

真BIM，假BIM，半BIM

冯树坚

香港建筑信息模拟学会副主席 香港註冊建築師
香港大学BIM 课程讲师



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The Hong Kong Institute of Building Information Modelling
香港建築信息模擬學會

HKIBIM Launch on 8th Jan 2010

Hong Kong Institute of Building Information Modelling (HKIBIM) was established in Jan 2009. After one year's preparation, it is proud to announce the launch of HKIBIM. On 8 Jan, 2010, the Launch was successfully held at the Hong Kong Club Building.

After opening speech by Ir Francis Leung, the Chairman of HKIBIM, the first fellow member of HKIBIM, Ms Ada Fung, made her speech followed by Architect Mr David Fung, Vice Chairman, sharing the membership application method and further direction of HKIBIM.

The launch ended with cocktail and networking until late night.



Click [here](#) to view the event photos.

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HKIBIM Launch on 8th Jan 2010
Official Launch of The Hong Kong Institute of Building Information Modelling (HKIBIM)

Useful Links

Membership Application Form:



PDF format

Link: www.hkibim.org

HKIBIM 的目标

- 促进和推动业界對 **BIM** 教育，理解，欣赏和兴趣，對建筑信息作出管理;
- 建立和推进建设行业信息化管理的实践标准。
- 建立与有关高等教育机构，政府决策局/部门，法定机构和其他组织的联系;
- 研究，推动和促进更好的信息化建设管理手段，在整个建筑生命周期改善沟通，协调，管理，生产力，交付时间，成本和质量;
- 提供建筑信息管理专业的职业指导;

- 三维模 - 非BIM也
- CG (Computer Graphic) - 非BIM也
- 有其型而没其神 - 非BIM也
- 有型, 有量, 能碰; 乃半BIM 矣
- 有型, 有神, 有务; 乃真BIM 也



B = Building 建築

I = Information 資訊

M = Modelling 模型/ 模擬

真耶, 假耶? 不在乎平台, 在於**BIM** 的應用程度和方法。



假BIM

三维模 - 非BIM也

M + ?



假BIM



假BIM

- CG (Computer Graphic) - 非BIM也
- 有其型而没其神 - 非BIM也

用 **BIM** 工具非等如用 **BIM!!!**



半BIM

I <> M

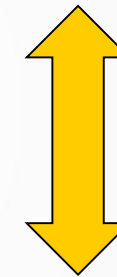
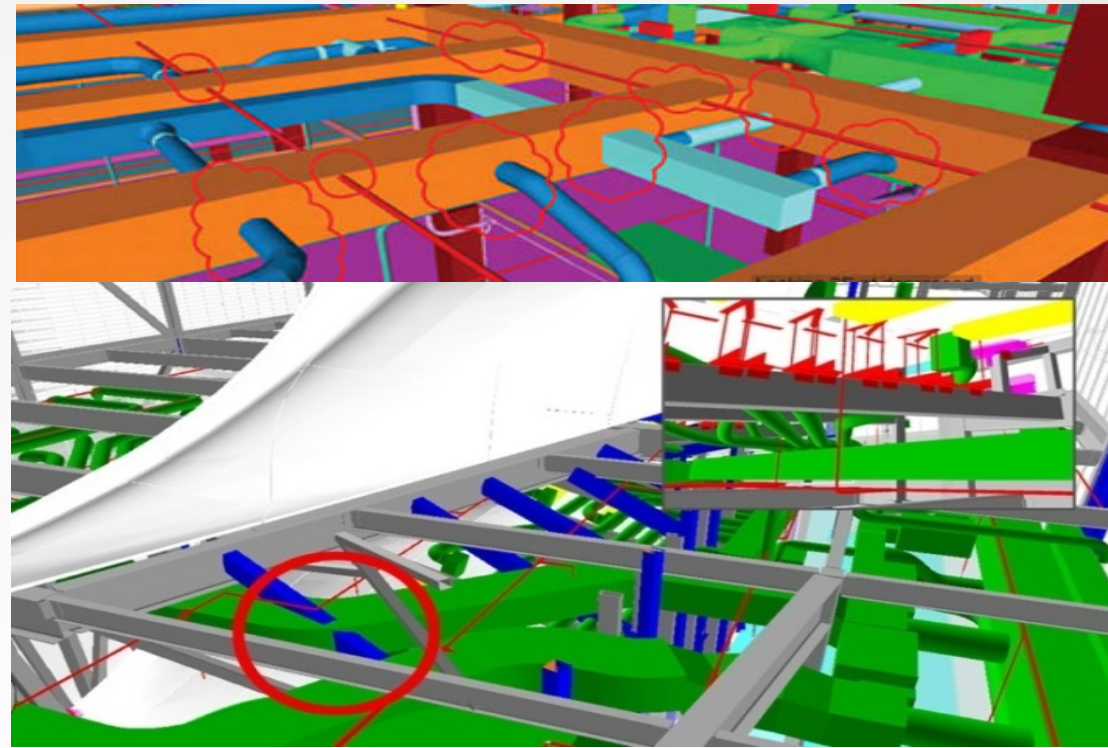
- 有型, 有量, 能碰; 乃半BIM 矣

半BIM

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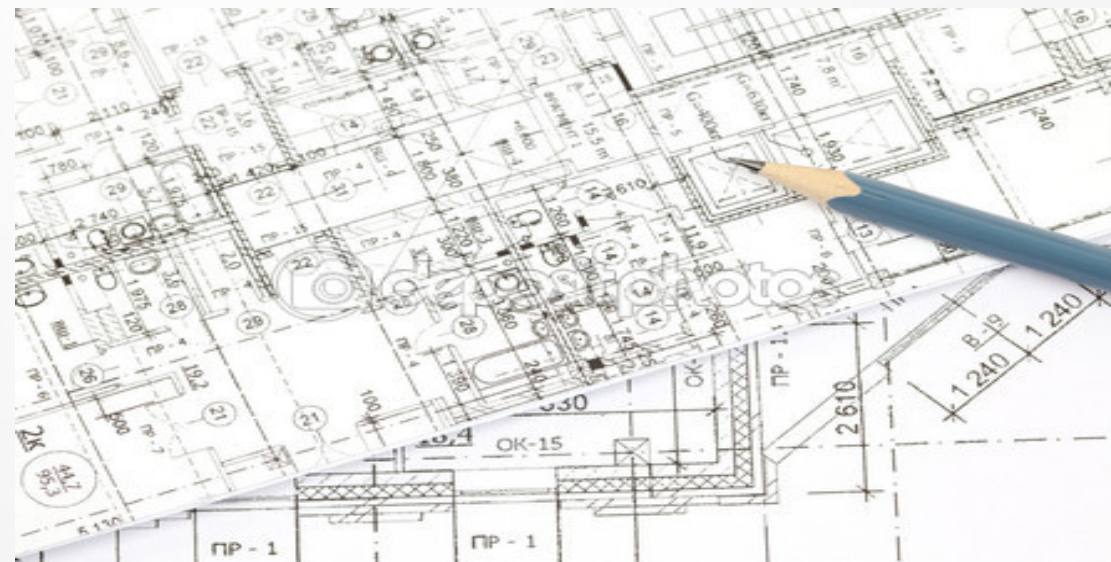
REVIT/
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CAD



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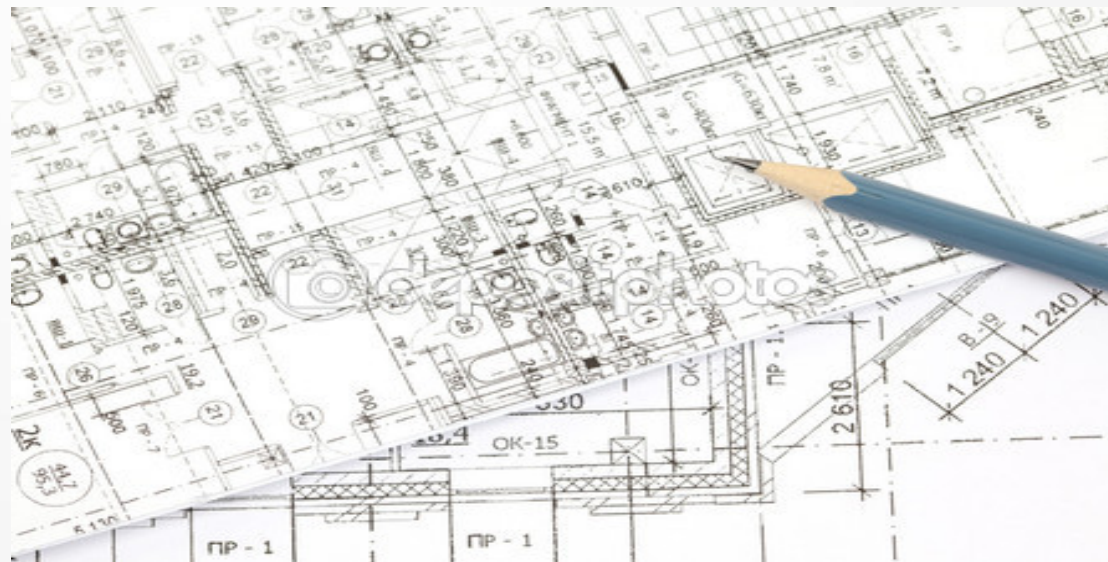
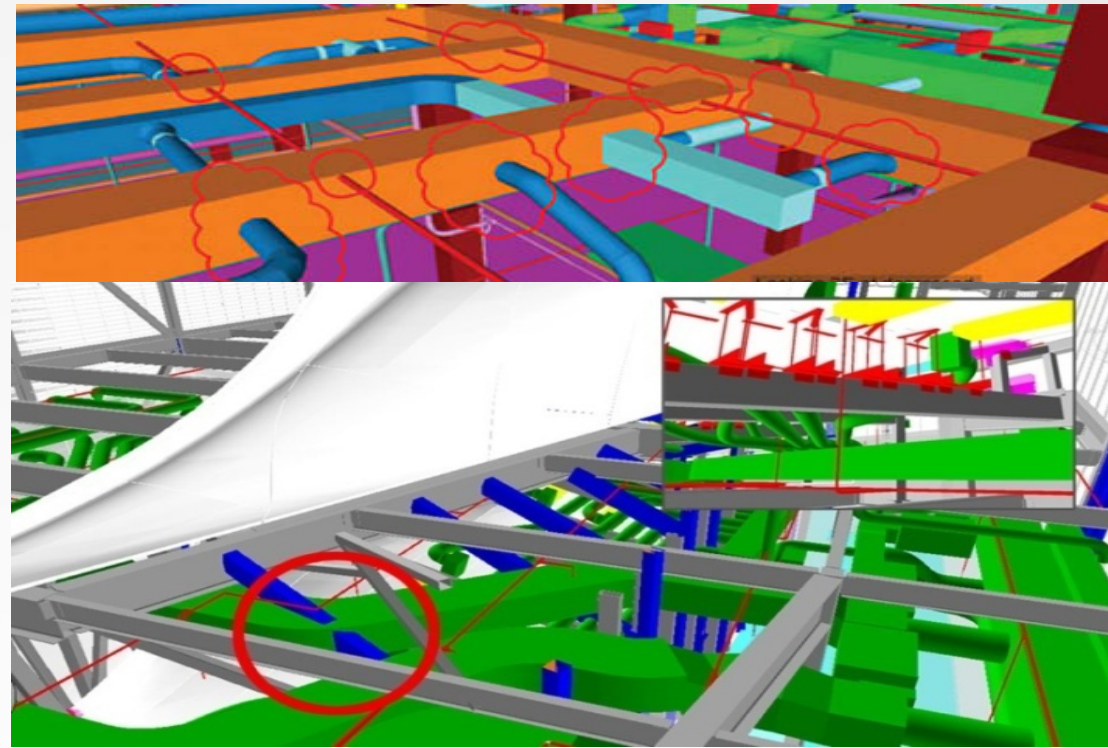
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設計

REVIT/
NAVIS WORKS



Drawings

Over Symbolized and
Needs collaboration among
Showing "Design Intent only" - not
actual routing Designer role and
tion Role

Conclusi

- BIM CAN produce E&M Drawings BIM enhances collaboration BIM facilitates automation

BIM in E&M Design and Drawings



and Air conditioning Fire Services Plumbing & Drainage Electrical Telecommunications... Schematics Elevations and Sections (Setting out) Equipment Schedules Construction Details (Typical Details) Some Reference files (existing conditions)

http://prezi.com/z2_-8nbjka13/copy-of-bim-in-em-design-and-documentation/

Fut

Automate

Constr

Combined

BIM is....?

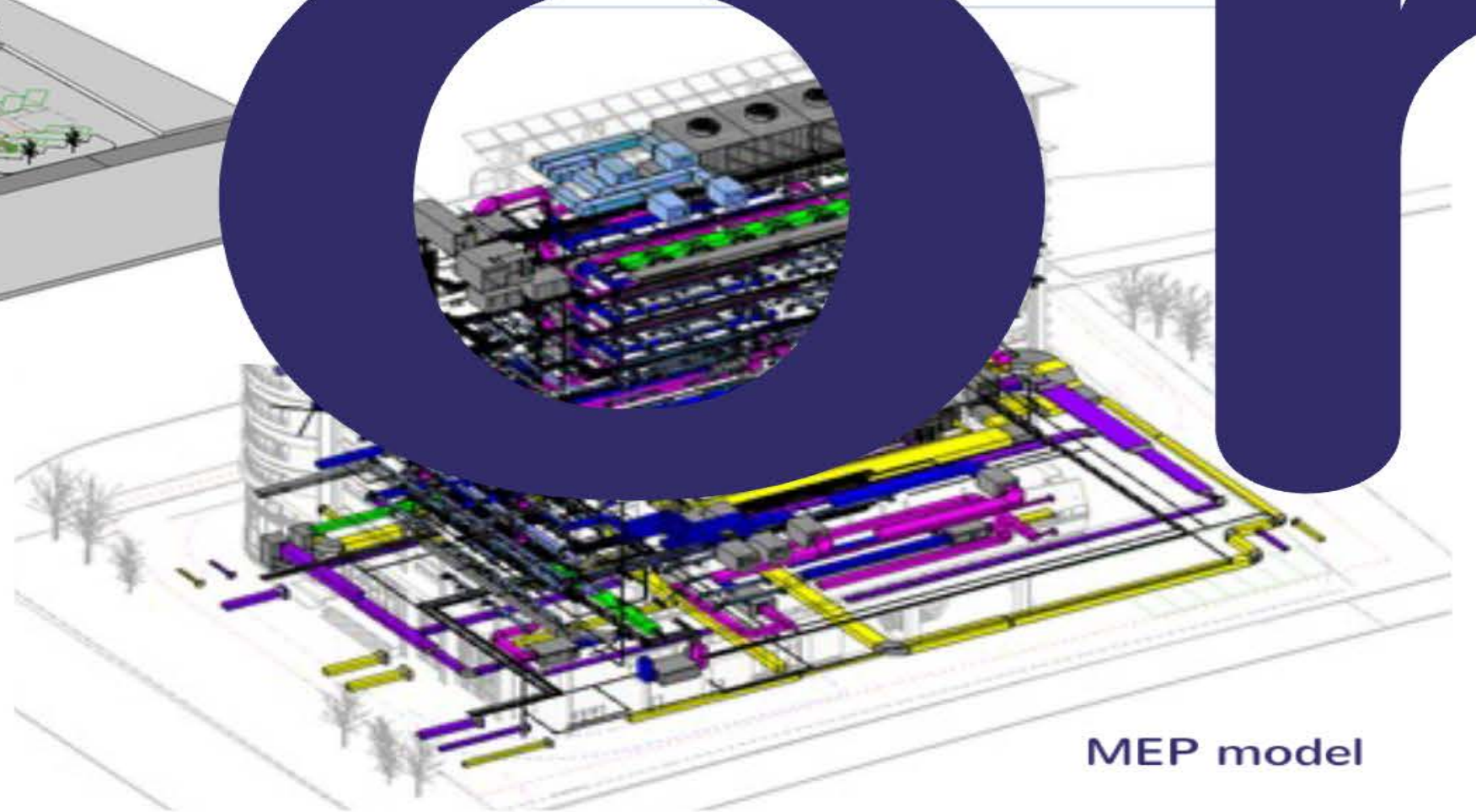
3D Modelling? Use  for Clash Analysis?



[]



Architectural + Structural M



MEP model

CONTRACT [REDACTED]

[REDACTED]

TENDER DRAWINGS

TENDER ISSUE

[REDACTED]

[REDACTED]

CONFIDENTIAL



CK004.B LIST					
Drawing Number		Drawing Title			
				Revision No.	Remark
CK004.B/T/QVB/MTR	000/000	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB		A	
CK004.B/T/QVB/MTR	A00/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	DRAWING LIST	A	
CK004.B/T/QVB/MTR	A00/002	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	CO-ORDINATED LAYOUT PLAN	A	
CK004.B/T/QVB/MTR	A10/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	GENERAL NOTE	A	
CK004.B/T/QVB/MTR	A10/002	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	PROPOSED AND DETAILS OF FLOOR COATING SYSTEM	A	SIGN PLATES AND ROOM PLATES DETAILS
CK004.B/T/QVB/MTR	A10/003	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	STANDARD BLOCKWORK DETAILS (SHEET 1 OF 6)	A	
CK004.B/T/QVB/MTR	A10/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	STANDARD BLOCKWORK DETAILS (SHEET 2 OF 6)	A	
CK004.B/T/QVB/MTR	A10/002	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	STANDARD BLOCKWORK DETAILS (SHEET 3 OF 6)	A	
CK004.B/T/QVB/MTR	A10/003	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	STANDARD BLOCKWORK DETAILS (SHEET 4 OF 6)	A	
CK004.B/T/QVB/MTR	A10/004	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	STANDARD BLOCKWORK DETAILS (SHEET 5 OF 6)	A	
CK004.B/T/QVB/MTR	A10/005	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	STANDARD BLOCKWORK DETAILS (SHEET 6 OF 6)	A	
CK004.B/T/QVB/MTR	A12/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	SITE LOCATION PLAN AND ACCESS ROUTE - QVB VENTILATION BUILDING	A	FOR REFERENCE ONLY
CK004.B/T/QVB/MTR	A12/002	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	CO-ORDINATED SECTIONS	A	
CK004.B/T/QVB/MTR	A12/003	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	CO-ORDINATED SECTIONS	A	
CK004.B/T/QVB/MTR	A12/004	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	CO-ORDINATED SECTIONS	A	
CK004.B/T/QVB/MTR	A13/100	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	CUTAWAY SECTIONS	A	FOR REFERENCE ONLY
CK004.B/T/QVB/MTR	A13/101	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	CUTAWAY SECTIONS	A	FOR REFERENCE ONLY
CK004.B/T/QVB/MTR	A41/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	FINISHES SCHEDULE & LOUVER SCHEDULE	A	
CK004.B/T/QVB/MTR	A53/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	DETAILS OF EXTERNAL ALUMINUM LOUVRES	A	
CK004.B/T/QVB/MTR	E00/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	LEGEND AND ABBREVIATION	A	
CK004.B/T/QVB/MTR	E00/002	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	ELECTRICAL SERVICES - NOTES	A	
CK004.B/T/QVB/MTR	E01/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	GROUND FLOOR LEVEL (+5.1)	A	EXISTING LIGHTING AND SMALL POWER LAYOUT
CK004.B/T/QVB/MTR	E01/002	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	GROUND FLOOR LEVEL (+5.1)	A	NEW LIGHTING AND SMALL POWER LAYOUT
CK004.B/T/QVB/MTR	E07/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	MODIFICATION OF EXISTING LV SWITCHBOARD	A	
CK004.B/T/QVB/MTR	E07/002	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	SCHEMATIC DIAGRAM OF EXISTING LV SWITCHBOARD	A	
CK004.B/T/QVB/MTR	E09/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	GROUND FLOOR LEVEL (+5.1)	A	NEW POWER CABLE ROUTE
CK004.B/T/QVB/MTR	E09/002	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	BASEMENT LEVEL 1 (-1.3)	A	NEW POWER CABLE ROUTE
CK004.B/T/QVB/MTR	E12/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	SCHEMATIC DIAGRAM OF NEW MCB BOARD 'DB-4'	A	
CK004.B/T/QVB/MTR	F00/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	SCHEMATIC AND NOTES FOR FM200 GAS EXTINGUISHING SYSTEM	A	
CK004.B/T/QVB/MTR	F08/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	QVB - GROUND FLOOR LEVEL	A	PROPOSED FS LAYOUT AT NEW 33KV SWITCHROOM
CK004.B/T/QVB/MTR	M00/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	GENERAL NOTES, LEGEND AND ABBREVIATIONS	A	
CK004.B/T/QVB/MTR	M07/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	ECS CONTROL, SCHEMATIC DIAGRAM & CONTROL PRINCIPLES	A	
CK004.B/T/QVB/MTR	M08/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	EXISTING CABLE CONTAINMENT LAYOUT AT	A	BASEMENT 1 (LEVEL -1.2)
CK004.B/T/QVB/MTR	M08/002	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	EXISTING CABLE CONTAINMENT LAYOUT AT G/F	A	FOR REFERENCE ONLY
CK004.B/T/QVB/MTR	M09/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	GROUND FLOOR LEVEL	A	NEW ECS LAYOUT
CK004.B/T/QVB/MTR	M09/002	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	GROUND FLOOR LEVEL	A	SECTION VIEW A - A, B - B & EQUIPMENT SCHEDULE
CK004.B/T/QVB/MTR	M09/003	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	LOCATION OF ECS CONTROL ROOM AT BASEMENT 1 (LEVEL -1.2)	A	
CK004.B/T/QVB/MTR	M11/001	CONVERSION OF EXISTING GENERATOR ROOM TO 33KV SWITCH ROOM AT QVB	TYPICAL ECS INSTALLATION DETAILS	A	
004/203	30112/001	LIGHTING & POWER SERVICE PRINCIPLE SCHEME	GROUND FLOOR LEVEL +5.1	D	FOR REFERENCE ONLY
C2619.09-10E/T/QVB/MTR	E07/001	MODIFICATION OF EMERGENCY POWER SUPPLY SYSTEM	AT NVB, SUB, QVB & KTT QVB	A	EXISTING & NEW POWER SUPPLY AND PROTECTION SCHEME
Grand total 40					

Symbols & Abbreviations



LOCAL MOTOR CONTROL PANEL



13A SWITCHED FSU C/W INDICATOR AND MATT-CHROME FINISH FRONT PLATE



13A SWITCHED POWER SOCKET OUTLET C/W MATT-CHROME FINISH FRONT PLATE



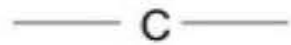
10A LIGHTING SWITCH, MATT-CHROME FINISH FRONT PLATE



EXISTING BULKHEAD LIGHTING



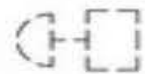
EXISTING CABLE ROUTE



NEW CABLE ROUTE



EXISTING EQUIPMENT

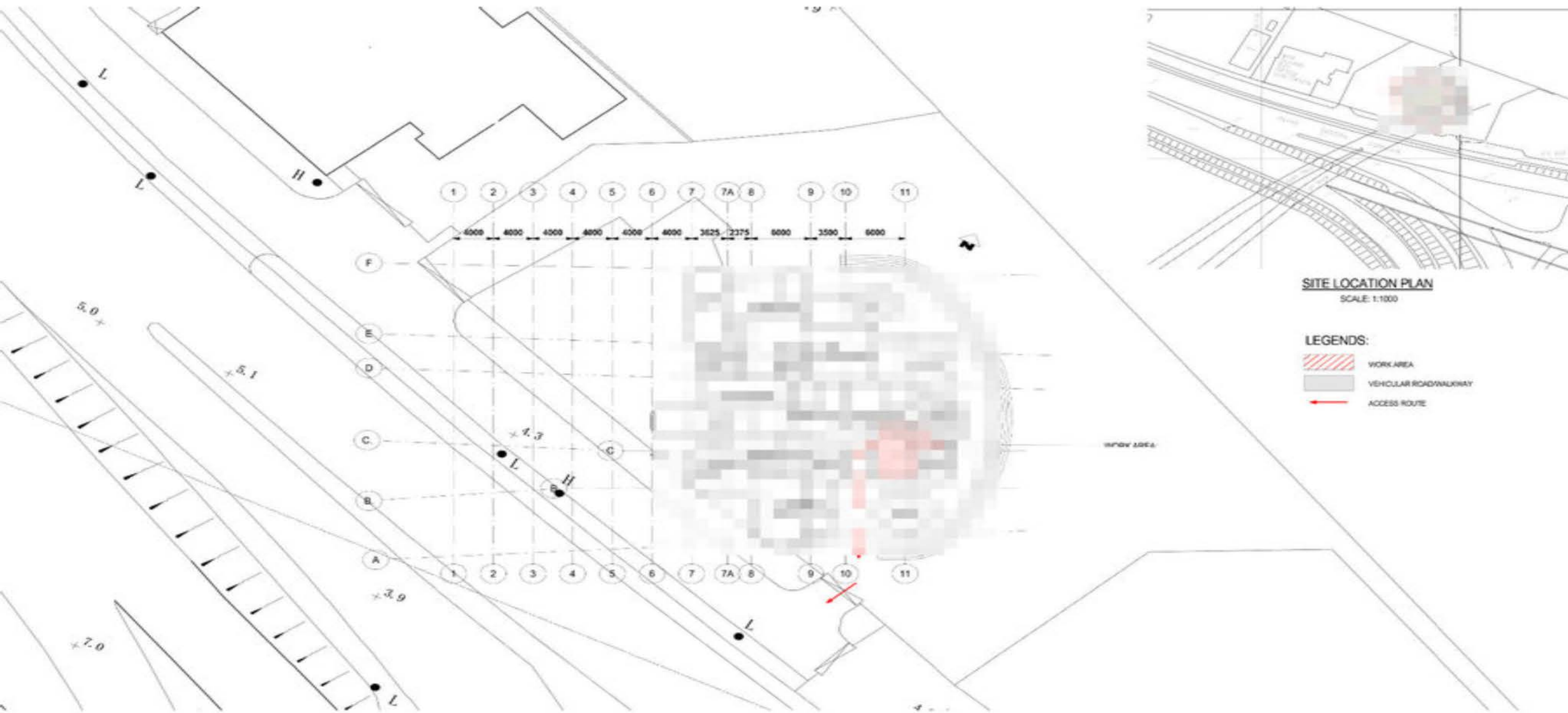


EXISTING EMERGENCY STOP BUTTON

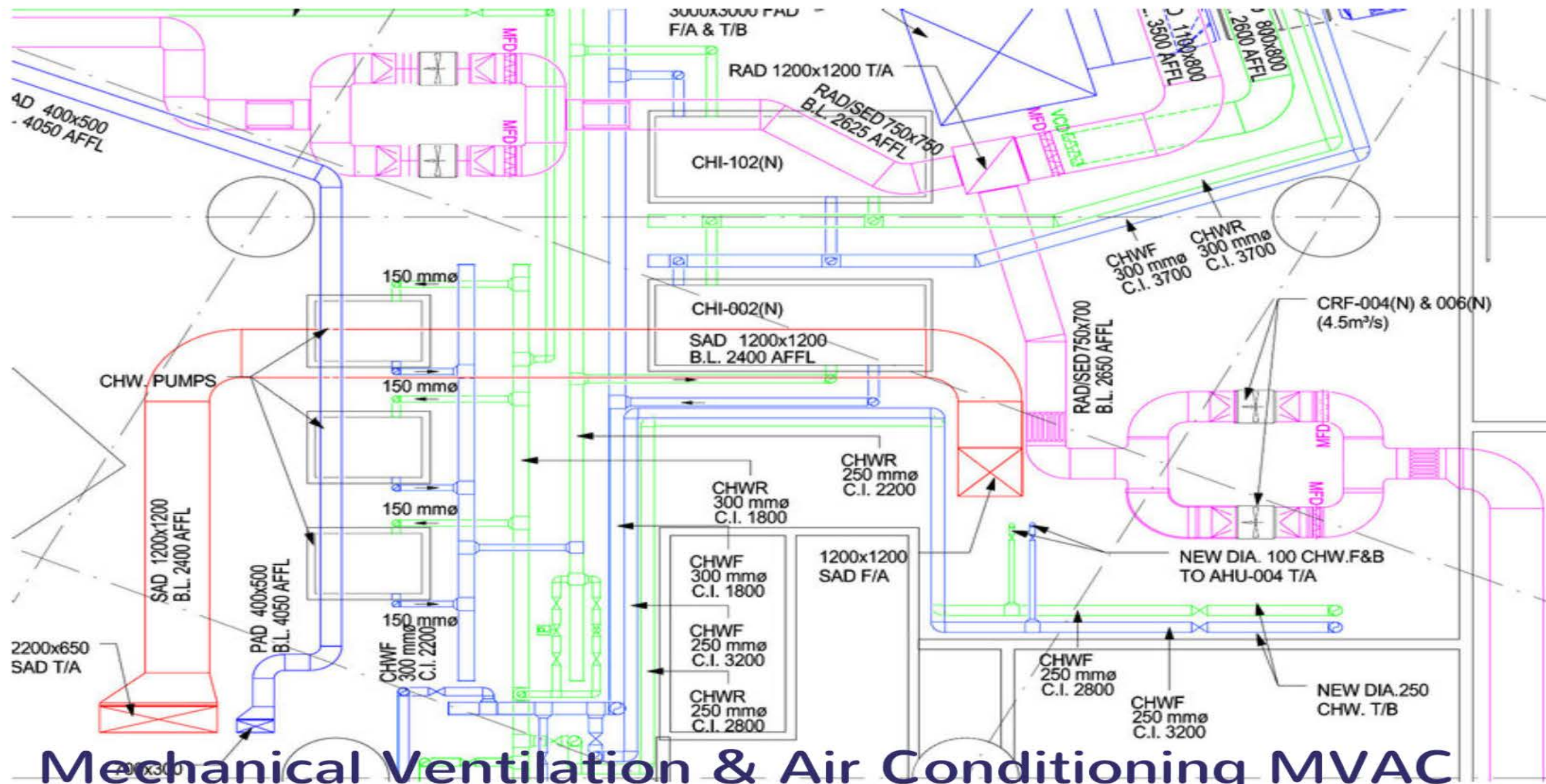
General Notes

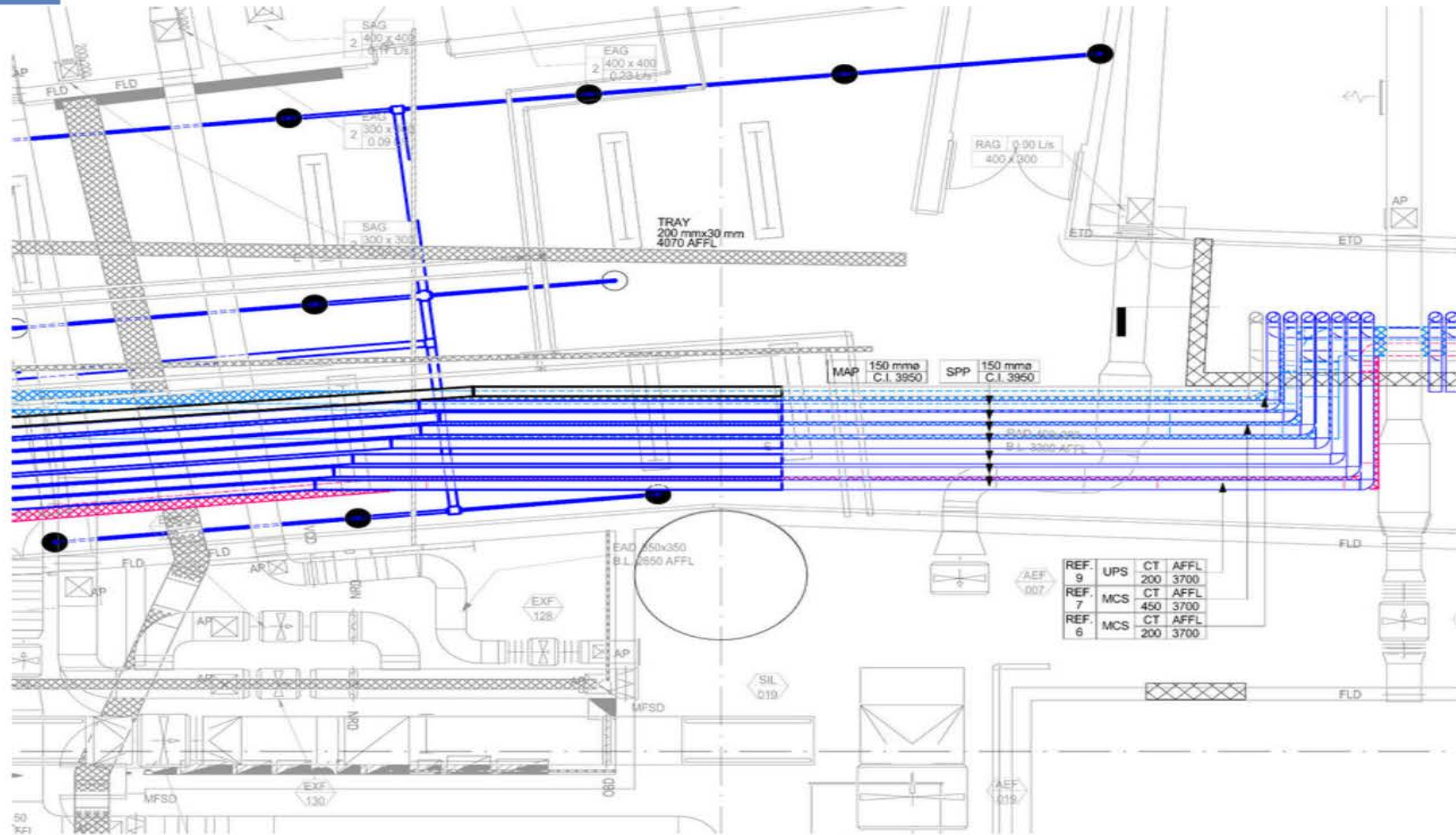
GENERAL NOTES:

1. UNLESS OTHERWISE SPECIFIED, THE CONTRACTOR SHALL DESIGN, SUPPLY & INSTALL ALL THE WHOLE ELECTRICAL WORKS (INSTALLATION SHOWN ON THE DRAWINGS EXCEPT FOR THOSE DESIGNATED AS BY OTHERS).
2. ALL DIMENSION SHOWN IN mm.
3. EXISTING INSTALLATION IS SHOWN IN DOTTED LINES OR IN DIM COLOR FOR EASE OF REFERENCE.
4. ALL MCBs SHALL COMPLY WITH BS EN 60897-2. THE INSTANTANEOUS SHORT-CIRCUIT PROTECTION SHALL BE ADJUSTABLE TYPE. THE A.C. RATED SHORT-CIRCUIT CAPACITY SHALL BE NOT LESS THAN 40kA.
5. ALL MCB PANEL BOARD SHALL BE MANUFACTURED IN COMPLIANCE WITH BS EN 60439-1 OR IEC 439-1 FORM 3s TYPE 2 STRUCTURE. THE DEGREE OF PROTECTION SHALL NOT BE LESS THAN IP42.
6. ALL CABLE TRAY BRACKETS, CABLE BRACKETS, SUPPORTS AND SOCKET MOUNTING PLATES SHALL BE HOT DIPPED GALVANIZED TO BS729 AFTER WELDING AND FABRICATION.
7. CABLE ROUTES AND SWITCHGEAR LOCATIONS SHOWN ARE INDICATIVE ONLY. THE CONTRACTOR SHALL SUBMIT DETAILED POWER & CONTROL CABLE ROUTE AND SWITCHGEAR ARRANGEMENT TO THE ENGINEER FOR APPROVAL AFTER HIS OWN SITE INSPECTION & COORDINATION AND PRIOR TO SITE INSTALLATION.
8. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTION REQUIRED WHEN THE WORK IS TO BE CARRIED OUT IN A CONFINED SPACE & HIGH LEVEL.
9. FIXING TO CONCRETE LINING SHALL BE BY MEANS OF STAINLESS STEEL ANCHORS.
10. THE CONTRACTOR SHALL DESIGN AND PROVIDE 0.1 U-CHANNEL BETWEEN 0.1 ROD / SUPPORT AND STAINLESS STEEL BOLT & ANCHOR TO AVOID DISSIMILAR METAL SIDE EFFECT FOR THE ENGINEER'S APPROVAL PRIOR TO SITE INSTALLATION. THE CONTRACTOR SHALL SUBMIT CALCULATION FOR THE SIZE OF THE U-CHANNEL FOR APPROVAL.
11. THE CONTRACTOR SHALL PROVIDE NEW CABLE BRACKETS, CABLE LADDERS AND CABLE TRAYS FOR FIXING NEW CABLES IF EXISTING CABLE BRACKETS, CABLE LADDERS AND CABLE TRAYS HAVE BEEN FULLY OCCUPIED BY EXISTING CABLES. SUCH NEW BRACKETS/LADDERS/TRAYS IN ADDITION TO THE EXISTING ONES SHALL HAVE BEEN INCLUDED IN THE CONTRACT SUM TO UTILIZE EXISTING CABLE CONTAINMENT FOR NEW CABLES. THE CONTRACTOR SHALL PROVIDE JUSTIFICATION, CALCULATIONS, PHOTOS ETC. TO DEMONSTRATE THAT THE EXISTING CABLE CONTAINMENT HAS ADEQUATE SPARE CAPACITY TO ACCOMMODATE THE NEW CABLES.
12. ALL SLAB OPENINGS AND WALL OPENINGS FOR CABLE RUNNING SHALL BE KEPT AT 300mm MINIMUM APART FROM THE EXISTING CABLE SLOT OR ANY POSITION OF CABLE SEALANT.
13. THE CONTRACTOR SHALL MAKE GOOD ALL SLAB OPENINGS OR WALL OPENINGS BY BACKFILLING WITH FIRE RESISTANT NON-ASBESTOS MATERIAL WITH FIRE RATING NOT LESS THAN THE PENETRATED SLAB/WALL AND, WITH ASBESTOS FREE MARKER ON BOTH SIDES FOR IDENTIFICATION. WATER PROOFING MATERIAL SHALL BE APPLIED ON SLAB OPENINGS FOR BACKFILLING.
14. THE CONTRACTOR SHALL VERIFY ABSENCE OF ANY CONCEALED SERVICE PIPE OR CONCEALED CONDUIT RUNNING ACROSS THE PROPOSED LOCATIONS OF SLAB/WALL OPENING BEFORE ANY DRILLING OR DESTRUCTIVE WORK IS MADE.
15. DRILLING THROUGH BEAM OR RB OF SLAB IS NOT ALLOWED UNLESS WITH THE ENGINEER'S APPROVAL.
16. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING THEIR PROPOSED SLAB OPENINGS AND WALL OPENINGS ETC. FOR ENGINEER'S APPROVAL BEFORE CARRYING OUT CORING WORK.
17. THE CONTRACTOR SHALL SUBMIT THE ACTUAL MOUNTING DETAILS INCLUDING DIMENSIONAL ELEVATION AND VIEW OF NEW INSTALLATIONS TOGETHER WITH BACKGROUND AS-CONSTRUCTED INFORMATION FOR ENGINEER'S APPROVAL BEFORE CARRYING OUT THE INSTALLATION.
18. THE CONTRACTOR SHALL SUBMIT THE ACTUAL MOUNTING DETAILS INCLUDING DIMENSIONAL ELEVATION AND VIEW OF NEW MCB BOARD, BOARD NEW MCBs PANEL AND ISOLATING SWITCH FOR ENGINEER'S APPROVAL BEFORE CARRYING OUT THE INSTALLATION.
19. ALL EXISTING CABLE CONTAINMENT WITH CABLES THE CLASHED WITH THAT NEW WORKS SHALL BE OVERTED IF THEY ARE STILL USEFUL OR DISASSEMBLED IF THEY ARE REDUNDANT.
20. CABLE DIVERSION SHALL INCLUDE ALL WORKS FOR RELOCATING, REARRANGING & STRAIGHTENING OF THE RELEVANT SECTION OF THE EXISTING CABLES BY GAINING CABLE SLACK, AND PROVISION OF NEW CABLE CONTAINMENT AND ASSOCIATED ACCESSORIES.
21. FOR EXISTING CABLES REQUIRED FOR DIVERSION BUT WITHOUT SUFFICIENT CABLE SLACK, NEW CABLES SHALL BE PROVIDED OR THE EXISTING CABLES SHALL BE EXTENDED BY ADDITION SECTION OF NEW CABLES WITH ADEQUATE CABLE JOINTS. THE CHOICE DEPENDS ON THE OPERATIONAL REQUIREMENT AND SITE CONDITION SUBJECT TO APPROVAL BY THE ENGINEER. THE ABOVE WORKS AND ALL NEW CABLES USED TO COMPLY WITH METROL'S STANDARD.
22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISMANTLING THE EXISTING CABLING, CABLE CONTAINMENT, POWER DISTRIBUTION EQUIPMENT AND CONTROL COMPONENTS WHICH ARE REDUNDANT FROM THE WORK, INCLUDING EXISTING LIGHTING SYSTEM, MCB BOARD AND MCBs.
23. ALL CONDUITS SHALL BE OF CONCEALED TYPE WHEN MOUNTING BELOW FALSE CEILING AT PUBLIC AREA AND BACK OF HOUSE OFFICE AREA.
24. FIRE RESISTANCE C₀ CABLE TO BS 6387 CAT. CH2 SHALL BE USED FOR THE CABLE BETWEEN EMERGENCY POWER PACK AND EMERGENCY LIGHTING FITTINGS.
25. UNLESS OTHERWISE SPECIFIED, ALL INTERNAL CABLES FOR LIGHTING FITTINGS SHALL BE OPERATED UP TO 125°C AND OF LOW SMOKE AND ZERO HALOGEN TYPE.
26. UNLESS OTHERWISE SPECIFIED, THE MINIMUM SIZE OF SMALL POWER AND CONTROL / SIGNAL CABLES SHALL BE 2.5mm² AND 1.5mm² COPPER CABLE ACCORDINGLY.
27. UNLESS OTHERWISE SPECIFIED, ALL CABLES OTHER THAN FIRE RESISTANT CABLE SHALL BE FIRE RETARDANT.
28. EMERGENCY LIGHTING CIRCUITS AND OTHER CIRCUITS SHALL NOT BE IN THE SAME CONDUIT OR IN THE SAME TRUNKING COMPARTMENTS.
29. ALL CIRCUITS SHALL BE PROVIDED WITH INDEPENDENT CIRCUIT PROTECTIVE CONDUCTORS.
30. FOR RELOCATION OF PANEL, BOARDS, THE CONTRACTOR SHALL EXTEND THE EXISTING CABLE LENGTH IN THE EVENT THAT THE EXISTING LENGTH IS NOT LONG ENOUGH. METHOD OF EXTENSION SHALL BE SUBMITTED FOR THE ENGINEER'S APPROVAL.
31. THIS SET OF DRAWINGS SHOWS DESIGN INTENT ONLY. THE CONTRACTOR SHALL VERIFY ON SITE THE EXACT NUMBER AND LOCATION OF DEVICES / EQUIPMENT AND COORDINATE THE WORKS WITH THE OTHER CONTRACTORS AND MTR REPRESENTATIVES.
32. LUMINAIRE MARKED WITH 'E' SHALL BE PROVIDED WITH SELF-CONTAINED TYPE EMERGENCY POWER PACK INCLUDING Ni-Cd BATTERIES, INVERTER AND CHARGER TO BACK UP ALL THE LAMPS.
33. ALL OUT GOING CABLES FROM DISTRIBUTION BOARDS CONNECTED TO DBS UPS WILL BE OF 1C FIRE RESISTANCE LSHF TYPE COPPER CABLE IN CONDUIT/TRUNKING UNLESS OTHERWISE SPECIFIED.
34. ALL OUTGOING CABLES FROM DISTRIBUTION BOARD ARE OF 1C LSHF C₀ CABLE IN TRUNKING/CONDUIT UNLESS OTHERWISE SPECIFIED.
35. *NO CATE CIRCUIT PROTECTED BY AN INDIVIDUAL OP MCB OR BUILT-IN RCD OF 30mA SENSITIVITY.
36. ALL CABLES TO EXTERNAL LIGHTING WILL BE 2C LSHF SWANLPE COPPER CABLES UNLESS OTHERWISE SPECIFIED.
37. EACH MCB DISTRIBUTION BOARD WILL BE OPERATED BY A METAL GLAZED ISOLATING SWITCH OF RATING AS SPECIFIED IN THE MCB BOARD SCHEDULE/SCHEMATIC.
38. ALL INSTALLATION SHALL FOLLOW THE NEW CABLE COLOUR CODE AS SPECIFIED BY THE EMBO OF THE HK SAR.
39. LIGHTING FITTINGS WALL MOUNTED, SURFACE MOUNTED OR PENDANT TYPE SHALL BE PROPERLY COORDINATED WITH EQUIPMENT LAYOUT AND SERVICES ARRANGEMENT INSIDE THE PLANTROOM TO ACHIEVE EVEN ILLUMINATION AND TO AVOID THE LIGHTING FITTING OBSTRUCTED BY THE SERVICES OR EQUIPMENT. THE CONTRACTOR SHALL SEEK THE ENGINEER'S APPROVAL TO THE INSTALLATION.
40. ALL NEW LIGHTINGS LAYOUT SHOWN ARE FOR REFERENCE ONLY. ACTUAL LIGHTINGS LAYOUT SHALL BE PROPOSED BY THE CONTRACTOR FOR APPROVAL. AT LEAST NUMBER OF LIGHT FITTINGS SPECIFIED IN THE DRAWINGS OR NUMBER OF LIGHT FITTINGS CALCULATED BY THE CONTRACTOR IN COMPLIANCE WITH THE REQUIREMENTS AS SPECIFIED IN THE APPENDIX D OF THE PS, WHICHEVER IS HIGHER, SHALL BE PROVIDED BY THE CONTRACTOR.
41. EACH SWITCH/FUSE, FUSE SWITCH, ISOLATING SWITCH, BUSBAR CHAMBER, MCB BOARD, ENERGY METER, FCU, CABLE TERMINATION BOX AND CABLE SHALL BE LABELLED ON FRONT COVER TO INDICATE:
 - a) THE CIRCUIT NAME / NUMBER;
 - b) THE RATING OF FUSE / CIRCUIT BREAKER;
 - c) THE PURPOSE OF THE CIRCUIT IT SERVES; (e.g. LIGHTING AT ENTRANCE & etc.)
42. EXISTING GENERATOR SET AND ASSOCIATED COMPONENT SHALL BE DEMOLISHED AND DISPOSED BY OTHERS.

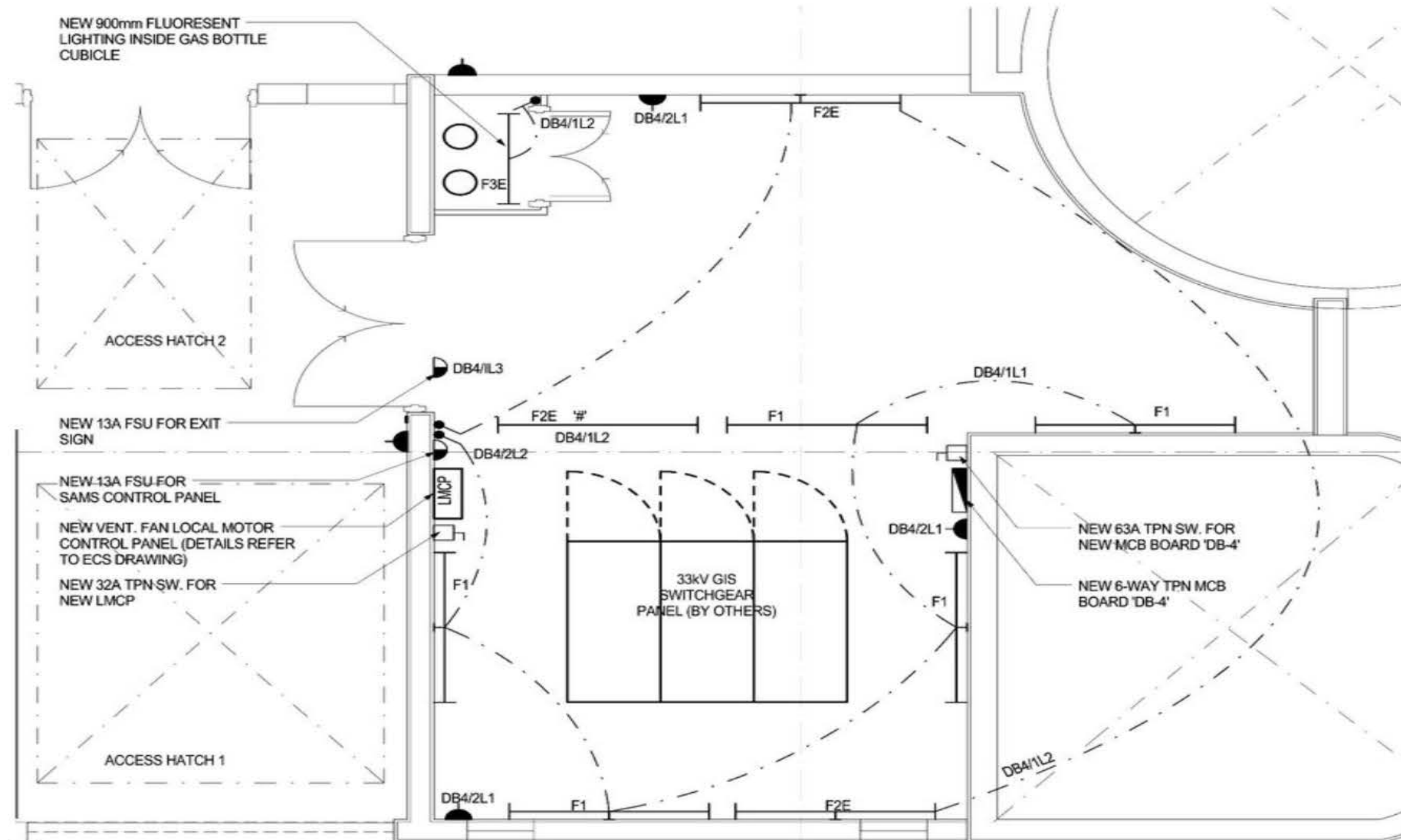


Site & Location Plan

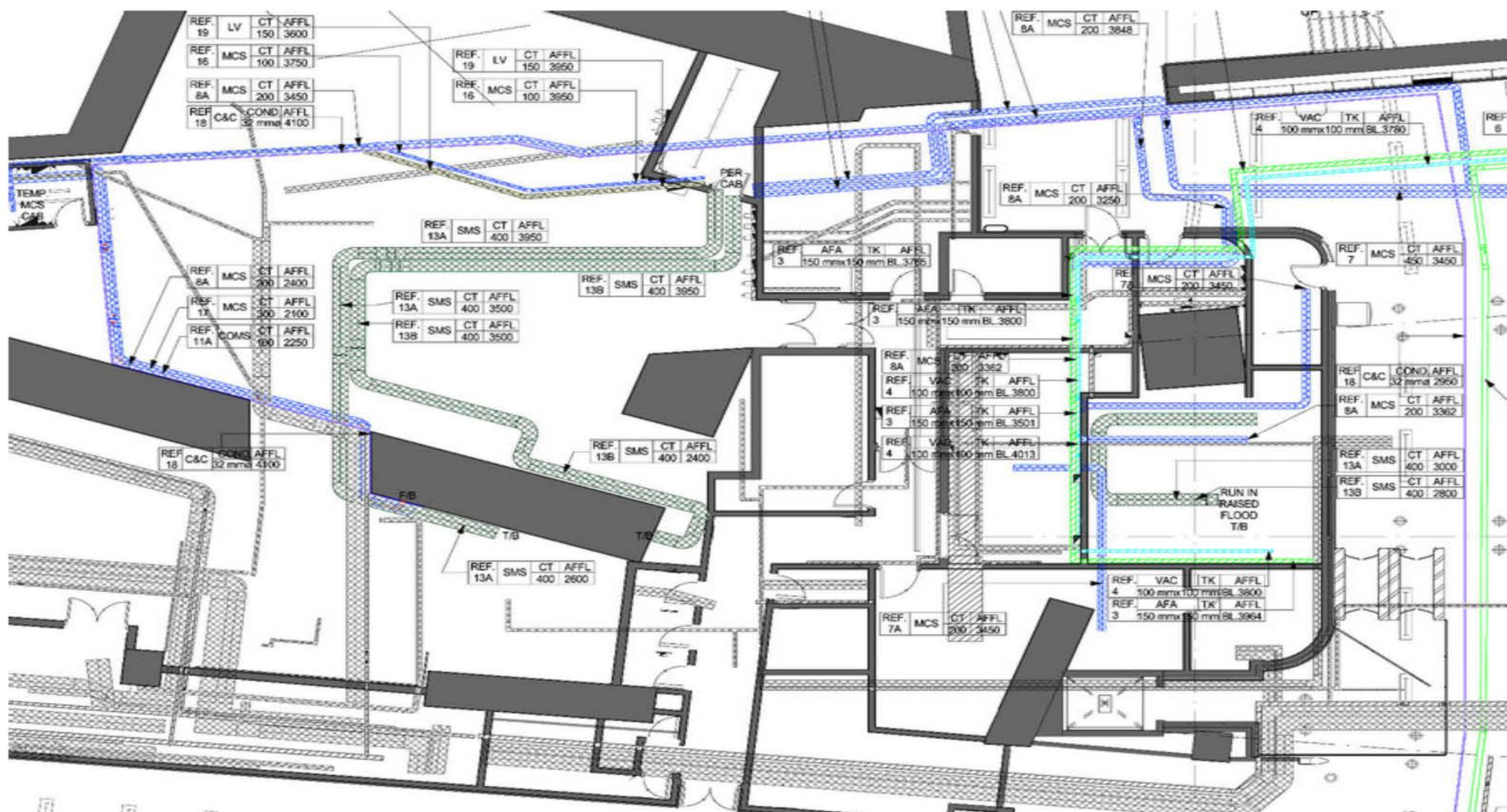




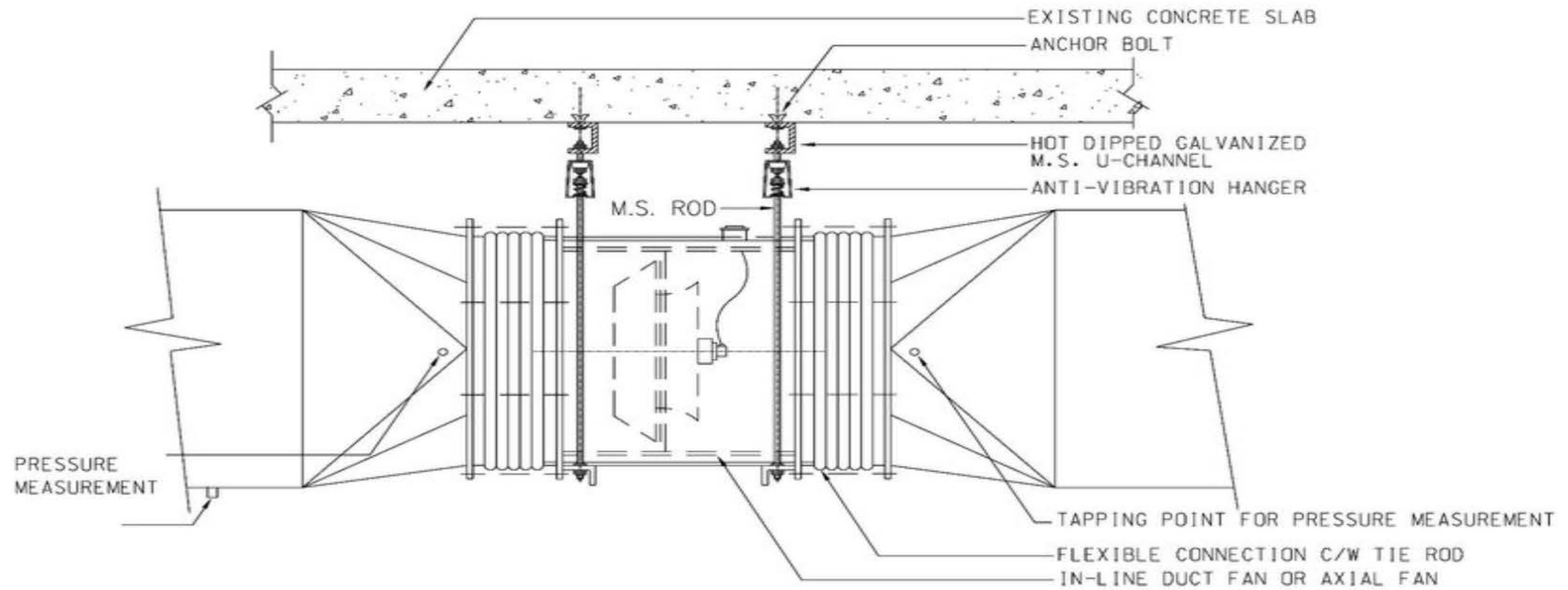
Fire Services, Plumbing & Drainage



Electrical



Cable Containment



MOUNTING DETAIL FOR IN-LINE DUCT FAN & AXIAL FAN

Typical Details

DIA.65 SPRINKLER PIPE SCHEDULE			
Family and Type	Size	Type Mark	Estimate Length (m)
Pipe Types: SPP	65 mmø	SPP	127.167

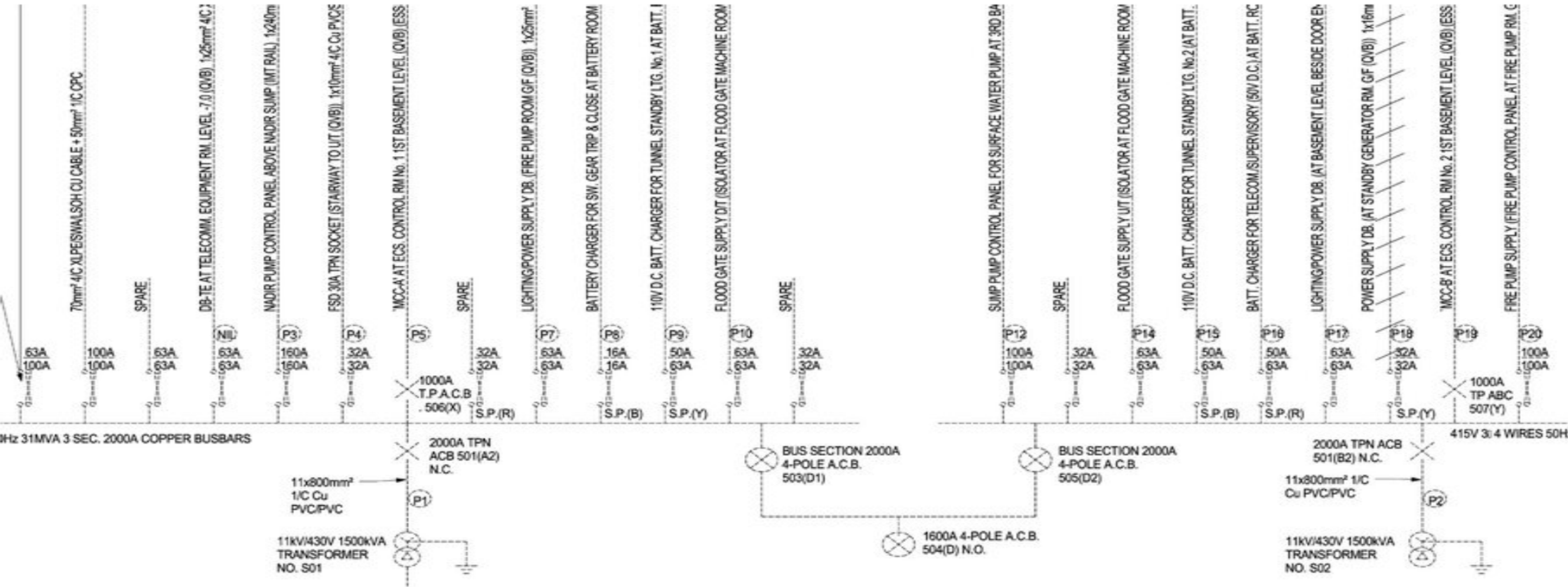
DIA.80 SPRINKLER PIPE SCHEDULE			
Family and Type	Size	Type Mark	Estimate Length (m)
Pipe Types: SPP	80 mmø	SPP	127.367

DIA.100 SPRINKLER PIPE SCHEDULE			
Family and Type	Size	Type Mark	Estimate Length (m)
Pipe Types: SPP	100 mmø	SPP	248.702

