



NT023-011

Nominated Sub-Contract for

the Design and Construction of

Data Services Platform (DSP)

for Cyberport Expansion

Project at Cyberport

BIM Execution Plan



Version, Status & Approval Log

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1 Overview

1.1 Introduction

The Contract BIM Execution Plan (BEP) has been prepared by Newtech Company Limited (NTC) to demonstrate the proposed approach, capability, capacity, and competence to meet the Project's Exchange Information Requirements.

This BIM Execution Plan shall address the following:

- Project information
- BIM Objective, Use and Deliverables
- Organizational Structure
- Information Standards
- Information Production methods and procedure
- Software, Hardware, and IT Infrastructure

This BEP is a live document that will be continuously developed as the project requirements evolves throughout the project delivery stage and will reflect the agreed alteration or enhancements to the Information Standards. Updates to this BEP shall be made in agreement with the Client and the appointed project BIM Manager.

1.2 References

The BEP is structured to align with the following documents:

1.2.1 Industry Standards

- CIC BIM Standards General, Version 2.1(2021)
- CIC BIM Standards for Architecture and Structural Engineering, Version 2.1 (2021)
- CIC BIM Standards for Mechanical, Electrical and Plumbing, Version 2 (2021)
- CIC BIM Standards for Underground Utilities, December 2021
- EMSD BIM-AM Standards and Guidelines, version 2.0, 2019
- BS EN ISO 19650-1:2018 Organization and digitization of information about buildings and civil engineering works, including Building Information Modelling (BIM) - Information management using building information modelling. Part 1: Concepts and principles.
- BS EN ISO 19650-2:2018 Organization and digitization of information about buildings and civil engineering works, including Building Information Modelling (BIM) - Information management using building information modelling. Part 2: Delivery phase of the assets.

1.3 Abbreviations

Abbreviation	Description
2D	Two-dimensional Layout Drawing
3D	Three-dimensional Building Information Modelling
4D	Four-dimensional Building Information Modelling (Time)
AIM	Asset Information Model
AIR	Asset Information Requirements
BEP	BIM Execution Plan
BIM	Building Information Modelling
CDE	Common Data Environment
CIC	Construction Industry Council
COBie	Construction Operation Building information exchange
DfMA	Design for Manufacture and Assembly
EDMS	Electronic Document Management System
FM	Facility Management
IFC	Industry Foundation Classes
LOD-G	Level of Development – Graphics / Level of Graphics
LOD-I	Level of Development – Information / Level of Information
LOIN	Level of Information Need
MEP	Mechanical, Electrical and Plumbing

Abbreviation	Description
MiC	Modular Integrated Construction
WIP	Work in progress

2 Project Information

Appointing Party	Hong Kong Cyberport Management Company Limited (HKCMCL)
Project Name	Nominated Sub-Contract for the Design and Construction of Data Services Platform (DSP) for Cyberport Expansion Project at Cyberport
Project Number	NT23-011
Project Location	Cyberport, Cyberport Rd, Pok Fu Lam
Project Start Date	5-MARCH-2023
Project Completion Date	30-JUNE-2026
Project Description	<p>HKCMCL desires to develop the "Cyberport Expansion (Phase 5)" (namely "CPX").</p> <p>This project is related to the construction Area of the following:</p> <ul style="list-style-type: none"> -GF: MEP works of 2 Fuel Pump Rooms -2F: MEP works of 3 LV Switch Rooms -4F: All Builder & MEP works except core areas and future provisions -RF: MEP works 3 Generator Rooms -Other services connecting between the rooms stated above



3 Organizational Structure

Legend:



3.1 Project Information Function

The list of names and contact details of the individuals fulfilling the necessary project functions for this Project are listed in the table below.

Discipline	Organization	Function	Name	Email	Contact No.
Sub-Contractor	Newtech Company Limited	Project Email: cyberport@newtechapac.com			
		BIM Manager	Mr. Ready Tse	readytse@newtechapac.com	60922591
		ELV Senior Manager	Mr. Calvin Mak	calvinmak@newtechapac.com	64626998
		EL Assistant Technical Manager	Mr. Keith Wong	keithwong@newtechapac.com	97761753
		MVAC Senior Engineer	Mr. Kevin Tam	kevintam@newtechapac.com	90807260
		FS Assistant Engineer	Mr. Lam Yip	lamyip@newtechapac.com	92484885

Discipline	Organization	Function	Name	Email	Contact No.
BIM	Vircon Limited (VCL)	Project Email: N/A			
		Assistant BIM Manager	Mr. Angus Cheng	anguscheng@vircon.com.hk	94484754
		BIM Coordinator	Mr. Ben Chan	benchan@vircon.com.hk	96171757
		BIM Modeler	Mr. Alex Wu	alexwu@vircon.com.hk	26172660
		BIM Modeler	Mr. Tiffany Tam	tiffanytam@vircon.com.hk	26172660

3.2 Roles and Responsibilities

Function	Organization	Responsibilities
BIM Manager	NTC	<ul style="list-style-type: none"> Manager VCL for overall BIM Quality Control Coordinate with the BIM Team of GCL and Tray Engineers of NTC Plan, develop and manage the project BIM standard and implementation strategy Provide quality control and checking procedures provide advice/guidance to the PM and PMD in <ul style="list-style-type: none"> a) reviewing BIM modelling formats/protocol and co-ordination; b) reviewing analysis and findings on application by using different software such as the clash detection and resolving the clashes; and c) providing technical support to the PMD regarding modelling enquiries.
Assistant BIM Manager	VCL	<ul style="list-style-type: none"> Act as BIM Model Manager on their respective discipline. Review and approve models and documentation for submission. Lead and manage the BIM process and provide input for BIM Execution Plan Ensure the deliverables are issued on schedule and in accordance with the BIM development programme.

BIM Coordinator	VCL	<ul style="list-style-type: none">• Lead the modelling and coordination effort for the sub-discipline.• Review and coordinate against interfacing discipline models.• Conduct regular BIM QA/QC checks.• Record and manage registers, BIM-related issues.• Interface and coordinate with engineers.
BIM Modeller	VCL	<ul style="list-style-type: none">• Responsible for Information modelling works.• Work under the direction of coordinator.• Capture and highlight any discrepancies found in Information model to the BIM Coordinator.• Ensure the geometric and information accuracy of the Information modelling.

4 BIM Objective, Use & Deliverables

4.1 BIM Objective

The objective of the application of BIM is to create a digital building information model for the project and to use BIM as a platform to facilitate project planning, site administration, safety planning, design coordination, clash detection prior to construction, financial planning, minimization of abortive works, waste reduction and efficient asset management to achieve the following beneficial purpose:

- To minimize design discrepancies, improve design coordination and deliver a clash-free design using 3D modelling techniques.
- To enhance visual communication between the Contractor and all stakeholders, improve mutual understanding of the design intent and facilitate design review and vetting process.
- To support the development of 4D modelling construction sequence during the construction stage to enhance communication, predict and manage the construction process.
- To enhance the payment application process through the development of 5D modelling.
- To support the development of asset management by using BIM with an as-built BIM model for effective operation and maintenance of the buildings.
- To support the development of facility management by using as-built BIM for implementation of digital twin concept.
- To adopt Digital Twin applications to aid design, construction, and operation.

4.2 BIM Use

The Sub-Contractor shall make use of BIM Model to facilitate and optimize the design and construction coordination works for the project. The BIM Uses are required to be performed by contractors during construction stages are as follows and are generally classified as mandatory ("M") or optional ("O") for execution.

BIM Team shall coordinate and manage the workflow for execution and audit the production to ensure smooth coordination and timely deliverables.

BIM Use	Scope of BIM use	Construction		As Built
		M	O	
Design Authoring	The use of BIM software to create and develop a project BIM model and plans, elevations, sections, details, shop drawings and schedules can also be produced by the authoring tools	M	N/A	

BIM Use	Scope of BIM use	Construction	As Built
Design Reviews	View a model or animated walk-throughs of a project, provide feedback and validate various design aspects by means of BIM model viewer	M	N/A
Drawing Generation (Drawing Production)	Drawing Generation is a process of using BIM to produce 2D drawings	M	M
Sustainability Evaluation	Sustainability Evaluation is a process in which a project model is evaluated based on BEAM Plus, LEED, or other sustainable / green building criteria.	M	M
Cost Estimation	Cost Estimation / 5D modelling is a process in which BIM can be used for cost estimates throughout the life cycle of a project. (a) Quantity take-off and cost estimating (b) 5D modelling / cash flow forecasting	M	N/A
3D/Spatial Coordination	Spatial Coordination is the whole process of design error avoidance using federated Information Models and a collaborative shared design environment.	M	N/A

BIM Use	Scope of BIM use	Construction	As Built
Phase Planning (4D Modelling)	Phase Planning (4D Modelling) is a process in which an interactive 4D model (3D models with the added dimension of time) is utilised to effectively plan the construction sequence and space requirements on a building site.	M	N/A
Site Utilization Planning	Site Utilisation Planning is a process of using models to graphically represent both permanent and temporary facilities on site for all of the phases of the construction process. The models should be linked to the construction schedule (4D) to review space planning, site logistics, sequencing requirements, temporary works, and safety.	M	N/A
As-Built Modelling	As-Built Modelling for asset management and facilities upkeep is a process used to depict an accurate representation of the physical conditions, environment, and assets of a facility, which shall be adopted in construction stage.	M	M
Maintenance Scheduling	Maintenance Scheduling is a process in which the functionality of the building structure (walls, floors, roof etc) and equipment serving the building (mechanical, electrical, plumbing etc) are maintained over the operational life of a facility. A successful maintenance program will improve building performance, reduce repairs, and reduce overall maintenance costs.	M	M
Asset Management	Asset Management is a process of linking an Asset Information Model (AIM), which shall be developed from the ABIM, and database to an organised building management system which should be used to maintain and operate a facility and its assets. The assets in the AIM for asset management shall include buildings, infrastructure, system, and equipment which should be operated, maintained and upgraded.	M	M

BIM Use	Scope of BIM use	Construction	As Built
Engineering Analysis	Engineering Analysis is a process that uses the Information Model to assist, analyse and optimise different design options to determine the most effective engineering solution to meet design codes and Appointing Party's / Client's requirements.	M	N/A

4.3 Deliverables

The following table includes the list of deliverables as required in the Appointing Party's Particular Specification for BIM:

Deliverables	Schedule
BIM Execution Plan	1st draft within 2 weeks upon contract commencement date of the Works.
BIM Works Programme Schedule	Within 1 month upon contract commencement date of the Works.
Clash Analysis Report	Bi-weekly, 2 days before BCM
CSD & CBWD Drawing	1st submission within 14 days and approved within 28 days before concreting on each floor.
4D Simulation Result	Within 1 month upon start of the Construction Works. Weekly (for comparison between Master programme and Actual site progress).
BIM Audit Report	Bi-monthly
5D BIM Simulation	TBC
As Built Model & COBie	Final version within 2 months after issuance of Practical Completion certificate.

