GROWING TOGETHER

Towards delivering world-class health facilities in Malaysia

A presentation by :

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PAB

GROWING TOGETHER

Towards delivering world-class health facilities in Malaysia

This paper shall discuss the need for **a tighter-knit sustainable working relationship between the Malaysian public sector and the private sector design consultancy professional services** towards the **delivery of better health facility buildings in Malaysia.**

As there is an **urgent need** in the **healthcare sector to construct new facilities and upgrade existing facilities across the country**, it is imperative to adopt a macro perspective of how best to approach human resource capacity building towards achieving the highest project delivery standards.

The **key stakeholders** from the public sector are: the users from the **Ministry of Health Malaysia (KKM)**; the health facility planning and project review teams at KKM; the construction professionals at the **Public Works Department (JKR)** comprising various construction professionals; the **private sector professional construction consultancy firms** such as architects, health facility planners, engineers of various specialisations, town planners, interior designers, medical equipment planners, and landscape architects.

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01 ABOUT US

PAB

ABOUT US

Perunding Alam Bina Sdn Bhd (PAB) was established in 1974 as a partnership and in 1981 as a body corporate architecture practice.

We offer a variety of professional services namely, architecture, health facility planning, town planning, landscape architecture, project management and interior design.

PAB has been involved in health facility projects since 1981, ie. almost 40 years of involvement in delivering public health facilities in Malaysia.

PAB

OUR PHILOSOPHY

MISSION

To provide design excellence and responsible project management that contributes to the best outcomes for our built environment.

VISION

To be a leading architecture practice contributing to a sustainable and vibrant built environment.

VALUES

Contextual Creativity

Provide context driven solutions which are timeless, efficient and cost effective.

Communication

To participate directly and closely with our clients, allied professionals in obtaining the best outcomes.

Unique solutions

To treat every project on its own merits and to complete each project to the best of our abilities.

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OUR SERVICES

ARCHITECTURE

Brief Formulation, Site Surveys & Reports, Feasibility Studies, Concept Development, Architectural Design, Authority Submissions, Working Drawings & Coordination , Project Procurement, Contract Administration, Site Supervision

HEALTH FACILITY PLANNING

Brief Formulation, Project Programming, Concept Development, Schedule of Accommodation, Room Data Sheets, 4-wall Elevations, Applications & Submissions

URBAN DESIGN AND PLANNING

Site Selection, Feasibility Studies, Master Planning, Urban & Regional Planning, Urban Design, Reports & Submissions

LANDSCAPE ARCHITECTURE

Site Master Planning, Landscape Design, Working Drawings & Specifications, Pre-Contract Procedures, Post-Contract Evaluation, Implementation

PROJECT MANAGEMENT

Project Planning & Programming
Project Coordination
Site Supervision
Contract Administration

ASSOCIATED SERVICES

Interior Design
Signage & Identity
Basic GBI Facilitation

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OUR HISTORY

40 YEARS OF EXPERIENCE IN PUBLIC HEALTH FACILITY DESIGN IN MALAYSIA

1974

PAB established

PAB was founded in Kuala Lumpur in May 1974

1981-1993

USM Kubang Kerian

PAB started on the USM Teaching Hospital in Kubang Kerian

1989-1992

Institut Jantung Negara

PAB appointed as the medical planners and architects for IJN.

1991 - 1994

Melaka General Hospital Upgrade

1994

Department of Chemistry Buildings

1998 - 2004

Hospital Sultan Ismail Johor Bahru

Health facility planners in collaboration with GDP as architects.

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OUR HISTORY

40 YEARS OF EXPERIENCE IN PUBLIC HEALTH FACILITY DESIGN IN MALAYSIA

2000 - 2004

HOSPITAL TEMERLOH
HOSPITAL SETIU
HOSPITAL PERMAI, TAMPOI

2004 -2012

HOSPITAL REHABILITASI, CHERAS

2007 -2013

INSTITUT KANSER NEGARA

2011 -2021

HOSPITAL SRI AMAN

2016 -2021

BLOK ENDOKRIN, HOSPITAL PUTRAJAYA

2017-2021

HOSPITAL CYBERJAYA

AND STILL GOING STRONG!

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CYBERJAYA HOSPITAL, CYBERJAYA
COMPLETION IS EXPECTED IN 2020
288 BEDS

This 288 bedded hospital is being developed by Cyberview Sdn. Bhd. (subsidiary of MOF) on a 12.8 acre site. This new healthcare facility will compliment Putrajaya and Serdang Hospital in serving mainly Cyberjaya, Putrajaya and surrounding part of Selangor Darul Ehsan.

Once completed, this hospital will be the first healthcare facility in Malaysia to be accredited with GBI platinum certification. Among the energy efficient features are solar panels, naturally ventilated atrium, rain water and daylight harvesting and many other M&E features.

The development includes 28 units of staff accomodation and nurses hostel for 20 nurses and a multi-storey car park block to house 790 car park bays.

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ENDOCRINE HOSPITAL, PUTRAJAYA
COMPLETION IS EXPECTED IN 2020
220 BEDS

The 220 bed Endocrine Complex will be built as an annexe to the existing Putrajaya Hospital connected by a link-bridge at level 2. This new facility shall be the Centre-of-Excellence for endocrinology related cases such as diabetes, obesity and metabolic complications, complete with training and research facilities.

PAB

SRI AMAN HOSPITAL, SARAWAK
COMPLETION IS EXPECTED IN 2021
108 BEDS

This 108-bed hospital (expandable to 200 beds) development is based on the Award Winning Design in the Hospital Design Competition organized by JKR in 2010.

The facility will be a replacement hospital to the existing 148 bed Sri Aman Hospital serving the district surrounding Bandar Sri Aman, Sarawak.

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INSTITUT KANSER NEGARA
COMPLETED 2013
252 BEDS

The National Cancer Institute located in Putrajaya is the first of its kind in providing a complete canter treatment and management in South East Asia.

It serves as the national referral centre with state-of-the-art equipment and facilities.

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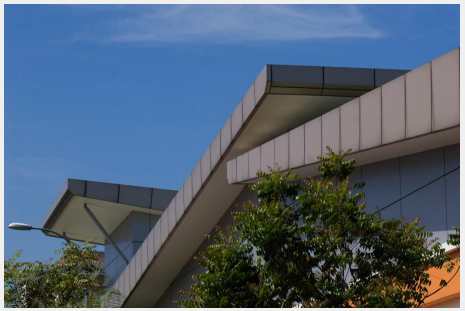
HOSPITAL REHABILITASI, CHERAS
COMPLETED 2012
166 BEDS

The rehabilitation hospital was constructed to replace the Lady Templer hospital on its 50.1 acre site in Cheras.This hospital provides training and research in rehabilitation and disability management.

This 166-bed hospital development includes staff accomodation and has the capacity to expand 300 beds in the future.



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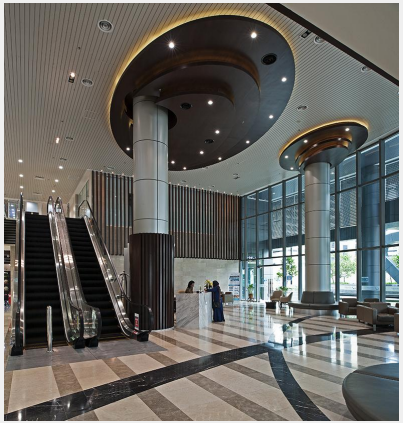
EXTENSION TO GLENEAGLES HOSPITAL, KUALA LUMPUR
COMPLETED 2015
100 BEDS

This 10-storey development includes 100 in-patient beds, 54 Medical Suites, a Health Screening, Daycare & Haemodialysis Centre in an annex building with a covered link-bridge to the existing Gleneagles Kuala Lumpur Hospital.



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02 PROPOSALS FOR RMK-12

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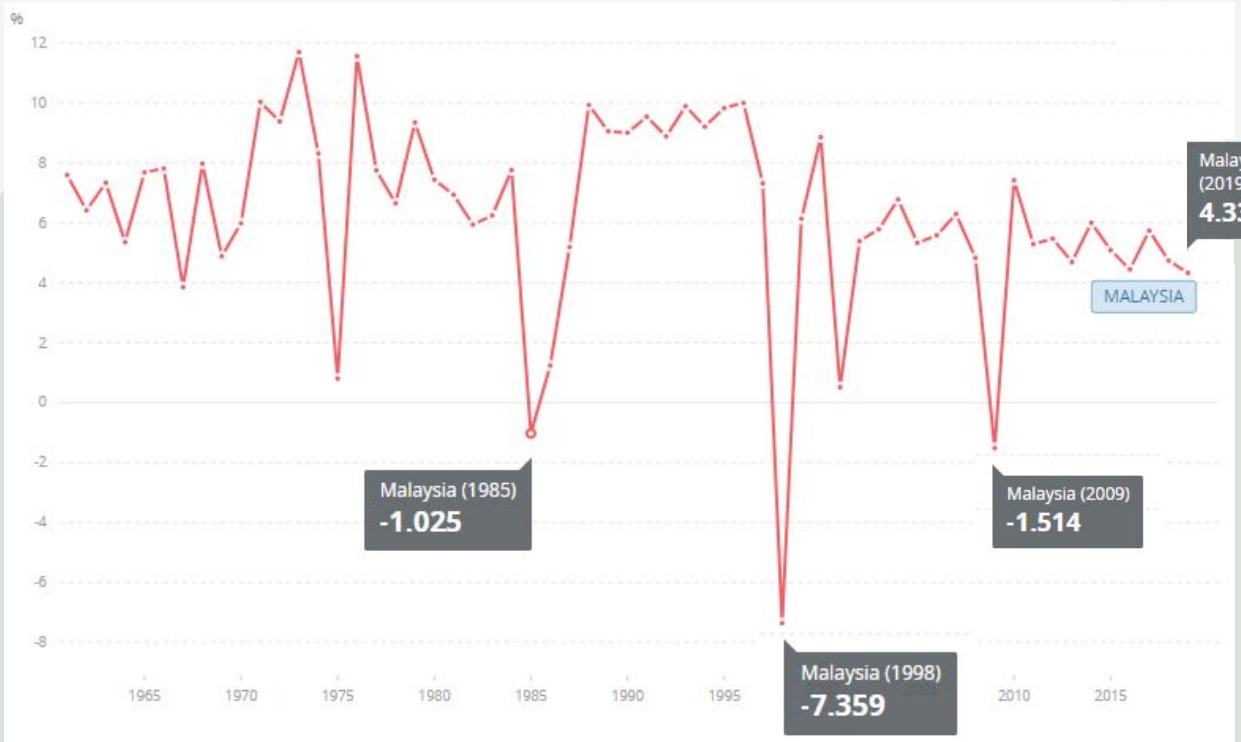
Malaysia Annual % GDP Growth 1960-2019



GDP growth (annual %) - Malaysia
World Bank national accounts data, and OECD National Accounts data files

THE EDGE MARKETS
MAKE BETTER DECISIONS

Update

World Bank revises Malaysia's 2020 GDP forecast to larger 4.9% contraction

"In addition, the **elevated unemployment rate and other weaknesses in the labour market would continue to weigh on private consumption**.

"Reflecting these developments, most demand components (net exports, private consumption and private investment) are expected to contract in 2020. **Government expenditure is expected to increase mainly due to stimulus spending,**" the World Bank said.

- The Edge Markets, September 29, 2020

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PAM Research & Futures Survey (May & July 2020)

Impact of Covid-19 on Architecture Firms

Key findings:

90% firms have less than 20 employees.

75% are Sole Proprietors.

35,000 people are employed by **1,608** architecture firms

As of July 2020,

24% of Architecture firms have retrenched at least 25% of their staff.

72% of firms cannot sustain salaries beyond 3 months after austerity measures (retrenchment, pay cuts, etc)

21% of firms reported their reserves have been depleted and will require a loan to sustain themselves.

4% firms have decided to close down.

11% are considering closure in near future.

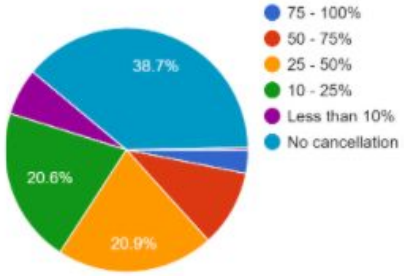
PAM Research & Futures Survey (July 2020)

How are architecture firms managing their financial risks?

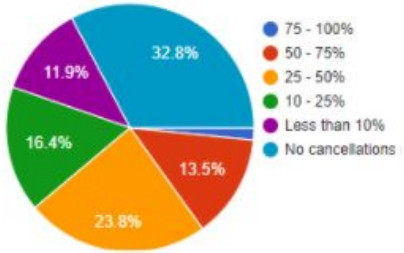
PAM Research & Futures Survey (July 2020)

Fee billings for 2020 and Outlook for 2021

Percentage of projects facing cancellation

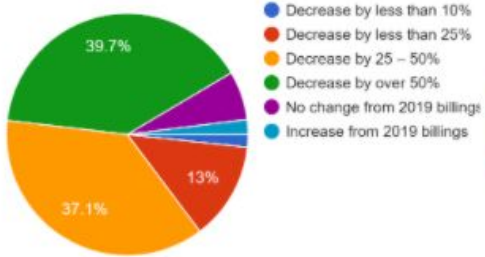


May 2020

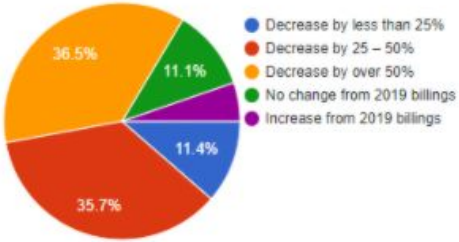


July 2020

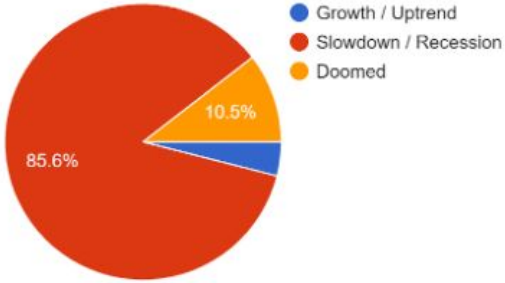
Fee billing projection 2020/2021



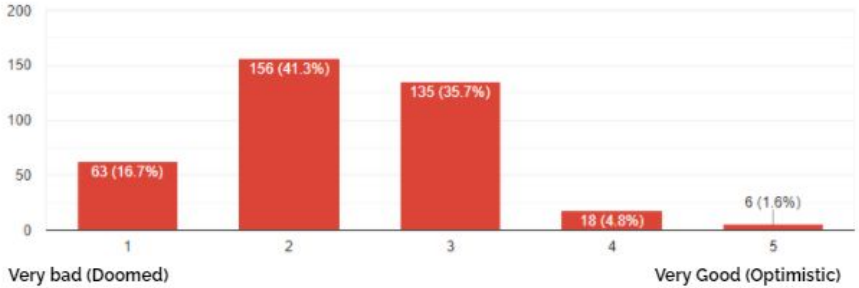
May 2020



July 2020



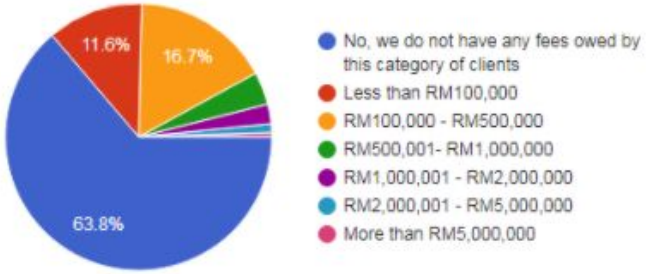
Outlook for 2020 / 2021 (May)



