Form No. S16-I
表格第 S16-I 號

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

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; and
位於鄉郊地區土地上及/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
位於鄉郊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.info.gov.hk/tpb/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.info.gov.hk/tpb/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

2400319 31/1 By hand

For Official Use Only 請勿填寫此欄	Application No. 申請編號	A/TP/693
	Date Received 收到日期	-2 FEB 2024

1. 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。

2. 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.info.gov.hk/tpb/. 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.info.gov.hk/tpb/)，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 樓及新界沙田上禾輋路 1 號沙田政府合署 14 樓)索取。

3. 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。

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1. Name of Applicant 申請人姓名/名稱

(☐ Mr. 先生 / ☐ Mrs. 夫人 / ☐ Miss 小姐 / ☐ Ms. 女士 / ☐ Company 公司 / ☑ Organisation 機構)

Drainage Project Division of Drainage Services Department
The Government of the Hong Kong Special Administration Region
香港特別行政區政府渠務署排水工程部

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

(☐ Mr. 先生 / ☐ Mrs. 夫人 / ☐ Miss 小姐 / ☐ Ms. 女士 / ☑ Company 公司 / ☐ Organisation 機構)

AECOM Asia Company Limited

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 at Tai Po Old Market Playground near On Ho Lane, Tai Po, New Territories (GLA-TP 143) (Part); and Government Land at slope feature no. 7NW-B/F193, Tai Po, New Territories
(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 7900 sq.m 平方米 ☑About 約 ☑Gross floor area 總樓面面積 1280 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）	7900 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	Approved Tai Po Outline Zone Planning Plan No. S/TP/30
(e)	Land use zone(s) involved 涉及的土地用途地帶	Open Space (O)
(f)	Current use(s) 現時用途	Tai Po Old Market Playground managed by Leisure and Cultural Services Department; and existing man-made feature (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)

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 ..... 年 ..... 月 ..... 日的記錄，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) 第(i)類 Change of use within existing building or part thereof 更改現有建築物或其部分內的用途

☐ Type (ii) 第(ii)類 Diversion of stream / excavation of land / filling of land / filling of pond as required under Notes of Statutory Plan(s) 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) 第(iii)類 Public utility installation / ~~Utility installation for private project~~ 公用事業設施裝置/~~私人發展計劃的公用設施裝置~~

☐ Type (iv) 第(iv)類 Minor relaxation of stated development restriction(s) as provided under Notes of Statutory Plan(s) 略為放寬於法定圖則《註釋》內列明的發展限制

☐ Type (v) 第(v)類 Use / development other than (i) to (iii) above 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： 如發展涉及蠶灰安置所用途，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

(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 ..... sq.m 平方米 ☐About 約 Depth of filling 填土厚度 ..... m 米 ☐About 約 ☐ Excavation of land 挖土 Area of excavation 挖土面積 ..... sq.m 平方米 ☐About 約 Depth of excavation 挖土深度 ..... 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	

(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

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)
Underground stormwater storage tank	1	80.7m(L)x52m(W)x18m(H)
Aboveground Pumping Facility	1	Pump House: 27m(L)x14m(W)x10.5m(H) Screen Room: 19.5m(L)x18m(W)x10.5m(H) Transformer Room: 40.5m(L)x6.1m(W)x8m(H) Switch Room: 17.8m(L)x9.5m(W)x8m(H)
Discharge Chamber	1	22.5m(L)x6m(W)x8m(H)

(Please illustrate on plan the layout of the installation 請用圖則顯示裝置的布局)

(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）	.....

(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) ..... m 米	☐About 約 ☐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 單位平均面積	.....sq. m 平方米	☐About 約
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 商店及服務行業	..... sq. m 平方米	☐About 約

☐ Government, institution or community facilities 政府、機構或社區設施

(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)

.....

.....

.....

☐ 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 休憩用地 (please specify land area(s) 請註明地面面積)

☐ private open space 私人休憩用地	..... sq. m 平方米	☐ Not less than 不少於
☐ public open space 公眾休憩用地	..... sq. m 平方米	☐ Not less than 不少於

(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

.....

.....

.....

.....

.....

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)

Tentatively Q2 2030

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	☐ 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） Proposed access to the site: 6m width
	No 否	☐
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	☑

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。

Does the development proposal involve alteration of existing building? 擬議發展計劃是否包括現有建築物的改動?	Yes 是	☐ Please provide details 請提供詳情 ....
	No 否	☑
Does the development proposal involve the operation on the right? 擬議發展是否涉及右列的工程? (Note: where Type (ii) application is the subject of application, please skip this section. 註：如申請涉及第(ii)類申請，請跳至下一條問題。)	Yes 是	☑ (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) (請用地盤平面圖顯示有關土地／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) ☐ 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 ..... sq.m 平方米 ☐About 約 Depth of filling 填土厚度 ..... m 米 ☐About 約 ☑ Excavation of land 挖土 Area of excavation 挖土面積 4200 sq.m 平方米 ☑About 約 Depth of excavation 挖土深度 20 m 米 ☑About 約
	No 否	☐

Would the development proposal cause any adverse impacts? 擬議發展計劃會否造成不良影響？	On environment 對環境	Yes 會 ☐	No 不會 ☑
	On traffic 對交通	Yes 會 ☐	No 不會 ☑
	On water supply 對供水	Yes 會 ☐	No 不會 ☑
	On drainage 對排水	Yes 會 ☐	No 不會 ☑
	On slopes 對斜坡	Yes 會 ☐	No 不會 ☑
	Affected by slopes 受斜坡影響	Yes 會 ☐	No 不會 ☑
	Landscape Impact 構成景觀影響	Yes 會 ☐	No 不會 ☑
	Tree Felling 砍伐樹木	Yes 會 ☑	No 不會 ☐
	Visual Impact 構成視覺影響	Yes 會 ☐	No 不會 ☑
	Others (Please Specify) 其他 (請列明)	Yes 會 ☐	No 不會 ☐
	_____		
	_____		

Please state measure(s) to minimise the impact(s). For tree felling, please state the number, diameter at breast height and species of the affected trees (if possible)
請註明盡量減少影響的措施。如涉及砍伐樹木，請說明受影響樹木的數目、及胸高度的樹幹直徑及品種(倘可)

Details refer to the attached Planning Application Report Appendix D

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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。

Please refer to the attached Planning Application Report Section 4 for details.

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

WU YAT FEI, ALEX
Name in Block Letters 姓名（請以正楷填寫）

EXECUTIVE DIRECTOR
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 ..... INSTITUTION OF CIVIL ENGINEER

on behalf of 代表 AECOM ASIA COMPANY LIMITED
☑ Company 公司 / ☐ Organisation Name and Chop (if applicable) 機構名稱及蓋章（如適用）

Date 日期 30/1/2024 (DD/MM/YYYY 日/月/年)

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 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。此部分將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 at Tai Po Old Market Playground near On Ho Lane, Tai Po, New Territories (GLA-TP 143) (Part); and Government Land at slope feature no. 7NW-B/F193, Tai Po, New Territories 新界大埔位於大埔舊墟遊樂場近安浩里之政府用地 (GLA-TP 143) (部份); 及新界大埔位於斜坡登記號碼7NW-B/F193之政府用地
Site area 地盤面積	7900 sq. m 平方米 ☑About 約 (includes Government land of 包括政府土地 7900 sq. m 平方米 ☑About 約)
Plan 圖則	Approved Tai Po Outline Zoning Plan (OZP) No. S/TP/30 大埔分區計劃大綱核准圖編號 S/TP/30
Zoning 地帶	休憩用地 (Open Space)
Applied use/ development 申請用途/發展	Proposed public utility installation (stormwater storage facility) 擬建公用事務設施裝置(雨水蓄洪設施)

			sq.m 平方米	Plot Ratio 地積比率
(i)	Gross floor area and/or plot ratio 總樓面面積及／或地積比率	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 1280 ☐ Not more than 不多於	☑About 約 0.16 ☐Not more than 不多於
(ii)	No. of block 幢數	Domestic 住用		
		Non-domestic 非住用	1 block of DSD's Pumping Station (Screen room, Transformer Room, Switchroom and Pump House) 1 block of DSD's Discharge Chamber	
		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	10.5 m 米 ☑ (Not more than 不多於)
			+16 mPD 米(主水平基準上) ☑ (Not more than 不多於)
			1 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		16 % ☑ 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	5200 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）	☐	☐
_____		
_____		
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	☐	☐
Others (please specify) 其他（請註明）	☐	☑
Tree Preservation and Removal Proposal		
_____		

Note: May insert more than one「✔」. 註：可在多於一個方格內加上「✔」號

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。

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Appendix Ia of RNTPC
Paper No. A/TP/693

渠務署
Drainage Services Department

Agreement No. CE 57/2022 (DS)

Drainage Improvement Works in Tai Po – Design & Construction

Planning Submission
(Tai Po Old Market Playground Stormwater Pumping Station)

Report No. 60700410/28/F

January 2024

AECOM Delivering a better world

TABLE OF CONTENTS

APPENDICES

*Appendix D-I will show the context relevant to the Application Site (refer **Drawing No. 60700410/R28/401**) only.

REMARKS:

This planning application submission is about the stormwater storage and pumping facility exclusively. The proposed pipes which are not located in the subject site which are shown in this submission for reference only and would not be discussed in details. According to Approved Tai Po Outline Zoning Plan No. S/TP/30 Notes (7)(b), drainage works are always permitted on land falling within the boundaries of the Plan except where the uses or developments are specified in Column 2 of the Notes of individual zones.

EXECUTIVE SUMMARY

Broad Development Parameters

a)	Application Site	Open Space at Tai Po Old Market Playground near Tai Po Old Market Public School and Open Space at slope feature no. 7NW-B/F 193
b)	Site Area	Approx. 7,900 m^2
c)	Total Floor Area	Underground Stormwater Storage Tank: Approx. 4,200 m^2 Above-ground Pump House: Approx. 380m^2 (Building Height: 10.5m; +16.0mPD) Transformer Room: Approx. 250m^2 (Building Height: 8m; +13.5mPD) Switch Room: Approx. 170m^2 (Building Height: 8m; +13.5mPD) Screen Room: Approx. 350m^2 (Building Height: 10.5m; +16.0mPD) Discharge Chamber: Approx. 130m^2 (Building Height: 3.7m; +7.2mPD)
d)	Plot Ratio	(380+250+170+350+130)/7,900 = 0.16
e)	Statutory Plan	Approved Tai Po Outline Zoning Plan (OZP) No. S/TP/30
f)	Zoning	“O” Open Space
g)	Applied Use/ Development	Stormwater Storage and Pumping Facility

Justification

The Review of Drainage Master Plan in Tai Po – Feasibility Study (DMP Review) identified that Tai Po Old Market would be subject to high flood risk having taken into account the tidal impacts at Lower Lam Tsuen River, dilapidated drainage networks, updated hydrological statistics and the anticipated effects of climate change. The existing drainage system cannot achieve the required flood standard. It is found that there is high risk of flooding due to insufficient capacity of existing drainage system, high water level at Lower Lam Tsuen River causing backflow to upstream drainage. Flooding impacts on traffic and residential area in the flood prone areas will also result in losses and inconvenience to the general public. To effectively relieve the flood risk in Tai Po Old Market, the Tai Po Old Market Playground Stormwater Pumping Scheme has been proposed to intercept and divert the runoff from Tai Po Old Market drainage catchment at upstream area for temporary storage and discharge by pumps during the peak flow condition. Upon completion of the works, the standards of flood protection at Tai Po Old Market will be largely enhanced to that specified in the standards of the Stormwater Drainage Manual (SDM) and the flood risks thereon can be significantly reduced.

The proposed site is zoned “Open Space” (“O”) on the Tai Po Outline Zoning Plan (OZP) No. S/TP/30. As stipulated in Schedule of Use of the OZP for “O”, the proposed stormwater storage and pumping facility, regarded as “Public Utility Installation”, is a column 2 use for the “O” zone. Therefore, planning permission from the Town Planning Board (TPB) is required.

The proposed development comprises (i) an underground stormwater storage tank, an underground pump well, electrical and mechanical (E&M) works and associated pipeworks; (ii) stormwater drains in nearby roads; (iii) ancillary works including re-provision of park amenities, basketball court and children playground at the Tai Po Old Market Playground; and (iv) a discharge chamber at slope feature no. 7NW-B/F 193. The proposed above-ground structure provides ancillary equipment and control systems for the operation of the underground storage tank and pumping facility. DSD will carry out annual inspection, routine cleansing, maintenance of the underground storage tank, discharge chamber and pumping facility, with access openings located within the pump house and at inconspicuous locations that will not seriously interrupt the operation and usage of nearby leisure facilities. In order to minimize disturbance to the public, some park amenities as well as basketball court will be re-provided above the underground storage tank. These proposed reprovisioned park amenities and basketball court above storage tank will be maintained and managed by the Leisure and Cultural Services Department (LCSD). The size of the storage tank and pump house had been carefully designed to meet flood protection standard as required to reduce flood risk and minimize the area occupied in the existing open space as far as practicable.

The justifications of this application are:

(i) The proposed development is an essential facility for Tai Po Old Market to meet the required flood protection standard and flood prevention. It reduces the risk of flooding and its consequent nuisance to the public in Tai Po Old Market, promotes local flood resilience and thus minimizes damage costs.

(ii) Having considered other potential sites in the neighbourhood, the Application Site is the most suitable location for the proposed development.

(iii) The proposed development will not undermine the planning intention of the "Open Space" zone for Tai Po Old Market Playground. The existing park facilities will be re-provided after construction and thus, the public enjoyment of open space during operation will not be affected.

(iv) Strategic integrated design by utilizing underground space for essential infrastructure while allowing public amenities to be built above ground, enabling multiple land uses on one site and thus making efficient use of scarce land resources in the urban neighbourhood.

(v) There are similar planning application in Kwun Tong and Wong Tai Sin Districts approved by the Board recently.

(vi) No adverse environmental and technical impacts to the surrounding areas.

The Applicant therefore requests that the Board approves this application.

行政摘要

概括發展規範

甲） 申請地址	大埔舊墟遊樂場近大埔舊墟公立學校之休憩用地及斜坡登記編號 7NW-B/F193 之休憩用地
乙） 地盤面積	約 7,900 平方米
丙） 總樓面面積	地下建築物 雨水蓄洪池：約 4,200 平方米 地面建築物 泵房： 約 380 平方米 (建築物高度：10.5 米, 主水平基準以上 16.0 米) 電力變壓房： 約 250 平方米 (建築物高度：8 米, 主水平基準以上 13.5 米) 電掣房： 約 170 平方米 (建築物高度：8 米, 主水平基準以上 13.5 米) 濾隔房： 約 350 平方米 (建築物高度：10.5 米, 主水平基準以上 16.0 米) 排水井： 約 130 平方米 (建築物高度：3.7 米, 主水平基準以上 7.2 米)
丁） 地積比率	(380+250+170+350+130)/7,900 = 0.16
戊） 法定圖則名稱及編號	大埔分區計劃大綱圖編號 S/TP/30
己） 涉及的土地用途地帶	“O” 休憩用地
庚） 申請用途	雨水蓄洪及抽水設施

理由

鑑於大埔雨水排放整體計劃檢討 – 可行性研究識別出大埔舊墟因林村河下游的高潮汐水位、排水管綫老化、水文數據更新及氣候變化的預期影響，該區的水浸風險為高。由於現有排水系統排水能力不足和下林村河高潮汐水位而造成倒流，導致排水系統未達所需的防洪標準。在低窪的地區的交通及住宅用地會較易受水浸影響，會對公眾造成損失及不便。為有效降低大埔舊墟水浸風險，擬議實施大埔舊墟遊樂場雨水蓄洪及抽水計劃，於高峰流量時截取及分流上游地區的徑流進行臨時儲存。工程完成後，大埔舊墟的的防洪能力會顯著提升，達到雨水排放整體計劃檢討中的標準並減低該區的水浸風險。

建議的選址劃為大埔分區計劃大綱圖(OZP)編號 S/TP/30 的「休憩用地」類別。根據 OZP 的「休憩用地」附表第二欄，擬建雨水蓄洪及抽水設施屬於「公共事業設施裝置」，須先向城市規劃委員會申請規劃許可。

計劃擬議發展的包括位於大埔舊墟遊樂場的 (i) 一個地下雨水蓄洪池、一個地下泵房、機電設施及相關管道工程，(ii) 鄰近街道的雨水渠，(iii) 附屬工程包括重置公園設施、籃球場及兒童遊樂場; 及 (iv) 一個位於斜坡登記編號 7NW-B/F193 的排水井。擬議的地面建築物為地下蓄洪設施和泵房的運作提供了輔助設備和控制系統。渠務署會定期對地下蓄洪池、排水井及泵房進行檢查、清潔及保養。維修出入口設於泵房內及公園內不顯眼的地方，不會干擾附近休憩設施的運作及使用。為了盡量減少對公眾的影響，一些公園設施以及籃球場將在地下蓄洪池上蓋重新設置。這些擬議重置的公園休憩設施和籃球場將由康樂及文化事務署營運及管理，並開放供公眾使用。擬議的地下蓄洪池和泵房的尺寸已小心考慮防洪標準及有效降低水浸風險的需求，儘可能減少現有開放空間的佔用面積。

這宗規劃申請的理由為：

(i) 擬議的項目是大埔舊墟滿足防洪標準和防洪需求的重要基礎設施，目的是減低當區的水浸風險，以減少水浸對公眾造成的滋擾、水浸意外發生和洪水造成的財物損傷，提高當區的承洪韌性。
(ii) 經過考慮附近其他潛在地點後，申請地點位置最為適合興建地下泵房；
(iii) 擬議項目不會破壞大埔舊墟遊樂場「休憩用地」地帶的規劃意向。現有的公園設施將會在工程完成後重新提供，因此不會影響公眾可享受的開放空間。
(iv) 策略性的一地兩用設計，將地下空間用作重要基礎設施並在上蓋興建公共休憩設施，充分善用城市中稀缺的土地資源；
(v) 觀塘和黃大仙區亦有相類似的規劃申請，並已於近期獲城規會批准。
(vi) 擬議項目不會對周邊地區造成不良的環境及技術性影響。。

因此申請人希望城規會批准是項申請。

1 INTRODUCTION

1.1 Background

1.1.1 The Review of Drainage Master Plan in Tai Po - Feasibility Study (DMP Review) was completed in December 2019. The hydraulic modelling results from DMP Review identified that the branch drainage system has less than 10-year flood protection level, i.e. insufficient capacity. In a large rainfall event under a high tide condition, the drainage networks will be surcharged and cannot be drained away due to high water level at Lower Lam Tsuen River. Therefore, the flood water will be trapped inside the basin and cause flooding in the town centre because of the backflow from Lower Lam Tsuen River.

1.1.2 To effectively relieve the flood risk in Tai Po Old Market, the DMP Review has proposed the drainage improvement works mainly in the form of stormwater pumping scheme and drainage system upgrading works. Upon completion of the Project, the flood protection level at areas concerned will be largely enhanced to that specified in the standard of the Stormwater Drainage Manual (SDM) and the flood risks thereon can be significantly reduced.

1.1.3 In January 2020, DSD commissioned an investigation study of the “Drainage Improvement Works in Tai Po” to carry out various review, site investigation, impact assessments and preliminary design for the project.

1.1.4 In January 2023, AECOM Asia Company Limited (AECOM) was appointed by the DSD to undertake the design and construction study of the “Drainage Improvement Works in Tai Po” (the Study). The Study comprises the drainage improvement works as briefly described in the following:

(a) Stormwater pumping scheme in Tai Po Old Market, including an underground storage tank, a pump house and the associated pipeworks and E&M works in Tai Po Old Market Playground, as well as the drainage upgrading works in Tai Po Tai Wo Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Mei Sun Lane and Kau Hui Chik Street, floodwall modification and new floodwall along Lower Lam Tsuen River and ancillary works including temporary relocation and reinstatement of playgrounds and associated facilities;

(b) Expansion of existing Tai Po Market Floodwater Pumping Station, including upgrading of existing pump house and the associated pipeworks and E&M works, as well as the drainage upgrading works in Tsing Yuen Street, Wai Yan Street, Pak Shing Street, Fu Shin Street, Yan Hing Street, Kwong Fuk Bridge Garden, Plover Cove Road, Tung Cheong Street, cycle track and footpath along southside of Lower Lam Tsuen River (between existing pumping station and elevated walkway at Tai Po Centre (structure no. NF97));

(c) Drainage upgrading works at Tai Mei Tuk, Ng Uk Tsuen, Ting Kok Shan Liu, Po Sam Pai, Ma Po Mei, San Uk Pai, Ping Long, Che Ha, Nam Hang and Tsung Tsai Yuen and Sai Sha Road (sections near Sai O, Kwun Hang, Tai Tung and Sai Keng); and

(d) River training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Sha Pa and She Shan River.

1.1.5 This planning application covers the Tai Po Old Market Playground Stormwater Pumping Station (TPOMPSPS) scheme. The proposed new pipes associated with the stormwater pumping scheme which are not located at the subject site would not be discussed in this town planning submission.

1.2 Description of the Project

1.2.1 The TPOMPSPS scheme comprises the following works and a location plan is given in **Appendix A**.

(a) A stormwater pumping scheme at Tai Po Old Market Playground including an underground storage tank, a discharge chamber, a pump house, E&M works and associated pipeworks;

(b) Ancillary works including but not limited to re-provision of the basketball court, children's playground and associated park facilities; and

(c) Drainage works in nearby roads including but not limited to Tai Po Tai Wo Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Mei Sun Lane and Kau Hui Chik Street. (not discussed in this submission)

1.3 Purpose of Submission

1.3.1 The Applicant, DSD, proposed a stormwater pumping scheme at Tai Po Old Market Playground. The area is zoned "Open Space" on Tai Po Outline Zoning Plan (OZP) No. S/TP/30. The proposed stormwater storage tank and associated pump house are "Public Utility Installation" falling under Column 2 use within "O" zone according to the notes of the OZP, which requires planning permission from the Town Planning Board (the "Board").

1.3.2 This planning application is submitted to the Board under Section 16 of the Town Planning Ordinance for the proposed TPOMPSPS.

1.3.3 AECOM is commissioned by the Applicant to prepare and submit this planning application to the Board for consideration and approval.

2 DESCRIPTION OF PROPOSED STORMWATER STORAGE AND PUMPING FACILITY

2.1 Description of the Site

2.1.1 The application site is located at a portion of Tai Po Old Market Playground and the slope feature no. 7NW-B/F 193 in Tai Po. It covers an area of about 7,900m^2 with an existing park including basketball court, children's playground, elderly fitness corner, park access and associated LCSD's leisure facilities, as well as the existing slope feature no. 7NW-B/F 193 between Lam Tsuen River and Tai Po Tai Wo Road.

2.1.2 The subject site is visible to the public nearby and to the users of the park. The current condition with surrounding environment is shown in **Appendix B**.

2.2 Proposed Stormwater Pumping Scheme

2.2.1 The proposed pumping station consists of a pump well with maximum pump rate of 16m^3/s and an underground stormwater tank with a capacity of 25,000m^3. During high rainstorm event, the runoff from Tai Po Old Market drainage catchment will be diverted into the pumping station via the new drainage network and then discharge into Lower Lam Tsuen River by pump. The excessive water will be temporarily stored in the underground tank. After provision of these proposed improvement works, the flood protection level at areas concerned will be largely enhanced to that specified in the standard of the Stormwater Drainage Manual (SDM) and the flood risks thereon can be significantly reduced.

2.2.2 The footprint of the underground storage tank is approximately 4,200m^2 with a height of approximately 18m. The above-ground structure consists of the associated DSD pump house (approx. 350m^2), screen room (approx. 350m^2), switch room (approx. 170m^2) and transformer room (approx. 250m^2) at the Tai Po Old Market Playground, as well as a discharge chamber (approx. 130m^2) at slope feature no. 7NW-B/F 193. The existing LCSD facilities (e.g. basketball court, elderly fitness corner, children's play area, park access, etc.) will be demolished during construction and re-provided at the space above the storage tank upon completion.

2.2.3 Details of the proposed drainage improvement works, sections of the stormwater storage tank and layout/sections of the aboveground structure are presented in **Appendix A**. The layout of the stormwater storage tank and the above-ground structures are preliminary and would be further finetuned subject to discussion with relevant authorities.

2.3 Public Consultation and Tentative Project Programme

2.3.1 On 19 July 2022, consultation paper including the background and description of the proposed development has been issued to the members of Tai Po District Council (TPDC) regarding the project scope. Members generally support the project.

2.3.2 The tentative project programme is illustrated as below:

1. Submission of s.16 application	Q1 2024
2. LegCo consultation	Q3 2024
3. Commencement of construction	Q1 2025
4. Completion	Q2 2030

3 ARCHITECTURAL AND LANDSCAPE DESIGN

3.1 Architectural Design

3.1.1 The proposed TPOMPSPS comprises of underground storage tank and above-ground DSD Pump House, Screen Room, Transformer Room, Switch Room and discharge chamber. The above-ground pumping station consists of DSD facilities serving the operational needs for the underground storage tank and stormwater pumps.

3.1.2 The façade of the pumping station is cladded with timber strips to create a natural surface treatment as an integration to the natural park. Timber-pattern planks is proposed for external wall to provide texture and variation to the blank surface and lessen the massiveness of the pumping house. The roof top would be placed with green roof to enhance the sustainability of the site. Stone-facing façade is applied for the discharge chamber to be in harmony with the nearby structure.

3.1.3 The photomontages and architectural plans of the proposed stormwater pumping station and discharge chamber are presented in **Appendix C**. The detailed architectural design of above-ground structures would be subject to discussion with maintenance parties. Layout of trees are indicative and would be further finetuned to follow the tree preservation and removal proposal to be submitted separately to the tree vetting panels. Layout of landscapes features would be further finetuned.

3.2 Landscape Design

Landscape Concept

3.2.1 Having considered the existing condition of the subject site and its surrounding context, the following landscape design objective are derived: -

- To create high-quality and enjoyable outdoor landscape areas for users and visitors.
- To re-provision all the existing park facilities and landscape elements to retain existing landscape character;
- To provide compensatory tree planting within the boundary as much as possible to the loss of existing trees due to the proposed development;
- To provide minimum 20% of greenery as much as practicable according to statutory requirements to create and enhance landscape buffers and shading for the landscaped area;
- To blend in the proposed development with adjacent existing and planned landscape context;

Landscape Design

3.2.2 The landscape design of the proposed development aims to create a high-quality and functional open space that serves the surrounding neighbourhood and integrates with the existing Tai Po Old Market playground and Tai Wo Road roadside amenity. In the light of the stormwater pumping station and discharge chamber development, re-provision of the active and passive park facilities would be distributed within the boundary, and additional buffer greening, vertical green and roof greening would be provided to mitigate the impact of the proposed development.

3.2.3 Within the subject site there will be the following key landscaped areas (see Landscape Plan and Sections in Figure 3.2.1 to Figure 3.2.3 in **Appendix C**):

(A) **Children's Play Area:** A children play area with diverse play functions would be provided. Surrounding the play area, shaded and comfortable seating space will be featured, along with canopy trees, to accommodate parental supervision and enhance the overall experience.

(B) **Basketball Court:** A Basketball Court size in accordance with HKPSG will be provided and as per existing provision.

(C) **Elderly Fitness Corner**: Elderly and other intergenerational exercise equipment will be provided to create an exercise space for all ages.

(D) **Planting Terrace**: A terraced landscape area will be reinstated to reserve the original landscape character of Tai Po Old Market Playground with landscaping.

(E) **Tai Po Sundial**: A landscape feature will be re-provided as a focal point of Tai Po Old Market Playground and keep its existing plaza function.

Greenery Provision

3.2.4 In accordance with DEVB TC(W) No. 3/2012, minimum 20% coverage of greenery including 10% at-grade greenery areas is to be provided for the subject site. Maximizing greening opportunities would be explored during the design stages to further improve the overall aesthetics and landscape design of the proposed development.

3.2.5 Due to the Proposed Development, portion of the site area will be occupied by the proposed pumping station building and the proposed discharge chamber, inevitably that the at-grade greenery provision will be reduced comparing to the existing conditions in Tai Po Old Market Playground (TPOMP) and Tai Wo Road Roadside amenity.

3.2.6 To compensate the loss of existing greenery, at-grade greenery will be re-provided at much as practicable. Additionally, additional greenery provisions such as Roof Greening and Vertical Greening on the proposed building will be provided.

3.2.7 In total, approximately 3,020 sqm of greening provision will be provided in the proposed development.

3.2.8 The greenery provision and planting area location of the proposed development is illustrated in Figure 3.2.5 in **Appendix C**, and the comparison of the greenery provision of existing condition and proposed development is summarised in following table:

Table 3.2.1 Comparison of Existing and Proposed Greenery Provision

Greenery Provision calculation in accordance with DEVB TC(W) No. 3/2012			
Site Area (Project Boundary)	**TPOMP**	**Tai Wo Road**	**7,900 sqm**
	7,200 sqm	700 sqm	
Site Coverage of Greenery Requirements (>20%)	**1,580 sqm**		
Comparison of Greenery Provision of Existing and Proposed Development			
Items without cap requirement			
Type of Greenery Provision	**TPOMP**	**Tai Wo Road**	**Sub total**
At-grade Greenery	1685 sqm	185 sqm	**~1,870 sqm**
Roof Greening	450 sqm	N/A	**~450 sqm**
Items with cap requirement			
Vertical Greening	350 sqm	N/A	**~700 sqm**
TOTAL	**~3,020 sqm (38%)**		

Hard Landscape Proposals

3.2.9 Hard landscape elements including footpath paving, furniture, planter, play equipment and surface finishes. All elements will be designed and./ or selected using the following below general criteria:

- Durability – long lasting or permanent materials and finishes;
- Reasonable cost and maintenance requirement – materials shall be easily maintained and managed; and
- Visual compatible with existing developments, in harmony and blending in with existing features of the local landscape.

Safety Standard for Outdoor, Recreational Facilities

3.2.10 The children's play equipment and other recreation facilities shall be in compliance with the relevant international safety standards, such as American Safety Standard ASTM F-1487, British Standards BS EN16630 and Standard Consumer Safety Performance Specifications for Playground Equipment for Public Use, subject to detailed design and liaison with maintenance party in next stage.

Soft Landscape Proposals

3.2.11 Soft landscape elements include planting, planting soil and drainage materials inside planting area. These elements will be selected using the following general criteria:

- Echo with Surrounding – using species listed in GMP, STSG and Themed Plant for Tai Po to match with the district greening character and echo with surrounding landscape;
- Seasonal interests - providing seasonal variety or special seasonal flowers, fruits or foliage colour;
- Ecological benefit - using native and ecological valuable species where possible;
- Appropriate spacing for tree planting - according to different tree species and mature size for sustainable growth; and
- Adequate soil depth - providing a minimum of 1200mm/600mm/300mm depth of planting soil for tree/shrub/groundcover respectively, excluding drainage layer.

3.2.12 Existing trees have been preserved as far as practicable in the proposed development. Given the limitation of site area, building footprint, emergency vehicular access, circulation pathway and amenity facilities in external area, tree felling is inevitable. This is necessary to provide sufficient space for the construction of the proposed Stormwater Pumping Station, along with an underground stormwater tank, which aims to enhance flood protection in the district. Additionally, the re-provision of the existing Tai Po Old Market Playground's park facilities to create an enjoyable open space for the neighbourhood's recreational use.

3.2.13 There are total 169 nos. of tree surveyed within the site boundary, while 35 nos. of tree proposed to be retained, 1 nos. of tree proposed to be transplanted and 133 nos. of tree proposed to be felled. In accordance with DEVB Technical Circular 4/2020, the compensatory tree implemented with ratio of not less than 1:1 with respect to the number of felled trees within the site as much as possible (subject to the site condition and future maintenance parties agreement). Sufficient space will be provided for the compensatory trees, taking into account of the space required to cater for the establishment and healthy growth of the trees up to maturity.

3.2.14 No Old and Valuable Trees (OVT) is identified within the site boundary.

3.2.15 There is 1 no. of Trees of Particular Interest (TPI) identified within survey boundary. T354 (*Dalbergia assamica*) is identified as TPI as it is protected under Cap. 586.

3.2.16 The concerned TPI (T354, *Dalbergia assamica*) will not be affected by the proposed works and therefore will be retained.

3.2.17 Further details of the individual tree treatment and condition is shown in **Appendix D**.

3.2.18 The recommended treatment to the existing trees found in the proposed development and proposed number of compensatory trees is summarized in following table:-

Table 3.2.2 Summary of Proposed Tree Treatment and Compensatory Trees

Existing Trees				
Number of existing trees proposed treatment	Retain	Transplant	Fell	Total
	35 nos.	1 no.	133 nos.	**169 nos.**
Compensatory Trees				
Number of new trees to be planted	Within Project Site		Off-site	Total
	133 nos.		-	**133 nos.**

3.2.19 The species selection of compensatory trees considered the mix of native and exotic flowering and evergreen trees species which altogether will contribute to the thematic planting that will increase the aesthetic value and enhance biodiversity of the Proposed Development. Also, the recommended tree list of the Greening Master Plan (GMP) of Tai Po and Street Tree Selection Guide (STSG) will be considered in the proposed compensatory trees.

3.2.20 The proposed tree species list for compensatory tree planting within site boundary is tabled in **Table 3.2.3**, and the final selection of planting species subject to the detailed planting design and liaison with maintenance party in next stage.

Table 3.2.3 Indicative Tree Species to be Compensated within Project Boundary

Botanical Name	**Chinese Name**	**DBH (mm)**	**Size (mm) Height x Spread**	**Spacing (mm)**	**Remarks**	**Quantity**
Brachychiton acerifolius	槭葉蘋婆	80	Heavy Standard: 4000 x 1500	5000	GMP & STSG	7 nos.
Cinnamomum camphora	樟樹	90	Heavy Standard: 4500 x 2500	5000	Native & GMP	11 nos.
Garcinia subelliptia #	菲島福木#	45	Standard: 2750 x 1000	1500	GMP & STSG	50 nos.
Juniperus chinensis 'Kaizuca' #	龍柏#	45	Standard: 2750 x 800	1500	GMP & STSG	32 nos.

Botanical Name	Chinese Name	DBH (mm)	Size (mm) Height x Spread	Spacing (mm)	Remarks	Quantity
Plumeria rubra	紅雞蛋花	70	Standard: 2750 x 1500	5000	GMP & STSG	7 nos.
Sterculia lanceolata	假蘋婆	80	Heavy Standard: 4000 x 1500	5000	Native & GMP	8 nos.
Tabebuia pentaphylla	紅花風鈴木	80	Heavy Standard: 4000 x 2000	5000	GMP	12 nos.
Wodyetia bifurcata	狐尾椰子	-	3000 x 2000	5000	GMP & STSG	6 nos.
					TOTAL	**133 nos.**
NOTE: *#Spacing and size are proposed for hedge planting and to achieve the compensation ratio of 1:1 in terms of quantity within the limited space available on site, in accordance to DEVB TC(W) 4/2020* *GMP: Greening Master Plan / STSG: Street Tree Selection Guide*						

3.2.21 The indicative planting species for at-grade planting, vertical greening (VG) and roof greening is tabled in **Table 3.2.4**, and the final selection of planting species subject to the detailed planting design and liaison with maintenance party in next stage.

Table 3.2.4 Indicative Species for At- grade planting, vertical greening (VG) and roof greening

Type	Scientific Name	Chinese Name	Native / Exotic	Height (mm)	Spread (mm)	Spacing (mm)	Remarks
Groundcovers							
Groundcover	*Cuphea hyssopifolia*	細葉雪茄花	Exotic	300	300	300	GMP
Groundcover	*Liriope spicata*	山麥冬	Native	300	300	300	GMP
Groundcover	*Nephrolepis hirsutula*	毛葉腎蕨	Native	300	300	300	GMP
Groundcover	*Iris tectorum*	鳶尾	Exotic	350	300	300	
Shrubs							
Shrub	*Canna x generalis "Bengal Tiger Variegata"*	大美人蕉	Exotic	600	300	300	GMP
Shrub	*Cordyline terminalis rubra*	紅鐵樹	Exotic	900	600	400	GMP, Shade Tolerant
Shrub	*Fagraea ceilanica*	灰莉	Exotic	600	600	600	GMP, Shade Tolerant

Shrub	*Loropetalum chinense var. rubrum "Purple Majesty"*	紅花繼木	Exotic	400	400	400	GMP
Shrub	*Melastoma malabathricum*	野牡丹	Native	500	300	400	GMP, Shade Tolerant
Shrub	*Rhodomyrtus tomentosa*	桃金娘	Native	500	300	400	
Shrub	*Ixora chinensis*	龍船花	Native	500	300	400	GMP
Climber							
Climber	*Ficus pumila*	薜荔	Native	1000mm	min. 4 shoots	300	
Climber	*Podranea ricasoliana*	紫雲藤	Exotic	1000mm	min. 4 shoots	300	
Trailing Plant							
TP	*Lonicera japonica*	金銀花	Native	1000mm	min. 4 shoots	300	GMP
TP	*Lantana montevidensis*	鋪地臭金鳳	Exotic	250	300	300	
Roof Greening (w.600mm Soil Depth)							
Groundcover	*Cuphea hyssopifolia*	細葉雪茄花	Native	300	300	300	GMP
Groundcover	*Liriope spicata*	山麥冬	Native	150	150	200	GMP
Groundcover	*Phyllanthus myrtifolius*	瘤腺葉下珠	Exotic	250	300	300	GMP
Shrub	*Loropetalum chinense var. rubrum "Purple Majesty"*	紅花繼木	Exotic	400	400	400	GMP
Shrub	*Tibouchina urvilleana*	巴西野牡丹	Exotic	400	300	400	

Irrigation and Drainage Strategy

3.2.22 Water is an essential resource for the healthy growth of the proposed soft landscape planting materials. For generally flat accessible areas, manual operated water points will be provided at an interval of not more than 40m apart (determined by 20m hose-pipe length). Also, planter drainage will be provided for all the planting areas.

4 JUSTIFICATIONS

4.1 To Alleviate Flood Risk in Areas of Tai Po

4.1.1 The existing drainage system in Tai Po Old Market cannot achieve the required flood protection standard. There is high risk of flooding due to insufficient capacity of existing drainage system, high water level at Lower Lam Tsuen River, causing backflow to upstream drainage. The proposed stormwater storage and pumping facility aim to alleviate the potential flooding problems in Tai Po Old Market area during heavy rainstorm events.

4.1.2 For the proposed drainage improvement works, other alternatives have been explored and evaluated, such as large-scale pipe upgrading and modification for the dilapidated drainage networks. However, it was concluded via hydraulic modelling that pipework upgrade itself is not sufficient to safeguard the low-lying areas of Tai Po Old Market from severe flooding during heavy rainstorms and high tide level. Furthermore, excessive public disruption would arise from the large-scale pipe upgrading works, and its technical feasibility would be in question as the existing underground space in Tai Po is heavily congested by utilities.

4.2 The Most Suitable Site for the Proposed Development

4.2.1 The application site, located at the downstream end of the drainage network in Tai Po Old Market, offers the most effective solution to isolate the influence of the Lower Lam Tsuen River's water level during heavy rainstorms. During high rainstorm events, the stormwater within Tai Po Old Market drainage catchment can be intercepted, stored in the storage tank and further discharged to Lower Lam Tsuen River effectively with pumps.

4.2.2 The site location was selected considering the cost-effectiveness with minimum modification made on the existing drainage network and creating the least nuisance to the public and the environment. The site is also selected because of its low-impact development which could avoid the large-scale upstream and downstream drainage improvement works.

4.2.3 The construction of the proposed stormwater storage and pumping facility at the application site would avoid private land resumption and substantial road opening on some high-volume carriageways. The disturbance to the public, traffic and environmental impacts would be lessened.

4.3 The Proposed Development will not undermine the Planning Intention of the "O" zone of Tai Po Old Market Playground

4.3.1 The application site is currently designated for recreation and leisure use only. The facilities within the site, such as the basketball court, children's playground, elderly fitness corner, park access and associated LCSD's leisure facilities, would be reprovisioned after the construction of the proposed underground stormwater storage tank and aboveground pumping facility. The size of the aboveground structures, including the DSD pump house, screen

room, switch room and transformer room at Tai Po Old Market Playground, as well as a discharge chamber at slope feature no. 7NW-B/F 193, has been optimized to meet the operational requirements. This optimization aims to minimize the impact on public's enjoyment of open space in future.

4.4 Better Site Utilization

4.4.1 The integrated design by utilizing underground space of existing open space for essential infrastructure and public amenities aboveground would make good use of scarce land resources in the urban area.

4.5 Approved Planning Applications in Kwun Tong and Wong Tai Sin with Similar Nature

4.5.1 Two planning application (TPB Ref. A/K14/811 and A/K8/53) with similar nature, i.e. underground stormwater tank and associated facilities within open space, were approved by the Board in 2022 and 2023 respectively.

4.5.2 These applications were approved with conditions by the Board on 28 January 2022 and 19 May 2023 respectively, mainly on the grounds that the proposed development were identified as an essential infrastructure that can reduce the potential flood risks; would not undermine the planning intention of "O" zone; and would not have significant adverse environmental, traffic, geotechnical, sewerage and drainage impacts.

4.5.3 The above approval of planning applications provides reference of acceptance to the Board for similar application.

4.6 No Adverse Environmental and Technical Implications

4.6.1 The proposed development will not generate adverse impacts on environmental, landscape, visual, drainage, traffic, geotechnical, sewerage, water supply and utilities aspects (detailed discussion can be found in Section 5 below). Relevant mitigation measures will be adopted to minimize the potential impacts during construction and operation stages.

4.6.2 As discussed in Section 3 above, the visual impact of the proposed aboveground structures will be mitigated by adopting timber strips on the pumping station's façade, timber-pattern planks on the external wall for texture, a green roof for sustainability, and stone-facing façade on the discharge chamber for harmony with nearby structure. Moreover, compensatory tree planting and greening proposal will be provided in accordance with DEVB TC(W) No. 4/2020 – Tree Preservation and DEVB TC(W) No. 3/2012 – Site Coverage of Greenery for Government Building Projects, respectively. With the implementation of the recommended transplanting and compensatory planting (see Section 5.5 below), residual landscape impact is not anticipated.

4.7 Conclusion

4.7.1 Based on the above justifications, the proposed location at Tai Po Old Market Playground is recommended for the construction of the proposed works.

5 POTENTIAL IMPACT AFTER THE WORKS

5.1 Environmental Impact

5.1.1 Air Quality

5.1.1.1 Potential fugitive impacts to nearby ASRs would mainly arise from excavation works, handling, transportation and removal of excavated spoil / material, stockpiling and wind erosion etc. Given the nature and limited scale of the proposed works, potential air quality impact dust emissions would be minor and localised. With the implementation of regular site watering and good construction practices for dust minimization, construction dust impacts are not expected to be significant on the surrounding sensitive receivers. Requirements of Air Pollution Control (Construction Dust) Regulation and EPD's Recommended Pollution Control Clauses for Construction Contracts are proposed to be incorporated into the contract.

5.1.1.2 No air pollution source is identified from the operation of any elements of the Project itself that no air quality impacts would be anticipated during operational phase.

5.1.2 Noise Impact

5.1.2.1 During the construction phase, the use of powered mechanical equipment (PME) for the construction of the Project such as excavation, steel fixing and concreting of structure, backfilling, electrical and mechanical (E&M) installations and associated pipeworks, and reinstatement and landscaping works, would pose potential impact on nearby NSRs. In view of the limited scale of the Project, no adverse construction noise impact would be anticipated with the implementation of recommended good site practices, noise mitigation measures including use of quality powered mechanical equipment (QPME) or quieter construction method (e.g. silent piling by press-in method as an alternative of traditional sheet piling), use of movable noise barrier, noise enclosure, acoustic mat and / or purpose-built barrier, proper scheduling of construction activities during examination period of Tai Po Old Market Public School and noise control requirements stipulated in Recommended Pollution Control Clauses for Construction Contracts.

5.1.2.2 It is assumed that the fixed plants at the proposed stormwater pumping station would be in operation / standby for 24 hours. During the operational phase, given that the planned fixed plants are properly designed to meet the maximum permissible SWL, no adverse noise impacts would be anticipated. The maximum permissible SWL would be specified as design criteria of the proposed fixed noise sources in the contract documents. The Contractor should design and select equipment that could comply with the specified design criteria in the contract. A Compliance Test Report demonstrating the compliance should be conducted before the operation of the Project.

5.1.3 Water Quality

5.1.3.1 Water quality impacts would mainly arise from land-based construction activities, including wastewater generated from general construction activities, construction site run-off, accidental spillage of chemicals and potential contamination of surface water and groundwater, and sewage from construction workforce. Impacts can be controlled by implementing the recommended mitigation measures. No adverse water quality impact during construction phase would be anticipated.

5.1.3.2 The operation of the Project does not constitute any elements that would be water pollution sources and would not generate any new pollution load to the catchment. No water quality impact would be expected during the operational phase.

5.1.4 Waste Management Implications

5.1.4.1 During construction phase, waste types generated from the Project are likely to include inert and non-inert C&D materials from construction and excavation works, chemical wastes from the maintenance of construction works and vehicles, and general refuse from the workforce. Land-based sediment might also be generated during excavation works as the Project site falls on reclaimed land. Provided that these wastes are handled, transported and disposed of according to the recommended good site practices and mitigation measures, no adverse environmental impacts (including potential hazard, air and odour emissions, noise and wastewater discharges) would be anticipated during the construction phase.

5.1.4.2 During the operational phase, small quantities of silt and debris, as well as chemical wastes would be anticipated from the maintenance of drains. With implementation of the recommended mitigation measures, adverse environmental impacts would not be anticipated during the operational phase.

5.1.5 Ecological and Fisheries Impact

5.1.5.1 The Project site is located within the existing Tai Po Old Market Playground as well as existing man-made slope and footpath / cycle track by Lower Lam Tsuen River, which constitute solely developed area habitat dominated by low diversity of exotic and/or ornamental flora species and very low diversity and abundance of fauna species, all the which were either very common or common. No species of conservation importance nor roosting site were recorded within the Project site. Given the limited scale of the Project and low ecological value of the affected habitat, the direct ecological impact is considered low.

5.1.5.2 Likewise, considering the existing high level of disturbance existing trafficked Tai Po Tai Wo Road and human activities at the Tai Po Old Market Playground, and that the proposed works are small scale and localized in nature, indirect construction disturbance impacts (e.g. increased human activities, glare, noise and dust) to the surrounding habitats and ardeid pre-roosting sites along Lower Lam Tsuen River is anticipated to be negligible. Consider that construction works during restricted hours would not be required for the proposed TPOMPSPS based on the current design of the Project and that the Project site is situated at over 100m from the ardeid night roosts at Kwong Fuk Bridge Garden, disturbance impact to the ardeid night roost is anticipated to be negligible.

5.1.5.3 During operational phase, the proposed TPOMPSPS would be unmanned that limited disturbance impacts would be anticipated. Likewise, the proposed low-rise aboveground structures of TPOMPSPS and the aboveground portion of its associated discharge chamber are not anticipated to affect the flight paths of ardeids forage along Lower Lam Tsuen River as the existing Tai Po Old Market Playground and proposed TPOMPSPS are surrounded by existing developments and high-rise residential building and no flight path towards / through the Playground were observed.

5.1.5.4 The proposed works would not result in direct impact to any fisheries resources and the potential indirect impacts are expected to be insignificant. No fisheries impact is anticipated during the construction and operation of the Project, and hence, specific mitigation measure and environmental audit and monitoring programme for fisheries impact are not necessary.

5.1.6 Cultural Heritage Impact

5.1.6.1 The Project site with the existing Tai Po Old Market Playground is situated on reclaimed land. No Declared Monument, Proposed Monument, Graded Historic Sites/Building/Structure, Sites/Buildings/Structures in the new list of proposed grading items, Government Historic Site or Sites of Archaeological Interest identified by AMO was identified within 50m from the Project site. Therefore, no cultural heritage impacts would be anticipated from the proposed works and no mitigation measures would be required.

5.1.6.2 The preliminary environmental review report is attached in **Appendix E**.

5.2 Drainage Impact

5.2.1 Since the objective of the project is to improve the drainage capabilities of the Tai Po Old Market area and alleviate flood risks, no adverse drainage impact will be anticipated. A preliminary drainage impact assessment is attached in **Appendix F**.

5.3 Traffic Impact

5.3.1 During construction phase, trenchless method will be adopted as far as practicable for the proposed pipe laying works to minimize the traffic impact. With the implementation of temporary traffic arrangement, the traffic impact during construction is considered temporary and minimal.

5.3.2 During operation phase, it is expected that only a few and infrequent maintenance vehicles will enter the proposed stormwater storage tank, therefore operational traffic impact is minimal.

5.3.3 The preliminary traffic impact assessment is attached in **Appendix G**.

5.4 Geotechnical Impact

5.4.1 Results of past ground investigation works, field tests and laboratory tests carried out for this Project were used to determine the geotechnical parameters and recommendations made. With the recommendations made on the feasible schemes of the foundation for the Project, it is anticipated that the proposed construction works would not impose any adverse effect on the adjacent ground and structures. A preliminary geotechnical assessment report is attached in **Appendix H**.

5.5 Landscape and Visual Impact

5.5.1 A tree survey has been conducted and compensatory tree planting will be provided in accordance with the relevant statutory requirements. According to the Tree Preservation and Removal Proposal (**Appendix D**)**,** 169 number of trees have been surveyed within the proposed Site. No Old and Valuable Tree are found. Out of which, 35 and 133 number of the trees are proposed to be retained and removed respectively. 1 number of trees will be transplanted.

5.5.2 Trees compensation and transplanting will be provided and considered as much as practicable on-site as a mitigation measure to maintain the current urban park landscape character. Additionally, the overall tree compensation ratio is targeted to achieve 1:1 ratio through on-site and off-site tree compensatory planting. Besides, all existing landscape elements to be re-provided within the project boundary, and they are open and well connected to the existing park and surrounding pathways. With the implementation of the recommended mitigation measures, including transplanting and compensatory planting, residual landscape impact is not anticipated during construction and operation stages.

5.5.3 Moreover, mitigation measures are proposed to minimize potential visual impact during construction. The storage tank would be placed underground and the proposed above-ground structures of stormwater pumping station and discharge chamber will have architectural and landscape design for aesthetic upgrade and enhance the visual environment. Architectural and landscape design is shown in **Appendix C**. The building mass of stormwater pumping station is encased with an earth-tone coloured and timber textured 'screen' with vertical greening to reduce its bulkiness, forming a dissolved barrier at the park edge. In addition, the 'screen' constructed with vertical timber-textured planks and green mesh forms a natural backdrop, which blend in with the adjacent vast greening, and continue the greening of the existing site edge facing Tai Po Old Market Playground. For the proposed discharge chamber, aesthetic treatment will be provided, the building façade will apply stone looking materials to harmonise with the existing surrounding retaining structures. As shown in Figure 3.2.8 to 3.2.12, the anticipated views from key viewing points illustrated the Proposed Development with above aesthetic treatment and enhancement have ameliorated the potential visual impact of the Proposed Development as far as possible. Hence, no significant adverse visual impact in operational phase would be anticipated.

5.6 Water Supply Impact

5.6.1 No adverse waterworks impact is identified from the Project. It is anticipated that no major watermain diversion would be required. Trial pits will be conducted before the construction of the proposed works to identify the exact location of the watermain. The Contractor shall monitor for excessive ground settlement to detect possible damages to the integrity of adjacent watermains during the construction phase.

5.7 Sewerage Impact

5.7.1 No proposed sewerage works is required and thus no adverse sewerage impact form the project. It is anticipated that no major sewerage diversion would be required. A preliminary sewerage impact assessment report is attached in **Appendix I**.

6 CONCLUSION

6.1.1 As stipulated in the Schedule of Use of the OZP for “Open Space”, the proposed stormwater storage and pumping facility which is considered as “Public Utility Installation” requires planning permission from the TPB.

6.1.2 With the provision of the stormwater storage and pumping facility, the flooding problem in Tai Po Old Market will be alleviated.

6.1.3 The application site is considered as the most suitable location for the proposed stormwater storage and pumping facility in the consideration of hydraulic performance, construction cost, traffic impact, social impact and environmental impact.

6.1.4 The proposed development will not result in any permanent impact to the existing facilities enjoyed by the public and therefore will not undermine the planning intention of the “O” zone for Tai Po Old Market Playground, which is primary for the provision of recreational uses.

6.1.5 Two planning applications with similar nature of the proposed development have been approved by the Board recently. The approval of these planning applications provides reference of acceptance to the Board for similar application.

6.1.6 The potential impacts due to construction of the proposed stormwater storage and pumping facility have been reviewed. With the implementation of recommended mitigation measures, it is concluded that no adverse impacts will be brought by the project.

