

## **Appendix IV**

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*CLP's Electricity Transformer Room Requirements*

[REDACTED]

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寄件者: Chan, Sally Suet Lei [REDACTED]  
寄件日期: 2024年5月17日星期五 上午 11:18  
收件者: Leung, Roget Kwai-Hay  
副本: Chow, Terence Siu-Hung  
主旨: RE: Electrical Supply Application at 8 Ka Shue Road Sai Kung  
附件: 20240516 Ka Shu Tx Room layout\_GF\_Comment.pdf

Dear Mr. Leung,

As per the provided drawings, the proposed delivery route from loading area to transformer room are 1:12 gradient (fulfil the COP101 requirement).

The equipment needs to change the delivery direction near the TX room, so please consider the delivery path near TX room to be flat and same level to TX room.

For this delivery path, permanent anchors should be provided by customer for assisting equipment delivery. The exact quantity and location of anchor are subjected to the site inspection before delivery. Please coordinate with construction team on site.

Moreover, the level of the cable draw pit is not fulfilled the requirement in COP101. Also, the PVC cable ducts at LG/F H/L should be concrete surround. Please review and revise.

Please kindly provide the AutoCAD for our further study for transformer room design and cable bending radius issue.

Thank you very much.

Best Regards,  
Sally Chan

Planning & Design - East & West Region  
CLP Power Hong Kong Limited  
Tel: (852) [REDACTED]

Information Classification: *PROPRIETARY*

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**From:** Leung, Roget Kwai-Hay [REDACTED]  
**Sent:** Thursday, May 16, 2024 2:32 PM  
**To:** Chan, Sally Suet Lei [REDACTED]  
**Cc:** Chow, Terence Siu-Hung [REDACTED]  
**Subject:** RE: Electrical Supply Application at 8 Ka Shue Road Sai Kung

**External email: Please pay attention and check whether the sender is trustworthy before clicking any links and opening any attachments.**

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Dear Ms Chan,

Consider to delivery of transformer route, please find transformer room layout with delivery for your perusal.

Should you have any queries, please contact me at [REDACTED]. Thank you for your attention.

Regards,



**Roget Leung**

T+ [REDACTED]

F+ [REDACTED]

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**From:** Chan, Sally Suet Lei [REDACTED]  
**Sent:** Wednesday, April 24, 2024 2:39 PM  
**To:** Leung, Roget Kwai-Hay [REDACTED]  
**Cc:** Chow, Terence Siu-Hung [REDACTED]  
**Subject:** Electrical Supply Application at 8 Ka Shue Road Sai Kung

Dear Mr. Leung,

According to the substation layout received (letter Ref.: 2502591A-AU-15165/23), there is a 1.45m floor level difference between substation and loading area. The ramp for plant delivery path cannot fulfil 1:12 gradient, so the electrical equipment cannot deliver to the proposed substation.

Please consider and design other location for substation and loading area which fulfil the requirement in COP101.

Should you have any further queries, please do not hesitate to contact me.

Best Regards,  
Sally Chan

Planning & Design - East & West Region  
CLP Power Hong Kong Limited  
Tel: (852) [REDACTED]

