1.1 CFA vs GFA

Other than Construction Floor Area (CFA), the term Gross Floor Area (GFA) may also be referred to in presenting a building design. There maybe a need to convert the data from one term to another in order to apply the data.

		Residential (including Green Features other than Skygarden)	Office	Retail/ Commercial	Hotel	Industrial (Heavy Duty)	Government/ Government Subvented Project
CFA/ GFA (excluding carparking provision)		1.10 to 1.15	1.15 to 1.25	1.15 to 1.25	1.30 to 1.45	1.15 to 1.20	1.15 to 1.25
CFA/ NOFA (Net Operational Floor Area)		N/A	N/A	N/A	N/A	N/A	1.80 to 2.00
The following areas are exempted from GFA calculations and should be added extra to the above percentage:-							
1. Carpark							
1.1	Covered Carparking Space	√ (applicable only for private spaces serving users of the building and as permitted under land leases.)					
1.2	Loading and Unloading Bay	√ (if permitted under land leases)					
2. Communal skygardens		√					
3. Clubhouse		√ (Area not exceeding 5% of the GFA of the residential portion)					
4. Plantrooms*		√ (included in above percentage; subject to justification with reasonable plant layouts)					
5. Refuge Floor		√					
6. Back of House and Drop Off							
6.1	Drop off area or picking-up area for Hotel users				√ (included in above percentage)		
6.2	Areas accessible to hotel staff only (back of house area)#				√ (included in above percentage)		

Green Features in Residential Projects include:- (Max. 10% cap + area of skygarden)		
1.	Balconies	√ (may upon application and subject to conditions)
2.	Wider common corridors and lift lobbies	√
3.	Non-structural prefabricated walls/ Curtain wall not exceeding 300mm	√ (subject to conditions; also applicable to non-domestic projects)
4.	Utility Platforms	√ (max. area per unit is 1.5m2 which may upon application and subject to conditions)
5.	Mail Delivery rooms with mailboxes	√
6.	Noise barrier	√

* - Air-conditioning plant rooms, water tanks, boiler rooms, electrical switch rooms, meter rooms, transformer rooms, generator rooms, pump rooms, telephone equipment rooms, CO2 rooms, swimming pool filtration plant rooms.

\# - Back of house areas such as workshops, laundry, F&B storage, linen storage and furniture storage area, staff changing room, rest room and staff canteen

1.2 Provision of Carpark and Refuge Floor

			Residential	Office	Retail/ Commercial	Hotel	Industrial (Heavy Duty)	Government/ Government Subvented Project
1.	**Carpark**							
1.1	Standard Carpark	40m2 to 65m2 for each carparking area; depending on the size and shape of floor plate; any structures for building above	1 car parking space for 0.67-9 flats; depending on lease conditions and flat size. E.g. 1 car parking space for 6-9 flats of size 650 s.f. 1 car parking space for 0.67 - 1 flat of size 1800 s.f.	For 1st 15,000m2 GFA; 1 per 200m2 Above 15,000m2 GFA; 1 per 300m2	1 no. per 300m2 GFA	1 no. per 100 rooms	1 no. per 600m2 -750m2 GFA	1 no. per 1000m2 - 1200m2 GFA
1.2	Loading and Unloading Provision	120m2 to 200m2 for each loading and unloading area; depending on the size and shape of floor plate; any structures for building above	1 no. per block or 1 no. per 800 flats	1 no. per 3000m2 GFA	1 no. per 1200m2 GFA	1 no. per 100 rooms	1 no. per 1000 - 1200m2 GFA	1 no. per 700m2 - 900m2 GFA
2.	**Refuge Floor**		Shall be provided in all buildings exceeding 25 storeys in height above the lowest ground storey (It does not apply to a domestic building or a composite building not exceeding 40 storyes in height above the lowest ground storey. In a domestic or a composite building exceeding 25 storeys but not exceeding 40 storeys in height above the lowest ground storey, the main roof of the building should be a refuge floor.)					
			At not more than 25 storey interval				At not more than 20 storey interval	

2.1 Demolition and Hoarding

When estimating demolition works, the project surveyor should consider whether there would be any items that have a credit value, e.g. steel reinforcement extracted from old industrial buildings can be sold and off-set part of the demolition cost. Also consider whether any temporary works would be required after demolition (e.g. raking shores). Normally, buildings will be demolished down to ground level only. Extra cost must be allowed if additional works need to be demolished (e.g. pile caps).

Table of Norms

Elements	
Covered Walkway	Double deck steel covered walkway shall be allowed to lot boundaries with pedestrians
Hoarding	Hoarding shall be allowed to lot boundaries adjacent to buildings/ without pedestrians
Demolition of Existing Building	Unit cost per m2 CFA of existing building

Exclusions:
1. Extra costs for congested site, temporary safety measures to adjacent buildings.

Points to Note:
1. Cost for demolition of existing buildings will mainly depend on the type of demolition method adopted:- e.g. mechanical, sawcut or by hand.
2. If the project is targeting a LEED or HKBEAM accreditation, the demolition method will be basically by small tools, while demolished materials will have to be sorted. This will increase the rate by 50%-100%.

2.2 Site Investigation

Bore holes are only one type of site investigation work. There would also be laboratory tests, inspection pits etc. and these are normally allowed as an add-on cost to the bore-hole cost.

Table of Norms

Elements	
Number of Bored Hole for foundation	5% of number of piles
Depth of Bored Hole	Anticipated depth of piles + 5m

Exclusions:
1. Extra cost for works on slope.

Points to Note:
1. Refer to the costs of other projects with similar site area/ building footprint.
2. $/m2 CFA depends on the density of the development. $/m2 CFA is more expensive for low-rise development, vice versa.

2.3 Foundation

Different types of foundation may carry different capacity of loads. The following table generally compares the range of CFA being supported by different types of foundation:

Table of Norms

Types of Foundation		Max. allowable axial loads (KN/No.)	Unit for supporting CFA	Residential	Office	Retail/ Commercial	Hotel	Industrial (Heavy Duty)	Government/ Government Subvented Project
Bored Piles (End-bearing; no bell-out)	Large diameter; 1 000mm to 3 000mm	45 000	m2 CFA/ m2 cross section area of piles	200 – 300	200 – 250	200 – 250	200 – 300	170 – 230	200 – 250
Driven Steel H-piles (Friction)	Grade 43; 305 x 305 x180kg/m	2 950	m2 CFA/ 1 no. of pile	50 – 90	50 – 80	50 – 80	50 – 90	40 – 80	50 – 80
	Grade 55C; 305 x 305 x 223kg/m	3 600	m2 CFA/ 1 no. of pile	60 – 110	60 – 100	60 – 100	60 – 110	50 – 100	60 – 100
Socketted H piles (pre-bored) (End-bearing)	305 x 305 x180kg/m	4 400	m2 CFA/ 1 no. of pile	70 – 120	70 – 110	70 – 110	70 – 120	60 – 110	70 – 110
	305 x 305 x 223kg/m; 550mm dia.	5 500	m2 CFA/ 1 no. of pile	80 – 140	80 – 130	80 – 130	80 – 140	70 – 130	80 – 130
Mini-piles (End-bearing)	100mm to 400mm dia.	700	m2 CFA/ 1 no. of pile	30 – 60	30 – 50	30 – 50	30 – 60	20 – 50	30 – 50
Raft foundation/ footing			No. of floor/ 1 m thick of raft	0 – 10 floors; 1m thick 10 – 20 floors; 2m thick					
			kg/m3 concrete of raft	150 – 350					

Exclusions:

1. The above norms are not applicable to low-rise buildings whose foundation may be very inefficient.
2. The above norms exclude the consideration of forming bell-out, the effect of negative skin friction, extraordinary ground conditions, etc.

