



BIM Applications in Practice

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デービッド・ファン シニア・アソシエート、BIM部長

Aedas Ltd

www.aedas.com



Where we are now

Aedas



- the 4th largest architectural practice in the world with over 2,500 staff working from 39 offices
- the largest in HK with over 800 staff



[illegible]

Leaders in use of BIM Technology

Aedas

BIM

Building Information Modeling

A New Chapter of Building Industry



香港
Hong Kong

Autodesk



AUTODESK INDUSTRY ADVISORY BOARD (AIAB) — THE 1ST BIM USER GROUP

On April 2005, a group of Revit users found that there was a need to form a user group to promote the development, usage and awareness of BIM design technology in HK. Therefore, The Autodesk Industry Advisory Board (AIAB) was founded. Through seminars and technology exchange conferences organized by AIAB, the use of the BIM technology in Hong Kong is getting more and more popular.

BIM is one of the keys to the future success of the Hong Kong AEC industry. The benefits are huge and some of the key players in the industry are already successfully applying BIM in different projects.

The adoption of the technology is progressing rapidly. In this section, several of the well known industry leaders are displaying how BIM helped to resolve different problems in their projects.



<http://www.aiab.org>

Being Leaders in the use of BIM technology in Hong Kong, our Project Team is led by Members of the Autodesk Industry Advisory Board (AIAB)





Information 情報

Graphical

図面上

Plan

Section

Elevation

Area Diagrams

Schematic Designs

General Building Plan

Structural Plans

E/M Drawings

Schematics

Details

Other Diagrams...

Non-Graphical

非図面上

Area Schedule

Finishing Schedules

Door/Window/Louvre

Schedules

Beam/ Column Schedule

Equipment Schedule...

Program

Cost Estimate

Quantity Take Off

Bills of Quantities

Variation Assessments



As a result.....

Inefficiencies（低生産性）, mistakes(エラー) and delays（工期延長） account for \$200 billion of the \$650 billion spent on construction in America every year.

New wiring, The Economist, January 13th, 2000

In the UK alone, the annual cost of rectifying construction defects(デフエクト) caused by poorly detailed drawings and operatives being given incorrect instructions has been put at £1bn (≈\$1.66bn).

IT Construction Best Practice service, <http://www.itcbp.org.uk>

The process of construction is itself repeated in its essentials from project to project. Indeed, research suggests that up to 80% of inputs into buildings are repeated.

M4i, <http://www.m4i.org.uk>



Information

Graphical

CAD SYSTEMS

e.g. AutoCAD,
Microstation

- Plan
- Section
- Elevation
- Area Diagrams
- Schematic Designs
- General Building Plan
- Structural Plans
- E/M Drawings
- Schematics
- Other Diagrams

Non-Graphical

- Area Schedule
- Word Schedules
- Door/Window/Louvre Sch
- Excel (spreadsheet)
- Beam/Column Schedule
- Access (Data Base)
- Program
- MS Project
- BQ Softwares
- Quantity Take Off
- Bills of Quantities
- Variations



Information

Graphical

- Plan
- Section
- Elevation
- Area Diagrams
- Schematic Designs
- General Building Plan
- Structural Plans
- E/M Drawings
- Schematics
- Other Diagrams

BIM

Non-Graphical

- Area Schedule
- Fitting Schedules
- Door/Window/Louvre Sch
- Beam/Column Schedule
- Equipment Schedule
- Program
- Cost Estimate
- Quantity Take Off
- Bills of Quantities
- Variations

Building Information Modeling

信息化建筑模型

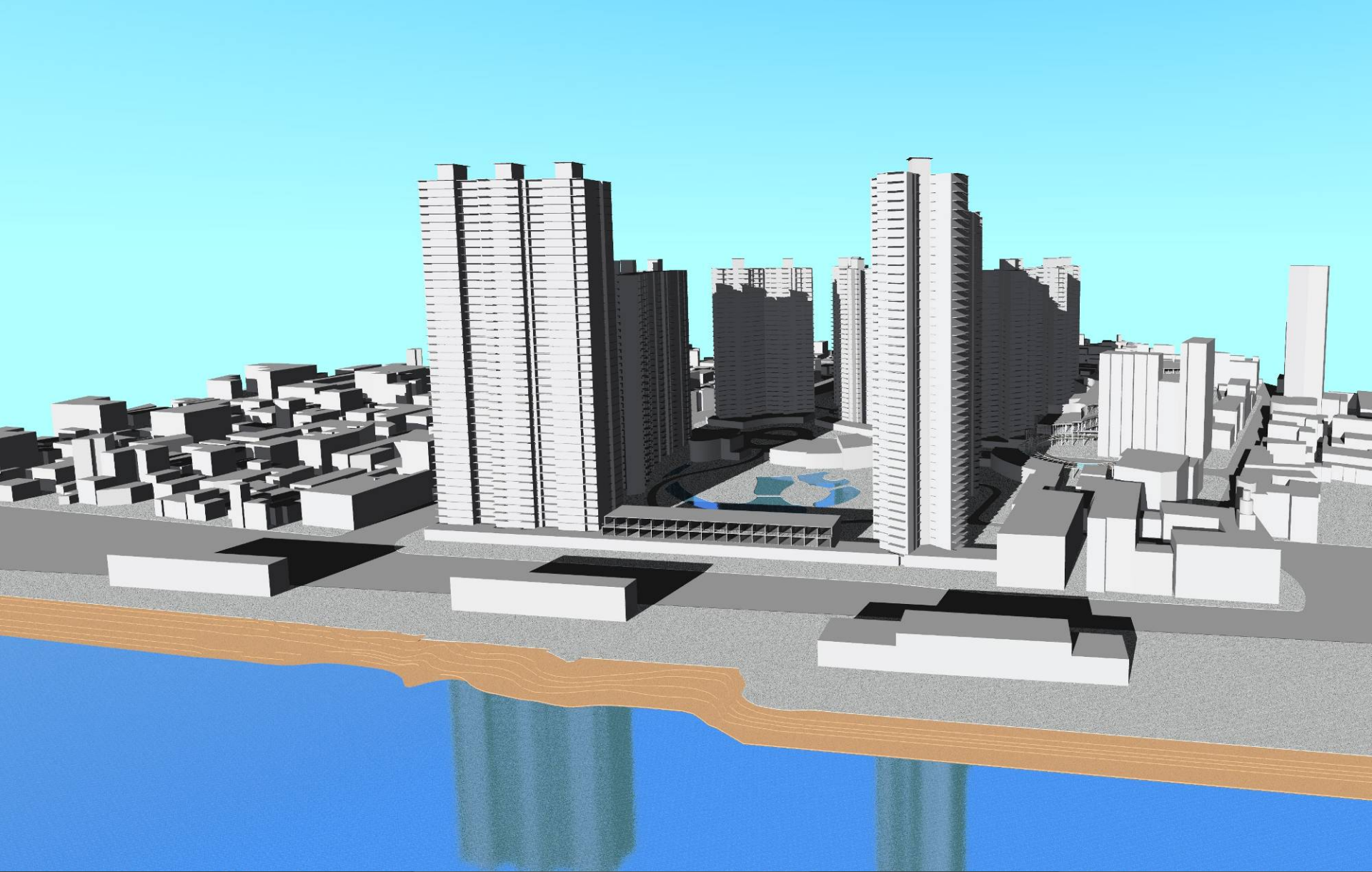
Use of Building Information Modeling (BIM)

BIMの活用

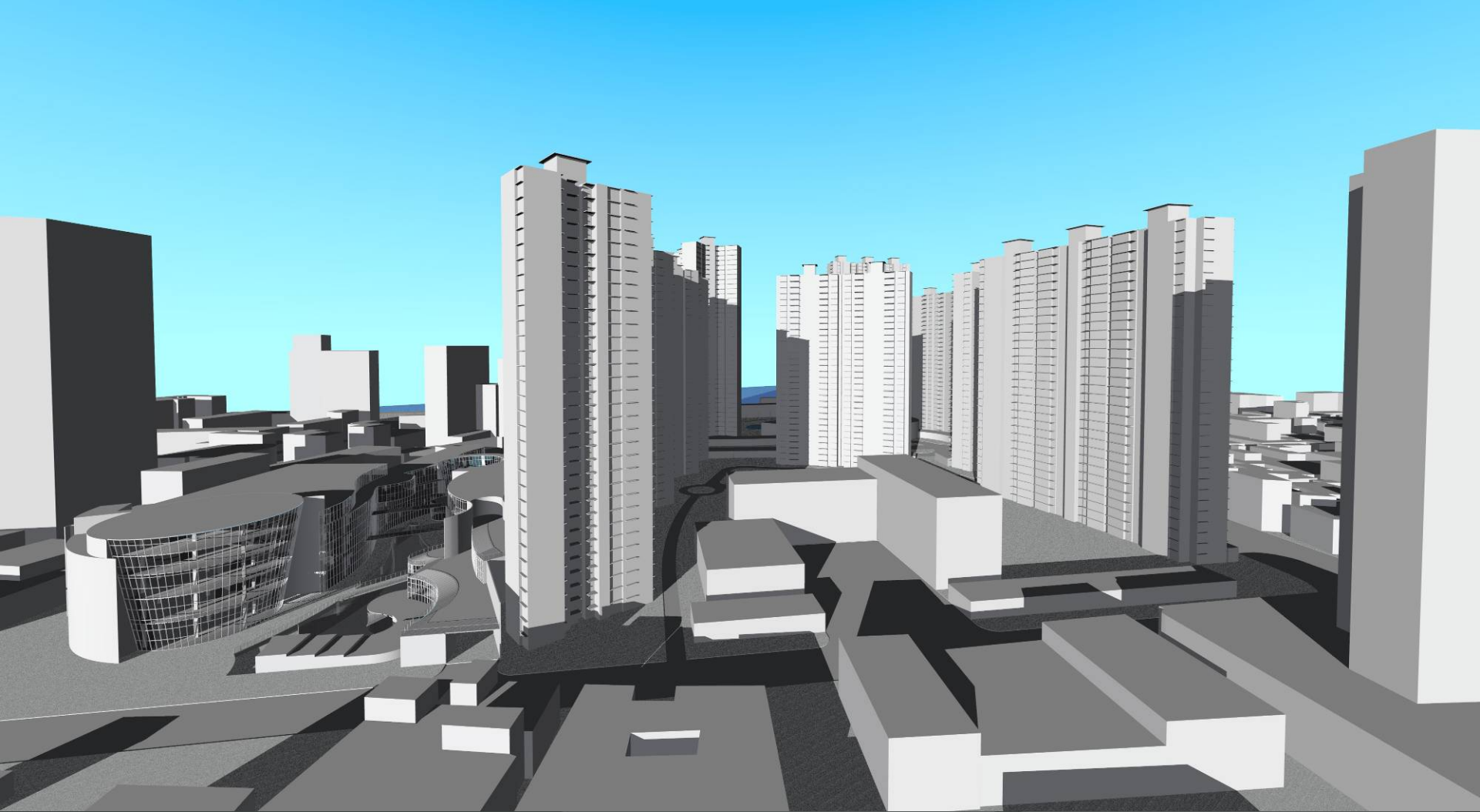
Aedas

1. **Design visualization** 設計の可視化
2. **Drawing Productions** 図面製作
3. **Services Co-ordination and Clash detection with other disciplines** 多部門との連携と干渉チェック
4. **Quantity taking and preparation of Tender Document** 数量拾い及び入札書類の作成
5. **Automated Statutory Submission** 確認申請図書作成の自動化
6. **Scientific analysis of different environmental aspects** 様々な環境解析
7. **Supply Chain Integration with the manufacturing and production** サプライヤとの連携
8. **Complex Geometry** 複雑な形状を実現可能

- 1. Design visualization** 設計の可視化
2. Drawing Productions
3. Services Co-ordination and Clash detection with other disciplines
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BUILDING IN CONTEXT



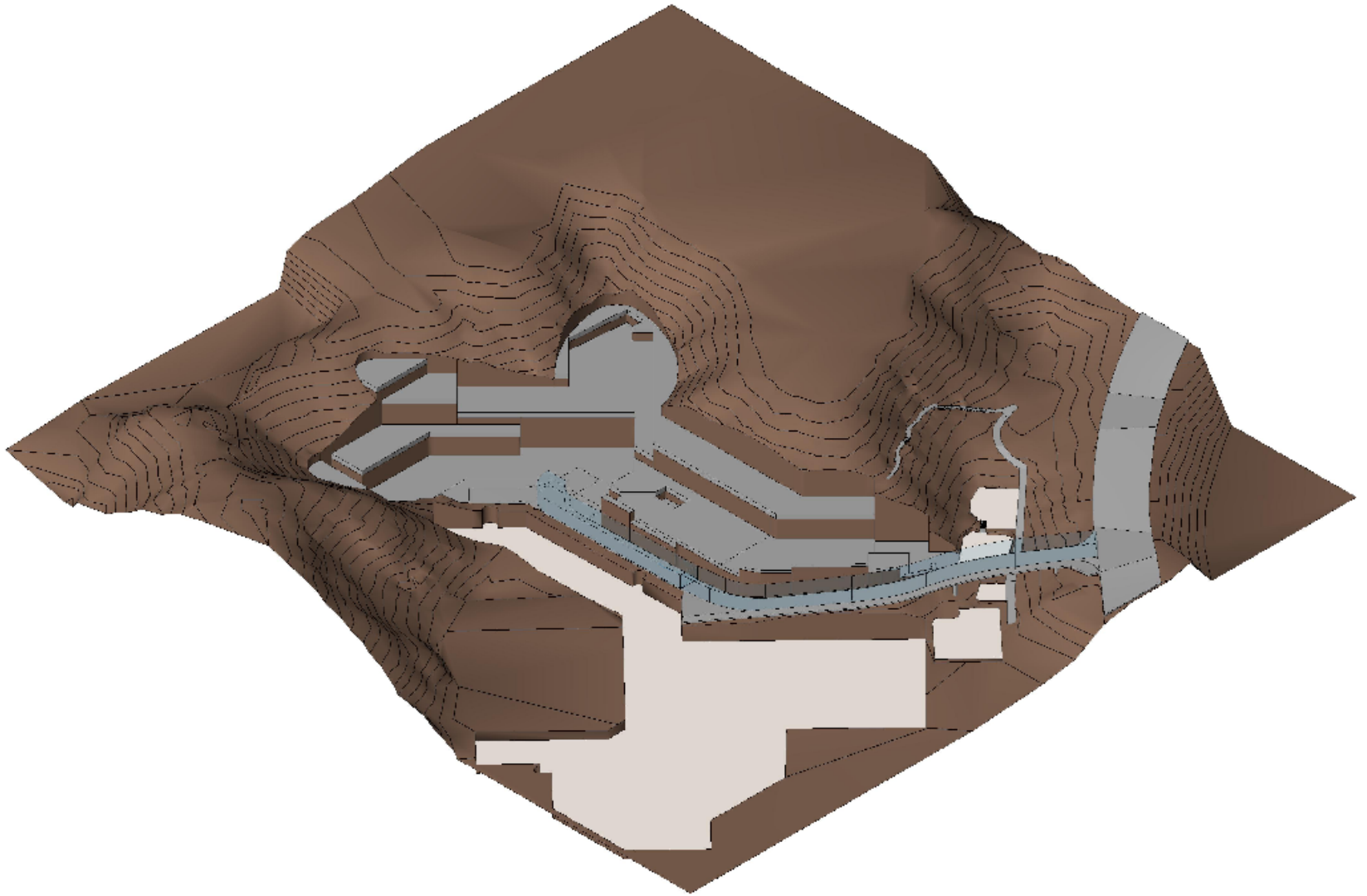
BUILDING IN CONTEXT



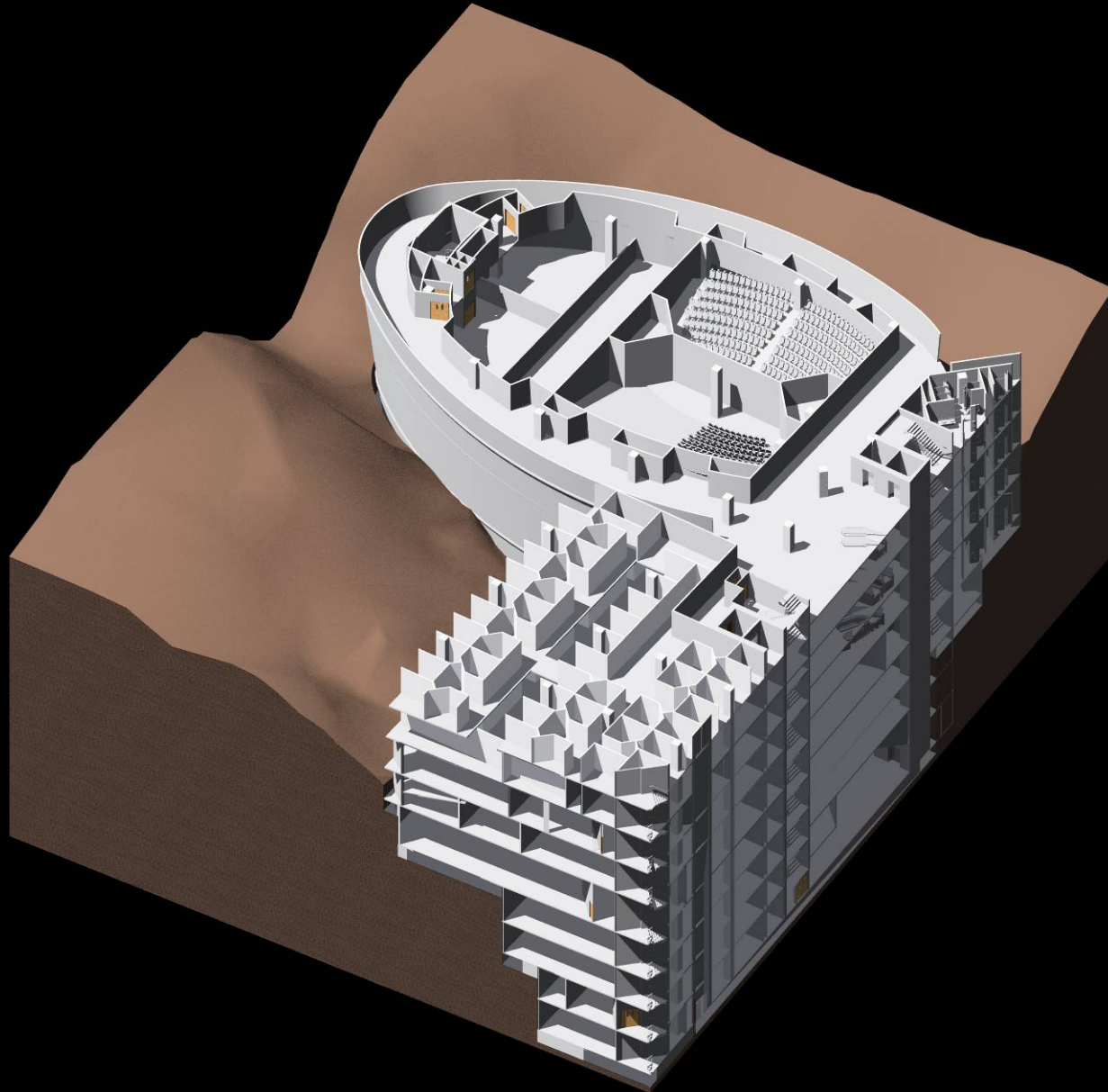
BUILDING IN GOOGLE EARTH

Aedas





TOPOGRAPHY HANDLING



BUILDING IN SITE CONTEXT





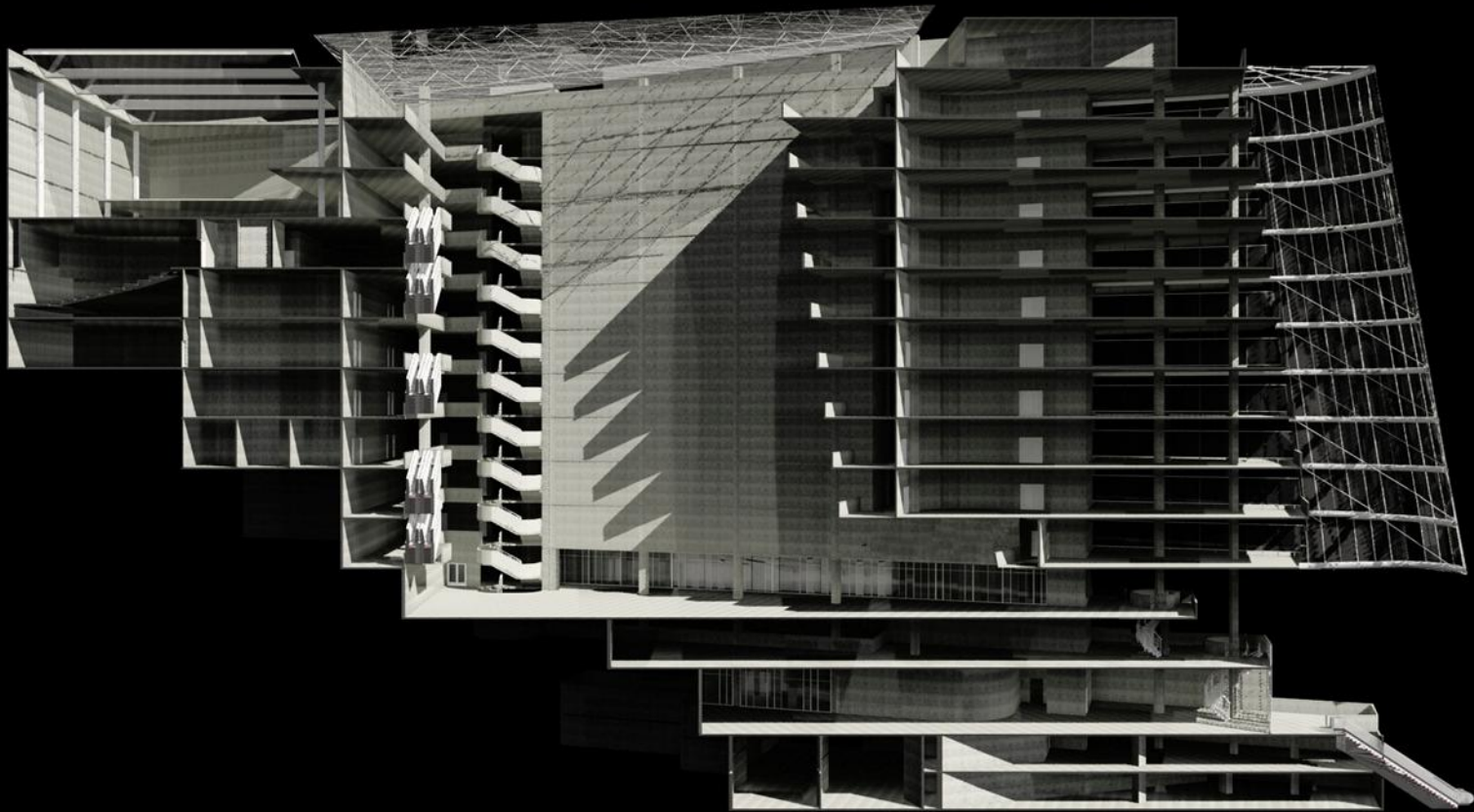




PERSPECTIVE



PERSPECTIVE



CUT AWAY PERSPECTIVE







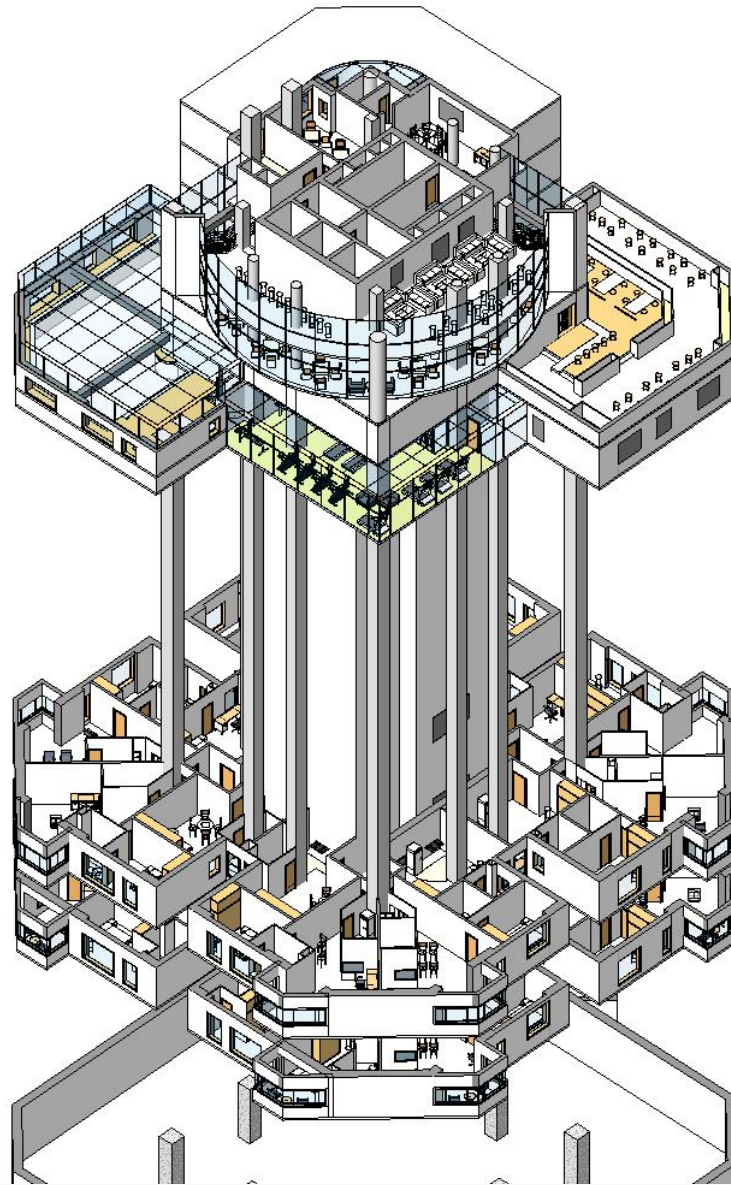




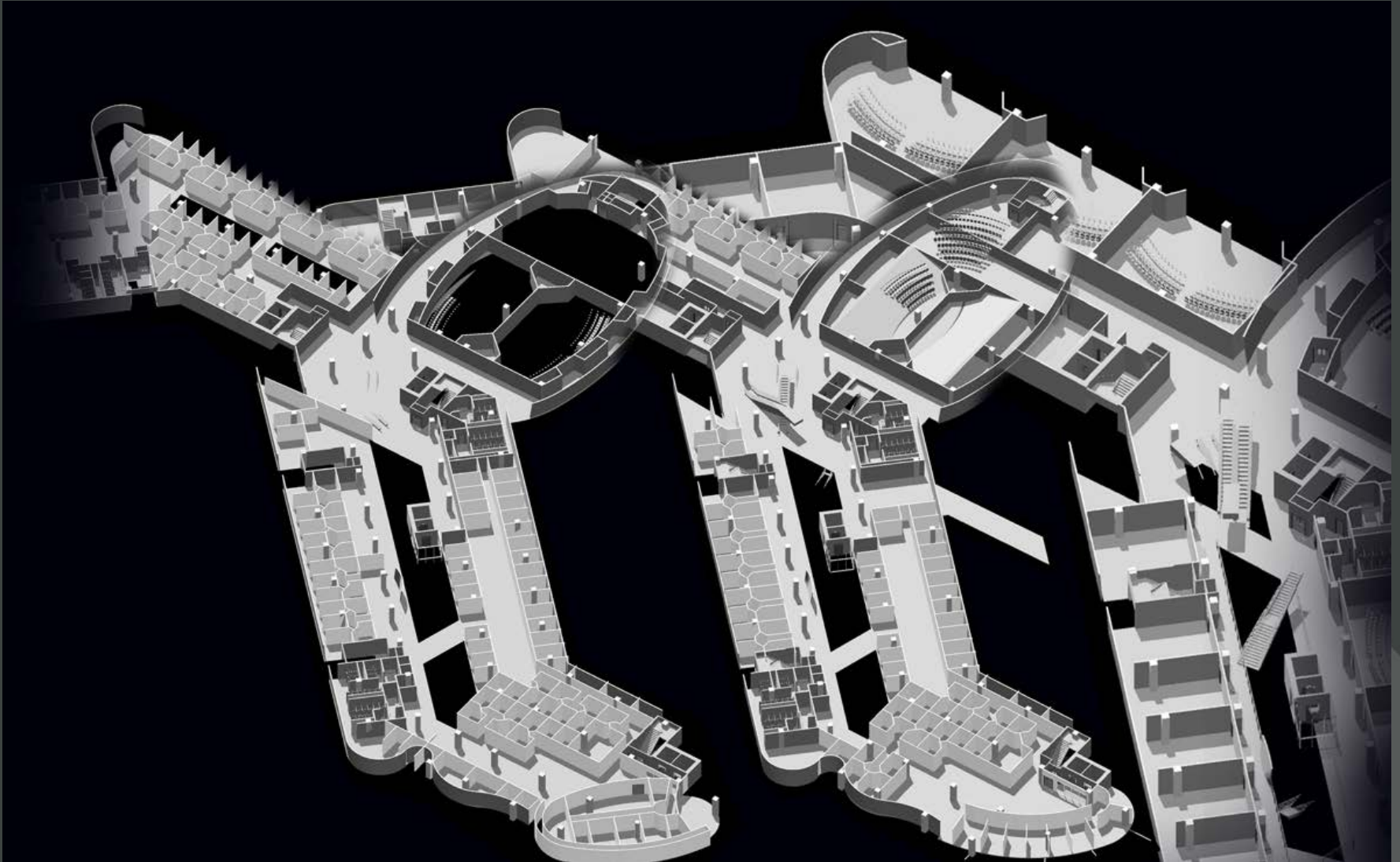
VISUALIZATION



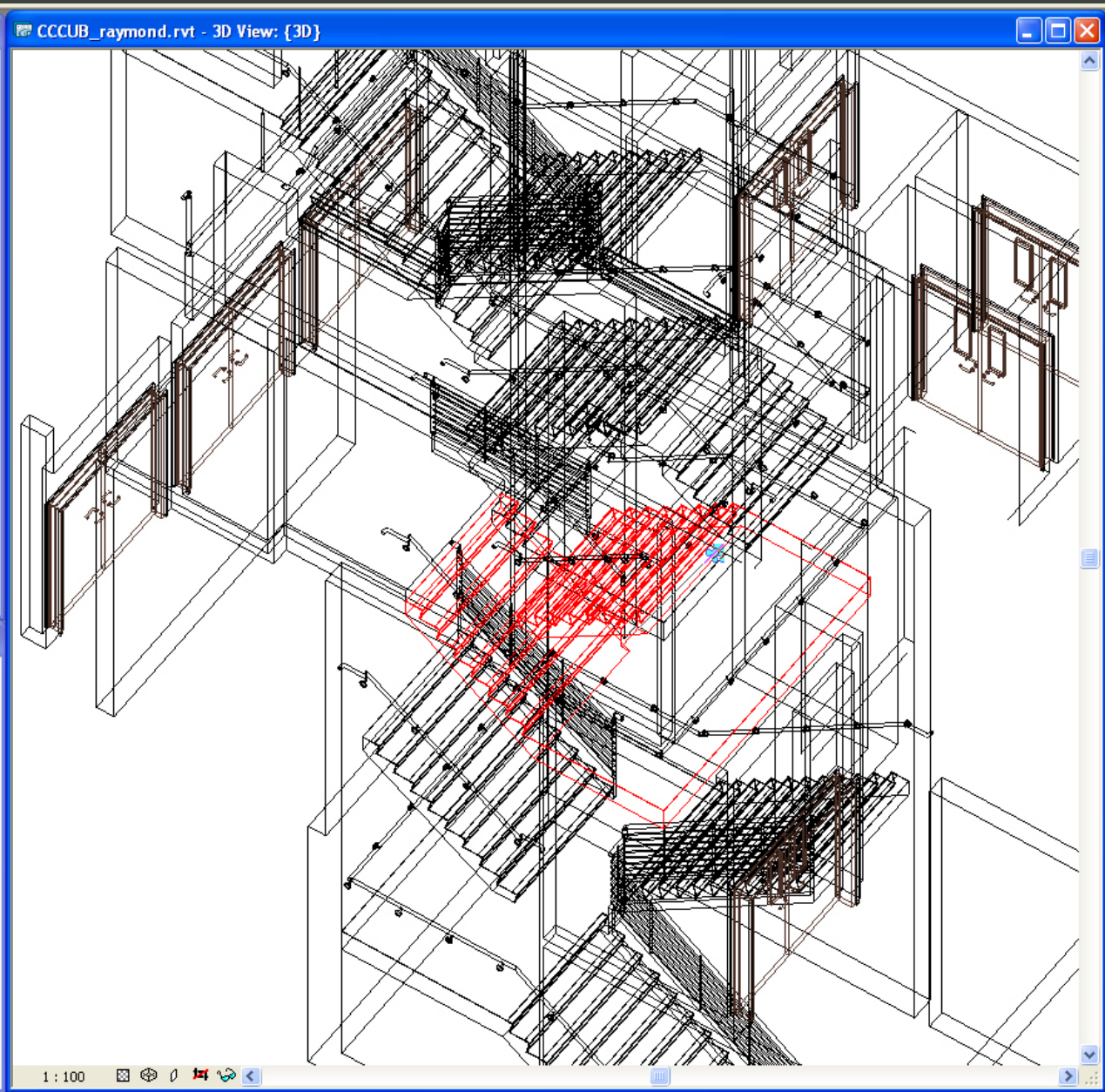
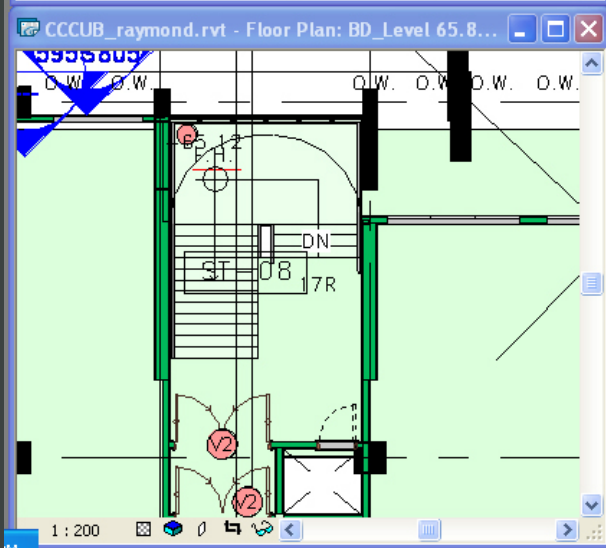
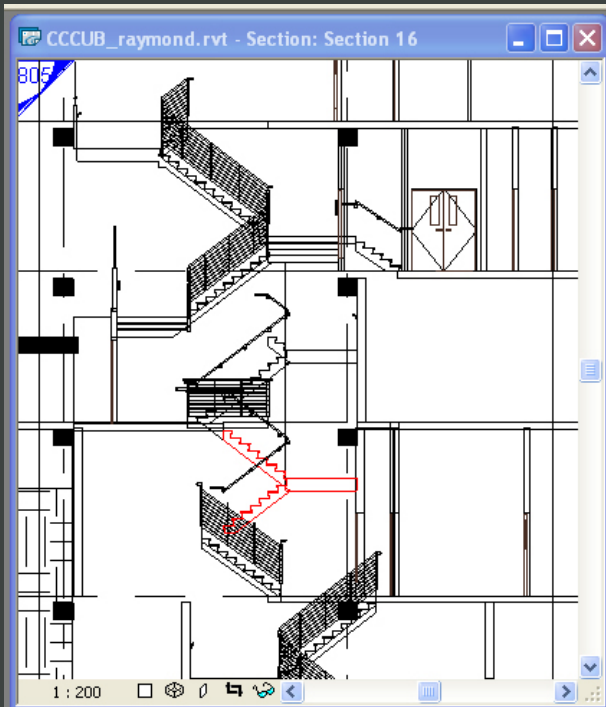
FAÇADE PANEL DESIGN



