



# Building Information Modelling

An Architect's Experience of how the Efficiency, Accuracy and Productivity in Building Design are integrated

BIM Application





# DESIGN

INTER-DISCIPLINARY COLLABORATION

PRESENTATION AND COMMUNICATION

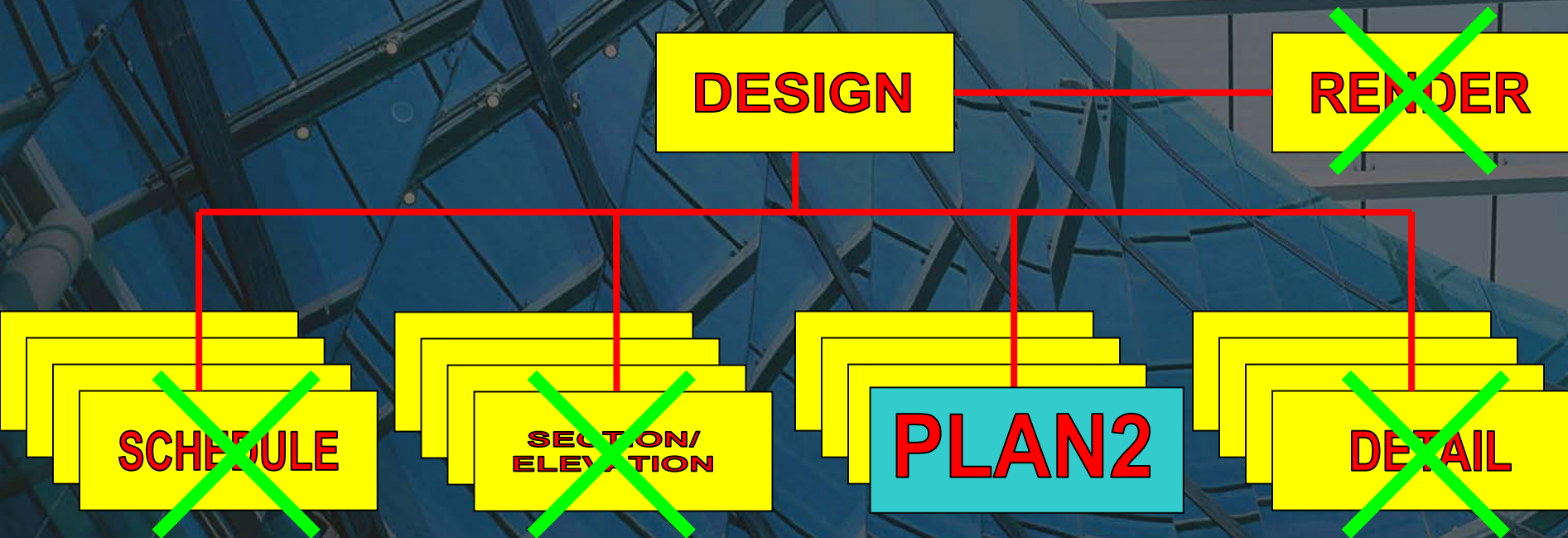
STATUTORY SUBMISSION

DOCUMENTATION

PROJECT MANAGEMENT

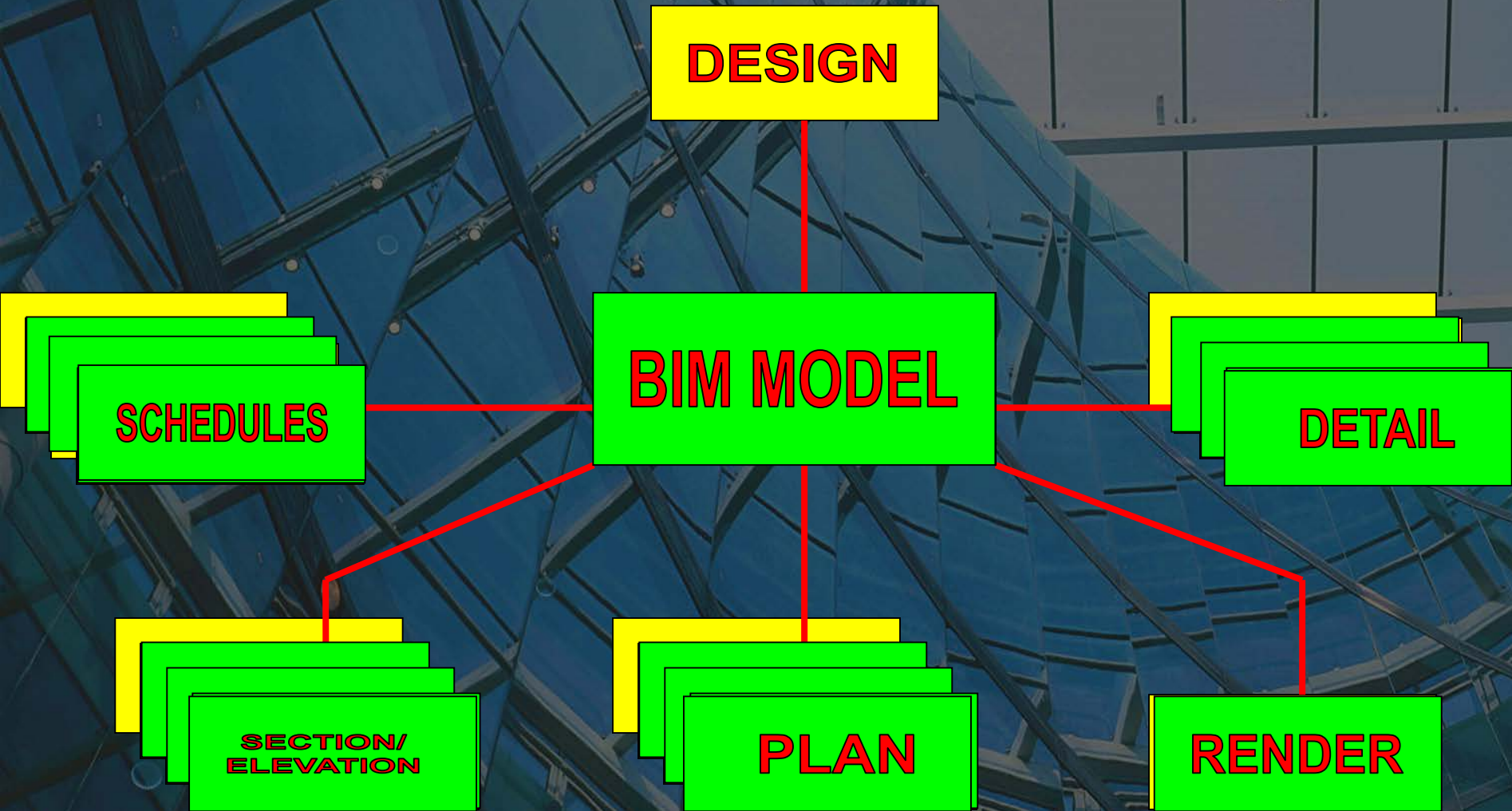
FACILITY MANAGEMENT

# EXISTING DESIGN AND DRAWING PRACTICE

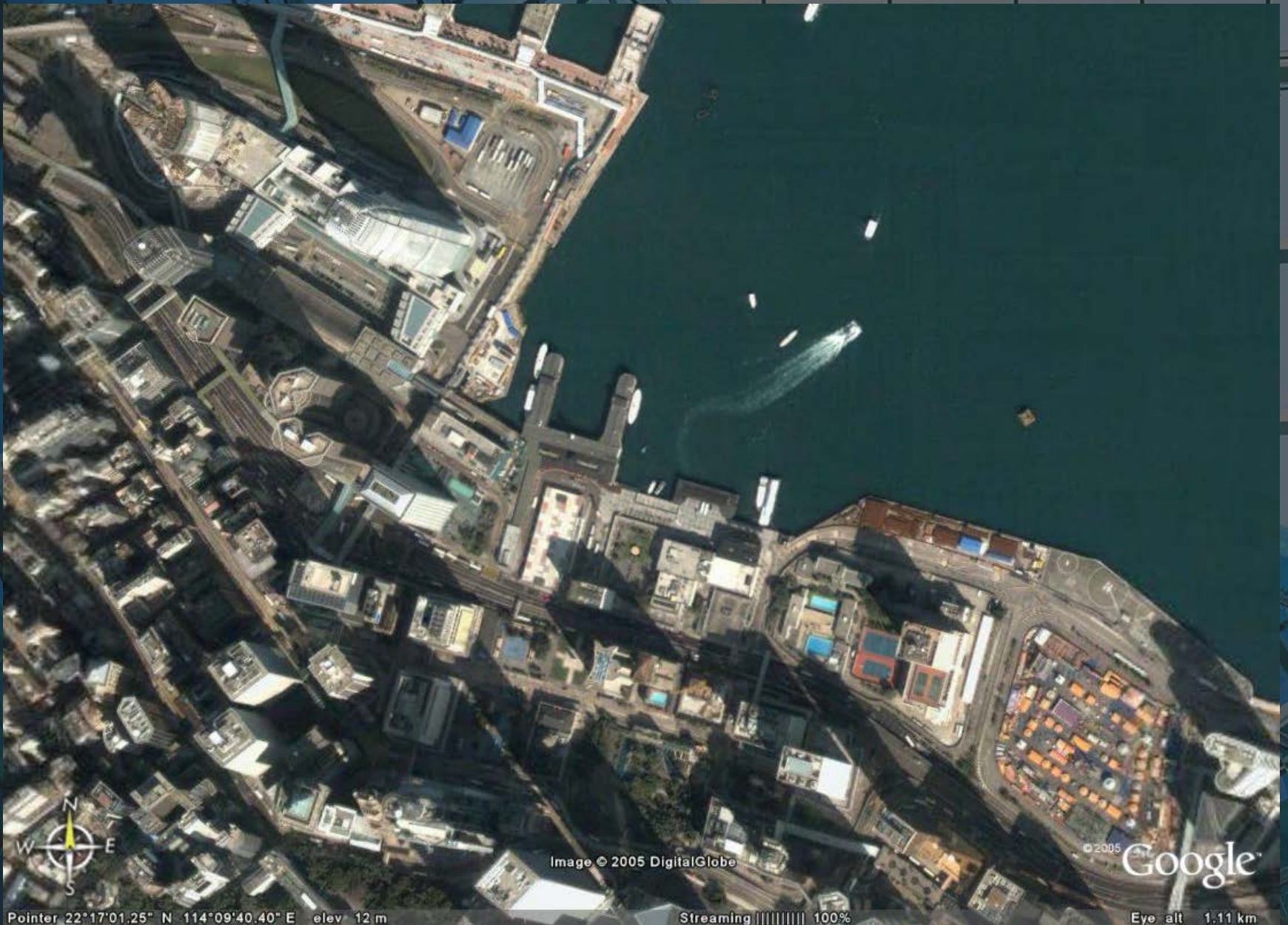




# BIM DESIGN AND DRAWING PROCESS







Pointer 22°17'01.25" N 114°09'40.40" E elev 12 m

Image © 2005 DigitalGlobe

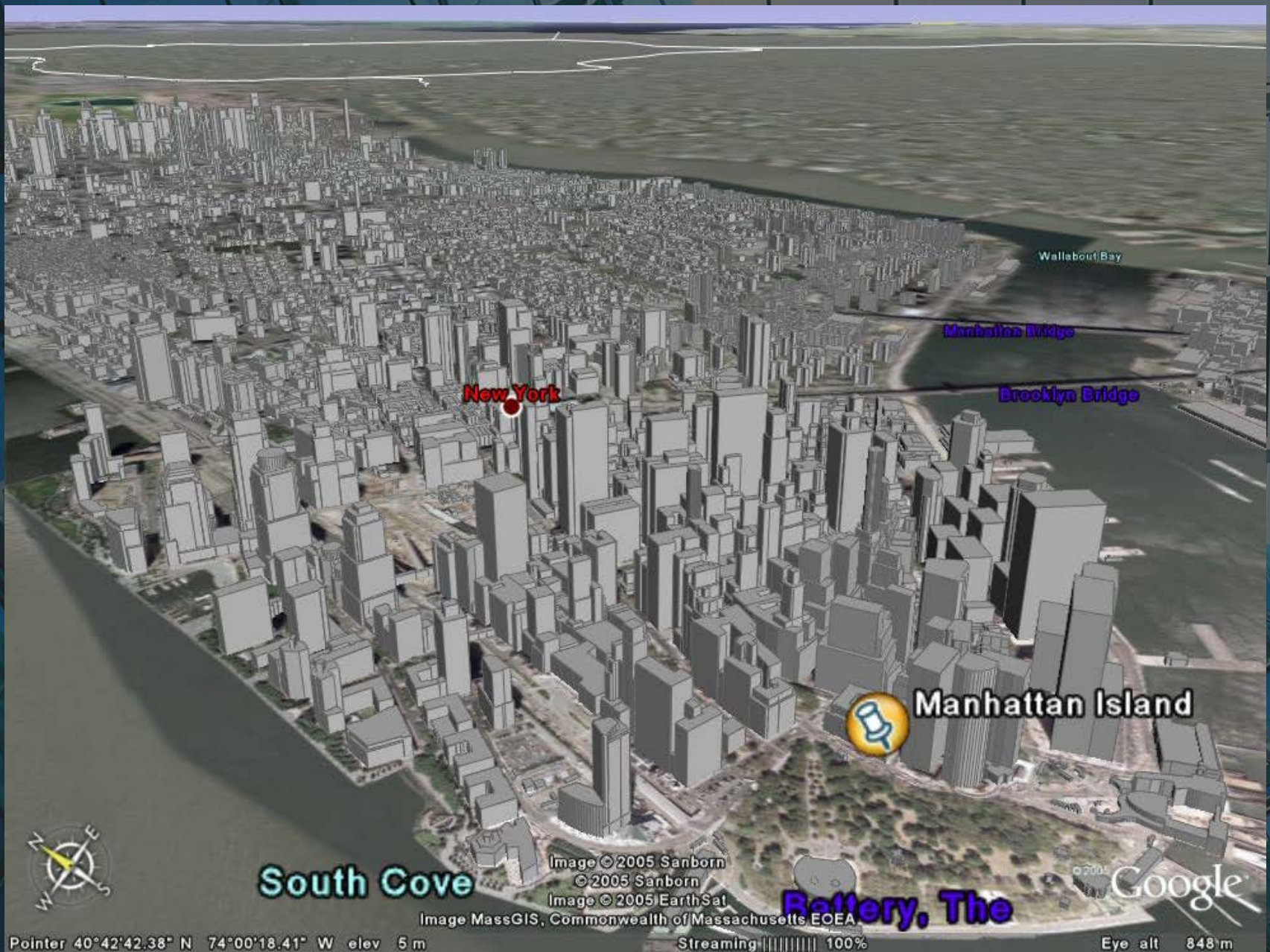
Streaming ||||| 100%

Eye alt 1.11 km

BIM Application

**SITE**

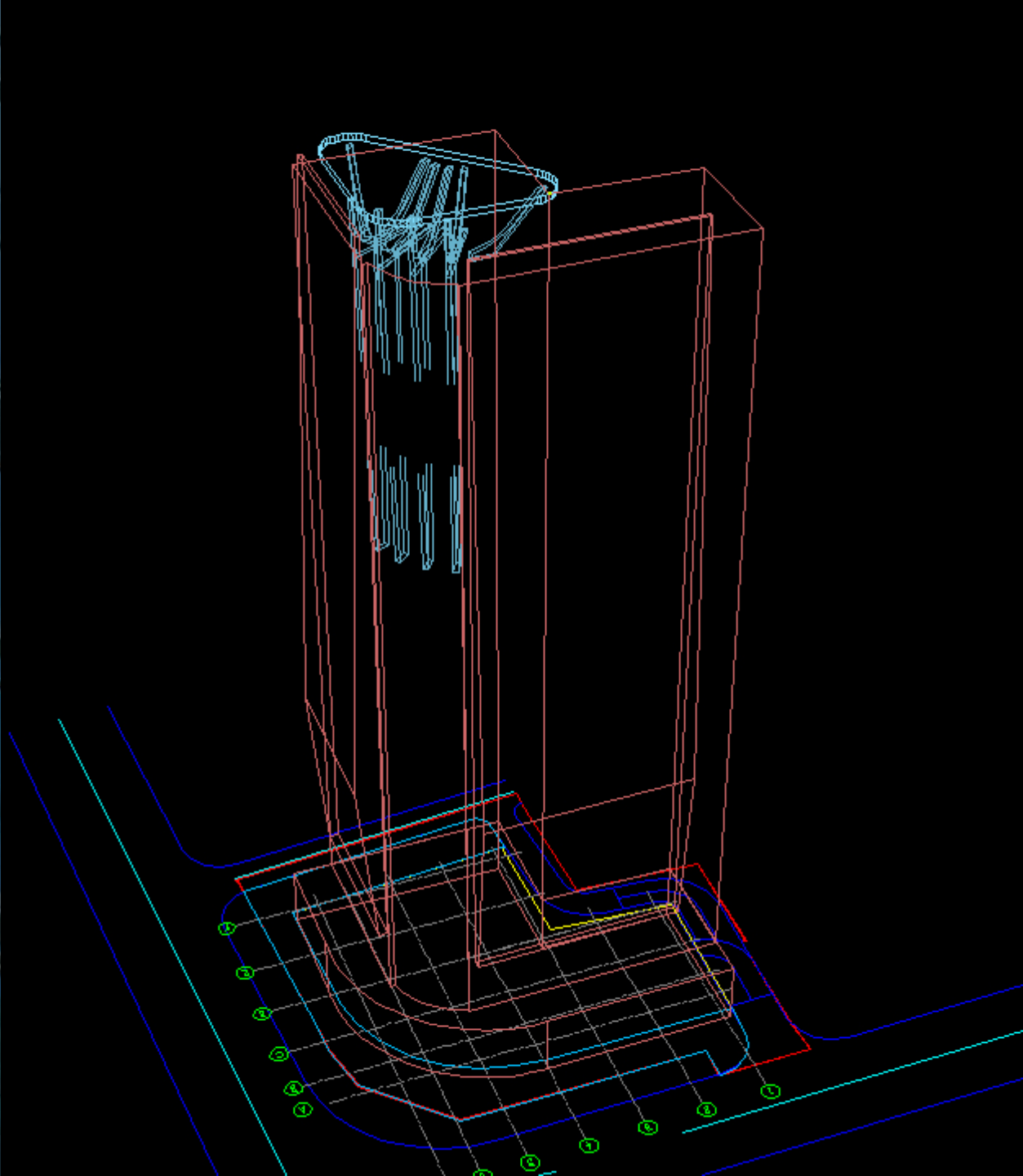






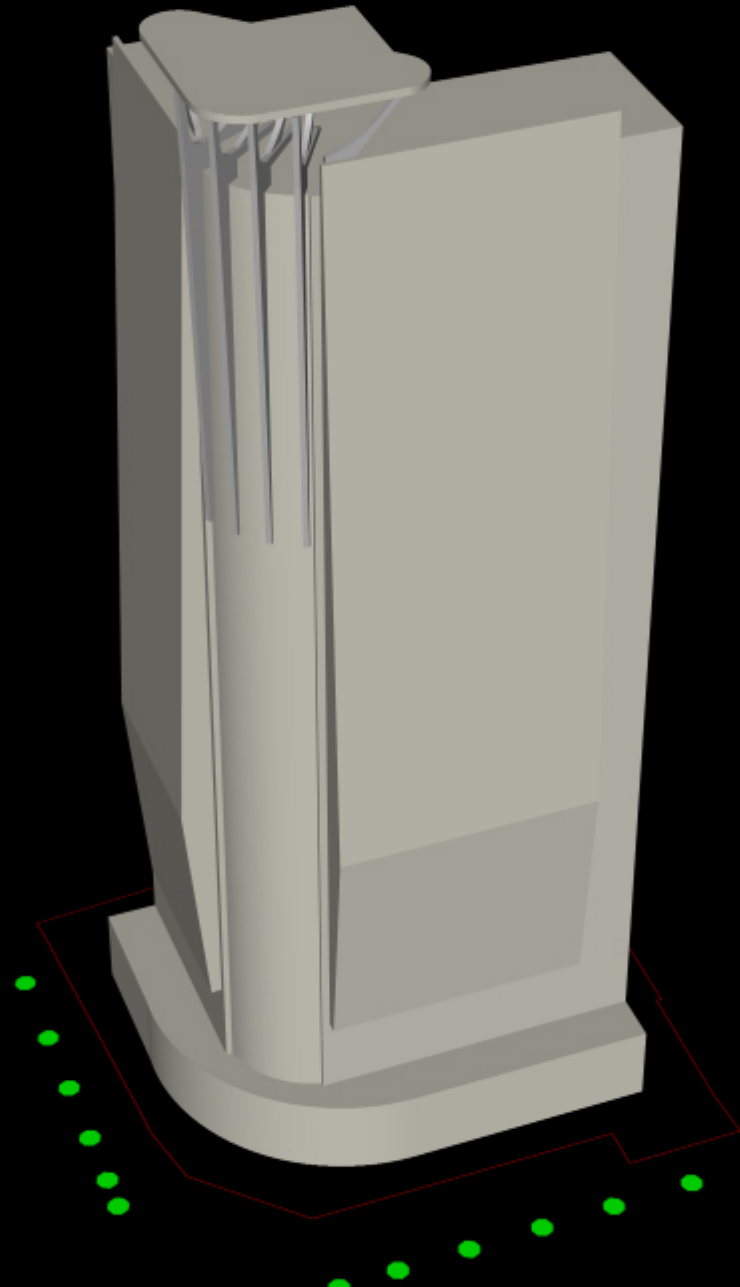
# BIM MODEL

BIM Application



# BIM MODEL

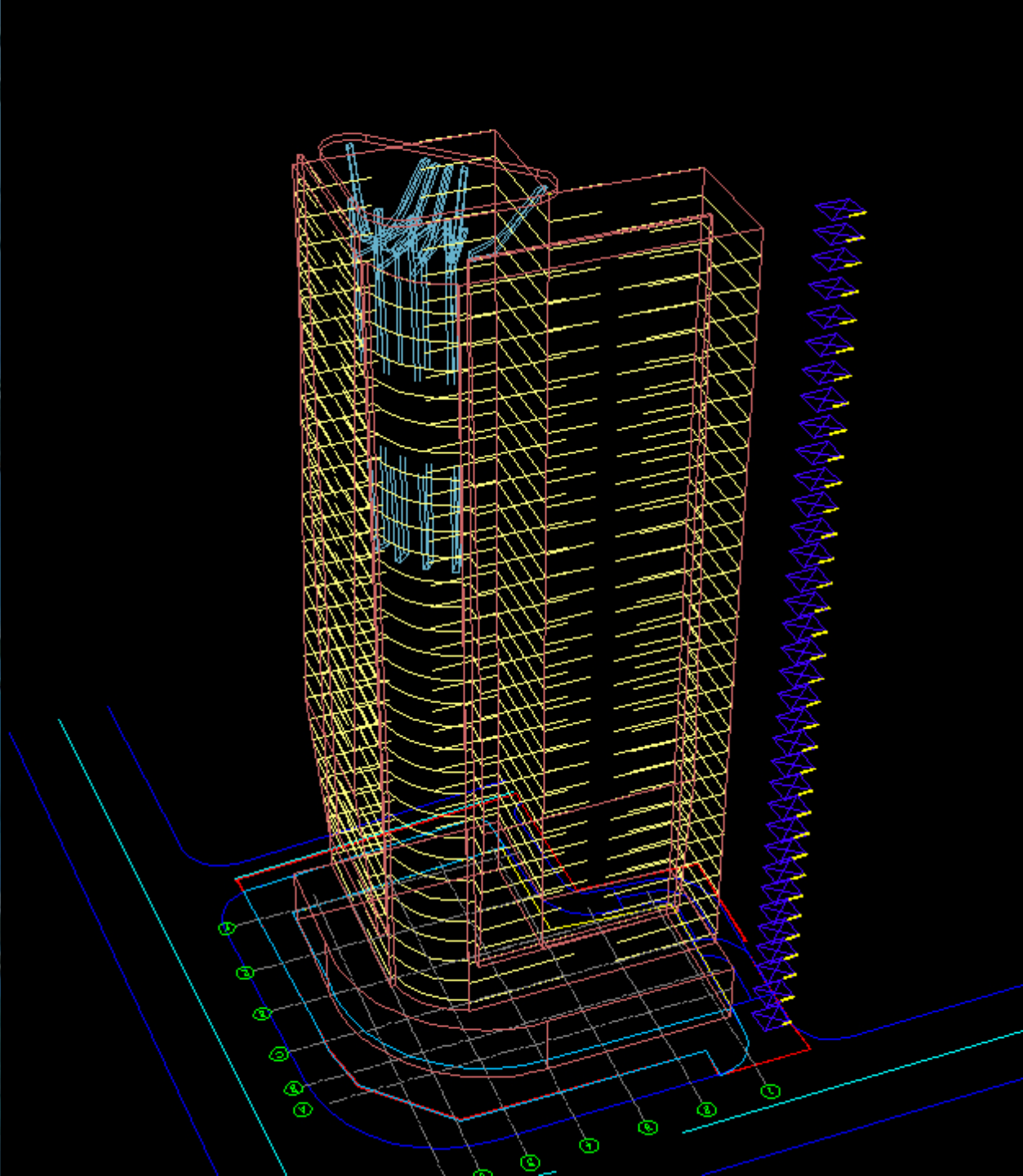
BIM Application