- END -

Appendix A – Proposed Works

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ISO A1 594mm x 841mm

Approved:

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Designer:

Project Management Initials:

PROPOSED MAINTENANCE ACCESS

PROPOSED TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION

EXISTING PUBLIC TOILET AND LCSD OFFICE TO BE RETAINED

PROPOSED ABOVEGROUND STRUCTURES

DISCHARGE CHAMBER

LEGEND:

- PROPOSED STORMWATER DRAIN
- PROPOSED DRAIN TO BE CONSTRUCTED BY PIPE JACKING
- PROPOSED RISING MAINS TO BE CONSTRUCTED BY PIPE JACKING
- EXISTING STORMWATER DRAIN
- EXISTING PIPE AND MANHOLE TO BE ABANDONED
- EXISTING STORMWATER DRAIN
- APPLICATION BOUNDARY
- EXISTING STORMWATER MANHOLE
- PROPOSED STORMWATER MANHOLE
- EXISTING STORMWATER MANHOLE TO BE RECONSTRUCTED
- EXISTING REGISTERED FEATURES

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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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STATUS
階段

SCALE 比例
A1 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

PROPOSED TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION

SHEET NUMBER
圖紙編號

60700410/R28/402

Plot File by: iu.yang 2024/1/29
PATH: P:\PROJECTS\60700410\DRAWING\REPORT\R28\R28_402.dgn

Appendix B – Current Condition with Surrounding Environment

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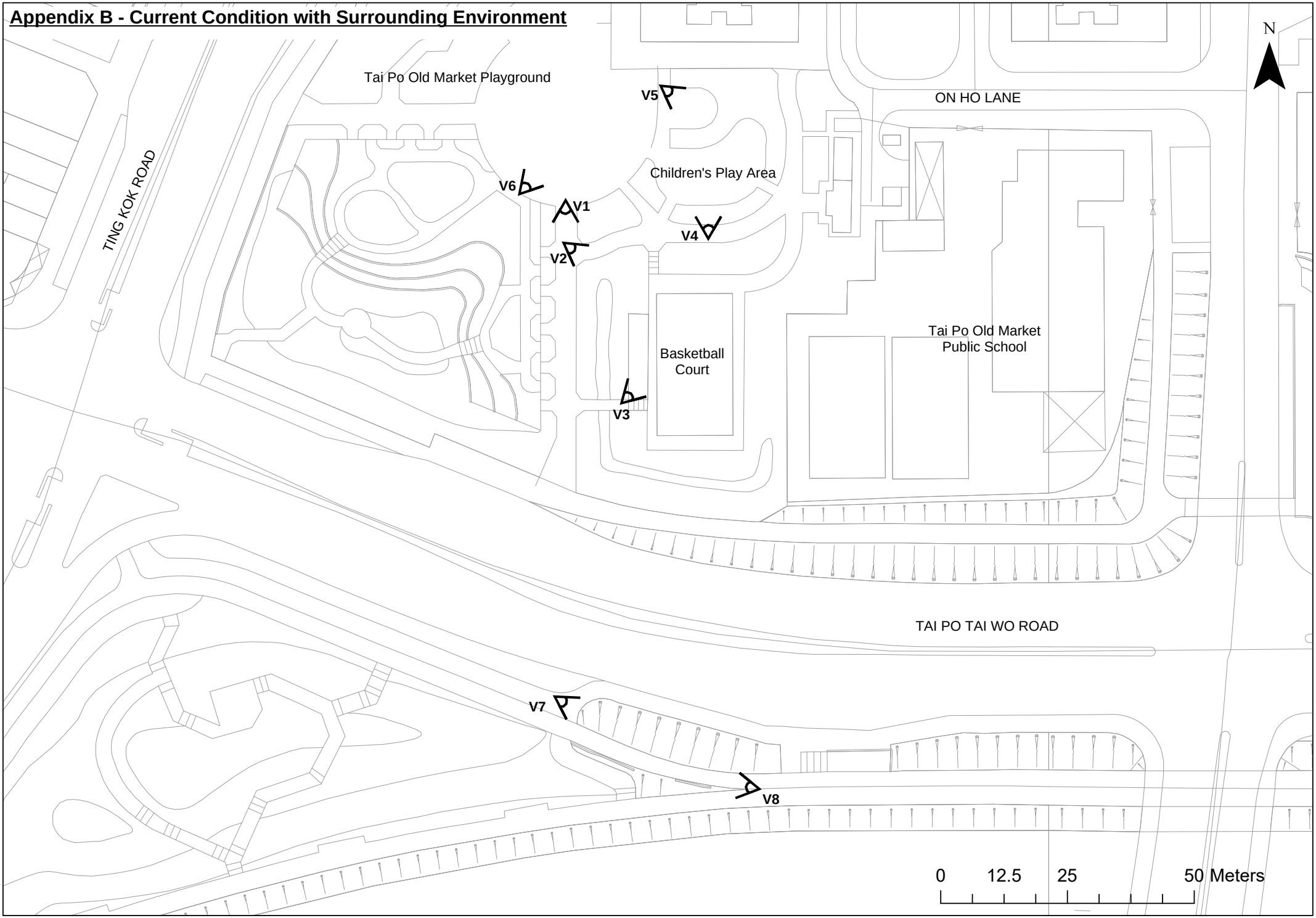
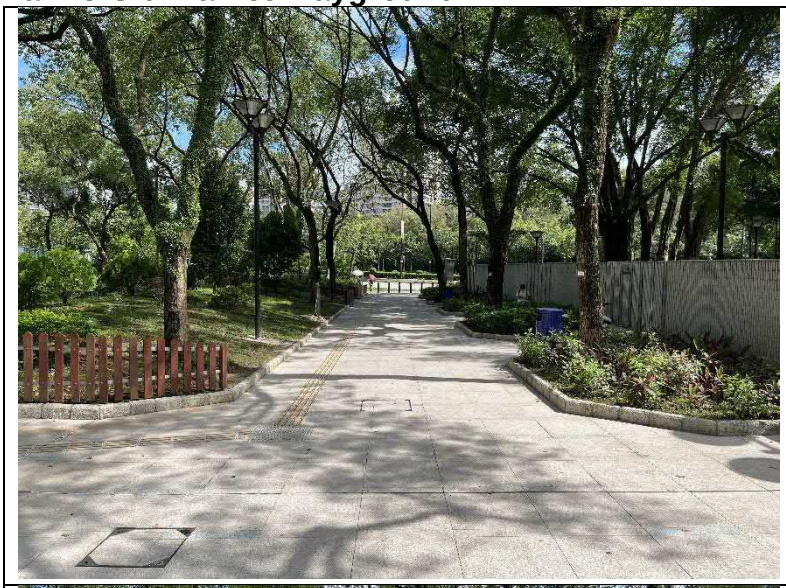
Appendix B - Current Condition with Surrounding Environment



Tai Po Old Market Playground

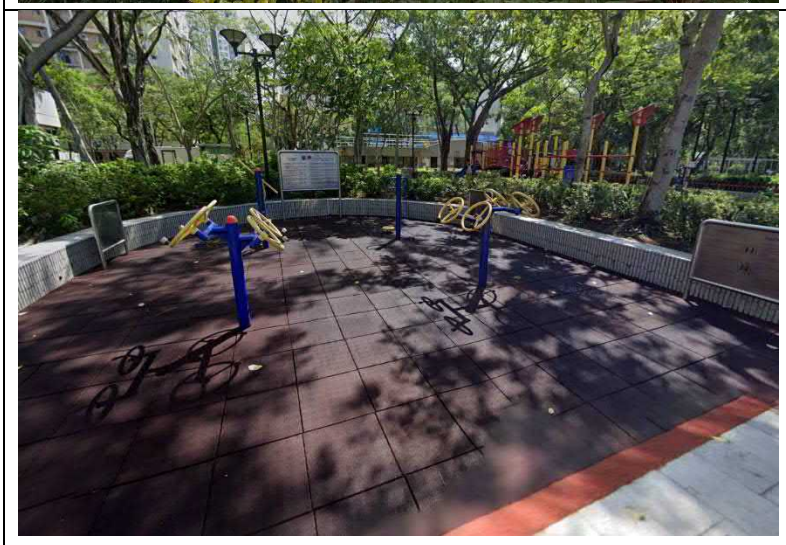


V1) Main Access of Park

V2) Park Access

V3) Basketball Court

V4) Children's Play Area



V5) Elderly Fitness Corner

V6) Tai Po Sundial

Feature No. 7NW-B/F 193

V7) Main Access of Park

V8) Park Access

Appendix C – Architectural and Landscape Design

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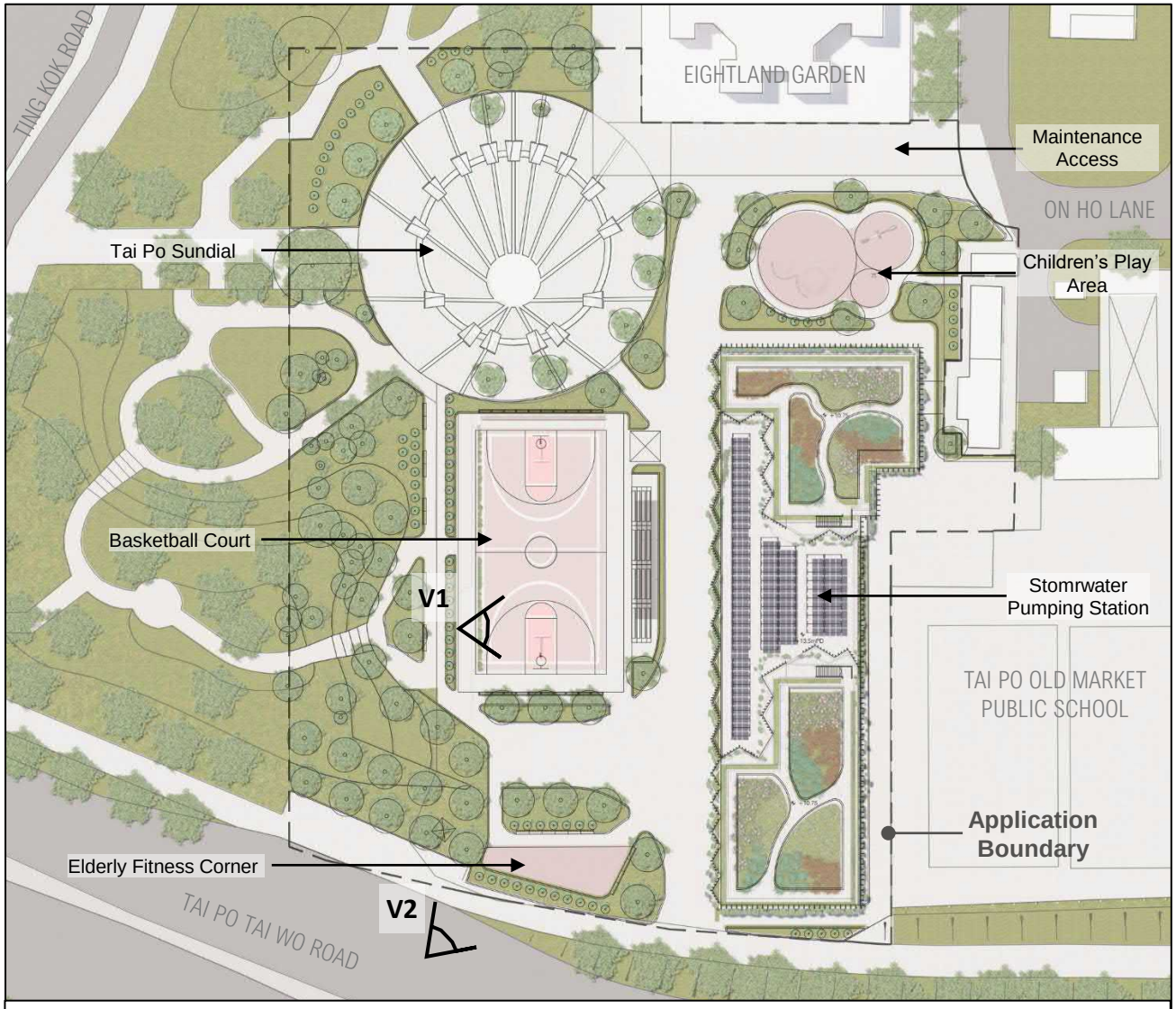
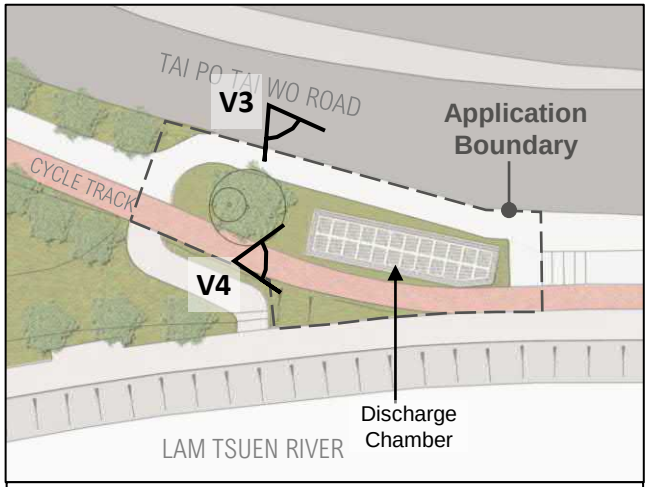
Figure 3.1.1 – Overview of Architectural Design



(A) Proposed Stormwater Pumping Station at Tai Po Old Market Playground



(B) Proposed Discharge Chamber at Slope Feature No. 7NW-B/F 193

NOT TO SCALE

Notes: Trees and landscape features within the application site shown are indicative only. Layout of trees should follow compensatory planting plan in the Tree Preservation and Removal Proposal. Layout of landscape features to be re-provided within the park would be further finetuned.

Figure 3.1.2 – Photomontages for proposed Pumping Station

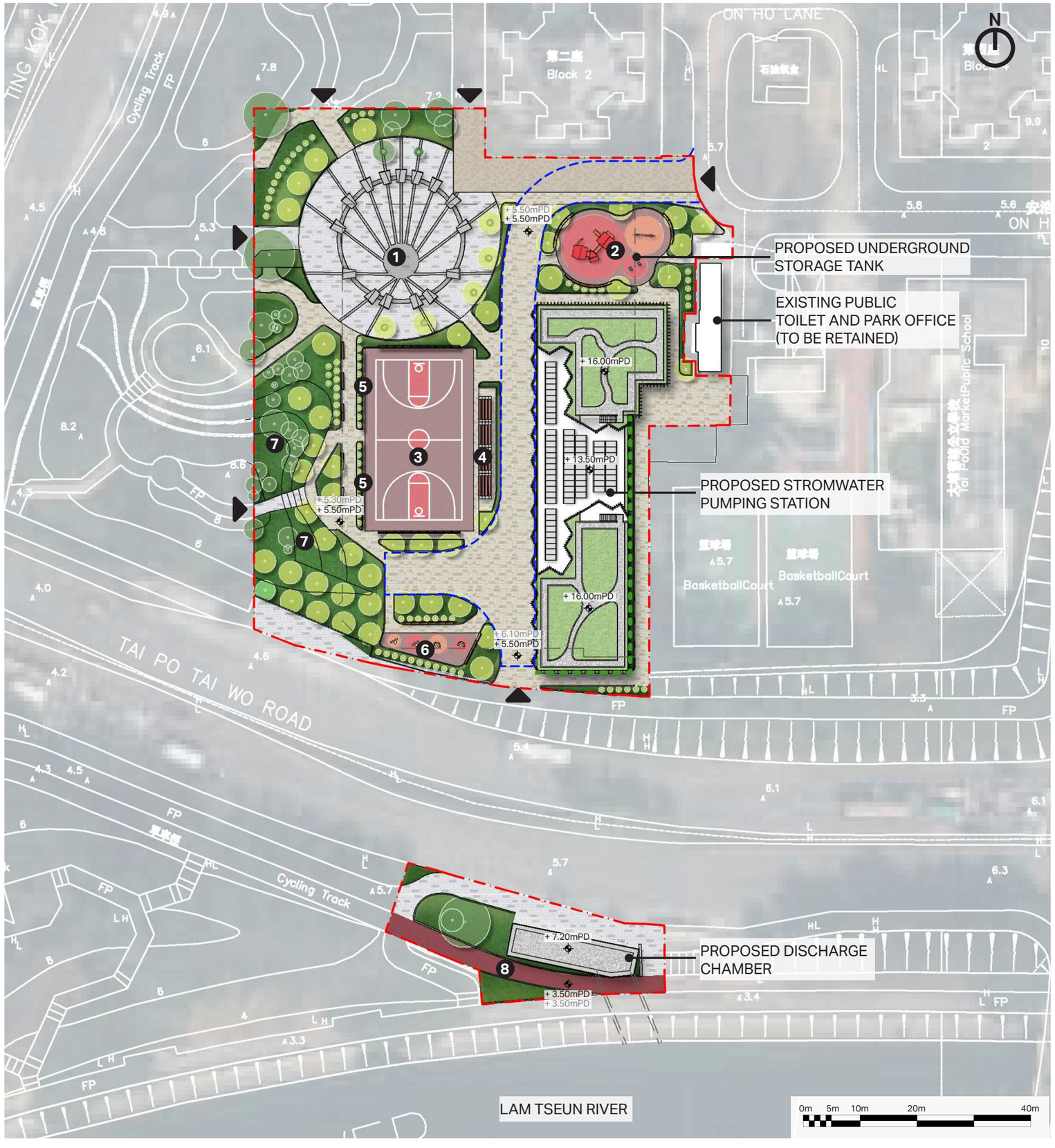
V1) View from Basketball Court

V2) View from Tai Po Tai Wo Road

Figure 3.1.3 – Photomontages for proposed Discharge Chamber

V3) View from Tai Po Tai Wo Road

V4) View from Cycle Track



LEGEND

- PROJECT BOUNDARY
- EMERGENCY VEHICLE ACCESS
- PROPOSED OPEN SPACE ENTERY POINT
- + x.xx mPD — EXISTING LEVEL
- + x.xx mPD — PROPOSED LEVEL
- PROPOSED HARD PAVED AREA
- PROPOSED SEATING
- PROPOSED AT-GRADE PLANTING AREA
- PORPOSED ROOF GREENING
- PROPOSED VERTICAL GREENING
- TREES PRPOSED TO BE RETAINED
- PRPOSED RECIPIENT LOCATION FOR TRANSPLANTED TREES
- PROPSOED COMPENSATORY TREE PLANTING
- 1 TAI PO SUNDIAL
- 2 CHILDREN'S PLAY AREA
- 3 BASKETBALL COURT (W/ BACKSTOP)
- 4 SPECTATOR STAND
- 5 FENCE WALL
- 6 ELDERLY FITNESS CORNER
- 7 PLANTING TERRACE
- 8 CYCLE TRACK

ISO A1 594mm x 841mm
Approved:
Checked:
Designer:
Project Management Initials:

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PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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STATUS 階段

SCALE 比例
A3 1:750

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

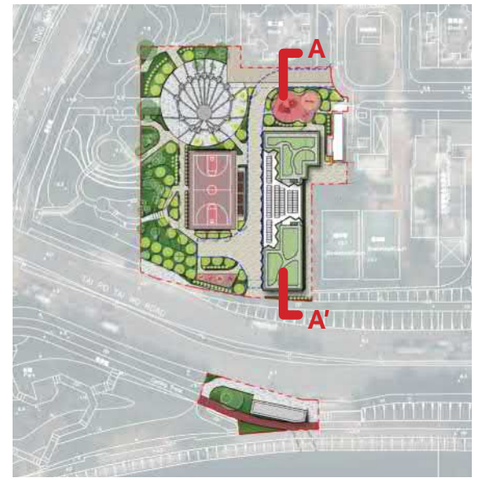
PROJECT NO. 項目編號
60700410

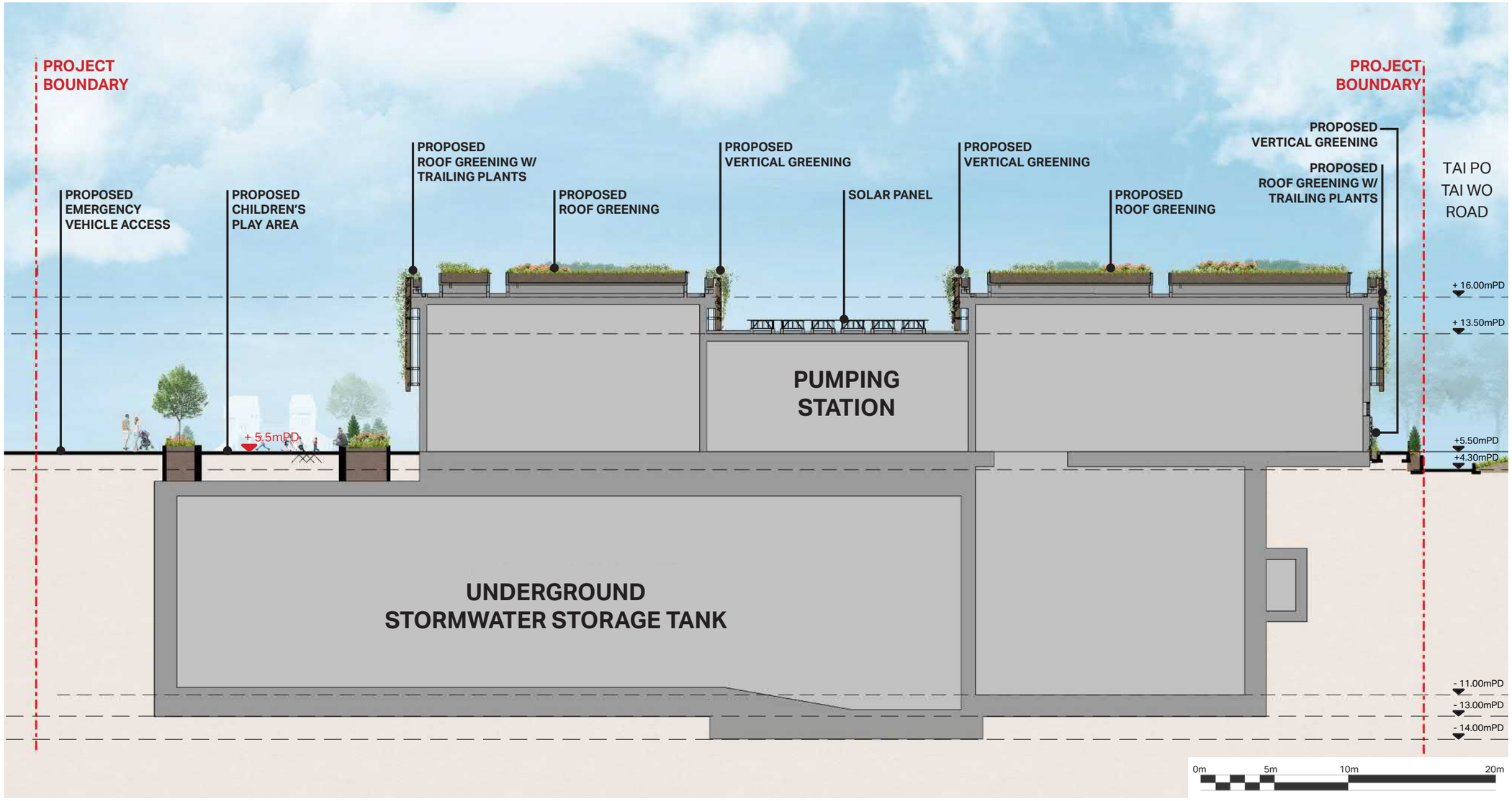
CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE 圖紙名稱
LANDSCAPE MASTER PLAN

SHEET NUMBER 圖紙編號
FIGURE 3.2.1

KEY PLAN





SECTION A-A'

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SCALE 比例 A3 1:300

DIMENSION UNIT 尺寸單位 METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號 60700410

CONTRACT NO. 合約編號 CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

ANTICIPATED SITE SECTION 01

SHEET NUMBER 圖紙編號

FIGURE 3.2.2

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

KEY PLAN

SECTION B-B'

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STATUS 階段

SCALE 比例 — A3 1:300

DIMENSION UNIT 尺寸單位 — METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號 — 60700410

CONTRACT NO. 合約編號 — CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

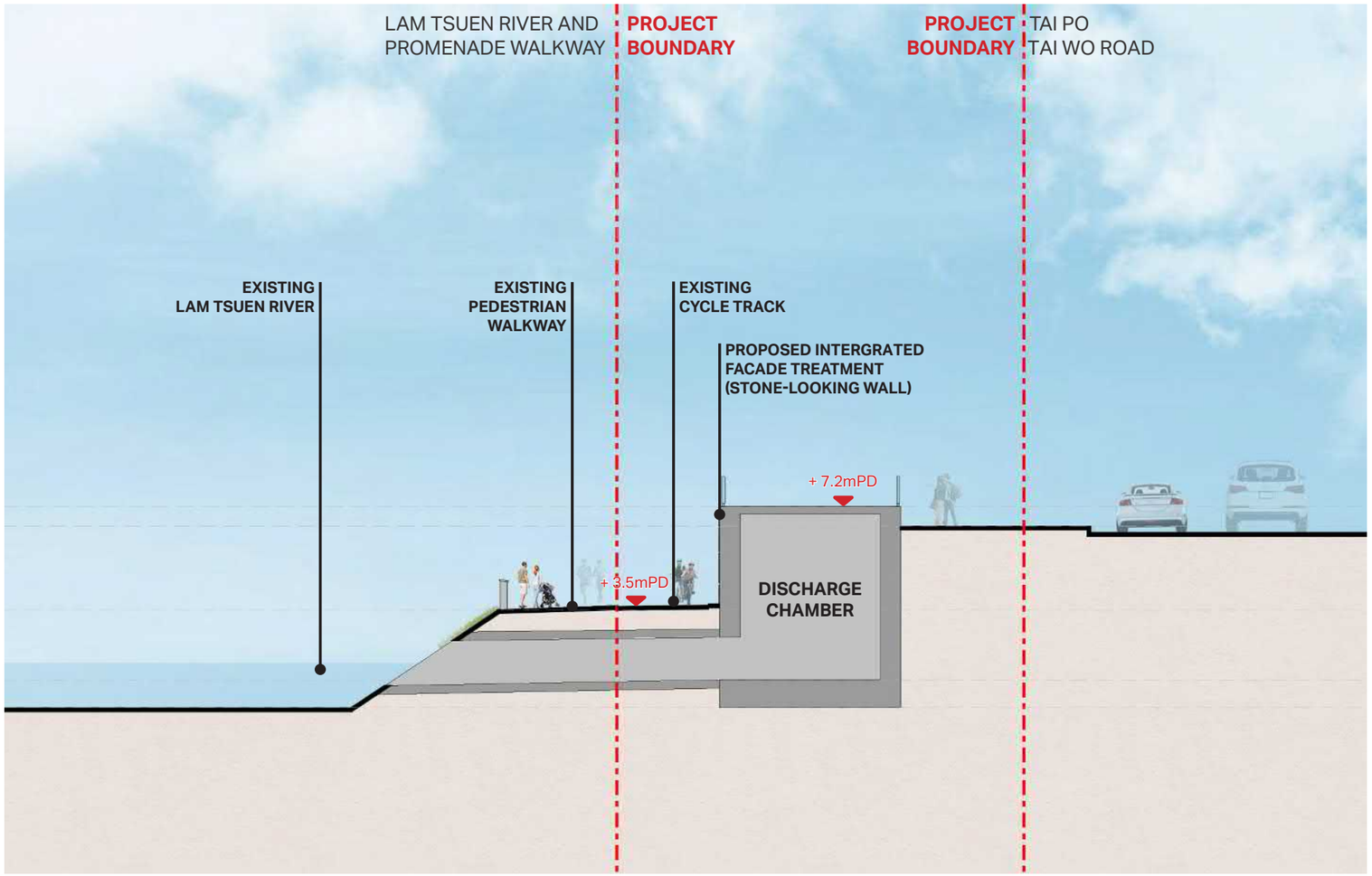
ANTICIPATED SITE SECTION 02

SHEET NUMBER 圖紙編號

FIGURE 3.2.3

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

KEY PLAN



SECTION C-C'

0m 5m 10m

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STATUS 階段

SCALE 比例
A3 1:250

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE 圖紙名稱
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SHEET NUMBER 圖紙編號
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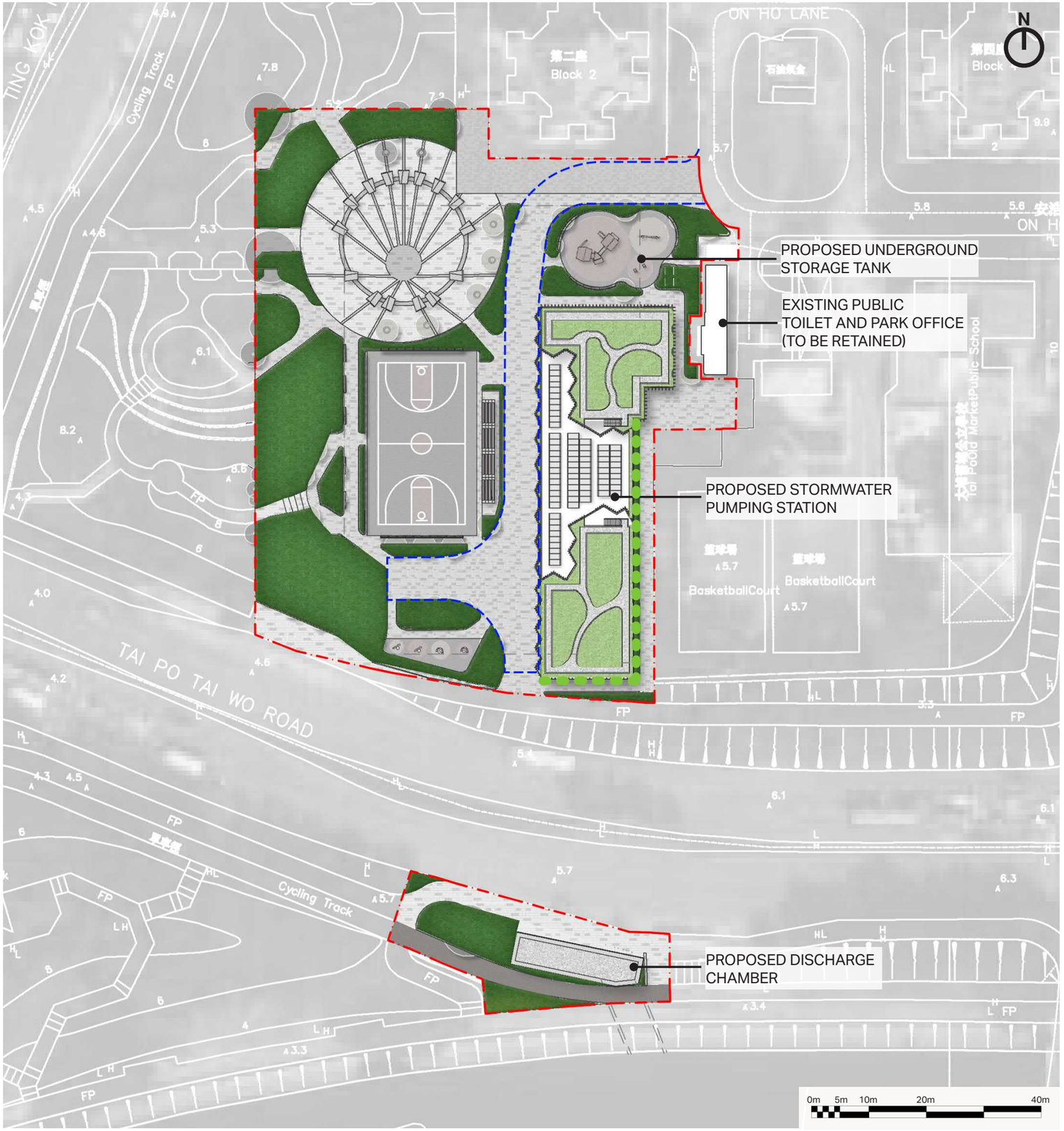

LEGEND

- PROJECT BOUNDARY
- EMERGENCY VEHICLE ACCESS
- AT-GRADE PLANTING AREA
- ROOF GREENING
- VERTICAL GREENING

Greenery Requirnment (in accordance to DEVB TC(W) 3/2012)		
Site Area (Project Boundary)	**TPOMP**	**Tai Wo Road**
	7200 sqm	700 sqm
	7900 sqm	
Required Greenery Provision (20%)	1,580 sqm	

Greenery Provision		
	TPOMP	**Tai Wo Road**
At-grade Planting	~1685 sqm	~185 sqm
Roof Greening	~450 sqm	N/A
Vertical Greening	~700 sqm	N/A
Total	**~3,020 sqm (38%)**	
Attaining the minimum total Greenery Areas	**YES >20%**	

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

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SCALE 比例
A3 1:750

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

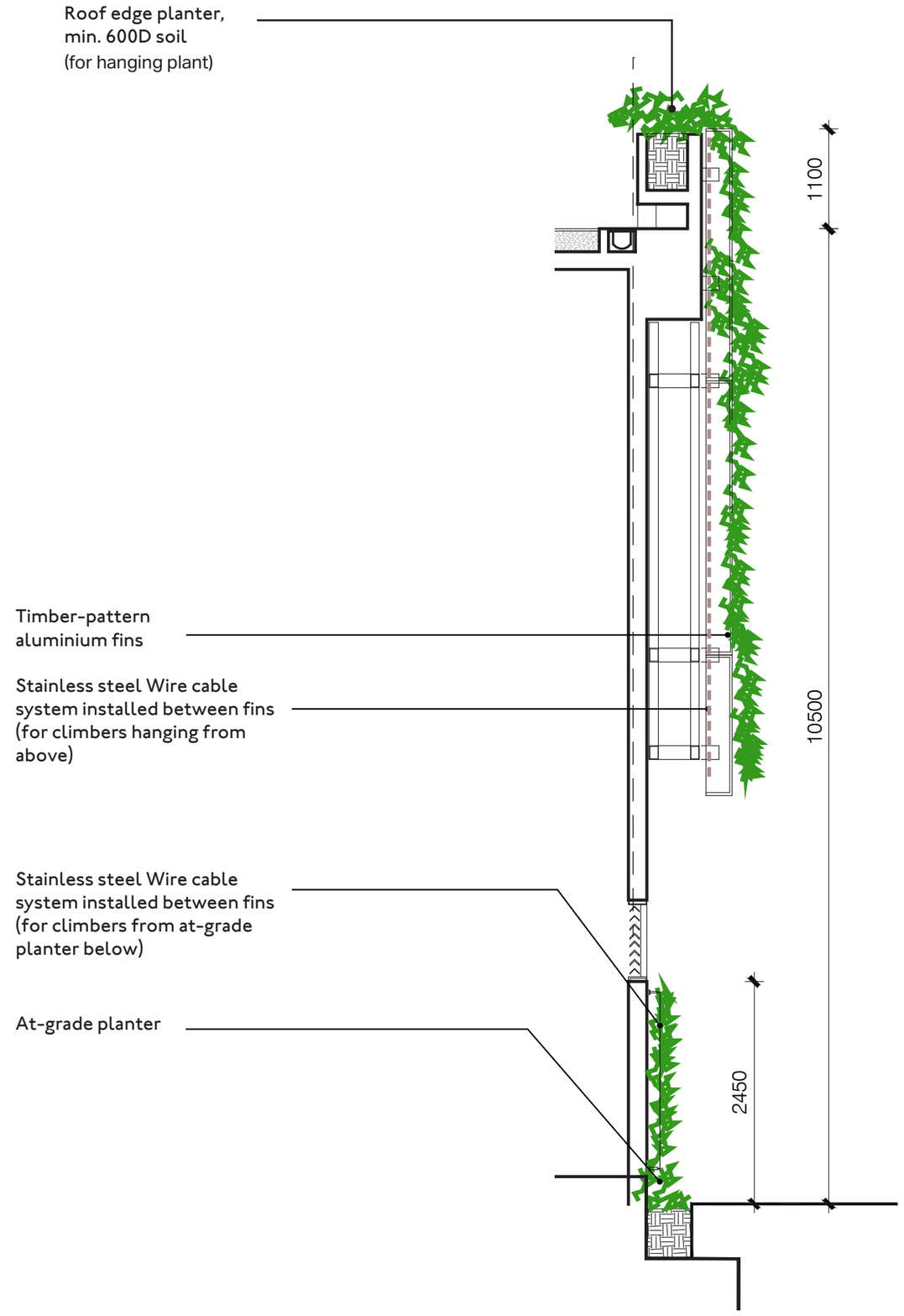
PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE 圖紙名稱
GREENERY PROVISION

SHEET NUMBER 圖紙編號
FIGURE 3.2.5

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm



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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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SCALE 比例
AS SHOWN

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

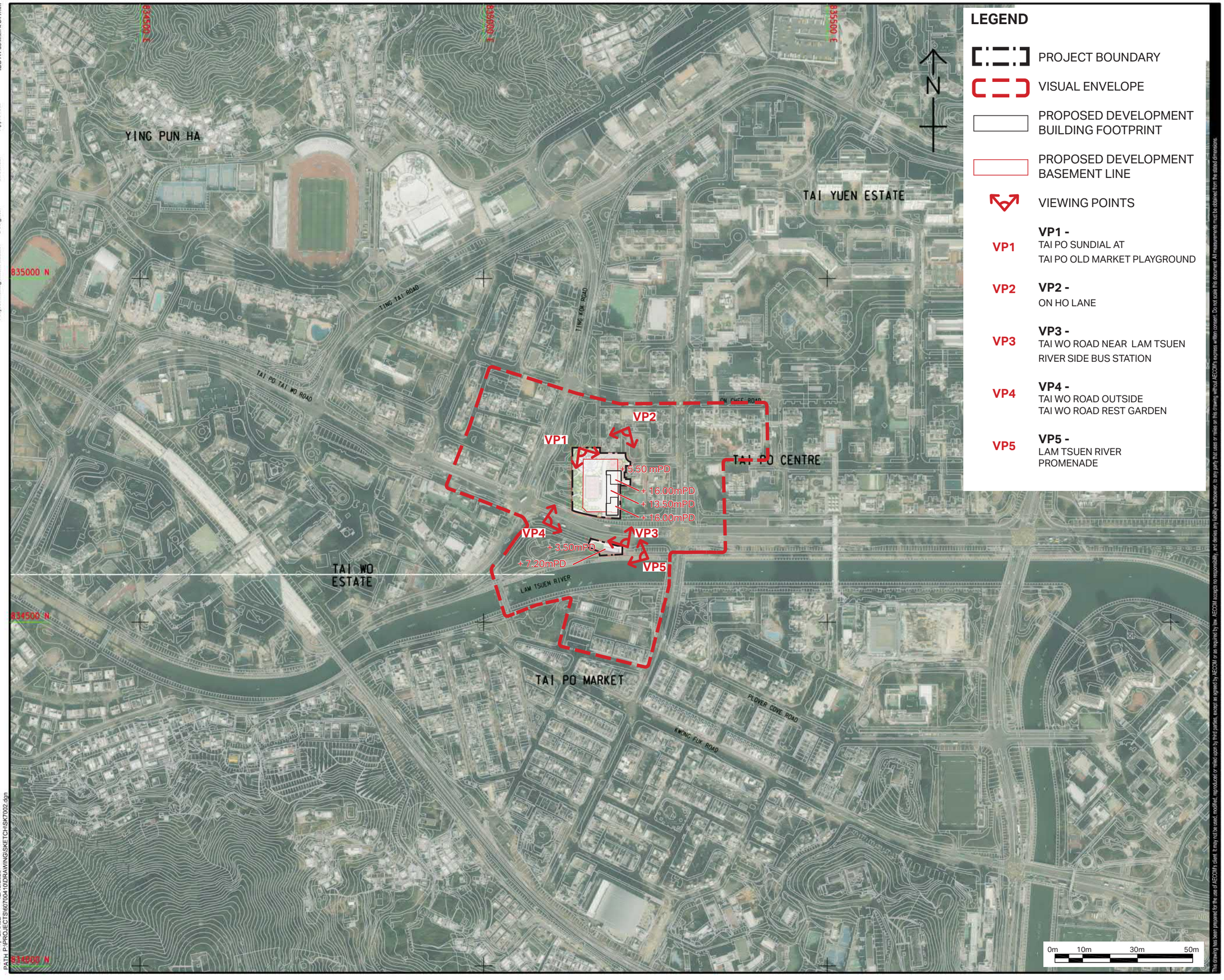
CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

PROPOSED VERTICAL GREENING SYSTEM - TYPICAL SECTION

SHEET NUMBER
圖紙編號

FIGURE 3.2.6



LEGEND

- PROJECT BOUNDARY
- VISUAL ENVELOPE
- PROPOSED DEVELOPMENT BUILDING FOOTPRINT
- PROPOSED DEVELOPMENT BASEMENT LINE
- VIEWING POINTS

VP1	**VP1 -** TAI PO SUNDIAL AT TAI PO OLD MARKET PLAYGROUND
VP2	**VP2 -** ON HO LANE
VP3	**VP3 -** TAI WO ROAD NEAR LAM TSUEN RIVER SIDE BUS STATION
VP4	**VP4 -** TAI WO ROAD OUTSIDE TAI WO ROAD REST GARDEN
VP5	**VP5 -** LAM TSUEN RIVER PROMENADE

AECOM

PROJECT
DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
渠務署 Drainage Services Department

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I/R	DATE	DESCRIPTION	CHK.

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SCALE A1 1 : 2500
DIMENSION UNIT METRES

KEY PLAN

PROJECT NO. 60700410
CONTRACT NO. CE 57/2022 (DS)

SHEET TITLE
SITE LOCATION WITH VIEWING POINTS AND VIUSAL ENVELOPE

SHEET NUMBER
FIGURE 3.2.7

ISO A1 594mm x 841mm
Approved:
Checked:
Designer:
Project Management Initials:
Plot File by: LIANJ2 12/19/2023
PATH: P:\PROJECTS\60700410\DRAWINGS\SKETCH\SK7002.dgn

ISO A1 594mm x 841mm

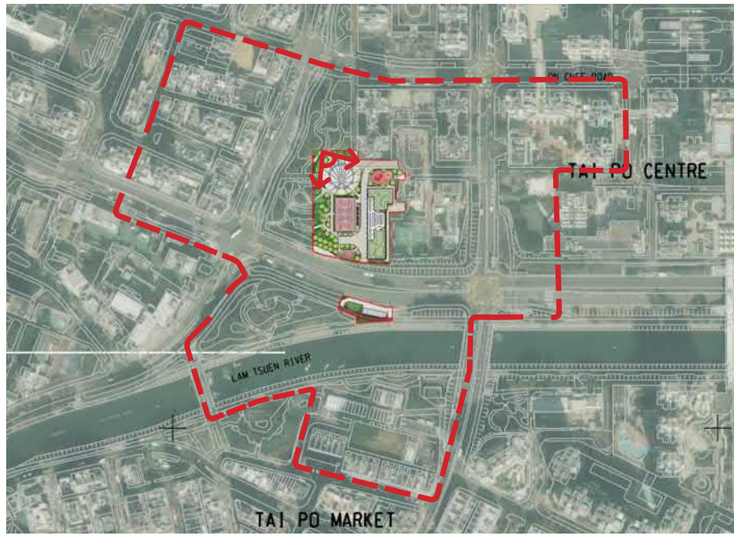
Approved:

Checked:

Designer:

Project Management Initials:

KEY PLAN



Tai Po Old Market Public School

Tai Po Old Market Playground Public Toilet

Tai Po Sundial

BEFORE

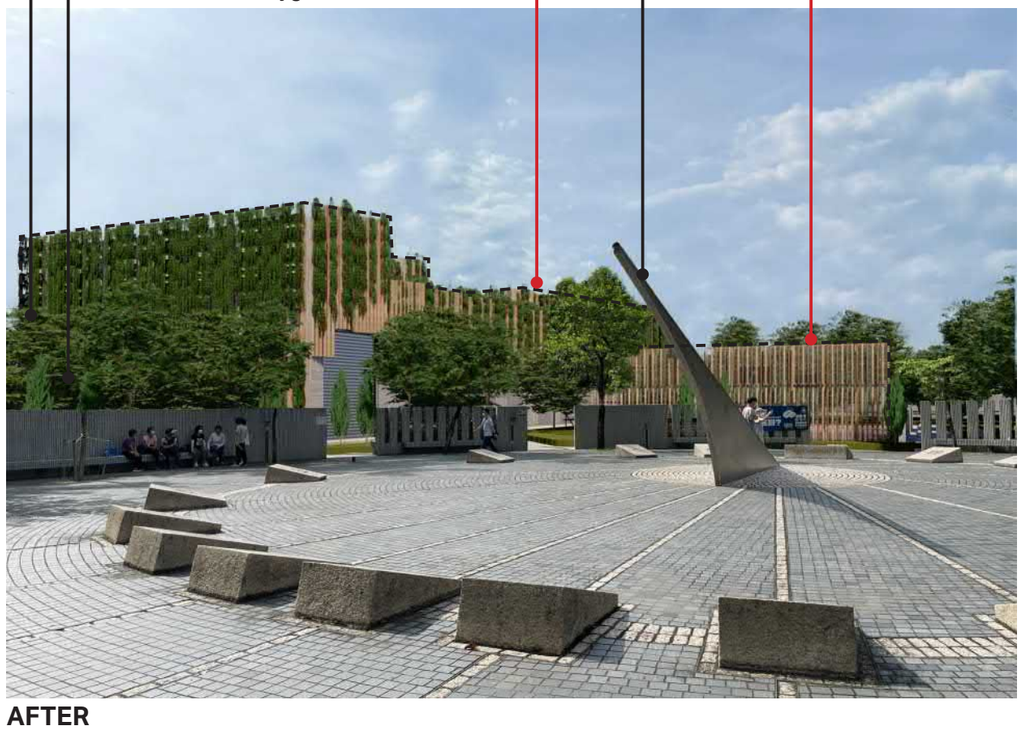
Tai Po Old Market Public School

Tai Po Old Market Playground Public Toilet

Proposed Stormwater Pumping Station

Tai Po Sundial

Proposed Basketball Court Backstop



AFTER

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PROJECT
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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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階段

SCALE 比例
N.T.S.

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

PHOTOMONTAGE OF VP1 –
TAI PO SUNDIAL AT
TAI PO OLD MARKET PLAYGROUND

SHEET NUMBER
圖紙編號

FIGURE 3.2.8

ISO A1 594mm x 841mm

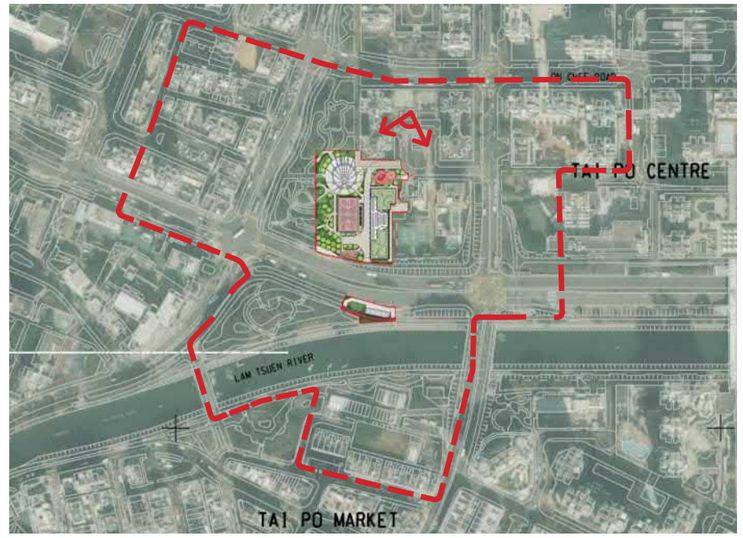
Approved:

Checked:

Designer:

Project Management Initials:

KEY PLAN



Tai Po Old Market Playground
Existing Public Toilet and Office

On Ho Lane

Eightland Garden

BEFORE

Tai Po Old Market Playground
Existing Public Toilet and Office

Proposed Stormwater Pumping Station

On Ho Lane

Eightland Garden

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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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METRES

KEY PLAN
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60700410

CONTRACT NO. 合約編號
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SHEET TITLE
圖紙名稱

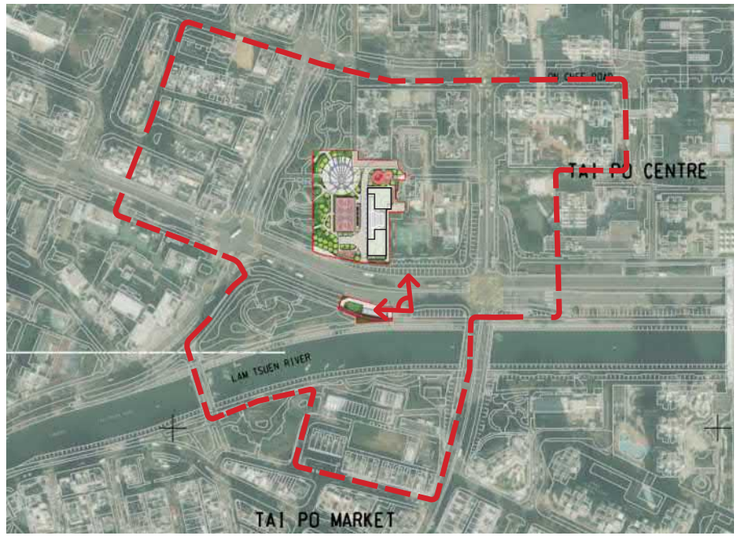
PHOTOMONTAGE OF VP2 – ON HO LANE

SHEET NUMBER
圖紙編號

FIGURE 3.2.9

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

KEY PLAN



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METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

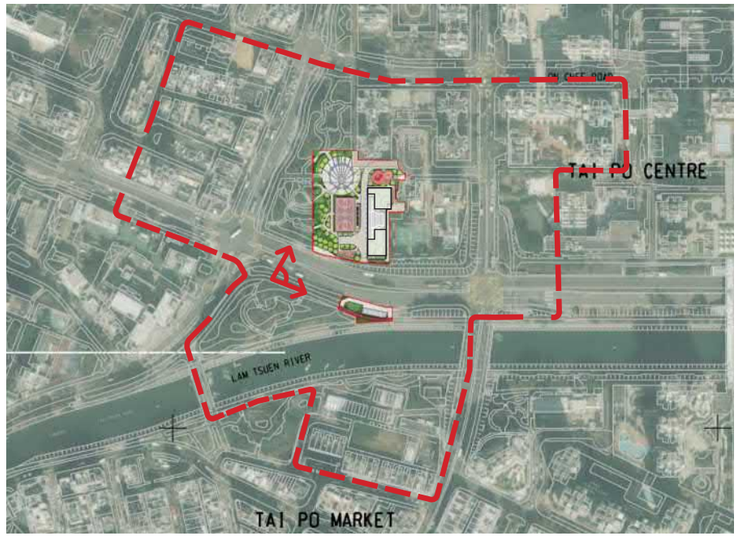
PHOTOMONTAGE OF VP3 - TAI PO TAI WO ROAD NEAR LAM TSUEN RIVER SIDE BUS STATION

SHEET NUMBER 圖紙編號

FIGURE 3.2.10

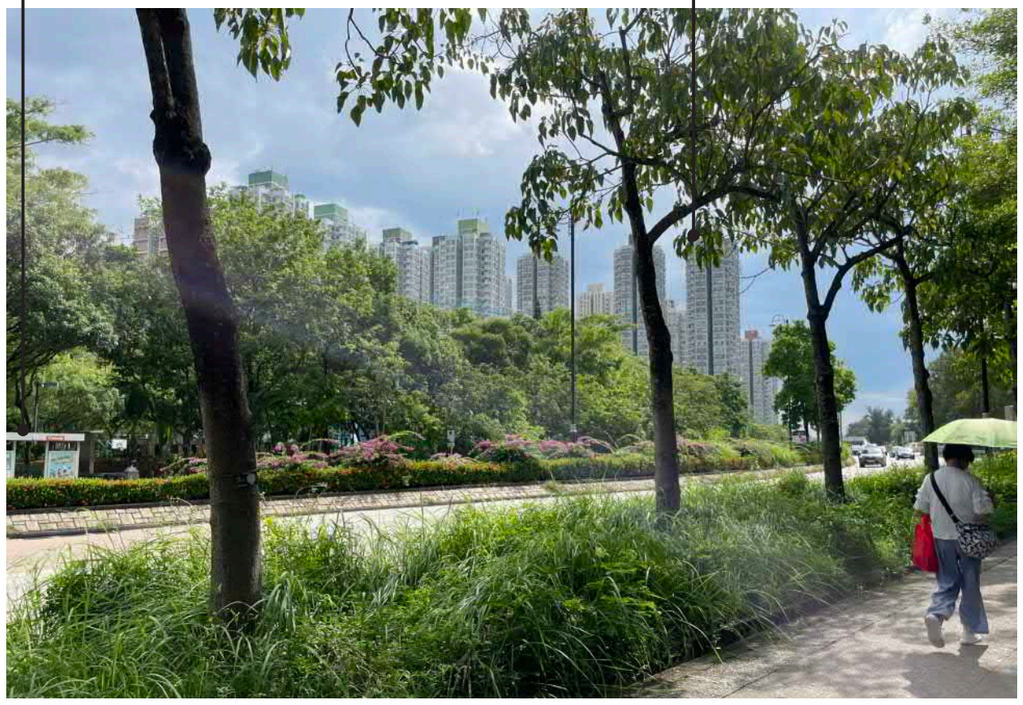
Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

KEY PLAN



Tai Po Old Market
Park Bus Station

Fortune
Plaza



BEFORE

Tai Po Old Market
Park Bus Station

Proposed Stormwater Pumping Station

Fortune
Plaza

AFTER

AECOM

PROJECT
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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

PHOTOMONTAGE OF VP4 - TAI PO TAI WO ROAD OUTSIDE TAI WO ROAD REST GARDEN

SHEET NUMBER
圖紙編號

FIGURE 3.2.11

ISO A1 594mm x 841mm

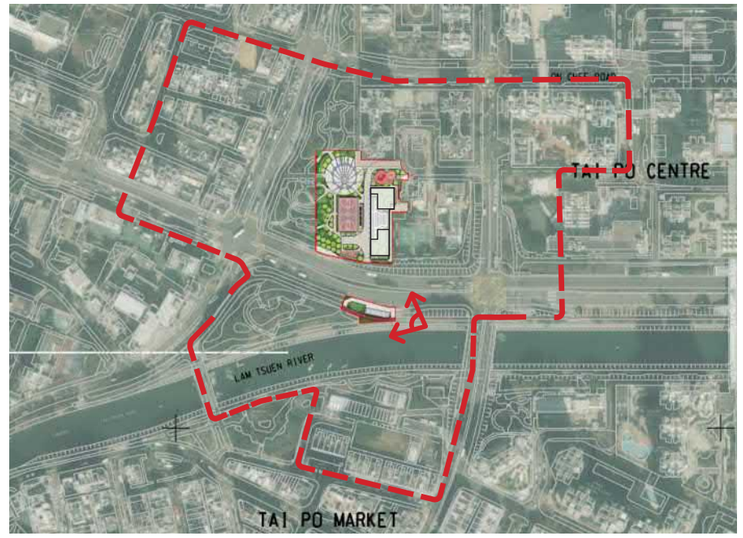
Approved:

Checked:

Designer:

Project Management Initials:

KEY PLAN



BEFORE

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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE 圖紙名稱
PHOTOMONTAGE OF VP6 - LAM TSUEN RIVER PROMENADE

SHEET NUMBER 圖紙編號
FIGURE 3.2.12

Appendix D – Tree Preservation and Removal Proposal

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Agreement No. CE57/2022(DS)
Drainage Improvement Works in Tai Po – Design and Construction

Draft Tree Preservation and Removal Proposal – Tai Po Old Market Playground Stormwater Pumping Station and Discharge Chamber

Table of Contents

1 INTRODUCTION

1.1 Background

1.1.1 The Review of Drainage Master Plan in Tai Po – Feasibility study and the Review of Drainage Master Plan in Sha Tin and Sai Kung – Feasibility Study (the DMP Review Study) identified that some areas in Tai Po, Lam Tsuen, Ting Kok and Ma On Shan would be subject to high flood risks.

