Advanced
Construction
Information
Development Ltd.

CIC BIM Competition 2019 (Open Group)

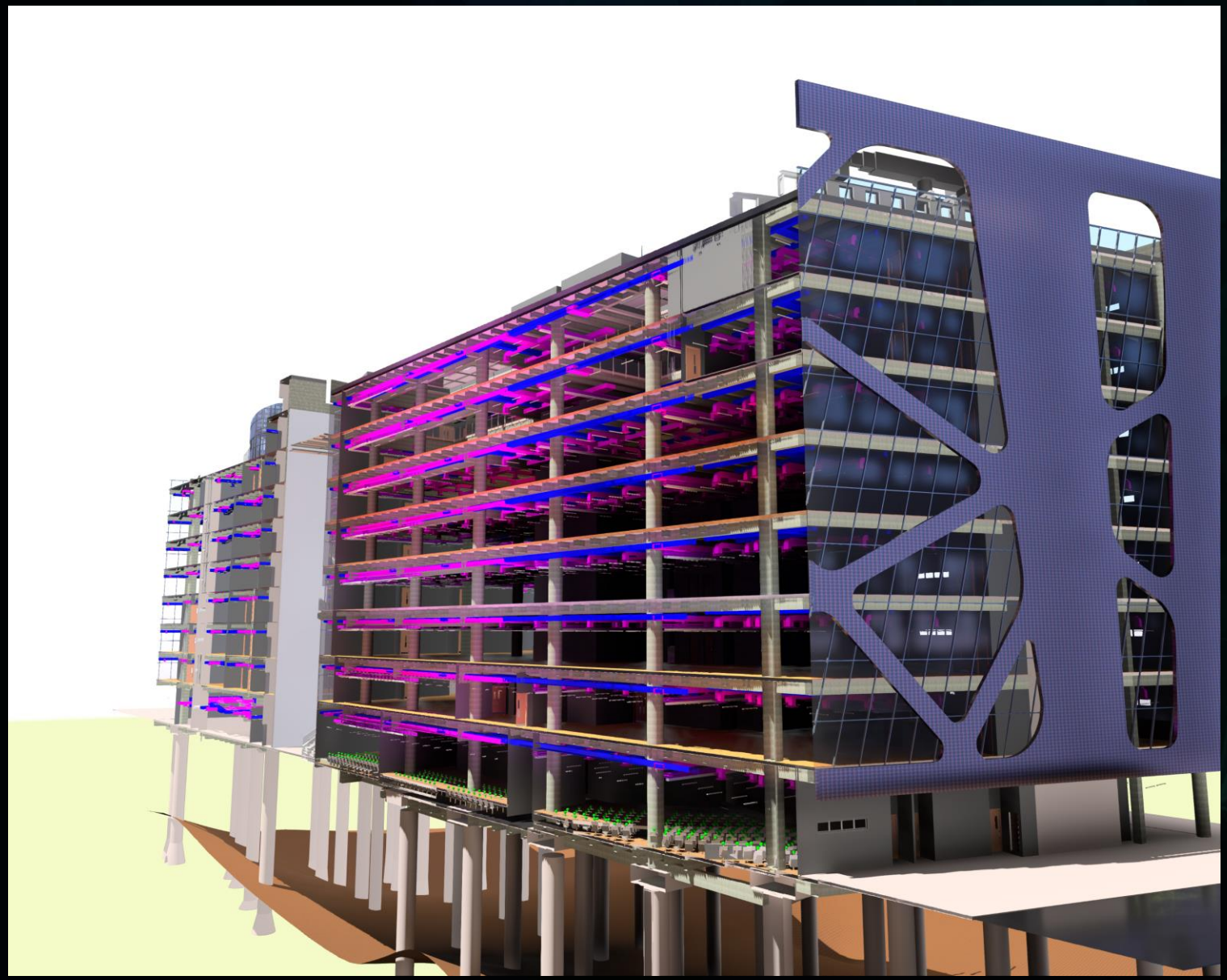
Presentation by HK ACID

Executive Summary

The design for Digital Design & Construction Centre (DDCC) is not only about the excellent outcome, but also showcase the overall workflow and approach of the very feasible fully adoption of Building Information Modelling (BIM) process from the very beginning of the project life cycle.

Objectives of participation

- *To illustrate the practical usage of BIM through collaborative and competitive learning approach in the construction industry;*
- *To illustrate the idea of "Single Source of Truth" (SSOT), which is the core concept of Building Information Modelling;*
- *To share the knowledge and experiences in BIM application and collaboration, further demonstrate how this is effective and beneficial to the productivity and clarity of the construction industry;*
- *To illustrate BIM is the perfect tool on "Design for buildability"*



Sectional perspective of federated BIM model

Executive Summary

Team Member roles -

BIM Architect – Ping Li

BIM Engineer (MEP) – Annie Cheng

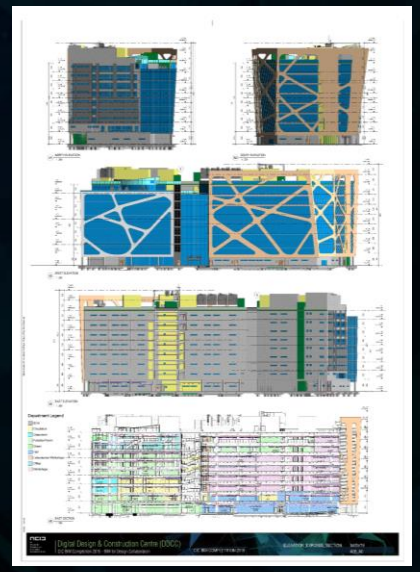
BIM Engineer (Structural) – all

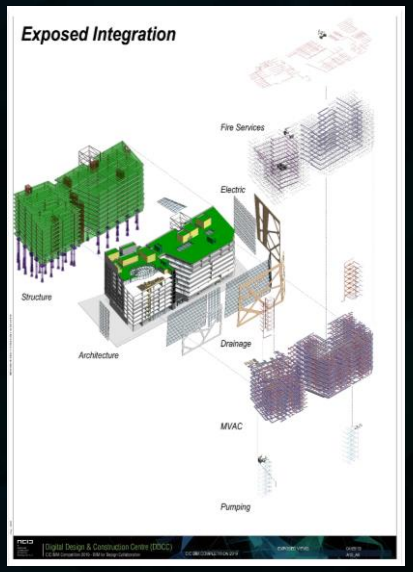
BIM Manager – Jason Wong

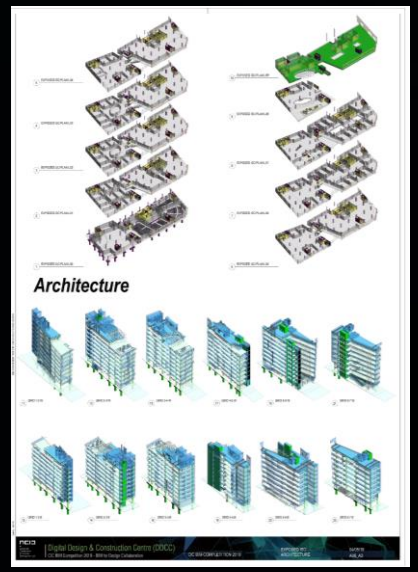
Overview of the complete package of submission

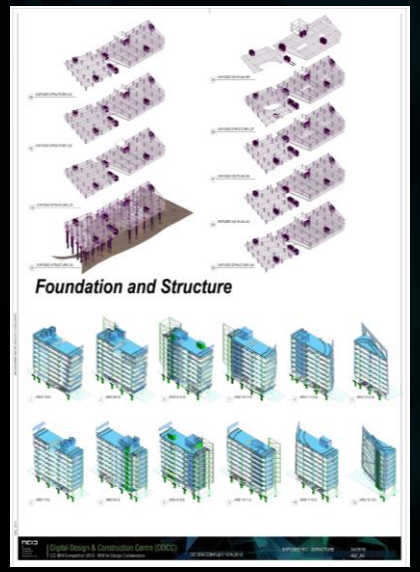
Single Source of Truth (SSOT): submission package from the same model

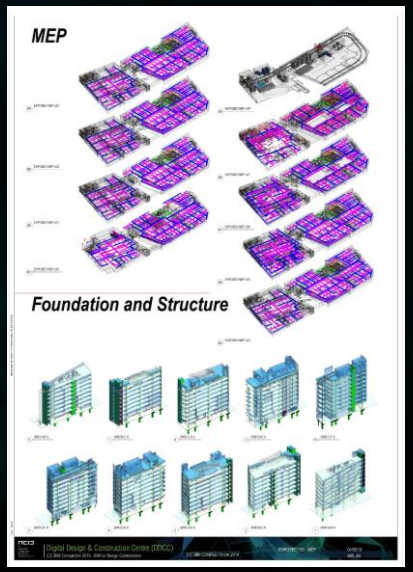
- 2D Drawings
- Schedules
- 3D visualisation
- Overall axonometric view
- “Anatomy” diagrams
- Illustration of working process
- Generative design scripting
- Solar Analysis
- Animation







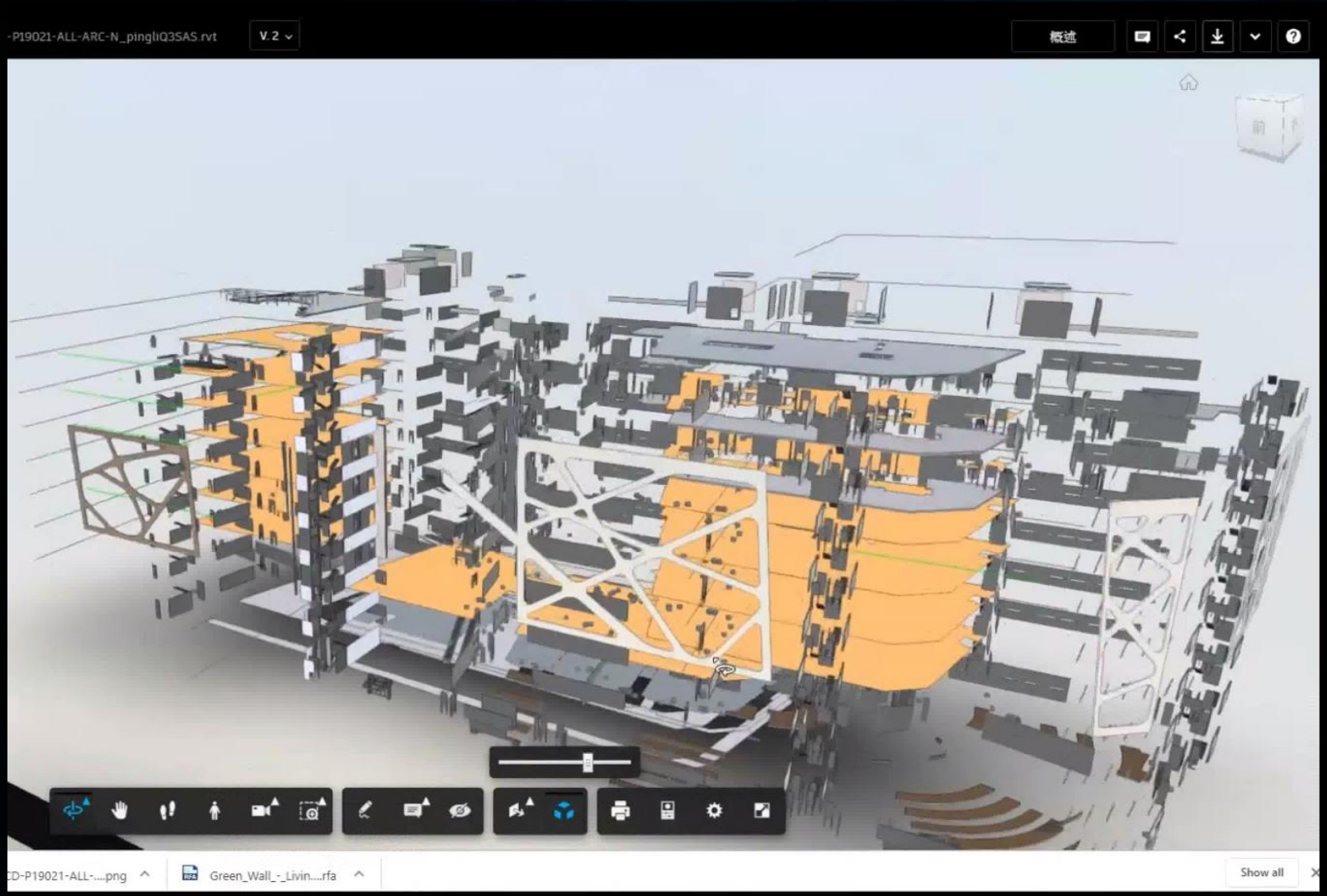




Use of Information

BIM for Buildability

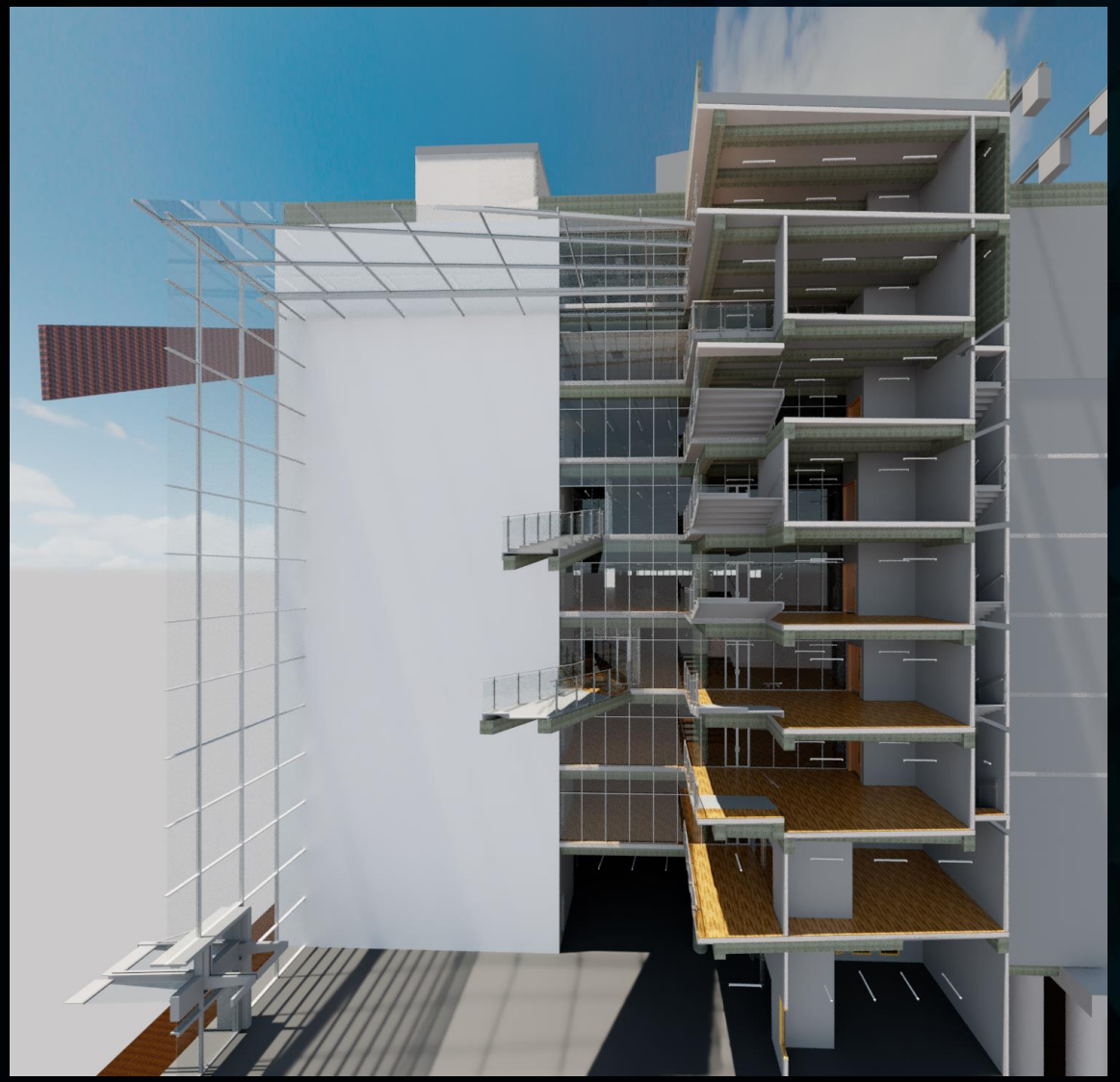
- BIM is an **Object-based** design process
- Rehearsal of the construction
- Buildability when modelling is essential consideration

