

e-form No. S16-I
電子表格第 S16-I 號

APPLICATION FOR PERMISSION
UNDER SECTION 16 OF
THE TOWN PLANNING ORDINANCE
(CAP. 131)

2024年 11月 2 5日

此文件在 收到・城市規劃委員會
只會在收到所有必要的資料及文件後才正式確認收到
申請的日期。

25 NOV 2024

This document is received on
The Town Planning Board will formally acknowledge
the date of receipt of the application only upon receipt
of all the required information and documents.

根據《城市規劃條例》(第131章)
第16條遞交的許可申請

Applicable to proposals not involving or not only involving:
適用於建議不涉及或不祇涉及:

- (i) Construction of "New Territories Exempted House(s)";
興建「新界豁免管制屋宇」;
- (ii) Temporary use/development of land and/or building not exceeding 3 years in
rural areas or Regulated Areas; and
位於鄉郊地區或受規管地區土地上及/或建築物內進行為期不超過三年的臨時用途/發展;及
- (iii) Renewal of permission for temporary use or development in rural areas or
Regulated Areas
位於鄉郊地區或受規管地區的臨時用途或發展的許可續期

Applicant who would like to publish the notice of application in local newspapers to meet one of the Town Planning Board's requirements of taking reasonable steps to obtain consent of or give notification to the current land owner, please refer to the following link regarding publishing the notice in the designated newspapers:
https://www.tpb.gov.hk/en/plan_application/apply.html

申請人如欲在本地報章刊登申請通知,以採取城市規劃委員會就取得現行土地擁有人的同意或通知現行土地擁有人所指定的其中一項合理步驟,請瀏覽以下網址有關在指定的報章刊登通知:
https://www.tpb.gov.hk/tc/plan_application/apply.html

General Note and Annotation for the Form
填寫表格的一般指引及註解

"Current land owner" means any person whose name is registered in the Land Registry as that of an owner of the land to which the application relates, as at 6 weeks before the application is made
「現行土地擁有人」指在提出申請前六星期,其姓名或名稱已在土地註冊處註冊為該申請所關乎的土地的擁有人的人

& Please attach documentary proof 請夾附證明文件

^ Please insert number where appropriate 請在適當地方註明編號

Please fill "NA" for inapplicable item 請在不適用的項目填寫「不適用」

Please use separate sheets if the space provided is insufficient 如所提供的空間不足,請另頁說明

Please insert a 「✓」 at the appropriate box 請在適當的方格內上加上「✓」號

For Official Use Only 請勿填寫此欄	Application No. 申請編號	A/NE-SLP/2
	Date Received 收到日期	25 NOV 2024

- The completed form and supporting documents (if any) should be sent to the Secretary, Town Planning Board (the Board), 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong.
申請人須把填妥的申請表格及其他支持申請的文件 (倘有), 送交香港北角渣華道 333 號北角政府合署 15 樓城市規劃委員會(下稱「委員會」)秘書收。
- Please read the "Guidance Notes" carefully before you fill in this form. The document can be downloaded from the Board's website at <http://www.tpb.gov.hk/>. It can also be obtained from the Secretariat of the Board at 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong (Tel: 2231 4810 or 2231 4835), and the Planning Enquiry Counters of the Planning Department (Hotline: 2231 5000) (17/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong and 14/F, Sha Tin Government Offices, 1 Sheung Wo Che Road, Sha Tin, New Territories).
請先細閱《申請須知》的資料單張, 然後填寫此表格。該份文件可從委員會的網頁下載 (網址: <http://www.tpb.gov.hk/>), 亦可向委員會秘書處 (香港北角渣華道 333 號北角政府合署 15 樓 - 電話: 2231 4810 或 2231 4835) 及規劃署的規劃資料查詢處 (熱線: 2231 5000) (香港北角渣華道 333 號北角政府合署 17 樓及新界沙田上禾輦路 1 號沙田政府合署 14 樓) 索取。
- This form can be downloaded from the Board's website, and obtained from the Secretariat of the Board and the Planning Enquiry Counters of the Planning Department. The form should be typed or completed in block letters. The processing of the application may be refused if the required information or the required copies are incomplete.
此表格可從委員會的網頁下載, 亦可向委員會秘書處及規劃署的規劃資料查詢處索取。申請人須以打印方式或以正楷填寫表格。如果申請人所提交的資料或文件副本不齊全, 委員會可拒絕處理有關申請。

1. Name of Applicant 申請人姓名/名稱

HGC Global Communications Limited (Company 公司)

2. Name of Authorised Agent (if applicable) 獲授權代理人姓名/名稱 (如適用)

JEG Engineering Company Limited (Company 公司)

3. Application Site 申請地點

(a) Full address / location / demarcation district and lot number (if applicable) 詳細地址/地點/丈量約份及地段號碼 (如適用)	Government Land near Lot 187RP in DD66, So Lo Pun, North District, N.T.
(b) Site area and/or gross floor area involved 涉及的地盤面積及/或總樓面面積	☒ Site area 地盤面積 12 sq.m 平方米 ☒ About 約 ☐ Gross floor area 總樓面面積 sq.m 平方米 ☐ About 約
(c) Area of Government land included (if any) 所包括的政府土地面積 (倘有)	12 sq.m 平方米 ☒ About 約

(d) Name and number of the related statutory plan(s) 有關法定圖則的名稱及編號	S/NE-SLP/4
(e) Land use zone(s) involved 涉及的土地用途地帶	Green Belt
(f) Current use(s) 現時用途	Vacant (If there are any Government, institution or community facilities, please illustrate on plan and specify the use and gross floor area) (如有任何政府、機構或社區設施，請在圖則上顯示，並註明用途及總樓面面積)
(g) Additional Information (if applicable) 附加資料（如適用）	

4. “Current Land Owner” of Application Site 申請地點的「現行土地擁有人」

The applicant 申請人 –

- ☐ is the sole “current land owner”^{#&} (please proceed to Part 6 and attach documentary proof of ownership).
是唯一的「現行土地擁有人」^{#&} (請繼續填寫第 6 部分，並夾附業權證明文件)。
- ☐ is one of the “current land owners”^{#&} (please attach documentary proof of ownership).
是其中一名「現行土地擁有人」^{#&} (請夾附業權證明文件)。
- ☐ is not a “current land owner”[#].
並不是「現行土地擁有人」[#]。

- ☒ The application site is entirely on Government land (please proceed to Part 6).
申請地點完全位於政府土地上（請繼續填寫第 6 部分）。

5. Statement on Owner's Consent/Notification

就土地擁有人的同意/通知土地擁有人的陳述

- (a) According to the record(s) of the Land Registry as at _____ (DD/MM/YYYY), this application involves a total of "current land owner(s)"#.

根據土地註冊處截至 _____ (日/月/年)的記錄，這宗申請共牽涉 _____ 名「現行土地擁有人」#。

- (b) The applicant 申請人 –

- ☐ has obtained consent(s) of _____ "current land owner(s)"#.

已取得 _____ 名「現行土地擁有人」#的同意。

Details of consent of "current land owner(s)"# obtained 取得「現行土地擁有人」#同意的詳情		
No. of 'Current Land Owner(s)' 「現行土地擁有人」數目	Lot number/address of premises as shown in the record of the Land Registry where consent(s) has/have been obtained 根據土地註冊處記錄已獲得同意的地段號碼/處所地址	Date of consent obtained (DD/MM/YYYY) 取得同意的日期 (日/月/年)

(Please use separate sheets if the space of any box above is insufficient. 如上列任何方格的空間不足，請另頁說明)

- ☐ has notified _____ "current land owner(s)"#

已通知 _____ 名「現行土地擁有人」#。

Details of the "current land owner(s)"# notified 已獲通知「現行土地擁有人」#的詳細資料		
No. of 'Current Land Owner(s)' 「現行土地擁有人」數目	Lot number/address of premises as shown in the record of the Land Registry where notification(s) has/have been given 根據土地註冊處記錄已發出通知的地段號碼/處所地址	Date of notification given (DD/MM/YYYY) 通知日期(日/月/年)

(Please use separate sheets if the space of any box above is insufficient. 如上列任何方格的空間不足，請另頁說明)

- ☐ has taken reasonable steps to obtain consent of or give notification to owner(s):
已採取合理步驟以取得土地擁有人的同意或向該人發給通知。詳情如下：

Reasonable Steps to Obtain Consent of Owner(s) 取得土地擁有人的同意所採取的合理步驟

- ☐ sent request for consent to the "current land owner(s)"[#] on _ (DD/MM/YYYY)
於 (日/月/年)向每一名「現行土地擁有人」[#]郵遞要求同意書[&]

Reasonable Steps to Give Notification to Owner(s) 向土地擁有人發出通知所採取的合理步驟

- ☐ published notices in local newspapers[&] on (DD/MM/YYYY)
於 (日/月/年)在指定報章就申請刊登一次通知[&]
- ☐ posted notice in a prominent position on or near application site/premises[&] on (DD/MM/YYYY)
於 (日/月/年)在申請地點／申請處所或附近的顯明位置貼出關於該申請的通知[&]
- ☐ sent notice to relevant owners' corporation(s)/owners' committee(s)/mutual aid committee(s)/management office(s) or rural committee[&] on _ (DD/MM/YYYY)
於 (日/月/年)把通知寄往相關的業主立案法團/業主委員會/互助委員會或管理處，或有關的鄉事委員會[&]

Others 其他

- ☐ others (please specify)
其他（請指明）

Note: May insert more than one 「✓」.

Information should be provided on the basis of each and every lot (if applicable) and premises (if any) in respect of the application.

註：可在多於一個方格內加上「✓」號
申請人須就申請涉及的每一地段（倘適用）及處所（倘有）分別提供資料

6. Type(s) of Application 申請類別

- ☐ Type (i) Change of use within existing building or part thereof
第(i)類 更改現有建築物或其部分內的用途
- ☒ Type (ii) Diversion of stream / excavation of land / filling of land / filling of pond as required under Notes of Statutory Plan(s)
第(ii)類 根據法定圖則《註釋》內所要求的河道改道／挖土／填土／填塘工程
- ☒ Type (iii) Public utility installation / Utility installation for private project
第(iii)類 公用事業設施裝置/私人發展計劃的公用設施裝置
- ☐ Type (iv) Minor relaxation of stated development restriction(s) as provided under Notes of Statutory Plan(s)
第(iv)類 略為放寬於法定圖則《註釋》內列明的發展限制
- ☐ Type (v) Use / development other than (i) to (iii) above
第(v)類 上述的(i)至(iii)項以外的用途／發展

Note 1: May insert more than one 「✓」.

註 1：可在多於一個方格內加上「✓」號

Note 2: For Development involving columbarium use, please complete the table in the Appendix.

註 2：如發展涉及靈灰安置用途，請填妥於附件的表格。

(i) For Type (i) application 供第(i)類申請			
(a) Total floor area involved 涉及的總樓面面積	sq.m 平方米		
(b) Proposed use(s)/development 擬議用途/發展	(If there are any Government, institution or community facilities, please illustrate on plan and specify the use and gross floor area) (如有任何政府、機構或社區設施，請在圖則上顯示，並註明用途及總樓面面積)		
(c) Number of storeys involved 涉及層數		Number of units involved 涉及單位數目	
(d) Proposed floor area 擬議樓面面積	Domestic part 住用部分 _____ sq.m 平方米		☐ About 約
	Non-domestic part 非住用部分 _____ sq.m 平方米		☐ About 約
	Total 總計 _____ sq.m 平方米		☐ About 約
(e) Proposed uses of different floors (if applicable) 不同樓層的擬議用途(如適用) (Please use separate sheets if the space provided is insufficient) (如所提供的空間不足，請另頁說明)	Floor(s) 樓層	Current use(s) 現時用途	Proposed use(s) 擬議用途
(f) Additional Information (if applicable) 附加資料 (如適用)			

(ii) For Type (ii) application 供第(ii)類申請		
(a) Operation involved 涉及工程	☐ Diversion of stream 河道改道 ☐ Filling of pond 填塘 Area of filling 填塘面積 _____ sq.m 平方米 ☐ About 約 Depth of filling 填塘深度 _____ m 米 ☐ About 約 ☒ Filling of land 填土 Area of filling 填土面積 12 _____ sq.m 平方米 ☒ About 約 Depth of filling 填土厚度 0.6 _____ m 米 ☒ About 約 ☒ Excavation of land 挖土 Area of excavation 挖土面積 12 _____ sq.m 平方米 ☒ About 約 Depth of excavation 挖土深度 0.6 _____ m 米 ☒ About 約 (Please indicate on site plan the boundary of concerned land/pond(s), and particulars of stream diversion, the extent of filling of land/pond(s) and/or excavation of land) (請用圖則顯示有關土地/池塘界線, 以及河道改道、填塘、填土及/或挖土的細節及/或範圍)	
(b) Intended use/development 有意進行的用途/發展	Proposed public utility installation (Microwave Station) and associated excavation of land and filling of land.	

(iii) For Type (iii) application 供第(iii)類申請														
(a) Nature and scale 性質及規模	☒ Public utility installation 公用事業設施裝置 ☐ Utility installation for private project 私人發展計劃的公用設施裝置 Please specify the type and number of utility to be provided as well as the dimensions of each building/structure, where appropriate 請註明有關裝置的性質及數量, 包括每座建築物/構築物(倘有)的長度、高度和闊度 <table border="1" data-bbox="531 1496 1482 1787"> <thead> <tr> <th>Name/type of installation 裝置名稱/種類</th> <th>Number of provision 數量</th> <th>Dimension of each installation /building/structure (m) (LxWxH) 每個裝置/建築物/構築物的尺寸 (米) (長 x 闊 x 高)</th> </tr> </thead> <tbody> <tr> <td>Microwave Station</td> <td>1</td> <td>3.45m(L)x3.45m(W)x4m(H)</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> (Please illustrate on plan the layout of the installation 請用圖則顯示裝置的布局)		Name/type of installation 裝置名稱/種類	Number of provision 數量	Dimension of each installation /building/structure (m) (LxWxH) 每個裝置/建築物/構築物的尺寸 (米) (長 x 闊 x 高)	Microwave Station	1	3.45m(L)x3.45m(W)x4m(H)						
Name/type of installation 裝置名稱/種類	Number of provision 數量	Dimension of each installation /building/structure (m) (LxWxH) 每個裝置/建築物/構築物的尺寸 (米) (長 x 闊 x 高)												
Microwave Station	1	3.45m(L)x3.45m(W)x4m(H)												

(iv) For Type (iv) application 供第(iv)類申請

- (a) Please specify the proposed minor relaxation of stated development restriction(s) and also fill in the proposed use/development and development particulars in part (v) below –

請列明擬議略為放寬的發展限制並填妥於第(v)部分的擬議用途/發展及發展細節 -

- | | | |
|--------------------------|--|---|
| ☐ | Plot ratio restriction
地積比率限制 | From 由 _____ to 至 _____ |
| ☐ | Gross floor area restriction
總樓面面積限制 | From 由 _____ sq. m 平方米 to 至 _____ sq. m 平方米 |
| ☐ | Site coverage restriction
上蓋面積限制 | From 由 _____ % to 至 _____ % |
| ☐ | Building height restriction
建築物高度限制 | From 由 _____ m 米 to 至 _____ m 米 |
| | | From 由 _____ mPD 米 (主水平基準上) to 至 _____ mPD 米 (主水平基準上) |
| | | From 由 _____ storeys 層 to 至 _____ storeys 層 |
| ☐ | Non-building area restriction
非建築用地限制 | From 由 _____ m to 至 _____ m |
| ☐ | Others (please specify)
其他 (請註明) | _____ |

- (b) Additional Information (if applicable)
附加資料（如適用）

(v) For Type (v) application 供第(v)類申請

(a) Proposed
use(s)/development
擬議用途/發展

(Please illustrate the details of the proposal on a layout plan 請用平面圖說明建議詳情)

(b) Development Schedule 發展細節表

Proposed gross floor area (GFA) 擬議總樓面面積 _____ sq.m 平方米 ☐ About 約

Proposed plot ratio 擬議地積比率 _____ ☐ About 約

Proposed site coverage 擬議上蓋面積 _____ % ☐ About 約

Proposed no. of blocks 擬議座數 _____

Proposed no. of storeys of each block 每座建築物的擬議層數 _____ storeys 層

☐ include 包括 _____ storeys of
basements 層地庫

☐ exclude 不包括 _____ storeys of
basements 層地庫

Proposed building height of each block 每座建築物的擬議高度 _____ mPD 米(主水平基準上) ☐ About 約

_____ m 米 ☐ About 約

☐ Domestic part 住用部分

GFA 總樓面面積 _____ sq. m 平方米 ☐ About 約

number of Units _____

單位數目

average unit size _____ sq. m 平方米 ☐ About 約

單位平均面積

estimated number of residents _____

估計住客數目

☐ Non-domestic part 非住用部分

GFA 總樓面面積

☐ eating place 食肆

_____ sq. m 平方米 ☐ About 約

☐ hotel 酒店

_____ sq. m 平方米 ☐ About 約

(please specify the number of rooms

請註明房間數目) _____

☐ office 辦公室

_____ sq. m 平方米 ☐ About 約

☐ shop and services

_____ sq. m 平方米 ☐ About 約

商店及服務行業

☐ Government, institution or community facilities

(please specify the use(s) and concerned land

政府、機構或社區設施

area(s)/GFA(s) 請註明用途及有關的地面面積／總樓面面積)

☐ other(s) 其他

(please specify the use(s) and concerned land

area(s)/GFA(s) 請註明用途及有關的地面面積／總樓面面積)

☐ Open space

(please specify land area(s) 請註明地面面積)

休憩用地

☐ private open space

_____ sq. m 平方米 ☐ Not less than 不

私人休憩用地

少於

☐ public open space

_____ sq. m 平方米 ☐ Not less than 不

公眾休憩用地

少於

(c) Use(s) of different floors (if applicable) 各樓層的用途 (如適用)

[Block number] [座數]	[Floor(s)] [層數]	[Proposed use(s)] [擬議用途]

(d) Proposed use(s) of uncovered area (if any) 露天地方（倘有）的擬議用途	
(e) Additional Information (if applicable) 附加資料（如適用）	

7. Anticipated Completion Time of the Development Proposal 擬議發展計劃的預計完成時間
Anticipated completion time (in month and year) of the development proposal (by phase (if any)) (e.g. June 2023) 擬議發展計劃預期完成的年份及月份（分期（倘有））（例：2023 年 6 月） (Separate anticipated completion times (in month and year) should be provided for the proposed public open space and Government, institution or community facilities (if any)) (申請人須就擬議的公眾休憩用地及政府、機構或社區設施（倘有）提供個別擬議完成的年份及月份) June 2025

8. Vehicular Access Arrangement of the Development Proposal
擬議發展計劃的行車通道安排

Any vehicular access to the site/subject building? 是否有車路通往地盤／有關建築物？	Yes 是 No 否	☐ There is an existing access. (please indicate the street name, where appropriate) 有一條現有車路。(請註明車路名稱(如適用)) _____ ☐ There is a proposed access. (please illustrate on plan and specify the width) 有一條擬議車路。(請在圖則顯示，並註明車路的闊度) ☒
Any provision of parking space for the proposed use(s)? 是否有為擬議用途提供停車位？	Yes 是	☐ (Please specify type(s) and number(s) and illustrate on plan) 請註明種類及數目並於圖則上顯示) Private Car Parking Spaces _____ 私家車車位 Motorcycle Parking Spaces _____ 電單車車位 Light Goods Vehicle Parking Spaces _____ 輕型貨車泊車位 Medium Goods Vehicle Parking Spaces _____ 中型貨車泊車位 Heavy Goods Vehicle Parking Spaces _____ 重型貨車泊車位 Others (Please Specify) 其他 (請列明) _____
	No 否	☒
Any provision of loading/unloading space for the proposed use(s)? 是否有為擬議用途提供上落客貨車位？	Yes 是	☐ (Please specify type(s) and number(s) and illustrate on plan) 請註明種類及數目並於圖則上顯示) Taxi Spaces _____ 的士車位 Coach Spaces _____ 旅遊巴車位 Light Goods Vehicle Spaces _____ 輕型貨車車位 Medium Goods Vehicle Spaces _____ 中型貨車車位 Heavy Goods Vehicle Spaces _____ 重型貨車車位 Others (Please Specify) 其他 (請列明) _____
	No 否	☒

Additional Information (if applicable) 附加資料（如適用）	
--	--

9. Impacts of Development Proposal 擬議發展計劃的影響

If necessary, please use separate sheets to indicate the proposed measures to minimise possible adverse impacts or give justifications/reasons for not providing such measures.

如需要的話，請另頁註明可盡量減少可能出現不良影響的措施，否則請提供理據/理由。

[illegible]

10. Justifications 理由

The applicant is invited to provide justifications in support of the application. Use separate sheets if necessary.
現請申請人提供申請理由及支持其申請的資料。如有需要，請另頁說明。

HGC shall provide evidence that can prove to the satisfaction of the OFCA that all requirements specified under a milestone with respect to the rollout of the network and the provision of high-speed broadband services at the committed speed to the villagers around So Lo Pun has been met before the completion deadline of that milestone.

As per request of OFCA, the application for the Microwave Station is to enhance the network coverage around So Lo Pun.

11. Declaration 聲明

I hereby declare that the particulars given in this application are correct and true to the best of my knowledge and belief.
本人謹此聲明，本人就這宗申請提交的資料，據本人所知及所信，均屬真實無誤。

I hereby grant a permission to the Board to copy all the materials submitted in this application and/or to upload such materials to the Board's website for browsing and downloading by the public free-of-charge at the Board's discretion. 本人現准許委員會酌情將本人就此申請所提交的所有資料複製及/或上載至委員會網站，供公眾免費瀏覽或下載。

Signature
簽署

Signed with recognised
e-signature
Signer: 張文添

☐ Applicant 申請人 / ☒ Authorised Agent 獲授權代理人

Structural engineer

Name
姓名

Position (if applicable)
職位 (如適用)

Professional Qualification(s) ☐ Member 會員 / ☐ Fellow of 資深會員

專業資格

☐ HKIP 香港規劃師學會 / ☐ HKIA 香港建築師學會 /

☐ HKIS 香港測量師學會 / ☐ HKIE 香港工程師學會 /

☐ HKILA 香港園境師學會 / ☐ HKIUD 香港城市設計學會 /

☐ RPP 註冊專業規劃師

Others 其他

On behalf of 代表

JEG Engineering Company Limited

Remark 備註

The materials submitted in this application and the Board's decision on the application would be disclosed to the public. Such materials would also be uploaded to the Board's website for browsing and free downloading by the public where the Board considers appropriate.

委員會會向公眾披露申請人所遞交的申請資料和委員會對申請所作的決定。在委員會認為合適的情況下，有關申請資料亦會上載至委員會網頁供公眾免費瀏覽及下載。

Warning 警告

Any person who knowingly or wilfully makes any statement or furnish any information in connection with this application, which is false in any material particular, shall be liable to an offence under the Crimes Ordinance.

任何人在明知或故意的情況下，就這宗申請提出在任何要項上是虛假的陳述或資料，即屬違反《刑事罪行條例》。

Statement on Personal Data 個人資料的聲明

1. The personal data submitted to the Board in this application will be used by the Secretary of the Board and Government departments for the following purposes:

委員會就這宗申請所收到的個人資料會交給委員會秘書及政府部門，以根據《城市規劃條例》及相關的城市規劃委員會規劃指引的規定作以下用途：

- (a) the processing of this application which includes making available the name of the applicant for public inspection when making available this application for public inspection; and
處理這宗申請，包括公布這宗申請供公眾查閱，同時公布申請人的姓名供公眾查閱；以及
(b) facilitating communication between the applicant and the Secretary of the Board/Government departments.
方便申請人與委員會秘書及政府部門之間進行聯絡。

2. The personal data provided by the applicant in this application may also be disclosed to other persons for the purposes mentioned in paragraph 1 above.

申請人就這宗申請提供的個人資料，或亦會向其他人士披露，以作上述第 1 段提及的用途。

3. An applicant has a right of access and correction with respect to his/her personal data as provided under the Personal Data (Privacy) Ordinance (Cap. 486). Request for personal data access and correction should be addressed to the Secretary of the Board at 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong.
根據《個人資料(私隱)條例》(第 486 章)的規定，申請人有權查閱及更正其個人資料。如欲查閱及更正個人資料，應向委員會秘書提出有關要求，其地址為香港北角渣華道 333 號北角政府合署 15 樓。

For Developments involving Columbarium Use, please also complete the following:
如發展涉及靈灰安置所用途，請另外填妥以下資料：

Ash interment capacity 骨灰安放容量[@]

Maximum number of sets of ashes that may be interred in the niches

在龕位內最多可安放骨灰的數量

Maximum number of sets of ashes that may be interred other than in niches

在非龕位的範圍內最多可安放骨灰的數量

Total number of niches 龕位總數

Total number of single niches

單人龕位總數

Number of single niches (sold and occupied)

單人龕位數目 (已售並佔用)

Number of single niches (sold but unoccupied)

單人龕位數目 (已售但未佔用)

Number of single niches (residual for sale)

單人龕位數目 (待售)

Total number of double niches

雙人龕位總數

Number of double niches (sold and fully occupied)

雙人龕位數目 (已售並全部佔用)

Number of double niches (sold and partially occupied)

雙人龕位數目 (已售並部分佔用)

Number of double niches (sold but unoccupied)

雙人龕位數目 (已售但未佔用)

Number of double niches (residual for sale)

雙人龕位數目 (待售)

Total no. of niches other than single or double niches (please specify type)

除單人及雙人龕位外的其他龕位總數 (請列明類別)

Number of niches (sold and fully occupied)

龕位數目 (已售並全部佔用)

Number of niches (sold and partially occupied)

龕位數目 (已售並部分佔用)

Number of niches (sold but unoccupied)

龕位數目 (已售但未佔用)

Number of niches (residual for sale)

龕位數目 (待售)

Proposed operating hours 擬議營運時間

[@] Ash interment capacity in relation to a columbarium means –

就靈灰安置所而言，骨灰安放容量指：

- the maximum number of containers of ashes that may be interred in each niche in the columbarium;
每個龕位內可安放的骨灰容器的最高數目；
- the maximum number of sets of ashes that may be interred other than in niches in any area in the columbarium; and
在該靈灰安置所並非龕位的範圍內，總共最多可安放多少份骨灰；以及
- the total number of sets of ashes that may be interred in the columbarium.
在該骨灰安置所內，總共最多可安放多少份骨灰。

Gist of Application 申請摘要

(Please provide details in both English and Chinese as far as possible. This part will also be circulated to relevant consultees, uploaded to the Town Planning Board's Website for browsing and free downloading by the public and available at the Planning Enquiry Counters of the Planning Department for general information.)

(請盡量以英文及中文填寫。此部分會發送予相關諮詢人士、上載至城市規劃委員會網頁供公眾免費瀏覽及下載及於規劃署規劃資料查詢處供一般參閱。)

Application No. 申請編號	(For Official Use Only) (請勿填寫此欄)		
Location/address 位置/地址	Government Land near Lot 187RP in DD66, So Lo Pun, North District, N.T.		
Site area 地盤面積	12 sq. m 平方米 ☒ About 約 (includes Government land of 包括政府土地 12 sq. m 平方米 ☒ About 約)		
Plan 圖則	S/NE-SLP/4		
Zoning 地帶	Green Belt		
Applied use/ development 申請用途/發展	Proposed public utility installation (Microwave Station) and associated excavation of land and filling of land.		
(i) Gross floor area and/or plot ratio 總樓面面積及/或 地積比率		sq.m 平方米	Plot Ratio 地積比率
	Domestic 住用	☐ About 約 ☐ Not more than 不多於	☐ About 約 ☐ Not more than 不多於
	Non-domestic 非住用	☐ About 約 ☐ Not more than 不多於	☐ About 約 ☐ Not more than 不多於
(ii) No. of blocks 幢數	Domestic 住用		
	Non-domestic 非住用		
	Composite 綜合用途		
(iii) Building height/No. of storeys 建築物高度/層數	Domestic 住用	m 米 ☐ (Not more than 不多於) mPD 米(主水平基準上) ☐ (Not more than 不多於) Storeys(s) 層 ☐ (Not more than 不多於) (☐ Include 包括 ☐ Exclude 不包括 ☐ Carport 停車間 ☐ Basement 地庫 ☐ Refuge Floor 防火層 ☐ Podium 平台)	
	Non-domestic 非住用	m 米 ☐ (Not more than 不多於) mPD 米(主水平基準上) ☐ (Not more than 不多於)	

		Storeys(s) 層 ☐ (Not more than 不多於) (□ Include 包括 □ Exclude 不包括) ☐ Carport 停車間 ☐ Basement 地庫 ☐ Refuge Floor 防火層 ☐ Podium 平台
	Composite 綜合用途	m 米 ☐ (Not more than 不多於)
		mPD 米(主水平基準上) ☐ (Not more than 不多於)
		Storeys(s) 層 ☐ (Not more than 不多於) (□ Include 包括 □ Exclude 不包括) ☐ Carport 停車間 ☐ Basement 地庫 ☐ Refuge Floor 防火層 ☐ Podium 平台
(iv) Site coverage 上蓋面積		% ☐ About 約
(v) No. of units 單位數目		
(vi) Open space 休憩用地	Private 私人	sq.m 平方米 ☐ Not less than 不少於
	Public 公眾	sq.m 平方米 ☐ Not less than 不少於
(vii) No. of parking spaces and loading / unloading spaces 停車位及上落客貨 車位數目	Total no. of vehicle parking spaces 停車位總數 _____ Private Car Parking Spaces 私家車車位 _____ Motorcycle Parking Spaces 電單車車位 _____ Light Goods Vehicle Parking Spaces 輕型貨車泊車位 _____ Medium Goods Vehicle Parking Spaces 中型貨車泊車位 _____ Heavy Goods Vehicle Parking Spaces 重型貨車泊車位 _____ Others (Please Specify) 其他 (請列明) _____ _____	
	Total no. of vehicle loading/unloading bays/lay-bys 上落客貨車位／停車處總數 _____ Taxi Spaces 的士車位 _____ Coach Spaces 旅遊巴車位 _____ Light Goods Vehicle Spaces 輕型貨車車位 _____ Medium Goods Vehicle Spaces 中型貨車車位 _____ Heavy Goods Vehicle Spaces 重型貨車車位 _____ Others (Please Specify) 其他 (請列明) _____ _____	

Submitted Plans, Drawings and Documents 提交的圖則、繪圖及文件		
	Chinese 中文	English 英文
Plans and Drawings 圖則及繪圖		
Master layout plan(s)/Layout plan(s) 總綱發展藍圖／布局設計圖	☐	☐
Block plan(s) 樓宇位置圖	☐	☐
Floor plan(s) 樓宇平面圖	☐	☐
Sectional plan(s) 截視圖	☐	☒
Elevation(s) 立視圖	☐	☒
Photomontage(s) showing the proposed development 顯示擬議發展的合成照片	☐	☐
Master landscape plan(s)/Landscape plan(s) 園境設計總圖／園境設計圖	☐	☐
Others (please specify) 其他（請註明）		
<u>location plan, excavation Plan, Land Filling Plan, S2693-1 & S2693-2</u>	☐	☒
Reports 報告書		
Planning Statement/Justifications 規劃綱領/理據	☐	☐
Environmental assessment (noise, air and/or water pollutions) 環境評估（噪音、空氣及／或水的污染）	☐	☐
Traffic impact assessment (on vehicles) 就車輛的交通影響評估	☐	☐
Traffic impact assessment (on pedestrians) 就行人的交通影響評估	☐	☐
Visual impact assessment 視覺影響評估	☐	☐
Landscape impact assessment 景觀影響評估	☐	☐
Tree Survey 樹木調查	☐	☐
Geotechnical impact assessment 土力影響評估	☐	☐
Drainage impact assessment 排水影響評估	☐	☐
Sewerage impact assessment 排污影響評估	☐	☐
Risk Assessment 風險評估	☐	☐
Air Ventilation Assessment 空氣流通評估	☐	☐
Management Plan 管理計劃	☐	☐
Social Impact Assessment 社會影響評估	☐	☐
Heritage Impact Assessment	☐	☐
Ecological Impact Assessment 生態影響評估	☐	☐
Conservation Management Plan 保育管理計劃	☐	☐
Others (please specify) 其他（請註明）	☐	☐

Note: The information in the Gist of Application above is provided by the applicant for easy reference of the general public. Under no circumstances will the Town Planning Board accept any liabilities for the use of the information nor any inaccuracies or discrepancies of the information provided. In case of doubt, reference should always be made to the submission of the applicant.

註：上述申請摘要的資料是由申請人提供以方便市民大眾參考。對於所載資料在使用上的問題及文義上的歧異，城市規劃委員會概不負責。若有任何疑問，應查閱申請人提交的文件。

Our Ref.: NNID/ML/hl/cl/cw/22/1212
12th December, 2022

By Hand

District Lands Office, North Lands Department
6/F, North District Government Offices
3 Pik Fung Road, Fanling,
New Territories, Hong Kong

Attn.: District Lands Officer/North

OFCA Project 1, 3, 4 - Proposed Installation of Extend Fibre-based Networks to Villages in Remote Areas at So Lo Pun, Ap Chau and Kat O (Tender Ref.: OFCA/M/22/C) / Antenna Tower

Dear Sir/Madam,

HGC Global Communications Limited (HGC) is one of major Fixed Telecommunication Network Services Operator (FTNS) in the telecommunication services of Hong Kong. HGC provides fast and high reliability telecom services experience by using our owned huge optical fibre based network to residential and commercial customers in Hong Kong everywhere.

In 2021, HGC is awarded as one of the FNOs under "Subsidy Scheme to Extend Fibre-based Networks to Villages in Remote Areas" by OFCA (Office of The Communications Authority) to provide fibre-based networks.



https://www.ofca.gov.hk/en/industry_focus/infrastructures/subsidy_scheme_to_extend_fibre_based_networks/progress_of_implementation/index.html

The scheme covers villages across nine districts in the New Territories and outlying islands (namely North, Sai Kung, Tai Po, Sha Tin, Yuen Long, Tuen Mun, Tsuen Wan Kwai Tsing and Islands). For involved villages please refer to the link below.



https://www.ofca.gov.hk/filemanager/ofca/en/content_1151/list.pdf



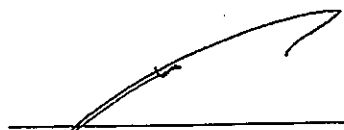
We, therefore, write to apply unleased lands for installing antenna tower in connection with our fibre networks at So Lo Pun, Ap Chau and Kat O. Kindly refer to the attached technical proposals for your perusal.

1. So Lo Pun Rain Shelter - Structure Calculation Report with A1 drawing
(Dwg no.: S2693-RST-1 Rev. -)
2. Ap Chau Water Tank - Structure Calculation Report with A1 drawing
(Dwg no.: S2693-TANK-1 Rev. -)
3. Kat O Fisherman Village Old Generator - Structure Calculation Report with A1 drawing
(Dwg no.: S2693-GEN-1 Rev. -)
4. Kat O Fisherman Village Public Toilet - Structure Calculation Report with A1 drawing
(Dwg no.: S2693-TOILET-1 Rev. -)

Highly appreciated your advice of contacts if above item 2 and 4 are not under your departmental supervision.

Should you have any query, please feel free to contact our Mr. Hutchison Lau at
or the undersigned at

Yours faithfully,
HGC Global Communications Limited



Morris Lau
Head of Infrastructure Development
Network & Engineering

Encl.



Photo 1: Showing the proposed microwave station concrete footing location

REV
DRAWING No.
S2693-1

ANTENNA SCHEDULE

ANTENNA POST NO.	P1			P2		
ANTENNA NO.	A1 (UPPER)	A2 (MIDDLE)	A3 (LOWER)	A4 (UPPER)	A5 (MIDDLE)	A6 (LOWER)
ANTENNA TYPE	MICROWAVE ANTENNA	MICROWAVE ANTENNA	MICROWAVE ANTENNA	MICROWAVE ANTENNA	MICROWAVE ANTENNA	MICROWAVE ANTENNA
BEARING (DEG)	-	-	-	-	-	-
DOWNTILT (DEG)	-	-	-	-	-	-
MICROWAVE ANTENNA	SIZE=ø675x558(D)mm			WEIGHT=100kg		

ANCHOR SCHEDULE

ANCHOR TYPE	RECOMMENDED LOAD,S	TEST LOAD,S x 1.5	EFFECTIVE ANCHORAGE DEPTH (mm)	MIN. BASE MATERIAL THICKNESS (mm)	MIN. SPACING (mm)	EDGE DISTANCE (mm)
HST3-R-M8-47	2.8	4.2	47	80	35	40
HST3-R-M10-60	5	7.5	60	120	45	70

MARK SCHEDULE

BEAM MARK	DESCRIPTION
C1 - C3	50x50x5mm THK. L
-	ø114.3x5mm THK. CHS
-	ø168.3x8mm THK. CHS
-	ø193.7x10mm THK. CHS
-	10mm THK. STEEL PLATE

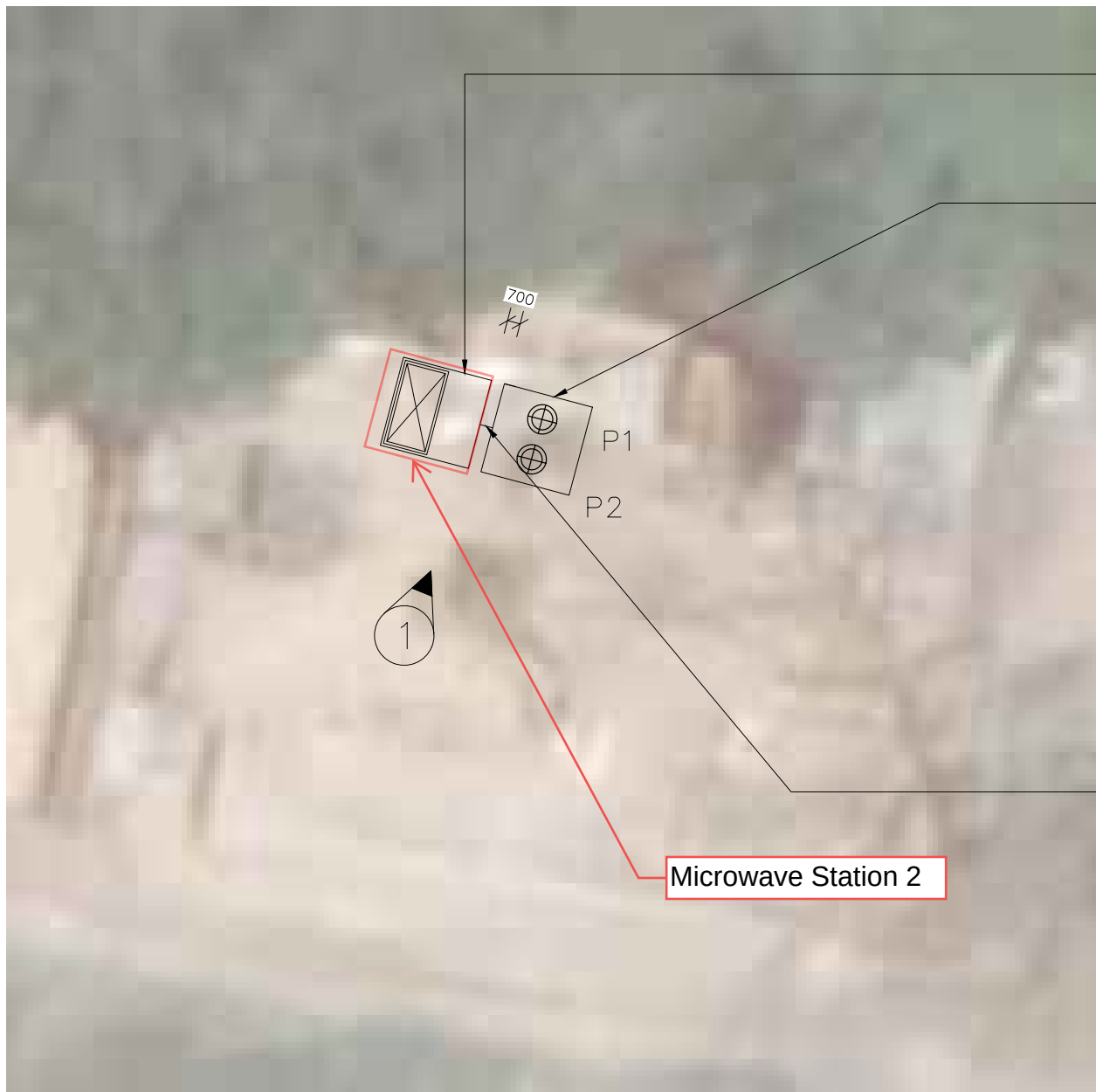


BLOCK PLAN

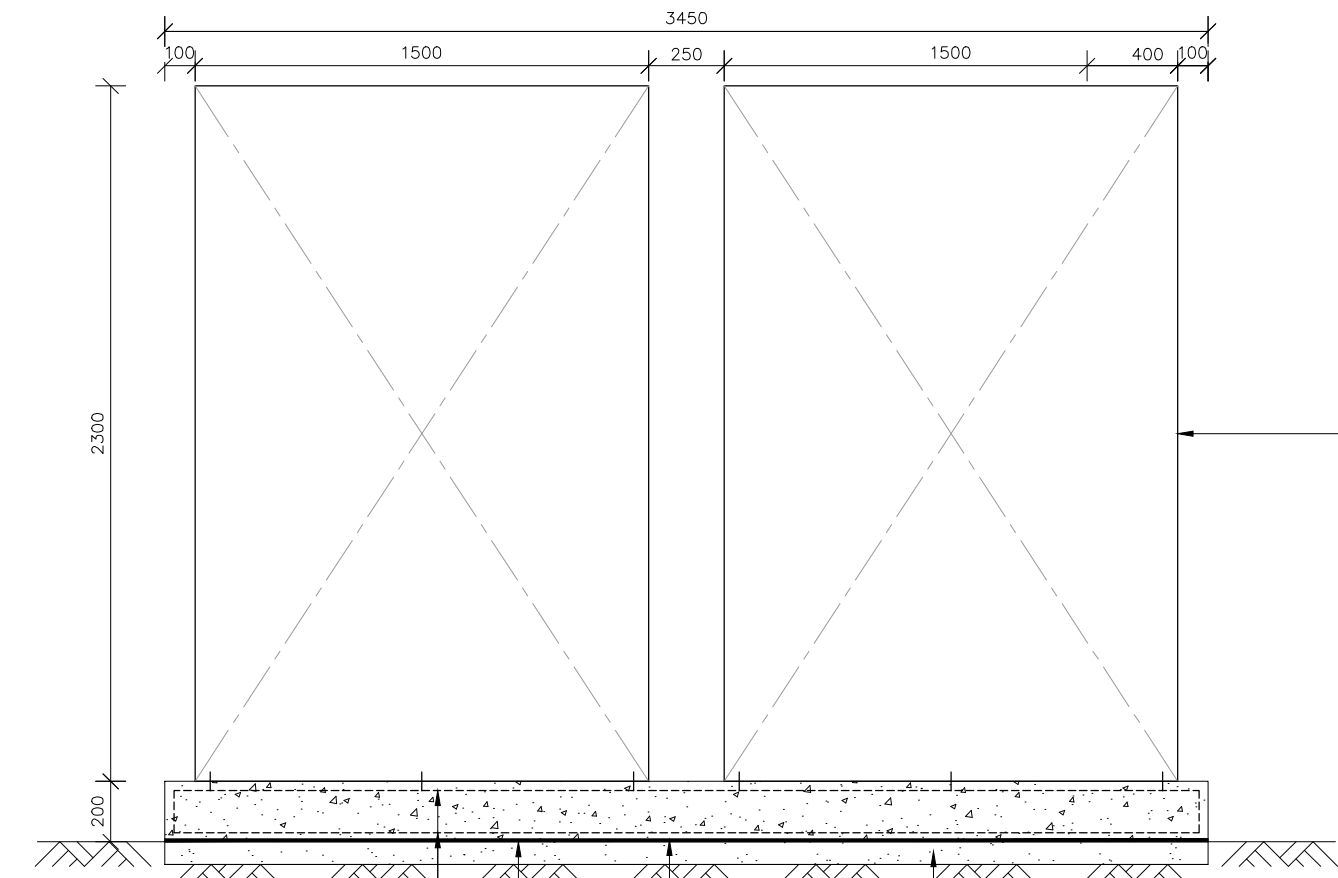
DO NOT SCALE DRAWINGS, VERIFY ALL DIMENSIONS ON SITE.

GENERAL NOTES :

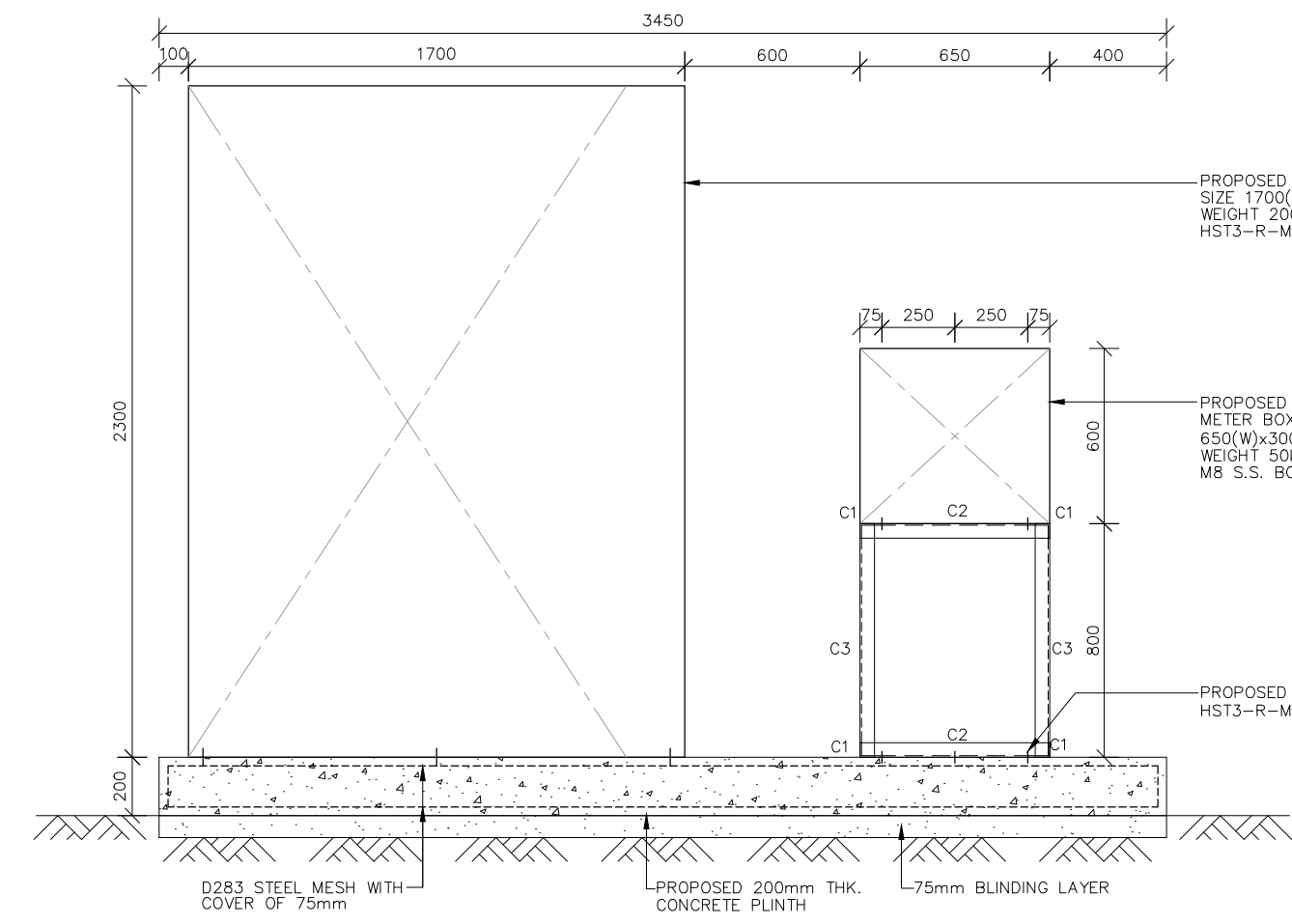
- ALL DIMENSIONS SHOWN ARE IN mm.
- EXACT DIMENSIONS TO BE VERIFIED ON SITE.
- ALL NEW STRUCTURAL STEEL WORK CHECKING COMPLY WITH THE CODE OF PRACTICE FOR THE STRUCTURAL USE OF STEEL 2011.
- ALL STRUCTURAL STEEL SHALL BE CLASS 1 OF GRADE S275 MINIMUM TO BS EN 10025 PART 1 & 2: 2004 STANDARD OR EQUIVALENT COMPLY WITH THE RELEVANT REFERENCE MATERIAL STANDARDS IN ANNEX A1.1 OF THE CODE OF PRACTICE FOR THE STRUCTURAL USE OF STEEL 2011.
- ALL HOT FINISHED STRUCTURAL HOLLOW SECTIONS SHOULD COMPLY WITH BS EN 10210 PART 1:2006
- ALL STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED TO A COATING OF 85 MICRONS THICK AND TWO COATS OF ZINC RICH PRIMER SHALL BE APPLIED AFTER WELDING CONNECTION TO BS EN ISO 1461:2008
- ALL STEEL BOLT/STUD/NUT TO BE GRADE 8.8 COMPLY WITH BS EN ISO 3506 PART 1 & 2: 2009 (P_{0.2}=575N/mm², P_{0.1}=560N/mm².)
- ALL WELDING SHALL BE IN ACCORDANCE WITH REQUIREMENT AS PER BS EN 1011 PART 1:2009 & PART 2:2001 (MIN. STRENGTH=220N/mm².)
- MAX. IMPOSED LOADING :
1) EQUIPMENT SELF WEIGHT = 450kg (MAX.)
- WIND PRESSURE IS IN ACCORDANCE WITH CODE OF PRACTICE ON WIND EFFECTS HONG KONG 2019. DESIGN WIND PRESSURE=1.35kPa, C_f=1.20 FOR EQUIPMENT. DESIGN WIND PRESSURE=1.35kPa, C_f=1.80 FOR ANTENNA.
- THE DESIGN AND CONSTRUCTION OF THE PROPOSED WORK SHALL COMPLY WITH THE BUILDINGS ORDINANCE, BUILDING REGULATIONS AND FIRE SAFETY IN BUILDINGS 2011.
- UNLESS OTHERWISE STATED, ALL ANCHOR BOLTS ARE HILTI TYPE AS SPECIFIED BELOW.
HST3-R-M12-70
MIN. EMBEDMENT LENGTH
12mm DIAMETER ANCHOR
- ADDITIONAL PLASTIC SHEET WASHER SHOULD BE PROVIDE BETWEEN S.S. BOLT & GMS STEEL.
- ALL PLASTER TO BE 25mm THICK CEMENT : SAND = 1 : 3.
- ALL METAL SURFACE SHALL BE CLEANED THOROUGHLY TO REMOVE ALL DIRT, WELD SPATTER, GREASE AND THE LIKE. CHIP, SCRAPE AND WIRE-BRUSH TO REMOVE LOOSE SCALE UNTIL BACK TO CLEAN METAL. REMOVE SURFACE FILE OF MILL AND BRUSH WITH DETERGENTS.
- CHIP OFF THE PLASTER FROM THE FACE OF THE R.C. MEMBERS TO BE IN CONTACT WITH THE STEEL MEMBERS BEFORE INSTALLING.
- ALL WELDING TO BE 5mm FILLET WELD ALL ROUND UNLESS OTHERWISE STATED.
- ROUTING SHOULD BE ADJUSTED ON SITE TO AVOID CROSSING ON EXISTING SERVICE DUCTS. ALL CONDUIT SHALL BE IN G.I.
- ADEQUATE EARTHING PROTECTION SHALL BE PROVIDED.
- ALL ELECTRICAL WORK SHALL COMPLY WITH THE CURRENT COP, IEE AND POWER COMPANY REGULATION.
- POWER SUPPLY SHOULD BE 200A TPN CLP METER.
- NAME PLATE SHOULD BE PROVIDED ON ALL PROPOSED EQUIPMENT CABINET, COAXIAL CABLES, CONDUITS AND FACILITIES FOR EASY IDENTIFICATION.
- ALL NEW CONCRETE USED TO BE DESIGNED MIXED 300/20.
- CONCRETE COVER TO MAIN REINFORCEMENT TO BE 75mm FOR FOOTING.



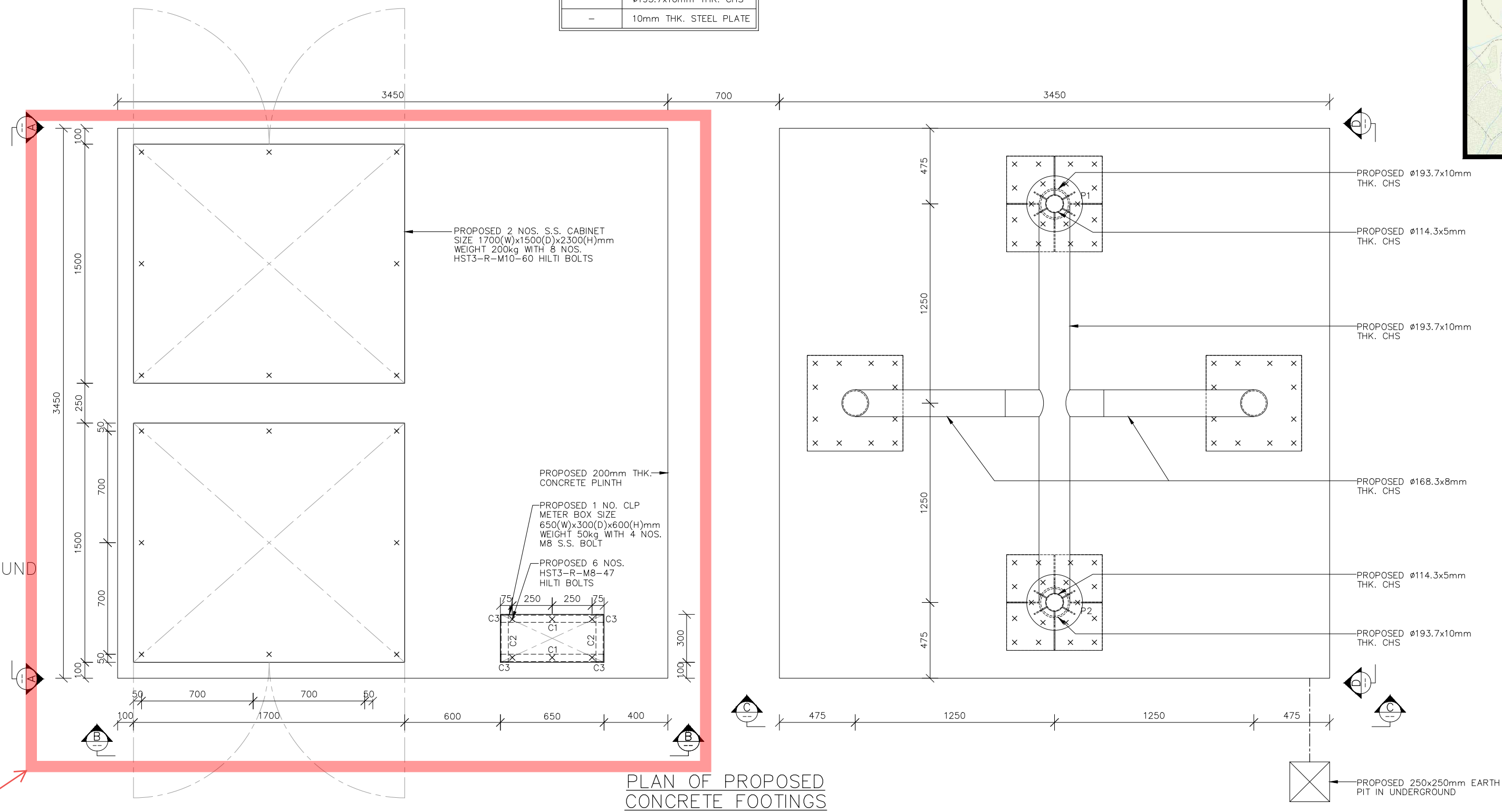
KEY PLAN
N.T.S.