4.4 Key Milestones

The below table provides the agreed milestones stage in consultation with the Project Delivery Team and the Appointing Party.

Project Milestone	Scope	Target Date
Milestone No. 1	BEAM Plus Submission of Provisional Assessment	30-JUN-2023
Milestone No. 2	Schematic Design Submission & Approval	7-JUL-2023
Milestone No. 3	Detail Design Submission & Approval	2-OCT-2023
Milestone No. 4	HKE Submission & Approval	31-DEC-2023
Milestone No. 5	Long Lead Equipment Procurement	15-JUL-2024
Milestone No. 6	BEAM Plus Provisional Submission & Approval	31-JAN-2024
Milestone No. 7	Site Possession	30-MAY-2024
Milestone No. 8	Site Possession	16-JUL-2024
Milestone No. 9	EPD Design Drawing Submission & Approval	25-FEB-2025
Milestone No. 10	Long Lead Equipment Production & Delivery	24-MAY-2024
Milestone No. 11	Site Installation period	22-MAR-2025
Milestone No. 12	HKE Electrical system energization at 1/F Tx Room and Main Switch Room	16-DEC-2024
Milestone No. 13	T&C of Individual equipment in Data Hall & CRAH corridors	1-APR-2025
Milestone No. 14	T&C of Individual equipment of UPS Rooms, Chillers, Chiller plant Control	26-MAY-2025
Milestone No. 15	Heat Load Test to Data Hall DC-1	9-JUN-2025

Project Milestone	Scope	Target Date
Milestone No. 16	IST	16-JUN-2025
Milestone No. 17	Handover date of Data Hall & MMR to ICT Installation (Grid line 1 - 14)	26-JUN-2025
Milestone No. 18	Handover date of Data Hall & MMR to ICT Installation (Grid line 14 - 101)	26-JUL-2025
Milestone No. 19	Training, Defect Rectification & Project Handover	13-AUG-2025
Milestone No. 20	BEAM Plus Final Submission & Approval	30-JUN-2026

5 Information Standards

5.1 Model Naming Convention

All BIM models shall follow the below model naming convention:

{Zone}-{Author}-{Discipline}			
Field	Abbreviation	Description	Organization
Zone	CP5	Main Building	
Author	NTC	Newtech Company Limited	
Discipline	AR-DSP	Architectural (Data Service Platform)	NTC
	MEP-DSP	MEP (Data Service Platform)	NTC

5.2 Object Naming Convention

- NTC will comply with the Project BIM Standard for BIM data consistency and integrity.
- The standard naming convention is applicable to all project models unless otherwise specified.
- All components in the model shall be hosted to the correct level defined in the model. No reference plane shall be used for component hosting.
- Use only letters A-Z, hyphen and numbers 0-9 with parenthesis "(" for all fields.
- All fields must be separated by the character "-".
- All the codes defined by consultants regarding materials and equipment types shall be provided with a parenthesis.
- All the NESTED families that are required to be "shared" for scheduling should add "NF-" in the prefix of the component naming for identification.
- Do NOT use any lowercase "x" between dimensions. Instead, first letter of the dimension type should be used to clarify the subsequent value of dimension and dimensions shall be listed in the alphabetical order of the abbreviation.

Abbreviation	Description
A	Angle
D	Depth/ Diameter
H	Height
L	Length
R	Radius
T	Thickness
W	Width

- Within a field, space can be added to separate words.

See Appendix A for object naming.

5.3 Object Type Naming Convention

See Appendix A for object type naming.

5.4 Workset Naming Convention

Worksets and worksharing are key components, not only in a collaborative workflow, but also in effective and efficient project workflows, even where only a single user is present. Enabling worksharing and using worksets to sub-divide project models into segments provides the opportunity to have multiple users working in the same project file concurrently.

Worksets shall be created in following the below Naming Convention:

Workset Naming Convention
{Author}_{Discipline}_{Description}
x_Datum_Grid/ Level/ etc.
x_Link

{Author} : refer to Section 5.1 for Author list

{Discipline} : refer to Section 5.1 for Discipline list

{Description} : description of scope

Workset Naming Examples

Name	Description
x_Datum_Grid	Grids in Architectural model
x_Datum_Level	Levels in structural model
x_Datum_ReferencePlane	Reference Planes in architectural model
x_Datum_ScopeBox	Scope box
x_Datum_PointCloud	Point cloud
x_Placeholder	Placeholder
x_TempWork	Temporary work
NTC_AR-DSP_4F	Default workset for architectural level
NTC_MEPM-DSP_AC	Default workset for HVAC service
NTC_MEPM-DSP_EL	Default workset for Electrical service
NTC_MEPM-DSP_FS	Default workset for Fire service
NTC_MEPM-DSP_EMG	Default workset for Emergency Generator service
NTC_MEPM-DSP_CBWD	Default workset for MEP scope
NTC_MEPM-DSP_Clearance	Default workset for MEP scope
NTC_MEPM-DSP_Maintenance Space	Default workset for MEP scope
NTC_MEPM-DSP_Hanger	Default workset for Hanger
NTC_MEPM-DSP_Plinth	Default workset for Plinth

5.5 Material Naming Convention

All building materials should be named systematically as follows:

Material Naming Convention

{Author}_{Material Code}_{Description}

Material Code shall follow the code assigned in the tender drawings. Unless otherwise specified, the following material abbreviation code should apply:

Material	Abbreviation
ABS	ABS
Aluminium	AL
Black Steel	BS
Bronze	BR
Carbon Steel	CS
Cast Iron	CI
Concrete	CC
Copper	CU
Ductile Iron	DI
Electrical Metallic Tubing	EMT
Fiberglass	FG
Flexible PVC	FPVC
Flexible Steel	FS
Galvanized Iron / Steel	GI
Glass Fiber Plastic	GFP
Malleable Iron	MI
Mild Steel	MS
Nylon	NY

Material	Abbreviation
Polyester	PY
Polyethylene	PE
Polyurethane	PU
PVC	PVC
Spun Concrete	SC
Stainless Steel	SS
UPVC	UPVC
Vitrified Clay	VC
Pipe Grade - Medium Duty	MD
Pipe Grade - Heavy Duty	HD
Pipe Grade - Ductile Iron EN545 Class K9	K9
Insulation - CFC Free	CFC
Insulation - Fire rated enclosure	FRP
Insulation - Fibreglass	FFG

5.6 MEP System Type Naming

Pipework and ductwork need to be assigned with a pipe system as setup in the Revit template:

Pipe System Name	Routing Description	Type Name
Fire Service (FS)	Gas Suppression System Pipe	FS-GSS
HVAC (AC)	Condensate Drain Pipe	AC-CDP
	Condensing Water Return Pipe	AC-CDWR
	Condensing Water Supply Pipe	AC-CDWS
	Chilled Water Return Pipe	AC-CHWR
	Chilled Water Supply Pipe	AC-CHWS
	Humidification Water Supply	AC-FWS

Duct System Name	Routing Description	Type Name
HVAC (AC)	Exhaust Air Duct	AC-EAD
	Fresh Air Duct	AC-FAD
	Primary Air Duct	AC-PAD
	Return Air Duct	AC-RAD
	Supply Air Duct	AC-SAD
Electrical (EL)	Trunking	ELV-MOBILE
		ELV-DCIM
		ELV-CP
		ELV-POWER
		ELV-UPS
		ELV-FS
		ELV-DARK FIBRE
		ELV-ICT/WiFi/GPON

Duct System Name	Routing Description	Type Name
Electrical (EL)	Trunking	ELV-SECURITY/CCTV
		ELV- PUBLIC ADDRESS SYSTEM
		ELV-SUB
		ELV-ISP
		ELV-FTNS
		ELV-PWR
		EL-BUSDUCT-4000A
		EL-BUSDUCT-5000A
		EL-EARTHING

5.7 Model Project Browser Organization

The Project Browser shows a logical hierarchy for all views, schedules, sheets, groups, and other parts of the current project. Each branch can be expanded and collapsed to hide or reveal lower-level items in the tree.

The Views under Project Browser are grouped under the scheme named (CPS) to manage the Views by Group and Sub-group attributes.

View Group	View Sub-group	View Name
00 GENERAL	BIM AUDIT	
	EXPORT	Navisworks Export
		BIM360 Publish View
		Revizto Export
01 DRAWING	AI/Sketch (Architecture)	AI No + (Date)
		Sketch No + (Date)
	Master Layout Plan	CBWD_Section
		CSD_Section
		MEP_Floor Plan
		MEP_Section
		WIP Section
02 WORKS PACKAGE	“Works Package Number” – “Contractor Name”	
04 COORDINATION	“Company” – “Location” – Purpose	
05 WIP	“Company” – “Staff Name”	

Schedule Group	Schedule Sub-group
00 GENERAL	Project Datum – Grids, Levels, etc
	Project View List, Project Sheet List
	Project Room List
	Project Model Groups
	Project RVT Links
	Mass
	Parts
	Assemblies
01 DRAWING	Works Packages Number – Works Contractor – Drawing Package Number & Description
02 BQ/SOR	Works Package Number – Works Contractor
03 WIP	

Sheet Group	Sheet Sub-group
01-GENERAL	
02-WORKS PACKAGE	Works Package Code – Contractor Name – Drawings Set Name

5.8 Model View Setting

5.8.1 View Type Naming Convention

Floor plan, Ceiling Plan, Structural plan, Section and Elevation view types shall be named according to the following naming convention:

View Type Naming Convention

{Code}_{Description}

{Code}: discipline code or XREF

{Description}: description of purpose of view

Example

AR_Working

AR_Coordination

AR_General Arrangement

AC_Duct

XREF_Architecture

5.8.2 View Naming Convention

All views created within a Revit project shall be named according to the following naming convention:

View Naming Convention

{TYPE}_{LV}_{AREA}_{PURPOSE}

{TYPE} – View types (FP: Floor plan, SC: Section, EL: Elevation, DV: Drafting views, etc.) {LV}

– Optional. Level denotation

{AREA} – Designation of Area

{PURPOSE} – Description of purpose of view

Example

FP_2F_LV Switch Room F_Master Plan

RCP_4F_Data Hall 1_Working

SC_4F_VIP Corridor_presentation

EL_GF_Fuel Pump Room A_Room Detail

5.8.3 View Template Naming

While object styles will be included in Model template, it is recommended that all graphic overrides are applied at the View template level rather than relying on Object styles setting in the model.