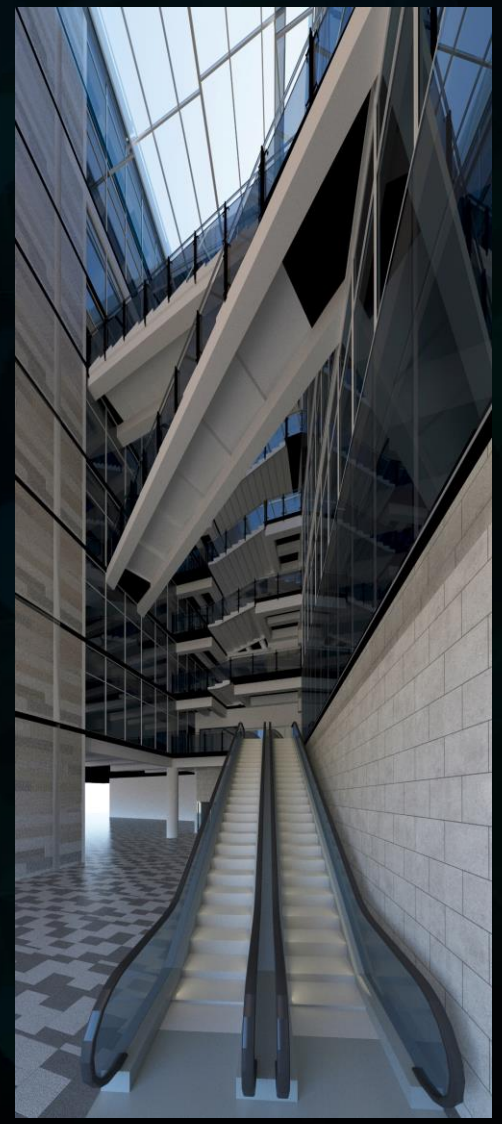


Use of Information

Design Concept

Atrium

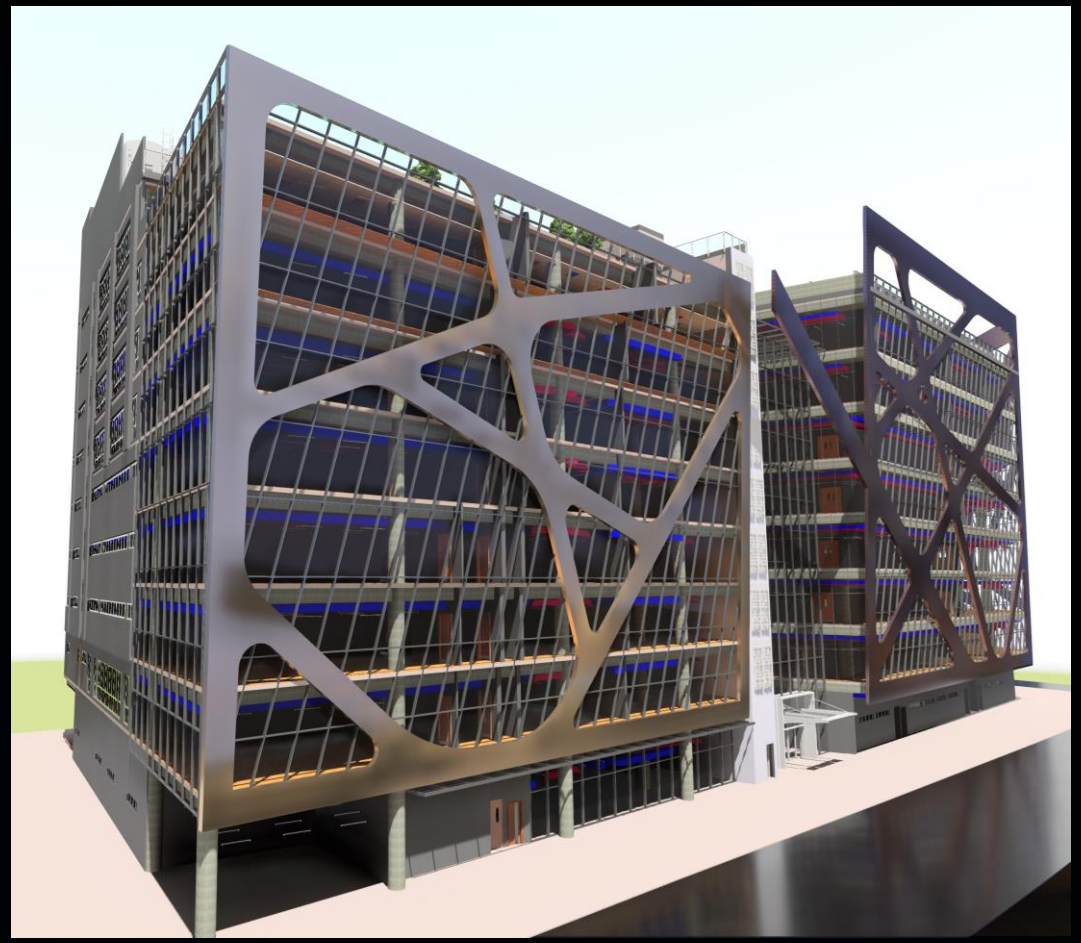




Use of Information

Design Concept

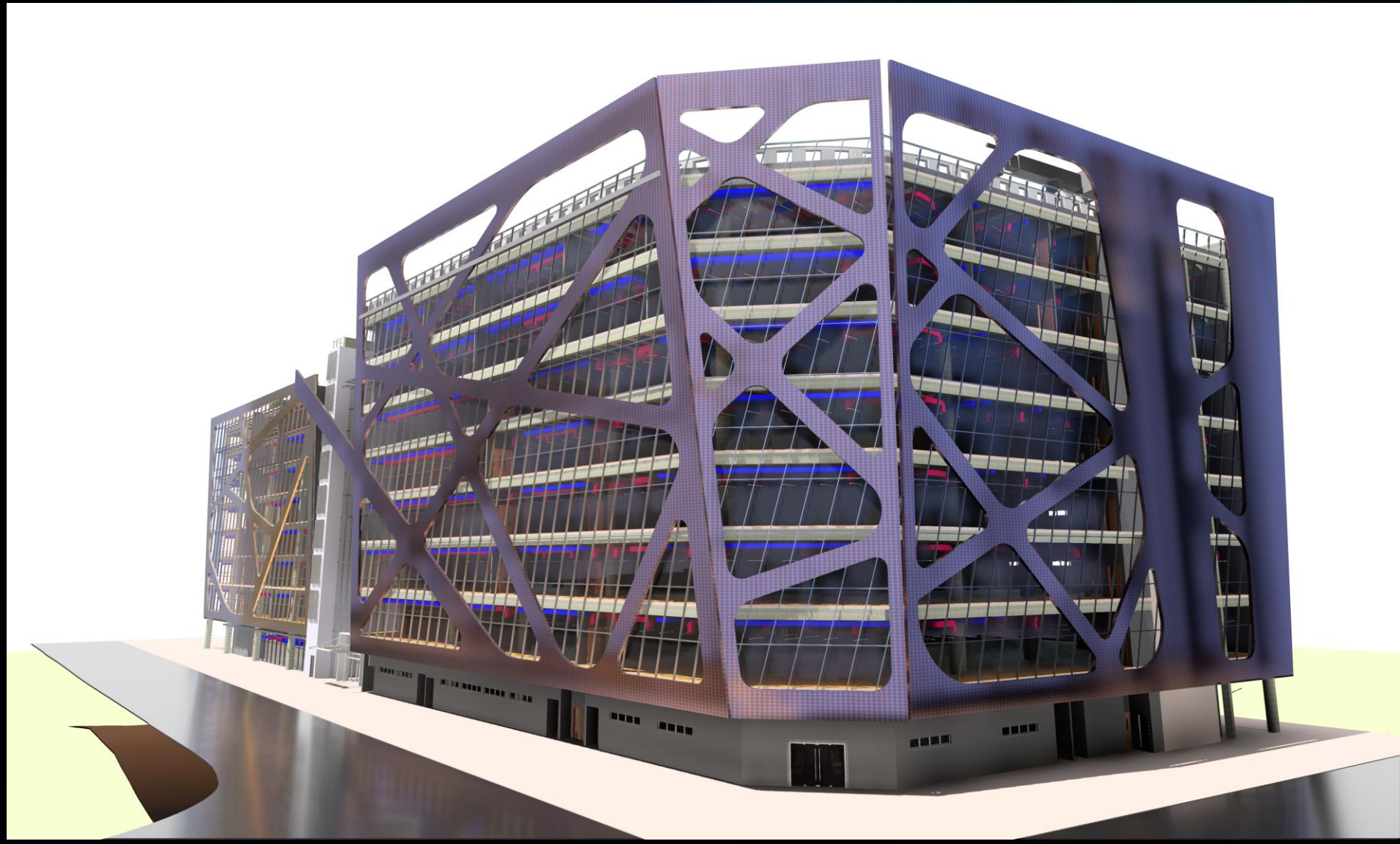
Division of Block



Use of Information

Design Concept

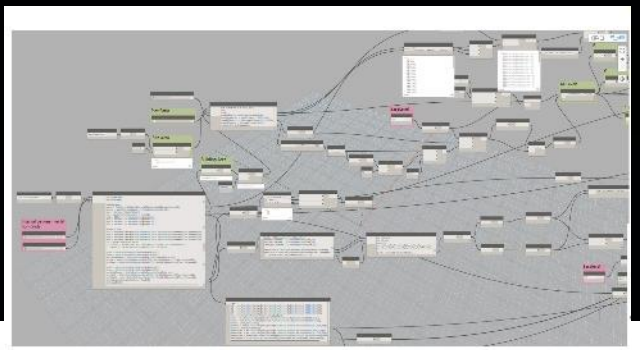
Aesthetic Consideration

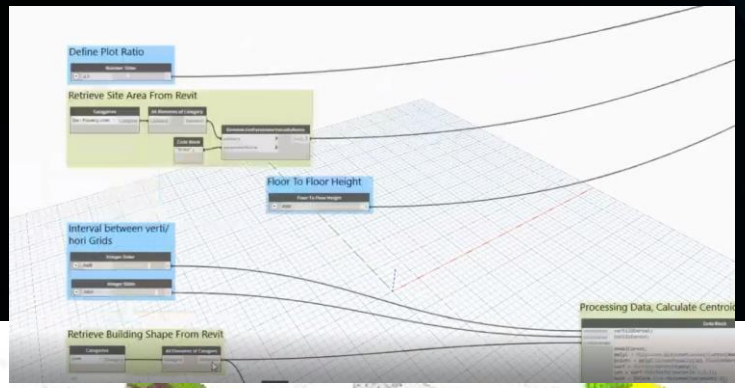


Computational Design, Engineering, Analysis and Optimisation

How BIM is applied - Architectural Design and Illustration

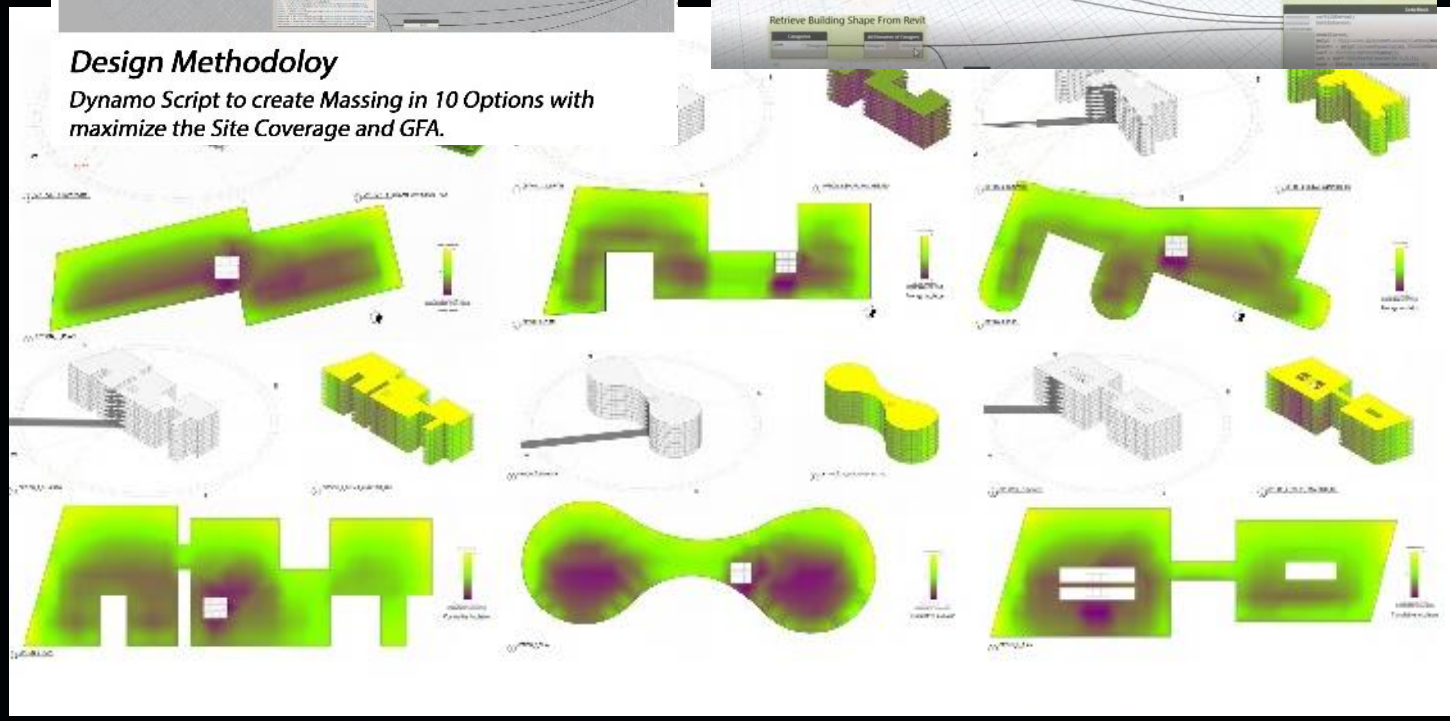
Generative Massing Design

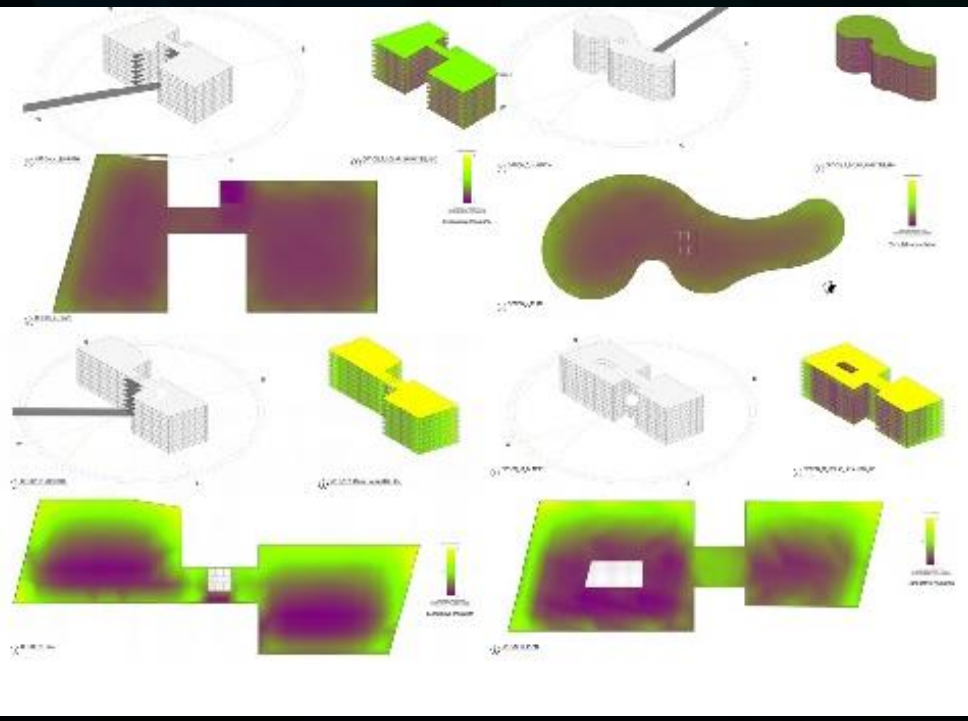




Design Methodoloy

Dynamo Script to create Massing in 10 Options with maximize the Site Coverage and GFA.