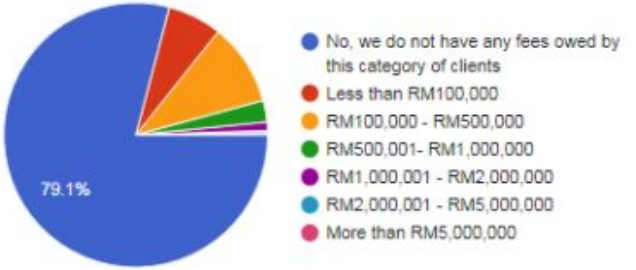
Outlook for 2020 / 2021 (July)

PAM Research & Futures Survey (July 2020)

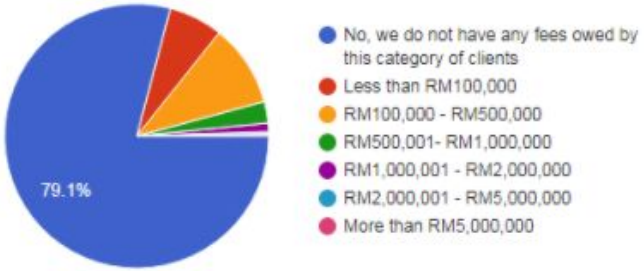
Quantum of fees owed to Architecture firms by Client Group



Owed to practices by 'Federal Government Ministries, Federal Government Departments, Federal Government Agencies, Public Universities'



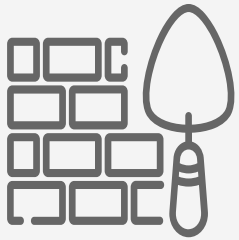
Owed to practices by 'State Governments, State Government Agencies, Local Governments, Local Authorities, City Corporations, and Companies owned by them'



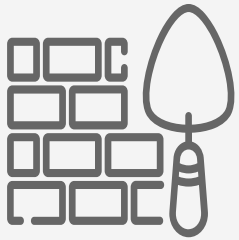
Owed to practices by 'Government Linked Companies (GLCs), Government Linked Investment Companies (GLICs) and their subsidiaries'

Owed to practices by Public Listed Companies (non-GLCs) and their subsidiaries

At least **36%** of architecture firms are actively involved in **public works**



RMK12 - The survival of Malaysian construction professional consultancy firms relies on access to government works



Proposals by Pertubuhan Akitek Malaysia for RMK-12

Items relevant to Health Facilities

Proposal by PAM	Rationale	Remarks by PAB
1. **Implementation of many smaller projects across the country** **Rejuvenation of secondary cities & small towns**	To spur the building industry, the Government, across Federal, state & district level, to implement larger number of smaller projects across the nation, eg: ● **Retrofit existing hospitals** / repurpose old buildings for pandemic needs. ● **Rehabilitate under-used older government owned buildings** to address changing social needs. ● **Refurbishment & greening of older government buildings** with Malaysia's GBI and other **green sustainability standards**. ● **Rehabilitate deteriorating public housing** projects to improve amenities including existing government quarters.	Increased investment in healthcare infrastructure and ancillary facilities will provide long term benefits for all and at the same time provide **multiplier effects** with the inclusion of a larger pool of professional consultants and building contractors. However, the **large number of smaller projects** would require **closer collaboration between the public and private sector** to ensure high quality outcomes are achieved. There is a need to address **better procurement methods** to achieve these ends.

Proposals by Pertubuhan Akitek Malaysia for RMK-12

Items relevant to Health Facilities

Proposal by PAM	Rationale	Remarks by PAB
2. **RFP for separate appointment of architects instead under Contractor's Design & Build**	**Appointment Architects in the RFPs for government sector projects** to be based on **fair experience and capacity** needed to service the various complexities and scale of the projects. Projects should cease being awarded by Design and Build or Turnkey under Contractors as the contractor will impose on Architects / Engineers a low fee, not in compliance to the Architects Act 1967 - Architects (Scale of Minimum Fees) Rules 2010. **Consultants selected in the RFP by the Government may then be nominated / seconded to the selected Contractor. To ensure projects are evenly distributed, Government may select pre-qualified Architects on a rotational basis.**	Recent requirements by JKR requiring high levels of BIM compliance is **beyond the Basic Services** stipulated in the **Architects (Scale of Minimum Fees) Rules 2010**, and should be considered as an additional service. As there has been no published reference to correctly ascertain the amount of fees adequate to cover cost of hardware, software, training of human resources and compliance to JKR requirements, fees charged to the turnkey contractor tends to be underpriced.

Proposals by Pertubuhan Akitek Malaysia for RMK-12

Items relevant to Health Facilities

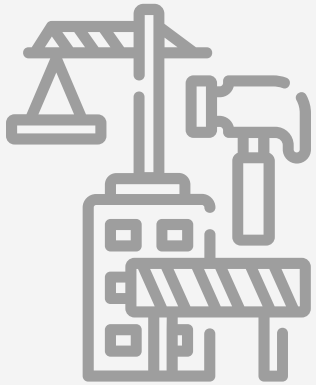
Proposal by PAM	Rationale	Remarks by PAB
3. **Use of collaborative teams of smaller architect practices for large-scale projects**	**To incentivize the use of collaboration of several smaller architecture practices to provide services for large-scale projects, to help SMEs build capacity** and enhance experience and in any case, the complexity of large-scale projects often requires various areas of expertise.	Experience requirements for projects should be tiered according to the size of the firm to enable younger architecture firms to participate and gain experience.
4. **Increase and improve training of building trades**	To emphasize and increase funding & incentives for training of building trades to improve skill and quality of work of Malaysian contractors. To encourage association / guilds of building tradesmen and craftsmen.	This will improve quality of construction projects and must work hand in hand with the adoption of BIM and increasing the use of prefabrication and industrialised building (IBS) technology. Bearing in mind that the cost of construction in Malaysia is amongst the lowest in the world, there is no immediate incentive for contractors to increase the adoption of IBS.

Proposals by Pertubuhan Akitek Malaysia for RMK-12

Items relevant to Health Facilities

Proposal by PAM	Rationale	Remarks by PAB
5. Reduce cost of IT infrastructure	To reduce taxes and tariffs on imported licensed design software and hardware that are needed to boost wider adoption of Integrated Digital Delivery (IDD) and Industrialised Building Systems (IBS) amongst Architects, building professionals and contractors. ● To reduce or remove 6% Digital Tax to increase affordability by Architect and professional firms of which over 98% are SMEs. 90% of all Architect firms employ below 20 persons. ● 6% Digital Tax to remain on the import of professional services.	The **cost of imported hardware and licensed specialist design software** for the specific needs of our architecture industry is **extremely high in Malaysia**, being imported from countries such as USA and Germany. eg. Cost of Autodesk Revit per year is minimum **RM9000** per seat (**equivalent to 2 months salary for a graduate architect**) and has been increasing annually due to the weakening of the Ringgit against the US Dollar.

RMK-12 is an opportunity to address national development disparities through an economic stimulus for the construction sector.



03 OUR BIM JOURNEY

PAB

BIM & IDD does not happen overnight

Malaysian practices have to constantly develop human resources and adopt new technologies

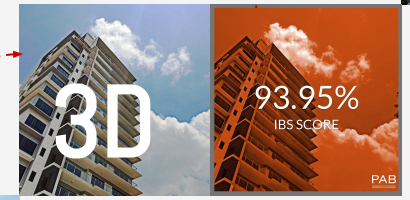
2020

LOD 500
BLOK ENDOKRIN
HOSPITAL PUTRAJAYA

2017

LOD 300
EMBASSY OF KUWAIT, PUTRAJAYA

2015



LOD 300
KUARTERS BANGSAR
HIGHEST IBS SCORE ON RECORD 2019

2010

LOD 200
INSTITUT KANSER NEGARA,
PUTRAJAYA

PAB's 10 year journey with BIM & IDD

PAB

Window mullion schedule extracted directly from the BIM model

MULLION SCHEDULE - 04 - HS2114 - AIRLOCK

ROOM NO	NO	TYPE	DESCRIPTION	LENGTH	ORIENTATION
A_CW_C_QCM_100 x 100mm					
VERTICAL					
HS2114	04	A_CW_C_QCM_100 x 100mm	100MM X 100MM QUAD CORNER CURTAIN WALL MULLION	4800 mm	VERTICAL
A_CW_C_QCM_100 x 100mm: 1				4800 mm	
A_CW_C_RM_50 x 100mm					
HORIZONTAL					
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1068 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1043 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	4100 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1068 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1043 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1000 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1000 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1043 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1068 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1068 mm	HORIZONTAL
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HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	4100 mm	HORIZONTAL
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HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	969 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	969 mm	HORIZONTAL
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HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1000 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1000 mm	HORIZONTAL
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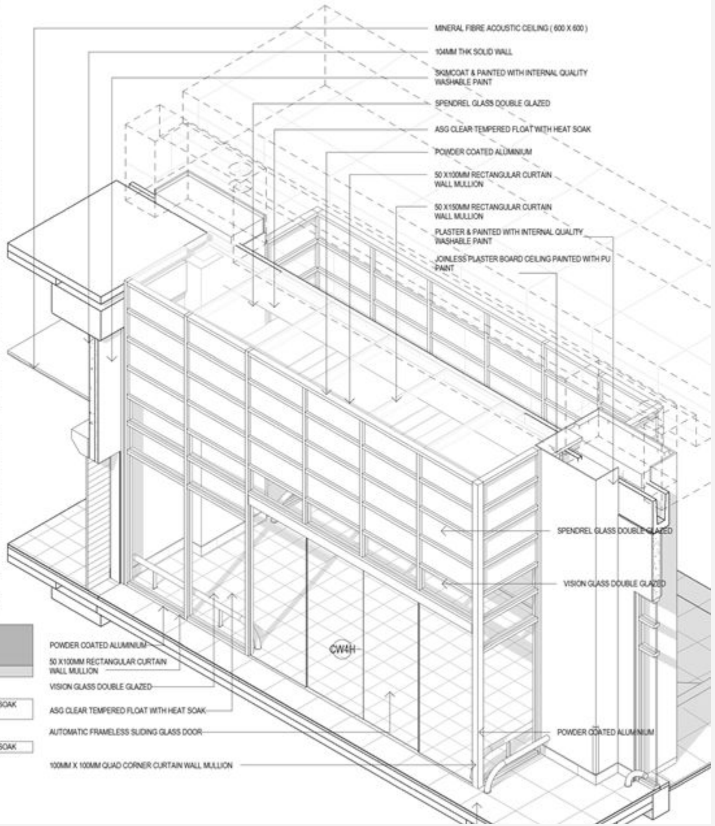
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1000 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	1000 mm	HORIZONTAL
VERTICAL					
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	4800 mm	VERTICAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	4800 mm	VERTICAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	4800 mm	VERTICAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	2150 mm	VERTICAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	2150 mm	VERTICAL
HS2114	04	A_CW_C_RM_50 x 100mm	50 X100MM RECTANGULAR CURTAIN WALL MULLION	2150 mm	VERTICAL
A_CW_C_RM_50 x 100mm: 48				69734 mm	
A_CW_C_RM_50 x 150mm					
HORIZONTAL					
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	1463 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	1463 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	1463 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	1463 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	1463 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	1463 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	1043 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	1068 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	994 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	994 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	994 mm	HORIZONTAL
HS2114	04	A_CW_C_RM_50 x 150mm	50 X150MM RECTANGULAR CURTAIN WALL MULLION	969 mm	HORIZONTAL
A_CW_C_RM_50 x 150mm: 12				14840 mm	

PANEL SCHEDULE - 04 - HS2114 - AIRLOCK

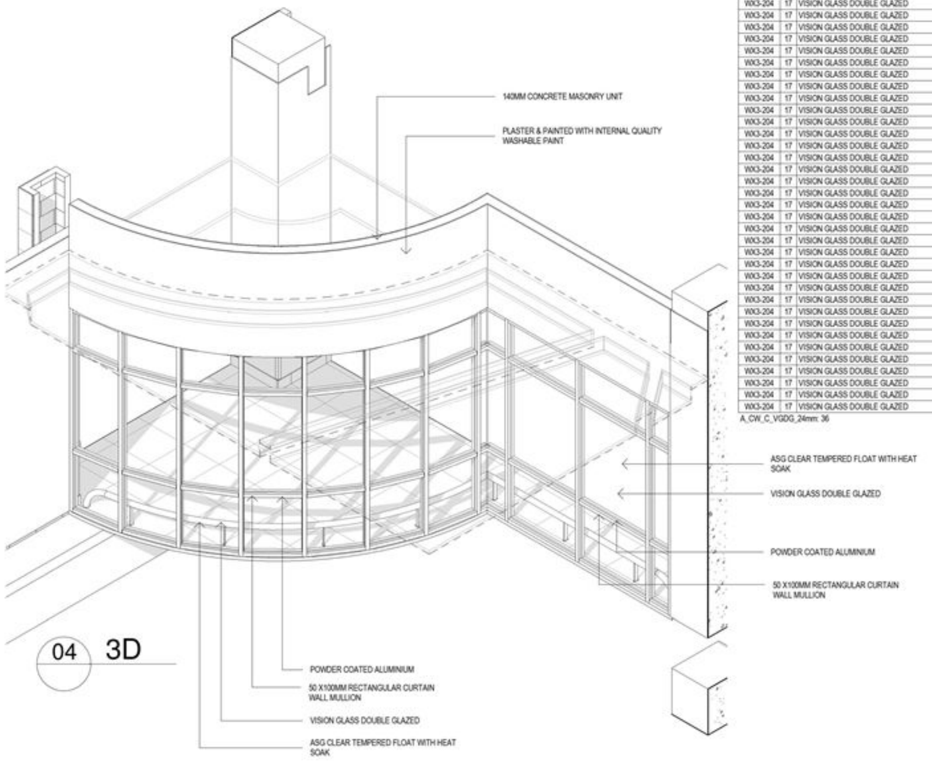
ROOM NO	NO	DESCRIPTION	TYPE	WIDTH	HEIGHT	AREA
A_CW_C_SGDG_24mm						
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1118 mm	1463 mm	1.64 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1118 mm	1463 mm	1.64 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1044 mm	1463 mm	1.53 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1044 mm	1463 mm	1.53 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1044 mm	1463 mm	1.53 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	1463 mm	1.45 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1043 mm	400 mm	0.42 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1068 mm	400 mm	0.43 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	969 mm	400 mm	0.39 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1043 mm	400 mm	0.42 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1068 mm	400 mm	0.43 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	969 mm	400 mm	0.39 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1043 mm	400 mm	0.42 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1068 mm	400 mm	0.43 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	969 mm	400 mm	0.39 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1043 mm	375 mm	0.39 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1068 mm	375 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	375 mm	0.37 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	375 mm	0.37 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	994 mm	375 mm	0.37 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	969 mm	375 mm	0.36 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1000 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1000 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1000 mm	400 mm	0.40 m²
HS2114	04	SPENDREL GLASS DOUBLE GLAZED	A_CW_C_SGDG_24mm	1000 mm	375 mm	0.38 m²
A_CW_C_SGDG_24mm: 34						20.43 m²
A_CW_C_VGDG_24mm						
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1043 mm	2050 mm	2.14 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1068 mm	2050 mm	2.19 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1068 mm	400 mm	0.43 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1043 mm	400 mm	0.42 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1043 mm	375 mm	0.39 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1068 mm	375 mm	0.40 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	994 mm	375 mm	0.37 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	994 mm	375 mm	0.37 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	994 mm	375 mm	0.37 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	969 mm	375 mm	0.36 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1000 mm	2050 mm	2.05 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1000 mm	375 mm	0.38 m²
HS2114	04	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1000 mm	400 mm	0.40 m²
A_CW_C_VGDG_24mm: 13						10.27 m²
CW4H - 4100 x 2550						
HS2114	04	AUTOMATIC FRAMELESS SLIDING GLASS DOOR	CW4H - 4100 x 2550	4100 mm	2550 mm	10.46 m²
CW4H - 4100 x 2550: 1						10.46 m²

