Latest Information Technology for Surveyors:

Cost Estimate, Bills of Quantities, Statutory Calculation, can they be updated automatically whenever a change occurs?

David Fung Associate, Aedas Ltd; HKIA; AIAB

Samson Wong Architect, HKIA; AIAB

Information

Graphical

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

Non-Graphical

Area Schedule
Finshing Schedules
Door/Window/Louvre Sch
Beam/Column Schedule
Equipment Schedule
Program

Cost Estimate
Quantity Take Off
Bills of Quantities
Variation Assessments

Information

Graphical

CAD SYSTEMs

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

e.g. AutoCAD, Microstation

Non-Graphical

- Area Schedule
- Ceiling Schedules
- Door/Window/Louvre Sch
- Beam/Column Schedule
- Room Schedule
- Program
- Bills of Quantities
- Variations

Word

Excel (spreadsheet)

Access (Data Base)

MS Project

BQ Softwares

Quantity Take Off

……

As a result……

Inefficiencies, mistakes and delays 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 caused by poorly detailed drawings and operatives being given incorrect instructions has been put a £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

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

BIM

Non-Graphical

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

Building Information Modeling

信息化建築模型

Building Information Modeling (BIM)
信息化建築模型

Definition:

BIM is an innovative approach to architectural design and documentation supporting all phases of design and all the architectural drawings and schedules required for the design, construction and management of a building project.

Building Information Modeling (BIM)
信息化建築模型

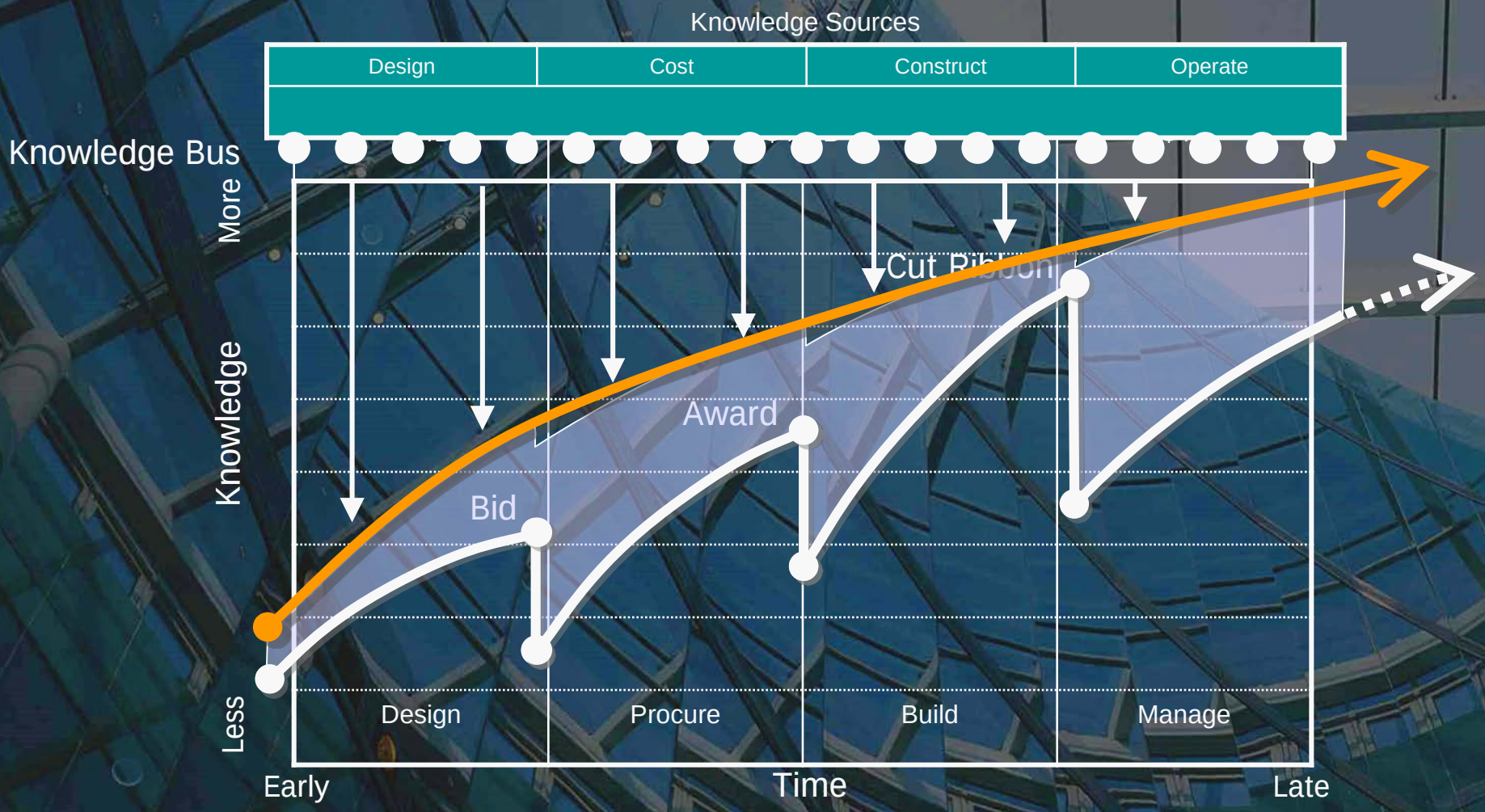
Misconception:

BIM **≤ >** **3D CAD**

Architectural Desktop (Autodesk)
Revit (Autodesk)
ArchiCAD (Graphsoft)
Triforma (Bentley)
Digital Project (Gehry Technology)

AutoCAD (Autodesk)
Microstation (Bentley)

Information “Backflow”



What is BIM (Building Information Model)

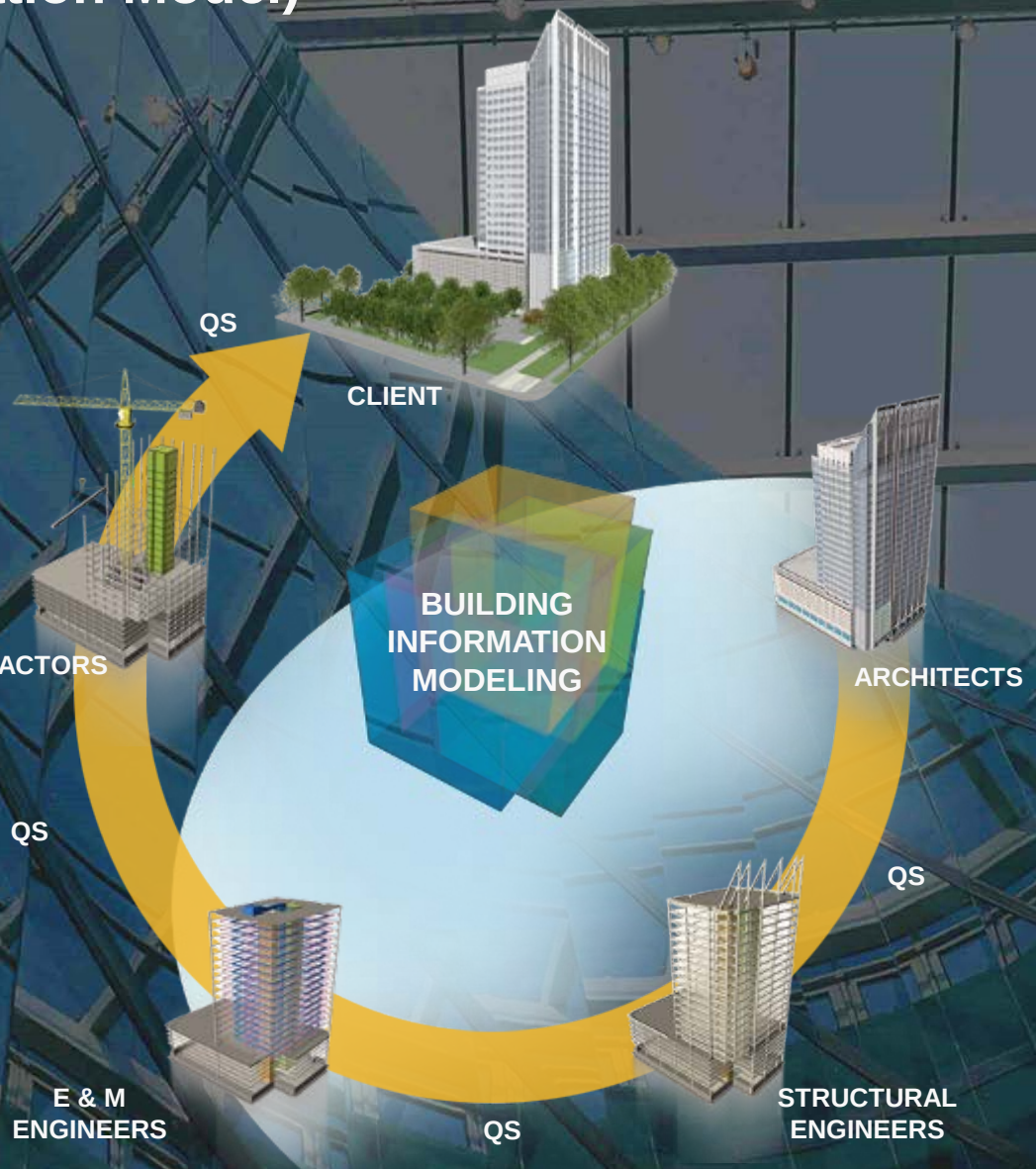
Graphical Data

+

Non-Graphical Data

+

New workflow



Building Information Modeling (BIM)
信息化建築模型

1 Visualization
2 Production
3 Co-ordination/ Collaboration
4 Submission
5 Analysis
6 Supply Chain Integration

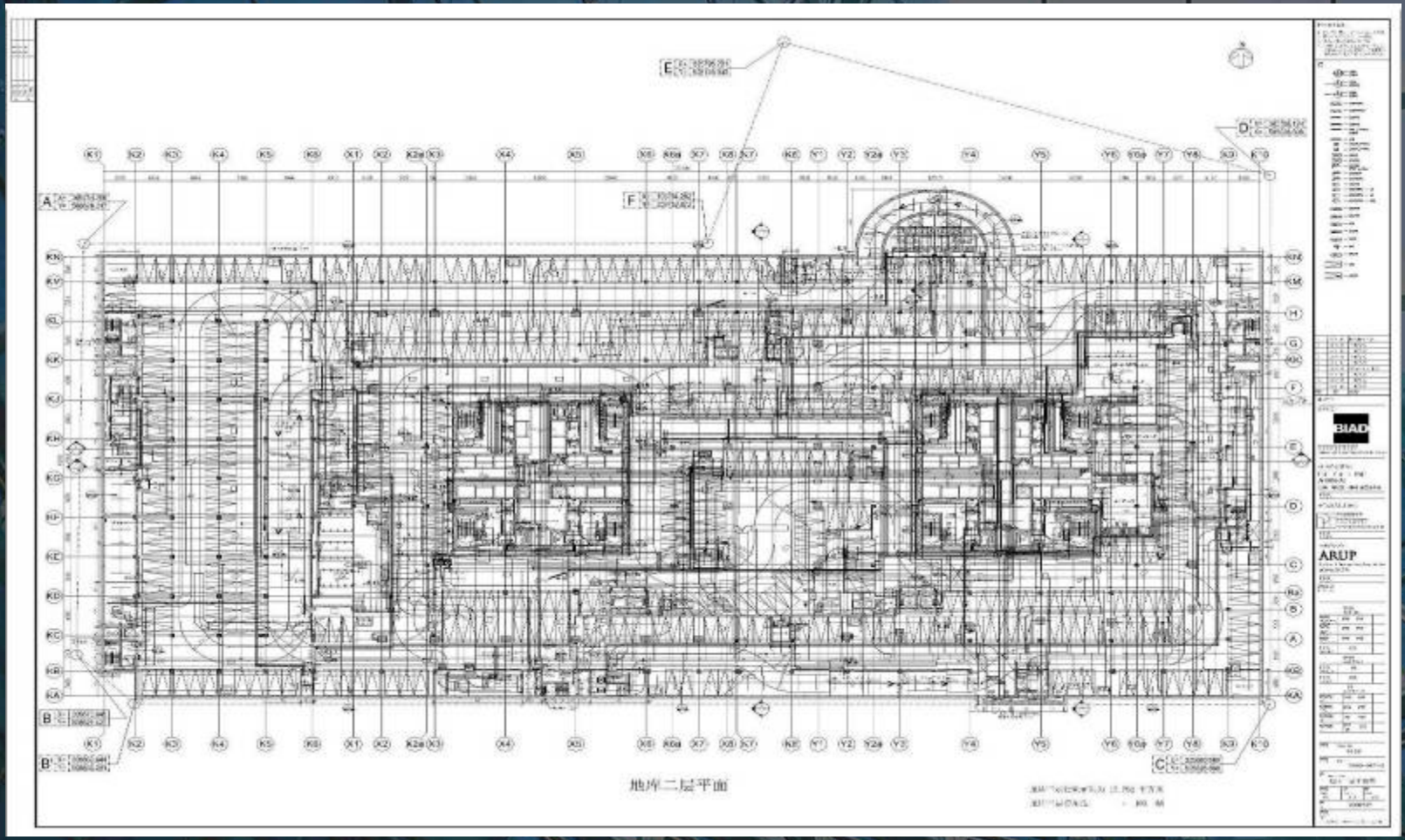
…..

VISUALIZATION & PRODUCTION

VISUALIZATION & PRODUCTION

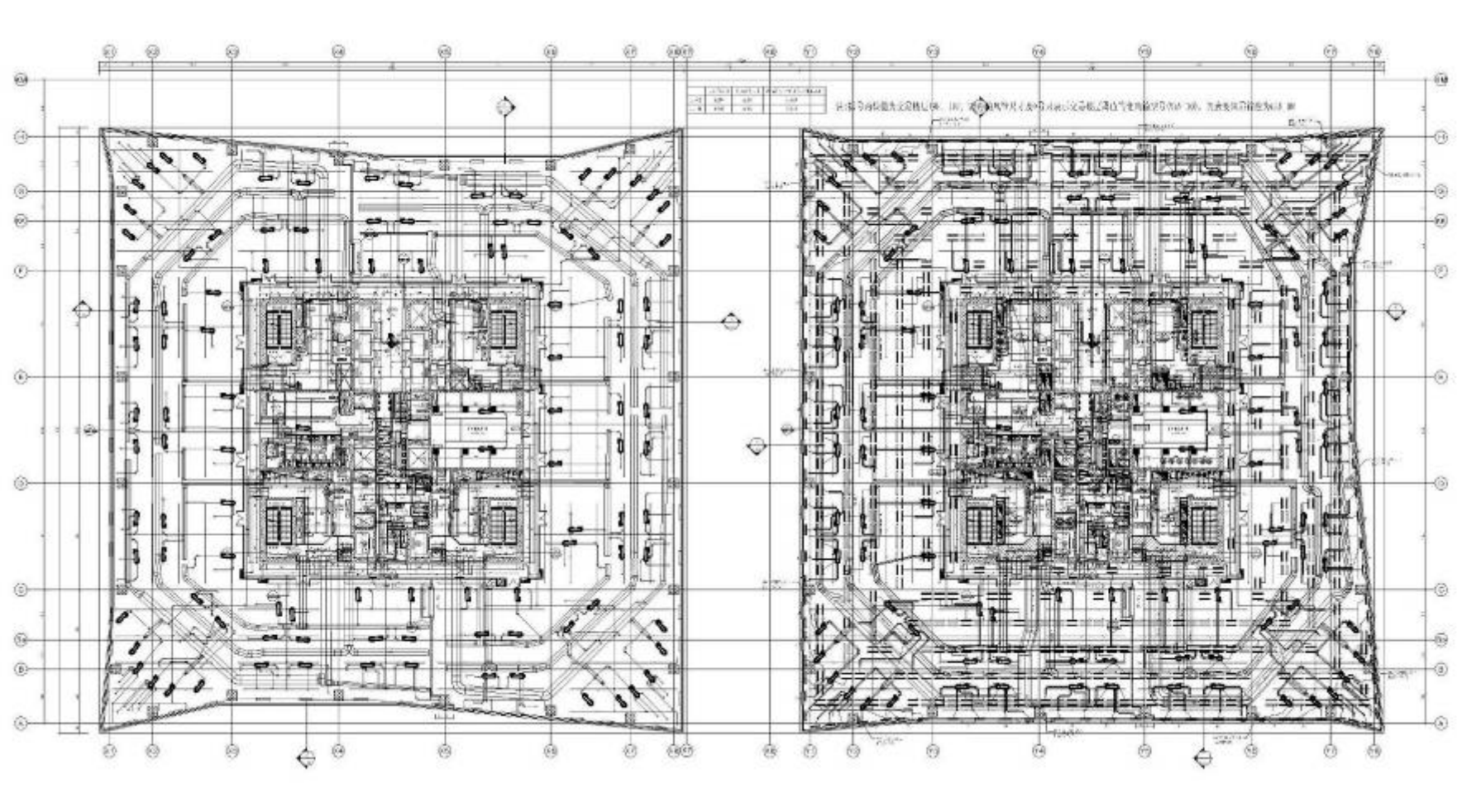
CO-ORDINATION

Work Flow – Conversion of 2D Information



CO-ORDINATION

Work Flow – Conversion of 2D Information



CO-ORDINATION

Work Flow – RFI

TECTÖN LIMITED

Autodesk

HK Consulting Partners

Request for Information

Item 1

Description: There is **NO LEVEL** for HVAC from **3/F to Roof**. There is **NO LEVEL** for Chiller Water from **1/F to Roof**...

Date: [illegible] Requestby: Anthony Law

Item 1

Drawing No.: [illegible] C-EL9-1_REV-D

Description: Cannot determine the dimension of cable tray from bottom to top, assume the cable tray size is the same at B2 (B1 to 3F, both towers)

And from 3-20F, estimate the tray size according to the cable size. 3-6F [illegible] 9-16F [illegible] 17-20F [illegible]

Image:

TECTÖN LIMITED

Autodesk

HK Consulting Partners

Request for Information

Date: [illegible] Requestby: Gillian

Item 1

Drawing No.: [illegible] C-AH2_D

Description: There is no dimension of the duct in the orange frame. Locate at X8-HF. Assume that it is the same scale of the drawing...

Image:

Item 2

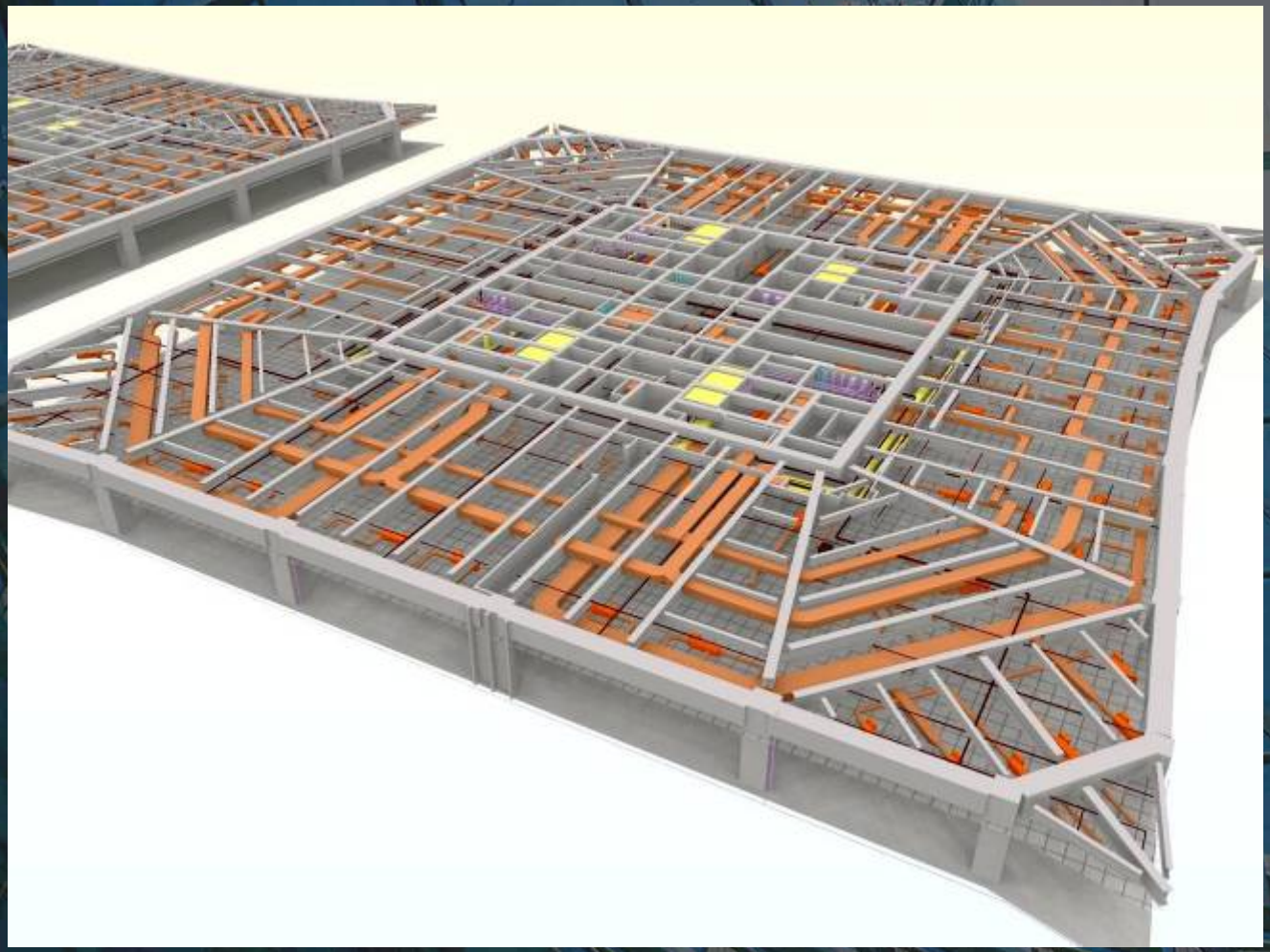
Drawing No.: [illegible] C-AH2_D

Description: There is no level of the bottom red duct. Located at X8-HG. Assume that they are the same as the near one (45.8)...

Image:

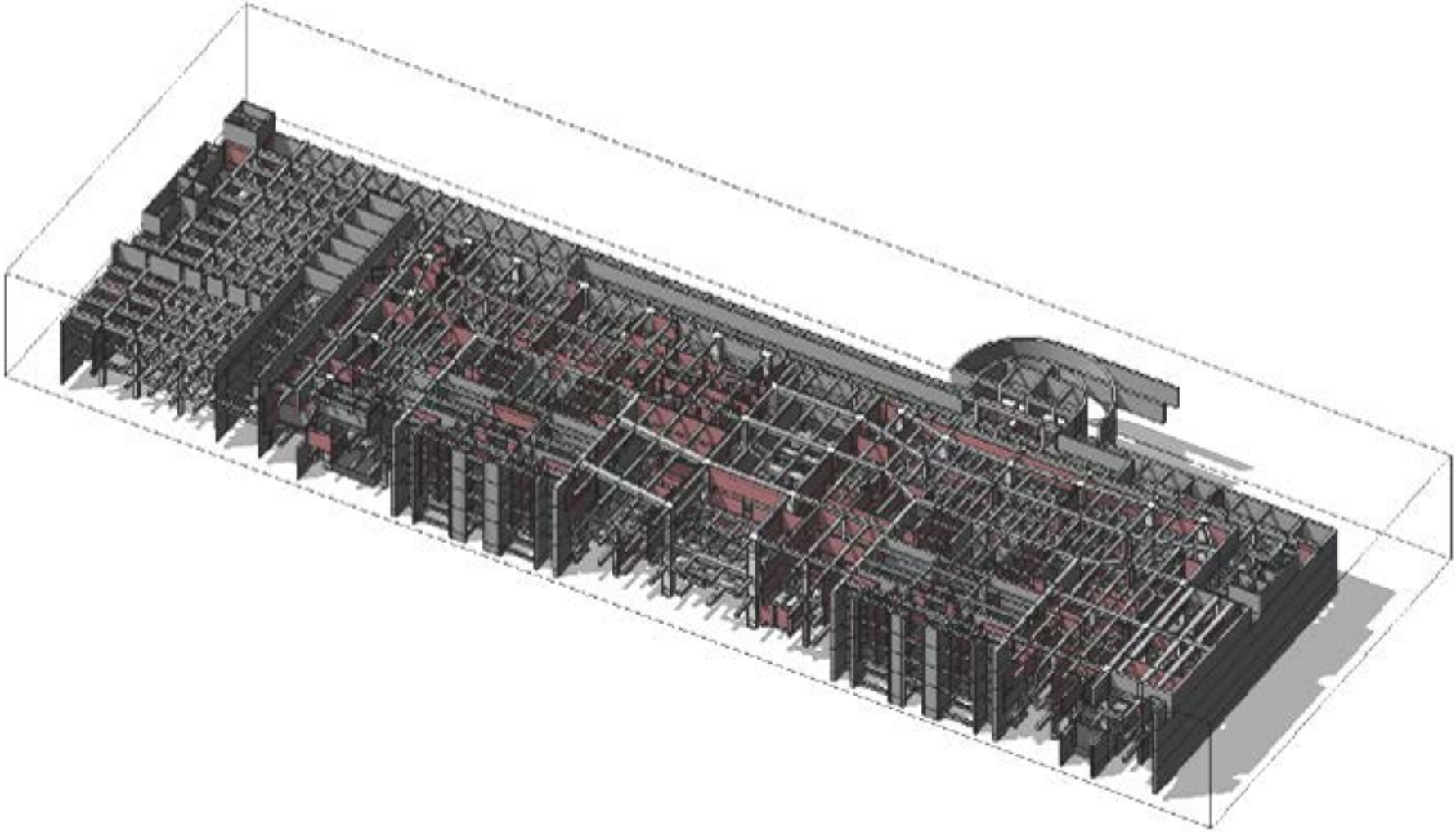
CO-ORDINATION

Work Flow – Establish BIM Model

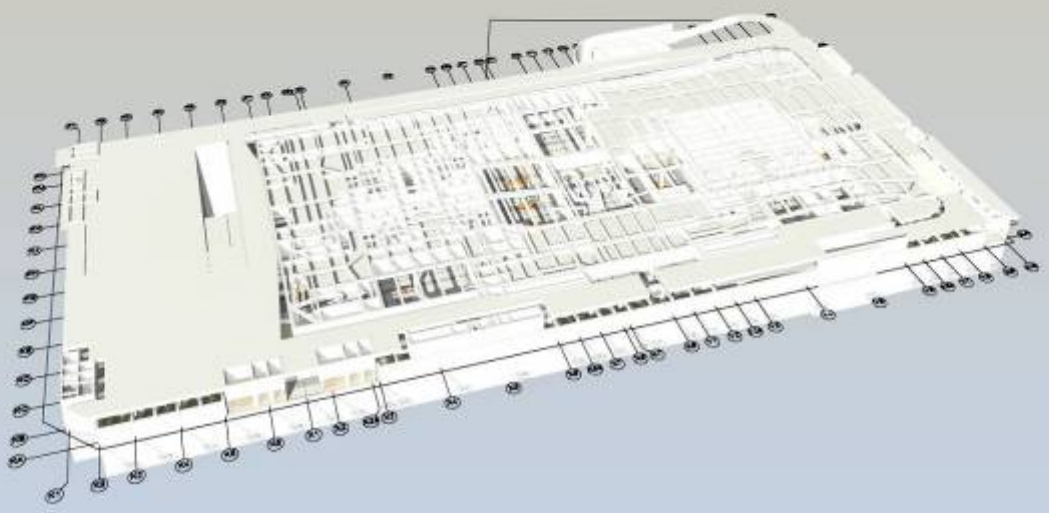


CO-ORDINATION

Work Flow – Establish BIM Model

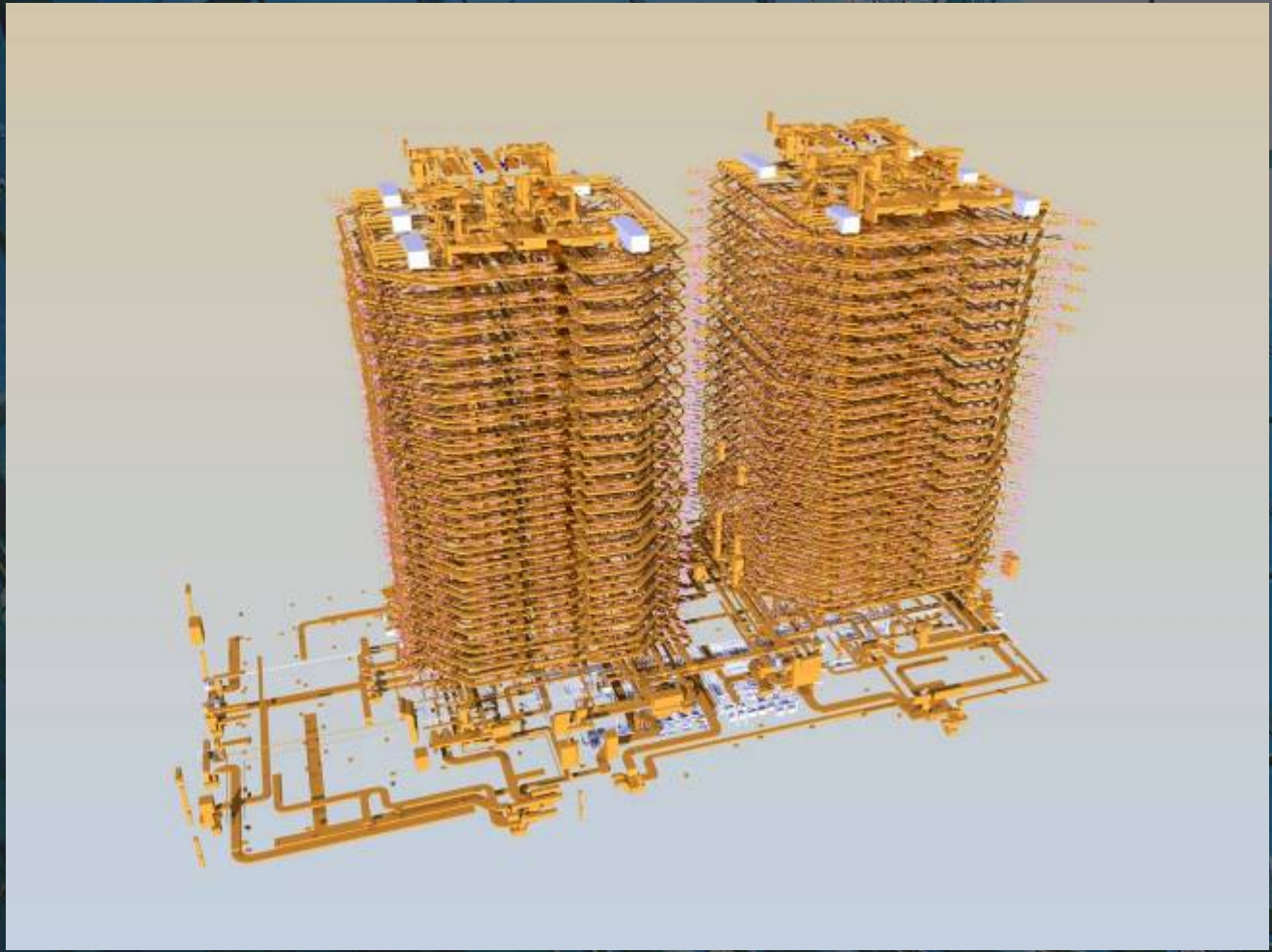


Basement 地下部分



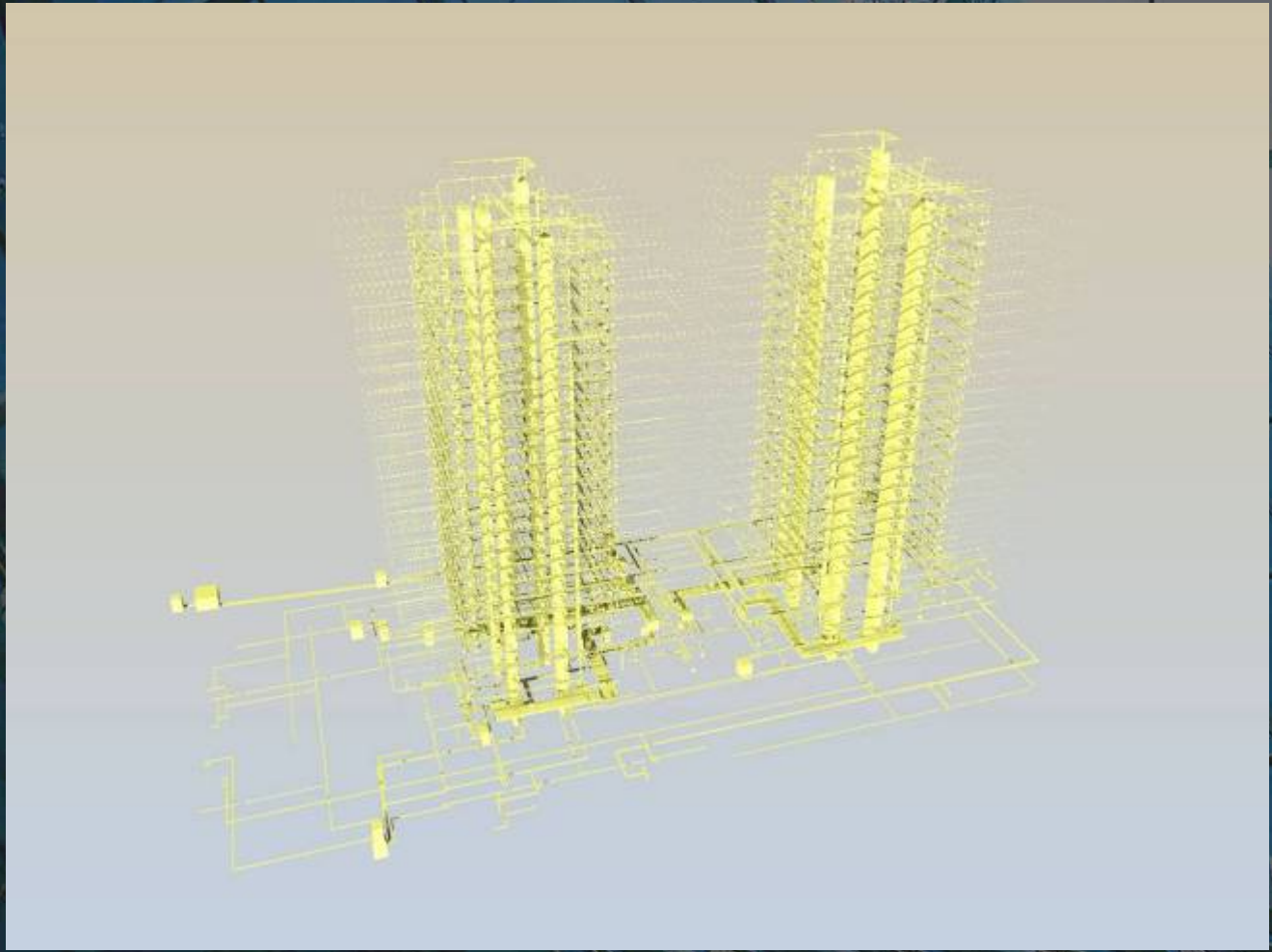
Superstructure 地上部分

HVAC Installation 空調系統部分

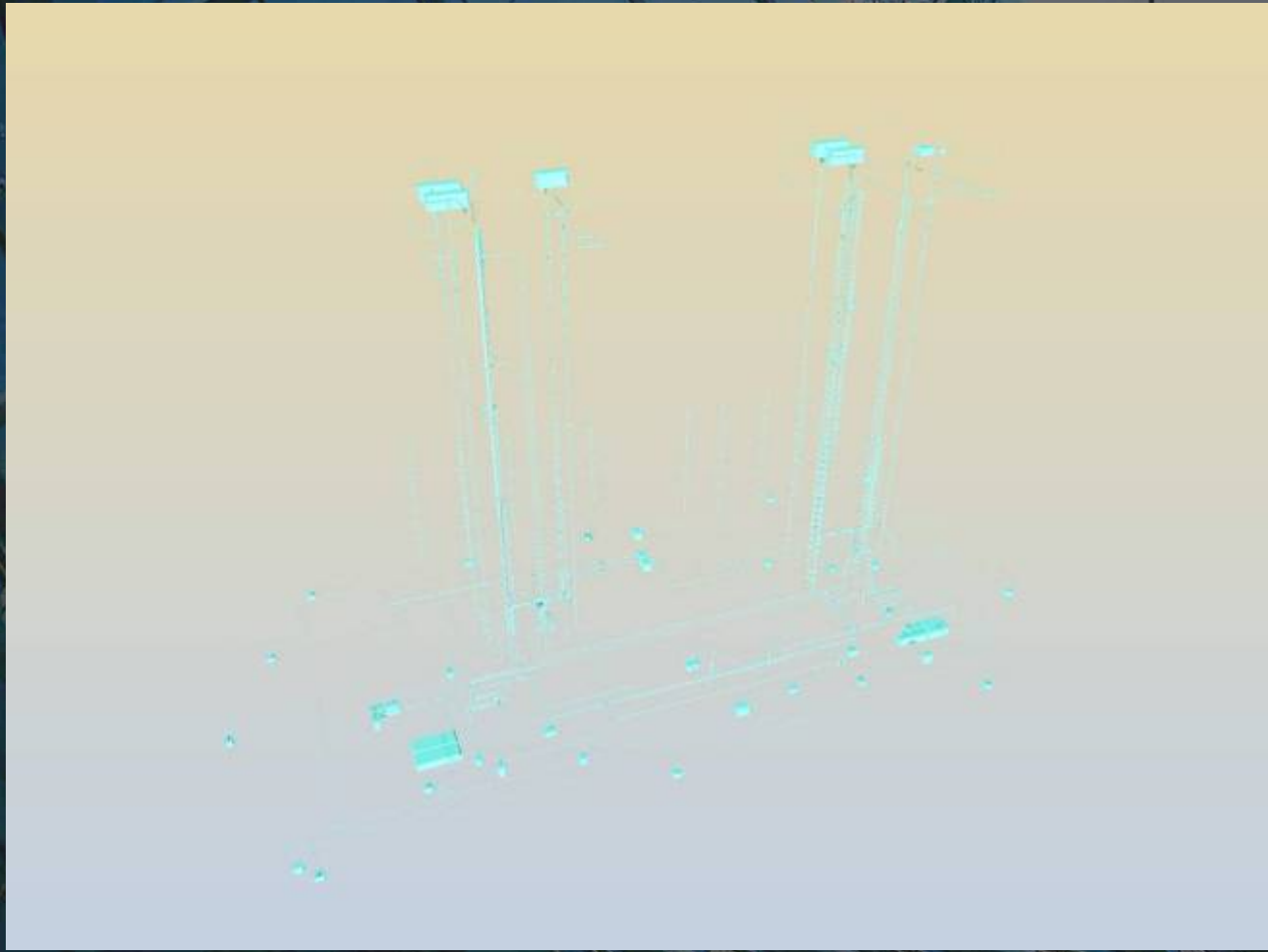


Fire Services Installation 消防系統部分

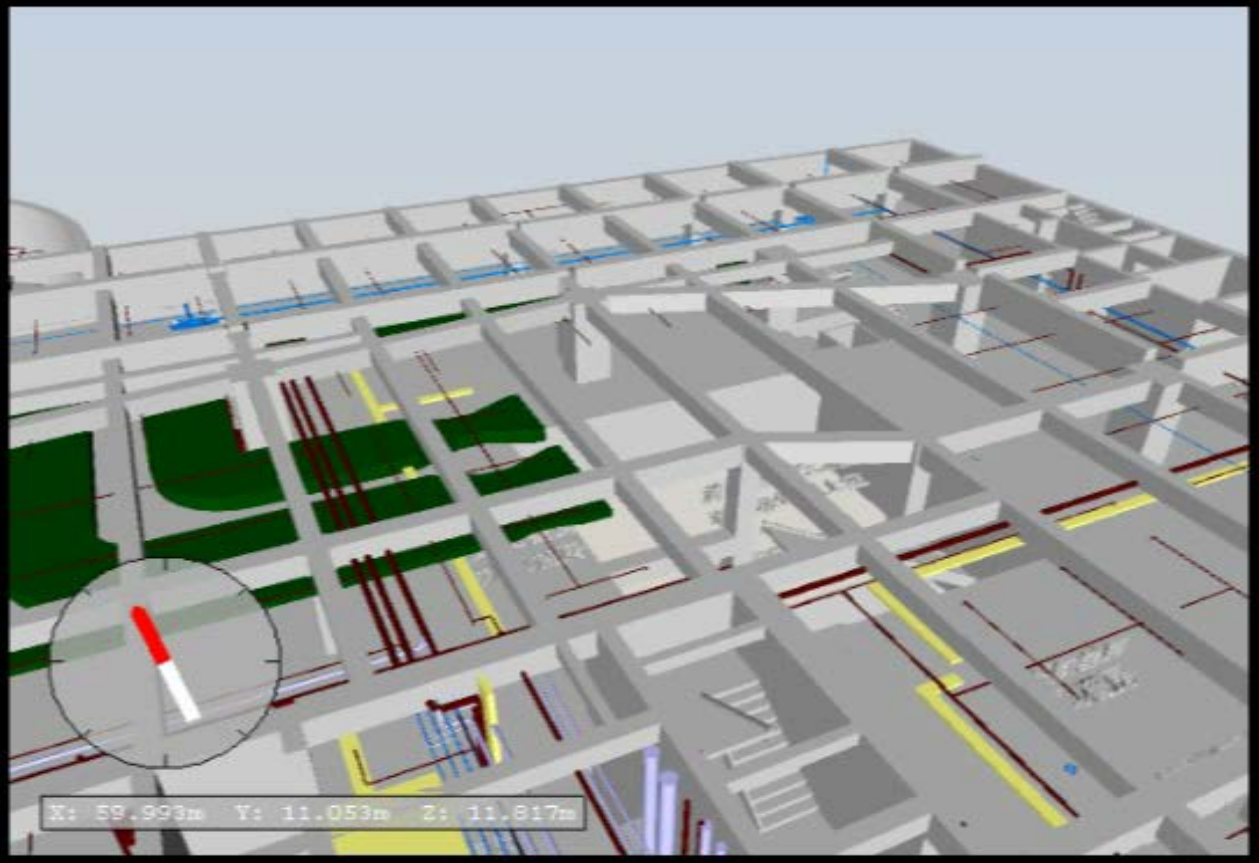
Electricity Installation 電力系統部分



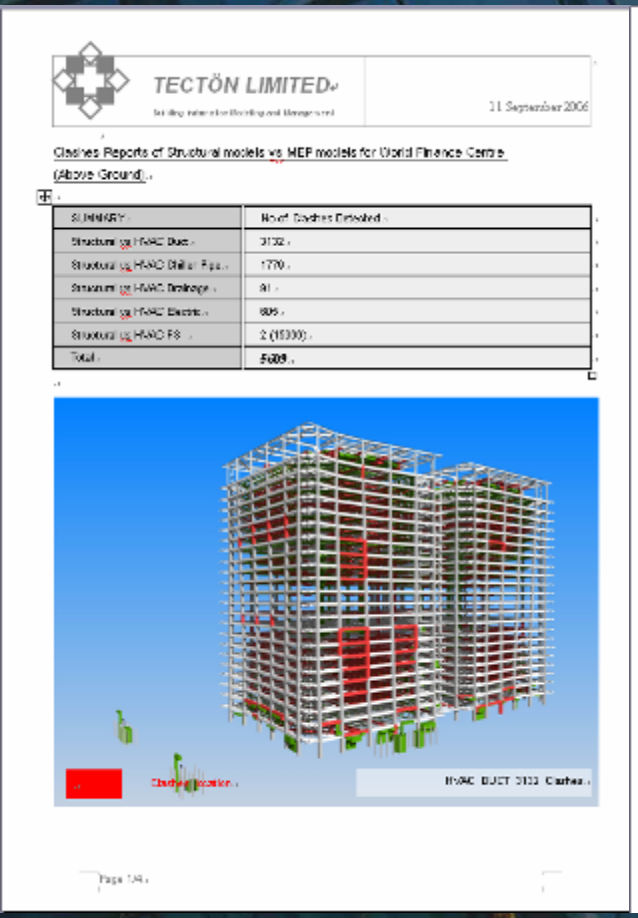
Plumbing & Drainage Installation 排水管道部分

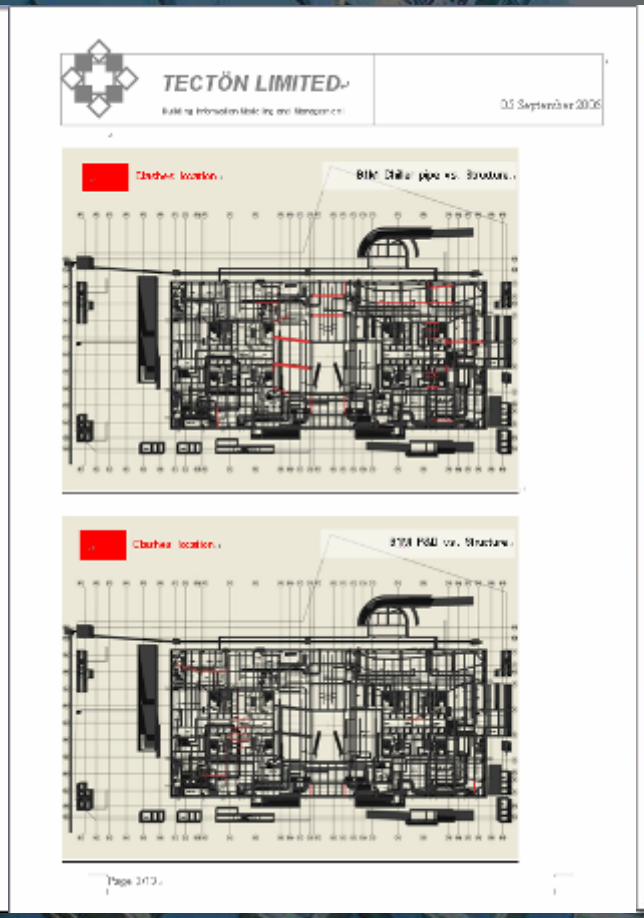


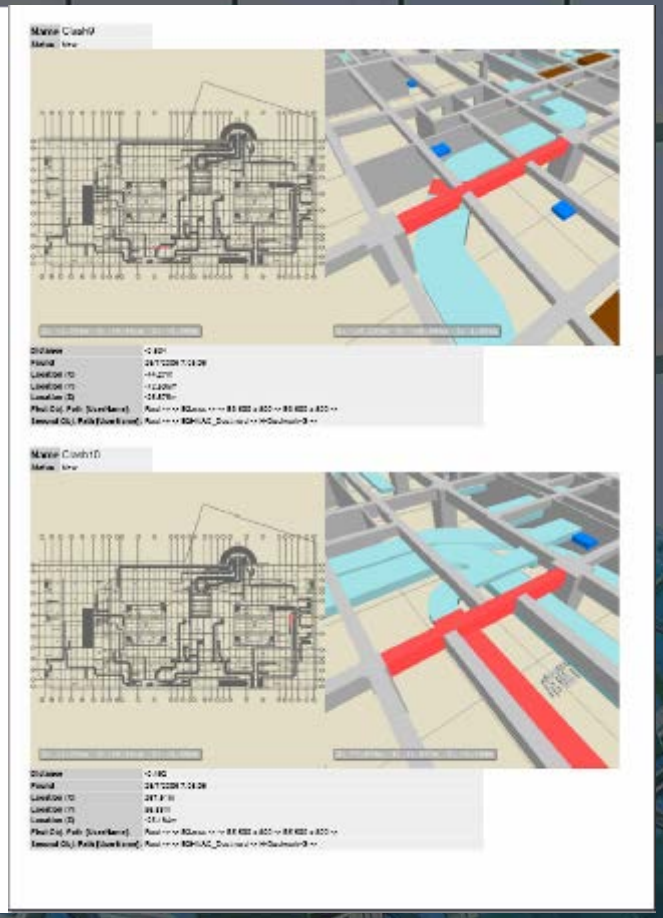
Work Flow - Clashes Identification Processes