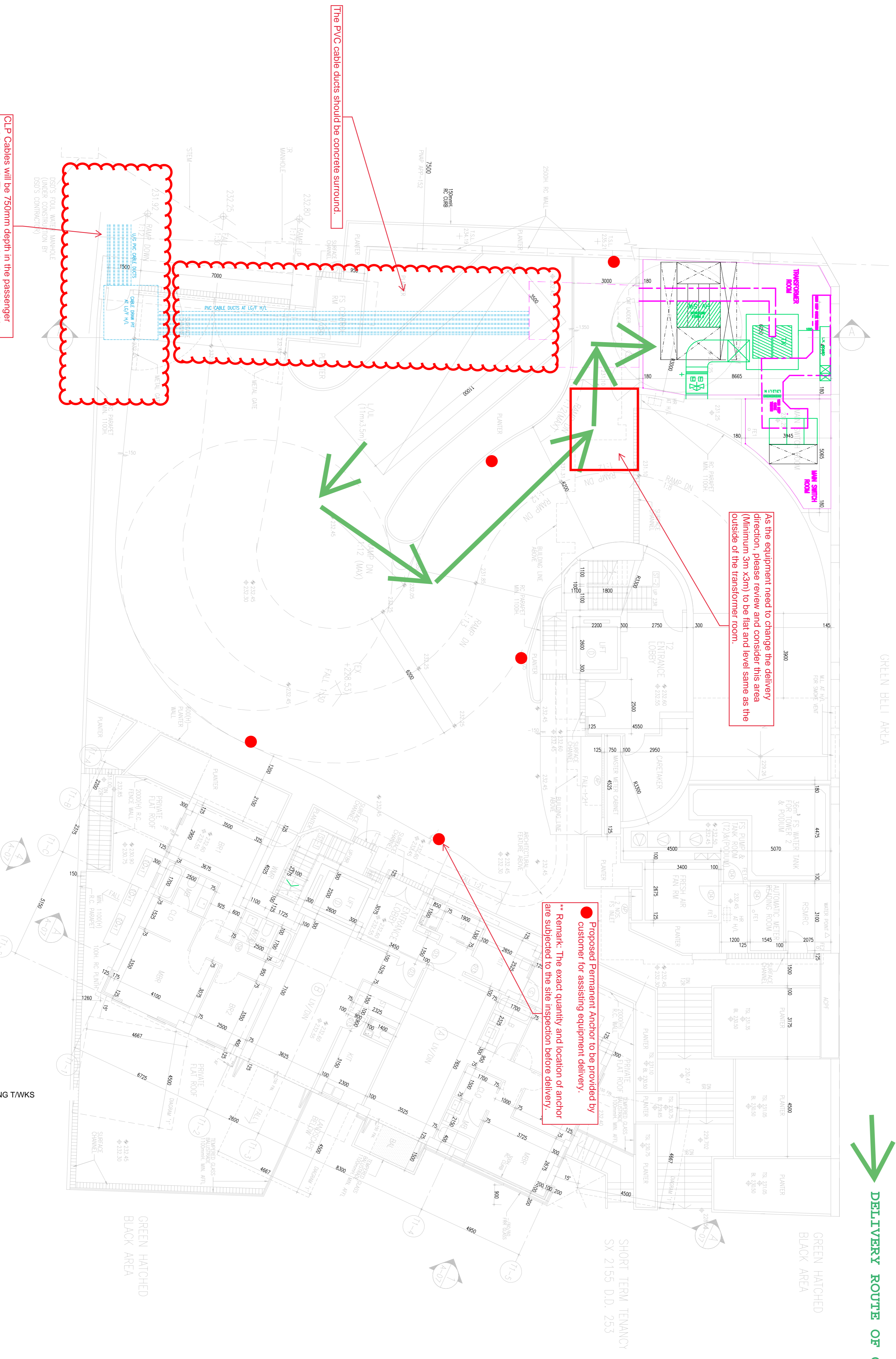
Information Classification: *PROPRIETARY*

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DELIVERY ROUTE OF CLP'S EQUIPMENT



As the equipment need to change the delivery direction, please review and consider this area (Minimum 3m x3m) to be flat and level same as the outside of the transformer room.

Proposed Permanent anchor to be provided by customer for assisting equipment delivery.  
Remark: The exact quantity and location of anchor are subjected to the site inspection before delivery.

The PVC cable ducts should be concrete surround.

CLP Cables will be 750mm depth in the passenger road (-231, 17). The proposed cable draw pit levels not fulfilled the requirement in COP 101.

**TRANSFORMER ROOM AND CABLE DUCT LAYOUT PLAN - G/F**  
SCALE: 1:100@A1  
DATE: 16 May 2024

寄件者: Chan, Sally Suet Lei [REDACTED]  
寄件日期: 2024年4月24日星期三 下午 2:39  
收件者: Leung, Roget Kwai-Hay  
副本: Chow, Terence Siu-Hung  
主旨: Electrical Supply Application at 8 Ka Shue Road Sai Kung  
附件: 2502591A-AU-15165\_23.pdf; 20231218 LGF PLAN LAYOUT WITH SUBSTATION.pdf; 20231218 GF PLAN LAYOUT WITH SUBSTATION.pdf

Dear Mr. Leung,

According to the substation layout received (letter Ref.: 2502591A-AU-15165/23), there is a 1.45m floor level difference between substation and loading area. The ramp for plant delivery path cannot fulfil 1:12 gradient, so the electrical equipment cannot deliver to the proposed substation.

Please consider and design other location for substation and loading area which fulfil the requirement in COP101.

Should you have any further queries, please do not hesitate to contact me.