PANEL MATERIAL SCHEDULE - 04 - HS2114 - AIRLOCK

ROOM NO	NO	TYPE	DESCRIPTION	MATERIAL
A_CW_C_SGDG_24mm				
HS2114	04	A_CW_C_SGDG_24mm	SPENDREL GLASS DOUBLE GLAZED	ASG CLEAR TEMPERED FLOAT WITH HEAT SOAK
A_CW_C_SGDG_24mm: 34				
A_CW_C_VGDG_24mm				
HS2114	04	A_CW_C_VGDG_24mm	VISION GLASS DOUBLE GLAZED	ASG CLEAR TEMPERED FLOAT WITH HEAT SOAK
A_CW_C_VGDG_24mm: 13				



Virtual building vs. constructed building



PANEL SCHEDULE - 17 - WX3-204 - CORRIDOR

ROOM NO	NO	DESCRIPTION	TYPE	WIDTH	HEIGHT	AREA
A_CW_C_VGDG_24mm						
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	353 mm	825 mm	0.29 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1150 mm	825 mm	0.95 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	325 mm	825 mm	0.27 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1150 mm	825 mm	0.95 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	156 mm	825 mm	0.13 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	825 mm	0.59 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	825 mm	0.59 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	825 mm	0.59 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	825 mm	0.59 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	686 mm	825 mm	0.57 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	825 mm	0.59 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	825 mm	0.59 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	325 mm	1450 mm	0.47 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1150 mm	1450 mm	1.67 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1150 mm	1450 mm	1.67 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	353 mm	1450 mm	0.51 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1150 mm	525 mm	0.60 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	1150 mm	525 mm	0.60 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	325 mm	525 mm	0.17 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	353 mm	525 mm	0.19 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	686 mm	1450 mm	0.99 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	686 mm	525 mm	0.36 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	525 mm	0.37 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	1450 mm	1.03 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	525 mm	0.37 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	1450 mm	1.03 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	525 mm	0.37 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	1450 mm	1.03 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	1450 mm	1.03 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	525 mm	0.37 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	525 mm	0.37 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	1450 mm	1.03 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	1450 mm	1.03 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	710 mm	525 mm	0.37 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	156 mm	525 mm	0.08 m²
WX3-204	17	VISION GLASS DOUBLE GLAZED	A_CW_C_VGDG_24mm	156 mm	1450 mm	0.23 m²
A_CW_C_VGDG_24mm: 36						22.63 m²

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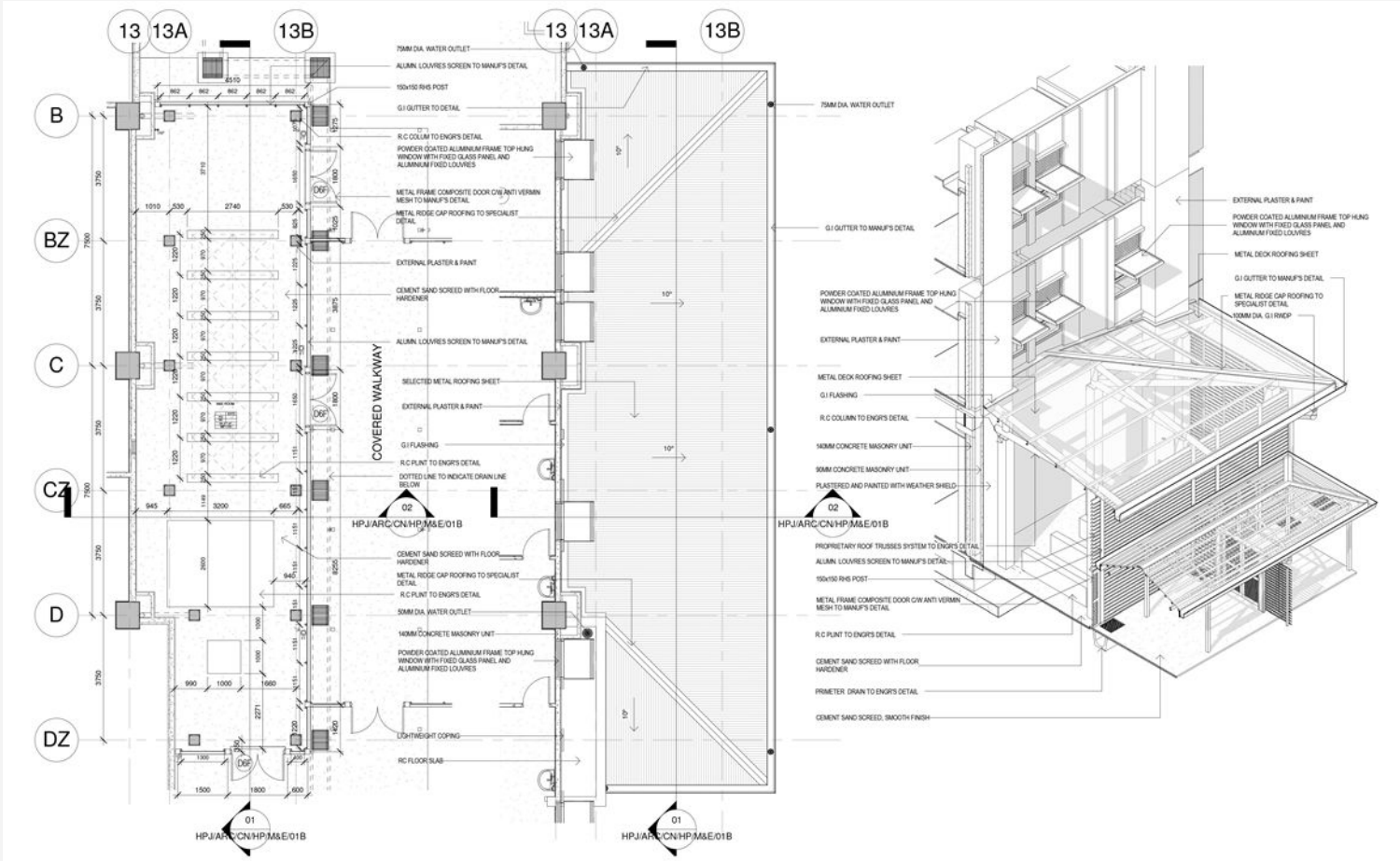
Water tanks and roof details fully modelled



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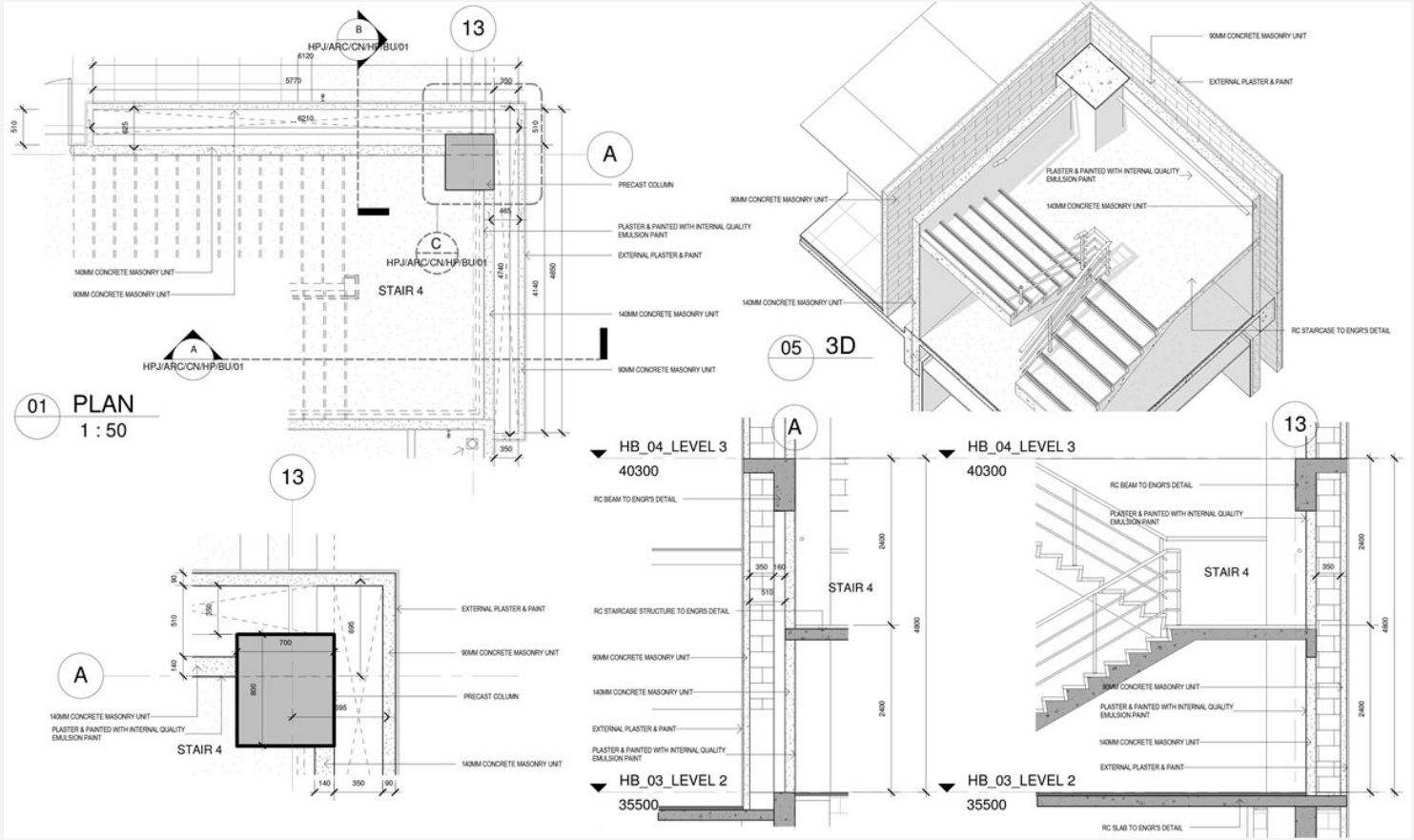
Staircase details in 3D



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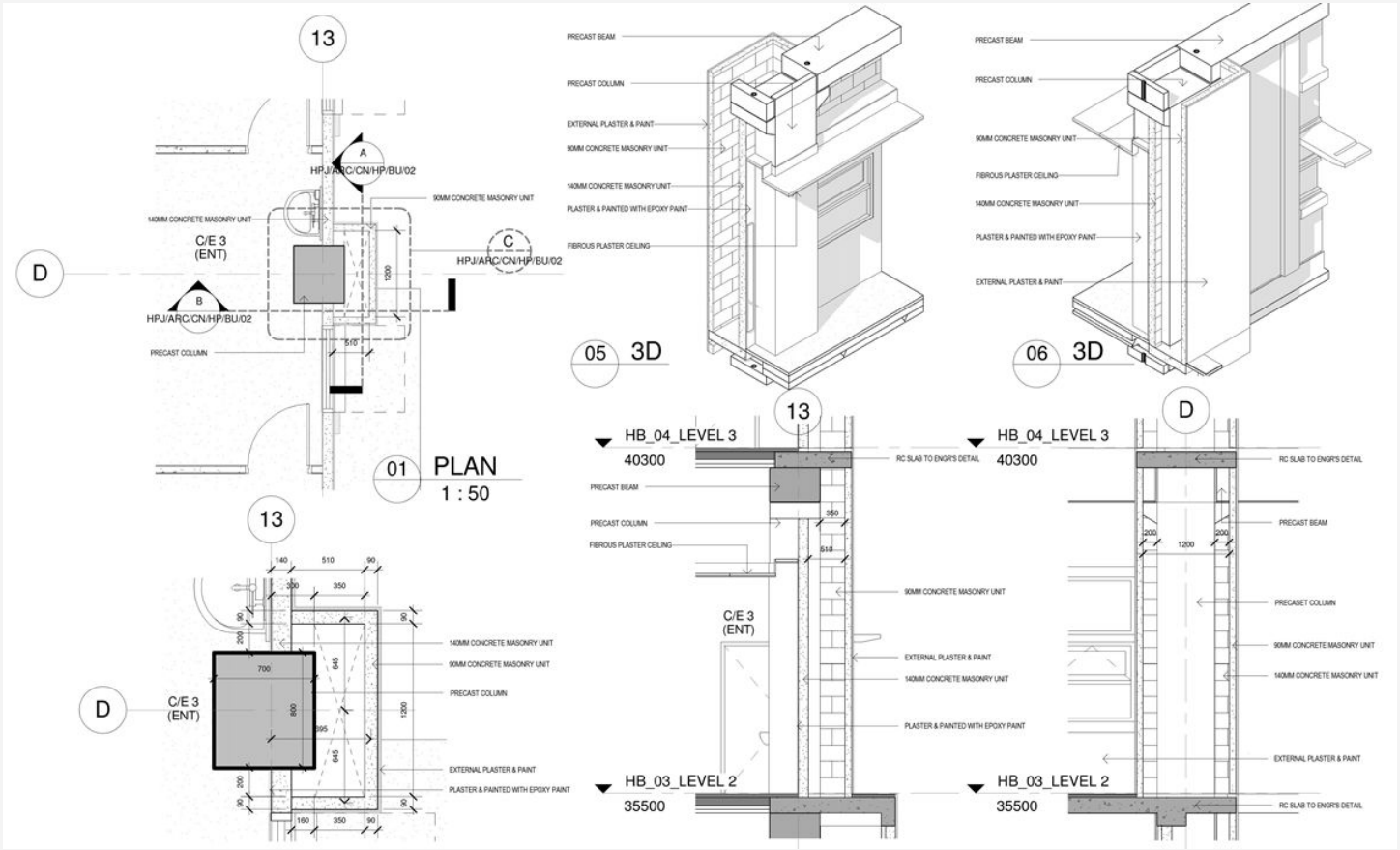
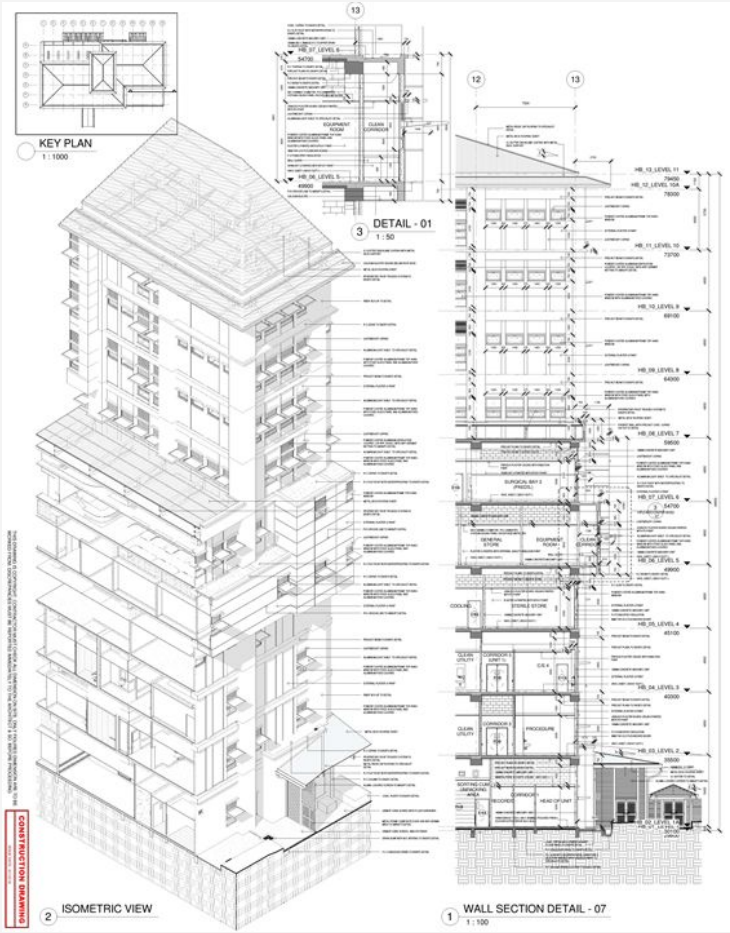
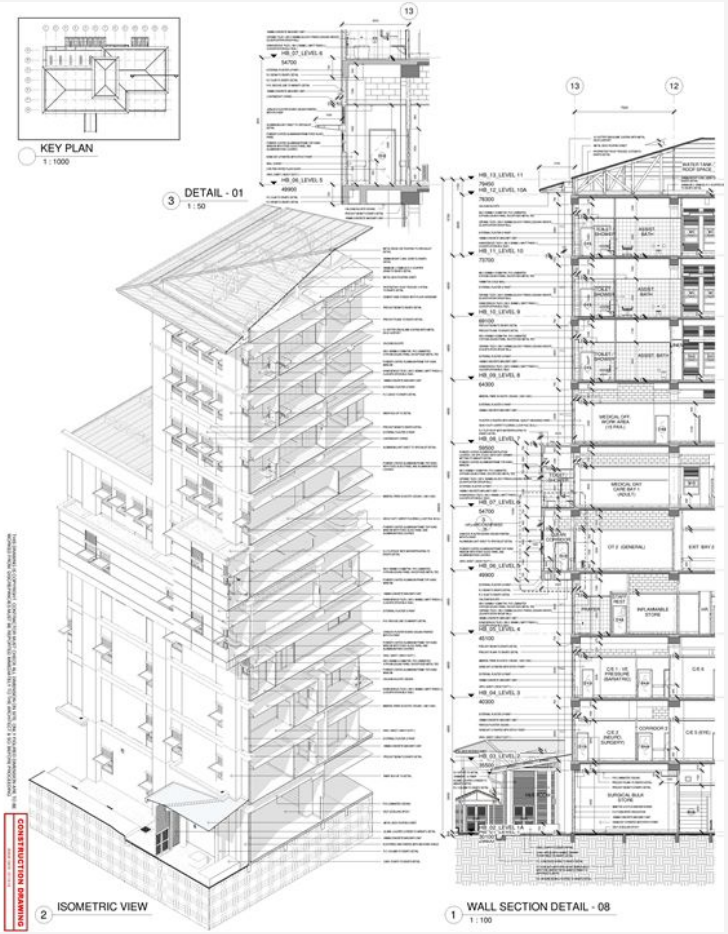
Selected wall details