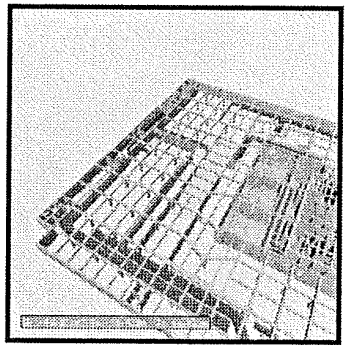
Work Flow – Clashes Report
流程 – 碰撞檢驗報告







Work Flow – Clashes Report
流程 – 碰撞報告



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

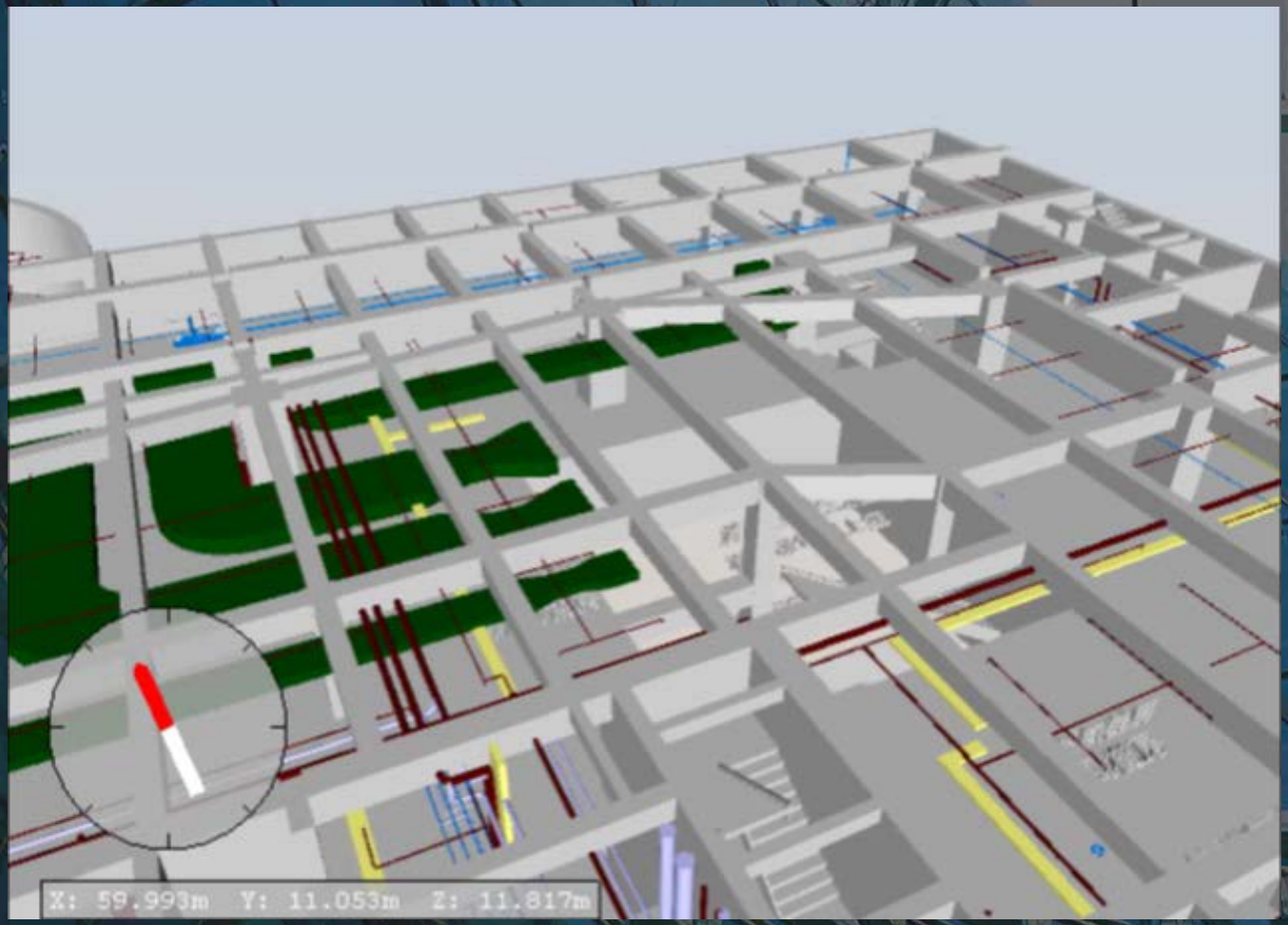
Item 2

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

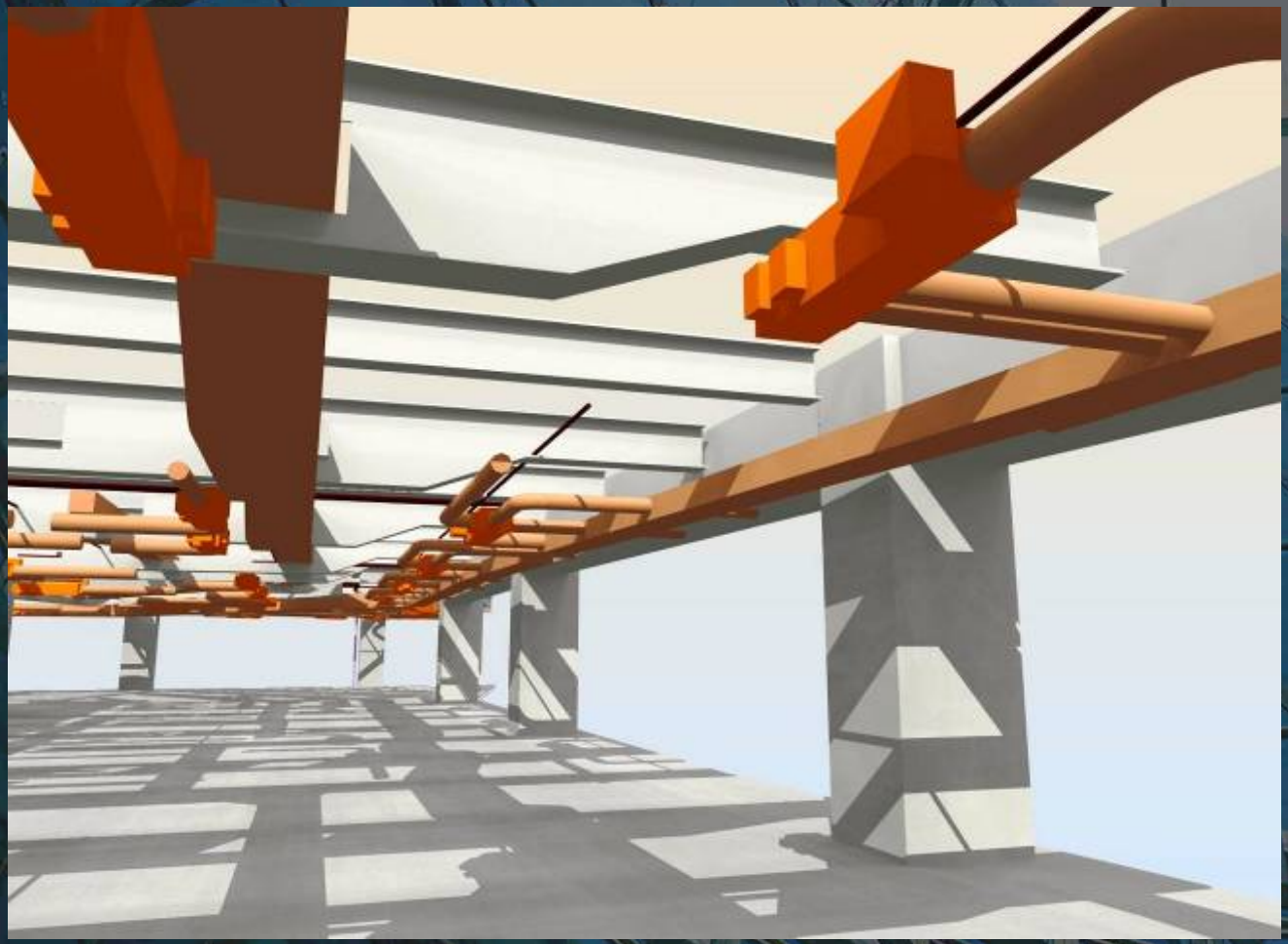
Results – No of Clashes
結果 – 碰撞數目

	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**

Work Flow – Clashes Identification Process (Update)

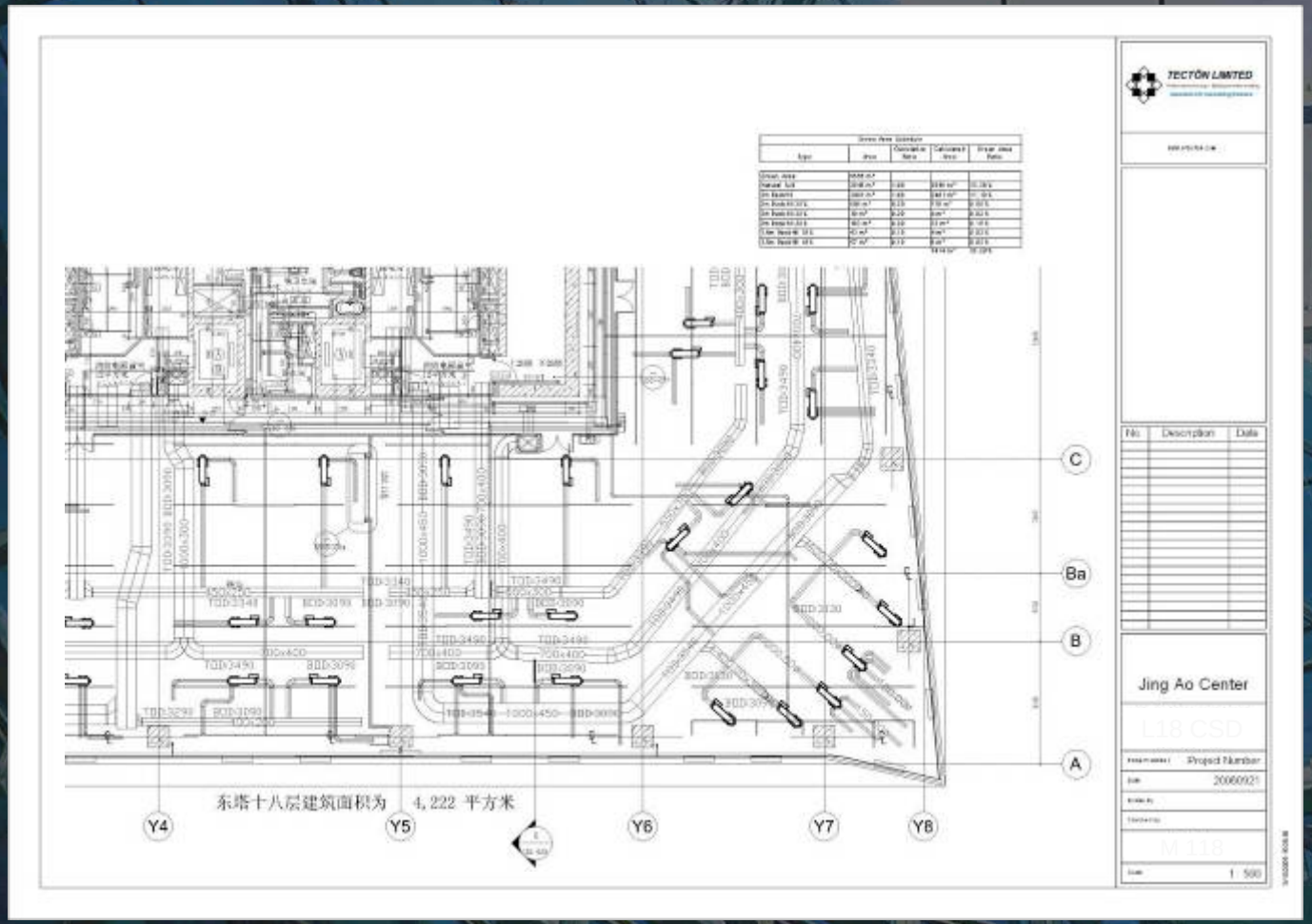


Work Flow – BIM Model Revision
流程 – BIM 模型修正

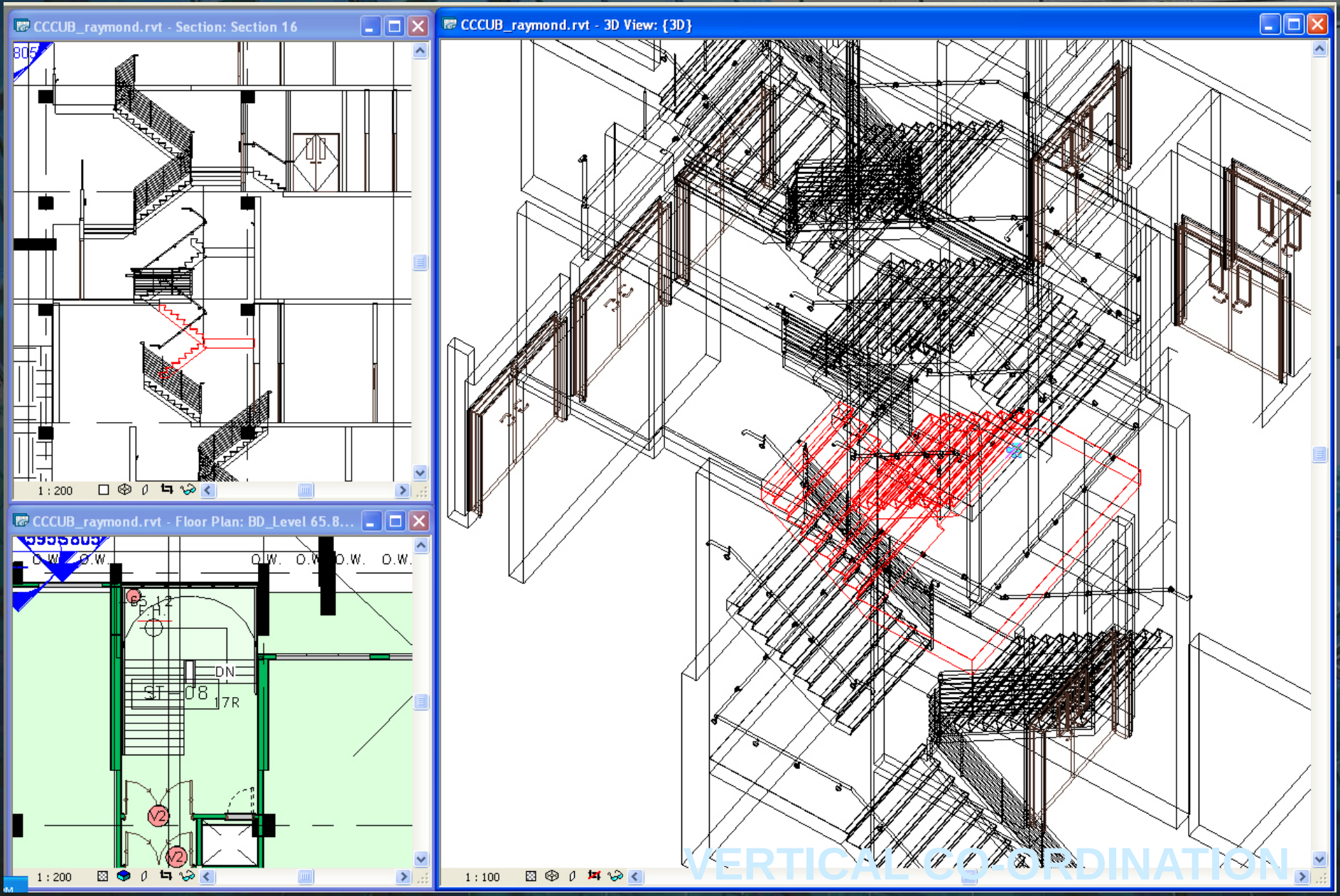


X: -65.357m Y: 19.867m Z: -2.579m

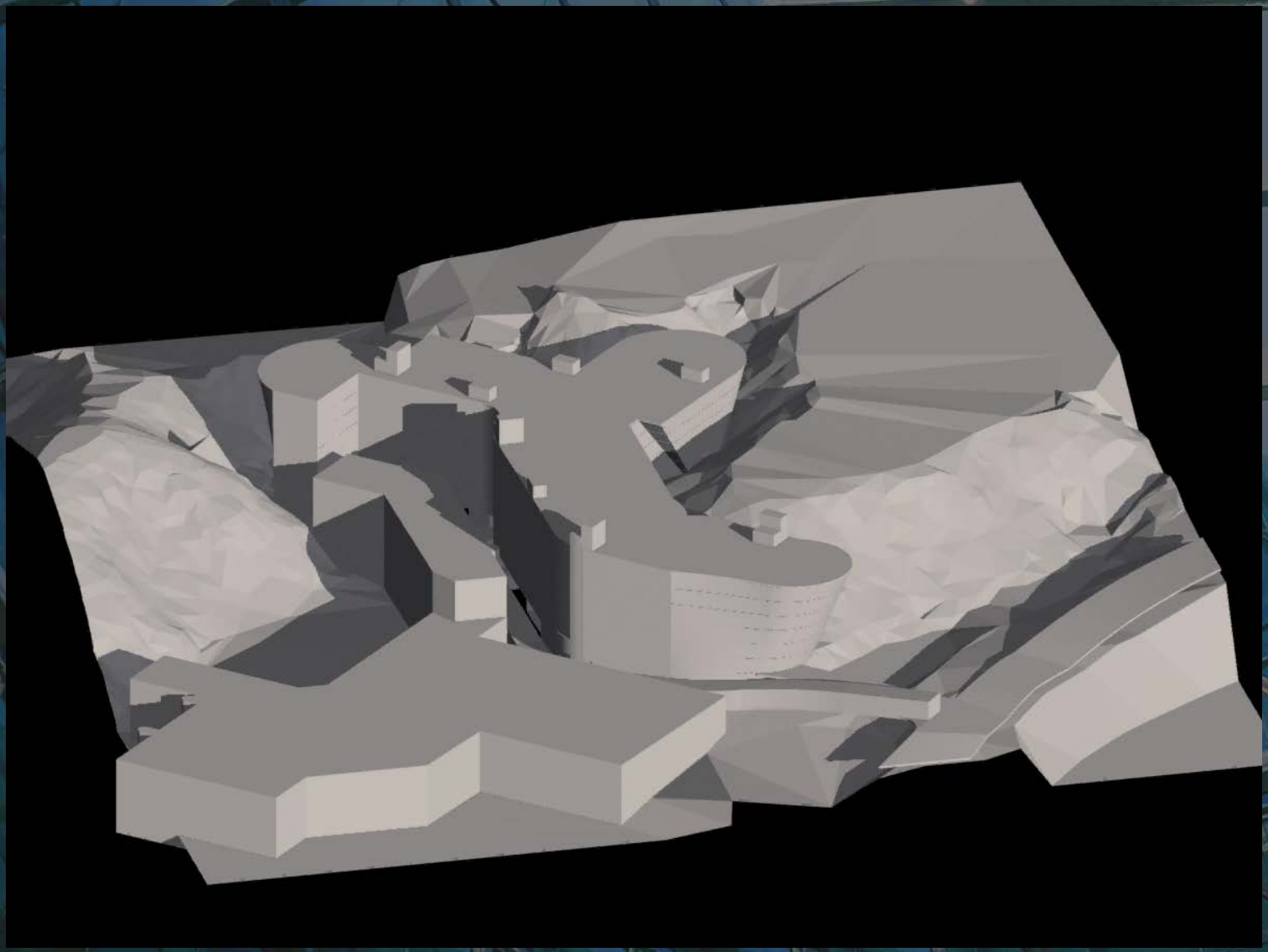
Work Flow – Production of Final Design Drawing
流程 – 最終設計圖紙



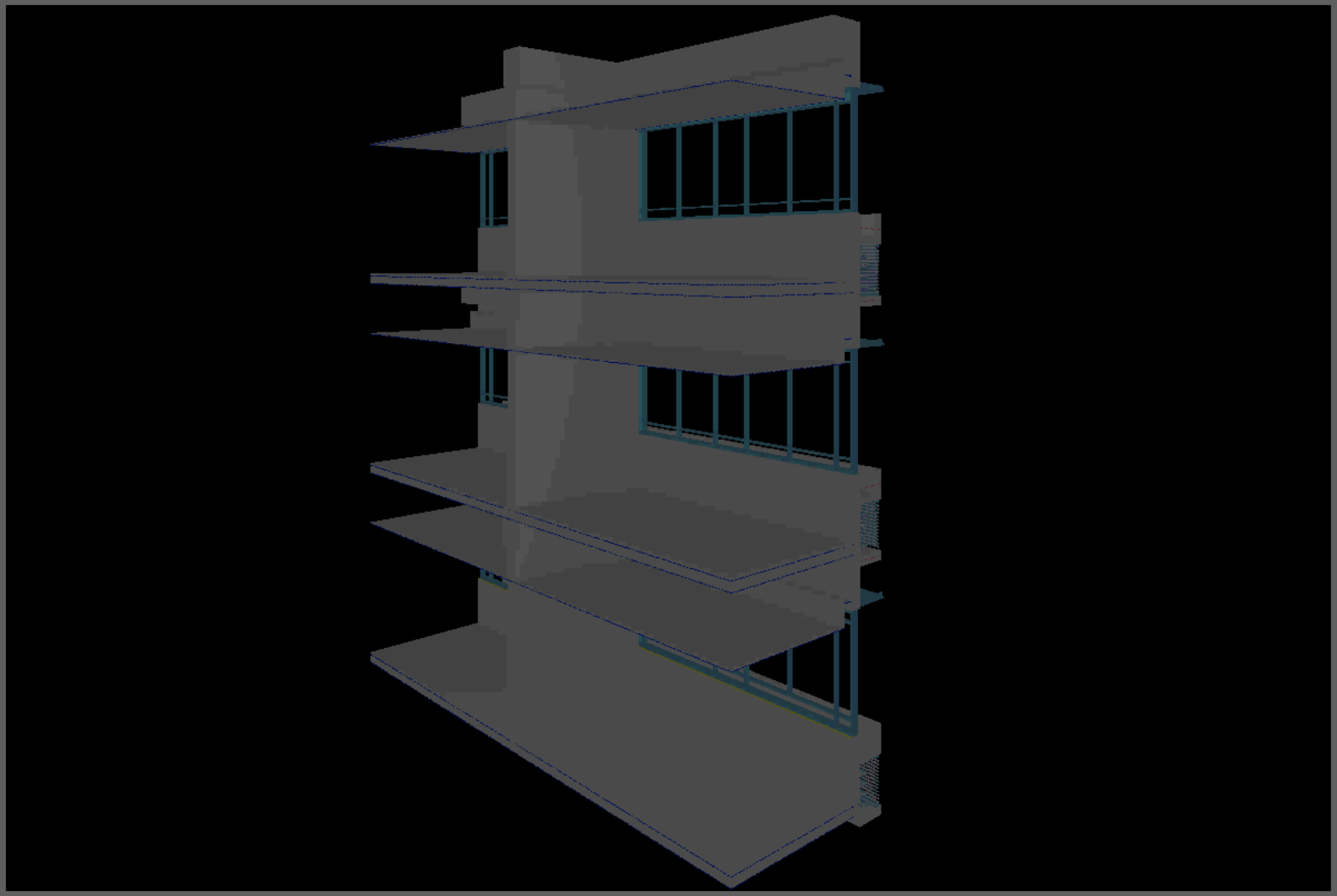
ANALYSIS


CCCUB_raymond.rvt - Section: Section 16
1 : 200
CCCUB_raymond.rvt - Floor Plan: BD_Level 65.8...
O.W.
DN
ST
08
7R
V2
1 : 200
CCCUB_raymond.rvt - 3D View: {3D}
1 : 100
VERTICAL CO-ORDINATION

ANALYSIS



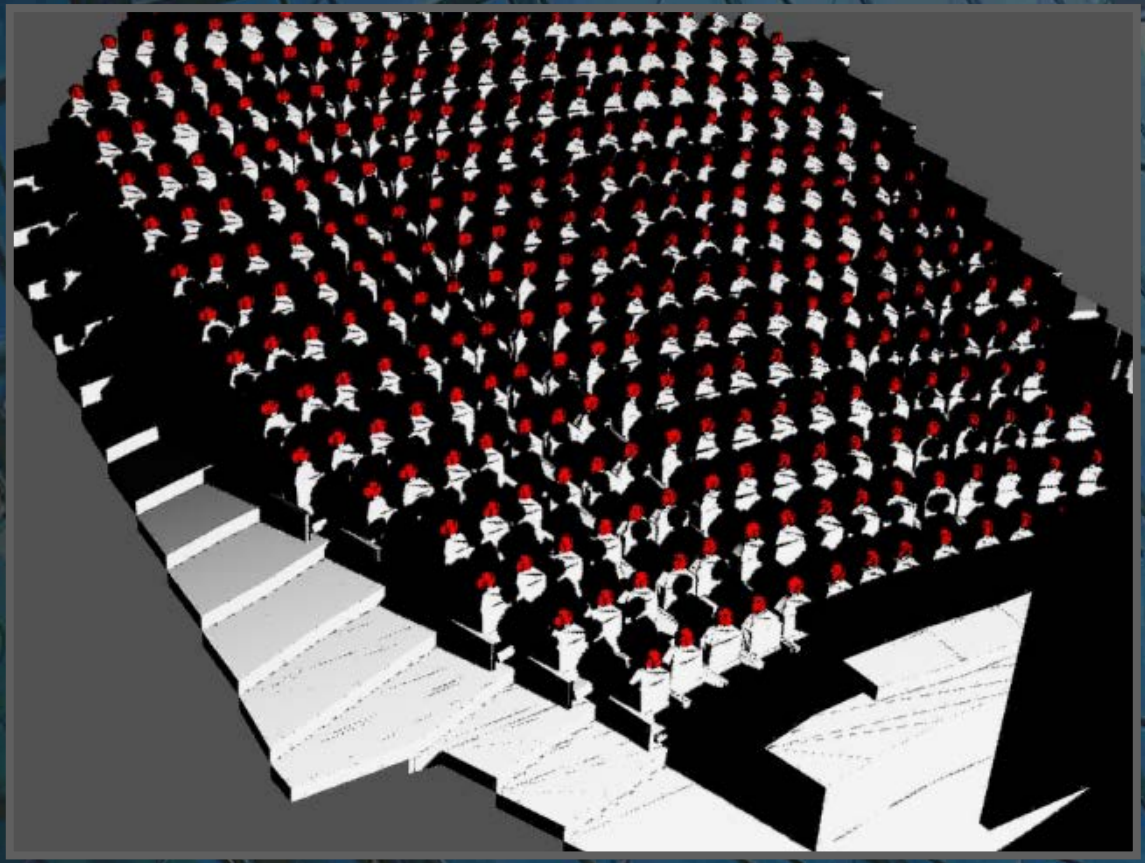
SUN STUDY



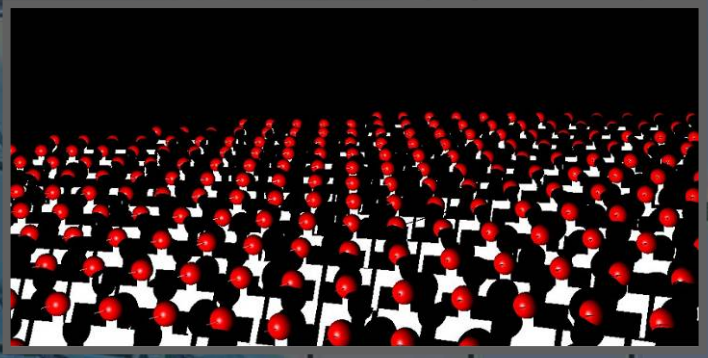
FAÇADE SOLAR STUDY

21/12/2006 7:00am – 6:00pm

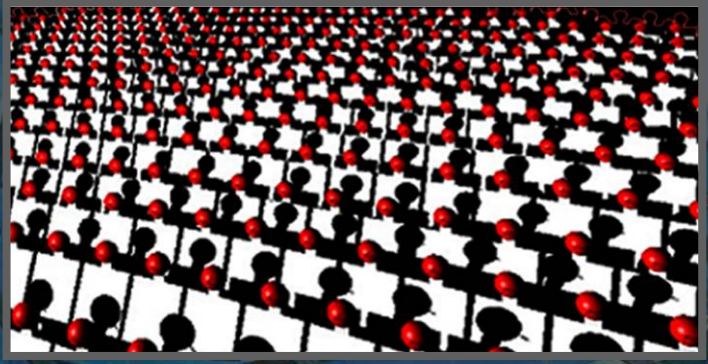
ANALYSIS



Radiating Light Method



Unsatisfactory sightlines



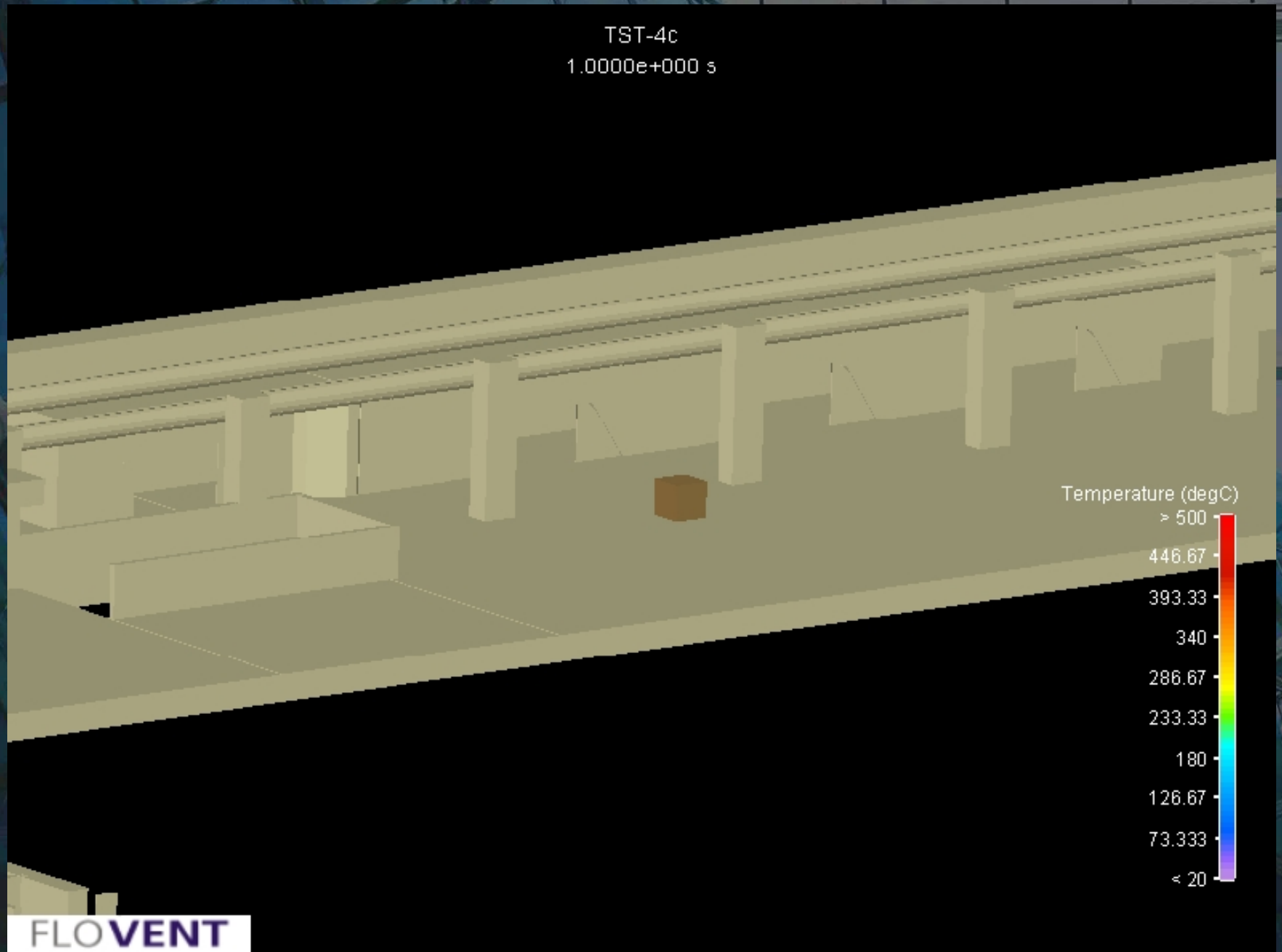
Satisfactory sightlines

SIGHTLINE STUDIES

ANALYSIS

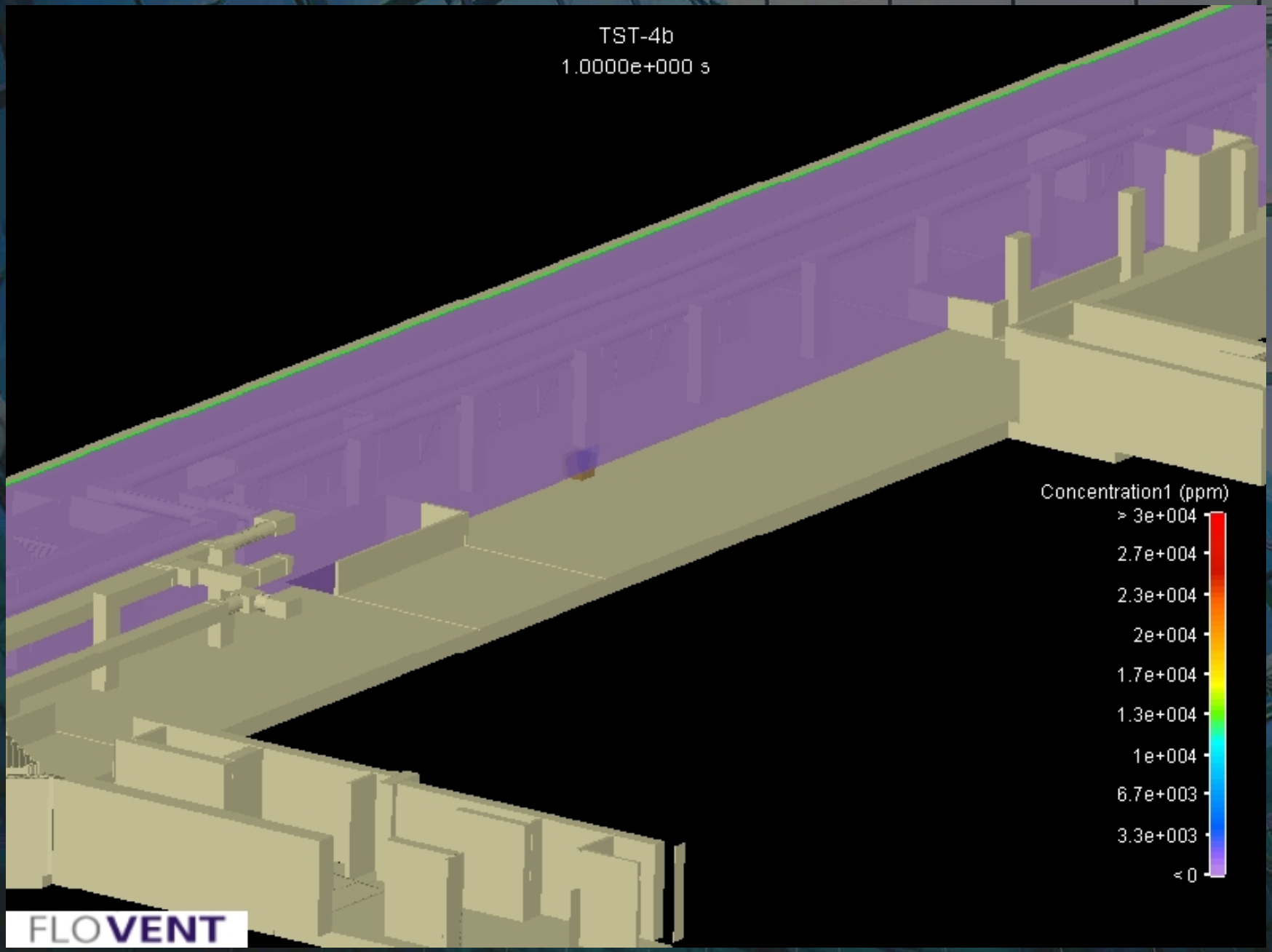
VISUALIZATION

ANALYSIS

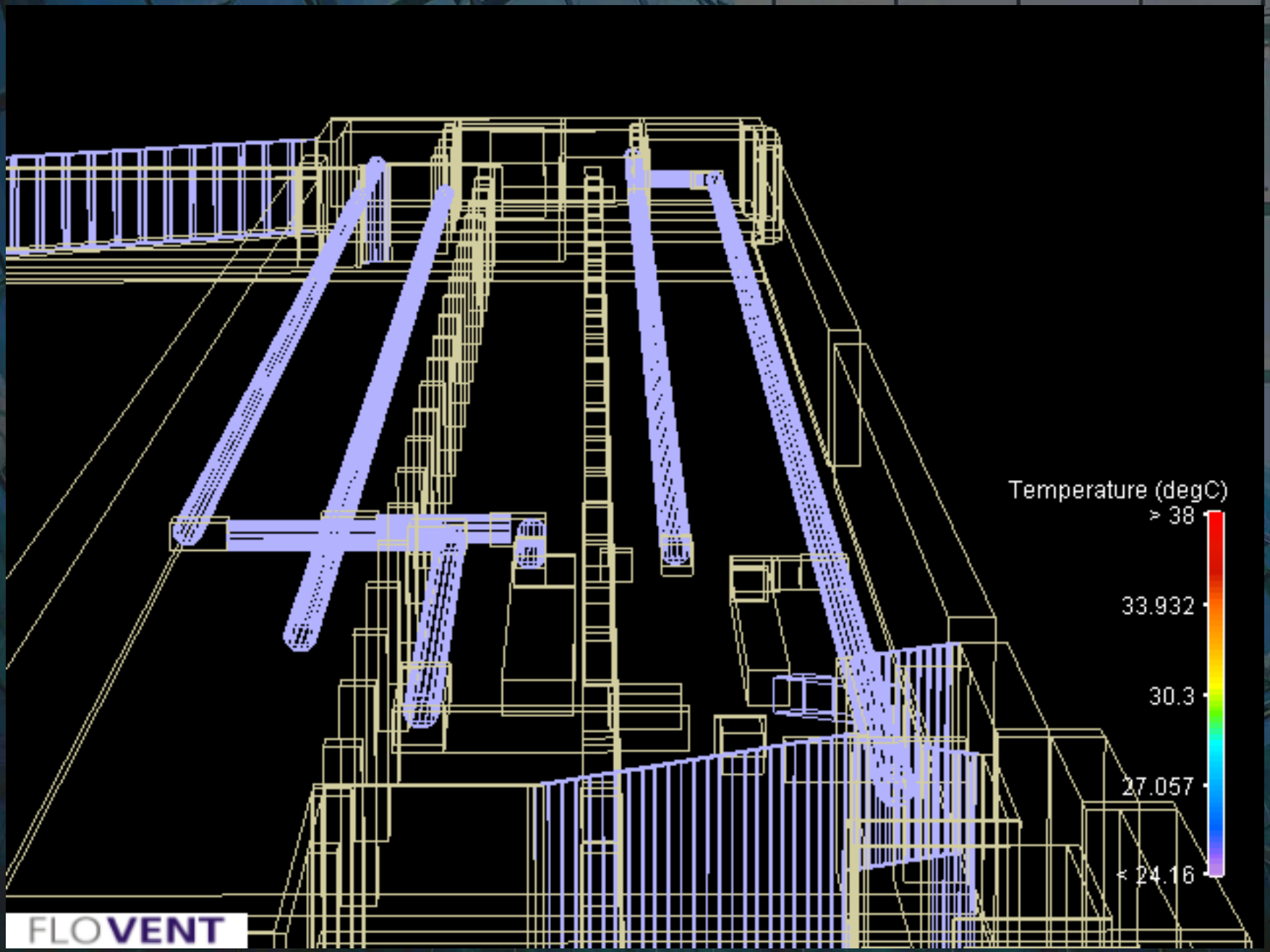


FLOVENT

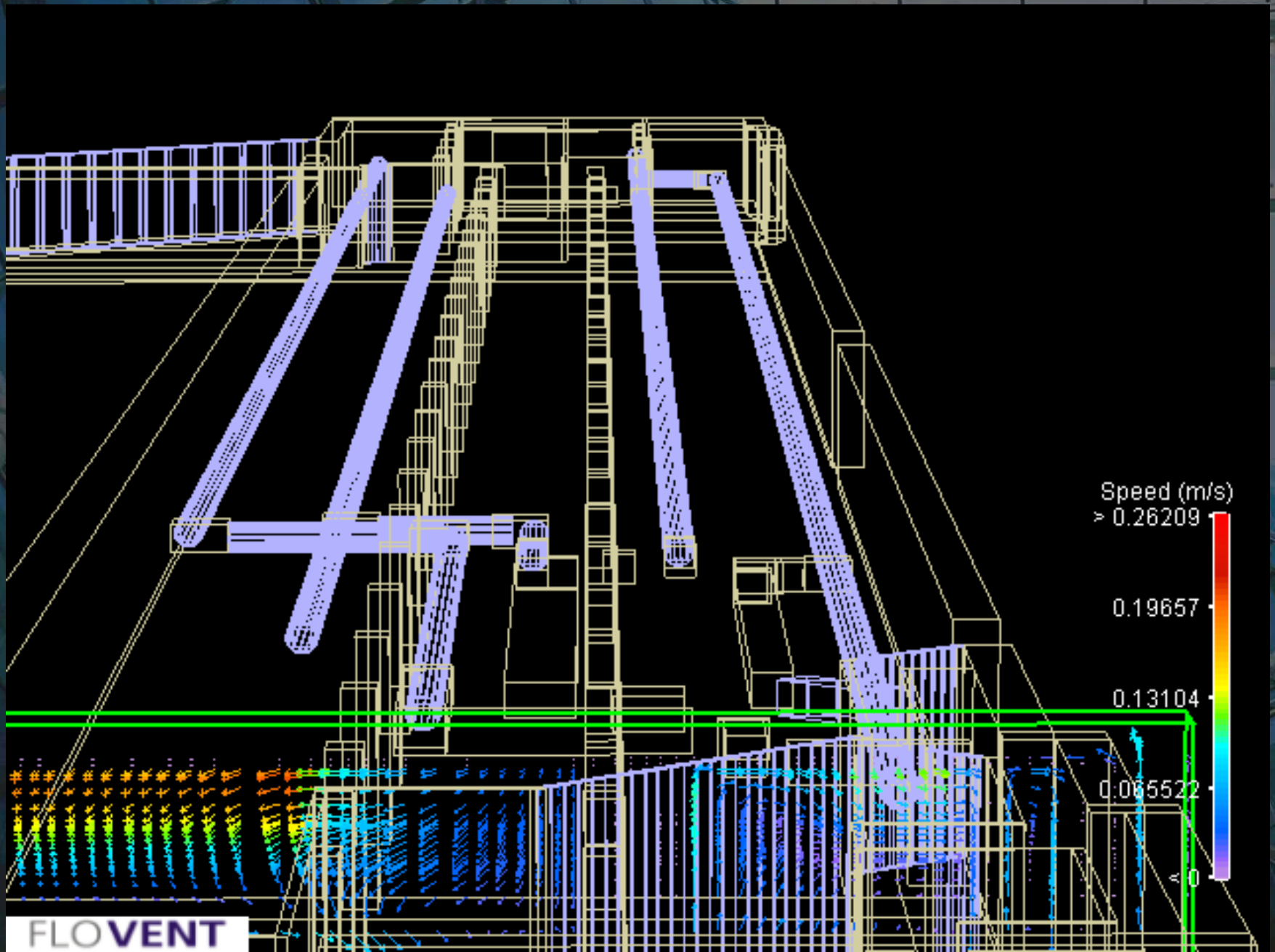
ANALYSIS


TST-4b
1.0000e+000 s
Concentration1 (ppm)
> 3e+004
2.7e+004
2.3e+004
2e+004
1.7e+004
1.3e+004
1e+004
6.7e+003
3.3e+003
< 0
FLOVENT

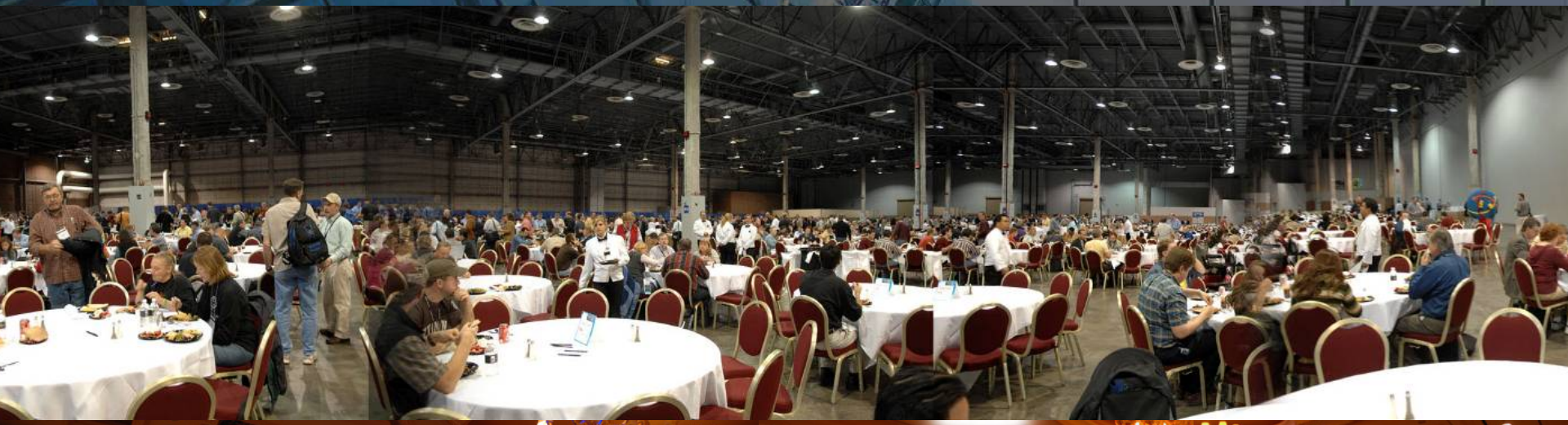
ANALYSIS



ANALYSIS



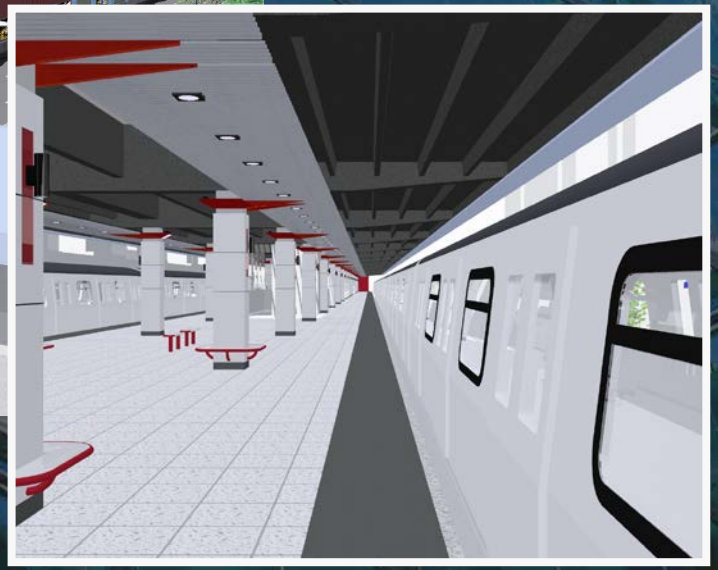
Is the Building Industry changing?