Best Regards,  
Sally Chan

Planning & Design - East & West Region  
CLP Power Hong Kong Limited  
Tel: (852) [REDACTED]

Information Classification: *PROPRIETARY*





Our Ref. 2502591A-AU-15165/23  
**By Hand**

18 December 2023

CLP Power Hong Kong Limited  
East and West Region  
3/F East and West Region Office  
1 To Wah Road  
Jordan, Kowloon

Dear Sir,

**RESIDENTIAL DEVELOPMENT AT 8 KA SHUE ROAD, SAI KUNG**  
**ELECTRICAL SUPPLY APPLICATION**

We are the Building Services Consultant for the captioned project. The target project completion date is Q3 of 2027. Based on our preliminary electrical loading estimation, 1 no. 1,500kVA transformer is required for the development.

We enclosed herewith the following supplementary information for your reference: -

1. Site location plan – A3 size);
2. A full set of architectural layout plans of the development with detail of substation
3. Preliminary electrical loading estimation

We will provide the schematic diagram of LV system and transformer room layout plans at later stage in Auto-cad format for your preparation of detailed transformer room arrangement.

Your early response would be very much appreciated. Should you have any queries, please do not hesitate to contact undersigned at [REDACTED] or our Mr Roget Leung at [REDACTED]

Thank you for your kind attention.

Yours faithfully,  
For and on behalf of  
WSP (Asia) Limited

**Terence Chow**  
Project Manager, Building MEP, China Region

c.c. Double One - Ms Claudia Tang / Mr Dave Yan (w/e)  
Limited  
CYS - Mr. James Cheung / Mr. Hassan Yuen (w/e)

TC/RKL/cl  
Encl.

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wsp.com



KA SHUE ROAD



**G/F PLAN**  
 SCALE 1:150 @ A3  
 DATE 27/11/2023

GREEN HATCHED BLACK  
 GREEN HATCHED BLACK  
 BBO Grill







**5. ARCHITECTURAL/CIVIL DESIGN**

**5.1 General Requirements**

5.1.1 All substations shall comply with the Hong Kong Electricity Ordinance (Cap. 406), the Hong Kong Buildings Ordinance (Cap. 123) and the “Fire Services Requirements for Consumer Substations using Oil Filled Transformers and Switchgear in Buildings” (latest version of NP 101), Part X of FSD Circular Letter no. 4/96, Part X.2 of FSD Circular Letter no. 5/98 and the related Codes of Practice on Fire Services.

5.1.2 Substations shall be situated at the periphery of the building and be accessible at all times. For the substations on ground level, the access route should be directly from open air (non-covered area). Such area should be vertically uncovered and unobstructed. In case the periphery is covered by the canopy of the building, the direct distance from the entry of the substation to the non-covered area should not exceed 2.5m. The permanent access to the substation shall be of adequate height, width and of sufficient strength to accommodate the size and weight of both the transformer and the conveying vehicle. The minimum width for plant delivery shall not be less than 3 meters taking into consideration the size of the major electrical plant such as transformers and switchgear being used.

5.1.3 For substation location exposing to the risk of flooding such as near an inclined road, slope and sea front, or locating at low principal datum (PD) level, less than 4.4mPD at Victoria Harbour or 5.5mPD at Tolo Harbour, the following anti-flooding measures shall be considered to prevent flooding of the substation:-

Description	Anti-Flooding Measures
New substation near inclined road, slope, sea front or located below the level of public street	Developer should change the location of substation from ground floor to upper floor or, retain the ground floor location with provision of one basement level below the substation, associate drainage system, sump pump facilities and flood gates subject to approval by CLP Power.
New substation outside pavement level reach <b>4.4mPD</b> at Victoria Harbour or <b>5.5mPD</b> at Tolo Harbour	Not required

Description	Anti-Flooding Measures
New substation outside pavement level reach between <b><u>3.8 ~ 4.4mPD</u></b> at Victoria Harbour or <b><u>4.9 ~ 5.5mPD</u></b> at Tolo Harbour	Install sump pump and a high water level detector facilities and flood gates. 600mm Flood gates should be installed in substation to prevent water ingress from door or low level louvre.
New substation outside pavement level below <b><u>3.8mPD</u></b> at Victoria Harbour or <b><u>4.9mPD</u></b> at Tolo Harbour	Developer should raise the substation floor level/change the location of substation from ground floor to upper floor

5.1.4 The layout shall be designed to be adequate for the lifetime of the substation and the ultimate quantities of electrical equipment to be installed such that any civil work in the substation can be avoided or will be minimal when additional electrical equipment is necessary to install.

