality and deliverability of the end product.

Upon Client's Written Approval of the Detail Design Submittal, the Consultant shall initiate the Tender Documents Stage to support main contractor and manufacture appointment. To include Employer's information, drawings, specifications, bill of quantities, schedule of rates, approved samples where applicable.

Tender stage activities will be controlled by the Client/ Project Managers and HKR will support these activities by providing Tender Support Services and prepare Contract Formation and IFC drawings and documents as required by NMDC-MEN-PRC-005

At the beginning of this stage HKR will prepare a comprehensive list of proposed construction contract packages and will identify possible risks of programme delay or cost over-run. HKR will work with the NMDC's approved Mass Modular Contractor (MMC), capture all commonalities between the various engaged MMC and finalize an optimized design and fabrication method. The methodology will be such that any of the MMC's engaged for construction can execute the works. HKR will liaise with the MMC's to ensure Modular construction coordination with fabricator/ manufacturer post tender and with the contractor to address any buildability/design issues

A full Materials & Products list shall be drawn up and reference numbers applied to every method and product.

HKR will assist in identifying packages where cost risks are significant and provide information for preliminary pricing e.g. cladding and curtain walling packages; accelerating these areas to tender ahead of other packages. So that costs can be established and any VE exercises implemented before tendering for the MMC Contractor. HKR will provide technical assistance in the trade package procurement process.

The Developed Design report will be updated to reflect any further developments from this stage of work and submitted prior to the Technical Design Review.

HKR will assist in preparing clarifications and addendums to the bid documents, if required. HKR will revise bid documents, if required and subject to agreement by the Client that this is

necessary, as an additional service. HKR will incorporate bidder VE exercises and/or alternative proposals If directed by the client

HKR will respond to bidder's enquiries within 3 days and, if necessary, amend the bid documents to reflect any clarifications. All communication with bidders will be through the Project Manager, the protocol for which will be defined in the PEP prepared at the inception of the project.

The Tender Documents set shall include all the information produced in the previous Design phase and shall be further detailed/refined to show the contractor the exact method of installation and construction, especially as it relates to exterior and interior visible areas and all critical components of the building and for the integrity and performance of the building.

A comprehensive list of all drawings, reports, specifications and BoQ's that form the tender documents will accompany the submission.

Stage 3D Deliverables & Approvals

The deliverables of the stage 3D will include all documents outlined in scope of services for stage 3D in "Mukaab Residential Assets Stage 3B-3D Design" scope of Services and NMDC-NEN-PRC-005 (Stage Deliverables Procedure).

The Consultant shall, in coordination with the Cost Consultant, prepare complete Tender Documents for review and approval by the Client. The Consultant shall provide the Client's Cost Consultant with required drawings, details and other documents enabling the Cost consultant to generate Bills of Quantities (BOQ) to an acceptable level of breakdown in order to avoid future claims to be raised by the Contractor executing the Project subject of this Contract. Tender Documents shall include specifications for site offices. Specification shall also provide for overtime for Client and Client's Consultants consistent with Client's Agreements with Client's Consultants. Upon Approval, the Consultant shall deliver a complete set of tender documents in soft copy (PDF & CAD format) on the Client's network.

Stage 3D – Tender Analysis

Upon Client's Written Approval of the Construction Documents the Consultant shall initiate the Tender Analysis Stage as outlined below.

HKR assisted by their sub-consultants will evaluate bids for technical compliance with the Construction documents and participate, as required, in a series of technical workshops after the receipt of bids. A Technical bid analysis Report will be delivered at the end of this stage.

During the tender of the project the Consultant shall:

- Issue bulletins during the tender period in answer to Tenderer's questions.
- Consider and advise the Client of any alternatives proposed by the Tenderers.
- Coordinate Responses to Bidder inquiries.

- Conduct Bid Review, Analysis and Evaluations.
- Where necessary and as an additional service, revise Contract Document information to adjust tender sum except for the revisions where required to correct errors and omissions.
- Consultant will analyze bids and advise Client in the evaluation of Tenderers bids and other submissions.

Stage 3D – Information for Construction

Information for Construction will be produced subject to final Tender Information including Bid Addendums, Contractor's Proposals and VE Exercises being agreed with the Client and incorporated into the bidder's costs. A general update of Tender Information will take place prior to the Contractor Signing the Contract and this will be the Information for construction Issue.

HKR will provide MMC support Services In line with the scope outlined In "Mukaab Residential Assets Stage 3B-3D Design" scope of Services, including HKR guardianship role during construction and responding to RFI's from the Contractors.

5.3 Disciplines Scope of Work

The scope for each discipline is described in appendix 8A of the Agreement Contract, and is summarised below.

- Refer to appendix C of this document for extensive description of each discipline's scope
- Extensive information regarding scope and deliverables can be found in appendices G through to K of the Residential Assets (Stage Deliverables Procedure) NMDC-NEN-PRC-005. It is not necessary to fully duplicate this information within this PEP.