Detailed wall sections





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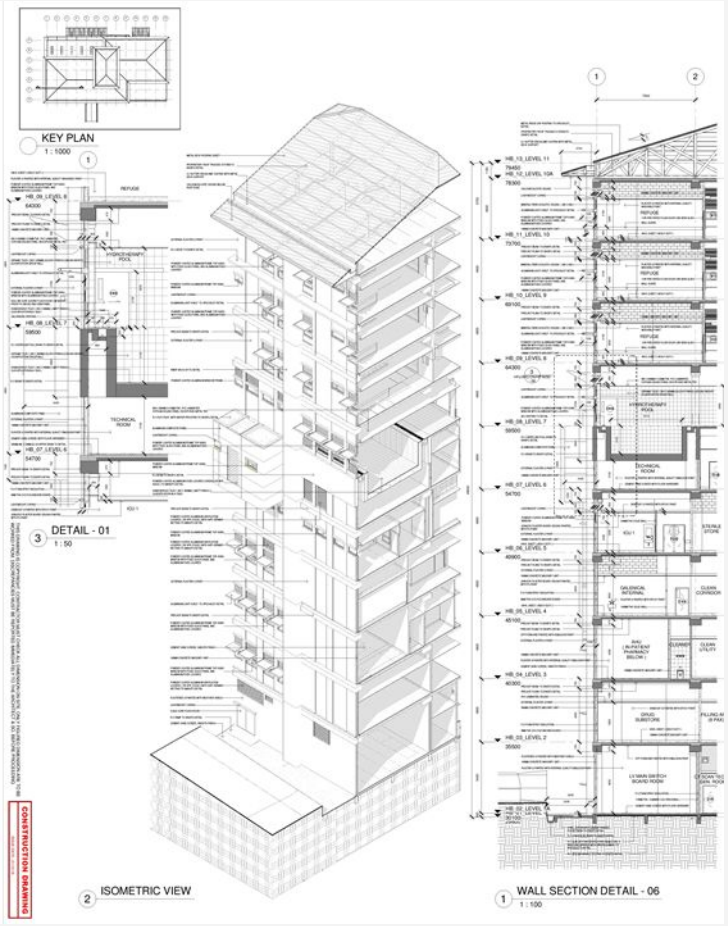
Detailed wall sections



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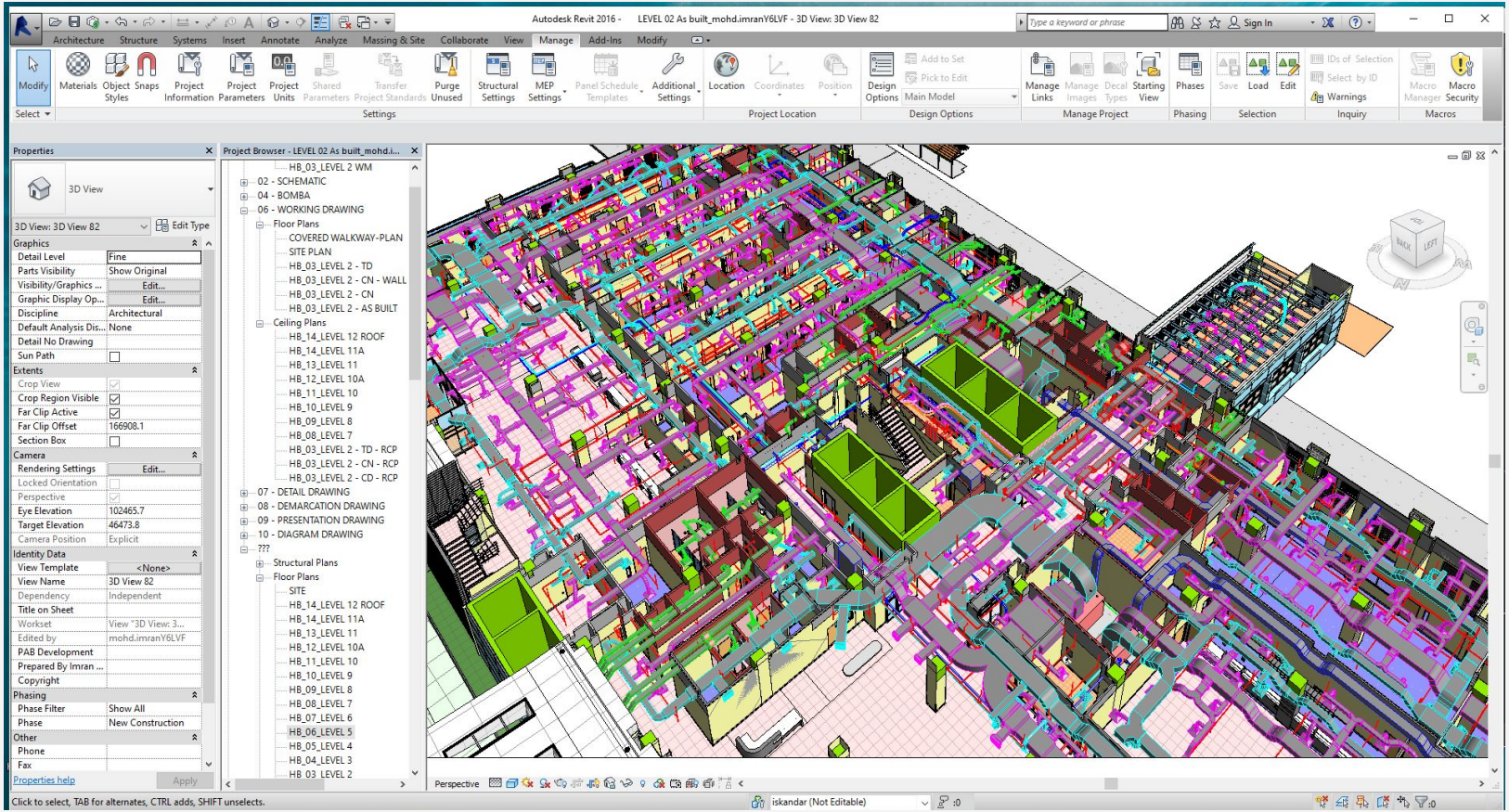
Virtual coordination of all services



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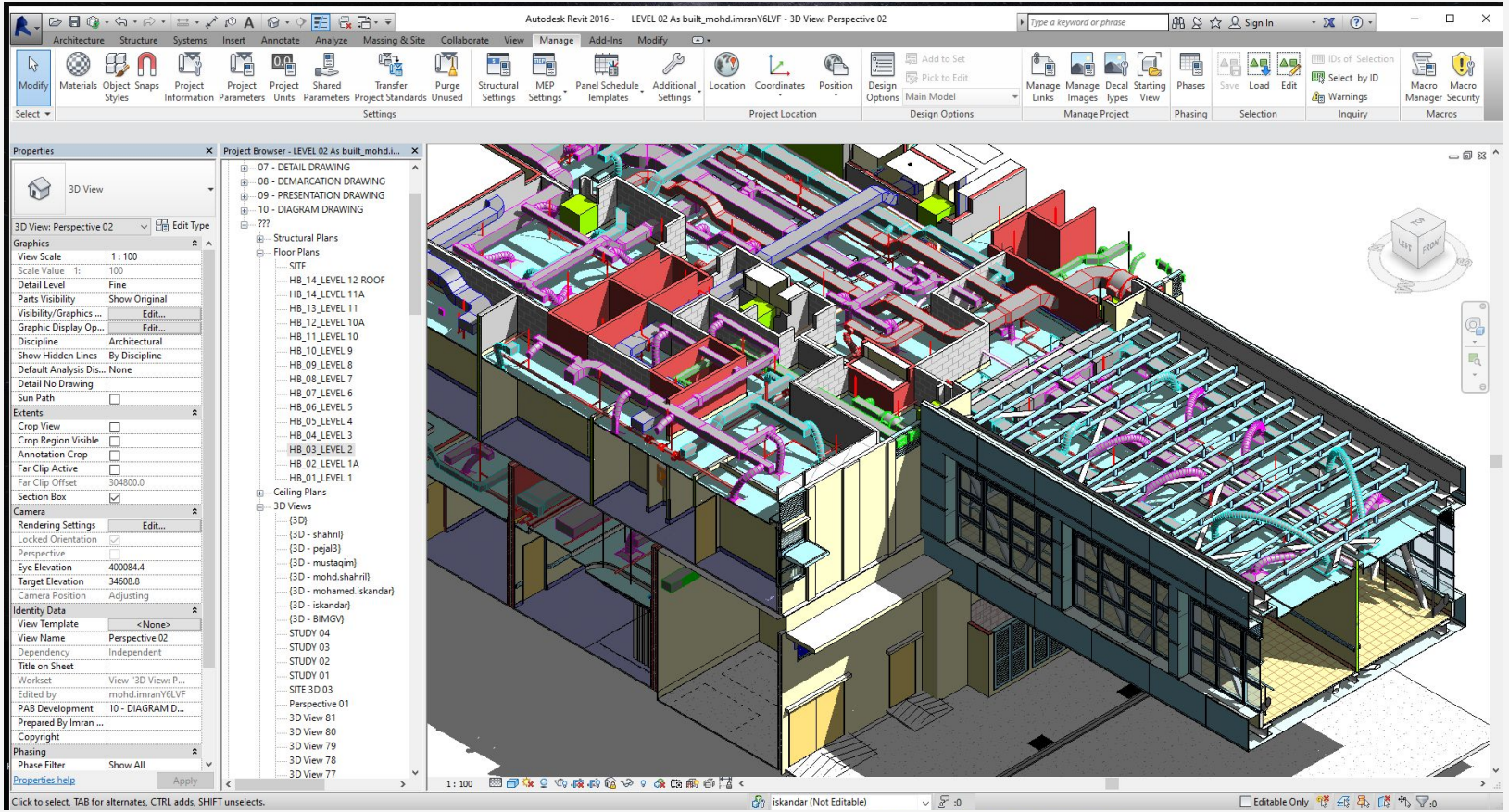
Virtual coordination of all services



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How do we derive fair fees for BIM & IDD?

Excerpts from Architect's Act 1967 - Architects (Scale of Minimum Fees) Rules 2010

An architectural consultancy practice which provides the Basic Services shall be paid in accordance with the minimum scale of fees.

7. Phases for Basic Services

The Basic Services that may be provided by the architectural consultancy practice shall be for any or all of the following phases:

(a) Schematic Design Phase;
(b) Design Development Phase;
(c) Contract Documentation Phase;
(d) Contract Implementation and Management Phase;
(e) Final Completion Phase.

10. Basic Services under Contract Documentation Phase

The Basic Services that may be provided by the architectural consultancy practice under the Contract Documentation Phase shall be any or all of the following:

(a) upon approval by the client of the updated preliminary estimates of construction costs and the project planning and implementation schedule, **preparing and finalizing detailed drawings and other particulars necessary to the stage of completion sufficient to enable bills of quantities to be prepared**;

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How do we derive fair fees for BIM & IDD?

Excerpts from Architect's Act 1967 - Architects (Scale of Minimum Fees) Rules 2010

Does not cover BIM scope of services

14. Additional Services

The Additional Services that may be provided by the architectural consultancy practice under a separate appointment shall be any or all of the following:

(a) advisory services;
(b) survey and investigation services;
(c) planning and development services;
(d) financial advisory services;
(e) exceptional negotiations and protracted involvement services;
(f) project management consultancy services;
(g) miscellaneous services. *??*

21. Miscellaneous services

The miscellaneous services that may be provided by the architectural consultancy practice shall be any or all of the following:

(a) providing **landscape** design services,
(b) advising the client on the selection of **works of art** or commissioning of decorative works and supervising their installation;
(c) undertaking **special studies** in connection with the development of designs for prototype buildings or models, including their testing and evaluation;
(d) providing **illumination** design services

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Conventional project cost (technical team) over 4 years

Illustration purposes only

Role	Remuneration / year	Software / year	Hardware / year	Training / year	Involvement / year	Total (MYR)
Technical Manager	125,000	1000	1200	500	2	255,400
Draftsman 1	70,200	1000	1200	500	4	385,200
Draftsman 2	54,600	1000	1200	500	4	291,600
Draftsman 1	70,200	1000	1200	500	3	288,900
Draftsman 2	54,600	1000	1200	500	3	218,700
Draftsman 2	54,600	1000	1200	500	2	145,800
Total						**1,307,600**

*Note: Remuneration costs includes salary + min. 1 month bonus,
EPF, SOCSO, health insurance, allowances and other benefits.

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Conventional project cost (technical team) over 4 years

Illustration purposes only

Role	Remuneration / year	Software / year	Hardware / year	Training / year	Involvement / year	Total (MYR)
BIM Manager	140,400	9000	5000	1500	2	311,800
BIM Coordinator	109,200	9000	5000	1500	4	498,800
BIM Modeller 1	109,200	9000	5000	800	3	372,000
BIM Modeller 2	78,000	9000	5000	800	3	325,200
BIM Modeller 2	78,000	9000	5000	800	2	216,800
Total						**1,555,300**

Smaller team but significantly higher additional overhead costs.
19% higher cost compared to conventional documentation.
Up to 25% if unforeseen circumstances are encountered.

