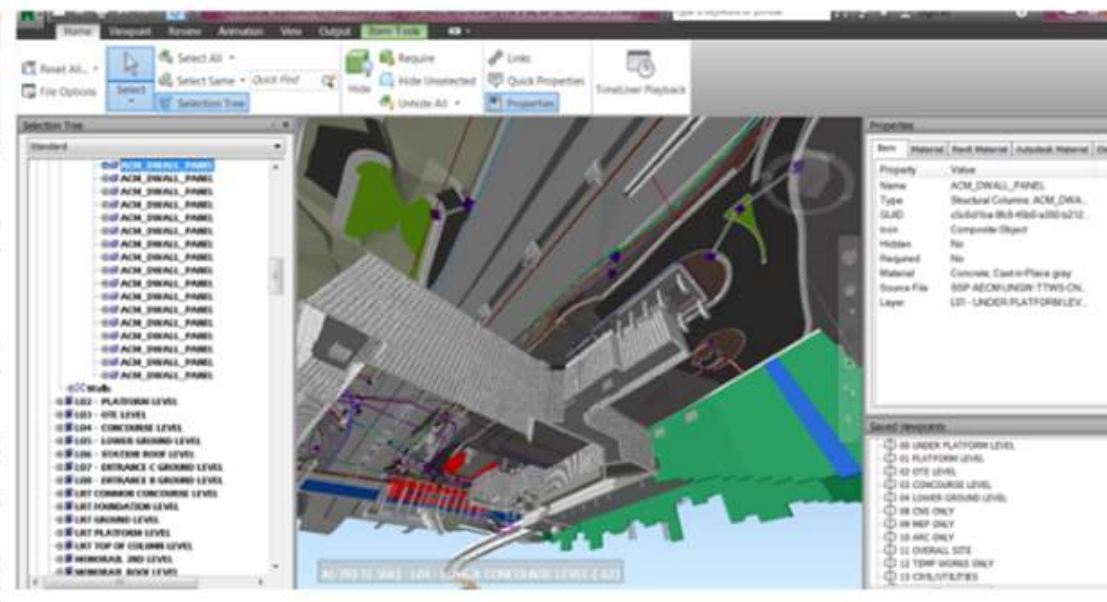
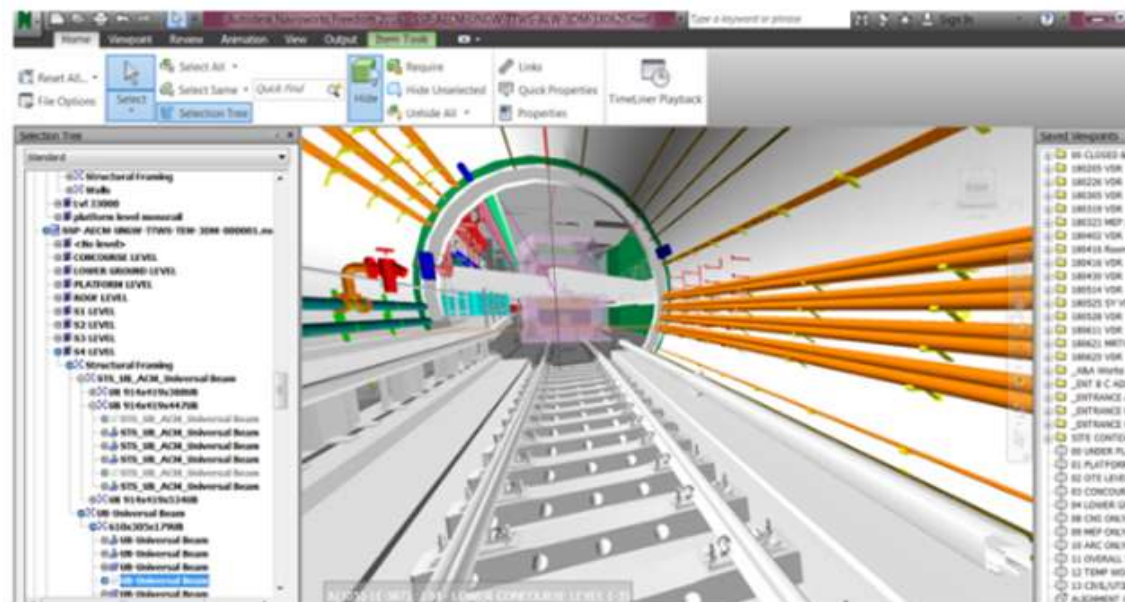
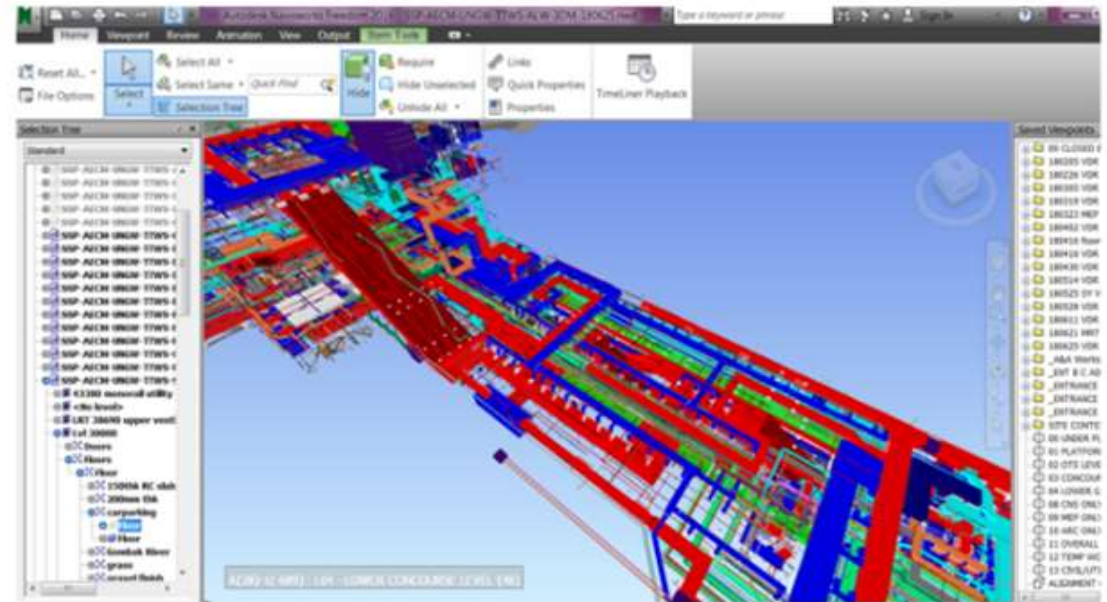
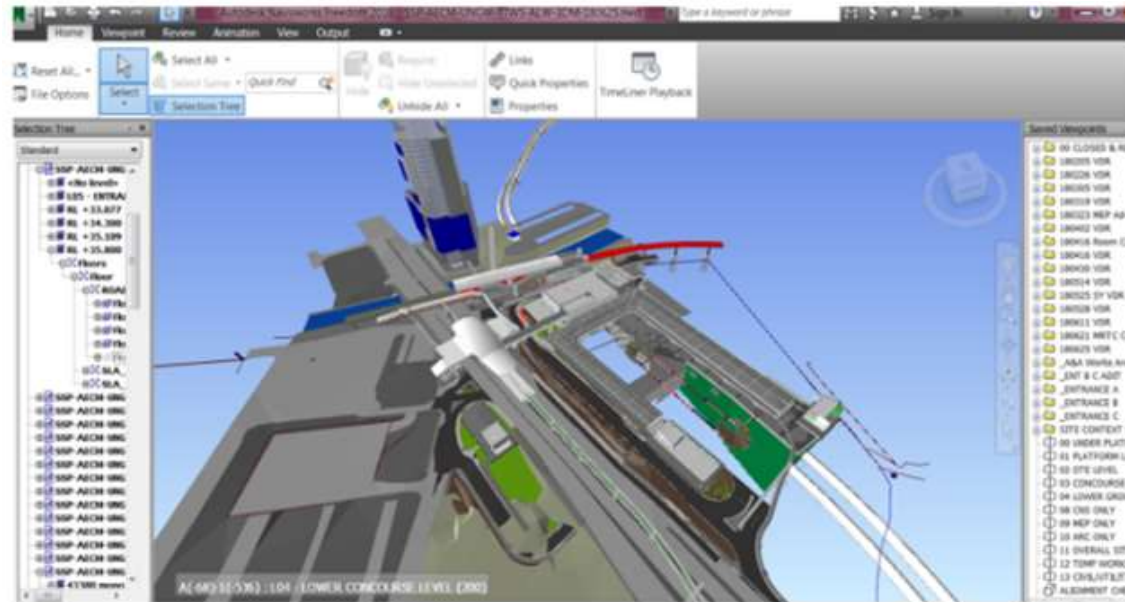


Digital Implementation and Adoption by MGKT.