Computational Design, Engineering, Analysis and Optimisation

How BIM is applied - Architectural Design and Illustration

Working with area and numbers (Rooms and schedules)

Room Schedule

(Checking) Room Schedule

Level	Number	Name	Department	Area	Required Area	Area Variation
P_L00	L0-101	Exhibition Area	Function Room	525.241 m²	400.000 m²	31.31%
P_L00	L0-102	Reception	Function Room	552.273 m²	600.000 m²	-7.95%
P_L00	L0-103	Cafe	Function Room	196.576 m²	200.000 m²	-1.71%
P_L00	L0-104	Student Classroom Lift	Circulation	22.386 m²		
P_L00	L0-105	Plant Rm.	BOH	2.803 m²		
P_L00	L0-106	Plant Rm.	BOH	7.913 m²		
P_L00	L0-107	Dis.	Toilet	5.501 m²		
P_L00	L0-108	F.	Toilet	21.250 m²		
P_L00	L0-109	M.	Toilet	19.764 m²		
P_L00	L0-110	Store Rm.	BOH	3.606 m²		
P_L00	L0-111	Transformer Rm.	BOH	115.901 m²		
P_L00	L0-112	Switch Rm.	BOH	36.276 m²		
P_L00	L0-113	Storage	BOH	1.327 m²		
P_L00	L0-201	Student Workshop Lift Lobby	Circulation	39.252 m²		
P_L00	L0-202	Pipe Duct	BOH	1.918 m²		
P_L00	L0-203	Rear Projection Rm.	BOH	25.025 m²		
P_L00	L0-204	Lecture Theatres	Hall	333.236 m²	400.000 m²	-16.69%
P_L00	L0-205	Storage	BOH	19.090 m²		
P_L00	L0-206	Storage	BOH	20.090 m²		
P_L00	L0-207	Rear Projection Rm.	BOH	18.926 m²		
P_L00	L0-208	Lecture Theatres	Hall	313.694 m²	400.000 m²	-21.58%
P_L00	L0-209	Storage	BOH	16.520 m²		
P_L00	L0-210	Rear Projection Rm.	BOH	18.173 m²		
P_L00	L0-211	Lecture Theatres	Hall	430.706 m²		
P_L00	L0-212	Rear Projection Rm.	BOH	15.460 m²		
P_L00	L0-213	Lecture Theatres	Hall	252.729 m²		
P_L00	L0-214	Storage	BOH	7.001 m²		
P_L00	L0-215	Plant Rm.	BOH	30.712 m²		
P_L00	L0-216	Loading / Unloading Lift	Circulation	14.539 m²		
P_L00	L0-217	Plant Rm.	BOH	1.695 m²		
P_L00	L0-218	F.	Toilet	53.092 m²		
P_L00	L0-219	Dis.	Toilet	4.395 m²		
P_L00	L0-220	M.	Toilet	46.646 m²		
P_L00	L0-221	Storage	BOH	1.593 m²		
P_L00	L0-222	Storage	BOH	3.194 m²		

(Checking) Room Schedule

Level	Number	Name	Department	Area	Required Area	Area Variation
L_L02	L2-100	Student Classroom Lift	Circulation	22.224 m²		
L_L02	L2-101	Plant Rm.	BOH	2.803 m²		
L_L02	L2-102	Classroom	Classroom	111.002 m²	100.000 m²	11.00%
L_L02	L2-103	Classroom	Classroom	102.915 m²	100.000 m²	2.92%
L_L02	L2-104	Classroom	Classroom	112.100 m²	100.000 m²	12.10%
L_L02	L2-105	Classroom	Classroom	99.629 m²	100.000 m²	-0.37%
L_L02	L2-106	Classroom	Classroom	114.077 m²	100.000 m²	14.08%
L_L02	L2-107	Classroom	Classroom	98.356 m²	100.000 m²	-1.64%
L_L02	L2-108	Classroom	Classroom	123.465 m²	100.000 m²	23.46%
L_L02	L2-109	Classroom	Classroom	103.767 m²	100.000 m²	3.77%
L_L02	L2-110	Plant Rm.	BOH	104.211 m²		
L_L02	L2-111	Store Rm.	BOH	2.948 m²		
L_L02	L2-112	M.	Toilet	30.872 m²		
L_L02	L2-113	F.	Toilet	34.861 m²		
L_L02	L2-114	Dis.	Toilet	4.370 m²		
L_L02				1067.601 m²		
R_L02	L2-200	Student Workshop Lift Lobby	Circulation	17.588 m²		
R_L02	L2-201	Exhibition Space	Laboratories Workshops	129.304 m²		
R_L02	L2-202	Large Workshop	Workshops	948.373 m²	1000.000 m²	-5.16%
R_L02	L2-203	Large Workshop	Workshops	913.929 m²	1000.000 m²	-8.61%
R_L02	L2-204	Plant Rm.	BOH	51.581 m²		
R_L02	L2-205	Loading / Unloading Lift	Circulation	41.454 m²		
R_L02	L2-206	Plant Rm.	BOH	6.181 m²		
R_L02	L2-207	Loading / Unloading Platform	BOH	76.235 m²		
R_L02	L2-207	Store Rm.	BOH	2.295 m²		
R_L02	L2-208	M.	Toilet	47.918 m²		
R_L02	L2-209	F.	Toilet	40.929 m²		
R_L02	L2-210	Dis.	Toilet	4.383 m²		
R_L02	L2-211	Store Rm.	BOH	2.818 m²		
R_L02	L2-212	Plant Rm.	BOH	3.042 m²		
R_L02	L2-213	Store Rm.	BOH	2.661 m²		
R_L02				2288.690 m²		
L_L03	L3-100	Student Classroom Lift	Circulation	22.224 m²		

Level	Number	
L_L04	L3-106	Infor
L_L04	L3-107	Plan
L_L04	L3-108	Plan
L_L04	L3-109	M.
L_L04	L3-110	F.
L_L04	L3-111	Dis.
L_L04		
R_L04	L3-200	Stud
R_L04	L3-201	Exhi
R_L04	L3-202	Larg
R_L04	L3-203	Larg
R_L04	L3-204	Plan
R_L04	L3-205	Load
R_L04	L3-206	Plan
R_L04	L3-207	Stor
R_L04	L3-208	Load
R_L04	L3-209	M.
R_L04	L3-210	F.
R_L04	L3-211	Dis.
R_L04	L3-212	Stor
R_L04	L3-213	Plan
R_L04	L3-214	Stor
R_L04		
L_L05	L4-100	Stud
L_L05	L4-101	Plan
L_L05	L4-102	Clas
L_L05	L4-103	Infor
L_L05	L4-104	Print
L_L05	L4-105	Plan
L_L05	L4-106	Plan
L_L05	L4-107	M.
L_L05	L4-108	F.
L_L05	L4-109	Dis.

Area Summary

(Checking) Room Schedule_Gross Area (GFA)

Department	Area
BOH	2568.226 m²
Circulation	3472.981 m²
Classroom	2146.529 m²
Fire Escape	656.276 m²
Function Room	7172.661 m²
Hall	2965.862 m²
Laboratories Workshops	616.951 m²
Office	1690.664 m²
Toilet	1364.633 m²
Workshops	9682.312 m²
Total:	32337.095 m²

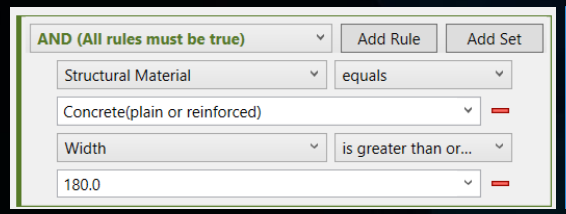
(Checking) Room Schedule_Functional Area (UFA)

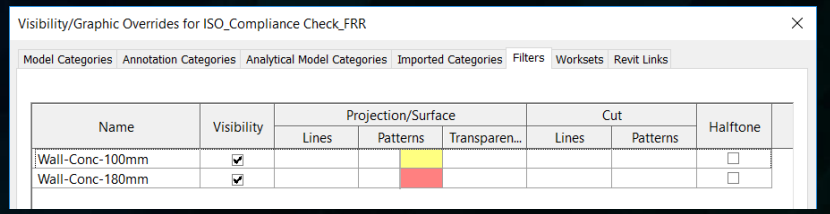
Department	Area
Classroom	2146.529 m²
Function Room	7172.661 m²
Hall	2965.862 m²
Laboratories Workshops	616.951 m²
Office	1690.664 m²
Workshops	9682.312 m²
Total:	24274.979 m²

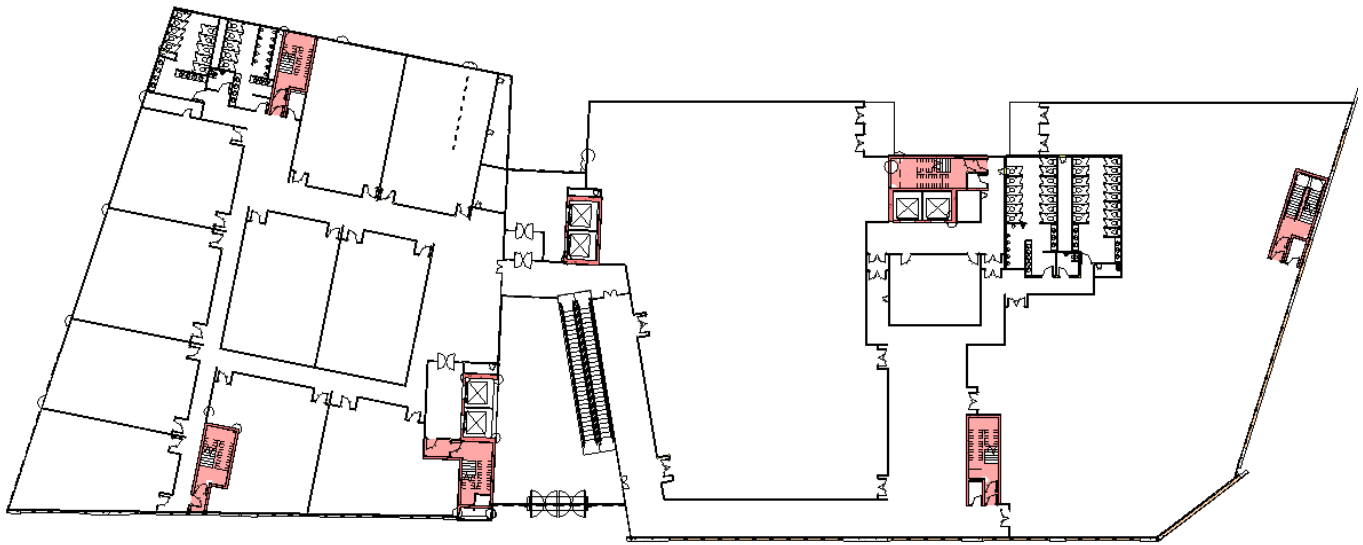
Computational Design, Engineering, Analysis and Optimisation

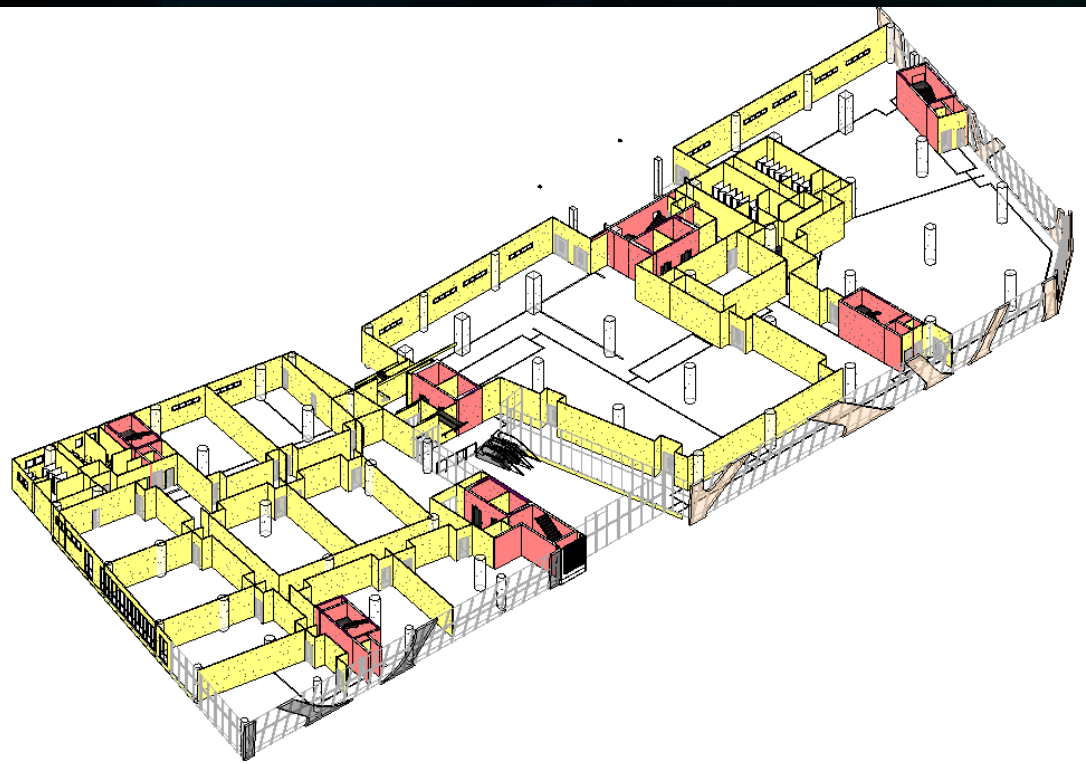
How BIM is applied - Architectural Design and Illustration

