下載初稿 Download Draft | 列印 Print | 重設 Reset | 儲存 Save | 提交 Submit

屋宇署 BUILDINGS DEPARTMENT

住宅熱傳送值的摘要匯表
RTTV Summary Sheet

請在適當的方格內填上『√』號。
please tick in box as appropriate.

Notes:
ER = External Reflectance
SC = Shading Coefficient
VLT = Visible Light Transmittance
Window and skylight data should represent the major proportion of its use in the development.

註:
ER = 外部反射率
SC = 遮光系數
VLT = 可見光透光率
應以發展項目中使用比例最高的窗戶和天窗的資料為準。

PNAP APP-156 附錄 Appendix A

電郵地址 E-mail Address	ⓘ 作認收電郵之用 (電子呈交適用) For acknowledgement email (e-submission)

地址 Address:	TOWER 1, PROPOSED RESIDENTIAL DEVELOPMENT AT INLAND LOT NO. 9076, 135 TAI HANG ROAD, HONG KONG	屋宇署檔號 BD Ref. No.	2/3003/20
建築物類型：Building Type:	住宅 Residential		
住宅熱傳送值計算者 RTTV calculated by	☑ 1. 註冊專業工程師 1. Registered Professional Engineers		
	☐ 2. 建築師 2. Architect		
	☐ 3. 其他，請註明： 3. Others, please specify:		
層數（住宅單位）No. of Storeys (Residential Units)	18		

表 1 Table

	當作符合總歷住宅熱傳送值 Deemed to Satisfy $RTTV_{Wall}$							
外牆朝向方位 Facade Orientation Facing	NORTHWEST	NORTHEAST	SOUTHEAST	SOUTHWEST				
平均吸收率值 Average Absorptivity	0.3	0.3	0.3	0.3				
窗戶與牆壁的平均比例 Average Window to Wall Ratio	69:100	0:100	44:100	7:100				
玻璃遮光系數 Shading Coefficient of Glazing	0.36		0.36	0.36				
外牆的平均遮光系數 Average Shading Coefficient of Facade								
可見光透光率 Visible Light Transmittance	51 %	%	51 %	51 %	%	%	%	%
外部反射率 External Reflectance	20 %	%	20 %	20 %	%	%	%	%

表 2 Table 2

牆壁住宅熱傳送值 $RTTV_{Wall}$

		NORT HWE ST	NORT HE AST	SOUT HE AST	SOUT HWE ST
外牆朝向方位 Facade Orientation Facing		NORT HWE ST	NORT HE AST	SOUT HE AST	SOUT HWE ST
牆壁方位系數 Wall Orientation Factor		0.79	1.072	0.975	1.131
外牆總面積 (住宅單位) Total External Wall Area (Residential Units)		2,273.43 平方米 m²	349.1 平方米 m²	1,361.71 平方米 m²	509.08 平方米 m²
窗戶與牆壁的比例 Window to Wall Ratio		= 156580:221	= 0:349.1	= 60315:136	= 941:12727
窗戶總面積 Total Window Area		1,565.8 m²	0 m²	603.15 m²	37.64 m²
熱傳導 Heat Conduction	不透光牆 Opaque Wall	0.95 瓦特/平方米 W/m²	12.33 瓦特/平方米 W/m²	6.25 瓦特/平方米 W/m²	12.05 瓦特/平方米 W/m²
	窗戶 Window	0.7 瓦特/平方米 W/m²	0 瓦特/平方米 W/m²	0.51 瓦特/平方米 W/m²	5.7 瓦特/平方米 W/m²
窗戶 Window	玻璃類型 Glass Type	☑ 反射性 Reflective 面積 Area= 1,565 平方米 m² SC= 0.36 VLT= 51 % ER= 20 %	☐ 反射性 Reflective 面積 Area= 平方米 m² SC= VLT= % ER= %	☑ 反射性 Reflective 面積 Area= 603.1 平方米 m² SC= 0.36 VLT= 51 % ER= 20 %	☑ 反射性 Reflective 面積 Area= 37.64 平方米 m² SC= 0.36 VLT= 51 % ER= 20 %
		☐ 有色 Tinted 面積 Area= 平方米 m² SC= VLT= % ER= %	☐ 有色 Tinted 面積 Area= 平方米 m² SC= VLT= % ER= %	☐ 有色 Tinted 面積 Area= 平方米 m² SC= VLT= % ER= %	☐ 有色 Tinted 面積 Area= 平方米 m² SC= VLT= % ER= %
		☐ 透明 Clear 面積 Area= 平方米 m² SC= VLT= % ER= %	☐ 透明 Clear 面積 Area= 平方米 m² SC= VLT= % ER= %	☐ 透明 Clear 面積 Area= 平方米 m² SC= VLT= % ER= %	☐ 透明 Clear 面積 Area= 平方米 m² SC= VLT= % ER= %
	雙層玻璃 Double Glazing	☑ 有 Yes ☐ 無 No	☐ 有 Yes ☐ 無 No	☑ 有 Yes ☐ 無 No	☑ 有 Yes ☐ 無 No
	外遮光物 External Shading	外懸伸建物 Overhang ☑ 有 Yes ☐ 無 No	外懸伸建物 Overhang ☐ 有 Yes ☐ 無 No	外懸伸建物 Overhang ☑ 有 Yes ☐ 無 No	外懸伸建物 Overhang ☑ 有 Yes ☐ 無 No
		側鰭伸建物 Sidefin ☐ 有 Yes ☑ 無 No	側鰭伸建物 Sidefin ☐ 有 Yes ☐ 無 No	側鰭伸建物 Sidefin ☐ 有 Yes ☑ 無 No	側鰭伸建物 Sidefin ☐ 有 Yes ☑ 無 No
穿透玻璃的太陽輻射量 Solar Radiation through Glazing		8.35 瓦特/平方米 W/m²	0 瓦特/平方米 W/m²	6.49 瓦特/平方米 W/m²	0.1 瓦特/平方米 W/m²
平均吸熱率值 Average Absorptivity		0.3	0.3	0.3	1.26
各幅外牆的牆壁住宅熱傳送值 $RTTV_{Wall}$ at each facade		10 瓦特/平方米 W/m²	12.33 瓦特/平方米 W/m²	13.25 瓦特/平方米 W/m²	13.4 瓦特/平方米 W/m²
總牆壁住宅熱傳送值 Overall $RTTV_{Wall}$		11.55 瓦特/平方米 W/m²			

表 3 Table 3

屋頂住宅熱傳送值 $RTTV_{Roof}$						
屋頂方位系數 Roof Orientation Factor		2.16				
屋頂總面積 (住宅單位) Total Roof Area (Residential Units)		249.63 平方米 m^2				
天窗總面積 Total Skylight Area		8.54 平方米 m^2				
熱傳導 Heat Conduction	屋頂 Roof	1.58 瓦特/平方米 W/m^2				
	天窗 Skylight	0.14 瓦特/平方米 W/m^2				
天窗 Skylight	玻璃類型 Glass Type	☑ 反射性 Reflective	面積= Area= 8.54 平方米 m^2	SC= 0.75	VLT= 79 %	ER= 7 %
		☐ 有色 Tinted	面積= Area= 平方米 m^2	SC=	VLT= %	ER= %
		☐ 透明 Clear	面積= Area= 平方米 m^2	SC=	VLT= %	ER= %
	雙層玻璃 Double Glazing	☑ 有 Yes ☐ 無 No				
	外遮光物 External Shading	☐ 有 Yes ☑ 無 No				
穿透玻璃的太陽輻射量 Solar Radiation through Glazing		2.28 瓦特/平方米 W/m^2				
平均吸熱率值 (屋頂) Average Absorptivity (roof)		0.9				
總屋頂住宅熱傳送值 Overall $RTTV_{Roof}$		3.998 瓦特/平方米 W/m^2				

簽署*
Signature*

任何失實核證或聲明可引致法律行動。##
Any false certification or declaration may be subject to legal action.##

日期 Date

1	6	0	8	2	0	2	4

日 dd 月 mm 年 yyyy

注意事項

任何人如作出虛假聲明或就重要事項作出失實陳述即屬觸犯刑事罪行，可能會被檢控。

甲. 填寫表格

1. 請填妥表格載列所有有關的部分。請附上所有證明文件。

2. 所提供的資料如有不全或錯誤，屋宇署將不能處理呈交的文件。

3. 如對本表格有任何疑問，請與屋宇署聯絡。

乙. 呈交方法

1. **郵寄/親身呈交 - 本表格連同有關文件應郵寄或親身呈交至屋宇署：**

呈交有關勸諭信 / 命令 / 通知 / 指示的表格：
九龍油麻地海庭道11號西九龍政府合署北座屋宇署總部地下一般查詢及收件處。

呈交至拓展部有關其他事宜的表格：
香港太古城太古灣道14號7樓屋宇署收發處。

丙. 聯絡資料

屋宇署
地址：九龍油麻地海庭道11號西九龍政府合署北座屋宇署總部
電話：2626 1616 (由"1823" 接聽)
傳真：2537 4992
電郵：enquiry@bd.gov.hk

Matters to Note

Any person making a false declaration or misrepresenting a material fact shall be guilty of a criminal offence and subject to prosecution.

A. Completion of Form

1. Please ensure that all relevant parts of the form are duly completed. Please enclose all supporting documents.
2. If incomplete or erroneous information is provided in the form, the Buildings Department may not be able to process the submission.
3. Enquiries regarding this form should be addressed to the Buildings Department.

B. Submission Methods

1. **By Post / In Person - This form together with the relevant documents shall be posted to or submitted in person to the Buildings Department:**

For submissions relating to advisory letter/order/notice/direction:
General Enquiry and Receipt Counter, G/F, Buildings Department Headquarters, North Tower, West Kowloon Government Offices, 11 Hoi Ting Road, Yau Ma Tei, Kowloon.

For other submissions to the New Buildings Division:
Receipt & Despatch Counter, Buildings Department, 7/F, 14 Taikoo Wan Road, Taikoo Shing, Hong Kong.

C. Contact Details

Buildings Department
Address: Buildings Department Headquarters, North Tower, West Kowloon Government Offices, 11 Hoi Ting Road, Yau Ma Tei, Kowloon
Tel No.: 2626 1616 (handled by "1823")
Fax No.: 2537 4992
Email: enquiry@bd.gov.hk

Tower 1, Proposed Residential Development at Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

RTTV Report for Residential Tower

Building Services Engineer:
AECOM Asia Company Limited

13/F Tower 2, Grand Central Plaza, 138 Shatin Rural Committee Road, Shatin, Hong Kong.

Tel: +852 3922 9162
Fax: +852 3922 9797

Gross Wall Area (Opaque walls + Glazing Areas) Calculation

Sheet no. T1 - 1

Storey heights (Residential Units) :

1/F- 19/F (Except 4/F & 13/F & 14/F)	=	3.50 m (	16 storeys)
21/F	=	3.50 m (	1 storey)
22/F	=	4.00 m (	1 storey)

Northwest Elevations

Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F- 19/F (Except 4/F & 13/F & 14/F)	(	5.60	+	25.30	+	5.60	)x	3.50	x	16	=	36.50	x	3.50	x	16	=	2044.00 m²
21/F	(	24.70	+	8.08			)x	3.50	x	1	=	32.78	x	3.50	x	1	=	114.71 m²
22/F	(	24.70	+	8.08			)x	3.50	x	1	=	32.78	x	3.50	x	1	=	114.71 m²

Gross Wall Areas 2273.43 m²

Northeast Elevations

Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F- 19/F (Except 4/F & 13/F & 14/F)	(	1.08	+	1.25	+	1.20 + 2.4	)x	3.50	x	16	=	5.93	x	3.50	x	16	=	331.80 m²
21/F	(	1.08	+	1.23			)x	3.50	x	1	=	2.31	x	3.50	x	1	=	8.07 m²
22/F	(	1.08	+	1.23			)x	4.00	x	1	=	2.31	x	4.00	x	1	=	9.23 m²

Gross Wall Areas 349.10 m²

Southeast Elevations

Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F- 19/F (Except 4/F & 13/F & 14/F)	(	1.15	+	1.28	+	6.75	+	2.18	+	1.20	+	6.75	+	1.28 + 1.20	)x	3.50	x	16	=	21.78 x 3.50 x 16 = 1219.40 m²
21/F	(	1.15	+	6.75	+	1.975	+	2.18	+	6.93					)x	3.50	x	1	=	18.98 x 3.50 x 1 = 66.41 m²
22/F	(	1.15	+	6.75	+	1.975	+	2.18	+	6.93					)x	4.00	x	1	=	18.98 x 4.00 x 1 = 75.90 m²

Gross Wall Areas 1361.71 m²

Southwest Elevations

Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F- 19/F (Except 4/F & 13/F & 14/F)	(	2.40	+	1.25	+	4.525	)x	3.50	x	16	=	8.18	x	3.50	x	16	=	457.80 m²
21/F	(	1.20	+	6.13			)x	3.50	x	1	=	7.33	x	3.50	x	1	=	25.64 m²
22/F	(	1.20	+	6.13			)x	3.50	x	1	=	7.33	x	3.50	x	1	=	25.64 m²

Gross Wall Areas 509.08 m²

Total Gross Wall Areas 4493.32 m²

Total Glazing Area (Window + Balcony) Calculation

Sheet no T1 - 2

Glazing heights (Residential Units) :

1/F (H1)	=	2.50 m	(1 storey)
1/F (H2)	=	2.70 m	(1 storey)
2/F- 19/F (Except 4/F, 13/F & 14/F) Window (H3)	=	2.50 m	(15 storeys)
2/F- 19/F (Except 4/F, 13/F & 14/F) Window (H4)	=	2.70 m	(15 storeys)
21/F (H5)	=	2.70 m	(1 storey)
22/F (H6)	=	3.42 m	(1 storey)

Northwest Elevations Gross Glazing Area = Total Length of Glazing x Glazing Height x No of Storeys

	Total Length of Glazing	Glazing Height	No of Storeys				Gross Glazing Area
1/F (H1)	(5.50 + 1.98 + 3.90 + 2.10 + 0.35 + 1.98 + 5.14)	x 2.50	x 1	= 21.12	x 2.50	x 1	= 52.80 m²
1/F (H2)	(3.03 + 2.91 + 3.93)	x 2.70	x 1	= 9.77	x 2.70	x 1	= 26.37 m²
2/F- 19/F (Except 4/F, 13/F & 14/F) Window (H3)	(5.50 + 1.98 + 11.40 + 1.98 + 5.14)	x 2.50	x 15	= 26.00	x 2.50	x 15	= 975.00 m²
2/F- 19/F (Except 4/F, 13/F & 14/F) Window (H4)	(4.03 + 4.03)	x 2.70	x 15	= 8.05	x 2.70	x 15	= 326.03 m²
21/F (H5)	(5.71 + 4.52 + 6.76 + 5.73 + 7.62)	x 2.70	x 1	= 30.32	x 2.70	x 1	= 81.97 m²
22/F (H6)	(5.71 + 4.52 + 6.76 + 5.73 + 7.62)	x 3.42	x 1	= 30.32	x 3.42	x 1	= 103.77 m²

Gross Glazing Areas 1565.80 m²

Northeast Elevations Gross Glazing Area = Total Length of Glazing x Glazing Height x No of Storeys

	Total Length of Glazing	Glazing Height	No of Storeys				Gross Glazing Area
1/F (H1)	(0.00)	x 2.50	x 1	= 0.00	x 2.50	x 1	= 0.00 m²
1/F (H2)	(0.00)	x 2.70	x 1	= 0.00	x 2.70	x 1	= 0.00 m²
2/F- 19/F (Except 4/F, 13/F & 14/F) Window (H3)	(0.00)	x 2.50	x 15	= 0.00	x 2.50	x 15	= 0.00 m²
2/F- 19/F (Except 4/F, 13/F & 14/F) Window (H4)	(0.00)	x 2.70	x 15	= 0.00	x 2.70	x 15	= 0.00 m²
21/F (H5)	(0.00)	x 2.70	x 1	= 0.00	x 2.70	x 1	= 0.00 m²
22/F (H6)	(0.00)	x 3.42	x 1	= 0.00	x 3.42	x 1	= 0.00 m²