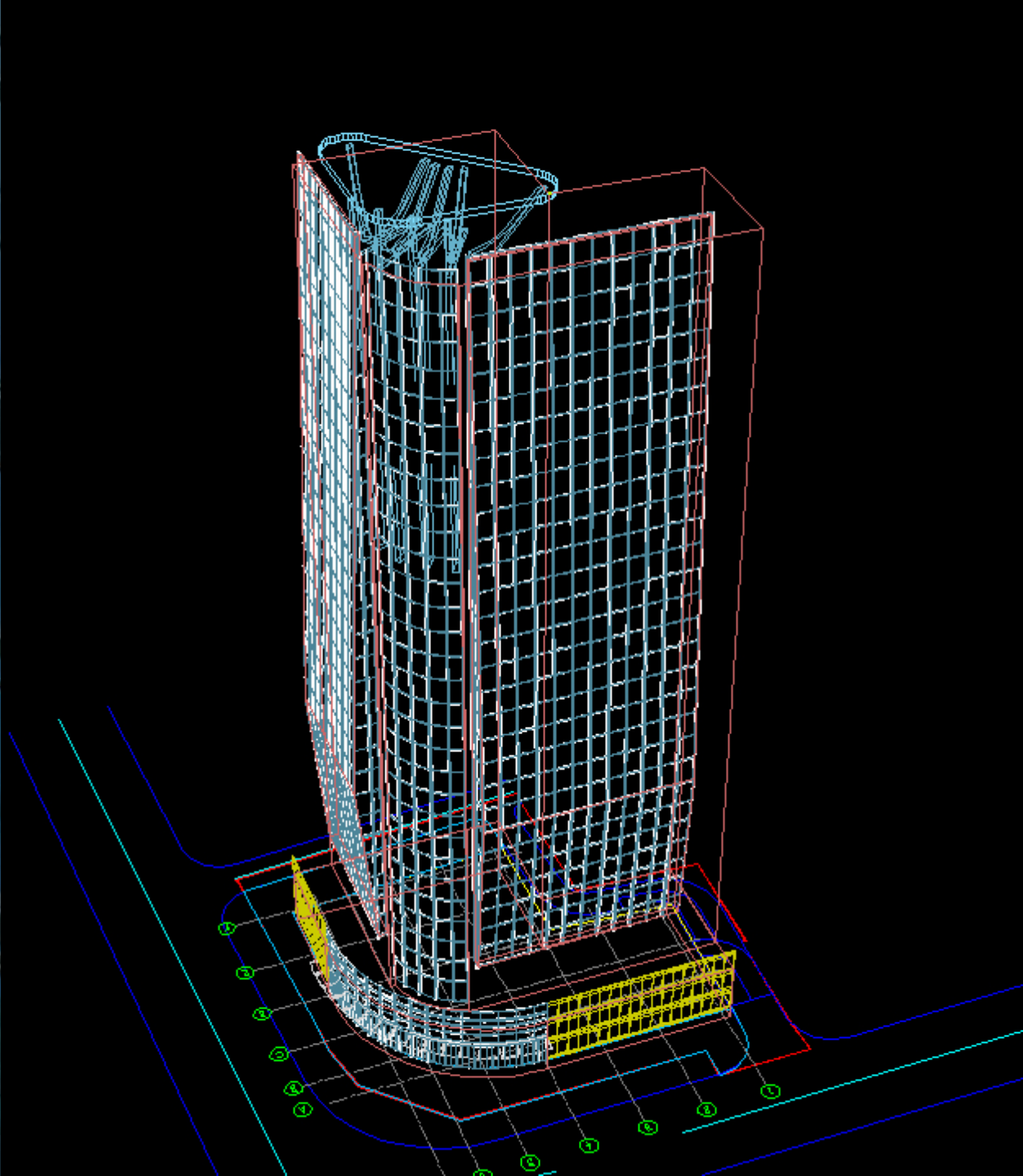
# BIM MODEL

BIM Application



# BIM MODEL

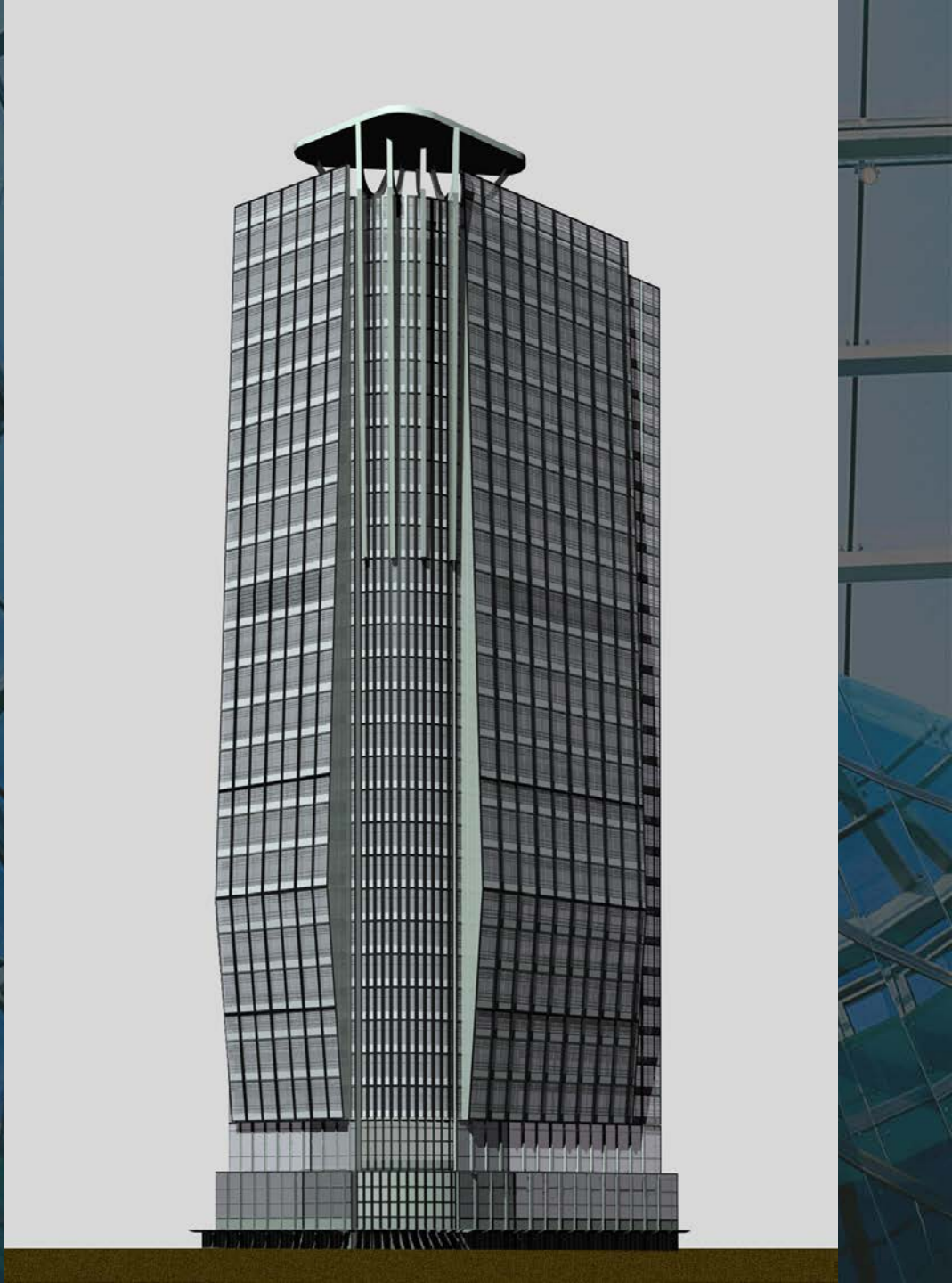
BIM Application

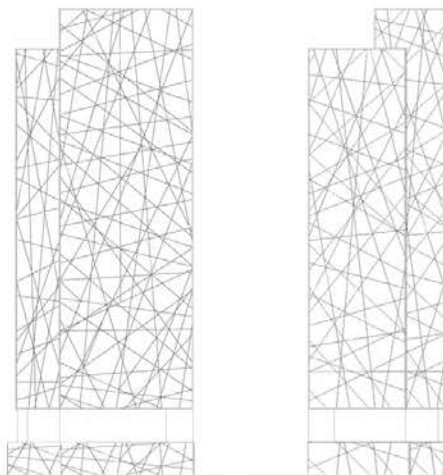
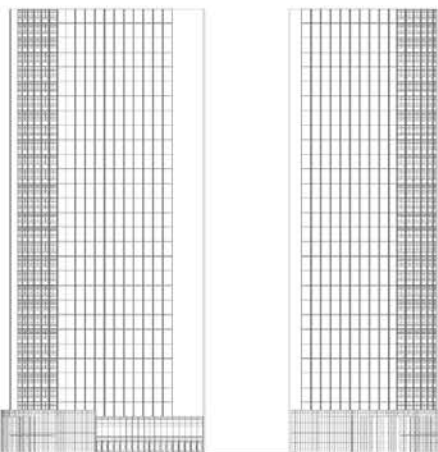
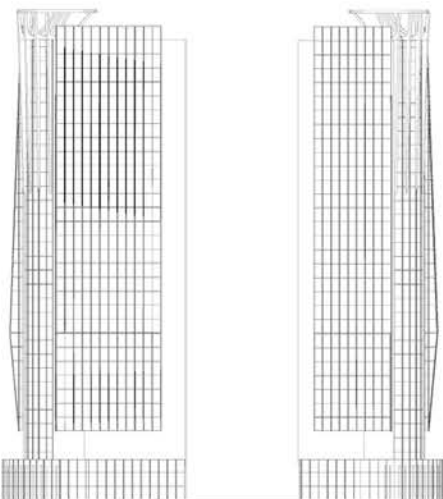
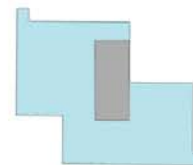
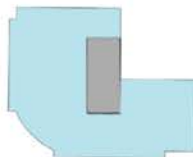
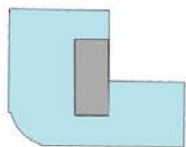
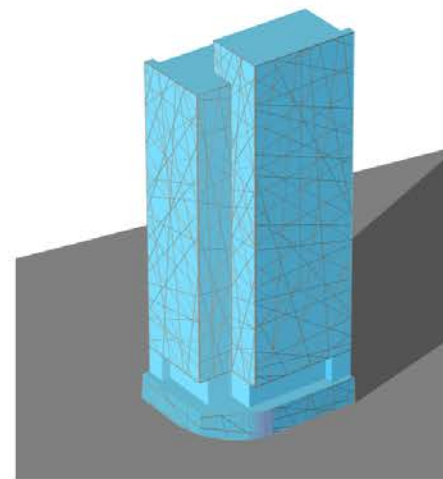
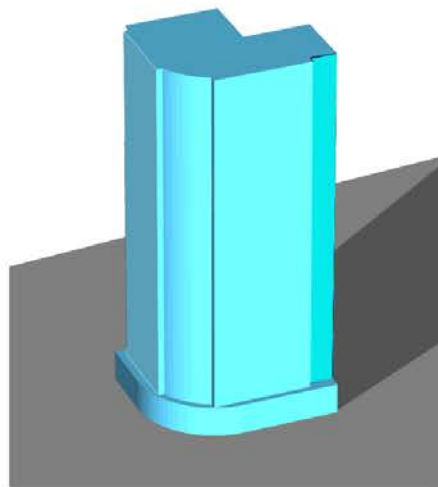
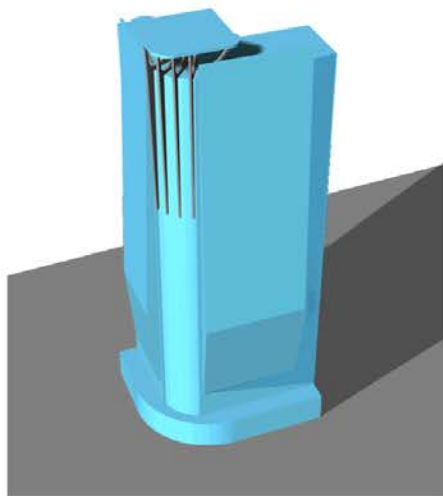






BIM Application



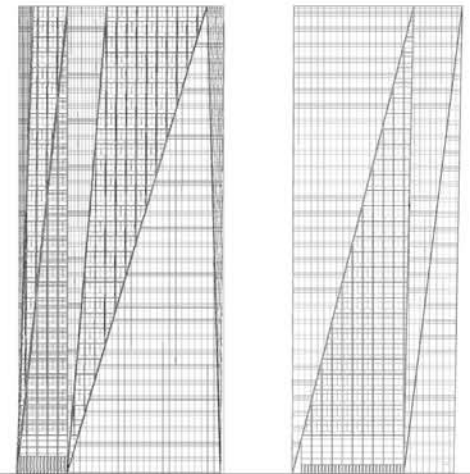
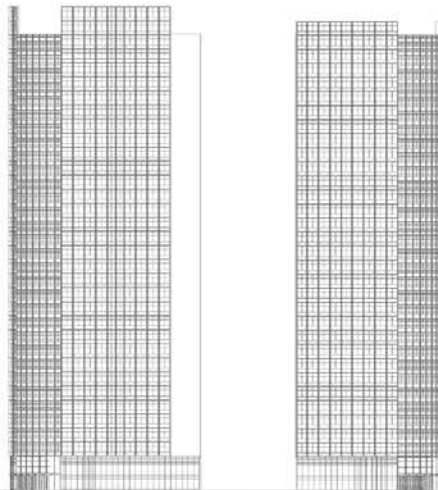
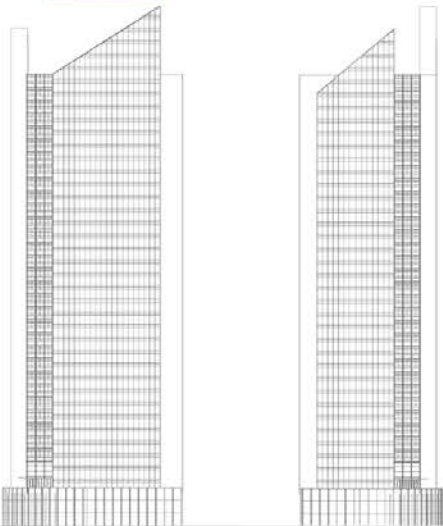
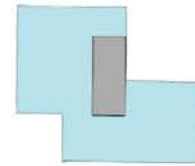
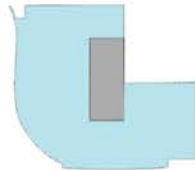
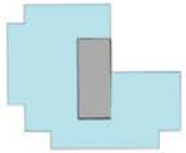
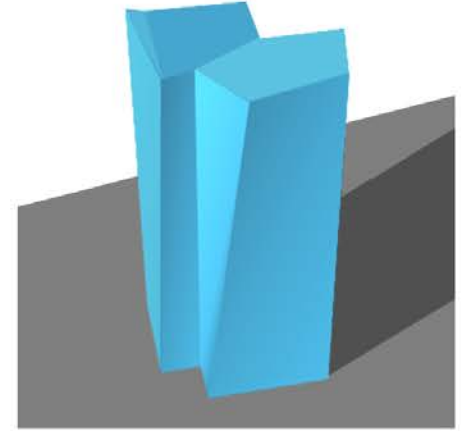
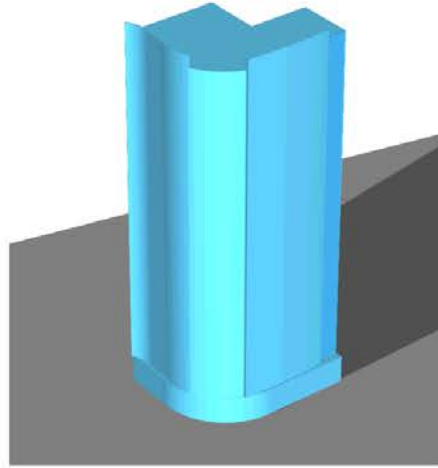
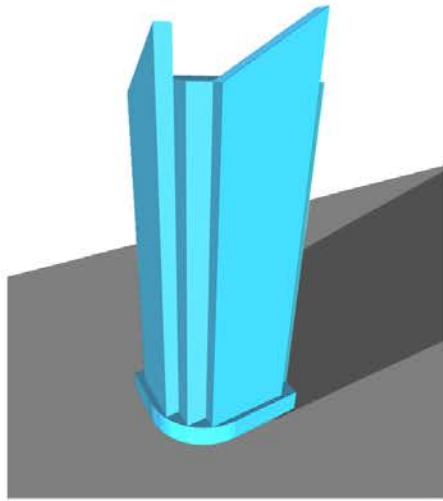