Statutory Compliance Audit







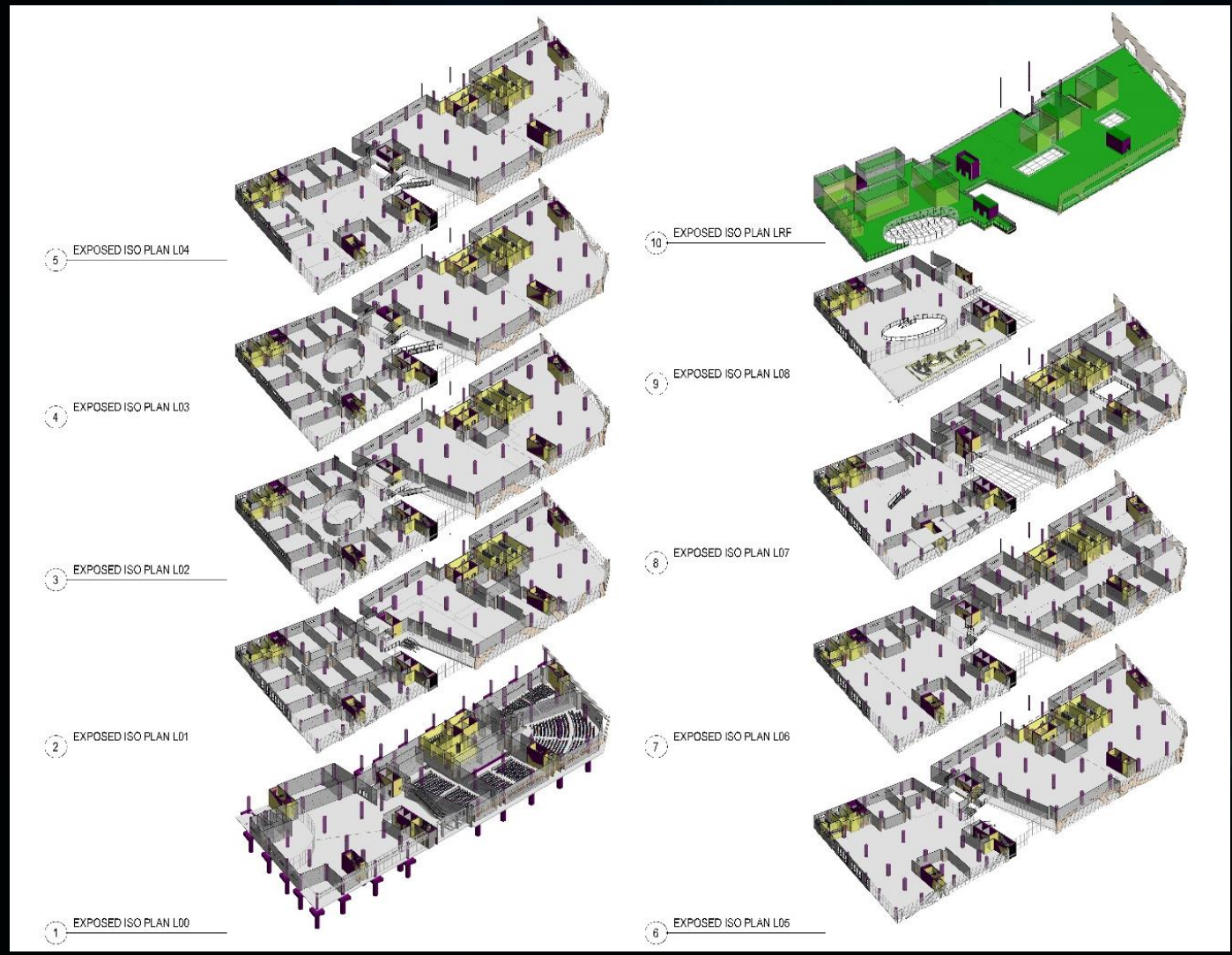


3 STATUTORY COMPLIANCE AUDIT - FIRE ESCAPE & PROTECTED LOBBY
1 : 300

Computational Design, Engineering, Analysis and Optimisation

How BIM is applied - Architectural Design and Illustration

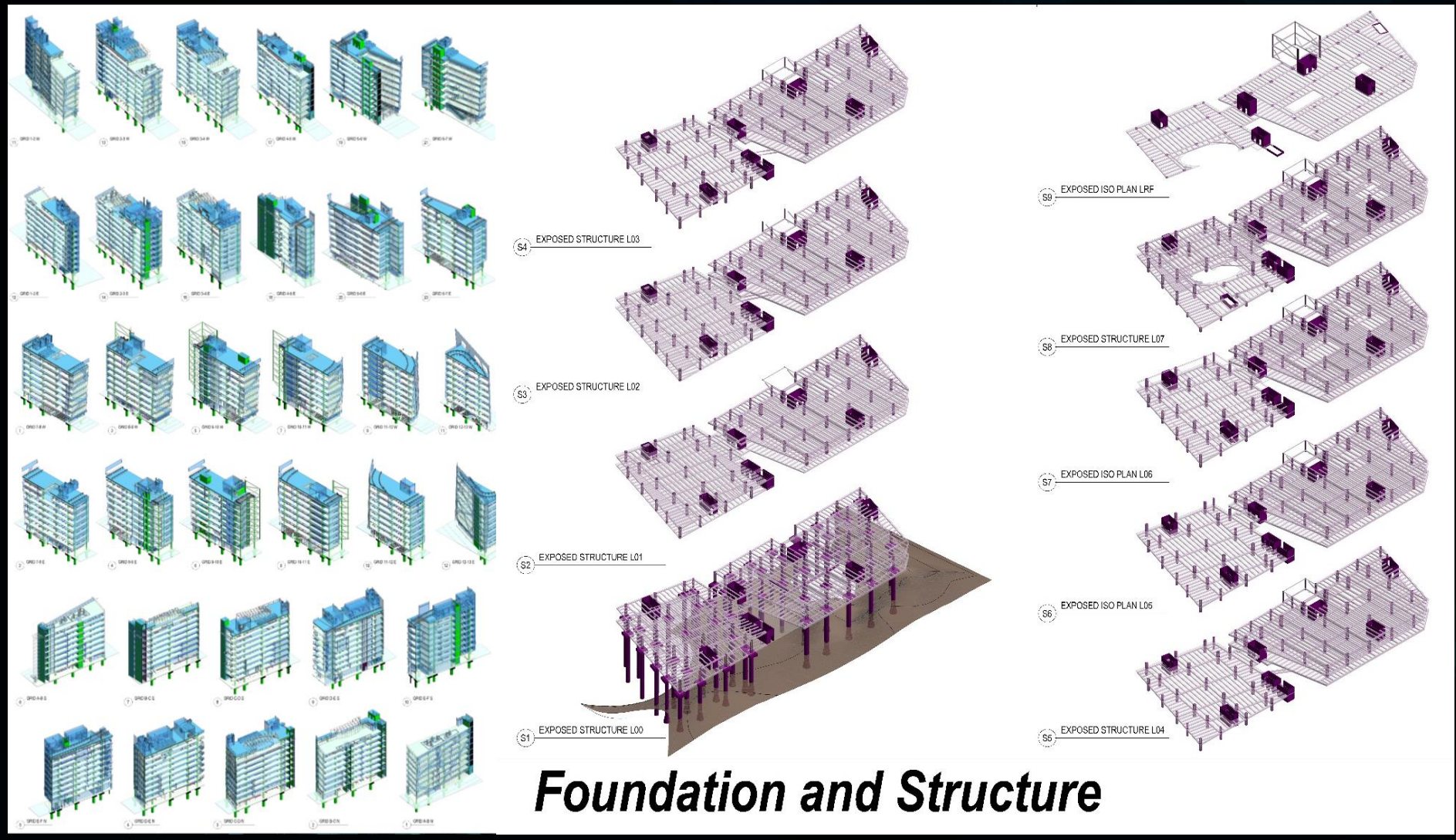
Anatomy of Architectural Model



Computational Design, Engineering, Analysis and Optimisation

How BIM is applied - Structural Design and Illustration

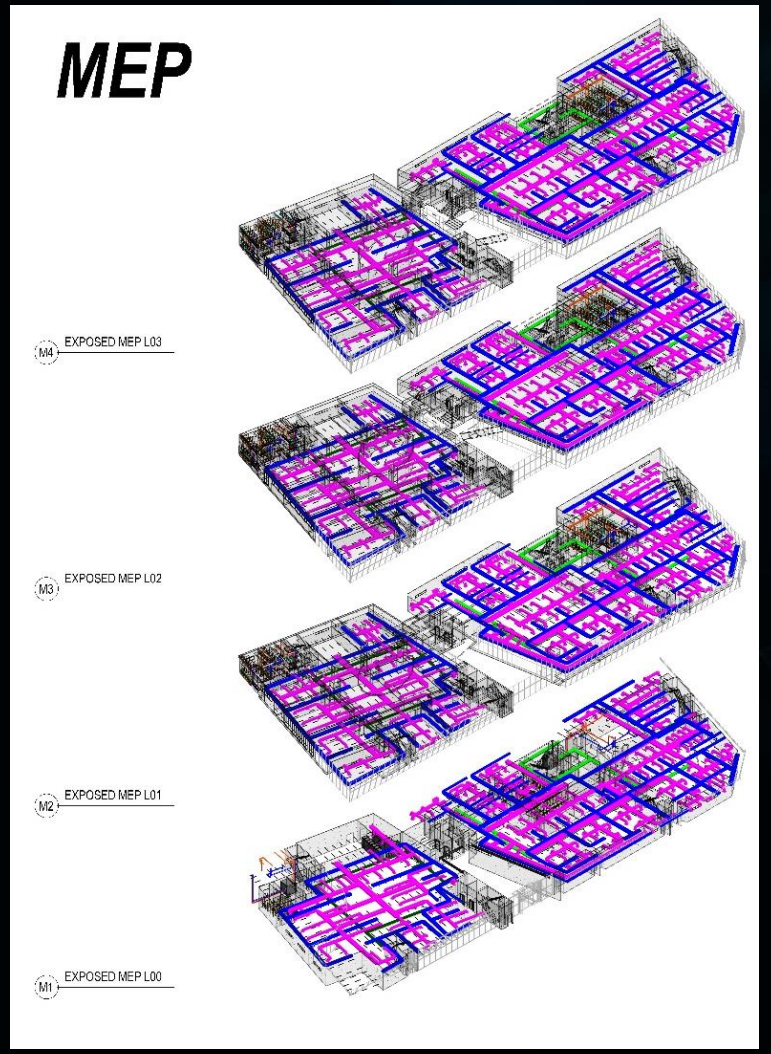
Anatomy of Structural Model



Computational Design, Engineering, Analysis and Optimisation

How BIM is applied - MEP Design and Illustration

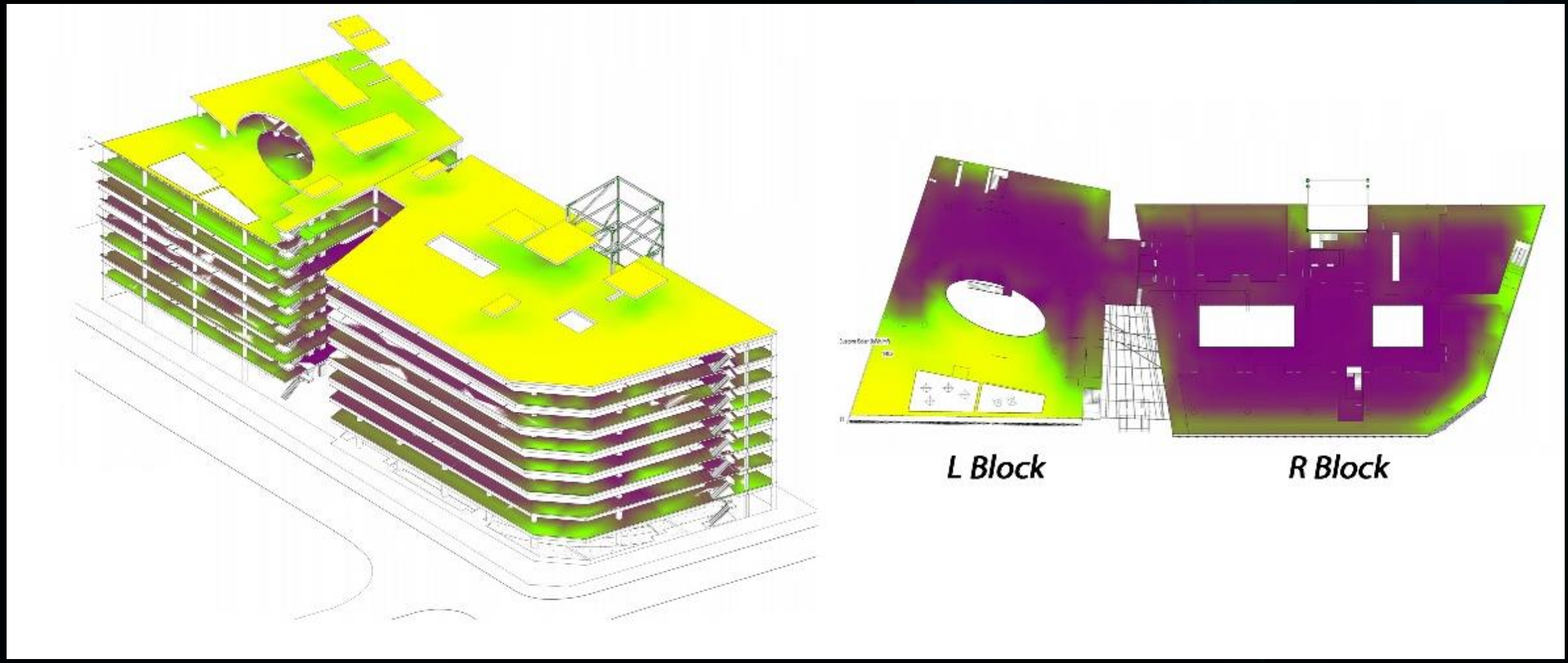
Anatomy of MEP Model



Computational Design, Engineering, Analysis and Optimisation

How BIM is applied - Structural Design and Illustration

Solar Analysis



Computational Design, Engineering, Analysis and Optimisation

How BIM is applied - Structural Design and Illustration

"HEAT MAP" – HEADROOM ANALYSIS

Height (mm)	Color
99999999	44, 134, 174
800	101, 195, 238
700	67, 173, 165
600	66, 152, 65
500	141, 198, 63
400	255, 242, 0
300	250, 166, 26
200	242, 101, 34
100	237, 28, 36
0	192, 0, 255
*	