1.1.2 The flooding incidents reported in the areas of Tai Po Old Market and Tai Po Market on 22 July 2010, Lam Tsuen Valley on 19 October 2016, and Ting Kok and Sai Sha Road on 18 July 2017 are some examples to substantiate the above findings.

1.1.3 To relieve the flood risk, the Study proposed various drainage improvement measures in these areas, the DMP Review Study has proposed by adopting drainage improvement measures in a combination of stormwater pumping scheme and associated drainage upgrading and river training works. Upon completion of the project, the flood risks in the areas can be significantly reduced.

1.1.4 In May 2018, Development Bureau (DEVB) signed out a Project Definition Statement (PDS) to justify and define the scope of the "Drainage Improvement Works in Tai Po". The Drainage Services Department (DSD) then completed a Technical Feasibility Statement (TFS) confirming its technical feasibility. The TFS was subsequently approved by DEVB in August 2018. The project was included into Cat B under PWP No. 4183CD in September 2018.

1.1.5 In January 2020, the DSD commissioned Agreement No. CE 11/2019(DS) "Drainage Improvement Works in Tai Po – Investigation" (referred to hereinafter as the "Investigation Study") to carry out various reviews, surveys, investigation, impact assessments and preliminary design for the Project.

1.1.6 AECOM Asia Company Limited was appointed by DSD on 13 January 2023 to undertake Agreement No. CE 57/2022 (DS) "Drainage Improvement Works in Tai Po – Design and Construction" (referred to hereinafter as "the Project", of which the starting date of the Project is 26 January 2023. The Project comprises the drainage improvement works as briefly described in the following:

(a) Stormwater pumping scheme in Tai Po Old Market, including an underground storage tank, a pump house and the associated pipeworks and E&M works in Tai Po Old Market Playground, as well as the drainage upgrading works in Tai Po Tai Wo Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Ting Kok Road, Mei Sun Lane and Kau Hui Chik Street, floodwall modification and new floodwall along Lam Tsuen River and ancillary works including temporary relocation and reinstatement of playgrounds and associated facilities;

(b) Expansion of existing Tai Po Market Floodwater Pumping Station, including upgrading of existing pump house and the associated pipeworks and E&M works, as well as the drainage upgrading works in Tsing Yuen Street, Wai Yan Street, Pak Shing Street, Fu Shin Street, Yan Hing Street, Kwong Fuk Bridge Garden, Plover Cove Road, Tung Cheong Street, cycle track and footpath along southside of Lower Lam Tsuen River (between existing pumping station and elevated walkway at Tai Po Centre (structure no. NF97);

(c) Drainage upgrading works at Tai Mei Tuk, Ng Uk Tsuen, Ting Kok Shan Liu, Po Sam Pai, Ma Po Mei, San Uk Pai, Ping Long, Che Ha, Nam Hang and Tsung Tsai Yuen and Sai Sha Road (sections near Sai O, Kwun Hang, Tai Tung and Sai Keng); and

(d) River training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Sha Pa and She Shan River.

1.2 Scope of this Report

1.2.1 The Consultant would carry out a comprehensive survey of all existing trees within the project area and identify with reference to DEVB TCW No. 6/2015, No. 4/2020 and 5/2020 and DSD TC No. 4/2015. Drawings showing the location and size of the trees together with a tree schedule showing the species, height, circumference of trunk, tree spread, general condition and photographs would be prepared. The number of trees to be retained, transplanted or felled due to the proposed works would be presented in the report and indicated in the drawings. The report would be submitted to the Tree Works Vetting Panel (TWVP) as required in accordance with the aforementioned technical circulars.

1.2.2 Following this introductory section, the remainder of this Report for **Tree Preservation and Removal Proposal** is structured as follows:

Section 2 describes legislations, standards and guidelines related to tree survey and tree preservation and removal proposal; and

Section 3 illustrates the tree survey methodology; and

Section 4 presents the tree preservation, transplanting and removal proposals; and

Section 5 presents the compensatory tree planting proposal; and

Section 6 summarises the findings of the report.

2 LEGISLATIONS, STANDARDS AND GUIDLEINES

2.1 Government Publications, Guidelines and Reports

2.1.1 Government Publications, Guidelines and Reports related to Tree Survey, Preservation and Removal Proposals include:

- Agriculture, Fisheries and Conservation Department – AFCD Nature Conservation Practice Note No. 1 – Clearing Mikania
- Agriculture, Fisheries and Conservation Department – AFCD Nature Conservation Practice Note No. 2 – Measurement of Diameter at Breast Height (DBH)
- Agriculture, Fisheries and Conservation Department – AFCD Nature Conservation Practice Note No. 3 – The Use of Plant Names
- Civil Engineering and Development (2020) – General Specifications for Civil Engineering Works, Sections 3 and 26
- Civil Engineering and Development (2022) – Project Administration Handbook, Chapters 1 and 4
- Guidelines for Tree Risk Assessment and Management Arrangement promulgated by Development Bureau – latest edition
- GEO Publication No. 1/2011 – Technical Guidelines on Landscape Treatment for Slopes
- GEO Report No. 183 (2006) – Performance Assessment of Greening Techniques on Slopes
- GEO Special Project Report No. SPR 7/2004 (2004) – Identification of Suitable Vegetation Species for Use on Man-made Slopes
- Input Guideline - HyD Slope Vegetation (SVI) Records
- HyD TC No. 10/2001 – Visibility of Directional Signs
- HyD HQ/GN/13 – Interim Guidelines for Tree Transplanting Works under Highways Department's Vegetation Maintenance Ambit
- HyD HQ/GN/15 – Guidelines for Greening Works along Highways
- HyD RD/GN/44 – Guidance Notes on Design and Construction of Pavements with Paving Units
- Requirements for Handover of Vegetation to Highways Department
- Latest General Requirement of Roadside Landscape Areas to be Handed over to LCSD
- Tree Management Practice Note No. 3 – Tree Pruning
- Guidelines on Soil Improvement issued by GTLMS, DEVB
- Guidelines on Soil Volume for Urban Trees issued by GTLMS, DEVB
- Guiding Principles on Use of Native Plant Species in Public Works Projects issued by GTLMS, DEVB
- Street Tree Selection Guide issued by GTLMS, DEVB
- CEDD's Greening Master Plan
- Guidelines on Handling Yard Wase for Recycling issued by EPD
- Disposal and Guidelines on Yard Waste Reduction and Treatment issued by GTLMS, DEVB
- "Guidelines on Tree Preservation during Development", GLTMS of DEVB
- "Guidelines on Tree Transplanting", GLTMS of DEVB
- Proper Planting Practices and other relevant guidelines issued by GLTMS of DEVB

2.2 Technical Circulars

2.2.1 Government Publications, Guidelines and Reports related to Tree Survey, Preservation and Removal Proposals include:

- ETWB TCW No. 13/2003A – Guidelines and Procedures for Environmental Impact Assessment of Government Projects and Proposals Planning for Provision of Noise Barriers
- ETWB TC(W) No. 14/2004 – Maintenance of Stormwater Drainage System and Natural Watercourses
- ETWB TC(W) No. 5/2005 – Protection of Natural Streams/Rivers from Adverse Impacts Arising from Construction Works
- DEVB TC(W) No. 2/2012 - Allocation of Space for Quality Greening on Roads.
- DEVB TC(W) No. 3/2012 - Site Coverage of Greenery for Government Building Projects.
- DEVB TC(W) No. 6/2015 – Maintenance of Vegetation and Hard Landscape Features
- DEVB TC(W) No. 5/2017 – Community Involvement in Greening Works
- DEVB TC(W) No. 1/2018 – Soft Landscape Provisions for Highway Structures
- DEVB TC(W) No. 4/2020 – Tree Preservation
- DEVB TC(W) No. 5/2020 – Registration of Old and Valuable Trees, and Guidelines for their Preservation
- CEDD TC No. 6/2014 – Vetting Committee on Slope Appearance
- CEDD TC No. 6/2020 – Reporting of Incidents on CEDD Works Sites
- Design Technical Guideline No. 17 of CEDD, Tree Preservation for Slope Works
- GEO Publication No. 1/2011- Technical Guidelines on Landscape Treatment for Slopes
- CEDD TC No. 3/2022 – Tree Works Vetting Panels

2.3 Ordinances and Regulations

2.3.1 Ordinances and Regulations related to Tree Survey, Preservation and Removal Proposals include:

- Forests and Countryside Ordinance (Cap. 96) and its subsidiary legislations
- Plant Varieties Protection Ordinance (Cap. 490)

- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)
- Environmental Impact Assessment Ordinance (Cap.499)
- Pesticides Ordinance (Cap.133) and its subsidiary legislation and Pesticides Regulations
- Wild Animal Protection Ordinance (Cap. 170)
- Plant (Importation and Pest Control) Ordinance (Cap. 207)

3 TREE SURVEY METHODOLOGY

3.1 Individual Tree Survey

3.1.1 In accordance with DEVB TCW No. 4/2020, all existing individual trees with a trunk diameter larger than 95mm (300mm girth) measured 1300mm above ground level are surveyed and identified with the following information recorded:

(a) Drawing: Drawing where the individual tree can be found

(b) Tree No. : Individual trees as being number labelled on site and marked on site and denoted correspondingly on the plan

(c) Photo No. : The photograph reference number of the tree being identified

(d) Species: Latin and Chinese names of the trees surveyed

(e) Tree size:

(i) Overall Height: Height measured from ground level to the top branch

(ii) Trunk Diameter (DBH): Diameter of the main trunk measured at 1.3m high above ground level

(iii) Average Crown Spread: Average diameter of the foliage canopy

(f) Amenity Value of a tree should be assessed by its functional values for shade, shelter, screening, reduction of pollution and noise and also its fung shui significance, and classified into the following categories:

(i) High (H) - important trees which should be retained by adjusting the design layout accordingly;

(ii) Medium (M) - trees that are desirable to be retained in order to create a pleasant environment, which includes healthy specimens of lesser importance than “Good” trees;

(iii) Low (L) - trees that are dead, dying or potentially hazardous and should be removed.

(g) Form:

(i) Good (G) - Well-balanced crown and straight strong trunk(s);

(ii) Average (A) - Slightly unbalanced crown and non-straight trunk(s); and

(iii) Poor (P) - Misshapen or awkwardly-forked trunk and / or unbalanced crown.

(h) Health:

(i) Good (G) - Sound and healthy trees;

(ii) Average (A) - Trees which are with few or no visible defects or health problem; and

(iii) Poor (P) - Rot and / or cavities in the main trunk and / or crown die back, severely infected with disease.

(i) Structural Condition:

(i) Good (G) - Trees with no or little sign of structural defect and would have low risk level of potential failure;

(ii) Average (A) - Trees with moderate sign of structural defect and would have medium risk level of potential failure; and

(iii) Poor (P) - Trees with significant and obvious sign of structural defect and would have high risk level of potential failure.

(j) Suitability for Transplanting: Assess the suitability of affected trees be transplanted taken into account of the following factors:

- conditions of the tree to be transplanted (including form, health and structure which will affect success of the proposed transplanting);
- size, species, and conservation status of the tree to be transplanted;
- availability and suitability of a permanent receptor site, both within and outside the project site;
- adequate time for preparation of transplanting operation;
- identification of a long-term maintenance party for the transplanted tree(s);
- access to the existing location and transportation to the receptor site (including availability of access to accommodate the tree, topography of the proposed route, engineering limitations, etc.); and
- cost-effectiveness.

Trees with the following features should not be considered suitable for transplanting under normal circumstances:

- low amenity value;
- irrecoverable form after transplanting (e.g. if substantial crown and root pruning are necessary to facilitate the transplanting);
- low survival rate after transplanting;
- very large size (unless the feasibility to transplant has been considered financially reasonable and technically feasible during the feasibility stage);
- with evidence of over-maturity and onset of senescence;
- with poor health, structure or form (e.g. imbalanced form, leaning, with major cavity/cracks/splits);
- undesirable species (e.g. *Leucaena leucocephala* which is an invasive exotic tree); or
- trees grown under poor conditions which have limited the formation of proper root ball necessary for transplanting (e.g. on steep slope).

Having considered the above factors and features of the trees, trees are assessed as follows:

(i) High - Trees are highly suitable for transplanting

(ii) Medium - Trees are moderately suitable for transplanting

(iii) Low – Trees are not suitable for transplanting

(k) Conservation Status: State the rarity and protection status of the species under relevant ordinances in Hong Kong. References such as Rare and Precious Plants of Hong Kong, the China Plant Red Data Book, the Protection of Endangered Species of Animals and Plants Ordinance (Cap 586) and the Forests and Countryside Ordinance (Cap. 96) are used.

(l) Recommendation: Proposed action for individual species which fall into three categories:

(i) Retain

(ii) Transplant

(iii) Remove

(m) Maintenance Department to Provide Comments on TPRP (Before/After)

(n) Justification: Proposed works which justify the recommendation.

(o) Additional Remarks: Supplementary note towards the assessment.

3.1.2 Trees of particular interest shall satisfy one or more of the following criteria in accordance with the Guidelines for Tree Risk Assessment and Management Arrangement promulgated by DEVB:

OVTs and trees that are potentially registerable in the Register of OVTs;

Trees of 100 years old or above;

Trees with trunk diameter equal to or exceeding 1.0 m (measured at 1.3 m above ground level), or with height/canopy spread equal to or exceeding 25 m;

Stonewall trees or trees of outstanding form (taking account of overall tree sizes, shape and any special features;

Rare tree species listed in “Rare and Precious Plants of Hong Kong” (http://herbarium.gov.hk/PublicationsPreface.aspx?BookNameId=1) published by Agriculture, Fisheries and Conservation Department;

Endangered plant species protected under the Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)

Tree species listed in the Forestry Regulations (Cap. 96A) under the Forests and Countryside Ordinance (Cap. 96)

Well-known Fung Shui trees

Landmark trees with evidential records to support the historical or cultural significance of the trees

Trees which may arouse widespread public concerns

Trees which may be subject to strong local objections on removal

4 TREE SURVEY FINDINGS AND RECOMMENDATIONS

4.1 Tree Survey Plans

4.1.1 The tree survey and subsequent proposed treatment are in accordance to criteria as stipulated in DEVB TC(W) No. 4/2020.

4.1.2 In order to determine whether or not the existing trees will be affected by the proposed works, reference has been made to the latest design layout. Please refer to General Project Layout Plan enclosed in **Appendix I** and Tree Survey and Treatment Plan enclosed in **Appendix II**.

4.1.3 Total 169 nos. of existing trees are surveyed, where are located within the existing Tai Po Old Market Playground and the Feature No. 7NW-B/F 193. The tree species recorded are mostly common species in Hong Kong, including but not limited to *Cinnamomum camphora*, *Ficus benjamina* and *Bauhinia x blakeana*. There are 29 species identified, their height ranges from 3m to 16m; crown spread from 0.5m to 18m; and DBH from 100mm to 950mm. They are generally poor - average in form, health & structural condition; and low - medium in amenity value. Please refer to their detail condition and remarks in Tree Assessment Schedule enclosed in **Appendix III**.

Old and Valuable Trees (OVTs) & Trees of Particular Interest (TPIs)

4.1.4 No Old and Valuable Trees (OVT) is identified within survey boundary. 1 no. of Trees of Particular Interest (TPIs) is identified within survey boundary. T354 (*Dalbergia assamica*) is identified as TPI as it is protected under Cap. 586.

4.2 Tree Preservation, Transplanting and Removal Proposals

4.2.1 Any trees surveyed which are in conflict with the proposed works will be proposed to be transplanted or removed. Justifications and remarks for affected trees are summarized in the Tree Assessment Schedule enclosed in **Appendix III**. Please refer to Photographic Record enclosed in **Appendix IV** for their detail images.

4.2.2 The summary of tree survey and treatment recommendations is shown in **Table 4.1** and the summary of tree species in terms of quantity and proposed treatment is shown in **Table 4.2**. The summary of proposed maintenance party of the proposed compensatory trees is shown in **Table 4.3.**

Tree Preservation & Removal Proposal

4.2.3 There is total 35 nos. of trees to be retained. Retained trees shall not be affected by proposed works and should be preserved in-situ on site. During construction period, retained trees will be protected from impact and construction activity as per General Specification for Civil Engineering Works (2020 Edition), Section 26 Preservation and Protection of Trees. **Tree Survey and Treatment Plan, Tree Protection Plan** in **Appendix II**.

4.2.4 On the other hand, trees to be affected are due to proposed excavation works and direct conflict to proposed structure. 134 nos. of trees cannot be retained in-situ due to excavation work within the site boundary. 133 nos. of trees are recommended to be removed and 1 no. of tree is recommended to be transplanted.

4.2.5 There is one TPI found, T354 *Dalbergia assamica* is under Cap. 586, will not be affected by the proposed works, will be retained in-situ.

Table 4.1 Summary of Tree Survey and Treatment Recommendations

Department to provide expert advice	Total Trees Surveyed	Trees to be Retained	Trees to be Removed	Trees to be Transplanted
LCSD	169	35	133	1
Total	**169**	**35**	**133**	**1**

Table 4.2 Summary of Tree Species and their Proposed Treatment in terms of Quantity

Venue	Botanical Name	Chinese Name	No. of Trees to be Removed	No. of Trees to be Retained	No. of Trees to be Transplanted	Total No.
Tai Po Old Market Playground	*Acacia confusa*	台灣相思	7	-	-	7
	Archontophoenix alexandrae	假檳榔	6	11	-	17
	Bauhinia variegata	宮粉羊蹄甲	1	-	-	1
	Bauhinia x *blakeana*	洋紫荊	17	2	-	19
	Caryota mitis	短穗魚尾葵	-	4	-	4
	Cassia fistula	臘腸樹	6	-	-	6
	Chukrasia tabularis	麻楝	-	2	-	2
	Cinnamomum camphora	樟	20	1	-	21
	Delonix regia	鳳凰木	5	-	-	5
	Dracontomelon duperreanum	人面子	-	1	-	1
	Dypsis lutescens	散尾葵	9	5	-	14
	Ficus benjamina	垂葉榕	23	--	-	23
	Ficus elastica	印度榕	2	-	-	2
	Ficus microcarpa	細葉榕	-	1	-	1
	Ficus virens	大葉榕	1	-	-	1
	Juniperus chinensis	圓柏	3	-	-	3
	Liquidambar formosana	楓香	-	1	-	1
	Livistona chinensis	蒲葵	-	2	-	2
	Lophostemon confertus	紅膠木	10	-	-	10
	Michelia × alba	白蘭	-	1	-	1
	Phoenix roebelenii	日本葵	-	2	-	2
	Plumeria rubra	雞蛋花	9	-	-	9
	Ravenala madagascariensis	旅人蕉	5	-	-	5
	Syagrus romanzoffiana	皇后葵	3	-	-	3
	Dead tree	死樹	1	-	-	1
Feature No. 7NW-B/F 193	*Albizia lebbeck*	大葉合歡	-	1	-	1
	Bischofia javanica	秋楓	-	-	1	1
	Celtis sinensis	朴樹	1	-	-	1
	*Dalbergia assamica**	南嶺黃檀	-	1	-	1
	Melaleuca cajuputi subsp. cumingiana	白千層	4	-	-	4
Total			**133**	**35**	**1**	**169**

*Tree of Particular Interest (DBH>1m and protected under Cap. 586)

Table 4.3 Summary of Proposed Maintenance Party of the Proposed Compensatory Trees

Department to Maintain proposed compensatory trees	LCSD	Total
Number of Compensatory Trees	133	133

Tree Transplanting Proposal

4.2.6 Among the trees affected by proposed works, trees are selected as far as possible for transplanting to reduce the impact on existing trees. The preparation of Tree Transplanting Proposal follows the Guidelines on Tree Transplanting issued by GLTM Section of DEVB. Transplanting should be considered as far as possible unless the trees affected are of low conservation and amenity value, or have a low chance of surviving or recovering to its normal form after transplanting. If the trees to be transplanted to other permanent locations within site are not possible, transplant the trees to a permanent location off site. Location of receptor site should preferably be within the same area for retention of amenity value in the vicinity.

4.2.7 Total 1 no. of tree is proposed to be transplanted within site, that are average in form, health and structural condition with medium suitability for transplanting.

4.2.8 A cost-effective transplanting strategy should be established at the Construction Phase of the Project, methodology shall be suggested and transplanting works to be implemented by the contractor. Transplanted tree is recommended to be relocated to final location without the use of Holding Nursery under single handling where possible subject to the sequence of construction of the works. This will minimize the cost and ensure the better survival of the trees after transplanting. However, if single transplanting handling is not possible, the transplanted trees shall be translocated to a holding nursery before the commencement of the engineering works; and will be replanted back to the receptor sites once the engineering works are completed.

5 COMPENSATORY TREE PLANTING PROPOSALS

5.1 Compensatory Planting Proposal

5.1.1 Any trees to be removed under the Project shall be compensated in accordance with DEVB TC(W) No. 4/2020 – Tree Preservation.

5.1.2 According to previous section, 133 nos. of existing trees are proposed to be removed due to direct conflict with proposed works and compensatory planting in a ratio of 1:1 in terms of number to be achieved as far as possible.

5.1.3 The compensatory of 133 nos. trees are proposed within the project site. Space for tree compensation within the Site Boundary has been explored as much as possible.

5.1.4 Please refer to **Table 5.1** for their indicative size, species and other specification; and **Appendix V – Compensatory Tree Planting Plan** for the detailed location of the compensatory trees proposed within project boundary.

5.1.5 Sufficient space shall be provided for the planting of new trees taking into the account the adequate space required to cater for the establishment and healthy growth of the trees up to maturity. The following table shows the suggested tree species which are referenced to “Theme Plants for Tai Po” of Greening Master Plan (GMP) by CEDD and Street Tree Selection Guide (STSG) by DEVB.

5.1.6 12 months establishment period by project department shall be provided for any planting to be handed over to LCSD.

Table 5.1 Summary of Compensatory Indictive Tree Planting List (On-Site)

Abbreviation	Botanical Name	Chinese Name	Size (mm)	Spacing (mm)	Remarks	Quantity
BRA. ACE.	*Brachychiton acerifolius*	槭葉蘋婆	Heavy Standard: 4000 x 1500	5000	GMP & STSG	7 Nos.
CIN. CAM.	*Cinnamomum camphora*	樟樹	Heavy Standard: 4500 x 2500	5000	Native & GMP	11 Nos.
GAR. SUB.	*Garcinia subelliptica* #	菲島福木	Standard: 2750 x 1000	1500	GMP & STSG	50 Nos.
JUN. CHI.	*Juniperus chinensis ‘Kaizuca’* #	龍柏	Standard: 2750 x 800	1500	GMP & STSG	32 Nos.
PLU.RUB.	*Plumeria rubra*	紅雞蛋花	Standard: 2750 x 1500	5000	GMP & STSG	7 Nos
STE. LAN.	*Sterculia lanceolata*	假蘋婆	Heavy Standard: 4000 x 1500	5000	Native & GMP	8 Nos.
TAB. PEN.	*Tabebuia pentaphylla*	紅花風鈴木	Heavy Standard: 4000 x 2000	5000	GMP	12 Nos.
WOD.BIF	*Wodyetia bifurcata*	狐尾椰子	3000 x 2000	5000	GMP & STSG	6 Nos
				Total Number of Compensatory Trees		**133 Nos.**

Spacing and size are proposed for hedge planting and to achieve the compensation ratio of 1:1 in terms of quantity within the limited space available on site, in accordance to DEVB TC(W) 4/2020 – Tree Preservation.

6 CONCLUSION

6.1.1 In summary, 169 nos. of trees have been surveyed within project site, of which 35 nos. of trees are proposed to be retained; 133 nos. of trees are proposed to be removed; while 1 no. of tree is proposed to be transplanted. To compensate the loss of existing trees, 133 nos. of standard and heavy standard compensatory trees are proposed in available planting area within site.

Appendix I

General Project Layout Plan

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

PROPOSED MAINTENANCE ACCESS

PROPOSED TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION

EXISTING PUBLIC TOILET AND LCSD OFFICE TO BE RETAINED

PROPOSED ABOVEGROUND STRUCTURES

DISCHARGE CHAMBER

LEGEND:

- PROPOSED STORMWATER DRAIN
- PROPOSED DRAIN TO BE CONSTRUCTED BY PIPE JACKING
- PROPOSED RISING MAINS TO BE CONSTRUCTED BY PIPE JACKING
- EXISTING STORMWATER DRAIN
- EXISTING PIPE AND MANHOLE TO BE ABANDONED
- EXISTING STORMWATER DRAIN
- APPLICATION BOUNDARY
- EXISTING STORMWATER MANHOLE
- PROPOSED STORMWATER MANHOLE
- EXISTING STORMWATER MANHOLE TO BE RECONSTRUCTED
- EXISTING REGISTERED FEATURES

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

PROPOSED TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION

SHEET NUMBER
圖紙編號

60700410/R28/402

Plot File by: iu.yang 2024/1/29
PATH: P:\PROJECTS\60700410\DRAWING\REPORT\R28\R28_402.dgn

Appendix II

Tree Survey and Treatment Plan

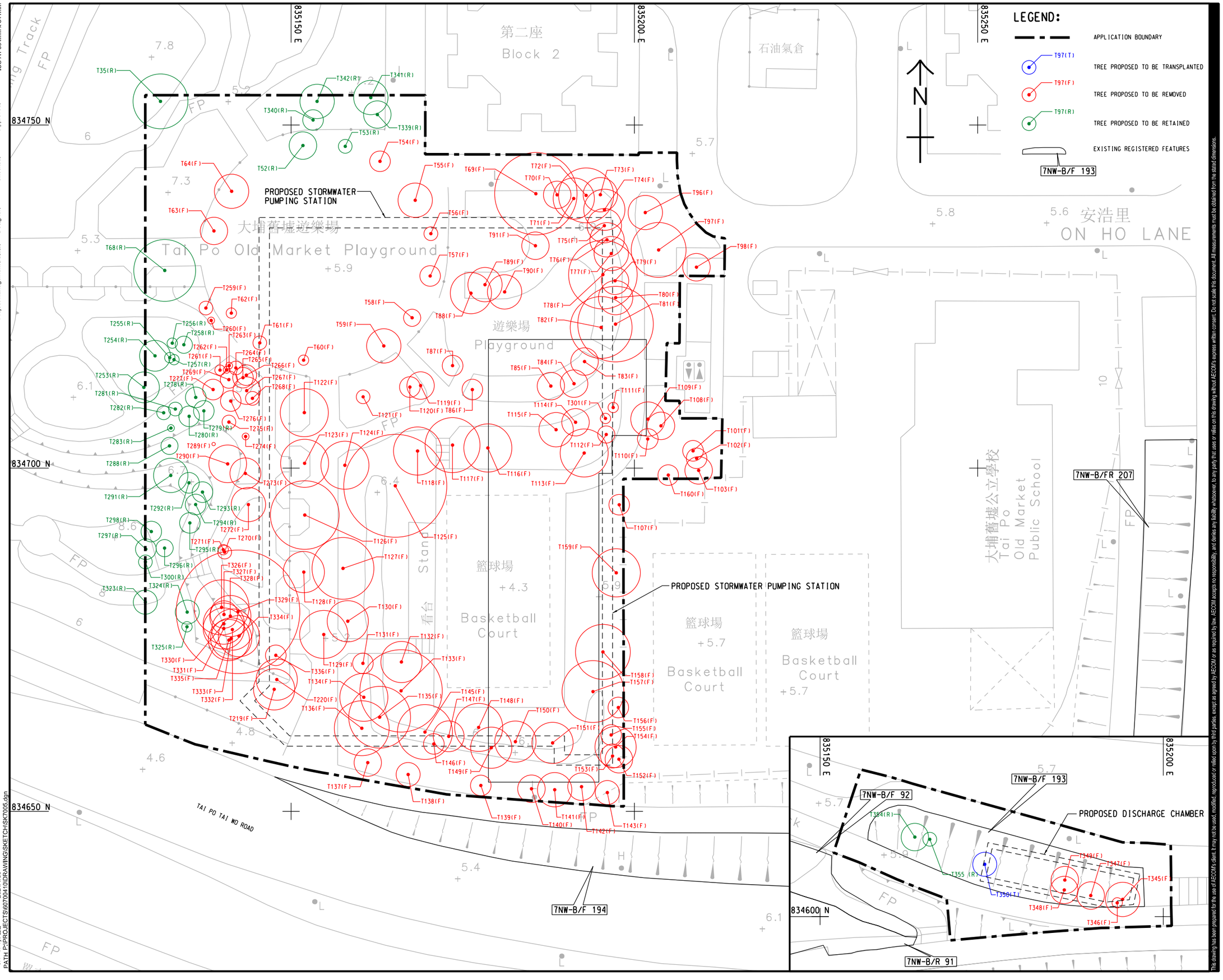
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
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ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 250

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

TREE SURVEY AND TREATMENT PLAN, FOR APPLICATION SITE

SHEET NUMBER
圖紙編號

60700410/SK7005

Plot File by: LIQ
2024/11/30
PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK7005.dgn

Appendix III

Tree Assessment Schedule

No. DP 10/2023 Drainage Improvement Works in Tai Po - Design and Construction

Conducted by: Mr. CHOI Kwok Fai TM322117
Date of Assessment: 22nd November 2023

Drawing No.	Tree No.	Photo No.	Species		Measurements			Amenity Value	Form	Health Condition	Structural Condition	Suitability for Transplanting		Conservation Status	Recommendation (Retain/ Transplant/ Remove)	Justification	Maintenance department to provide comments on TPRP		Additional Remarks	SIMAR Slope No.
			Scientific Name	Chinese Name	Height (m)	DBH (mm)	Crown Spread (m)	(High(H)/ Medium (M)/ Low(L))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A)/ Poor(P))	(High(H)/ Medium(M) / Low(L))	Remarks				Before	After		
60700410/SK7005	T35	T35	*Liquidambar formosana*	楓香	15.5	400	8.0	M	A	A	A	L	b d	NIL	retain	-	LCSD	LCSD	leaning trunk	
60700410/SK7005	T52	T52	*Bauhinia × blakeana*	洋紫荊	4.0	100	4.0	M	P	A	A	L	f	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T53	T53	*Bauhinia × blakeana*	洋紫荊	4.0	100	2.0	M	P	A	A	L	f	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T54	T54	*Bauhinia × blakeana*	洋紫荊	4.0	100	3.0	M	P	A	A	L	f	NIL	remove	conflict with proposed	LCSD	-		
60700410/SK7005	T55	T55	*Bauhinia × blakeana*	洋紫荊	4.0	200	5.0	M	P	A	A	L		NIL	remove	conflict with proposed	LCSD	-		
60700410/SK7005	T56	T56	*Dead tree ^*	死樹	6.0	130	2.0	L	P	P	P	L	-	N/A	remove	conflict with proposed underground tank	LCSD	-	lack of foliage; co-dominant branches; fungal fruiting bodies at trunk base	
60700410/SK7005	T57	T57	*Bauhinia × blakeana*	洋紫荊	5.0	110	3.0	M	P	A	A	L	f	NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T58	T58	*Bauhinia × blakeana*	洋紫荊	5.0	180	2.5	L	P	P	P	L	a b f	NIL	remove	conflict with proposed underground tank	LCSD	-	dieback; leaning trunk; abnormal bark cracks on trunk; crooked trunk	
60700410/SK7005	T59	T59	*Bauhinia × blakeana*	洋紫荊	5.0	300	5.0	M	P	A	A	L	f	NIL	remove	conflict with proposed underground tank	LCSD	-	dead branch	
60700410/SK7005	T60	T60	*Bauhinia × blakeana*	洋紫荊	4.0	100	1.5	M	P	P	A	L	f	NIL	remove	conflict with proposed underground tank	LCSD	-	dead branch	
60700410/SK7005	T61	T61	*Bauhinia × blakeana*	洋紫荊	4.0	110	2.0	M	P	A	A	L	f	NIL	remove	conflict with proposed underground tank	LCSD	-	exposed dead wood on trunk	
60700410/SK7005	T62	T62	*Bauhinia × blakeana*	洋紫荊	4.0	130	1.5	M	P	A	A	L	f	NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T63	T63	*Bauhinia × blakeana*	洋紫荊	4.0	120	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	leaning trunk	
60700410/SK7005	T64	T64	*Bauhinia × blakeana*	洋紫荊	4.0	150	5.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	leaning trunk	
60700410/SK7005	T68	T68	*Cinnamomum camphora*	樟	10.0	380	9.0	M	P	A	A	L	b c f	NIL	retain	-	LCSD	LCSD	asymmetric canopy; co-dominant branches; epiphytic plants on branch	
60700410/SK7005	T69	T69	*Ficus benjamina*	垂葉榕	10.5	750	12.0	M	A	A	A	L	b d	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; sparse foliage; co-dominant branches	
60700410/SK7005	T70	T70	*Ficus benjamina*	垂葉榕	12.0	300	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	sparse foliage; leaning trunk	
60700410/SK7005	T71	T71	*Ficus benjamina*	垂葉榕	11.5	510	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	sparse foliage; co-dominant branches	
60700410/SK7005	T72	T72	*Ficus benjamina*	垂葉榕	13.0	700	8.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; sparse foliage; leaning trunk; sign of borer on trunk	
60700410/SK7005	T73	T73	*Ficus benjamina*	垂葉榕	11.5	550	5.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; sparse foliage; co-dominant branches; sign of borer on trunk	
60700410/SK7005	T74	T74	*Ficus benjamina*	垂葉榕	11.0	300	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	sparse foliage; co-dominant branches; sign of borer on trunk	

Drawing No.	Tree No.	Photo No.	Species		Measurements			Amenity Value	Form	Health Condition	Structural Condition	Suitability for Transplanting		Conservation Status	Recommendation (Retain/ Transplant/ Remove)	Justification	Maintenance department to provide comments on TPRP		Additional Remarks	SIMAR Slope No.
			Scientific Name	Chinese Name	Height (m)	DBH (mm)	Crown Spread (m)	(High(H)/ Medium (M)/ Low(L))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A)/ Poor(P))	(High(H)/ Medium(M) / Low(L))	Remarks				Before	After		
60700410/SK7005	T75	T75	*Ficus benjamina*	垂葉榕	9.0	360	5.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	sparse foliage; co-dominant branches; crossed branches; leaning trunk; sign of borer on trunk	
60700410/SK7005	T76	T76	*Ficus benjamina*	垂葉榕	11.0	250	5.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	sparse foliage; sign of borer on trunk	
60700410/SK7005	T77	T77	*Ficus benjamina*	垂葉榕	11.0	200	5.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	sparse foliage; co-dominant branches; sign of borer on trunk	
60700410/SK7005	T78	T78	*Ficus benjamina*	垂葉榕	11.0	500	10.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	sparse foliage; co-dominant branches; sign of borer on trunk	
60700410/SK7005	T79	T79	*Ficus benjamina*	垂葉榕	10.5	180	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	sparse foliage; sign of borer on trunk	
60700410/SK7005	T80	T80	*Ficus benjamina*	垂葉榕	11.5	250	5.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; sparse foliage; sign of borer on trunk	
60700410/SK7005	T81	T81	*Ficus benjamina*	垂葉榕	15.0	540	11.0	M	A	A	A	L	b d	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches; sign of borer on trunk	
60700410/SK7005	T82	T82	*Ficus benjamina*	垂葉榕	12.0	600	9.0	M	A	A	A	L	b	NIL	remove	conflict with proposed pumping station	LCSD	-	co-dominant branches; sign of borer on trunk	
60700410/SK7005	T83	T83	*Delonix regia*	鳳凰木	8.0	270	4.0	M	P	A	P	L	b f	NIL	remove	conflict with proposed pumping station	LCSD	-	asymmetric canopy; co-dominant branches; included bark between branches	
60700410/SK7005	T84	T84	*Delonix regia*	鳳凰木	8.0	370	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed pumping station	LCSD	-	co-dominant branches	
60700410/SK7005	T85	T85	*Delonix regia*	鳳凰木	6.0	220	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed pumping station	LCSD	-	asymmetric canopy; co-dominant branches	
60700410/SK7005	T86	T86	*Juniperus chinensis 'Kaizuca'*	龍柏	8.0	270	3.0	M	A	A	A	L	c	NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T87	T87	*Juniperus chinensis 'Kaizuca'*	龍柏	6.5	379	3.0	M	A	A	A	L	b c	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches; low branch bifurcation; leaning trunk	
60700410/SK7005	T88	T88	*Cassia fistula*	臘腸樹	10.0	310	6.0	M	P	A	P	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy, bark crack, leaning crown	
60700410/SK7005	T89	T89	*Cassia fistula*	臘腸樹	11.5	300	5.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches, restricted roots	
60700410/SK7005	T90	T90	*Cassia fistula*	臘腸樹	12.5	250	5.0	M	A	P	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches, trunk wound, pruned wound	
60700410/SK7005	T91	T91	*Plumeria rubra*	雞蛋花	3.0	110	4.0	M	P	A	A	L	f	NIL	remove	conflict with proposed underground tank	LCSD	-	broken branch; low branch bifurcation	
60700410/SK7005	T96	T96	*Bauhinia × blakeana*	洋紫荊	5.0	280	5.0	M	P	A	A	L	f	NIL	remove	conflict with proposed underground tank	LCSD	-	cavity on branch; dead branch	
60700410/SK7005	T97	T97	*Delonix regia*	鳳凰木	8.5	370	8.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches	
60700410/SK7005	T98	T98	*Delonix regia*	鳳凰木	7.5	310	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches; crossed branches	

Drawing No.	Tree No.	Photo No.	Species		Measurements			Amenity Value	Form	Health Condition	Structural Condition	Suitability for Transplanting		Conservation Status	Recommendation (Retain/ Transplant/ Remove)	Justification	Maintenance department to provide comments on TPRP		Additional Remarks	SIMAR Slope No.
			Scientific Name	Chinese Name	Height (m)	DBH (mm)	Crown Spread (m)	(High(H)/ Medium (M)/ Low(L))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A)/ Poor(P))	(High(H)/ Medium(M) / Low(L))	Remarks				Before	After		
60700410/SK7005	T101	T101	*Lophostemon confertus*	紅膠木	7.0	220	3.0	M	P	A	P	L	b c f	NIL	remove	conflict with proposed maintenance access	LCSD	-	asymmetric canopy; co-dominant branches; leaning trunk; wounded trunk	
60700410/SK7005	T102	T102	*Lophostemon confertus*	紅膠木	10.0	220	3.0	M	A	A	A	L	b c	NIL	remove	conflict with proposed maintenance access	LCSD	-	asymmetric canopy	
60700410/SK7005	T103	T103	*Lophostemon confertus*	紅膠木	11.5	220	4.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed maintenance access	LCSD	-	asymmetric canopy; co-dominant branches; leaning trunk	
60700410/SK7005	T107	T107	*Acacia confusa*	台灣相思	8.5	330	3.0	M	P	A	A	L	c f	NIL	remove	conflict with proposed underground tank	LCSD	-	curved trunk	
60700410/SK7005	T108	T108	*Plumeria rubra*	雞蛋花	6.0	194	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed maintenance access	LCSD	-	co-dominant branches; low branch bifurcation; co-dominant trunks	
60700410/SK7005	T109	T109	*Plumeria rubra*	雞蛋花	6.0	269	5.0	M	P	A	P	L	b f	NIL	remove	conflict with proposed maintenance access	LCSD	-	included bark, low branch bifurcation; leaning trunk, wounded trunk	
60700410/SK7005	T110	T110	*Plumeria rubra*	雞蛋花	6.0	206	3.0	M	P	A	A	L	f	NIL	remove	conflict with proposed maintenance access	LCSD	-	co-dominant branches; low branch bifurcation	
60700410/SK7005	T111	T111	*Plumeria rubra*	雞蛋花	4.0	156	1.5	M	P	A	A	L	b f	NIL	remove	conflict with proposed pumping station	LCSD	-	low branch bifurcation; contorted trunks, sparse foliage	
60700410/SK7005	T112	T112	*Plumeria rubra*	雞蛋花	5.0	156	2.5	M	P	A	A	L	b f	NIL	remove	conflict with proposed pumping station	LCSD	-	asymmetric canopy; co-dominant branches	
60700410/SK7005	T113	T113	*Cinnamomum camphora*	樟	9.0	350	7.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed pumping station	LCSD	-	co-dominant branches; epiphytic plants on branch; epiphytic plant on trunk	
60700410/SK7005	T114	T114	*Ficus elastica*	印度榕	8.0	220	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed pumping station	LCSD	-	co-dominant branches; leaning trunk	
60700410/SK7005	T115	T115	*Ficus elastica*	印度榕	7.5	230	5.0	M	P	A	A	L	f	NIL	remove	conflict with proposed pumping station	LCSD	-	co-dominant branches	
60700410/SK7005	T116	T116	*Cinnamomum camphora*	樟	8.5	300	7.0	M	A	A	A	L	b c	NIL	remove	conflict with proposed pumping station	LCSD	-	asymmetric canopy; co-dominant branches; epiphytic plants on branch; epiphytic plant on trunk	
60700410/SK7005	T117	T117	*Cinnamomum camphora*	樟	10.0	300	8.0	M	A	A	A	L	b c	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; epiphytic plants on branch; leaning trunk, restricted roots	
60700410/SK7005	T118	T118	*Cinnamomum camphora*	樟	10.0	330	7.0	M	A	A	A	L	b c	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches; epiphytic plants on branch; epiphytic plant on trunk	
60700410/SK7005	T119	T119	*Plumeria rubra*	雞蛋花	5.0	160	4.0	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches; low branch bifurcation, pruned wound	
60700410/SK7005	T120	T120	*Plumeria rubra*	雞蛋花	5.0	214	3.0	M	P	A	A	L	f	NIL	remove	conflict with proposed underground tank	LCSD	-	leaning, asymmetric crown	
60700410/SK7005	T121	T121	*Juniperus chinensis 'Kaizuca'*	龍柏	7.0	200	2.0	M	A	A	A	L	b c	NIL	remove	conflict with proposed underground tank	LCSD	-	leaning trunk,	

Drawing No.	Tree No.	Photo No.	Species		Measurements			Amenity Value	Form	Health Condition	Structural Condition	Suitability for Transplanting		Conservation Status	Recommendation (Retain/ Transplant/ Remove)	Justification	Maintenance department to provide comments on TPRP		Additional Remarks	SIMAR Slope No.
			Scientific Name	Chinese Name	Height (m)	DBH (mm)	Crown Spread (m)	(High(H)/ Medium (M)/ Low(L))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A)/ Poor(P))	(High(H)/ Medium(M) / Low(L))	Remarks				Before	After		
60700410/SK7005	T122	T122	*Cinnamomum camphora*	樟	9.5	300	7.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	dieback; sparse foliage; co-dominant branches; crooked branch; epiphytic plants on branch; epiphytic plant on trunk	
60700410/SK7005	T123	T123	*Cinnamomum camphora*	樟	11.5	300	7.0	M	A	A	A	L	b c	NIL	remove	conflict with proposed underground tank	LCSD	-	dieback; epiphytic plants on branch; epiphytic plant on trunk	
60700410/SK7005	T124	T124	*Cinnamomum camphora*	樟	11.0	330	7.0	M	A	A	A	L	b c	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches; epiphytic plants on branch	
60700410/SK7005	T125	T125	*Cinnamomum camphora*	樟	10.5	430	15.0	M	A	A	A	L	b c d	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches	
60700410/SK7005	T126	T126	*Cinnamomum camphora*	樟	13.0	400	10.0	M	A	A	A	L	b c	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches; dead branch; epiphytic plants on branch	
60700410/SK7005	T127	T127	*Cinnamomum camphora*	樟	12.5	330	9.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches; epiphytic plants on branch; epiphytic plant on trunk	
60700410/SK7005	T128	T128	*Cinnamomum camphora*	樟	14.5	320	6.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches	
60700410/SK7005	T129	T129	*Cinnamomum camphora*	樟	13.5	330	7.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches; leaning trunk	
60700410/SK7005	T130	T130	*Cinnamomum camphora*	樟	12.5	360	6.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches	
60700410/SK7005	T131	T131	*Ravenala madagascariensis*	旅人蕉	6.0	150	3.0	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T132	T132	*Cinnamomum camphora*	樟	12.0	300	6.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	curved trunk	
60700410/SK7005	T133	T133	*Cinnamomum camphora*	樟	15.5	360	12.0	M	A	A	A	L	b c d	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches	
60700410/SK7005	T134	T134	*Cassia fistula*	臘腸樹	9.0	330	7.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches	
60700410/SK7005	T135	T135	*Cassia fistula*	臘腸樹	14.5	480	9.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches	
60700410/SK7005	T136	T136	*Cassia fistula*	臘腸樹	14.5	430	8.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; dieback; co-dominant branches	
60700410/SK7005	T137	T137	*Bauhinia variegata*	宮粉羊蹄甲	5.5	160	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches; sign of wood borer on branch; leaning trunk	
60700410/SK7005	T138	T138	*Bauhinia × blakeana*	洋紫荊	4.5	120	3.5	M	P	A	A	L	f	NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T139	T139	*Bauhinia × blakeana*	洋紫荊	8.5	150	3.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy	
60700410/SK7005	T140	T140	*Bauhinia × blakeana*	洋紫荊	9.0	200	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches	

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			Scientific Name	Chinese Name	Height (m)	DBH (mm)	Crown Spread (m)	(High(H)/ Medium (M)/ Low(L))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A)/ Poor(P))	(High(H)/ Medium(M) / Low(L))	Remarks				Before	After		
60700410/SK7005	T141	T141	*Bauhinia × blakeana*	洋紫荊	6.5	140	5.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches; leaning trunk	
60700410/SK7005	T142	T142	*Bauhinia × blakeana*	洋紫荊	5.0	180	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches; leaning trunk	
60700410/SK7005	T143	T143	*Bauhinia × blakeana*	洋紫荊	5.0	160	3.5	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; crooked trunk	
60700410/SK7005	T145	T145	*Cinnamomum camphora*	樟	14.0	360	8.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches; leaning trunk	
60700410/SK7005	T146	T146	*Cinnamomum camphora*	樟	6.0	300	3.0	M	P	A	A	L	c f	NIL	remove	conflict with proposed underground tank	LCSD	-	broken branch; grew by hard structure	
60700410/SK7005	T147	T147	*Lophostemon confertus*	紅膠木	10.0	220	4.5	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant branches; leaning trunk; history of uproot	
60700410/SK7005	T148	T148	*Cinnamomum camphora*	樟	10.0	260	7.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches; leaning trunk	
60700410/SK7005	T149	T149	*Cinnamomum camphora*	樟	7.5	320	6.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed pumping station	LCSD	-	asymmetric canopy; leaning trunk	
60700410/SK7005	T150	T150	*Acacia confusa*	台灣相思	11.5	350	6.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed pumping station	LCSD	-	asymmetric canopy; co-dominant branches; leaning trunk	
60700410/SK7005	T151	T151	*Lophostemon confertus*	紅膠木	12.5	330	6.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed pumping station	LCSD	-	asymmetric canopy; low live-crown ratio; co-dominant branches; leaning trunk	
60700410/SK7005	T152	T152	*Lophostemon confertus*	紅膠木	13.0	400	4.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	low live-crown ratio; broken branch; grew by hard structure	
60700410/SK7005	T153	T153	*Lophostemon confertus*	紅膠木	11.5	150	3.5	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	low live-crown ratio; leaning trunk	
60700410/SK7005	T154	T154	*Lophostemon confertus*	紅膠木	9.0	180	6.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches; leaning trunk	
60700410/SK7005	T155	T155	*Acacia confusa*	台灣相思	11.5	350	3.0	L	P	P	P	L	a b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; wilted foliage in entire crown; abnormal bark cracks on trunk; curved trunk; fungal fruiting bodies on trunk	
60700410/SK7005	T156	T156	*Cinnamomum camphora*	樟	9.5	260	3.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; leaning trunk	
60700410/SK7005	T157	T157	*Acacia confusa*	台灣相思	10.5	380	9.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed pumping station	LCSD	-	co-dominant branches; abnormal bark crack on branch; leaning trunk	
60700410/SK7005	T158	T158	*Acacia confusa*	台灣相思	10.0	280	8.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed pumping station	LCSD	-	asymmetric canopy; dead branch; leaning trunk	
60700410/SK7005	T159	T159	*Acacia confusa*	台灣相思	12.5	370	7.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed pumping station	LCSD	-	asymmetric canopy	
60700410/SK7005	T160	T160	*Acacia confusa*	台灣相思	8.0	250	3.0	M	P	A	A	L	c f	NIL	remove	conflict with proposed maintenance access	LCSD	-	curved trunk	

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			Scientific Name	Chinese Name	Height (m)	DBH (mm)	Crown Spread (m)	(High(H)/ Medium (M)/ Low(L))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A)/ Poor(P))	(High(H)/ Medium(M) / Low(L))	Remarks				Before	After		
60700410/SK7005	T219	T219	*Lophostemon confertus*	紅膠木	11.5	360	6.0	M	P	A	A	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches; leaning trunk	
60700410/SK7005	T220	T220	*Lophostemon confertus*	紅膠木	10.0	360	6.0	M	P	A	P	L	b c f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; co-dominant branches; leaning trunk; trunk chafing against hard structure	
60700410/SK7005	T253	T253	*Livistona chinensis*	蒲葵	8.5	250	4.5	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T254	T254	*Livistona chinensis*	蒲葵	8.0	280	4.5	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T255	T255	*Dypsis lutescens*	散尾葵	8.0	149	1.5	M	A	A	A	L	b	NIL	retain	-	LCSD	LCSD	multi-trunks	
60700410/SK7005	T256	T256	*Dypsis lutescens*	散尾葵	5.5	100	1.5	M	A	A	A	L	b	NIL	retain	-	LCSD	LCSD	multi-trunks	
60700410/SK7005	T257	T257	*Dypsis lutescens*	散尾葵	6.0	127	1.5	M	A	A	A	L	b	NIL	retain	-	LCSD	LCSD	multi-trunks	
60700410/SK7005	T258	T258	*Dypsis lutescens*	散尾葵	6.0	162	2.5	M	A	A	A	L	b	NIL	retain	-	LCSD	LCSD	multi-trunks	
60700410/SK7005	T259	T259	*Ravenala madagascariensis*	旅人蕉	5.0	160	2.0	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T260	T260	*Ravenala madagascariensis*	旅人蕉	4.0	120	1.0	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T261	T261	*Dypsis lutescens*	散尾葵	6.0	100	1.5	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	leaning trunk	
60700410/SK7005	T262	T262	*Dypsis lutescens*	散尾葵	7.0	100	1.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant trunks	
60700410/SK7005	T263	T263	*Dypsis lutescens*	散尾葵	6.0	127	1.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant trunks	
60700410/SK7005	T264	T264	*Dypsis lutescens*	散尾葵	6.5	135	2.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	multi-trunks	
60700410/SK7005	T265	T265	*Dypsis lutescens*	散尾葵	7.5	100	3.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	multi-trunks	
60700410/SK7005	T266	T266	*Dypsis lutescens*	散尾葵	6.5	141	3.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	multi-trunks	
60700410/SK7005	T267	T267	*Dypsis lutescens*	散尾葵	6.5	210	4.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	multi-trunks	
60700410/SK7005	T268	T268	*Dypsis lutescens*	散尾葵	7.0	156	2.0	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	multi-trunks	
60700410/SK7005	T269	T269	*Dypsis lutescens*	散尾葵	3.5	121	2.5	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-	multi-trunks	
60700410/SK7005	T270	T270	*Ravenala madagascariensis*	旅人蕉	6.0	170	2.0	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T271	T271	*Ravenala madagascariensis*	旅人蕉	6.0	150	1.5	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T272	T272	*Syagrus romanzoffiana*	皇后葵	8.5	280	5.0	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T273	T273	*Syagrus romanzoffiana*	皇后葵	10.0	210	4.5	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-		