09. 2005

OPTIONS







09. 2005

OPTIONS



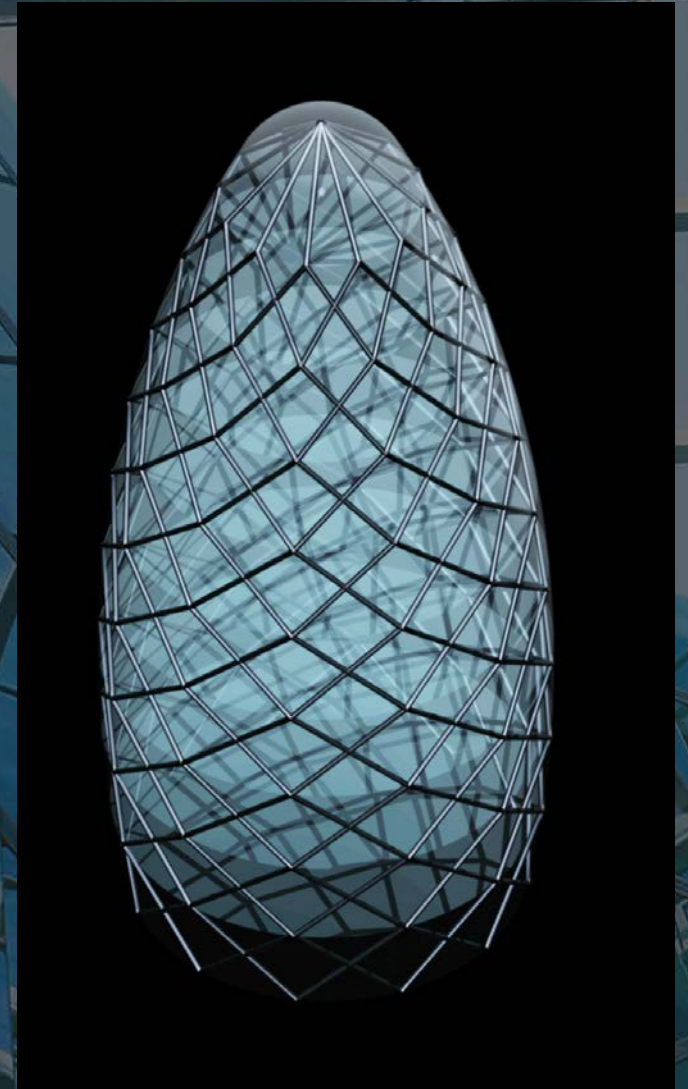


BIM Application



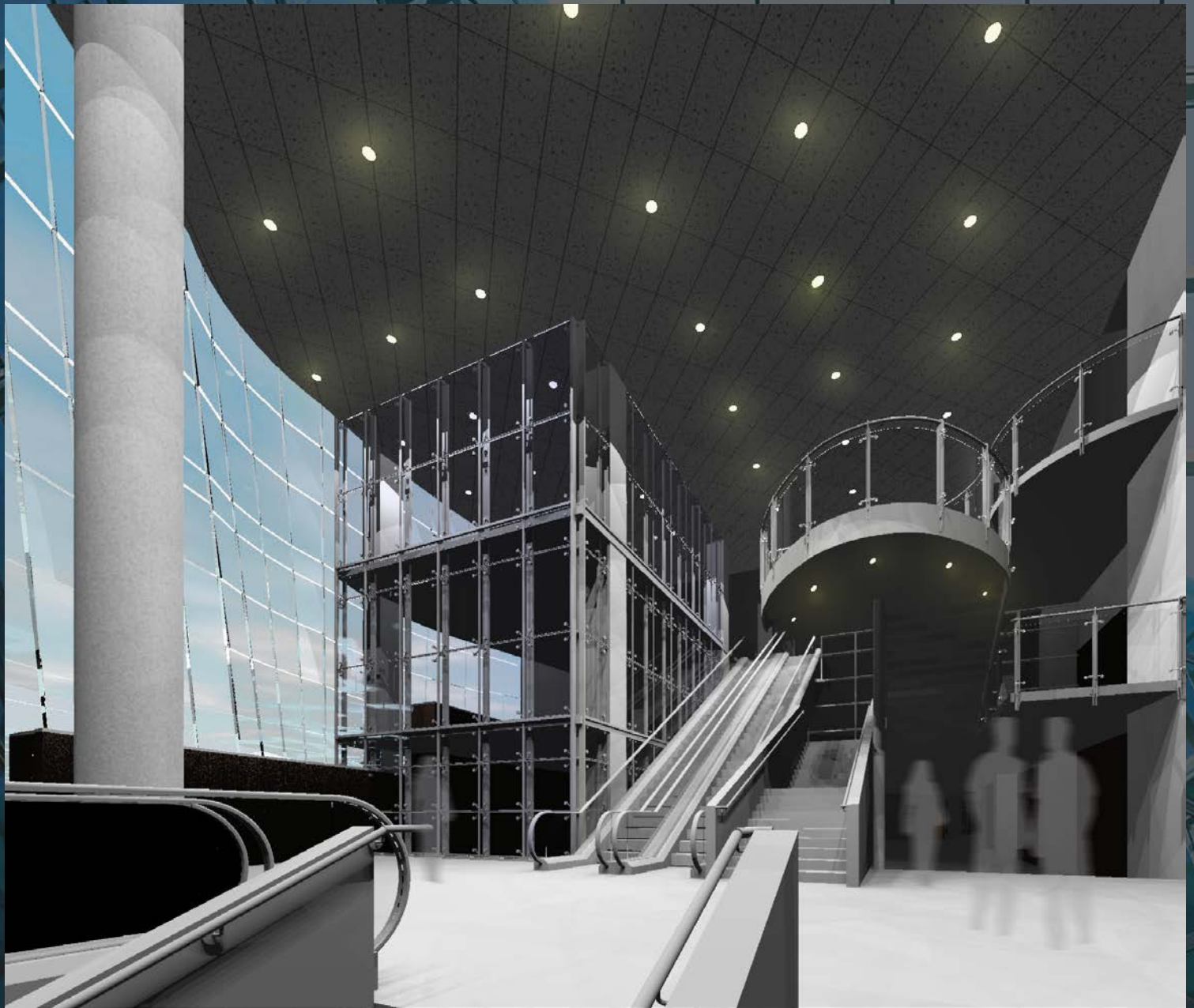


BIM Application



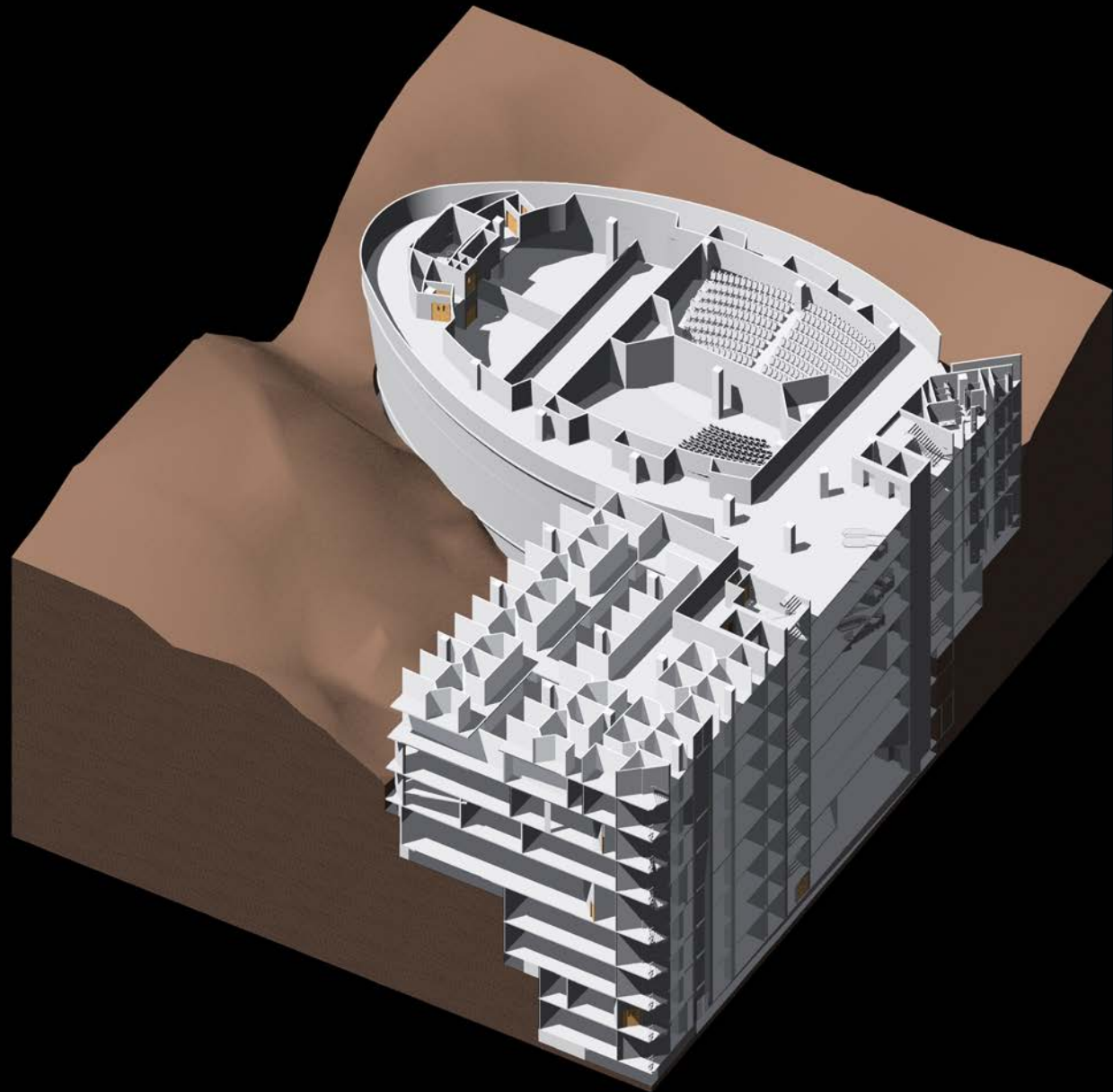
**COMPLEX FORMS**





BIM Application

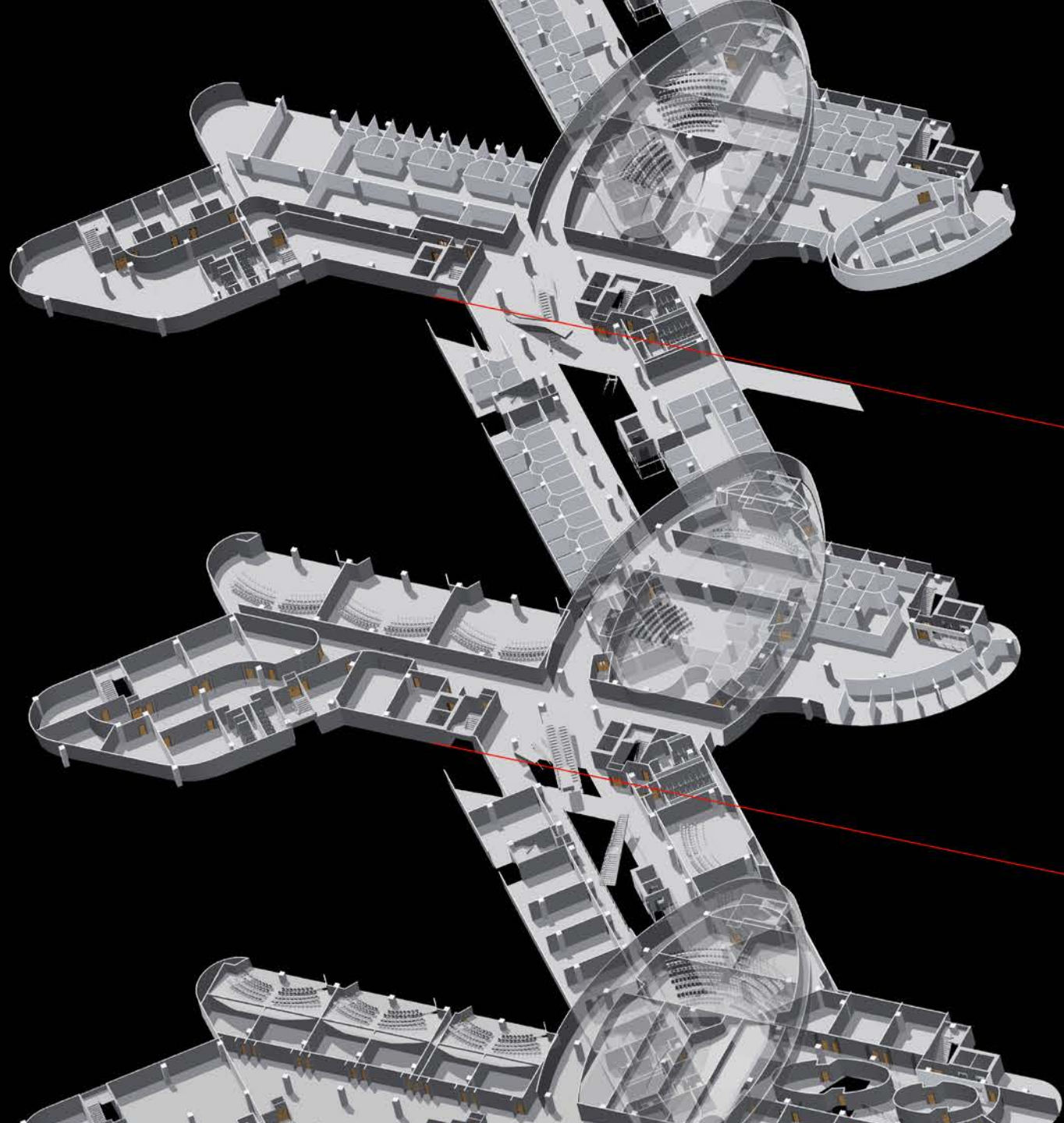




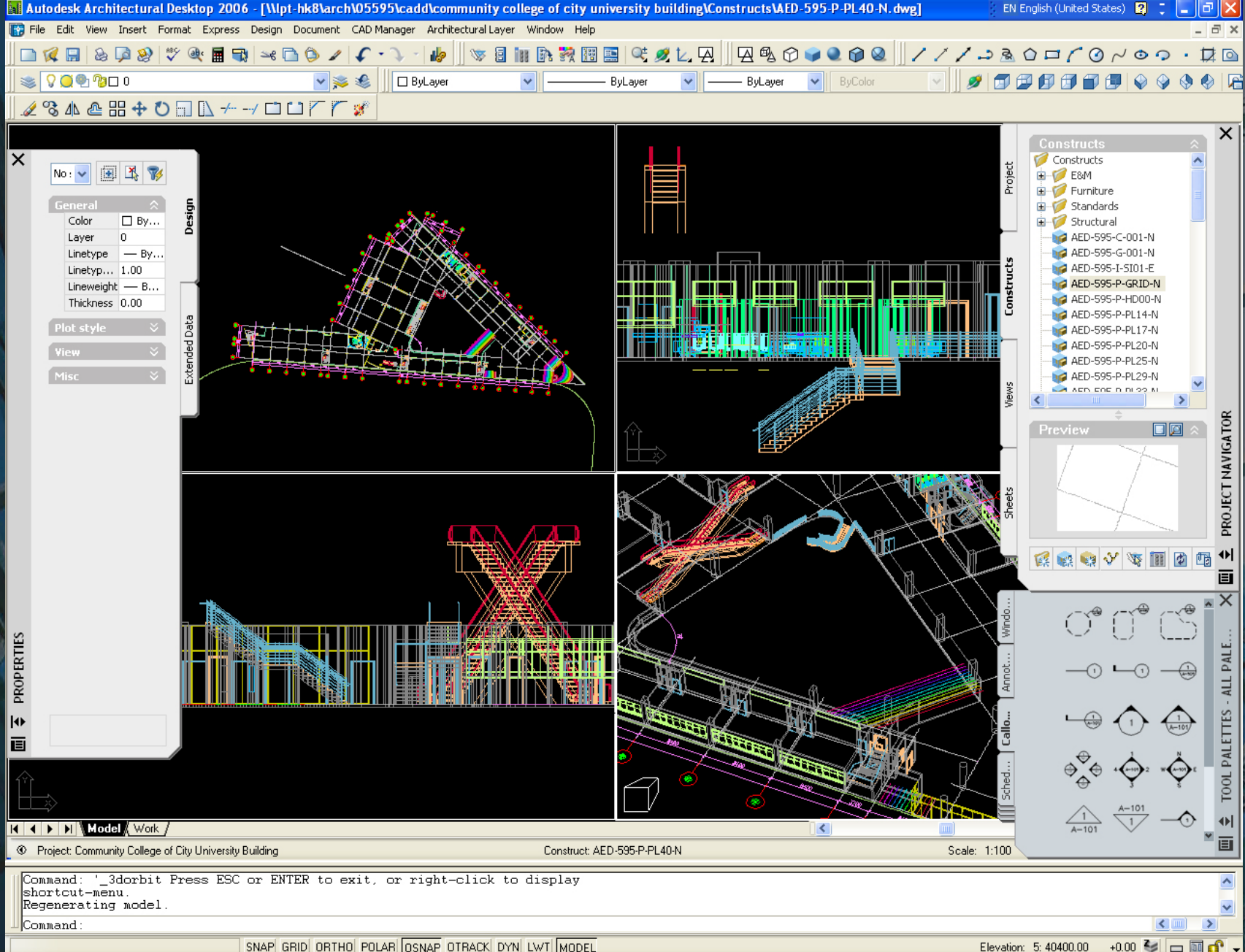
SIXTH FLOOR

FIFTH FLOOR

FOURTH FLOOR

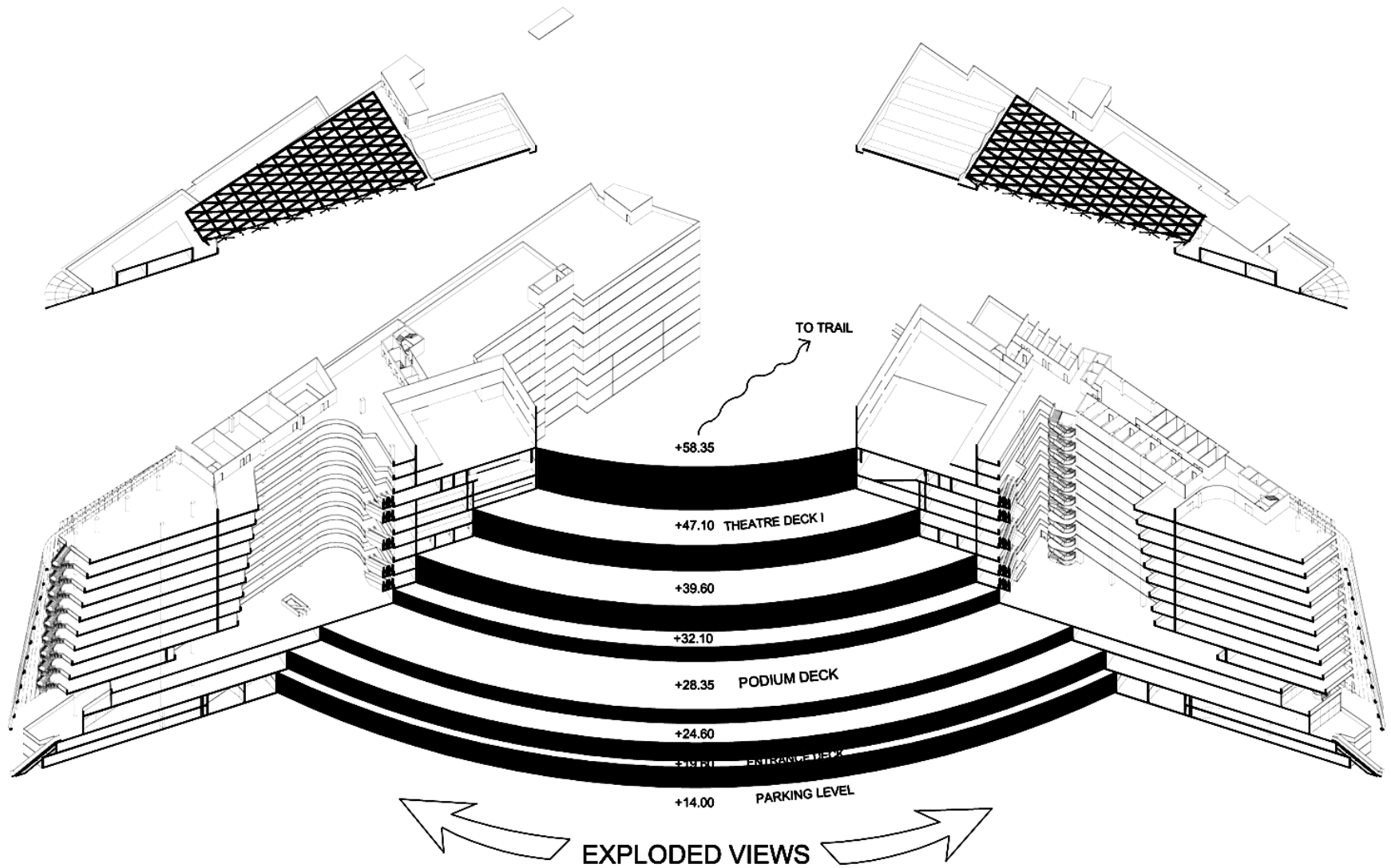




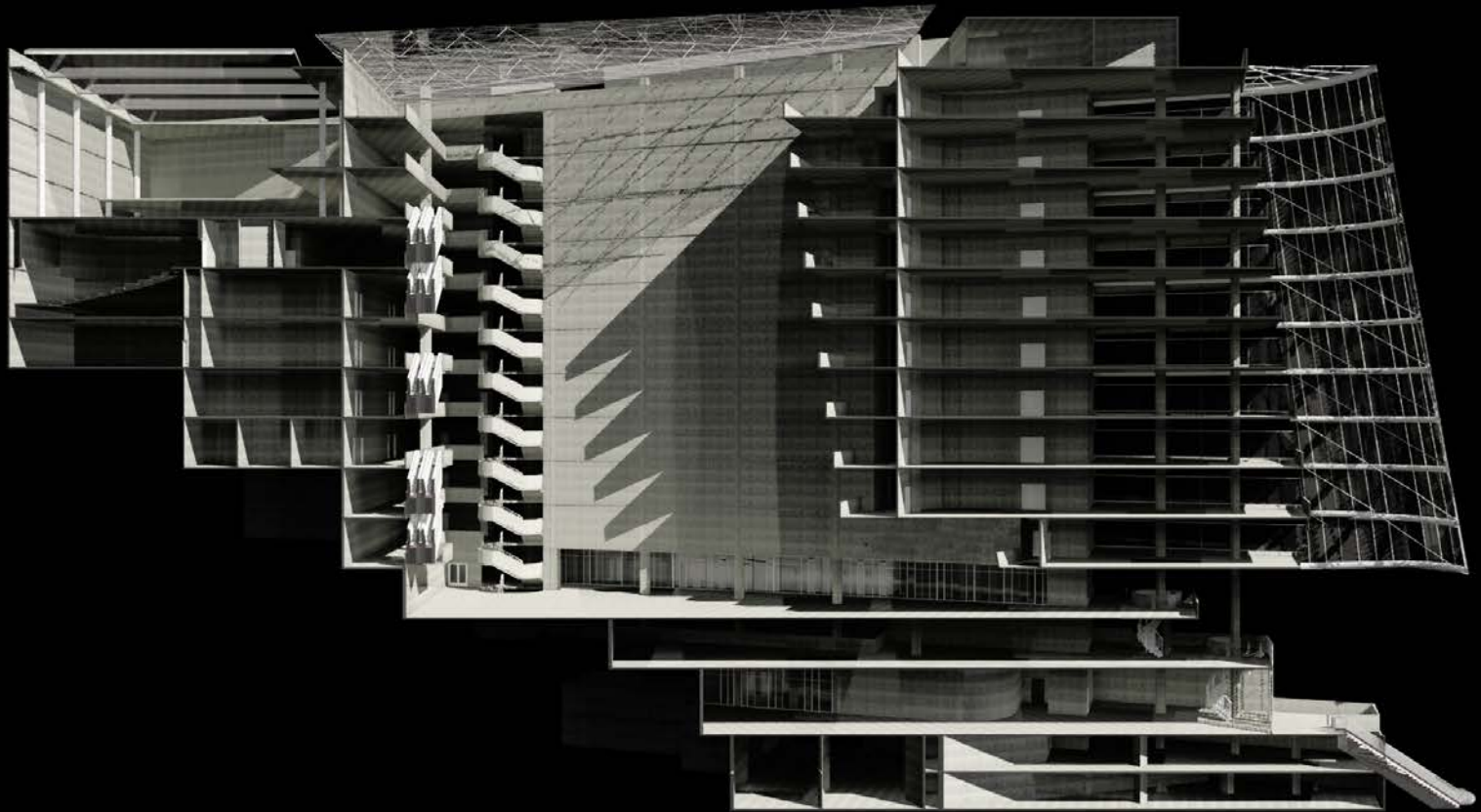


BIM Application

VIEWED INTERFACE





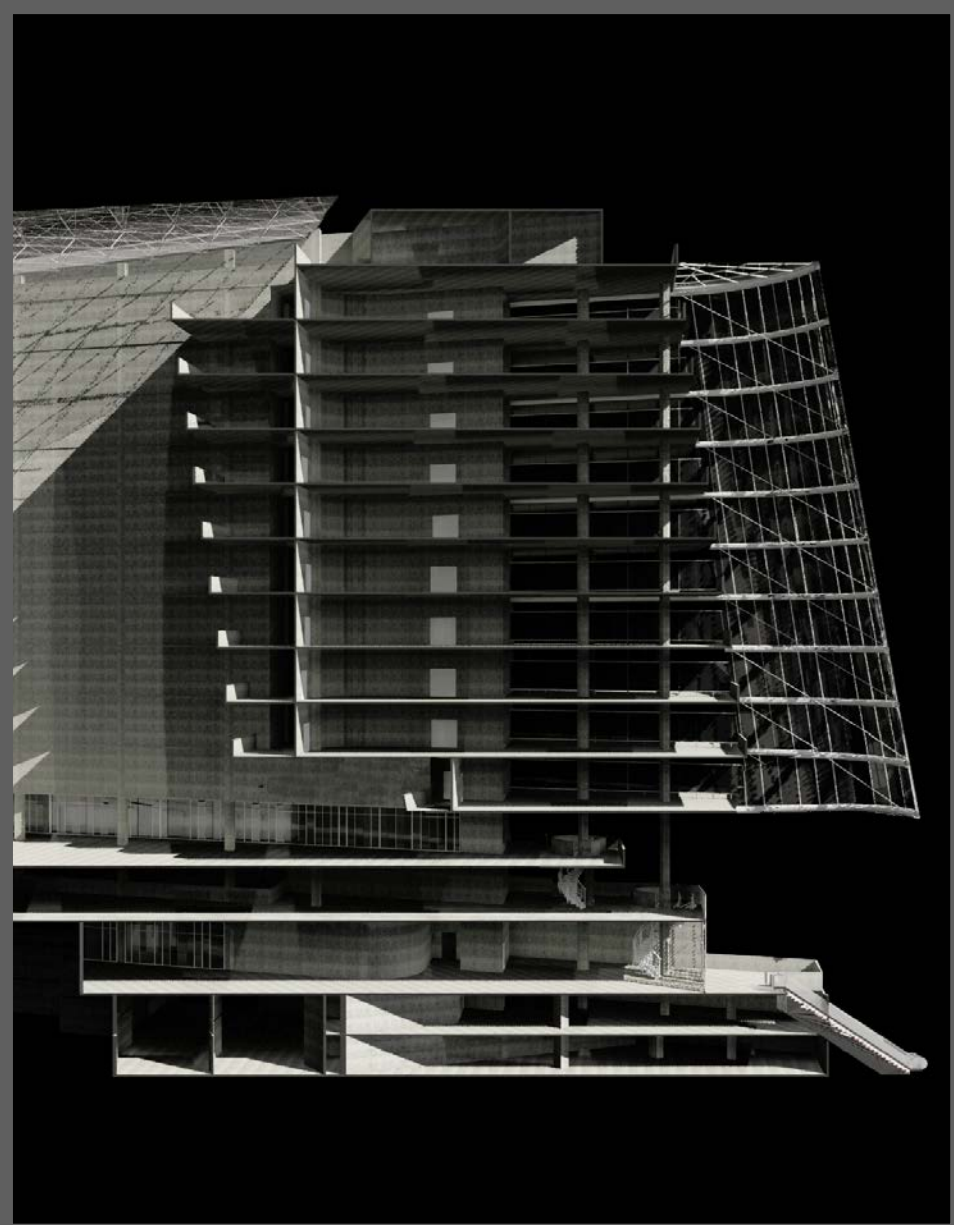


BIM Application

**RENDERING**

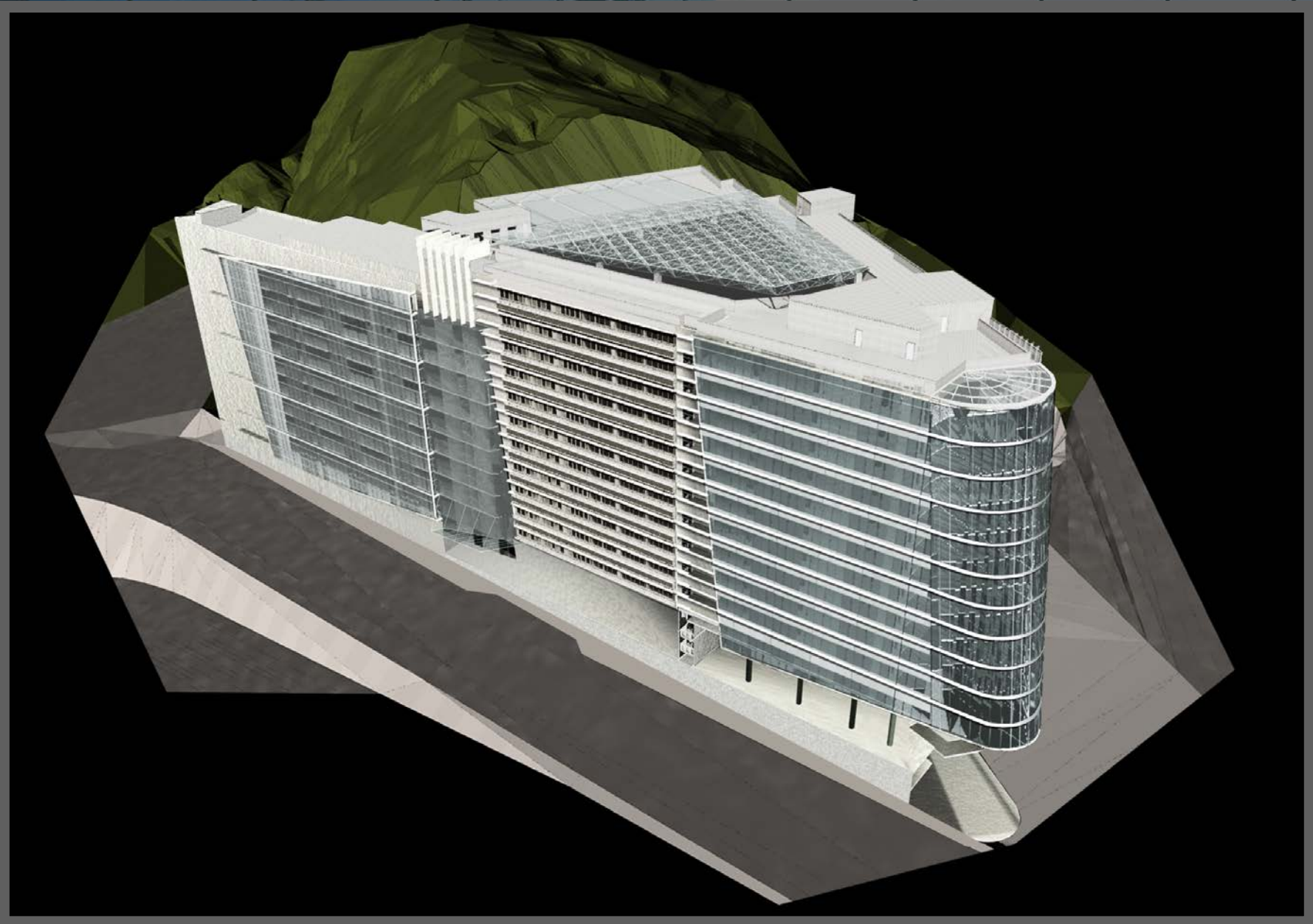


BIM Application



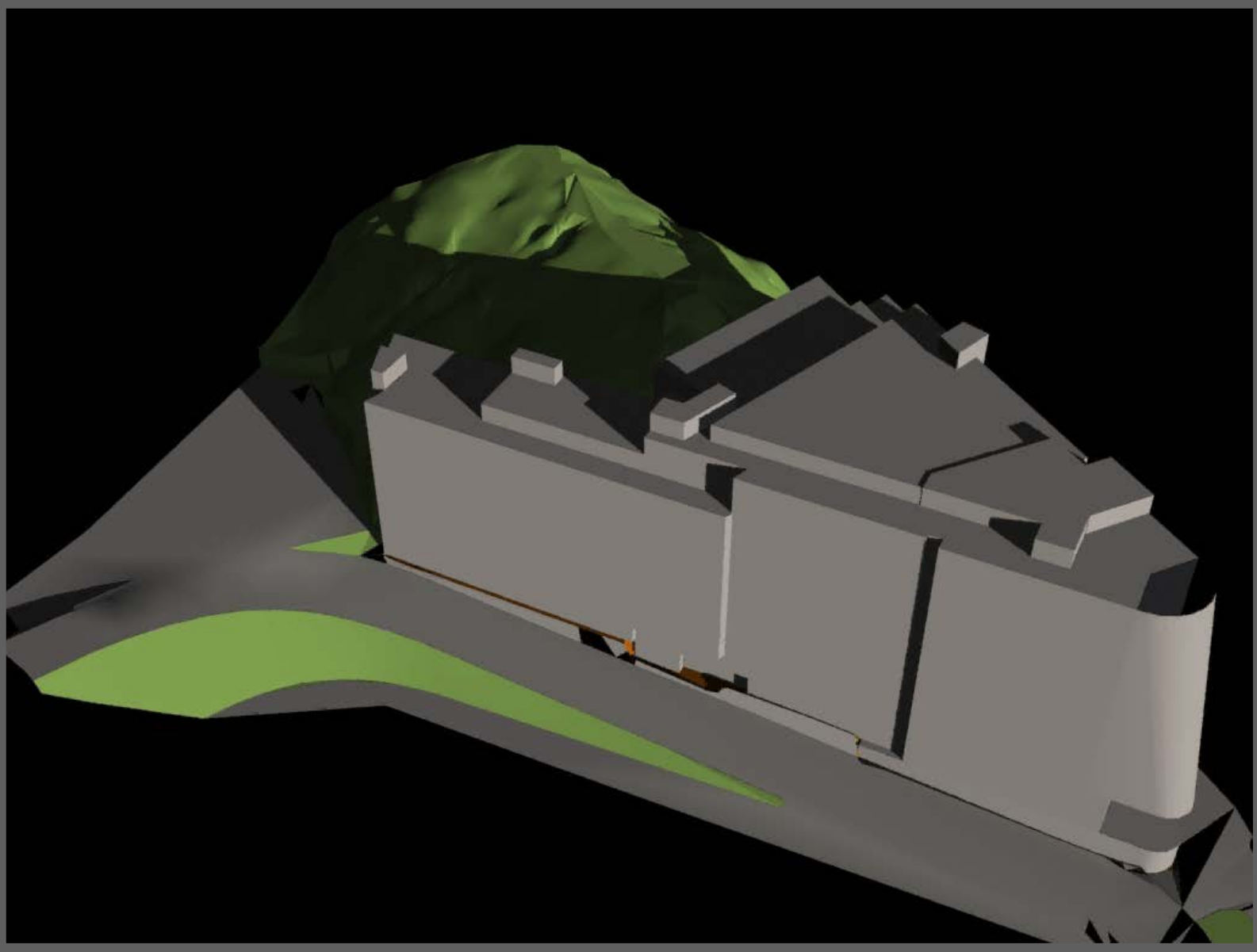
**GENERATED VIEWS**





BIM Application

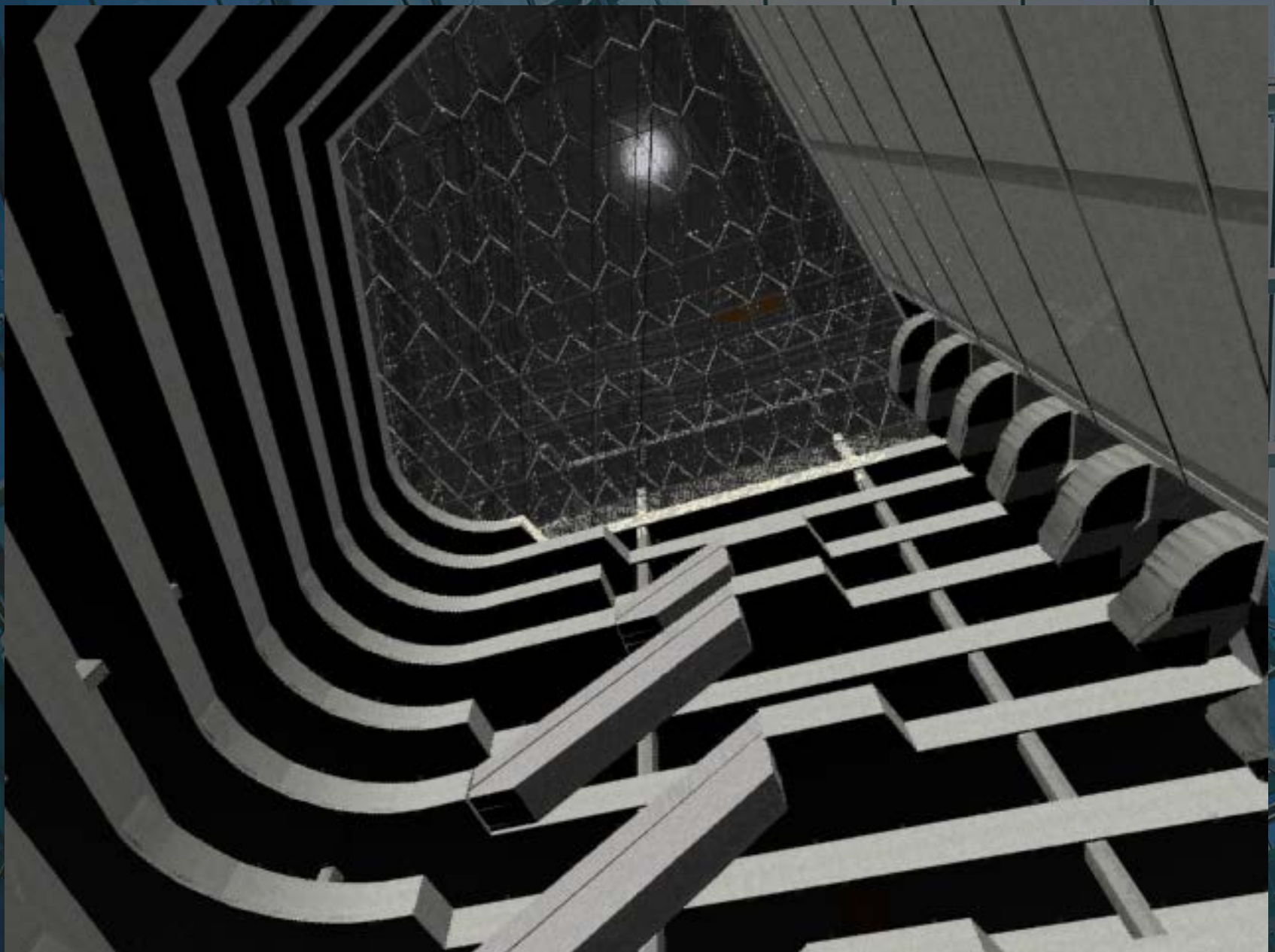
**RENDERING**



BIM Application