Gross Glazing Areas 0.00 m²

Sheet no T1 - 3

Southeast Elevations Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

	Total Length of Glazing	Glazing Height	No of Storeys				Gross Glazing Area
1/F (H1)	(0.65 + 6.00 + 6.00 + 1.00)	x 2.50	x 1	= 13.65	x 2.50	x 1	= 34.88 m²
1/F (H2)	(0.00)	x 2.70	x 1	= 0.00	x 2.70	x 1	= 0.00 m²
2/F- 19/F (Except 4/F, 13/F & 14/F) Window (H3)	(0.65 + 6.00 + 6.00 + 1.00)	x 2.50	x 15	= 13.65	x 2.50	x 15	= 523.13 m²
2/F- 19/F (Except 4/F, 13/F & 14/F) Window (H4)	(0.00)	x 2.70	x 15	= 0.00	x 2.70	x 15	= 0.00 m²
21/F (H5)	(0.65 + 5.93 + 0.50)	x 2.70	x 1	= 7.36	x 2.70	x 1	= 19.91 m²
22/F (H6)	(0.65 + 5.93 + 0.50)	x 3.42	x 1	= 7.38	x 3.42	x 1	= 25.24 m²

Gross Glazing Areas 603.15 m²

Southwest Elevations Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

	Total Length of Glazing	Glazing Height	No of Storeys				Gross Glazing Area
1/F (H1)	(0.00)	x 2.50	x 1	= 0.00	x 2.50	x 1	= 0.00 m²
1/F (H2)	(0.00)	x 2.70	x 1	= 0.00	x 2.70	x 1	= 0.00 m²
2/F- 19/F (Except 4/F, 13/F & 14/F) Window (H3)	(0.00)	x 2.50	x 15	= 0.00	x 2.50	x 15	= 0.00 m²
2/F- 19/F (Except 4/F, 13/F & 14/F) Window (H4)	(0.00)	x 2.70	x 15	= 0.00	x 2.70	x 15	= 0.00 m²
21/F (H5)	(4.98)	x 2.70	x 1	= 4.98	x 2.70	x 1	= 13.43 m²
22/F (H6)	(5.95 + 1.10)	x 3.42	x 1	= 7.06	x 3.42	x 1	= 24.21 m²

Gross Glazing Areas 37.64 m²

Total Gross Glazing Areas 2206.59 m²

Northwest Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at Northwest Elevations = **2273.43** m²

Glazing Areas at Northwest Elevations = **1565.80** m²

Breakdown of Glazing Areas

Glazing Areas	**Unshaded**		(NW-F1)	=	**1082.29** m²
Glazing Areas	**ESC =**	**0.795**	(NW-F2)	=	**352.39** m²
Glazing Areas	**ESC =**	**0.8**	(NW-F3)	=	**12.20** m²
Glazing Areas	**Unshaded**		(NW-F4)	=	**118.92** m²

Opaque Wall Areas at Northwest Elevations = **707.63** m²

Breakdown of Opaque Wall Areas

RC Wall Areas (200mm) (NW-W1) = **707.63** m²

Window to Wall Ratio (WWR) = 1565.80 / 2273.43 = **0.69**

Wall Orientation Factor Gw = 0.79 (Refer to **Table 9**)

Average Absorptivity (α) of the External Opaque Wall at Northwest Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to Table 5)
Silver Aluminium Cladding	100%	0.3

Average Absorptivity = 0.30

'U' value of Opaque Wall Areas

$U = 1/(Ri+x_1/k_1+x_2/k_2+...+x_n/k_n+Ra+Ro)$ where

- Ri — Surface film resistance of internal surface (Refer to **Table 2**)
- Ro — Surface film resistance of external surface (Refer to **Table 2**)
- Ra — Air space resistance (Refer to **Table 3**)
- x — Thickness of building materials
- k — Thermal conductivity of building materials (Refer to **Table 1**)

NW-W1 Description: RC Wall Areas (200mm)

Wall Material					
External surface film resistance			Ro	=	0.044
Air space resistanace			Ra	=	0
5mm aluminium alloy	0.005	/	160	=	0.000
185mm concrete wall	0.185	/	2.16	=	0.086
10mm gypsum plaster	0.01	/	0.38	=	0.026
Internal surface film resistance			Ri	=	0.12
Total					**0.276** W/m²K

Uw1 = 1 / 0.276 = 3.62

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014
Form RTTV (Wall) 1 - Calculation of $RTTV_{wall}$ of Each Facade

Sheet No. T1 - 5 BD Ref No. 2/3003/20

Building Address Tower 1, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Facade Orientation Facing Northwest Gross Wall Area (Ao) = 2273.43

Window to Wall Ratio (WWR) 0.69 Wall Orientation Factor (Gw) = 0.79

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		**Code No.**		
Description	**Units**	**NW-W1**		
External Finish Material		185mm concrete wall		
Conductivity	W/mK	2.16		
Thickness	m	0.185		
Average Absorptivity	(α)	0.30		
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity				
Thickness				
Intermediate component				
Conductivity				
Thickness				
Internal Finish Material		10mm gypsum plaster		
Conductivity	W/mK	0.38		
Thickness	m	0.01		
U-value of Opaque Area (Uwi)	W/m^2K	3.62		
Opaque Wall Area (Awi)	m^2	707.63		
Heat Conduction = 3.57(Awi/Ao) Uwi αwi Gw		**0.95**		

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi αwi Gw where i= 1, 2, ..., n

= **0.95** W/m^2

Part 2 - Calculation of Heat Conduction through Glazing						
Components / Details		**Code No.**				
Description	**Units**	**NW-F1**	**NW-F2**	**NW-F3**	**NW-F4**	
Glazing Type		Tinted	Tinted	Tinted	Tinted	
Thickness	m	0.023	0.02	0.038	0.038	
Glazing Area (Afi)	m^2	1082.29	352.39	12.20	118.92	
U-value of Glazing (Ufi)	W/m^2K	1.840	1.620	1.620	4.640	
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		**0.443**	**0.127**	**0.004**	**0.123**	

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n

= **0.70** W/m^2

Part 3 - Calculation of Solar Radiation through Glazing						
Components / Details		**Code No.**				
Description	**Units**	**NW-F1**	**NW-F2**	**NW-F3**	**NW-F4**	
Glazing Type		Tinted	Tinted	Tinted	Tinted	
Thickness	m	0.023	0.02	0.038	0.038	
Glazing Area (Afi)	m^2	1082.29	352.39	12.20	118.92	
Shading Coefficient of Glazing (SCf)		0.36	0.35	0.35	0.71	
External Shading Miltiplier (ESC)		1.000	0.795	0.800	1.000	
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw		**5.65**	**1.42**	**0.05**	**1.22**	

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n

= **8.35** W/m^2

Summary of RTTV at Northwest Elevations

= 0.95 + 0.70 + 8.35

= **10.00** W/m^2

Northeast Elevations

Gross Wall Areas = **349.10** m²
(Opaque Walls + Glazing Areas) (Ao) at Northeast Elevations

Glazing Areas at Northeast Elevations = **0.00** m²

Breakdown of Glazing Areas

Glazing Areas Unshaded (NE-F1) = **0.00** m²

Glazing Areas ESC = 0.00 (NE-F2) = **0.00** m²

Opaque Wall Areas at Northeast Elevations = **349.10** m²

Breakdown of Opaque Wall Areas

RC Wall Areas (200mm) (NE-W1) = **349.10** m²

Window to Wall Ratio (WWR) = 0.00 / 349.10 = **0.00**

Wall Orientation Factor Gw = 1.072 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at Northeast Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to
Dark Grey paint	100%	0.9

Average Absorptivity = 0.90

'U' value of Opaque Wall Areas

$U = 1/(Ri+x_1/k_1+x_2/k_2+...+x_n/k_n+Ra+Ro)$

where Ri Surface film resistance of internal surface (Refer to Table 2)
Ro Surface film resistance of external surface (Refer to Table 2)
Ra Air space resistance (Refer to Table 3)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to Table 1)

NE-W1 Description: RC Wall Areas (200mm)

Wall Material					
External surface film resistance			Ro	=	0.044
Air space resistanace			Ra	=	0
5mm mosaic tiles	0.005	/	1.5	=	0.003
185mm concrete wall	0.185	/	2.16	=	0.086
10mm gypsum plaster	0.01	/	0.38	=	0.026
Internal surface film resistance			Ri	=	0.12
Total					**0.279** W/m²K

$$Uw1 = \frac{1}{0.279} = 3.58$$

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014
Form RTTV (Wall) 1 - Calculation of $RTTV_{wall}$ of Each Facade

Sheet No. T1 - 7 BD Ref No. 2/3003/20

Building Address Tower 1, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Facade Orientation Facing Northeast Gross Wall Area (Ao) = 349.10

Window to Wall Ratio (WWR) 0.00 Wall Orientation Factor (Gw) = 1.072

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		**Code No.**		
Description	**Units**	**NE-W1**		
External Finish Material		185mm concrete wall		
Conductivity	W/mK	2.16		
Thickness	m	0.185		
Average Absorptivity	(α)	0.90		
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		10mm gypsum plaster		
Conductivity	W/mK	0.38		
Thickness	m	0.01		
U-value of Opaque Area (Uwi)	W/m²K	3.58		
Opaque Wall Area (Awi)	m²	349.10		
Heat Conduction = 3.57(Awi/Ao) Uwi αwi Gw		**12.33**		

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi αwi Gw where i= 1, 2, ..., n

= **12.33** **W/m²**

Part 2 - Calculation of Heat Conduction through Glazing						
Components / Details		**Code No.**				
Description	**Units**	**NE-F1**				
Glazing Type		Tinted				
Thickness	m	0.008				
Glazing Area (Afi)	m²	0.00				
U-value of Glazing (Ufi)	W/m²K	5.700				
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		**0.00**				

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n

= **0.00** **W/m²**

Part 3 - Calculation of Solar Radiation through Glazing						
Components / Details		**Code No.**				
Description	**Units**	**NE-F1**				
Glazing Type		Tinted				
Thickness	m	0.008				
Glazing Area (Afi)	m²	0.00				
Shading Coefficient of Glazing (SCf)		0.36				
External Shading Miltiplier (ESC)		1.00				
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw		**0.00**				

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n

= **0.00** **W/m²**

Summary of RTTV at Northeast Elevations

= 12.33 + 0.00 + 0.00

= **12.33** **W/m²**

Southeast Elevations

Gross Wall Areas
(Opaque Walls + Glazing Areas) (Ao) at **Southeast Elevations** = **1361.71** m²

Glazing Areas at **Southeast Elevations** = **603.15** m²

Breakdown of Glazing Areas

Glazing Areas	**Unshaded**	(SE-F1)	=	**603.15** m²

Opaque Wall Areas at **Southeast Elevations** = **758.56** m²

Breakdown of Opaque Wall Areas

RC Wall Areas (200mm)		(SE-W1)	=	**758.56** m²

Window to Wall Ratio (WWR) = 603.15 / 1361.71 = **0.44**

Wall Orientation Factor Gw = 0.975 (Refer to **Table 9**)

Average Absorptivity (α) of the External Opaque Wall at **Southeast Elevations**

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to Table 5)
Dark Grey paint	100%	0.9

Average Absorptivity = 0.90

'U' value of Opaque Wall Areas

$U = 1/(Ri+x_1/k_1+x_2/k_2+...+x_n/k_n+Ra+Ro)$

where Ri Surface film resistance of internal surface (Refer to **Table 2**)
Ro Surface film resistance of external surface (Refer to **Table 2**)
Ra Air space resistance (Refer to **Table 3**)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to **Table 1**)

SE-W1 Description: RC Wall Areas (200mm)

Wall Material						
External surface film resistance			Ro	=	0.044	
Air space resistanace			Ra	=	0	
5mm mosaic tiles	0.005	/	1.5	=	0.003	
185mm concrete wall	0.185	/	2.16	=	0.086	
10mm gypsum plaster	0.01	/	0.38	=	0.026	
Internal surface film resistance			Ri	=	0.12	
Total					**0.279**	**W/m²K**

$Uw1 = \frac{1}{0.279} = 3.58$

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014
Form RTTV (Wall) 1 - Calculation of $RTTV_{wall}$ of Each Facade

Sheet No. T1 - 9 BD Ref No. 2/3003/20

Building Address Tower 1, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Facade Orientation Facing Southeast Gross Wall Area (Ao) = 1361.71

Window to Wall Ratio (WWR) 0.44 Wall Orientation Factor (Gw) = 0.975

Part 1 - Calculation of Heat Conduction through Opaque Walls

Components / Details		Code No.		
Description	**Units**	**SE-W1**		
External Finish Material		185mm concrete wall		
Conductivity	W/mK	2.16		
Thickness	m	0.185		
Average Absorptivity	(α)	0.90		
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		10mm gypsum plaster		
Conductivity	W/mK	0.38		
Thickness	m	0.01		
U-value of Opaque Area (Uwi)	W/m^2K	3.58		
Opaque Wall Area (Awi)	m^2	758.56		
Heat Conduction = 3.57(Awi/Ao) Uwi αwi Gw		**6.25**		

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi αwi Gw where i= 1, 2, ..., n

= **6.25** W/m^2

Part 2 - Calculation of Heat Conduction through Glazing

Components / Details		Code No.				
Description	**Units**	**SE-F1**				
Glazing Type		Tinted				
Thickness	m	0.008				
Glazing Area (Afi)	m^2	603.15				
U-value of Glazing (Ufi)	W/m^2K	1.840				
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		**0.51**				

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n

= **0.51** W/m^2

Part 3 - Calculation of Solar Radiation through Glazing

Components / Details		Code No.				
Description	**Units**	**SE-F1**				
Glazing Type		Tinted				
Thickness	m	0.008				
Glazing Area (Afi)	m^2	603.15				
Shading Coefficient of Glazing (SCf)		0.36				
External Shading Miltiplier (ESC)		1.000				
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw		**6.49**				

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n

= **6.49** W/m^2

Summary of RTTV at Southeast Elevations

= 6.25 + 0.51 + 6.49

= **13.25** W/m^2

Southwest Elevations

Gross Wall Areas
(Opaque Walls + Glazing Areas) (Ao) at **Southwest Elevations** = **509.08** m²

Glazing Areas at **Southwest Elevations** = **37.64** m²

Breakdown of Glazing Areas

Glazing Areas	**Unshaded**	(SW-F1)	=	**37.64** m²

Opaque Wall Areas at **Southwest Elevations** = **471.43** m²

Breakdown of Opaque Wall Areas

RC Wall Areas (200mm)		(SW-W1)	=	**471.43** m²

Window to Wall Ratio (WWR) = 37.64 / 509.08 = **0.07**

Wall Orientation Factor Gw = 1.131 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at **Southwest Elevations**

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity
Dark Grey paint	100%	0.9

Average Absorptivity = 0.90

'U' value of Opaque Wall Areas

$U = 1/(Ri+x_1/k_1+x_2/k_2+...+x_n/k_n+Ra+Ro)$

where Ri Surface film resistance of internal surface (Refer to **Table 2**)
Ro Surface film resistance of external surface (Refer to **Table 2**)
Ra Air space resistance (Refer to **Table 3**)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to **Table 1**)