5.9 Schedule and Legends Naming Convention

View Naming Convention

{CODE}_{CATEGORY}_{PURPOSE}

{CODE} : Discipline Code

{Category} : Category of the scheduled element

{Purpose} : Description of purpose of view

Example

AR_Door_Type

AR_Areas_Gross

AR_Legend_WallType

AR_Window_Type

AR_Room_Finishes

View Filters Naming Convention

{CODE}_{CATEGORY}_{DESCRIPTION}

{CODE} : Discipline Code

{Category} : Category of the Revit element

{Description} : Description of purpose of view filter

Example

Global_View_Working

Global_View_NOT_Working

AR_Door_Glass

AC_Duct_Supply

5.10 Level of Information Need

The Level of Information Need is used to clearly define the degree of information required according to its purpose, quality, quantity, and granularity of the information.

5.10.1 LOIN Definition

The Level of Information Need (LOIN) (formerly known as Level of Development (LOD)) enables Appointing Parties / Clients, architects, engineers, contractors, quantity surveyors and facility managers to clearly specify the content of models at each stage of a project. There are mainly three components in LOIN which are LODG, LOD-I and DOC.

5.10.1.1 Level of Graphics (LOD-G) Definition

Graphical representation can mean many things within a model and should be subdivided as there can be different needs for modelling (3D), drawing (2D), and visualization. The geometry for drawings is often dependent upon symbology which sometimes varies depending on the selected scale. Four generic levels of graphical representation are identified as LOD-G notations.

These are numbered from LOD-G 100 to LOD-G 400 and defined in the table below:

LOD-G	Definition
100	The model element is graphically represented within the model by a symbol or generic representation or rough 3D shape.
200	The model element is graphically represented within the model as a generic system, object, or assembly with approximate quantities, assumed size, shape, location, and orientation. The assumed spaces required for access and maintenance shall be indicated.

300	The model element is graphically represented within the model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. The model shall include details of the spaces required for handling installation, operation and maintenance, and the interface details for checking and coordination with other models/objects.
400	The model element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing for fabrication, assembly, and installation.
500	Not used.

5.10.1.2 Level of Graphics (LOD-I) Definition

Level of Information (LOD-I) is the description of non-graphical information in a model element and will evolve as the project progresses. LOD-I requirements should be defined and agreed beforehand as identified within the AIR. Provision of a data dictionary against which product data templates can be prepared facilitates the delivery of verifiable data. As the required LOD-I varies for each project, this Standards does not aim to provide an exhaustive list of information for each model element, but instead indicates a suitable approach for adoption.

To specify LOIN, and how information is to be delivered, the specifiers should identify the following prerequisites:

- Purposes of the information to be delivered.
- Information delivery milestones.
- Parties who will request and deliver information; and
- Objects in one or more breakdown structures.

The LOD-I required for the model elements should be determined based on their intended usage and should NOT be over specified.

5.10.2 Project LOD Requirement

VCL will develop models in accordance with the Level of Development (LOD) specified below during construction development.

Project Stage	Minimum Level of Development
Construction	LOD-G 400
As-built	LOD-I 500

For detail of minimum LOD requirement on each model elements in each discipline, please refer to Appendix C.

The BIM Manager shall coordinate and update the LOD matrices and requirements to meet the project need. The LOD requirement on model data shall also refer to the BIM standards which cover the 5D data requirement in line with SMM4. Please refer to Appendix B.

5.11 LOD Responsibility Matrix

See Appendix C for Model LOD Responsibility Matrix.

5.12 Origin and Orientation

Project coordinates shall follow the Hong Kong Metric Grid Coordinates and Datum Elevation system. All models shall be included with “Shared Location”, namely, “True Coordinates”, for ease of finding reference between models.

All discipline teams are required to use the Project Template prepared by the project BIM Manager to develop the BIM model. The template ensures all teams' model has the same internal coordinates.

“Project North” in models shall be parallel to the short grid. The project base point shall be referred to the HK1980 Grid System actual location of the project.

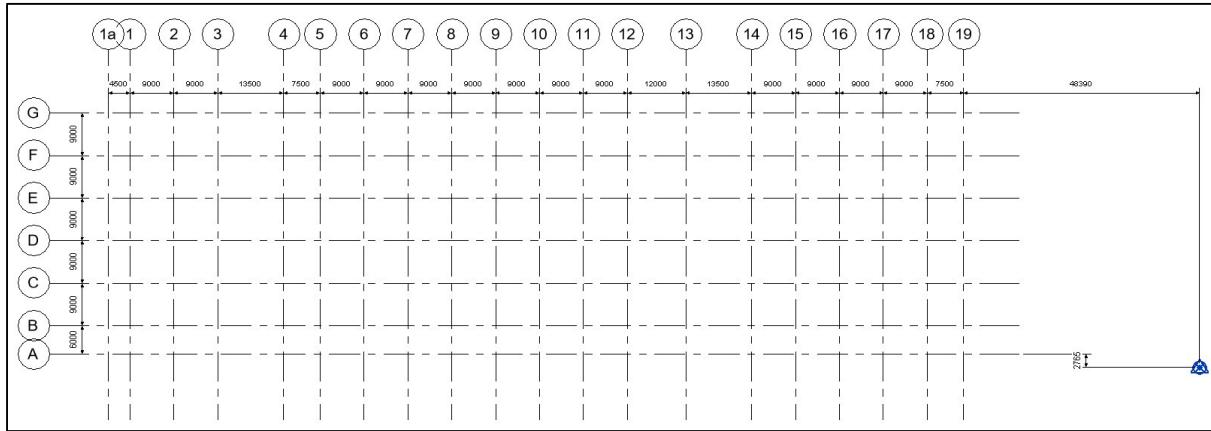
Point	Easting (mm)	Northing (mm)	Elevation or Site Datum (mPD)	Angle to True North (°)
Survey Point	E 831370000	N 813396000	0	55° 36'35"
Project Basepoint	E 831370000	N 813396000	0	55° 36'35"

Project Template

Directory in ACC	100 BIM/1.6 – Project Templates & Library/1.6.1 – Revit Template
Latest Version	CPX.Project Template-V1.rvt

5.13 Grids and Levels

All grids shall refer to Architectural models.



All levels shall refer to Structural level.

Floor	Level (mPD)

B2	-4.250
B1	-0.850
G/F	+6.000
1/F	+12.500
2/F	+17.400
2M/F	+21.600
3/F	+24.200
4/F	+28.400
5/F	+34.400
6/F	+38.900
7/F	+43.400
8/F	+47.900
R/F	+52.400
UR/F	+58.000

5.14 Units and Measurements

The common unit system of measurement will be Metric Units.

All project model length unit should be set to millimetres. All elements in the models shall be modelled to exact design dimension. Refer to below setting for other Revit Project Units settings.

The units of measurement will follow the format as per the below:

Description	Units	Example value and abbreviation	Accuracy
Length	Millimetres	1 mm	0 decimal places
Angle	Decimal degrees	0.001°	3 decimal places
Area	Square meters	0.001 m ²	3 decimal places
Volume	Cubic meters	0.001 m ³	3 decimal places
Slope	Decimal degrees	0.001°	3 decimal places
Mass density	Kilograms per cubic meter	0.001 kg/m ³	3 decimal places

5.15 Model Size

It is recommended to keep the size of a single model to be within 600MB. If it is larger than agreed size limit, the project team should consider further segregation of the model.

5.16 Model Colour Scheme

All system can be distinguished by different color code, they are set using “filter” in the Revit visibility orders and Revizto Appearance Profiler. The basics color code are as follow:

Discipline	Presentation Color			Color Palette
	Red	Green	Blue	
Architectural	175	235	240	
Structural	255	120	15	
HVAC	0	255	0	
Electrical	210	160	0	
Fire Services	255	0	0	
Drainage	0	0	255	
Plumbing	0	255	255	
Gas	255	0	255	
Fuel	255	128	192	
Existing	192	192	192	

5.17 Shared Parameter

Shared parameters are standardized parameter definitions that are stored in a text file independent of any family file or Revit project. All discipline BIM leads are required to use and apply those shared parameters in Revit families or projects for standardization and consistency of data stored across projects.

The project shared parameter is shared and located in ACC hub. Any request by consultants on change or addition of parameters is required to be made to the team and they are required to provide grounds for approval by HKCMCL. BIM manager reserves the right to make changes to the CPS.Shared Parameter to suit the project BIM development needs whenever necessary.

All project parameters shall be Shared Parameter unless otherwise approved by BIM manager. No other project parameters that are not listed here shall be added to project files. When there's a need for additional project parameter, discipline BIM coordinator shall request BIM manager for the new parameters.

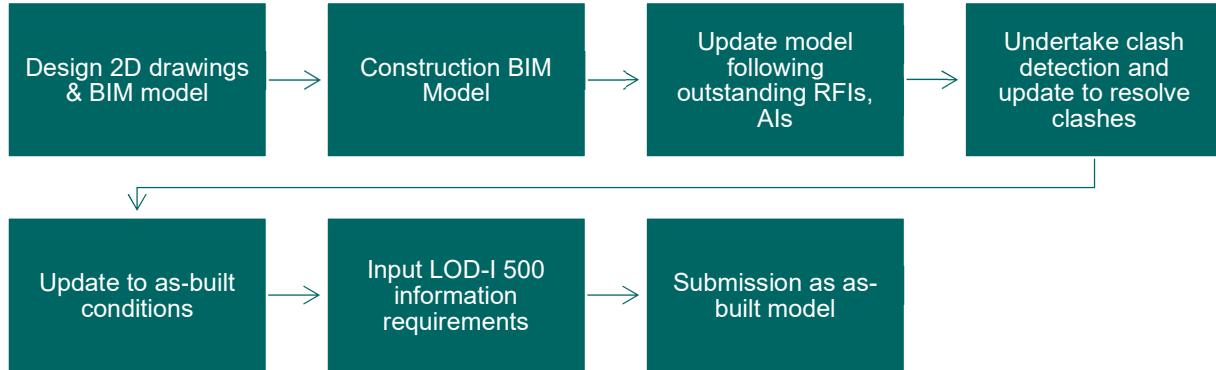
Directory in ACC	100 BIM/Library/Shared Parameter
Latest Version	CPS. Shard Parameter-V7.txt

See Appendix D for project shared parameters.

6 Information Production Methods and Procedure

6.1 Overall BIM Development

The overall BIM development workflow is illustrated as follows:



6.2 Common Data Environment

Autodesk Construction Cloud (ACC) will be used for Project Management System (PMS) for this project and is owned by HKCMCL and maintained by Lead Architect. The ACC platform will be the Common Data Environment for this project and will also be used for document/administration management, design coordination, and submittal process.