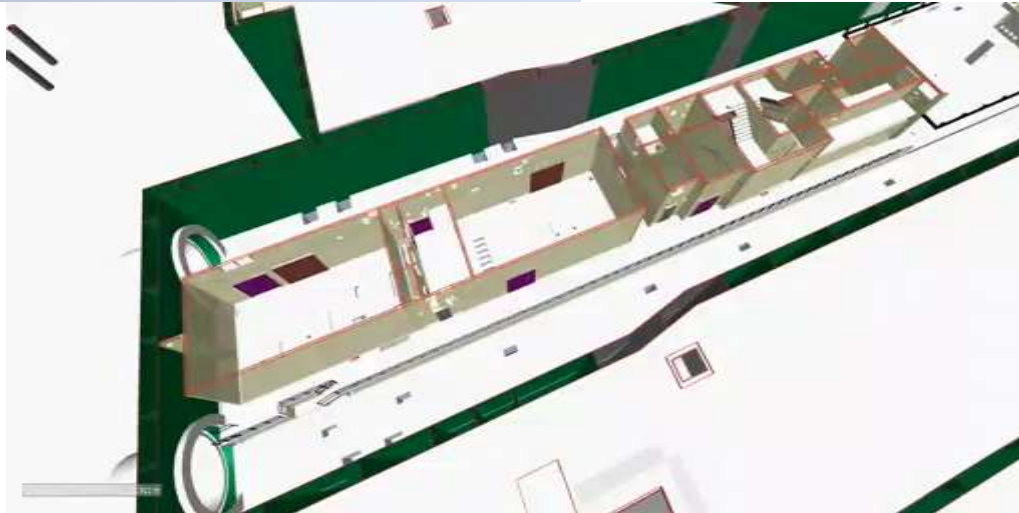
- 3D DESIGN AUTHORIZING (Modelling)
- 4D and 5D digital workflows.
- Cloud based Digital Solutions
- Common Data Environment (CDE) – Cloud Based
- BIMcollab – Cloud Based
- Construction Management Software Tools – Fieldview – Cloud Based
- Geospatial Information Systems (GIS) – Cloud Based
- Data Analytics – IBM Cognos – Cloud Based
- Site Data models using Drones
- Augmented Reality
- IT strategy
- Training
- BIM Level 2 Information Management & Certification

3D DESIGN AUTHORIZING (Modelling)



4D KBNS STATION

Planning Template – M & E



Monday 8:00:00 AM 7/13/2020 Day=1 Week=1
 New Data Source (Root) [58%]
 KAMPUNG BARU NORTH STATION [M&E 54%]
 SITE INSTALLATION [60%]
 Platform Level [28%]
 ABWF Platform [54%]
 ABWF Zone 1 [76%]
 ABWF 1st Fix (Civil 76%]
 ABWF Zone 2 [76%]
 ABWF 1st Fix (Civil 76%]
 ABWF Zone 3 [54%]
 ABWF 1st Fix (Civil 54%]
 Building Services [28%]
 Zone 2 - BufferArea4 [33%]
 Under Platform Level [45%]
 Building Services [45%]
 DRS [90%]
 T&C [40%]
 ECS [25%]
 FPS [25%]
 ELE [40%]
 DRS [40%]

















Can track all MEP installation, Testing & Commission activities from start to finish
 With RED flags raised against late program items



ZONE 1

Appearance Profiles :

	START	END		START	END		START	END
1 st FIX			PICO			PAT		
2 nd FIX			FINAL FIX			SAT 1		MODEL
CABLE PULLING			ACTIVITY GAP			SAT 2		APPREANCE

Platform Level M&E 15/07/20 to 01/06/2021

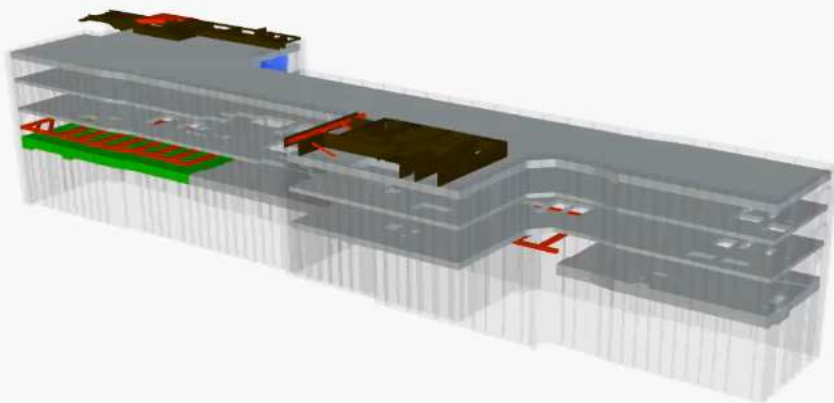
100% Quantification & Productivity rates derived from the MEP 3D Model

4D STWS STATION Planning Template – Structural

STWS Construction Progress Up to September 2019

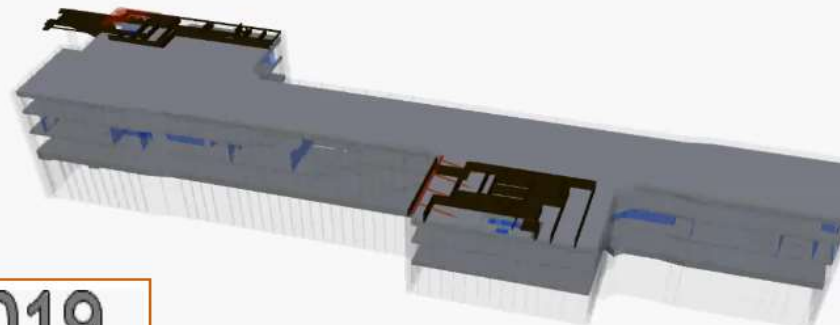
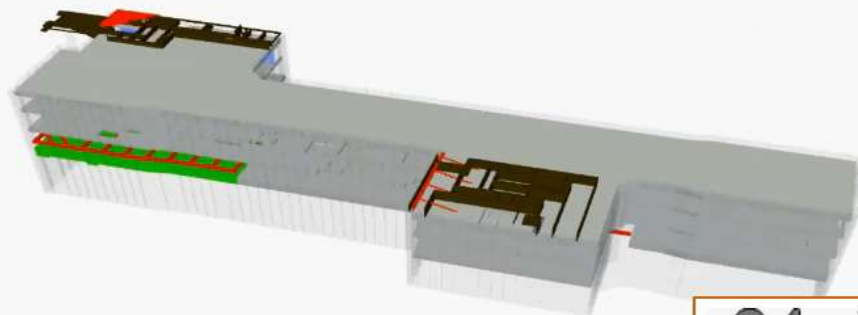
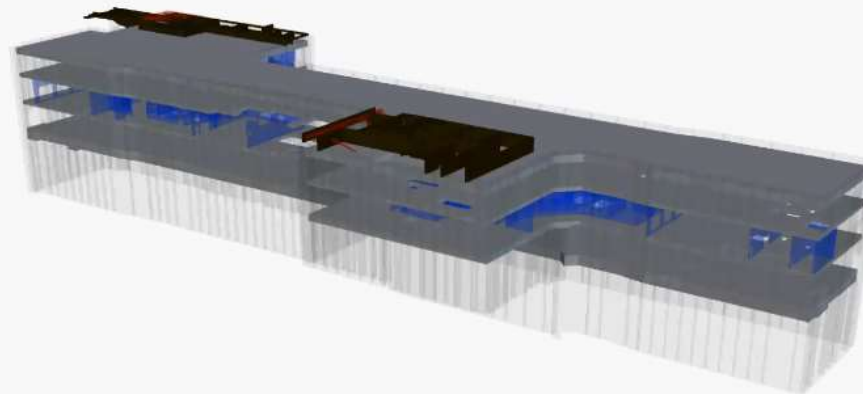
PLANNED

Progress : 68.42%

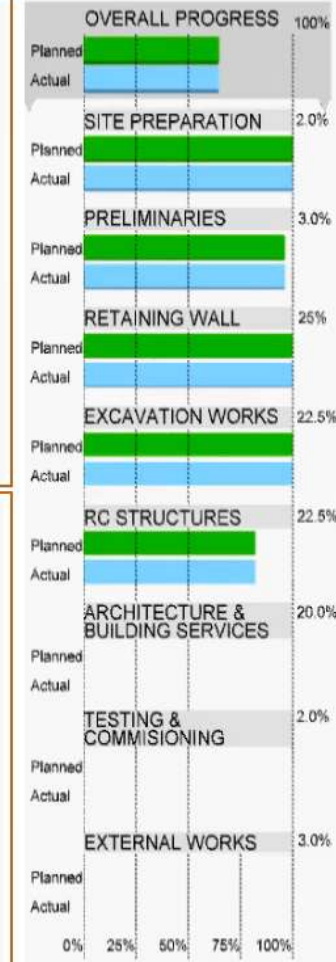


ACTUAL





Progress : 71.06%







01 Jun 2019




Appearance Profiles :

	START	END
RETAINING WALL		
EXCAVATION		

	START	END
RC STRUT / SLAB		
RC WALL / COLUMN		

	START	END
RECTIFICATION		
ABOVE ROOF STRUCTURE		

	START	END
DISASSEMBLE		
STEEL STRUT		

TTWS – 5D Revenue V Cost

TITIWANGSA STATION CONSTRUCTION PROGRESS AND REVENUE UP TO MARCH 2018

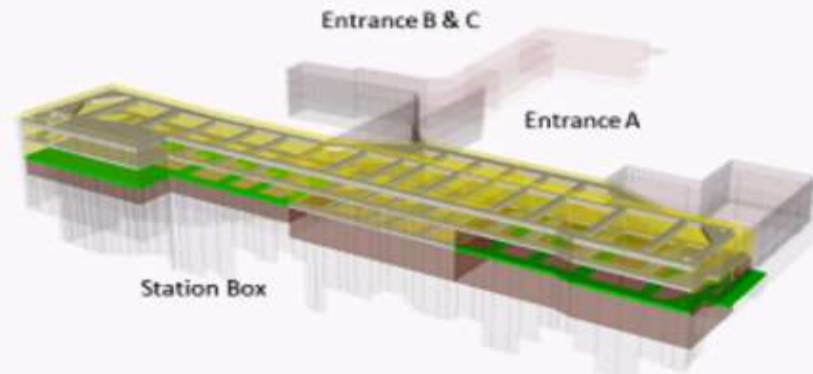
Based on Baseline 3.0 rev

MMC-GAMUDA
KVMRT (T) SDN BHD



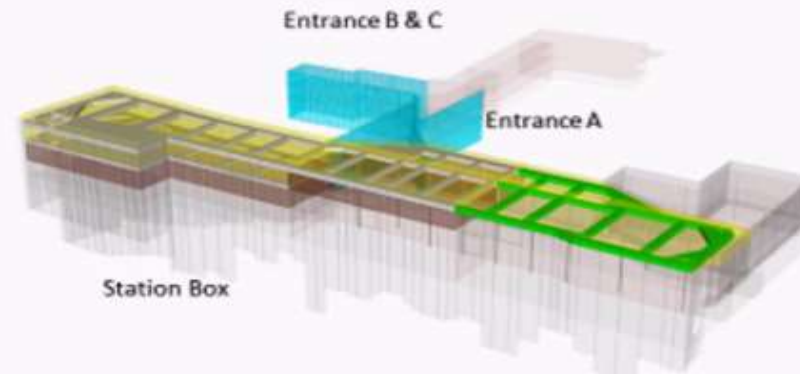
PLANNED

Progress : 48.45%
Total Revenue : RM40279741.00
Total Cost : RM36251766.90



ACTUAL

Progress : 42.34%
Total Revenue : RM40279741.00
Total Cost : RM36251766.90



31 March 2018

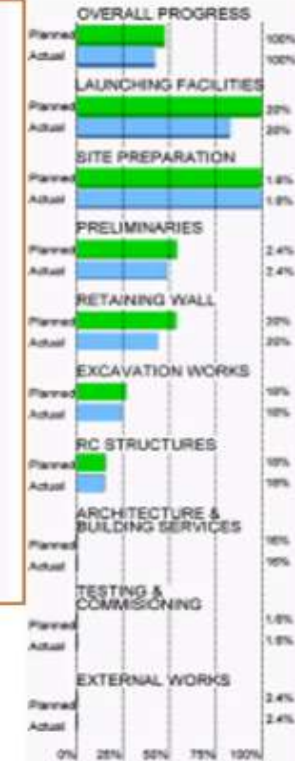
Cumulative Revenue :