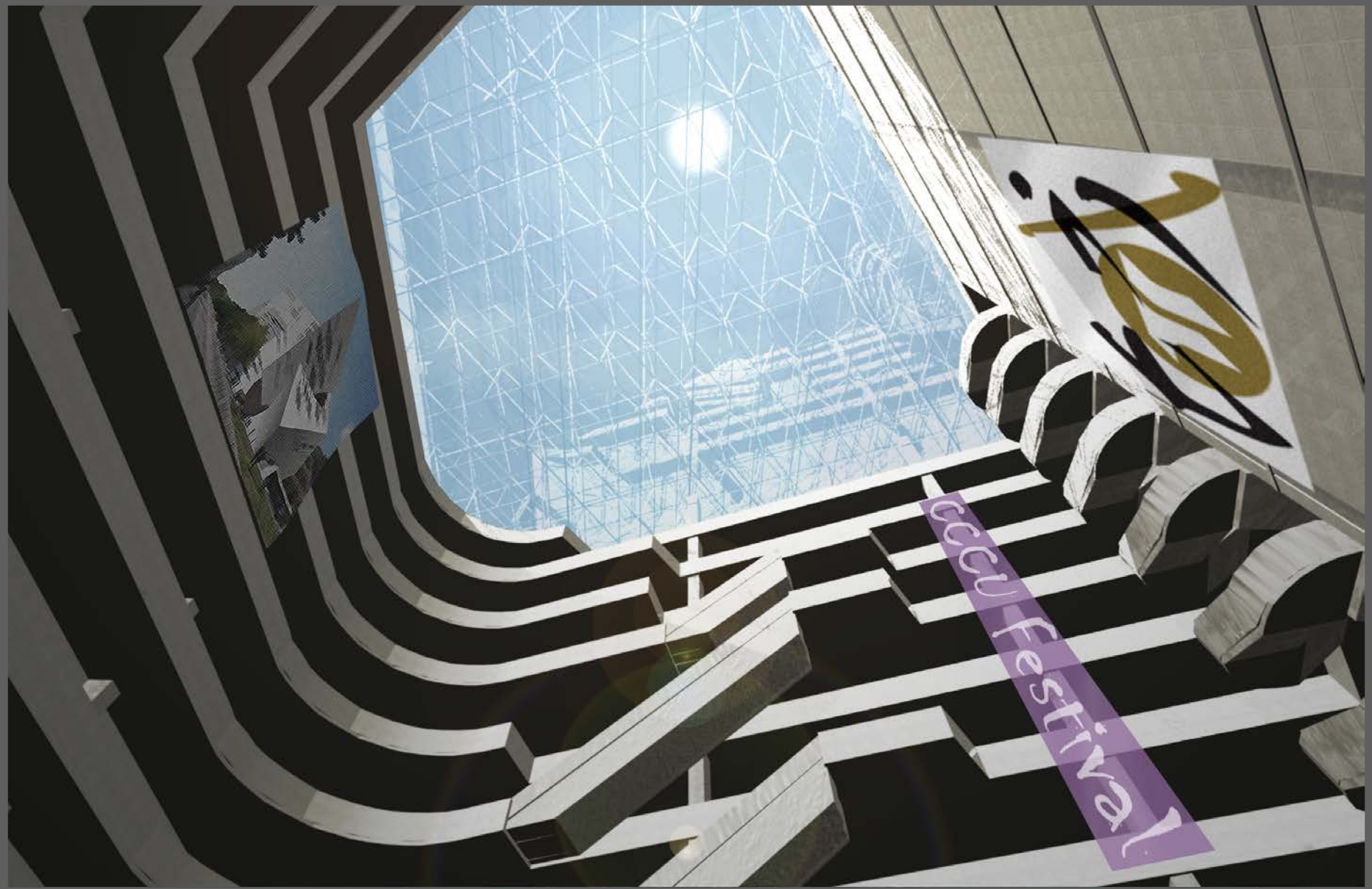
SOLAR STUDY 21/12/2004 7:00am – 6:00pm



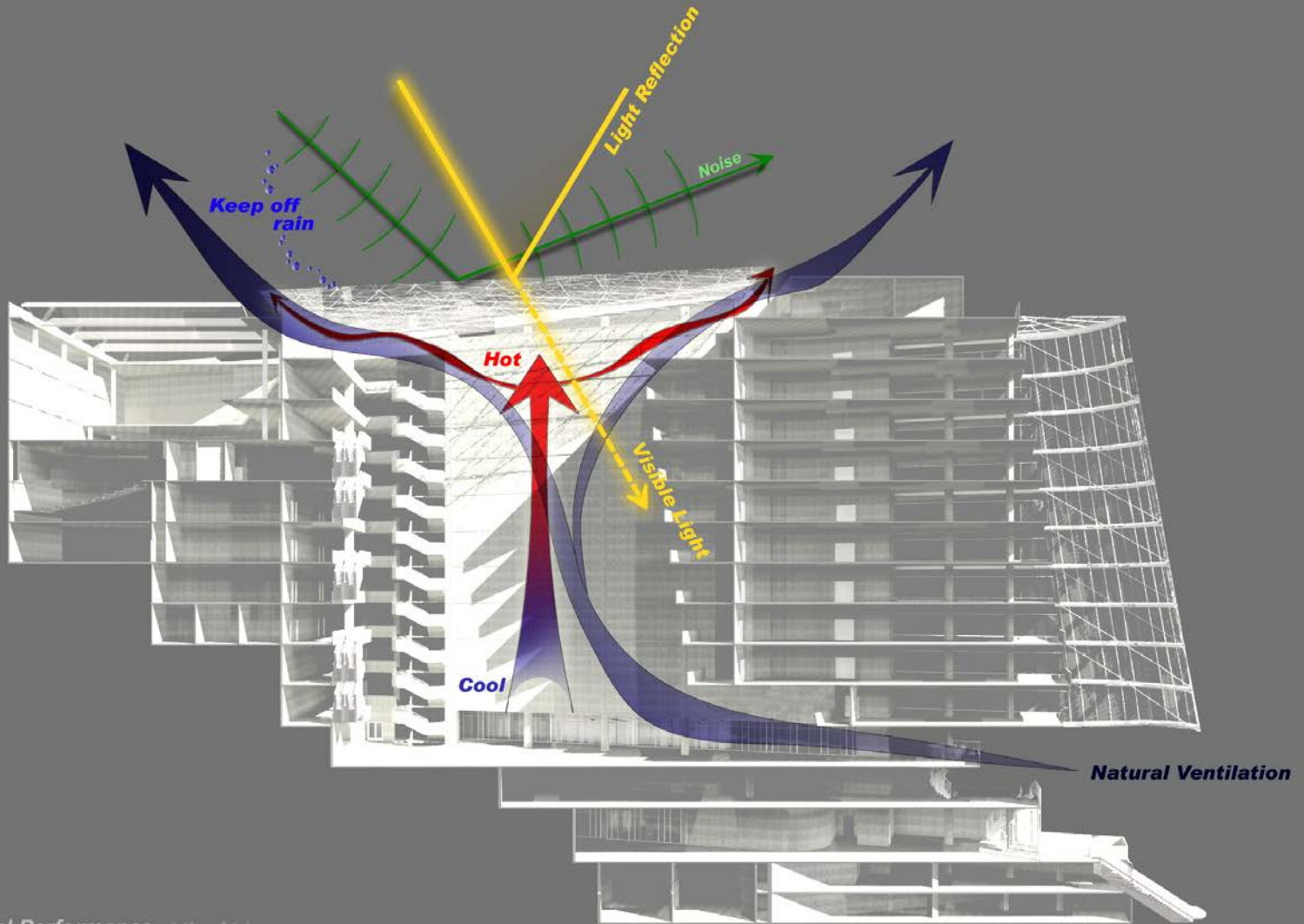


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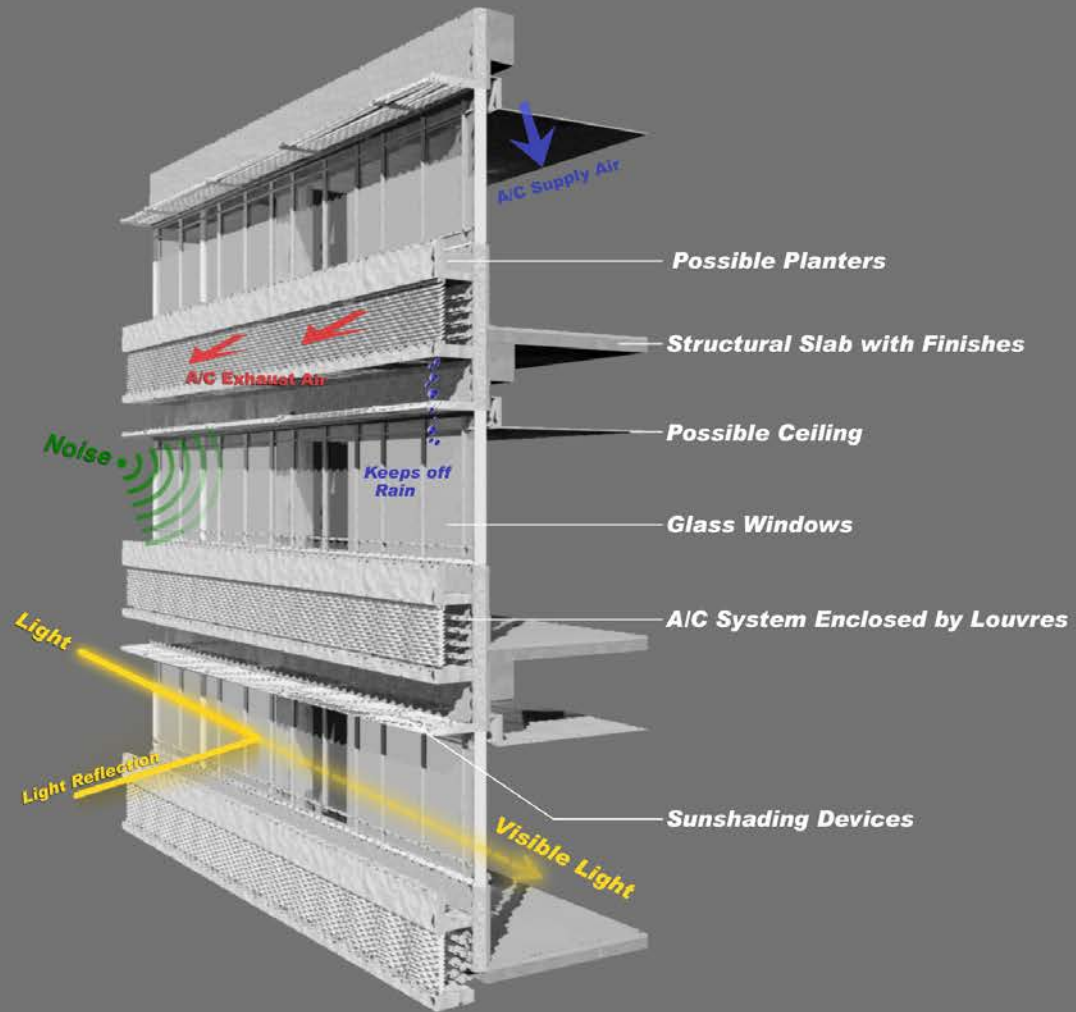
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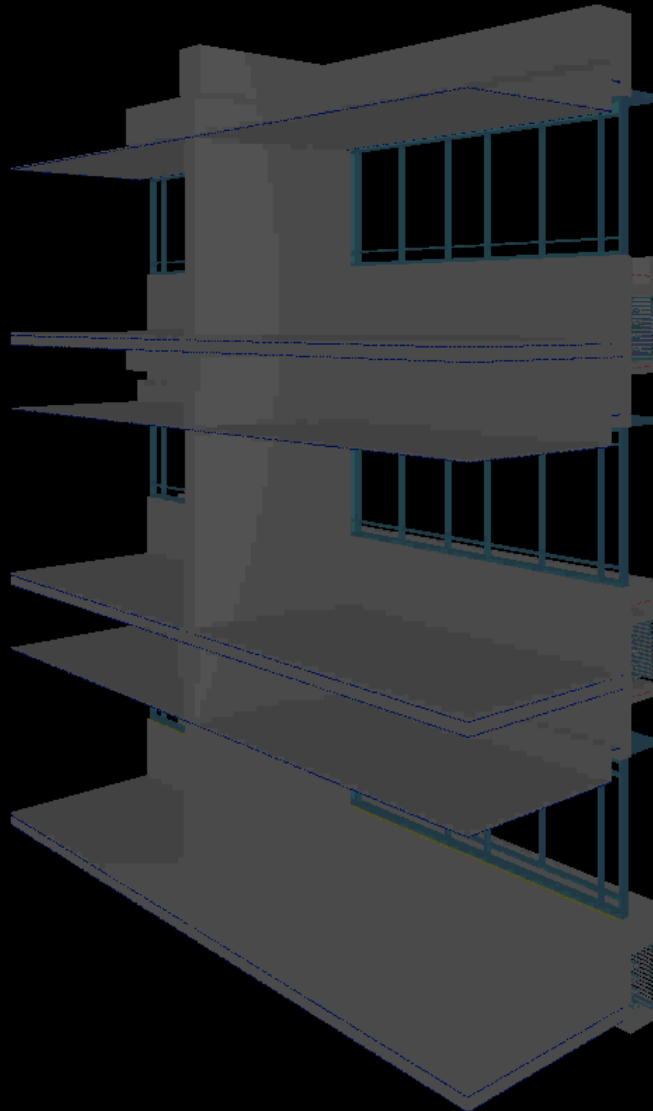


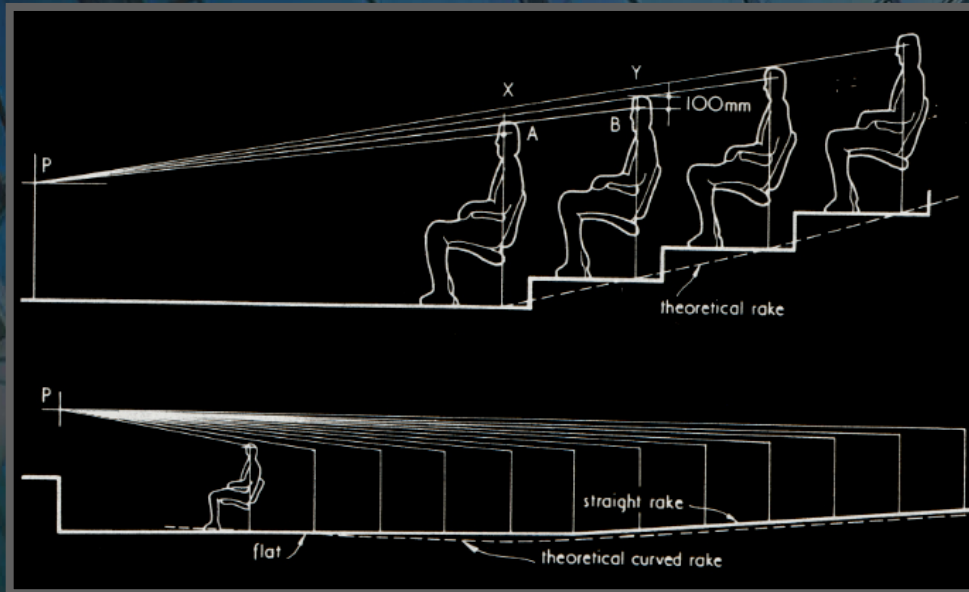
*Environmental Performance at the Atrium -  
Courtyard Scheme*



Analysis of the Facade -  
Typical Classroom Modules





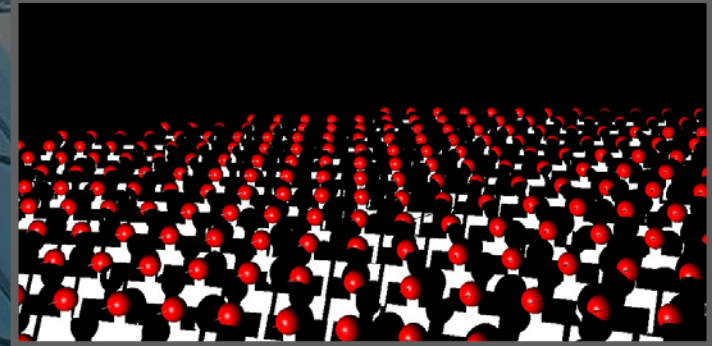
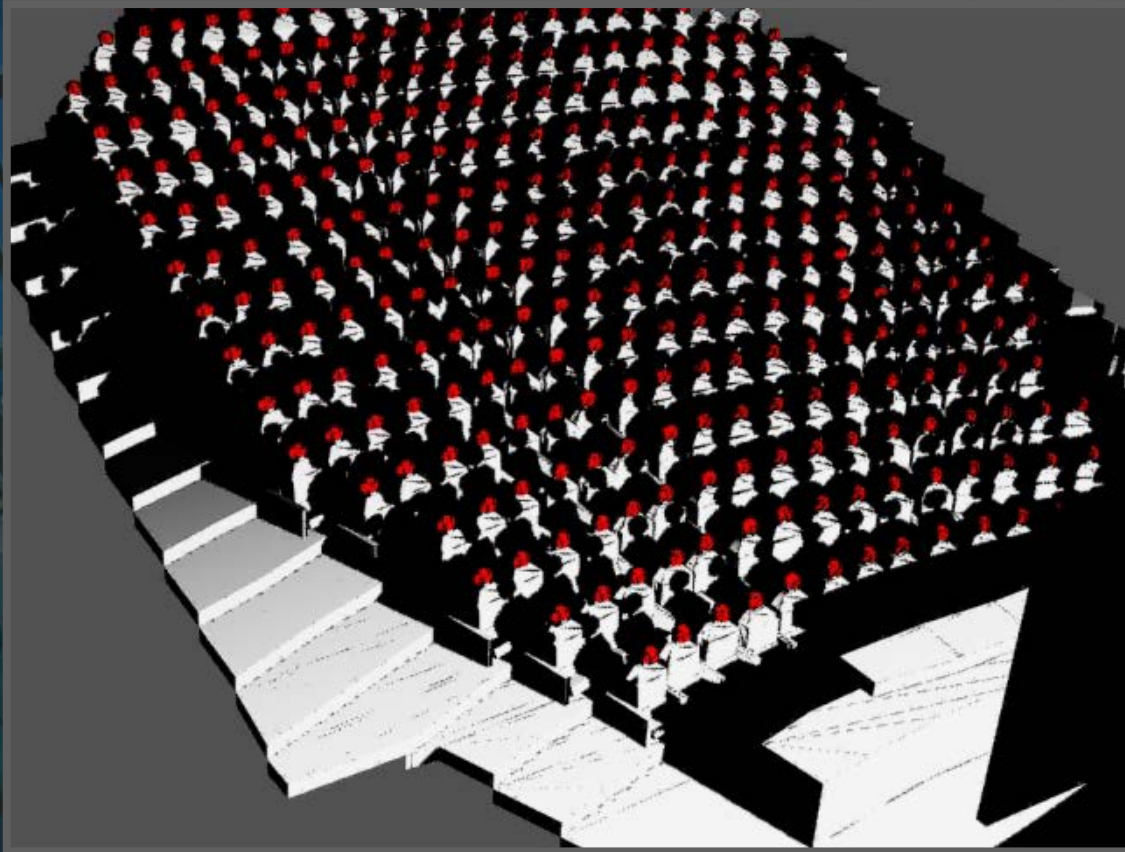


## Traditional Sightline Study

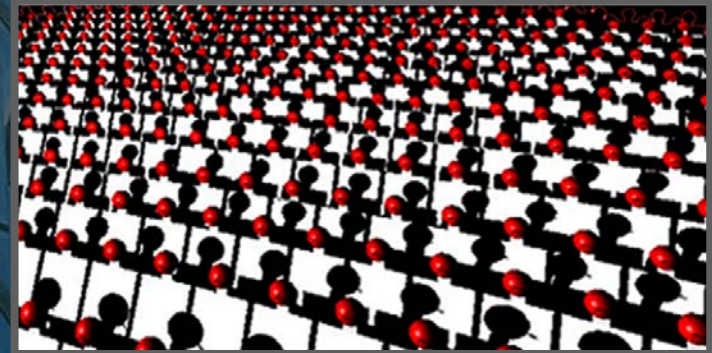
Problems:

- Inaccurate measure of sight blockage.
- Cannot determine the positioning of sightlines of seats other than from the center row.