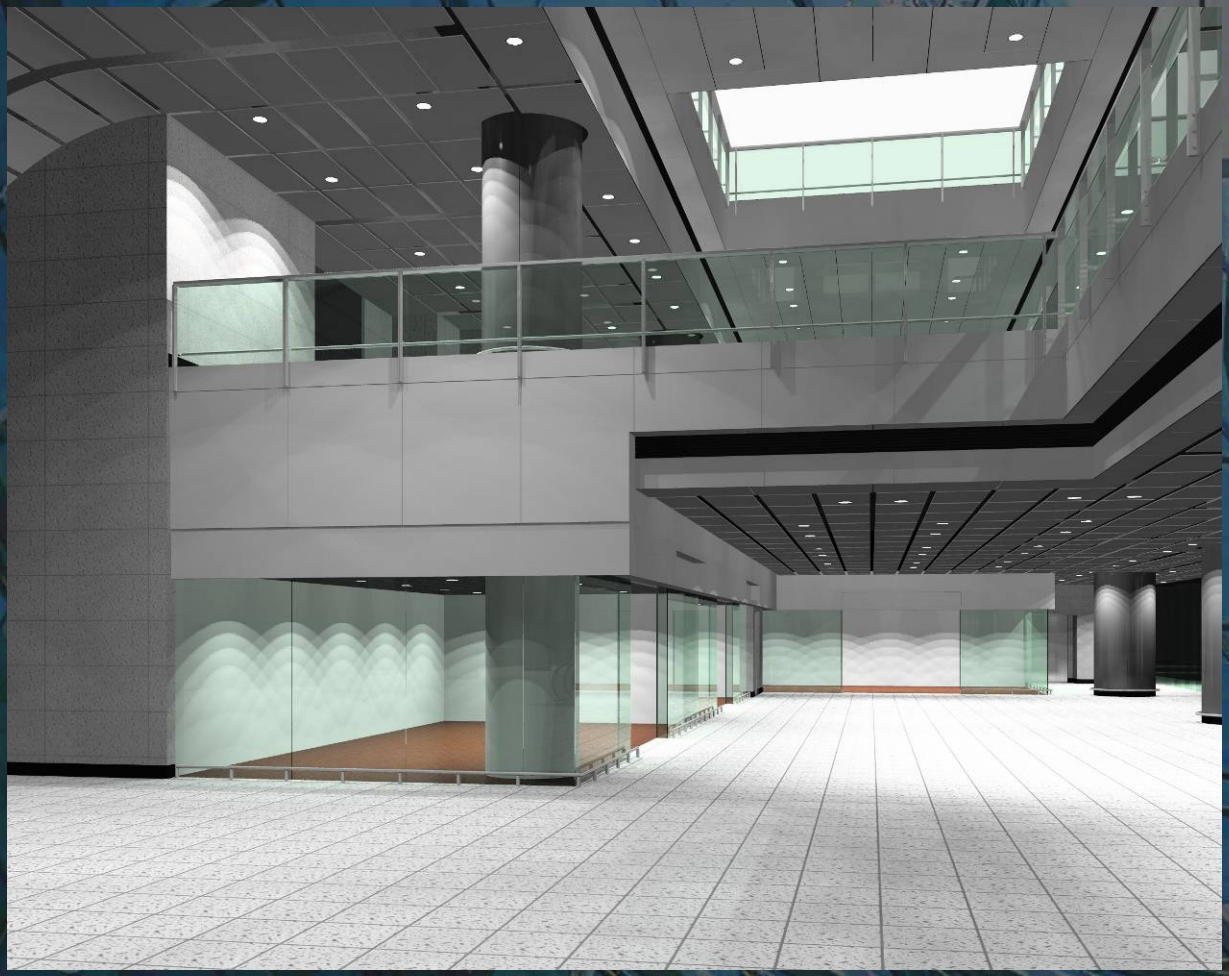
A year ago…

MTRC …

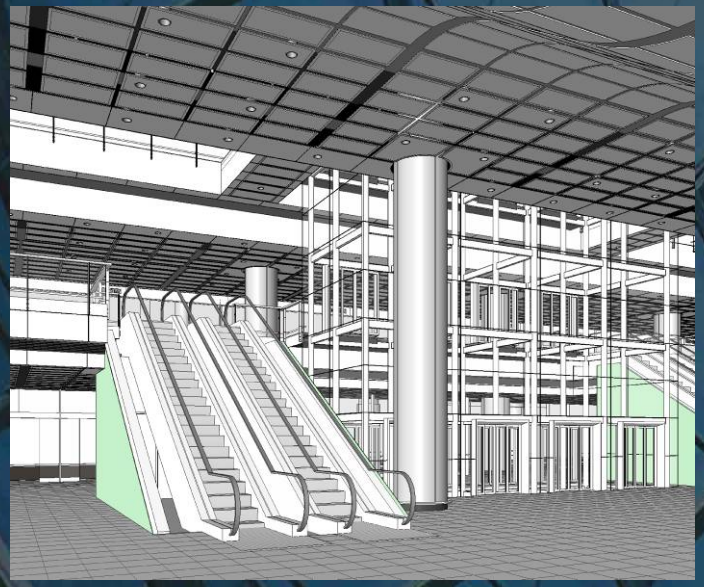
A year ago…

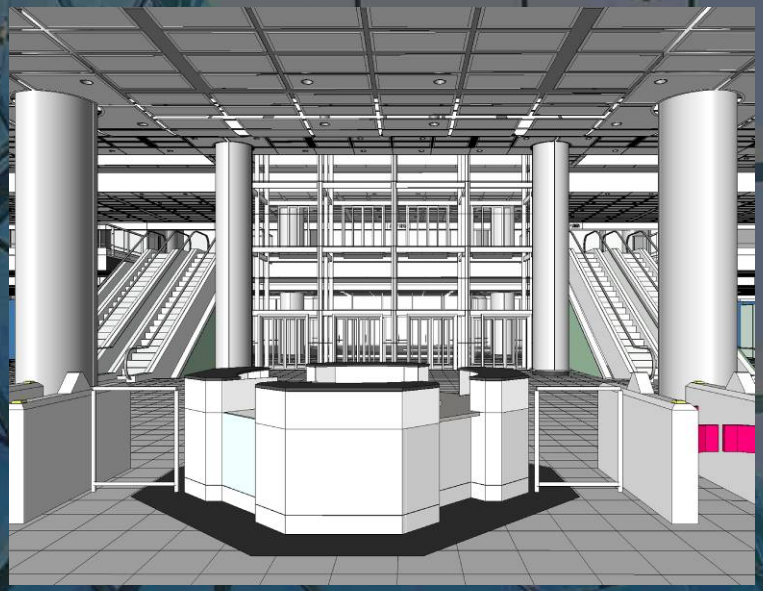


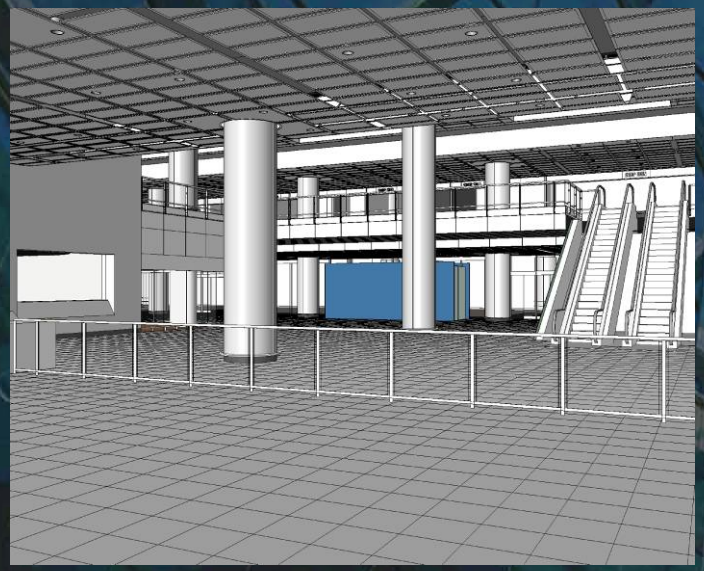
Early Projects…

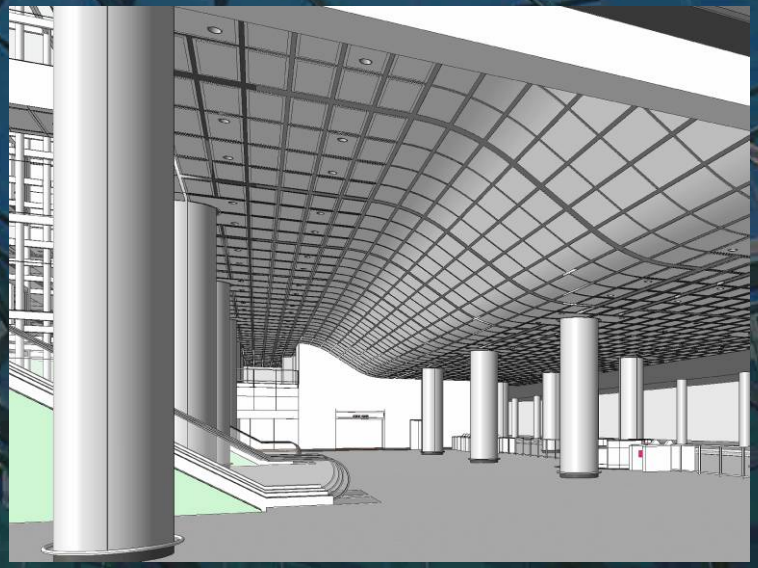


Early Projects…Hong Kong Station

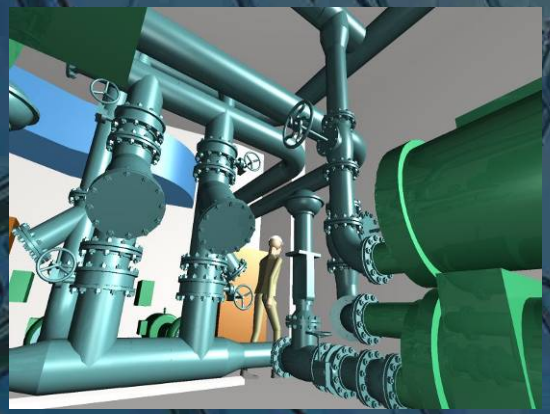






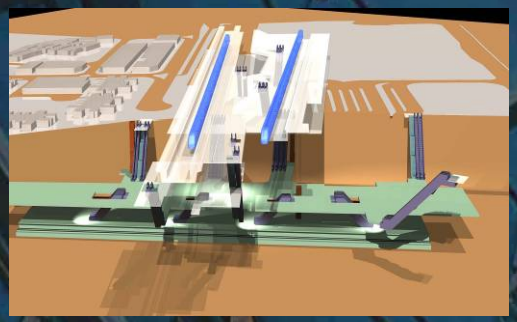


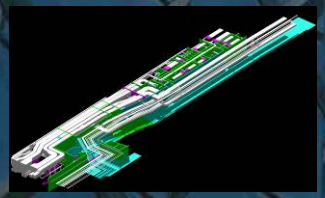
6 Months Ago

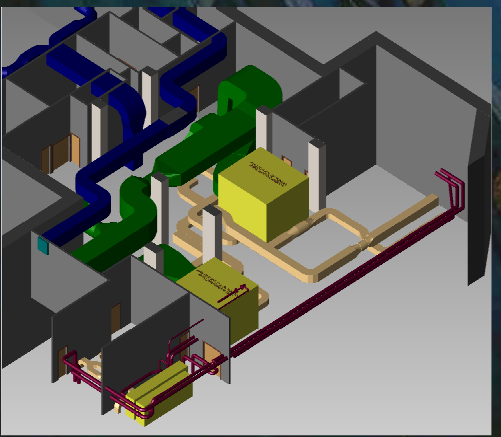


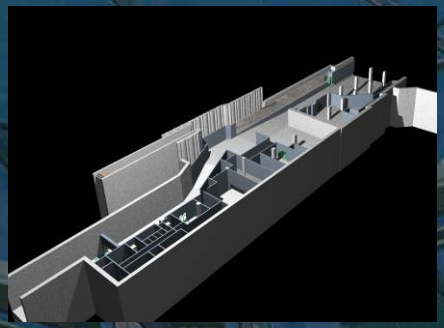
三維空間信息

- 更容易展示物體之間的關係
- 導線碰撞檢查





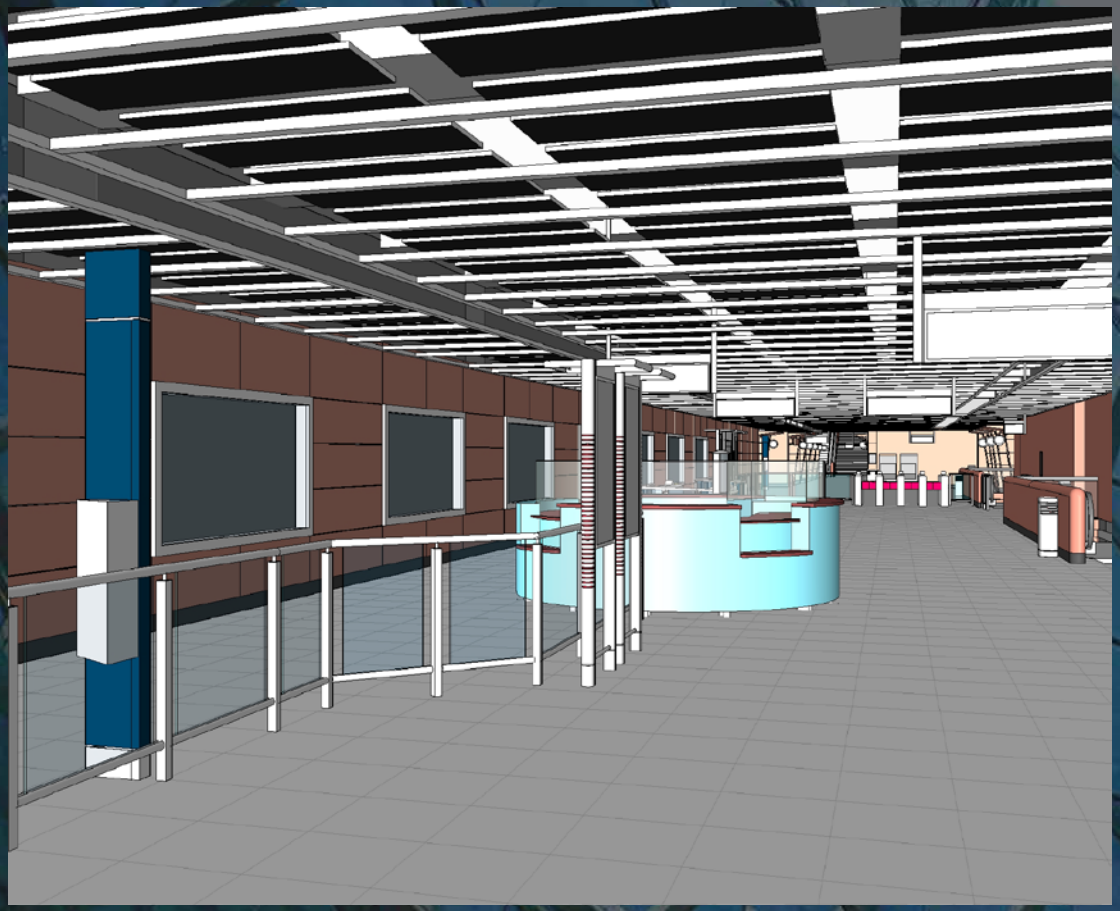




New Projects…Tai Wo Hau External Passenger Lift

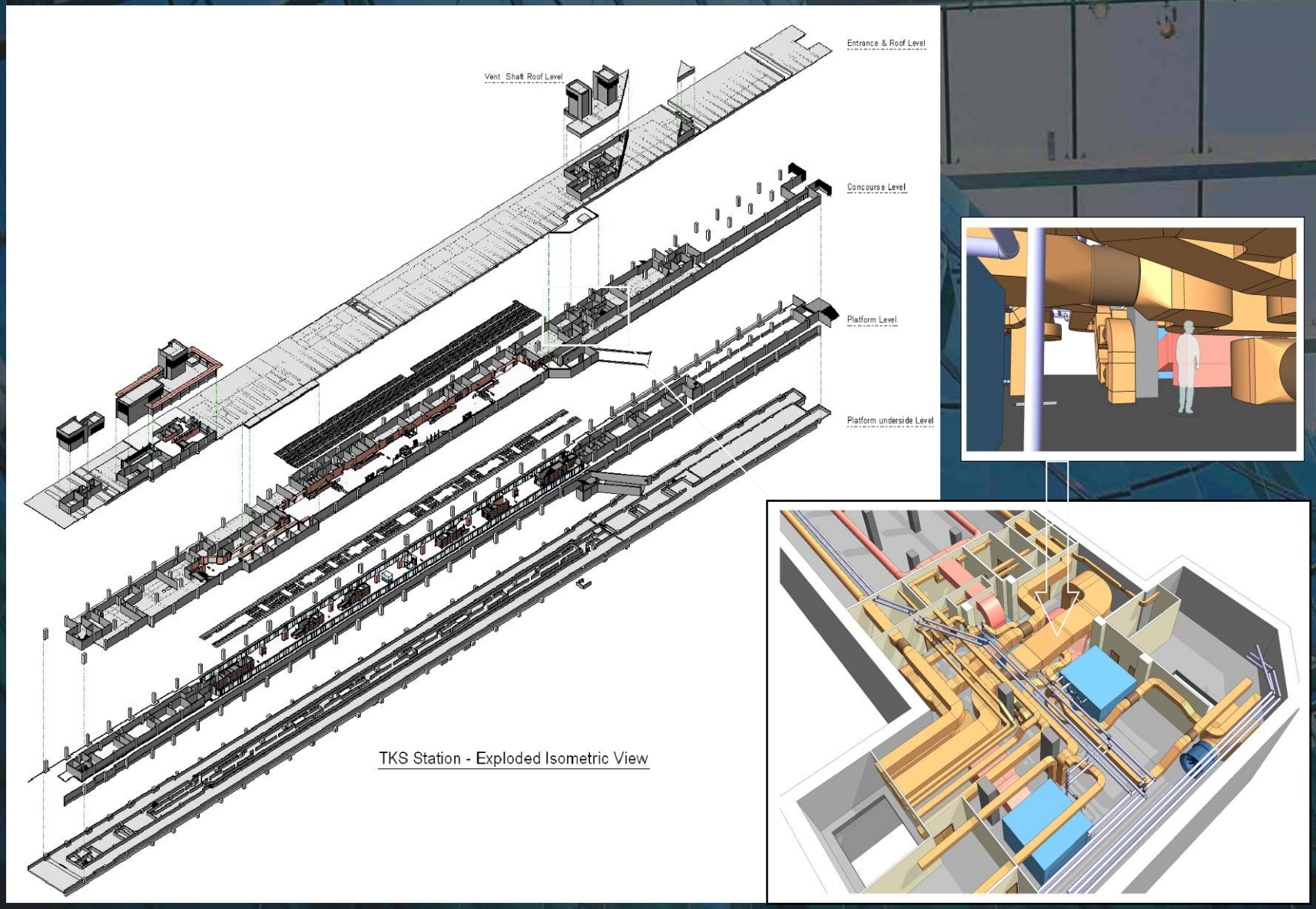
From Design to Project Documentation

New Project…Tseung Kwan O South Station

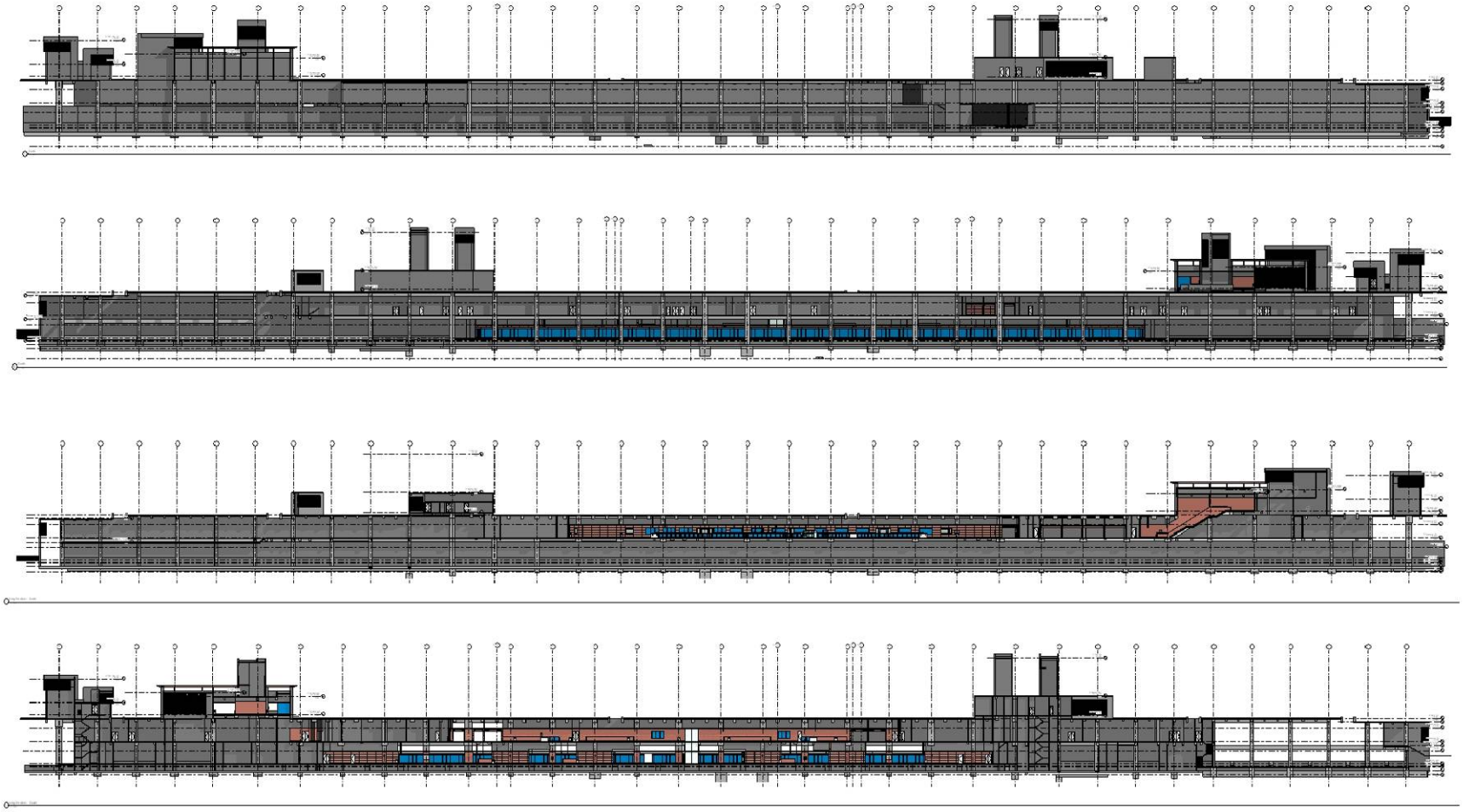


Spatial Study

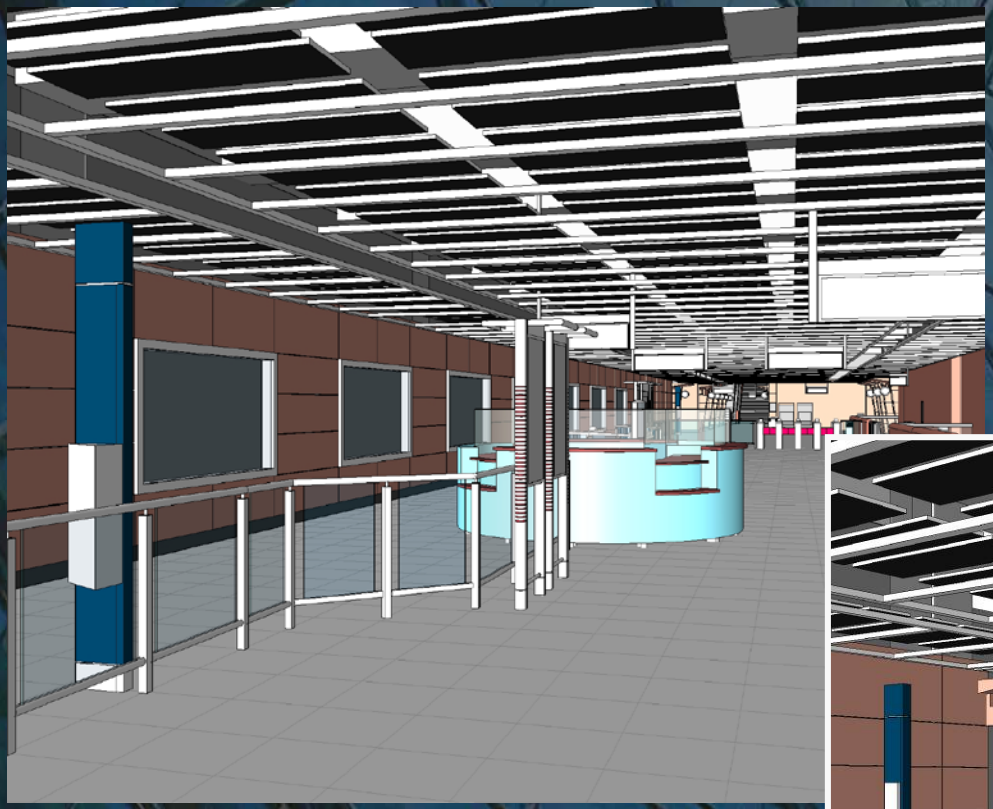
Design Checking


Entrance & Roof Level
Vent Shaft Roof Level
Concourse Level
Platform Level
Platform underside Level
TKS Station - Exploded Isometric View

New Project…Tseung Kwan O South Station



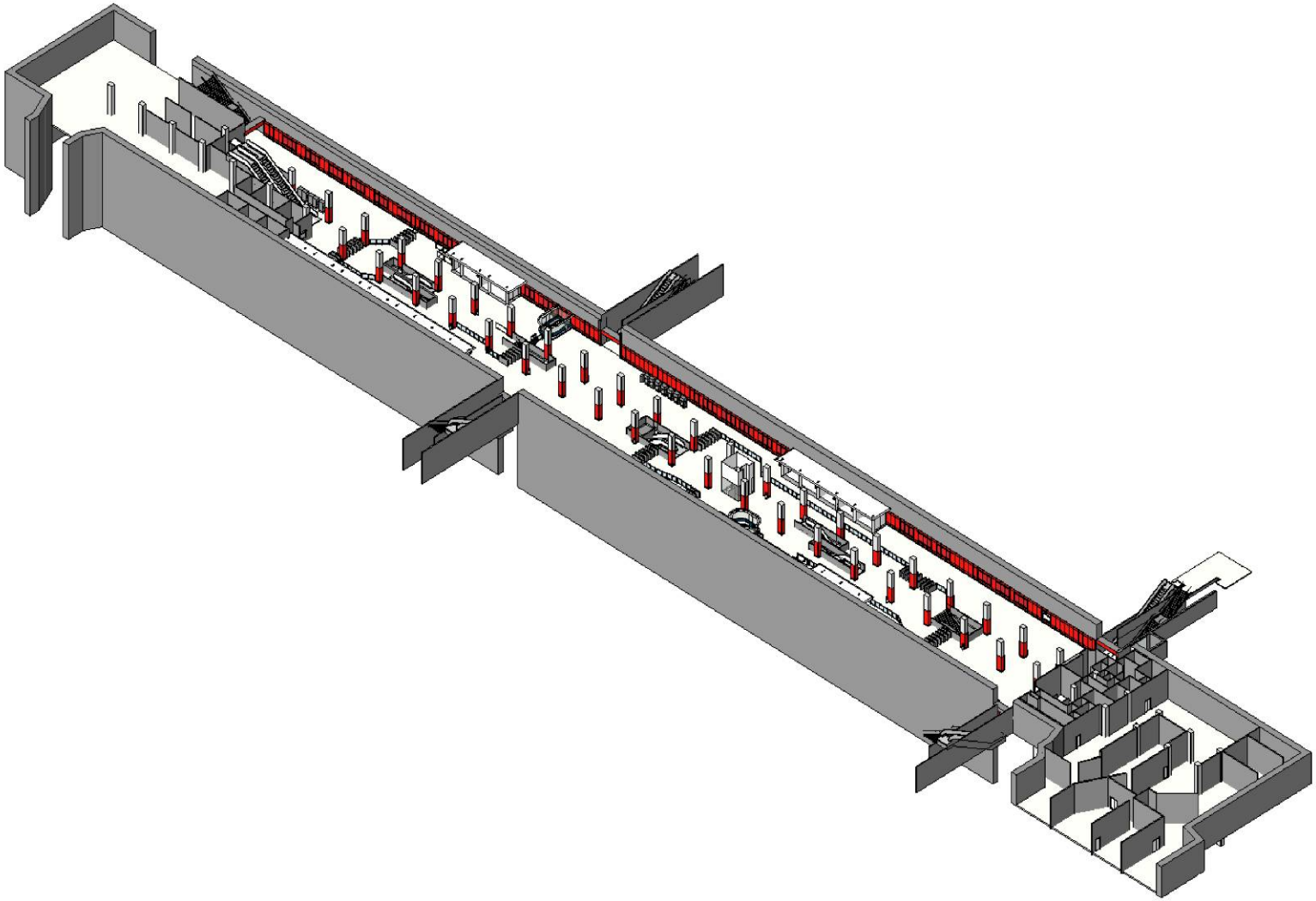
New Project…Tseung Kwan O South Station



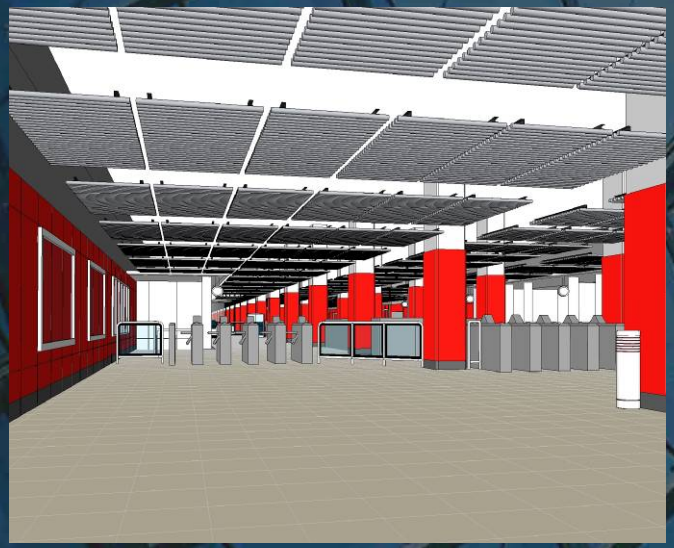
See walkthrough

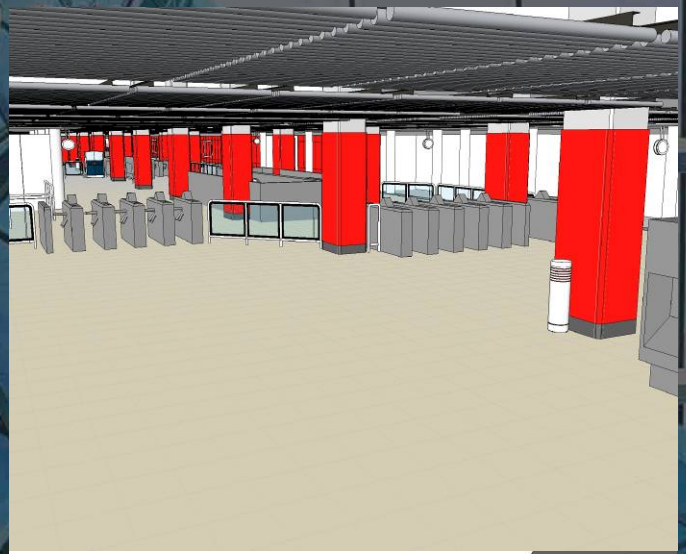
Spatial Analysis… Mong Kok Station Year 2020

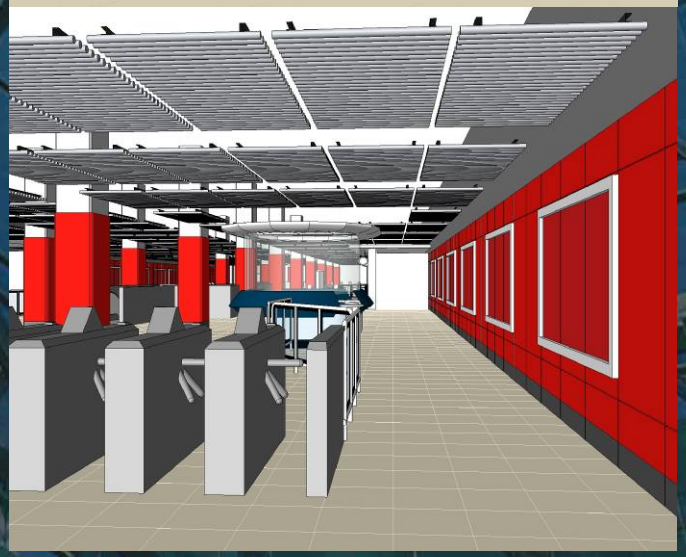
Spatial Analysis… Mong Kok Station



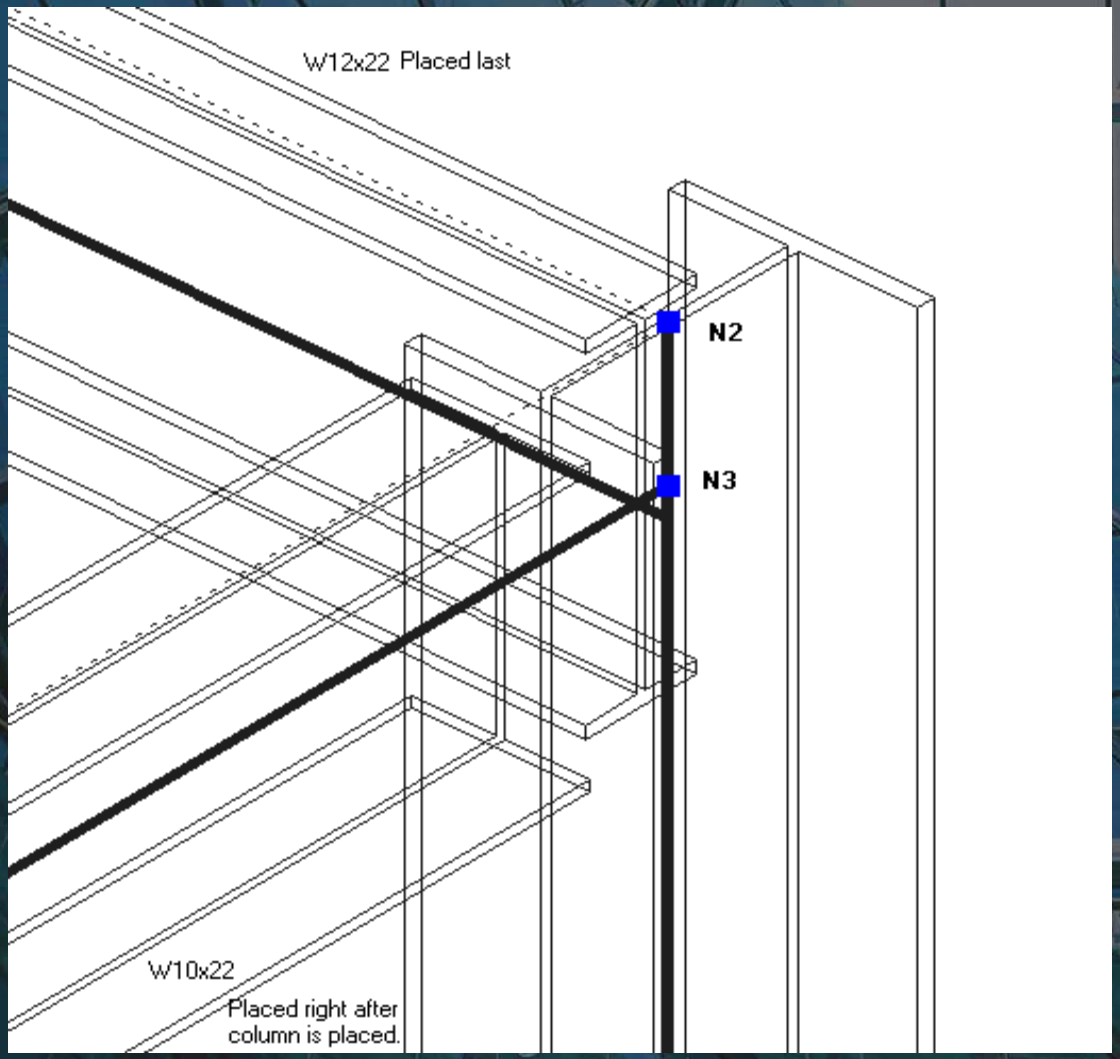
Spatial Analysis… Mong Kok Station



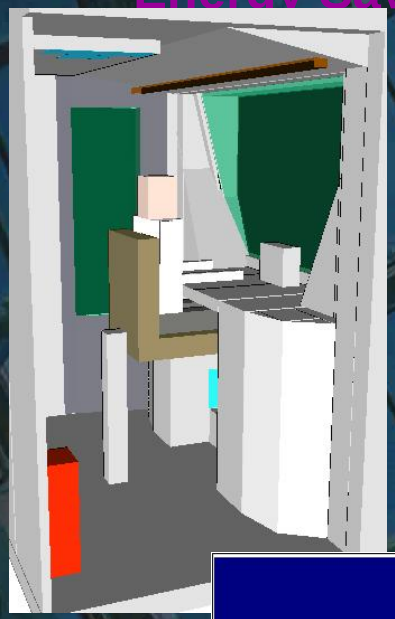


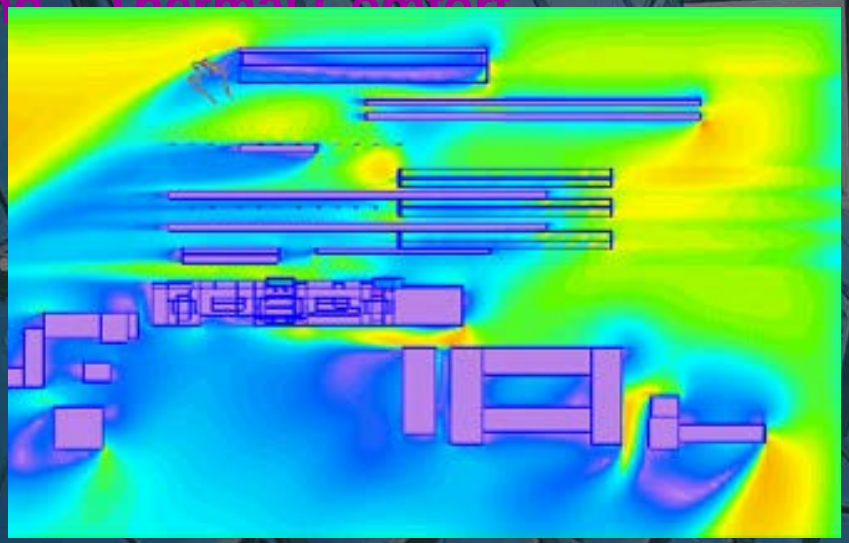


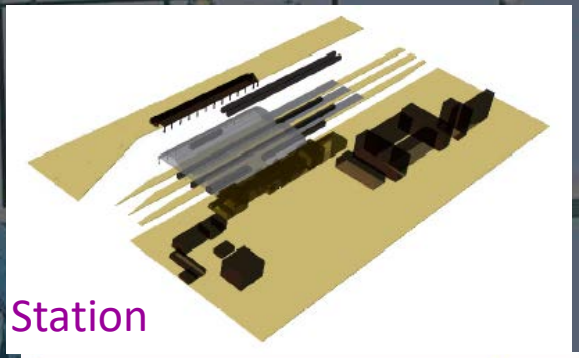
Synchronization between CAD Model and Analytical Models



Energy Saving – Thermal Comfort

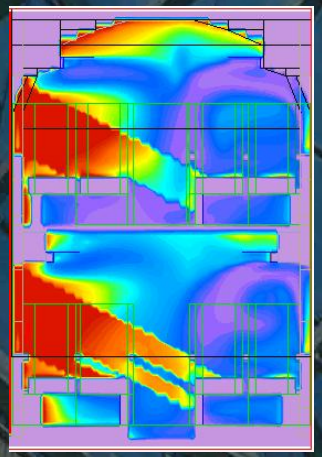




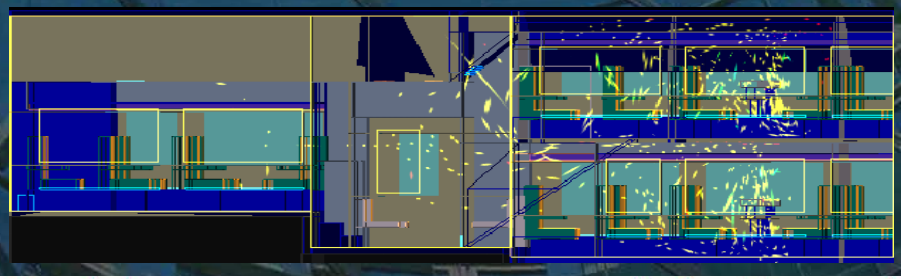


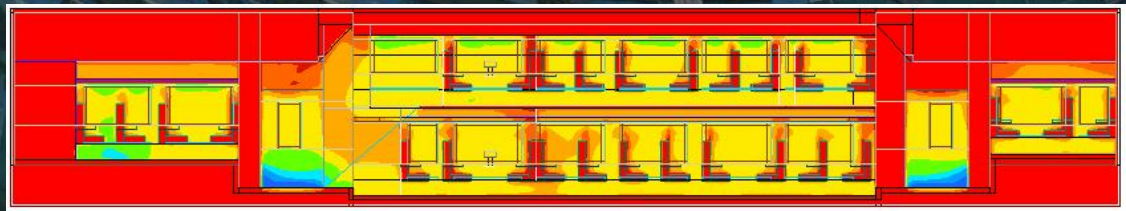
Station

Train Driver

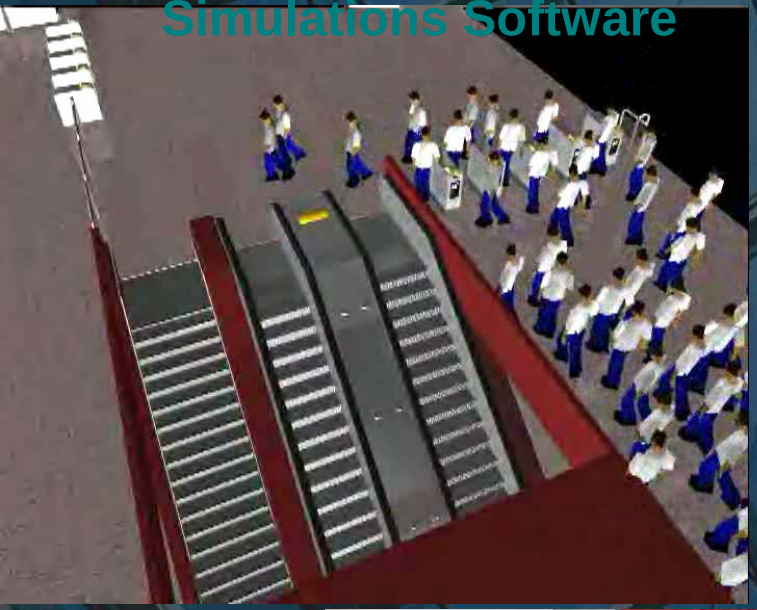


Train

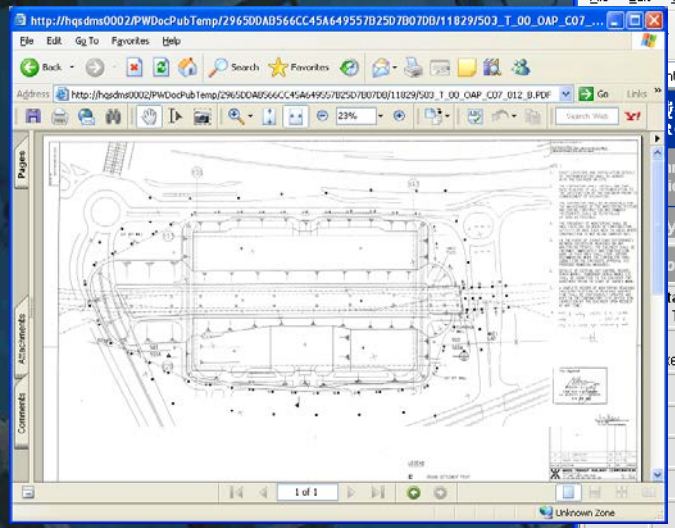




Simulations Software



Asset Management



Asset Technical Information System - Microsoft Internet Explorer provided by MTR Corporation Limited

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http://hqsdms0002/mtrcl/rais/atis.htm

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Corporation

Asset Technical Information System

nical ion	Project Definition Document	Statutory Record	Fire Safety Information	Maintenance Information	Asset Replacement Planning	Project-In-Progress	Asset Key Parameter	Drawing Management System	Knowledge Library

y Record

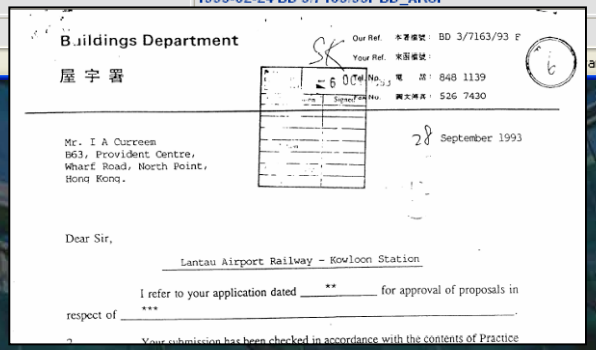
ords found : 1126 — Ungrouped

	tatutory Type	Submission Title	Document Ref No
	BD xemption	Agreement between the Mass Transit Corporation and the Public Works Department	-
	BD	Lantau Airport Railway - Kowloon Station	1993-09-28 BD 3/7163/93 F BD_ AURP
	BD	Lantau Airport Railway - Kowloon Station	1993-10-26 BD 3/7163/93 F BD_ ARUP
	BD	Lantau Airport Railway - Kowloon Station	1993-10-26 BD 3/7163/93 F BD_ ARUP
	BD	Lantau Airport Railway - Kowloon Station	1993-10-26 BD 3/7163/93 F BD_ ARUP
	BD	Lantau Airport Railway - Kowloon Station	1993-10-26 BD 3/7163/93 F BD_ ARUP
KOW	BD	Lantau Airport Railway - Kowloon Station	1994-01-07 (20) in BD 3/7163/93/F BD_ ARUP
KOW	BD	Lantau Airport Railway - Kowloon Station	1994-01-20 BD 3/7163/93/F BD_ARUP.PDF
KOW	BD	Lantau Airport Railway - Kowloon Station	1994-03-24 BD 3/7163/93/F BD_ARUP.PDF
KOW	BD	Lantau Airport Railway - Kowloon Station	1994-05-19 BD 3/7163/93 F BD_ARUP
			1994-09-06 BD 3/7163/93 F BD_ARUP
			1995-02-09 BD 3/7163/93 F BD_ARUP
			1995-02-24 BD 3/7163/93F BD_ARUP

anet

Drawing / Document List

Drawing Title	Drawing Number	Revision
	Letter	
CONTRACT 503A KOWLOON STATION FOUNDATIONS SITE PLAN GEOTECHNICAL MONITORING PLAN	503/T/00/OAP/C07/012/B	B
CONTRACT 503A KOWLOON STATION FOUNDATIONS SITE PLAN GEOTECHNICAL MONITORING PLAN	503/T/00/OAP/C07/012/B	B
CONTRACT 503A KOWLOON STATION FOUNDATIONS GENERAL INFORMATION FORMATION PLAN	503/T/00/OAP/C10/015/A	A
CONTRACT 503A KOWLOON STATION FOUNDATIONS GENERAL INFORMATION FORMATION PLAN	503/T/00/OAP/C10/015/A	A
CONTRACT 503A KOWLOON STATION FOUNDATIONS SITE FORMATION SECTIONS	503/T/00/OAP/C10/016/A	A
CONTRACT 503A KOWLOON STATION FOUNDATIONS SITE FORMATION SECTIONS	503/T/00/OAP/C10/016/A	A
CONTRACT 503A KOWLOON STATION FOUNDATIONS DIAPHRAGM WALL ZONE 11 LAYOUT AND WALL SCHEDULE	503/T/03/OAP/C10/150/B	B
CONTRACT 503A KOWLOON STATION FOUNDATIONS DIAPHRAGM WALL ZONE 11 LAYOUT	503/T/03/OAP/C10/150/B	B



Buildings Department
屋宇署

Our Ref. BD 3/7163/93 F
Your Ref.
Tel No. 848 1139
Fax No. 526 7430

Mr. I A Curreem
B63, Provident Centre,
Wharf Road, North Point,
Hong Kong.

28 September 1993

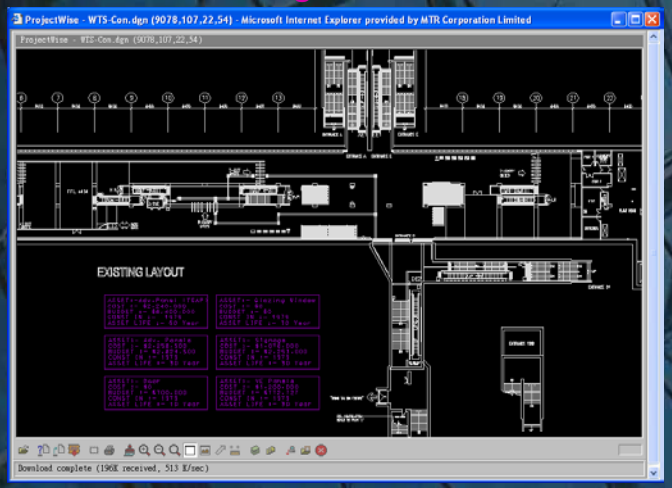
Dear Sir,

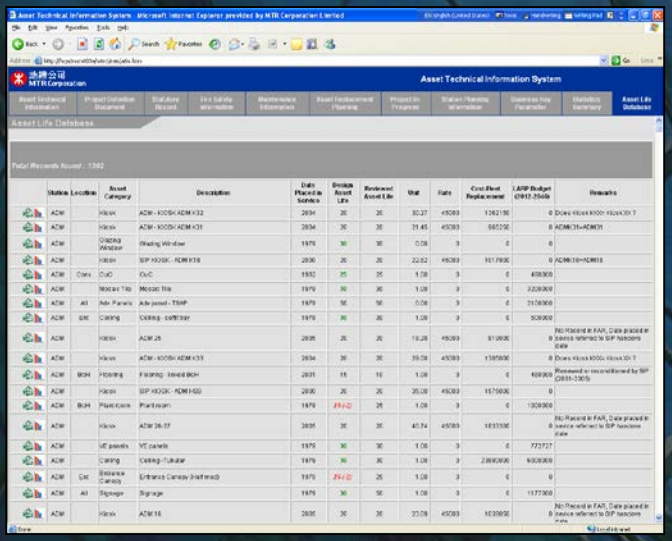
Lantau Airport Railway - Kowloon Station

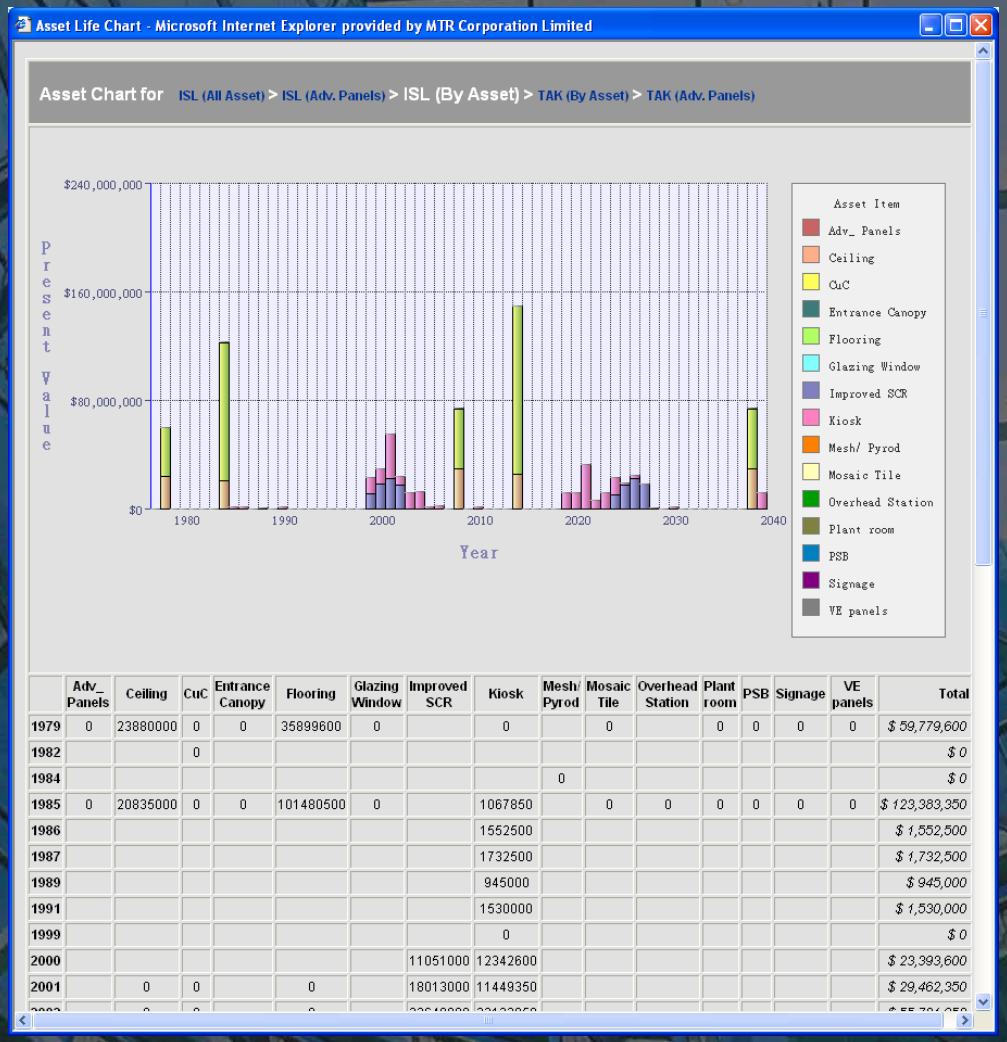
I refer to your application dated ** for approval of proposals in respect of ***

2. Your submission has been checked in accordance with the contents of Practice

Asset Management

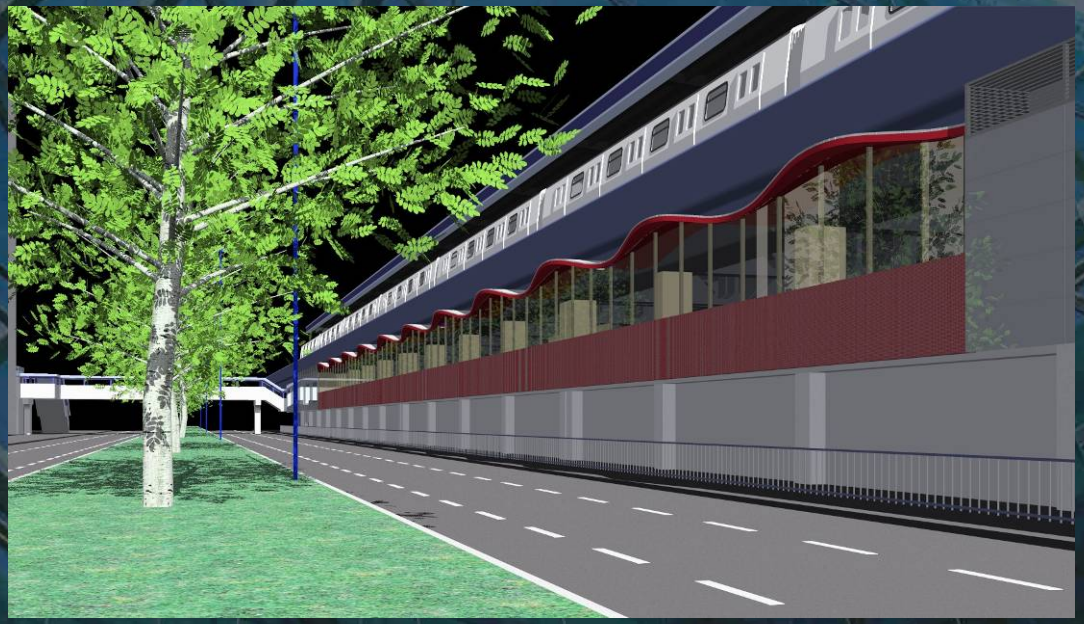






	Adv_ Panels	Ceiling	CuC	Entrance Canopy	Flooring	Glazing Window	Improved SCR	Kiosk	Mesh/ Pyrod	Mosaic Tile	Overhead Station	Plant room	PSB	Signage	VE panels	Total
1979	0	23880000	0	0	35899600	0		0		0		0	0	0	0	$ 59,779,600
1982			0													$ 0
1984									0							$ 0
1985	0	20835000	0	0	101480500	0		1067850		0	0	0	0	0	0	$ 123,383,350
1986								1552500								$ 1,552,500
1987								1732500								$ 1,732,500
1989								945000								$ 945,000
1991								1530000								$ 1,530,000
1999								0								$ 0
2000							11051000	12342600								$ 23,393,600
2001		0	0		0		18013000	11449350								$ 29,462,350