Points to Note:

1. For end-bearing pile, pile base is founded on the relatively firm soil (founding stratum) such as rock, very dense sand or gravel and the load of the structure is transferred through the pile to the firm soil. If the firm soil is at a considerable depth below ground, the cost of using end-bearing pile would be much expensive. In this situation, friction pile may be more preferable in terms of cost since friction pile is driven through the penetrable soil for some distance and the load of the structure is transferred to the penetrable soil by means of skin friction or cohesion between the soil and the embedded surface of the pile.
2. Negative skin friction – a negative skin friction is an effect that arises as a result of the settlement of soil around the pile. A soil deforming around the pile tends to pull the pile down thus reducing its bearing capacity. Thus, additional piles shall be allowed.
3. Piles on slope – the buildings constructed on steep slopes may be subjected to large lateral loads, such as those caused by typhoons, earthquakes, and high-speed vehicles. Additional piles may be allowed. Moreover, the bearing level of the piles shall be lower than the adjacent street level. Working platform may be required for construction of the piles, which shall be allowed separately.
4. Cavities – if marble cavities are encountered, the piles would be much longer and pre-boring is proposed for each pile to confirm the ground condition at each pile location. Permanent casing shall be required for bored piles.
5. Underground obstacles – pre-boring shall be required and percussion piles may not be applicable.

2.4 Basement Enclosure

DLS uses the element "Basement Enclosure" and not the more common element "Basement" to separate the cost of the surrounding basement structure that would be extra to the frame and slabs below ground. This would allow us to consider the frame and slab within the basement enclosure in the same manner as that for the frame and slab above ground.

Table of Norms

Elements		
Basement not deeper than 2 floor levels	Type of temporary retaining wall	Sheet pile
	Size of temporary retaining wall	FSPIII 150kg/m2 or FSPIV 190kg/m2
	Depth of temporary retaining wall	Around 2 times of the depth of excavation
	Type of strutting	Steel waling, strut and king post 350kg/m2 to 600kg/m2 on strutting areas
	Thickness of screen wall	300 – 500mm
Basement deeper than 2 floor levels	Type of temporary retaining wall	Diaphragm walls
	Size of temporary retaining wall	800 – 1 200mm thick; depends on the depth of basement
	Depth of temporary retaining wall	30 – 70m; depends on the depth of basement and soil condition
	Type of strutting	Steel waling, strut and king post 300kg/m2 to 550kg/m2 on strutting areas
	Thickness of cavity wall	150 – 200mm thick concrete block wall

Exclusions:
Excavation, grouting, waterproofing to basement walls and slab, wearing slab

Points to Note:
1. Rock level will affect the depth of the temporary retaining works (steel sheet piles, diaphragm walls etc.).
2. Selection of temporary retaining wall depends on
   a. the depth of the basement
   b. availability of working space
   c. soil condition e.g. pipe piles or soldier piles shall be used for high level rock situation.
3. Grout curtain shall be allowed if water level is high.
4. Diaphragm wall may or may not be used as permanent walls also. Check with the design team on this. When used as permanent structures, the reinforcement ratio will normally be higher as it would need to support super-imposed loads.

2.5 Frame and Slab

The following norms for Frame and Slab applies to the whole project – e.g. do not apply the "Low rise" ratios to the lower portion of the project and the "High rise" ratios to the upper portion of the project! This principle applies also to projects that are split into podium and tower – the podium is just the lower portion of the project, it is not a "low rise" structure.

Table of Norms

Elements	Unit	Residential	Office	Retail/ Commercial	Hotel	Industrial (Heavy Duty)	School
For Low Rise (up to 10 storey)							
Concrete ratio; grade 40D	m3/ m2 CFA	0.35 – 0.45	0.42 – 0.50	0.42 – 0.50	0.40 – 0.45	0.45 – 0.55	0.35 – 0.50
Reinforcement ratio	kg/ m2 CFA	70 – 100	80 – 120	80 – 120	70 – 100	90 – 140	70 – 100
Formwork	m2/ m2 CFA	2.00 – 2.80	2.00 – 3.00	2.00 – 3.00	2.00 – 2.80	2.20 – 3.00	2.00 – 3.00
Transfer plate; thickness of plate per supporting floor	m/ floor	0.07 – 0.15	0.07 – 0.15	0.07 – 0.15	0.07 – 0.15	0.07 – 0.15	N/A
Transfer plate; reinforcement ratio	kg/m3 concrete	200 – 250	220 – 270	220 – 270	220 – 270	240 – 280	N/A
For High Rise (up to 50 storey)							
Concrete ratio; grade 45D to 60D	m3/ m2 CFA	0.45 – 0.60	0.50 – 0.65	N/A	0.45 – 0.55	N/A	N/A
Reinforcement ratio	kg/ m2 CFA	100 – 150	120 – 180	N/A	100 – 150	N/A	N/A
Formwork	m2/ m2 CFA	2.40 – 3.00	2.50 – 3.00	N/A	2.40 – 3.00	N/A	N/A
Transfer plate; thickness of plate per supporting floor	m/ floor	0.07 – 0.15	0.07 – 0.15	N/A	0.07 – 0.15	N/A	N/A
Transfer plate; reinforcement ratio	kg/m3 concrete	240 – 320	250 – 350	N/A	250 – 350	N/A	N/A
For Super High Rise (say 300m high; Reinforced Concrete for core area; Structural Steel for non-core area)							
Concrete ratio; grade 45D to 80D	m3/ m2 CFA	0.30 – 0.40	0.35 – 0.45	N/A	0.30 – 0.40	N/A	N/A
Reinforcement ratio	kg/ m2 CFA	70 – 100	90 – 120	N/A	70 – 100	N/A	N/A
Formwork	m2/ m2 CFA	1.50 – 2.00	1.50 – 2.00	N/A	1.50 – 2.00	N/A	N/A
Structural steel	kg/m2 CFA	120 – 150	130 – 160	N/A	120 – 150	N/A	N/A
Steel deck	m2/m2 CFA	0.70 – 0.85	0.70 – 0.85	N/A	0.70 – 0.85	N/A	N/A
Steel outrigger/ transfer truss	kg/m2 CFA	Around 15% to 20% of structural steel					
For Steel Truss Roof							
Structural steel (excluding vertical supporting)	kg/m2 roof area	50 – 70 kg/m2 for flat roof with 30m span; no building above; non-accessible					

Exclusion:
Irregular design, exceptional high building height, large span

Points to Note:
1. Design efficiency depends on building height, floor plate area, shape of building, function of building and wind load of the location.
2. Exclude non-structural concrete.
3. Transfer plate not included in the base norms.