6.2.1 CDE Setup

ACC Account Name	Hong Kong Cyberport Management Company Limited
Project Name	CPX CONSTRUCTION MAIN CONTRACT
Project URL	https://acc.autodesk.com/docs/files/projects/caaeb131-78e7-486a-b455-a1548bcba917?folderUrn=urn%3Aadsk.wipprod%3Afs.folder%3Aco.xUpjmzg4T5CorG3RKyD7bQ&viewModel=detail&moduleId=folders
Folder Structure	Refer to Appendix E

The Lead Architect and HKCMCL will be notified, for their approval, any change in personnel or account use.

To serve the purpose of BIM implementation as the collaborative process, all shared project Information shall be shared in a Common Data Environment (CDE). There shall be only one CDE used for a single project as the single source of truth.

6.2.2 CDE Access

In accordance with ISO 19650 and CIC BIM Standards, the following access will be applied to the functional area of the CDE:

Work in Progress - Information containers in this state **should not be visible or accessible to any other task team**

Shared - Information containers in the shared states **should be visible and accessible but should not be editable**. If editing is required, an information container should be returned to the work in progress state for amendment and resubmission by its author.

Archived - the CDE shall provide a **read-only interface** that enable viewing and retrieving such Project Record in the same fashion as what and how could be seen during design and construction stages before handover. The linkage and relationship among the model files and other documentations shall be retained in this read-only CDE interface.

6.2.3 Functional Section

6.2.3.1 Work in Progress

The Work in Progress (WIP) Section of the CDE is where different Task Team creates the information. Information being developed by its originator or Task Team in this state should not be visible to or accessible to any other Task team.

6.2.3.2 Shared

Established to allow the use of current information that had been released for an identified purpose with a known level of risk associated with it.

The purpose of the shared state is to enable constructive and collaborative development of the information model.

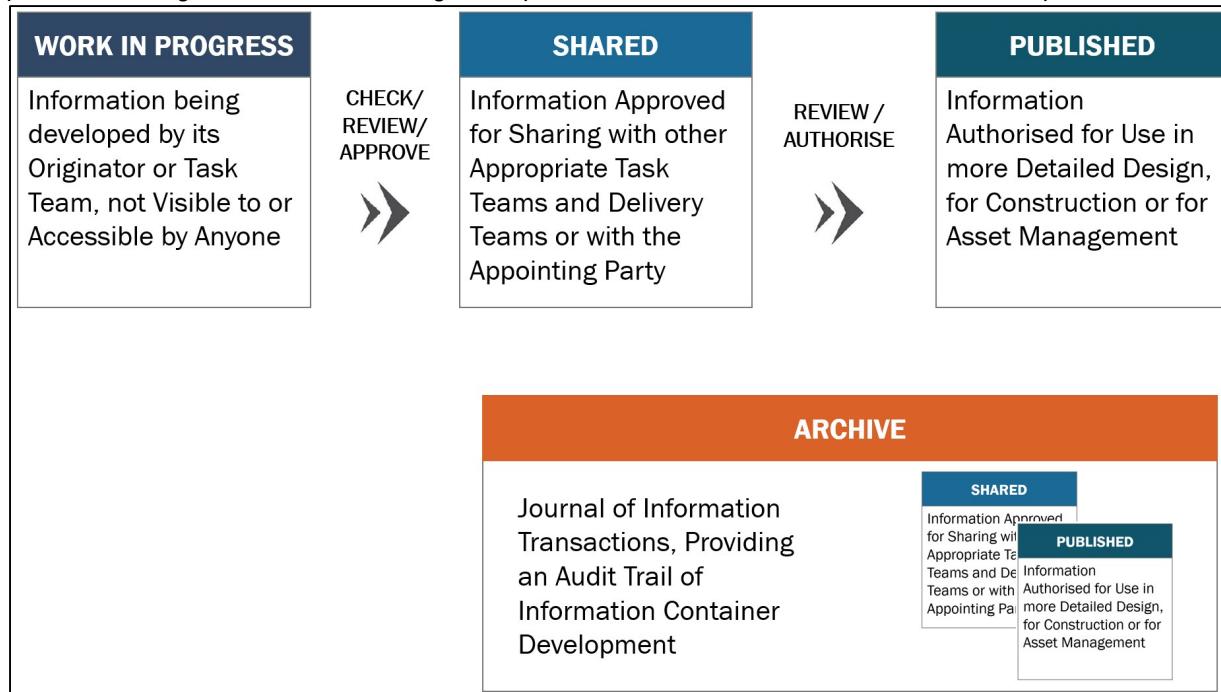
6.2.3.3 Published

Published Information represents identified contractual deliverables to be produced at specific milestones or information against specific deliverables.

The published state is used for information that has been authorized for use.

6.2.3.4 Archive

The archive state is used to hold a journal and record of information containers that have been shared and published during the information management process as well as the audit trail of their development.



6.3 Federation Strategy

Federation strategies and Information container breakdown structures are important concepts in managing the federated information models in accordance with ISO 19650.

Federation and information container breakdown will be used to:

- Allow different task teams to work on different parts of the information model simultaneously.
- Ease Information transmission by reducing the sizes of individual information containers.
- Federation and information container breakdown can also be used to help define scopes of services for different task teams.
- Support Information Security

6.3.1 Model Segregation (Division)

It is recommended to divide the Information model into separate files to enable better Information Authoring and management. To achieve this, considerations to the Information container breakdown structure as defined by the appointing party, planned BIM uses, and scope of service have been identified.

For efficient handling of the Information models, the model may be divided into:

- Building
- Discipline/Trade
- System
- Sub-system

Each task team working within the spatial boundaries should locate the systems, components, or construction elements they are responsible for. The modelling practices for all individual BIM models shall be consistent so that they could be combined into a federated model

All the models will be federated using the master files for coordination, standard checking, and BIM audit. All discipline models must maintain the same coordinate system as per project template.

The model structure is subject to change as project development progresses. For any change in the model segregation structure, discipline BIM lead will inform the Project BIM manager and HKCMCL for approval.

It was proposed and agreed with teams to segregate the models using the following structure to suit for the need of the development and management of model by different discipline teams.

List of models is recorded in the following table:

Model Name	Description
CP5-NTC-AR-DSP.rvt	DSP AR Model
CP5-NTC-MEP-DSP.rvt	DSP MEP Model – CSD & CBWD

6.4 Coordination and Design Issue Management

The Multi discipline spatial coordination shall be carried out in three stages:

6.4.1 Clash Avoidance

This first stage involves the exchange and use, through the CDE, of verified Information Models that will be referenced by the task teams into their own working model. This process supports “clash avoidance” and leads to the creation of reasonably coordinated Information Models from the beginning of the design stage.

6.4.2 Clash Analysis and Reporting

The second stage will be the use of a 3D based clash analysis and reporting by the Revizto listed in Section 8.2. NTC will use a cloud-based collaboration platform that allow users to collaborate with, analyse, and audit the latest Information model.

NTC shall carry out clash analysis Bi-weekly or as required by the project throughout the project period. NTC will resolve all major system clashes prior to construction by identifying and resolving clashes among different disciplines. This procedure will be documented to provide the required reporting on the resolution requirements of the remaining coordination issues to the corresponding task teams. The clash analysis will also consider the integration of third-party Information models to support the interface management.

In addition to clash detection, NTC will check other spatial coordination requirements like headroom requirements, working spaces for building services operations, and maintenance activities such as equipment replacements.

The Clash analysis and report shall include the following:

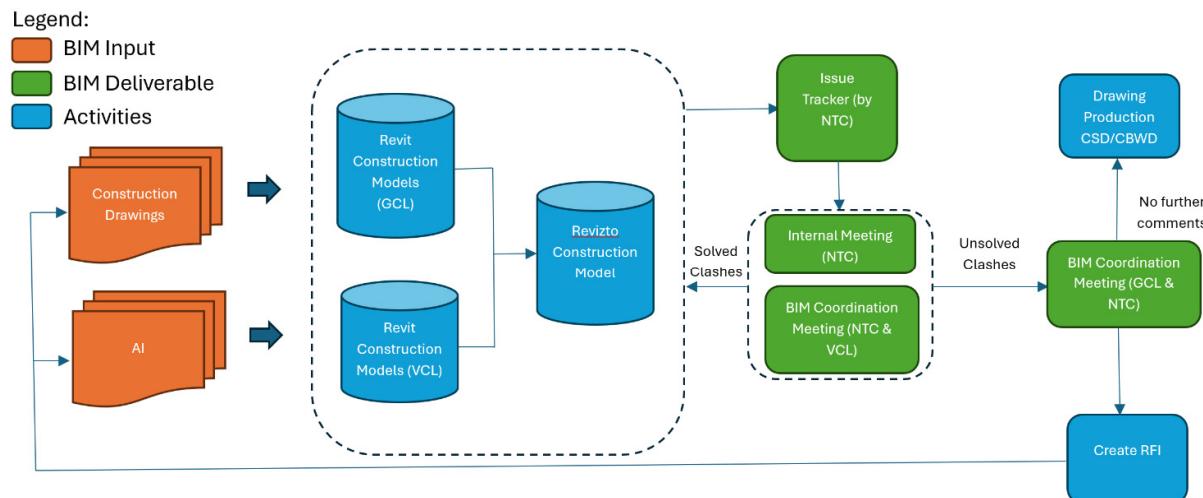
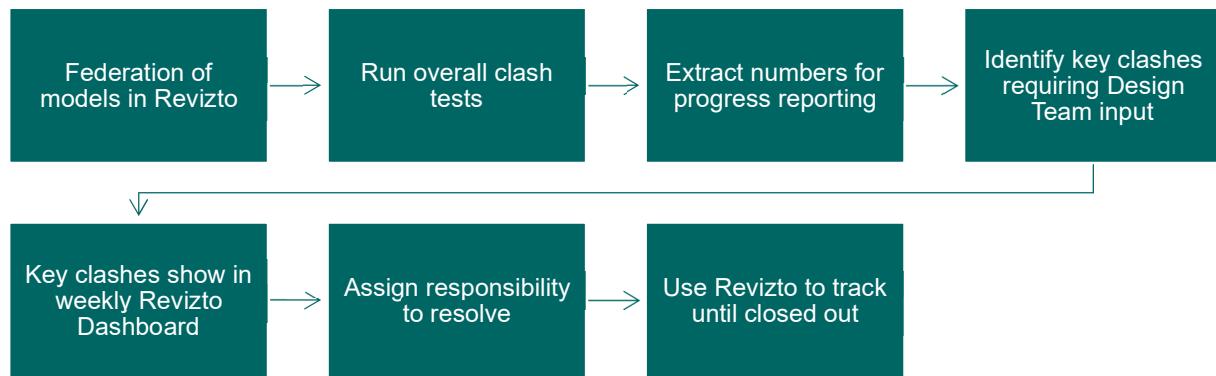
- Process overview (including software used)
- Responsibilities (person responsible to address the issue)
- Clash outputs
- Clash resolution process
- Action plan with target completion schedule to handle and resolve detected clashes
- Tolerance levels (mm) for different disciplines
- Operation clearance
- Maintenance clearance

6.4.3 Clash Resolution

The third stage is Clash Resolution. This is the stage where different task teams resolve remaining design and coordination issues that require the input and decision of more than one task team. This can be done through regular coordination workshops to progressively close out those residual design and coordination issues. This Coordination workshops should have a set of agenda on what issues to be discussed in the meeting and what issues can be resolved “Closed”. Model updated in design option with “Solved” status & updated in construction model with “Closed” status.

