

# BIM IMPLEMENTATION ON DEVELOPMENT OF MARINE ENGINEERING POLYTECHNIC, MALAYSIA

Muhammad Syaiful Safwan bin Nordin



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# BACKGROUND



## MUHAMMAD SYAIFUL SAFWAN BIN NORDIN BIM Manager

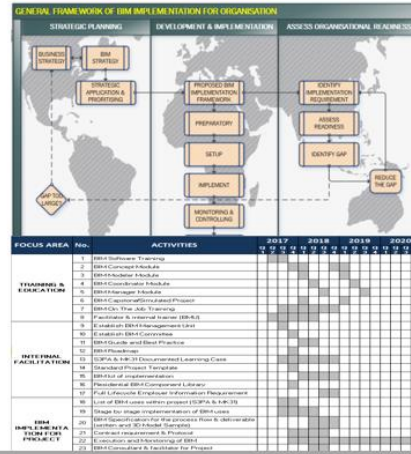
- BIM Manager (UMP Holdings Pte Ltd)
- Certified BIM Manager by Construction Industry Development Board Malaysia (CIDB)
- Certified Master Trainer for BIM Personnel under CIDB Malaysia
- Experience in training & education, project implementation and organisational & industrial transformation of BIM

# SCOPE OF EXPERIENCES



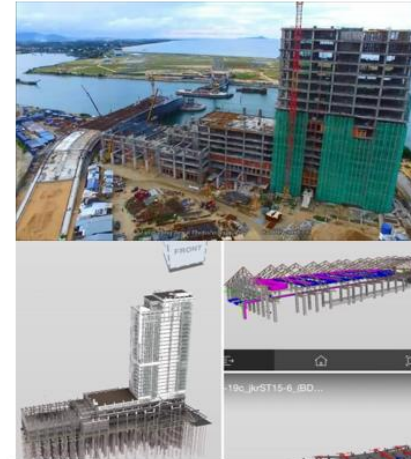
## TRAINING AND EDUCATION

- CIDB MyBIM Satellite Center – East Coast
- Specialised in technical & management training
- CIDB competency modules, customised and industrial based training & education



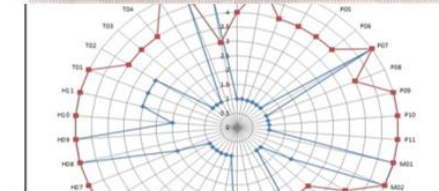
## ORGANISATIONAL TRANSFORMATION

- BIM strategy & execution plan
- BIM process model & SOP development
- Knowledge based approach to BIM
- BIM facilitation and on the job assistance



## PROJECT AND CONSULTANCY

- BIM Modelling Services
- 4D Simulation
- BIM Model audit and checking
- Project Coordination & Management
- Object library & content creation



## RESEARCH AND DEVELOPMENT

- Industrial technical & non technical research
- BIM optimisation & digital construction
- Case study of BIM implementation
- Capability and maturity of BIM Implementation

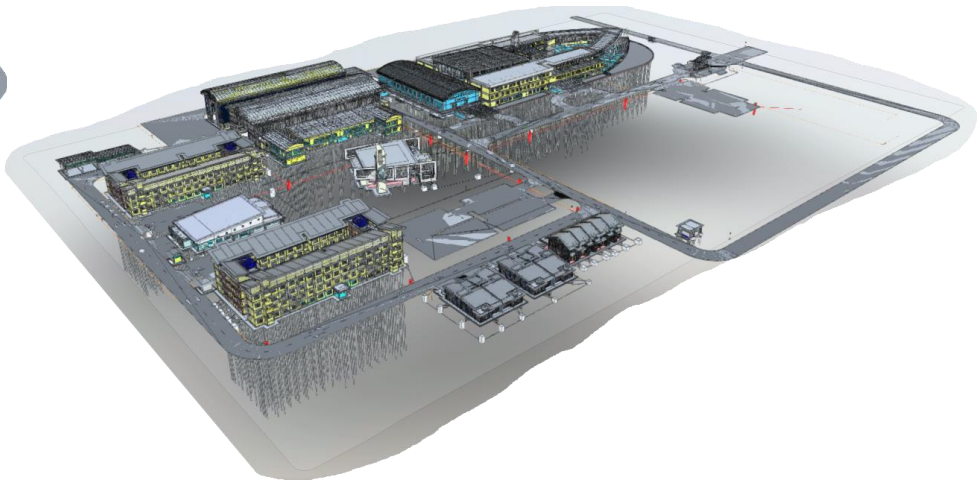
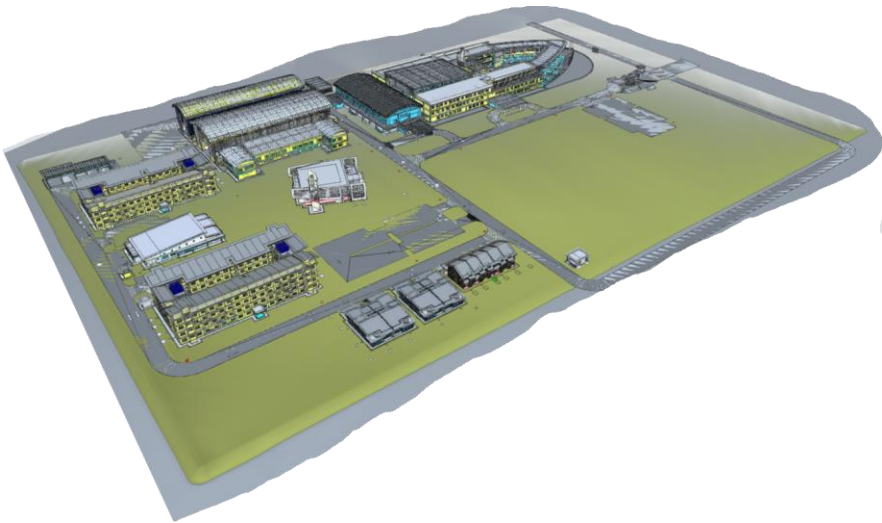