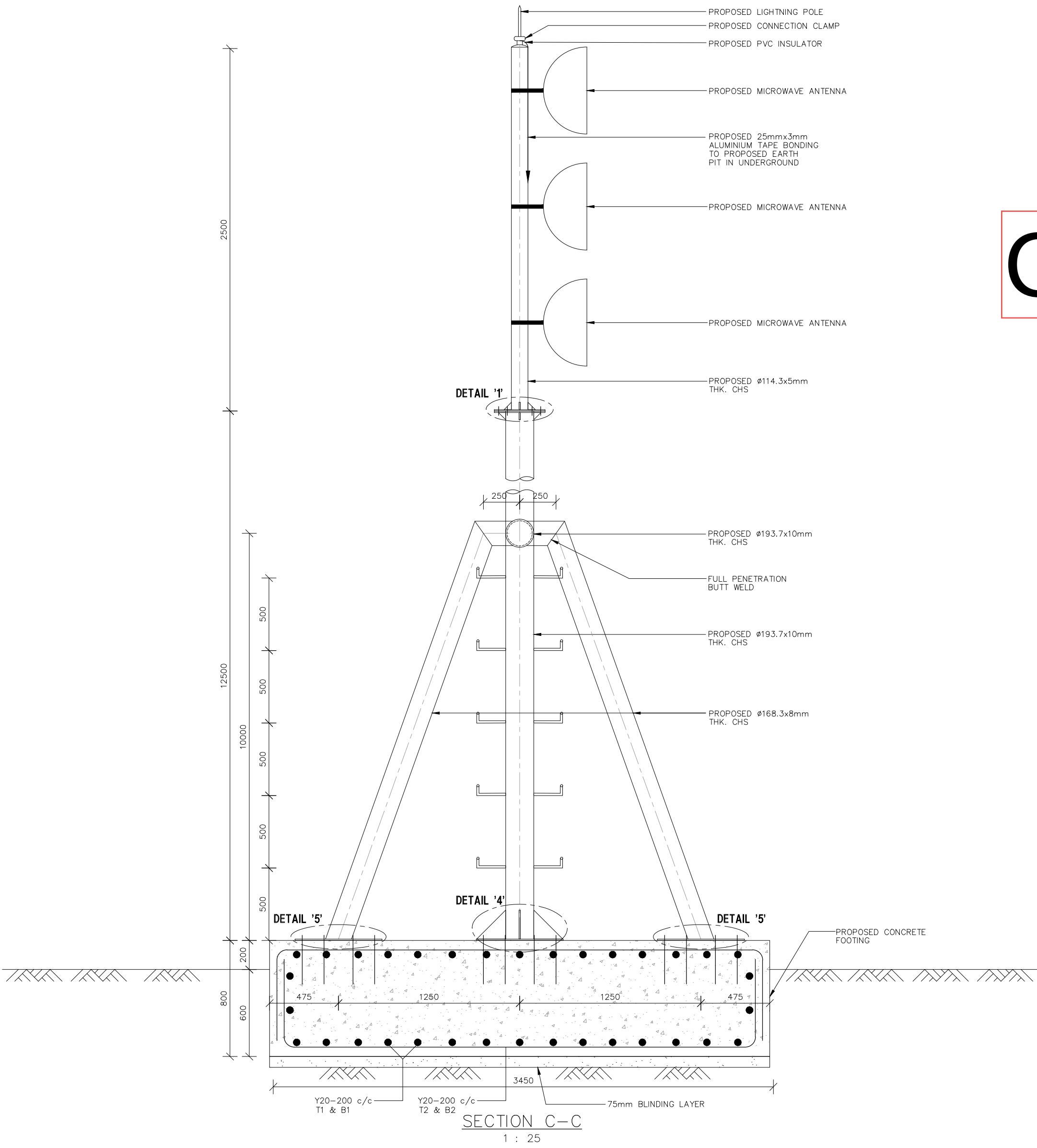
SECTION A-A
1 : 25



SECTION B-B
1 : 25



PLAN OF PROPOSED CONCRETE FOOTINGS
1 : 25

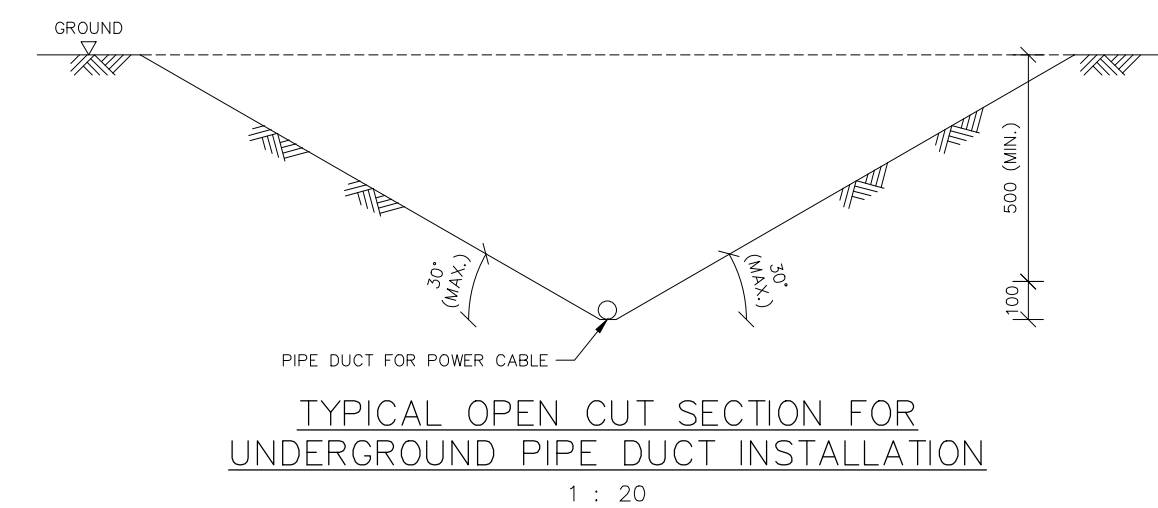
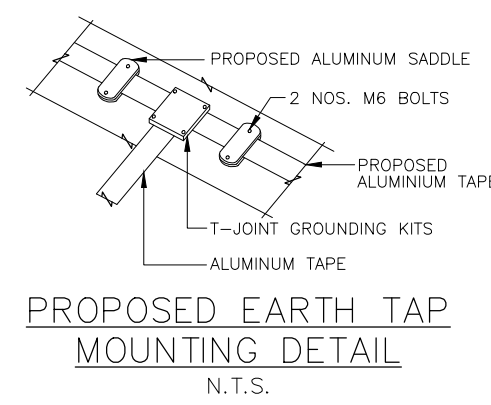
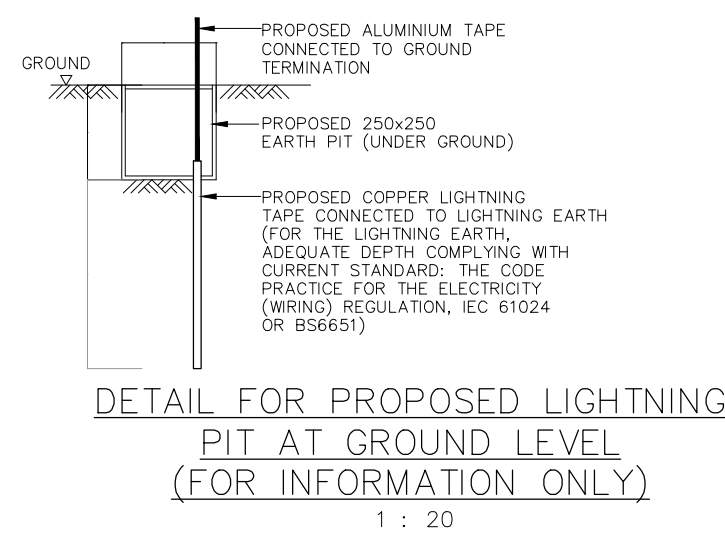
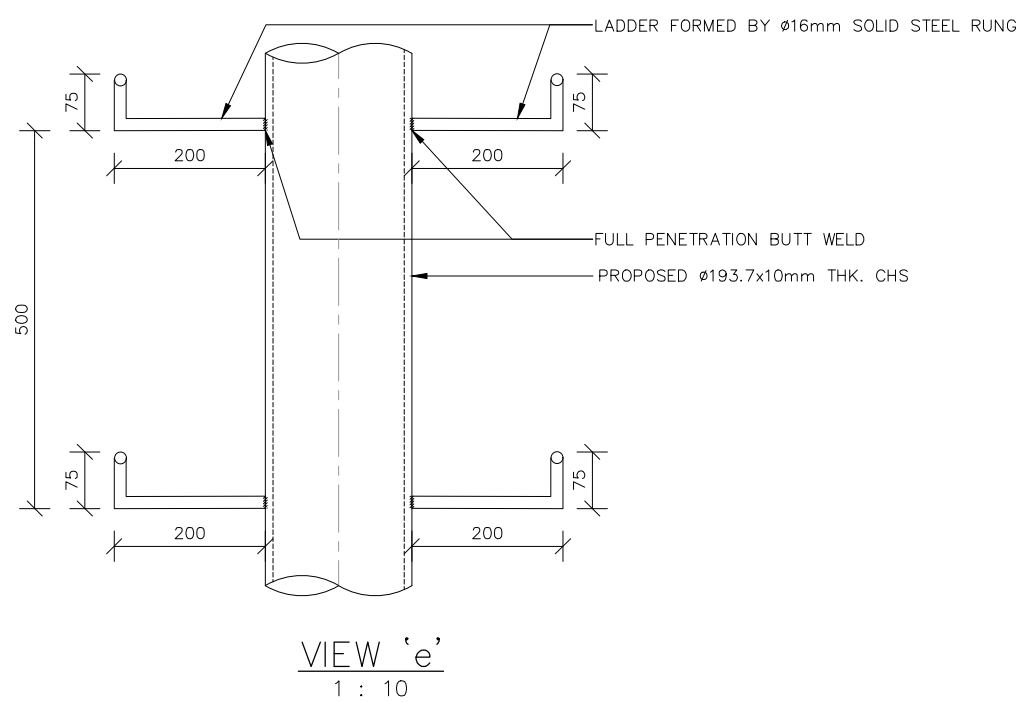
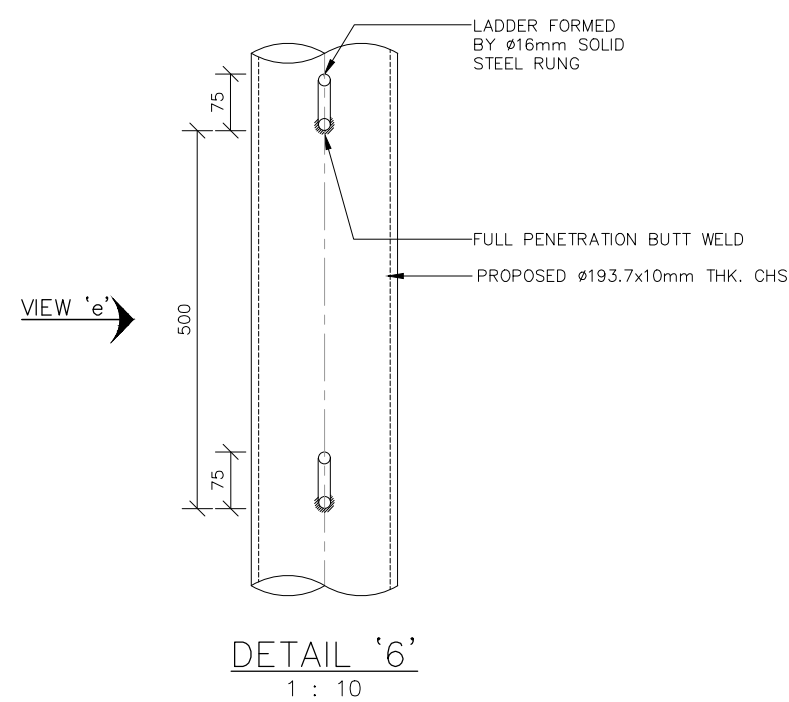
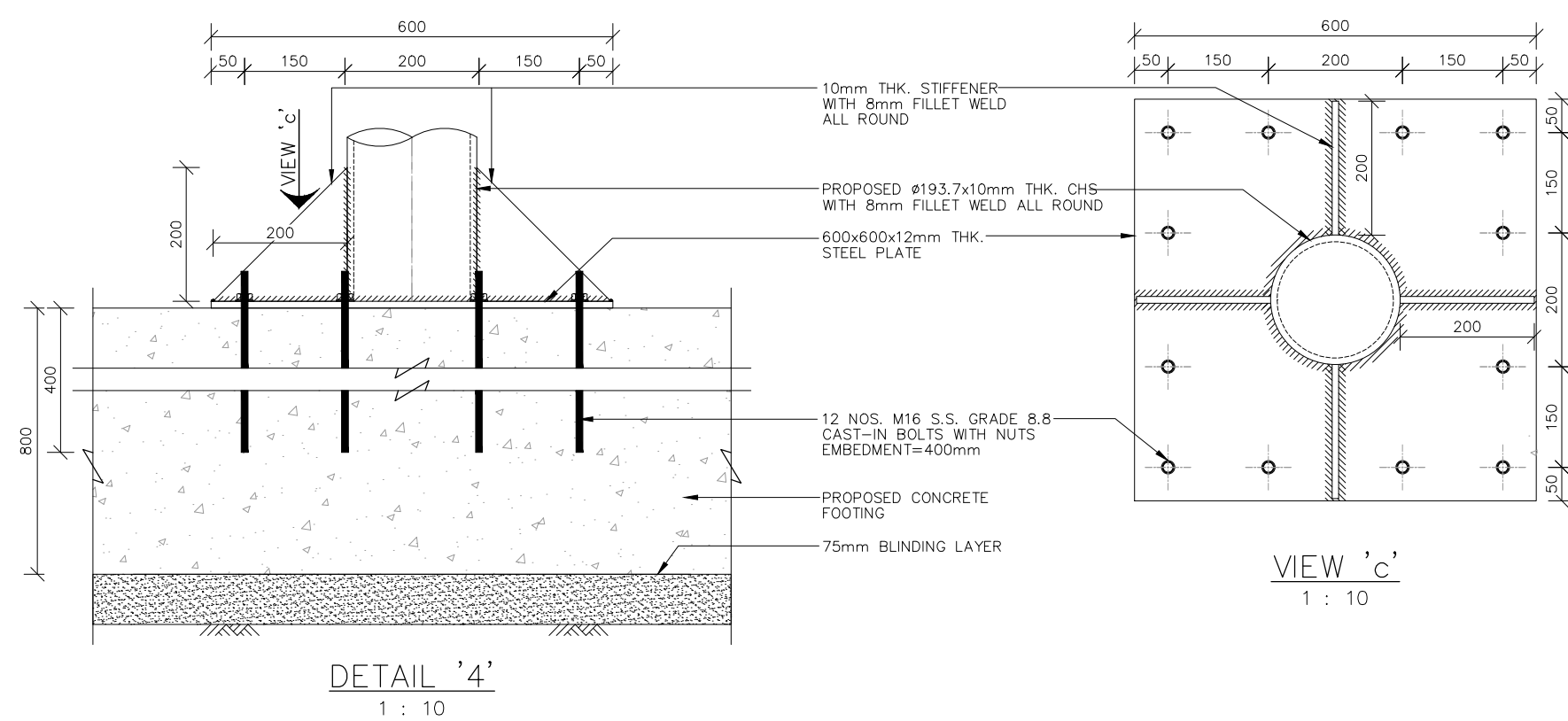
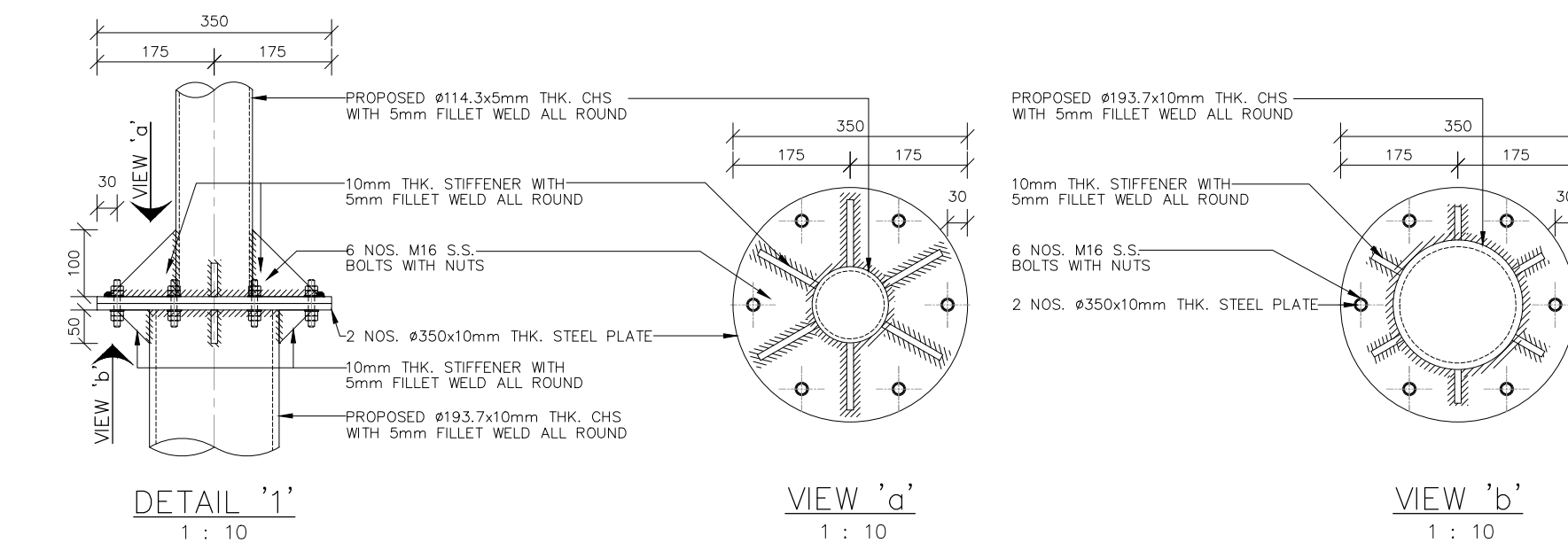
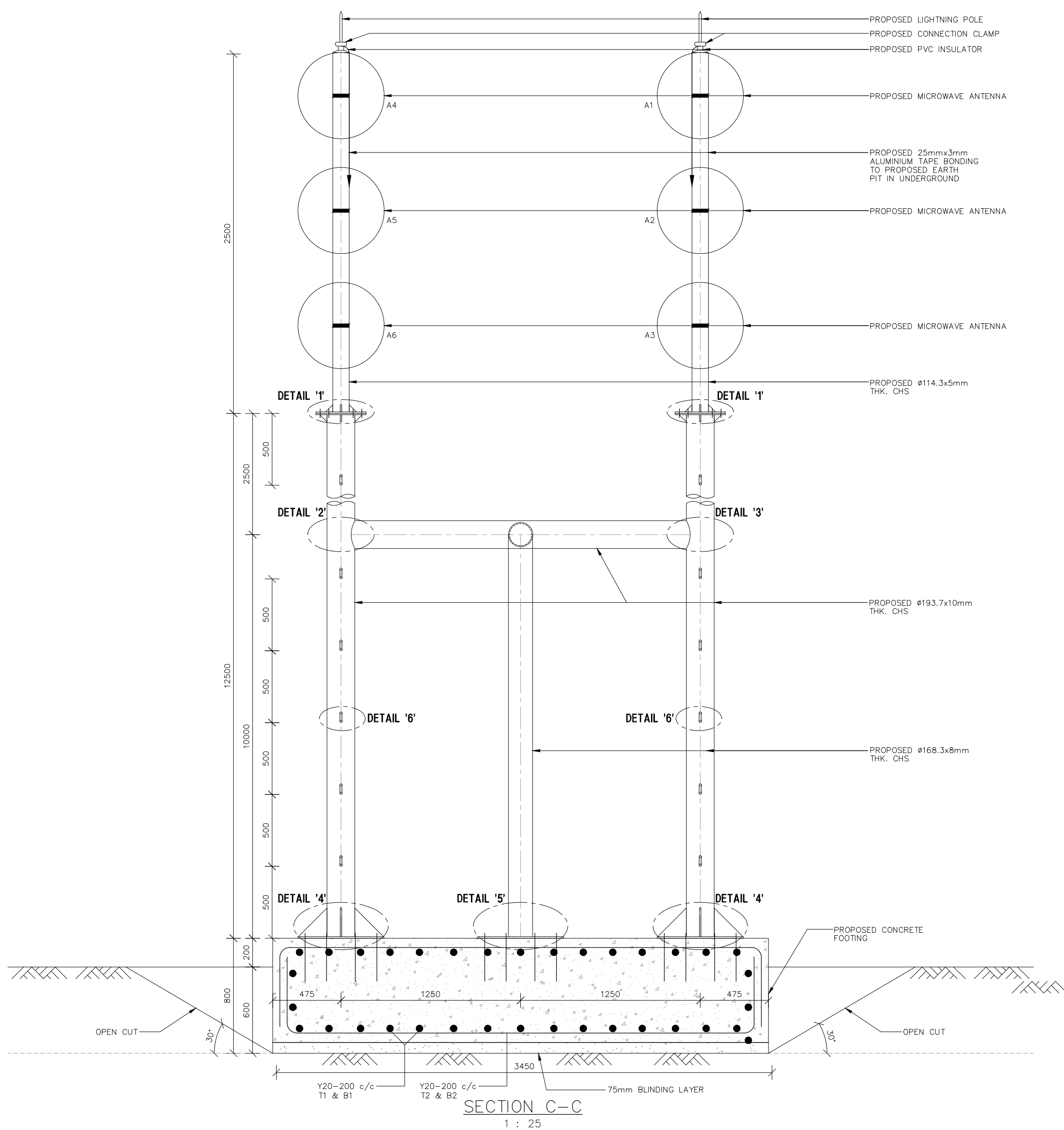


SECTION C-C
1 : 25

Construction Drawing

REV	DESCRIPTION	DATE	BY	CHK'D	APP
創域工程有限公司 JEG Engineering Co. Ltd					
1/F, B1k E, Cheong Fat Factory Bldg., 346 Fuk Wing St., Cheung Sha Wan, Kin. TEL : 2117 9500 FAX : 3103 8077 E-MAIL : jeg@jeg-ltd.com					
CLIENT :  環電 GLOBAL COMMUNICATIONS					
PROJECT : SO LO PUN (APPLICATION FOR BLOCK LICENSE)					
DRAWING TITLE : DETAILS OF TRANSMISSION MICROWAVE ANTENNA					
SCALE AT A1 AS SHOWN		DESIGNED : A. CHAN		DRAWN : S.M.	
		APPROVED : A. CHAN		DATE : 29 FEB., 2024	
PROJECT No. J8009		DRAWING No. : S2693-1		REV. -	

NOTES :
1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH DRAWING S2693-1.
1. NOTES REFER TO DRAWING NO. S2693-1



REV	DESCRIPTION	DATE	BY	CHK'D	APP
創域工程有限公司 JEG Engineering Co. Ltd. 1/F, B1k E, Cheong Fat Factory Bldg., 346 Fuk Wing St., Cheung Sha Wan, Kln. TEL : 2117 9500 FAX : 3103 8077 E-MAIL : jeg@jeg-ltd.com					
CLIENT : HGC 環電 GLOBAL COMMUNICATIONS					
PROJECT : SO LO PUN (APPLICATION FOR BLOCK LICENSE)					
DRAWING TITLE : DETAILS OF TRANSMISSION MICROWAVE ANTENNA					
SCALE AT A1 AS SHOWN	DESIGNED : A. CHAN	DRAWN : S.M.	CHECKED : G.C.	DATE 29 FEB., 2024	
PROJECT No. J8009	DRAWING No. : S2693-2				REV. -

Excavation Plan



Land Filling Plan





前往地圖: <https://www.map.gov.hk/gm/geo:22.5382,114.2556?z=564>



©地圖版權屬香港特別行政區政府

地圖列印於 2024 年 4 月 16 日

0 49 m

由「地理資訊地圖」網站提供: <https://www.map.gov.hk>

注意: 使用此地圖受「地理資訊地圖」的使用條款及條件以及知識產權告示約束。

e-form No. S16-I
電子表格第 S16-I 號

APPLICATION FOR PERMISSION
UNDER SECTION 16 OF
THE TOWN PLANNING ORDINANCE
(CAP. 131)

2024年11月25日

收到：城市規劃委員會
只會在收到申請時，才正式確認收到
申請的日期。

25 NOV 2024

This document is received on
The Town Planning Board will formally acknowledge
the date of receipt of the application only upon receipt
of all the required information and documents.

根據《城市規劃條例》(第131章)

第16條遞交的許可申請

Applicable to proposals not involving or not only involving:
適用於建議不涉及或不祇涉及：

- (i) Construction of "New Territories Exempted House(s)";
興建「新界豁免管制屋宇」；
- (ii) Temporary use/development of land and/or building not exceeding 3 years in rural areas or Regulated Areas; and
位於鄉郊地區或受規管地區土地上及/或建築物內進行為期不超過三年的臨時用途/發展；及
- (iii) Renewal of permission for temporary use or development in rural areas or Regulated Areas
位於鄉郊地區或受規管地區的臨時用途或發展的許可續期

Applicant who would like to publish the notice of application in local newspapers to meet one of the Town Planning Board's requirements of taking reasonable steps to obtain consent of or give notification to the current land owner, please refer to the following link regarding publishing the notice in the designated newspapers:
https://www.tpb.gov.hk/en/plan_application/apply.html

申請人如欲在本地報章刊登申請通知，以採取城市規劃委員會就取得現行土地擁有人的同意或通知現行土地擁有人所指定的其中一項合理步驟，請瀏覽以下網址有關在指定的報章刊登通知：
https://www.tpb.gov.hk/tc/plan_application/apply.html

General Note and Annotation for the Form
填寫表格的一般指引及註解

"Current land owner" means any person whose name is registered in the Land Registry as that of an owner of the land to which the application relates, as at 6 weeks before the application is made
「現行土地擁有人」指在提出申請前六星期，其姓名或名稱已在土地註冊處註冊為該申請所關乎的土地的擁有人的人

& Please attach documentary proof 請夾附證明文件

^ Please insert number where appropriate 請在適當地方註明編號

Please fill "NA" for inapplicable item 請在不適用的項目填寫「不適用」

Please use separate sheets if the space provided is insufficient 如所提供的空間不足，請另頁說明

Please insert a 「✓」 at the appropriate box 請在適當的方格內上加上「✓」號

For Official Use Only 請勿填寫此欄	Application No. 申請編號	A/NE-SLP/3
	Date Received 收到日期	25 NOV 2024

- The completed form and supporting documents (if any) should be sent to the Secretary, Town Planning Board (the Board), 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong.
申請人須把填妥的申請表格及其他支持申請的文件(倘有),送交香港北角渣華道333號北角政府合署15樓城市規劃委員會(下稱「委員會」)秘書收。
- Please read the "Guidance Notes" carefully before you fill in this form. The document can be downloaded from the Board's website at <http://www.tpb.gov.hk/>. It can also be obtained from the Secretariat of the Board at 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong (Tel: 2231 4810 or 2231 4835), and the Planning Enquiry Counters of the Planning Department (Hotline: 2231 5000) (17/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong and 14/F, Sha Tin Government Offices, 1 Sheung Wo Che Road, Sha Tin, New Territories).
請先細閱《申請須知》的資料單張,然後填寫此表格。該份文件可從委員會的網頁下載(網址:<http://www.tpb.gov.hk/>),亦可向委員會秘書處(香港北角渣華道333號北角政府合署15樓-電話:2231 4810或2231 4835)及規劃署的規劃資料查詢處(熱線:2231 5000)(香港北角渣華道333號北角政府合署17樓及新界沙田上禾輦路1號沙田政府合署14樓)索取。
- This form can be downloaded from the Board's website, and obtained from the Secretariat of the Board and the Planning Enquiry Counters of the Planning Department. The form should be typed or completed in block letters. The processing of the application may be refused if the required information or the required copies are incomplete.
此表格可從委員會的網頁下載,亦可向委員會秘書處及規劃署的規劃資料查詢處索取。申請人須以打印方式或以正楷填寫表格。如果申請人所提交的資料或文件副本不齊全,委員會可拒絕處理有關申請。

1. Name of Applicant 申請人姓名/名稱

HGC Global Communications Limited (Company 公司)

2. Name of Authorised Agent (if applicable) 獲授權代理人姓名/名稱(如適用)

JEG Engineering Company Limited (Company 公司)

3. Application Site 申請地點

(a) Full address / location / demarcation district and lot number (if applicable) 詳細地址/地點/丈量約份及地段號碼(如適用)	Government Land near Lot 187RP in DD66, So Lo Pun, North District, N.T.
(b) Site area and/or gross floor area involved 涉及的地盤面積及/或總樓面面積	☒ Site area 地盤面積 12 sq.m 平方米 ☒ About 約 ☐ Gross floor area 總樓面面積 sq.m 平方米 ☐ About 約
(c) Area of Government land included (if any) 所包括的政府土地面積(倘有)	12 sq.m 平方米 ☒ About 約

(d) Name and number of the related statutory plan(s) 有關法定圖則的名稱及編號	S/NE-SLP/4
(e) Land use zone(s) involved 涉及的土地用途地帶	Green Belt
(f) Current use(s) 現時用途	Vacant (If there are any Government, institution or community facilities, please illustrate on plan and specify the use and gross floor area) (如有任何政府、機構或社區設施，請在圖則上顯示，並註明用途及總樓面面積)
(g) Additional Information (if applicable) 附加資料 (如適用)	

4. “Current Land Owner” of Application Site 申請地點的「現行土地擁有人」

The applicant 申請人 –

- ☐ is the sole “current land owner”^{#&} (please proceed to Part 6 and attach documentary proof of ownership).
是唯一的「現行土地擁有人」^{#&} (請繼續填寫第 6 部分，並夾附業權證明文件)。
- ☐ is one of the “current land owners”^{#&} (please attach documentary proof of ownership).
是其中一名「現行土地擁有人」^{#&} (請夾附業權證明文件)。
- ☐ is not a “current land owner”[#].
並不是「現行土地擁有人」[#]。

- ☒ The application site is entirely on Government land (please proceed to Part 6).
申請地點完全位於政府土地上 (請繼續填寫第 6 部分)。

5. Statement on Owner's Consent/Notification**就土地擁有人的同意/通知土地擁有人的陳述**

- (a) According to the record(s) of the Land Registry as at (DD/MM/YYYY), this application involves a total of "current land owner(s)"[#].
根據土地註冊處截至 (日/月/年)的記錄，這宗申請共牽涉 名「現行土地擁有人」[#]。

- (b) The applicant 申請人 –

☐ has obtained consent(s) of "current land owner(s)"[#].

已取得 名「現行土地擁有人」[#]的同意。

Details of consent of "current land owner(s)" [#] obtained 取得「現行土地擁有人」 [#] 同意的詳情		
No. of 'Current Land Owner(s)' 「現行土地擁有人」數目	Lot number/address of premises as shown in the record of the Land Registry where consent(s) has/have been obtained 根據土地註冊處記錄已獲得同意的地段號碼/處所地址	Date of consent obtained (DD/MM/YYYY) 取得同意的日期(日/月/年)

(Please use separate sheets if the space of any box above is insufficient. 如上列任何方格的空間不足，請另頁說明)

☐ has notified "current land owner(s)"[#]

已通知 名「現行土地擁有人」[#]。

Details of the "current land owner(s)" [#] notified 已獲通知「現行土地擁有人」 [#] 的詳細資料		
No. of 'Current Land Owner(s)' 「現行土地擁有人」數目	Lot number/address of premises as shown in the record of the Land Registry where notification(s) has/have been given 根據土地註冊處記錄已發出通知的地段號碼/處所地址	Date of notification given (DD/MM/YYYY) 通知日期(日/月/年)

(Please use separate sheets if the space of any box above is insufficient. 如上列任何方格的空間不足，請另頁說明)

- ☐ has taken reasonable steps to obtain consent of or give notification to owner(s):
已採取合理步驟以取得土地擁有人的同意或向該人發給通知。詳情如下：

Reasonable Steps to Obtain Consent of Owner(s) 取得土地擁有人的同意所採取的合理步驟

- ☐ sent request for consent to the "current land owner(s)"[#] on _ (DD/MM/YYYY)
於 (日/月/年)向每一名「現行土地擁有人」[#]郵遞要求同意書[&]

Reasonable Steps to Give Notification to Owner(s) 向土地擁有人發出通知所採取的合理步驟

- ☐ published notices in local newspapers[&] on (DD/MM/YYYY)
於 (日/月/年)在指定報章就申請刊登一次通知[&]
- ☐ posted notice in a prominent position on or near application site/premises[&] on (DD/MM/YYYY)
於 (日/月/年)在申請地點／申請處所或附近的顯明位置貼出關於該申請的通知[&]
- ☐ sent notice to relevant owners' corporation(s)/owners' committee(s)/mutual aid committee(s)/management office(s) or rural committee[&] on _ (DD/MM/YYYY)
於 (日/月/年)把通知寄往相關的業主立案法團/業主委員會/互助委員會或管理處，或有關的鄉事委員會[&]

Others 其他

- ☐ others (please specify)
其他（請指明）

Note: May insert more than one 「✓」.

Information should be provided on the basis of each and every lot (if applicable) and premises (if any) in respect of the application.

註：可在多於一個方格內加上「✓」號

申請人須就申請涉及的每一地段（倘適用）及處所（倘有）分別提供資料

6. Type(s) of Application 申請類別

- ☐ Type (i) Change of use within existing building or part thereof
第(i)類 更改現有建築物或其部分內的用途
- ☒ Type (ii) Diversion of stream / excavation of land / filling of land / filling of pond as required under Notes of Statutory Plan(s)
第(ii)類 根據法定圖則《註釋》內所要求的河道改道／挖土／填土／填塘工程
- ☒ Type (iii) Public utility installation / Utility installation for private project
第(iii)類 公用事業設施裝置/私人發展計劃的公用設施裝置
- ☐ Type (iv) Minor relaxation of stated development restriction(s) as provided under Notes of Statutory Plan(s)
第(iv)類 略為放寬於法定圖則《註釋》內列明的發展限制
- ☐ Type (v) Use / development other than (i) to (iii) above
第(v)類 上述的(i)至(iii)項以外的用途／發展

Note 1: May insert more than one 「✓」.

註 1：可在多於一個方格內加上「✓」號

Note 2: For Development involving columbarium use, please complete the table in the Appendix.

註 2：如發展涉及靈灰安置用途，請填妥於附件的表格。

(i) For Type (i) application 供第(i)類申請			
(a) Total floor area involved 涉及的總樓面面積	sq.m 平方米		
(b) Proposed use(s)/development 擬議用途/發展	(If there are any Government, institution or community facilities, please illustrate on plan and specify the use and gross floor area) (如有任何政府、機構或社區設施，請在圖則上顯示，並註明用途及總樓面面積)		
(c) Number of storeys involved 涉及層數		Number of units involved 涉及單位數目	
(d) Proposed floor area 擬議樓面面積	Domestic part 住用部分 _____ sq.m 平方米		☐ About 約
	Non-domestic part 非住用部分 _____ sq.m 平方米		☐ About 約
	Total 總計 _____ sq.m 平方米		☐ About 約
(e) Proposed uses of different floors (if applicable) 不同樓層的擬議用途(如適用) (Please use separate sheets if the space provided is insufficient) (如所提供的空間不足，請另頁說明)	Floor(s) 樓層	Current use(s) 現時用途	Proposed use(s) 擬議用途
(f) Additional Information (if applicable) 附加資料(如適用)			

(ii) For Type (ii) application 供第(ii)類申請		
(a) Operation involved 涉及工程	☐ Diversion of stream 河道改道 ☐ Filling of pond 填塘 Area of filling 填塘面積 sq.m 平方米 ☐ About 約 Depth of filling 填塘深度 m 米 ☐ About 約 ☒ Filling of land 填土 Area of filling 填土面積 12 sq.m 平方米 ☒ About 約 Depth of filling 填土厚度 0.6 m 米 ☒ About 約 ☒ Excavation of land 挖土 Area of excavation 挖土面積 12 sq.m 平方米 ☒ About 約 Depth of excavation 挖土深度 0.6 m 米 ☒ About 約 (Please indicate on site plan the boundary of concerned land/pond(s), and particulars of stream diversion, the extent of filling of land/pond(s) and/or excavation of land) (請用圖則顯示有關土地/池塘界線, 以及河道改道、填塘、填土及/或挖土的細節及/或範圍)	
	(b) Intended use/development 有意進行的用途/發展	
	Proposed public utility installation (Microwave Station) and associated excavation of land and filling of land.	

(ii) For Type (ii) application 供第(ii)類申請														
(a) Nature and scale 性質及規模	☒ Public utility installation 公用事業設施裝置 ☐ Utility installation for private project 私人發展計劃的公用設施裝置 Please specify the type and number of utility to be provided as well as the dimensions of each building/structure, where appropriate 請註明有關裝置的性質及數量, 包括每座建築物/構築物(倘有)的長度、高度和闊度													
	<table border="1"> <thead> <tr> <th>Name/type of installation 裝置名稱/種類</th> <th>Number of provision 數量</th> <th>Dimension of each installation /building/structure (m) (LxWxH) 每個裝置/建築物/構築物的尺寸(米)(長x闊x高)</th> </tr> </thead> <tbody> <tr> <td>Microwave Station</td> <td>1</td> <td>3.45m(L)x3.45m(W)x16m(H)</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Name/type of installation 裝置名稱/種類	Number of provision 數量	Dimension of each installation /building/structure (m) (LxWxH) 每個裝置/建築物/構築物的尺寸(米)(長x闊x高)	Microwave Station	1	3.45m(L)x3.45m(W)x16m(H)							(Please illustrate on plan the layout of the installation 請用圖則顯示裝置的布局)
	Name/type of installation 裝置名稱/種類	Number of provision 數量	Dimension of each installation /building/structure (m) (LxWxH) 每個裝置/建築物/構築物的尺寸(米)(長x闊x高)											
	Microwave Station	1	3.45m(L)x3.45m(W)x16m(H)											

(iv) *For Type (iv) application 供第(iv)項申請*

- (a) Please specify the proposed minor relaxation of stated development restriction(s) and also fill in the proposed use/development and development particulars in part (v) below –
請列明擬議略為放寬的發展限制並填妥於第(v)部分的擬議用途/發展及發展細節 –

- | | | |
|--------------------------|--|---|
| ☐ | Plot ratio restriction
地積比率限制 | From 由 _____ to 至 _____ |
| ☐ | Gross floor area restriction
總樓面面積限制 | From 由 _____ sq. m 平方米 to 至 _____ sq. m 平方米 |
| ☐ | Site coverage restriction
上蓋面積限制 | From 由 _____ % to 至 _____ % |
| ☐ | Building height restriction
建築物高度限制 | From 由 _____ m 米 to 至 _____ m 米 |
| | | From 由 _____ mPD 米 (主水平基準上) to 至 _____ mPD 米 (主水平基準上) |
| | | From 由 _____ storeys 層 to 至 _____ storeys 層 |
| ☐ | Non-building area restriction
非建築用地限制 | From 由 _____ m to 至 _____ m |
| ☐ | Others (please specify)
其他 (請註明) | _____ |

- (b) Additional Information (if applicable)
附加資料 (如適用)

(v) For Type (v) application 供第(v)類申請

(a) Proposed
use(s)/development
擬議用途/發展

(Please illustrate the details of the proposal on a layout plan 請用平面圖說明建議詳情)

(b) Development Schedule 發展細節表

Proposed gross floor area (GFA) 擬議總樓面面積

_____ sq.m 平方米

☐ About 約

Proposed plot ratio 擬議地積比率

☐ About 約

Proposed site coverage 擬議上蓋面積

_____ %

☐ About 約

Proposed no. of blocks 擬議座數

Proposed no. of storeys of each block 每座建築物的擬議層數

_____ storeys 層

☐ include 包括 _____ storeys of
basements 層地庫

☐ exclude 不包括 _____ storeys of
basements 層地庫

Proposed building height of each block 每座建築物的擬議高度

_____ mPD 米(主水平基準上) ☐ About 約

_____ m 米

☐ About 約

☐ Domestic part 住用部分

GFA 總樓面面積

_____ sq. m 平方米

☐ About 約

number of Units

單位數目

average unit size

_____ sq. m 平方米

☐ About 約

單位平均面積

estimated number of residents

估計住客數目

☐ Non-domestic part 非住用部分

GFA 總樓面面積

☐ eating place 食肆

_____ sq. m 平方米

☐ About 約

☐ hotel 酒店

_____ sq. m 平方米

☐ About 約

(please specify the number of rooms

請註明房間數目) _____

☐ office 辦公室

_____ sq. m 平方米

☐ About 約

☐ shop and services

_____ sq. m 平方米

☐ About 約

商店及服務行業

☐ Government, institution or community facilities

(please specify the use(s) and concerned land

area(s)/GFA(s) 請註明用途及有關的地面面積／總樓面面積)

政府、機構或社區設施

☐ other(s) 其他

(please specify the use(s) and concerned land

area(s)/GFA(s) 請註明用途及有關的地面面積／總樓面面積)

☐ Open space

(please specify land area(s) 請註明地面面積)

休憩用地

☐ private open space

_____ sq. m 平方米

☐ Not less than 不

私人休憩用地

少於

☐ public open space

_____ sq. m 平方米

☐ Not less than 不

公眾休憩用地

少於

(c) Use(s) of different floors (if applicable) 各樓層的用途 (如適用)

[Block number] [座數]	[Floor(s)] [層數]	[Proposed use(s)] [擬議用途]

(d) Proposed use(s) of uncovered area (if any) 露天地方（倘有）的擬議用途	
(e) Additional Information (if applicable) 附加資料（如適用）	

7. Anticipated Completion Time of the Development Proposal 擬議發展計劃的預計完成時間
Anticipated completion time (in month and year) of the development proposal (by phase (if any)) (e.g. June 2023) 擬議發展計劃預期完成的年份及月份（分期（倘有））（例：2023 年 6 月） (Separate anticipated completion times (in month and year) should be provided for the proposed public open space and Government, institution or community facilities (if any)) (申請人須就擬議的公眾休憩用地及政府、機構或社區設施（倘有）提供個別擬議完成的年份及月份) June 2025

8. Vehicular Access Arrangement of the Development Proposal
擬議發展計劃的行車通道安排

Any vehicular access to the site/subject building? 是否有車路通往地盤/有關建築物?	Yes 是 No 否	☐ There is an existing access. (please indicate the street name, where appropriate) 有一條現有車路。(請註明車路名稱(如適用)) _____ ☐ There is a proposed access. (please illustrate on plan and specify the width) 有一條擬議車路。(請在圖則顯示, 並註明車路的闊度) ☒
Any provision of parking space for the proposed use(s)? 是否有為擬議用途提供停車位?	Yes 是	☐ (Please specify type(s) and number(s) and illustrate on plan) 請註明種類及數目並於圖則上顯示) Private Car Parking Spaces _____ 私家車車位 Motorcycle Parking Spaces _____ 電單車車位 Light Goods Vehicle Parking Spaces _____ 輕型貨車泊車位 Medium Goods Vehicle Parking Spaces _____ 中型貨車泊車位 Heavy Goods Vehicle Parking Spaces _____ 重型貨車泊車位 Others (Please Specify) 其他 (請列明) _____
	No 否	☒
Any provision of loading/unloading space for the proposed use(s)? 是否有為擬議用途提供上落客貨車位?	Yes 是	☐ (Please specify type(s) and number(s) and illustrate on plan) 請註明種類及數目並於圖則上顯示) Taxi Spaces _____ 的士車位 Coach Spaces _____ 旅遊巴車位 Light Goods Vehicle Spaces _____ 輕型貨車車位 Medium Goods Vehicle Spaces _____ 中型貨車車位 Heavy Goods Vehicle Spaces _____ 重型貨車車位 Others (Please Specify) 其他 (請列明) _____
	No 否	☒

Additional Information (if applicable) 附加資料（如適用）	
--	--

If necessary, please use separate sheets to indicate the proposed measures to minimise possible adverse impacts or give justifications/reasons for not providing such measures.
如需要的話，請另頁註明可盡量減少可能出現不良影響的措施，否則請提供理據/理由。

[illegible]

10. Justifications 理由

The applicant is invited to provide justifications in support of the application. Use separate sheets if necessary.
現請申請人提供申請理由及支持其申請的資料。如有需要，請另頁說明。

HGC shall provide evidence that can prove to the satisfaction of the OFCA that all requirements specified under a milestone with respect to the rollout of the network and the provision of high-speed broadband services at the committed speed to the villagers around So Lo Pun has been met before the completion deadline of that milestone.

As per request of OFCA, the application for the Microwave Station is to enhance the network coverage around So Lo Pun.

11. Declaration 聲明

I hereby declare that the particulars given in this application are correct and true to the best of my knowledge and belief.
本人謹此聲明，本人就這宗申請提交的資料，據本人所知及所信，均屬真實無誤。

I hereby grant a permission to the Board to copy all the materials submitted in this application and/or to upload such materials to the Board's website for browsing and downloading by the public free-of-charge at the Board's discretion. 本人現准許委員會酌情將本人就此申請所提交的所有資料複製及/或上載至委員會網站，供公眾免費瀏覽或下載。

Signature 簽署: Signed with recognised e-signature
Signer: 張文添
☐ Applicant 申請人 / ☒ Authorised Agent 獲授權代理人
Structural engineer

Name
姓名

Position (if applicable)
職位 (如適用)

Professional Qualification(s) 專業資格
☐ Member 會員 / ☐ Fellow of 資深會員

- ☐ HKIP 香港規劃師學會 / ☐ HKIA 香港建築師學會 /
☐ HKIS 香港測量師學會 / ☐ HKIE 香港工程師學會 /
☐ HKILA 香港園境師學會 / ☐ HKIUD 香港城市設計學會 /
☐ RPP 註冊專業規劃師
Others 其他

On behalf of 代表: JEG Engineering Company Limited

Remark 備註

The materials submitted in this application and the Board's decision on the application would be disclosed to the public. Such materials would also be uploaded to the Board's website for browsing and free downloading by the public where the Board considers appropriate.

委員會會向公眾披露申請人所遞交的申請資料和委員會對申請所作的決定。在委員會認為合適的情況下，有關申請資料亦會上載至委員會網頁供公眾免費瀏覽及下載。

Warning 警告

Any person who knowingly or wilfully makes any statement or furnish any information in connection with this application, which is false in any material particular, shall be liable to an offence under the Crimes Ordinance.

任何人在明知或故意的情況下，就這宗申請提出在任何要項上是虛假的陳述或資料，即屬違反《刑事罪行條例》。

Statement on Personal Data 個人資料的聲明

- The personal data submitted to the Board in this application will be used by the Secretary of the Board and Government departments for the following purposes:
委員會就這宗申請所收到的個人資料會交給委員會秘書及政府部門，以根據《城市規劃條例》及相關的城市規劃委員會規劃指引的規定作以下用途：
(a) the processing of this application which includes making available the name of the applicant for public inspection when making available this application for public inspection; and
處理這宗申請，包括公布這宗申請供公眾查閱，同時公布申請人的姓名供公眾查閱；以及
(b) facilitating communication between the applicant and the Secretary of the Board/Government departments.
方便申請人與委員會秘書及政府部門之間進行聯絡。
- The personal data provided by the applicant in this application may also be disclosed to other persons for the purposes mentioned in paragraph 1 above.
申請人就這宗申請提供的個人資料，或亦會向其他人士披露，以作上述第 1 段提及的用途。
- An applicant has a right of access and correction with respect to his/her personal data as provided under the Personal Data (Privacy) Ordinance (Cap. 486). Request for personal data access and correction should be addressed to the Secretary of the Board at 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong.
根據《個人資料(私隱)條例》(第 486 章)的規定，申請人有權查閱及更正其個人資料。如欲查閱及更正個人資料，應向委員會秘書提出有關要求，其地址為香港北角渣華道 333 號北角政府合署 15 樓。

For Developments involving Columbarium Use, please also complete the following:
如發展涉及靈灰安置所用途，請另外填妥以下資料：

Ash interment capacity 骨灰安放容量[@]

Maximum number of sets of ashes that may be interred in the niches

在龕位內最多可安放骨灰的數量

Maximum number of sets of ashes that may be interred other than in niches

在非龕位的範圍內最多可安放骨灰的數量

Total number of niches 龕位總數

Total number of single niches

單人龕位總數

Number of single niches (sold and occupied)

單人龕位數目 (已售並佔用)

Number of single niches (sold but unoccupied)

單人龕位數目 (已售但未佔用)

Number of single niches (residual for sale)

單人龕位數目 (待售)

Total number of double niches

雙人龕位總數

Number of double niches (sold and fully occupied)

雙人龕位數目 (已售並全部佔用)

Number of double niches (sold and partially occupied)

雙人龕位數目 (已售並部分佔用)

Number of double niches (sold but unoccupied)

雙人龕位數目 (已售但未佔用)

Number of double niches (residual for sale)

雙人龕位數目 (待售)

Total no. of niches other than single or double niches (please specify type)

除單人及雙人龕位外的其他龕位總數 (請列明類別)

Number of niches (sold and fully occupied)

龕位數目 (已售並全部佔用)

Number of niches (sold and partially occupied)

龕位數目 (已售並部分佔用)

Number of niches (sold but unoccupied)

龕位數目 (已售但未佔用)

Number of niches (residual for sale)

龕位數目 (待售)

Proposed operating hours 擬議營運時間

[@] Ash interment capacity in relation to a columbarium means –

就靈灰安置所而言，骨灰安放容量指：

- the maximum number of containers of ashes that may be interred in each niche in the columbarium;
每個龕位內可安放的骨灰容器的最高數目；
- the maximum number of sets of ashes that may be interred other than in niches in any area in the columbarium; and
在該靈灰安置所並非龕位的範圍內，總共最多可安放多少份骨灰；以及
- the total number of sets of ashes that may be interred in the columbarium.
在該骨灰安置所內，總共最多可安放多少份骨灰。

Gist of Application 申請摘要

(Please provide details in both English and Chinese as far as possible. This part will also be circulated to relevant consultees, uploaded to the Town Planning Board's Website for browsing and free downloading by the public and available at the Planning Enquiry Counters of the Planning Department for general information.)

(請盡量以英文及中文填寫。此部分會發送予相關諮詢人士、上載至城市規劃委員會網頁供公眾免費瀏覽及下載及於規劃署規劃資料查詢處供一般參閱。)

Application No. 申請編號	(For Official Use Only) (請勿填寫此欄)		
Location/address 位置/地址	Government Land near Lot 187RP in DD66, So Lo Pun, North District, N.T.		
Site area 地盤面積	12 sq. m 平方米 ☒ About 約 (includes Government land of 包括政府土地 12 sq. m 平方米 ☒ About 約)		
Plan 圖則	S/NE-SLP/4		
Zoning 地帶	Green Belt		
Applied use/ development 申請用途/發展	Proposed public utility installation (Microwave Station) and associated excavation of land and filling of land.		
(i) Gross floor area and/or plot ratio 總樓面面積及/或地積比率	Domestic 住用	sq.m 平方米 ☐ About 約 ☐ Not more than 不多於	Plot Ratio 地積比率 ☐ About 約 ☐ Not more than 不多於
	Non-domestic 非住用	☐ About 約 ☐ Not more than 不多於	☐ About 約 ☐ Not more than 不多於
(ii) No. of blocks 幢數	Domestic 住用		
	Non-domestic 非住用		
	Composite 綜合用途		
(iii) Building height/No. of storeys 建築物高度/層數	Domestic 住用	m 米 ☐ (Not more than 不多於) mPD 米(主水平基準上) ☐ (Not more than 不多於)	
		Storeys(s) 層 ☐ (Not more than 不多於) (☐ Include 包括 ☐ Exclude 不包括) ☐ Carport 停車間 ☐ Basement 地庫 ☐ Refuge Floor 防火層 ☐ Podium 平台)	
	Non-domestic 非住用	m 米 ☐ (Not more than 不多於) mPD 米(主水平基準上) ☐ (Not more than 不多於)	

		Storeys(s) 層 ☐ (Not more than 不多於) (□ Include 包括 □ Exclude 不包括) ☐ Carport 停車間 ☐ Basement 地庫 ☐ Refuge Floor 防火層 ☐ Podium 平台)
	Composite 綜合用途	m 米 ☐ (Not more than 不多於) mPD 米(主水平基準上) ☐ (Not more than 不多於) Storeys(s) 層 ☐ (Not more than 不多於) (□ Include 包括 □ Exclude 不包括) ☐ Carport 停車間 ☐ Basement 地庫 ☐ Refuge Floor 防火層 ☐ Podium 平台)
(iv) Site coverage 上蓋面積		% ☐ About 約
(v) No. of units 單位數目		
(vi) Open space 休憩用地	Private 私人	sq.m 平方米 ☐ Not less than 不少於
	Public 公眾	sq.m 平方米 ☐ Not less than 不少於
(vii) No. of parking spaces and loading / unloading spaces 停車位及上落客貨 車位數目	Total no. of vehicle parking spaces 停車位總數 _____ Private Car Parking Spaces 私家車車位 _____ Motorcycle Parking Spaces 電單車車位 _____ Light Goods Vehicle Parking Spaces 輕型貨車泊車位 _____ Medium Goods Vehicle Parking Spaces 中型貨車泊車位 _____ Heavy Goods Vehicle Parking Spaces 重型貨車泊車位 _____ Others (Please Specify) 其他 (請列明) _____ _____	
	Total no. of vehicle loading/unloading bays/lay-bys 上落客貨車位／停車處總數 _____ Taxi Spaces 的士車位 _____ Coach Spaces 旅遊巴車位 _____ Light Goods Vehicle Spaces 輕型貨車車位 _____ Medium Goods Vehicle Spaces 中型貨車車位 _____ Heavy Goods Vehicle Spaces 重型貨車車位 _____ Others (Please Specify) 其他 (請列明) _____ _____	

Submitted Plans, Drawings and Documents 提交的圖則、繪圖及文件		
	Chinese 中文	English 英文
Plans and Drawings 圖則及繪圖		
Master layout plan(s)/Layout plan(s) 總綱發展藍圖／布局設計圖	☐	☐
Block plan(s) 樓宇位置圖	☐	☐
Floor plan(s) 樓宇平面圖	☐	☐
Sectional plan(s) 截視圖	☐	☒
Elevation(s) 立視圖	☐	☒
Photomontage(s) showing the proposed development 顯示擬議發展的合成照片	☐	☐
Master landscape plan(s)/Landscape plan(s) 園境設計總圖／園境設計圖	☐	☐
Others (please specify) 其他 (請註明)		
location plan, excavation plan, land filling plan, S2693-1 & S2693-2	☐	☒
Reports 報告書		
Planning Statement/Justifications 規劃綱領/理據	☐	☐
Environmental assessment (noise, air and/or water pollutions) 環境評估 (噪音、空氣及／或水的污染)	☐	☐
Traffic impact assessment (on vehicles) 就車輛的交通影響評估	☐	☐
Traffic impact assessment (on pedestrians) 就行人的交通影響評估	☐	☐
Visual impact assessment 視覺影響評估	☐	☐
Landscape impact assessment 景觀影響評估	☐	☐
Tree Survey 樹木調查	☐	☐
Geotechnical impact assessment 土力影響評估	☐	☐
Drainage impact assessment 排水影響評估	☐	☐
Sewerage impact assessment 排污影響評估	☐	☐
Risk Assessment 風險評估	☐	☐
Air Ventilation Assessment 空氣流通評估	☐	☐
Management Plan 管理計劃	☐	☐
Social Impact Assessment 社會影響評估	☐	☐
Heritage Impact Assessment	☐	☐
Ecological Impact Assessment 生態影響評估	☐	☐
Conservation Management Plan 保育管理計劃	☐	☐
Others (please specify) 其他 (請註明)	☐	☐

Note: The information in the Gist of Application above is provided by the applicant for easy reference of the general public. Under no circumstances will the Town Planning Board accept any liabilities for the use of the information nor any inaccuracies or discrepancies of the information provided. In case of doubt, reference should always be made to the submission of the applicant.

註：上述申請摘要的資料是由申請人提供以方便市民大眾參考。對於所載資料在使用上的問題及文義上的歧異，城市規劃委員會概不負責。若有任何疑問，應查閱申請人提交的文件。

Our Ref.: NNID/ML/hl/cl/cw/22/1212
12th December, 2022

By Hand

District Lands Office, North Lands Department
6/F, North District Government Offices
3 Pik Fung Road, Fanling,
New Territories, Hong Kong

Attn.: District Lands Officer/North

OFCA Project 1, 3, 4 - Proposed Installation of Extend Fibre-based Networks to Villages in Remote Areas at So Lo Pun, Ap Chau and Kat O (Tender Ref.: OFCA/M/22/C) / Antenna Tower

Dear Sir/Madam,

HGC Global Communications Limited (HGC) is one of major Fixed Telecommunication Network Services Operator (FTNS) in the telecommunication services of Hong Kong. HGC provides fast and high reliability telecom services experience by using our owned huge optical fibre based network to residential and commercial customers in Hong Kong everywhere.