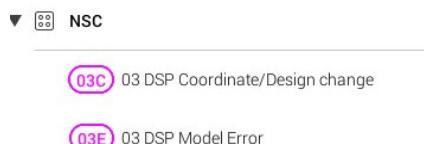
Status in Revizto issue tracker:

Open	:New Issue
In progress	:Reviewed in BCM
Solved	:Resolved in BCM
Closed	:Submitted formal reply



Revit Issue Stamp preset for coordination as below:

DSP/NSC – Stamp for internal issue coordination



6.5 3D Modelling Methodology

The Modelling Strategy will support the management of multi-user work-sharing, Internal coordination, and collaborative Information exchange between different task teams. This will include the development, production and handover of Information, design revision, and clash resolution.

The development of the Information Model will adopt the following best modelling practice guidelines:

- No more than one Building/Structure shall be modelled in a single file.
- Split the model into separate files, to enable a better model authoring and management. Subdividing the model (Model Segregation) in consideration of:
 - The Task Team shall not duplicate any information generated by other task teams. Only discipline specific elements will be modelled in a discipline file.
 - Clear definition of Data ownership throughout the life cycle of the project should be defined and documented to avoid duplicating elements and coordination errors.
 - Models that require multiple users to access, should adopt a work-set process.
 - The Information model must be clear, accurate and concise, and contain no ambiguities. The Task team shall not generate information that contains any superfluous detail.
 - Spatially coordinate geometrical components with other geometrical components and cross-reference all information with information shared with the appropriate suitability within the project's common data environment.
 - When required, Model the existing infrastructure and systems in sufficient detail to provide integration with the works under the contract.
 - All model files are recommended to be kept at a reasonable size in order to maintain workable files and ensure manageable navigation of the information model. The BIM Manager will monitor the performance and will consider re-structuring the Information model when the file size exceeds the recommended limit.
 - Encourage the practice of minimum detailing without compromising quality.

6.6 Drawing Production Methodology

6.6.1 Sheet Configuration

All sheets should be prepared with title block displaying sheet number and following sheet numbering convention and sheet title. When there are more than two views in a sheet, view titles should be displayed with numeric detail number assigned in consecutive order. When sheets are exported as other formats, e.g., PDF or DWG, the same sheet number should be used as individual file name. Sheet numbering convention may be adopted by the team as drawing sheets are being developed.

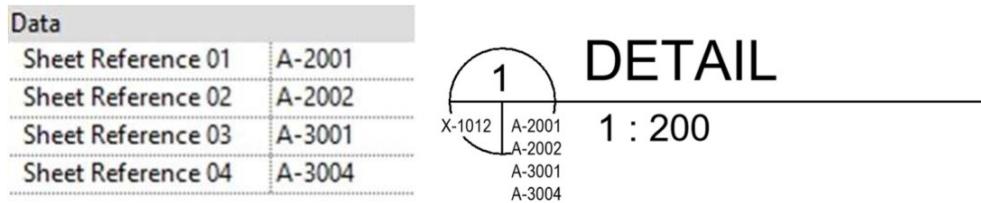
6.6.2 Title Block

All sheets created and issued shall be prepared with a standard title block. Correct scale bar should be included within the title block. If the drawings are planar views (e.g., Floor plan, RCP, site plan, layout plan, etc.), North Arrow symbol should be properly set.

BIM Manager will update the client title block to include any project specific information.

6.6.3 View Title

If there are more than two views in a sheet, view titles must be placed with proper title, detail number and reference numbers assigned regardless of discipline. Standard view title is included in project template. In Model Template, "Sheet_Reference_01" through "Sheet_Reference_04" shared parameters for views are prepared for manual back reference to be displayed in view title. If a view has been referenced from another view, usually from a smaller scale view, referencing sheet number should be manually inputted.



6.6.4 Drawing Production

NTC shall generate drawings in the required file format from the BIM model to facilitate the co-ordination and operation for the construction of the work.

For detail drawings such as architectural details, building services schematic /diagrams /drawings, and reinforcement details which requires a level of accuracy may not be generated from BIM model. Alternative software, i.e., non-BIM authoring software like AutoCad, could be used and these 2D drawings shall be prepared in accordance with the Project CAD Standard.

6.7 Phase Planning (4D)

NTC will make use of the coordinated 4D model to simulate all construction process of works by NTC to:

- Establish relationships between the programme and sequence of construction activities including the delivery of material and equipment to be carried out during the construction.
- Demonstrate the Contractor's works sequences
- Identify potential time and spatial conflicts
- Optimize the use of critical resources
- Enhance construction process control
- Minimize disturbance to the neighbourhood
- Better co-ordinate with affected parties and resolve interfacing issues at early stages
- Monitor procurement status of project materials
- Facilitate the preparation of Financial ModelThe 4D simulations shall be demonstrated in monthly intervals linking all activities in the master program and it shall be automatically matched with the activities as shown in the master program with appropriate file format.

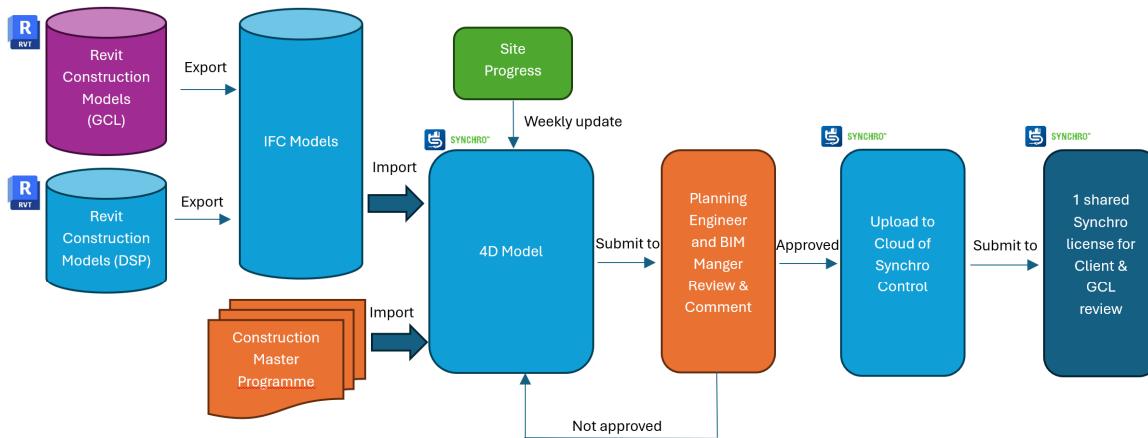
NTC shall submit a 4D Simulation Result including but not limited to:

- 4D simulation report
- 4D simulation video(s)
- BIM native model(s).
- Models(s) for 4D simulation platform.
- Linked project program or equivalent deliverable

4D BIM Workflow

Legend:

	Planning and BIM Team (NTC)		Revit
	Construction Team (NTC)		Microsoft Project
	BIM Team (VCL)		
	BIM Team (GCL)		Synchro 4D
	Client and GCL		



Submission schedule of 4D simulation

No.	Description	Submission Date
1	Master Program	3 rd May, 2024
2	4D model linking with Master Program	24 th May, 2024
3	Progress monitoring using Synchro Control	Update every Friday starting from 7 th Jun, 2024

6.8 Cost Estimation (5D) (TBC)

NTC will reconcile the quantities derived according to contract documents and the Quantity-Take-Off (QTO) extracted from the Base Model.

NTC will prepare a financial model based on the 4D model for the following criteria:

1. Interim payment simulation in video format with dynamic bar chart showing time and cost relation ship for major construction activities;
2. Cashflow forecast to compare actual cashflow against planned cashflow; and
3. Estimate of variations including the schedule for the coast of omission and addition.

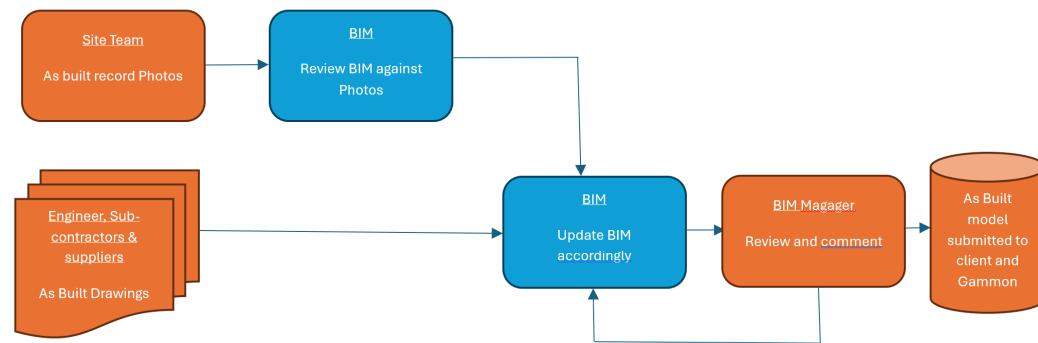
6.9 As Built Modelling

All as-built drawings will be generated from the as-built model directly for submission. VCL will develop the as-built BIM model up to LOD500 and shall comply to the project BIM standards.

NTC will verify the dimensions and setting-out of the as-built models to reflect the actual site conditions accurately through 360° camera photos of each room, corridor and all other places that need to be recorded before ceiling close if necessary.

Legend:

- █ NTC
- █ VCL



6.10 Asset Information Model

NTC will input the asset information into the as-built model based on latest requirements specified by the Architect during construction phase and referring to latest Building Information Modelling for Asset Management (BIM-AM) Standards and Guidelines issued by the Electrical and Mechanical Services Department.

NTC will provide COBie file format, which is data file format exported from the as-built model, as one of the as-built deliverables.

7 Quality Control and Assurance Procedure

7.1 Quality Control

Each discipline BIM lead shall be responsible for performing quality control checks for their designs, dataset, and model properties before submitting their deliverables.