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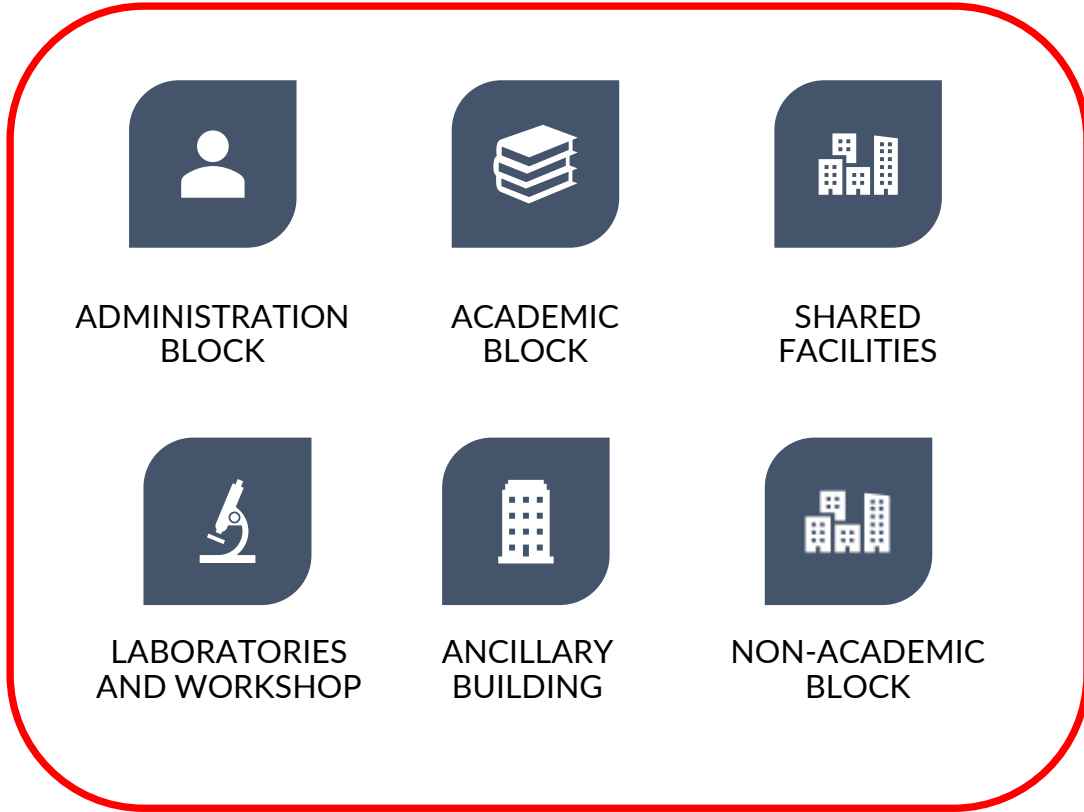


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# MARINE ENGINEERING POLYTECHNIC MALAYSIA



# SCOPE OF WORKS



## BUILDING WORKS



## CIVIL & INFRA WORKS

## 1. Objectives of BIM

1. Facilitate design review process
2. Manage client's expectation through 3D visualization
3. Generate documentations through model
4. Minimize conflicts & reworks at construction site
5. Facilitate facility record model and capturing for FM system use

## 2. BIM Usage

1. Multidisciplinary BIM Model Authoring for Detail Design, Construction & As-Built
2. To prepare spatial analysis requirement on Architecture Model
3. BIM Coordination for clash and design review
4. Room Data Interaction
5. To generate electronic drawing for contract drawings, construction drawings and as-builts drawing
6. To update construction models and to produce coordinated models for all disciplines
7. To produce record model for operation and maintenance



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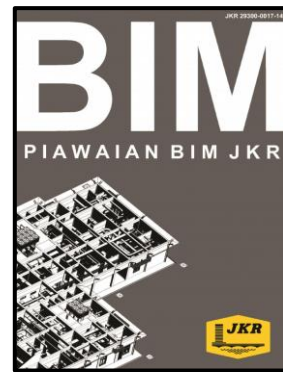


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# DOCUMENTS TO COMPLY WITH PUBLIC WORKS DEPARTMENT MALAYSIA (JKR)