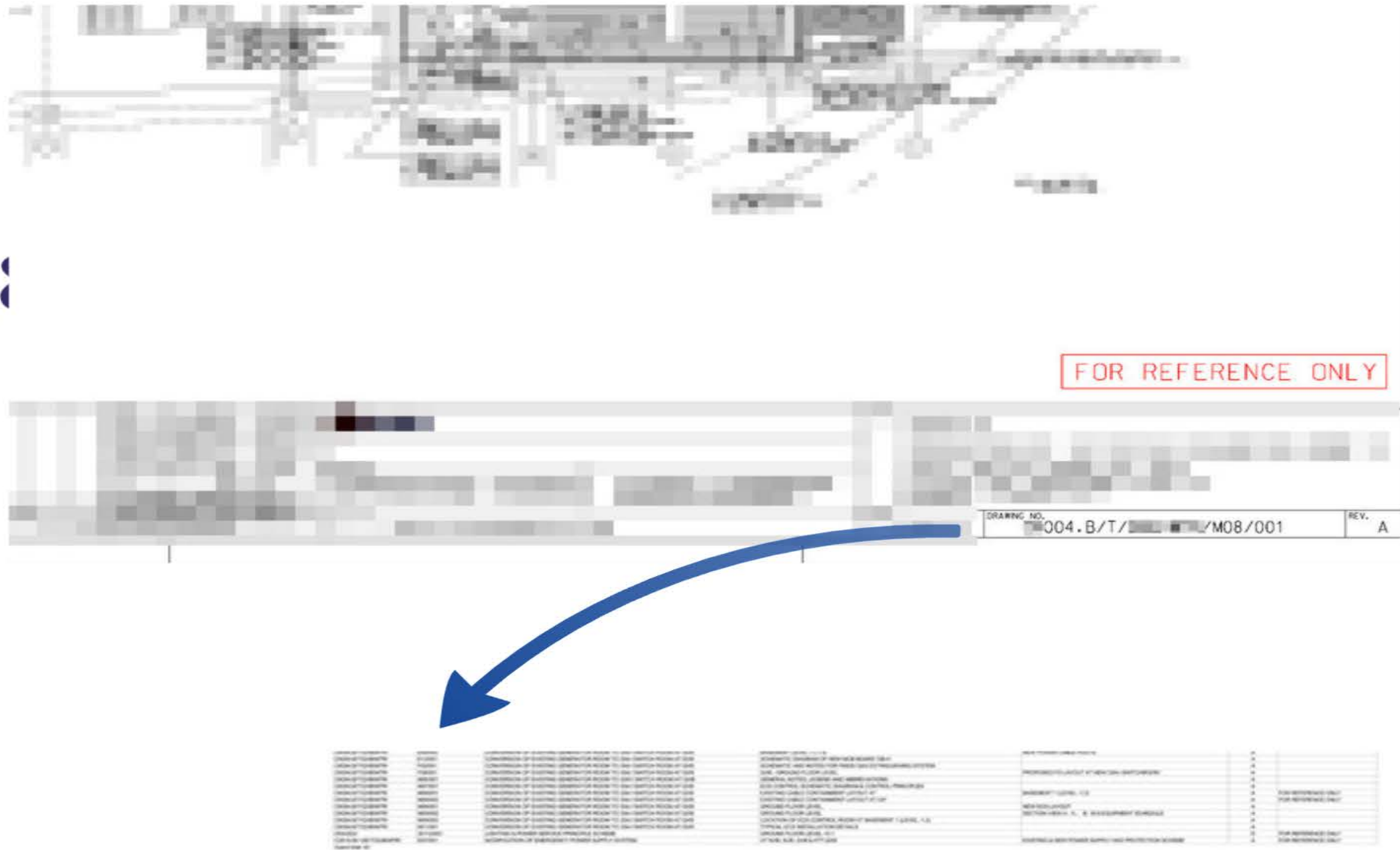
DIA.150 SPRINKLER PIPE SCHEDULE			
Family and Type	Size	Type Mark	Estimate Length (m)
Pipe Types: SPP	150 mmø	SPP	1746.315

Equipment Schedule

Schematic



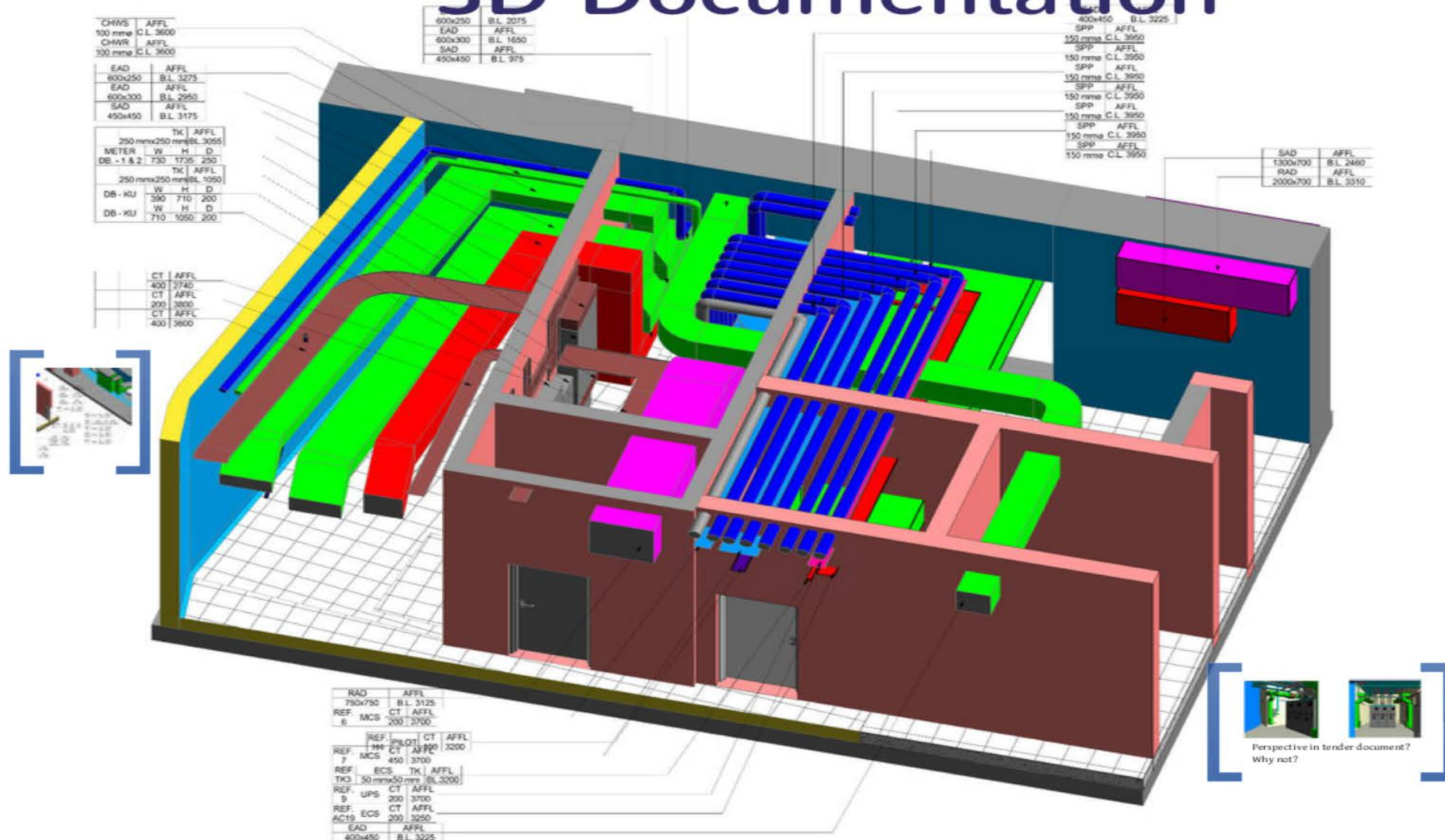
nsE:



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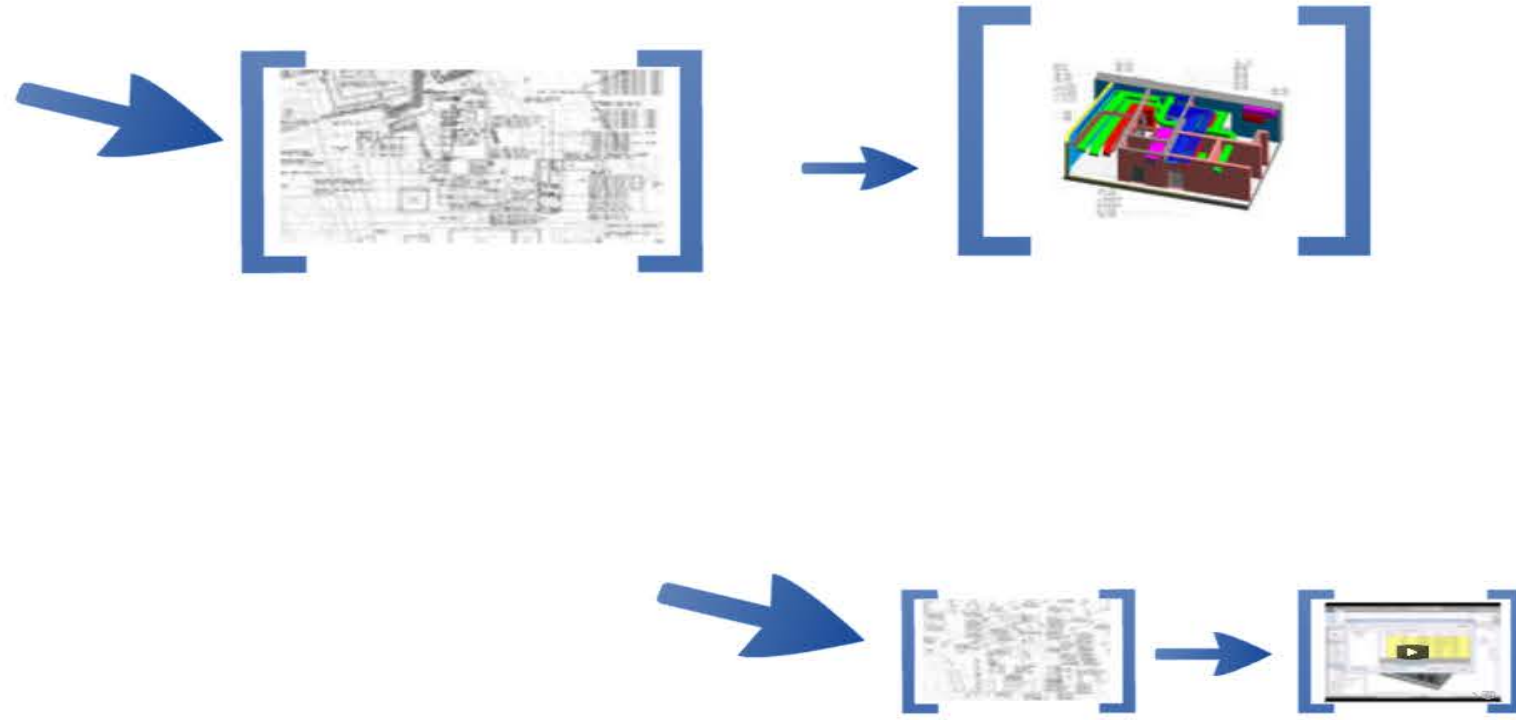
Reference Drawings

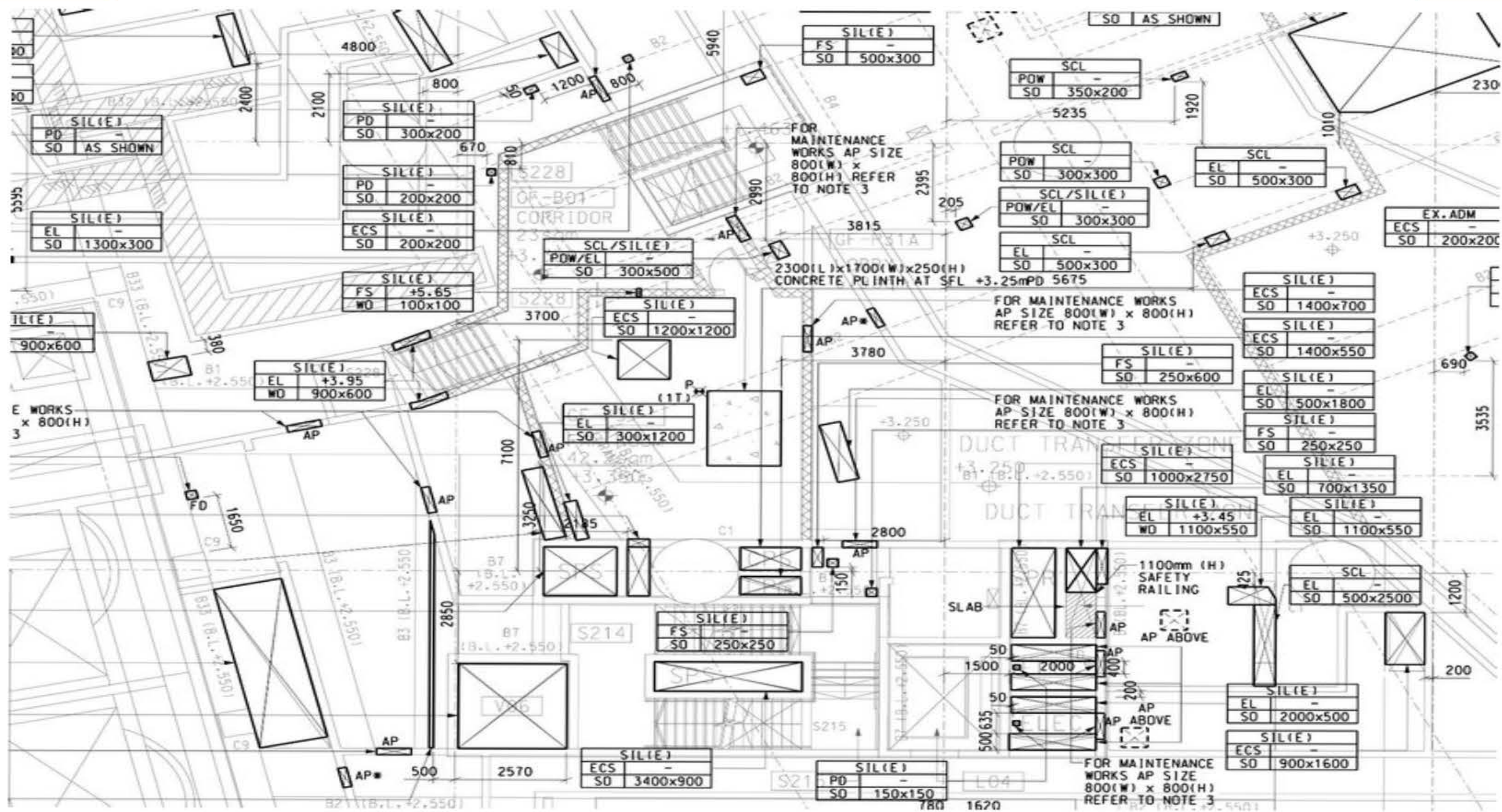
3D Documentation

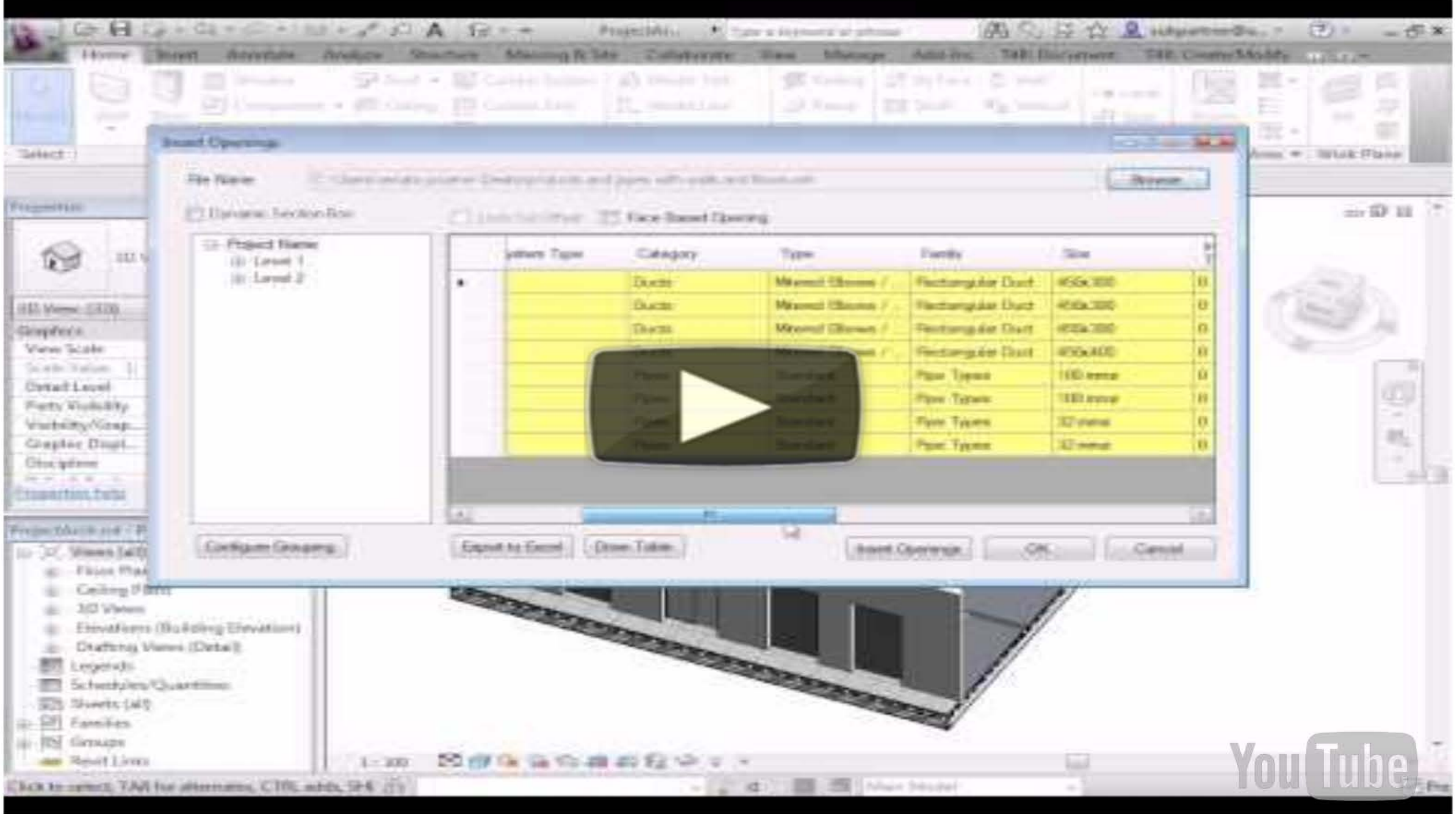


Construction drawings

Combined Services Drawings CSDCo-ordination of different



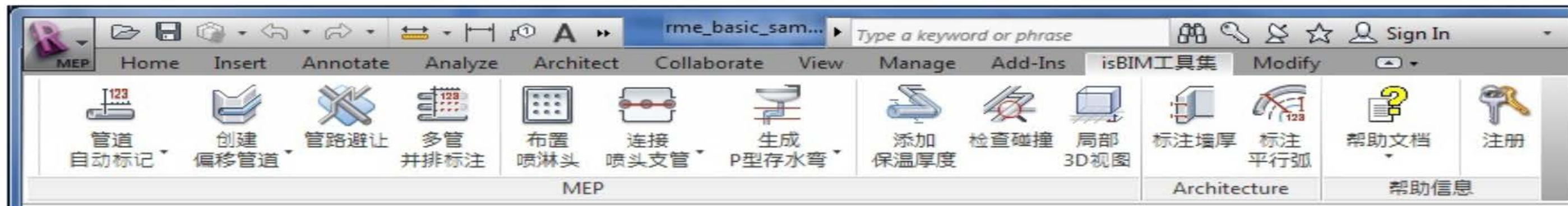




YouTube

Further Development

Automated Design





And one more thing...

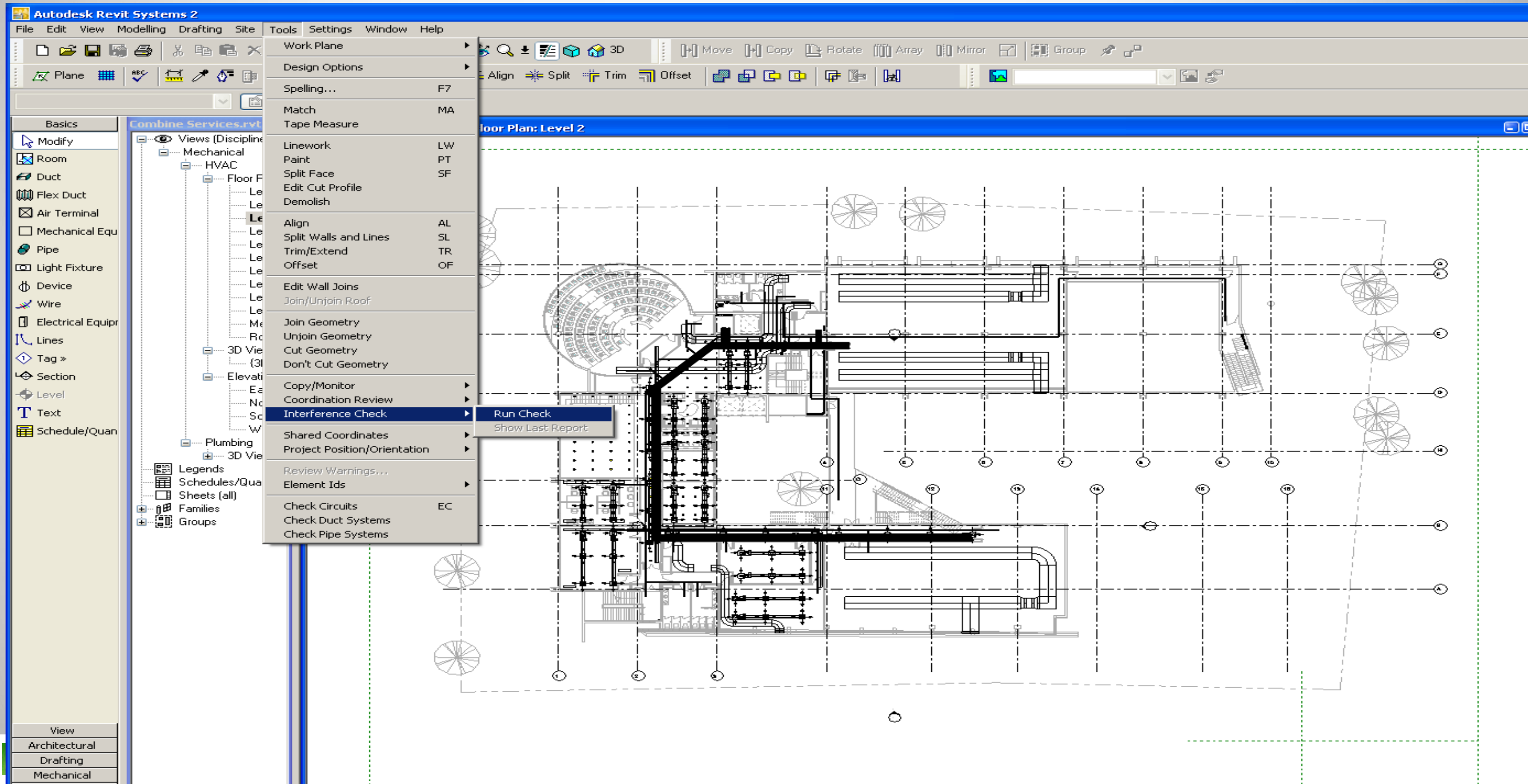
BIM is becoming more popular in construction industry and even statutory in some countries.

Conclusion

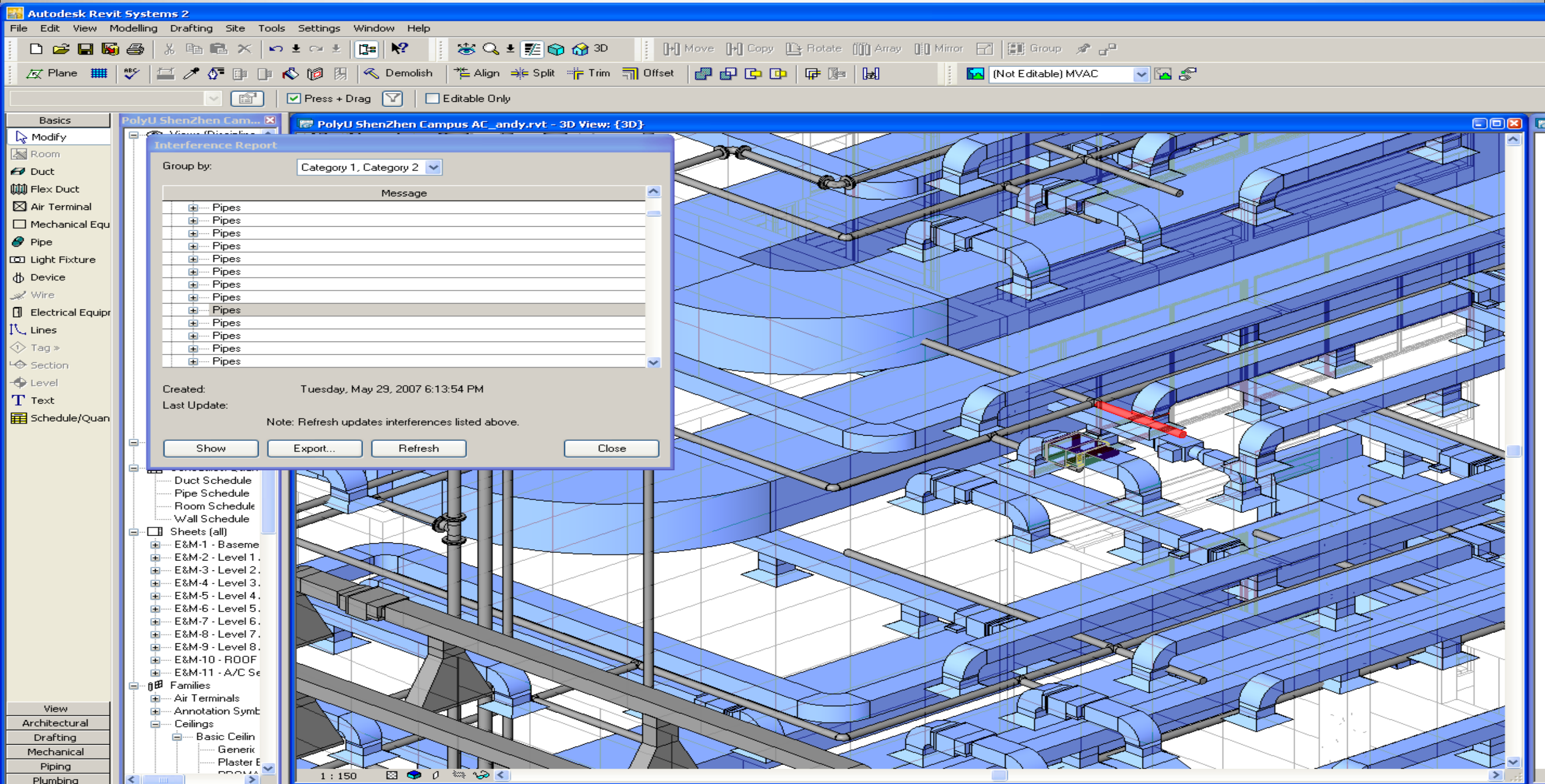
- BIM CAN produce E&M Drawings
BIM enhances collaboration
BIM facilitates automation



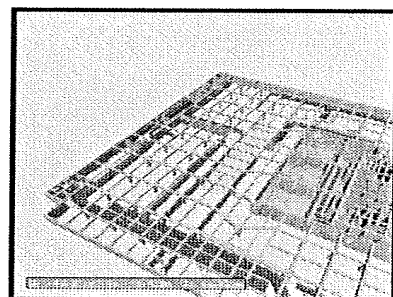
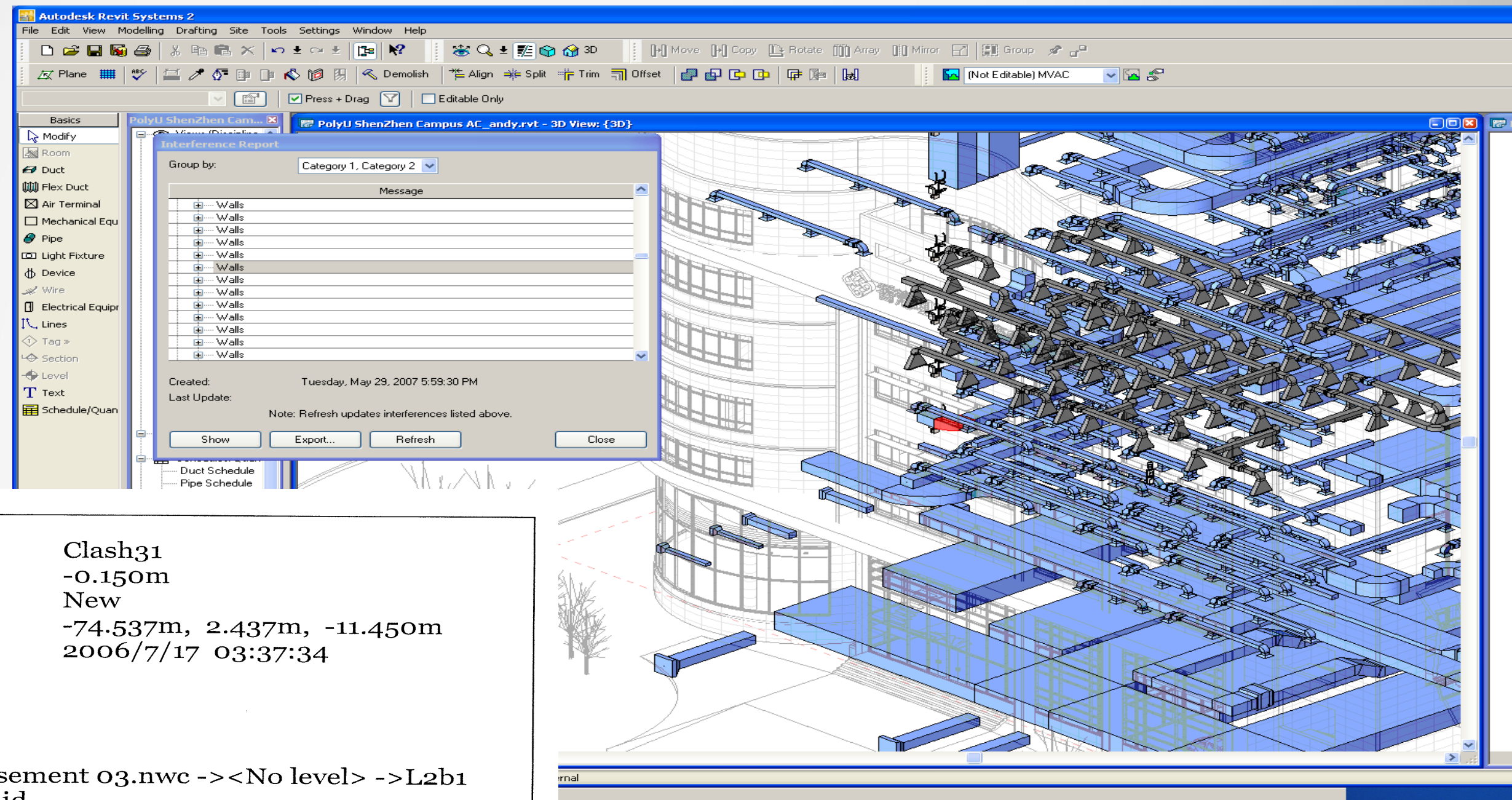
CLASH ANALYSIS



CLASH ANALYSIS



CLASH ANALYSIS REPORT



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Status New
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Date Created 2006/7/17 03:37:34
Approved By

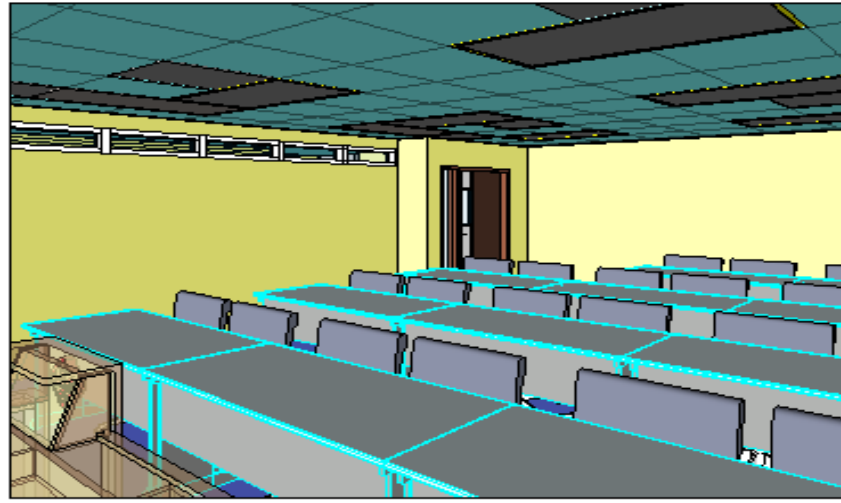
Item 1

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500 x 700 -> L2b1 500 x 700 -> Solid

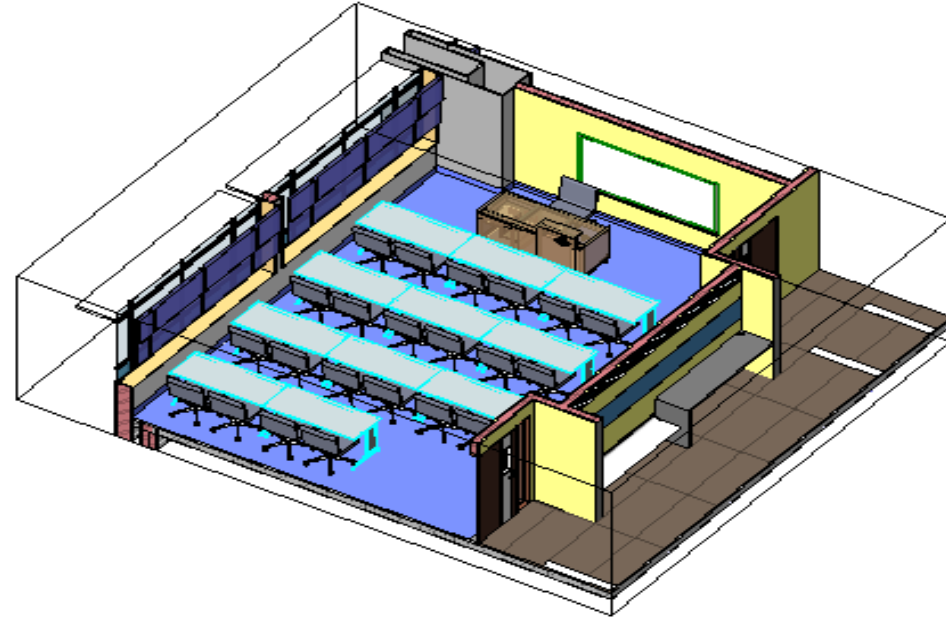
Item 2

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

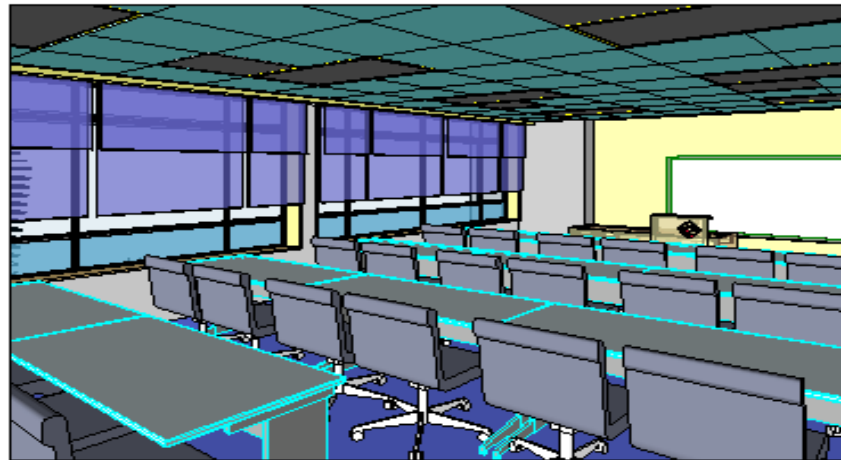
PRODUCTION OF CONSTRUCTION DRAWINGS



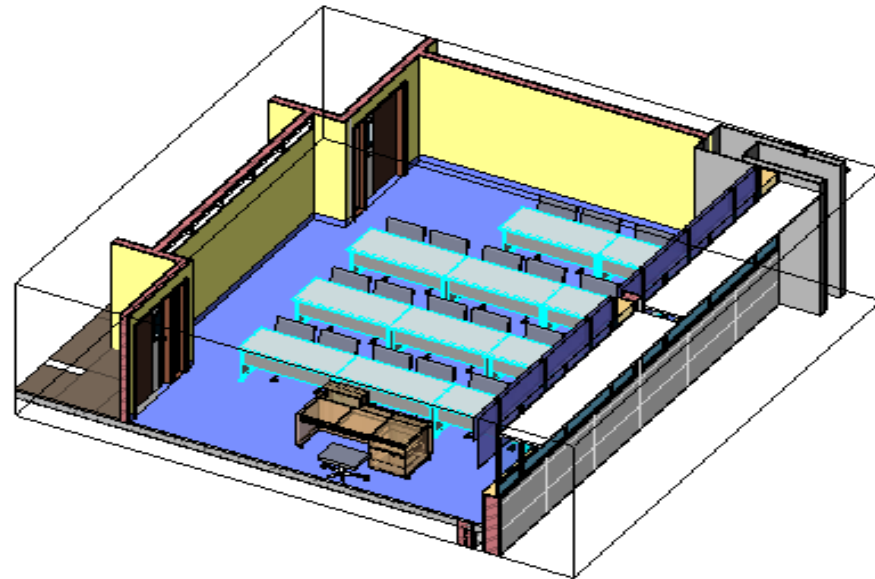
6 行政人员培训室立体示意图2



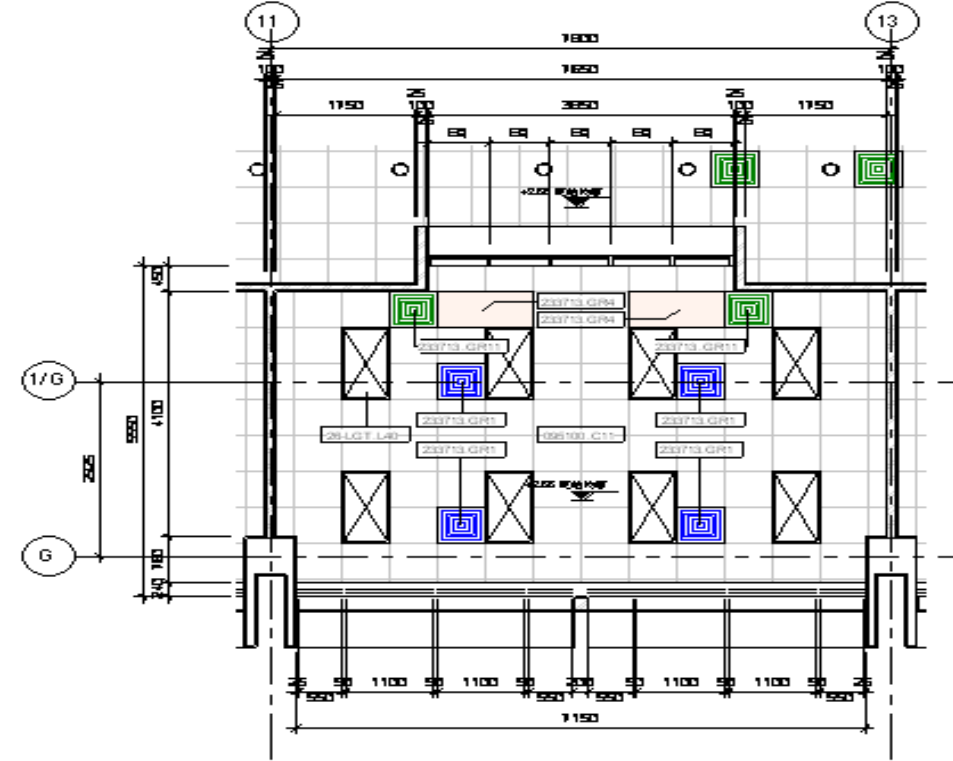
4 行政人员培训室立体剖面示意图2



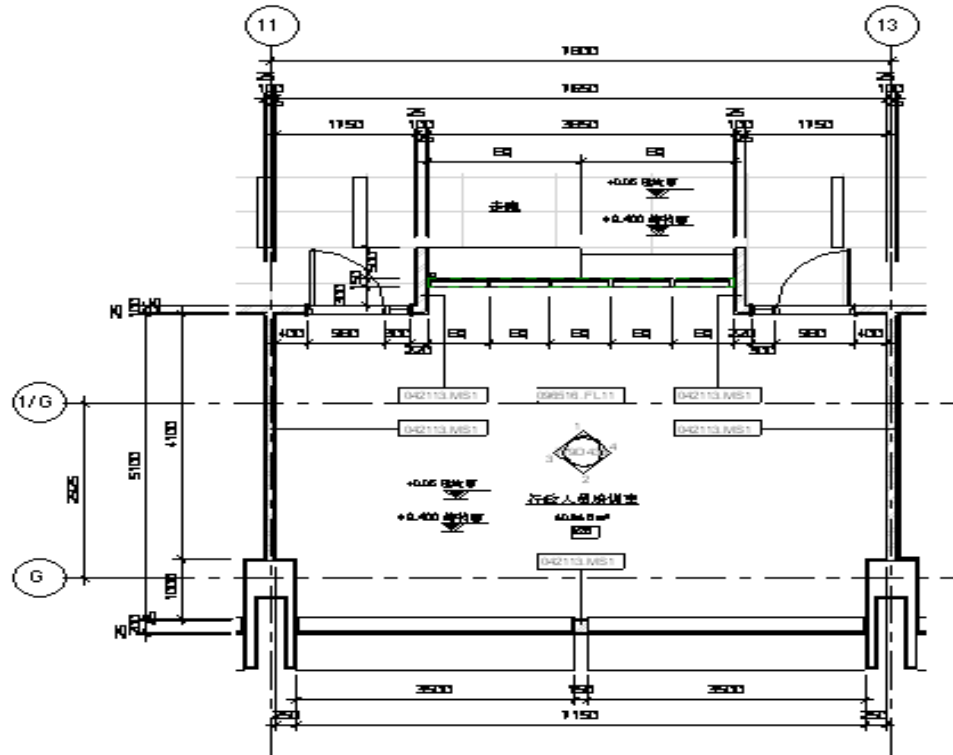
5 行政人员培训室立体示意图1



3 行政人员培训室立体剖面示意图1

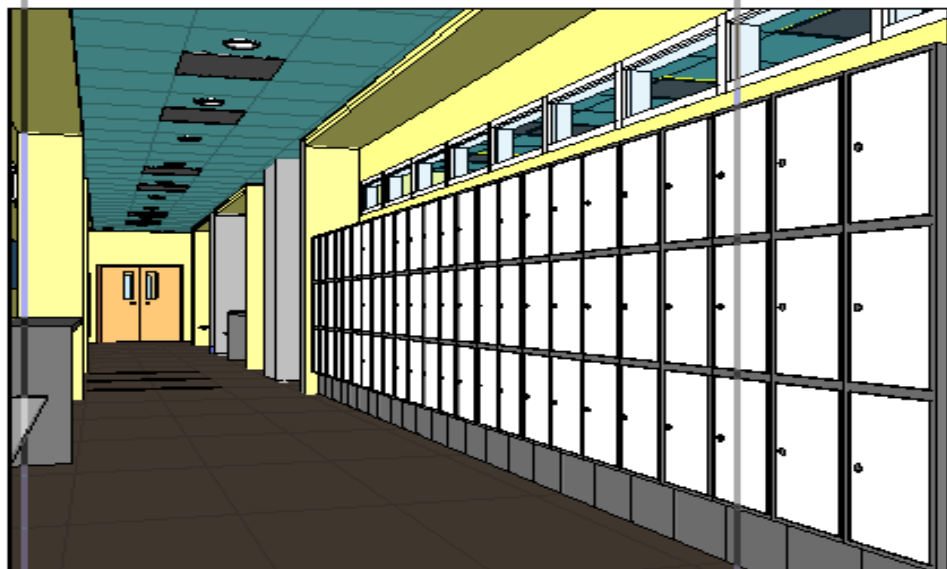


2 行政人员培训室天花平面图(高楼三层)1
1 : 50

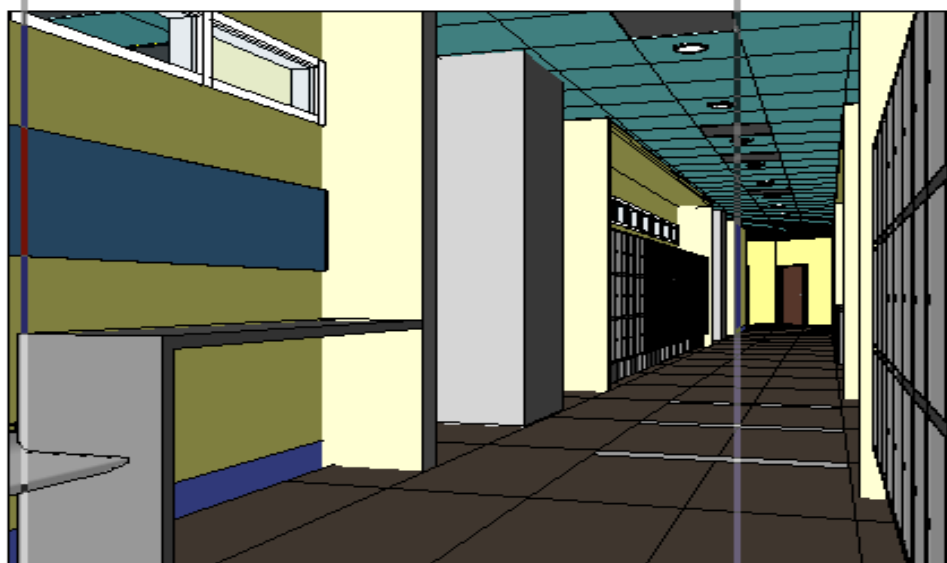


1 行政人员培训室平面图(高楼三层)1
1 : 50

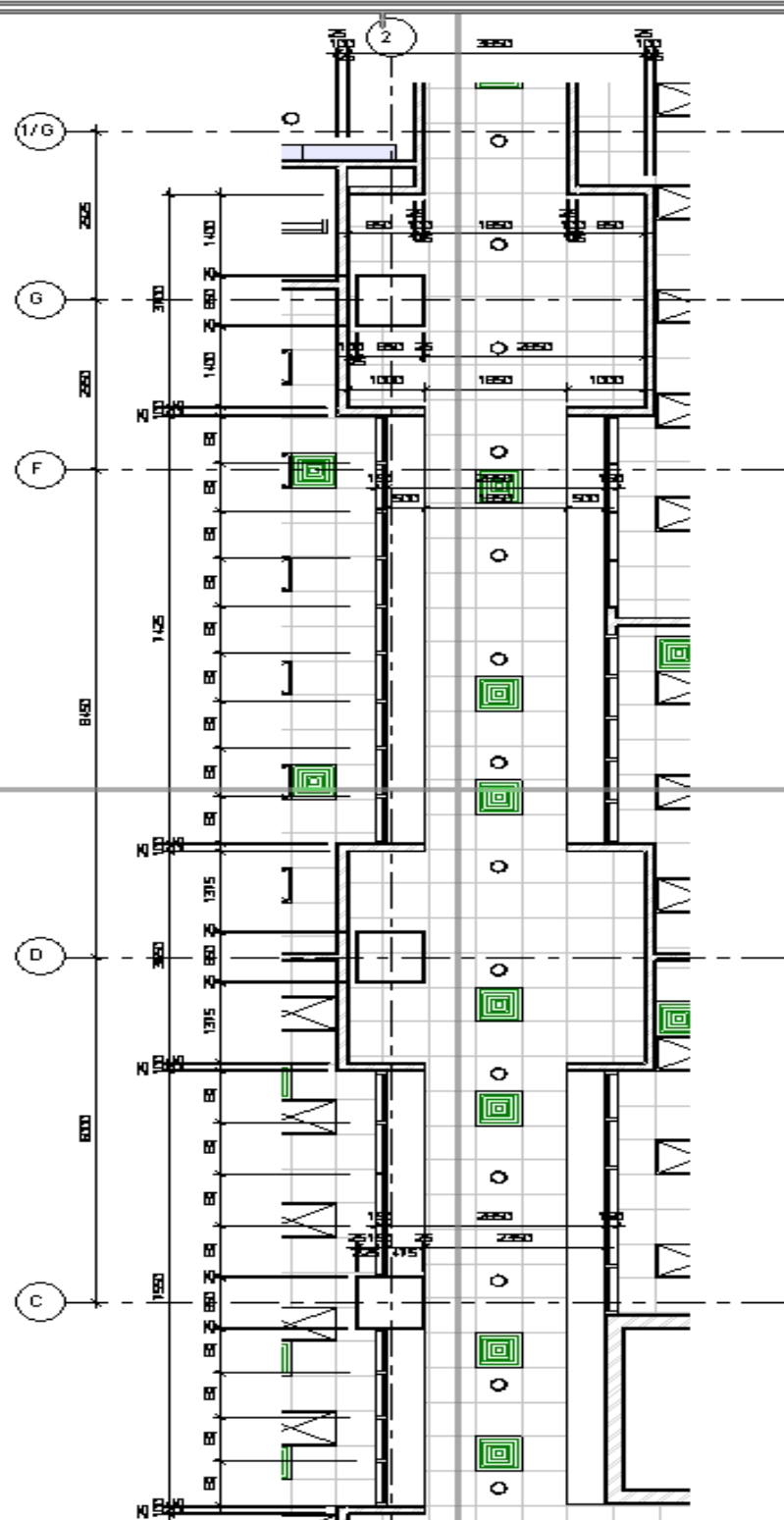
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F.S.D. Reference No.		GOVERNMENT REFERENCE NO.	
Authorized By			
AUTHORIZE PERFORMER ENGINEERING AREA			
Notes			



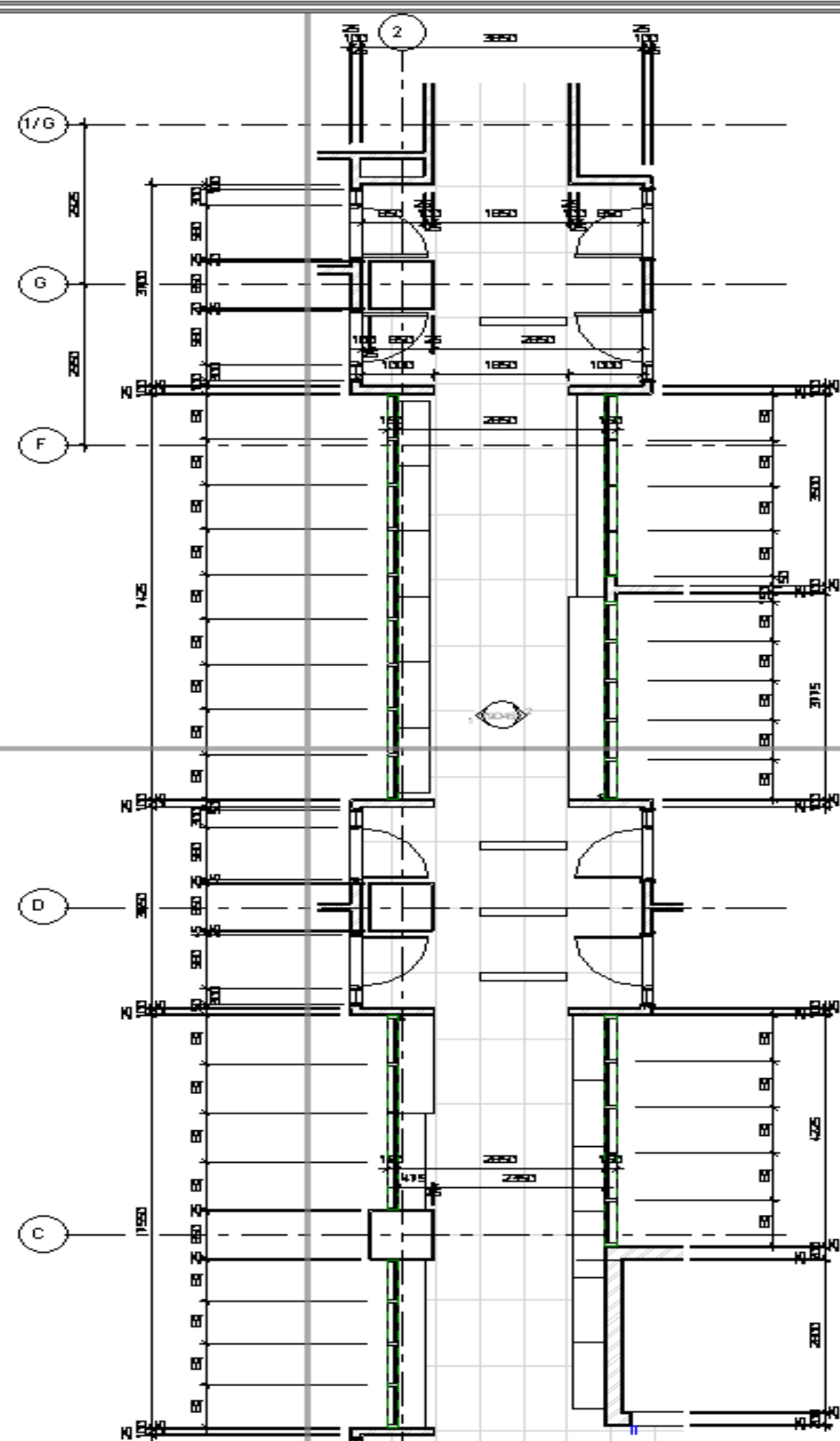
4 走廊立体示意图(低楼三至四层)2



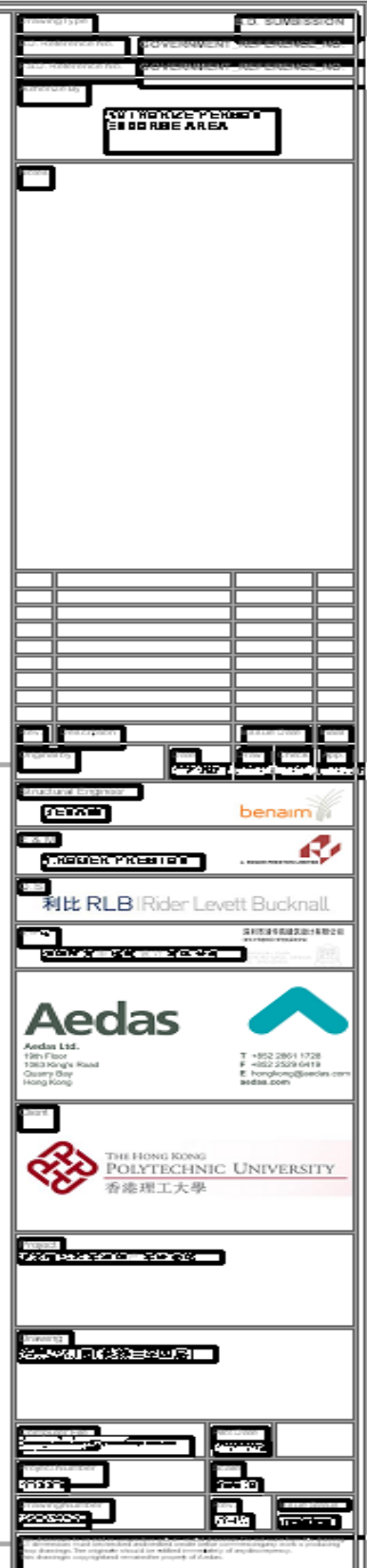
2 走廊立体示意图(低楼三至四层)1

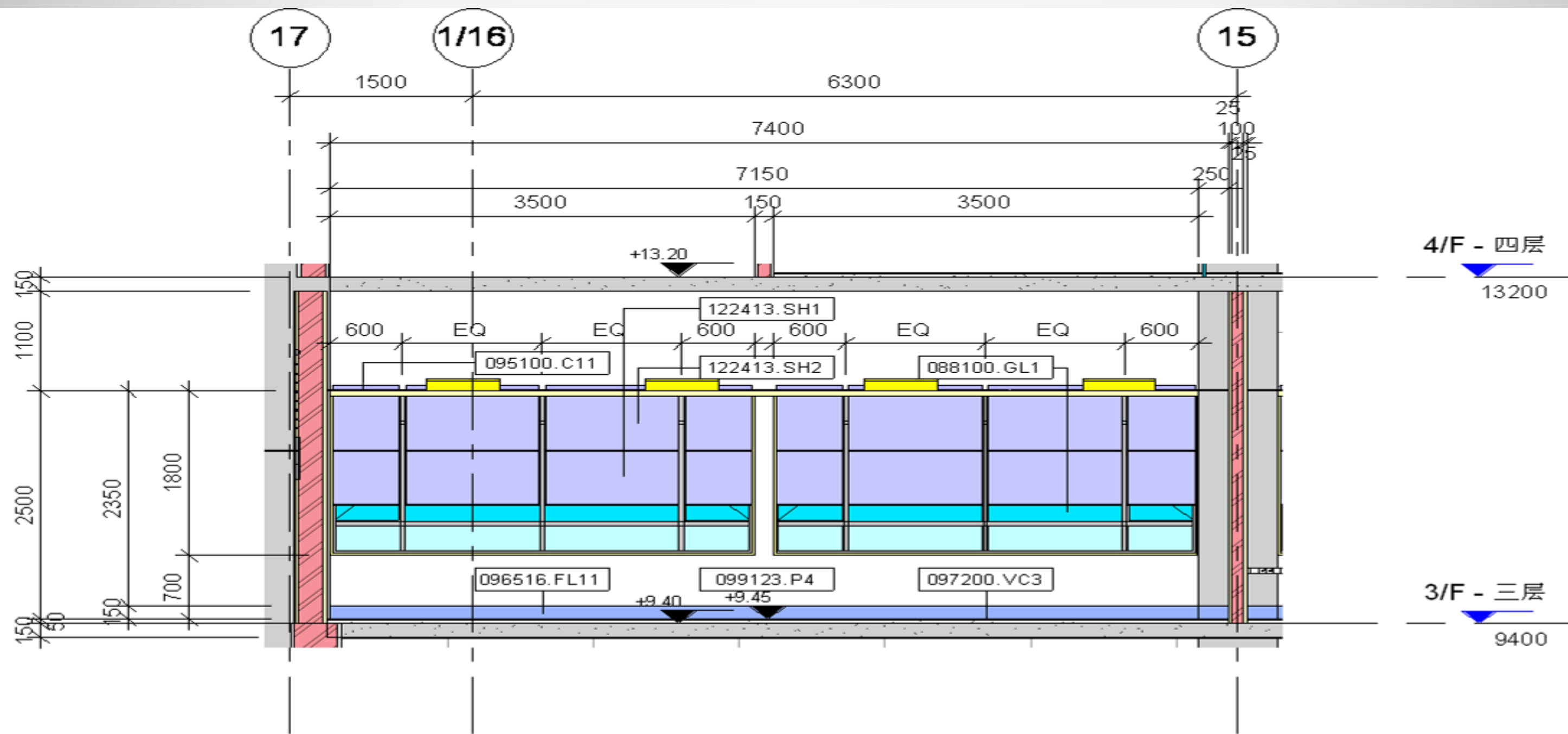


2 走廊天花平面图(低楼三至四层)
1:50



1 走廊平面图(低楼三至四层)
1:50





2

行政人员培训室立面图(高楼三层)6

1:50

真BIM

有型, 有神, 有务; 乃真BIM 也

I = M

I > M

真BIM

B I M

=



Modelling

模型/模擬

Information

信息

Business

業務



真BIM

$$M + I = B$$

有型, 有神, 有务; 乃真BIM 也

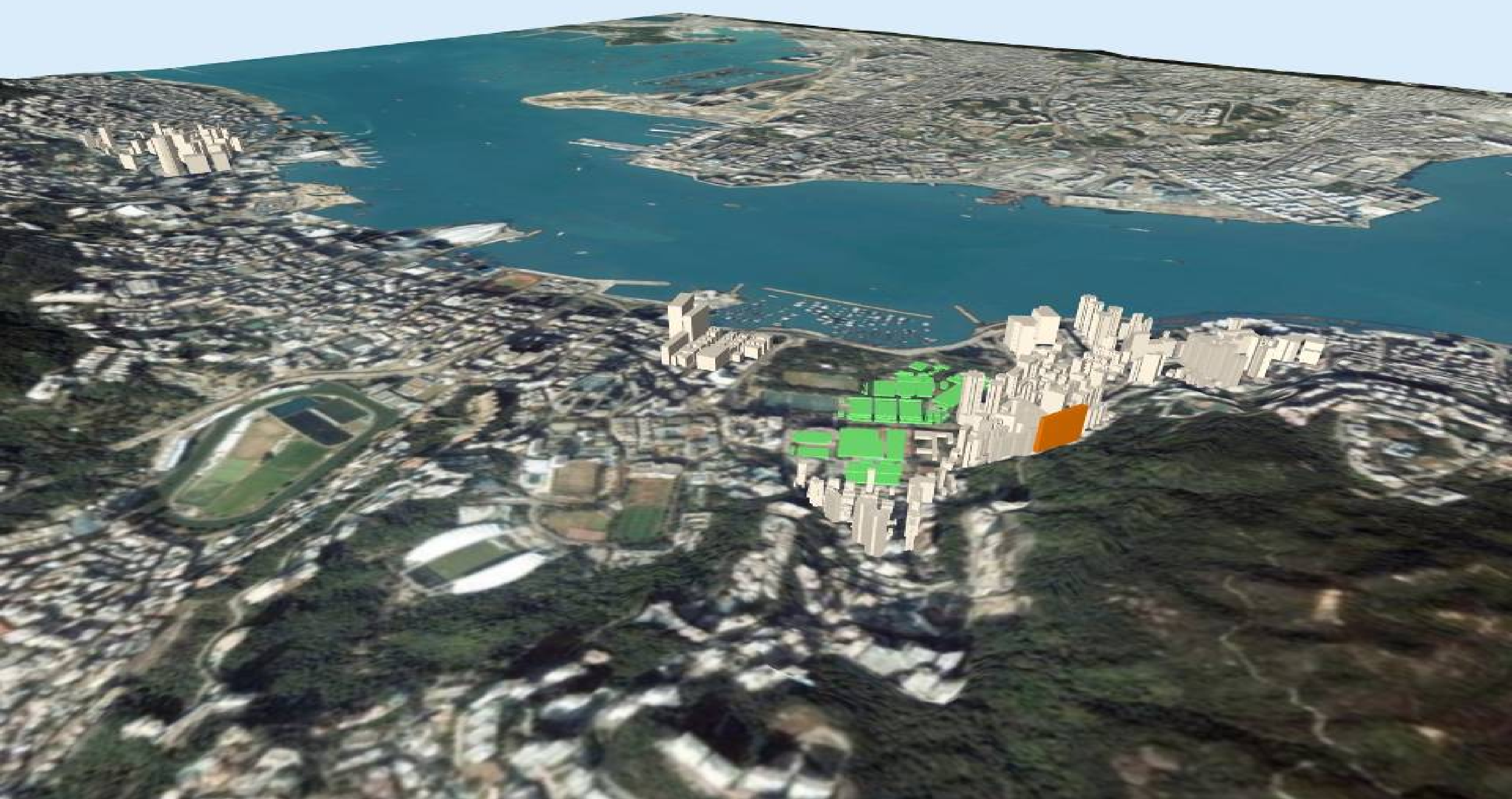
案例一



真BIM (设计阶段)