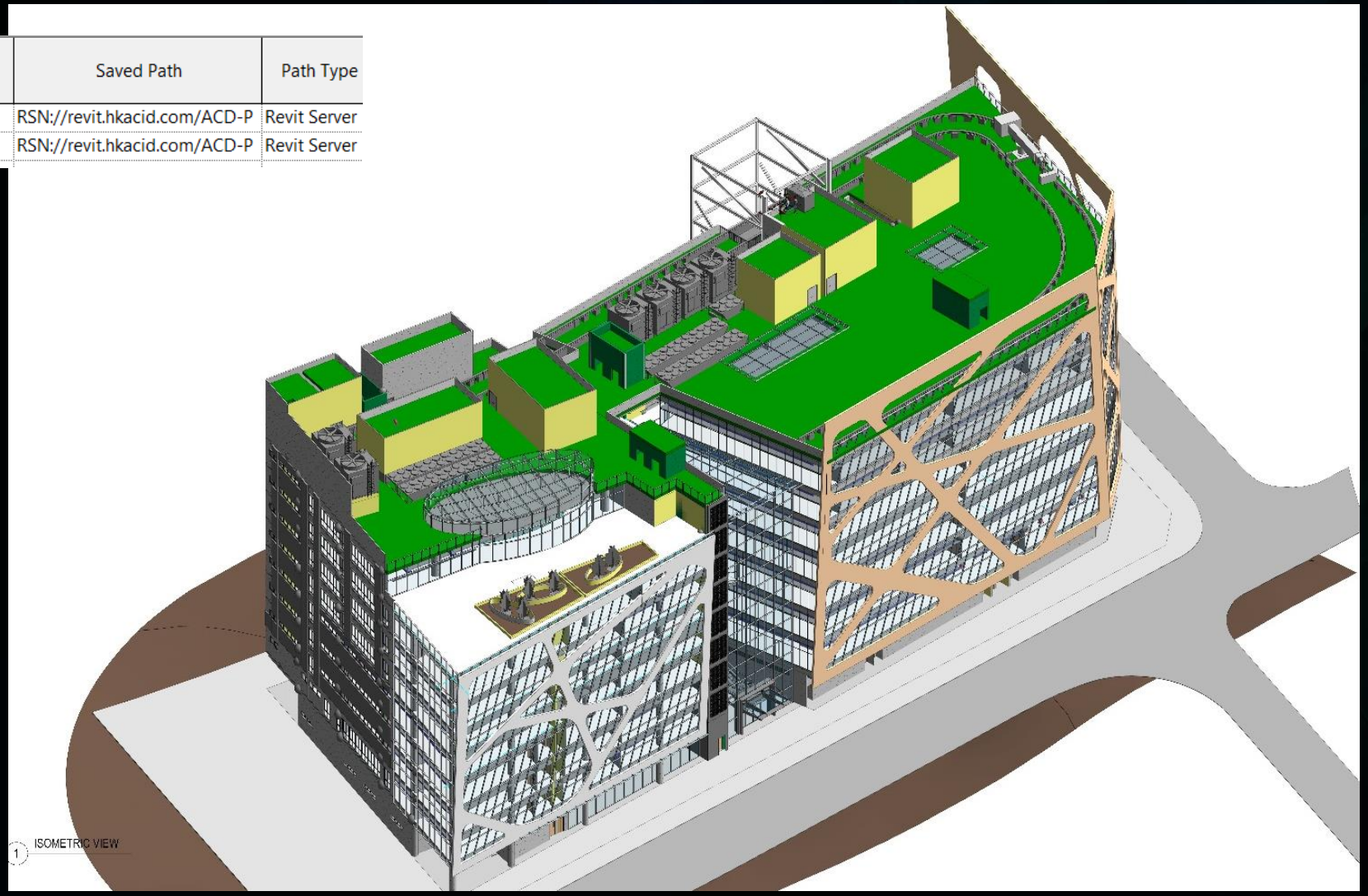
Record 1 of 10

Computational Design, Engineering, Analysis and Optimisation

Multidisciplinary Coordination & Collaboration

Combined model

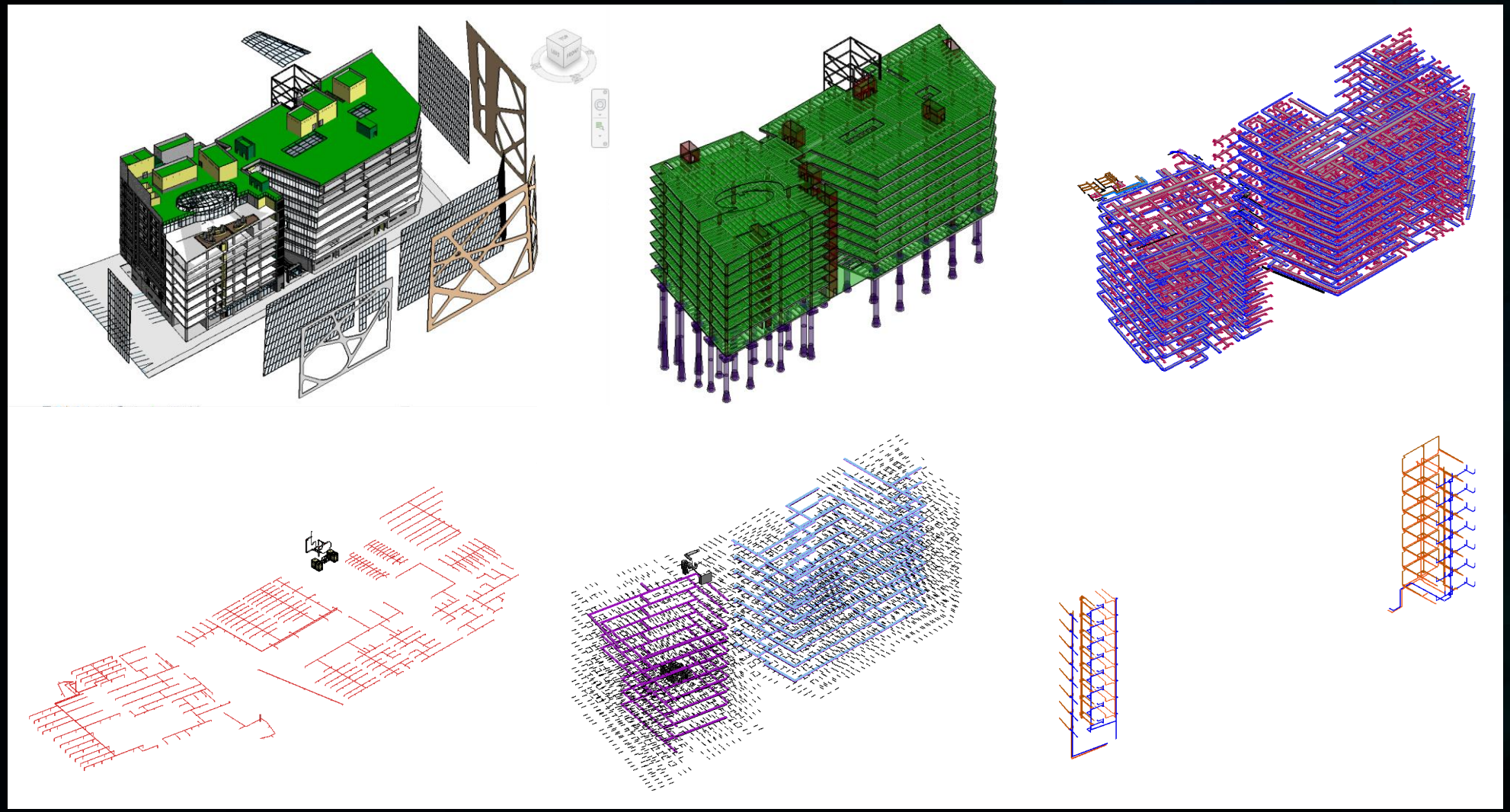
Link Name	Status	Reference Type	Positions Not Saved	Saved Path	Path Type
ACD-P19021-ALL-STR-N.rvt	Loaded	Overlay	☐	RSN://revit.hkacid.com/ACD-P	Revit Server
ACD-P19021-ALL-MEP-N.rvt	Loaded	Overlay	☐	RSN://revit.hkacid.com/ACD-P	Revit Server