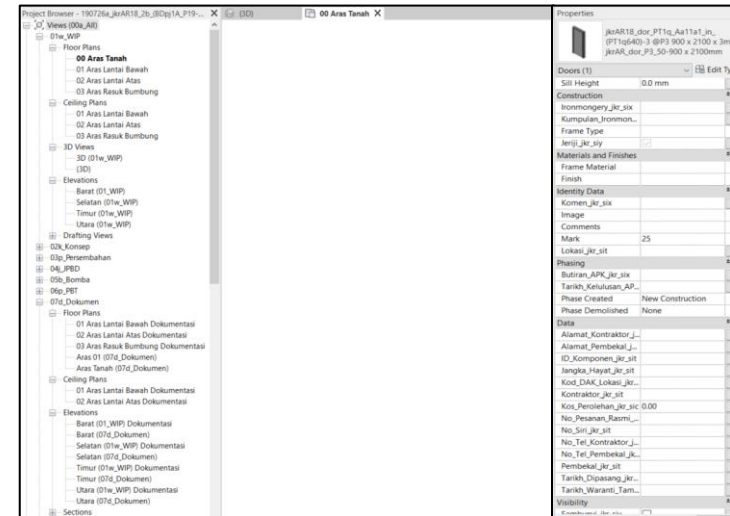
Guideline



Standard



Requirement



JKR BIM Revit Template

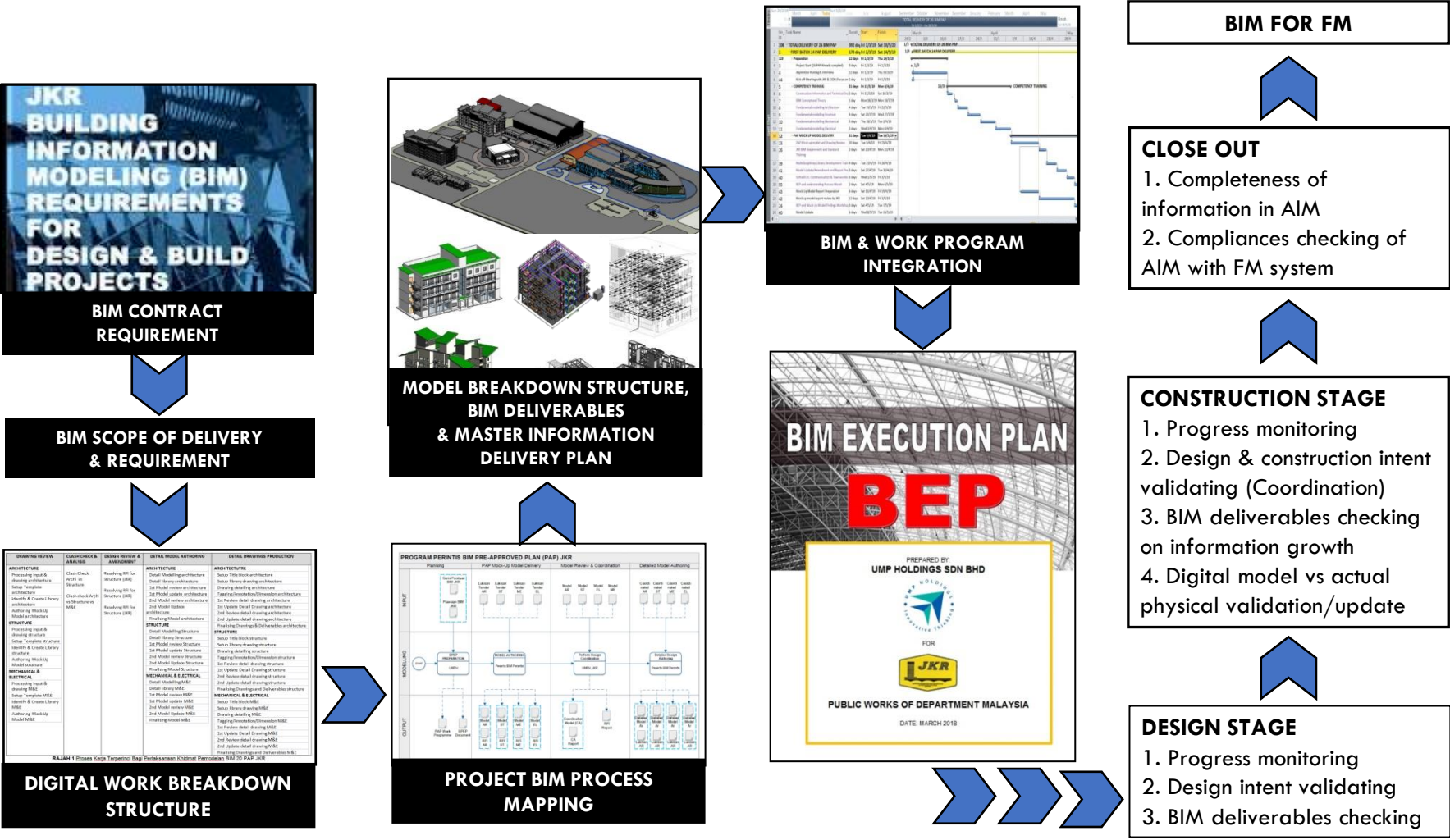


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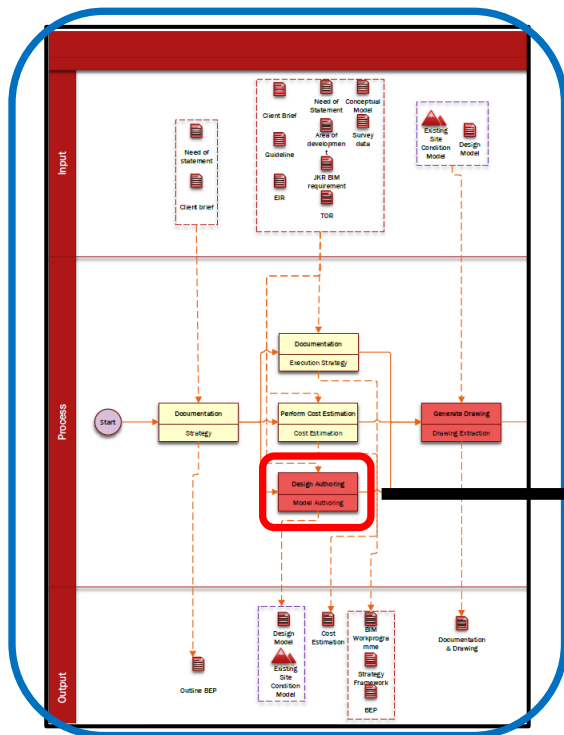
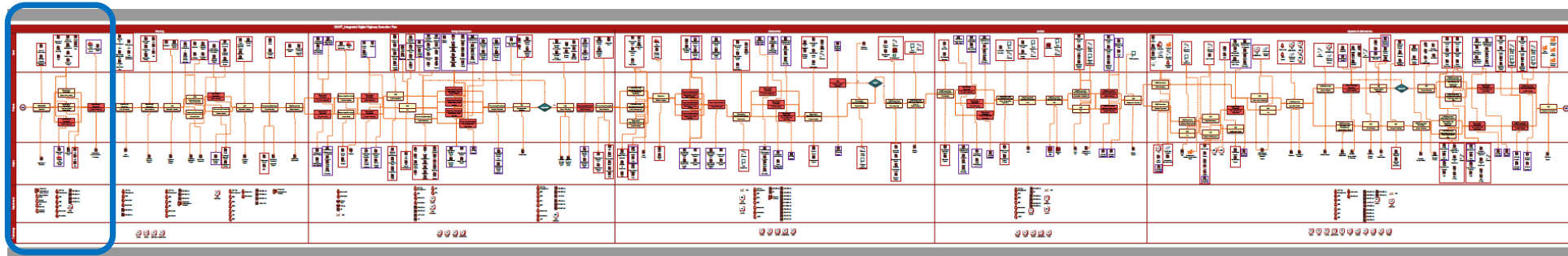
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# PROCESS FLOW TO DEVELOP BIM EXECUTION PLAN





# INTEGRATED WORK PROCESS



	A	B	C
1	<b>PRELIM</b>		
2	<b>INPUT</b>	Need of Statement, Client Brief	Client Brief, Guideline, EIR, Need of Statement, Conceptual Design Sketch
3	<b>PROCESS</b>	<b>Doc: Strategy</b>	<b>Model Authoring: Concept</b>
4	<b>WEIGHTAGE (%)</b>	<b>0.2</b>	<b>1.2</b>
5	<b>OUTPUT</b>	Outline BEP	Design Model, Existing Site Condition Model
6	<b>RESPONSIBILITY</b>	BIM Manager	BIM Coordinator, Modeller
7	<b>REQUIREMENT</b>	Visio , Microsoft Words	Revit, Civil 3D, Naviswork
