

# 註冊電業工程人員持續進修計劃

- Dick Chan
- 從事教授工程行業軟件超過15年
  - AutoCAD, Sketchup
  - Photoshop
  - MS Project, Visio
- [dikdik3@gmail.com](mailto:dikdik3@gmail.com)

# 目的

- 電業工程圖則種類多，包括位置圖、垂直圖、電錶箱圖等等。清晰易讀的圖則更易令設計人員、施工人員及政府部門了解及便利審批。
- 使用電腦繪圖軟件，坊間學習途經，提供常用、常見圖則範本，從而方便工作。
- 了解一般顧問及政府部門對提交圖則的大致標準

# 內容

利用行業廣泛使用的AutoCAD軟件為根據

- 淺談部分繪圖技巧及知識
- 繪製圖框要注意的地方
- 淺談出圖的選擇

# 內容

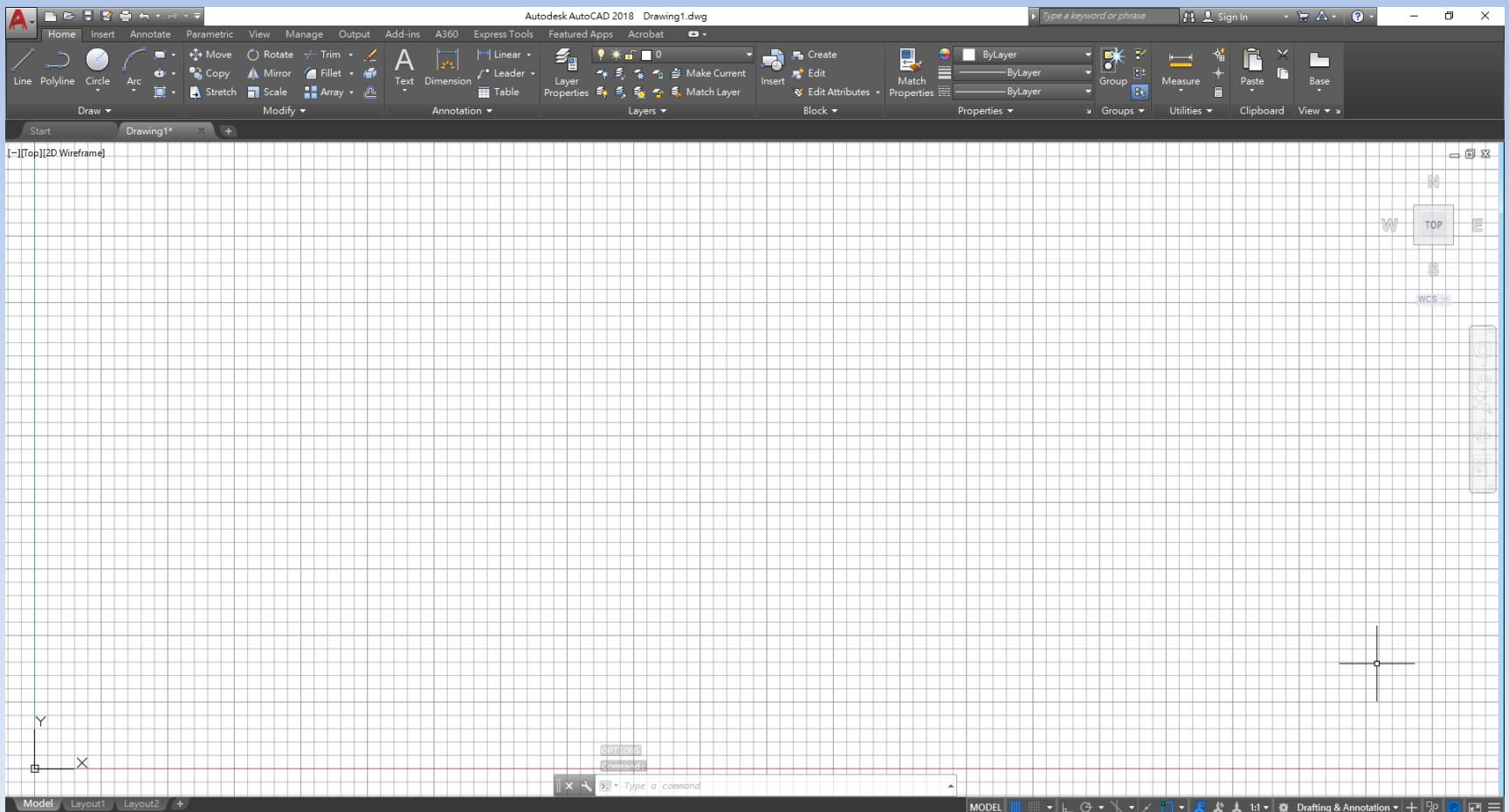
- 1.常用繪圖軟件
- 2.部分常用繪圖資料
- 3.展示圖框設計
- 4.比例的要求
- 5.文字的輸入
- 6.印圖注意地方

# 1.常用繪圖軟件

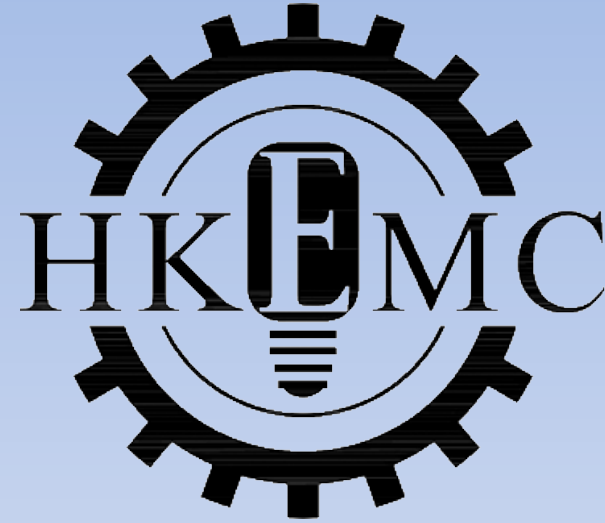
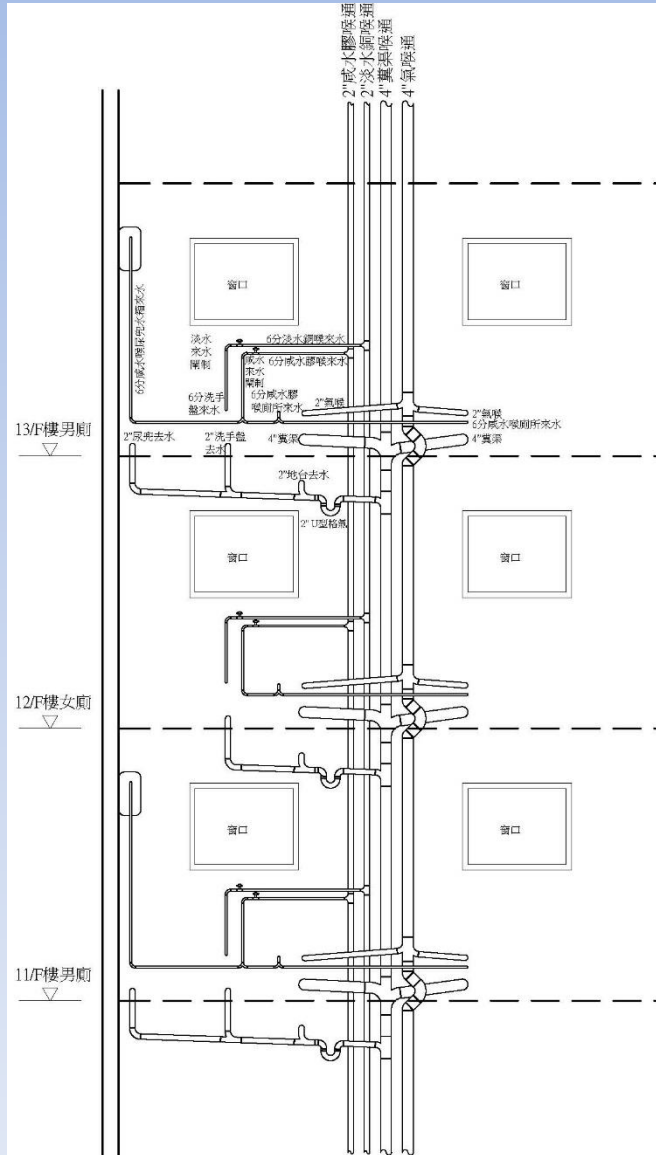
- 機電行業較為常用
  - AutoCAD
  - MS Excel
  - MS Word
- 機電行業較為少用
  - Sketchup (3D)
  - Photoshop