In 2021, HGC is awarded as one of the FNOs under "Subsidy Scheme to Extend Fibre-based Networks to Villages in Remote Areas" by OFCA (Office of The Communications Authority) to provide fibre-based networks.



https://www.ofca.gov.hk/en/industry_focus/infrastructures/subsidy_scheme_to_extend_fibre_based_networks/progress_of_implementation/index.html

The scheme covers villages across nine districts in the New Territories and outlying islands (namely North, Sai Kung, Tai Po, Sha Tin, Yuen Long, Tuen Mun, Tsuen Wan Kwai Tsing and Islands). For involved villages please refer to the link below.



https://www.ofca.gov.hk/filemanager/ofca/en/content_1151/list.pdf





GLOBAL
COMMUNICATIONS

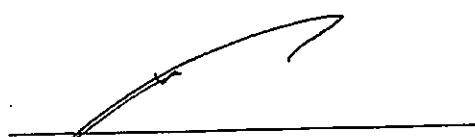
We, therefore, write to apply unleased lands for installing antenna tower in connection with our fibre networks at So Lo Pun, Ap Chau and Kat O. Kindly refer to the attached technical proposals for your perusal.

1. So Lo Pun Rain Shelter - Structure Calculation Report with A1 drawing
(Dwg no.: S2693-RST-1 Rev. -)
2. ~~Ap Chau Water Tank~~ - Structure Calculation Report with A1 drawing
(Dwg no.: S2693-TANK-1 Rev. -)
3. ~~Kat O Fisherman Village Old Generator~~ - Structure Calculation Report with A1 drawing
(Dwg no.: S2693-GEN-1 Rev. -)
4. ~~Kat O Fisherman Village Public Toilet~~ - Structure Calculation Report with A1 drawing
(Dwg no.: S2693-TOILET-1 Rev. -)

Highly appreciated your advice of contacts if above item 2 and 4 are not under your departmental supervision.

Should you have any query, please feel free to contact our Mr. Hutchison Lau at
or the undersigned at

Yours faithfully,
HGC Global Communications Limited



Morris Lau
Head of Infrastructure Development
Network & Engineering

Encl.



Photo 1: Showing the proposed microwave station concrete footing location

REV
DRAWING No.
S2693-1

ANTENNA SCHEDULE

ANTENNA POST NO.	P1			P2		
ANTENNA NO.	A1 (UPPER)	A2 (MIDDLE)	A3 (LOWER)	A4 (UPPER)	A5 (MIDDLE)	A6 (LOWER)
ANTENNA TYPE	MICROWAVE ANTENNA	MICROWAVE ANTENNA	MICROWAVE ANTENNA	MICROWAVE ANTENNA	MICROWAVE ANTENNA	MICROWAVE ANTENNA
BEARING (DEG)	-	-	-	-	-	-
DOWNTILT (DEG)	-	-	-	-	-	-
MICROWAVE ANTENNA	SIZE=ø675x558(D)mm			WEIGHT=100kg		

ANCHOR SCHEDULE

ANCHOR TYPE	RECOMMENDED LOADS	TEST LOADS x 1.5	EFFECTIVE ANCHORAGE DEPTH (mm)	MIN. BASE MATERIAL THICKNESS (mm)	MIN. SPACING (mm)	EDGE DISTANCE (mm)
HST3-R-M8-47	2.8	4.2	47	80	35	40
HST3-R-M10-60	5	7.5	60	120	45	70

MARK SCHEDULE

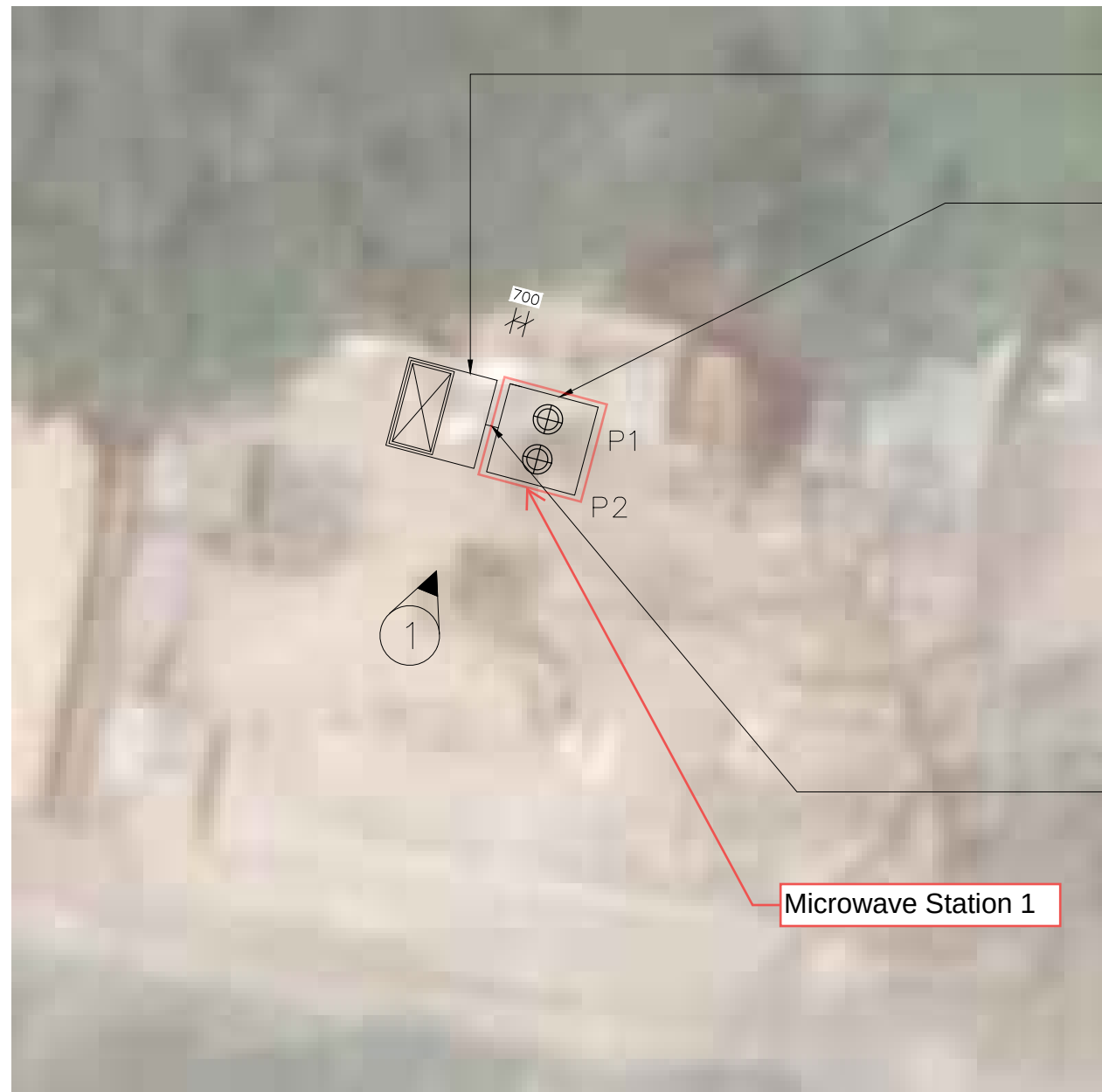
BEAM MARK	DESCRIPTION
C1 - C3	50x50x5mm THK. L
-	ø114.3x5mm THK. CHS
-	ø168.3x8mm THK. CHS
-	ø193.7x10mm THK. CHS
-	10mm THK. STEEL PLATE



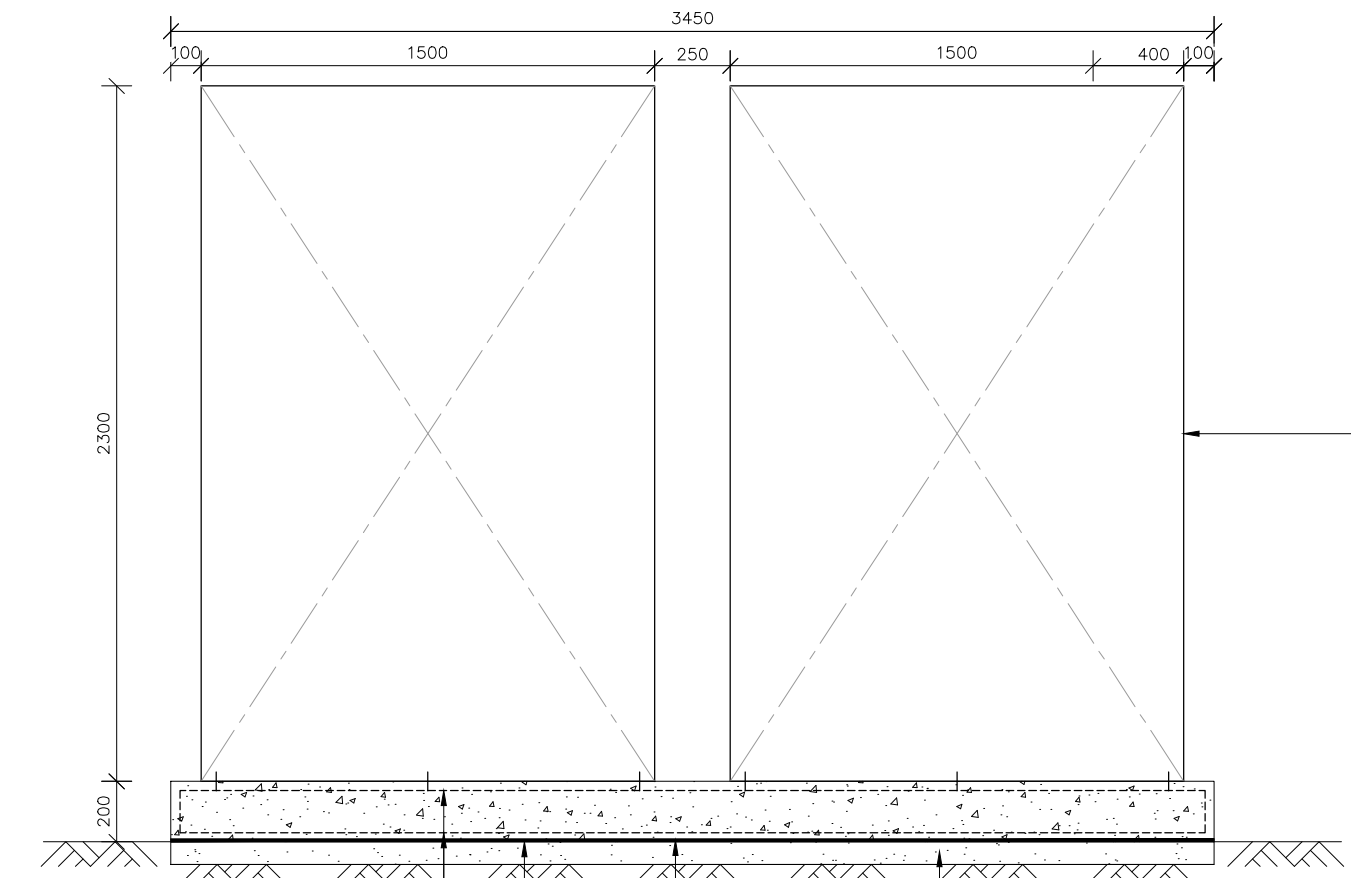
BLOCK PLAN

GENERAL NOTES :

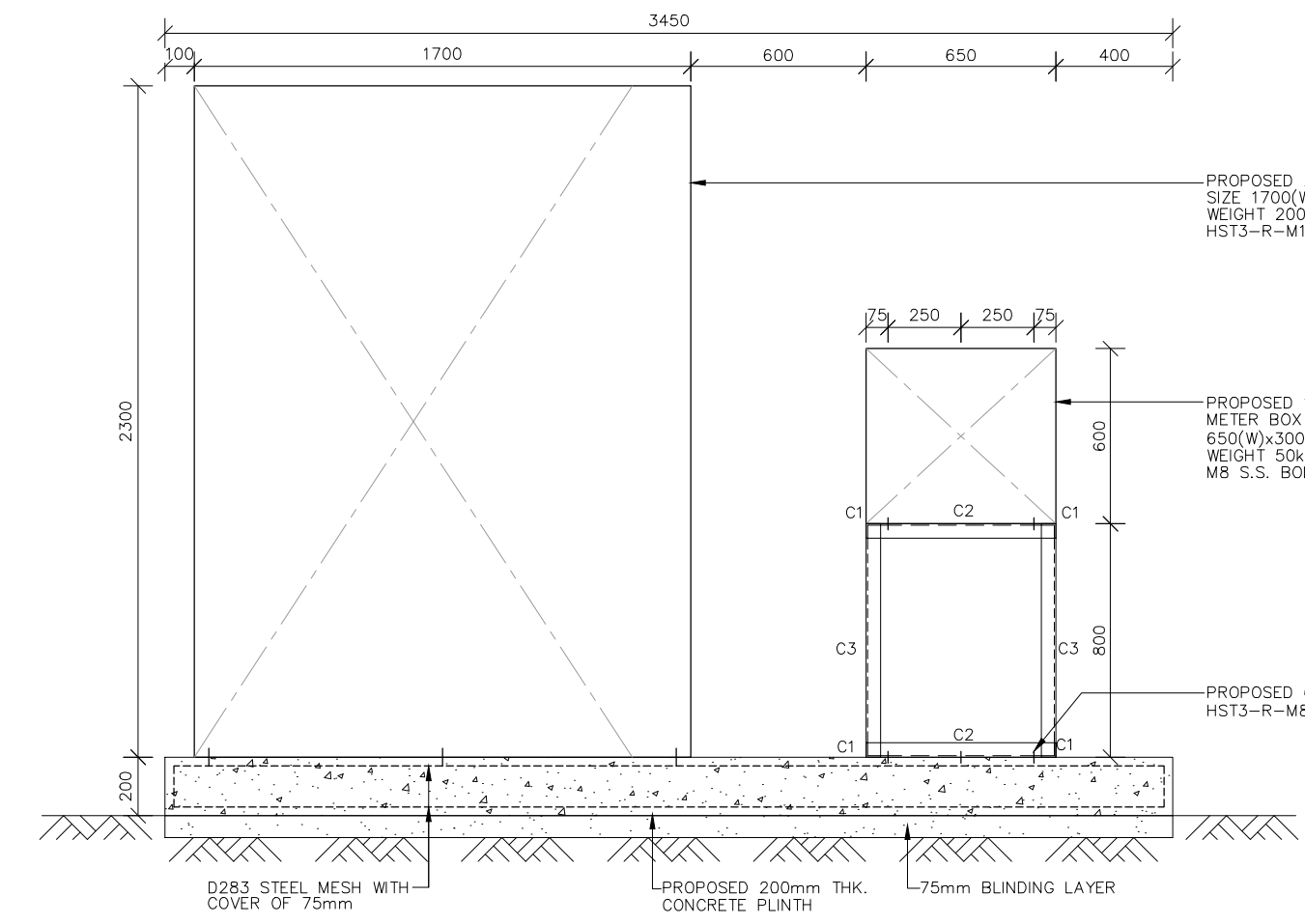
- ALL DIMENSIONS SHOWN ARE IN mm.
- EXACT DIMENSIONS TO BE VERIFIED ON SITE.
- ALL NEW STRUCTURAL STEEL WORK CHECKING COMPLY WITH THE CODE OF PRACTICE FOR THE STRUCTURAL USE OF STEEL 2011.
- ALL STRUCTURAL STEEL SHALL BE CLASS 1 OF GRADE S275 MINIMUM TO BS EN 10025 PART 1 & 2: 2004 STANDARD OR EQUIVALENT COMPLY WITH THE RELEVANT REFERENCE MATERIAL STANDARDS IN ANNEX A1.1 OF THE CODE OF PRACTICE FOR THE STRUCTURAL USE OF STEEL 2011.
- ALL HOT FINISHED STRUCTURAL HOLLOW SECTIONS SHOULD COMPLY WITH BS EN 10210 PART 1:2006
- ALL STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED TO A COATING OF 85 MICRONS THICK AND TWO COATS OF ZINC RICH PRIMER SHALL BE APPLIED AFTER WELDING CONNECTION TO BS EN ISO 1461:2008
- ALL STEEL BOLT/STUD/NUT TO BE GRADE 8.8 COMPLY WITH BS EN ISO 3506 PART 1 & 2: 2009 (P_{0.2}=375N/mm², P_{0.1}=560N/mm².)
- ALL WELDING SHALL BE IN ACCORDANCE WITH REQUIREMENT AS PER BS EN 1011 PART 1:2009 & PART 2:2001 (MIN. STRENGTH=220N/mm².)
- MAX. IMPOSED LOADING :
1) EQUIPMENT SELF WEIGHT = 450kg (MAX.)
- WIND PRESSURE IS IN ACCORDANCE WITH CODE OF PRACTICE ON WIND EFFECTS HONG KONG 2019. DESIGN WIND PRESSURE=1.35kPa, C_f=1.20 FOR EQUIPMENT. DESIGN WIND PRESSURE=1.35kPa, C_f=1.80 FOR ANTENNA.
- THE DESIGN AND CONSTRUCTION OF THE PROPOSED WORK SHALL COMPLY WITH THE BUILDINGS ORDINANCE, BUILDING REGULATIONS AND FIRE SAFETY IN BUILDINGS 2011.
- UNLESS OTHERWISE STATED, ALL ANCHOR BOLTS ARE HLT TYPE AS SPECIFIED BELOW.
HST3-R-M12-70
MIN. EMBEDMENT LENGTH
12mm DIAMETER ANCHOR
- ADDITIONAL PLASTIC SHEET WADDER SHOULD BE PROVIDE BETWEEN S.S. BOLT & GMS STEEL.
- ALL PLASTER TO BE 25mm THICK CEMENT : SAND = 1 : 3.
- ALL METAL SURFACE SHALL BE CLEANED THOROUGHLY TO REMOVE ALL DIRT, WELD SPATTER, GREASE AND THE LIKE. CHIP, SCRAPE AND WIRE-BRUSH TO REMOVE LOOSE SCALE UNTIL BACK TO CLEAN METAL. REMOVE SURFACE FILE OF MILL AND BRUSH WITH DETERGENTS.
- CHIP OFF THE PLASTER FROM THE FACE OF THE R.C. MEMBERS TO BE IN CONTACT WITH THE STEEL MEMBERS BEFORE INSTALLING.
- ALL WELDING TO BE 5mm FILLET WELD ALL ROUND UNLESS OTHERWISE STATED.
- ROUTING SHOULD BE ADJUSTED ON SITE TO AVOID CROSSING ON EXISTING SERVICE DUCTS. ALL CONDUIT SHALL BE IN G.I.
- ADEQUATE EARTHING PROTECTION SHALL BE PROVIDED.
- ALL ELECTRICAL WORK SHALL COMPLY WITH THE CURRENT COP, IEE AND POWER COMPANY REGULATION.
- POWER SUPPLY SHOULD BE 200A TPN CLP METER.
- NAME PLATE SHOULD BE PROVIDED ON ALL PROPOSED EQUIPMENT CABINET, COAXIAL CABLES, CONDUITS AND FACILITIES FOR EASY IDENTIFICATION.
- ALL NEW CONCRETE USED TO BE DESIGNED MIXED 300/20.
- CONCRETE COVER TO MAIN REINFORCEMENT TO BE 75mm FOR FOOTING.



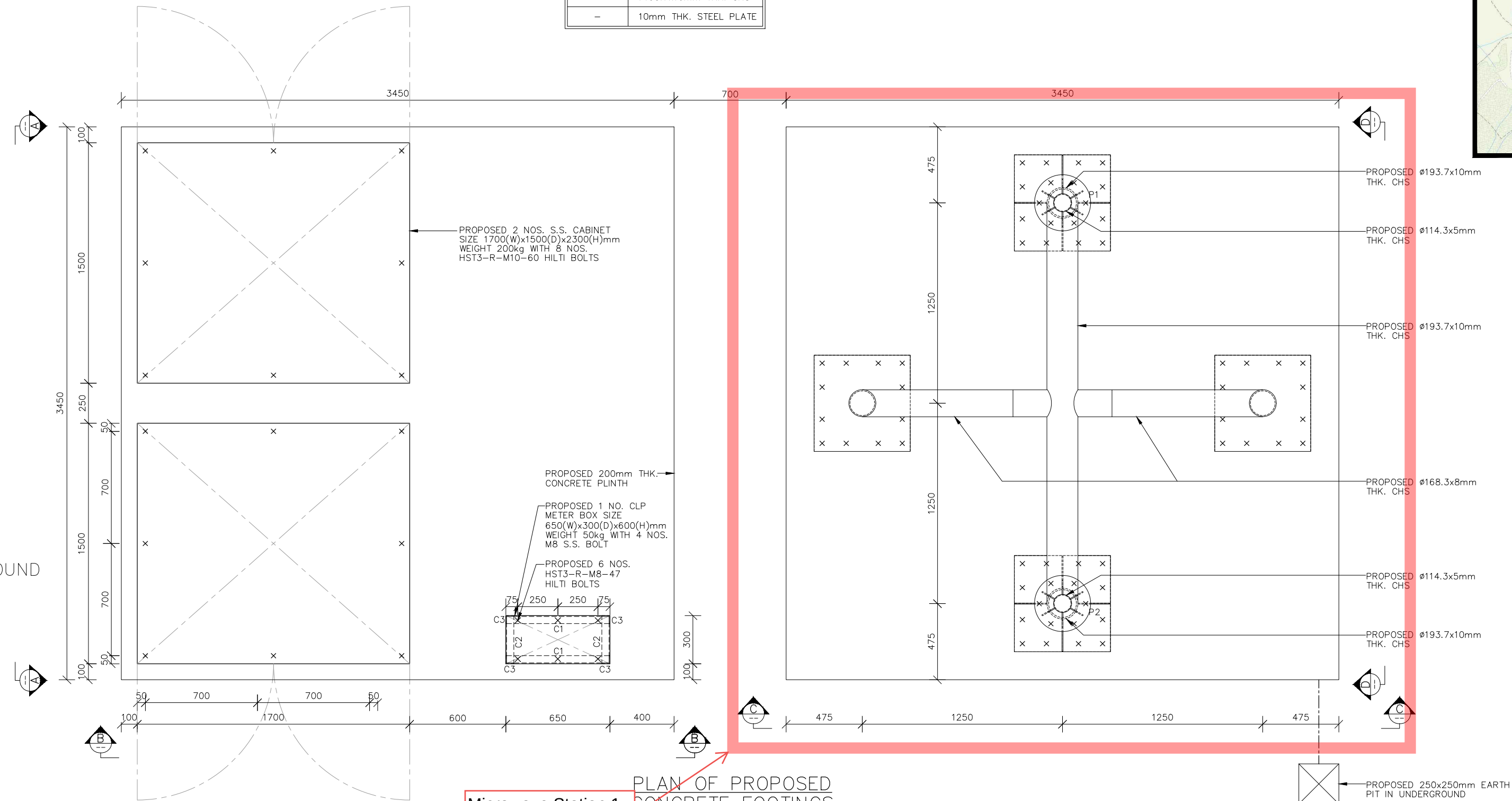
KEY PLAN
N.T.S.



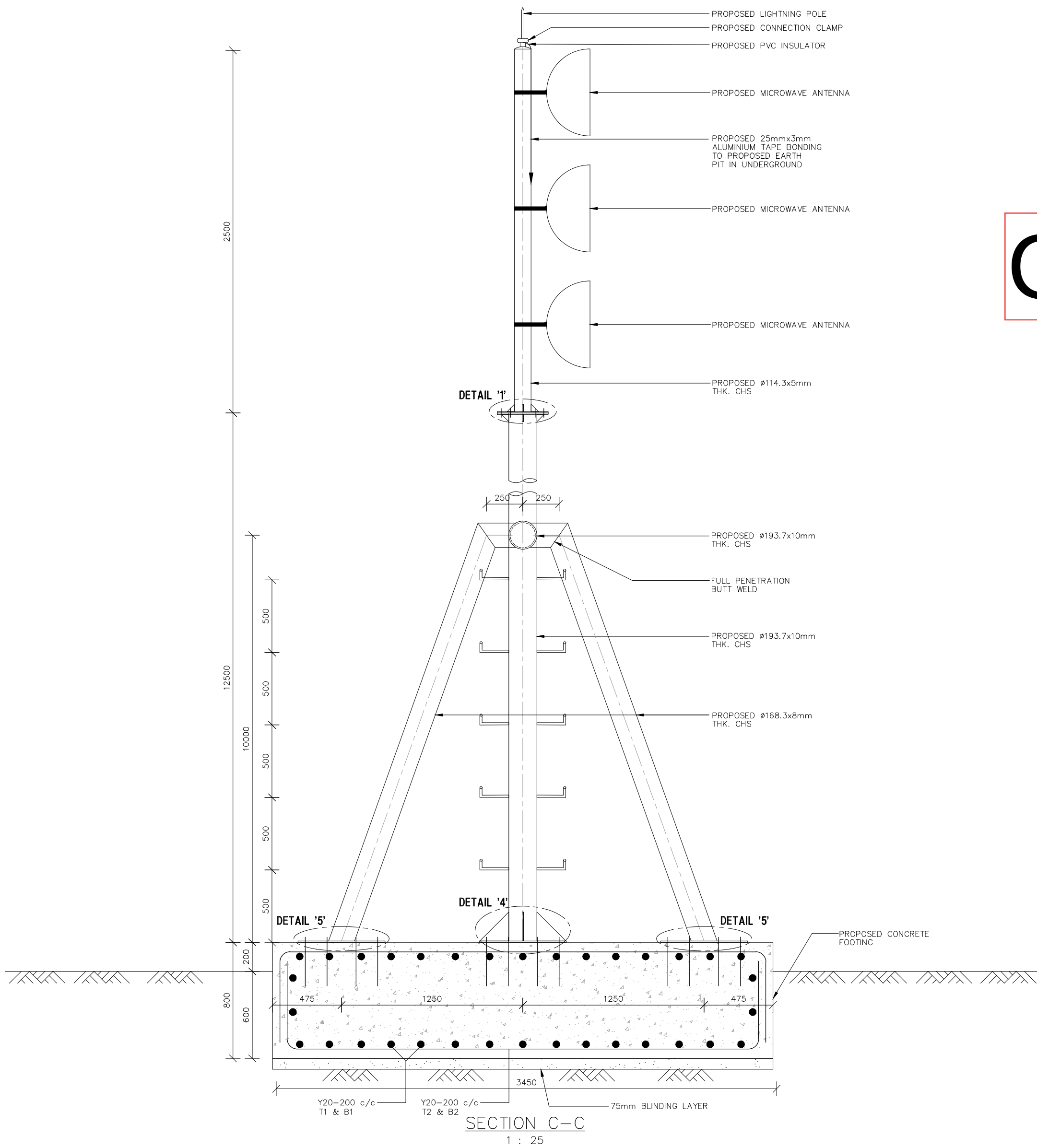
SECTION A-A
1 : 25



SECTION B-B
1 : 25



PLAN OF PROPOSED CONCRETE FOOTINGS
1 : 25



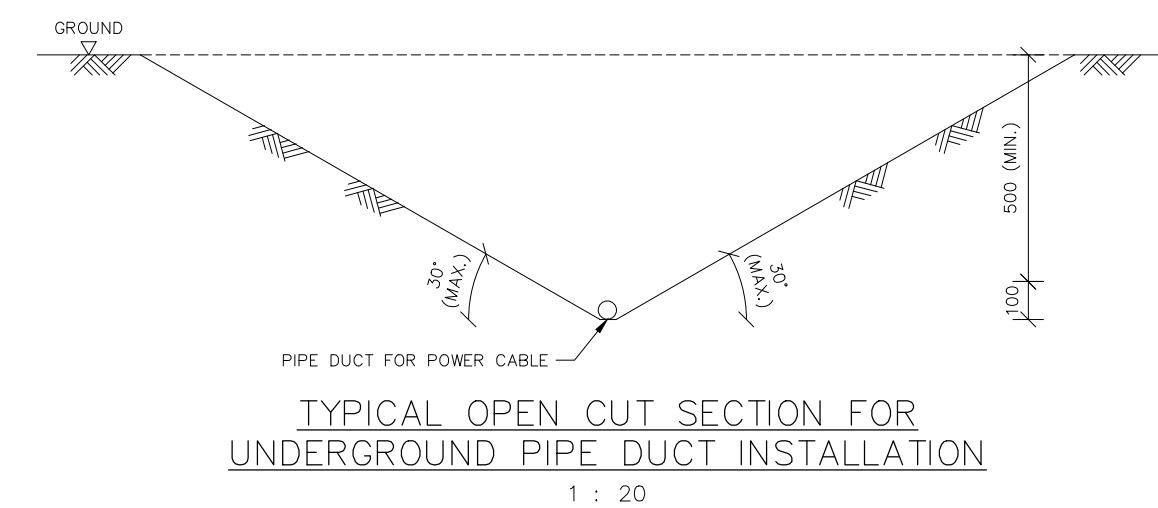
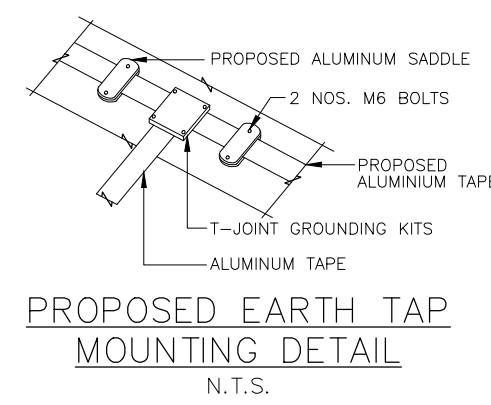
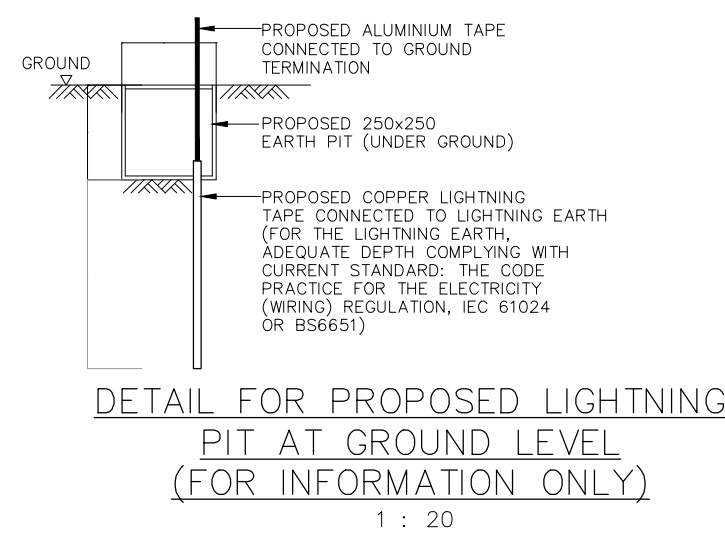
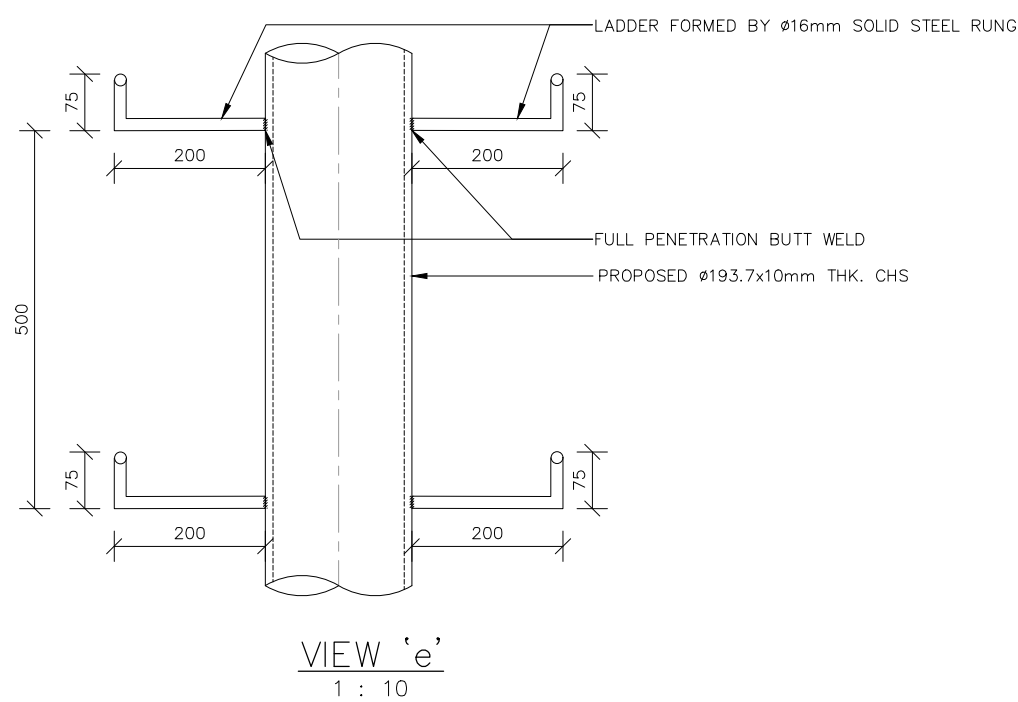
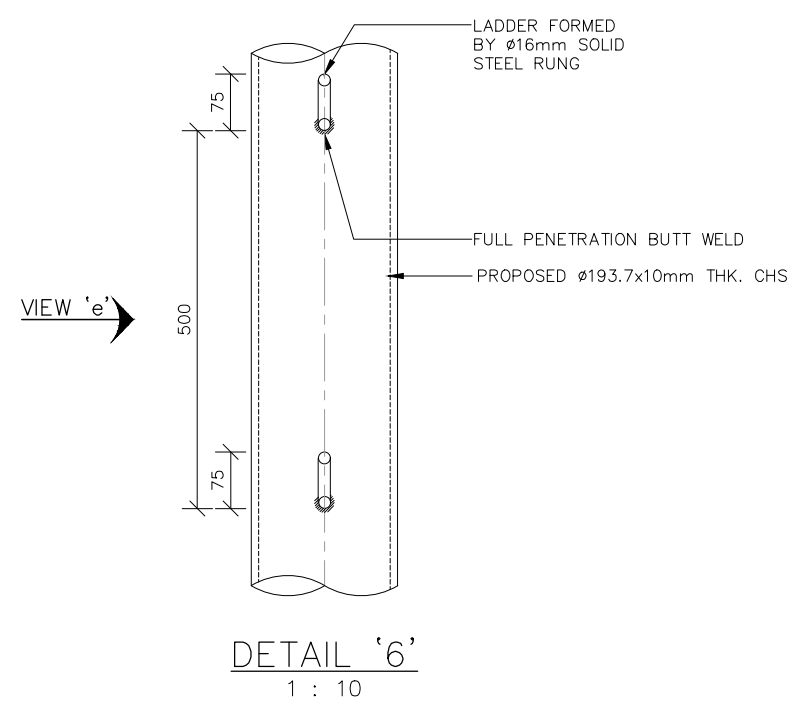
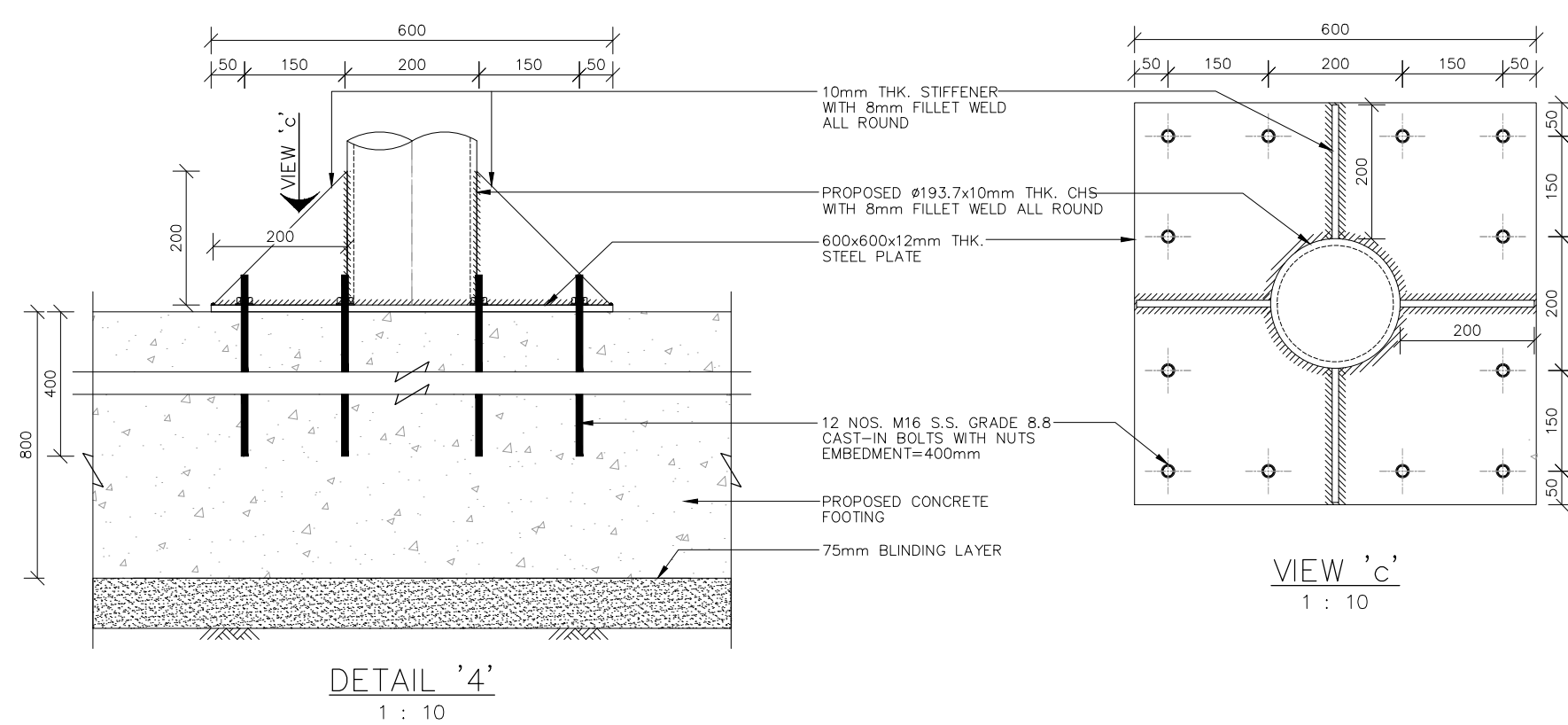
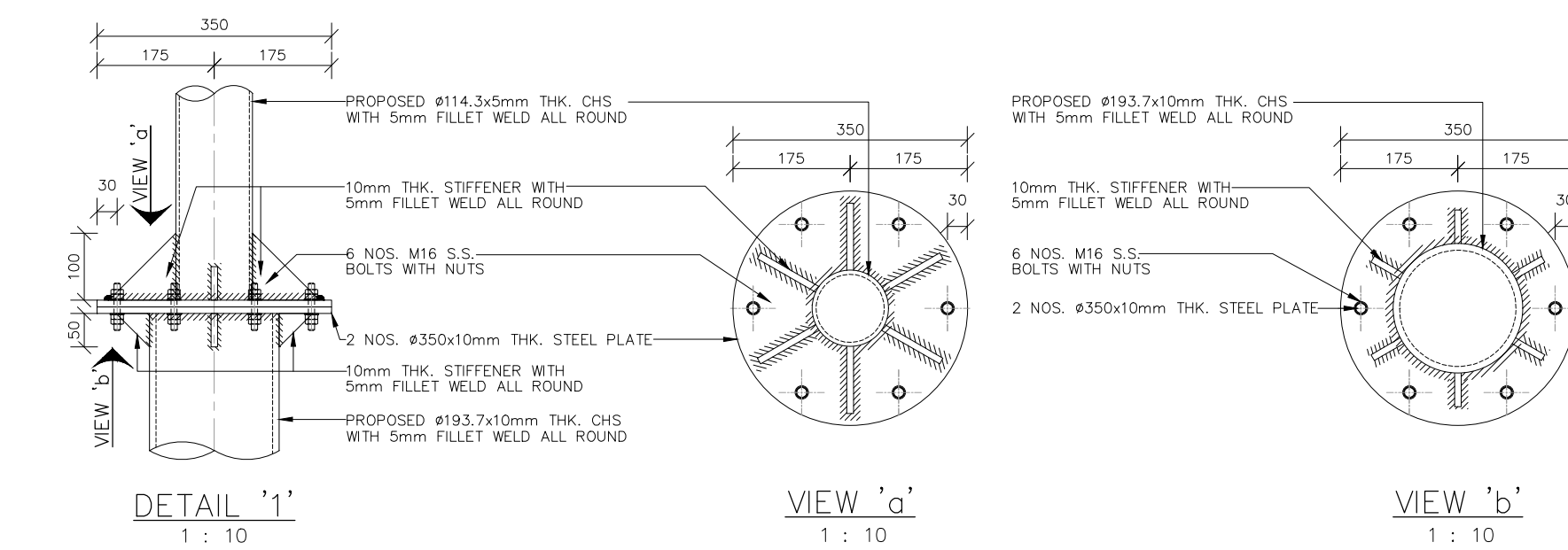
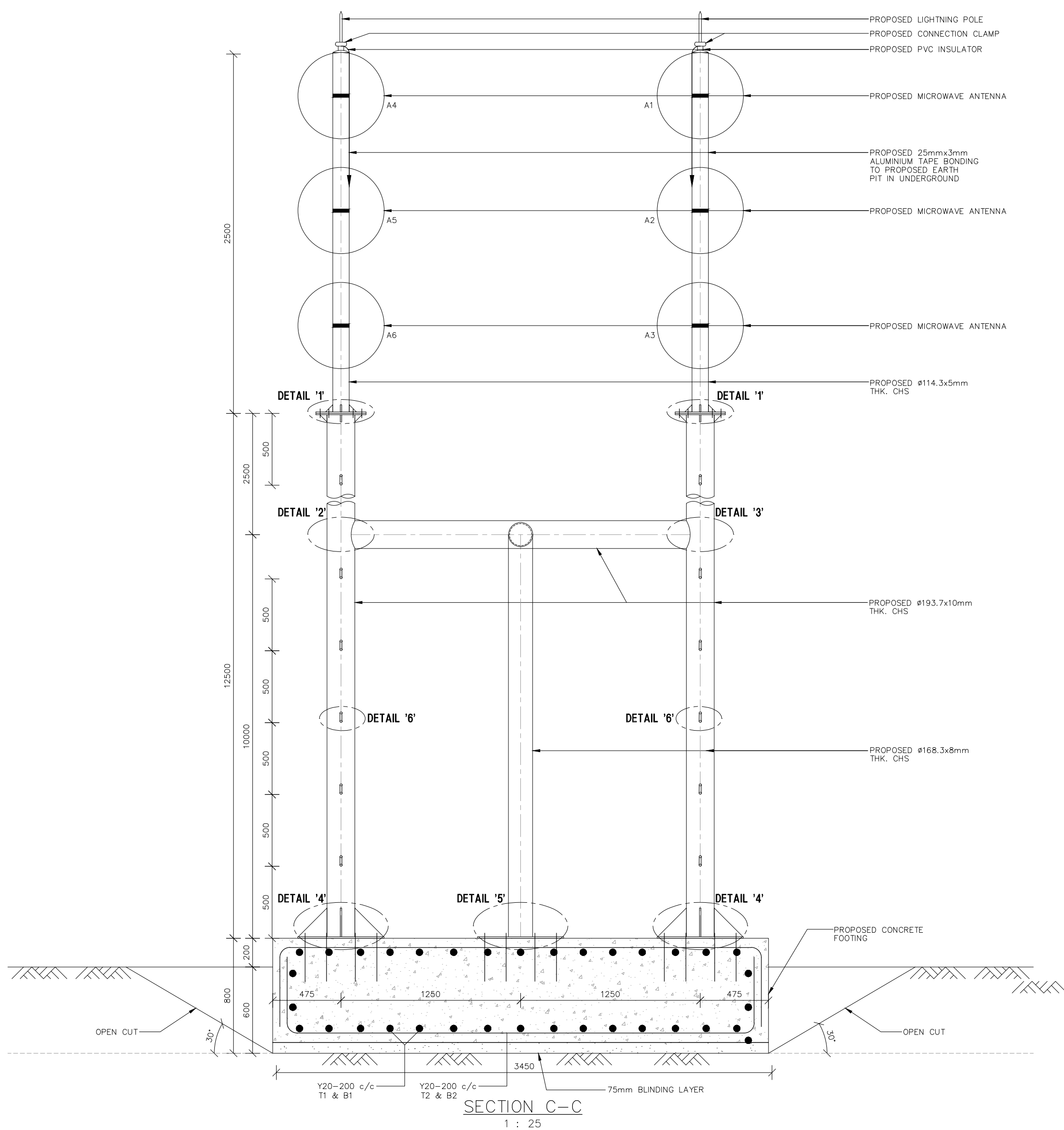
SECTION C-C
1 : 25

Construction Drawing

REV	DESCRIPTION	DATE	BY	CHK'D	APP
創域工程有限公司 JEG Engineering Co. Ltd.					
1/F, B1K E, Cheong Fat Factory Bldg., 346 Fuk Wing St., Cheung Sha Wan, Kln. TEL : 2117 9500 FAX : 3103 8077 E-MAIL : jeg@jeg-ltd.com					
CLIENT : HGC環電 GLOBAL COMMUNICATIONS					
PROJECT : SO LO PUN (APPLICATION FOR BLOCK LICENSE)					
DRAWING TITLE : DETAILS OF TRANSMISSION MICROWAVE ANTENNA					
SCALE AT A1 AS SHOWN	DESIGNED : A. CHAN	DRAWN : S.M.	CHECKED : G.C.		
	APPROVED : A. CHAN	DATE : 29 FEB., 2024			
PROJECT No. J8009	DRAWING No. : S2693-1			REV. -	

NOTES :

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH DRAWING S2693-1.
1. NOTES REFER TO DRAWING NO. S2693-1



REV	DESCRIPTION	DATE	BY	CHK'D	APP
創域工程有限公司 JEG Engineering Co. Ltd. 1/F, B1k E, Cheong Fat Factory Bldg., 346 Fuk Wing St., Cheung Sha Wan, Kln. TEL : 2117 9500 FAX : 3103 8077 E-MAIL : jeg@jeg-ltd.com					
CLIENT : HGC 環電 GLOBAL COMMUNICATIONS					
PROJECT : SO LO PUN (APPLICATION FOR BLOCK LICENSE)					
DRAWING TITLE : DETAILS OF TRANSMISSION MICROWAVE ANTENNA					
SCALE AT A1 AS SHOWN	DESIGNED : A. CHAN	DRAWN : S.M.	CHECKED : G.C.	DATE 29 FEB., 2024	
PROJECT No. J8009	DRAWING No. : S2693-2				REV. —

Excavation Plan



Land Filling Plan





前往地圖: <https://www.map.gov.hk/gm/geo:22.5382,114.2556?z=564>



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地圖列印於 2024 年 4 月 16 日

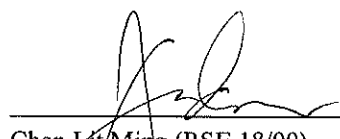
由「地理資訊地圖」網站提供: <https://www.map.gov.hk>

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Microwave Link Installation Report And Structural Calculation Report

For Microwave Antenna Fixing
At So Lo Pun

(Re-submission A)


Chan Lit/Ming (RSE 18/00)
Registered Structural Engineer

Project No.	:	J8009 – S2693-LANDS	Prepared	Checked	Approved
Client	:	HGC Global Communications Limited			
Structural Engineer	:	JEG Engineering Company Limited		Tim	
Date	:	April 2024			

Contents:

1	Introduction	1
2	Design Calculation for Equipment	S1 ~ S28
3	Design Calculation for Antenna	A1 ~ A39
4	Site Photos	

The following are the Drawings to be submitted with report.

<u>Drawing No.</u>	<u>Rev</u>	<u>Description</u>
S2693-LANDS-1	A	Details of Transmission Microwave Antenna Fixing
S2693-LANDS-2	A	Details of Transmission Microwave Antenna Fixing

Introduction

This report is to present the omni antenna installation work to be located at So Lo Pun for HGC Global Communications Limited (HGC).

The objective of the structural design calculation is to prove design check for the structural adequacy of antenna posts and equipment.

Microwave Link Installation Works

Installation of Equipment

- 1 group of BTS equipment (which include 3 nos. of S.S. Cabinet) will be installed.

The proposed equipment location and details of mounting are shown in the structural drawing and in the attached marked photos.

Installation of Antennae

- 6 nos. of microwave antenna (A1 to A6) mounted on 2 nos. of antenna posts (P1 to P2) will be installed.

The proposed antennae location and details of mounting are shown in the structural drawing and in the attached marked photos.

Installation of Power Cable

Total 200A three phase electrical power source will be required for the proposed equipment. Application will be submitted to China Light & Power Company Ltd. (CLP) to install additional power meter. In this case, a diameter of 50mm armored power cable from the proposed power meter to the proposed BTS equipment will be installed without blocking any access.

Installation of Fiber Cable

A diameter of 50mm armored fiber cable from the proposed BTS equipment to the proposed antenna will be installed without blocking any access.

Conclusion

Based on our calculation and site inspection, the proposed works will not induce adverse effect to the existing structure and the existing structure is adequate to sustain the proposed load.

Design Code and Reference

- I. Code of Practice for the Structural Use of Steel 2011;
- II. Code of Practice on Wind Effects Hong Kong 2019;
- III. Code of Practice for Dead and Imposed Loads 2011;
- IV. Hong Kong Building (Construction) Regulation;
- V. Hilti Fastening Technology Manual;

Material Strength

- I. All structural steel shall be class 1 of Grade S275 minimum to BS EN 10025 part 1 to 6: 2004 standards or equivalent, and complying with the relevant reference material standards in Annex A1.1 of the Code of Practice for the Structural Use of Steel 2011;
- II. All welds shall comply with BS EN 1011 Part 1: 2009 & Part 2: 2001 with weld strength of 220 N/mm^2 ;
- III. All structural steelworks shall be hot dip galvanized in compliance with BS EN ISO 1461: 2009, with minimum thickness not less than $85\mu\text{m}$ unless otherwise stated;
- IV. All steel bolt/stud to be grade 8.8 comply with BS EN ISO 3560 part 1&2: 2009 ($P_{tb} = 560 \text{ N/mm}^2$, $P_{sb} = 375 \text{ N/mm}^2$)

Design Calculation

JEG	Job		Job No. J8009 52693	Page 51
	CALCULATION	Calculations by	Checked by A. Chan	Date Apr 2024

Design Wind Pressure Calculation under CoP on Wind Effects 2019

Max. Actual Height , Z, above ground level = 2.5 m
 Wind reference pressure, $Q_{0,z}$ = $3.7 (2.5/500)^{0.16}$ ==> 1.59 kPa
 Directionality factor on pressure, S_θ = 0.85 (assume critical value)
 Max. Slope Height = 0 m; Max. Slope Length = 0 m;
 Upwind slope of topographic feature = 0/0 ==> #DIV/0! <0.03
 The topography factor, S_t = 1.00 Outside the topography significant zone
 Net pressure on surface, Q_z = $Q_{0,z} S_t S_\theta$ ==> 1.35 kPa
 Building Size = 1.50 (W) x 3.40 (D) x 2.30 (H)
 Force coefficient (W), C_{f1} = 1.11

$$C_f = 1.1 + \frac{0.055 H_e/D}{\exp\{[\log_e\{(0.6B/D)(1 - 0.011 H_e/D)\}][1.7 - 0.0013(H_e/D)^2]\}}$$

 Force coefficient (D), C_{f2} = 1.18
 The size factor, S_s = 1.00
 The final design wind pressure (W) = $Q_z \times C_f \times S_s$
 = $1.35 \times 1.11 \times 1$
 = 1.50 kPa
 The final design wind pressure (D) = $Q_z \times C_f \times S_s$
 = $1.35 \times 1.18 \times 1$
 = 1.60 kPa

Where

H_e effective building height, based on H , taking account of surroundings.

B breadth of building

D depth of building

Equation 4-1 can be used for $H_e/D \leq 12$.

Figure 5-2 Size factor, S_s

CALCULATION

Calculations by

Checked by A. Chan

Date Apr 2024

Design Loading For Equipment Unit

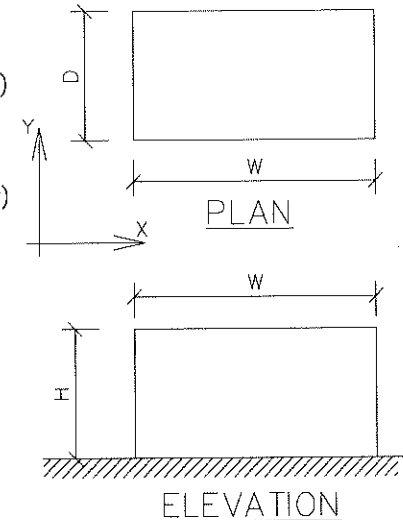
Max. Overall Size of Cabinet or Antenna = 1.00 m (W) x 1.00 m (D) x 2.30 m (H)

Max. Frontal Area of Cabinet in x dir.
= 3.40 x 2.30 + 0.00 x 0.00

$$= 7.82 \text{ m}^2 (A_x)$$

Max. Frontal Area of Cabinet in y dir
= 1.50 x 2.30 + 0.65 x 0.60

$$= 3.84 \text{ m}^2 (A_y)$$



Wind Load:

W.L. = 1.35 kPa (the building height under 3 m)

Force Coefficient, C_f = 1.2

Live Load:

Equipment self weight = Equipment (200 kg) x 2 Nos. = 400 kg

$$\text{s/w of conc. Plinth} = 2450 \times W \times L \times H = 5832 \text{ kg}$$

$$\text{Total Weight} = 6233 \text{ kg}$$

$$\text{Unit Weight} = \frac{\text{Max Weight}}{\text{Loaded area}} = \frac{62.33}{3.45 \times 3.45} = 5.24 < 50.00 \text{ kPa}$$

CALCULATION

Calculations by

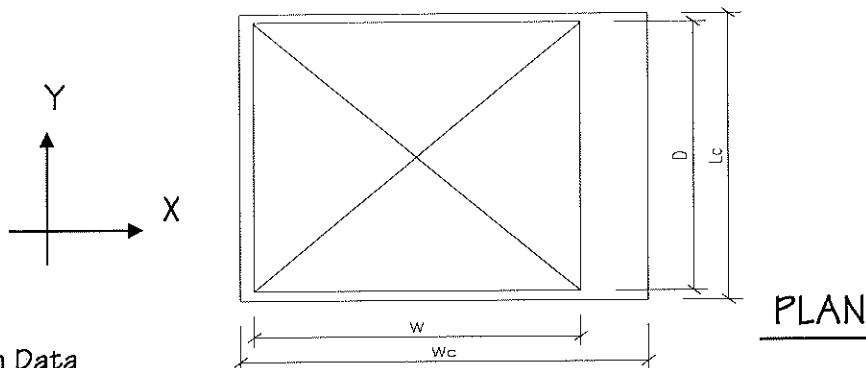
Checked by

A. Chan

Date

Apr 2024

Checking for Equipment Cabinet



Design Data

Design Wind Pressure, q	=	1.35	kPa
Force Coefficient, C_f	=	1.20	
Max. Overall Size of Cabinet or Antenna	=	1.00 m (W) x 1.00 m (D) x 2.30 m (H)	
Proposed Plinth Size	=	3.45 m (W_c) x 3.45 m (L_c) x 0.20 m (H_c)	

Check Stability of Equipment Cabinet

Check Overturning (wind x dir)

Overturning Moment, M_o	=	$q \times C_f \times A_x \times (H/2)$	
	=	$1.35 \times 1.2 \times 7.82 \times (2.3 / 2)$	= 14.6 kNm
Resisting Moment, M_r	=	total weight of cabinet x ($W_c / 2$)	
	=	$6233 / 100 \times 3.45 / 2$	= 107.5 kNm
Factor of Safety	=	$M_r / M_o = (107.5) / 14.6$	= 7.4 >= 1.5 OK!

Check Overturning (wind y dir)

Overturning Moment, M_o	=	$q \times C_f \times A_y \times (H/2)$	
	=	$1.35 \times 1.2 \times 3.84 \times (2.3 / 2)$	= 7.2 kNm
Resisting Moment, M_r	=	total weight of cabinet x ($L_c / 2$)	
	=	$6233 / 100 \times 3.45 / 2$	= 107.5 kNm
Factor of Safety	=	$M_r / M_o = (107.5) / 7.2$	= 15.03 >= 1.5 OK!

Check Sliding Case (wind x dir) - enclosed by 3.2m height existing R.C. wall

Sliding Force, F_s	=	$q \times C_f \times A_x$	
	=	$1.35 \times 1.2 \times 7.82$	= 12.7 kN
Resisting Force, F_r	=	total weight of cabinet x μ	
	=	$6233 / 100 \times 0.4$	= 24.9 kN
Factor of Safety	=	$F_r / F_s = (24.9) / 12.7$	= 1.97 >= 1.5 OK!