Checks	Definition	In charge	Software Programme(S)	Frequency
Visual Check	Ensure there are no unintended model components, and the design intent has been followed	Discipline BIM Coordinator	Autodesk Revit	Weekly
	Check that families are being correctly used.			
	Observe unreasonable modelling errors			
	Geometry satisfied required LOD-G level at the corresponding phase			
3D Coordination Check	Detect problems in the model where two building components are clashing including soft and hard clashes	Discipline BIM Coordinator	Autodesk Navisworks Manage	Weekly
Standards Check	Ensure that the Project BIM standards and BEP have been followed (e.g.: fonts, dimensions, line styles, levels, file naming and room numbering.)	Discipline BIM Coordinator	Autodesk Revit	Weekly
Model data Integrity check	The process used to ensure that the project data set has no undefined, incorrectly defined, or duplicated elements and satisfied the required LOD-G level at the corresponding phase. Reporting process on non-compliant elements and corrective action plans.	Discipline BIM Coordinator	Autodesk Revit	Weekly
BIM Design Validation	Ensure design intent and data incorporated are accurate and correct by designer.	Discipline BIM Support Engineer	Autodesk Navisworks Manage	Weekly
Document Deliverable Check (DOC)	Ensure documentations are generated from the Single Source of Truth Information Model.	Project BIM Manager	N/A	Weekly

7.2 Project BIM Audit

BIM Manager should review all disciplines models and ensure compliance with BIM BEP and Client BIM Standard. Discipline BIM lead are required to follow up and address the issue. Audit report should be attached in CSD submission.

Model Check Items	
Item	Definition
Model size	Check if the model size is kept within agreed limit. Typically, it is recommended to keep the size of a single model to be within 300MB. If it is larger than agreed size limit, the project team should consider further segregation of the model.
Workset	Check if model elements are assigned to correct work sets.
Purge Unused	Check if there are unnecessary families loaded on to the project model.
Model Warnings	Go through model warnings and identify errors that should be resolved.
Model Audit	Last successful model audit time. Model audit should be carried out weekly at minimum.
Model Alignment	Check if the model is assigned with correct coordinates, project north, project basepoint and internal origin. All project models within the same project should be linked with correct alignment without manual adjustment.
View Management	Check if the browser organization aligned with the standard
Naming Convention	Check if naming convention of model elements (sheets, views, families, etc.)
Project Parameter	Check if the project parameter aligned with the standard
Graphic Standard	Check compliance of graphic standards (line weight, object style, annotation elements, etc.)
Model coordination	Check spatial coordination requirements (see section 7.4.2)

8 Software, Hardware, and IT Infrastructure

8.1 System Performance

Data Backup

All backup schedules will be aligned to the business continuity plans, regulatory and the Information Retention Policy and Guideline.

3rd Party/ Vendor Management

Service level agreements (SLAs) will define the expected performance for each required security control, describe measurable outcomes, and identify remedies and response requirements for any identified instance of non-compliance.

Capacity Planning

Designated staff will handle any potential system interruption or performance degradation detected both during and after office hours in a timely manner.

8.2 Software Specification

The required software is listed in the below table:

Discipline of Works	Software	Version	Submission File Format
Architectural & MEP	Autodesk Revit	2023	.rvt
MiC	Autodesk Revit	2023	.rvt
Model Federation	Autodesk Navisworks Manage	2020	.nwd
Online BIM Issue Tracking Platform for BIM Collaboration and Coordination	Autodesk Construction Cloud	N/A	N/A
4D Simulation	Synchro 4D	2023	.spx/.mp4
4D Checking	Synchro Control	N/A	Shared license with client, consultant and project team
5D BIM	TBC	TBC	TBC
Automation for Model Production	Dynamo for Revit	2.6.1	.dyn
As-built Modeling	Autodesk BIM Interoperability Tools	9.0.8119.0	.xml

The use of additional software not specified, proprietary or freeware, including software plug-ins, object enablers or viewers etc., by the sub-contractor in the project under contract with HKCMCL shall seek approval by HKCMCL.

Any software upgrade during the course of the project shall be reviewed, coordinated, and approved by the BIM Manager. Implementation of any upgrade shall be in line with the BIM Guidelines.

8.3 Hardware Specification

Specifications	
Operating System	Microsoft Windows 10 64-bit Professional
CPU Type	Intel i7-9850H vPro
Memory	32GB DDR4 2666MHz (2x16GB)
Video Display Resolutions	NVIDIA® Quadro RTX™ 4000 8GB GDDR6
Disk Space	1 TB PCIe SSD
Connectivity	Internet connection for license registration and prerequisite component download

8.4 Data Security and Back-Up

It is important that all project information is managed securely and responsibly to safeguard the integrity and availability of both our client's and the Project Delivery Team's information.

NTC will ensure all data associated with the project shall be securely stored and protected from unauthorized access, distribution, or use. When sharing information, due consideration shall be given to the environment in which the data is shared. NTC will ensure and establish adequate access rights to related stakeholders to prevent any possible data loss, corruption, data misuse or deliberate damage throughout the project and shall comply with the project policy on information security.

Where a security policy based on ISO 19650 Part 5 – Information management using building information modelling is required, significant planning and specialist advice may be required which is not within the scope of this document.

Appendix

A. Object Naming

1. ARCHITECTURAL

1.1 General

- All concrete grade should be named in “XX/XX” format.
- Hose reel door or Water Meter cabinet door and alike should be modelled as part of their respective component as a whole.

1.2 Non-Structural Wall

Category: Wall (System Family)						RLB 5D Ref.	
Family Naming: Basic Wall (Fixed)							
Type Naming:							
CORE	Brick Wall	(XX)		1 <60mins FRR>	T150	1.13 1.14 1.32 1.33 1.34 1.35 1.36 2.6	
	Block Wall	(XX)		2 <120mins FRR>	T200		
	Dry Wall	(XX)					
	Gypsum Block	(XX)					

Example

Family Name:	Basic Wall
Type Name:	CORE_Dry Wall_(XX)_0_T150

1.3 Wall Finishes

Category: Wall (System Family)					RLB 5D Ref.	
Family Naming: Basic Wall (Fixed)						
Type Naming:						
FIN	Wall Core Material	Material Type Code	Fire Resistance Rating	Thickness	Section 5	
	Paint	(XX)	0	T20		

Example

Family Name:	Basic Wall
Type Name:	FIN_Paint_(XX)_0_T20

1.4 Floor Finishes

Category: Floor (System Family)					RLB 5D Ref.	
Family Naming: Floor (Fixed)						
Type Naming:						
Floor Category	Material	Material Type Code	Tile Size (if applicable)	Thickness	Section 4	
RFS <Raised Floor System>	(XX)	(XX)	L600W600	T300		

Example

Family Name:	Floor
Type Name:	RFS_(XX)_(XX)_L600W600_T300

1.5 Ceiling

Category: Ceiling (System Family)					RLB 5D Ref.	
Family Naming: Basic Ceiling (Fixed)/ Compound Ceiling (Fixed)						
Type Naming:						
Ceiling Material	Ceiling Code	Type/Identifier	Tile Size	Overall Thickness	Section 6	
Aluminium	(XX)	C Strip	L300W300	T100		
Paint						
Plastering						

Example

Family Name:	Ceiling
Type Name:	Aluminium_(XX)_C Strip_L300W300_T100

1.6 Door

Category: Door			RLB 5D Ref.
Family Naming:			
Door Material	Door Panel	Description	
Plaster Laminate (PL)	SS {Single Swing}		
Wood (WD)	DS {Double Swing}		
Glass (GL)	SL {Sliding}		
Stainless Steel (SS)			
Type Naming:			
Door Type	Door Size {Door Leaf}	Fire Resistance Rating (Integrity/Insulation)	2.12
(XXXX)	H2100W850	60/60	3.31
Shared Parameter:			3.5~10
CPS.Acoustic Requirement CPS.Rough Height CPS.Rough Width CPS.Leaf Height CPS.Leaf Width CPS.Thickness			

Example

Family Name:	WD_DS_SWING DOOR
Type Name:	(XXXX)_H2900W1000/1000_60/60

1.7 Louvre

Category: Air Terminal (Customized Family)			RLB 5D Ref.
Family Naming:			
Louver Group	Frame Material	Louver Blade	Description
LOU	Aluminium (AL)	Double Bank	
Type Naming:			
Louver Type	Size	Fire Resistance Rating (Integrity/Insulation)	2.13
(L001)	H1350W1000	60/60	

Example

Family Name:	LOU_AL_Double Bank
Type Name:	(L001)_H1350W1000_60/60

2. MEP

2.1 Air Terminals

Category: Air Terminals					RLB 5D Ref.
Family Naming:					
Category	Air Terminals Type	Air Terminals Material	Mounting	Description (Optional)	
Air Terminals	Diffuser	Aluminium	Ceiling	(XXXX)	
	Grill		Wall		
Type Naming:					
Air Terminals Code	Air Terminals Size				
AG01	H600W600				

2.2 Cable Tray Fittings

Category: Cable Tray Fittings					RLB 5D Ref.
Family Naming: Basic Ceiling (Fixed)/ Compound Ceiling (Fixed)					
Category	Fittings Type	Direction	Shape	Description (Optional)	
Cable Tray Fittings	Bend	Horizontal	Channel	(XXXX)	
	Cross	Vertical	Ladder		
	Tee				
	InBend				
	OutBend				
Type Naming:					
Cable Tray Fittings Type					10.23
(XXXX)					
Parameter:					
- Brand					
- Model					

2.3 Conduit Fittings

Category: Conduit Fittings				RLB 5D Ref.
Family Naming:				
Category	Fittings Type	Fittings Material	Description (Optional)	
Conduit Fittings	Elbow	Cast Zinc	(XXXX)	
	Junction Box			
Type Naming:				
Conduit Fittings Type				
(XXXX)				
Parameter:				
- Brand				
- Model				

2.4 Duct Accessories

Category: Duct Accessories			RLB 5D Ref.
Family Naming:			
Category	Fittings Type	Description (Optional)	
Duct Accessories	Air Filter	(XXXX)	
	Damper		
	Silencer		
Parameter:			
- Brand			7.28
- Model			39
			49

2.5 Duct Terminals

Category: Duct Terminals		RLB 5D Ref.
Family Naming:		
Category	Description	
Duct Terminals	(XXXX)	
Parameter:		
- Brand		
- Model		

2.6 Duct Fittings

Category: Duct Fittings			RLB 5D Ref.
Family Naming:			
Category	Fittings Type	Description (Optional)	
Duct Fittings	Bend	(XXXX)	
	Cross		
	Tee		
	Transition		
	Endcap		
Type Naming:			
Duct Fittings Type			7.20
(XXXX)			10.9
Parameter:			21
- Brand			23
- Model			33
			36
			44
			47

2.7 Duct Placeholders

Category: Duct Placeholders			RLB 5D Ref.
Family Naming:			
Category	Description		
Duct Placeholders	(XXXX)		
Parameter:			
- Brand			
- Model			