Computational Design, Engineering, Analysis and Optimisation

Multidisciplinary Coordination & Collaboration

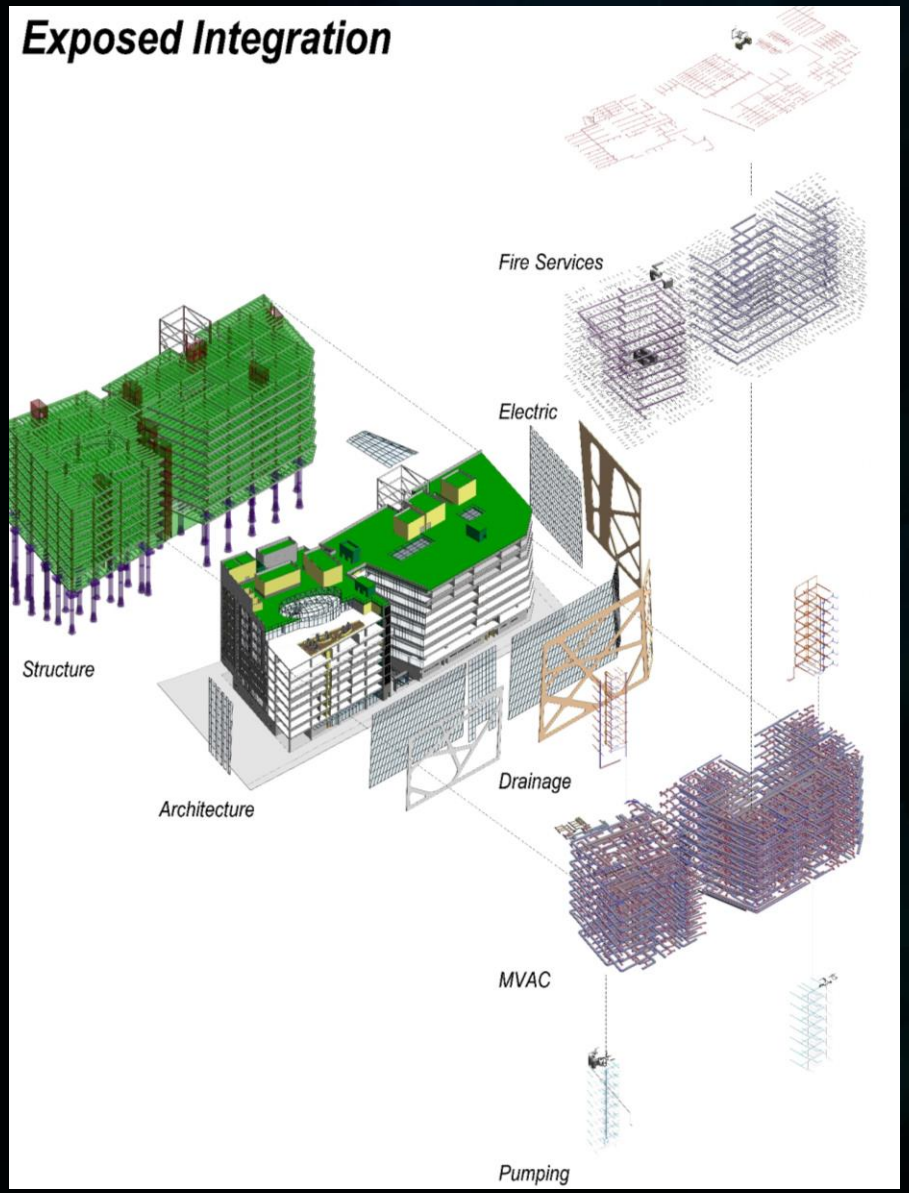
Exposed Integration



Computational Design, Engineering, Analysis and Optimisation

Multidisciplinary Coordination & Collaboration

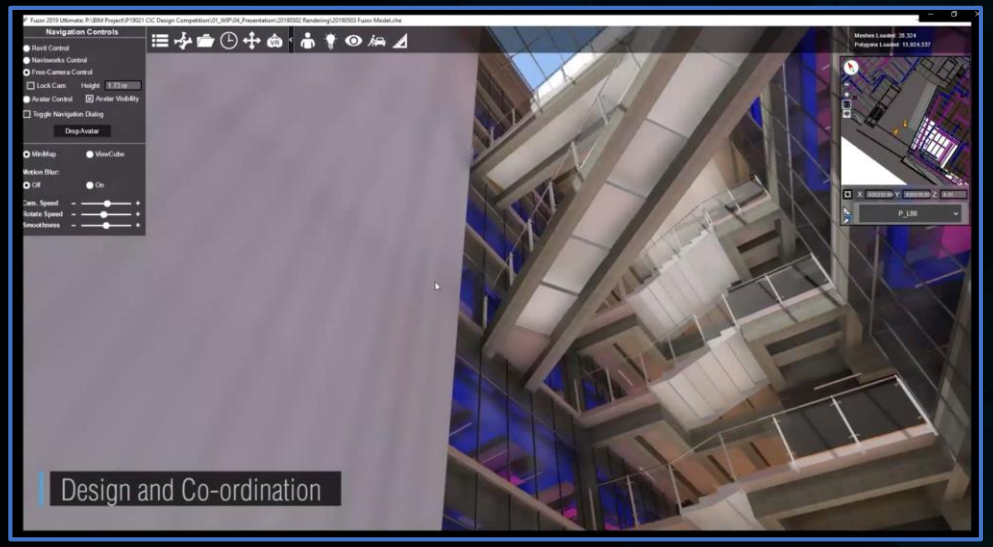
Exposed Integration



Computational Design, Engineering, Analysis and Optimisation

Multidisciplinary Coordination & Collaboration

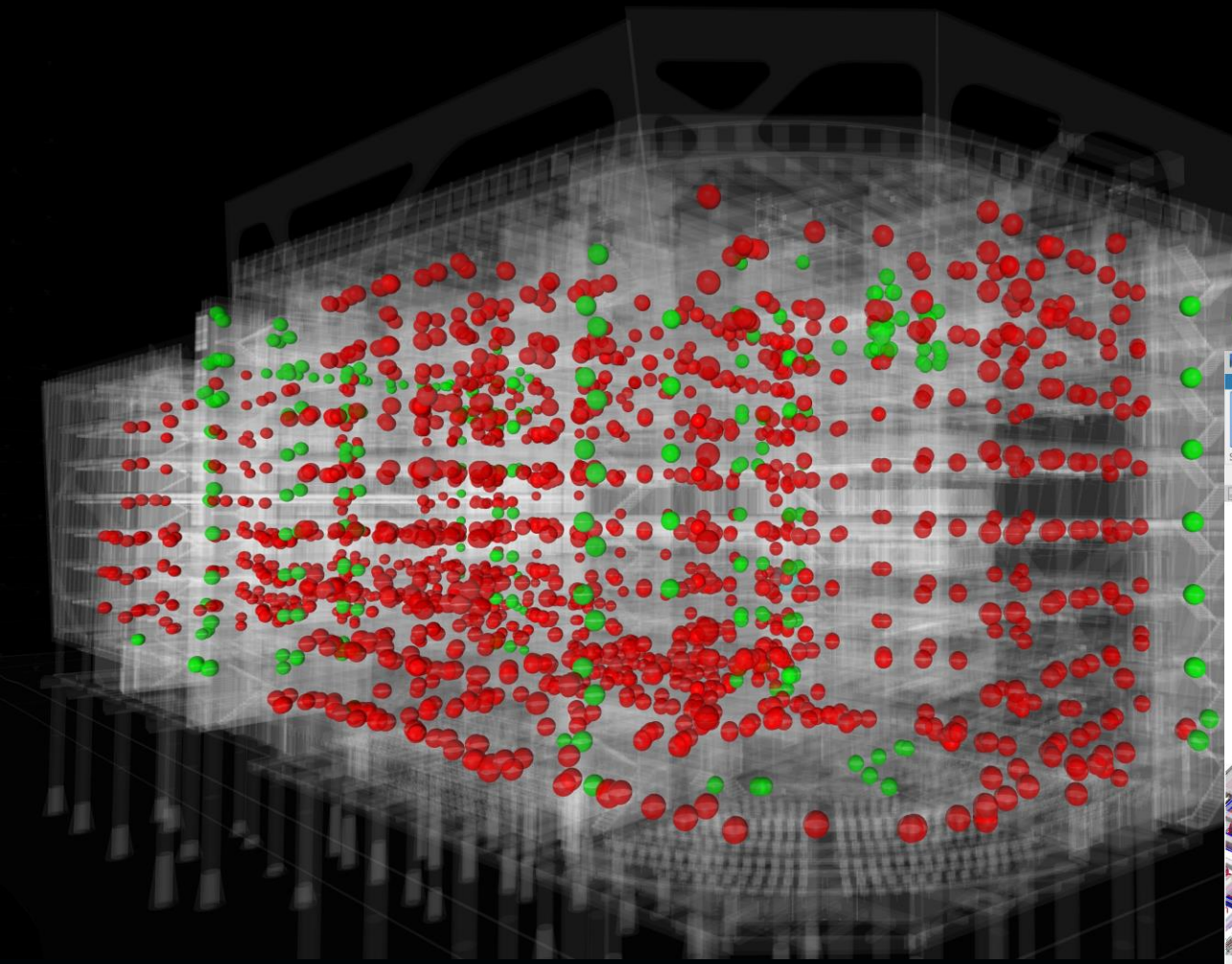
Federated Model Walkthrough and Review

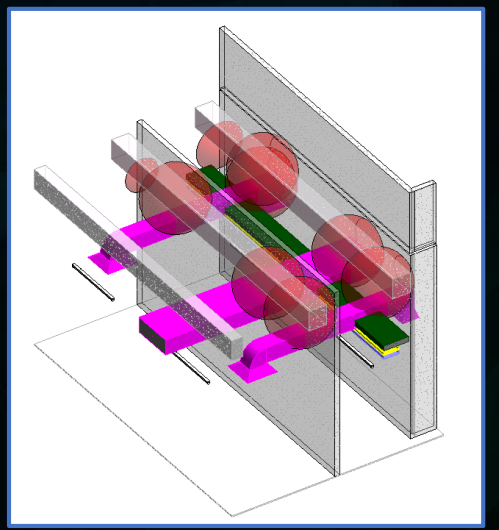


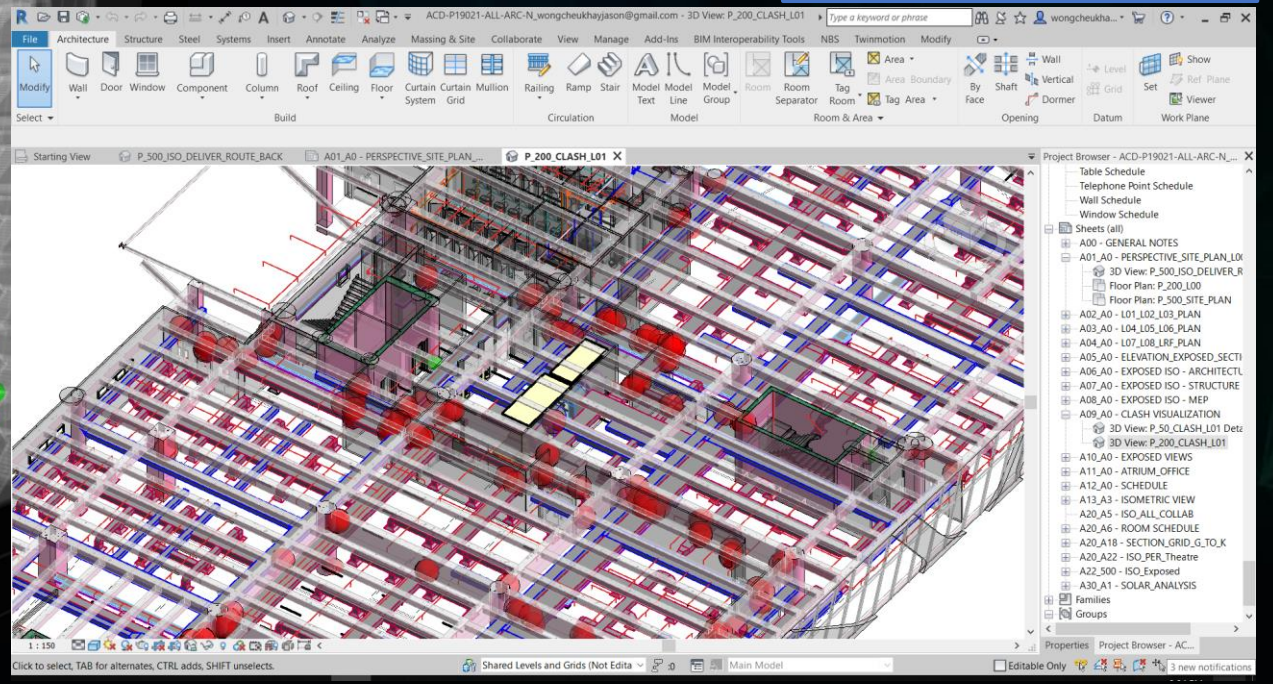
Computational Design, Engineering, Analysis and Optimisation