Architectural & Modular Design Works

The Mukaab includes eight (8) different residential asset typologies with a total of seventy-one (71) buildings. HKR and the design teams will identify the basic module of 4.5m x 7.2m (the basic building block) at an early stage of design (3B). It must be explored as a kit of well-defined parts, identify all the parts, define the required performance specifications (aligned with the specifications provided in Stage 3A) for each part as well as interface specifications for each of the parts and assign one or more manufacturer to develop a common universal design solution that can be manufactured by all.

Interior Architectural Works

Interior finishes, furniture, fixtures and equipment (FF&E), and appliances for all residential units fall under three main categories:

- Economy
- Standard
- Premium

Coastal buildings are expected to have premium finishes, whereas the selection of finishes in other buildings, whether it is by unit or building type, will be driven by Value Engineering (VE) and cost optimization during the design process. HKR have split the interior works into two packs: modular interior design, common areas interior design.

Structural & Civil Engineering

BMCE as part of the design team will lead the structural and civil design of the NMDC Mukaab, all the units are based on a module size of (4.5 m) width and (7.2 m) deep, as that gives the opportunity to combine several volumetric modules to generate different residential unit types. The Urban buildings have (6.5 m) high podiums that are to be built using off-site manufactured "Kit of Parts" components, to accommodate the retail / F&B units' requirements for size and height.

MEP, AV, ICT, ELV

Delap & Waller as part of the design team will lead the MEP design of the NMDC Mukaab, including Thermal Modelling.

A key strategy to reduce reliance on manpower is by leveraging data analytics, predictive maintenance, and smart technology solutions by deploying systems including (but not limited to):

- Building Management System (BMS)
- Building Energy Management System (EMS)
- Leak detection systems
- Smart irrigation systems
- Construction Operations Building Information Exchange (COBIE) and Building Information Modelling (BIM)

Landscape Architecture

Uncommon Land will lead the Landscape element. There are sixty (60) buildings with courtyards across the Mukaab. Eleven (11) of the U1 buildings do not include any courtyard.

The courtyards vary in size depending on their associated building typology.

The Coastal C-shaped buildings have open courtyards where one side looks out onto the surrounding landscape (Coast and Port). The Urban O-shaped buildings have enclosed courtyards, resembling an oasis in the middle of the building.

Sustainability, Acoustics, Fire Safety Engineering

AESG as part of the design team will lead the sustainability, acoustics and fire safety engineering aspect of the NMDC, working in synergy with the Mukaab District wide masterplan to achieve NMDC's sustainability objectives which include (but are not limited to):

- Zero-emissions energy, water supply and mobility
- Zero-waste implementation of circular economy principles
- Landscape irrigation from 100% water reuse
- Native planting and net improvement in ecological value
- Improvement of social value and enhanced well-being
- Liveable community with a connected, walkable, and comfortable public realm
- Incorporation of innovation and technology
- LEED certification.

- Processes:

NMDC-NLF-PRC-002_03.00 - Fire Safety Approvals Procedure

NMDC-NEV-PRC-501 Interim Sustainability Requirements Procedure

Façade

Koltay as part of the design team will lead the façade engineering for the NMDC Mukaab.

The Concept Design defines seven (7) different façades typologies:

- Cassette Long
- Cassette Short
- Cassette In and Out
- Cassette In and Out Plus
- Grid
- Majlis
- Porch.

Waste Management, Retail F&B

Elevate as part of the design team will lead the waste management and retail F&B for the NMDC Mukaab.

Logistic & Mobility

Velocity as part of the design team will lead The logistics and Mobility element of the scope.

- **Smart Locker Rooms:** A storage solution that has integrated technology built into it, allowing it to automate package delivery, notification, and distribution. Once the verification information is entered correctly, the door to the correct locker will open and the resident will be able to retrieve their package.
- **Unmanned Aerial Vehicles (UAV):** The roof area and / or the landscape may be used for dispatching and landing goods via delivery drones. Delivery drones may incorporate biometric identification technologies or integrate an acknowledgment system for verifying package owners.
- **Autonomous Delivery Assets:** Create the possibility of delivering packages to residents up to their front door using machines.
- **Waste Collection Vehicles Dedicated Areas:** Waste is to be collected by special vehicles and transferred to the outside of the Mukaab. Specific approaches to transfer waste from the storage rooms to the automated vehicles must be developed by the Consultant.

- **Delivery Vehicle Drop-Off Areas:** The drop-off areas shall accommodate FF&E transportation for up to three (3) to four (4) units at a time.
- **Underground Tubular Delivery:** A zero emissions underground delivery system specifically dedicated to the logistics hubs.