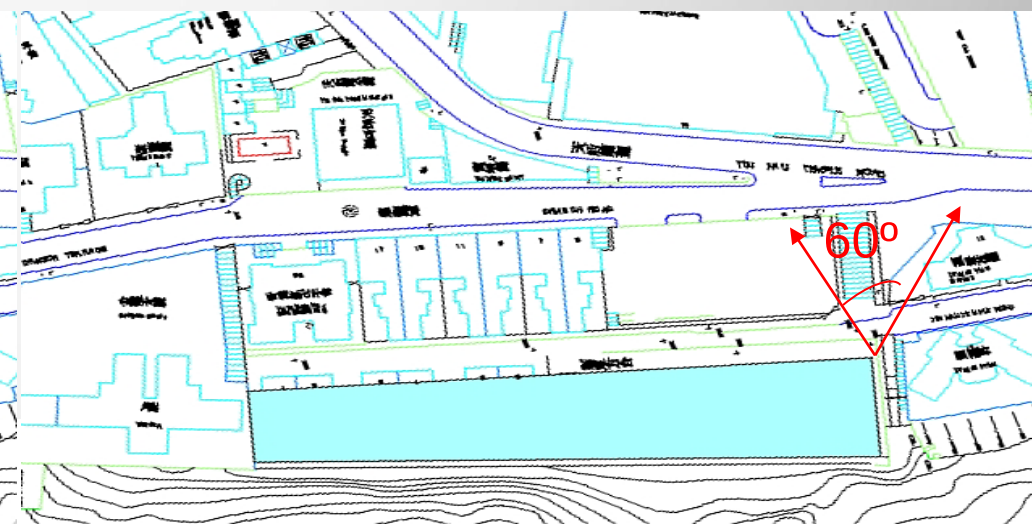
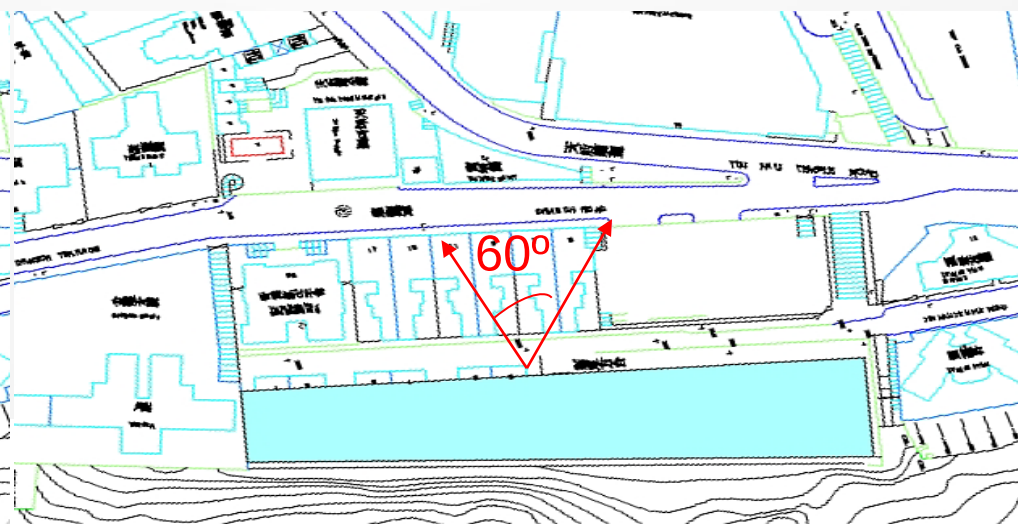
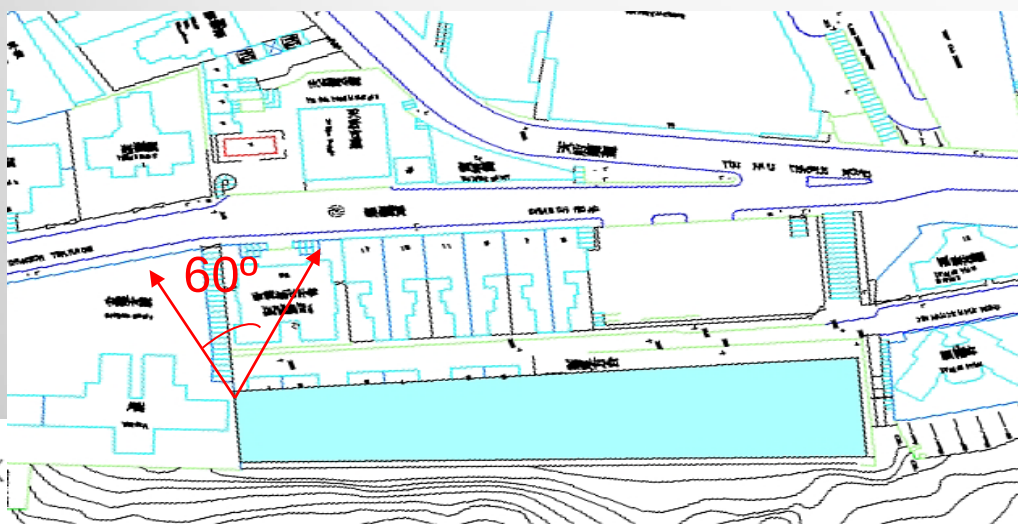
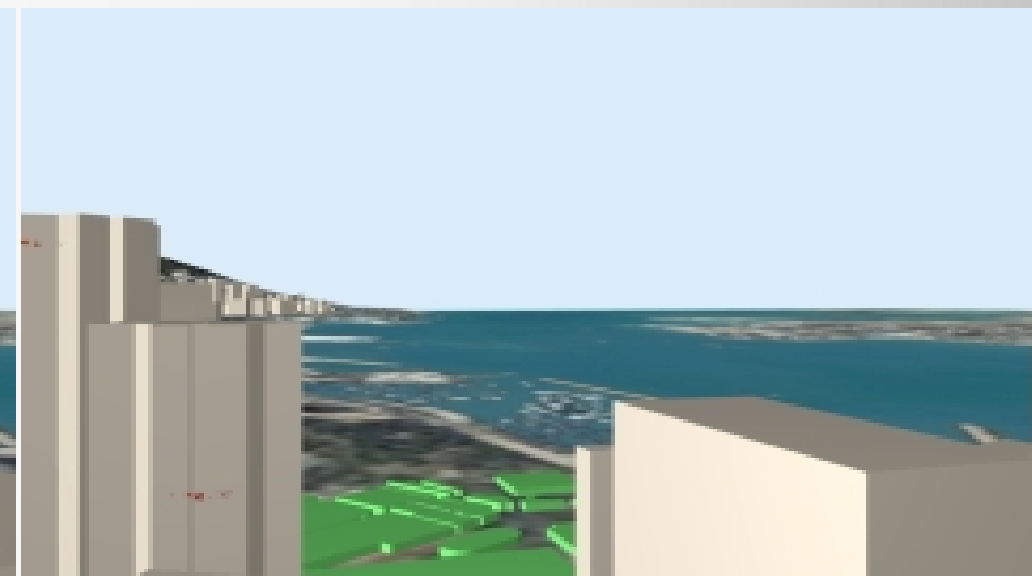
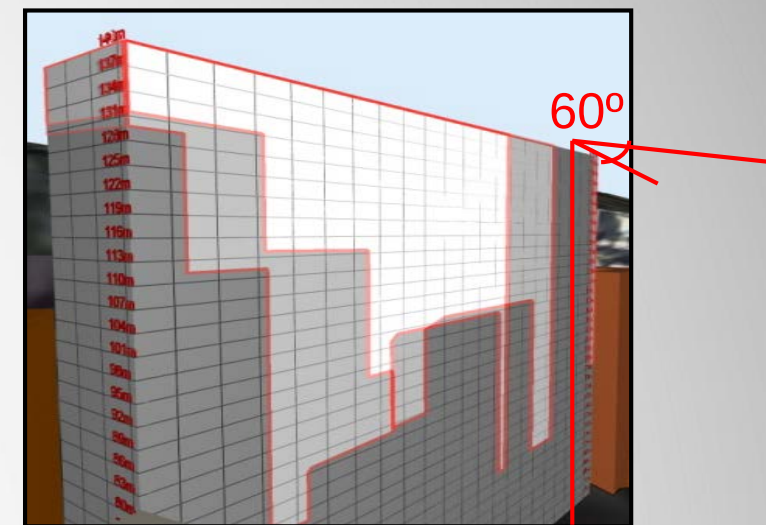
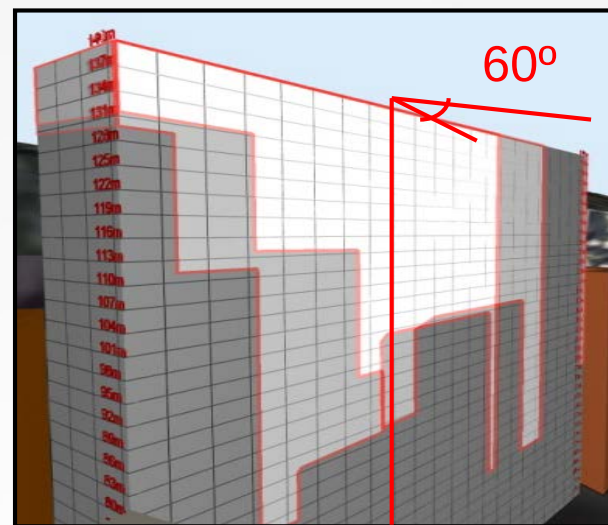
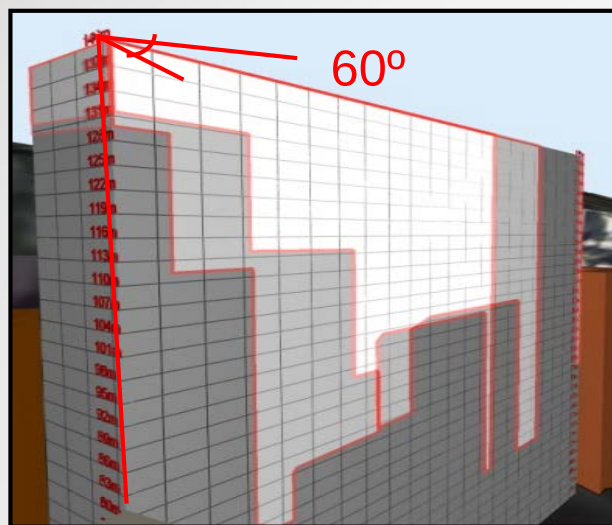
$$M + I = B \text{ (发展成本)}$$





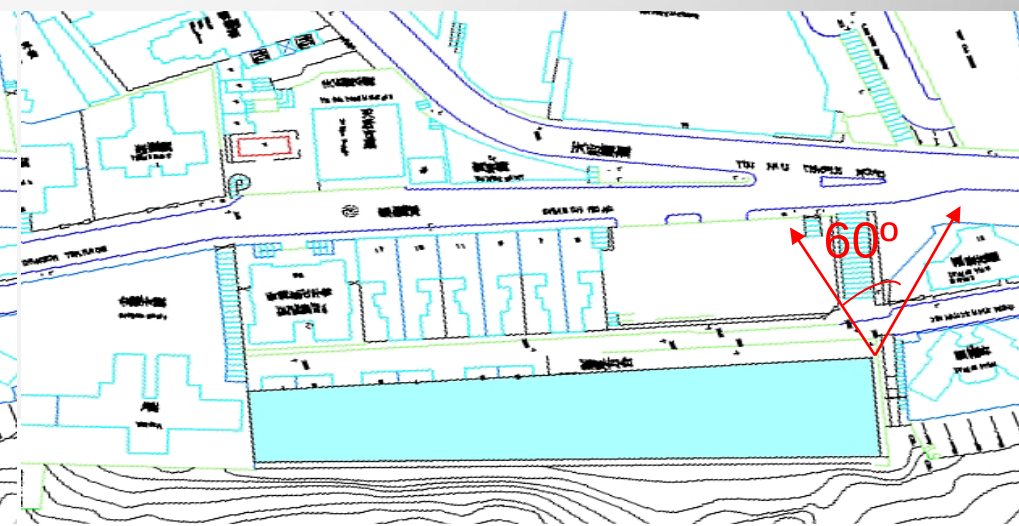
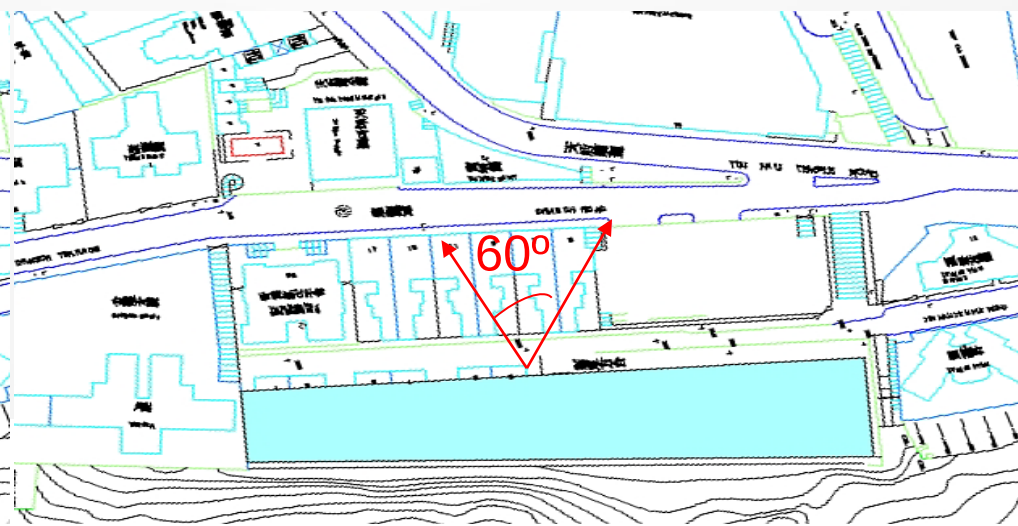
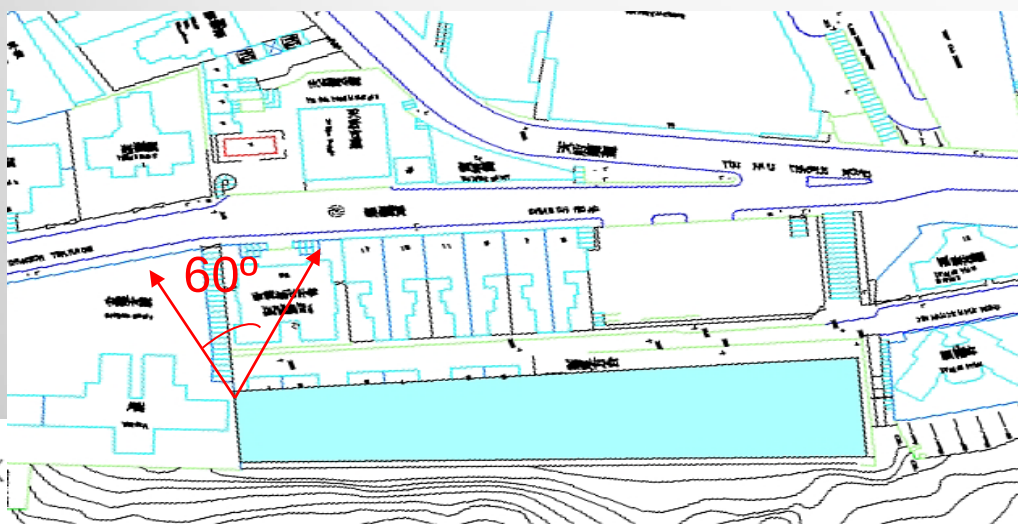
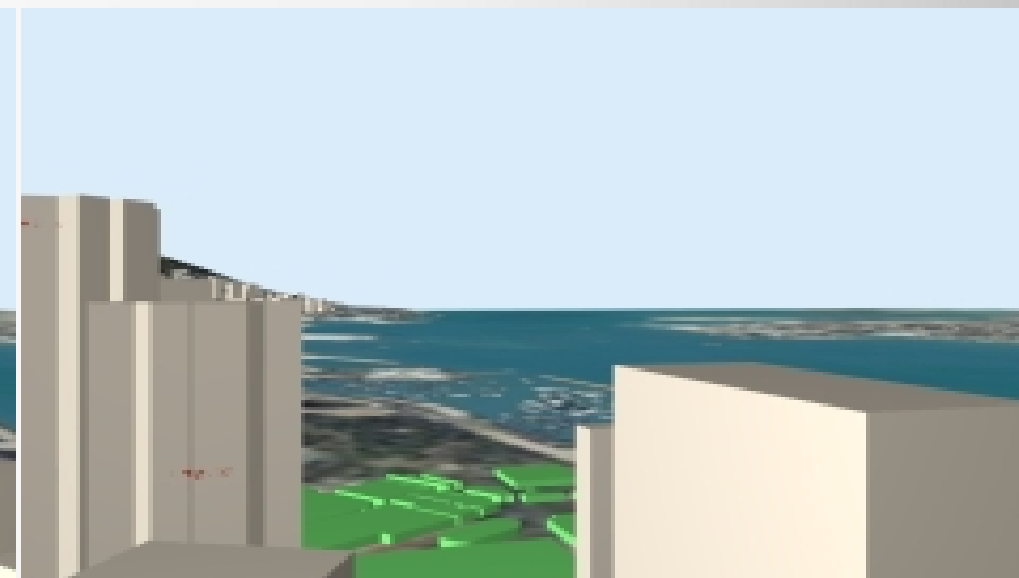
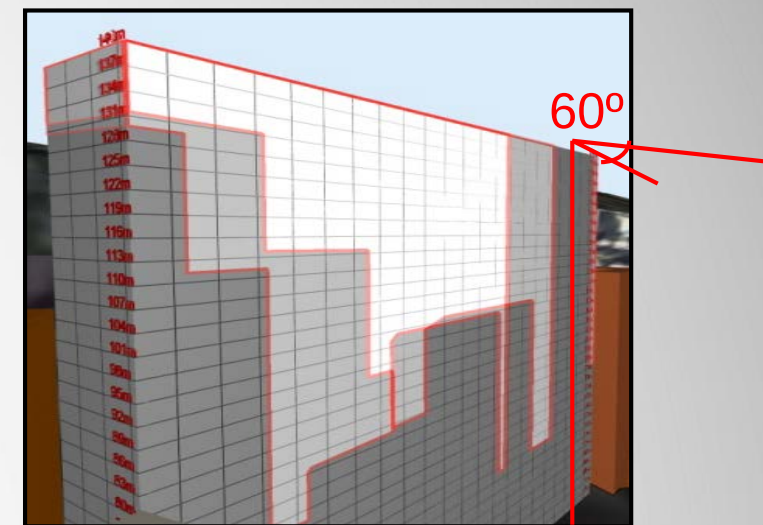
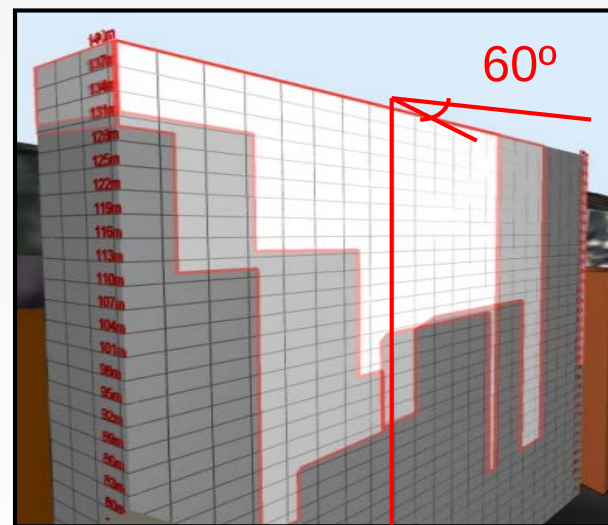
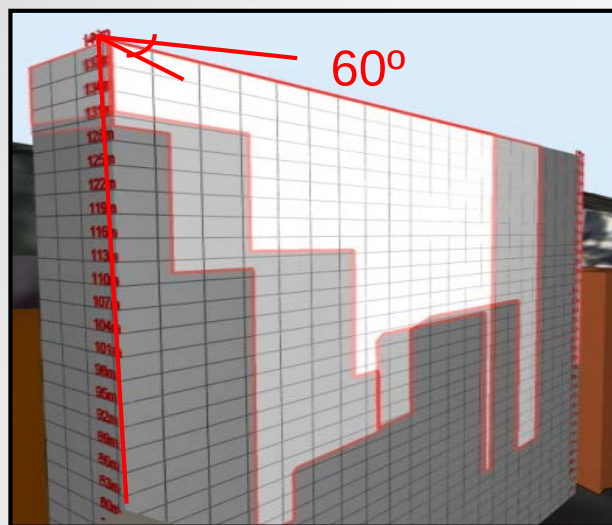
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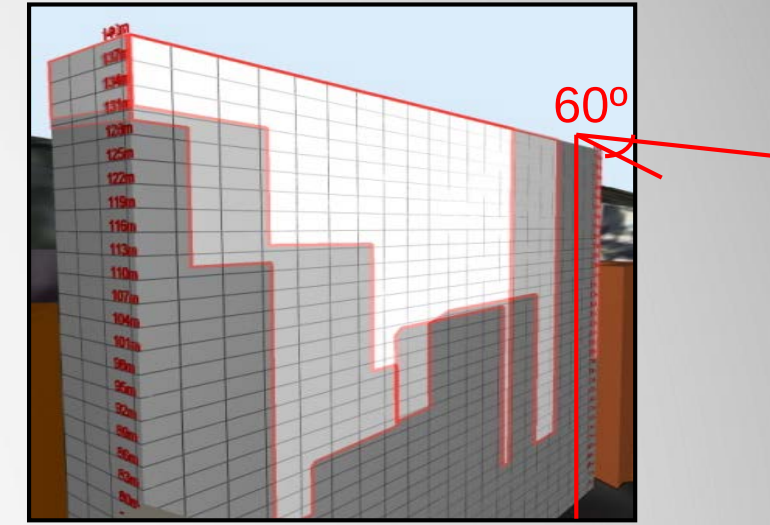
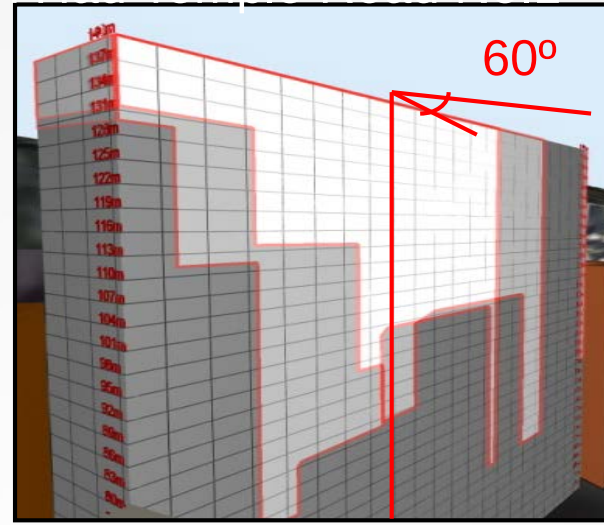
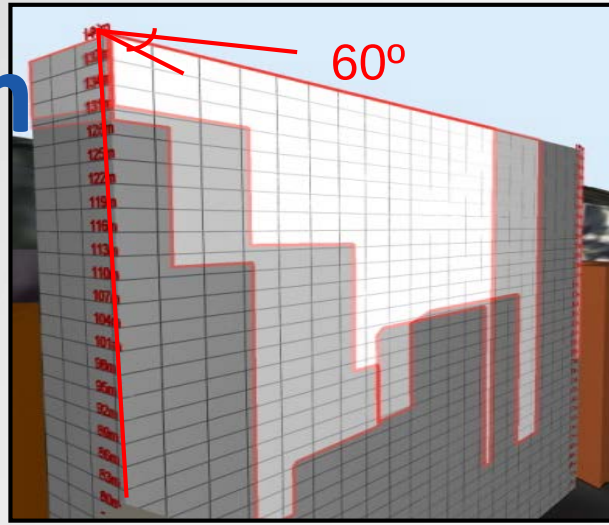
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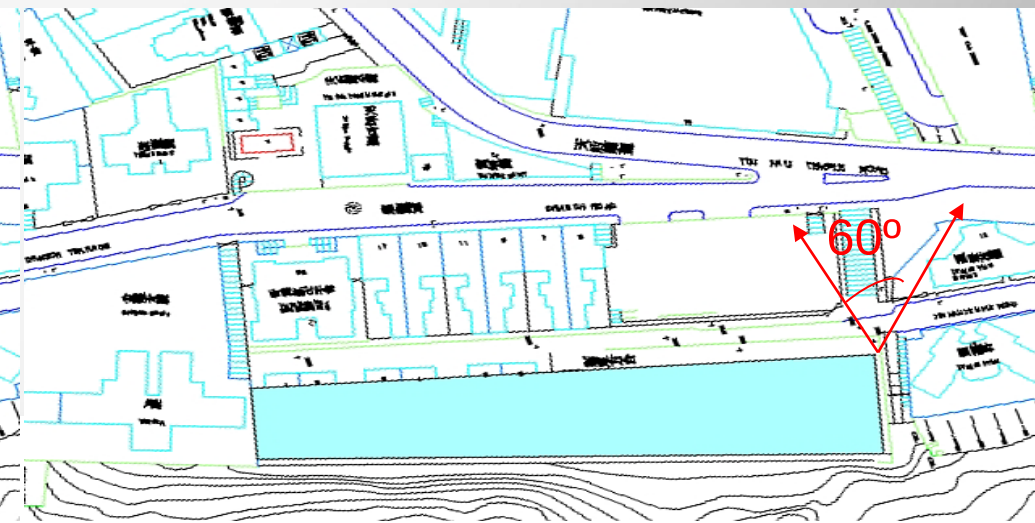
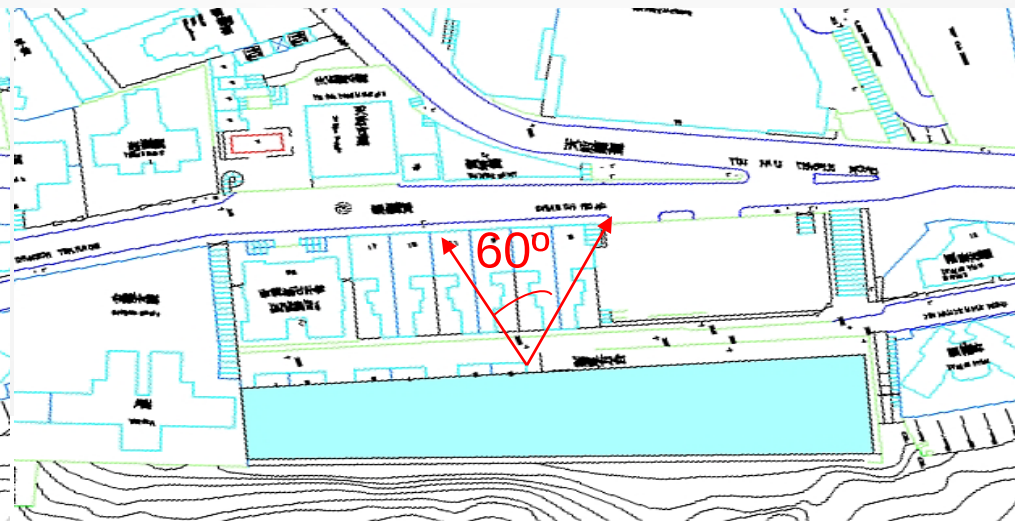
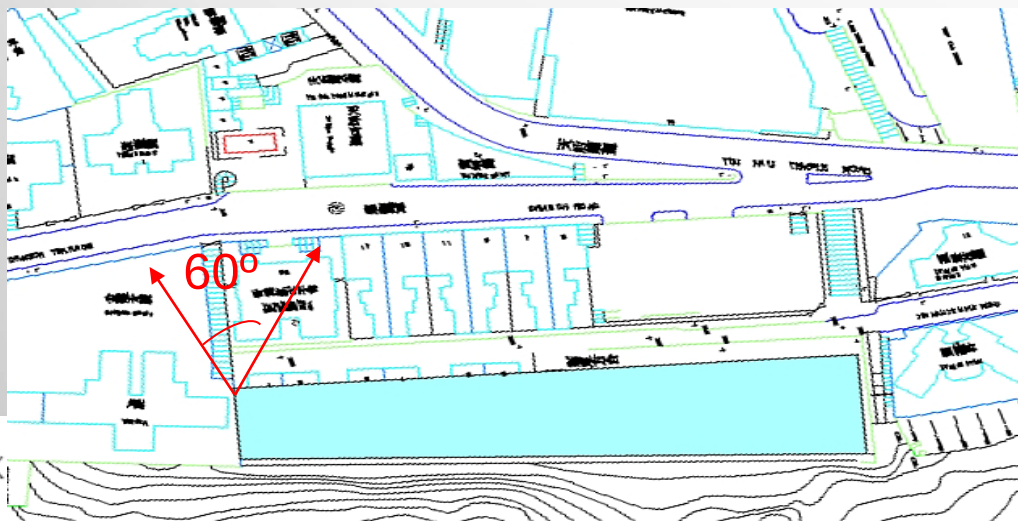
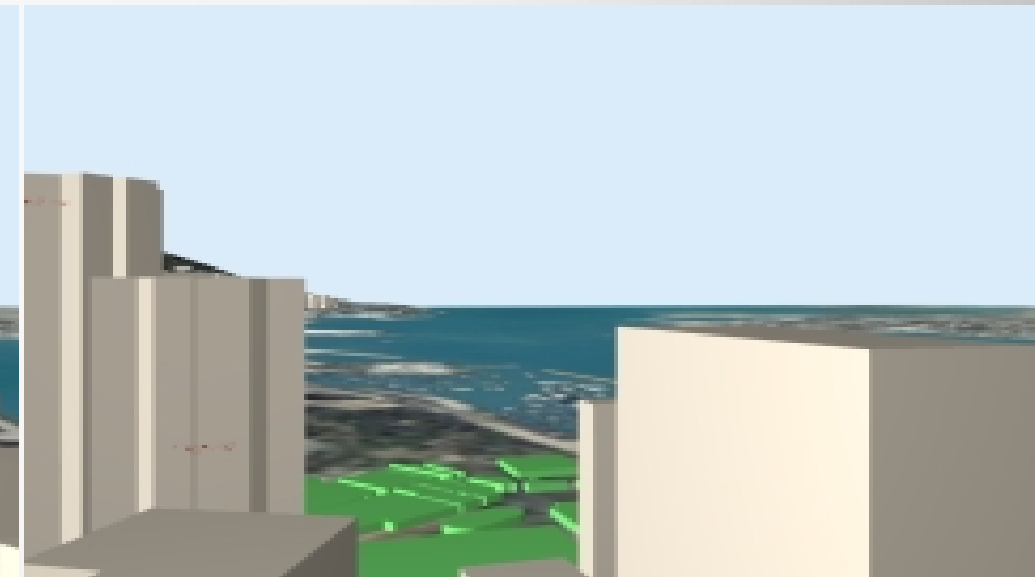


Tin Hau Temple Road No.1

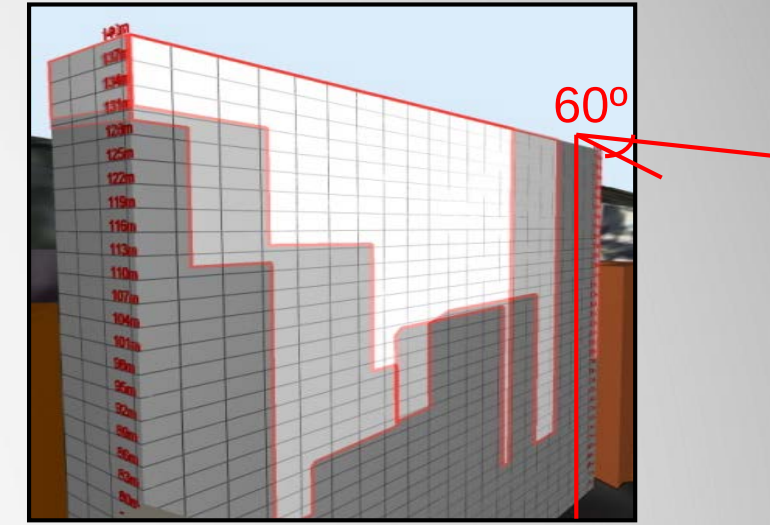
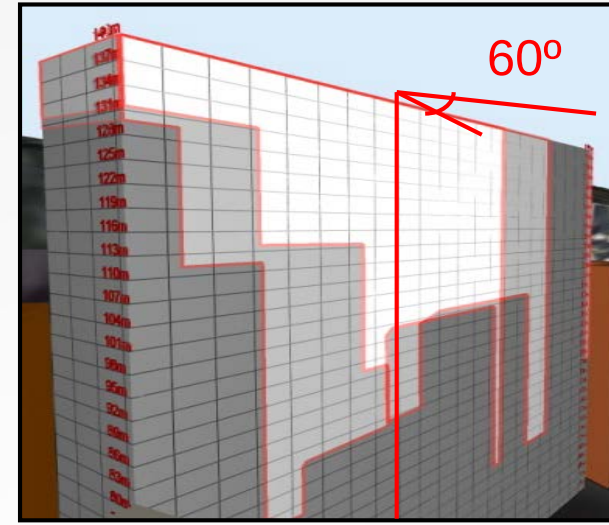
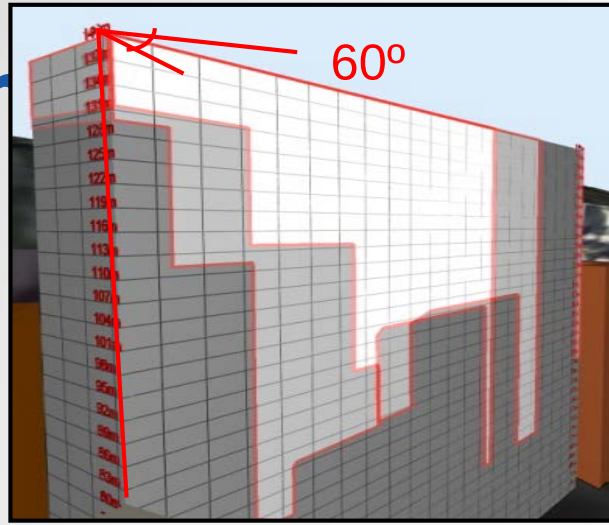
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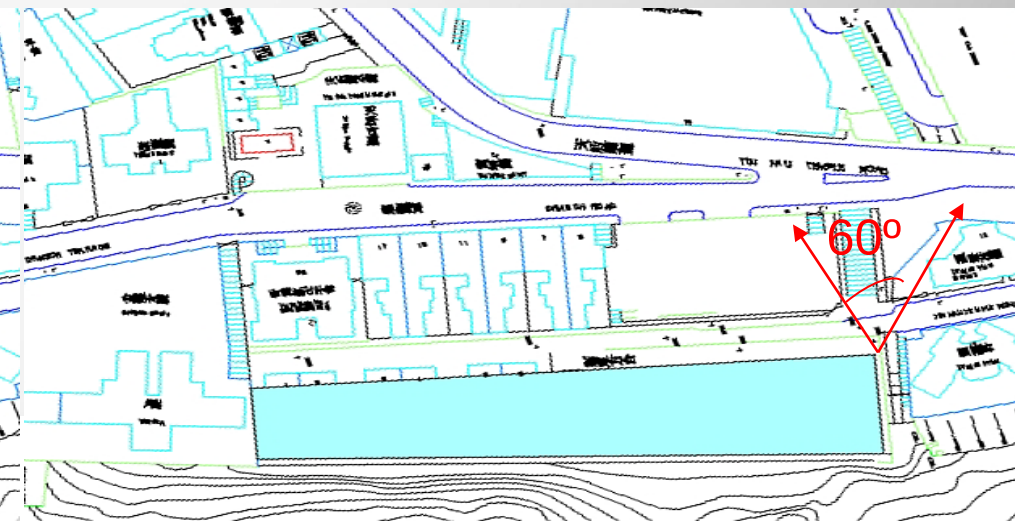
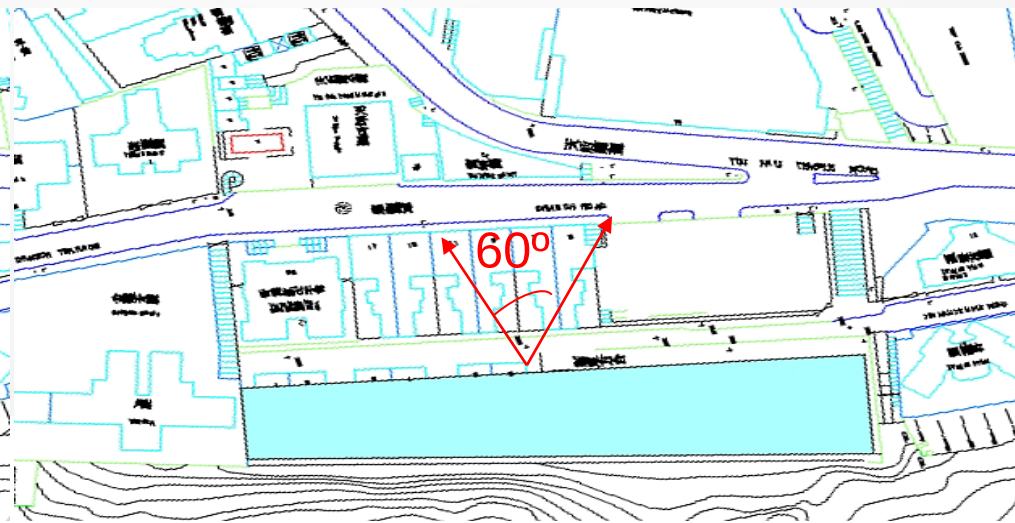
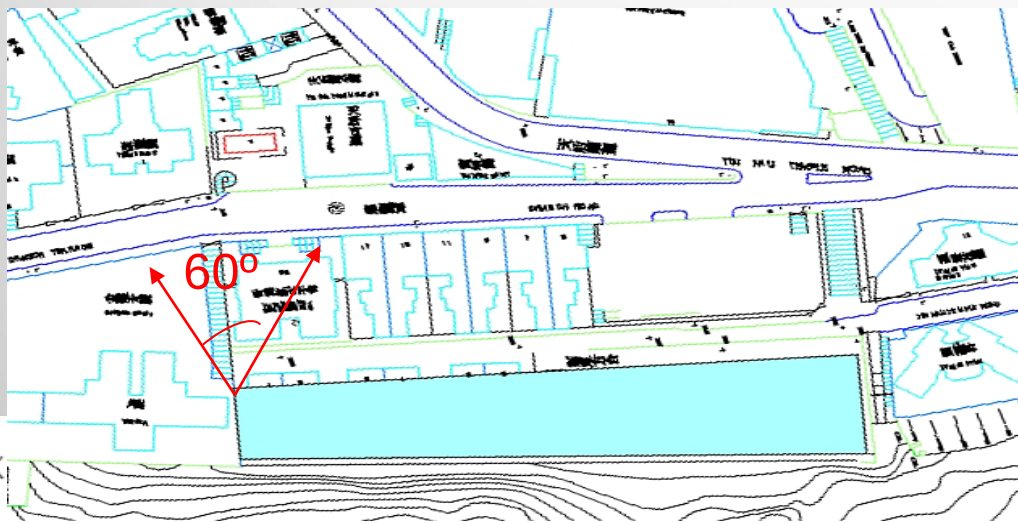
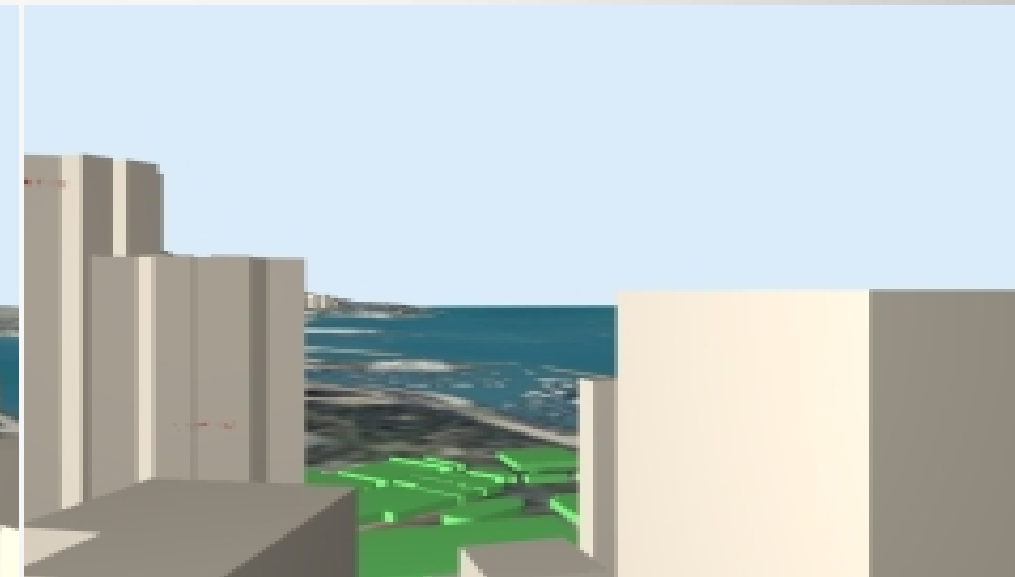
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125m

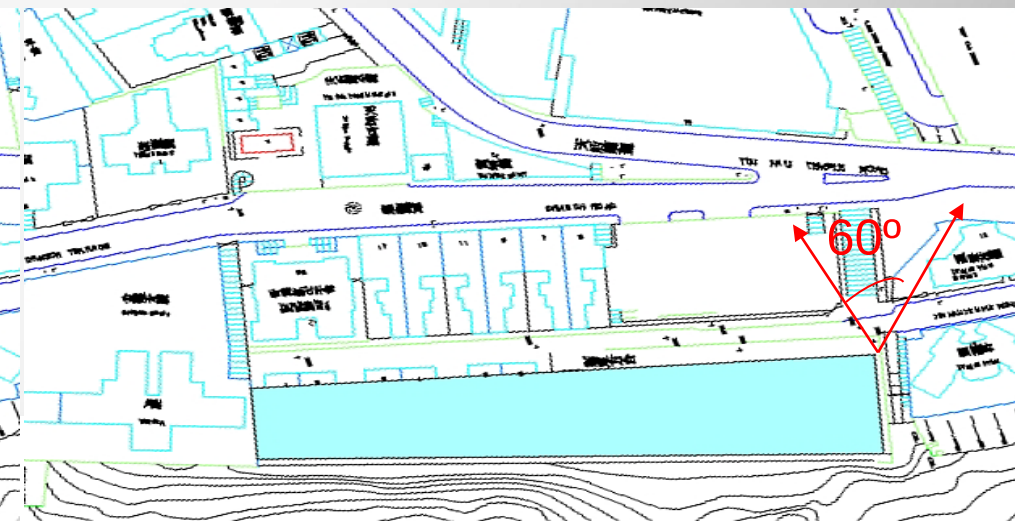
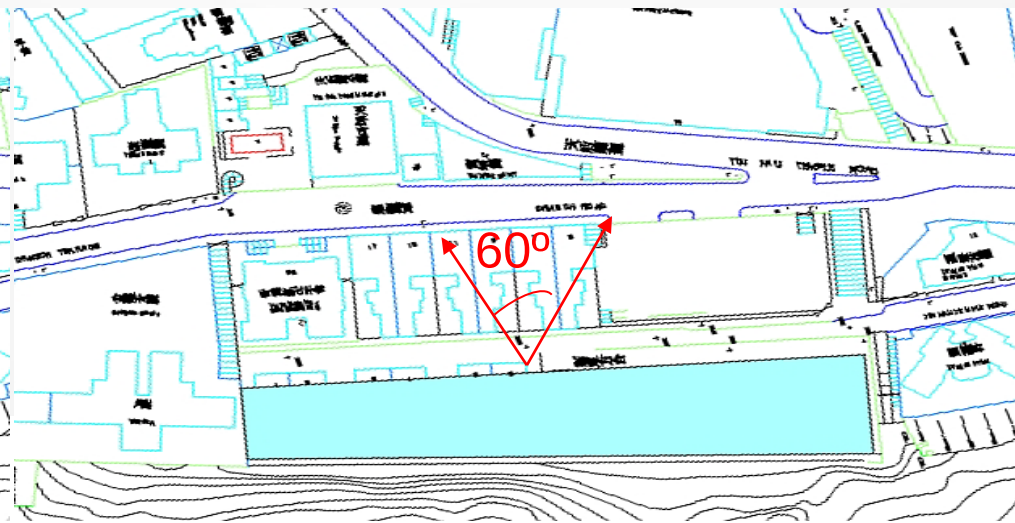
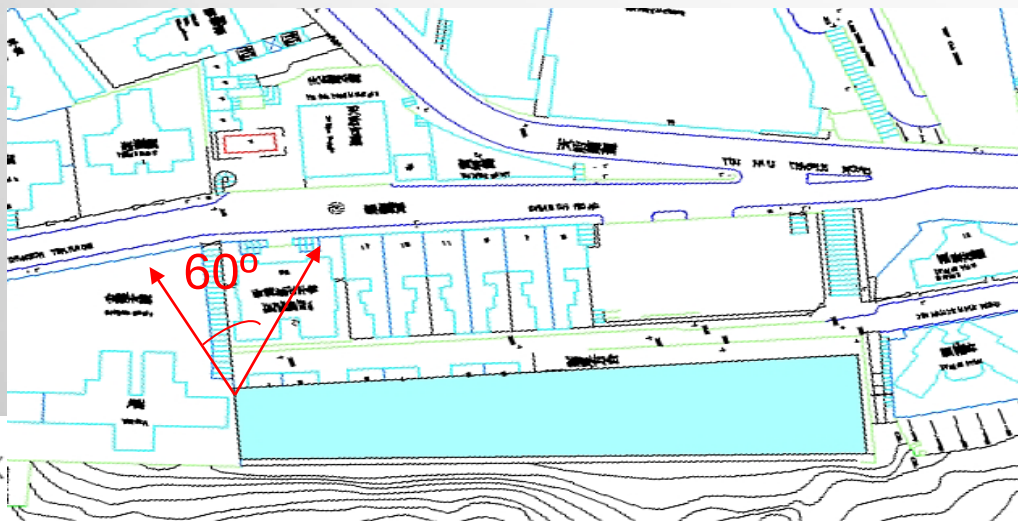
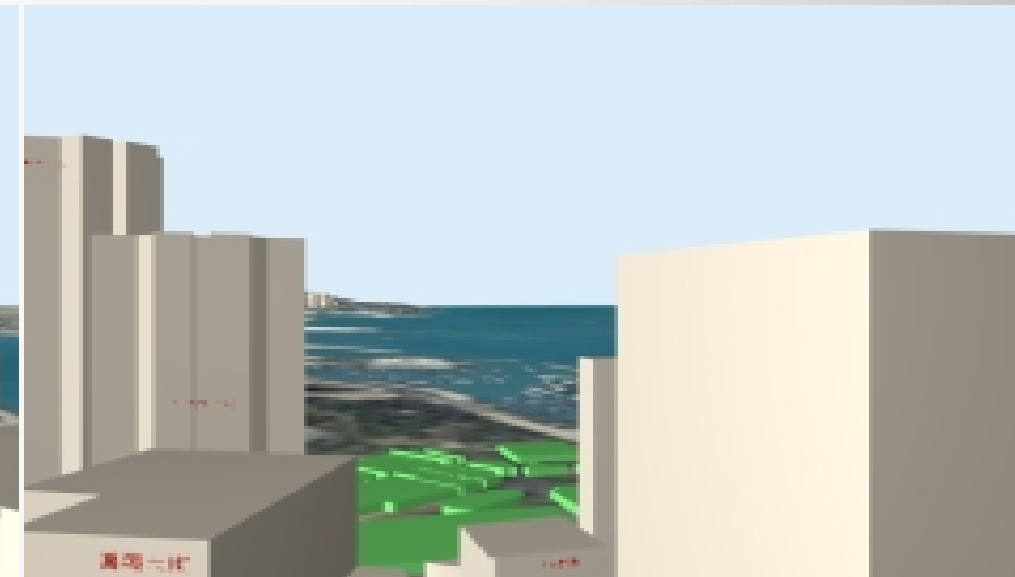
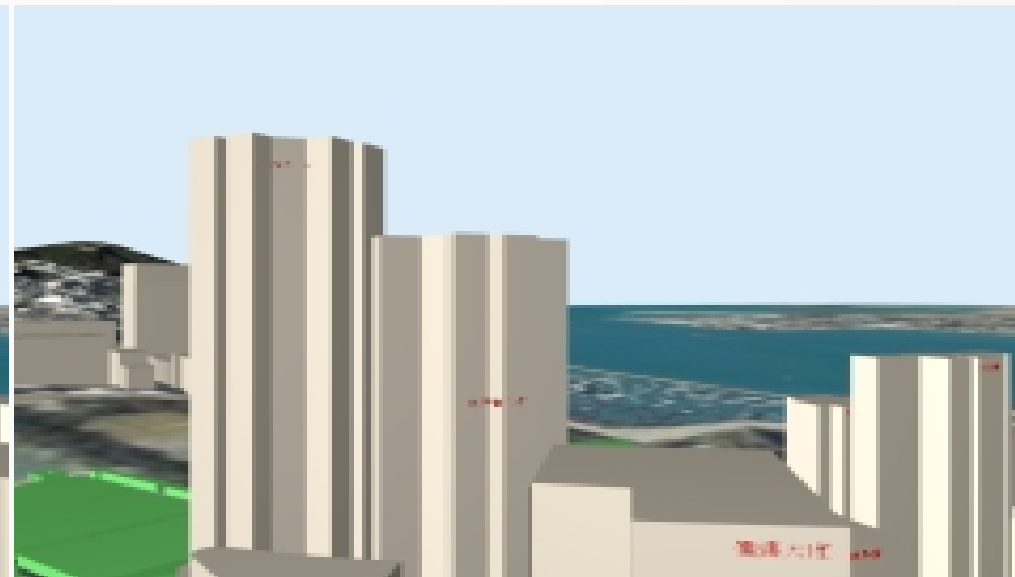
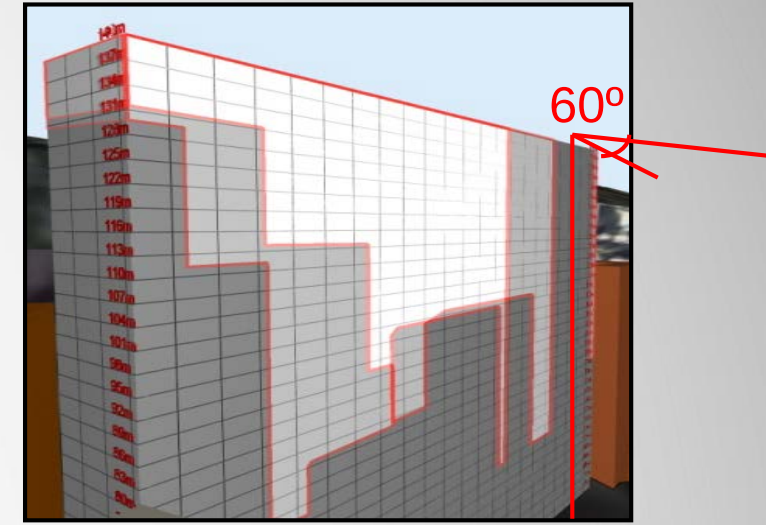
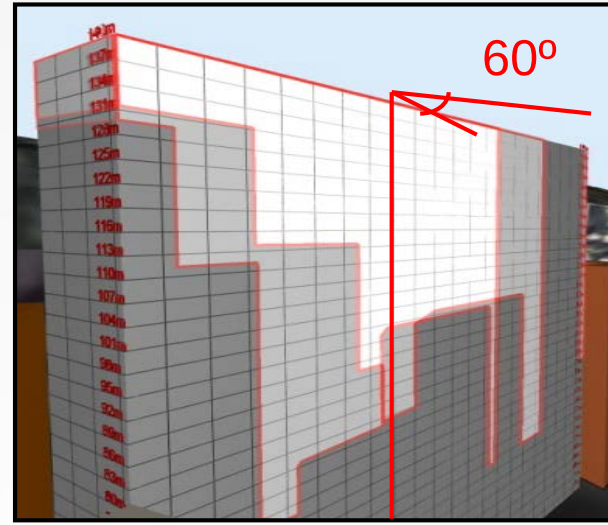
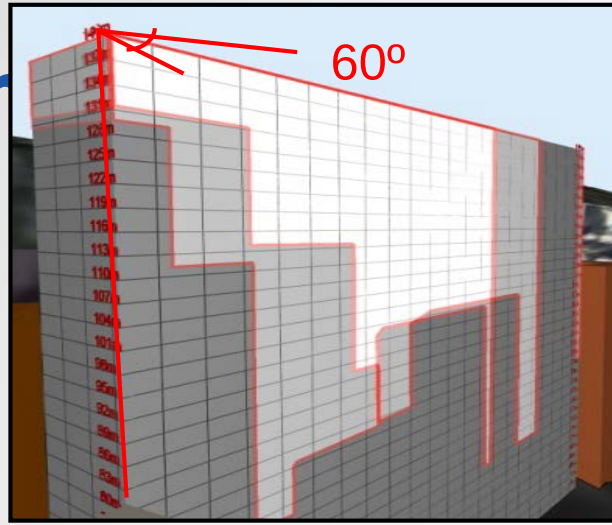