# 1.常用繪圖軟件

- AutoCAD 2018 板面



# 1. 常用繪圖軟件-例子



# 1.常用繪圖軟件-例子

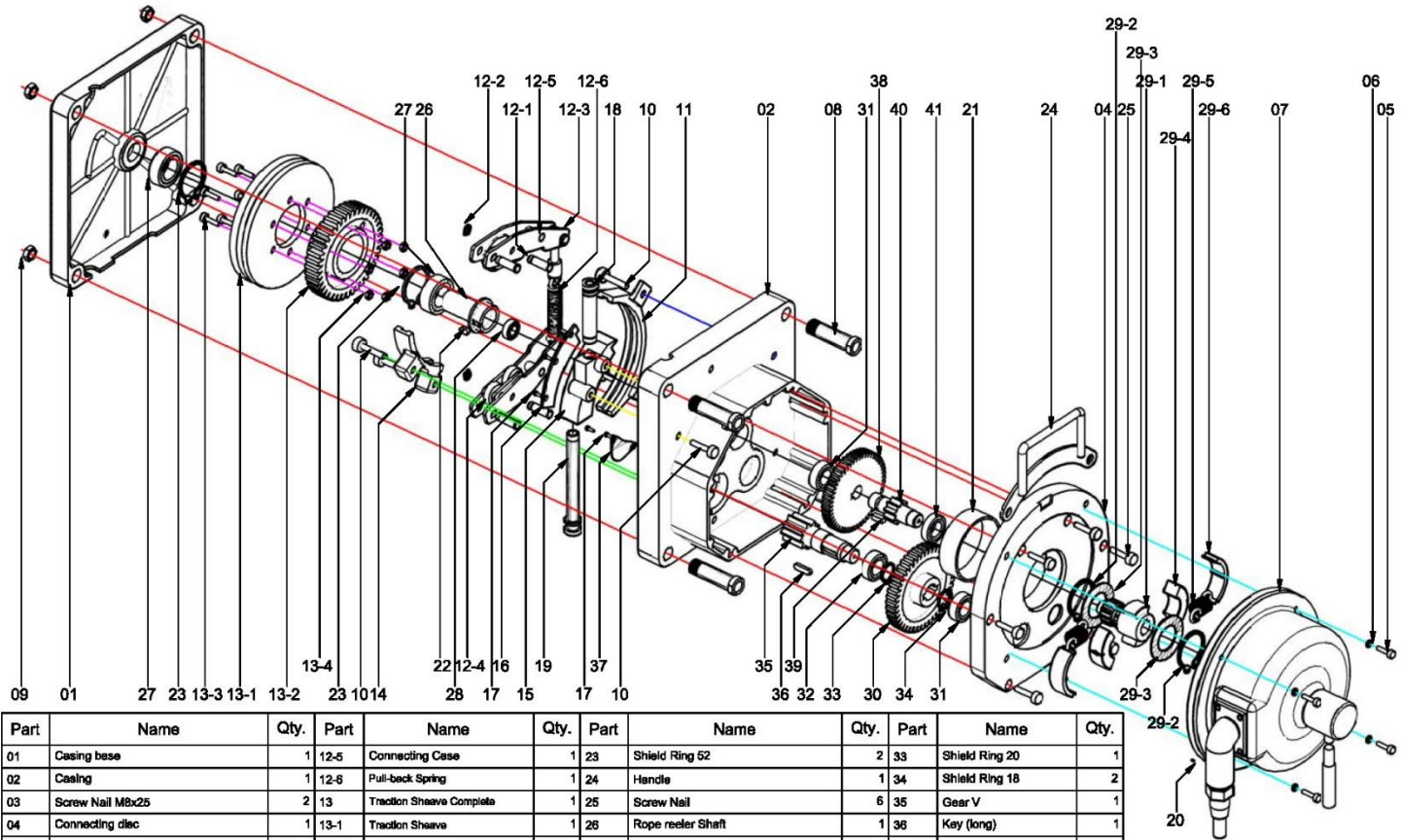
Project No. : RHA16-19										Date : 26/11/2016									
Project Title : AES Office Redevelopment at 48 Wany Lee Street, Yuen Long Industrial Estate, Yuen Long, N.T.										Rev. : -									
LPD summary table										Arch Ref. : 17/10/2016 (received on 25/11/2016)									
Floor	Location	Room Area (m <sup>2</sup> )	Lighting Fixing	Power for each Lamp (W)	Power Loss for each Lamp (W)	Quantity (Nos.)	Total Lamp Power (W)	Mounting Height (mm)	Workplane Level (mm)	Calculated Lux Level	Design Lux Level	Calculated LPD (W/m <sup>2</sup> )	Min. No. of Switch	Maxlight power allowed	Max. allowable LPD (W/m <sup>2</sup> )	Applicable Type of Space	Automatic Control	Auto auto Control Check	LPD Check
G/F	Car Parks	170	1x20W TS (120mm) Flu. Lamp	28	3	27	857	2500	780	200	4.92	1	167.4	9	Car Park	Yes	1	1	
G/F	Male Lav.	14.31	1x20W TS (120mm) Flu. Lamp	28	3	6	166	2500	780	200	10.83	1	167.4	11	Toilet/Washroom/Shower Room	Yes	1	1	
G/F	Accessible Toilet	5.19	1x20W TS (120mm) Flu. Lamp	28	3	2	62	2600	780	200	11.86	1	67.1	11	Toilet/Washroom/Shower Room	Yes	0	0	
G/F	Female Lav	9.72	1x20W TS (120mm) Flu. Lamp	28	3	3	93	2500	780	200	9.57	1	109.9	11	Toilet/Washroom/Shower Room	Yes	0	1	
G/F	Partly 1	74.3	2x20W TS (120mm) Flu. Lamp	66	6	13	806	2500	780	600	10.86	4	817.3	11	Corridor	No	1	1	
G/F	Common Area 1	67.38	1x20W TS (120mm) Flu. Lamp	28	3	17	527	2500	780	600	7.92	1	530.0	9	Corridor	Yes	1	1	
G/F	Common Area 1	67.38	1x12W LED downlight	12	6	44	525	2500	780	600	7.92	1	636.6	9	Corridor	Yes	1	1	
G/F	Reception Lobby	65.28	1x20W TS (120mm) Flu. Lamp	28	3	37	1147	2500	780	600	17.67	1	1,176.0	16	Corridor / Platform / Entrance / Atrium / Staircase with headroom over 5 m	No	1	1	
G/F	Office 1	63.88	2x20W TS (120mm) Flu. Lamp	66	6	12	744	2500	780	600	11.48	2	749.3	12	Office (Internal Floor area at above 15m2)	Yes	1	1	
G/F	Conference Room 1	75.31	2x20W TS (120mm) Flu. Lamp	66	6	12	744	2500	780	600	9.99	1	1,254.3	14	Conference Seminar Room	Yes	1	1	
1/F	Store Room 1	6.64	1x14W TS (80mm) Flu. Lamp	14	3	3	61	2500	780	200	7.98	1	69.8	9	Store	Yes	0	1	
1/F	Male Lav.	14.4	1x20W TS (120mm) Flu. Lamp	28	3	6	166	2700	780	200	10.71	1	169.2	11	Toilet/Washroom/Shower Room	Yes	1	1	
1/F	Female Lav.	17.64	1x20W TS (120mm) Flu. Lamp	28	3	8	166	2700	780	200	10.64	1	149.0	11	Toilet/Washroom/Shower Room	Yes	1	1	
1/F	Partly 2	291.88	2x20W TS (120mm) Flu. Lamp	66	6	6	310	2500	780	600	10.81	4	316.6	11	Corridor	No	1	1	
1/F	Office 2	290.89	1x20W TS (120mm) Flu. Lamp	28	3	80	2759	2500	780	600	11.95	2	2,770.7	12	Office (Internal Floor area at above 15m2)	Yes	1	1	
1/F	Office 3	22.67	1x20W TS (120mm) Flu. Lamp	28	3	8	243	2500	780	600	10.84	2	272.0	12	Office (Internal Floor area at above 15m2)	Yes	1	1	
1/F	Office 4	18.88	1x20W TS (120mm) Flu. Lamp	28	3	7	217	2500	780	600	11.49	2	228.8	12	Office (Internal Floor area at above 15m2)	Yes	1	1	
1/F	Office 5	18.88	1x20W TS (120mm) Flu. Lamp	28	3	7	217	2500	780	600	11.48	2	229.6	12	Office (Internal Floor area at above 15m2)	Yes	1	1	
1/F	Shower Room	6.98	1x20W TS (80mm) Flu. Lamp	14	3	4	85	2500	780	600	9.72	2	86.8	10	Shower Room / Toilet Room	No	0	1	
1/F	Office 6	13.32	1x20W TS (120mm) Flu. Lamp	28	3	5	155	2500	780	600	11.64	1	173.2	13	Office (Internal Floor area at or below 15m2)	Yes	1	1	
1/F	Store Room 2	6.04	1x14W TS (80mm) Flu. Lamp	14	3	3	61	2500	0	200	7.98	1	69.8	9	Store	Yes	0	1	
1/F	Office 7	13.37	1x20W TS (120mm) Flu. Lamp	28	3	5	155	2500	780	600	11.60	1	173.8	13	Office (Internal Floor area at or below 15m2)	Yes	1	1	
1/F	Office 8	12.24	1x20W TS (120mm) Flu. Lamp	28	3	6	166	2500	780	600	12.66	1	169.1	13	Office (Internal Floor area at or below 15m2)	Yes	1	1	
1/F	Office 9	23.59	1x20W TS (120mm) Flu. Lamp	28	3	9	279	2500	780	600	11.83	2	283.1	12	Office (Internal Floor area at above 15m2)	Yes	1	1	
1/F	Conference Room 2	31.42	1x20W TS (120mm) Flu. Lamp	28	3	14	434	2500	780	600	13.91	1	439.3	14	Conference Seminar Room	Yes	1	1	
1/F	Void																		
1/F	Bakery	15.41																	
1/F	Male Lav.	12.04	1x20W TS (120mm) Flu. Lamp	28	3	5	155	2700	780	200	12.87	1	132.4	11	Toilet/Washroom/Shower Room	Yes	1	0	
2/F	Female Lav.	10.86	1x20W TS (120mm) Flu. Lamp	28	3	6	166	2700	780	200	14.27	1	119.6	11	Toilet/Washroom/Shower Room	Yes	1	0	
2/F	Partly 3	30.46	2x20W TS (120mm) Flu. Lamp	66	6	8	310	2500	780	600	10.16	4	336.0	11	Corridor	No	1	1	
2/F	Training Room/ Rehabilitation Room	40.8	2x20W TS (120mm) Flu. Lamp	66	6	9	583	2500	780	600	13.88	1	871.2	14	Conference Seminar Room	Yes	1	1	
2/F	Training Room	73.4	2x20W TS (120mm) Flu. Lamp	66	6	12	744	2500	780	600	10.14	1	880.8	12	Classroom/ Training Room	Yes	1	1	
2/F	Training Room	73.4	1x15W LED downlight	12	6	11	132	2500	780	600	1.90	1	880.0	12	Classroom/ Training Room	Yes	0	1	
2/F	Training Room	73.4																	
2/F	Staff Room (Lounge)	46.6	1x20W TS (120mm) Flu. Lamp	28	3	10	558	2500	780	600	12.90	2	650.0	12	Office (Internal Floor area at above 15m2)	Yes	1	0	
2/F	Bathroom	7.8	1x20W TS (120mm) Flu. Lamp	28	3	5	155	2700	780	200	20.39	1	83.6	11	Toilet/Washroom/Shower Room	Yes	1	0	
2/F	Corridor	120	1x20W TS (120mm) Flu. Lamp	28	3	27	837	2500	780	600	6.96	1	960.0	8	Corridor	Yes	1	1	
2/F	Store	15.15	1x20W TS (120mm) Flu. Lamp	28	3	4	124	2500	0	200	8.16	1	136.4	9	Store	Yes	0	1	
2/F	Accounting Department & Commercial Department & Secretary	74	2x20W TS (120mm) Flu. Lamp	66	6	12	744	2500	780	600	10.06	2	880.0	12	Office (Internal Floor area at above 15m2)	Yes	1	1	
2/F	Accounting Department & Commercial Department & Secretary	74	1x12W LED downlight	12	6	11	132	2500	780	600	1.76	2	880.0	12	Office (Internal Floor area at above 15m2)	Yes	0	1	
2/F	Accounting Department & Commercial Department & Secretary	74																	
2/F	Office 11	33.92	1x20W TS (120mm) Flu. Lamp	28	3	10	310	2500	780	600	11.84	2	880.0	12	Office (Internal Floor area at above 15m2)	Yes	0	1	
2/F	Mr. Kuo's Corridor	13.6	1x12W LED downlight	12	6	8	96	2500	780	600	7.96	1	100.8	8	Corridor	Yes	1	1	
2/F	Mr. Kuo's Office	53.8	2x20W TS (120mm) Flu. Lamp	66	6	9	583	2500	780	600	10.37	2	646.6	12	Office (Internal Floor area at above 15m2)	Yes	1	1	
2/F	Mr. Kuo's Office	53.8	1x12W LED downlight	12	6	7	94	2500	780	600	1.86	2	646.6	12	Office (Internal Floor area at above 15m2)	Yes	0	1	
2/F	Mr. Kuo's Office	53.8																	
2/F	Bakery	65.28																	
R/F	Pump Room	40	1x20W TS (120mm) Flu. Lamp	28	3	15	465	2500	780	600	8.48	1	480.0	10	Plant Room / Machine Room / Switch Room	No	1	1	
R/F	Staircase S1-1	15	1x14W TS (80mm) Flu. Lamp	14	3	6	85	2500	780	600	6.64	1	91.0	7	Plant Room / Machine Room / Switch Room	No	0	1	