Unsatisfactory sightlines



Satisfactory sightlines

## Radiating Light Method



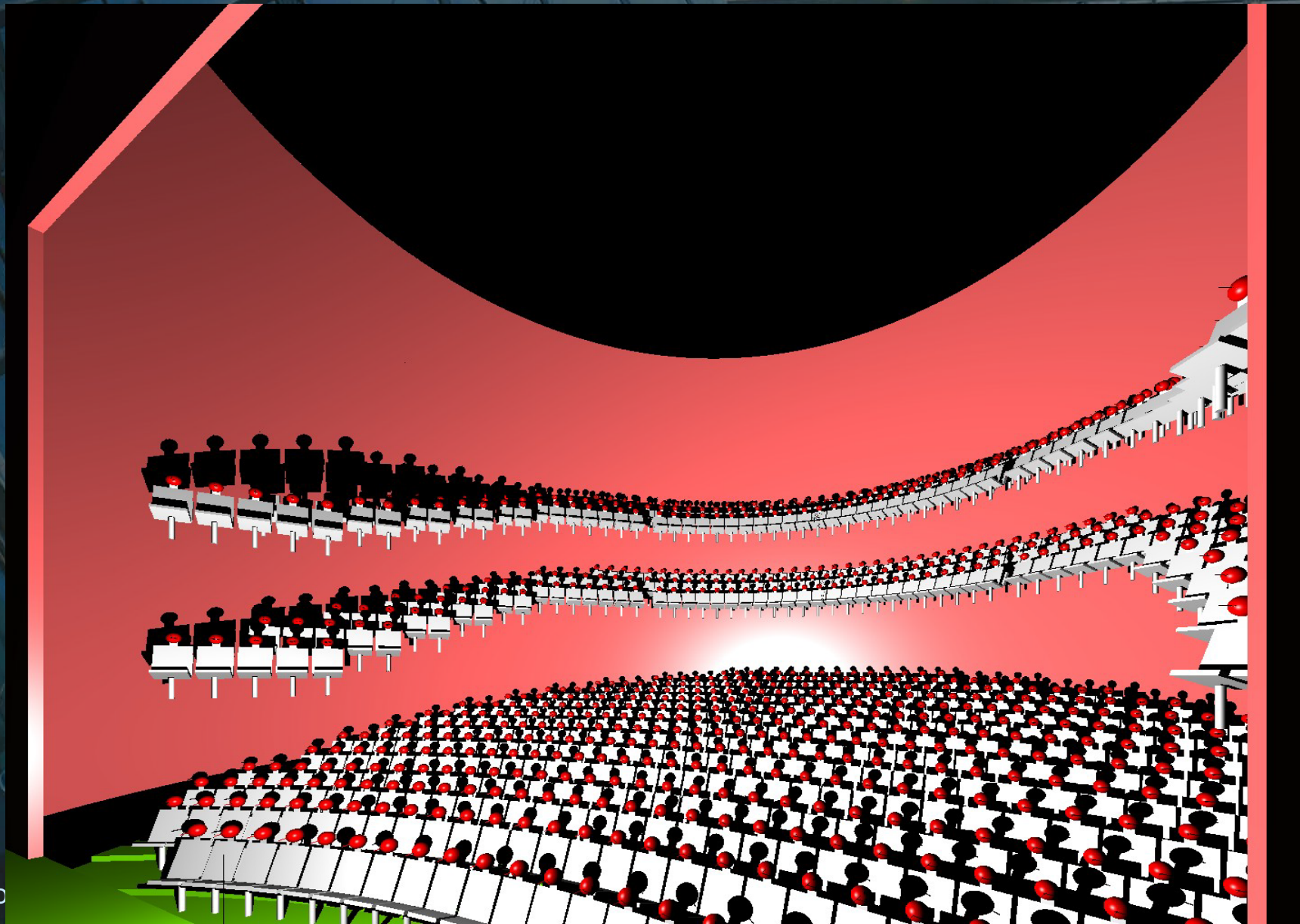


BIM Application

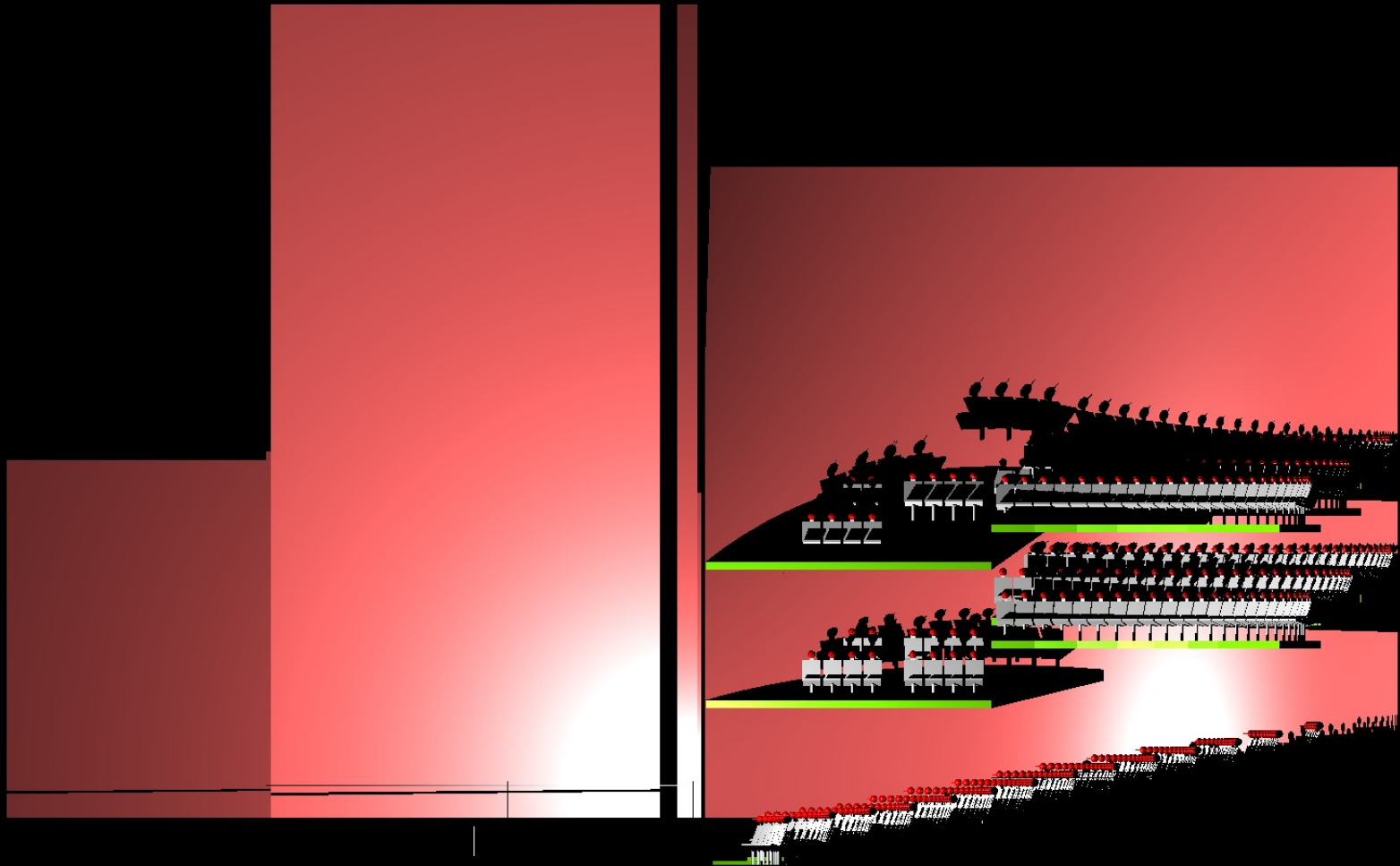
**SIGHTLINE STUDIES**



# SIGHTLINE ANALYSIS



# SIGHTLINE ANALYSIS





# THEATRE

A photograph of a modern theatre interior. The view is from the audience, looking towards the stage. The seating consists of red and orange plastic chairs arranged in a semi-circular pattern. Above the main seating area, there are three levels of curved balconies, each with a wooden slatted front panel. The ceiling is a complex, geometric structure made of glass and metal, with a blue-tinted sky visible through the glass. Several stage lights are visible, hanging from the ceiling and mounted on the balconies. The overall atmosphere is modern and architectural.

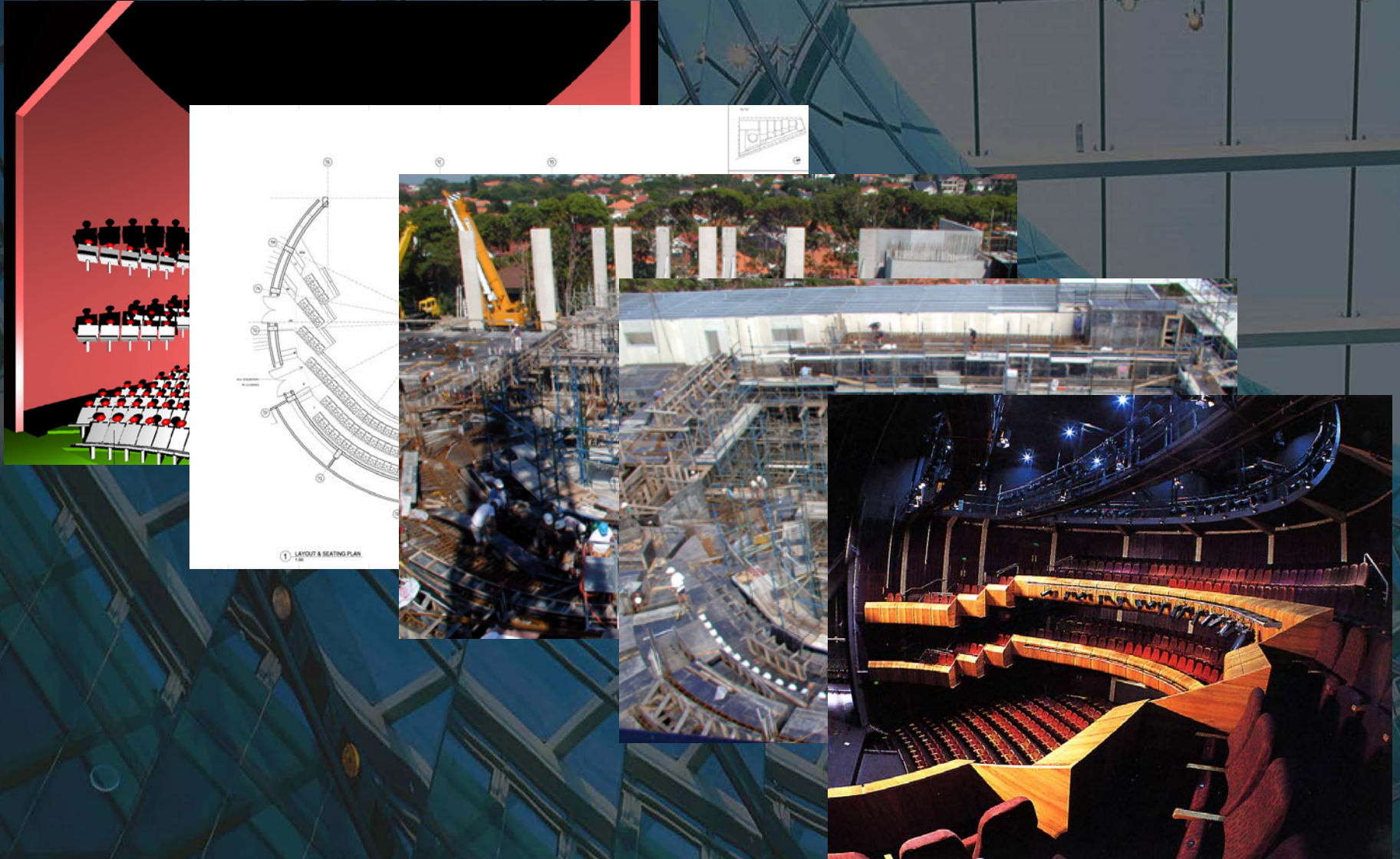


# THEATRE



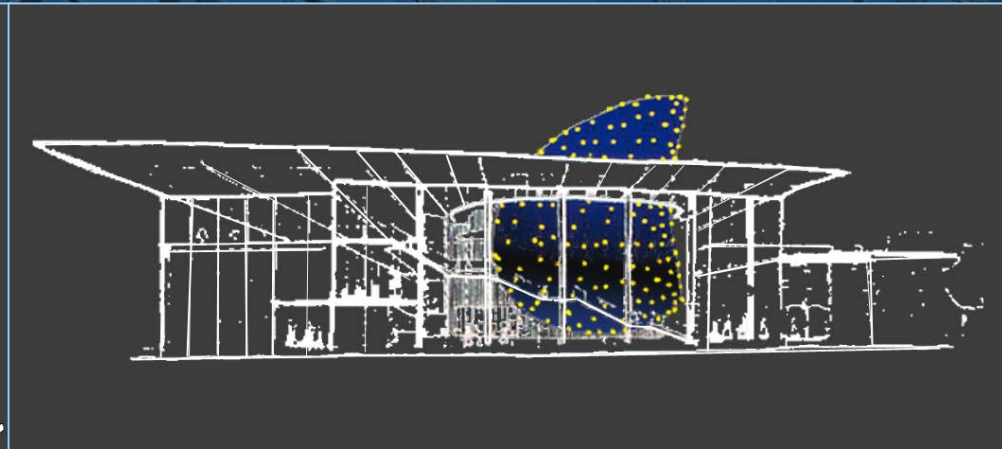
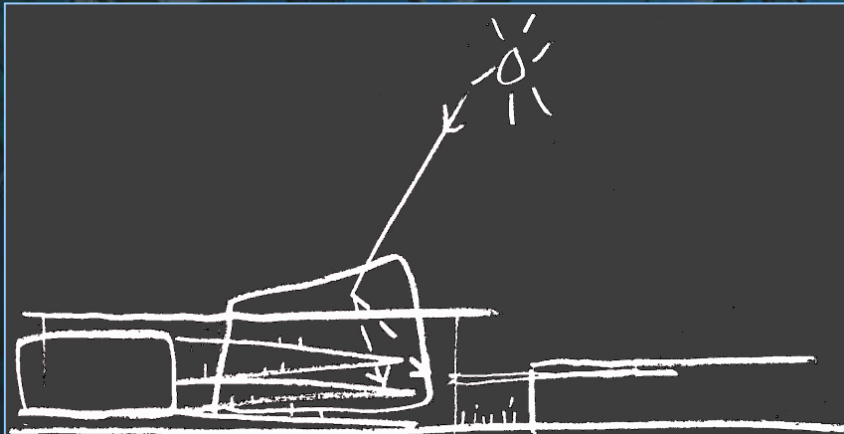
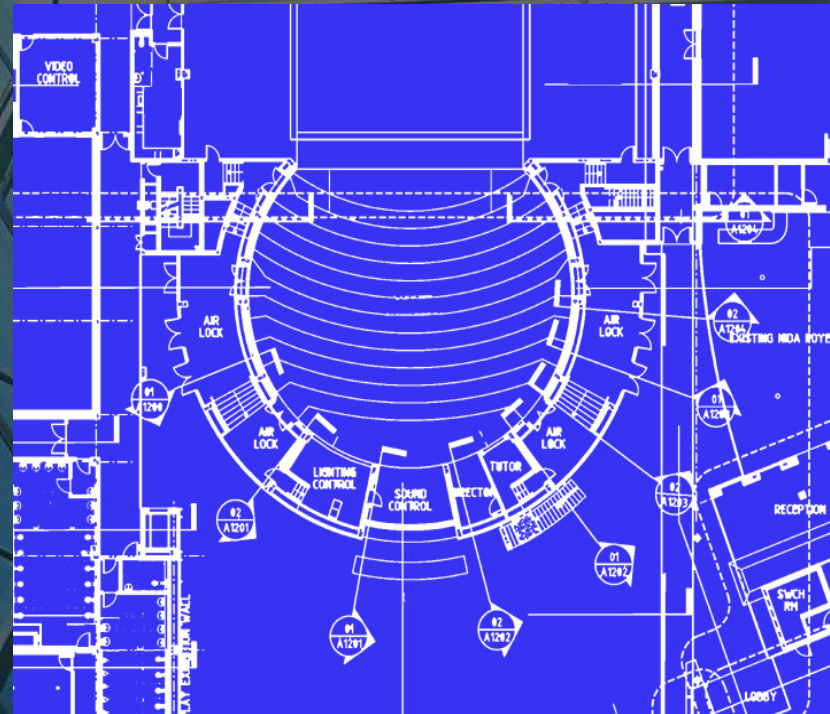


# DESIGN – DOCUMENTATION – CONSTRUCTION



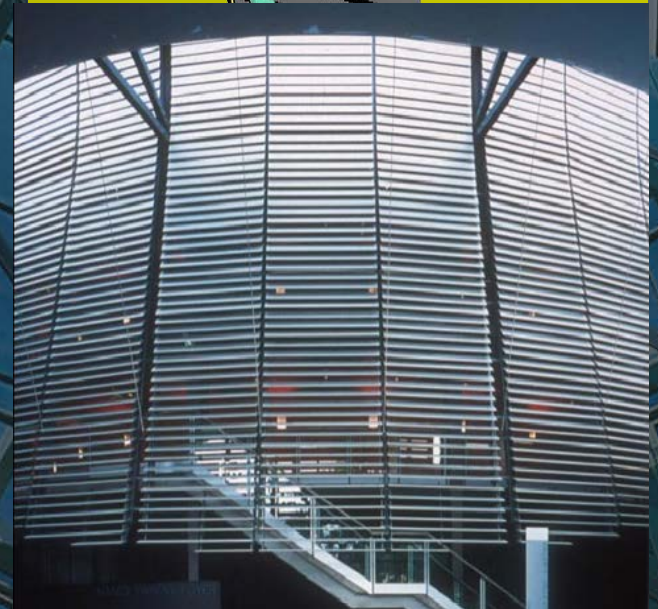
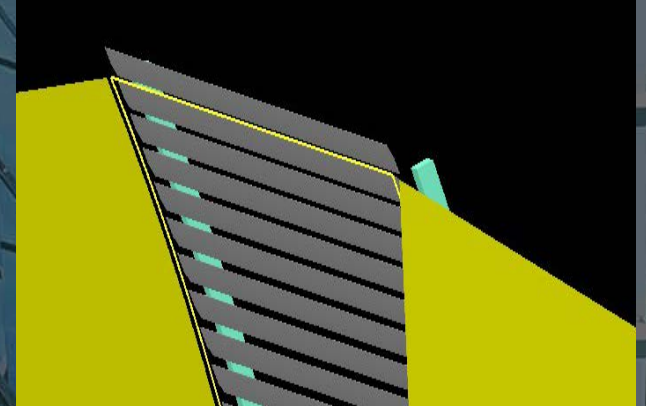
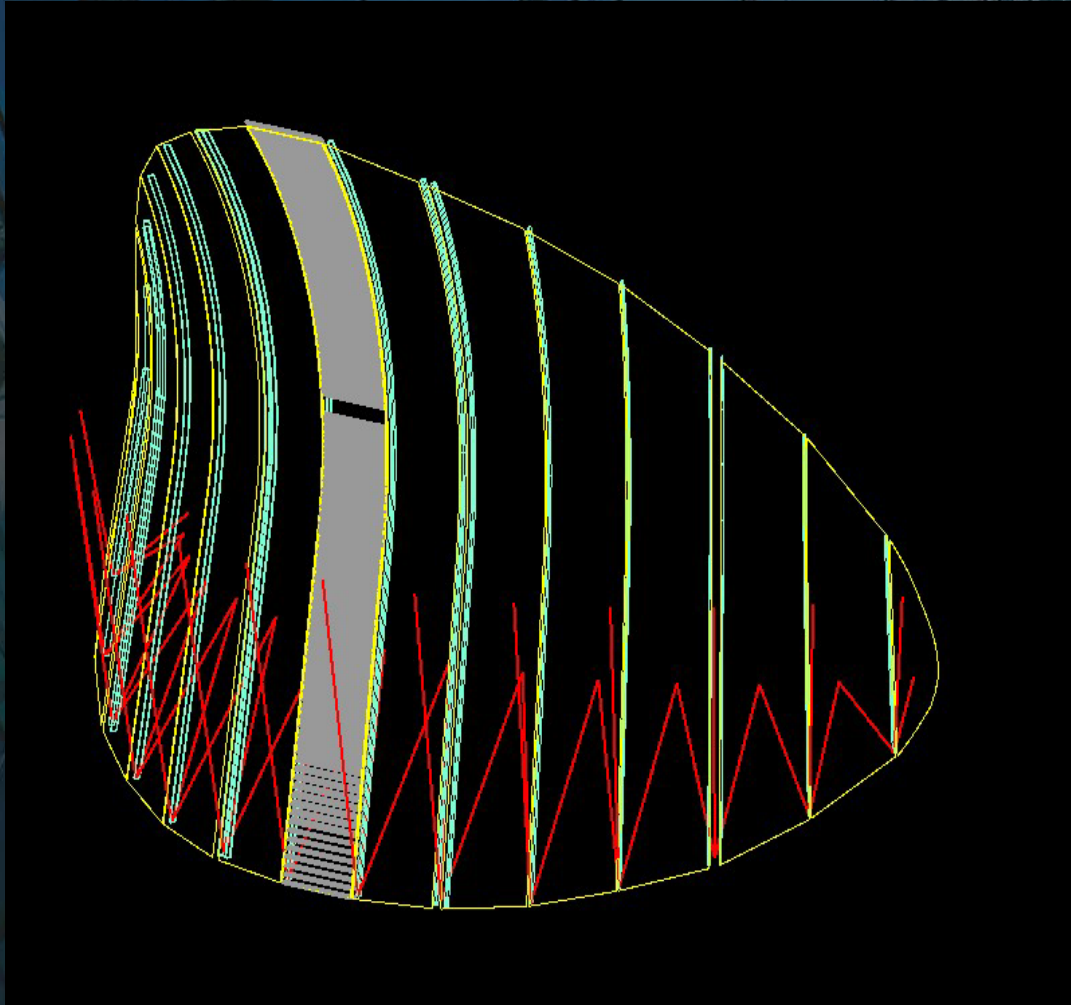