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			Scientific Name	Chinese Name	Height (m)	DBH (mm)	Crown Spread (m)	(High(H)/ Medium (M)/ Low(L))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A)/ Poor(P))	(High(H)/ Medium(M) / Low(L))	Remarks				Before	After		
60700410/SK7005	T274	T274	*Archontophoenix alexandrae*	假檳榔	6.5	210	1.0	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T275	T275	*Archontophoenix alexandrae*	假檳榔	9.0	220	2.0	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T276	T276	*Archontophoenix alexandrae*	假檳榔	9.0	190	3.0	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T277	T277	*Archontophoenix alexandrae*	假檳榔	8.5	180	3.0	M	A	A	A	L		NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T278	T278	*Archontophoenix alexandrae*	假檳榔	10.0	210	3.0	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T279	T279	*Archontophoenix alexandrae*	假檳榔	10.5	230	3.0	M	A	A	A	L	b	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T280	T280	*Archontophoenix alexandrae*	假檳榔	10.0	200	3.0	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T281	T281	*Phoenix roebelenii*	日本葵	3.0	100	2.0	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD	curved trunk	
60700410/SK7005	T282	T282	*Phoenix roebelenii*	日本葵	4.5	100	2.0	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T283	T283	*Caryota mitis*	短穗魚尾葵	5.0	100	1.0	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T288	T288	*Caryota mitis*	短穗魚尾葵	5.5	206	2.5	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T289	T289	*Archontophoenix alexandrae*	假檳榔	5.0	190	0.5	M	A	P	A	L	f	NIL	remove	conflict with proposed underground tank	LCSD	-	pencilling trunk	
60700410/SK7005	T290	T290	*Syagrus romanzoffiana*	皇后葵	10.0	230	5.5	M	A	A	A	L	b	NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T291	T291	*Archontophoenix alexandrae*	假檳榔	8.5	190	5.0	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T292	T292	*Archontophoenix alexandrae*	假檳榔	12.5	200	3.0	M	A	A	A	L	b	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T293	T293	*Archontophoenix alexandrae*	假檳榔	10.5	180	3.0	M	A	A	A	L	b	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T294	T294	*Michelia × alba*	白蘭	6.5	160	3.0	M	A	A	A	M	-	1	retain	-	LCSD	LCSD	co-dominant branches; low branch bifurcation	
60700410/SK7005	T295	T295	*Archontophoenix alexandrae*	假檳榔	11.5	220	3.0	M	A	A	A	L	b	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T296	T296	*Archontophoenix alexandrae*	假檳榔	7.5	160	2.5	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T297	T297	*Archontophoenix alexandrae*	假檳榔	9.0	190	3.0	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T298	T298	*Archontophoenix alexandrae*	假檳榔	10.5	210	3.0	M	A	A	A	L	b	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T300	T300	*Dypsis lutescens*	散尾葵	4.0	100	2.0	M	A	A	A	L	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T301	T301	*Plumeria rubra*	雞蛋花	4.0	127	1.5	M	P	A	A	L	f	NIL	remove	conflict with proposed pumping station	LCSD	-	low branch bifurcation, contorted trunks, sparse crown	
60700410/SK7005	T323	T323	*Archontophoenix alexandrae*	假檳榔	8.5	170	3.5	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T324	T324	*Caryota mitis*	短穗魚尾葵	5.5	141	3.5	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		
60700410/SK7005	T325	T325	*Caryota mitis*	短穗魚尾葵	5.5	120	1.5	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD		

Drawing No.	Tree No.	Photo No.	Species		Measurements			Amenity Value	Form	Health Condition	Structural Condition	Suitability for Transplanting		Conservation Status	Recommendation (Retain/ Transplant/ Remove)	Justification	Maintenance department to provide comments on TPRP		Additional Remarks	SIMAR Slope No.
			Scientific Name	Chinese Name	Height (m)	DBH (mm)	Crown Spread (m)	(High(H)/ Medium (M)/ Low(L))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A)/ Poor(P))	(High(H)/ Medium(M) / Low(L))	Remarks				Before	After		
60700410/SK7005	T326	T326	*Ficus benjamina*	垂葉榕	12.0	700	8.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio; co-dominant branches	
60700410/SK7005	T327	T327	*Ficus benjamina*	垂葉榕	12.0	480	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T328	T328	*Ficus benjamina*	垂葉榕	11.0	460	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T329	T329	*Ficus virens*	大葉榕	16.0	950	18.0	M	A	A	A	L	b d	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant trunks, DBH>1m, restricted roots, growing closely with T328	
60700410/SK7005	T330	T330	*Ficus benjamina*	垂葉榕	13.0	550	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio; crossed branches	
60700410/SK7005	T331	T331	*Ficus benjamina*	垂葉榕	13.0	400	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio; crossed branches	
60700410/SK7005	T332	T332	*Ficus benjamina*	垂葉榕	12.0	370	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T333	T333	*Ficus benjamina*	垂葉榕	13.0	500	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T334	T334	*Ficus benjamina*	垂葉榕	13.0	550	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T335	T335	*Ficus benjamina*	垂葉榕	15.0	600	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T336	T336	*Archontophoenix alexandrae*	假檳榔	5.0	150	3.0	M	P	A	A	L	c, f	NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T339	T339	*Chukrasia tabularis*	麻楝	8.5	280	4.0	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD	co-dominant branches	
60700410/SK7005	T340	T340	*Ficus microcarpa*	細葉榕	3.0	127	3.0	M	P	A	A	L	b f	NIL	retain	-	LCSD	LCSD	crossed branches; co-dominant trunks	
60700410/SK7005	T341	T341	*Chukrasia tabularis*	麻楝	8.5	240	5.0	M	P	A	A	L	f	NIL	retain	-	LCSD	LCSD	curved trunk	
60700410/SK7005	T342	T342	*Dracontomelon duperreanum*	人面子	8.5	240	5.0	M	P	A	A	L	f	NIL	retain	-	LCSD	LCSD	co-dominant branches	
60700410/SK7005	T345	T345	*Melaleuca cajuputi subsp. cumingiana*	白千層	9.0	480	5.0	M	A	A	A	L	c	NIL	remove	conflict with proposed above ground structure	HyD	-	co-dominant branches; on slope	7NW-B/F193
60700410/SK7005	T346	T346	*Celtis sinensis*	朴樹	5.0	134	1.5	M	P	A	A	L	b f	NIL	remove	conflict with proposed above ground structure	HyD	-	asymmetric canopy; co-dominant branches; low branch bifurcation; on slope	7NW-B/F193
60700410/SK7005	T347	T347	*Melaleuca cajuputi subsp. cumingiana*	白千層	11.5	300	4.0	M	A	A	A	L	b	NIL	remove	conflict with proposed above ground structure	HyD	-	co-dominant branches; on slope	7NW-B/F193
60700410/SK7005	T348	T348	*Melaleuca cajuputi subsp. cumingiana*	白千層	10.5	330	4.0	M	A	A	A	L	b	NIL	remove	conflict with proposed above ground structure	HyD	-	asymmetric canopy; co-dominant branches; on slope	7NW-B/F193
60700410/SK7005	T349	T349	*Melaleuca cajuputi subsp. cumingiana*	白千層	10.0	430	4.0	M	A	A	A	L	b	NIL	remove	conflict with proposed above ground structure	HyD	-	asymmetric canopy; co-dominant branches; epiphytic plant on trunk; on slope	7NW-B/F193

Drawing No.	Tree No.	Photo No.	Species		Measurements			Amenity Value	Form	Health Condition	Structural Condition	Suitability for Transplanting		Conservation Status	Recommendation (Retain/ Transplant/ Remove)	Justification	Maintenance department to provide comments on TPRP		Additional Remarks	SIMAR Slope No.
			Scientific Name	Chinese Name	Height (m)	DBH (mm)	Crown Spread (m)	(High(H)/ Medium (M)/ Low(L))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A)/ Poor(P))	(High(H)/ Medium(M) / Low(L))	Remarks				Before	After		
60700410/SK7005	T350	T350	*Bischofia javanica*	秋楓	7.0	270	3.5	M	A	A	A	M	-	NIL	transplant	conflict with proposed above ground structure	HyD	HyD	on slope	7NW-B/F193
60700410/SK7005	T354	T354	*Dalbergia assamica* §	南嶺黃檀	5.0	110	4.0	M	P	A	A	L	b, f	2	retain	-	HyD	HyD	crossed branches; low branch bifurcation; co-dominant trunks; leaning trunk	7NW-B/F193
60700410/SK7005	T355	T355	*Albizia lebbeck*	大葉合歡	5.5	75	2.0	M	P	A	A	L	b, f	NIL	retain	-	HyD	HyD	co-dominant branches; on slope	7NW-B/F193

^ Dead Tree

§ TPI

Remarks:
- Site visit was conducted on 24 January 2024 to verify the DBH measurement for T329.

Suitability for Transplanting:
a - low amenity value;
b - irrecoverable form after transplanting (e.g. if substantial crown and rot pruning are necessary to facilitate the transplanting);
c - low survival rate after transplanting;
d - very large size (unless the feasibility to transplant has been considered financially reasonable and technically feasible during the feasibility stage);
e - with evidence of over-maturity and onset of senescence;
f - poor health, structure or form (e.g. Imbalanced form, leaning with major cavity / cracks / splits);
g - undesirable species (e.g. *Leucaena leucocephala* which is an invasive, exotic tree); or
h - trees grown under poor conditions which have limited the formation of proper root ball necessary for transplanting (e.g. on steep slope).

Conservation Status:
1 - Scheduled under Cap. 96
2 - Protected under Cap. 586
3 - Rare and Precious Plants of Hong Kong
4 - China Plant Red Data Book

Appendix IV

Photographic Record

T35_(1)_Liquidambar formosana_Overview_retain

T35_(3)_Liquidambar formosana_Trunk_retain

T35_Liquidambar formosana_Tag

T52_(1)_Bauhinia × blakeana_Overview_retain

T52_(3)_Bauhinia × blakeana_Trunk_retain

T52_Bauhinia × blakeana_Tag

T53_(1)_Bauhinia × blakeana_Overview_retain

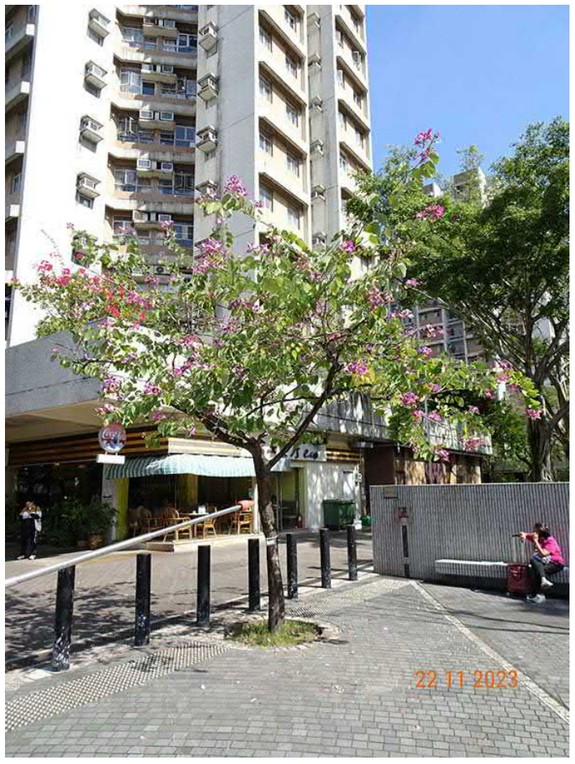
T53_(3)_Bauhinia × blakeana_Trunk_retain

T53_Bauhinia × blakeana_Tag

T54_(1)_Bauhinia × blakeana_Overview_remove

T54_(3)_Bauhinia × blakeana_Trunk_remove

T54_Bauhinia × blakeana_Tag



T55_(1)_Bauhinia × blakeana_Overview_remove

T55_(3)_Bauhinia × blakeana_Trunk_remove

T55_Bauhinia × blakeana_Tag

T56_(1)_Overview_remove

T56_(3)_Trunk_remove

T56_Tag

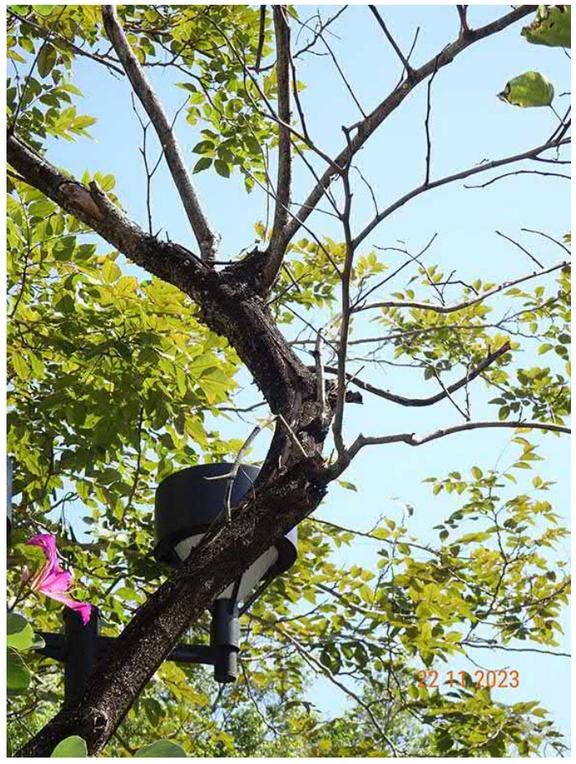
T57_(1)_Bauhinia × blakeana_Overview_remove

T57_(3)_Bauhinia × blakeana_Trunk_remove

T57_Bauhinia × blakeana)_Tag

T58_(1)_Bauhinia × blakeana_Overview_remove

T58_(3)_Bauhinia × blakeana_Trunk_remove

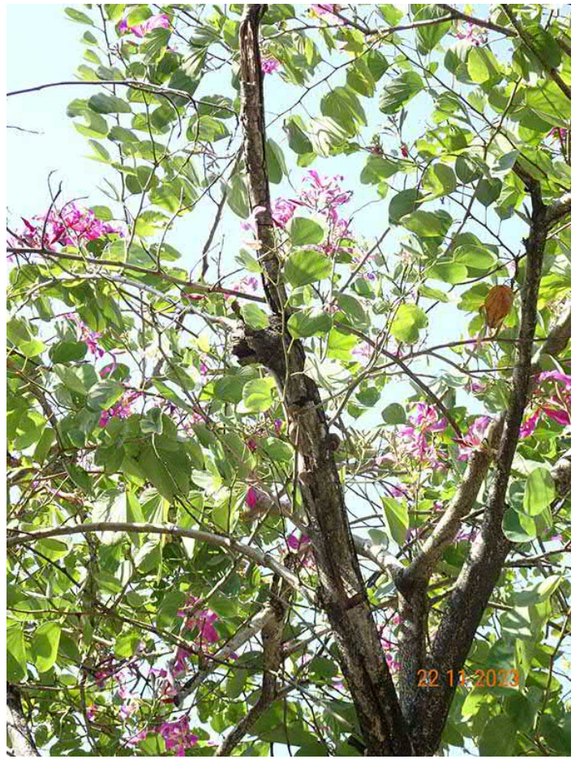


T58_(5)_Bauhinia × blakeana_trunk wound-remove

T58_Bauhinia × blakeana_Tag

T59_(1)_Bauhinia × blakeana_Overview_remove

T59_(3)_Bauhinia × blakeana_Trunk_remove



T59_(5)_Bauhinia × blakeana_trunk decay_remove

T59_Bauhinia × blakeana_tag

T60_(1)_Bauhinia × blakeana_Overview_remove

T60_(3)_Bauhinia × blakeana_Trunk_remove

T60_(5)_Bauhinia × blakeana_trunk wound_remove

T60_Bauhinia × blakeana_Tag

T61_(1)_Bauhinia × blakeana_Overview_remove

T61_(3)_Bauhinia × blakeana_Trunk_remove

T61_(5)_Bauhinia × blakeana_trunk decay_remove

T61_Bauhinia × blakeana_Tag

T62_(1)_Bauhinia × blakeana_Overview_remove

T62_(3)_Bauhinia × blakeana_Trunk_remove

T62_Bauhinia × blakeana_Tag

T63_(1)_Bauhinia × blakeana_Overview_remove

T63_(1)_Bauhinia × blakeana_Trunk_remove

T63_Bauhinia × blakeana_Tag

T64_(1)_Bauhinia × blakeana_Overiew_remove

T64_(3)_Bauhinia × blakeana_Trunk_remove

T64_Bauhinia × blakeana_Tag

T68_(1)_Cinnamomum camphora_Overview_retain

T68_(2)_Cinnamomum camphora_Crown_retain

T68_(3)_Cinnamomum camphora_Trunk_retain

T68_Cinnamomum camphora_Tag

T69_(1)_Ficus benjamina_Overview_remove

T69_(2)_Ficus benjamina_Crown_remove

T69_(3)_Ficus benjamina_Trunk_remove

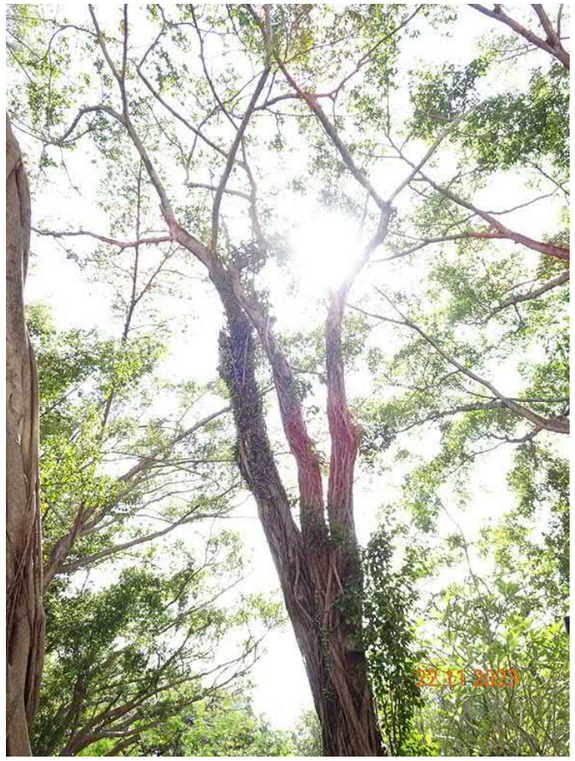
T69_Ficus benjamina_Tag

T70_(1)_Ficus benjamina_Overview_remove

T70_(3)_Ficus benjamina_Trunk_remove

T70_Ficus benjamina_Tag

T71_(1)_Ficus benjamina_Overview_remove



T71_(2)_Ficus benjamina_Crown_remove

T71_(3)_Ficus benjamina_Trunk_remove

T71_Ficus benjamina_Tag

T72_(1)_Ficus benjamina_Overview_remvoe

T72_(3)_Ficus benjamina_Trunk_remove

T72_Ficus benjamina_Tag

T73_(1)_Ficus benjamina_Overview_remove

T73_(3)_Ficus benjamina_Trunk_remove

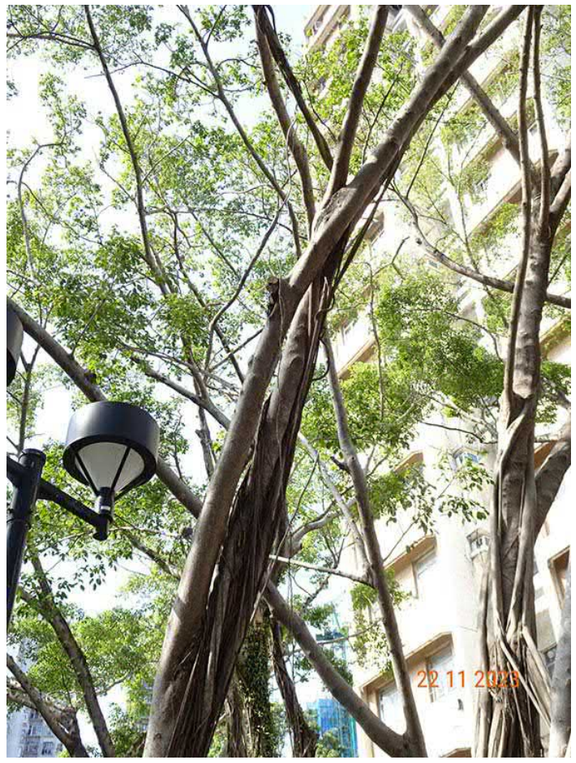
T73_Ficus benjamina_Tag

T74_(1)_Ficus benjamina_Overview_remove

T74_(3)_Ficus benjamina_Trunk_remove

T74_Ficus benjamina_Tag

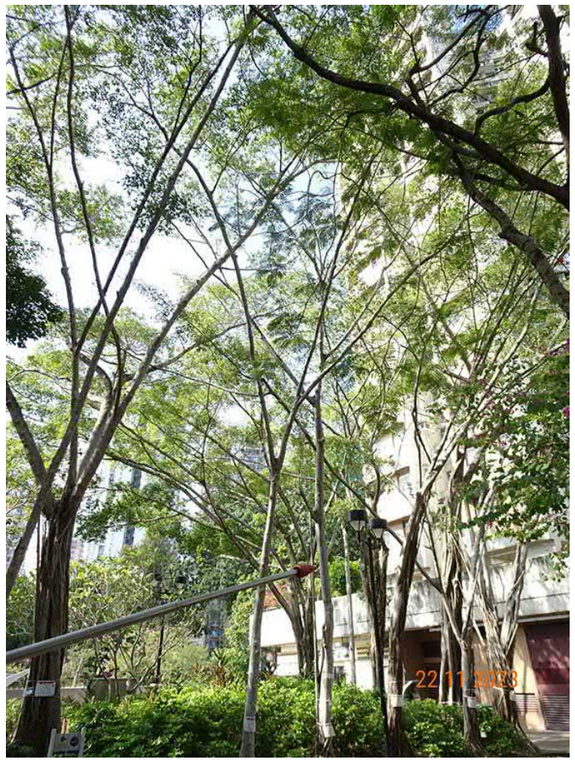
T75_(1)_Ficus benjamina_Overview_remove



T75_(3)_Ficus benjamina_Trunk_remove

T75_(4)_Ficus benjamina_Base_remove

T75_Ficus benjamina_Tag



T76_(1)_Ficus benjamina_Overview_remove

T76_(3)_Ficus benjamina_Trunk_remove

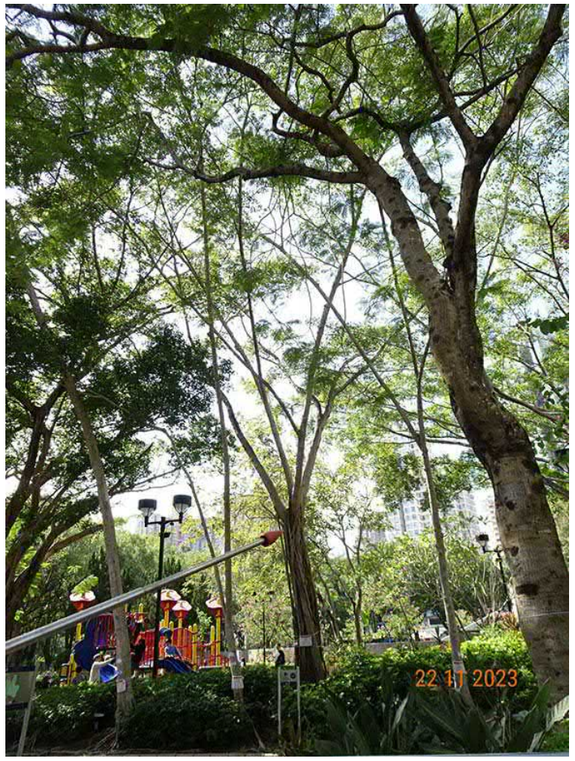
T76_Ficus benjamina_Tag

T77_(1)_Ficus benjamina_Overview_remove

T77_(3)_Ficus benjamina_Trunk_remove

T77_(4)_Ficus benjamina_Base_remove

T77_Ficus benjamina_Tag



T78_(1)_Ficus benjamina_Overview_remove

T78_(3)_Ficus benjamina_Trunk_remove

T78_Ficus benjamina_Tag

T79_(1)_Ficus benjamina_Overview_remove

T79_(3)_Ficus benjamina_Trunk_remove

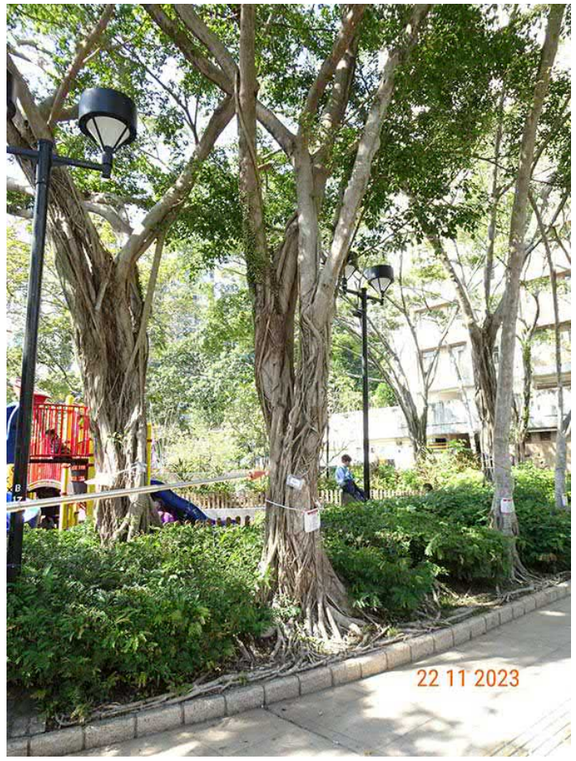
T79_Ficus benjamina_Tag

T80_(1)_Ficus benjamina_Overview_remove

T80_(3)_Ficus benjamina_Trunk_remove

T80_Ficus benjamina_Tag

T81_(1)_Ficus benjamina_Oveview_remove



T81_(4)_Ficus benjamina_Base_remove

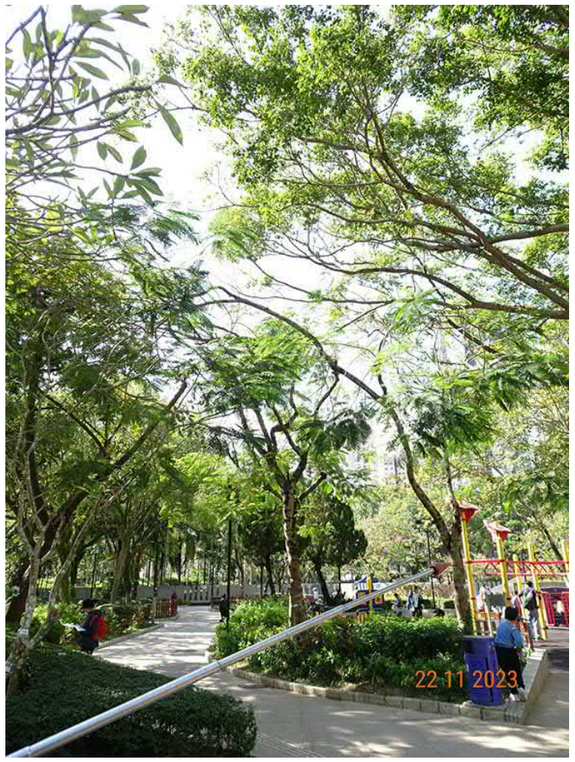
T81_Ficus benjamina_Tag

T82_(1)_Ficus benjamina_Overview_remove

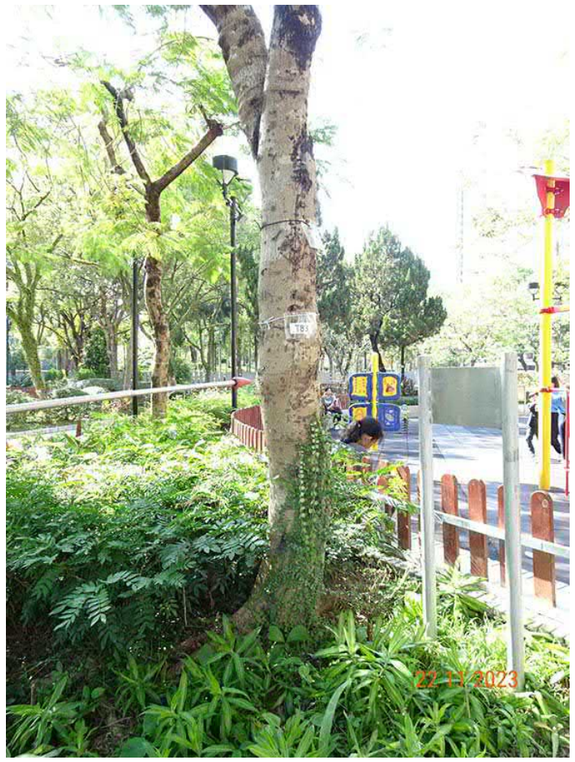
T82_(3)_Ficus benjamina_Trunk_remove

T82_(4)_Ficus benjamina_Base_remove

T82_Ficus benjamina_Tag



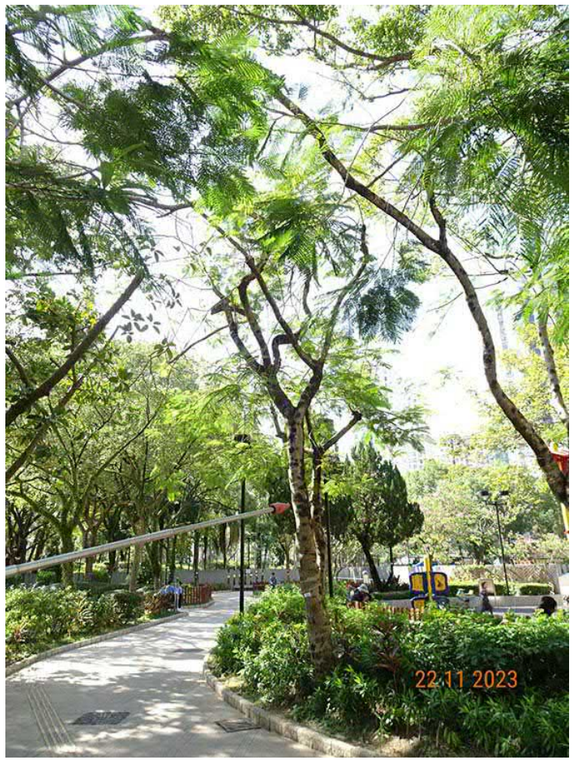
T83_(1)_Delonix regia_Overview_remove



T83_(3)_Delonix regia_Trunk_remove

T83_(5)_Delonix regia_included bark_remove

T83_Delonix regia_Tag



T84_(1)_Delonix regia_Overview_remove

T84_(3)_Delonix regia_Trunk_remove

T84_Delonix regia_Tag

T85_(1)_Delonix regia_Overview_remove

T85_(1)_Delonix regia_Trunk_remove

T85_Delonix regia_Tag

T86_(1)_Juniperus chinensis 'Kaizuca'_Overview_rem...

T86_(3)_Juniperus chinensis 'Kaizuca' _Trunk_remove

T86_Juniperus chinensis 'Kaizuca' _Tag

T87_(1)_Juniperus chinensis 'Kaizuca' _Overview_re...

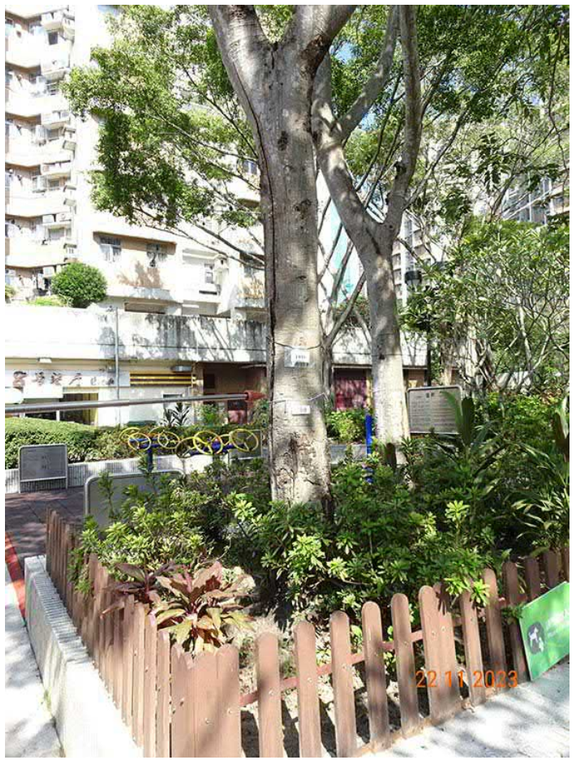
T87_(2)_Juniperus chinensis 'Kaizuca' _Crown_remove

T87_(3)_Juniperus chinensis 'Kaizuca' _Trunk_remove

T87_Juniperus chinensis 'Kaizuca' _Tag

T88_(1)_Cassia fistula_Overview_remove

T88_(2)_Cassia fistula_Crown_remove

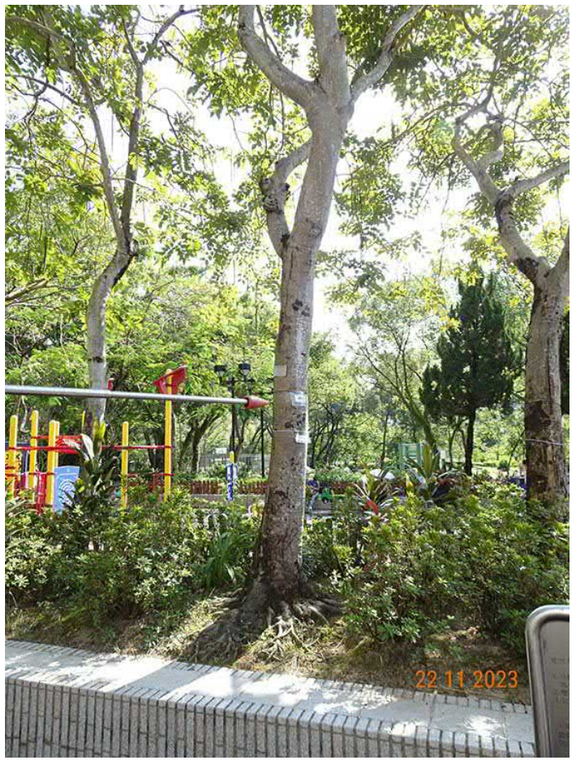


T88_(3)_Cassia fistula_Trunk_remove

T88_Cassia fistula_Tag

T89_(1)_Cassia fistula_Overview_remove

T89_(2)_Cassia fistula_Crown_remove



T89_(3)_Cassia fistula_Trunk_remove

T89_Cassia fistula_Tag

T90_(1)_Cassia fistula_Overview

T90_(3)_Cassia fistula_Trunk_remove

T90_Cassia fistula_Tag

T91_(1)_Plumeria rubra_Overview_remove

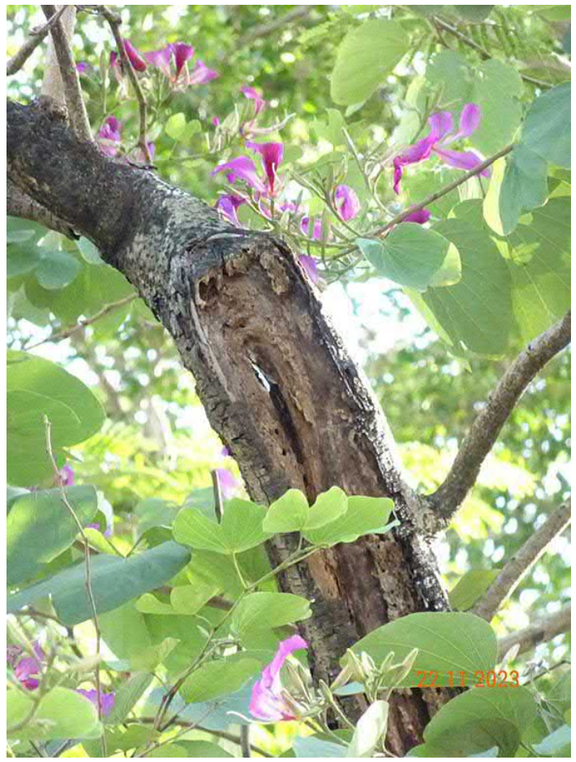
T91_(3)_Plumeria rubra_Trunk_remove

T91_Plumeria rubra_Tag

T96_(1)_Bauhinia × blakeana_Overview_remove

T96_(2)_Bauhinia × blakeana_Crown_remove

T96_(3)_Bauhinia × blakeana_Trunk_remove



T96_(5)_Bauhinia × blakeana_trunk wound_remove

T96_Bauhinia × blakeana_Tag

T97_(1)_Delonix regia_Overview_remove

T97_(2)_Delonix regia_Crown_remove

T97_(3)_Delonix regia_Trunk_remove

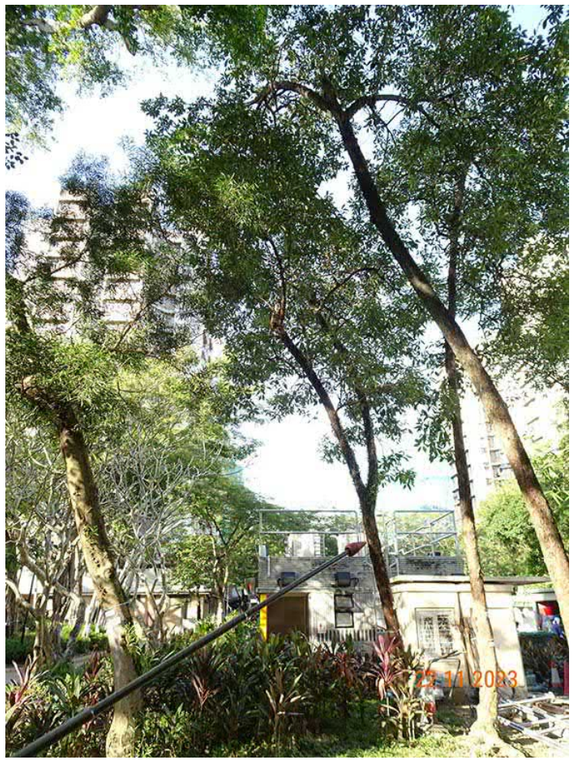
T97_Delonix regia_Tag

T98_(1)_Delonix regia_Overview_remove

T98_(2)_Delonix regia_Crown_remove

T98_(3)_Delonix regia_Trunk_remove

T98_Delonix regia_Tag



T101_(1)_Lophostemon confertus_Overview_remove

T101_(2)_Lophostemon confertus_Crown_remove

T101_(3)_Lophostemon confertus_Trunk_remove

T101_(4)_Lophostemon confertus_Base_remove

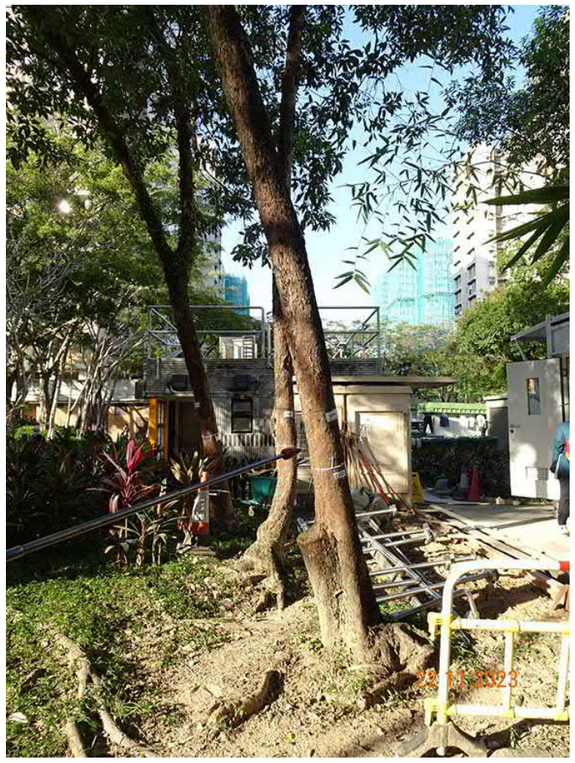
T101_Lophostemon confertus_Tag

T102_(1)_Lophostemon confertus_Overview_remove

T102_(3)_Lophostemon confertus_Trunk_remove

T102_Lophostemon confertus_Tag

T103_(1)_Lophostemon confertus_Overview_remove



T103_(3)_Lophostemon confertus_Trunk_remove

T103_(4)_Lophostemon confertus_Base_remove

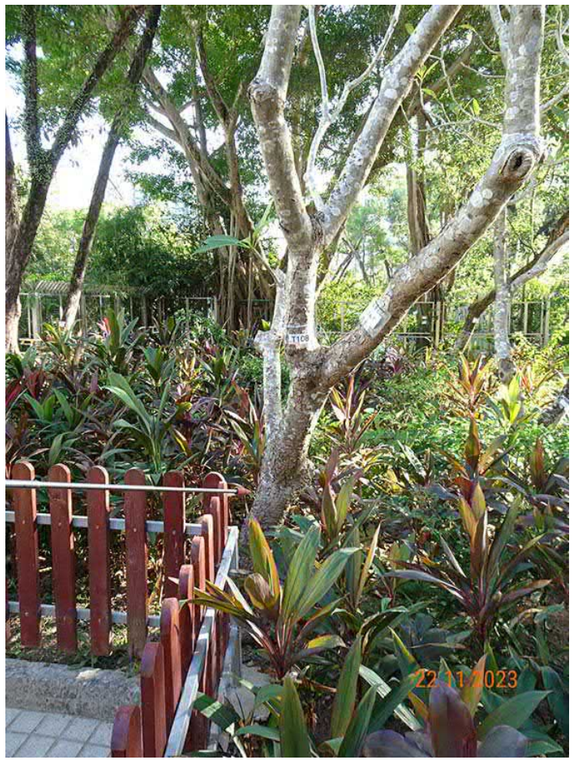
T103_Lophostemon confertus_Tag

T107_(1)_Acacia confusa_Overview_remove

T107_(3)_Acacia confusa_Trunk_remove

T107_Acacia confusa_Tag

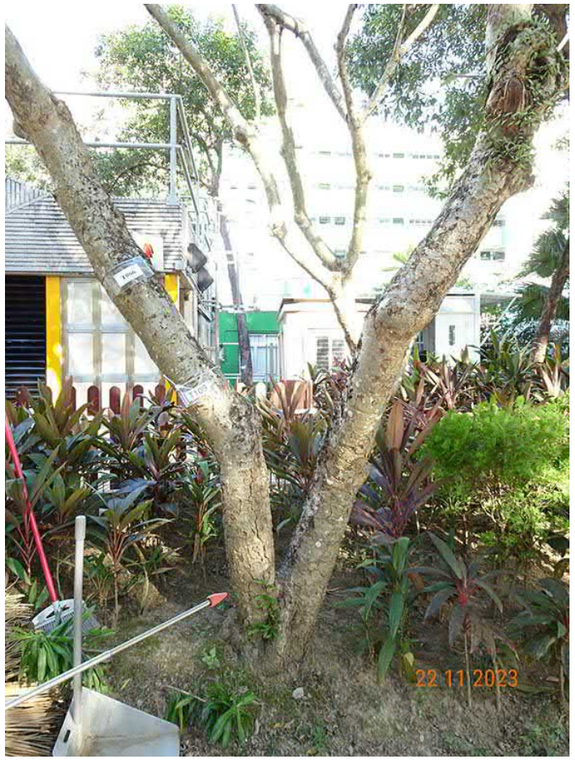
T108_(1)_Plumeria rubra_Overview_remove



T108_(3)_Plumeria rubra_Trunk_remove

T108_Plumeria rubra_Tag

T109_(1)_Plumeria rubra_Overview_remove



T109_(3)_Plumeria rubra_Trunk_remove

T109_Plumeria rubra_Tag

T110_(1)_Plumeria rubra_Overview_remove

T110_(3)_Plumeria rubra_Trunk_remove

T110_Plumeria rubra_Tag

T111_(1)_Plumeria rubra_Overview_remove

T111_(3)_Plumeria rubra_Trunk_remove

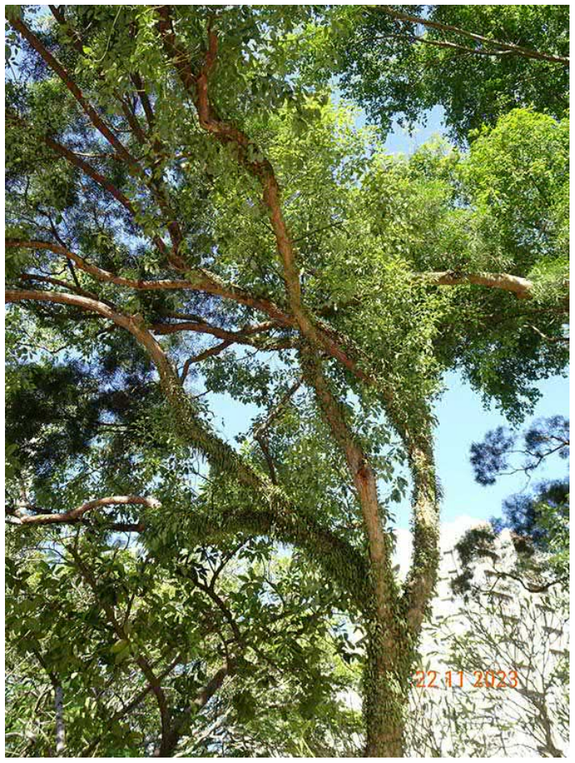
T111_Plumeria rubra_Tag

T112_(1)_Plumeria rubra_Overview_remove

T112_(3)_Plumeria rubra_Trunk_remove

T112_Plumeria rubra_Tag

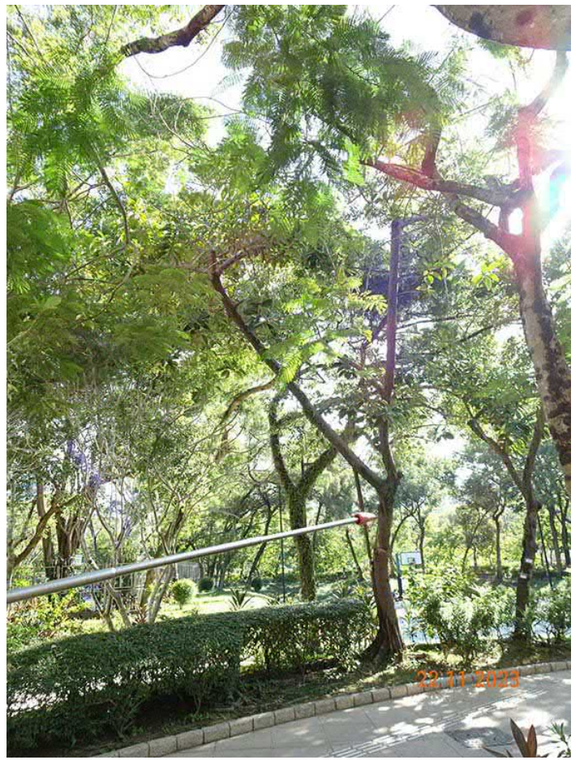
T113_(1)_Cinnamomum camphora_Overview_remove



T113_(2)_Cinnamomum camphora_Crown_remove

T113_(3)_Cinnamomum camphora_Trunk_remove

T113_Cinnamomum camphora_Tag



T114_(1)_Ficus elastica_Overview_remove

T114_(3)_Ficus elastica_Trunk_remove

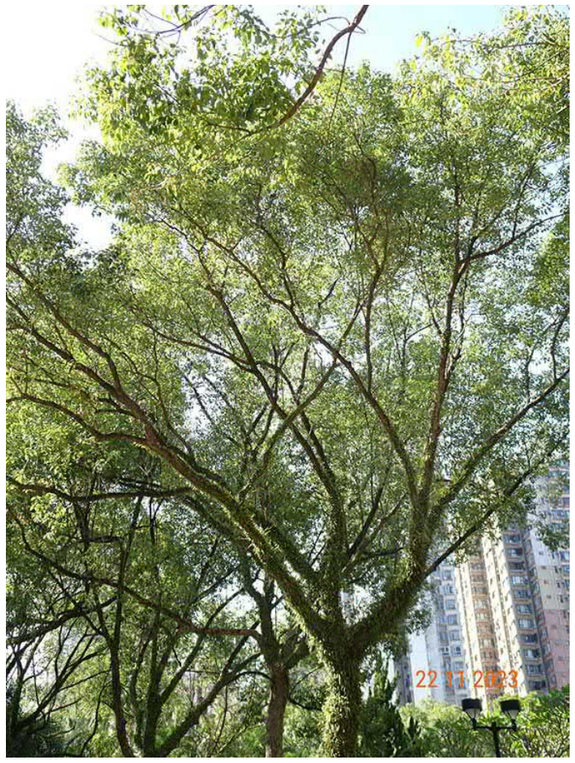
T114_Ficus elastica_Tag

T115_(1)_Ficus elastica_Overview_remove

T115_(3)_Ficus elastica_Trunk_remove

T115_Ficus elastica_Tag

T116_(1)_Cinnamomum camphora_Overview_remove



T116_(2)_Cinnamomum camphora_Crown_remove

T116_(3)_Cinnamomum camphora_Trunk_remove

T116_Cinnamomum camphora_Tag

T117_(1)_Cinnamomum camphora_Overview_remove

T117_(3)_Cinnamomum camphora_Trunk_remove

T117_Cinnamomum camphora_Tag

T118_(1)_Cinnamomum camphora_Overview_remove

T118_(2)_Cinnamomum camphora_Crown_remove

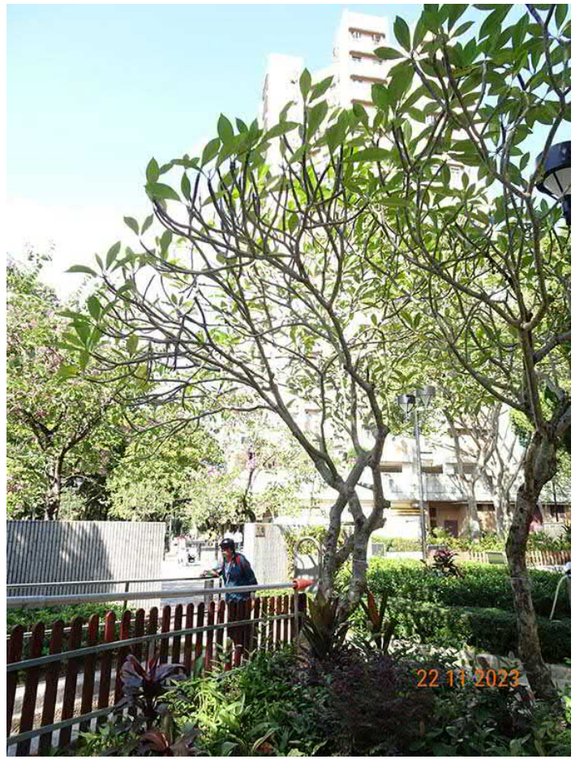
T118_(3)_Cinnamomum camphora_Trunk_remove

T118_Cinnamomum camphora_Tag

T119_ (3)_Plumeria rubra_Trunk_remove

T119_(1)_Plumeria rubra_Overview_remove

T119_Plumeria rubra_Tag



T120_(1)_Plumeria rubra_Overview_remove

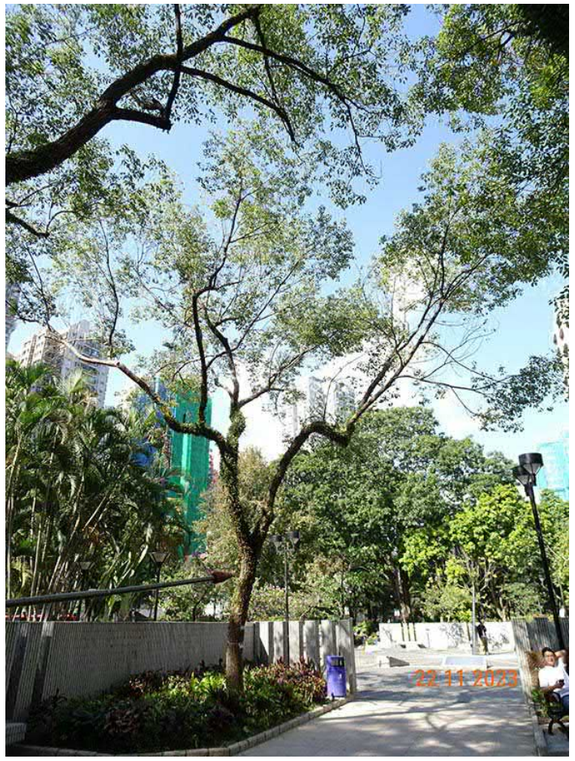
T120_(3)_Plumeria rubra_Trunk_remove

T120_Plumeria rubra_Tag

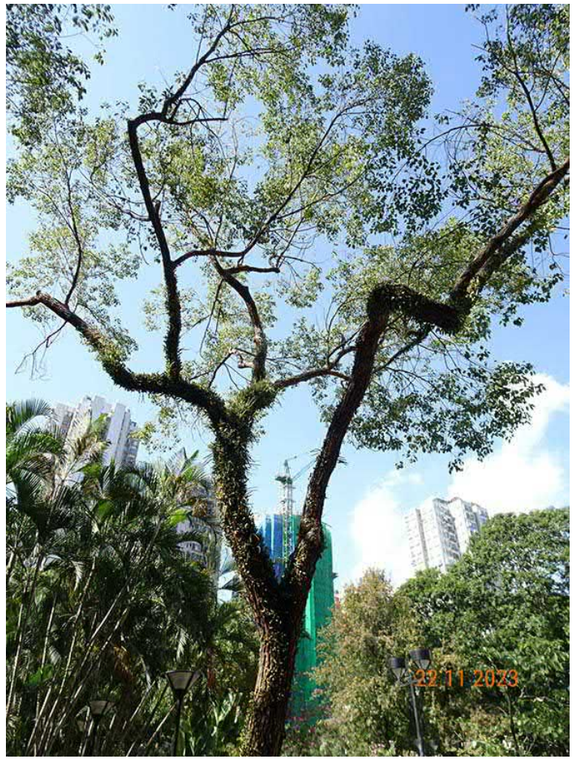
T121_(1)_Juniperus chinensis 'Kaizuca' _Overview_re...