Remark:  
 1. Max. LPD extract from Table 6.4 of COPC 2016  
 2. Automatic control not applicable for Lamp Power less than 180W (Clause 6.6.1.1)  
 3. LPD not necessary to fulfil if total lamp power less than 70W

CLIENT :	ARCHITECT :	M/E ENGINEER :	NOTES :	PROJECT TITLE :	DRAWING TITLE :	REV.	DATE	DESCRIPTIONS :	DESIGNED : ERIC	JOB NO. : 454
			Thinker's data is subject to verification by the client. The client is responsible for providing accurate and complete information. The Engineer is not responsible for any errors or omissions in the client's data. The Engineer is not responsible for any errors or omissions in the client's data.						DRAWN : ERIC	PAGE : -
									CHECKED : DICKY	SCALE : NTS
									APPROVED : YF YUNG	DWG NO. :
									DATE : 02-07-2017	RHA16-19/EL-301

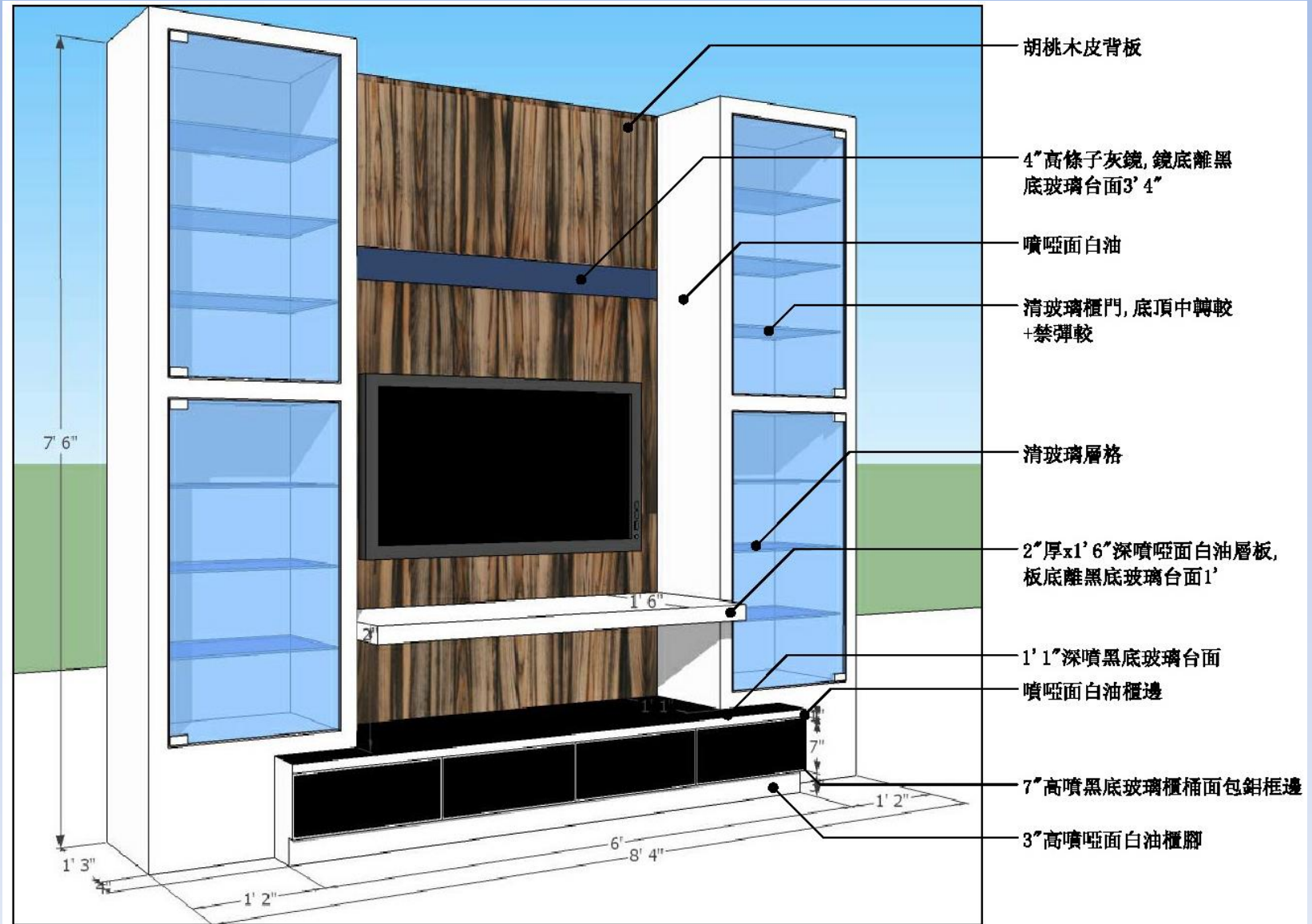


# 1. 常用繪圖軟件-例子

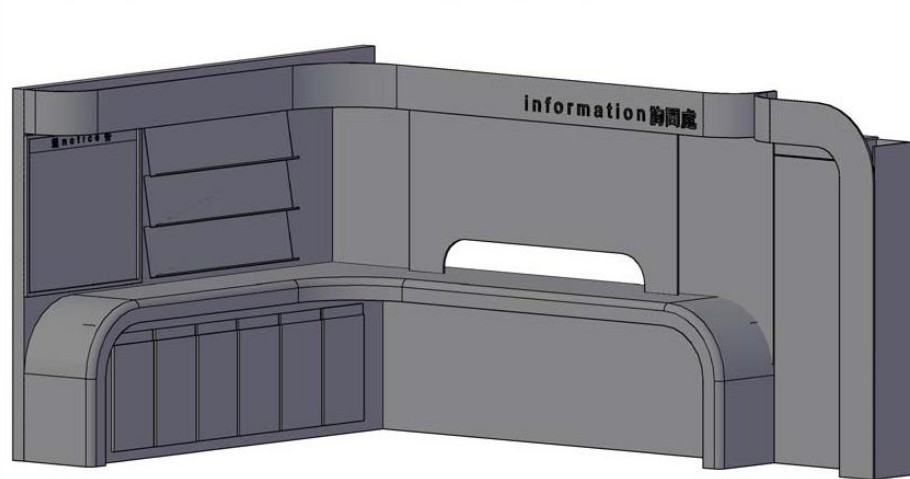
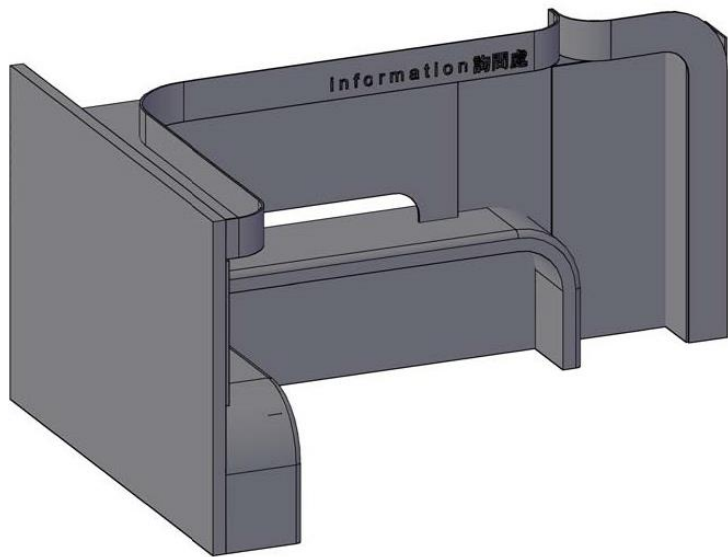


Part	Name	Qty.	Part	Name	Qty.	Part	Name	Qty.	Part	Name	Qty.
01	Casing base	1	12-5	Connecting Case	1	23	Shield Ring 62	2	33	Shield Ring 20	1
02	Casing	1	12-8	Pull-back Spring	1	24	Handle	1	34	Shield Ring 18	2
03	Screw Nail M8x25	2	13	Traction Sheave Complete	1	25	Screw Nail	6	35	Gear V	1
04	Connecting disc	1	13-1	Traction Sheave	1	26	Rope reeler Shaft	1	36	Key (long)	1
05	Bolt	4	13-2	Gear VI	1	27	Bearing 6205ZZ	2	37	Dust Cover	1
06	Washer 10	4	13-3	Screw Nail M8x25	6	28	Bearing 61902ZZ	1	38	Gear II	1
07	Motor	1	13-4	Screw Nut M8	6	29	Centrifugal Governor	1	39	Key (short)	1
08	Hollow Bolt	4	14	Wire Rope Guiding Plate (Small)	1	29-1	Gear I	1	40	Gear III	1
09	Screw nut	4	15	Rope Diverting Device	1	29-2	Shield Ring 35	2	41	Bearing 6003ZZ	1
10	Screw Nail M8x25	4	16	Steel Plate	1	29-3	Shield Piece	2			
11	Wire Rope Guiding Plate (Big)	1	17	Screw Nail M4x8	5	29-4	Flyweight	2			
12	Pressure System Complete	1	18	Rope Entry Tube	1	29-5	Spring	2			
12-1	Fixed Shaft	2	19	Rope Exit Tube	1	29-6	Friction Plate	2			
12-2	Shield Ring 10	5	20	Motor Rubber Cap	1	30	Gear IV	1			
12-3	Frame	4	21	Bushing	1	31	Bearing 6203ZZ	2			
12-4	Roller c/w Supporting Steel Plate (set)	2	22	Key (short)	1	32	Bearing 6005ZZ	1			