# VEIL – SCIENTIFICALLY DERIVED CURVATURE

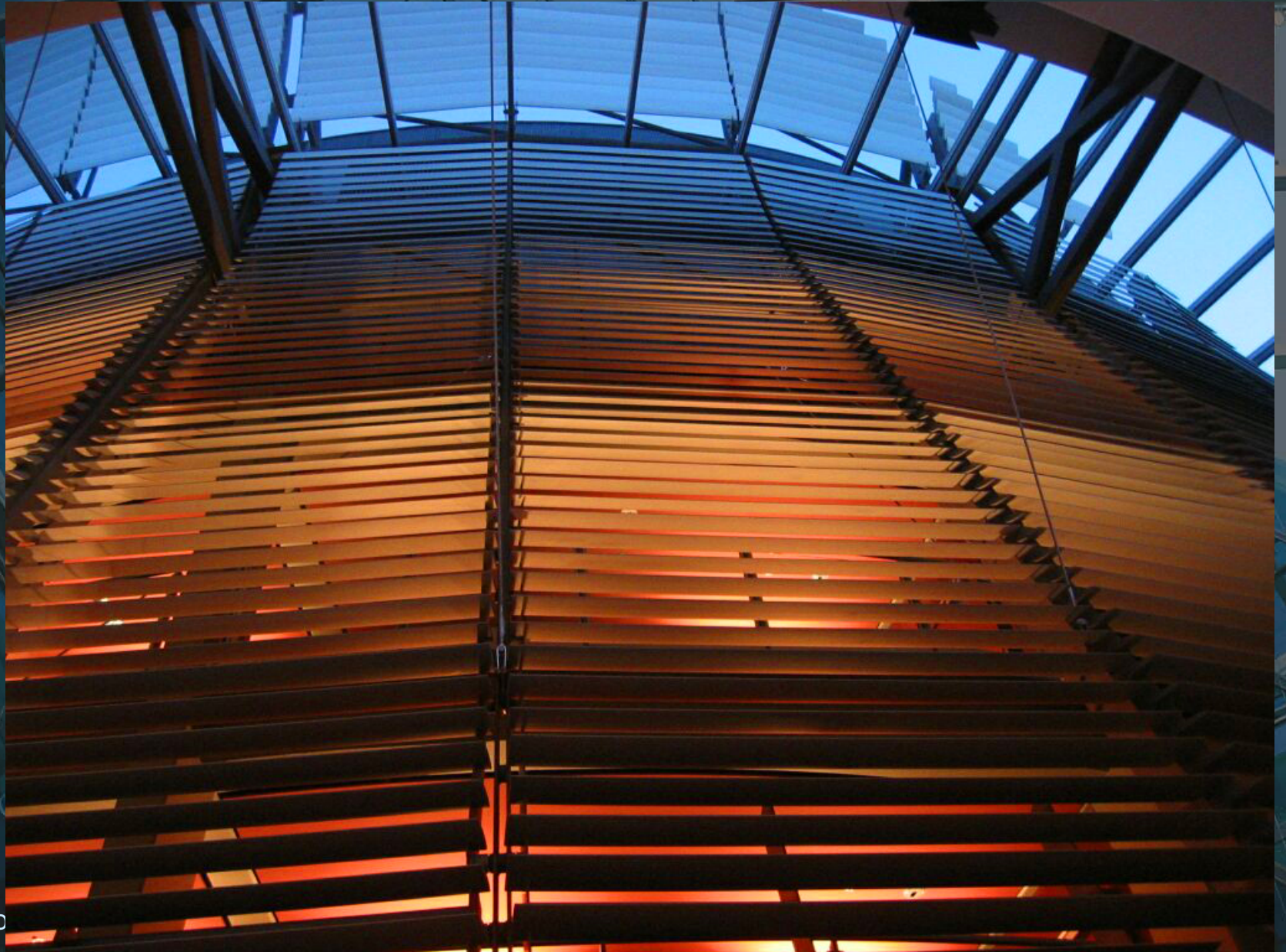




# VEIL – COMPLICATED GEOMETRY

















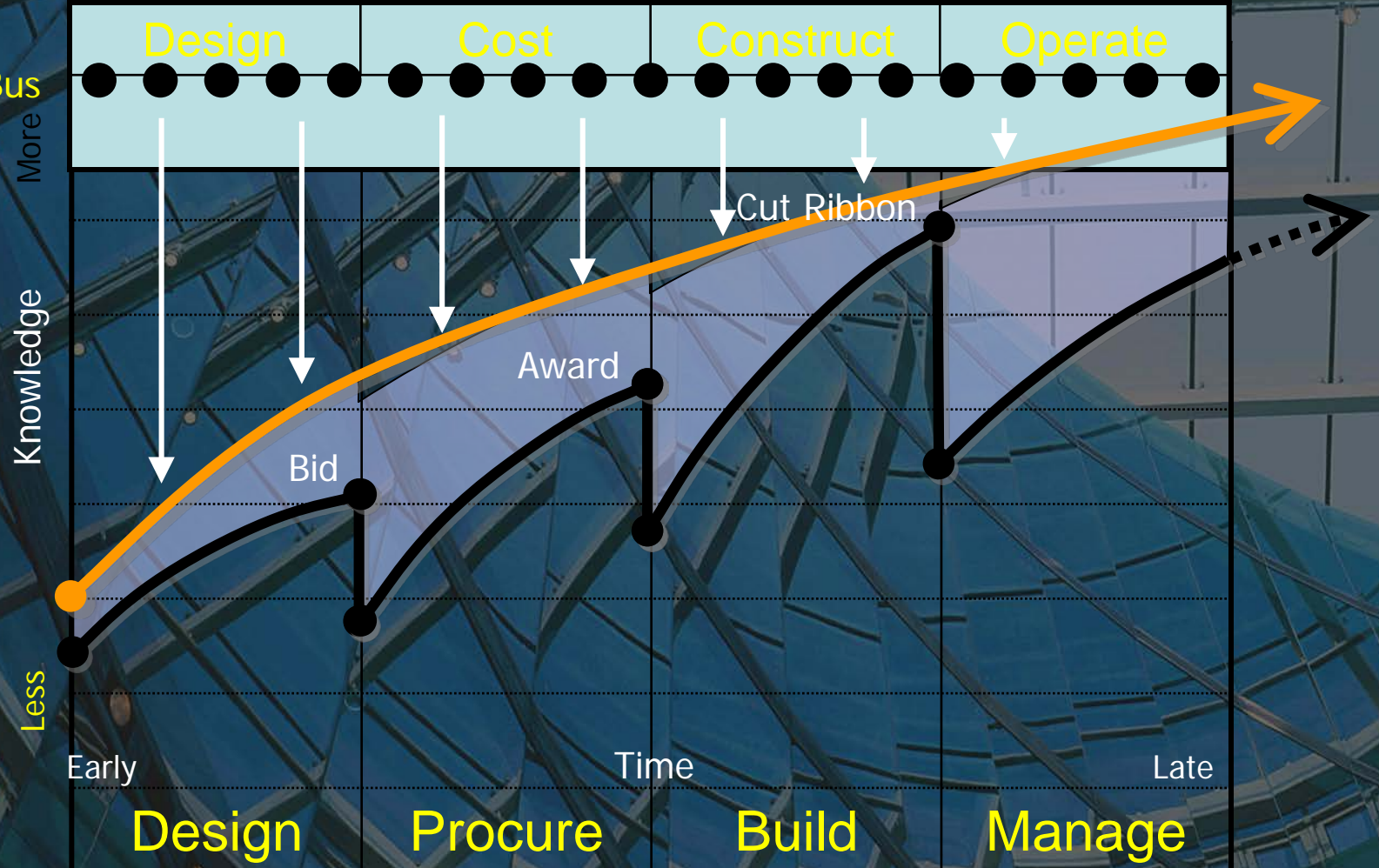


BIM Application



# Knowledge Sources

Knowledge Bus







DESIGN

**INTER-DISCIPLINARY COLLABORATION**

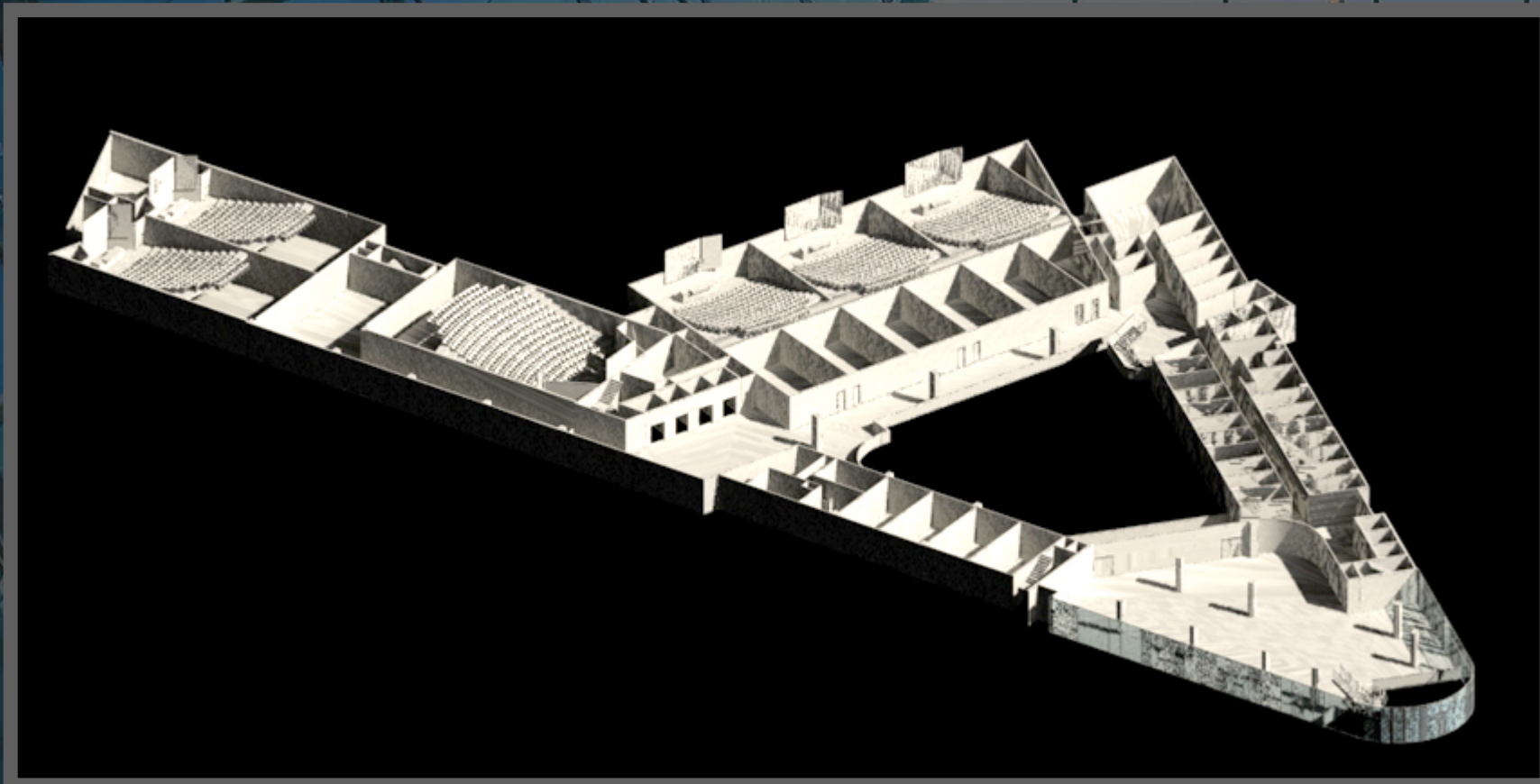
PRESENTATION AND COMMUNICATION

STATUTORY SUBMISSION

DOCUMENTATION

PROJECT MANAGEMENT

FACILITY MANAGEMENT

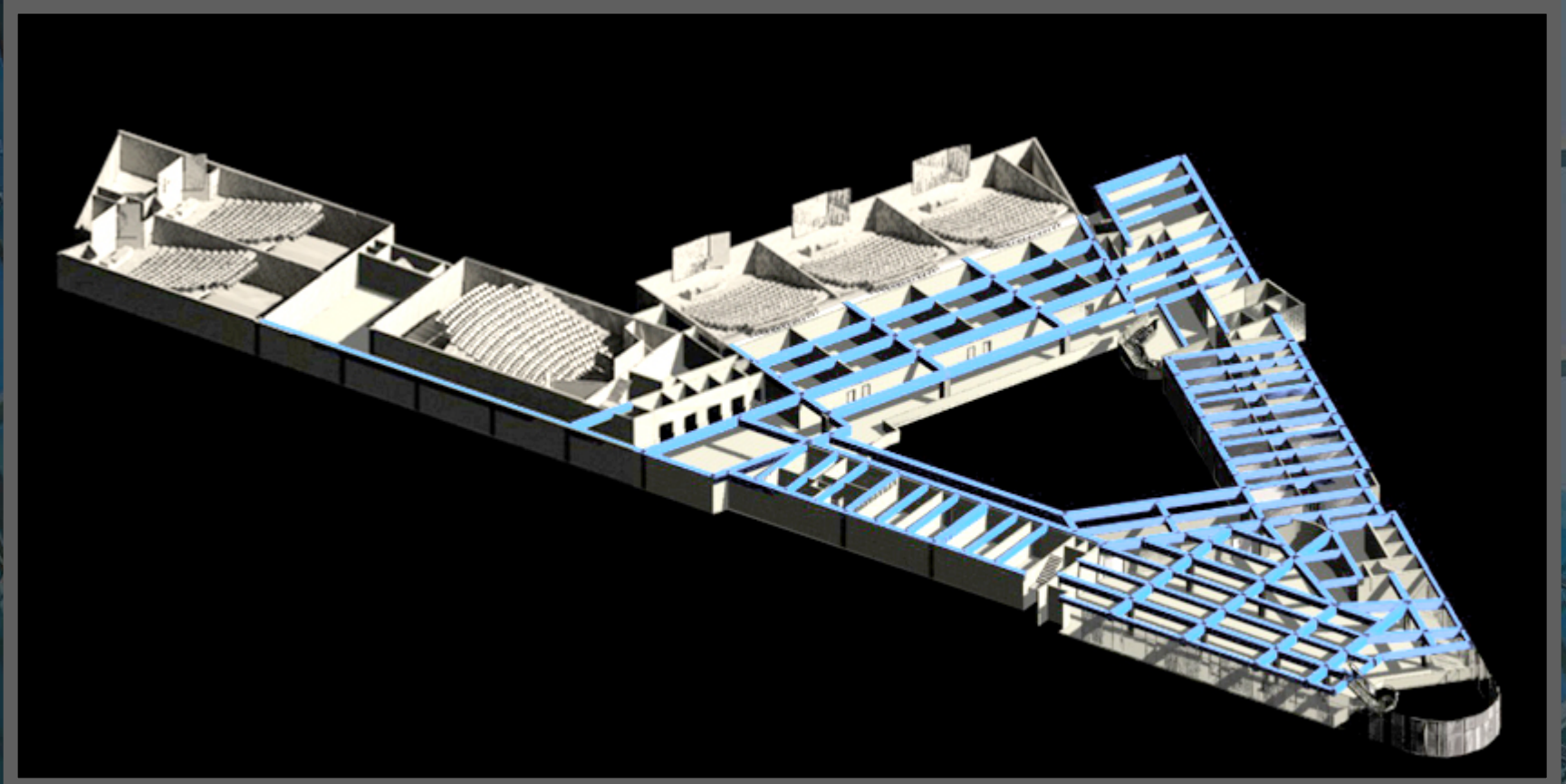


BIM Application

Architecture

Autodesk Architectural Desktop 2006 for Architecture

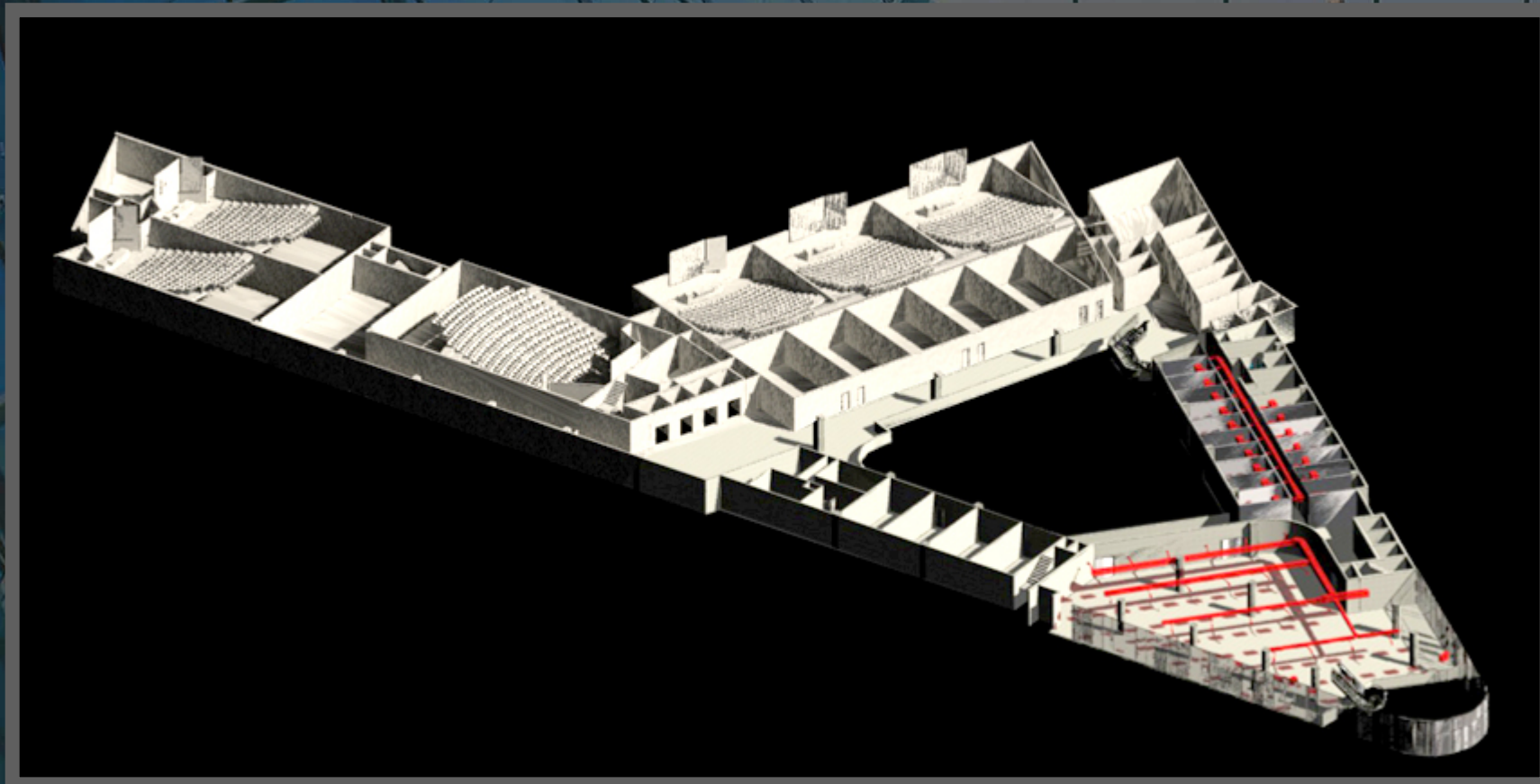




BIM Application

# Architecture + Structure

Autodesk Architectural Desktop 2006 for Structure

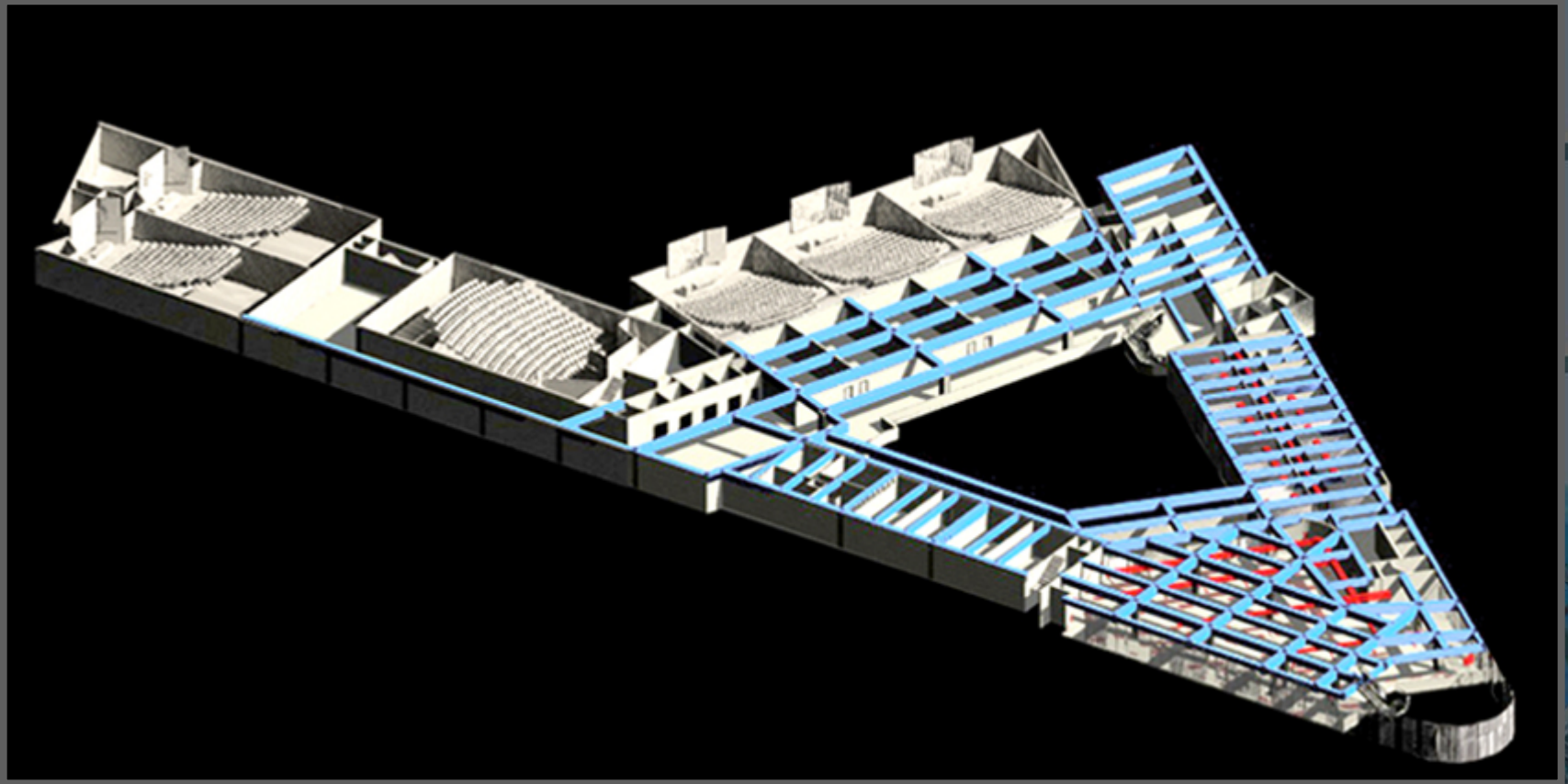


BIM Application

**Architecture + E&M**

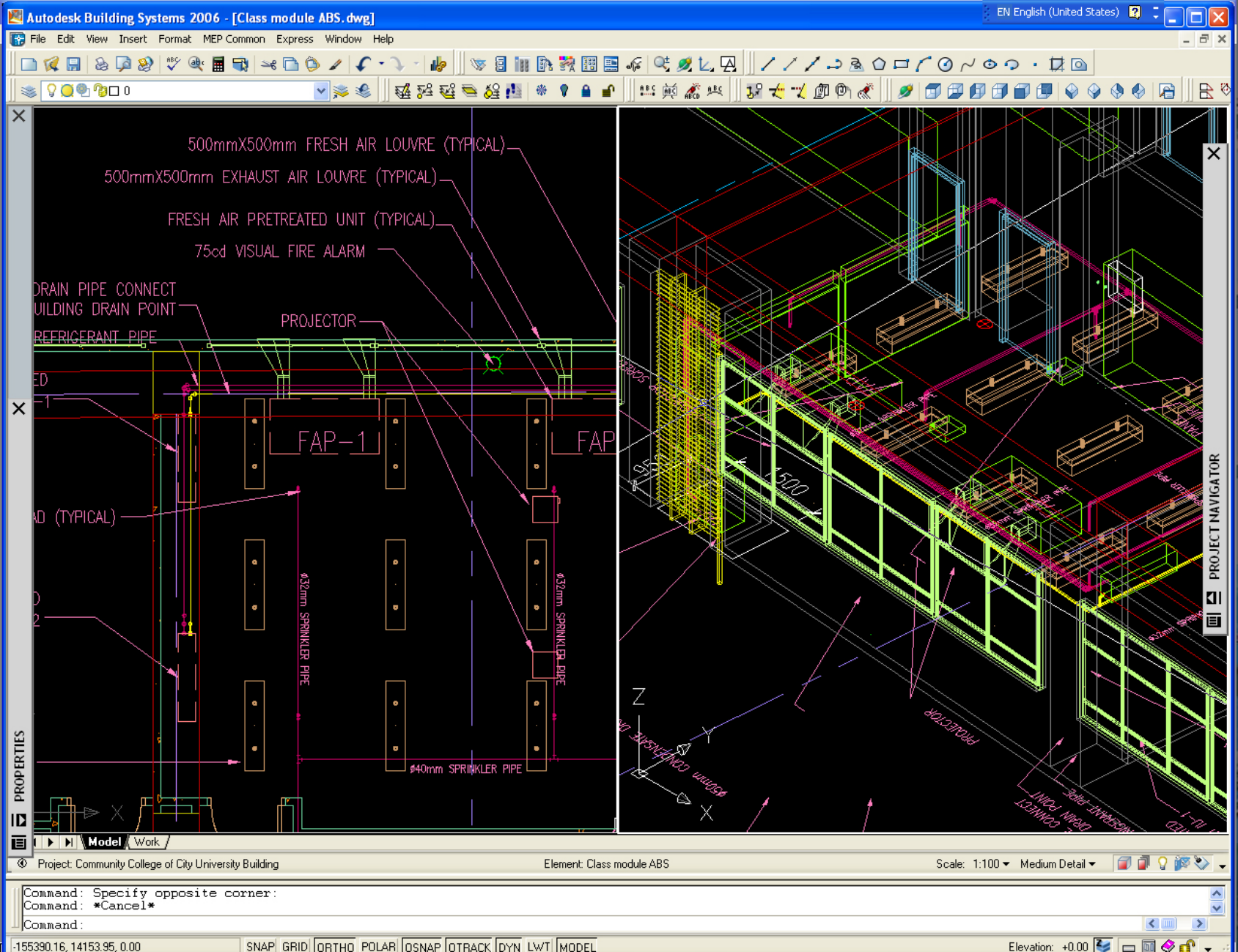
Autodesk Building Systems 2006 for E&M



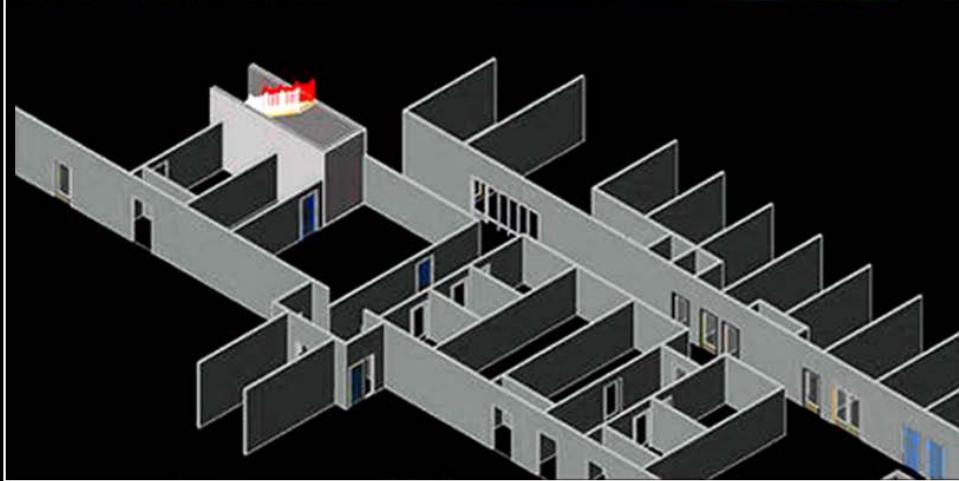
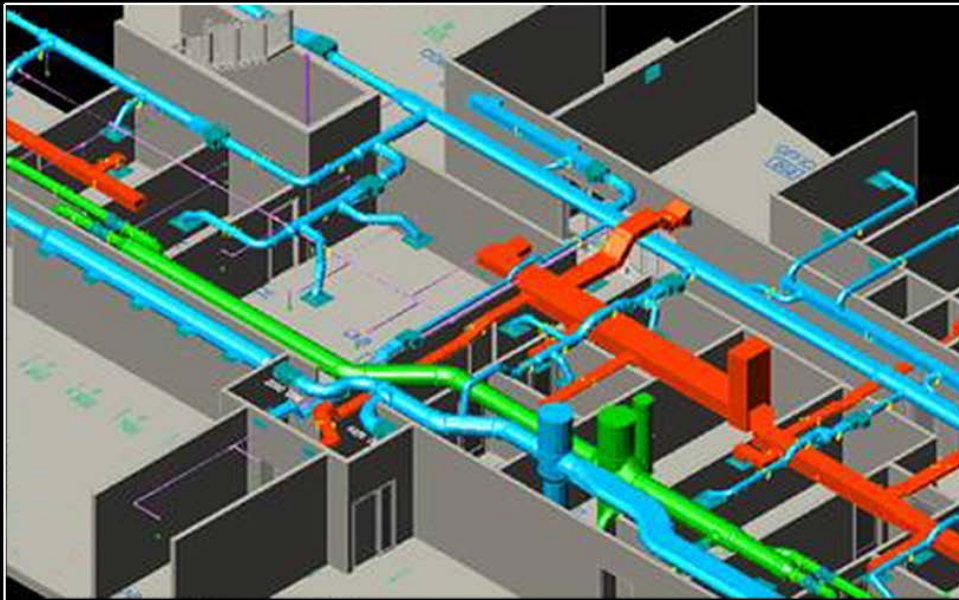