Appearance Profiles :



Cumulative Cost :

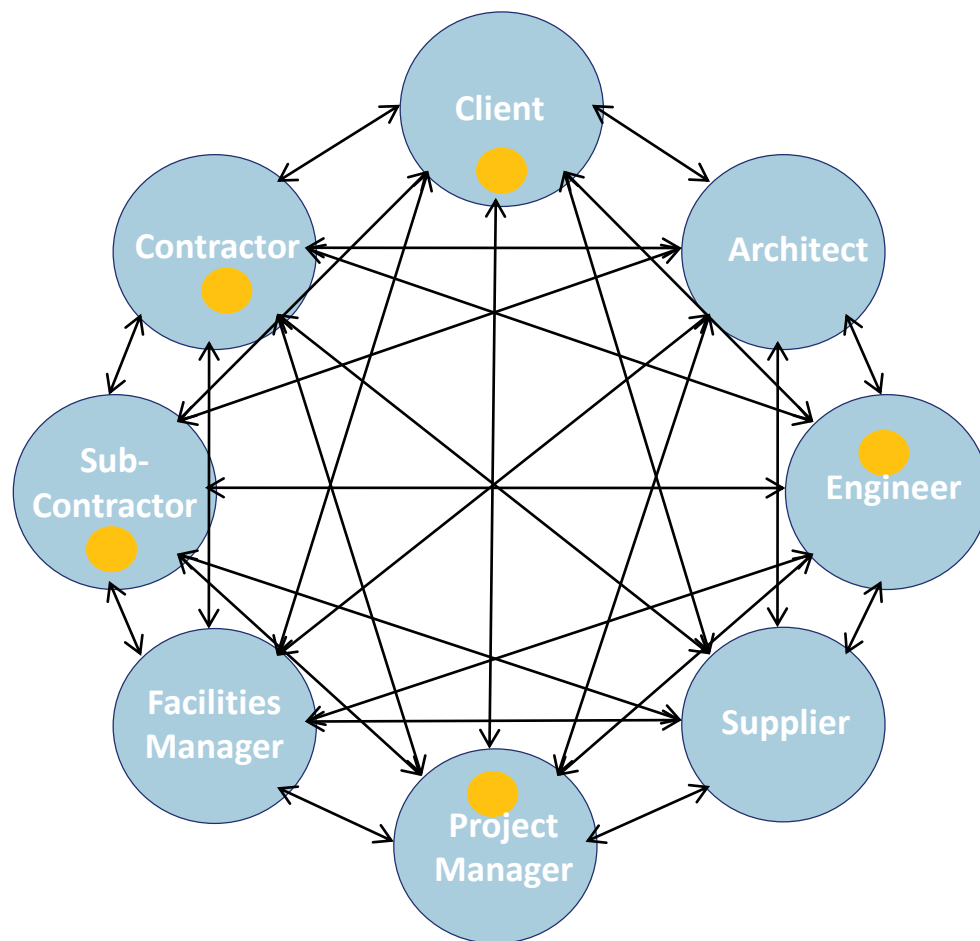


See Animation

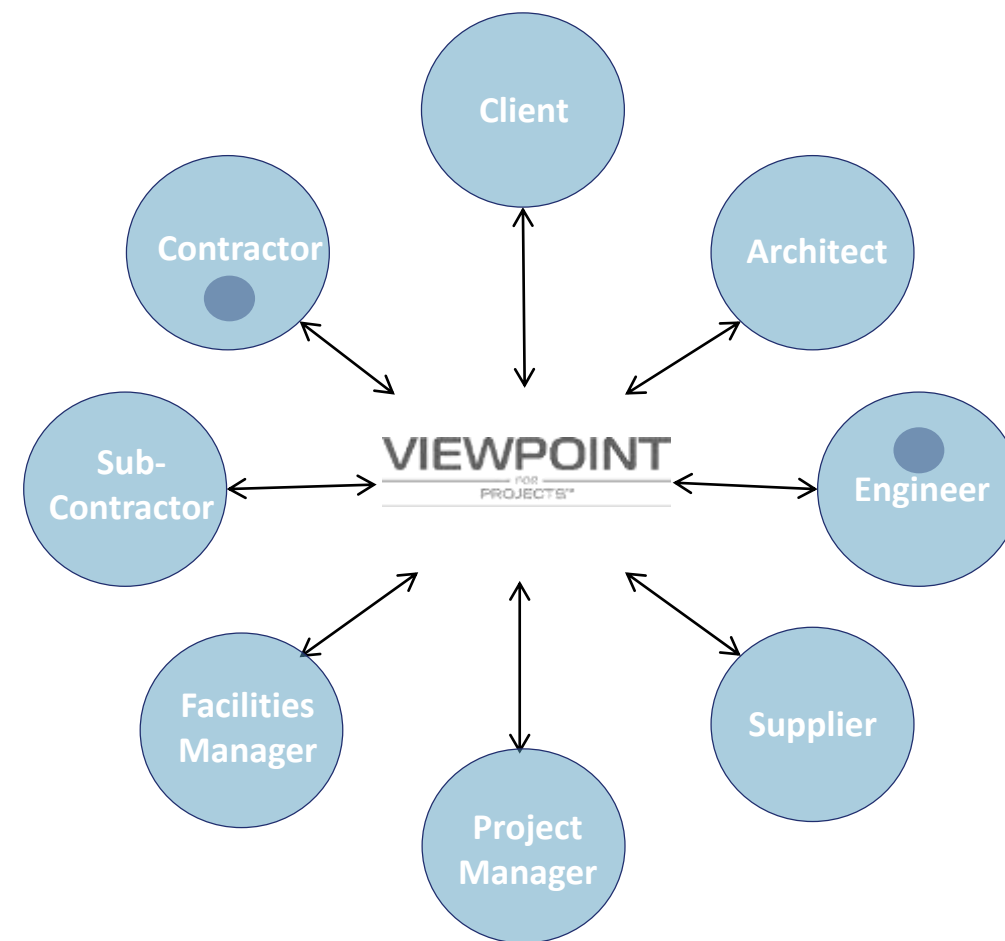


Common Data Environment (CDE) – Cloud Based

Traditional Communication



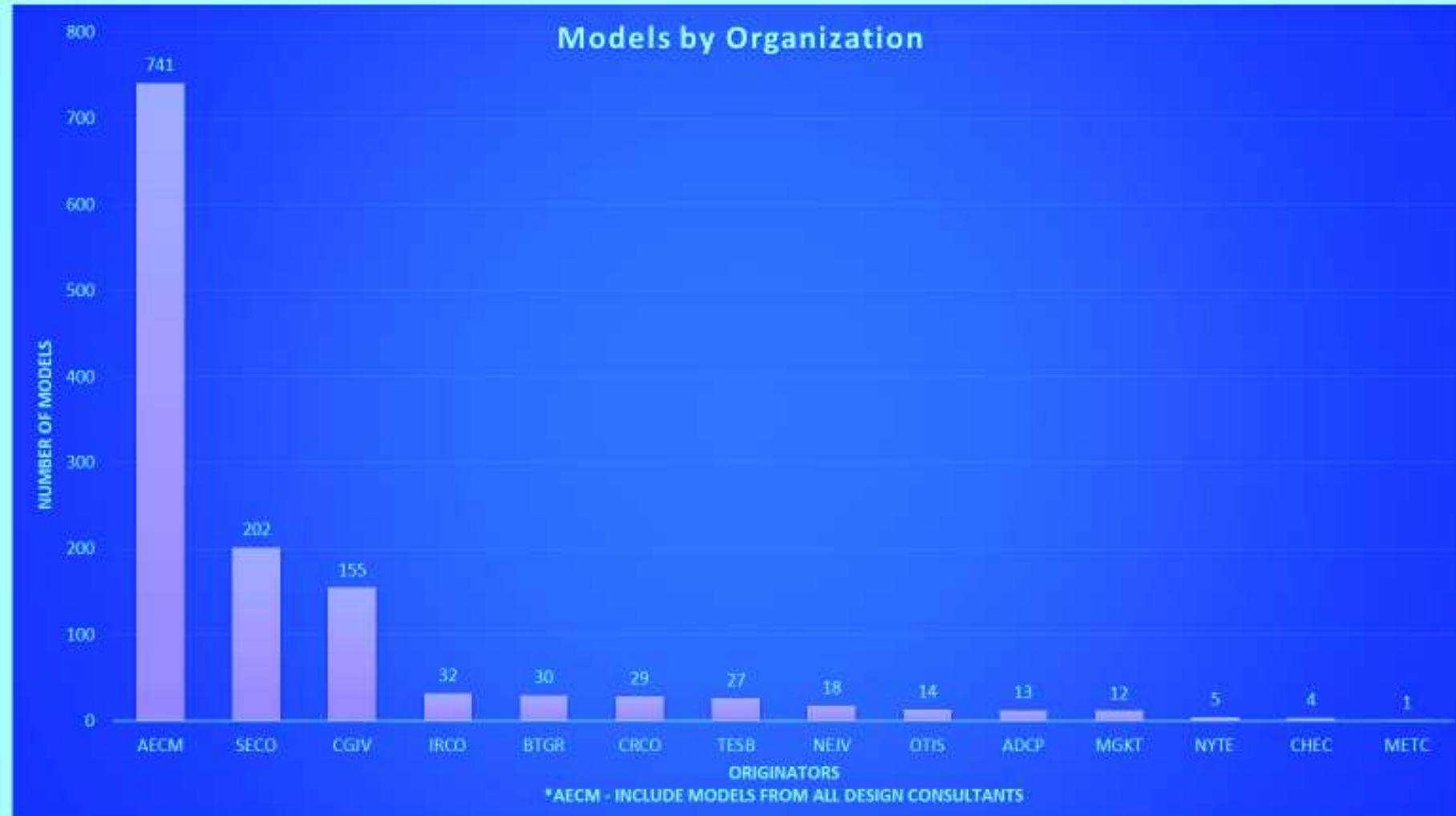
VFP Communication



Adopting a CDE Optimises and Simplifies the Information Management process

- Project Information Management & Exchange

- Common Data Environment
- 1,570 Users
- 3,800 Model Files
- Over 100,000 documents
- Single Source



Common Data Environment (CDE) – Cloud Based.