Multidisciplinary Coordination & Collaboration

Clash Management



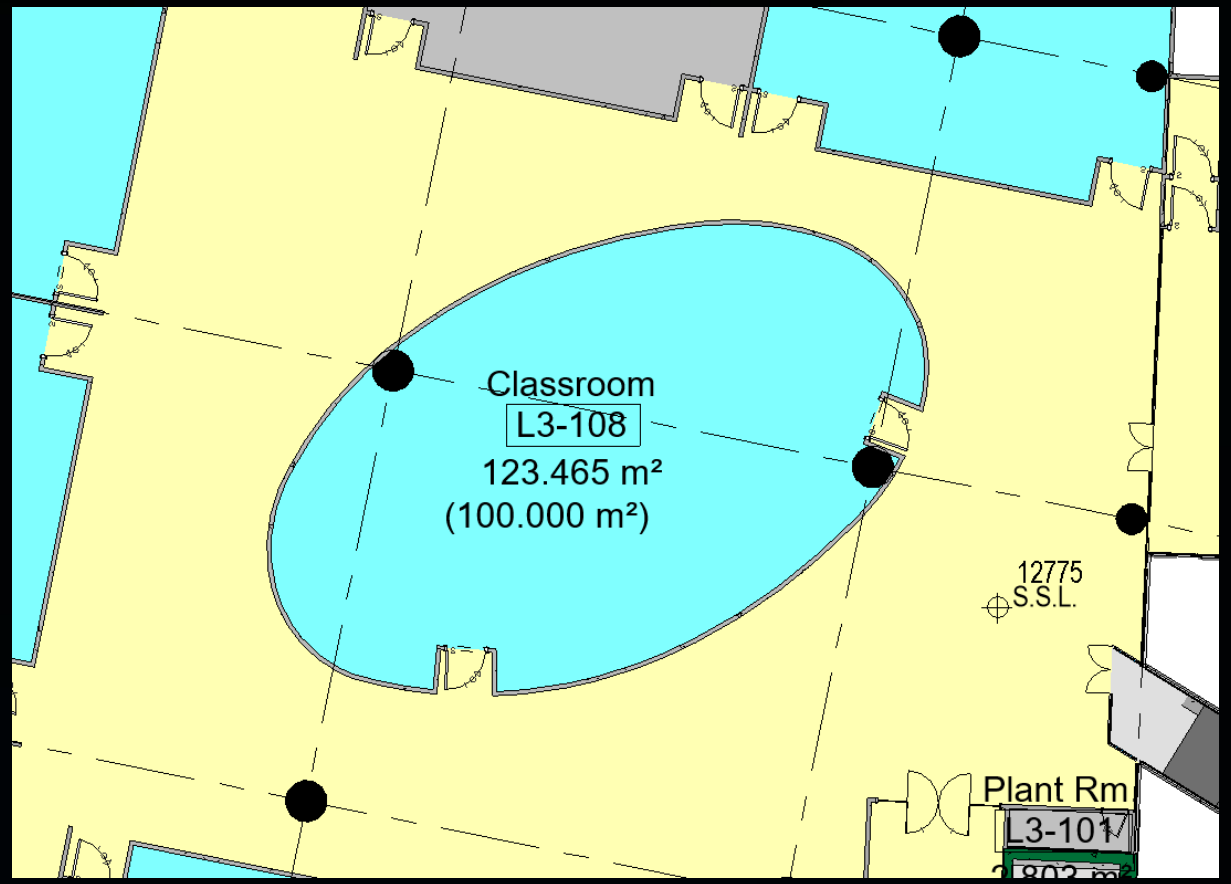


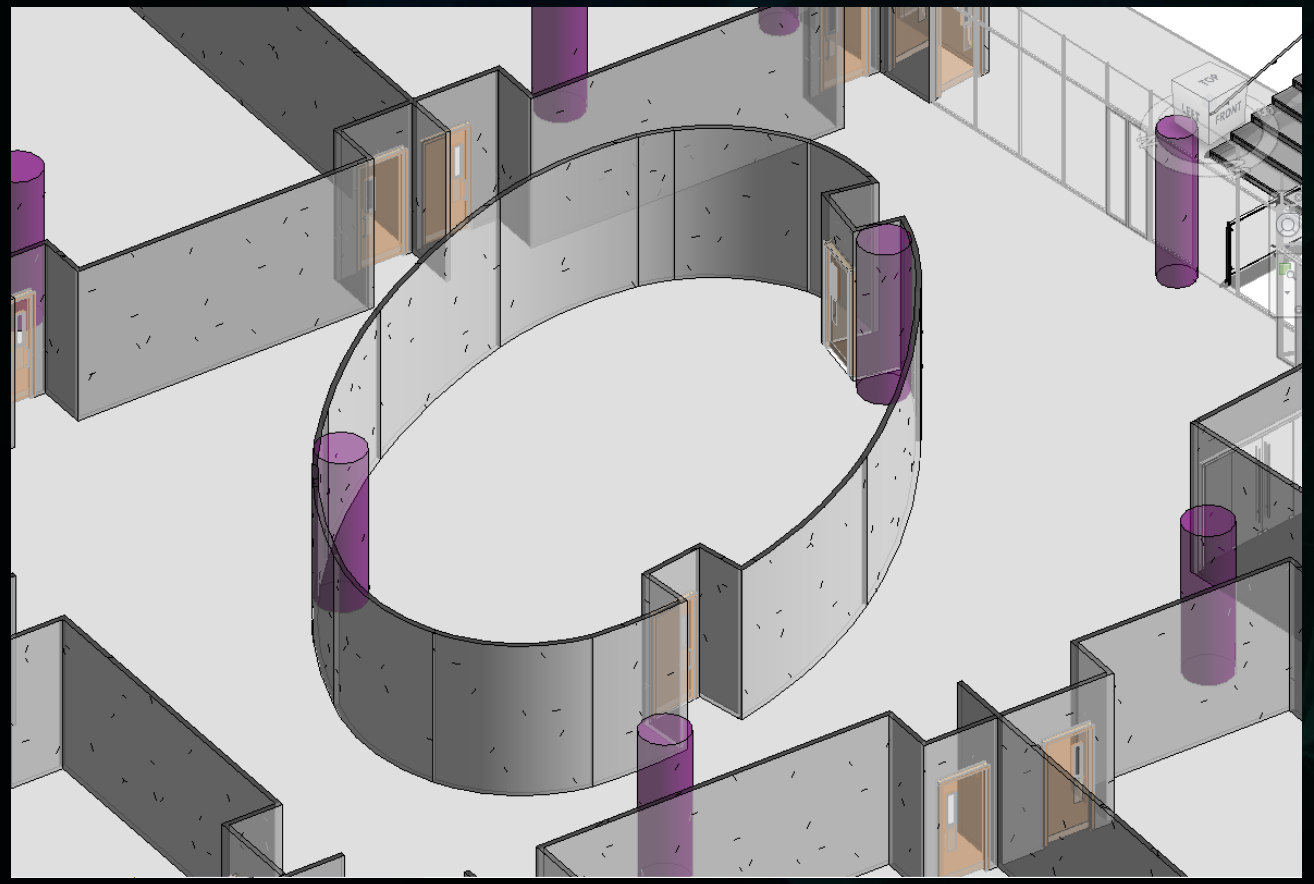


Creativity, Innovation & Technology

Architectural / Aesthetical / Environmental

Oval Shape Classroom

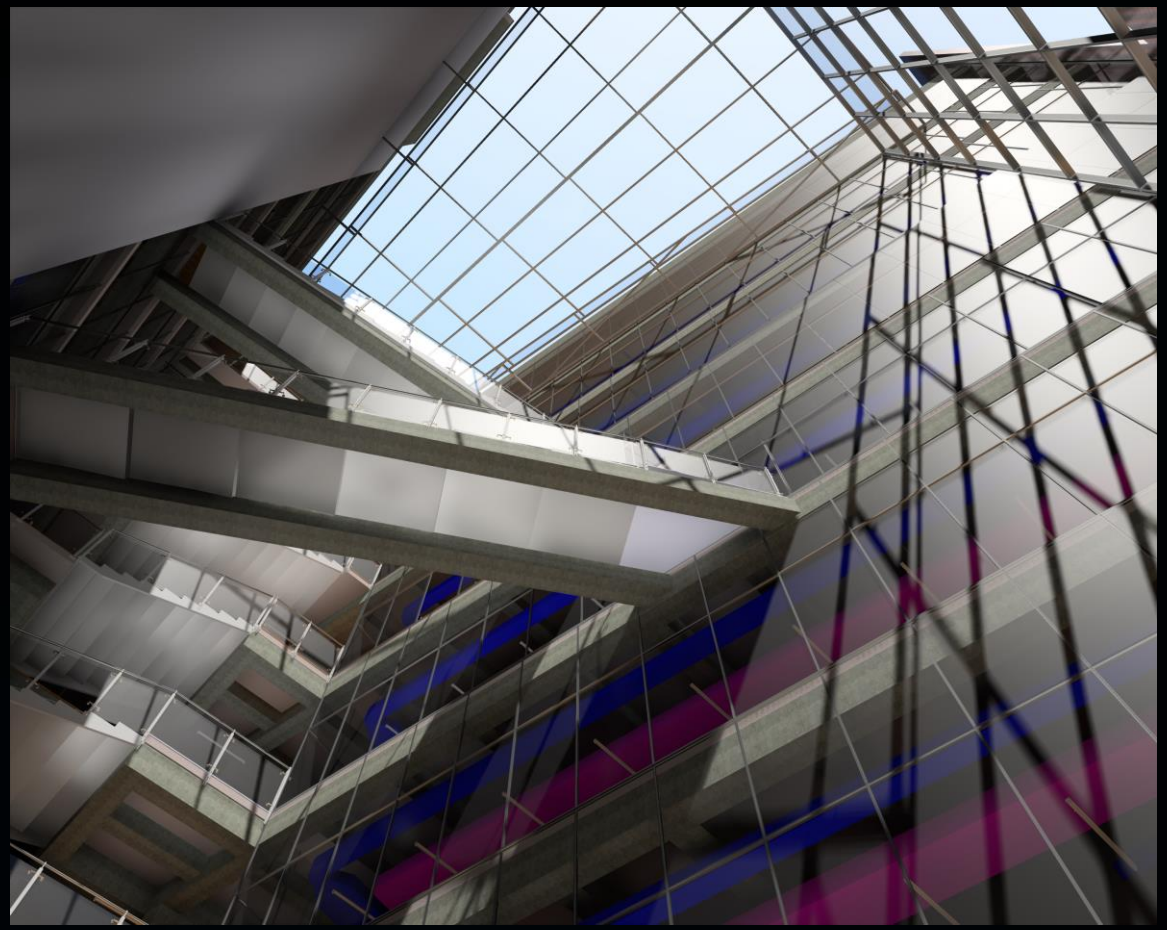


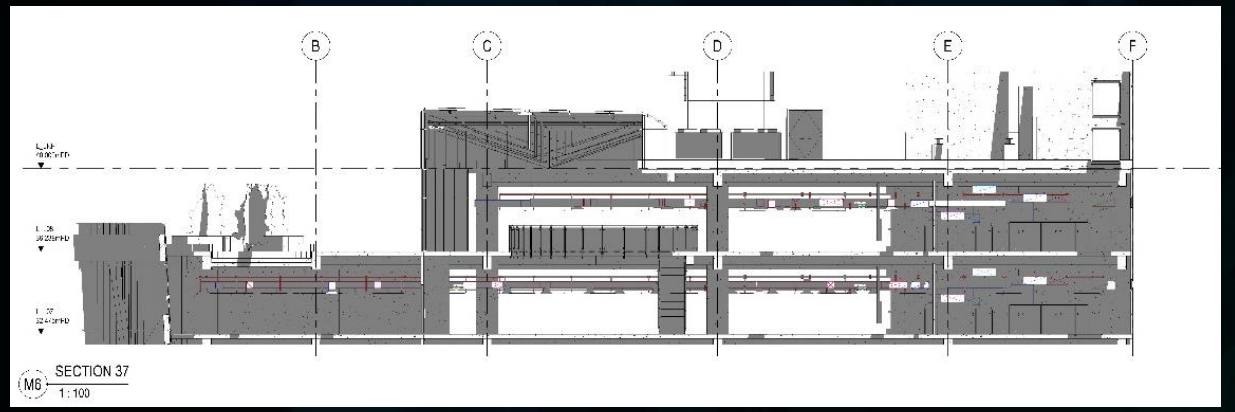


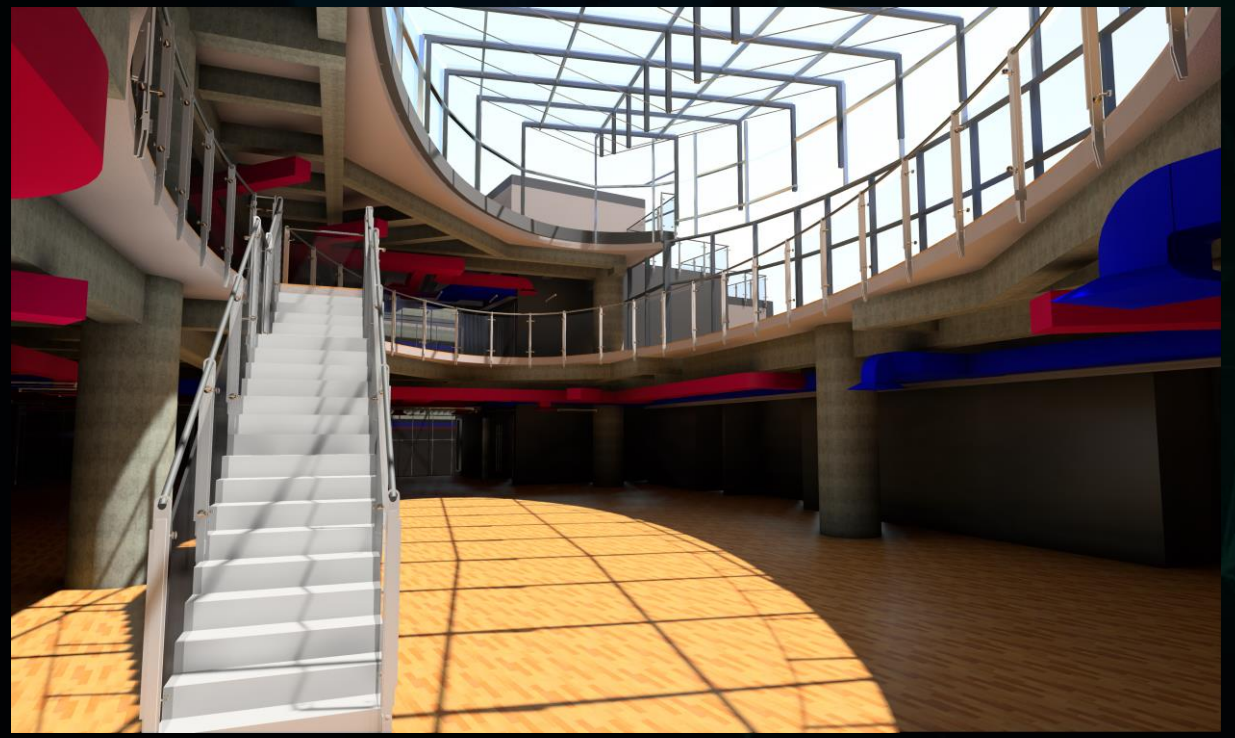
Creativity, Innovation & Technology

Architectural / Aesthetical / Environmental

Skylight



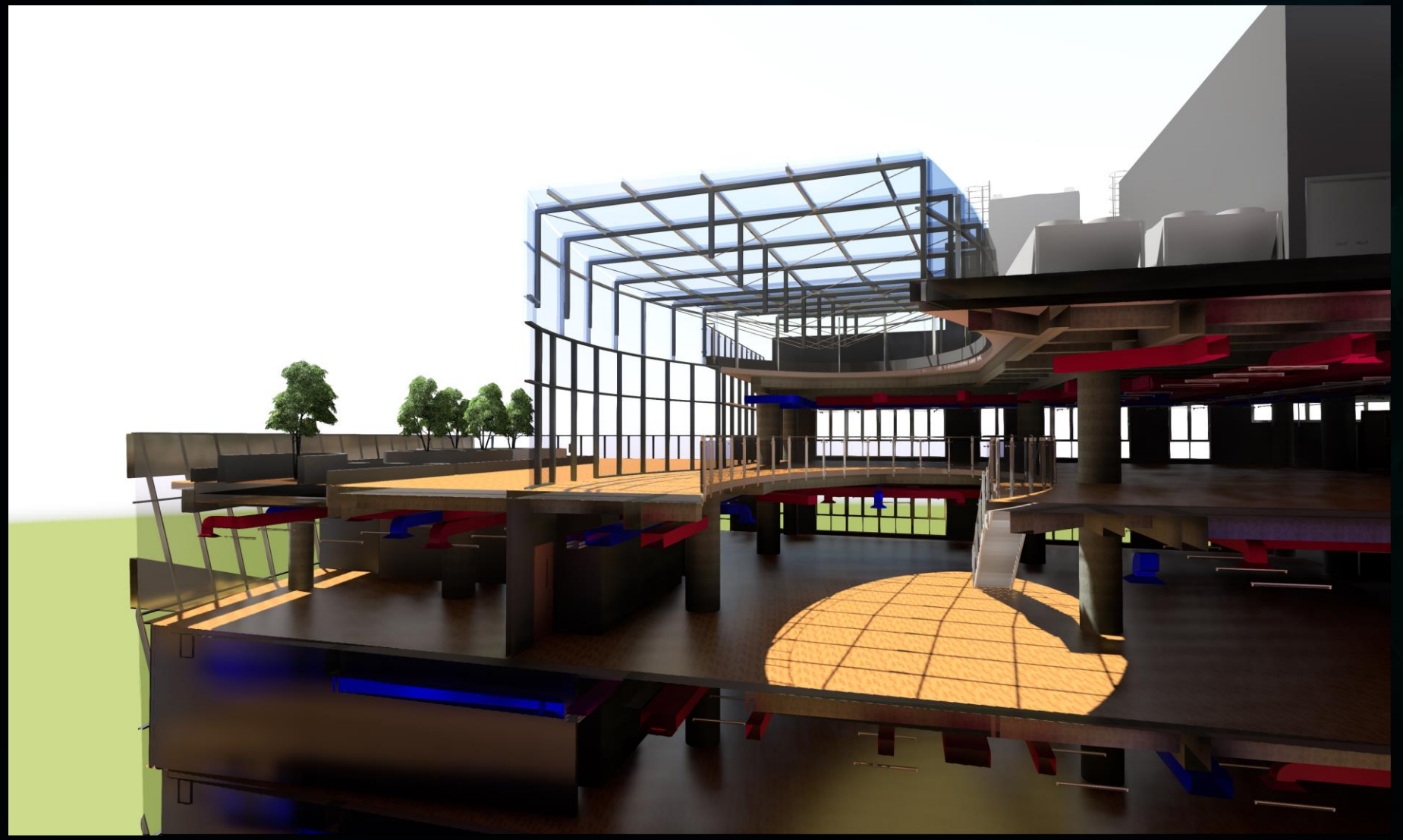




Creativity, Innovation & Technology

Architectural / Aesthetical / Environmental

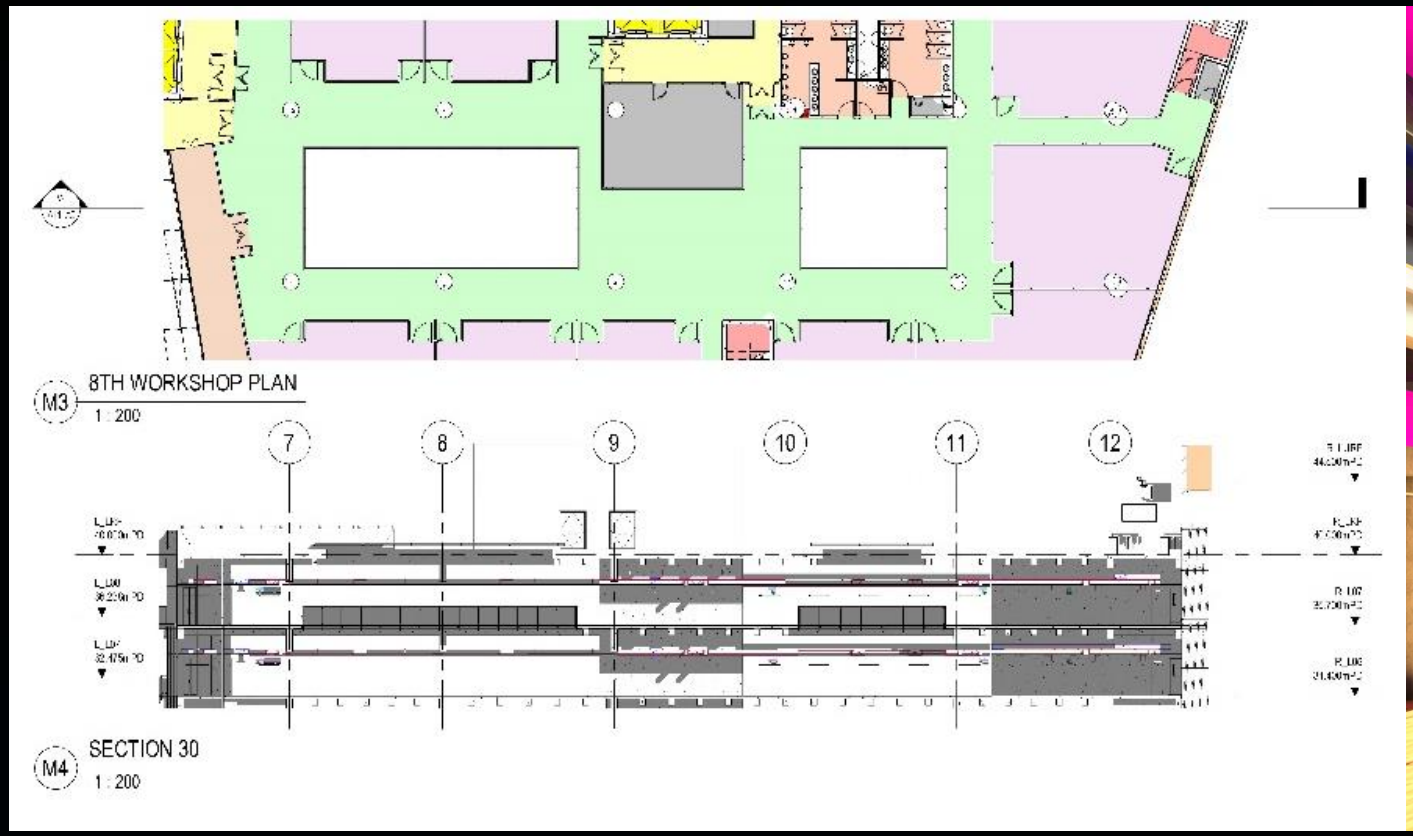
Roof Garden



Creativity, Innovation & Technology

Architectural / Aesthetical / Environmental

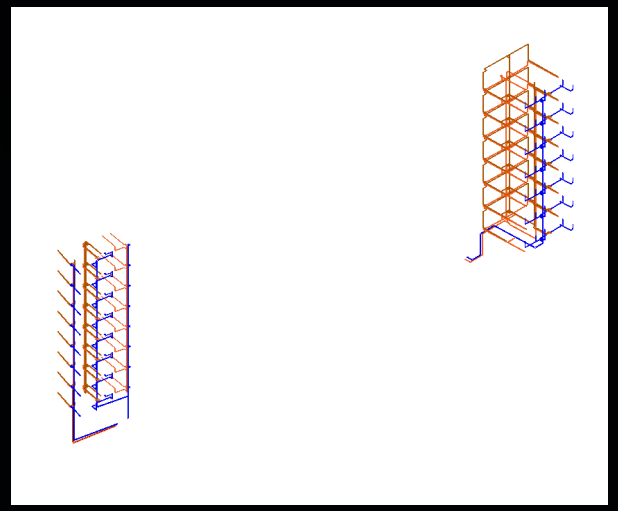
Workshop

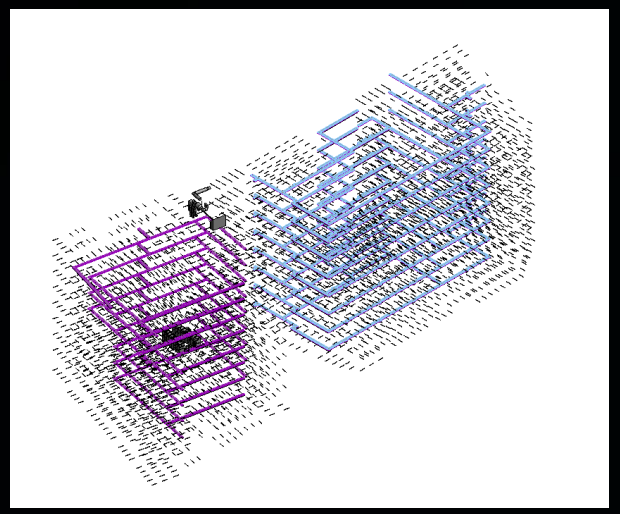


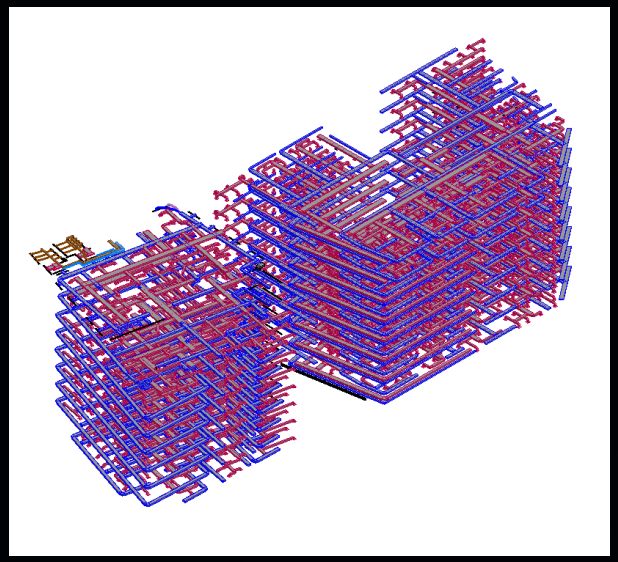
Creativity, Innovation & Technology

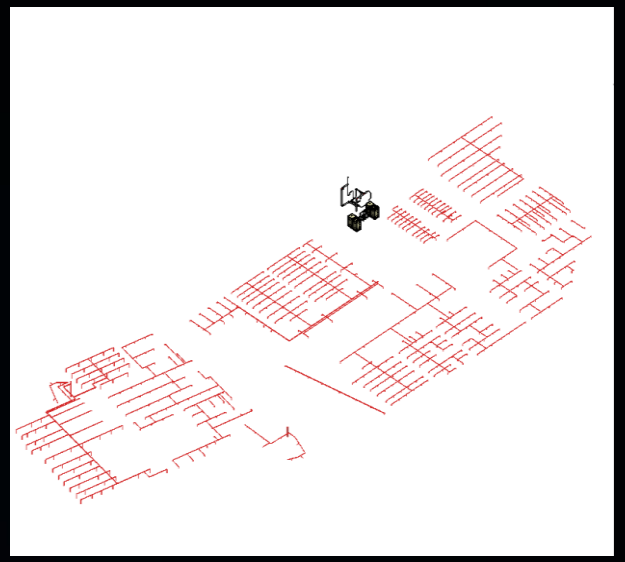
Engineering on Sustainability

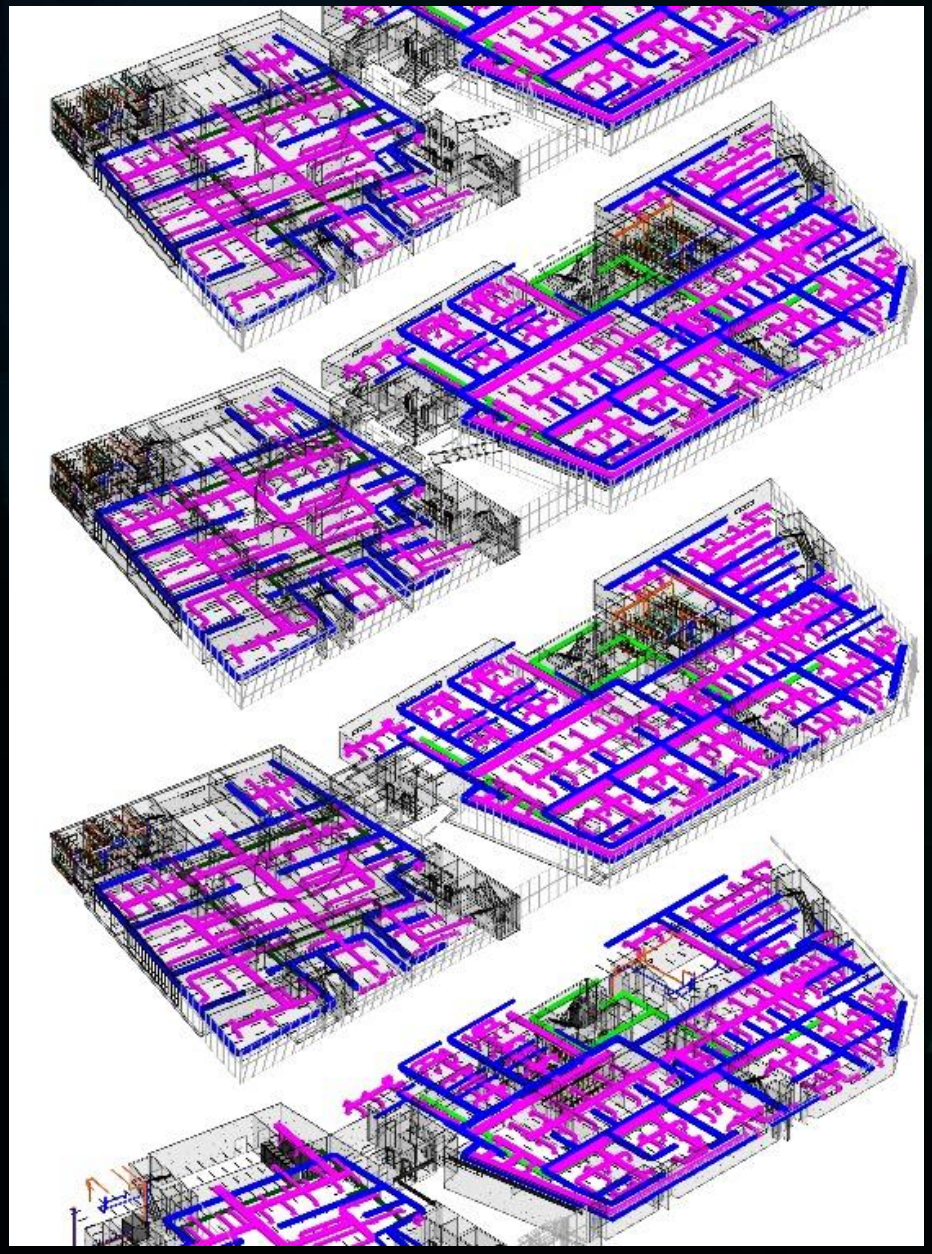
MEP Efficiency







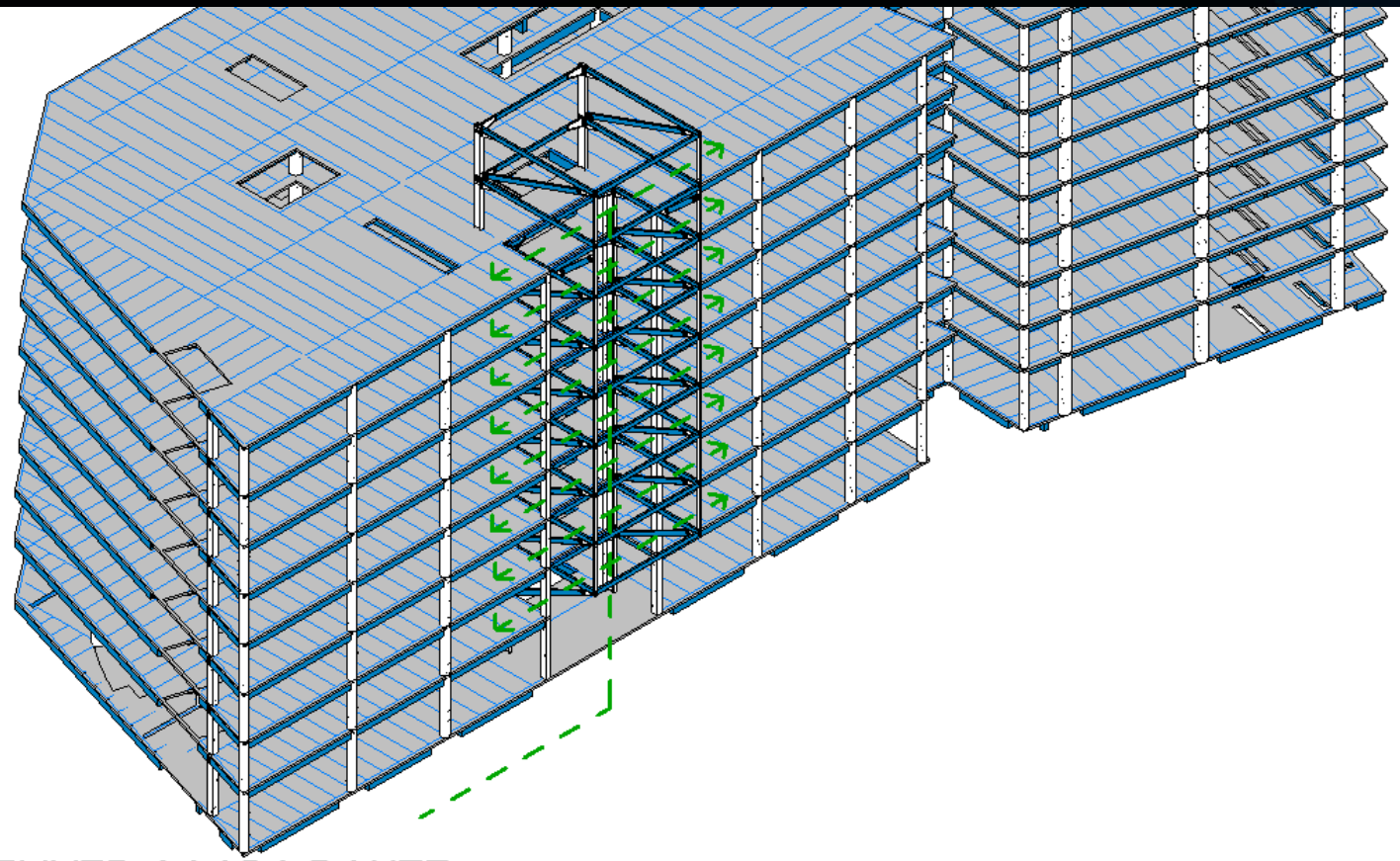




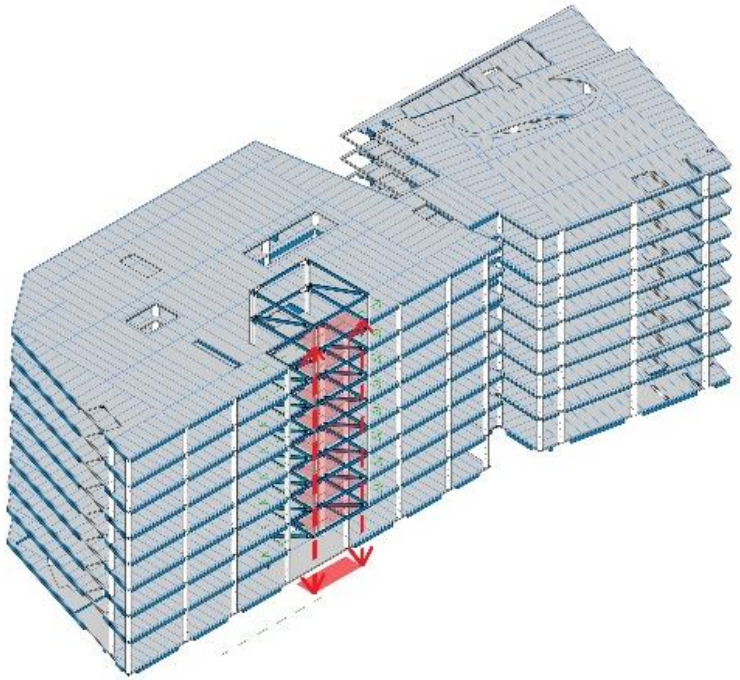
Creativity, Innovation & Technology

Construction

Lifting platform machine



M2 DELIVER GOODS ROUTE



Materials Vertical Transportation

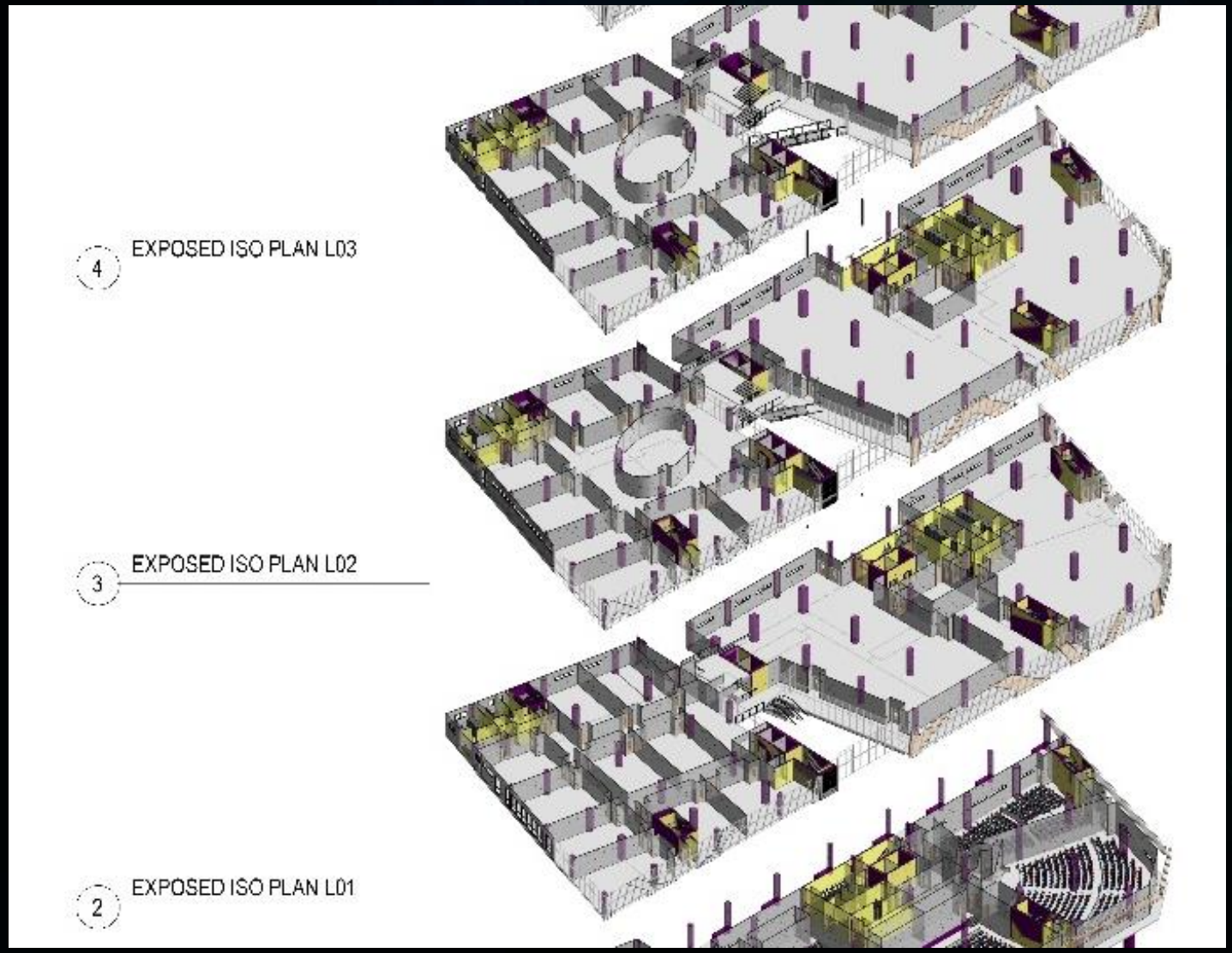
Since the Workshop will be used for different building materials, an external Steel Structure with Lifting Platform Machine can be served for vertial transporation.