T121_(3)_Juniperus chinensis 'Kaizuca'_Trunk_remove

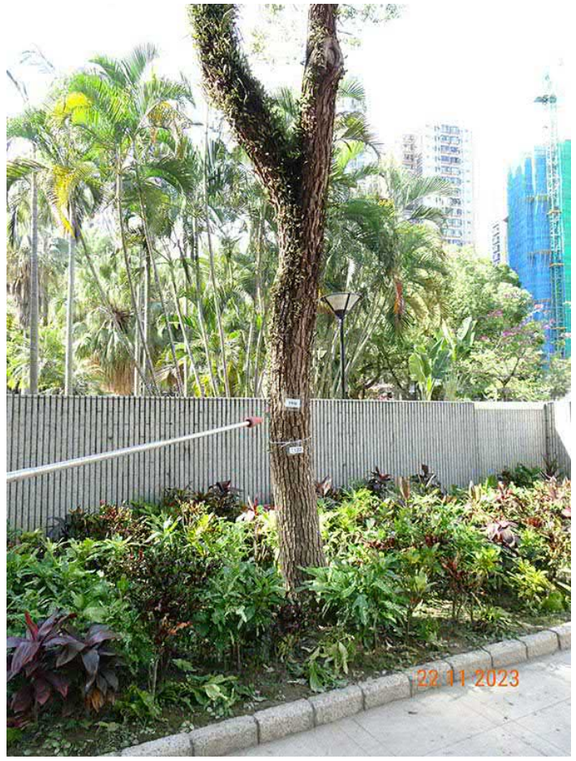
T121_Juniperus chinensis 'Kaizuca'_Tag



T122_(1)_Cinnamomum camphora_Overview_remove



T122_(2)_Cinnamomum camphora_Crown_remove



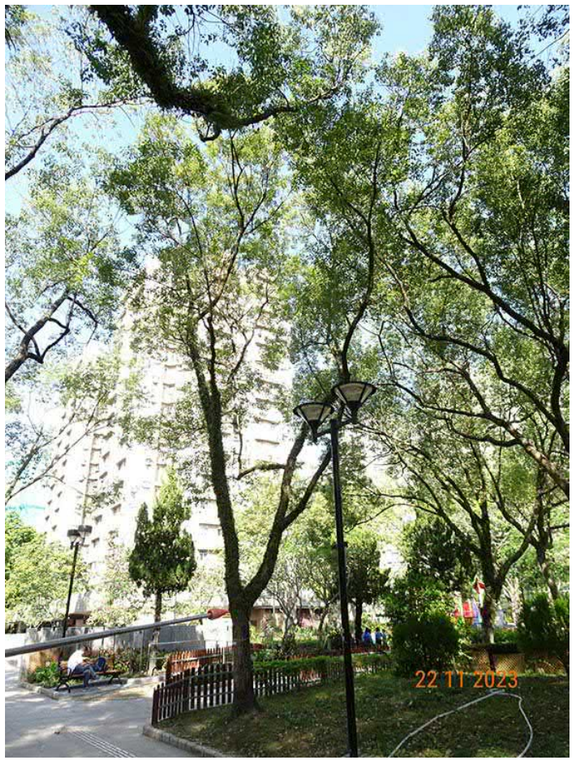
T122_(3)_Cinnamomum camphora_Trunk_remove

T122_Cinnamomum camphora_Tag

T123_(1)_Cinnamomum camphora_Overview_remove

T123_(3)_Cinnamomum camphora_Trunk_remove

T123_Cinnamomum camphora_Tag



T124_(1)_Cinnamomum camphora_Overview_remove

T124_Cinnamomum camphora_Tag

T125_(1)_Cinnamomum camphora_Overview_remove

T125_(3)_Cinnamomum camphora_Trunk_remove

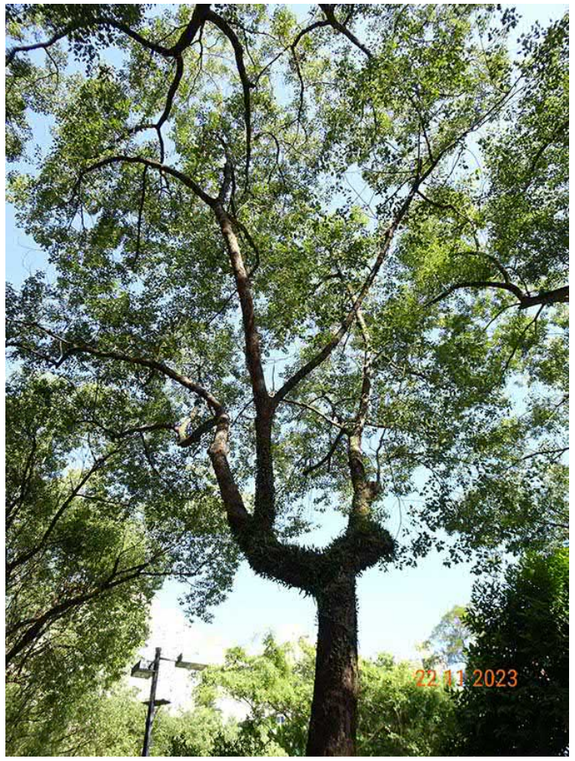
T125_Cinnamomum camphora_Tag

T126_(1)_Cinnamomum camphora_Overview_remove

T126_(3)_Cinnamomum camphora_Trunk_remove

T126_Cinnamomum camphora_Tag

T127_(1)_Cinnamomum camphora_Overview_remove

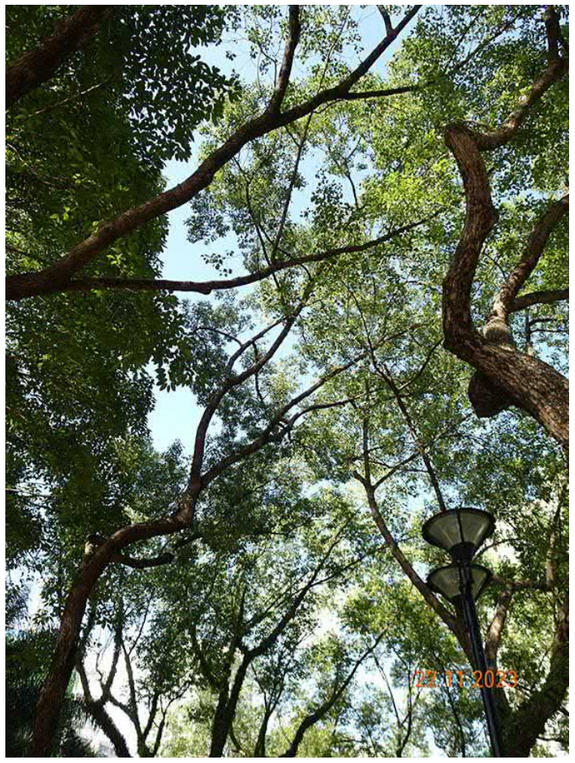


T127_(2)_Cinnamomum camphora_crown_remove

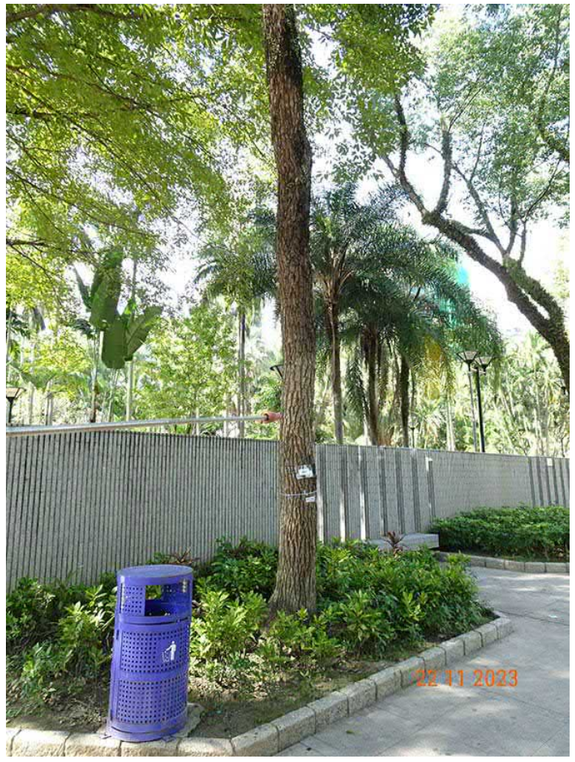
T127_(3)_Cinnamomum camphora_Trunk_remove

T127_Cinnamomum camphora_Tag

T128_(1)_Cinnamomum camphora_Overview_remove



T128_(2)_Cinnamomum camphora_Crown_remove



T128_(3)_Cinnamomum camphora_Trunk_remove

T128_Cinnamomum camphora_Tag

T129_(1)_Cinnamomum camphora_Overview_remove

T129_(2)_Cinnamomum camphora_Crown_remove

T129_(3)_Cinnamomum camphora_Trunk_remove

T129_Cinnamomum camphora_Tag

T130_(1)_Cinnamomum camphora_Overview_remove

T130_(2)_Cinnamomum camphora_Crown_remove

T130_(3)_Cinnamomum camphora_Trunk_remove

T130_Cinnamomum camphora_Tag

T131_(1)_Ravenala madagascariensis_overview_rem...

T131_(3)_Ravenala madagascariensis_Trunk_remove

T131_Ravenala madagascariensis_Tag

T132_(1)_Cinnamomum camphora_Overview_remove

T132_(2)_Cinnamomum camphora_Crown_remove

T132_(3)_Cinnamomum camphora_Trunk_remove

T132_Cinnamomum camphora_Tag

T133_(1)_Cinnamomum camphora_Overview_remove

T133_(2)_Cinnamomum camphora_Crown_remove

T133_(3)_Cinnamomum camphora_Trunk_remove

T133_Cinnamomum camphora_Tag

T134_(1)_Cassia fistula_Overview_remove

T134_(2)_Cassia fistula_Crown_remove

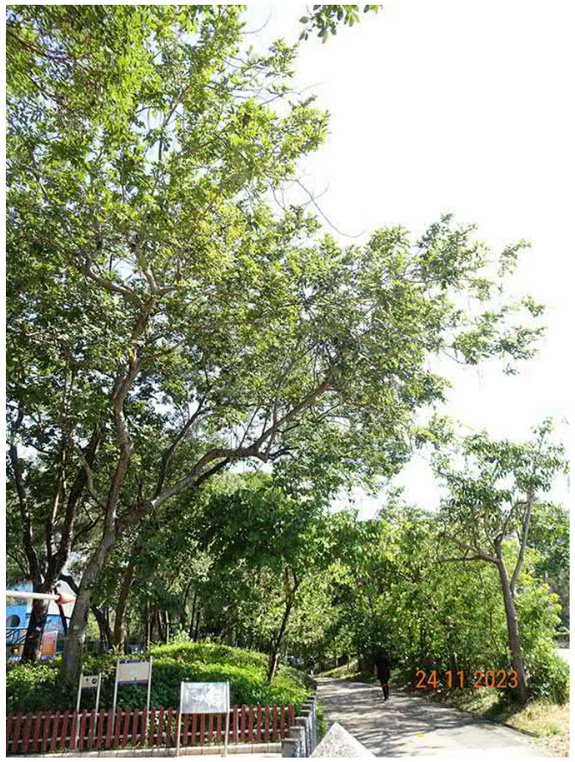
T134_(3)_Cassia fistula_Trunk_remove

T134_Cassia fistula_Tag

T135_(1)_Cassia fistula_Overview_remove

T135_(3)_Cassia fistula_Trunk_remove

T135_Cassia fistula_Tag



T136_(1)_Cassia fistula_Overview_remove

T136_(2)_Cassia fistula_Crown_remove

T136_(3)_Cassia fistula_Trunk_remove

T136_Cassia fistula_Tag

T137_(1)_Bauhinia variegata_Overview_remove

T137_(2)_Bauhinia variegata_Crown_remove

T137_(3)_Bauhinia variegata_Trunk_remove

T137_Bauhinia variegata_Tag

T138_(1)_Bauhinia × blakeana_Overview_remove

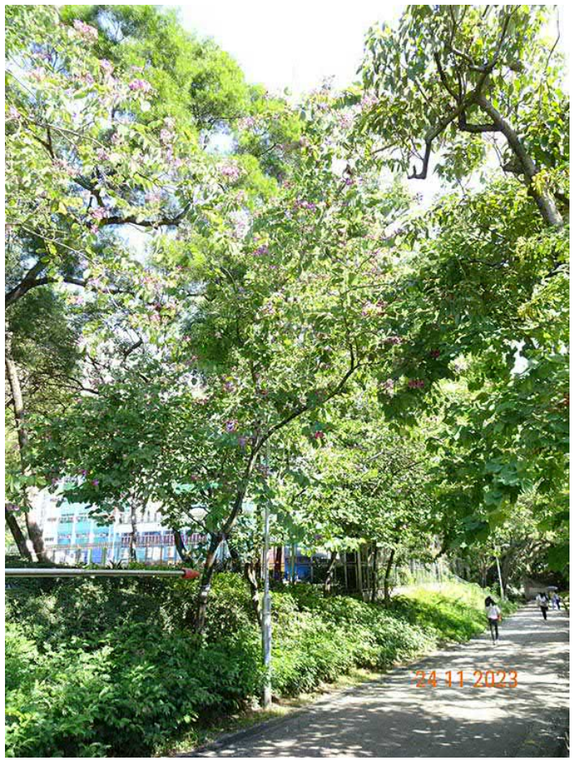
T138_(2)_Bauhinia × blakeana_Trunk_remove

T138_Bauhinia × blakeana_Tag

T139_(1)_Bauhinia × blakeana_Overview_remove

T139_(3)_Bauhinia × blakeana_Trunk_remove

T139_Bauhinia × blakeana_Tag



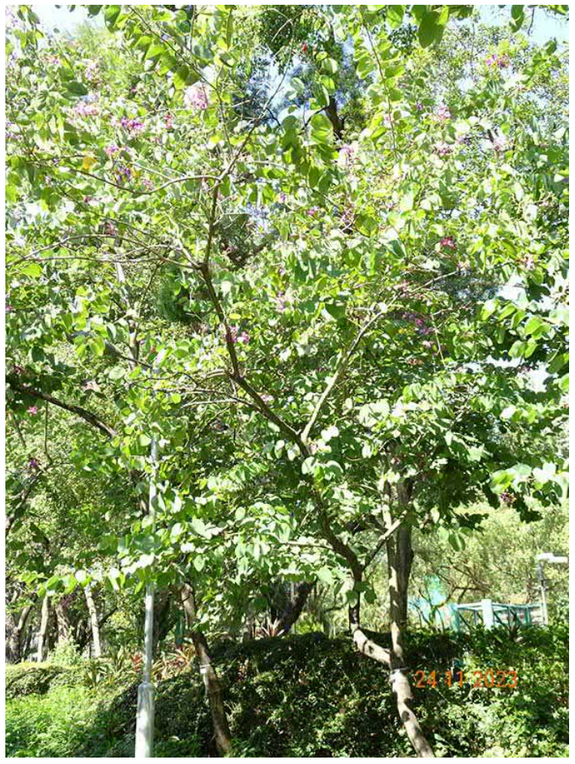
T140_(1)_Bauhinia × blakeana_Overview_remove

T140_(2)_Bauhinia × blakeana_Crown_remove

T140_(3)_Bauhinia × blakeana_Trunk_remove

T140_Bauhinia × blakeana_Tag

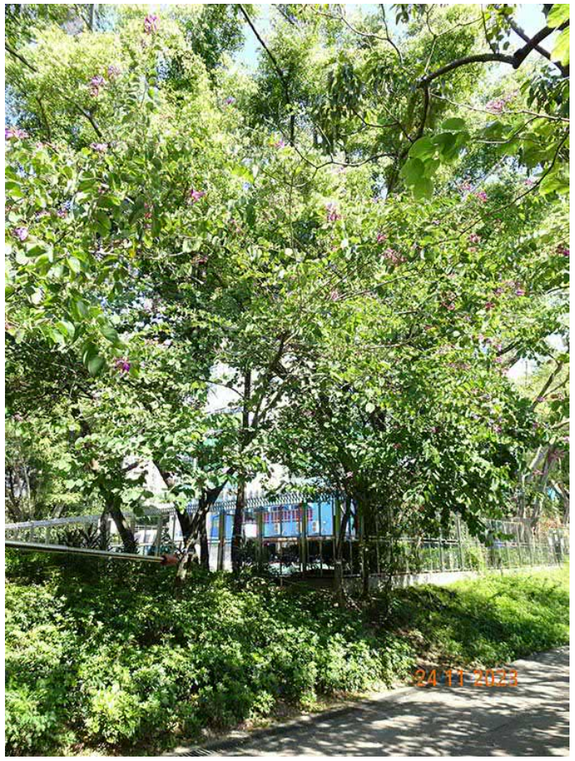
T141_(1)_Bauhinia × blakeana_Overview_remove



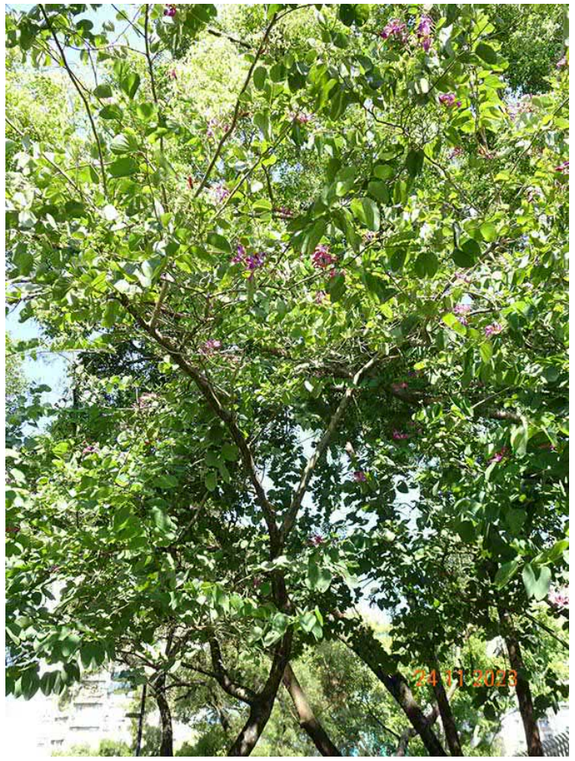
T141_(2)_Bauhinia × blakeana_Crown_remove

T141_(3)_Bauhinia × blakeana_Trunk_remove

T141_Bauhinia × blakeana_Tag



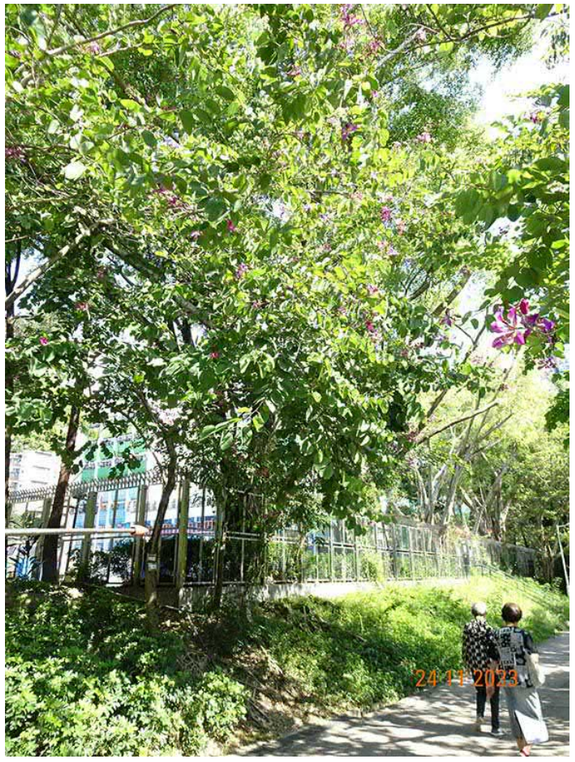
T142_(1)_Bauhinia × blakeana_Overview_remove



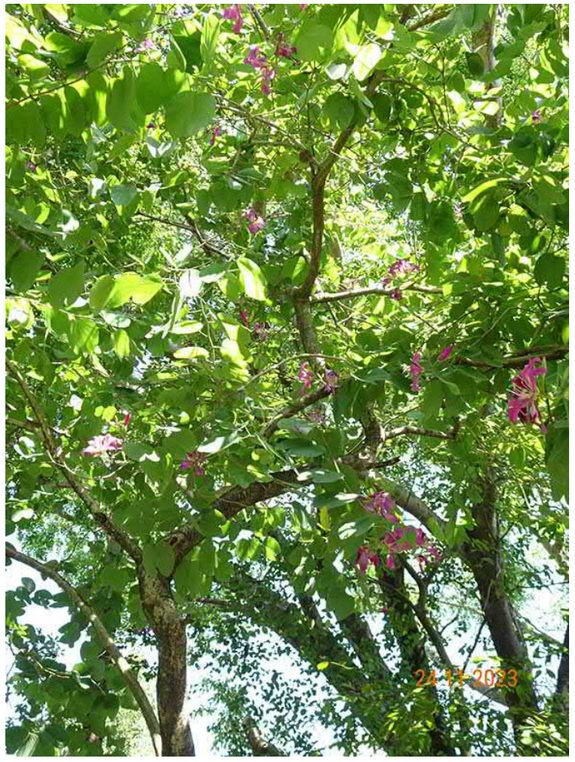
T142_(2)_Bauhinia × blakeana_Crown_remove

T142_(3)_Bauhinia × blakeana_Trunk_remove

T142_Bauhinia × blakeana_Tag



T143_(1)_Bauhinia × blakeana_Overview_remove



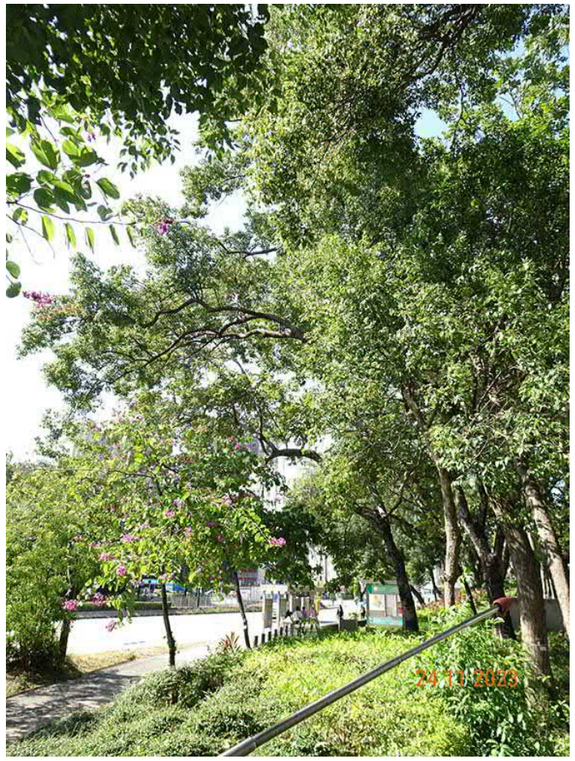
T143_(2)_Bauhinia × blakeana_Crown_remove

T143_(3)_Bauhinia × blakeana_Trunk_remove

T143_Bauhinia × blakeana_Tag

T145 _Cinnamomum camphora_Tag

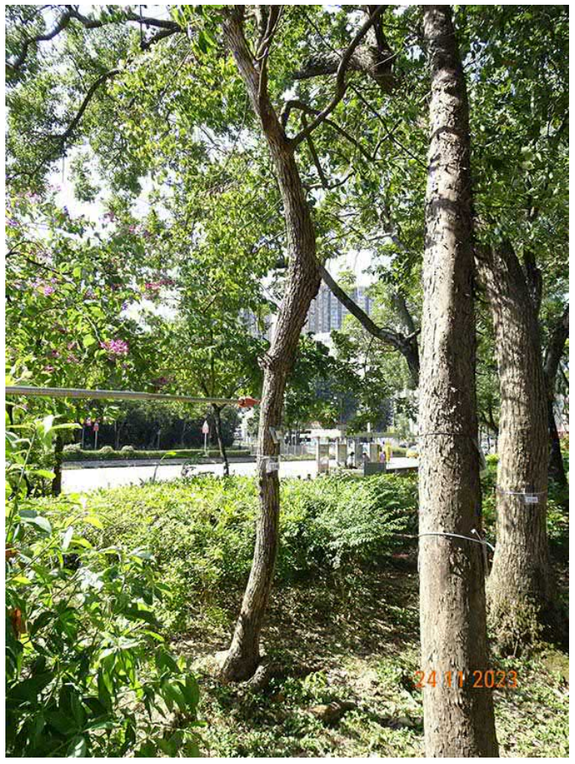
T145_(1)_Cinnamomum camphora_Overview_remove



T145_(2)_Cinnamomum camphora_Crown_remove

T145_(3)_Cinnamomum camphora_Trunk_remove

T146_(1)_Cinnamomum camphora_Overview_remove

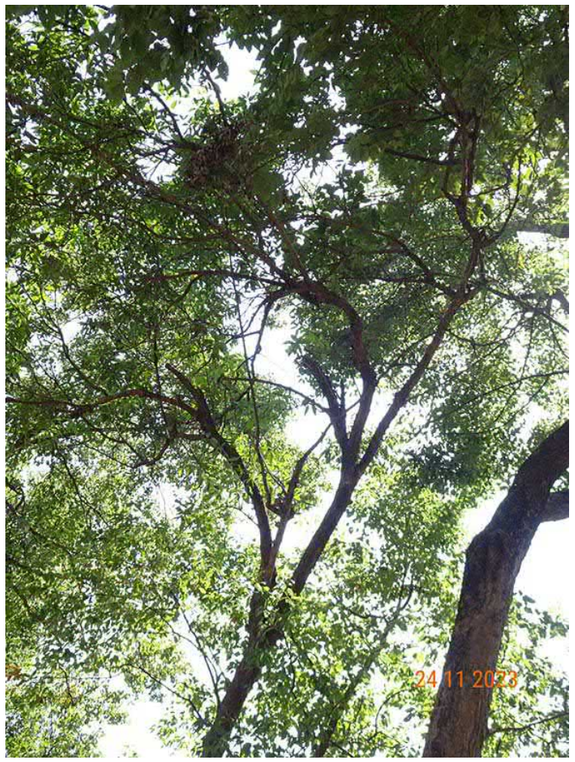


T146_(3)_Cinnamomum camphora_Trunk_remove

T146_(4)_Cinnamomum camphora_Base_remove

T146_Cinnamomum camphora_Tag

T147_(1)_Lophostemon confertus_Overview_remove



T147_(2)_Cinnamomum camphora_Crown_remove

T147_(3)_Lophostemon confertus_Trunk_remove

T147_(4)_Lophostemon confertus_Base_remove

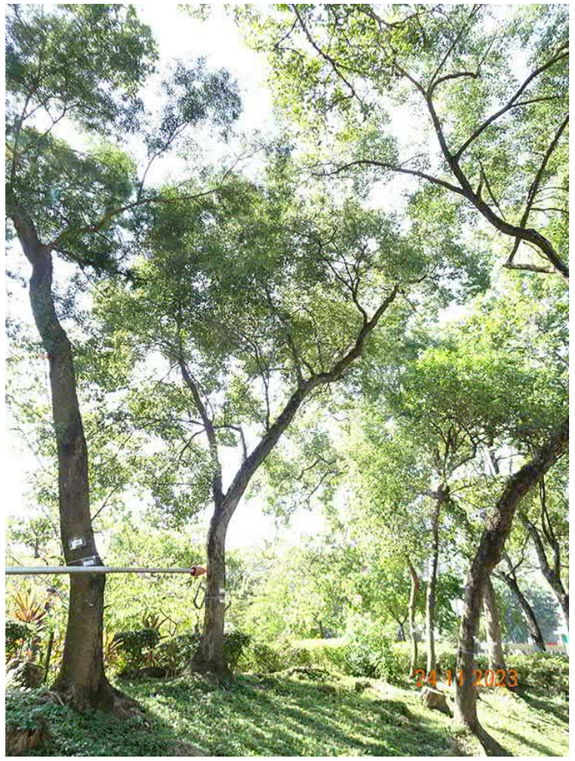
T147_Lophostemon confertus_Tag

T148_(1)_Cinnamomum camphora_Overview_remove

T148_(3)_Cinnamomum camphora_runk_remove

T148_(4)_Cinnamomum camphora_Base_remove

T148_Cinnamomum camphora_Tag



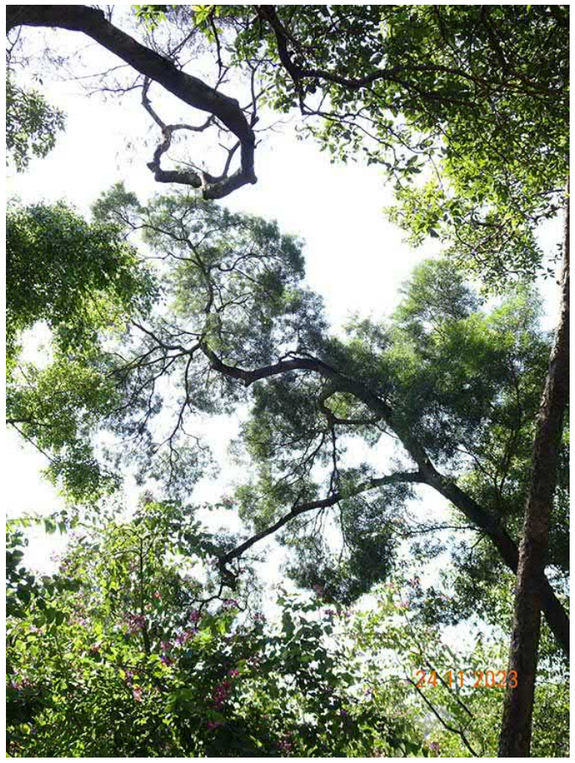
T149_(1)_Cinnamomum camphora_Overview_remove

T149_(3)_Cinnamomum camphora_Trunk_remove

T149_Cinnamomum camphora_Tag

T150 _Acacia confusa_Tag

T150_(1)_Acacia confusa_Overview_remove



T150_(2)_Acacia confusa_Crown_remove

T150_(3)_Acacia confusa_Trunk_remove

T151_ Lophostemon confertus_Tag

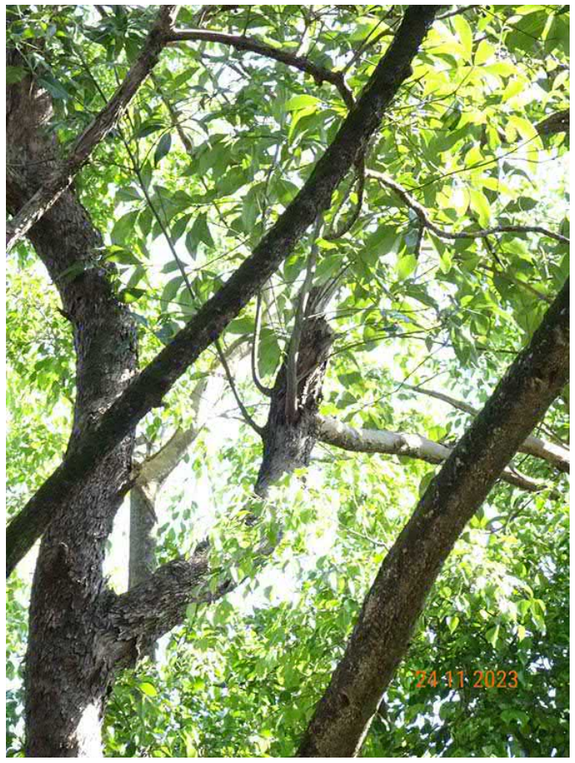
T151_(1)_Lophostemon confertus_Overview_remove

T151_(2)_Lophostemon confertus_Crown_remove

T151_(3)_Lophostemon confertus_Trunk_remove

T152_(1)_Lophostemon confertus_Overview_remove

T152_(3)_Lophostemon confertus_Trunk_remove



T152_(5)_Lophostemon confertus_Trunk wound_remo...

T152_Lophostemon confertus_Tag

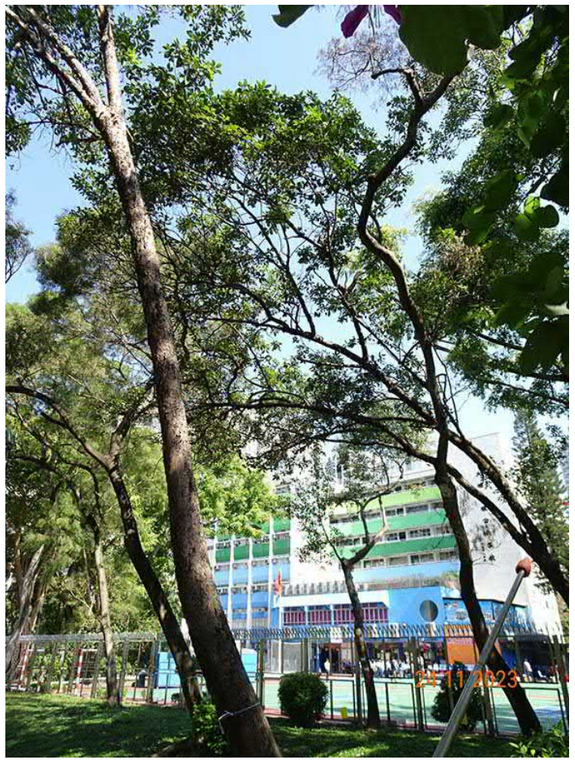
T153_(1)_Lophostemon confertus_Overview_remove

T153_(3)_Lophostemon confertus_Trunk_remove

T153_(4)_Lophostemon confertus_Base_remove

T153_Lophostemon confertus_Tag

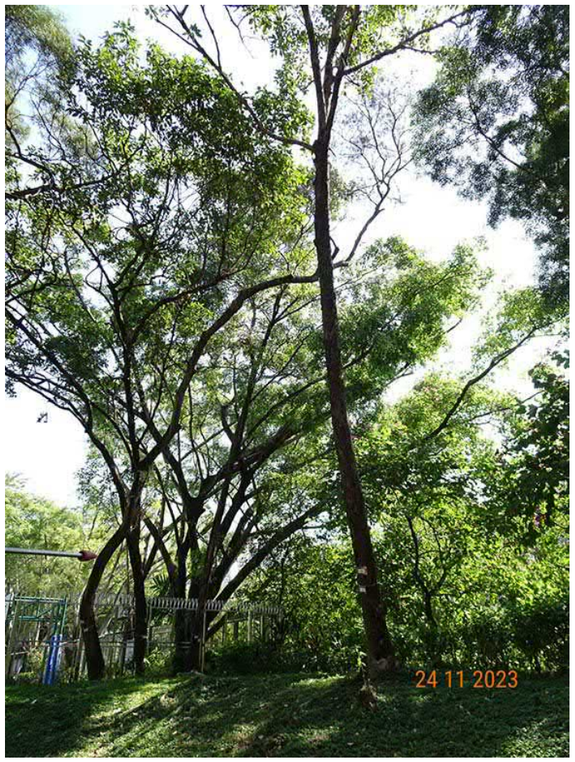
T154_(1)_Lophostemon confertus_Overview_remove



T154_(2)_Lophostemon confertus_Crown_remove

T154_(3)_Lophostemon confertus_Trunk_remove

T154_Lophostemon confertus_Tag



T155_(1)_Acacia confusa_Overview_remove

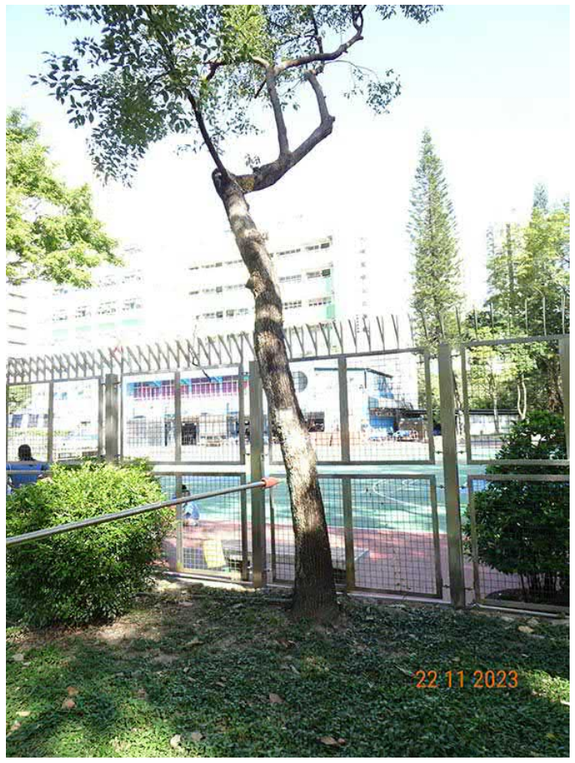
T155_(2)_Acacia confusa_Crown_remove

T155_(3)_Acacia confusa_Trunk_remove

T155_(5)_Acacia confusa_decay fungi branch_remove

T155_Acacia confusa_Tag

T156_(1)_Cinnamomum camphora_Overview_remove



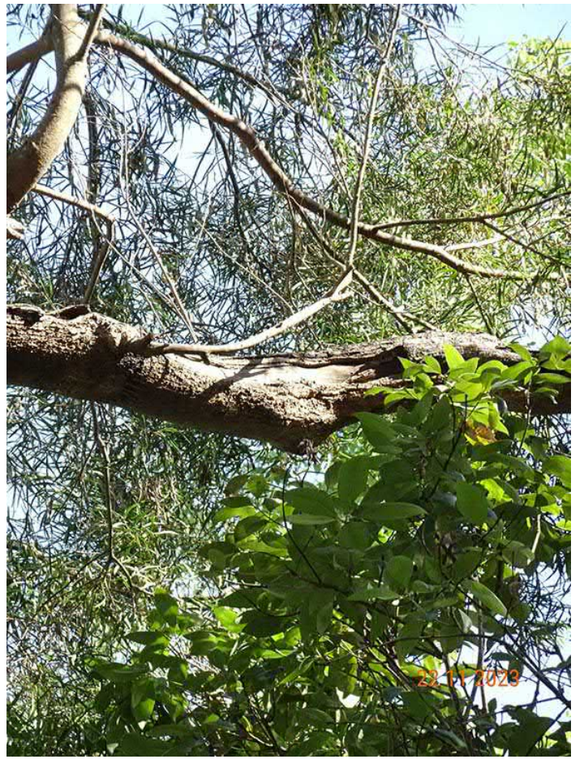
T156_(3)_Cinnamomum camphora_Trunk_remove

T156_Cinnamomum camphora_Tag

T157_(1)_Acacia confusa_Overview_remove

T157_(2)_Acacia confusa_Crown_remove

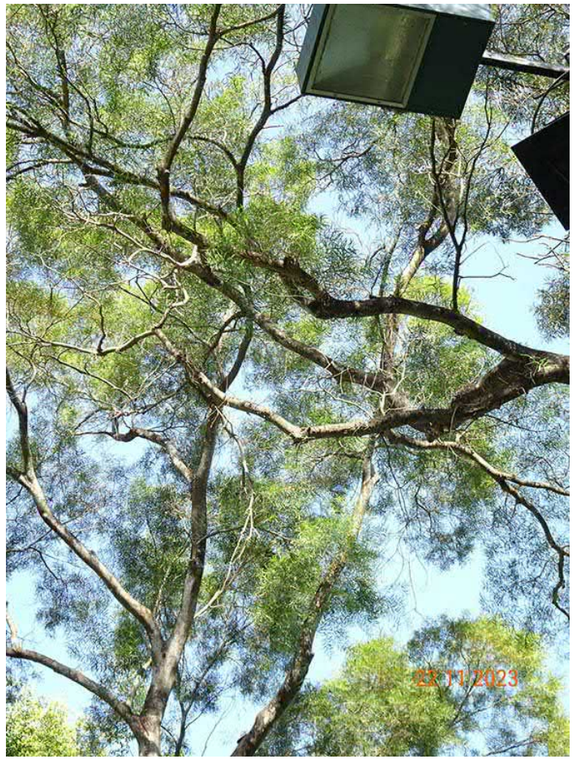
T157_(3)_Acacia confusa_Trunk_remove



T157_(5)_Acacia confusa_decay branch_remove

T157_Acacia confusa_Tag

T158_(1)_Acacia confusa_Overview_remove



T158_(2)_Acacia confusa_Crown_remove

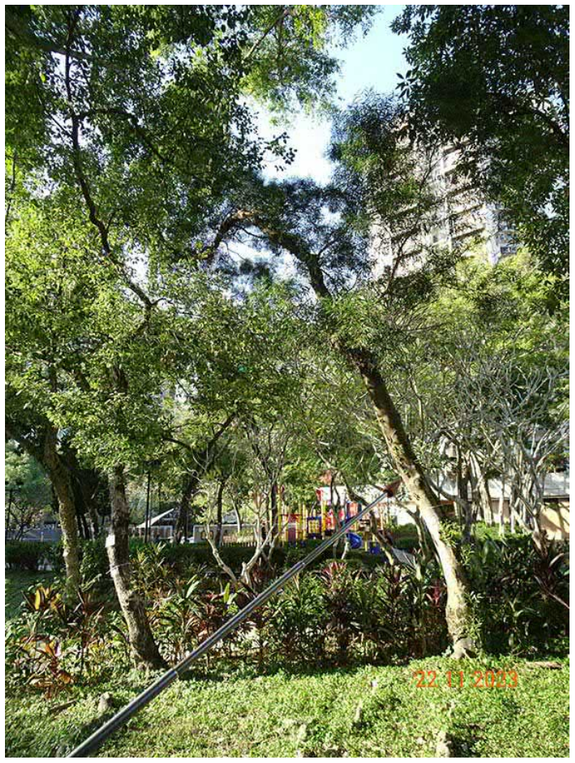
T158_(3)_Acacia confusa_Trunk_emove

T158_Acacia confusa_Tag

T159_ Acacia confusa_Tag

T159_(1)_Acacia confusa_Overview_remove

T159_(3)_Acacia confusa_Trunk_remove

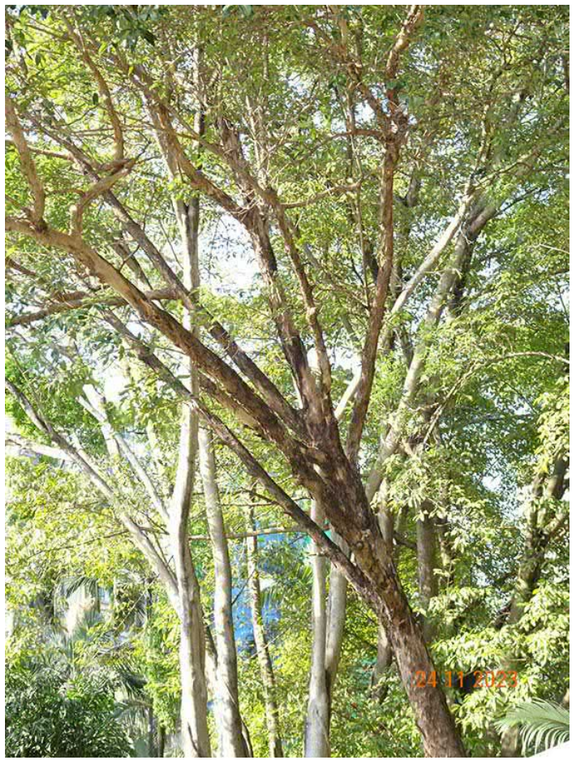


T160_(1)_Acacia confusa_Overview_remove

T160_(3)_Acacia confusa_Trunk_remove

T160_Acacia confusa_Tag

T219_(1)_Lophostemon confertus_Overview_remove



T219_(2)_Lophostemon confertus_Crown_remove

T219_(3)_Lophostemon confertus_Trunk_remove

T219_Lophostemon confertus_Tag

T220_(1)_Lophostemon confertus_Overview_remove

T220_(3)_Lophostemon confertus_Trunk_remove

T220_(5)_Lophostemon confertus_trunk conflict with s...

T220_Lophostemon confertus_Tag

T253_(1)_Livistona chinensis_Overview_retain

T253_(3)_Livistona chinensis_Trunk_retain

T253_Livistona chinensis_Tag

T254_(1)_Livistona chinensis_Overview_retain

T254_(3)_Livistona chinensis_Trunk_retain

T254_Livistona chinensis_Tag

T255_(1)_Dypsis lutescens_Overview_retain

T255_(2)_Dypsis lutescens_Trunk_retain

T255_Dypsis lutescens_Tag

T256_(1)_Dypsis lutescens_Overview_retain

T256_(3)_Dypsis lutescens_Trunk_retain

T256_Dypsis lutescens_Tag

T257_(1)_Dypsis lutescens_Overview_retain

T257_(3)_Dypsis lutescens_Trunk_retain

T257_Dypsis lutescens_Tag

T258_(1)_Dypsis lutescens_Overview_retain

T258_(3)_Dypsis lutescens_Trunk_retain

T258_Dypsis lutescens_Tag

T259_(1)_Ravenala madagascariensis_Overview_rem...

T259_(2)_Ravenala madagascariensis_Trunk_remove

T259_Ravenala madagascariensis_Tag

T260_(1)_Ravenala madagascariensis_Overview_rem...

T260_(3)_Ravenala madagascariensis_Trunk_remove

T260_Ravenala madagascariensis_Tag

T261_(1)_Dypsis lutescens_Overview_remove

T261_(3)_Dypsis lutescens_Trunk_remove

T261_Dypsis lutescens_Tag

T262_(1)_Dypsis lutescens_Overview_remove

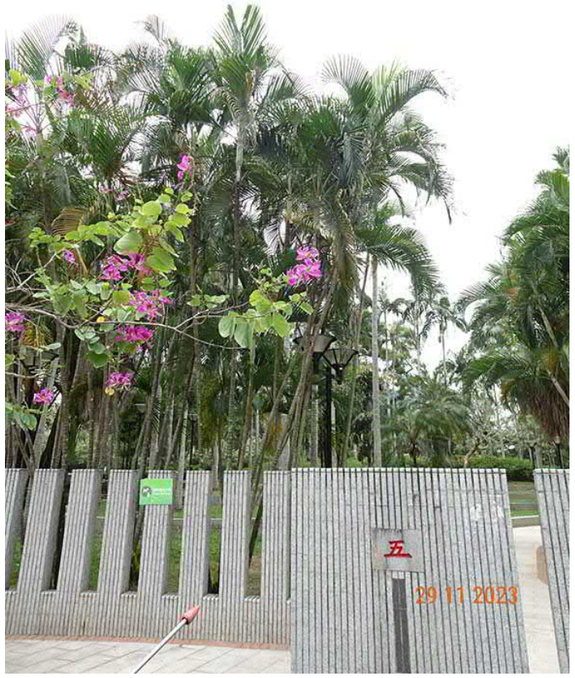
T262_(3)_Dypsis lutescens_Trunk_remove

T262_Dypsis lutescens_Tag

T263_(1)_Dypsis lutescens_Overview_remove

T263_(2)_Dypsis lutescens_Trunk_remove

T263_Dypsis lutescens_Tag

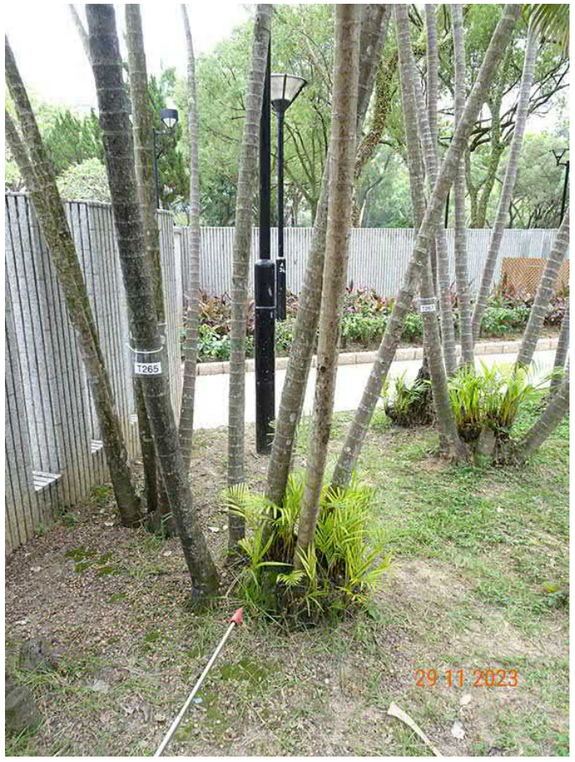


T264_(1)_Dypsis lutescens_Overview_remove

T264_(3)_Dypsis lutescens_Trunk_removeo

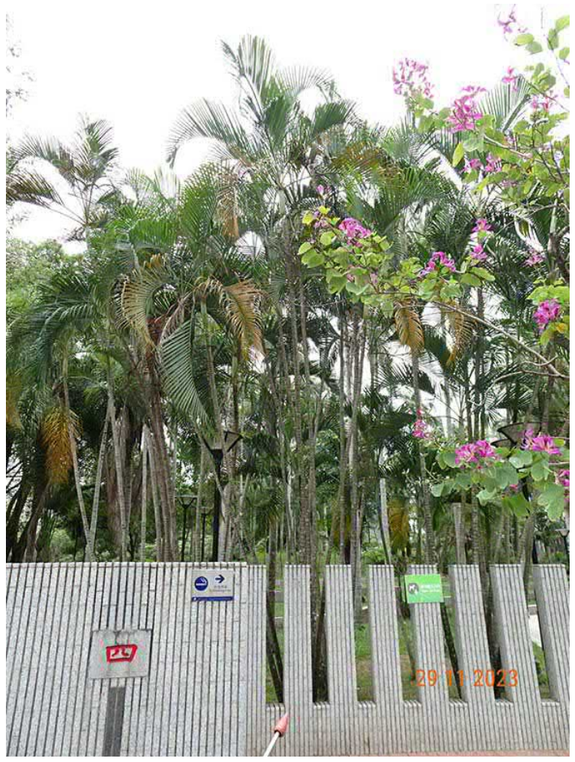
T264_Dypsis lutescens_Tag

T265_(1)_Dypsis lutescens_Overview_remove



T265_(3)_Dypsis lutescens_Trunk_remove

T265_Dypsis lutescens_Tag



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T266_(3)_Dypsis lutescens_Trunk_remove

T266_Dypsis lutescens_Tag

T267_(1)_Dypsis lutescens_Overview_remove

T267_(3)_Dypsis lutescens_Trunk_remove

T267_Dypsis lutescens_Tag

T268_(1)_Dypsis lutescens_Overview_remove

T268_(3)_Dypsis lutescens_Trunk_remove

T268_Dypsis lutescens_Tag

T269_(1)_Dypsis lutescens_Overview_remove

T269_(3)_Dypsis lutescens_Trunk_remove

T269_Dypsis lutescens_Tag

T270_(1)_Ravenala madagascariensis_Overview_rem...