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Unforeseen BIM Implementation Costs

Based on PAB's experience

- Older existing employees find it **difficult to reskill**.
- **Skilled individuals rampantly poached** by other firms, contractors or private sector developers.
- High turnover leads to **repeated training costs** incurred by the company / or higher employment costs.
- **Lack of BIM library** creates initial delays to the project.
- **Delays caused by other consultants** who are brought in by D&B Contractor but do not have BIM capabilities.
- **Client group misunderstands BIM** processes and makes ad-hoc requests which **obstructs the work programme.**
- BIM execution **plan not followed through** by all parties.
- Consultant pressured by D&B Contractor to provide documentation to avoid Liquidated Damages. Leads to **doubling up resources** (2 teams).

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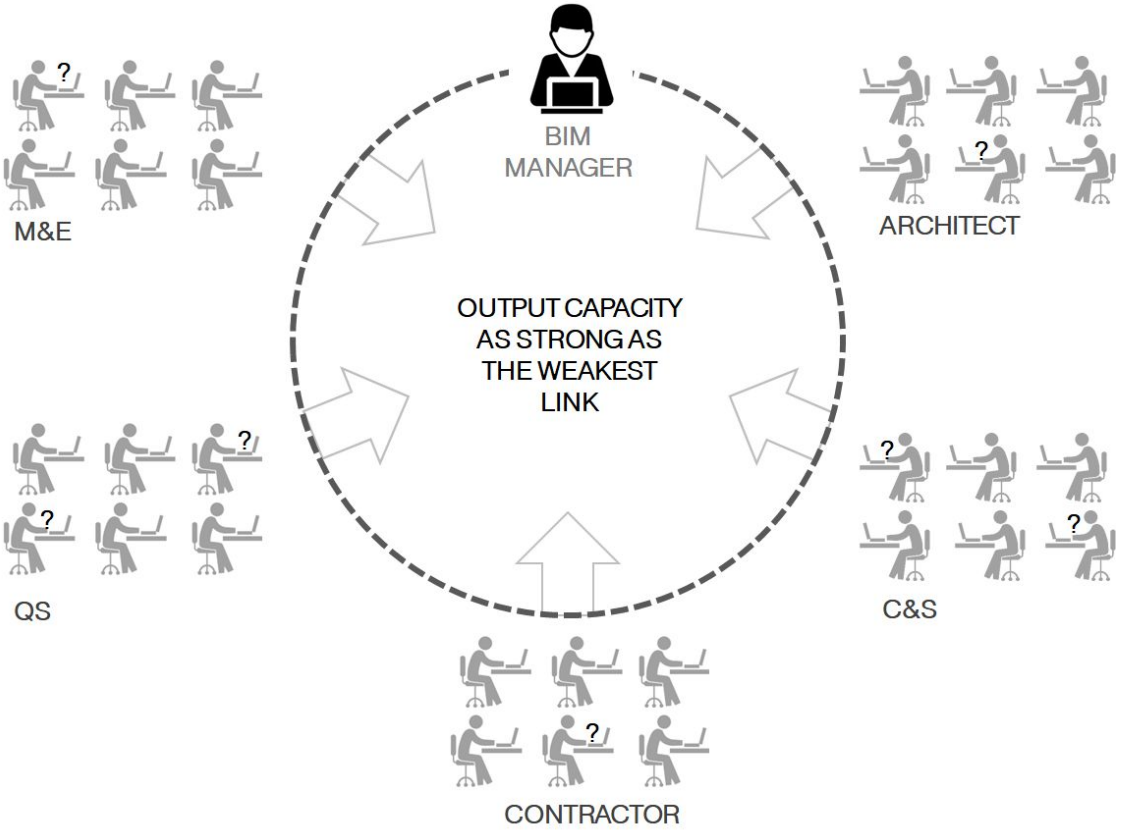
BIM: Input vs Output

Reality of data entry



BIM: Input vs Output

Reality of BIM

Diagram by:

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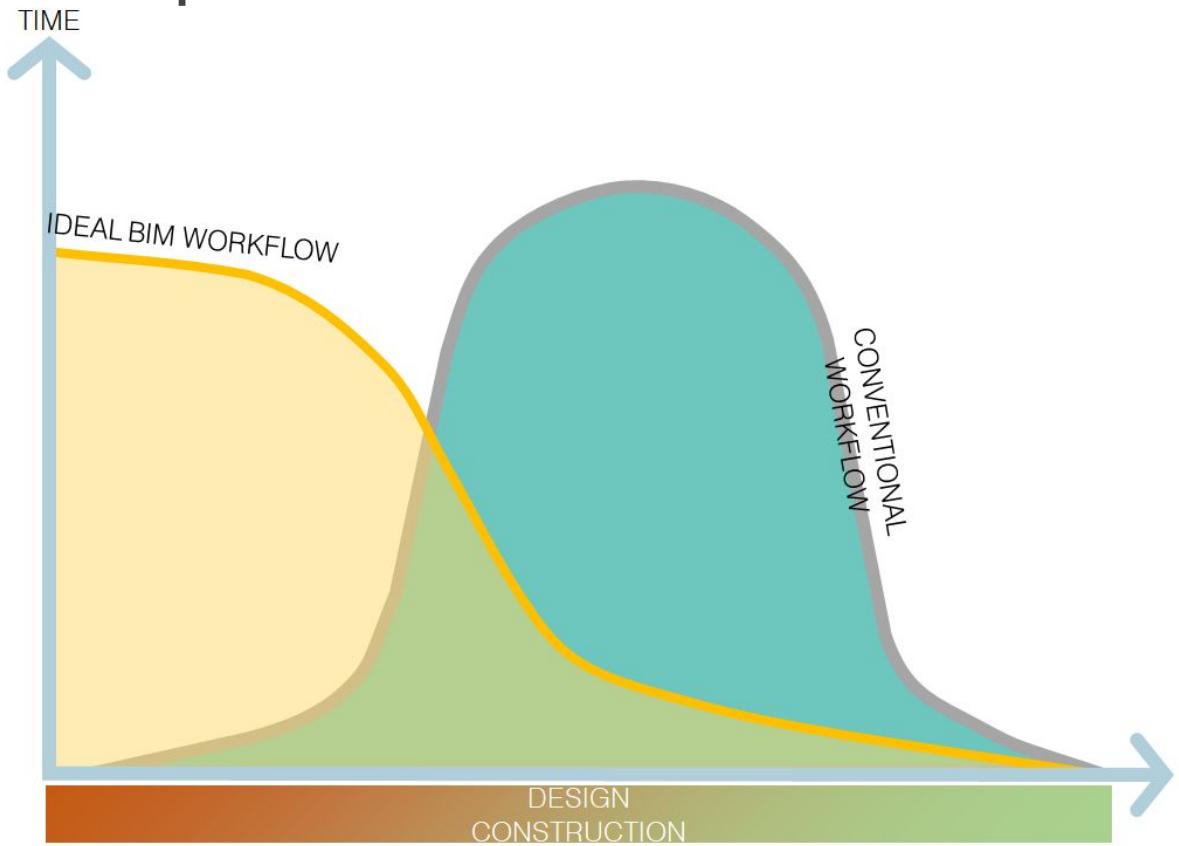

BIM: Input vs Output

Reality of BIM

Diagram by:

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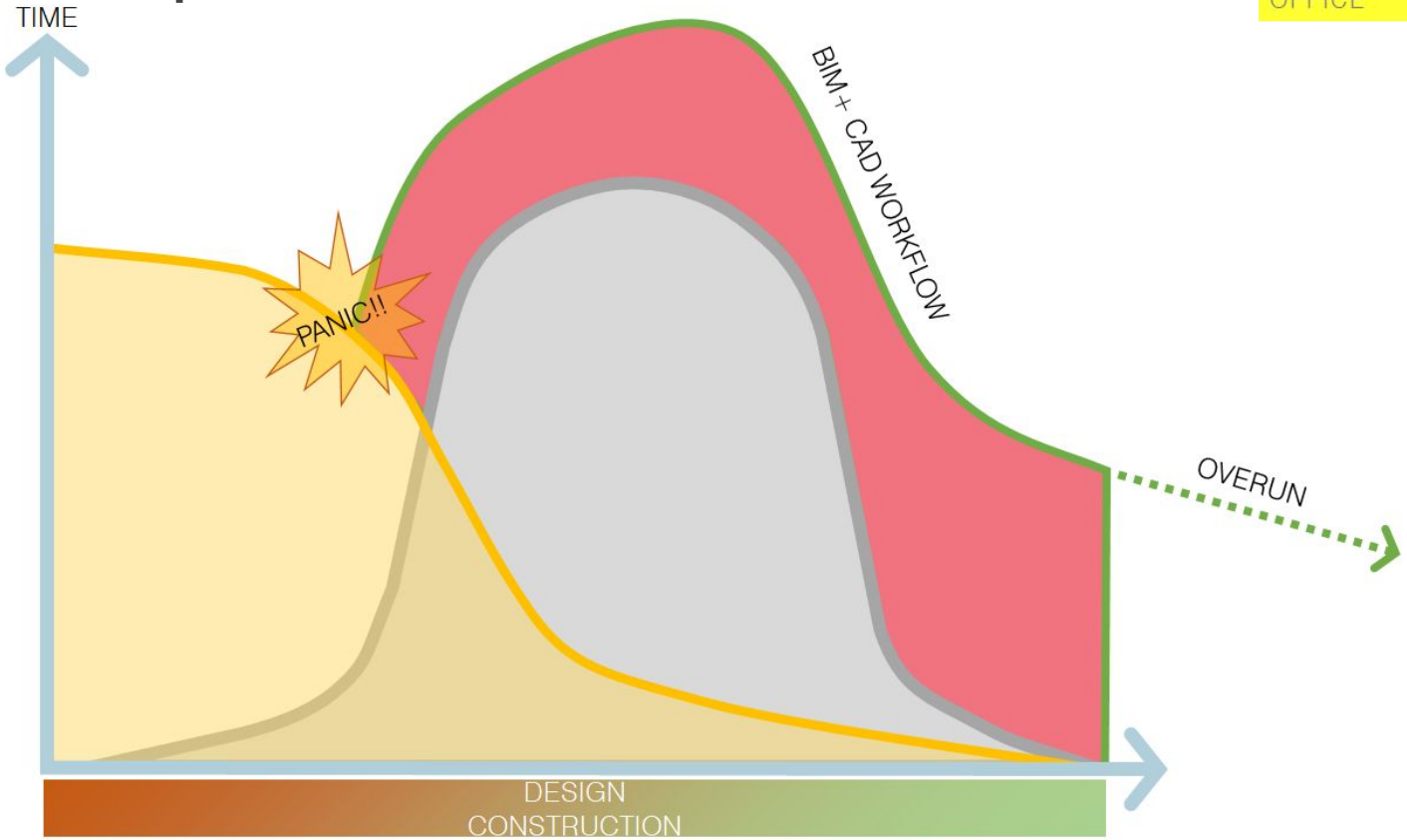

BIM: Input vs Output

Reality of BIM

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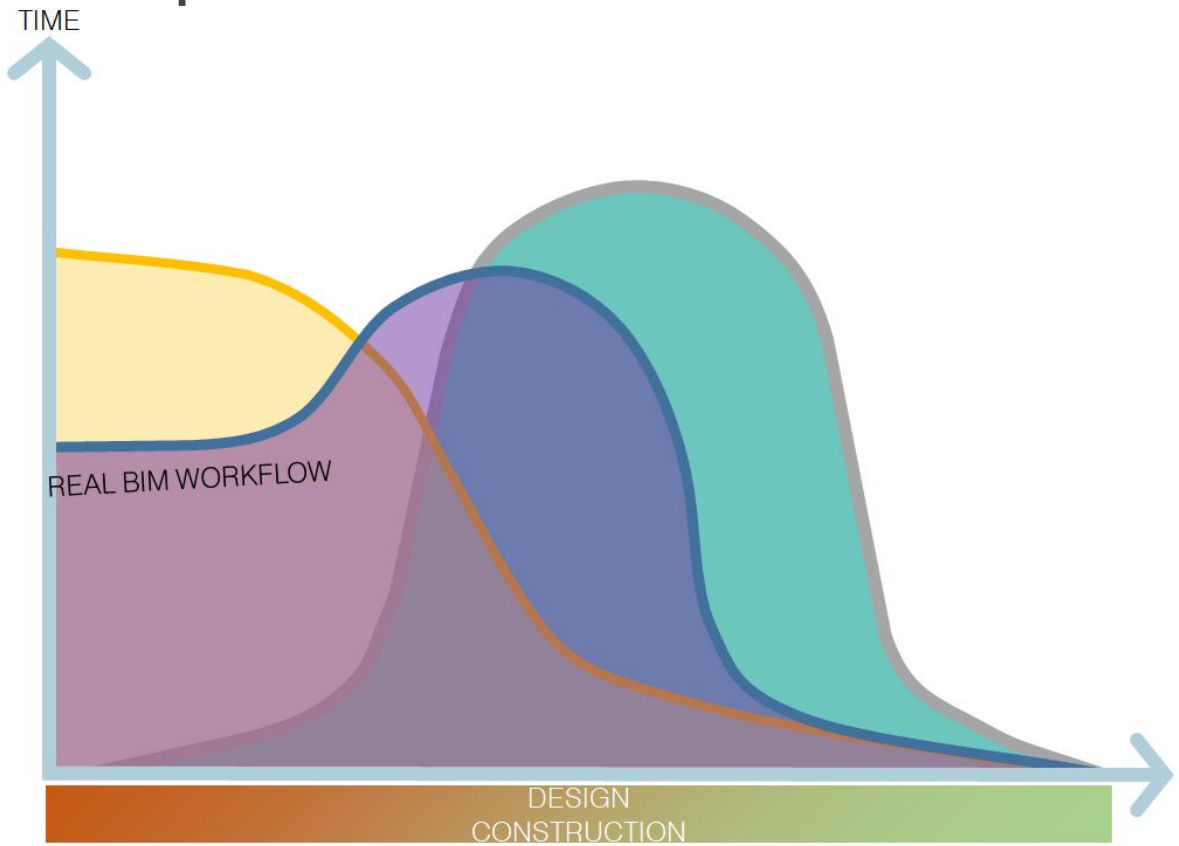

Diagram by:

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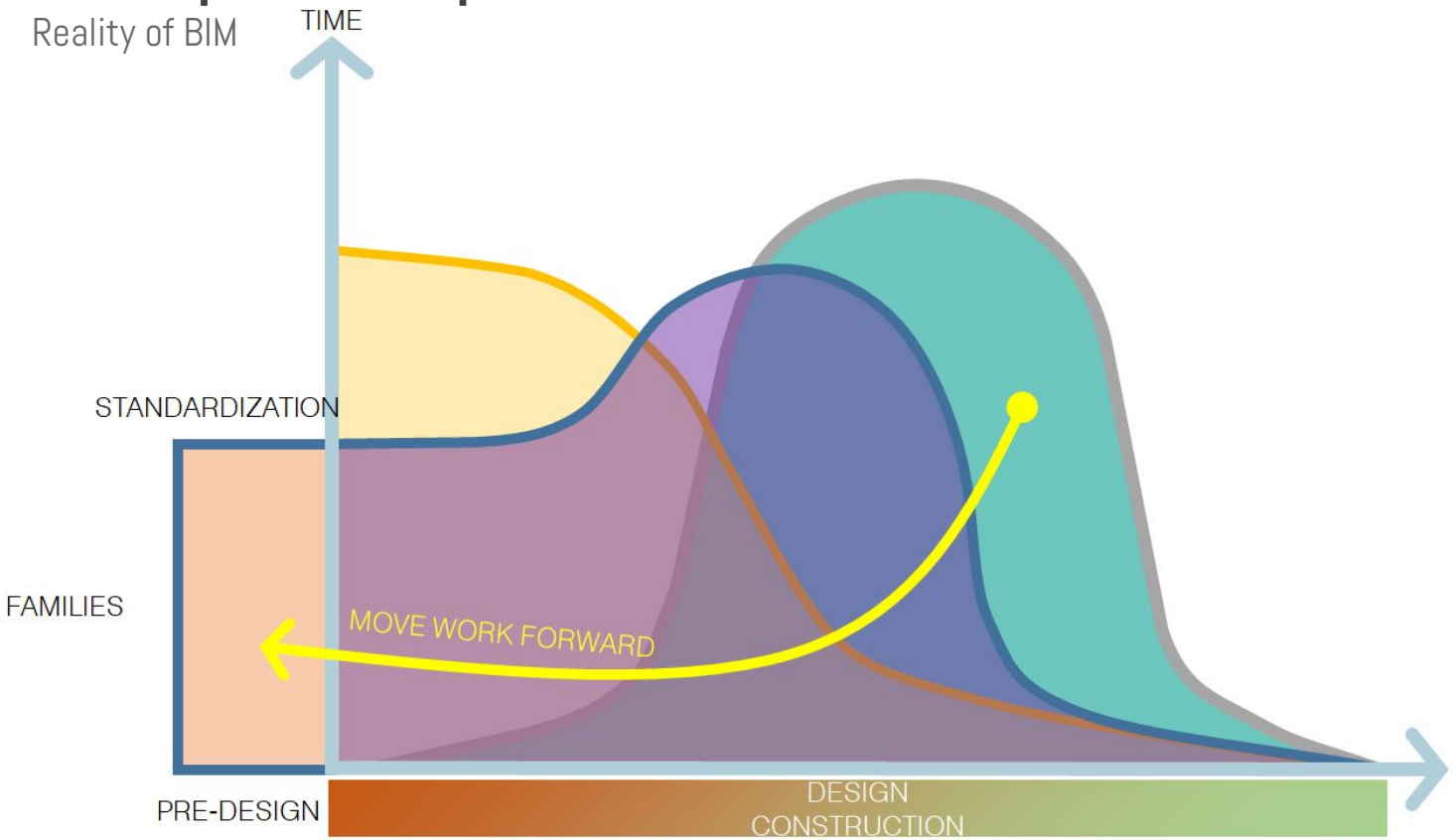
BIM: Input vs Output

Reality of BIM



BIM: Input vs Output

Reality of BIM

Diagram by:

6IX
DESIGN
OFFICE

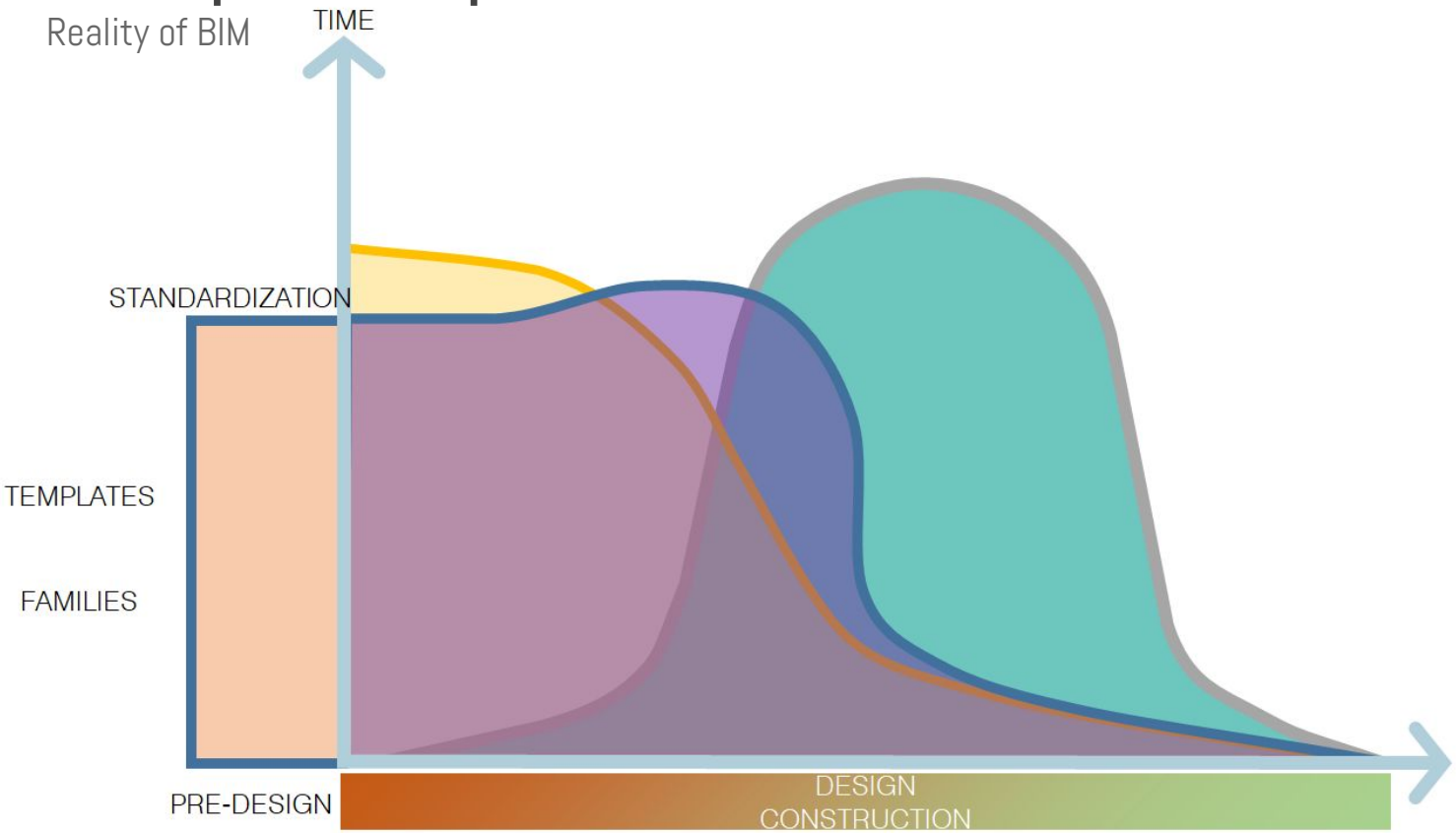


Diagram by:

6IX
DESIGN
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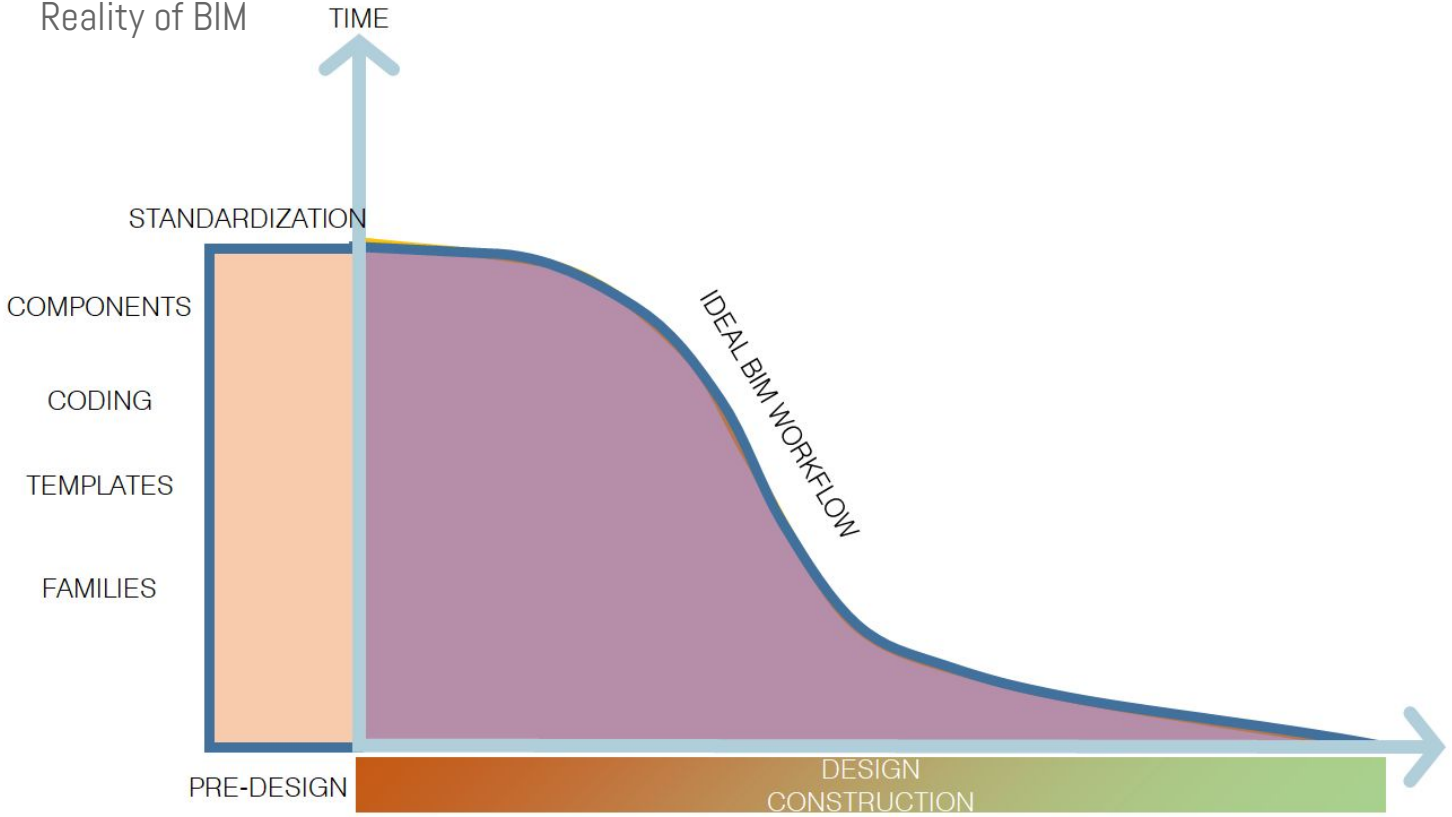
BIM: Input vs Output

Reality of BIM



04 RECOMMENDATIONS

Public sector should build capacity in partnership with the private sector

Allow for a clear progression for firms to participate

2020-2022

5m

Retrofit existing hospitals / clinics
Rehabilitate older building
Make existing buildings green

2022-2025

20m

Smaller 'Klinik Kesihatan',
Larger upgrading works for existing hospital / clinic

2025-2028

50m

Larger 'Klinik Kesihatan',
More complex renovation works,
new hospital department, etc.

2028 - 2032

>100m

New specialist block
for existing district hospital
New 70 bed hospital, etc.

Allow smaller firms to team up with experienced firms for larger projects.

Allowing firms to grow through RMK12 and RMK13 (10 years)

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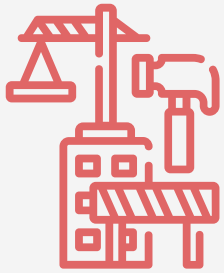
Need for a specialised
health facility planning course
tailor made for Malaysia.

An opportunity to
export services to ASEAN.



Sustainability also includes using technology **effectively**

Global Comparison of Cost of Construction

ARCADIS Design & Consultancy for natural and built assets

Which cities are most expensive for construction?

Dense cities with high cost building locations, such as New York and Hong Kong, continue to prosper and see significant development activity thanks to their attractiveness as desirable global cities for commerce and people. In this year's rankings our assessment is based on typical developments in city locations, illustrating the significant product quality, supply chain and cost differential factors specific to these locations.

Find out more about some of the cities profiled using the interactive graph, or download the full International Cost Comparison chart.