Check Sliding Case (wind y dir) - enclosed by 3.2m height existing R.C. wall

Sliding Force, F_s	=	$q \times C_f \times A_y$	
	=	$1.35 \times 1.2 \times 3.84$	= 6.2 kN
Resisting Force, F_r	=	total weight of cabinet x μ	
	=	$6233 / 100 \times 0.4$	= 24.9 kN
Factor of Safety	=	$F_r / F_s = (24.9) / 6.2$	= 4.01 >= 1.5 OK!

CALCULATION

Calculations by

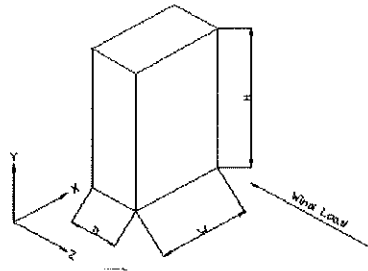
Checked by

A. Chan

Date

Apr 2024

Design for S.S. Cabinet



Max. Equipment size: 1500 (W) x 1700 (D) x 2300 (H)

Max Weight of Equipment, s/w = 200 kg

Wind pressure, qz = 1.35 kPa (Building under 2.5 m(max))

Force coefficient, Cf = 2.0

Shear due to Wind load, Vx = qz x Cf x D x H = 1.35 x 2 x 1.7 x 2.3 = 10.56 kN

Shear due to Wind Load, Vy = qz x Cf x W x H = 1.35 x 2 x 1.5 x 2.3 = 9.32 kN

Moment due to Wind Load, Mx = Vy x H / 2 = 9.315 x 2.3 / 2 = 10.71 kNm

Moment due to Wind Load, My = Vx x H / 2 = 10.557 x 2.3 / 2 = 12.14 kNm

Adopt 8 nos. HST3-R-M10 Hilti Bolt

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Company:
Address:
Phone | Fax:
Design:
Fastening point:

Page:
Specifier:
E-Mail:
Date:

0
17/4/2024

Specifier's comments:

1 Input data

Anchor type and diameter:
Return period (service life in years):
Item number:
Filling set or any suitable annular gap filling solution
Effective embedment depth:
Material:
Evaluation Service Report:
Issued | Valid:
Proof:
Stand-off installation:
Anchor plate:
Profile:
Base material:
Installation:
Reinforcement:

HST3-R M10 hefz

50

2105864 HST3-R M10x90 30/10

$h_{ef,act} = 60.0 \text{ mm}$ ($h_{ef,min} = \dots \text{ mm}$), $h_{nom} = 68.0 \text{ mm}$

A4

ETA 99/0001

20/7/2023 | -

SOFA based on EN 1992-4, Mechanical

$e_b = 0.0 \text{ mm}$ (no stand-off); $t = 3.0 \text{ mm}$

$l_p \times l_y \times t = 1,500.0 \text{ mm} \times 1,700.0 \text{ mm} \times 3.0 \text{ mm}$; (Recommended plate thickness: not calculated)

no profile

cracked concrete, C25/30, $f_{c,sp} = 25.00 \text{ N/mm}^2$; $h = 1,000.0 \text{ mm}$, User-defined partial material safety factor $\gamma_c = 1.500$

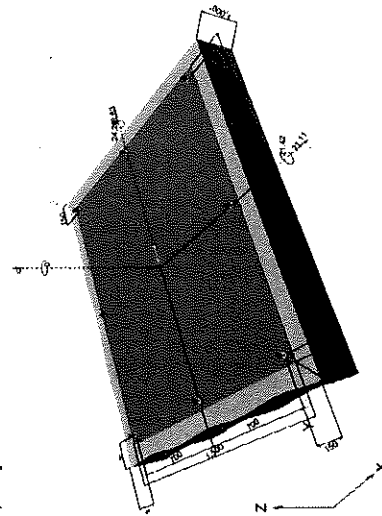
hammer drilled hole, Installation condition: Dry

no reinforcement or reinforcement spacing $\geq 150 \text{ mm}$ (any $\emptyset$) or $\geq 100 \text{ mm}$ ($\emptyset \leq 10 \text{ mm}$) with longitudinal edge reinforcement $d \geq 12.0 \text{ [mm]}$ + close mesh (stirrups, hangers) $s \leq 100.0 \text{ [mm]}$

Application also possible with HST4-R M10 under the selected boundary conditions.
More information in section Alternative fastening data of this report.

^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [mm] & Loading [kN, kNm]



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Company:
Address:
Phone | Fax:
Design:
Fastening point:

Page:
Specifier:
E-Mail:
Date:

1
17/4/2024

1.1 Load combination

Case	Description	Forces [kN] / Moments [kNm]	Seismic	Fire	Max. Util. Anchor [%]
1	Combination 1	$N = 0.000$; $V_x = 21.110$; $V_y = 18.630$; $M_x = -21.420$; $M_y = 24.280$; $M_z = 0.000$;	no	no	79

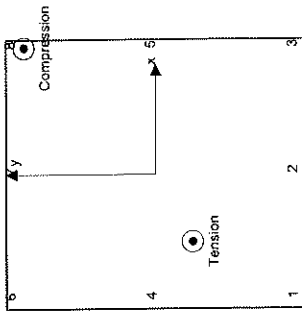
2 Load case/Resulting anchor forces

Anchor reactions [kN]

Anchor	Tension force (+Tension, -Compression)	Shear force x	Shear force y
1	5.843	3.519	2.639
2	3.784	3.519	2.639
3	1.724	3.519	2.639
4	4.827	3.519	2.639
5	0.708	3.519	2.639
6	3.811	3.519	2.639
7	1.751	3.519	2.639
8	0.000	3.519	2.639

max. concrete compressive strain: 0.06 ‰
max. concrete compressive stress: 1.87 [N/mm²]
resulting tension force in (x/y) = (-375.7/-206.3): 22.448 [kN]
resulting compression force in (x/y) = (705.9/747.9): 22.448 [kN]

Anchor forces are calculated based on the assumption of a rigid anchor plate.





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Company:	Specifier:	
Address:	E-Mail:	
Phone Fax:	Date:	17/4/2024
Design:		
Fastening point:		

3 Tension load (EN 1992-4, Section 7.2.1)

	Load [kN]	Capacity [kN]	Utilization β_k [%]	Status
Steel Strength*	5.843	20.500	29	OK
Pullout Strength*	5.843	11.180	53	OK
Concrete Breakout Failure**	5.843	11.929	49	OK
Splitting failure**	N/A	N/A	N/A	N/A

* highest loaded anchor ** anchor group (anchors in tension)

3.1 Steel Strength

$N_{Ed} \leq N_{Rk,s} = \frac{N_{Ra,s}}{\gamma_{M,s}}$ EN 1992-4, Table 7.1

$N_{Rk,s}$ [kN]	$\gamma_{M,s}$	$N_{Ra,s}$ [kN]	N_{Ed} [kN]
28.700	1.400	20.500	5.843

3.2 Pullout Strength

$N_{Ed} \leq N_{Ra,p} = \frac{w_c \cdot N_{Ra,p}}{\gamma_{Ra,p}}$ EN 1992-4, Table 7.1

$N_{Ra,p}$ [kN]	w_c	$\gamma_{Ra,p}$	$N_{Ra,p}$ [kN]	N_{Ed} [kN]
15.000	1.118	1.500	11.180	5.843



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Company:	Specifier:	
Address:	E-Mail:	
Phone Fax:	Date:	17/4/2024
Design:		
Fastening point:		

3.3 Concrete Breakout Failure

$N_{Ed} \leq N_{Rk,c} = \frac{N_{Ra,c}}{\gamma_{Ra,c}}$ EN 1992-4, Table 7.1

$N_{Rk,c} = N_{Ra,c}^0 \cdot \frac{A_{N,c}}{A_{N,c}^0} \cdot \psi_{s,N} \cdot \psi_{re,N} \cdot \psi_{act,N} \cdot \psi_{ec2,N} \cdot \psi_{M,N}$ EN 1992-4, Eq. (7.1)

$N_{Ra,c}^0 = k_1 \cdot \sqrt{f_{ctd}} \cdot h_{ef}^{1.5}$ EN 1992-4, Eq. (7.2)

$A_{N,c}^0 = s_{cr,N} \cdot s_{ef,N}$ EN 1992-4, Eq. (7.3)

$\psi_{s,N} = 0.7 + 0.3 \cdot \frac{c}{c_{ef,N}} \leq 1.00$ EN 1992-4, Eq. (7.4)

$\psi_{act,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{N,1}}{s_{ef,N}} \right)} \leq 1.00$ EN 1992-4, Eq. (7.6)

$\psi_{ec2,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{N,2}}{s_{ef,N}} \right)} \leq 1.00$ EN 1992-4, Eq. (7.6)

$\psi_{M,N} = 1$ EN 1992-4, Eq. (7.7)

$A_{N,c}$ [mm ²]	$A_{N,c}^0$ [mm ²]	$c_{ef,N}$ [mm]	$s_{ef,N}$ [mm]	f_{ctd} [N/mm ²]
32,400	32,400	90.0	180.0	25.00

$e_{N,1}$ [mm]	$\psi_{act,N}$	$e_{N,2}$ [mm]	$\psi_{ec2,N}$	$\psi_{s,N}$	$N_{Rk,c}$ [kN]	N_{Ed} [kN]
0.0	1.000	0.0	1.000	1.000	11.929	5.843

z [mm]	$\psi_{M,N}$	k_1	$N_{Ra,c}^0$ [kN]	$\gamma_{Ra,c}$	$N_{Rk,c}$ [kN]	N_{Ed} [kN]
1,442.4	1.000	7.700	17.883	1.500	11.929	5.843

Group anchor ID	1
-----------------	---



4 Shear load (EN 1992-4, Section 7.2.2)

Steel Strength (without lever arm)*	Load [kN]	Capacity [kN]	Utilization P _v [%]	Status
Steel failure (with lever arm)*	3.519	20.240	18	OK
Pryout Strength**	3.519	31.850	12	OK
Concrete edge failure in direction x**	22.236	40.496	55	OK

* highest loaded anchor ** anchor group (relevant anchors)

4.1 Steel Strength (without lever arm)

$$V_{Ed} \leq V_{Rd,s} = \frac{V_{Rd,s}}{\gamma_{M,s}} \quad \text{EN 1992-4, Table 7.2}$$
$$V_{Rd,s} = k_1 \cdot \rho \cdot V_{Rd,s} \quad \text{EN 1992-4, Eq. (7.35)}$$

$V_{Rd,s}^0$ [kN]	k_1	$V_{Rd,s}$ [kN]	$\gamma_{M,s}$	$V_{Rd,s}$ [kN]	V_{Ed} [kN]
25.300	1.000	25.300	1.250	20.240	3.519

4.2 Pryout Strength

$$V_{Ed} \leq V_{Rd,p} = \frac{V_{Rd,p}}{\gamma_{M,p}} \quad \text{EN 1992-4, Table 7.2}$$
$$V_{Rd,p} = k_1 \cdot N_{Rd,p} \quad \text{EN 1992-4, Eq. (7.39a)}$$
$$N_{Rd,p} = N_{Rd,s} \cdot \frac{A_{s,N}}{A_{s,N}^0} \cdot \psi_{s,N} \cdot \psi_{ed,N} \cdot \psi_{ec1,N} \cdot \psi_{ec2,N} \cdot \psi_{MN} \quad \text{EN 1992-4, Eq. (7.1)}$$
$$N_{Rd,s} = k_1 \cdot \sqrt{f_{ct}} \cdot h_{ef}^{1.5} \quad \text{EN 1992-4, Eq. (7.2)}$$
$$N_{s,N}^0 = s_{ed,N} \cdot s_{ed,N} \quad \text{EN 1992-4, Eq. (7.3)}$$
$$\psi_{s,N} = 0.7 + 0.3 \cdot \frac{c_{ed,N}}{s_{ed,N}} \leq 1.00 \quad \text{EN 1992-4, Eq. (7.4)}$$
$$\psi_{ec1,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{y,1}}{s_{ed,N}} \right)} \leq 1.00 \quad \text{EN 1992-4, Eq. (7.6)}$$
$$\psi_{ec2,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{y,2}}{s_{ed,N}} \right)} \leq 1.00 \quad \text{EN 1992-4, Eq. (7.6)}$$
$$\psi_{MN} = 1 \quad \text{EN 1992-4, Eq. (7.7)}$$

$A_{s,N}$ [mm ²]	$A_{s,N}^0$ [mm ²]	$c_{ed,N}$ [mm]	$s_{ed,N}$ [mm]	k_1	t_{ed} [N/mm ²]
32.400	32.400	90.0	180.0	2.670	25.00
$e_{y,1}$ [mm]	$e_{y,2}$ [mm]	$e_{ed,N}$ [mm]	$\psi_{ec2,N}$	ψ_{MN}	$\psi_{Rd,N}$
0.0	0.0	0.0	1.000	1.000	1.000
k_1	$N_{Rd,s}^0$ [kN]	$\gamma_{M,p}$	$V_{Rd,p}$ [kN]	V_{Ed} [kN]	
7.700	17.893	1.500	31.850	3.519	

Group anchor ID: 8



4.3 Concrete edge failure in direction x**

$$V_{Ed} \leq V_{Rd,c} = \frac{V_{Rd,c}}{\gamma_{M,c}} \quad \text{EN 1992-4, Table 7.2}$$
$$V_{Rd,c} = k_1 \cdot \rho \cdot A_{c,v} \cdot \psi_{s,v} \cdot \psi_{ed,v} \cdot \psi_{ec1,v} \cdot \psi_{ec2,v} \cdot \psi_{MN,v} \quad \text{EN 1992-4, Eq. (7.40)}$$
$$\rho = k_3 \cdot d_{nom}^{0.5} \cdot \sqrt{f_{ct}} \cdot h_{ef}^{1.5} \quad \text{EN 1992-4, Eq. (7.41)}$$
$$\alpha = 0.1 \cdot \left(\frac{l}{c_1} \right) \quad \text{EN 1992-4, Eq. (7.42)}$$
$$\beta = 0.1 \cdot \left(\frac{d_{nom}}{c_1} \right)^{0.2} \quad \text{EN 1992-4, Eq. (7.43)}$$
$$A_{c,v}^0 = 4.5 \cdot c_1^2 \quad \text{EN 1992-4, Eq. (7.44)}$$
$$\psi_{s,v} = 0.7 + 0.3 \cdot \frac{c_2}{1.5 \cdot c_1} \leq 1.00 \quad \text{EN 1992-4, Eq. (7.45)}$$
$$\psi_{ed,v} = \left(\frac{1.5 \cdot c_1}{h} \right)^{0.5} \geq 1.00 \quad \text{EN 1992-4, Eq. (7.46)}$$
$$\psi_{ec1,v} = \frac{1}{1 + \left(\frac{2 \cdot e_{y,1}}{3 \cdot c_1} \right)} \leq 1.00 \quad \text{EN 1992-4, Eq. (7.47)}$$
$$\psi_{ec2,v} = \frac{1}{\left(\cos \alpha_v \right)^2 + \left(0.5 \cdot \sin \alpha_v \right)^2} \geq 1.00 \quad \text{EN 1992-4, Eq. (7.48)}$$

l_1 [mm]	d_{nom} [mm]	k_3	μ	β	t_{ed} [N/mm ²]
80.0	10.00	1.700	0.063	0.058	25.00
c_1 [mm]	$A_{c,v}$ [mm ²]	$A_{c,v}^0$ [mm ²]			
150.0	286.875	101.250			
$\psi_{s,v}$	$\psi_{ed,v}$	u_v [°]	$\psi_{s,v}$	$e_{y,2}$ [mm]	$\psi_{ec1,v}$
0.900	1.000	18.31	1.039	0.0	1.000
$V_{Rd,c}^0$ [kN]	k_1	$\gamma_{M,c}$	$V_{Rd,c}$ [kN]	V_{Ed} [kN]	
22.922	1.0	1.500	40.496	22.236	



5 Combined tension and shear loads (EN 1992-4, Section 7.2.3)

Steel failure				
β_N	β_V	α	Utilization $\beta_{N,V}$ [%]	Status
0.285	0.174	2.000	12	OK
$\beta_N^* + \beta_V^* \leq 1.0$				
Concrete failure				
β_N	β_V	α	Utilization $\beta_{N,V}$ [%]	Status
0.523	0.549	1.500	79	OK
$\beta_N^* + \beta_V^* \leq 1.0$				

6 Displacements (highest loaded anchor)

Short term loading:		δ_N	=	0.4586 [mm]
N_{Sk}	=	4.328 [kN]		
V_{Sk}	=	2.607 [kN]		
		δ_V	=	0.4135 [mm]
Long term loading:		δ_{Nv}	=	0.6153 [mm]
		δ_N	=	0.9871 [mm]
N_{Sk}	=	4.328 [kN]		
V_{Sk}	=	2.607 [kN]		
		δ_V	=	0.6113 [mm]
		δ_{Nv}	=	1.1611 [mm]

Comments: Tension displacements are valid with half of the required installation torque moment for uncracked concrete! Shear displacements are valid without friction between the concrete and the anchor plate! The gap due to the drilled hole and clearance hole tolerances are not included in this calculation!

The acceptable anchor displacements depend on the fastened construction and must be defined by the designer!

7 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff. In order not to be deformed when subjected to the design loading, PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Design is only valid if hole is filled to remove clearance, clearance as per EN 1992-4 Table 6.1
- Checking the transfer of loads into the base material is required in accordance with EN 1992-4, Annex A!
- The design is only valid if the clearance hole in the fixture is not larger than the value given in Table 6.1 of EN 1992-4! For larger diameters of the clearance hole see section 6.2.2 of EN 1992-4!
- The accessory list in this report is for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- For the determination of the $v_{se,v}$ (concrete edge failure) the minimum concrete cover defined in the design settings is used as the concrete cover of the edge reinforcement.
- The characteristic bond resistances depend on the return period (service life in years): 50



Fastening meets the design criteria!

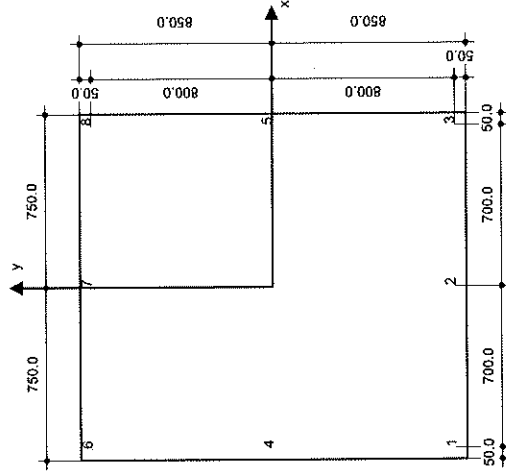
8 Installation data

Anchor plate, steel: EN S235; E = 205.000,00 N/mm ² ; f_{yk} = 235,00 N/mm ²	Anchor type and diameter: HST3-R M10 hef2
Profile: no profile	Item number: 2105864 HST3-R M10x90 30/10
Hole diameter in the fixture: d_f = - mm	Maximum installation torque: 45 Nm
Plate thickness (input): 3.0 mm	Hole diameter in the base material: 10.0 mm
Recommended plate thickness: not calculated	Hole depth in the base material: 85.0 mm
Drilling method: Hammer drilled	Minimum thickness of the base material: 100.0 mm
Clearing: No clearing of the drilled hole is required	

Hilti HST3 stud anchor with 60 mm embedment, M10 hel2, Stainless steel, installation per ETA 98.00001, with annular gaps filled with Hilti Filling set or any suitable gap solutions

8.1 Recommended accessories

Drilling	Clearing	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• No accessory required	• Torque controlled cordless impact tool • Torque wrench • Hammer



Coordinates Anchor [mm]											
Anchor						Anchor					
		x	y	c _x	c _{xy}			x	y	c _x	c _{xy}
1	-700.0	-800.0	-	1,550.0	-	1,750.0	5	700.0	0.0	-	150.0
2	0.0	-800.0	-	850.0	-	1,750.0	6	-700.0	800.0	-	1,550.0
3	700.0	-800.0	-	150.0	-	1,750.0	7	0.0	800.0	-	850.0
4	-700.0	0.0	-	1,550.0	-	950.0	8	700.0	800.0	-	150.0

Input data and results must be checked for conformity with the existing conditions and for plausibility!

9 Drilling and installation

MS7 (R) subject to:		MS	MS1	MS2	MS3	MS4
Anchor item						
Nuclear safety			TEC-A - TE-N-A		TE-B - TE-U	
Diamond core drilling			DD-29-V	DD-CC1		
Sliding bar			Sliding bar MS-SC		TE-CD TE-YO	
Welding and air drilling						
Electric S&P Flaring tool			Specialty flaring tool MS-M20 (Carbon and stainless steel A4)			
Impact Wrench and Air Impact Torque Wrench			Impact Wrench S&P CAT-622 and Air Impact Torque Wrench S&P CAT-622			

*Installation methods provided in EIA-5880001
 *Sensors, not needed to fit the Areside gap between motor and Ebers
 (at minimum 3.4). (Nuclear Medical Technology (NMT))

Input data and results must be checked for conformity with the existing conditions and for plausibility!



www.hilti.com.hk	Page:	10
Company:	Specifier:	
Address:	E-Mail:	
Phone / Fax:	Date:	17/4/2024
Design:		
Fastening point:		

10 Alternative fastening

10.1 Alternative fastening data

Anchor type and diameter: HST4-R M10

Return period (service life in years): 50

Item number: 2329101 HST4-R M10x90 S-40

Filling set or any suitable annular gap filling solution

Effective embedment depth: $h_{\text{red}} = 60.0 \text{ mm}$ ($h_{\text{min}} = - \text{mm}$), $h_{\text{max}} = 68.0 \text{ mm}$

Material: A4

Evaluation Service Report: ETA-21/0878

Issued / Valid: 28/2/2024 | -

Proof: SOFA based on EN 1992-1, Mechanical

Stand-off installation: $e_s = 0.0 \text{ mm}$ (no stand-off); $t = 3.0 \text{ mm}$

Anchor plate R : $l_x, l_y, t = 1,500.0 \text{ mm} \times 1,700.0 \text{ mm} \times 3.0 \text{ mm}$; (Recommended plate thickness: not calculated)

Profile: no profile

Base material: cracked concrete, C25/30, $f_{\text{ct,eff}} = 25.00 \text{ N/mm}^2$; $h = 1,000.0 \text{ mm}$, User-defined partial material safety factor $\gamma_c = 1.500$

Installation: hammer drilled hole, installation condition: Dry

Reinforcement: no reinforcement or reinforcement spacing $\geq 150 \text{ mm}$ (any $\emptyset$) or $\geq 100 \text{ mm}$ ($\emptyset \leq 10 \text{ mm}$)

with longitudinal edge reinforcement $d \geq 12.0 \text{ [mm]}$ + close mesh (stirrups, hangers) $s \leq 100.0 \text{ [mm]}$

Max. Utilization with HST4-R M10: 69 %
Fastening meets the design criteria!

10.2 Installation data

Anchor plate, steel: EN S235; $E = 205,000.00 \text{ N/mm}^2$; $f_{\text{yk}} = 235.00 \text{ N/mm}^2$

Profile: no profile

Hole diameter in the fixture, $d_i = - \text{mm}$

Plate thickness (input): 3.0 mm

Recommended plate thickness: not calculated

Drilling method: Hammer drilled

Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: HST4-R M10

Item number: 2329101 HST4-R M10x90 S-40

Maximum installation torque: 40 Nm

Hole diameter in the base material: 10.0 mm

Hole depth in the base material: 88.0 mm

Minimum thickness of the base material: 115.0 mm

Hilti HST4-R stud anchor with 60 mm embedment, M10, Stainless steel, installation per ETA-21/0878, with annular gaps filled with Hilti Filling set or any suitable gap solutions

10.2.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• No accessory required	• Torque controlled cordless impact tool • Torque wrench • Hammer

Input data and results must be checked for conformity with the existing conditions and for plausibility!

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Company:	Specifier:	
Address:	E-Mail:	
Phone / Fax:	Date:	17/4/2024
Design:		
Fastening point:		

11 Remarks; Your Cooperation Duties

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CALCULATION

Calculations by

Checked by

A. Chan

Date

Apr, 2024

Design Loading For S.S.Cabinet

$$q_z = 1.35 \text{ kPa} \quad (\text{the building height under } 2.5 \text{ m})$$

$$C_p = 2.00$$

$$\text{Size of S.S.Cabinet} = 0.650 \text{ m (W)} \times 0.300 \text{ m (D)} \times 0.600 \text{ m (H)} \quad (50 \text{ kg})$$

Wind Load

$$W_{Lex} = q_z \times C_p \times 0.65 \times 0.6 \times 1.4$$

$$= 1.48 \text{ kN}$$

$$W_{Ley} = q_z \times C_p \times 0.3 \times 0.6 \times 1.4$$

$$= 0.69 \text{ kN}$$

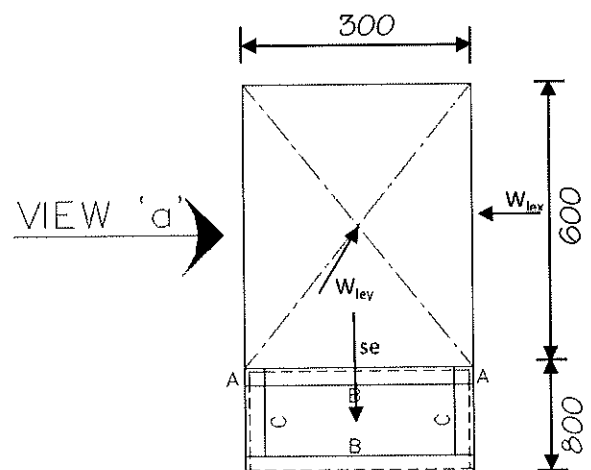
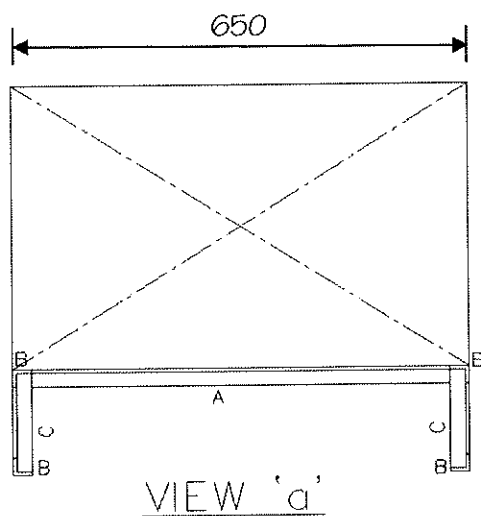
$$s/w, se = 50 / 100 \times 1.4$$

$$= 0.70 \text{ kN}$$

Member A : C1

Member B : C2

Member C : C3



CALCULATION

Calculations by O

Checked by A. Chan

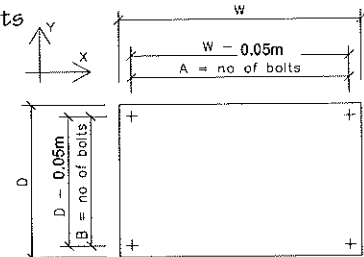
Date Apr,2024

Check Bolt Connection for S.S.Cabinet & Steel Platform

Size of S.S.Cabinet = 0.65 (W) x 0.30 (D) x 0.60 (H)

 $q_z = 1.35 \text{ kPa}$
 $C_f = 2.00$

Try (row) 2 x (column) 2 nos. M8 Grade A1 - 50 Stainless Steel Bolts



$$\begin{aligned} \text{Shear Capacity, } P_s &= A_t \times P_{sb} \\ &= 36.6 \times 200 / 10^3 \\ &= 7.32 \text{ kN} \end{aligned}$$

$$\begin{aligned} \text{Tension Capacity, } P_t &= A_t \times P_{st} \\ &= 36.6 \times 210 / 10^3 \\ &= 7.69 \text{ kN} \end{aligned}$$

$$\begin{aligned} \text{Total nos. of bolts} &= 4 \text{ nos.} \\ \text{Bolt area, } A_t &= 36.6 \text{ mm}^2 \\ \text{Shear strength of bolt, } p_{sb} &= 200 \text{ N/mm}^2 \\ \text{Tension strength of bolt, } p_{tb} &= 210 \text{ N/mm}^2 \end{aligned}$$

For wind in x direction

$$\begin{aligned} \text{Shear per bolt, } F_s &= q_z \times C_f \times D \times H \times 1.4 / 4 \text{ nos.} \\ &= 1.35 \times 2 \times 0.3 \times 0.6 \times 1.4 / 4 \text{ nos.} \\ &= 0.17 \text{ kN} < P_s \quad \text{OK!} \end{aligned}$$

$$\begin{aligned} \text{Tension per bolt, } F_t &= q_z \times C_f \times D \times H^2 / 2 / (W - 0.05) \times 1.4 / 2 \text{ nos.} \\ &= 1.35 \times 2 \times 0.3 \times 0.6^2 / 2 / (0.65 - 0.05) \times 1.4 / 2 \text{ nos.} \\ &= 0.17 \text{ kN} < P_t \quad \text{OK!} \end{aligned}$$

Check Combine Effect

$$F_s / P_s + F_t / P_{nom} = 0.17 / 7.32 + 0.17 / 7.69 = 0.05 < 1.4 \quad \text{OK!}$$

For wind in y direction

$$\begin{aligned} \text{Shear per bolt, } F_s &= q_z \times C_f \times W \times H \times 1.4 / 4 \text{ nos.} \\ &= 1.35 \times 2 \times 0.65 \times 0.6 \times 1.4 / 4 \text{ nos.} \\ &= 0.37 \text{ kN} < P_s \quad \text{OK!} \end{aligned}$$

$$\begin{aligned} \text{Tension per bolt, } F_t &= q_z \times C_f \times W \times H^2 / 2 / (D - 0.05) \times 1.4 / 2 \text{ nos.} \\ &= 1.35 \times 2 \times 0.65 \times 0.6^2 / 2 / (0.3 - 0.05) \times 1.4 / 2 \text{ nos.} \\ &= 0.88 \text{ kN} < P_t \quad \text{OK!} \end{aligned}$$

Check Combine Effect

$$F_s / P_s + F_t / P_{nom} = 0.37 / 7.32 + 0.88 / 7.69 = 0.17 < 1.4 \quad \text{OK!}$$

Adopt 4nos. M8 Stainless Steel Bolts

CALCULATION

Calculations by

O

Checked by

A. Chan

Date

Apr, 2024

Check Member C1 (L = 650 mm)

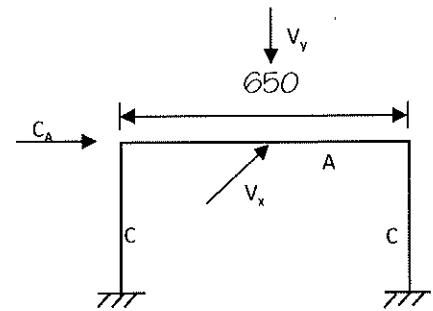
Try EA 50x50x5+

$$\begin{aligned} \text{Compression on C1,} &= W_{Ley} / 2 \text{ nos} \\ &= 0.69 / 2 \text{ nos} \\ &= 0.35 \text{ kN} \end{aligned}$$

$$\begin{aligned} \text{Max Shear on C1,} &= [(W_{Lex} / 2)^2 + (se / 2)^2]^{0.5} \\ &= [(1.48 / 2)^2 + (0.7 / 2)^2]^{0.5} \\ &= 0.82 \text{ kN} \end{aligned}$$

$$\begin{aligned} \text{Moment, } M_x &= se / 2 \times L / 4 \\ &= 0.7 / 2 \times 0.65 / 4 \\ &= 0.06 \text{ kNm} \end{aligned}$$

$$\begin{aligned} \text{Moment, } M_y &= W_{Lex} / 2 \times L / 4 \\ &= 1.48 / 2 \times 0.65 / 4 \\ &= 0.13 \text{ kNm} \end{aligned}$$



For member checking, please refer to next page.

Adopt EA 50x50x5+

JEG	Job Title		Job No.	Sheet No.	Rev.
				S14	
CALCULATION	Design by	Checked by	M.K. Wong		
		Date:			

Member C1
EA 50x50x5+
HKSC:2011 APPROACH

Member Forces

F_c Axial Compression	=	0.35	kN
F_t Axial Tension	=	0.00	kN
V Shear Force = $\sqrt{V_x^2 + V_y^2}$	=	0.82	kN
M_x Major Bending	=	0.06	kNm
M_y Minor Bending	=	0.13	kNm

Load Case 1

1. Shear Capacity	0.021	O.K.
2. Bending Capacity	0.160	O.K.
3. LTB	-	O.K.
4. Compression Capacity	0.004	O.K.
5. Tensile Capacity	0.000	O.K.
6. Combined Axial & Bending	0.203	O.K.

Section Properties

Note: This Section is a Rolled Steel Joist. It is assumed that the section is a standard section.

Dimensions	mm	Length	mm
Depth, D	50	L	1000 max
Width, B	50	L_{ex}	= 1.0 L
Flange Thk, T	5.0	L_{ey}	= 1.0 L
Web Thk, t	5.0		
depth, d	50.0	d/t =	10
width, b	50.0	b/T =	10

Steel	Grade	S275	Radius of Gyration				
	p_y	275	r_x	14.8	mm		
	p_{yw}	275	r_y	14.8	mm		
	$\epsilon = (275/p_y)^{1/2}$	1.00	ϵ_{web}	1.00			
	E	205000					
	Area A_g	491					

Second Moment of Area

I_x	1.070E+05	mm ⁴
I_y	1.070E+05	mm ⁴

Section Modulus

Elastic:	Z_x	2.950E+03	mm ³	Plastic:	S_x	5.580E+03	mm ³
	Z_y	2.950E+03	mm ³		S_y	5.580E+03	mm ³

Limiting Width-to-Thickness Ratios

Compression Element		Limiting Value			Ratio	Classification
Design Type		Class 1 Plastic	Class 2 Compact	Class 3 Semi-Compact		
Flange	Compression due to Bending	8e 8.00	9e 9.00	13e 13.00	b/T 10.00	Semi-Compact
Web	Neutral Axis at Mid-Depth	80e 80.00	100e 100.00	120e 120.00	d/t 10.00	Plastic
Web	Generally ($>= 40\epsilon = 40$)	80e/(1+r1) 79.59	100e/(1+1.5r1) 79.39	120e/(1+2r2) 119.38	d/t 10.00	Plastic

Stress Ratios for Classification

$r_1 = F_c / d t p_{yw}$	= 0.01	$r_2 = F_c / A_g p_{yw}$	= 0.00
$\therefore$	= 0.01		

Shear Capacity

$V_c = P_y A_v / \sqrt{3}$	1	
$A_v = tD$		
$= 250$	mm ²	
$\therefore V_c = 39.69$	kN	Low Shear Condition

Moment Capacity

$S_{x,eff} = Z_x + (S_y - Z_y) \left[\frac{\left(\frac{\beta_{3w}}{d/t} \right) - 1}{\left(\frac{\beta_{3w}}{\beta_{2w}} \right) - 1} \right] \leq Z_x + (S_y - Z_y) \left[\frac{\left(\frac{\beta_{3f}}{b/T} \right) - 1}{\left(\frac{\beta_{3f}}{\beta_{2f}} \right) - 1} \right]$		$S_{y,eff} = Z_y + (S_x - Z_x) \left[\frac{\left(\frac{\beta_{3f}}{B/T} \right) - 1}{\left(\frac{\beta_{3f}}{\beta_{2f}} \right) - 1} \right]$
$= 26623 \text{ mm}^3$	$\leq 34510 \text{ mm}^3$	$= 34510 \text{ mm}^3$
$= 26623 \text{ mm}^3$		
$S_v = 2083 \text{ mm}^3$	$\rho = \left(\frac{2V}{V_c} - 1 \right)^2 = 0.0017$	

S.S. Equipment Cabinet Steel Frame on concrete plinth.xls
A
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JEG	Job Title		Job No.	Sheet No. 515	Rev.
	Design by		Checked by M.K. Wong	Date:	

Member C1 EA 50x50x5+ HKSC:2011 APPROACH

$M_c = p_y \times Z \text{ (Seff)} \leq 1.2 \cdot p_y (Z_x - p \cdot S_y / 1.5) / 1000 = 1 \text{ kNm}$; Cl. 8.2.2
 $M_{cx} = p_y \times \min(Z_x, S_{x,eff}) = 0.81 \text{ kNm}$; $M_{cx} = .81 \text{ kNm}$ > M_x , OK
 $M_{cy} = p_y \times \min(Z_y, S_{y,eff}) = 0.81 \text{ kNm}$; $M_{cy} = .81 \text{ kNm}$ > M_y , OK

1

Moment Capacity to Lateral Torsional Buckling

$M_b \geq m_{LT} M_x$; Cl. 8.3.5.2
 $m_{LT} = 1.0$; Table 8.4a
 $M_b = p_b Z_x \text{ or } p_b \text{ Seff}$; (8.20 - 8.24)
 $\lambda_{LT} = u v \lambda \sqrt{\beta_w}$; Cl. 8.3.5.3
 $u = 0.9$
 $\lambda = L_E / r_y = L_{ey} / r_y = 67.57$
 $x = D / T = 10.00$
 $v = \frac{1}{(1 + 0.05 (\lambda / x)^2)^{0.25}} = 0.74$
 $\sqrt{\beta_w} = 0.5$ Semi-Compact Sections
 $\therefore \lambda_{LT} = 32.85$
 $\rho_b = 275.00 \text{ N/mm}^2$ Hot-rolled Section
 $P_{cy} \geq A_g \rho_c$; 8.3.5.2 App. 8.1
 $\therefore M_b = 1.53 \text{ kNm}$ > $m_{LT} M_x$, OK
 Rolled Section

Compression Resistance

$L_{ex} = L = 1000 \text{ mm}$; $r_x = 14.8 \text{ mm}$; $\lambda_x = L_{ex} / r_x = 67.6$ Rolled H-Section
 $L_{ey} = L = 1000 \text{ mm}$; $r_y = 14.8 \text{ mm}$; $\lambda_y = L_{ey} / r_y = 67.6$
 $p_{cx} = 206.67 \text{ N/mm}^2$; $P_{cx} = p_{cx} \cdot A = 101.47 \text{ kN}$; Cl. 8.7.5
 $p_{cy} = 186.07 \text{ N/mm}^2$; $P_{cy} = p_{cy} \cdot A = 91.36 \text{ kN}$; Table 8.7, App. 8.4
 $\therefore P_c = 91.36 \text{ kN}$ > F_c , OK

Compression Members under Combined Axial Force and Moments

Cross-section Capacity

$F_c / A_g P_y + M_x / M_{cx} + M_y / M_{cy} \leq 1$; Cl. 8.9.1
 $= 0.00 + 0.074 + 0.160$
 $= 0.24$
 < 1.00 < 1, OK

Member Buckling Resistance

$m_y = 1.0$; Table 8.9
 $M_{cy} = p_y Z_y$; Cl. 8.9.2
 $= 0.81 \text{ kNm}$
 $F_c / P_{cy} + m_{LT} M_x / M_b + m_y M_y / M_{cy} \leq 1$; Cl. 8.9.2
 $= 0.00 + 0.04 + 0.16$
 $= 0.20$
 < 1.00 < 1, OK

Tension Resistance

$K_e = 1.0$
 $A_e = K_e a_n \leq a_g$ Hole Area = 0 mm^2
 $= 491 \text{ mm}^2$
 $\therefore P_t = p_y \cdot A_e$; $a_1 = 250 \text{ mm}^2$
 $= 135.03 \text{ kN}$; $a_2 = 241 \text{ mm}^2$ > F_t , OK

Tension Members under Combined Axial Force and Moments

$F_t / P_t + M_x / M_{cx} + M_y / M_{cy} \leq 1$; Cl. 8.8
 $= 0.00 + 0.074 + 0.160$
 $= 0.23$
 < 1.00 < 1, OK

CALCULATION

Calculations by

O

Checked by

A. Chan

Date

Apr, 2024

Check Member C2

(L = 300 mm)

Try

EA 50x50x5+

Compression on C2,

$$= W_{Lex} / 2 \text{ nos}$$

$$= 1.48 / 2 \text{ nos}$$

$$= 0.74 \text{ kN}$$

Max Shear on C2,

$$= [(se / 2)^2 + (W_{Ley} / 2)^2]^{0.5}$$

$$= [(0.7 / 2)^2 + (0.69 / 2)^2]^{0.5}$$

$$= 0.5 \text{ kN}$$

Moment, M_x

$$= se / 2 \times L / 4$$

$$= 0.7 / 2 \times 0.3 / 4$$

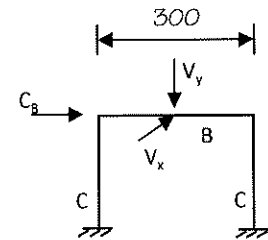
$$= 0.03 \text{ kNm}$$

Moment, M_y

$$= W_{Ley} / 2 \times L / 4$$

$$= 0.69 / 2 \times 0.3 / 4$$

$$= 0.03 \text{ kNm}$$



For member checking, please refer to next page.

Adopt EA 50x50x5+

Member C2

EA 50x50x5+

HKSC:2011 APPROACH

Member Forces

F_c Axial Compression	=	0.74	kN
F_t Axial Tension	=	0.00	kN
V Shear Force	= $\sqrt{V_x^2 + V_y^2}$	0.50	kN
M_x Major Bending	=	0.03	kNm
M_y Minor Bending	=	0.03	kNm

Load Case	1	
1. Shear Capacity	0.013	O.K.
2. Bending Capacity	0.037	O.K.
3. LTb	-	O.K.
4.Compression Capacity	0.008	O.K.
5.Tensile Capacity	0.000	O.K.
6. Combined Axial & Bending	0.065	O.K.

Section Properties

The first two independent eigenvectors are $\vec{v}_1 = \begin{pmatrix} 0 \\ 1 \\ -1 \end{pmatrix}$ and $\vec{v}_2 = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}$. The third independent eigenvector is $\vec{v}_3 = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$.

Dimensions	mm	Length	mm	
Depth, D	50	L	=	1000
Width, B	50	L _{ox}	= 1.0 L	max
Flange Thk, T	5.0	L _{ey}	= 1.0 L	1000
Web Thk, t	5.0			
depth, d	50.0	d/t =	10	
width, b	50.0	b/T =	10	

Steel	Grade	S275	Radius of Gyration				; Cl. 3.1.2 Table 3.2
	$p_y =$	275	N/mm^2	$r_x =$	14.8	mm	
	$p_{yw} =$	275	N/mm^2	$r_y =$	14.8	mm	
	$\epsilon = (275/p_y)^{1/2}$	1.00	$\epsilon_{web} =$	1.00			
	$E =$	205000	N/mm^2				
	Area $A_g =$	491	mm^2				

Second Moment of Area			
$I_x =$	1.070E+05	mm ⁴	
$I_y =$	1.070E+05	mm ⁴	

Section Modulus							
Elastic:	$Z_x =$	2.950E+03	mm ³	Plastic:	$S_x =$	5.580E+03	mm ³
	$Z_y =$	2.950E+03	mm ³		$S_y =$	5.580E+03	mm ³

Limiting Width-to-Thickness Ratios

; Cl. Table 7.1 and 7.2

Compression Element Design Type		Limiting Value			Ratio	Classification
		Class 1 Plastic	Class 2 Compact	Class 3 Semi-Compact		
Flange	Compression due to Bending	8e 8.00	9e 9.00	13e 13.00	b/T 10.00	Semi-Compact
Web	Neutral Axis at Mid-Depth	80e 80.00	100e 100.00	120e 120.00	d/t 10.00	Plastic
Web	Generally ($\geq 40\epsilon = 40$)	80e / (1+r1) 79.15	100e / (1+1.5r1) 78.73	120e / (1+2r2) 118.70	d/t 10.00	Plastic

Stress Ratios for Classification

$r_1 = F_c / d t_{pyw} \quad ; -1 < r_1 \leq 1$ $= 0.01$ $\therefore = 0.01$	$r_2 = F_c / A_g p_{yw}$ $= \underline{0.01}$	; Cl. 7.3 (a) & (c)
--	--	---------------------

Shear Capacity

$$\therefore V_c = 39.69 \text{ kN} \quad \text{Low Shear Condition} \quad > V, \text{ OK}$$

Moment Capacity

$$S_{x,eff} = Z_x + (S_x - Z_x) \left[\frac{\left(\frac{\beta_{3w}}{d/t} \right) - 1}{\left(\frac{\beta_{3w}}{\beta_{2w}} \right) - 1} \right] \leq Z_x + (S_x - Z_x) \left[\frac{\left(\frac{\beta_{3f}}{b/T} \right) - 1}{\left(\frac{\beta_{3f}}{\beta_{2f}} \right) - 1} \right]$$

$$S_{y,eff} = Z_y + (S_y - Z_y) \left[\frac{\left(\frac{\beta_{3f}}{B/T} \right) - 1}{\left(\frac{\beta_{3f}}{\beta_{2f}} \right) - 1} \right]$$

$$S_v = 26411 \text{ mm}^3 \leq 34510 \text{ mm}^3$$

$$S_v = 26411 \text{ mm}^3$$

$$\rho = \left(\frac{2 V}{V_c} - 1 \right)^2 = 0.0006$$

CALCULATION

Calculations by O

Checked by A. Chan

Date Apr, 2024

Check Member C3 (L = 800 mm)

Try EA 50x50x5+

Compression on C3,

$$= se / 4 nos$$

$$= 0.18 \text{ kN}$$

Max Shear on C3,

$$= [(W_{Lex} / 4)^2 + (W_{Ley} / 4)^2]^{0.5}$$

$$= [(1.48 / 4)^2 + (0.69 / 4)^2]^{0.5}$$

$$= 0.41 \text{ kN}$$

Moment, M_x

$$= W_{Lex} / 4 \times (H / 2 + L)$$

$$= 1.48 / 4 \times (0.6 / 2 + 0.8)$$

$$= 0.41 \text{ kNm}$$

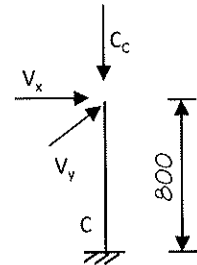
Moment, M_y

$$= W_{Ley} / 4 \times (H / 2 + L)$$

$$= 0.69 / 4 \times (0.6 / 2 + 0.8)$$

$$= 0.19 \text{ kNm}$$

For member checking, please refer to next page.



Adopt EA 50x50x5+

JEG	Job Title		Job No.	Sheet No.	Rev.
				520	
CALCULATION	Design by	Checked by	M.K. Wong		
			Date:		

Member C3
EA 50x50x5+
HKSC:2011 APPROACH

Member Forces

F_c Axial Compression	=	0.18	kN
F_t Axial Tension	=	0.00	kN
V Shear Force = $\sqrt{F_v^2 + F_h^2}$	=	0.41	kN
M_x Major Bending	=	0.41	kNm
M_y Minor Bending	=	0.19	kNm

Load Case 1

1. Shear Capacity	0.010	O.K.
2. Bending Capacity	0.505	O.K.
3. LTB	-	O.K.
4. Compression Capacity	0.002	O.K.
5. Tensile Capacity	0.000	O.K.
6. Combined Axial & Bending	0.503	O.K.

Section Properties

Notes: 1. Dimensions are in mm unless otherwise specified. 2. Properties are for the section as shown. 3. Properties are for the section as shown. 4. Properties are for the section as shown.

Dimensions	mm	Length	mm
Depth, D	50	L	= 1000 max
Width, B	50	L_{ex}	= 1.0 L
Flange Thk, T	5.0	L_{ey}	= 1.0 L
Web Thk, t	5.0		
depth, d	50.0	d/t	= 10
width, b	50.0	b/T	= 10

Steel	Grade	S275	Radius of Gyration				
	p_y	275	r_x	=	14.8	mm	
	p_{yw}	275	r_y	=	14.8	mm	
	$\epsilon = (275/p_y)^{1/2}$	1.00	ϵ_{web}	=	1.00		
	E	205000					
	Area A_g	491					

Second Moment of Area

I_x	=	1.070E+05	mm ⁴
I_y	=	1.070E+05	mm ⁴

Section Modulus

Elastic:	Z_x	=	2.950E+03	mm ³	Plastic:	S_x	=	5.580E+03	mm ³
	Z_y	=	2.950E+03	mm ³		S_y	=	5.580E+03	mm ³

Limiting Width-to-Thickness Ratios

Compression Element	Design Type	Limiting Value			Ratio	Classification
		Class 1 Plastic	Class 2 Compact	Class 3 Semi-Compact		
Flange	Compression due to Bending	8e 8.00	9e 9.00	13e 13.00	b/T 10.00	Semi-Compact
Web	Neutral Axis at Mid-Depth	80e 80.00	100e 100.00	120e 120.00	d/t 10.00	Plastic
Web	Generally ($\geq 40\epsilon = 40$)	80e/(1+r1) 79.79	100e/(1+1.5r1) 79.69	120e/(1+2r2) 119.68	d/t 10.00	Plastic

Stress Ratios for Classification

$r_1 = F_c / d t p_{yw}$	=	0.00	$r_2 = F_c / A_g p_{yw}$	=	0.00
$\therefore$	=	0.00			

Shear Capacity

$V_c = P_y A_v / \sqrt{3}$	=	39.69	kN
$A_v = t D$	=	250	mm ²
$\therefore V_c$	=	39.69	kN

Low Shear Condition > V, OK

Moment Capacity

$$S_{x,eff} = Z_x + (S_x - Z_x) \left[\frac{\left(\frac{\beta_{yw}}{d/t} - 1 \right)}{\left(\frac{\beta_{yw}}{\beta_{tw}} - 1 \right)} \right] \leq Z_x + (S_x - Z_x) \left[\frac{\left(\frac{\beta_{tw}}{b/T} - 1 \right)}{\left(\frac{\beta_{tw}}{\beta_{tw}} - 1 \right)} \right]$$

= 26717 mm³ ≤ 34510 mm³

= 26717 mm³

$$S_{y,eff} = Z_y + (S_y - Z_y) \left[\frac{\left(\frac{\beta_{tw}}{B/T} - 1 \right)}{\left(\frac{\beta_{tw}}{\beta_{tw}} - 1 \right)} \right]$$

= 34510 mm³

$S_v = 2083 \text{ mm}^3$

$\rho = \left(\frac{2V}{V_c} - 1 \right)^2 = 0.0004$

JEG	Job Title		Job No.	Sheet No. 521	Rev.
	Design by		Checked by M.K. Wong	Date:	
CALCULATION					

Member C3
EA 50x50x5+
HKSC:2011 APPROACH

$$M_c = p_y \times Z(\text{Self}) \leq 1.2 \cdot p_y(Z_x - p \cdot S_y / 1.5) / 1000 = 1 \text{ kNm} \quad ; \text{Cl. 8.2.2}$$

$$M_{cx} = p_y \times \min(Z_x, S_x, \text{eff}) = 0.81 \text{ kNm} \quad \therefore M_{cx} = .81 \text{ kNm} > M_x, \text{OK}$$

$$M_{cy} = p_y \times \min(Z_y, S_y, \text{eff}) = 0.81 \text{ kNm} \quad \therefore M_{cy} = .81 \text{ kNm} > M_y, \text{OK}$$

$$\leq 1.2 \cdot p_y(Z_y - p \cdot S_x / 1.5) / 1000 = .97 \text{ kNm}$$

1

Moment Capacity to Lateral Torsional Buckling

$$M_{f_b} \geq m_{LT} M_k$$

$$m_{LT} = 1.0$$

$$M_b = p_b Z_x \text{ or } p_b \text{ Self}$$

$$\lambda_{LT} = uv\lambda\sqrt{\beta_w}$$

$$u = 0.9$$

$$\lambda = L_E / r_y = L_{ay} / r_y = 67.57$$

$$x = D / T = 10.00$$

$$v = \frac{1}{(1 + 0.05(\lambda / x)^2)^{0.25}} = 0.74$$

$$\sqrt{\beta_w} = 0.5$$

$$\therefore \lambda_{LT} = 32.85$$

$$p_b = 275.00 \text{ N/mm}^2$$

$$P_{cy} \geq A_g p_c$$

$$\therefore M_b = 1.53 \text{ kNm}$$

Hot-rolled Section

Semi-Compact Sections

Rolled Section

$$; \text{Cl. 8.3.5.2}$$

$$; \text{Table 8.4a}$$

$$; (8.20 - 8.24)$$

$$; \text{Cl. 8.3.5.3}$$

$$2.00$$

$$; 8.3.5.2 \text{ App. 8.1}$$

$$> m_{LT} M_x, \text{OK}$$

Compression Resistance

$$L_{ax} = L = 1000 \text{ mm}$$

$$L_{ay} = L = 1000 \text{ mm}$$

$$r_x = 14.8 \text{ mm}$$

$$r_y = 14.8 \text{ mm}$$

$$p_{cx} = 206.67 \text{ N/mm}^2$$

$$p_{cy} = 186.07 \text{ N/mm}^2$$

$$\therefore P_c = 91.36 \text{ kN}$$

Rolled H-Section

$$\lambda_x = L_{ax} / r_x = 67.6$$

$$\lambda_y = L_{ay} / r_y = 67.6$$

$$P_{cx} = p_{cx} \cdot A = 101.47 \text{ kN}$$

$$P_{cy} = p_{cy} \cdot A = 91.36 \text{ kN}$$

$$> F_c, \text{OK}$$

$$; \text{Cl. 8.7.5}$$

$$; \text{Table 8.7, App. 8.4}$$

$$> F_c, \text{OK}$$

Compression Members under Combined Axial Force and Moments

Cross-section Capacity

$$F_c / A_g P_y + M_x / M_{cx} + M_y / M_{cy} \leq 1$$

$$= 0.00 + 0.505 + 0.234$$

$$= 0.74$$

$$< 1.00$$

$$; \text{Cl. 8.9.1}$$

$$< 1, \text{OK}$$

Member Buckling Resistance

$$m_y = 1.0$$

$$M_{cy} = p_y Z_y$$

$$= 0.81 \text{ kNm}$$

$$F_c / P_{cy} + m_{LT} M_x / M_b + m_y M_y / M_{cy} \leq 1$$

$$= 0.00 + 0.27 + 0.23$$

$$= 0.50$$

$$< 1.00$$

$$; \text{Table 8.9}$$

$$; \text{Cl. 8.9.2}$$

$$; \text{Cl. 8.9.2}$$

$$< 1, \text{OK}$$

Tension Resistance

$$K_e = 1.0$$

$$A_e = K_e a_n \leq a_g$$

$$= 491 \text{ mm}^2$$

$$\therefore P_t = p_y \cdot A_e$$

$$= 135.03 \text{ kN}$$

Hole Area = 0 mm²

$$a_1 = 250 \text{ mm}^2$$

$$a_2 = 241 \text{ mm}^2$$

$$> F_t, \text{OK}$$

Tension Members under Combined Axial Force and Moments

$$F_t / P_t + M_x / M_{cx} + M_y / M_{cy} \leq 1$$

$$= 0.00 + 0.505 + 0.234$$

$$= 0.74$$

$$< 1.00$$

$$; \text{Cl. 8.8}$$

$$< 1, \text{OK}$$

CALCULATION

Calculations by O

Checked by A. Chan

Date Apr, 2024

Design for Weld Connection

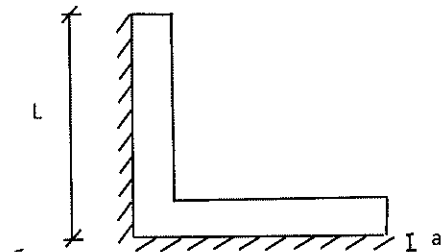
Try 5 mm fillet weld all round, $p_w = 220 \text{ N/mm}^2$

$$a = 5 \sin 45^\circ$$

$$= 3.54 \text{ mm}$$

$$L = 50 - 2 \times 5$$

$$= 40 \text{ mm}$$



$$\text{Weld Area, } A_{\text{weld}} = 2aL$$

$$= 2 \times 3.54 \times 40$$

$$= 284 \text{ mm}^2$$

$$\text{C1: } V_A = 0.82 \text{ kN}$$

$$C_A = 0.35 \text{ kN}$$

$$R_A = 0.9 \text{ kN}$$

$$\text{C2: } V_B = 0.5 \text{ kN}$$

$$C_B = 0.74 \text{ kN}$$

$$R_B = 0.9 \text{ kN}$$

$$\text{C3: } V_C = 0.41 \text{ kN}$$

$$C_C = \text{Max. Compression of C3} + \text{Compression due to Wind Moment of C3}$$

$$= 0.18 + W_{\text{Lex}} / 2 \times (H / 2 + 0.8) / D + W_{\text{Ley}} / 2 \times (H / 2 + 0.8) / W$$

$$= 0.18 + 1.48 / 2 \times (0.6 / 2 + 0.8) / 0.3 + 0.69 \times (0.6 / 2 + 0.8) / 0.65$$

$$= 3.4772 \text{ kN}$$

$$R_C = 3.51 \text{ kN}$$

$$\text{Shear on weld} = 3.47717948717949 \times 1000 / 284$$

$$= 12.25 \text{ N/mm}^2 < p_w \quad \text{OK!}$$

Adopt 5 mm Fillet Weld All Round

Design for Anchor Bolts

$$\text{Shear, } V_x = W_{\text{Lex}} / 2 / 1.4 = 1.48 / 2 / 1.4 = 0.53 \text{ kN}$$

$$\text{Shear, } V_y = W_{\text{Ley}} / 2 / 1.4 = 0.69 / 2 / 1.4 = 0.25 \text{ kN}$$

$$\text{Moment, } M_y = W_{\text{Lex}} / 1.4 \times (H / 2 + 0.8) = 1.48 / 1.4 \times (0.6 / 2 + 0.8) = 1.16 \text{ kNm}$$

$$\text{Max Tension, } T = se / 2 / 1.4 + W_{\text{Ley}} / 1.4 \times (H / 2 + 0.8) / W$$

$$= 0.7 / 2 + 0.69 / 1.4 \times (0.6 / 2 + 0.8) / 0.65$$

$$= 1.18 \text{ kN}$$

Try 6 nos. HST3 - R - M8

Please refer to hilti output

Adopt 6nos HST3-R- M8 bolts

www.hilti.com.hk

Company:
Address:
Phone | Fax:
Design:
Fastening point:

09-2693-S.S. Cabinet (1)

17/4/2024

Page:
Specifier:
E-Mail:
Date:

0

Specifier's comments:

1 Input data



Anchor type and diameter: HST3-R M8 hefz

Return period (service life in years): 50

Item number: 2105696 HST3-R M8x75 -/10

Filling set or any suitable annular gap filling solution

Effective embedment depth: $h_{ef,act} = 47.0 \text{ mm}$ ($h_{ef,jum} = - \text{ mm}$), $h_{nom} = 54.0 \text{ mm}$

Material: A4

Evaluation Service Report: ETA 98/0001

Issued | Valid: 20/7/2023 | -

Proof: SOFA based on EN 1992-4 and fib bulletin 58, Mechanical

Stand-off installation: $e_b = 0.0 \text{ mm}$ (no stand-off), $t = 3.0 \text{ mm}$

Anchor plate: $l_a \times l_p \times t = 650.0 \text{ mm} \times 50.0 \text{ mm} \times 3.0 \text{ mm}$; (Recommended plate thickness: not calculated)

Profile: no profile

Base material: cracked concrete, C25/30, $f_{c,sp} = 25.00 \text{ N/mm}^2$, $h = 200.0 \text{ mm}$, User-defined partial material safety factor $\gamma_c = 1.500$

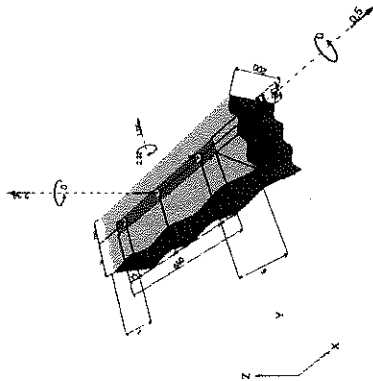
Installation: hammer drilled hole, installation condition: Dry

Reinforcement: no reinforcement or reinforcement spacing $\geq 150 \text{ mm}$ (any $\emptyset$) or $\geq 100 \text{ mm}$ ($\emptyset \leq 10 \text{ mm}$) with longitudinal edge reinforcement $d \geq 12.0 \text{ [mm]}$ + close mesh (stirrups, hangers) $s \leq 100.0 \text{ [mm]}$

Application also possible with HST4-R M8 under the selected boundary conditions.
More information in section Alternative fastening data of this report.