SW-W1	Description:	RC Wall Areas (200mm)			
Wall Material					
External surface film resistance			Ro	=	0.044
Air space resistanace			Ra	=	0
5mm mosaic tiles	0.005	/ 1.5		=	0.003
185mm concrete wall	0.185	/ 2.16		=	0.086
10mm gypsum plaster	0.01	/ 0.38		=	0.026
Internal surface film resistance			Ri	=	0.12
Total					**0.279** W/m²K

$$Uw1 = \frac{1}{0.279} = 3.58$$

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014
Form RTTV (Wall) 1 - Calculation of $RTTV_{wall}$ of Each Facade

Sheet No. T1 - 11 BD Ref No. 2/3003/20

Building Address Tower 1, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Facade Orientation Facing Southwest Gross Wall Area (Ao) = 509.08

Window to Wall Ratio (WWR) 0.07 Wall Orientation Factor (Gw) = 1.131

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		**Code No.**		
Description	**Units**	**SW-W1**		
External Finish Material		185mm concrete wall		
Conductivity	W/mK	2.16		
Thickness	m	0.185		
Average Absorptivity	(α)	0.90		
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		10mm gypsum plaster		
Conductivity	W/mK	0.38		
Thickness	m	0.01		
U-value of Opaque Area (Uwi)	W/m²K	3.58		
Opaque Wall Area (Awi)	m²	471.43		
Heat Conduction = 3.57(Awi/Ao) Uwi αwi Gw		**12.05**		

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi αwi Gw where i= 1, 2, ..., n

= **12.05** **W/m²**

Part 2 - Calculation of Heat Conduction through Glazing									
Components / Details		**Code No.**							
Description	**Units**	**SW-F1**							
Glazing Type		Tinted							
Thickness	m	0.008							
Glazing Area (Afi)	m²	37.64							
U-value of Glazing (Ufi)	W/m²K	1.840							
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		**0.10**							

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n

= **0.10** **W/m²**

Part 3 - Calculation of Solar Radiation through Glazing									
Components / Details		**Code No.**							
Description	**Units**	**SW-F1**							
Glazing Type		Tinted							
Thickness	m	0.008							
Glazing Area (Afi)	m²	37.64							
Shading Coefficient of Glazing (SCf)		0.36							
External Shading Miltiplier (ESC)		1.000							
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw		**1.26**							

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n

= **1.26** **W/m²**

Summary of RTTV at Southwest Elevations

= 12.05 + 0.10 + 1.26

= **13.40** **W/m²**

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014
Form RTTV (Wall) 2 - Summary of Overall $RTTV_{wall}$ of Building

Sheet No. T1 - 12 BD Ref No. 2/3003/20

Building Address Tower 1, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Overall Gross Wall Area [a] 4493.32 m²

Facade Orientation Facing	Gross Wall Area (m^2) [b]	Heat Conduction through Opaque Walls (W/m^2) [c]	Heat Conduction through Glazing (W/m^2) [d]	Solar Radiation through Glazing (W/m^2) [e]	RTTVwall at Each Facade (W/m^2) [f]=[c]+[d]+[e]	Area-weighted RTTVwall (W/m^2) [g]=[f]x[b]/[a]
Northwest	2273.43	0.95	0.70	8.35	10.00	5.06
Northeast	349.10	12.33	0.00	0.00	12.33	0.96
Southeast	1361.71	6.25	0.51	6.49	13.25	4.01
Southwest	509.08	12.05	0.10	1.26	13.40	1.52

Overall RTTVwall = 11.55 **W/m²**

< 14 W/m²

Roof

Gross Roof Areas (Opaque Walls + Skylight Areas) (Aro) at **Roof** = **249.63 m²**

Skylight Areas at **Roof** = **8.54 m²**

Breakdown of Skylight Areas

Skylight Areas **Unshaded** (S1) = **8.54 m²**

OpaqueAreas at **Roof** = **241.09 m²**

Breakdown of Opaque Roof Areas

RC Roof Areas (R1) = **241.09 m²**

Roof Orientation Factor Gs = 2.16 (Refer to **Table 9**)

Average Absorptivity (α) of the External Opaque Wall at **Roof**

External Roof Material (Colour/Finish)	% of roof area	α Absorptivity (Refer to **Table 5**)
Dark grey ceramic tiles	100%	0.9
	Average Absorptivity =	**0.9**

'U' value of Opaque Roof Areas

$U = 1/(Ri+x_1/k_1+x_2/k_2+...+x_n/k_n+Ra+Ro)$

where Ri Surface film resistance of internal surface (Refer to **Table 2**)
Ro Surface film resistance of external surface (Refer to **Table 2**)
Ra Air space resistance (Refer to **Table 3**)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to **Table 1**)

R1 Description: Roof Area

Roof Material				
External surface film resistance		Ro	=	0.055
Air space resistanace		Ra	=	0
9mm porcelain tiles	0.009 /	1.5	=	0.006
41mm cement sand	0.041 /	0.72	=	0.057
125mm polystyrene foam	0.125 /	0.034	=	3.676
25mm waterproofing membrane	0.025 /	1.15	=	0.022
30mm cement sand	0.03 /	0.72	=	0.042
150mm concrete slab	0.15 /	2.16	=	0.069
15mm gypsum plaster	0.015 /	0.38	=	0.039
Internal surface film resistance		Ri	=	0.162
Total				**4.129**

$$Uw1 = \frac{1}{4.129} = 0.24 \text{ W/m}^2\text{K}$$

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014
Form RTTV (Roof) 1 - Calculation of $RTTV_{roof}$

Sheet No. T1 - 14 BD Ref No. 2/3003/20

Building Address Tower 1, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Roof Orientation Facing Flat Gross Roof Area (Aro) = 249.63

Skylight to Roof Ratio (SRR) = 0.0342 Roof Orientation Factor (Gs) = 2.16

Part 1 - Calculation of Heat Conduction through Opaque Roof				
Components / Details		**Code No.**		
Description	**Units**	**R1**		
External Finish Material		9mm porcelain tiles		
Conductivity	W/mK	1.50		
Thickness	m	0.01		
Average Absorptivity	(α)	0.90		
Intermediate component		41mm cement sand		
Conductivity	W/mK	0.72		
Thickness	m	0.04		
Intermediate component		125mm polystyrene foam		
Conductivity	W/mK	0.03		
Thickness	m	0.13		
Intermediate component		25mm waterproofing membrane		
Conductivity	W/mK	1.15		
Thickness	m	0.03		
Intermediate component		30mm cement sand		
Conductivity	W/mK	0.72		
Thickness	m	0.03		
Intermediate component		150mm concrete slab		
Conductivity	W/mK	2.16		
Thickness	m	0.15		
Internal Finish Material		15mm gypsum plaster		
Conductivity	W/mK	0.38		
Thickness	m	0.02		
U-value of the Roof (Uri)	W/m²K	0.24		
Opaque Roof Area (Ari)	m²	241.09		
Heat Conduction = 3.47(Ari/Aro) Uri ari Gs		**1.58**		

Heat Conduction through Opaque Roof = 3.47(Ari/Aro) Uri ari Gs where i= 1, 2, ..., n

= **1.58** **W/m²**

Part 2 - Calculation of Heat Conduction through Skylight					
Components / Details		**Code No.**			
Description	**Units**	**S1**			
Skylight Glazing Type		Tinted			
Thickness	m	0.03			
Skylight Area (Asi)	m²	8.54			
U-value of Skylight Glazing (Usi)	W/m²K	4.82			
Heat Conduction = 0.40 (Asi/Aro) Usi Gs		**0.14**			

Heat Conduction through Skylight = 0.40 (Asi/Aro) Usi Gs where i= 1, 2, ..., n

= **0.14** **W/m²**

Part 3 - Calculation of Solar Radiation through Skylight					
Components / Details		**Code No.**			
Description	**Units**	**S1**			
Skylight Glazing Type		Tinted			
Thickness	m	0.03			
Skylight Area (Asi)	m²	8.54			
Shading Coefficient of Skylight Glazing (SCr)		0.75			
Solar Radiation = 41.10 (Asi/Aro) (SCri) Gs		**2.28**			

Solar Radiation through Skylight = 41.10 (Asi/Aro) (SCri) Gs where i= 1, 2, ..., n

= **2.28** **W/m²**

Summary of RTTV at Roof

= 1.58 + 0.14 + 2.28

= **3.998** **W/m²**

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014

Form RTTV (Roof) 2 - Summary of $RTTV_{roof}$ of Building Envelopes

Sheet No. T1 - 15 BD Ref No. 2/3003/20

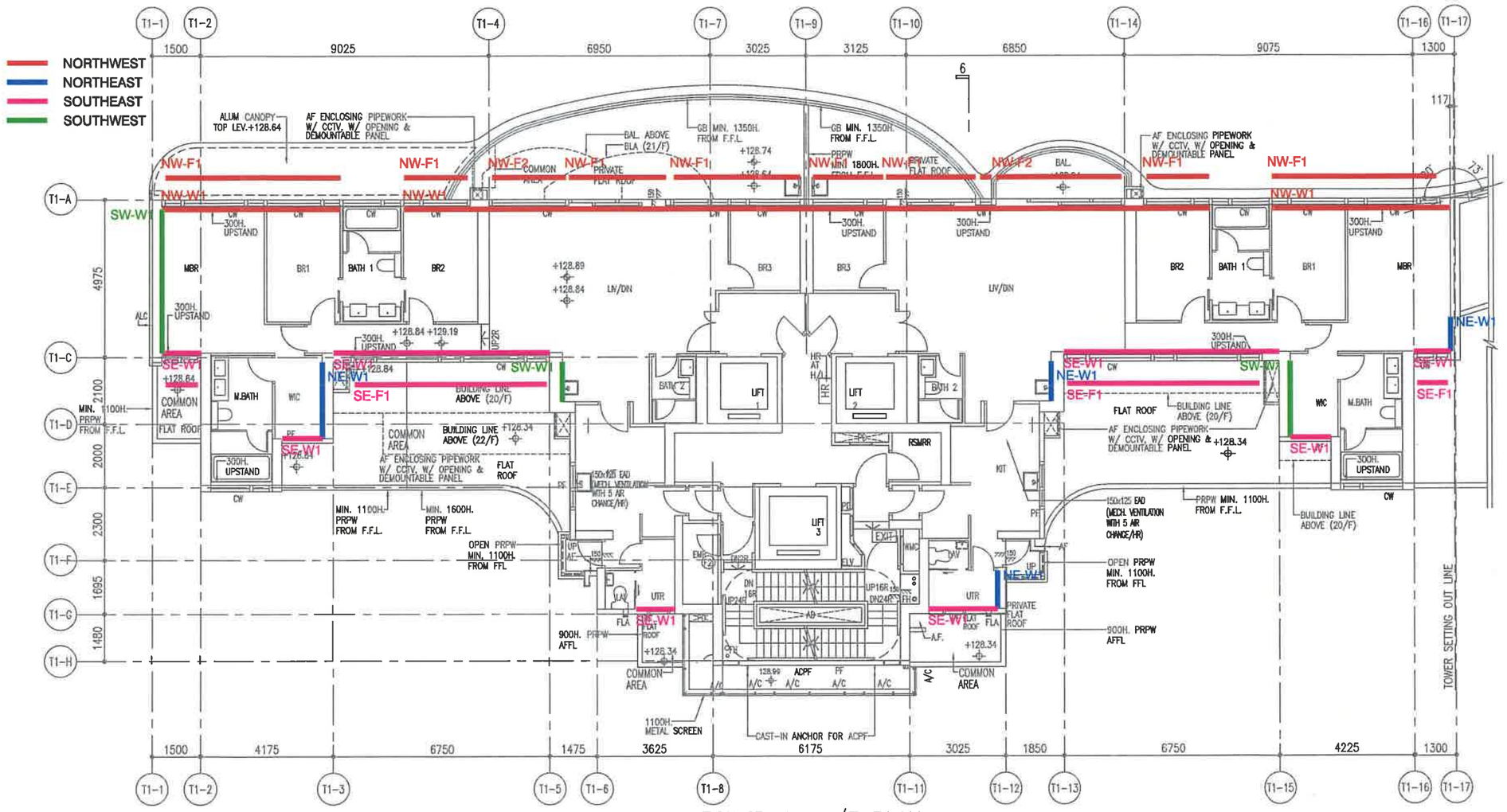
Building Address Tower 1, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Overall Roof Area [a] 249.63 m²

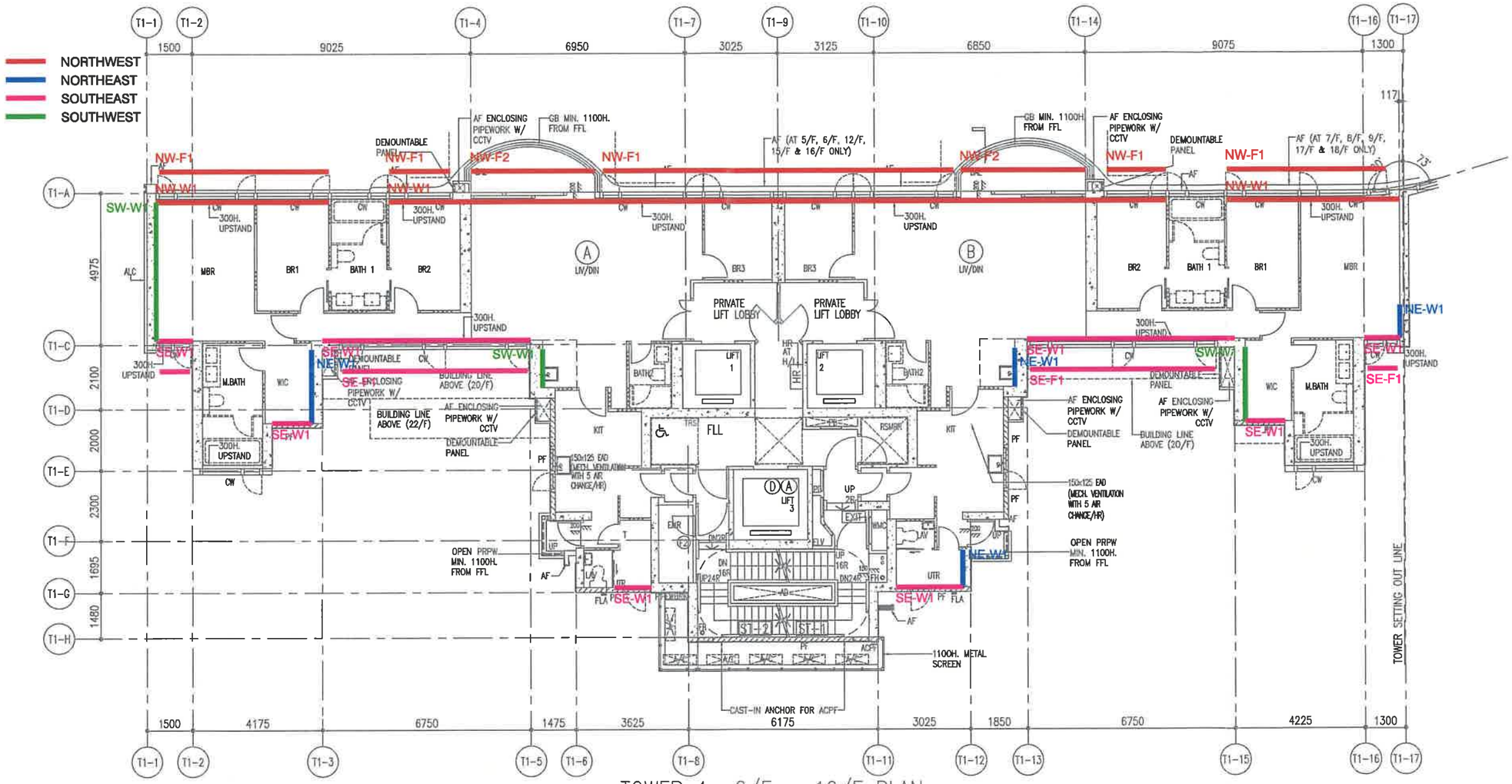
Roof	Gross Roof Area (m²) [b]	Heat Conduction through Opaque Roof (W/m²) [c]	Heat Conduction through Skylight (W/m²) [d]	Solar Radiation through Skylight (W/m²) [e]	RTTVroof at Each Type of Roof (W/m²) [f]=[c]+[d]+[e]	Area-weighted RTTVroof (W/m²) [g]=[f]x[b]/[a]
Flat Roof	249.63	1.58	0.14	2.28	4.00	4.00

Overall RTTVroof = **3.998** **W/m²**

< 4 W/m² ok.