VERTICAL CO-ORDINATION



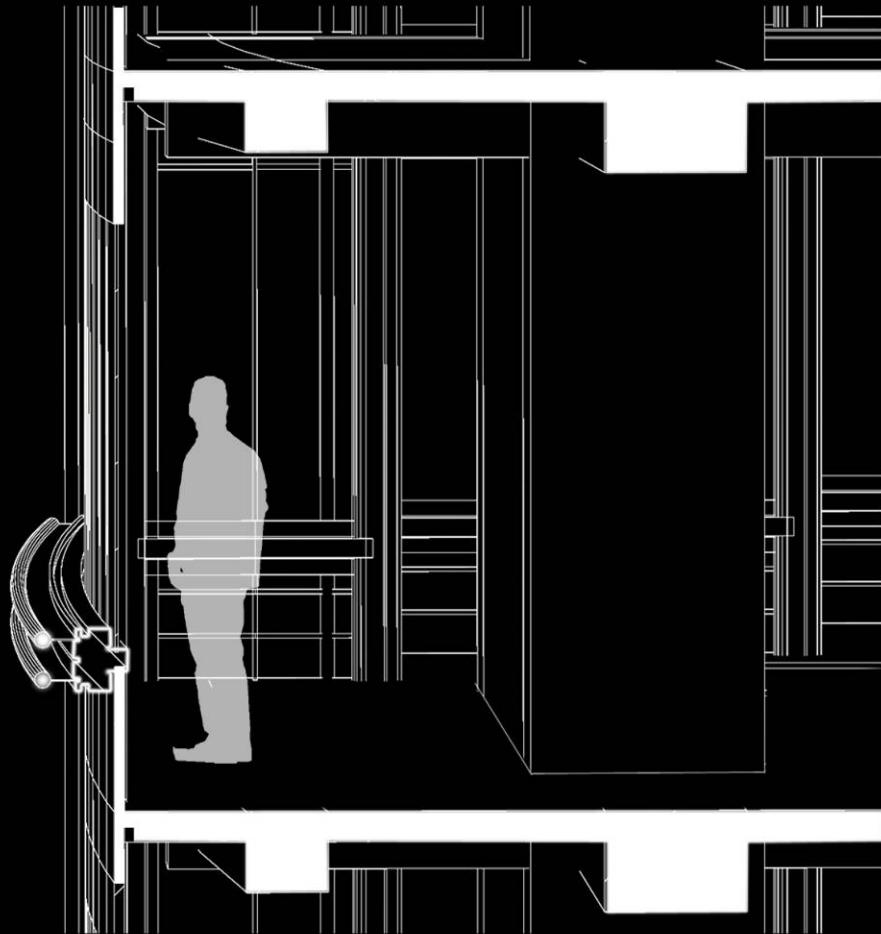
DIFFERENT DESIGN APPROACH



VERTICAL CO-ORDINATION



FAÇADE DESIGN and CO-ORDINATION



FAÇADE DESIGN and CO-ORDINATION



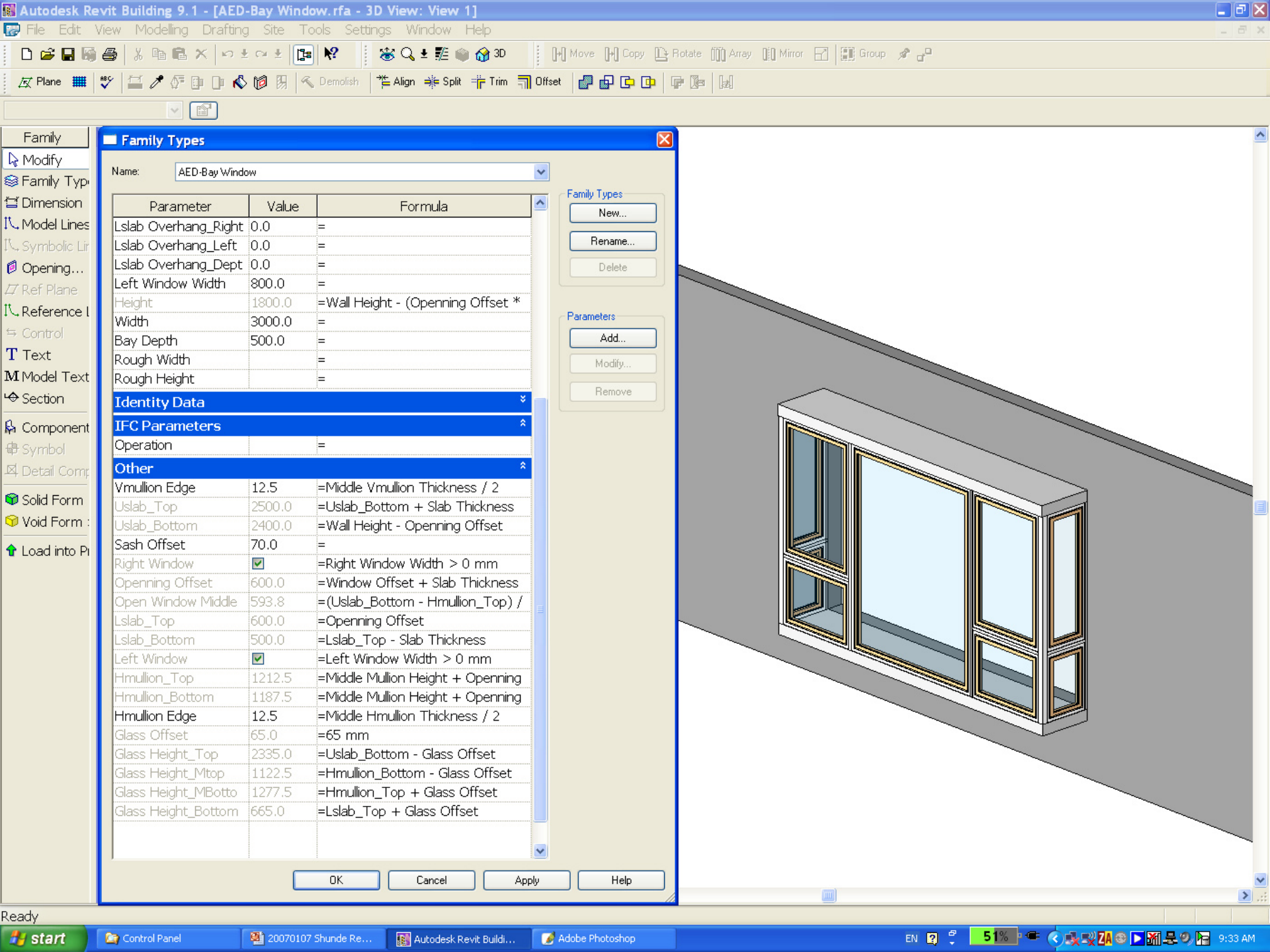
REPETITIONS vs VARIATIONS



PARAMETRIC MODELLING

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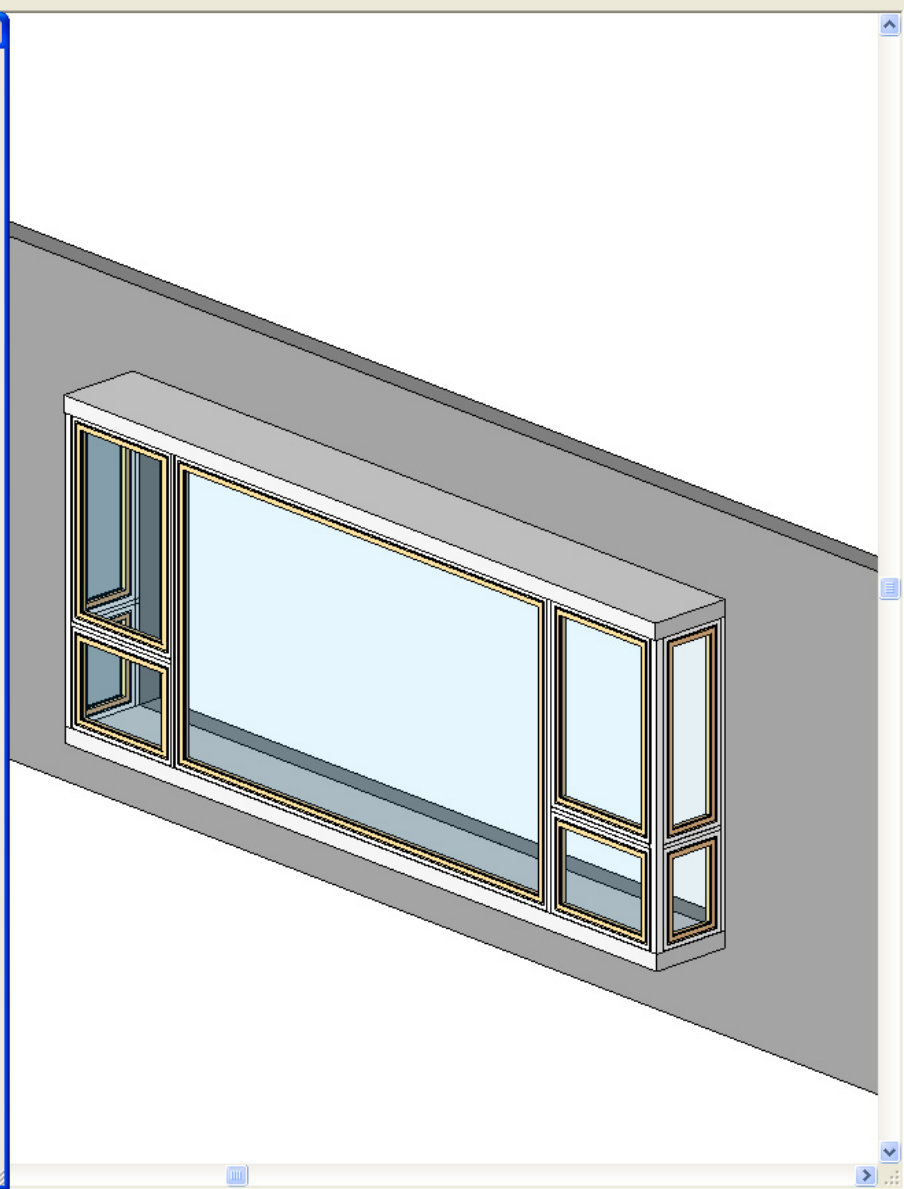


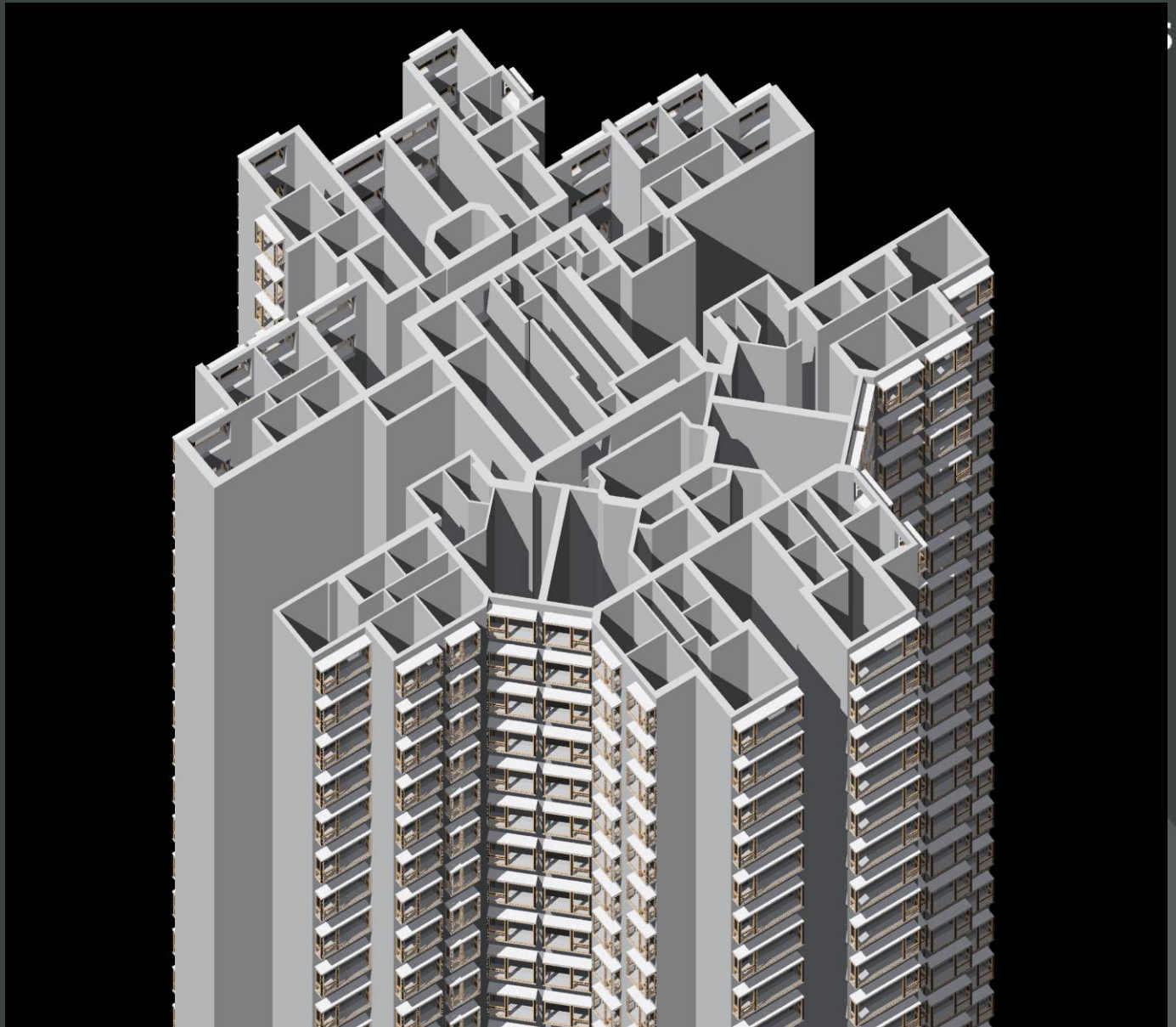
Family Types

Name: AED-Bay Window

Parameter	Value	Formula
Lslab Overhang_Right	0.0	=
Lslab Overhang_Left	0.0	=
Lslab Overhang_Dept	0.0	=
Left Window Width	800.0	=
Height	1800.0	=Wall Height - (Opening Offset *
Width	4500.0	=
Bay Depth	500.0	=
Rough Width		=
Rough Height		=
Identity Data		
IFC Parameters		
Operation		=
Other		
Vmullion Edge	12.5	=Middle Vmullion Thickness / 2
Uslab_Top	2500.0	=Uslab_Bottom + Slab Thickness
Uslab_Bottom	2400.0	=Wall Height - Opening Offset
Sash Offset	70.0	=
Right Window	☒	=Right Window Width > 0 mm
Opening Offset	600.0	=Window Offset + Slab Thickness
Open Window Middle	593.8	=(Uslab_Bottom - Hmullion_Top) /
Lslab_Top	600.0	=Opening Offset
Lslab_Bottom	500.0	=Lslab_Top - Slab Thickness
Left Window	☒	=Left Window Width > 0 mm
Hmullion_Top	1212.5	=Middle Mullion Height + Opening
Hmullion_Bottom	1187.5	=Middle Mullion Height + Opening
Hmullion Edge	12.5	=Middle Hmullion Thickness / 2
Glass Offset	65.0	=65 mm
Glass Height_Top	2335.0	=Uslab_Bottom - Glass Offset
Glass Height_Mtop	1122.5	=Hmullion_Bottom - Glass Offset
Glass Height_MBotto	1277.5	=Hmullion_Top + Glass Offset
Glass Height_Bottom	665.0	=Lslab_Top + Glass Offset

OK Cancel Apply Help





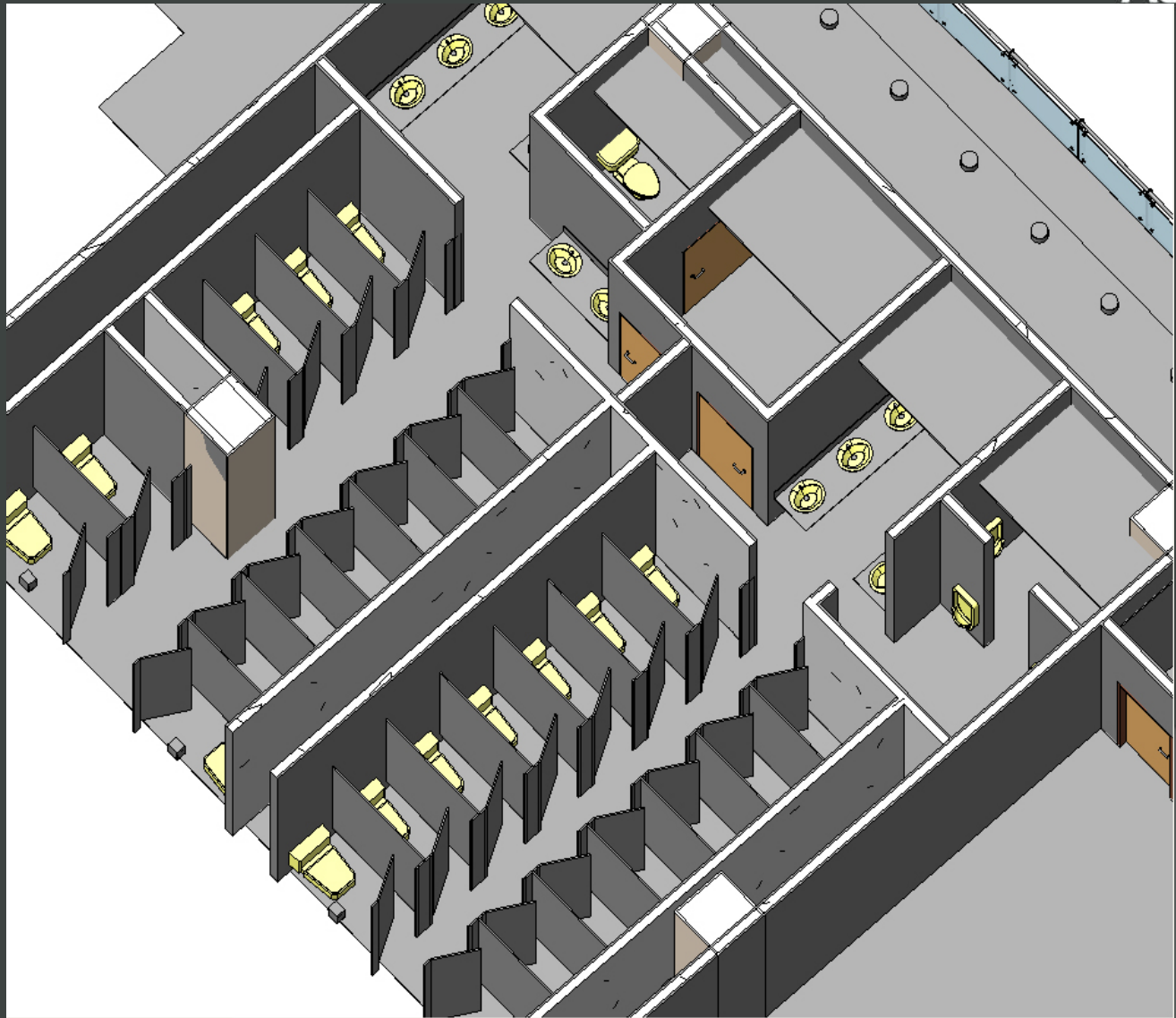
REPETITIONS vs VARIATIONS



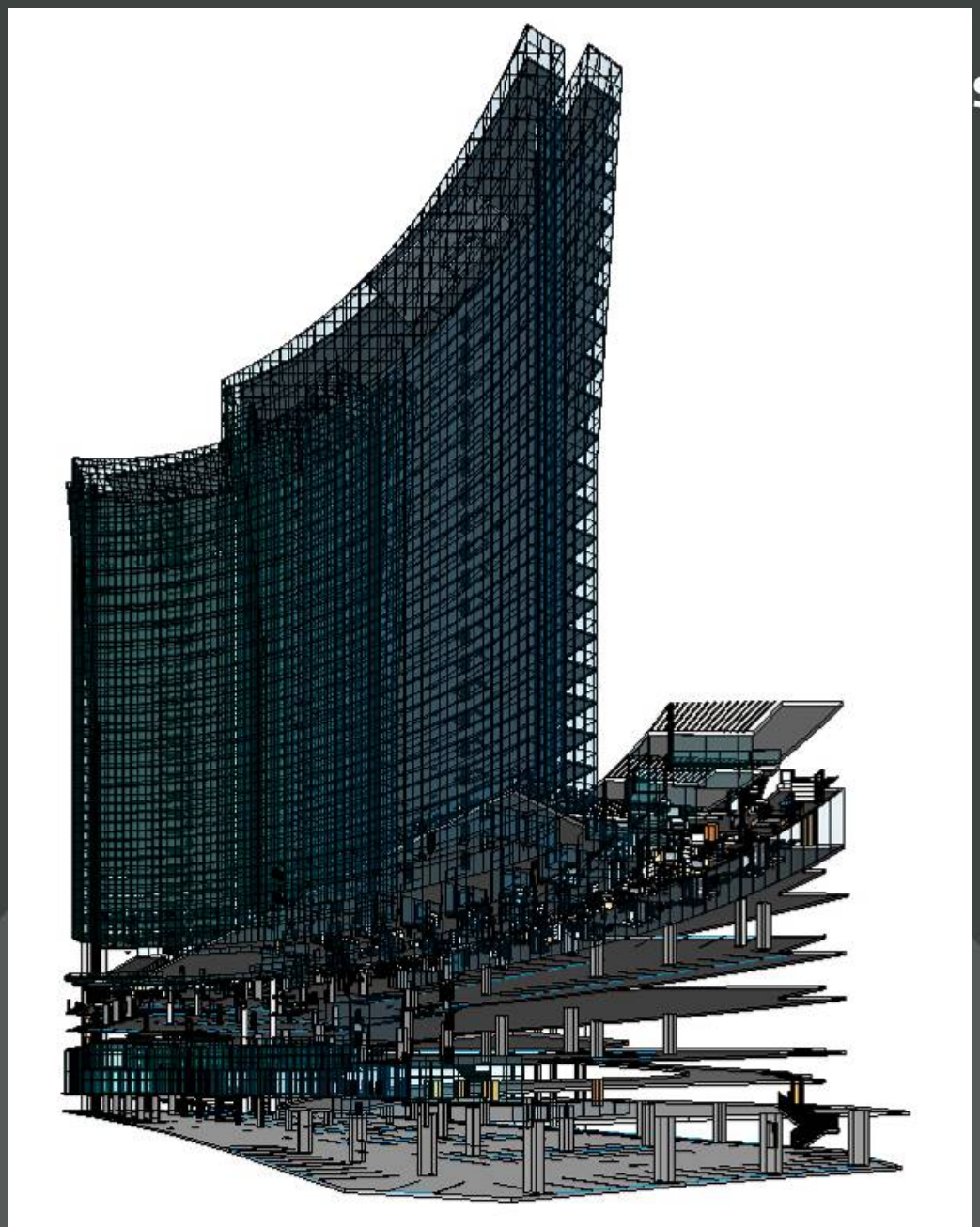
PARAMETRIC MODELLING

Aedas

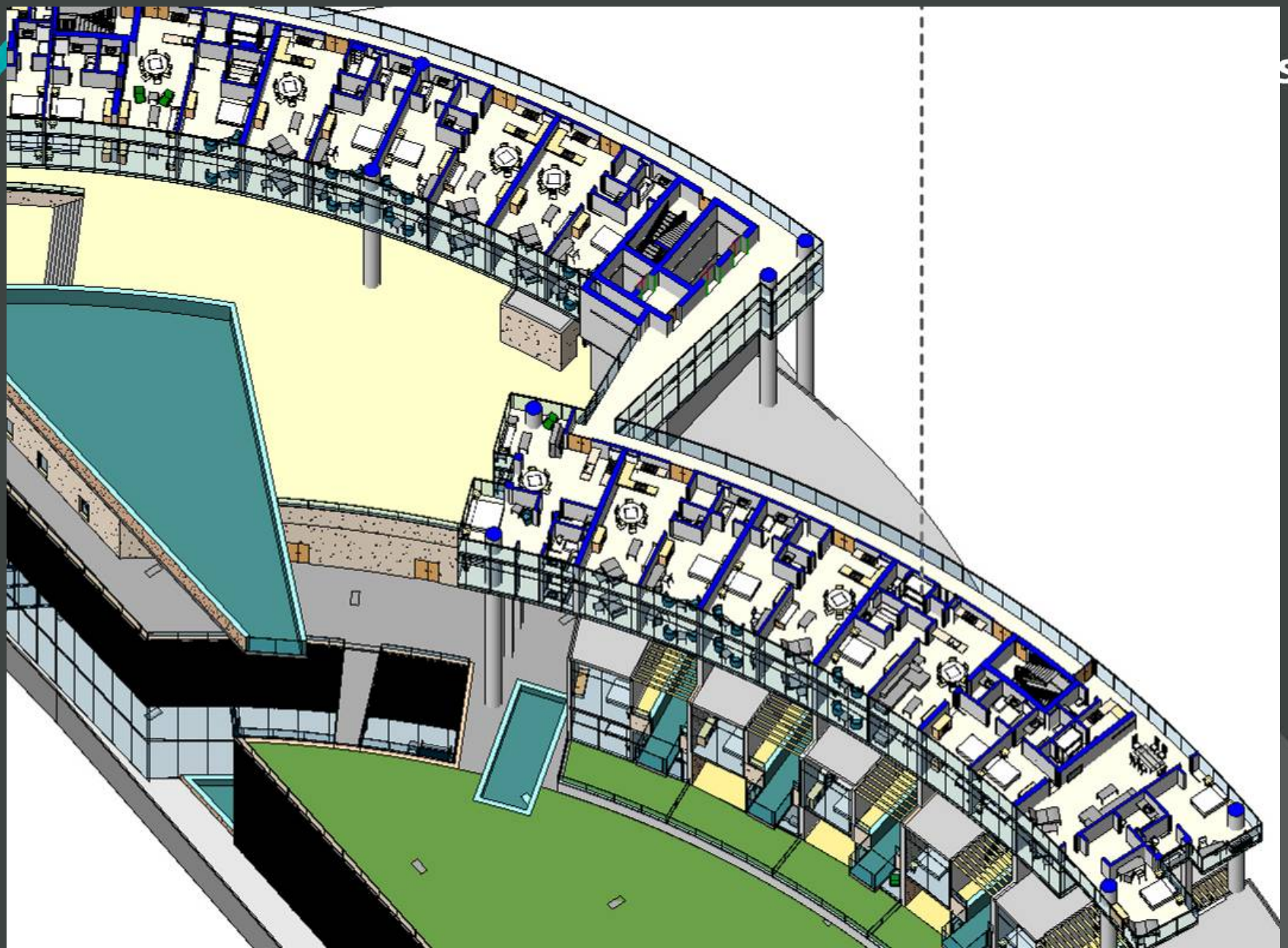




CREATIVE TOOLS

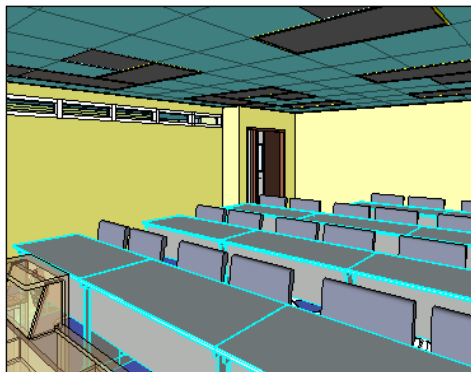


HORIZONTAL REPETITION / MODULARIZATION

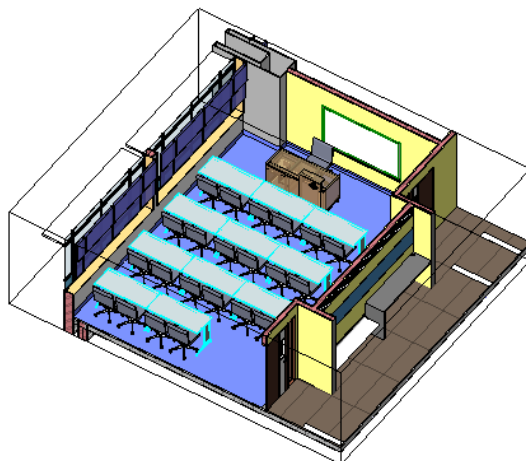


MODULAR DESIGN

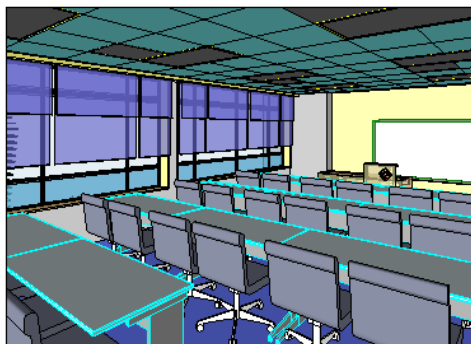
1. Design visualization
- 2. Drawing Productions 図面製作**
3. Services Co-ordination and Clash detection with other disciplines
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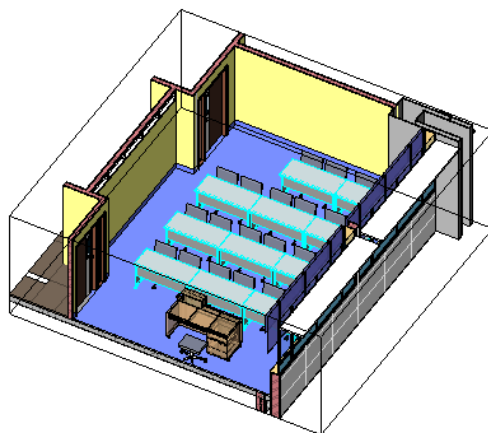
6 行政人员培训室立体示意图2



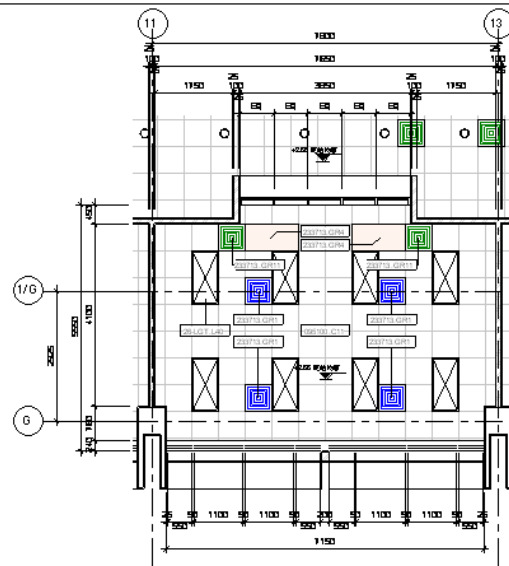
4 行政人员培训室立体剖面示意图2



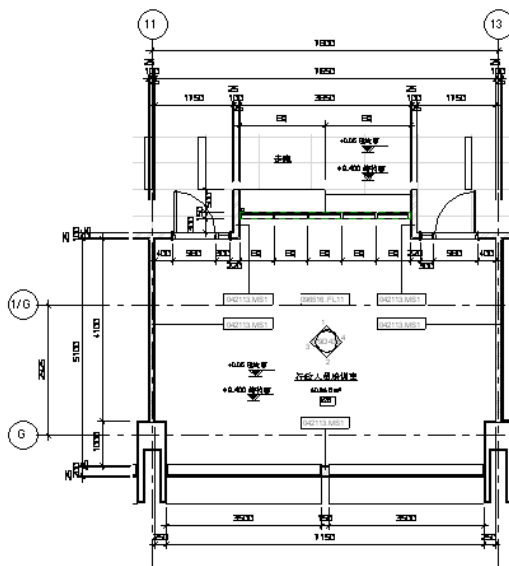
5 行政人员培训室立体示意图1



3 行政人员培训室立体剖面示意图1

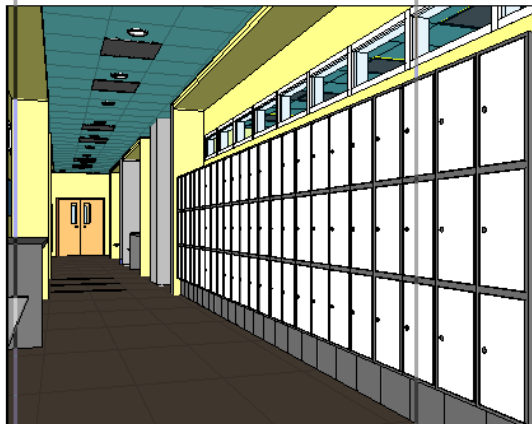


2 行政人员培训室天花平面图(高楼三层)1
1 : 50

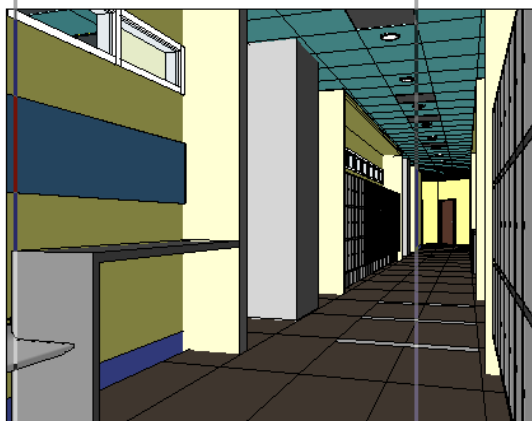


1 行政人员培训室平面图(高楼三层)1
1 : 50

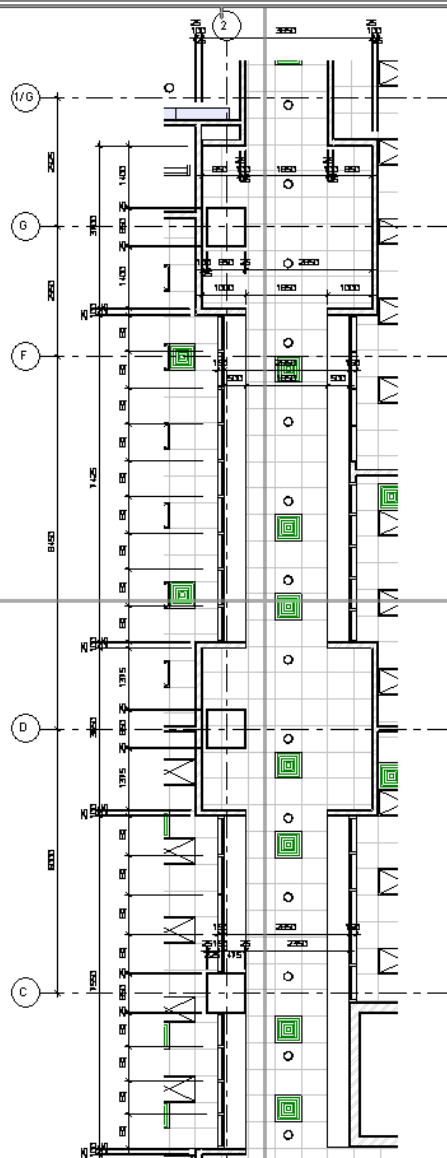
Drawing Type		S.D. SUBMISSION	
S.D. Submission No.		GOVERNMENT REFERENCE NO.	
1-2-2 Submission No.		GOVERNMENT REFERENCE NO.	
Author's Name		AUTHORIZE PERSON OR SUBMIT AREA	
Notes			



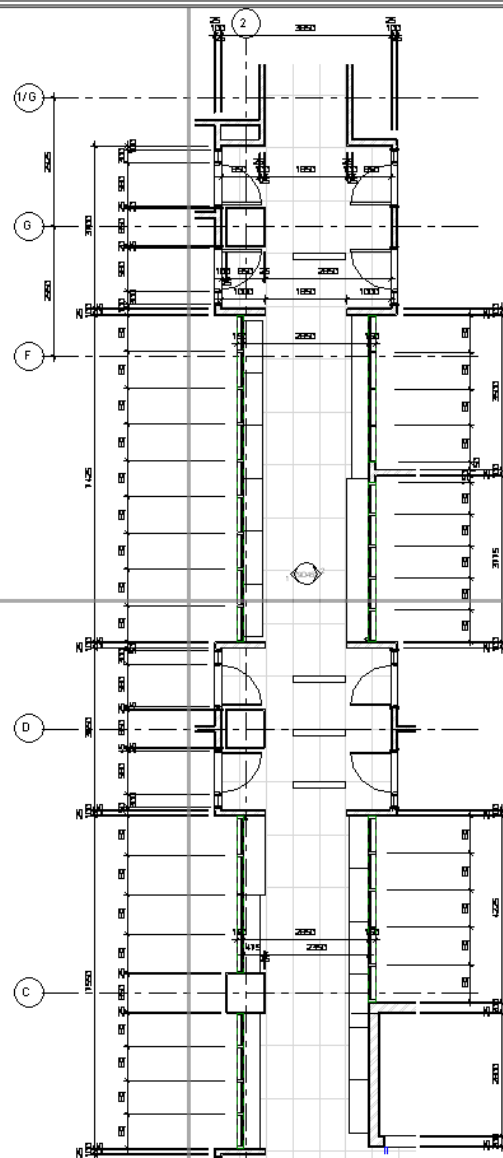
4 走廊立体示意图(低楼三至四层)



3 走廊立体示意图(低楼三至四层)



2 走廊天花平面图(低楼三至四层)
1:50

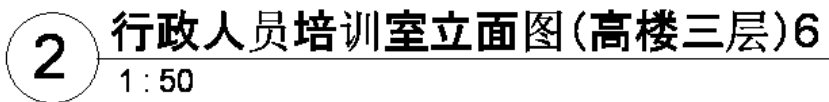


1 走廊平面图(低楼三至四层)
1:50

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 香港理工大学

benaim
 RIDER LEVETT & BUCKNALL
 利比 RLB Rider Levett Bucknall



行政人员培训室立面图(高楼三层)6

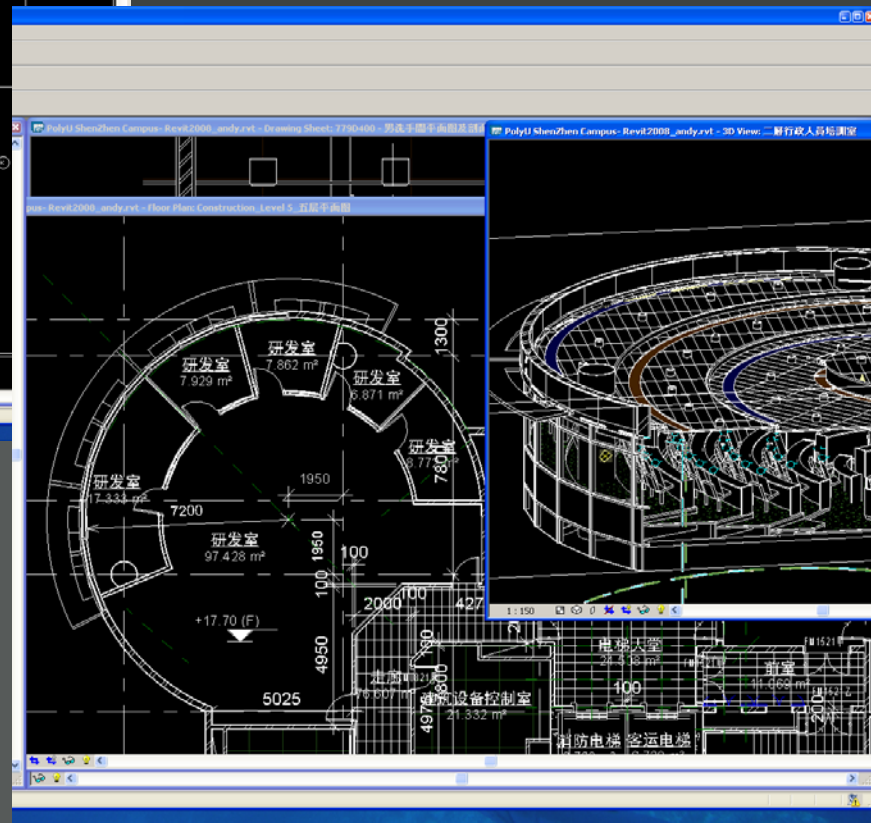
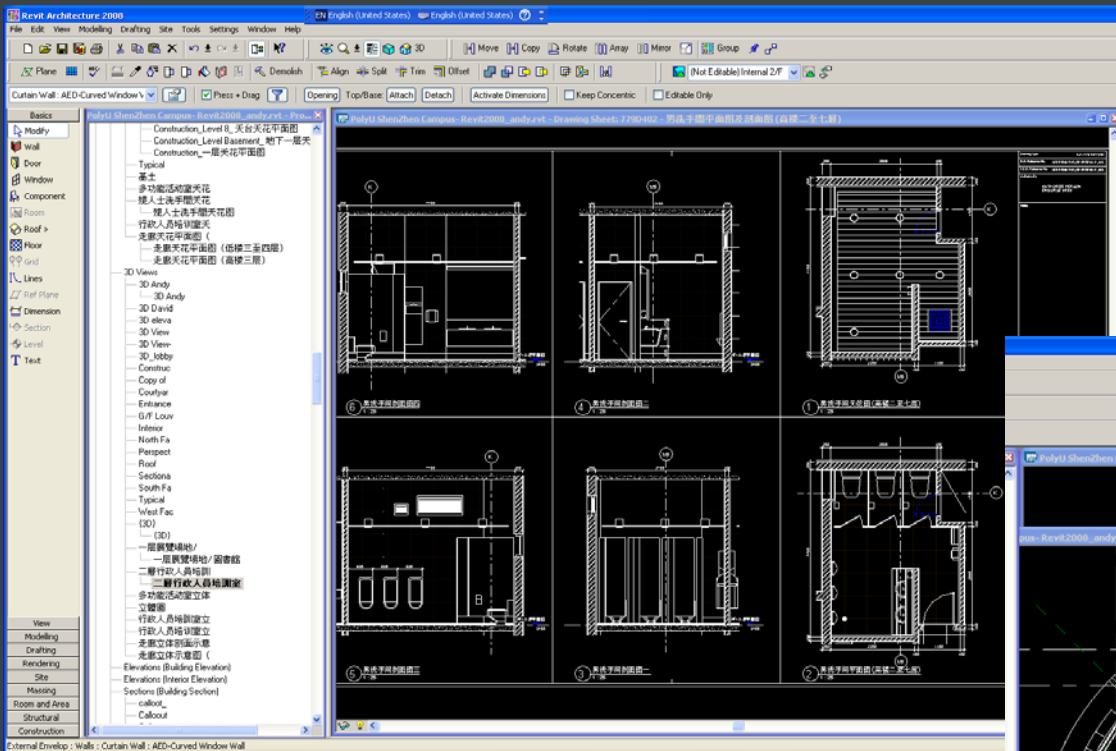
1 : 50

1. Design visualization
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多部門との連携と干渉チェック
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Production

