



BIM Conference 2013

# How does BIM fit in the legal process of Plan Submission, Approval and Inspection in Hong Kong building industry

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*HKIBIM Vice Chairman*

*HKUSPACE Department of Architecture, Adjunct Lecturer*

B

= Building

建築

I

= Information

資訊

M

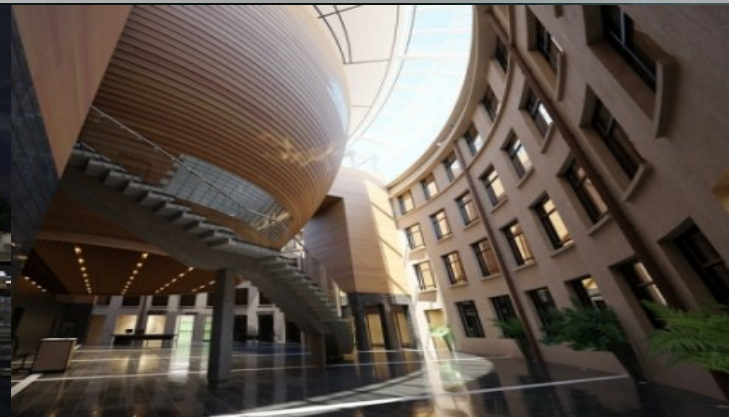
= Modelling

模型/ 模擬

# Fake BIM

M + ?

JUST 3D MODEL – NOT BIM



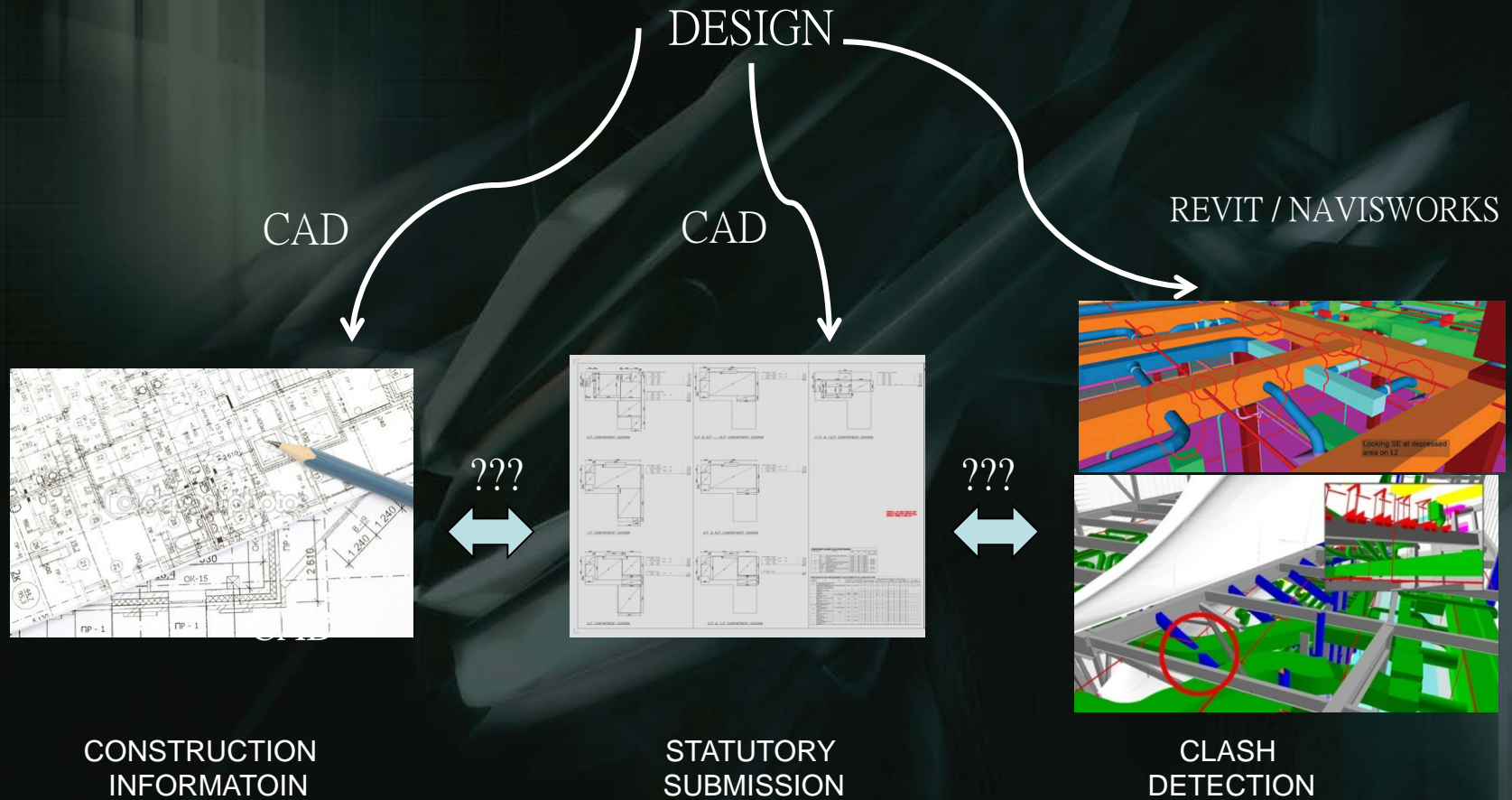
# HALF-BIM

I <> M

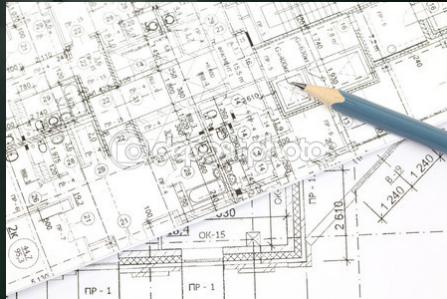
3D MODEL >> QTO , CLASH ANALYSIS



# HALF BIM

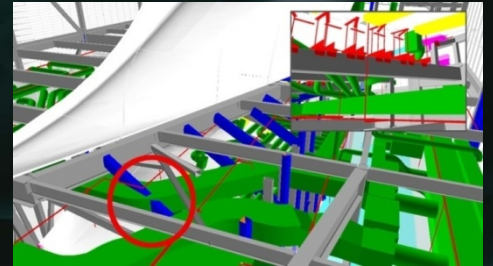
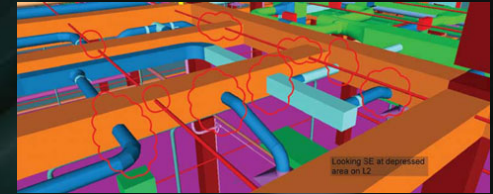


# REAL BIM

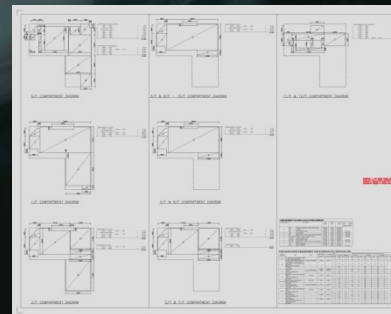


CONSTRUCTION  
INFORMATOIN

DESIGN  
in  
BIM



CLASH  
DETECTION



STATUTORY  
SUBMISSION

# REAL BIM

I = M

I > M

INFORMATION FROM MODEL,  
INFORMATION MORE IMPORTANT

# B I M



Modelling

Information

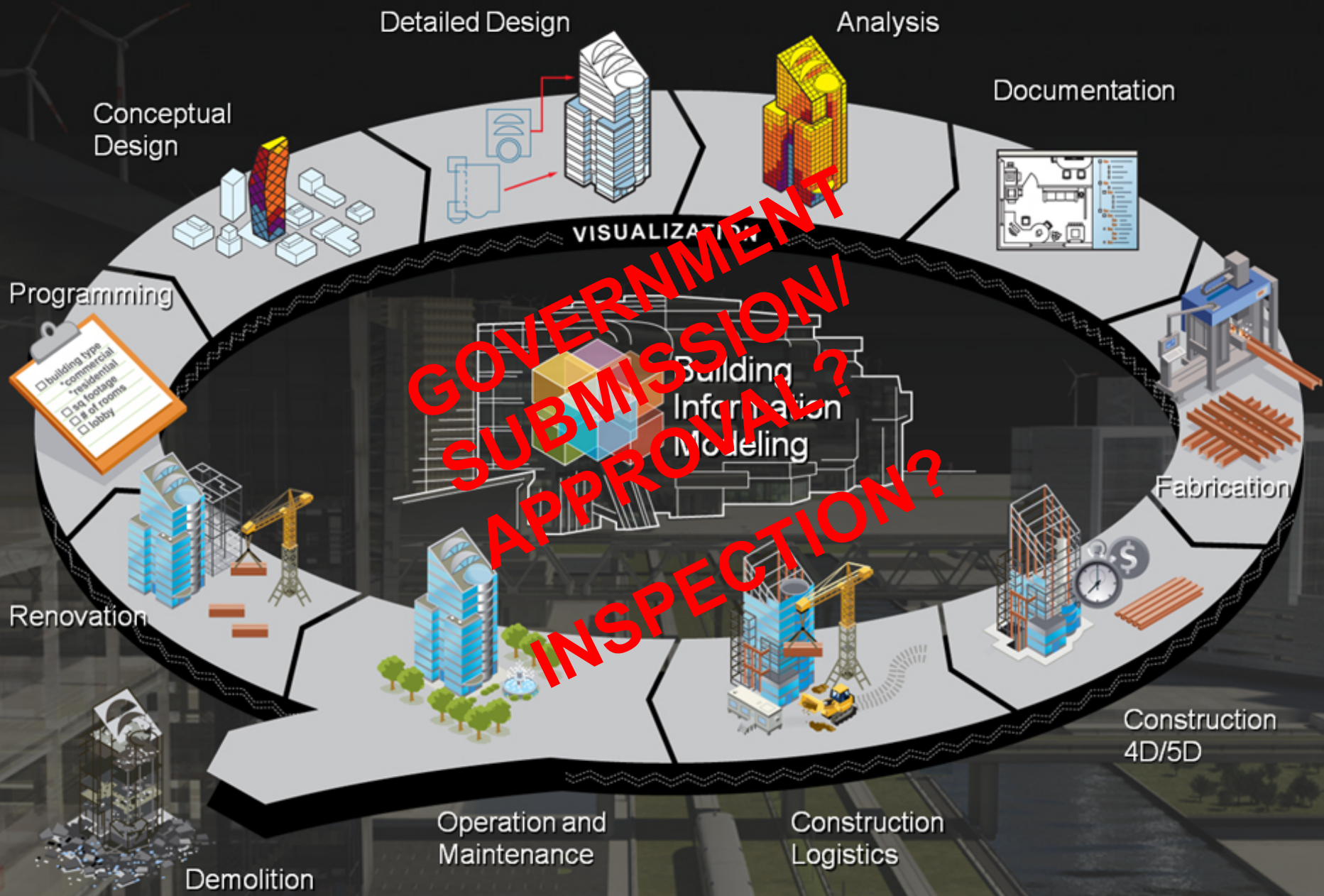
Business

## REAL BIM

$$M + I = B$$

BIM is a process, Business is the objective





## REAL BIM

$$M + I = B \text{ (Statutory Submission)}$$

# GOVERNMENT SUBMISSION IN HONG KONG

## Purpose:

To demonstrate a development complies with statutory requirement and seek government approval using BIM

## Applicable Development:

Applied to new building & alteration and addition works in Hong Kong

## Content of Submission:

Plans, sections, elevations, calculations and other relevant documents

# TODAY'S TOPIC: ANOTHER WAY TO PREPARE THE CALCULATION FOR GOVERNMENT SUBMISSION

An area based calculation

convert areas into following figures through checking of regulations & codes of practice:

plot ratio

room capacity

fire compartment

sanitary fitment provision etc.

site coverage

width of escape route

fire resisting period



# COMMON WAY:

## STEP 2: CHECKING OF REGULATIONS & CODES

Height of building in metres	Domestic buildings						Non-domestic buildings					
	Percentage site coverage			Plot ratio			Percentage site coverage			Plot ratio		
	Class A site	Class B site	Class C site	Class A site	Class B site	Class C site	Class A site	Class B site	Class C site	Class A site	Class B site	Class C site
Not exceeding 15 m	66.6	75	80	3.3	3.75	4.0	100	100	100	5	5	5
Over 15 m but not exceeding 18 m	60	67	72	3.6	4.0	4.3	97.5	97.5	97.5	5.8	5.8	5.8
Over 18 m but not exceeding 21 m	56	62	67	3.9	4.3	4.7	95	95	95	6.7	6.7	6.7
Over 21 m but not exceeding 24 m	52	58	63	4.2	4.6	5.0	92	92	92	7.4	7.4	7.4
Over 24 m but not exceeding 27 m	49	55	59	4.4	4.9	5.3	89	90	90	8.0	8.1	8.1
Over 27 m but not exceeding 30 m	46	52	55	4.6	5.2	5.5	85	87	88	8.5	8.7	8.8
Over 30 m but not exceeding 36 m	42	47.5	50	5.0	5.7	6.0	80	82.5	85	9.5	9.9	10.2
Over 36 m but not exceeding 43 m	39	44	47	5.4	6.1	6.5	75	77.5	80	10.5	10.8	11.2
Over 43 m but not exceeding 49 m	37	41	44	5.9	6.5	7.0	69	72.5	75	11.0	11.6	12.0
Over 49 m but not exceeding 55 m	35	39	42	6.3	7.0	7.5	64	67.5	70	11.5	12.1	12.6
Over 55 m but not exceeding 61 m	34	38	41	6.8	7.6	8.0	60	62.5	65	12.2	12.5	13.0
Over 61 m	33.33	37.5	40	8.0	9.0	10.0	60	62.5	65	15	15	15

(L.N. 294 of 1976)

Table 1	
Intended use of storey	Factor representing usable floor area in m <sup>2</sup> per person
(a) Assembly halls, auditoria and stadia without seating or with movable seating	0.5
(b) Areas accessible to the public in viewing galleries, banking halls, betting centres and places where public service counters are provided	0.5
(c) Dance halls (calculated on dancing area), disco and reception area for restaurant	0.75
(d) Restaurants (calculated on dining area), dining area, lounges, committee rooms, conference rooms, meeting rooms, common rooms, function room and waiting rooms	1
(e) Kitchens attached to restaurants	4.5
(f) Museums, exhibition halls, tradenants and display areas	2
(g) Supermarkets, showrooms, jewellery and goldsmith shops, pawn shops and money changers	2
(h) Shopping arcades, department stores and shopping areas	
- basement, G/F, 1/F & 2/F	3
- 3/F & above	4.5
(i) Offices	9
(j) Tenement houses, barracks, dormitories, and self-contained flats comprising a single room or having the main living area subdivided by rooms	3
(k) Self-contained flats with corridor or balcony access having five or more flats on each floor served by each staircase	4.5
(l) Flats not covered by (j) or (k)	9
(m) Flatted factories	4.5
(n) Warehouses, godowns and storage areas	30
(o) Classrooms of school not covered by Education Ordinance and other lecture rooms, library and study rooms	2

Table 2

Table showing minimum number of exit doors from a room, or exit routes from a storey, and required minimum width thereof

Capacity of room or storey	Min. No. of exit doors (from room) or exit routes (from storey)	Min. Total Width of		Min. Width of each	
		exit doors	exit routes	exit door	exit route
4 - 30	1			750 mm	1050 mm
31 - 200	2	1750 mm	2100 mm	850 mm	1050 mm
201 - 300	2	2500 mm	2500 mm	1050 mm	1050 mm
301 - 500	2	3000 mm	3000 mm	1050 mm	1050 mm
501 - 750	3	4500 mm	4500 mm	1200 mm	1200 mm
751 - 1000	4	6000 mm	6000 mm	1200 mm	1200 mm
1001 - 1250	5	7500 mm	7500 mm	1350 mm	1350 mm
1251 - 1500	6	9000 mm	9000 mm	1350 mm	1350 mm
over 1500	7 or such greater number as the Building Authority may require	to be calculated at the rate of 300mm per 50 persons		1500 mm	1500 mm

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Table 5 : Discharge Value of a Staircase in a Non-sprinklered Building

No. of Storey served	Width of Staircase						
	1050mm but under 1200mm	1200mm but under 1350mm	1350mm but under 1500mm	1500mm but under 1600mm	1600mm but under 1700mm	1700mm but under 1800mm	1800mm but under 1900mm
1	210	240	270	300	320	340	360
2	242	278	315	351	377	402	428
3	274	316	360	402	434	464	496
4	306	354	405	453	491	526	564
5	338	392	450	504	548	588	632
6	370	430	495	555	605	650	700
7	402	468	540	606	662	712	768
8	434	506	585	657	719	774	836
9	466	544	630	708	776	836	904
10	498	582	675	759	833	898	972
Each additional storey add	32	38	45	51	57	62	68

TABLE A

WALLS CONSTRUCTED WHOLLY OF NON-COMBUSTIBLE MATERIALS

Construction and Materials	Minimum thickness in mm (excluding plaster) for period of		
	4 hrs.	2 hrs.	1 hr.
<b>SOLID CONSTRUCTION</b>			
Solid bricks of clay, concrete or sand lime without plaster	225	225*	100
Reinforced concrete -			
(a) containing not less than 1 per cent of vertical reinforcement	180	100	75
Concrete cover to main reinforcement	25	25	15
(b) containing less than 1 per cent of vertical reinforcement	240	160	120
Concrete cover to main reinforcement	25	25	25
<b>HOLLOW BLOCK CONSTRUCTION</b>			
Clay blocks (outer web not less than 13 mm thick) of 2 cells not less than 50 per cent solid finished with 13 mm gypsum plaster on each side		100	100
Concrete blocks of one cell in wall thickness not less than 50 per cent solid finished with 13 mm gypsum plaster on each side			190

\* Where finished with 13 mm gypsum plaster on each side, the thickness may be reduced to 100 mm.