Signage & Wayfinding

Dezigntechnic as part of the design team will lead the signage and wayfinding strategies. Signage and wayfinding shall serve as a communication tool to not only facilitate access, but also to reflect the local culture, complement the built and natural environment. The signage design shall be aligned with the approved Detailed Masterplan design for the Mukaab, as well as the overall landscape design.

Vertical Transportation

RBA as part of the design team will lead the vertical transportation strategies.

Cost

Compass will work within the Design Team providing regular concise and timely advice on the design and delivery strategies. While the cost consultant reports directly to the Project Director he/she will also have a direct line of communication to the PM/QS thereby ensuring the design stages remain within budget and avoiding the delay of unnecessary redesign to align construction budgets. Cost Control is therefore embedded in the Design process. Compass are responsible for cost estimation following procedures NMDC-NCE-PRC-001 and NMDC-NCE-PRC-002.

Geotechnical Engineering

BMCE and NEB collectively are to advise on the geotechnical survey requirements and review/advise on the report outcome of the geotechnical survey. BMCE to advise primarily on structural issues and requirements. NEB to advise primarily on local code aspects.

Security

NEB as part of the design team will lead the security strategies.

5.4 Project Specific design and approval process.

HKR is responsible for design of the assets, including the day-to-day management of the design, monitoring and updating the work programme, allocation of staff resources, and reporting to achieve project objectives. Each design submission will be accompanied by a BIM model developed to the level specified in NMDC's Technical Procedure reference NMDC-NEN-PRC-009 (GIS & BIM Procedure) at the end of each design stage.

The stage 3B design review is mandatory for all design projects unless waived by NMDC as a special case. All 3B design deliverables as a minimum will be as per design deliverables in NMDC-NEN-PRC-005 Appendix G and H, these have been appended as per their original Appendix Number in NMDC-NEN-PRC-005.

For the purposes of the initial PEP, HKR are describing Stage 3B design review procedure. Full description of all stages are available in Design Review Procedure NMDC-NPR-PRO-100_ Rev 02.00.

- A. The purpose of the Stage 3B Design Review is to accomplish one or more of the following:
 - To confirm that the designer has the Basis of Design Data (BOD), including as-builts and utility interface points, and validated any data provided by NMDC; To approve the initial design basis criteria and the initial asset brief criteria that will govern the design;
 - To list major procurement items and study options for procurement of long lead ones.
 - To submit exceptional risk/constructability assessments.
 - To demonstrate compliance to All 3B Design deliverables as per NMDC-NEN-PRC-005.
- B. PMC will notify their engineering department reviewers and the lead discipline engineers that the package is available and the date for comments to be returned. The design review period will be (20) working days for 1st cycle and (10) Working days for second or subsequent submissions. This will need to be clearly reflected within all schedules relates activities undertaken by the designer and PMC.
- C. HKR will submit the package to PMC for review and approval. PMC will review and approve the designer documents for completeness. Post PMC review the CRS will be issued to relevant NMDC PTS design manager for No objection. The regional NMDC PTS design manager will coordinate with all relevant NMDC teams (NEV/ETSD/UD/Relevant Sectors). The CRS will then be transmitted back to the PMC and designer. HKR will act on the comments and resubmit any affected documents of the package to PMC via CRS on ACONEX.
- D. PMC will receive the designer response to the comments and the forward them to the original reviewers for concurrence. Each reviewer will indicate on the comment sheet whether the designer & response is in compliance with his comment as stated. NMDC will investigate all comments not marked in compliance and take appropriate action to resolve the discrepancies in consultation with the lead discipline engineers and the cognizant HKR representatives.

- E. Once resolution of all comments is agreed, PMC will instruct the designer to proceed to next stage. NMDC will retain copies of all the CRS and these will be used during the formal design gates.
- F. During the formal design gate 3B, PMC will also prepare a stage review report, attach the package, and transmit it to PTS. NMDC PTS will conduct a quantitative gate review. NMDC design managers will identify the required number of packages and the recipients in their respective departments. PMC will forward the comments to the designer for advance review while also arranging a meeting with the designer and the reviewers to discuss and agree on the necessary actions to comply with the comments. HKR will prepare minutes of the meeting which will be signed by NMDC, PMC, and other key participants of the meeting.
- G. If Value Engineering (VE) is required by current NMDC standards, PMC will provide one copy of the review package to the value engineering coordinator who will arrange for a workshop to be conducted. Following the value engineering workshop, PMC will review the recommendations produced by the workshop and prepare an implementation plan. The implementation plan will include justifications for any deviations from the recommendations of the VE workshop. Once approved, the implementation plan will be forwarded to the designer for action. A copy of the implementation plan will be retained by NMDC.