BIM Application

Architecture + Structure + E&M







## ***Clash Analysis***

***Full set of construction  
Combined Services Drawings  
produced***

***Close-up collaboration***

BIM Application

**3D DESIGN COLLABORATION**



INTERACTIVE COLLABORATION OF INFORMATION  
COST





DESIGN

INTER-DISCIPLINARY COLLABORATION

**PRESENTATION AND COMMUNICATION**

STATUTORY SUBMISSION

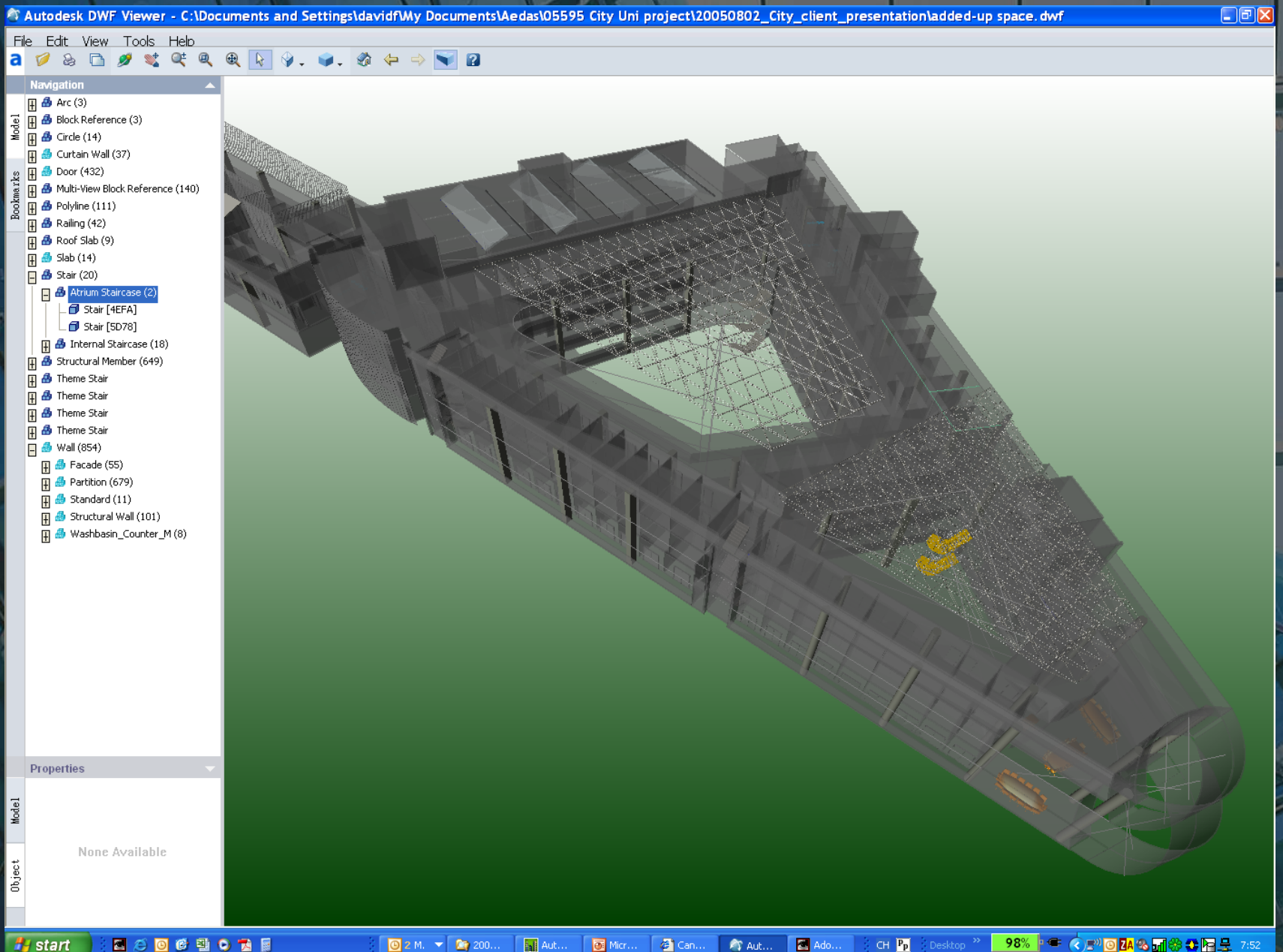
DOCUMENTATION

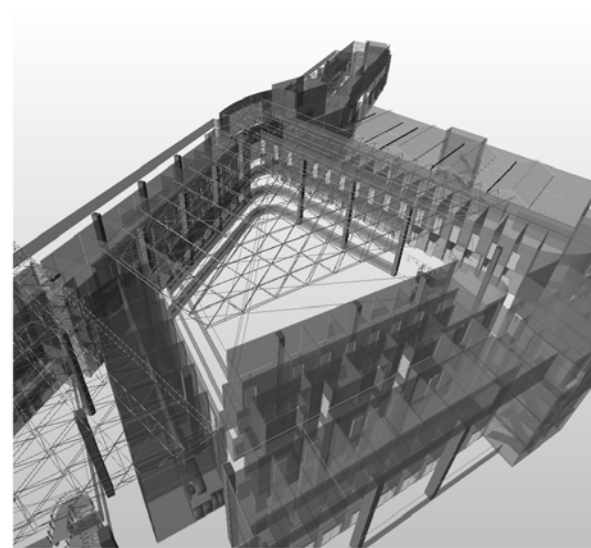
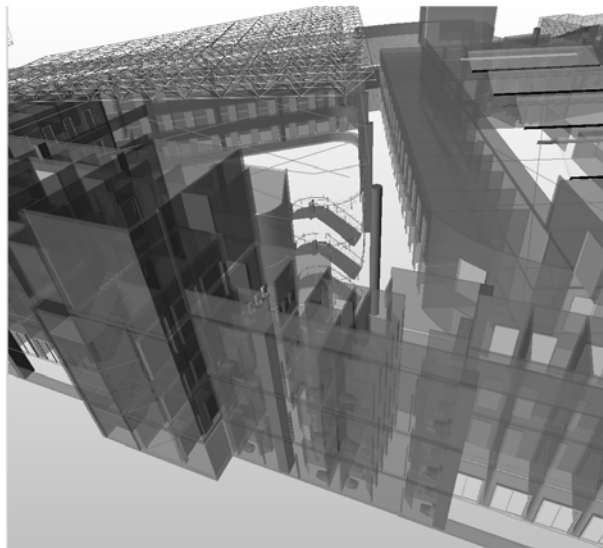
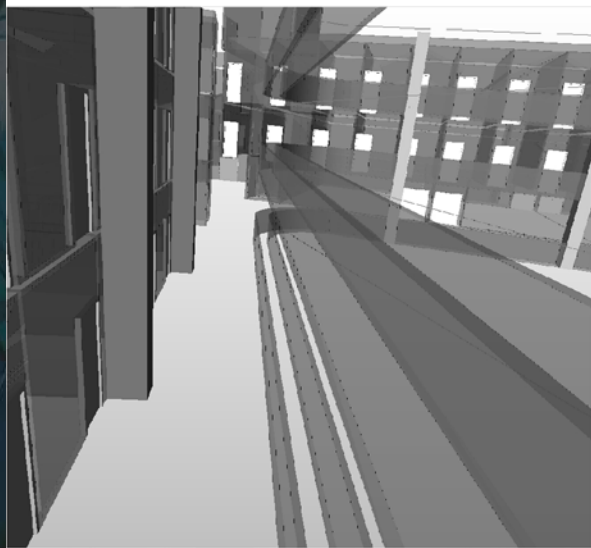
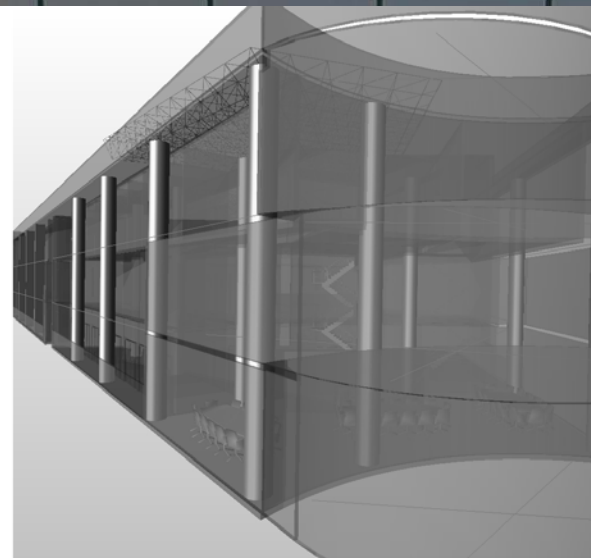
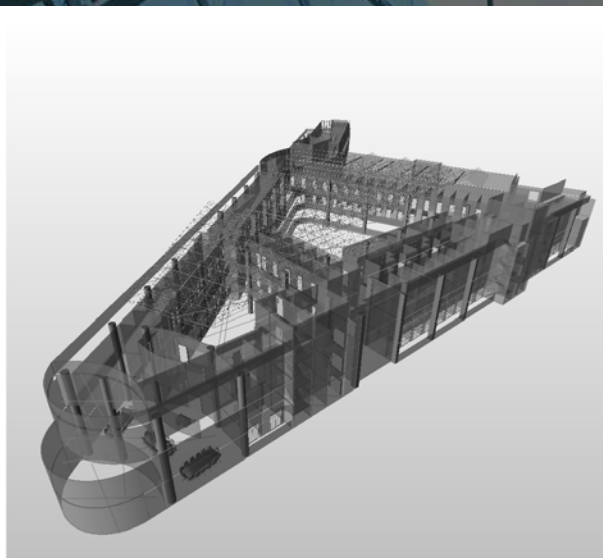
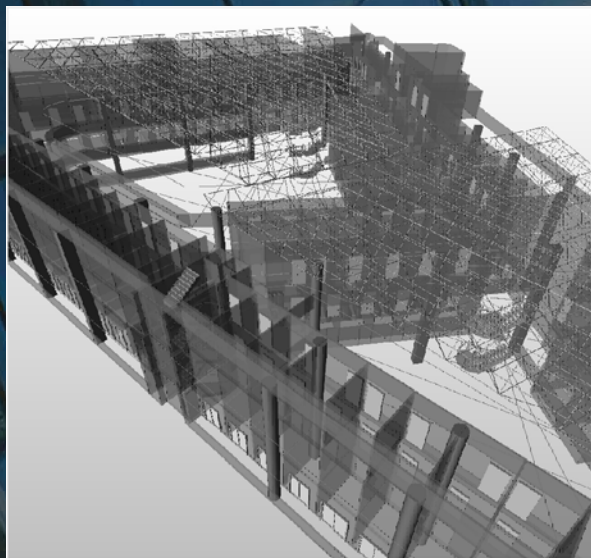
PROJECT MANAGEMENT

FACILITY MANAGEMENT









BIM Application

**INTERACTIVE COMMUNICATION – DWF**





DESIGN

INTER-DISCIPLINARY COLLABORATION

PRESENTATION AND COMMUNICATION

**STATUTORY SUBMISSION**

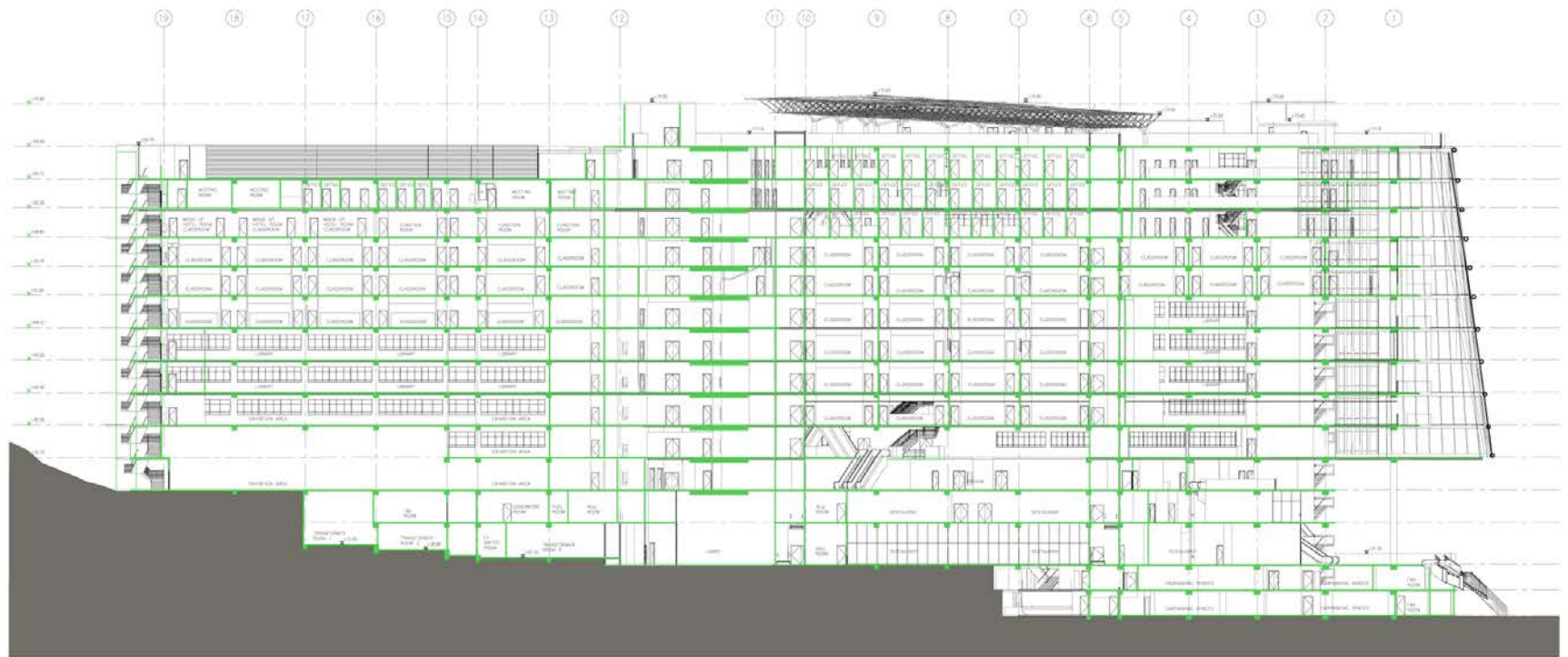
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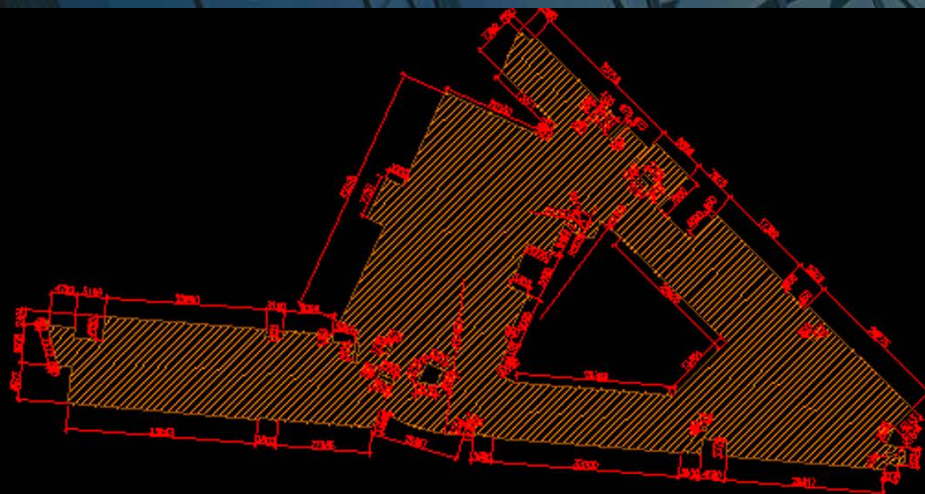
PROJECT MANAGEMENT

FACILITY MANAGEMENT









5/F (+40.40) GROSS FLOOR AREA DIAGRAM

5/F (+40.40) GROSS FLOOR AREA CALCULATION

GFA PER FLOOR		
LEVEL	ROOM	AREA (SQ.M)
LEVEL +40.40	1	4361.420
		4361.420



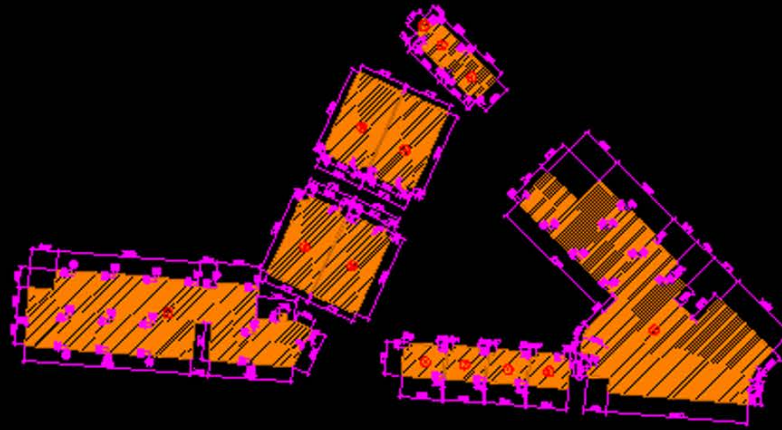
6/F (+44.25) GROSS FLOOR AREA DIAGRAM

6/F (+44.85) GROSS FLOOR AREA CALCULATION

GFA PER FLOOR		
LEVEL	ROOM	AREA (SQ.M)
LEVEL +44.85	1	4332.316
		4332.316



5/F (+40.40) USABLE FLOOR AREA DIAGRAM



SCHEDULE OF PERSONS FOR MEANS OF ESCAPE														
LEVEL	ROOM	USE	USABLE FLOOR AREA (sq. m.)	FSD PERMITTED DENSITY	CAPACITY	MIN. NO. OF EXIT DOORS (FROM ROOM) OR EXIT ROUTES (FROM STOREY)	SCHEDULE MINIMUM NUMBER & WIDTH OF EXIT DOOR & EXIT ROUTE FROM EACH ROOM							
							MIN. TOTAL WIDTH OF				MIN. WIDTH OF EACH			
							REQUIRED		PROVIDED		REQUIRED		PROVIDED	
							EXIT DOORS	EXIT ROUTES	EXIT DOORS	EXIT ROUTES	EXIT DOOR	EXIT ROUTE	EXIT DOOR	EXIT ROUTE
LEVEL +40.40	1	CLEANER'S ROOM	6.049	30	1	1	—	—	—	—	—	—	—	—
LEVEL +40.40	2	STUDY ROOM	49.138	2	25	2	—	—	—	—	750	1050	750	1050
LEVEL +40.40	3	STUDY ROOM	44.458	2	23	2	—	—	—	—	750	1050	750	1050
LEVEL +40.40	4	LIBRARY	1018.305	2	510	3	4500	4500	4500	4500	1200	1200	1200	1200
LEVEL +40.40	5	STUDY ROOM	52.285	2	27	2	—	—	—	—	750	1050	750	1050
LEVEL +40.40	6	STUDY ROOM	52.296	2	27	2	—	—	—	—	750	1050	750	1050
LEVEL +40.40	7	STUDY ROOM	52.419	2	27	2	—	—	—	—	750	1050	750	1050
LEVEL +40.40	8	STUDY ROOM	54.764	2	28	2	—	—	—	—	750	1050	750	1050
LEVEL +40.40	9	LIBRARY	756.991	2	380	2	3000	3000	3000	3000	1050	1050	1050	1050
LEVEL +40.40	10	LECTURE ROOM	169.049	2	85	2	1750	2100	1750	2100	850	1050	850	1050
LEVEL +40.40	11	LECTURE ROOM	168.813	2	85	2	1750	2100	1750	2100	850	1050	850	1050
LEVEL +40.40	12	LECTURE ROOM	169.764	2	85	2	1750	2100	1750	2100	850	1050	850	1050
LEVEL +40.40	13	LECTURE ROOM	170.707	2	86	2	1750	2100	1750	2100	850	1050	850	1050
			2767.018		1389									

## STATUTORY SUBMISSION – MEANS OF ESCAPE CALCULATION







DESIGN

CO-LABORATION

PRESENTATION  
COMMUNICATION

STATUTORY SUBMISSION

**DOCUMENTATION**

PROJECT MANAGEMENT

FACILITY MANAGEMENT

[illegible]

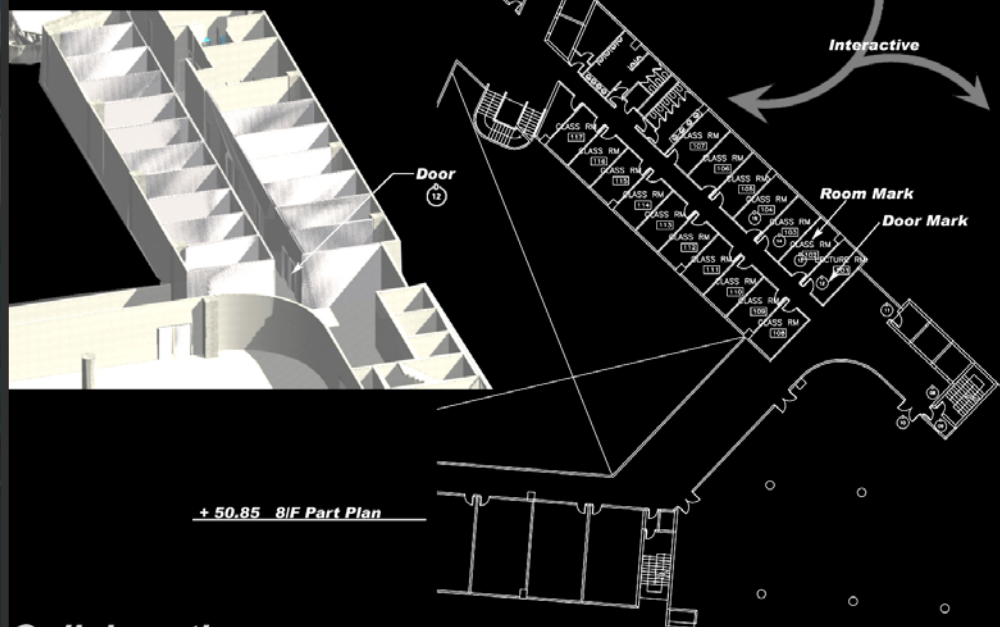
AREA SCHEDULE					
Room No.	Room	Dimension			
		Net Floor Area	Length	Width	Height
101	LECTURE RM.	14m <sup>2</sup>	5641	5772	2750
102	LECTURE RM.	13m <sup>2</sup>	5315	5772	2750
103	LECTURE RM.	14m <sup>2</sup>	5677	5772	2750
104	LECTURE RM.	14m <sup>2</sup>	5677	5772	2750
105	LECTURE RM.	13m <sup>2</sup>	5315	5772	2750
106	LECTURE RM.	14m <sup>2</sup>	5677	5772	2750
107	LECTURE RM.	14m <sup>2</sup>	5677	5772	2750
108	LECTURE RM.	12m <sup>2</sup>	5334	5303	2750
109	LECTURE RM.	12m <sup>2</sup>	5230	4958	2750
110	LECTURE RM.	12m <sup>2</sup>	5230	5303	2750
111	LECTURE RM.	12m <sup>2</sup>	5334	5303	2750
112	LECTURE RM.	12m <sup>2</sup>	5230	4958	2750
113	LECTURE RM.	12m <sup>2</sup>	5303	5303	2750
114	LECTURE RM.	12m <sup>2</sup>	5334	5303	2750
115	LECTURE RM.	12m <sup>2</sup>	5230	4958	2750
116	LECTURE RM.	12m <sup>2</sup>	5302	5303	2750
117	LECTURE RM.	12m <sup>2</sup>	5334	5303	2750

### Linked Schedules

## Interactive

**By using Autodesk Architectural Desktop, all schedules eg. Area Schedule, Finish Schedule, Door Schedule, Window Schedule are related to 3D model.**

**Change in model results in updating of schedules.**



+ 50.85 8/F Part Plan

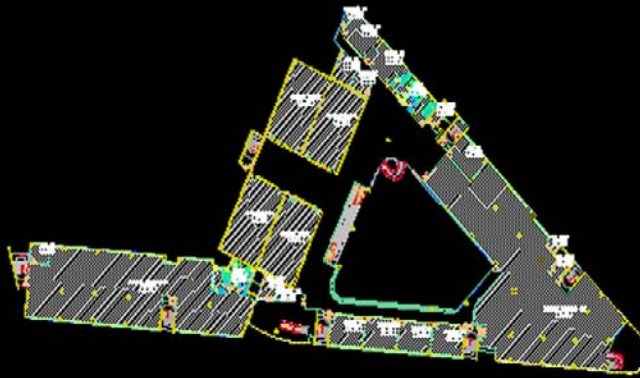
## Collaboration of Information in Documentation & Construction Stage

DOOR AND FRAME SCHEDULE															
DOOR								FRAME					FIRE RATING LABEL	HARDWARE	
MARK	SIZE			MATL	GLAZING	LOUVER		MATL	EL	DETAIL					
	WD	HGT	THK			WD	HGT			HEAD	JAMB	SILL	SET NO	KEYS RM N	
8	750	2000	50	1M	---	0	0	ST	---	T05	T06	T07	1/2HR	---	---
9	750	2000	50	1M	---	0	0	ST	---	T05	T06	T07	1/2HR	---	---
10	1800	2000	40	---	WG	0	0	---	---	---	---	---	2HR	---	---
11	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	1HR	---	---
12	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	1HR	---	---
13	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	1HR	---	---
14	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	1HR	---	---
15	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	1HR	---	---
18	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	1HR	---	---
53	750	2000	50	1M	---	0	0	ST	---	T05	T06	T07	1/2HR	---	---
54	750	2000	50	1M	---	0	0	ST	---	T05	T06	T07	1/2HR	---	---
55	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	1HR	---	---
57	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	1HR	---	---
58	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	1HR	---	---
56	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	---	---	---
59	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	---	---	---
60	750	2000	50	1M	---	0	0	ST	---	T05	T06	T07	---	---	---
61	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	---	---	---
62	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	---	---	---
83	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	---	---	---
84	900	2000	50	1M	TG	0	0	ST	---	T05	T06	T07	---	---	---

# BIM Application

# INTERACTIVE COLLABORATION OF INFORMATION ARCHITECTURAL





BIM 3D MODEL - 01									
Item	Code	Description	Quantity	Unit	Material	Color	Finish	Notes	Remarks
1	01	Concrete	100	m³	Concrete	Grey	Smooth		
2	02	Reinforcement	100	m³	Reinforcement	Grey	Smooth		
3	03	Formwork	100	m²	Formwork	Grey	Smooth		
4	04	Brickwork	100	m³	Brickwork	Red	Smooth		
5	05	Plaster	100	m³	Plaster	White	Smooth		
6	06	Paint	100	m²	Paint	White	Smooth		
7	07	Roofing	100	m²	Roofing	Grey	Smooth		
8	08	Cladding	100	m²	Cladding	Grey	Smooth		
9	09	Windows	100	m²	Windows	White	Smooth		
10	10	Doors	100	m²	Doors	White	Smooth		

BIM 3D MODEL - 02									
Item	Code	Description	Quantity	Unit	Material	Color	Finish	Notes	Remarks
1	01	Concrete	100	m³	Concrete	Grey	Smooth		
2	02	Reinforcement	100	m³	Reinforcement	Grey	Smooth		
3	03	Formwork	100	m²	Formwork	Grey	Smooth		
4	04	Brickwork	100	m³	Brickwork	Red	Smooth		
5	05	Plaster	100	m³	Plaster	White	Smooth		
6	06	Paint	100	m²	Paint	White	Smooth		
7	07	Roofing	100	m²	Roofing	Grey	Smooth		
8	08	Cladding	100	m²	Cladding	Grey	Smooth		
9	09	Windows	100	m²	Windows	White	Smooth		
10	10	Doors	100	m²	Doors	White	Smooth		

BIM 3D MODEL - 03									
Item	Code	Description	Quantity	Unit	Material	Color	Finish	Notes	Remarks
1	01	Concrete	100	m³	Concrete	Grey	Smooth		
2	02	Reinforcement	100	m³	Reinforcement	Grey	Smooth		
3	03	Formwork	100	m²	Formwork	Grey	Smooth		
4	04	Brickwork	100	m³	Brickwork	Red	Smooth		
5	05	Plaster	100	m³	Plaster	White	Smooth		
6	06	Paint	100	m²	Paint	White	Smooth		
7	07	Roofing	100	m²	Roofing	Grey	Smooth		
8	08	Cladding	100	m²	Cladding	Grey	Smooth		
9	09	Windows	100	m²	Windows	White	Smooth		
10	10	Doors	100	m²	Doors	White	Smooth		

BIM 3D MODEL - 04									
Item	Code	Description	Quantity	Unit	Material	Color	Finish	Notes	Remarks
1	01	Concrete	100	m³	Concrete	Grey	Smooth		
2	02	Reinforcement	100	m³	Reinforcement	Grey	Smooth		
3	03	Formwork	100	m²	Formwork	Grey	Smooth		
4	04	Brickwork	100	m³	Brickwork	Red	Smooth		
5	05	Plaster	100	m³	Plaster	White	Smooth		
6	06	Paint	100	m²	Paint	White	Smooth		
7	07	Roofing	100	m²	Roofing	Grey	Smooth		
8	08	Cladding	100	m²	Cladding	Grey	Smooth		
9	09	Windows	100	m²	Windows	White	Smooth		
10	10	Doors	100	m²	Doors	White	Smooth		