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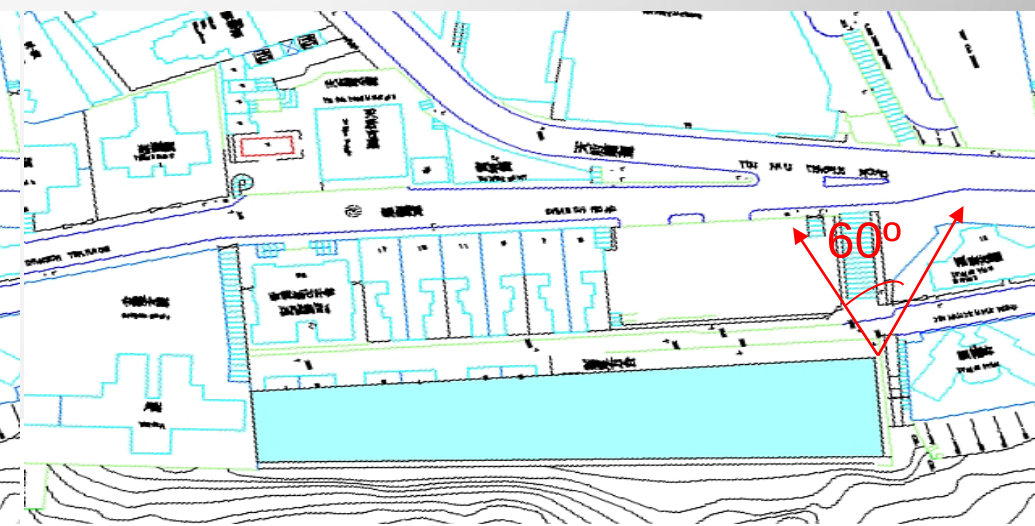
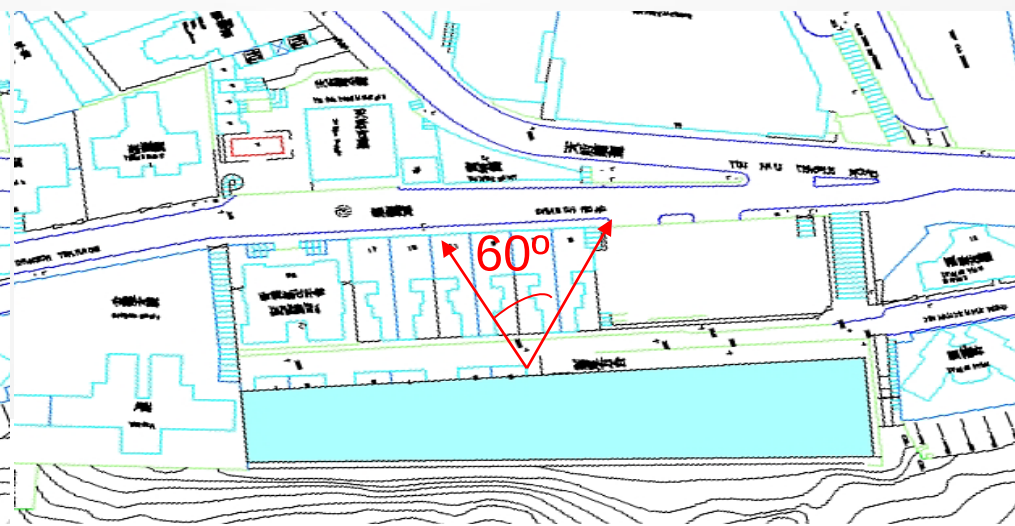
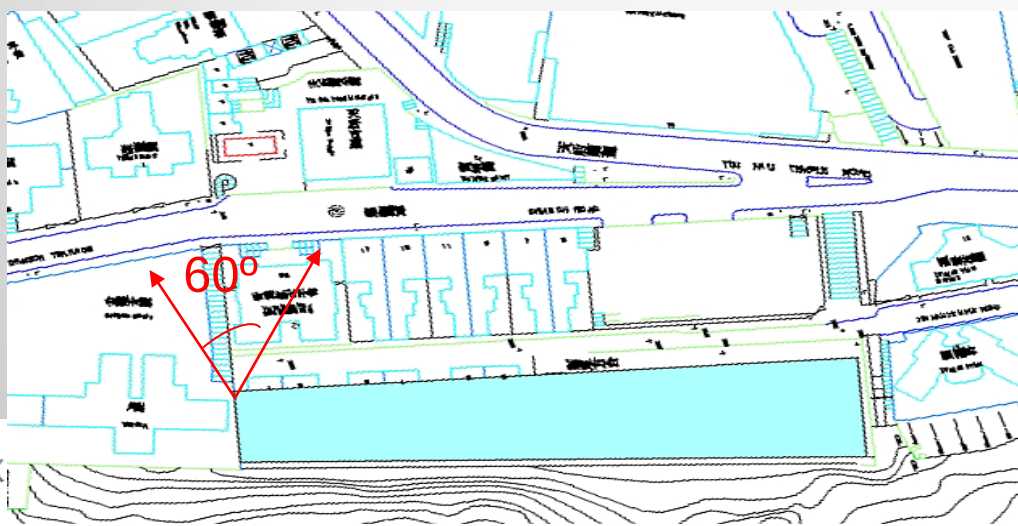
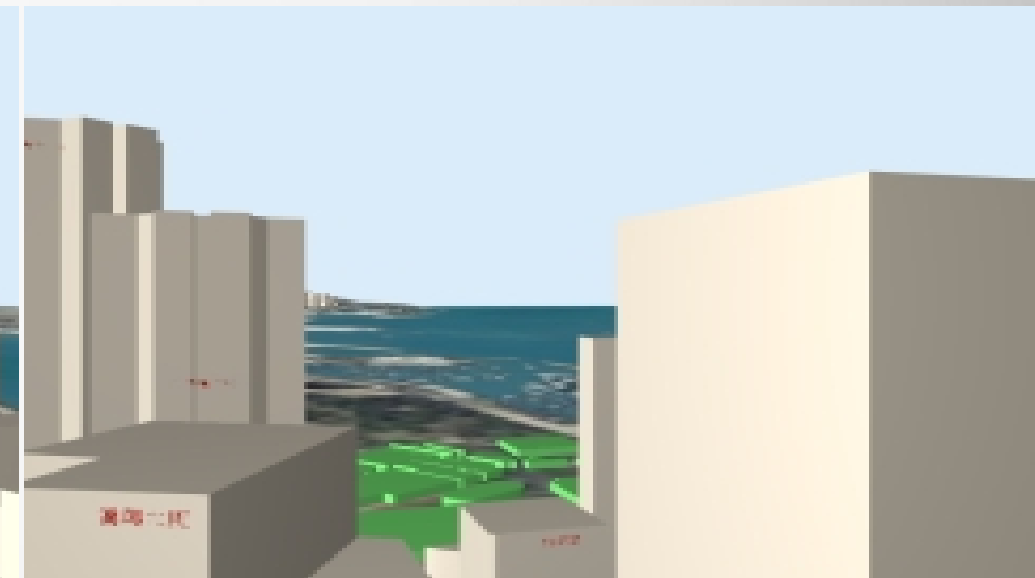
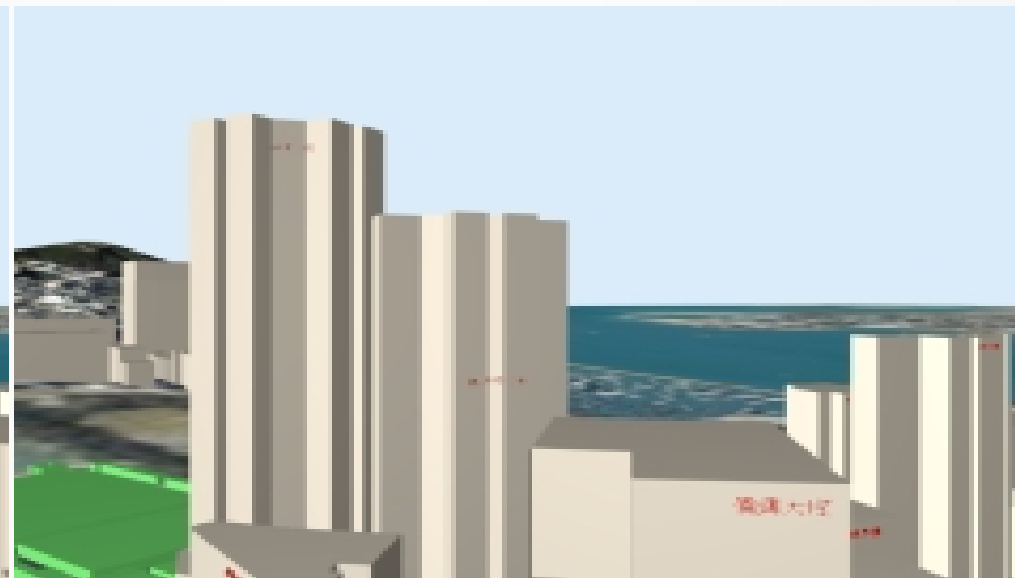
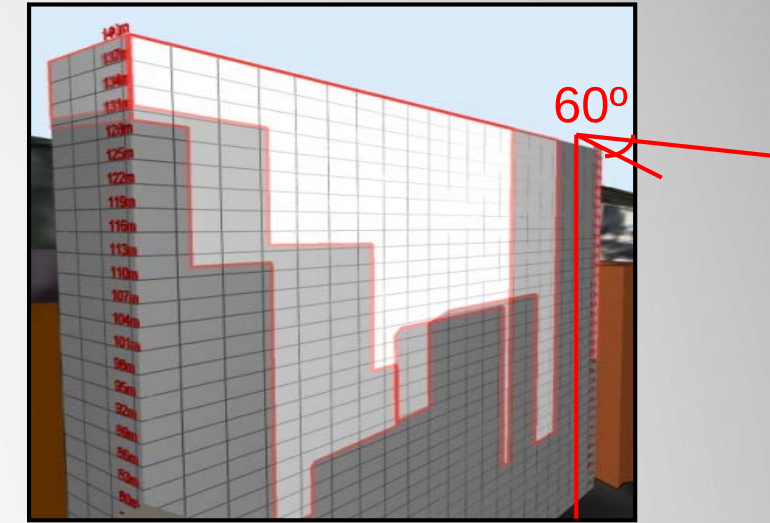
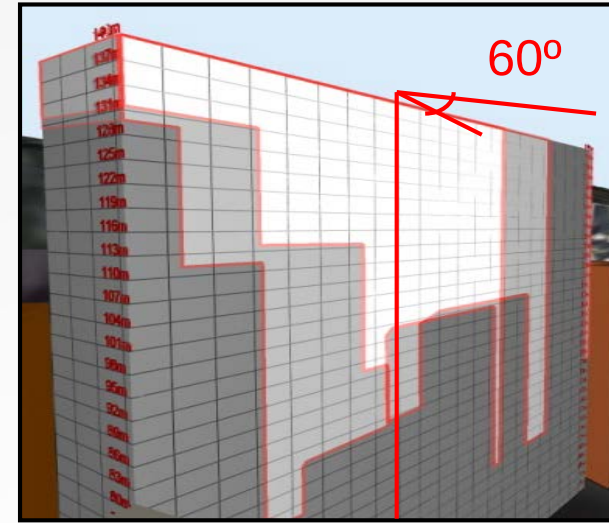
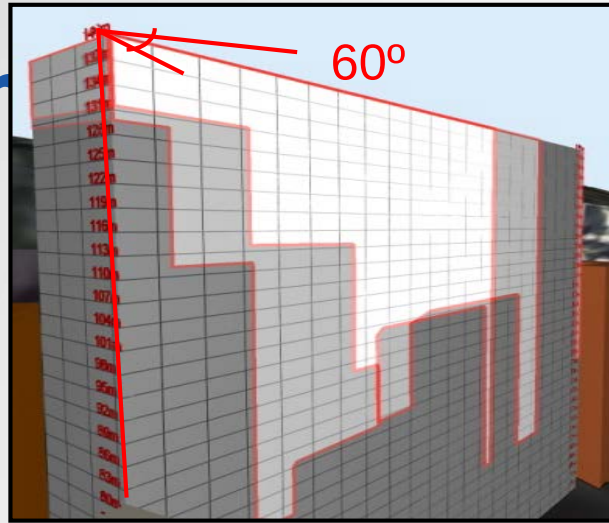
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115m

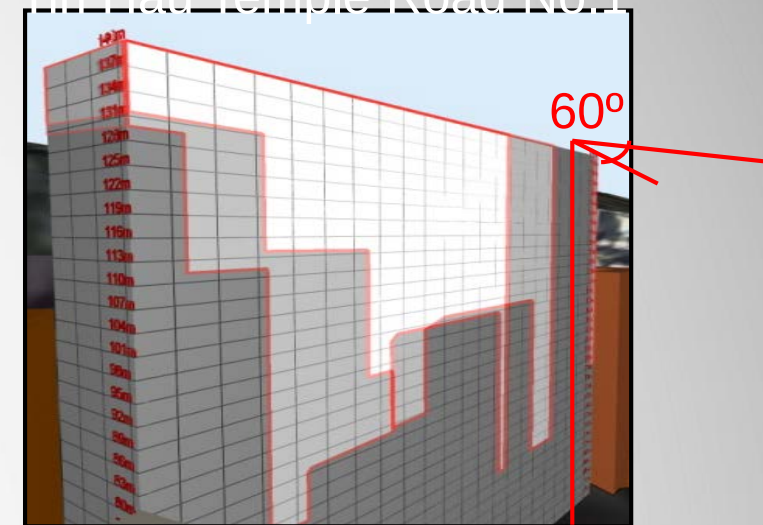
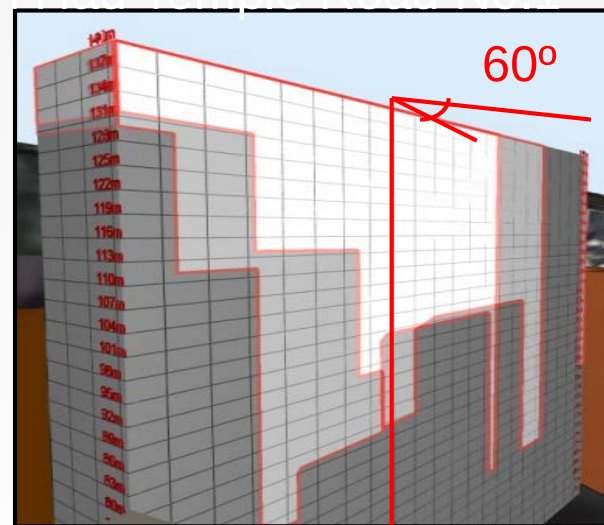
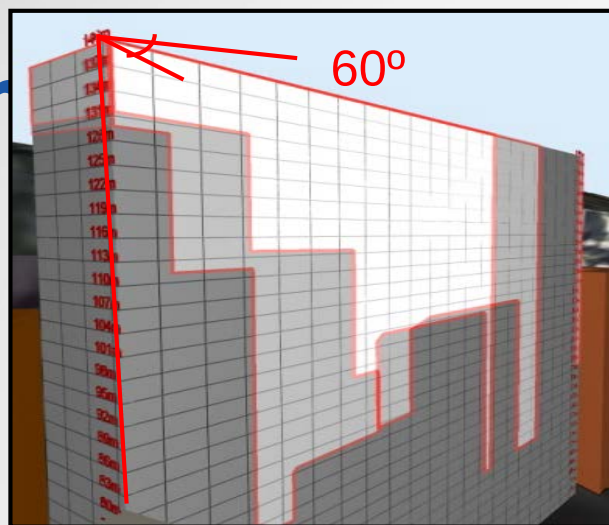
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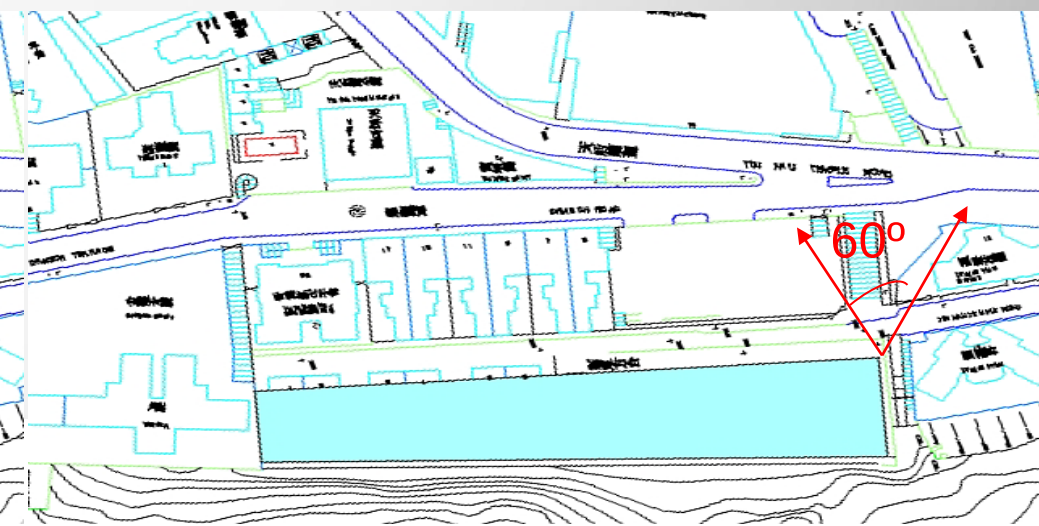
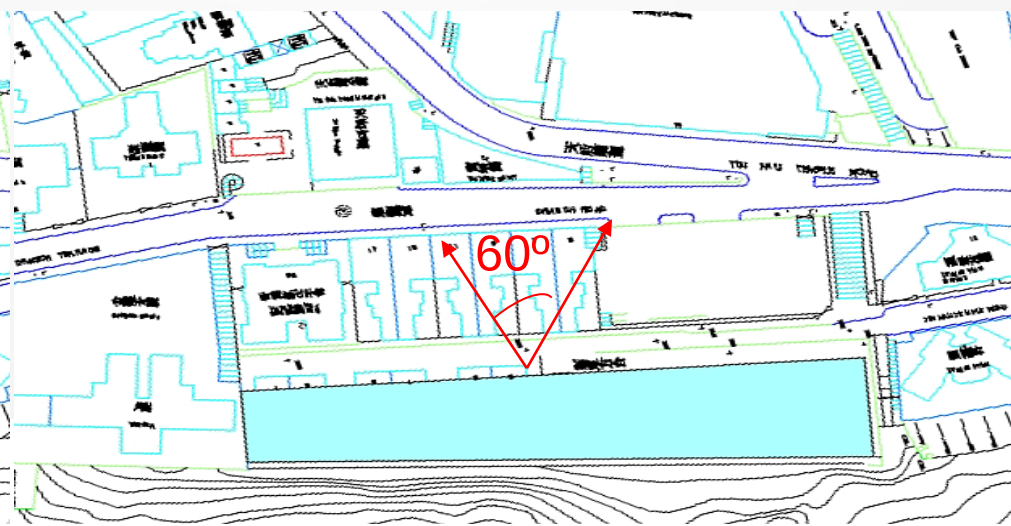
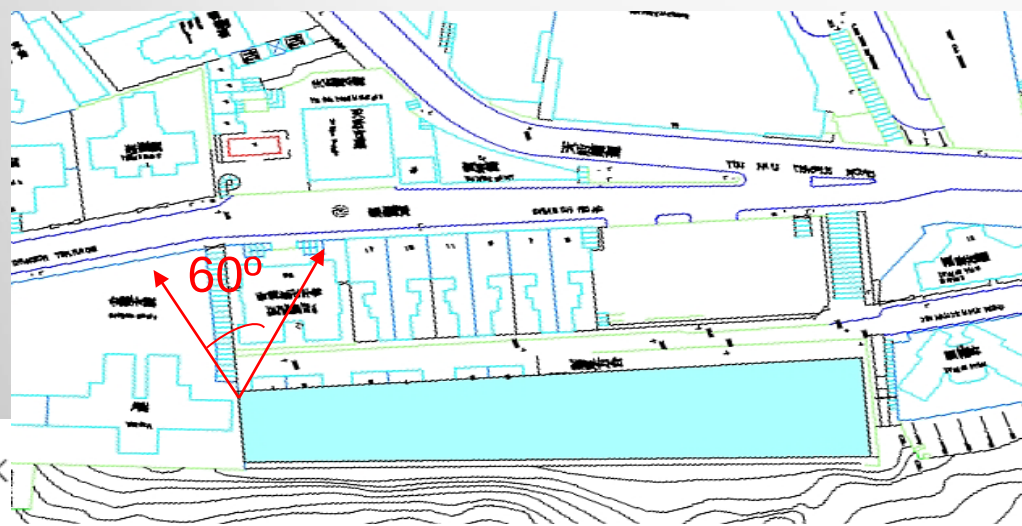
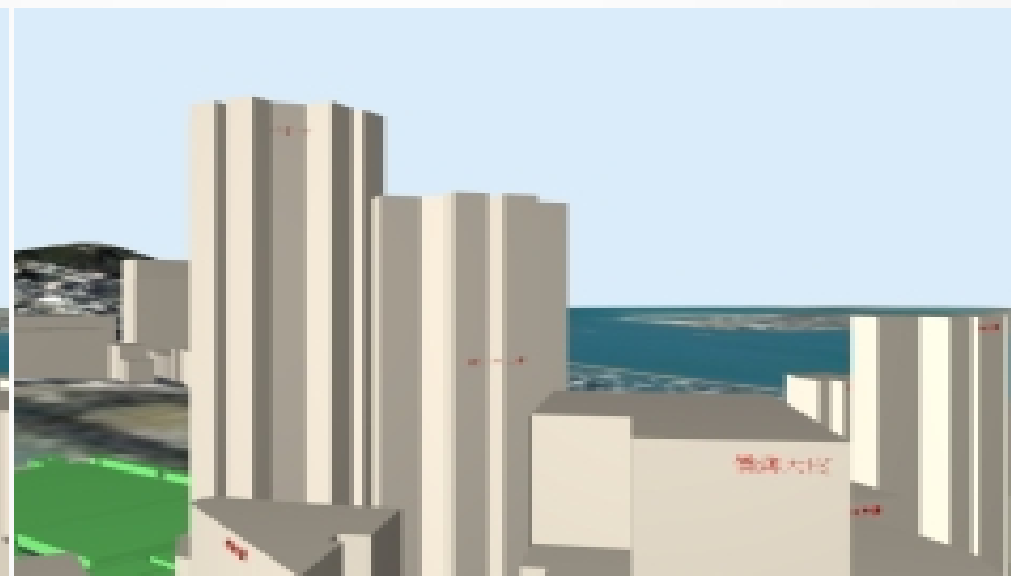
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Tin Hau Temple Road No.1

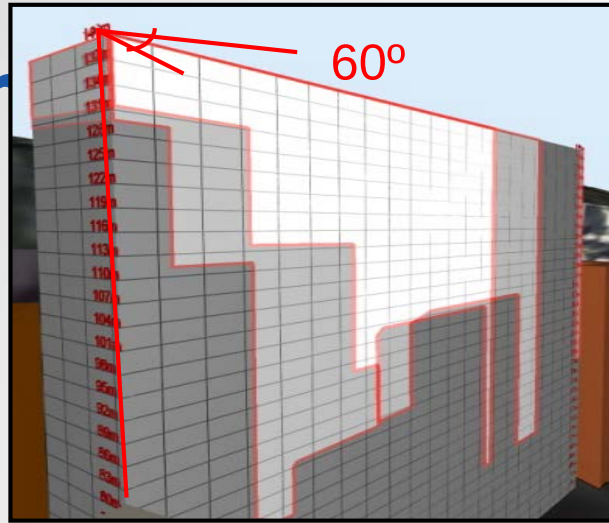
Tin Hau Temple Road No.1



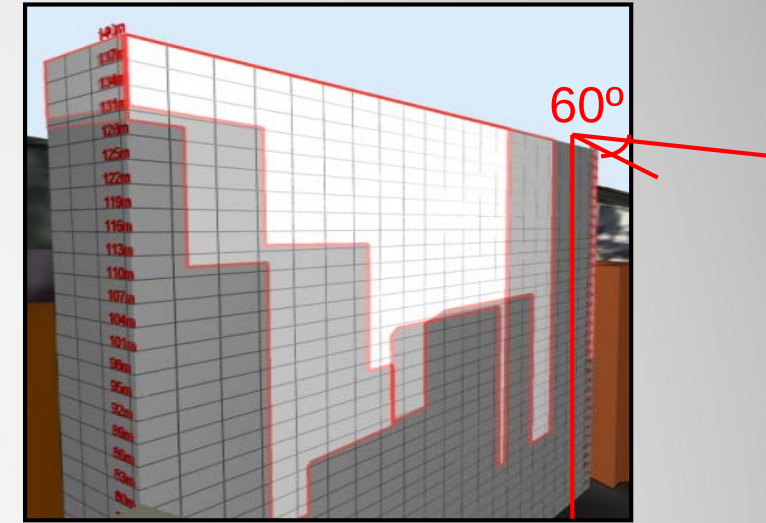
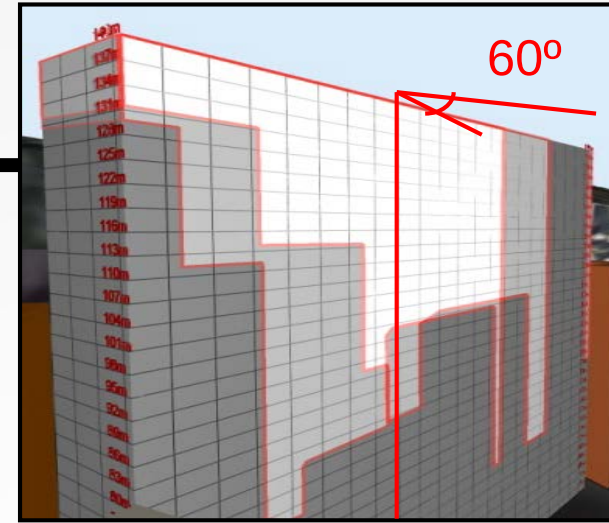
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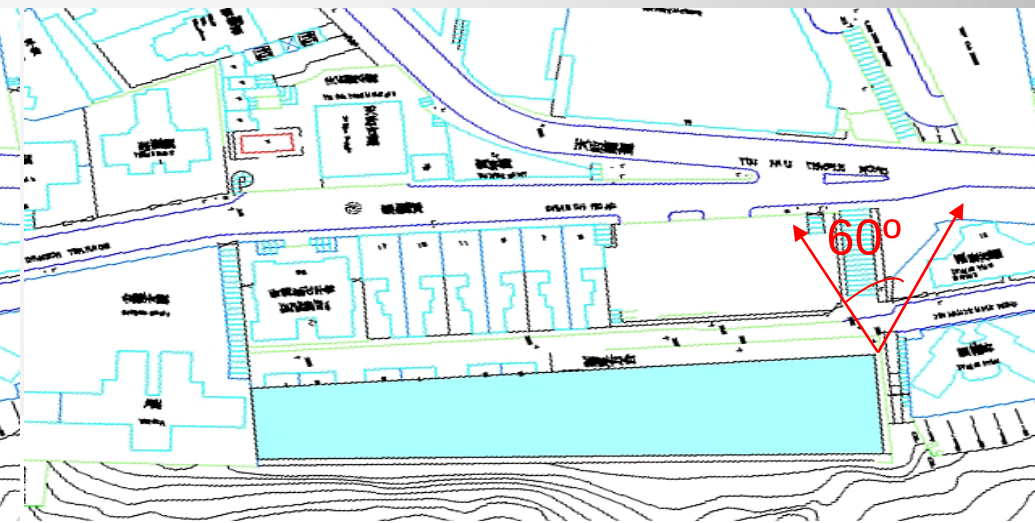
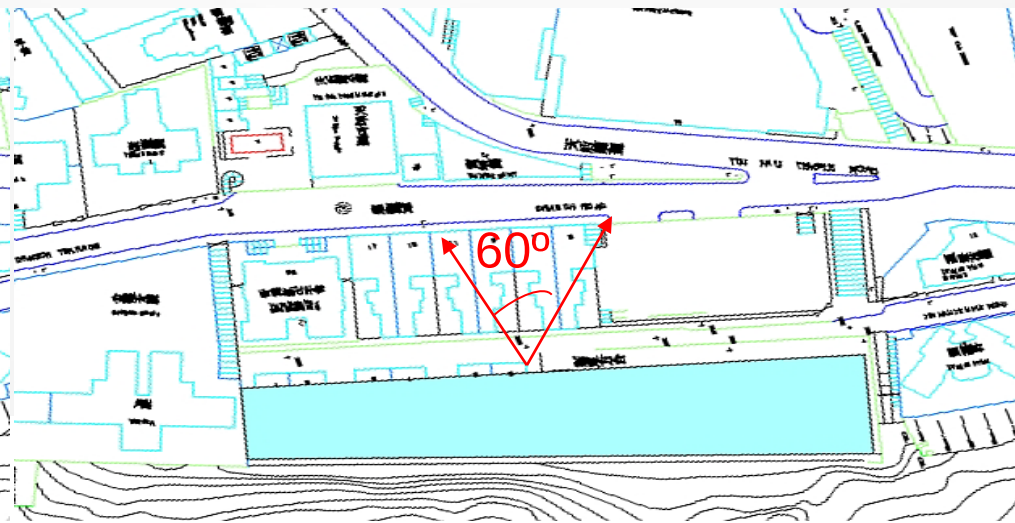
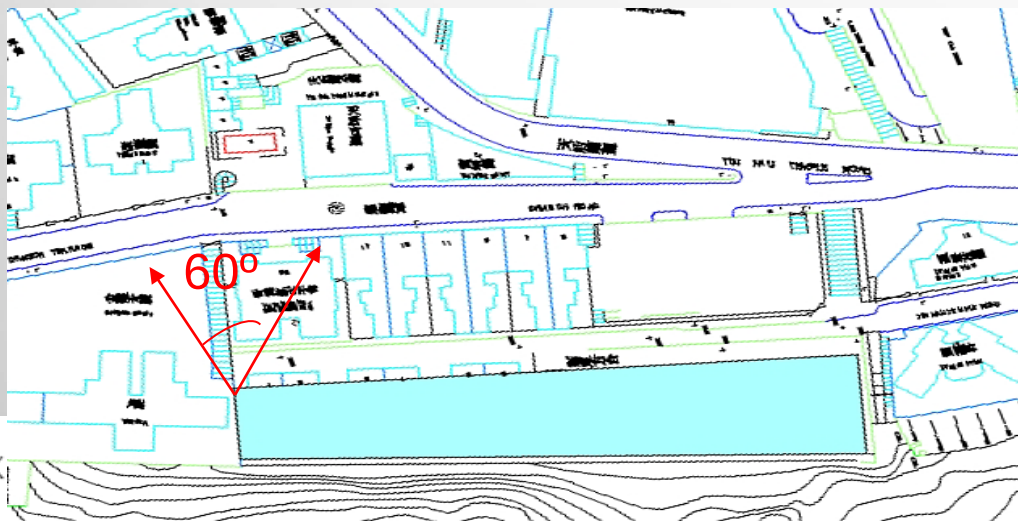
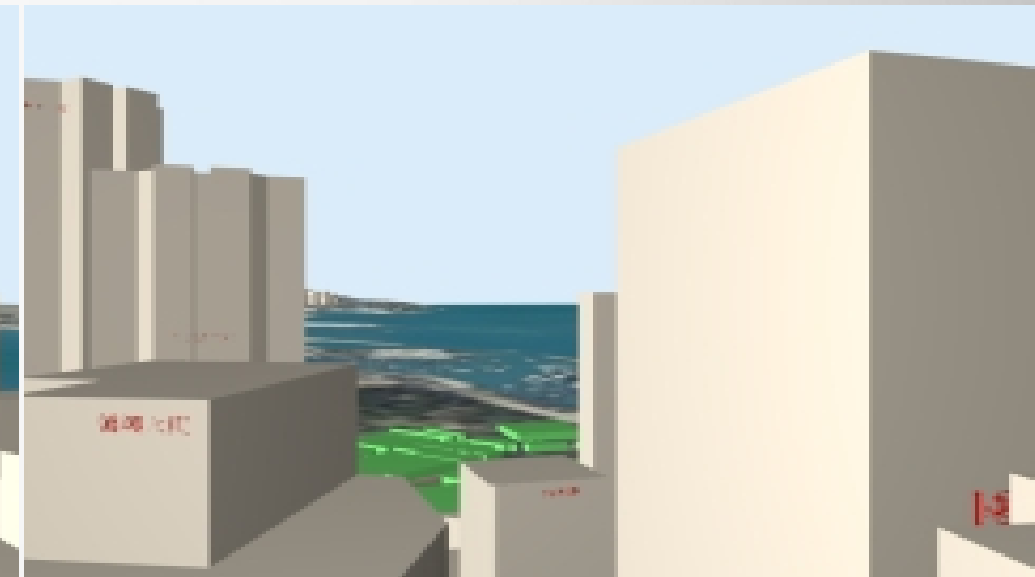
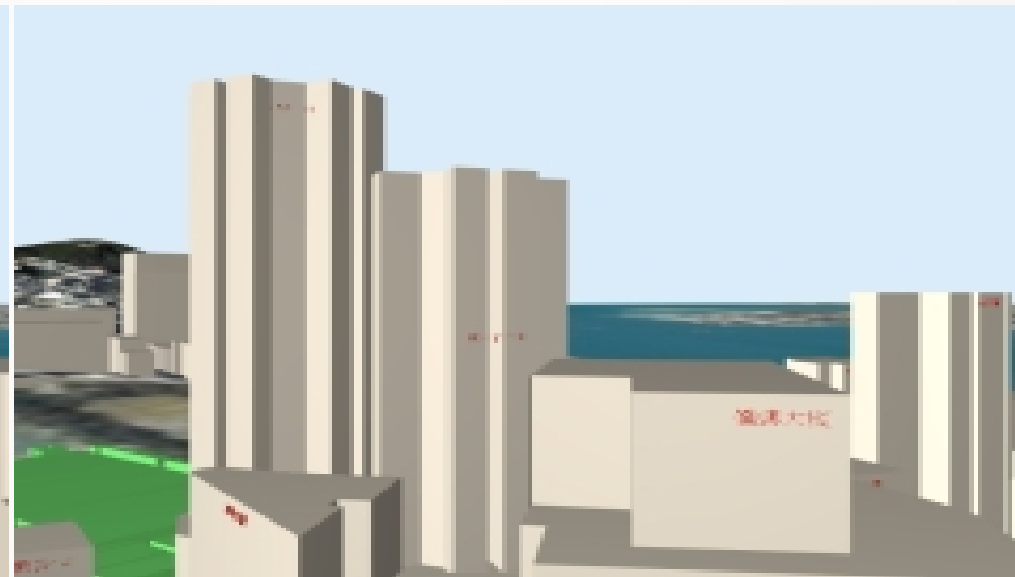
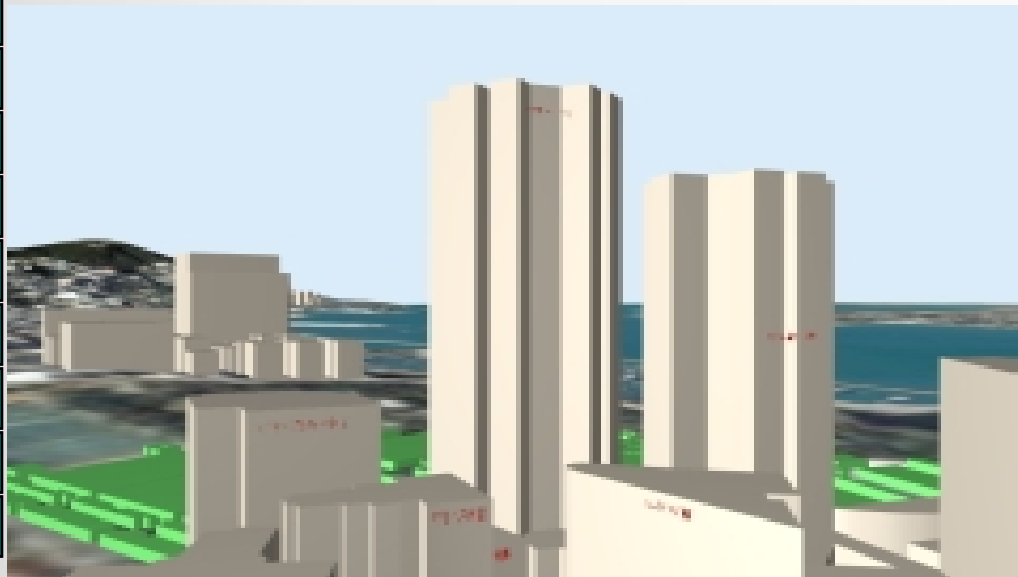
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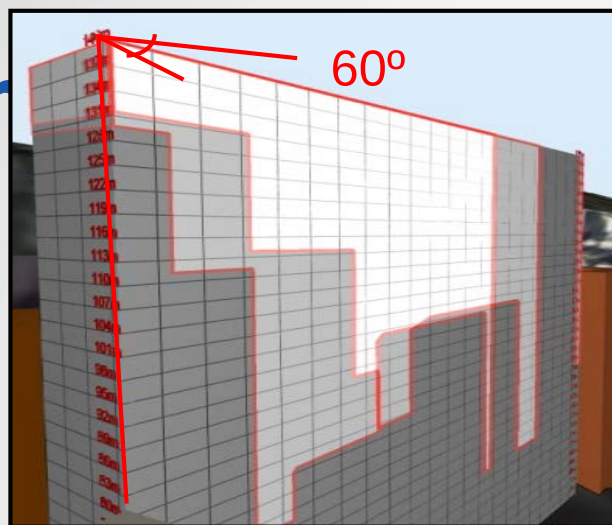
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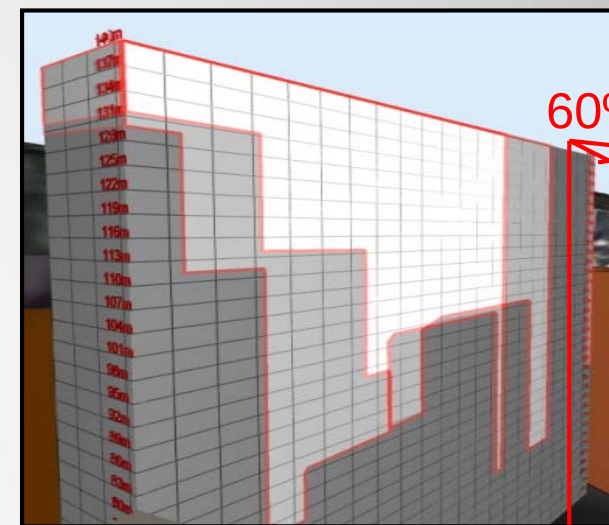
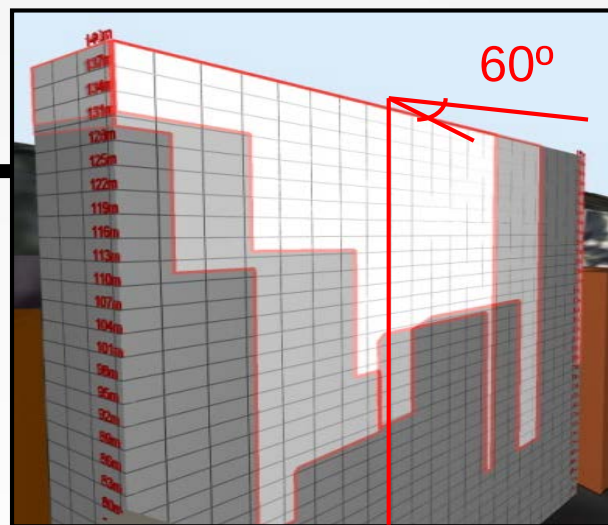
140m
135m
130m
125m
120m
115m
110m
105m
100m
95m
90m
85m
80m



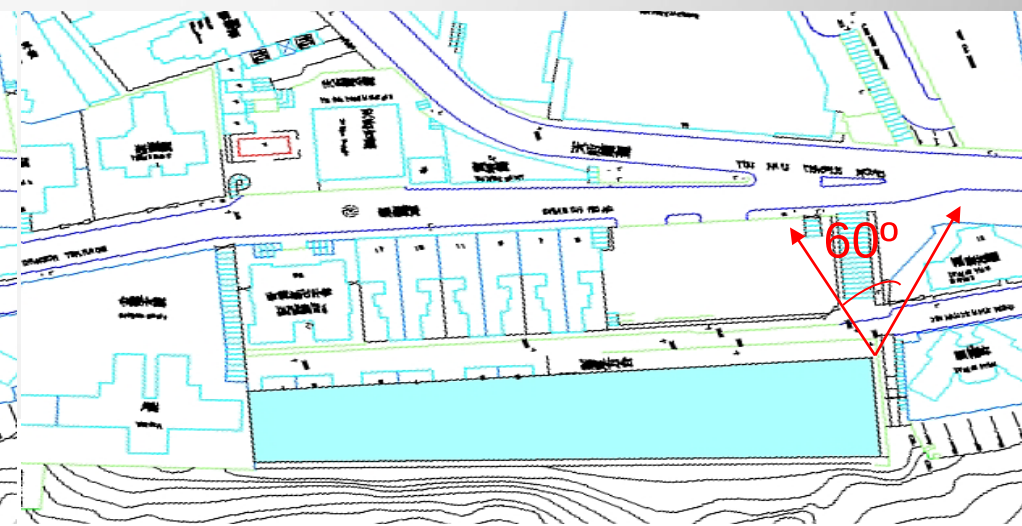
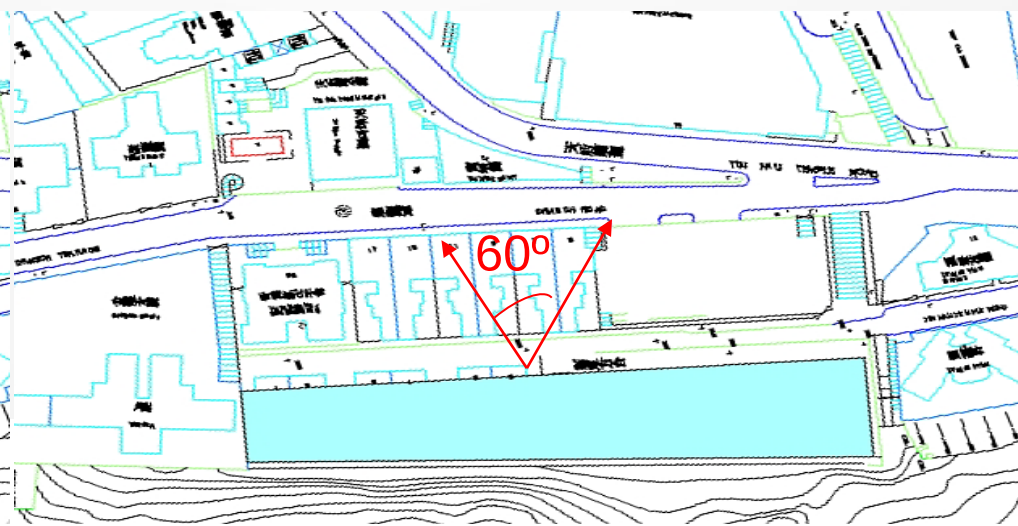
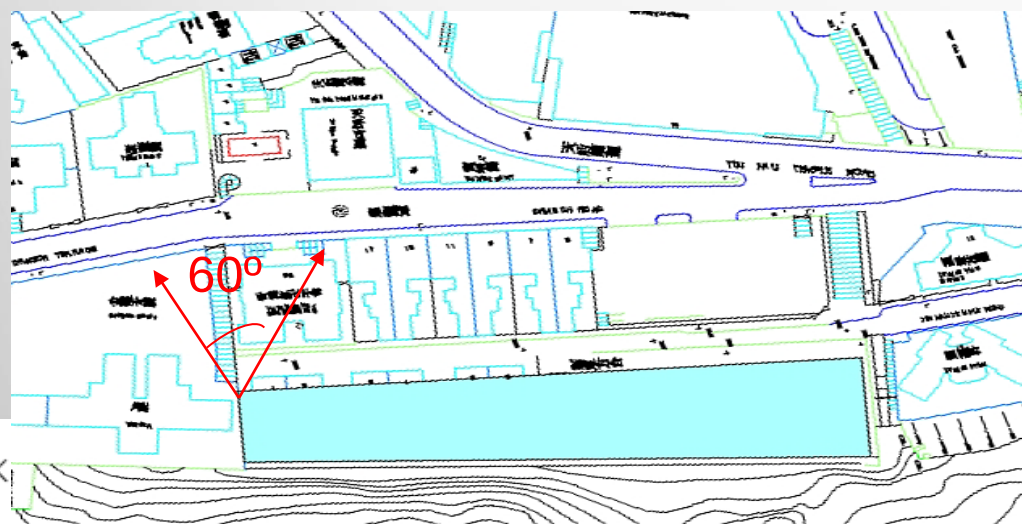
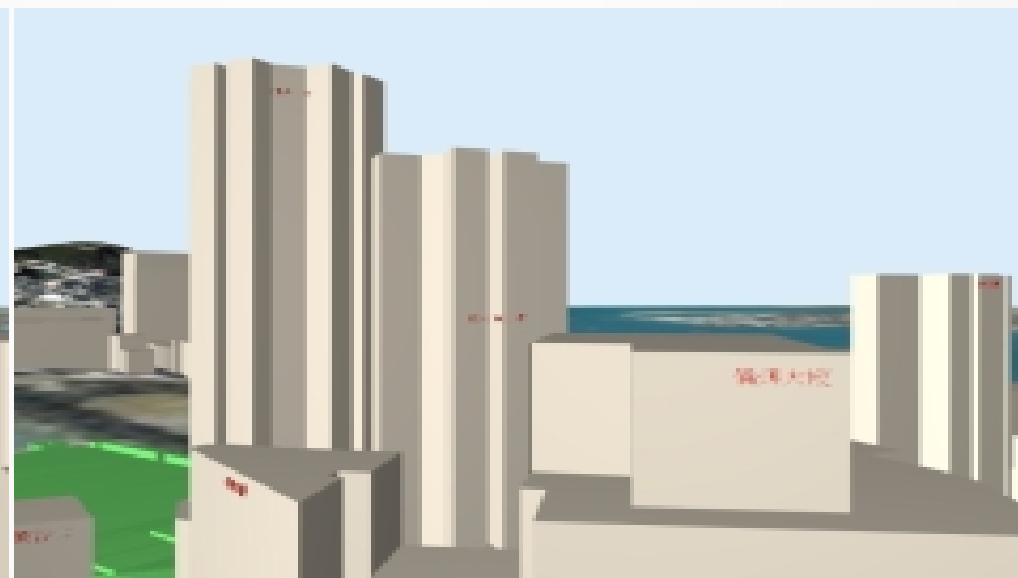
100m



1

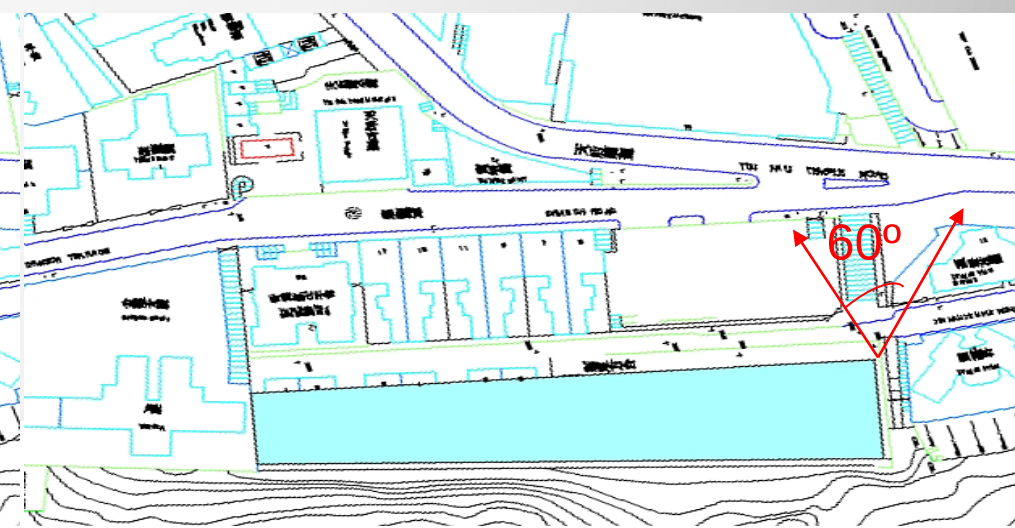
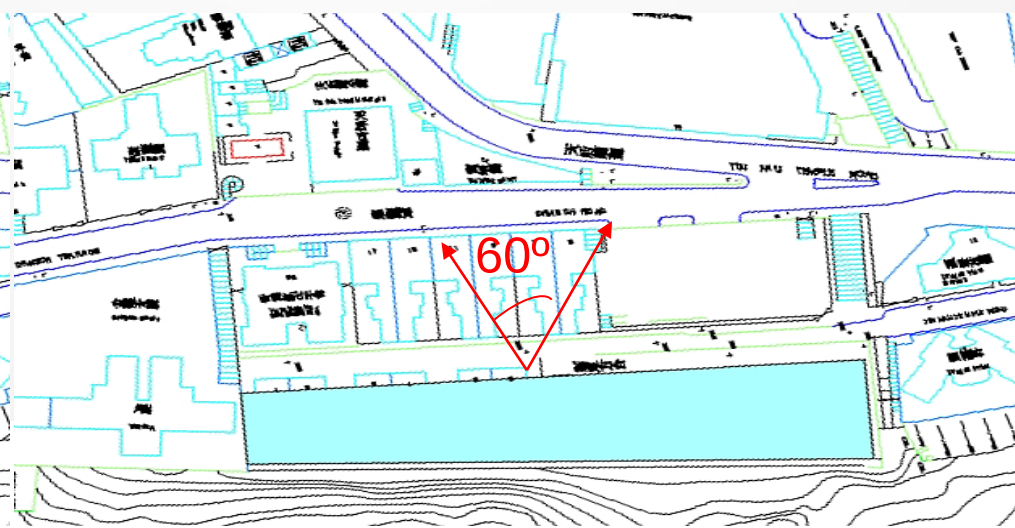
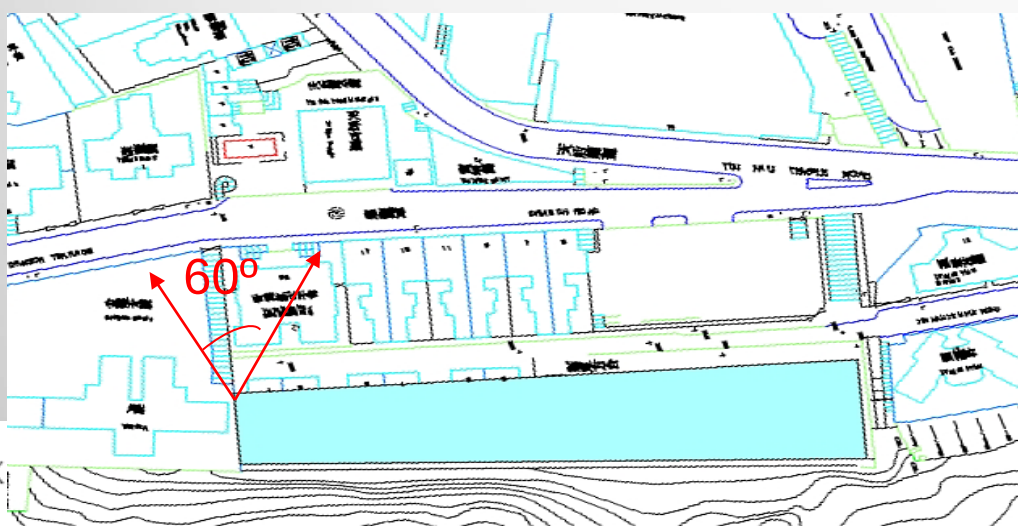
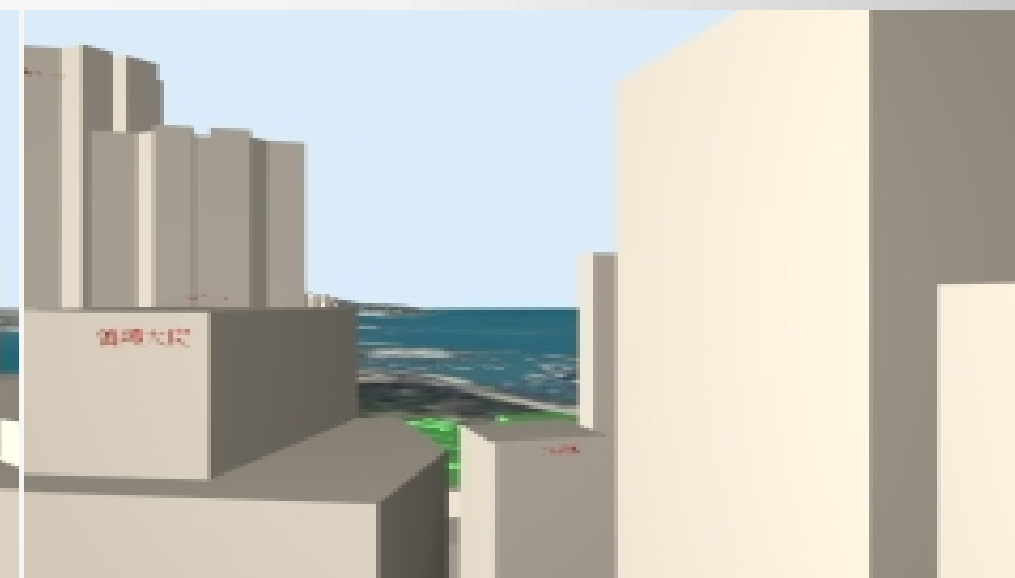
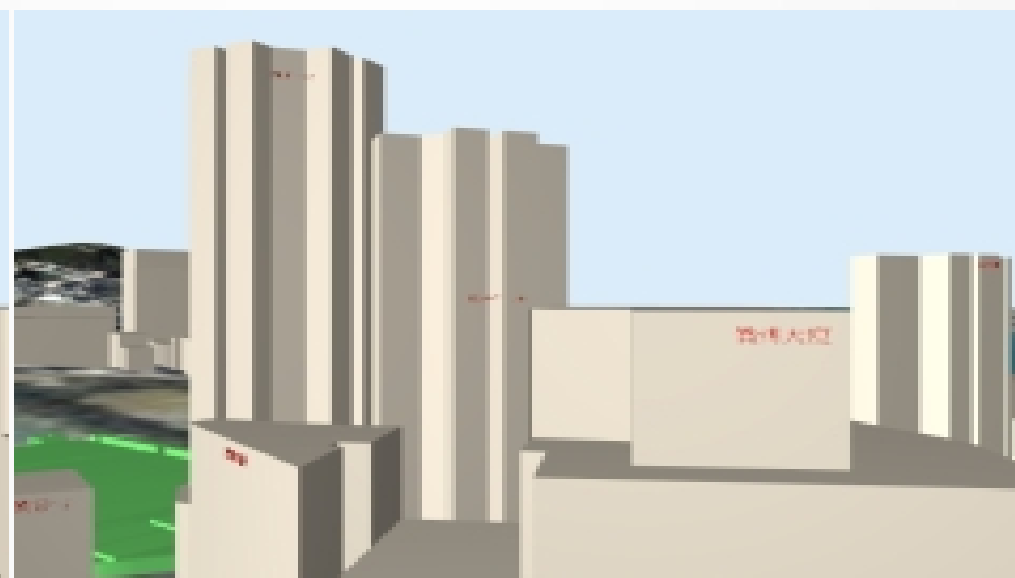
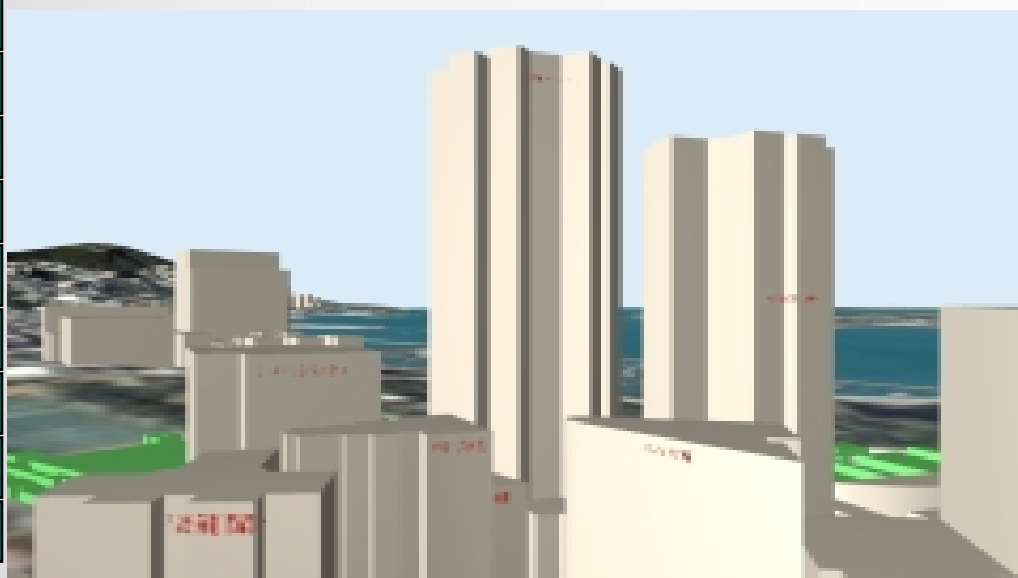
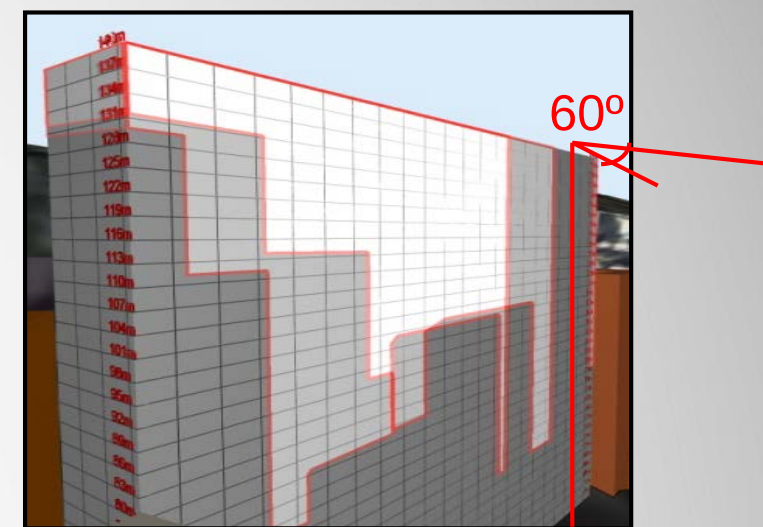
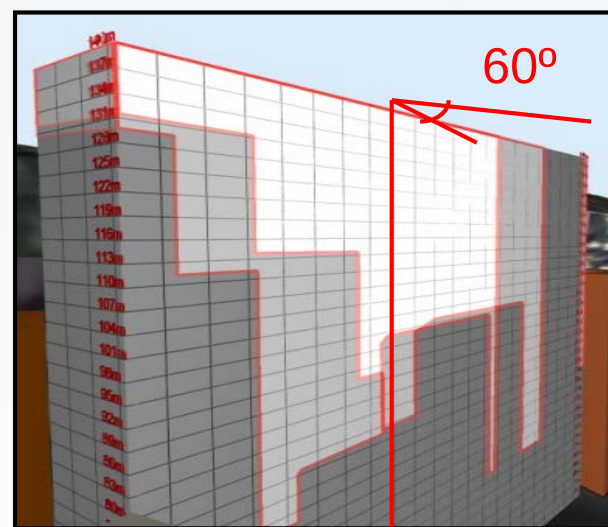
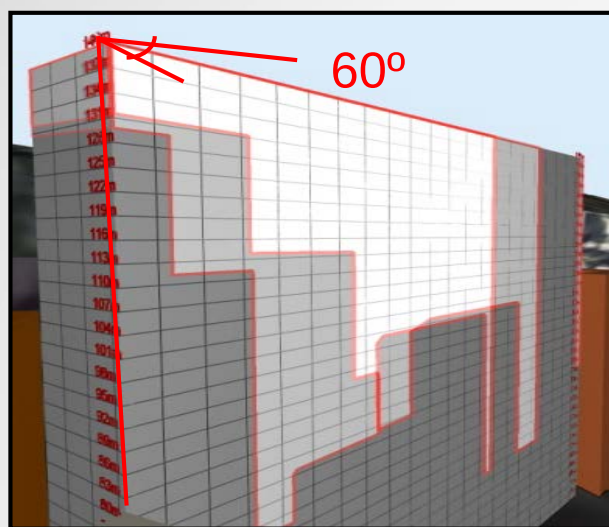


140m
135m
130m
125m
120m
115m
110m
105m
100m
95m
90m
85m
80m

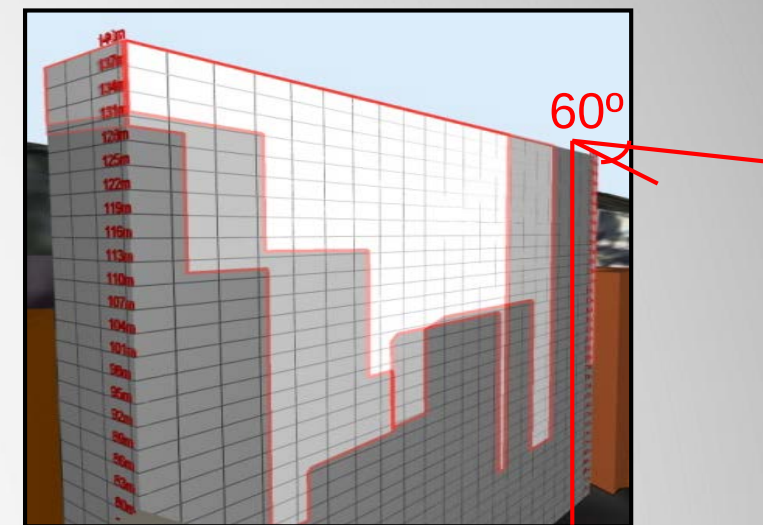
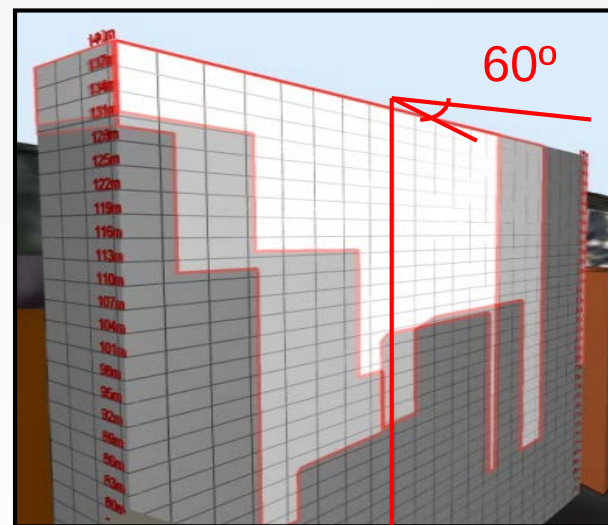
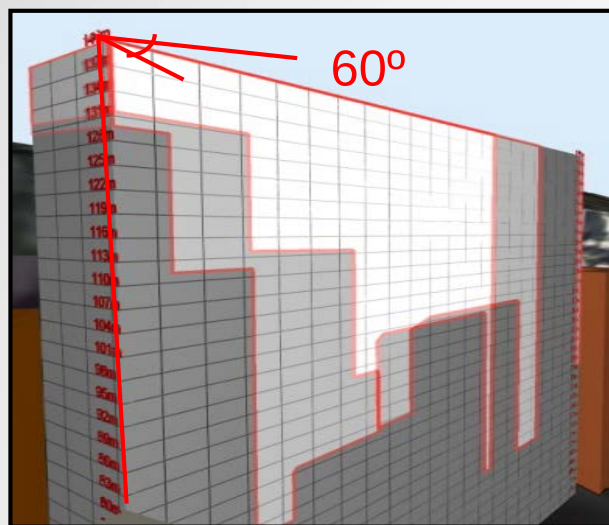