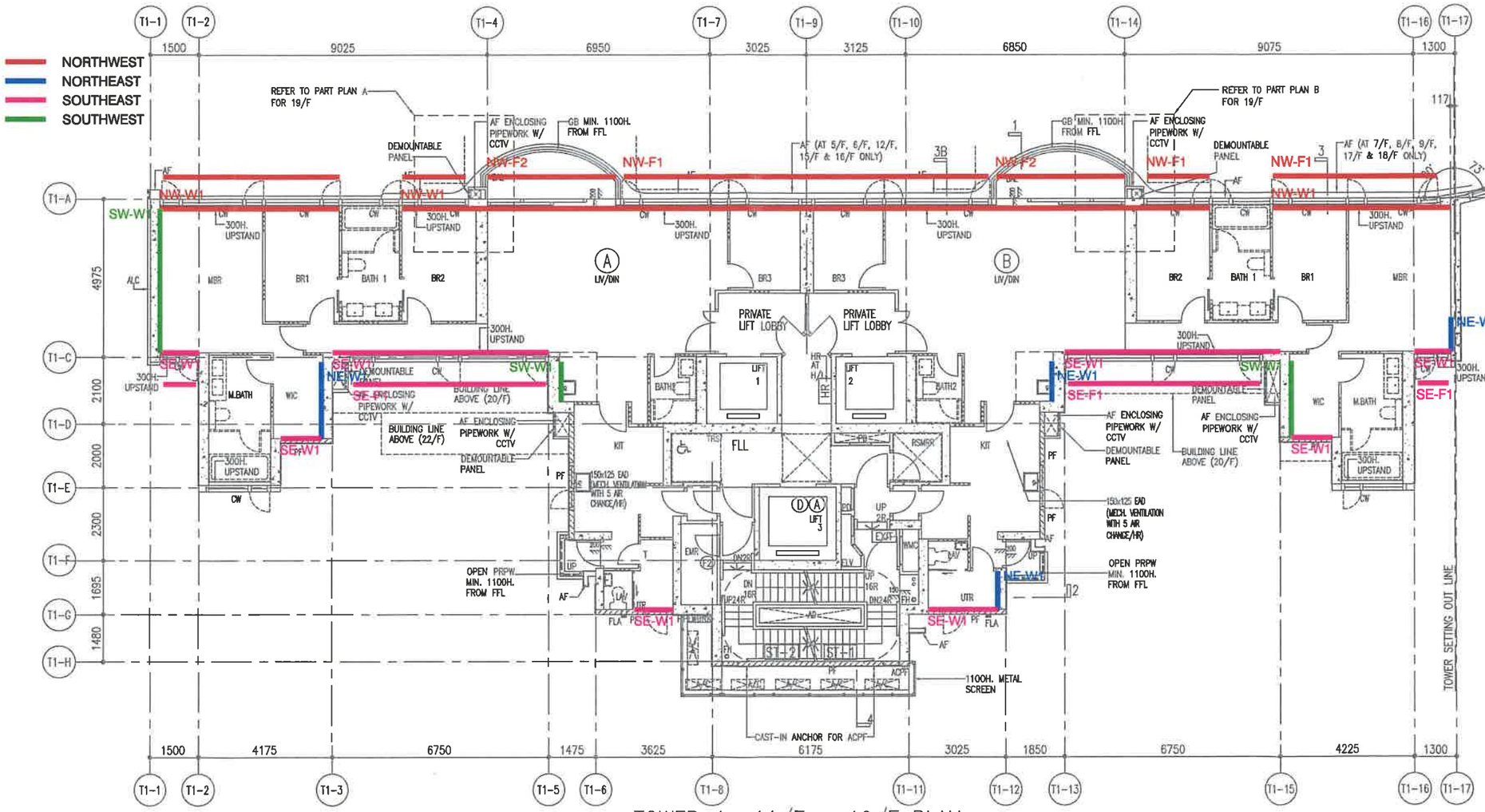
TOWER 1 1/F PLAN



TOWER 1 2/F – 10/F PLAN

(8 STOREYS)

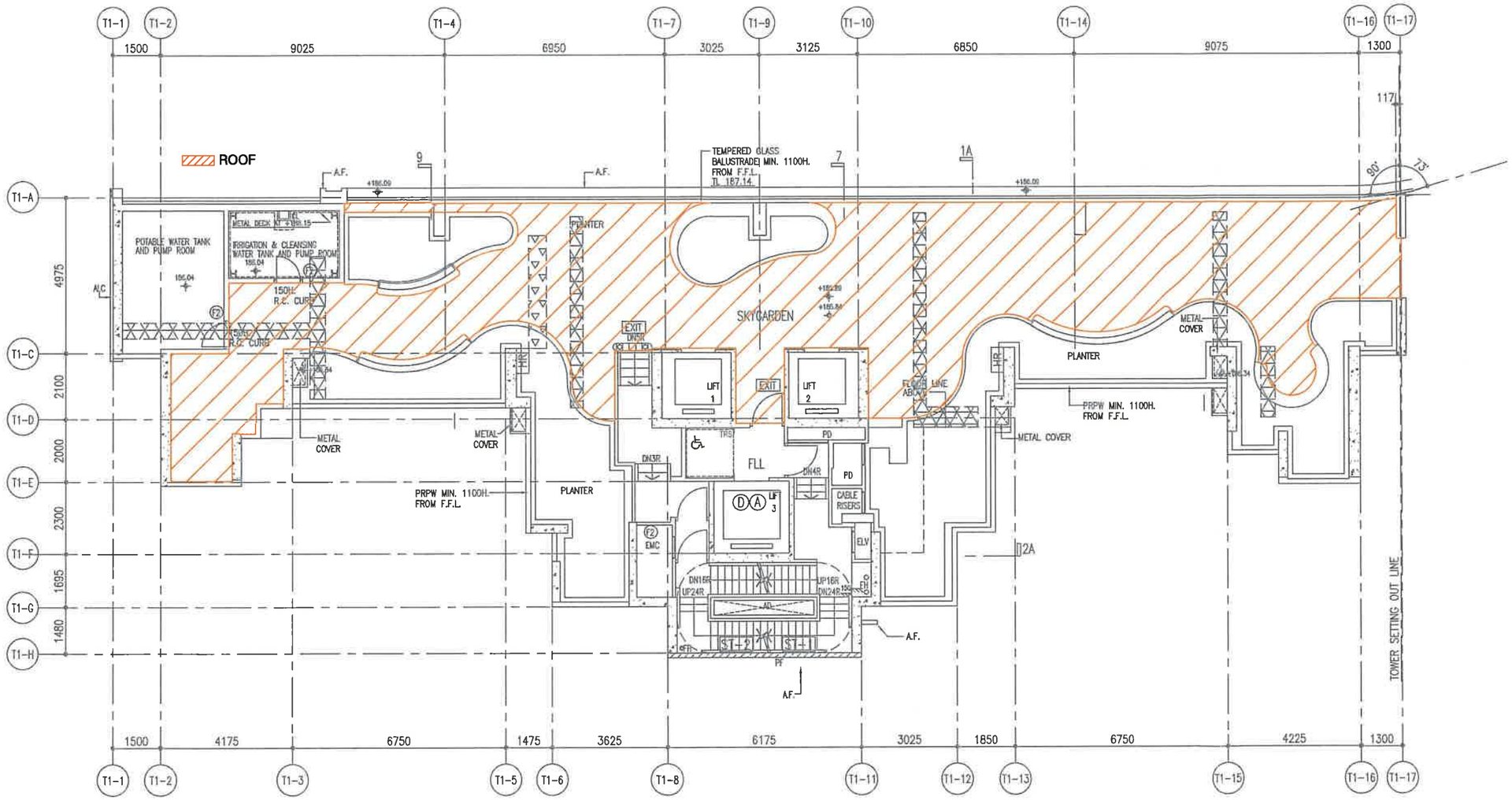
(FLOOR No.4, 13, 14 NOT USED.)



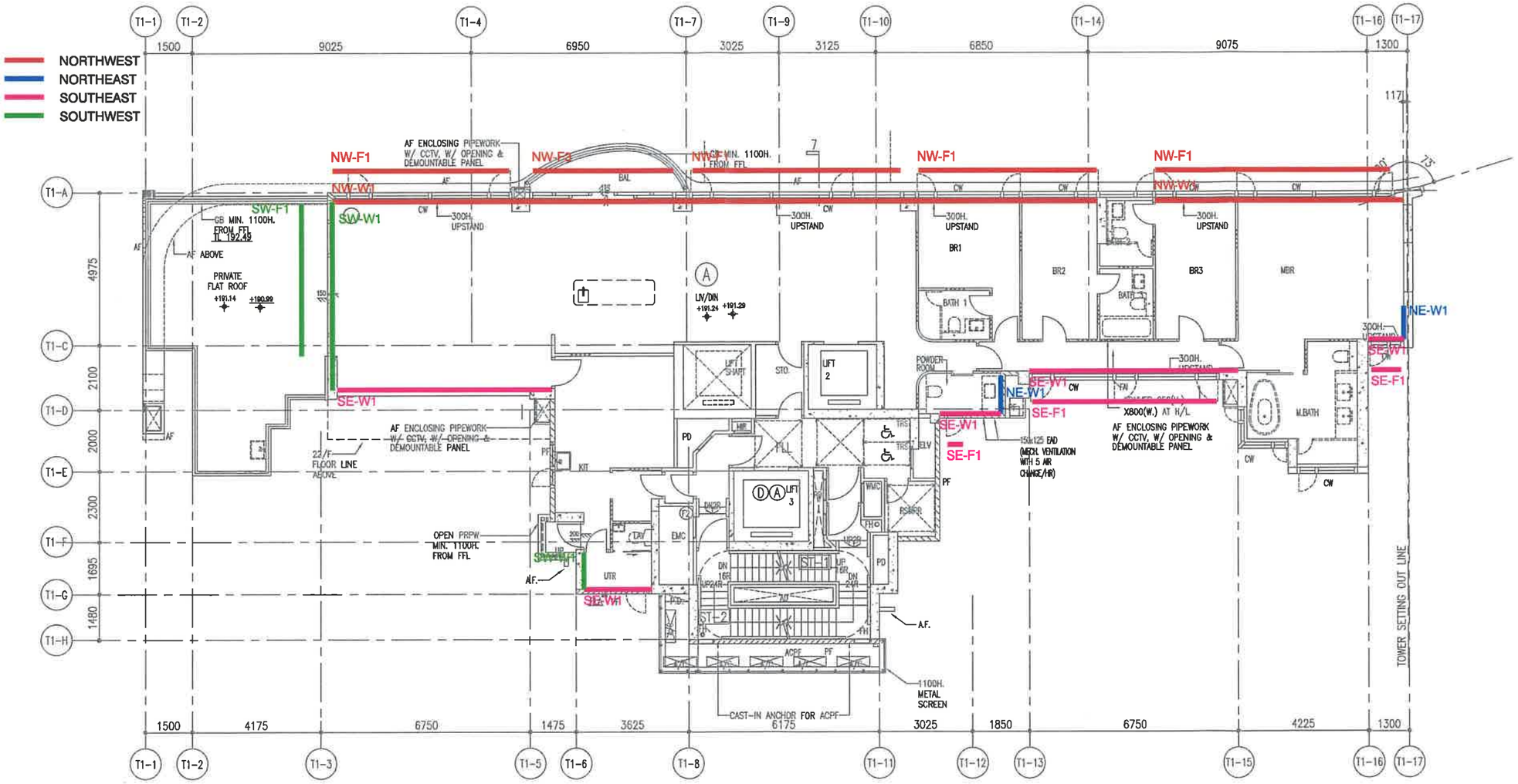
TOWER 1 11/F – 19/F PLAN

(7 STOREYS)

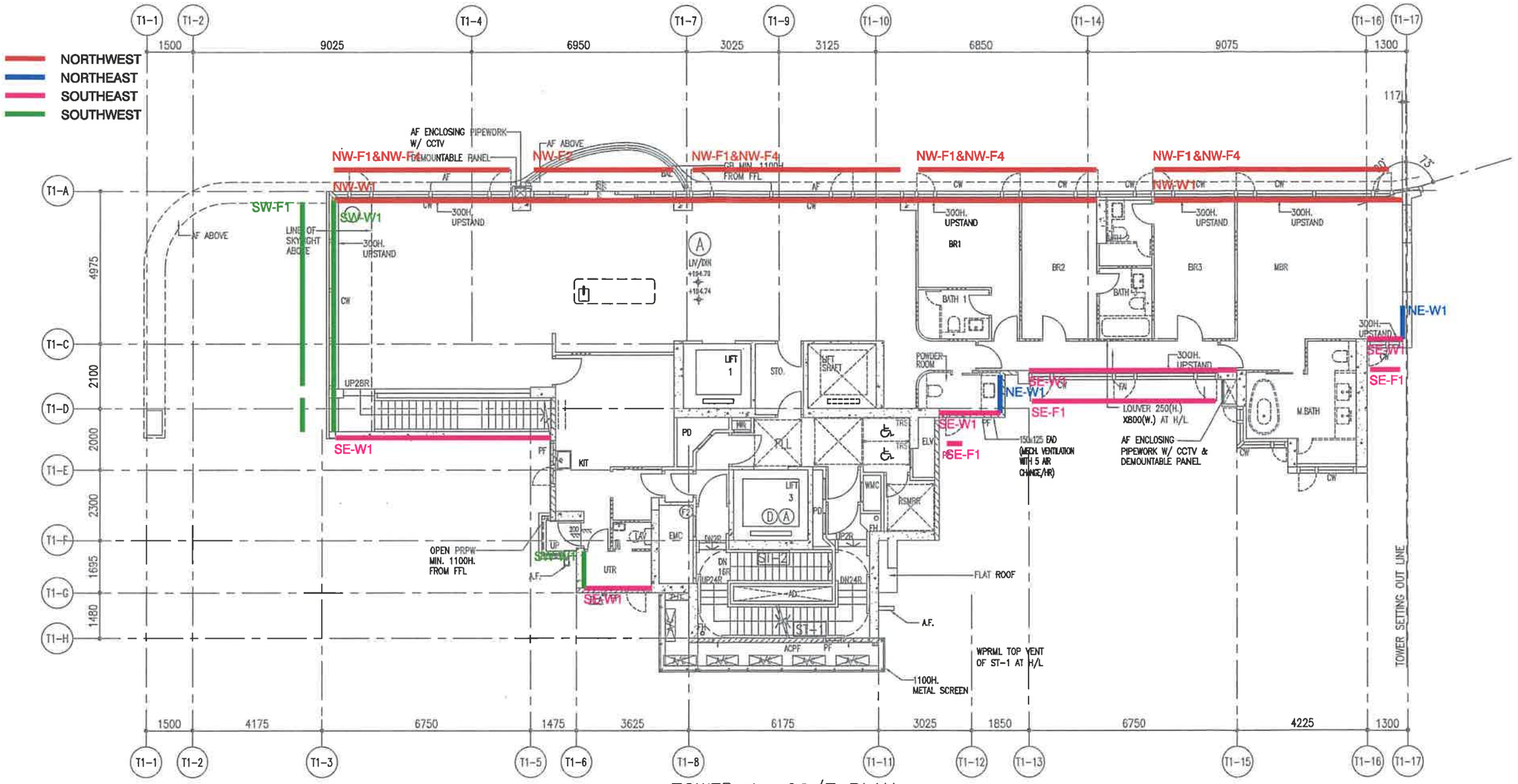
(FLOOR No.4, 13, 14 NOT USED.)