# COMMON WAY: STEP 2: CHECKING OF REGULATIONS & CODES



# COMMON WAY: PROJECT EXAMPLE

## PLATE RATIO & MIN. COVERAGE CALCULATION

### 1) SITE COVERAGE

Site = CLASS 'B' SITE  
Site Area = 803.5 sqm  
Main Street Level = 3.000  
Height of Building = 58.500 - 3.855  
= 54.645 (Over 40m but not exceeding 50m)

For Non-Domestic Area (GF - 10F)  
Site Coverage Permitted under  
First Schedule of  
Building Planning Regulations = 60.904 (80.0 % + 100%)  
Site Coverage Provided over 15m  
(40 to 100) = 67.48% - 67.75%

For Domestic Area (11F - 12F)  
Site Coverage Permitted under  
First Schedule of  
Building Planning Regulations = 30.76%  
Site Coverage Provided over 15m = 30.92% (80.0 % + 100%)  
= 30.98% - 30.9%

### 2) FLOORMIN

Permitted Domestic Plot Ratio = 7  
Permitted Non-Domestic Plot Ratio = 121  
GF A of Domestic Part = 660.821 sqm  
Actual P.R. of Domestic Part = 7.75  
Permissible P.R. for Non-Domestic Part = 12.07  
GF A of Non-Domestic Part = 620.001 sqm  
Actual P.R. of Non-Domestic Part = 6.200 (100.0 % + 100.0 %)

## GROSS FLOOR AREA CALCULATION

FLOOR	GFA
GROUND FLOOR	411.324
1ST FLOOR	40.235
2ND FLOOR	40.235
3RD FLOOR	40.235
4TH FLOOR	40.235
5TH FLOOR	40.235
6TH FLOOR	40.235
7TH FLOOR	40.235
8TH FLOOR	40.235
9TH FLOOR	40.235
10TH FLOOR	40.235
11TH FLOOR	40.235
12TH FLOOR	40.235
TOTAL GFA FOR NON-DOMESTIC AREA	400.800
TOTAL GFA FOR DOMESTIC AREA	40.235
TOTAL GFA FOR OVERALL AREA	441.035

## REFUSE STORAGE AND MATERIAL RECOVERY CHAMBER CALCULATION

TOTAL GFA FOR NON-DOMESTIC PART = 400.800 sqm  
REFUSE STORAGE AND MATERIAL RECOVERY CHAMBER REQUIRED = 4.400 sqm  
REFUSE STORAGE AND MATERIAL RECOVERY CHAMBER PROVIDED = 4.400 sqm  
REFUSE STORAGE AND MATERIAL RECOVERY CHAMBER PROVIDED = 4.400 sqm

## REFUSE STORAGE AND MATERIAL RECOVERY CHAMBER DIAGRAM

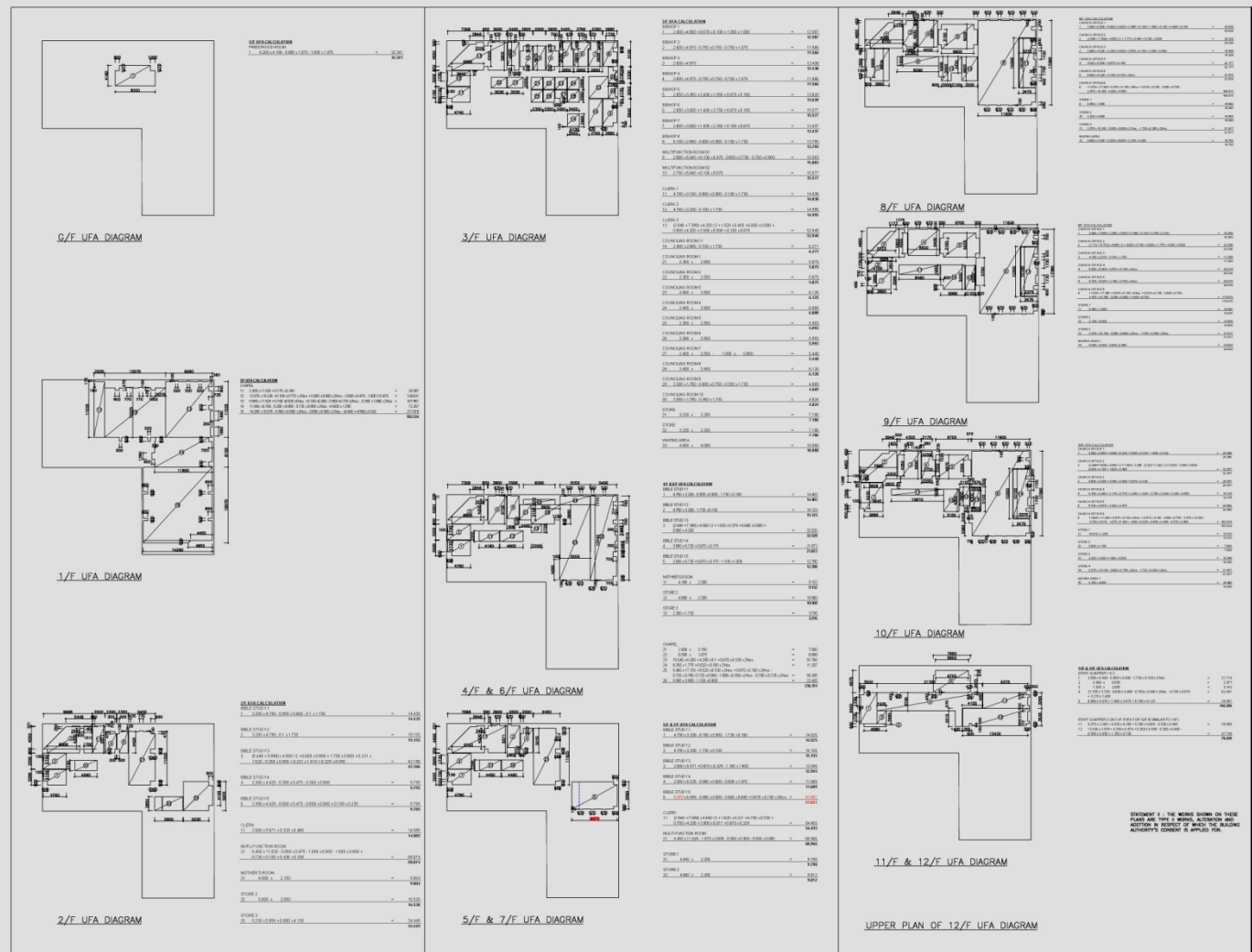


## PRESCRIBED WINDOW AREA CALCULATION

### PRESCRIBED WINDOW AREA PROVIDED FOR DIFFERENT TYPES OF WINDOWS

TYPE OF WINDOW	AREA PROVIDED
1) 1210 x 2100 mm	1.900
2) 1210 x 1800 mm	2.000
3) 1210 x 1500 mm	2.400
4) 1210 x 1200 mm	3.000
5) 1210 x 900 mm	3.600
6) 1210 x 600 mm	4.200
7) 1210 x 300 mm	4.800
8) 1210 x 150 mm	5.400
9) 1210 x 75 mm	6.000
10) 1210 x 37.5 mm	6.600
11) 1210 x 18.75 mm	7.200
12) 1210 x 9.375 mm	7.800
13) 1210 x 4.6875 mm	8.400
14) 1210 x 2.34375 mm	9.000
15) 1210 x 1.171875 mm	9.600
16) 1210 x 0.5859375 mm	10.200
17) 1210 x 0.29296875 mm	10.800
18) 1210 x 0.146484375 mm	11.400
19) 1210 x 0.0732421875 mm	12.000
20) 1210 x 0.03662109375 mm	12.600
21) 1210 x 0.018310546875 mm	13.200
22) 1210 x 0.0091552734375 mm	13.800
23) 1210 x 0.00457763671875 mm	14.400
24) 1210 x 0.002288818359375 mm	15.000
25) 1210 x 0.0011444091796875 mm	15.600
26) 1210 x 0.00057220458984375 mm	16.200
27) 1210 x 0.000286102294921875 mm	16.800
28) 1210 x 0.0001430511474609375 mm	17.400
29) 1210 x 0.00007152557373046875 mm	18.000
30) 1210 x 0.000035762786865234375 mm	18.600
31) 1210 x 0.0000178813934326171875 mm	19.200
32) 1210 x 0.00000894069671630859375 mm	19.800
33) 1210 x 0.000004470348358154296875 mm	20.400
34) 1210 x 0.0000022351741790771484375 mm	21.000
35) 1210 x 0.00000111758708953857421875 mm	21.600
36) 1210 x 0.000000558793544769287109375 mm	22.200
37) 1210 x 0.0000002793967723846435546875 mm	22.800
38) 1210 x 0.00000013969838619232177734375 mm	23.400
39) 1210 x 0.000000069849193096160888671875 mm	24.000
40) 1210 x 0.0000000349245965480804443359375 mm	24.600
41) 1210 x 0.00000001746229827404022216796875 mm	25.200
42) 1210 x 0.000000008731149137020111083984375 mm	25.800
43) 1210 x 0.0000000043655745685100555419921875 mm	26.400
44) 1210 x 0.00000000218278728425502777099609375 mm	27.000
45) 1210 x 0.000000001091393642127513885498046875 mm	27.600
46) 1210 x 0.0000000005456968210637569427490234375 mm	28.200
47) 1210 x 0.00000000027284841053187847137451171875 mm	28.800
48) 1210 x 0.000000000136424205265939235735585884375 mm	29.400
49) 1210 x 0.0000000000682121026329696178687929421875 mm	30.000
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51) 1210 x 0.00000000001705302565824240446719698235546875 mm	31.200
52) 1210 x 0.0000000000085265128291212022338984961177734375 mm	31.800
53) 1210 x 0.00000000000426325641456060111694924805888671875 mm	32.400
54) 1210 x 0.000000000002131628207280300558474624029443359375 mm	33.000
55) 1210 x 0.00000000000106581410364015027923731221471675 mm	33.600
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75) 1210 x 0.0000000000000000010164395367050781245511171875 mm	45.600
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77) 1210 x 0.000000000000000000254109884176269531137779421875 mm	46.800
78) 1210 x 0.00000000000000000012705494208813476556888671875 mm	47.400
79) 1210 x 0.000000000000000000063527471044067377784443359375 mm	48.000
80) 1210 x 0.0000000000000000000317637355220033688922216796875 mm	48.600
81) 1210 x 0.00000000000000000001588186776100168444611171875 mm	49.200
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83) 1210 x 0.0000000000000000000039704669402504211113779421875 mm	50.400
84) 1210 x 0.0000000000000000000019852334701252105556888671875 mm	51.000
85) 1210 x 0.00000000000000000000099261673506252777784443359375 mm	51.600
86) 1210 x 0.00000000000000000000049630836753126388922216796875 mm	52.200
87) 1210 x 0.000000000000000000000248154183765631944611171875 mm	52.800
88) 1210 x 0.00000000000000000000012407709188281597223055888671875 mm	53.400
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91) 1210 x 0.0000000000000000000000155096364853519827784443359375 mm	55.200
92) 1210 x 0.000000000000000000000007754818242675991388922216796875 mm	55.800
93) 1210 x 0.0000000000000000000000038774091213379956944611171875 mm	56.400
94) 1210 x 0.000000000000000000000001938704560668997847223055888671875 mm	57.000
95) 1210 x 0.0000000000000000000000009693522803344998922216796875 mm	57.600
96) 1210 x 0.00000000000000000000000048467614016724994611171875 mm	58.200
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120) 1210 x 0.0000000000000000000000000000000288889491646240234375000020992647109375 mm	72.600
121) 1210 x 0.0000000000000000000000000000000144444745823120117187500001049632355888671875 mm	73.200
122) 1210 x 0.0000000000000000000000000000000072222372911505588922216796875000052481627109375 mm	73.800
123) 1210 x 0.00000000000000000000000000000000361111864557752794611377942187500002624081355888671875 mm	74.400
124) 1210 x 0.000000000000000000000000000000001805559322788763973055888671875000013120406779421875 mm	75.000
125) 1210 x 0.00000000000000000000000000000000090277966139438198652778444335937500000656020388922216796875 mm	75.600
126) 1210 x 0.00000000000000000000000000000000045138983069719099326388922216796875000003280101944611171875 mm	76.200
127) 1210 x 0.00000000000000000000000000000000022569491534859549663194461117187500000164005097223055888671875 mm	76.800
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132) 1210 x 0.0000000000000000000000000000000000070529661046423593574998263889222167968750000000512515944611171875 mm	79.800
133) 1210 x 0.0000000000000000000000000000000000035264830523211796787499913444611171875000000025625797223055888671875 mm	80.400
134) 1210 x 0.00000000000000000000000000000000000176324152616058983937499956889222167968750000000128128986113779421875 mm	81.000
135) 1210 x 0.00000000000000000000000000000000000088162076308029491968724997844433593750000000064064493055888671875 mm	81.600

# COMMON WAY: PROJECT EXAMPLE



# COMMON WAY: STEP 1: CALCULATE AREA

Outline area



# COMMON WAY: STEP 1: CALCULATE AREA

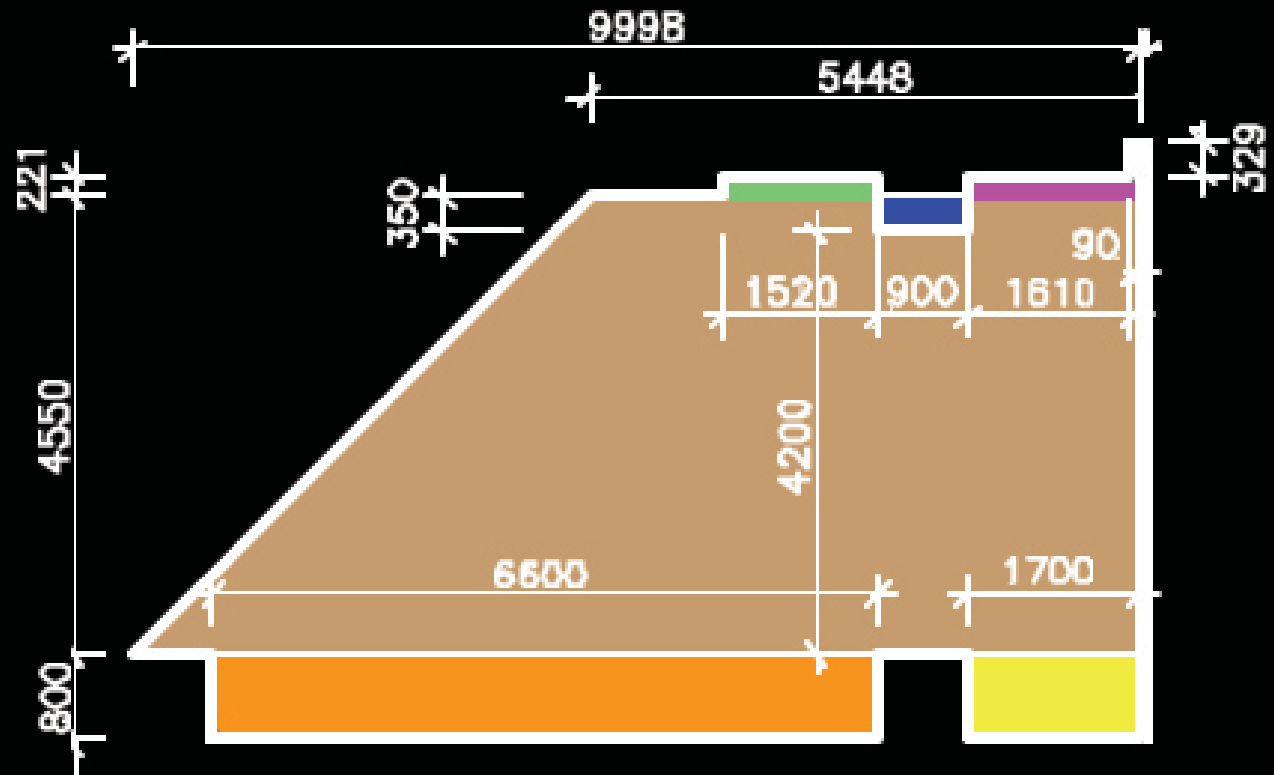
Subdivide area into simple geometry such as rectangle, triangle, circle, etc.