T270_(3)_Ravenala madagascariensis_Trunk_remove

T270_Ravenala madagascariensis_Tag

T271_(1)_Ravenala madagascariensis_Overview_rem...

T271_(3)_Ravenala madagascariensis_Trunk_remove

T271_Ravenala madagascariensis_Tag

T272_(1)_Syagrus romanzoffiana_Overview_remove

T272_(3)_Syagrus romanzoffiana_Trunk-remove

T272_Syagrus romanzoffiana_Tag

T273_(1)_Syagrus romanzoffiana_Overview_remove

T273_(3)_Syagrus romanzoffiana_Trunk_remove

T273_Syagrus romanzoffiana_Tag

T274_(1)_Archontophoenix alexandrae_Overview_re...

T274_(3)_Archontophoenix alexandrae_Trunk_remove

T274_Archontophoenix alexandrae_Tag

T275_(1)_Archontophoenix alexandrae_Overview_re...

T275_(3)_Archontophoenix alexandrae_Trunk_remove

T275_Archontophoenix alexandrae_Tag

T276_(1)_Archontophoenix alexandrae_Overview_re...

T276_(3)_Archontophoenix alexandrae_Trunk_remove

T276_Archontophoenix alexandrae_Tag

T277_(1)_Archontophoenix alexandrae_Overview_re...

T277_(3)_Archontophoenix alexandrae_Trunk_remove

T277_Archontophoenix alexandrae_Tag

T278_(1)_Archontophoenix alexandrae_Overview_ret...

T278_(3)_Archontophoenix alexandrae_Trunk_retain

T278_Archontophoenix alexandrae_Tag

T279_(1)_Archontophoenix alexandrae_Overview_ret...

T279_(3)_Archontophoenix alexandrae_Trunk_retain

T279_Archontophoenix alexandrae_Tag

T280_(1)_Archontophoenix alexandrae_Overview_ret...

T280_(3)_Archontophoenix alexandrae_Trunk_retain

T280_Archontophoenix alexandrae_Tag

T281_(1)_Phoenix roebelenii_Overview_retain

T281_(3)_Phoenix roebelenii_Trunk_retain

T281_Phoenix roebelenii_Tag

T282_(1)_Phoenix roebelenii_Overview_retain

T282_(3)_Phoenix roebelenii_Trunk_retain

T282_Phoenix roebelenii_Tag

T283_(1)_Caryota mitis_Overview_retain

T283_(3)_Caryota mitis_Trunk_retain

T283_Caryota mitis_Tag

T288_(1)_Caryota mitis_Overview_retain

T288_(4)_Caryota mitis_Base_retain

T288_Caryota mitis_Tag

T289_(1)_Archontophoenix alexandrae_Overview_re...

T289_(3)_Archontophoenix alexandrae_Trunk_remove

T289_Archontophoenix alexandrae_Tag

T290_(1)_Syagrus romanzoffiana_Overview_remove

T290_(3)_Syagrus romanzoffiana_Trunk_remove

T290_Syagrus romanzoffiana_Tag

T291_(1)_Archontophoenix alexandrae_Overview_ret...

T291_(3)_Archontophoenix alexandrae_Trunk_retain

T291_Archontophoenix alexandrae_Tag

T292_(1)_Archontophoenix alexandrae_Overview_ret...

T292_(3)_Archontophoenix alexandrae_Trunk_retain

T292_Archontophoenix alexandrae_Tag

T293_(1)_Archontophoenix alexandrae_Overview_ret...

T293_(3)_Archontophoenix alexandrae_Trunk_retain

T293_Archontophoenix alexandrae_Tag

T294_ (1)_Michelia × alba_Overview_retain

T294_ (3)_Michelia × alba_Trunk_retain

T294_Michelia × alba_Tag

T295_(1)_Archontophoenix alexandrae_Overview_ret...

T295_(3)_Archontophoenix alexandrae_Trunk_retain

T295_Archontophoenix alexandrae_Tag

T296_(1)_Archontophoenix alexandrae_Overview_ret...

T296_(3)_Archontophoenix alexandrae_Trunk_retain

T296_Archontophoenix alexandrae_Tag

T297_(1)_Archontophoenix alexandrae_Overview_ret...

T297_(3)_Archontophoenix alexandrae_Trunk_retain

T297_Archontophoenix alexandrae_Tag

T298_ (1)_Archontophoenix alexandrae_Overview_ret...

T298_ (3)_Archontophoenix alexandrae_Trunk_retain

T298_ Archontophoenix alexandrae_Tag

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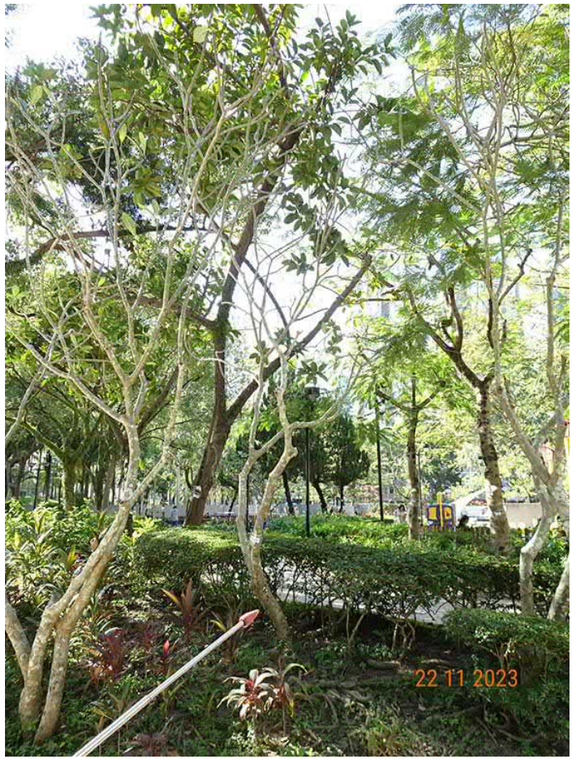
T300_Dypsis lutescens_Tag



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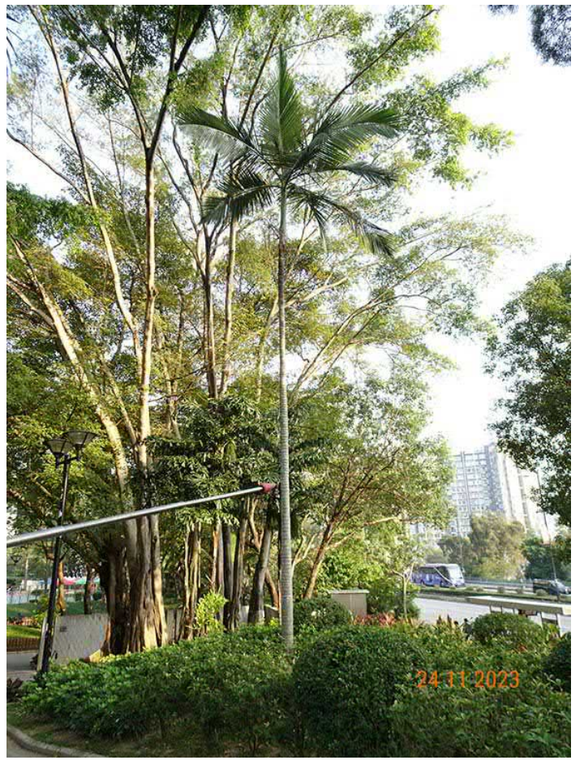
T301_(3)_Plumeria rubra_Trunk_remove

T301_Plumeria rubra_Tag



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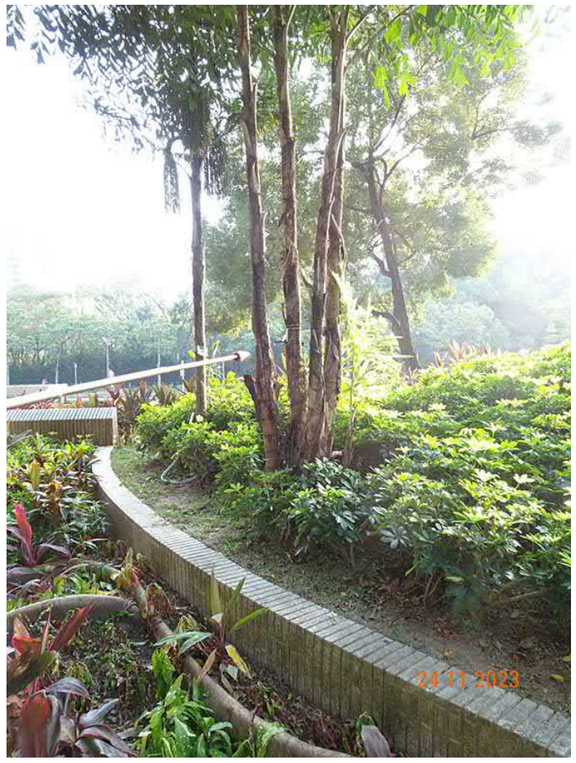
T324_(1)_Caryota mitis_Overview_retain



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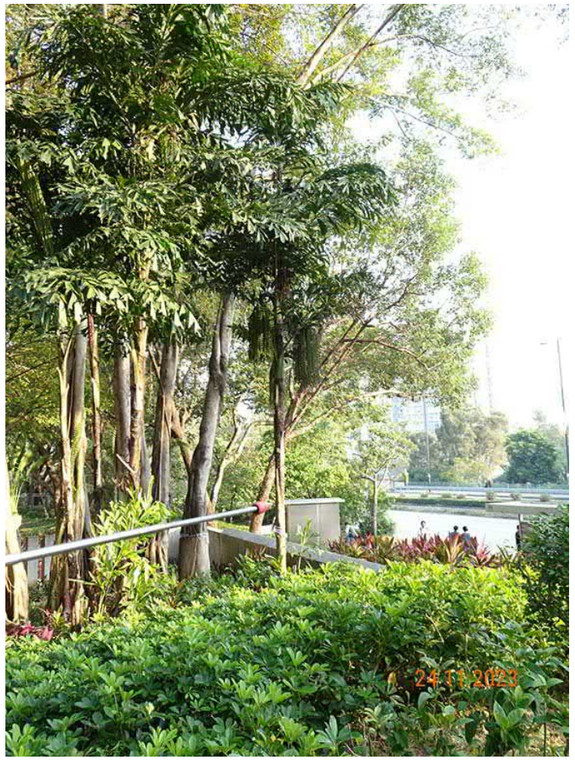

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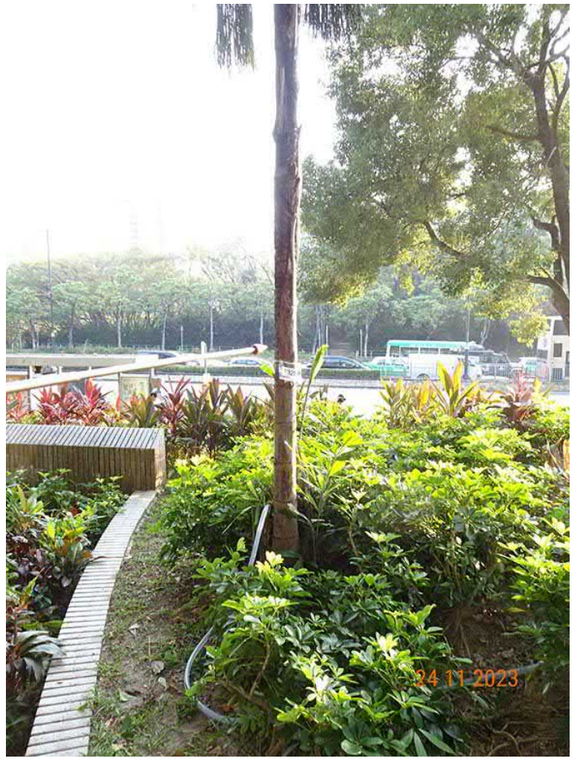


T325_(3)_Caryota mitis_Trunk_retain

T325_Caryota mitis_Tag

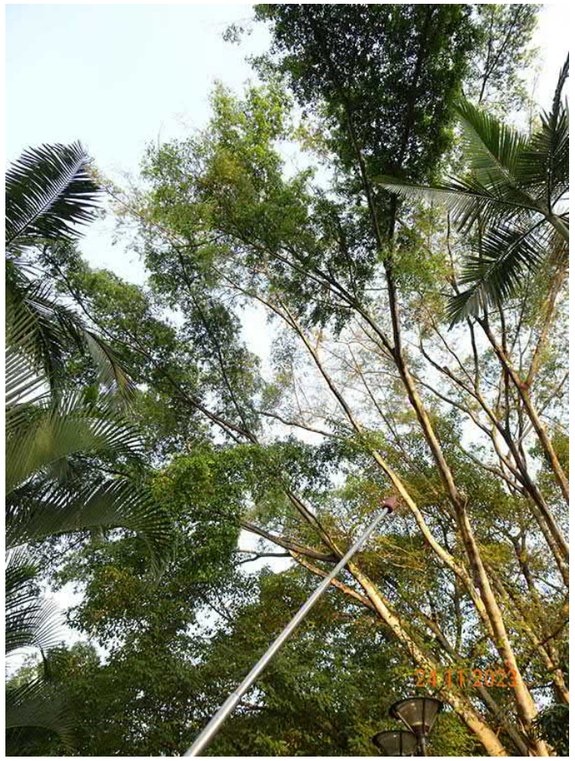
T326_(1)_Ficus benjamina_Overview_remove

T326_(2)_Ficus benjamina_Crown_remove

T326_(3)_Ficus benjamina_Trunk_remove

T326_Ficus benjamina_Tag

T327_(1)_Ficus benjamina_Overview_remove



T327_(2)_Ficus benjamina_Crown_remove

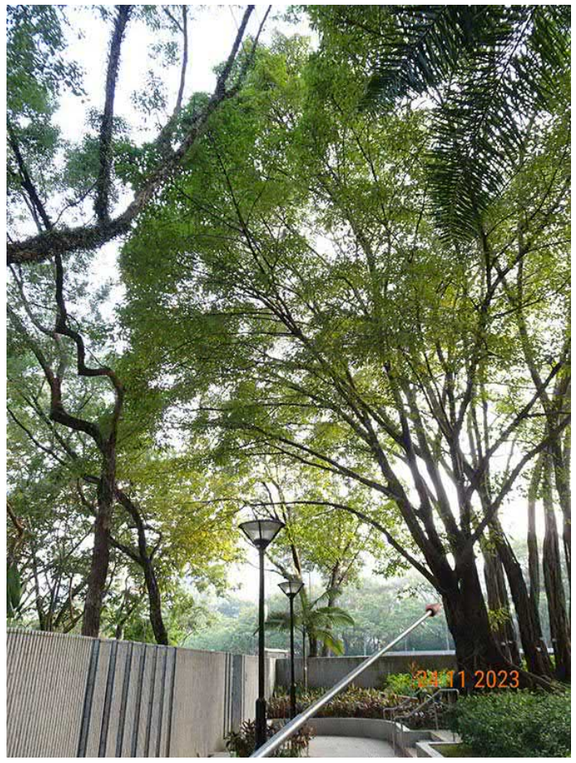
T327_(3)_Ficus benjamina_Trunk_remove

T327_Ficus benjamina_Tag

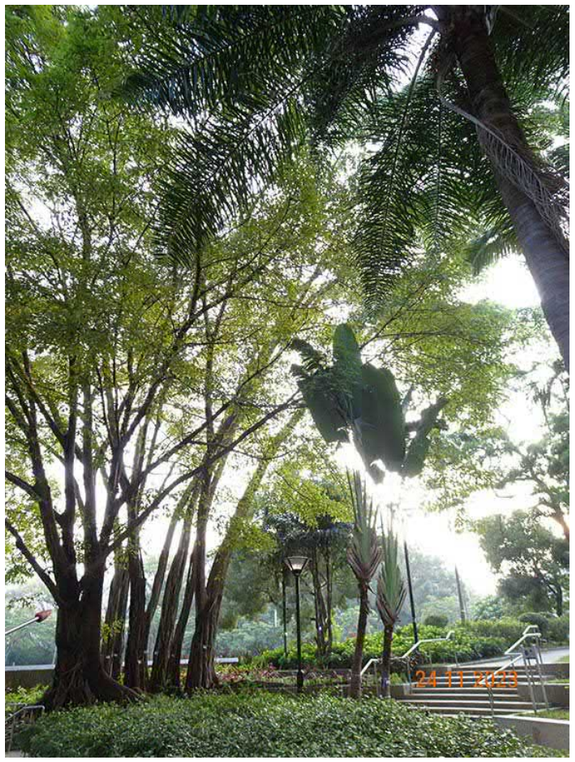
T328_(1)_Ficus benjamina_Overview_remove

T328_(3)_Ficus benjamina_Trunk_remove

T328_Ficus benjamina_Tag



T329_(1)_Ficus virens_Overview_remove



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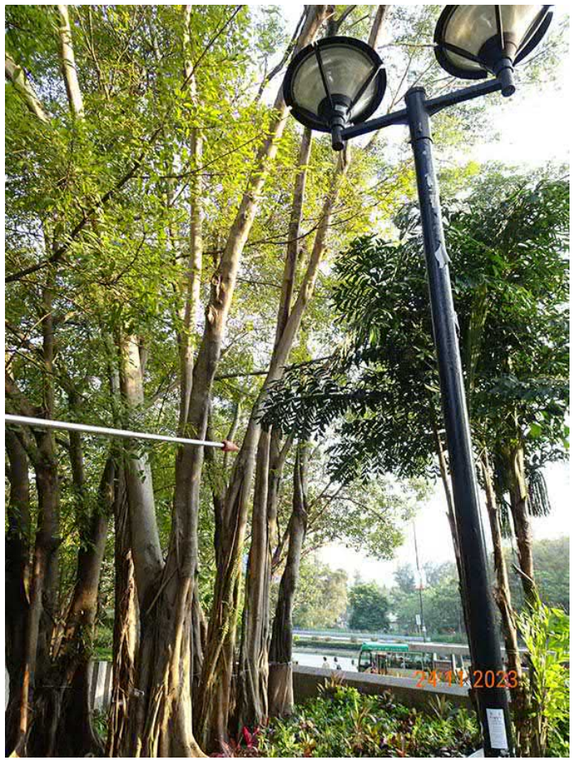
T329_(3)_Ficus virens_Trunk_remove

T329_(4)_Ficus virens_Base_remove

T329_Ficus virens_Tag



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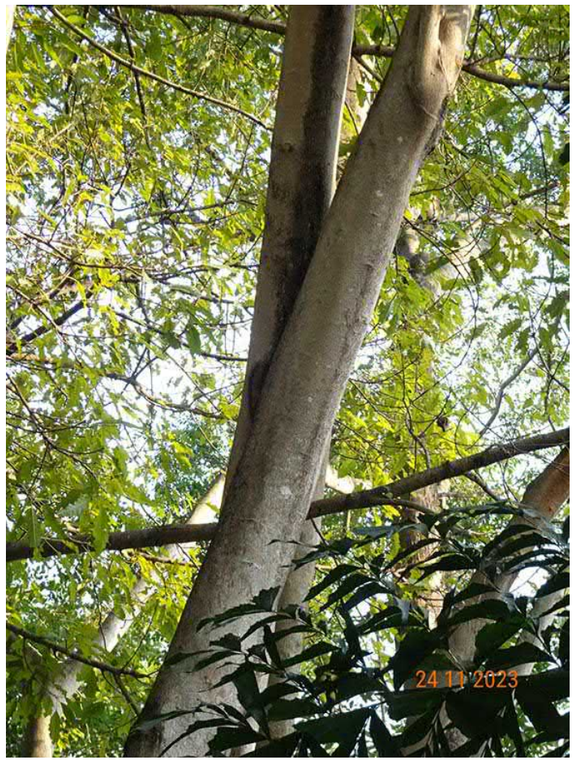
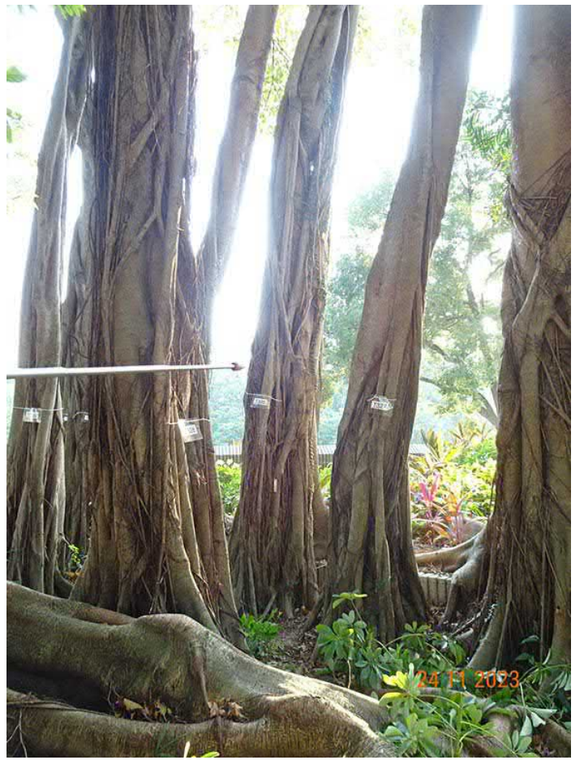
T330_(2)_Ficus benjamina_Crown_remove



T330_(3)_Ficus benjamina_Trunk_remove



T330_(4)_Ficus benjamina_Base_remove

T330_Ficus benjamina_Tag

T331_(1)_Ficus benjamina_Overview_remove

T331_(3)_Ficus benjamina_Trunk_remove

T331_Ficus benjamina_Tag

T332_(1)_Ficus benjamina_Overview_remove

T332_(3)_Ficus benjamina_Trunk_remove

T332_Ficus benjamina_Tag

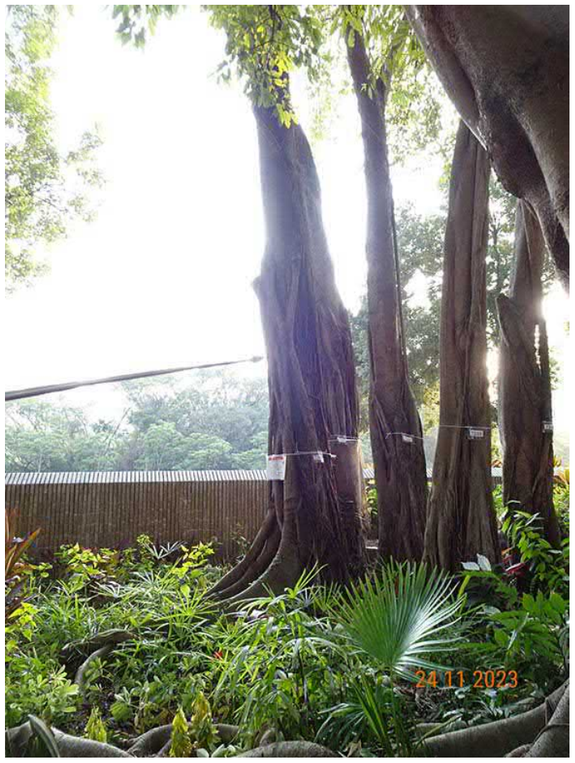
T333_(1)_Ficus benjamina_Overview_remove

T333_(3)_Ficus benjamina_Trunk_remove

T333_Ficus benjamina_Tag

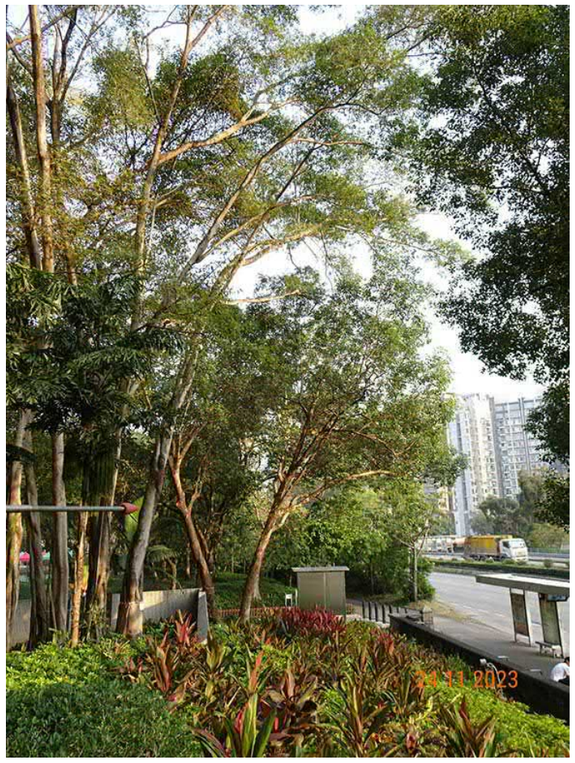
T334_(1)_Ficus benjamina_Overview_remove

T334_(2)_Ficus benjamina_Crown_remove



T334_(3)_Ficus benjamina_Trunk_remove

T334_Ficus benjamina_Tag



T335_(1)_Ficus benjamina_Overview_remove

T335_(3)_Ficus benjamina_Trunk_remove

T335_Ficus benjamina_Tag

T336_ Archontophoenix alexandrae_Tag

T336_(1)_Archontophoenix alexandrae_Overview_re...

T336_(3)_Archontophoenix alexandrae_Trunk_remove

T339_(1)_Chukrasia tabularis_Oveview_retain

T339_(3)_Chukrasia tabularis_Trunk_retain

T340_(1)_Ficus microcarpa_Overview_retain

T340_(3)_Ficus microcarpa_Trunk_retain

T341_(1)_Chukrasia tabularis_Overview_retain

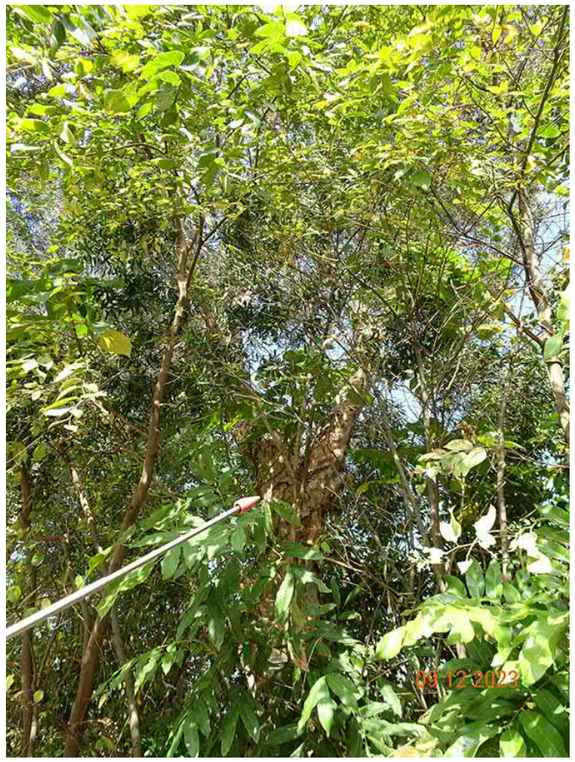
T341_(3)_Chukrasia tabularis_Trunk_retain

T342_(1)_Dracontomelon duperreanum_Overview_ret...

T342_(2)_Dracontomelon duperreanum_Crown_retain

T342_(3)_Dracontomelon duperreanum_Trunk_retain

T345_(1)_Melaleuca cajuputi subsp. cumingiana_Over...

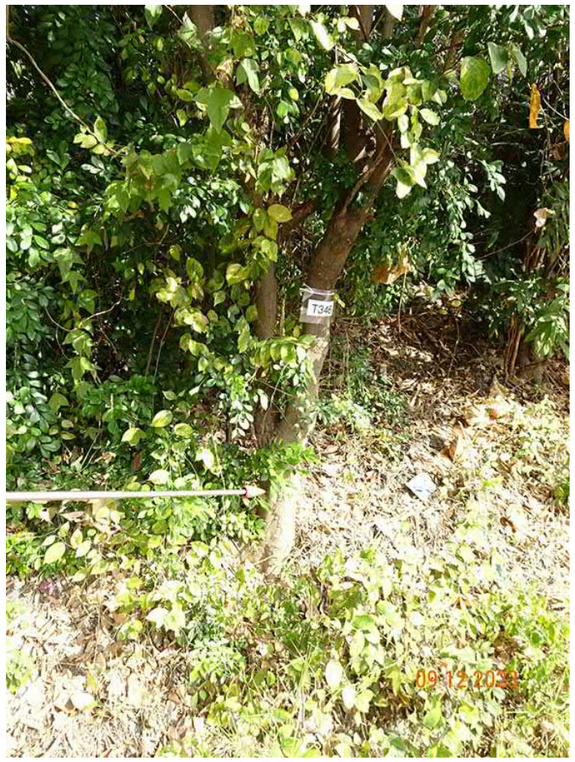


T345_(2)_Melaleuca cajuputi subsp. cumingiana_Cro...

T345_(3)_Melaleuca cajuputi subsp. cumingiana_Trun...

T345_Melaleuca cajuputi subsp. cumingiana_Tag

T346_(1)_Celtis sinensis_Overview_remove



T346_(3)_Celtis sinensis_Trunk_remove

T346_Celtis sinensis_Tag

T347_(1)_Melaleuca cajuputi subsp. cumingiana_Over...

T347_(2)_Melaleuca cajuputi subsp. cumingiana_Trun...

T347_Melaleuca cajuputi subsp. cumingiana_Tag

T348_(1)_Melaleuca cajuputi subsp. cumingiana_Over...

T348_(3)_Melaleuca cajuputi subsp. cumingiana_Trun...

T348_Melaleuca cajuputi subsp. cumingiana_Tag

T349_(1)_Melaleuca cajuputi subsp. cumingiana_Over...

T349_(3)_Melaleuca cajuputi subsp. cumingiana_Trun...

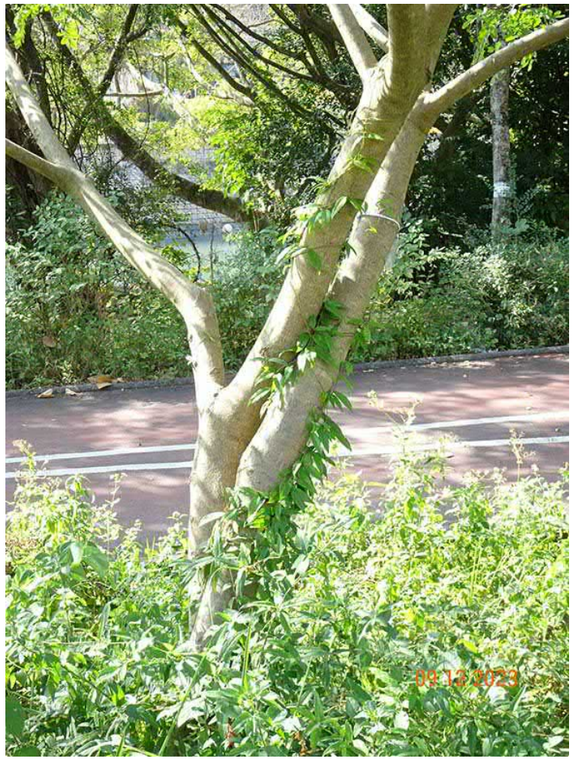
T349_Melaleuca cajuputi subsp. cumingiana_Tag

T350_(1)_Bischofia javanica_Overview_transplant

T350_(3)_Bischofia javanica_Trunk_transplant

T350_Bischofia javanica_Tag

T354_(1)_Dalbergia assamica_Overview_retain



T354_(3)_Dalbergia assamica_Trunk_retain

T354_(4)_Dalbergia assamica_Base_retain

T354_Dalbergia assamica_Tag

T355 (1) Albizia lebbeck_Overview_retain

T355_(3) Albizia lebbeck_Trunk_retain

Appendix V

Compensatory Tree Planting Plan

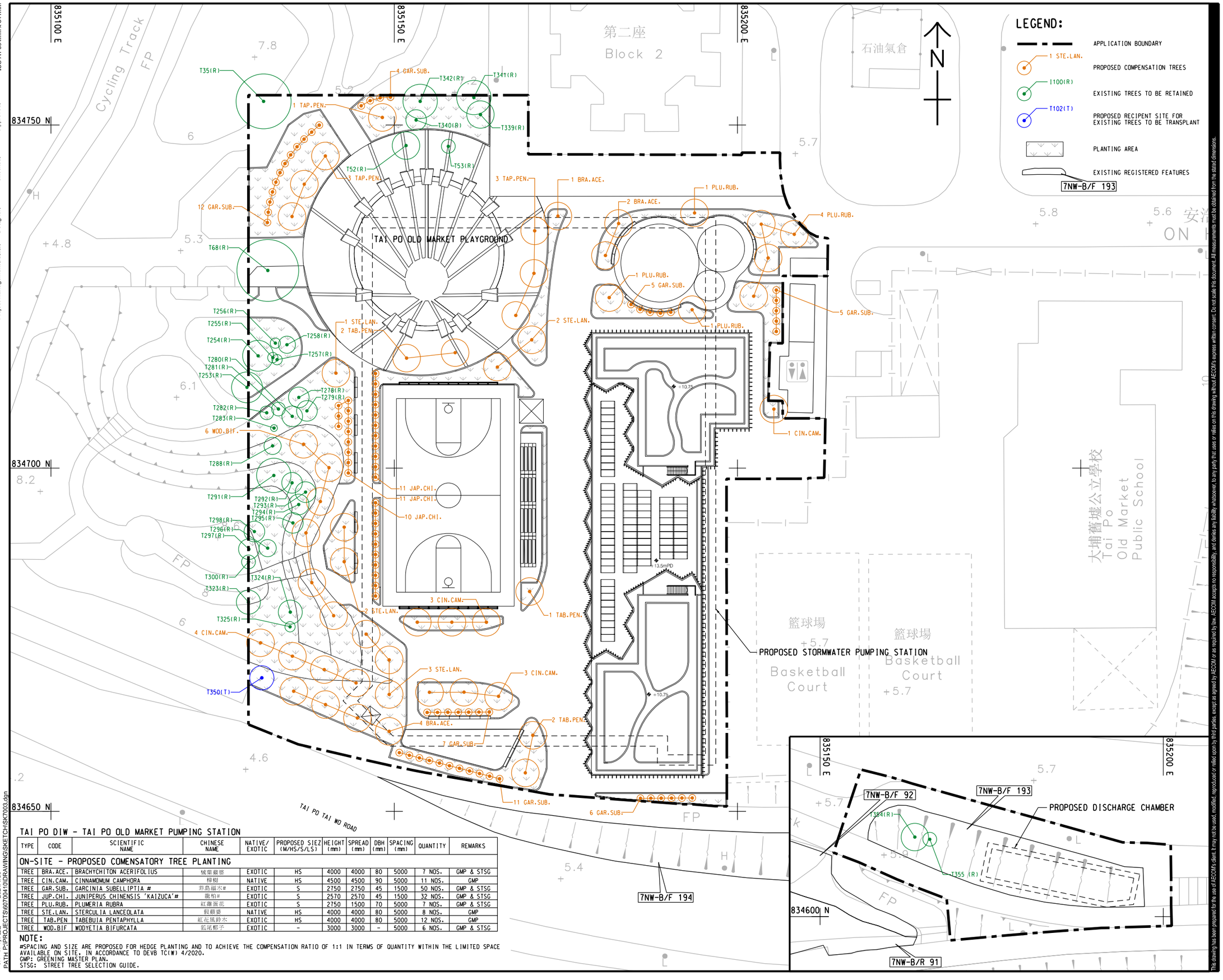
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



TAI PO DIW - TAI PO OLD MARKET PUMPING STATION

TYPE	CODE	SCIENTIFIC NAME	CHINESE NAME	NATIVE/ EXOTIC	PROPOSED SIEZ (M/HS/S/LS)	HEIGHT (mm)	SPREAD (mm)	DBH (mm)	SPACING (mm)	QUANTITY	REMARKS
ON-SITE - PROPOSED COMENSATORY TREE PLANTING											
TREE	BRA.ACE.	BRACHYCHITON ACERIFOLIUS	槭葉蘋婆	EXOTIC	HS	4000	4000	80	5000	7 NOS.	GMP & STSG
TREE	CIN.CAM.	CINNAMOMUM CAMPHORA	樟樹	NATIVE	HS	4500	4500	90	5000	11 NOS.	GMP
TREE	GAR.SUB.	GARCINIA SUBELLIPTIA #	菲島福木#	EXOTIC	S	2750	2750	45	1500	50 NOS.	GMP & STSG
TREE	JUP.CHI.	JUNIPERUS CHINENSIS 'KAIZUCA'#	龍柏#	EXOTIC	S	2570	2570	45	1500	32 NOS.	GMP & STSG
TREE	PLU.RUB.	PLUMERIA RUBRA	紅纓蛋花	EXOTIC	S	2750	1500	70	5000	7 NOS.	GMP & STSG
TREE	STE.LAN.	STERCULIA LANCEOLATA	假蘋婆	NATIVE	HS	4000	4000	80	5000	8 NOS.	GMP
TREE	TAB.PEN	TABEBUIA PENTAPHYLLA	紅花風鈴木	EXOTIC	HS	4000	4000	80	5000	12 NOS.	GMP
TREE	WOD.BIF	WODYETIA BIFURCATA	狐尾椰子	EXOTIC	-	3000	3000	-	5000	6 NOS.	GMP & STSG

NOTE:
#SPACING AND SIZE ARE PROPOSED FOR HEDGE PLANTING AND TO ACHIEVE THE COMPENSATION RATIO OF 1:1 IN TERMS OF QUANTITY WITHIN THE LIMITED SPACE AVAILABLE ON SITE. IN ACCORDANCE TO DEVB TC(W) 4/2020.
GMP: GREENING MASTER PLAN.
STSG: STREET TREE SELECTION GUIDE.

Plot File by: LIQ
Plot Date: 2024/11/30
PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK7003.dgn

AECOM

PROJECT
項目
DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主
渠務署
Drainage Services Department

CONSULTANT
工程顧問公司
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
階段

SCALE 比例
A1 1 : 250

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱
COMPENSATOR TREE PLANTING PLAN

SHEET NUMBER
圖紙編號
60700410/SK7003

Appendix VI

Tree Protection Plan

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

Plot File by: LIQ
PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK7006.dgn
2024/11/30

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 250

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

TREE PROTECTION PLAN FOR APPLICATION SITE

SHEET NUMBER
圖紙編號

60700410/SK7006

Appendix E – Preliminary Environmental Review Report

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1 INTRODUCTION

1.1 Background

1.1.1.1 The Review of Drainage Master Plan in Tai Po – Feasibility study and the Review of Drainage Master Plan in Sha Tin and Sai Kung – Feasibility Study (the DMP Review Study) identified that some areas in Tai Po, Lam Tsuen, Ting Kok and Ma On Shan would be subject to high flood risks.

1.1.1.2 The flooding incidents reported in the areas of Tai Po Old Market and Tai Po Market on 22 July 2010, Lam Tsuen Valley on 19 October 2016, and Ting Kok and Sai Sha Road on 18 July 2017 are some examples to substantiate the above findings.

1.1.1.3 To relieve the flood risk, the Study proposed various drainage improvement measures in these areas, the DMP Review Study has proposed by adopting drainage improvement measures in a combination of stormwater pumping scheme and associated drainage upgrading and river training works. Upon completion of the project, the flood risks in the areas can be significantly reduced.

1.1.1.4 In May 2018, Development Bureau (DEVB) signed out a Project Definition Statement (PDS) to justify and define the scope of the "Drainage Improvement Works in Tai Po". The Drainage Services Department (DSD) then completed a Technical Feasibility Statement (TFS) confirming its technical feasibility. The TFS was subsequently approved by DEVB in August 2018. The project was included into Cat B under PWP No. 4183CD in September 2018.

1.1.1.5 In January 2020, the DSD commissioned Agreement No. CE 11/2019(DS) "Drainage Improvement Works in Tai Po – Investigation" (referred to hereinafter as the "Investigation Study") to carry out various reviews, surveys, investigation, impact assessments and preliminary design for the Project.

1.1.1.6 AECOM Asia Company Limited was appointed by DSD on 13 January 2023 to undertake Agreement No. CE 57/2022 (DS) "Drainage Improvement Works in Tai Po – Design and Construction" (referred to hereinafter as "the Project", of which the *starting date* of the Project is 26 January 2023. The Project comprises the drainage improvement works as briefly described in the following:

(a) Stormwater pumping scheme in Tai Po Old Market, including an underground storage tank, a pump house and the associated pipeworks and E&M works in Tai Po Old Market Playground, as well as the drainage upgrading works in Tai Po Tai Wo Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Ting Kok Road, Mei Sun Lane and Kau Hui Chik Street, floodwall modification and new floodwall along Lam Tsuen River and ancillary works including temporary relocation and reinstatement of playgrounds and associated facilities;

(b) Expansion of existing Tai Po Market Floodwater Pumping Station, including upgrading of existing pump house and the associated pipeworks and E&M works, as well as the drainage upgrading works in Tsing Yuen Street, Wai Yan Street, Pak Shing Street, Fu Shin Street, Yan Hing Street, Kwong Fuk Bridge Garden, Plover Cove Road, Tung Cheong Street, cycle track and footpath along southside of Lower Lam Tsuen River (between existing pumping station and elevated walkway at Tai Po Centre (structure no. NF97);

(c) Drainage upgrading works at Tai Mei Tuk, Ng Uk Tsuen, Ting Kok Shan Liu, Po Sam Pai, Ma Po Mei, San Uk Pai, Ping Long, Che Ha, Nam Hang and Tsung Tsai Yuen and Sai Sha Road (sections near Sai O, Kwun Hang, Tai Tung and Sai Keng); and

(d) River training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Sha Pa and She Shan River.

1.2 Purpose and Scope of the Updated PER

1.2.1.1 AECOM Asia Company Limited was appointed by DSD on 13 January 2023 to undertake Agreement No. CE 57/2022 (DS) "Drainage Improvement Works in Tai Po – Design and Construction" (referred to hereinafter as "the Assignment", of which the starting date of the Project is 26 January 2023. As part of the Assignment, the findings, conclusions and recommendations of the Preliminary Environmental Review (PER) carried out under the Investigation Study shall be reviewed and updated based on the latest detailed design of the recommended drainage improvement works in Tai Po, and an Updated PER Report shall be prepared.

1.2.1.2 The purpose of this Updated PER is to review the findings, conclusions, and recommendations of related environmental studies/review carried out by previous consultants, DSD, EPD, HyD, CEDD and other Government departments, making particular reference to the PER Report prepared under the Investigation Study and the PER Scope.

1.2.1.3 In accordance with Clause 6.11 of the Scope, the Updated PER should comprise the following major items:

- fully satisfies the requirements of the PER Scope
- reviews, identifies and describes any changed circumstances since the completion of the PER Report in the Investigation Study and propose measures to cater for such changes;
- highlights cumulative environmental impacts and issues of concern to the community, the levels of residual environmental impacts and benefits with cumulative effects;
- identifies the mitigation measures and the impacts arising from them;
- confirms the overall environmental acceptability of the Project;
- describes the agreed schedules and programmes for implementing the mitigation measures and monitoring and audit requirements;
- prescribes the specification for detailed design and construction of the recommendations and mitigation measures;
- addresses the potential impacts in course of regular and major maintenance works of the proposed plant; and
- provides with the impacts summary, the study findings, conclusions, recommendations and a mechanism for implementation.

1.2.1.4 The Updated PER covers only the proposed stormwater pumping station with underground storage tank at Tai Po Old Market Playground and its associated discharge chamber (hereinafter referred to as "the Project"). The other elements of the stormwater pumping scheme in Tai Po Old Market described in **Section 1.1.1.6(a)** (including drainage upgrading works along existing roads and floodwall

along Lam Tsuen River) and other drainage improvement works in Tai Po detailed in **Section 1.1.1.6(b) to 1.1.1.6(d)** will be covered by separate Updated PER Report(s).

1.3 Structure of this Report

1.3.1.1 The background of the Project and objective of the Report are introduced in **Section 1**. An overall description of the Project is provided in **Section 2**. The remainder of the Report is organised as follows:

- Section 3 – Air quality impact
- Section 4 – Noise impact
- Section 5 – Water quality impact
- Section 6 – Waste management implications
- Section 7 – Ecological Impact
- Section 8 – Fisheries impact
- Section 9 – Heritage impact
- Section 10 – Not used
- Section 11 – Land Contamination Implications
- Section 12 – Environmental monitoring and audit requirements
- Section 13 – Conclusions

2 PROJECT DESCRIPTION

2.1 Location and Scope of the Project

2.1.1.1 The proposed Tai Po Old Market Playground Stormwater Pumping Station (TPOMPSPS) is part of the Tai Po Old Market Stormwater Pumping Scheme recommended under the Investigation Study, which includes a stormwater pumping station within underground stormwater storage tank and associated E&M works at Tai Po Old Market Playground and its associated discharge chamber near Lower Lam Tsuen River as shown in **Figure 2.1**. The Project boundary is within the existing Tai Po Old Market Playground and falls within area zoned as "Open Space" ("O") on the Approved Tai Po Outline Zoning Plan (OZP) No. S/TP/30.

2.1.1.2 The TPOMPSPS will have a maximum pumping capacity of 16m^3/s a storage to detain 25,000 m^3 of stormwater. It consists of an underground stormwater storage tank, aboveground pump house (equipped with seven pumps) and screen room (about 10.5m in height), and switch and transformer rooms (about 8m in height) within the Tai Po Old Market Playground, as well as an underground discharge chamber (about 2.5m to 3.7m in height) on existing manmade slope next to Lower Lam Tsuen River (**Appendix 2.1** refers). The footprint of the proposed aboveground pump house / screen room / switch and transformer rooms would be approximately 1,150 m^2 and that of the aboveground portion of the discharge chamber would be approximately 130 m^2 whilst the total area of the Project is approximately 7,200 m^2 within Tai Po Old Market Playground and 700 m^2 next to Lower Lam Tsuen River (**Figure 2.1** refers).

2.1.1.3 The construction of the Project would mainly involve site clearance, excavation and lateral Support (ELS), foundation works, steel fixing and concreting of structure, backfilling, electrical and mechanical (E&M) installation and associated pipeworks, and reinstatement and landscaping works. The tentative works area and stockpile area are illustrated in **Figure 2.2**. The existing facilities within the Tai Po Old Market Playground (e.g. basketball court and playground) affected by the Project will be reinstated / reprovisioned within the Project boundary.

2.1.1.4 Excessive stormwater runoff from overflow pipes will be pumped by the proposed TPOMPSPS for discharge at Lower Lam Tsuen River via the upgraded drainage system (which would be covered by separate Updated PER Report as discussed in **Section 1.2.1.4**) and / or stored in proposed underground stormwater storage tank.

2.1.1.5 During operational phase, regular maintenance / desilting works of stormwater tanks and pump chambers of the proposed TPOMPSPS would be carried out by the DSD to remove excessive silts, debris and any obstructions to safeguard the hydraulic capacity of the SPS. The maintenance to the proposed TPOMPSPS would tentatively be carried out on an annual basis during dry season (November to March), except during emergency situations where the accumulated silt would adversely affect the hydraulic capacity of the SPS or where flooding risk is imminent. The maintenance practices and frequency would be similar to the existing maintenance works undertaken by the DSD. Typically, desilting is done via manual / robotic rodding / scooping in the tanks, which will be collected at a desilting opening using lifting equipment. Water jetting is also a common method to wash away the accumulated silts inside pipes and tanks.

2.2 Project Implementation Programme

2.2.1.1 The proposed upgrading works would tentatively commence in 2025 for completion and commissioning in 2030. The tentative construction programme is detailed in **Appendix 2.2**.

2.3 Interaction with Concurrent Projects

2.3.1.1 Based on the best available information, no concurrent projects are identified within 500m from the proposed works.

2.3.1.2 Based on the latest design, the other elements of the stormwater pumping scheme in Tai Po Old Market (including drainage upgrading works along existing roads and floodwall along Lam Tsuen River) (to be covered by the separate Updated PER Report as discussed in **Section 1.2.1.4**) which would be overlapped with the Project would be constructed section by section with standard pollution control measures in place (e.g. dust suppression measures, construction noise control measures, good site practices etc.). In view of the nature and limited scale of these drainage works, the associated potential environmental impacts would be localised and well controlled by the standard pollution control measures and good site practices. Likewise, given the Project is situated at over 100m from the recommended Expansion of Tai Po Market Floodwater Pumping Station (which would be covered by separate Updated PER Report as discussed in **Section 1.2.1.4**), significant cumulative impact from the construction of the floodwater pumping station would not been anticipated.

2.3.1.3 During the detailed design stage, DSD would request the contractor of this Project to closely liaise the contractors of the recommended Expansion of Tai Po Market Floodwater Pumping Station and the other elements of the stormwater pumping scheme in Tai Po Old Market in planning the interfacing works properly to minimise the potential cumulative impacts by avoiding/minimising repeated and concurrent construction works. As such, with appropriate pollution control measures and good site practices, adverse cumulative environmental impact due to the construction of the Project is not anticipated.

3 AIR QUALITY

3.1 Environmental Legislation, Policies, Plans, Standards and Criteria

Air Quality Objectives

3.1.1.1 The Air Pollution Control Ordinance (APCO) provides the statutory authority for controlling air pollutants from a variety of sources. The Hong Kong Air Quality Objectives (AQOs), which stipulate the maximum allowable concentrations over specific periods for typical pollutants, should be met. The relevant AQOs are listed in **Table 3.1**.

Table 3.1 Air Quality Objectives for Hong Kong

Pollutants	Averaging Time	Concentration Limit (µg/m^3) [1]	Number of Exceedance Allowed per Year
Respirable Suspended Particulates (RSP or PM10) [2]	24-hour	100	9
	Annual [4]	50	N/A
Fine Suspended Particulates (FSP or PM2.5) [3]	24-hour	50	18 [5]
	Annual [4]	25	N/A
Nitrogen Dioxide (NO_2)	1-hour	200	18
	Annual [4]	40	N/A
Sulphur Dioxide (SO_2)	10-min	500	3
	24-hour	50	3
Carbon Monoxide (CO)	1-hour	30,000	0
	8-hour	10,000	0
Ozone (O_3)	8-hour	160	9
Lead (Pb)	Annual [4]	0.5	NA

Notes:
[1] Gaseous pollutant measured at 293K and 101.325kPa
[2] Suspended particulates in air with a nominal aerodynamic diameter of 10µm or smaller.
[3] Suspended particulates in air with a nominal aerodynamic diameter of 2.5µm or smaller.
[4] Arithmetic mean
[5] For Government projects

Air Pollution Control (Construction Dust) Regulation

3.1.1.2 Notifiable and regulatory works are under the control of Air Pollution Control (Construction Dust) Regulation. This Project is expected to include notifiable works (superstructure construction) and regulatory works (dusty material handling and excavation). Contractors and site agents are required to inform EPD and adopt dust reduction measures to minimize dust emission while carrying out construction works to the acceptable level.

Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation

3.1.1.3 The Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation comes into effect on 1 June 2015. Under the Regulation, non-road mobile machinery (NRMMs), except those exempted, are required to comply with the prescribed emission standards. From 1 September 2015, all regulated machines sold or leased for use in Hong Kong must be approved or exempted with a proper label in a prescribed format issued by EPD. Starting from 1 December 2015, only approved or exempted NRMMs with a proper label are allowed to be used in specified activities and locations including construction sites. The Contractor is required to ensure the adopted machines or non-road vehicle under the Project could meet the prescribed emission standards and requirement.

Hong Kong Planning Standards and Guidelines (HKPSG)

3.1.1.4 Table 3.1 of Chapter 9 HKPSG has recommended the buffer distance to minimize the potential impacts from air pollution on the open space, which is also applicable to air sensitive uses in the vicinity. **Table 3.2** summarises the required buffer distance for the air sensitive uses recommended in the HKPSG.

Table 3.2 Recommended Buffer Distance for Air Sensitive Uses

Pollutant Sources	Parameter	HKPSG Recommended Buffer Distance
Road and Highways	*Type of Road*	
	Trunk Road and Primary Distributor	>20m
	District Distributor	>10m
	Local Distributor	>5m
Construction and earth moving activities	-	>50m

3.2 Baseline Conditions

3.2.1.1 The proposed TPOMPSPS is located within the existing Tai Po Old Market Playground. The dominant existing air emission source within 500m assessment area from the Project site would be vehicular emission from the adjacent Tai Po Tai Wo Road, Ting Kok Road and On Cheung Road.

3.2.1.2 The EPD general air quality monitoring stations (AQMSs) located closest to the Project site is Tai Po AQMS. The recent five years (2018 – 2022) concentrations of air pollutants relevant to the Project are summarised in **Table 3.3**. The measured concentrations of SO_2, NO_2, RSP and FSP in the past five-year all complied with the respective AQOs. In general, the results showed that there was a decreasing trend in the pollutants levels in the past 5 years. The 10th highest 8-hour O_3 concentrations exceeded the prevailing AQO criteria in 2018 to 2022. High level of ambient O_3, which is mainly influenced by the regional photochemical smog problem, is a regional air pollution problem. The HKSAR government has been strengthening its collaboration with the Guangdong Provincial Government to alleviate the photochemical smog and the associated O_3 problems in the region and continuing to restrict vehicular emission and implement other control measures to reduce local emissions.