5.5 Scoring Card Process

Minimum design review scope for all assets will be as per NMDC's Stage Deliverables Procedure NMDC-NEN-PRC-005 and as per the requirements of the Initial Asset Brief NMDC-NEN-PRC-004. Design maturity will be subject to design stage reviews as per NMDC's Stage Review Approval Procedure NMDC-NEN-PRC-021 and the quantitative design gate approach as per this document. This DMP outlines the specific design gate requirements during Stage 3 and the gate Pass/Fail criteria for NMDC design stages. This will be implemented and conducted by PTS in addition to the requirements of NMDC -NEN-PRC-021.

It is extremely important to segregate the design review and design gates (Stage Review). These are two different attributes, and the outcomes of design review will enable NMDC to conduct the design gates. There will be 5 major design gate attributes which will be gauged quantitatively.

- Please refer to Appendix E for scoring criteria examples.

The total available gate score for Stages 3A and 3B will be 105 and for Stages 3C and 3D the total available score will 115. Please note the total score available is a baseline and can be adjusted to suit the requirements of a specific asset.

It is expected that at 3A and 3B a 70% score will initiate a design gate pass whereas for 3C a minimum pass core of 90% must be achieved. For Stage 3D a pass core of 100% must be achieved. Please see Appendix 1 and 4 for NMDC stage gates and scoring criteria. Evidence of design stage-gate review will be maintained in ACONEX.

6. Communication Procedures

During the first week of the project, the design team have communicated with the client team informally via email, workshops/meetings with recordings/minutes, with HKR generally being the main point of contact between the design team and the client body. A project specific protocol for communicating through Aconex will be adopted as outlined in the during workshop No 1 on 21/02/2023: Document Control Process, Aconex, Standards & Requirements & Design.

HKR operates it's own procedures for internal team communications. The Project Coordinator is responsible for leading communications across the HKR team. Where large elements of the team are based remotely this requires increased focus. This will be reflected in the communications plan established within the project quality plan and the frequency of verbal communication through Teams, conference calls and collocation of the Project Coordinator between the various offices involved.

All formal letters and document transmittals, between organisations are to be authorised by the Project Director and marked for the attention of the recipients Project Director. The Project Director authorisation will act to ensure that the following protocol is observed:

- HKR are to seek Client (prior) approval for all outgoing communications with any organisations with whom we are not contractually bound by Agreement (for example, members of Project Team and Authorised Third Parties); where approved for issue, mails are to copy the Client and the Employer.
- HKR are to reply to any project-related correspondence from a party with whom we are not contractually bound by Agreement, on which our Client is not copied, asking that it be 'reissued through the correct channels of communication'.

- HKR are to act to ensure that our sub-consultants (where appointed) do not communicate with any member of the Project Team without HKRs prior knowledge and consent; and that, where authorised, HKR are kept copied.

Any deviation from this protocol must be authorised by the Project Director.

7. Document Control

7.1 Information Naming and Filing

All project material is named in accordance with the general principles set out by the clients naming and numbering procedures. All material is to be filed within the relevant sub-folder of the Server Project folder until formally issued via Aconex. A unique protocol is to be observed for BIM Model management - detailed in the BIM Execution Plan. All drawings will use the title block provided.

Procedures: NMDC-NEN-PRC-030 Project Document Numbering and Revision Procedure, NMDC-NEN-PRC-008 Numbering and Revision and NMDC-NEN-PRC-010 Drawing and Drafting Procedure.

7.2 Checking Procedures

All published information, including drawings, is to be subject to checking procedures prior to release. All documents shall contain a "Document Approval" section used to record the preparation, review and approval of the document. This shall be in table format and shall contain the columns indicating "prepared by", "reviewed by" and "approved by". Signature to be signed underneath the Job Title column for each reviewer. All sub-consultants information is to be issued in accordance with the same procedure. The core principle of this process is to ensure that all documents are;

- checked for formatting or administrative errors
- authorised by the author(s) for issue
- checked by senior technical staff for technical errors and inconsistencies
- authorised by top management/ Enquiry Director

7.3 Incoming Documentation

All incoming documentation and formal correspondence (letters and hard copy information) is to be directed to the document Controller for processing. All the letters and financial related correspondence should be addressed to Contracts. NIC dc Parsons.

7.4 Outgoing Documentation

The Information Controller is responsible for processing all outgoing documentation and formal correspondence in accordance with the Checking process and Issuing Documentation process. Project Document Transmittals are to be transmitted through the Client's chosen document management platform, in this case, Aconex.

7.5 Email Filing

All significant incoming and outgoing emails are to be filed on the project folder, in a subfolder location according to the intended recipient/ sender.

7.6 Document Management Platform

Aconex Construction Management from Oracle

7.7 Client Project Protocols

NMDC-NEN-PRC-030 Project Document Numbering and Revision Procedure

8. Inclusions and Exclusions of Services

8.1 Inclusions

Inclusions are as per the HKR appointment contract with the exception of the exclusions outlined below.