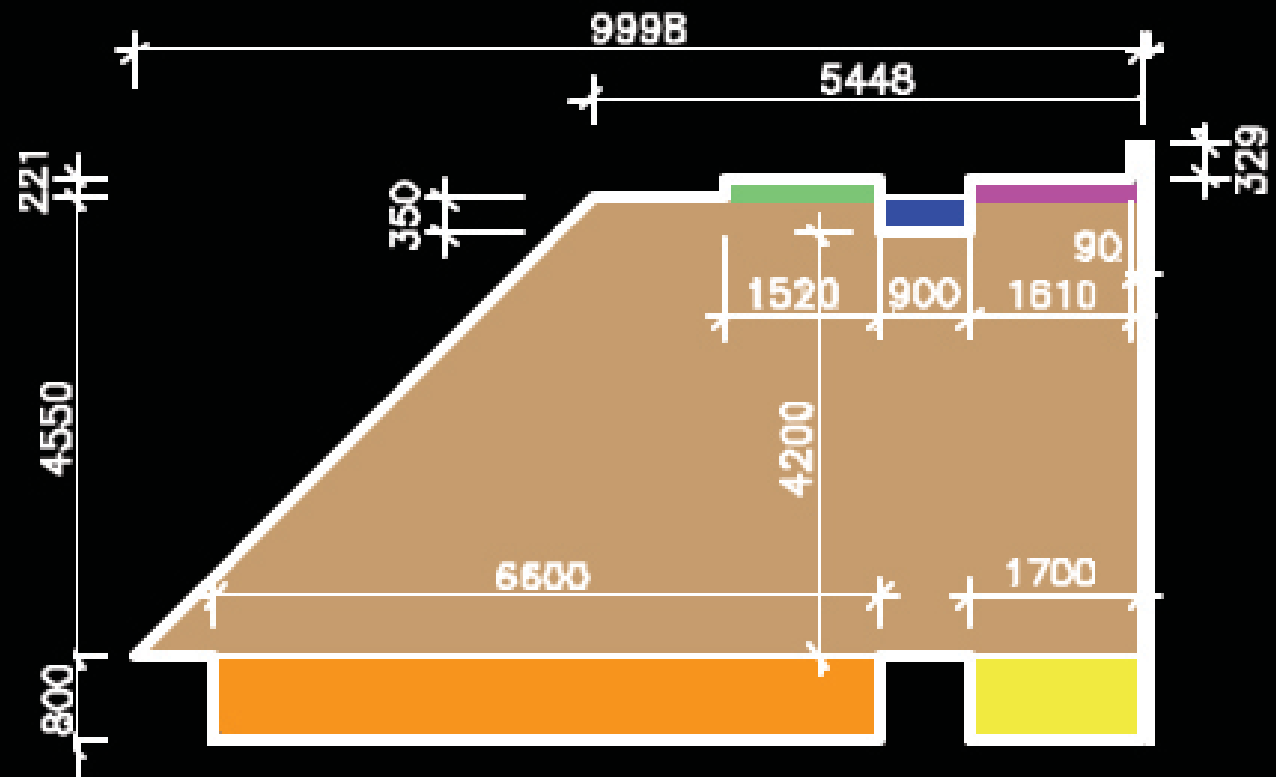
# COMMON WAY: STEP 1: CALCULATE AREA

Measure dimension



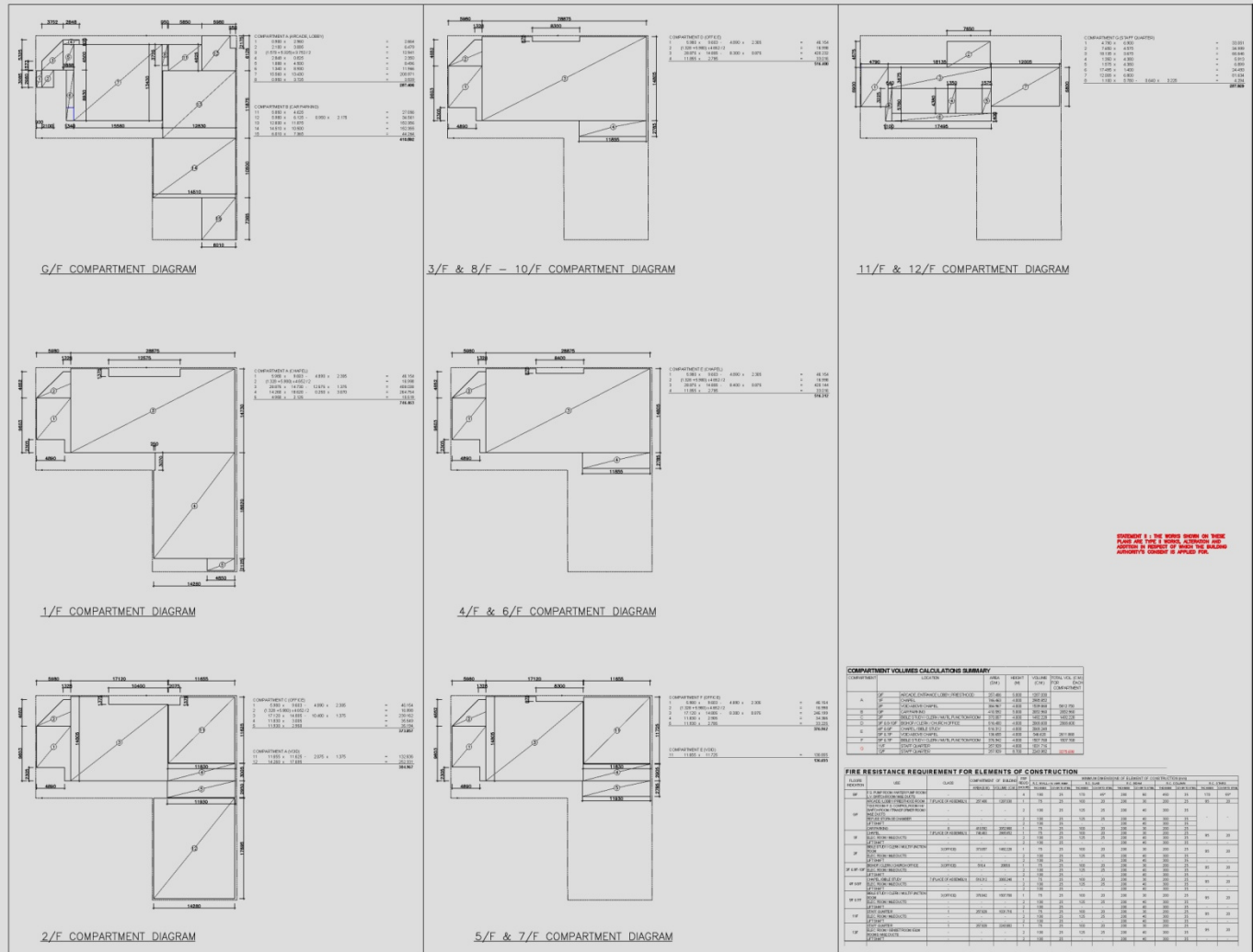
# COMMON WAY: STEP 1: CALCULATE AREA

Calculate area by applying geometric formula

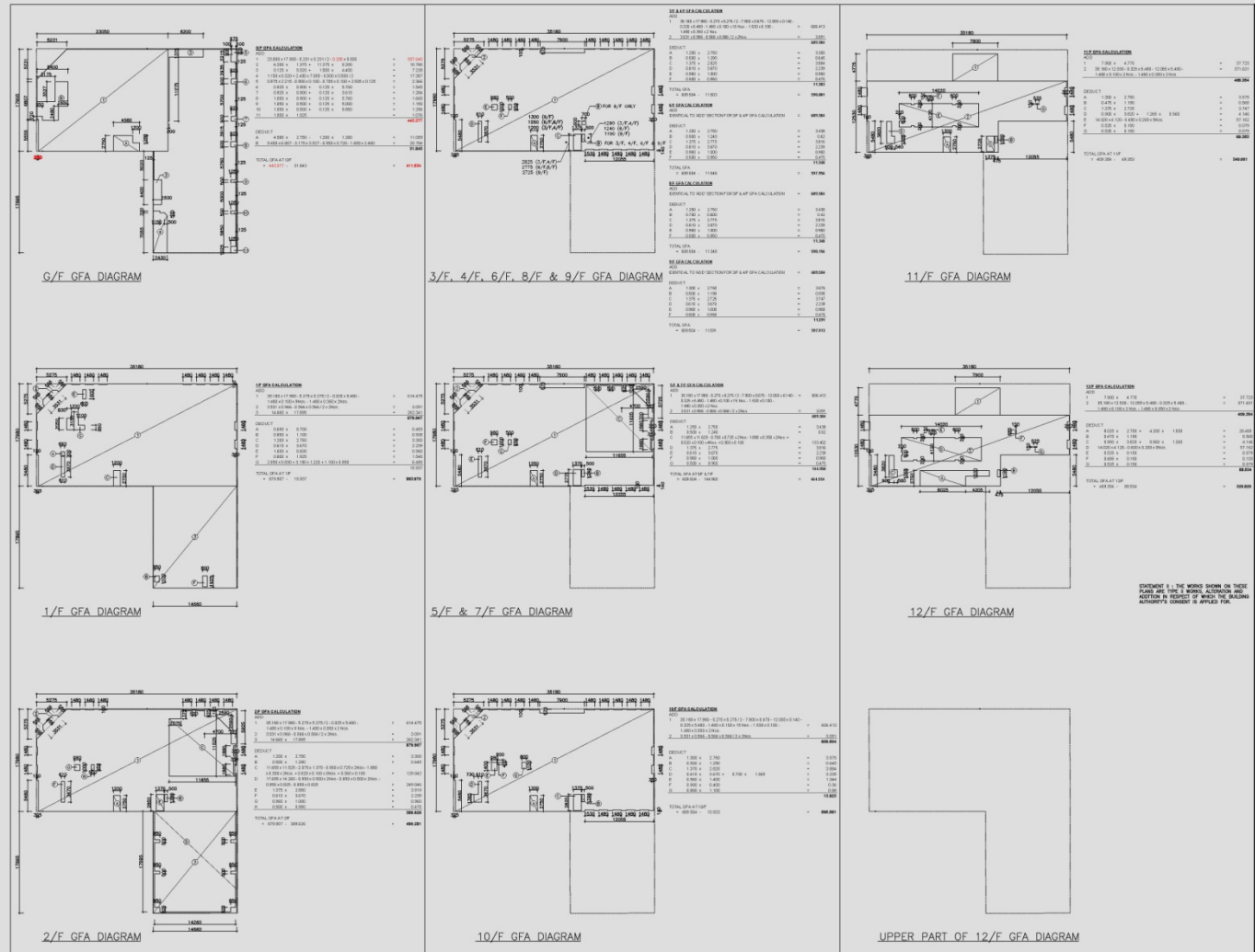


$$(5.448+9.998) \times 4.550 / 2 + 6.600 \times 0.800 + 1.700 \times 0.800 + 0.221 \times 1.520 - 0.350 \times 0.900 + 0.221 \times 1.610 + 0.329 \times 0.090 = 42.186$$

# COMMON WAY: PROJECT EXAMPLE



# COMMON WAY: PROJECT EXAMPLE



# COMMON WAY: HOW LONG DOES IT TAKE?

Previous Submission Involves

- ~1200 raw data
- ~1700 mathematical operations
- ~1000 statutory checking
- ~5000 data input

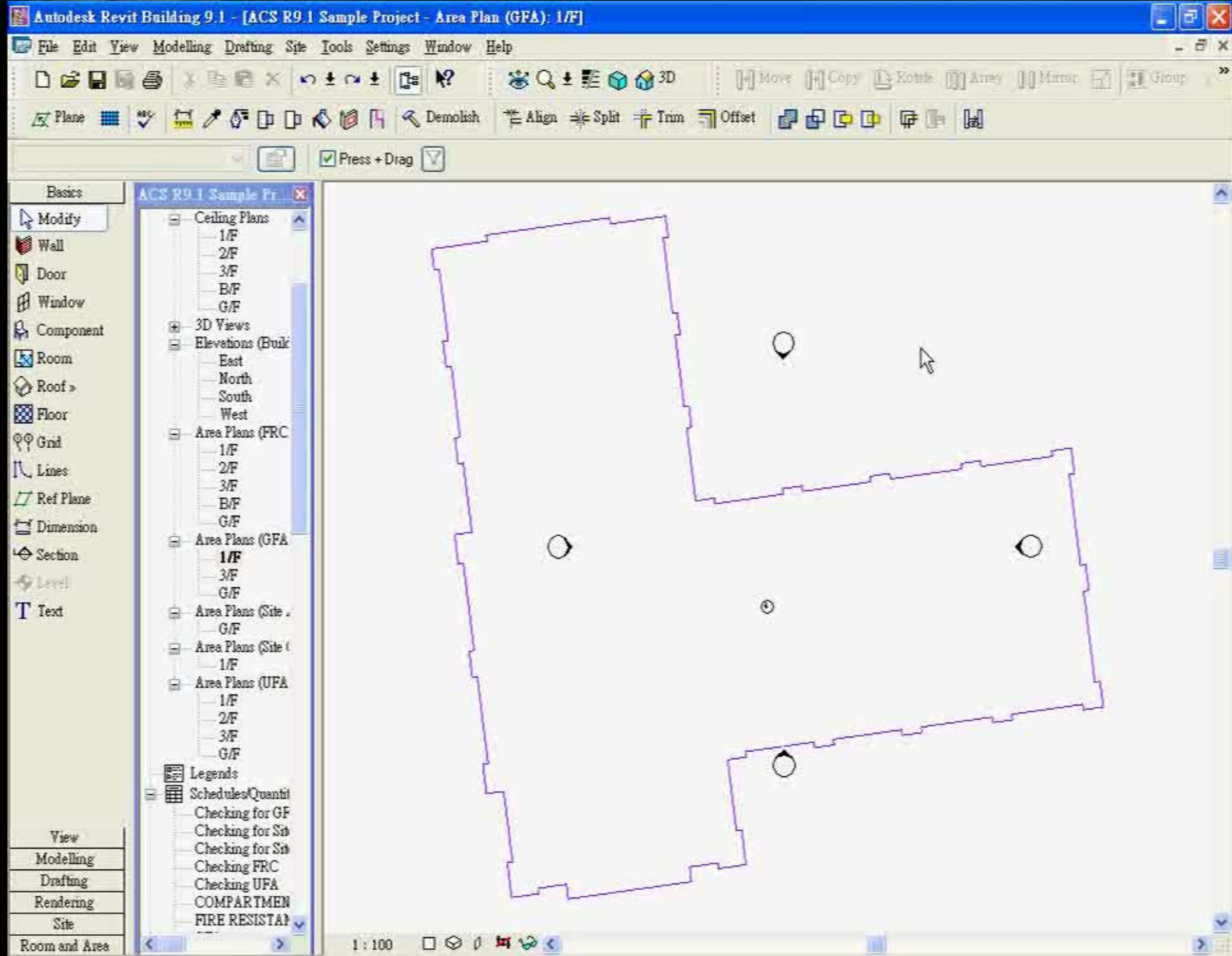
Require 2 weeks to complete

a step by step calculation: any change in layout will affect the calculation significantly

Takes another 1 week in average for every amendment submission



# BIM method: GFA CALCULATION



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

CAP NUM

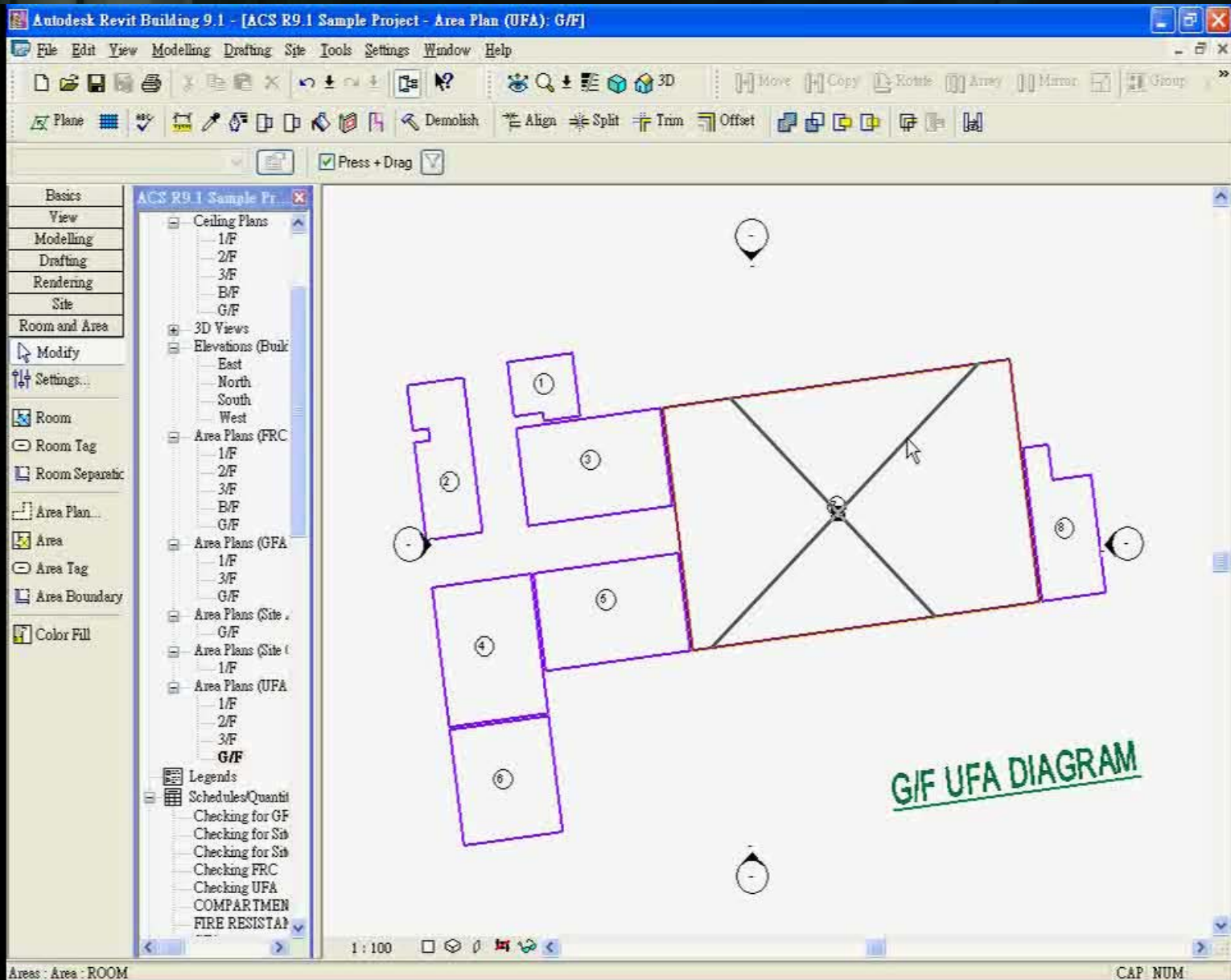
# BIM method: GFA CALCULATION

The screenshot displays the Autodesk Revit Building 9.1 interface. The title bar indicates the project is 'ACS R9.1 Sample Project - Area Plan (Site Area): G/F'. The left sidebar shows the 'Basics' tab with various toolsets. The 'Area Plans (GFA)' category is expanded, showing a tree structure with 'G/F' selected. The main view area displays a table of calculation results for the GFA.

GFA CALCULATION RESULTS	
CLASS OF SITE:	A
SITE AREA (SQ.M):	1990.642
BUILDING HEIGHT (M):	19
PERMITTED NON-DOMESTIC SC (%):	95
PERMITTED NON-DOMESTIC PR:	6.7
ACTUAL SITE COVERAGE (SQ.M):	788.919
ACTUAL SITE COVERAGE IN %:	39.631<95
ACTUAL NON-DOMESTIC GFA (SQ.M):	2237.736
ACTUAL NON-DOMESTIC PR:	1.124<6.7

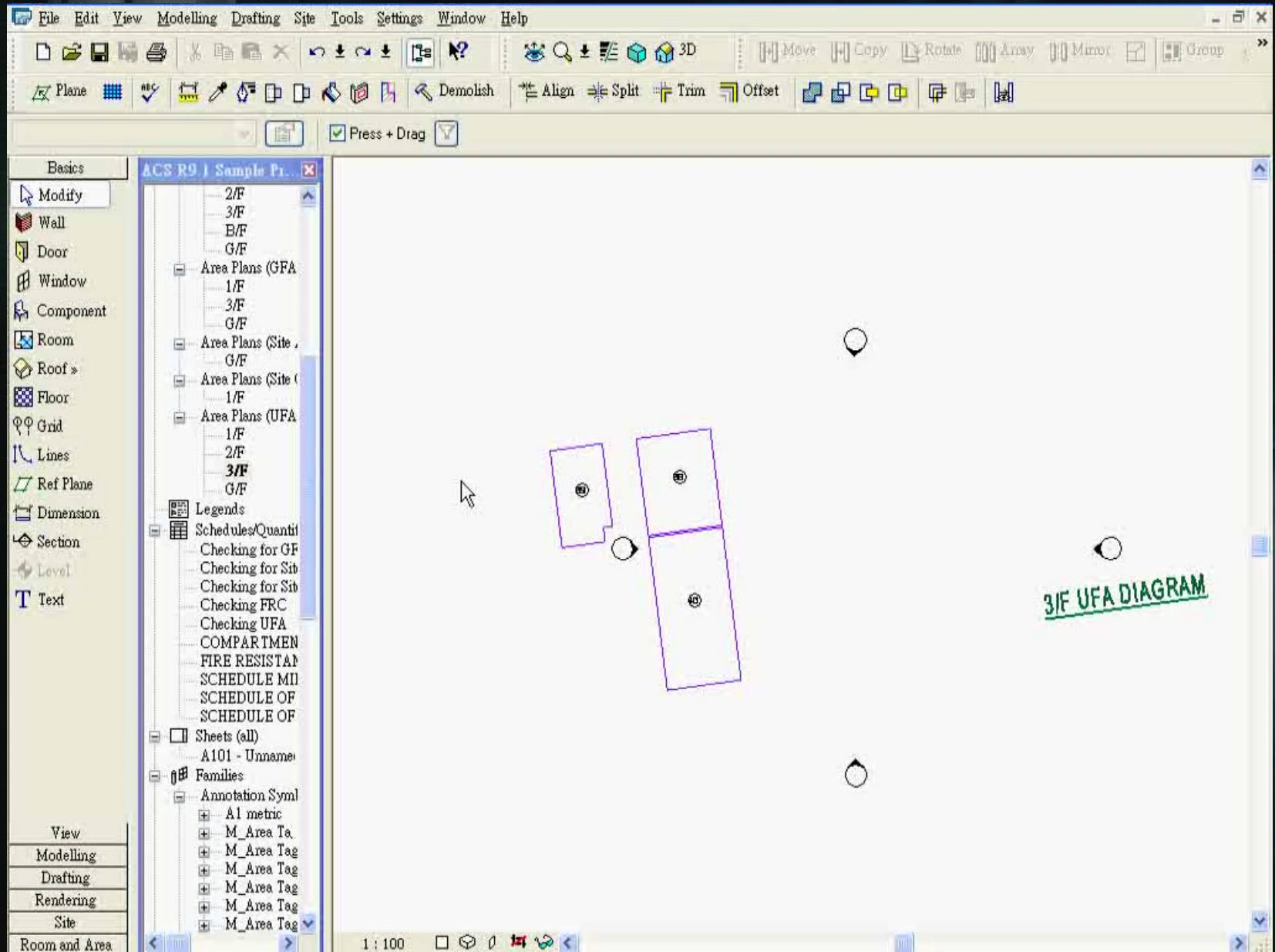
At the bottom of the interface, there is a status bar with the text 'Click to select, TAB for alternates, CTRL adds, SHIFT unselects.' and a scale indicator '1 : 50'.