2.5 Frame and Slab (Cont'd)

Table of Norms

Elements	Reinforcement Ratio (kg/m3 concrete)
Raft / Pile Cap / Footing	150 – 350
Structural Wall	250 – 400
Column	250 – 400
Beams	250 – 350
Slab	100 – 200
Transfer structure	200 – 350

Points to Note:

1. When applying the reinforcement ratio given by Structural Engineer, please check the following:
   (i) whether the ratio includes links, stirrup, binder and special spacers or not. If not, extra 8% - 13% shall be allowed.
   (ii) whether the ratio includes laps or not. If not, extra 5% shall be allowed.
   (iii) whether the engineer includes the portion of beams and columns intersecting with slab in calculating the reinforcement ratio. Bearing in mind that in our method of measurement of concrete volume, the slab on top is excluded from the measurement of beams, but the slab intersection is included in the measurement of columns. Make sure the engineer's ratio is used correctly.

2.6 Façade

Whenever possible, the wall to floor ratio of the external façade should be measured in lieu of using norms. Using the norms to estimate the ratio of window etc. is only when the purpose is for estimation and when design is not available.

Table of Norms

I. Residential

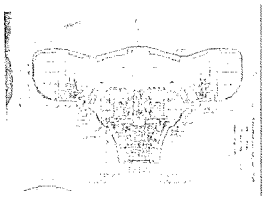
Types of Layout	Floor Plate	No. of Flats per Floor	Average Flat Size	Storey Height	Façade Area	Window/ Glass Wall Area	External Wall Finishes Area	Façade Area to Floor Ratio	Window to Floor Ratio	External Wall Finishes to Floor Ratio
	m2 CFA/ floor	No.	m2/flat	m	m2	m2	m2	m2/m2 CFA	m2/m2 CFA	m2/m2 CFA
Type 1	189	2	95	2.975	245*	55	190	1.30	0.29	1.01
Type 2 & 3 (Duplex)	598 (345 + 253)	2	299	2.95/ 5.90	572	202	370	0.96	0.34	0.62
Type 4	366	4	92	3.00	326*	71	255	0.89	0.19	0.70
Type 5	649	6	108	3.30	774*	137	637	1.19	0.21	0.98
Type 6	552	4	138	3.30	657*	103	554	1.19	0.19	1.00
Type 7	458	8	57	2.80	641*	95	546	1.40	0.21	1.19
Type 8	603	8	75	3.15	722*	143	580	1.20	0.24	0.96
Type 9	625	10	63	3.40	753*	144	609	1.20	0.23	0.97
Type 10	646	2	323	3.15	356	356	0	0.55	0.55	0.00

Points to Note:

- Façade area includes finishes to tops, soffits and sides of bay windows.

Types of Layout:

Type 1



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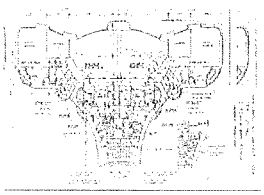

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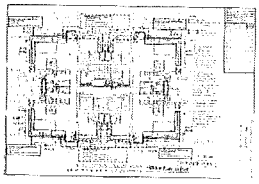

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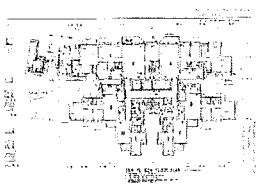
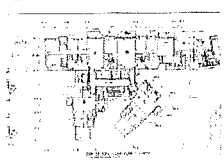


Type 5



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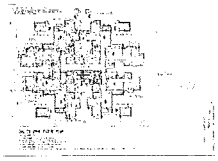

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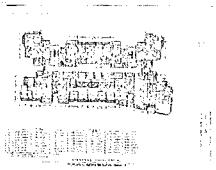

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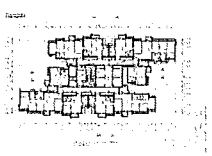


Type 9

Type 10

Refer to Appendix A for enlarged layouts.

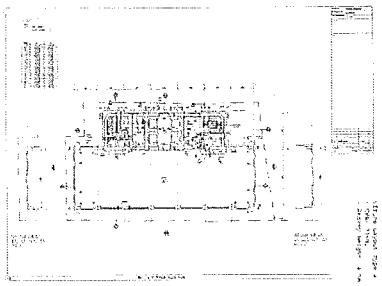
2.6 Façade (Cont'd)

Table of Norms (Cont'd)

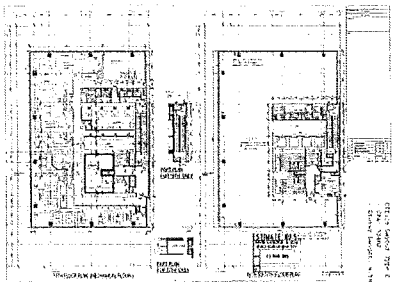
II. Office

Types of Layout	Floor Plate	Storey Height	Building Girth	Façade Area	Façade Area to Floor Ratio
	m2 CFA/ floor	m	m	m2	m2/m2 CFA
Type A	736	4.5	124	558	0.76
Type B	934	4.5	130	585	0.63
Type C	1,387	4.2	172	722	0.52
Type D	1,566	4.5	165	743	0.47
Type E	1,857	4.2	178	748	0.40
Type F	2,044	4.2	200	840	0.41
Type G	2,557	4.5	203	914	0.36
Type H	2,590	4.2	310	1,302	0.50

Types of Layout:



Type A



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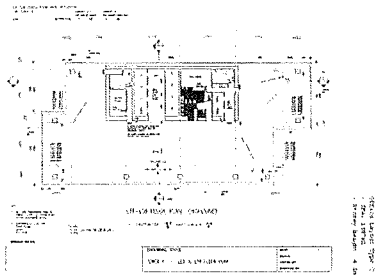

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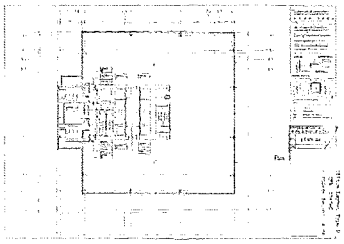

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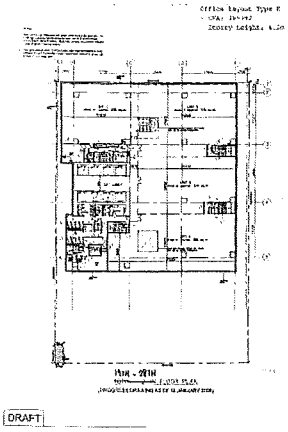

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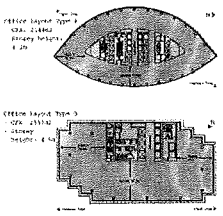
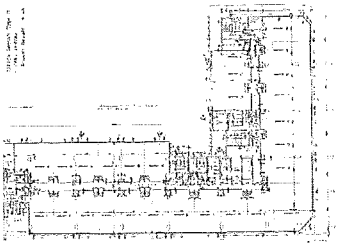


Type F & G



Type H

Refer to Appendix B for enlarged layouts.