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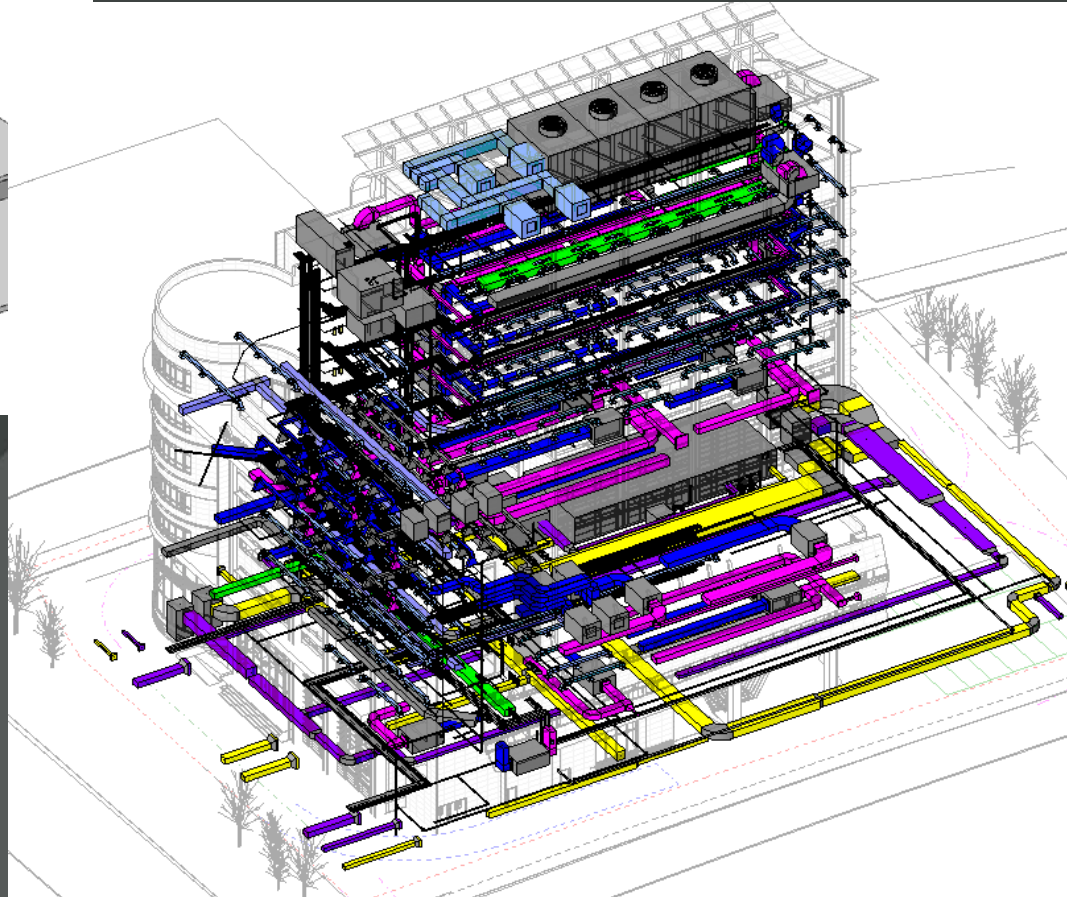
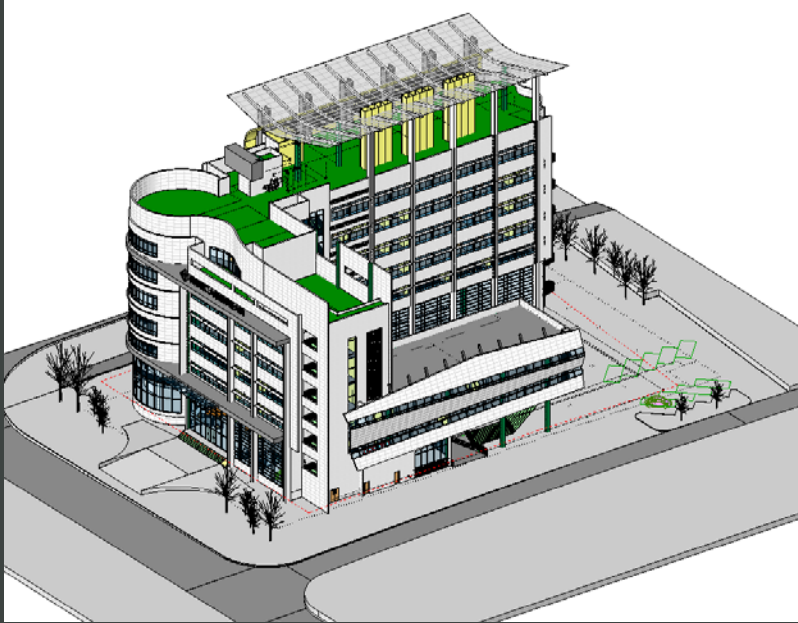




CO-ORDINATION / COLLABORATION

Work Flow – Establish BIM Models

Aedas





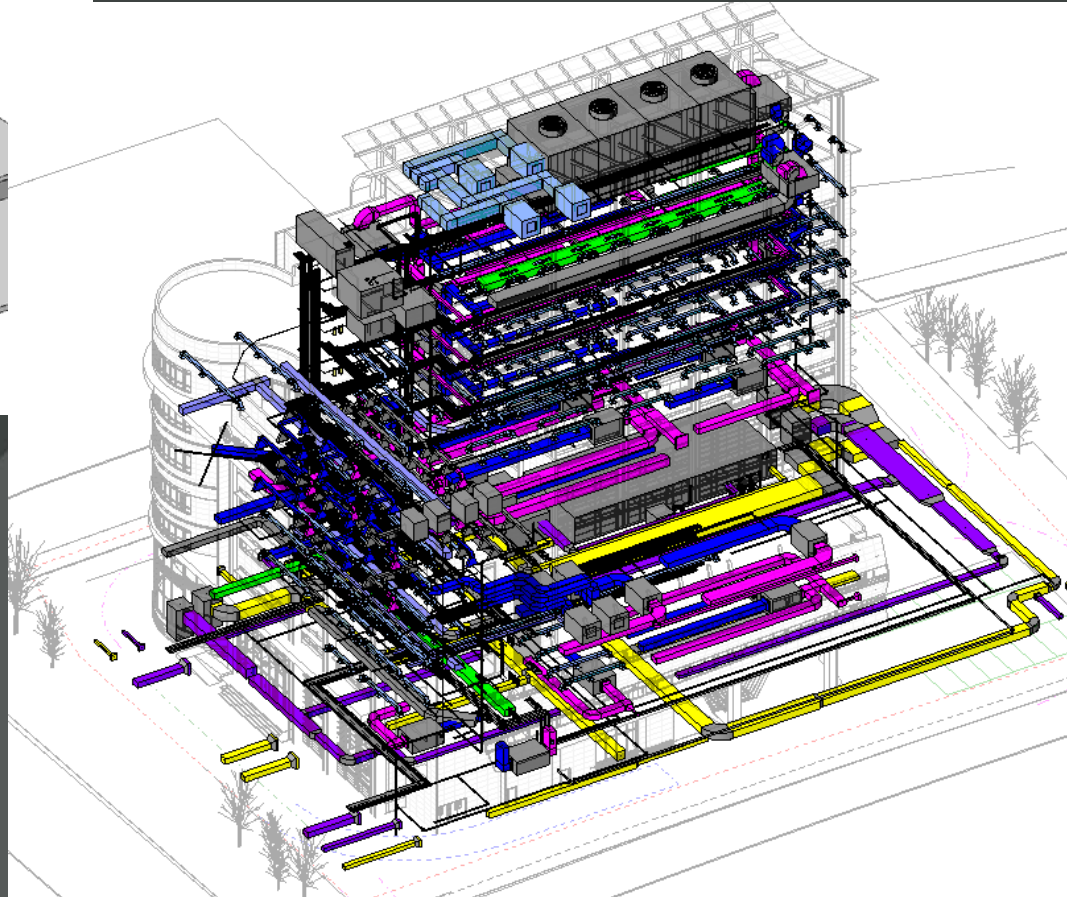
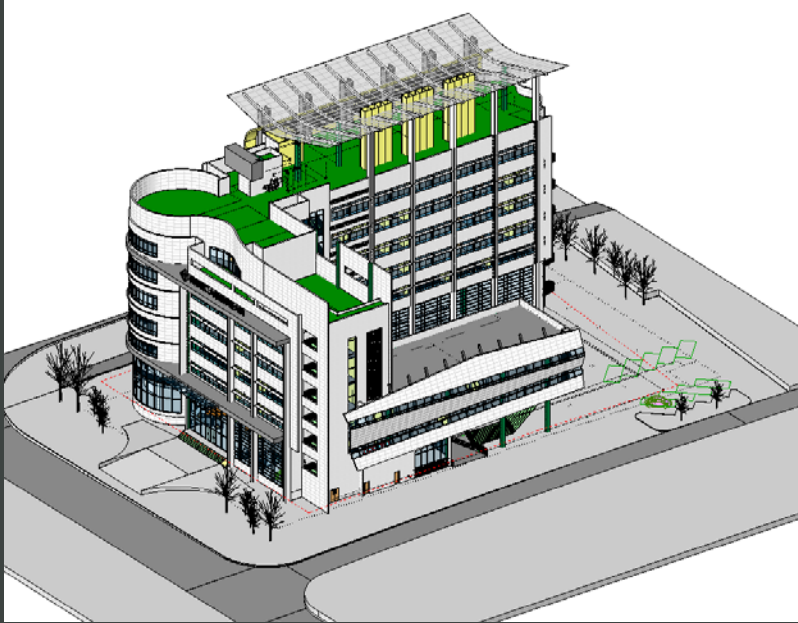


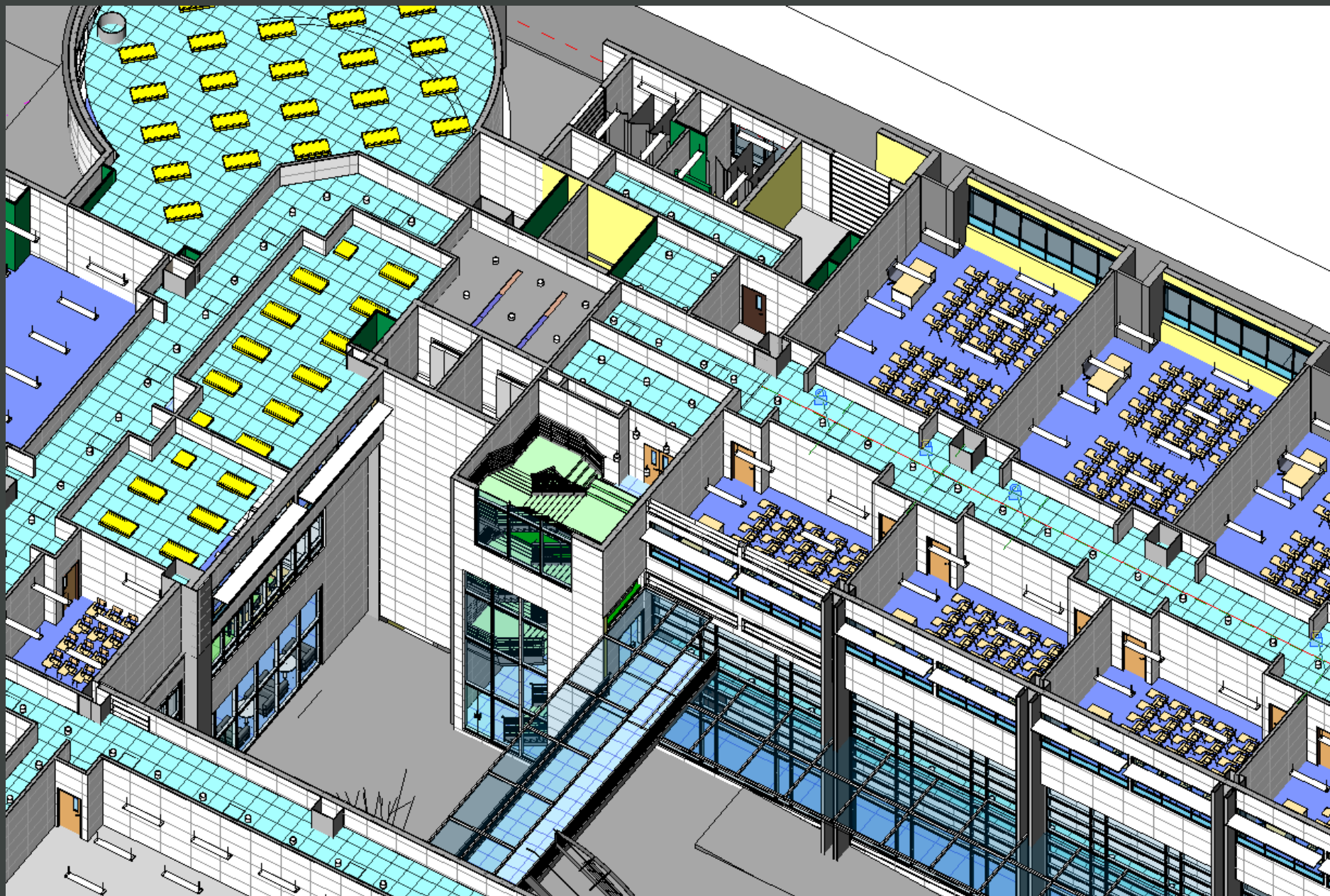


CO-ORDINATION / COLLABORATION

Work Flow – Establish BIM Models

Aedas



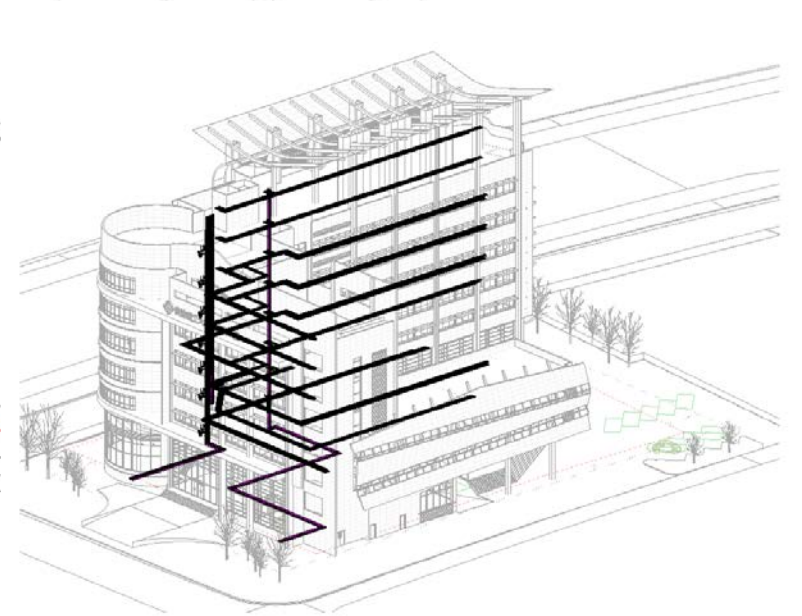
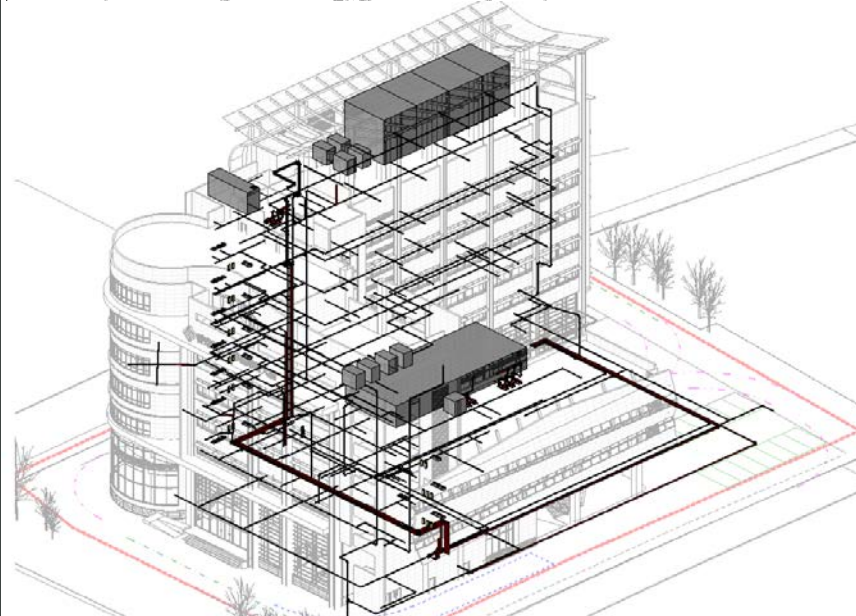
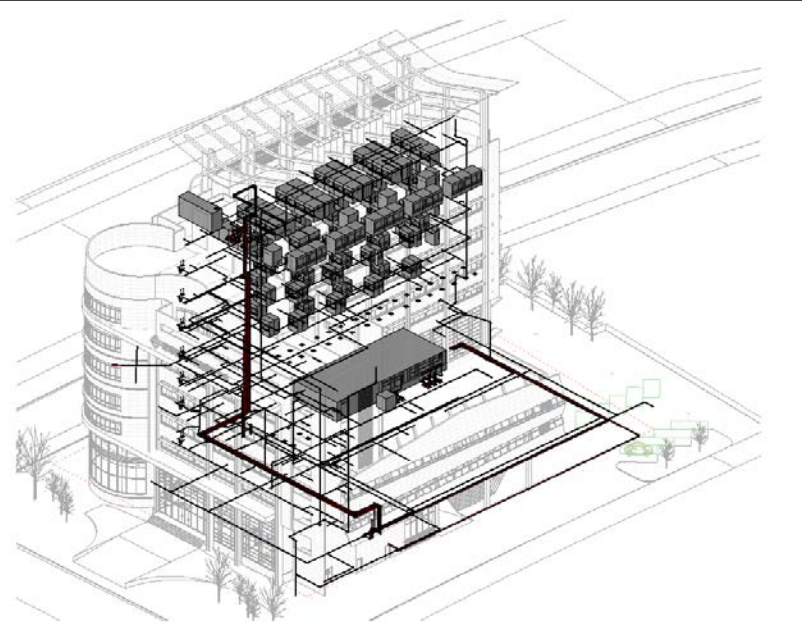
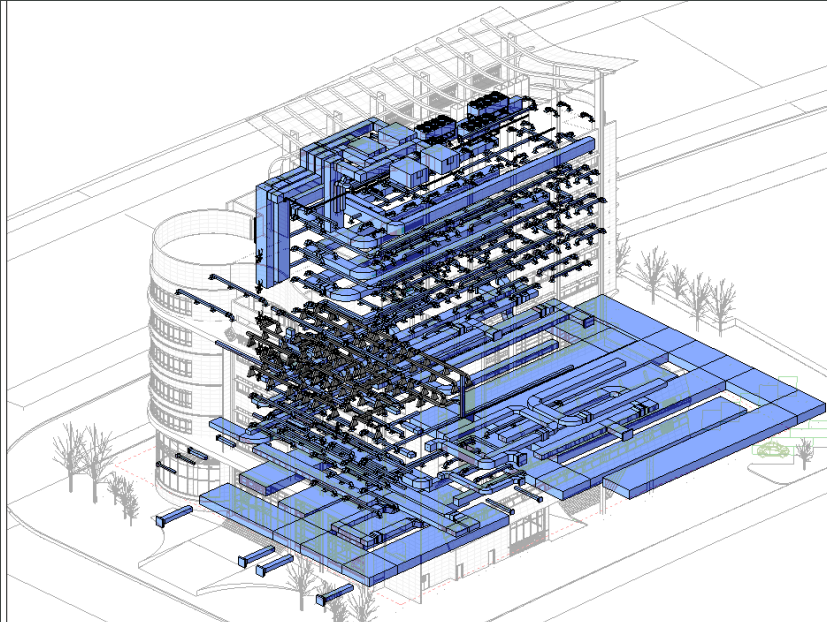




HVAC Installation

Fire Services Installation

Aedas



P/D Installation

Electricity Installation

Work Flow – Clashes Report

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The screenshot displays the Autodesk Revit Systems 2 interface. The main window shows a 3D view of a mechanical system, specifically a fan coil unit, with various pipes and ducts. A dialog box titled "Interference Report" is open in the foreground. The dialog box has a "Group by:" dropdown set to "Category 1, Category 2". Below this is a table with a "Message" column and a list of items, all of which are "Pipes". The table is currently empty. Below the table, the "Created:" date is "Tuesday, May 29, 2007 6:13:54 PM" and the "Last Update:" is blank. A note states: "Note: Refresh updates interferences listed above." At the bottom of the dialog box are buttons for "Show", "Export...", "Refresh", and "Close". The background 3D view shows a complex network of pipes and ducts, with a red line indicating a specific pipe. The left sidebar shows the "Basics" tab selected, with a list of elements including Room, Duct, Flex Duct, Air Terminal, Mechanical Equ, Pipe, Light Fixture, Device, Wire, Electrical Equip, Lines, Tag, Section, Level, Text, and Schedule/Quan. The bottom status bar shows the current view is "3D View: {3D}" and the scale is "1:150". The bottom left corner shows the page number "Page 4" and the section "Sec 1". The bottom right corner shows the language "English (U.S.)".

Autodesk Revit Systems 2

File Edit View Modeling Drafting Site Tools Settings Window Help

Plane Grid Section Level Text Schedule/Quan

Basics Modify Room Duct Flex Duct Air Terminal Mechanical Equ Pipe Light Fixture Device Wire Electrical Equip Lines Tag Section Level Text Schedule/Quan

PolyU Shenzhen Campus AC_andy.rvt - 3D View: {3D}

Interference Report

Group by: Category 1, Category 2

Message
Pipes
Pipes
Pipes
Pipes
Pipes
Pipes
Pipes
Pipes
Pipes
Pipes
Pipes
Pipes
Pipes
Pipes

Created: Tuesday, May 29, 2007 6:13:54 PM

Last Update:

Note: Refresh updates interferences listed above.

Show Export... Refresh Close

Duct Schedule Pipe Schedule Room Schedule Wall Schedule

Sheets (all)

- E&M-1 - Baseme
- E&M-2 - Level 1.
- E&M-3 - Level 2.
- E&M-4 - Level 3.
- E&M-5 - Level 4.
- E&M-6 - Level 5.
- E&M-7 - Level 6.
- E&M-8 - Level 7.
- E&M-9 - Level 8.
- E&M-10 - ROOF
- E&M-11 - A/C Se

Families

- Air Terminals
- Annotation Symb
- Ceilings
 - Basic Ceilin
 - Generic
 - Plaster E

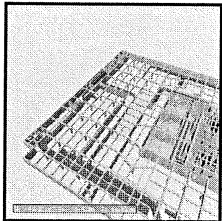
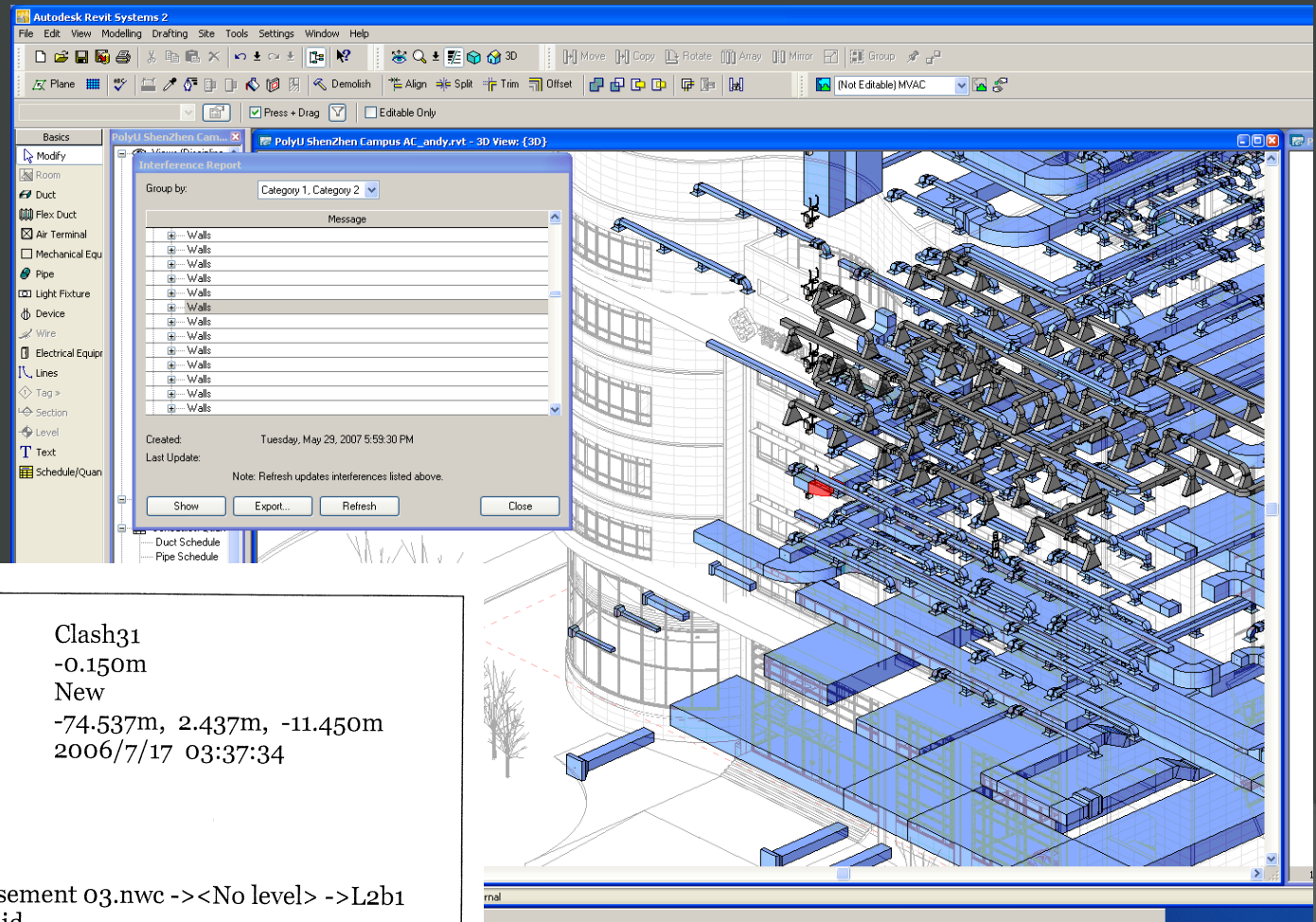
1:150

MVAC : Mechanical Equipment : M_Fan Coil Unit - Horizontal Basic Concealed with Plenum : M_02

Page 4 Sec 1 4/4 At 3.1cm Ln 2 Col 2 REC TRK EXT OVR English (U.S.)

Work Flow – Clashes Report

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Name Clash31
Distance -0.150m
Status New
Clash Point -74.537m, 2.437m, -11.450m
Date Created 2006/7/17 03:37:34
Approved By

Item 1

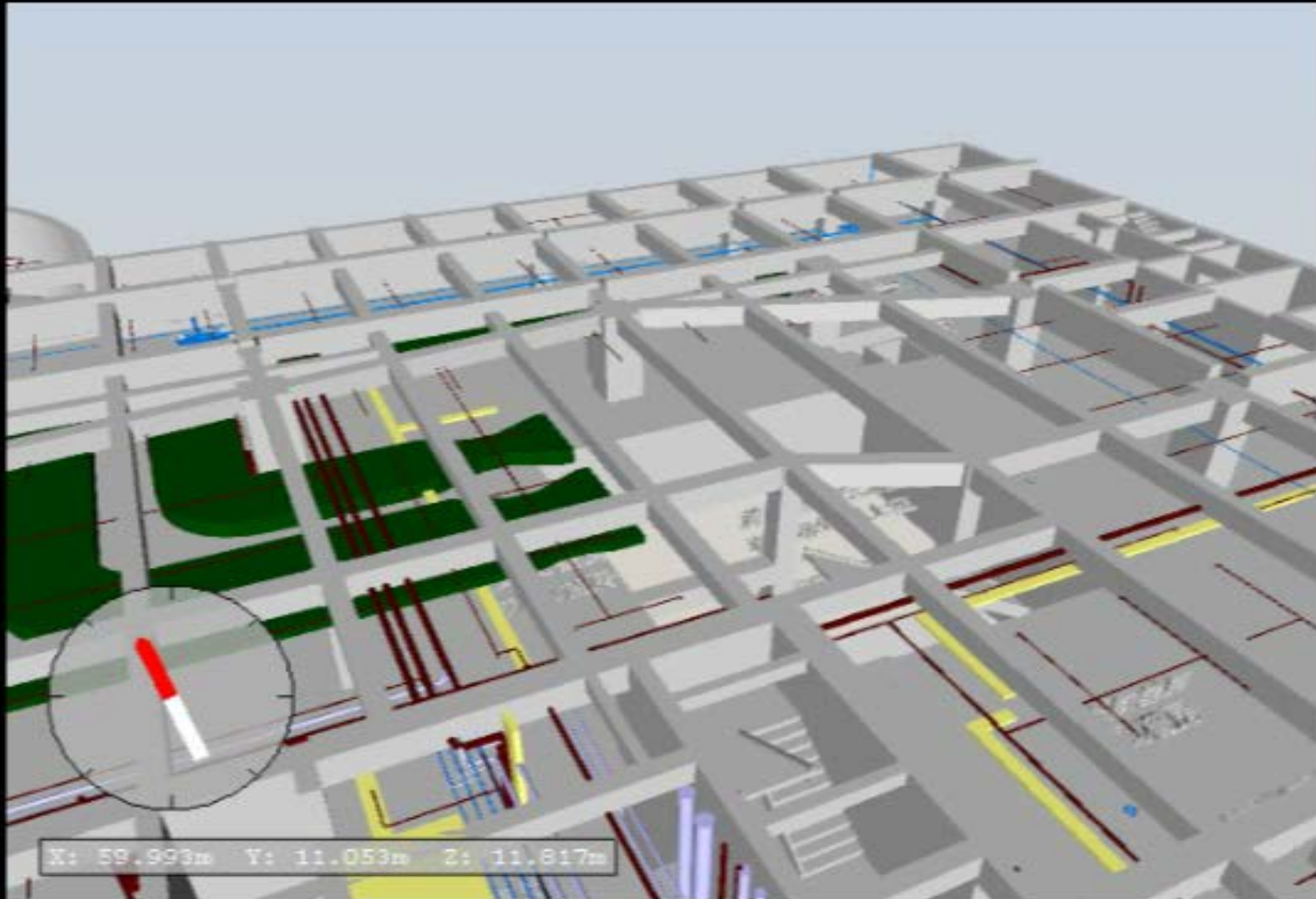
Path File ->File ->Basement 03.nwc -><No level> ->L2b1
500 x 700 ->L2b1 500 x 700 ->Solid