Asset Management

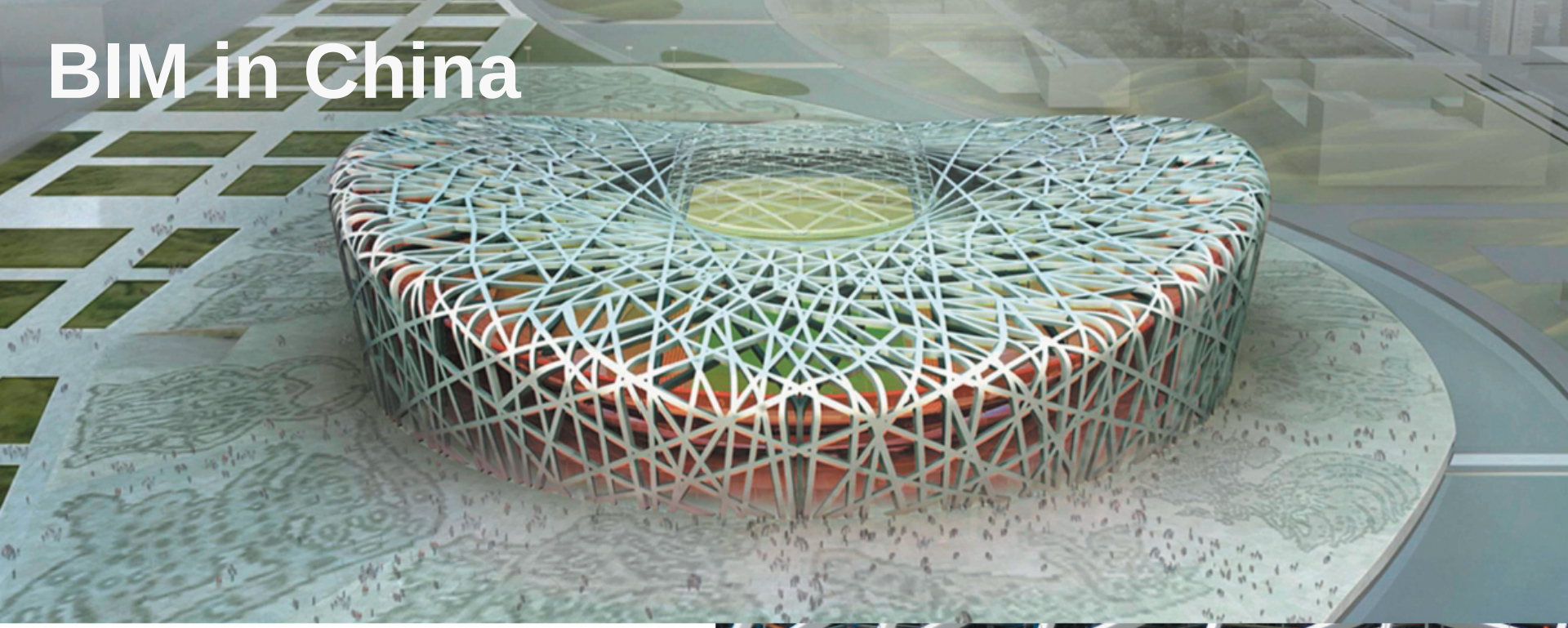


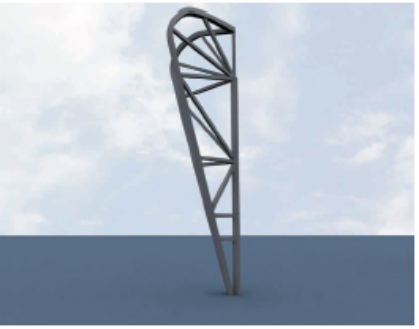
MTR Tseung Kwan O Station

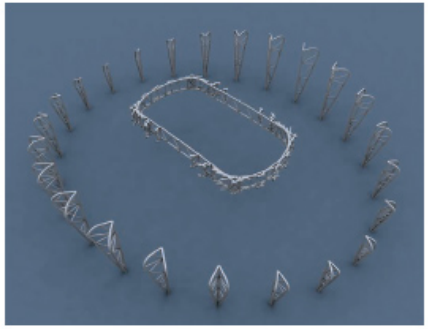
File Help

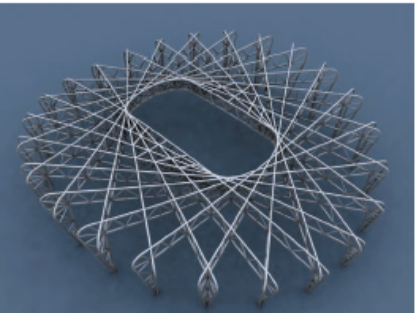
- TKS900x900_RC_Column
- FloorStruct_250mm_THK
- WallExterior_250mm_THK
- WallO_R_Track_Area_200mm
- FloorStruct_200mm_THK
- WallTrack_upstand_300mm_1
- FloorStruct_450mm_THK
- WallTrack_upstand_225mm_1
- WallTrack_upstand_250mm_1
- WallO_R_Track_Area_400mm
- WallInterior_400mm_THK
- WallInterior_200mm_THK
- 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_Colum

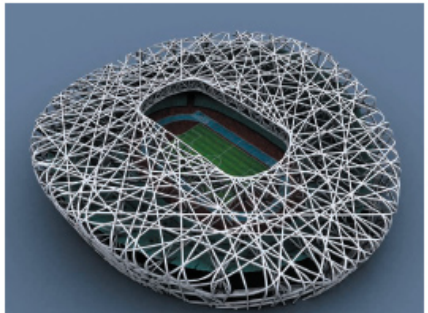
BIM in China

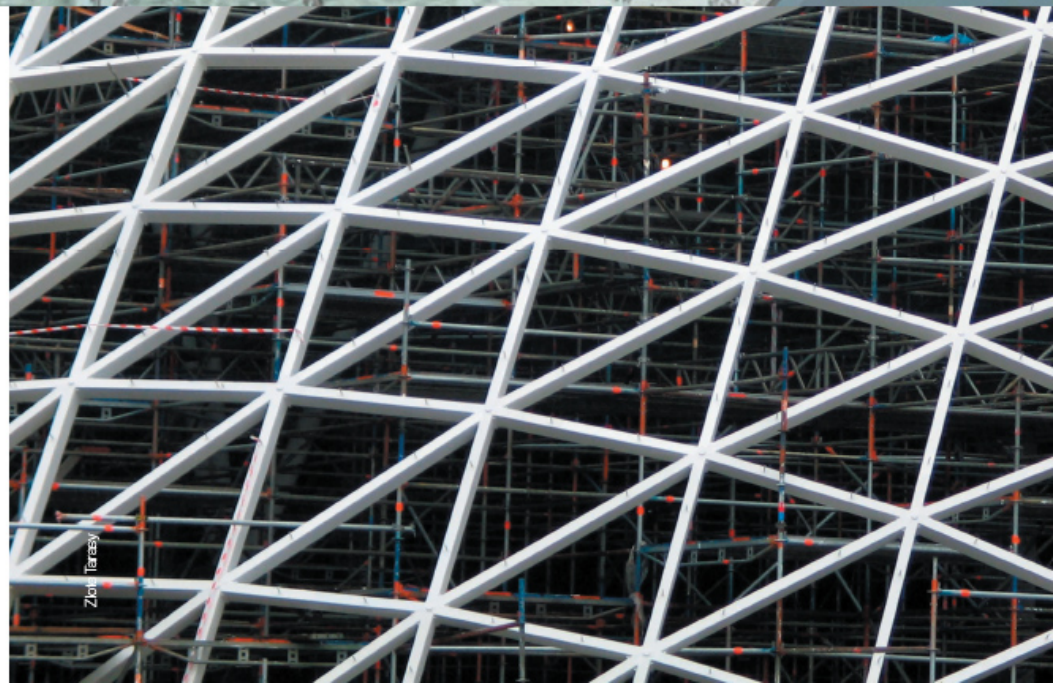












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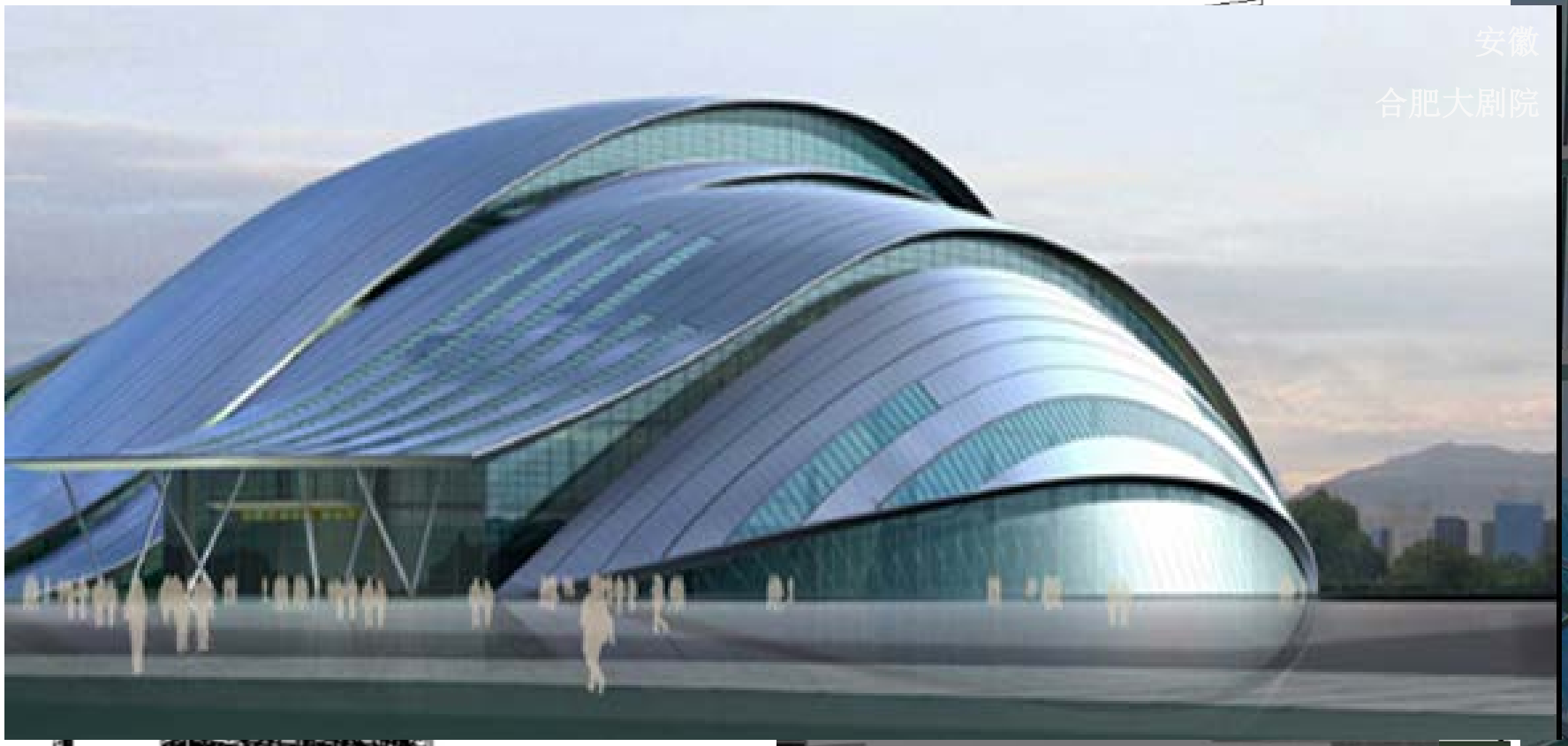
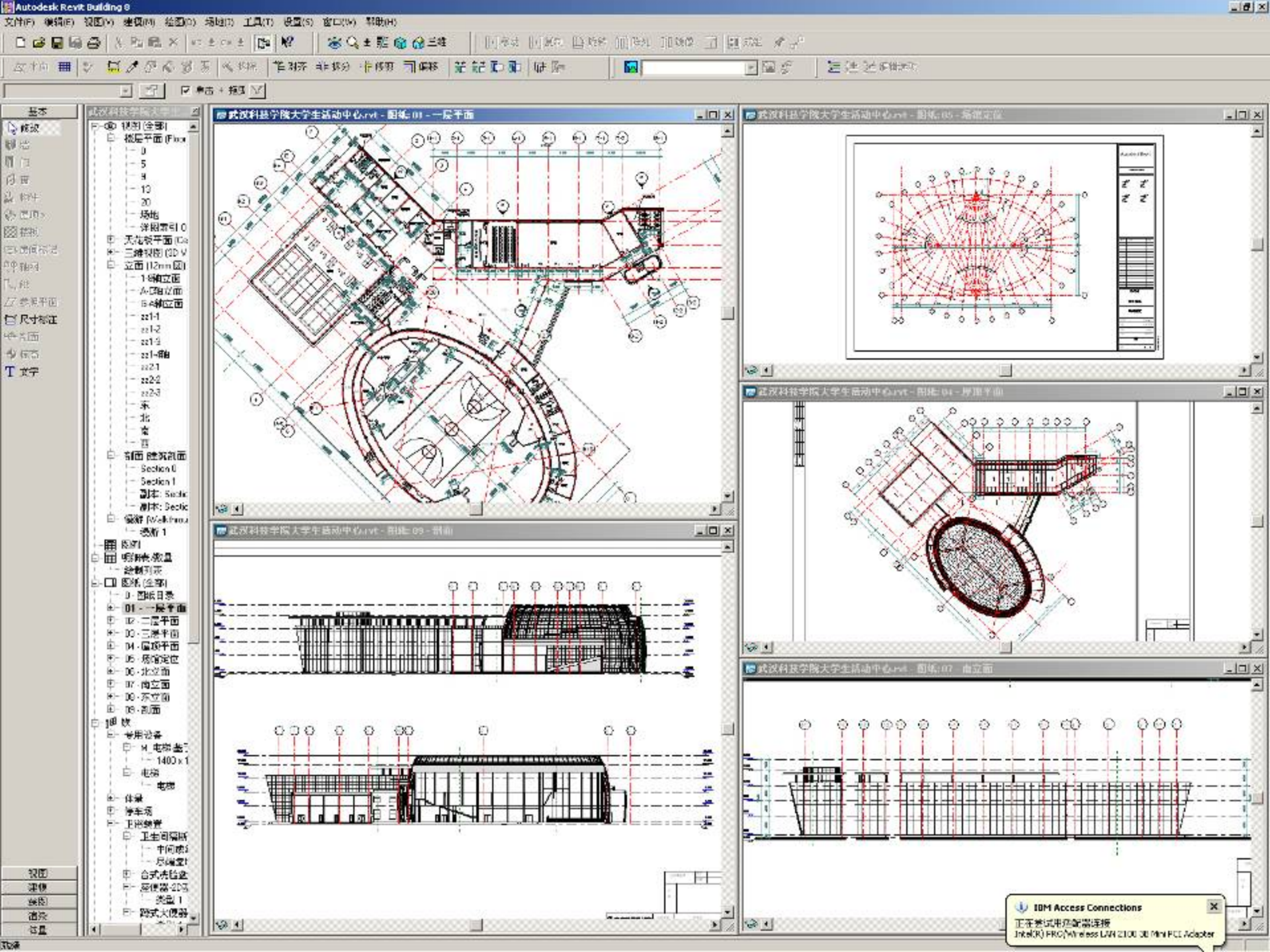
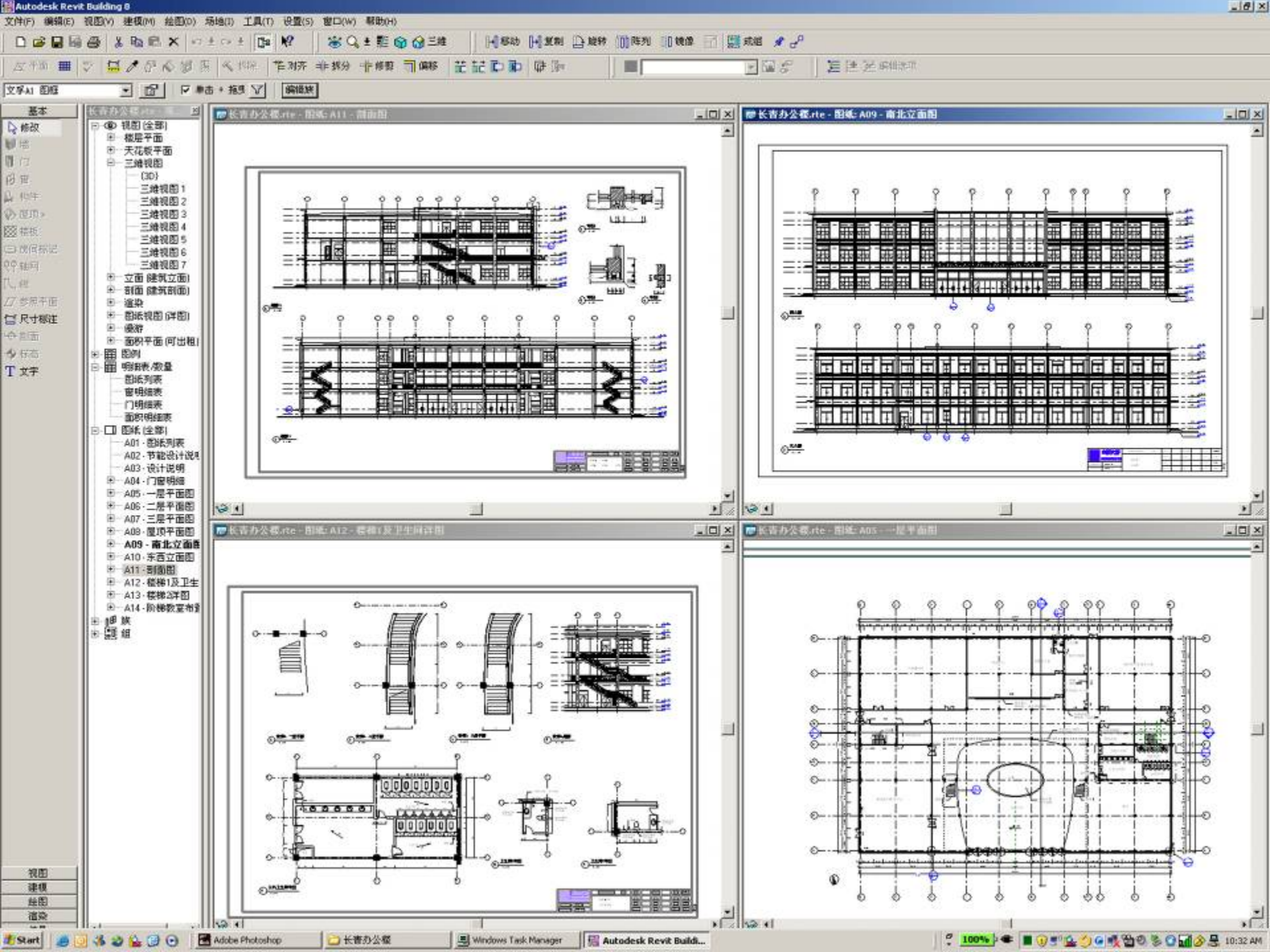



Autodesk Revit Building 9
武汉科技学院大学生活动中心.rvt - 图纸: 01 - 一层平面
IBM Access Connections


Autodesk Revit Building 8
文件(F) 编辑(E) 视图(V) 建模(M) 绘图(D) 场地(I) 工具(T) 设置(S) 窗口(W) 帮助(H)
长青办公楼.rte - 图纸: A11 - 剖面图
长青办公楼.rte - 图纸: A09 - 南北立面图
长青办公楼.rte - 图纸: A12 - 楼梯1及卫生间详图
长青办公楼.rte - 图纸: A05 - 一层平面图
视图(全部)
楼层平面
天花板平面
三维视图
立面 (建筑立面)
剖面 (建筑剖面)
渲染
图纸视图 (详图)
漫游
面积平面 (可出租)
图例
明细表/数量
图纸列表
窗明细表
门明细表
面积明细表
图纸 (全部)
A01 - 图纸列表
A02 - 节能设计说明
A03 - 设计说明
A04 - 门窗明细
A05 - 一层平面图
A06 - 二层平面图
A07 - 三层平面图
A08 - 屋顶平面图
A09 - 南北立面图
A10 - 东西立面图
A11 - 剖面图
A12 - 楼梯1及卫生
A13 - 楼梯2详图
A14 - 阶梯教室布置
族
组
Start
Adobe Photoshop
长青办公楼
Windows Task Manager
Autodesk Revit Buildi...
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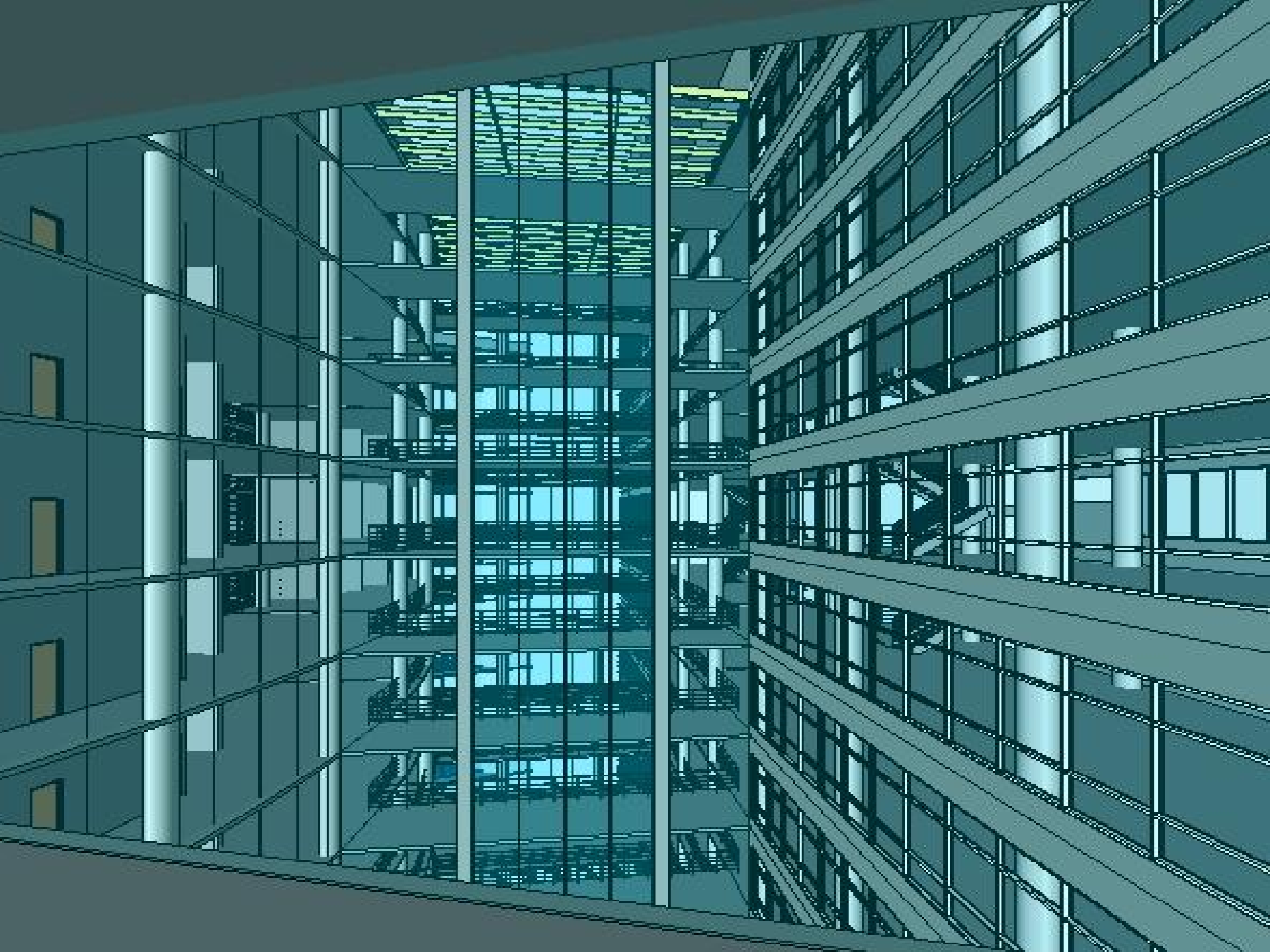
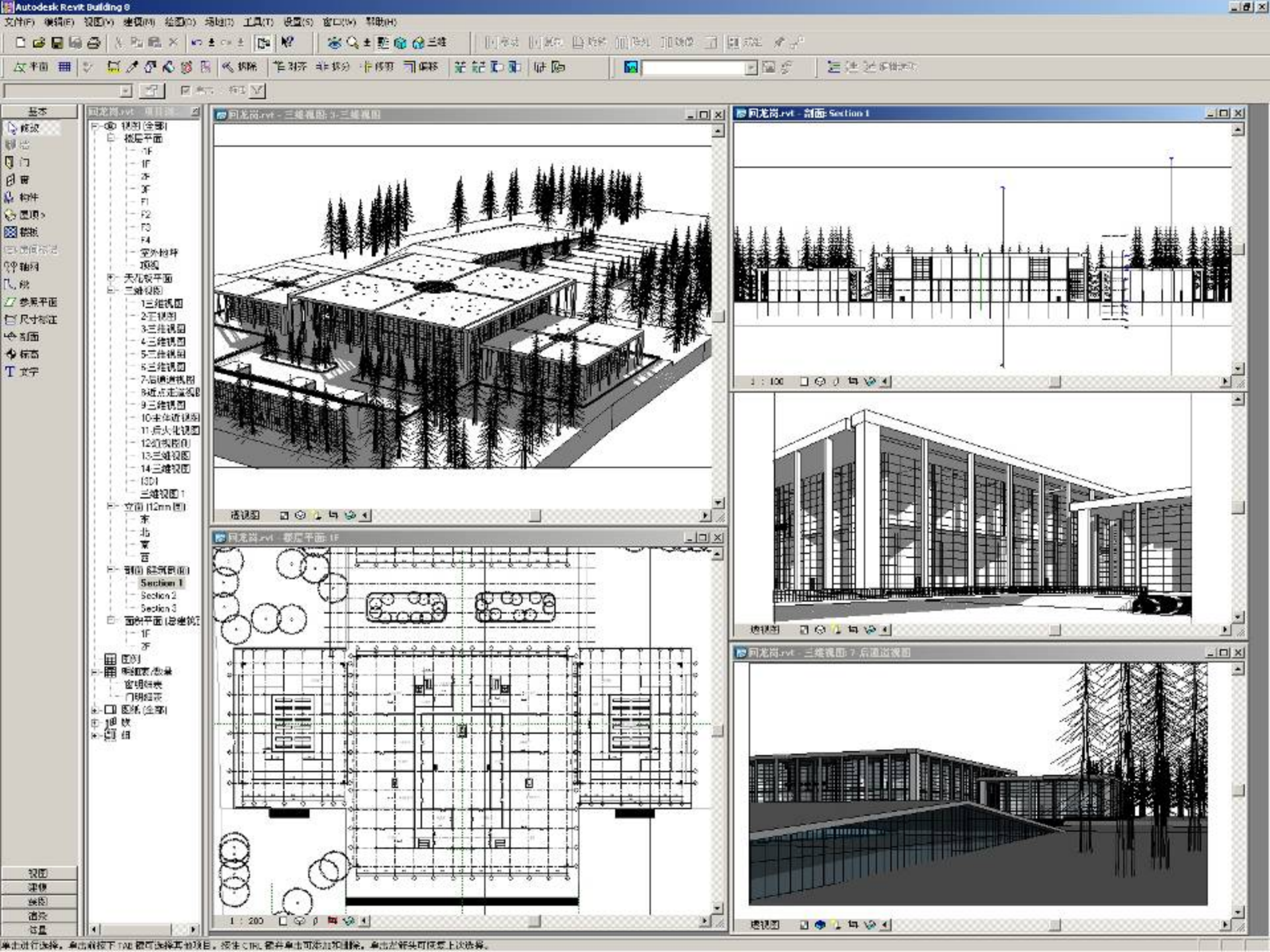
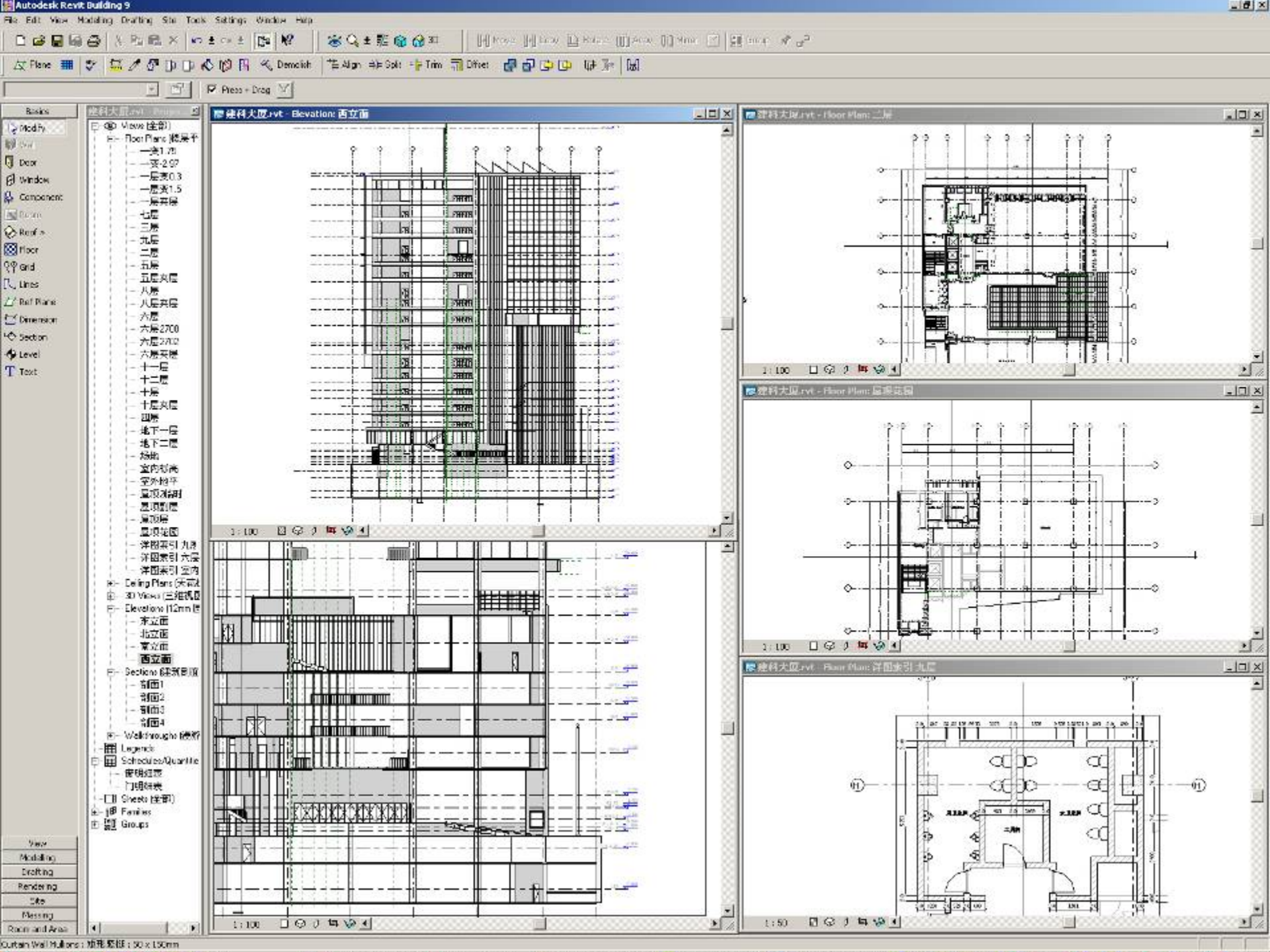
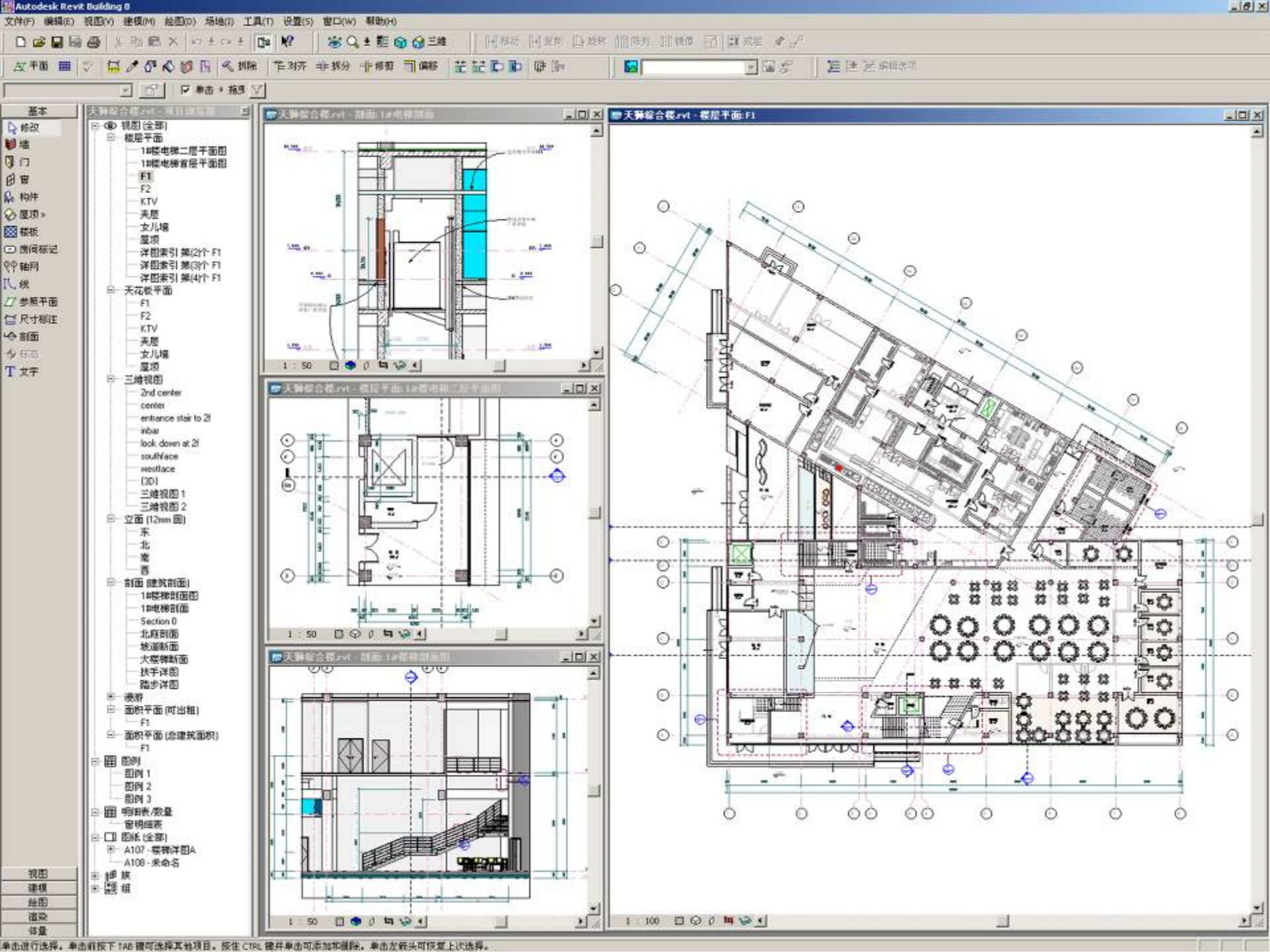
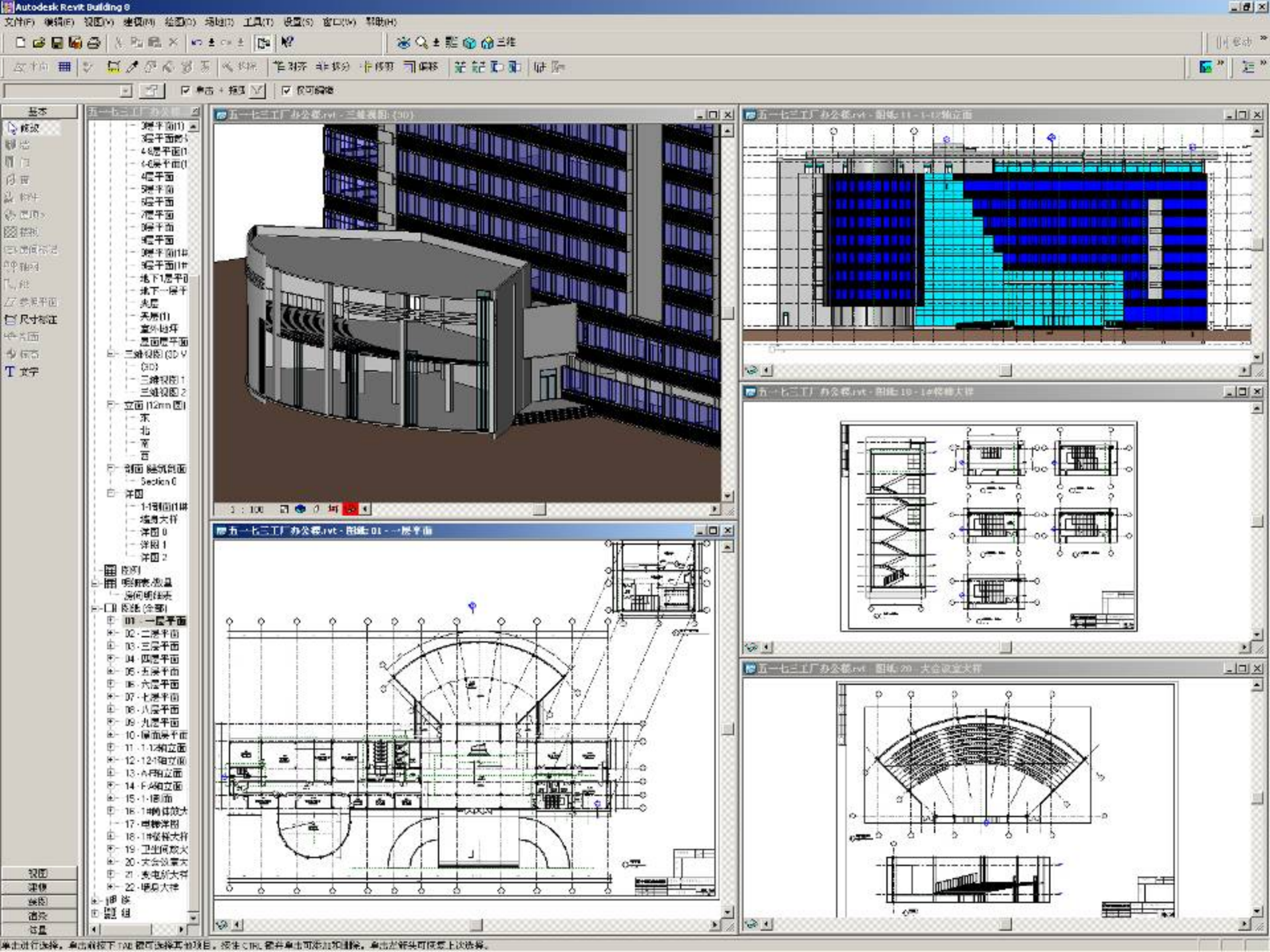
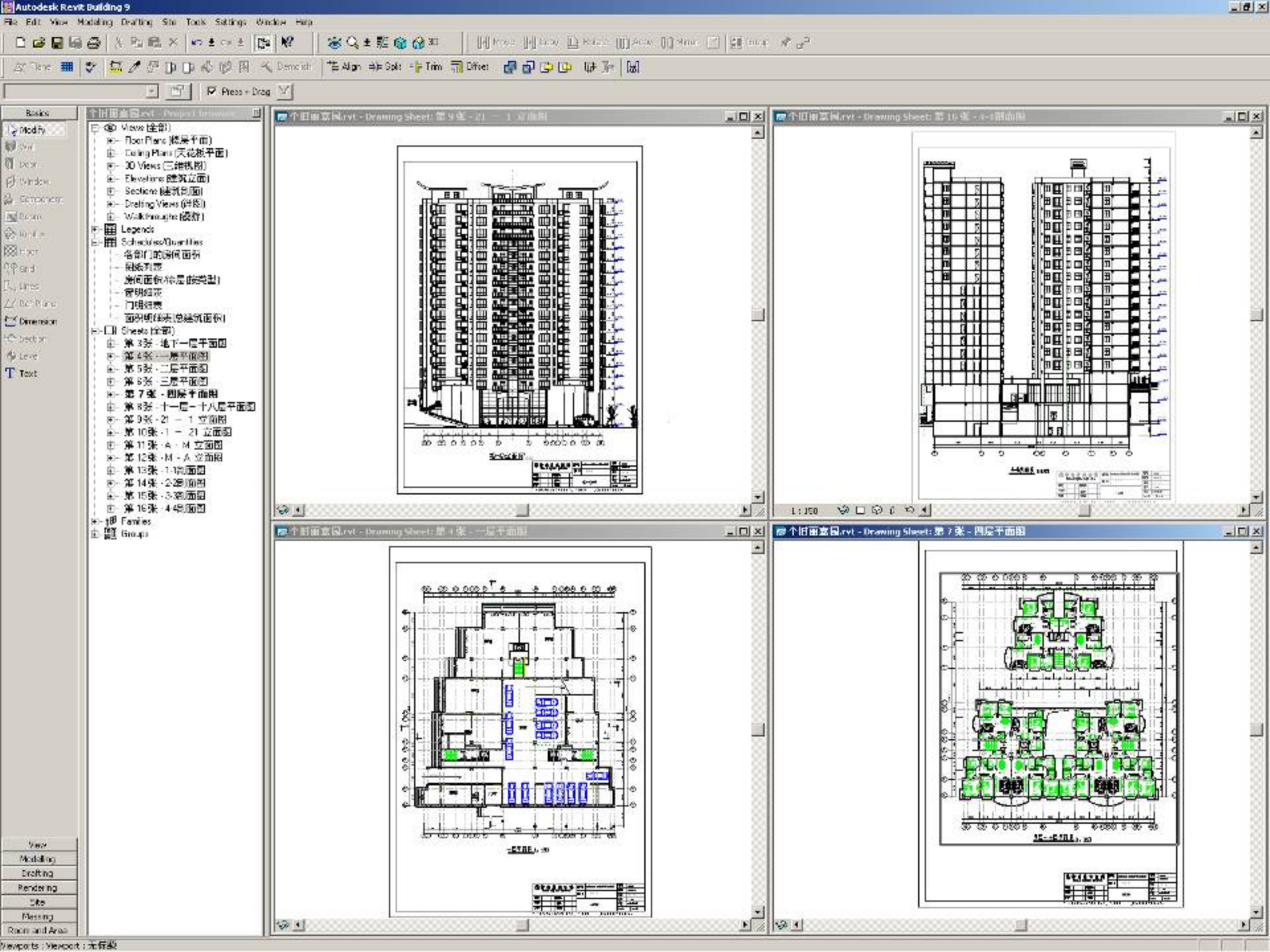


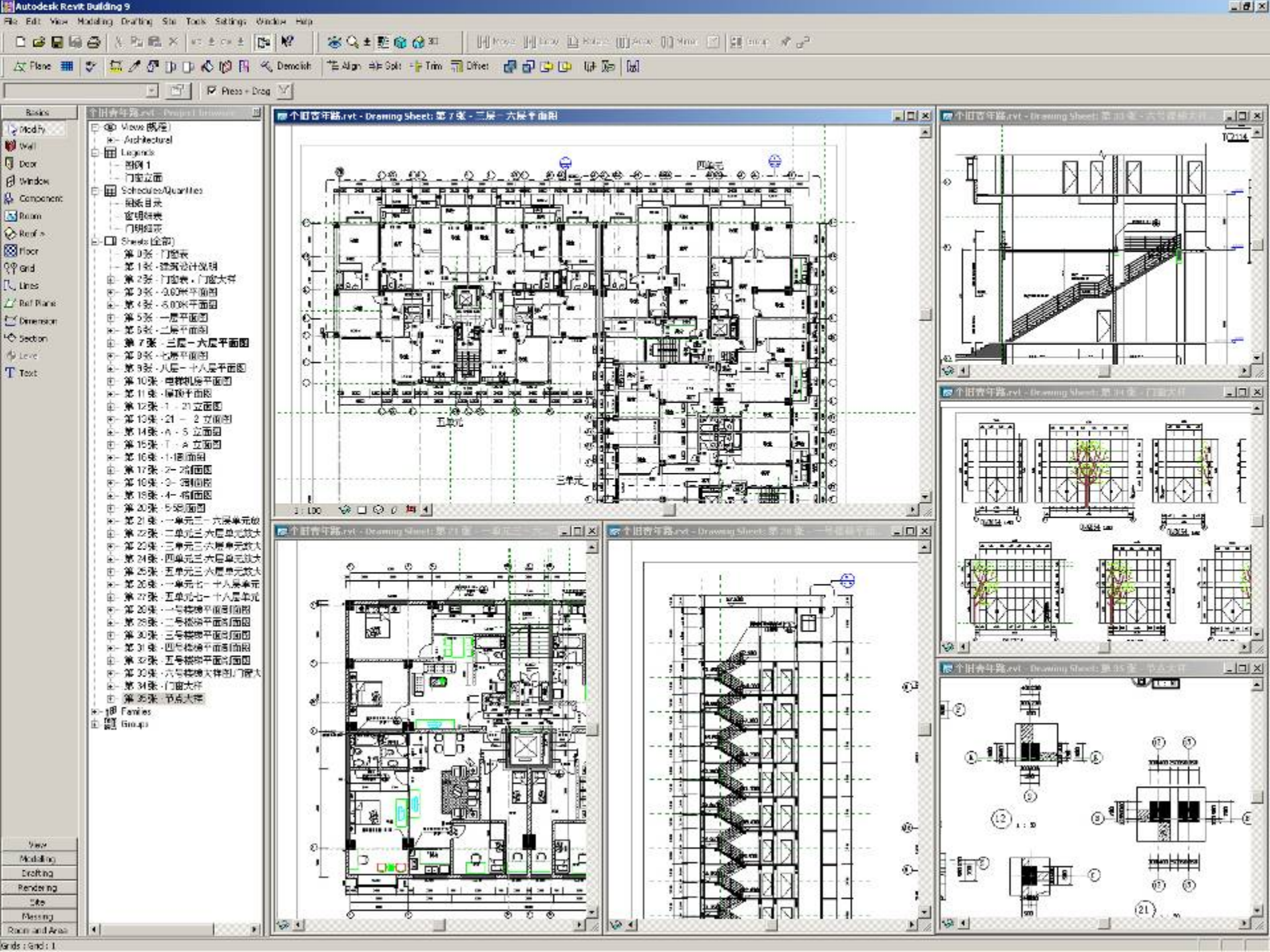

Autodesk Revit Building
同龙岗.rvt - 三维视图: 3-三维视图
同龙岗.rvt - 剖面: Section 1
同龙岗.rvt - 楼层平面: 1F
同龙岗.rvt - 三维视图: 7-后通道视图
Section 1
Section 2
Section 3

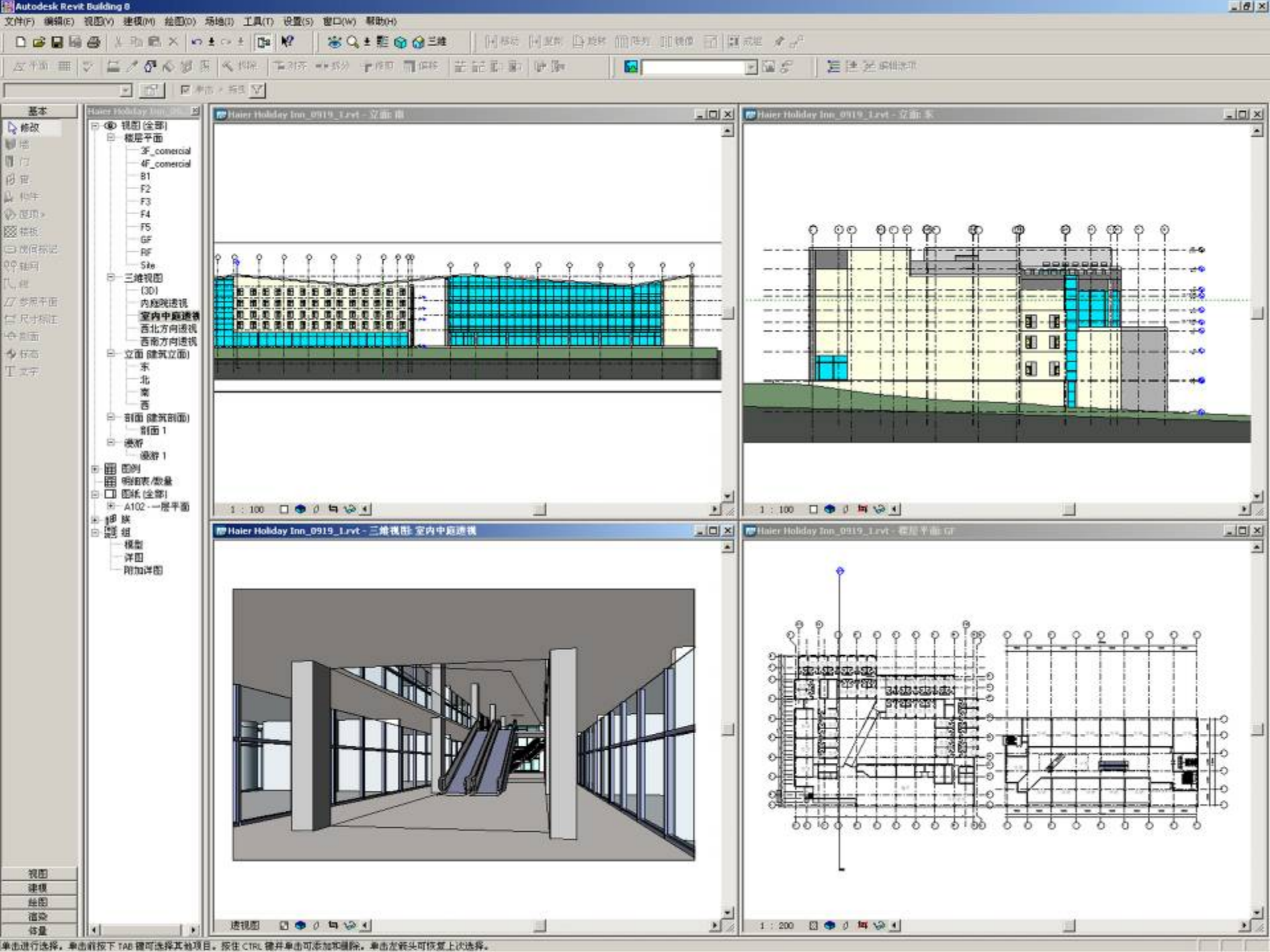

Autodesk Revit Building 9
File Edit View Modeling Drafting Site Tools Settings Window Help
Plane
Demolish
Align
Split
Trim
Offset
Press + Drag
Basics
Modify
Wall
Door
Window
Component
Room
Roof
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text
建科大厦.rvt - Elevation: 西立面
建科大厦.rvt - Floor Plan: 二层
建科大厦.rvt - Floor Plan: 屋顶花园
建科大厦.rvt - Floor Plan: 详图索引 九层
View
Modeling
Drafting
Rendering
Site
Massing
Room and Area
Curtain Wall Mullions : 幕墙竖梃 : 50 x 150mm


Autodesk Revit Building 8
文件(F) 编辑(E) 视图(V) 建模(M) 绘图(D) 场地(I) 工具(T) 设置(S) 窗口(W) 帮助(H)
天狮综合楼.rvt - 楼层平面: F1
视图 (全部)
楼层平面
1#楼电梯二层平面图
1#楼电梯首层平面图
F1
F2
KTV
夹层
女儿墙
屋顶
详图索引 第(2)个 F1
详图索引 第(3)个 F1
详图索引 第(4)个 F1
天花板平面
三维视图
2nd center
center
entrance stair to 2f
inbar
lock down at 2f
southface
westface
{3D}
三维视图 1
三维视图 2
立面 (12mm 圆)
东
北
南
西
剖面 (建筑剖面)
1#楼梯剖面图
1#电梯剖面
Section 0
北庭剖面
坡道剖面
大楼梯剖面
扶手详图
踏步详图
漫游
面积平面 (可出租)
面积平面 (总建筑面积)
图例
图例 1
图例 2
图例 3
明细表/数量
图纸 (全部)
A107 - 楼梯详图A
A108 - 未命名
族
组
1 : 50
1 : 100