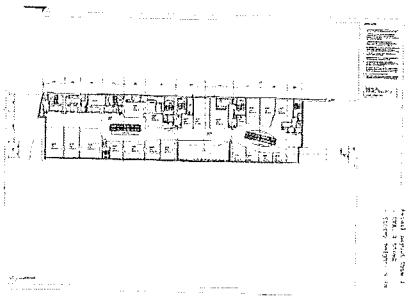
2.6 Façade (Cont'd)

Table of Norms (Cont'd)

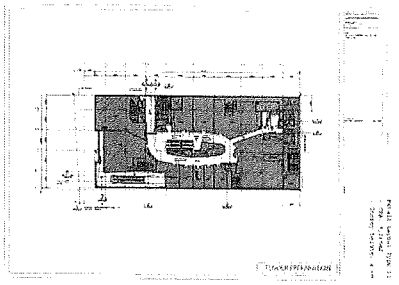
III. Retail

Types of Layout	Floor Plate	Storey Height	Building Girth	Façade Area	Façade Area to Floor Ratio
	m2 CFA/ floor	m	m	m2	m2/m2 CFA
Type I	2,556	5.8	265	1,537	0.60
Type II	3,265	4.6	265	1,219	0.37
Type III	10,699	5.0	543	2,715	0.25
Type IV	12,910	6.5	640	4,160	0.32
Type V	3,550	5.6	292	1,635	0.46

Types of Layout:



Type I



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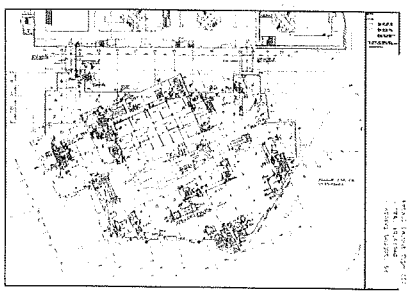

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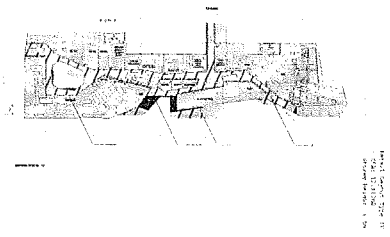

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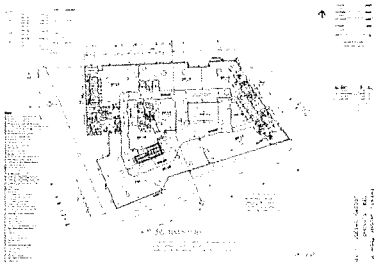


Type V

Refer to Appendix C for enlarged layouts.

2.7 Internal Wall

The full extent of internal walls are not usually shown in the preliminary design drawings. When available, measure the internal walls from the drawings and use the norms to check if additional allowance to the quantities is required or not.

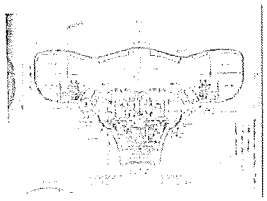
Table of Norms

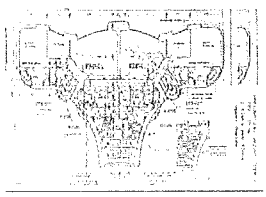
I. Residential

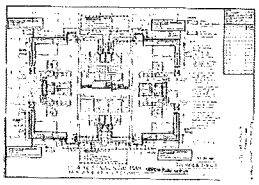
Types of Layout	Floor Plate	No. of Flats per Floor	Average Flat Size	Storey Height	Total Internal Wall Area	Internal RC Wall Area	Internal Concrete Block Wall Area	Internal Wall Area to Floor Ratio	Internal RC Wall Area to Floor Ratio	Internal Concrete Block Wall to Floor Ratio
	m2 CFA/ floor	No.	m2/flat	m	m2	m2	m2	m2/m2 CFA	m2/m2 CFA	m2/m2 CFA
Type 1	189	2	95	2.975	146	70	76	0.77	0.37	0.40
Type 2 & 3 (Duplex)	598 (345 + 253)	2	299	2.95 + 2.95	484	256	228	0.81	0.43	0.38
Type 4	366	4	92	3.00	363	171	192	0.99	0.47	0.52
Type 5	649	6	108	3.30	546	252	294	0.84	0.39	0.45
Type 6	552	4	138	3.30	430	168	262	0.78	0.30	0.47
Type 7	458	8	57	2.80	309	165	144	0.67	0.36	0.31
Type 8	603	8	75	3.15	644	376	268	1.07	0.62	0.44
Type 9	625	10	63	3.40	864	499	365	1.38	0.80	0.58
Type 10	646	2	323	3.15	403	178	225	0.62	0.28	0.35

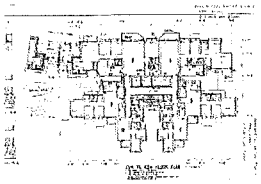
Types of Layout:

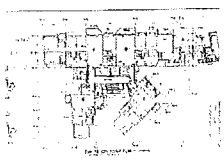

Type 1

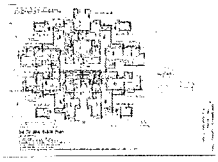

Type 2

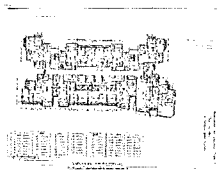

Type 3

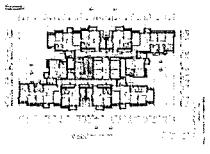

Type 4


Type 5


Type 6


Type 7


Type 8


Type 9


Type 10

Refer to Appendix A for enlarged layouts.