5.1.5 The substation minimum clear headroom shall be:

- 3.3m above ground for substation without transformer.
- 3.6m above ground for substation with transformer and 630mm diameter exhaust fan.
- 3.8m above ground for substation with transformer and 800mm diameter exhaust fan.

The recommended maximum ceiling height is 4m but subjected to the required clearance of lifting hoist on the ceiling if provided.

5.1.6 The substation ceiling and customer main switchroom ceiling shall be of suitable waterproof construction to prevent water leakage. No water pipe, drainage pipe or customer's installation shall be located in the substation or located in and passing through any part of and inside the ceiling slab of the substation. Decorative structure / add-on material applied on the ceiling surface of the substation will not be allowed.

5.1.7 To avoid water seepage / leakage into the substation from the floors above the substation, double slab ceiling with waterproofing construction and drainage system or equivalent design shall be constructed by the building owner / customer of the substation. The double slab ceiling or equivalent design shall first be agreed with CLP Power and shall be approved by the Authorized Person (AP) (as defined under the Buildings Ordinance) of the developer and/or the building owner of the substation.

The developer and / or the building owner of the substation is recommended to follow the standard requirement of double slab, which headroom of 1000mm under slab and 600mm underneath beam. However, in case the developer has encountered specific site difficulties and with substantiation provided such as:

- 1) site constraint;
- 2) height restriction;
- 3) tight construction programme.

The following alternative solutions will also be accepted by CLP:-

- i) Transfer slab with minimum thickness of 1000mm;
- ii) minimum 600mm under slab

There shall be no left in timber formwork inside the void after casting the concrete to avoid breeding of organisms.

Other alternative arrangements proposed such as light weight ceiling / non-structural double slab with water proofing are required to be substantiated by the developer with life time performance not worse than double slab design for CLP consideration.

- 5.1.8 No civil expansion joint shall be located in any part of the substation.
- 5.1.9 Not more than 3 transformers shall be accommodated within any one transformer room.
- 5.1.10 Ground level substations should be at least 150mm higher than the outside (pavement) level to reduce the risk of flooding.
- 5.1.11 Substation walls shall be made of reinforced concrete or concrete block of BS 6073 Part A with a compressive strength of not less than 20N/mm<sup>2</sup>. The wall and the ceiling should be cement and sand plastered. Two coats of liquid applied waterproofing coating and two coats of light grey epoxy dustproof coating should be applied at bottom 1500mm high of the wall. Above 1500mm height, the wall and the ceiling should be finished with one coat of liquid prepolymer sealing and two finishing coats of white acrylic resin based coating in glossy finish.
- 5.1.12 The substation floor should be cement and sand rendered with trowelled smooth finish and painted with one coat of polyurethane sealer and two coats of grey epoxy dustproof coating.
- 5.1.13 When single core cables are used for the connection between the 11kV/LV transformer LV terminals and the customer's switchgear, the customer main switchroom should be immediately adjacent to, above



or below the substation. Cable sealing to 2-hour fire resistance rating (FRR) by 'Multi-Cable Transit' (MCT) system shall be used.

- 5.1.14 The openings for cable inlet shall be properly sealed by CLP Power so as to prevent water ingress into the substation and be of 2-hour FRR construction. The method of sealing shall be referred to CLP Power's duct sealing standard.
- 5.1.15 For laying of temporary supply cables from the substation, a 150mm x150mm through wall opening at high level on the perimeter wall of the substation shall be provided. The opening shall be sealed by removable stainless steel cover with waterproof gasket. The cover shall be fitted on both inside and outside of the substation.
- 5.1.16 All external steelwork shall be stainless steel of the low carbon type, Grade 316L (Japanese SUS 316L or US AISI 316L). This specification applies to all doors, door frames, louvres, rat guards, etc. The stainless steel substation door should not be painted to avoid maintenance due to aging of the painting.
- 5.1.17 Internal steelwork (air trunking hangers, chequer plate, etc.) should be hot dip galvanised and finished with one coat of calcium plumbate or zinc phosphate primer and two finishing coats of grey synthetic paint.
- 5.1.18 Adequate ventilation to open air by means of permanent installation which is completely segregated from ventilation system of the main building should be provided.
- 5.1.19 A recess for sump pump in the deepest cable trench shall be constructed for placing the sump pump to extract water in the cable trench when necessary.
- 5.1.20 No storage of transformer insulant or switchgear insulant is allowed in the distribution substation or customer main switchroom.
- 5.1.21 The typical distribution substation layouts in this Code of Practice should be used whenever possible.
- 5.1.22 Black/Yellow colour stripes shall be painted on the edge/step where floor level change.
- 5.1.23 When stair is built for accessing the substation, handrailing shall be installed along the stair and the stair nosing (the front edge of the stair step) should use durable yellow colour tile or shall be painted by durable yellow colour reflective paint.
- 5.1.24 Adequate exit signage and emergency lights in compliance with the relevant BD, FSD regulations shall be provided along the emergency exit route of distribution substation.