8.2 Exclusions

The following items are excluded from the scope:

- Provision of Physical models
- VR interface with 3D models
- Provision of hard copies of all documentation?
- Research and development of new software
- Research and development of new products
- Design of any elements outside of the building asset plots.
- Calculations for road capacities requirements
- Calculations for any other infrastructure capacities
- New balcony typology design

9. Detail Design Schedule and Schedule Management

The objective of the time management element of the PEP is to set the principle of schedule development in line with NMDC's Program, Planning and Control Manual (NMDC-NEN-MNL-001) and control its updates in order to meet the completion date of the project and the reporting requirement under the different classes of schedules.

HKR Architects will develop a Design Stage and Tender Stage Master Deliverables Schedule (MDS) in coordination with all sub consultants. This MDS will identify all proposed documents and models to be delivered at each design stage and will be in line with the scope of work identified in NMDC-NEN- PRC-005.

HKR Project Coordination and Administration Team will use the MDS as a management tool to track progress and coordinate all key design and authority submissions. This Master Deliverables

Schedule will be used to identify and track documents required for submission at stages 3B to 3D.

A baseline design programme will be developed for each stage of the project, following the principles and work-flows set out in the client procedures and protocols. This programme is the baseline against which design progress is measured and managed through the design stage using Primavera to measure progress against the project KPI's.

Detailed programmes for each design stage are produced and circulated by HKR Architects, following liaison with all sub-consultants, the PM and Client. HKR will identify any areas of risk to the programme, by updating and issuing the Design Risk Register.

- Refer to Appendix F: Refer to Appendix F: Detail Design Schedule and Schedule Management (Various)
- Procedures:

NMDC-NCE-PRC-002_01.00 Key Performance Indicators Procedure

NMDC-NEN-MNL-001 Program Planning and Control (PP&C) manual

NMDC-NPR-PLN-004 NMDC Projects Project Controls Reporting Plan

NMDC-NPR-PLN-006 NMDC Projects Schedule Management Plan

10. Cost Management

It is essential that the development of the design is continuously monitored and not simply the subject of a review at each stage in the process. Notwithstanding the fact that the client will appoint an independent Project Manager / Cost Consultant, HKR will engage their own independent Cost Consultant, to work within the Design Team providing regular concise and timely advice on the design and delivery strategies. While the cost consultant reports directly to the Project Director he/she will also have a direct line of communication to the PM/QS thereby ensuring the design stages remain within budget and avoiding the delay of unnecessary redesign to align construction budgets. Cost Control is therefore embedded in the Design process. Including defining the scope of works for provisional sum(s) & evaluation of the provisional sums during & post tender.

Cost control of the project is of paramount importance. The objective is to carefully plan out every aspect to minimize the unknowns during the design development and construction phases in order to maintain expenditure within the budget. Cost control advice is a critical and important part of the design process.

The establishment of a financial framework at the very first stages of the project with the aid of the Cost Consultant is essential. HKR will work closely with them to achieve this. Continuous monitoring of the scheme ensures that the costs of the project are known at each stage, allowing the design team to control the scheme development within the cost budgets.

This team will provide accurate, bench marked, market tested and up to date cost advice as we move through the design stages. They will instil processes in the design function to mitigate the financial risks to the project, reduce abortive design costs and strive for value. The cost consultant operate continuous 'live' cost tracking as the design progresses providing the client with continuous reassurance that the design is being carefully cost monitored as it progresses through the stages.

In addition to the above, HKR design team will be following cost management procedures set out by the client:

NMDC-NCC-PRC-001_02.00 - Cost Estimation Procedure

NMDC-NCE-MNL-001_01.00 Cost Estimation Manual

NMDC-NEN-PRC-007_01.00 Value Engineering Procedure

11. Value Engineering

HKR promotes, throughout the entire development process for any project the ability to "Design for Value" through a rigorous process of value management. This is a philosophy which is naturally engrained within the working methodologies of HKR. Through value management, our teams always strive towards the most appropriate and commercially advantageous designs which fit with our client's brief.

Within HKR, a wealth of knowledge will be available to the client to ensure that the project will be a success. There are many facets to our management process, but it is fundamentally our ability

to always challenge the design that makes our projects commercially successful. We employ the following methods to ensure that these targets are achieved.