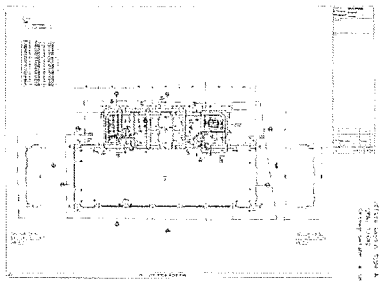
2.7 Internal Wall (Cont'd)

Table of Norms (Cont'd)

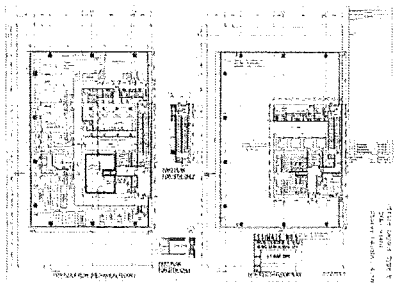
II. Office

Types of Layout	Floor Plate	Storey Height	Partitioning for Typical Corridors	Partitioning for Tenant Areas	Total Internal Wall Area	Internal RC Wall Area	Internal Concrete Block Wall Area	Internal Wall Area to Floor Ratio	Internal RC Wall Area to Floor Ratio	Internal Concrete Block Wall to Floor Ratio
	m2 CFA/ floor	m	Yes or No	Yes or No	m2	m2	m2	m2/m2 CFA	m2/m2 CFA	m2/m2 CFA
Type A	736	4.5	No	No	225	192	33	0.31	0.26	0.04
Type B	934	4.5	No	No	598	532	66	0.64	0.57	0.07
Type C	1,387	4.2	No	No	430	349	81	0.31	0.25	0.06
Type D	1,566	4.5	No	No	995	849	146	0.64	0.54	0.09
Type E	1,857	4.2	No	No	886	698	188	0.48	0.38	0.10
Type F	2,044	4.2	No	No	626	427	199	0.31	0.21	0.10
Type G	2,557	4.5	No	No	1,382	1,331	51	0.54	0.52	0.02
Type H	2,590	4.2	Yes	No	1,614	369	1,245	0.62	0.14	0.48

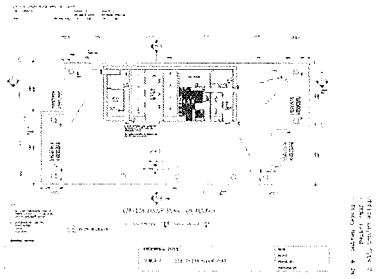
Types of Layout:



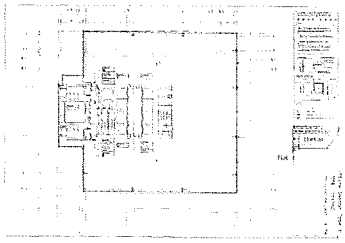
Type A



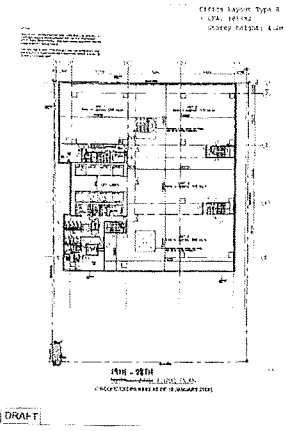
Type B



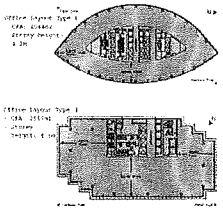
Type C



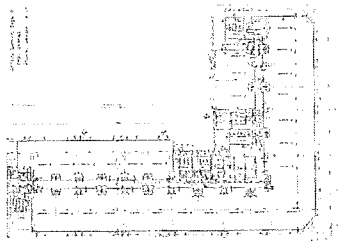
Type D



Type E



Type F & G



Type H

2.7 Internal Wall (Cont'd)

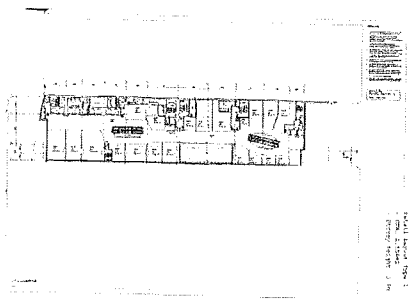
Table of Norms (Cont'd)

III. Retail

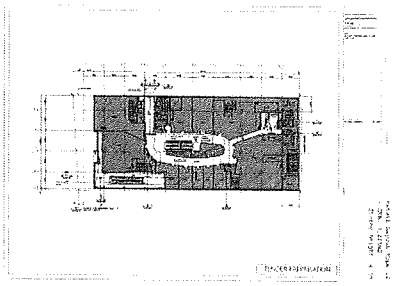
Types of Layout	Floor Plate	Storey Height	Total Internal Wall Area	Internal Wall Area to Floor Ratio	Internal RC Wall Area	Internal Concrete Block Wall Area
	m2 CFA/ floor	m	m2	m2/m2 CFA	%	%
Type I	2,556	5.8	2,491	0.97	76%	24%
Type II	3,265	4.6	2,778	0.85	33%	67%
Type III	10,699	5.0	7,372	0.69	82%	18%
Type IV	12,910	6.5	8,949	0.69	97%	3%
Type V	3,550	5.6	2,466	0.69	95%	5%

Shop Front Area	Shop Front to Floor Ratio
m2	m2/m2 CFA
840	0.33
460	0.14
1,785	0.17
3,548	0.27
1,214	0.34

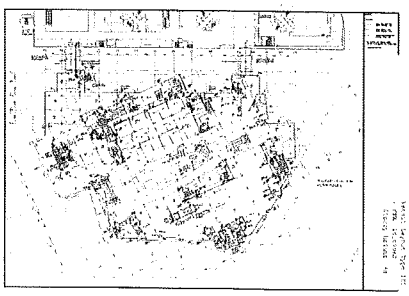
Types of Layout:



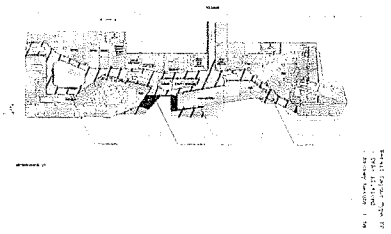
Type I



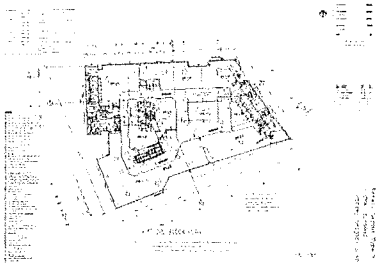
Type II



Type III



Type IV



Type V

Refer to Appendix C for enlarged layouts.

2.8 Doors

Table of Norms

I. Residential

Types of Layout	Floor Plate	No. of Flats per Floor	Average Flat Size	Flat Mix	Total No. of Doors	Door No. to Floor Ratio
	m2 CFA/ floor	No.	m2/flat		No.	No./ m2 CFA
Type 1	189	2	95	1 flat – 3 Bedroom, 2 Bathroom; 1 flat – 3 Bedroom, 2 Bathroom, 1 Maid Room	19	0.10
Type 2 & 3 (Duplex)	598 (345 + 253)	2	299	2 flats – 4 Bedroom, 3 Bathroom, 1 Maid Room, 1 Maid Toilet	36	0.06
Type 4	366	4	92	4 flats – 3 Bedroom, 2 Bathroom, 1 Maid Room, 1 Maid Toilet	44	0.12
Type 5	649	6	108	2 flats – 4 Bedroom, 3 Bathroom, 1 Maid Room, 1 Maid Toilet; 2 flats – 3 Bedroom, 2 Bathroom, 1 Maid Room, 1 Maid Toilet; 2 flats – 2 Bedroom, 1 Bathroom	60	0.09
Type 6	552	4	138	2 flats – 4 Bedroom, 3 Bathroom, 1 Maid Room, 1 Maid Toilet; 2 flats – 3 Bedroom, 2 Bathroom, 1 Maid Room, 1 Maid Toilet	49	0.09
Type 7	458	8	57	2 flats – 3 Bedroom, 1 Bathroom; 6 flats – 2 Bedroom, 1 Bathroom	51	0.11
Type 8	603	8	75	1 flat – 3 Bedroom, 1 Bathroom; 5 flats – 2 Bedroom, 1 Bathroom; 2 flats – 3 Bedroom, 2 Bathroom, 1 Maid Room, 1 Maid Toilet	59	0.10
Type 9	625	10	63	3 flats – 3 Bedroom, 2 Bathroom; 5 flats – 2 Bedroom, 1 Bathroom; 2 flats – 1 Bedroom, 1 Bathroom	61	0.10
Type 10	646	2	323	2 flats – 4 Bedroom, 3 Bathroom, 1 Maid Room, 1 Maid Toilet	32	0.05