R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [mm] & Loading [kN, kNm]



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Company:
Address:
Phone | Fax:
Design:
Fastening point:

09-2693-S.S. Cabinet (1)

17/4/2024

Page:
Specifier:
E-Mail:
Date:

1

1.1 Load combination

Case	Description	Forces [kN] / Moments [kNm]	Seismic	Fire	Max. Util. Anchor [%]
1	Combination 1	$N = 2.360$; $V_x = 0.500$; $V_y = 1.060$; $M_x = 0.000$; $M_y = 2.320$; $M_z = 0.000$;	no	no	68

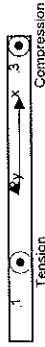
2 Load case/Resulting anchor forces

Anchor reactions [kN]

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	4.252	0.391	0.167	0.353
2	2.195	0.391	0.167	0.353
3	0.139	0.391	0.167	0.353

max. concrete compressive strain: 0.10 [‰]
max. concrete compressive stress: $2.91 \text{ [N/mm}^2\text{]}$
resulting tension force in (x/y) = (-156.1/0.0): 6.586 [kN]
resulting compression force in (x/y) = (305.6/0.0): 4.226 [kN]

Anchor forces are calculated based on the assumption of a rigid anchor plate.





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3 Tension load (EN 1992-4, Section 7.2.1)

	Load [kN]	Capacity [kN]	Utilization ρ_n [%]	Status
Steel Strength*	4.252	12.643	34	OK
Pullout Strength*	4.252	6.336	68	OK
Concrete Breakout Failure**	4.252	8.270	52	OK
Splitting failure**	N/A	N/A	N/A	N/A
* Highest loaded anchor **anchor group (anchors in tension)				
3.1 Steel Strength				
$N_{Ed} \leq N_{Rd,s} = \frac{N_{Rk,s}}{\gamma_{Ms}}$ EN 1992-4, Table 7.1				
$N_{Rk,s}$ [kN]	γ_{Ms}	$N_{Rd,s}$ [kN]	N_{Ed} [kN]	
17.700	1.400	12.643	4.252	
3.2 Pullout Strength				
$N_{Ed} \leq N_{Rd,p} = \frac{V_c \cdot N_{Rk,p}}{\gamma_{Ms,p}}$ EN 1992-4, Table 7.1				
$N_{Rk,p}$ [kN]	V_c	$\gamma_{Ms,p}$	$N_{Rd,p}$ [kN]	N_{Ed} [kN]
8.500	1.119	1.500	6.336	4.252



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3.3 Concrete Breakout Failure

$N_{Ed} \leq N_{Rd,c} = \frac{N_{Rk,c}}{\gamma_{Mc}}$ EN 1992-4, Table 7.1				
$N_{Rk,c} = N_{Rk,c}^0 \cdot \frac{A_{c,N}}{A_{c,N}^0} \cdot \psi_{s,N} \cdot \psi_{ed,N} \cdot \psi_{cr,N} \cdot \psi_{rel,N} \cdot \psi_{ec,N} \cdot \psi_{MN}$ EN 1992-4, Eq. (7.1)				
$N_{Rk,c}^0 = k_1 \cdot \sqrt{f_{ct}} \cdot h_{ef}^{1.5}$ EN 1992-4, Eq. (7.2)				
$A_{c,N}^0 = s_{cr,N} \cdot s_{ed,N}$ EN 1992-4, Eq. (7.3)				
$\psi_{s,N} = 0.7 + 0.3 \cdot \frac{c}{c_{cr,N}} \leq 1.00$ EN 1992-4, Eq. (7.4)				
$\psi_{ed,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{ed,N}}{s_{ed,N}} \right)} \leq 1.00$ EN 1992-4, Eq. (7.6)				
$\psi_{cr,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{cr,N}}{s_{cr,N}} \right)} \leq 1.00$ EN 1992-4, Eq. (7.6)				
$\psi_{MN} = 1$ EN 1992-4, Eq. (7.7)				
$A_{s,N}$ [mm ²]	$A_{c,N}$ [mm ²]	$e_{cr,N}$ [mm]	$s_{ed,N}$ [mm]	$f_{ct,cr}$ [N/mm ²]
19.881	19.881	70.5	1410	25.00
$e_{ed,N}$ [mm]	$\psi_{ed,N}$	$e_{cr,N}$ [mm]	$\psi_{cr,N}$	$\psi_{s,N}$
0.0	1.000	0.0	1.000	1.000
z [mm]	ψ_{MN}	k_1	$N_{Rd,c}$ [kN]	γ_{Mc}
461.8	1.000	7.700	12.405	1.500
Group anchor ID				N_{Ed} [kN]
1				4.252



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4 Shear load (EN 1992-4, Section 7.2.2)

	Load [kN]	Capacity [kN]	Utilization ρ_v [%]	Status
Steel Strength (without lever arm)**	0.391	12.560	4	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength**	0.391	21.668	2	OK
Concrete edge failure in direction y^*	1.172	33.440	4	OK

* highest loaded anchor ** anchor group (relevant anchors)

4.1 Steel Strength (without lever arm)

$$V_{Ed} \leq V_{Rd,s} = \frac{V_{Rd,s}}{\gamma_{M,s}} \quad \text{EN 1992-4, Table 7.2}$$
$$V_{Rd,s} = k_y \cdot V_{Rd,s}^0 \quad \text{EN 1992-4, Eq. (7.35)}$$

$V_{Rd,s}^0$ [kN]	k_y	$V_{Rd,s}$ [kN]	$\gamma_{M,s}$	V_{Ed} [kN]
-------------------	-------	-----------------	----------------	---------------

15.700	1.000	15.700	1.250	0.391
--------	-------	--------	-------	-------

4.2 Pryout Strength

$$V_{Ed} \leq V_{Rd,sp} = \frac{V_{Rd,sp}}{\gamma_{M,sp}} \quad \text{EN 1992-4, Table 7.2}$$
$$V_{Rd,sp} = k_y \cdot N_{Rd,sp} \quad \text{EN 1992-4, Eq. (7.39a)}$$
$$N_{Rd,sp} = N_{Rd,c}^0 \cdot \psi_{s,N} \cdot \psi_{s,N} \cdot \psi_{s,N} \cdot \psi_{s,N} \cdot \psi_{s,N} \cdot \psi_{s,N} \quad \text{EN 1992-4, Eq. (7.1)}$$
$$N_{Rd,c}^0 = k_1 \cdot \sqrt{f_{td}} \cdot h_{ef}^{1.5} \quad \text{EN 1992-4, Eq. (7.2)}$$
$$A_{c,N}^0 = s_{o,N} \cdot s_{o,N} \quad \text{EN 1992-4, Eq. (7.3)}$$
$$\psi_{s,N} = 0.7 + 0.3 \cdot \frac{c_{o,N}}{c_{o,N}} \leq 1.00 \quad \text{EN 1992-4, Eq. (7.4)}$$
$$\psi_{s,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{s,N}}{s_{o,N}} \right)} \leq 1.00 \quad \text{EN 1992-4, Eq. (7.6)}$$
$$\psi_{s,N} = \frac{1}{1 + \left(\frac{2 \cdot e_{s,N}}{s_{o,N}} \right)} \leq 1.00 \quad \text{EN 1992-4, Eq. (7.6)}$$
$$\psi_{s,N} = 1 \quad \text{EN 1992-4, Eq. (7.7)}$$

$A_{c,N}$ [mm ²]	$A_{c,N}^0$ [mm ²]	$c_{o,N}$ [mm]	$s_{o,N}$ [mm]	k_y	f_{td} [N/mm ²]
19,881	19,881	70.5	141.0	2.620	25.00
$e_{s,N}$ [mm]	$\psi_{s,N}$	$e_{s,N}$ [mm]	$\psi_{s,N}$	$\psi_{s,N}$	$\psi_{s,N}$
0.0	1.000	0.0	1.000	1.000	1.000
k_1	$N_{Rd,c}^0$ [kN]	$\gamma_{M,sp}$ [kN]	$V_{Rd,sp}$ [kN]	V_{Ed} [kN]	
7.700	12.405	1.500	21.668	0.391	

Group anchor ID

3



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4.3 Concrete edge failure in direction y^*

$$V_{Ed} \leq V_{Rd,c} = \frac{V_{Rd,c}}{\gamma_{M,c}} \quad \text{fbs Bulletin 58, Table (10.2-1)}$$
$$V_{Rd,c} = V_{Rd,c}^0 \cdot \psi_{s,V} \cdot \psi_{s,V} \cdot \psi_{s,V} \cdot \psi_{s,V} \cdot \psi_{s,V} \cdot \psi_{s,V} \quad \text{fbs Bulletin 58, Eq. (10.2-5)}$$
$$V_{Rd,c}^0 = k_y \cdot d_{nom}^{1.5} \cdot \sqrt{f_{td}} \cdot c_1^{1.5} \quad \text{fbs Bulletin 58, Eq. (10.2-5a)}$$
$$\alpha = 0.1 \cdot \left(\frac{1}{c_1} \right)^{0.5} \quad \text{fbs Bulletin 58, Eq. (10.2-5a)}$$
$$\beta = 0.1 \cdot \left(\frac{d_{nom}}{c_1} \right)^{0.2} \quad \text{fbs Bulletin 58, Eq. (10.2-5a)}$$
$$A_{c,V}^0 = 4.5 \cdot c_1^2 \quad \text{fbs Bulletin 58, Eq. (10.2-5b)}$$
$$\psi_{s,V} = \frac{A_{c,V}}{A_{c,V}^0} \quad \text{fbs Bulletin 58 (07/2011) Section 10.2.5.1.1 b)}$$
$$A_{c,V} = 0.7 + 0.3 \cdot \frac{c_2}{1.5 \cdot c_1} \leq 1.00 \quad \text{fbs Bulletin 58 (07/2011) Figure 10.2-4}$$
$$\psi_{s,V} = \left(\frac{1.5 \cdot c_1}{h} \right)^{0.5} \geq 1.00 \quad \text{fbs Bulletin 58, Eq. (10.2-5c)}$$
$$\psi_{s,V} = \frac{1}{1 + \left(\frac{2 \cdot e_{s,V}}{3 \cdot c_1} \right)} \leq 1.00 \quad \text{fbs Bulletin 58, Eq. (10.2-5e)}$$
$$\psi_{s,V} = \sqrt{\frac{1}{(\cos \alpha_v)^2 + \left(\frac{\sin \alpha_v}{\psi_{s,V}} \right)^2}} \geq 1.00 \quad \text{fbs Bulletin 58, Eq. (10.2-5f)}$$

l_t [mm]	d_{nom} [mm]	k_y	α	β	f_{td} [N/mm ²]
47.0	8.00	1.700	0.069	0.060	25.00
c_1 [mm]	$A_{c,V}$ [mm ²]	$A_{c,V}^0$ [mm ²]	$\psi_{s,V}$	$e_{s,V}$ [mm]	$\psi_{s,V}$
100.0	120.000	45.000	2.667		
$\psi_{s,V}$	$\psi_{s,V}$	$\psi_{s,V}$	$\psi_{s,V}$	$\psi_{s,V}$	$\psi_{s,V}$
1.000	1.000	25.25	1.066	0.0	1.000
$\psi_{s,V}$	$V_{Rd,c}$ [kN]	$V_{Rd,c}$ [kN]	V_{Ed} [kN]	V_{Ed} [kN]	
2.500	12.366	1.500	33.440	1.172	



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5 Combined tension and shear loads (EN 1992-4, Section 7.2.3)

Steel failure	β_N	β_V	α	Utilization $\beta_{N,V}$ [%]	Status
	0.336	0.031	2.000	12	OK
$\beta_N^* + \beta_V^* \leq 1.0$					
Concrete failure	β_N	β_V	α	Utilization $\beta_{N,V}$ [%]	Status
	0.671	0.035	1.500	56	OK
$\beta_N^* + \beta_V^* \leq 1.0$					

6 Displacements (highest loaded anchor)

Short term loading:		δ_N	=	0.5250 [mm]
N_{Sk}	=	3.150 [kN]		
V_{Sk}	=	0.289 [kN]		
		δ_V	=	0.2309 [mm]
		$\delta_{N,V}$	=	0.5735 [mm]
Long term loading:		δ_N	=	0.9624 [mm]
N_{Sk}	=	3.150 [kN]		
V_{Sk}	=	0.289 [kN]		
		δ_V	=	0.3475 [mm]
		$\delta_{N,V}$	=	1.0234 [mm]

Comments: Tension displacements are valid with half of the required installation torque moment for uncracked concrete! Shear displacements are valid without friction between the concrete and the anchor plate! The gap due to the drilled hole and clearance hole tolerances are not included in this calculation!

The acceptable anchor displacements depend on the fastened construction and must be defined by the designer!

7 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CSFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Design is only valid if hole is filled to remove clearance, clearance as per EN 1992-4 Table 6.1
- Checking the transfer of loads into the base material is required in accordance with EN 1992-4, Annex A!
- The design is only valid if the clearance hole in the fixture is not larger than the value given in Table 6.1 of EN 1992-4! For larger diameters of the clearance hole see section 6.2.2 of EN 1992-4!
- The accessory list in this report is for the information of the user only. In any case, the instructions for use provided with the product have to be followed to ensure a proper installation.
- For the determination of the w_{ex} (concrete edge failure) the minimum concrete cover defined in the design settings is used as the concrete cover of the edge reinforcement.
- The characteristic bond resistances depend on the return period (service life in years): 50



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Fastening meets the design criteria!

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8 Installation data

Anchor plate, steel: EN S235; $E = 205,000.00 \text{ N/mm}^2$; $f_{t,k} = 235.00 \text{ N/mm}^2$

Profile: no profile

Hole diameter in the fixture: $d_f = - \text{mm}$

Plate thickness (input): 3.0 mm

Recommended plate thickness: not calculated

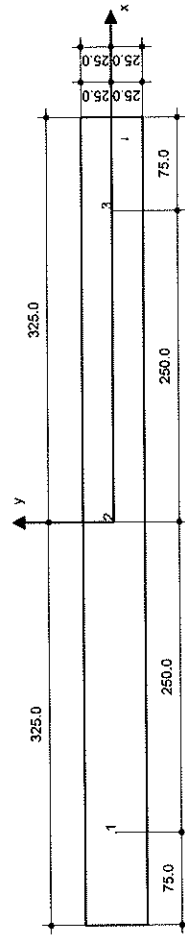
Drilling method: Hammer drilled

Cleaning: No cleaning of the drilled hole is required

Hilti HST3 stud anchor with 47 mm embedment, M8 hefz. Stainless steel, installation per ETA 99/0001, with annular gaps filled with Hilti Filling set or any suitable gap solutions

8.1 Recommended accessories

Drilling	Cleaning	Setting
- Suitable Rotary Hammer - Property sized drill bit	No accessory required	- Torque controlled cordless impact tool - Torque wrench - Hammer



Coordinates Anchor [mm]

Anchor	x	y	c_{x1}	c_{x2}	c_{y1}	c_{y2}
1	-250.0	0.0	-	-	100.0	-
2	0.0	0.0	-	-	100.0	-
3	250.0	0.0	-	-	100.0	-

Input data and results must be checked for conformity with the existing conditions and for plausibility!
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9 Drilling and installation

Anchor data	M8	M10	M12	M16	M20	M24
Fastener design	HEZ-A1 - (E-M-A)					
Drill bit design	HEZ-A1 - (E-M-A)					
Drill bit diameter	00-30V G2-EC1					
Setting tool	Setting tool HS-SC					
Follow drill bit design	TE-SD, TE-VO					
Setting tool design	Setting tool HS-SC					
Impact wrench and Adapter	Impact wrench Set M8-M20 (Carbon and Stainless Steel)					
Impact wrench	Impact wrench Set M8-M20 (Carbon and Stainless Steel)					

Input data and results must be checked for conformity with the existing conditions and for plausibility!
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10 Alternative fastening

10.1 Alternative fastening data

Anchor type and diameter:

Return period (service life in years):

Item number:

Filling set or any suitable annular gap filling solution

Effective embedment depth:

Material:

Evaluation Service Report:

Issued | Valid:

Proof:

Stand-off installation:

Anchor plate:

Profile:

Base material:

Installation:

Reinforcement:



HST4-R M8

50

2329094 HST4-R M8x65 5-20

$t_{\text{act}} = 47.0 \text{ mm}$ ($t_{\text{act}} = t_{\text{min}}$), $t_{\text{min}} = 53.0 \text{ mm}$

A4

ETA-21/0878

28/2/2024 | -

SOFA based on EN 1992-4 and fib bulletin 58, Mechanical

$e_b = 0.0 \text{ mm}$ (no stand-off), $t = 3.0 \text{ mm}$

$t_1 \times t_2 \times t_3 = 650.0 \text{ mm} \times 50.0 \text{ mm} \times 3.0 \text{ mm}$; (Recommended plate thickness: not calculated)

no profile

cracked concrete, C25/30, $f_{\text{ct,sp}} = 25.00 \text{ N/mm}^2$, $h = 200.0 \text{ mm}$, User-defined partial material safety factor $\gamma_c = 1.500$

hammer drilled hole, installation condition: Dry

no reinforcement or reinforcement spacing $\geq 150 \text{ mm}$ (any $\emptyset$) or $\geq 100 \text{ mm}$ ($\emptyset \leq 10 \text{ mm}$)

with longitudinal edge reinforcement $d \geq 12.0 \text{ [mm]}$ * close mesh (stirrups, hangers) $s \leq 100.0 \text{ [mm]}$

Max. Utilization with HST4-R M8: 58 % Fastening meets the design criteria!

10.2 Installation data

Anchor plate, steel: EN S235; E = 205,000.00 N/mm²; $f_k = 235.00 \text{ N/mm}^2$

Profile: no profile

Hole diameter in the fixture: $d_f = - \text{ mm}$

Plate thickness (input): 3.0 mm

Recommended plate thickness: not calculated

Drilling method: Hammer drilled

Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: HST4-R M8

Item number: 2329094 HST4-R M8x65 5-20

Maximum installation torque: 20 Nm

Hole diameter in the base material: 8.0 mm

Hole depth in the base material: 73.0 mm

Minimum thickness of the base material: 94.0 mm

Hilti HST4-R stud anchor with 47 mm embedment, M8, Stainless steel, installation per ETA-21/0878, with annular gaps filled with Hilti Filling set or any suitable gap solutions

10.2.1 Recommended accessories

Drilling

- Suitable Rotary Hammer
- Properly sized drill bit

Cleaning

- No accessory required

Setting

- Torque controlled cordless impact tool
- Torque wrench
- Hammer



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11 Remarks; Your Cooperation Duties

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CALCULATION

Calculations by

Checked by

M.K. Wong

Date

Apr 2024

Design Wind Pressure Calculation under CoP on Wind Effects 2019

Max. Actual Height, Z , above ground level = 16 m

Wind reference pressure, $Q_{0,z}$ = $3.7 (16/500)^{0.16}$ ==> 2.13 kPa

Directionality factor on pressure, S_θ = 0.85 (assume critical value)

Max. Slope Height = 0 m; Max. Slope Length = 0 m;

Upwind slope of topographic feature = 0/0 ==> #DIV/0! < 0.03

The topography factor, S_t = 1.00 (Outside the topography significant zone)

Net pressure on surface, Q_z = $Q_{0,z} S_t S_\theta$ ==> 1.82 kPa

Net pressure coefficient, C_p = 1.8 (at edge zones of building, reference from Table B2-1)

The size factor, S_s = 1.000

The final design wind pressure = $Q_z \times C_p \times S_s$

= $1.82 \times 1.8 \times 1$

= 3.28 kPa (Adopt 3.42 kPa as critical case in some calculation)

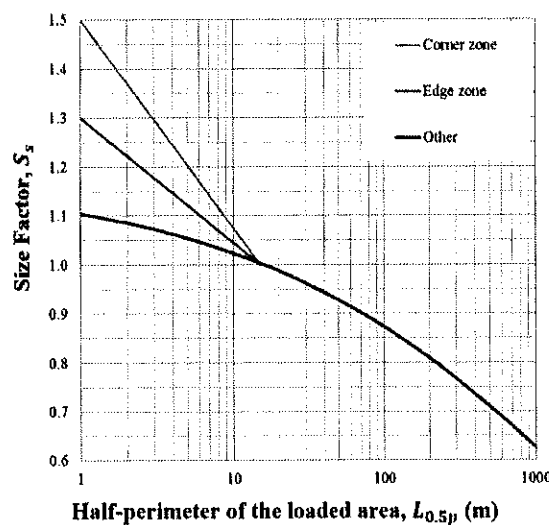


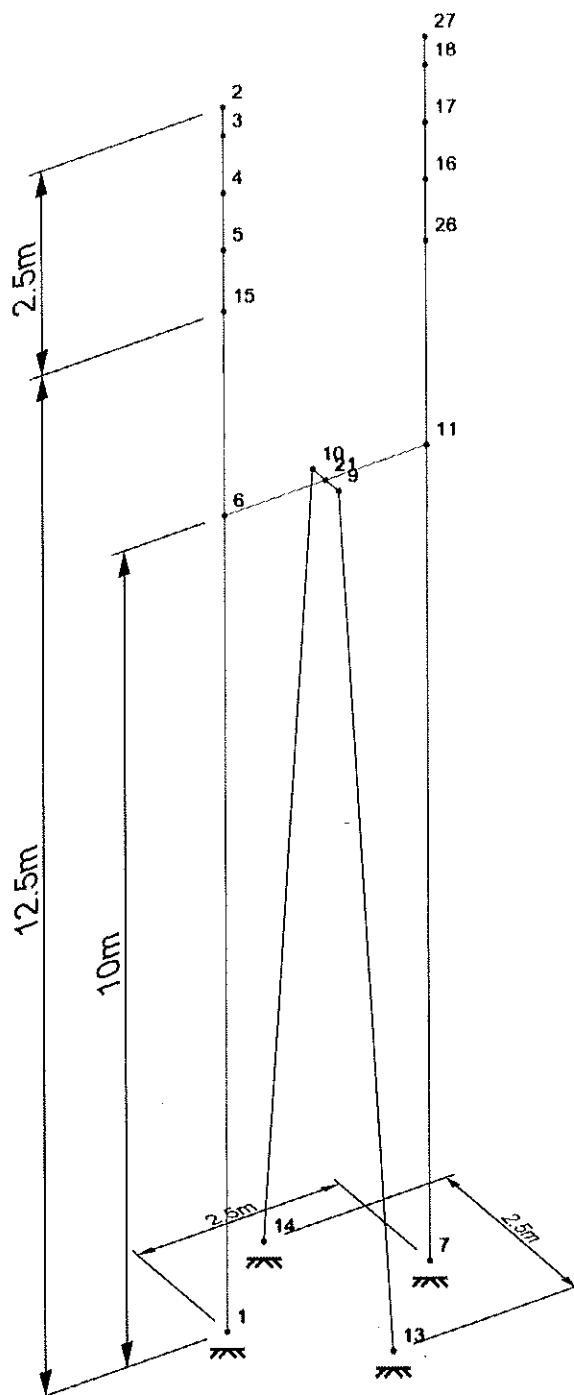
Figure 5-2 Size factor, S_s

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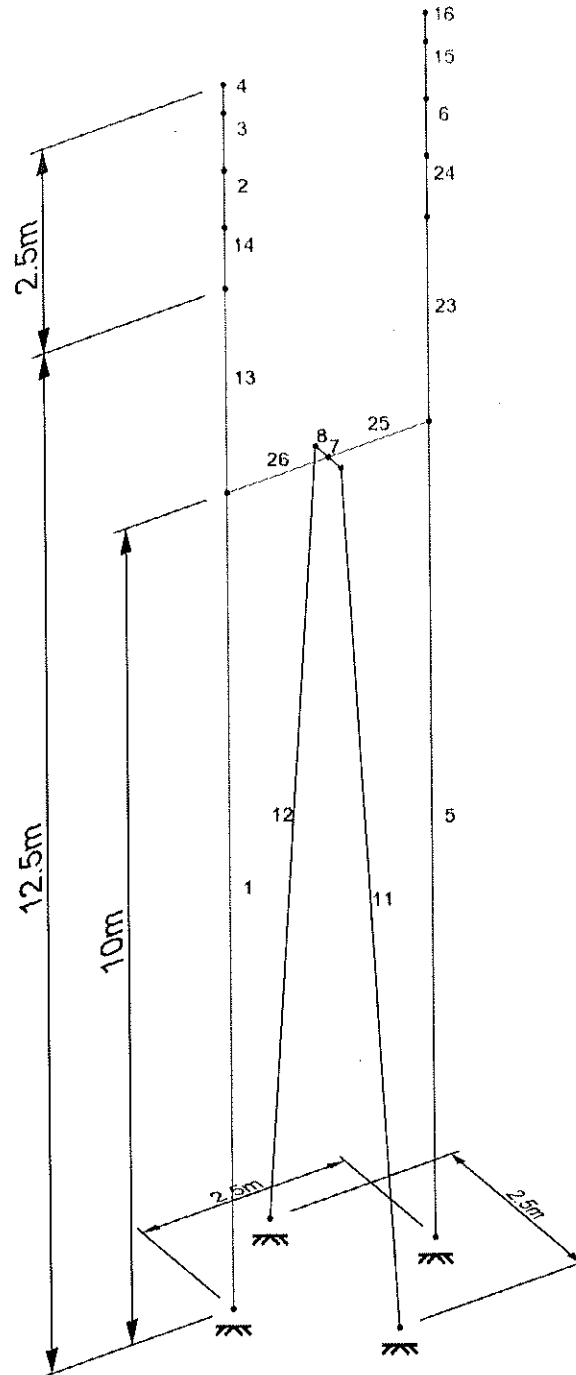
Scale (1:75), Viewpoint (148,33)

Sections:

- 2 168.3x6.3 CHS
- 3 193.7x10.0 CHS
- 4 114.3x5.0 CHS

Materials:

- 1 STEEL



Scale (1:75), Viewpoint (148,33)

Materials:
 1 STEEL

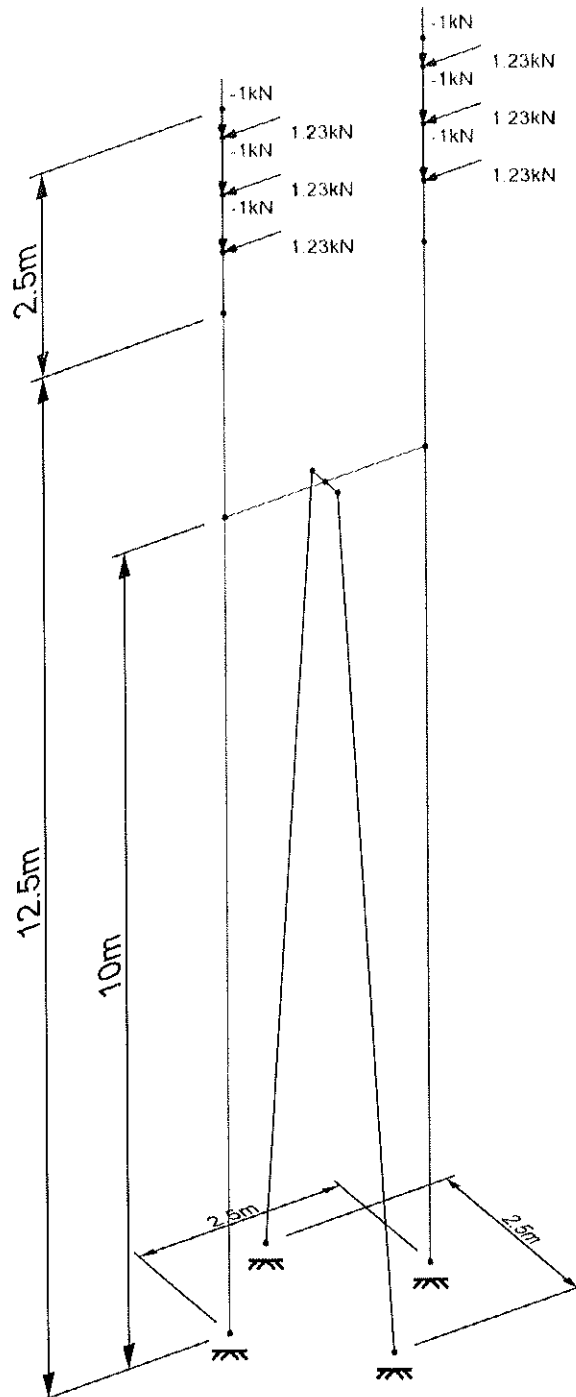
Sections:

- 2 168.3x6.3 CHS
- 3 193.7x10.0 CHS
- 4 114.3x5.0 CHS



Load case 2

■ 2 Antenna Wind X



Scale (1:75), Viewpoint (148,33), Loads

Sections:

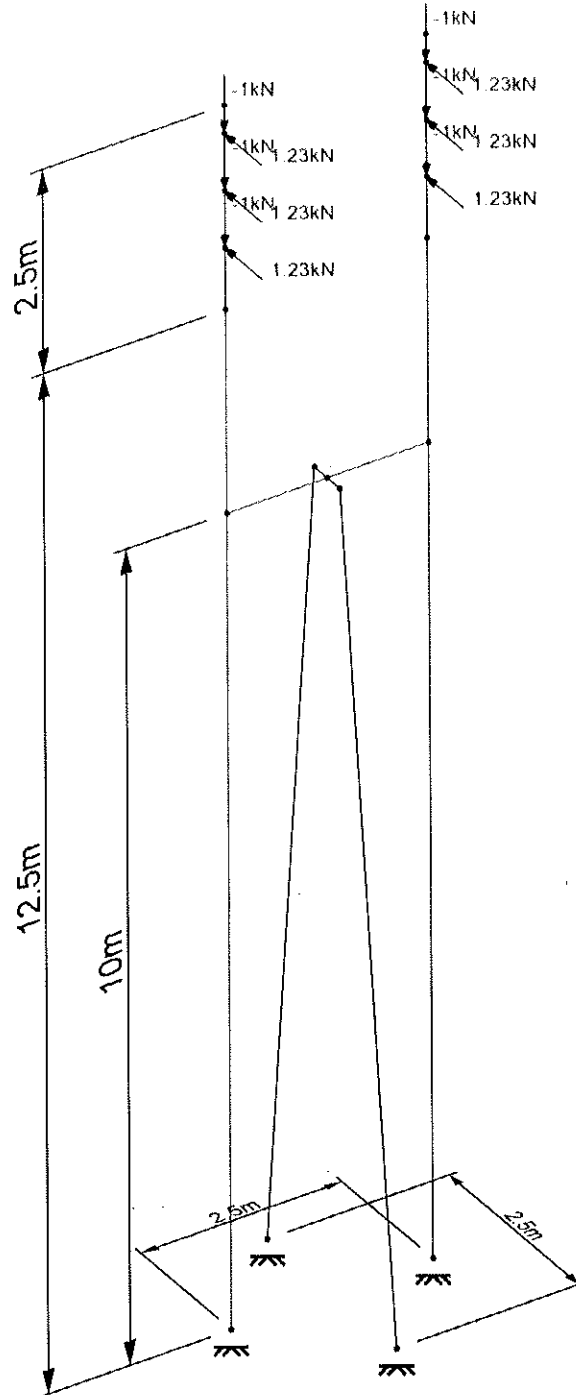
- 2 168.3x6.3 CHS
- 3 193.7x10.0 CHS
- 4 114.3x5.0 CHS

Materials:

- 1 STEEL

Load case 3

■ 3 Antenna Wind Z



Scale (1:75), Viewpoint (148,33), Loads

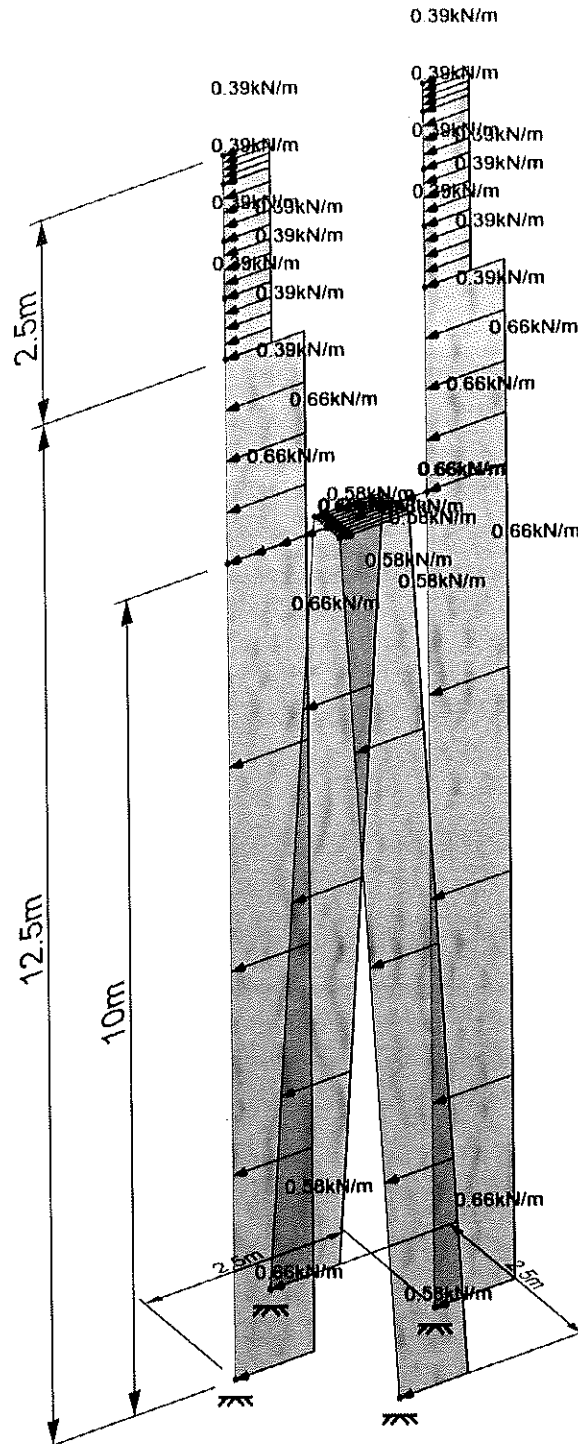
Materials:
 ■ 1 STEEL

Sections:

- 2 168.3x6.3 CHS
- 3 193.7x10.0 CHS
- 4 114.3x5.0 CHS

Load case 4

■ 4 Pole Wind X



Scale (1:75), Viewpoint (148,33), Loads

Sections:

- 2 168.3x6.3 CHS
- 3 193.7x10.0 CHS
- 4 114.3x5.0 CHS

Materials:

- 1 STEEL

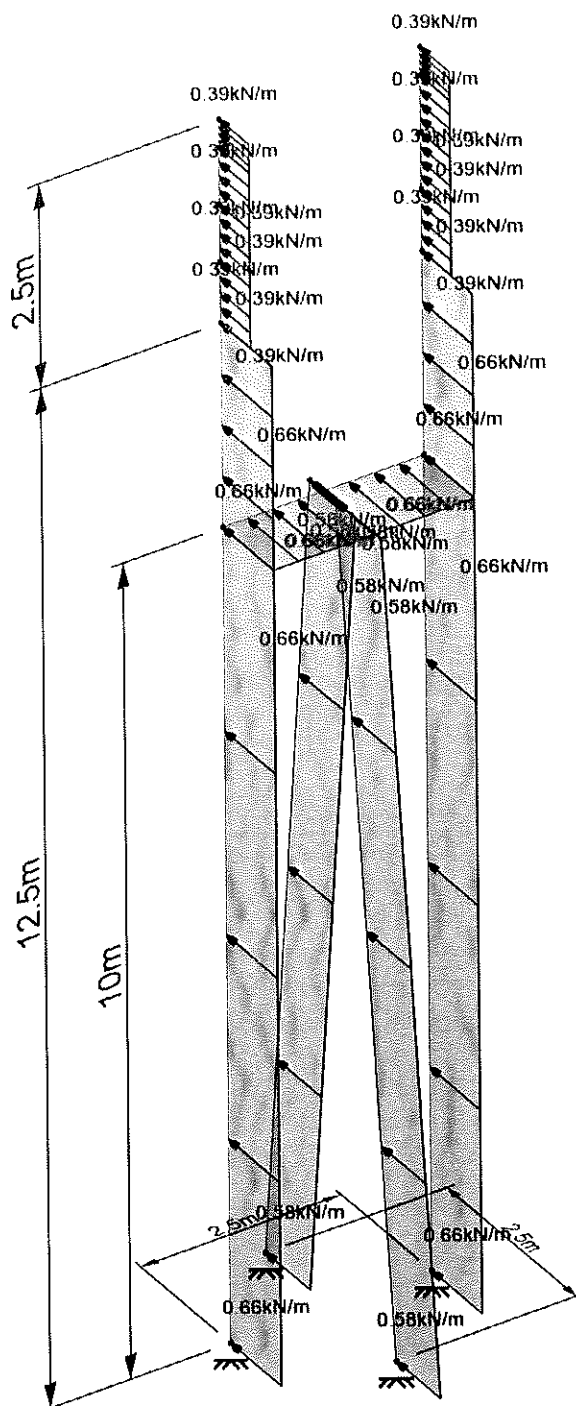
A7

SPACE GASS 14 (HK3334) (64-bit) - JEG ENGINEERING CO LTD
 Path: Y:\J8009(other)\2693\LANDS\20240415\4
 Designer: Date: Wednesday, April 24, 2024 12:13 PM, Page: 1



Load case 5

■ 5 Pole Wind Z



Scale (1:75), Viewpoint (148,33), Loads

Sections:

- 2 168.3x6.3 CHS
- 3 193.7x10.0 CHS
- 4 114.3x5.0 CHS

Materials:

- 1 STEEL

A8

SPACE GASS 14 (HK3334) (64-bit) - JEG ENGINEERING CO LTD

Path: Y:\J8009(other)\2693\LANDS\20240415\4

Designer: Date: Wednesday, April 24, 2024 12:13 PM, Page: 1

Combination Case	1 SW	2 Antenna Wind X	3 Antenna Wind Z	4 Pole Wind X	5 Pole Wind Z	11 Wind X	12 Wind Z
11	1.4	1.4		1.4			
12	1.4		1.4		1.4		
21						0.7143	
22							0.7143

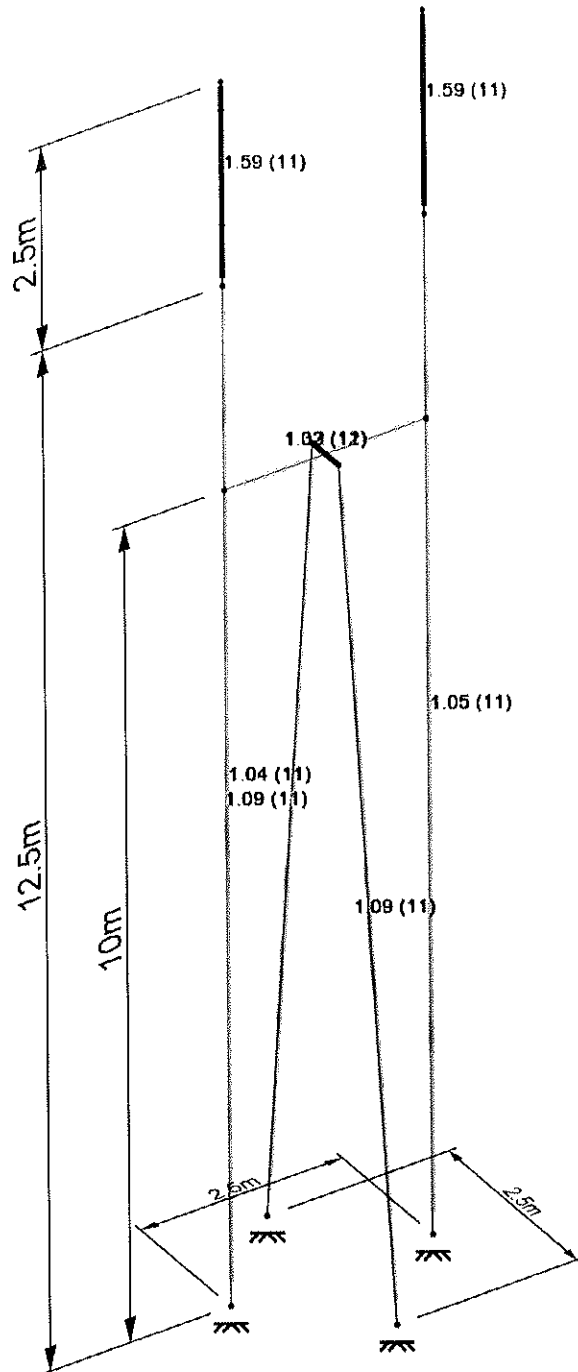
A⁹

SPACE GASS 14 (HK3334) (64-bit) - JEG ENGINEERING CO LTD
 Path: Y:\J8009(other)\2693\LANDS\20240415\4
 Designer: Date: Wednesday, April 24, 2024 12:13 PM, Page: 1



HK CP2011 Load Factors:

- ☐ ≥ 2.00 (Pass)
- ☒ ≥ 1.10 (Pass)
- ☒ ≥ 1.00 (Pass)
- ☒ < 1.00 (Fail)
- ☒ < 0.90 (Fail)
- ☒ < 0.50 (Fail)
- ☒ Seismic failure
- ☒ L/r failure
- ☒ Design error
- ☒ Not Designed



Scale (1:75), Viewpoint (148,33)

Sections:

- ☒ 2 168.3x6.3 CHS
- ☒ 3 193.7x10.0 CHS
- ☒ 4 114.3x5.0 CHS

Materials:

- ☒ 1 STEEL

[illegible]

11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 844. 845. 846. 847

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| 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 | 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 | 800 | 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 | 816 | 817 | 818 | 819 | 820 | 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 | 830 | 831 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 | 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 860 | 861 | 862 | 863 | 864 | 865 | 866 | 867 | 868 | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 | 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 | 896 | 897 | 898 | 899 | 900 | 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 | 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 | 921 | 922 | 923 | 924 | 925 | 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 | 939 | 940 | 941 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | 951 | 952 | 953 | 954 | 955 | 956 | 957 | 958 | 959 | 960 | 961 | 962 | 963 | 964 | 965 | 966 | 967 | 968 | 969 | 970 | 971 | 972 | 973 | 974 | 975 | 976 | 977 | 978 | 979 | 980 | 981 | 982 | 983 | 984 | 985 | 986 | 987 | 988 | 989 | 990 | 991 | 992 | 993 | 994 | 995 | 996 | 997 | 998 | 999 | 1000 |
|----|------|
| 11 | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | aa | ab | ac | ad | ae | af | ag | ah | ai | aj | ak | al | am | an | ao | ap | aq | ar | as | at | au | av | aw | ax | ay | az | ba | bb | bc | bd | be | bf | bg | bh | bi | bj | bk | bl | bm | bn | bo | bp | bq | br | bs | bt | bu | bv | bw | bx | by | bz | ca | cb | cc | cd | ce | cf | cg | ch | ci | cj | ck | cl | cm | cn | co | cp | cq | cr | cs | ct | cu | cv | cw | cx | cy | cz | da | db | dc | dd | de | df | dg | dh | di | dj | dk | dl | dm | dn | do | dp | dq | dr | ds | dt | du | dv | dw | dx | dy | dz | ea | eb | ec | ed | ee | ef | eg | eh | ei | ej | ek | el | em | en | eo | ep | eq | er | es | et | eu | ev | ew | ex | ey | ez | fa | fb | fc | fd | fe | ff | fg | fh | fi | fj | fk | fl | fm | fn | fo | fp | fq | fr | fs | ft | fu | fv | fw | fx | fy | fz | ga | gb | gc | gd | ge | gf | gg | gh | gi | gj | gk | gl | gm | gn | go | gp | gq | gr | gs | gt | gu | gv | gw | gx | gy | gz | ha | hb | hc | hd | he | hf | hg | hh | hi | hj | hk | hl | hm | hn | ho | hp | hq | hr | hs | ht | hu | hv | hw | hx | hy | hz | ia | ib | ic | id | ie | if | ig | ih | ii | ij | ik | il | im | in | io | ip | iq | ir | is | it | iu | iv | iw | ix | iy | iz | ja | jb | jc | jd | je | jf | jj | jh | ji | jj | jk | jl | jm | jn | jo | jp | jq | jr | js | jt | ju | jv | jw | jx | ky | kz | la | lb | lc | ld | le | lf | lg | lh | li | lj | lk | ll | lm | ln | lo | lp | lq | lr | ls | lt | lu | lv | lw | lx | ly | lz | ma | mb | mc | md | me | mf | mg | mh | mi | mj | mk | ml | mm | mn | mo | mp | mq | mr | ms | mt | mu | mv | mw | mx | my | mz | na | nb | nc | nd | ne | nf | ng | nh | ni | nj | nk | nl | nm | nn | no | np | nq | nr | ns | nt | nu | nv | nw | nx | ny | nz | oa | ob | oc | od | oe | of | og | oh | oi | oj | ok | ol | om | on | oo | op | oq | or | os | ot | ou | ov | ow | ox | oy | oz | pa | pb | pc | pd | pe | pf | pg | ph | pi | pj | pk | pl | pm | pn | po | pp | pq | pr | ps | pt | pu | pv | pw | px | py | pz | qa | qb | qc | qd | qe | qf | qg | qh | qi | qj | qk | ql | qm | qn | qo | qp | qq | qr | qs | qt | qu | qv | qw | qx | qy | qz | ra | rb | rc | rd | re | rf | rg | rh | ri | rj | rk | rl | rm | rn | ro | rp | rq | rr | rs | rt | ru | rv | rw | rx | ry | rz | sa | sb | sc | sd | se | sf | sg | sh | si | sj | sk | sl | sm | sn | so | sp | sq | sr | ss | st | su | sv | sw | sx | sy | sz | ta | tb | tc | td | te | tf | tg | th | ti | tj | tk | tl | tm | tn | to | tp | tq | tr | ts | tt | tu | tv | tw | tx | ty | tz | ua | ub | uc | ud | ue | uf | ug | uh | ui | uj | uk | ul | um | un | uo | up | uq | ur | us | ut | uu | uv | uw | ux | uy | uz | va | vb | vc | vd | ve | vf | vg | vh | vi | vj | vk | vl | vm | vn | vo | vp | vq | vr | vs | vt | vu | vv | vw | vx | vy | vz | wa | wb | wc | wd | we | wf | wg | wh | wi | wj | wk | wl | wm | wn | wo | wp | wq | wr | ws | wt | wu | wv | ww | wx | wy | wz | xa | xb | xc | xd | xe | xf | xg | xh | xi | xj | xk | xl | xm | xn | xo | xp | xq | xr | xs | xt | xu | xv | xw | xx | xy | xz | ya | yb | yc | yd | ye | yf | yg | yh | yi | yj | yk | yl | ym | yn | yo | yp | yq | yr | ys | yt | yu | yv | yw | yx | yy | yz | za | zb | zc | zd | ze | zf | zg | zh | zi | zj | zk | zl | zm | zn | zo | zp | zq | zr | zs | zt | zu | zv | zw | zx | zy | zz | |
| 1 | 1 | |

FIG. 1. REACTIVITY (100%, 100°C, 10 min, 100%
-----) (E-1) (E-2) (E-3) (E-4)

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```

1 FFFFFF 000000
2 FFFFFF 000000
3 FFFFFF 000000
4 FFFFFF 000000

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SECTION PROPERTIES (see, for example, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839,

| Part | Size | Year | Shape | Source |
|------|-------------------|------|---------------|---------|
| 1 | 133, 186, 3 CHS | 31 | Modular tube | British |
| 2 | 163, 186, 3 CHS | 32 | Circular tube | British |
| 3 | 193, 181, 1.5 CHS | 33 | Circular tube | British |
| 4 | 111, 185, 6 CHS | 34 | Circular tube | British |

SPACE GASS 14 (HX3334) (64-bit) - JEG ENGINEERING CO LTD
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| Case | Year | Gender | Age (years) | Weight (kg) | Height (cm) | Body mass index (kg/m ²) | Waist circumference (cm) | Waist-hip ratio | Diagnosis |
|------|------|--------|-------------|-------------|-------------|--------------------------------------|--------------------------|-----------------|-----------|
| 23 | 1 | GI | 66.00±4 | 100.00±0 | 76.602 | 94.662 | 0.960 | 0.960 | II |
| | | | | | 94.662 | 0.960 | 0.960 | | |
| 24 | 1 | GI | 66.00±0 | 100.00±0 | 66.390 | 94.664 | 0.960 | 0.960 | II |
| | | | | | 66.390 | 0.960 | 0.960 | | |

| | | | | | | | | |
|----|---|----|--------|-----------|--------|--------|--------|---|
| 29 | 1 | GE | 0,0000 | 1,00,0000 | 0,0000 | 0,0000 | 0,0000 | 0 |
| | | | | | 0,0000 | 0,0000 | 0,0000 | |
| 25 | 1 | GE | 0,0000 | 1,00,0000 | 0,0000 | 0,0000 | 0,0000 | 0 |
| | | | | | 0,0000 | 0,0000 | 0,0000 | |
| 5 | 1 | GE | 0,0000 | 1,00,0000 | 0,0000 | 0,0000 | 0,0000 | 0 |
| | | | | | 0,0000 | 0,0000 | 0,0000 | |
| 2 | 1 | GE | 0,0000 | 1,00,0000 | 0,0000 | 0,0000 | 0,0000 | 0 |
| | | | | | 0,0000 | 0,0000 | 0,0000 | |
| 3 | 1 | GE | 0,0000 | 1,00,0000 | 0,0000 | 0,0000 | 0,0000 | 0 |
| | | | | | 0,0000 | 0,0000 | 0,0000 | |
| 4 | 1 | GE | 0,0000 | 1,00,0000 | 0,0000 | 0,0000 | 0,0000 | 0 |
| | | | | | 0,0000 | 0,0000 | 0,0000 | |

| Case | Time | Iteration | Iteration | Iteration | Iteration | Iteration | Iteration |
|------|------|-----------|-----------|-----------|-----------|-----------|-----------|
| 4 | 1 | 21 | 0.0000 | 100.0000 | 0.0000 | 0.0000 | 0.0000 |
| 5 | 1 | 21 | 0.0000 | 100.0000 | 0.0000 | 0.0000 | 0.0000 |
| 6 | 1 | 21 | 0.0000 | 100.0000 | 0.0000 | 0.0000 | 0.0000 |
| 11 | 1 | 21 | 0.0000 | 100.0000 | 0.0000 | 0.0000 | 0.0000 |
| 12 | 1 | 21 | 0.0000 | 100.0000 | 0.0000 | 0.0000 | 0.0000 |
| 13 | 1 | 21 | 0.0000 | 100.0000 | 0.0000 | 0.0000 | 0.0000 |
| 14 | 1 | 21 | 0.0000 | 100.0000 | 0.0000 | 0.0000 | 0.0000 |
| 15 | 1 | 21 | 0.0000 | 100.0000 | 0.0000 | 0.0000 | 0.0000 |

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SPACE GASS 14 (HK3334) (64-bit) - JEG ENGINEERING CO LTD
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| | | | | | | | |
|----|----|---------|--------|--------|---------|---------|---------|
| 4 | | 0.009 | 0.137 | 0.000 | 0.001 | -0.000 | -0.021 |
| | 2 | 0.000 | 0.000 | 0.000 | 0.000 | -0.000 | 0.000 |
| 5 | 7 | -34.314 | 10.776 | -0.000 | -0.000 | 0.000 | -40.518 |
| | 11 | -34.314 | 3.125 | -0.000 | -0.000 | -0.000 | 27.941 |
| 6 | 16 | -0.000 | 0.613 | -0.000 | 0.000 | 0.000 | -0.597 |
| | 17 | -0.000 | 0.499 | -0.000 | -0.000 | 0.000 | -0.213 |
| 7 | 3 | -0.000 | -0.000 | 0.612 | -10.126 | -1.031 | 0.000 |
| | 21 | 0.000 | -0.000 | 0.145 | -10.126 | -1.012 | -0.000 |
| 8 | 11 | 0.000 | -0.000 | -0.000 | 10.126 | 1.031 | 0.000 |
| | 23 | 0.000 | -0.000 | -0.145 | 10.126 | 1.012 | -0.000 |
| 11 | 9 | 0.000 | 0.000 | 0.146 | -0.000 | -10.126 | -0.000 |
| | 13 | 0.000 | 0.000 | 0.535 | -0.000 | 20.379 | 0.000 |
| 12 | 10 | 0.000 | 0.000 | 0.145 | 0.000 | 10.174 | -0.000 |
| | 14 | 0.000 | 0.000 | -0.525 | 0.000 | -20.379 | 0.000 |
| 13 | 5 | -0.000 | -2.330 | 0.000 | -0.000 | -0.000 | -5.725 |
| | 15 | -0.000 | 0.275 | 0.000 | -0.000 | -0.000 | -1.215 |
| 14 | 15 | -0.000 | 0.475 | 0.000 | -0.000 | -0.000 | -1.215 |
| | 17 | -0.000 | 0.433 | 0.000 | -0.000 | -0.000 | -0.597 |
| 15 | 7 | -0.000 | 0.109 | -0.000 | 0.000 | 0.000 | -0.215 |
| | 19 | -0.000 | 0.137 | -0.000 | -0.000 | 0.000 | -0.020 |
| 16 | 13 | 0.000 | 0.137 | 0.000 | 0.000 | 0.000 | 0.020 |
| | 27 | 0.000 | 0.000 | -0.000 | 3.000 | -0.000 | 0.000 |
| 23 | 11 | -1.000 | 2.330 | -0.000 | 0.000 | 0.000 | -5.725 |
| | 26 | -1.000 | 0.375 | -0.000 | 2.000 | 0.000 | -1.215 |
| 24 | 16 | 3.000 | 0.975 | -0.000 | -0.000 | 0.000 | -1.215 |
| | 28 | 0.000 | 0.643 | -0.000 | -0.000 | 0.000 | -0.597 |
| 25 | 21 | 0.000 | 34.314 | -0.000 | 0.000 | 0.000 | -10.126 |
| | 11 | -0.000 | 34.314 | -0.000 | 0.000 | 0.000 | 32.769 |
| 26 | 4 | 0.126 | 31.314 | -0.000 | 0.000 | -0.000 | -32.769 |
| | 24 | -0.000 | 31.314 | -0.000 | 0.000 | -0.000 | 10.126 |