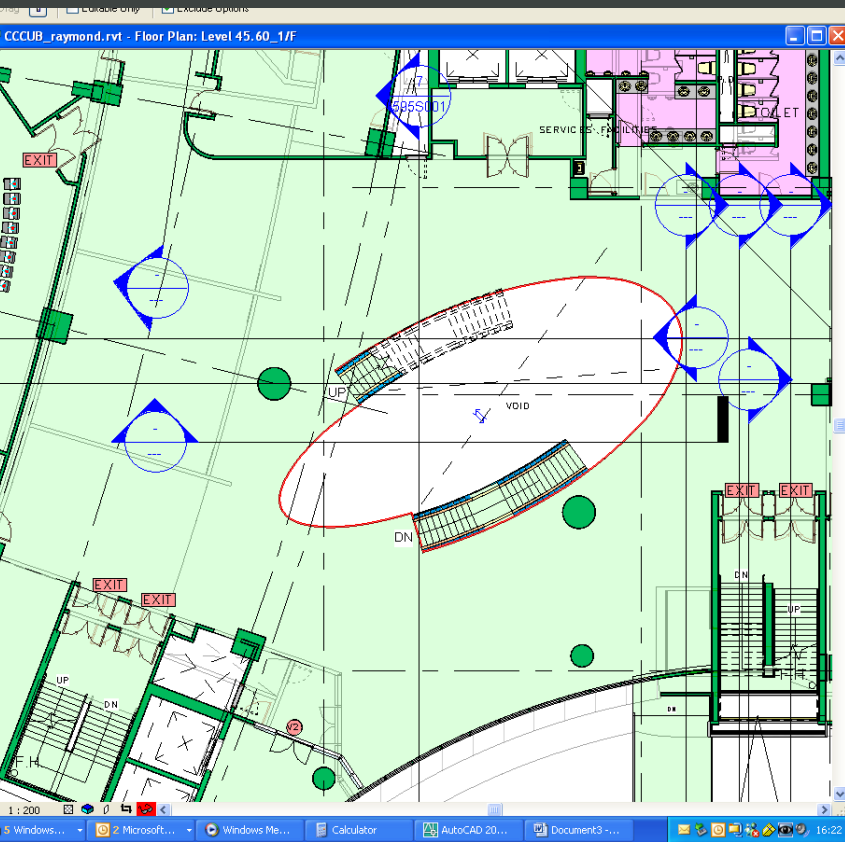
Item 2

Entity Handle 2AD6
Path File ->File ->B3HVAC_Duct.nwd ->H-Ductwork-G -
>Duct



Work Flow - Clashes Identification Processes



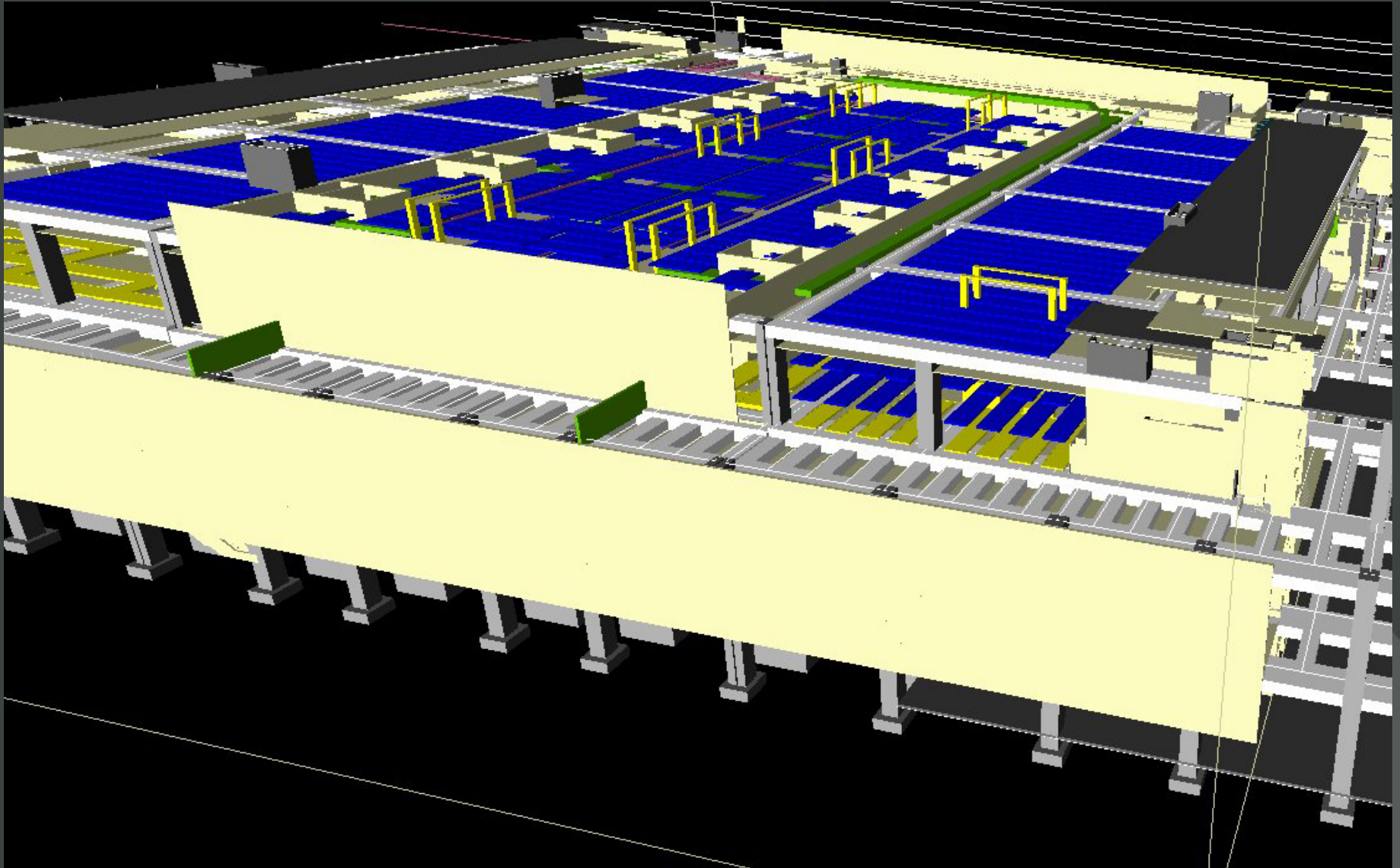




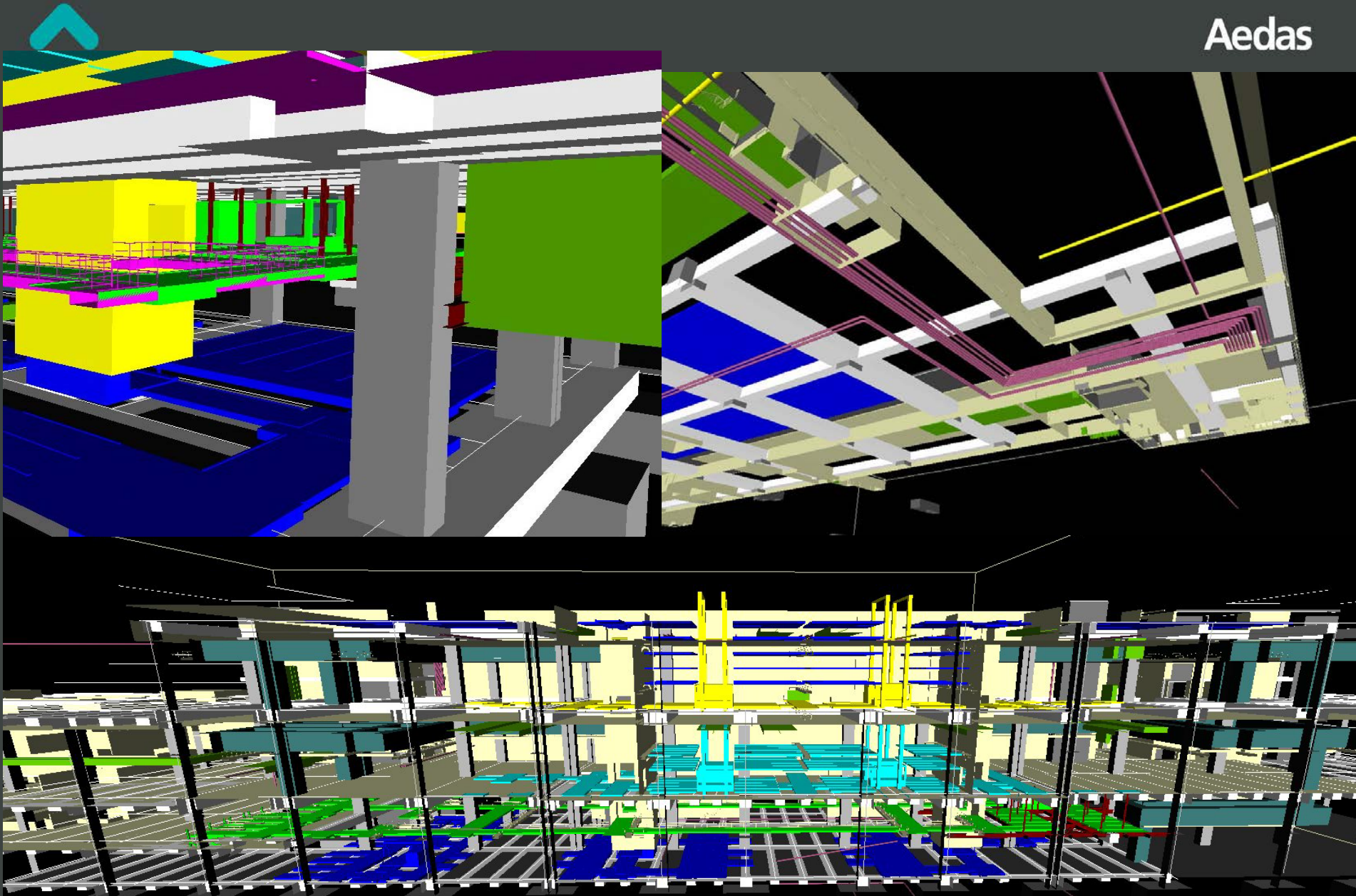
Results – No of Clashes

結果 – 碰撞數目

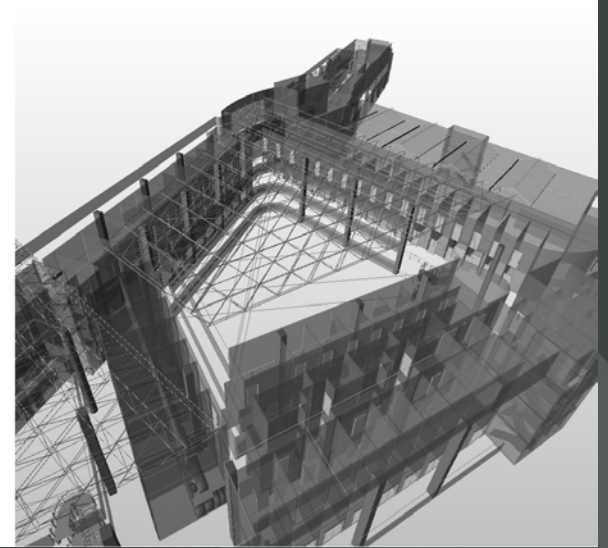
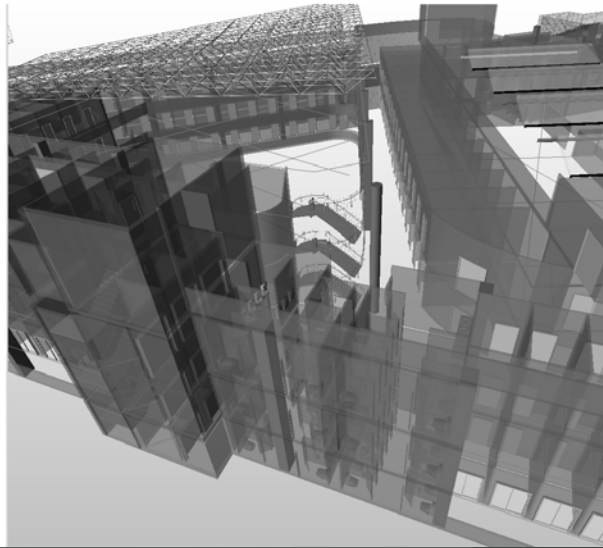
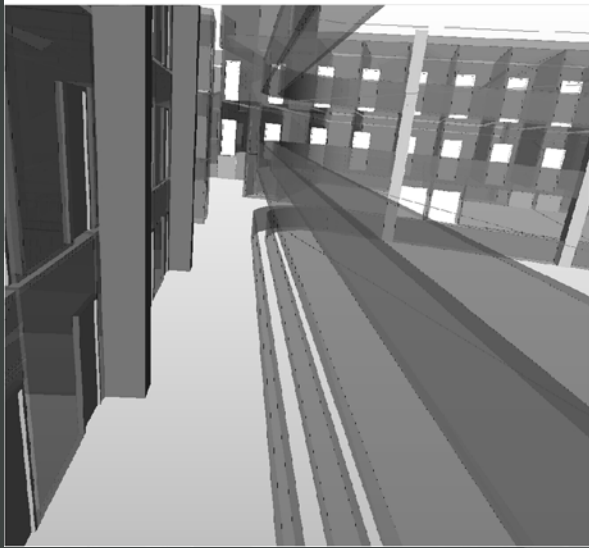
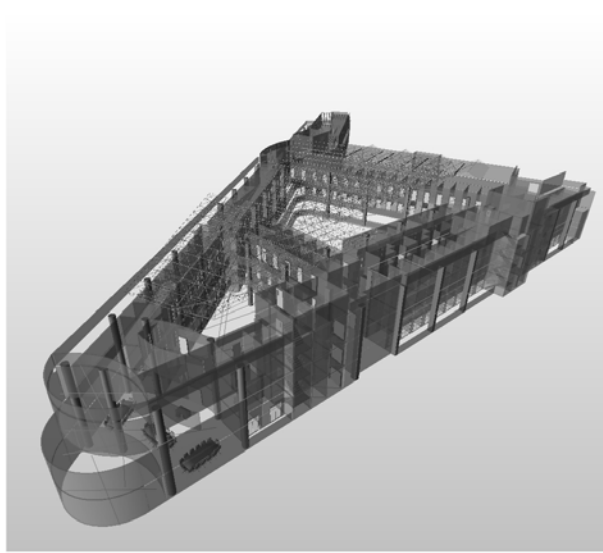
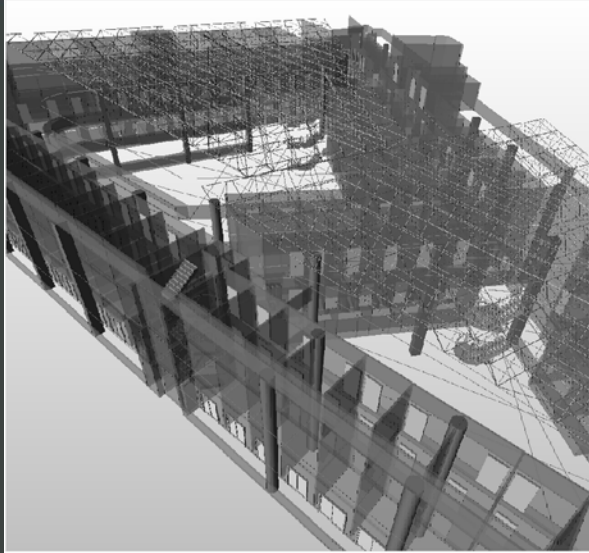
	HVAC Ductwork	Chiller Water Pipe	Fire Services	P&D	Electrical	Total
B1	0	0	0	0	0	0
B1M	0	0	0	0	0	0
B2	0	0	0	0	0	0
B3	0	0	0	0	0	0
Total	0	0	0	0	0	0



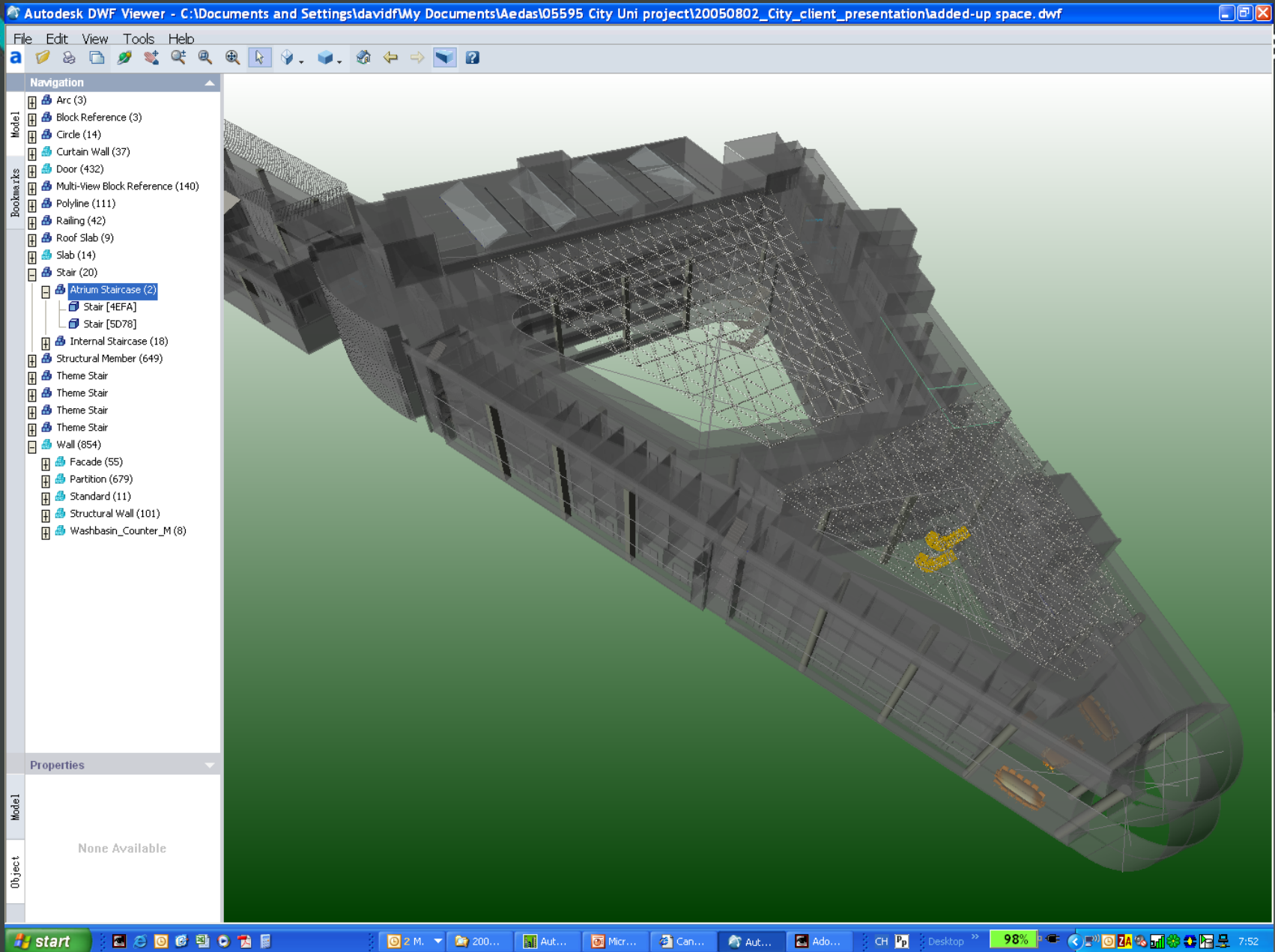
DISCIPLINES COLLABORATION



DISCIPLINES COLLABORATION



INTERACTIVE COMMUNICATION – DWF



INTERACTIVE COMMUNICATION – DWF

1. Design visualization
2. Drawing Productions
3. Services Co-ordination and Clash detection with other disciplines
- 4. Quantity taking and preparation of Tender Document** 数量拾い及び
入札書類の作成
5. Automated Statutory Submission
6. Scientific analysis of different environmental aspects
7. Supply Chain Integration with the manufacturing and production
8. Complex Geometry



Wall Schedule							Aedas
Family	Family and Type	Length	Width	Count	Area	Volume	
Basic Wall: AED-Concrete - 50mm + Render One sides							
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.548 m2	0.027 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.548 m2	0.027 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.548 m2	0.027 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.548 m2	0.027 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.548 m2	0.027 m3	
0.548 m2: 5		1000		5	2.738 m2	0.137 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
0.578 m2: 6		1200		6	3.465 m2	0.173 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.608 m2	0.030 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.608 m2	0.030 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.608 m2	0.030 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.608 m2	0.030 m3	
0.608 m2: 4		800		4	2.430 m2	0.122 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.638 m2	0.032 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.638 m2	0.032 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.638 m2	0.032 m3	
0.638 m2: 3		600		3	1.913 m2	0.096 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	250	50	1	0.730 m2	0.037 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	250	50	1	0.730 m2	0.037 m3	
0.730 m2: 2		500		2	1.460 m2	0.073 m3	

DISCIPLINES COLLABORATION

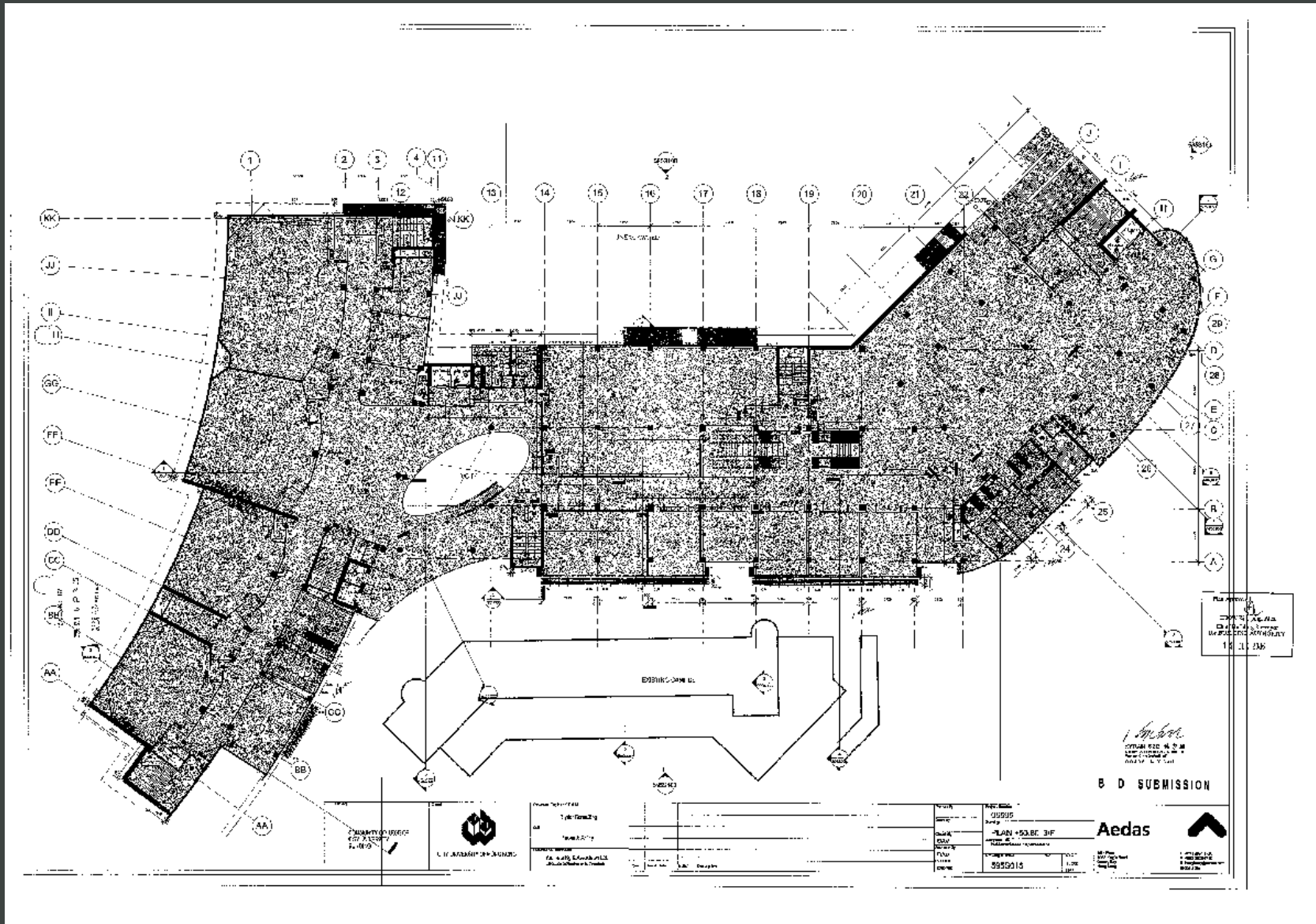
Use of Building Information Modeling (BIM)

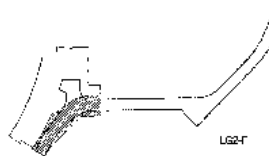
Aedas

1. Design visualization
2. Drawing Productions
3. Services Co-ordination and Clash detection with other disciplines
4. Quantity taking and preparation of Tender Document
- 5. Automated Statutory Submission** 確認申請図書作成の自動化
6. Scientific analysis of different environmental aspects
7. Supply Chain Integration with the manufacturing and production
8. Complex Geometry

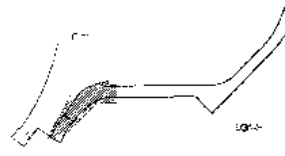


Aedas

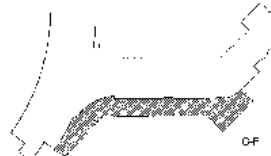




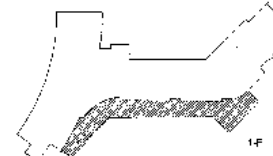
① EVA of Level 34.00_LG2/F
1:1000



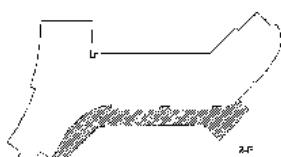
② EVA of Level 37.80, LG1/F
1:1000



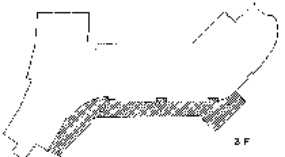
③ $\frac{\text{EVA of Level 41.60_GIF}}{1:1000}$



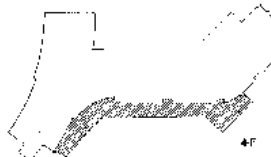
④ EVA of Level 45.60... 1/F
1:1000



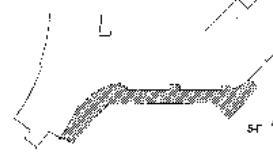
⑤ EVA of Level 49.80 2rF
1:1300



⑥ EVA of Level 53.80_3/F
1:1000

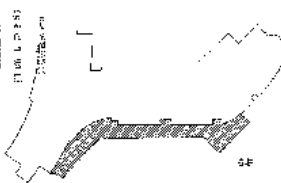


7 EVA of Level 5B.2D_4/F
1:1000



⑧ EVA of Level 62.00 5/F
1:1000

B D SUBMISSION



⑨ $\frac{\text{EVA of Level 65.80}_6/\text{F}}{1:1000}$

* Hatch area represents the total length of the building facade served by the EVA

CALCULATION OF TOTAL LENGTH OF BUILDING FACADE TO BE SERVED BY EVA AND HENGCHEN FIRE OF SUCH LENGTH OVER THE TOTAL LENGTH OF ALL THE PERIMETER WALLS OF THE BUILDING

www.marine-weather.com																																											
Date	Time	Lat	Long	Alt	Speed	Heading	Temp	Pressure	Humidity	Wind	Wave	Sea	Sky	Cloud	Visibility	Remarks																											
01	1999	01	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19	01	19			
02	1999	02	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	02	20	
03	1999	03	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03	21	03
04	1999	04	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04	22	04
05	1999	05	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05	23	05
06	1999	06	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06	24	06
07	1999	07	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07	25	07
08	1999	08	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08	26	08
09	1999	09	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09	27	09
10	1999	10	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10	28	10
11	1999	11	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11	29	11
12	1999	12	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12	30	12
13	1999	13	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13	31	13
14	1999	14	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14	32	14

姓名	性别	出生年月	民族	籍贯	学历	学位	职称	工作单位	研究方向
王德胜	男	1965.03	汉族	山东烟台	硕士		副教授	烟台大学	应用数学
李小明	男	1972.08	汉族	河南郑州	本科		讲师	河南大学	计算机科学
张小红	女	1978.12	汉族	江苏南京	硕士		讲师	南京理工大学	材料科学
刘伟	男	1985.05	汉族	湖北武汉	本科		助教	武汉大学	物理学
陈丽	女	1988.09	汉族	四川成都	本科		助教	四川大学	化学
赵强	男	1990.01	汉族	广东广州	本科		助教	中山大学	生物学
周敏	女	1992.06	汉族	浙江杭州	本科		助教	浙江大学	环境科学
吴昊	男	1995.11	汉族	安徽合肥	本科		助教	安徽大学	历史学
孙悦	女	1998.04	汉族	湖南长沙	本科		助教	湖南大学	文学
郑宇	男	2000.07	汉族	福建厦门	本科		助教	厦门大学	法学
林芳	女	2002.10	汉族	广西桂林	本科		助教	广西大学	教育学
黄涛	男	2005.03	汉族	江西九江	本科		助教	江西大学	医学
徐静	女	2007.08	汉族	山西太原	本科		助教	山西大学	艺术学
马健	男	2009.12	汉族	陕西西安	本科		助教	西安交通大学	工程学
宋佳	女	2011.05	汉族	云南昆明	本科		助教	云南大学	地理学
周涛	男	2013.09	汉族	贵州贵阳	本科		助教	贵州大学	天文学
吴悦	女	2015.01	汉族	海南三亚	本科		助教	海南大学	海洋学
郑宇	男	2017.06	汉族	宁夏银川	本科		助教	宁夏大学	农学
林芳	女	2019.11	汉族	青海西宁	本科		助教	青海大学	林学
黄涛	男	2021.04	汉族	新疆乌鲁木齐	本科		助教	新疆大学	畜牧学
徐静	女	2023.08	汉族	内蒙古呼和浩特	本科		助教	内蒙古大学	兽医学

[illegible]

Van Aggen
 Chief Building Surveyor
 for the City of Seattle
 1/1/2011

 UNIVERSITY OF CAMBRIDGE ENGINEERING BUILDING	 UNIVERSITY OF CAMBRIDGE ENGINEERING BUILDING	 UNIVERSITY OF CAMBRIDGE ENGINEERING BUILDING	 UNIVERSITY OF CAMBRIDGE ENGINEERING BUILDING	 UNIVERSITY OF CAMBRIDGE ENGINEERING BUILDING	 UNIVERSITY OF CAMBRIDGE ENGINEERING BUILDING	 UNIVERSITY OF CAMBRIDGE ENGINEERING BUILDING	 UNIVERSITY OF CAMBRIDGE ENGINEERING BUILDING	 UNIVERSITY OF CAMBRIDGE ENGINEERING BUILDING
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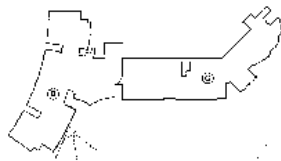
STATUTORY SUBMISSION

Aedas

LG/5/F (+37.82) COMPARTMENT CALCULATION



G/F (+41.80) COMPARTMENT CALCULATION



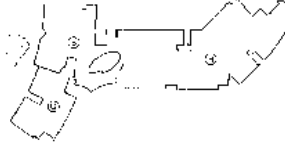
1/F (+45.80) COMPARTMENT CALCULATION



2/F (+49.80) COMPARTMENT CALCULATION



3/F (+53.80) COMPARTMENT CALCULATION



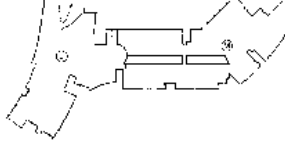
4/F (+58.20) COMPARTMENT CALCULATION



5/F (+62.00) COMPARTMENT CALCULATION



6/F (+65.80) COMPARTMENT CALCULATION



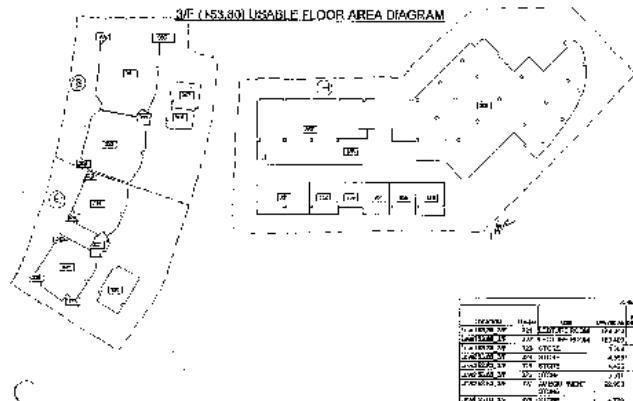
COMPARTMENT OF FLOOR				
LOC.	NO.	TYPE	AREA (sq.m.)	VOLUME (cu.m.)
LG/5/F	1	Office	275.442	105.177
G/F	1	Shop	54.208	21.683
G/F	2	Office	412.213	164.885
3/F	1	Restaurant	178.557	70.423
3/F	2	Kitchen	166.561	66.624
5/F	1	Office	2031.235	812.494
5/F	2	Restaurant	178.557	70.423
5/F	3	Kitchen	166.561	66.624
5/F	4	Exhibition hall	704.213	281.685
6/F	1	Office	2031.235	812.494
6/F	2	Restaurant	178.557	70.423
6/F	3	Kitchen	166.561	66.624
6/F	4	Exhibition hall	704.213	281.685

Total Capacity of COQUE				
Location	Use	Area	Factor	Total Capacity
LG/5/F	Office	275.442	9	31
G/F	Shop	54.208	3	19
G/F	Office	412.213	9	41
3/F	Restaurant	178.557	1	178
3/F	Kitchen	166.561	4.5	107
5/F	Office	2031.235	9	294
5/F	Restaurant	178.557	1	177
5/F	Kitchen	166.561	4.5	42
5/F	Exhibition hall	704.213	2	353
Total number of students				6900
Total				5148

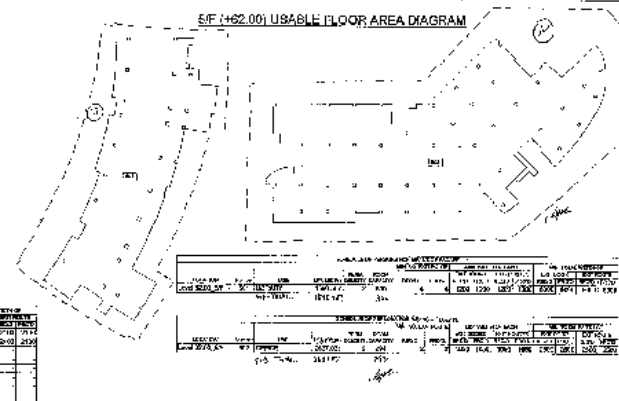
SCHEDULE 1: MINIMUM NUMBER & WIDTH OF EXIT ROUTES FOR EACH FLOOR									
LOCATION	FLOOR	SUBJECT	MIN. NO. OF EXIT ROUTES		MIN. WIDTH OF EACH EXIT ROUTE		MIN. TOTAL WIDTH OF EXIT ROUTES		REMARKS
			REQD.	PROV.	REQD.	PROV.	REQD.	PROV.	
LG/5/F	5	Office	1	1	1.00	1.00	1.00	1.00	
G/F	1	Shop	1	1	1.00	1.00	1.00	1.00	
G/F	2	Office	1	1	1.00	1.00	1.00	1.00	
3/F	1	Restaurant	1	1	1.00	1.00	1.00	1.00	
3/F	2	Kitchen	1	1	1.00	1.00	1.00	1.00	
5/F	1	Office	1	1	1.00	1.00	1.00	1.00	
5/F	2	Restaurant	1	1	1.00	1.00	1.00	1.00	
5/F	3	Kitchen	1	1	1.00	1.00	1.00	1.00	
5/F	4	Exhibition hall	1	1	1.00	1.00	1.00	1.00	
6/F	1	Office	1	1	1.00	1.00	1.00	1.00	
6/F	2	Restaurant	1	1	1.00	1.00	1.00	1.00	
6/F	3	Kitchen	1	1	1.00	1.00	1.00	1.00	
6/F	4	Exhibition hall	1	1	1.00	1.00	1.00	1.00	

THE RESISTANCE REQUIREMENTS FOR SUBSTRUCTURE OF CONSTRUCTION										
COMPONENT	CLASS	TOTAL VOLUME (REQD.)	THK.	R.C. COLUMN (REQD.)		R.C. BEAM (REQD.)		R.C. SLAB (REQD.)		R.C. STAIR (REQD.)
				THK.	CONCRETE STRENGTH	THK.	CONCRETE STRENGTH	THK.	CONCRETE STRENGTH	
1	CONCRETE	1000.000	10	10	10	10	10	10	10	10
2	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
3	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
4	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
5	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
6	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
7	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
8	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
9	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
10	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
11	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
12	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
13	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
14	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
15	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
16	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
17	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
18	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
19	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
20	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
21	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
22	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
23	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
24	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
25	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
26	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
27	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
28	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
29	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
30	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
31	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
32	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
33	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
34	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
35	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
36	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
37	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
38	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
39	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
40	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
41	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
42	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
43	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
44	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
45	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
46	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
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93	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
94	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
95	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
96	FLOOR OF ASSEMBLY	1000.000	10	10	10	10	10	10	10	10
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.. 3/F (153.80) USABLE FLOOR AREA DIAGRAM

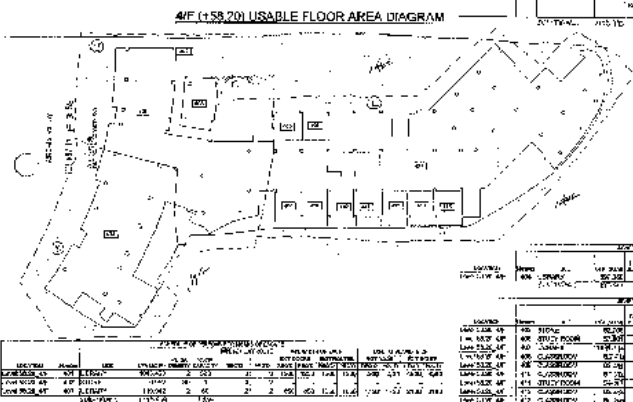
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5/F (+62.00) USABLE FLOOR AREA DIAGRAM

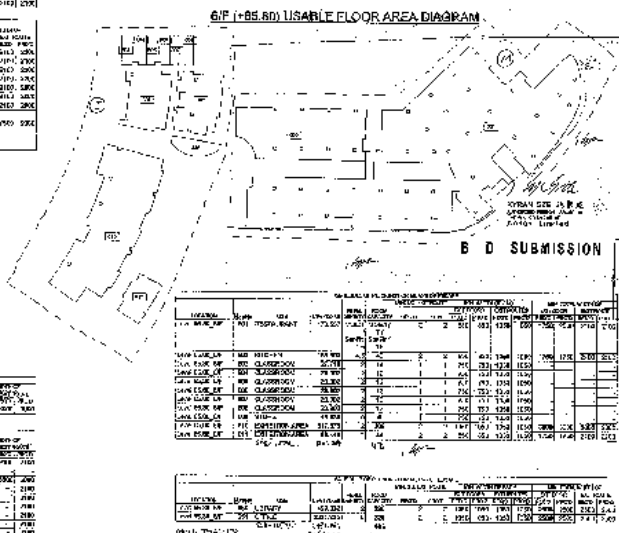


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JOHN DOE	10/10/1980	10:00	10:00	10:00	10:00	10:00
JANE SMITH	10/10/1980	10:00	10:00	10:00	10:00	10:00
JOHN DOE	10/10/1980	10:00	10:00	10:00	10:00	10:00
JANE SMITH	10/10/1980	10:00	10:00	10:00	10:00	10:00

4/F (+58.20) USABLE FLOOR AREA DIAGRAM

[illegible]

6/F (+85.80) USABLE FLOOR AREA DIAGRAM

[illegible]

B D SUBMISSION

J. M. Applegate
 CHIEF OF ALB.
 Lake & King Survey
 See BULLETIN 20, 1907

Downloaded At: 11:53 11 September 2009



SEMPER PARATUS

[illegible]

NAME	DECKS
ADDRESS	CAL L
CITY	NEW YORK
STATE	NEW YORK
ZIP	10008

Aedas

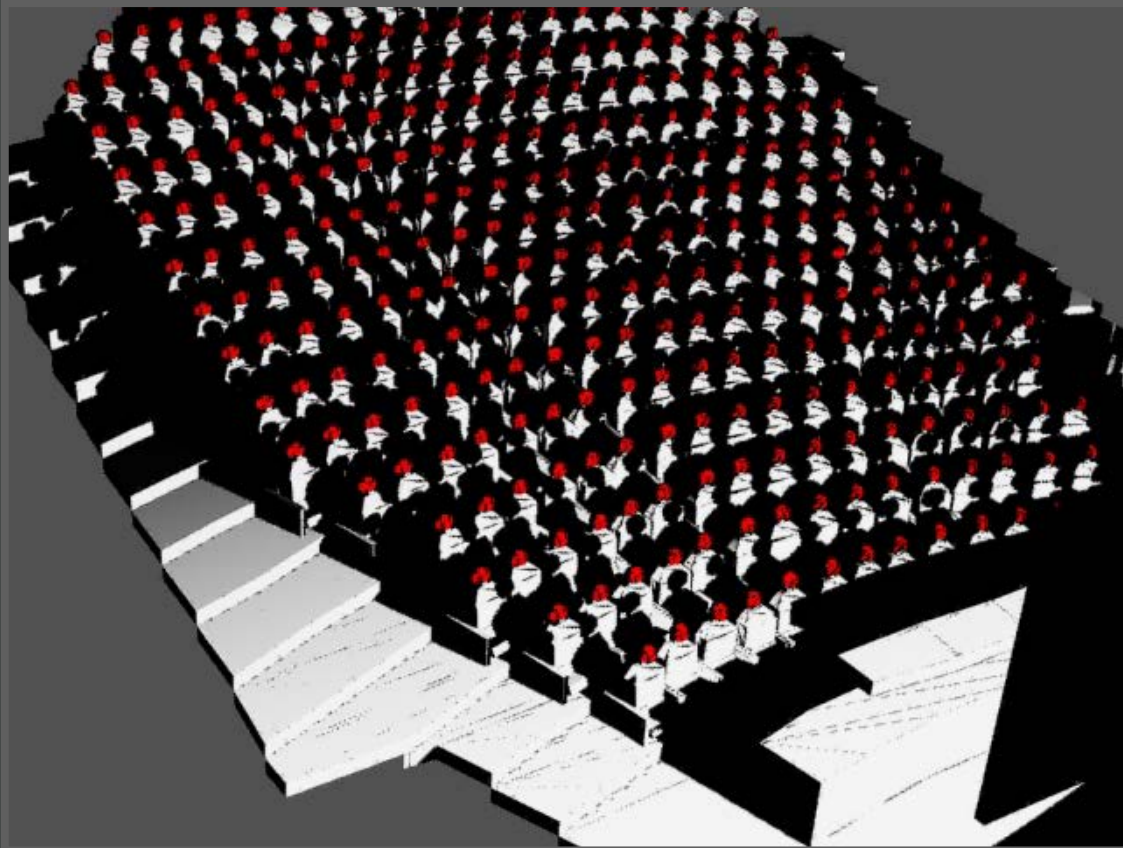


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P 441 150 1442
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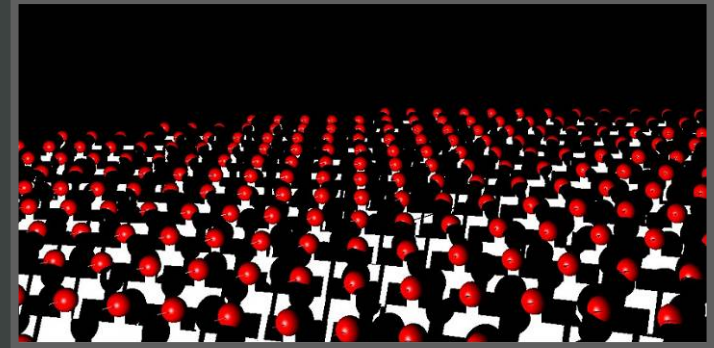
Use of Building Information Modeling (BIM)

Aedas

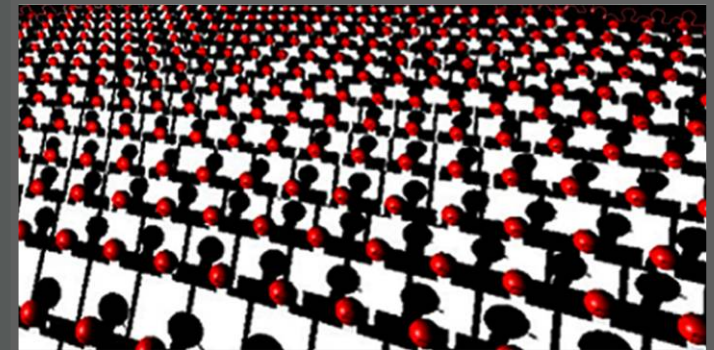
1. Design visualization
2. Drawing Productions
3. Services Co-ordination and Clash detection with other disciplines
4. Quantity taking and preparation of Tender Document
5. Automated Statutory Submission
- 6. Scientific analysis of different environmental aspects** 様々な環境
解析
7. Supply Chain Integration with the manufacturing and production
8. Complex Geometry