2.8 Doors (Cont'd)

Table of Norms (Cont'd)

II. Office

Types of Layout	Floor Plate	Partitioning for Typical Corridors	Partitioning for Tenant Areas	Total No. of Doors	Door No. to Floor Ratio
	m2 CFA/ floor	Yes or No	Yes or No	No.	No./ m2 CFA
Type A	736	No	No	10	0.01
Type B	934	No	No	17	0.02
Type C	1,387	No	No	16	0.01
Type D	1,566	No	No	21	0.01
Type E	1,857	No	No	28	0.02
Type F	2,044	No	No	20	0.01
Type G	2,557	No	No	16	0.01
Type H	2,590	Yes	No	66	0.03

III. Retail

Types of Layout	Floor Plate	Total No. of Doors	Door No. to Floor Ratio
	m2 CFA/ floor	No.	No./ m2 CFA
Type I	2,556	31	0.01
Type II	3,265	65	0.02
Type III	10,699	137	0.01
Type IV	12,910	74	0.01
Type V	3,550	41	0.01

2.9 Floor & Ceiling Finishes

When drawings are available, always measure approx. quantities for different finishes. Use the norms only in locations where designs are not yet available.

Table of Norms

I. Residential

Types of Layout *	Floor Plate	Total Floor Finishes Area	Total Ceiling Finishes Area	Floor Finishes to Floor Ratio	Ceiling Finishes to Floor Ratio
	m2 CFA/ floor	m2	m2	m2/m2 CFA	m2/m2 CFA
Type 1	189	146	175	0.77	0.93
Type 2 & 3	598 (345 + 253)	417	500	0.70	0.84
Type 4	366	287	344	0.78	0.94
Type 5	649	523	628	0.81	0.97
Type 6	552	444	533	0.80	0.97
Type 7	458	350	420	0.76	0.92
Type 8	603	495	594	0.82	0.99
Type 9	625	509	611	0.81	0.98
Type 10	646	508	610	0.79	0.94

Types of Layout *	L/D Rm	Bed Rm	Kitchen	Bathroom	Maid/ Maid Toilet	Balcony	Typical Lift Lobby	Typical Lift Corridor	E&M	Staircase
	%	%	%	%	%	%	%	%	%	%
Type 1	30%	25%	8%	9%	1%	3%	10%	N/A	2%	12%
Type 2 & 3	36%	31%	4%	7%	3%	N/A	3%	3%	5%	8%
Type 4	28%	30%	8%	10%	4%	4%	5%	1%	3%	7%
Type 5	31%	29%	8%	10%	3%	5%	4%	4%	3%	3%
Type 6	28%	30%	8%	10%	4%	4%	4%	4%	4%	4%
Type 7	34%	26%	10%	7%	N/A	7%	4%	5%	3%	4%
Type 8	33%	25%	8%	8%	2%	6%	4%	5%	4%	5%
Type 9	33%	25%	8%	8%	N/A	5%	3%	11%	3%	4%
Type 10	30%	37%	9%	10%	3%	N/A	3%	N/A	4%	4%

* Refer to Appendix A for types of residential layout.

2.9 Floor & Ceiling Finishes (Cont'd)

Table of Norms (Cont'd)

II. Office

Types of Layout *	Floor Plate	Total Floor / Ceiling Finishes Area	Floor / Ceiling Finishes to Floor Ratio
	m2 CFA/ floor	m2	m2/m2 CFA
Type A	736	611	0.83
Type B	934	788	0.84
Type C	1,387	1,163	0.84
Type D	1,566	1,351	0.86
Type E	1,857	1,559	0.84
Type F	2,044	1,662	0.81
Type G	2,557	2,157	0.84
Type H	2,590	2,391	0.92

Types of Layout *	Tenant Area	Toilets	Store/ Cleaners' Room	BOH / Corridor	Typical Lift Lobby	Typical Lift Corridor	Service Lift Lobby	E&M	Staircase
	%	%	%	%	%	%	%	%	%
Type A	81%	5%	N/A	1%	3%	N/A	1%	4%	5%
Type B	79%	5%	N/A	1%	5%	N/A	1%	5%	4%
Type C	84%	2%	N/A	1%	4%	N/A	1%	4%	4%
Type D	84%	4%	N/A	1%	3%	N/A	N/A	5%	3%
Type E	82%	4%	1%	1%	3%	N/A	1%	4%	4%
Type F	83%	4%	N/A	1%	4%	N/A	1%	4%	3%
Type G	86%	4%	N/A	1%	2%	N/A	1%	4%	2%
Type H	78%	3%	N/A	1%	1%	10%	1%	2%	4%

* Refer to Appendix B for types of office layout.

2.9 Floor & Ceiling Finishes (Cont'd)

Table of Norms (Cont'd)

III. Retail

Types of Layout *	Floor Plate	Total Floor / Ceiling Finishes Area	Floor / Ceiling Finishes to Floor Ratio
	m2 CFA/ floor	m2	m2/m2 CFA
Type I	2,556	2,134	0.83
Type II	3,265	2,847	0.87
Type III	10,699	9,772	0.91
Type IV	12,910	11,101	0.86
Type V	3,550	2,966	0.84

Types of Layout *	Arcade	Tenant Area	Toilets	Corridor to Toilet	BOH Corridor	Service Lift Lobby	Plant Room	Staircase	Others
	%	%	%	%	%	%	%	%	%
Type I	31%	51%	3%	2%	1%	1%	3%	8%	N/A
Type II	14%	64%	2%	1%	5%	2%	4%	8%	N/A
Type III	23%	60%	2%	2%	2%	1%	5%	5%	N/A
Type IV	27%	51%	1%	2%	2%	1%	6%	5%	5%
Type V	26%	63%	1%	N/A	1%	N/A	4%	5%	N/A

* Refer to Appendix C for types of retail layout.