It is placed on the back of the building facade.

Creativity, Innovation & Technology

Construction

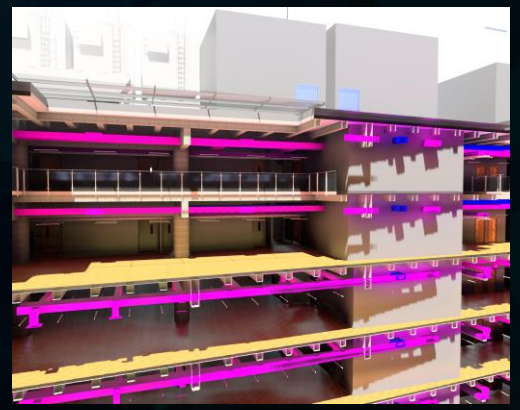
Modularisation

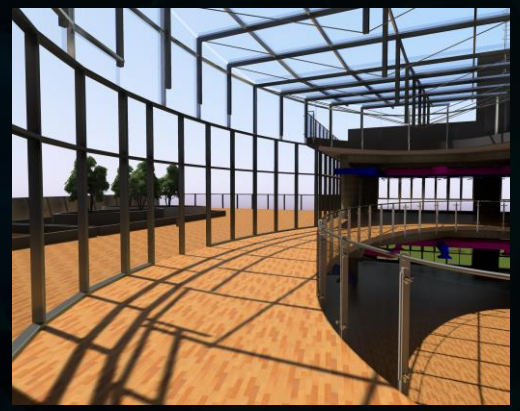


Closing

Learning Outcome:

- Building Information modelling is undoubtedly a powerful tool for improving productivity in construction industry. Yet, not dissimilar to any other kind of technologies and knowledge, there are nothing perfect and “one-size-fit-all” solution. There are always room for improvement on how things being done.
- On the other hand, no matter how such technology offers any brilliant solutions to problems, it is nothing until it is put into action.
- This competition entry tried to demonstrate a holistic approach and suggest how a typical BIM workflow put into practical usage. It would not be perfect solution, but hopefully this entry could proof the general usage of BIM could improve the design and construction quality to certain extent.
- One thing to have learnt and put to note is that, BIM is a process that facilitate the design and construction process, not the design process itself. A proficient BIMer does not necessarily mean one is a good designer. From the process, it is believed that the best way for BIM implementation is to enable designers with the BIM knowledge and mindset





Acknowledgement

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