Load case 1 (Linear): Pole Wind X
Paradise solver

| Part | Size | Actual
Force | Y-Axis
Shear | X-Axis
Shear | X-Axis
Torsion | Y-Axis
Moment | Z-Axis
Moment |
|------|------|-----------------|-----------------|-----------------|-------------------|------------------|------------------|
| 1 | 1 | 0.000 | 0.000 | -5.145 | 0.232 | 15.173 | -0.000 |
| | 9 | 0.000 | 0.000 | 1.175 | -0.232 | -9.157 | 0.000 |
| 2 | 5 | 0.000 | -0.003 | -0.593 | 0.000 | 0.597 | 0.000 |
| | 1 | 0.000 | -0.003 | -0.000 | 0.000 | 0.215 | 0.000 |
| 3 | 1 | 0.000 | 0.000 | -0.109 | 0.000 | 0.215 | 0.000 |
| | 3 | 0.000 | 0.000 | -0.137 | 0.000 | 0.021 | 0.000 |
| 4 | 3 | 0.000 | -0.003 | -0.137 | 0.000 | 0.021 | 0.000 |
| | 2 | 0.000 | -0.003 | -0.000 | 0.000 | -0.000 | -0.000 |
| 5 | 7 | 0.000 | -0.003 | -5.145 | -0.232 | 15.173 | -0.000 |
| | 11 | 0.000 | -0.003 | 1.175 | -0.232 | -9.157 | -0.000 |
| 6 | 13 | 0.003 | 0.000 | -0.593 | -0.000 | 0.597 | -0.000 |
| | 19 | 0.000 | 0.000 | -0.109 | 0.000 | 0.215 | 0.000 |
| 7 | 21 | -1.533 | 62.341 | -0.000 | 0.000 | 0.000 | -11.820 |
| | 9 | -4.777 | 62.341 | -0.000 | 0.000 | 0.000 | 3.500 |

A14

SPACE GASS 14 (HX3334) (64-bit) - JEG ENGINEERING CO LTD
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| Load case 1 (Linear: Antenna Wind X)
Parabolic solver | | | | | | |
|--|--------------|--------------|--------------|---------------|---------------|---------------|
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 7 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 13 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 14 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Sum | -4.576E+01 | -4.576E+01 | 0.000E+00 | 0.000E+00 | -4.576E+01 | 4.576E+01 |
| React | 1.144E+01 | 1.144E+01 | 0.000E+00 | 0.000E+00 | 1.144E+01 | -1.144E+01 |
| Dist | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Load case 2 (Linear: Antenna Wind Y)
Parabolic solver | | | | | | |
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 7 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 13 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 14 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Sum | -4.576E+01 | -4.576E+01 | 0.000E+00 | 0.000E+00 | -4.576E+01 | 4.576E+01 |
| React | 1.144E+01 | 1.144E+01 | 0.000E+00 | 0.000E+00 | 1.144E+01 | -1.144E+01 |
| Dist | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Load case 3 (Linear: Antenna Wind Z)
Parabolic solver | | | | | | |
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 7 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 13 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 14 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sum | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| React | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Dist | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Load case 4 (Linear: Antenna Wind X)
Parabolic solver | | | | | | |
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 7 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 13 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 14 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Sum | -4.576E+01 | -4.576E+01 | 0.000E+00 | 0.000E+00 | -4.576E+01 | 4.576E+01 |
| React | 1.144E+01 | 1.144E+01 | 0.000E+00 | 0.000E+00 | 1.144E+01 | -1.144E+01 |
| Dist | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Load case 5 (Linear: Antenna Wind Y)
Parabolic solver | | | | | | |
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 7 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 13 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 14 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Sum | -4.576E+01 | -4.576E+01 | 0.000E+00 | 0.000E+00 | -4.576E+01 | 4.576E+01 |
| React | 1.144E+01 | 1.144E+01 | 0.000E+00 | 0.000E+00 | 1.144E+01 | -1.144E+01 |
| Dist | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Load case 6 (Linear: Antenna Wind Z)
Parabolic solver | | | | | | |
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 7 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 13 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 14 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sum | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| React | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Dist | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

SPACE GASS 14 (HX3334) (64-bit) - JEG ENGINEERING CO LTD
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| Load case 1 (Linear: Antenna Wind X)
Haverkort solver, Symmetric ES, Linear AFD | | | | | | |
|--|--------------|--------------|--------------|---------------|---------------|---------------|
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | -33.333 | -33.333 | 0.000 | 0.000 | -33.333 | 33.333 |
| React | 33.333 | 33.333 | 0.000 | 0.000 | 33.333 | -33.333 |
| Dist | -33.333 | -33.333 | 0.000 | 0.000 | -33.333 | 33.333 |
| Load case 2 (Linear: Antenna Wind Y)
Haverkort solver | | | | | | |
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 7 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 13 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 14 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Sum | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| React | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Dist | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Load case 3 (Linear: Antenna Wind Z)
Haverkort solver, Symmetric ES, Linear AFD | | | | | | |
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 7 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 13 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 14 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sum | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| React | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Dist | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

BOOKING LOAD FACTORS

| Load Case | Node | Load Factor | Tolerance | Iterations | Node at Max Triax | Node at Max Sum |
|-----------|------|-------------|-----------|------------|-------------------|-----------------|
| 1 | 1 | 71.202 | 0.007312 | 21 | 2 (X) | 2 (X) |
| 2 | 1 | 47.941 | 0.007312 | 13 | 2 (X) | 3 (X) |
| 3 | 1 | 87.510 | 0.007312 | 21 | 27 (X) | 27 (X) |
| 4 | 1 | 1000.0 | 0.000000 | 0 | | |
| 5 | 1 | 2100.0 | 0.000000 | 0 | | |
| 11 | 1 | 14.059 | 0.007312 | 15 | 2 (X) | 2 (X) |
| 12 | 1 | 47.951 | 0.007312 | 19 | 27 (X) | 27 (X) |
| 21 | 1 | 65.820 | 0.007312 | 21 | 2 (X) | 2 (X) |
| 22 | 1 | 65.263 | 0.007312 | 21 | 27 (X) | 27 (X) |

BOOKING EFFECTIVE LENGTHS (mm)

| Load case 1 (Linear: SW)
Haverkort solver, Symmetric ES, Linear AFD | | | | | |
|--|------|---------|--------|--------------------|--------|
| Node | Mesh | Per | Length | Ly | Lz |
| 1 | 1 | 179.279 | 10.000 | 10.532 | 10.532 |
| | 2 | 16.513 | 0.700 | 17.520 | 17.523 |
| | 3 | 9.305 | 0.700 | 22.628 | 22.628 |
| | 4 | 3.103 | 0.350 | 39.133 | 39.133 |
| | 5 | 139.479 | 10.000 | 10.532 | 10.532 |
| | 6 | 16.513 | 0.700 | 17.520 | 17.523 |
| | 7 | 12.044 | 0.350 | 41.337 | 41.337 |
| | 8 | 12.034 | 0.350 | 41.337 | 41.337 |
| | 11 | 211.001 | 10.000 | 9.909 | 9.909 |
| | 12 | 211.001 | 10.000 | 9.909 | 9.909 |
| | 13 | 102.723 | 2.500 | 21.653 | 21.653 |
| | 14 | 23.559 | 0.700 | 14.065 | 14.065 |
| | 15 | 3.905 | 0.700 | 22.628 | 22.628 |
| | 16 | 2.303 | 0.350 | 39.133 | 39.133 |
| | 23 | 102.723 | 2.500 | 21.653 | 21.653 |
| | 24 | 23.559 | 0.700 | 14.065 | 14.065 |
| | 25 | -0.000 | 1.250 | Not in compression | |
| | 26 | -0.000 | 1.250 | Not in compression | |

SPACE GASS 14 (HX3334) (64-bit) - JEG ENGINEERING CO LTD
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Filter: No filter

| Load case 1 (Linear: Antenna Wind X)
Parabolic solver | | | | | | |
|---|--------------|--------------|--------------|---------------|---------------|---------------|
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 7 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 13 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 14 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Sum | -4.576E+01 | -4.576E+01 | 0.000E+00 | 0.000E+00 | -4.576E+01 | 4.576E+01 |
| React | 1.144E+01 | 1.144E+01 | 0.000E+00 | 0.000E+00 | 1.144E+01 | -1.144E+01 |
| Dist | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Load case 11 (Linear: Antenna Wind X)
Parabolic solver | | | | | | |
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 7 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 13 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 14 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Sum | -4.576E+01 | -4.576E+01 | 0.000E+00 | 0.000E+00 | -4.576E+01 | 4.576E+01 |
| React | 1.144E+01 | 1.144E+01 | 0.000E+00 | 0.000E+00 | 1.144E+01 | -1.144E+01 |
| Dist | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Load case 12 (Linear: Antenna Wind X)
Parabolic solver | | | | | | |
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 7 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 13 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 14 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Sum | -4.576E+01 | -4.576E+01 | 0.000E+00 | 0.000E+00 | -4.576E+01 | 4.576E+01 |
| React | 1.144E+01 | 1.144E+01 | 0.000E+00 | 0.000E+00 | 1.144E+01 | -1.144E+01 |
| Dist | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Load case 21 (Linear: Antenna Wind X)
Parabolic solver | | | | | | |
| Node | X-Axis Force | Y-Axis Force | Z-Axis Force | X-Axis Moment | Y-Axis Moment | Z-Axis Moment |
| 1 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 7 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 13 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| 14 | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |
| Sum | -4.576E+01 | -4.576E+01 | 0.000E+00 | 0.000E+00 | -4.576E+01 | 4.576E+01 |
| React | 1.144E+01 | 1.144E+01 | 0.000E+00 | 0.000E+00 | 1.144E+01 | -1.144E+01 |
| Dist | -1.144E+01 | -1.144E+01 | 0.000E+00 | 0.000E+00 | -1.144E+01 | 1.144E+01 |

A15

DOI: 10.1002/eqe.220

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[illegible][illegible]

Wang, J. and J. S. Liu. 1999. The effects of the 1997 Asian financial crisis on the U.S. stock market. *Journal of International Money and Finance* 18: 391-401.

| $15\text{--}30$ | $30\text{--}40$ | $40\text{--}50$ | $50\text{--}60$ | $60\text{--}70$ | $70\text{--}80$ |
|-----------------|-----------------|---------------------|-----------------|-----------------|-----------------|
| 1 | 1 | ± 0.100 | ± 0.030 | ± 0.001 | ± 0.000 |
| | 2 | ± 0.100 | ± 0.030 | ± 0.001 | ± 0.000 |
| | 3 | ± 0.100 | ± 0.030 | ± 0.001 | ± 0.000 |
| | 4 | ± 0.100 | ± 0.030 | ± 0.001 | ± 0.000 |
| | 5 | ± 0.100 | ± 0.030 | ± 0.001 | ± 0.000 |
| | 6 | $0.0\text{--}0.003$ | ± 0.000 | ± 0.000 | ± 0.000 |
| | 7 | $0.0\text{--}0.003$ | ± 0.000 | ± 0.000 | ± 0.000 |
| | 8 | $0.0\text{--}0.003$ | ± 0.000 | ± 0.000 | ± 0.000 |
| | 9 | ± 0.004 | ± 0.013 | ± 0.001 | ± 0.000 |
| 10 | 10 | ± 0.004 | ± 0.013 | ± 0.001 | ± 0.000 |
| 11 | 11 | ± 0.004 | ± 0.001 | ± 0.000 | ± 0.000 |
| 12 | 12 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 13 | 13 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 14 | 14 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 15 | 15 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 16 | 16 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 17 | 17 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 18 | 18 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 19 | 19 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 20 | 20 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 21 | 21 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 22 | 22 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 23 | 23 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 24 | 24 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 25 | 25 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 26 | 26 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 27 | 27 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 28 | 28 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 29 | 29 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |
| 30 | 30 | ± 0.004 | ± 0.000 | ± 0.000 | ± 0.000 |

Last call 3 (Morat): Antenna Wild 2

day-frost solver, 316-70pt 2S, Linear AE

| Fig. 1 | Fig. 2 | $\tau = 0.01$
T, sec | $\tau = 0.01$
T, sec | $\tau = 0.01$
T, sec |
|--------|--------|-------------------------|-------------------------|-------------------------|
| 1 | 1 | ± 0.003 | ± 0.001 | ± 0.001 |
| 2 | 2 | ± 0.24 | ± 0.01 | ± 0.01 |
| 3 | 3 | ± 0.153 | ± 0.01 | ± 0.132 |
| 4 | 4 | ± 0.147 | ± 0.01 | ± 0.137 |
| 5 | 5 | ± 0.101 | ± 0.01 | |
| 6 | 6 | ± 0.006 | ± 0.002 | ± 0.006 |
| 7 | 7 | ± 0.006 | ± 0.001 | ± 0.006 |
| 8 | 8 | ± 0.006 | ± 0.004 | ± 0.006 |
| 9 | 9 | ± 0.006 | ± 0.023 | ± 0.006 |
| 10 | 10 | ± 0.006 | ± 0.01 | ± 0.006 |
| 11 | 11 | ± 0.10 | ± 0.005 | ± 0.06 |
| 12 | 12 | ± 0.10 | ± 0.005 | ± 0.06 |
| 13 | 13 | ± 0.10 | ± 0.005 | ± 0.06 |
| 14 | 14 | ± 0.10 | ± 0.005 | ± 0.06 |
| 15 | 15 | ± 0.005 | ± 0.01 | ± 0.135 |
| 16 | 16 | ± 0.105 | ± 0.01 | ± 0.137 |

Filter: No filter

| Node | Node | X=Axis
Transl'n | Y=Axis
Transl'n | Z=Axis
Transl'n |
|------|------|--------------------|--------------------|--------------------|
| 10 | | -0.013 | -0.010 | -0.026 |
| 11 | | -0.013 | -0.009 | -0.025 |
| 12 | | -0.008 | -0.009 | -0.017 |
| 14 | | -0.006 | -0.009 | -0.006 |
| 15 | | -0.009 | -0.008 | -0.021 |
| 16 | | -0.009 | -0.003 | -0.025 |
| 17 | | -0.000 | -0.003 | -0.12 |
| 18 | | -0.000 | -0.006 | -0.16 |
| 21 | | -0.000 | -0.003 | -0.37 |
| 24 | | -0.000 | -0.003 | -0.24 |
| 27 | | -0.000 | -0.009 | -0.13 |

Lead cage 22 (linear): Wind 2 feet/s

Wavefront solver, Significant 23, Linear Algebra

| Mode | X-Axis
Transl | Y-Axis
Transl | Z-Axis
Transl |
|------|------------------|------------------|------------------|
| 1 | 0.000 | 0.000 | 0.000 |
| 2 | -0.193 | -0.001 | 1.800 |
| 3 | -0.172 | -0.001 | 0.810 |
| 4 | -0.131 | -0.001 | 0.680 |
| 5 | -0.094 | -0.001 | 0.510 |
| 6 | -0.000 | -0.001 | 0.000 |
| 7 | 0.000 | 0.000 | 0.000 |
| 8 | 0.000 | -0.003 | 0.005 |
| 10 | 0.000 | -0.030 | 0.005 |
| 11 | 0.000 | -0.001 | 0.005 |
| 12 | 0.000 | 0.000 | 0.000 |
| 13 | 0.000 | 0.000 | 0.000 |
| 14 | -0.063 | -0.001 | 0.160 |
| 16 | 0.034 | -0.001 | 0.510 |
| 17 | 0.131 | -0.001 | 0.680 |
| 18 | 0.172 | -0.001 | 0.810 |
| 19 | 0.000 | -0.015 | 0.005 |
| 26 | 0.000 | -0.001 | 0.000 |
| 27 | -0.193 | -0.001 | 1.800 |

BILL OF MATERIALS

| Item
Item | Part | Qty | Section Name | Unit
Length | Total
Length | Unit
Mass | Total
Mass |
|--------------|------|-----|---------------|----------------|-----------------|--------------|---------------|
| 1 | 3 | 2 | 193,761.0 CHS | 10.300 | 201.500 | 0.453 | 91.069 |
| 2 | 1 | 4 | 114,365.0 CHS | 0.700 | 2.800 | 0.002 | 0.008 |
| 2 | 1 | 2 | 114,365.0 CHS | 0.450 | 0.700 | 0.005 | 0.003 |
| 4 | 1 | 2 | 169,369.3 CHS | 0.500 | 0.500 | 0.019 | 0.009 |
| 4 | 1 | 2 | 169,369.3 CHS | 10.000 | 20.100 | 0.253 | 0.506 |
| 6 | 3 | 2 | 193,761.0 CHS | 2.500 | 5.000 | 1.113 | 5.226 |
| 7 | 4 | 2 | 114,365.0 CHS | 0.750 | 1.500 | 0.010 | 0.020 |
| 8 | 3 | 2 | 193,761.0 CHS | 1.250 | 2.500 | 0.657 | 1.113 |
| | | | | | 53.100 | | 1.932 |
| | | | | | | | |
| 2 | 2 | 2 | 143,364.3 CHS | 20.000 | 20.000 | 0.513 | 0.513 |
| 3 | 2 | 2 | 193,761.0 CHS | 27.500 | 27.500 | 1.216 | 1.216 |
| 5 | 1 | 2 | 114,365.0 CHS | 2.500 | 2.500 | 0.056 | 0.056 |

Total mass = 1.921
Center of gravity = -1.250, 6.438, 0.000

| Mode | Mode | X-Axis
Tangential | Y-Axis
Tangential | Z-Axis
Tangential |
|------|------|----------------------|----------------------|----------------------|
| 1 | 1 | 0.000 | 0.000 | 0.000 |
| | 2 | 0.000 | -0.000 | 1.000 |
| | 3 | 0.000 | -0.000 | 0.000 |
| | 4 | 0.000 | 0.000 | 0.000 |
| | 5 | 0.000 | 0.000 | 0.000 |
| | 6 | 0.000 | 0.000 | 0.000 |
| | 7 | 0.000 | 0.000 | 0.000 |
| | 8 | 0.000 | 0.000 | 0.000 |

RECEIVED 1994-01-24; REVISED 1994-05-24; ACCEPTED 1994-06-01

^a $\chi^2_{(1)} = 1.4$, $p = .24$.
$$\begin{aligned} \mathcal{L}_{\text{reg}}(\theta) &= \frac{1}{2} \|\mathbf{y} - \mathbf{X}\theta\|_2^2 + \frac{\lambda}{2} \|\theta\|_2^2 \\ \mathcal{L}_{\text{reg}}(\theta) &= \frac{1}{2} \|\mathbf{y} - \mathbf{X}\theta\|_2^2 + \frac{\lambda}{2} \|\theta\|_2^2 \end{aligned}$$

1. The first part of the paper is devoted to the analysis of the results of the first part of the paper.

| Feature | With
Noise | With
Pattern | Without
Pattern | Without
Noise | With
Noise | With
Pattern | With
Noise | With
Pattern | With
Noise | With
Pattern |
|----------|---------------|-----------------|--------------------|------------------|---------------|-----------------|---------------|-----------------|---------------|-----------------|
| Position | 1.1 | 0.150 | | 1.1 | 0.0 | -0.0250 | -0.008 | 0.000 | 1.1 | 0.150 |
| Height | 1.1 | 0.000 | 0.800 | 1.1 | 0.0 | -0.014 | -0.000 | 0.000 | 1.1 | 0.000 |
| SizeM | 1.1 | 0.000 | | 1.1 | 0.0 | -0.0050 | -0.000 | 0.000 | 1.1 | 0.000 |

Leaf and flower:

- | | | |
|----|------|---------------------------------------|
| 1 | 0.01 | Mean = 0.000000 and StdDev = 0.000000 |
| 2 | 0.01 | Mean = 0.000000 and StdDev = 0.000000 |
| 3 | 0.01 | Mean = 0.000000 and StdDev = 0.000000 |
| 4 | 0.01 | Mean = 0.000000 and StdDev = 0.000000 |
| 5 | 0.01 | Mean = 0.000000 and StdDev = 0.000000 |
| 11 | 1.00 | Mean = 0.000000 and StdDev = 0.000000 |
| 12 | 1.00 | Mean = 0.000000 and StdDev = 0.000000 |
| 13 | 1.00 | Mean = 0.000000 and StdDev = 0.000000 |

[illegible]

| | | | | | | | |
|----------------|---|------|------------|----------------|---|------|------------|
| γ_{11} | = | 1.00 | (3.1, 3.2) | γ_{12} | = | 1.00 | (3.4, 3.5) |
| γ_{21} | = | 0.00 | (3.1, 3.2) | γ_{22} | = | 0.00 | (3.4, 3.5) |
| γ_{31} | = | 0.00 | (3.1, 3.2) | γ_{32} | = | 0.00 | (3.4, 3.5) |
| γ_{41} | = | 0.00 | (3.1, 3.2) | γ_{42} | = | 0.00 | (3.4, 3.5) |
| γ_{51} | = | 0.00 | (3.1, 3.2) | γ_{52} | = | 0.00 | (3.4, 3.5) |
| γ_{61} | = | 0.00 | (3.1, 3.2) | γ_{62} | = | 0.00 | (3.4, 3.5) |
| γ_{71} | = | 0.00 | (3.1, 3.2) | γ_{72} | = | 0.00 | (3.4, 3.5) |
| γ_{81} | = | 0.00 | (3.1, 3.2) | γ_{82} | = | 0.00 | (3.4, 3.5) |
| γ_{91} | = | 0.00 | (3.1, 3.2) | γ_{92} | = | 0.00 | (3.4, 3.5) |
| γ_{101} | = | 0.00 | (3.1, 3.2) | γ_{102} | = | 0.00 | (3.4, 3.5) |
| γ_{111} | = | 0.00 | (3.1, 3.2) | γ_{112} | = | 0.00 | (3.4, 3.5) |
| γ_{121} | = | 0.00 | (3.1, 3.2) | γ_{122} | = | 0.00 | (3.4, 3.5) |
| γ_{131} | = | 0.00 | (3.1, 3.2) | γ_{132} | = | 0.00 | (3.4, 3.5) |
| γ_{141} | = | 0.00 | (3.1, 3.2) | γ_{142} | = | 0.00 | (3.4, 3.5) |
| γ_{151} | = | 0.00 | (3.1, 3.2) | γ_{152} | = | 0.00 | (3.4, 3.5) |
| γ_{161} | = | 0.00 | (3.1, 3.2) | γ_{162} | = | 0.00 | (3.4, 3.5) |
| γ_{171} | = | 0.00 | (3.1, 3.2) | γ_{172} | = | 0.00 | (3.4, 3.5) |
| γ_{181} | = | 0.00 | (3.1, 3.2) | γ_{182} | = | 0.00 | (3.4, 3.5) |
| γ_{191} | = | 0.00 | (3.1, 3.2) | γ_{192} | = | 0.00 | (3.4, 3.5) |
| γ_{201} | = | 0.00 | (3.1, 3.2) | γ_{202} | = | 0.00 | (3.4, 3.5) |
| γ_{211} | = | 0.00 | (3.1, 3.2) | γ_{212} | = | 0.00 | (3.4, 3.5) |
| γ_{221} | = | 0.00 | (3.1, 3.2) | γ_{222} | = | 0.00 | (3.4, 3.5) |
| γ_{231} | = | 0.00 | (3.1, 3.2) | γ_{232} | = | 0.00 | (3.4, 3.5) |
| γ_{241} | = | 0.00 | (3.1, 3.2) | γ_{242} | = | 0.00 | (3.4, 3.5) |
| γ_{251} | = | 0.00 | (3.1, 3.2) | γ_{252} | = | 0.00 | (3.4, 3.5) |
| γ_{261} | = | 0.00 | (3.1, 3.2) | γ_{262} | = | 0.00 | (3.4, 3.5) |
| γ_{271} | = | 0.00 | (3.1, 3.2) | γ_{272} | = | 0.00 | (3.4, 3.5) |
| γ_{281} | = | 0.00 | (3.1, 3.2) | γ_{282} | = | 0.00 | (3.4, 3.5) |
| γ_{291} | = | 0.00 | (3.1, 3.2) | γ_{292} | = | 0.00 | (3.4, 3.5) |
| γ_{301} | = | 0.00 | (3.1, 3.2) | γ_{302} | = | 0.00 | (3.4, 3.5) |
| γ_{311} | = | 0.00 | (3.1, 3.2) | γ_{312} | = | 0.00 | (3.4, 3.5) |
| γ_{321} | = | 0.00 | (3.1, 3.2) | γ_{322} | = | 0.00 | (3.4, 3.5) |
| γ_{331} | = | 0.00 | (3.1, 3.2) | γ_{332} | = | 0.00 | (3.4, 3.5) |
| γ_{341} | = | 0.00 | (3.1, 3.2) | γ_{342} | = | 0.00 | (3.4, 3.5) |
| γ_{351} | = | 0.00 | (3.1, 3.2) | γ_{352} | = | 0.00 | (3.4, 3.5) |
| γ_{361} | = | 0.00 | (3.1, 3.2) | γ_{362} | = | 0.00 | (3.4, 3.5) |
| γ_{371} | = | 0.00 | (3.1, 3.2) | γ_{372} | = | 0.00 | (3.4, 3.5) |
| γ_{381} | = | 0.00 | (3.1, 3.2) | γ_{382} | = | 0.00 | (3.4, 3.5) |
| γ_{391} | = | 0.00 | (3.1, 3.2) | γ_{392} | = | 0.00 | (3.4, 3.5) |
| γ_{401} | = | 0.00 | (3.1, 3.2) | γ_{402} | = | 0.00 | (3.4, 3.5) |

| | | | | | |
|----------------|---|------------------------|----------------|---|-----------------------|
| F | = | 11.31 kN (2.5k+impact) | F _y | = | -116.46 kN |
| F _x | = | 6.00 kN | M _x | = | -5.00 kNm (clockwise) |
| M _y | = | Max. at support | | | |

| | | | | | |
|------|---|--------------------|-------|---|--------------------|
| Pt | n | 0.00 LR (3.5) | Yu | n | 0.00 LR (3.45) |
| Bo | n | 0.00 LR (3.75) | Ky | n | 0.00 LR (3.75) |
| Pray | n | 0.00 LR (3.75) | Prayb | n | 0.00 LR (3.75) |
| Ver | n | 305.73 LR (3.2, 1) | Vey | n | 305.73 LR (3.2, 1) |
| Man | n | 41.13 LR (3.2, 1) | Hay | n | 41.13 LR (3.2, 1) |
| Sh | n | 0.00 LR (3.4, 2) | Shy | n | 0.00 LR (3.4, 2) |

Table 1. *Salmonella* serotypes and phage types isolated from the 1996-1997 salmonellosis outbreak in the Netherlands

HE CP-011 CALCULATIONS FOR GROUP 12 (*=Tailored)

Critical load case is 11, out of 1-22

Section: 149.3x6.3 CHS (Circular tube, Cold formed)

REMARKS: Not all load cases were analysed non-linearly with 8-3

| WARNING: Minor compression effective length was reduced by flange restraints | | | | | | | | | |
|--|-----------|-------------|--------------|-------------|-------------|-------------|--------------|--------------|-------------|
| Failure Mode | Cell Case | Start Pos'n | Finish Pos'n | Axial Force | Major Shear | Minor Shear | Major Moment | Minor Moment | Load Factor |
| Section Header | 1 | 10.050 | | 4.44 | -10.04 | -0.18 | -0.30 | -37.38 | 1.00 |
| Header | 1 | 0.050 | 10.050 | 151.39 | | | -0.32 | 0.00 | 0.93 |
| Shear | 1 | 10.050 | | 4.44 | -10.04 | -0.18 | -0.30 | -37.38 | 10.00 |

[illegible]

- | | | | | |
|----|-------|---------|------------------------------|---------------------|
| 1 | 48.68 | Marker | - Corp and bilateral bending | (8.9, 9.2) eq 8.79 |
| 2 | 6.51 | Section | - Compression and bending | (8.9, 9.1) eq 8.781 |
| 3 | 10.93 | Marker | - Corp and bilateral bending | (8.9, 9.2) eq 8.79 |
| 4 | 2.92 | Section | - Bending about minor axis | (8.2, 8.1) |
| 5 | 3.02 | Section | - Compression and bending | (8.9, 9.1) eq 8.780 |
| 11 | 1.99 | Section | - Compression and bending | (8.9, 9.1) eq 8.783 |
| 12 | 1.31 | Section | - Compression and bending | (8.9, 9.1) eq 8.793 |
| 21 | 1.56 | Section | - Compression and bending | (8.9, 9.1) eq 8.780 |
| 22 | 2.53 | Section | - Compression and bending | (8.9, 9.1) eq 8.783 |

| | | | |
|-------------------|--|-------------------|--|
| Py | = 275.0 MPa | U _u | = 130.0 MPa |
| pyr | = 275.0 MPa | L _u | = 10.650 m (FF Post-Extr.) |
| Ltot | = 10.050 m | | |
| Le | = 10.050 m (Bonding) | | |
| Lc | = 10.333 m (Compression) | | |
| Lcr/Le | = 311.3 (Compression) | | |
| Ax | = 0.0 cm ² | A _u | = 0.0 cm ² |
| Aq | = 3210.0 cm ² | Ae | = 1310.0 cm ² (77.9/9.6) |
| Avc | = 130.0 cm ² | A _o | = 1310.0 cm ² (18.2/1.1) |
| A _u | = 14.13 cm ² | C _{eff} | = 34.15 mm (17.9) |
| Z _{eff1} | = 124.780x10 ⁻³ cm ³ | Z _{eff2} | = 124.780x10 ⁻³ cm ³ (7.5) |
| Z _{eff3} | = 185.080x10 ⁻³ cm ³ | Z _{eff4} | = 185.080x10 ⁻³ cm ³ (7.5) |

| | | | |
|----------------|--------------------------------|----------------|--------------------------------|
| γ_{12} | $\pm$ 1.00 (3.1, 1.2) | γ_{22} | $\pm$ 1.20 (3.1, 1.2) |
| γ_{32} | $\pm$ 0.00 (8.9, 2.3) | γ_{33} | $\pm$ 0.60 (8.9, 2.3) |
| γ_{42} | $\pm$ 0.00 (8.1, 5.2) | γ_{43} | $\pm$ 0.00 (3.4, 5.3/3.8, 2.2) |
| γ_{52} | $\pm$ 0.00 (8.1, 5.3/3.8, 2.2) | γ_{53} | $\pm$ 0.00 (3.4, 5.3/3.8, 2.2) |
| γ_{62} | $\pm$ 0.00 (3.1, 5.3/3.8, 2.2) | γ_{63} | $\pm$ 0.00 (3.4, 5.3/3.8, 2.2) |
| γ_{72} | $\pm$ 0.00 (3.1, 4.1) | γ_{73} | $\pm$ 0.05 (3.7, 1.7) |
| γ_{82} | $\pm$ 0.00 (3.2, 3.1/2.5) | γ_{83} | $\pm$ 0.60 (3.2, 3.1/2.5) |
| γ_{92} | $\pm$ 0.00 (3.2, 3.1/2.5) | γ_{93} | $\pm$ 0.60 (3.2, 3.1/2.5) |
| γ_{102} | $\pm$ 0.60 (3.7, 4.7/3.8, 4.1) | γ_{103} | $\pm$ 0.60 (3.7, 4.7/3.8, 4.1) |
| γ_{112} | $\pm$ 1.20 (3.3, 4.1) | γ_{113} | $\pm$ 1.20 (3.3, 4.1) |

| | | | | | |
|-----------------|---|------------------------|-----------------|---|--------------------|
| F | = | 4.14 kN (Semi-compact) | F _{xy} | = | -0.16 kN |
| F _{ox} | = | -10.04 kN | F _{yx} | = | -0.36 kN (Plastic) |
| F _{is} | = | -0.30 kN (Plastic) | F _{iy} | = | -0.36 kN (Plastic) |

| | | | | | | | | | |
|--------|---|--------|----|------------|--------|---|--------|----|------------|
| PE | = | 0.00 | km | (8.6) | VE | = | 0.00 | km | (3.4, 5.1) |
| Per | = | 0.00 | km | (8.7, 5) | Vry | = | 0.00 | km | (9.7, 5) |
| Perbac | = | 0.00 | km | (8.7, 5) | Vrybac | = | 0.00 | km | (5.7, 5) |
| Vrx | = | 305.79 | km | (8.2, 1) | Voy | = | 305.79 | km | (8.2, 1) |
| Hrx | = | 41.18 | km | (8.2, 2.1) | Hoy | = | 41.18 | km | (8.2, 2.1) |
| Hrb | = | 0.00 | km | (3.3, 5.2) | Hrb | = | 0.00 | km | (8.4, 4.2) |

Governing node - Compression and bending (8.3.1 to 8.74) (Pas

4) $\alpha_1 = 11$, $\alpha_2 = 15$, $\alpha_3 = 17$, $\alpha_4 = 19$, $\alpha_5 = 23$, $\alpha_6 = 29$, $\alpha_7 = 37$, $\alpha_8 = 47$, $\alpha_9 = 59$, $\alpha_{10} = 71$, $\alpha_{11} = 83$, $\alpha_{12} = 97$, $\alpha_{13} = 113$, $\alpha_{14} = 131$, $\alpha_{15} = 151$, $\alpha_{16} = 173$, $\alpha_{17} = 197$, $\alpha_{18} = 223$, $\alpha_{19} = 251$, $\alpha_{20} = 281$, $\alpha_{21} = 313$, $\alpha_{22} = 347$, $\alpha_{23} = 383$, $\alpha_{24} = 421$, $\alpha_{25} = 461$, $\alpha_{26} = 503$, $\alpha_{27} = 547$, $\alpha_{28} = 593$, $\alpha_{29} = 641$, $\alpha_{30} = 691$, $\alpha_{31} = 743$, $\alpha_{32} = 797$, $\alpha_{33} = 853$, $\alpha_{34} = 911$, $\alpha_{35} = 971$, $\alpha_{36} = 1033$, $\alpha_{37} = 1097$, $\alpha_{38} = 1163$, $\alpha_{39} = 1231$, $\alpha_{40} = 1301$, $\alpha_{41} = 1373$, $\alpha_{42} = 1447$, $\alpha_{43} = 1523$, $\alpha_{44} = 1601$, $\alpha_{45} = 1681$, $\alpha_{46} = 1763$, $\alpha_{47} = 1847$, $\alpha_{48} = 1933$, $\alpha_{49} = 2021$, $\alpha_{50} = 2111$, $\alpha_{51} = 2203$, $\alpha_{52} = 2297$, $\alpha_{53} = 2393$, $\alpha_{54} = 2491$, $\alpha_{55} = 2591$, $\alpha_{56} = 2693$, $\alpha_{57} = 2797$, $\alpha_{58} = 2903$, $\alpha_{59} = 3011$, $\alpha_{60} = 3121$, $\alpha_{61} = 3233$, $\alpha_{62} = 3347$, $\alpha_{63} = 3463$, $\alpha_{64} = 3581$, $\alpha_{65} = 3701$, $\alpha_{66} = 3823$, $\alpha_{67} = 3947$, $\alpha_{68} = 4073$, $\alpha_{69} = 4201$, $\alpha_{70} = 4331$, $\alpha_{71} = 4463$, $\alpha_{72} = 4597$, $\alpha_{73} = 4733$, $\alpha_{74} = 4871$, $\alpha_{75} = 5011$, $\alpha_{76} = 5153$, $\alpha_{77} = 5297$, $\alpha_{78} = 5443$, $\alpha_{79} = 5591$, $\alpha_{80} = 5741$, $\alpha_{81} = 5893$, $\alpha_{82} = 6047$, $\alpha_{83} = 6203$, $\alpha_{84} = 6361$, $\alpha_{85} = 6521$, $\alpha_{86} = 6683$, $\alpha_{87} = 6847$, $\alpha_{88} = 7013$, $\alpha_{89} = 7181$, $\alpha_{90} = 7351$, $\alpha_{91} = 7523$, $\alpha_{92} = 7697$, $\alpha_{93} = 7873$, $\alpha_{94} = 8051$, $\alpha_{95} = 8231$, $\alpha_{96} = 8413$, $\alpha_{97} = 8597$, $\alpha_{98} = 8783$, $\alpha_{99} = 8971$, $\alpha_{100} = 9161$, $\alpha_{101} = 9353$, $\alpha_{102} = 9547$, $\alpha_{103} = 9743$, $\alpha_{104} = 9941$, $\alpha_{105} = 10141$, $\alpha_{106} = 10343$, $\alpha_{107} = 10547$, $\alpha_{108} = 10753$, $\alpha_{109} = 10961$, $\alpha_{110} = 11171$, $\alpha_{111} = 11383$, $\alpha_{112} = 11597$, $\alpha_{113} = 11813$, $\alpha_{114} = 12031$, $\alpha_{115} = 12251$, $\alpha_{116} = 12473$, $\alpha_{117} = 12697$, $\alpha_{118} = 12923$, $\alpha_{119} = 13151$, $\alpha_{120} = 13381$, $\alpha_{121} = 13613$, $\alpha_{122} = 13847$, $\alpha_{123} = 14083$, $\alpha_{124} = 14321$, $\alpha_{125} = 14561$, $\alpha_{126} = 14803$, $\alpha_{127} = 15047$, $\alpha_{128} = 15293$, $\alpha_{129} = 15541$, $\alpha_{130} = 15791$, $\alpha_{131} = 16043$, $\alpha_{132} = 16297$, $\alpha_{133} = 16553$, $\alpha_{134} = 16811$, $\alpha_{135} = 17071$, $\alpha_{136} = 17333$, $\alpha_{137} = 17597$, $\alpha_{138} = 17863$, $\alpha_{139} = 18131$, $\alpha_{140} = 18401$, $\alpha_{141} = 18673$, $\alpha_{142} = 18947$, $\alpha_{143} = 19223$, $\alpha_{144} = 19501$, $\alpha_{145} = 19781$, $\alpha_{146} = 20063$, $\alpha_{147} = 20347$, $\alpha_{148} = 20633$, $\alpha_{149} = 20921$, $\alpha_{150} = 21211$, $\alpha_{151} = 21503$, $\alpha_{152} = 21797$, $\alpha_{153} = 22093$, $\alpha_{154} = 22391$, $\alpha_{155} = 22691$, $\alpha_{156} = 22993$, $\alpha_{157} = 23297$, $\alpha_{158} = 23603$, $\alpha_{159} = 23911$, $\alpha_{160} = 24221$, $\alpha_{161} = 24533$, $\alpha_{162} = 24847$, $\alpha_{163} = 25163$, $\alpha_{164} = 25481$, $\alpha_{165} = 25801$, $\alpha_{166} = 26123$, $\alpha_{167} = 26447$, $\alpha_{168} = 26773$, $\alpha_{169} = 27101$, $\alpha_{170} = 27431$, $\alpha_{171} = 27763$, $\alpha_{172} = 28097$, $\alpha_{173} = 28433$, $\alpha_{174} = 28771$, $\alpha_{175} = 29111$, $\alpha_{176} = 29453$, $\alpha_{177} = 29797$, $\alpha_{178} = 30143$, $\alpha_{179} = 30491$, $\alpha_{180} = 30841$, $\alpha_{181} = 31193$, $\alpha_{182} = 31547$, $\alpha_{183} = 31903$, $\alpha_{184} = 32261$, $\alpha_{185} = 32621$, $\alpha_{186} = 32983$, $\alpha_{187} = 33347$, $\alpha_{188} = 33713$, $\alpha_{189} = 34081$, $\alpha_{190} = 34451$, $\alpha_{191} = 34823$, $\alpha_{192} = 35197$, $\alpha_{193} = 35573$, $\alpha_{194} = 35951$, $\alpha_{195} = 36331$, $\alpha_{196} = 36713$, $\alpha_{197} = 37097$, $\alpha_{198} = 37483$, $\alpha_{199} = 37871$, $\alpha_{200} = 38261$, $\alpha_{201} = 38653$, $\alpha_{202} = 39047$, $\alpha_{203} = 39443$, $\alpha_{204} = 39841$, $\alpha_{205} = 40241$, $\alpha_{206} = 40643$, $\alpha_{207} = 41047$, $\alpha_{208} = 41453$, $\alpha_{209} = 41861$, $\alpha_{210} = 42271$, $\alpha_{211} = 42683$, $\alpha_{212} = 43097$, $\alpha_{213} = 43513$, $\alpha_{214} = 43931$, $\alpha_{215} = 44351$, $\alpha_{216} = 44773$, $\alpha_{217} = 45197$, $\alpha_{218} = 45623$, $\alpha_{219} = 46051$, $\alpha_{220} = 46481$, $\alpha_{221} = 46913$, $\alpha_{222} = 47347$, $\alpha_{223} = 47783$, $\alpha_{224} = 48221$, $\alpha_{225} = 48661$, $\alpha_{226} = 49103$, $\alpha_{227} = 49547$, $\alpha_{228} = 49993$, $\alpha_{229} = 50441$, α_{230}

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$$\begin{aligned} \mathcal{L}_{\text{reg}}(\mathbf{w}) &= \frac{1}{2} \|\mathbf{w}\|_2^2 \\ \mathcal{L}_{\text{data}}(\mathbf{w}) &= \sum_{i=1}^n \ell(\mathbf{w}; \mathbf{x}_i, y_i) \end{aligned}$$

USCIB096; H-1 all 1944 census were analyzed individually with I-A
USCIB096; H1: 2 - 1944 census was analyzed length was 16 inches, wings - 8.5 inches

| Feature Name | Grid Size | Pixel Width | Pixel Height | Aerial Photo | Height Above | Height Below | Height Horizontal | Height Vertical | Level |
|--------------|-----------|-------------|--------------|--------------|--------------|--------------|-------------------|-----------------|-------|
| Feature 1 | 10 | 0.00 | | 1.0 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| Feature 2 | 10 | 0.00 | 1.00 | 1.00 | | | | | 1.00 |
| Feature 3 | 10 | 0.00 | | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |

2014年12月15日 星期二

- ```

1 1.1.5 Section = "Introduction and Motivation" (1.1.5.1)
2 1.1.6 Section = "Introduction and Motivation" (1.1.5.2)
3 1.1.7 Section = "Introduction and Motivation" (1.1.5.3)
4 1.1.8 Section = "Introduction and Motivation" (1.1.5.4)
5 1.1.9 Section = "Introduction and Motivation" (1.1.5.5)
6 1.1.10 Section = "Introduction and Motivation" (1.1.5.6)
7 1.1.11 Section = "Introduction and Motivation" (1.1.5.7)
8 1.1.12 Section = "Introduction and Motivation" (1.1.5.8)
9 1.1.13 Section = "Introduction and Motivation" (1.1.5.9)
10 1.1.14 Section = "Introduction and Motivation" (1.1.5.10)
11 1.1.15 Section = "Introduction and Motivation" (1.1.5.11)
12 1.1.16 Section = "Introduction and Motivation" (1.1.5.12)

```

[illegible]

|        |   |                     |     |   |           |
|--------|---|---------------------|-----|---|-----------|
| F      | = | 1.66 m (5'4.91-in)  | FSY | = | 8.52 ksi  |
| E      | = | 0.0001 in           | EY  | = | 0.0001 in |
| Et     | = | 0.00015 in (Pile)   |     |   |           |
| Ec     | = | 0.0001 in (Cap)     |     |   |           |
| FSY    | = | 0.0001 ksi (1.6)    |     |   |           |
| FSYc   | = | 0.0001 ksi (1.7.5)  |     |   |           |
| FSYcap | = | 0.0001 ksi (1.7.5)  |     |   |           |
| FSYbar | = | 0.0001 ksi (1.7.5)  |     |   |           |
| FSY    | = | 163.8 ksi (1.2.1.1) |     |   |           |
| FSYc   | = | 14.8 ksi (1.2.1.1)  |     |   |           |
| FSYcap | = | 14.8 ksi (1.2.1.1)  |     |   |           |
| FSYbar | = | 14.8 ksi (1.2.1.1)  |     |   |           |

Governing mode = Compression and bending (3.9.1 to 3.78) (Pasch)

Governing code - Berlin about major axis (4.2.2.1) (Pass)

119

SPACE GASS 14 (HK3334) (64-bit) - JEG ENGINEERING CO LTD  
 Path: Y:\J8009(other)\2693\LANDS\20240415\4  
 Designer: Date: Wednesday, April 24, 2024 12:14 PM, Page: 1

Envelope = Load Cases 11,12  
 and Nodes 1,7,13,14

DISPLACEMENTS (mm,rad) (\*=Maximum, #=Minimum)

| Node | Case | Tx     | Ty     | Tz     | Rx     | Ry     | Rz     |
|------|------|--------|--------|--------|--------|--------|--------|
| 1    | 11   | 0.00*# | 0.00*# | 0.00*# | 0.00*# | 0.00*# | 0.00*# |

REACTIONS (kN,kNm) (\*=Maximum, #=Minimum)

| Node | Case | Fx      | Fy       | Fz      | Mx      | My     | Mz     |
|------|------|---------|----------|---------|---------|--------|--------|
| 1    | 12   | 0.01*   | 12.35    | -6.72   | -19.18# | 0.67   | -0.04# |
| 7    | 11   | -17.54# | -71.35   | 0.00    | 0.00    | 0.00   | 75.47* |
| 13   | 11   | -10.04  | 4.43     | 0.27*   | -0.30   | -3.73# | 37.19  |
| 13   | 12   | 0.00    | -141.17# | -20.58  | -16.36  | 0.00   | 0.00   |
| 14   | 11   | -10.04  | 4.43     | -0.27   | 0.30*   | 3.73*  | 37.19  |
| 14   | 12   | 0.00    | 150.03*  | -21.12# | -15.77  | 0.00   | 0.00   |

A20

SPACE GASS 14 (HK3334) (64-bit) - JEG ENGINEERING CO LTD  
 Path: Y:\J8009(other)\2693\LANDS\20240415\4  
 Designer: Date: Wednesday, April 24, 2024 12:47 PM, Page: 1

DISPLACEMENTS AT NODE 8 (mm,rad)

| Case | Tx   | Ty   | Tz   | Rx   | Ry   | Rz   |
|------|------|------|------|------|------|------|
| 21   | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 22   | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

REACTIONS AT NODE 8 (kN,kNm)

| Case | Fx     | Fy    | Fz     | Mx      | My   | Mz     |
|------|--------|-------|--------|---------|------|--------|
| 21   | -39.39 | 24.48 | 0.00   | 0.00    | 0.00 | 310.36 |
| 22   | 0.00   | 24.48 | -39.39 | -310.36 | 0.00 | 0.00   |



A22

Company: JEG Engineering Company Limited  
Address: Bldg. E, 1/F, Cheong Fat Factory Bldg., 346 Fuk Wing St., Cheung Sha Wan, Kln  
Tel: 2117 9500 Fax: 3103 8077 Email: jeg@jeg-td.com

Project:  
Client:  
Element:

WeldCalc20100214  
User Registration No: Unregistered Copy  
Made by: \_\_\_\_\_ Date: \_\_\_\_\_ Page No: \_\_\_\_\_  
Checked: \_\_\_\_\_ Job No: \_\_\_\_\_ Revision: \_\_\_\_\_

WeldGroup in X-Y Plane

WeldGroup in Direct Shear, Bending and Torsion

Applied Loads:  
Direction: Mag kN  
Fx kN: 21.12  
Fy kN: 0  
Fz kN: 150.03

Load Position from Origin:  
Xo mm: \_\_\_\_\_ Yo mm: \_\_\_\_\_ Zo mm: \_\_\_\_\_  
Xc mm: \_\_\_\_\_ Yc mm: \_\_\_\_\_ Zc mm: \_\_\_\_\_

Load Eccentricity Moments at Centroid:  
Mx kNmm: \_\_\_\_\_ My kNmm: \_\_\_\_\_ Mz kNmm: 0.0

Strength Check:  
Design Strength: 0.220 kN/mm2  
Induced Max Stress: 0.177 kN/mm2  
<Allowable; Hence OK

Applied Moments:  
Mx kNmm: 0 My kNmm: 15770 Mz kNmm: 0  
Equivalent Stress Calculation Method: Sqrt [fx^2 + fy^2 + fz^2]  
Resultant Moments on the Weld Group:  
Mx kNmm: -0.0 My kNmm: -0.0 Mz kNmm: 15,770.0

Weld Description: 168.3 Weld

Weld Group Properties about its Centroid (x to u-axis angle = -8.472 deg):  
Xo mm: -0.0 Yo mm: 0.0 Zo mm: 0  
Ix mm^4: 10,445,440 Iy mm^4: 10,445,440 Iz mm^4: 20,890,880  
Ix-y mm^4: 0 Iy-x mm^4: 0

Input for Weld Group Geometry:

| Node No | Part No | Xo mm  | Yo mm  | Throat, a mm | Area, A mm^2 | A x Yo mm^3 | A x Xo mm^3 | Ixx mm^4 | Iyy mm^4 | Ixy mm^4 | Stress fx kN/mm^2 | Stress fy kN/mm^2 | Stress fz kN/mm^2 | Stress fe kN/mm^2 | Force Fxw kN | Force Fyw kN | Force Fzw kN |
|---------|---------|--------|--------|--------------|--------------|-------------|-------------|----------|----------|----------|-------------------|-------------------|-------------------|-------------------|--------------|--------------|--------------|
| 1       | 1       | -84.15 | 0.00   | 5.66         | 124          | -10,285     | 1,354       | 19,660   | 850,794  | -111,998 | 0.007             | -0.000            | 0.177             | 0.177             | 0.880        | -0.000       | 21,778       |
| 2       | 1       | -81.28 | 21.78  | 5.66         | 124          | -9,584      | 3,970       | 131,011  | 739,443  | -305,984 | 0.007             | -0.000            | 0.173             | 0.173             | 0.880        | -0.000       | 20,720       |
| 3       | 1       | -72.88 | 42.08  | 5.66         | 124          | -8,230      | 6,315       | 323,876  | 546,577  | -417,982 | 0.007             | -0.000            | 0.160             | 0.160             | 0.880        | -0.000       | 18,676       |
| 4       | 1       | -59.50 | 59.50  | 5.66         | 124          | -6,315      | 8,230       | 546,577  | 323,876  | -417,982 | 0.007             | -0.000            | 0.140             | 0.140             | 0.880        | -0.000       | 15,785       |
| 5       | 1       | -42.08 | 72.88  | 5.66         | 124          | -3,970      | 9,584       | 739,443  | 131,011  | -305,984 | 0.007             | -0.000            | 0.114             | 0.114             | 0.880        | -0.000       | 12,245       |
| 6       | 1       | -21.78 | 81.28  | 5.66         | 124          | -1,354      | 10,285      | 850,794  | 19,660   | -111,998 | 0.007             | -0.000            | 0.083             | 0.083             | 0.880        | -0.000       | 8,295        |
| 7       | 1       | 0.00   | 84.15  | 5.66         | 124          | 1,354       | 10,285      | 850,794  | 19,660   | 111,998  | 0.007             | 0.000             | 0.051             | 0.051             | 0.880        | 0.000        | 4,207        |
| 8       | 1       | 21.78  | 81.28  | 5.66         | 124          | 3,970       | 9,584       | 739,443  | 131,011  | 305,984  | 0.007             | 0.000             | 0.017             | 0.017             | 0.880        | 0.000        | 0,258        |
| 9       | 1       | 42.08  | 72.88  | 5.66         | 124          | 6,315       | 8,230       | 546,577  | 323,876  | 417,982  | 0.007             | 0.000             | -0.013            | 0.015             | 0.880        | 0.000        | -3,283       |
| 10      | 1       | 59.50  | 59.50  | 5.66         | 124          | 8,230       | 6,315       | 323,876  | 546,577  | 417,982  | 0.007             | 0.000             | -0.040            | 0.040             | 0.880        | 0.000        | -6,174       |
| 11      | 1       | 72.88  | 42.08  | 5.66         | 124          | 10,285      | 3,970       | 131,011  | 739,443  | 305,984  | 0.007             | 0.000             | -0.072            | 0.073             | 0.880        | 0.000        | -9,276       |
| 12      | 1       | 81.28  | 21.78  | 5.66         | 124          | 10,285      | 1,354       | 19,660   | 850,794  | 111,998  | 0.007             | 0.000             | -0.072            | 0.073             | 0.880        | 0.000        | -9,276       |
| 13      | 1       | 84.15  | 0.00   | 5.66         | 124          | 10,285      | -1,354      | 19,660   | 850,794  | -111,998 | 0.007             | 0.000             | -0.072            | 0.073             | 0.880        | 0.000        | -9,276       |
| 14      | 1       | 81.28  | -21.78 | 5.66         | 124          | 9,584       | -3,970      | 131,011  | 739,443  | -305,984 | 0.007             | 0.000             | -0.060            | 0.060             | 0.880        | 0.000        | -8,218       |
| 15      | 1       | 72.88  | -42.08 | 5.66         | 124          | 8,230       | -6,315      | 323,876  | 546,577  | -417,982 | 0.007             | 0.000             | -0.040            | 0.040             | 0.880        | 0.000        | -6,283       |
| 16      | 1       | 59.50  | -59.50 | 5.66         | 124          | 6,315       | -8,230      | 546,577  | 323,876  | -417,982 | 0.007             | 0.000             | -0.013            | 0.015             | 0.880        | 0.000        | 0,258        |
| 17      | 1       | 42.08  | -72.88 | 5.66         | 124          | 3,970       | -9,584      | 739,443  | 131,011  | -305,984 | 0.007             | 0.000             | 0.017             | 0.019             | 0.880        | 0.000        | 4,207        |
| 18      | 1       | 21.78  | -81.28 | 5.66         | 124          | 1,354       | -10,285     | 850,794  | 19,660   | -111,998 | 0.007             | 0.000             | 0.050             | 0.051             | 0.880        | -0.000       | 8,295        |
| 19      | 1       | 0.00   | -84.15 | 5.66         | 124          | -1,354      | -10,285     | 850,794  | 19,660   | 111,998  | 0.007             | 0.000             | 0.083             | 0.083             | 0.880        | -0.000       | 12,245       |
| 20      | 1       | -21.78 | -81.28 | 5.66         | 124          | -3,970      | -9,584      | 739,443  | 131,011  | 305,984  | 0.007             | -0.000            | 0.014             | 0.114             | 0.880        | -0.000       | 15,785       |
| 21      | 1       | -42.08 | -72.88 | 5.66         | 124          | -6,315      | -8,230      | 546,577  | 323,876  | 417,982  | 0.007             | -0.000            | 0.140             | 0.140             | 0.880        | -0.000       | 18,676       |
| 22      | 1       | -59.50 | -59.50 | 5.66         | 124          | -8,230      | -6,315      | 323,876  | 546,577  | 417,982  | 0.007             | -0.000            | 0.160             | 0.160             | 0.880        | -0.000       | 20,720       |
| 23      | 1       | -72.88 | -42.08 | 5.66         | 124          | -9,584      | -3,970      | 131,011  | 739,443  | 305,984  | 0.007             | -0.000            | 0.173             | 0.173             | 0.880        | -0.000       | 21,778       |
| 24      | 1       | -81.28 | -21.78 | 5.66         | 124          | -10,285     | -1,354      | 19,660   | 850,794  | 111,998  | 0.007             | -0.000            | 0.177             | 0.177             | 0.880        | -0.000       | 21,778       |
| 25      | 1       | -84.15 | 0.00   | 5.66         | 124          | -10,285     | 1,354       | 19,660   | 850,794  | -111,998 | 0.007             | -0.000            | 0.177             | 0.177             | 0.880        | -0.000       | 21,778       |
| 26      |         |        |        |              |              |             |             |          |          |          |                   |                   |                   |                   |              |              |              |
| 27      |         |        |        |              |              |             |             |          |          |          |                   |                   |                   |                   |              |              |              |
| 28      |         |        |        |              |              |             |             |          |          |          |                   |                   |                   |                   |              |              |              |
| 29      |         |        |        |              |              |             |             |          |          |          |                   |                   |                   |                   |              |              |              |
| 30      |         |        |        |              |              |             |             |          |          |          |                   |                   |                   |                   |              |              |              |