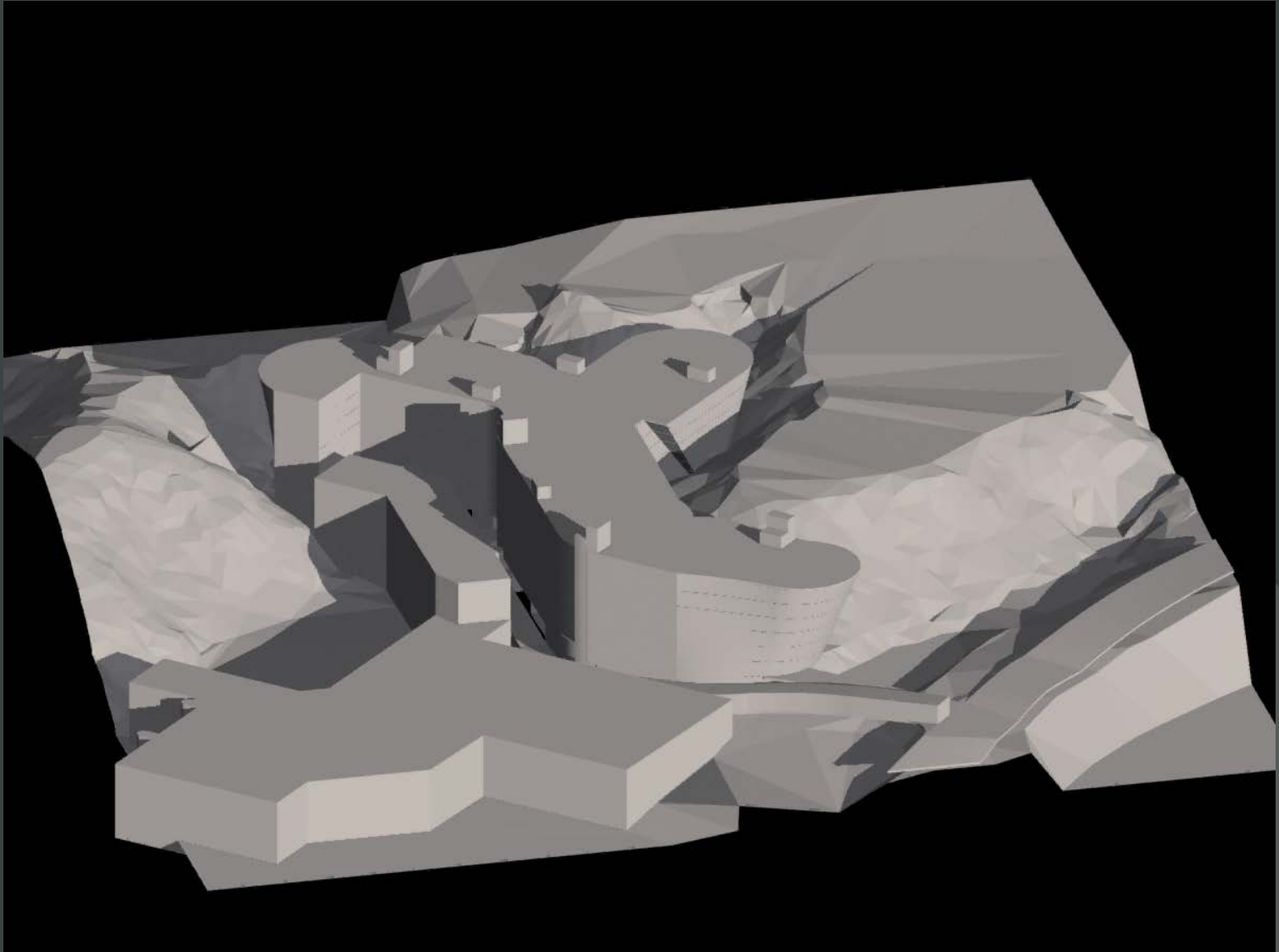
Radiating Light Method



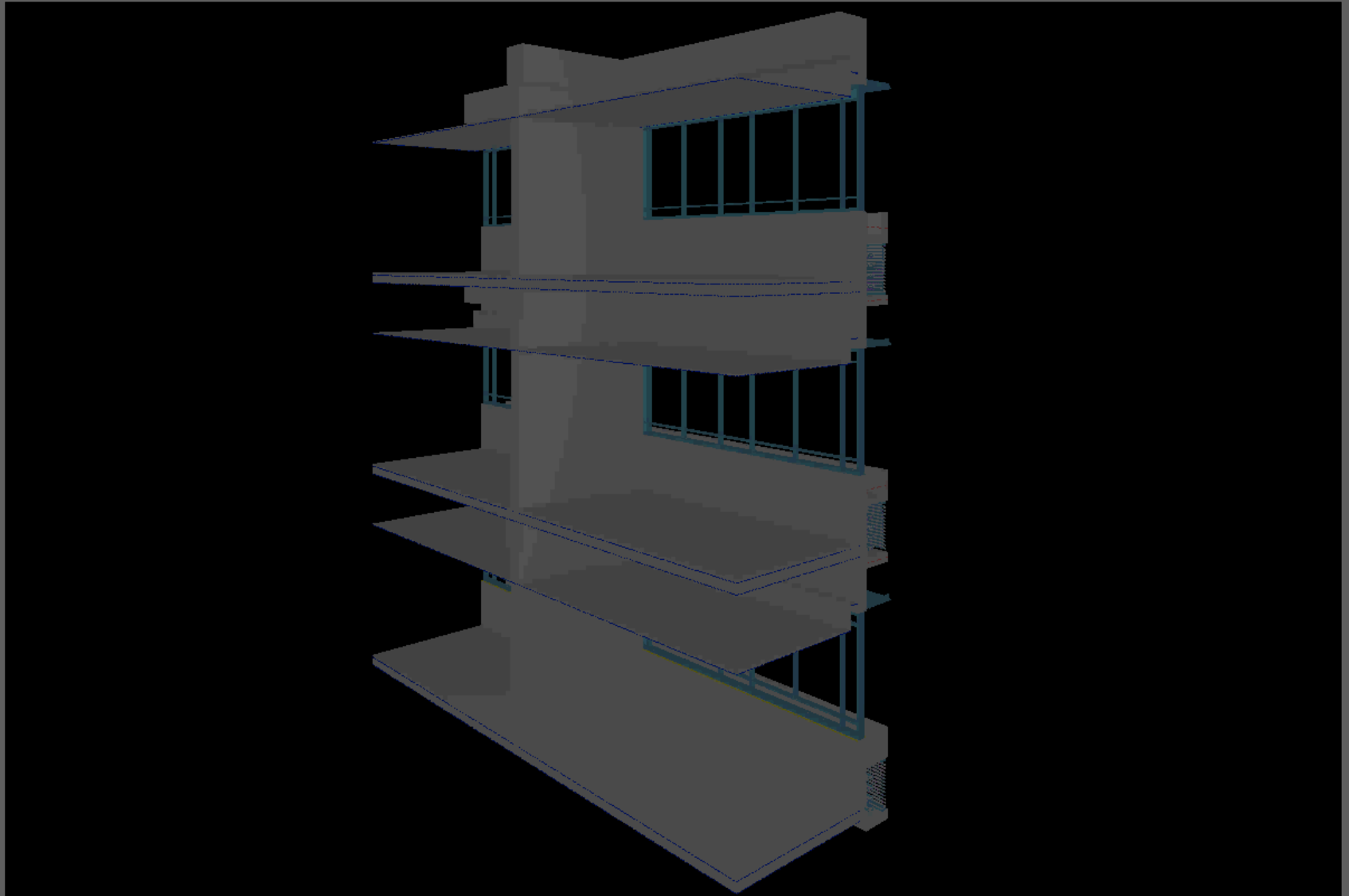
Unsatisfactory sightlines



Satisfactory sightlines

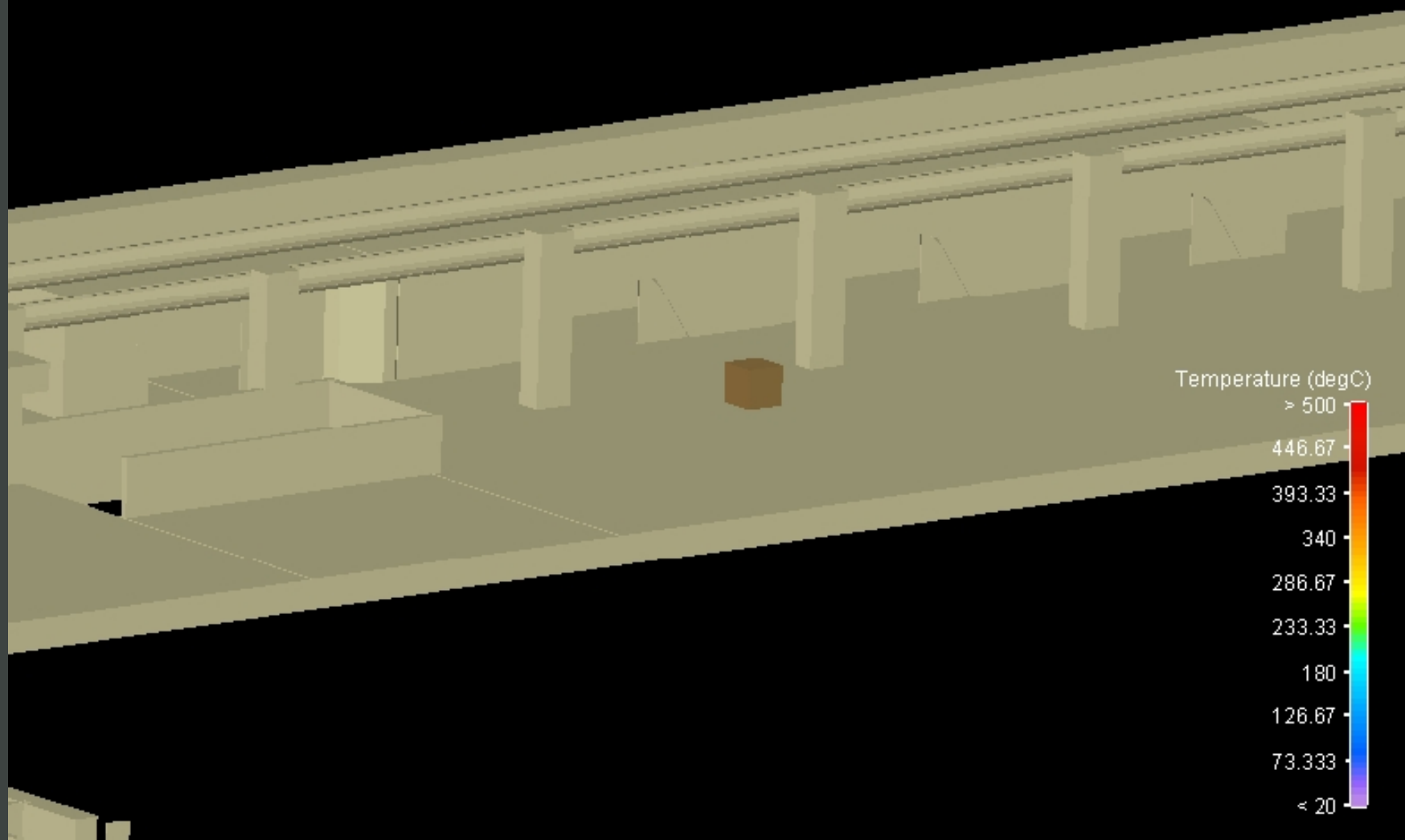


SUN STUDY



FAÇADE SOLAR STUDY
21/12/2006 7:00am – 6:00pm

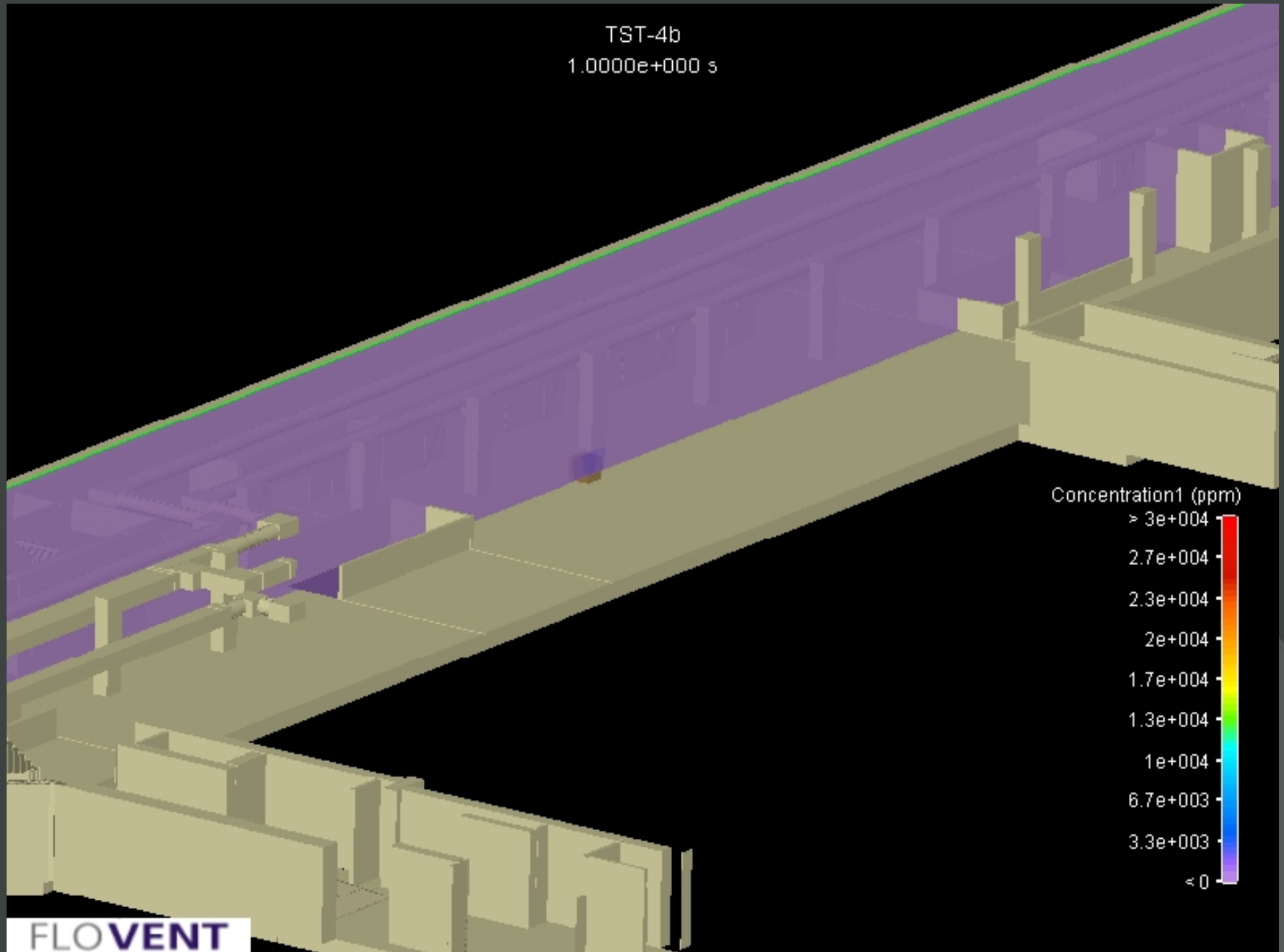
TST-4c
1.0000e+000 s

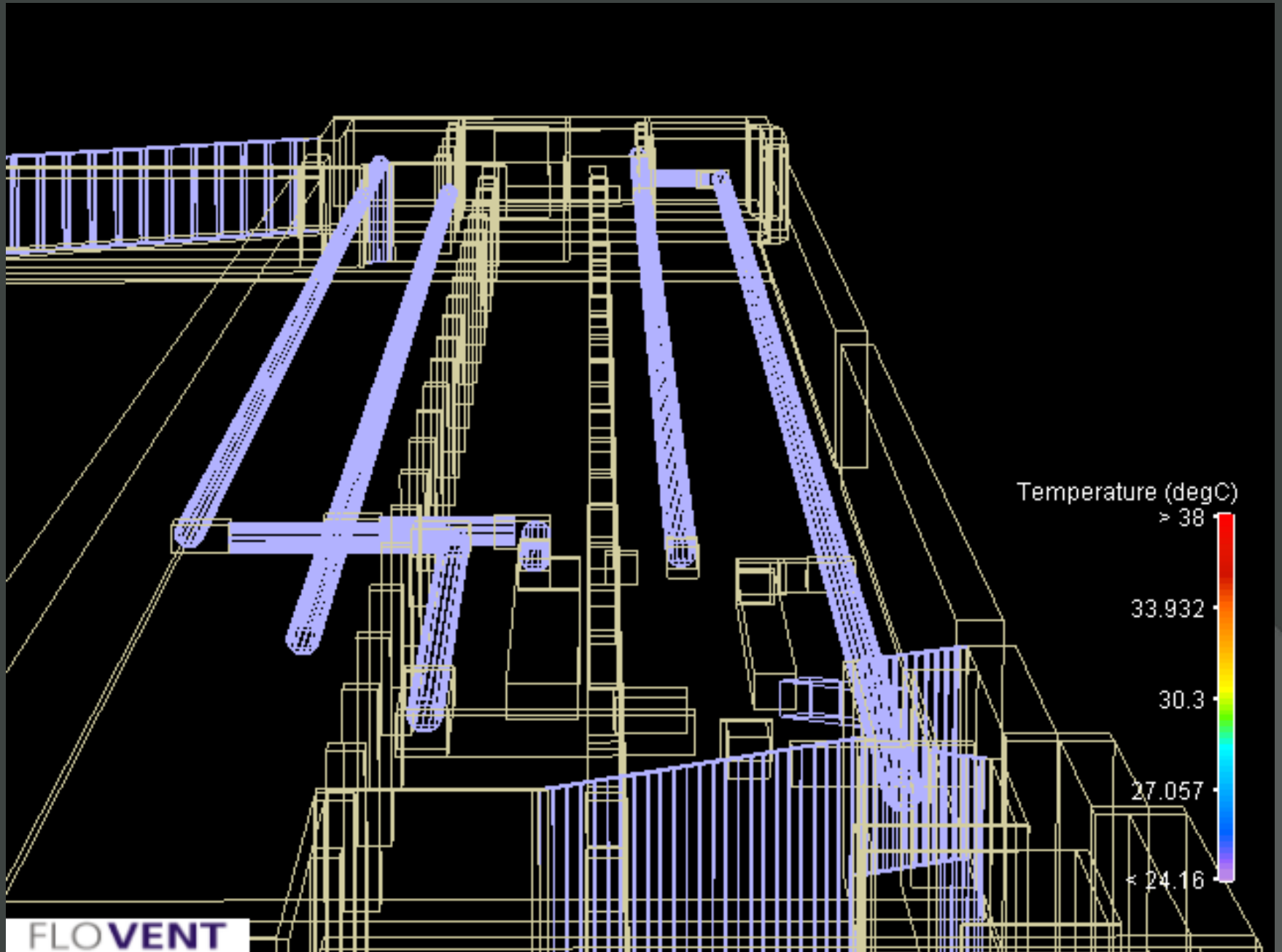


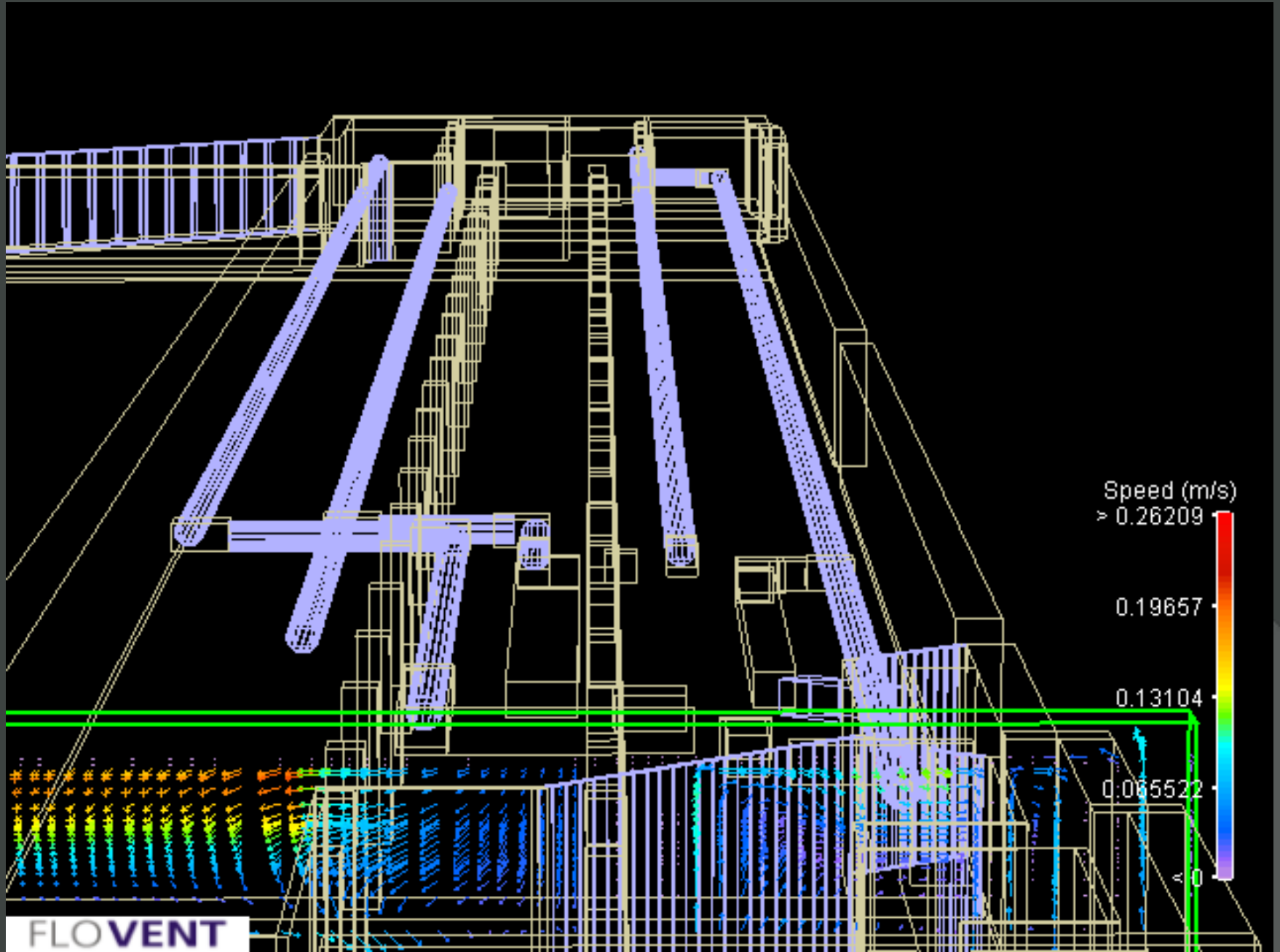
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TST-4b
1.0000e+000 s





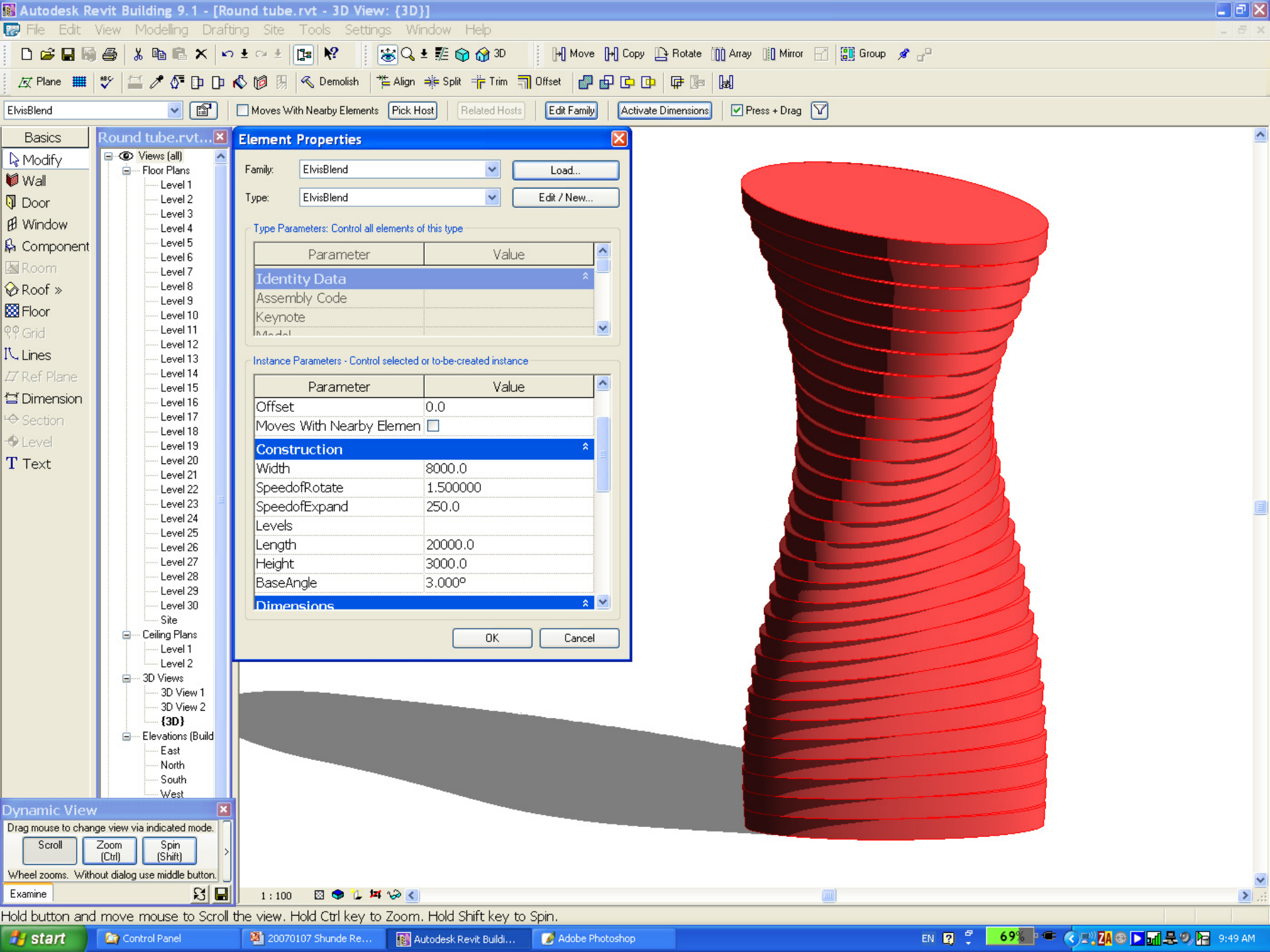


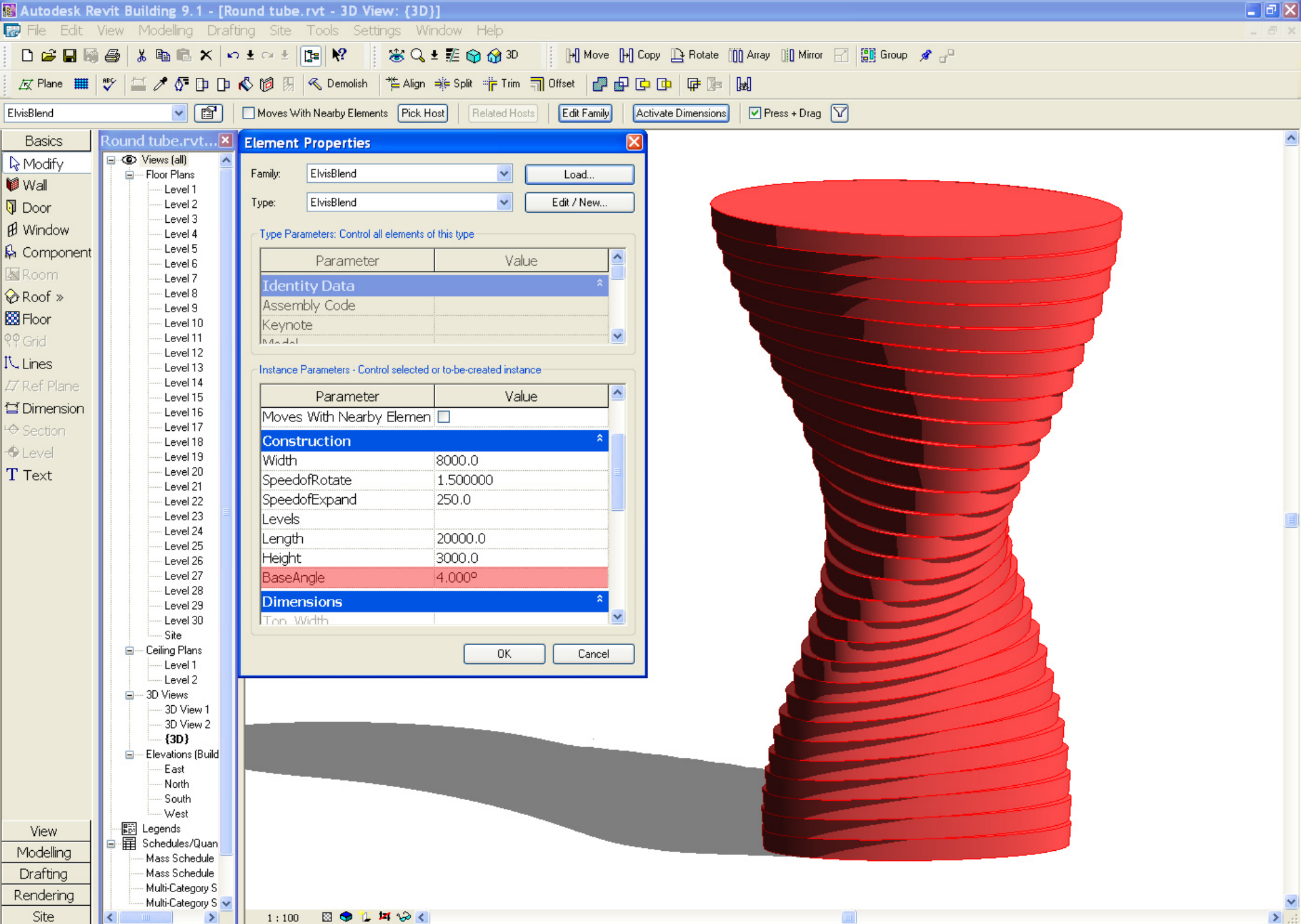
1. Design visualization
2. Drawing Productions
3. Services Co-ordination and Clash detection with other disciplines
4. Quantity taking and preparation of Tender Document
5. Automated Statutory Submission
6. Scientific analysis of different environmental aspects
- 7. Supply Chain Integration with the manufacturing and production**
サプライヤとの連携
8. Complex Geometry

Use of Building Information Modeling (BIM)

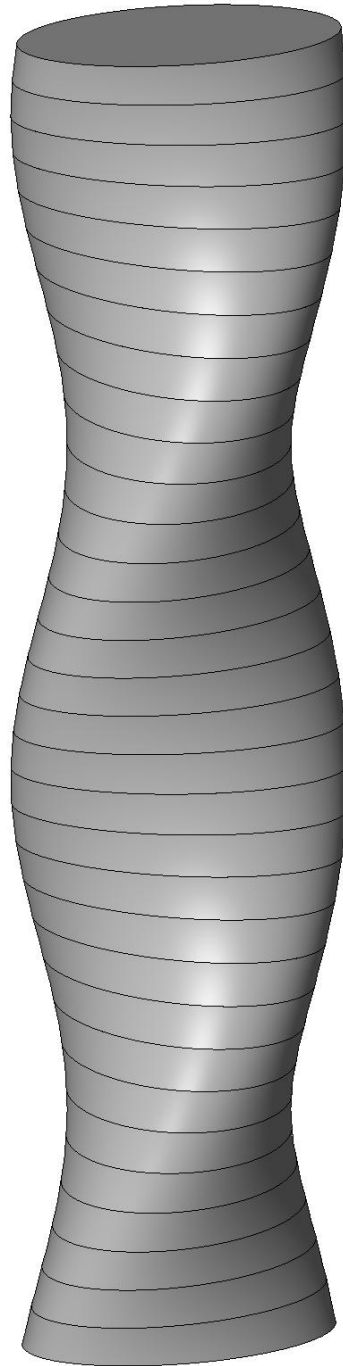
Aedas

1. Design visualization
2. Drawing Productions
3. Services Co-ordination and Clash detection with other disciplines
4. Quantity taking and preparation of Tender Document
5. Automated Statutory Submission
6. Scientific analysis of different environmental aspects
7. Supply Chain Integration with the manufacturing and production
8. **Complex Geometry** 複雑な形状を実現可能





Click to select, TAB for alternates, CTRL adds, SHIFT unselects.





absolute world BUILDING 2

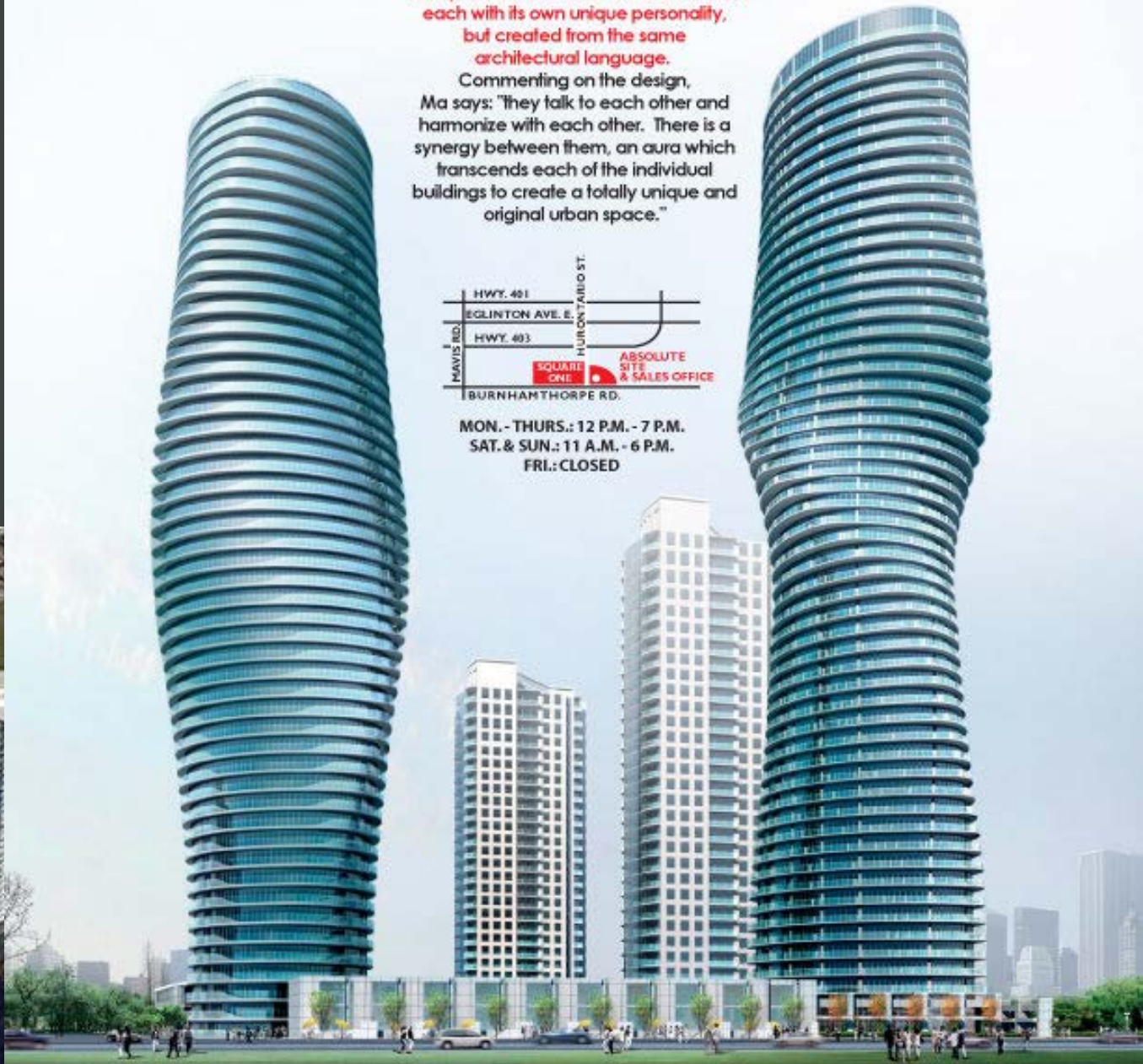
AbsoluteWorld's two buildings, as envisioned by their creator, Yansong Ma. The buildings were designed to complement and enhance each other, each with its own unique personality, but created from the same architectural language.

Commenting on the design, Ma says: "They talk to each other and harmonize with each other. There is a synergy between them, an aura which transcends each of the individual buildings to create a totally unique and original urban space."

absolute world BUILDING 1



MON. - THURS.: 12 P.M. - 7 P.M.
SAT. & SUN.: 11 A.M. - 6 P.M.
FRI.: CLOSED

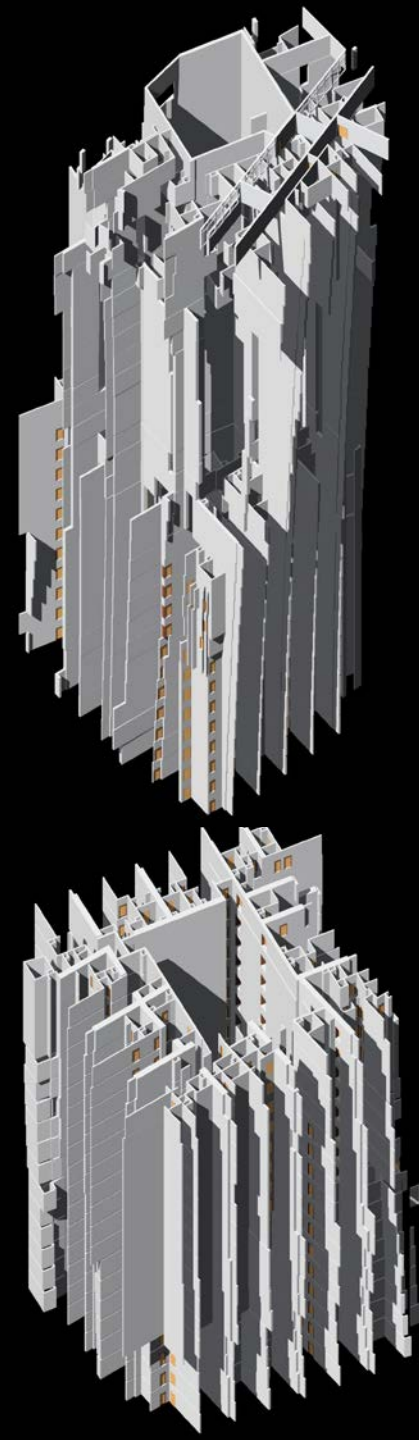




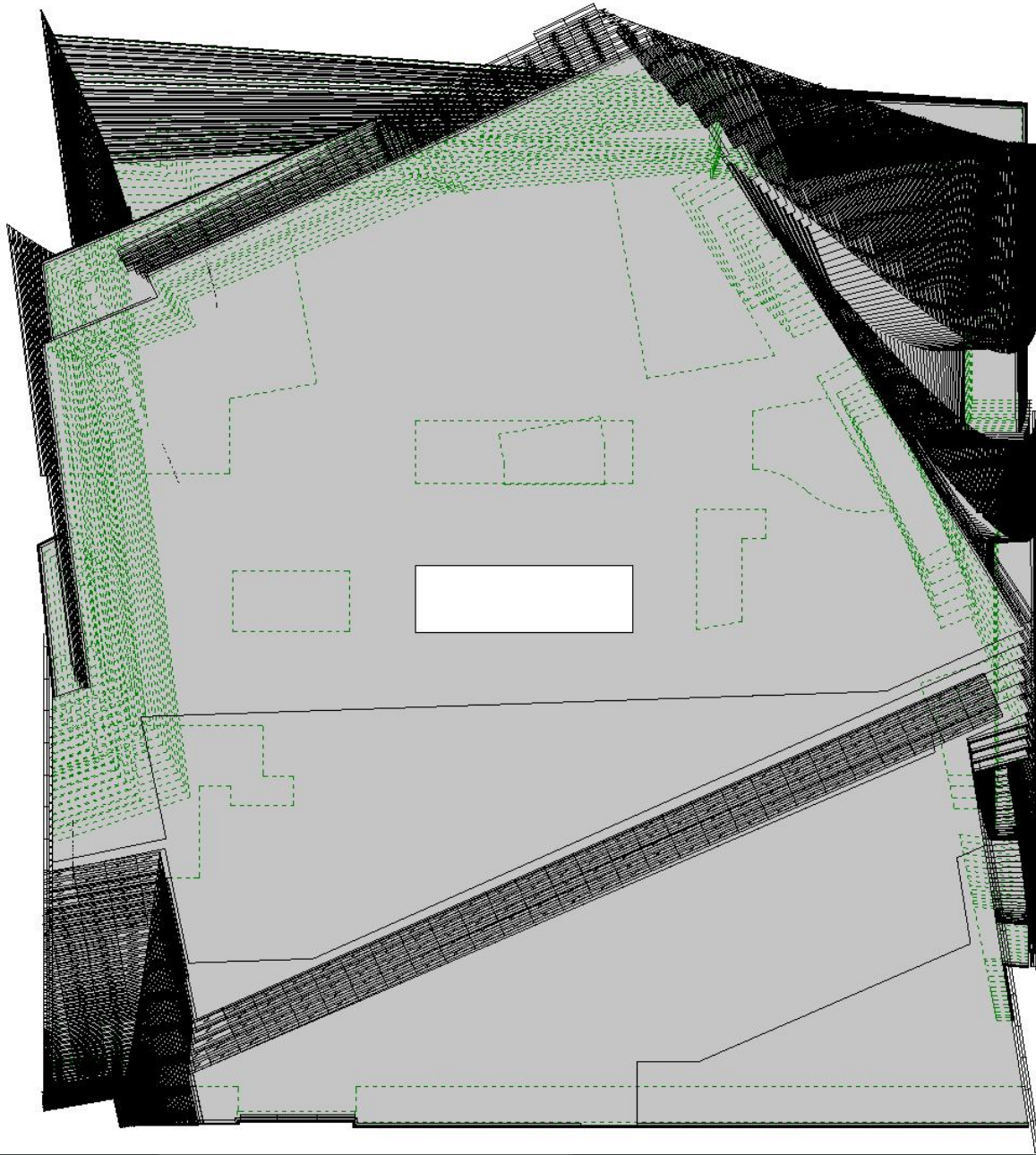
Program: Residential, Site Area: 3,746 sqm
Floor Area: 659,659 sqm | Building Height: 345 m