MMC-GAMUDA

Search...

Welcome, Nick Morecock (Nick Morecock - MMC-Gamuda) (using Viewpoint For Projects™) | Support | Suggestion B

Previous Login: 29 November 2019 23:...

> Gamuda > Gamuda Engineering > SSP > UNGW > STWS > MEP > ECS > PDF Renditions > 2D Draw

NAVIGATION

CSD

CSQ

DRD

GIS

GTP

MEP

CWS

DRS

ECS

2D Drawing

3D Model

DWFX Models

IFC Models

Navigator imodels

Navisworks Models

Revit Models

Shared - External

Shared - Internal

Restore

Shared Construction Models

PDF Renditions

2D Drawing

Reports

ELE

FPS

PLM

SEM

SIC

SUB-CONTRACTOR INFORMATION

SUW

TEM

Items Search Advanced Search Export As Report

Upload File(s) [Icons] Revise Item Attach To Actions Views [Dropdown] nick [My Views]

			Name	Description	Revision	Status	Organisation Name	Author	Revision Date Mod	State
			SSP-MGKT-UNGW-STWS-ECS-LAP-012181	SENTUL WEST ST...	F01	Detailed Design - Final	Gamlite IT (...)	Anson Tan	29 Novembe...	Revised
			SSP-MGKT-UNGW-STWS-ECS-SCM-012040	SENTUL WEST ST...	F01	Detailed Design - Final	Gamlite IT (...)	Anson Tan	14 Septembe...	Revised
			SSP-MGKT-UNGW-STWS-ECS-SCM-012039	SENTUL WEST ST...	F01	Detailed Design - Final	Gamlite IT (...)	Anson Tan	14 Septembe...	Revised
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Displaying Results 1 - 20 of 135 in pages of 20

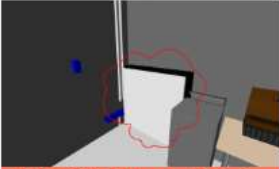
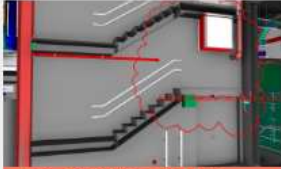
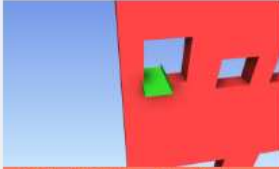
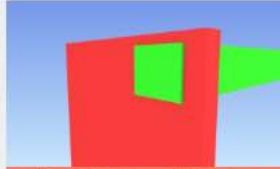

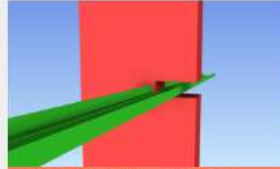
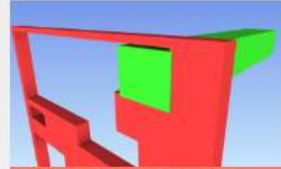
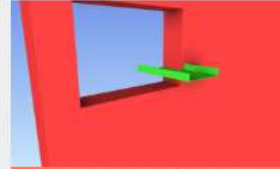

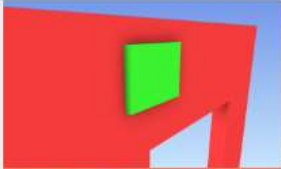
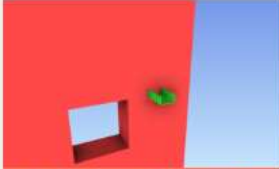

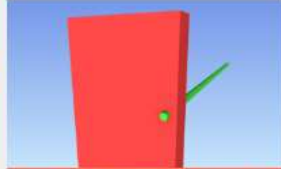

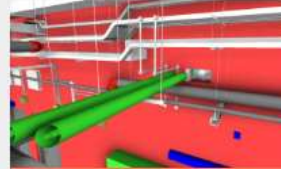

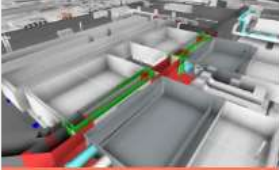
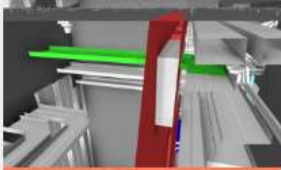
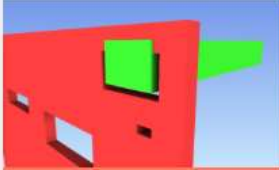
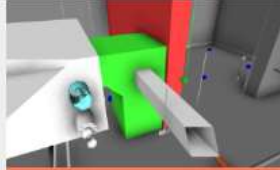
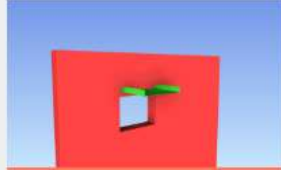
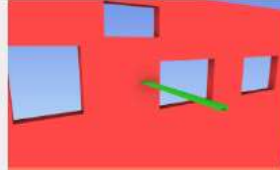
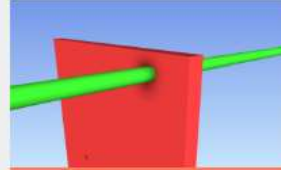
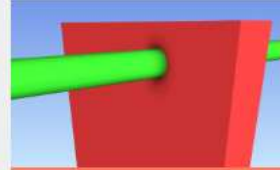
VFP is hosting MMC-Gamuda M&E sub-contractors 2D Shop Drawings for Review and Approvals

STWS - Sentul West Station

New issue Report Filter

Active, Resolved (98 from 1815)

Show all All open Open for me Filter

 <p>1628 . 1363-MEP to check TAG size</p> <p>David Wong</p> <p>Active, Normal</p> <p>Undecided</p>	 <p>1750 . 20190806 - MGKT Platform ...</p> <p>David Wong</p> <p>Active, Critical</p> <p>Design phase, Platform Level</p>	 <p>1670 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1671 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1672 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1673 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1674 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1675 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>
 <p>1676 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1677 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1678 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1679 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1680 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1681 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1682 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>	 <p>1683 . ARC Walls vs MEP System...</p> <p>Mohd Nazri Husain</p> <p>Active, Critical</p> <p>Design phase, Concourse Le...</p>
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project Issue Report extract from BIMcollab for KBNS June 2019

Construction Management Software Tools – Fieldview – Cloud Based

Mobile Field Construction Management – Removing traditional paper based Forms to DIGITAL

Form location	Checks	100%
Package	Decorative 2021	100%
Contributor	Vertical	100%

Pre-Tile Check		
01. Internal & external angles to walls checked Internal & external angles to walls checked	<input checked="" type="radio"/> Yes <input type="radio"/> No	100%
02. Bittings square and level Bittings square and level	<input checked="" type="radio"/> Yes <input type="radio"/> No	100%
03. No proud fixings to battings No proud fixings to battings	<input checked="" type="radio"/> Yes <input type="radio"/> No	100%
04. Bath has been sealed to wall Bath has been sealed to wall	<input checked="" type="radio"/> Yes <input type="radio"/> No	100%

*Site Diaries, Inspections,
Permits to Work, Health & Safety,
Progress Photos, QA/QC
Claims, Installations, Tunnelling
Environmental etc.*



Data capture & automated workflows – replication of any paper-based process

[illegible]

Digital Fieldview processes transforming the way we work on site

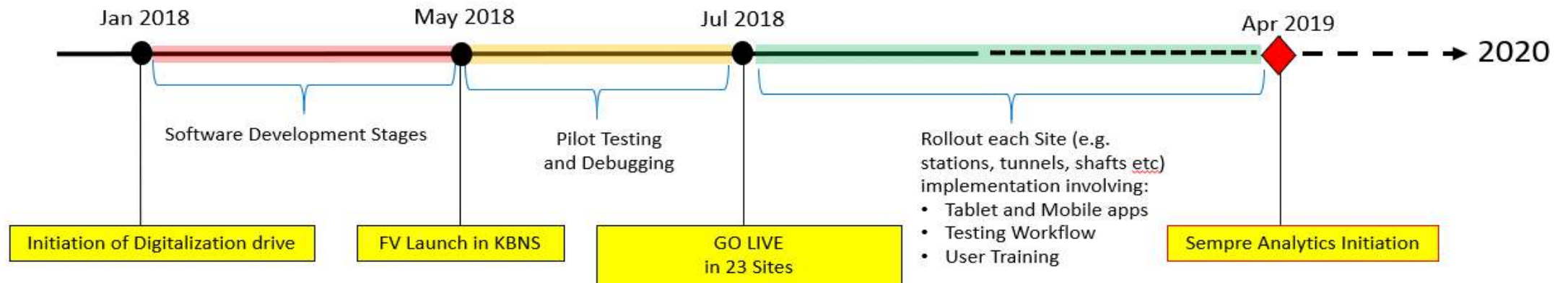
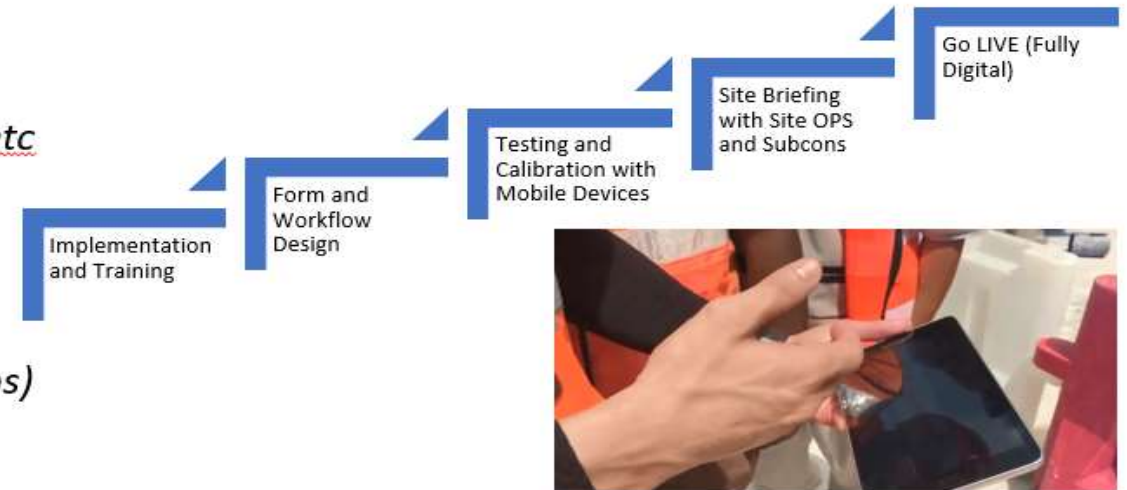
Construction Management Software Tools – Fieldview – Cloud Based