# 1. 常用繪圖軟件-例子



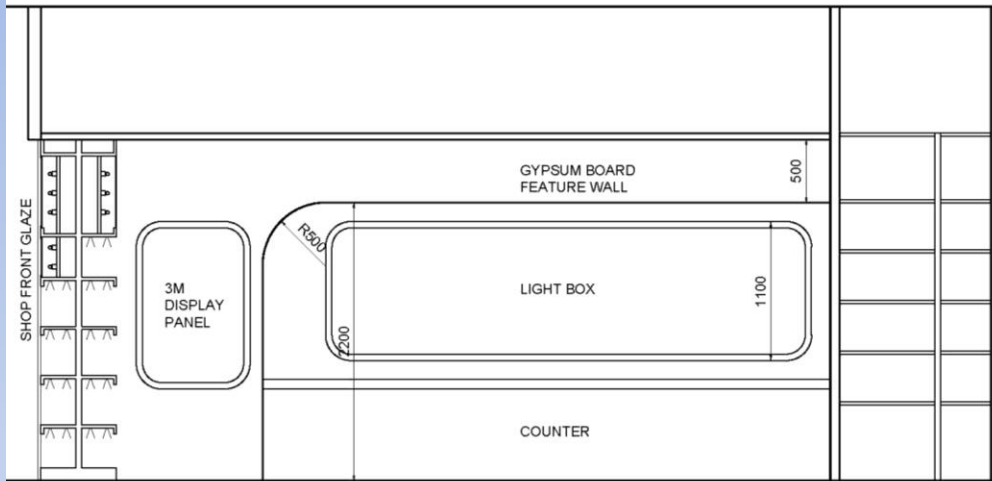
# 1. 常用繪圖軟件-例子



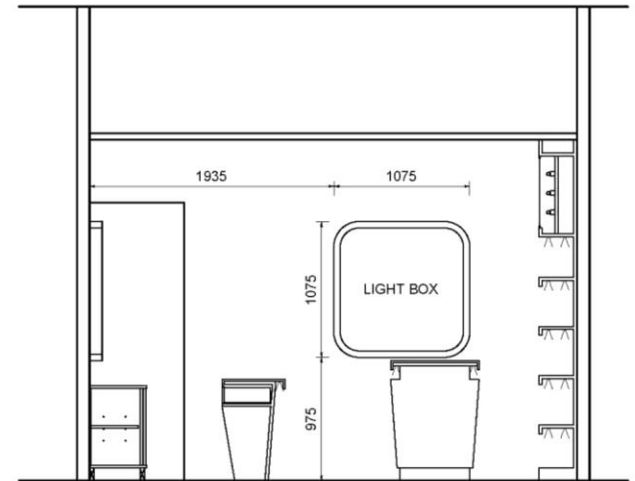
FOR DRAFT  
18/11/2008



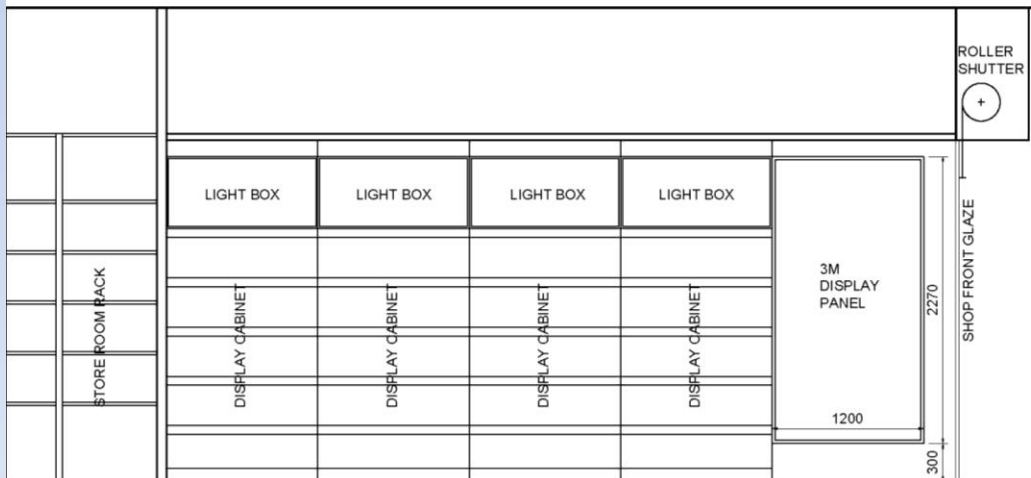
# 1. 常用繪圖軟件-例子



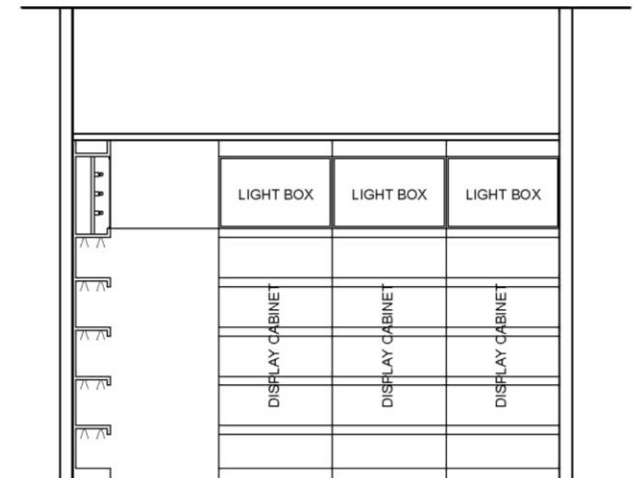
ELEVATION A  
SCALE: 1:40



ELEVATION B  
SCALE: 1:40

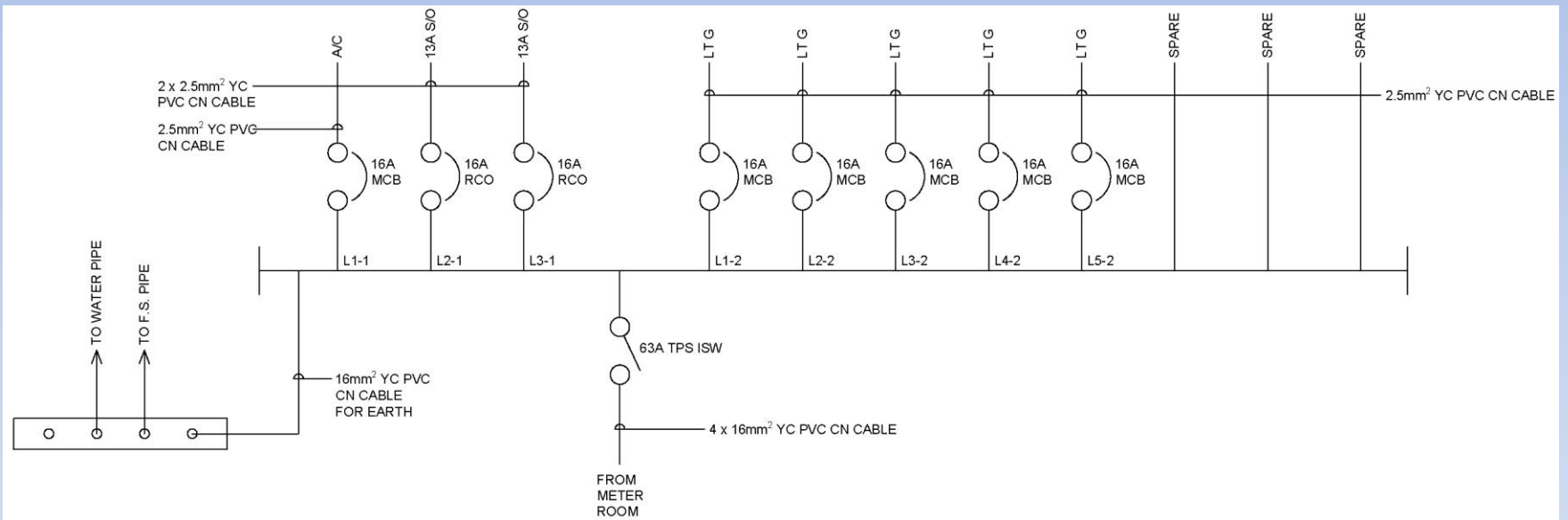


ELEVATION C  
SCALE: 1:40



ELEVATION D  
SCALE: 1:40

# 1. 常用繪圖軟件-例子

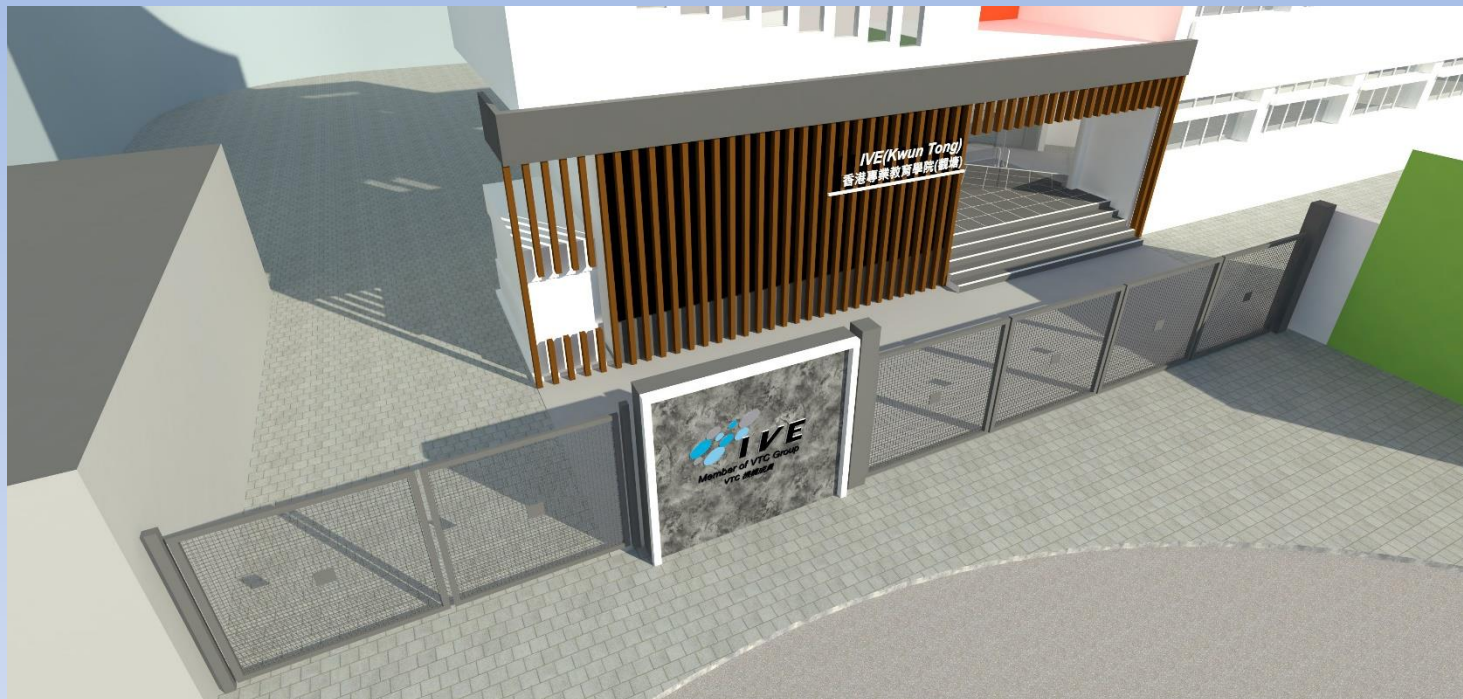




# 1. 常用繪圖軟件-例子



# 1. 常用繪圖軟件-例子





## 2.部分常用繪圖資料

- 圖則通常是工程投標文件重要的部份
- 繪圖軟件適用於下列電業工程：
  - 新建大樓、拆卸工程、大廈維修、政府/私人投標、加建工程、單一大型裝修項目、飲食/會所牌照等
- 繪製電業行業圖則，不外乎利用線、圓、文字等，再配合行業作法及政府要求標準，用列印圖紙呈現正確資訊遞交相關工程顧問確認或政府部門審批