8	<b>FILE FORMAT</b>	Pdf, docx, vsdx, vssx	.rvt, .dwg, nwc
9		0	Setup
10			0.1
11			Library Matching
12			0.4
13	<b>SUBPROCESS</b>		Authoring Conceptual Model
14			0.6
15			Coordination
16			0.1
17			

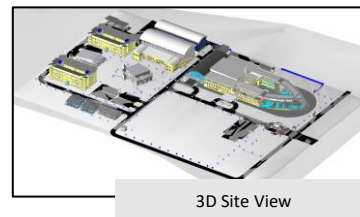
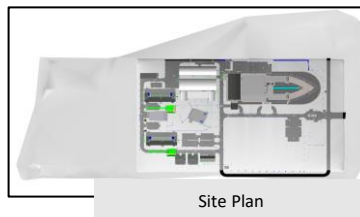
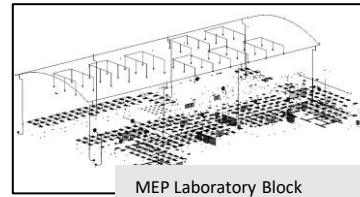
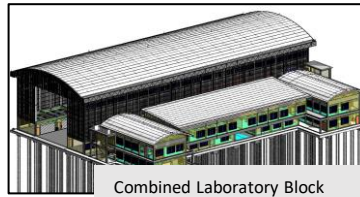
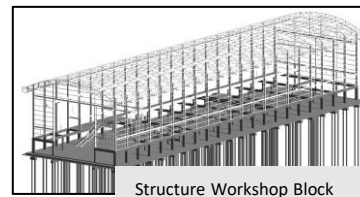
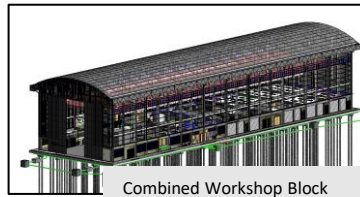
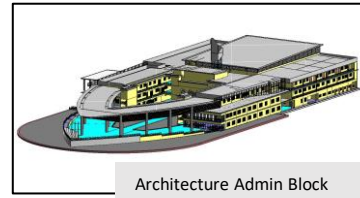
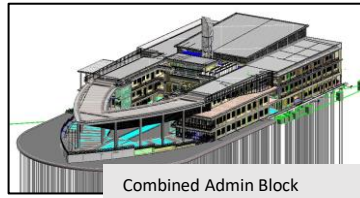


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# 3D INFORMATICS BIM MODELS



## 1. BENEFITS OF 3D INFORMATICS BIM MODELS

- Overcome the critical part in construction which are producing an accurate as-built drawing.
- Avoid any mistake during material take-off when there is an amendment that has been done in the model.
- Provide better visualization and documentation of the design improvements.