TOP 10 CHEAPEST CITIES FOR CONSTRUCTION

1. Taipei
2. Bangalore
3. Bangkok
4. Kuala Lumpur
5. Ho Chi Min
6. Bucharest
7. Prague
8. Sarajevo
9. Sofia
10. Jakarta

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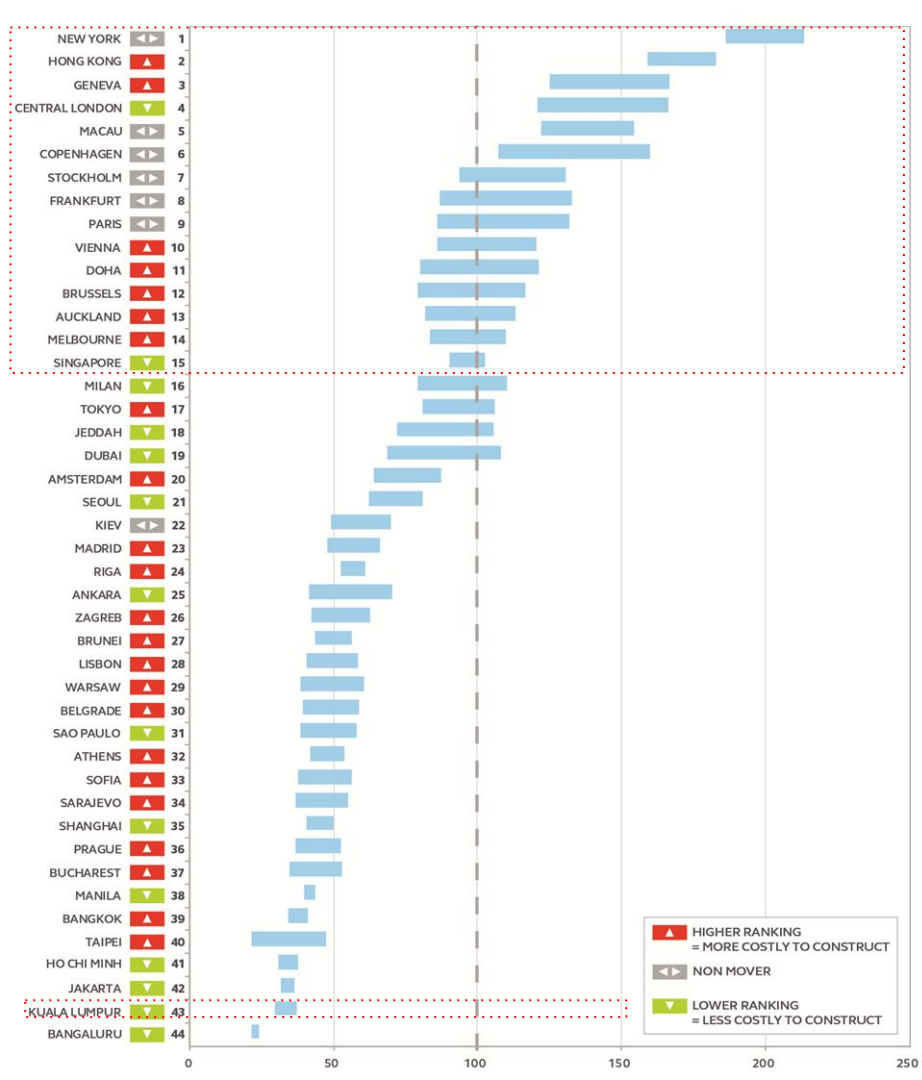
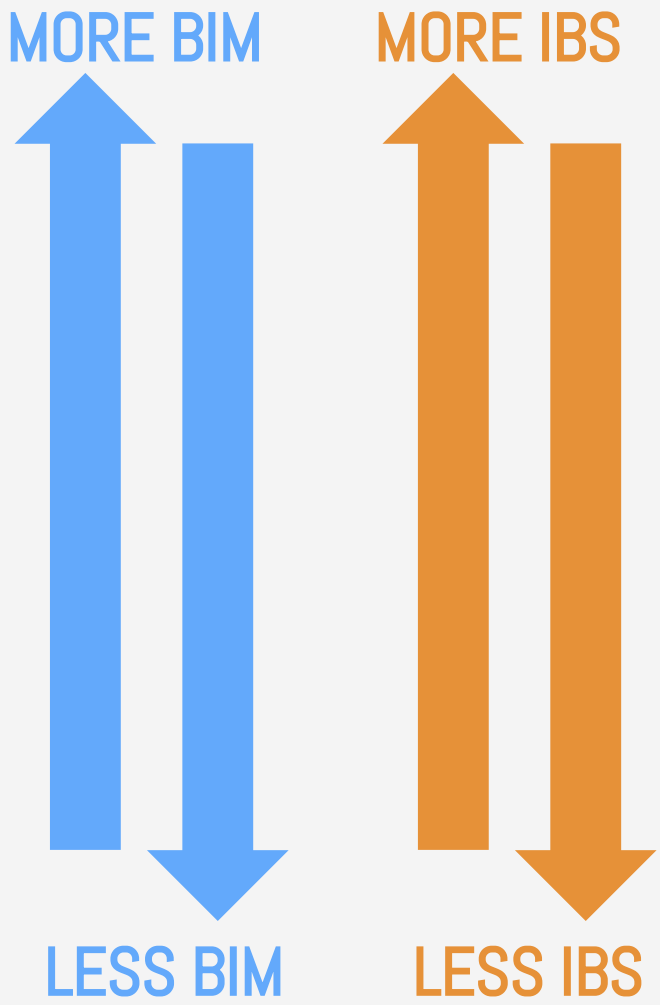
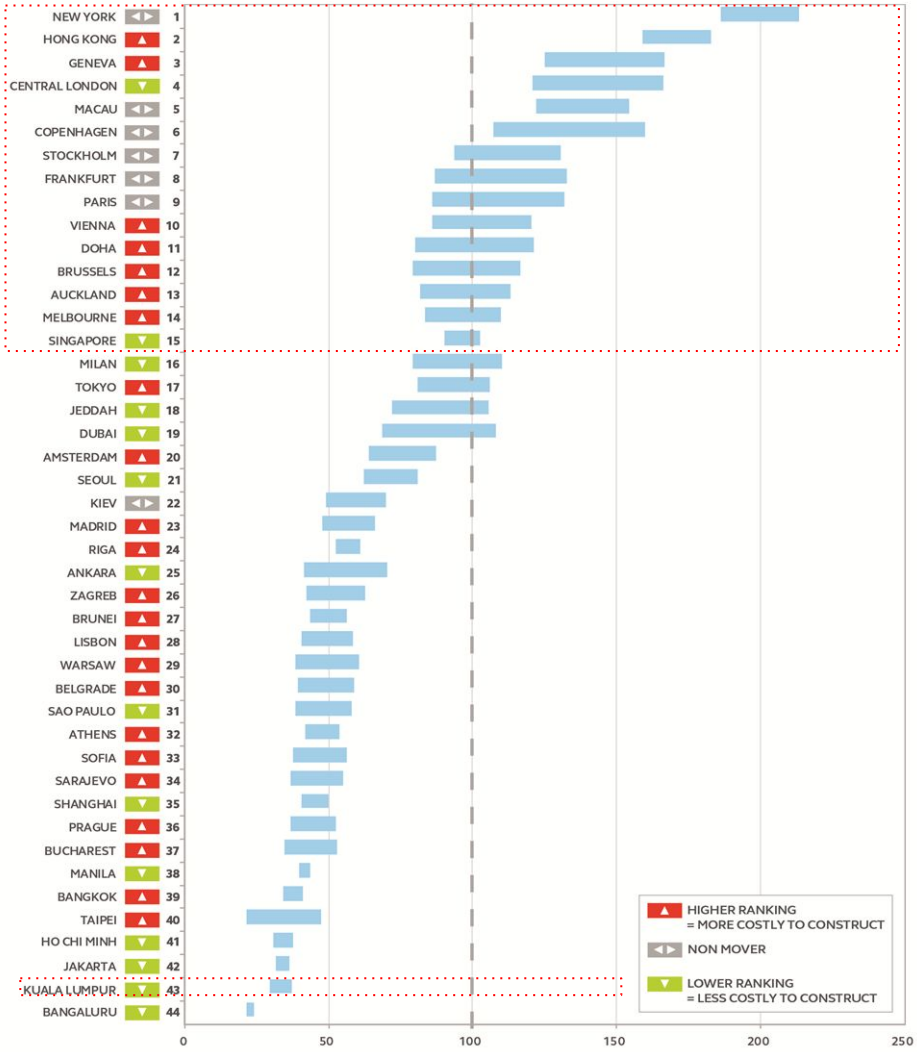

NEW YORK 1
HONG KONG 2
GENEVA 3
CENTRAL LONDON 4
MACAU 5
COPENHAGEN 6
STOCKHOLM 7
FRANKFURT 8
PARIS 9
VIENNA 10
DOHA 11
BRUSSELS 12
AUCKLAND 13
MELBOURNE 14
SINGAPORE 15
MILAN 16
TOKYO 17
JEDDAH 18
DUBAI 19
AMSTERDAM 20
SEOUL 21
KIEV 22
MADRID 23
RIGA 24
ANKARA 25
ZAGREB 26
BRUNEI 27
LISBON 28
WARSAW 29
BELGRADE 30
SAO PAULO 31
ATHENS 32
SOFIA 33
SARAJEVO 34
SHANGHAI 35
PRAGUE 36
BUCHAREST 37
MANILA 38
BANGKOK 39
TAIPEI 40
HO CHI MINH 41
JAKARTA 42
KUALA LUMPUR 43
BANGALURU 44
0
50
100
150
200
250
HIGHER RANKING
= MORE COSTLY TO CONSTRUCT
NON MOVER
LOWER RANKING
= LESS COSTLY TO CONSTRUCT


MORE BIM
MORE IBS
LESS BIM
LESS IBS

PAB



Higher skilled labour & Industrialised processes = cost premium

RM 300 million new hospital in Malaysia

Equivalent construction cost:

RM 1.0 billion in Melbourne **330%** higher
RM 1.2 billion in London **400%** higher
RM 2.0 billion in New York **660%** higher

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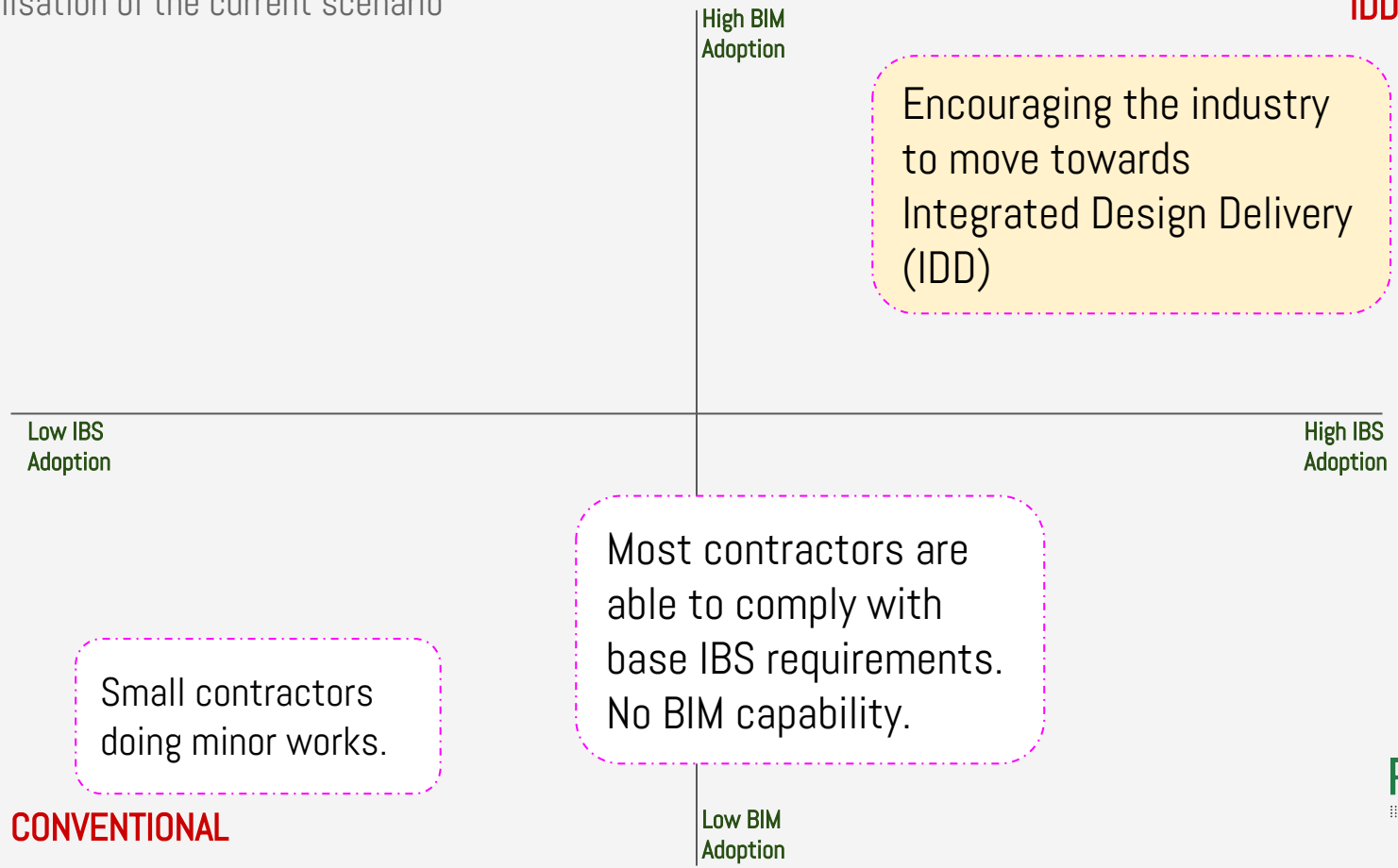
Idealised Adoption of IDD by Contractors

Visualisation of the current scenario



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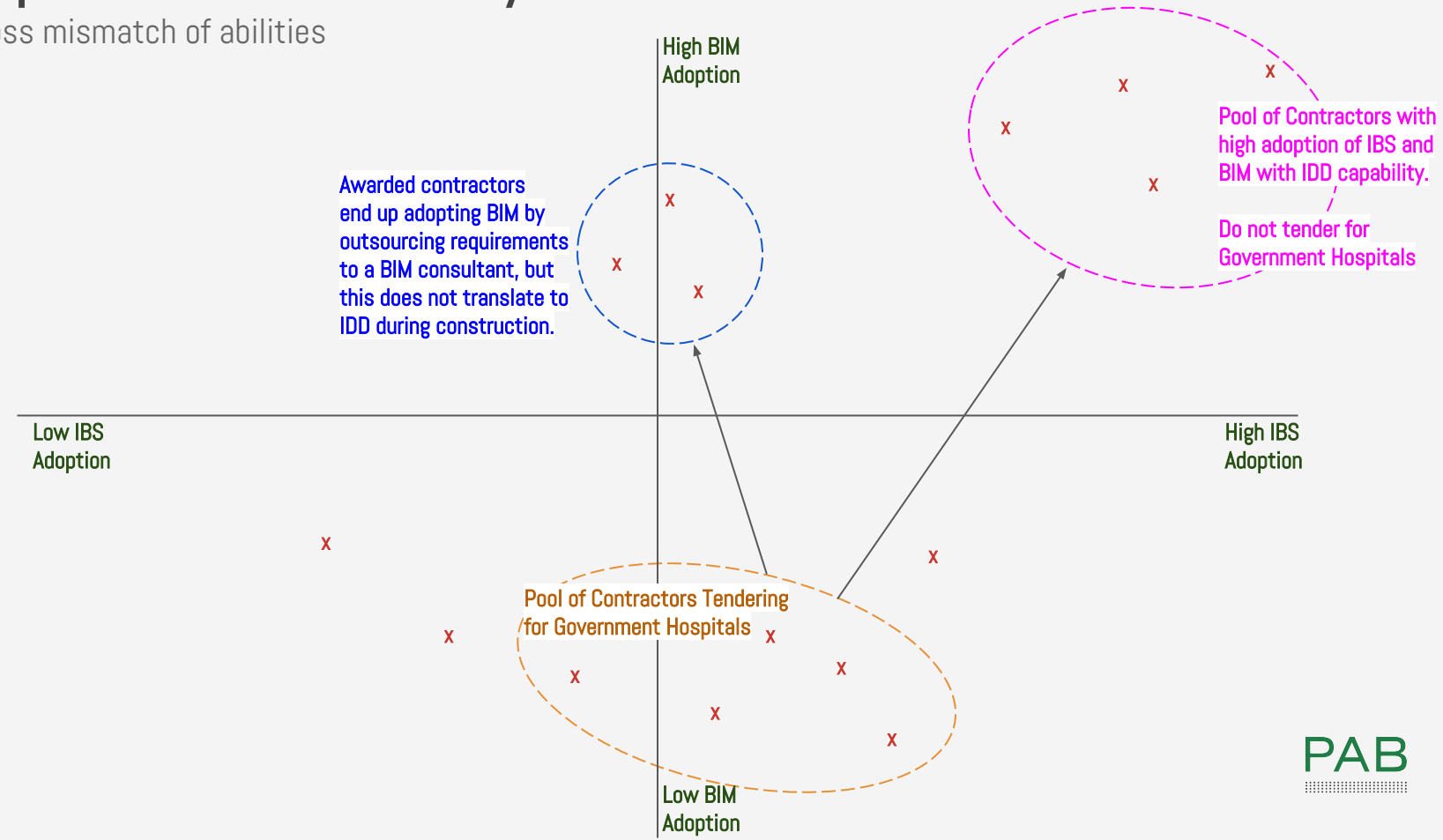
Adoption of IBS and BIM by Contractors

A gross mismatch of abilities



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Adoption of IBS and BIM by Contractors

A gross mismatch of abilities

HAS IMPOSED BIM IMPLEMENTATION LED CONTRACTORS TO DEVELOP THEIR IDD CAPABILITIES?