# MEANS OF ESCAPE & SANITARY FITMENT PROVISION

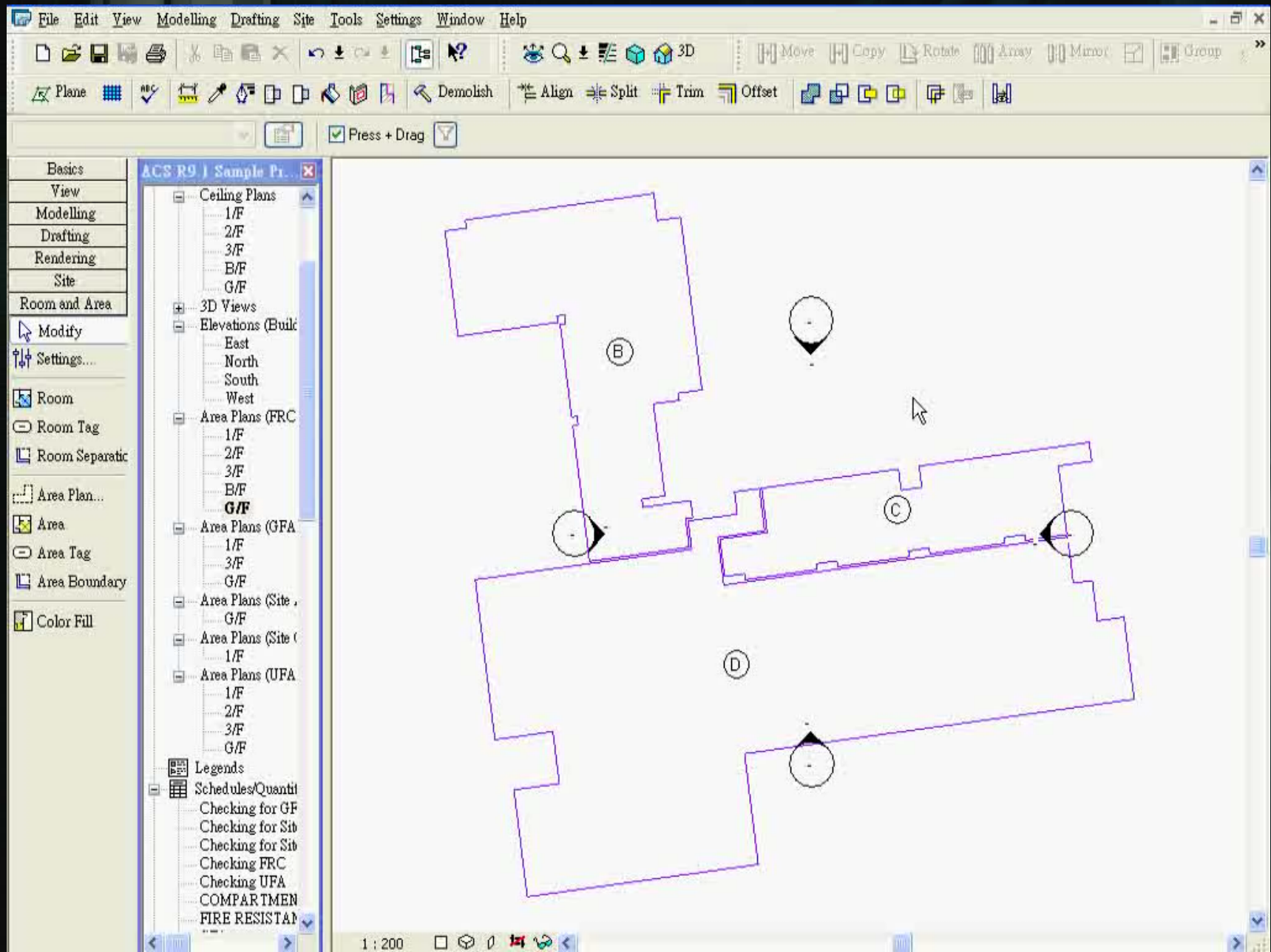




# MEANS OF ESCAPE & SANITARY FITMENT PROVISION

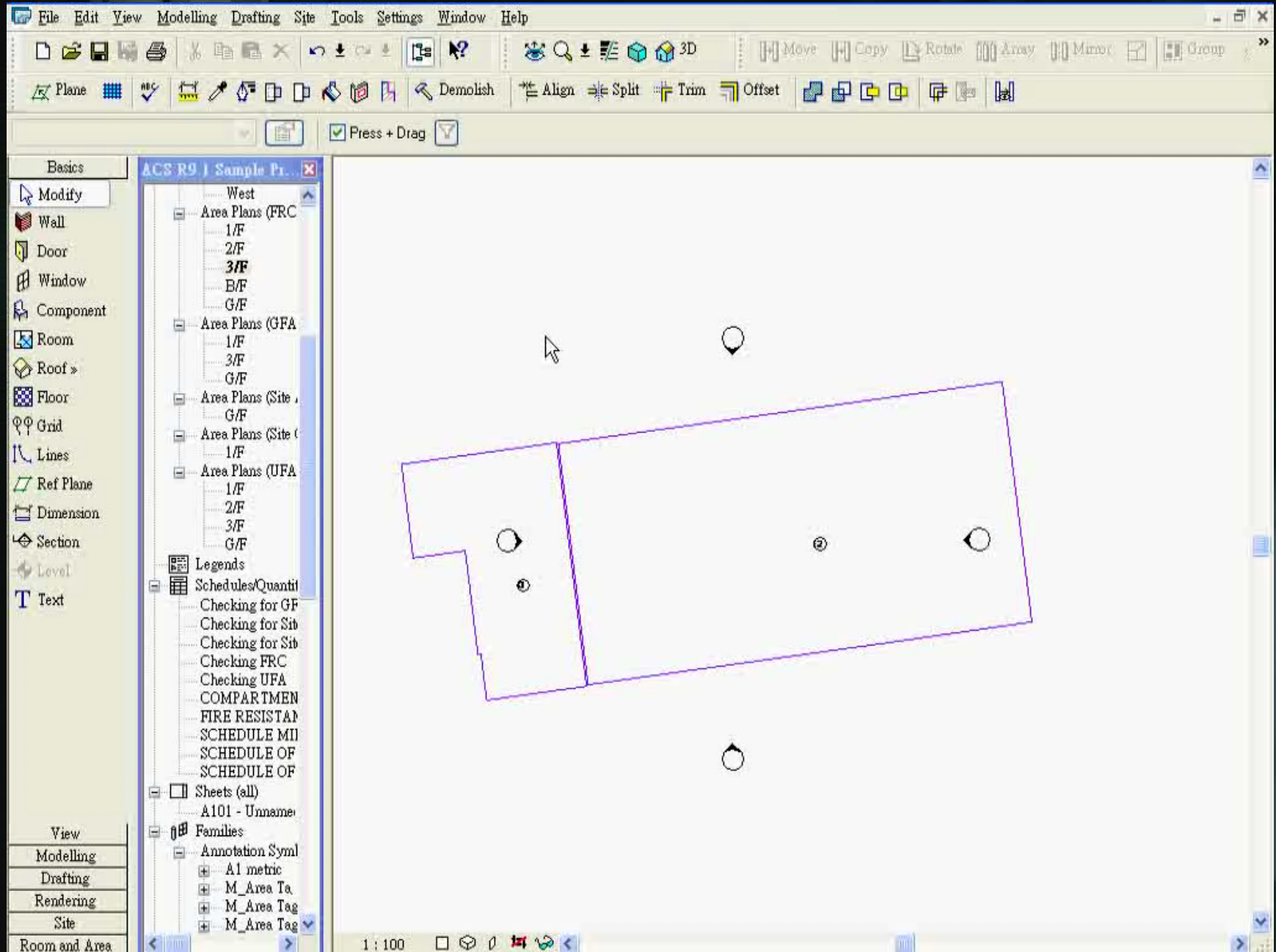


# FIRE RESISTING CONSTRUCTION

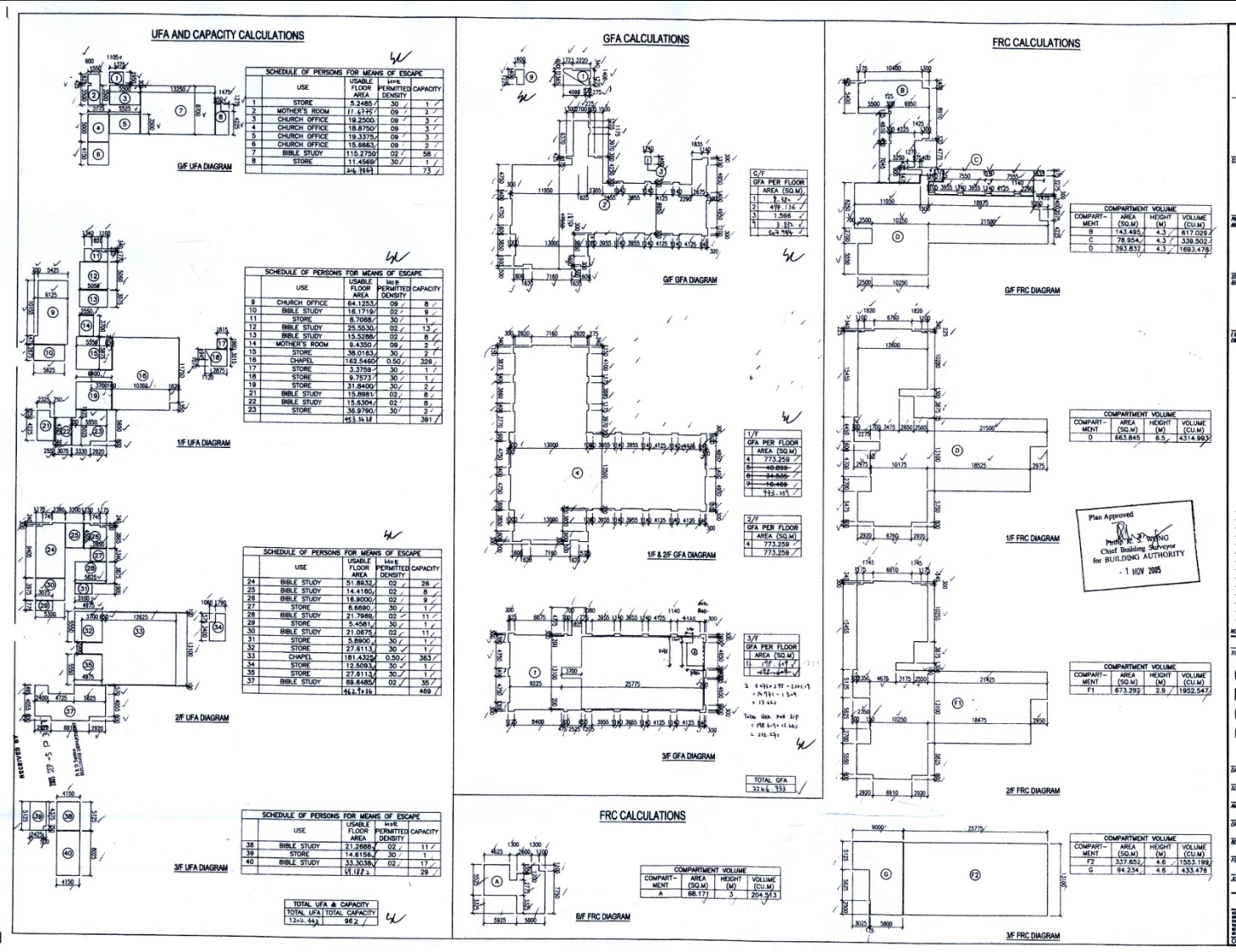




# FIRE RESISTING CONSTRUCTION



# EXAMPLE OF GOVERNMENT SUBMISSION ADOPTING BIM



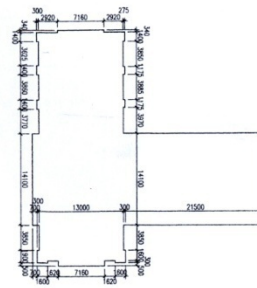


# EXAMPLE OF GOVERNMENT SUBMISSION ADOPTING BIM

## SITE COVERAGE & PLOT RATIO CALCULATION

### 1. UNDER BUILDING REGULATION

- A. CLASS OF SITE = A
- B. AREA OF SITE (FROM LEASE) = 1990.8 s.m.
- PROPOSED USE OF SITE = NON-DOMESTIC
- MEAN STREET LEVEL = 12.000
- BUILDING TOP LEVEL = 33.000 s.m.
- PROPOSED HEIGHT OF BUILDING = 21.00 m
- NON-DOMESTIC PERMITTED PERCENTAGE SITE COVERAGE = 95 %
- NON-DOMESTIC PERMITTED PLOT RATIO = 6.7
- C. SITE COVERAGE = 788.919 s.m.
- THEFORE SITE COVERAGE = 39.63 % < 95 %
- D. PLOT RATIO = 2.46 (2.7) s.m.
- PROPOSED NON-DOMESTIC GROSS FLOOR AREA = 1.91 < 6.7 (O.K.)
- PROPOSED NON-DOMESTIC PLOT RATIO = 2336.587 s.m. / 1990.8 s.m.



SITE COVERAGE DIAGRAM

### 2. UNDER LEASE CONDITION

- A. PERMITTED USE OF SITE = CHURCH TOGETHER WITH ANCILLARY CHURCH FACILITIES
- PROPOSED USE OF SITE = AS ABOVE
- B. GROSS FLOOR AREA : MAXIMUM PERMISSIBLE GFA UNDER LEASE = 2,520 s.m.
- TOTAL GFA OF PROPOSED DEVELOPMENT = 2,746.71 s.m.
- C. BUILDING HEIGHT : MEAN FORMATION LEVEL OF SITE : 12.000
- BUILDING TOP LEVEL : 33.000 s.m.
- BUILDING HEIGHT : 21.00 m
- D. SITE COVERAGE : MAXIMUM PERMISSIBLE SITE COVERAGE : 40%
- PROPOSED SITE COVERAGE : 39.63% < 40% (O.K.)
- E. PARKING SPACE : PARKING REQUIREMENT UNDER LEASE = 14 CARPARKING SPACES AND 1 U/AU BAY
- PROPOSED PARKING PROVISION = SAME AS ABOVE

STAIR	WIDTH OF STAIR PROVIDED (NOS. OF STOREY SERVED ABOVE GROUND)	DISCHARGE VALUE	ACTUAL NO. OF PERSON ABOVE
ST-A	1300	3	556
ST-B	1050	3	484
ST-C	1175	3	484
			1524

SCHEDULE MINIMUM NUMBER & WIDTH OF EXIT DOOR & EXIT ROUTE FROM EACH FLOOR											
FLOOR	CAPACITY OF ROOM OR STOREY	MIN. NO. OF EXIT DOORS (FROM ROOM OR STOREY) OR EXIT ROUTES (FROM STOREY)	MIN. TOTAL WIDTH OF				MIN. WIDTH OF EACH				
			REQUIRED		PROVIDED		REQUIRED		PROVIDED		
			EXIT DOORS	EXIT ROUTES	EXIT DOORS	EXIT ROUTES	EXIT DOORS	EXIT ROUTES	EXIT DOOR	EXIT ROUTE	
			Minimum	Normal							
1/F	391	2	3	3000	3000	3000	3000	3575	1050	1050	1050
2/F	489	2	3	3000	3000	3000	3575	1050	1050	1050	1050
3/F	29	1	3	—	—	1700	2350	750	850	850	850

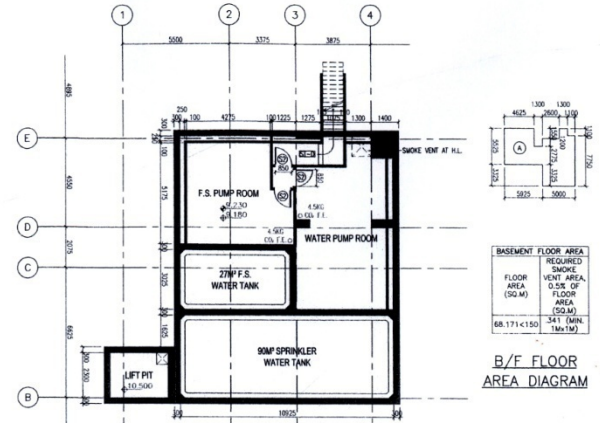
SCHEDULE OF SANITARY FITMENTS PROVISIONS																
LOCATION	USE	CAPACITY			W.C.				BATH				URINAL			
					M.		F.		M.		F.		M.			
		TOTAL	M	F	REQ'D	PRO'D	REQ'D	PRO'D	REQ'D	PRO'D	REQ'D	PRO'D	REQ'D	PRO'D		
G/F-2/F	OFFICE	18	13	6	1	1	1	1	1	1	1	1	1	1		
G/F-3/F	PLACE OF PUBLIC	943	472	471	5	34	30	7	10	5	74	30	5	8	10	11

COMPARTMENTS		FIRE RESISTANCE REQUIREMENT FOR ELEMENTS OF CONSTRUCTION															
		COMPARTMENT VOLUME		FRP REQ'D		R.C. WALL		R.C. SLAB		R.C. COLUMN		R.C. BEAM		R.C. STAIR			
A	CLASS			THK.	COVER	THK.	COVER	THK.	COVER	THK.	COVER	THK.	COVER	THK.	COVER		
B	(BASEMENT)	204,513	4	180	25	170	45*	35	450	280	60*	170	55*				
C	8 (CARPARKING)	617,629	1	75	15	100	20	25	200	200	30	65	20				
D	8 (CARPARKING)	339,502	1	75	15	100	20	25	200	200	30	65	20				
E	7 (PLACE OF ASSEMBLY)	1063,478	1	75	15	100	20	25	200	200	30	65	20				
F	7 (PLACE OF ASSEMBLY)	4314,693	1	75	15	100	20	25	200	200	30	65	20				
G	7 (PLACE OF ASSEMBLY)	3505,746	1	75	15	100	20	25	200	200	30	65	20				
H	7 (PLACE OF ASSEMBLY)	4314,478	1	75	15	100	20	25	200	200	30	65	20				
I (1+2)	DIFFERENT USES/CLASS	—	2	100	25	125	25	35	300	200	40	125	30				
	WALL/SLAB BETWEEN DIFFERENT USES/CLASS	—	2	100	25	125	25	35	300	200	40	125	30				

### REFUSE STORAGE CALCULATION

UFS = 1261.461 s.m. < 3,960 s.m.