Fieldview Progress Status in UG (LIVE since March 2018)

- **70,000 Forms** to date
- *average 600 Forms raised per-site each month*
- *480 Form design templates for OPS, SHE, QAQC, MEP, ABWF etc*
- **900 users** in UG (including Subcons)
- *Subcons mainly use Mobile Phones and Laptops*
- *ongoing Training and Support*
- *DDC and SC on-board (IAR, NCR and SWO)*
- **200 tablets** distributed for MGKT staff (iPad and Samsung Tabs)

FIELDVIEW IMPLEMENTATION STEPS



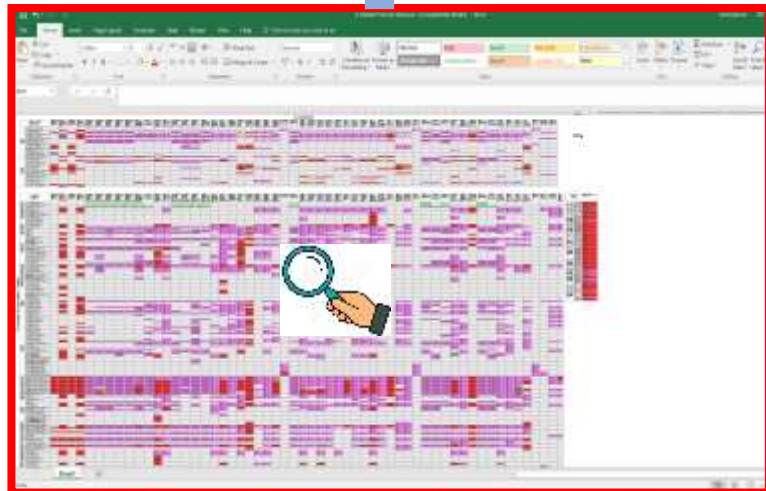
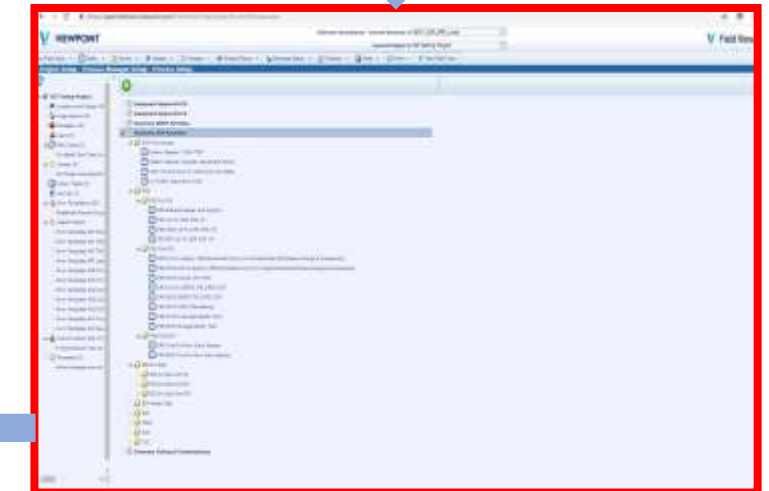
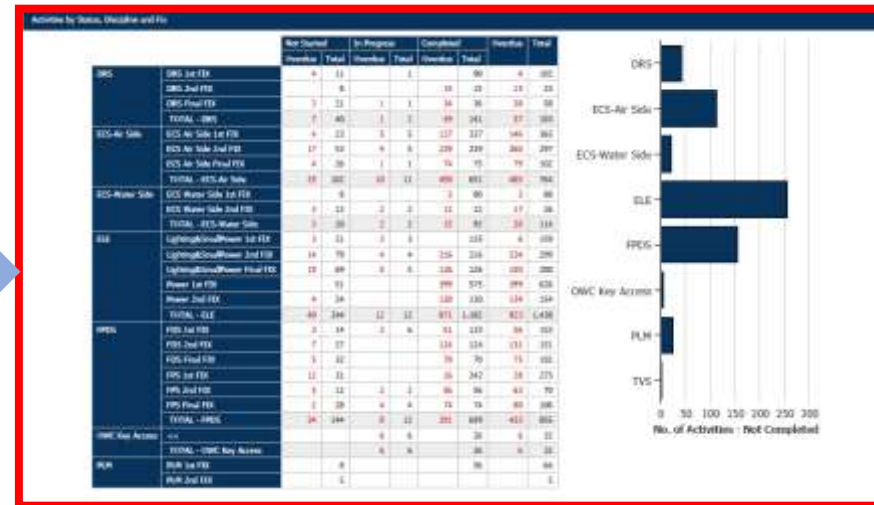
Fieldview Implementation Status

Process

1. 3D Design Model use for Quantification



2. P6 CIP Baseline Programme



5. Cognos Data Analytics- Tracking Progress, Real time Project analysis

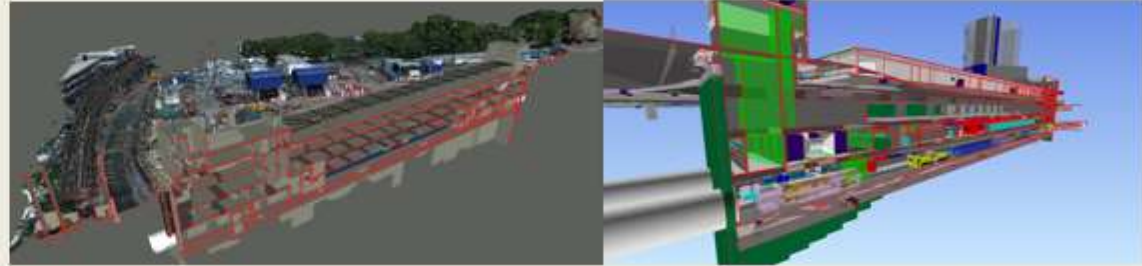
4. Monitor/Review in Realtime (operational)

3. Detailed Process/Task activity in FV

Design Process summary for Fieldview Construction Progress and reporting

SSP Line 2 Equipment Maintenance Asset Data Challenge

Typical Underground MRT Station



Contains approx 10,000 LRU's /
Maintainable Assets

Each Asset has approx 120
separate lines of attribute fields

Total data set for CMMS per station
is in excess of 1.2 Million data cells

Captured and managed in FieldView

+



=

1	Master Attributes List	CMM
2		
3	Asset Information	
4	Asset / Parts Particular	
5	Asset Tag	Asset T.
6	Originator Code	To fill in
7	System Code	To fill in
8	Sub-system Code	To fill in
9	Equipment Type (LRU) / Component Code	To fill in
10	Equipment Code ID	Equipm

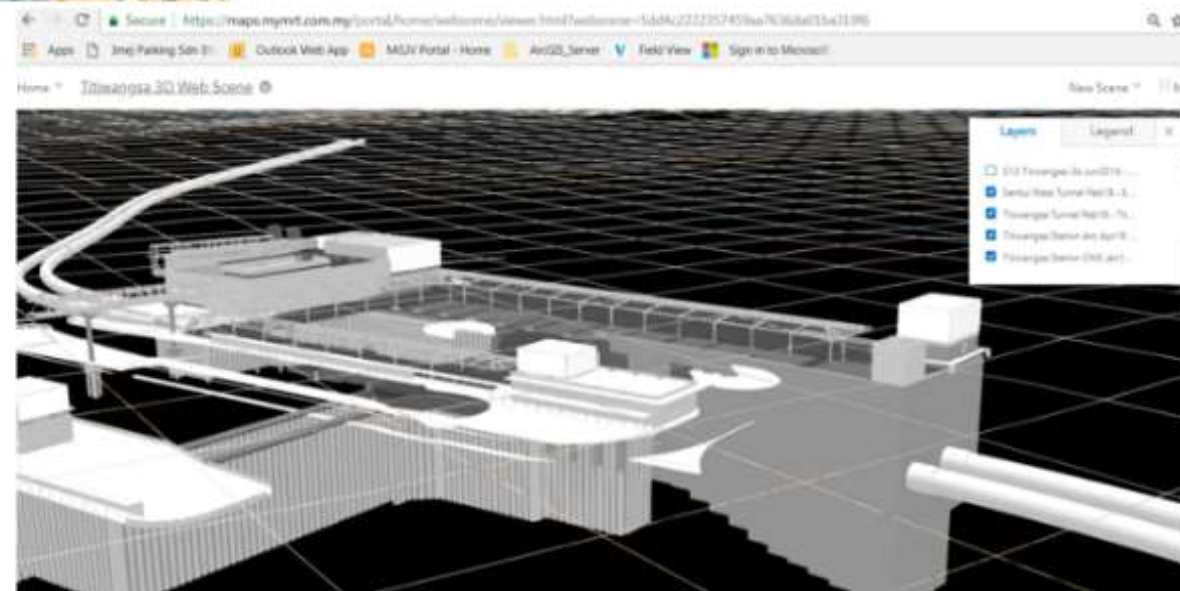
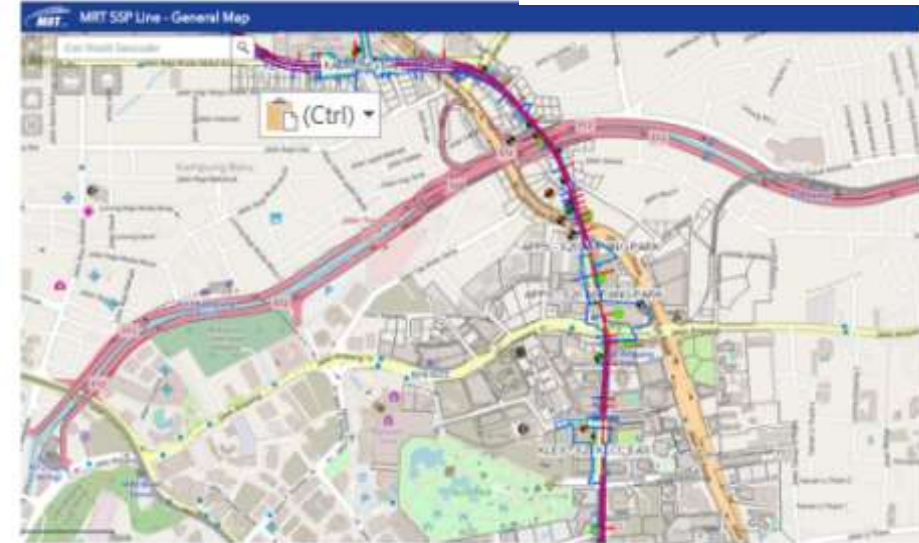