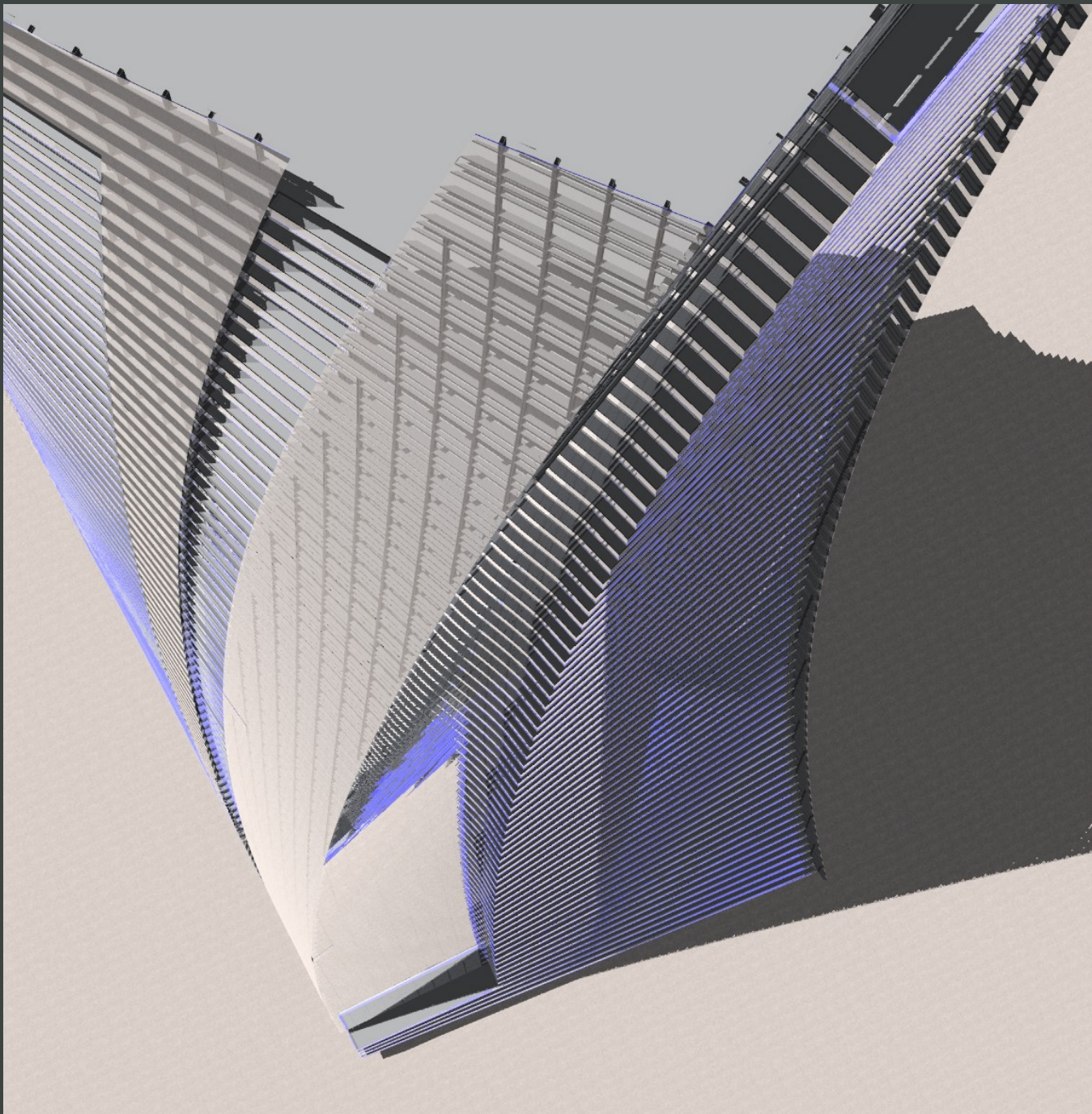


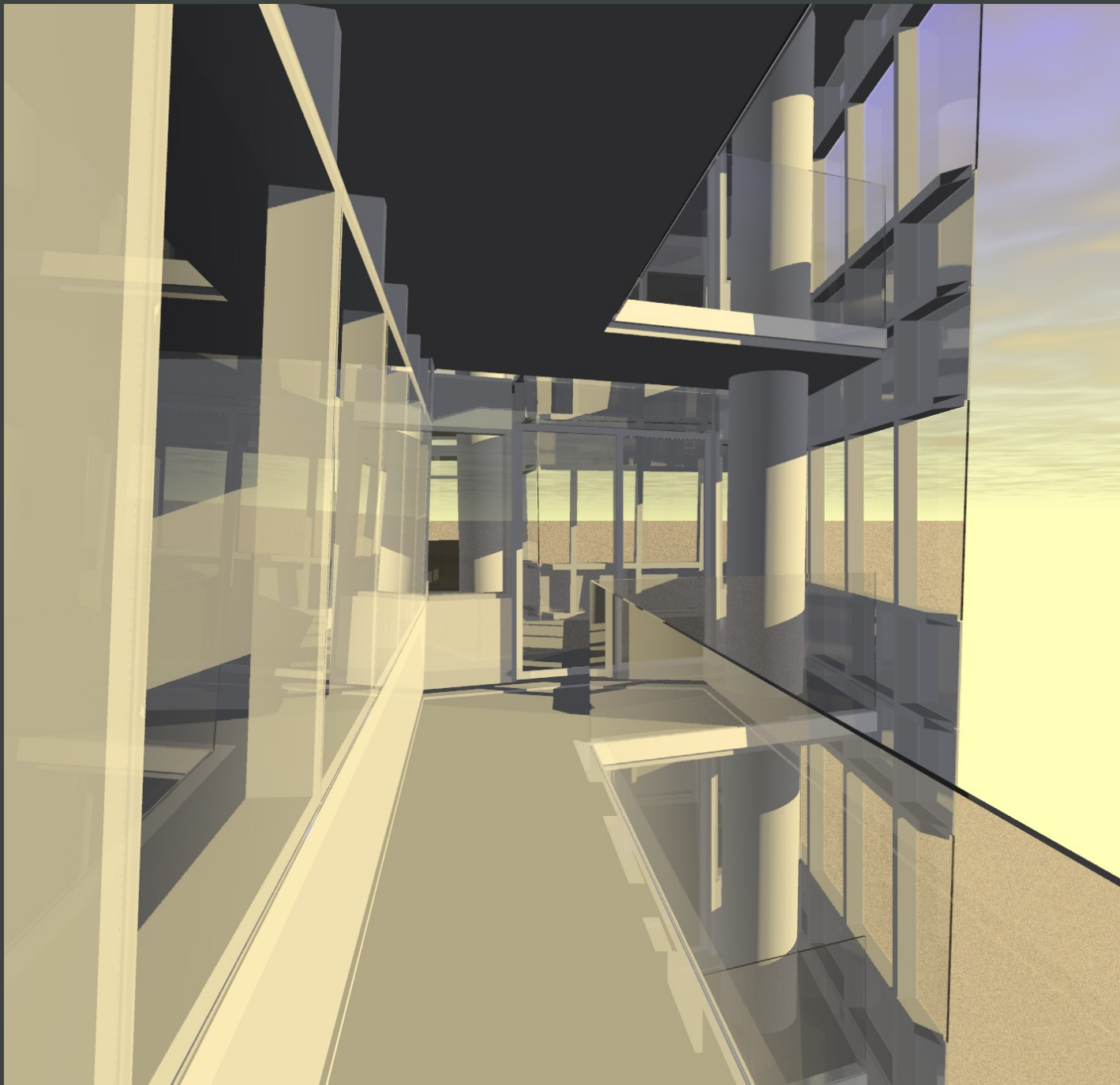
Dubai **Ocean Heights One**

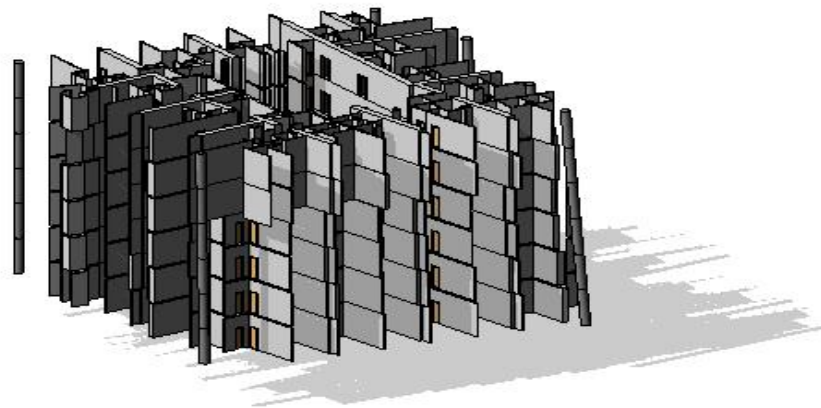


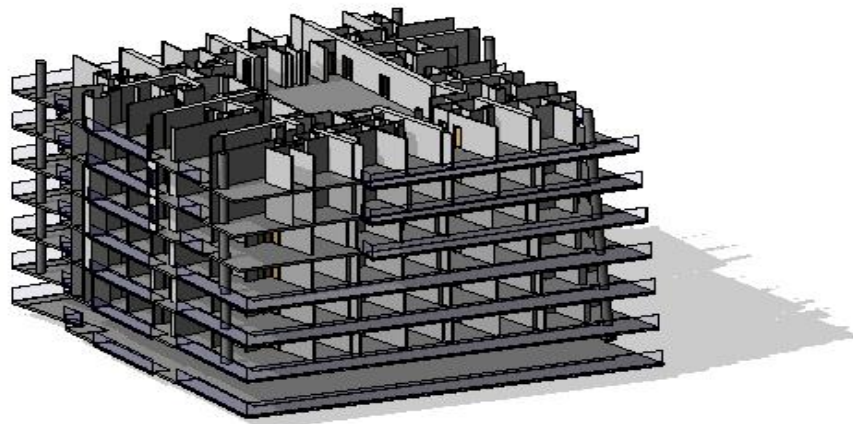
COMPLEX GEOMETRY









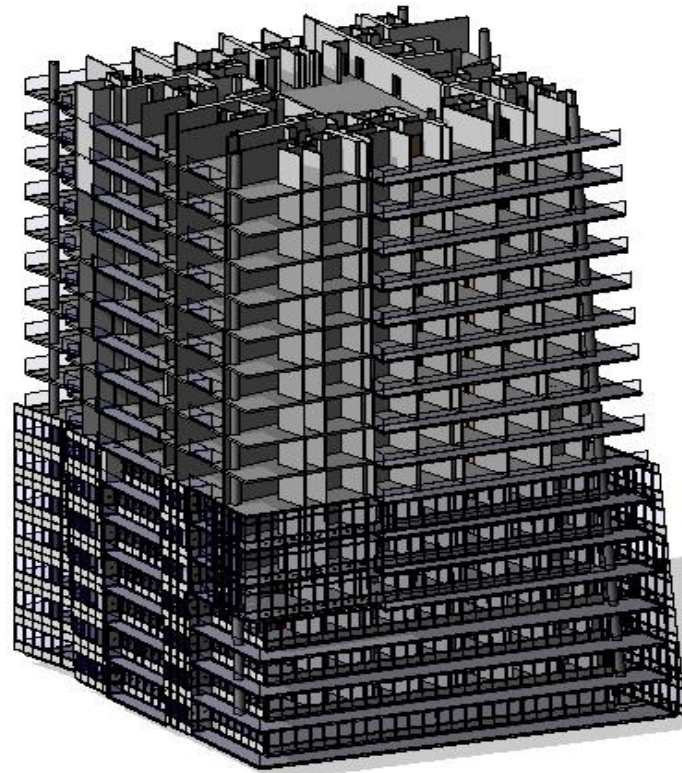


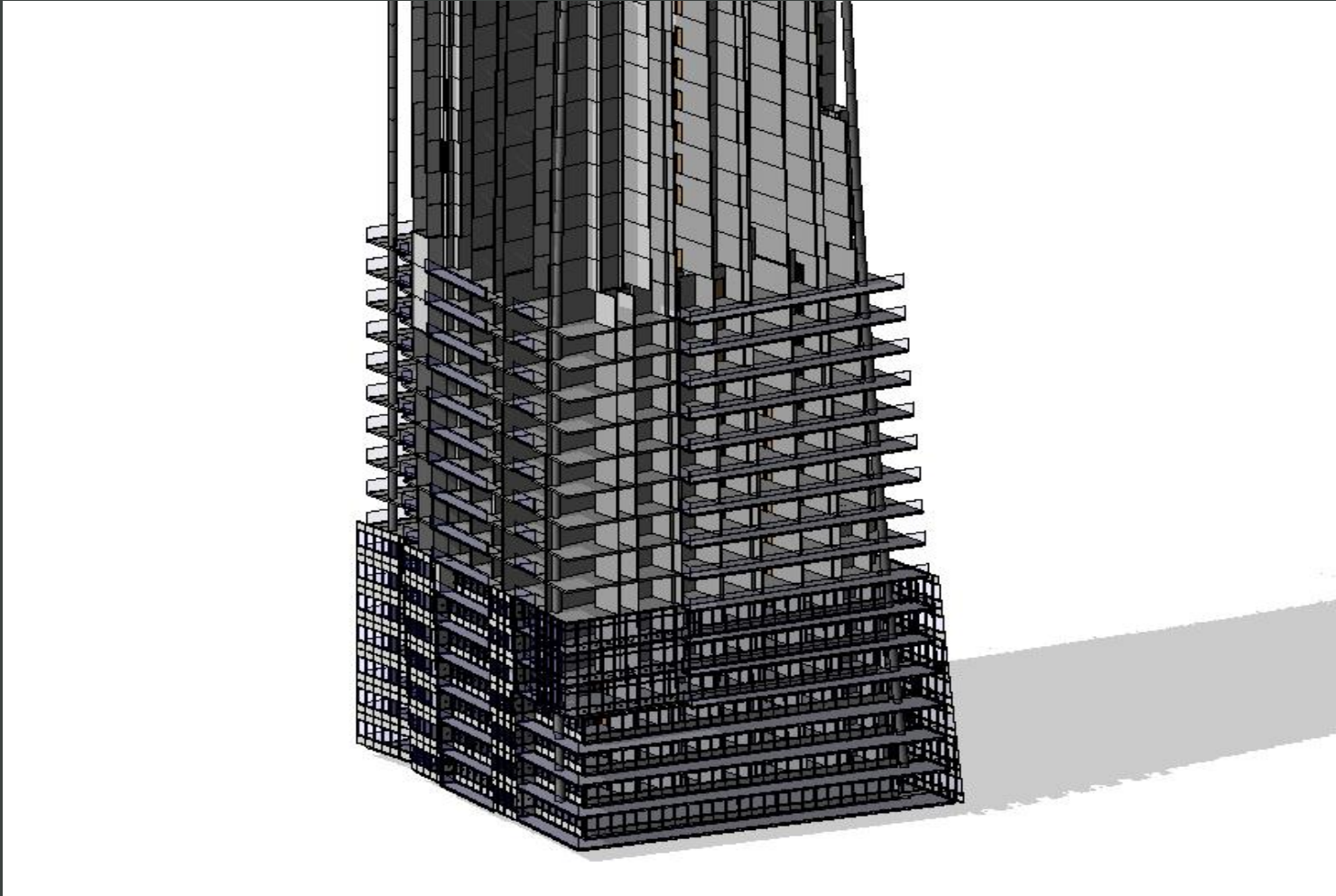








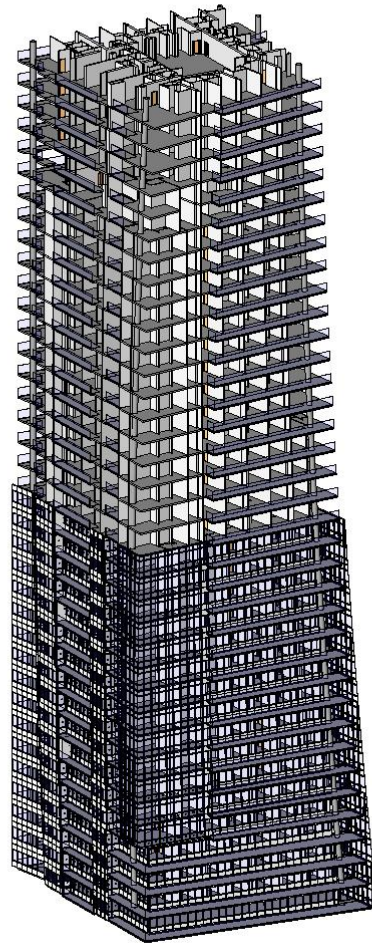


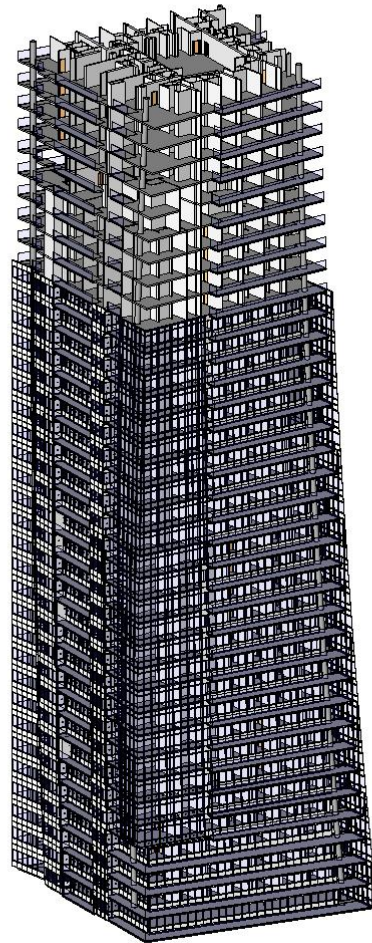


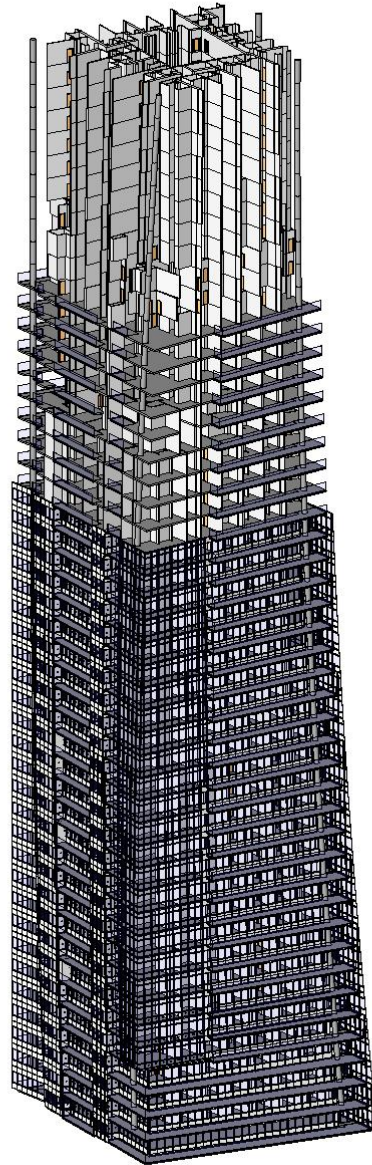


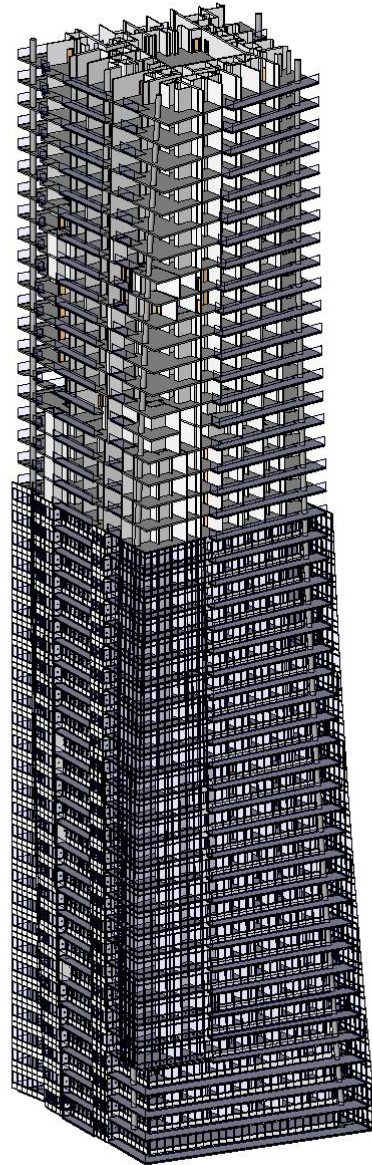


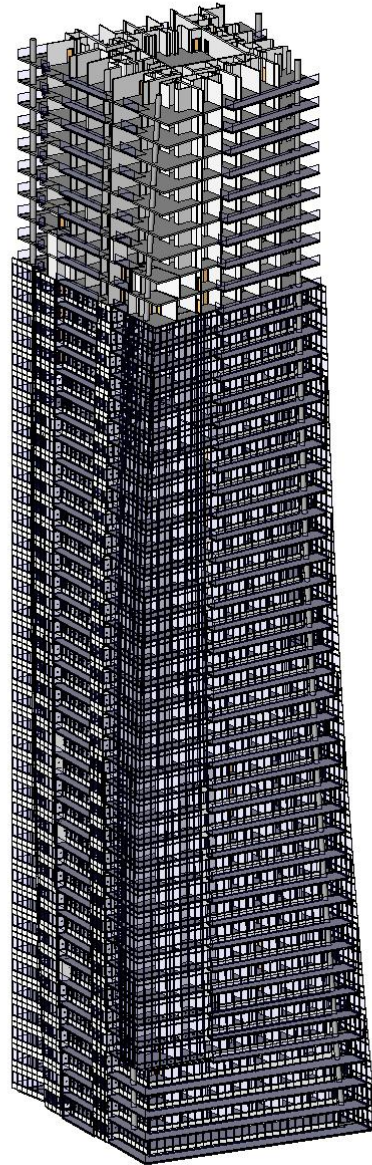


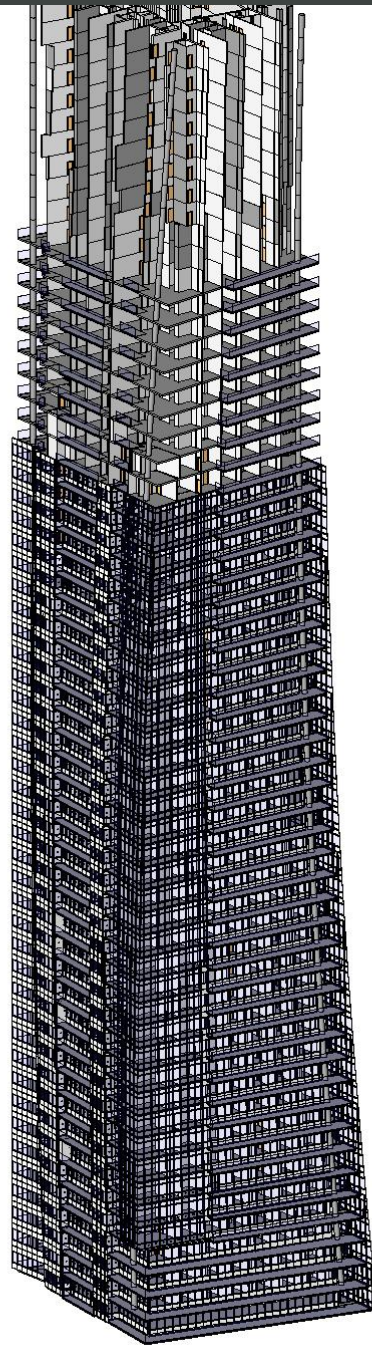


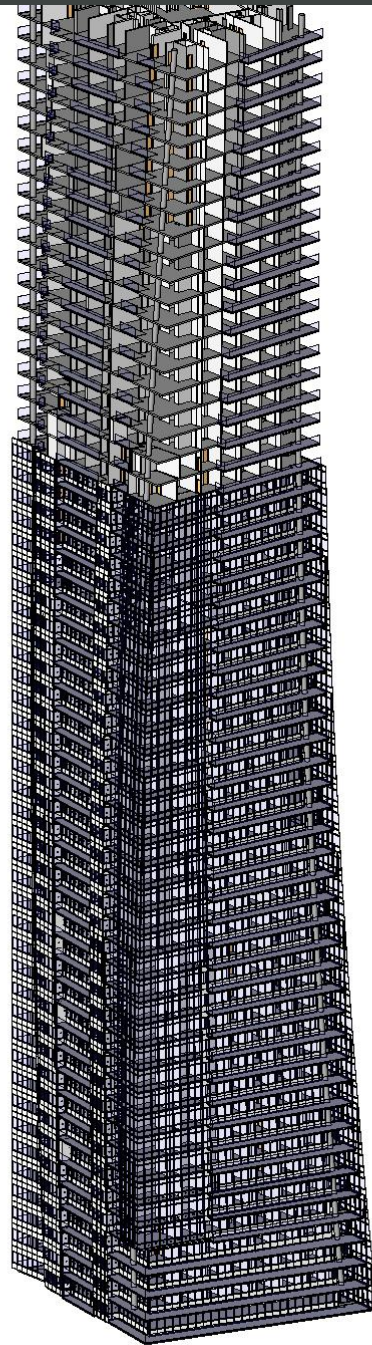


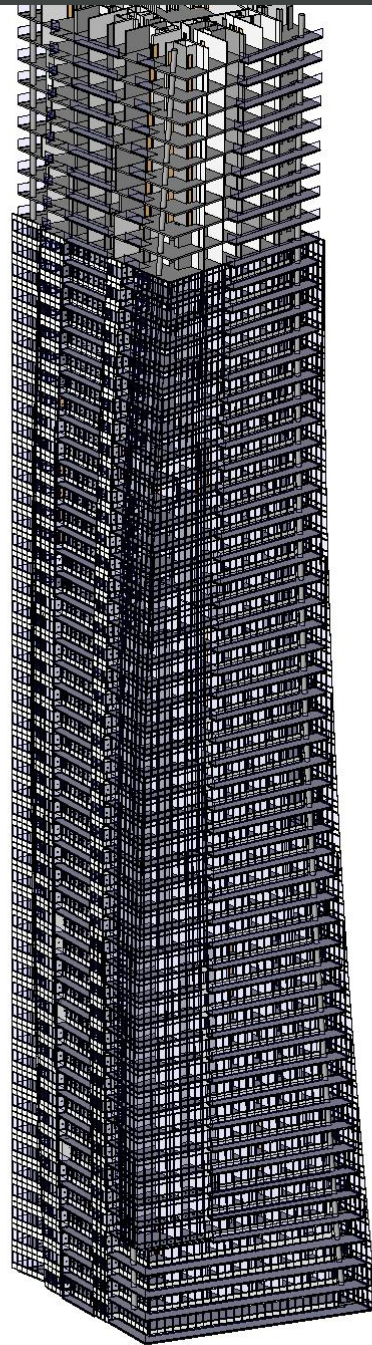
















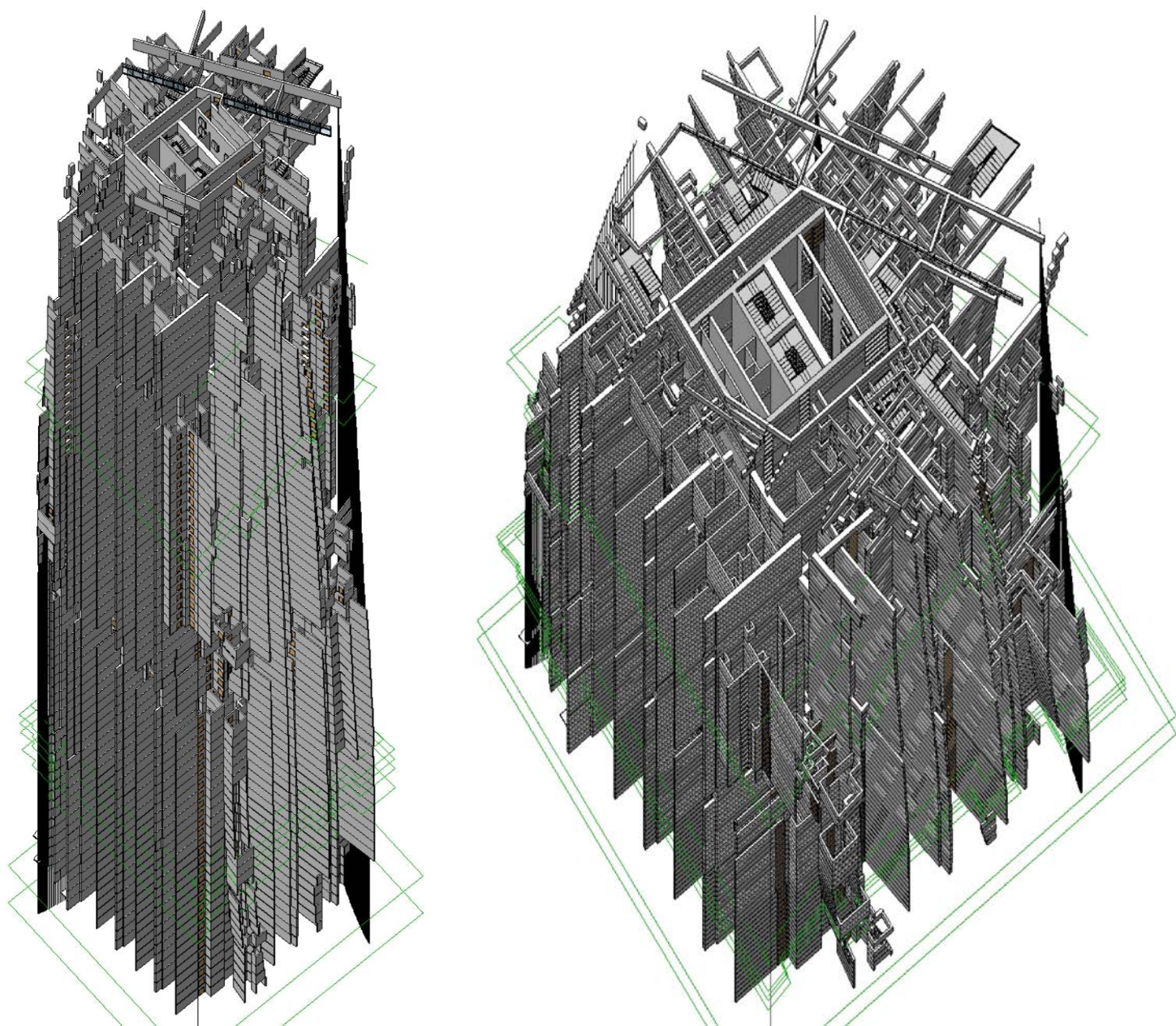




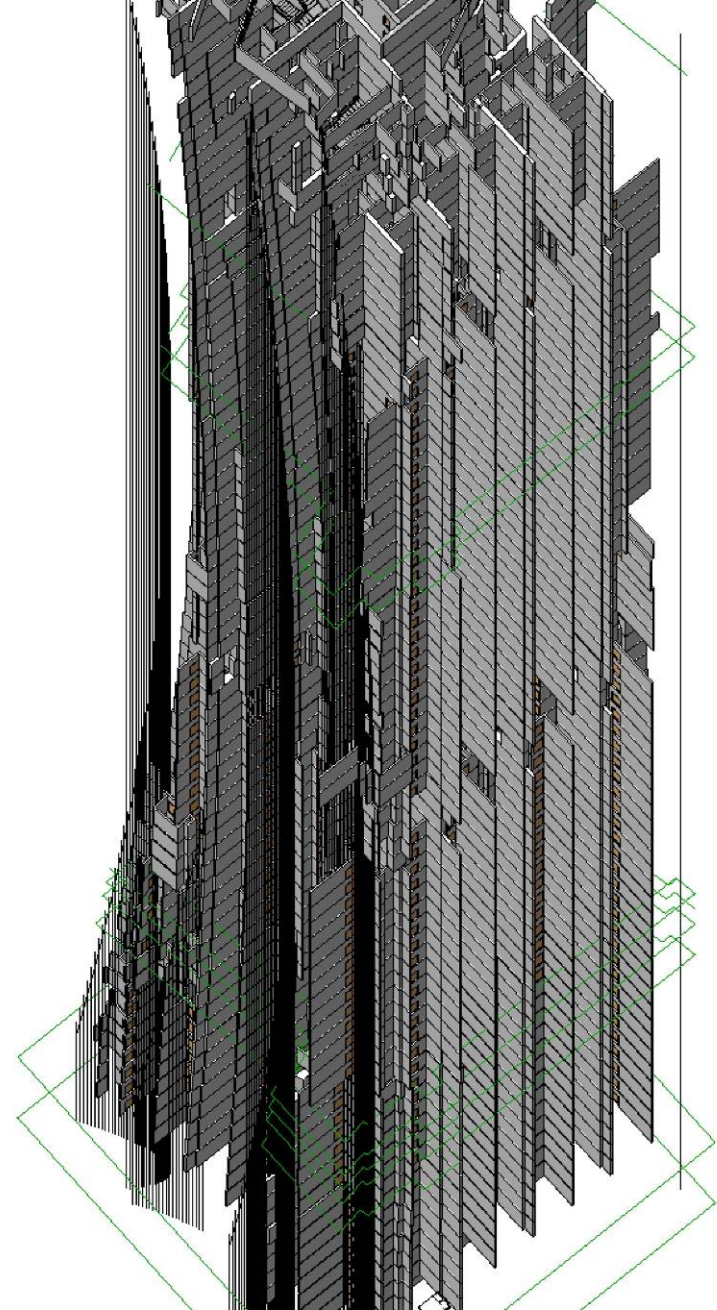
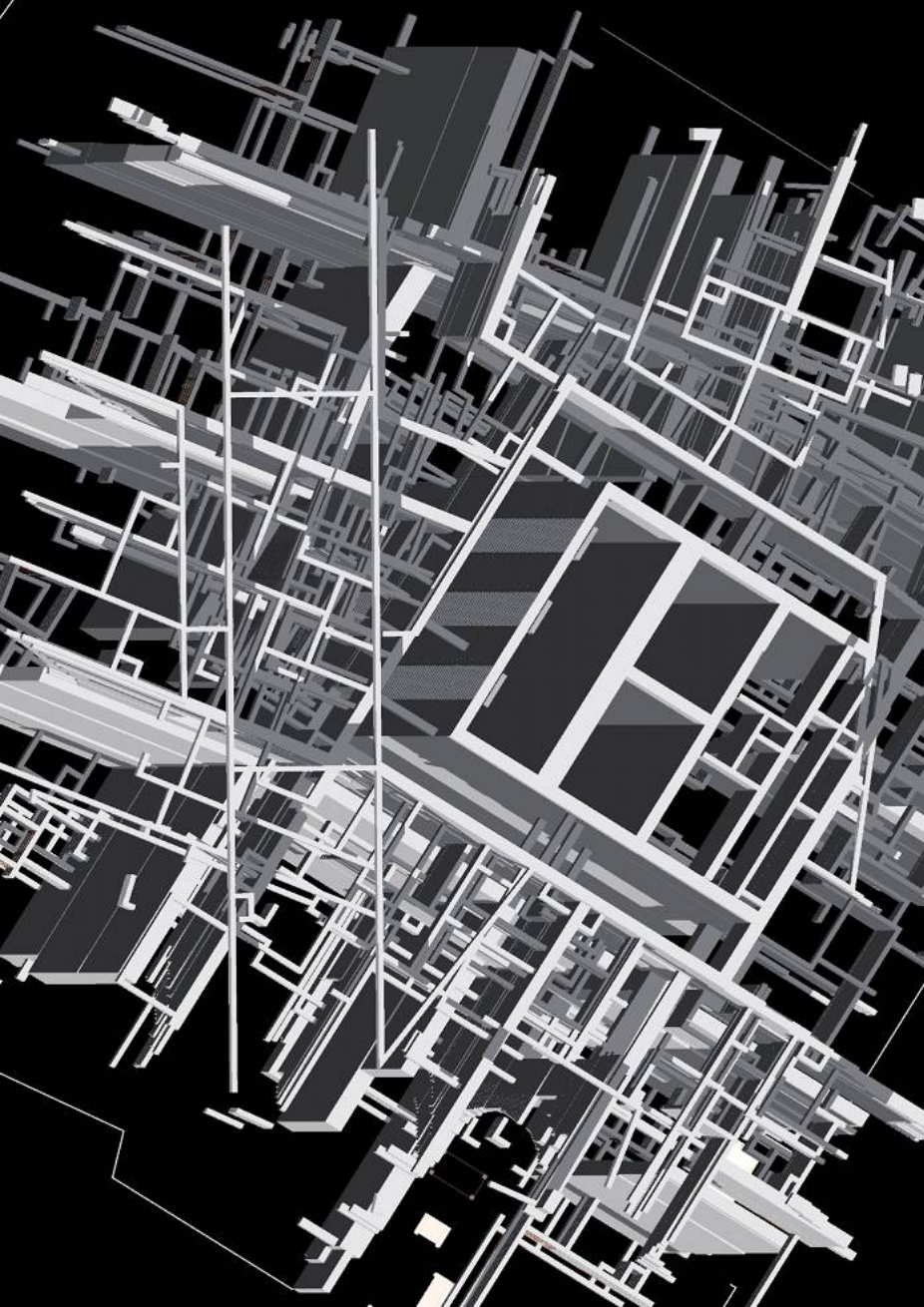