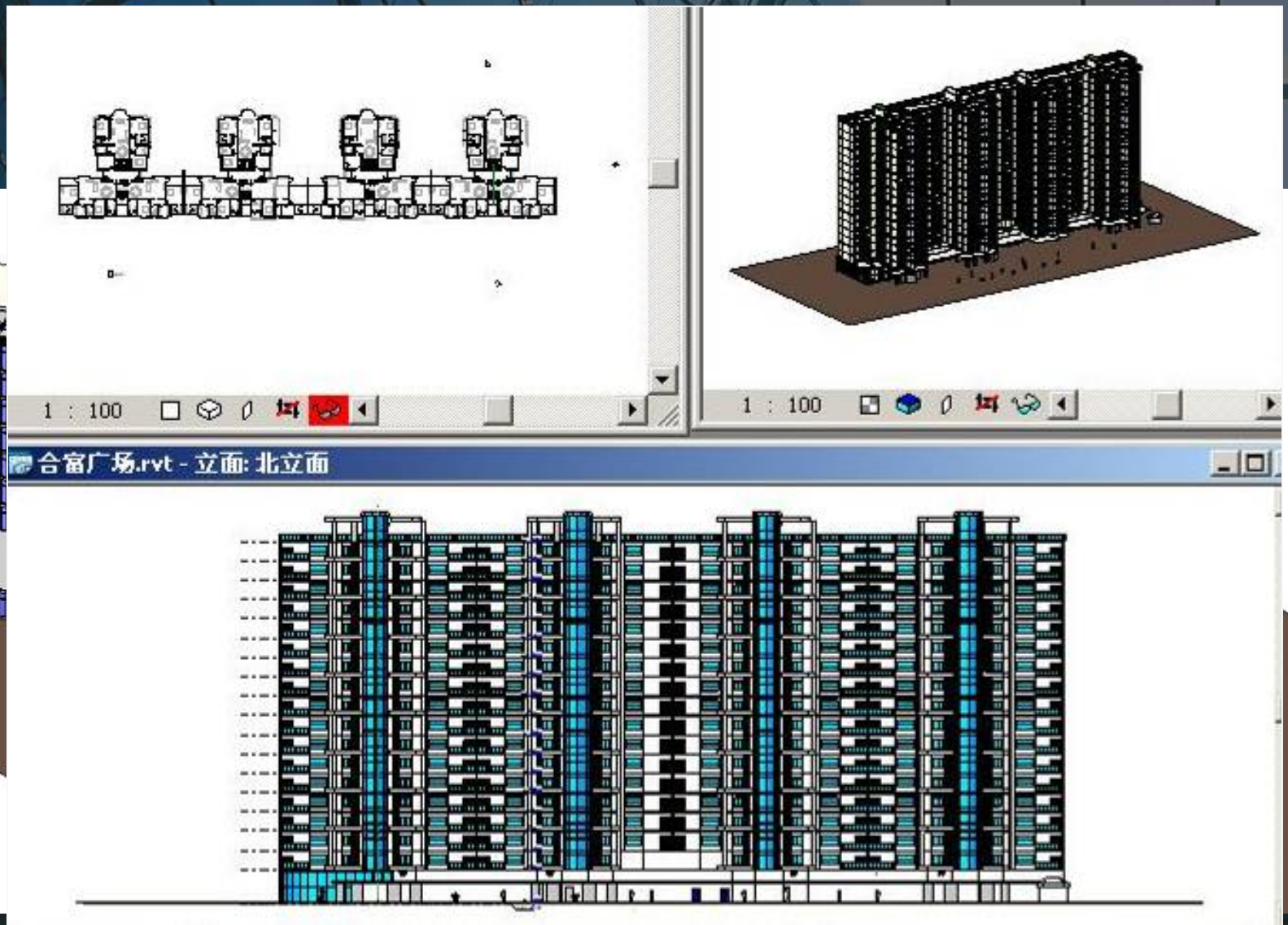

Autodesk Revit Building
五一七三工厂办公楼.rvt - 三维视图: {3D}
五一七三工厂办公楼.rvt - 图纸: 11 - 1-13轴立面
五一七三工厂办公楼.rvt - 图纸: 10 - 1#楼梯大样
五一七三工厂办公楼.rvt - 图纸: 01 - 一层平面
五一七三工厂办公楼.rvt - 图纸: 20 - 大会议室大样


Autodesk Revit Building 9
File Edit View Modeling Drafting Site Tools Settings Window Help
Basics
Modify
Wall
Door
Window
Component
Room
Roof
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text
Project Browser
Views (全部)
Floor Plans (楼层平面)
Ceiling Plans (天花板平面)
3D Views (三维视图)
Elevations (建筑立面)
Sections (建筑剖面)
Drafting Views (详图)
Walkthroughs (漫游)
Legends
Schedules/Quantities
Sheets (全部)
第 3张 - 地下一层平面图
第 4张 - 一层平面图
第 5张 - 二层平面图
第 6张 - 三层平面图
第 7张 - 四层平面图
第 8张 - 十一层－十八层平面图
第 9张 - 21 － 1 立面图
第 10张 - 1 － 21 立面图
第 11张 - A － M 立面图
第 12张 - M － A 立面图
第 13张 - 1-1剖面图
第 14张 - 2-2剖面图
第 15张 - 3-3剖面图
第 16张 - 4-4剖面图
Families
Groups
View
Modeling
Drafting
Rendering
Site
Massing
Room and Area
Viewports : Viewport : 未保存


Autodesk Revit Building 9
File Edit View Modeling Drafting Site Tools Settings Window Help
Plane
Demolish
Align
Split
Trim
Offset
Press + Drag
Basics
Modify
Wall
Door
Window
Component
Room
Roof
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text
Views (概览)
Architectural
Legends
Schedules/Quantities
Sheets (全部)
Families
Groups
View
Modeling
Drafting
Rendering
Site
Massing
Room and Area
Grids : Grid : 1

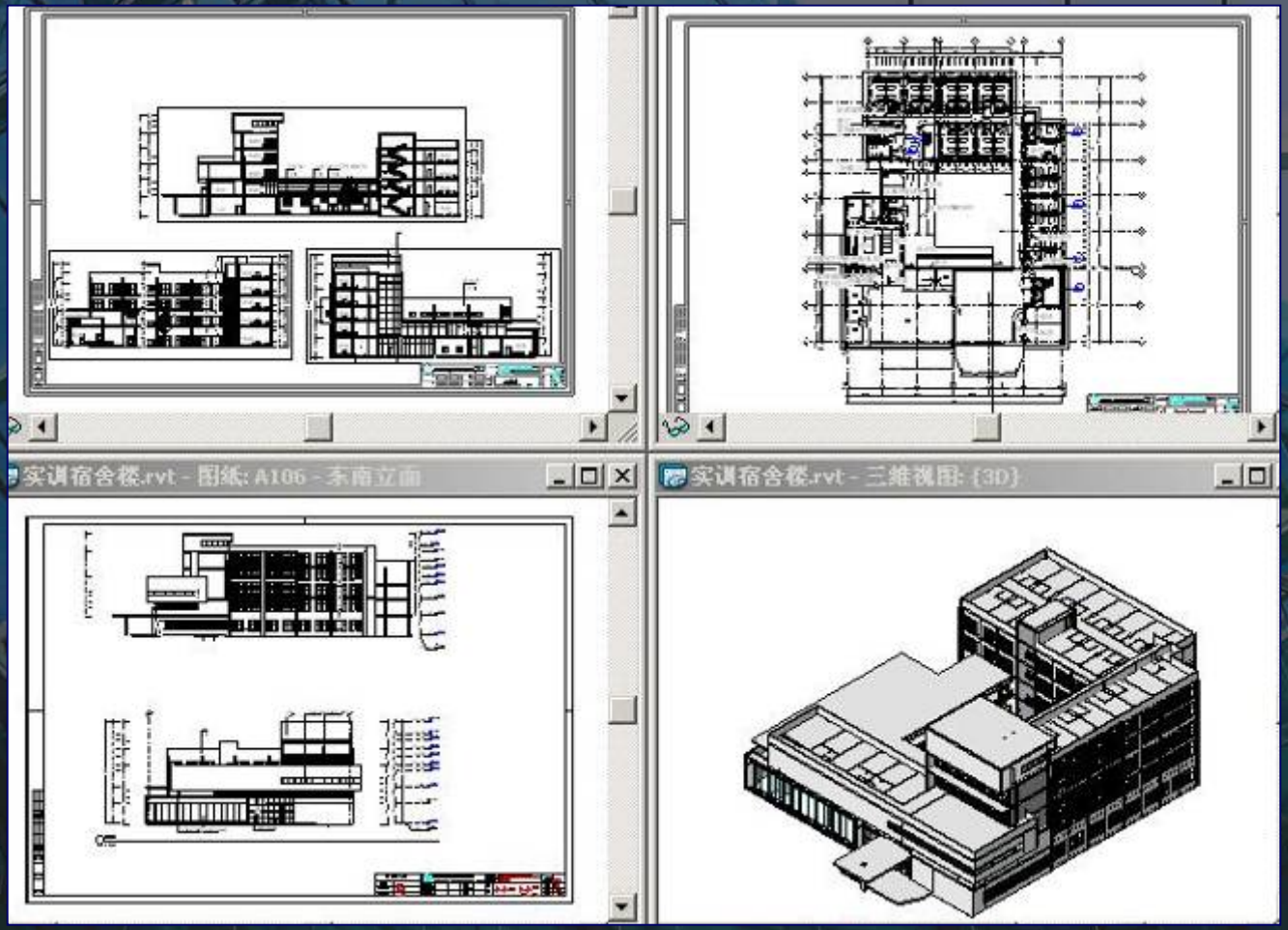

Autodesk Revit Building 8
文件(F) 编辑(E) 视图(V) 建模(M) 绘图(D) 场地(I) 工具(T) 设置(S) 窗口(W) 帮助(H)
基本
修改
视图 (全部)
楼层平面
3F_comercial
4F_comercial
B1
F2
F3
F4
F5
GF
RF
Site
三维视图
{3D}
内庭院透视
室内中庭透视
西北方向透视
西南方向透视
立面 (建筑立面)
东
北
南
西
剖面 (建筑剖面)
剖面 1
楼梯
楼梯 1
图例
明细表/数量
图纸 (全部)
A102 - 一层平面
族
组
模型
详图
附加详图
视图
建模
绘图
渲染
体量
Haier Holiday Inn_0919_1.rvt - 立面: 南
Haier Holiday Inn_0919_1.rvt - 立面: 东
Haier Holiday Inn_0919_1.rvt - 三维视图: 室内中庭透视
Haier Holiday Inn_0919_1.rvt - 楼层平面: GF
1 : 100
1 : 100
透视图
1 : 200
单击进行选择。单击前按下 TAB 键可选择其他项目。按住 CTRL 键并单击可添加和删除。单击左箭头可恢复上次选择。

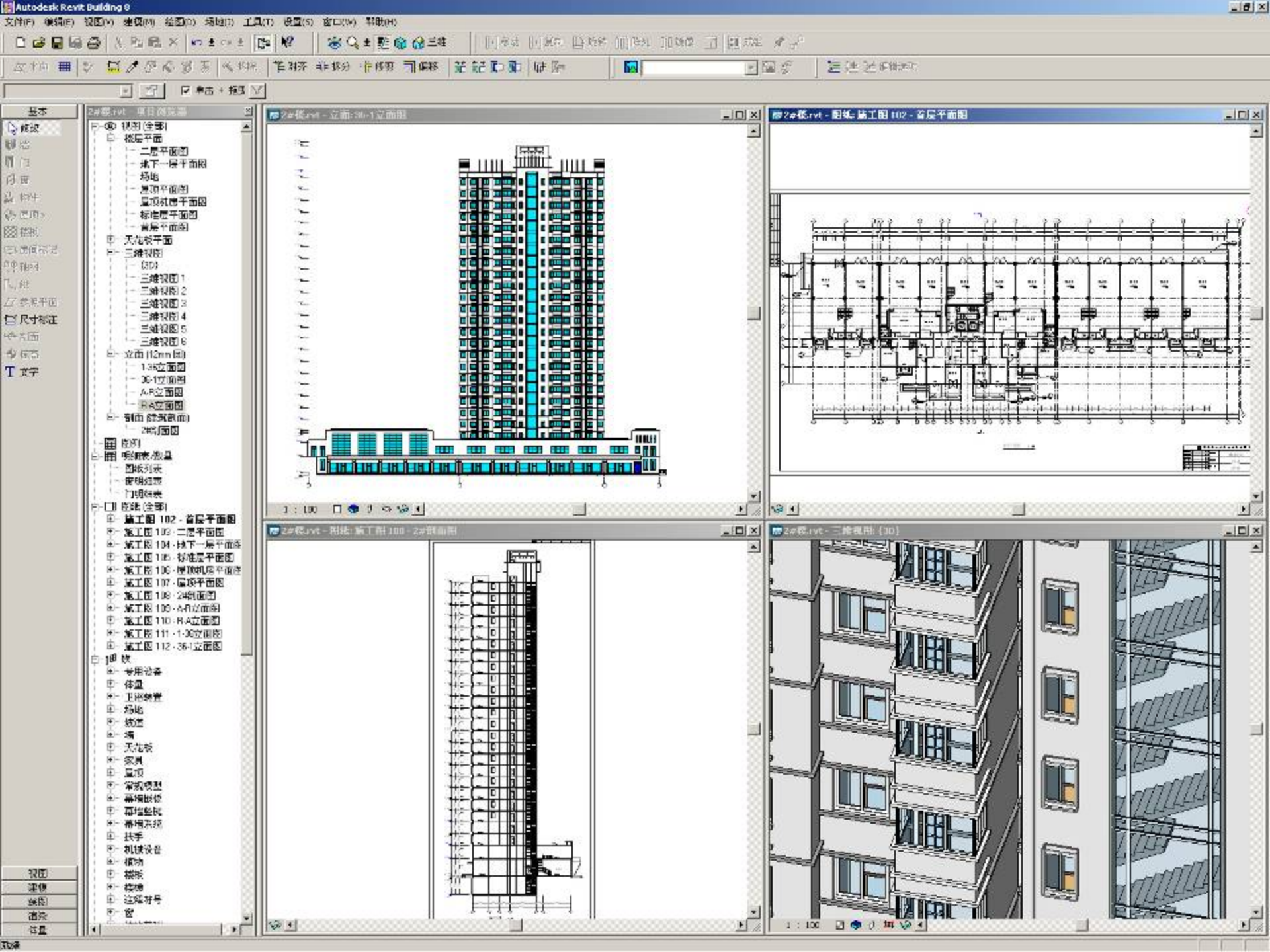
广东省建筑设计研究院 建筑师：郑凯帆

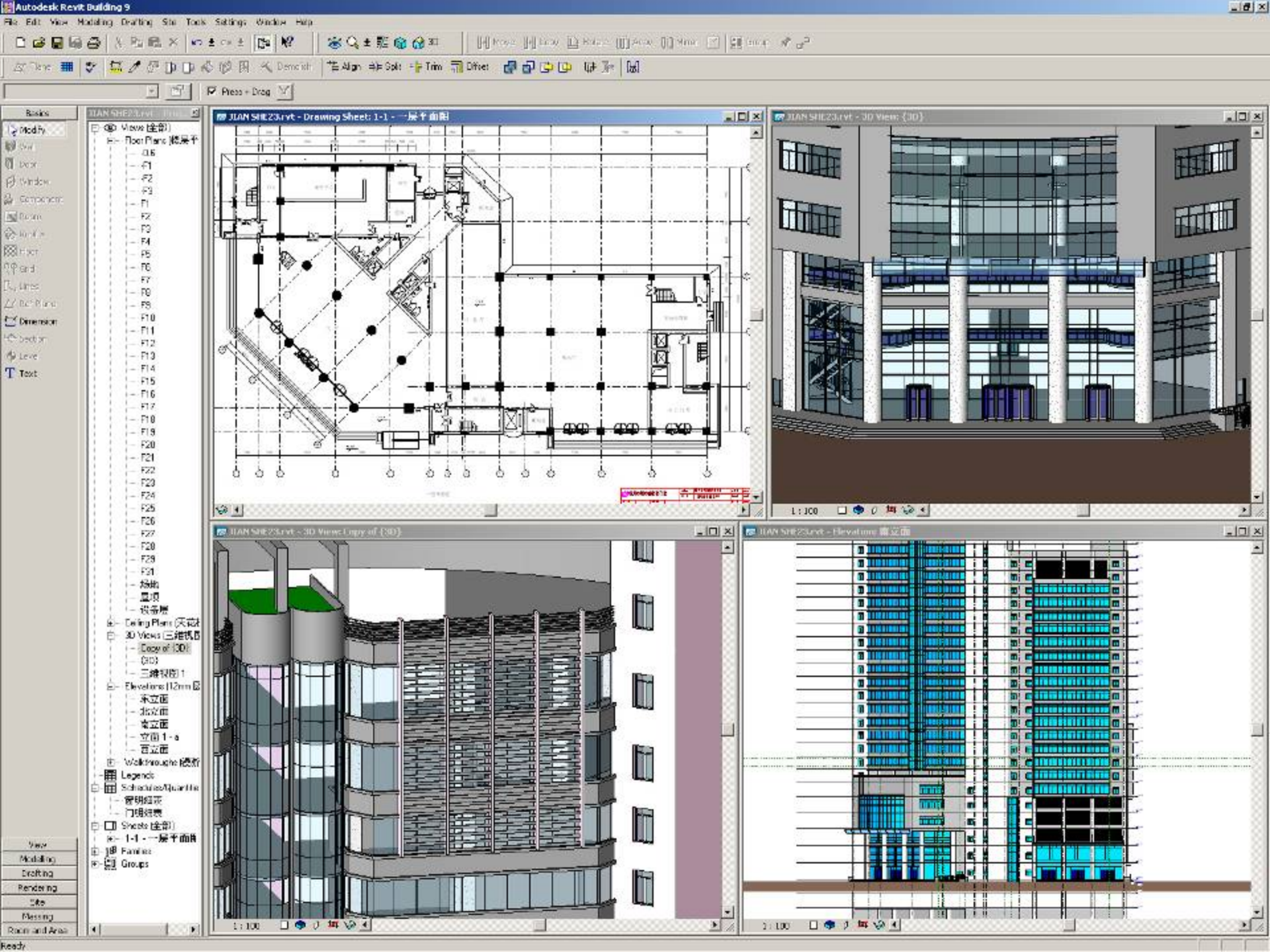


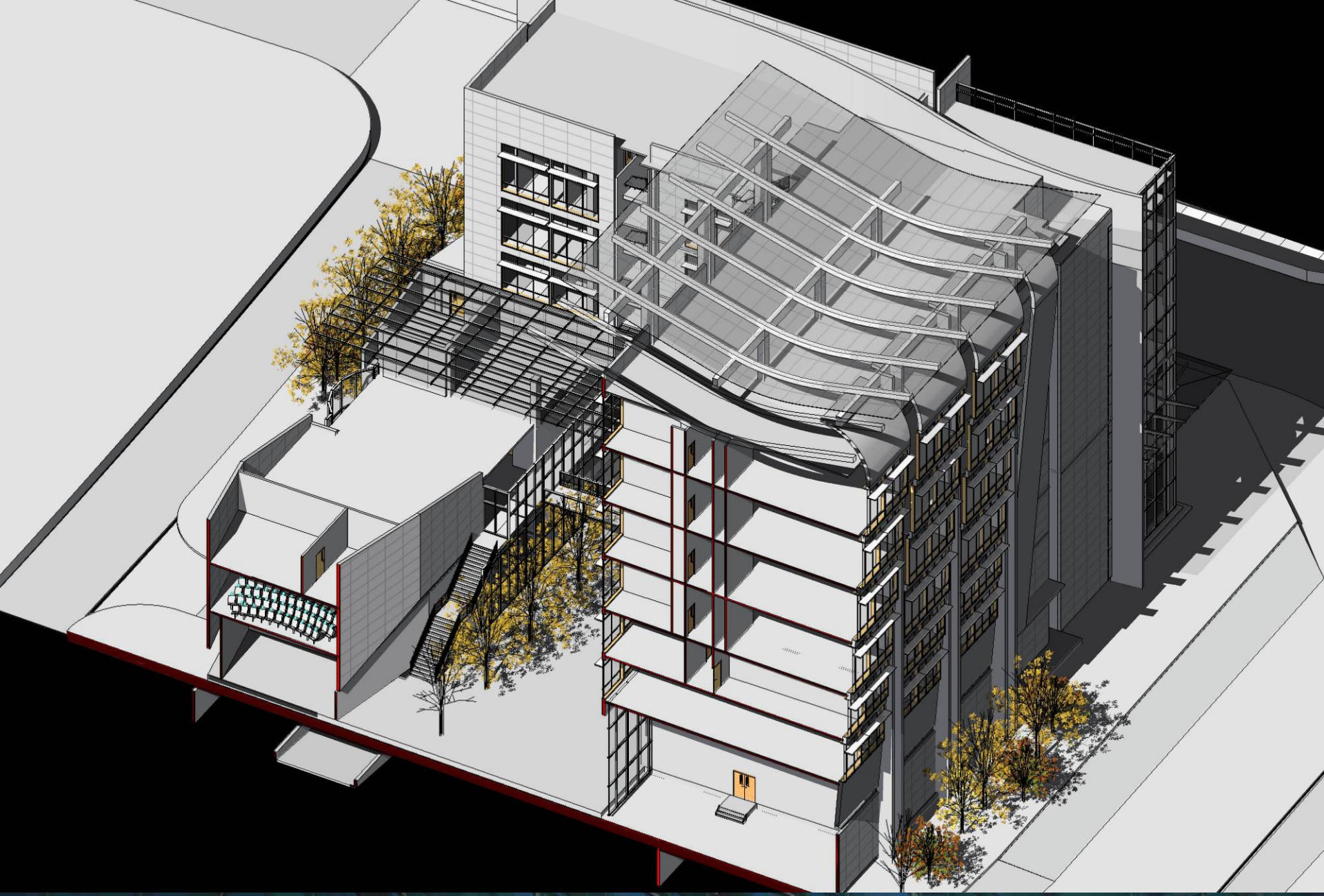
盛邦（上海）咨询有限公司成都分公司 建筑师：许 燕

- 中国民航飞行学院模拟机训练中心



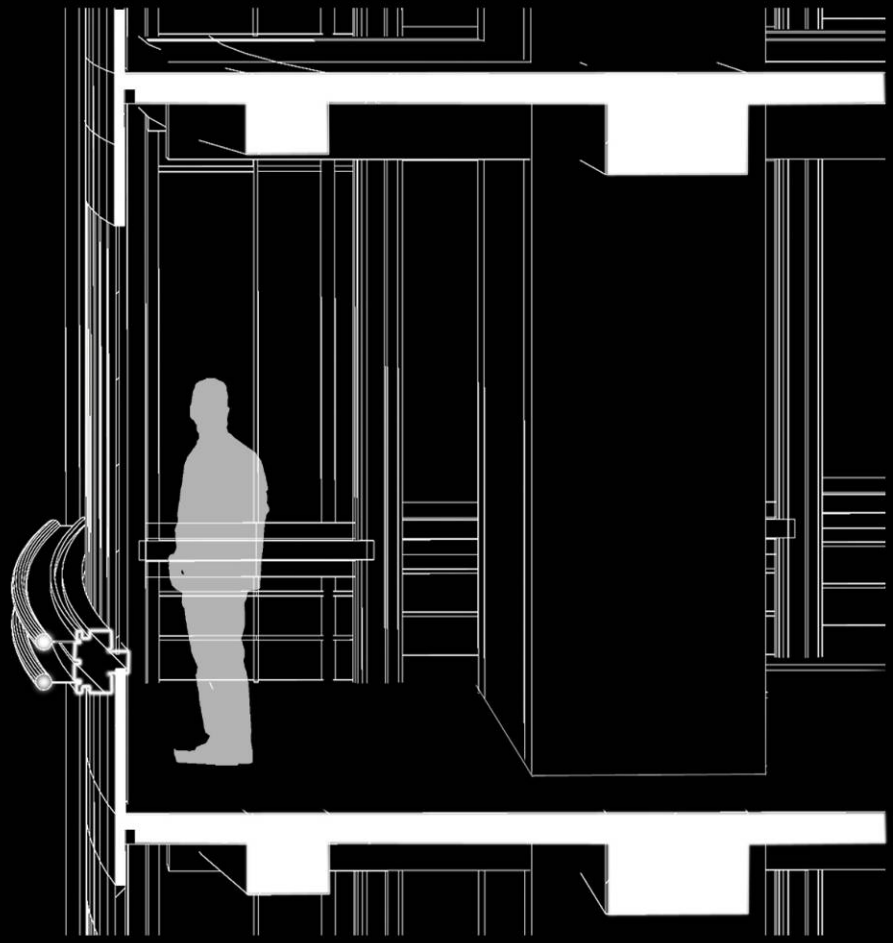

Autodesk Revit Building 8
文件(F) 编辑(E) 视图(V) 建模(M) 绘图(D) 场地(T) 工具(T) 设置(S) 窗口(W) 帮助(H)
基本
视图
详图
图纸
族
连接
设置
2#楼.rvt - 项目浏览器
视图 (全部)
楼层平面
二层平面图
地下一层平面图
场地
屋顶平面图
屋顶机房平面图
标准层平面图
首层平面图
无光板平面
三维视图
{3D}
三维视图 1
三维视图 2
三维视图 3
三维视图 4
三维视图 5
三维视图 6
立面 (12mm图)
1-36立面图
36-1立面图
A-F立面图
F-A立面图
剖面 (建筑剖面)
2#剖面图
图例
明细表/数量
图纸列表
窗明细表
门明细表
图纸 (全部)
施工图 102 - 首层平面图
施工图 103 - 二层平面图
施工图 104 - 地下一层平面图
施工图 105 - 标准层平面图
施工图 106 - 屋顶机房平面图
施工图 107 - 屋顶平面图
施工图 108 - 2#剖面图
施工图 109 - A-F立面图
施工图 110 - F-A立面图
施工图 111 - 1-36立面图
施工图 112 - 36-1立面图
族
专用设备
体量
卫浴装置
场地
楼梯
墙
无光板
家具
屋顶
常规模型
幕墙嵌板
幕墙竖梃
幕墙系统
扶手
机械设备
植物
楼板
结构基础
注释符号
窗
2#楼.rvt - 立面: 36-1立面图
2#楼.rvt - 图纸: 施工图 102 - 首层平面图
2#楼.rvt - 图纸: 施工图 108 - 2#剖面图
2#楼.rvt - 三维视图: {3D}
1 : 100


Autodesk Revit Building 9
File Edit View Modeling Drafting Site Tools Settings Window Help
Basics
Modify
Wall
Door
Window
Component
Room
Roof
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text
JIAN SHE23.rvt - Drawing Sheet: 1-1 - 一层平面图
JIAN SHE23.rvt - 3D View: {3D}
JIAN SHE23.rvt - 3D View: Copy of {3D}
JIAN SHE23.rvt - Elevations: 南立面
Views (全部)
Floor Plans 楼层平
Ceiling Plans 天花
3D Views 三维视图
Copy of {3D}
{3D}
三维视图 1
Elevations (12mm
东立面
北立面
西立面
立面 1 - a
南立面
Walkthroughs 漫游
Legends
Schedules/Quantities
管线明细表
门明细表
Sheets (全部)
1-1 - 一层平面图
Families
Groups
View
Modeling
Drafting
Rendering
Site
Massing
Room and Area
Ready



廣州辦公室項目

FAÇADE DESIGN and CO-ORDINATION



廣州辦公室項目

FAÇADE DESIGN and CO-ORDINATION

"GIS is the inevitable language of the future." -- Jack Dangermond

SOM To Buy 100 Copies of Gehry Technologies' Digital Project

Posted on Wednesday, December 13, 2006 9:03 PM

Skidmore, Owings & Merrill (SOM), one of the world's best known architecture firms, will purchase 100 copies of Digital Project, the parametric BIM software from Gehry Technology. The sales is the largest single deal since Gehry Partners launched the software development venture in 2002.

The purchases will be deployed over a three-year period in SOM offices worldwide. The acquistion is being considered an addition to SOM's technology portfolio, not a displacement of any other software system.

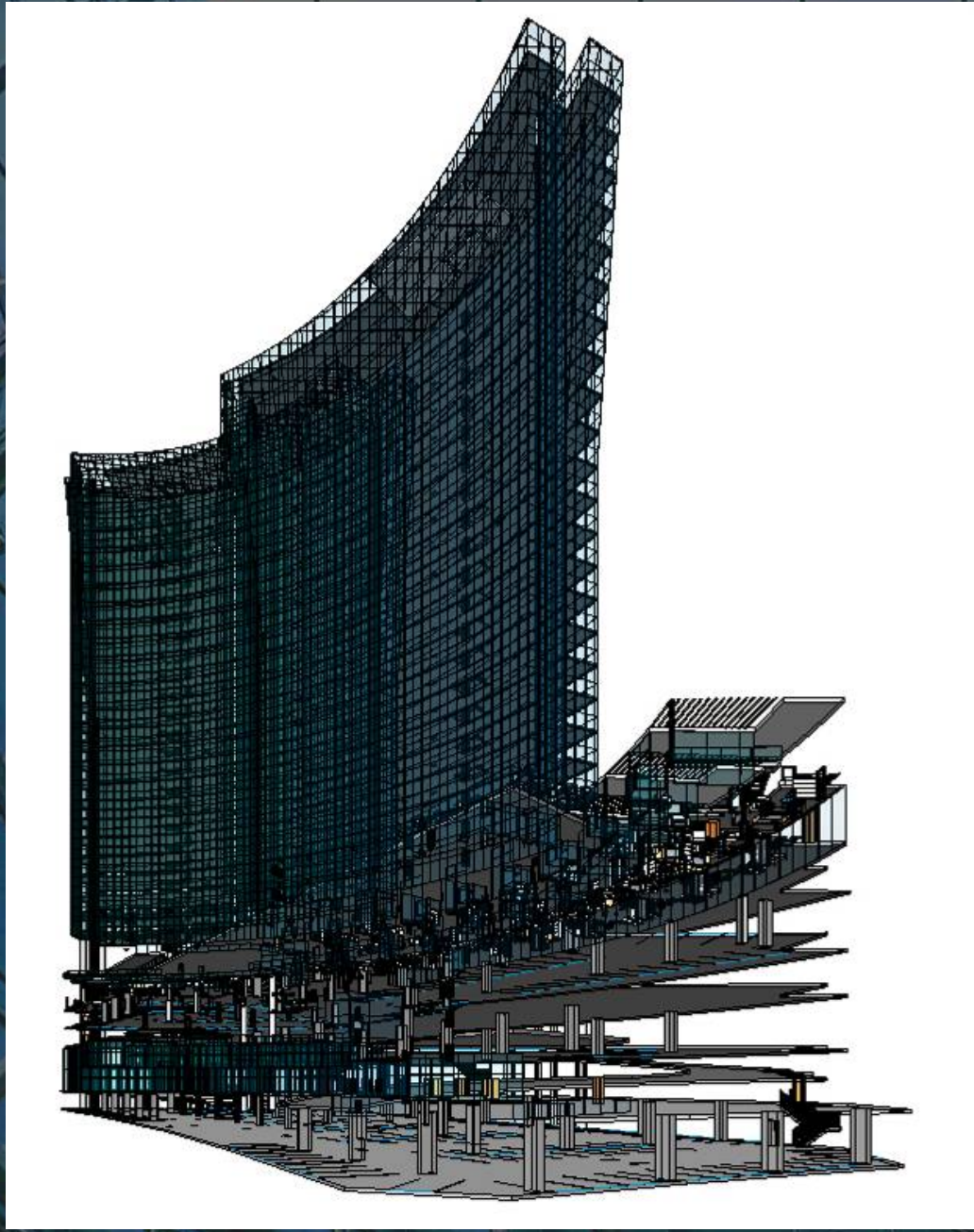
Digital Project has been used by boutique architectural firms on several high-profile projects, and has found some acceptance among large construction firms who find value in developing their own project model. But despite the cachet of coming from the offices of noted architect Frank Gehry, the software has been slow to develop a following.

SOM will use Digital Project on a wide variety of design projects throughout its offices in New York, Chicago, San Francisco, and London, says Darren Rizza, SOM' s Firmwide Director of Digital Design. "Digital Project will provide us with a powerful design technology, augmenting our overall vision of the digital design process, and maintaining SOM' s position as an industry leader and innovator in design and construction. "

Gehry Technologies will provide consulting services and support to SOM during the three-year implementation, to include services for training, implementation, and advanced modeling. "We are delighted to have been selected by SOM to provide advanced software and support services to their design teams, " commented Dr. Dennis Shelden, CTO of Gehry Technologies, "SOM has long been a leader in the use of CAD and Building Information Modeling (BIM), and this acquisition will enable them to remain at the forefront for many years to come. "

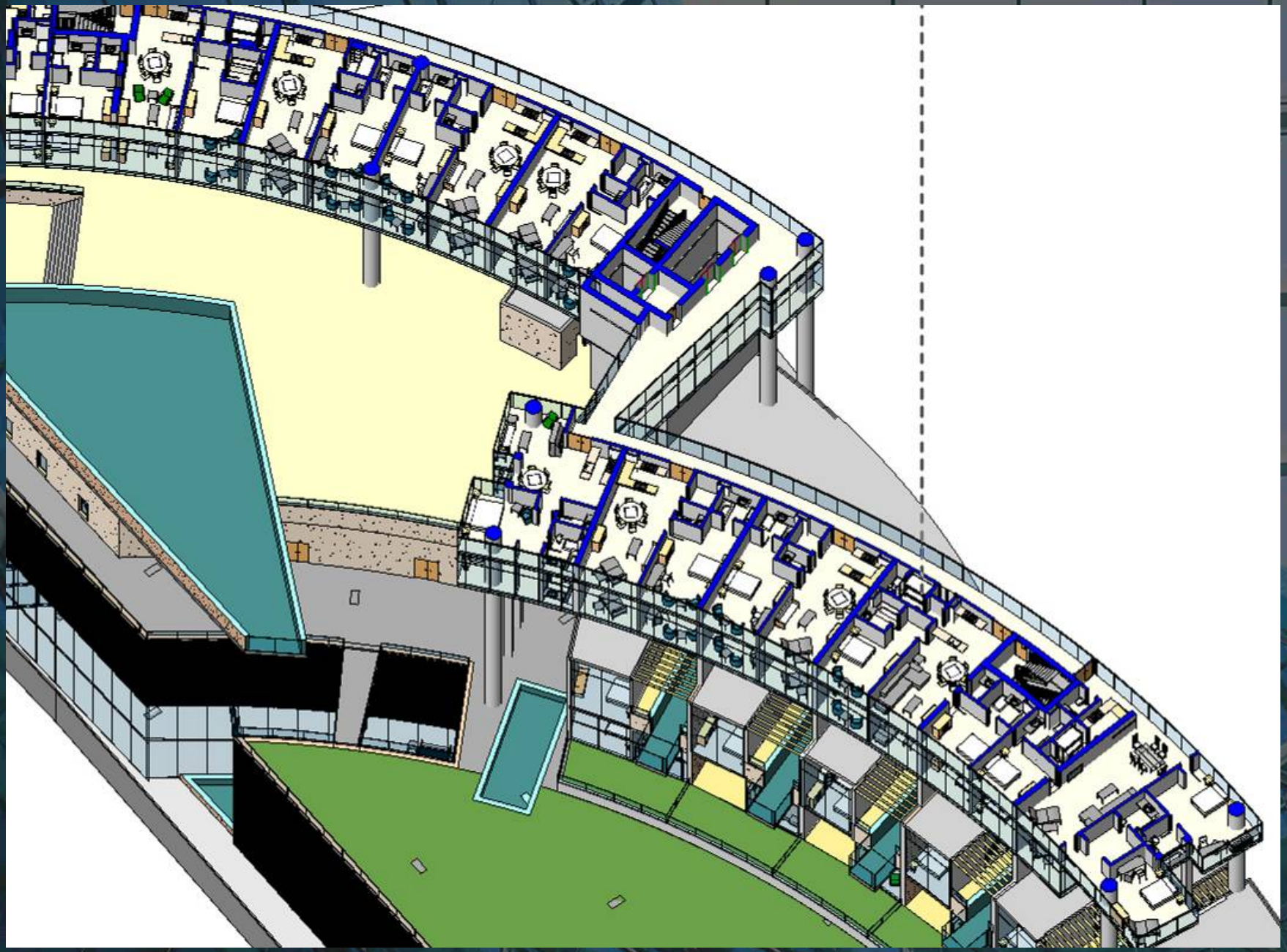
Digital Project is a customized version of CATIA, the 3D parametric CAD software from Dassault Systèmes. It is primarily used by aerospace and automotive firms.

--RSN



中東酒店項目

HORIZONTAL REPETITION / MODULARIZATION

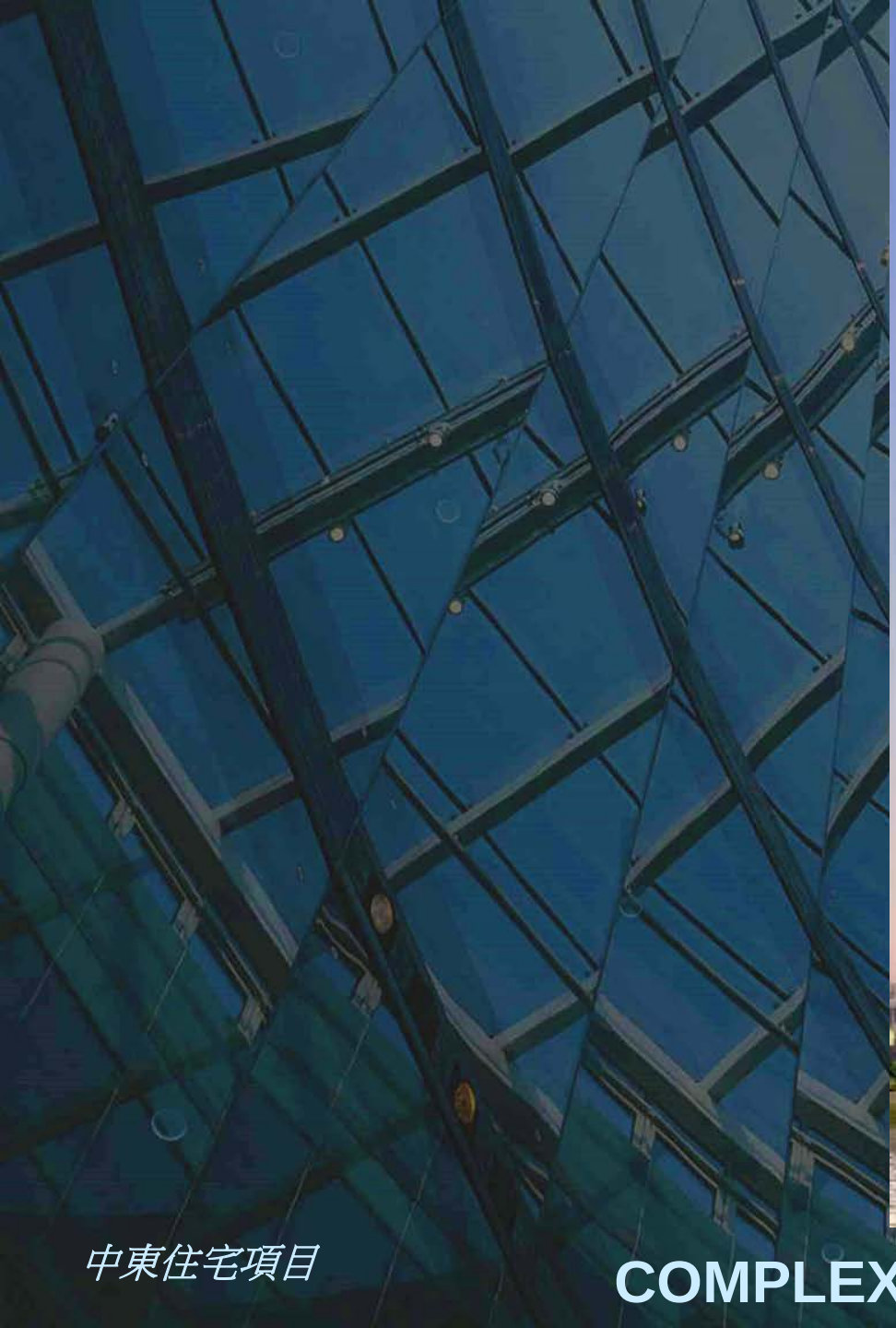


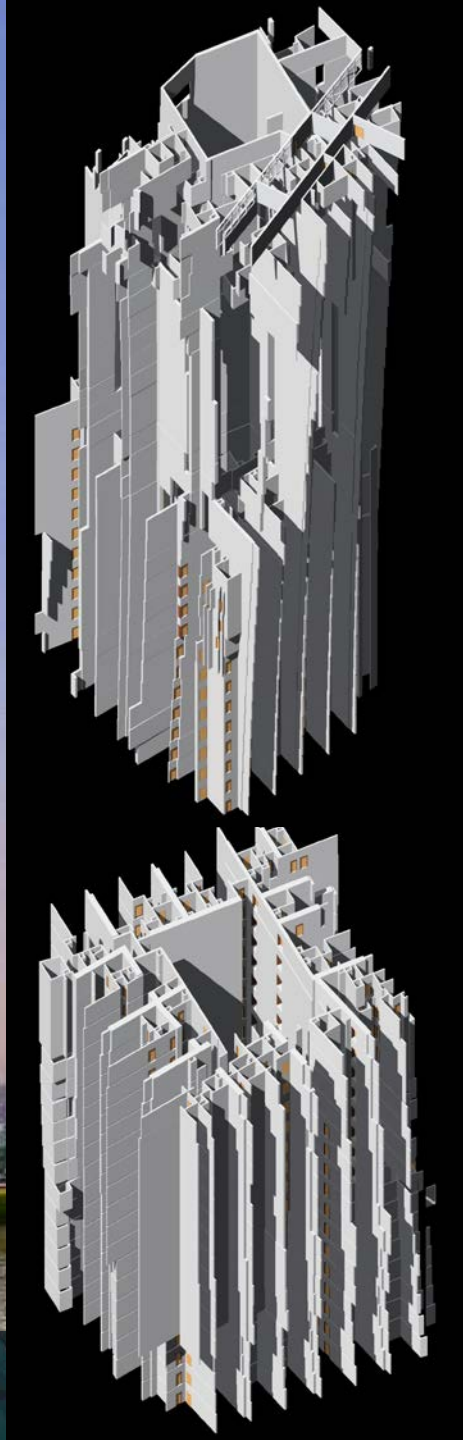
中東酒店項目

MODULAR DESIGN

Program **Residential** Site Area **3,746 sqm**
Floor Area 858,855 sqm Building Height **304 m**