THEREFORE, STORAGE CHAMBER IS NOT REQUIRED ACCORDING TO BERS(COR), 53(3)

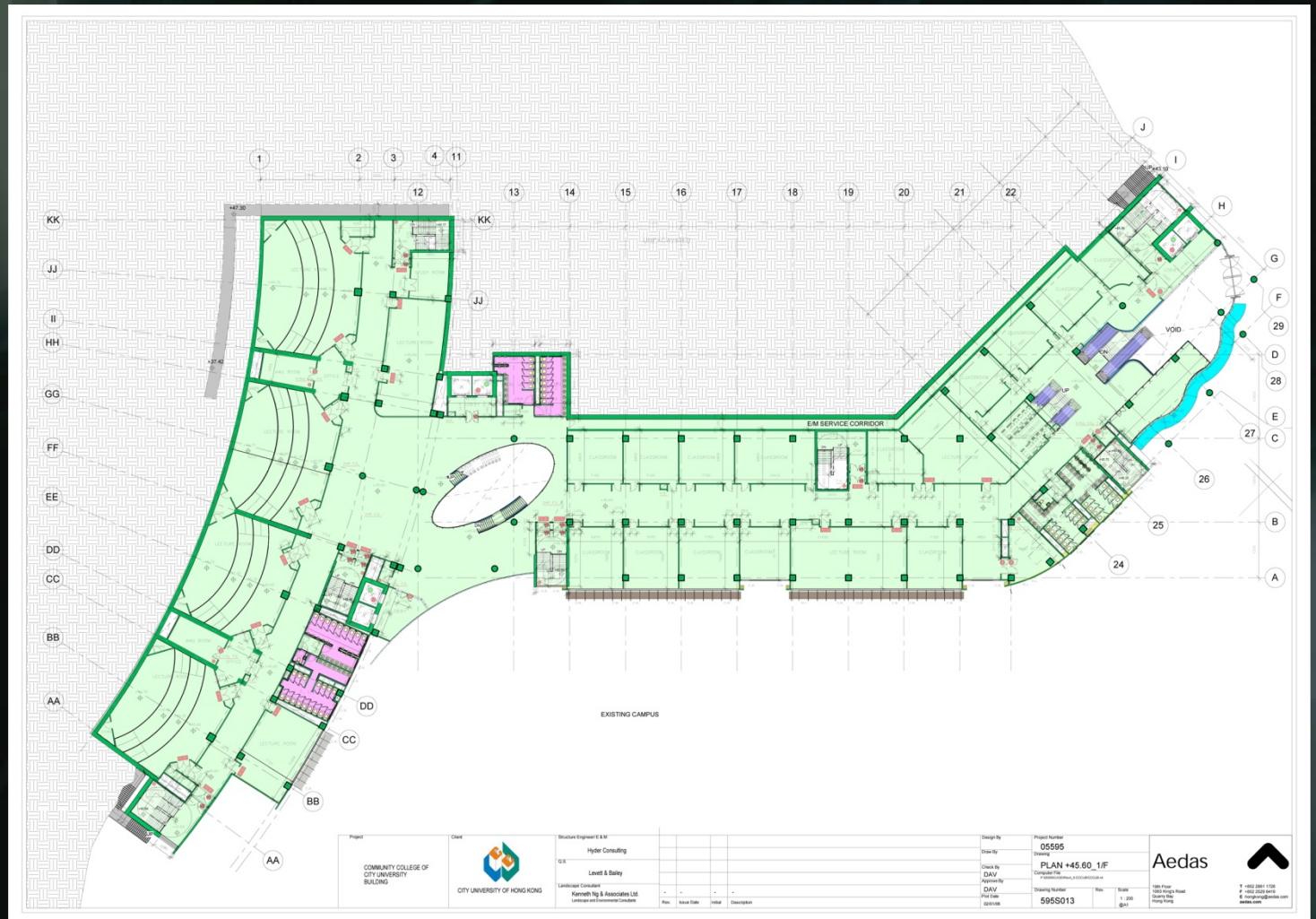


B/F PLAN, 1:100

SCHEDULE OF PERSONS FOR MEANS OF ESCAPE										
G/F	USE	CAPACITY OF EXIT ROOM	MIN. TOTAL WIDTH OF				MIN. WIDTH OF EACH			
			REQUIRE		PROVIDED		REQUIRE		PROVIDED	
			EXIT DOORS	EXIT ROUTES	EXIT DOORS	EXIT ROUTES	EXIT DOORS	EXIT ROUTES	EXIT DOORS	EXIT ROUTES
1	STORE	1	—	—	750	1050	—	—	750	1050
2	METAPHYSICS ROOM	2	1	—	750	1050	—	—	750	1050
3	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
4	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
5	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
6	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
7	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
8	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
9	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
10	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
11	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
12	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
13	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
14	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
15	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
16	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
17	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
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29	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
30	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
31	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
32	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
33	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
34	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
35	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
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41	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
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69	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
70	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
71	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
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96	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
97	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
98	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
99	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050
100	CHURCH OFFICE	2	1	—	750	1050	—	—	750	1050

1/F		SCHEDULE OF PROVISION FOR MEANS OF ESCAPE						MIN. TOTAL WIDTH OF		MIN. WIDTH OF EACH	
1/F	USE	CAPACITY OF EXIT	NO. OF EXIT	REQUIRED		PROVIDED		REQUIRED		PROVIDED	
				DOORS	ROUTES	DOORS	ROUTES	DOORS	ROUTES	DOORS	ROUTES
1	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
2	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
3	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
4	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
5	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
6	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
7	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
8	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
9	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
10	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
11	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
12	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
13	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
14	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
15	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
16	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
17	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
18	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
19	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
20	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
21	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
22	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050
23	CHURCH OFFICE	6	1	750	1050	750	1050	750	1050	750	1050

# EXAMPLE OF GOVERNMENT SUBMISSION ADOPTING BIM





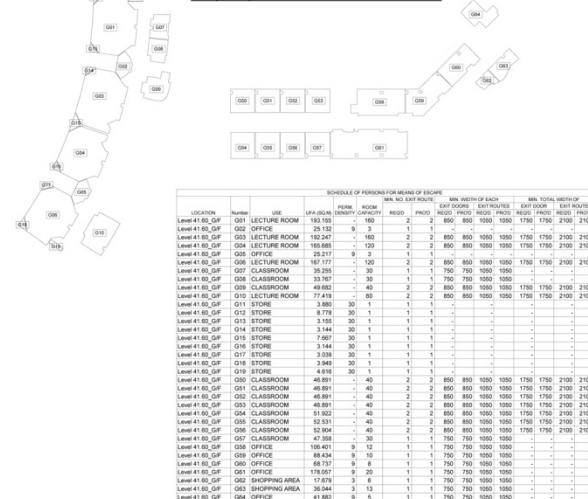
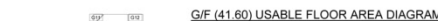
The image displays a set of architectural drawings for the Community College of City University Building. The drawings include:

- Section A-A (1:200):** A longitudinal section showing the building's internal structure, including lecture rooms, libraries, offices, a canteen, and a restaurant. It features a grid system from 12 to 21.
- Section B-B (1:200):** A longitudinal section showing the building's internal structure, including lecture rooms, libraries, offices, and a canteen. It features a grid system from 12 to 21.
- Section C-C (1:200):** A longitudinal section showing the building's internal structure, including lecture rooms, libraries, and offices.
- Section D-D (1:200):** A longitudinal section showing the building's internal structure, including lecture rooms, libraries, and offices.
- Elevation 2 (1:200):** A vertical elevation showing the building's facade, including a large curved section and a series of windows.
- Curtain Wall section (1:50):** A detailed section of the curtain wall, showing the glazing system and structural details.

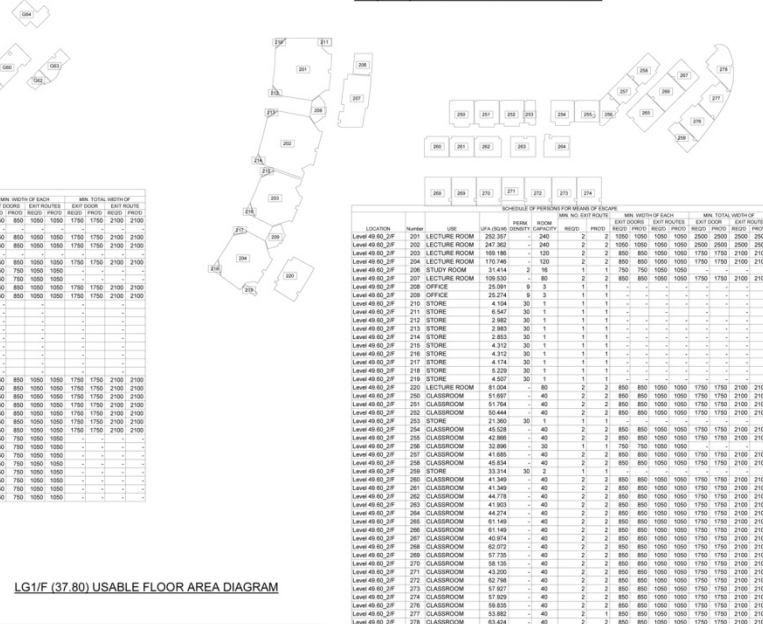
The drawings are color-coded and include various annotations, such as room names, dimensions, and grid lines. The building is shown in a yellow color, with internal walls and furniture in various shades of blue, green, and brown. The ground level is indicated by a grey line.



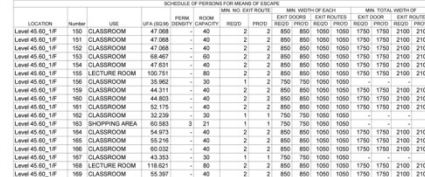
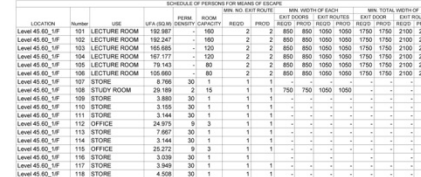
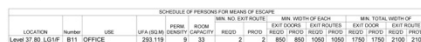
# EXAMPLE OF GOVERNMENT SUBMISSION ADOPTING BIM



LG2/F (34.00) USABLE FLOOR AREA DIAGRAM



LG1/F (37.80) USABLE FLOOR AREA DIAGRAM



Technical drawing of a bridge deck cross-section showing two types of reinforcement: TYPE\_P and TYPE\_R. The drawing includes dimensions for width (6300), height (1000), and spacing (53.80). It also shows the arrangement of reinforcement bars and the location of the center of gravity (G.C.).

Kil.  
65.80

Staircase No.	No. of storey served	Width of Staircase (mm)	Discharge Value (Person)	Factor
ST-01	6	2400	1480	
ST-02	6	1800	1060	
ST-03	4	1800	739	0.8
ST-04	8	1800	1196	
ST-05	8	1800	1196	
ST-06	8	1800	1196	
ST-07	8	2400	1688	
ST-08	2	1800	788	
<b>Permitted discharge value</b>			<b>9175</b>	
<b>Actual capacity of CCCUB</b>			<b>8788</b>	
<b>Therefore, Permitted Discharge Value (Person) &gt; Actual Capacity (Person)</b>				

1. For latrines and urinals connected a flush system to the requirement shall be -

- a) For boys - Two urinals for every 30 pupils  
b) For girls - One pan for every 20 pupils

KITCHEN		GLAZED WINDOW AREA					OPENABLE WINDOW AREA				
TYPE	LOCATION	UFA (sq.m)	TOTAL WIDTH	HEIGHT	PROVIDED (85% EFFECTIVE)	REQUIRED (116% of UFA)	TOTAL WIDTH	HEIGHT	PROVIDED (85% EFFECTIVE)	REQUIRED (116% of UFA)	
			12.600	2.850	30.524		12.600	2.030	21.741		
			12.600	1.800	19.278		12.600	0.980	10.496		
P	LEVEL -53.80 GridLine 14-14VC-D	472.540		sub-total	49.802	>	47.254				
P	LEVEL -53.80 GridLine 14-14H-E-J	172.513	9.100		25.835	>	9.100				

OFFICE		GLAZED WINDOW AREA				OPENABLE WINDOW AREA			
LOCATION	UFA (sq.m)	TOTAL LENGTH (m)	TOTAL HEIGHT (m)	PROVIDED (80% EFFECTIVE) (sq.m)	REQUIRED (10% of UFA) (sq.m)	TOTAL LENGTH (m)	TOTAL HEIGHT (m)	PROVIDED (80% EFFECTIVE) (sq.m)	REQUIRED (10% of UFA) (sq.m)
LEVEL +37.80 Groundline 12-13A-C	293.119	13.380	3.800	43.217	> 29.3119	Application for modification			
LEVEL +41.80 Groundline 18-21A-B	178.077	21.950	2.330	43.472	> 17.8077	21.950	1.920	28.359	> 11.129
LEVEL +42.00 Groundline 12-14B	291.350	10.800	2.600	36.040					
	(curtain wall)	46.300	2.150	24.098					
	(curtain wall)	43.000	3.800	138.890					
		with total		242.938	> 241.838	Application for modification			
LEVEL +45.80 Groundline 13-18F-H, 19-28F-J	2022.023	10.800	2.440	91.049					
		10.000	2.700	24.098					
		30.450	2.250	58.236					
	(curtain wall)	43.000	3.800	138.890					
		with total		312.273	> 202.202	Application for modification			

SCHEDULE OF A/C PLANT ROOM AREA				
LOCATION	LOCATION OF THE PLANT ROOM	TOTAL G.R.A. OF FLOOR WHERE THE PLANT ROOM IS SITUATED	TOTAL A/C AREA	PERCENTAGE OF PAULTRAP AREA OF EACH FLOOR
G/F (+14.10m)	GRID 13-14H		24.3081	
	GRID 20-20C	451.1267	24.4715	
	GRID 22-22B		24.3891	87.564
	GRID 18-18H		24.3891	1.9374
1/F (+15.60m)	GRID 22-22B	4532.375	24.3891	
	GRID 22-22B		24.3891	84.721
	GRID 22-22B		24.3891	1.8744
	GRID 22-22B		24.3891	
2/F (+16.80m)	GRID 22-22B	5235.575	38.851	
	GRID 22-22B		38.851	112.816
	GRID 10-10C		25.176	2.1514
	GRID 27-27H		25.176	
3/F (+13.30m)	GRID 3-3J	5387.226	44.311	
	GRID 23-23E		19.303	2.0714
	GRID 3-3J		25.364	
	GRID 24-24B		25.710	
4/F (+15.20m)	GRID 22-22B	5615.262	30.089	
	GRID 22-22B		31.284	100.492
	GRID 22-22B		25.368	1.7954
	GRID 22-22B		25.725	
5/F (+16.20m)	GRID 22-22B	5545.511	29.845	
	GRID 22-22B		102.232	1.8414
	GRID 33-33K		17.822	
	GRID 22-22B		23.578	
6/E (+16.50m)	GRID 22-22B		25.489	
	GRID 22-22B	5416.710	97.061	1.7064

### PLLOT RATIO & SITE COVERAGE CALCULATION

#### 1) SITE COVERAGE

Site = CLASS 2 SITE  
 Site Area = 3555  
 Main Street Level = 3.555  
 Height of Building = 58.550 - 3.555 = 54.995 (Over all height not exceeding 55m)

For Non-Domestic Area (GF + 1GF)  
 Fire Coverage Provided under Fire Schedule of Building (Planning Regulations) = 67.0%  
 Site Coverage Provided over 15m (up to 1GF) = 67.4% - 67.5%

For Domestic Area (1 GF + 1GF)  
 Fire Coverage Provided under Fire Schedule of Building (Planning Regulations) = 30.7%  
 Site Coverage Provided over 15m = 32.102 / 90.5 = 100%  
 Site Coverage Provided over 15m = 32.385 - 100%

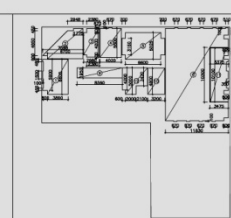
#### 2) PLOT RATIO

Permitted Domestic Plot Ratio = 7  
 Under Fire Schedule of Building (Planning Regulations) = 12.1  
 GFA of Domestic Plot = 600.621 sq.m  
 Actual P.R. of Non-Domestic Plot = 0.737  
 Permitted P.R. of Non-Domestic Plot = 0.737 (12.1 / 16.4)  
 GFA of Non-Domestic Plot = 630.477 / 80.5 = 7.832  
 Actual P.R. of Non-Domestic Plot = 0.905 - 100.00%

#### GROSS FLOOR AREA CALCULATION

FLOOR	AREA
1. GROUND FLOOR	600.621
2. 1ST FLOOR	600.621
3. 2ND FLOOR	600.621
4. 3RD FLOOR	600.621
5. 4TH FLOOR	600.621
6. 5TH FLOOR	600.621
7. 6TH FLOOR	600.621
8. 7TH FLOOR	600.621
9. 8TH FLOOR	600.621
10. 9TH FLOOR	600.621
11. 10TH FLOOR	600.621
12. 11TH FLOOR	600.621
13. 12TH FLOOR	600.621
14. 13TH FLOOR	600.621
15. 14TH FLOOR	600.621
16. 15TH FLOOR	600.621
17. 16TH FLOOR	600.621
18. 17TH FLOOR	600.621
19. 18TH FLOOR	600.621
20. 19TH FLOOR	600.621
21. 20TH FLOOR	600.621
22. 21ST FLOOR	600.621
23. 22ND FLOOR	600.621
24. 23RD FLOOR	600.621
25. 24TH FLOOR	600.621
26. 25TH FLOOR	600.621
27. 26TH FLOOR	600.621
28. 27TH FLOOR	600.621
29. 28TH FLOOR	600.621
30. 29TH FLOOR	600.621
31. 30TH FLOOR	600.621
32. 31ST FLOOR	600.621
33. 32ND FLOOR	600.621
34. 33RD FLOOR	600.621
35. 34TH FLOOR	600.621
36. 35TH FLOOR	600.621
37. 36TH FLOOR	600.621
38. 37TH FLOOR	600.621
39. 38TH FLOOR	600.621
40. 39TH FLOOR	600.621
41. 40TH FLOOR	600.621
42. 41ST FLOOR	600.621
43. 42ND FLOOR	600.621
44. 43RD FLOOR	600.621
45. 44TH FLOOR	600.621
46. 45TH FLOOR	600.621
47. 46TH FLOOR	600.621
48. 47TH FLOOR	600.621
49. 48TH FLOOR	600.621
50. 49TH FLOOR	600.621
51. 50TH FLOOR	600.621
52. 51ST FLOOR	600.621
53. 52ND FLOOR	600.621
54. 53RD FLOOR	600.621
55. 54TH FLOOR	600.621
56. 55TH FLOOR	600.621
57. 56TH FLOOR	600.621
58. 57TH FLOOR	600.621
59. 58TH FLOOR	600.621
60. 59TH FLOOR	600.621
61. 60TH FLOOR	600.621
62. 61ST FLOOR	600.621
63. 62ND FLOOR	600.621
64. 63RD FLOOR	600.621
65. 64TH FLOOR	600.621
66. 65TH FLOOR	600.621
67. 66TH FLOOR	600.621
68. 67TH FLOOR	600.621
69. 68TH FLOOR	600.621
70. 69TH FLOOR	600.621
71. 70TH FLOOR	600.621
72. 71ST FLOOR	600.621
73. 72ND FLOOR	600.621
74. 73RD FLOOR	600.621
75. 74TH FLOOR	600.621
76. 75TH FLOOR	600.621
77. 76TH FLOOR	600.621
78. 77TH FLOOR	600.621
79. 78TH FLOOR	600.621
80. 79TH FLOOR	600.621
81. 80TH FLOOR	600.621
82. 81ST FLOOR	600.621
83. 82ND FLOOR	600.621
84. 83RD FLOOR	600.621
85. 84TH FLOOR	600.621
86. 85TH FLOOR	600.621
87. 86TH FLOOR	600.621
88. 87TH FLOOR	600.621
89. 88TH FLOOR	600.621
90. 89TH FLOOR	600.621
91. 90TH FLOOR	600.621
92. 91ST FLOOR	600.621
93. 92ND FLOOR	600.621
94. 93RD FLOOR	600.621
95. 94TH FLOOR	600.621
96. 95TH FLOOR	600.621
97. 96TH FLOOR	600.621
98. 97TH FLOOR	600.621
99. 98TH FLOOR	600.621
100. 99TH FLOOR	600.621
101. 100TH FLOOR	600.621
102. 101ST FLOOR	600.621
103. 102ND FLOOR	600.621
104. 103RD FLOOR	600.621
105. 104TH FLOOR	600.621
106. 105TH FLOOR	600.621
107. 106TH FLOOR	600.621
108. 107TH FLOOR	600.621
109. 108TH FLOOR	600.621
110. 109TH FLOOR	600.621
111. 110TH FLOOR	600.621
112. 111ST FLOOR	600.621
113. 112ND FLOOR	600.621
114. 113RD FLOOR	