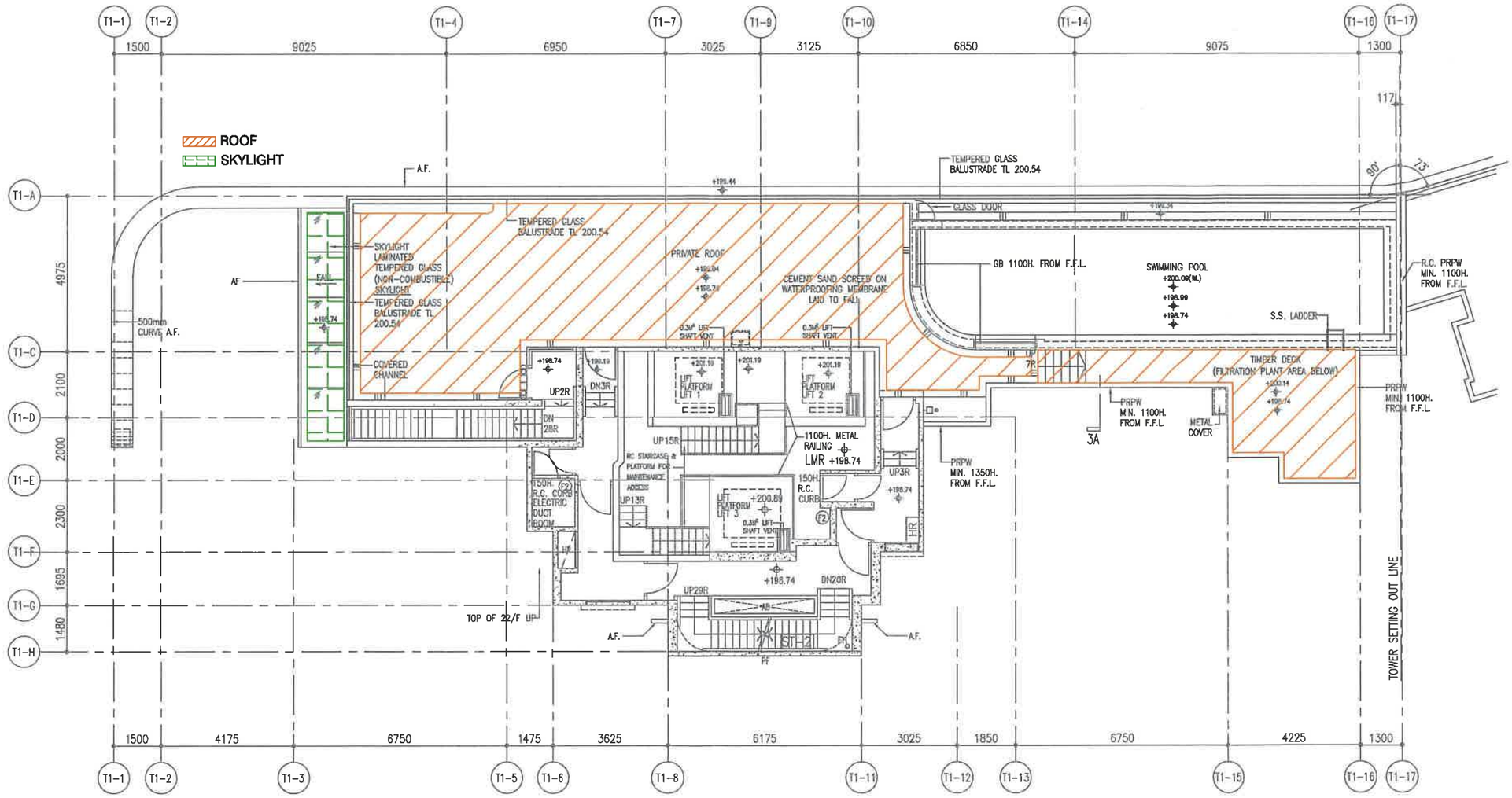
TOWER 1 20/F PLAN (COMMUNAL SKYGARDEN)



TOWER 1 21/F PLAN



TOWER 1 22/F PLAN



TOWER 1 MAIN ROOF FLOOR PLAN

下載初稿 Download Draft | 列印 Print | 重設 Reset | 儲存 Save | 提交 Submit

屋宇署 BUILDINGS DEPARTMENT

住宅熱傳送值的摘要匯表
RTTV Summary Sheet

請在適當的方格內填上「√」號。
please tick in box as appropriate.

Notes:
ER = External Reflectance
SC = Shading Coefficient
VLT = Visible Light Transmittance
Window and skylight data should represent the major proportion of its use in the development.

註:
ER = 外部反射率
SC = 遮光系數
VLT = 可見光透光率
應以發展項目中使用比例最高的窗戶和天窗的資料為準。

PNAP APP-156 附錄 Appendix A

電郵地址 E-mail Address	ⓘ 作認收電郵之用 (電子呈交適用) For acknowledgement email (e-submission)

地址 Address:	TOWER 2, PROPOSED RESIDENTIAL DEVELOPMENT AT INLAND LOT NO. 9076, 135 TAI HANG ROAD, HONG KONG	屋宇署檔號 BD Ref. No. 2/3003/20
建築物類型：Building Type:	住宅 Residential	
住宅熱傳送值計算者 RTTV calculated by	☑ 1. 註冊專業工程師 1. Registered Professional Engineers	
	☐ 2. 建築師 2. Architect	
	☐ 3. 其他，請註明： 3. Others, please specify:	
層數（住宅單位）No. of Storeys (Residential Units)	18	

表 1 Table

當作符合最歷住宅熱傳送值 Deemed to Satisfy $RTTV_{Well}$								
外牆朝向方位 Facade Orientation Facing	NORT HWEST	NORT HEAST	SOUT HEAST	SOUT HWEST				
平均吸收率值 Average Absorptivity	0.3	0.3	0.3	0.3				
窗戶與牆壁的平均比例 Average Window to Wall Ratio	58:100	16:100	52:100	0:100				
玻璃遮光系數 Shading Coefficient of Glazing	0.36	0.36	0.36					
外牆的平均遮光系數 Average Shading Coefficient of Facade								
可見光透光率 Visible Light Transmittance	51 %	51 %	51 %	%	%	%	%	%
外部反射率 External Reflectance	20 %	20 %	20 %	%	%	%	%	%

表 2 **Table 2**

牆壁住宅熱傳送值 $RTTV_{Wall}$

外牆朝向方位 Facade Orientation Facing		NORT HWE ST				NORT HE AST				SOUT HE AST				SOUT HWE ST					
牆壁方位系數 Wall Orientation Factor		0.79				1.072				0.975				1.131					
外牆總面積 (住宅單位) Total External Wall Area (Residential Units)		1,749.18 平方米 m²		窗戶與牆壁的比例 Window to Wall Ratio	= 33739:583(	459.68 平方米 m²		窗戶與牆壁的比例 Window to Wall Ratio	= 452:2873	981.62 平方米 m²		窗戶與牆壁的比例 Window to Wall Ratio	= 51051:9816	288.7 平方米 m²		窗戶與牆壁的比例 Window to Wall Ratio	= 0:288.7		
窗戶總面積 Total Window Area		1,012.17 m²				72.32 m²				510.51 m²				0 m²					
熱傳導 Heat Conduction	不透光牆 Opaque Wall	1.29 瓦特/平方米 W/m²				10.39 瓦特/平方米 W/m²				5.38 瓦特/平方米 W/m²				13.01 瓦特/平方米 W/m²					
	窗戶 Window	0.54 瓦特/平方米 W/m²				0.23 瓦特/平方米 W/m²				0.57 瓦特/平方米 W/m²				0 瓦特/平方米 W/m²					
窗戶 Window	玻璃類型 Glass Type	☑ 反射性 Reflective	面積 Area= 1,012 平方米 m²	SC= 0.36	VLT= 51 % ER= 20 %	☑ 反射性 Reflective	面積 Area= 72.32 平方米 m²	SC= 0.36	VLT= 51 % ER= 20 %	☑ 反射性 Reflective	面積 Area= 510.5 平方米 m²	SC= 0.36	VLT= 51 % ER= 20 %	☐ 反射性 Reflective	面積 Area= 平方米 m²	SC=	VLT= % ER= %		
		☐ 有色 Tinted	面積 Area= 平方米 m²	SC=	VLT= % ER= %	☐ 有色 Tinted	面積 Area= 平方米 m²	SC=	VLT= % ER= %	☐ 有色 Tinted	面積 Area= 平方米 m²	SC=	VLT= % ER= %	☐ 有色 Tinted	面積 Area= 平方米 m²	SC=	VLT= % ER= %		
		☐ 透明 Clear	面積 Area= 平方米 m²	SC=	VLT= % ER= %	☐ 透明 Clear	面積 Area= 平方米 m²	SC=	VLT= % ER= %	☐ 透明 Clear	面積 Area= 平方米 m²	SC=	VLT= % ER= %	☐ 透明 Clear	面積 Area= 平方米 m²	SC=	VLT= % ER= %		
	雙層玻璃 Double Glazing	☑ 有 Yes ☐ 無 No				☑ 有 Yes ☐ 無 No				☑ 有 Yes ☐ 無 No				☐ 有 Yes ☐ 無 No					
	外遮光物 External Shading	外懸伸建物 Overhang ☑ 有 Yes ☐ 無 No				外懸伸建物 Overhang ☑ 有 Yes ☐ 無 No				外懸伸建物 Overhang ☑ 有 Yes ☐ 無 No				外懸伸建物 Overhang ☐ 有 Yes ☐ 無 No					
		側鰭伸建物 Sidefin ☐ 有 Yes ☑ 無 No				側鰭伸建物 Sidefin ☐ 有 Yes ☑ 無 No				側鰭伸建物 Sidefin ☐ 有 Yes ☑ 無 No				側鰭伸建物 Sidefin ☐ 有 Yes ☐ 無 No					
穿透玻璃的太陽輻射量 Solar Radiation through Glazing		6.63 瓦特/平方米 W/m²				2.84 瓦特/平方米 W/m²				6.96 瓦特/平方米 W/m²				0 瓦特/平方米 W/m²					
平均吸熱率值 Average Absorptivity		0.3				0.3				0.3				0.3					
各幅外牆的牆壁住宅熱傳送值 $RTTV_{Wall}$ at each facade		8.47 瓦特/平方米 W/m²				13.46 瓦特/平方米 W/m²				12.92 瓦特/平方米 W/m²				13.01 瓦特/平方米 W/m²					
總牆壁住宅熱傳送值 Overall $RTTV_{Wall}$		10.76 瓦特/平方米 W/m²																	

表 3 Table 3

屋頂住宅熱傳送值 $RTTV_{Roof}$						
屋頂方位系數 Roof Orientation Factor		2.16				
屋頂總面積 (住宅單位) Total Roof Area (Residential Units)		242.92 平方米 m^2				
天窗總面積 Total Skylight Area		6.35 平方米 m^2				
熱傳導 Heat Conduction	屋頂 Roof	1.94 瓦特/平方米 W/m^2				
	天窗 Skylight	0.11 瓦特/平方米 W/m^2				
天窗 Skylight	玻璃類型 Glass Type	☑ 反射性 Reflective	面積= Area= 6.35 平方米 m^2	SC= 0.75	VLT= 79 %	ER= 7 %
		☐ 有色 Tinted	面積= Area= 平方米 m^2	SC=	VLT= %	ER= %
		☐ 透明 Clear	面積= Area= 平方米 m^2	SC=	VLT= %	ER= %
	雙層玻璃 Double Glazing	☑ 有 Yes ☐ 無 No				
	外遮光物 External Shading	☐ 有 Yes ☑ 無 No				
穿透玻璃的太陽輻射量 Solar Radiation through Glazing		1.74 瓦特/平方米 W/m^2				
平均吸熱率值 (屋頂) Average Absorptivity (roof)		0.9				
總屋頂住宅熱傳送值 Overall $RTTV_{Roof}$		3.79 瓦特/平方米 W/m^2				

簽署*
Signature*

任何失實核證或聲明可引致法律行動。##
Any false certification or declaration may be subject to legal action.##

日期 Date

1	6	0	8	2	0	2	4

日 dd 月 mm 年 yyyy

注意事項

任何人如作出虛假聲明或就重要事項作出失實陳述即屬觸犯刑事罪行，可能會被檢控。

甲. 填寫表格

1. 請填妥表格載列所有有關的部分。請附上所有證明文件。

2. 所提供的資料如有不全或錯誤，屋宇署將不能處理呈交的文件。

3. 如對本表格有任何疑問，請與屋宇署聯絡。

乙. 呈交方法

1. **郵寄/親身呈交 - 本表格連同有關文件應郵寄或親身呈交至屋宇署：**

呈交有關勸諭信 / 命令 / 通知 / 指示的表格：
九龍油麻地海庭道11號西九龍政府合署北座屋宇署總部地下一般查詢及收件處。

呈交至拓展部有關其他事宜的表格：
香港太古城太古灣道14號7樓屋宇署收發處。

丙. 聯絡資料

屋宇署
地址：九龍油麻地海庭道11號西九龍政府合署北座屋宇署總部
電話：2626 1616 (由"1823" 接聽)
傳真：2537 4992
電郵：enquiry@bd.gov.hk

Matters to Note

Any person making a false declaration or misrepresenting a material fact shall be guilty of a criminal offence and subject to prosecution.

A. Completion of Form

1. Please ensure that all relevant parts of the form are duly completed. Please enclose all supporting documents.

2. If incomplete or erroneous information is provided in the form, the Buildings Department may not be able to process the submission.

3. Enquiries regarding this form should be addressed to the Buildings Department.

B. Submission Methods

1. **By Post / In Person - This form together with the relevant documents shall be posted to or submitted in person to the Buildings Department:**

For submissions relating to advisory letter/order/notice/direction:
General Enquiry and Receipt Counter, G/F, Buildings Department Headquarters, North Tower, West Kowloon Government Offices, 11 Hoi Ting Road, Yau Ma Tei, Kowloon.

For other submissions to the New Buildings Division:
Receipt & Despatch Counter, Buildings Department, 7/F, 14 Taikoo Wan Road, Taikoo Shing, Hong Kong.

C. Contact Details

Buildings Department
Address: Buildings Department Headquarters, North Tower, West Kowloon Government Offices, 11 Hoi Ting Road, Yau Ma Tei, Kowloon
Tel No.: 2626 1616 (handled by "1823")
Fax No.: 2537 4992
Email: enquiry@bd.gov.hk

Tower 2, Proposed Residential Development at Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

RTTV Report for Residential Tower

Building Services Engineer:
AECOM Asia Company Limited

13/F Tower 2, Grand Central Plaza, 138 Shatin Rural Committee Road, Shatin, Hong Kong.