## 2. CHALLENGES TO DEVELOP THE 3D BIM MODEL

- Need to optimize the modelling method so that it will fulfill all of the requirements needed to used on site
- Need to know every detail of design intent of all disciplines involved in the project
- Need to properly planning for the Model Breakdown Structure for all the BIM Models



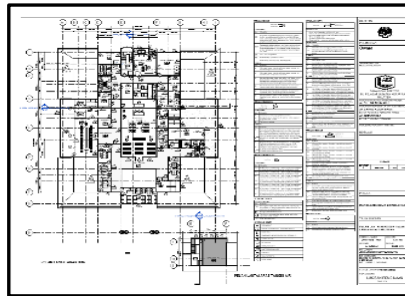
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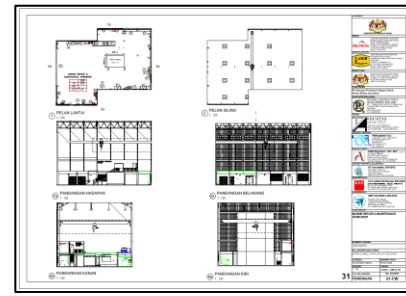
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# INTEGRATED DRAWINGS & SCHEDULE

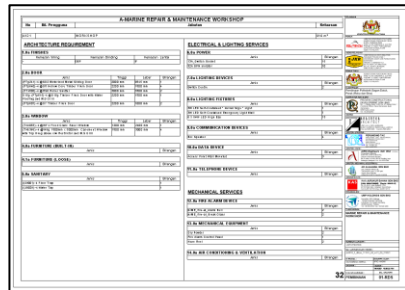
## Integrated Drawings & Schedule (Room Data Interaction)



Layout Plan

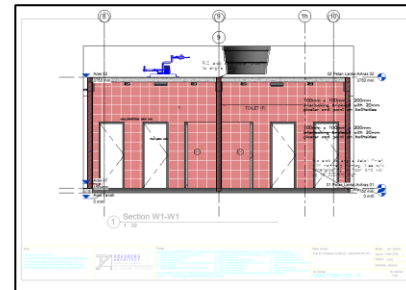


Four Wall Drawing



Room Name	Area	Volume	Electrical & Lighting Services	Mechanical Services	Water & Sewerage Services	Other Services
Room 101	100.00	1000.00	1000.00	1000.00	1000.00	1000.00
Room 102	100.00	1000.00	1000.00	1000.00	1000.00	1000.00
Room 103	100.00	1000.00	1000.00	1000.00	1000.00	1000.00
Room 104	100.00	1000.00	1000.00	1000.00	1000.00	1000.00
Room 105	100.00	1000.00	1000.00	1000.00	1000.00	1000.00
Room 106	100.00	1000.00	1000.00	1000.00	1000.00	1000.00
Room 107	100.00	1000.00	1000.00	1000.00	1000.00	1000.00
Room 108	100.00	1000.00	1000.00	1000.00	1000.00	1000.00
Room 109	100.00	1000.00	1000.00	1000.00	1000.00	1000.00
Room 110	100.00	1000.00	1000.00	1000.00	1000.00	1000.00

Room Data Sheet



Detailed Drawing

## 1. BENEFITS OF THE INTEGRATED DRAWING FOR PROJECT TEAM

- All of the view involved in this project were totally integrated. Any amendment of the BIM Model, will automatically integrated with the drawing and the schedules itself.
- Accuracy of the drawing can be ensured precisely as per BIM Model created
- Benefits for long term uses. Any renovation, operation and maintenance that need to be done for future can be easily refer to the digital drawing that had been developed

## 2. CHALLENGES TO DEVELOP THE INTEGRATED DRAWING & SCHEDULE

- Need to proper setup all of the drawing template so that it can easily read by the project team
- Need to have a parametric project title block so that it follow all of the requirements stated by the Public Work Department
- Need to have a proper tagging for every component involved so that il will appear in the Schedules