26 36 48 60 72 84 96 108 120 132 144 156 168 180 192 216 240 270 300 324 360 420 480 540 600 648 720 840 960 1080 1260 1440 1680 1800 2160 2520 2880 3240 3600 4320 4800 5040 5400 5760 6480 7200 7560 8100 8640 9360 10080 10800 11520 12240 12960 13680 14400 15120 16560 18000 19440 21600 23760 25200 27000 28800 30240 32400 34560 36000 37440 39600 42120 43200 45360 47520 49680 51840 54000 56160 58320 60480 62640 64800 66960 69120 71280 73440 75600 77760 80000 82080 84240 86400 88560 90720 92880 95040 97200 99360 101520 103680 105840 108000 110160 112320 114480 116640 118800 120960 123120 125280 127440 129600 131760 133920 136080 138240 140400 142560 144720 146880 149040 151200 153360 155520 157680 159840 162000 164160 166320 168480 170640 172800 174960 177120 179280 181440 183600 185760 187920 190080 192240 194400 196560 198720 200880 203040 205200 207360 209520 211680 213840 216000 218160 220320 222480 224640 226800 228960 231120 233280 235440 237600 239760 241920 244080 246240 248400 250560 252720 254880 257040 259200 261360 263520 265680 267840 270000 272160 274320 276480 278640 280800 282960 285120 287280 289440 291600 293760 295920 298080 300240 302400 304560 306720 308880 311040 313200 315360 317520 319680 321840 324000 326160 328320 330480 332640 334800 336960 339120 341280 343440 345600 347760 349920 352080 354240 356400 358560 360720 362880 365040 367200 369360 371520 373680 375840 378000 380160 382320 384480 386640 388800 390960 393120 395280 397440 399600 401760 403920 406080 408240 410400 412560 414720 416880 419040 421200 423360 425520 427680 429840 432000 434160 436320 438480 440640 442800 444960 447120 449280 451440 453600 455760 457920 460080 462240 464400 466560 468720 470880 473040 475200 477360 479520 481680 483840 486000 488160 490320 492480 494640 496800 498960 501120 503280 505440 507600 509760 511920 514080 516240 518400 520560 522720 524880 527040 529200 531360 533520 535680 537840 540000 542160 544320 546480 548640 550800 552960 555120 557280 559440 561600 563760 565920 568080 570240 572400 574560 576720 578880 581040 583200 585360 587520 589680 591840 594000 596160 598320 600480 602640 604800 606960 609120 611280 613440 615600 617760 619920 622080 624240 626400 628560 630720 632880 635040 637200 639360 641520 643680 645840 648000 650160 652320 654480 656640 658800 660960 663120 665280 667440 669600 671760 673920 676080 678240 680400 682560 684720 686880 689040 691200 693360 695520 697680 699840 702000 704160 706320 708480 710640 712800 714960 717120 719280 721440 723600 725760 727920 730080 732240 734400 736560 738720 740880 743040 745200 747360 749520 751680 753840 756000 758160 760320 762480 764640 766800 768960 771120 773280 775440 777600 779760 781920 784080 786240 788400 790560 792720 794880 797040 799200 801360 803520 805680 807840 810000 812160 814320 816480 818640 820800 822960 825120 827280 829440 831600 833760 835920 838080 840240 842400 844560 846720 848880 851040 853200 855360 857520 859680 861840 864000 866160 868320 870480 872640 874800 876960 879120 881280 883440 885600 887760 889920 892080 894240 896400 898560 900720 902880 905040 907200 909360 911520 913680 915840 918000 920160 922320 924480 926640 928800 930960 933120 935280 937440 939600 941760 943920 946080 948240 950400 952560 954720 956880 959040 961200 963360 965520 967680 969840 972000 974160 976320 978480 980640 982800 984960 987120 989280 991440 993600 995760 997920 1000080 1002240 1004400 1006560 1008720 1010880 1013040 1015200 1017360 1019520 1021680 1023840 1026000 1028160 1030320 1032480 1034640 1036800 1038960 1041120 1043280 1045440 1047600 1049760 1051920 1054080 1056240 1058400 1060560 1062720 1064880 1067040 1069200 1071360 1073520 1075680 1077840 1080000 1082160 1084320 1086480 1088640 1090800 1092960 1095120 1097280 1099440 1101600 1103760 1105920 1108080 1110240 1112400 1114560 1116720 1118880 1121040 1123200 1125360 1127520 1129680 1131840 1134000 1136160 1138320 1140480 1142640 1144800 1146960 1149120 1151280 1153440 1155600 1157760 1159920 1162080 1164240 1166400 1168560 1170720 1172880 11750	
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[illegible][illegible]

Technical drawing of a mechanical assembly, likely a pump or motor component, showing a cross-section with various parts labeled with numbers and letters. Dimensions are provided in millimeters (mm). The drawing includes a main view and a detailed view of a specific component.

1000

UPPER PLAN OF 12/F UFA DIAGRAM



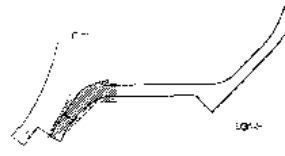
Architectural floor plan of the 3rd floor of the Aedas building. The plan shows a large, irregularly shaped building with a central courtyard area. The plan is overlaid with a grid system with letters A through R and numbers 1 through 24. Various rooms and areas are labeled, including 'RECEPTION', 'LOBBY', 'CORRIDOR', 'STAIRS', and 'ELEVATOR'. A north arrow is located in the bottom right corner. The plan is signed 'Aedas' and 'B D SUBMISSION'.



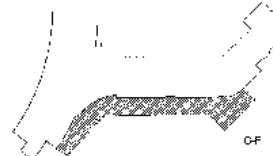
# STATUTORY SUBMISSION



① EVA of Level 34.00\_LG2/F  
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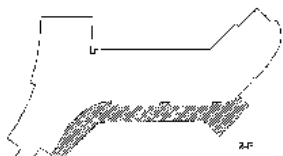
② EVA of Level 37.80 LG1/F  
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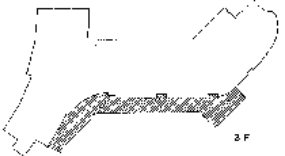
③ EVA of Level 41.60\_GrF  
1:1000



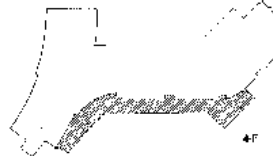
④ EVA of Level 45.60... 1/F  
1:1000



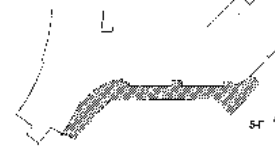
5 EVA of Level 40.80 2/F  
1:1000



⑥ EVA of Level 53.80\_3/F  
1:1000

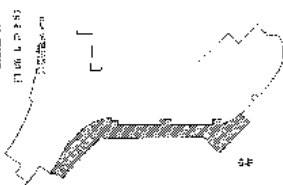


7) EVA of Level 5B.2D\_4/F  
1.1300



8 EVA of Level 62.00 5/F  
1 : 1/10/22

B D SUBMISSION



9 EVA of Level 65.80\_6/F  
1:1000

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

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

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Date		Time		Lat		Long		Alt		Speed		Heading		Course		Status	
Day	Month	Year	Hour	Min	Sec	N	E	M	S	Feet	Kts	Mph	True	Magnetic	Compass	Waypoint	Remarks
01	01	2000	12	00	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	01	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	02	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	03	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	04	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	05	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	06	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	07	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	08	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	09	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	10	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	11	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	12	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	13	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	14	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	15	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	16	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	17	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	18	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	19	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	20	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	21	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	22	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	23	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	24	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	25	00	34	00	00	00	0	0	0	0	0	0	0	0
01	01	2000	12	26	00	34	00	00	00	0	0	0	0	0	0	0	0

Sl. No.	Name of the person	Age	Sex	Religion	Marital Status	Occupation	Address	Signature	Date
1	Mr. A. K. Singh	45	M	Hindu	Married	Teacher	123 Main St, Delhi	[Signature]	10/10/2023
2	Mr. B. S. Sharma	52	M	Hindu	Married	Engineer	456 Park Ave, Mumbai	[Signature]	11/10/2023
3	Mr. C. P. Reddy	38	M	Hindu	Married	Doctor	789 Lake Dr, Bangalore	[Signature]	12/10/2023
4	Mr. D. R. Singh	60	M	Hindu	Married	Retired	101 Hill Top, Kolkata	[Signature]	13/10/2023
5	Mr. E. M. Khan	42	M	Muslim	Married	Business	202 Canal St, Chennai	[Signature]	14/10/2023
6	Mr. F. J. D'Souza	55	M	Catholic	Married	Lawyer	303 Church St, Goa	[Signature]	15/10/2023
7	Mr. G. K. Singh	30	M	Hindu	Single	Student	404 Main St, Lucknow	[Signature]	16/10/2023
8	Mr. H. S. Reddy	48	M	Hindu	Married	Farmer	505 Village Rd, Hyderabad	[Signature]	17/10/2023
9	Mr. I. P. Singh	58	M	Hindu	Married	Retired	606 Canal St, Jaipur	[Signature]	18/10/2023
10	Mr. J. R. D'Souza	40	M	Catholic	Married	Teacher	707 Main St, Pondicherry	[Signature]	19/10/2023
11	Mr. K. M. Singh	35	M	Hindu	Married	Engineer	808 Park Ave, Chandigarh	[Signature]	20/10/2023
12	Mr. L. S. Reddy	50	M	Hindu	Married	Business	909 Lake Dr, Coimbatore	[Signature]	21/10/2023
13	Mr. M. P. Singh	43	M	Hindu	Married	Doctor	1010 Hill Top, Bhopal	[Signature]	22/10/2023
14	Mr. N. R. D'Souza	53	M	Catholic	Married	Lawyer	1111 Church St, Thiruvananthapuram	[Signature]	23/10/2023
15	Mr. O. K. Singh	33	M	Hindu	Single	Student	1212 Main St, Shimla	[Signature]	24/10/2023
16	Mr. P. S. Reddy	47	M	Hindu	Married	Farmer	1313 Village Rd, Tirupur	[Signature]	25/10/2023
17	Mr. Q. P. Singh	57	M	Hindu	Married	Retired	1414 Canal St, Varanasi	[Signature]	26/10/2023
18	Mr. R. J. D'Souza	41	M	Catholic	Married	Teacher	1515 Main St, Durgam	[Signature]	27/10/2023
19	Mr. S. M. Singh	36	M	Hindu	Married	Engineer	1616 Park Ave, Raipur	[Signature]	28/10/2023
20	Mr. T. S. Reddy	49	M	Hindu	Married	Business	1717 Lake Dr, Solapur	[Signature]	29/10/2023
21	Mr. U. P. Singh	54	M	Hindu	Married	Retired	1818 Hill Top, Bikaner	[Signature]	30/10/2023
22	Mr. V. R. D'Souza	44	M	Catholic	Married	Lawyer	1919 Church St, Kavaratti	[Signature]	31/10/2023
23	Mr. W. K. Singh	34	M	Hindu	Single	Student	2020 Main St, Dehra Dun	[Signature]	01/11/2023
24	Mr. X. S. Reddy	46	M	Hindu	Married	Farmer	2121 Village Rd, Bellary	[Signature]	02/11/2023
25	Mr. Y. P. Singh	56	M	Hindu	Married	Retired	2222 Canal St, Meerut	[Signature]	03/11/2023
26	Mr. Z. J. D'Souza	46	M	Catholic	Married	Teacher	2323 Main St, Dibrugarh	[Signature]	04/11/2023
27	Mr. A. M. Singh	37	M	Hindu	Married	Engineer	2424 Park Ave, Bhubaneswar	[Signature]	05/11/2023
28	Mr. B. S. Reddy	51	M	Hindu	Married	Business	2525 Lake Dr, Gulbarga	[Signature]	06/11/2023
29	Mr. C. P. Singh	61	M	Hindu	Married	Retired	2626 Hill Top, Jodhpur	[Signature]	07/11/2023
30	Mr. D. R. D'Souza	41	M	Catholic	Married	Lawyer	2727 Church St, Karaikal	[Signature]	08/11/2023
31	Mr. E. K. Singh	31	M	Hindu	Single	Student	2828 Main St, Dehra Dun	[Signature]	09/11/2023
32	Mr. F. S. Reddy	45	M	Hindu	Married	Farmer	2929 Village Rd, Bellary	[Signature]	10/11/2023
33	Mr. G. P. Singh	55	M	Hindu	Married	Retired	3030 Canal St, Meerut	[Signature]	11/11/2023
34	Mr. H. J. D'Souza	45	M	Catholic	Married	Teacher	3131 Main St, Dibrugarh	[Signature]	12/11/2023
35	Mr. I. M. Singh	36	M	Hindu	Married	Engineer	3232 Park Ave, Bhubaneswar	[Signature]	13/11/2023
36	Mr. J. S. Reddy	50	M	Hindu	Married	Business	3333 Lake Dr, Gulbarga	[Signature]	14/11/2023
37	Mr. K. P. Singh	60	M	Hindu	Married	Retired	3434 Hill Top, Jodhpur	[Signature]	15/11/2023
38	Mr. L. R. D'Souza	40	M	Catholic	Married	Lawyer	3535 Church St, Karaikal	[Signature]	16/11/2023
39	Mr. M. K. Singh	30	M	Hindu	Single	Student	36	[Signature]	17/11/2023
40	Mr. N. S. Reddy	44	M	Hindu	Married	Farmer	3737 Main St, Dibrugarh	[Signature]	18/11/2023
41	Mr. O. P. Singh	54	M	Hindu	Married	Retired	3838 Canal St, Meerut	[Signature]	19/11/2023
42	Mr. P. J. D'Souza	44	M	Catholic	Married	Teacher	3939 Main St, Dibrugarh	[Signature]	20/11/2023
43	Mr. Q. M. Singh	35	M	Hindu	Married	Engineer	4040 Park Ave, Bhubaneswar	[Signature]	21/11/2023
44	Mr. R. S. Reddy	49	M	Hindu	Married	Business	4141 Lake Dr, Gulbarga	[Signature]	22/11/2023
45	Mr. S. P. Singh	59	M	Hindu	Married	Retired	4242 Hill Top, Jodhpur	[Signature]	23/11/2023
46	Mr. T. R. D'Souza	39	M	Catholic	Married	Lawyer	4343 Church St, Karaikal	[Signature]	24/11/2023
47	Mr. U. K. Singh	29	M	Hindu	Single	Student	4444 Main St, Dibrugarh	[Signature]	25/11/2023
48	Mr. V. S. Reddy	43	M	Hindu	Married	Farmer	4545 Village Rd, Bellary	[Signature]	26/11/2023
49	Mr. W. P. Singh	53	M	Hindu	Married	Retired	4646 Canal St, Meerut	[Signature]	27/11/2023
50	Mr. X. J. D'Souza	43	M	Catholic	Married	Teacher	4747 Main St, Dibrugarh	[Signature]	28/11/2023
51	Mr. Y. M. Singh	34	M	Hindu	Married	Engineer	4848 Park Ave, Bhubaneswar	[Signature]	29/11/2023
52	Mr. Z. S. Reddy	48	M	Hindu	Married	Business	4949 Lake Dr, Gulbarga	[Signature]	30/11/2023
53	Mr. A. P. Singh	58	M	Hindu	Married	Retired	5050 Hill Top, Jodhpur	[Signature]	01/12/2023
54	Mr. B. R. D'Souza	38	M	Catholic	Married	Lawyer	5151 Church St, Karaikal	[Signature]	02/12/2023
55	Mr. C. K. Singh	28	M	Hindu	Single	Student	5252 Main St, Dibrugarh	[Signature]	03/12/2023
56	Mr. D. S. Reddy	42	M	Hindu	Married	Farmer	5353 Village Rd, Bellary	[Signature]	04/12/2023
57	Mr. E. P. Singh	52	M	Hindu	Married	Retired	5454 Canal St, Meerut	[Signature]	05/12/2023
58	Mr. F. R. D'Souza	42	M	Catholic	Married	Teacher	5555 Main St, Dibrugarh	[Signature]	06/12/2023
59	Mr. G. M. Singh	33	M	Hindu	Married	Engineer	5656 Park Ave, Bhubaneswar	[Signature]	07/12/2023
60	Mr. H. S. Reddy	47	M	Hindu	Married	Business	5757 Lake Dr, Gulbarga	[Signature]	08/12/2023
61	Mr. I. P. Singh	57	M	Hindu	Married	Retired	5858 Hill Top, Jodhpur	[Signature]	09/12/2023
62	Mr. J. R. D'Souza	37	M	Catholic	Married	Lawyer	5959 Church St, Karaikal	[Signature]	10/12/2023
63	Mr. K. K. Singh	27	M	Hindu	Single	Student	6060 Main St, Dibrugarh	[Signature]	11/12/2023
64	Mr. L. S. Reddy	41	M	Hindu	Married	Farmer	6161 Village Rd, Bellary	[Signature]	12/12/2023
65	Mr. M. P. Singh	51	M	Hindu	Married	Retired	6262 Canal St, Meerut	[Signature]	13/12/2023
66	Mr. N. R. D'Souza	41	M	Catholic	Married	Teacher	6363 Main St, Dibrugarh	[Signature]	14/12/2023
67	Mr. O. K. Singh	32	M	Hindu	Married	Engineer	6464 Park Ave, Bhubaneswar	[Signature]	15/12/2023
68	Mr. P. S. Reddy	46	M	Hindu	Married	Business	6565 Lake Dr, Gulbarga	[Signature]	16/12/2023
69	Mr. Q. P. Singh	56	M	Hindu	Married	Retired	6666 Hill Top, Jodhpur	[Signature]	17/12/2023
70	Mr. R. J. D'Souza	36	M	Catholic	Married	Lawyer	6767 Church St, Karaikal	[Signature]	18/12/2023
71	Mr. S. M. Singh	26	M	Hindu	Single	Student	6868 Main St, Dibrugarh	[Signature]	19/12/2023
72	Mr. T. S. Reddy	40	M	Hindu	Married	Farmer	6969 Village Rd, Bellary	[Signature]	20/12/2023
73	Mr. U. P. Singh	50	M	Hindu	Married	Retired	7070 Canal St, Meerut	[Signature]	21/12/2023
74	Mr. V. R. D'Souza	40	M	Catholic	Married	Teacher	7171 Main St, Dibrugarh	[Signature]	22/12/2023
75	Mr. W. K. Singh	31	M	Hindu	Married	Engineer	7272 Park Ave, Bhubaneswar	[Signature]	23/12/2023
76	Mr. X. S. Reddy	45	M	Hindu	Married	Business	7373 Lake Dr, Gulbarga	[Signature]	24/12/2023
77	Mr. Y. P. Singh	55	M	Hindu	Married	Retired	7474 Hill Top, Jodhpur	[Signature]	25/12/2023
78	Mr. Z. J. D'Souza	35	M	Catholic	Married	Lawyer	7575 Church St, Karaikal	[Signature]	26/12/2023
79	Mr. A. M. Singh	25	M	Hindu	Single	Student	7676 Main St, Dibrugarh	[Signature]	27/12/2023
80	Mr. B. S. Reddy	39	M	Hindu	Married	Farmer	7777 Village Rd, Bellary	[Signature]	28/12/2023
81	Mr. C. P. Singh	49	M	Hindu	Married	Retired	7878 Canal St, Meerut	[Signature]	29/12/2023
82	Mr. D. R. D'Souza	39	M	Catholic	Married	Teacher	7979 Main St, Dibrugarh	[Signature]	30/12/2023
83	Mr. E. K. Singh	29	M	Hindu	Married	Engineer	8080 Park Ave, Bhubaneswar	[Signature]	31/12/2023
84	Mr. F. S. Reddy	43	M	Hindu	Married	Business	8181 Lake Dr, Gulbarga	[Signature]	01/01/2024
85	Mr. G. P. Singh	53	M	Hindu	Married	Retired	8282 Hill Top, Jodhpur	[Signature]	02/01/2024
86	Mr. H. J. D'Souza	33	M	Catholic	Married	Lawyer	8383 Church St, Karaikal	[Signature]	03/01/2024
87	Mr. I. M. Singh	23	M	Hindu	Single	Student	8484 Main St, Dibrugarh	[Signature]	04/01/2024
88	Mr. J. S. Reddy	37	M	Hindu	Married	Farmer	8585 Village Rd, Bellary	[Signature]	05/01/2024
89	Mr. K. P. Singh	47	M	Hindu	Married	Retired	8686 Canal St, Meerut	[Signature]	06/01/2024
90	Mr. L. R. D'Souza	37	M	Catholic	Married	Teacher	8787 Main St, Dibrugarh	[Signature]	07/01/2024
91	Mr. M. K. Singh	28	M	Hindu	Married	Engineer	8888 Park Ave, Bhubaneswar	[Signature]	08/01/2024
92	Mr. N. S. Reddy	42	M	Hindu	Married	Business	8989 Lake Dr, Gulbarga	[Signature]	09/01/2024
93	Mr. O. P. Singh	52	M	Hindu	Married	Retired	9090 Hill Top, Jodhpur	[Signature]	10/01/2024
94	Mr. P. J. D'Souza	32	M	Catholic	Married	Lawyer	9191 Church St, Karaikal	[Signature]	11/01/2024
95	Mr. Q. M. Singh	22	M	Hindu	Single	Student	9292 Main St, Dibrugarh	[Signature]	12/01/2024
96	Mr. R. S. Reddy	36	M	Hindu	Married	Farmer	9393 Village Rd, Bellary	[Signature]	13/01/2024
97	Mr. S. P. Singh	46	M	Hindu	Married	Retired	9494 Canal St, Meerut	[Signature]	14/01/2024
98	Mr. T. R. D'Souza	36	M	Catholic	Married	Teacher	9595 Main St, Dibrugarh	[Signature]	15/01/2024
99	Mr. U. K. Singh	27	M	Hindu	Married	Engineer	9696 Park Ave, Bhubaneswar	[Signature]	16/01/2024
100	Mr. V. S. Reddy	41	M	Hindu	Married	Business	9797 Lake Dr, Gulbarga	[Signature]	17/01/2024