Tel: +852 3922 9162
Fax: +852 3922 9797

Gross Wall Area (Opaque walls + Glazing Areas) Calculation

Sheet no T2-1

Storey heights (Residential Units) :

1/F	=	3.50 m	(1 storey)
2/F	=	3.50 m	(1 storey)
3/F-10/F (Except 4/F)	=	3.50 m	(7 storeys)
11/F-19/F (Except 13/F & 14/F)	=	3.50 m	(7 storeys)
21/F	=	3.50 m	(1 storey)
22/F	=	4.00 m	(1 storey)

Northwest Elevations Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F	(	25.40	+	1.50			)	x	3.50	x	1	=	26.90	x	3.50	x 1 = 94.33 m²
2/F	(	25.40	+	1.50			)	x	3.50	x	1	=	26.90	x	3.50	x 1 = 94.33 m²
3/F-10/F (Except 4/F)	(	25.40	+	1.50	+	1.50	)	x	3.50	x	7	=	28.51	x	3.50	x 7 = 699.50 m²
11/F- 19/F (Except 13/F & 14/F)	(	25.40	+	1.50	+	1.50	)	x	3.50	x	7	=	28.51	x	3.50	x 7 = 699.50 m²
21/F	(	21.80					)	x	3.50	x	1	=	21.80	x	3.50	x 1 = 76.30 m²
22/F	(	21.80					)	x	4.00	x	1	=	21.80	x	4.00	x 1 = 87.20 m²

Gross Wall Areas 1749.18 m²

Northeast Elevations Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F	(	4.65	+	0.98			)	x	3.50	x	1	=	5.63	x	3.50	x 1 = 19.69 m²
2/F	(	4.68					)	x	3.50	x	1	=	4.68	x	3.50	x 1 = 16.38 m²
3/F-10/F (Except 4/F)	(	4.65	+	2.95			)	x	3.50	x	7	=	7.62	x	3.50	x 7 = 186.73 m²
11/F- 19/F (Except 13/F & 14/F)	(	4.68	+	2.95			)	x	3.50	x	7	=	7.62	x	3.50	x 7 = 186.73 m²
21/F	(	6.70					)	x	3.50	x	1	=	6.70	x	3.50	x 1 = 23.45 m²
22/F	(	6.70					)	x	4.00	x	1	=	6.70	x	4.00	x 1 = 26.80 m²

Gross Wall Areas 459.68 m²

Southeast Elevations Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F	(	6.68	+	1.47	+	1.77	)	x	3.50	x	1	=	10.52	x	3.50	x 1 = 36.81 m²
2/F	(	6.68	+	1.67	+	1.77	)	x	3.50	x	1	=	10.52	x	3.50	x 1 = 36.81 m²
3/F-10/F (Except 4/F)	(	6.68	+	6.68	+	1.67	+ 1.77	)	x	3.50	x	7	=	17.40	x	3.50 x 7 = 426.23 m²
11/F- 19/F (Except 13/F & 14/F)	(	6.70	+	6.68	+	1.67	+ 1.77	)	x	3.50	x	7	=	17.22	x	3.50 x 7 = 421.87 m²
21/F	(	2.58	+	0.40	+	1.33	+ 1.77	+ 1.92	)	x	3.50	x	1	=	8.00	x 3.50 x 1 = 27.98 m²
22/F	(	2.58	+	0.40	+	1.33	+ 1.77	+ 1.92	)	x	4.00	x	1	=	8.00	x 4.00 x 1 = 31.98 m²

Gross Wall Areas 981.62 m²

Southwest Elevations Gross Wall Area = Total Length of Opaque Walls & Glazing x Storey Height x No. of Storeys

1/F	(	0.75	+	0.73	+	2.945	)	x	3.50	x	1	=	4.48	x	3.50	x 1 = 15.68 m²
2/F	(	0.75	+	0.73	+	2.945	)	x	3.50	x	1	=	4.48	x	3.50	x 1 = 15.68 m²
3/F-10/F (Except 4/F)	(	0.75	+	0.73	+	2.945	)	x	3.50	x	7	=	4.48	x	3.50	x 7 = 109.76 m²
11/F- 19/F (Except 13/F & 14/F)	(	0.57	+	0.52	+	3.6	)	x	3.50	x	7	=	5.05	x	3.50	x 7 = 124.71 m²
21/F	(	2.30	+	0.75			)	x	3.50	x	1	=	3.05	x	3.50	x 1 = 10.68 m²
22/F	(	2.30	+	0.75			)	x	4.00	x	1	=	3.05	x	4.00	x 1 = 12.20 m²

Gross Wall Areas 288.70 m²

Total Gross Wall Areas 3479.18 m²

Total Glazing Area (Window + Balcony) Calculation

Sheet no. T2 - 2

Glazing heights (Residential Units) :

1/F-2/F (H1)	=	2.50 m	(2 storeys)
1/F-2/F (H2)	=	2.70 m	(2 storeys)
3/F-10/F (Except 4/F) (H3)	=	2.50 m	(7 storeys)
3/F-10/F (Except 4/F) (H4)	=	2.70 m	(7 storeys)
11/F- 19/F (Except 13/F & 14/F) (H5)	=	2.50 m	(7 storeys)
11/F- 19/F (Except 13/F & 14/F) (H6)	=	2.70 m	(7 storeys)
21/F (H7)	=	2.50 m	(1 storey)
22/F (H8)	=	2.94 m	(1 storey)

Northwest Elevations

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

1/F-2/F (H1)	(	2.38	+	5.00	+	5.83	+	2.32	)x	2.50	x	2	=	15.52 x 2.50 x 2 = 77.59 m²
1/F-2/F (H2)	(	2.13	+	2.15	+	2.19			)x	2.70	x	2	=	6.46 x 2.70 x 2 = 34.91 m²
3/F-10/F (Except 4/F) (H3)	(	2.38	+	5.00	+	5.83	+	2.32	)x	2.50	x	7	=	15.52 x 2.50 x 7 = 271.55 m²
3/F-10/F (Except 4/F) (H4)	(	2.13	+	2.15	+	2.19			)x	2.70	x	7	=	6.46 x 2.70 x 7 = 122.17 m²
11/F- 19/F (Except 13/F & 14/F) (H5)	(	2.38	+	5.00	+	5.83	+	2.32	)x	2.50	x	7	=	15.52 x 2.50 x 7 = 271.55 m²
11/F- 19/F (Except 13/F & 14/F) (H6)	(	2.13	+	2.15	+	2.19			)x	2.70	x	7	=	6.46 x 2.70 x 7 = 122.17 m²
21/F (H7)	(	4.85	+	15.80					)x	2.50	x	1	=	20.65 x 2.50 x 1 = 51.63 m²
22/F (H8)	(	4.85	+	15.80					)x	2.94	x	1	=	20.65 x 2.94 x 1 = 60.62 m²

Gross Glazing Areas 1012.17 m²

Northeast Elevations

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

1/F-2/F (H1)	(	0.00							)x	2.50	x	2	=	0.00 x 2.50 x 2 = 0.00 m²
1/F-2/F (H2)	(	0.00							)x	2.70	x	2	=	0.00 x 2.70 x 2 = 0.00 m²
3/F-10/F (Except 4/F) (H3)	(	0.00							)x	2.50	x	7	=	0.00 x 2.50 x 7 = 0.00 m²
3/F-10/F (Except 4/F) (H4)	(	0.00							)x	2.70	x	7	=	0.00 x 2.70 x 7 = 0.00 m²
11/F- 19/F (Except 13/F & 14/F) (H5)	(	2.15							)x	2.50	x	7	=	2.15 x 2.50 x 7 = 37.54 m²
11/F- 19/F (Except 13/F & 14/F) (H6)	(	0.00							)x	2.70	x	7	=	0.00 x 2.70 x 7 = 0.00 m²
21/F (H7)	(	6.40							)x	2.50	x	1	=	6.40 x 2.50 x 1 = 16.00 m²
22/F (H8)	(	6.40							)x	2.94	x	1	=	6.40 x 2.94 x 1 = 18.78 m²

Gross Glazing Areas 72.32 m²

Sheet no. T2 - 3

Southeast Elevations

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

1/F-2/F (H1)	(	4.52	)	x	2.50	x	2	=	4.52	x	2.50	x	2 = 22.59 m²
1/F-2/F (H2)	(	1.99	)	x	2.70	x	2	=	1.99	x	2.70	x	2 = 10.74 m²
3/F-10/F (Except 4/F) (H3)	(	4.44	+ 4.53)	x	2.50	x	7	=	8.97	x	2.50	x	7 = 156.99 m²
3/F-10/F (Except 4/F) (H4)	(	1.99	+ 1.99)	x	2.70	x	7	=	3.98	x	2.70	x	7 = 75.15 m²
11/F- 19/F (Except 13/F & 14/F) (H5)	(	4.44	+ 4.53)	x	2.50	x	7	=	8.97	x	2.50	x	7 = 156.99 m²
11/F- 19/F (Except 13/F & 14/F) (H6)	(	1.99	+ 1.99)	x	2.70	x	7	=	3.98	x	2.70	x	7 = 75.15 m²
21/F (H7)	(	2.38	)	x	2.50	x	1	=	2.38	x	2.50	x	1 = 5.94 m²
22/F (H8)	(	2.38	)	x	2.94	x	1	=	2.38	x	2.94	x	1 = 6.97 m²

Gross Glazing Areas 510.51 m²

SouthWest Elevations

Gross Glazing Area = Total Length of Glazing x Glazing Height x No. of Storeys

1/F-2/F (H1)	(	0.00	)	x	2.50	x	2	=	0.00	x	2.50	x	2 = 0.00 m²
1/F-2/F (H2)	(	0.00	)	x	2.70	x	2	=	0.00	x	2.70	x	2 = 0.00 m²
3/F-10/F (Except 4/F) (H3)	(	0.00	)	x	2.50	x	7	=	0.00	x	2.50	x	7 = 0.00 m²
3/F-10/F (Except 4/F) (H4)	(	0.00	)	x	2.70	x	7	=	0.00	x	2.70	x	7 = 0.00 m²
11/F- 19/F (Except 13/F & 14/F) (H5)	(	0.00	)	x	2.50	x	7	=	0.00	x	2.50	x	7 = 0.00 m²
11/F- 19/F (Except 13/F & 14/F) (H6)	(	0.00	)	x	2.70	x	7	=	0.00	x	2.70	x	7 = 0.00 m²
21/F (H7)	(	0.00	)	x	2.50	x	1	=	0.00	x	2.50	x	1 = 0.00 m²
22/F (H8)	(	0.00	)	x	2.94	x	1	=	0.00	x	2.94	x	1 = 0.00 m²

Gross Glazing Areas 0.00 m²

Total Gross Glazing Areas 1595.01 m²

Northwest Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at Northwest Elevations = **1749.18** m²

Glazing Areas at Northwest Elevations = **1012.17** m²

Breakdown of Glazing Areas

Glazing Areas Unshaded (NW-F1) = **640.80** m²

Glazing Areas ESC = 0.83 (NW-F2) = **339.86** m²

Glazing Areas Unshaded (NW-F3) = **31.52** m²

Opaque Wall Areas at Northwest Elevations = **737.00** m²

Breakdown of Opaque Wall Areas

RC Wall Areas (200mm) (NW-W1) = **737.00** m²

Window to Wall Ratio (WWR) = 1012.17 / 1749.18 = **0.58**

Wall Orientation Factor Gw = 0.79 (Refer to **Table 9**)

Average Absorptivity (α) of the External Opaque Wall at Northwest Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to Table 5)
Silver Aluminium Cladding	100%	0.3

Average Absorptivity = 0.30

'U' value of Opaque Wall Areas

$U = 1/(Ri+x_1/k_1+x_2/k_2+...+x_n/k_n+Ra+Ro)$ where

- Ri Surface film resistance of internal surface (Refer to Table 2)
- Ro Surface film resistance of external surface (Refer to Table 2)
- Ra Air space resistance (Refer to Table 3)
- x Thickness of building materials
- k Thermal conductivity of building materials (Refer to Table 1)

NW-W1 Description: RC Wall Areas (200mm)

Wall Material					
External surface film resistance			Ro	=	0.044
Air space resistanace			Ra	=	0
5mm aluminium alloy	0.005	/ 160		=	0.000
185mm concrete wall	0.185	/ 2.16		=	0.086
10mm gypsum plaster	0.01	/ 0.38		=	0.026
Internal surface film resistance			Ri	=	0.12
Total					**0.276** W/m²K

$$Uw1 = \frac{1}{0.276} = 3.62$$

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014
Form RTTV (Wall) 1 - Calculation of $RTTV_{wall}$ of Each Facade

Sheet No. T2 - 5 BD Ref No. 2/3003/20

Building Address Tower 2, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Facade Orientation Facing Northwest Gross Wall Area (Ao) = 1749.18

Window to Wall Ratio (WWR) 0.58 Wall Orientation Factor (Gw) = 0.79

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		**Code No.**		
Description	**Units**	**NW-W1**		
External Finish Material		185mm concrete wall		
Conductivity	W/mK	2.16		
Thickness	m	0.185		
Average Absorptivity	(α)	0.30		
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity				
Thickness				
Intermediate component				
Conductivity				
Thickness				
Internal Finish Material		10mm gypsum plaster		
Conductivity	W/mK	0.38		
Thickness	m	0.01		
U-value of Opaque Area (Uwi)	W/m^2K	3.62		
Opaque Wall Area (Awi)	m^2	737.00		
Heat Conduction = 3.57(Awi/Ao) Uwi αwi Gw		**1.29**		

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi αwi Gw where i= 1, 2, ..., n

= **1.29** **W/m²**

Part 2 - Calculation of Heat Conduction through Glazing					
Components / Details		**Code No.**			
Description	**Units**	**NW-F1**	**NW-F2**	**NW-F3**	
Glazing Type		Tinted	Tinted	Tinted	
Thickness	m	0.023	0.02	0.038	
Glazing Area (Afi)	m^2	640.80	339.86	31.52	
U-value of Glazing (Ufi)	W/m^2K	1.840	1.620	4.640	
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		**0.341**	**0.159**	**0.042**	

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n

= **0.54** **W/m²**

Part 3 - Calculation of Solar Radiation through Glazing					
Components / Details		**Code No.**			
Description	**Units**	**NW-F1**	**NW-F2**	**NW-F3**	
Glazing Type		Tinted	Tinted	Tinted	
Thickness	m	0.023	0.02	0.038	
Glazing Area (Afi)	m^2	640.80	339.86	31.52	
Shading Coefficient of Glazing (SCf)		0.36	0.35	0.71	
External Shading Miltiplier (ESC)		1.000	0.830	1.000	
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw		**4.35**	**1.86**	**0.42**	

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n

= **6.63** **W/m²**

Summary of RTTV at Northwest Elevations

= 1.29 + 0.54 + 6.63

= **8.47** **W/m²**

Northeast Elevations

Gross Wall Areas = **459.68** m²
(Opaque Walls + Glazing Areas) (Ao) at Northeast Elevations

Glazing Areas at Northeast Elevations = **72.32** m²

Breakdown of Glazing Areas

Glazing Areas Unshaded (NE-F1) = **46.91** m²

Glazing Areas Unshaded (NE-F2) = **16.00** m²

Glazing Areas Unshaded (NE-F3) = **9.41** m²

Opaque Wall Areas at Northeast Elevations = **387.36** m²

Breakdown of Opaque Wall Areas

RC Wall Areas (200mm) (NE-W1) = **387.36** m²

Window to Wall Ratio (WWR) = 72.32 / 459.68 = **0.16**

Wall Orientation Factor Gw = 1.072 (Refer to **Table 9**)

Average Absorptivity (α) of the External Opaque Wall at Northeast Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to
Dark Grey paint	100%	0.9

Average Absorptivity = 0.90

'U' value of Opaque Wall Areas

$U = 1/(Ri+x_1/k_1+x_2/k_2+...+x_n/k_n+Ra+Ro)$

where Ri Surface film resistance of internal surface (Refer to Table 2)
Ro Surface film resistance of external surface (Refer to Table 2)
Ra Air space resistance (Refer to Table 3)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to Table 1)

NE-W1 Description: RC Wall Areas (200mm)

Wall Material					
External surface film resistance			Ro	=	0.044
Air space resistanace			Ra	=	0
5mm mosaic tiles	0.005	/ 1.5		=	0.003
185mm concrete wall	0.185	/ 2.16		=	0.086
10mm gypsum plaster	0.01	/ 0.38		=	0.026
Internal surface film resistance			Ri	=	0.12
Total					**0.279** W/m²K