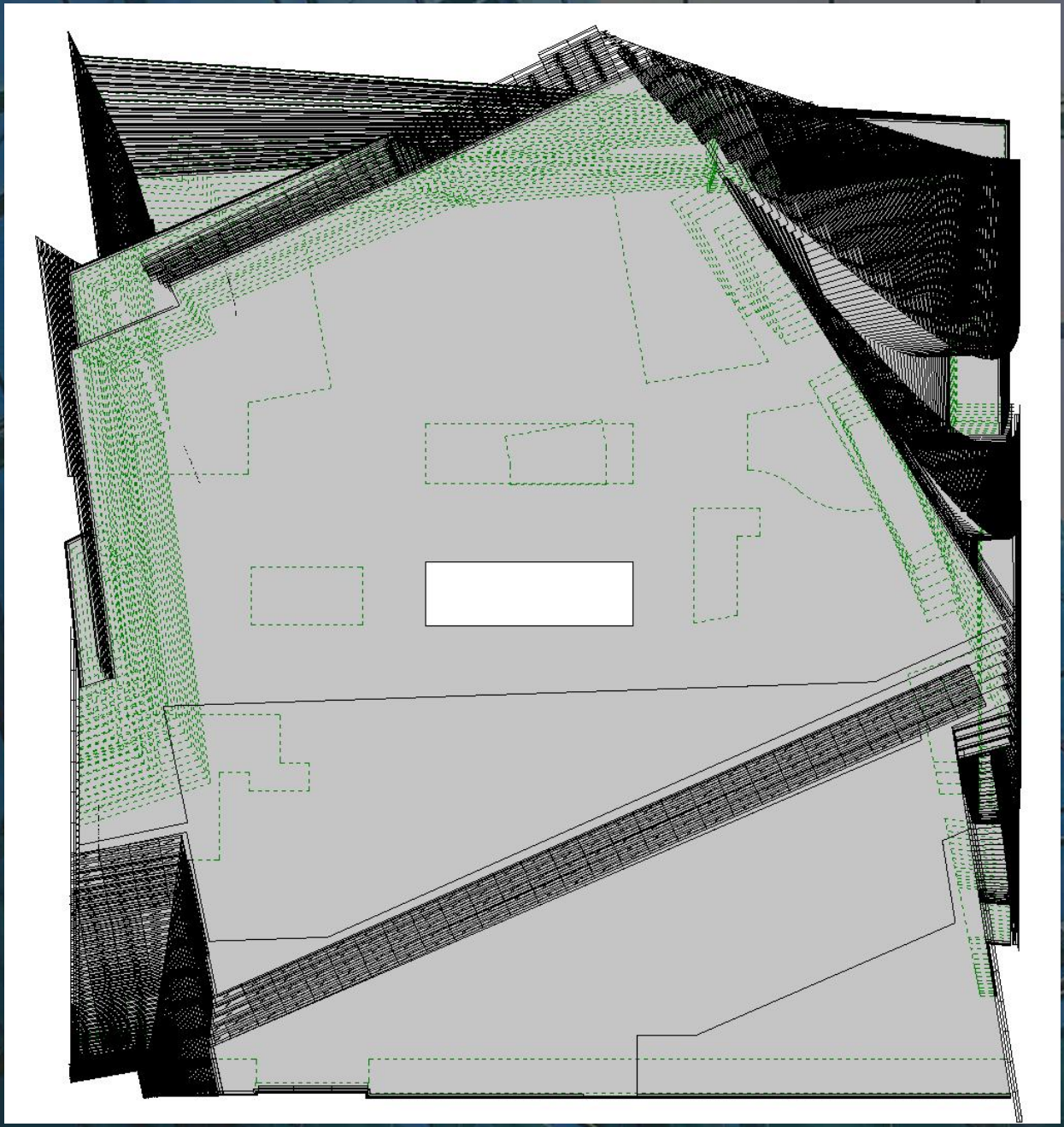
Dubai **Ocean Heights One**

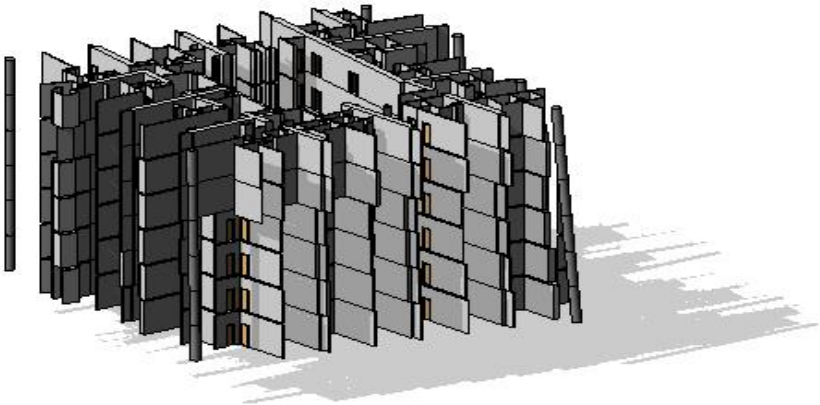


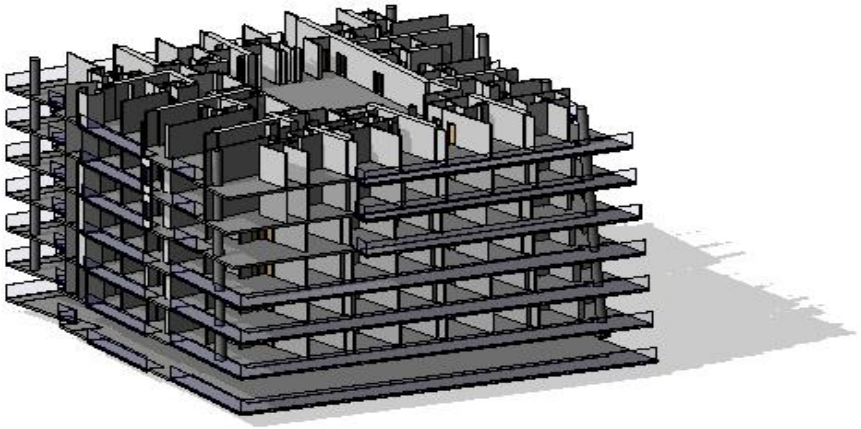


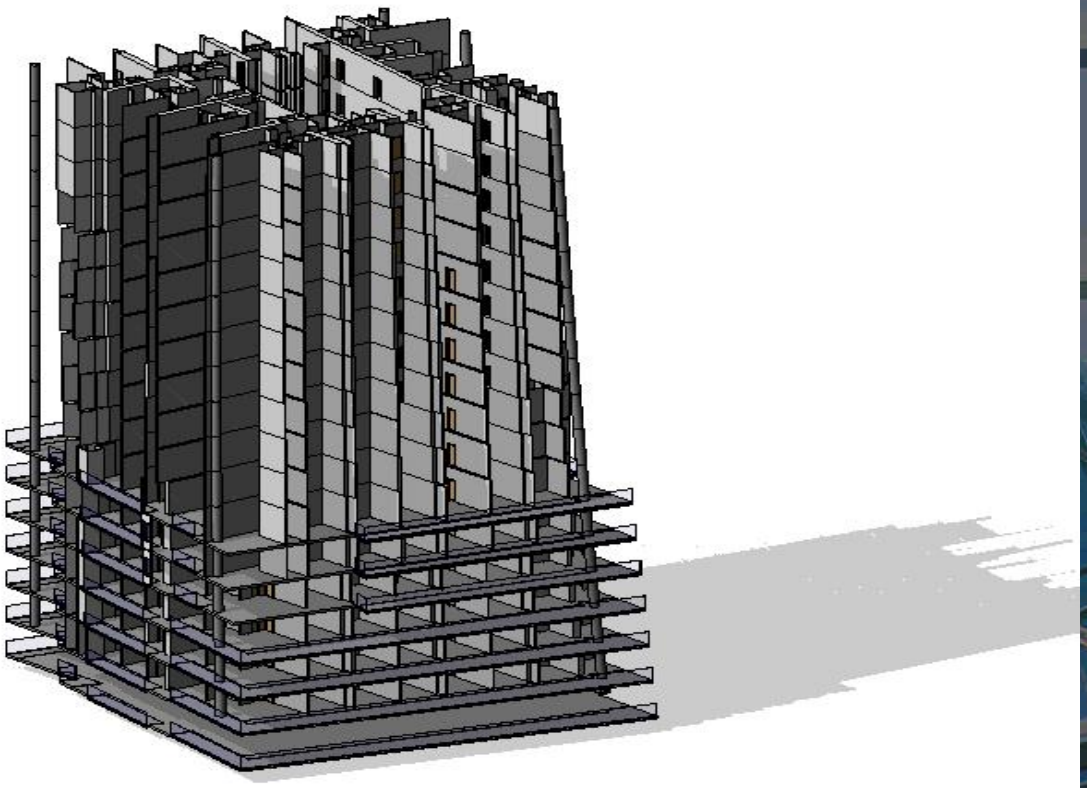
中東住宅項目

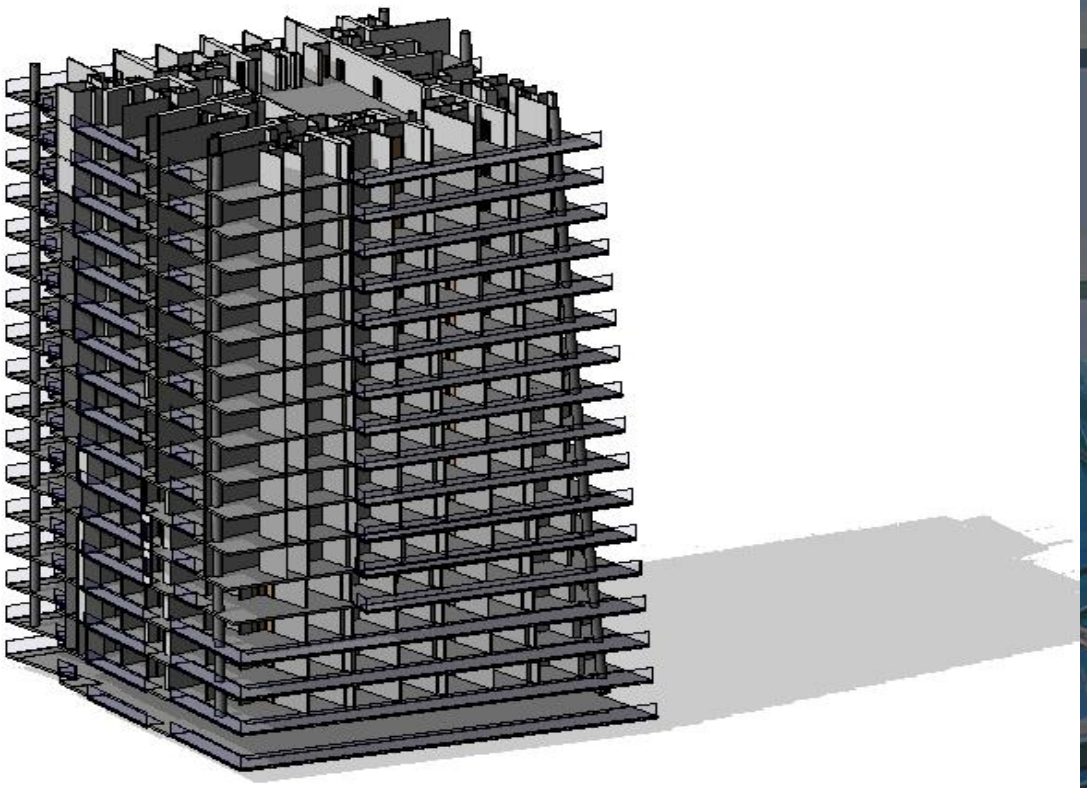
COMPLEX GEOMETRY

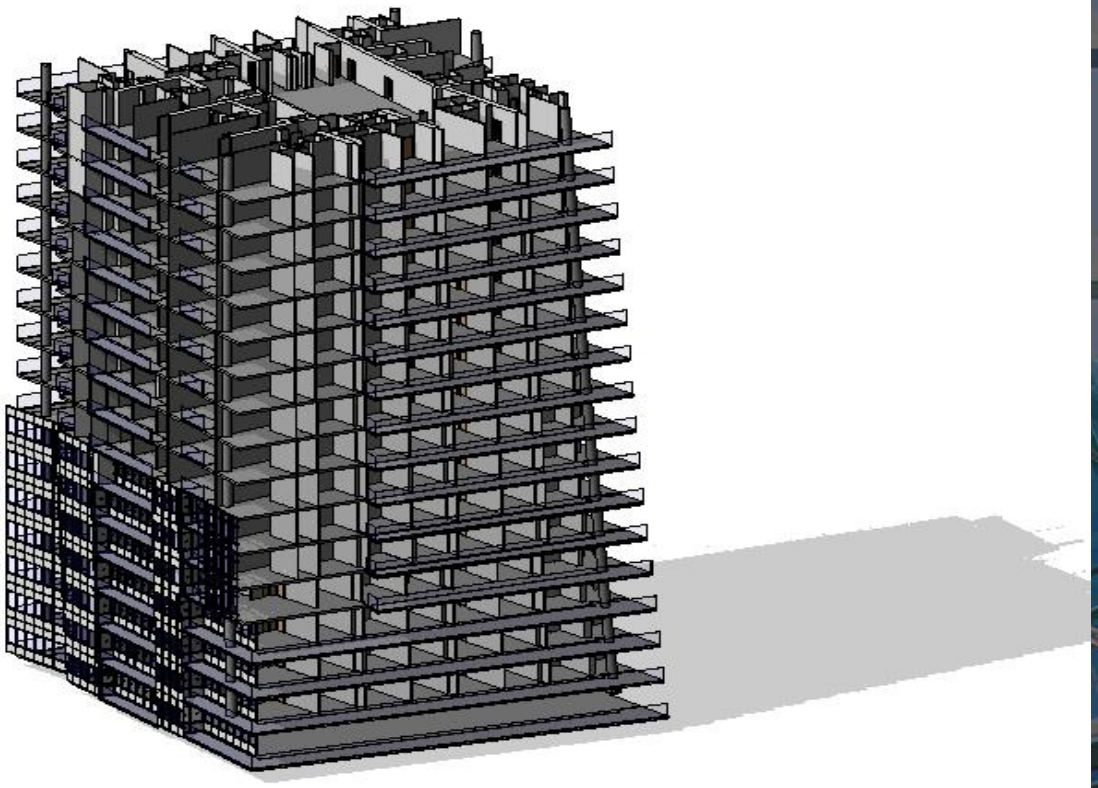


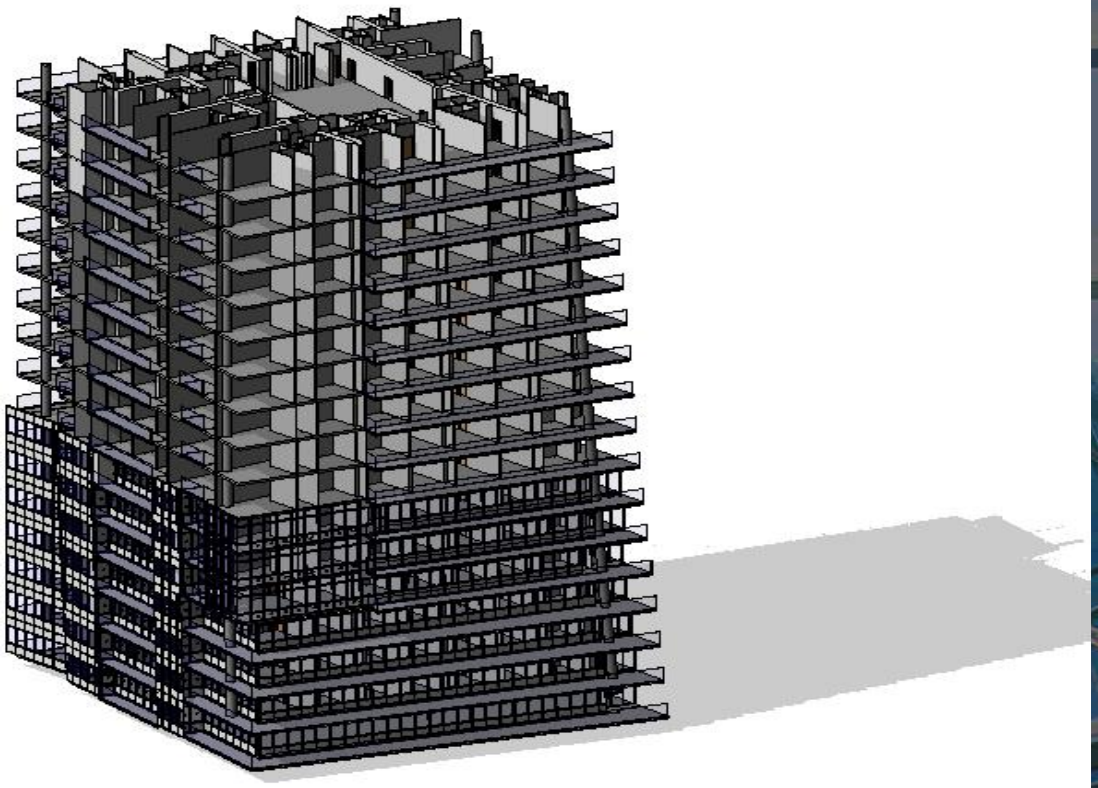


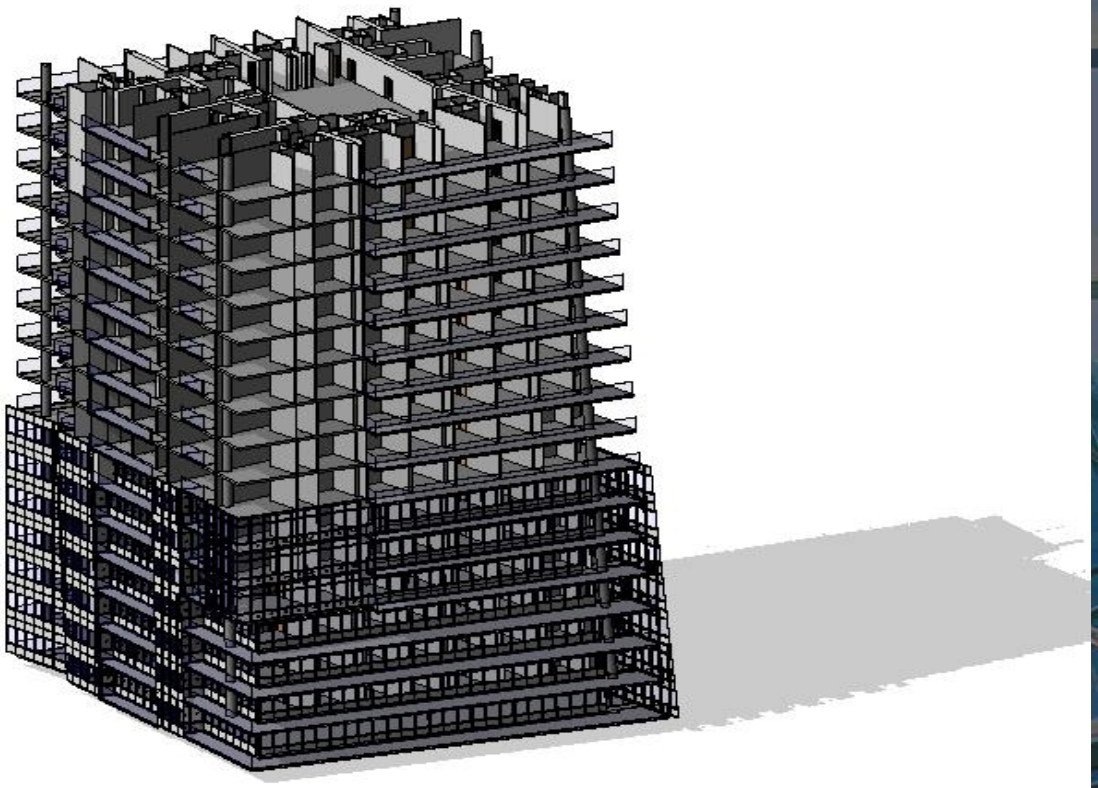


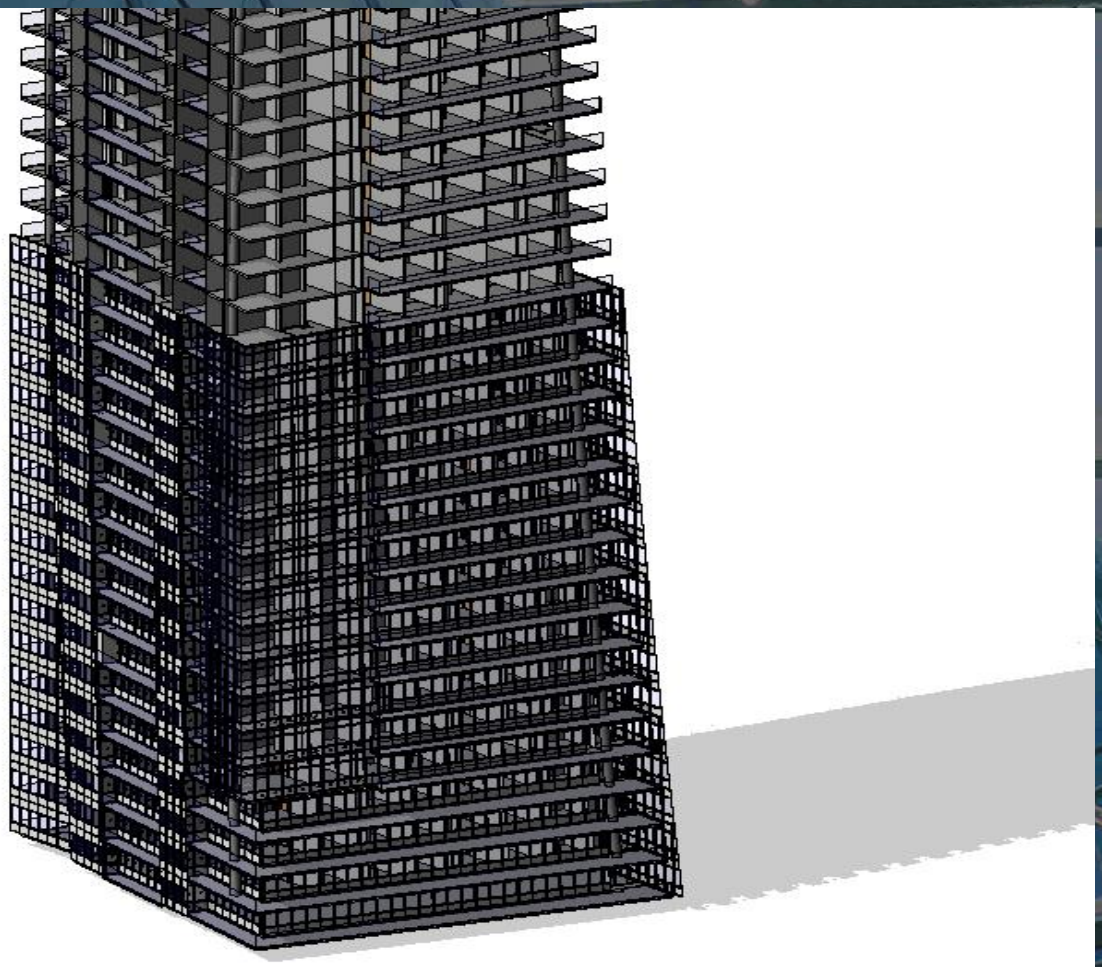


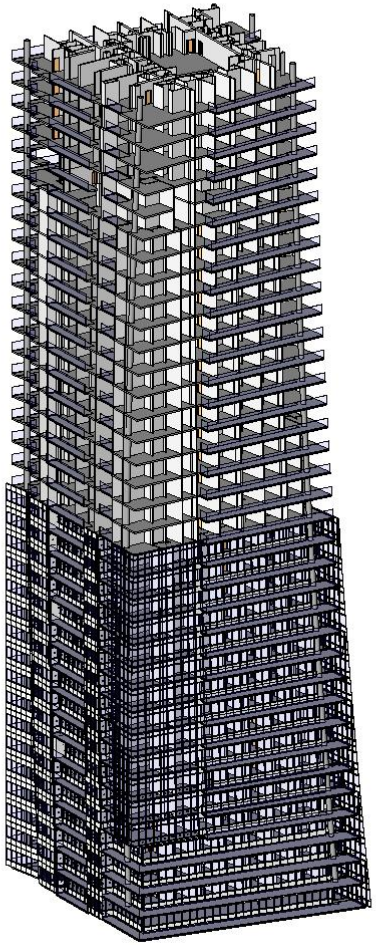


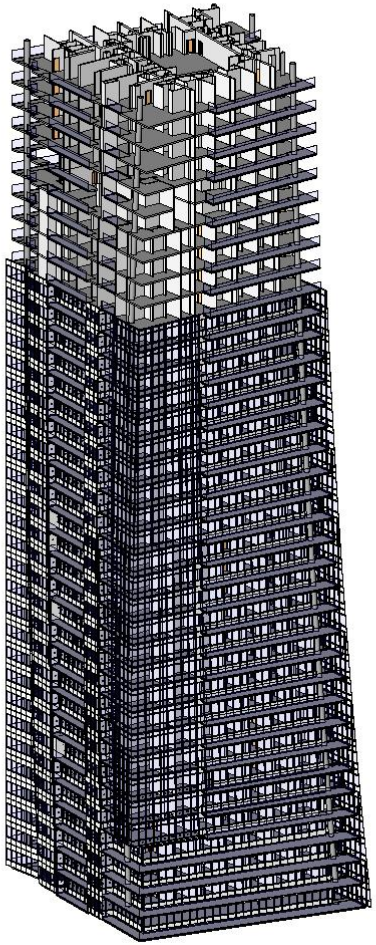


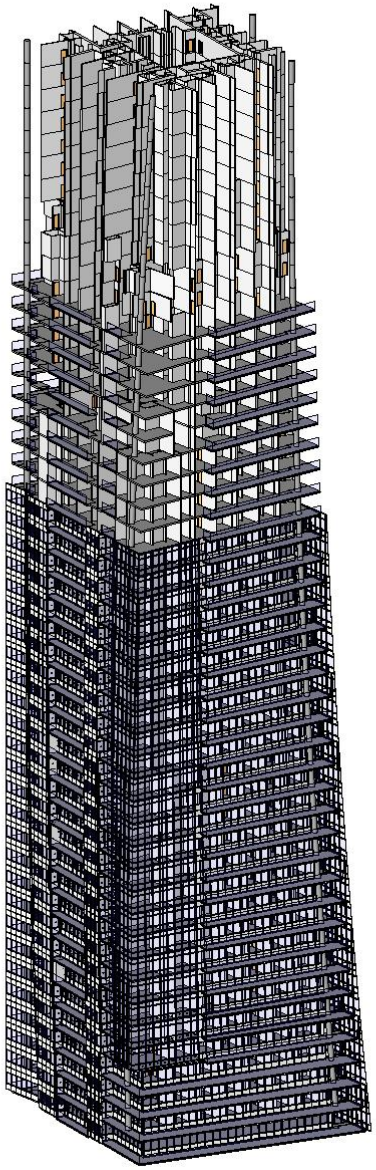


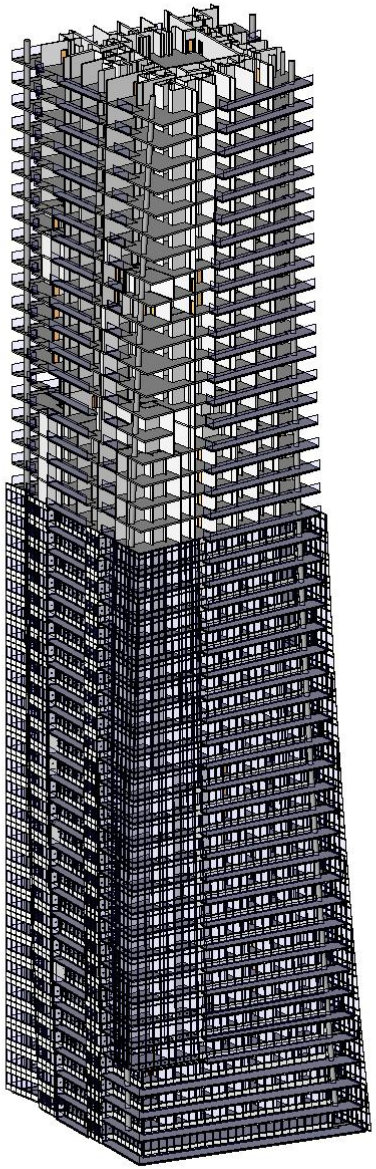


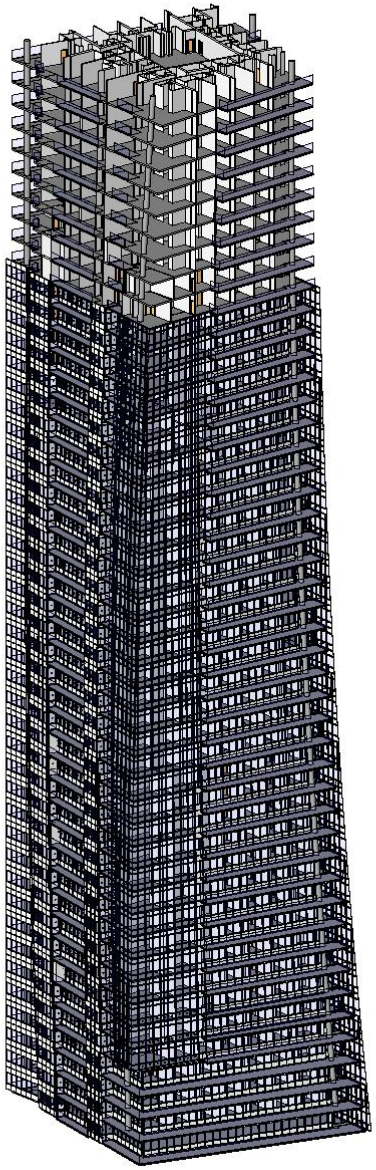


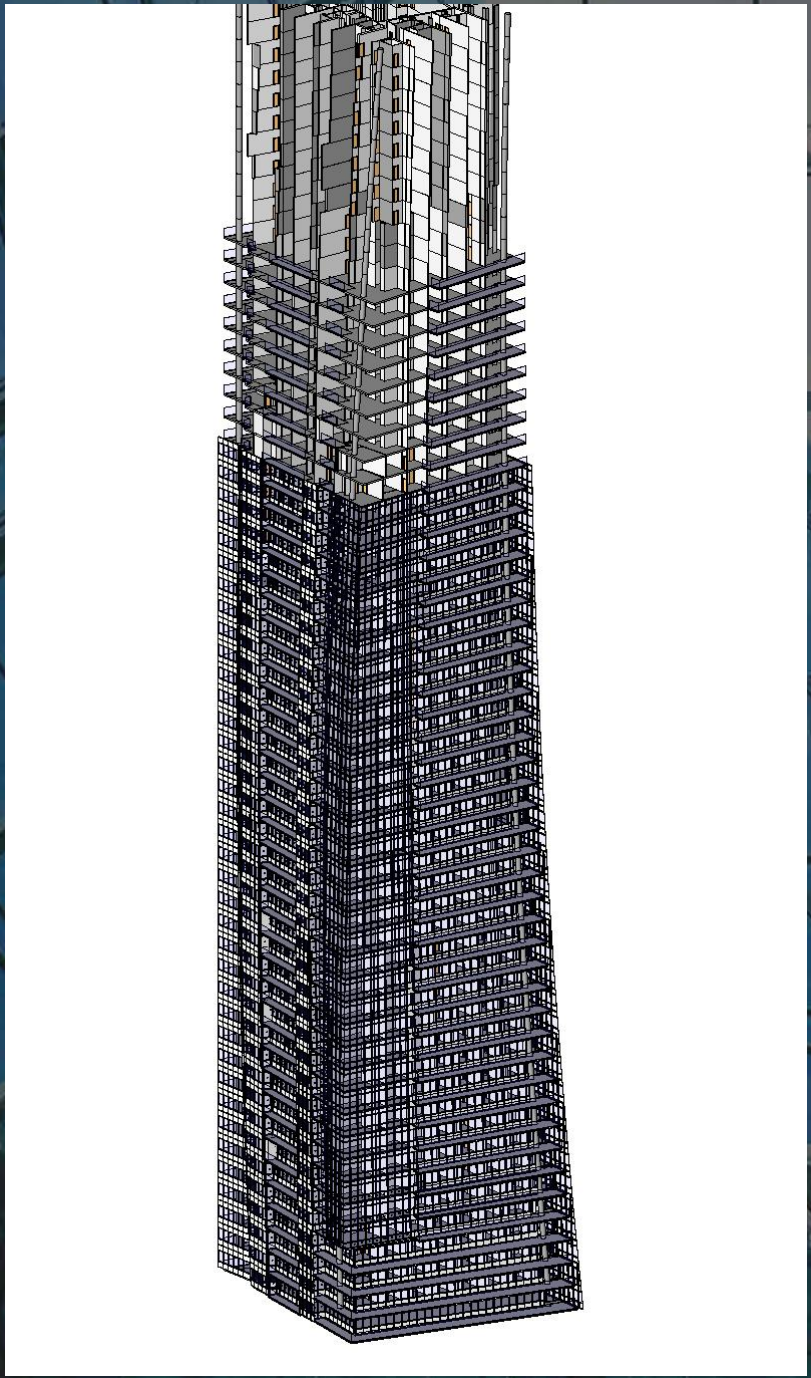


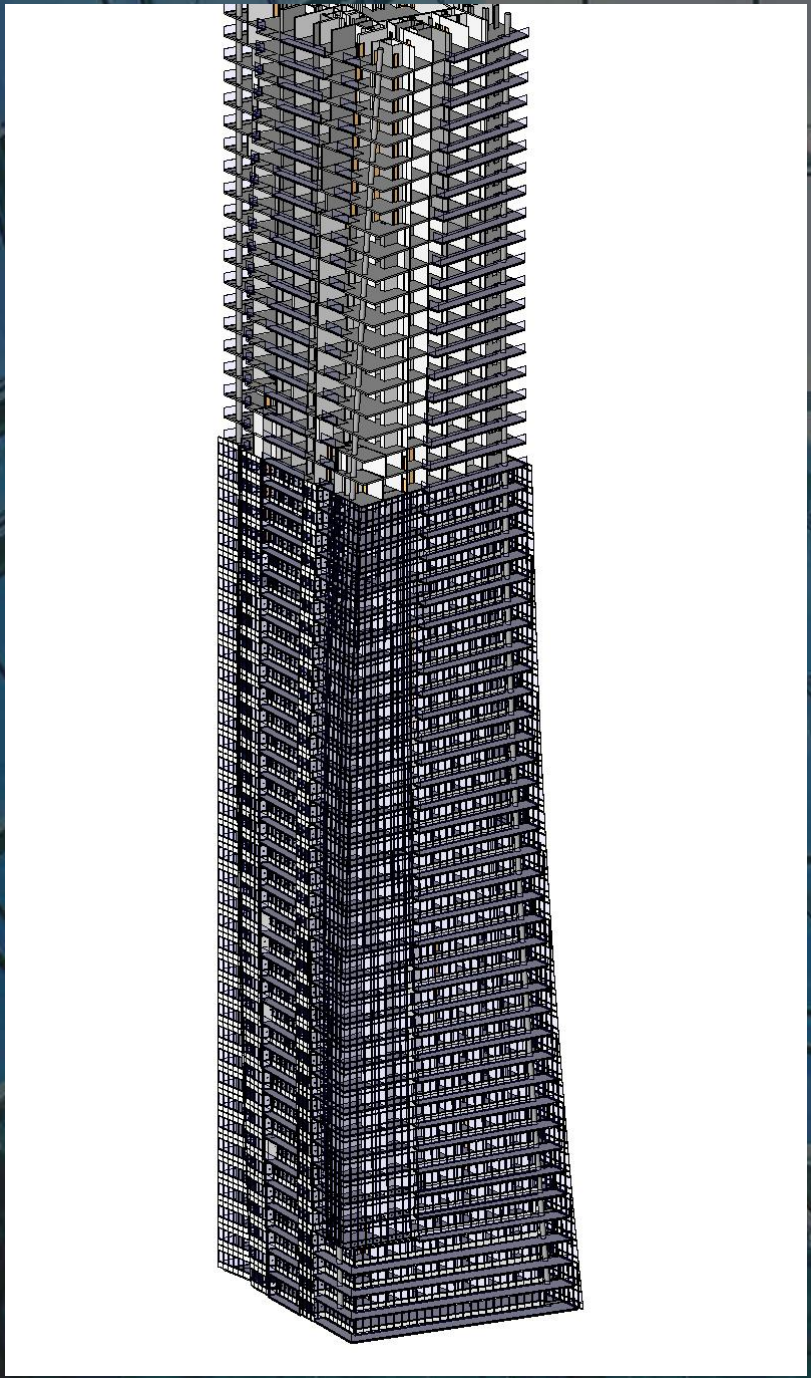


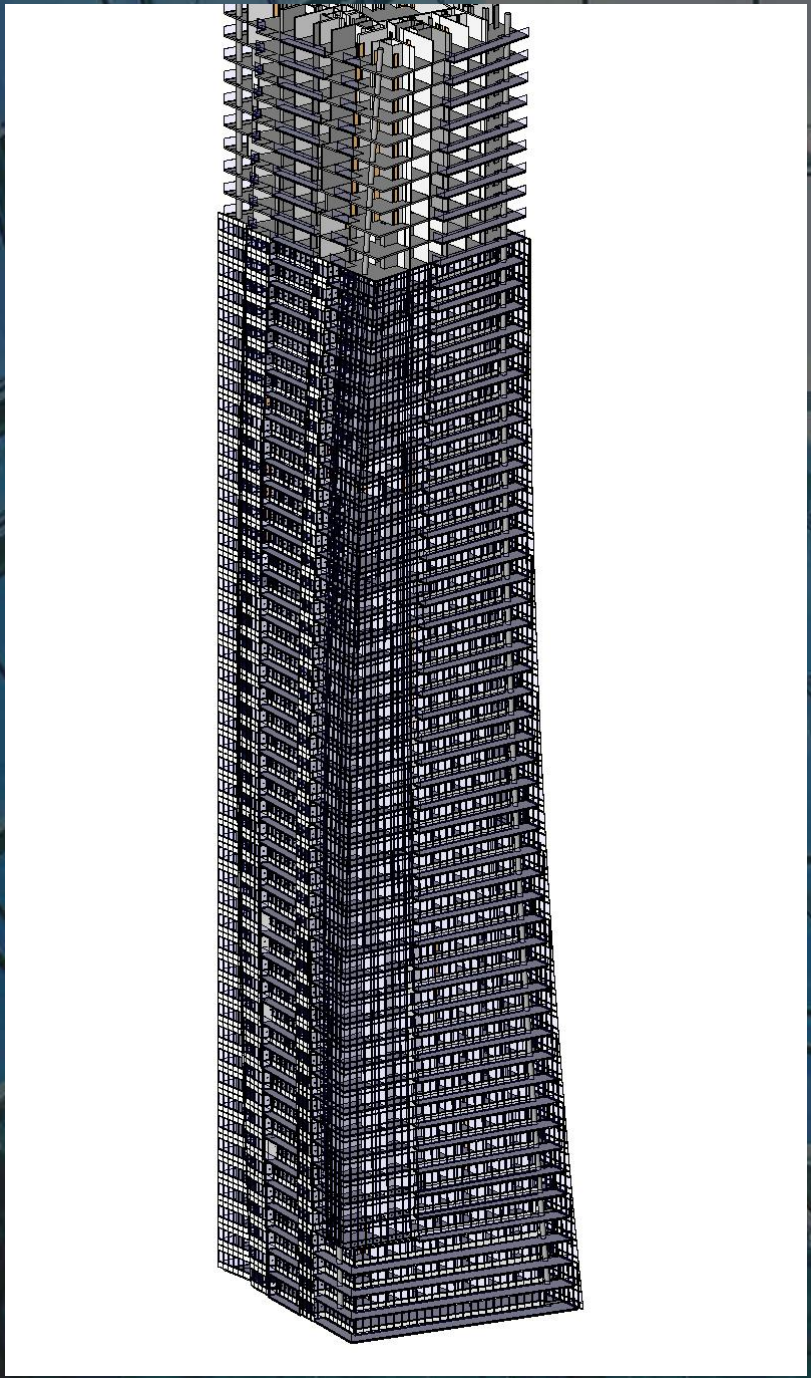


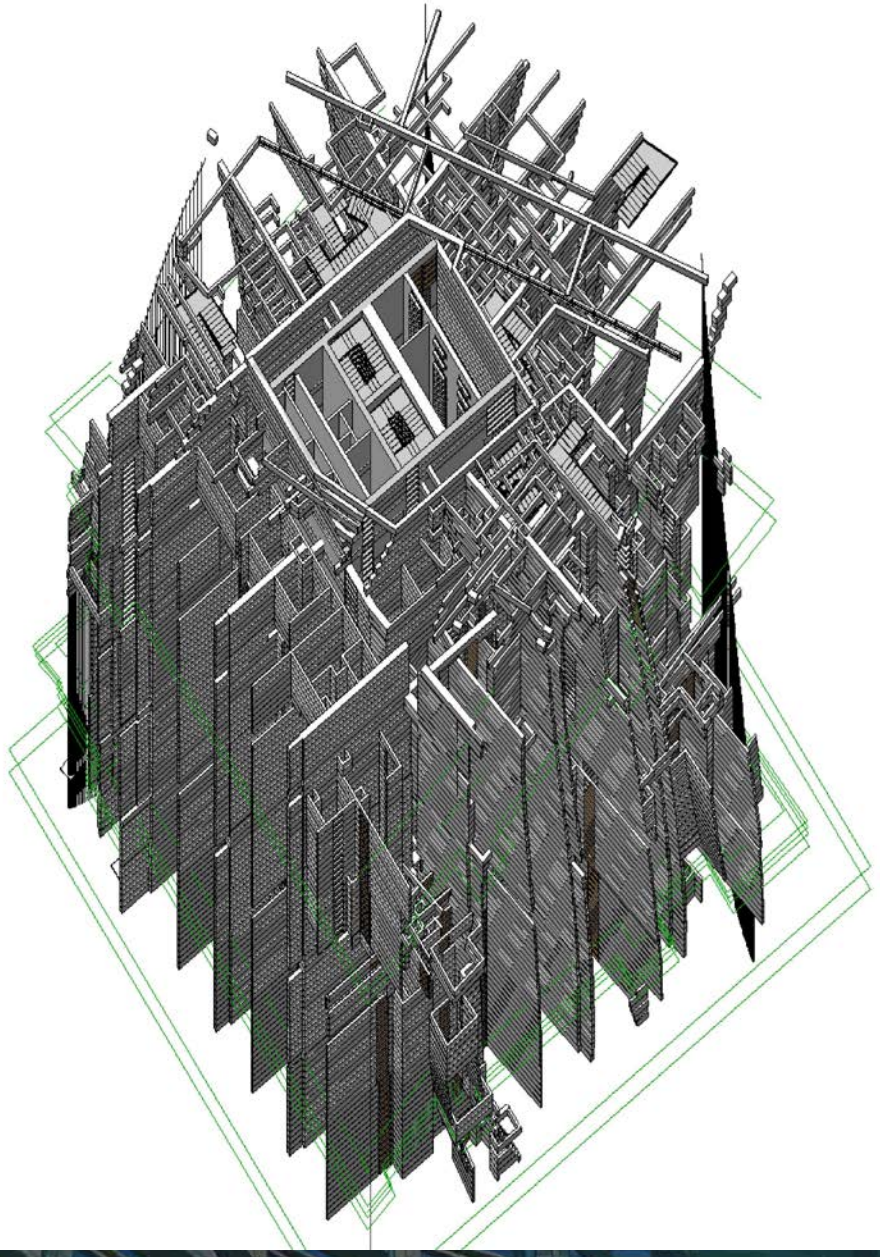






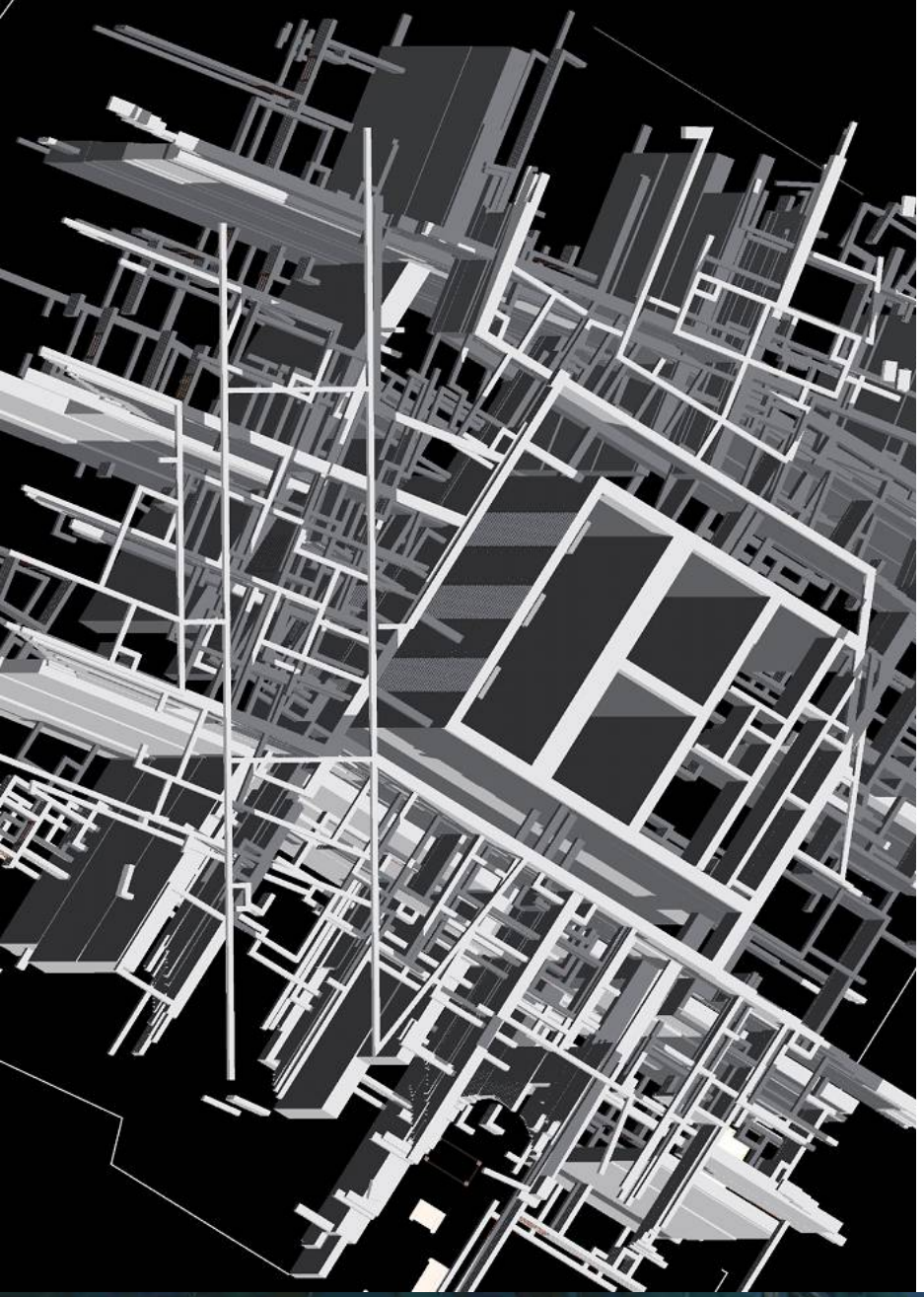


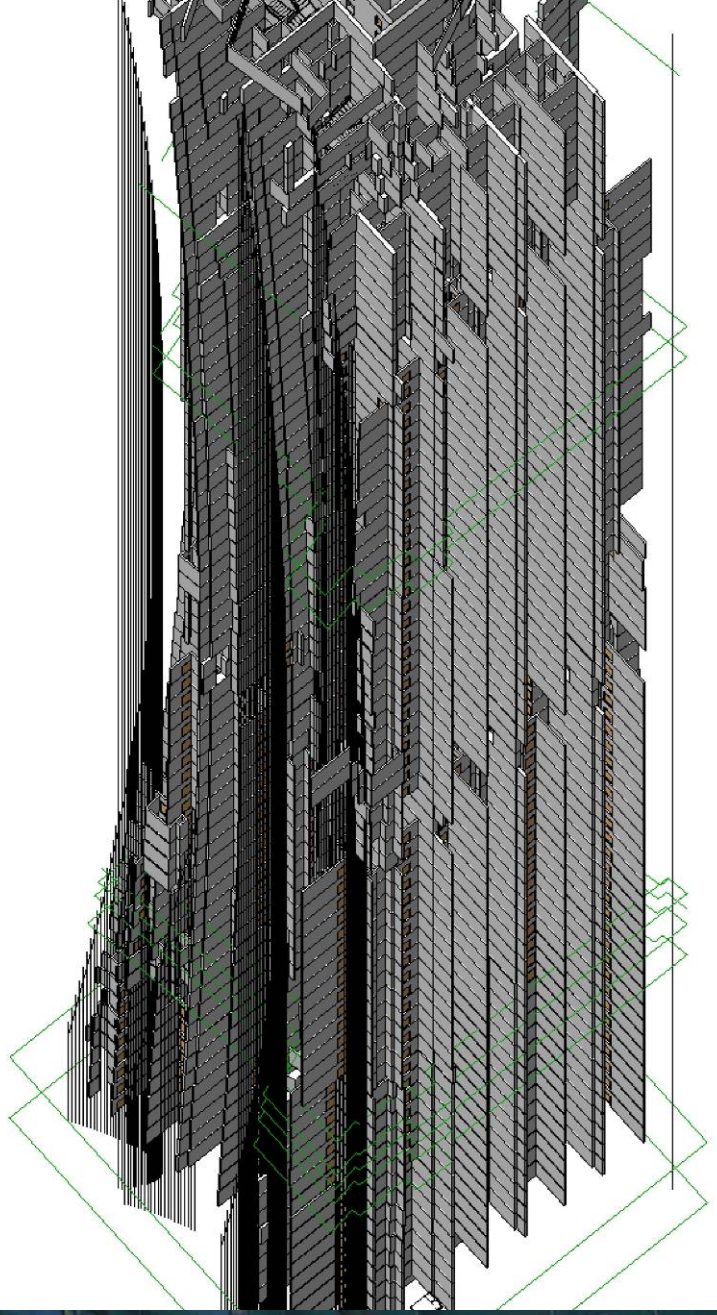




中東住宅項目

VERTICAL CO-ORDINATION





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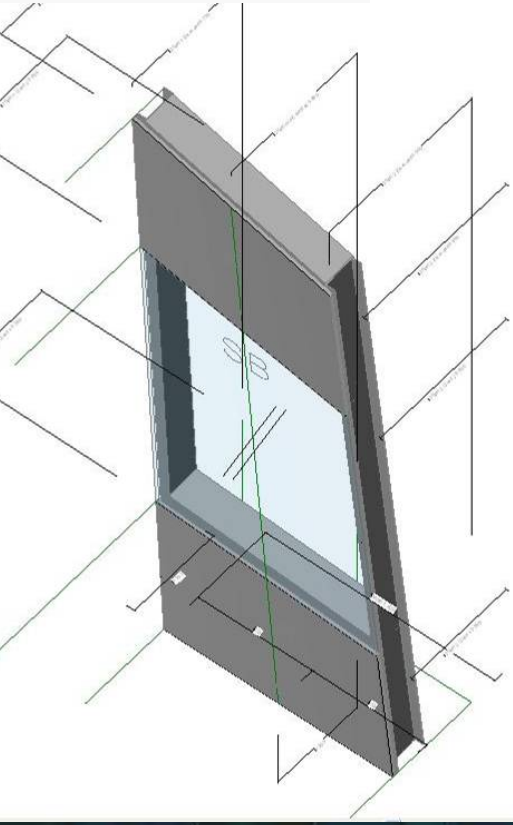
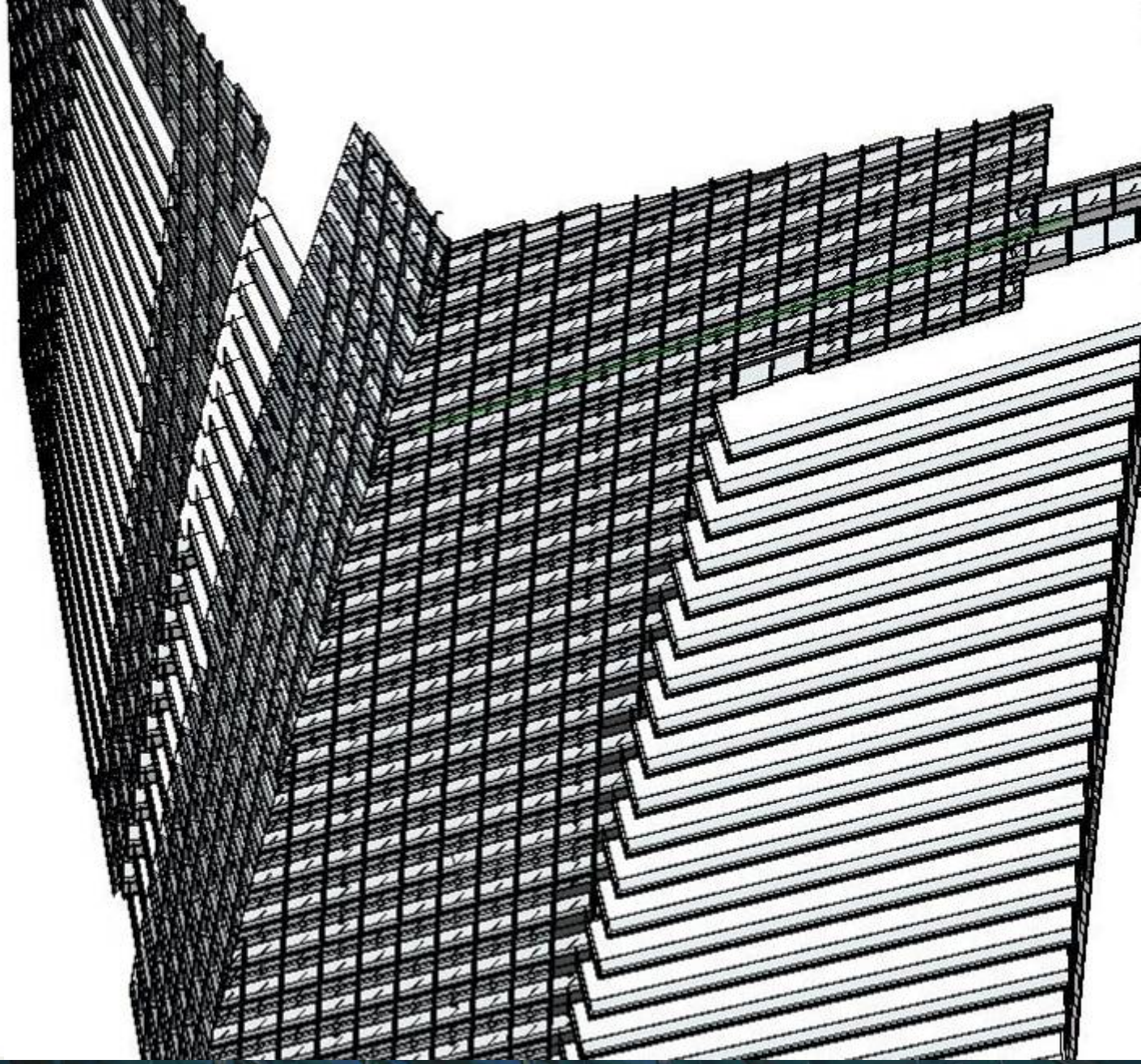
INTERNAL vs EXTERNAL





中東住宅項目

COMPLICATED CURTAIN WALL

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 ▪

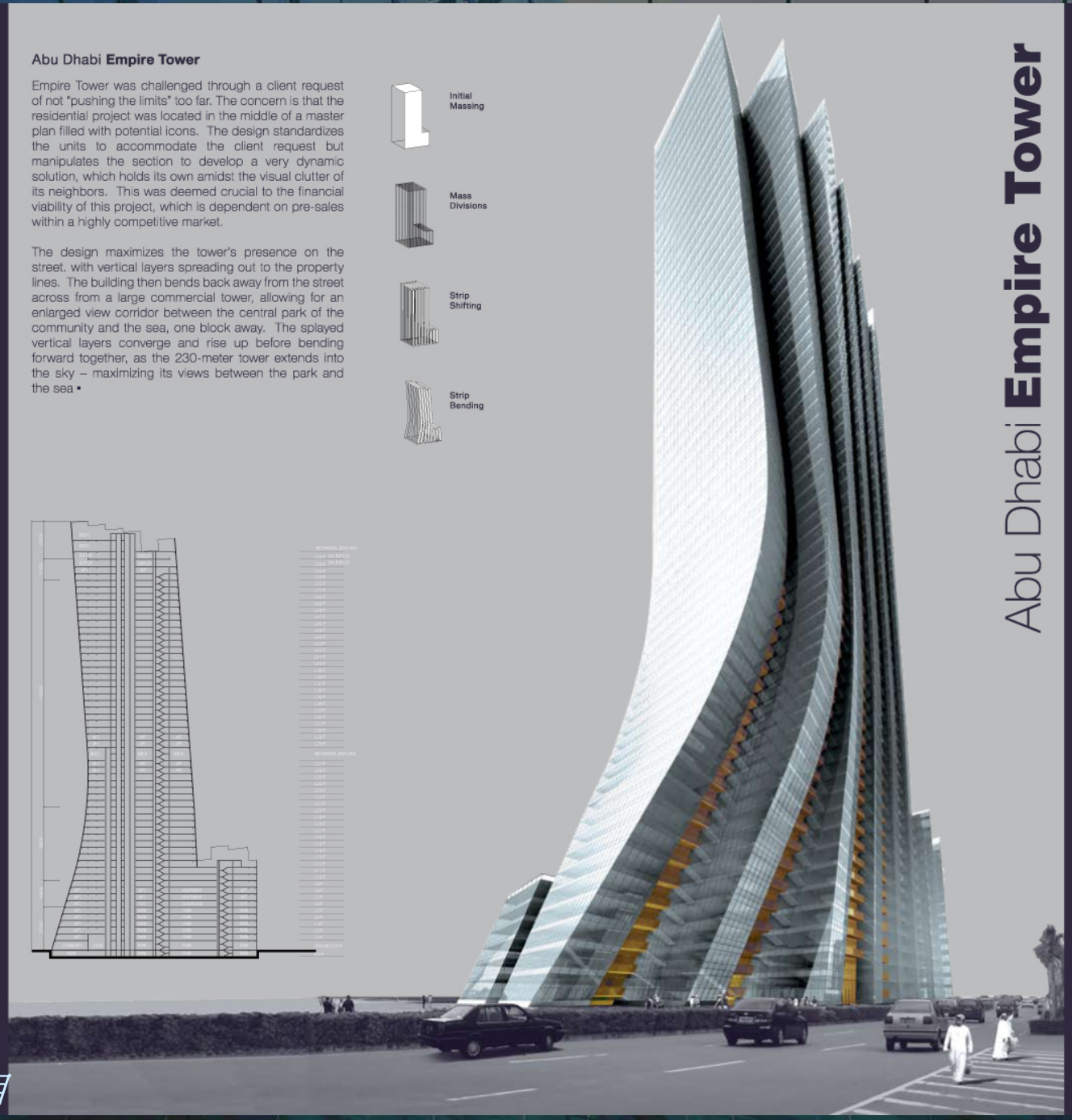
Initial Massing

Mass Divisions

Strip Shifting

Strip Bending

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



Abu Dhabi **Empire Tower**

中東住宅項目

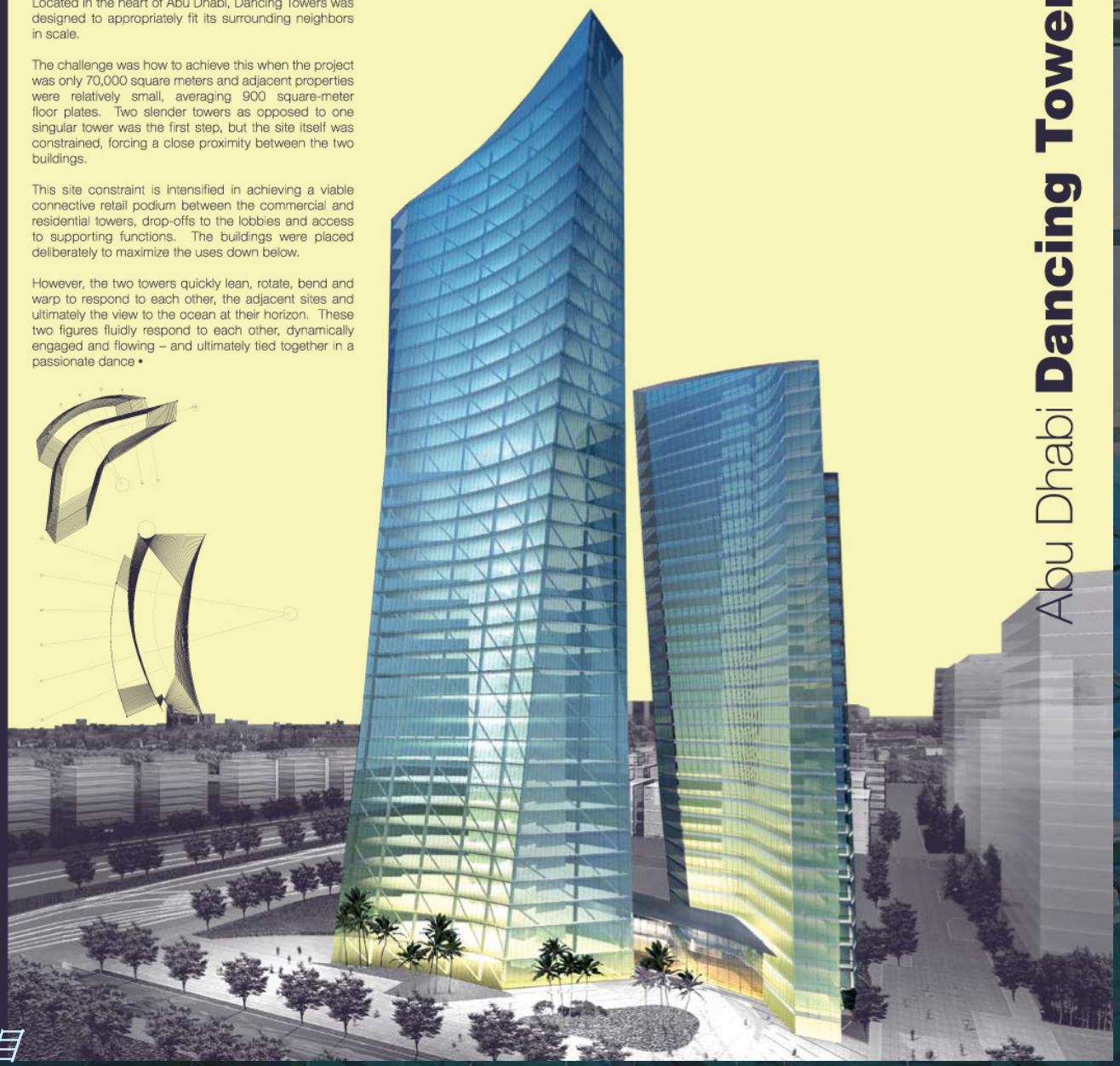
Abu Dhabi **Dancing Towers**

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 **4,180 sqm**
Floor Area **44,235 sqm** Building Height **160 m**

Abu Dhabi **Dancing Towers**

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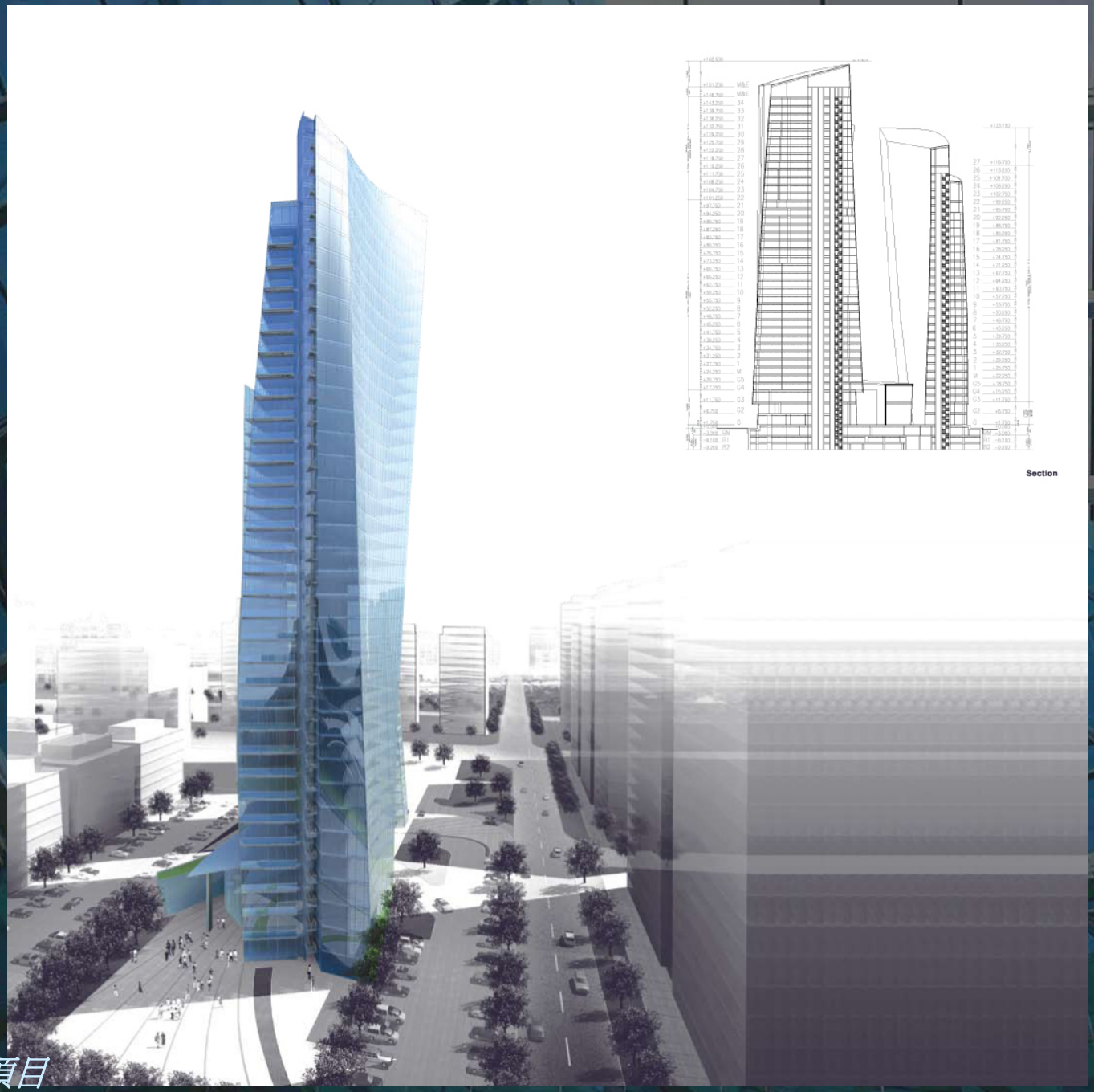

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Dubai **Ocean Heights Two**

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 modulized 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 **3,435sqm**
Floor Area **197,375 sqm**, Building Height **460 m**

Dubai **Ocean Heights Two**

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1st Floor
2nd-3rd Floors
4th Floor
7th Floor
37th Floor
69th Floor
79th Floor
90th Floor
100th Floor
101th Floor

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GSA U.S. General Services Administration

SEARCH

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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 Modeliing (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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Abbreviation Look-up

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Choose State: AK GO

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A-Z Links to GSA Topics

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.