PERFORMANCE							
2000	2,373	f	451.85%	=	1,589,971	21.4%	2000
2001	2,579	f	102.83%	=	1,589,971	21.0%	2001
2002	2,664	f	46.80%	=	1,589,971	21.0%	2002
2003	2,703	f	47.23%	=	1,589,971	21.0%	2003
2004	2,748	f	48.82%	=	1,589,971	21.0%	2004
2005	2,780	f	49.80%	=	1,589,971	21.0%	2005
2006	2,810	f	48.85%	=	1,589,971	21.0%	2006
2007	2,820	f	49.23%	=	1,589,971	21.0%	2007
2008	2,830	f	49.23%	=	1,589,971	21.0%	2008

7/20/2002  
 CITY OF KANSAS, MO  
 Chief Building Surveyor  
 600 S. 10TH AVE. SUITE 200  
 KANSAS CITY, MO 64105

 <p>CITY OF VANCOUVER COMMUNITY DEVELOPMENT BUREAU</p>	 <p>CITY OF VANCOUVER COMMUNITY DEVELOPMENT BUREAU</p>	 <p>CITY OF VANCOUVER COMMUNITY DEVELOPMENT BUREAU</p>	 <p>CITY OF VANCOUVER COMMUNITY DEVELOPMENT BUREAU</p>	 <p>CITY OF VANCOUVER COMMUNITY DEVELOPMENT BUREAU</p>	 <p>CITY OF VANCOUVER COMMUNITY DEVELOPMENT BUREAU</p>	 <p>CITY OF VANCOUVER COMMUNITY DEVELOPMENT BUREAU</p>	 <p>CITY OF VANCOUVER COMMUNITY DEVELOPMENT BUREAU</p>	 <p>CITY OF VANCOUVER COMMUNITY DEVELOPMENT BUREAU</p>
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# STATUTORY SUBMISSION

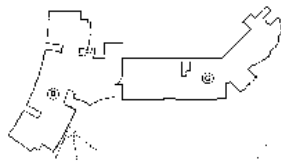
LG/5/F (+37.82) COMPARTMENT CALCULATION



3/F (+53.80) COMPARTMENT CALCULATION



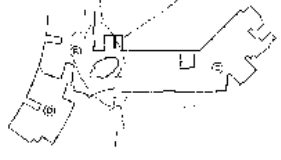
G/F (+41.80) COMPARTMENT CALCULATION



4/F (+53.20) COMPARTMENT CALCULATION



1/F (+45.80) COMPARTMENT CALCULATION



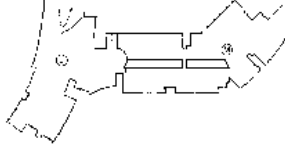
5/F (+52.00) COMPARTMENT CALCULATION



2/F (+49.80) COMPARTMENT CALCULATION



6/F (+55.80) COMPARTMENT CALCULATION



COMPARTMENT OF FLOOR				
LOC.	NO.	TYPE	AREA (sq.m)	VOLUME (cu.m)
LG/5/F	1	Office	146.42	146.42
LG/5/F	2	Shop	146.42	146.42
LG/5/F	3	Office	146.42	146.42
LG/5/F	4	Office	146.42	146.42
LG/5/F	5	Office	146.42	146.42
LG/5/F	6	Office	146.42	146.42
LG/5/F	7	Office	146.42	146.42
LG/5/F	8	Office	146.42	146.42
LG/5/F	9	Office	146.42	146.42
LG/5/F	10	Office	146.42	146.42
LG/5/F	11	Office	146.42	146.42
LG/5/F	12	Office	146.42	146.42
LG/5/F	13	Office	146.42	146.42
LG/5/F	14	Office	146.42	146.42
LG/5/F	15	Office	146.42	146.42
LG/5/F	16	Office	146.42	146.42
LG/5/F	17	Office	146.42	146.42
LG/5/F	18	Office	146.42	146.42
LG/5/F	19	Office	146.42	146.42
LG/5/F	20	Office	146.42	146.42

Total Capacity of COQUE				
Location	Use	Area	Factor	Total Capacity
LG/5/F	Office	275.442	9	31
G/F	Shop	54.208	3	19
G/F	Office	412.208	9	41
3/F	Restaurant	146.42	1	146
3/F	Kitchen	481.136	4.5	107
5/F	Office	212.144	9	294
6/F	Office	203.128	9	228
6/F	Restaurant	178.557	1	177
6/F	Kitchen	166.561	4.5	42
6/F	Exhibition hall	704.208	2	353
Total number of students				6000
Total				848

SCHEDULE 1: MINIMUM NUMBER & WIDTH OF EXIT ROUTES FOR EACH FLOOR

LOCATION	FLOOR	SUBJECT	MIN. NO. OF EXIT ROUTES		MIN. WIDTH OF EACH EXIT ROUTE		MIN. TOTAL WIDTH OF EXIT ROUTES	
			REQD.	PHAS.	REQD.	PHAS.	REQD.	PHAS.
LG/5/F	1	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	2	Shop	1	1	1.00	1.00	1.00	1.00
LG/5/F	3	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	4	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	5	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	6	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	7	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	8	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	9	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	10	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	11	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	12	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	13	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	14	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	15	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	16	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	17	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	18	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	19	Office	1	1	1.00	1.00	1.00	1.00
LG/5/F	20	Office	1	1	1.00	1.00	1.00	1.00

THE RESISTANCE REQUIREMENTS FOR SUBSTRUCTURE OF CONSTRUCTION														
COMPONENT S.NO.	CLASS	TOTAL VOLUME (cu.m)	RES. REQD.		THK.	CONCRETE STRENGTH		THK.	CONCRETE STRENGTH		THK.	CONCRETE STRENGTH		THK.
			RES. REQD.	THK.		CONCRETE STRENGTH	THK.		CONCRETE STRENGTH	THK.				
1	CONCRETE	1592.553	1	15	10	10	10	10	10	10	10	10	10	10
2	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
3	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
4	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
5	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
6	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
7	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
8	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
9	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
10	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
11	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
12	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
13	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
14	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
15	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
16	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
17	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
18	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
19	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
20	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
21	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
22	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
23	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
24	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
25	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
26	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
27	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
28	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
29	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
30	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
31	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
32	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
33	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
34	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
35	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
36	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
37	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
38	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
39	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
40	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
41	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
42	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
43	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
44	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
45	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
46	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
47	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
48	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
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57	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
58	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
59	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
60	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
61	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
62	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
63	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
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76	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
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80	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
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99	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10
100	STEEL	1000.000	1	10	10	10	10	10	10	10	10	10	10	10



# SUMMARY:

## WHAT ARE THE DIFFERENCES?

Efficiency:

2 weeks vs 1 day

Consistency:

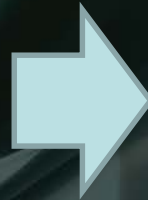
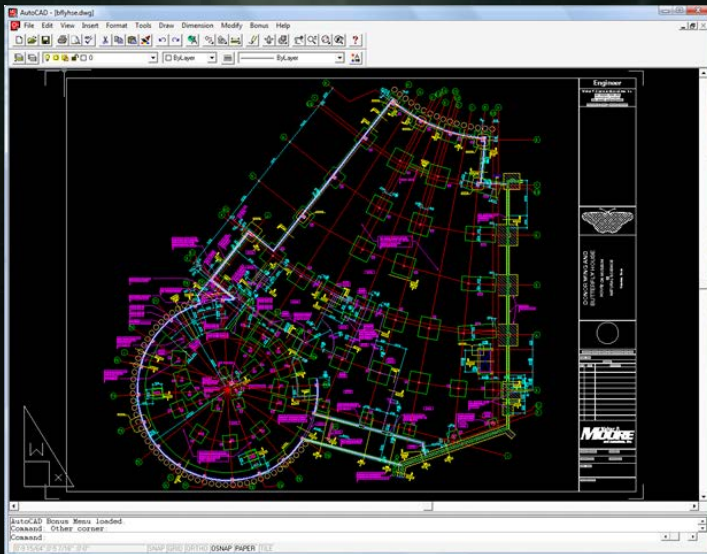
update automatically according to any change in layout, minimize error and mistakes

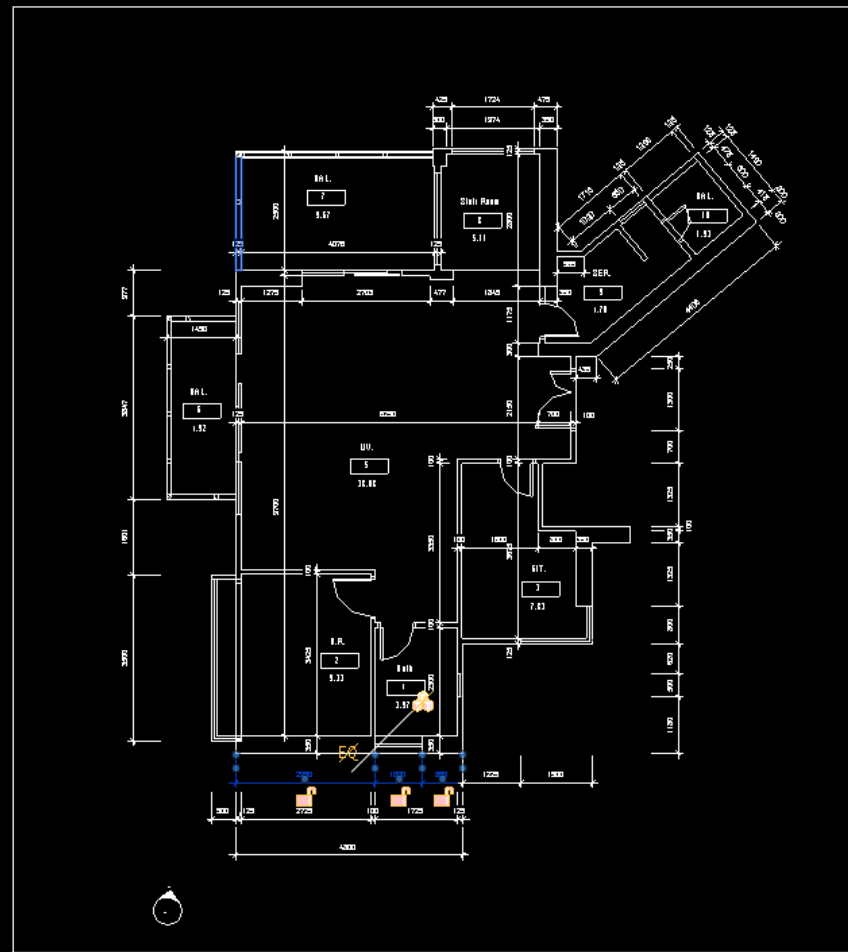
# CHALLENGES?

1. Government Acceptance – Another way (Better way) than CAD AutoCAD / Microstation  
PNAP 272 Appendix F only accepts AutoCAD / Microstation, not BIM
2. Paradigm Shift – alternative way (more efficient way) of submission. Automatic calculation & Checking
3. Co-operation of other disciplines – all consultants adopt similar system
4. Future – automatic submission/checking system e.g. Singapore ?



# Design / Approved Information = As built Information?





Design / Approved drawing information



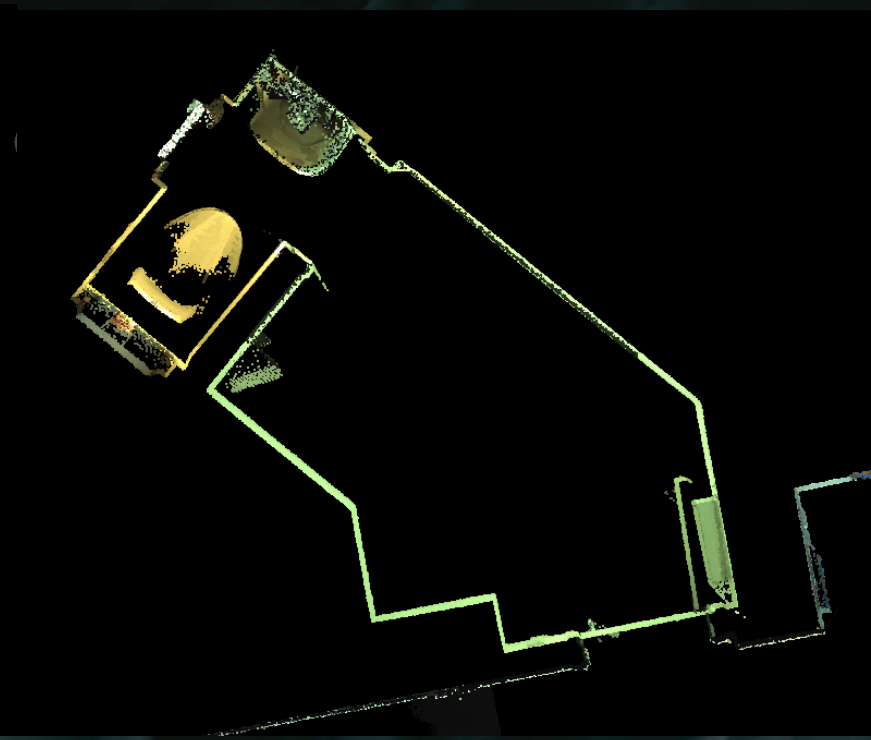
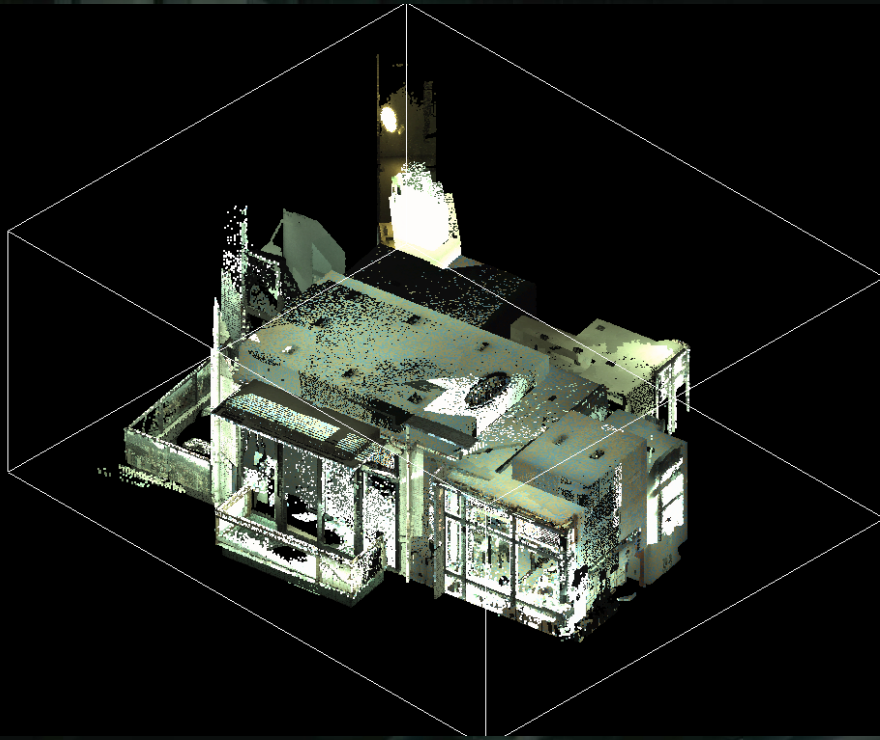
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Laser Scanner - 50,000 pts /s; Range: 300m; Accuracy 6mm