Table 3.3 Air Quality Monitoring Data in the latest Five Years (Year 2018 to 2022) at EPD's Tai Po Air Quality Monitoring Station

Pollutant [1]	Parameter	Concentrations (µg/m^3)					Prevailing AQO (µg/m^3) [2]
		2018	2019	2020	2021	2022	
FSP ($PM_{2.5}$)	19th highest 24-hour	38	41	33	32	30	50 (18) [3]
	Annual	19	20	15	16	14	25
RSP (PM_{10})	10th highest 24-hour	69	65	58	60	48	100 (9)
	Annual	31	31	24	26	21	50
SO_2	4th highest 10-minutes	24	20	19	15	12	500 (3)
	4th highest 24-hour	8	10	7	9	5	50 (3)
NO_2	19th highest 1-hour	125	142	106	115	93	200 (18)
	Annual	36	36	30	32	27	40
O_3	10th highest 8-hour	**167**	**197**	**165**	**168**	**188**	160 (9)

Notes:
[1] CO concentration is not measured at Tai Po AQMS.
[2] The prevailing AQOs came into effect on 1 January 2022. Number of exceedance allowed under the AQO is shown in ( ).
[3] Under the prevailing AQOs, the number of exceedances allowed per year for daily FSP is 35 times. However, for new government projects, the number of exceedances allowed per year for daily FSP is 18 times only.
[4] **Bold** values indicate exceedance of relevant AQOs.

3.2.1.3 Future background air quality levels from the Pollutants in the Atmosphere and the Transport over Hong Kong Version 2.1 (PATH-v2.1) model released by EPD had been extracted. The emission sources including those in Pearl River Delta Economic Zone, roads, marine, airport, power plants and industries within Hong Kong are all considered in the PATH-v2.1 model. The emission inventory adopted in the PATH-v2.1 model has taken into account various emission control measures (such as (1) reducing roadside air pollution; (2) reducing marine emissions; (3) emission control of power plant; and (4) emission control of non-road mobile) to be implemented in HKSAR. The predicted concentrations of relevant pollutants by PATH-v2.1 model with Year 2025 emission inventory for the grid covering the Project site are summarised in **Table 3.4**. The predicted concentrations of RSP and FSP are all below the respective AQOs.

Table 3.4 Air Pollutant Concentrations Extracted from the PATH-v2.1 Model with Year 2025 Emission Inventory

Pollutant	Averaging Time	AQOs	Future Background Concentration in µg/m³ at Grid
		µg/m³	39,48
RSP	24-hr 10th Highest	100	64
	Annual	50	27
FSP	24-hr 19th Highest	50	34
	Annual	25	15
SO_2	4th highest 10-minutes	500	70
	4th highest 24-hour	50	10
NO_2	19th highest 1-hour	200	91
	Annual	40	16

Notes:
(1) The 10th highest daily RSP concentration predicted by PATH are adjusted by adding 11 µg/m³, according to EPD's Guidelines on Choice of Models and Model Parameters.
(2) The annual RSP and FSP concentrations predicted by PATH are adjusted by adding 10.3 µg/m³ and 3.5 µg/m³ respectively, according to EPD's Guidelines on Choice of Models and Model Parameters.
(3) Reference conditions of gaseous pollutants concentration data: 293 K and 101.325 kPa.
(4) 19th highest 24-hour FSP concentration is not a criterion in AQO. Nevertheless, on a best endeavours basis for government projects, a more stringent standard of 24-hour AQO for FSP at a concentration level of 50 µg/m³ and the number of allowable exceedances of 18 days per calendar year as the benchmark for conducting air quality assessment.

3.3 Representative Air Sensitive Receivers

3.3.1.1 Pursuant to Clause 3.5 of the PER Brief, the air quality impact assessment area is defined by a distance of 500 m from the boundary of the proposed works site. The representative air sensitive receivers (ASRs) within the assessment area were identified in accordance with the *Hong Kong Planning Standards and Guidelines* (HKPSG) as listed in **Table 3.5** and shown in **Figure 3.1**.

Table 3.5 Representative Air Sensitive Receivers

ID	Description	Land Use	Number of Storeys	Approximate Horizontal Distance to Project Site Boundary, m
A1	Eightland Gardens	Residential	15	<5
A2	Tai Po Old Market Public School Basketball Court	Educational Institution	N/A	<5
A3	Tai Po Old Market Playground	Recreational	N/A	35
A4	Tai Wo Road Rest Garden	Recreational	N/A	80
A5	No. 29, Po Yick Lane	Residential	5	65

3.4 Identification and Evaluation of Potential Impacts

3.4.1 Construction Phase

3.4.1.1 During construction phase, fugitive dust emissions from construction activities would be the major source of air quality impact. Potential fugitive impacts to nearby ASRs during construction phase would mainly arise from excavation works, as well as handling, transportation and removal of excavated spoil / material, stockpiling and wind erosion etc. Based on the latest design and construction programme, the excavation works would last for around 7 months (**Appendix 2.2** refers).

3.4.1.2 Some of the ASRs, A1 and A2, are located in close proximity to the northern and eastern side of the Project site– A1 is located at approximately 12m from the excavation extent and stockpile area while A2 is situated at around 7m and 11m from the excavation extent and stockpile area respectively (**Figure 2.2** and **Figure 3.1** refer). With reference to the approved EIA study of Route 11 (Section between Yuen Long and North Lantau) (Register No.: AEIAR-255/2023), which has reviewed the construction phase dust monitoring data for various recent infrastructure large scale projects involving extensive heavy construction works, including Tung Chung New Town Extension, Central-Wan Chai Bypass, Central Kowloon Route, Tseung Kwan O – Lam Tin Tunnel, Development of Anderson Road Quarry site – Road Improvement Works and Widening and Reconstruction of Tai Po Road (Sha Tin Section), there were no exceedance of measured 1-hr TSP levels caused by construction activities of those projects recorded at any dust monitoring stations (with the closest ones at around 5m to 15m from construction sites), demonstrating that dust impacts could be readily mitigated by appropriate dust suppression measures as stipulated in the *Air Pollution Control (Construction Dust) Regulation* and good site practices, such watering and tarpaulin covering of stockpiling of spoil. Given the comparatively short period of heavy construction works required as well as the nature and limited scale of the proposed works (maximum excavation extent of approximately 4,040 m^2 and stockpiling area of around 380 m^2, as well as small number of up to 10 nos. of PME to be used at a time), potential air quality impact dust emissions would be minor and localised and could be well controlled with appropriate dust suppression measures as stipulated in the *Air Pollution Control (Construction Dust) Regulation* and good site practices.

3.4.1.3 The other elements of the stormwater pumping scheme in Tai Po Old Market (including drainage upgrading works along existing roads and floodwall along Lam Tsuen River) (to be covered by the separate Updated PER Report as discussed in **Section 1.2.1.4**) would be constructed section by section with standard pollution control measures in place (e.g. dust suppression measures and good site practices etc.). In view of the nature and limited scale of these drainage works, the associated dust emission would be localised and well controlled by the standard pollution control measures and good site practices. Likewise, the Project is situated at over 100m from the recommended Expansion of Tai Po Market Floodwater Pumping Station (which would be covered by separate Updated PER Report as discussed in **Section 1.2.1.4**), significant cumulative air quality impact from the construction of the pumping station would not be expected. During the detailed design stage, DSD would request the contractor of this Project to closely liaise the contractors of the other elements of the stormwater pumping scheme in Tai Po Old Market and the recommended Expansion of Tai Po Market Floodwater Pumping Station in planning the interfacing works properly to minimise the potential cumulative impacts by avoiding/minimising repeated and concurrent construction works, particularly

dusty works. As such, with appropriate dust suppression measures as stipulated in the *Air Pollution Control (Construction Dust) Regulation* and good site practices, adverse cumulative air quality impact due to the construction of the Project is not anticipated.

3.4.1.4 Likewise, fuel combustion from the use of PMEs during construction works could be a potential source of air pollutants such as NO_2, SO_2 and CO. To improve air quality and protect public health, EPD has introduced the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* on 1 June 2015 and since 1 December 2015, only approved or exempted non-road mobile machinery are allowed to be used in construction sites. In addition, all construction plants are required to use ultra-low sulphur diesel (ULSD) (defined as diesel fuel containing not more than 0.005% sulphur by weight) as stipulated in Environment, Transport and Works Bureau Technical Circular (ETWB-TC(W)) No. 19/2005 on Environmental Management on Construction Sites. The Contractor is required to ensure the adopted machines or non-road vehicle under the Project could meet the prescribed emission standards and requirement. Given the localised and small scale of the Project, adverse air quality impacts due to emissions from the use of PMEs would be unlikely with the implementation of the said Regulations.

3.4.2 Operational Phase

3.4.2.1 The Project involves only facilities to pump and / store excessive stormwater runoff in case of heavy rainstorm event that the Project itself does not constitute any elements that would be an air pollutant emission source. No air quality impact from the Project would be expected during the operational phase.

3.4.2.2 The existing facilities within the Tai Po Old Market Playground (e.g. basketball court and playground) affected by the Project will be reinstated / reprovisioned within the Project boundary. With sufficient buffer distance between Tai Po Tai Wo Road (Primary Distributor) and the reprovisioned air sensitive uses as per requirement stated in the Chapter 9 of HKPSG as summarised in **Table 3.2** and illustrated in **Figure 3.2**, adverse air quality impact to the reprovisioned air sensitive uses due to vehicular emissions is not expected.

3.5 Recommended Mitigation Measures

3.5.1 Construction Phase

3.5.1.1 Dust suppression measures in the Air Pollution Control (Construction Dust) Regulation and good site practices should be incorporated to control dust emission from the site. Major control measures relevant to this Project are listed below, and they are recommended to be included in relevant contract documents:

- Use of regular watering, to reduce dust emissions from exposed site surfaces and unpaved roads particularly during dry weather;
- Use of frequent watering in particularly dusty construction areas close to ASRs;
- Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering should be applied to aggregate fines;
- For the work sites close to the ASR with a separation distance less than 5m, provide hoardings of not less than 5m high from ground level along the site boundary; for the work sites close to the ASRs with a separation distance between 5m and 10 m, provide hoardings of not less than 3.5 m high from

ground level along the site boundary; for other work sites, hoarding of not less than 2.4 m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit where a site boundary adjoins a road, street, service lane or other area accessible to the public;

- Open temporary stockpiles should be avoided or covered. Prevent placing dusty material storage plies near ASRs;
- Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations;
- Establishment and use of vehicle wheel and body washing facilities at the exit point of the site;
- Imposition of speed control for vehicles on unpaved site roads. 8 km/hr is the recommended limit;
- Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs;
- Avoid position of material stockpiling areas, major haul roads and dusty works within the construction site close to concerned ASRs; and
- Avoid unnecessary exposed earth.

3.5.1.2 Guidelines stipulated in EPD's *Recommended Pollution Control Clauses for Construction Contracts* should be incorporated in the contract documents to abate dust impacts. The clauses include:

- The Contractor shall observe and comply with the APCO and its subsidiary regulations, particularly the Air Pollution Control (Construction Dust) Regulation.
- The Contractor shall undertake at all times to prevent dust nuisance as a result of the construction activities.
- The Contractor shall ensure that there will be adequate water supply / storage for dust suppression.
- The Contractor shall devise, arrange methods of working and carrying out the works in such a manner so as to minimise dust impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these methods are implemented.
- Before the commencement of any work, the Contractor may be required submitting the methods of working, plant, equipment and air pollution control system to be used on the site for the Engineer inspection and approval.

3.5.1.3 In order to help reduce carbon emission and pollution, timely application of temporary electricity would be made and electric vehicles would be adopted in accordance with *DEVB TC(W) No. 13/2020 "Timely Application of Temporary Electricity and Water Supply for Public Works Contracts and Wider Use of Electric Vehicles in Public Works Contracts"* in the Project.

3.6 Environmental Monitoring and Audit

3.6.1.1 Weekly site audit is recommended to be undertaken during the construction phase to ensure the proposed dust suppression measures are implemented in an appropriate manner and are effective.

3.6.1.2 No EM&A is considered necessary during the operational phase.

3.7 Conclusion

3.7.1.1 Potential fugitive impacts to nearby ASRs would mainly arise from excavation works, handling, transportation and removal of excavated spoil / material, stockpiling and wind erosion etc. With the implementation of regular site watering and good construction practices for dust minimization, construction dust impacts are not expected to be significant on the surrounding sensitive receivers. Requirements of *Air Pollution Control (Construction Dust) Regulation* and *EPD's Recommended Pollution Control Clauses for Construction Contracts* are proposed to be incorporated into the contract.

3.7.1.2 No air pollution source is identified from the operation of any elements of the Project itself that no air quality impacts would be anticipated during the operational phase.

4 NOISE IMPACT

4.1 Environmental Legislation, Standards and Guidelines

4.1.1 Construction Noise

4.1.1.1 In accordance with EPD's Professional Persons Environmental Consultative Committee (ProPECC) Practice Note (PN) ProPECC PN 1/24, construction noise level at the façade of residential dwellings should not exceed $L_{eq\ (30\text{-}minute)}$ 75 dB(A), and construction noise level at the façade of schools should not exceed $L_{eq\ (30\text{-}minute)}$ 70 dB(A) (65 dB(A) during examinations) between the hours of 7 a.m. and 7 p.m. on any day not being a general holiday.

4.1.1.2 Apart from ProPECC PN 1/24, the Noise Control Ordinance (NCO) provided statutory framework for noise control. Assessment procedure and standards are set out in the following relevant Technical Memoranda:

- Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM);
- Technical Memorandum on Noise from Construction Work in Designated Areas (DA -TM); and
- Technical Memorandum on Noise from Percussive Piling (PP-TM).

4.1.1.3 Between 1900 and 0700 hours and all day on Sundays and public holidays, activities involving the use of PME for the purpose of carrying out construction work is prohibited unless a construction noise permit (CNP) has been obtained. In case of any construction activities required during restricted hours, it is the Contractor's responsibility to ensure compliance with the Construction Noise Permit (CNP) and the relevant TMs.

4.1.1.4 Under the DA-TM, in addition to the general controls on the use of PME during restricted hours, the use of Specified PME (SPME) and / or the undertaking of Prescribed Construction Work (PCW) as shown in **Table 4.1** within a designated area during the restricted hours would require a valid CNP. In general, it shall not be presumed that a CNP will be granted for carrying out PCW within a designated area during restricted hours. The CNP may be granted for the execution of construction works during restricted hours involving the use of PME and/or SPME if the relevant ANLs and criteria stipulated in the GW-TM and DA-TM can be met. The corresponding basic noise levels (BNLs) for evening and night-time periods are given in **Table 4.2**.

Table 4.1 Specified Powered Mechanical Equipment and Prescribed Construction Work Controlled under DA-TM

Specified Powered Mechanical Equipment (SPME)	Prescribed Construction Work (PCW)
● Hand-held Breaker ● Bulldozer ● Concrete Lorry Mixer ● Dump Truck ● Hand-held Vibratory Poker	● Erection or Dismantling of Formwork or Scaffoldings ● Loading, Unloading or Handling of Rubble, Wooden Boards, Steel Bars, Wood or Scaffolding Material ● Hammering

Table 4.2 Construction Noise Standards during Restricted Hours

Time Period	Basic Noise Levels[#], dB(A)		
	Area Sensitive Rating A	**Area Sensitive Rating** B	**Area Sensitive Rating** C
All weekdays during the evening (1900 to 2300 hours), and general holidays (including Sundays) during the day and evening (0700 to 2300 hours)	60 (45)	65 (50)	70 (55)
All days during the night-time (2300 to 0700 hours)	45 (30)	50 (35)	55 (40)

Note:
#: Noise levels in brackets denote the acceptable noise levels (ANLs) generated by construction works involving the use of SPME within a designated area during restricted hours.

4.1.1.5 Percussive piling is prohibited between 1900 and 0700 hours on any weekday not being a general holiday and at any time on Sunday or general holiday. A CNP is required for the carrying out of percussive piling between 0700 and 1900 hours on any day not being a general holiday. PP-TM sets out the requirements for working and determination of the permitted hours of operations. The permitted hours of operations would be 3, 5 or 12 hours per day depending on the types of percussive piling (diesel, pneumatic and / or steam hammer) and the predicted noise impact at NSRs. Based on the current design of the Project, alternative construction methods (e.g. bored piling) could be adopted for foundation. Should percussive piling method be required, a CNP as mentioned above, shall be applied during construction of the Project.

4.1.2 Operational Phase Fixed Plant Noise

4.1.2.1 For planning of noise sensitive developments against noise from fixed sources, the *Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites* (IND-TM) issued under Noise Control Ordinance (NCO) has stipulated appropriate Acceptable Noise Levels (ANLs). The ANLs and criteria for different Area Sensitivity Rating (ASRs) are summarised in **Table 4.3** and **Table 4.4** below.

Table 4.3 Area Sensitivity Ratings

Type of Area Containing NSR	Degree to which NSR is Affected by Influencing Factors		
	Not Affected	**Indirectly Affected**	**Directly Affected**
(i) Rural area, including country parks or village type developments	A	B	B
(ii) Low density residential area consisting of low-rise or isolated high-rise developments	A	B	C
(iii) Urban area	B	C	C
(iv) Area other than those above	B	B	C

Table 4.4 Acceptable Noise Level

Time Period	Acceptable Noise Level (ANL) for Different Area Sensitivity Rating ($L_{eq\ 30min}$, dB(A))		
	ASR A	ASR B	ASR C
Day (0700 to 1900 hrs)	60	65	70
Evening (1900 to 2300 hrs)	60	65	70
Night (2300 to 0700 hrs)	50	55	60

4.1.2.2 The Project site within Tai Po Old Market Playground or near Lower Lam Tsuen River is not rural area, low density residential area or urban area. Noise sensitive receivers (NSRs) in vicinity of the Project include both high density of high rise and low rise housing developments and education institutions and therefore are considered to be at (iv) area other than those above according to **Table 4.3**. Based on the Annual Traffic Census 2022, the annual average daily traffic (AADT) of the sections of Tai Po Tai Wo Road nearby the Project site is less than 30,000 and is not considered as an Influencing Factor (IF) according to the IND-TM. An Area Sensitivity Rating of "B" is hence assigned to the NSRs N1, N2 and N3 as they are not affected by any IF.

4.1.2.3 With reference to the HKPSG, the fixed noise criteria for the proposed fixed noise sources would be 5 dB(A) lower than the ANL, or the prevailing background noise levels (for quiet areas with level 5 dB(A) below the ANL. The prevailing background noise measurement was conducted in September 2022 in the PER under the Investigation Study. Considering that there have been no changes in land use of the surrounding area of the Project site, the prevailing background noise levels for the purpose of this Updated PER has been referenced to that in the PER Report prepared under the Investigation Study. Determination of fixed plant noise criteria are presented in **Appendix 4.1**.

4.1.2.4 In any event, the Area Sensitivity Ratings assumed in this Updated PER are for indicative assessment only. It should be noted that fixed noise sources are controlled under Section 13 of the NCO. At the time of investigation, the Noise Control Authority shall determine noise impact from concerned fixed noise sources on the basis of prevailing legislation and practices being in force and taking account of contemporary conditions / situation of adjoining land uses. Nothing in this Updated PER shall bind the Noise Control Authority in the context of law enforcement against all the fixed noise sources being assessed.

4.2 Description of Environment and Baseline Conditions

4.2.1.1 The proposed TPOMPSPS is located within the existing Tai Po Old Market Playground. The prevailing noise climate of the Project site and its vicinity mainly comprises road traffic noise from the adjacent Tai Po Tai Wo Road, Ting Kok Road and On Cheung Road.

4.3 Noise Sensitive Receivers

4.3.1.1 Pursuant to Clause 3.9 of the PER Brief, the noise impact assessment area is defined by a distance of 300 m from the boundary of the proposed works site. Representative noise sensitive receivers (NSRs) were identified in accordance with the HKPSG as listed in **Table 4.5** and shown in **Figure 4.1**.

Table 4.5 Noise Sensitive Receivers within 300m of Assessment Areas

ID	Description	Land Use	Approximate Horizontal Distance to Project Site Boundary, m
N1	Eightland Gardens	Residential	<5
N2	Tai Po Old Market Public School	Educational Institution	23
N3	No. 29, Po Yick Lane	Residential	65

4.4 Construction Noise Impact Assessment

4.4.1 Identification and Evaluation of Impacts

4.4.1.1 Construction noise impact from the proposed works would be expected from the use of powered mechanical equipment (PME) during ELS, excavation, steel fixing and concreting of structure, backfilling, E&M installations and associated pipeworks, and reinstatement and landscaping works. The extent of noise impact depends on the type and number of PMEs to be adopted in different construction activities. The tentative plant inventory of PME required is provided in **Table 4.6**.

Table 4.6 Tentative Plant Inventory for the Key Construction Activities outside of PTWs Structures / Compartments

Construction Activities	PME Types	
Excavation and lateral supports (ELS)	▪ Excavator/loader ▪ Breaker / road ripper / hydraulic crusher ▪ Water Pump, Submersible (Electric) ▪ Piling, oscillator ▪ Power rammer	▪ Giken Piler ▪ Dump Truck with grab ▪ Mobile Crane ▪ Lorry, with crane/grab ▪ Air compressor ▪ Generator, super silenced
Bulk excavation	▪ Excavator/loader ▪ Breaker / road ripper / hydraulic crusher ▪ Dump Truck with grab	▪ Roller, Vibratory ▪ Water Pump, Submersible ▪ Generator
Steel fixing and concreting of structure	▪ Mobile crane ▪ Lorry, with crane/grab ▪ Bar bender and cutter	▪ Poker, vibratory, hand-held ▪ Concrete lorry mixer ▪ Generator
Backfilling	▪ Excavator/loader ▪ Dump Truck with grab ▪ Roller, Vibratory	▪ Water Pump, Submersible (Electric) ▪ Generator, super silenced
E&M Installations and associated pipeworks	▪ Mobile crane ▪ Lorry, with crane/grab	▪ Drill/Grinder, Hand-held ▪ Generator, super silenced

Construction Activities	PME Types	
Reinstatement and landscaping works	▪ Mobile crane ▪ Excavator/loader ▪ Generator, super silenced	▪ Poker, vibratory, hand-held ▪ Concrete lorry mixer

Note:

[1] Quiet equipment or QPME would be adopted where appliable and practicable.

4.4.1.2 In view of the proximity of the nearby NSRs, particularly N1 with less than 5m away from the Project site, adverse construction noise impact would be expected. In order to minimise the noise impact from the construction of proposed works, appropriate noise mitigation measures as recommended in **Section 4.4.2**, including use of QPME / quieter construction methods, use of movable noise barrier / enclosure / acoustic mat / purpose-built barrier, proper scheduling of construction activities during examination period, and good site practices such as locating mobile plant as far away from NSRs as practicable, would be required. Site hoarding with higher surface density and height to provide extra noise attenuation should be also considered to protect the nearby NSRs, particularly N1 and N2.Based on the current design of the Project, construction works during restricted hours would not be required and alternative construction methods (e.g. bored piling) could be adopted for foundation. In case of any construction activities required during restricted hours or percussive piling works required, the Contractor should submit CNP application to the Noise Control Authority and abide by any conditions stated in the CNP. The Noise Control Authority will consider CNP application for construction works within restricted hours as guided by the relevant TMs issued under the NCO.

4.4.2 Recommended Construction Noise Control and Mitigation Measures

4.4.2.1 In view of the proximity of the nearby NSRs, construction noise exceedances would be anticipated in the absence of proper noise mitigation measure. Noise control requirements stipulated in *Recommended Pollution Control Clauses for Construction Contracts* and *Contract Specification for Noise Mitigation Measures in Annex B of the PN 1/24,* as well as the below mitigation measures should be implemented in all work sites to ensure compliance of relevant noise criteria under the NCO. A construction noise management plan, covering the identification of noise source inventory and assessment of the effectiveness construction noise mitigation measures, should be prepared by the Contractor before the commencement of construction works.

Good Site Practices

4.4.2.2 Good site practices listed below should be adopted to abate noise impacts during the construction phase and noise control requirements stipulated in EPD's "Recommended Pollution Control Clauses for Construction Contracts" should be followed and included in the contract document:

- Only well-maintained PME to be operated on-site and should be serviced regularly during construction works;
- Silencers or mufflers on construction equipment should be utilised (if appropriate) and should be properly maintained during construction;
- Mobile plant, if any, should be sited as far away from NSRs as possible;
- Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;

- Plant known to emit noise strongly in one direction should, wherever possible, be orientated to direct noise away from the nearby NSRs; and
- Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

Use of Quality Powered Mechanical Equipment (QPME) or Quieter Construction Method

4.4.2.3 The use of QPME is considered a practicable means to mitigate the construction noise impact. QPME is defined as a PME having actual SWL lower than the value specified in the GW-TM.

4.4.2.4 Quieter construction method shall be considered and adopted as far as practical, such as bored piling as an alternative for percussive pilling, silent piling by press-in method as an alternative of traditional sheet piling, hydraulic crusher to substitute hydraulic breaker for demolition, road ripper to substitute breaker for ground breaking, self-compacting concrete for concreting, etc. Whilst it is generally considered too restrictive to specify that the Contractor has to use specific models or items of plant, it is reasonable and practicable to set plant noise performance specifications for specific PME so that some flexibility in selection of plant is allowed. A pragmatic approach would be to request the Contractor independently verifies the noise level of the plant proposed to be used and demonstrates through furnishing of these results, that the plant proposed to be used on the site meets the requirements.

Use of Movable Noise Barrier, Noise Enclosure, Acoustic Mat and Purpose-built Barrier

4.4.2.5 Movable noise barriers that can be placed close to the construction equipment and moved along with the PME are effective for screening noise from NSRs. A typical design which has been used locally is a wooden framed barrier with a cantilevered upper portion of superficial density no less than 10 kg/m² on a skid footing with 25mm thick internal sound absorptive lining. This measure is particularly effective for low level zone of NSRs. A longer cantilevered top cover would be required to achieve screening benefits at upper floors of NSRs. Purpose-built acoustics barrier can be used to screen noise from particular items of PME or noisy construction activities. The Contractor shall be responsible for the design and actual position of the movable noise barriers with due consideration given to the position and size of the PME, and the requirement of intercepting the line-of-sight from the NSRs to the PME, as well as ensuring that the barriers should have no opening and gap. The direct line-of-sight between the PME and the NSRs should be totally screened by a substantial barrier such that the PME will not be visible when viewed from any window, door or other opening in any façade of the NSR. Reference shall be made to the EPD webpage[1] for the design of noise barrier.

4.4.2.6 It is anticipated that properly designed movable noise barriers would achieve a 5 dB(A) reduction for mobile PME and a 10 dB(A) reduction for static PME while a purpose-built noise barrier would achieve a 10 dB(A) reduction. Acoustic mat with surface mass of not less than 7kg/m^2 would be used for plant items such as piler and a 10 dB(A) noise reduction is anticipated. The use of full enclosure has

[1] https://www.epd.gov.hk/epd/misc/construction_noise/contents/index.php/en/road-works/item/74-mitigation-measures/157-construction-noise-barrier.html

been considered in this assessment to shelter relatively static plant including ventilation fan. This type of enclosure is expected to provide approximately 15 dB(A) noise reduction.

Proper Scheduling of Construction Activities during Examination Period

4.4.2.7 The Contractor should keep close communication with the operator of Tai Po Old Market Public School (N1) to obtain the updated schedule of examination for proper scheduling of construction activities during the examination period to avoid and minimise the potential noise impacts.

4.5 Operational Fixed Plant Noise Impacts

4.5.1 Identification of Impacts

4.5.1.1 Potential fixed plant noise impacts would be anticipated from the operation of the proposed TPOMPSPS on the nearby NSRs (e.g. pump, transformer, ventilation fan and emergency generator) (**Figure 4.1** refers). Based on the latest engineering design, all the fixed plants of the proposed TPOMPSPS would be housed/enclosed in a concrete structure with soundproof doors and openings of the ventilation fans / louver would be facing away from the nearest NSRs, i.e. towards to the southern or western side of the Project site.

4.5.2 Assessment Approach and Methodology

4.5.2.1 Since detailed design information and noise specification of proposed fixed plants have yet to be confirmed, the maximum permissible noise levels (SWL), taking into account cumulative noise levels from other committed fixed noise sources, were determined for future detailed design of the fixed plant to ensure compliance with the relevant noise criteria. It is assumed that all the fixed plant within the same location would be operated simultaneously for the worst-case scenario. A positive 3 dB(A) is added to the predicted noise levels at the NSRs due to the façade effect. The following standard acoustic formula was used for calculating the Max SWL of the fixed plant.

$$SPL = Max\ SWL - DC + FC - BC + TC$$

Where*:*

SPL	*Sound Pressure Level, in dB(A)*
Max SWL	*Maximum Permissible SWL, in dB(A)*
DC	*Distance Attenuation, in dB(A) (i.e. 20logD + 8 [where D is the distance in metres])*
FC	*Façade Correction, in dB(A) (i.e. 3 dB(A))*
BC	*Barrier Correction, in dB(A)*
TC	*Tonality correction, in dB(A)*

4.5.2.2 If the noise exhibits characteristics of tonality, intermittency or impulsiveness during the detailed design or the commissioning of the plant, the recommended maximum permissible SWL should be reviewed and adjusted as appropriate in accordance with the recommendation given in Section 3.3 of IND-TM.

4.5.3 Evaluation of Fixed Plant Noise Impacts

4.5.3.1 Determination of the maximum permissible sound power levels (SWL) of proposed fixed noise sources of the Project have been presented in **Appendix 4.1**. Given that the proposed fixed plants are properly designed to meet the maximum permissible sound power levels, no adverse fixed plant noise impact would be anticipated.

4.5.4 Fixed Plant Noise Mitigation Measures

4.5.4.1 Provided that the planned fixed plants are properly designed to meet the maximum permissible SWL, no adverse operational phase noise impacts would be anticipated. Nonetheless, the following best practices should be implemented as far as practicable to further minimise any potential impacts:

- Quieter plant should be chosen as far as practicable;
- Include noise levels specification when ordering new plant items;
- Locate fixed plant / louvres away from any NSRs as far as practicable;
- Locate fixed plant in walled plant rooms or in specially designed enclosures;
- Install direct noise mitigation measures including silencers, acoustic louvres and acoustic enclosure where necessary; and
- Develop and implement a regularly scheduled plant maintenance programme so that plant items are properly operated and serviced. The programme should be implemented by properly trained personnel.

4.5.4.2 The maximum permissible SWL in **Appendix 4.1** should be specified as design criteria of the proposed fixed noise sources in the contract documents. The Contractor should design and select equipment that could comply with the specified design criteria in the contract. A Compliance Test Report demonstrating the compliance of the NCO should be conducted before the operation of the Project.

4.6 Environmental Monitoring and Audit

4.6.1.1 With the implementation of the recommended mitigation measures in **Section 4.4.2**, no unacceptable residual construction noise impact would be anticipated. A construction noise management plan, covering the identification of noise source inventory and assessment of the effectiveness construction noise mitigation measures, should be prepared by the Contractor before the commencement of construction works. Weekly site audit should be carried out during the construction phase to ensure the recommended mitigation measures are being properly implemented.

4.6.1.2 Commissioning test should be conducted for the proposed fixed plant sources prior to operation of the Project to ensure compliance with the relevant noise standards.

4.7 Conclusion

4.7.1.1 During the construction phase, the use of PME for construction activities would have potential noise impact on nearby NSRs. With the implementation of recommended good site practices, noise mitigation measures, including use of QPME / quieter construction methods, use of movable noise barrier / enclosure / acoustic mat / purpose-built barrier, proper scheduling of construction activities during examination period, and good site practices such as locating mobile plant as far away from NSRs as practicable, site hoarding with higher surface density and height, and noise control requirements stipulated in Recommended Pollution Control Clauses for Construction Contracts, no adverse construction noise impact would be anticipated. A construction noise management plan, covering the identification of noise source inventory and assessment of the effectiveness construction noise mitigation measures, should be prepared by the Contractor before the commencement of construction works.

4.7.1.2 Provided that the planned fixed plants are properly designed to meet the maximum permissible SWL, no adverse noise impacts would be anticipated during the operational phase.

5 WATER QUALITY IMPACT

5.1 Environmental Legislation, Policies, Plans, Standards and Criteria

Water Quality Objectives under Water Pollution Control Ordinance (WPCO)

5.1.1.1 The Water Pollution Control Ordinance (WPCO) provides the major statutory framework for the protection and control of water quality in Hong Kong. According to the Ordinance and its subsidiary legislation, Hong Kong waters are divided into ten Water Control Zones (WCZs). Corresponding statements of Water quality objectives (WQOs) are stipulated for different water regimes (marine waters, inland waters, bathing beaches subzones, secondary contact recreation subzones and fish culture subzones) in each WCZ based on their beneficial uses. The Project site is located in the Tolo Harbour and Channel WCZ. Relevant WQOs for the Tolo Harbour and Channel WCZ are listed in **Table 5.1**.

Table 5.1 Summary of Water Quality Objectives for Tolo Harbour and Channel WCZ

Parameters	Objectives	Sub-Zone
Offensive odour, tints	Not to be present	Whole zone
Visible foam, oil scum, litter	Not to be present	Whole zone
Colour	Should not cause the colour of waters of the subzone to exceed 50 Hazen units at any time.	Inland Waters in Shing Mun (A, C, D, E, H, I), Tai Po (B, C) subzones and other watercourses
Dissolved oxygen (DO)	Not less than 4 mg/L or 40% saturation (at 15^0C) at any time	Inland Waters
pH	Not exceed the normal pH range of 6.0 – 9.0 at any time	Inland Waters in Shing Mun (D, E, I) subzones and other watercourses
Temperature	Not to cause the natural daily temperature range to be extended by greater than ±2.0 °C at any location or time.	Inland Waters
Chemical oxygen demand (COD)	Not exceed 30 mg/L at any time	Inland Waters in Shing Mun (A, C, D, E, H, I), Tai Po (B, C) subzones and other watercourses
5-day biochemical oxygen demand (BOD_5)	Not exceed 5 mg/L at any time	Inland Waters in Shing Mun (A, C, D, E, H, I), Tai Po (B, C) subzones and other watercourses
Suspended solids (SS)	Not to cause the annual median level to exceed 25 mg/L.	Inland Waters in Shing Mun (D, E, I) subzones and other watercourses
Settleable Material	Bottom deposits or submerged objects should not adversely influence bottom-living communities, alter the basic Harbour geometry or shipping channels, present any hazard to shipping or diving activities, or affect any other beneficial use of the waters.	Whole zone
Ammonia Nitrogen (NH_3-N)	Not to exceed 0.5 mg/L at any time	Inland Waters
E. coli Bacteria	Not exceed 1000 per 100mL, calculated as a running median of the most recent 5 consecutive samples taken at intervals of between 7 and 21 days (or 14 and 42 days)	Inland Waters in Shing Mun (A, C, D, E, H, I) and Tai Po (B, C) subzones and other watercourses
Toxic substances	Should not attain such a level as to produce significant toxic effects in humans, fish or any other aquatic organisms.	Whole zone

Source: Statement of Water Quality Objectives (Tolo Harbour and Channel Water Control Zone) for Watercourses.

Technical Memorandum on Effluents Discharge Standards

5.1.1.2 Discharges of effluents are subject to control under the WPCO. The "*Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters*" (TM-DSS), issued under Section 21 of the WPCO, gives guidance on permissible effluent discharges based on the type of receiving waters (foul sewers, storm water drains, inland and coastal waters). The limits control the physical, chemical and microbial quality of effluent. Any sewage from the proposed construction and operational activities shall comply with the relevant standards as given in the *TM-DSS*.

Practice Notes and Technical Circular

5.1.1.3 The Professional Persons Environmental Consultative Committee *Practice Note on Construction Site Drainage (ProPECC PN 2/23)* issued by EPD provides good practice guidelines for dealing with various types of discharge from a construction site. Practices outlined in the PN shall be followed as far as possible during construction to minimize the water quality impact due to construction site drainage.

5.1.1.4 Environment, Transport and Works Bureau (ETWB) Technical Circular (Works) [ETWB TC(Works)] No. 5/2005 "*Protection of natural streams / rivers from adverse impacts arising from construction works*" provides an administrative framework to better protect all natural streams/rivers from the impacts of construction works. The procedures promulgated under this Circular aim to clarify and strengthen existing measures for protection of natural streams/rivers from government projects and private developments. The guidelines and precautionary mitigation measures given in the ETWB TC (Works) No. 5/2005 should be followed as far as possible to protect the inland watercourse at or near the Project area during the construction phase.

Hong Kong Planning Standards and Guidelines

5.1.1.5 The Hong Kong Planning Standards and Guidelines (HKPSG), Chapter 9 (Environment), provides additional guidelines against water pollution for sensitive uses such as aquaculture and fisheries zones, bathing waters and other contact recreational waters.

5.2 Baseline Conditions

5.2.1 Water Sensitive Receivers

5.2.1.1 Lower Lam Tsuen River is the only water sensitive receiver (WSR) identified within 500 m from the Project site. It is situated at over 60m from the Project site alongside and south to the Tai Po Tai Wo Road as illustrated in **Figure 5.1**.

5.2.2 Inland Water Quality

5.2.2.1 A section of Lower Lam Tsuen River is located within the assessment area, the corresponding EPD river water quality monitoring results at Station TR12I, is shown in **Table 5.2**.

5.2.2.2 In general, the rivers in the Tai Po District achieved high WQO compliance in 2022. Lam Tsuen River, the major river draining through the urban area of Tai Po, achieved 97% compliance rate.

Table 5.2 Baseline Water Quality Condition for Lam Tsuen River in 2022

Parameters	Lam Tsuen River TR12I	WPCO WQO (in inland waters)
Dissolved Oxygen (DO) (mg/L)	4.8 (3.8 – 7.6)	≥ 4 mg/L or 40% saturation (at 15℃)
pH	7.2 (7.1 – 7.5)	within 6.0 - 9.0
Suspended Solids (SS) (mg/L)	2.6 (1.3 – 6.0)	Annual median ≤ 25 mg/L
5-day Biochemical Oxygen Demand (BOD_5) (mg/L)	2.5 (1.1 – 4.4)	≤ 5 mg/L
Chemical Oxygen Demand (COD) (mg/L)	12(7 – 26)	≤ 30 mg/L
Oil & Grease (mg/L)	<0.5 (<0.5 - <0.5)	Not available
E. coli (cfu/100mL)	58 000 (18 000 – 150 000)	Running median of the most recent 5 consecutive samples taken at intervals of between 7 and 21 days (or 14 and 42 days): ≤ 1,000 cfu/100mL
Faecal Coliforms (cfu/100mL)	180 000 (62 000 – 530 000)	Not available
Ammonia Nitrogen (mg/L)	0.595 (0.093 – 1.400)	≤ 0.5 mg/L
Nitrate Nitrogen (mg/L)	0.610 (0.190 – 0.960)	Not available
Total Kjeldahl Nitrogen (mg/L)	0.88 (0.28 – 1.90)	Not available
Orthophosphate Phosphorus (PO_4-P) (mg/L)	0.044 (0.011 – 0.110)	Not available
Total Phosphorus (mg/L)	0.11 (0.06 – 0.22)	Not available
Sulphide (mg/L)	<0.02 (<0.02 –<0.02)	Not available
Aluminium (Al) (µg/L)	<50 (<50 – <50)	Not available
Cadmium (Cd) (µg/L)	<0.1 (<0.1 - 0.1)	Not available
Chromium (Cr) (µg/L)	1 (<1 – 3)	Not available
Copper (Cu) (µg/L)	2 (<1 – 5)	Not available
Lead (Pb) (µg/L)	<1 (<1 - <1)	Not available
Zinc (Zn) (µg/L)	13 (<10 – 20)	Not available
Flow (m^3/s)	NM	Not available

Notes:
1. Data source: EPD River Water Quality in Hong Kong in 2022
2. Data presented are in annual medians of monthly samples; except those for faecal coliforms and *E. coli* and which are in annual geometric means.
3. Equal values for annual medians (or geometric means) and ranges indicate that all data are the same as or below laboratory reporting limits.
4. Figures in brackets are annual ranges.
5. "NM" indicates no measurement taken.
6. cfu – colony forming unit

5.3 Assessment Methodology

5.3.1.1 The background information on the existing water systems were collected and reviewed. The WSRs that may be affected by the Project construction have been identified. Potential sources of water quality impact that may arise during the construction works were described. The identified sources of potential water quality impact on the WSRs were evaluated and their impact significance determined. Mitigation measures to reduce any identified adverse impacts to acceptable levels were recommended as necessary.

5.4 Identification and Evaluation of Potential Impacts

5.4.1 Construction Phase

5.4.1.1 Construction of the Project would only involve land-based construction works. No marine works would be required. Potential water quality impacts arising from the construction phase include:

- General construction activities;
- Construction site runoff;
- Construction works in close proximity of inland water;
- Accidental spillage of chemicals and potential contamination of surface water and groundwater; and
- Sewage effluent from construction workforce.

Wastewater from General Construction Activities

5.4.1.2 Wastewater generated from these inland construction activities may contain high suspended solids (SS) concentrations, as well as a certain amount of grease and oil. Potential water quality impacts due to uncontrolled wastewater discharge can be avoided if construction and site management practices are implemented to ensure that litter, fuels, and solvents do not enter the water environment. It is expected that if the good site practice suggested in **Section 5.5** are followed as far as practicable, the potential water quality impacts associated with construction activities would be minimal.

Construction Site Runoff

5.4.1.3 Potential pollution sources of site run-off may include:

- Run-off and erosion of exposed bare soil and earth, drainage channels, earth working areas and stockpiles;
- Wash water from dust suppression sprays and wheel washing facilities; and
- Fuel, oil and lubricants from maintenance of construction vehicles and equipment.

5.4.1.4 During rainstorms, site run-off would wash away the soil particles on unpaved lands and areas with topsoil exposed, if any. The run-off is generally characterised by high concentrations of SS. Release of uncontrolled site run-off would increase the SS levels and turbidity in the nearby water environment. Site run-off may also wash away soil particles that were contaminated by the construction activities and therefore cause water pollution.

5.4.1.5 Wind-blown dust would be generated from exposed soil surfaces in works areas. It is possible that wind-blown dust would fall directly onto the nearby water bodies when a strong wind occurs. Dispersion of dust within the works areas may increase the SS levels in surface run-off causing a potential impact to the nearby sensitive receivers.

5.4.1.6 It is important that proper site practice and good site management should be followed to prevent run-off with high level of SS from entering the surrounding waters. Best Management Practices (BMPs) in controlling construction site discharges are recommended in **Section 5.5**. With the implementation of BMPs to control run-off and drainage from the construction site, disturbance of water bodies would be avoided and deterioration in water quality would be minimal.

Construction Works in Close Proximity to Inland Water

5.4.1.7 Construction activities in close vicinity to the inland watercourses may impact water quality due to the potential uncontrolled release of construction waste and wastewater. Construction waste and wastewater are generally characterised by high SS concentration and elevated pH. The implementation of adequate construction site drainage and BMPs, as well as provision of precautionary measures / practices to minimise the water quality impacts on surface water systems as specified in ETWB TC(Works) No. 5/2005 "*Protection of natural streams / rivers from adverse impacts arising from construction works*" as described in **Section 5.5.1**, it is anticipated that water quality impacts would be minimal.

Sewage Effluent from Construction Workforce

5.4.1.8 During the construction of the Project, the workforce on site will generate sewage effluent, which is characterised by high levels of biochemical oxygen demand (BOD), ammonia and *E. coli* counts. Potential water quality impacts upon the local drainage and freshwater system may arise from these sewage effluents, if uncontrolled.

5.4.1.9 Temporary sewage generation can be adequately treated by interim sewage treatment facilities, such as portable chemical toilets. Provided that sewage is not discharged directly into storm drains or inland waters adjacent to the construction site, temporary sanitary facilities are used and properly maintained, and control measures as recommended in **Section 5.5** are adopted as far as practicable, it is unlikely that sewage generated from construction workforce would have a significant water quality impact.

Accidental Spillage of Chemicals and Potential Contamination of Surface Water and Groundwater

5.4.1.10 The use of engine oil and lubricants, and their storage as waste materials has the potential to create impacts on the water quality of adjacent inland water bodies or storm drains if spillage occurs. Waste oil may infiltrate into the surface soil layer, or run-off into local water courses, increasing hydrocarbon levels. Groundwater pollution may also arise from the improper use and storage of chemicals and petroleum products within the site area where groundwater infiltrates into the area. Infiltration of groundwater may occur at area where there are faults and / or fissures in the rock mass. The potential impacts could however be avoided by practical precautionary measures and good site practices (as given in **Section 5.5**).

5.4.2 Operational Phase

5.4.2.1 The proposed TMOMPSPS aims to mitigate the existing flooding risk in Tai Po and has not expanded its drainage catchment in the Tai Po district. The operation of the Project does not constitute any elements that would be water pollution sources and would not generate any new pollution load to the catchment. No water quality impact would be expected during the operational phase.

5.5 Mitigation Measures

5.5.1 Construction Phase

Wastewater from General Construction Activities and Construction Site Run-off

5.5.1.1 Control of potential pollution of nearby water bodies during the construction phase of the Project should be achieved by measures to:

- prevent or minimise the likelihood of pollutants (generated from construction activities) being in contact with rainfall or run-off; and
- abate pollutants in the stormwater surface run-off prior to the discharge of surface run-off to the nearby water bodies.

5.5.1.2 These principal objectives should be achieved by implementation of the BMPs of mitigation measures in controlling water pollution. The guidelines for handling and disposal of construction site discharges as detailed in the ProPECC PN 2/23 should be followed, where applicable. Discharge license will be obtained according to the WPCO requirements before any wastewater discharge from the site to storm drains or foul sewers. All site discharges will be pre-treated as necessary, in accordance with the WPCO, the conditions of the WPCO discharge license and the relevant standards listed in the TM-DSS.

5.5.1.3 The Contractor should follow the practices, and be responsible for the design, construction, operation and maintenance of all the mitigation measures as specified in *ProPECC PN 2/23*. The design of the mitigation measures should be submitted by the Contractor to the engineer for approval. These mitigation measures should include the following practices to minimise site surface runoff and the chance of erosion, and to retain and reduce any suspended solids prior to discharge:

- At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sandbag barriers should be provided on site to direct storm water to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the Contractor prior to the commencement of construction.
- Sand / silt removal facilities such as sand / silt traps and sediment basins should be provided to remove sand / silt particles from runoff to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 2/23, which states that the retention time for silt / sand traps should be 5 minutes under maximum flow conditions. The detailed design of the sand / silt traps shall be undertaken by the Contractor prior to the commencement of construction.
- All drainage facilities and erosion and sediment control structures should always be regularly inspected and maintained to ensure proper and efficient operation and particularly during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.
- Measures should be taken to minimise the ingress of site drainage into excavations. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities.
- If surface excavation works cannot be avoided during the wet season (April to October), temporarily exposed slope / soil surfaces should be covered by a tarpaulin or other means, as far as practicable, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Interception channels should be provided (e.g. along the crest / edge of the excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. Other measures that need to be implemented before, during and after rainstorms are summarised in ProPECC PN 2/23.
- All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facility should be provided at every construction site exit where practicable. Wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains.
- Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms.

5.5.1.4 Debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby water bodies and public drainage system. Stockpiles of cement and other construction materials should be kept covered when not being used.

Construction Works in Close Proximity of Inland Waters and Potential Diversion / Rerouting of Watercourse

5.5.1.5 The precautionary measures / practices outlined in ETWB TC (Works) No. 5/2005 "*Protection of natural streams / rivers from adverse impacts arising from construction works*" should also be adopted where applicable to minimise the water quality impacts on any surface water systems. Relevant precautionary measures / practices from the ETWB TC (Works) No. 5/2005 include but not limited to the following:

- The use of less or smaller construction plants may be specified in areas close to the watercourses to reduce the disturbance to the surface water.
- Temporary storage of materials (e.g. equipment, chemicals and fuel) and temporary stockpile of construction materials should be located well away from any water courses when carrying out of the construction works.
- Stockpiling of construction materials and dusty materials should be covered and located away from any watercourses.
- Construction debris and spoil should be covered up and / or disposed of as soon as possible to avoid being washed into the nearby water receivers.
- Proper shoring may need to be erected in order to prevent soil or mud from slipping into the watercourses.

Sewage Effluent from Construction Workforce

5.5.1.6 No direct discharge of sewage to the stormwater drains and inland water will be allowed. Adequate and sufficient portable chemical toilets should be provided in the works areas to handle sewage from construction workforce. A licensed collector should be employed to clean and maintain the chemical toilets on a regular basis.

Accidental Spillage of Chemicals and Potential Contamination of Surface Water and Groundwater

5.5.1.7 Oils and fuels should only be used and stored in designated areas, which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby storm water drain or watercourse, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. Rainwater in the bunds should be cleared after each rain event. Waste oils, fuels and solvents collected within the bund should be handled and treated as chemical waste in accordance with the Waste Disposal (Chemical Waste) (General) Regulation and relevant guidelines (e.g. the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes) as detailed in **Section 6**.

5.6 Environmental Monitoring and Audit

5.6.1.1 No adverse water quality impact would be anticipated during the construction phase. Thus, water quality monitoring is considered not necessary. However, weekly site audit is recommended to be undertaken during the construction phase to ensure the proposed mitigation measures in **Section 5.5** are implemented in an appropriate manner and are effective.

5.6.1.2 No adverse water quality impacts would be anticipated during the operational phase that no EM&A requirement is considered necessary.

5.7 Conclusion

5.7.1.1 Water quality impacts would mainly arise from land-based construction activities, including wastewater generated from general construction activities, construction site run-off, accidental spillage of chemicals and potential contamination of surface water and groundwater, and sewage from construction workforce. Impacts can be controlled by implementing the recommended mitigation measures. No adverse water quality impact during construction phase would be anticipated.

5.7.1.2 The operation of the Project does not constitute any elements that would be water pollution sources and would not generate any new pollution load to the catchment. No water quality impact would be expected during the operational phase.

6 WASTE MANAGEMENT IMPLICATIONS

6.1 Environmental Legislation, Standards and Guidelines

6.1.1 General

6.1.1.1 The following legislation relates to the handling, treatment and disposal of wastes in the Hong Kong Special Administrative Region (HKSAR) and has been used in assessing potential impacts:

- Waste Disposal Ordinance WDO (Cap. 354)
- Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C)
- Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N);
- Land (Miscellaneous Provisions) Ordinance (Cap. 28);
- Public Health and Municipal Services Ordinance (Cap. 132) - Public Cleansing and Prevention of Nuisances Regulation; and
- Dumping at Sea Ordinance (Cap. 466).

Waste Disposal Ordinance (Cap. 354)

6.1.1.2 The *Waste Disposal Ordinance (WDO)* prohibits any unauthorised disposal of wastes. Construction waste is defined under Cap. 354N of the *WDO* as any substance, matter or thing that is generated and abandoned from construction works regardless of if it has been processed or stockpiled before being abandoned, excluding sludge, screenings or any matter removed or generated from desludging, desilting or dredging works. Under the *WDO*, waste can be disposed of only at designated waste disposal facilities licensed by the EPD.

Waste Disposal (Chemical Waste) (General) Regulation (Cap.354C)

6.1.1.3 Issued under the *WDO*, the *Waste Disposal (Chemical Waste) (General) Regulation (Cap.354C)* controls the possession, storage, collection, transport and disposal of chemical wastes. EPD has also issued three guidelines detailing the Contractor should comply with the regulations on chemical wastes, namely *A Guide to the Chemical Waste Control Scheme (2016), A Guide to the Registration of Chemical Waste Producers (2016) and Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes and its Addendum (1992 & 2022)*.

Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap.354N)

6.1.1.4 Under the *Waste Disposal (Charges for Disposal of Construction Waste) Regulation*, construction waste delivered to a landfill for disposal must not contain more than 50% by weight of inert material. Construction waste delivered to a sorting facility for disposal must contain more than 50% by weight of inert material, and construction waste delivered to a Public Fill Reception Facilities (PFRF) for disposal must consist entirely of inert material.

Land (Miscellaneous Provisions) Ordinance (Cap.28)

6.1.1.5 The inert portion of Construction and Demolition (C&D) materials (including rocks, soil, broken concrete, building debris, etc.) may be taken to Public Fill Reception Facilities (PFRFs) operated by the Civil Engineering and Development Department (CEDD). These facilities usually form part of land reclamation schemes and are operated by the CEDD. The *Land (Miscellaneous Provisions) Ordinance* requires that individuals or companies who deliver public fill to the public filling facilities are required to obtain Dumping Licences. The licences are issued by the CEDD under delegated authority from the Director of Lands.

Public Health and Municipal Services Ordinance

6.1.1.6 *The Public Cleansing and Prevention of Nuisances Regulation* (Cap. 132BK) under the *Public Health and Municipal Services Ordinance* provides control on illegal dumping of wastes on unauthorised / unlicensed sites. The illegal dumping of wastes can lead to a fine and / or imprisonment.

Dumping at Sea Ordinance (Cap. 466)

6.1.1.7 This Ordinance came into operation in April 1995 and empowers the Director of Environmental Protection (DEP) to control the disposal and incineration of substances and particles at sea for the protection of the marine environment. Under the Ordinance, a dumping permit from the DEP is required for the disposal of regulated substances within and outside the waters of Hong Kong. The permit contains terms and conditions which include the following specifications, but not limited to:

- Type and quantity of substances permitted to be dumped;
- Location of the disposal grounds;
- Requirement of equipment for monitoring the disposal operations; and
- Environmental monitoring requirements.