- By collaborative working. At HKR, we listen, we design, we solve and achieve the best solutions for the client.
- We carry our rigorous peer reviews of every stage of the design process to ensure the most efficient designs are achieved. We have extensive experience in designing building for construction, having worked with and for contractors during the site phase. HKR bring the knowledge of being a 'poacher' and a 'gamekeeper'.
- We will naturally always challenge conventional designs-taking nothing for granted.
- We provide optioneering studies to best inform the client of the most appropriate and cost beneficial solutions.
- We exploit creative engineering solutions to optimize potential and commercial returns for the client.
- We strive for standardization of elements in any project.
- We are experts in modular modern methods of construction. We provide agnostic design solutions, to enhance tender return ability.
- We ensure that building spaces are flexible and are adaptable to foreseen and unforeseen future use changes. This can mean for example that hotels are adaptable to serviced apartments, residential units, or even commercial spaces. This is the way HKR think.
- We put a lot of energy into core planning thereby optimizing lettable areas while at the same time planning cores that allow flexibility in tenancies. We start with a good solution and always strive to improve it. Many of our completed office Buildings have achieved Ratios approaching 90% net to gross.
- We always strive to understand the local market and determine the most appropriate solutions with the client, contractors and consultants collaboratively.
- We use BIM design production technologies, whilst freeing our designers to design and maximize the potential of any building.

Ultimately design is a collaborative process, and we take the best facets of every consultants input and deliver the most appropriate solutions. This is what value management means to HKR, "Design for Value".

- Processes: NMDC-NEN-PRC-007_01.00 Value Engineering Procedure

12. Deliverables List of Documents for Stages 3B to 3D

The table below is an excerpt from the “design Stages Deliverables Procedure” and describes the deliverables of design Stage 3. Please refer to NMDC-NEN- PRC-005 for full details.

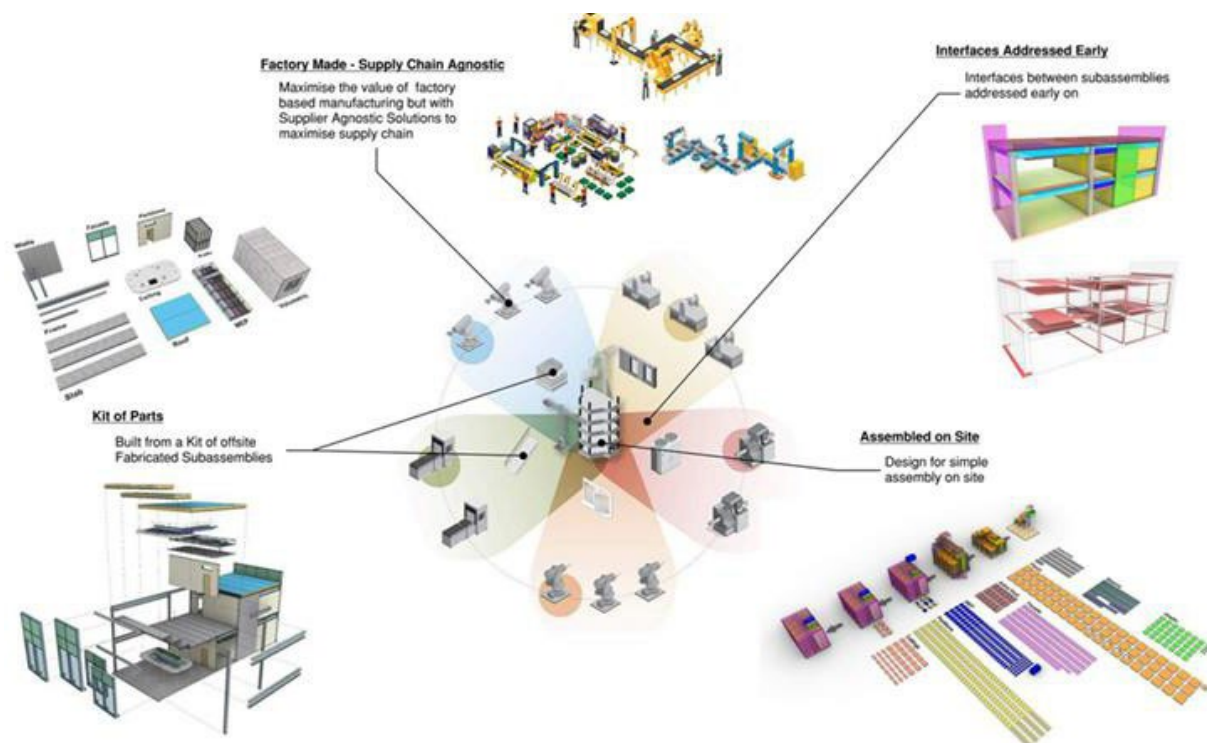
Refer to Appendix D for a complete list of documents.