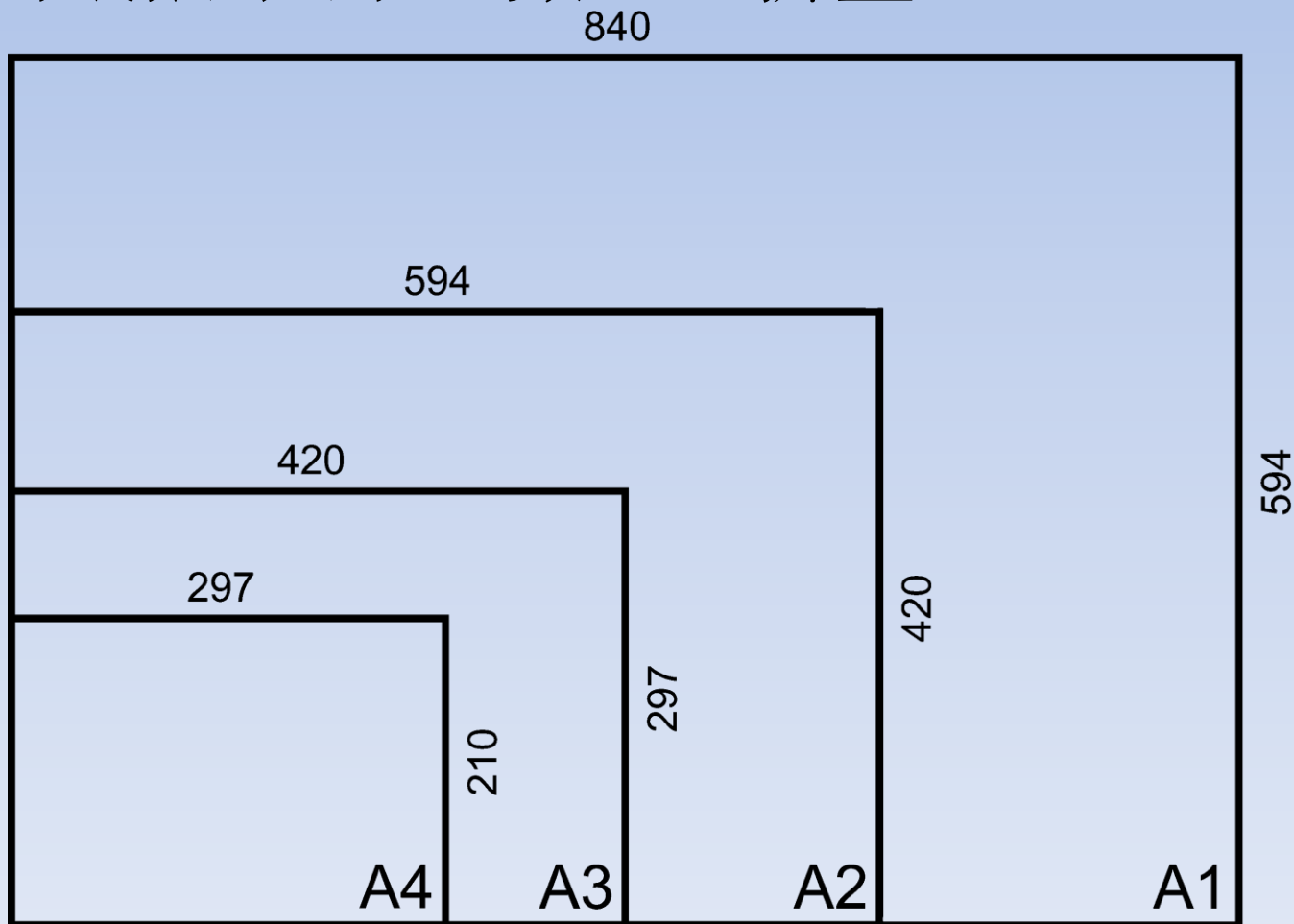


## 2.部分常用繪圖資料

- 製圖流程
  - 決定工程目的及範疇
  - 審視項目招標文件提交圖則的要求
    - 圖則紙張: 大小、數量、折疊、索引
    - 圖則表達方式、圖例、符號、線型、文字可讀性
    - 繪圖及列印比例
  - 電子投標更需加倍留意提交電腦圖則檔要求
    - 如圖檔版本/格式、圖檔設置要求、上傳方法、上傳位置、確認信息等
  - 於AutoCAD開始製圖
    - 加、減、改、睇、覆檢、列印

## 2.部分常用繪圖資料

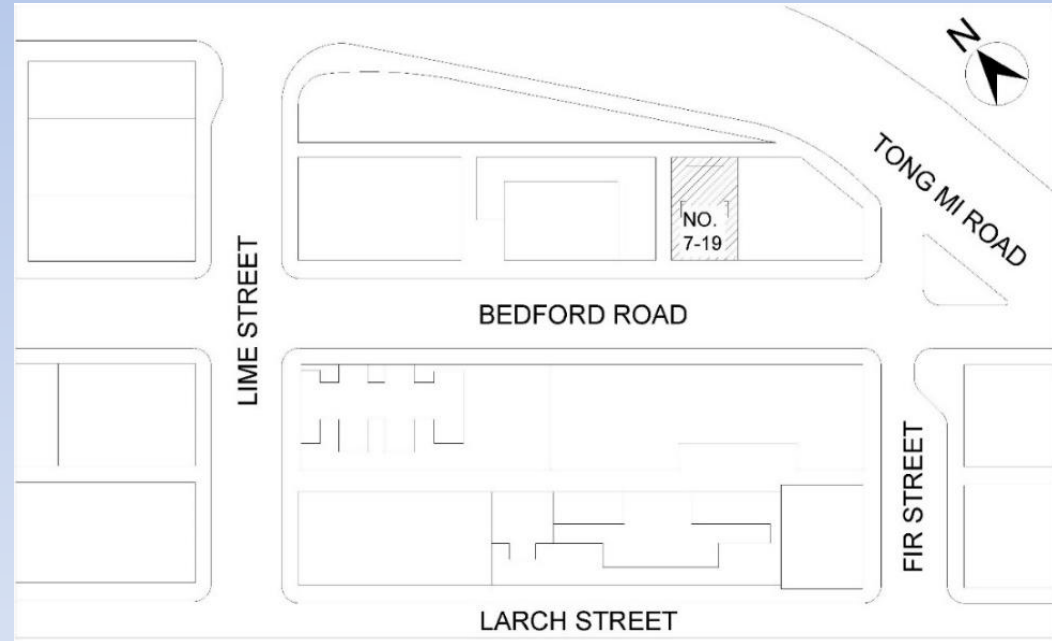
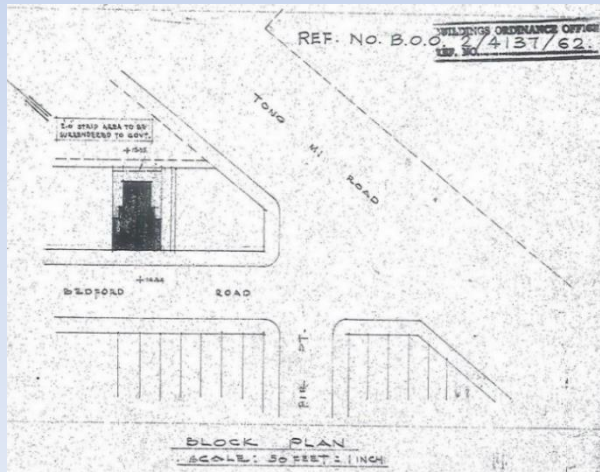
- 圖則紙張: 大小、數量、折疊





# 2.部分常用繪圖資料

- 圖則紙張: 位置圖



# 2.部分常用繪圖資料

- 圖則紙張: 比例尺





## 2.部分常用繪圖資料

- AutoCAD製圖指令
  - 加 (線、矩形、圓、弧、字、標註.....)
  - 減 (有系統地刪減物件)
  - 改 (複製、移動、延長、修剪、改字.....)
  - 睇 (畫面放大、縮小、平移)
  - 覆檢 (物件大小、長度、面積、角度.....)
  - 列印 (模型、配置)
  - 輔助繪圖 (正交、物件鎖點.....)
  - 繪圖管理 (選取物件、圖層、圖塊.....)