## 5.5 Cable Trenches, Cable Ducts and Draw Pits

The cross-sectional areas of cable trenches shall not be reduced by ground beams or other civil structures. Power cables of different voltages should be segregated in different cable trenches. The invert level of cable trenches at the boundary of a substation should be 1050mm (if trench depth is 1200mm) below pavement level. If ground beams are present at the boundary of a substation, the clearance under the beams shall be 500mm minimum. A recess inside the cable trench should be constructed for placing the sump pump at the lowest level of the trench.

The cable trench steel chequer plates shall be marked with numbers (left to right and clockwise convention) to avoid being misplaced. Proper supports such as a removable angle iron should be provided at the bends and tee-points.

### 5.5.1 HV Cable Trenches

HV cable trenches shall be generally 1200mm deep.

5.5.1.1 800mm wide for 11kV switchgear panels;

5.5.1.2 600mm wide for 11kV cables from 11kV switchgear to transformers; the final section which leads to the transformer HV terminal could be 300mm wide.

### 5.5.2 LV Cable Trenches

5.5.2.1 LV cable trenches should generally be 800mm wide x 1200mm deep.

5.5.2.2 Trench for LV single core cables from the transformers to customer main switchroom should be 1000mm wide x 1200mm deep for 4 MCT's. The maximum length of this section of trench is limited to 20m.

### 5.5.3 Pilot Cable Trench

A short trench 400mm wide x 1000mm deep should be extended to where the pilot cable marshalling boxes are installed.

### 5.5.4 Trenches, Cable Ducts and Draw Pits Construction

Except cable trenches inside the substation, all cable trenches, cable ducts and draw pits outside the substation are required to fully fill up with sand or sifted soil or sand bags at all time after cabling by CLP Power is completed.

## 5.11 Requirements for Vehicular Access

5.11.1 In general, the minimum requirements for vehicular access shall be :

Lorry dimension	11.5m (L) x 2.7m (W)
Turning radius of vehicular	10m
Headroom for loaded lorry movement	4.6m
Headroom for unloading area	5.5m
Weight for the loaded lorry	38000 kg
Weight for the 1.5 MVA transformer	9000 kg
Plant delivery access	3m (W) x 2.8m (H)