95m

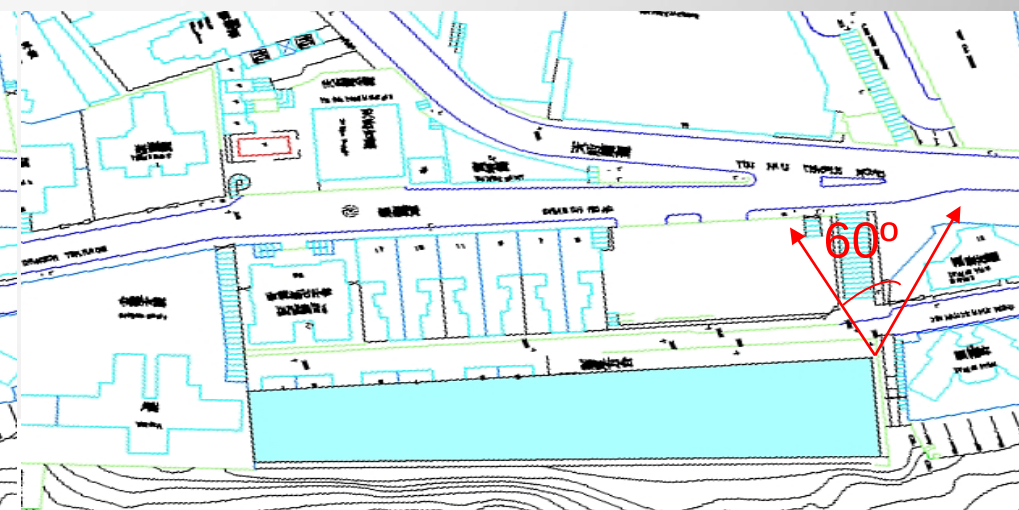
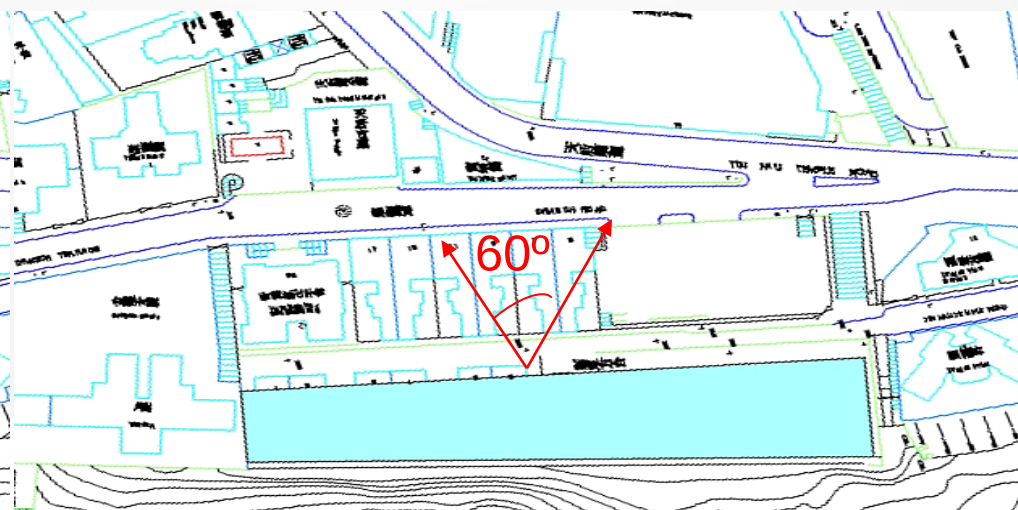
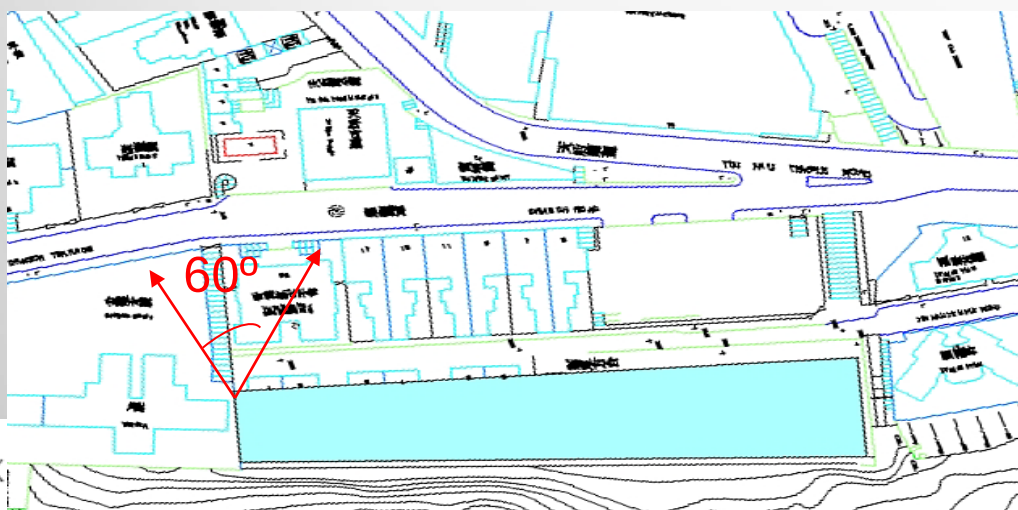
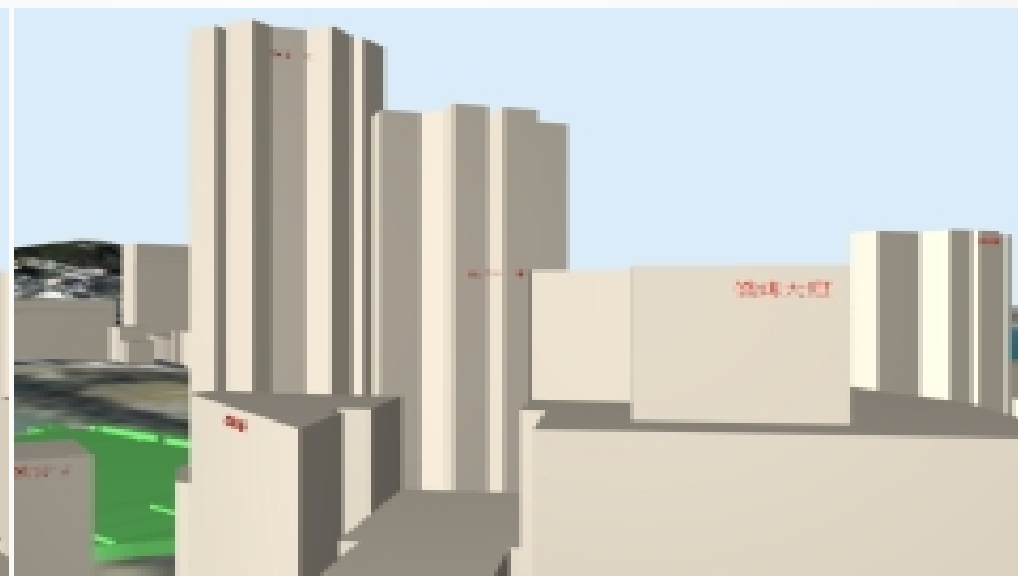
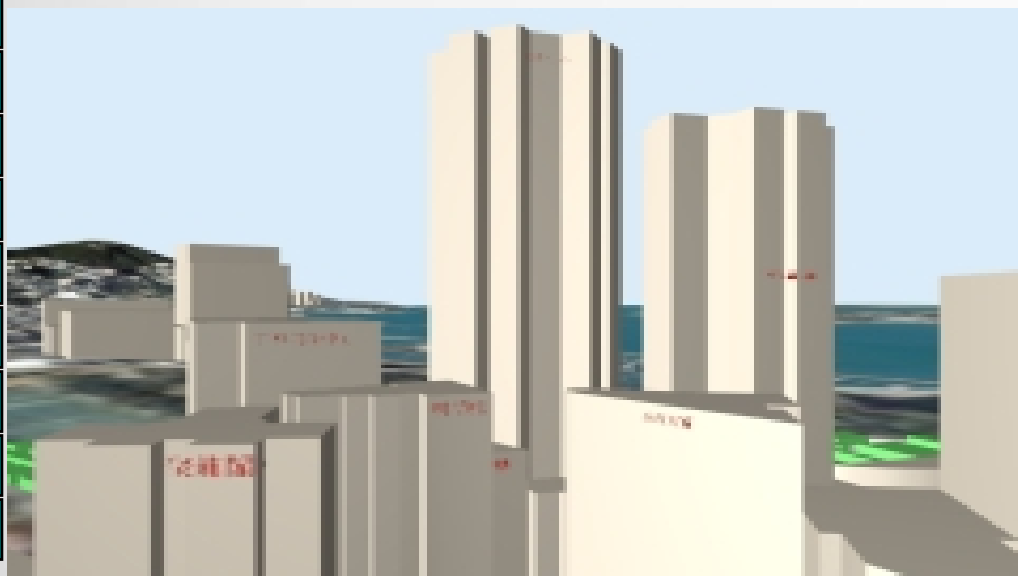
140m
135m
130m
125m
120m
115m
110m
105m
100m
95m
90m
85m
80m



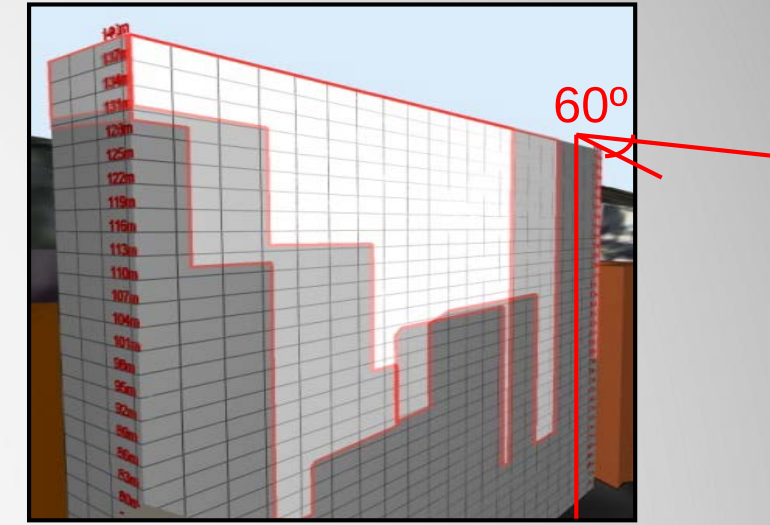
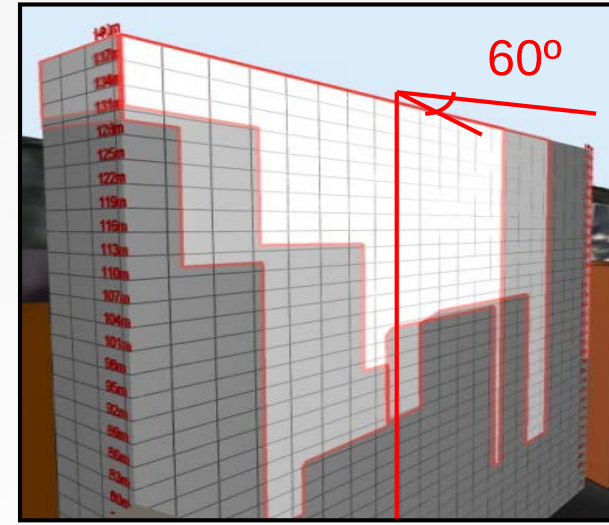
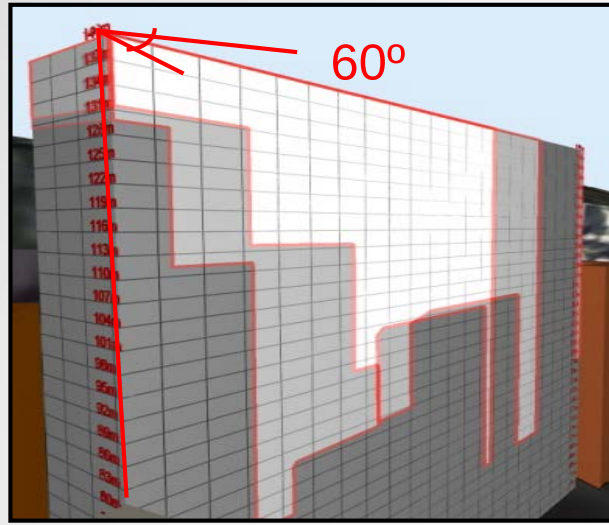
90m



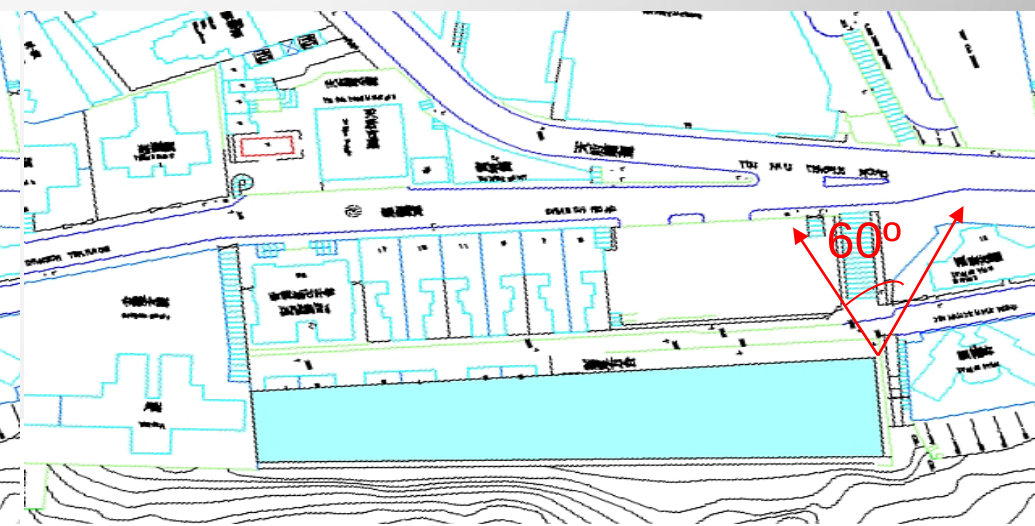
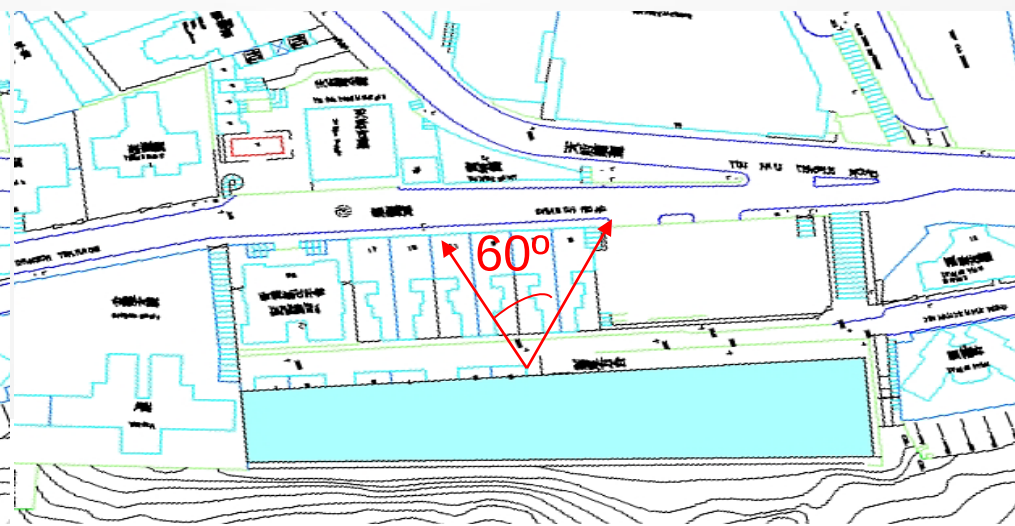
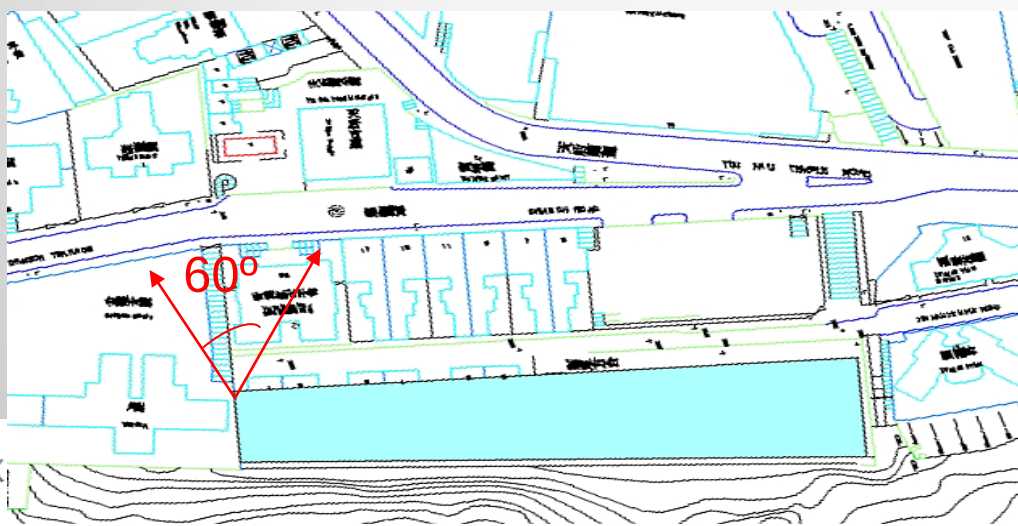
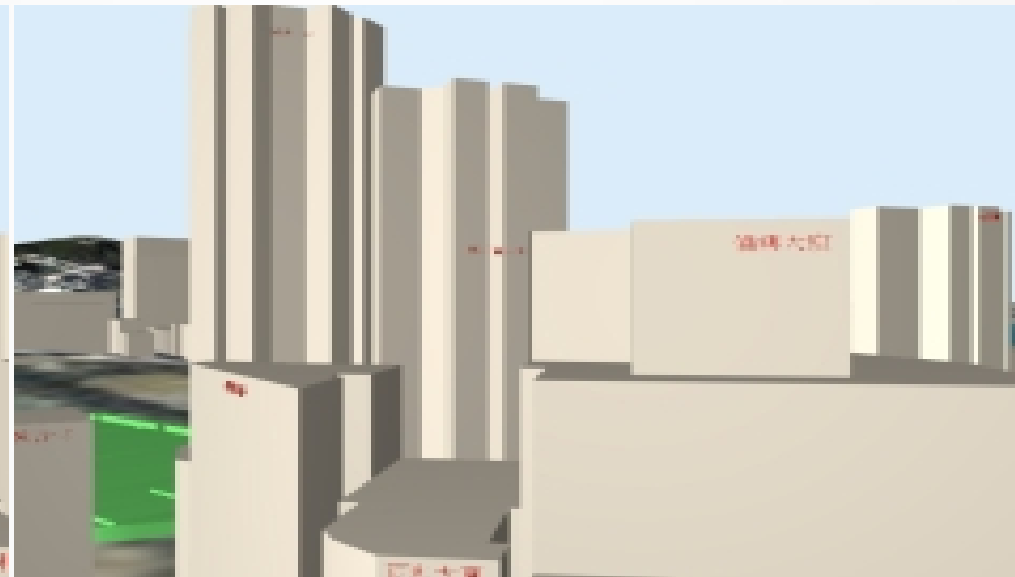
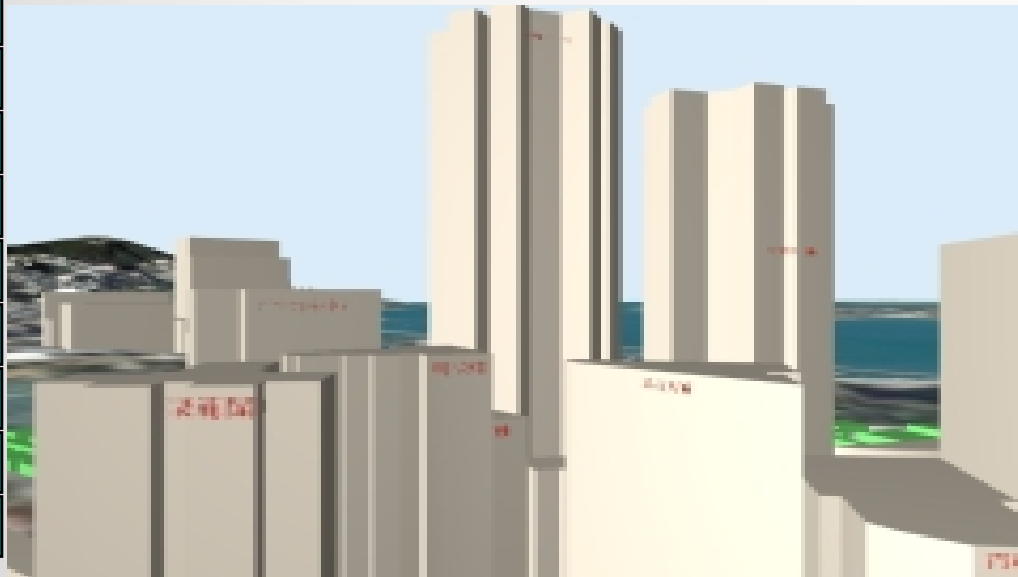
140m
135m
130m
125m
120m
115m
110m
105m
100m
95m
90m
85m
80m



85m

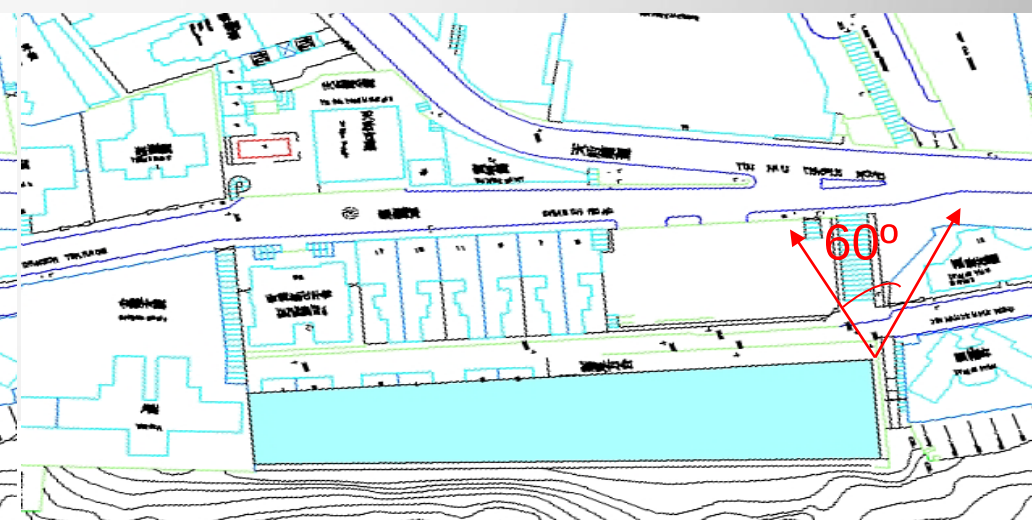
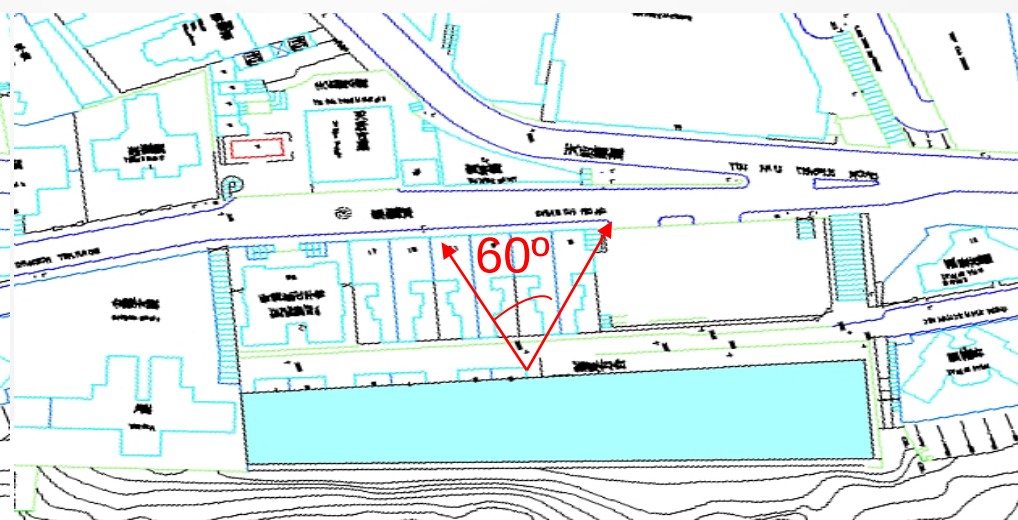
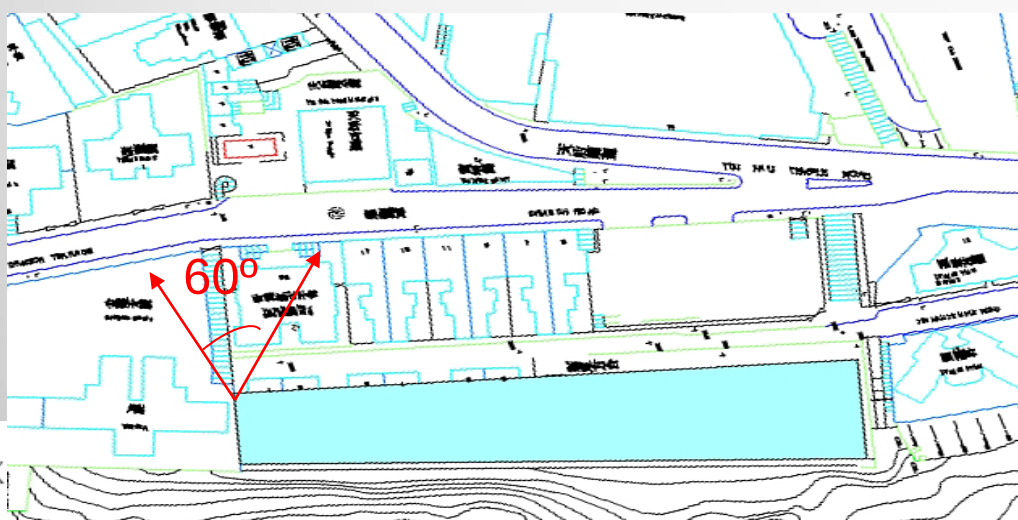
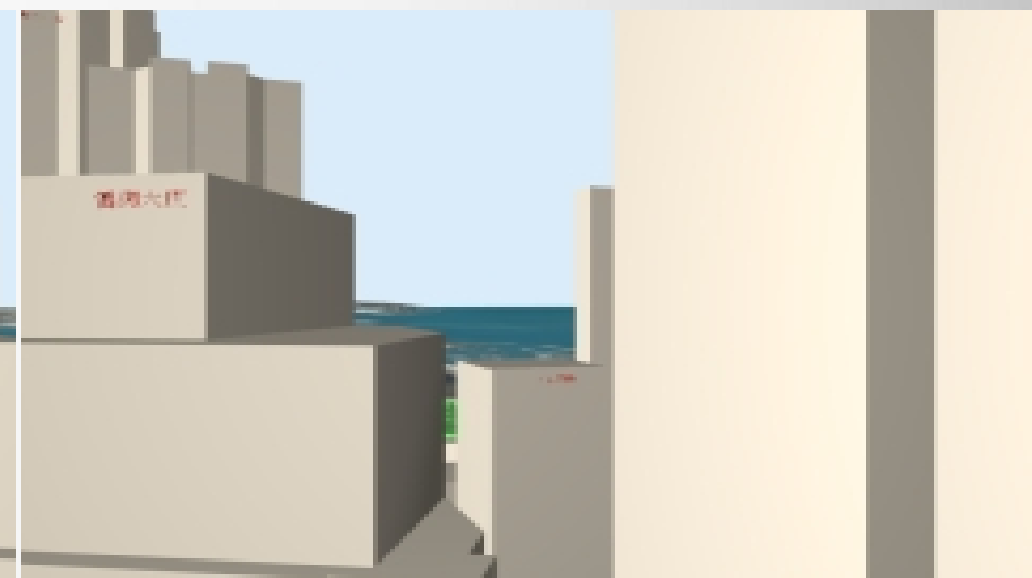
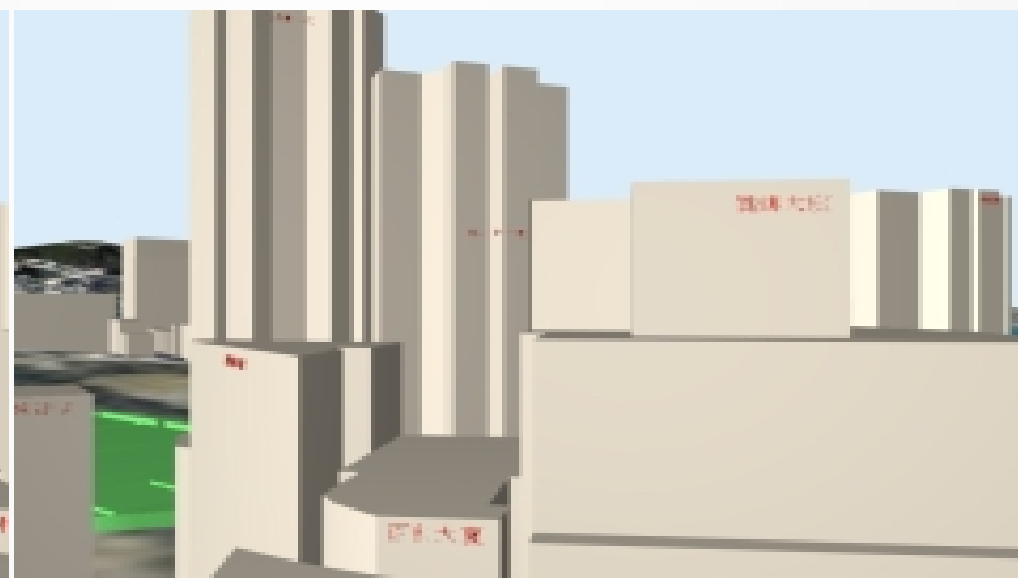
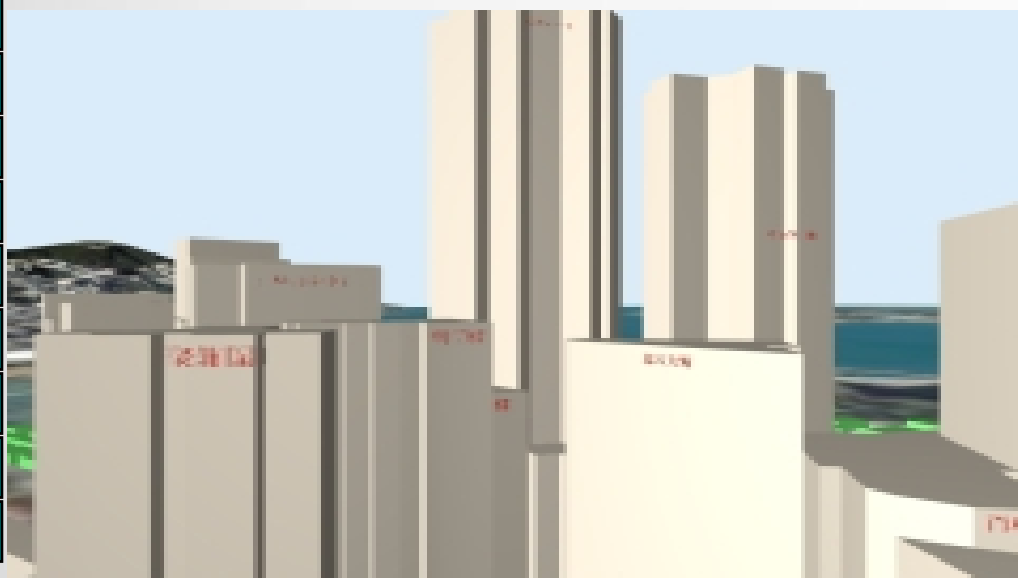
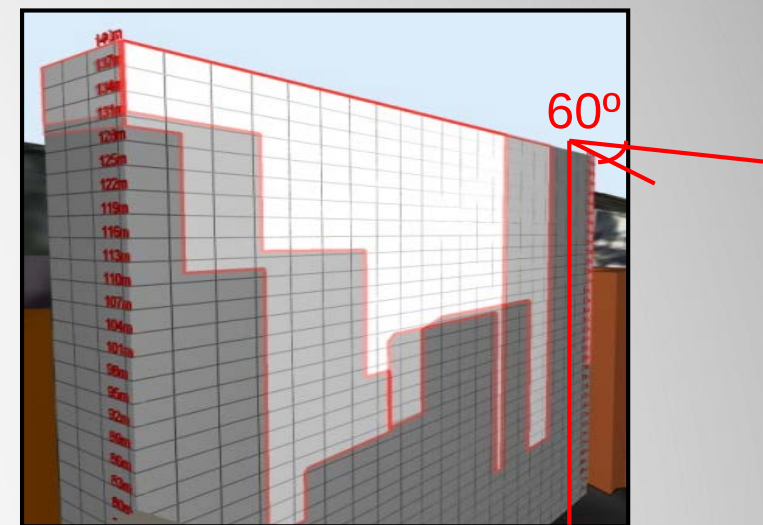
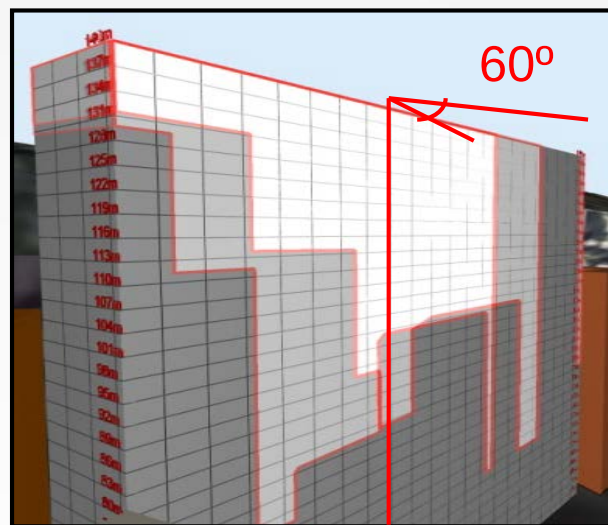
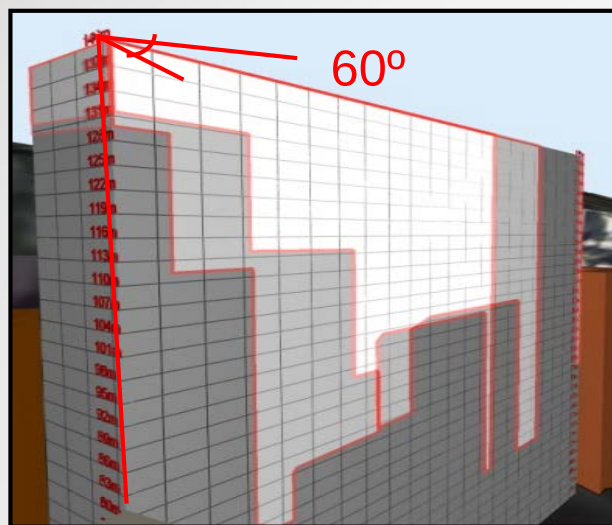


140m
135m
130m
125m
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110m
105m
100m
95m
90m
85m
80m

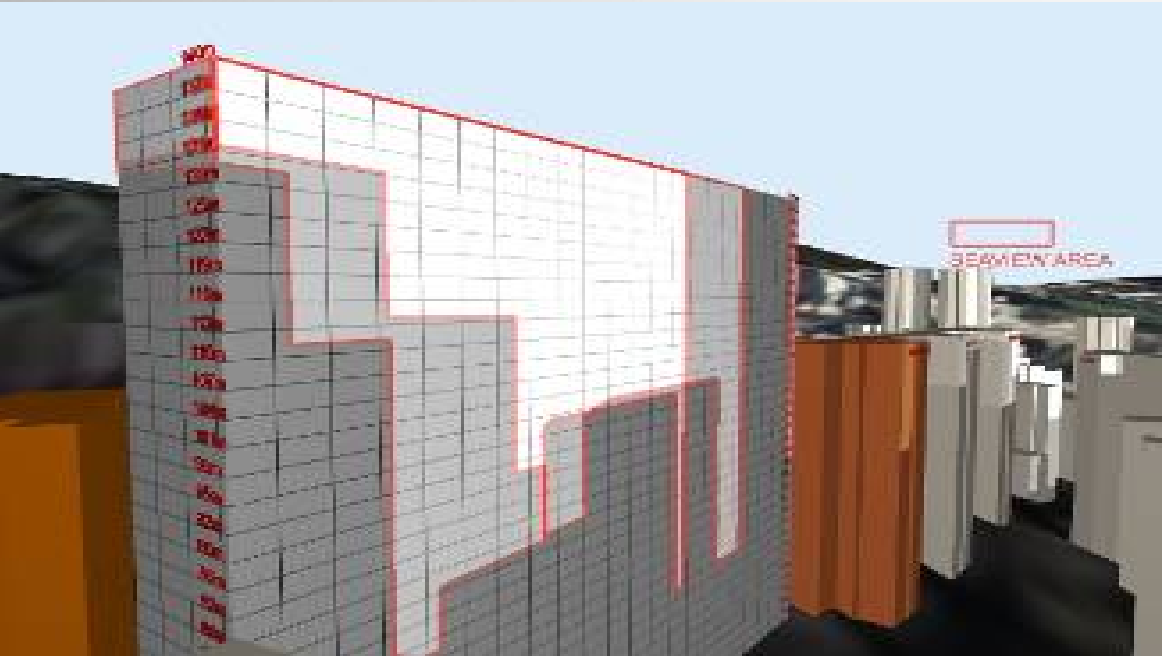


80m

140m
135m
130m
125m
120m
115m
110m
105m
100m
95m
90m
85m
80m



方案 A

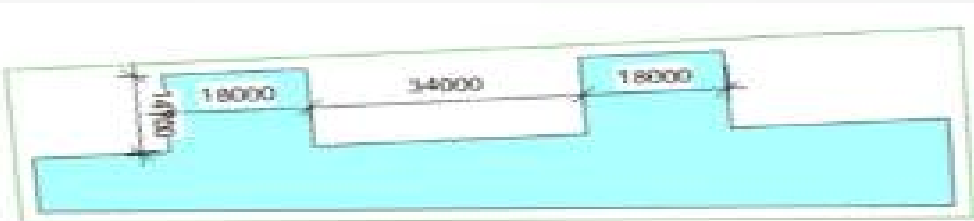
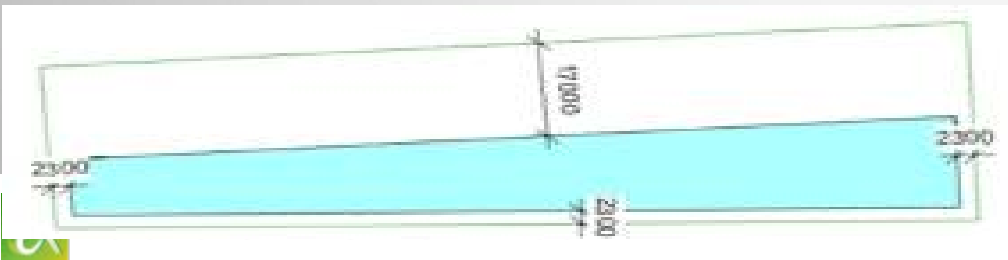
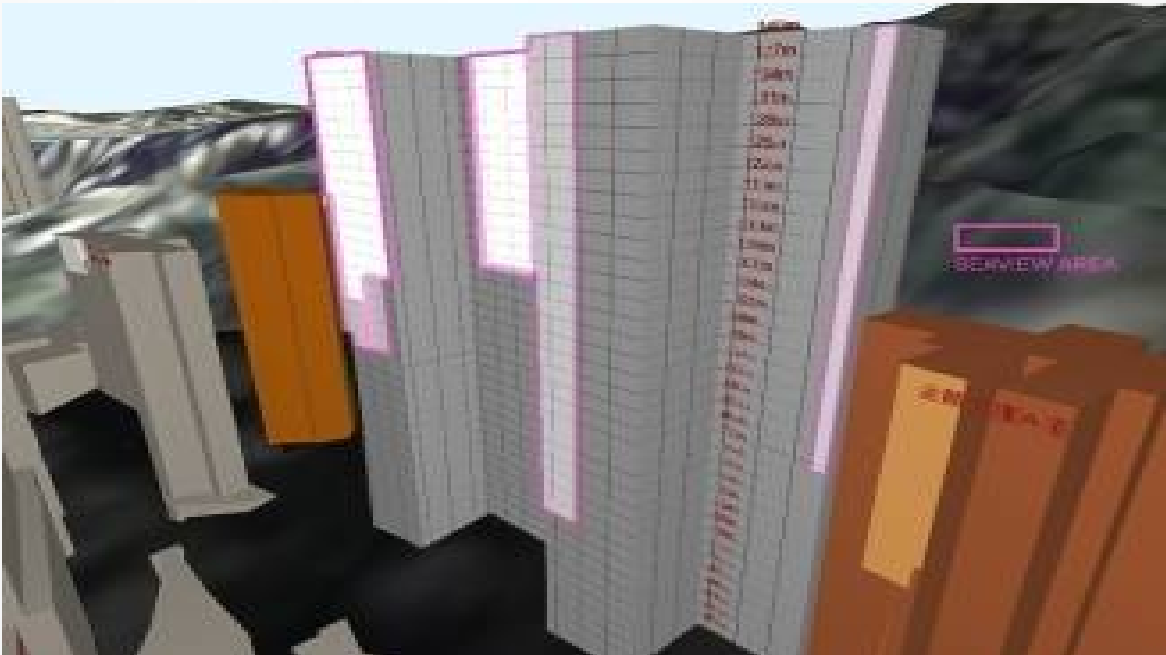
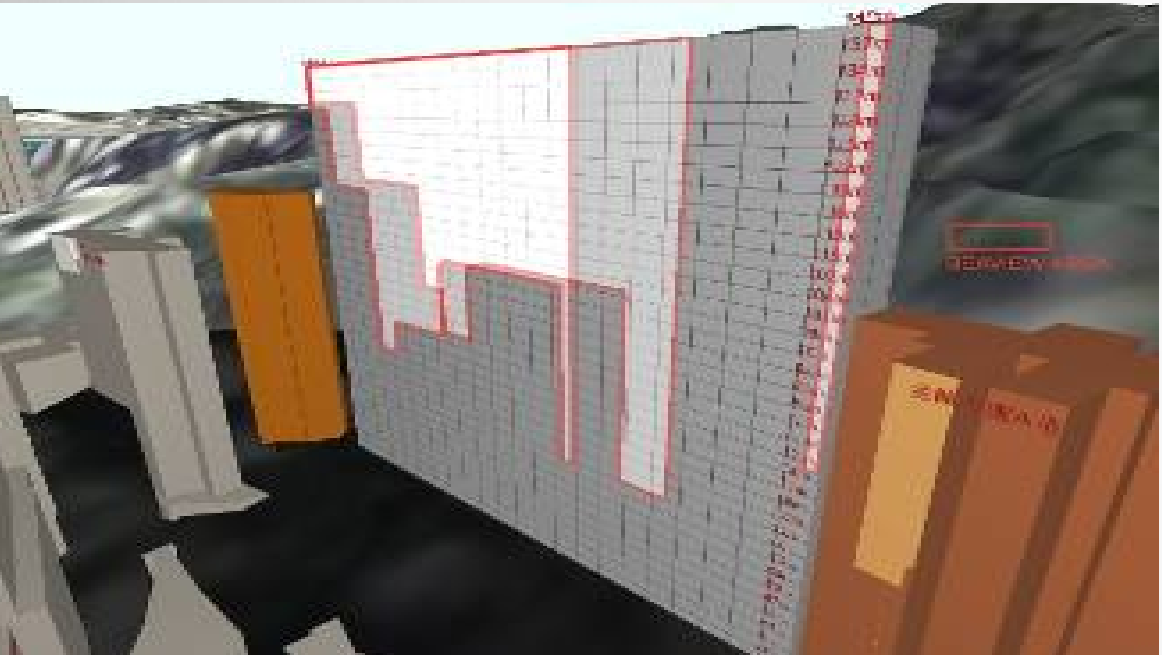


方案 B



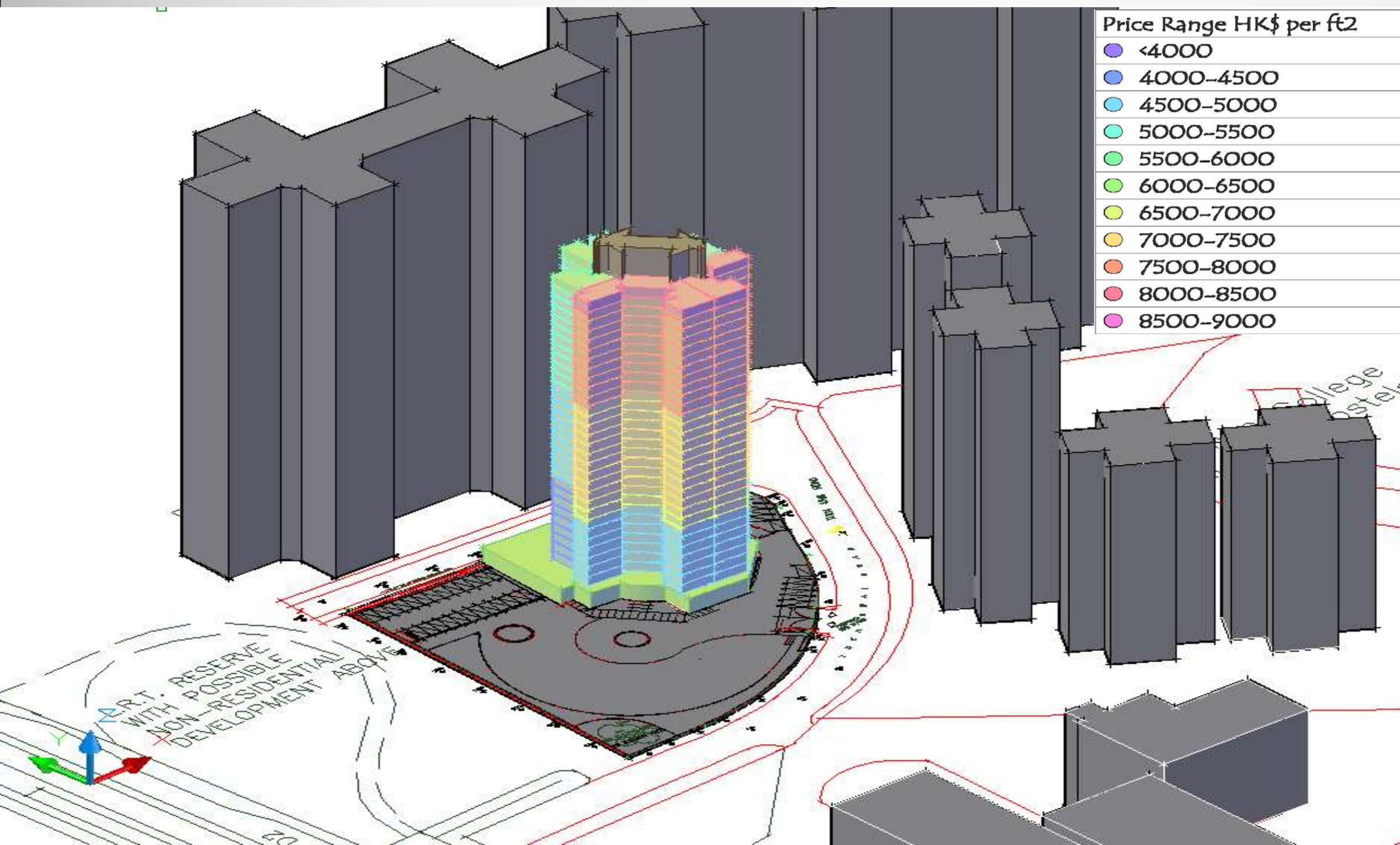
方案 A
方案 B

海景
海景



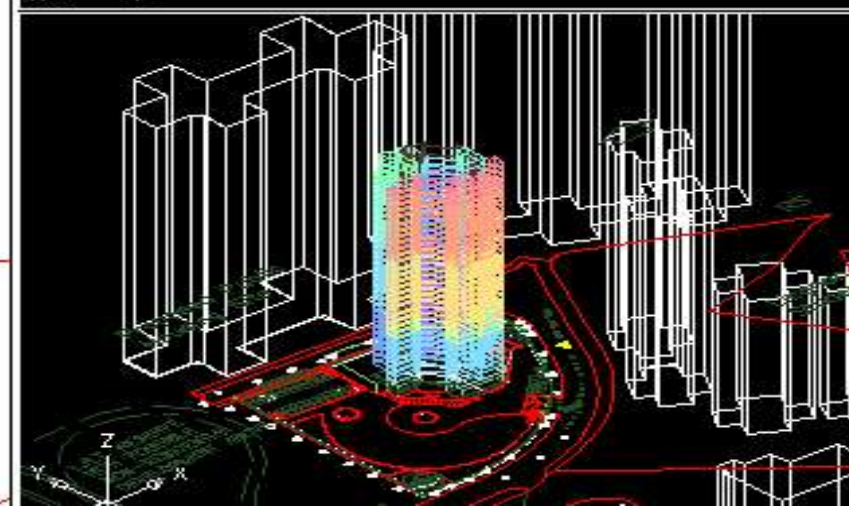
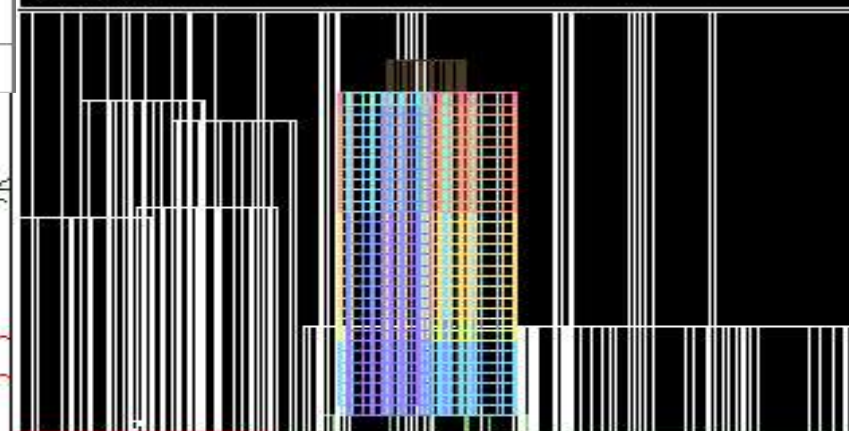
可研通設計平台

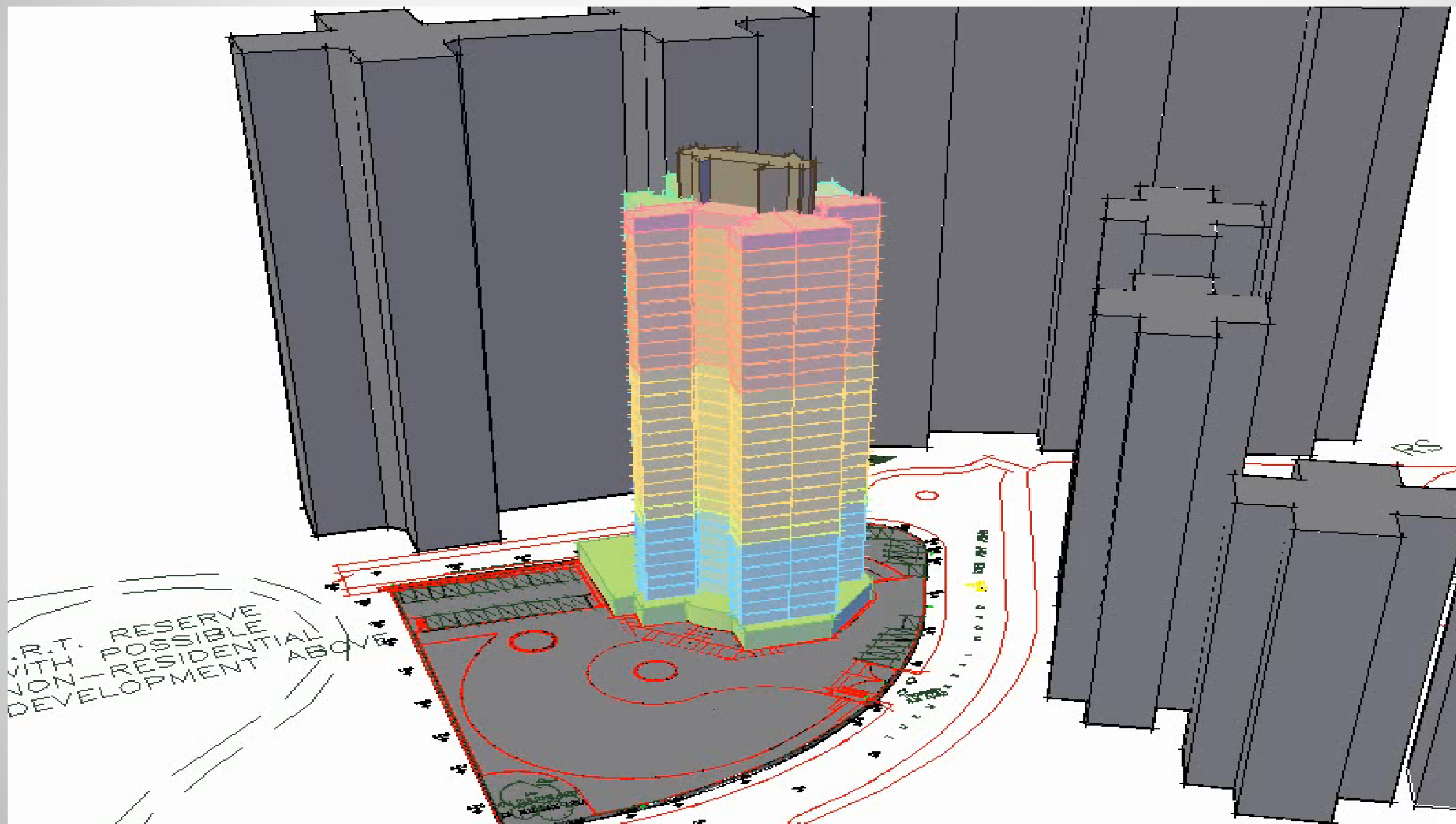
網上整合佈置,收益,景觀,成本,等等數據



Analysis

Area	Price / Flat
66	\$3,256,000
50	\$2,198,000
15780	\$967,386,000

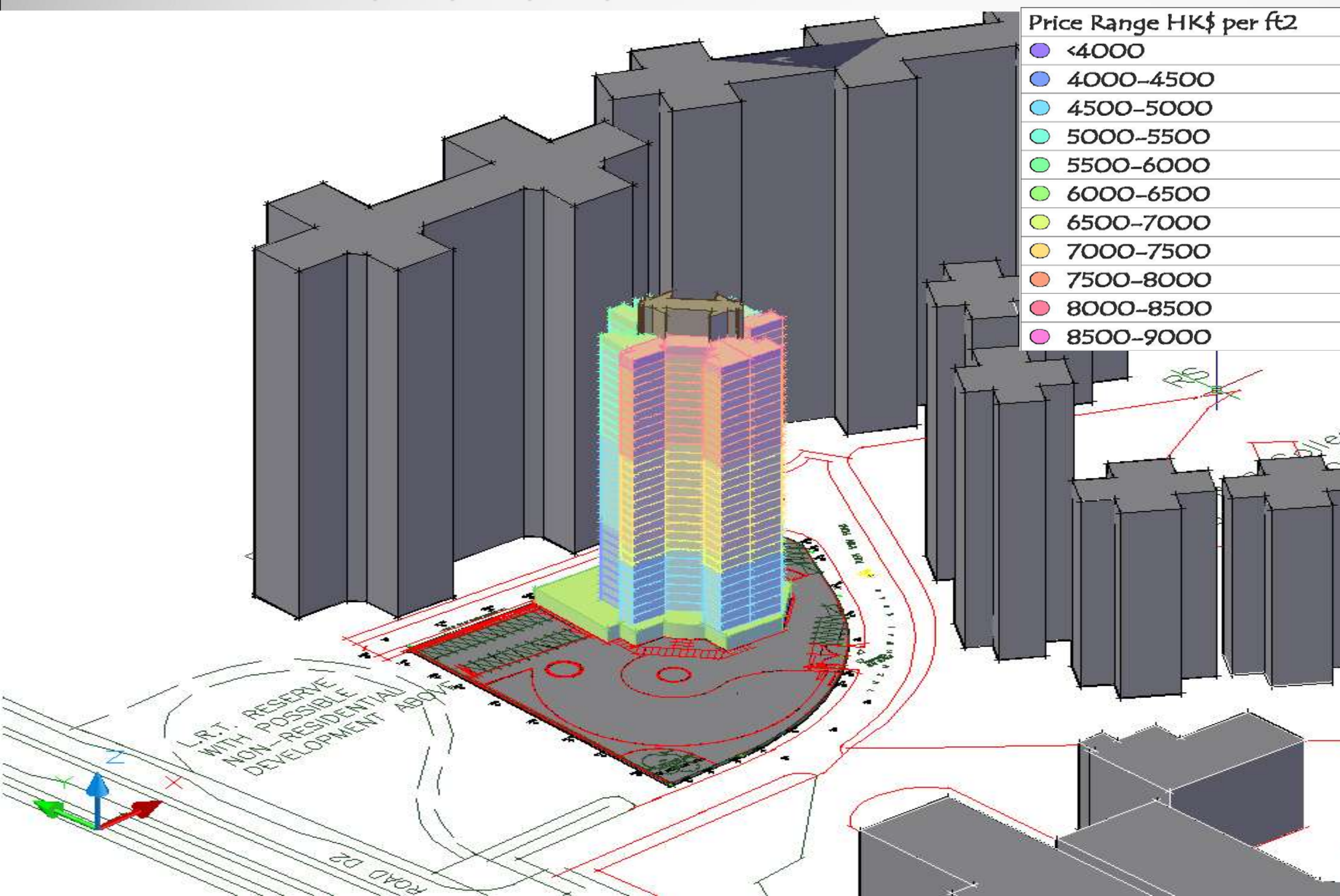




Price Range HK\$ per ft2	
●	<4000
●	4000-4500
●	4500-5000
●	5000-5500
●	5500-6000
●	6000-6500
●	6500-7000
●	7000-7500
●	7500-8000
●	8000-8500
●	8500-9000

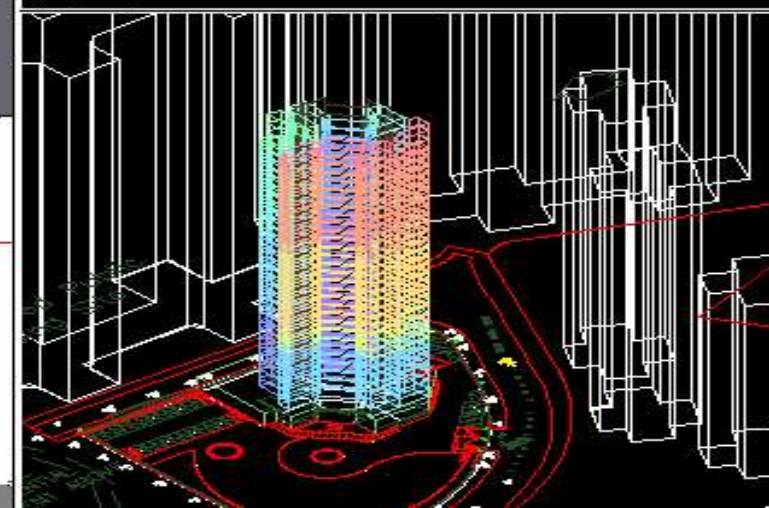
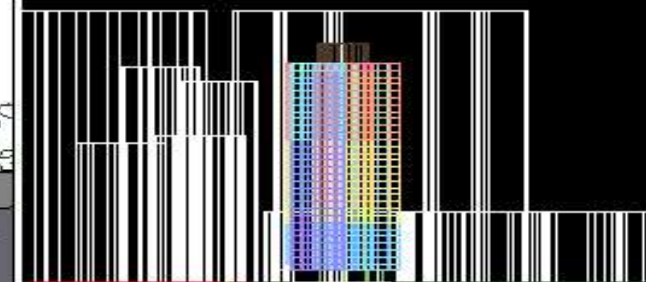
可研通設計平台