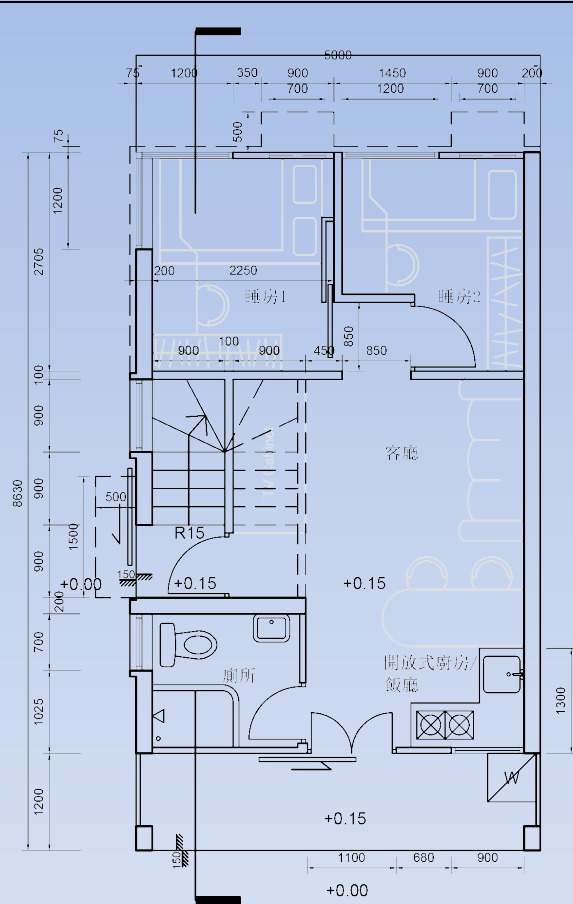


# 4.比例的要求

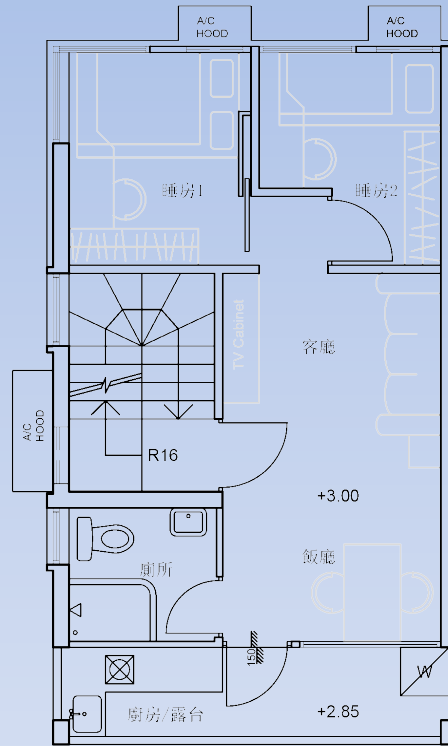
- AutoCAD製圖比例
  - 製圖比例跟列印比例有著必然關係
  - 喉路於建築平面/立面圖: 1:1
  - 喉路示意圖: 1:1 或 N.T.S.
  - 垂直剖面喉路示意圖: 1:1 或 N.T.S.
  - 索引首頁圖及圖例: N.T.S.



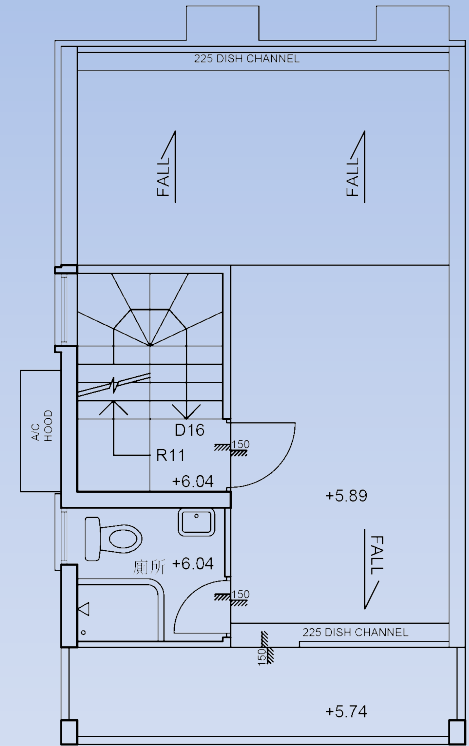
# 4. 比例的要求



地下平面圖



一樓平面圖



天台平面圖

項目: 丁屋	內容: 地下/一樓/天台平面圖
比例: 1:75@A4	日期: 19/2/2019
圖號: GP001	版本: Ver. 00

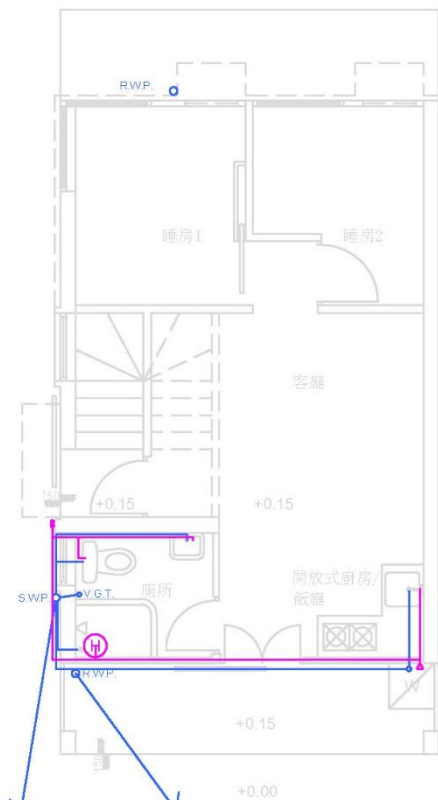
# 5.文字的輸入

- AutoCAD文字大小及比例
  - 文字大小是根據列印比例及其可讀性而決定
  - 建議英文字的大字、中字及小字高度分別為5mm、3mm及2mm
  - 建議中文字的大字、中字及小字高度分別為7mm、5mm及3mm

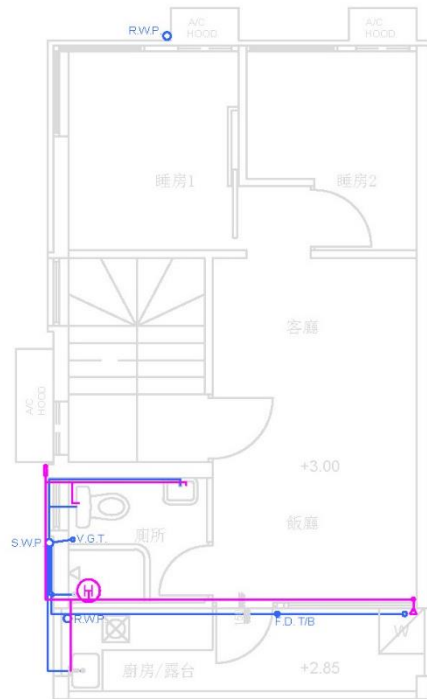
# 6.印圖注意地方

- AutoCAD列印比例
  - 喉路於1:1建築平面圖上: 1:100, 1:150, 1:200.....
  - 喉路示意圖: 根據圖紙大小1:1
  - 垂直剖面喉路示意圖:根據圖紙大小1:1
  - 索引首頁圖及圖例:根據圖紙大小1:1
- AutoCAD列印色彩
- AutoCAD列印線段粗幼及樣式

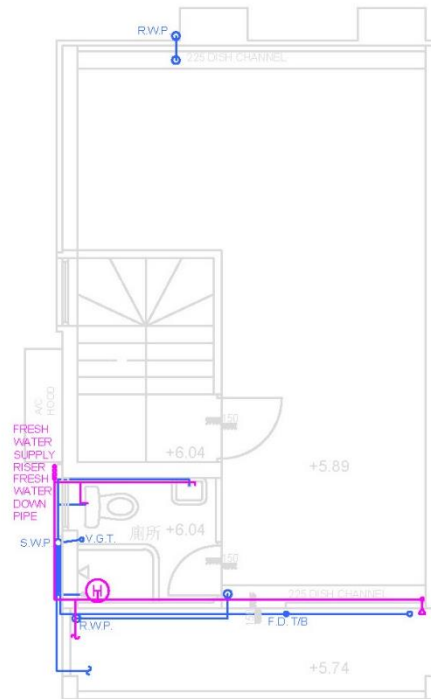
# 6.印圖注意地方(比例)



地下平面圖



一樓平面圖



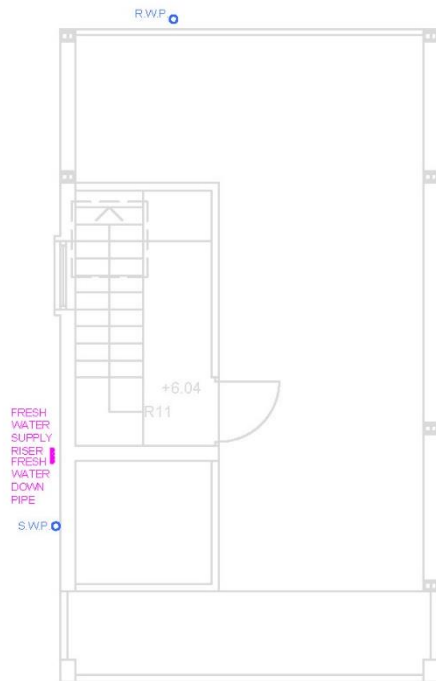
天台平面圖

## 圖例

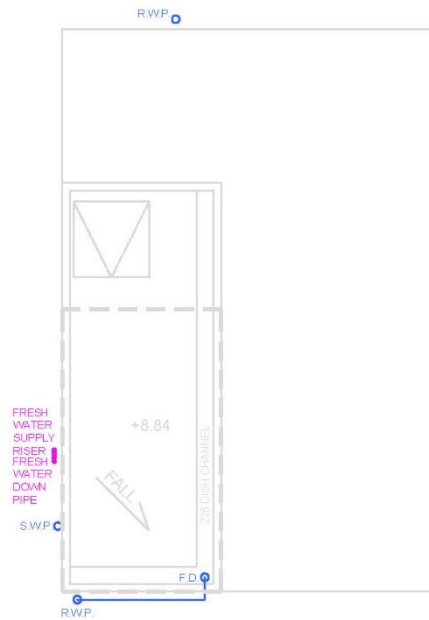
-  淡水給水管
-  污/雨水去水管
-  電熱水爐

項目: 丁屋	內容: 地下/一樓/天台供水/排污圖
比例: 1:75@A4	日期: 19/2/2019
圖號: D001	版本: Ver. 00

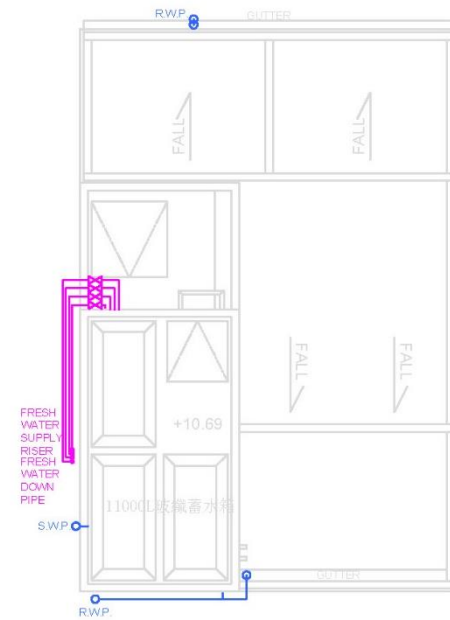
# 6. 印圖注意地方(比例)