Field View

Asset Data requirement captured and managed in Fieldview

Geospatial Information Systems (GIS) – Cloud Based

GIS – 2D and 3D Web Portal and Online Database



Extract form SSP Line 2 GIS Cloud based Web Portal

Geospatial Information Systems (GIS) – Cloud Based



MRT CORP WINS GLOBAL GIS AWARD



Mass Rapid Transit Corporation Sdn Bhd (MRT Corp) has won this year's Special Achievement in GIS (SAG) Award by Esri Inc for its implementation of the first cloud-based Geographic Information System (GIS) in Asia by fully integrating Building Information Modelling (BIM) and Reality Modelling into the ArcGIS Portal.

The SAG Award by the United States GIS software, location intelligence, and mapping company is one of most coveted in the GIS industry internationally. This award is given to Esri users around the world for their outstanding work with GIS technology.

MRT Corp was selected out of more than 100,000 organisations worldwide for its innovative use of GIS and BIM technology in the Architecture, Engineering & Construction (AEC) industry.

The SAG Award winners were announced at the Esri User Conference 2019, attended by over 19,000 attendees on 8 July 2019 at the San Diego Convention Center, United States.

Thousands of SAG Award nominations are submitted by Esri users every year from around the world. The submissions are then personally reviewed and selected by Esri President and founder, Mr Jack Dangermond himself.

The Sungai Buloh-Serdang-Putrajaya (SSP) Line Geospatial Web Portal powered by ESRI ArcGIS technology serves engineering, topographic and environmental data of project sites for better informed decision making, improved project execution and reduced risk exposure.

The portal has enabled the project teams to retrieve and access spatial data in an easy-to-use cloud-based platform which has increased productivity, data-sharing and data retrieval between different engineering disciplines.

It has facilitated the collaboration and sharing of geospatial information in a centralised cloud platform. The project team can easily explore and navigate the mapping platform; layering it with data from other disciplines.

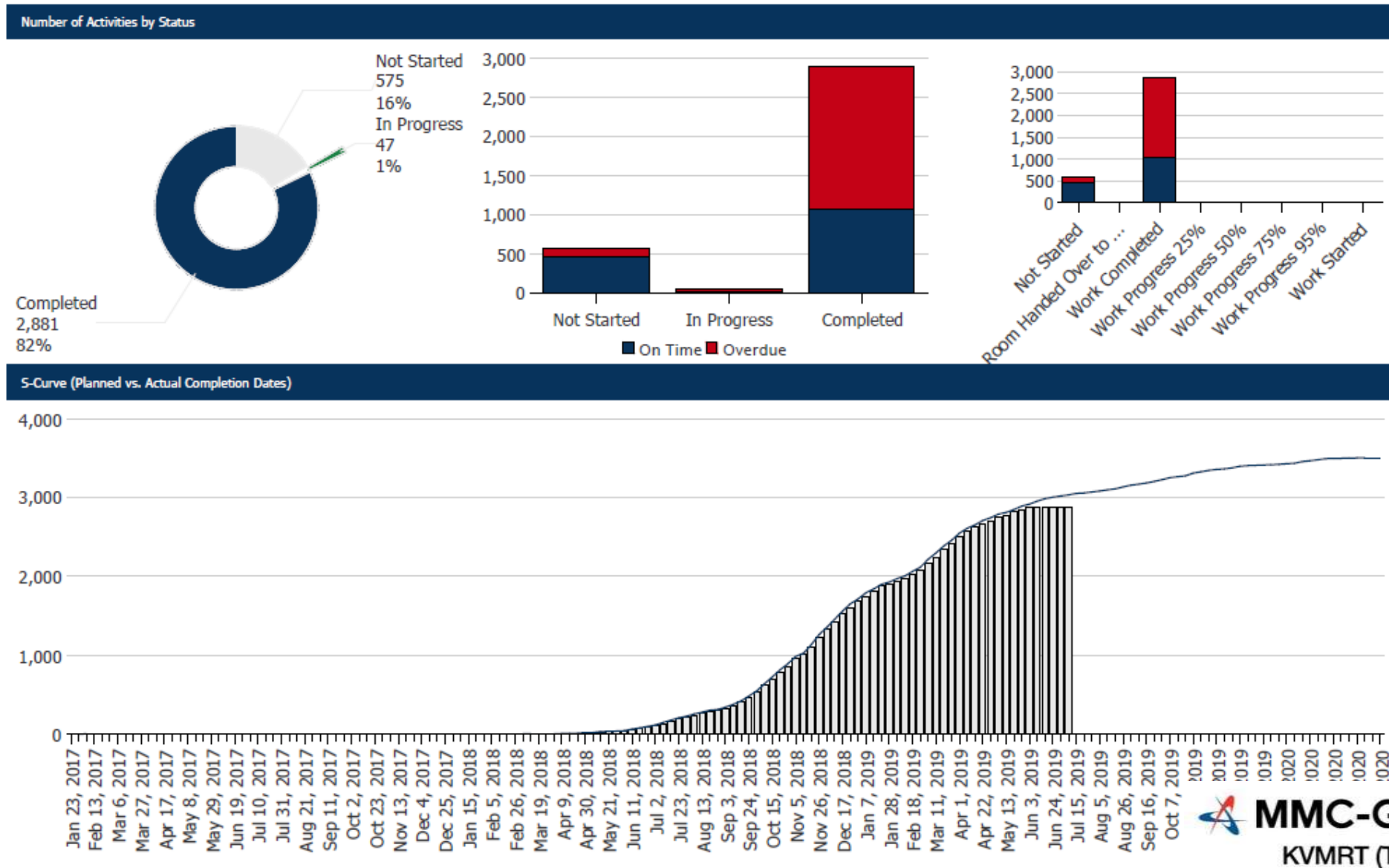
The project team members can view, analyse and query data on this platform; increasing overall productivity and ease of data sharing between disciplines, contractors and departments.

The MRT SSP Line Project has been recognised as the industry leader for advanced digital technology implementation such as BIM Level 2 and GIS in this region and as a testament to the use of technology to enhance productivity, efficiency and quality for project delivery.



Asia Geospatial Award + Special Achievement Award by ESRI inc US

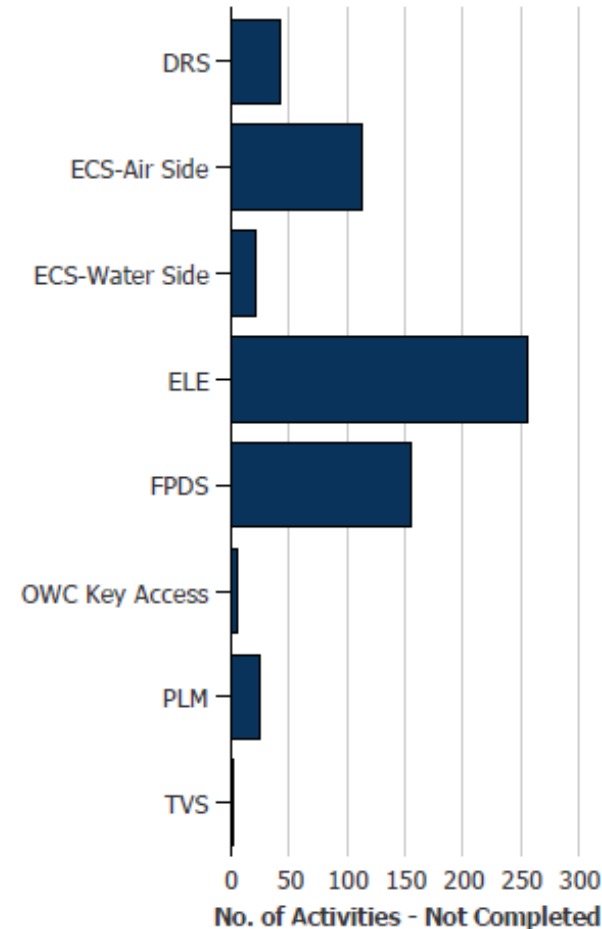
Live Progress reporting by **Status** and **S-Curve** reports from Cognos