2.10 Internal Wall Finishes

Table of Norms

I. Residential

Types of Layout *	Floor Plate	Average Flat Size	Storey Height	Total Internal Wall Finishes Area	Internal Wall Finishes to Floor Ratio
	m2 CFA/ floor	m2/ flat	m	m2	m2/m2 CFA
Type 1	189	95	2.975	567	3.01
Type 2 & 3	598 (345 + 253)	299	2.95 + 2.95	1,193	1.98
Type 4	366	92	3.00	1,169	3.20
Type 5	649	108	3.30	2,064	3.17
Type 6	552	138	3.30	1,709	3.10
Type 7	458	57	2.80	1,304	2.85
Type 8	603	75	3.15	1,890	3.13
Type 9	625	63	3.40	2,169	3.47
Type 10	646	323	3.15	1,425	2.20

Types of Layout *	L/D Rm	Bed Rm	Kitchen	Bathroom	Maid/ Maid Toilet	Typical Lift Lobby	Typical Lift Corridor	E&M	Staircase
	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)
Type 1	0.56 (19%)	0.72 (24%)	0.31 (10%)	0.39 (13%)	0.08 (3%)	0.23 (7%)	N/A	0.23 (8%)	0.49 (16%)
Type 2 & 3	0.43 (22%)	0.48 (24%)	0.09 (5%)	0.23 (11%)	0.10 (5%)	0.06 (3%)	0.07 (4%)	0.22 (11%)	0.30 (15%)
Type 4	0.59 (18%)	0.93 (29%)	0.31 (10%)	0.45 (14%)	0.27 (9%)	0.13 (4%)	0.06 (2%)	0.19 (6%)	0.27 (8%)
Type 5	0.72 (23%)	0.92 (29%)	0.30 (9%)	0.44 (14%)	0.20 (6%)	0.08 (3%)	0.15 (5%)	0.20 (6%)	0.16 (5%)
Type 6	0.61 (20%)	0.93 (30%)	0.27 (9%)	0.45 (15%)	0.25 (8%)	0.10 (3%)	0.11 (3%)	0.18 (6%)	0.20 (6%)
Type 7	0.78 (27%)	0.84 (30%)	0.35 (12%)	0.29 (10%)	N/A	0.10 (4%)	0.15 (5%)	0.17 (6%)	0.17 (6%)
Type 8	0.80 (26%)	0.87 (28%)	0.34 (11%)	0.40 (13%)	0.08 (2%)	0.10 (3%)	0.16 (5%)	0.19 (6%)	0.19 (6%)
Type 9	0.95 (27%)	1.00 (29%)	0.40 (11%)	0.47 (13%)	N/A	0.05 (3%)	0.34 (5%)	0.13 (6%)	0.13 (6%)
Type 10	0.40 (18%)	0.72 (33%)	0.20 (9%)	0.34 (15%)	0.13 (6%)	0.06 (3%)	N/A	0.17 (8%)	0.18 (8%)

* Refer to Appendix A for types of residential layout.

2.10 Internal Wall Finishes (Cont'd)

Table of Norms (Cont'd)

II. Office

Types of Layout *	Floor Plate	Storey Height	Partitioning for Typical Corridors	Partitioning for Tenant Areas	Total Internal Wall Finishes Area	Internal Wall Finishes to Floor Ratio
	m2 CFA/ floor	m	Yes or No	Yes or No	m2	m2/m2 CFA
Type A	736	4.5	No	No	953	1.29
Type B	934	4.5	No	No	1,468	1.56
Type C	1,387	4.2	No	No	1,284	0.92
Type D	1,566	4.5	No	No	1,503	0.96
Type E	1,857	4.2	No	No	1,797	0.96
Type F	2,044	4.2	No	No	1,636	0.80
Type G	2,557	4.5	No	No	2,575	1.01
Type H	2,590	4.2	Yes	Yes	3,828	1.47

Types of Layout *	Tenant Area	Toilets	Store/ Cleaners' Room	BOH / Corridor	Typical Lift Lobby	Typical Corridor	Service Lift Lobby	E&M	Staircase
	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)
Type A	0.38 (29%)	0.26 (20%)	N/A	0.10 (8%)	0.08 (6%)	N/A	0.03 (3%)	0.17 (13%)	0.27 (21%)
Type B	0.57 (36%)	0.20 (13%)	0.03 (2%)	0.09 (6%)	0.11 (7%)	N/A	0.07 (5%)	0.25 (16%)	0.24 (15%)
Type C	0.32 (35%)	0.13 (14%)	N/A	0.03 (3%)	0.07 (8%)	N/A	0.05 (5%)	0.15 (17%)	0.17 (18%)
Type D	0.19 (20%)	0.21 (22%)	N/A	0.05 (5%)	0.09 (9%)	N/A	0.04 (4%)	0.24 (25%)	0.14 (15%)
Type E	0.27 (28%)	0.14 (15%)	0.06 (6%)	0.07 (7%)	0.06 (6%)	N/A	0.04 (5%)	0.09 (9%)	0.23 (24%)
Type F	0.20 (25%)	0.15 (18%)	N/A	0.04 (5%)	0.07 (9%)	N/A	0.05 (7%)	0.17 (21%)	0.12 (15%)
Type G	0.52 (51%)	0.13 (13%)	0.02 (2%)	0.05 (5%)	0.05 (5%)	N/A	0.03 (3%)	0.10 (10%)	0.11 (11%)
Type H	0.60 (41%)	0.12 (8%)	N/A	0.05 (3%)	0.04 (3%)	0.37 (25%)	0.04 (3%)	0.11 (7%)	0.14 (10%)

* Refer to Appendix B for types of office layout.

2.10 Internal Wall Finishes (Cont'd)

Table of Norms (Cont'd)

III. Retail

Types of Layout *	Floor Plate	Storey Height	Total Internal Wall Finishes Area	Internal Wall Finishes to Floor Ratio
	m2 CFA/ floor	m	m2	m2/m2 CFA
Type I	2,556	5.8	5,424	2.13
Type II	3,265	4.6	5,322	1.62
Type III	10,699	5.0	16,180	1.52
Type IV	12,910	6.5	23,094	1.78
Type V	3,550	5.6	4,042	1.14

Types of Layout *	Arcade	Tenant Area	Toilets	Corridor to Toilet	BOH Corridor	Service Lift Lobby	Plant Room	Staircase	Others
	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)	m2/m2 CFA (%)
Type I	0.10 (5%)	1.06 (50%)	0.13 (6%)	0.12 (6%)	0.06 (3%)	0.09 (4%)	0.24 (11%)	0.33 (15%)	N/A
Type II	0.08 (5%)	0.72 (44%)	0.08 (5%)	0.05 (3%)	0.18 (11%)	0.10 (6%)	0.16 (10%)	0.25 (16%)	N/A
Type III	0.05 (3%)	0.76 (50%)	0.09 (6%)	0.06 (4%)	0.11 (7%)	0.05 (3%)	0.17 (11%)	0.23 (16%)	N/A
Type IV	0.01 (1%)	0.72 (40%)	0.09 (5%)	0.15 (8%)	0.14 (8%)	0.05 (3%)	0.23 (13%)	0.31 (18%)	0.08 (4%)
Type V	0.06 (5%)	0.41 (36%)	0.08 (7%)	0.02 (2%)	0.08 (7%)	0.04 (4%)	0.23 (20%)	0.22 (19%)	N/A

* Refer the Appendix C for types of retail layout.