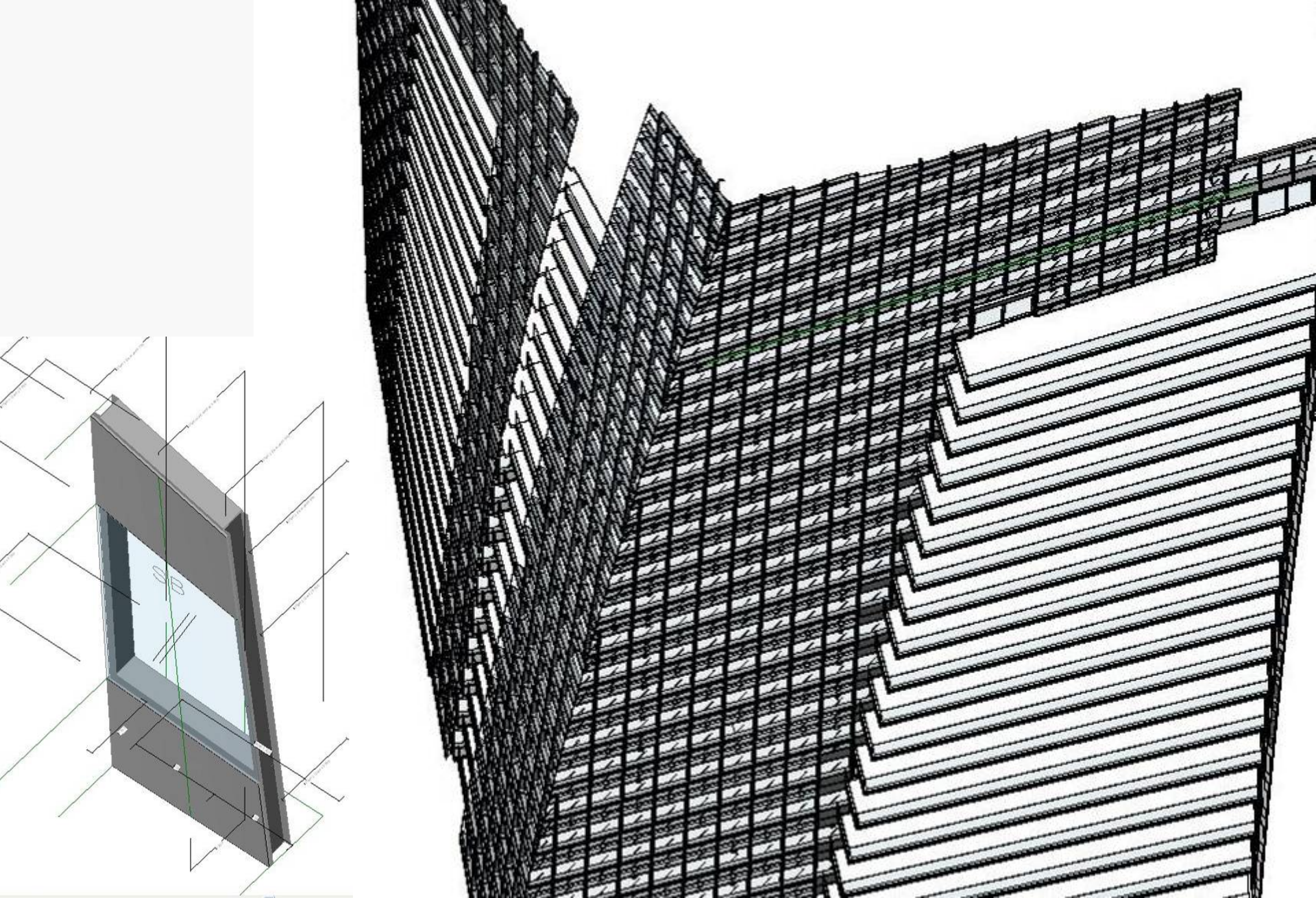




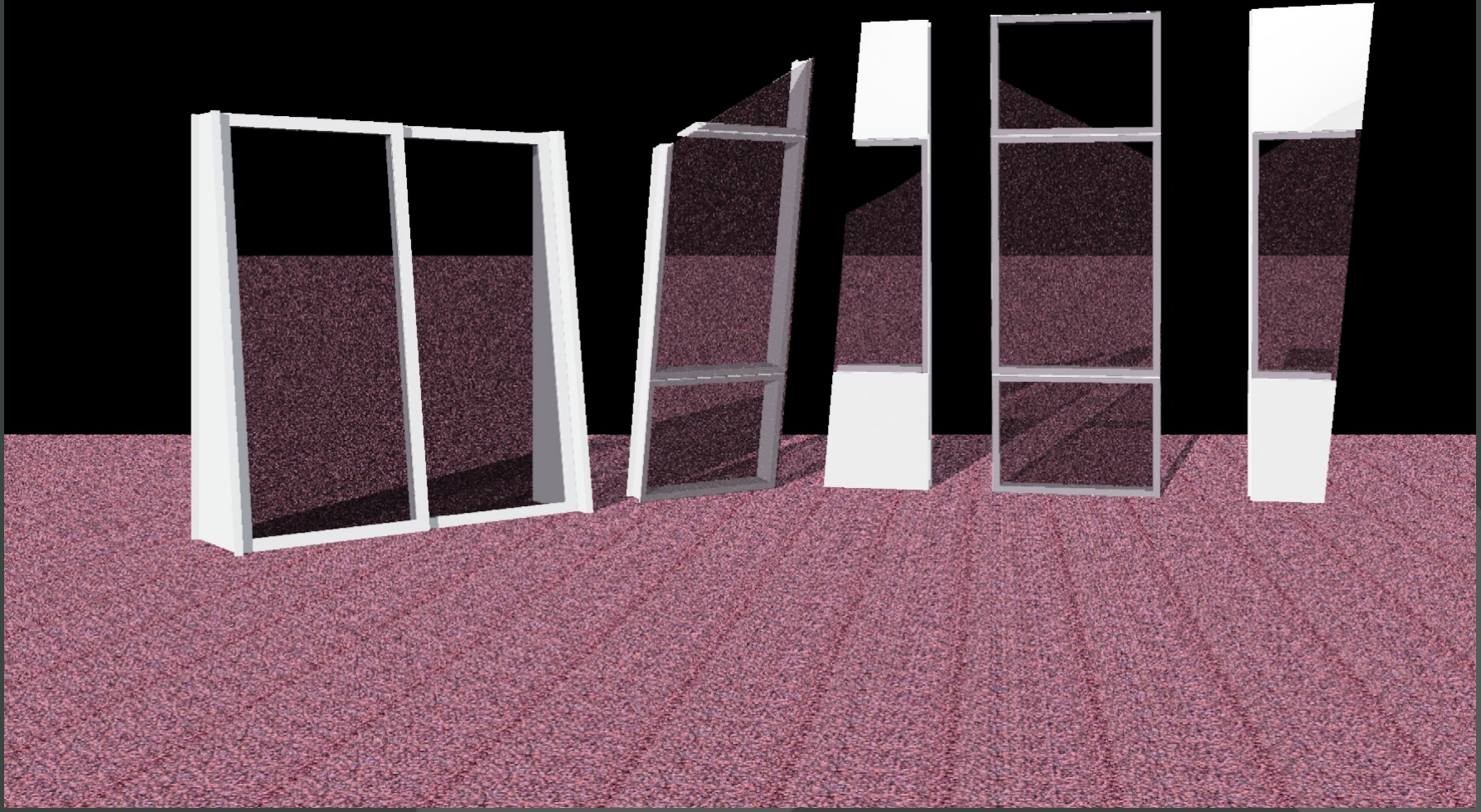
VERTICAL CO-ORDINATION



INTERNAL vs EXTERNAL



COMPLICATED CURTAIN WALL



Autodesk Revit Structure 4 - [Ocean Heights 1 R4 Local 2.rvt - Schedule: Multi-Category Schedule]

File Edit View Modelling Drafting Site Tools Settings Window Help

Plane

Demolish

Align

Split

Trim

Offset

Move

Copy

Rotate

Array

Mirror

Group

[Not Editable] Level 31 to

Headers: Group Ungroup Rows: New Delete Show

Basics

Ocean Heights 1 R4 Local 2.rvt

Views (all)

Structural Plans

CAD REFERENCE

Level 1

Level 1 - An

Level 2

Level 2 - An

Level 4

Level 10

Level 20

Level 30

Level 40

Level 50

Level 60

Level 65

Level 70

Level 75

3D Views

3D View 1

3D View 2

3D View 3

3D View 4

3D View 5

3D View 6

Copy of 3D View 1

View 1 - An

(3D)

Elevations (Building)

East

North

South

West

Sections (Building)

Section 1

Section 2

Section 3

Legends

Schedules/Quantities

Multi-Category Schedule

Multi-Category Schedule

Sheets (all)

Families

Annotation Symbols

Ceilings

Curtain Panels

Curtain Systems

Curtain Wall Multi

Detail Items

Doors

Floors

Furniture

View

Architectural

Drafting

Rendering

Site

Massing

Modelling

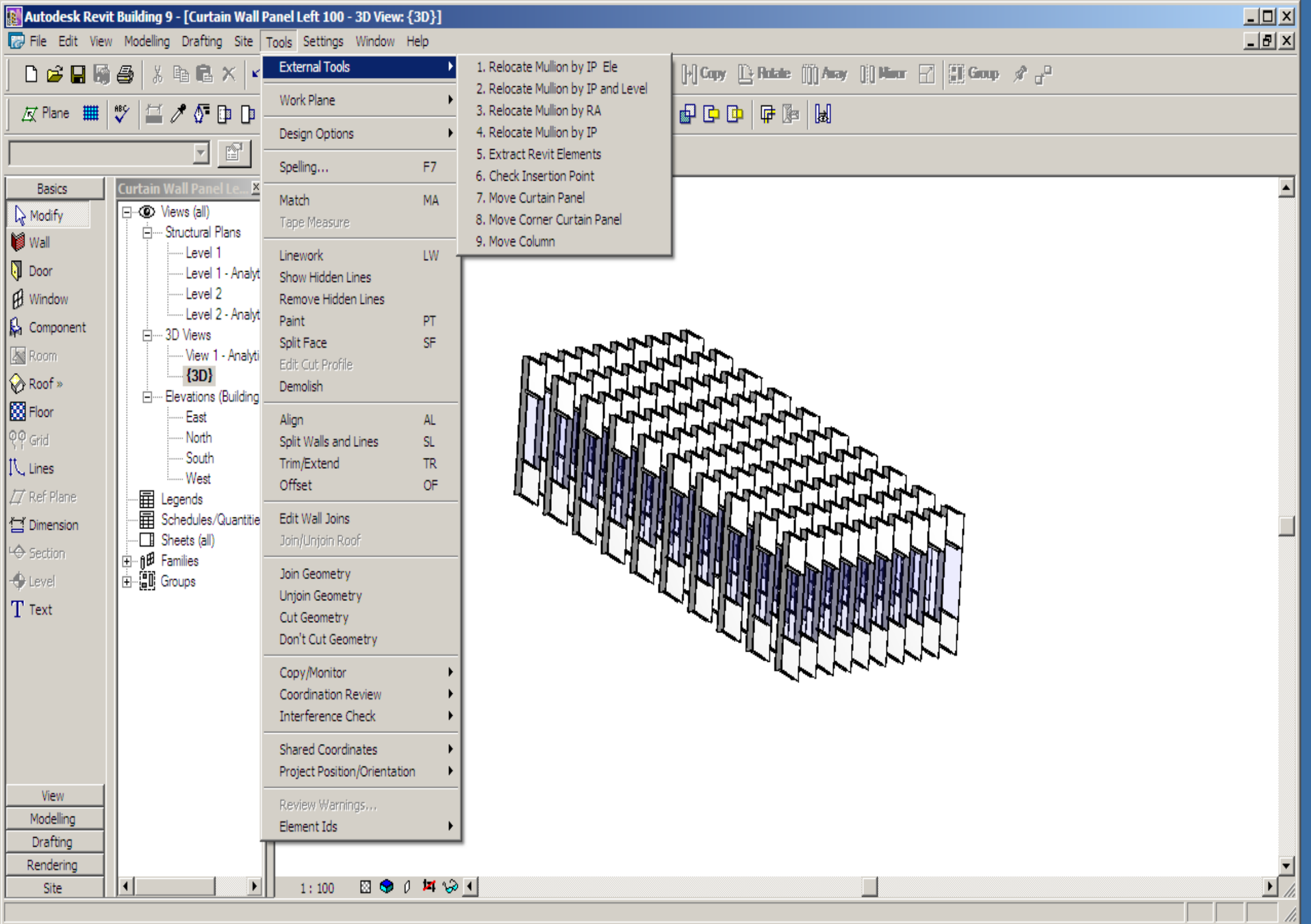
Construction

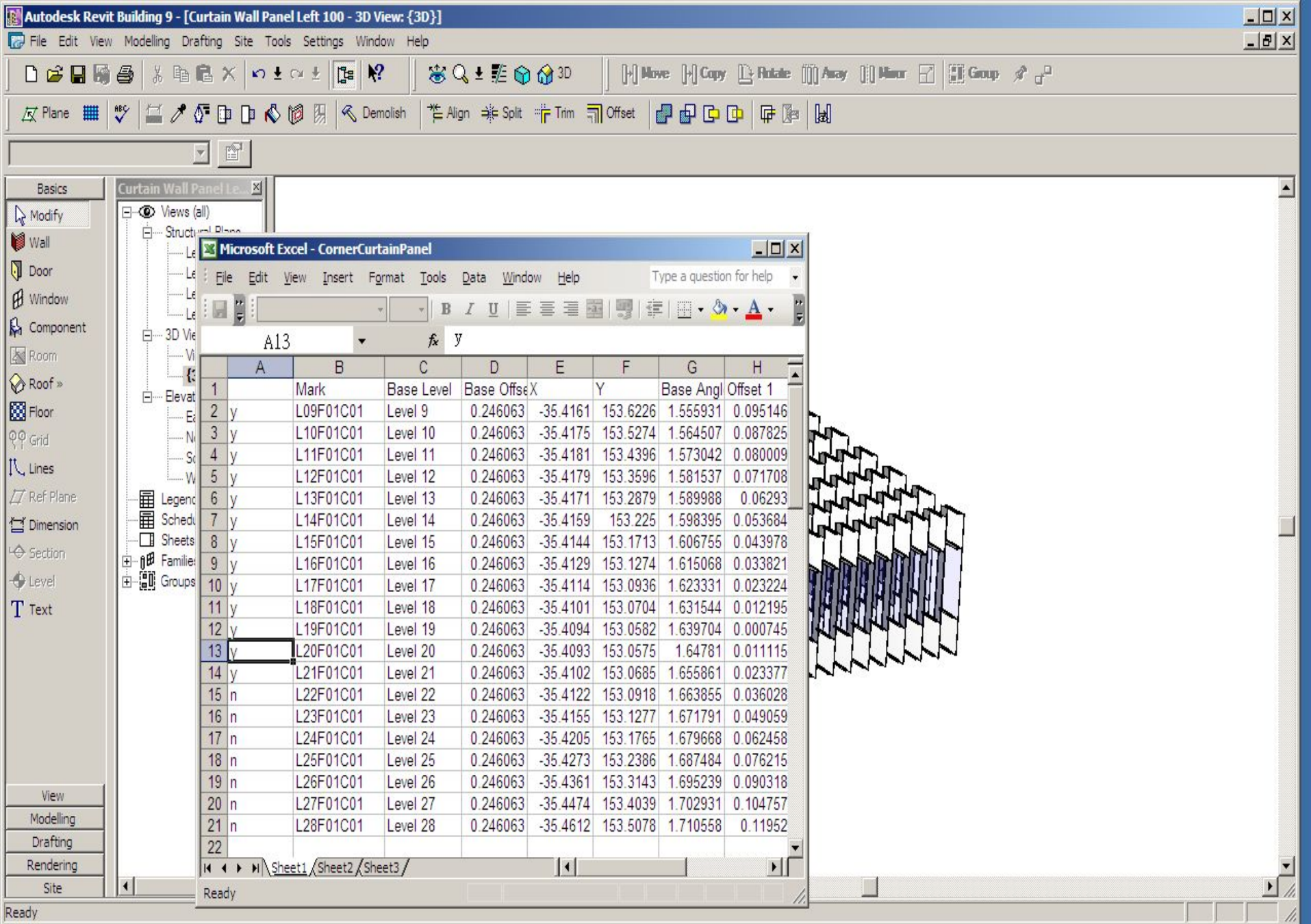
Multi-Category Schedule

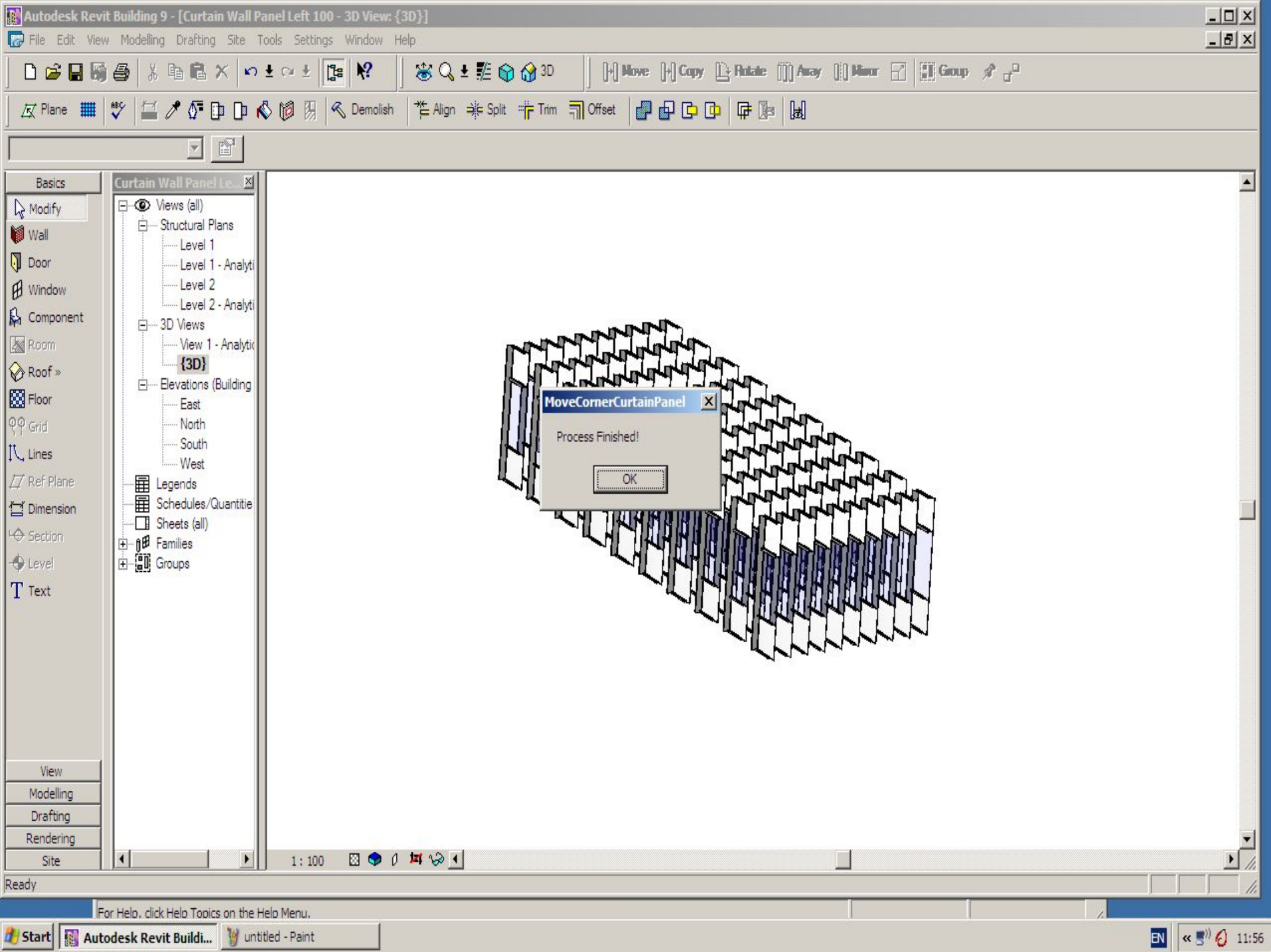
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Curtain Wall Panel 3	L04F04N06	Level 4	1200.00			-137.45	-137.47
Curtain Wall Panel 3	L04F04N07	Level 4	1200.00			-137.47	-137.49

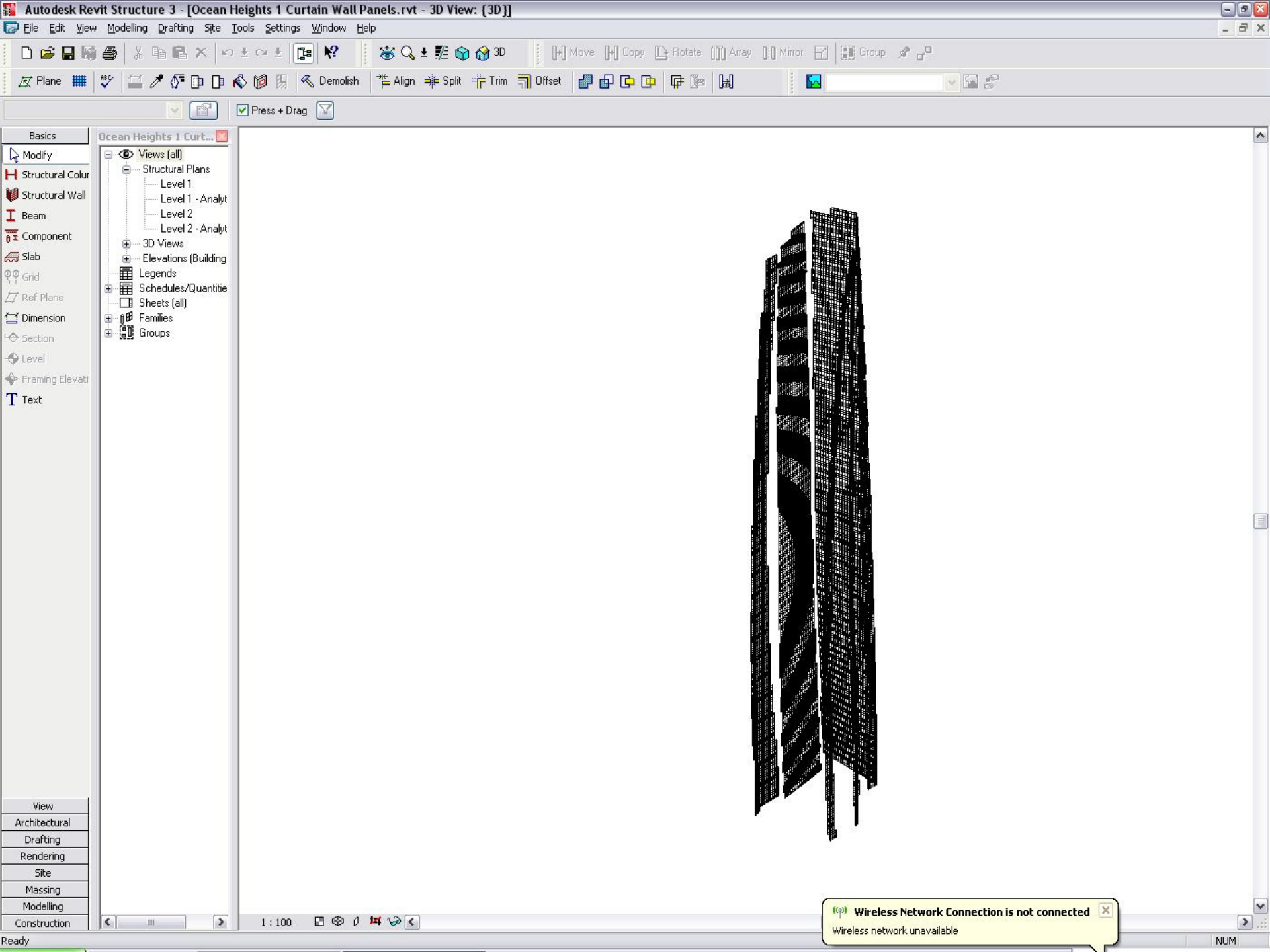
Ready

Ref Plane	Level 20	Sliding Door	L71B05D12	Level 71	2550.00		0.00
Dimension	Level 30	Sliding Door	L71B05D15	Level 71	2550.00		0.00
Section	Level 40	Sliding Door	L72B01D02	Level 72	2400.00		0.00
Level	Level 50	Sliding Door	L72B02D02	Level 72	2500.00		0.00
Framing Elevati	Level 60	Sliding Door	L72B04D01	Level 72	1800.00		0.00
Text	Level 65	Sliding Door	L72B05D03	Level 72	2550.00		0.00
	Level 70	Sliding Door	L72B05D05	Level 72	2550.00		0.00
	Level 75	Sliding Door	L72B05D08	Level 72	2550.00		0.00
	3D Views	Sliding Door	L72B05D10	Level 72	2550.00		0.00
	3D View 1	Sliding Door	L72B05D12	Level 72	2550.00		0.00
	3D View 2	Sliding Door	L72B05D15	Level 72	2550.00		0.00
	3D View 3	Sliding Door	L73B01D02	Level 73	2400.00		0.00
	3D View 4	Sliding Door	L73B02D02	Level 73	2500.00		0.00
	3D View 5	Sliding Door	L73B04D01	Level 73	1700.00		0.00
	3D View 6	Sliding Door	L73B05D03	Level 73	2550.00		0.00
	Copy of 3D V	Sliding Door	L73B05D05	Level 73	2550.00		0.00
	View 1 - Ana	Sliding Door	L73B05D08	Level 73	2550.00		0.00
	{3D}	Sliding Door	L73B05D10	Level 73	2550.00		0.00
	Elevations (Build	Sliding Door	L73B05D12	Level 73	2550.00		0.00
	East	Sliding Door	L73B05D15	Level 73	2550.00		0.00
	North	Sliding Door	L74B01D02	Level 74	2400.00		0.00
	South	Sliding Door	L74B02D02	Level 74	2500.00		0.00
	West	Sliding Door	L74B04D01	Level 74	1600.00		0.00
	Sections (Building	Sliding Door	L74B05D03	Level 74	2550.00		0.00
	Section 1	Sliding Door	L74B05D05	Level 74	2550.00		0.00
	Section 2	Sliding Door	L74B05D08	Level 74	2550.00		0.00
	Section 3	Sliding Door	L74B05D10	Level 74	2550.00		0.00
	Legends	Sliding Door	L74B05D12	Level 74	2550.00		0.00
	Schedules/Quan	Sliding Door	L74B05D15	Level 74	2550.00		0.00
	Multi-Category S	Sliding Door	L75B01D02	Level 75	2400.00		0.00
	Multi-Category S	Sliding Door	L75B02D02	Level 75	2500.00		0.00
	Sheets (all)	Sliding Door	L76B01D02	Level 76	2400.00		0.00
	Families	Sliding Door	L76B02D02	Level 76	2500.00		0.00
	Annotation Symb	Sliding Door	L77B01D02	Level 77	2400.00		0.00
	Ceilings	Sliding Door	L77B02D01	Level 77	2426.17		0.00
	Curtain Panels	Sliding Door	L78B01D02	Level 78	2400.00		0.00
	Curtain Systems	Sliding Door	L78B02D01	Level 78	2203.01		0.00
	Curtain Wall Mul	Sliding Door	L79B01D02	Level 79	2400.00		0.00
	Detail Items	Sliding Door	L79B02D01	Level 79	1974.15		0.00
	Doors	Sliding Door: 649					
	Floors	Sliding Door to Replace CW Pan	L10F01N10	Level 10	1255.77		-123.24
	Furniture	Sliding Door to Replace CW Panel: 1					
		Grand total: 9740					











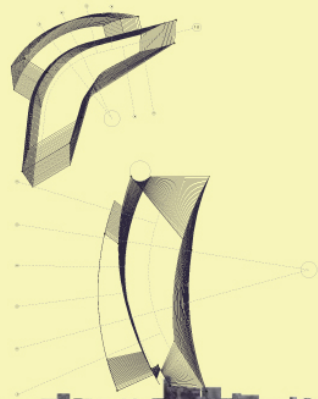
Abu Dhabi Dancing Towers

Located in the heart of Abu Dhabi, Dancing Towers was designed to appropriately fit its surrounding neighbors in scale.

The challenge was how to achieve this when the project was only 70,000 square meters and adjacent properties were relatively small, averaging 900 square-meter floor plates. Two slender towers as opposed to one singular tower was the first step, but the site itself was constrained, forcing a close proximity between the two buildings.

This site constraint is intensified in achieving a viable connective retail podium between the commercial and residential towers, drop-offs to the lobbies and access to supporting functions. The buildings were placed deliberately to maximize the uses down below.

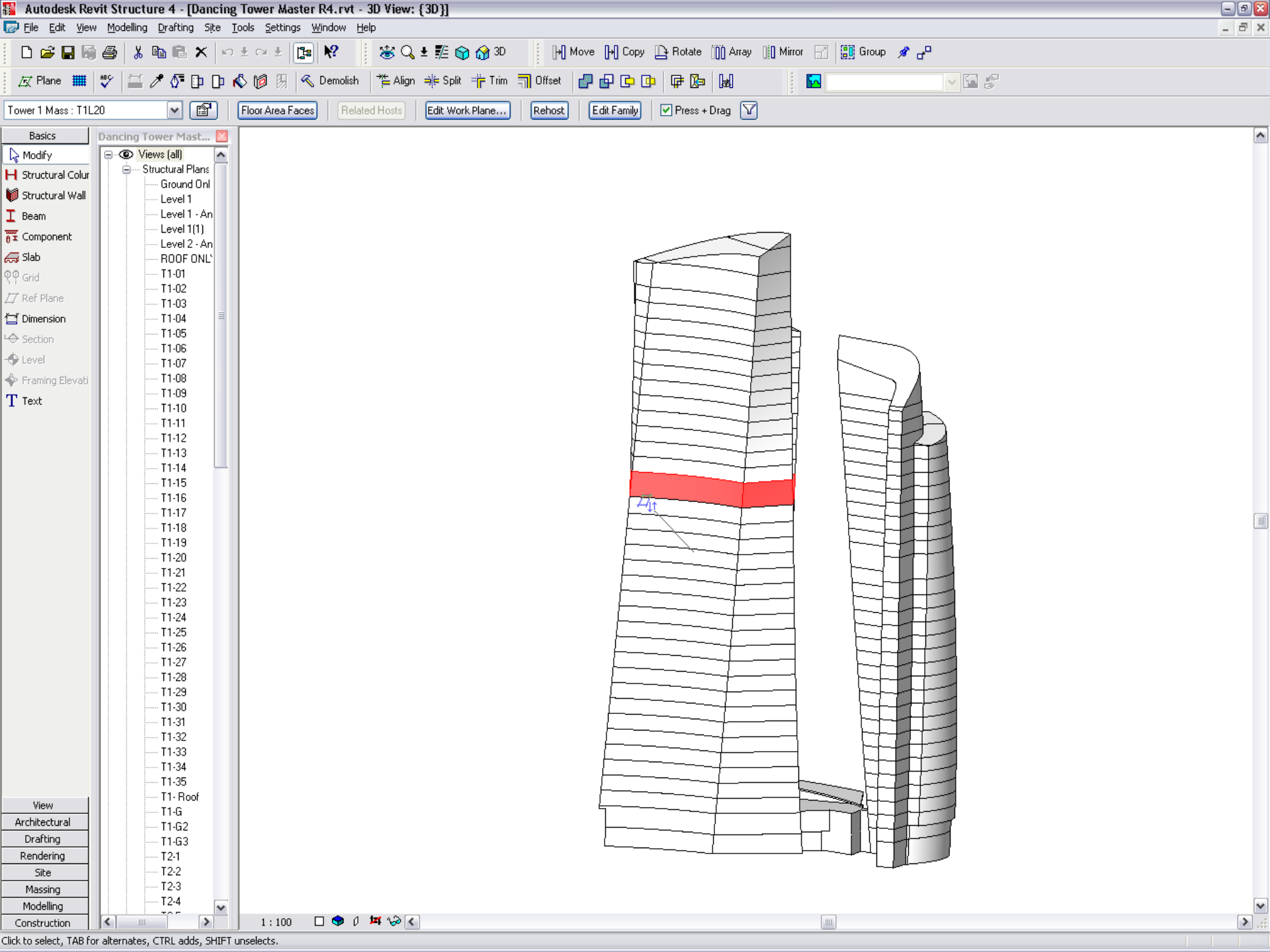
However, the two towers quickly lean, rotate, bend and warp to respond to each other, the adjacent sites and ultimately the view to the ocean at their horizon. These two figures fluidly respond to each other, dynamically engaged and flowing – and ultimately tied together in a passionate dance •

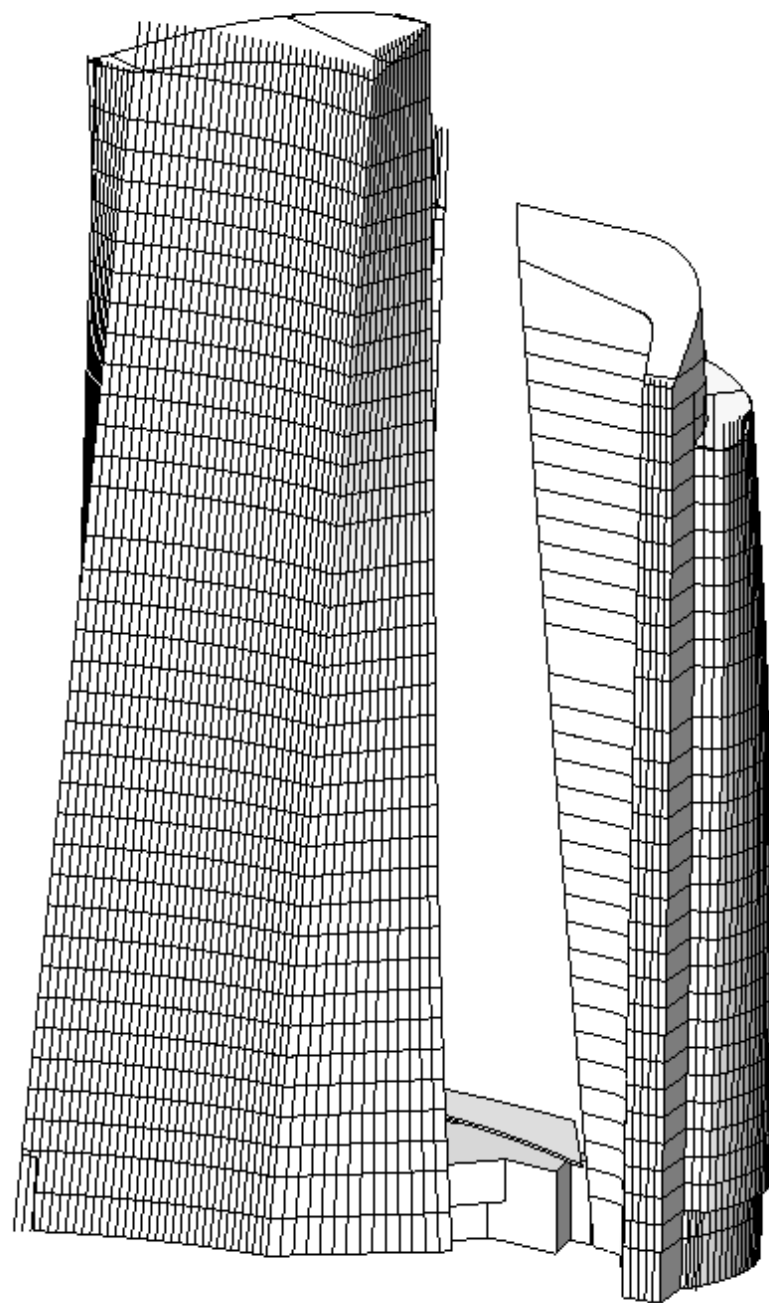


Program Mixed Use Site Area 4,160 sqm
Floor Area 44,235 sqm Building Height 160 m

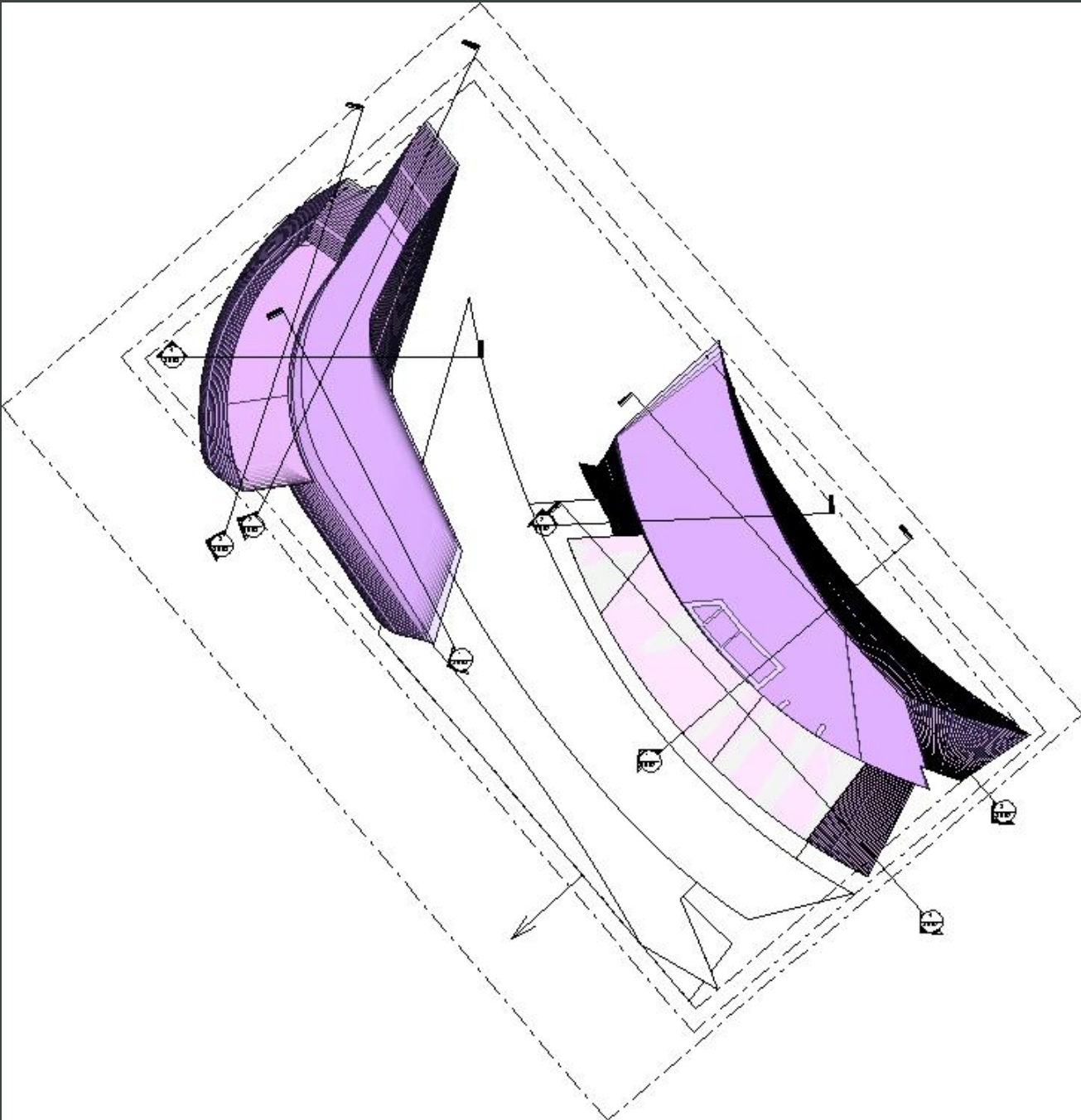


Abu Dhabi Dancing Towers









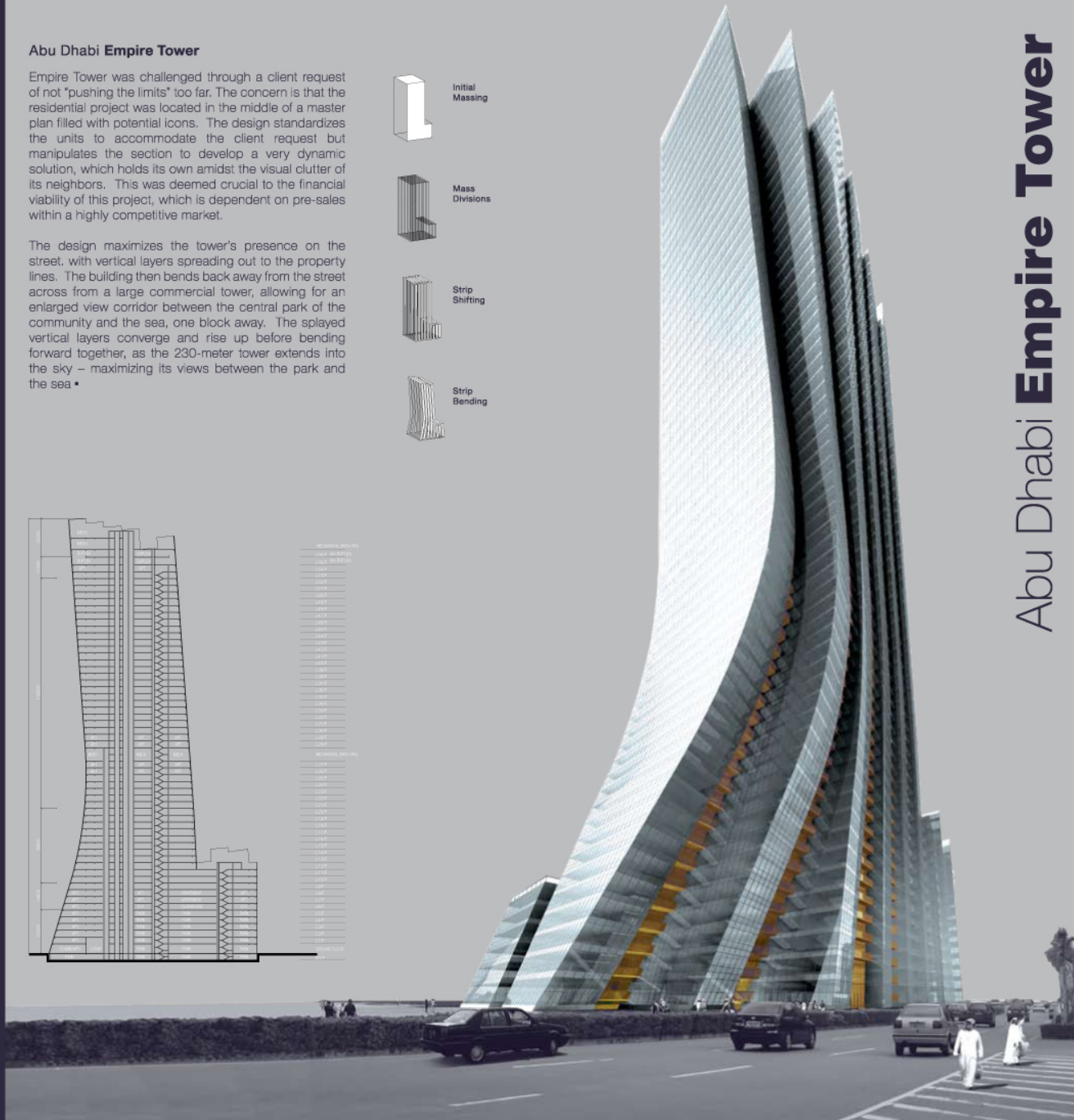
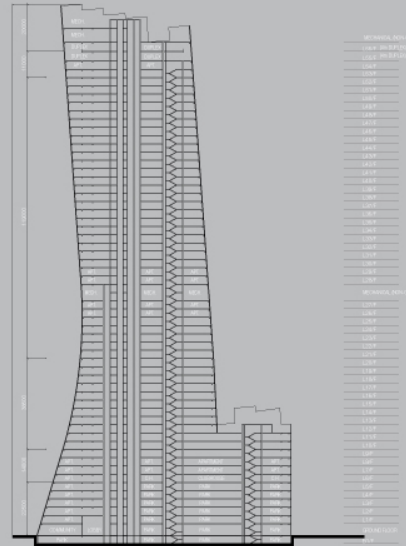


Program: Residential, Site Area 7,007 sqm
Floor Area 90,206 sqm, Building Height 225 m

Abu Dhabi Empire Tower

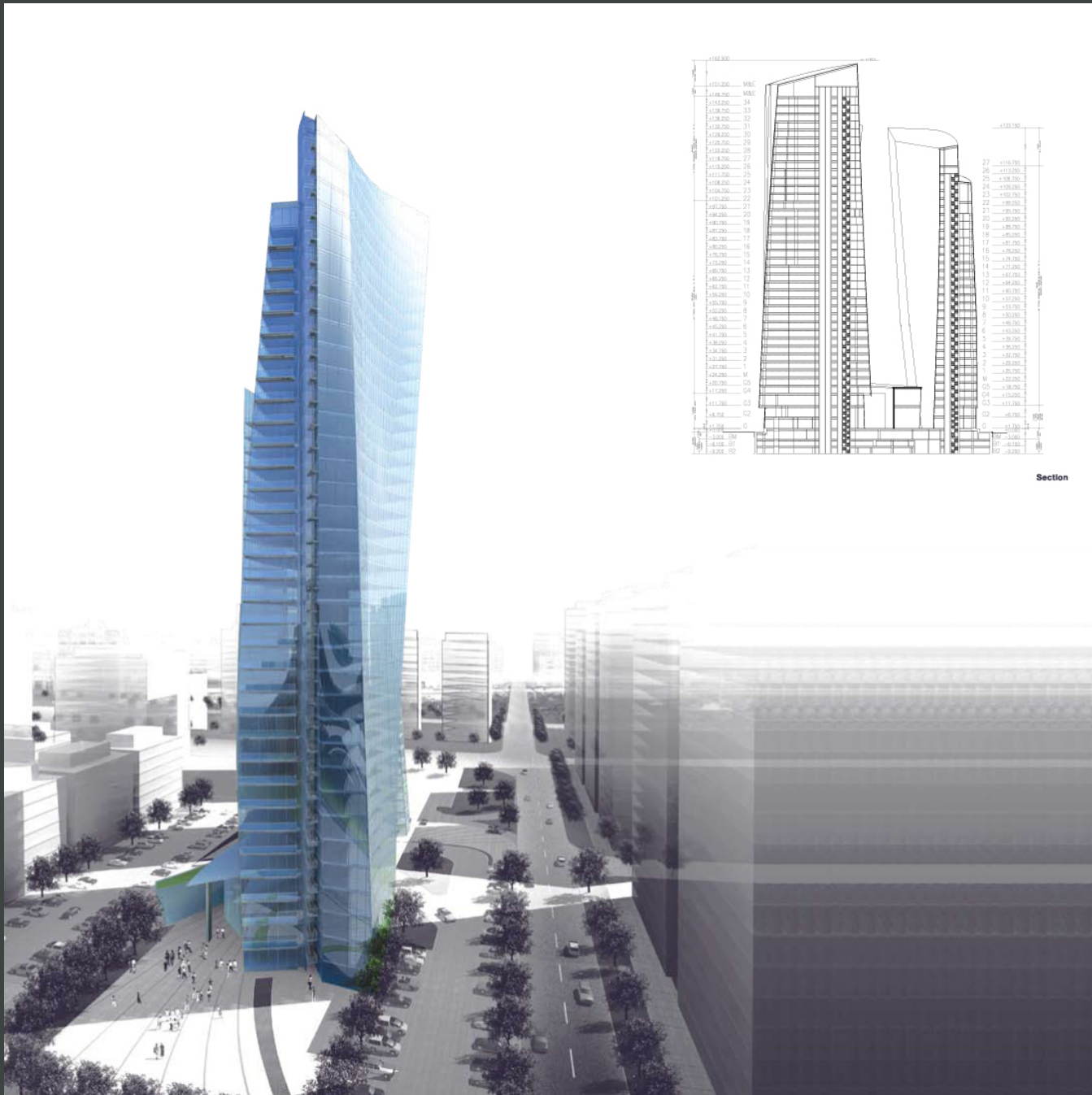
Empire Tower was challenged through a client request of not "pushing the limits" too far. The concern is that the residential project was located in the middle of a master plan filled with potential icons. The design standardizes the units to accommodate the client request but manipulates the section to develop a very dynamic solution, which holds its own amidst the visual clutter of its neighbors. This was deemed crucial to the financial viability of this project, which is dependent on pre-sales within a highly competitive market.