$Uw1 = \frac{1}{0.279} = 3.58$

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014
Form RTTV (Wall) 1 - Calculation of $RTTV_{wall}$ of Each Facade

Sheet No. T2 - 7 BD Ref No. 2/3003/20

Building Address Tower 2, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Facade Orientation Facing Northeast Gross Wall Area (Ao) = 459.68

Window to Wall Ratio (WWR) 0.16 Wall Orientation Factor (Gw) = 1.072

Part 1 - Calculation of Heat Conduction through Opaque Walls

Components / Details		Code No.		
Description	**Units**	**NE-W1**		
External Finish Material		185mm concrete wall		
Conductivity	W/mK	2.16		
Thickness	m	0.185		
Average Absorptivity	(α)	0.90		
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		10mm gypsum plaster		
Conductivity	W/mK	0.38		
Thickness	m	0.01		
U-value of Opaque Area (Uwi)	W/m^2K	3.58		
Opaque Wall Area (Awi)	m^2	387.36		
Heat Conduction = 3.57(Awi/Ao) Uwi αwi Gw		**10.39**		

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi αwi Gw where i= 1, 2, ..., n

= **10.39** W/m^2

Part 2 - Calculation of Heat Conduction through Glazing

Components / Details		Code No.				
Description	**Units**	**NE-F1**	**NE-F2**	**NE-F3**		
Glazing Type		Tinted	Tinted	Tinted		
Thickness	m	0.023	0.02	0.038		
Glazing Area (Afi)	m^2	46.91	16.00	9.41		
U-value of Glazing (Ufi)	W/m^2K	1.840	1.620	4.640		
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		**0.13**	**0.04**	**0.07**		

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n

= **0.23** W/m^2

Part 3 - Calculation of Solar Radiation through Glazing

Components / Details		Code No.				
Description	**Units**	**NE-F1**	**NE-F2**	**NE-F3**		
Glazing Type		Tinted	Tinted	Tinted		
Thickness	m	0.023	0.02	0.038		
Glazing Area (Afi)	m^2	46.91	16.00	9.41		
Shading Coefficient of Glazing (SCf)		0.36	0.35	0.71		
External Shading Miltiplier (ESC)		1.00	1.00	1.00		
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw		**1.64**	**0.55**	**0.65**		

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n

= **2.84** W/m^2

Summary of RTTV at Northeast Elevations

= 10.39 + 0.23 + 2.84

= **13.46** W/m^2

Southeast Elevations

Gross Wall Areas (Opaque Walls + Glazing Areas) (Ao) at Southeast Elevations = **981.62** m²

Glazing Areas at Southeast Elevations = **510.51** m²

Breakdown of Glazing Areas

Glazing Areas Unshaded (SE-F1) = **349.48** m²

Glazing Areas ESC = 0.747 (SE-F2) = **161.03** m²

Opaque Wall Areas at Southeast Elevations = **471.11** m²

Breakdown of Opaque Wall Areas

RC Wall Areas (200mm) (SE-W1) = **471.11** m²

Window to Wall Ratio (WWR) = 510.51 / 981.62 = **0.52**

Wall Orientation Factor Gw = 0.975 (Refer to **Table 9**)

Average Absorptivity (α) of the External Opaque Wall at Southeast Elevations

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity (Refer to Table 5)
Dark Grey paint	100%	0.9

Average Absorptivity = 0.90

'U' value of Opaque Wall Areas

$U = 1/(Ri+x_1/k_1+x_2/k_2+...+x_n/k_n+Ra+Ro)$

where Ri Surface film resistance of internal surface (Refer to **Table 2**)
Ro Surface film resistance of external surface (Refer to **Table 2**)
Ra Air space resistance (Refer to **Table 3**)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to **Table 1**)

SE-W1 Description: RC Wall Areas (200mm)

Wall Material						
External surface film resistance				Ro	=	0.044
Air space resistanace				Ra	=	0
5mm mosaic tiles	0.005	/	1.5		=	0.003
185mm concrete wall	0.185	/	2.16		=	0.086
10mm gypsum plaster	0.01	/	0.38		=	0.026
Internal surface film resistance				Ri	=	0.12
Total						**0.279** W/m²K

$$Uw1 = \frac{1}{0.279} = 3.58$$

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014
Form RTTV (Wall) 1 - Calculation of $RTTV_{wall}$ of Each Facade

Sheet No. T2 - 9 BD Ref No. 2/3003/20

Building Address Tower 2, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Facade Orientation Facing Southeast Gross Wall Area (Ao) = 981.62

Window to Wall Ratio (WWR) 0.52 Wall Orientation Factor (Gw) = 0.975

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		**Code No.**		
Description	**Units**	**SE-W1**		
External Finish Material		185mm concrete wall		
Conductivity	W/mK	2.16		
Thickness	m	0.185		
Average Absorptivity	(α)	0.90		
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		10mm gypsum plaster		
Conductivity	W/mK	0.38		
Thickness	m	0.01		
U-value of Opaque Area (Uwi)	W/m^2K	3.58		
Opaque Wall Area (Awi)	m^2	471.11		
Heat Conduction = 3.57(Awi/Ao) Uwi αwi Gw		**5.38**		

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi αwi Gw where i= 1, 2, ..., n

= **5.38** W/m^2

Part 2 - Calculation of Heat Conduction through Glazing						
Components / Details		**Code No.**				
Description	**Units**	**SE-F1**	**SE-F2**			
Glazing Type		Tinted	Tinted			
Thickness	m	0.023	0.02			
Glazing Area (Afi)	m^2	349.48	161.03			
U-value of Glazing (Ufi)	W/m^2K	1.840	1.620			
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		**0.41**	**0.17**			

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n

= **0.57** W/m^2

Part 3 - Calculation of Solar Radiation through Glazing						
Components / Details		**Code No.**				
Description	**Units**	**SE-F1**	**SE-F2**			
Glazing Type		Tinted	Tinted			
Thickness	m	0.023	0.02			
Glazing Area (Afi)	m^2	349.48	161.03			
Shading Coefficient of Glazing (SCf)		0.36	0.35			
External Shading Miltiplier (ESC)		1.000	0.747			
Solar Radiation = 41.75 (Afi/Ao){SCfi)(ESCwi)Gw		**5.22**	**1.75**			

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n

= **6.96** W/m^2

Summary of RTTV at Southeast Elevations

= 5.38 + 0.57 + 6.96

= **12.92** W/m^2

SouthWest Elevations

Gross Wall Areas
(Opaque Walls + Glazing Areas) (Ao) at **SouthWest Elevations** = **288.70** m²

Glazing Areas at **SouthWest Elevations** = **0.00** m²

Breakdown of Glazing Areas

Glazing Areas **Unshaded** (SW-F1) = **0.00** m²

Opaque Wall Areas at **SouthWest Elevations** = **288.70** m²

Breakdown of Opaque Wall Areas

RC Wall Areas (200mm) (SW-W1) = **288.70** m²

Window to Wall Ratio (WWR) = 0.00 / 288.70 = **0.00**

Wall Orientation Factor Gw = 1.131 (Refer to Table 9)

Average Absorptivity (α) of the External Opaque Wall at **SouthWest Elevations**

External Wall Material (Colour/Finish)	% of wall area	α Absorptivity
Dark Grey paint	100%	0.9

Average Absorptivity = 0.90

'U' value of Opaque Wall Areas

$U = 1/(Ri+x_1/k_1+x_2/k_2+...+x_n/k_n+Ra+Ro)$

where Ri Surface film resistance of internal surface (Refer to Table 2)
Ro Surface film resistance of external surface (Refer to Table 2)
Ra Air space resistance (Refer to Table 3)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to Table 1)

SW-W1 Description: RC Wall Areas (200mm)

Wall Material						
External surface film resistance				Ro	=	0.044
Air space resistanace				Ra	=	0
5mm mosaic tiles	0.005	/	1.5		=	0.003
185mm concrete wall	0.185	/	2.16		=	0.086
10mm gypsum plaster	0.01	/	0.38		=	0.026
Internal surface film resistance				Ri	=	0.12
Total						0.279 W/m²K

$Uw1 = \frac{1}{0.279} = 3.58$

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014
Form RTTV (Wall) 1 - Calculation of $RTTV_{wall}$ of Each Facade

Sheet No. T2 - 11 BD Ref No. 2/3003/20

Building Address Tower 2, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Facade Orientation Facing Southwest Gross Wall Area (Ao) = 288.70

Window to Wall Ratio (WWR) 0.00 Wall Orientation Factor (Gw) = 1.131

Part 1 - Calculation of Heat Conduction through Opaque Walls				
Components / Details		**Code No.**		
Description	**Units**	**SW-W1**		
External Finish Material		185mm concrete wall		
Conductivity	W/mK	2.16		
Thickness	m	0.185		
Average Absorptivity	(α)	0.90		
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Intermediate component				
Conductivity	W/mK			
Thickness	m			
Internal Finish Material		10mm gypsum plaster		
Conductivity	W/mK	0.38		
Thickness	m	0.01		
U-value of Opaque Area (Uwi)	W/m^2K	3.58		
Opaque Wall Area (Awi)	m^2	288.70		
Heat Conduction = 3.57(Awi/Ao) Uwi αwi Gw		**13.01**		

Heat Conduction through Opaque Walls = 3.57(Awi/Ao) Uwi αwi Gw where i= 1, 2, ..., n

= **13.01** **W/m^2**

Part 2 - Calculation of Heat Conduction through Glazing					
Components / Details		**Code No.**			
Description	**Units**	**SW-F1**			
Glazing Type		Tinted			
Thickness	m	0.008			
Glazing Area (Afi)	m^2	0.00			
U-value of Glazing (Ufi)	W/m^2K	5.700			
Heat Conduction = 0.64 (Afi/Ao) Uf Gw		**0.00**			

Heat Conduction through Glazing = 0.64 (Afi/Ao) Ufi Gw where i= 1, 2, ..., n

= **0.00** **W/m^2**

Part 3 - Calculation of Solar Radiation through Glazing					
Components / Details		**Code No.**			
Description	**Units**	**SW-F1**			
Glazing Type		Tinted			
Thickness	m	0.008			
Glazing Area (Afi)	m^2	0.00			
Shading Coefficient of Glazing (SCf)		0.45			
External Shading Miltiplier (ESC)		1.000			
Solar Radiation = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw		**0.00**			

Solar Radiation through Glazing = 41.75 (Afi/Ao)(SCfi)(ESCwi)Gw where i= 1, 2, ..., n

= **0.00** **W/m^2**

Summary of RTTV at SouthWest Elevations

= 13.01 + 0.00 + 0.00

= **13.01** **W/m^2**

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014

Form RTTV (Wall) 2 - Summary of Overall RTTV$_{wall}$ of Building

Sheet No. T2 - 12 BD Ref No. 2/3003/20

Building Address Tower 2, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Overall Gross Wall Area [a] 3479.18 m²

Facade Orientation Facing	Gross Wall Area (m^2) [b]	Heat Conduction through Opaque Walls (W/m^2) [c]	Heat Conduction through Glazing (W/m^2) [d]	Solar Radiation through Glazing (W/m^2) [e]	RTTVwall at Each Facade (W/m^2) [f]=[c]+[d]+[e]	Area-weighted RTTVwall (W/m^2) [g]=[f]x[b]/[a]
Northwest	1749.18	1.29	0.54	6.63	8.47	4.26
Northeast	459.68	10.39	0.23	2.84	13.46	1.78
Southeast	981.62	5.38	0.57	6.96	12.92	3.65
Southwest	288.70	13.01	0.00	0.00	13.01	1.08

Overall RTTVwall = **10.76** **W/m²**

< 14 W/m² ok.

Roof

Gross Roof Areas (Opaque Walls + Skylight Areas) (Aro) at **Roof** = **242.92** m²

Skylight Areas at **Roof** = **6.35** m²

Breakdown of Skylight Areas

Skylight Areas **Unshaded** (S1) = **6.35** m²

OpaqueAreas at **Roof** = **236.57** m²

Breakdown of Opaque Roof Areas

RC Roof Areas (R1) = **236.57** m²

Roof Orientation Factor Gs = 2.16 (Refer to **Table 9**)

Average Absorptivity (α) of the External Opaque Wall at **Roof**

External Roof Material (Colour/Finish)	% of roof area	α Absorptivity (Refer to **Table 5**)
Dark grey ceramic tiles	100%	0.9
	Average Absorptivity =	**0.9**

'U' value of Opaque Roof Areas

$U = 1/(Ri+x_1/k_1+x_2/k_2+...+x_n/k_n+Ra+Ro)$

where Ri Surface film resistance of internal surface (Refer to **Table 2**)
Ro Surface film resistance of external surface (Refer to **Table 2**)
Ra Air space resistance (Refer to **Table 3**)
x Thickness of building materials
k Thermal conductivity of building materials (Refer to **Table 1**)

R1 Description: Roof Area

Roof Material						
External surface film resistance				Ro	=	0.055
Air space resistanace				Ra	=	0
9mm porcelain tiles	0.009	/	1.5		=	0.006
41mm cement sand	0.041	/	0.72		=	0.057
100mm polystyrene foam	0.1	/	0.034		=	2.941
25mm waterproofing membrane	0.025	/	1.15		=	0.022
30mm cement sand	0.03	/	0.72		=	0.042
150mm concrete slab	0.15	/	2.16		=	0.069
15mm gypsum plaster	0.015	/	0.38		=	0.039
Internal surface film resistance				Ri	=	0.162
Total						**3.393**

$$Uw1 = \frac{1}{3.393} = 0.29 \text{ W/m}^2\text{K}$$

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014
Form RTTV (Roof) 1 - Calculation of $RTTV_{roof}$

Sheet No. T2 - 14 BD Ref No. 2/3003/20

Building Address Tower 2, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Roof Orientation Facing Flat Gross Roof Area (Aro) = 242.92

Skylight to Roof Ratio (SRR) = 0.026 Roof Orientation Factor (Gs) = 2.16

Part 1 - Calculation of Heat Conduction through Opaque Roof				
Components / Details		**Code No.**		
Description	**Units**	**R1**		
External Finish Material		9mm porcelain tiles		
Conductivity	W/mK	1.50		
Thickness	m	0.01		
Average Absorptivity	(α)	0.90		
Intermediate component		41mm cement sand		
Conductivity	W/mK	0.72		
Thickness	m	0.04		
Intermediate component		100mm polystyrene foam		
Conductivity	W/mK	0.03		
Thickness	m	0.10		
Intermediate component		25mm waterproofing membrane		
Conductivity	W/mK	1.15		
Thickness	m	0.03		
Intermediate component		30mm cement sand		
Conductivity	W/mK	0.72		
Thickness	m	0.03		
Intermediate component		150mm concrete slab		
Conductivity	W/mK	2.16		
Thickness	m	0.15		
Internal Finish Material		15mm gypsum plaster		
Conductivity	W/mK	0.38		
Thickness	m	0.02		
U-value of the Roof (Uri)	W/m^2K	0.29		
Opaque Roof Area (Ari)	m^2	236.57		
Heat Conduction = 3.47(Ari/Aro) Uri αri Gs		**1.94**		

Heat Conduction through Opaque Roof = 3.47(Ari/Aro) Uri αri Gs where i= 1, 2, ..., n

= **1.94** **W/m^2**

Part 2 - Calculation of Heat Conduction through Skylight						
Components / Details		**Code No.**				
Description	**Units**	**S1**				
Skylight Glazing Type		Tinted				
Thickness	m	0.03				
Skylight Area (Asi)	m^2	6.35				
U-value of Skylight Glazing (Usi)	W/m^2K	4.82				
Heat Conduction = 0.40 (Asi/Aro) Usi Gs		**0.11**				

Heat Conduction through Skylight = 0.40 (Asi/Aro) Usi Gs where i= 1, 2, ..., n

= **0.11** **W/m^2**

Part 3 - Calculation of Solar Radiation through Skylight						
Components / Details		**Code No.**				
Description	**Units**	**S1**				
Skylight Glazing Type		Tinted				
Thickness	m	0.03				
Skylight Area (Asi)	m^2	6.35				
Shading Coefficient of Skylight Glazing (SCr)		0.75				
Solar Radiation = 41.10 (Asi/Aro) (SCri) Gs		**1.74**				

Solar Radiation through Skylight = 41.10 (Asi/Aro) (SCri) Gs where i= 1, 2, ..., n

= **1.74** **W/m^2**

Summary of RTTV at Roof

= 1.94 + 0.11 + 1.74

= **3.79** **W/m^2**

Guidelines on Design and Construction Requirements for Energy Efficiency of Residential Buildings 2014

Form RTTV (Roof) 2 - Summary of $RTTV_{roof}$ of Building Envelopes

Sheet No. T2 - 15 BD Ref No. 2/3003/20

Building Address Tower 2, Proposed Residential Development At Inland Lot No. 9076, 135 Tai Hang Road, Hong Kong

Overall Roof Area [a] 242.92 m²

Roof	Gross Roof Area (m²) [b]	Heat Conduction through Opaque Roof (W/m²) [c]	Heat Conduction through Skylight (W/m²) [d]	Solar Radiation through Skylight (W/m²) [e]	RTTVroof at Each Type of Roof (W/m²) [f]=[c]+[d]+[e]	Area-weighted RTTVroof (W/m²) [g]=[f]x[b]/[a]
Flat Roof	242.92	1.94	0.11	1.74	3.79	3.79

Overall RTTVroof = 3.79 W/m²

< 4 W/m² ok.