網上整合佈置,收益,景觀,成本,等等數據



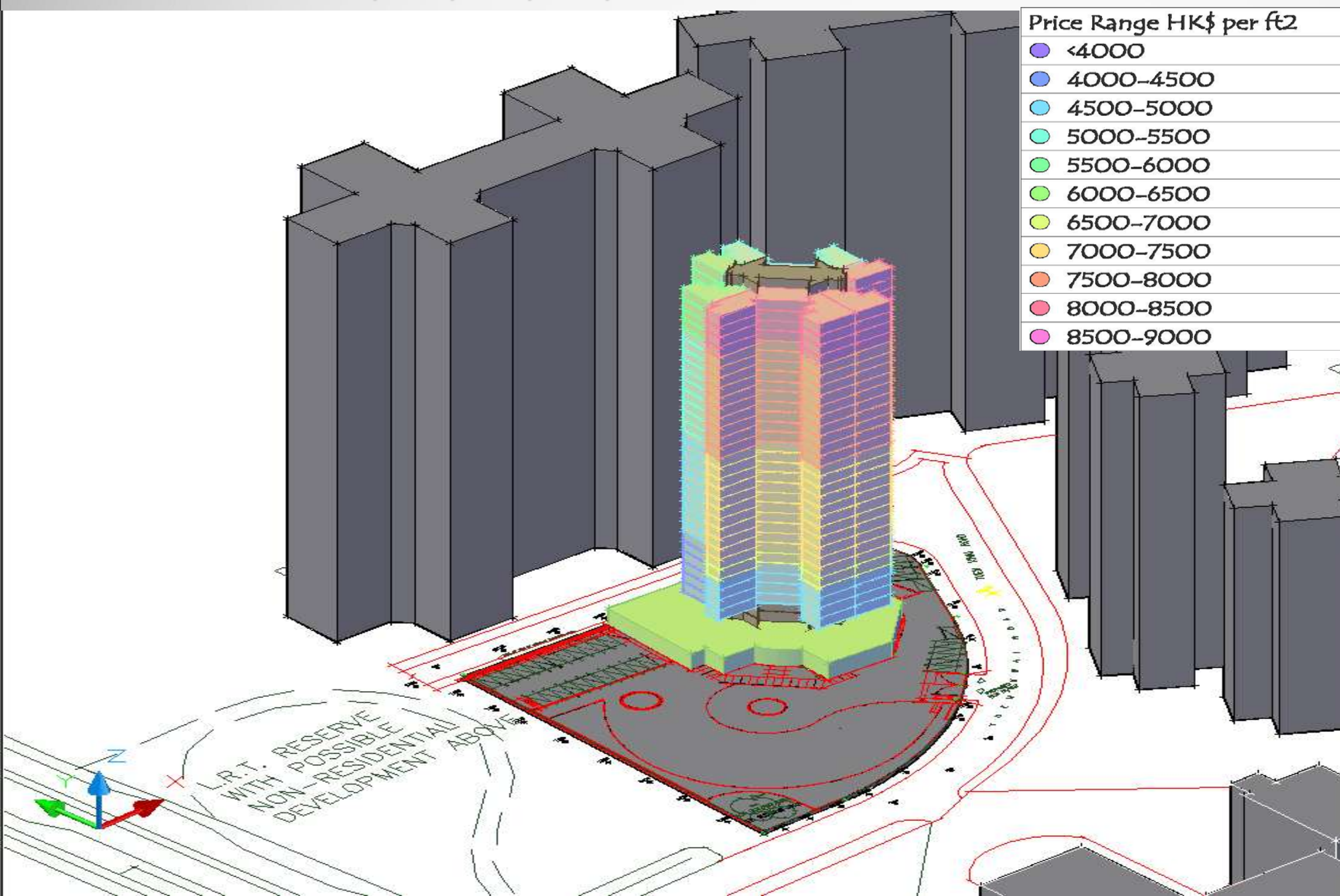
Analysis

Area	Price / Flat
66	\$3,256,000
50	\$2,198,000
15780	\$967,386,000

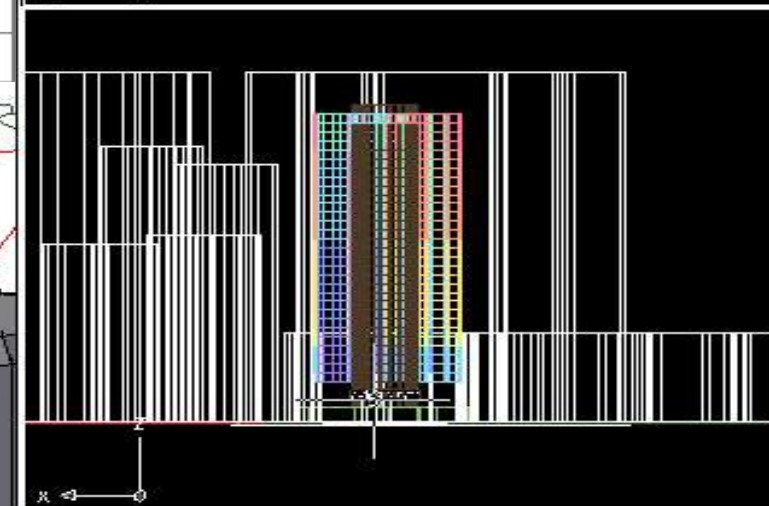


可研通設計平台

網上整合佈置,收益,景觀,成本,等等數據

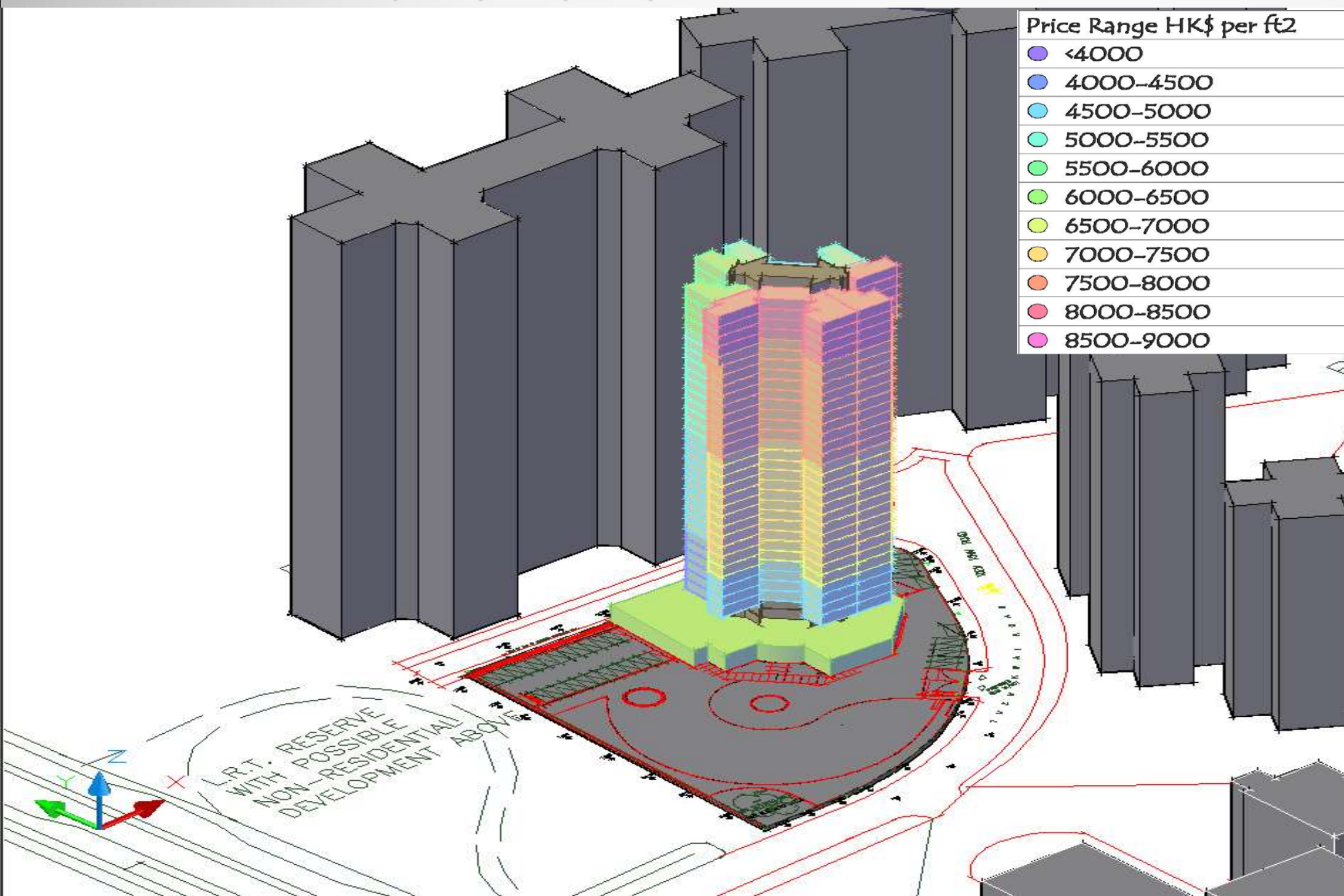


Value Analysis		
ft ²	Area	Price / Flat
3	66	\$3,363,000
3	50	\$2,279,000
	15780	\$1,010,820,000

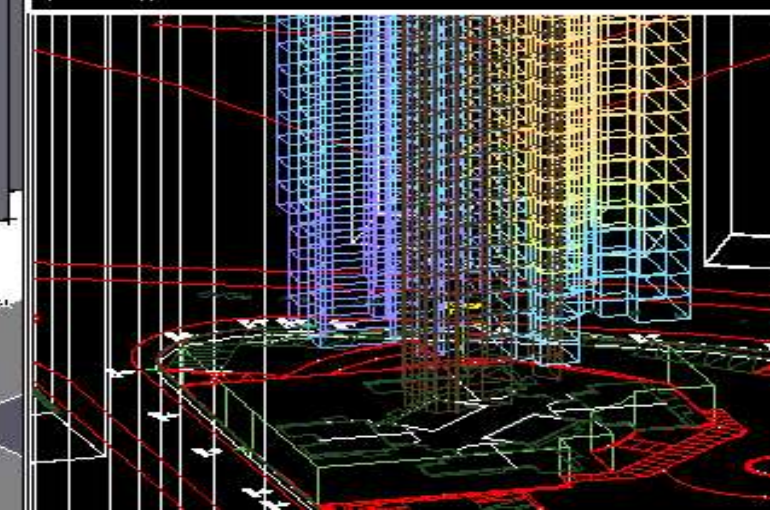


可研通設計平台

網上整合佈置,收益,景觀,成本,等等數據



45	\$2,051,000
50	\$2,010,000
65	\$3,312,000
66	\$3,363,000
46	\$1,849,000
50	\$2,279,000
15780	\$1,012,542,000



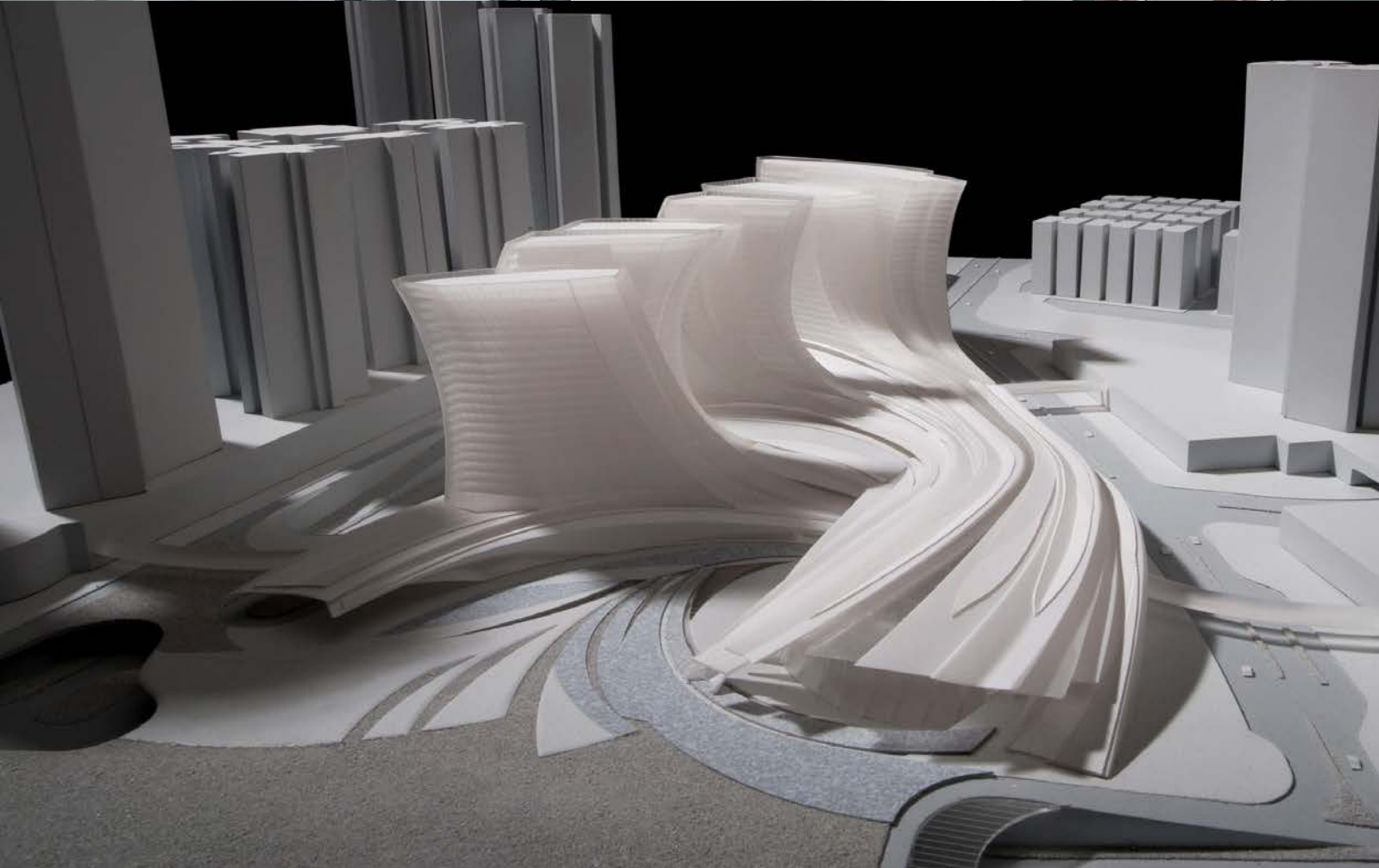
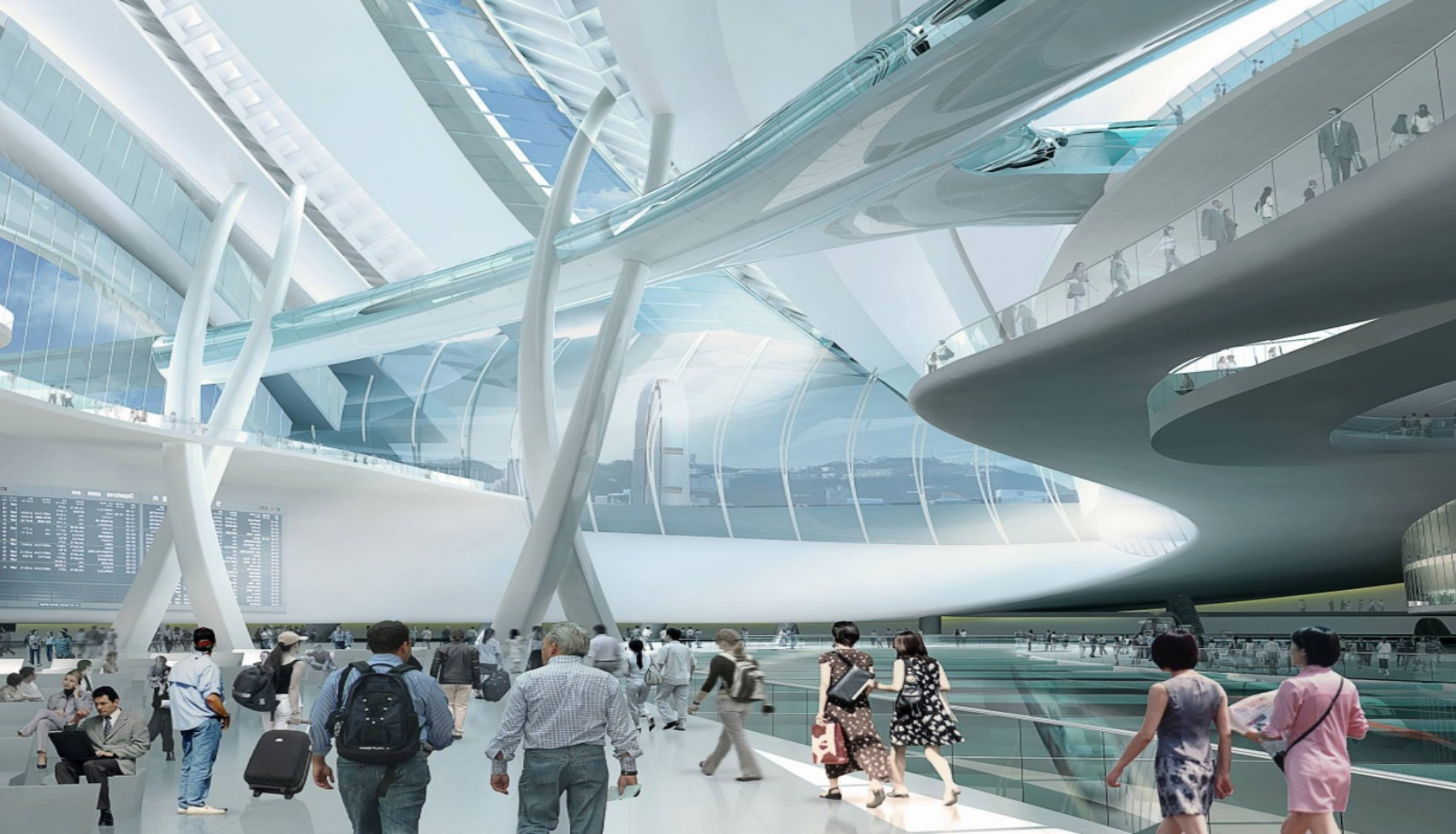
案例二



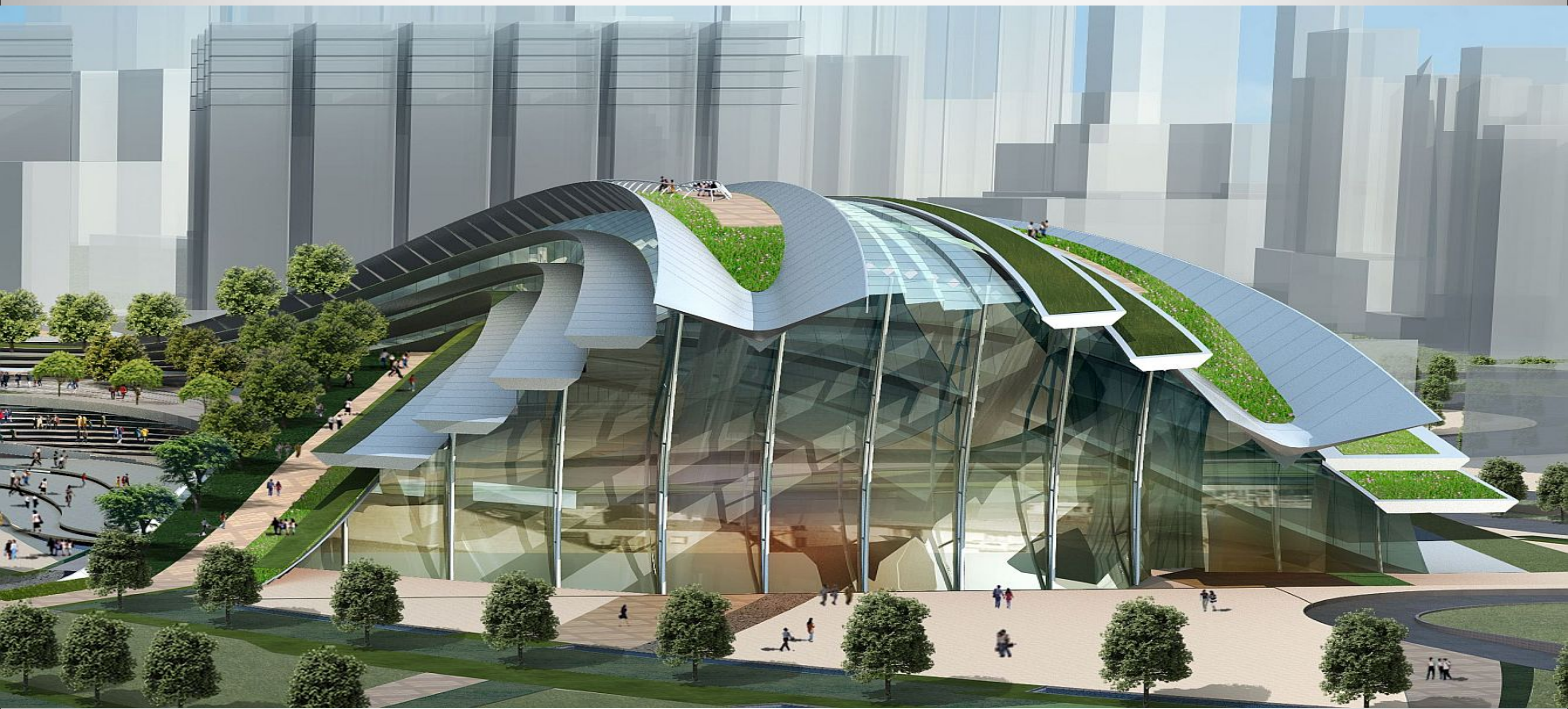
真BIM (施工阶段)

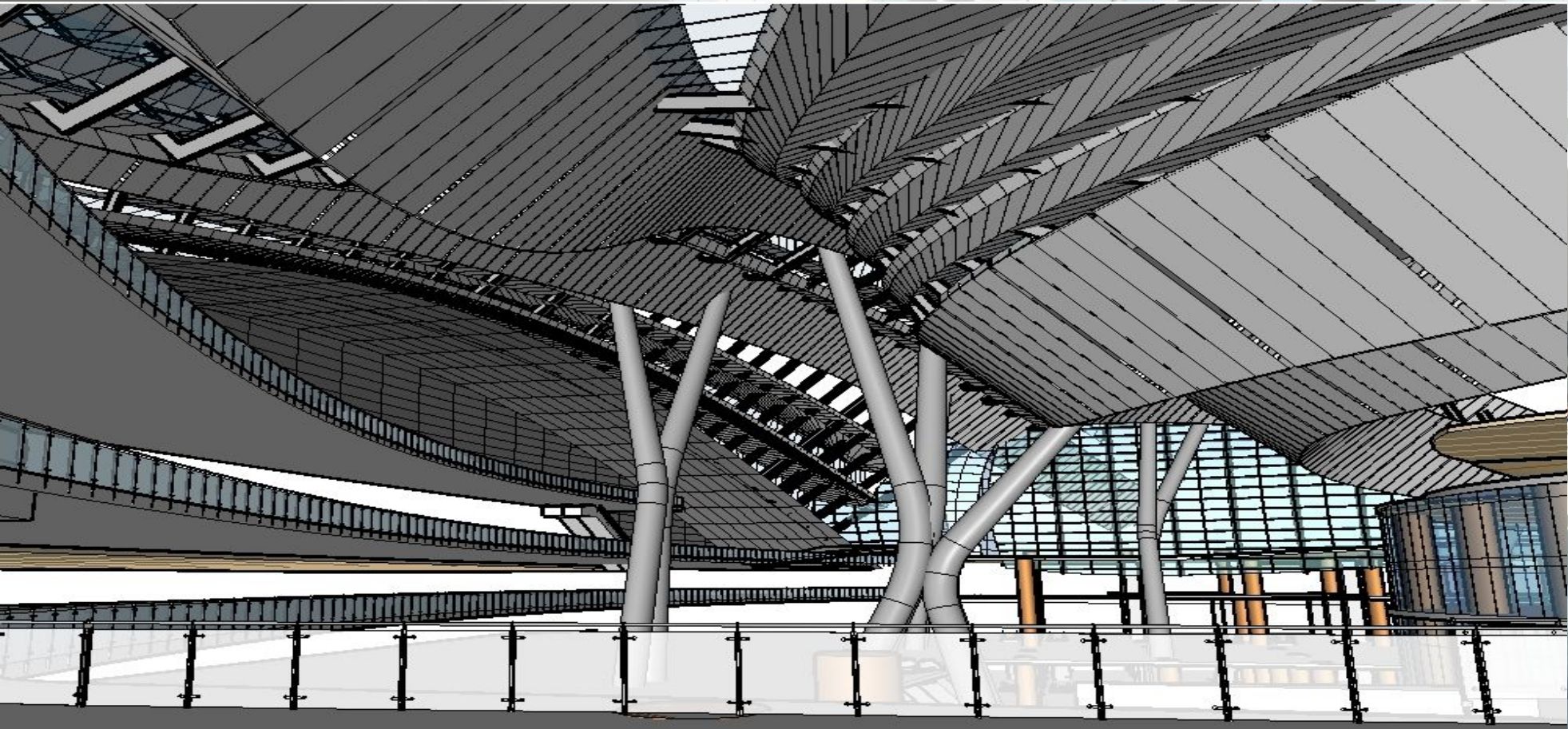
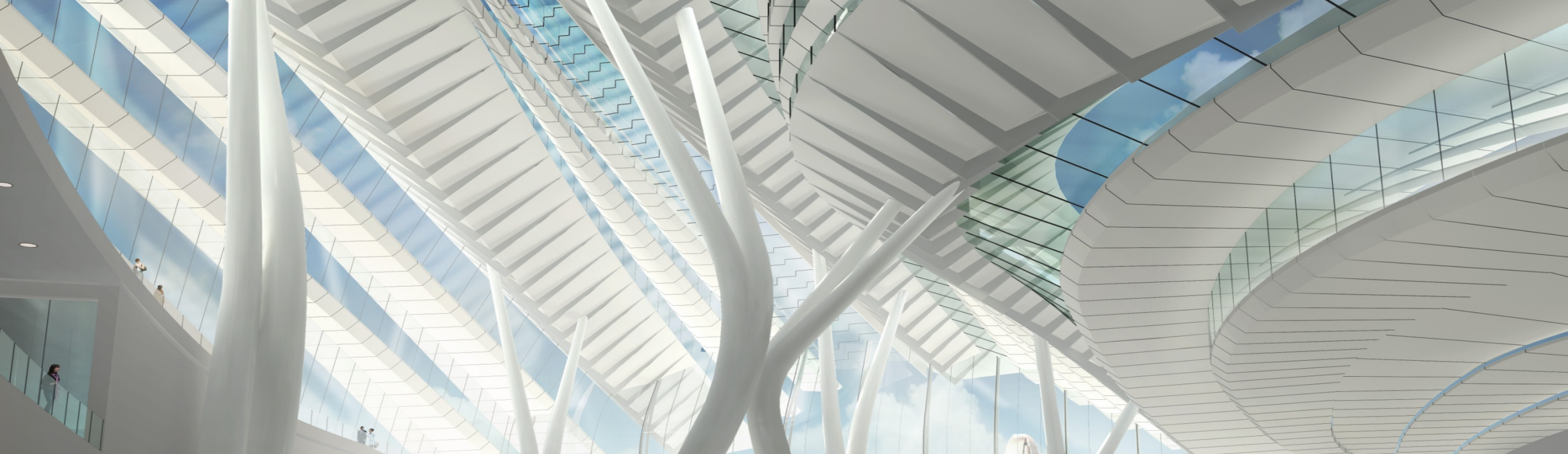
$M + I = B$ (制造)

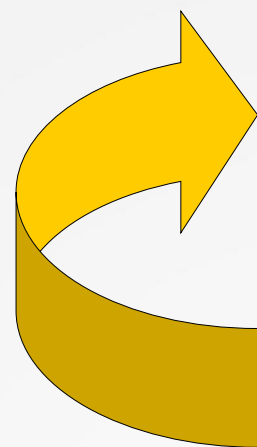












设计

RHINO



格网分化

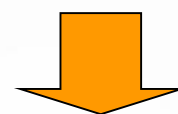
GRASSHOPPER



汇出

数字库

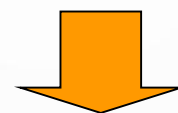
REVIT API



汇入

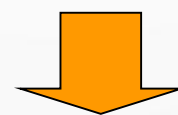
自动优化

REVIT API



BIM生产

REVIT



出图

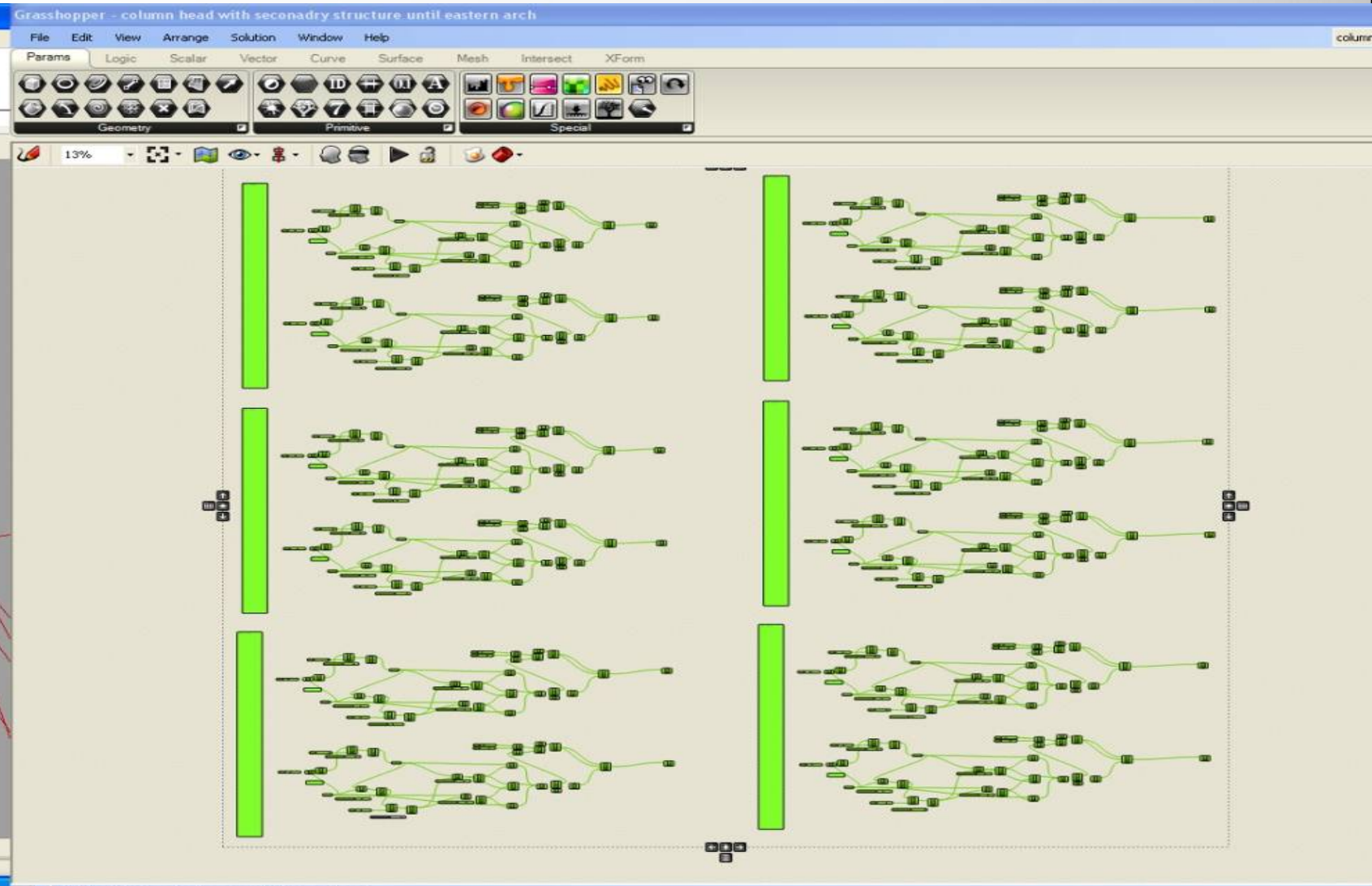
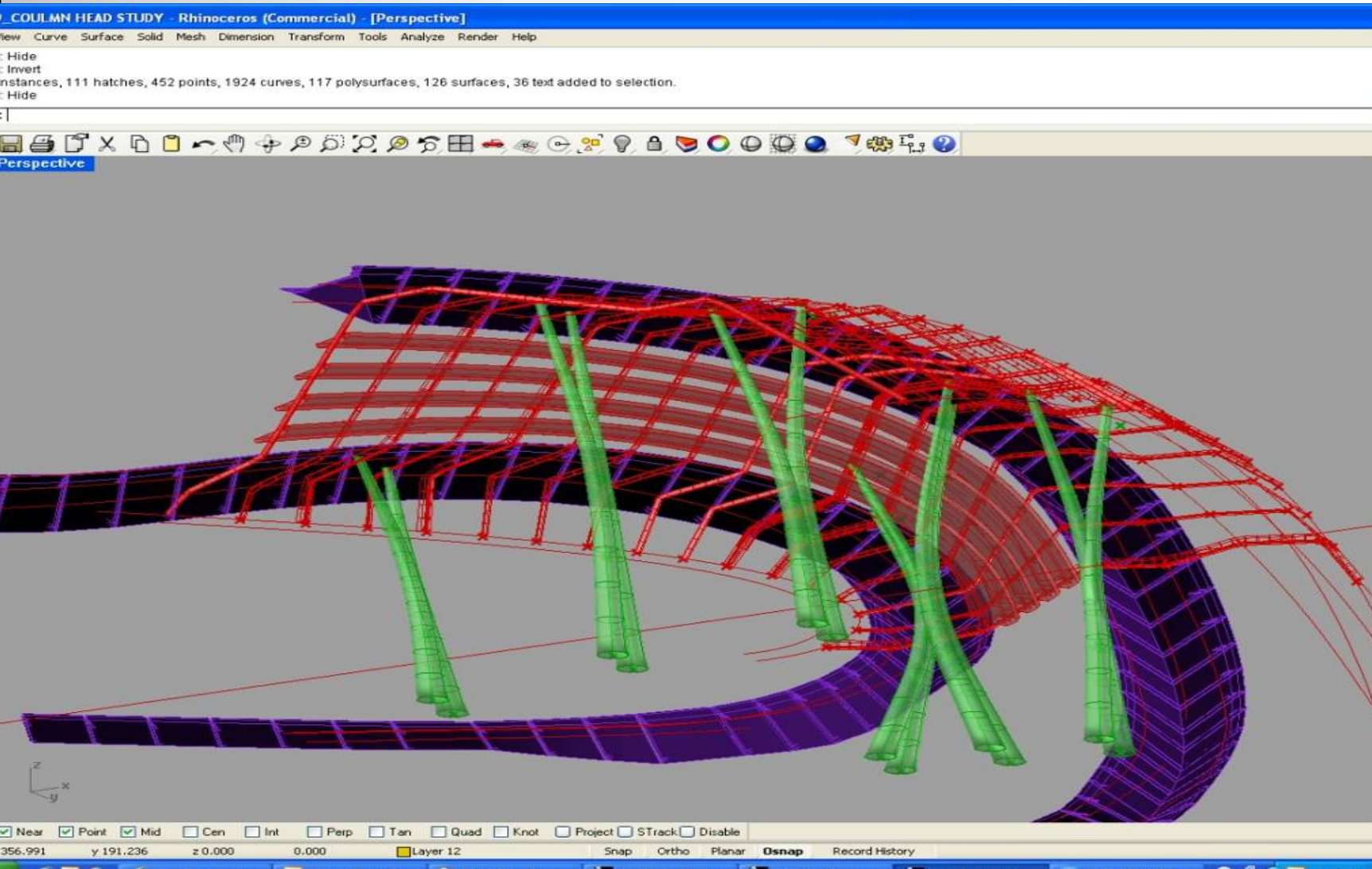
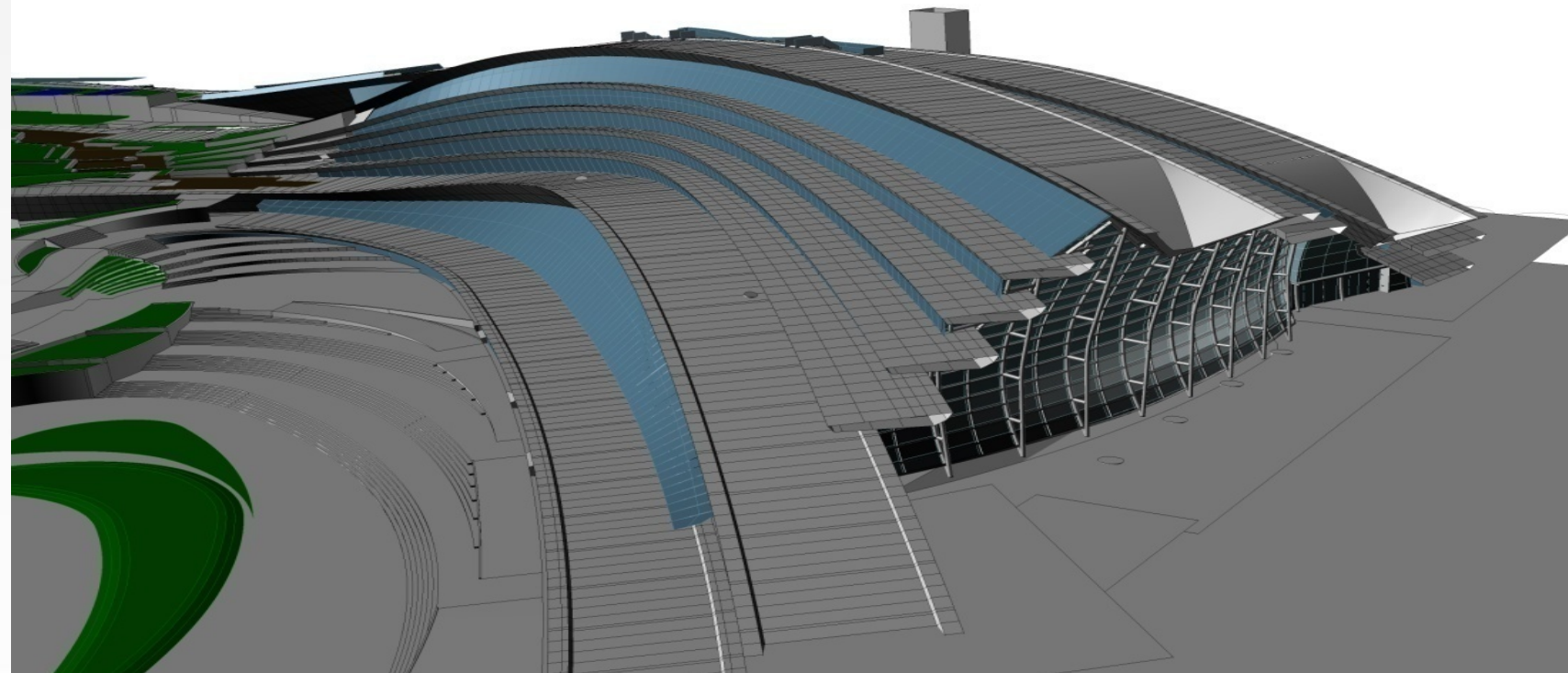
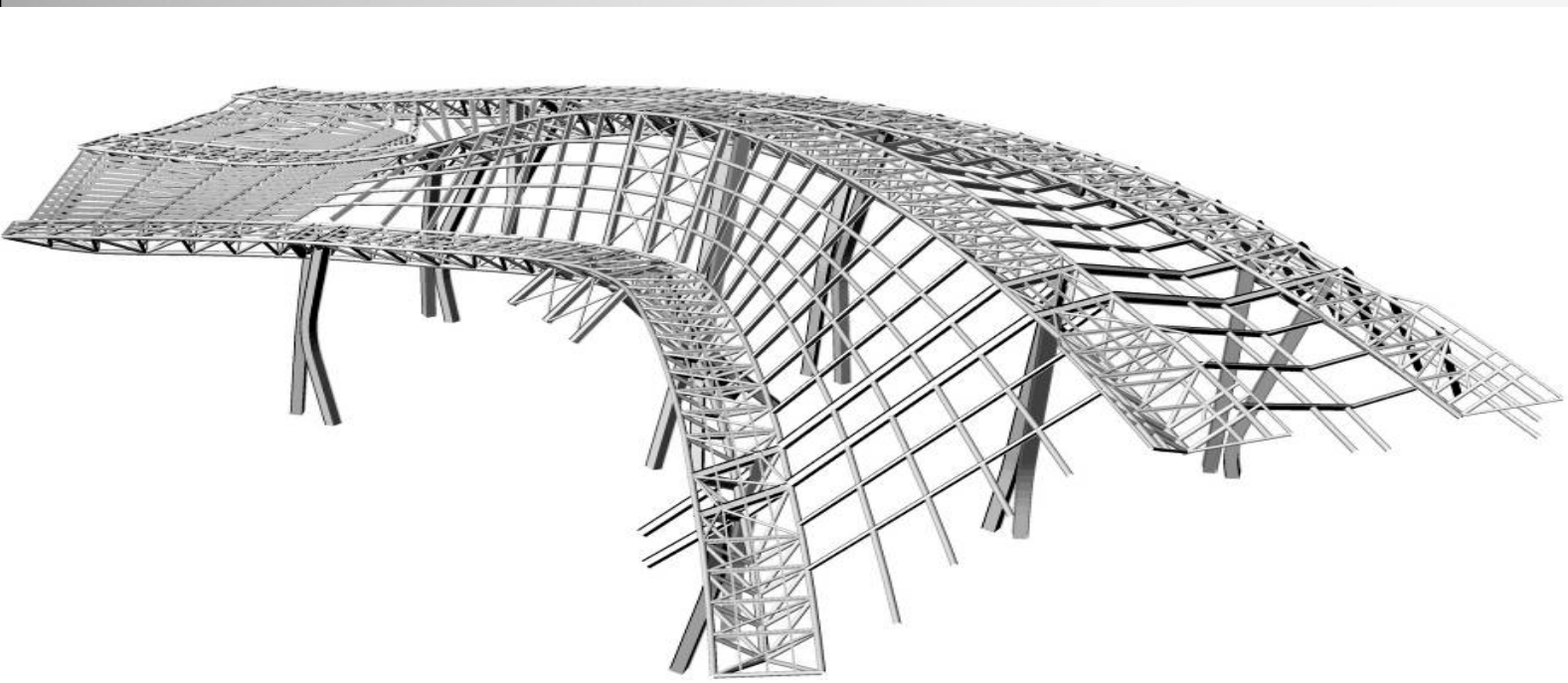
REVIT

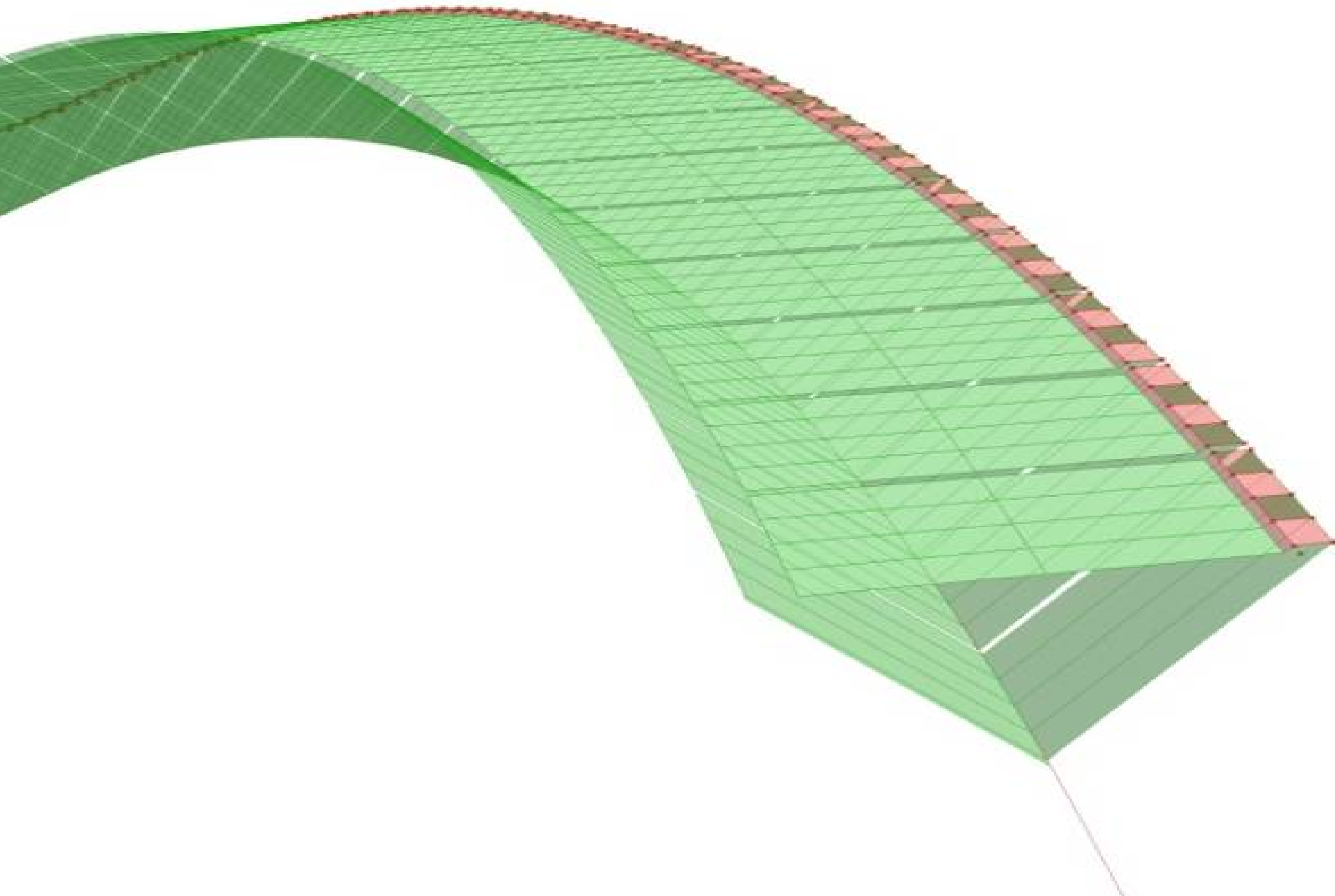


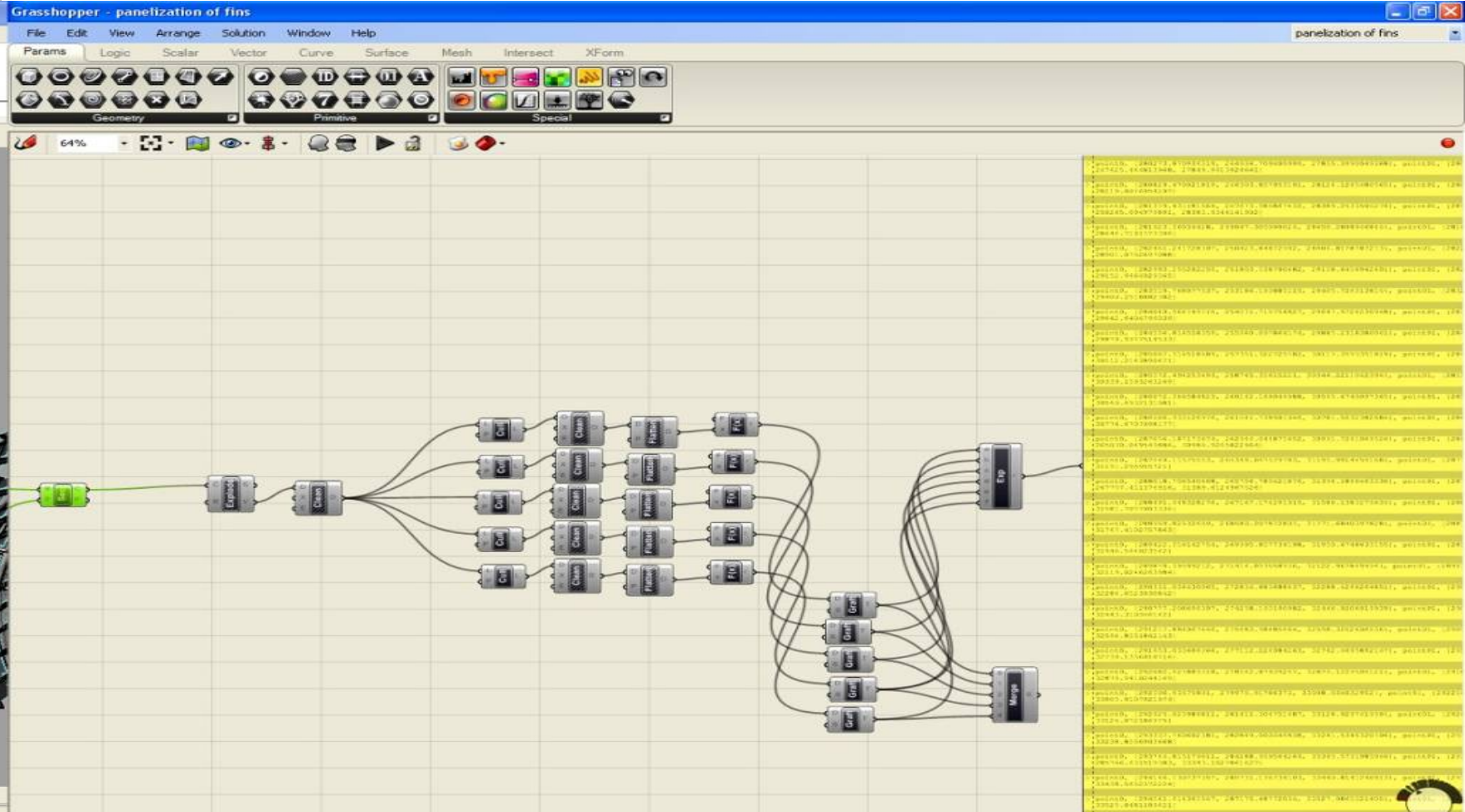
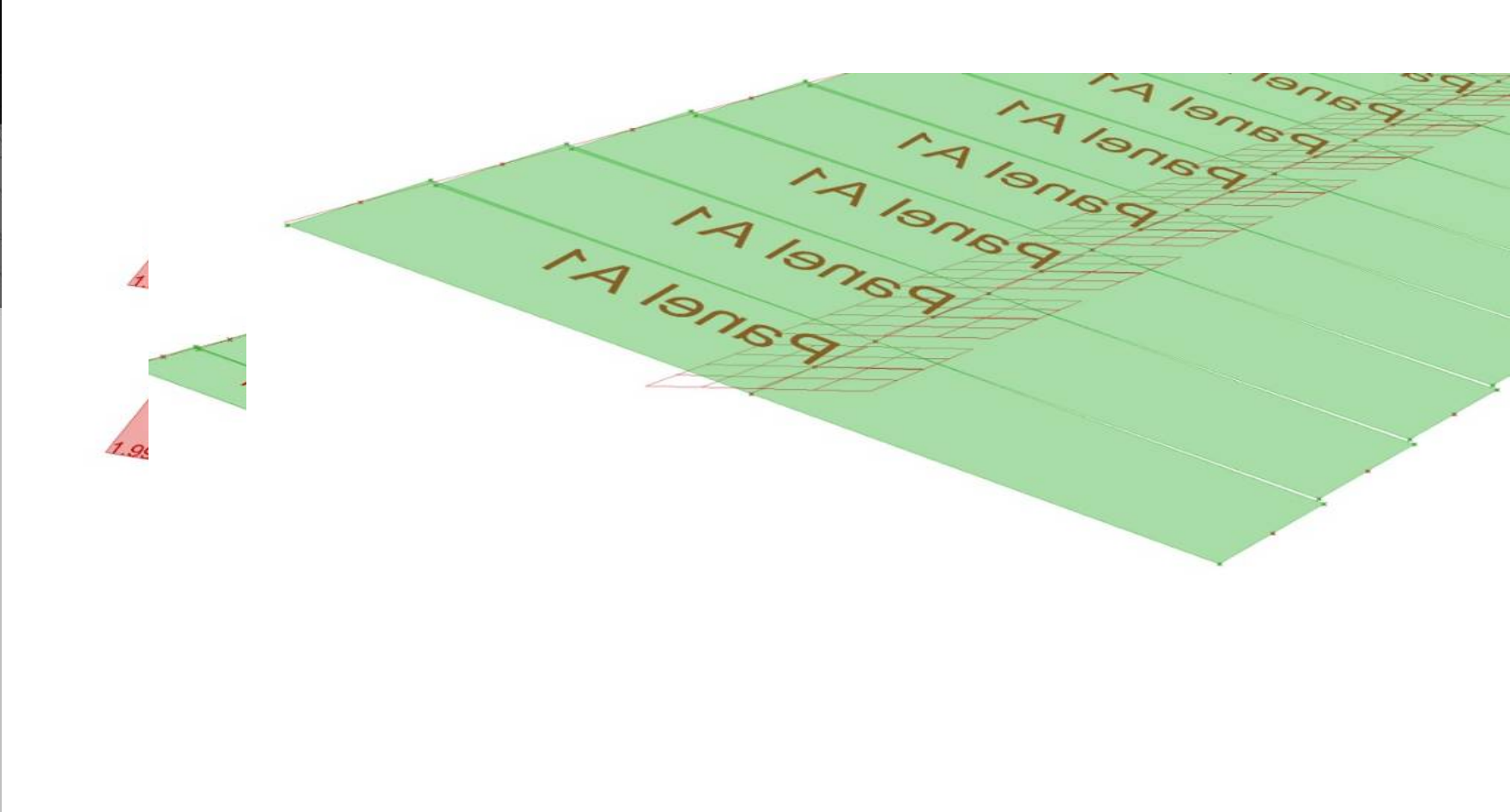
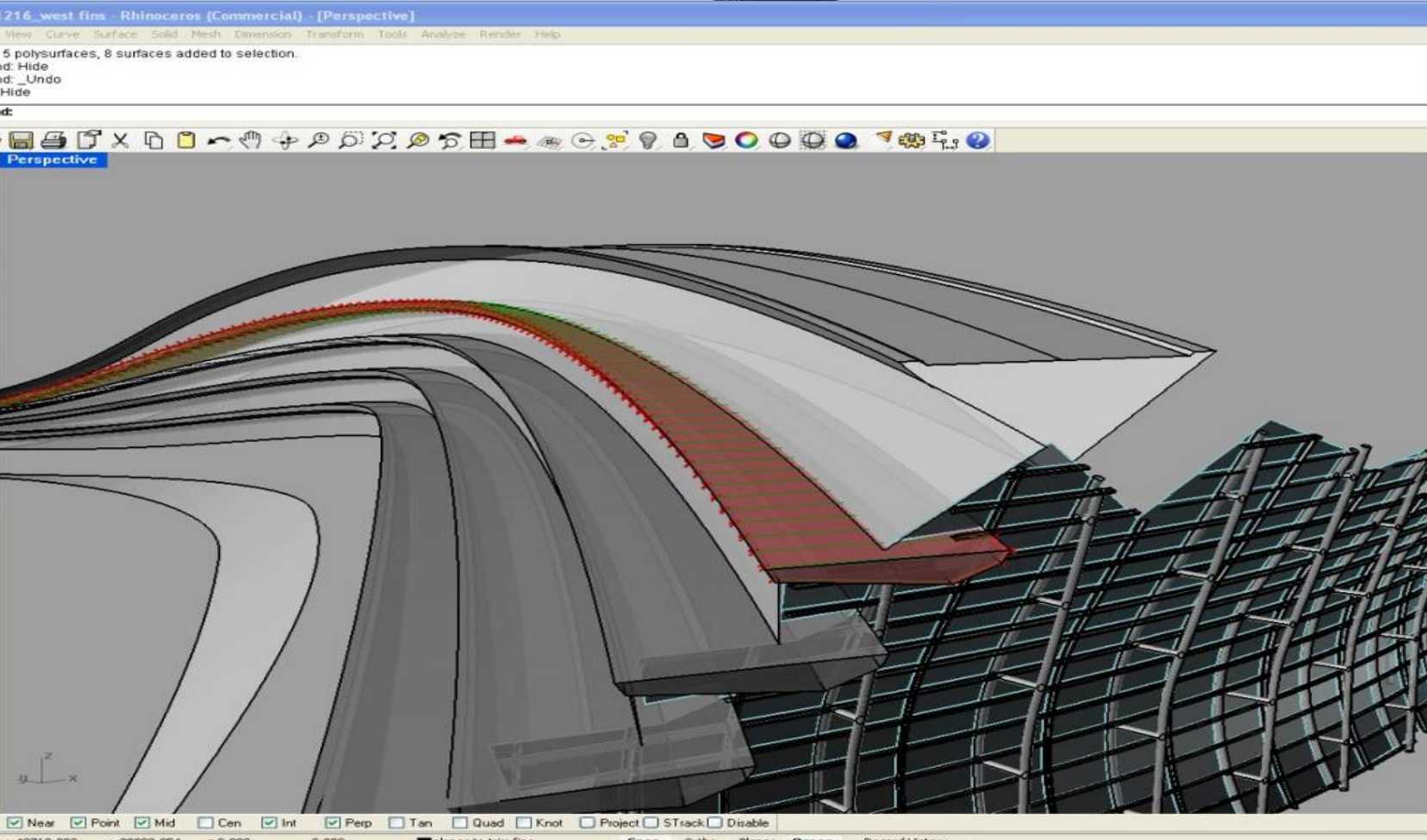
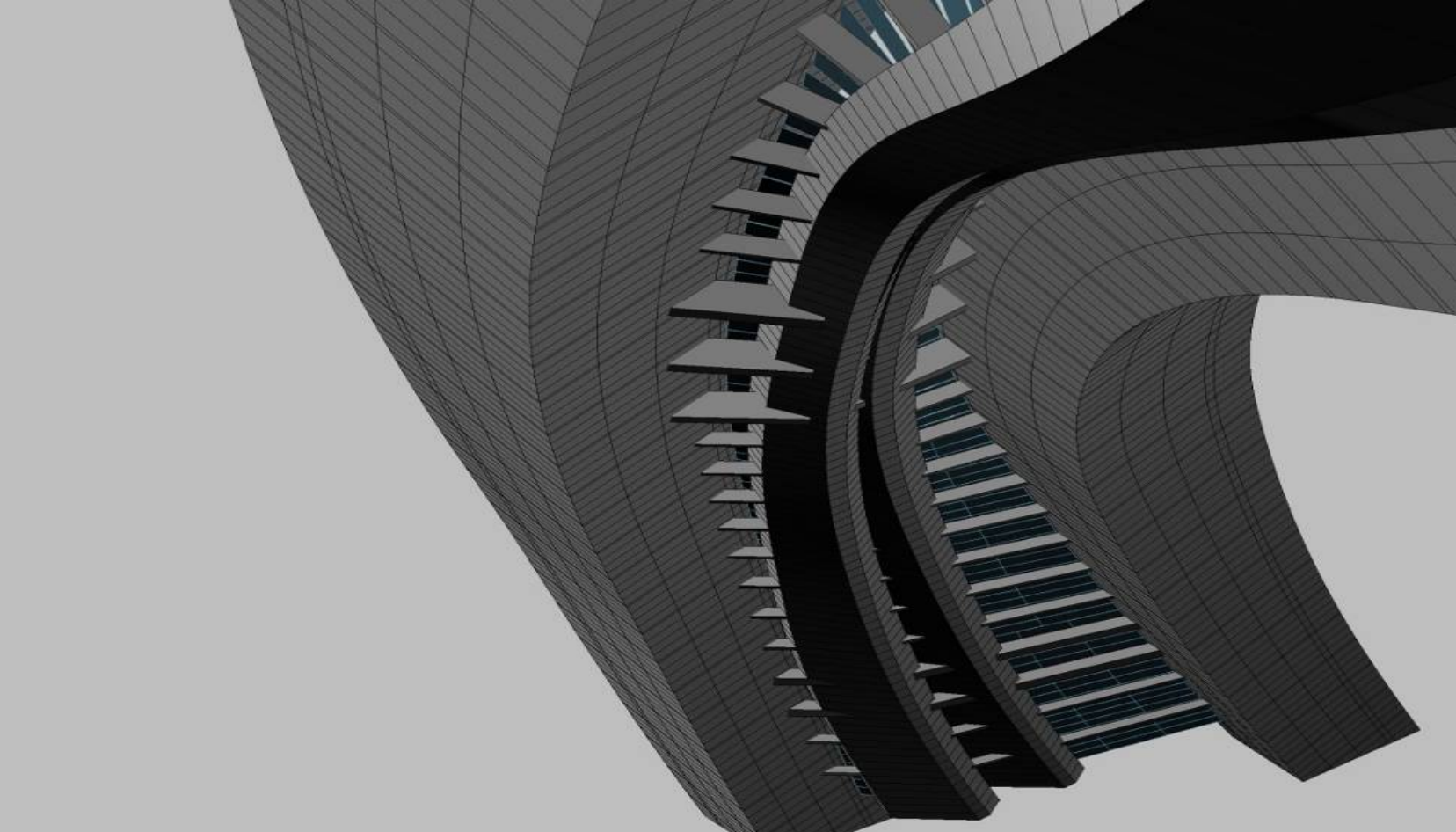
投标