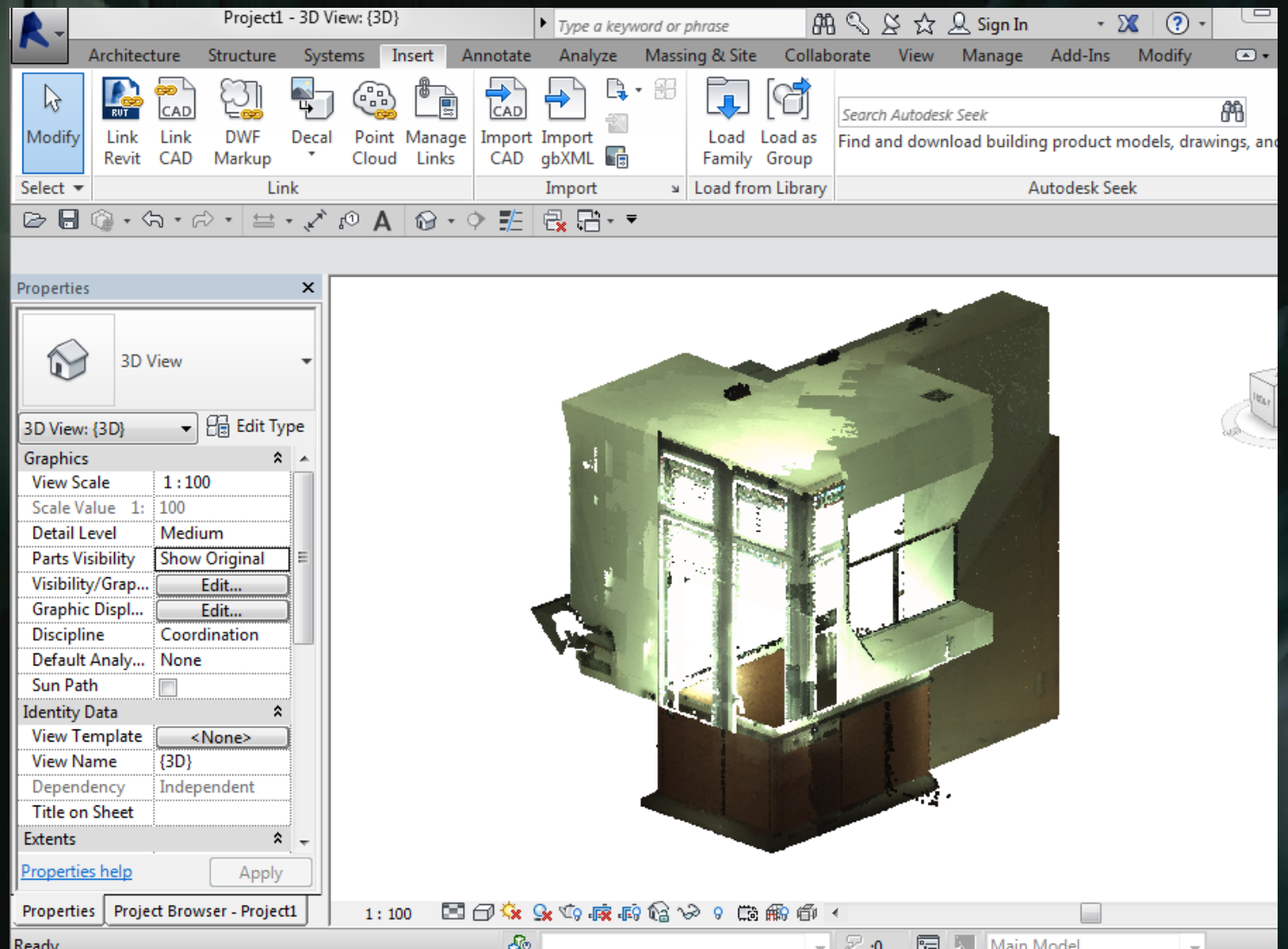
Point Cloud



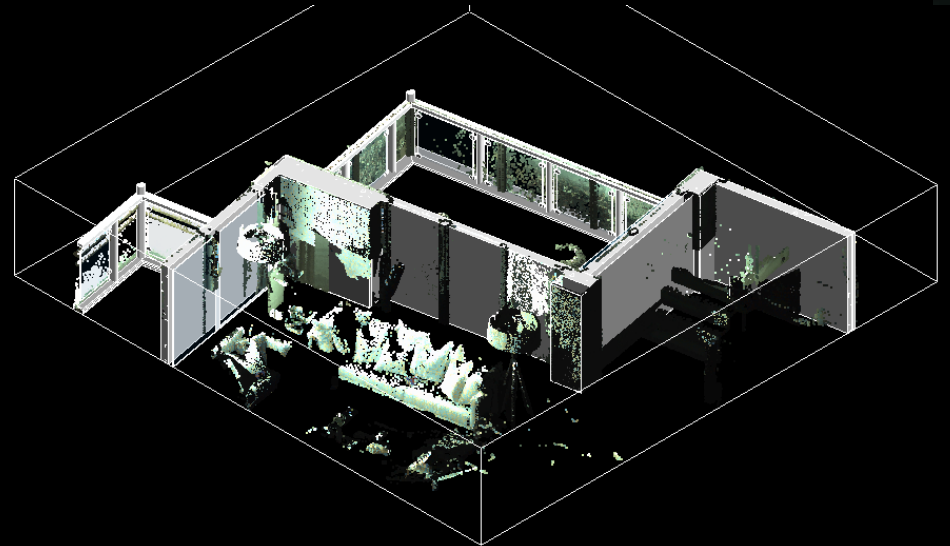
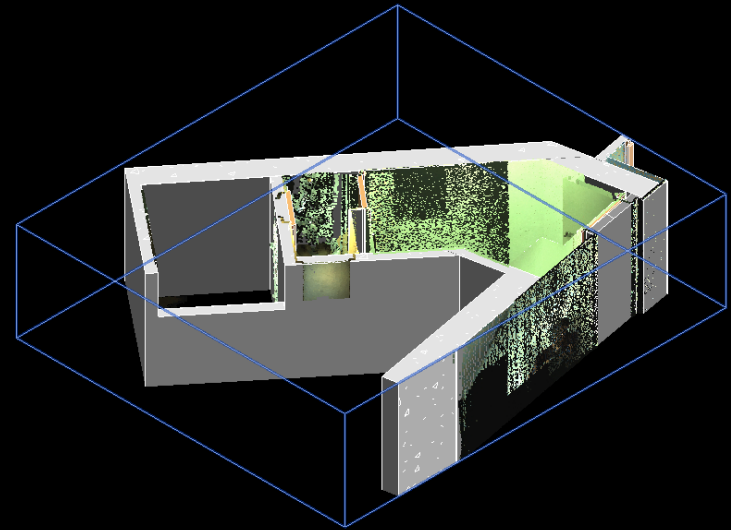
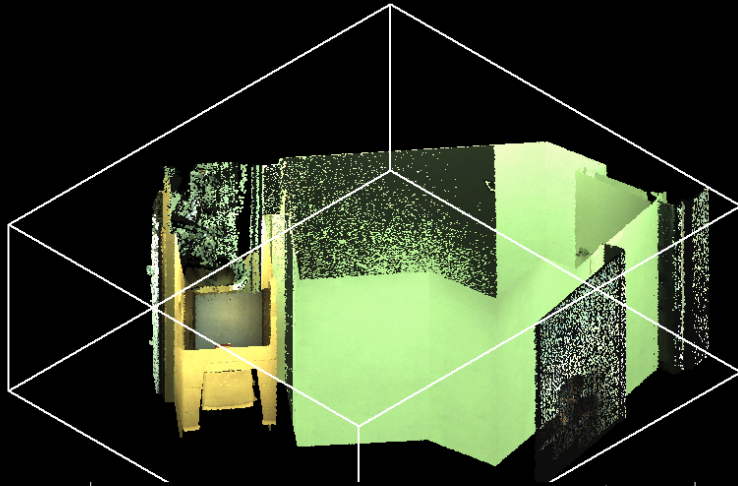
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Point Cloud Data

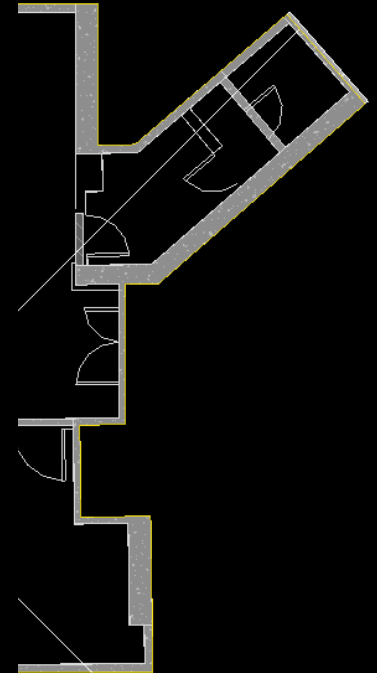
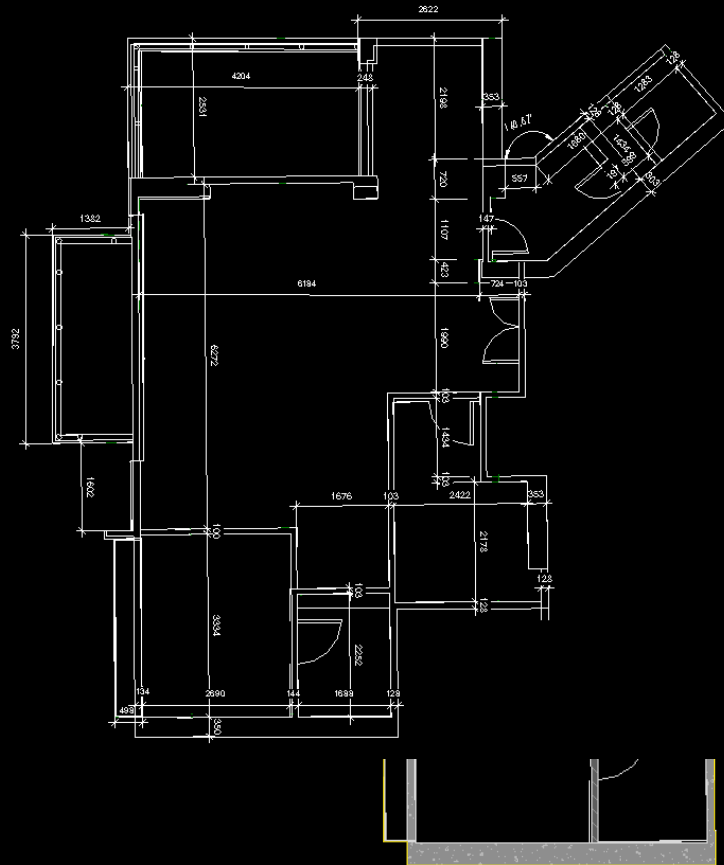




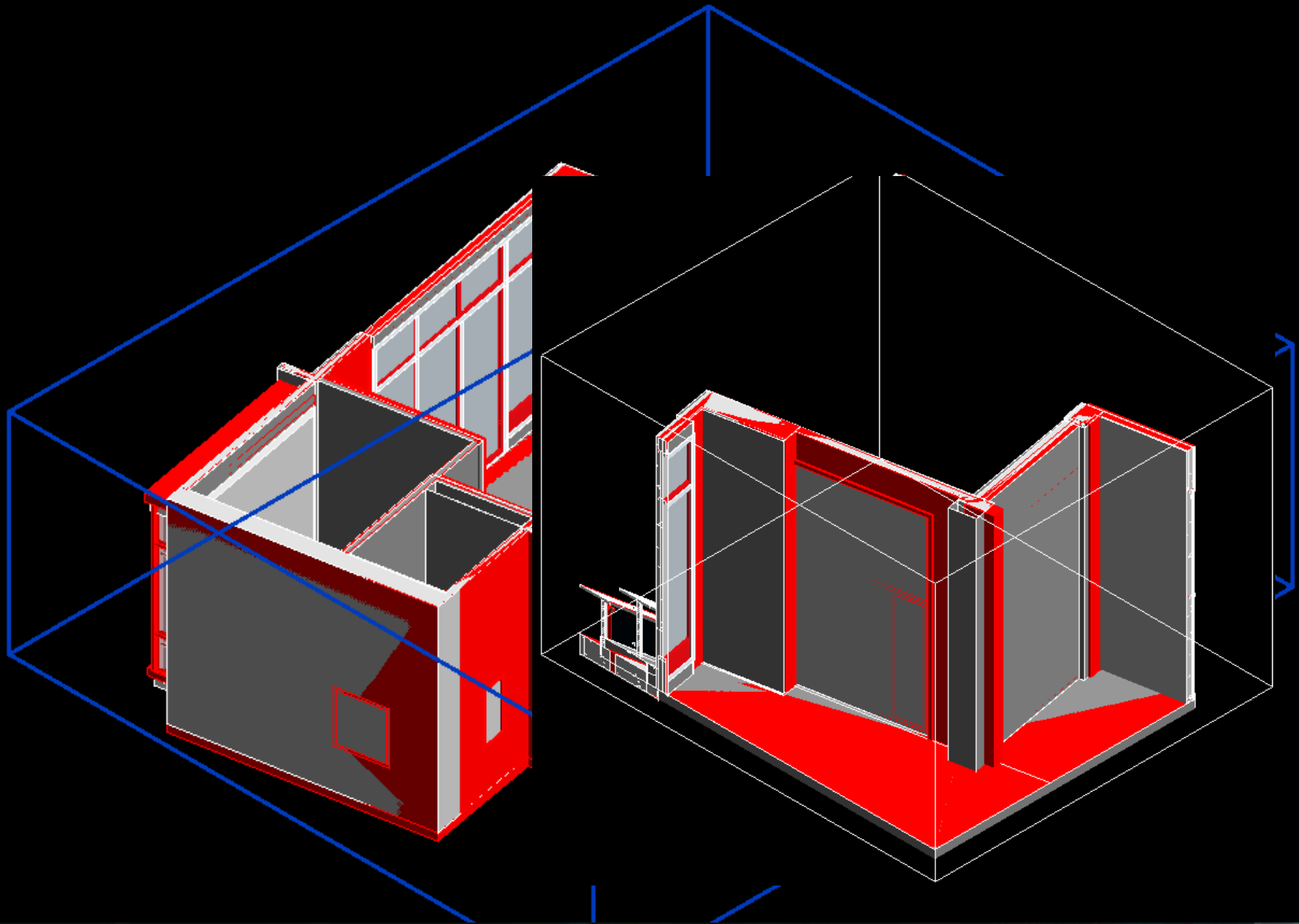
Point Cloud to BIM Model



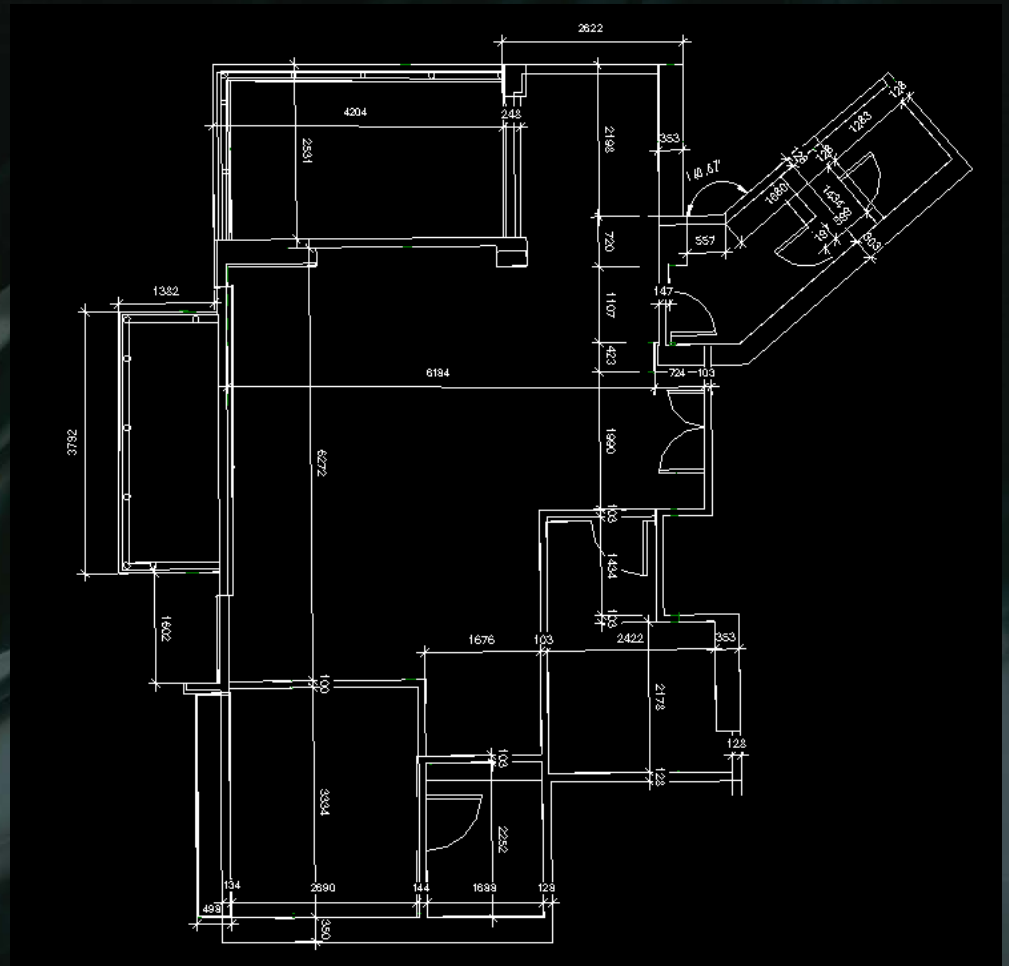
Point Cloud to BIM Model



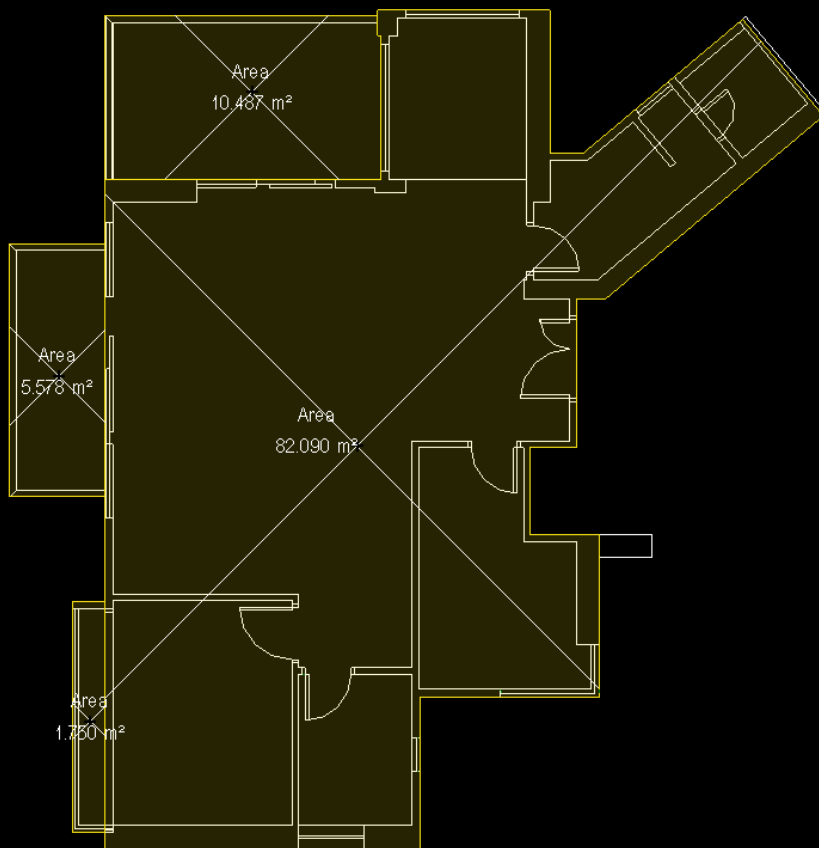
Design / Approved Model + As-built Model





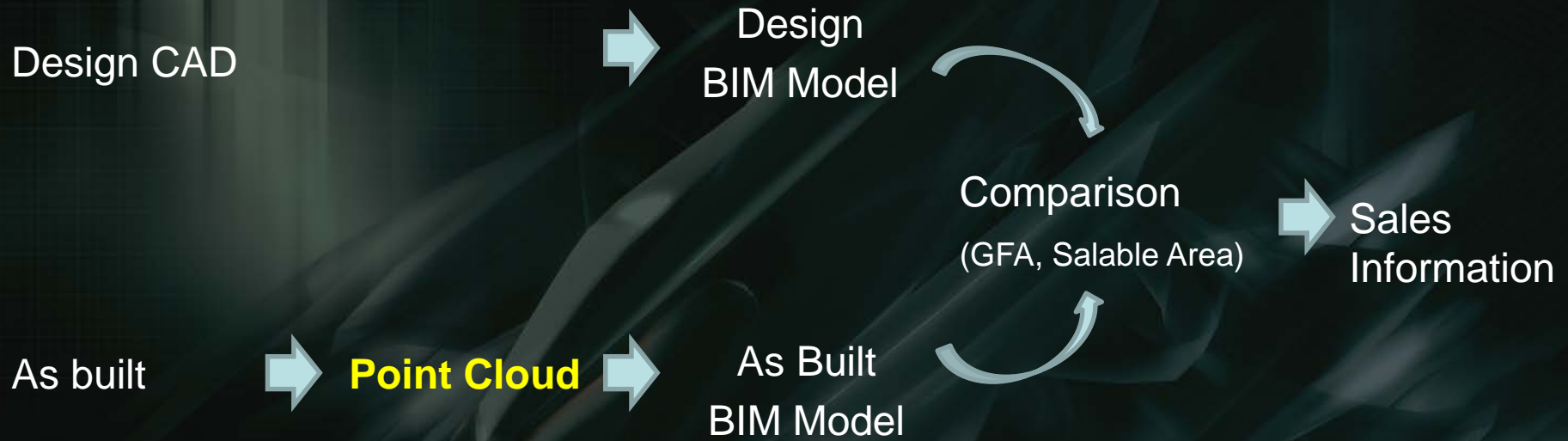


As-built Model > As-built Plan



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Area Comparison As-built Model > As-built Plan



Difference is .... -0.9 % (As-Built is less than Approved Information)

Assuming an average unit in HK is 700 sq.ft, and say \$8000/ sq ft

Less 0.9% =  $700 \times \$8000 \times 0.9 = \$50,400$

Assuming HK has 45,000 new units/ year

Then  $\$50,400 \times 45,000 = \text{HK\$}2.3 \text{ Billion}$  (23億)

Design / Approved Information <> As built Information?

Unknown



**Known**



As owner – sales information vs actual as-built, legal liability?

As buyer – has ability to tell the actual area, any legal implications?  
“rescission of agreement” 踢契 during down times?

As A.P., rethink about the certified area?

As Contractor, any process to arrive better precision?

As legislative body, is there a benchmark for tolerance? 0.4%, 0.5%, 0.6%....?

As Inspection Authority, is the current practice sufficient to safeguard deviation?

As professionals... New opportunities... Point Cloud scanning, BIM Process?

BIM Technology



**Change in Practices**

The background is a dark, moody composition. It features a subtle grid pattern, possibly a window pane or a digital overlay, which is partially obscured by large, flowing, ribbon-like shapes that resemble smoke or liquid. These shapes are rendered in shades of dark teal and black, with some highlights that give them a three-dimensional appearance. The overall effect is one of depth and movement.

THANK YOU!