BIM 3D MODEL - 05									
Item	Code	Description	Quantity	Unit	Material	Color	Finish	Notes	Remarks
1	01	Concrete	100	m³	Concrete	Grey	Smooth		
2	02	Reinforcement	100	m³	Reinforcement	Grey	Smooth		
3	03	Formwork	100	m²	Formwork	Grey	Smooth		
4	04	Brickwork	100	m³	Brickwork	Red	Smooth		
5	05	Plaster	100	m³	Plaster	White	Smooth		
6	06	Paint	100	m²	Paint	White	Smooth		
7	07	Roofing	100	m²	Roofing	Grey	Smooth		
8	08	Cladding	100	m²	Cladding	Grey	Smooth		
9	09	Windows	100	m²	Windows	White	Smooth		
10	10	Doors	100	m²	Doors	White	Smooth		

**INTERACTIVE COLLABORATION OF INFORMATION  
BUILDING SERVICES**



ELEC POWER SCHEDULE TABLE

ELEC POWER SCHEDULE TABLE														
Level	Room Number	Room Name	ELECTRICAL POWER											
			POWER SUPPLY			PROVISIONS						I.T.		
			Normal	NormalEssen	13ampSocket	ComputerSocket	ShaverSocket	TeleSocket	TvSocket-FMsocket	Twln13ampSocket	Intercom	Smartcard	CCTV	
5	01	LEARNING RESOURCE CTR		✓	0	0	0	0	0	0			✓	
5	02	PROJECT RM		✓	0	0	0	0	0	0			✓	
5	03	PROJECT RM		✓	0	0	0	0	0	0			✓	
5	04	PROJECT RM		✓	0	0	0	0	0	0			✓	
5	05	PROJECT RM		✓	0	0	0	0	0	0			✓	
5	06	LEARNING RESOURCE CTR		✓	0	0	0	0	0	0			✓	
5	07	PROJECT RM		✓	0	0	0	0	0	0			✓	
5	08	PROJECT RM		✓	0	0	0	0	0	0			✓	
5	09	LECTURE THEATRE		✓	0	0	0	0	0	0			✓	
5	10	LECTURE THEATRE		✓	0	0	0	0	0	0			✓	
5	11	LECTURE THEATRE		✓	0	0	0	0	0	0			✓	
5	12	LECTURE THEATRE		✓	0	0	0	0	0	0			✓	
5	501	TOILET		✓	0	0	0	0	0	0			✓	
5	502	TOILET		✓	0	0	0	0	0	0			✓	
5	601	AHU RM		✓	0	0	0	0	0	0			✓	
5	602	ELECTRICAL RM		✓	0	0	0	0	0	0			✓	
5	603	AHU RM		✓	0	0	0	0	0	0			✓	
5	604	SERVER RM		✓	0	0	0	0	0	0			✓	
5	605	AHU RM		✓	0	0	0	0	0	0			✓	
5	606	CLEANER'S RM		✓	0	0	0	0	0	0			✓	
5	701	LIFT LOBBY		✓	0	0	0	0	0	0			✓	
5	702	LIFT LOBBY		✓	0	0	0	0	0	0			✓	
5	703	LIFT LOBBY		✓	0	0	0	0	0	0			✓	
5	704	LIFT LOBBY		✓	0	0	0	0	0	0			✓	

FIRE SERVICES SCHEDULE TABLE

Level	Room Number	Room Name	FIRE SERVICES
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INTERACTIVE COLLABORATION OF INFORMATION  
BUILDING SERVICES





DESIGN

CO-LABORATION

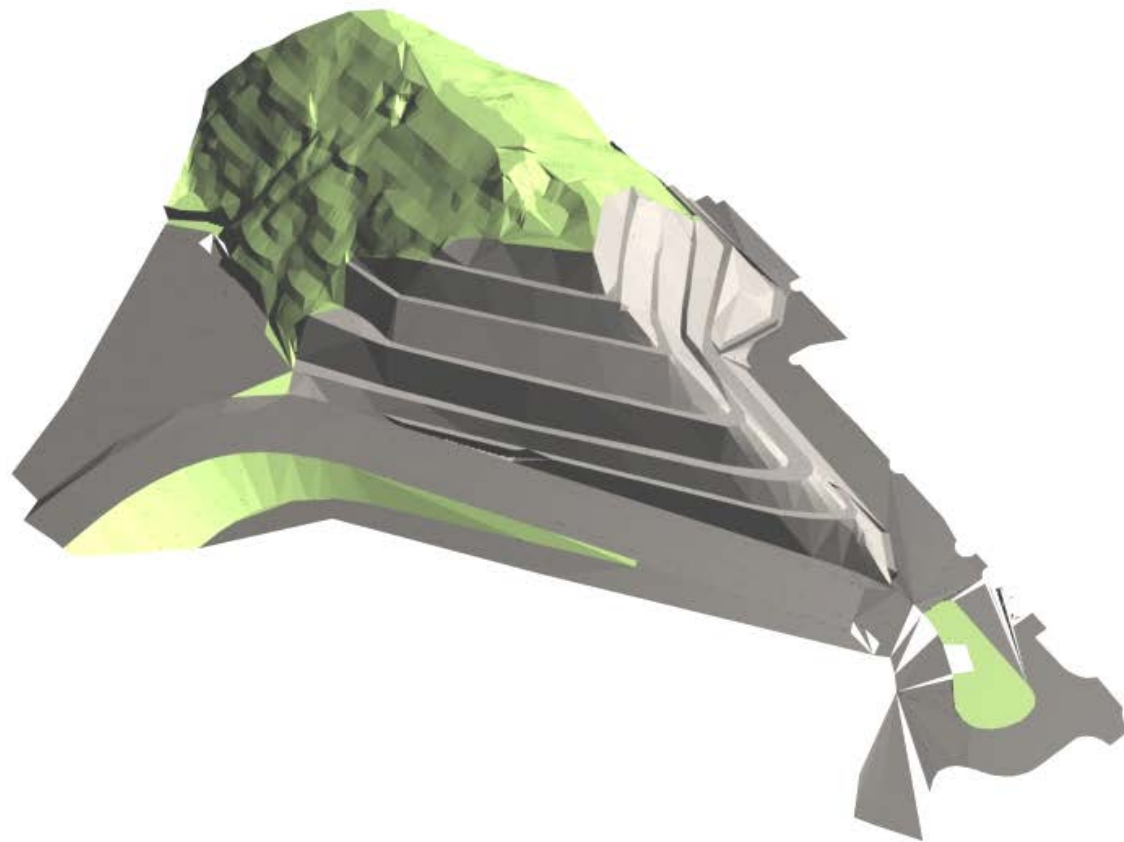
PRESENTATION  
COMMUNICATION

STATUTORY SUBMISSION

DOCUMENTATION

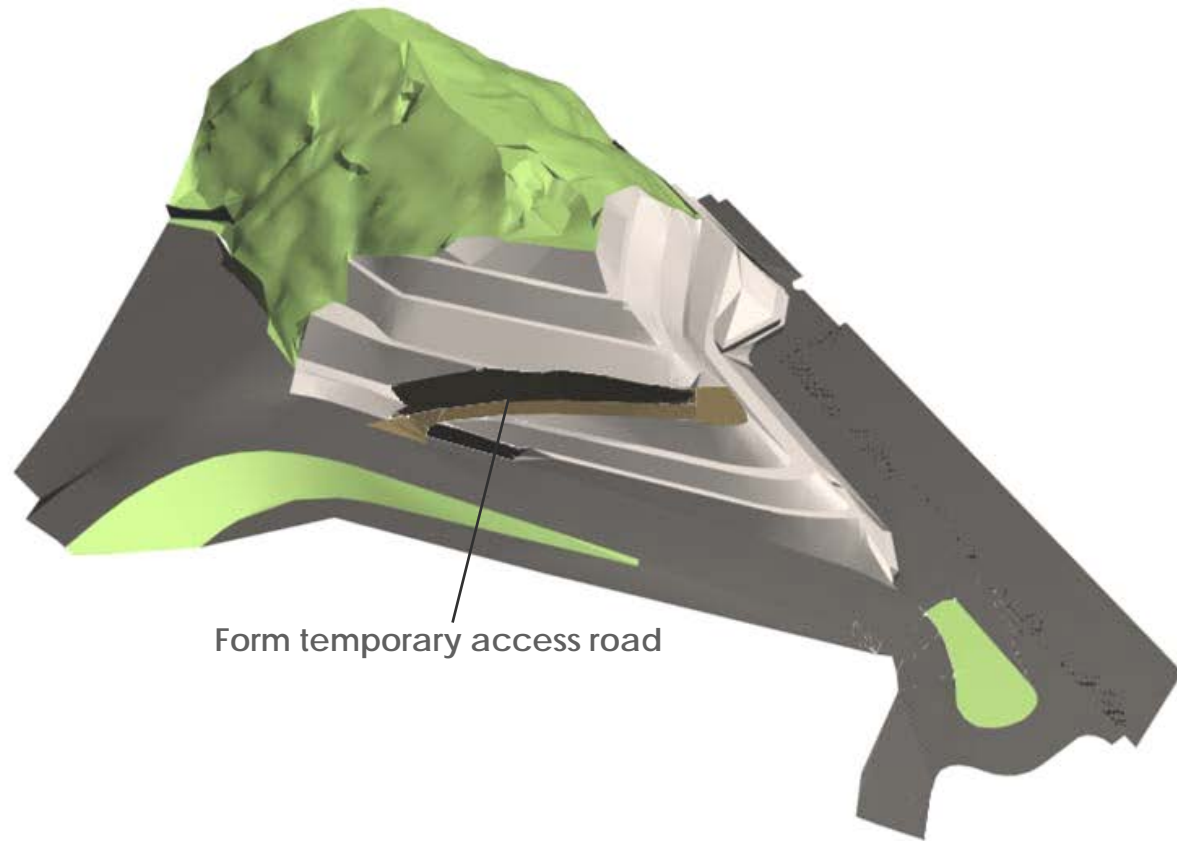
**PROJECT MANAGEMENT**

FACILITY MANAGEMENT



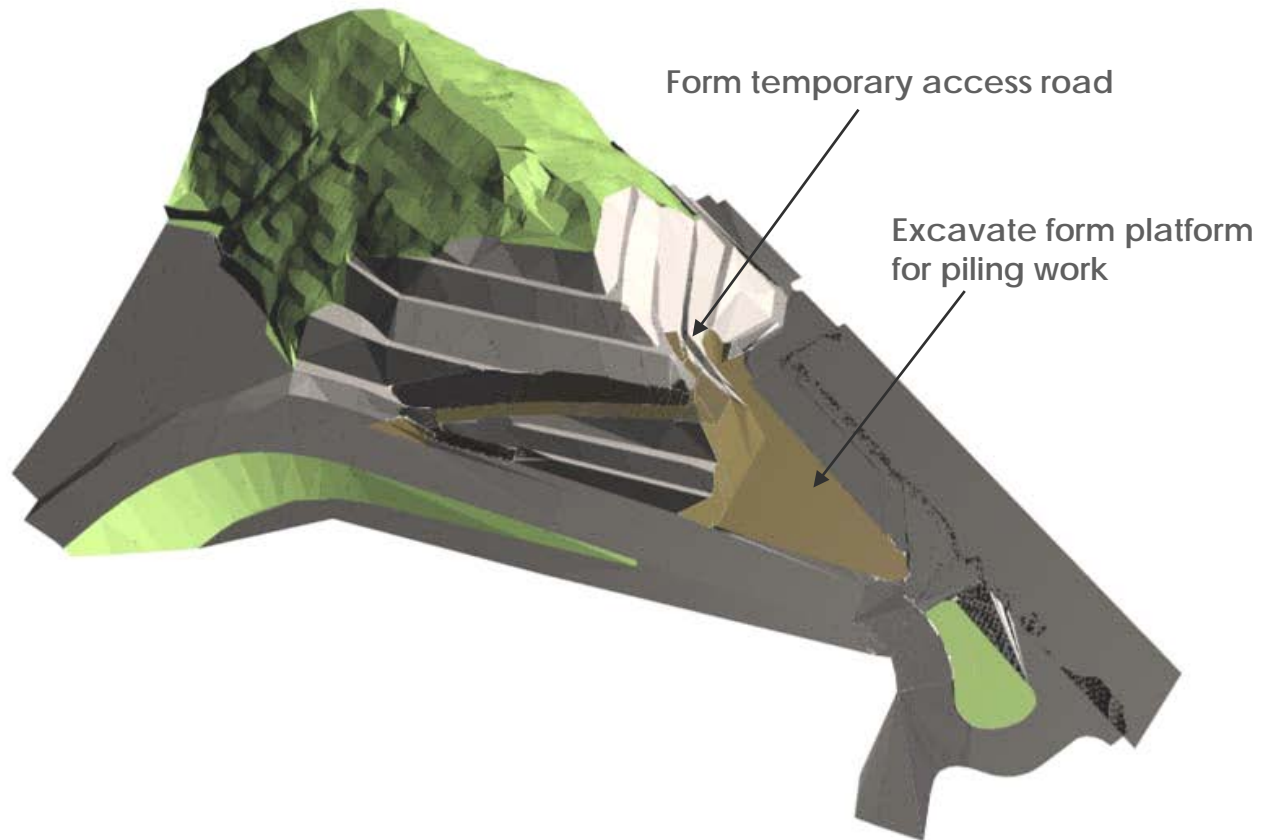
Existing Site





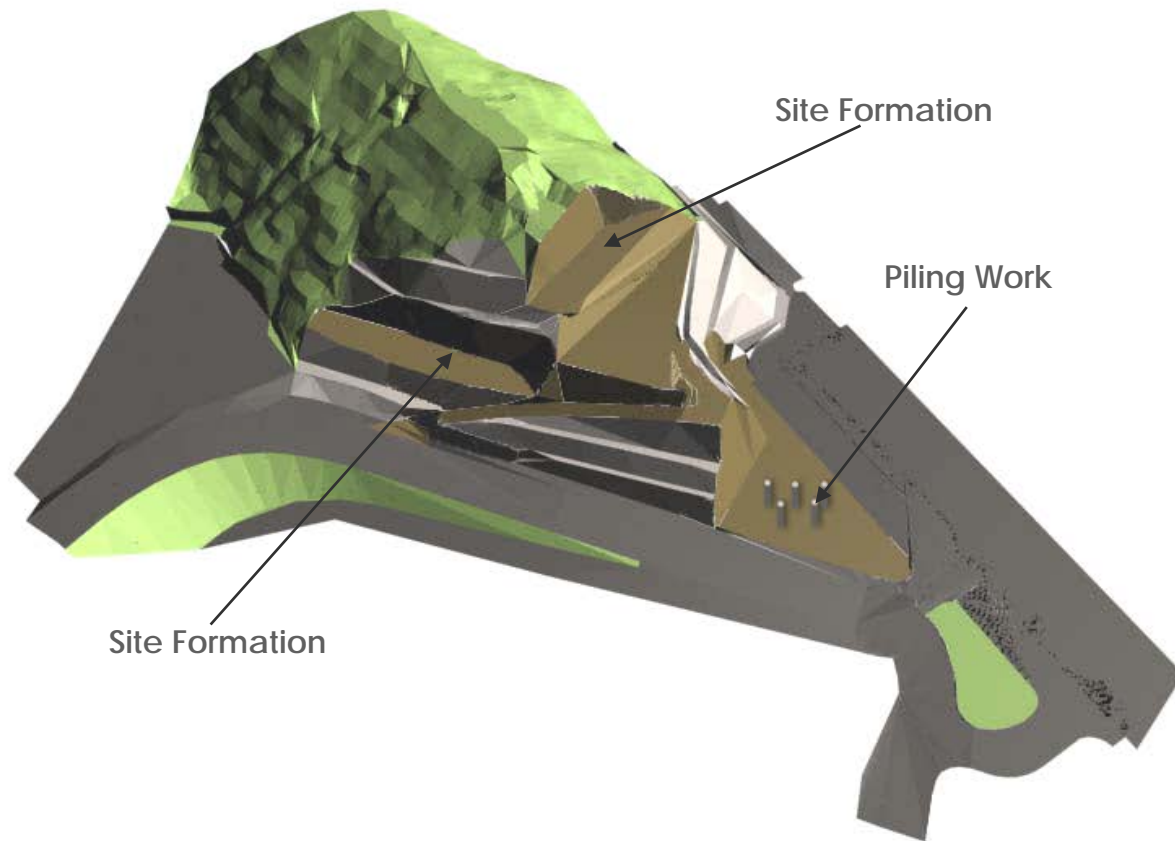
Form temporary access road

Stage 1

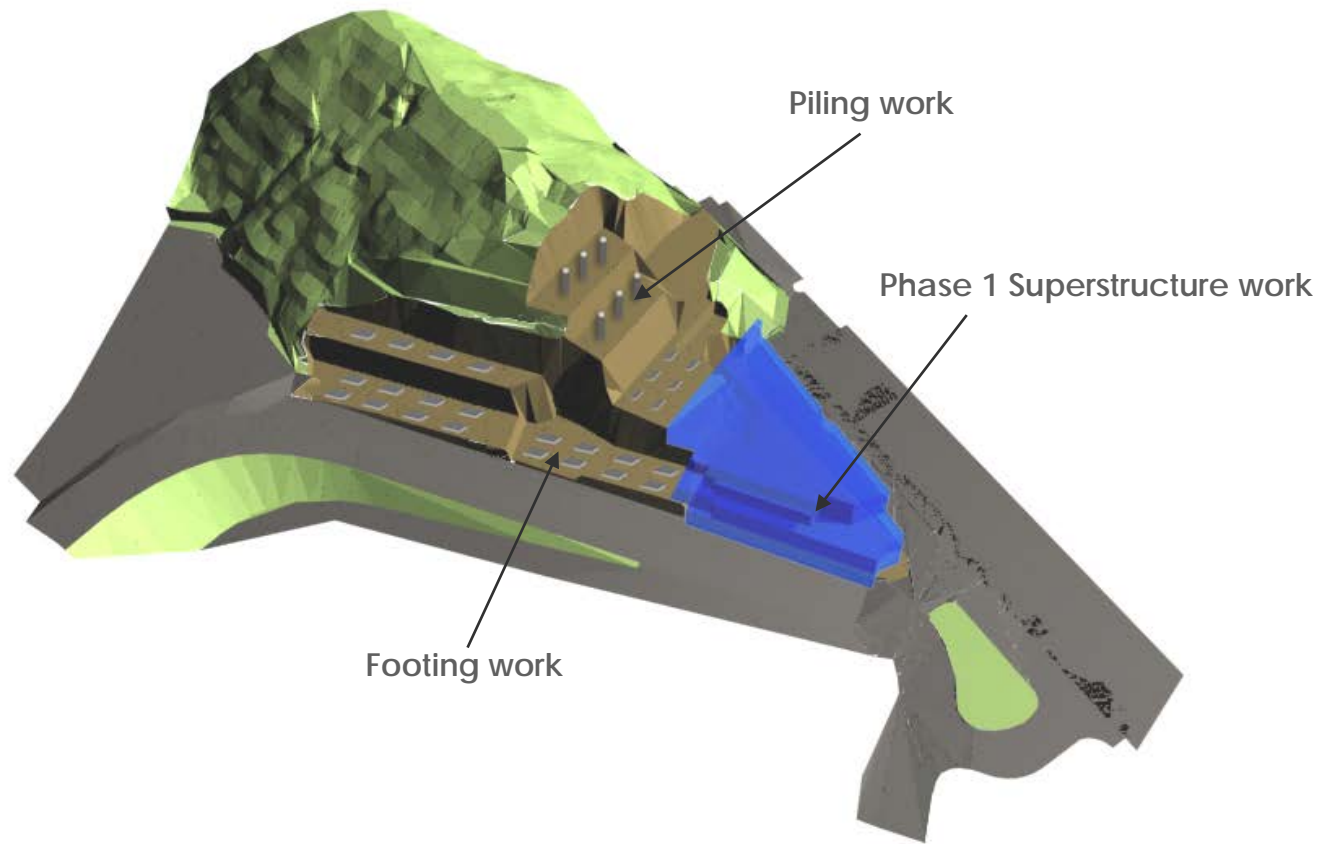


Stage 2

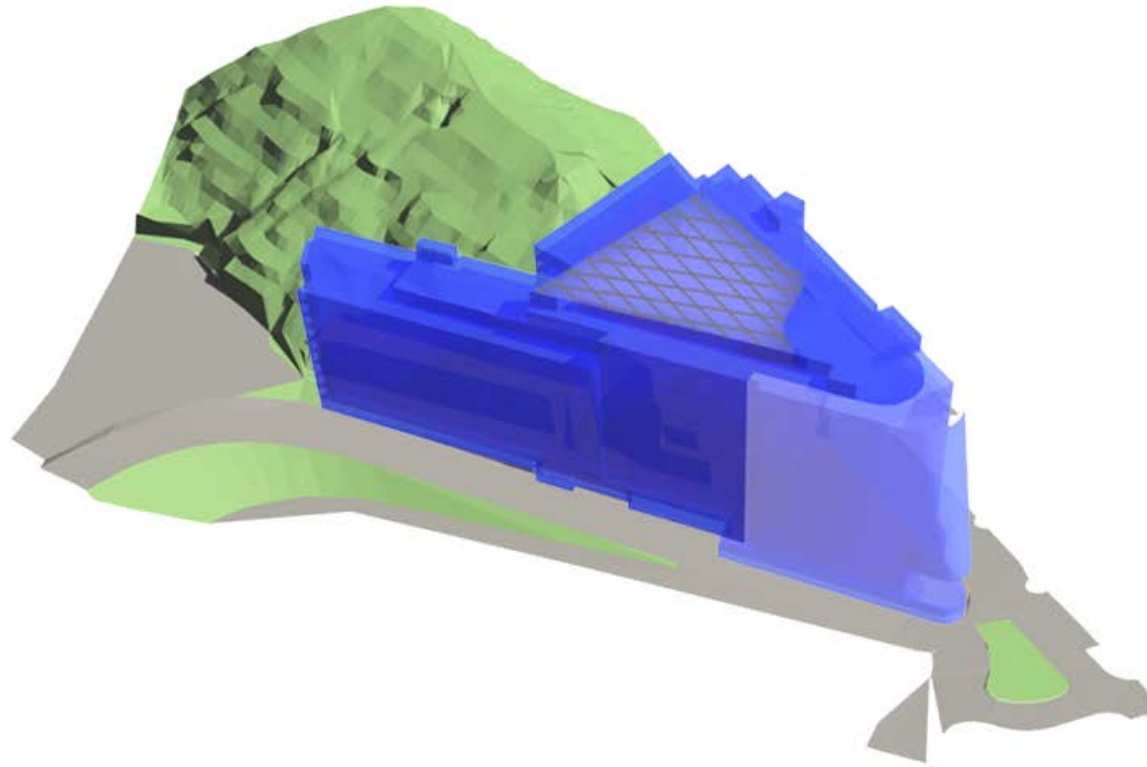




Stage 3







Completion



DESIGN

CO-LABORATION

PRESENTATION  
COMMUNICATION

STATUTORY SUBMISSION

DOCUMENTATION

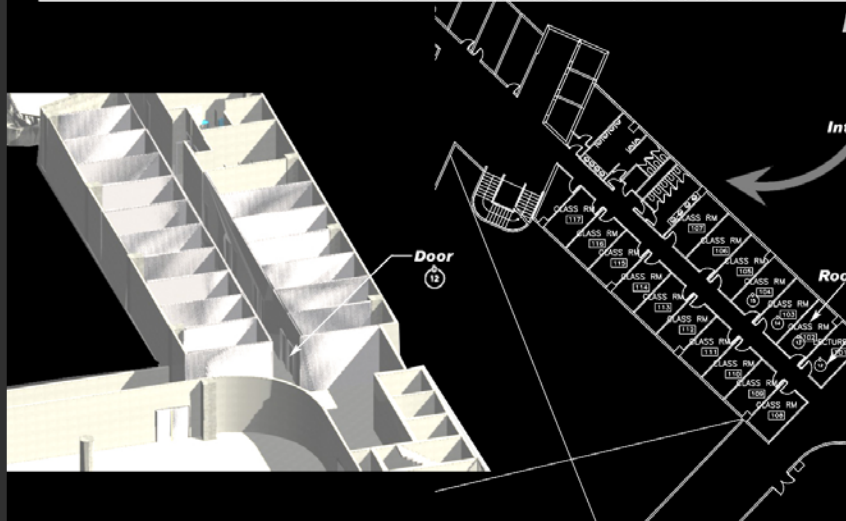
PROJECT MANAGEMENT

**FACILITY MANAGEMENT**



## ROOM FINISH SCHEDULE

Room No.	Room	FLOOR		WALLS												CEIL							
				NORTH				SOUTH				EAST						WEST					
		MATL	COL	MATL	COLOR	MATL	COLOR	MATL	COLOR	MATL	COLOR	MATL	COLOR	MATL	COLOR	MATL	COLOR						
		CN	HT	WHITE	EP	FB	UB	RED	WHITE	YEL	EP	FB	UB	RED	WHITE	YEL	EP	FB	UB	RED	WHITE	YEL	CB
101	LECTURE RM.																						
102	LECTURE RM.																						
103	LECTURE RM.																						
104	LECTURE RM.																						
105	LECTURE RM.																						
106	LECTURE RM.																						
107	LECTURE RM.																						
108	LECTURE RM.																						
109	LECTURE RM.																						
110	LECTURE RM.																						
111	LECTURE RM.																						
112	LECTURE RM.																						
113	LECTURE RM.																						
114	LECTURE RM.																						
115	LECTURE RM.																						
116	LECTURE RM.																						
117	LECTURE RM.																						



1500x500mm FRESH AIR LOUVRE (TYPICAL)

EXHAUST AIR LOUVRE (TYPICAL)

PRETREATED UNIT (TYPICAL)

VISUAL FIRE ALARM

PROJECTOR

FAP-1

FAP

ø32mm SPRINKLER PIPE

ø32mm SPRINKLER PIPE

ø40mm SPRINKLER PIPE

ø50mm CONCRETE PIPE

ELEC POWER SCHEDULE TABLE

Level	Room Number	Room Name	ELECTRICAL POWER PROVISIONS										I.T.		
			POWER SUPPLY		13ampSocket	ComputerSocket	ShaverSocket	TeleSocket	TVsocket-FMsocket	Twin13ampSocket	Intercom	Smartcard	CCTV		
			Normal	NormalEben											
5	01	LEARNING RESOURCE CTR		✓	0	0	0	0	0	0			✓		
5	02	PROJECT RM		✓	0	0	0	0	0	0			✓		
5	03	PROJECT RM		✓	0	0	0	0	0	0			✓		



**Thank You...**