The design maximizes the tower's presence on the street, with vertical layers spreading out to the property lines. The building then bends back away from the street across from a large commercial tower, allowing for an enlarged view corridor between the central park of the community and the sea, one block away. The splayed vertical layers converge and rise up before bending forward together, as the 230-meter tower extends into the sky – maximizing its views between the park and the sea •



Abu Dhabi Empire Tower

Aedas

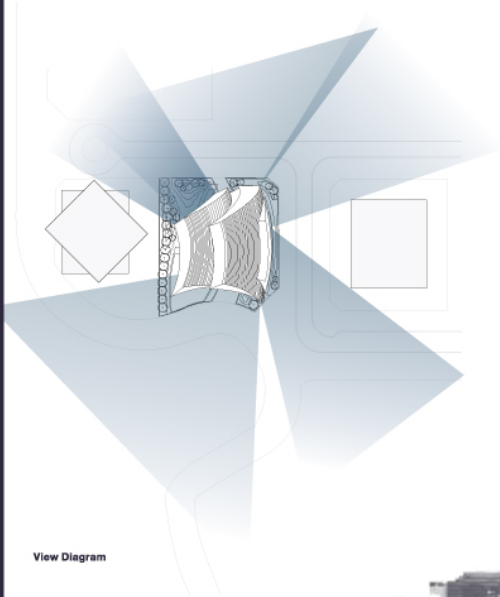




Dubai Ocean Heights Two

Ocean Heights Two is also located in Dubai Marina, UAE, along with its sister project, Ocean Heights One. At 460 meters in height and 105 floors, it will be the tallest tower in its vicinity. However, unlike its predecessor, the requirements for more modulated units up to the 60th floor, forced a different approach while intending to maintain the spirit of its sister.

The first 60th floors of the tower are intended to be service apartments, which in order to be marketable, needed to have the majority of units standardized. The curved shape of the tower improves views past its densely located neighbors. The playfulness of this tower was concentrated into the two most visible faces, allowing units to bend up the tower in two blades. These blades were still modulated up to the 60th floor before the tight restrictions of unit area fluctuations become more relaxed. At this point, the modules drop off and the blades continue, tapering and bending into the sky.

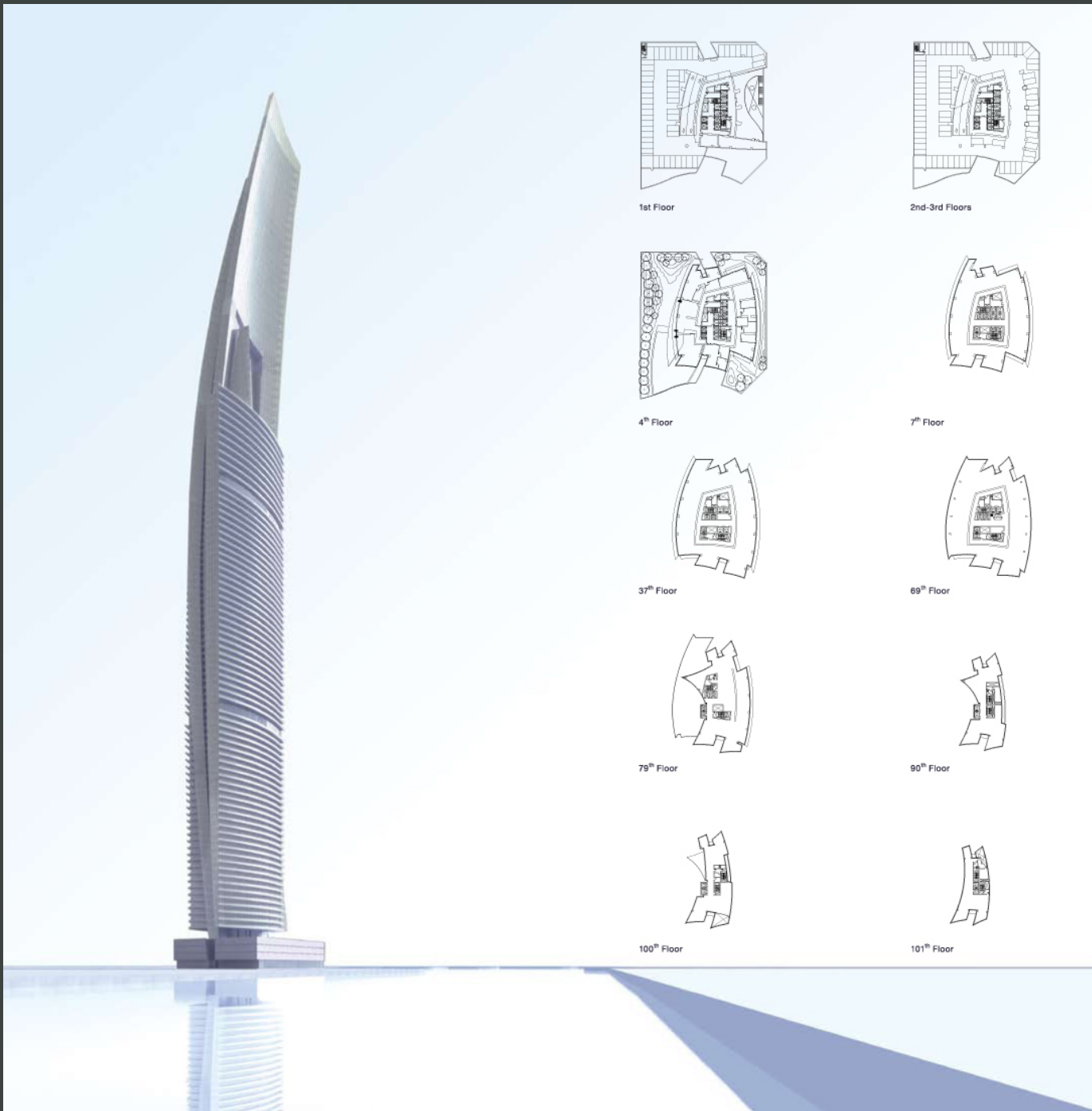


View Diagram

Program Residential Site Area 3,463sqm
Floor Area 197,979 sqm Building Height 460 m

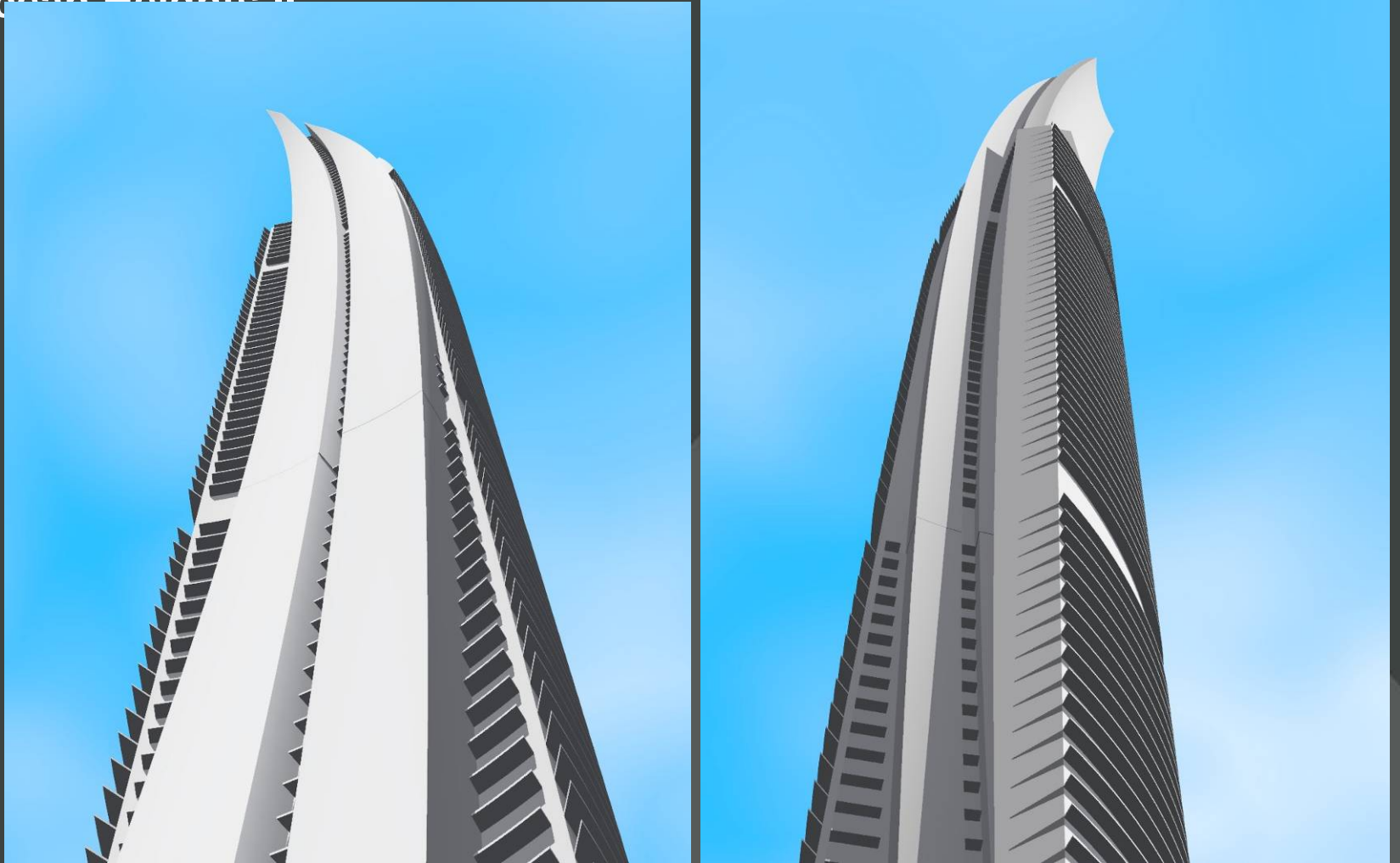
Dubai Ocean Heights Two





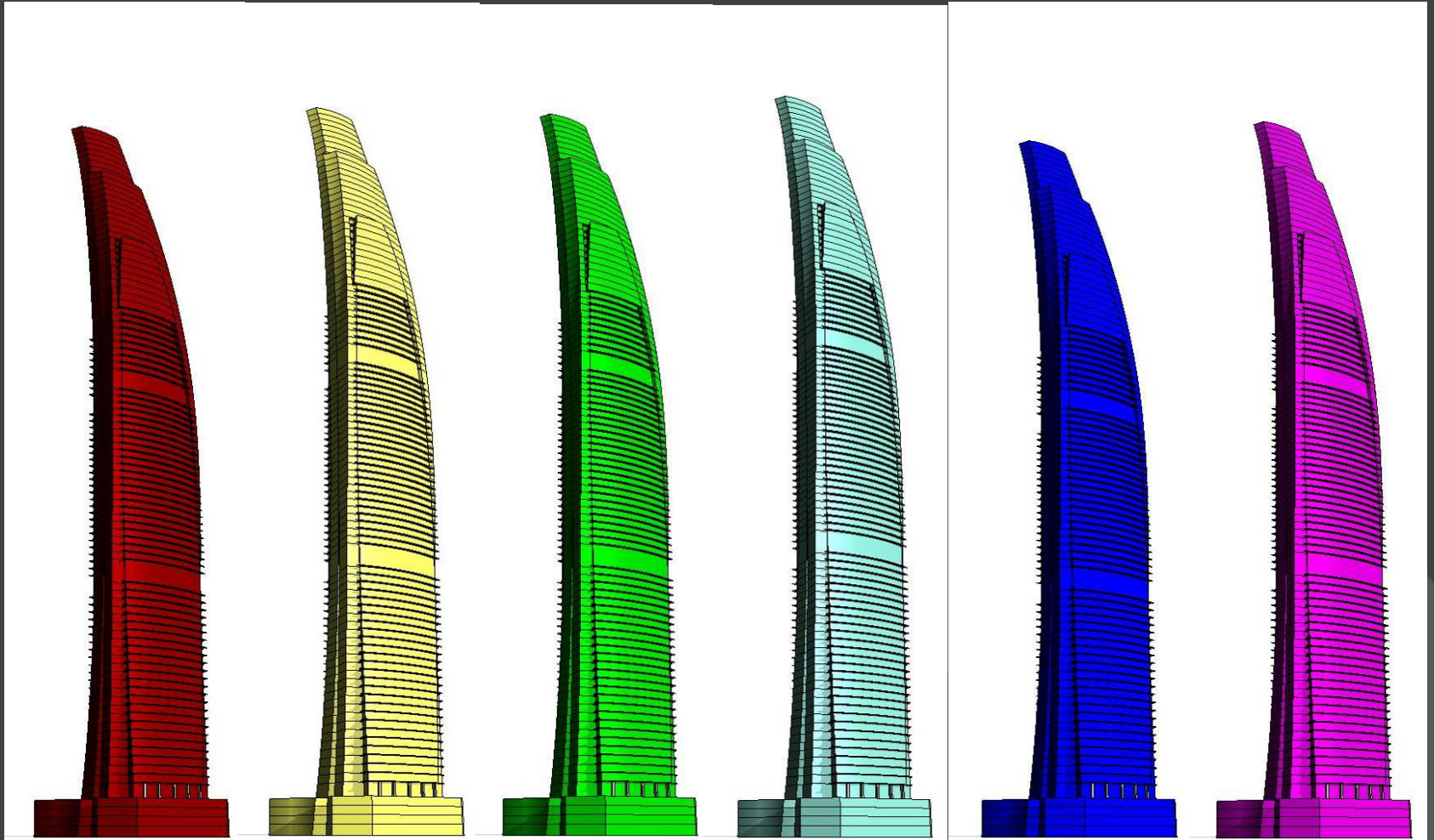


Ocean Heights II



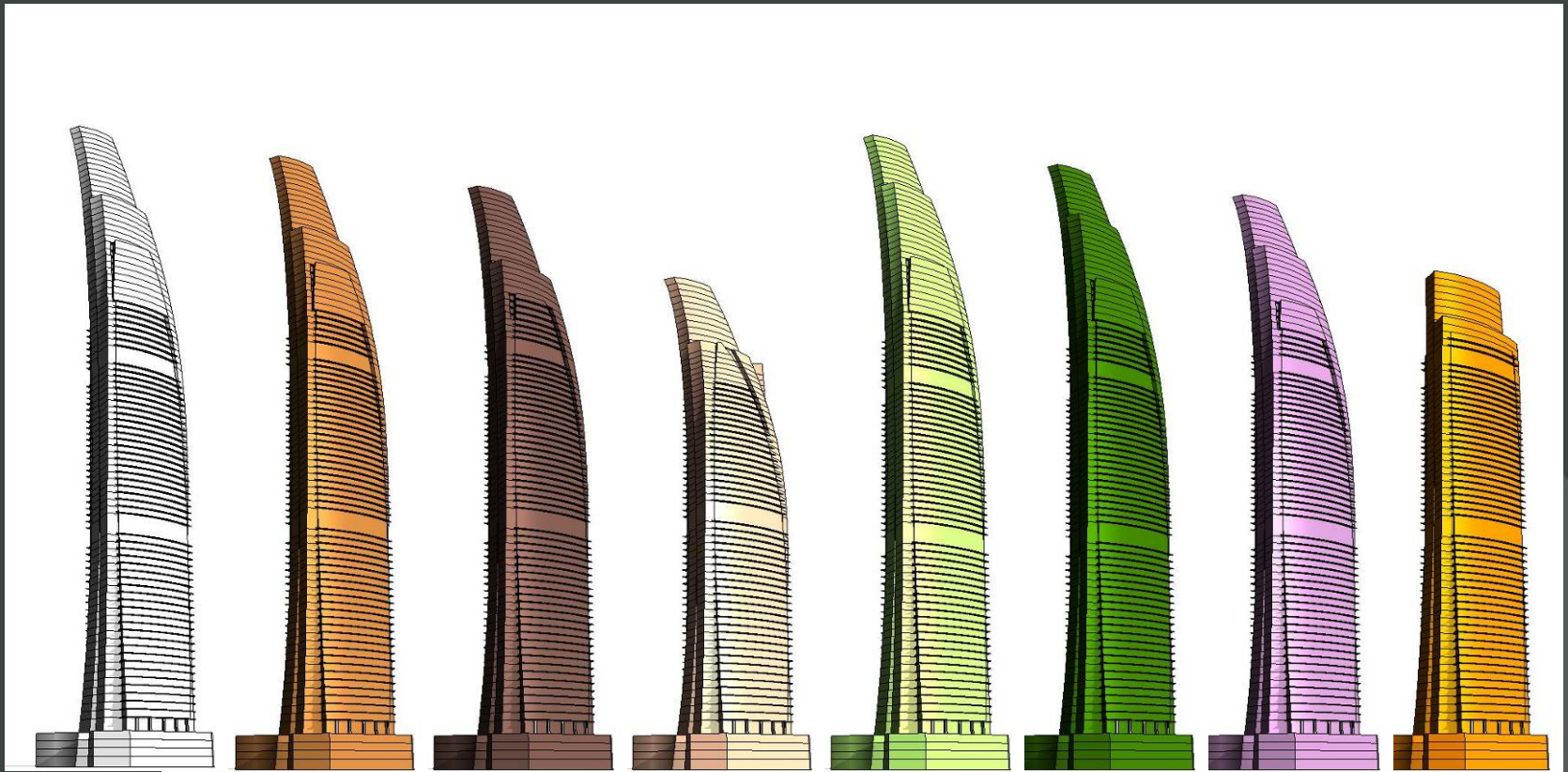


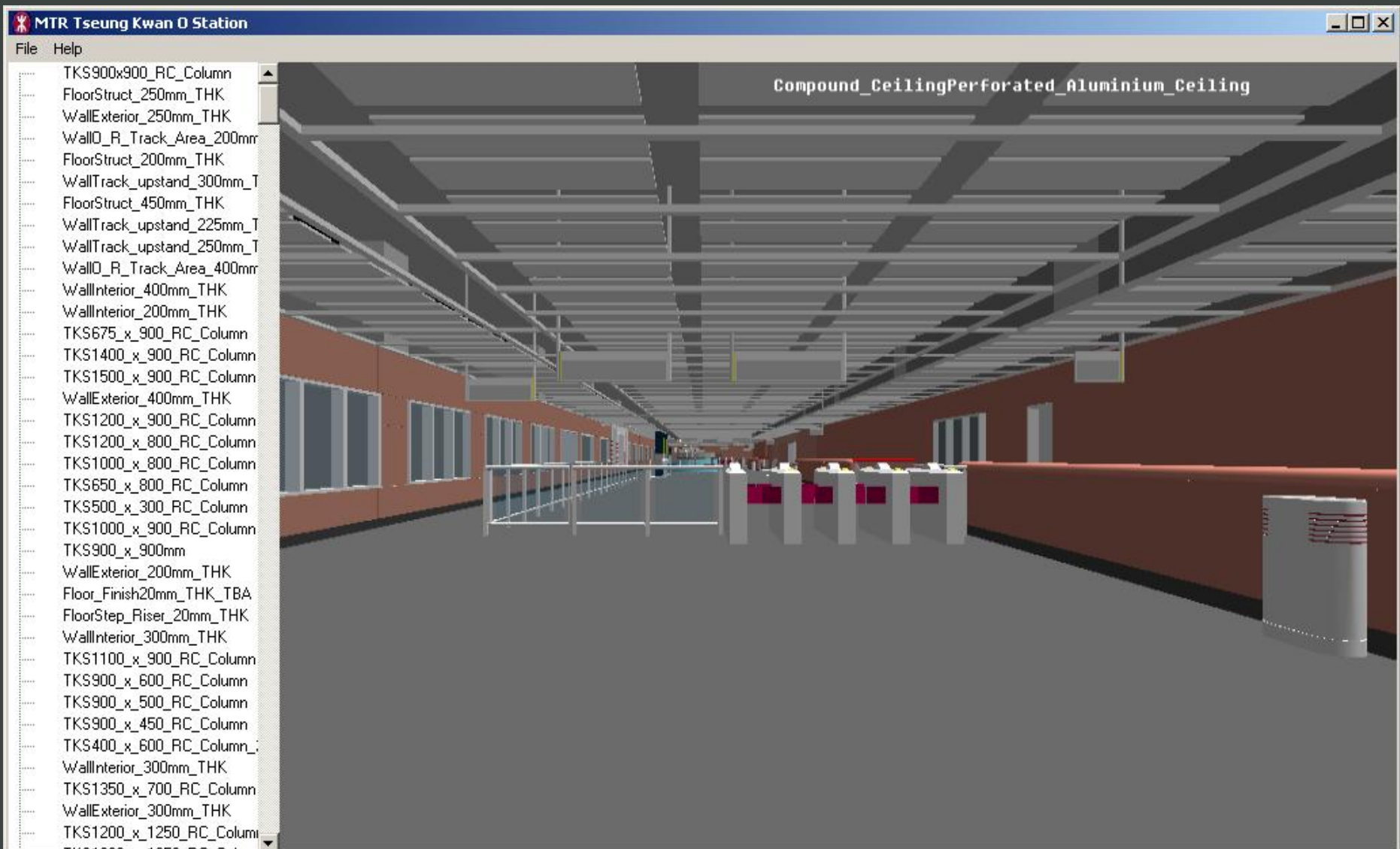
Ocean Heights II – Options

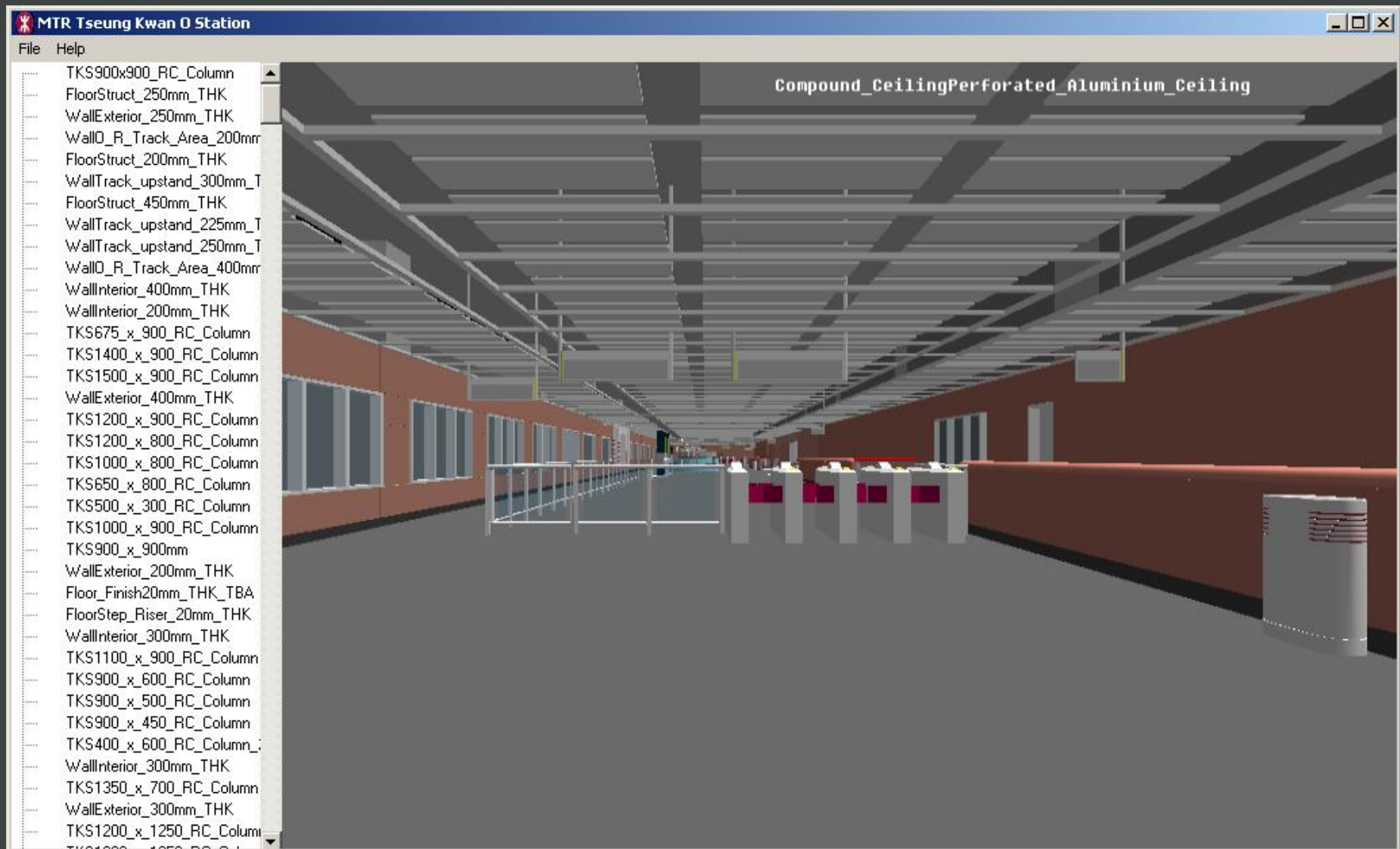




Ocean Heights II – Options









MTR Tseung Kwan O Station

File Help

- TKS900x900_RC_Column
- FloorStruct_250mm_THK
- WallExterior_250mm_THK
- WallO_R_Track_Area_200mm
- FloorStruct_200mm_THK
- WallTrack_upstand_300mm_T
- FloorStruct_450mm_THK
- WallTrack_upstand_225mm_T
- WallTrack_upstand_250mm_T
- WallO_R_Track_Area_400mm
- WallInterior_400mm_THK
- WallInterior_200mm_THK
- TKS675_x_900_RC_Column
- TKS1400_x_900_RC_Column
- TKS1500_x_900_RC_Column
- WallExterior_400mm_THK
- TKS1200_x_900_RC_Column
- TKS1200_x_800_RC_Column
- TKS1000_x_800_RC_Column
- TKS650_x_800_RC_Column
- TKS500_x_300_RC_Column
- TKS1000_x_900_RC_Column
- TKS900_x_900mm
- WallExterior_200mm_THK
- Floor_Finish20mm_THK_TBA
- FloorStep_Riser_20mm_THK
- WallInterior_300mm_THK
- TKS1100_x_900_RC_Column
- TKS900_x_600_RC_Column
- TKS900_x_500_RC_Column
- TKS900_x_450_RC_Column
- TKS400_x_600_RC_Column
- WallInterior_300mm_THK
- TKS1350_x_700_RC_Column
- WallExterior_300mm_THK
- TKS1200_x_1250_RC_Column

Station Property Detail

Item :	Floor_Mount_Information_SignINF_1
Type :	Perforated Aluminium Ceiling
Station :	Tseung Kwan O South Station
Location :	Platform South Entrance
Installed Date :	15 January, 2003
Installed By :	ABC Engineering Company
Manufacturer :	Aluminium Ceiling Factory
Item WebLink :	http://ACF.com
History :	3 years 11 months
Department :	Operation and Facility Control
Description :	Item is under normal situation

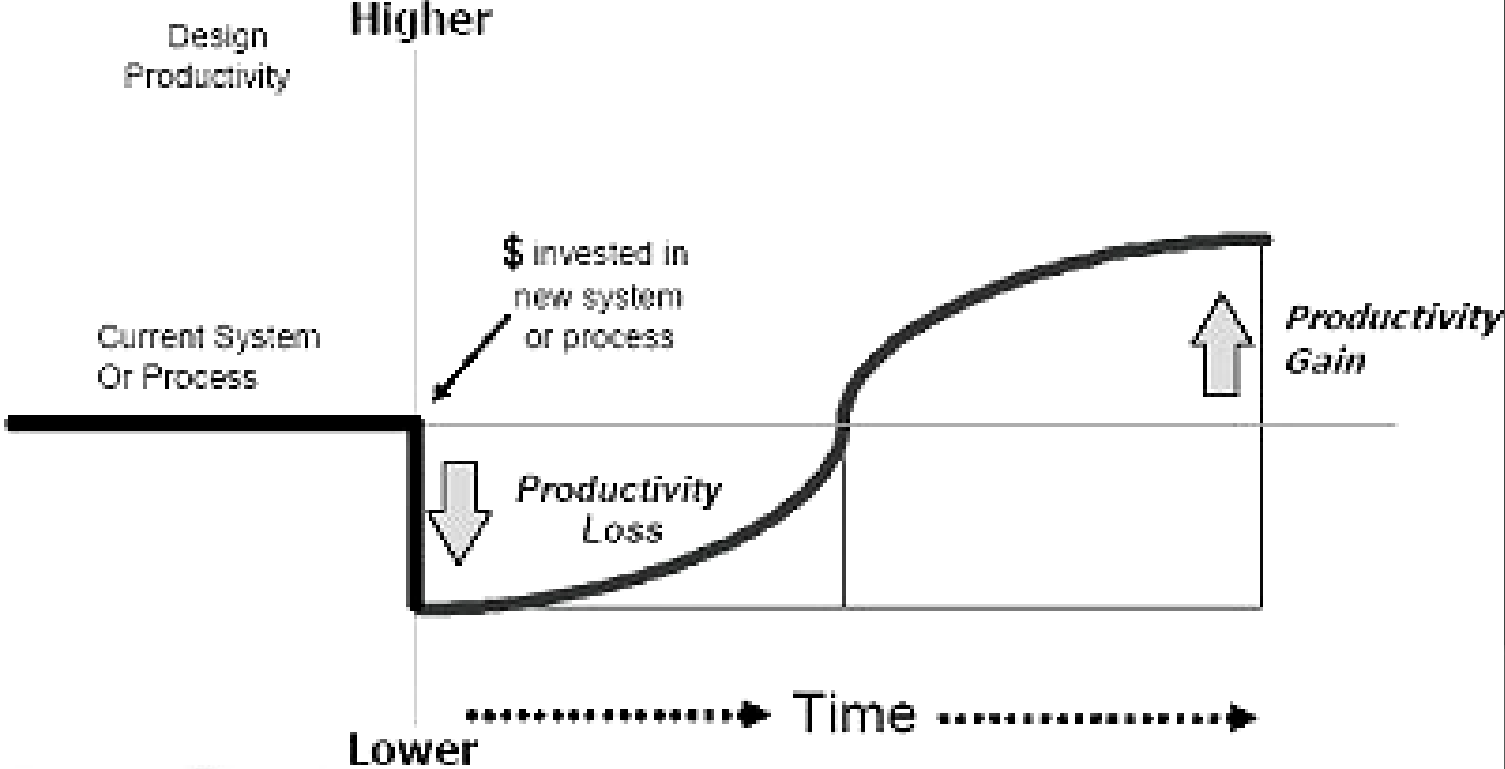
1. Design visualization
2. Drawing Productions
3. Services Co-ordination and Clash detection with other disciplines
4. Quantity taking and preparation of Tender Document
5. Automated Statutory Submission
6. Scientific analysis of different environmental aspects
7. Supply Chain Integration with the manufacturing and production
8. Complex Geometry 複雑な形状を実現可能

Sustainable Design



Is the AEC Industry Changing?





$$\frac{(B - (\frac{B}{1+E})) \times (12 - C)}{A + (B \times C \times D)} = \text{First Year ROI}$$

A = cost of hardware and software (dollars)	
B = monthly labor cost (dollars)	
C = training time (months)	
D = productivity lost during training (percentage)	
E = productivity gain after training (percentage)	

Source 26/1/07:
<http://aec.cadalyst.com/aec/article/articleDetail.jsp?id=124222>

PRODUCTIVITY
>60%

A = cost of hardware and software	\$6,000
B = monthly labor cost	\$4,200
C = training time	3 months
D = productivity lost during training	50%
E = productivity gain after training	25%



Design and Construction

• Overview

• Architecture & Engineering

• CAD Standards

▶ 3D-4D Building Information Modeling

3D-4D-BIM Overview

Spatial Program Validation

4D Phasing

3D Laser Scanning

Energy and Sustainability

BIM Library

• Commissioning

• Construction Excellence

• Design Excellence and the Arts

• Facility Access for the Disabled

• Sustainable Design

• Urban Development

• Design and Construction Delivery Process

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3D-4D Building Information Modeling

Since 2003, the General Services Administration (GSA) through its Public Buildings Service (PBS) Office of Chief Architect (OCA) has established the National 3D-4D-BIM Program. OCA has completed 10 pilot projects. It has 11 pilot projects underway in its current capital program, while assessing and supporting 3D, 4D, Building Information Modeling (BIM) applications in over 25 ongoing projects across the nation. The power of visualization, coordination, simulation, and optimization from three-dimensional (3D), four-dimensional (4D), and BIM computer technologies allow GSA to more effectively meet customer, design, construction, and program requirements. GSA is committed to a strategic and incremental adoption of 3D, 4D, BIM technologies.

There is a progression from 2D to 3D, 4D and BIM. While 3D models make valuable contributions to communications, not all 3D models qualify as BIM models since a 3D geometric representation is only part of the BIM concept.

Critical to successful integration of computer models into project coordination, simulation, and optimization is the inclusion of information—the "I" in BIM—to generate feedback. As a shared knowledge resource, BIM can serve as a reliable basis for decision making and reduce the need for re-gathering or re-formatting information. GSA is currently exploring the use of BIM technology throughout a project's lifecycle in the following areas: spatial program validation, 4D phasing, laser scanning, energy and sustainability, and courts design validation.

For all major projects (prospectus-level) receiving design funding in Fiscal Year 2007 and beyond, GSA will require spatial program BIMs be the minimum requirements for submission to OCA for Final Concept approvals by the PBS Commissioner and the Chief Architect. At the same time, all GSA projects are encouraged to deploy mature 3D, 4D, and BIM technologies—spatial program validation and beyond—at strategic project phases in support of specific project challenges.

[BIM Program Flyer](#)

The following are highlights of the GSA National 3D-4D-BIM Program:

- Established policy to phase in 3D, 4D, and BIM adoption for all major projects
- Leading 3D-4D-BIM pilot application on current capital projects
- Providing expert support and assessment for ongoing capital projects to incorporate 3D, 4D, and BIM technologies
- Assessing industry readiness and technology maturity
- Developed GSA-specific incentives for 3D-4D-BIM
- Developed solicitation and contractual language for 3D-4D-BIM services
- Partnered with BIM vendors, professional associations, open standard organizations, and academic/research institutions

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For all major projects (prospectus-level) receiving design funding in Fiscal Year 2007 and beyond, GSA will require spatial program **BIMs** be the **minimum requirements** for submission to OCA for Final Concept approvals by the PBS Commissioner and the Chief Architect.



Q & A



Thank You...