Concept Design (Stage 3A)	Interim Presentation	Section 6.5.1
	↓ Concept Design Submission	Design Technical Submissions: Book 1 (Section 6.5.2.1) / Book 2 (Section 6.5.2.2) / Book 3 (Section 6.5.2.3) / Book 4 (Section 6.5.2.4) / Book 5 (Section 6.5.2.5), BIM and GIS Model Commercial Report & Tender Documents : Commercial Report (Section 7.5.1)
Developed Design (Stage 3B)	↓ Developed Design Submission	Design Technical Submissions: Book 1 (Section 6.6.1) / Book 2 Results (Section 6.6.2) / Book 3 (Section 6.6.3) / Book 4 Drawings (Section 6.6.4) / Book 5 (Section 6.6.5) / Commercial Report (Section 7.1.5), BIM and GIS Model Commercial Report & Tender Documents : Commercial Report (Section 7.6.1) / Draft Tender Documents (Section 7.6.2)
	↓ Detailed Design and Tender Documents Submission	Design Technical Submissions: Book 1 (Section 6.7.1) / Book 2 Results (Section 6.7.2) / Book 3 (Section 6.7.3) / Book 4 Drawings (Section 6.7.4) / Book 5 (Section 6.7.5) / Commercial Report (Section 7.7.1), BIM and GIS Model Commercial Report & Tender Documents : Commercial Report (Section 7.7.1) / Tender Documents (Section 7.7.2)
Tendering Stage and IFC (Stage 3D)	↓ Tendering Stage Support and IFC Submission	Tendering Stage Submittals: Section 8

13. Strategy for Kit of parts management

The Strategy adopted for the kit of parts management is in line with the key methodology set out in the Design Services Agreement. Excerpt below.

The IC approach seeks to subdivide each building asset down into a Kit of Parts (1D, 2D, 3D) which are manufactured offsite before being brought to site and assembled with minimum finishing or associated site works. Each of these parts are specified by the Consultant in a manner that allows multiple suppliers to manufacture them to increase the available supply chain, remove the risk associated with one single point of supply and allow scalability to meet project demands. For the use of multiple suppliers to work successfully, standardized supplier elements must be used in developing the design and the resulting performance specification(s). In addition, the interfaces between parts must be given equal focus both in design and specification to bring interoperability between parts and ensure a successful and seamless site assembly.



Above: key methodology to achieve this is seen as the adoption of an IC approach for the delivery.

13.1 Team Structure for Industrialized Construction Approach and Design of Construction System 1 (CS1)

Within an Industrialized Construction project there are several key roles that are important for its success:

- Design Team - To maximize the value of an IC approach, the design shall be developed from the outset with the IC approach in mind. Therefore, the developed and detailed design stages shall be undertaken by a design team with substantial ID&C expertise and appointed with the specific aim of delivering an IC based solution.
- Interface Lead – This is key to the success of the IC design and implementation as it ensures that the interfaces between different parts and components delivered by various manufacturers, including but not limited to structural, MEP, and finishes are addressed with as much importance as the design and specification of each of the parts and components. It is a specific role that shall be covered by the design team, and therefore substantial Industrialized Design and Construction expertise is required. This key role must be appointed very early and maintained throughout the project.
- Industry and Suppliers – The suppliers of the kits are key and must be brought into the process at an early stage of the 3B Design Stage. They shall be familiar with an IC approach and have their products clearly developed and documented. Clarity of performance and a commitment to a collaborative focus on interfaces is mandatory, as well as the ability to work in a fully digital manner.

13.2 The Industrialized Construction Design Process

An IC design process seeks to achieve a balance between the two current extremes seen in the use of Design for Manufacturing Assembly (DfMA) / Modern Methods of Construction (MMC) solutions. Either appoint a single supplier at the outset, or design conventionally and the contractor then redesigns to suit the final DfMA / MMC solution.

The IC design process seeks to use an informed and knowledgeable design team to generate a developed and detailed design that meets the brief, but is setup to be constructed as a Kit of Parts (1D, 2D, 3D) without it being locked to a particular system and / or manufacturer. The

design team focuses on the overall IC strategy and defines the performance requirements of the Kit of Parts and particularly the interfaces (e.g., structural, MEP) between them.

NMDC has signed Pre-Contract Service Agreements (PCSAs) with selected MMC manufacturers. The Consultant will be mandated to collaborate with the selected manufacturers that have been contracted through the signed PCSAs. The Consultant shall collaborate from the outset with the selected manufacturers and suppliers. The products' specifications must be further defined and developed allowing a digital prototype of the building to be constructed that ensures all interfaces are fully coordinated prior to manufacture and assembly.

13.3 Key Requirements for an Industrialized Construction Approach

A) Kits of Parts (1D, 2D, 3D)

The building design must be developed in a manner that breaks it down into parts that can be made off site. These parts (1D, 2D, 3D) may be delivered directly onto the building or to a location near the building for assembly into larger parts which are then installed on to the building.

The determination of these parts shall be carried out by the Consultant in collaboration with the suppliers to suit the building form and design and shall seek to use standard 1D, 2D or 3D element types (e.g., post and beam frame, floor slabs, unitized façade systems, bathroom pods, volumetric systems) to be able to draw from the existing global MMC supply chain.