Challenges from the Technology to the Industry

- Participation of all participants
- Redefinition of roles of all Building Industry Participants
- Project Delivery Time
- Fee Structure
- Standard Contract Provision – position of BIM model
- Contractual Relationship
- Other supports – Government, Professional Bodies, Education
- BIM Authorities – Standards and Certification
- …..

Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - 3D View: 1. Rock Profile]

File Edit View Modelling Drafting Site Tools Settings Window Help

Move Copy Rotate Array Mirror Group

Plane Demolish Align Split Trim Offset

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Swimming Pool 11 Oct 0...

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- Sheets (all)
- Families
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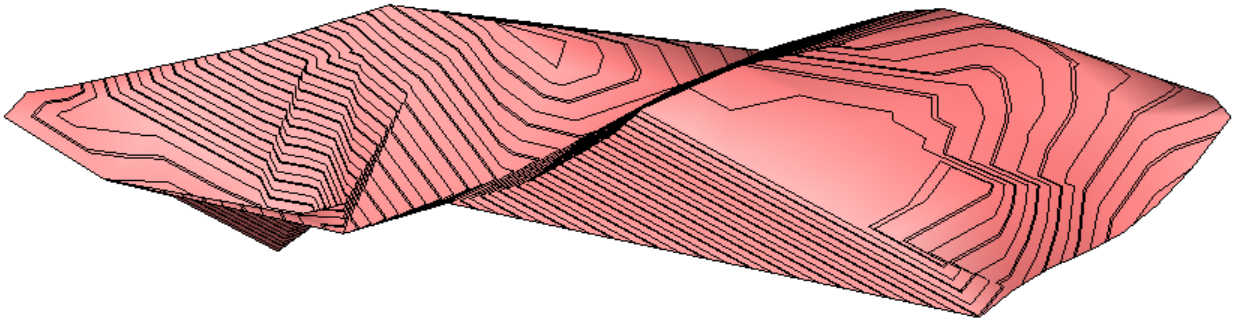

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Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - 3D View: 2. Mini-piles]

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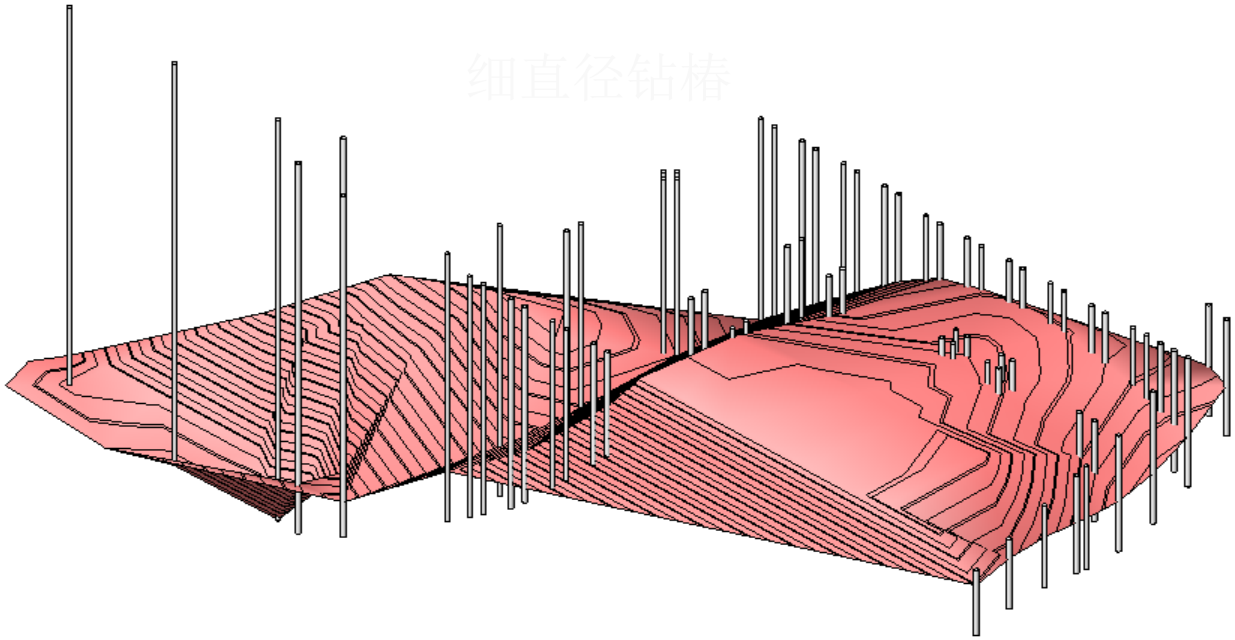

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Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - 3D View: 3. Pile Caps & Footings]

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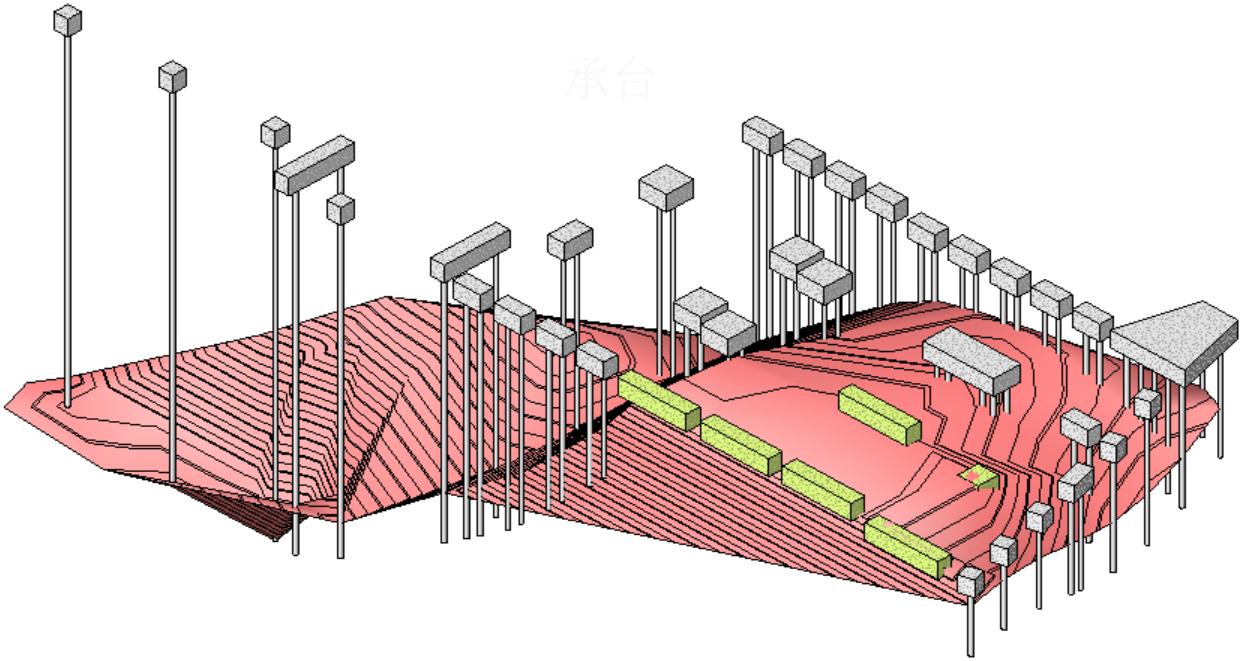

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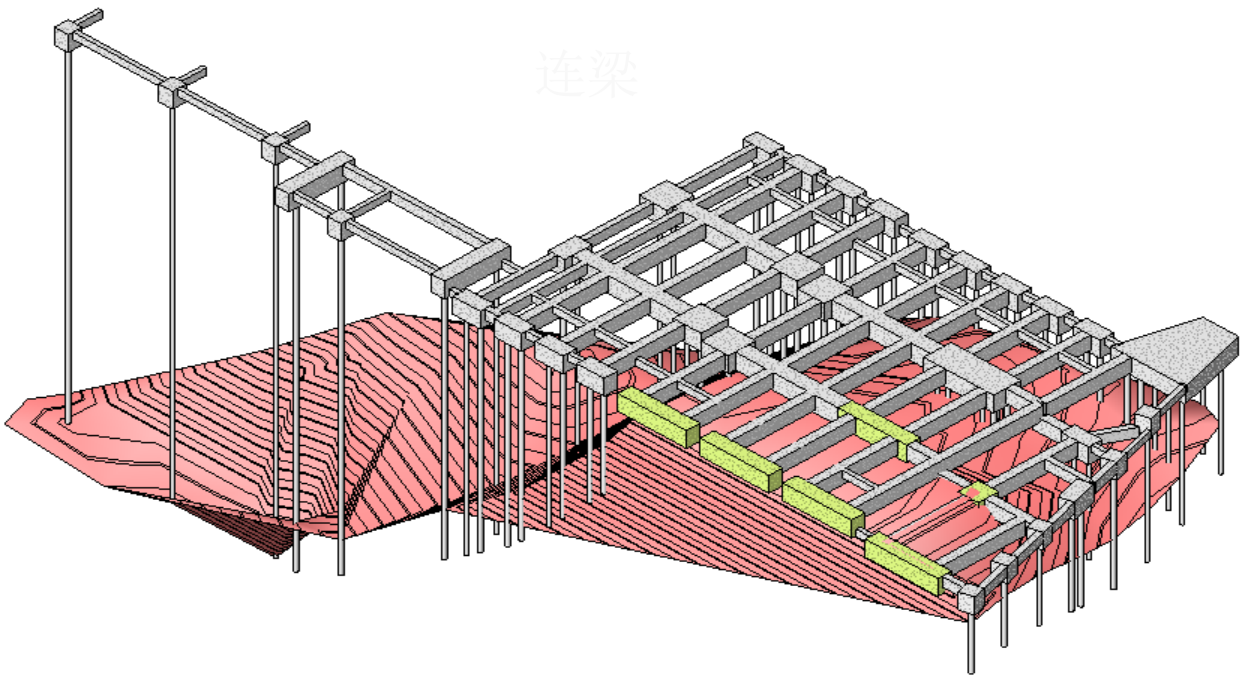

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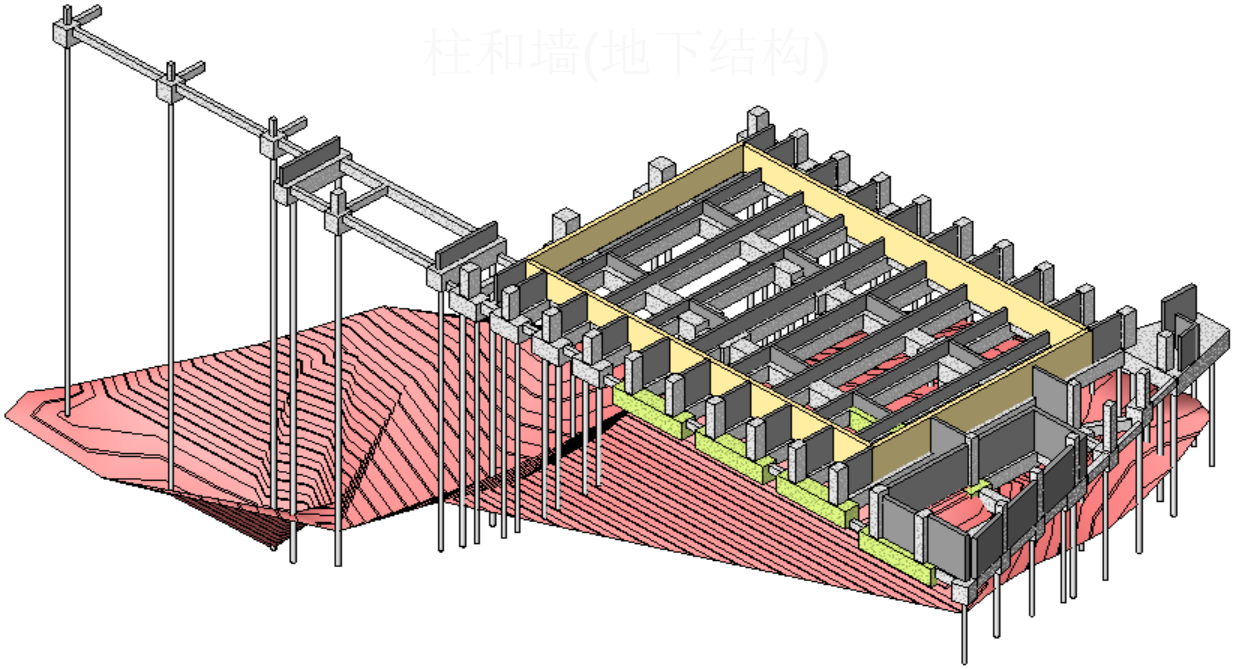

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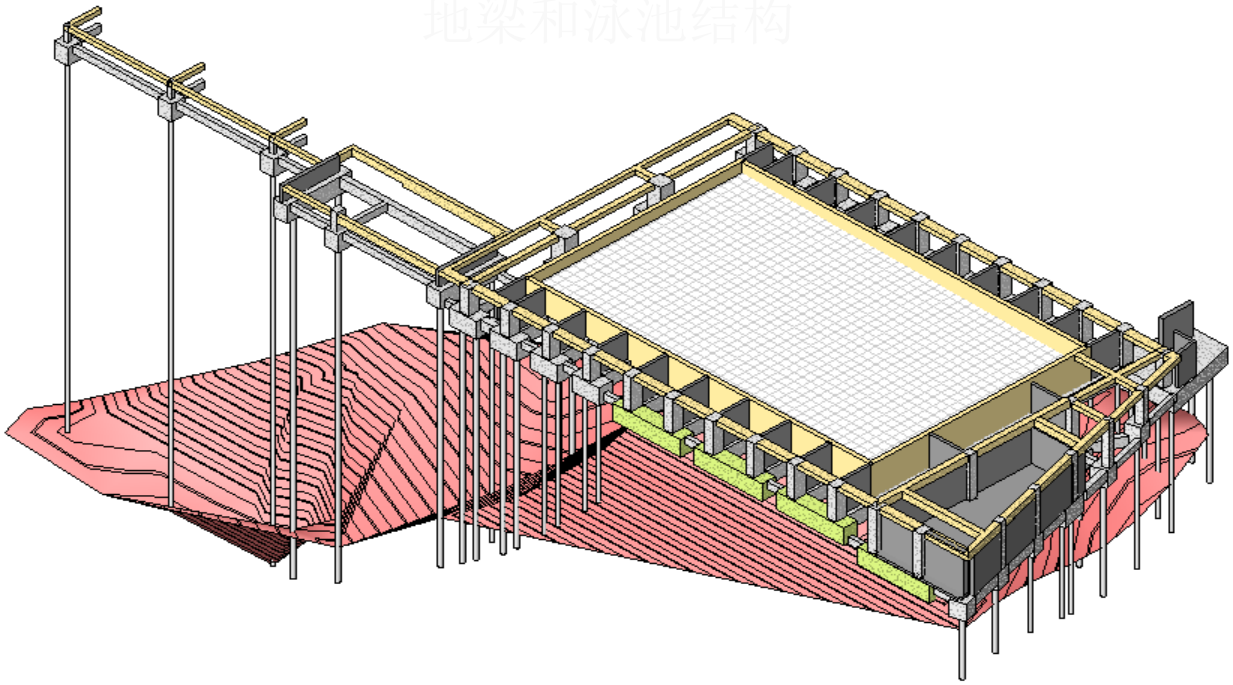

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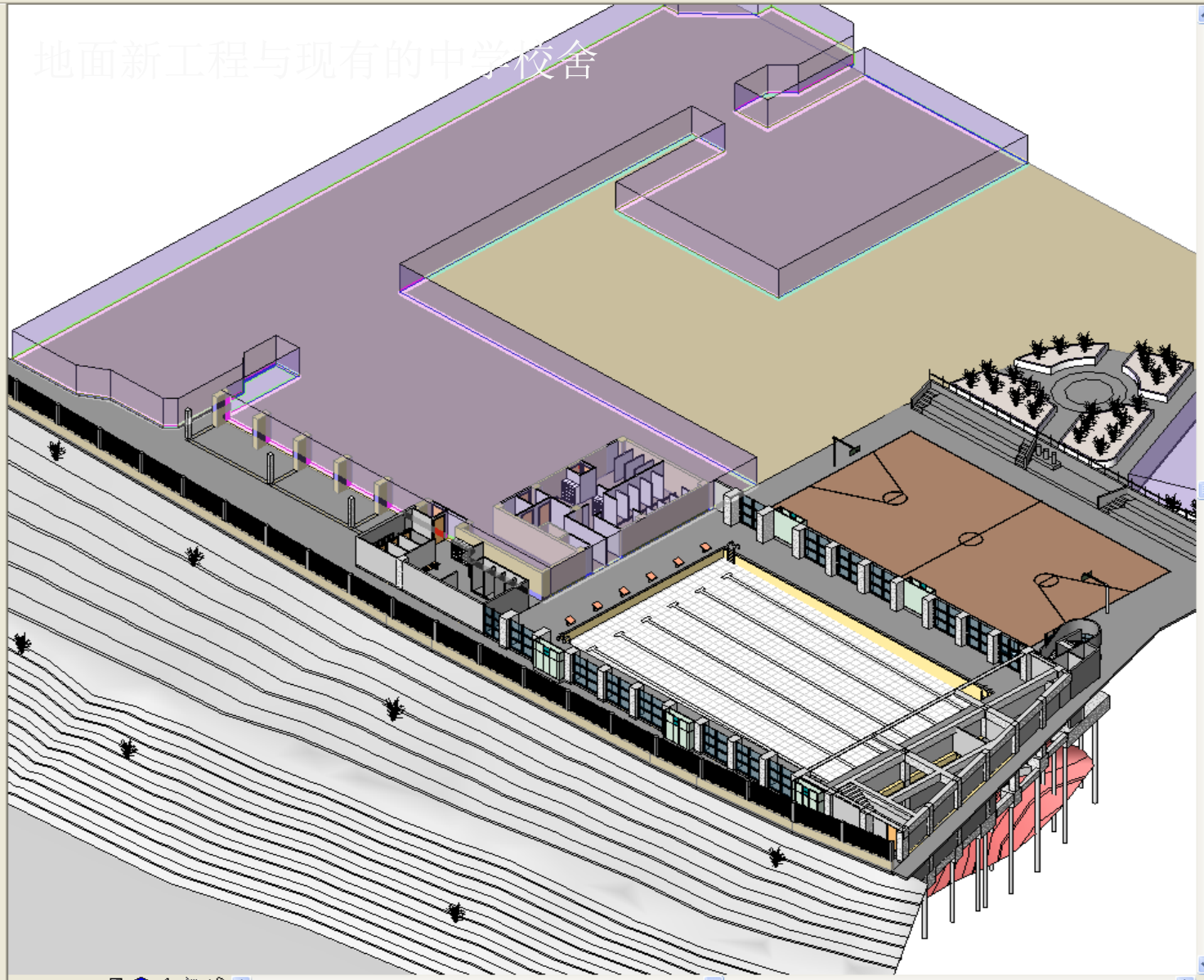

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Floors : Floor : R.C. Slab on Grade - 175mm

NUM

Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - 3D View: 8. UG/F & New Flat Roof]

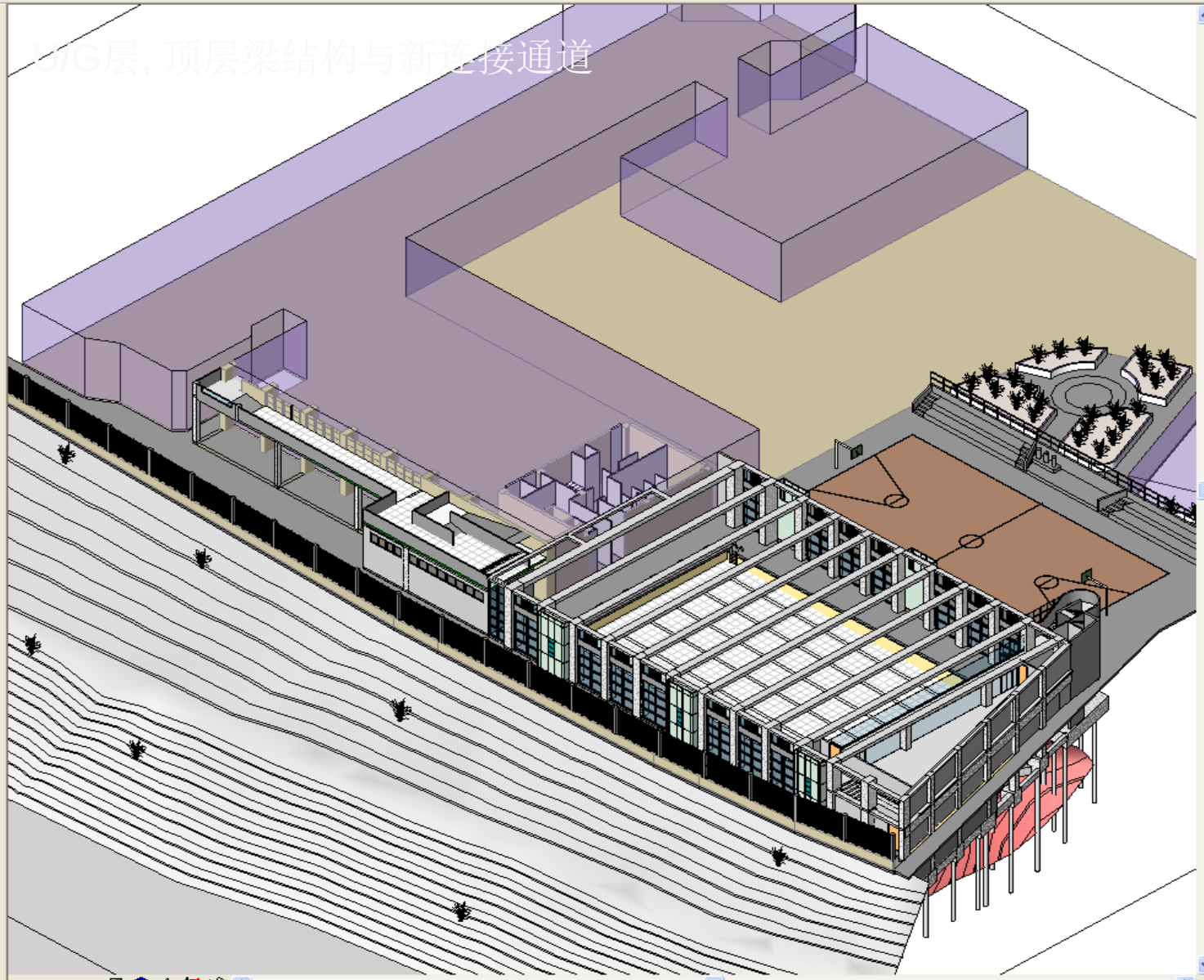
File Edit View Modelling Drafting Site Tools Settings Window Help

Plane Demolish Align Split Trim Offset Press + Drag

Basics
Modify
Wall
Door
Window
Component
Room
Roof »
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text

Swimming Pool 11 Oct 0...

- Views (all)
  - Floor Plans
    - Cap Level 63.5
    - G/F
    - New Cover for Flat R
    - New Flat Roof
    - R/F
    - Site
    - Top of Fencing
    - U/G Floor
    - Upper Roof
  - 3D Views
    - 1. Rock Profile
    - 2. Mini-piles
    - 3. Pile Caps & Footing
    - 4. Tie Beams
    - 5. Columns & Walls (
    - 6. Slabs & Gd. Beams
    - 7. G/F
    - **8. UG/F & New Fl**
    - 9. Roof
    - 10. NW Exterior
    - 11. Pool Interior
    - {3D}
  - Elevations (Building Eleve
  - Sections (Building Section
- Legends
- Schedules/Quantities
  - 2. Mini-Piles
  - 3. Pile Caps & Footings
  - 4. Tie Beams
  - 5a. Columns (Substructure
  - 5b. Bearing/Screen Walls
  - 6. Ground Beams
  - 7. Floor Material Takeoff
  - 8a. Beams (Superstructure
  - 8b. Columns (Superstructu
  - 9. Walls (Superstructure)
  - 10. Roof Material Takeof
  - 11. Ramp Schedule
  - 12. Stairs Material Takeof
- Sheets (all)
- Families
- Groups



View
Modelling
Drafting
Rendering
Site

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

NUM

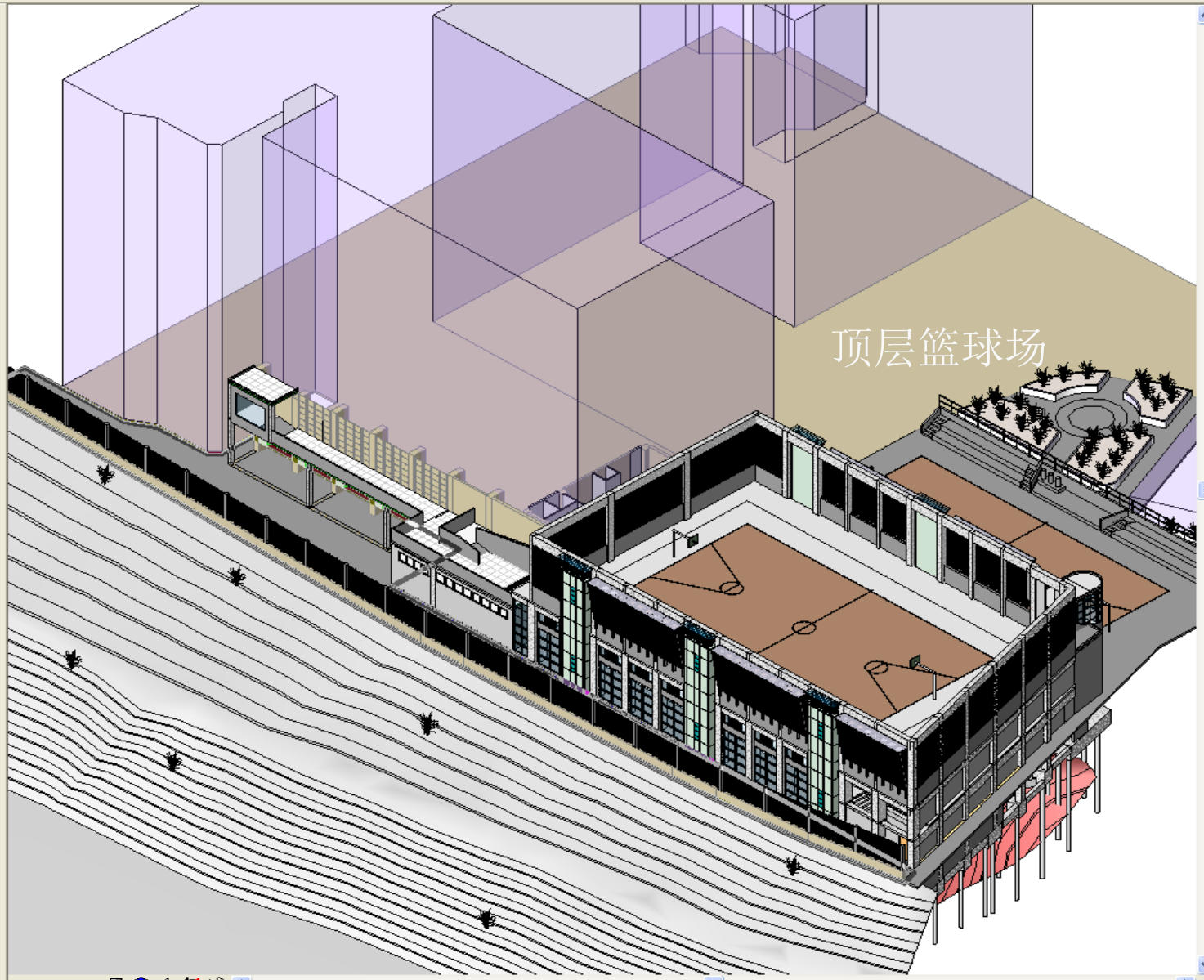
Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - 3D View: 9. Roof]

File Edit View Modelling Drafting Site Tools Settings Window Help

Plane Demolish Align Split Trim Offset Press + Drag

Basics
- Modify
- Wall
- Door
- Window
- Component
- Room
- Roof »
- Floor
- Grid
- Lines
- Ref Plane
- Dimension
- Section
- Level
- Text

Swimming Pool 11 Oct 0...
- Views (all)
  - Floor Plans
    - Cap Level 63.5
    - G/F
    - New Cover for Flat R
    - New Flat Roof
    - R/F
    - Site
    - Top of Fencing
    - U/G Floor
    - Upper Roof
  - 3D Views
    - 1. Rock Profile
    - 2. Mini-piles
    - 3. Pile Caps & Footing
    - 4. Tie Beams
    - 5. Columns & Walls (
    - 6. Slabs & Gd. Beams
    - 7. G/F
    - 8. UG/F & New Flat R
    - **9. Roof**
    - 10. NW Exterior
    - 11. Pool Interior
    - {3D}
  - Elevations (Building Eleva
  - Sections (Building Section
- Legends
- Schedules/Quantities
  - 2. Mini-Piles
  - 3. Pile Caps & Footings
  - 4. Tie Beams
  - 5a. Columns (Substructure
  - 5b. Bearing/Screen Walls
  - 6. Ground Beams
  - 7. Floor Material Takeoff
  - 8a. Beams (Superstructure
  - 8b. Columns (Superstructu
  - 9. Walls (Superstructure)
  - 10. Roof Material Takeof
  - 11. Ramp Schedule
  - 12. Stairs Material Takeof
- Sheets (all)
- Families
- Groups



1 : 100

View
Modelling
Drafting
Rendering
Site

Floors : Floor : R.C. Slab on Grade - 175mm

NUM

Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - 3D View: 10. NW Exterior]

File Edit View Modelling Drafting Site Tools Settings Window Help

Basics
Modify
Wall
Door
Window
Component
Room
Roof »
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text

Swimming Pool 11 Oct 0...

- Views (all)
  - Floor Plans
    - Cap Level 63.5
    - G/F
    - New Cover for Flat R
    - New Flat Roof
    - R/F
    - Site
    - Top of Fencing
    - U/G Floor
    - Upper Roof
  - 3D Views
    - 1. Rock Profile
    - 2. Mini-piles
    - 3. Pile Caps & Footing
    - 4. Tie Beams
    - 5. Columns & Walls (
    - 6. Slabs & Gd. Beams
    - 7. G/F
    - 8. UG/F & New Flat R
    - 9. Roof
    - **10. NW Exterior**
    - 11. Pool Interior
    - {3D}
  - Elevations (Building Eleve
  - Sections (Building Section
- Legends
- Schedules/Quantities
  - 2. Mini-Piles
  - 3. Pile Caps & Footings
  - 4. Tie Beams
  - 5a. Columns (Substructure
  - 5b. Bearing/Screen Walls
  - 6. Ground Beams
  - 7. Floor Material Takeoff
  - 8a. Beams (Superstructure
  - 8b. Columns (Superstructu
  - 9. Walls (Superstructure)
  - 10. Roof Material Takeof
  - 11. Ramp Schedule
  - 12. Stairs Material Takeof
- Sheets (all)
- Families
- Groups

View
Modelling
Drafting
Rendering
Site

Perspective

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

Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - 3D View: 11. Pool Interior]

File Edit View Modelling Drafting Site Tools Settings Window Help

Move Copy Rotate Array Mirror Group

Plane Demolish Align Split Trim Offset

Press + Drag

Basics

Modify

Wall

Door

Window

Component

Room

Roof »

Floor

Grid

Lines

Ref Plane

Dimension

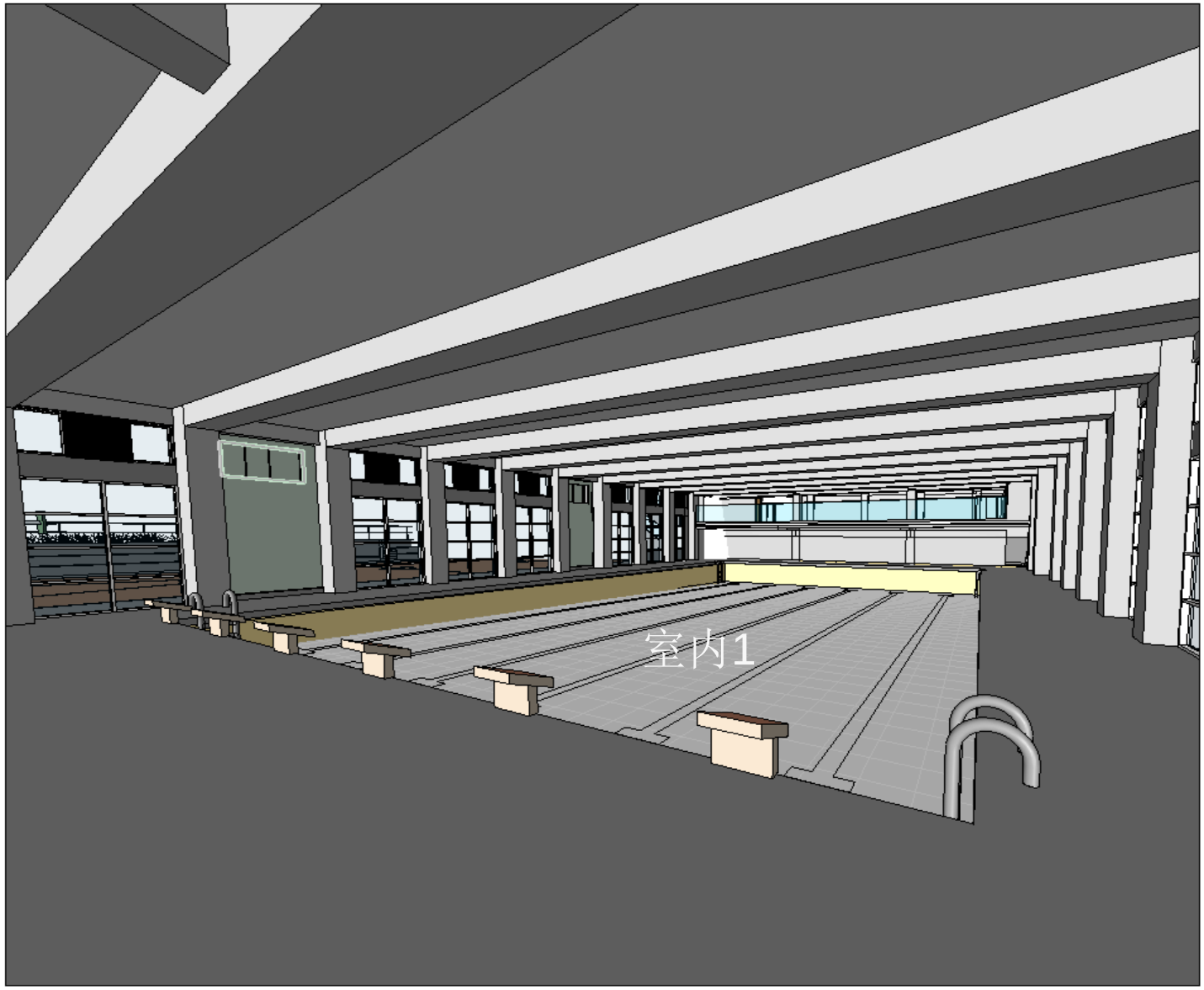
Section

Level

Text

Swimming Pool 11 Oct 0...

- Views (all)
  - Floor Plans
    - Cap Level 63.5
    - G/F
    - New Cover for Flat R
    - New Flat Roof
    - R/F
    - Site
    - Top of Fencing
    - U/G Floor
    - Upper Roof
  - 3D Views
    - 1. Rock Profile
    - 2. Mini-piles
    - 3. Pile Caps & Footing
    - 4. Tie Beams
    - 5. Columns & Walls (
    - 6. Slabs & Gd. Beams
    - 7. G/F
    - 8. UG/F & New Flat R
    - 9. Roof
    - 10. N W Exterior
    - **11. Pool Interior**
    - {3D}
  - Elevations (Building Eleva
  - Sections (Building Section
- Legends
- Schedules/Quantities
  - 2. Mini-Piles
  - 3. Pile Caps & Footings
  - 4. Tie Beams
  - 5a. Columns (Substructure
  - 5b. Bearing/Screen Walls
  - 6. Ground Beams
  - 7. Floor Material Takeoff
  - 8a. Beams (Superstructure
  - 8b. Columns (Superstructu
  - 9. Walls (Superstructure)
  - 10. Roof Material Takeof
  - 11. Ramp Schedule
  - 12. Stairs Material Takeof
- Sheets (all)
- Families
- Groups



Perspective

View

Modelling

Drafting

Rendering

Site

Rectangular Straight Wall Opening : Rectangular Straight Wall Opening

Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - 3D View: {3D}]

File Edit View Modelling Drafting Site Tools Settings Window Help

New
Zoom
View Properties... VP
Dynamically Modify View F8
Orient
Visibility/Graphics... VG
Category Invisible VH
Other Categories Invisible VI
Temporary Hide/Isolate
Apply View Template...
Create View Template from View...
Activate View
Deactivate View
Wireframe WF
Hidden Line HL
Shading
Shading with Edges SD
Advanced Model Graphics... AG
Thin Lines TL
Show Mass
Rendering
Refresh F5

Floor Plan...
Ceiling Plan...
Plan Region
Elevation
Framing Elevation
Section
Default 3D View
Callout
Drafting View...
Area Plan...
Camera
Walkthrough
Legend
Schedule/Quantities...
Material Takeoff...
View List...
Drawing List...
Note Block...
Keynote Legend...
Revision Schedule...
Sheet...
Add View...
Place Titleblock...

Legends
Schedules/Quantities
2. Mini-Piles
3. Pile Caps & Footings
4. Tie Beams
5a. Columns (Substructure
5b. Bearing/Screen Walls
6. Ground Beams
7. Floor Material Takeoff
8a. Beams (Superstructure
8b. Columns (Superstructu
9. Walls (Superstructure)
10. Roof Material Takeof
11. Ramp Schedule
12. Stairs Material Takeof
Sheets (all)
Families
Groups

Basics
Modify
Wall
Door
Window
Component
Room
Roof »
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text

View
Modelling
Drafting
Rendering
Site

1 : 100

Create a material takeoff

NUM

Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - 3D View: {3D}]

File Edit View Modelling Drafting Site Tools Settings Window Help

Basics
Modify
Wall
Door
Window
Component
Room
Roof »
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text

Swimming Pool 11 Oct 0...

- Views (all)
  - Floor Plans
    - Cap Level 63.5
    - G/F
    - New Cover for Flat R
    - New Flat Roof
    - R/F
    - Site
    - Top of Fencing
    - U/G Floor
    - Upper Roof
  - 3D Views
    - 1. Rock Profile
    - 2. Mini-piles
    - 3. Pile Caps & Footing
    - 4. Tie Beams
    - 5. Columns & Walls (
    - 6. Slabs & Gd. Beams
    - 7. G/F
    - 8. UG/F & New Flat R
    - 9. Roof
    - 10. NW Exterior
    - 11. Pool Interior
    - **{3D}**
  - Elevations (Building Eleve
  - Sections (Building Section
- Legends
- Schedules/Quantities
  - 2. Mini-Piles
  - 3. Pile Caps & Footings
  - 4. Tie Beams
  - 5a. Columns (Substructure
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  - 9. Walls (Superstructure)
  - 10. Roof Material Takeof
  - 11. Ramp Schedule
  - 12. Stairs Material Takeof
- Sheets (all)
- Families
- Groups

View
Modelling
Drafting
Rendering
Site

New Material Takeoff

Category:
- <Multi-Category>
- Casework
- Ceilings
- Columns
- Curtain Panels
- Doors
- Electrical Equipment
- Electrical Fixtures
- Floors
- Furniture
- Furniture Systems
- Generic Models
- Lighting Fixtures
- Mechanical Equipment
- Plumbing Fixtures
- Roofs

Name: Column Material Takeoff

Phase: New Construction

☐ Show categories from all disciplines

OK Cancel Help

1 : 100

Ready NUM

Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - 3D View: {3D}]

File Edit View Modelling Drafting Site Tools Settings Window Help

Plane Demolish Align Split Trim Offset

Basics
Modify
Wall
Door
Window
Component
Room
Roof »
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text

Swimming Pool 11 Oct 0...

- Views (all)
  - Floor Plans
    - Cap Level 63.5
    - G/F
    - New Cover for Flat R
    - New Flat Roof
    - R/F
    - Site
    - Top of Fencing
    - U/G Floor
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    - 6. Slabs & Gd. Beams
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    - 11. Pool Interior
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  - Elevations (Building Eleva
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  - 4. Tie Beams
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  - 9. Walls (Superstructure)
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  - 12. Stairs Material Takeof
- Sheets (all)
- Families
- Groups

View
Modelling
Drafting
Rendering
Site

Material Takeoff Properties

Fields | Filter | Sorting/Grouping | Formatting | Appearance

Available fields:

Length
Manufacturer
Mark
Material: Comments
Material: Cost
Material: Description
Material: Keynote
Material: Manufacturer
Material: Mark
Material: Model
Material: Name
Material: URL

Add -->
<-- Remove
Add Parameter...
Calculated Value...

Scheduled fields (in order):

Family
Type
Material: Area

Edit... Delete
Edit... Delete

Select available fields from:
Walls

Move Up Move Down

Include elements in linked files

確定 取消 說明

1 : 100

Ready NUM

Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - Schedule: 8b. Columns (Superstructure)]

File Edit View Modelling Drafting Site Tools Settings Window Help

Headers Group Ungroup Rows: New Delete Show

Basics

Modify
Wall
Door
Window
Component
Room
Roof »
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text

Swimming Pool 11 Oct 0...