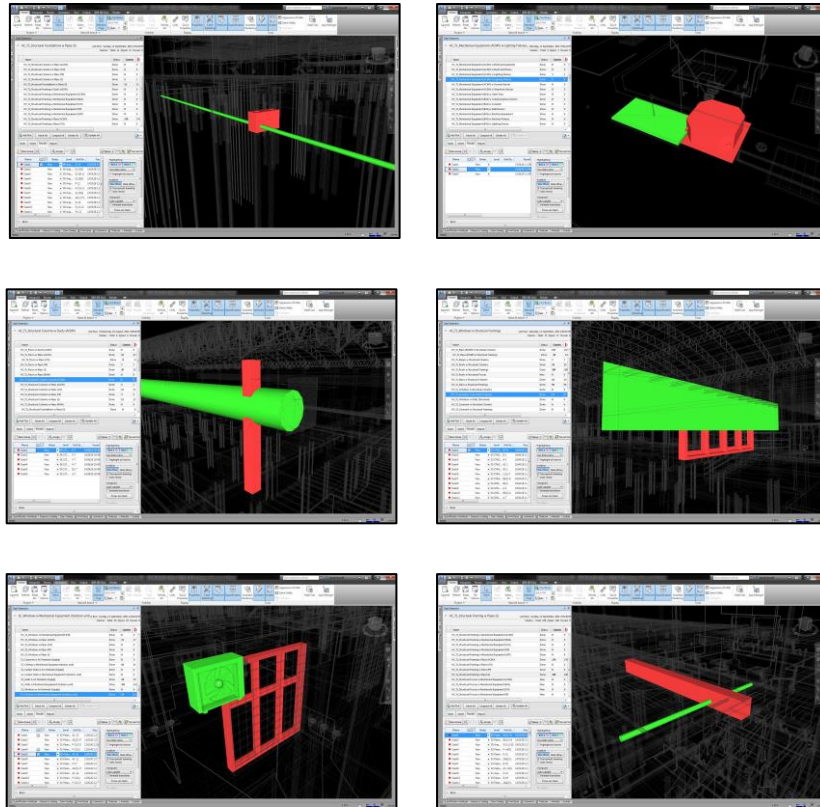


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# CLASH ANALYSIS



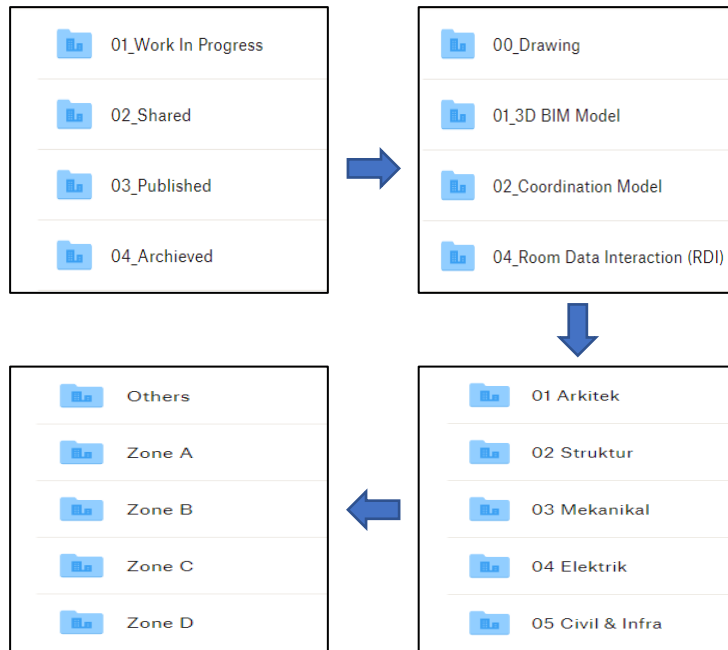
## 1. CLASH DETECTION BENEFITS OF BIM MODEL FOR PROJECT TEAM

- a) Reduce construction work conflicts between contractors, subcontractors or suppliers and, in turn, reduce the request of information (RFI) and increase work productivity on site.
- b) The increase in costs due to construction clashes can be reduced.
- c) The construction period can be accelerated without any reworks and redesigns

## 2. CLASH DETECTION CHALLENGES

- a) Need to proper setup all the template for the model management software that will be used (Autodesk Naviswork)
- b) Need to manually filtering and selection all of the component involved in the project
- c) All of the tolerance of the clash need to manually assign for every list of clash detection and analysis

# COMMON DATA ENVIRONMENT



## 1. BENEFITS OF CDE FOR PROJECT TEAM

- CDE collects, manages, and disseminates all relevant approved project documents for multi-disciplinary teams in a managed process.
- Serves as a digital hub, allowing for the efficient and accurate sharing of verified and coordinated information with all project team members
- Creating this single source of information facilitates collaboration between project team members and helps avoid duplication and mistakes

## 2. CDE CHALLENGES

- All of the project team members need to have a clear understanding for the matrix communication of the CDE workflow
- Need a yearly subscription for the official Autodesk CDE platform
- Need to have a proper and standard file and folder naming for the CDE



# ROOM DATA INTERACTION (RDI) IN BIM

Room Data Interaction by using BIM is the process to execute **Room Data Interaction** to identify, review and check in detail the equipment involved such as M&E requirement, loose & built-in furniture, material specification and etc.

The objective of the Room Data Interaction are :

1. Check and verify Client Brief of Requirement (CBOR)
2. Space Planning for special equipment and heavy machineries
3. Generate documentation through model (4 walls drawings and RDS)
4. Minimize the discrepancies of the design by the consultant and functionality of the room based on the end user's need
5. Help design team engage with end users of the spaces to ensure that they are fully understand specific requirement based on CBOR
6. Digital data and information for simulation and decision making
7. Structured management of data and information

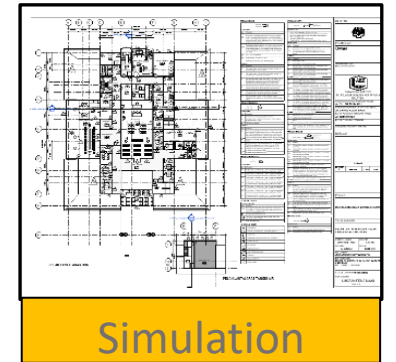
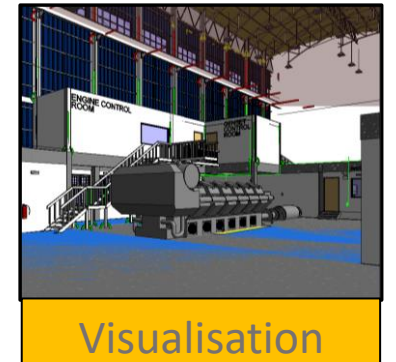
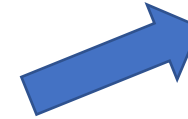
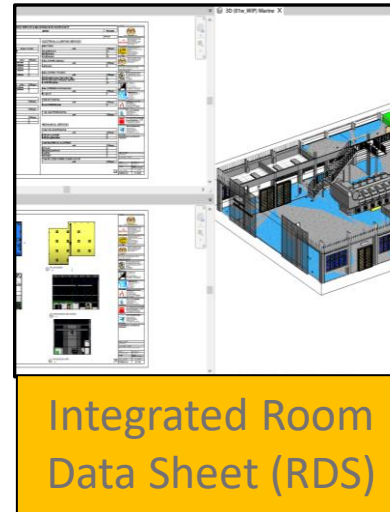
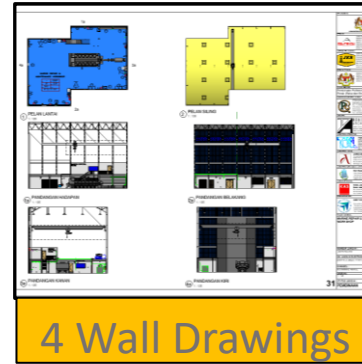
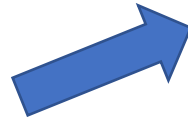
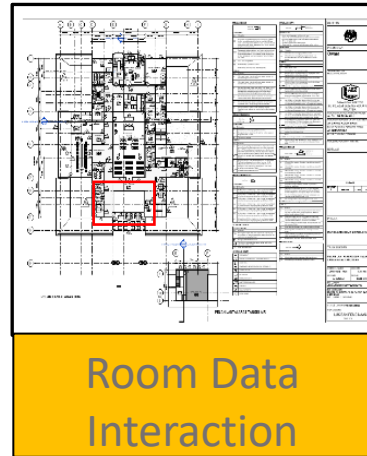
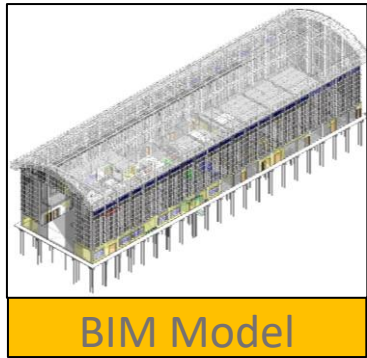