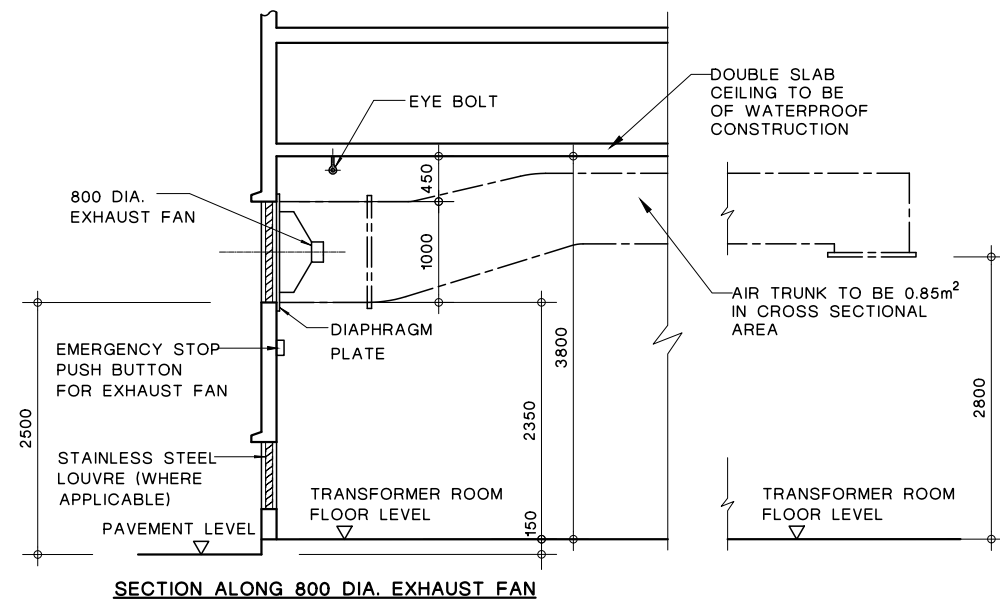
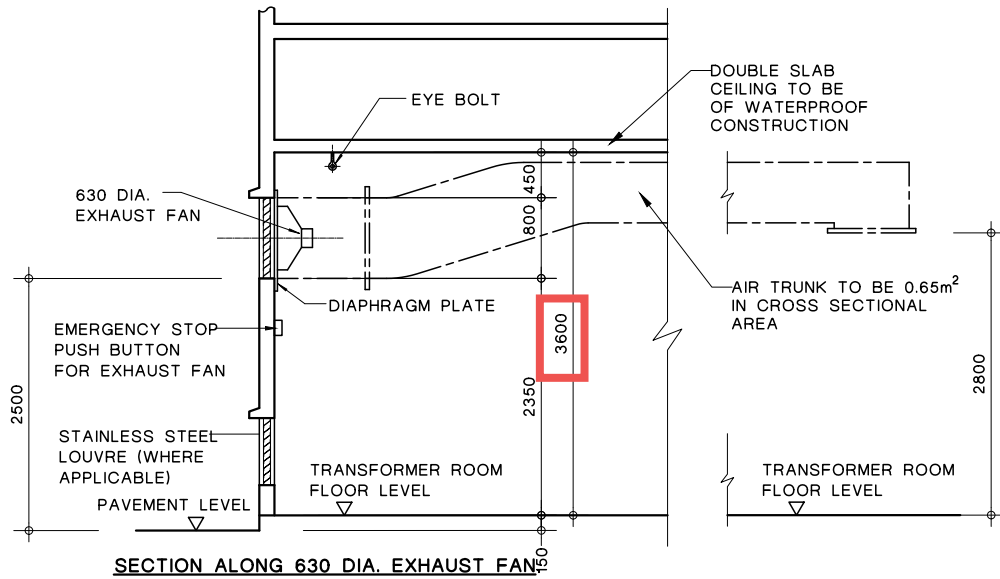
## 5.12 Plant Delivery

The maximum allowable gradient of ramp for plant delivery shall be in a ratio of 1:12. Level difference between floor inside substation and public pavement should not be greater than 400mm wherever practical.

If there is a ramp at the plant delivery route, a structural steel haulage lug, 20mm diameter mild steel bar with minimum internal radius 80mm, fixing to the external wall structural element with 5000kg horizontal load capacity at the end of a delivery access ramp shall be provided and maintained by the building owner. Appropriate safe load test (horizontal load) certificate by an accredited testing laboratory, and shop drawing with structural calculation shall be submitted to confirm its safety.



Extract from CLP's Standard Drawings



NOTES:

1. WATERPROOFING SHALL BE APPLIED TO THE SLAB BETWEEN THE CEILING OF THE SUBSTATION AND THE VOID.

2. DRAIN SHALL BE PROVIDED IN THE VOID TO DRAIN AWAY WATER LEAKED INTO THE VOID.

3. NO DRAIN OR OTHER WATER SERVICES PIPE SHALL RUN INTO OR CONCEAL IN THE CEILING SLAB OF THE SUBSTATION.

F	DIMENSION UPDATED	E	AIR TRUNK UPDATED	D	GENERAL AMENDMENT
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REVS.	16.08.07	08.01.10	26.04.12	06.06.14	23.02.17	10.06.20							
INITIAL	A	B	C	D	E	F	G	H	J	K	L		
	K.C.C.	K.C.C.	K.C.C.	H.T.YU	H.T.YU	H.T.YU							

TITLE :  
 TYPICAL SECTIONS OF TRANSFORMER ROOM AT EXHAUST FAN POSITION (NOT DIRECTLY ABOVE SUBSTATION DOOR) (SHEET 1 OF 3)

DRAWN: S. C. TO	DATE: 23-07-2002
CHECKED: K. C. CHENG	APPROVED: K. W. WONG
SCALE: 1 : 75 (mm)	SHEET(S) IN SET:

ASSET MANAGEMENT	DRG. NO. T	C	O	P	1	0	2	5	0	D	E	3	3	0	1	0	2	0	7	F	A
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