B) Supplier Agnostic Design Solutions

Wherever possible, the Consultant shall keep the design of the individual parts (1D, 2D, 3D) at the performance specification level to determine the key design parameters required from the component, potentially developing the design solution with the appointed manufacturers and / or suppliers. This provides the supply chain with the opportunity to make the decision as to what they can offer as the most suitable solution and ensures the widest possible range of suppliers for the project.

The Consultant shall identify the respective roles and responsibilities, including related deliverables for the detailed design, with the appointed manufacturers and / or suppliers. The Consultant shall produce a detailed design that will hold the needed information and

specifications for the manufacturing and assembling processes at the end of Stage 3C. The economic proposal to be submitted by the Consultant shall allow for an agile design and deliverables approach.

C) Interfaces

Alongside the parts specifications, the interfaces between these parts (and any on site elements) must be given equal consideration early on and each parts specification must include an interface specification (that is common between the two connecting parts). The design and specifications shall address the following:

- **Compatibility** - The interfacing parts shall be compatible to connect in a known and planned manner and shall not require on site modification or adjustment.
- **Interoperability** - The interface must not rely on supplier specific solutions to allow for multiple suppliers to provide the product, and the connection between them and other parts is consistent.
- **Tolerances** - The interface must address normal tolerances and be able to accommodate these without the need for post installation works.
- **Co-ordinated Information** - The final design information must include the full interface details and the elements of the other part being connected to it to ensure full co-ordination and that no detail gaps exist.
- **Responsibility** - Both Consultants and manufacturers shall be accountable for the interface, while the Consultant must be clearly defined as the responsible party for the interface so that nothing is ambiguous or left unresolved.
- **Digital Prototyping** - The IC approach seeks to achieve right first-time installation on-site. Therefore, a fully detailed LOD500 level BIM model is required to be produced prior to the commencement of fabrication. This shall be produced referring to the supplier's BIM information to create an accurate digital twin, but with the incorporation of reasonable tolerances around each element so that the impact of tolerances on interfaces can be accurately assessed and accounted for prior to fabrication.
- **Logistics and Assembly** - The developed design must consider the transportation, storage, erection, and assembly strategy for the building from the outset, as this will form a key part of developing the Kit of Parts strategy. This must account for the method of transportation from the factory to the site (including any shipping that may be required and its limitations),

any on-site but off building assembly required, craneage related size / weight limitations, lifting points, and access for final connection.

Note: Refer to the Industrialised construction section of the Design Services Agreement for further details including IC related scope.

14. Quality Management

This Project Quality Plan is intended to define useful project specific information. The plan falls into three parts:

1. Project Definition

This section is intended as an executive summary, presenting high-level project-specific information. This is intended as an efficient way of communicating key project information to the Consultant Team.

2. The Services and Project Team

This section is intended to provide all information necessary to understand the scope of services and the role of each project team organisation.

3. Project Processes

This section provides the bulk of information on processes which are to be operated or maintained during the course of the Project. Where possible these are described through reference to the standard processes covered in the Practice Manual; however deviations from standard protocol or bespoke project processes are fully detailed (through reference to Level 4 process information, templates and records).

Refer to separate document: NMDC-HKR-DES-PLN-000002 Project Quality Plan

15. BIM Management

This BEP presents an agreed, unified approach for delivering the BIM & GIS Information Requirements as outlined in the Information Requirements and BIM & GIS Procedure of NMDC (PRC-009). In conjunction with that document and the documents and annexes referenced therein, this BEP and its appendices form the complete source of information concerning BIM & GIS on the Project.

- The BEP is binding on all Team Members responsible for authoring and assuring the quality of Information Models and any associated data. All Team Members shall comply with the PRC-009 and this BEP in its entirety.
- A thorough understanding of the Employer Information Requirements and BIM & GIS Procedure of NMDC is a prerequisite to using the BEP.
- In the event of a conflict between the two documents, the details presented in the PRC-009 document shall prevail unless exceptions/non-compliance has been documented explicitly in the BEP document with NMDC's approval.
- The BEP shall be the only BIM plan used by the Team Members. All relevant organizational standards and methods of working shall be incorporated into the BEP, either in the body or as annexes.
- For clarity, the BEP supersedes any other BIM plan that may have previously existed for the Project.
- The BEP is a 'live' document and shall be kept up to date with agreed amendments that reflect changes to the Project, the Delivery/Operation Team Members, NMDC BIM & GIS requirements, and any other project environment.

Refer to separate document: NMDC-HKR-ARC-BEP-000001BIM Execution Plan

Appendix A

Subconsultants Team Structure

Appendix B

Stage 3A design review CRS

Appendix C

Scope of Works Broken Down by Discipline

Appendix D

List of documents for stages 3B to 3D

Appendix E

Design Gates Score Sheet Sample

Appendix F

Detail Design Schedule and Schedule Management (Various)

- Basis of Schedule
- Design Baseline Primavera
- Resource Deployment Schedules