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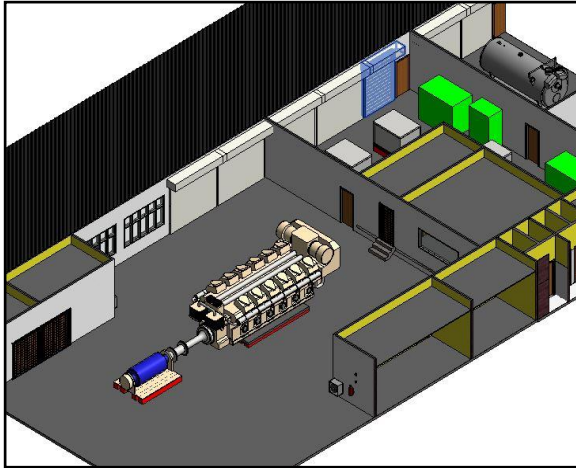
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# RDI PROCESS FLOW



# ROOM DATA INTERACTION

## 1. Marine Repair and Maintenance Workshop



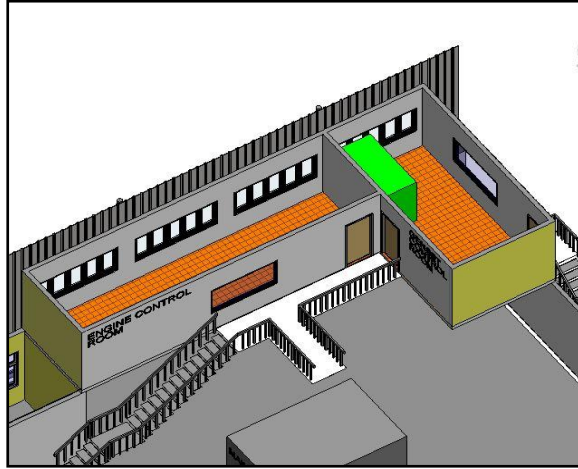
Engine Control Room and Genset Room at Ground Floor Level



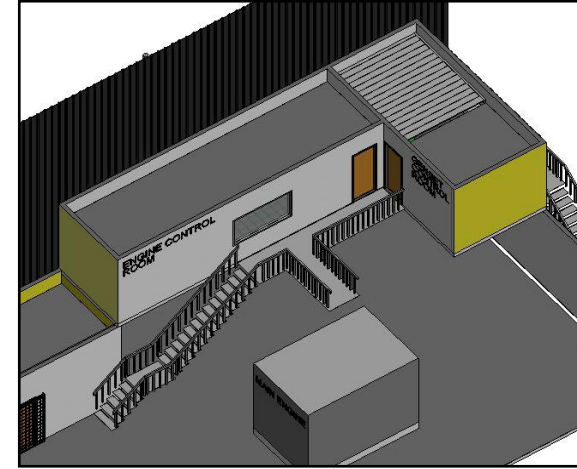
The position and level of the Engine Control Room and Genset Room have been modified. End users have requested these changes in order to improve ship engine monitoring and maintenance.



## 2. Genset Control Room



Placement of genset equipment at level 2 inside the genset room



A roller shutter was requested by the end user for the placement of large genset equipment using a gantry crane

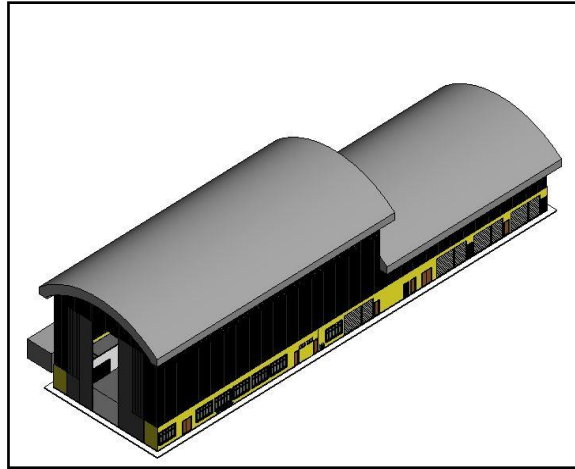


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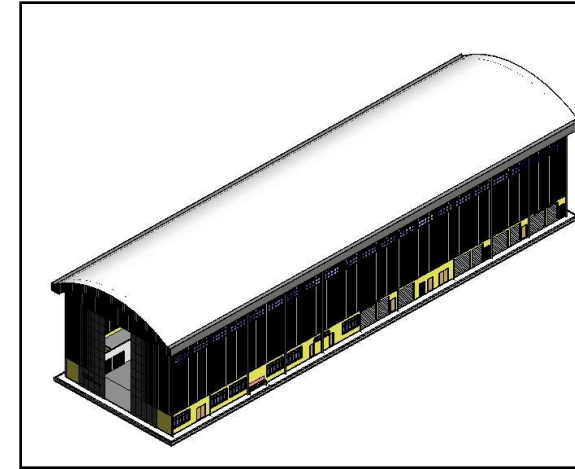