2.8 Electrical Equipment

Category: Electrical Equipment			RLB 5D Ref.
Family Naming:			
Category	Fittings Type	Description (Optional)	
Electrical Equipment	Emergency Generator	(XXXX)	
	Switch Board		
	Junction Box		
	Panel Board		
Parameter:			
- Brand			7.53
- Model			54

2.9 Electrical Fixtures

Category: Electrical Fixtures			RLB 5D Ref.	
Family Naming:				
Category	Fittings Type	Description (Optional)		
Electrical Fixtures	Appliance	(XXXX)		
	Emergency Power Point			
	Outlet			
	Sensor			
	Switch			
Parameter:				
- Brand - Model				

2.10 Fire Alarm Devices

Category: Fire Alarm Devices			RLB 5D Ref.	
Family Naming:				
Category	Type	Mounting		
Fire Alarm Devices	Fire Alarm Speaker	Ceiling		
	Fire Alarm Bell	Wall		
	Smoke Detector			
Parameter:				
- Brand - Model			8.23~30	

2.11 Lighting Fixtures

Category: Lighting Fixtures				RLB 5D Ref.
Family Naming:				
Category	Type	Mounting	Description (Optional)	
Lighting Fixtures	Spot	Ceiling		
Type Naming:				
Lighting Size				10.17 18
L100W200				
D100				
Parameter:				
- Brand				
- Model				

2.12 Mechanical Equipment

Category: Mechanical Equipment			RLB 5D Ref.
Family Naming:			
Category	Type	Description (Optional)	
Mechanical Equipment	Air Conditioner	(XXXX)	
	Condenser		
	Fan		
Type Naming:			
Size			7.32
L200W200H300			43
Parameter:			52
- Brand			
- Model			

2.13 Pipe Accessories

Category: Pipe Accessories			RLB 5D Ref.
Family Naming:			
Category	Type	Description (Optional)	
Pipe Accessories	Valve	(XXXX)	
Type Naming:			
Size			
D50			
Parameter:			
- Brand			
- Model			

2.14 Pipe Fittings

Category: Pipe Fittings			RLB 5D Ref.
Family Naming:			
Category	Fittings Type	Fittings Material	Description (Optional)
Pipe Fittings	Cross	Cast Zinc	(XXXX)
	Elbow	Steel	
	Flange	Aluminum	
	Reducer	PVC	
	Tee	Galvanized Iron(GI)	
Type Naming:			
Pipe Fittings Type			5
(XXXX)			9.2
Parameter:			
- Brand			
- Model			

2.15 Security Devices

Category: Security Devices			RLB 5D Ref.	
Family Naming:				
Category	Type	Description (Optional)		
Security Devices	CCTV	(XXXX)		
	Card_Reader			
	Electric_Lock			
	Key_Card			
Parameter:				
- Brand - Model				

B. RLB 5D Standard

Please refer to separate attachment “Appendix B-RLB 5D Standard”.

C. LOD Responsibility Matrix

The LOD Matrix in the table below outline minimum modelling requirement and respective level of development at different project stages. Minimum modelling requirement and LOD are project specific.

A. Architecture / Interior Design & Fitting Out								
Item No.	Model Element List	Required	Construction Stage			As-built Stage		
			AUT	LOD-G	LOD-I	AUT	LOD-G	LOD-I
A01	Room space, corridor, plant & equipment room	Y	Newtech	100	-	Newtech	100	-
A02	Openings	Y	Newtech	100	100	Newtech	100	100
A03	Interior wall / partition / non-structural wall with finishes	Y	Newtech	400	400	Newtech	400	500
A04	Raised floor system and false ceiling	Y	Newtech	400	400	Newtech	400	500
A05	Interior design and fitout works	Y	Newtech	400	400	Newtech	400	500
A06	Interior lighting (FOH area)	Y	Newtech	400	400	Newtech	400	500
A07	Door	Y	Newtech	400	400	Newtech	400	500
A08	Louvre on external wall/internal wall	Y	Newtech	400	400	Newtech	400	500
A09	Railing, balustrade, handrail	Y	Newtech	400	400	Newtech	400	500
A10	Access ladder and catwalk	Y	Newtech	400	400	Newtech	400	500
A11	Maintenance platform	Y	Newtech	400	400	Newtech	400	500
A12	Finishes on architectural elements	Y	Newtech	400	400	Newtech	400	500
A13	Exit sign	Y	Newtech	400	400	Newtech	400	500

B. M&E – Mechanical Ventilation and Air Conditioning								
Item No.	Model Element List	Required	Construction Stage			As-built Stage		
			AUT	LOD-G	LOD-I	AUT	LOD-G	LOD-I
B01	Ductwork	Y	Newtech	400	400	Newtech	400	500
B02	Diffuser, air boot, air grill	Y	Newtech	400	400	Newtech	400	500
B03	Fire damper	Y	Newtech	400	400	Newtech	400	500
B04	Fan coil unit	Y	Newtech	400	400	Newtech	400	500
B05	Chiller	Y	Newtech	400	400	Newtech	400	500
B06	Chilled water pump	Y	Newtech	400	400	Newtech	400	500
B07	Split-type indoor & outdoor air conditioning unit	Y	Newtech	400	400	Newtech	400	500
B08	Refrigerant pipe	Y	Newtech	400	400	Newtech	400	500

B09	Chilled water pipe	Y	Newtech	400	400	Newtech	400	500
B10	Condensate drain pipe	Y	Newtech	400	400	Newtech	400	500
B11	Control panel	Y	Newtech	400	400	Newtech	400	500
B12	BMS panel	Y	Newtech	400	400	Newtech	400	500
B13	BMS control & monitoring module	Y	Newtech	400	400	Newtech	400	500

C. M&E – Fire Services								
Item No.	Model Element List	Required	Construction Stage			As-built Stage		
			AUT	LOD-G	LOD-I	AUT	LOD-G	LOD-I
C01	Fire alarm system, alarm bell, gongs & break glass unit	Y	Newtech	400	400	Newtech	400	500
C02	Fire detection, heat or smoke detectors	Y	Newtech	400	400	Newtech	400	500
C03	AFA panel	Y	Newtech	400	400	Newtech	400	500
C04	Portable handoperated approved appliance, fire extinguisher	Y	Newtech	400	400	Newtech	400	500
C05	FM200 and related equipment, valve and etc.	Y	Newtech	400	400	Newtech	400	500

D.M&E – Electrical								
Item No.	Model Element List	Required	Construction Stage			As-built Stage		
			AUT	LOD-G	LOD-I	AUT	LOD-G	LOD-I
D01	Cable tray, trunking, cable containment, busduct, busbar, busway, power feed	Y	Newtech	400	400	Newtech	400	500
D02	Generator or Emergency generator	Y	Newtech	400	400	Newtech	400	500
D03	Generator exhaust flue incl. acoustic treatment	Y	Newtech	400	400	Newtech	400	500
D04	Diesel tank & fuel pipes	Y	Newtech	400	400	Newtech	400	500
D05	Electric Meter	Y	Newtech	400	400	Newtech	400	500
D06	Transformer	N						
D07	Switchboard, switchgear	Y	Newtech	400	400	Newtech	400	500
D08	Concealed and cast-in place conduit	N						
D09	Outlet, wall switch, security device, card access and "Plug mould" (socket point)	Y	Newtech	400	400	Newtech	400	500
D10	Light fitting	Y	Newtech	400	400	Newtech	400	500
D11	Emergency lighting	Y	Newtech	400	400	Newtech	400	500

D12	Landscape lighting	N						
D13	Emergency power point	Y	Newtech	400	400	Newtech	400	500
D14		Y	Newtech	400	400	Newtech	400	500
D15	Lightning rod	N						

E. Specialist System								
Item No.	Model Element List	Required	Construction Stage			As-built Stage		
			AUT	LOD-G	LOD-I	AUT	LOD-G	LOD-I
G01	Computer racking, servers etc.	Y	Newtech	400	400	Newtech	400	500
G02	Security system including smart card access and CCTV camera	Y	Newtech	400	400	Newtech	400	500

D. Shared Parameter

CPS.SHARED PARAMETER				PROJECT PARAMETER				As Built (Y/N)	Example (From AI001)
GROUP	NAME	DATA TYPE	DISCIPLINE	PARAMETER GROUP	TYPE/ INSTANCE	VALUE PER GROUP	CATEGORY ASSIGNED		
0.Project Setup	CPS.Schedule Group	TEXT	COMMON	Identity Data	Instance	Group	Schedule	Y	
0.Project Setup	CPS.Schedule Subgroup	TEXT	COMMON	Identity Data	Instance	Group	Schedule	Y	
0.Project Setup	CPS.Sheet Group	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	
0.Project Setup	CPS.Sheet Subgroup	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	
0.Project Setup	CPS.View Group	TEXT	COMMON	Identity Data	Instance	Group	View	Y	
0.Project Setup	CPS.View Subgroup	TEXT	COMMON	Identity Data	Instance	Group	View	Y	
1.Standard Dimension	CPS.AFL	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	
1.Standard Dimension	CPS.Area	AREA	COMMON	Identity Data	Type	Group	Categories	Y	
1.Standard Dimension	CPS.ASFL	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	
1.Standard Dimension	CPS.Bottom Level	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	
1.Standard Dimension	CPS.Center Level	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	
1.Standard Dimension	CPS.Depth	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	100
1.Standard Dimension	CPS.Diameter	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	100
1.Standard Dimension	CPS.Elevation	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	
1.Standard Dimension	CPS.Height	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	100
1.Standard Dimension	CPS.Invert Level	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	
1.Standard Dimension	CPS.Length	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	100
1.Standard Dimension	CPS.Thickness	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	10
1.Standard Dimension	CPS.Top Level	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	
1.Standard Dimension	CPS.Width	LENGTH	COMMON	Identity Data	Type	Group	Categories	Y	20
2.General	CPS.Asset ID	TEXT	COMMON	Identity Data	Type	Group	Categories	Y	
2.General	CPS.Location	TEXT	COMMON	Identity Data	Type	Group	Categories	Y	
2.General	CPS.Material Specification	TEXT	COMMON	Identity Data	Type	Group	Categories	Y	
2.General	CPS.Material Submission	TEXT	COMMON	Identity Data	Type	Group	Categories	Y	
2.General	CPS.Part ID	TEXT	COMMON	Identity Data	Type	Group	Categories	Y	
3.Drawing Production	CPS.Approved Date	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	
3.Drawing Production	CPS.BD Reference	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	
3.Drawing Production	CPS.Checked Date	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	
3.Drawing Production	CPS.Contract Number	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	
3.Drawing Production	CPS.Drawn Date	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	