Combined Properties for the Weld Group

2,984 -0 0 10,445,440 10,445,440 0

Maximum of fz & fe: 0.177 0.177 0.177

Valid Design Maximum Stress: 0.177

Force Resultants in the Weld Group

21,120 21,120 150,030

Weld Group in X-Y Plane

Applied Loads:  
Direction: Mag kN  
Fx kN: 21.12  
Fy kN: 0  
Fz kN: 150.03

Load Position from Origin:  
Xo mm: \_\_\_\_\_ Yo mm: \_\_\_\_\_ Zo mm: \_\_\_\_\_  
Xc mm: \_\_\_\_\_ Yc mm: \_\_\_\_\_ Zc mm: \_\_\_\_\_

Load Eccentricity Moments at Centroid:  
Mx kNmm: \_\_\_\_\_ My kNmm: \_\_\_\_\_ Mz kNmm: 0.0

Strength Check:  
Design Strength: 0.220 kN/mm2  
Induced Max Stress: 0.177 kN/mm2  
<Allowable; Hence OK

Applied Moments:  
Mx kNmm: 0 My kNmm: 15770 Mz kNmm: 0  
Equivalent Stress Calculation Method: Sqrt [fx^2 + fy^2 + fz^2]  
Resultant Moments on the Weld Group:  
Mx kNmm: -0.0 My kNmm: -0.0 Mz kNmm: 15,770.0

Weld Description: 168.3 Weld

Weld Group Properties about its Centroid (x to u-axis angle = -8.472 deg):  
Xo mm: -0.0 Yo mm: 0.0 Zo mm: 0  
Ix mm^4: 10,445,440 Iy mm^4: 10,445,440 Iz mm^4: 20,890,880  
Ix-y mm^4: 0 Iy-x mm^4: 0

Input for Weld Group Geometry:

| Node No | Part No | Xo mm  | Yo mm  | Throat, a mm | Area, A mm^2 | A x Yo mm^3 | A x Xo mm^3 | Ixx mm^4 | Iyy mm^4 | Ixy mm^4 | Stress fx kN/mm^2 | Stress fy kN/mm^2 | Stress fz kN/mm^2 | Stress fe kN/mm^2 | Force Fxw kN | Force Fyw kN | Force Fzw kN |
|---------|---------|--------|--------|--------------|--------------|-------------|-------------|----------|----------|----------|-------------------|-------------------|-------------------|-------------------|--------------|--------------|--------------|
| 1       | 1       | -84.15 | 0.00   | 5.66         | 124          | -10,285     | 1,354       | 19,660   | 850,794  | -111,998 | 0.007             | -0.000            | 0.177             | 0.177             | 0.880        | -0.000       | 21,778       |
| 2       | 1       | -81.28 | 21.78  | 5.66         | 124          | -9,584      | 3,970       | 131,011  | 739,443  | -305,984 | 0.007             | -0.000            | 0.173             | 0.173             | 0.880        | -0.000       | 20,720       |
| 3       | 1       | -72.88 | 42.08  | 5.66         | 124          | -8,230      | 6,315       | 323,876  | 546,577  | -417,982 | 0.007             | -0.000            | 0.160             | 0.160             | 0.880        | -0.000       | 18,676       |
| 4       | 1       | -59.50 | 59.50  | 5.66         | 124          | -6,315      | 8,230       | 546,577  | 323,876  | -417,982 | 0.007             | -0.000            | 0.140             | 0.140             | 0.880        | -0.000       | 15,785       |
| 5       | 1       | -42.08 | 72.88  | 5.66         | 124          | -3,970      | 9,584       | 739,443  | 131,011  | -305,984 | 0.007             | -0.000            | 0.114             | 0.114             | 0.880        | -0.000       | 12,245       |
| 6       | 1       | -21.78 | 81.28  | 5.66         | 124          | -1,354      | 10,285      | 850,794  | 19,660   | -111,998 | 0.007             | -0.000            | 0.083             | 0.083             | 0.880        | -0.000       | 8,295        |
| 7       | 1       | 0.00   | 84.15  | 5.66         | 124          | 1,354       | 10,285      | 850,794  | 19,660   | 111,998  | 0.007             | 0.000             | 0.051             | 0.051             | 0.880        | 0.000        | 4,207        |
| 8       | 1       | 21.78  | 81.28  | 5.66         | 124          | 3,970       | 9,584       | 739,443  | 131,011  | 305,984  | 0.007             | 0.000             | 0.017             | 0.019             | 0.880        | 0.000        | 0,258        |
| 9       | 1       | 42.08  | 72.88  | 5.66         | 124          | 6,315       | 8,230       | 546,577  | 323,876  | 417,982  | 0.007             | 0.000             | -0.013            | 0.015             | 0.880        | 0.000        | -3,283       |
| 10      | 1       | 59.50  | 59.50  | 5.66         | 124          | 8,230       | 6,315       | 323,876  | 546,577  | 417,982  | 0.007             | 0.000             | -0.040            | 0.040             | 0.880        | 0.000        | -6,174       |
| 11      | 1       | 72.88  | 42.08  | 5.66         | 124          | 10,285      | 3,970       | 131,011  | 739,443  | 305,984  | 0.007             | 0.000             | -0.072            | 0.073             | 0.880        | 0.000        | -9,276       |
| 12      | 1       | 81.28  | 21.78  | 5.66         | 124          | 10,285      | 1,354       | 19,660   | 850,794  | 111,998  | 0.007             | 0.000             | -0.072            | 0.073             | 0.880        | 0.000        | -9,276       |
| 13      | 1       | 84.15  | 0.00   | 5.66         | 124          | 10,285      | -1,354      | 19,660   | 850,794  | -111,998 | 0.007             | 0.000             | -0.072            | 0.073             | 0.880        | 0.000        | -9,276       |
| 14      | 1       | 81.28  | -21.78 | 5.66         | 124          | 9,584       | -3,970      | 131,011  | 739,443  | -305,984 | 0.007             | 0.000             | -0.060            | 0.060             | 0.880        | 0.000        | -8,218       |
| 15      | 1       | 72.88  | -42.08 | 5.66         | 124          | 8,230       | -6,315      | 323,876  | 546,577  | -417,982 | 0.007             | 0.000             | -0.040            | 0.040             | 0.880        | 0.000        | -6,283       |
| 16      | 1       | 59.50  | -59.50 | 5.66         | 124          | 6,315       | -8,230      | 546,577  | 323,876  | -417,982 | 0.007             | 0.000             | -0.013            | 0.015             | 0.880        | 0.000        | 0,258        |
| 17      | 1       | 42.08  | -72.88 | 5.66         | 124          | 3,970       | -9,584      | 739,443  | 131,011  | -305,984 | 0.007             | 0.000             | 0.017             | 0.019             | 0.880        | 0.000        | 4,207        |
| 18      | 1       | 21.78  | -81.28 | 5.66         | 124          | 1,354       | -10,285     | 850,794  | 19,660   | -111,998 | 0.007             | 0.000             | 0.050             | 0.051             | 0.880        | -0.000       | 8,295        |
| 19      | 1       | 0.00   | -84.15 | 5.66         | 124          | -1,354      | -10,285     | 850,794  | 19,660   | 111,998  | 0.007             | 0.000             | 0.083             | 0.083             | 0.880        | -0.000       | 12,245       |
| 20      | 1       | -21.78 | -81.28 | 5.66         | 124          | -3,970      | -9,584      | 739,443  | 131,011  | 305,984  | 0.007             | -0.000            | 0.014             | 0.114             | 0.880        | -0.000       | 15,785       |
| 21      | 1       | -42.08 | -72.88 | 5.66         | 124          | -6,315      | -8,230      | 546,577  | 323,876  | 417,982  | 0.007             | -0.000            | 0.140             | 0.140             | 0.880        | -0.000       | 18,676       |
| 22      | 1       | -59.50 | -59.50 | 5.66         | 124          | -8,230      | -6,315      | 323,876  | 546,577  | 417,982  | 0.007             | -0.000            | 0.160             | 0.160             | 0.880        | -0.000       | 20,720       |
| 23      | 1       | -72.88 | -42.08 | 5.66         | 124          | -9,584      | -3,970      | 131,011  | 739,443  | 305,984  | 0.007             | -0.000            | 0.173             | 0.173             | 0.880        | -0.000       | 21,778       |
| 24      | 1       | -81.28 | -21.78 | 5.66         | 124          | -10,285     | -1,354      | 19,660   | 850,794  | 111,998  | 0.007             | -0.000            | 0.177             | 0.177             | 0.880        | -0.000       | 21,778       |
| 25      | 1       | -84.15 | 0.00   | 5.66         | 124          | -10,285     | 1,354       | 19,660   | 850,794  | -111,998 | 0.007             | -0.000            | 0.177             | 0.177             | 0.880        | -0.000       | 21,778       |
| 26      |         |        |        |              |              |             |             |          |          |          |                   |                   |                   |                   |              |              |              |
| 27      |         |        |        |              |              |             |             |          |          |          |                   |                   |                   |                   |              |              |              |
| 28      |         |        |        |              |              |             |             |          |          |          |                   |                   |                   |                   |              |              |              |
| 29      |         |        |        |              |              |             |             |          |          |          |                   |                   |                   |                   |              |              |              |
| 30      |         |        |        |              |              |             |             |          |          |          |                   |                   |                   |                   |              |              |              |

Combined Properties for the Weld Group

2,984 -0 0 10,445,440 10,445,440 0

Maximum of fz & fe: 0.177 0.177 0.177

Valid Design Maximum Stress: 0.177

Force Resultants in the Weld Group

21,120 21,120 150,030

Weld Group in X-Y Plane

Applied Loads:  
Direction: Mag kN  
Fx kN: 21.12  
Fy kN: 0  
Fz kN: 150.03

Load Position from Origin:  
Xo mm: \_\_\_\_\_ Yo mm: \_\_\_\_\_ Zo mm: \_\_\_\_\_  
Xc mm: \_\_\_\_\_ Yc mm: \_\_\_\_\_ Zc mm: \_\_\_\_\_

Load Eccentricity Moments at Centroid:  
Mx kNmm: \_\_\_\_\_ My kNmm: \_\_\_\_\_ Mz kNmm: 0.0

Strength Check:  
Design Strength: 0.220 kN/mm2  
Induced Max Stress: 0.177 kN/mm2  
<Allowable; Hence OK

Applied Moments:  
Mx kNmm: 0 My kNmm: 15770 Mz kNmm: 0  
Equivalent Stress Calculation Method: Sqrt [fx^2 + fy^2 + fz^2]  
Resultant Moments on the Weld Group:  
Mx kNmm: -0.0 My kNmm: -0.0 Mz kNmm: 15,770.0

Weld Description: 168.3 Weld

Weld Group Properties about its Centroid (x to u-axis angle = -8.472 deg):  
Xo mm: -0.0 Yo mm: 0.0 Zo mm: 0  
Ix mm^4: 10,445,440 Iy mm^4: 10,445,440 Iz mm^4: 20,890,880  
Ix-y mm^4: 0 Iy-x mm^4: 0

Input for Weld Group Geometry:

| Node No | Part No | Xo mm | Yo mm | Throat, a mm | Area, A mm^2 | A x Yo mm^3 | A x Xo mm^3 | Ixx mm^4 | Iyy mm^4 | Ixy mm^4 | Stress fx kN/mm^2 | Stress fy kN/mm^2 | Stress fz kN/mm^2 |  |
|---------|---------|-------|-------|--------------|--------------|-------------|-------------|----------|----------|----------|-------------------|-------------------|-------------------|--|
|---------|---------|-------|-------|--------------|--------------|-------------|-------------|----------|----------|----------|-------------------|-------------------|-------------------|--|



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Phone / Fax: 09-2693-139.7 Bracket 24/4/2024

Design: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Fastening point: \_\_\_\_\_ Date: \_\_\_\_\_

Specifier's comments:

1 Input data

**Anchor type and diameter:** HIT-RE 500 V3 + HAS-U 8.8 M16

**Return period (service life in years):** 50

**Item number:** 2223885 HAS-U 8.8 M16x380 (element) / 2123403 HIT-RE 500 V3 (adhesive)

**Filling set or any suitable annular gap filling solution**

**Effective embedment depth:**  $h_{ef,act} = 320.0 \text{ mm}$  ( $h_{ef,lim} = - \text{mm}$ )

**Material:** 8.8

**Evaluation Service Report:** ETA 16/0143

**Issued / Valid:** 14/5/2019 | -

**Proof:** SOFA based on EN 1992-4, Chemical

**Stand-off installation:**  $e_b = 0.0 \text{ mm}$  (no stand-off);  $t = 10.0 \text{ mm}$

**Anchor plate<sup>R</sup>:**  $l_a \times l_b \times t = 600.0 \text{ mm} \times 600.0 \text{ mm} \times 10.0 \text{ mm}$  (Recommended plate thickness: not calculated)

**Profile:** Cross beam:  $(L \times W \times T \times FT) = 593.7 \text{ mm} \times 593.7 \text{ mm} \times 10.0 \text{ mm} \times 10.0 \text{ mm}$

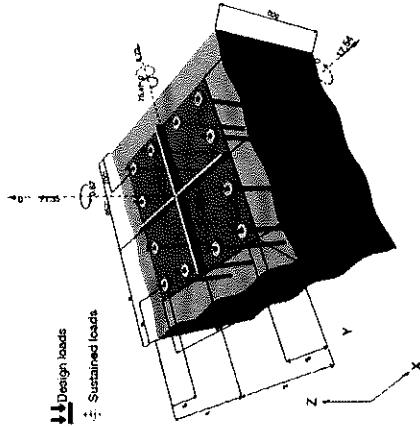
**Base material:** cracked concrete, C25/30,  $f_{ct,cr} = 25.00 \text{ N/mm}^2$ ;  $h = 500.0 \text{ mm}$ , Temp. short/long: 40/24 °C, User-defined partial material safety factor  $\gamma_c = 1.500$

**Installation:** hammer drilled hole, Installation condition: Dry

**Reinforcement:** no reinforcement or reinforcement spacing  $\geq 150 \text{ mm}$  (any  $\emptyset$ ) or  $\geq 100 \text{ mm}$  ( $\emptyset \leq 10 \text{ mm}$ ) with longitudinal edge reinforcement  $d \geq 12.0 \text{ (mm)}$  + close mesh (stirrups, hangers)  $s \leq 100.0 \text{ (mm)}$

<sup>R</sup> - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [mm] & Loading [kN, kNm]



Input data and results must be checked for conformity with the existing conditions and for plausibility!  
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Phone / Fax: 09-2693-139.7 Bracket 24/4/2024

Design: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Fastening point: \_\_\_\_\_ Date: \_\_\_\_\_

1.1 Load combination

| Case | Description   | Forces [kN] / Moments [kNm]                                                                                                                        | Seismic | Fire | Max. Util. Anchor [%] |
|------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|-----------------------|
| 1    | Combination 1 | $N = 71.350; V_x = 17.540; V_y = 6.720;$<br>$M_x = 19.180; M_y = 75.470; M_z = 0.670;$<br>$N_{red} = 0.000; M_{y,red} = 0.000; M_{z,red} = 0.000;$ | no      | no   | 79                    |

2 Load case/Resulting anchor forces

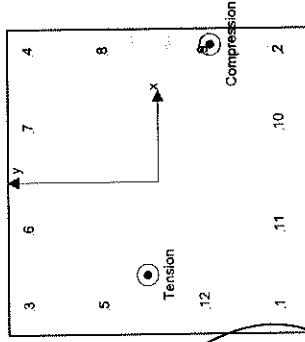
Anchor reactions [kN]

Tension force: (+Tension, -Compression)

| Anchor | Tension force | Shear force | Shear force x | Shear force y |
|--------|---------------|-------------|---------------|---------------|
| 1      | 32.654        | 1.667       | 1.617         | 0.405         |
| 2      | 0.000         | 1.768       | 1.617         | 0.715         |
| 3      | 38.344        | 1.368       | 1.307         | 0.405         |
| 4      | 0.757         | 1.489       | 1.307         | 0.715         |
| 5      | 36.637        | 1.457       | 1.400         | 0.405         |
| 6      | 27.068        | 1.398       | 1.307         | 0.498         |
| 7      | 12.033        | 1.447       | 1.307         | 0.622         |
| 8      | 0.000         | 1.572       | 1.400         | 0.715         |
| 9      | 6.344         | 1.663       | 1.524         | 0.715         |
| 10     | 21.378        | 1.732       | 1.617         | 0.522         |
| 11     | 21.378        | 1.692       | 1.617         | 0.498         |
| 12     | 34.361        | 1.577       | 1.524         | 0.405         |

max. concrete compressive strain: 0.28 [%]  
max. concrete compressive stress: 8.43 [N/mm<sup>2</sup>]  
resulting tension force in (x/y): (-182.8/22.4): 209.577 [kN]  
resulting compression force in (x/y): (268.8/-104.9): 138.227 [kN]

Anchor forces are calculated based on the assumption of a rigid anchor plate.



Input data and results must be checked for conformity with the existing conditions and for plausibility!  
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09-2693-139.7 Bracket (1)

24/4/2024

Specifier's comments:

## 1 Input data

Anchor type and diameter:

HIT-RE 500 V3 + HAS-U 8.8 M16

Return period (service life in years):

50

Item number:

2223885 HAS-U 8.8 M16x380 (element) / 2123403  
HIT-RE 500 V3 (adhesive)

Filling set or any suitable annular gap filling solution

$h_{\text{res}} = 320.0 \text{ mm}$  ( $h_{\text{min}} = - \text{mm}$ )

Effective embedment depth:

8.8

Material:

ETA 160143

Evaluation Service Report:

14/5/2019 | -

Proof:

SOFA based on EN 1992-4, Chemical

Stand-off installation:

$e_b = 0.0 \text{ mm}$  (no stand-off);  $t = 10.0 \text{ mm}$

Anchor plate <sup>R</sup>:

$l_a \times l_y \times t = 600.0 \text{ mm} \times 600.0 \text{ mm} \times 10.0 \text{ mm}$ ; (Recommended plate thickness: not calculated)

Profile:

Double flat bar:  $(L \times W \times T) = 600.0 \text{ mm} \times 168.3 \text{ mm} \times 8.0 \text{ mm}$

Base material:

cracked concrete, C25/30;  $f_{\text{ctk}} = 25.00 \text{ N/mm}^2$ ;  $h = 500.0 \text{ mm}$ , Temp. shortfing: 40/24 °C.

Installation:

User-defined partial material safety factor  $\gamma_{\text{M}} = 1.500$

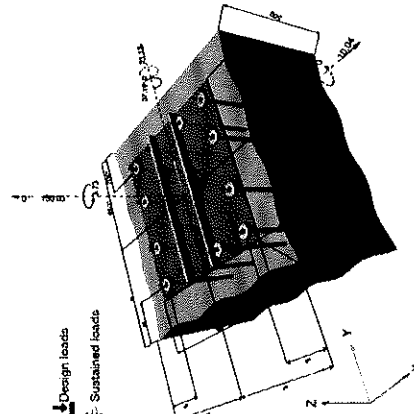
Reinforcement:

no reinforcement or reinforcement spacing  $\geq 150 \text{ mm}$  (any  $\emptyset$ ) or  $\geq 100 \text{ mm}$  ( $\emptyset \leq 10 \text{ mm}$ )

with longitudinal edge reinforcement  $d \geq 12.0 \text{ [mm]}$  + close mesh (stirrups, hangers)  $s \leq 100.0 \text{ [mm]}$

<sup>R</sup> - The anchor calculation is based on a rigid anchor plate assumption.

## Geometry [mm] & Loading [kN, kNm]



Input data and results must be checked for conformity with the existing conditions and for plausibility!

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 Date:

09-2693-139.7 Bracket (1)

24/4/2024

1.1 Load combination

| Case | Description   | Forces [kN] / Moments [kNm]                                                                                                                                                                 | Seismic | Fire | Max. Util. Anchor [%] |
|------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|-----------------------|
| 1    | Combination 1 | $N = 150.030$ ; $V_x = 10.040$ ; $V_y = 21.120$ ;<br>$M_x = 16.360$ ; $M_y = 37.190$ ; $M_z = 3.730$ ;<br>$N_{\text{res}} = 0.000$ ; $M_{\text{res}} = 0.000$ ; $M_{\text{yres}} = 0.000$ ; | no      | no   | 74                    |

## 2 Load case/Resulting anchor forces

### Anchor reactions [kN]

| Anchor | Tension force (+Tension, -Compression) | Shear force x | Shear force y |
|--------|----------------------------------------|---------------|---------------|
| 1      | 23.917                                 | 1.922         | 1.700         |
| 2      | 0.000                                  | 3.126         | 1.700         |
| 3      | 32.762                                 | 0.897         | -0.027        |
| 4      | 6.409                                  | 2.624         | -0.027        |
| 5      | 30.108                                 | 1.022         | 0.491         |
| 6      | 24.856                                 | 1.415         | -0.027        |
| 7      | 14.315                                 | 2.106         | -0.027        |
| 8      | 3.756                                  | 2.689         | 0.491         |
| 9      | 0.218                                  | 2.877         | 1.182         |
| 10     | 5.470                                  | 2.706         | 1.700         |
| 11     | 16.011                                 | 2.212         | 1.700         |
| 12     | 26.570                                 | 1.484         | 1.182         |

max. concrete compressive strain:

0.18 [‰]

max. concrete compressive stress:

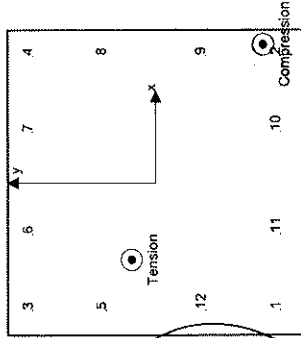
5.42 [N/mm<sup>2</sup>]

resulting tension force in (x/y):

(151.0/48.5); 184.392 [kN]

resulting compression force in (x/y):

(271.7/-215.8); 34.362 [kN]



Anchor forces are calculated based on the assumption of a rigid anchor plate.

Input data and results must be checked for conformity with the existing conditions and for plausibility!

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## CALCULATION

Calculations by

Checked by

A. Chan

Date

Apr,2024

### Design for cast in bolt

$$N = 38.344 \text{ kN}$$

$$V_x = 3.126 \text{ kN}$$

$$V_y = 3.126 \text{ kN}$$

Try M16 Grade 8.8 GMS bolt

$$\text{Bolt area, } A_t = 157 \text{ mm}^2$$

$$\text{Shear strength of bolt, } p_{sb} = 375 \text{ N/mm}^2$$

$$\text{Tension strength of bolt, } p_{tb} = 560 \text{ N/mm}^2$$

Shear Capacity,  $P_s$ 

$$= A_t \times p_{sb}$$

$$= 157 \times 375 / 10^3$$

$$= 58.88 \text{ kN}$$

Tension Capacity,  $P_t$ 

$$= A_t \times p_{tb}$$

$$= 157 \times 560 / 10^3$$

$$= 87.92 \text{ kN}$$

Shear per bolt,  $F_s$ 

$$= \sqrt{V_x^2 + V_y^2}$$

$$= \sqrt{3.126^2 + 3.126^2}$$

$$= 4.42 \text{ kN}$$

$$< P_s$$

OK!

Tension per bolt,  $F_t$ 

$$= N$$

$$= 38 \text{ kN}$$

$$< P_t$$

OK!

Check Combin Effect

$$F_s/P_s + F_t/P_{nom} = 4.42 / 58.88 + 38.34 / 87.92 = 0.51 < 1.4 \quad \text{OK!}$$

Adopt M16 Grade 8.8 GMS bolt

### Check for anchorage length

$$\text{Tension per bolt} = 38 \text{ kN}$$

$$\text{Concrete cube strength, } f_{cu} = 30 \text{ N/mm}^2$$

$$\text{Try anchorage length, } l_b = 400 \text{ mm}$$

$$\text{Coefficient dependent on the bar type, } \beta = 0.5 \text{ For Type 2 : deformed bars}$$

$$= F_s / (\pi \times \phi \times l_b)$$

$$\text{Design anchorage bond stress, } f_b = 38 \times 10^3 / (\pi \times 16 \times 400)$$

$$= 1.91 \text{ N/mm}^2$$

$$= \beta \times \sqrt{f_{cu}}$$

$$\text{Ultimate anchorage bond stress, } f_{bu} = 0.5 \times \sqrt{30}$$

$$= 2.74 \text{ N/mm}^2 > f_b$$

OK!

Adopt 400mm anchorage length

**JEG**

Job

Job No.

Page

A26

**CALCULATION**

Calculations by

Checked by

A. Chan

Date

Shear at Joint

$$= 1.71 \times 2 \times 1.4 \times \pi \times \left( \frac{0.675}{2} \right)^2 \times 3 = 5.14 \text{ kN}$$

Moment at Joint

$$= 5.14 \times \left( 2.5 - 0.675 - 0.2 - \frac{0.675}{2} \right) = 6.62 \text{ kNm}$$





## CALCULATION

Calculations by

Checked by

A. Chan

Date

Apr 2024

### Section Modulus for Bolt Group at Joint of Antenna Group

|     |                  |   |                      |                       |                 |
|-----|------------------|---|----------------------|-----------------------|-----------------|
| Try | CHS 114.3 x 5.0  | ▼ | for pole above joint | Elastic modulus = 45  | cm <sup>3</sup> |
|     |                  |   |                      | Plastic modulus = 45  | cm <sup>3</sup> |
| Try | CHS 193.7 x 10.0 | ▼ | for pole below joint | Elastic modulus = 252 | cm <sup>3</sup> |
|     |                  |   |                      | Plastic modulus = 252 | cm <sup>3</sup> |

Diameter of blot, d  
= 16 mm

Distance between outer most bolts about centroid of blot group  
= 350 - 30 x 2 = 290 mm

Elastic modulus

$I_{xx}$  for bolt 1, 4

$$\begin{aligned}
 &= I_c + Ay^2 \\
 &= \pi d^2/64 + \pi d^2/4(D/2)^2 \\
 &= 3217 + 4227327 \\
 &= 4230544 \text{ mm}^4
 \end{aligned}$$

$I_{xx}$  for bolt 2, 3, 5, 6

$$\begin{aligned}
 &= I_c + Ay^2 \\
 &= \pi d^2/64 + \pi d^2/4(D/4)^2 \\
 &= 3217 + 1056832 \\
 &= 1060049 \text{ mm}^4
 \end{aligned}$$

Total  $I_{xx}$  for bolt group

$$\begin{aligned}
 &= 2 \times 4230544 + 4 \times 1060049 \\
 &= 1.3E+07 \text{ mm}^4
 \end{aligned}$$

Elastic modulus of bolt group

$$\begin{aligned}
 &= 1.3E+07 / (D/2) \\
 &= 87595 \text{ mm}^3 \\
 &= 87.60 \text{ cm}^3 > 52.5 \text{ cm}^3 \text{ Elastic modulus for CHS 114.3 x 5.0 OK!}
 \end{aligned}$$

Plastic modulus

Plastic modulus for bolt 1, 4

$$\begin{aligned}
 &= A_w y_c + A_{Tf} y_f \\
 &\quad (y_c = y_f = D/2) \\
 &= \pi d^2 y/4 + \pi d^2 y/4 \\
 &= 29154 + 29154 \\
 &= 58308 \text{ mm}^3
 \end{aligned}$$

Plastic modulus for bolt 2, 3, 5, 6

$$\begin{aligned}
 &= A_w y_c + A_{Tf} y_f \\
 &\quad (y_c = y_f = D/4) \\
 &= \pi d^2 y/4 + \pi d^2 y/4 \\
 &= 14577 + 14577 \\
 &= 29154 \text{ mm}^3
 \end{aligned}$$

Total  $I_{xx}$  for bolt group

$$\begin{aligned}
 &= 1 \times 58308 + 2 \times 29154 \\
 &= 116616 \text{ mm}^3
 \end{aligned}$$

Plastic modulus of bolt group

$$\begin{aligned}
 &= 116616 \text{ mm}^3 \\
 &= 116.6 \text{ cm}^3 > 45.0 \text{ cm}^3 \text{ Plastic modulus for CHS 114.3 x 5.0 OK!}
 \end{aligned}$$

Therefore, section of bolt group is not a critical section

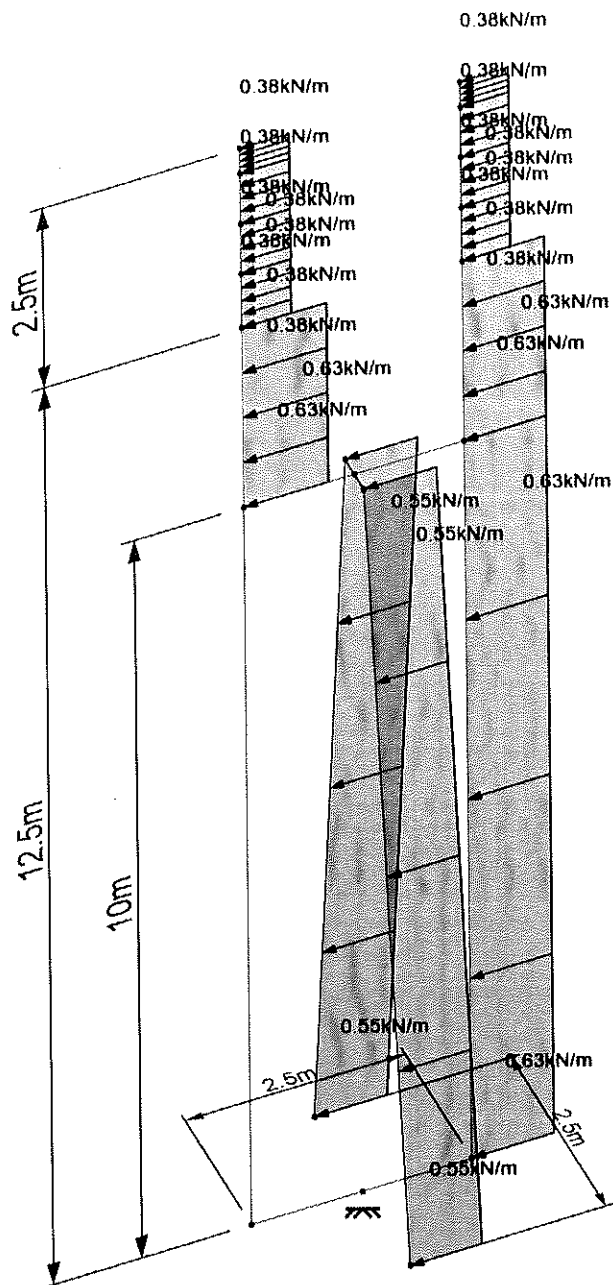
A30

SPACE GASS 14 (HK3334) (64-bit) - JEG ENGINEERING CO LTD  
Path: Y:\J8009(other)\2693\LANDS\20240415\5  
Designer: Date: Wednesday, April 24, 2024 4:45 PM, Page: 1



Load case 4

■ 4 Pole Wind X



Scale (1:75), Viewpoint (157,42), Loads

Sections:

- 2 168.3x6.3 CHS
- 3 193.7x10.0 CHS
- 4 114.3x5.0 CHS

Materials:

- 1 STEEL



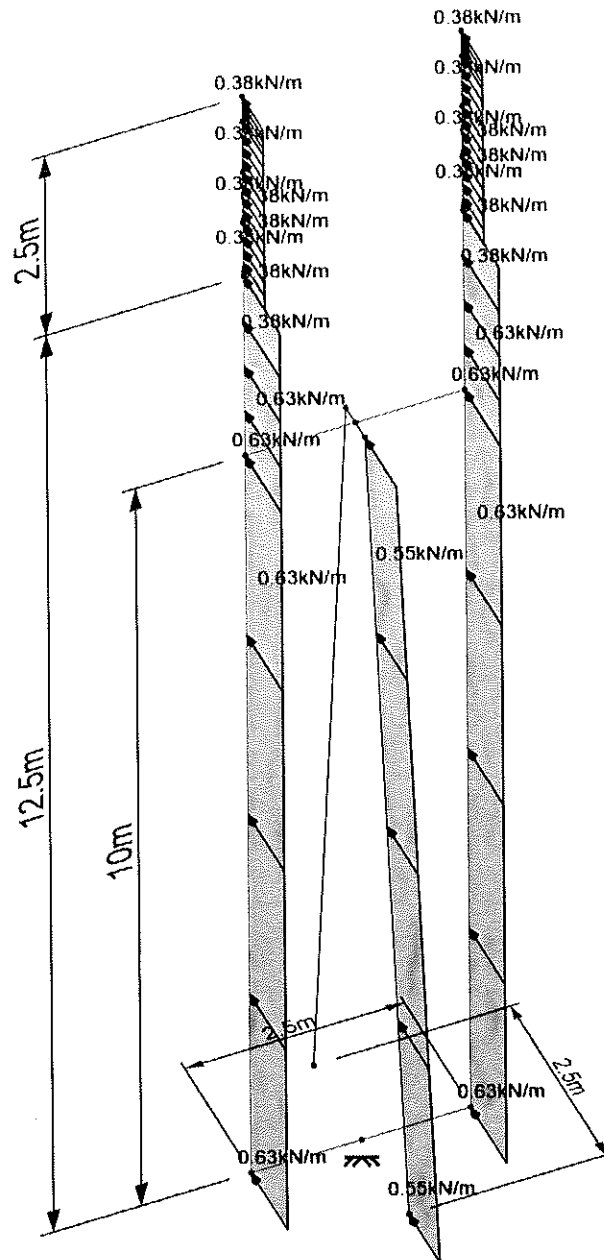
A31

SPACE GASS 14 (HK3334) (64-bit) - JEG ENGINEERING CO LTD  
 Path: Y:\J8009(other)\2693\LANDS\20240415\5  
 Designer: Date: Wednesday, April 24, 2024 4:46 PM, Page: 1



Load case 5

■ 5 Pole Wind Z



Scale (1:75), Viewpoint (157,42), Loads

Sections:

- 2 168.3x6.3 CHS
- 3 193.7x10.0 CHS
- 4 114.3x5.0 CHS

Materials:

- 1 STEEL

A32

SPACE GASS 14 (HK3334) (64-bit) - JEG ENGINEERING CO LTD  
Path: Y:\J8009(other)\2693\LANDS\20240415\5  
Designer: Date: Wednesday, April 24, 2024 4:51 PM, Page: 1

## DISPLACEMENTS AT NODE 8 (mm, rad)

| Case | Tx   | Ty   | Tz   | Rx   | Ry   | Rz   |
|------|------|------|------|------|------|------|
| 21   | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 22   | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

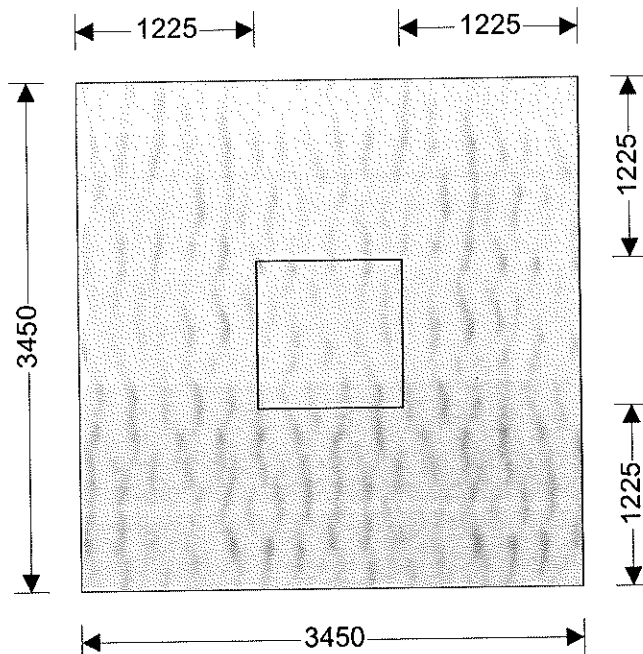
## REACTIONS AT NODE 8 (kN, kNm)

| Case | Fx     | Fy    | Fz     | Mx      | My   | Mz     |
|------|--------|-------|--------|---------|------|--------|
| 21   | -29.87 | 25.08 | 0.00   | 0.00    | 0.00 | 251.54 |
| 22   | 0.00   | 25.08 | -30.67 | -255.53 | 0.00 | 0.00   |

|                                                                                  |                                |            |              |                              |               |
|----------------------------------------------------------------------------------|--------------------------------|------------|--------------|------------------------------|---------------|
|  |                                | Project    |              | Job no. <b>A33</b>           |               |
|                                                                                  |                                | Calcs for  |              | Start page no./Revision<br>1 |               |
| Calcs by<br><b>P</b>                                                             | Calcs date<br><b>4/24/2024</b> | Checked by | Checked date | Approved by                  | Approved date |

### PAD FOOTING ANALYSIS AND DESIGN (BS8110-1:1997)

Tedds calculation version 2.0.07



#### **Pad footing details**

|                                |                                            |
|--------------------------------|--------------------------------------------|
| Length of pad footing          | $L = 3450 \text{ mm}$                      |
| Width of pad footing           | $B = 3450 \text{ mm}$                      |
| Area of pad footing            | $A = L \times B = 11.903 \text{ m}^2$      |
| Depth of pad footing           | $h = 800 \text{ mm}$                       |
| Depth of soil over pad footing | $h_{\text{soil}} = 0 \text{ mm}$           |
| Density of concrete            | $\rho_{\text{conc}} = 24.5 \text{ kN/m}^3$ |

#### **Column details**

|                          |                         |
|--------------------------|-------------------------|
| Column base length       | $l_A = 1000 \text{ mm}$ |
| Column base width        | $b_A = 1000 \text{ mm}$ |
| Column eccentricity in x | $e_{Px} = 0 \text{ mm}$ |
| Column eccentricity in y | $e_{Py} = 0 \text{ mm}$ |

#### **Soil details**

|                            |                                            |
|----------------------------|--------------------------------------------|
| Density of soil            | $\rho_{\text{soil}} = 20.0 \text{ kN/m}^3$ |
| Design shear strength      | $\phi' = 25.0 \text{ deg}$                 |
| Design base friction       | $\delta = 19.3 \text{ deg}$                |
| Allowable bearing pressure | $P_{\text{bearing}} = 63 \text{ kN/m}^2$   |

#### **Axial loading on column**

|                              |                            |
|------------------------------|----------------------------|
| Dead axial load on column    | $P_{GA} = 25.1 \text{ kN}$ |
| Imposed axial load on column | $P_{QA} = 0.0 \text{ kN}$  |
| Wind axial load on column    | $P_{WA} = 0.0 \text{ kN}$  |
| Total axial load on column   | $P_A = 25.1 \text{ kN}$    |

#### **Foundation loads**

|                        |                                             |
|------------------------|---------------------------------------------|
| Dead surcharge load    | $F_{G_{\text{sur}}} = 0.000 \text{ kN/m}^2$ |
| Imposed surcharge load | $F_{Q_{\text{sur}}} = 0.000 \text{ kN/m}^2$ |



|               |                         |            |              |                              |               |
|---------------|-------------------------|------------|--------------|------------------------------|---------------|
| Project       |                         |            |              | Job no. <b>A34</b>           |               |
| Calcs for     |                         |            |              | Start page no./Revision<br>2 |               |
| Calcs by<br>P | Calcs date<br>4/24/2024 | Checked by | Checked date | Approved by                  | Approved date |

Pad footing self weight

$$F_{swt} = h \times \rho_{conc} = 19.600 \text{ kN/m}^2$$

Soil self weight

$$F_{soil} = h_{soil} \times \rho_{soil} = 0.000 \text{ kN/m}^2$$

Total foundation load

$$F = A \times (F_{Gsur} + F_{Qsur} + F_{swt} + F_{soil}) = 233.3 \text{ kN}$$

**Horizontal loading on column base**

Dead horizontal load in x direction

$$H_{GxA} = 30.7 \text{ kN}$$

Imposed horizontal load in x direction

$$H_{QxA} = 0.0 \text{ kN}$$

Wind horizontal load in x direction

$$H_{WxA} = 0.0 \text{ kN}$$

Total horizontal load in x direction

$$H_{xA} = 30.7 \text{ kN}$$

Dead horizontal load in y direction

$$H_{GyA} = 0.0 \text{ kN}$$

Imposed horizontal load in y direction

$$H_{QyA} = 0.0 \text{ kN}$$

Wind horizontal load in y direction

$$H_{WyA} = 0.0 \text{ kN}$$

Total horizontal load in y direction

$$H_{yA} = 0.0 \text{ kN}$$

**Moment on column base**

Dead moment on column in x direction

$$M_{GxA} = -255.530 \text{ kNm}$$

Imposed moment on column in x direction

$$M_{QxA} = 0.000 \text{ kNm}$$

Wind moment on column in x direction

$$M_{WxA} = 0.000 \text{ kNm}$$

Total moment on column in x direction

$$M_{xA} = -255.530 \text{ kNm}$$

Dead moment on column in y direction

$$M_{GyA} = 0.000 \text{ kNm}$$

Imposed moment on column in y direction

$$M_{QyA} = 0.000 \text{ kNm}$$

Wind moment on column in y direction

$$M_{WyA} = 0.000 \text{ kNm}$$

Total moment on column in y direction

$$M_{yA} = 0.000 \text{ kNm}$$

**Check stability against sliding**

Resistance to sliding due to base friction

$$H_{friction} = \max([P_{GA} + (F_{Gsur} + F_{swt} + F_{soil}) \times A], 0 \text{ kN}) \times \tan(\delta) = 90.5 \text{ kN}$$

Passive pressure coefficient

$$K_p = (1 + \sin(\phi')) / (1 - \sin(\phi')) = 2.464$$

**Stability against sliding in x direction**

Passive resistance of soil in x direction

$$H_{xpas} = 0.5 \times K_p \times (h^2 + 2 \times h \times h_{soil}) \times B \times \rho_{soil} = 54.4 \text{ kN}$$

Total resistance to sliding in x direction

$$H_{xres} = H_{friction} + H_{xpas} = 144.9 \text{ kN}$$

**PASS - Resistance to sliding is greater than horizontal load in x direction****Check stability against overturning in x direction**

Total overturning moment

$$M_{xOT} = M_{xA} + H_{xA} \times h = -230.994 \text{ kNm}$$

**Restoring moment in x direction**

Foundation loading

$$M_{xsur} = A \times (F_{Gsur} + F_{swt} + F_{soil}) \times L / 2 = 402.424 \text{ kNm}$$

Axial loading on column

$$M_{xaxial} = (P_{GA}) \times (L / 2 + e_{pXA}) = 43.263 \text{ kNm}$$

Total restoring moment

$$M_{xres} = M_{xsur} + M_{xaxial} = 445.687 \text{ kNm}$$

**PASS - Overturning safety factor exceeds the minimum of 1.5 in the x direction****Calculate pad base reaction**

Total base reaction

$$T = F + P_A = 258.4 \text{ kN}$$

Eccentricity of base reaction in x

$$e_{Tx} = (P_A \times e_{pXA} + M_{xA} + H_{xA} \times h) / T = -894 \text{ mm}$$

Eccentricity of base reaction in y

$$e_{Ty} = (P_A \times e_{pYA} + M_{yA} + H_{yA} \times h) / T = 0 \text{ mm}$$

**Check pad base reaction eccentricity**

$$\text{abs}(e_{Tx}) / L + \text{abs}(e_{Ty}) / B = 0.259$$

**Base reaction acts outside of middle third of base****Calculate pad base pressures**

$$q_1 = 2 \times T / [3 \times B \times (L / 2 - \text{abs}(e_{Tx}))] = 60.083 \text{ kN/m}^2$$

|               |                         |            |              |                              |               |
|---------------|-------------------------|------------|--------------|------------------------------|---------------|
| Project       |                         |            |              | Job no. <b>A35</b>           |               |
| Calcs for     |                         |            |              | Start page no./Revision<br>3 |               |
| Calcs by<br>P | Calcs date<br>4/24/2024 | Checked by | Checked date | Approved by                  | Approved date |

Minimum base pressure  
Maximum base pressure

$$q_2 = 2 \times T / [3 \times B \times (L / 2 - \text{abs}(e_{Tx}))] = 60.083 \text{ kN/m}^2$$

$$q_3 = 0.000 \text{ kN/m}^2$$

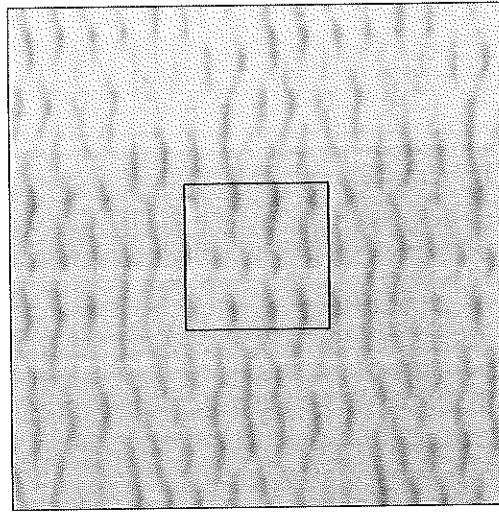
$$q_4 = 0.000 \text{ kN/m}^2$$

$$q_{\min} = \min(q_1, q_2, q_3, q_4) = 0.000 \text{ kN/m}^2$$

$$q_{\max} = \max(q_1, q_2, q_3, q_4) = 60.083 \text{ kN/m}^2$$

**PASS - Maximum base pressure is less than allowable bearing pressure**

60.1 kN/m<sup>2</sup> 0.0 kN/m<sup>2</sup>



60.1 kN/m<sup>2</sup> 0.0 kN/m<sup>2</sup>

#### Partial safety factors for loads

Partial safety factor for dead loads

$$\gamma_{FG} = 1.40$$

Partial safety factor for imposed loads

$$\gamma_{FQ} = 1.60$$

Partial safety factor for wind loads

$$\gamma_{FW} = 0.00$$

#### Ultimate axial loading on column

Ultimate axial load on column

$$P_{uA} = P_{GA} \times \gamma_{FG} + P_{QA} \times \gamma_{FQ} + P_{WA} \times \gamma_{FW} = 35.1 \text{ kN}$$

#### Ultimate foundation loads

Ultimate foundation load

$$F_u = A \times [(F_{Gsur} + F_{swt} + F_{soil}) \times \gamma_{FG} + F_{Qsur} \times \gamma_{FQ}] = 326.6 \text{ kN}$$

#### Ultimate horizontal loading on column

Ultimate horizontal load in x direction

$$H_{xuA} = H_{GxA} \times \gamma_{FG} + H_{QxA} \times \gamma_{FQ} + H_{WxA} \times \gamma_{FW} = 42.9 \text{ kN}$$

Ultimate horizontal load in y direction

$$H_{yuA} = H_{GyA} \times \gamma_{FG} + H_{QyA} \times \gamma_{FQ} + H_{WyA} \times \gamma_{FW} = 0.0 \text{ kN}$$

#### Ultimate moment on column

Ultimate moment on column in x direction

$$M_{xuA} = M_{GxA} \times \gamma_{FG} + M_{QxA} \times \gamma_{FQ} + M_{WxA} \times \gamma_{FW} = -357.742 \text{ kNm}$$

Ultimate moment on column in y direction

$$M_{yuA} = M_{GyA} \times \gamma_{FG} + M_{QyA} \times \gamma_{FQ} + M_{WyA} \times \gamma_{FW} = 0.000 \text{ kNm}$$

#### Calculate ultimate pad base reaction

Ultimate base reaction

$$T_u = F_u + P_{uA} = 361.7 \text{ kN}$$

Eccentricity of ultimate base reaction in x

$$e_{Txu} = (P_{uA} \times e_{Px} + M_{xuA} + H_{xuA} \times h) / T_u = -894 \text{ mm}$$

Eccentricity of ultimate base reaction in y

$$e_{Tyu} = (P_{uA} \times e_{Py} + M_{yuA} + H_{yuA} \times h) / T_u = 0 \text{ mm}$$

|               |                         |            |              |                              |               |
|---------------|-------------------------|------------|--------------|------------------------------|---------------|
| Project       |                         |            |              | Job no. <b>A36</b>           |               |
| Calcs for     |                         |            |              | Start page no./Revision<br>4 |               |
| Calcs by<br>P | Calcs date<br>4/24/2024 | Checked by | Checked date | Approved by                  | Approved date |

### Calculate ultimate pad base pressures

$$q_{1u} = 2 \times T_u / [3 \times B \times (L / 2 - \text{abs}(e_{Txu}))] = 84.117 \text{ kN/m}^2$$

$$q_{2u} = 2 \times T_u / [3 \times B \times (L / 2 - \text{abs}(e_{Txu}))] = 84.117 \text{ kN/m}^2$$

$$q_{3u} = 0.000 \text{ kN/m}^2$$

$$q_{4u} = 0.000 \text{ kN/m}^2$$

Minimum ultimate base pressure

$$q_{\min u} = \min(q_{1u}, q_{2u}, q_{3u}, q_{4u}) = 0.000 \text{ kN/m}^2$$

Maximum ultimate base pressure

$$q_{\max u} = \max(q_{1u}, q_{2u}, q_{3u}, q_{4u}) = 84.117 \text{ kN/m}^2$$

### Calculate rate of change of base pressure in x direction

Left hand base reaction

$$f_{uL} = (q_{1u} + q_{2u}) \times B / 2 = 290.202 \text{ kN/m}$$

Right hand base reaction

$$f_{uR} = (q_{3u} + q_{4u}) \times B / 2 = 0.000 \text{ kN/m}$$

Length of base reaction

$$L_x = 3 \times (L / 2 + e_{Txu}) = 2493 \text{ mm}$$

Rate of change of base pressure

$$C_x = (f_{uR} - f_{uL}) / L_x = -116.413 \text{ kN/m/m}$$

### Calculate pad lengths in x direction

Left hand length

$$L_L = L / 2 + e_{PxA} = 1725 \text{ mm}$$

Right hand length

$$L_R = L / 2 - e_{PxA} = 1725 \text{ mm}$$

### Calculate ultimate moments in x direction

Ultimate positive moment in x direction

$$M_x = f_{uL} \times L_L^2 / 2 + C_x \times L_L^3 / 6 - F_u \times L_L^2 / (2 \times L) = 191.327 \text{ kNm}$$

Position of maximum negative moment

$$L_z = 1725 \text{ mm}$$

Ultimate negative moment in x direction

$$M_{x\text{neg}} = f_{uL} \times L_L^2 / 2 + C_x \times L_L^3 / 6 - F_u \times L_L^2 / (2 \times L) + H_{xuA} \times h + M_{xuA}$$

$$M_{x\text{neg}} = -132.064 \text{ kNm}$$

### Calculate rate of change of base pressure in y direction

Top edge base reaction

$$f_{uT} = (q_{2u} + q_{4u}) \times L / 2 = 145.101 \text{ kN/m}$$

Bottom edge base reaction

$$f_{uB} = (q_{1u} + q_{3u}) \times L / 2 = 145.101 \text{ kN/m}$$

Length of base reaction

$$L_y = B = 3450 \text{ mm}$$

Rate of change of base pressure

$$C_y = (f_{uB} - f_{uT}) / L_y = 0.000 \text{ kN/m/m}$$

### Calculate pad lengths in y direction

Top length

$$L_T = B / 2 - e_{PyA} = 1725 \text{ mm}$$

Bottom length

$$L_B = B / 2 + e_{PyA} = 1725 \text{ mm}$$

### Calculate ultimate moments in y direction

Ultimate moment in y direction

$$M_y = f_{uT} \times L_T^2 / 2 + C_y \times L_T^3 / 6 - F_u \times L_T^2 / (2 \times B) = 75.035 \text{ kNm}$$

### Material details

Characteristic strength of concrete

$$f_{cu} = 30 \text{ N/mm}^2$$

Characteristic strength of reinforcement

$$f_y = 500 \text{ N/mm}^2$$

Characteristic strength of shear reinforcement

$$f_{yv} = 500 \text{ N/mm}^2$$

Nominal cover to reinforcement

$$C_{nom} = 30 \text{ mm}$$

### Moment design in x direction

Diameter of tension reinforcement

$$\phi_{xB} = 20 \text{ mm}$$

Depth of tension reinforcement

$$d_x = h - C_{nom} - \phi_{xB} / 2 = 760 \text{ mm}$$

### Design formula for rectangular beams (cl 3.4.4.4)

$$K_x = M_x / (B \times d_x^2 \times f_{cu}) = 0.003$$

$$K_x' = 0.156$$

**$K_x < K_x'$  compression reinforcement is not required**

Lever arm

$$z_x = d_x \times \min([0.5 + \sqrt{(0.25 - K_x / 0.9)}], 0.95) = 722 \text{ mm}$$

Area of tension reinforcement required

$$A_{s\_x\_req} = M_x / (0.87 \times f_y \times z_x) = 609 \text{ mm}^2$$

|               |                         |            |              |                              |               |
|---------------|-------------------------|------------|--------------|------------------------------|---------------|
| Project       |                         |            |              | Job no. <b>A37</b>           |               |
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| Calcs by<br>P | Calcs date<br>4/24/2024 | Checked by | Checked date | Approved by                  | Approved date |

Minimum area of tension reinforcement

$$A_{s_x \min} = 0.0013 \times B \times h = \mathbf{3588 \text{ mm}^2}$$

Tension reinforcement provided

**17 No. 20 dia. bars bottom (200 centres)**

Area of tension reinforcement provided

$$A_{s_xB \text{ prov}} = N_{xB} \times \pi \times \phi_{xB}^2 / 4 = \mathbf{5341 \text{ mm}^2}$$

**PASS - Tension reinforcement provided exceeds tension reinforcement required**

#### Negative moment design in x direction

Diameter of tension reinforcement

$$\phi_{xT} = \mathbf{20 \text{ mm}}$$

Depth of tension reinforcement

$$d_x = h - C_{nom} - \phi_{xT} / 2 = \mathbf{760 \text{ mm}}$$

#### Design formula for rectangular beams (cl 3.4.4.4)

$$K_x = -M_{xneg} / (B \times d_x^2 \times f_{cu}) = \mathbf{0.002}$$

$$K_x' = 0.156$$

**$K_x < K_x'$  compression reinforcement is not required**

Lever arm

$$z_x = d_x \times \min([0.5 + \sqrt{(0.25 - K_x / 0.9)}], 0.95) = \mathbf{722 \text{ mm}}$$

Area of tension reinforcement required

$$A_{s_x \text{ req}} = -M_{xneg} / (0.87 \times f_y \times z_x) = \mathbf{420 \text{ mm}^2}$$

Minimum area of tension reinforcement

$$A_{s_x \min} = 0.0013 \times B \times h = \mathbf{3588 \text{ mm}^2}$$

Tension reinforcement provided

**17 No. 20 dia. bars top (200 centres)**

Area of tension reinforcement provided

$$A_{s_xT \text{ prov}} = N_{xT} \times \pi \times \phi_{xT}^2 / 4 = \mathbf{5341 \text{ mm}^2}$$

**PASS - Tension reinforcement provided exceeds tension reinforcement required**

#### Moment design in y direction

Diameter of tension reinforcement

$$\phi_{yB} = \mathbf{20 \text{ mm}}$$

Depth of tension reinforcement

$$d_y = h - C_{nom} - \phi_{yB} / 2 = \mathbf{740 \text{ mm}}$$

#### Design formula for rectangular beams (cl 3.4.4.4)

$$K_y = M_y / (L \times d_y^2 \times f_{cu}) = \mathbf{0.001}$$

$$K_y' = 0.156$$

**$K_y < K_y'$  compression reinforcement is not required**

Lever arm

$$z_y = d_y \times \min([0.5 + \sqrt{(0.25 - K_y / 0.9)}], 0.95) = \mathbf{703 \text{ mm}}$$

Area of tension reinforcement required

$$A_{s_y \text{ req}} = M_y / (0.87 \times f_y \times z_y) = \mathbf{245 \text{ mm}^2}$$

Minimum area of tension reinforcement

$$A_{s_y \min} = 0.0013 \times L \times h = \mathbf{3588 \text{ mm}^2}$$

Tension reinforcement provided

**17 No. 20 dia. bars bottom (200 centres)**

Area of tension reinforcement provided

$$A_{s_yB \text{ prov}} = N_{yB} \times \pi \times \phi_{yB}^2 / 4 = \mathbf{5341 \text{ mm}^2}$$

**PASS - Tension reinforcement provided exceeds tension reinforcement required**

#### Calculate ultimate shear force at d from left face of column

Ultimate pressure for shear

$$q_{su} = (q_{2u} + C_x \times (L / 2 + e_{pXA} - l_A / 2 - d_x) / B + q_{1u}) / 2$$

$$q_{su} = \mathbf{76.271 \text{ kN/m}^2}$$

Area loaded for shear

$$A_s = B \times \min((L / 2 + e_{pXA} - l_A / 2 - d_x), 3 \times (L / 2 + e_{TX})) = \mathbf{1.604 \text{ m}^2}$$