Live Progress reporting by Status, Discipline and Fix in Cognos

Activities by Status, Discipline and Fix

Discipline	Fix	Not Started		In Progress		Completed		Overdue	Total
		Overdue	Total	Overdue	Total	Overdue	Total		
DRS	DRS 1st FIX	4	11		1		90	4	102
	DRS 2nd FIX		8			15	15	15	23
	DRS Final FIX	3	21	1	1	34	36	38	58
	TOTAL - DRS	7	40	1	2	49	141	57	183
ECS-Air Side	ECS Air Side 1st FIX	4	23	5	5	137	337	146	365
	ECS Air Side 2nd FIX	17	53	4	5	239	239	260	297
	ECS Air Side Final FIX	4	26	1	1	74	75	79	102
	TOTAL - ECS-Air Side	25	102	10	11	450	651	485	764
ECS-Water Side	ECS Water Side 1st FIX		8			3	80	3	88
	ECS Water Side 2nd FIX	3	12	2	2	12	12	17	26
	TOTAL - ECS-Water Side	3	20	2	2	15	92	20	114
ELE	Lighting&SmallPower 1st FIX	3	21	3	3		135	6	159
	Lighting&SmallPower 2nd FIX	14	79	4	4	216	216	234	299
	Lighting&SmallPower Final FIX	19	69	5	5	126	126	150	200
	Power 1st FIX		51			399	575	399	626
	Power 2nd FIX	4	24			130	130	134	154
	TOTAL - ELE	40	244	12	12	871	1,182	923	1,438
FPDS	FDS 1st FIX	3	14	2	6	51	133	56	153
	FDS 2nd FIX	7	27			124	124	131	151
	FDS Final FIX	5	32			70	70	75	102
	FPS 1st FIX	12	31			16	242	28	273
	FPS 2nd FIX	5	12	2	2	56	56	63	70
	FPS Final FIX	2	28	4	4	74	74	80	106
	TOTAL - FPDS	34	144	8	12	391	699	433	855
OWC Key Access	<<			6	6		26	6	32
	TOTAL - OWC Key Access			6	6		26	6	32
PLM	PLM 1st FIX		8				56		64
	PLM 2nd FIX		5						5



Status

Live Progress reporting by Location Report in Cognos

Station

Location

Activities by Location												
	Lvl	Zone	Room	Not Started		In Progress		Completed		Overdue	Total	
				Overdue	Total	Overdue	Total	Overdue	Total			
STWS	CONCOURSE LEVEL	OVERALL	OVERALL		3			6	6	6	9	
			TOTAL - OVERALL		3			6	6	6	9	
		ZONE 1.01 - CMTS, CTER, MDF RM, BMS RM, SERVER RM, ICSS RM, CORRIDOR (BOH) 07, TER	ZONE 1.01.01 - TER			2	2	34	50	36	52	
			ZONE 1.01.02 - CMTS					35	58	35	58	
			ZONE 1.01.03 - CTER					34	54	34	54	
			ZONE 1.01.04 - BMS RM					33	52	33	52	
			ZONE 1.01.05 - ICSS RM					31	50	31	50	
			ZONE 1.01.06 - MDF RM, SERVER RM, CORRIDOR (BOH) 07	3	3	1	1	41	67	45	71	
			TOTAL - ZONE 1.01 - CMTS, CTER, MDF RM, BMS RM, SERVER RM, ICSS RM, CORRIDOR (BOH) 07, TER	3	3	3	3	208	331	214	337	
			ZONE 1.02 - UPS RM, DB RM 05	ZONE 1.02 - UPS RM, DB RM 05			5	5	43	59	48	64
		TOTAL - ZONE 1.02 - UPS RM, DB RM 05				5	5	43	59	48	64	
		ZONE 1.03 - SPR&HR/WATER TANK&PUMP RM, ECS CTRL RM03, ECS PLNT RM04, GAS RM09/10, SPR/WR/CW TANK1/2	ZONE 1.03 - SPR&HR/WATER TANK&PUMP RM, ECS CTRL RM03, ECS PLNT RM04, GAS RM09/10, SPR/WR/CW TANK1/2	13	43	3	3	17	50	33	96	
			TOTAL - ZONE 1.03 - SPR&HR/WATER TANK&PUMP RM, ECS CTRL RM03, ECS PLNT RM04, GAS RM09/10, SPR/WR/CW TANK1/2	13	43	3	3	17	50	33	96	
		ZONE 1.04 - CORRIDOR (BOH) 08, FIRE/ELV/LV/ECS/SPD	ZONE 1.04 - CORRIDOR (BOH) 08, FIRE/ELV/LV/ECS/SPD	2	22	1	2	35	71	38	95	
			TOTAL - ZONE 1.04 - CORRIDOR (BOH) 08, FIRE/ELV/LV/ECS/SPD	2	22	1	2	35	71	38	95	
		ZONE 2.01 - AFCER, CSO, SCR, STRONG RM	ZONE 2.01.01 - AFCER			1	1	35	52	36	53	
			ZONE 2.01.02 - CSO			1	1	31	41	32	42	
			ZONE 2.01.03 - SCR			1	1	51	66	52	67	
			ZONE 2.01.04 - STRONG RM			1	1	32	42	33	43	
			TOTAL - ZONE 2.01 - AFCER, CSO, SCR, STRONG RM			4	4	149	201	153	205	
		ZONE 2.02 - DB RM 06, CORRIDOR (BOH) 12, PRE-ACTION SPR CLOSET	ZONE 2.02 - DB RM 06, CORRIDOR (BOH) 12, PRE-ACTION SPR CLOSET					49	71	49	71	
			TOTAL - ZONE 2.02 - DB RM 06, CORRIDOR (BOH) 12, PRE-ACTION SPR CLOSET					49	71	49	71	
		ZONE 2.03 - ECS CONTROL RM 04, ECS PLANT RM 05, CHILLER PLANT RM, GAS RM 11/12	ZONE 2.03 - ECS CONTROL RM 04, ECS PLANT RM 05, CHILLER PLANT RM, GAS RM 11/12	7	26	2	2	41	72	50	100	
			TOTAL - ZONE 2.03 - ECS CONTROL RM 04, ECS PLANT RM 05, CHILLER PLANT RM, GAS RM 11/12	7	26	2	2	41	72	50	100	
		ZONE 2.04 - CORRIDOR (BOH) 13, ES-03, TV/ECS/VS/LV/SPD/ELV/VE	ZONE 2.04 - CORRIDOR (BOH) 13, ES-03, TV/ECS/VS/LV/SPD/ELV/VE					48	74	48	74	
			TOTAL - ZONE 2.04 - CORRIDOR (BOH) 13, ES-03, TV/ECS/VS/LV/SPD/ELV/VE					48	74	48	74	
		ZONE 3.01 - CONCOURSE PAID/UNPAID, RETAIL AREA 01/02/03/04, LFT-02/04, ECP 09/10/11/12	ZONE 3.01 - CONCOURSE PAID/UNPAID, RETAIL AREA 01/02/03/04, LFT-02/04, ECP 09/10/11/12	3	36			29	61	32	97	
			TOTAL - ZONE 3.01 - CONCOURSE PAID/UNPAID, RETAIL AREA 01/02/03/04, LFT-02/04, ECP 09/10/11/12	3	36			29	61	32	97	

Status

Live SHE Audit Charting with Sempre Cognos

Performance Monitor Score Trend Month vs Month - Score Month vs Month - Detail

MMC-GAMUDA
KVMRT (T) SDN BHD

Month: May 2019 Comparison Month: Apr 2019 Project Type: All Projects Current Status: All Statuses

High Risk NCR Normal Risk NCR Need Improvement Acceptable Not Applicable Form Present, No Answer No Form

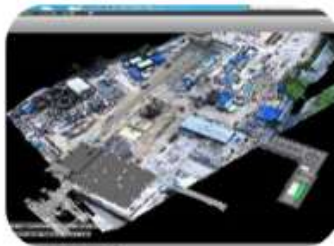
	Ampang Park Station (APPS)	Bandar Malaysia Crossover (BMSX)	Bandar Malaysia North Station (BMNS)	Bandar Malaysia South Station (BMSS)	Chan Sow Lin Station (CSLS)	Conlay Station (CLYS)	Desa Water Park South Portal	Escape Shaft 1 (ES1)	Escape Shaft 2 (ES2)	Escape Shaft 3 (ES3)	HKL Crossover (HKLX) and IVS1	Hospital Kuala Lumpur Station (HKLS)	Intervention Shaft 2 (IVS2)	Intervention Shaft 3 (IVS3)	Kampung Baru North Station (KBNS)	Keramat Police Quarters (KPQ)	KLCC East Station (KLES)	Sentul West Station (STWS)	Titik Nelayan Station (TTWN)
Part A - OSH	1.1 Site set-up and layout Pla	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable
	1.2 Site & office entry points	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
	1.3 Site internal traffic mana	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable
	1.4 Segregation of fabrication	Acceptable	Acceptable	Need Improvement	Acceptable	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Need Improvement	Acceptable
	1.5 Tunnel and UG Station tail	Normal Risk NCR	Acceptable	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Not Applicable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
	1.6 Site lighting for access a	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Need Improvement	Acceptable	Acceptable	Normal Risk NCR	Acceptable	Acceptable	Acceptable	Need Improvement
	1.7 Emergency & escape lightin	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Normal Risk NCR	Normal Risk NCR	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable
	1.8 EM Lighting Testing	Acceptable	Acceptable	Need Improvement	Acceptable	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Normal Risk NCR	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable
	1.9 Storage areas	Normal Risk NCR	Acceptable	Acceptable	Acceptable	Normal Risk NCR	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Need Improvement	Acceptable	Acceptable	Need Improvement	Acceptable	Normal Risk NCR	Acceptable	Normal Risk NCR
	1.10 Security	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Need Improvement	Acceptable
	2.1 Internal Site Notice Board	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

Real time SHE NCR Report Generated form Cognos

Site Data models using Drones

Survey and GIS - 3D Drone Image Modelling – BIM Verification, Checking and Progress

3D Reality Models and Drone



SSP Line 2 TLS 3D Point Cloud and Drone acquisition

Stations, Shafts and Crossovers

3D Survey Equipment and Software

TLS Leica P40 Hi-def Laser Scan

Leica iStar Panoramic Camera

DJI Phantom 4 Pro Drone (for Exterior and Aerial)