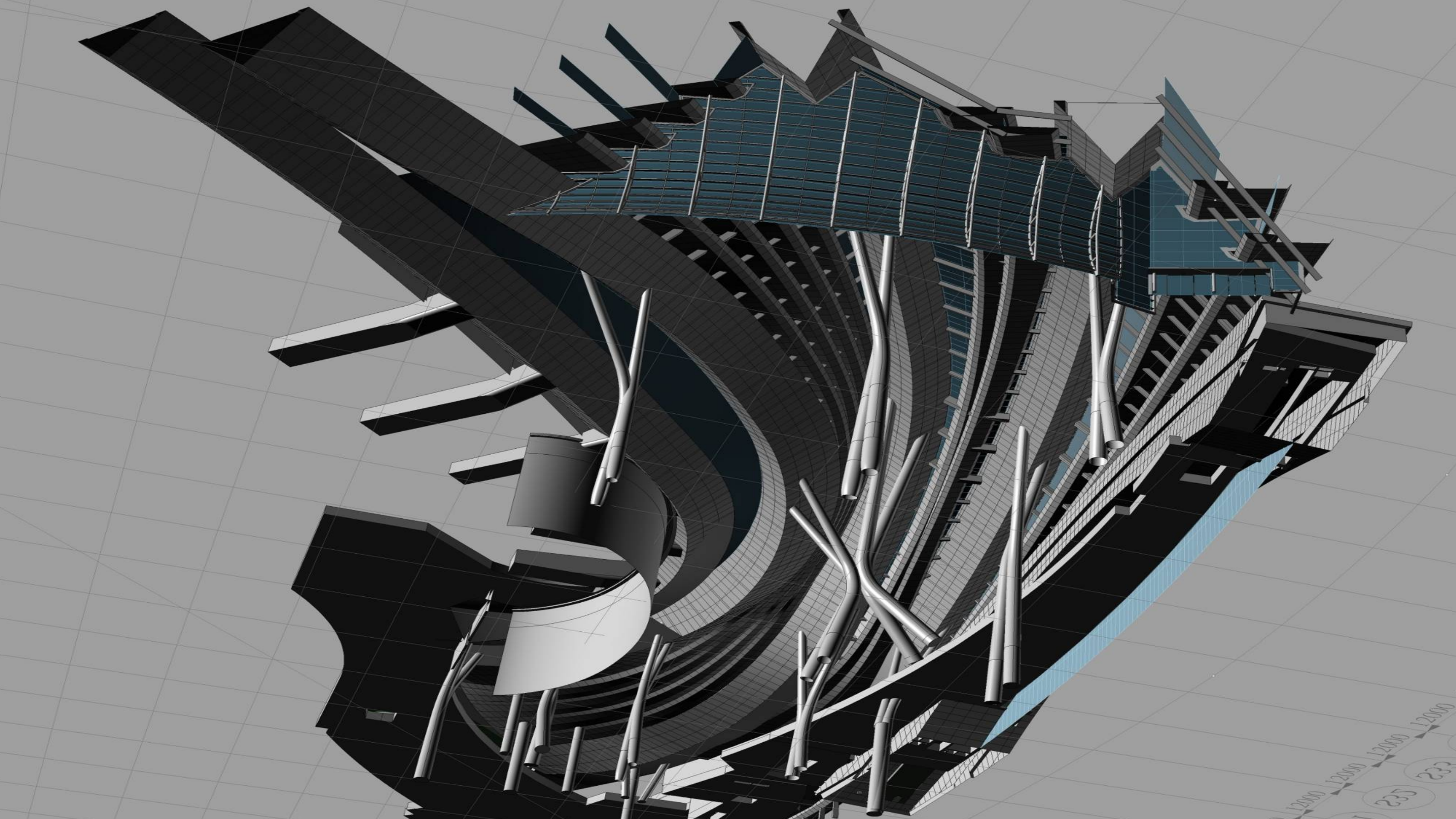
制造生产

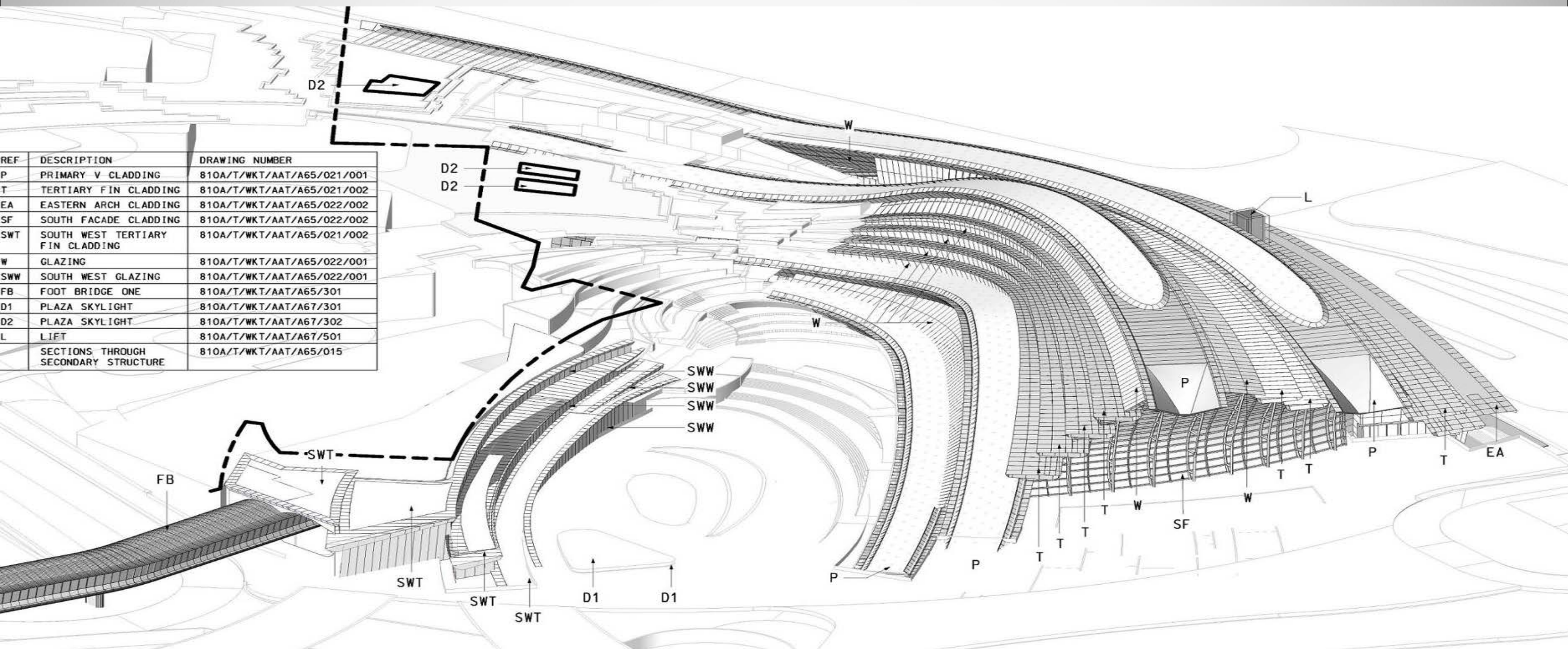


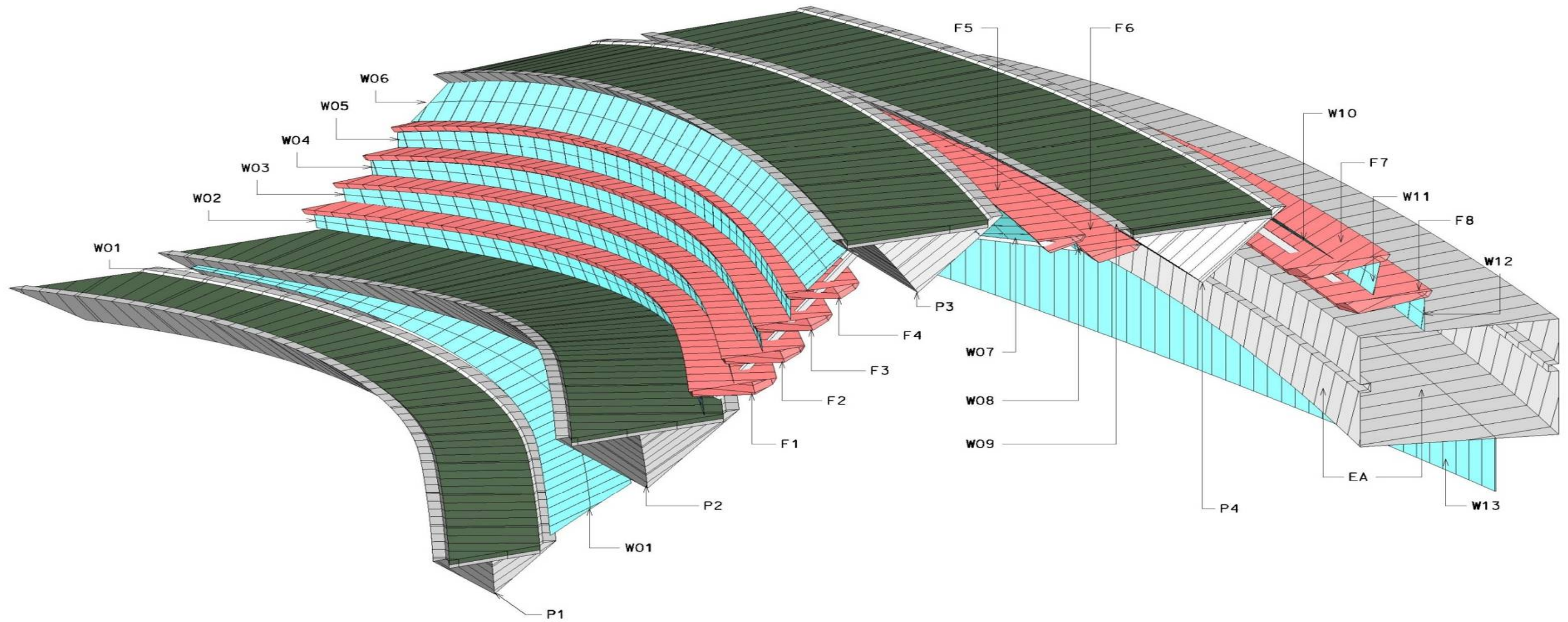


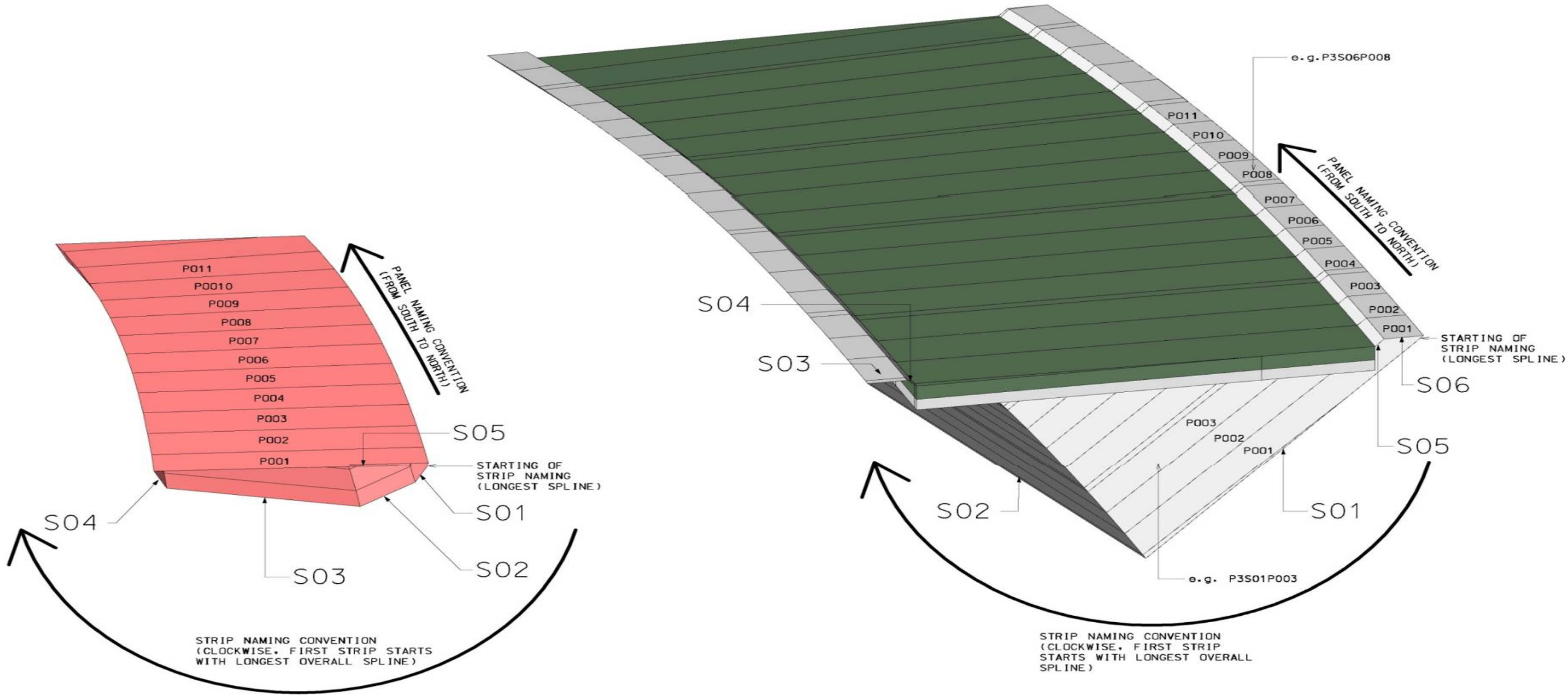












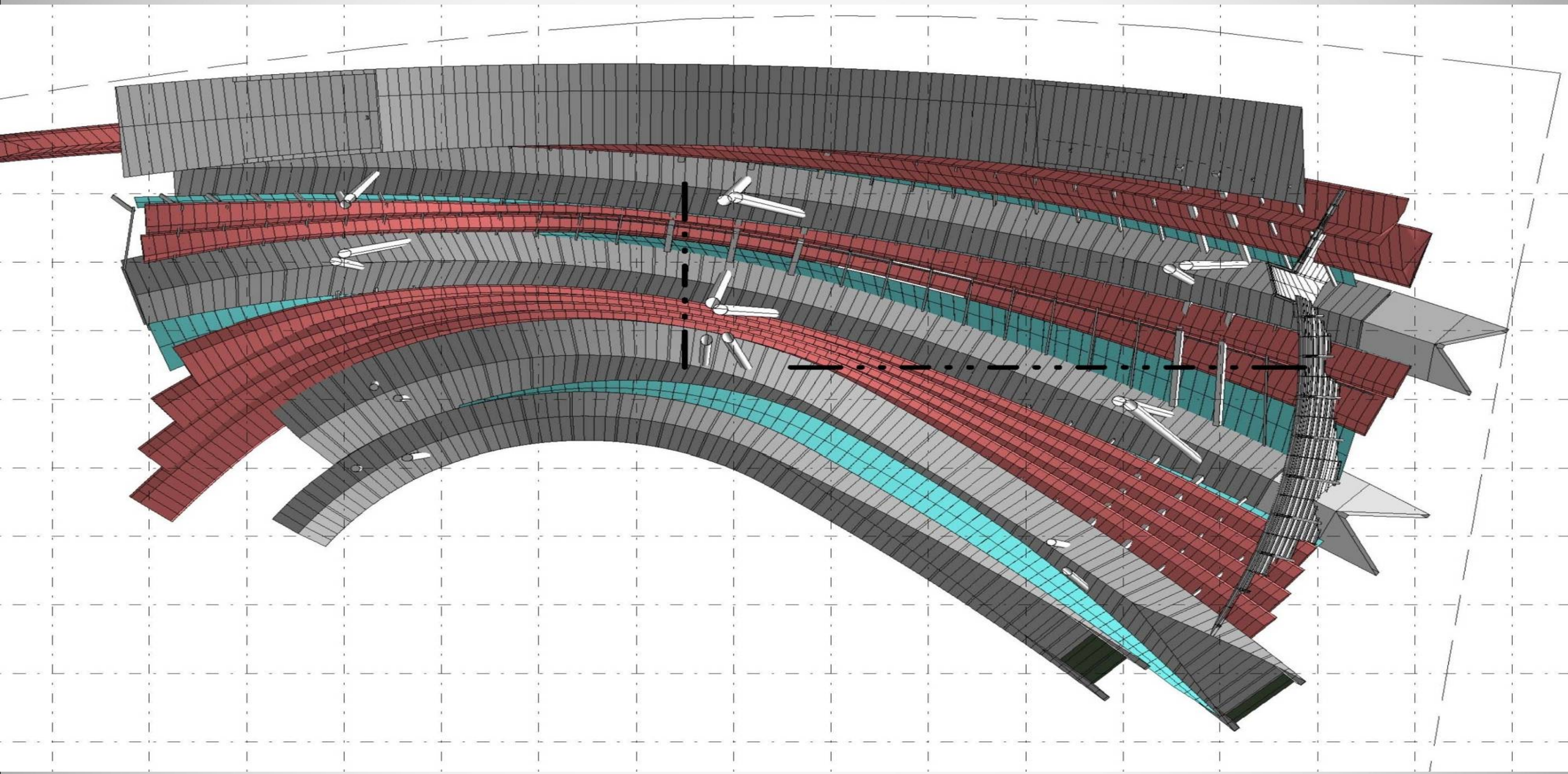
2 Nomenclature - Fin Cladding
e.g. F1

NAMING CONVENTION:
ELEMENT / STRIP(S) / PANEL(P)
E.G. F1 / SXX / PXXX
F1S03P078

1 Nomenclature - V Cladding
e.g. P3

NAMING CONVENTION:
ELEMENT / STRIP(S) / PANEL(P)
E.G. P3 / SXX / PXXX
P3S17P123





R30		A													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1		P01x## lengt	P01y## lengt	P01z## lengt	P02x## lengt	P02y## lengt	P02z## lengt	P03x## lengt	P03y## lengt	P03z## lengt	P04x## lengt	P04y## lengt	P04z## lengt	Panel Type##tot	
2	P3S06P001	149572.632	43124.1138	30997.4089	150034.096	44497.0923	31201.1007	151479.165	44220.6936	29756.4955	151017.994	42846.0425	29553.4116	P3S06P001	
3	P3S06P002	150034.096	44497.0923	31201.1007	150490.205	45872.5015	31400.2904	151935	45597.7674	29955.086	151479.165	44220.6936	29756.4955	P3S06P002	
4	P3S06P003	150490.205	45872.5015	31400.2904	150940.93	47250.3052	31594.9821	152385.473	46977.2334	30149.1841	151935	45597.7674	29955.086	P3S06P003	
5	P3S06P004	150940.93	47250.3052	31594.9821	151386.267	48630.4698	31785.1616	152830.57	48359.0618	30338.7828	152385.473	46977.2334	30149.1841	P3S06P004	
6	P3S06P005	151386.267	48630.4698	31785.1616	151474.689	48906.7825	31822.6539	152918.944	48635.7079	30376.1616	152830.57	48359.0618	30338.7828	P3S06P005	
7	P3S06P006	151474.689	48906.7825	31822.6539	151913.575	50289.7323	32007.3872	153357.585	50020.3276	30560.3477	152918.944	48635.7079	30376.1616	P3S06P006	
8	P3S06P007	151913.575	50289.7323	32007.3872	152347.08	51674.9657	32187.576	153790.836	51407.2369	30740.0246	153357.585	50020.3276	30560.3477	P3S06P007	
9	P3S06P008	152347.08	51674.9657	32187.576	152775.147	53062.4739	32363.2813	154218.667	52796.4316	30915.2314	153790.836	51407.2369	30740.0246	P3S06P008	
10	P3S06P009	152775.147	53062.4739	32363.2813	153197.744	54452.3272	32534.6167	154641.09	54188.0429	31086.0665	154218.667	52796.4316	30915.2314	P3S06P009	
11	P3S06P010	153197.744	54452.3272	32534.6167	153281.603	54730.5766	32568.3694	154724.924	54466.654	31119.7184	154641.09	54188.0429	31086.0665	P3S06P010	
12	P3S06P011	153281.603	54730.5766	32568.3694	153697.624	56123.188	32734.5715	155140.841	55861.1282	31285.4274	154724.924	54466.654	31119.7184	P3S06P011	
13	P3S06P012	153697.624	56123.188	32734.5715	154108.128	57517.7498	32896.4211	155551.199	57257.4509	31446.8027	155140.841	55861.1282	31285.4274	P3S06P012	
14	P3S06P013	154108.128	57517.7498	32896.4211	154513.02	58914.0007	33053.6684	155955.863	58655.1793	31603.5689	155551.199	57257.4509	31446.8027	P3S06P013	
15	P3S06P014	154513.02	58914.0007	33053.6684	154912.275	60311.9726	33206.0604	156354.833	60054.3601	31755.4605	155955.863	58655.1793	31603.5689	P3S06P014	
16	P3S06P015	154912.275	60311.9726	33206.0604	154991.455	60591.8003	33235.9403	156433.956	60334.4167	31785.2395	156354.833	60054.3601	31755.4605	P3S06P015	
17	P3S06P016	154991.455	60591.8003	33235.9403	155384.039	61992.164	33382.3144	156826.258	61735.9125	31931.1206	156433.956	60334.4167	31785.2395	P3S06P016	
18	P3S06P017	155384.039	61992.164	33382.3144	155771.104	63394.5402	33523.6095	157213.036	63139.4019	32071.9532	156826.258	61735.9125	31931.1206	P3S06P017	
19	P3S06P018	155771.104	63394.5402	33523.6095	156152.641	64799.0536	33659.8994	157594.329	64545.1147	32207.8035	157213.036	63139.4019	32071.9532	P3S06P018	
20	P3S06P019	156152.641	64799.0536	33659.8994	156528.665	66205.8406	33791.3989	157970.193	65953.318	32338.8909	157594.329	64545.1147	32207.8035	P3S06P019	
21	P3S06P020	156528.665	66205.8406	33791.3989	156603.207	66487.4657	33817.1437	158044.711	66235.2527	32364.5566	157970.193	65953.318	32338.8909	P3S06P020	
22	P3S06P021	156603.207	66487.4657	33817.1437	156972.591	67896.8372	33943.1573	158414.002	67646.2548	32490.1972	158044.711	66235.2527	32364.5566	P3S06P021	
23	P3S06P022	156972.591	67896.8372	33943.1573	157336.329	69307.9002	34064.607	158777.619	69058.83	32611.2857	158414.002	67646.2548	32490.1972	P3S06P022	
24	P3S06P023	157336.329	69307.9002	34064.607	157694.338	70720.5482	34181.3772	159135.5	70472.822	32727.6793	158777.619	69058.83	32611.2857	P3S06P023	
25	P3S06P024	157694.338	70720.5482	34181.3772	158046.558	72134.4265	34293.1711	159487.514	71887.6646	32839.0806	159135.5	70472.822	32727.6793	P3S06P024	
26	P3S06P025	158046.558	72134.4265	34293.1711	158116.297	72417.2914	34314.8748	159557.191	72170.6364	32860.703	159487.514	71887.6646	32839.0806	P3S06P025	
27	P3S06P026	158116.297	72417.2914	34314.8748	158461.474	73832.0687	34419.7934	159901.955	73585.5129	32965.2043	159557.191	72170.6364	32860.703	P3S06P026	
28	P3S06P027	158461.474	73832.0687	34419.7934	158800.798	75247.6674	34518.1928	160240.723	75000.5299	33063.172	159901.955	73585.5129	32965.2043	P3S06P027	
29	P3S06P028	158800.798	75247.6674	34518.1928	159134.34	76664.522	34609.6099	160573.676	76416.4942	33154.1589	160240.723	75000.5299	33063.172	P3S06P028	
30	P3S06P029	159134.34	76664.522	34609.6099	159462.105	78082.6818	34693.7628	160900.837	77833.534	33237.8995	160573.676	76416.4942	33154.1589	P3S06P029	
31	P3S06P030	159462.105	78082.6818	34693.7628	159526.964	78366.4655	34709.6976	160965.574	78117.0662	33253.7554	160900.837	77833.534	33237.8995	P3S06P030	
32	P3S06P031	159526.964	78366.4655	34709.6976	159847.917	79786.6698	34784.8936	161285.941	79536.0393	33328.5833	160965.574	78117.0662	33253.7554	P3S06P031	
33	P3S06P032	159847.917	79786.6698	34784.8936	160163.369	81209.1412	34852.7734	161600.864	80957.3769	33396.1369	161285.941	79536.0393	33328.5833	P3S06P032	
34	P3S06P033	160163.369	81209.1412	34852.7734	160473.329	82633.6703	34913.5237	161910.348	82380.8678	33456.5958	161600.864	80957.3769	33396.1369	P3S06P033	
35	P3S06P034	160473.329	82633.6703	34913.5237	160777.356	84058.5399	34967.1102	162213.944	83804.7494	33509.9212	161910.348	82380.8678	33456.5958	P3S06P034	
36	P3S06P035	160777.356	84058.5399	34967.1102	160837.419	84343.4967	34976.9482	162273.925	84089.5132	33519.7114	162213.944	83804.7494	33509.9212	P3S06P035	
37	P3S06P036	160837.419	84343.4967	34976.9482	161133.92	85768.179	35021.638	162570.037	85513.2534	33564.1916	162273.925	84089.5132	33519.7114	P3S06P036	
38	P3S06P037	161133.92	85768.179	35021.638	161424.472	87194.961	35058.7408	162860.157	86938.7178	33601.1181	162570.037	85513.2534	33564.1916	P3S06P037	
39	P3S06P038	161424.472	87194.961	35058.7408	161710.115	88626.5835	35088.1259	163145.242	88368.1089	33630.3397	162860.157	86938.7178	33601.1181	P3S06P038	
40	P3S06P039	161710.115	88626.5835	35088.1259	161991.372	90062.1491	35109.5513	163425.853	89800.6144	33651.6209	163145.242	88368.1089	33630.3397	P3S06P039	
41	P3S06P040	161991.372	90062.1491	35109.5513	162046.965	90348.8387	35112.8371	163481.328	90086.742	33654.8892	163425.853	89800.6144	33651.6209	P3S06P040	
42	P3S06P041	162046.965	90348.8387	35112.8371	162320.456	91777.2531	35124.1735	163754.377	91513.2313	33666.1912	163481.328	90086.742	33654.8892	P3S06P041	
43	P3S06P042	162320.456	91777.2531	35124.1735	162582.475	93187.6147	35126.9896	164016.659	92925.0915	33668.9867	163754.377	91513.2313	33666.1912	P3S06P042	


```

        {
            case 'x':
                p[index].x = System.Convert.ToDouble(para.AsValueString());
                break;
            case 'y':
                p[index].y = System.Convert.ToDouble(para.AsValueString());
                break;
            case 'z':
                p[index].z = System.Convert.ToDouble(para.AsValueString());
                break;
            default:
                MessageBox.Show("Wrong format of parameter name");
                break;
        }
    }
}

CladdingPanel cl = new CladdingPanel(p, PanelCounter); // new panel created from list of points.
double Area_m2 = cl.PanelArea / 1000000; // division by 1000000 to get area in m2 from mm2

//current family type parameter is updated with value of Area_m2 ;
document.BeginTransaction();
if( symbol.ParametersMap["Area"].Set(Area_m2) == false )
{
    MessageBox.Show("Wrong parameter type");
}
document.EndTransaction();

ArrayOfPanels.Add(cl); // new panel inserted into the array of panels

output += cl.UniqueNumber + " " + Area_m2 + " " + cl.T_edge[0] + " " + cl.T_edge[1] + " " + cl.T_edge[2] + " " + cl.T_edge[3]

// creating panel objects in space
document.BeginTransaction();
FamilyInstance instance = document.Create.NewFamilyInstance(location, symbol, StructuralType.NonStructural);
document.EndTransaction();
}
//MessageBox.Show(output);

```

```

        public bool ContainsEdgeWith(GEdge edge, int n, double tolerance)
        {
            if
            (
                Math.Abs(nextPanel.G_edge[0] - G_edge[0]) <= tolerance
                &&
                Math.Abs(nextPanel.G_edge[1] - G_edge[1]) <= tolerance
                &&
                Math.Abs(nextPanel.G_edge[2] - G_edge[2]) <= tolerance
                &&
                Math.Abs(nextPanel.G_edge[3] - G_edge[3]) <= tolerance
                &&
                Math.Abs(nextPanel.G_diagonal_1 - G_diagonal_1) <= tolerance * Math.Sqrt(2)
            )
            { return true; }
            else
            { return false; }

        }

    }

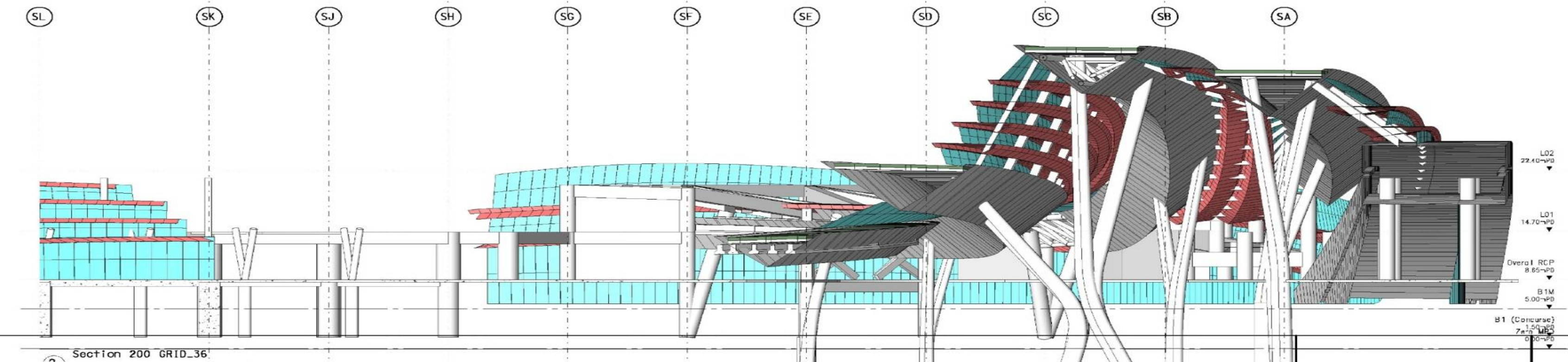
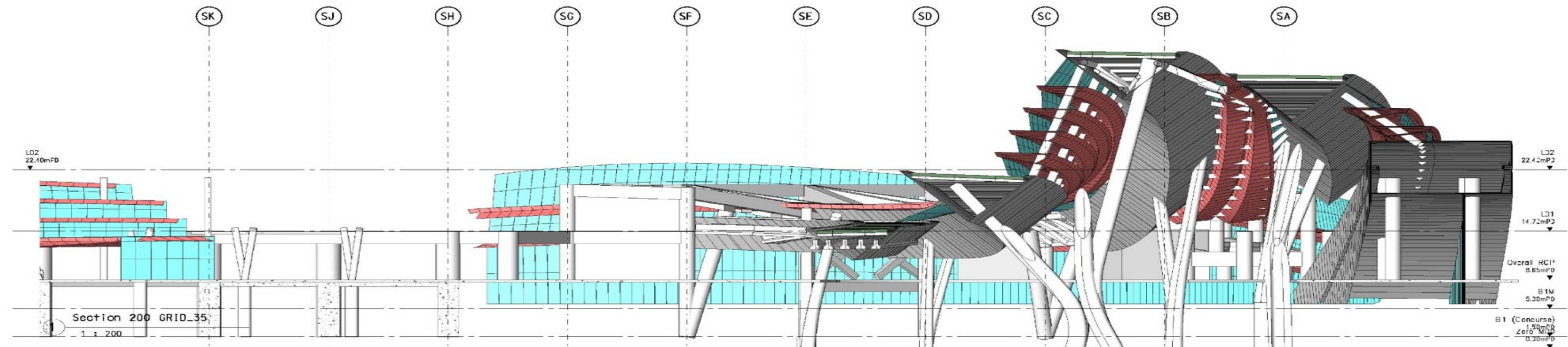
}
#endregion

public class Group
{
    public int GroupNumber;
    public double[] Edge; //array of lengths of groups's edges.
    public double Diagonal; //length of group's diagonal.
    public double Area; //area of a grouped panel;
}

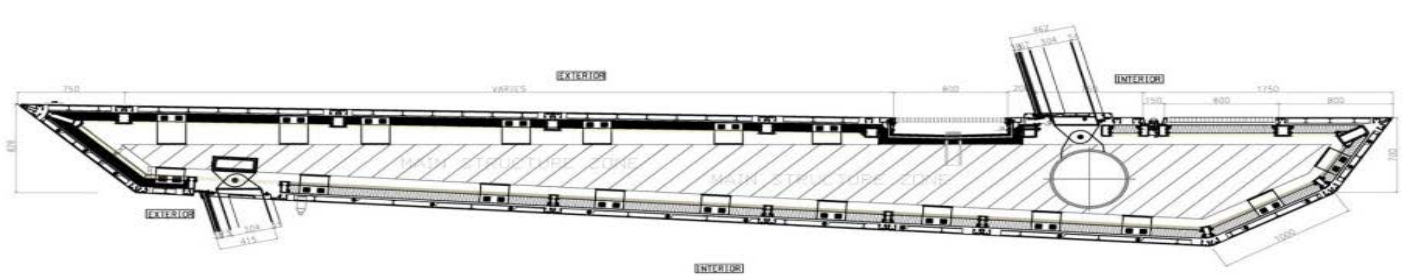
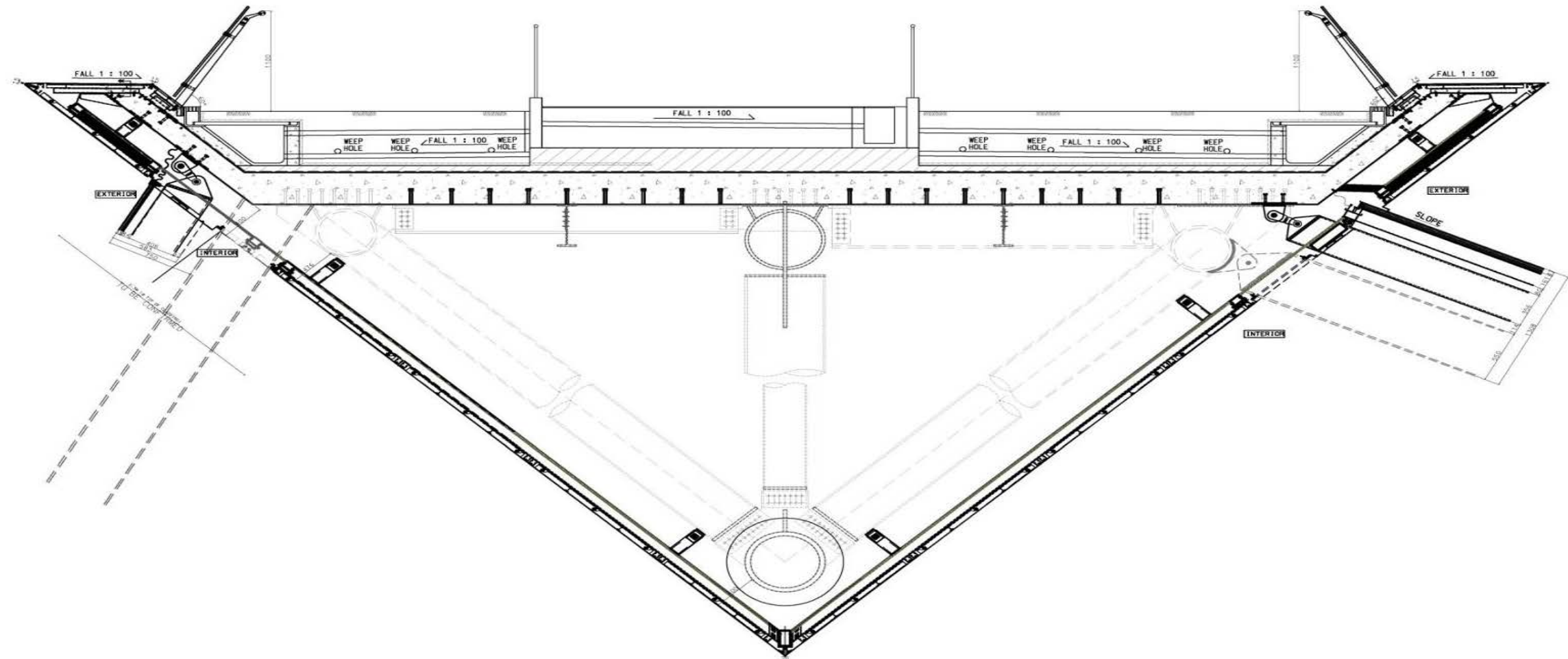
double toFeet(double value) //conversion of linear sizes for family instances
{
    return value * FACTOR_MMtoFT;
}

double toSqFeet(double value) //conversion of areal sizes for family instances
{

```

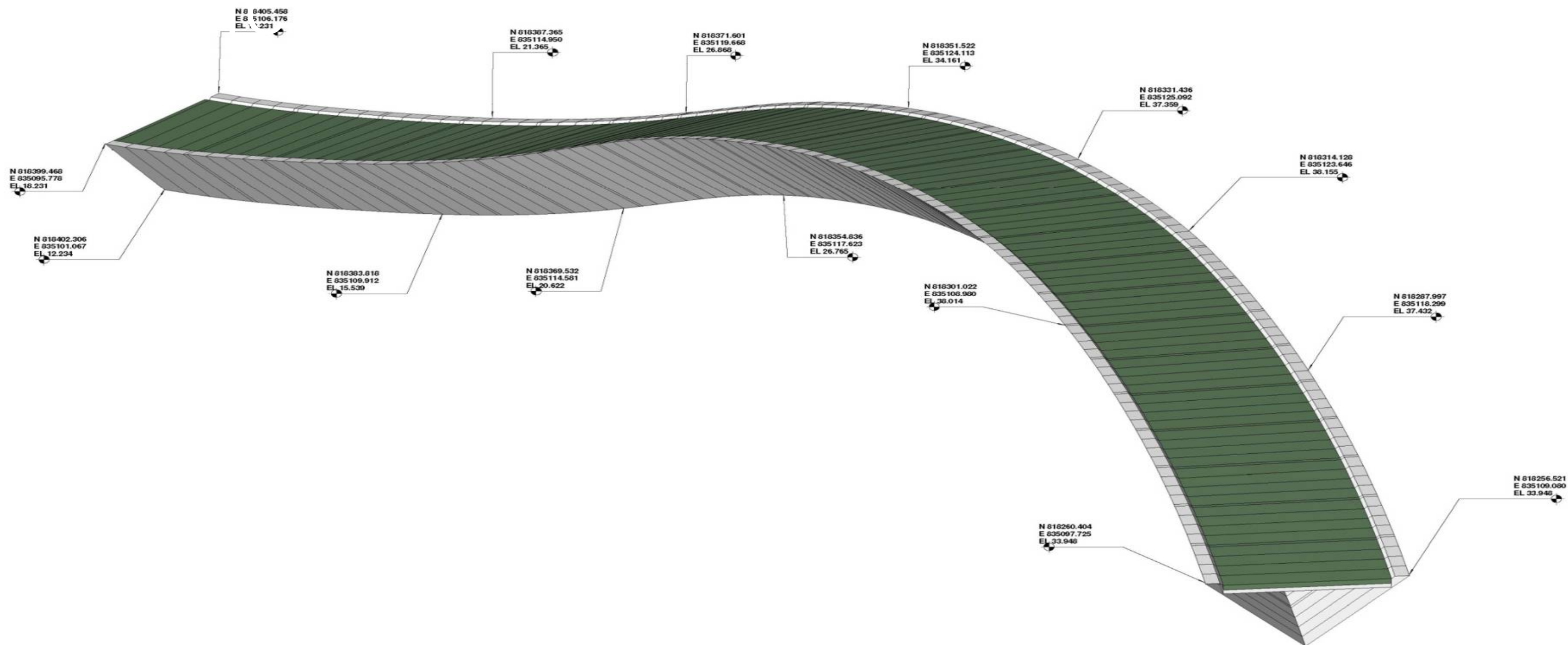


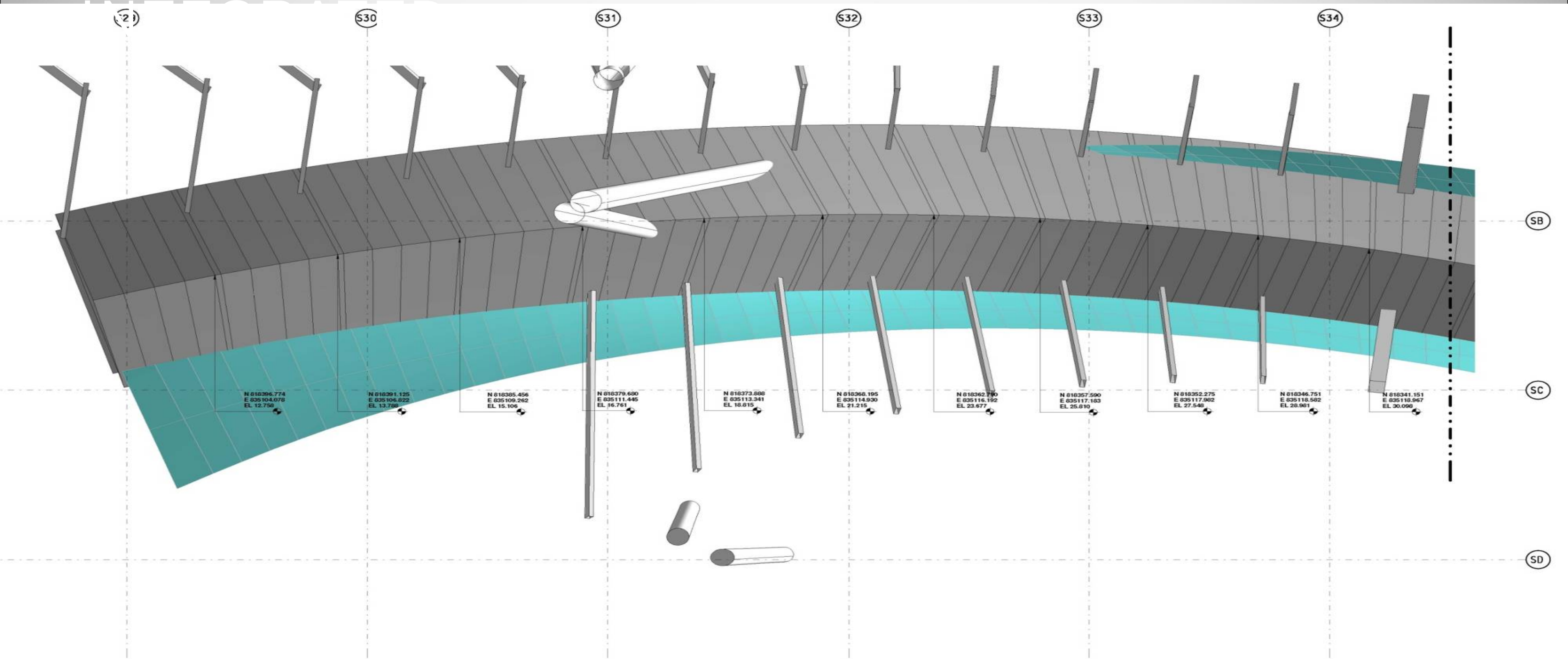
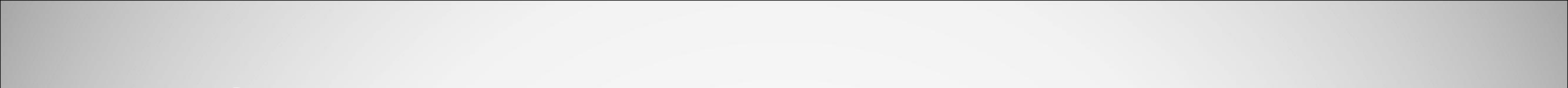




1 Component Elevation 1/3 North
1 : 100

- EXCEEDING EXPECTATIONS





1 LEFT_Component RCP P3
1 : 100

ARRIVING or DEPARTING

Panel P3S03P082

Group AL 36
Edge 1 1391 mm
Edge 2 839 mm
Edge 3 1398 mm
Edge 4 839 mm
Diagonal 1628 mm
Area 1.197 m²

Panel P3S03P081

Group AL 33
Edge 1 1358 mm
Edge 2 839 mm
Edge 3 1366 mm
Edge 4 839 mm
Diagonal 1600 mm
Area 1.169 m²

Panel P3S03P080

Group AL 34
Edge 1 267 mm
Edge 2 824 mm
Edge 3 269 mm
Edge 4 824 mm
Diagonal 867 mm
Area 0.234 m²

Panel P3S03P079

Group AL 33
Edge 1 1358 mm
Edge 2 839 mm
Edge 3 1366 mm
Edge 4 839 mm
Diagonal 1600 mm
Area 1.169 m²

Panel P3S03P078

Group AL 33
Edge 1 1358 mm
Edge 2 839 mm
Edge 3 1366 mm
Edge 4 839 mm
Diagonal 1600 mm
Area 1.169 m²

Panel P3S03P077

Group AL 33
Edge 1 1358 mm
Edge 2 839 mm
Edge 3 1366 mm
Edge 4 839 mm
Diagonal 1600 mm
Area 1.169 m²

Panel P3S04P082

Group AL 43
Edge 1 1378 mm
Edge 2 276 mm
Edge 3 1378 mm
Edge 4 276 mm
Diagonal 1405 mm
Area 0.400 m²

Panel P3S04P081

Group AL 40
Edge 1 1347 mm
Edge 2 276 mm
Edge 3 1354 mm
Edge 4 276 mm
Diagonal 1379 mm
Area 0.392 m²

Panel P3S04P080

Group AL 41
Edge 1 265 mm
Edge 2 271 mm
Edge 3 266 mm
Edge 4 271 mm
Diagonal 381 mm
Area 0.078 m²

Panel P3S04P079

Group AL 40
Edge 1 1347 mm
Edge 2 276 mm
Edge 3 1354 mm
Edge 4 276 mm
Diagonal 1379 mm
Area 0.392 m²

Panel P3S04P078

Group AL 40
Edge 1 1347 mm
Edge 2 276 mm
Edge 3 1354 mm
Edge 4 276 mm
Diagonal 1379 mm
Area 0.392 m²

Panel P3S04P077

Group AL 40
Edge 1 1347 mm
Edge 2 276 mm
Edge 3 1354 mm
Edge 4 276 mm
Diagonal 1379 mm
Area 0.392 m²

Panel P3S02P082

Group AL 30
Edge 1 1412 mm
Edge 2 8443 mm
Edge 3 1400 mm
Edge 4 8443 mm
Diagonal 8559 mm
Area 11.992 m²

Panel P3S02P081

Group AL 29
Edge 1 1400 mm
Edge 2 8443 mm
Edge 3 1367 mm
Edge 4 8443 mm
Diagonal 8551 mm
Area 11.801 m²

Panel P3S02P080

Group AL 23
Edge 1 272 mm
Edge 2 8298 mm
Edge 3 272 mm
Edge 4 8298 mm
Diagonal 8296 mm
Area 2.361 m²

Panel P3S02P079

Group AL 29
Edge 1 1400 mm
Edge 2 8443 mm
Edge 3 1367 mm
Edge 4 8443 mm
Diagonal 8551 mm
Area 11.801 m²

Panel P3S02P078

Group AL 29
Edge 1 1400 mm
Edge 2 8443 mm
Edge 3 1367 mm
Edge 4 8443 mm
Diagonal 8551 mm
Area 11.801 m²

Panel P3S02P077

Group AL 29
Edge 1 1400 mm
Edge 2 8443 mm
Edge 3 1367 mm
Edge 4 8443 mm
Diagonal 8551 mm
Area 11.801 m²



P3

Panel	Point 1			Point 2			Point 3			Point 4			Center of weight			Edges					Area	Group	
	P01 x	P01 y	P01 z	P02 x	P02 y	P02 z	P03 x	P03 y	P03 z	P04 x	P04 y	P04 z	C x	C y	C z	Edge 1	Edge 2	Edge 3	Edge 4	Diagonal			
P3S01P001	835106129	818405541	18228	835101017	818402394	12231	835106871	818404239	18290	835101802	818401012	12299	835103955	818403297	15262	1493	8446	1583	8446	8585	13.111 m²	AL 1	
P3S01P002	835106871	818404239	18290	835101802	818401012	12299	835107598	818402931	18391	835102588	818399625	12410	835104710	818401952	15347	1493	8446	1593	8446	8595	13.111 m²	AL 1	
P3S01P003	835107598	818402931	18391	835102588	818399625	12410	835108310	818401617	18528	835103312	818398241	12560	835105447	818400604	15472	1493	8446	1583	8446	8585	13.111 m²	AL 1	
AL 1: 3																						39.333 m²	
P3S01P004	835108310	818401617	18528	835103312	818398241	12560	835109007	818400300	18698	835104033	818396862	12745	835106166	818399255	15633	1493	8446	1559	8446	8583	13.010 m²	AL 2	
AL 2: 1																						13.010 m²	
P3S01P005	835109007	818400300	18698	835104033	818396862	12745	835109144	818400036	18736	835104175	818396588	12786	835106590	818398446	15741	294	8313	305	8313	8318	2.594 m²	AL 3	
P3S01P010	835111765	818394722	19674	835106783	818391211	13770	835111890	818394454	19728	835106906	818390943	13826	835109336	818392833	16750	294	8313	305	8313	8318	2.594 m²	AL 3	
P3S01P015	835114256	818399075	20934	835109228	818385543	15084	835114368	818388805	21001	835109337	818385271	15154	835111797	818387174	18043	294	8313	305	8313	8318	2.594 m²	AL 3	
P3S01P020	835116476	818383392	22499	835111414	818379769	16734	835116575	818383121	22582	835111511	818379492	16822	835113994	818381444	19659	294	8313	305	8313	8318	2.594 m²	AL 3	
P3S01P025	835118417	818377721	24432	835113315	818373975	18781	835118503	818377451	24534	835113398	818373701	18888	835115908	818375712	21659	294	8313	305	8313	8318	2.594 m²	AL 3	
P3S01P030	835120084	818372092	26716	835114909	818368280	21178	835120157	818371825	26832	835114977	818368015	21297	835117532	818370053	24006	294	8313	305	8313	8318	2.594 m²	AL 3	
AL 3: 6																						15.564 m²	
P3S01P006	835109144	818400036	18736	835104175	818396588	12786	835109822	818398714	18942	835104883	818395227	13005	835107001	818397641	15867	1493	8446	1534	8446	8581	12.901 m²	AL 4	
P3S01P018	835115454	818386100	21710	835110405	818382531	15899	835115973	818384746	22094	835110918	818381150	16305	835113187	818383632	19002	1493	8446	1534	8446	8581	12.901 m²	AL 4	
P3S01P019	835115973	818384746	22094	835110918	818381150	16305	835116476	818383392	22499	835111414	818379769	16734	835113995	818382264	19408	1493	8446	1534	8446	8581	12.901 m²	AL 4	
P3S01P021	835116575	818383121	22582	835111511	818379492	16822	835117059	818381769	23013	835111987	818378111	17278	835114263	818380623	19924	1493	8446	1534	8446	8581	12.901 m²	AL 4	
P3S01P022	835117059	818381769	23013	835111987	818378111	17278	835117528	818380417	23465	835112447	818376730	17757	835114755	818379257	20378	1493	8446	1534	8446	8581	12.901 m²	AL 4	
P3S01P023	835117528	818380417	23465	835112447	818376730	17757	835117980	818379068	23938	835112890	818375351	18258	835115211	818377891	20855	1493	8446	1534	8446	8581	12.901 m²	AL 4	
P3S01P024	835117980	818379068	23938	835112890	818375351	18258	835118417	818377721	24432	835113315	818373975	18781	835115908	818375712	21659	1493	8446	1534	8446	8581	12.901 m²	AL 4	
P3S01P026	835118503	818377451	24534	835113398	818373701	18888	835118921	818376108	25052	835113802	818372332	19436	835116158	818374898	21978	1493	8446	1534	8446	8581	12.901 m²	AL 4	
AL 4: 8																						103.208 m²	
P3S01P007	835109822	818398714	18942	835104883	818395227	13005	835110485	818397388	19170	835105522	818393885	13245	835107673	818396303	16090	1493	8445	1507	8445	8578	12.786 m²	AL 5	
P3S01P008	835110485	818397388	19170	835105522	818393885	13245	835111132	818396057	19414	835106161	818392551	13500	835108325	818394970	16332	1493	8445	1507	8445	8578	12.786 m²	AL 5	
P3S01P009	835111132	818396057	19414	835106161	818392551	13500	835111765	818394722	19674	835106783	818391211	13770	835108960	818393635	16590	1493	8445	1507	8445	8578	12.786 m²	AL 5	
P3S01P011	835111890	818394454	19728	835106906	818390943	13826	835112504	818393115	20006	835107510	818389599	14116	835109702	818392028	16919	1493	8445	1507	8445	8578	12.786 m²	AL 5	
P3S01P012	835112504	818393115	20006	835107510	818389599	14116	835113103	818391771	20300	835108097	818388252	14422	835110304	818390684	17211	1493	8445	1507	8445	8578	12.786 m²	AL 5	
P3S01P013	835113103	818391771	20300	835108097	818388252	14422	835113688	818390425	20609	835108670	818386900	14745	835110890	818389337	17519	1493	8445	1507	8445	8578	12.786 m²	AL 5	
P3S01P014	835113688	818390425	20609	835108670	818386900	14745	835114256	818389075	20934	835109228	818385543	15084	835111460	818387986	17843	1493	8445	1507	8445	8578	12.786 m²	AL 5	
P3S01P016	835114368	818388805	21001	835109337	818385271	15154	835114919	818387453	21346	835109878	818383906	15516	835112126	818386359	18254	1493	8445	1507	8445	8578	12.786 m²	AL 5	
P3S01P017	835114919	818387453	21346	835109878	818383906	15516	835115454	818386100	21710	835110405	818382531	15899	835112664	818384998	18618	1493	8445	1507	8445	8578	12.786 m²	AL 5	
P3S01P027	835118921	818376108	25052	835113802	818372332	19436	835119324	818374766	25590	835114189	818370971	20002	835116559	818373544	22520	1493	8445	1507	8445	8578	12.786 m²	AL 5	
P3S01P028	835119324	818374766	25590	835114189	818370971	20002	835119711	818373428	26145	835114559	818369618	20585	835116948	818372196	23081	1493	8445	1507	8445	8578	12.786 m²	AL 5	
P3S01P029	835119711	818373428	26145	835114559	818369618	20585	835120084	818372092	26716	835114909	818368280	21178	835117316	818370855	23656	1493	8445	1507	8445	8578	12.786 m²	AL 5	
AL 5: 12																						153.433 m²	
P3S01P031	835120157	818371825	26832	835114977	818368015	21297	835120513	818370490	27416	835115304	818366697	21896	835117738	818369257	24360	1493	8445	1477	8445	8574	12.661 m²	AL 6	
AL 6: 1																						12.661 m²	

Remark: An above table is a portion extracted for presentation purpose from the full schedule of panels included in the BIM model.