CPS.SHARED PARAMETER				PROJECT PARAMETER				As Built (Y/N)	Example (From AI001)
GROUP	NAME	DATAT YPE	DISCIPLINE	PARAMETER GROUP	TYPE/ INSTANCE	VALUE PER GROUP	CATEGORY ASSIGNED		
3.Drawing Production	CPS.FSD Ref	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	
3.Drawing Production	CPS.Paper Size	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	
3.Drawing Production	CPS.Prefix Sheet Number	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	
3.Drawing Production	CPS.Sheet Issue Description	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	
3.Drawing Production	CPS.Sheet Scale	TEXT	COMMON	Identity Data	Instance	Group	Sheet	Y	
4.Construction	CPS.Activity ID	TEXT	COMMON	Construction	Instance	Group	Categories	Y	
4.Construction	CPS.Bill Number	TEXT	COMMON	Construction	Instance	Group	Categories	N	
4.Construction	CPS.Classification	TEXT	COMMON	Construction	Instance	Group	Categories	N	
4.Construction	CPS.Cost Code	TEXT	COMMON	Construction	Instance	Group	Categories	N	
4.Construction	CPS.Country of Origin	TEXT	COMMON	Construction	Instance	Group	Categories	N	
4.Construction	CPS.Design Consultant	TEXT	COMMON	Construction	Instance	Group	Categories	Y	DSO-DSP
4.Construction	CPS.Design Revision	TEXT	COMMON	Construction	Instance	Group	Categories	Y	AI002
4.Construction	CPS.Works Package ID	TEXT	COMMON	Construction	Instance	Group	Categories	Y	NSC
4.Construction	CPS.Payment No.	TEXT	COMMON	Construction	Instance	Group	Categories	Y	IPO2
4.Construction	CPS.Progress Date	TEXT	COMMON	Construction	Instance	Group	Categories	Y	22/4/2023
4.Construction	CPS.Progress Remark	TEXT	COMMON	Construction	Instance	Group	Categories	Y	
4.Construction	CPS.Status	TEXT	COMMON	Construction	Instance	Group	Categories	Y	
5.Architectural	CPS.A.Acoustic Requirement	TEXT	COMMON	Identity Data	Type	Group	Door	Y	
5.Architectural	CPS.A.BD Door Mark	TEXT	COMMON	Identity Data	Type	Group	Door	Y	GW2A
5.Architectural	CPS.A.Door Leaf Height	LENGTH	COMMON	Identity Data	Type	Group	Door	Y	100
5.Architectural	CPS.A.Door Leaf Thickness	LENGTH	COMMON	Identity Data	Type	Group	Door	Y	400
5.Architectural	CPS.A.Door Leaf Width	TEXT	COMMON	Identity Data	Type	Group	Door	Y	
5.Architectural	CPS.A.Face Material Inside	TEXT	COMMON	Identity Data	Type	Group	Door	Y	MT-03
5.Architectural	CPS.A.Face Material Outside	TEXT	COMMON	Identity Data	Type	Group	Door	Y	MT-03
5.Architectural	CPS.A.Front of House	TEXT	COMMON	Identity Data	Instance	Group	Room	Y	NA
5.Architectural	CPS.A.FRR Insulation	TEXT	COMMON	Identity Data	Type	Group	Door	Y	100
5.Architectural	CPS.A.FRR Integrity	TEXT	COMMON	Identity Data	Type	Group	Door	Y	100
5.Architectural	CPS.A.Ironmongery Type	TEXT	COMMON	Identity Data	Type	Group	Door	Y	
5.Architectural	CPS.A.Louvre	YES/NO	COMMON	Identity Data	Type	Group	Door	Y	
5.Architectural	CPS.A.Remarks	TEXT	COMMON	Identity Data	Type	Group	Door	Y	LV5
5.Architectural	CPS.A.Room Type	TEXT	COMMON	Identity Data	Instance	Group	Room	Y	
5.Architectural	CPS.A.Security	YES/NO	COMMON	Identity Data	Type	Group	Door	Y	
5.Architectural	CPS.A.Smoke Seal	YES/NO	COMMON	Identity Data	Type	Group	Door	Y	
5.Architectural	CPS.A.Vision Panel	YES/NO	COMMON	Identity Data	Type	Group	Door	Y	

CPS.SHARED PARAMETER				PROJECT PARAMETER				As Built (Y/N)	Example (From AI001)
GROUP	NAME	DATA TYPE	DISCIPLINE	PARAMETER GROUP	TYPE/ INSTANCE	VALUE PER GROUP	CATEGORY ASSIGNED		
6.Structural	CPS.S.Beam Type	TEXT	COMMON	Identity Data	Type	Group	Structural Framing	N	
6.Structural	CPS.S.Bellout Depth	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Bellout Diameter	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Bellout Radius	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Cap Thickness	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Casing Thickness	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Column Type	TEXT	COMMON	Identity Data	Instance	Group	Columns, Structural Columns	N	
6.Structural	CPS.S.Concrete Grade	TEXT	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Cut off level	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Drop Panel	YES/NO	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Embedded H-Pile	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Pile Diameter	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Pile Length	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Pile Radius	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Rock Socket Diameter	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Rock Socket Radius	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Shaft Diameter	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Slab Gradient	TEXT	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Socket Length	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Steel Plate Thickness	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Steel Plate Width	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Tentative Rockhead Level	LENGTH	COMMON	Identity Data	Type	Group	Categories	N	
6.Structural	CPS.S.Top Level of Pile Cap	LENGTH	COMMON	Identity Data	Instance	Group	Categories	N	
6.Structural	CPS.S.Tentative Bedrock Level at Pile Shaft	LENGTH	COMMON	Identity Data	Instance	Group	Categories	N	
6.Structural	CPS.S.Shaft Length in Rock Socket	LENGTH	COMMON	Identity Data	Instance	Group	Categories	N	
6.Structural	CPS.S.Cut Off Level of Pile	LENGTH	COMMON	Identity Data	Instance	Group	Categories	N	
6.Structural	CPS.S.Effective Length in Rock Socket	LENGTH	COMMON	Identity Data	Instance	Group	Categories	N	
6.Structural	CPS.S.Waterproofing	TEXT	COMMON	Materials and Finishes	Instance	Group	Categories	N	
6.Structural	CPS.S.FRR	TEXT	COMMON	Materials and Finishes	Instance	Group	Categories	N	
7.Mechanical, Electrical and Plumbing	CPS.M.Equipment Air Flow	TEXT	COMMON	Identity Data	Instance	Group	Categories	Y	0.43m³/s
7.Mechanical, Electrical and Plumbing	CPS.M.Equipment Capacity	TEXT	COMMON	Identity Data	Instance	Group	Categories	Y	400Pa

CPS.SHARED PARAMETER				PROJECT PARAMETER				As Built (Y/N)	Example (From AI001)
GROUP	NAME	DATA TYPE	DISCIPLINE	PARAMETER GROUP	TYPE/ INSTANCE	VALUE PER GROUP	CATEGORY ASSIGNED		
7.Mechanical, Electrical and Plumbing	CPS.M.Equipment ID	TEXT	COMMON	Identity Data	Instance	Group	Categories	Y	EAF-B2-004
7.Mechanical, Electrical and Plumbing	CPS.M.Equipment Water Flow	TEXT	COMMON	Identity Data	Instance	Group	Categories	Y	2.5L/s
8.Façade	CPS.F.Façade System	TEXT	COMMON	Identity Data	Type	Group	Categories	N	
8.Façade	CPS.F.Façade Material Code	TEXT	COMMON	Identity Data	Type	Group	Categories	N	
9.MiC	CPS.MiC Module	TEXT	COMMON	Identity Data	Type	Group	Categories	N	
9.MiC	CPS.MiC ID	TEXT	COMMON	Identity Data	Type	Group	Categories	N	

E. CDE Folder Structure

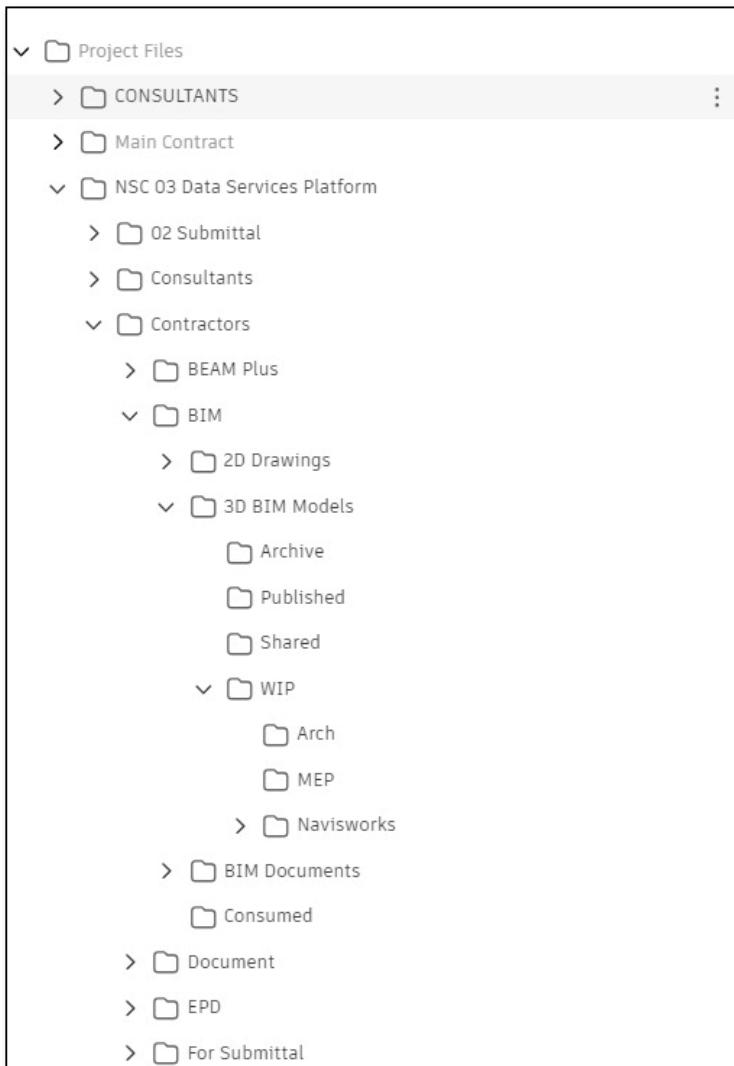


Table of folder description

Folder Name	NSC 03 Data Services Platform	Contractors	BIM	3D BIM Models	Archive	Published
Description	All files related to DSP	All submittals by DSP subcontractor	All DSP files related to BIM	All DSP BIM model submittals	Record of information for audit trail of development	Information Authorised for Construction
Folder Name	Shared	WIP	Arch	MEP	Navisworks	/
Description	Information approved for sharing with other stakeholders	Working DSP models	Working DSP Arch Models	Working DSP MEP Models	Native progress model submission	/