天台平面圖



高層天台平面圖



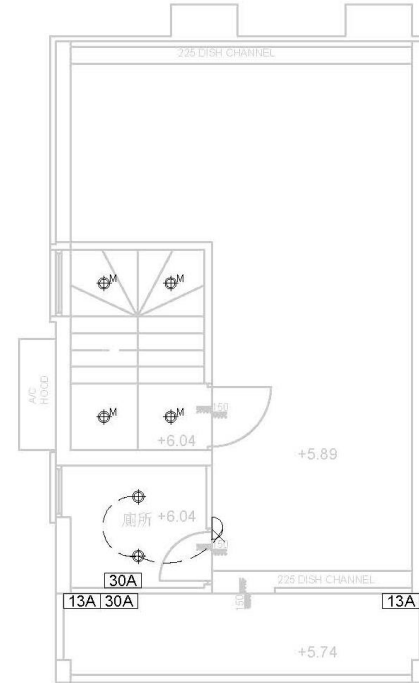
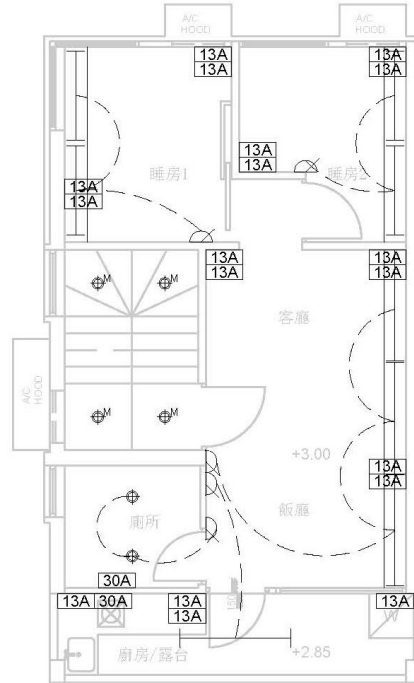
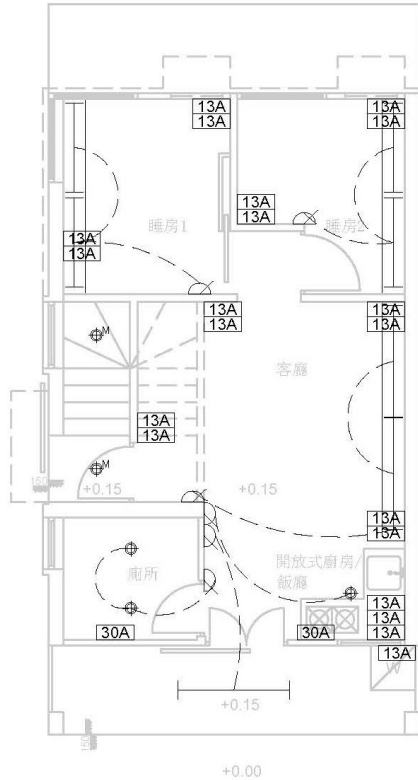
高層天台平面圖

## 圖例

-  淡水給水管
-  污/雨水去水管
-  電熱水爐

項目: 丁屋	內容: 天台/高層天台供水/排污圖
比例: 1:75@A4	日期: 19/2/2019
圖號: D002	版本: Ver. 00

# 6.印圖注意地方(比例)

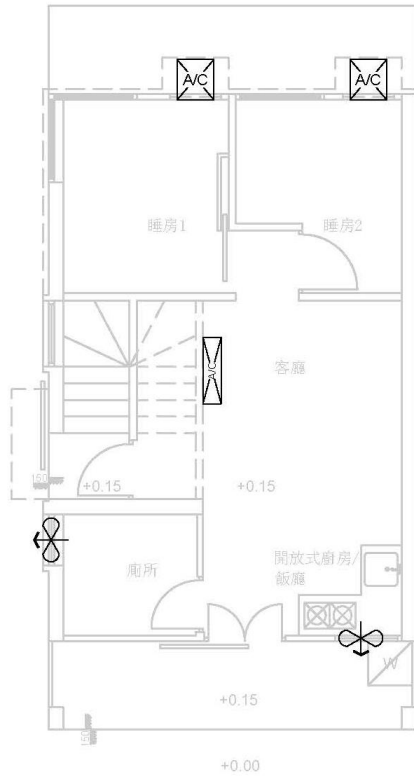


## 圖例

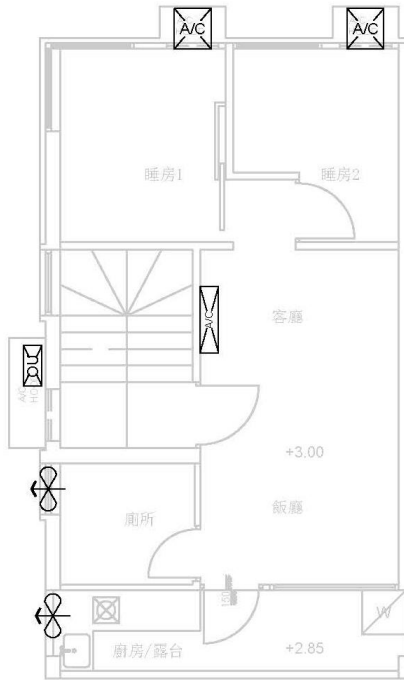
- 13A 13A單蘇
- 3' 4' 5' 米管
- 米色筷子筒筒燈
- 附動作感應開關米色筷子筒筒燈
- 燈制開關

項目: 丁屋	內容: 地下/一樓/天台配電圖
比例: 1:75@A4	日期: 19/2/2015
圖號: E001	版本: Ver. 00

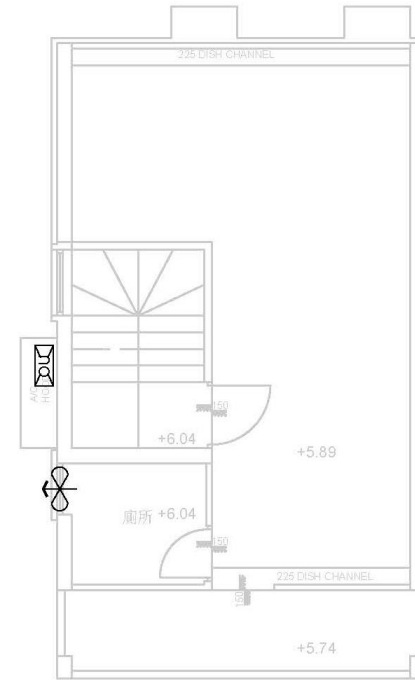
# 6.印圖注意地方(比例)