Panel P3S02P002

Group AL 14
Edge 1 1583 mm
Edge 2 8445 mm
Edge 3 1367 mm
Edge 4 8445 mm
Diagonal 8568 mm
Area 12.573 m²

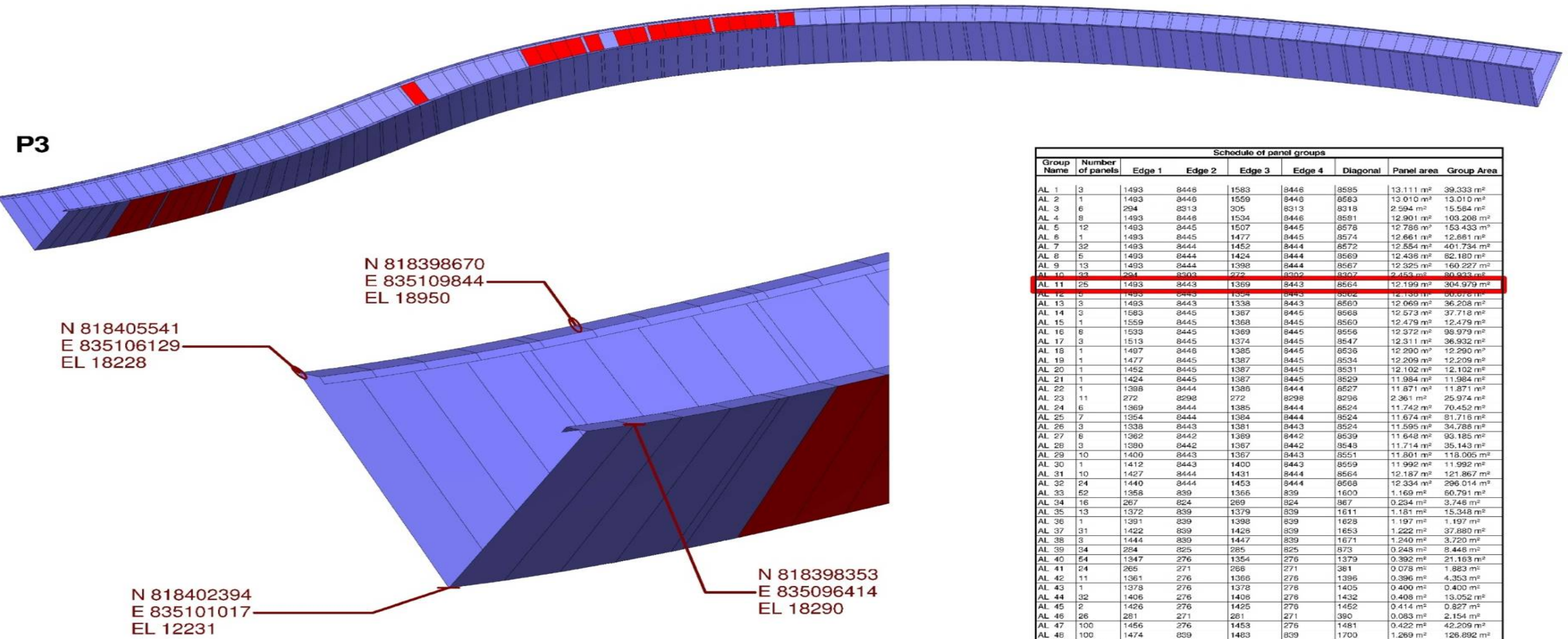
N 818401012
E 835101802
EL 12299

N 818404239
E 835106871
EL 18290

Panel P3S01P002
Group AL 1
Edge 1 1493 mm
Edge 2 8446 mm
Edge 3 1583 mm
Edge 4 8446 mm
Diagonal 8585 mm
Area 13.111 m²

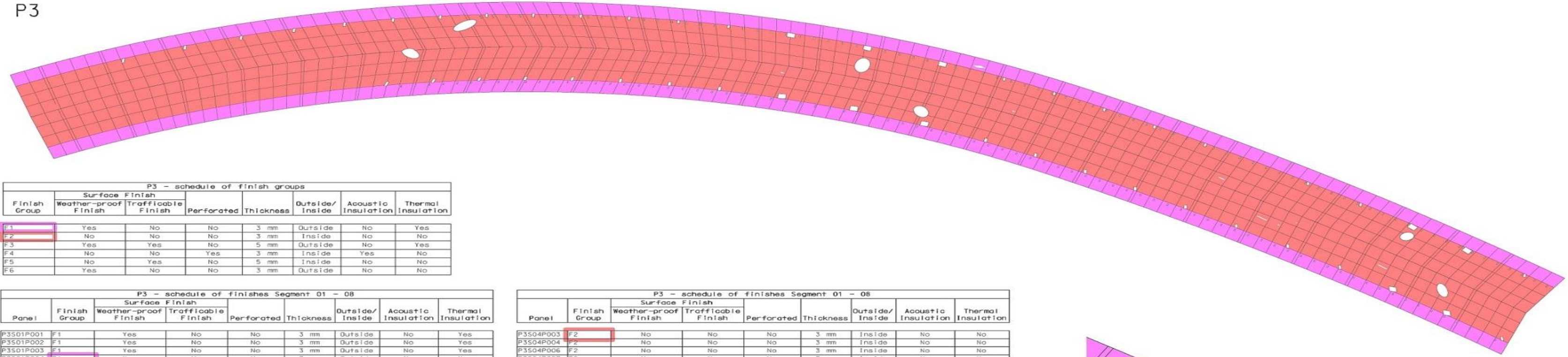
Panel P3S01P009
Group AL 5
Edge 1 1493 mm
Edge 2 8445 mm
Edge 3 1507 mm
Edge 4 8445 mm
Diagonal 8578 mm
Area 12.786 m²





Schedule of panel groups							
Group Name	Number of panels	Edge 1	Edge 2	Edge 3	Edge 4	Diagonal	Panel area Group Area
AL 1	3	1493	8446	1583	8446	8585	13.111 m ² 39.333 m ²
AL 2	1	1493	8446	1559	8446	8583	13.010 m ² 13.010 m ²
AL 3	6	294	8313	305	8313	8318	2.594 m ² 15.564 m ²
AL 4	8	1493	8446	1534	8446	8581	12.901 m ² 103.208 m ²
AL 5	12	1493	8445	1507	8445	8578	12.786 m ² 153.433 m ²
AL 6	1	1493	8445	1477	8445	8574	12.661 m ² 12.661 m ²
AL 7	32	1493	8444	1452	8444	8572	12.554 m ² 401.734 m ²
AL 8	5	1493	8444	1424	8444	8569	12.436 m ² 62.180 m ²
AL 9	13	1493	8444	1398	8444	8567	12.325 m ² 160.227 m ²
AL 10	23	294	8303	272	8303	8307	2.453 m ² 80.833 m ²
AL 11	25	1493	8443	1369	8443	8564	12.199 m ² 304.979 m ²
AL 12	5	1493	8443	1354	8443	8562	12.135 m ² 60.678 m ²
AL 13	3	1493	8443	1338	8443	8560	12.069 m ² 36.208 m ²
AL 14	3	1583	8445	1387	8445	8568	12.573 m ² 37.718 m ²
AL 15	1	1559	8445	1368	8445	8560	12.479 m ² 12.479 m ²
AL 16	8	1533	8445	1369	8445	8556	12.372 m ² 98.979 m ²
AL 17	3	1513	8445	1374	8445	8547	12.311 m ² 36.932 m ²
AL 18	1	1497	8446	1385	8445	8536	12.290 m ² 12.290 m ²
AL 19	1	1477	8445	1387	8445	8534	12.209 m ² 12.209 m ²
AL 20	1	1452	8445	1387	8445	8531	12.102 m ² 12.102 m ²
AL 21	1	1424	8445	1387	8445	8529	11.984 m ² 11.984 m ²
AL 22	1	1388	8444	1386	8444	8527	11.871 m ² 11.871 m ²
AL 23	11	272	8298	272	8298	8296	2.361 m ² 25.974 m ²
AL 24	6	1369	8444	1385	8444	8524	11.742 m ² 70.452 m ²
AL 25	7	1354	8444	1384	8444	8524	11.674 m ² 81.716 m ²
AL 26	3	1338	8443	1381	8443	8524	11.595 m ² 34.786 m ²
AL 27	8	1362	8442	1389	8442	8539	11.648 m ² 93.185 m ²
AL 28	3	1380	8442	1367	8442	8548	11.714 m ² 35.143 m ²
AL 29	10	1400	8443	1367	8443	8551	11.801 m ² 118.005 m ²
AL 30	1	1412	8443	1400	8443	8559	11.992 m ² 11.992 m ²
AL 31	10	1427	8444	1431	8444	8564	12.187 m ² 121.867 m ²
AL 32	24	1440	8444	1453	8444	8568	12.334 m ² 296.014 m ²
AL 33	52	1358	839	1366	839	1600	1.169 m ² 60.791 m ²
AL 34	16	267	824	269	824	867	0.234 m ² 3.746 m ²
AL 35	13	1372	839	1379	839	1611	1.181 m ² 15.348 m ²
AL 36	1	1391	839	1398	839	1628	1.197 m ² 1.197 m ²
AL 37	31	1422	839	1426	839	1653	1.222 m ² 37.880 m ²
AL 38	3	1444	839	1447	839	1671	1.240 m ² 3.720 m ²
AL 39	34	284	825	285	825	873	0.248 m ² 8.446 m ²
AL 40	54	1347	276	1354	276	1379	0.392 m ² 21.163 m ²
AL 41	24	265	271	266	271	381	0.078 m ² 1.883 m ²
AL 42	11	1361	276	1366	276	1396	0.396 m ² 4.353 m ²
AL 43	1	1378	276	1378	276	1405	0.400 m ² 0.400 m ²
AL 44	32	1406	276	1406	276	1432	0.408 m ² 13.052 m ²
AL 45	2	1426	276	1425	276	1452	0.414 m ² 0.827 m ²
AL 46	26	281	271	281	271	390	0.083 m ² 2.154 m ²
AL 47	100	1456	276	1453	276	1481	0.422 m ² 42.209 m ²
AL 48	100	1474	839	1483	839	1700	1.269 m ² 126.892 m ²
Grand total: 750							2923.906 m ²

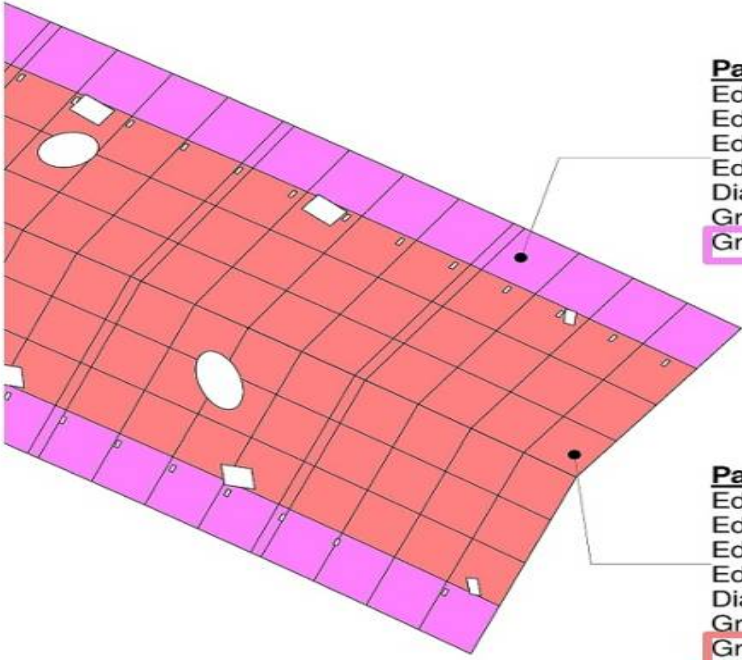
P3



P3 - schedule of finish groups							
Finish Group	Surface Finish		Perforated	Thickness	Outside/ Inside	Acoustic Insulation	Thermal Insulation
	Weather-proof Finish	Trafficable Finish					
F1	Yes	No	No	3 mm	Outside	No	Yes
F2	No	No	No	3 mm	Inside	No	No
F3	Yes	Yes	No	5 mm	Outside	No	Yes
F4	No	No	Yes	3 mm	Inside	Yes	No
F5	No	Yes	No	5 mm	Inside	No	No
F6	Yes	No	No	3 mm	Outside	No	No

P3 - schedule of finishes Segment 01 - 08								
Panel	Finish Group	Surface Finish		Perforated	Thickness	Outside/ Inside	Acoustic Insulation	Thermal Insulation
		Weather-proof Finish	Trafficable Finish					
P3S01P001	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S01P002	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S01P003	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S01P004	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S01P005	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S01P006	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S01P007	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S01P008	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S01P009	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S08P001	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S08P002	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S08P003	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S08P004	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S08P005	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S08P006	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S08P007	F1	Yes	No	No	3 mm	Outside	No	Yes
P3S08P008	F1	Yes	No	No	3 mm	Outside	No	Yes
F 1: 17								
P3S02P001	F2	No	No	No	3 mm	Inside	No	No
P3S02P002	F2	No	No	No	3 mm	Inside	No	No
P3S02P003	F2	No	No	No	3 mm	Inside	No	No
P3S02P004	F2	No	No	No	3 mm	Inside	No	No
P3S02P005	F2	No	No	No	3 mm	Inside	No	No
P3S02P006	F2	No	No	No	3 mm	Inside	No	No
P3S02P007	F2	No	No	No	3 mm	Inside	No	No
P3S02P008	F2	No	No	No	3 mm	Inside	No	No
P3S02P009	F2	No	No	No	3 mm	Inside	No	No
P3S03P001	F2	No	No	No	3 mm	Inside	No	No
P3S03P002	F2	No	No	No	3 mm	Inside	No	No
P3S03P003	F2	No	No	No	3 mm	Inside	No	No
P3S03P004	F2	No	No	No	3 mm	Inside	No	No
P3S03P005	F2	No	No	No	3 mm	Inside	No	No
P3S03P006	F2	No	No	No	3 mm	Inside	No	No
P3S03P007	F2	No	No	No	3 mm	Inside	No	No
P3S03P008	F2	No	No	No	3 mm	Inside	No	No
P3S03P009	F2	No	No	No	3 mm	Inside	No	No
P3S04P001	F2	No	No	No	3 mm	Inside	No	No
P3S04P002	F2	No	No	No	3 mm	Inside	No	No

P3 - schedule of finishes Segment 01 - 08								
Panel	Finish Group	Surface Finish		Perforated	Thickness	Outside/ Inside	Acoustic Insulation	Thermal Insulation
		Weather-proof Finish	Trafficable Finish					
P3S04P003	F2	No	No	No	3 mm	Inside	No	No
P3S04P004	F2	No	No	No	3 mm	Inside	No	No
P3S04P006	F2	No	No	No	3 mm	Inside	No	No
P3S04P007	F2	No	No	No	3 mm	Inside	No	No
P3S04P008	F2	No	No	No	3 mm	Inside	No	No
P3S04P009	F2	No	No	No	3 mm	Inside	No	No
F 2: 25								
P3S03P005	F2	No	No	No	3 mm	Inside	No	No
P3S04P005	F2	No	No	No	3 mm	Inside	No	No
P3S05P001	F2	No	No	No	3 mm	Inside	No	No
P3S05P002	F2	No	No	No	3 mm	Inside	No	No
P3S05P003	F2	No	No	No	3 mm	Inside	No	No
P3S05P004	F2	No	No	No	3 mm	Inside	No	No
P3S05P005	F2	No	No	No	3 mm	Inside	No	No
P3S05P006	F2	No	No	No	3 mm	Inside	No	No
P3S05P007	F2	No	No	No	3 mm	Inside	No	No
P3S05P008	F2	No	No	No	3 mm	Inside	No	No
P3S05P009	F2	No	No	No	3 mm	Inside	No	No
P3S06P001	F2	No	No	No	3 mm	Inside	No	No
P3S06P002	F2	No	No	No	3 mm	Inside	No	No
P3S06P003	F2	No	No	No	3 mm	Inside	No	No
P3S06P004	F2	No	No	No	3 mm	Inside	No	No
P3S06P005	F2	No	No	No	3 mm	Inside	No	No
P3S06P006	F2	No	No	No	3 mm	Inside	No	No
P3S06P007	F2	No	No	No	3 mm	Inside	No	No
P3S06P008	F2	No	No	No	3 mm	Inside	No	No
P3S06P009	F2	No	No	No	3 mm	Inside	No	No
P3S07P001	F2	No	No	No	3 mm	Inside	No	No
P3S07P002	F2	No	No	No	3 mm	Inside	No	No
P3S07P003	F2	No	No	No	3 mm	Inside	No	No
P3S07P004	F2	No	No	No	3 mm	Inside	No	No
P3S07P005	F2	No	No	No	3 mm	Inside	No	No
P3S07P006	F2	No	No	No	3 mm	Inside	No	No
P3S07P007	F2	No	No	No	3 mm	Inside	No	No
P3S07P008	F2	No	No	No	3 mm	Inside	No	No
P3S07P009	F2	No	No	No	3 mm	Inside	No	No
F 6: 29								

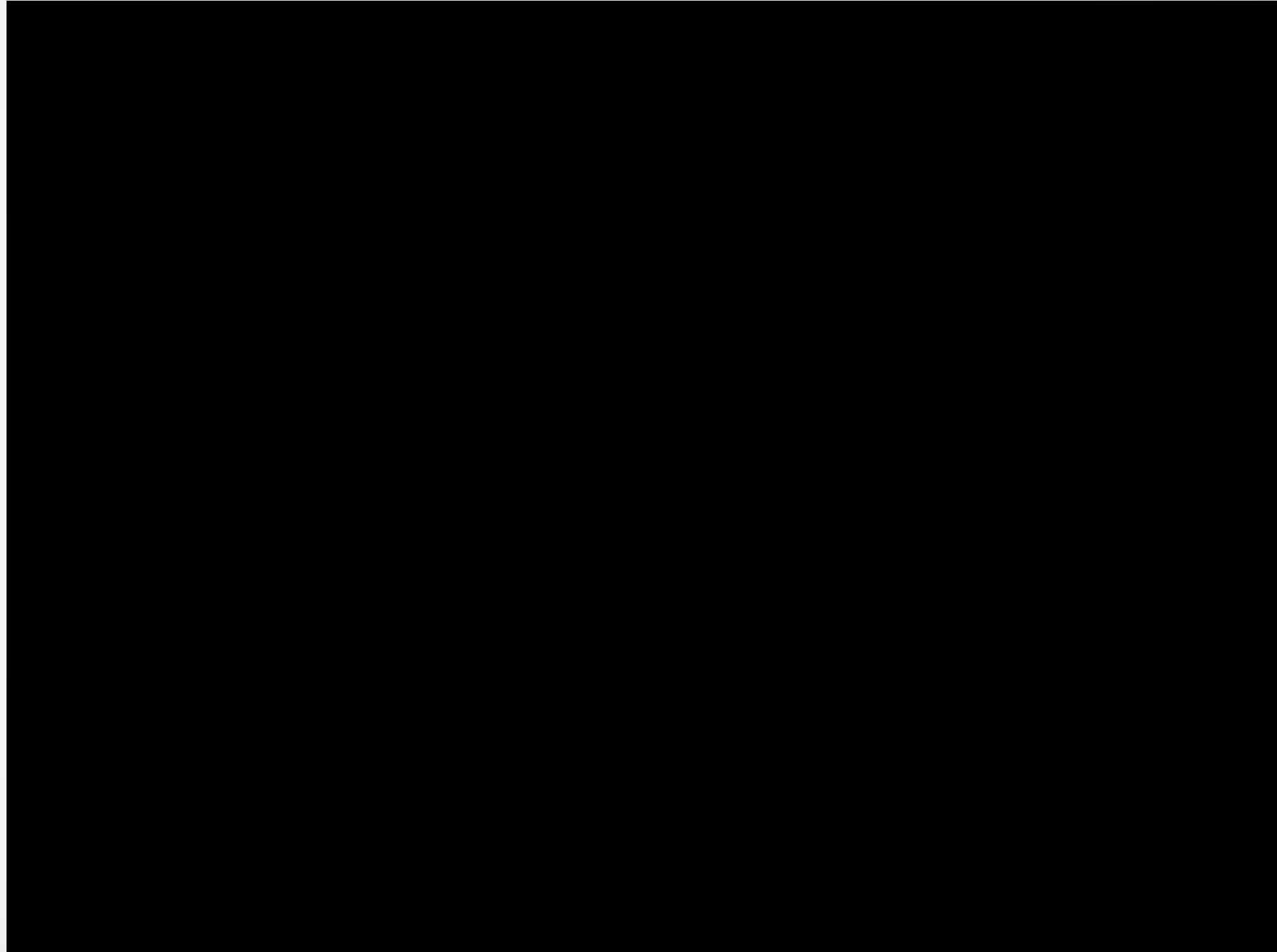


Panel P3S01P004
Edge 1 1488 mm
Edge 2 2279 mm
Edge 3 1476 mm
Edge 4 2279 mm
Diagonal 2720 mm
Group(Size) A 1
Group(Finish)... F 1

Panel P3S04P001
Edge 1 1460 mm
Edge 2 2042 mm
Edge 3 1445 mm
Edge 4 2042 mm
Diagonal 2508 mm
Group(Size) A 13
Group(Finish)... F 2

Remark: An above is a portion extracted for presentation purpose the full schedule of panels included in the BIM model.

从建造到制造



<http://adapa.dk/>



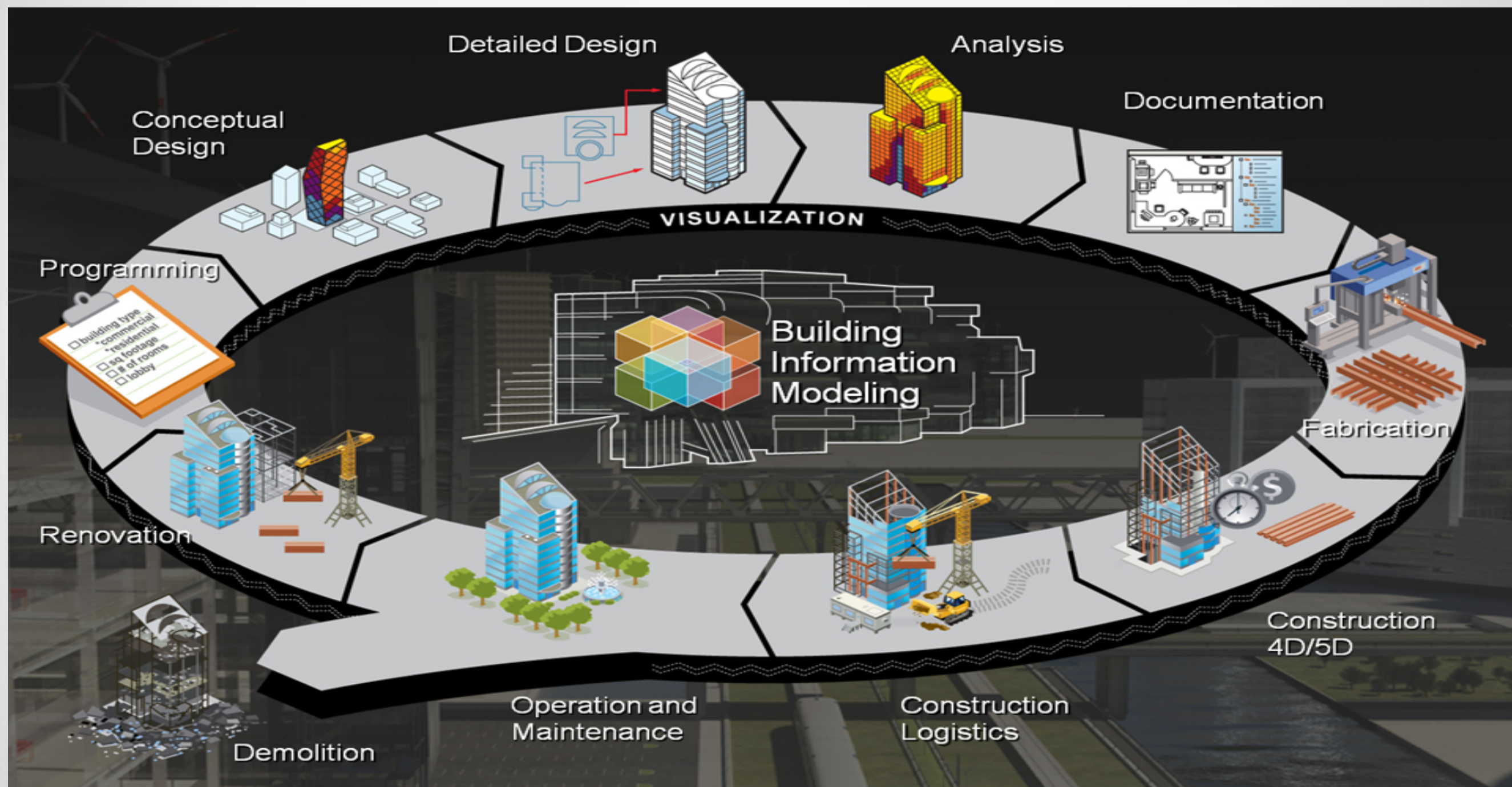
案例三



真BIM (营运阶段)

$$M + I = B \text{ (安全)}$$

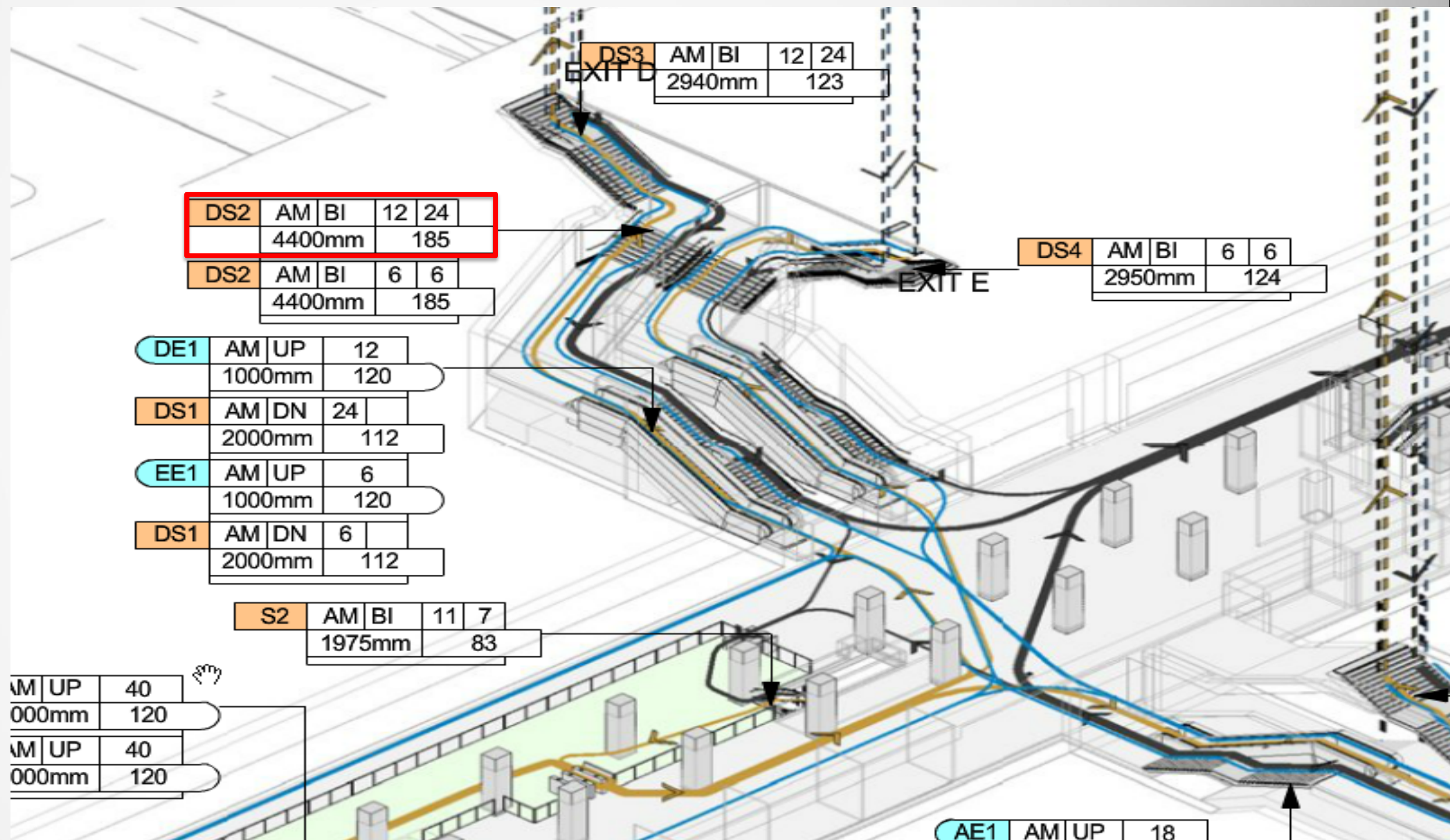




真BIM

STAIR SCHEDULE

NAME	STAIR WIDTH (mm)	NORMAL AM PEAK					TOTAL CAPACITY
		DIR. (UP/DN/BI)	CAL.CAP.				
			UP	DN	BI		
AS1	2050	DN	103	115	86	115	
AS2	4400	BI	220	246	185	185	
AS2E	4400	UP	220	246	185	220	
BS1	2000	UP	100	112	84	100	
BS2	2000	UP	100	112	84	100	
BS3	4450	BI	223	249	187	187	
BS4	4370	BI	219	245	184	184	
BS4E	2630	UP	132	147	110	219	
BS5	4370	BI	219	245	184	184	
BS5E	4370	DN	219	245	184	245	
CS1	4400	BI	220	246	185	185	
CS2	2010	DN	101	113	84	113	
CS3	2370	BI	119	133	100	100	
CS3E	2370	UP	119	133	100	119	
CS4	2370	BI	119	133	100	100	
CS4E	2370	UP	119	133	100	119	
DS1	2000	DN	100	112	84	112	
DS1	2000	DN	100	112	84	112	
DS2	4400	BI	220	246	185	185	
DS2	4400	BI	220	246	185	185	
DS3	2940	BI	147	165	123	123	



真BIM

Edit Label

Select parameters to add to the label. Parameters will be combined into a single label.
Enter sample values to represent this label in the family environment.

☐ Wrap between parameters only

Category Parameters

Select available fields from:

Stairs

- Actual Number of Risers
- Actual Riser Height
- Actual Tread Depth
- Assembly Code
- Assembly Description
- Assembly Name
- Calculated Capacity_AM
- Calculated Capacity_Evacuation**
- Comments
- Cost
- Description
- Dir_AM (UP/DN/BI)
- Dir_EVA (UP/DN)
- Dir_PM (UP/DN/BI)

Label Parameters

	Parameter Name	Spaces	Prefix	Sample Value	Suffix	Break
1	Calculated Capacity_Evacua	1		EVA		☐

人流计算

OK Cancel Apply

参数定义



真BIM

A	B	C	D	E	F
Esc. No	Stair Name	Type Mark	Width	Actual Number of	Actual Riser
E7		ESC	1000	23	246
E8		ESC	1000	23	246
E9		ESC	1000	23	246
E10		ESC	1000		
E23		ESC	1000		
E11		ESC	1000		
E12		ESC	1000		
E13		ESC	1000		
E26		ESC	1000		
E25		ESC	1000		
E17		ESC	1000		
E18		ESC	1000		
E19		ESC	1000		
E15		ESC	1000		
E16		ESC	1000		
E14		ESC	1000		
E24		ESC	1000		
E1		ESC	1000		
E2		ESC	1000		
E3		ESC	1000		
E4		ESC	1000		
E6		ESC	1000		
E5		ESC	1000		
E20		ESC	1000		
E21		ESC	1000		
E22		ESC	1000		
BE1	BE1	ESC	1000		
BE2	BE2	ESC	1000		
BE3	BE3	ESC	1000		
BE4	BE4	ESC	1000	22	227
BE5	BE5	ESC	1000	22	227
BE6	BE6	ESC	1000	22	227
	ES2	FINISH	1850	17	147
	ES2		1900	17	147
	ES3	FINISH	1850	19	134
	ES3		1900	19	132
	ES5	FINISH	1850	9	173

Schedule Properties

Fields
Filter
Sorting/Grouping

Available fields:
Actual Capacity
Calculated Capacity
Direction

Edit...
Delete

Select available fields from:
Stairs

☒ Include elements in linked f

J	K	L
Assembly Name	Base Level	Calculated
	BASEMENT (E)	120
	BASEMENT (E)	120
	BASEMENT (E)	120
	BASEMENT (E)	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	UPPER PLATFORM	120
	UPPER PLATFORM	120
	UPPER PLATFORM	120
	UPPER PLATFORM	120
	UPPER PLATFORM	120
	UPPER PLATFORM	120
	UPPER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	LOWER PLATFORM	120
	CONCOURSE (E)	120
	CONCOURSE (E)	120
	CONCOURSE (E)	120
	CONCOURSE (E)	120
	CONCOURSE (E)	120
	CONCOURSE (E)	120
	CONCOURSE (E)	120
	BASEMENT (E)	93
	CONCOURSE LEV	
	BASEMENT (E)	93
	CONCOURSE LEV	
	CONCOURSE (E)	93

Modify Schedule/Quantities

Properties Schedule Properties

Fields Filter Sorting/Grouping Formatting Appearance

Available fields:

- Actual Number of Risers
- Actual Riser Height
- Actual Tread Depth
- Assembly Code
- Assembly Description
- Assembly Name
- Base Level
- Calculated Capacity_AM
- Calculated Capacity_Evacuation
- Comments
- Cost
- Count
- Critical
- Description
- Dir_AM (UP/DN/BI)
- Dir_EVA (UP/DN)
- Esc. No
- Escalator
- Escalator/Passenger Conveyor
- Family
- Family and Type
- Function
- Keynote
- Landing Type
- Left Support Type
- Machine/Controller Location (MIT/MOT/ MIT/CO)
- Manufacturer
- Mark
- mark test
- Maximum Riser Height

Edit... Delete

Select available fields from:

Stairs

☒ Include elements in linked files

Calculated Value

Name: Capacity Up

☒ Formula ☐ Percentage

Discipline: Common

Type: Integer

Formula: $\text{Width} / 1000 \text{ mm} * 50$

OK Cancel Help

Scheduled fields (in order):

- Type Mark
- Dir_PM (UP/DN/BI)
- Width
- Capacity Up
- Capacity Down
- Capacity - Bi Direction
- Calculated Capacity_PM
- Stair Name

Add --> <-- Remove

Add Parameter... Calculated Value...

Edit... Delete

Move Up Move Down

确定 取消 帮助

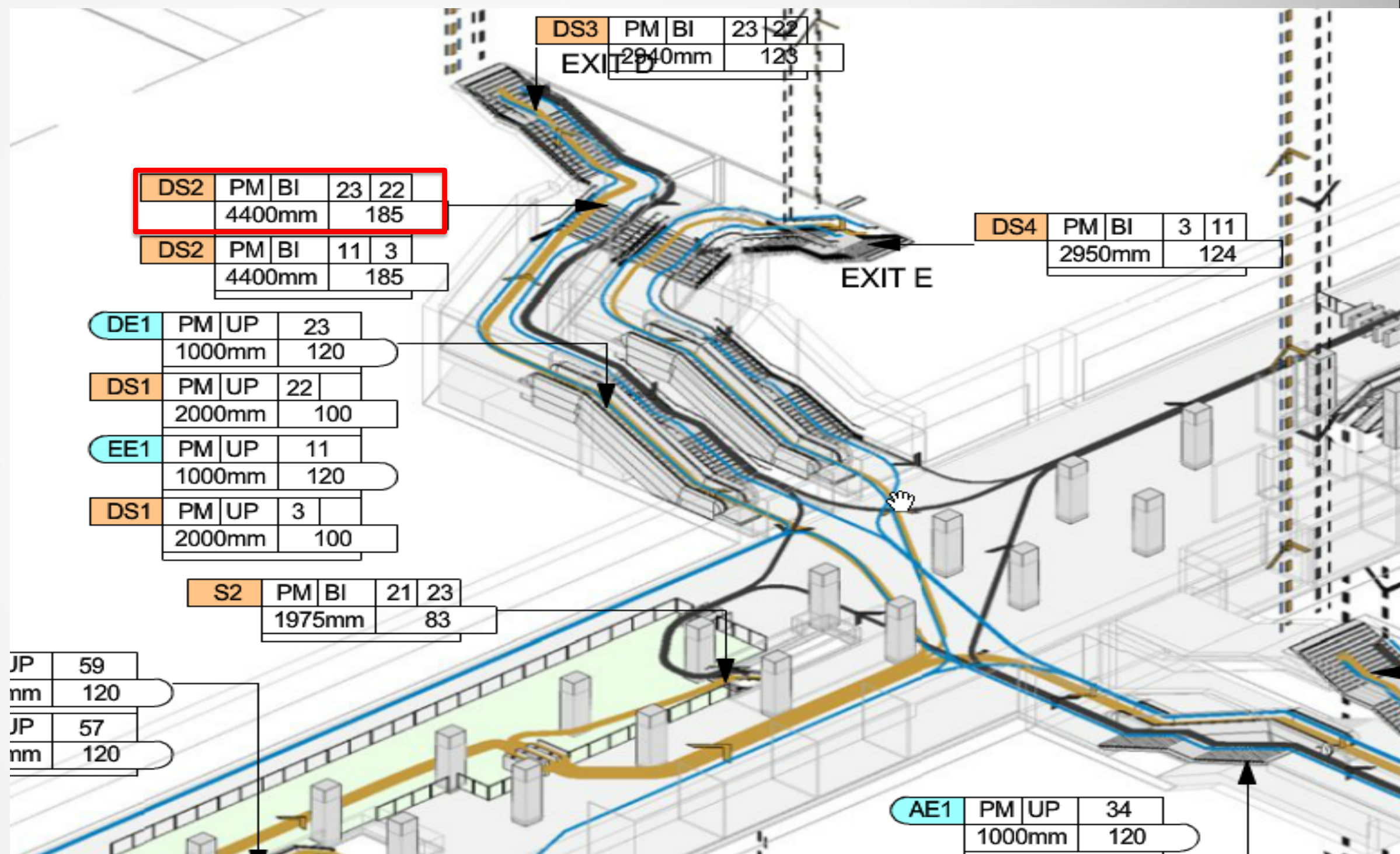
运算定义

BI	99	111	83	83
DN	99	111	83	111
BI	99	111	83	83

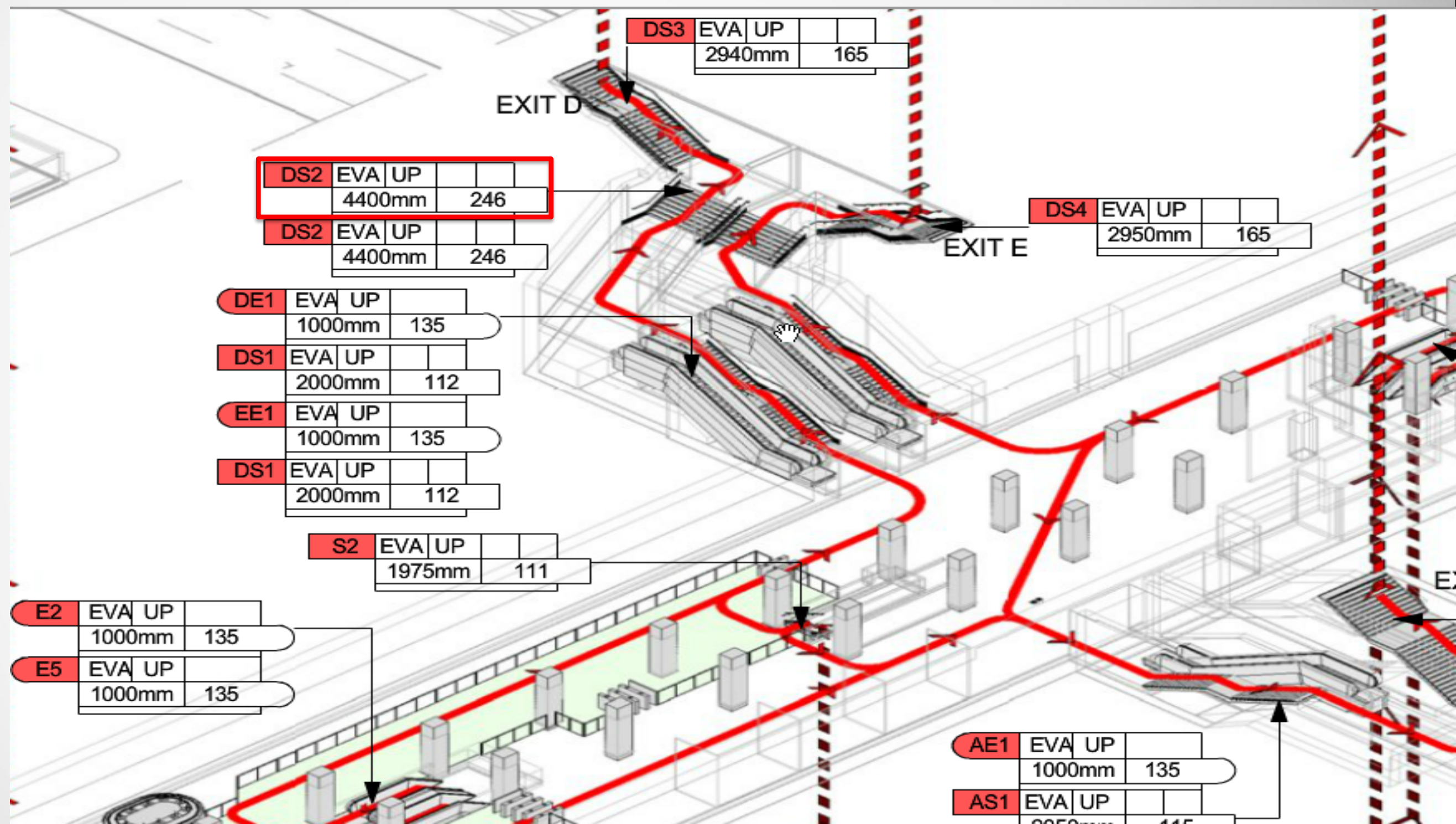
真BIM

$$(23 + 22) / 185$$
$$= 24.3\%$$
$$= \text{安全}$$

(安全指標超過80%可能會有危機)



真BIM



案例四

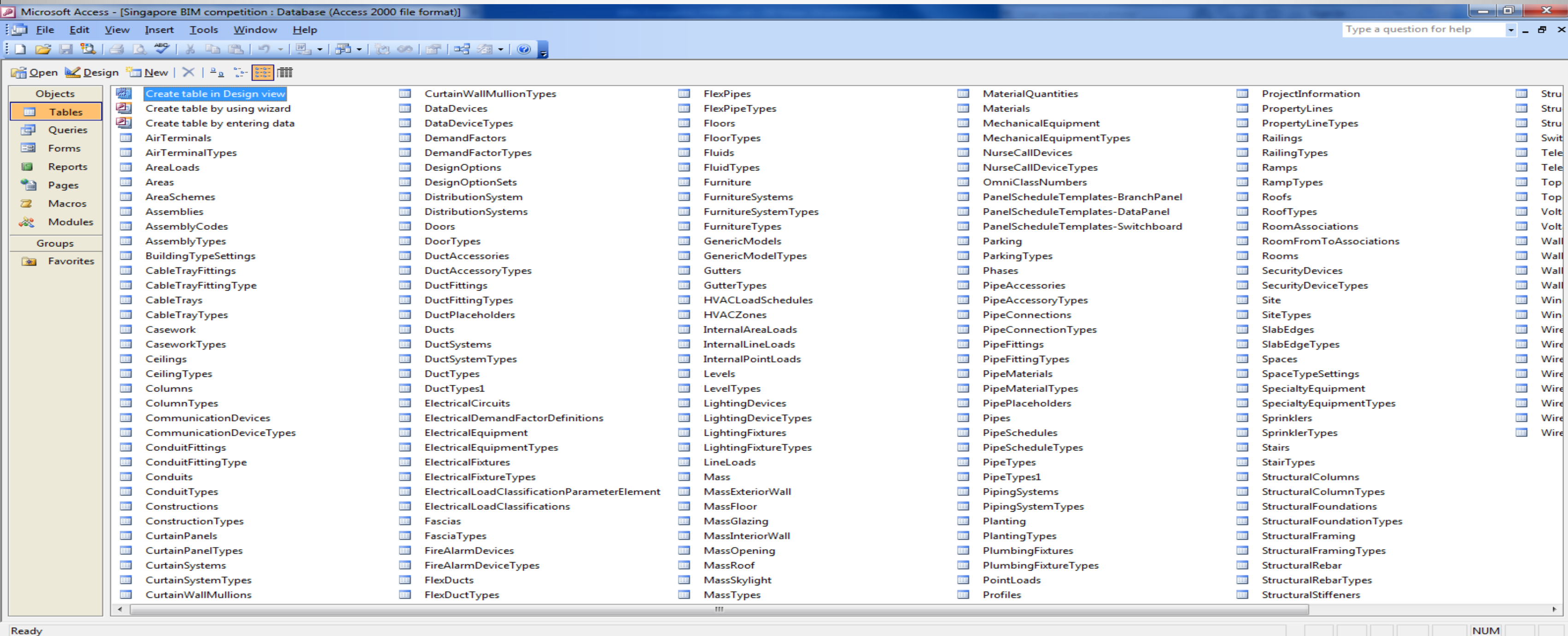


真BIM (营运阶段)

M + I = B (维修保养)



物业管理 - 维修保养



物業管理

Properties

Sheet: LEGEND, ABBREVI...
Graphics
Visibility/Graphi...
Scale
Text
C&R No.
Figure No. Prefix
Sheet Name 2nd...
Identity Data
Properties help
Apply

Z_LRL_PUT_ARC.rvt - Project Browser

Views (all)
Floor Plans
(CONTRACT)_Z_PLATFORM LE
(CONTRACT)_Z_RAIL LEVEL_S
(CONTRACT)_Z_S1000_Site PI
(CONTRACT)_Z_TRACK LEVEL_
(CONTRACT)_Z_TRACK_S100_
3D Views
(CONTRACT)_Z_ISO
(CONTRACT)_Z_PER01
(CONTRACT)_Z_PER02
SOLAR DECEMBER 22 0900
SOLAR DECEMBER 22 1200
SOLAR DECEMBER 22 1500
SOLAR JUNE 22 0900
SOLAR JUNE 22 1200
SOLAR JUNE 22 1500
SOLAR MARCH 21 0900
SOLAR MARCH 21 1200
SOLAR MARCH 21 1500
SOLAR SEPTEMBER 21 0900
SOLAR SEPTEMBER 21 1200
SOLAR SEPTEMBER 21 1500
{3D}
Elevations (Building Elevation)
(CONTRACT)_Z_S100 EAST EL
(CONTRACT)_Z_S100 NORTH
(CONTRACT)_Z_S100 SOUTH
(CONTRACT)_Z_S100 WEST EL
Sections (Building Section)
01
02
PLATFORM 1
PLATFORM 2
Legends
Schedules/Quantities
DRAWING LIST
Tiling Schedule
VOICE PCP (All types)
Sheets (all)
A01/010 - LEGEND, ABBREVIAT
A01/100 - SITE PLAN
A01/101 - PLATFORM PLAN SHE

DRAWING LIST

DRAWING	DRAWING TITLE	REVISION	SHEET ISSUE DATE
A01/010	LEGEND, ABBREVIATION, DRAWING LIST		07/23/10
A01/100	SITE PLAN		07/22/10
A01/101	PLATFORM PLAN SHEET 1 OF 2		07/22/10
A01/102	PLATFORM PLAN SHEET 2 OF 2		07/30/10
A01/103	EAST ELEVATION		08/26/10
A01/104	WEST ELEVATION		07/22/10
A01/105	SOUTH ELEVATION		07/23/10
A01/106	NORTH ELEVATIONS		07/22/10
A01/107	SECTION 01		07/23/10
A01/108	SECTION 02		07/30/10
A01/110	ISOMETRIC & PERSPECTIVES		07/23/10
A01/120	SOLAR STUY MARCH		07/23/10
A01/121	SOLAR STUY MARCH		07/23/10
A01/122	SOLAR STUY MARCH		08/26/10
A01/123	SOLAR STUY JUNE		08/26/10
A01/124	SOLAR STUY JUNE		08/26/10
A01/125	SOLAR STUY JUNE		08/26/10
A01/126	SOLAR STUY SEPT		08/26/10
A01/127	SOLAR STUY SPET		08/26/10
A01/128	SOLAR STUY SPET		08/26/10
A01/129	SOLAR STUY DEC		08/26/10
A01/130	SOLAR STUY DEC		08/26/10
A01/131	SOLAR STUY DEC		08/26/10
A01/132	SECTIONS		10/20/10

Tiling Schedule

Family	Level	Type	Type Mark	Keynote	Count
GEM_MTR_Floor Care Mark Based_DimGray	PLATFORM	GEM_MTR_Floor Care Mark Based_DimGray			12
GEM_MTR_Floor Security Line Based_Yellow	PLATFORM				2
TLG-DRN-MTR-Type_A	PLATFORM	Brick Frame Colour Khaki	A		36
TLG-DRN-MTR-Type_B		Brick Frame Colour Khaki	B		194
TLG-DRN-MTR-Type_C	PLATFORM		C		240

VOICE PCP (All types)

Family	Mark	Type Mark
ELF-ARC-MTR-PCP	xxxx	E
ELF-ARC-MTR-PCP	xxxx	E
ELF-ARC-MTR-PCP	xxxx	E
ELF-ARC-MTR-PCP-Exit_Voice	xxxx	E
ELF-ARC-MTR-PCP-Exit_Voice	xxxx	E
ELF-ARC-MTR-PCP	xxxx	X
ELF-ARC-MTR-PCP	xxxx	X
ELF-ARC-MTR-PCP	xxxx	X
ELF-ARC-MTR-PCP	xxxx	X
ELF-ARC-MTR-PCP	xxxx	X
ELF-ARC-MTR-PCP-Exit_Voice	xxxx	X
ELF-ARC-MTR-PCP-Exit_Voice	xxxx	X
ELF-ARC-MTR-PCP-Exit_Voice	xxxx	X
ELF-ARC-MTR-PCP-Exit_Voice	xxxx	X
ELF-ARC-MTR-PCP-Exit_Voice	xxxx	X
Grand total: 15		

A14

1530141

	A	J	K	L	C
1	Id	FamilyName	TypeName	TypeMark	C
2	7848	Model Text	600mm Arial		
3	1148899	Model Text	200mm - wood		
4	1148901	Model Text	300mm - black		
5	1148904	Model Text	50mm - steel		
6	1193027	GEM_MTR_Floor Care Mark Based_DimGray	GEM_MTR_Floor Care Mark Based_DimGray		
7	1194842	GEM_MTR_Floor Security Line Based_Yellow	Security Line_MTR_Floor Based_Yellow		
8	1206709	GEM_MTR_Floor Security Line Based_Yellow	Security Line_MTR_Floor Based_Yellow W39600mm		
9	1282975	GEM_MTR_Floor Security Line Based_Yellow	Security Line_MTR_Floor Based_Yellow W39500mm		
10	1528388	TLG-DRN-MTR-Type_A	Brick Frame Colour Khaki	A	
11	1528390	TLG-DRN-MTR-Type_A	Brick Frame Colour DimGray		
12	1529333	TLG-DRN-MTR-Type_B	Brick Frame Colour Khaki	B	
13	1529335	TLG-DRN-MTR-Type_B	Brick Frame Colour DimGray		
14	1530141	TLG-DRN-MTR-Type_C	Brick Frame Colour Khaki	C	
15	1530143	TLG-DRN-MTR-Type_C	Brick Frame Colour DimGray		
16	1532279	TLG-DRN-MTR-Type_C	Brick Frame Colour Khaki W200mm	C	
17	1606926	TRN-TRN-MTR-LRL-Headstock	TRN-TRN-MTR-LRL-Headstock		
18	1618524	TRN-TRN-MTR-LRL-Coach	TRN-TRN-MTR-LRL-Coach		
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物业管理 - 维修保养

Microsoft Access

File Edit View Insert Tools Window Help

Type a question for help

Singapore BIM competition : Database (Access 2000 file format)

Open Design New

Objects

- Tables
- Queries
- Forms
- Reports
- Pages
- Macros
- Modules

Groups

- Favorites

Create query in Design view

Create query by using wizard

Query1 : Select Query

Mass

- * Id
- TypeId
- PhaseCreated
- PhaseDemolished
- DesignOption
- GrossVolume
- GrossSurfaceArea
- GrossFloorArea
- Comments
- BaseLevel
- Mark

MassTypes

- * Id
- Keynote
- Model
- Manufacturer
- TypeComments
- URL
- Description
- OmniClassNumber
- AssemblyCode
- FamilyName
- TypeName
- TypeMark
- Cost

Field: FamilyName TypeName TypeMark

Table: MassTypes MassTypes MassTypes

Sort:

Show: ☒ ☒ ☒ ☐ ☒ ☐ ☐

Criteria:

or:

204944 189968 86961 0.0988485594523319 10.0633833270263

Ready

NUM



物业管理 - 维修保养

Query1 : Select Query		
	FamilyName	TypeName
▶	SAT Tower Mullion	SAT Tower Mullion
	SAT Tower Surface Ref	SAT Tower Surface Ref
	Tower Panel	S01-P001
	Tower Panel	S01-P002
	Tower Panel	S01-P003
	Tower Panel	S01-P004
	Tower Panel	S01-P005
	Tower Panel	S01-P006
	Tower Panel	S01-P007
	Tower Panel	S01-P008
	Tower Panel	S01-P009
	Tower Panel	S01-P010
	Tower Panel	S01-P011
	Tower Panel	S01-P012
	Tower Panel	S01-P013
	Tower Panel	S01-P014
	Tower Panel	S01-P015
	Tower Panel	S01-P016
	Tower Panel	S01-P017
	Tower Panel	S01-P018
	Tower Panel	S01-P019
	Tower Panel	S01-P020
	Tower Panel	S01-P021
	Tower Panel	S01-P022
	Tower Panel	S01-P023
	Tower Panel	S01-P024
	Tower Panel	S01-P025
	Tower Panel	S01-P026
	Tower Panel	S01-P027
	Tower Panel	S01-P028
	Tower Panel	S01-P029
	Tower Panel	S01-P030
	Tower Panel	S01-P031
	Tower Panel	S01-P032
	Tower Panel	S01-P033
	Tower Panel	S01-P034
	Tower Panel	S01-P035
	Tower Panel	S01-P036
	Tower Panel	S01-P037
	Tower Panel	S01-P038
	Tower Panel	S01-P039
	Tower Panel	S01-P040
Record: 1 of 2503		

Room No. 3.3 - Cleaners' Room									
Function	A room for storage of small volume of cleansing materials, tools and short stay of cleaners								
Size	15 - 20 m ²								
Occupants	3-5 persons								
Location	Non-public area								
Fire Rating	# In accordance with Fire Safety Standard for KTL/TWL/ISL Stations - S/ARC/PD/005								
Security Level	Low								
Finish	Floor		Skirting		Wall		Ceiling		
	Vitrified ceramic tiles, 150x150x8, on c/s screed - "Pilkington Dorset, colour Dark Grey" or equal approved; on liquid-applied waterproof membrane - "Lacticrete 9235 with fabric reinforcement" or equal approved		Coved ceramic tiles, 150x150x8, on c/s backing - "Pilkington Dorset, colour Dark Grey", or equal approved; on liquid-applied waterproof membrane - "Lacticrete 9235 with fabric reinforcement" or equal approved		Glazed ceramic tiles, 150x150x6.5, on c/s backing - "Pilkington Architectural Colours, colour Vellum White" or equal approved; Durable paint on c/s render above 2100 high - "Alphadecor, colour 9010 White" or equal approved		Durable paint on fairface concrete - "Alphadecor, colour 9010 White" or equal approved		
Door Set	Size	Fire Rating	Acting	Frame	Inside Finish	Outside Finish	Air Resistance	Others	
	900 x 2100 mm	# (see above)	Swing In 90°	Painted/ S/S *	Painted/ S/S *	Painted/ S/S *	N/A	Durable kickplate to u/s of push plate	
Ironmongery	Lock Set	Security Level	Access Card		Remote Control	Inside Handle	Outside Handle	Accessories	
	Night Latch	Low	No	No	No	Lever handle on back plate	Pull handle on back plate	Door closer, door stop	
Signage	Door Plate (supply by Ops)								
Environment	Temperature	Ventilation	Humidity			Acoustic		Thermal	
	24 °C A/C	N/A	50% ± 10%			NC 50		---	
Lighting	Normal Illuminance	Emergency Illuminance	Type			Diffusers		Source	
	300 Lux	10 Lux	Fluorescent, surface mounted			---		Direct	
Fire	Detection		Suppression			Extinguisher		Smoke Extraction	
	Smoke Detectors		N/A			Relocate existing		---	
Plumbing & Drainage	Water Supply				Drainage				
	Yes				Yes + Floor drain				
E & M, C & C	Equipment		Socket Type			Socket No. / Location		Communications	
	PABX (no outside call feature)		RJ11 provided by in-house C&C			1 / At 1440mm AFFL		Telephone wire to MTRC distribution box	
	General		Twin 13A			2 / Skirting level		---	
Fixtures & Furniture	Slop sink connect to foul drainage, storage cabinets, lockers, vacuum cleaner, table and chair.								
Others	---								

* Dependent on location - stainless steel door to be used when facing public areas.
- painted doors to be used when facing BofH areas.

Revision D

ROOM
DATA
SHEET

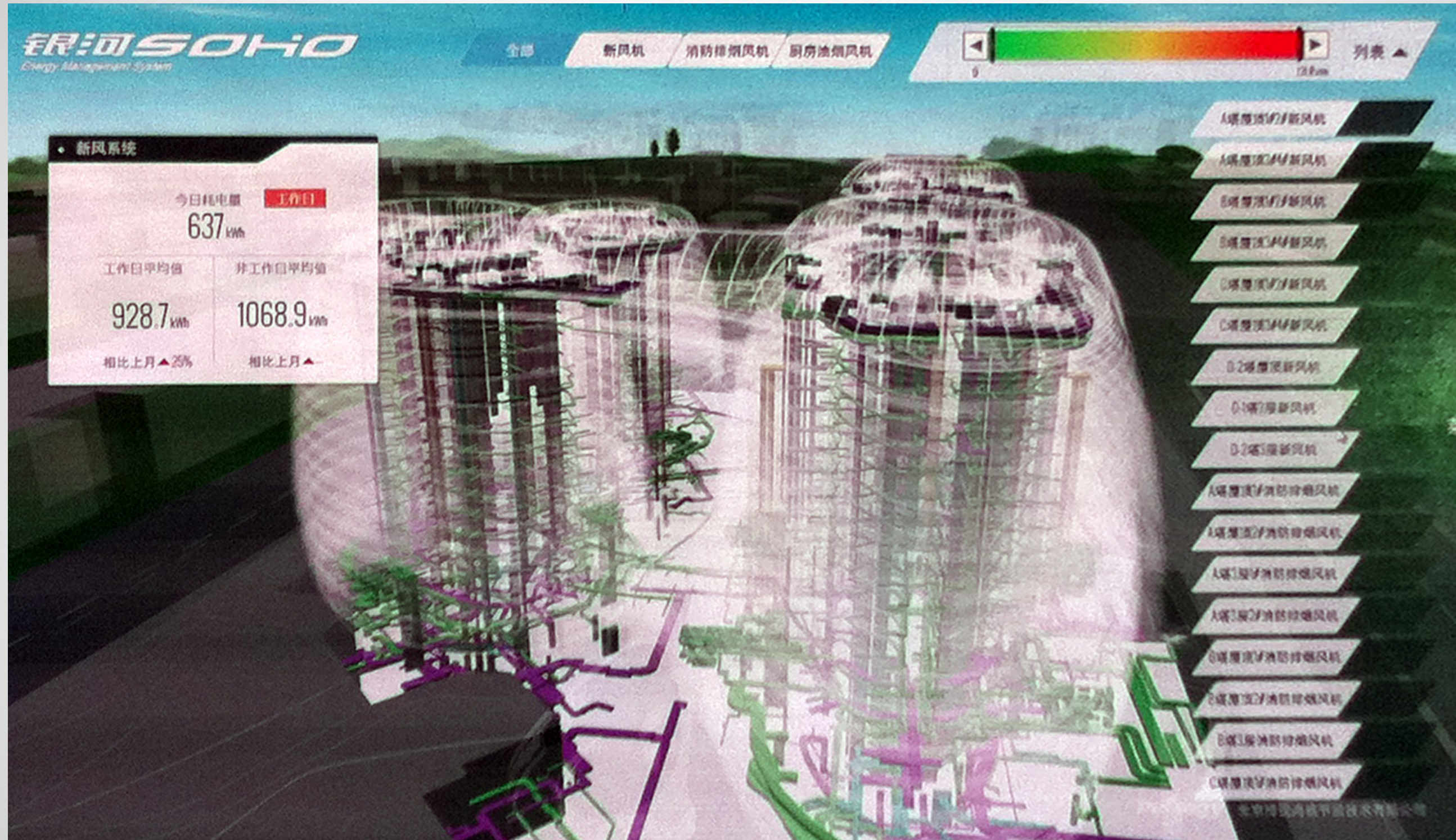


物业管理 - 维修保养

The screenshot shows the Maximo Reports application running in Internet Explorer. The browser address bar displays the URL: `http://localhost:7001/maximo/ui?event=loadapp&value=wotrack&uisessionid=1253495337442`. The application interface includes a sidebar with 'Report Datasets' and 'MAXIMO'. The main content area features a 'Reports' section with a 'Select a report from the list, or click Create Report to create an ad hoc report.' prompt. Below this, there are tabs for 'On Demand Reports' and 'Scheduling Status'. The 'On Demand Reports' tab is active, showing a list of reports to run, including 'Estimated vs Actual Work Order Costs', 'Open Work Orders and PM', 'SSRS First Report', and 'SSRS Work Order by Work Type'. A 'Request Page' section is also visible. At the bottom, there is a 'Parameters' section with a 'Search Location Hierarchy' field and a 'Submit' button. A 'Select Value' dialog box is open, displaying a table of work order items.

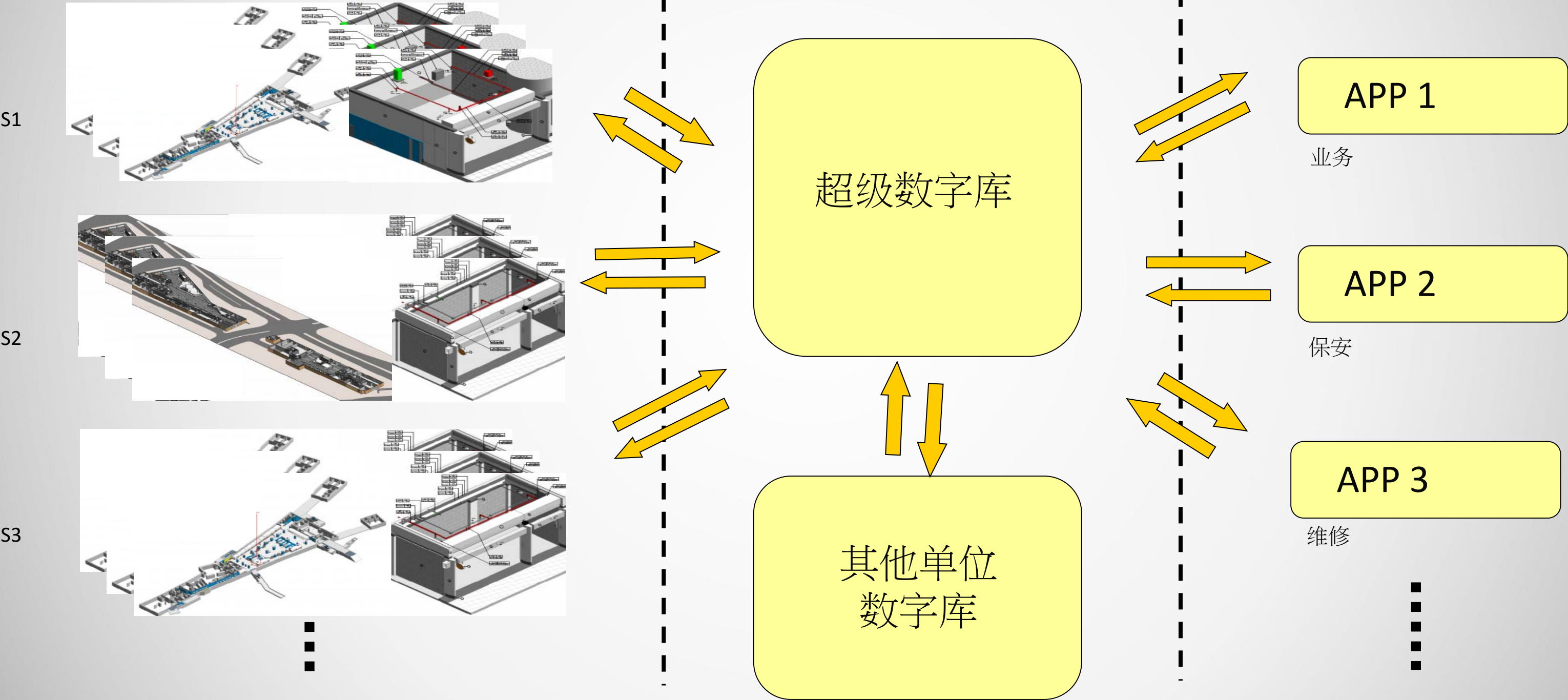
Location	Description	Type	Site
☐ ADDR2001	Address Unit #2001 Oak St. - W560	OPERATING	BEDFORD
☐ ADDR2002	Address Unit #2002, Oak St. - W560	OPERATING	BEDFORD
☐ ADDR2003	Address Unit #2003, Oak St. - W560	OPERATING	BEDFORD
☐ AIR100	Supply Duct Inlet- Conf. Room #100	OPERATING	BEDFORD
☐ AIR101	Supply Duct Inlet- Office #101	OPERATING	BEDFORD
☐ AIR102	Supply Duct Inlet- Office #102	OPERATING	BEDFORD
☐ AIR103	Supply Duct Inlet- Office #103	OPERATING	BEDFORD
☐ AIR104	Supply Duct Inlet- Office #104	OPERATING	BEDFORD
☐ AIR105	Supply Duct Inlet- Office #105	OPERATING	BEDFORD
☐ AIR211	East Wing, First Floor Supply Duct	OPERATING	BEDFORD
☐ AIR212	West Wing, First Floor Supply Duct	OPERATING	BEDFORD
☐ BALL	Allan Ball	LABOR	BEDFORD
☐ BASIN-W1	Main Storm Water Basin - W1	OPERATING	BEDFORD
☐ BLK1000	1000 Block, Oak St. - W560	OPERATING	BEDFORD
☐ BLK2000	2000 Block, Oak St. - W560	OPERATING	BEDFORD
☐ BLK3000	3000 Block, Oak St. - W560	OPERATING	BEDFORD
☐ BOILER	Boiler Room	OPERATING	BEDFORD
☐ BONEY	Joe Boney	LABOR	BEDFORD
☐ BOSTON	City of Boston	OPERATING	BEDFORD
☐ BOW-W1	Harbour Run-off - W1	OPERATING	BEDFORD

物业管理 - 维修保养



BIM 在物业管理中概念

独立模型 (M)+ 独立数字库 (I)



- 三维模 **M** - 非BIM也
- CG (Computer Graphic) - 非BIM也
- 有其型 **M** 而没其神 - 非BIM也
- 有型 **M**, 有量 **I**, 能碰; 乃半BIM 矣
- 有型 **M**, 有神 **I**, 有务 **B**; 乃真BIM 也