2.11 Roof Finishes

Total roof finishes should equal at least the footprint of the building. Remember to allow roof finishes to top of podiums and to top of basements that extend beyond the ground floor enclosure.

Points to Note:

1. Roof finishes of waterproofing membrane and insulation layer with screeding shall be allowed in the following areas:
   (i) basement roof (non-enclosed area at G/F);
   (ii) podium roof (non-tower area); and
   (iii) roof and upper roof.
2. Precast concrete tile and heat insulation shall be allowed for roof with access for maintenance purpose.
3. Landscaping/ planter/ good quality paving shall be allowed separately and grouped in "External and Landscaping Works".

2.12 Sanitary Fittings

Table of Norms

I. Residential

Types of Sanitary Fittings	No. of persons residing in the building	No. of fittings
W.C.	1 – 8	1
	More than 8	1 per 15

II. Office

Types of Sanitary Fittings	Male		Female	
	No. of persons	No. of fittings	No. of persons	No. of fittings
W.C.	0 – 25	1	1 – 10	1
	26 – 50	2	11 – 25	2
	51 – 75	3	26 – 50	3
	76 – 100	4	51 – 75	4
	101 – 150	5	76 – 100	5
	151 – 200	6	101 – 125	6
	201 up	1 per 50	125 up	1 per 25
Urinal	10 – 50	1	N/A	
	51 – 100	2		
	101 – 150	3		
	151 - 200	1 per 50		
Basin	0 – 25	1	0 – 25	1
	26 – 50	2	26 – 50	2
	51 – 75	3	51 – 75	3
	76 – 100	4	76 – 100	4
	101 – 150	5	101 – 150	5
	151 – 200	1 per 50	151 – 200	1 per 50

Points to Note:

1. The No. of persons for office is calculated based on two assumptions:
   (i) 9m² of Usable Floor Area per one person; and
   (ii) the proportion of Male to Female is 1 to 1.

2.12 Sanitary Fittings (Cont'd)

Table of Norms (Cont'd)

III. Retail

Types of Sanitary Fittings	Male			Female		
	No. of persons	**No. of fittings**	**Remarks**	**No. of persons**	**No. of fittings**	**Remarks**
W.C.	1 – 125	1	1 for every 125 persons	1 – 25	1	1 for every 250 persons
	126 – 250	2		26 – 50	2	
	251 - 375	3		51 – 125	3	
	376 – 500	4		126 – 250	4	
	500 – 750	5	More than 500; 4 plus 1 for every additional 250 persons	251 – 350	5	More than 250; 4 plus 1 for every additional 100 persons
	751 – 1,000	6		351 – 450	6	
Urinal	1 – 250	1	1 for every 250 persons	N/A		
	251 – 500	2				
	501 – 750	3				
Lavatory Basin	1 – 125	1	1 for every 125 persons	1 – 125	1	1 for every 125 persons
	126 – 250	2		126 - 250	2	
	251 – 375	3		251 – 375	3	
	376 – 500	4		376 – 500	4	
	500 – 750	5	More than 500; 4 plus 1 for every additional 250 persons	500 – 750	5	More than 500; 4 plus 1 for every additional 250 persons
	751 – 1,000	6		751 – 1,000	6	

2.13 External and Landscaping Works

Table of Norms

Sports Activity		Authority	Court Size	Court Size with Margins		Margins of Court to Court	Margins of Clear Height
				Dimension	Area	m	m
Badminton		IBF	13.4m x 6.1m	17.4m x 10.1m	176m2	2.0	9.0
Squash		WS	9.75m x 6.40m		62m2	-	5.64
Table Tennis	ITTF*	ITTF	14.0m x 7.0m		98m2	-	4.05
	National	ITTF	14.0m x 7.0m		98m2	-	4.05
	Recreation	ITTF	7.0m x 4.6m		32m2	-	-
Tennis*	Competition	ITF	23.77m x 10.97m	36.57m x 18.29m	669m2	4.27	9.1
	Recreation	ITF	23.77m x 10.97m	36.57m x 18.29m	669m2	3.66	9.1
Basketball*		FIBA	28.0m x 15.0m	32.0m x 19.0m	608m2	2.0	7.0
Volleyball		IVBF	18.0m x 9.0m	34.0m x 19.0m	646m2	5.0	12.0
	National	IVBF	18.0m x 9.0m	34.0m x 19.0m	646m2	5.0	9.0
	Recreation	IVBF	18.0m x 9.0m	34.0m x 19.0m	646m2	3.0	9.0
Football	Min.	FIFA	100.0m x 64.0m	118.0m x 82.0m	9,676m2	-	
	Max.	FIFA	110.0m x 75.0m	128.0m x 93.0m	11,904m2	-	
7-A-Side Soccer (Mini-soccer)	Min.		61.26m x 36.57m	71.26m x 46.57m	3,319m2	-	-
	Max		76.80m x 56.69m	86.80m x 66.69m	5,789m2	-	-
5-A-Side Soccer	Min.		28.0m x 18.0m		504m2	-	6.7
	Max		36.0m x 30.0m		1,080m2	-	6.7 (rebound wall)
Cricket	Adult	MCC	20.12m x 3.05m (pitch measurement)		61m2	-	-
	Junior (under 13)	MCC	19.20m x 3.05m (pitch measurement)		59m2	-	-
Rugby		IRB	n/e144.00m x n/e70.00m		10,080m2	-	-
Multi-purpose Grass Pitch			120.0m x 100.0m		12,000m2	-	-
Gymnasium		FIG	73.0m x 33.5m		2,446m2	-	7.6
	National	FIG	50.0m x 25.0m		1,250m2	-	7.6
Athletics Complex			2.0ha – 3.0ha		2.0ha – 3.0ha	-	
Fitness Room			80m2 – 210m2		80m2 – 210m2	-	3.5 – 4.0
Dance Room			80m2 – 210m2		80m2 – 210m2	-	3.5 – 4.0

* – An attempt should be made to provide up to full competition standard. If there are site constraints, at least one of each type of court should be up to competition standard, and the full sized court should be specified in the layout plan.

IBF – International Badminton Federation
WS – World Squash
ITTF – International Table-Tennis Federation
ITF – International Tennis Federation
FIBA – International Amateur Basketball Federation
IVBF – International Volleyball Federation
FIFA – Federation Internationale de Football Association
FAG – Federation Internationale de Gymnastique
MCC – The Marylebone Cricket Club
IRB – International Rugby Board

2.13 External and Landscaping Works (Cont'd)

Points to Note:

1. External and landscaping works shall include:-
   (i) paving at ground floor/ podium floor;
   (ii) planter and soft landscaping and irrigation;
   (iii) site drainage and lighting;
   (iv) outdoor water feature/ lake;
   (v) outdoor swimming pool and deck;
   (vi) external signage;
   (vii) fence wall;
   (viii) underground drainage; and
   (ix) utilities connections.