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### 3. Marine Repair and Maintenance Workshop Roof



Previous design for marine repair and maintenance workshop roof



The roof's level was raised to allow gantry crane operations up to the building's end

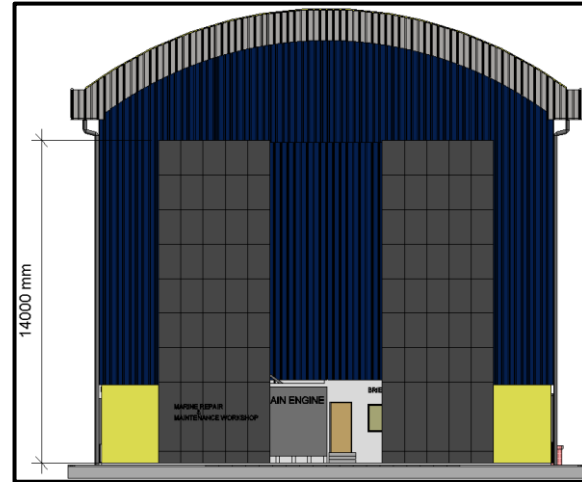


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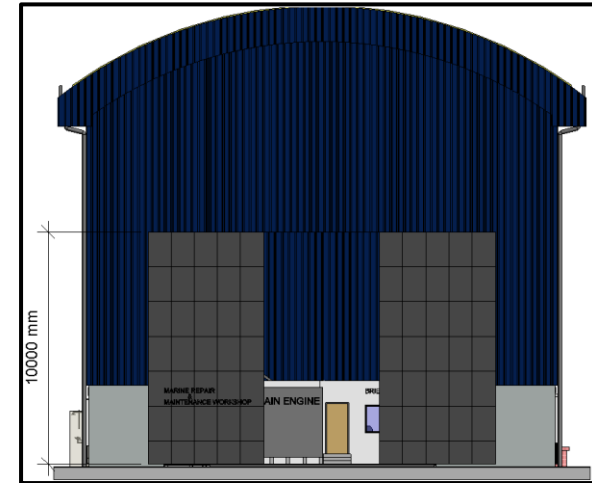


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## 4. Main Door for Ship Maintenance Workshop

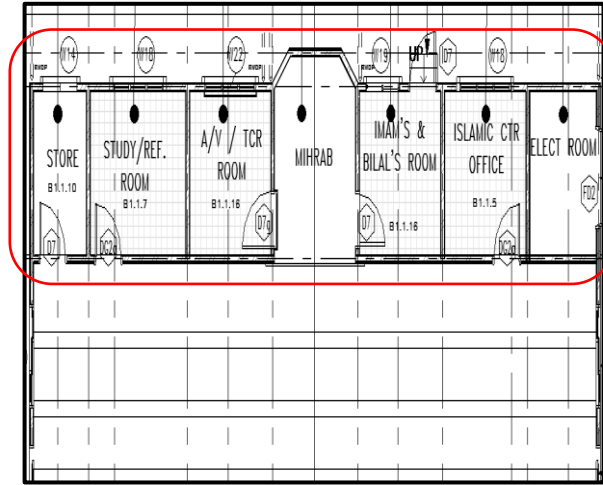


The main door height was 14 meters, and this required the services of a specialized supplier and will contribute additional cost of the motorized door

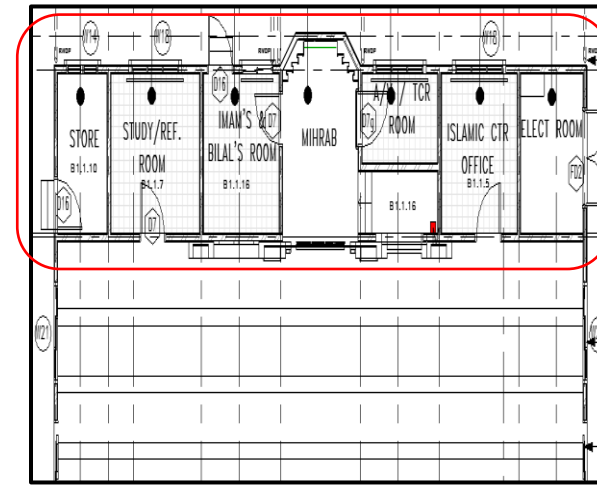


The main door's design was reduced to 10 meters in order to meet the market's standard specifications for a large motorized door

## 5. Major Layout Changes for Islamic Centre



Previous designs for specific room layouts do not meet the specifications based on the Contract Brief Requirements



The design of the access route and room positioning were modified to meet the needs of the end users

# CHALLENGES OF BIM IMPLEMENTATION AT PROJECT LEVEL

1. Mismatched level of BIM capability among project team
2. Unclear/Confusing scope of work
3. Unclear standard for data management
4. Misinterpretation of expectation on the process and deliverables
5. The absence of technical specification for BIM deliverables
6. Inconsistent technical standard for BIM Models
7. Poor process flow coordination between digital and physical activities



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# Winning the 1<sup>st</sup> place award for the best BIM Project (Building – Design & Build)



# THANK YOU



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BIM UMPH - Digital Construction Centre



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