Ultimate shear force

$$V_{su} = A_s \times (q_{su} - F_u / A) = \mathbf{78.338 \text{ kN}}$$

#### Shear stresses at d from left face of column (cl 3.5.5.2)

Design shear stress

$$v_{su} = V_{su} / (B \times d_x) = \mathbf{0.030 \text{ N/mm}^2}$$

#### From BS 8110:Part 1:1997 - Table 3.8

Design concrete shear stress

$$v_c = 0.79 \text{ N/mm}^2 \times \min(3, [100 \times A_{s_xB \text{ prov}} / (B \times d_x)]^{1/3}) \times \max((400 \text{ mm} / d_x)^{1/4}, 0.67) \times (\min(f_{cu} / 1 \text{ N/mm}^2, 40) / 25)^{1/3} / 1.25 = \mathbf{0.337 \text{ N/mm}^2}$$

Allowable design shear stress

$$v_{max} = \min(0.8 \text{ N/mm}^2 \times \sqrt{f_{cu} / 1 \text{ N/mm}^2}, 5 \text{ N/mm}^2) = \mathbf{4.382 \text{ N/mm}^2}$$

**PASS -  $v_{su} < v_c$  - No shear reinforcement required**

|               |                         |            |              |                              |               |
|---------------|-------------------------|------------|--------------|------------------------------|---------------|
| Project       |                         |            |              | Job no. <b>A38</b>           |               |
| Calcs for     |                         |            |              | Start page no./Revision<br>6 |               |
| Calcs by<br>P | Calcs date<br>4/24/2024 | Checked by | Checked date | Approved by                  | Approved date |

### Calculate ultimate punching shear force at face of column

|                                          |                                                                                                                                                                |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ultimate pressure for punching shear     | $q_{puA} = q_{1u} + [(L/2 + e_{Px} - l_A/2) + (l_A/2)] \times C_x / B - [(B/2 + e_{Py} - b_A/2) + (b_A/2)] \times C_y / L =$<br><b>25.910 kN/m<sup>2</sup></b> |
| Average effective depth of reinforcement | $d = (d_x + d_y) / 2 =$ <b>750 mm</b>                                                                                                                          |
| Area loaded for punching shear at column | $A_{pA} = (l_A) \times (b_A) =$ <b>1.000 m<sup>2</sup></b>                                                                                                     |
| Length of punching shear perimeter       | $U_{pA} = 2 \times (l_A) + 2 \times (b_A) =$ <b>4000 mm</b>                                                                                                    |
| Ultimate shear force at shear perimeter  | $V_{puA} = P_{uA} + (F_u / A - q_{puA}) \times A_{pA} =$ <b>36.642 kN</b>                                                                                      |
| Effective shear force at shear perimeter | $V_{puAeff} = V_{puA} \times [1 + 1.5 \times \text{abs}(M_{xuA}) / (V_{puA} \times (b_A))] =$ <b>573.255 kN</b>                                                |

### Punching shear stresses at face of column (cl 3.7.7.2)

|                               |                                                                                                                                |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Design shear stress           | $v_{puA} = V_{puAeff} / (U_{pA} \times d) =$ <b>0.191 N/mm<sup>2</sup></b>                                                     |
| Allowable design shear stress | $v_{max} = \min(0.8 \text{ N/mm}^2 \times \sqrt{f_{cu} / 1 \text{ N/mm}^2}, 5 \text{ N/mm}^2) =$ <b>4.382 N/mm<sup>2</sup></b> |

**PASS - Design shear stress is less than allowable design shear stress**

### Calculate ultimate punching shear force at perimeter of 1.5 d from face of column

|                                          |                                                                                                                                                                                                                                                      |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ultimate pressure for punching shear     | $q_{puA1.5d} = q_{1u} + [(L/2 + e_{Px} - l_A/2 - 1.5 \times d) + (l_A + 2 \times 1.5 \times d) / 2] \times C_x / B - [(B/2 + e_{Py} - b_A/2 - 1.5 \times d) + (b_A + 2 \times 1.5 \times d) / 2] \times C_y / L =$<br><b>25.910 kN/m<sup>2</sup></b> |
| Average effective depth of reinforcement | $d = (d_x + d_y) / 2 =$ <b>750 mm</b>                                                                                                                                                                                                                |
| Area loaded for punching shear at column | $A_{pA1.5d} = (l_A + 2 \times 1.5 \times d) \times (b_A + 2 \times 1.5 \times d) =$ <b>10.563 m<sup>2</sup></b>                                                                                                                                      |
| Length of punching shear perimeter       | $U_{pA1.5d} = 2 \times (l_A + 2 \times 1.5 \times d) + 2 \times (b_A + 2 \times 1.5 \times d) =$ <b>13000 mm</b>                                                                                                                                     |
| Ultimate shear force at shear perimeter  | $V_{puA1.5d} = P_{uA} + (F_u / A - q_{puA1.5d}) \times A_{pA1.5d} =$ <b>51.274 kN</b>                                                                                                                                                                |
| Effective shear force at shear perimeter | $V_{puA1.5deff} = V_{puA1.5d} \times [1 + 1.5 \times \text{abs}(M_{xuA}) / (V_{puA1.5d} \times (b_A + 2 \times 1.5 \times d))] =$<br><b>216.386 kN</b>                                                                                               |

### Punching shear stresses at perimeter of 1.5 d from face of column (cl 3.7.7.2)

|                     |                                                                                        |
|---------------------|----------------------------------------------------------------------------------------|
| Design shear stress | $v_{puA1.5d} = V_{puA1.5deff} / (U_{pA1.5d} \times d) =$ <b>0.022 N/mm<sup>2</sup></b> |
|---------------------|----------------------------------------------------------------------------------------|

### From BS 8110:Part 1:1997 - Table 3.8

|                               |                                                                                                                                                                                                                                                                                                 |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Design concrete shear stress  | $v_c = 0.79 \text{ N/mm}^2 \times \min(3, [100 \times (A_{s\_xB\_prov} / (B \times d_x) + A_{s\_yB\_prov} / (L \times d_y)) / 2]^{1/3}) \times \max((800 \text{ mm} / (d_x + d_y))^{1/4}, 0.67) \times (\min(f_{cu} / 1 \text{ N/mm}^2, 40) / 25)^{1/3} / 1.25 =$ <b>0.339 N/mm<sup>2</sup></b> |
| Allowable design shear stress | $v_{max} = \min(0.8 \text{ N/mm}^2 \times \sqrt{f_{cu} / 1 \text{ N/mm}^2}, 5 \text{ N/mm}^2) =$ <b>4.382 N/mm<sup>2</sup></b>                                                                                                                                                                  |

**PASS -  $v_{puA1.5d} < v_c$  - No shear reinforcement required**

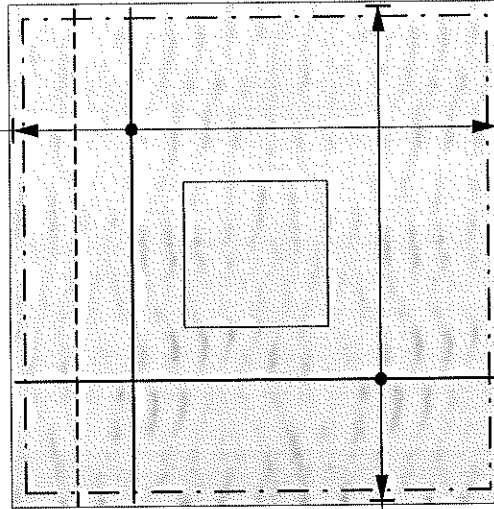




Tekla Tedds

|               |                         |            |              |                              |               |
|---------------|-------------------------|------------|--------------|------------------------------|---------------|
| Project       |                         |            |              | Job no. A39                  |               |
| Calcs for     |                         |            |              | Start page no./Revision<br>7 |               |
| Calcs by<br>P | Calcs date<br>4/24/2024 | Checked by | Checked date | Approved by                  | Approved date |

17 No. 20 dia. bars btm (200 c/c)  
17 No. 20 dia. bars top (200 c/c)



17 No. 20 dia. bars btm (200 c/c), 17 No. 20 dia. bars top (200 c/c)

--- Shear at  $d$  from column face

— Punching shear perimeter at  $1.5 \times d$  from column face

## **Site Photos**



Photo 1: Showing the proposed antenna & equipment concrete footing location

|                  |                      |                  |                  |                  |                  |                  |  |
|------------------|----------------------|------------------|------------------|------------------|------------------|------------------|--|
| ANTENNA POST #10 |                      | P1               |                  |                  | P2               |                  |  |
| ANTENNA NO.      | A1 (UPPER)           | A2 (MIDDLE)      | A3 (LOWER)       | A4 (UPPER)       | A5 (MIDDLE)      | A6 (LOWER)       |  |
| ANTENNA TYPE     | MCROWAVE ANTENNA     | MCROWAVE ANTENNA | MCROWAVE ANTENNA | MCROWAVE ANTENNA | MCROWAVE ANTENNA | MCROWAVE ANTENNA |  |
| BEARING CODE     | ---                  | ---              | ---              | ---              | ---              | ---              |  |
| DOWNFILL (DEC)   | ---                  | ---              | ---              | ---              | ---              | ---              |  |
| MCROWAVE ANTENNA | SIZES = #675x55#02mm | WEIGHT = 100g    |                  |                  |                  |                  |  |

| ANCHOR TYPE   | RECOMMENDED LOADS | TEST LOADS $\times 1.5$ | EFFECTIVE ANCHORAGE DEPTH (mm) | MIN. BASE MATERIAL THICKNESS (mm) | MIN. BASE MATERIAL SPACING (mm) | EDGE DISTANCE (mm) |
|---------------|-------------------|-------------------------|--------------------------------|-----------------------------------|---------------------------------|--------------------|
|               | TENSION (kN)      | TENSION (kN)            |                                |                                   |                                 |                    |
| HST3-R-W8-47  | 2.8               | 4.2                     | 47                             | 80                                | 35                              | 40                 |
| HST3-R-W10-60 | 5                 | 7.5                     | 60                             | 120                               | 45                              | 70                 |

| ITEM MARK | DESCRIPTION           |
|-----------|-----------------------|
| C1 - C3   | 50.50x5mm THK. L      |
| -         | #114 3x5mm THK. CHS   |
| -         | #159 3x8mm THK. CHS   |
| -         | #193 7x10mm THK. CHS  |
| -         | 10mm THK. STEEL PLATE |

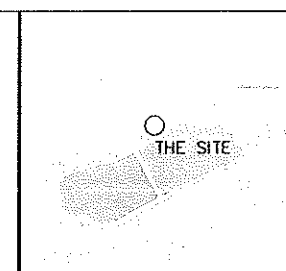
PROPOSED BTS EQUIPMENT LOCATION

PI PROPOSED ANTENNA POST PI LOCATION

PHOTO MARK (PHOTO REFER TO REPORT FOR INFORMATION ONLY)

GENERAL NOTES :

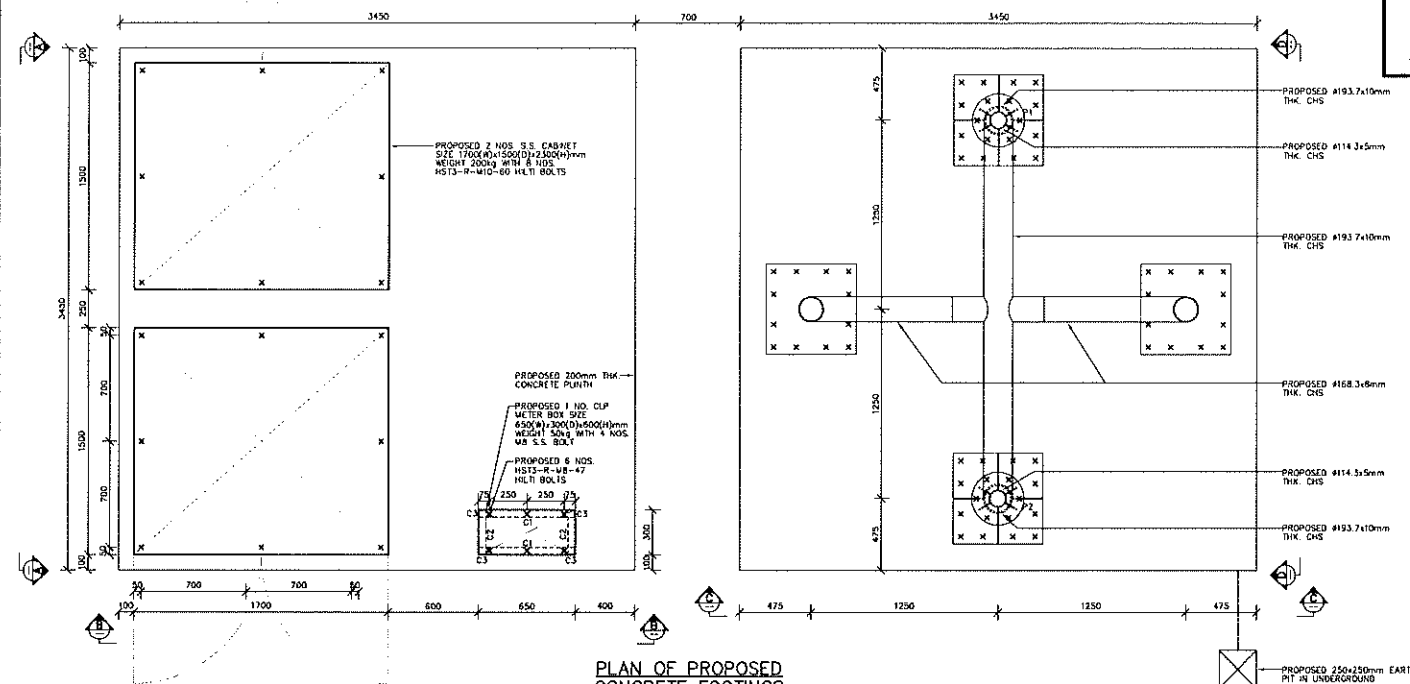
1. ALL DIMENSIONS SHOWN ARE IN mm.
2. EXACT DIMENSIONS TO BE VERIFIED ON SITE.
3. ALL NEW STRUCTURAL STEEL WORK CHECKING COMPANY'S COPY OF THE CODE OF PRACTICE FOR THE STRUCTURAL USE OF STEEL 2011.
4. ALL STRUCTURAL STEEL SHALL BE CLASS 1 OF GRADE S275 OR S355 OR S460 OR S690 OR ANY OTHER STAINLESS OR EQUIVALENT COMPLY WITH THE RELEVANT REFERENCE STANDARDS AND SHALL BE APPLIED AFTER THE CODE OF PRACTICE FOR THE STRUCTURAL USE OF STEEL 2011.
5. ALL NOT FINISHED STRUCTURAL Hollow SECTIONS SHOULD COMPLY WITH BS EN 10120 PART 1: 2006
6. ALL STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED TO A COATING OF 85 MICRONS THICK AND TWO COATS OF ZINC RICH PRIMER SHALL BE APPLIED AFTER WELDING CONNECTION TO BS EN 1461: 2009.
7. ALL STEEL BOLT/STUD/HUT TO BE GRADE 8.8 COMPLY WITH BS EN 15038 PART 1 & 2: 2009 (P40+320N/mm<sup>2</sup>)
8. ALL WELDED SHALL BE IN ACCORDANCE WITH REQUIREMENT AS PER BS EN 10111 PART 1: 2009 & PART 2: 2001 (WELD STRENGTH=220N/mm<sup>2</sup>).
9. WAK. INSULATED LOADING:  
a) EQUIPMENT SELF WEIGHT = 450kg (MAX.)  
b) WORK PRESSURE IS IN ACCORDANCE WITH CODE OF PRACTICE ON WAK EFFECTS HONG KONG 2018.  
c) WAK WORK PRESSURE SHALL BE 120-200 FOR ANTENNA DESIGN WAK PRESSURE=182kPa, (C=180 FOR ANTENNA)
10. THE DESIGN AND CONSTRUCTION OF THE PROPOSED SMALL SHALL COMPLY WITH THE BUILDINGS DRAINAGE, ALLEVING REGULATIONS AND FIRE SAFETY IN BUILDINGS 2011.
11. ALL HUNG ANCHOR BOLTS SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING SPECIFICATION
12. UNLESS OTHERWISE STATED, ALL ANCHOR BOLTS ARE MULTI TYPE AS SPECIFIED BELOW:  
HS12-8-H12-70  
mm EMBEDMENT LENGTH  
12mm DIAMETER ANCHOR  
ANCHOR TYPE
13. ALL ALLEVING PLASTIC SHEET WASHER SHOULD PROVIDE BETWEEN S.S. BOLT & G/S STEEL.
14. ALL PLASTER TO BE 25mm THICK CEMENT : SAND = 1 : 3.
15. ALL METAL SURFACE SHALL BE CLEANED THOROUGHLY TO REMOVE ALL DIRT, GREASE, OIL, GREASE AND THE LIKE. CHIP, SCRAPE AND BRUSH-BRUSH TO REMOVE ALL SCALE, SLURRY, BURNED, OIL, GREASE, AND RESIDUE SURFACE FILM OF MILD AND BRUSH WITH DETERGENTS.
16. CHIP OFF THE PLASTER FROM THE FACE OF THE R.C. MEMBERS WHERE IN CONTACT WITH THE STEEL MEMBERS BEFORE INSTALLING.
17. ALL WELDING TO BE 5mm FILL WELD ALL AROUND UNLESS OTHERWISE STATED.
18. ROOFING SHOULD BE ADJUSTED ON SITE TO AVOID CRACKING ON EXISTING SURFACE DECKS. ALL ANCHOR SHALL BE 90 DEG.
19. ADEQUATE EARTHING PROTECTION SHALL BE PROVIDED.
20. ALL ELECTRICAL WORK SHALL COMPLY WITH THE CURRENT CODE, IEC AND POWER COMPANY REGULATION.
21. POWER SUPPLY SHOULD BE 250A TYPE C/P W/ETER.
22. PLANE PLASTER SHALL PROVIDED TO ALL EXTERIOR EXPOSED EQUIPMENT CABINETS, CONCRETE CANALS, CONDUITS AND FADULTIES FOR EASY IDENTIFICATION.
23. ALL NEW CONCRETE COVER TO BE DESIGNED W/400 300mm
24. CONCRETE COVER TO WAK REINFORCEMENT TO BE 75mm



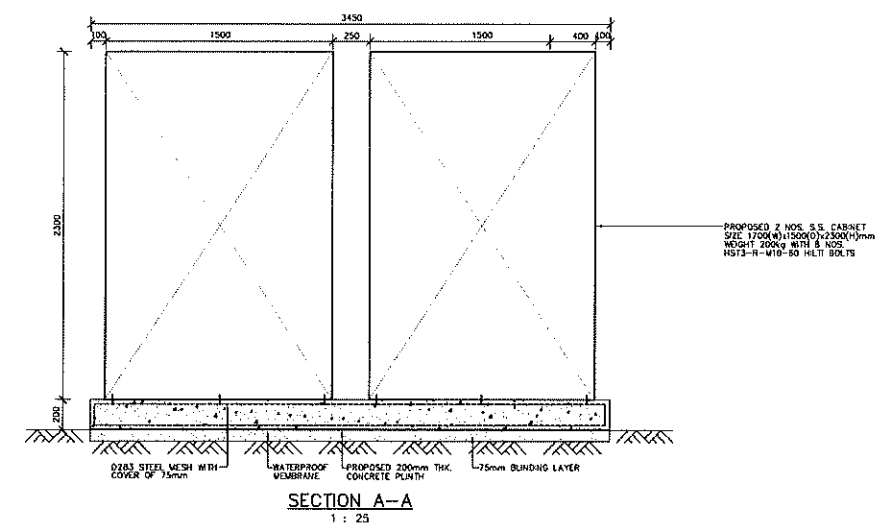
BLOCK PLAN



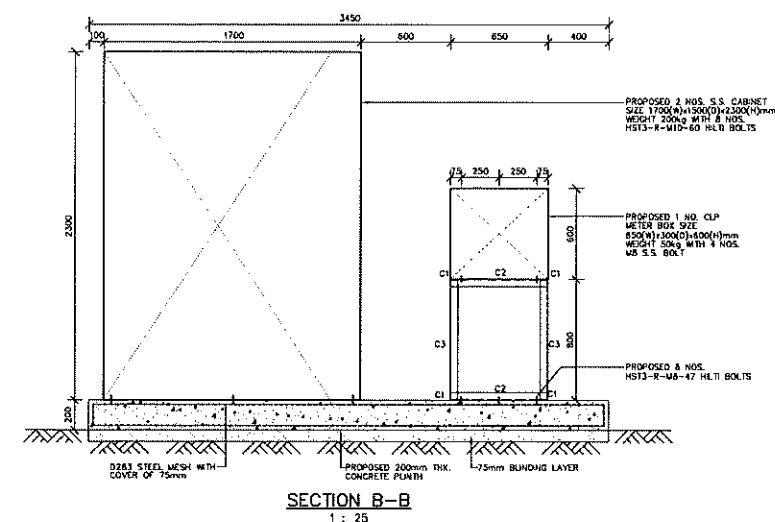
KEY PLAN  
N.T.S.



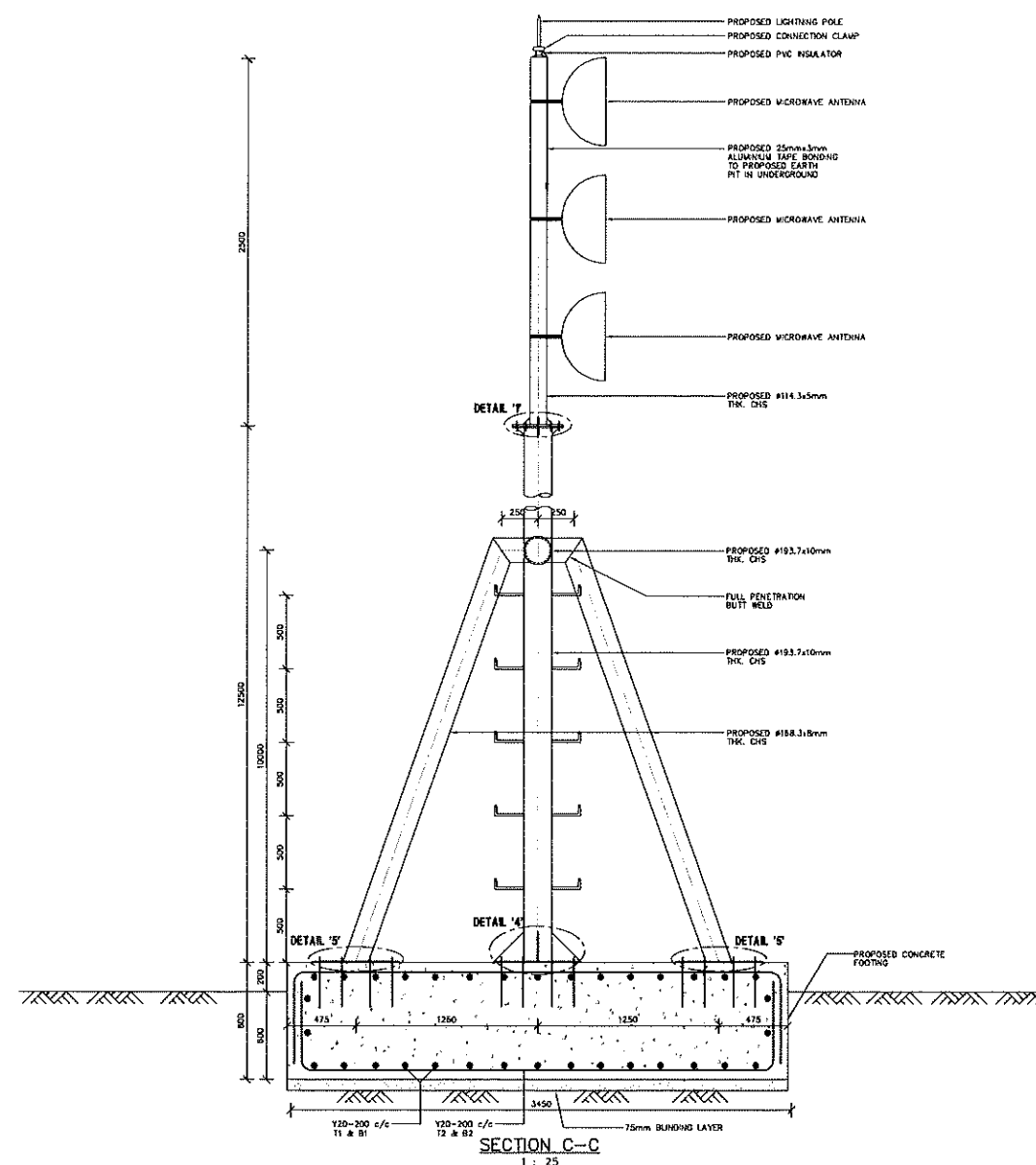
PLAN OF PROPOSED  
CONCRETE FOOTINGS  
1 : 25



SECTION A-A  
1 : 25



SECTION B-B  
1 : 25

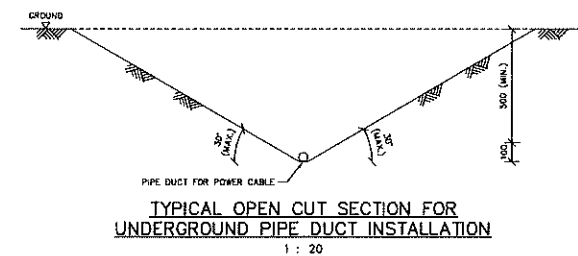
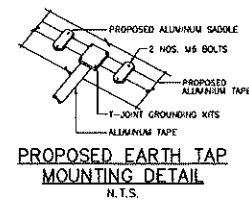
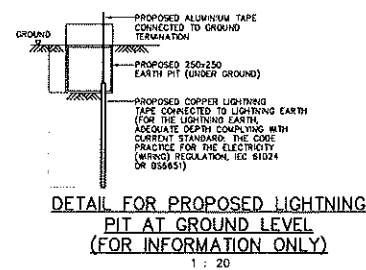
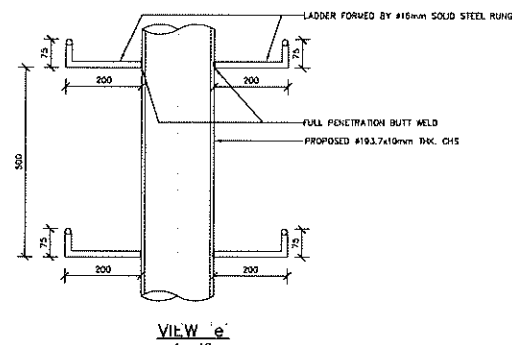
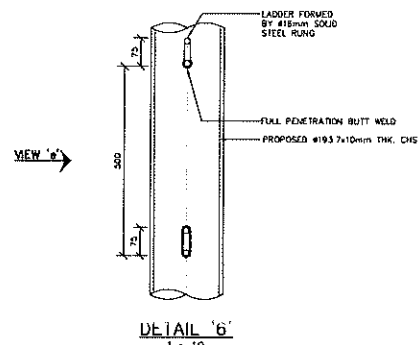
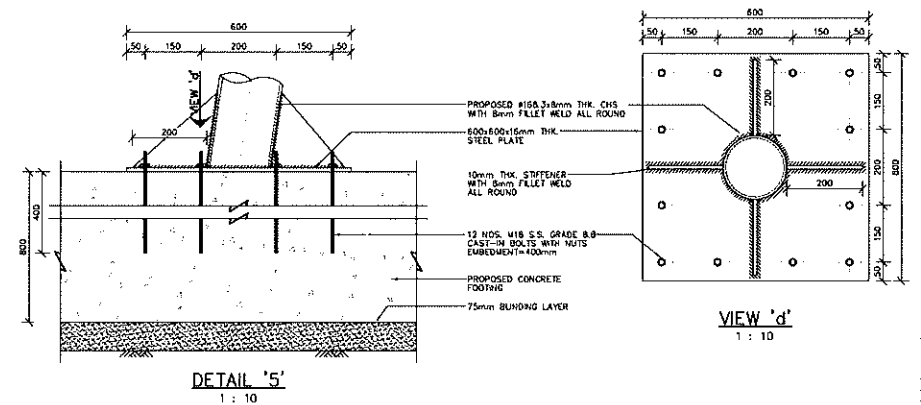
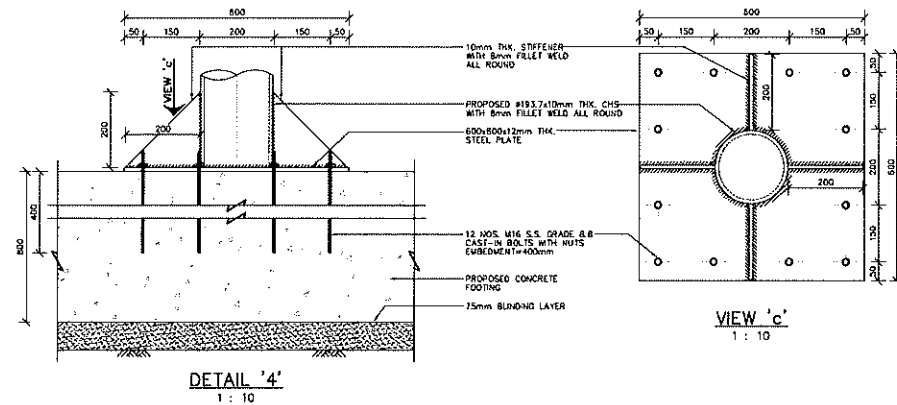
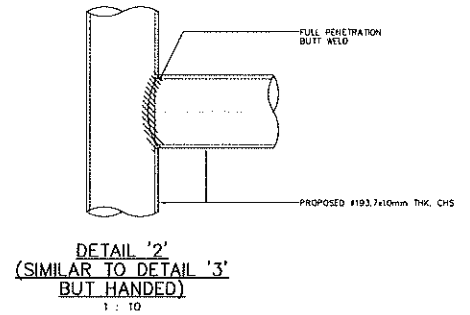
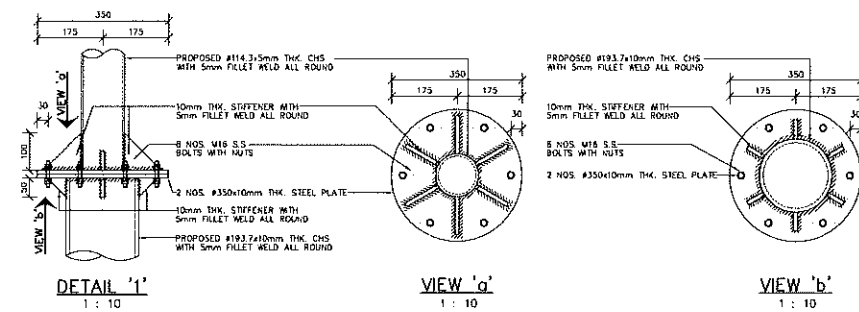
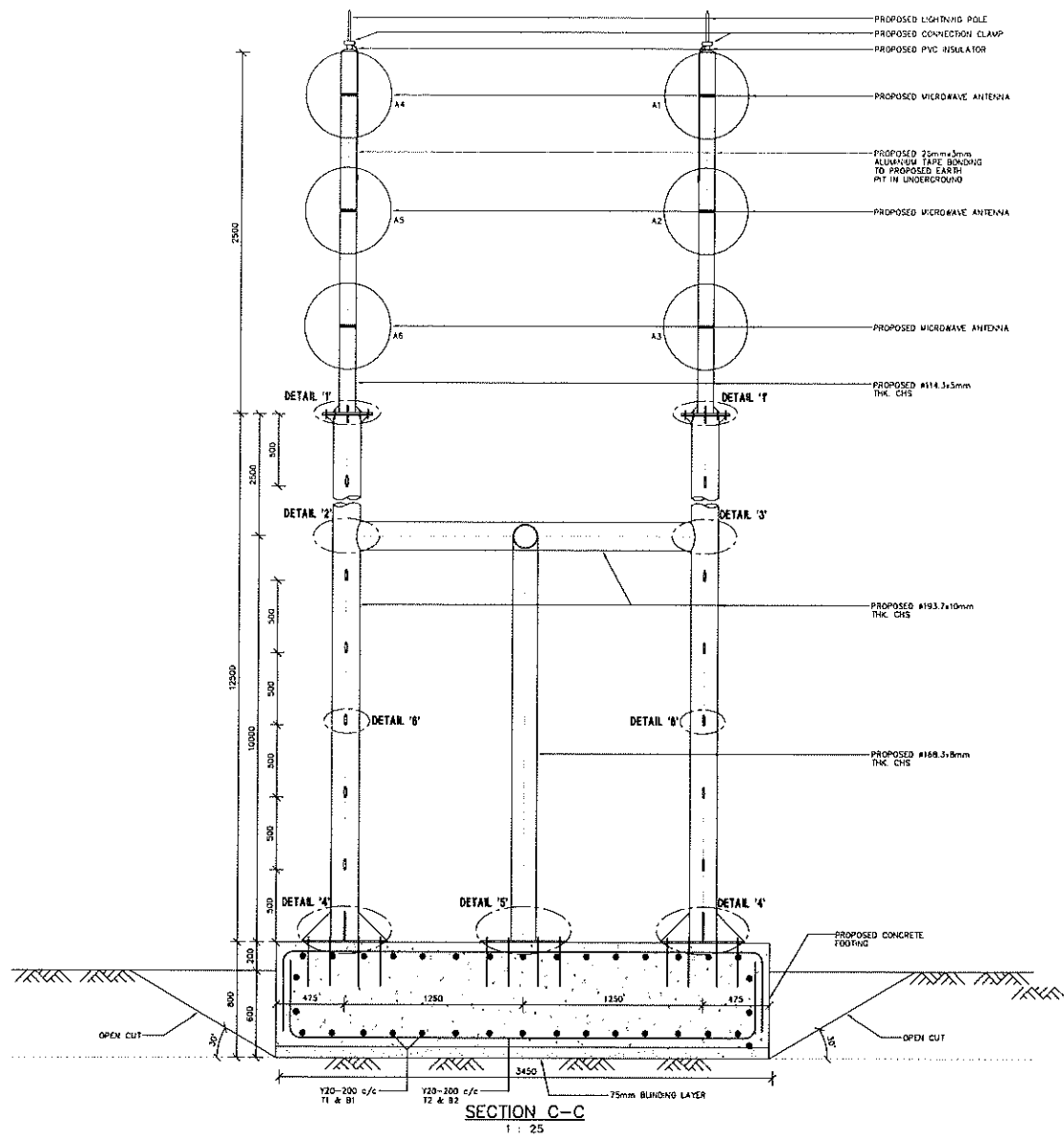


SECTION C-C  
1 : 25

|                                                                                                                                                                                                       |                                 |                         |                   |       |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------------|-------------------|-------|-----|
| REV                                                                                                                                                                                                   | DESCRIPTION                     | DATE                    | BY                | CHK'D | AP  |
| <p><b>創域工程有限公司</b><br/> <b>JEG Engineering Co. Ltd</b><br/> 1/F, Bk E, Cheong Fat Factory Bldg, 346 Fuk Wing St., Cheung Sha Wan, Kln<br/> TEL : 2117 9500 FAX : 3103 8077 E-MAIL : jeg03-jed.com</p> |                                 |                         |                   |       |     |
| <p>CUSTOMER :</p> <p><b>HGC 環電</b><br/> GLOBAL COMMUNICATIONS</p>                                                                                                                                     |                                 |                         |                   |       |     |
| <p>PROJECT :</p> <p>SO LO PUN<br/> (APPLICATION<br/> FOR BLOCK LICENSE)</p>                                                                                                                           |                                 |                         |                   |       |     |
| <p>DRAWING TITLE :</p> <p>DETAILS OF TRANSMISSION<br/> MICROWAVE ANTENNA</p>                                                                                                                          |                                 |                         |                   |       |     |
| SCALE AT A1                                                                                                                                                                                           | DESIGNED :<br>A. CHAN           | DRAWN :<br>S.M.         | CHECKED :<br>G.C. |       |     |
| AS SHOWN                                                                                                                                                                                              | APPROVED :<br>A. CHAN           | DATE :<br>29 FEB., 2024 |                   |       |     |
| PROJECT No.<br><b>J8009</b>                                                                                                                                                                           | DRAWING No. :<br><b>S2693-1</b> |                         |                   |       | REV |

## NOTES :

1. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH DRAWING S2693-1.
1. NOTES REFER TO DRAWING NO. S2693-1.



| REV                                                                                                                                                                                           | DESCRIPTION | DATE | BY | CHK'D | APP |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|----|-------|-----|
| <b>創域工程有限公司</b><br><b>JEG Engineering Co. Ltd.</b><br>1/F, Bk E, Cheong Fat Factory Bldg, 348 Fuk Wing St., Cheung Sha Wan, Kln.<br>TEL : 2117 8500 FAX : 3103 8077 E-MAIL : jeg@jeg-lltd.com |             |      |    |       |     |
| <b>HGC 環電</b><br>GLOBAL COMMUNICATIONS                                                                                                                                                        |             |      |    |       |     |

|                 |                                                 |
|-----------------|-------------------------------------------------|
| PROJECT :       | SO LO PUN<br>(APPLICATION<br>FOR BLOCK LICENSE) |
| DRAWING TITLE : | DETAILS OF TRANSMISSION<br>MICROWAVE ANTENNA    |

|                   |                     |                      |                |
|-------------------|---------------------|----------------------|----------------|
| SCALE AT A1       | DESIGNED : A. CHAN  | DRAWN : S.M.         | CHECKED : G.C. |
| AS SHOWN          | APPROVED : A. CHAN  | DATE : 29 FEB., 2024 |                |
| PROJECT No. J8009 | DRAWING No. S2693-2 | REV. -               |                |

Chen Li Ming (RSE 18/00)  
Registered Structural Engineer

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**Candice Yan Ki LO/PLAND**

---

寄件者:  
寄件日期: 2024年11月27日星期三 17:08  
收件者: Candice Yan Ki LO/PLAND  
副本:  
主旨: Construction of microwave station near So Lo Pun Section 16 submission  
(Equipment & Antenna) J8009-S2693  
類別: Internet Email

Dear Ms. Lo,

Per telephone convention, please find the following Justifications for your process.

The proposed location at So Lo Pun is chosen since the line of sight to both Ap chau, Kat O located in mid point of both islands, provide shortest transmission path fibre fixed network is reaching So lo pun. The proposed location is relatively flat compared to the vicinity which makes it easier to construct the station.

B.rgds.

Ying Chung

JEG Engineering Company Limited

☐Urgent ☐Return receipt ☐Expand Group ☐Restricted ☐Prevent Copy

**Candice Yan Ki LO/PLAND**

---

寄件者:  
寄件日期: 2025年01月10日星期五 14:13  
收件者: Candice Yan Ki LO/PLAND  
副本:  
主旨: A/NE-SLP/2&3 Public Comments J8009-S2693 HGC  
附件: 20241203---EPD letter.pdf; Reply PD[2].pdf  
類別: Internet Email

Dear Ms. Lo,

Please find attach our reply the public comments and relate documents for your process. Thanks.

B.rgds.

Ying Chung

JEG Engineering Company Limited



1.

The excavated materials will be temporarily covered with canvas during the daytime, and the workers will remove the excavated materials per working day.

We will establish a temporary work site for storage or stockpiling work materials next to our site without encroaching sites of ecologically sensitive habitats, such as the rest of the area of the existing ruin (denoted R).



No additional temporary access will be required. The materials will be transported to the jetty first and the workers will make use of the existing footpath to transport work materials.

No night-time work will be done therefore no additional light and glare will be installed on site. Nocturnal species will not be disturbed.

The proposed site is located on an existing ruin and therefore, no tree or vegetation is required to be cleared.

A waterproof membrane will be provided under concrete footing to prevent potential construction runoff from entering into the nearby mangrove and



ecologically important stream.

3.All work will be done between the period of 9:00am and 5:00pm, no works will be scheduled on Saturday, Sunday and public holidays in order to minimize the impact on hikers.

本署檔號  
OUR REF:  
來函檔號  
YOUR REF  
電話  
TEL. NO.:  
圖文傳真  
FAX NO.:  
電子郵件  
E-MAIL:  
網址  
HOMEPAGE: <http://www.epd.gov.hk>

Environmental Protection  
Department  
Branch Office  
27<sup>th</sup> Floor, Southorn Centre,  
130 Hennessy Road,  
Wan Chai, Hong Kong.



環境保護署分處  
香港灣仔  
軒尼詩道  
一百三十號  
修頓中心廿七樓

03 December 2024

**By Post (Total Page: 1)**

JEG Engineering Company Limited

Dear Mr. CHEUNG,

**Microwave Station at Government Land in D.D. 66, So Lo Pun, New Territories**

We refer to your email dated 15 November 2024 seeking our advice on whether the proposed works will constitute a Designated Project (DP) under EIAO.

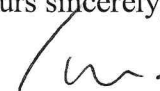
From the information provided, it is noted a microwave station is proposed at area which falls within "Green Belt" zone on approved So Lo Pun Outline Zoning Plan No. S/NE-SLP/4. The proposed works are supported by The Office of the Communications Authority (OFCA) under "Subsidy Scheme to Extend Fibre-based Networks to Villages in Remote Areas" and aim to enhance the network coverage of remote area (i.e. Ap Chau and Kat O).

In view of the above, please be advised that the proposed works would not constitute a Designated Project (DP) under EIAO. Hence, Environmental Permit for the proposed works is not required.

Please be reminded to strictly comply with relevant environmental protection/ pollution control ordinances, including but not limited to Air Pollution Control Ordinance, Noise Control Ordinance, Water Pollution Control Ordinance and Waste Disposal Ordinance. For potential environmental impacts during construction, please be reminded to make reference to "Recommended Pollution Control Clause for Construction Contracts" (available at [https://www.epd.gov.hk/epd/english/environmentinhk/eia\\_planning/guide\\_ref/rpc.html](https://www.epd.gov.hk/epd/english/environmentinhk/eia_planning/guide_ref/rpc.html)) and implement suitable mitigation measures and good site practice to minimize any potential environmental nuisance.

Besides, as the proposed works are located on Outline Zoning Plan No. S/NE-SLP/4, you may wish to consult PlanD from statutory planning perspective.

Yours sincerely,

  
(Miss Winnie TANG)

Assistant Environmental Protection Officer  
for Director of Environmental Protection

Internal  
S(TN)4

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**Candice Yan Ki LO/PLAND**

---

寄件者:  
寄件日期: 2025年01月17日星期五 12:31  
收件者: Candice Yan Ki LO/PLAND  
副本:  
主旨: RE: So Lo Pun - Ap Chau - Kat O Sai Kung (Microwave Link Technical Proposal)  
Section 16 submission (Equipment) J8009-S2693 (HGC)  
類別: Internet Email

Dear Ms. Lo,

About 1.5m vertical space is reserved for the installation for the solar panels on top of the s.s. cabinet for electricity supply to the s.s. cabinet. Thank you.

Best regards,  
Tim Cheung

JEG Engineering Company Limited 創域工程有限公司

**Relevant Extracts of Town Planning Board Guidelines on  
Application for Development within Green Belt Zone  
(TPB PG-No. 10)**

1. In assessing applications for development within “Green Belt” (“GB”) zone, the relevant planning criteria are summarised as follows:
  - (a) there is a general presumption against development (other than redevelopment) in a “GB” zone. In general the Town Planning Board will only be prepared to approve applications for development in the context of requests to rezone to an appropriate use;
  - (b) an application for new development in a “GB” zone will only be considered in exceptional circumstances and must be justified with very strong planning grounds. The scale and intensity of the proposed development including the plot ratio, site coverage and building height should be compatible with the character of surrounding areas;
  - (c) applications for government/institution/community (G/IC) uses and public utility installations must demonstrate that the proposed development is essential and that no alternative sites are available. The plot ratio of the development site may exceed 0.4 so as to minimise the land to be allocated for G/IC uses;
  - (d) the design and layout of any proposed development should be compatible with the surrounding area. The development should not involve extensive clearance of existing natural vegetation, affect the existing natural landscape, or cause any adverse visual impact on the surrounding environment;
  - (e) the proposed development should not overstrain the capacity of existing and planned infrastructure such as sewerage, roads and water supply. It should not adversely affect drainage or aggravate flooding in the area;
  - (f) the proposed development must comply with the development controls and restrictions of areas designated as water gathering grounds;
  - (g) the proposed development should not overstrain the overall provision of G/IC facilities in the general area;
  - (h) the proposed development should not be susceptible to adverse environmental effects from pollution sources nearby such as traffic noise, unless adequate mitigating measures are provided, and it should not itself be the source of pollution; and
  - (i) any proposed development on a slope of hillside should not adversely affect slope stability.

**Recommended Advisory Clauses**

- (a) to note the comments of the District Lands Officer/North, Lands Department (DLO/N, LandsD) that:
- the applicant will need to apply to her office for an excavation permit for carrying out the proposed excavation for plinths of microwave stations at the Sites. The application for the excavation permit will be considered by the Government in its capacity as a landlord and there is no guarantee that it will be approved. The excavation permit, if approved, will be subject to such terms and conditions including the payment of prescribed fee as considered appropriate by LandsD;
  - the applicant should ensure the proposed installations are covered by Block Licence dated 27.6.1997 issued by Chief Estate Surveyor/Estate Management, LandsD, otherwise necessary applications for occupation of GL should be submitted before commencement of works; and
  - the applicant should comply with all the land filling requirements imposed by relevant government departments. GL should not be disturbed unless with prior approval.
- (b) to note the comment of the Director of Agriculture, Fisheries and Conservation (DAFC) that the applicant should minimise the area of excavation and landfilling and avoid adverse impact to the surrounding natural environment. The works area should be properly reinstated upon completion of the proposed works.
- (c) to note the comment of the Director of Environmental Protection (DEP) that the applicant should implement standard pollution control measures to meet the statutory requirements under relevant pollution control ordinances to avoid causing adverse environmental impacts to the surrounding.
- (d) to note the comments of the Chief Town Planner/Urban Design and Landscape, Planning Department (CTP/UD&L, PlanD) that:
- the applicant may wish to explore measures for the proposed public utility installation as appropriate to respect the natural and rural setting of the locality; and
  - approval of the application does not imply approval of tree works such as pruning, transplanting and felling. The applicant is reminded to seek approval for any proposed tree works from relevant authority prior to commencement of the works.
- (e) to note the comments of the Director of Electrical and Mechanical Services (DEMS) that in the interests of public safety and ensuring the continuity of electricity supply, the parties concerned with planning, designing, organizing and supervising any activity near the underground cable or overhead line under the mentioned document should approach the electricity supplier (i.e. CLP Power) for the requisition of cable plans (and overhead line alignment drawings, where applicable) to find out whether there is any underground cable and/or overhead line within and/or in the vicinity of the concerned sites. The applicant is also reminded to observe the Electricity Supply

Lines (Protection) Regulation and the “Code of Practice on Working near Electricity Supply Lines” established under the Regulation when carrying out works in the vicinity of the electricity supply lines.

- (f) to note the comments of the Director of Fire Services (D of FS) that detailed fire services requirements will be formulated upon receipt of a formal submission of Short Term Tenancy/Short Term Waiver, general building plans or referral of application via relevant licensing authority. Furthermore, the emergency vehicular access provision shall comply with the requirements as stipulated in Section 6, Part D of the Code of Practice for Fire Safety in Buildings 2011, which is administered by the Building Authority.
- (g) to note the comments of the Commissioner for Transport (C for T) that:
  - the proposed installations would not obstruct traffic or cause safety issues to other road users;
  - if temporary lane closure and/or loading/unloading operation is required to be carried out on the public roads managed by Transport Department (TD), the applicant should submit a proposal for temporary traffic management to relevant parties, including TD and Road Management Office of Hong Kong Police Force, for comments; and
  - the access road between Bride’s Pool Road and the Sites is not managed by TD. The applicant should seek comments from the responsible party.

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**From:**  
**Sent:** 2024-12-27 星期五 03:07:26  
**To:** tpbpd/PLAND <tpbpd@pland.gov.hk>  
**Subject:** A/NE-SLP/2 and 3 DD 66 So Lo Pun GB HGC

Dear TPB Members,

Application 1 withdrawn, back with two for the price of one.

Previous objections relevant and upheld.

Mary Mulvihill

---

**From:**  
**To:** tpbpd <tpbpd@pland.gov.hk>  
**Date:** Friday, 27 December 2024 3:01 AM HKT  
**Subject:** A/NE-SLP/2 DD 66 So Lo Pun GB HGC

A/NE-SLP/1 HGC Global Communications

Government Land in D.D. 66, So Lo Pun, New Territories

Site area: About 12sq.m

Zoning: "Green Belt"

Applied development: Telecommunication Radio Base Station / **Excavation and Filling of Land**

Dear TPB Members,

Application 1 withdrawn, back with a reduced footprint.

Previous objections applicable and upheld.

Mary Mulvihill

---

**From:**  
**To:** tpbpd <tpbpd@pland.gov.hk>  
**Date:** Friday, 4 October 2024 2:23 AM HKT  
**Subject:** A/NE-SLP/1 DD 66 So Lo Pun GB HGC

A/NE-SLP/1 HGC Global Communications

---

Government Land in D.D. 66, So Lo Pun, New Territories

Site area: About 24sq.m

Zoning: "Green Belt"

Applied development: Telecommunication Radio Base Station / **Excavation and Filling of Land**

Dear TPB Members,

Strong Objections.

The justification 'to enhance network coverage' is not supported by any data or details.

No information of disturbance to trees and vegetation, not only on the location but also damage to GB that would be caused by movement of machinery brought in to erect the base station.

Mary Mulvihill



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**Sent:** 2024-12-27 星期五 03:07:26  
**To:** tpbpd/PLAND <tpbpd@pland.gov.hk>  
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Mary Mulvihill

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**From:**  
**Sent:** 2024-12-27 星期五 08:00:00  
**To:** tpbpd/PLAND <tpbpd@pland.gov.hk>  
**Subject:** Comments on the Section 16 Application No. A/NE-SLP/2  
**Attachment:** TPB20241227(SLP2).pdf

Dear Sir/Madam,

Please refer to the attachment for the captioned.

Yours faithfully,  
Ng Hei Man (Mr.)  
Campaign Manager  
The Conservancy Association

T:

D:

F:

Registered Name 註冊名稱 : The Conservancy Association 長春社  
(Incorporated in Hong Kong with limited liability by guarantee 於香港註冊成立的擔保有限公司)

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長春社

Since 1968

The Conservancy Association

27<sup>th</sup> December 2024

Town Planning Board  
15/F North Point Government Offices  
333 Java Road  
North Point  
Hong Kong

By e-mail: [tpbpd@pland.gov.hk](mailto:tpbpd@pland.gov.hk)

Dear Sir/Madam,

Comments on the Section 16 Application No. A/NE-SLP/2

So Lo Pun is one of the Country Park enclaves surrounded by Plover Cove Country Park. Any works, either public or private, in such important ecological hotspot need good justification and careful assessment. Based on current information provided by the applicant, The Conservancy Association (CA) would like to express and highlight some of the concerns on the captioned application.

**1. Environmental and ecological assessment**

In the submission, no environmental and ecological assessment, even not very detailed, are available to justify that no potential environmental and ecological impacts would be anticipated. As So Lo Pun is such an area with high ecological and landscape significance, preliminary environmental and ecological assessments are still necessary. At least some of the issues below need to be further clarified and evaluated:

- How the excavated materials be handled and transported away to prevent illegal dumping of construction and demolition waste at the work site
- Location of temporary work site for storage or stockpiling work materials to prevent encroaching sites of ecologically sensitive habitats
- Any temporary access needed to be created to transport work materials from the jetty at the north to the work site
- Any additional light and glare disturbance on nocturnal species during construction phase



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Since 1968

The Conservancy Association

---

- Any tree removal or vegetation clearance work required
- Preventive measures to prevent potential construction runoff from entering into the nearby mangrove and Ecologically Important Stream

## **2. Work schedule**

Except completion time of the proposed work (i.e. June 2025), no further details on work schedule are available. It is suggested that a detailed work schedule should be given in the submission.

## **3. Potential disturbance on villagers and hikers**

To our understanding, currently no permanent villagers are living in the village. The hiking trail in So Lo Pun is not the most popular compared to the one in Lai Chi Wo. However, to maintain the tranquil rural environment, certain restrictions on work time should be set. For example, no night-time work (say after 5pm and before 9am) should be allowed during construction phase, no works scheduled on Saturday, Sunday and public holidays to minimize impact on hikers, etc..

Yours faithfully,

The Conservancy Association



☐Urgent ☐Return receipt ☐Expand Group ☐Restricted ☐Prevent Copy

4

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**From:**  
**Sent:** 2024-12-27 星期五 08:00:00  
**To:** tpbpd/PLAND <tpbpd@pland.gov.hk>  
**Subject:** Comments on the Section 16 Application No. A/NE-SLP/3  
**Attachment:** TPB20241227(SLP3).pdf

Dear Sir/Madam,

Please refer to the attachment for the captioned.

Yours faithfully,  
Ng Hei Man (Mr.)  
Campaign Manager  
The Conservancy Association

T:

D:

F:

Registered Name 註冊名稱 : The Conservancy Association 長春社  
(Incorporated in Hong Kong with limited liability by guarantee 於香港註冊成立的擔保有限公司)

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長春社

Since 1968

The Conservancy Association

27<sup>th</sup> December 2024

Town Planning Board  
15/F North Point Government Offices  
333 Java Road  
North Point  
Hong Kong

By e-mail: [tpbpd@pland.gov.hk](mailto:tpbpd@pland.gov.hk)

Dear Sir/Madam,

Comments on the Section 16 Application No. A/NE-SLP/3

So Lo Pun is one of the Country Park enclaves surrounded by Plover Cove Country Park. Any works, either public or private, in such important ecological hotspot need good justification and careful assessment. Based on current information provided by the applicant, The Conservancy Association (CA) would like to express and highlight some of the concerns on the captioned application.

**1. Environmental and ecological assessment**

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- How the excavated materials be handled and transported away to prevent illegal dumping of construction and demolition waste at the work site
- Location of temporary work site for storage or stockpiling work materials to prevent encroaching sites of ecologically sensitive habitats
- Any temporary access needed to be created to transport work materials from the jetty at the north to the work site
- Any additional light and glare disturbance on nocturnal species during construction phase



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- Any tree removal or vegetation clearance work required
- Preventive measures to prevent potential construction runoff from entering into the nearby mangrove and Ecologically Important Stream

## **2. Work schedule**

Except completion time of the proposed work (i.e. June 2025), no further details on work schedule are available. It is suggested that a detailed work schedule should be given in the submission.

## **3. Potential disturbance on villagers and hikers**

To our understanding, currently no permanent villagers are living in the village. The hiking trail in So Lo Pun is not the most popular compared to the one in Lai Chi Wo. However, to maintain the tranquil rural environment, certain restrictions on work time should be set. For example, no night-time work (say after 5pm and before 9am) should be allowed during construction phase, no works scheduled on Saturday, Sunday and public holidays to minimize impact on hikers, etc..

Yours faithfully,

The Conservancy Association



致城市規劃委員會秘書：

專人送遞或郵遞：香港北角渣華道 333 號北角政府合署 15 樓

傳真：2877 0245 或 2522 8426

電郵：tpbpd@pland.gov.hk

To : Secretary, Town Planning Board

By hand or post : 15/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong

By Fax : 2877 0245 or 2522 8426

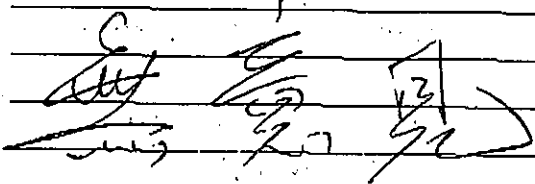
By e-mail : tpbpd@pland.gov.hk

有關的規劃申請編號 The application no. to which the comment relates

A/NE-SLP/2

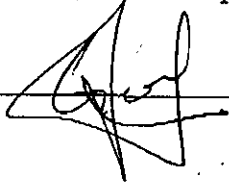
意見詳情 (如有需要，請另頁說明)

Details of the Comment (use separate sheet if necessary)

  
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\_\_\_\_\_  
\_\_\_\_\_

「提意見人」姓名/名稱 Name of person/company making this comment 侯志強議員

簽署 Signature



日期 Date

2024.12.10

致城市規劃委員會秘書：

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Details of the Comment (use separate sheet if necessary)

投訴意見

「提意見人」姓名/名稱 Name of person/company making this comment

葉榮成

簽署 Signature

日期 Date

17-12-2024

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意見詳情 (如有需要，請另頁說明)

Details of the Comment (use separate sheet if necessary)

無意見

「提意見人」姓名/名稱 Name of person/company making this comment 侯志強

簽署 Signature

日期 Date 2024.12.10

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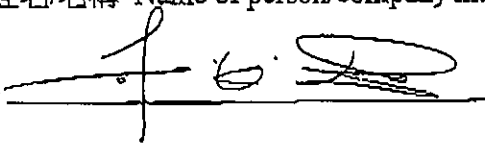
Details of the Comment (use separate sheet if necessary)

沒有意見

「提意見人」姓名/名稱 Name of person/company making this comment

葉樂成

簽署 Signature



日期 Date

17-12-2024