地下平面圖



一樓平面圖



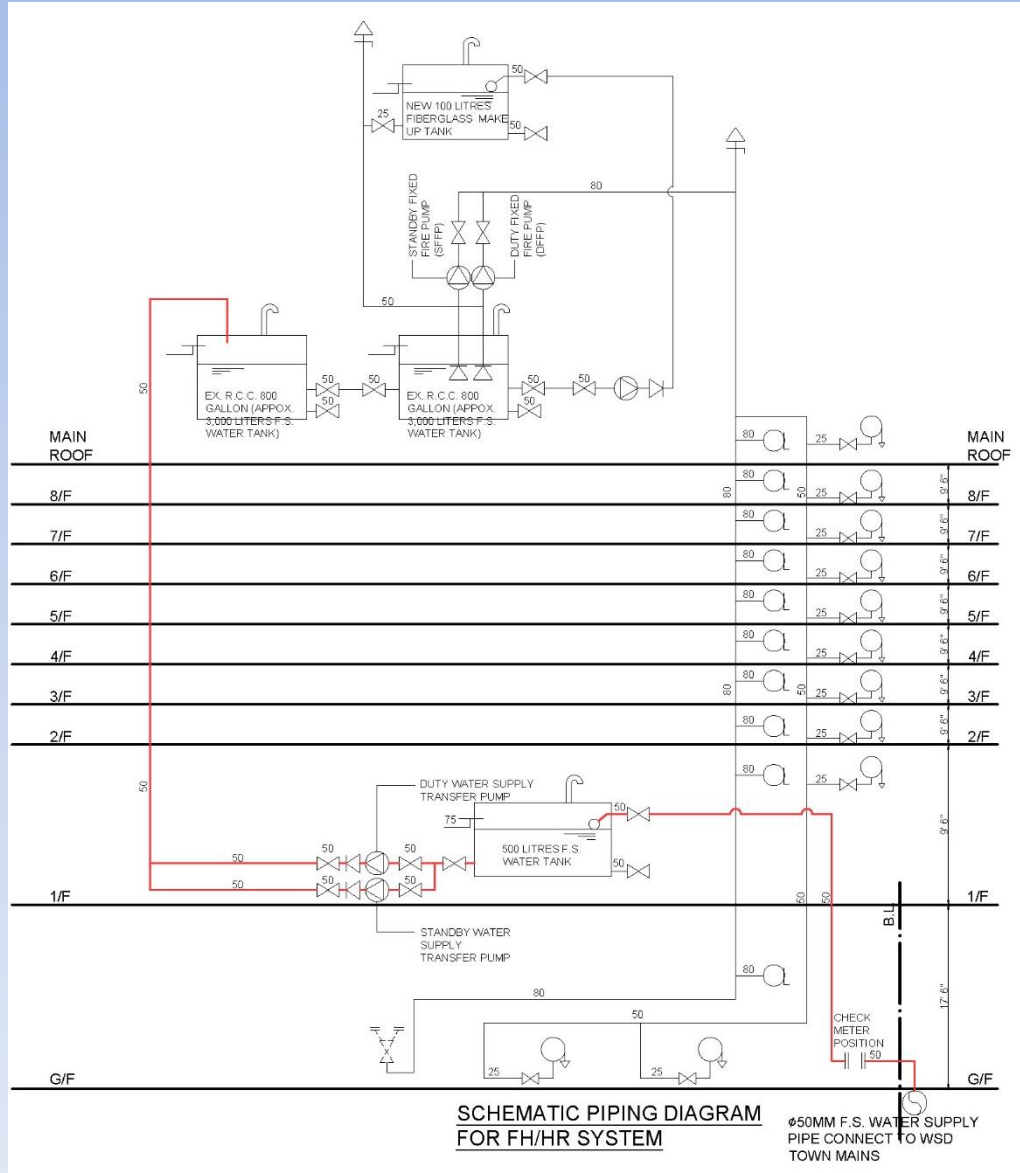
天台平面圖

**圖例**

-  3/4匹窗式空調機
-  1.5匹掛牆式空調室內機
-  1.5匹掛牆式空調室外機
-  抽氣扇

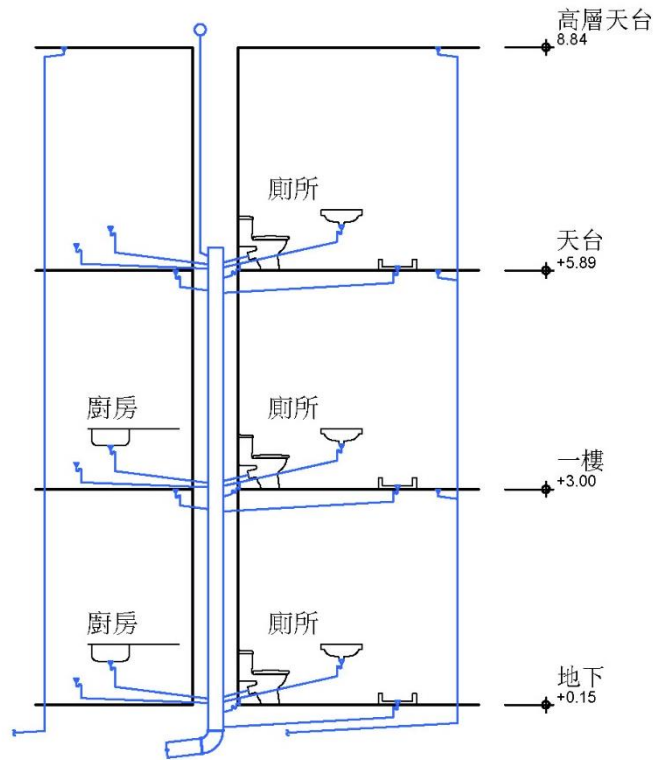
項目: 丁屋	內容: 地下/一樓/天台空調圖
比例: 1:75@A4	日期: 19/2/2015
圖號: A001	版本: Ver. 00

# 6.印圖注意地方(比例)



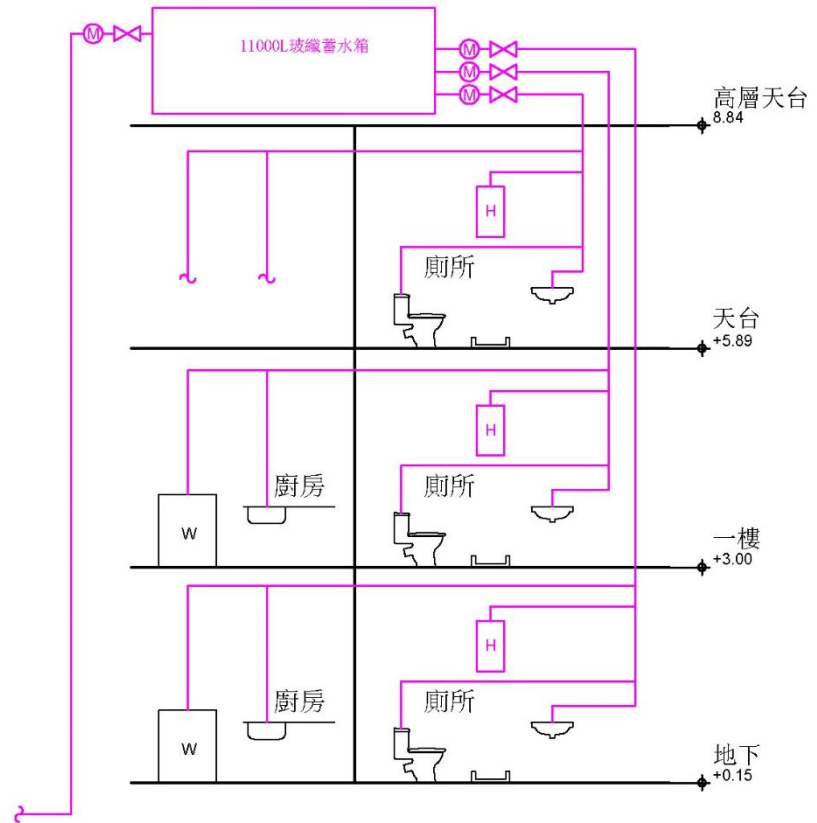
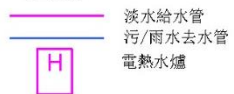


# 6.印圖注意地方(色彩)



排污剖面示意圖

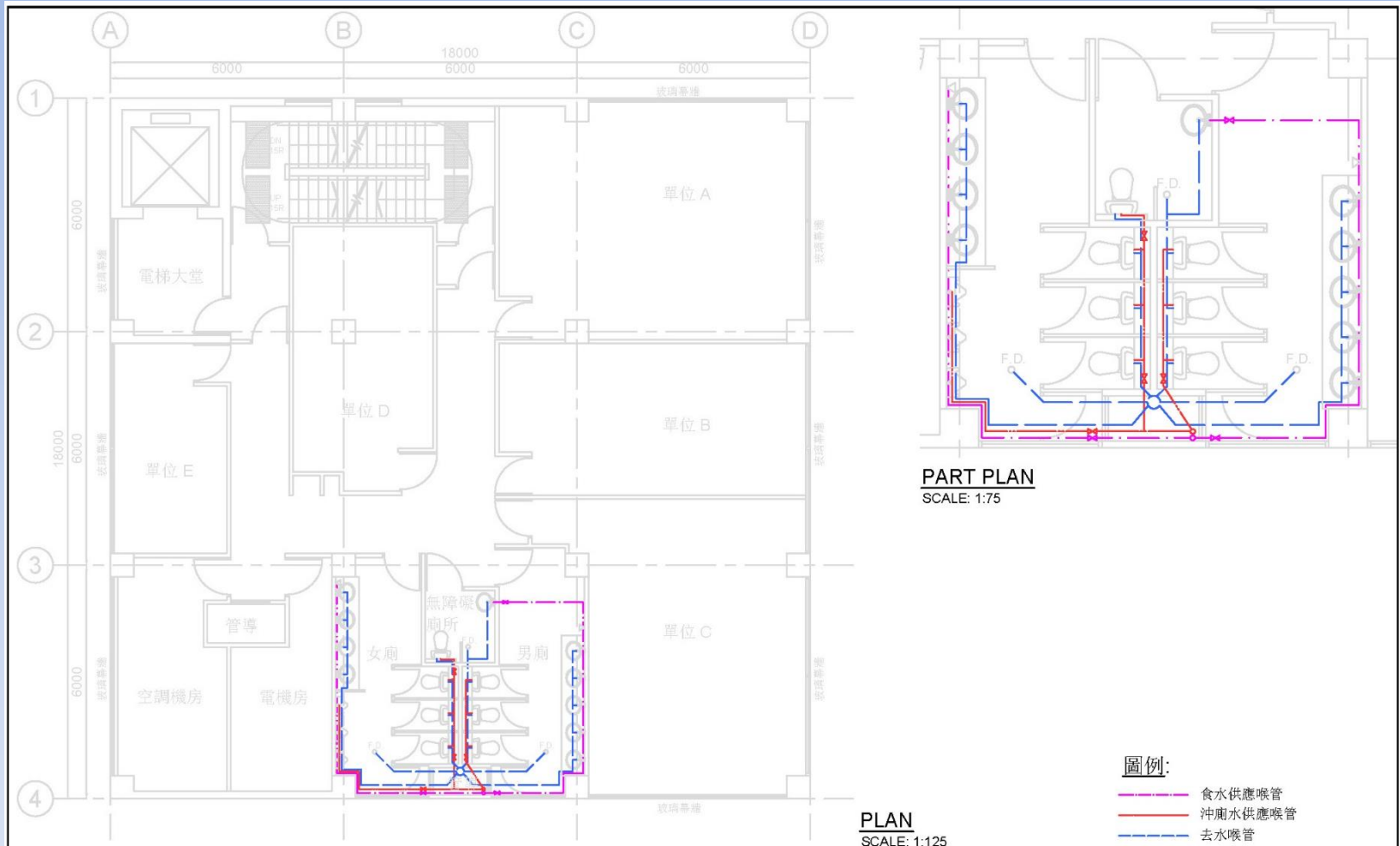
圖例



供水剖面示意圖

項目: 丁屋	內容: 供水/排污剖面示意圖
比例: 1:75@A4	日期: 19/2/2019
圖號: D003	版本: Ver. 00

# 6.印圖注意地方(色彩/線段)



	NAME	INITIAL	DATE	CLIENT	PROJECT	SCALE
AUTH	Dick Chan			HONG KONG ELECTRICAL & MECHANICAL COLLEGE	Renovation of SH Building	As Shown@A4
CKD				LEVEL 3		DRG NO GP06
DRAWN					DRAWING TITLE	A4 297 x 210
					Typical Floor Plan - Plumb & Drainage Services	DC   DICK CHAN CO. LTD.

# 一般圖則的要求

## 提交圖則的一般標準

- (a) 應提交最少一套圖則
- (b) 每張圖則應有獨立的編號
- (c) 應在圖則編號加後綴（Rev.A）、（Rev.B）等以註明圖則的版本
- (d) 圖則標題應清楚描述圖則的內容
- (e) 應提供配以適當數值或圖像的比例尺，以對應圖則的比例
- (f) 至少有一張圖則顯示所有已用過的標記和符號
- (g) 字體和編號不應被重陰影或深色遮蓋

# 一般圖則的要求

## 圖則索引

如提交了超過一張圖則，工程計劃應附有圖則索引。圖則索引應包括圖則編號、圖則的描述、圖則版本和準備/修改的日期。

## 圖則尺寸

A0 1189 毫米 x 841 毫米

A1 841 毫米 x 594 毫米

A2 594 毫米 x 420 毫米

A3 420 毫米 x 297 毫米

A4 297 毫米 x 210 毫米

# 一般圖則的要求

尺寸是紙張外邊緣的尺寸。通常在尺寸內留有繪製邊框(限制實際繪圖區域)。平面尺寸應避免大於 **A0** 尺寸。所有圖則應折疊成不超過 **A4** 尺寸的平面尺寸(即 **297** 毫米 x **210** 毫米)，折疊後仍能顯示圖紙編號和標題。

# 一般圖則的要求

建議在原件的 4 邊留有至少如下所示的空白邊框：

- A0 - 20 毫米
- A1 - 20 毫米
- A2 - 10 毫米
- A3 - 10 毫米
- A4 - 10 毫米

Q & A

# 多謝!

感謝本會各義工協助

期待各位會員工作順利,家庭幸福