- Views (all)
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    - 3. Pile Caps & Footing
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    - 5. Columns & Walls (
    - 6. Slabs & Gd. Beams
    - 7. G/F
    - 8. UG/F & New Flat R
    - 9. Roof
    - 10. NW Exterior
    - 11. Pool Interior
    - {3D}
  - Elevations (Building Eleva
  - Sections (Building Section
- Legends
- Schedules/Quantities
  - 2. Mini-Piles
  - 3. Pile Caps & Footings
  - 4. Tie Beams
  - 5a. Columns (Substructure
  - 5b. Bearing/Screen Walls
  - 6. Ground Beams
  - 7. Floor Material Takeoff
  - 8a. Beams (Superstructure
  - **8b. Columns (Superst**
  - 9. Walls (Superstructure)
  - 10. Roof Material Takeof
  - 11. Ramp Schedule
  - 12. Stairs Material Takeof
- Sheets (all)
- Families
- Groups

8b. Columns (Superstructure)

Family	Type	Material: Name	Mark	Length	Base Level	Base Offset	Top Level	Top Offset	Material: Area	Concrete: Volume	Location
R.C. Column (Superstructure)	400 x 850m	R.C. Grade 40/20 (Superstructure)	C24G	2550	G/F	0	U/G Floor	-150	7.055 m²	0.87 m³	
R.C. Column (Superstructure)	400 x 500m	R.C. Grade 40/20 (Superstructure)	C35G	2700	G/F	0	U/G Floor	0	5.260 m²	0.54 m³	
R.C. Column (Superstructure)	400 x 500m	R.C. Grade 40/20 (Superstructure)	C37G	2700	G/F	0	U/G Floor	0	5.260 m²	0.54 m³	
R.C. Column (Superstructure)	400 x 500m	R.C. Grade 40/20 (Superstructure)	C25G	2700	G/F	0	U/G Floor	0	5.260 m²	0.54 m³	
R.C. Column (Superstructure)	400 x 500m	R.C. Grade 40/20 (Superstructure)	C36G	2700	G/F	0	U/G Floor	0	5.260 m²	0.54 m³	
R.C. Column (Superstructure)	400 x 500m	R.C. Grade 40/20 (Superstructure)	C26G	2700	G/F	0	U/G Floor	0	5.260 m²	0.54 m³	
R.C. Column (Superstructure)	600 x 600m	R.C. Grade 40/20 (Superstructure)	C22G	5350	G/F	0	R/F	-150	13.560 m²	1.93 m³	
R.C. Column (Superstructure)	500 x 500m	R.C. Grade 40/20 (Superstructure)	C34G	2550	G/F	0	U/G Floor	-150	5.600 m²	0.64 m³	
R.C. Column (Superstructure)	500 x 500m	R.C. Grade 40/20 (Superstructure)	C33G	2550	G/F	0	U/G Floor	-150	5.600 m²	0.64 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C21G	2550	G/F	0	U/G Floor	-150	8.100 m²	1.22 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C23G	2550	G/F	0	U/G Floor	-150	8.100 m²	1.22 m³	
R.C. Column (Superstructure)	1150 x 600	R.C. Grade 40/20 (Superstructure)	C17G	5350	G/F	0	R/F	-150	20.105 m²	3.69 m³	
R.C. Column (Superstructure)	1150 x 600	R.C. Grade 40/20 (Superstructure)	C19G	5350	G/F	0	R/F	-150	20.105 m²	3.69 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C6G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C5G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C7G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C9G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C11G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C13G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C15G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C8G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C10G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C12G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C14G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C16G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C18G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	1150 x 700	R.C. Grade 40/20 (Superstructure)	C2G	5350	G/F	0	R/F	-150	21.405 m²	4.31 m³	
R.C. Column (Superstructure)	1150 x 700	R.C. Grade 40/20 (Superstructure)	C1G	5350	G/F	0	R/F	-150	21.405 m²	4.31 m³	
R.C. Column (Superstructure)	1150 x 600	R.C. Grade 40/20 (Superstructure)	C3G	5350	G/F	0	R/F	-150	20.105 m²	3.69 m³	
R.C. Column (Superstructure)	1150 x 600	R.C. Grade 40/20 (Superstructure)	C4G	5350	G/F	0	R/F	-150	20.105 m²	3.69 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C20G	5350	G/F	0	R/F	-150	15.940 m²	2.57 m³	
R.C. Column (Superstructure)	500 x 600m	R.C. Grade 40/20 (Superstructure)	C38G	3600	G/F	0	New Flat R	-150	8.520 m²	1.08 m³	
: 32									429.225 m²	69.63 m³	
R.C. Column (Superstructure)	300 x 300m	R.C. Grade 40/20 (Superstructure)	C39G	3750	G/F	0	New Flat R	0	4.680 m²	0.34 m³	New flat roof
R.C. Column (Superstructure)	300 x 300m	R.C. Grade 40/20 (Superstructure)	C40G	3750	G/F	0	New Flat R	0	4.680 m²	0.34 m³	New flat roof
R.C. Column (Superstructure)	300 x 300m	R.C. Grade 40/20 (Superstructure)	C41G	3900	G/F	0	New Flat R	150	4.860 m²	0.35 m³	New flat roof
New flat roof: 3									14.220 m²	1.08 m³	
R.C. Column (Superstructure)	400 x 500m	R.C. Grade 40/20 (Superstructure)	C35U	2650	U/G Floo	0	R/F	-150	5.170 m²	0.53 m³	
R.C. Column (Superstructure)	400 x 500m	R.C. Grade 40/20 (Superstructure)	C37U	2650	U/G Floo	0	R/F	-150	5.170 m²	0.53 m³	
R.C. Column (Superstructure)	400 x 500m	R.C. Grade 40/20 (Superstructure)	C25U	2650	U/G Floo	0	R/F	-150	5.170 m²	0.53 m³	
R.C. Column (Superstructure)	400 x 500m	R.C. Grade 40/20 (Superstructure)	C36U	2650	U/G Floo	0	R/F	-150	5.170 m²	0.53 m³	
R.C. Column (Superstructure)	400 x 500m	R.C. Grade 40/20 (Superstructure)	C26U	2650	U/G Floo	0	R/F	-150	5.170 m²	0.53 m³	
R.C. Column (Superstructure)	500 x 500m	R.C. Grade 40/20 (Superstructure)	C34U	2200	U/G Floo	0	R/F	-600	4.900 m²	0.55 m³	
R.C. Column (Superstructure)	500 x 500m	R.C. Grade 40/20 (Superstructure)	C33U	2200	U/G Floo	0	R/F	-600	4.900 m²	0.55 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C21U	2650	U/G Floo	0	R/F	-150	8.380 m²	1.27 m³	
R.C. Column (Superstructure)	800 x 600m	R.C. Grade 40/20 (Superstructure)	C23U	2650	U/G Floo	0	R/F	-150	8.380 m²	1.27 m³	
R.C. Column (Superstructure)	400 x 850m	R.C. Grade 40/20 (Superstructure)	C24U	2800	U/G Floo	0	R/F	0	7.680 m²	0.95 m³	
: 10									60.090 m²	7.25 m³	
R.C. Column (Substructure)	300 x 300m	R.C. Grade 40/20 (Superstructure)	P3F	3400	New Flat	0	New Cover f	0	4.260 m²	0.31 m³	New flat roof
R.C. Column (Substructure)	300 x 300m	R.C. Grade 40/20 (Superstructure)	C41F	3100	New Flat	300	New Cover f	0	3.900 m²	0.28 m³	New flat roof
New flat roof: 2									8.160 m²	0.59 m³	

View
Modelling
Drafting
Rendering
Site

Ready NUM

Default Model Quantities Explained
模型材料量的解释

	Area	Volumn	Length
Concrete Wall	1 vertical face (LxH) 一垂直面	LxWxH 长x阔x高	L
Concrete Structural Column	4 vertical faces 四垂直面 [2(L+W)xH]	LxWxH 长x阔x高	L
Concrete Floor	1 horizontal face 一平面 (LxW)	LxWxT 长x阔x厚	n/a

Material Take-Off with BIM - Key Issues (Courtesy from Mr. Kenny Tse)

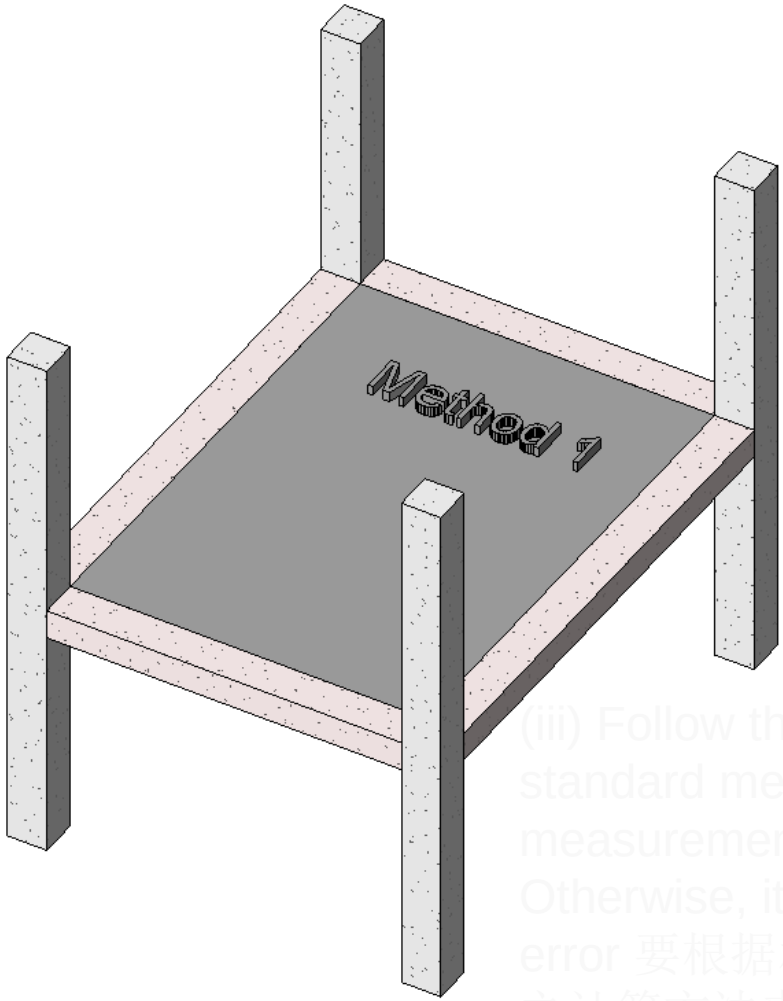
- (i) The default schedules only list out the objects which are appear in the model, i.e. No object ➞ No quantity
- (ii) Use the correct object, e.g. An *Architecture Column (no quantity parameter)* vs. a *Structural Column*
- (iii) Follow the stipulated standard method of measurement (SMM)? Otherwise, it may render a B.Q. error
- (iv) The model quantity may not necessary equal to the B.Q. quantity

Autodesk Revit Building 9 - [6 Jan 07 Shunde - 3D View: {3D}]

File Edit View Modelling Drafting Site Tools Settings Window Help

Basics
Modify
Wall
Door
Window
Component
Room
Roof »
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text

6 Jan 07 Shunde...
Views (all)
Floor Plans
1/F
2/F
G/F
Site
Ceiling Plans
1/F
G/F
3D Views
Elevations (Buil
East
North
South
West
Legends
Schedules/Quanti
Sheets (all)
Families
Groups



(ii) Follow the stipulated standard method of measurement (SMM). Otherwise, it may render a B.Q. error 要根据相关的标准工程量之计算方法来建构模型

View
Modelling
Drafting
Rendering
Site

1 : 100

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

NUM

Autodesk Revit Building 9 - [6 Jan 07 Shunde - 3D View: {3D}]

File Edit View Modelling Drafting Site Tools Settings Window Help

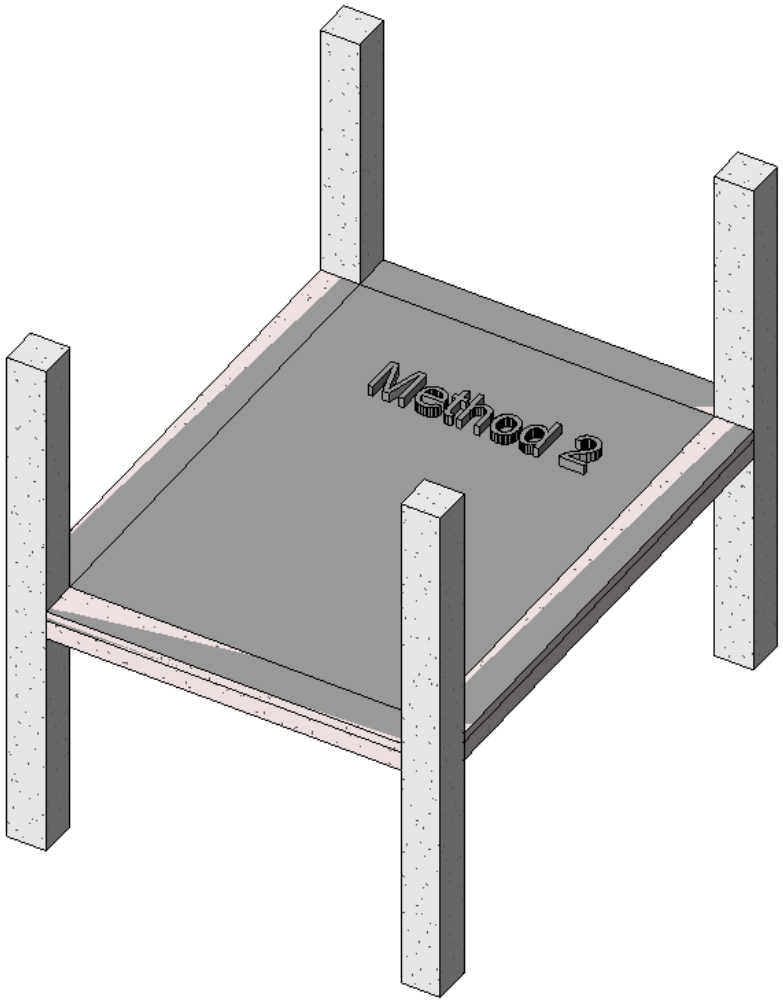
Move Copy Rotate Array Mirror Group 3D

Plane Demolish Align Split Trim Offset

Press + Drag

Basics
- Modify
- Wall
- Door
- Window
- Component
- Room
- Roof »
- Floor
- Grid
- Lines
- Ref Plane
- Dimension
- Section
- Level
- Text

6 Jan 07 Shunde...
- Views (all)
  - Floor Plans
    - 1/F
    - 2/F
    - G/F
    - Site
  - Ceiling Plans
    - 1/F
    - G/F
  - 3D Views
  - Elevations (Buil
    - East
    - North
    - South
    - West
- Legends
- Schedules/Quanti
- Sheets (all)
- Families
- Groups



View
Modelling
Drafting
Rendering
Site

1 : 100

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

NUM

Autodesk Revit Building 9 - [6 Jan 07 Shunde - 3D View: {3D}]

File Edit View Modelling Drafting Site Tools Settings Window Help

3D Move Copy Rotate Array Mirror Group

Plane Demolish Align Split Trim Offset

Press + Drag

Basics
- Modify
- Wall
- Door
- Window
- Component
- Room
- Roof »
- Floor
- Grid
- Lines
- Ref Plane
- Dimension
- Section
- Level
- Text

6 Jan 07 Shunde...
- Views (all)
  - Floor Plans
    - 1/F
    - 2/F
    - G/F
    - Site
  - Ceiling Plans
    - 1/F
    - G/F
  - 3D Views
  - Elevations (Buil
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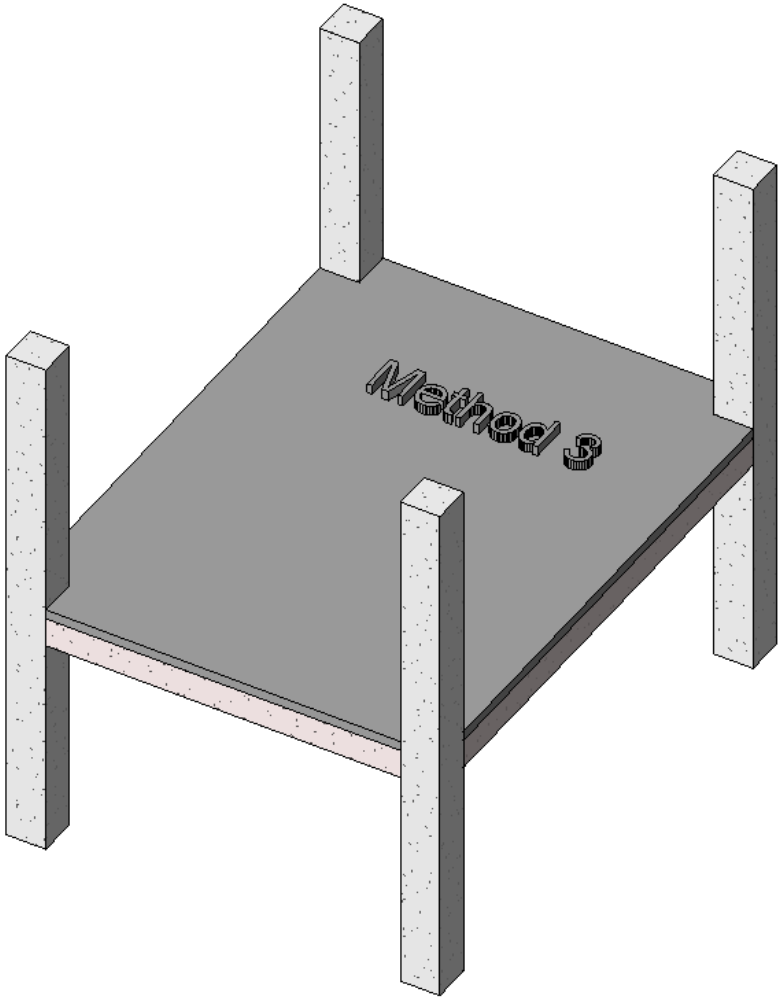
    - North
    - South
    - West
- Legends
- Schedules/Quanti
- Sheets (all)
- Families
- Groups



View
Modelling
Drafting
Rendering
Site

1 : 100

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

NUM

Autodesk Revit Building 9 - [6 Jan 07 Shunde - 3D View: {3D}]

File Edit View Modelling Drafting Site Tools Settings Window Help

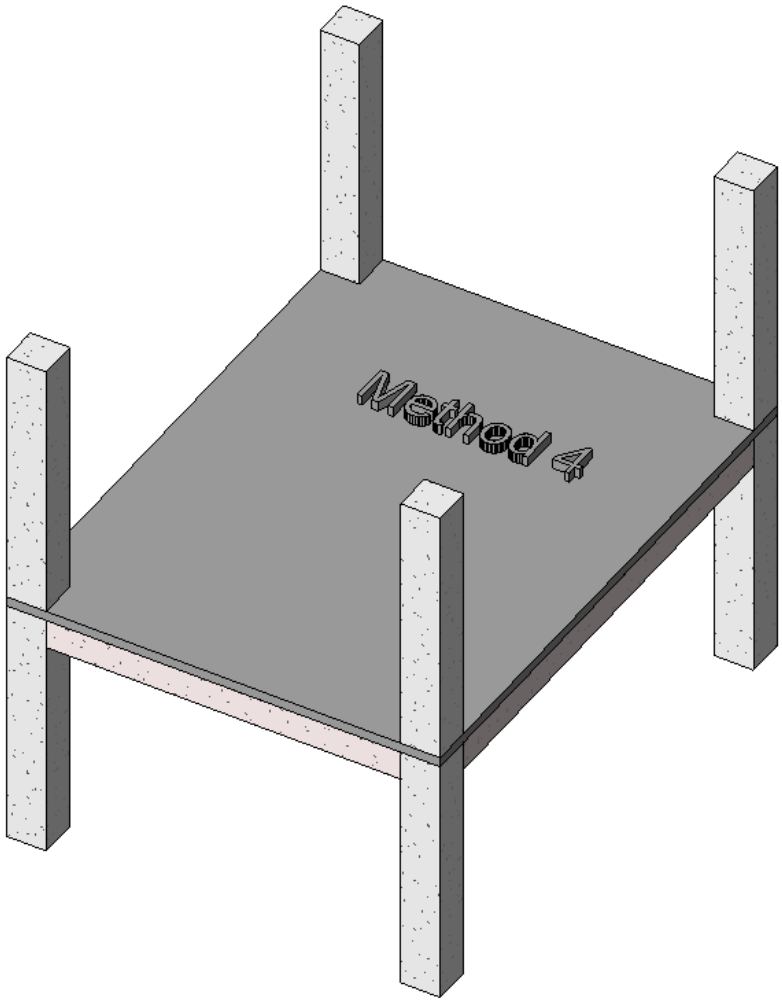
Move Copy Rotate Array Mirror Group 3D

Plane Demolish Align Split Trim Offset

Press + Drag

Basics
- Modify
- Wall
- Door
- Window
- Component
- Room
- Roof »
- Floor
- Grid
- Lines
- Ref Plane
- Dimension
- Section
- Level
- Text

6 Jan 07 Shunde...
- Views (all)
  - Floor Plans
    - 1/F
    - 2/F
    - G/F
    - Site
  - Ceiling Plans
    - 1/F
    - G/F
  - 3D Views
  - Elevations (Buil
    - East
    - North
    - South
    - West
- Legends
- Schedules/Quanti
- Sheets (all)
- Families
- Groups



View
Modelling
Drafting
Rendering
Site

1 : 100

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

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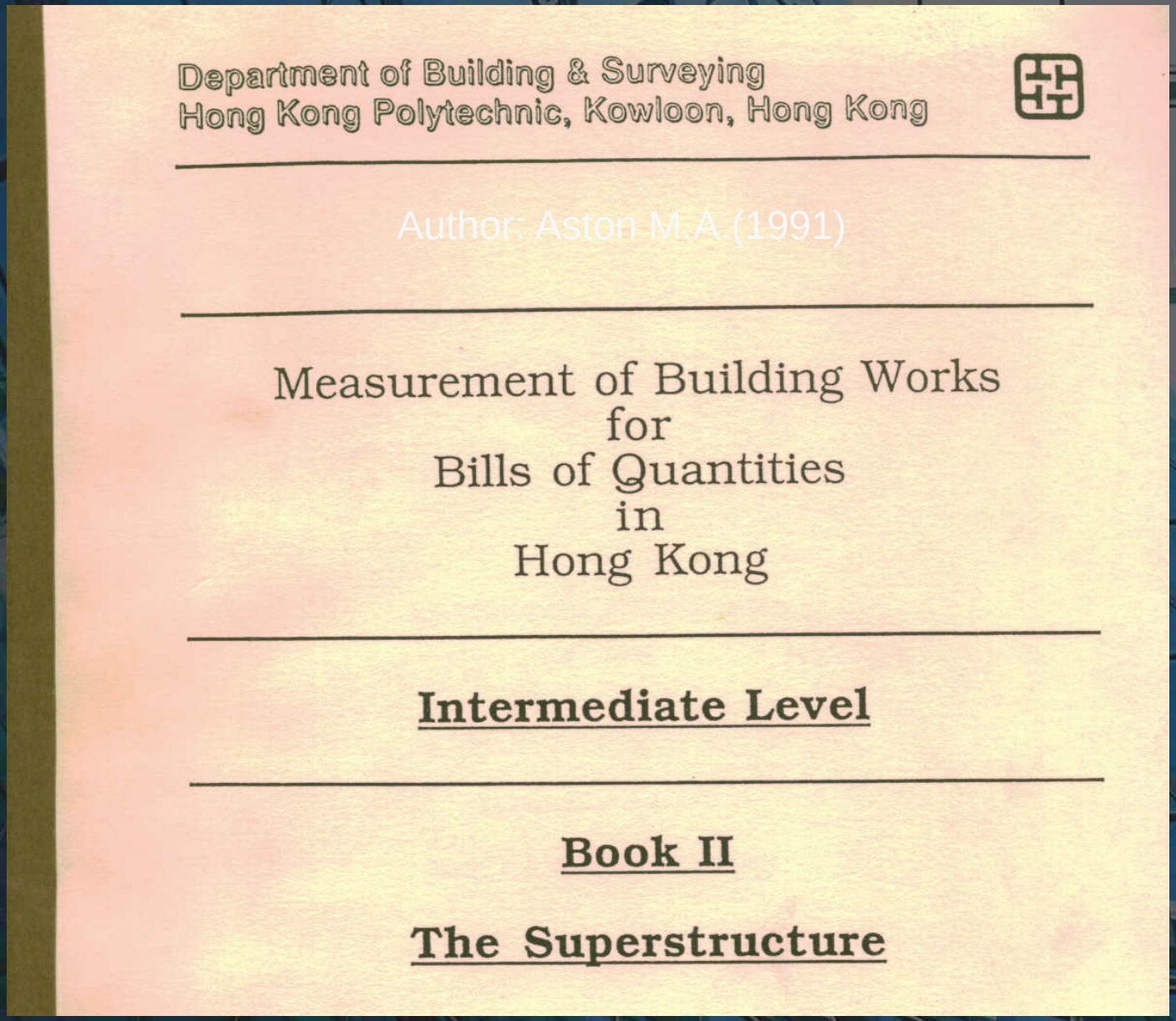

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Author: Aston M.A.(1991)

Measurement of Building Works
for
Bills of Quantities
in
Hong Kong

Intermediate Level

Book II

The Superstructure

香港工程量计算方法的教科书

© M A Ashton 1991

Concrete Measurement 混凝土量的计算方法

1) Suspended slabs are measured over everything, including over beams and column heads.* 楼板量的计算以楼板覆盖所有构件,包括梁及柱头

2) Columns before walls and beams.

3) Beams before walls except at end and intermediate bearings.

4) Primary beams before secondary beams, etc.

5) Staircases (waist and treads in flights) measured between suspended slabs and landings.

6) Staircase beams measured below staircase landings and waists.

7) Upstand beams measured above suspended slabs.

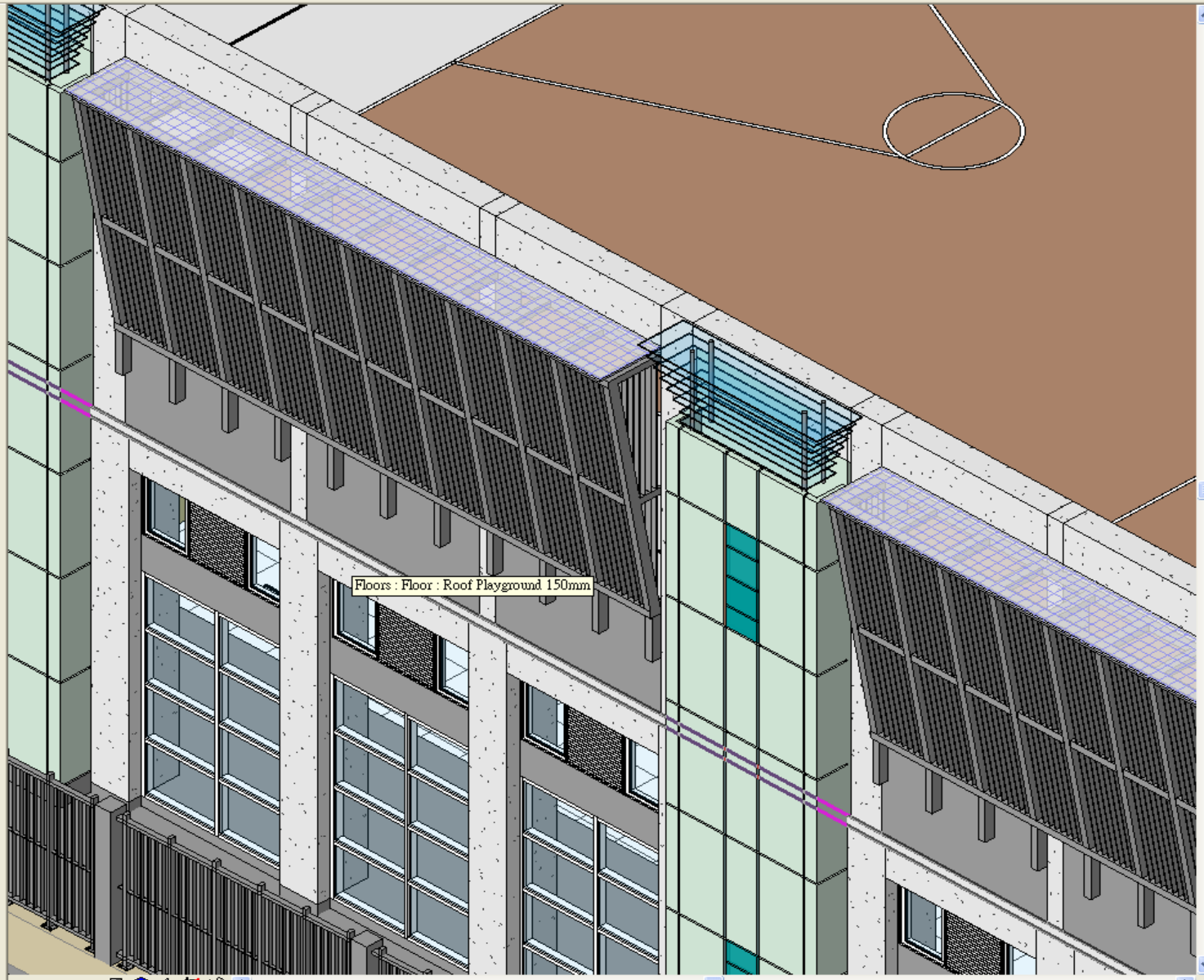
Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - 3D View: {3D}]

File Edit View Modelling Drafting Site Tools Settings Window Help

Plane Demolish Align Split Trim Offset Press + Drag

Basics
Modify
Wall
Door
Window
Component
Room
Roof »
Floor
Grid
Lines
Ref Plane
Dimension
Section
Level
Text

Swimming Pool 11 Oct 0...
- Views (all)
  - Floor Plans
    - Cap Level 63.5
    - G/F
    - New Cover for Flat R
    - New Flat Roof
    - R/F
    - Site
    - Top of Fencing
    - U/G Floor
    - Upper Roof
  - 3D Views
    - 1. Rock Profile
    - 2. Mini-piles
    - 3. Pile Caps & Footing
    - 4. Tie Beams
    - 5. Columns & Walls (
    - 6. Slabs & Gd. Beams
    - 7. G/F
    - 8. UG/F & New Flat R
    - 9. Roof
    - 10. N W Exterior
    - 11. Pool Interior
    - {3D}
  - Elevations (Building Eleva
  - Sections (Building Section
- Legends
- Schedules/Quantities
  - 2. Mini-Piles
  - 3. Pile Caps & Footings
  - 4. Tie Beams
  - 5a. Columns (Substructure
  - 5b. Bearing/Screen Walls
  - 6. Ground Beams
  - 7. Floor Material Takeoff
  - 8a. Beams (Superstructure
  - 8b. Columns (Superstructu
  - 9. Walls (Superstructure)
  - 10. Roof Material Takeof
  - 11. Ramp Schedule
  - 12. Stairs Material Takeof
- Sheets (all)
- Families
- Groups



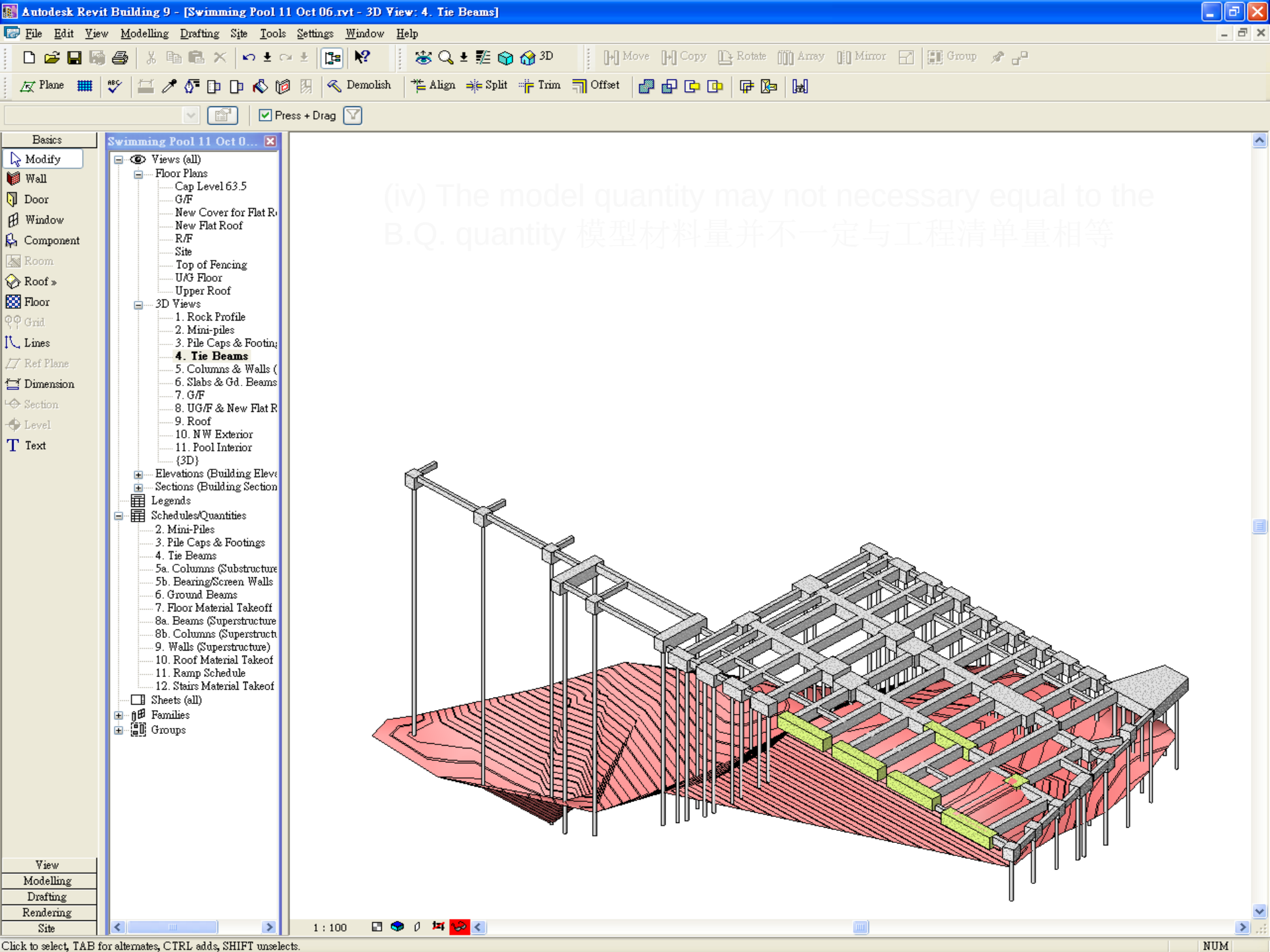
1 : 100

View
Modelling
Drafting
Rendering
Site

Floors : Floor : Roof Playground 150mm

NUM

(iv) The model quantity may not necessary equal to the B.Q. quantity 模型材料量并不一定与工程清单量相等



Autodesk Revit Building 9 - [Swimming Pool 11 Oct 06.rvt - Schedule: 2. Mini-Piles]

File Edit View Modelling Drafting Site Tools Settings Window Help

Basics | Modify | Wall | Door | Window | Component | Room | Roof » | Floor | Grid | Lines | Ref Plane | Dimension | Section | Level | Text

Swimming Pool 11 Oct 0...

- Views (all)
  - Floor Plans
    - Cap Level 63.5
    - G/F
    - New Cover for Flat R
    - New Flat Roof
    - R/F
    - Site
    - Top of Fencing
    - U/G Floor
    - Upper Roof
  - 3D Views
    - 1. Rock Profile
    - 2. Mini-piles
    - 3. Pile Caps & Footing
    - 4. Tie Beams
    - 5. Columns & Walls (
    - 6. Slabs & Gd. Beams
    - 7. G/F
    - 8. UG/F & New Flat R
    - 9. Roof
    - 10. N W Exterior
    - 11. Pool Interior
    - {3D}
  - Elevations (Building Eleva
  - Sections (Building Section
- Legends
- Schedules/Quantities
  - **2. Mini-Piles**
  - 3. Pile Caps & Footings
  - 4. Tie Beams
  - 5a. Columns (Substructure
  - 5b. Bearing/Screen Walls
  - 6. Ground Beams
  - 7. Floor Material Takeoff
  - 8a. Beams (Superstructure
  - 8b. Columns (Superstructu
  - 9. Walls (Superstructure)
  - 10. Roof Material Takeof
  - 11. Ramp Schedule
  - 12. Stairs Material Takeof
- Sheets (all)
- Families
- Groups

View | Modelling | Drafting | Rendering | Site

Headers Group Ungroup Rows: New Delete Show

2. Mini-Piles

Family	Type	Mark	Base Level	Base Offset	Top Level	Top Offset	Length	Comments
Mini-Pile	273mm	24P1	Cap Level 62.23	-5830	Cap Level 62.23	-1200	4.630	
Mini-Pile	273mm	23P1	Cap Level 62.23	-5530	Cap Level 62.23	-1200	4.330	
Mini-Pile	273mm	25P1	Cap Level 62.23	-6630	Cap Level 62.23	-1200	5.430	
Mini-Pile	273mm	26P1	Cap Level 62.23	-7730	Cap Level 62.23	-1200	6.530	
Mini-Pile	273mm	26P2	Cap Level 62.23	-8030	Cap Level 62.23	-1200	6.830	
Mini-Pile	273mm	27P1	Cap Level 62.23	-8930	Cap Level 62.23	-1200	7.730	
Mini-Pile	273mm	22P1	Cap Level 62.23	-7930	Cap Level 62.23	-1200	6.730	
Mini-Pile	273mm	22P2	Cap Level 62.23	-7430	Cap Level 62.23	-1200	6.230	
: 8								
Cap Level 62.23: 8								
Mini-Pile	273mm	28P1	Cap Level 63.0	-10000	Cap Level 63.0	-1200	8.800	
Mini-Pile	273mm	29P1	Cap Level 63.0	-9800	Cap Level 63.0	-1200	8.600	
Mini-Pile	273mm	29P2	Cap Level 63.0	-9300	Cap Level 63.0	-1200	8.100	
Mini-Pile	273mm	29P4	Cap Level 63.0	-9000	Cap Level 63.0	-1200	7.800	
Mini-Pile	273mm	29P5	Cap Level 63.0	-8600	Cap Level 63.0	-1200	7.400	
Mini-Pile	273mm	29P7	Cap Level 63.0	-8300	Cap Level 63.0	-1200	7.100	
Mini-Pile	273mm	29P3	Cap Level 63.0	-9000	Cap Level 63.0	-1200	7.800	
Mini-Pile	273mm	29P6	Cap Level 63.0	-8600	Cap Level 63.0	-1200	7.400	
Mini-Pile	273mm	21P1	Cap Level 63.0	-7800	Cap Level 63.0	-1200	6.600	
Mini-Pile	273mm	21P2	Cap Level 63.0	-7600	Cap Level 63.0	-1200	6.400	
Mini-Pile	273mm	20P1	Cap Level 63.0	-7200	Cap Level 63.0	-1200	6.000	
Mini-Pile	273mm	20P2	Cap Level 63.0	-7100	Cap Level 63.0	-1200	5.900	
Mini-Pile	273mm	18P1	Cap Level 63.0	-7100	Cap Level 63.0	-1200	5.900	
Mini-Pile	273mm	18P2	Cap Level 63.0	-7100	Cap Level 63.0	-1200	5.900	
Mini-Pile	273mm	17P1	Cap Level 63.0	-7400	Cap Level 63.0	-1200	6.200	
Mini-Pile	273mm	17P2	Cap Level 63.0	-7700	Cap Level 63.0	-1200	6.500	
Mini-Pile	273mm	16P1	Cap Level 63.0	-8200	Cap Level 63.0	-1200	7.000	
Mini-Pile	273mm	16P2	Cap Level 63.0	-8700	Cap Level 63.0	-1200	7.500	
Mini-Pile	273mm	13P2	Cap Level 63.0	-5100	Cap Level 63.0	-1200	3.900	
Mini-Pile	273mm	13P1	Cap Level 63.0	-5100	Cap Level 63.0	-1200	3.900	
Mini-Pile	273mm	19P2	Cap Level 63.0	-6200	Cap Level 63.0	-1200	5.000	
Mini-Pile	273mm	19P1	Cap Level 63.0	-5900	Cap Level 63.0	-1200	4.700	
Mini-Pile	273mm	19P4	Cap Level 63.0	-5800	Cap Level 63.0	-1200	4.600	
Mini-Pile	273mm	19P3	Cap Level 63.0	-5500	Cap Level 63.0	-1200	4.300	
Mini-Pile	273mm	14P2	Cap Level 63.0	-7500	Cap Level 63.0	-1200	6.300	
Mini-Pile	273mm	14P1	Cap Level 63.0	-7300	Cap Level 63.0	-1200	6.100	
Mini-Pile	273mm	19RP4	Cap Level 63.0	-7400	Cap Level 63.0	-1200	6.200	
Mini-Pile	273mm	19RP3	Cap Level 63.0	-7100	Cap Level 63.0	-1200	5.900	
Mini-Pile	273mm	19RP2	Cap Level 63.0	-8200	Cap Level 63.0	-1200	7.000	
Mini-Pile	273mm	19RP1	Cap Level 63.0	-8000	Cap Level 63.0	-1200	6.800	
: 30								
Cap Level 63.0: 30								
Mini-Pile	273mm	5P1	Cap Level 63.5	-16800	Cap Level 63.5	-1200	15.600	
Mini-Pile	273mm	5P2	Cap Level 63.5	-16800	Cap Level 63.5	-1200	15.600	
Mini-Pile	273mm	4P2	Cap Level 63.5	-17300	Cap Level 63.5	-1200	16.100	
Mini-Pile	273mm	4P1	Cap Level 63.5	-16600	Cap Level 63.5	-1200	15.400	
Mini-Pile	273mm	8P2	Cap Level 63.5	-15200	Cap Level 63.5	-1200	14.000	
Mini-Pile	273mm	8P1	Cap Level 63.5	-14300	Cap Level 63.5	-1200	13.100	
Mini-Pile	273mm	10P2	Cap Level 63.5	-12400	Cap Level 63.5	-1200	11.200	
Mini-Pile	273mm	10P1	Cap Level 63.5	-11300	Cap Level 63.5	-1200	10.100	
Mini-Pile	273mm	12P2	Cap Level 63.5	-9300	Cap Level 63.5	-1200	8.100	
Mini-Pile	273mm	12P1	Cap Level 63.5	-8200	Cap Level 63.5	-1200	7.000	
Mini-Pile	273mm	15P1	Cap Level 63.5	-10400	Cap Level 63.5	-1200	9.200	

Ready NUM

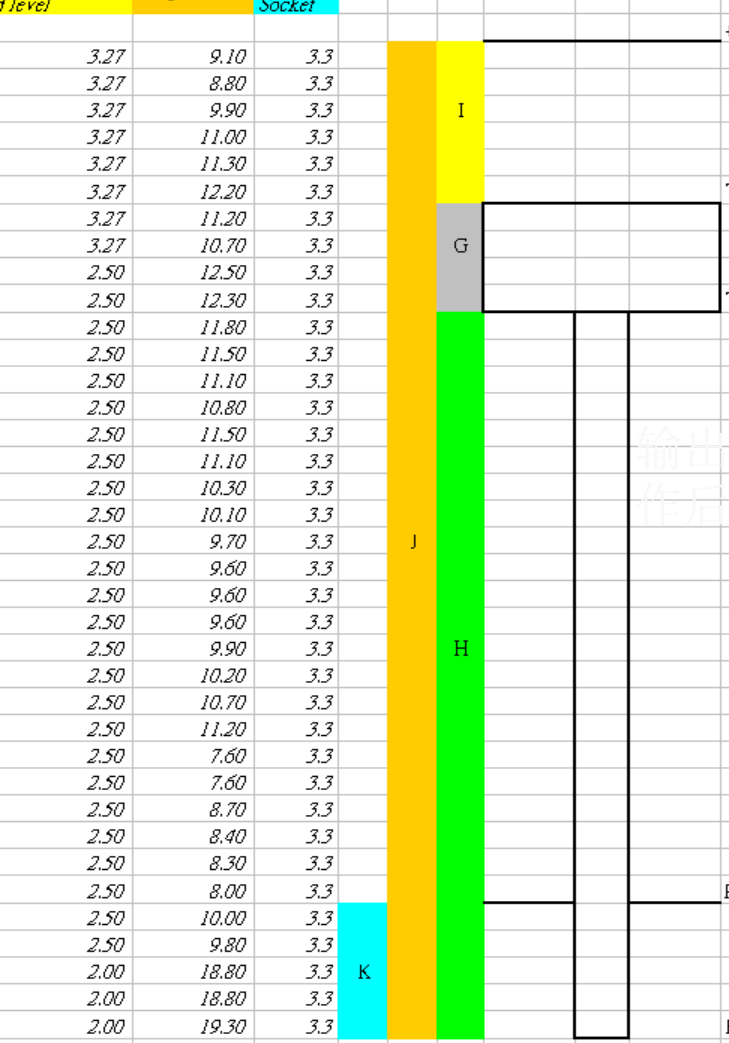
Microsoft Excel - Mini-Piles.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

A1 Mini-Piles

Mini-Piles

Family	Type	Mark	Base Level	Base Offset	Top Level	Top Offset	Length	*Distance between top level and existing ground level*	*Total Length*	*E.O. for Rock Socket*
							= F - E			
Mini-Pile	273mm	24P1	Cap Level 62.23	-5830	Cap Level 62.23	-1200	4.63	*3.27*	*9.10*	*3.3*
Mini-Pile	273mm	23P1	Cap Level 62.23	-5530	Cap Level 62.23	-1200	4.33	*3.27*	*8.80*	*3.3*
Mini-Pile	273mm	25P1	Cap Level 62.23	-6630	Cap Level 62.23	-1200	5.43	*3.27*	*9.90*	*3.3*
Mini-Pile	273mm	26P1	Cap Level 62.23	-7730	Cap Level 62.23	-1200	6.53	*3.27*	*11.00*	*3.3*
Mini-Pile	273mm	26P2	Cap Level 62.23	-8030	Cap Level 62.23	-1200	6.83	*3.27*	*11.30*	*3.3*
Mini-Pile	273mm	27P1	Cap Level 62.23	-8930	Cap Level 62.23	-1200	7.73	*3.27*	*12.20*	*3.3*
Mini-Pile	273mm	22P1	Cap Level 62.23	-7930	Cap Level 62.23	-1200	6.73	*3.27*	*11.20*	*3.3*
Mini-Pile	273mm	22P2	Cap Level 62.23	-7430	Cap Level 62.23	-1200	6.23	*3.27*	*10.70*	*3.3*
Mini-Pile	273mm	28P1	Cap Level 63.0	-10000	Cap Level 63.0	-1200	8.80	*2.50*	*12.50*	*3.3*
Mini-Pile	273mm	29P1	Cap Level 63.0	-9800	Cap Level 63.0	-1200	8.60	*2.50*	*12.30*	*3.3*
Mini-Pile	273mm	29P2	Cap Level 63.0	-9300	Cap Level 63.0	-1200	8.10	*2.50*	*11.80*	*3.3*
Mini-Pile	273mm	29P4	Cap Level 63.0	-9000	Cap Level 63.0	-1200	7.80	*2.50*	*11.50*	*3.3*
Mini-Pile	273mm	29P5	Cap Level 63.0	-8600	Cap Level 63.0	-1200	7.40	*2.50*	*11.10*	*3.3*
Mini-Pile	273mm	29P7	Cap Level 63.0	-8300	Cap Level 63.0	-1200	7.10	*2.50*	*10.80*	*3.3*
Mini-Pile	273mm	29P3	Cap Level 63.0	-9000	Cap Level 63.0	-1200	7.80	*2.50*	*11.50*	*3.3*
Mini-Pile	273mm	29P6	Cap Level 63.0	-8600	Cap Level 63.0	-1200	7.40	*2.50*	*11.10*	*3.3*
Mini-Pile	273mm	21P1	Cap Level 63.0	-7800	Cap Level 63.0	-1200	6.60	*2.50*	*10.30*	*3.3*
Mini-Pile	273mm	21P2	Cap Level 63.0	-7600	Cap Level 63.0	-1200	6.40	*2.50*	*10.10*	*3.3*
Mini-Pile	273mm	20P1	Cap Level 63.0	-7200	Cap Level 63.0	-1200	6.00	*2.50*	*9.70*	*3.3*
Mini-Pile	273mm	20P2	Cap Level 63.0	-7100	Cap Level 63.0	-1200	5.90	*2.50*	*9.60*	*3.3*
Mini-Pile	273mm	18P1	Cap Level 63.0	-7100	Cap Level 63.0	-1200	5.90	*2.50*	*9.60*	*3.3*
Mini-Pile	273mm	18P2	Cap Level 63.0	-7100	Cap Level 63.0	-1200	5.90	*2.50*	*9.60*	*3.3*
Mini-Pile	273mm	17P1	Cap Level 63.0	-7400	Cap Level 63.0	-1200	6.20	*2.50*	*9.90*	*3.3*
Mini-Pile	273mm	17P2	Cap Level 63.0	-7700	Cap Level 63.0	-1200	6.50	*2.50*	*10.20*	*3.3*
Mini-Pile	273mm	16P1	Cap Level 63.0	-8200	Cap Level 63.0	-1200	7.00	*2.50*	*10.70*	*3.3*
Mini-Pile	273mm	16P2	Cap Level 63.0	-8700	Cap Level 63.0	-1200	7.50	*2.50*	*11.20*	*3.3*
Mini-Pile	273mm	13P2	Cap Level 63.0	-5100	Cap Level 63.0	-1200	3.90	*2.50*	*7.60*	*3.3*
Mini-Pile	273mm	13P1	Cap Level 63.0	-5100	Cap Level 63.0	-1200	3.90	*2.50*	*7.60*	*3.3*
Mini-Pile	273mm	19P2	Cap Level 63.0	-6200	Cap Level 63.0	-1200	5.00	*2.50*	*8.70*	*3.3*
Mini-Pile	273mm	19P1	Cap Level 63.0	-5900	Cap Level 63.0	-1200	4.70	*2.50*	*8.40*	*3.3*
Mini-Pile	273mm	19P4	Cap Level 63.0	-5800	Cap Level 63.0	-1200	4.60	*2.50*	*8.30*	*3.3*
Mini-Pile	273mm	19P3	Cap Level 63.0	-5500	Cap Level 63.0	-1200	4.30	*2.50*	*8.00*	*3.3*
Mini-Pile	273mm	14P2	Cap Level 63.0	-7500	Cap Level 63.0	-1200	6.30	*2.50*	*10.00*	*3.3*
Mini-Pile	273mm	14P1	Cap Level 63.0	-7300	Cap Level 63.0	-1200	6.10	*2.50*	*9.80*	*3.3*
Mini-Pile	273mm	5P1	Cap Level 63.5	-16800	Cap Level 63.5	-1200	15.60	*2.00*	*18.80*	*3.3*
Mini-Pile	273mm	5P2	Cap Level 63.5	-16800	Cap Level 63.5	-1200	15.60	*2.00*	*18.80*	*3.3*
Mini-Pile	273mm	4P2	Cap Level 63.5	-17300	Cap Level 63.5	-1200	16.10	*2.00*	*19.30*	*3.3*
Mini-Pile	273mm	4P1	Cap Level 63.5	-16600	Cap Level 63.5	-1200	15.40	*2.00*	*18.60*	*3.3*
Mini-Pile	273mm	8P2	Cap Level 63.5	-15200	Cap Level 63.5	-1200	14.00	*2.00*	*17.20*	*3.3*



輸出列表至Excel
作后期處理

Mini-Piles

Ready NUM

Microsoft Excel - Bill No. 4 - Piling.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

A1

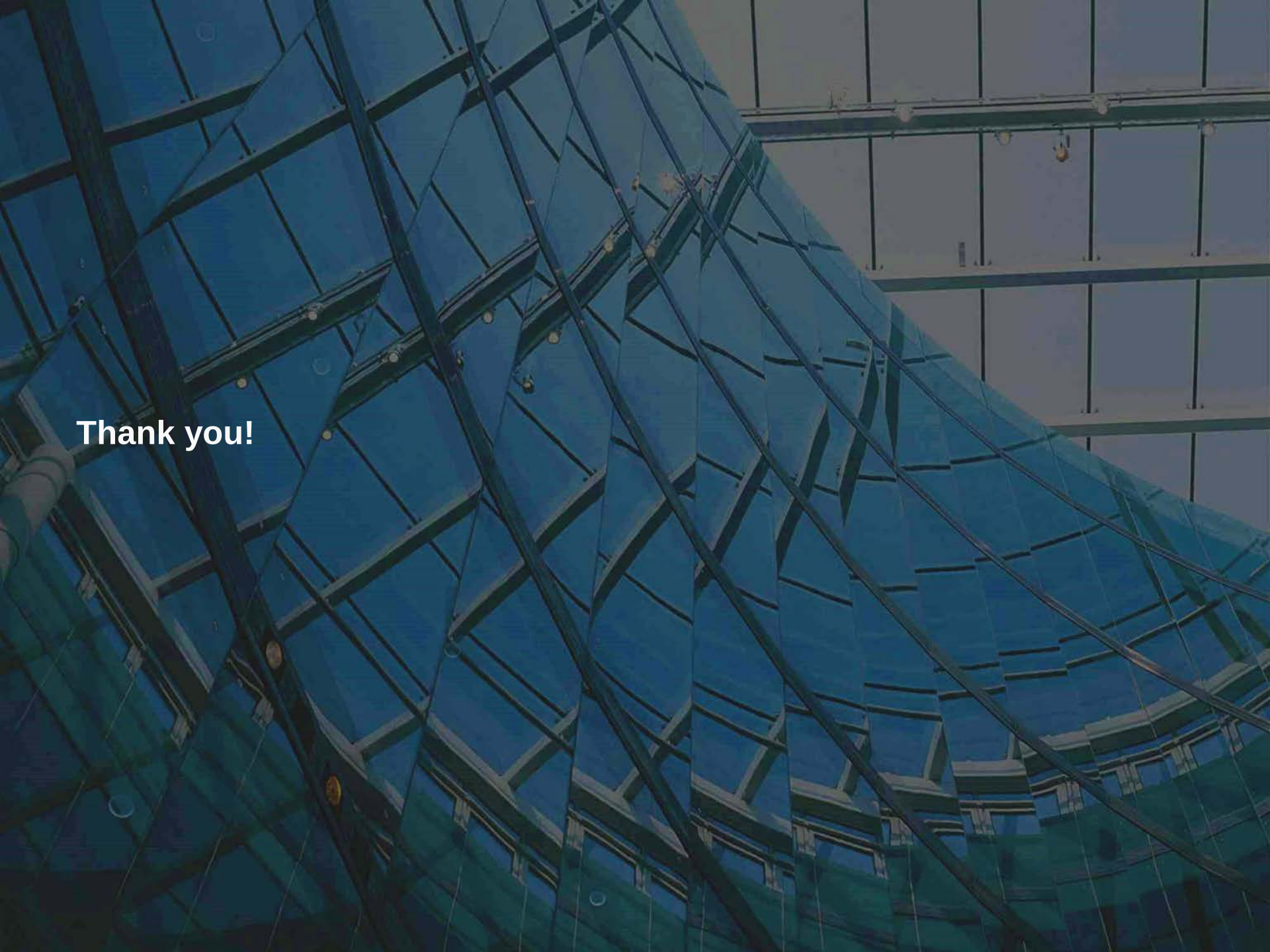
	A	B	C	D	E	F	G	H
1							BILL NO. 4	
2							PILING	
3								
4	Item	Description	Quantity	Unit	Rate	Total		
5								
6		Bill No. 4						
7		PILING						
8								
9		MINI-PILE FOUNDATION						
10								
11	A	Vertical pile 273mm diameter including drilling, steel casing, steel reinforcement, coupler and grouting		m				
12								
13	B	Extra over for drilling in rock socket (PROVISIONAL)		m				
14								
15	C	Raking pile 273mm diameter including drilling, steel reinforcement and grouting		m				
16								
17	D	Extra over for drilling in rock socket (PROVISIONAL)		m				
18								

Bill No. 4 / Bill No. 4 Backup

Ready NUM

Conclusion (Courtesy from Mr. Kenny Tse)

- BIM is a tool to facilitate material take-off
- Save resources in material take-off; could use the saved resources to enhance other services of quantity surveyors
- The default material schedules only list out the objects which are appear in the model
- Use the correct object
- Pay attention to the stipulated standard method of measurement (SMM).
- Model Quantities are not necessarily = Bill of Quantities
- BIM in Material take-off: QS's domain knowledge is essential



Thank you!