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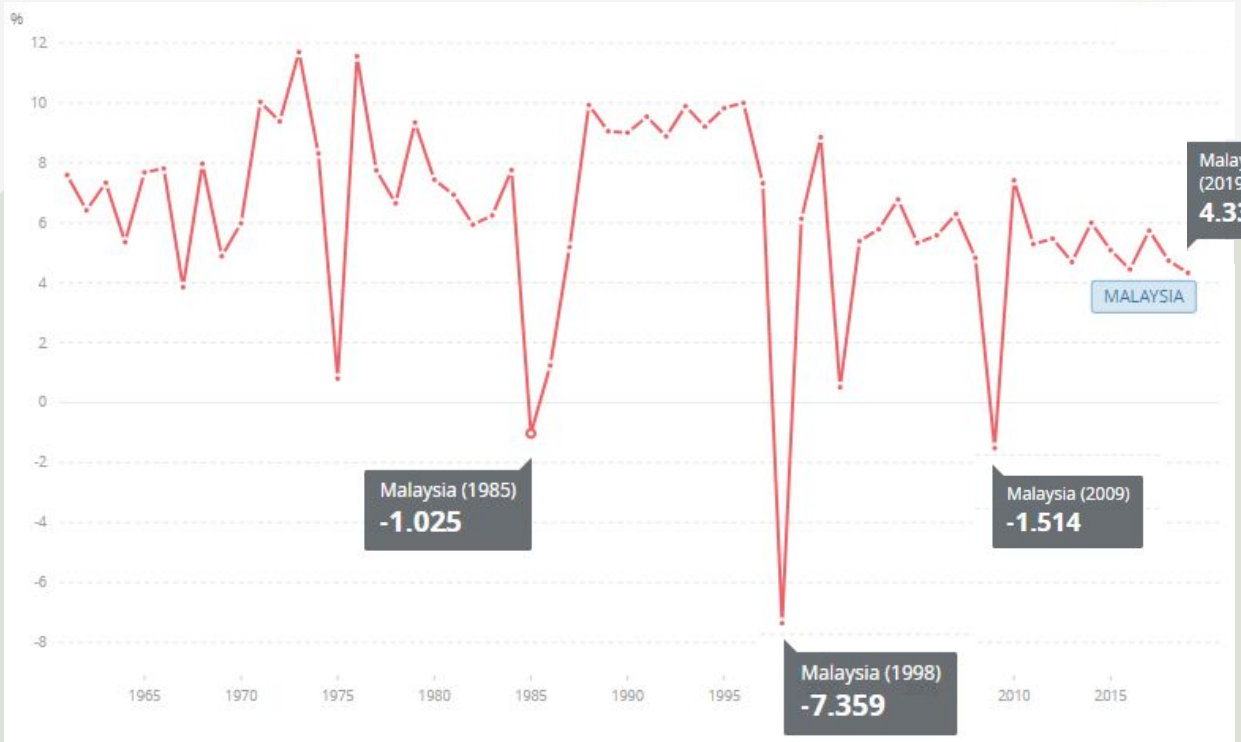
Malaysia Annual % GDP Growth 1960-2019



GDP growth (annual %) - Malaysia
World Bank national accounts data, and OECD National Accounts data files

THE EDGE MARKETS
MAKE BETTER DECISIONS

Update

World Bank revises Malaysia's 2020 GDP forecast to larger 4.9% contraction

"In addition, the **elevated unemployment rate and other weaknesses in the labour market would continue to weigh on private consumption**.

"Reflecting these developments, most demand components (net exports, private consumption and private investment) are expected to contract in 2020. **Government expenditure is expected to increase mainly due to stimulus spending,**" the World Bank said.

- The Edge Markets, September 29, 2020

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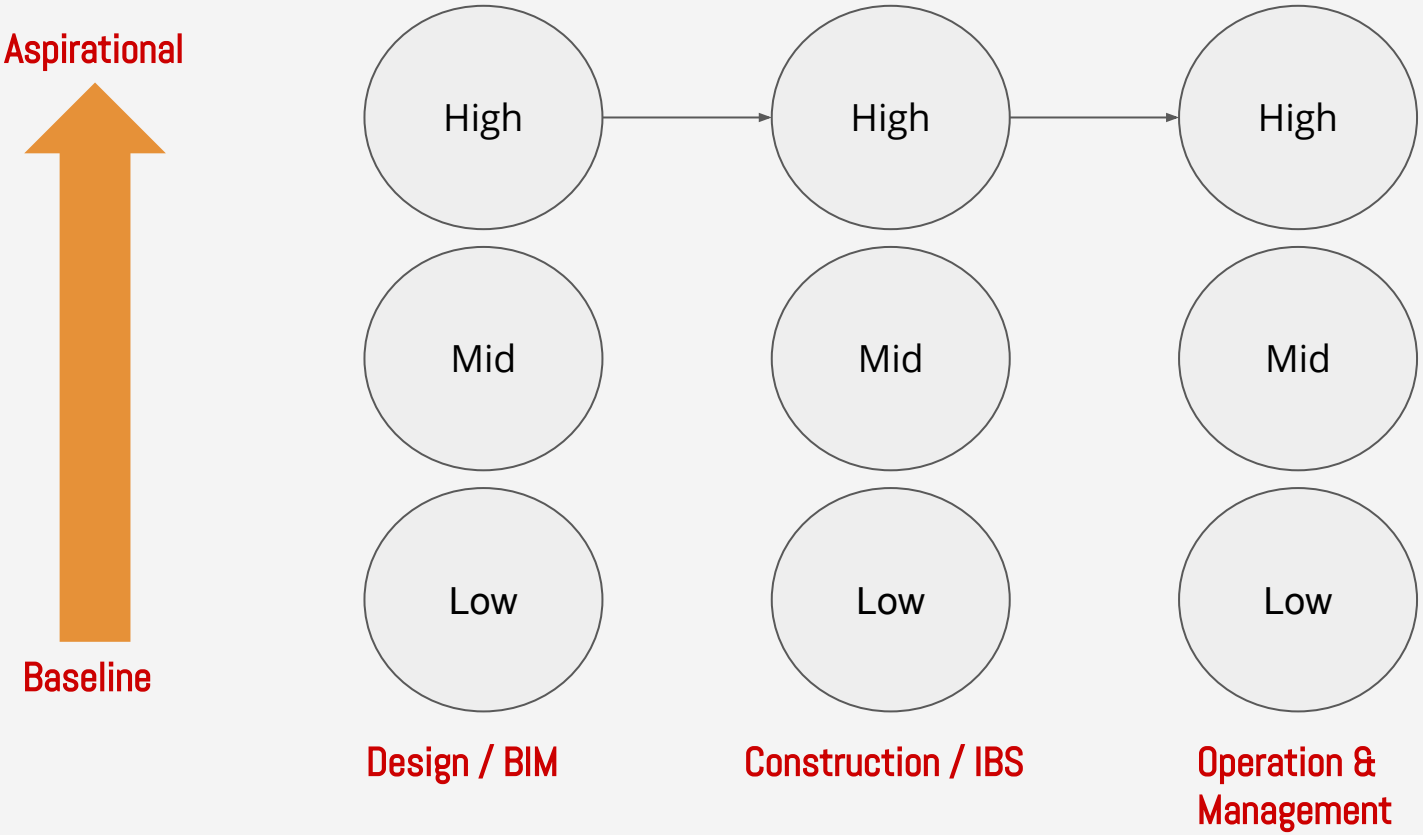
Finding a balance between application and results

Seeking to find a middle ground for fiscal and operational sustainability for all projects



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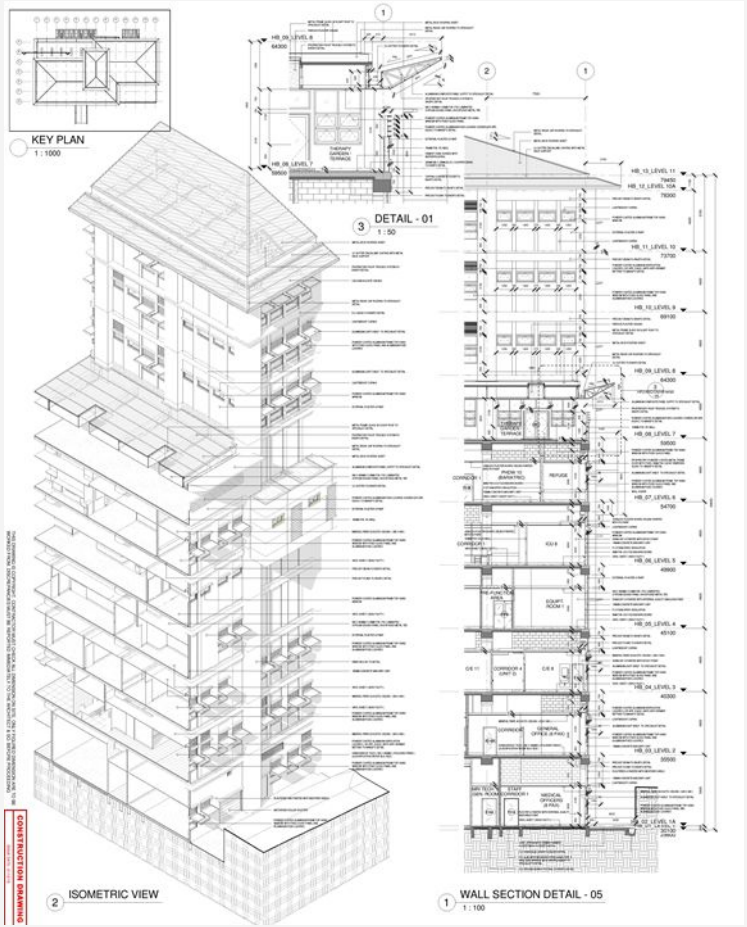
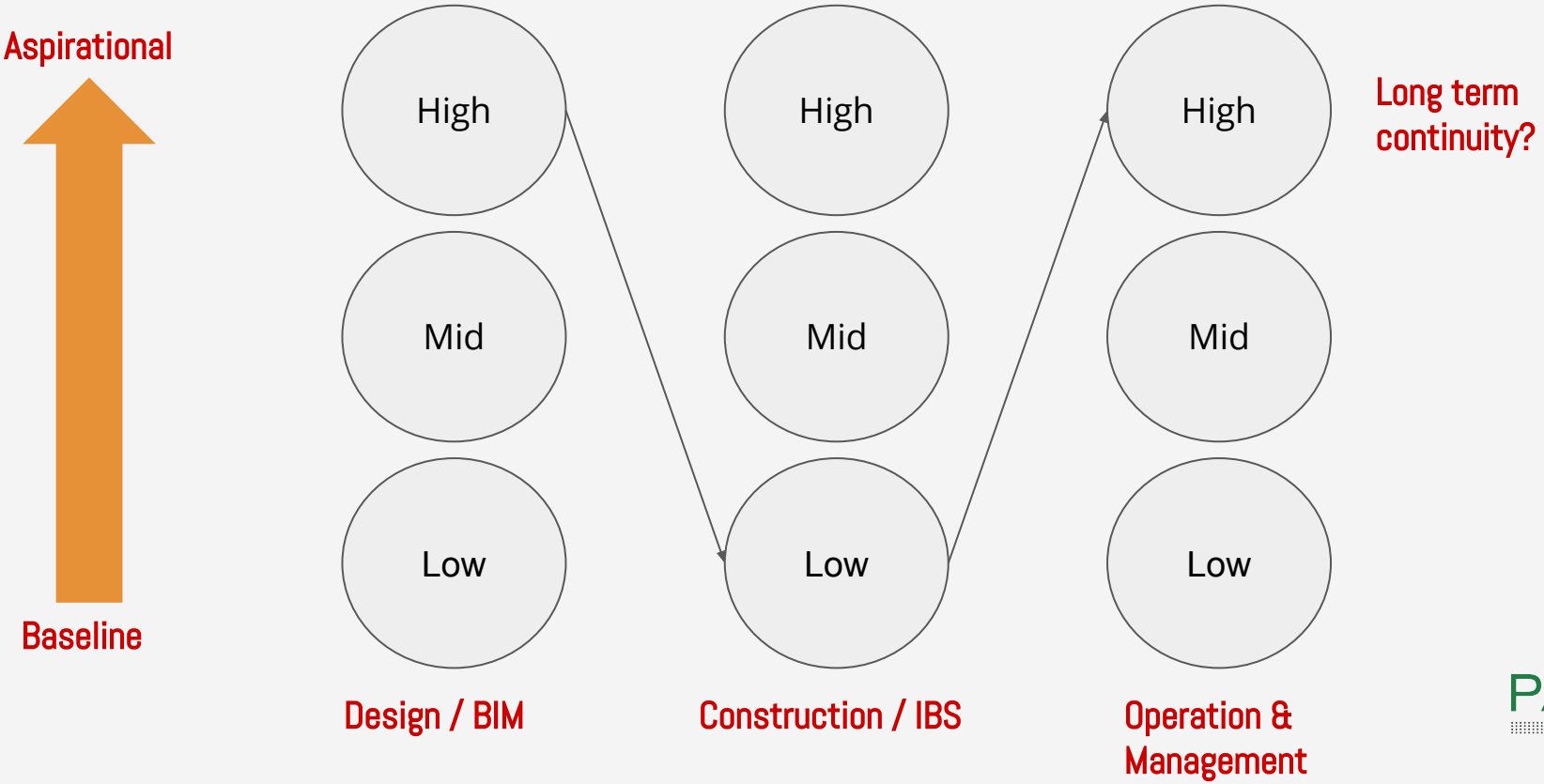
Juxtaposition of virtual building vs. actual construction



PAB

Finding a balance between application and results

Seeking to find a middle ground for fiscal and operational sustainability for all projects



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Finding a balance between application and results

Seeking to find a middle ground for fiscal and operational sustainability for all projects

Aspirational

Baseline

Design / BIM	Construction / IBS	Operation & Management
High	High	High
Mid	Mid	Mid
Low	Low	Low

PAB

Finding a balance between application and results

Seeking to find a middle ground for fiscal and operational sustainability for all projects

Aspirational

Baseline

High

High

High

Mid

Mid

Mid

Low

Low

Low

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Design / BIM

Construction / IBS

Operation & Management

BIM implementation (Based on PAM Proposal)

JKR to appoint consultant team through RFP

Architects may serve as lead consultant.

Consultant Team appointed based on fair experience & capabilities to deliver on BIM requirements.

Past experience and portfolio of BIM experience / capabilities

Interaction Process

Health facility planner to go through interactions with KKM using 2D floor plans and a sample of 'kit-of-parts'.

LOD 200
for Interaction with KKM.
No 3D.

Tender Documentation

Signoff obtained with KKM before mobilising full revit modelling

LOD 300
GA sufficient for BP & Tender purposes.

Tender based on final agreed design

Consultant team will prepare **Design Development of 50%** enough for Tender Documents to be prepared for Contractor to provide highly competitive tender.

LOD 300
GA sufficient for BP & Tender purposes.

Novation of Consultant Team

Consultant Team novated to successful D&B contractor.

Team proceeds to apply for KM & BP under new contractor, complete remaining 50% of design development.

LOD 300
model developed to LOD 500

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BIM implementation (D&B Status Quo + Refinements)

Design + Build Tender Submission

Contractor Pre-qualified based on experience and capability

Contractor's Consultant team to be assessed based on experience and capability.

LOD 300 BIM Model of 1 department only

Contract Award

Only hardcopies and PDF submission of contract documents to determine scope of the project

Interaction Process

Health facility planner to go through interactions with KKM using 2D floor plans and a sample of 'kit-of-parts'.

LOD 200 for Interaction with KKM. No 3D.

Authority submissions

Signoff obtained before mobilising full BIM modelling

LOD 300 GA sufficient for BP purposes.

Construction Documentation

Contractor's internal team to use model to develop details at LOD 400-500 and produce 'shop-drawing' details.

Move towards using model for fabrication, ie. IDD.

LOD 300 developed to LOD 500

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In conclusion...

- Allow for **clear progression** for private sector to participate.
  - Encourage participation for young firms with strong design credentials.
  - Allow for collaborations with established Health Facility Planners / Architects

- Maintain D&B Procurement Method due to benefit to JKR, ie. single point of contact and liability with Contractor.
  - **Adopt Hybrid procurement - initial design development by consultant team up to 50% with KKM + JKR.** Novate consultant team to successful D&B Contractor.
  - or **Retain existing D&B arrangement but with streamlined BIM requirements.**

- Suggestion for KKM to collaborate with academic subject matter experts to **develop a local Health Facility Planning course**.
  - Post-graduate Diploma / Masters Degree based on KKM requirements.
  - Architects to develop capabilities to export expertise in health facility architecture to ASEAN.

- Establish medium term goals for BIM and IDD adoption to **allow consultants and contractors to build capability progressively**

- As a way forward, establish a **working group** between private sector representatives with KKM, Cawangan Kerja Kesihatan JKR, and Unit BIM to

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TERIMA KASIH

Does anyone have any questions?

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