NORTHWEST
NORTHEAST
SOUTHEAST
SOUTHWEST

NW-F1 NW-F2 NW-F1 NW-F2 NW-F1 NW-F2 NW-F1
NW-W1
NE-W1
SE-W1
SW-W1
SE-F1 SE-F2

AF (AT 7/F, 8/F, 9/F ONLY)
GB MIN. 1100H. FROM FFL
AF ENCLOSING PIPEWORK W/ CCTV & DEMOUNTABLE PANEL
AF (AT 5/F, 6/F, 12/F, 15/F, 16/F ONLY)
ALUM. CLADDING
300H. UPSTAND
AF ENCLOSING PIPEWORK W/ CCTV
1100H. METAL SCREEN
LIGHT WEIGHT CONC. FILL
GB MIN. 1100H. FROM FFL

C LIV/DIN
B LIV/DIN
A LIV/DIN
D LIV/DIN
MBR
BR1
BATH 1
M.BATH
WIC
0 KIT
FULL HEIGHT -/30/30 F.R.R.
BUILDING LINE ABOVE (21/F)
LL
LIFT 4
LIFT 5
LIFT 6
UP 20R DN20R
RSMRR
EMR

T2-A T2-B T2-D T2-E T2-G T2-K T2-L T2-C T2-F T2-H T2-J T2-L

192 5175 3175 3175 5325 5700 2925
3490 3500 1360 2275 3495 605 6800 2525 2075 1420 1905
500 575 6750 1500 4500 1950 2300 7200

T2-1 T2-2 T2-4 T2-6 T2-8 T2-9 T2-11 T2-13

TOWER SETTING OUT LINE

TOWER 2 2/F PLAN

NORTHWEST
NORTHEAST
SOUTHEAST
SOUTHWEST

NW-F1 NW-F2 NW-F1 NW-F2 NW-F1 NW-F2 NW-F1
NW-W1
NE-W1
SE-W1
SW-W1
SE-F1 SE-F2

AF (AT 7/F, 8/F, 9/F, 12/F & 15/F ONLY)
AF (AT 7/F, 8/F, 9/F ONLY)
GB MIN. 1100H. FROM FFL
AF ENCLOSING PIPEWORK W/ CCTV & DEMOUNTABLE PANEL
AF (AT 5/F, 6/F, 12/F, 15/F, 16/F ONLY)
AF ENCLOSING PIPEWORK W/ CCTV & DEMOUNTABLE PANEL
ALUM. CLADDING
300H. UPSTAND
1100H. METAL SCREEN

192 5175 3175 3175 5325 5700 2925
3490 3500 1360 2275 3495 605 500
6800 2525 2075 1420 1905
575 6750 1500 4500 1950 2300 7200

T2-A T2-B T2-D T2-E T2-G T2-K T2-L
T2-C T2-F T2-H T2-J T2-L
T2-1 T2-2 T2-4 T2-6 T2-8 T2-9 T2-11 T2-13

C LIV/DIN B LIV/DIN D LIV/DIN A LIV/DIN E LIV/DIN
MBR BR1 WIC M.BATH BATH 1 O KIT LL
LIFT 4 LIFT 5 LIFT 6 LIFT D A
FULL HEIGHT -/30/30 F.R.R.
AF ENCLOSING PIPEWORK W/ CCTV
GB MIN. 1100H. FROM FFL
ALC
TOWER SETTING OUT LINE

TOWER 2 3/F TO 10/F PLAN

NORTHWEST
NORTHEAST
SOUTHEAST
SOUTHWEST

NW-F1 NW-F2 NW-F1 NW-F2 NW-F1 NW-F2 NW-F1

NW-W1

NE-W1

SE-W1

SW-W1

NW-W2

NE-W1

NE-F1&NE-F2

SE-W1

SE-F1

SE-F2

AF (AT 7/F, 8/F, 9/F, 12/F & 18/F ONLY)

AF (AT 7/F, 8/F, 9/F ONLY)

GB MIN. 1100H. FROM FFL

AF ENCLOSING PIPEWORK W/ CCTV & DEMOUNTABLE PANEL

REFER PART PLAN A FOR 19/F

REFER PART FOR 19/F

AF ENCLOSING PIPEWORK W/ CCTV

ALUM. CLADDING

300H. UPSTAND

FULL HEIGHT -/30/30 F.R.R.

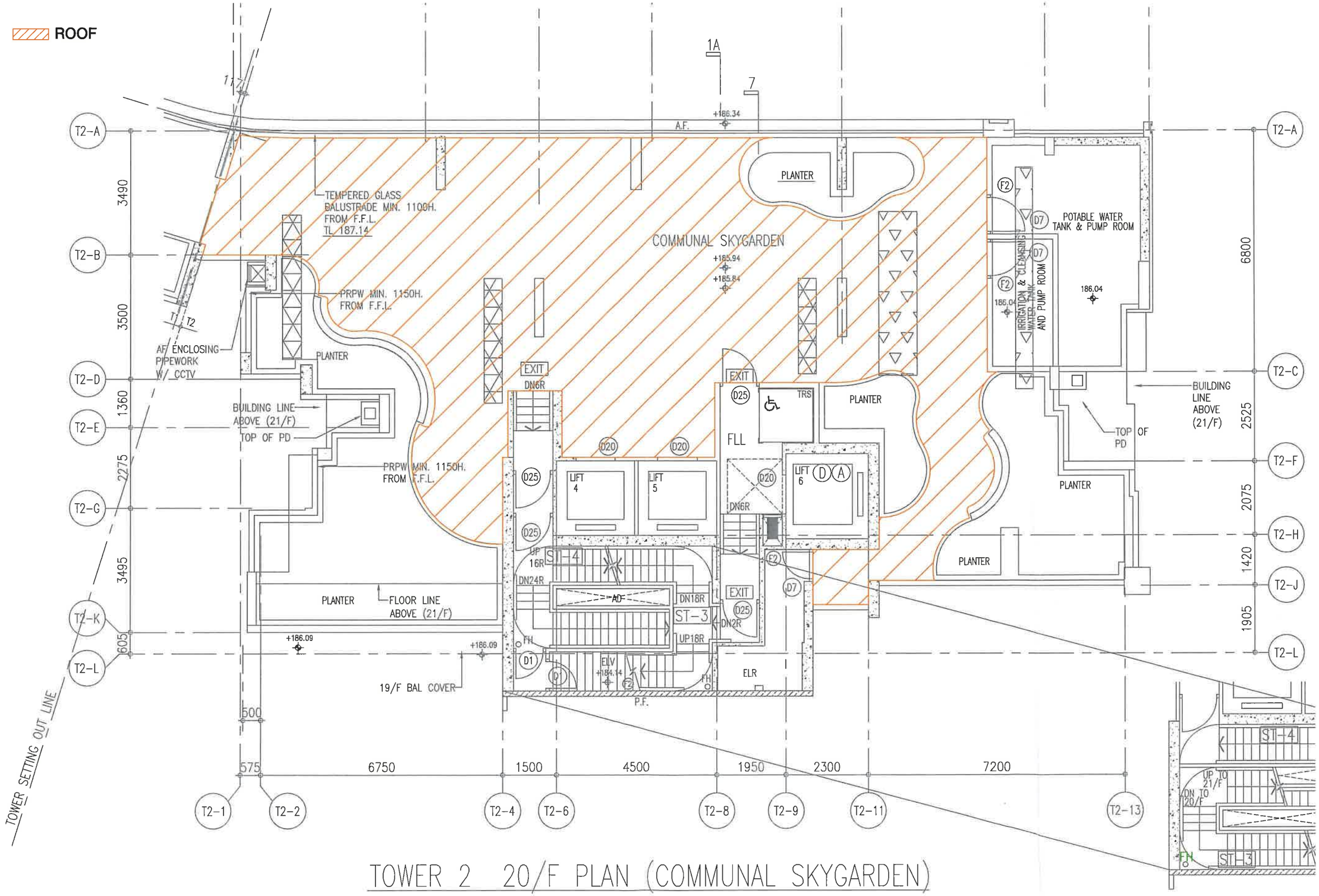
GB MIN. 1100H. FROM FFL

1100H. METAL SCREEN

TOWER SETTING OUT LINE

TOWER 2 11/F TO 19/F PLAN

ROOF



TOWER 2 20/F PLAN (COMMUNAL SKYGARDEN)

NORTHWEST
NORTHEAST
SOUTHEAST
SOUTHWEST

NW-F1 NW-F2 NW-F3
NW-W1
GB MIN. 1100H. FROM FFL
AF ENCLOSING PIPEWORK W/ CCTV
BAL
AF
CW
300H. UPSTAND
MBR
BR2
BR1
BATH 2
BATH 1
WIC
LIV/DIN
+191.29
+191.24
NE-W1
NE-F2
AF ABOVE
+191.14
PRIVATE FLAT ROOF
+190.99
SW-W1
AF ENCLOSING PIPEWORK W/ CCTV
PF
BATH 3
POWDER ROOM
PRIVATE LIFT LOBBY
UTR 2
KIT
TEMPERED GLASS BALUSTRADE MIN. 1100H. FROM F.F.L
TL 192.49
LIFT 4
LIFT 5
LIFT 6
FLL
FIREMAN LIFT LOBBY
M.BATH
BR3
SE-W1
SE-F1
EXIT
ST-3
ST-4
UP 16R
DN24R
UP16R
UTR 1
LAV
RSMR
OPEN PRPW MIN. 1100H. FROM FFL
ACPF
1100H. METAL SCREEN
CAST-IN ANCHOR FOR ACPF
TOWER SETTING OUT LINE

192 5175 3175 3175 5325 5700 2925
3490 3500 1360 2275 3495 605 500
6800 2525 2075 1420 1905
575 6750 1500 4500 1950 2300 7200

T2-A T2-B T2-D T2-E T2-G T2-K T2-L
T2-C T2-F T2-H T2-J T2-L
T2-1 T2-2 T2-4 T2-6 T2-8 T2-9 T2-11 T2-13

TOWER 2 21/F PLAN

NORTHWEST
NORTHEAST
SOUTHEAST
SOUTHWEST

NW-F1 NW-F2 NW-F1 & NW-F3
NW-W1
GB MIN. 1100H. FROM FFL
AF ENCLOSING PIPEWORK W/ CCTV & DEMOUNTABLE PANEL
AF
CW
300H. UPSTAND
NE-W1
NE-F3
AF ABOVE
NE-F1
NE-F3
SW-W1
AF ENCLOSING PIPEWORK W/ CCTV
SE-W1
SE-F1
OPEN PRPW MIN. 1100H. FROM FFL
100H. METAL SCREEN
GLASS BALUSTRADE MIN. 1100H. FROM FFL

MBR
BR2
BR1
BR3
BATH 1
BATH 2
BATH 3
M.BATH
POWDER ROOM
WIC
LIV/DIN
+194.79
+194.74
PRIVATE LIFT LOBBY
LIFT 4
LIFT 5
LIFT 6
FLE
FIREMAN LIFT LOBBY
UTR 1
UTR 2
KIT
LAV
PD
EMR
RSMRR
TRS
EXIT
FH
ST-4
ST-3
DN24R
UP23R
AB
UP
PF
ACPF
A/C
LINE OF SKYLIGHT ABOVE
CAST-IN ANCHOR FOR ACPF
WPRML TOP VENT OF ST-3 AT H/L

T2-A T2-B T2-C T2-D T2-E T2-F T2-G T2-H T2-J T2-K T2-L
T2-1 T2-2 T2-4 T2-6 T2-8 T2-9 T2-11 T2-13

192 5175 3175 3175 5325 5700 2925
3490 3500 1360 2275 3495 605 500 575 6750 1500 4500 1950 2300 7200
6800 2525 2075 1420 1905

TOWER SETTING OUT LINE

TOWER 2 22/F PLAN

ROOF
SKYLIGHT

192 5175 3175 3175 5325 5700 2925

3A

METAL A.F.
+199.44
+199.34
GLASS DOOR
METAL A.F.

GB TL 200.54
GB 1100H. FROM FFL
+200.14
+198.74
S.S. LADDER
TIMBER DECK (FILTRATION PLANT AREA BELOW)
SWIMMING POOL +200.09(WL)
+198.99
+198.74
GB 1100H. FROM F.F.L.
GB 1100H. FROM F.F.L.
GB TL 200.54

COVERED CHANNEL
PRPW. MIN.1500H. FROM FFL
TOP OF PD
CEMENT SAND SCREED ON WATERPROOFING MEMBRANE LAID TO FALL
GB 1100H. FROM FFL
PRIVATE ROOF
+199.04
+198.74
SKYLIGHT
LAMINATED TEMPERED GLASS (NON-COMBUSTIBLE)

EXIT
RC STAIRCASE & PLATFORM FOR MAINTENANCE ACCESS
+199.19 UP 2R
DN 2BR
+200.89
0.3M² LIFT SHAFT VENT
FLUSHING WATER TANK & PUMP ROOM
+198.74
198.94
C.L. W/. HATCH DOOR ABOVE
+199.19
+199.14
UP15R
UP3R
LIFT PLATFORM LIFT 4
LIFT PLATFORM LIFT 5
LIFT PLATFORM LIFT 6
+201.19
0.3M² LIFT SHAFT VENT
+200.89
SKYLIGHT
LAMINATED TEMPERED GLASS (NON-COMBUSTIBLE)
+198.44
+198.64
+198.79
+198.74
D4
UP 3R
D8
D2
F2
PRIVATE ROOF
PRPW. MIN. 1500H. FROM FFL
UP13R +198.74
ST-4
UP 29R
DN 20R
A.D.
AP1
ELECTRIC DUCT ROOM
TOP OF 22/F UP

T2-A T2-B T2-C T2-D T2-E T2-F T2-G T2-H T2-J T2-K T2-L

3490 3500 1360 2275 3495 605 6800 2525 2075 1420 1905

500 575 6750 1500 4500 1950 2300 7200

T2-1 T2-2 T2-4 T2-6 T2-8 T2-9 T2-11 T2-13

TOWER SETTING OUT LINE

TOWER 2 MAIN ROOF PLAN