Leica Cyclone Point Cloud Software

AutoDesk Recap Point Cloud Software

3D Modelling and Processing Software

Bentley Context Capture

High-end 3D Processing Workstation (DELL Alienware)

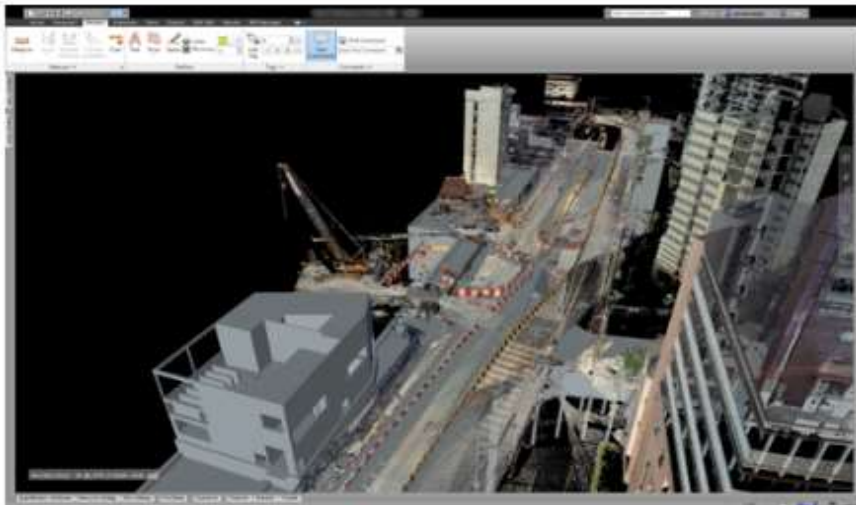
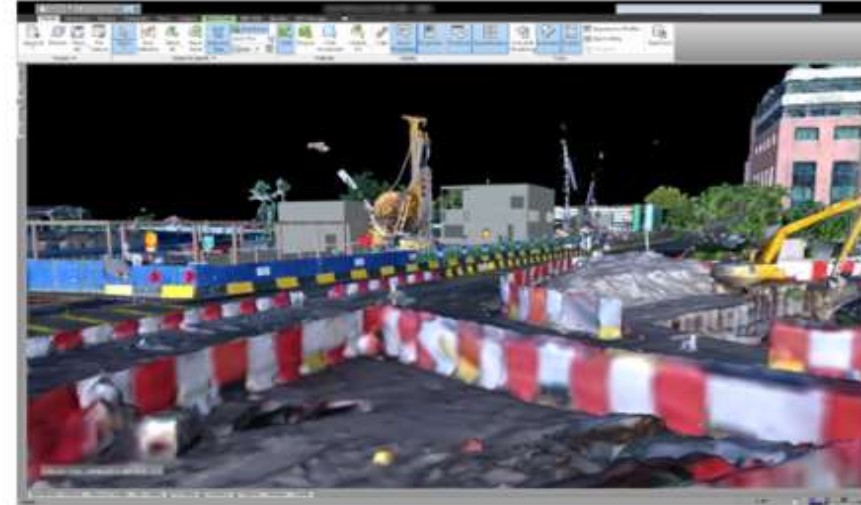


<https://www.youtube.com/watch?v=UvUPdZEWhSY&feature=youtu.be>

Digital tools in use on SSP on Line 2

Site Data models using Drones

Integration – BIM Revit Models + TLS Point Cloud + 3D CC Drone Model



Integrating Digital outputs on SSP Line 2

REALITY MODELING



MMC Gamuda KVMRT (T) Sdn Bhd

Drone Surveying for BIM and GIS Data
Capture- Malaysian Metro Megaproject
Kuala Lumpur, Malaysia

Project Playbook: AssetWise,
ComplyPro, ContextCapture, Navigator,
OpenRail, ProjectWise

[READ PROJECT SUMMARY +](#)

MMC GAMUDA KVMRT (T) SDN BHD

We've struck gold again by winning The Year in Infrastructure Bentley Awards 2019 under the Reality Modeling Category, echoing our last win in Bentley's 2017 Be Inspired Awards under the BIM Advancements in Rail & Transit Category. This time we won for our ingenious use of drones and various software to deliver accurate 3D reality meshes of our sites, making them accessible across the project and effectively saving thousands of hours for surveyors, engineers and project managers with a better digitalized workflow.


The Year in
INFRASTRUCTURE
2019 AWARDS

WINNER

AR Augmented Reality

IT Strategy

MGKT as part of our BIM Level 2 certification requirement have developed detailed documentation that defines our IT strategy. Detailed IT Policy, Disaster recovery, IT standards and MGKT's IT infrastructure is documented extensively as a detailed solution and plan designed to support, protect and secure the integrity of MGKT's project information.

Training

Facilities like Gamuda's GLC and BIM training facilities are essential resources that combined with the continuous training policies and development of in-house training materials that have been developed internally for MGKT technologies are essential for creating the necessary employee skill sets.



BIM training facility at GLC

ACTUAL TRAINING NUMBERS as of MAY 2019

Course Title	No of MGKT Staff Trained
Navisworks	100
BIM fundamentals	243
3D Modelling essentials	180
Revit MEP Essentials	16
Revit structure Essentials	70
Solibri	8
Costx 4D & 5D	67
Fieldview	1060
Viewpoint for Projects	160
Cognos (Data analytics)	10
BIM Level 2 Essentials	100
BIM Level 2 for Site Managers	80
BIM Level 2 for Information Managers	15
Total	2109

BIM Level 2 - Information Management



MMC GAMUDA KVMRT (T) SDN. BHD.

PLAN TITLE

BIM IMPLEMENTATION STRATEGY

Reference No. : [LEAVE THIS BLANK]
(Formerly: [Leave this blank])

Revision : [00]

Date : DD Month YYYY

Action	Name & Position	Signature
Approved by	Satpal S Bhogal (Project Director)	
Reviewed by	Name Surname (Job Title)	
Reviewed by	Name Surname (Job Title)	
Prepared by	Name Surname (Job Title)	
Prepared by	Name Surname (Job Title)	
Reviewed by	Name Surname (Job Title)	
Reviewed by	Name Surname (Job Title)	
Prepared by	Name Surname (Job Title)	



Table of Contents

1	PURPOSE	7
2	SCOPE	7
3	DEFINITION	7
3.1	Building Information Modelling (BIM)	7
3.2	What BIM is and What it is not	7
3.3	When to implement the ISO 19650 series	8
3.4	Credits	8
3.5	Standards and Publications	9
3.6	Other Publications	9
3.7	Terms, Definitions and abbreviations for BIM	9
4	RESPONSIBILITIES	25
4.1	Organisational	25
4.1.1	Lead Supplier/Tier 1 Contractor	25
4.2	Key Individual Roles	25
4.2.1	Project Information Manager	25
4.2.2	Project Delivery Manager	25
5	INTRODUCTION TO LEVEL 2 BIM	25
5.1	Deliverables	27
5.2	Insurance	28
5.3	Contracts	28
5.4	Roles	28
5.5	Common Data Environment (CDE)	29
5.6	Compliance Plan	29
5.7	Standards, Methods and Procedures (SMP)	29
5.8	Spatial Coordination and Clash Avoidance Strategy	30
5.9	Information Management Roles	30
5.10	Terms, definitions and abbreviations for BIM	30
5.11	Organization and Asset Information Requirements	30
5.12	Pre-Qualification Questionnaire	31
5.13	Employers Information Requirements (EIR)	31
5.14	Supply Chain Capability Assessment Forms – CPix	31
5.15	Supply Chain Capability Summary Form	31
5.16	Responsibility Matrix	32
5.17	Task Information Delivery Plan (TIDP)	32
5.18	Master Information Delivery Plan (MIDP)	32
5.19	Post-Contract BIM Execution Plan (BEP)	32
6	INFORMATION MANAGEMENT ROLES	32
6.1	Summary of Key Roles	33
6.2	Information Management Responsibility Matrix	33
6.3	Employer Roles	35
6.4	Project Roles	36
6.4.1	Project Information Manager	36
6.4.2	The Project Delivery Manager	39
6.4.3	The Lead Designer	40
6.4.4	Task Team Manager	40
6.4.5	Task Information Manager	41
6.4.6	Interface Manager	41
6.4.7	Information Originator	41
6.5	Competencies for roles defined in PAS 1192-2	41
7	TYPES OF INFORMATION	44

PAS 1192-2:2013
Incorporating Corrigendum No. 1

Specification for information management for the capital/delivery phase of construction projects using building information modelling



BIM Level 2 Certification – Certification was achieved in September 2019

bre

Certificate of Approval

Certificate Number: BIM10042 Issue: 01

This is to certify the BIM Level 2 Prepared capabilities provided by
MMC Gamuda KVMRT (T) SDN BHD

are in accordance with the requirements of
PAS 1192-2:2013

Specification for information management for the capital/delivery phase of construction projects using building information modelling, having complied with the requirements of BIM Level 2 Prepared, outlined in Scheme Document SD222 Rev 6.0

MMC Gamuda KVMRT (T) SDN BHD is subject to periodic surveillance and is licensed to use the BRE Global Certification Mark on documentation directly related to BIM Level 2 Prepared capabilities.

Company Address	BIM Role
Level 3A-3, Corporate Building (Block E), Pusat Komersial Southgate, No.2, Jalan Dua, Off Jalan Chan Sow Lin, 55200 Kuala Lumpur, Malaysia	Lead Supplier

Signed for BRE Global Limited Laura Critien
Certification Manager

23 August 2019 23 August 2019 22 August 2021
Date of this issue Date of first issue Expiry date

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BIM Level 2 prepared
Certificate Number BIM 10042

Thank you

• Why Digital?

- To establish a collaborative design process using a common data environment (CDE).
- To create deliverables through a standardised production processes.
- To embed non-geographical content (Asset Data) for use within future operations and maintenance.
- To eliminate waste.
- Digital Twins for visualisation, Planning Simulation, Cost Analysis, Coordination, clash mitigation, predictive analysis
- Leads to benefits in less re-work, more efficient processes driving time savings, improved quality and reduce costs.
- To develop strategies that drive accurate data collection for improved Project insights and decision making.
- We don't have a choice!! It's a necessity to remain in business.