6.1.1.8 Marine disposal of any dredged/excavated sediment is subject to control under the Dumping at Sea Ordinance (DASO). Dredge/excavated sediment destined for marine disposal is classified based on its contaminant levels with reference to the Paragraph 4.2.1 of Chapter 4 of the PAH, 2022 Version – Management of Dredged/Excavated Sediment [previously Environment, Transport and Works Bureau Technical Circular (Works) No. 34/2002 – Management of Dredged/Excavated Sediment (ETWB TC(W) No. 34/2002)]. Paragraph 4.2.1 of Chapter 4 of the PAH stipulated a set of sediment quality criteria or Chemical Exceedance Levels (CEL) for contaminants including metals, metalloid and organic pollutants.

6.1.2 Other Relevant Environmental Guidelines

6.1.2.1 Other relevant circulars / guidelines are applicable to waste management practices for the Project include:

- Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992), EPD;
- A Guide to the Chemical Waste Control Scheme;
- A Guide to the Registration of Chemical Waste Producers;
- Environment, Transport and Works Bureau Technical Circular (Works) [ETWB TC(W)] No. 19/2005 'Environmental Management on Construction Site';
- Development Bureau Technical Circular (Works) [DEVB TC(W)] No.06/2010 'Trip Ticket System for Disposal of C&D Materials';

- DEVB TC(W) No. 2/2011 'Encouraging the Use of Recycled and other Green Materials in Public Works Projects';
- DEVB TC(W) No. 9/2011 'Enhanced Control Measures for Management of Public Fill';
- DEVB TCW No. 08/2010 'Enhanced Specification for Site Cleanliness and Tidiness';
- Works Branch Technical Circular (WBTC) No. 2/93 'Public Dumps';
- WBTC No. 2/93B 'Public Filling Facilities';
- WBTC No. 16/96 'Wet Soil in Public Dumps';
- WBTC No. 12/2000 'Fill Management';
- Project Administration Handbook (PAH) for Civil Engineering Works, Section 4.1.3 of Chapter 4, 2022 Edition; and
- CEDD TC No. 11/2019 'Management of Construction and Demolition Materials'.

6.1.2.2 The current policy related to the dumping of C&D materials is documented in the *WBTC No. 2/93, Public Dumps*. C&D materials that are wholly inert, namely public fill, should not be disposed of to landfill, but taken to public filling areas for reuse.

6.1.2.3 The *ETWB TC(W) No. 19/2005 on Environmental Management on Construction Site* includes procedures on waste management requiring contractors to reduce the C&D materials to be disposed of during the course of construction, the *Project Administrative Handbook for Civil Engineering Works, Section 4.1.3 "Management of Construction and Demolition Material Including Rock" (2016 Edition)* published by CEDD to enhance the management of C&D materials and to minimise their generation at source. The enhancement measures include drawing up a Construction and Demolition Material Management Plan (C&DMMP) at an early design stage to minimise C&D materials generation and encourage proper management of such materials. Projects generating less than 50,000m^3 C&D materials or importing less than 50,000m^3 of fill material are exempted from the C&DMMP. Under *ETWB TC(W) No. 19/2005*, the contractor is required to prepare and implement an Environmental Management Plan (EMP) and the Waste Management Plan (WMP) becomes part of the EMP.

6.1.2.4 Under *DEVB TCW No. 6/2010 'Trip Ticket System for Disposal of Construction and Demolition Materials'*, for all contracts that are expected to generate inert C&D materials requiring disposal from site, the project office shall write to the Public Fill Committee (PFC) through Secretary of the PFC to request a designated disposal ground for incorporation into the tender documents. For contracts where the estimated amount of non-inert C&D materials requiring disposal at landfill facilities equals to or exceeds 50 m^3, the project office shall seek confirmation from the DEP in terms of the availability of landfill facilities for disposal of such materials and the DEP will designate landfill facilities, if available, for the contracts. For contracts where the estimated amount of non-inert C&D materials to be generated from the contract is less than 50 m^3, the project office is not required to apply to DEP for designated landfill facilities but it should still specify in the tender documents of the appropriate landfill facilities for disposal.

6.2 Identification and Evaluation of Environmental Impacts

6.2.1 Construction Phase

6.2.1.1 The construction of the Project would mainly involve site clearance, excavation and lateral Support (ELS), foundation works, steel fixing and concreting of structure, backfilling, electrical and mechanical (E&M) installation and associated pipeworks, and reinstatement and landscaping works. These activities would generate a variety of wastes that can be divided into distinct categories based on their composition and ultimate method of disposal. The identified waste types include:

- Construction and Demolition (C&D) materials;
- Chemical waste;
- General refuse; and
- excavated sediment (if any).

C&D Materials

6.2.1.2 C&D materials would mainly be generated from excavation works during site clearance and formation works and construction of new buildings and infrastructure. The C&D materials would both comprise inert C&D materials (e.g. soil, rock and concrete, etc.) and non-inert C&D materials (e.g. timber, paper, etc.) generated. Estimated volumes of the waste materials are summarised in **Table 6.1** below. With the implementation of the recommended measures in **Section 6.3**, adverse environmental impacts arising from the storage, handling, and transportation of C&D materials would not be anticipated.

Table 6.1 Estimated Quantities of Different Types of C&D Materials

Type of C&D Materials	Amount of Waste Generated (m^3)
Inert C&D Materials To be Reused in the Project	6,600
Inert C&D materials to be delivered to public fill reception facilities (PFRF) for beneficially reuse in other projects	77,400
Non-inert C&D materials to be reused, recycled or disposed of at landfill*	2,000
All C&D materials	86,000

Note:
* It is difficult to quantify the amount of non-inert C&D materials that would arise from the construction activities as it would be highly dependent on the contractor's on-site maintenance activities The non-inert C&D materials would be reused and recycled as much as possible before disposal of at landfill.

6.2.1.3 It is the Contractor's responsibility to separate the inert and non-inert C&D materials on-site. The inert C&D materials should be reused on-site as far as possible to minimise the net amount of inert C&D materials generated from the Project. The surplus inert C&D materials shall be delivered to public fill reception facility (PFRF) for beneficial reuse in other projects. The designated disposal site of inert C&D materials shall be confirmed with the Public Fill Committee of CEDD. A Construction and Demolition Material Management Plan (C&DMMP) will be prepared and submitted to Public Fill Committee for approval in accordance with

Project Administration Handbook for Civil Engineering Works. It is estimated that a maximum of about 15 truck trips[1] per day will be required to dispose of these materials off-site during the construction phase.

6.2.1.4 The non-inert C&D material would be reused and recycled as much as possible before disposal of at strategic landfill. The non-inert C&D materials would be disposed of at North East New Territories (NENT) Landfill via Tai Po Tai Wo Road, Tolo Highway and Fanling Highway. The disposal of non-inert C&D materials would require a maximum of 15 truck trips per day. CEDD shall enquire with EPD on the availability of landfill and acceptability of the waste.

6.2.1.5 The contractor is required to prepare and implement a Waste Management Plan (WMP) as part of the EMP. With the implementation of proper management for C&D materials and good site practices, no unacceptable environmental impacts due to handling and disposal of C&D materials arising from the Project would be anticipated.

Chemical Waste

6.2.1.6 The maintenance and servicing of construction plant and vehicles may generate some chemical wastes such as waste oil / grease, spent solvents / solutions, used oil filter and scrap batteries etc. It is difficult to quantify the amount of chemical waste that would arise from the construction activities as it would be highly dependent on the contractor's on-site maintenance activities and the quantity of plant and equipment utilized. In view of the small scale of works at each Project site, it is anticipated that the quantity of chemical waste generated would be limited in the order of a few cubic meters. The amount of chemical waste to be generated would be quantified in the WMP to be prepared by the Contractors.

6.2.1.7 Since the construction activities would be carried out in close proximity to watercourse and the sea, chemical wastes arising during the construction phase may pose environmental, health and safety hazards if not stored or disposed of in an appropriate manner as stipulated in the *Waste Disposal (Chemical Waste) (General) Regulations (Cap. 354C)*. Materials classified as chemical waste shall require special handling and storage arrangements by the Contractor. All chemical waste shall be collected by a licensed collector and be disposed at a licensed chemical waste treatment and disposal facility such as Chemical Waste Treatment Centre (CWTC) at Tsing Yi. Unused chemical or those with remaining functional capacity would be reused and recycled on site or by licensed companies whenever possible. Mitigation and control requirements for chemical wastes are detailed in **Section 6.3**. Provided that the handling, storage and disposal of chemical wastes are to be in accordance with these requirements and the *Code of Practice on Packaging, Labelling and Storage of Chemical Wastes* published by EPD, adverse environmental impacts would not be anticipated.

General Refuse

6.2.1.8 During the construction phase of the Project, the workforce will generate general refuse comprising food waste, wastepaper, empty containers, etc. Improper collection or removal of general refuse would give rise to hygiene problems and

1 Assuming a construction truck with a capacity of 7.5m^3, material bulking factor of 1.1 for general fill and 1.4 for non-inert C&D materials.

adverse environmental impacts to residents, e.g. odour impacts. It is estimated that the number of workers would be up to 30 at the Project site. Based on the generation rate of 0.65 kg per worker per day, it is estimated no more than 19.5 kg general refuse per day would be generated from the construction of the Project. The amount of general refuse to be generated should be updated and quantified in the WMP to be prepared by the Contractors.

6.2.1.9 The general refuse should be collected on-site regularly, separately from C&D materials by an appropriate waste collector employed by the Contractor. Prior to disposal off-site, such refuse will be temporarily put in suitably covered storage areas / bins where they will have to be regularly cleaned and maintained to avoid attracting vermin and pests. With proper on-site handling and storage as and regular disposal of the waste, no unacceptable environmental impact (including potential hazard, air and odour emissions, noise and wastewater discharges) or public transport impact would be anticipated. Recommendations of mitigation measures for managing general refuse are presented in **Section 6.3.1.11**.

6.2.1.10 The proposed Project site falls on reclaimed land. The proposed excavation depth for the construction of the underground stormwater storage tank is approximately 18 m below ground level (bgl). Based on the nearest available ground investigation (GI) records (**Appendix 6.1** refers), marine deposit / marine sand with top levels ranging from 2.5 to 6.0 m bgl are present in the vicinity of the proposed underground stormwater storage tank. The construction of the underground stormwater storage tank would therefore require the excavation of the underlying land-based marine deposits if present. Based on the preliminary review and subject to further assessment, approximately 18,700 m^3 of marine deposit may be generated.

6.2.1.11 A Sediment Sampling and Testing Plan (SSTP) was prepared with reference to *Paragraph 4.2.1 of Chapter 4 of the PAH* and submitted to EPD for review and agreement. The SSTP details the ranges of parameters to be analysed; the number, type and methods of sampling; sample preservation; chemical and biological laboratory test methods to be used. Based on the adopted sampling grid arrangement, a total of 2 sediment land-based sampling locations were proposed within the potential excavation extent. Ground Investigation (GI) works would be conducted according to the agreed SSTP. The sediment sampling results and recommended disposal method of any excavated sediment will be reported in a standalone Sediment Quality Report (SQR).

6.2.1.12 Excavation of sediment should be minimised and any excavated sediment should be reused on-site as far as possible (e.g. as backfilling materials). Any excavated sediment, in particular uncontaminated sediment, should be reused as far as possible. Subject to the classification of sediment based on its contaminant levels, the sediment may need to be treated for reuse on-site. If marine disposal of sediment is required, the sediment should be disposed of at the designated marine disposal sites in accordance with *Paragraph 4.2.1 of Chapter 4 of the PAH*. Sediment, if any, should be excavated, handled, transported and disposed of in a manner that would minimise adverse environmental impacts.

6.2.2 Operational phase

6.2.2.1 During the operational phase of the Project, regular maintenance / desilting works of stormwater tanks and pump chambers of the proposed TPOMPSPS would be carried out by the DSD to remove excessive silts, debris and any obstructions to safeguard the hydraulic performance of the facilities. Small amount of silt, debris and screenings, which would be similar in nature to general refuse, would be

generated from the operation and routine maintenance works. Such waste will be disposed of at landfill after the clearance works.

6.2.2.2 Very small amount of chemical waste, in the order of less than a cubic meter each time, would be generated during maintenance works and would be properly stored, labelled and removed by licensed waste collectors. No unacceptable environmental impact (including potential hazard, air and odour emissions, noise and wastewater discharges) and public transport impact would thus be anticipated.

6.3 Environmental Protection and Mitigation Measures

6.3.1 Construction Phase

Waste Management Hierarchy

6.3.1.1 The waste management hierarchy has been applied in the assessment and development of mitigation measures for waste which aims at evaluating the desirability of waste management methods and includes the followings in descending preference:

- Avoidance and reduction of waste generation;
- Reuse of materials as far as practicable;
- Recovery and recycling of residual materials where possible; and
- Treatment and disposal according to relevant laws, guidelines and good practices.

6.3.1.2 Good site practices and waste reduction measures to achieve avoidance and minimisation of waste generation in the hierarchy are recommended as follow.

Good Site Practices

6.3.1.3 Adverse impacts would not arise in the construction site, provided that good site practices are strictly followed. Recommendations for good site practices during the construction phase include:

- Nomination of approved personnel, such as a site manager, to be responsible for implementation of good site practices, arrangements for waste collection and effective disposal to an appropriate facility;
- Training of site personnel in site cleanliness, concepts of waste reduction, reuse and recycling, proper waste management and chemical waste handling procedures;
- Provision of sufficient waste reception / disposal points, and regular collection of waste;
- Adoption of appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;
- Provision of regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors;
- Adoption of a recording system for the amount of wastes generated, recycled and disposed (including the disposal sites); and
- Preparation of WMP, as a part of the EMP in accordance with ETWB TC(W) No. 19/2005 "Environmental Management on Construction Sites" for submission to the Architect/Engineer for approval.

Waste Reduction Measures

6.3.1.4 Good management and control of construction site activities / processes can minimise the generation of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction are discussed as follow:

- Segregate and store different types of construction related waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- Provide separate labelled bins to segregate recyclable waste such as aluminium cans from other general refuse generated by the work force, and to encourage collection by individual collectors;
- Recycle any unused chemicals or those with remaining functional capacity;
- Maximise the use of reusable steel formwork to reduce the amount of C&D materials;
- Adopt proper storage and site practices to minimise the potential for damage to, or contamination of construction materials;
- Plan the delivery and stock of construction materials carefully to minimise the amount of waste generated; and
- Minimise over ordering and wastage through careful planning during purchasing of construction materials.

6.3.1.5 In addition to the above good site practices and waste reduction measures, specific mitigation measures are recommended below for the identified waste arising to minimise environmental impacts during the handling, transportation and disposal of these waste.

Reducing and Reuse of C&D Materials

6.3.1.6 Careful design, planning together with good site management can reduce over-ordering and generation of C&D materials such as concrete, mortar and cement grouts. Formwork should be designed to minimise the use of standard wooden panels, so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing should be considered to increase the potential for reuse.

6.3.1.7 To minimise off-site disposal of inert C&D materials, the excavated inert materials with suitable characteristics / size should be reused on-site as fill material as far as practicable. The surplus inert C&D materials would be transported and delivered to public filing area for beneficial reuse as filling material by other projects. Prior to disposal of non-inert C&D materials, wood, steel and other metals should also be separated for reuse and / or recycle where practicable so as to minimise the quantity of waste to be disposed of at landfill.

Storage of C&D Materials

6.3.1.8 Suitable areas should be designated within the works site boundaries for temporary stockpiling of C&D materials. Within stockpile areas, the following measures should be taken to control potential environmental impacts or nuisance:

- cover material during heavy rainfall;
- locate stockpiles to minimise potential visual impacts; and
- minimise land intake of stockpile areas as far as possible.

Disposal of C&D Materials

6.3.1.9 In order to monitor the disposal of C&D materials at the designated public fill reception facility and landfill and to control fly-tipping, a trip-ticket system should be included. One may make reference to DEVB TC(W) No.06/2010 for details. A recording system for the amount of waste generated, recycled and disposed, including the disposal sites, should also be set up. Warning signs should be put up to remind the designated disposal sites. CCTV should also be installed at the vehicular entrance and exit of the site as additional measures to prevent fly-tipping. When delivering inert C&D materials at a public fill reception facility for beneficial reuse, the material shall only consist of soil, rock, concrete, brick, cement plaster / mortar, inert building debris, aggregates and asphalt, and be free from marine mud, household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered to be unsuitable by the Filling Supervisor. GPS or equivalent systems are recommended to be equipped to all dump trucks for real-time tracking and monitoring of transportation of inert C&D materials to designated locations as one of the practicable means of avoiding illegal dumpling and landfilling.

Chemical Wastes

6.3.1.10 If chemical waste is produced at the construction site, the Contractor would be required to register with the EPD as a Chemical Waste Producer and must follow the guidelines stated in the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidising, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes at a licensed chemical waste treatment and disposal facility such as CWTC at Tsing Yi in accordance with the *Waste Disposal (Chemical Waste) (General) Regulation*.

General Refuse

6.3.1.11 General refuse should be stored in enclosed bins or compaction units separate from C&D materials and chemical wastes. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from C&D materials and chemical wastes, on a regular basis to minimise odour, pest and litter impacts. The collected general refuse will be disposed of at designated landfill. Clearly labelled recycling bins should be provided on site in order to encourage segregation and recycling of aluminium and plastic wastes, and wastepaper in order to reduce general refuse production. The contractor should carry out an education programme for workers in avoiding, reducing, reusing and recycling of materials generation. Posters and leaflets advising on the use of the bins should also be provided onsite as reminders. The recyclable waste materials should then be collected by reliable waste recycling agents on a regular basis.

Excavated Sediment

6.3.1.12 The sediment should be excavated, handled, transported and disposed of in a manner that would minimise adverse environmental impacts.

6.3.1.13 For off-site disposal, the basic requirements and procedures specified under *Paragraph 4.2.1 of Chapter 4 of the PAH* shall be followed. Marine Fill Committee (MFC) of CEDD is managing the disposal facilities in Hong Kong for the dredged / excavated sediment, while EPD is the authority of issuing marine dumping permit under the Dumping at Sea Ordinance (DASO).

6.3.1.14 For the purpose of site allocation and application of marine dumping permit, a Sediment Sampling and Testing Plan (SSTP) has been submitted to EPD for agreement under DASO. Site investigation works, based on the agreed SSTP, will be carried out in order to confirm the disposal arrangements of the excavated sediment. A Sediment Quality Report (SQR), reporting the chemical and biological screening results and the estimated quantities of sediment under different disposal options, shall then be submitted to EPD for agreement under DASO. The excavated sediments would be disposed of according to its determined disposal options and *Paragraph 4.2.1 of Chapter 4 of the PAH*.

6.3.1.15 To ensure disposal space is allocated for the Project, the project proponent should be responsible for obtaining agreement from MFC on the allocation of the disposal site. The contractor(s), on the other hand, should be responsible for the application of the marine dumping permit under DASO from EPD for the sediment disposal.

6.3.1.16 In order to minimise the potential odour / dust emissions during excavation and transportation of the sediment, the excavated sediments shall be wetted during excavation / material handling and shall be properly covered when placed on trucks or barges. Loading of the excavated sediments to the barge shall be controlled to avoid splashing and overflowing of the sediment slurry to the surrounding water.

6.3.1.17 If applicable, the barge transporting the sediments to the designated disposal sites shall be equipped with tight fitting seals to prevent leakage and shall not be filled to a level that would cause overflow of materials or laden water during loading or transportation. In addition, monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the DEP.

6.3.2 Operation Phase

6.3.2.1 The main type of wastes generated during operational phase would be silt and debris, which would be similar in nature to general refuse, as well as limit amount of chemical waste, from the maintenance of drains. The waste generated from the maintenance of the proposed drains should be stored in enclosed bins or compaction units separately. Likewise, measures stipulated in the *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes* should be strictly followed for the handling and disposal of chemical waste.

6.4 Environmental Monitoring and Audit

6.4.1.1 Waste management would be the contractor's responsibility to ensure that all wastes produced during the construction of the Project are handled, stored and disposed of in accordance with good waste management practices and EPD's regulations and requirements. The recommended mitigation measures in **Section 6.3** should form the basis of the site's WMP, as part of EMP, to be developed by the Contractors and submitted to Engineer for approval before construction in

accordance with ETWB TCW No. 19/2005. Regular inspection should be conducted to ensure proper management and handling of waste, and appropriate implementation of the mitigation measures.

6.4.1.2 No EM&A requirement is considered necessary during the operational phase.

6.5 Conclusion

6.5.1.1 During construction phase, waste types generated from the Project are likely to include inert and non-inert C&D materials from construction and excavation works, chemical wastes from the maintenance of construction works and vehicles, and general refuse from the workforce. Subject to the results of the GI works to be conducted upon agreement of the SSTP, land-based sediment may be generated during excavation works. Provided that these wastes are handled, transported and disposed of according to the recommended good site practices and mitigation measures, no adverse environmental impacts (including potential hazard, air and odour emissions, noise and wastewater discharges) would be anticipated during the construction phase.

6.5.1.2 During the operational phase, small quantities of silt and debris, as well as chemical wastes would be anticipated from the maintenance of drains. With implementation of the recommended mitigation measures, adverse environmental impacts would not be anticipated during the operational phase.

7 ECOLOGICAL AND FISHERIES

7.1 Environmental Legislation, Policies, Plans, Standards and Criteria

7.1.1.1 This section makes reference to the following ordinances, regulations, standards, guidelines and documents when identifying ecological importance of habitats and species and identifying implications of the Project on ecological resources:

- Environmental Impact Assessment Ordinance (EIAO) (Cap. 499)
- EIAO-TM and Annexes 8 and 16 of EIAO-TM
- EIAO Guidance Note Nos. 3/2010, 6/2010, 7/2010 and 10/2010
- Country Parks Ordinance (Cap. 208)
- Forests and Countryside Ordinance and its subsidiary legislation (Cap. 96 & 96A)
- Wild Animals Protection Ordinance (Cap. 170)
- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)
- Town Planning Ordinance (Cap. 131)
- Water Pollution Control Ordinance (Cap. 358)
- Chapter 10 of the Hong Kong Planning Standard and Guidelines (HKPSG)
- Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TCW) No. 13/2003 Guidelines and Procedures for Environmental Impact Assessment of Government Projects and Proposals
- ETWB TCW No. 5/2005 Protection of Natural Streams/Rivers from Adverse Impacts arising from Construction Works
- Development Bureau Technical Circular (Works) (DEVB TCW) No. 4/2020 Tree Preservation
- Greening, Landscape and Tree Management Section Development Bureau (2015) Guidelines on Tree Preservation during Development
- Environmental Protection Department Practice Note for Professional Persons ProPECC PN 2/23 Construction Site Drainage

7.1.1.2 This section also makes reference to the following international conventions, national, regional and local legislation:

- The International Union for the Conservation of Nature (IUCN)'s Red List of Threatened Species
- The Lists of Key Protected Wildlife and Plant Species under the People's Republic of China's (PRC) Wild Animal Protection Law
- The Convention on Biological Diversity (CBD)

7.2 Assessment Methodology

7.2.1.1 The assessment area for terrestrial ecological impact assessment included areas within 500 m from the Project site (**Figure 7.1** refers).

7.2.1.2 The PER Report under the Investigation Study and other relevant reports, studies and available information [e.g. aerial photos, Egretry Counts in Hong Kong with particular reference to the Mai Po Inner Deep Bay Ramsar Site (Anon, 2000 to 2020), AFCD Biodiversity Survey Records (2002 to 2020) (based on territory-wide long-term monitoring survey on major taxon groups), AFCD Hong Kong Biodiversity Database, AFCD's Newsletter Hong Kong Biodiversity] were collated

and reviewed to identify the ecological characteristics and resources within assessment area.

7.2.1.3 The Project site covers the existing Tai Po Old Market Playground, as well as existing manmade slope and footpath / cycle track by Lower Lam Tsuen River . Based on desktop research and review of aerial photos, the Project site and its vicinity are primarily urbanised and surrounded by high-rise residential buildings or trafficked roads. Lower Lam Tsuen River is screened from the Tai Po Old Market Playground by the trafficked Tai Po Tai Wo Road and the Playground was not recorded as part of the flight paths of ardeids recorded along Lower Lam Tsuen River. No roosting sites were recorded within or in proximity of Tai Po Old Market Playground.

7.2.1.4 Consider that there have been no changes in land use in vicinity of the Project site as well as the nature and limited scale of the Project, additional ecological survey were considered not necessary for the ecological impact assessment for this Updated PER.

7.3 Description of the Environment

7.3.1 Recognised Sites of Conservation Importance

7.3.1.1 No recognised sites of conservation importance are located within the 500m assessment area (**Figure 7.1** refers). Tai Po Market Egretry and Tai Mo Market Egretry SSSI are situated at over 580m and 720m from the Project site respectively.

7.3.2 Habitat and Vegetation

7.3.2.1 Three types of habitat, including developed area, plantation and modified watercourse, were identified within the assessment area in previous PER Report under the Investigation Study.

7.3.2.2 The Project site covers within the existing Tai Po Old Market Playground, which is an urban park, as well as existing man-made slope and footpath / cycle track by Lower Lam Tsuen River. It is considered to constitute solely developed area habitat dominated by low diversity of exotic and/or ornamental flora species, such as Elephant's Ear (*Macaranga tanarius var. tomentosa*), Ivy Tree (*Schefflera heptaphylla*) and *Hymenocallis littoralis*. No flora species of conservation importance was recorded in previous studies.

7.3.3 Fauna

7.3.3.1 The previous PER Report under the Investigation Study recorded very low diversity and abundance of fauna species, all the which were either very common or common, were recorded within the Project site, such as Red-whiskered Bulbul (*Pycnonotus jocosus*), Eurasian Tree Sparrow (*Passer montanus*), Great Mormon (*Papilio memnon*). No fauna species of conservation importance nor roosting site were recorded within the Project site.

7.3.3.2 Within the assessment area, the recorded fauna diversity and abundance was also low and dominated by very common or common species, e.g. Domestic Pigeon (*Columba livia*), Red-whiskered Bulbul, Eurasian Tree Sparrow, Common Grass Yellow (*Eurema hecabe)*, Chinese Gecko (*Gekko chinensis*). Four avifauna species of conservation importance were recorded within the assessment area, all of which were along Lower Lam Tsuen River, including Black-crowned Night Heron (*Nycticorax nycticorax*), Chinese Pond Heron (*Ardeola bacchus*), Great Egret (*Ardea alba*) and Little Egret (*Egretta garzetta*).

7.3.3.3 Flight path surveys were also conducted in previous PER Report under the Investigation Study to study ardeid's night roost along Lower Lam Tsuen River. The major flight paths within the assessment area were all along Lower Lam Tsuen River. Ardeid's night roosts were recorded at Kwong Fuk Bridge Garden whereas the pre-roosting sites were recorded by the bankside of Lam Tsuen River near Tai Wo Road Rest Garden and Po Heung Bridge (**Figure 7.1** refers).

7.4 Identification and Evaluation of Environmental Impacts

7.4.1 Construction Phase

Direct Habitat Loss

7.4.1.1 Direct impact to the developed area habitat within the urban park of the Tai Po Old Market Playground, as well as existing man-made slope and footpath / cycle track by Lower Lam Tsuen River would be anticipated during the construction phase. The existing Playground and footpath / cycle track along Lower Lam Tsuen River have been subject to existing high level of human disturbance from visitors and the nearby trafficked Tai Po Tai Wo Road and Ting Kok Road and supported low diversity and abundance of wildlife that it is considered of low ecological value. Nonetheless, part of the affect Tai Po Old Market Playground would be reinstated upon the completion of construction works and compensatory re-vegetation / planting would be undertaken as recommended in Tree Preservation and Removal Proposal to be submitted separately. Given the limited scale of the Project and low ecological value of the affected habitat, the ecological impact of direct habitat loss is considered low.

Indirect Disturbance Impacts

7.4.1.2 Indirect construction disturbance impacts would be also anticipated (e.g. increased human activities, glare, noise and dust). However, the Project site is mostly surrounded by developed area with no structural nor functional linkage with any highly valued habitats. Consider the transient nature of the construction and limited scale of the Project, indirect impact to the surrounding habitats is anticipated to be insignificant.

7.4.1.3 Construction works during restricted hours would not be required for the Project based on the current design. The Project sites within Tai Po Old Market Playground (for the construction of the proposed main structures of TPOMPSPS and underground stormwater storage tank) and near Lower Lam Tsuen River (for the construction of the proposed discharge chamber) are situated at over 100m and around 85m from the ardeid night roosts at Kwong Fuk Bridge Garden. Consider the limited scale of works and that the areas in the vicinity of the proposed works have already been urbanised and highly disturbed, disturbance impact to the ardeid night roost is anticipated to be negligible.

7.4.1.4 Likewise, the ardeid pre-roosting sites along Lower Lam Tsuen River are separated by the existing trafficked Tai Po Tai Wo Road from the Project site within Tai Po Old Market Playground. While the proposed works near Lower Lam Tsuen River is situated near the recorded pre-roosting sites, it is also bounded by Tai Po Tai Wo Road and existing footpath / cycle track. The ardeids recorded along Lam Tsuen River (**Section 7.3.3** refers) are highly mobile and are generally tolerant to disturbance in the urban environment. Given the existing high level of disturbance and that the proposed works are small scale and localized in nature, the disturbance impact from the Project to the ardeid pre-roosting sites is anticipated to be negligible.

7.4.1.5 For ardeids recorded along Lower Lam Tsuen River, consider that Lower Lam Tsuen River separated from the Project site by the existing trafficked Tai Po Tai Wo Road and Po Heung Bridge or existing footpath / cycletrack, and that the Playground / man-made slope was not recorded to be a habitat or part of the flight path of the ardeids, the disturbance impact to these species of conservation importance is anticipated to be negligible.

Indirect Impacts from Deterioration of Water Quality

7.4.1.6 Uncontrolled released of construction site run-off or wastewater discharge, which generally consist of high concentration of suspended solids (SS) and elevated pH, could cause potential indirect water quality impacts to Lower Lam Tsuen River nearby the Project site. The high SS level could lead to clogging of respiratory and feeding systems in aquatic organisms, while increased turbidity would reduce photosynthetic rate of aquatic plants and hinder vision of fauna in turn affecting their activities. Accidental spillage of chemicals such as engine oil, fuel and lubricants could potentially follow the uncontrolled runoff into the water, affecting the aquatic communities. With the implementation of appropriate measures to control runoff from construction site, as well as adoption of good site practices for handling and disposal of construction discharges (**Section 5** refers), adverse ecological impacts arising from water quality deterioration by land-based construction works of the Project would not be anticipated.

7.4.2 Operational Phase

7.4.2.1 The proposed TPOMPSPS would be unmanned that limited disturbance impacts would be anticipated.

7.4.2.2 The existing Tai Po Old Market Playground and proposed TPOMPSPS are surrounded by existing developments and high-rise residential building and no flight path towards / through the Playground were observed. Likewise, the aboveground portion of the proposed discharge chamber would be constructed at similar level of the existing man-made slope (**Appendix 2.1** refers) along existing footpath / cycle track. As such, the proposed low-rise aboveground structures of TPOMPSPS (around 8 to 10.5m tall) and its associated discharge chamber are not anticipated to affect the flight paths of ardeids forage along Lower Lam Tsuen River.

7.5 Environmental Protection and Mitigation Measures

7.5.1.1 While no adverse ecological impact would be anticipated from the proposed Project as detailed in **Section 7.4**, construction disturbances to surrounding habitats and associated wildlife could be further minimised through the implementation of mitigation measures and good site practices on air quality, noise and water quality control as recommended in **Sections 3 to 5**, such as standard good site practices (e.g. erection of hoardings around work sites) and practical dust, noise and water control measures (e.g. regular watering, noise control measures stipulated in EPD's "*Recommended Pollution Control Clauses for Construction Contracts*", site practices outlined in *ProPECC PN 2/23 "Construction Site Drainage"* etc).

7.6 Environmental Monitoring and Audit

7.6.1.1 Adverse ecological quality impact would not be anticipated with the implementation of the recommended mitigation measures. Thus, ecological monitoring is considered not necessary. However, weekly site audit is

recommended to be undertaken during the construction phase to ensure the proposed mitigation measures and good site practices on air quality, noise and water quality control as recommended in **Sections 3 to 5** are properly implemented.

7.6.1.2 No adverse ecological impacts would be anticipated during the operational phase that no EM&A requirements are considered necessary. ,

7.7 Conclusion

7.7.1.1 The Project site is located within the existing Tai Po Old Market Playground as well as existing man-made slope and footpath / cycle track by Lower Lam Tsuen River, which constitute solely developed area habitat dominated by low diversity of exotic and/or ornamental flora species and very low diversity and abundance of fauna species, all the which were either very common or common. No species of conservation importance nor roosting site were recorded within the Project site.

7.7.1.2 No recognised sites of conservation importance are located within the 500m assessment area. Within the assessment area, the recorded fauna diversity and abundance was also low and dominated by very common or common species. Four avifauna species of conservation importance were recorded within the assessment area, all of which were along Lower Lam Tsuen River, including Black-crowned Night Heron, Chinese Pond Heron, Great Egret and Little Egret.

7.7.1.3 Given the limited scale of the Project and low ecological value of the affected habitat, the ecological impact of direct habitat loss is considered low. Indirect construction disturbance impacts would also be anticipated (e.g. increased human activities, glare, noise and dust). The Project site is mostly surrounded by developed area and adjacent to existing trafficked Tai Po Tai Wo Road and / or existing footpath / cycle track. As such, considering the existing high level of disturbance and that the proposed works are small scale and localized in nature, indirect impact to the surrounding habitats and ardeid pre-roosting sites is anticipated to be negligible.

7.7.1.4 Considering that construction works during restricted hours would not be required based on the current design of the Project, the limited scale of works and that the areas in the vicinity of the proposed works are already urbanised and highly disturbed, disturbance impact to the ardeid night roost is anticipated to be negligible.

7.7.1.5 During operational phase, the proposed TPOMPSPS would be unmanned that limited disturbance impacts would be anticipated. Likewise, the proposed low-rise aboveground structures of TPOMPSPS (around 8 to 10.5m tall) and the aboveground portion of its associated discharge chamber (at similar level of the existing man-made slope) are not anticipated to affect the flight paths of ardeids forage along Lower Lam Tsuen River as the proposed works are surrounded by existing developments and high-rise residential building and no flight path towards / through the Project site were observed.

8 FISHERIES IMPACT

8.1 Environmental Legislation, Policies, Plans, Standards, and Guidelines

8.1.1.1 Local legislations that are relevant to this fisheries impact assessment include:

- Fisheries Protection Ordinance (Cap. 171) – promotes the conservation of fish and other forms of aquatic life within Hong Kong waters by regulating fishing practices to prevent detrimental activities to the fisheries industry;
- Marine Fish Culture Ordinance (Cap. 353) – regulates and protects marine fish culture by designating areas of fish culture zone, granting license, prohibiting unauthorized vessels and any deposition of chemicals or other substance which are likely to cause injury to fish in a fish culture zone; and
- Water Pollution Control Ordinance (Cap. 358) – controls water pollution in waters of Hong Kong.

8.2 Assessment Approach

8.2.1.1 Collation and desktop review of available relevant fisheries baseline data (e.g. AFCD Port Survey 2021, EIAs and other available relevant studies) within or in vicinity of the assessment area were carried out. Given the validity and adequacy of the existing data available from literature review, no fisheries surveys were necessary. Potential fisheries impacts arising from the Project were identified and evaluated where possible.

8.2.1.2 The Project will only involve land-based construction works within Tai Po Old Market Playground. Nonetheless, capture and culture fisheries were identified in the marine waters downstream of the assessment areas, i.e. Tolo Harbour.

8.3 Baseline Fisheries Condition

8.3.1.1 No fish culture zone (FCZ) was identified within or in vicinity of the 500 m assessment areas. The nearest FCZ, i.e. Yim Tin Tsai FCZ, is situated at over 4.5 km from the Project site.

8.3.1.2 According to the Based on the report of Fisheries Resources and Fishing Operations in Hong Kong, recognised nursery areas or spawning grounds of commercial fisheries resources identified in the Tolo Harbour and Channel Water Control Zone (WCZ), i.e. the important nursery area of commercial fisheries resources in Three Fathoms Cove, is situated over 8 km away from the Project site.

8.3.1.3 Based on AFCD Port Survey 2021, the marine waters downstream of the Lower Lam Tsuen River within Tolo Harbour and Channel WCZ supported moderate amount of fishing vessels (>200 – 400) and moderate fisheries production (>100-200 kg/ha). Sampan was the dominant kind of fishing vessel used in both the assessment areas in previous years, but other vessels such as gill netters, long liners and purse seiner were also found operating. According to Hong Kong Fisheries Resources Monitoring Report (2010 – 2015), the key composition of fisheries resources according to biomass in the marine waters downstream of the assessment area consists of Clupeidae, Engraulidae, Leiognathidae, Penaeidae and Sciaenidae.

8.4 Identification and Evaluation of Potential Impacts

8.4.1 Construction Phase

8.4.1.1 Since the proposed works are all land-based, no direct fisheries impacts would be anticipated.

8.4.1.2 Uncontrolled released of construction site run-off or wastewater discharge and accidental spillage of chemicals during construction phase could cause potential indirect water quality impacts. With the implementation of appropriate measures to control runoff from construction site, as well as adoption of good site practices for handling and disposal of construction discharges (**Section 5** refers), adverse fisheries impacts arising from water quality deterioration by land-based construction works of the Project would not be anticipated.

8.4.2 Operation Phase

8.4.2.1 The proposed TMOMPSPS aims to mitigate the existing flooding risk in Tai Po and has not expanded its drainage catchment in the Tai Po district. The operation of the Project does not constitute any elements that would be water pollution sources and would not generate any new pollution load to the catchment. No fisheries impact would be anticipated during operational phase.

8.5 Environmental Protection and Mitigation Measures

8.5.1.1 No adverse fisheries impacts would be anticipated from the proposed Project with the implementation of appropriate measures to control runoff from construction site, as well as adoption of good site practices for handling and disposal of construction discharges (**Section 5** refers). No specific mitigation measures for fisheries impact are considered necessary.

8.6 Environmental Monitoring and Audit

8.6.1.1 As no unacceptable adverse fisheries impacts are anticipated during both construction and operational phases, no specific EM&A requirements for fisheries is required.

8.6.1.2 Regular weekly site inspection during the construction phase has been proposed in **Section 5** to inspect the construction activities and works area to ensure the recommended water pollution control measures are properly implemented.

8.7 Conclusion

8.7.1.1 The proposed works would not result in direct impact to any fisheries resources and the potential indirect impacts are expected to be insignificant. No fisheries impact would be anticipated during the construction and operation of the Project, and hence, specific mitigation measure and environmental audit and monitoring programme for fisheries impact are considered not necessary.

9 HERITAGE IMPACT

9.1 Environmental Legislation, Standards and Guidelines

9.1.1.1 Legislation, standards, guidelines and criteria relevant to the assessment of heritage impacts under this study include the following:

- Antiquities and Monuments Ordinance (A&MO) (Cap.53)
- Guidelines for Cultural Heritage Impact Assessment (Guidelines for CHIA)
- Hong Kong Planning Standards and Guidelines (HKPSG)
- Development Bureau Technical Circular (Works) (DEVB TC (W) No. 1/2022 – Heritage Impact Assessment Mechanism for Capital Works Projects

9.2 Assessment Methodology

9.2.1.1 According to Clause 3.16 of the PER Brief, the study area for this heritage impact assessment should include all areas within a distance of 50 m from the boundary of the Project. The methodology for heritage impact assessment is described below.

9.2.1.2 A desk-top review was conducted to identify cultural heritage resources within the study area based on examination on the following resources:

- List of Proposed and Declared Monuments as issued by the AMO;
- List of the 1,444 Historic Buildings and list of new items with Assessment Results by the Antiquities Advisory Board (AAB);
- Other heritage resources recorded by the AMO, including Government Historic Sites identified by AMO;
- Relevant information from AMO's website;
- All available literatures, including previous including previous EIA Studies, related publications on relevant historical issues, historical, cartographic and pictorial documentations; and
- Unpublished archival papers and records, and collection and libraries of tertiary institutions.

9.2.1.3 The potential direct and indirect impacts that may affect the cultural heritage resources were assessed by following the procedures and requirements of the Guideline for CHIA and DEVB TC (W) No. 1/2022.

9.3 Evaluation of Cultural Heritage Impact

9.3.1.1 The Project site with the existing Tai Po Old Market Playground and man-made slope near Lower Lam Tsuen River is situated on reclaimed land. No Declared Monument, Proposed Monument, Graded Historic Sites/Building/Structure, Sites/Buildings/Structures in the new list of proposed grading items, Government Historic Site or Sites of Archaeological Interest identified by AMO was identified within 50m from the Project site. Therefore, no cultural heritage impacts would be anticipated from the proposed works and no mitigation measures would be required.

10 NOT USED

11 LAND CONTAMINATION IMPLICATIONS

11.1 Introduction

11.1.1.1 This section presents review of the potential land contamination impacts associated with the proposed Tai Po Old Market Playground Stormwater Pumping Station (TPOMPSPS).

11.2 Environmental Legislation, Standards and Guidelines

11.2.1.1 The relevant environmental guidelines and standards for land contamination assessment include the following:

- Guidance Note for Contaminated Land Assessment and Remediation (Guidance Note) (EPD, April 2023) - The Guidance Note sets out the requirements for proper assessment and management of potentially contaminated sites such as oil installations (e.g. oil depots, petrol filling stations), gas works, power plants, shipyards/boatyards, chemical manufacturing/processing plants, steel mills/metal workshops, car repairing/dismantling workshops and scrap yards. In addition, this Guidance Note provides guidelines on how site assessments shall be conducted and analysed and suggests practical remedial measures that can be adopted for the remediation of contaminated sites.
- Practice Guide for Investigation and Remediation of Contaminated Land (Practice Guide) (EPD, April 2023) - This guide outlines typical investigation methods and remediation strategies for the range of potential contaminants typically encountered in Hong Kong.
- Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management (Guidance Manual) (EPD, April 2023) - The Guidance Manual introduces the risk-based approach in land contamination assessment and present instructions for comparison of soil and groundwater data to the Risk-Based Remediation Goals (RBRGs) for 54 chemicals of concern commonly found in Hong Kong. The RBRGs were derived to suit Hong Kong conditions by following the international practice of adopting a risk-based methodology for contaminated land assessment and remediation and were designed to protect the health of people who could potentially be exposed to land impacted by chemicals under four broad post restoration land use categories. The RBRGs also serve as the remediation targets if remediation is necessary.

11.3 Assessment Methodology

11.3.1.1 A site appraisal was conducted to identify any current / historical potentially contaminating land uses within the proposed TPOMPSPS. The site appraisal, including site walkover and desktop review, was carried out with reference to the Guidance Note, Guidance Manual and Practice Guide.

11.3.1.2 The site walkover was conducted within the proposed TPOMPSPS to identify any existing contaminative land uses and contamination sources (or 'hotspots'). For the desktop review, the following information was reviewed:

- Available records of dangerous goods, chemical wastes, chemical spillage/leakage and fire incidents from Environmental Protection Department (EPD) and Fire Services Department (FSD);
- Preliminary Environmental Review Report – Tai Po under Agreement No. CE 11/2019 (DS) – Drainage Improvement Works in Tai Po – Investigation; and

- Selected aerial photographs and topographic maps held by the Lands Department.

11.3.1.3 If potentially contaminated land use(s) were identified within the proposed TPOMPSPS, the potential land contamination impacts to the Project would be evaluated and the appropriate mitigation measures would be recommended.

11.4 Identification of Potential Land Contamination Impacts

11.4.1 Review of Previous Study

11.4.1.1 Land contamination assessment was conducted for the Preliminary Environmental Review (PER) Report under the Investigation stage of the Project. Except for the northern portion of the proposed TPOMPSPS, the assessment covers the proposed TPOMPSPS (refer to **Appendix 11.1**). The assessment included desktop study (e.g. review of aerial photographs and relevant information from government departments) and site walkover conducted in September 2022.

11.4.1.2 Based on findings of the PER, no potentially contaminating land uses were identified. However, this finding would be further reviewed when the information from FSD on the records of any DG license or fire incident records found within the proposed TPOMPSPS is obtained.

11.4.2 Review of Historical Land Uses

11.4.2.1 A review of aerial photographs extracted from the PER Report and the latest aerial photograph available in the Survey and Mapping Office of Lands Department has been undertaken to identify any historical land uses within the proposed TPOMPSPS that may have potential contamination implications. Findings of the review are discussed below. The aerial photographs reviewed are provided in **Appendix 11.1**.

11.4.2.2 A summary of the historical land uses is presented in **Table 11.1** below.

Table 11.1 Summary of Historical Land Uses for proposed TPOMPSPS

Year	Drawing No. in Appendix 11.1	Site Description
1963	AP1	The proposed TPOMPSPS was part of the sea / Tolo Harbour.
1973	AP2	No significant land use change was observed within the proposed TPOMPSPS.
1982	AP3	Reclaimed land was observed within the proposed TPOMPSPS.
1993	AP4	The proposed TPOMPSPS was occupied by the existing park of Tai Po Old Market Playground, as well as existing man-made slope and footpath / cycle track near Lower Lam Tsuen River.

Year	Drawing No. in Appendix 11.1	Site Description
2001	AP5	No significant land use change was observed within the proposed TPOMPSPS.
2011	AP6	No significant land use change was observed within the proposed TPOMPSPS.
2021	AP7	No significant land use change was observed within the proposed TPOMPSPS.
2022	AP8	No significant land use change was observed within the proposed TPOMPSPS.

11.4.2.1 Based on the review of aerial photographs, similar to findings of the PER Report, no historical potentially contaminating land uses were identified within the proposed TPOMPSPS.

11.4.3 Site Walkover

11.4.3.1 Site walkover was conducted on 30 August 2023 to investigate any land contamination issues associated with the current land uses within the proposed TPOMPSPS. Photographic records, along with the site layout plan, are shown in **Figure 11.1**. The site walkover checklist is attached in **Appendix 11.2**.

11.4.3.2 Similar to findings of the PER Report, the proposed TPOMPSPS is currently occupied by the existing Tai Po Old Market Playground and includes a children's playground, a basketball court, vegetation and footpaths. No potentially contaminating land uses / activities were observed within the proposed TPOMPSPS during the site walkover.

11.4.4 Acquisition of Information from Government Departments

11.4.4.1 The EPD and FSD have been contacted for (i) records on any release of chemicals and chemical waste, (ii) records of dangerous goods (DG), (iii) records of Chemical Waste Producer(s) (CWP(s)) and (iv) records of reported fire incidents within the locations for proposed drainage improvement works. EPD and FSD's replies on the request have been received and attached in **Appendix 11.3**. The information is summarised below.

Environmental Protection Department

11.4.4.2 The reply from EPD on the records of any chemical spillage / leakage records found within the proposed TPOMPSPS is outstanding and will be furnished in the next submission. In addition, visit to EPD's Southorn Centre Office was undertaken on 31 August 2023 to review the available CWP records. According to the records reviewed, there are no registered CWPs found within the proposed TPOMPSPS.

Fire Services Department

11.4.4.3 The reply from FSD on the records of any DG license or fire incident records found within the proposed TPOMPSPS is outstanding and will be furnished in the

next submission.

11.5 Evaluation of Potential Land Contamination Impacts

11.5.1.1 Based on the findings of the site appraisal, the proposed TPOMPSPS has been occupied by non-contaminating land uses (i.e. reclaimed land and playground) only. No potential land contamination impact is therefore anticipated for the construction of the proposed TPOMPSPS.

11.6 Environmental Monitoring and Audit

11.6.1.1 Based on the site appraisal, no land contamination impact is anticipated for construction of the proposed TPOMPSPS. No environmental monitoring and audit are considered necessary.

11.7 Conclusion

11.7.1.1 A site appraisal, in the form of desktop review and site walkover, had been carried out from August to September 2023 to identify the past and current potentially contaminating land uses within the proposed TPOMPSPS.

11.7.1.2 Based on findings of the site appraisal, no potentially contaminating land uses were identified within the proposed TPOMPSPS. No adverse land contamination impact is therefore anticipated for construction of the proposed TPOMPSPS.

12 ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

12.1 Introduction

12.1.1.1 This section elaborates the requirements of environmental monitoring and audit (EM&A) for the construction and operation phases of the Project, based on the assessment results of the various environmental issues. The objectives of carrying out EM&A for the Project include the following:

- to provide a database against which any short- or long-term environmental impacts of the Project can be determined;
- to provide an early indication shall any of the environmental control measures or practices fail to achieve the acceptable standards;
- to monitor the performance of the Project and the effectiveness of mitigation measures;
- to verify the environmental impacts predicted;
- to determine project compliance with regulatory requirements, standards and government policies;
- to provide a plan for remedial action if unexpected problems or unacceptable impacts arise; and
- to provide data to enable an environmental audit.

12.1.1.2 The following sections summarise the recommended EM&A requirements for the various environmental impacts of this Project.

12.2 Air Quality Impact

12.2.1.1 Weekly site audit is recommended to be undertaken during the construction phase to ensure the proposed dust suppression measures are implemented in an appropriate manner.

12.2.1.2 No EM&A is considered necessary during operational phase.

12.3 Noise Impact

12.3.1.1 Weekly site audit shall be carried out to inspect the construction activities and works areas in order to ensure the recommended mitigation measures are being properly implemented.

12.3.1.2 No EM&A requirement is considered necessary during operational phase. Commissioning test should be conducted for the proposed fixed plant sources prior to operation of the Project to ensure compliance with the relevant noise standards.

12.4 Water Quality Impact

12.4.1.1 Weekly site audit is recommended to be undertaken during the construction phase to ensure proper implementation of the proposed mitigation measures.

12.4.1.2 No EM&A requirement is considered necessary during the operational phase.

12.5 Waste Management Implications

12.5.1.1 Waste management would be the contractor’s responsibility to ensure that all wastes produced during the construction of the Project are handled, stored and

disposed of in accordance with good waste management practices and EPD's regulations and requirements. The recommended mitigation measures in **Section 6** should form the basis of the site's WMP, as part of EMP, to be developed by the Contractors and submitted to Engineer for approval before construction in accordance with ETWB TCW No. 19/2005. Regular inspection should be conducted to ensure proper management and handling of waste, and appropriate implementation of the mitigation measures.

12.5.1.2 No EM&A requirement is considered necessary during the operational phase.

12.6 Ecological Impact

12.6.1.1 Specific EM&A requirements for ecology are considered not necessary during the construction and operational phases. Weekly site audit is recommended to be undertaken during the construction phase to ensure the proposed mitigation measures and good site practices on air quality, noise and water quality control as recommended in **Sections 3 to 5** are properly implemented.

12.7 Fisheries Impact

12.7.1.1 No specific EM&A requirement for fisheries is required during the construction and operational phases.

12.8 Cultural Heritage Impact

12.8.1.1 No EM&A requirement is considered necessary during the construction and operational phases.

12.9 Landscape and Visual Impact

12.9.1.1 No EM&A requirement is considered necessary during the construction and operational phase.

12.10 Land Contamination Impact

12.10.1.1 No EM&A requirement is considered necessary during the construction and operational phases.

13 CONCLUSIONS

13.1 Introduction

13.1.1.1 This Updated PER Report has provided a review of the potential environmental impacts associated with the construction and operation of the proposed Tai Po Old Market Playground Stormwater Pumping Station, based on the latest engineering design information available at this stage and the findings, conclusions and recommendations of the PER Report prepared under the Investigation Study.

13.1.1.2 The Updated PER has been conducted in accordance with the PER Scope, covering the following environmental issues:

- Air Quality Impact
- Noise Impact
- Water Quality Impact
- Waste Management Implications
- Ecological Impact
- Fisheries Impact
- Heritage Impact
- Land Contamination Implications

13.1.1.3 The findings of this Updated PER have information on the likely nature and extent of environmental impacts arising from the construction and operation of the Project. The Updated PER has predicted that the Project would be environmentally acceptable with the implementation of the recommended mitigation measures for construction and operation phases.

13.1.1.4 The assessment results for each environmental aspect are summarised in the following sections.

13.2 Air Quality Impact

13.2.1.1 Potential fugitive impacts to nearby ASRs would mainly arise from excavation works, handling, transportation and removal of excavated spoil / material, stockpiling and wind erosion etc. With the implementation of regular site watering and good construction practices for dust minimization, construction dust impacts are not expected to be significant on the surrounding sensitive receivers. Requirements of *Air Pollution Control (Construction Dust) Regulation* and *EPD's Recommended Pollution Control Clauses for Construction Contracts* are proposed to be incorporated into the contract.

13.2.1.2 No air pollution source is identified from the operation of any elements of the Project itself that no air quality impacts would be anticipated.

13.3 Noise Impact

13.3.1.1 During the construction phase, the use of PME for the construction of the Project such as excavation, steel fixing and concreting of structure, backfilling, E&M installations and associated pipeworks, and reinstatement and landscaping works, would pose potential impact on nearby NSRs. In view of the limited scale of the Project, no adverse construction noise impact would be anticipated with the implementation of recommended good site practices, noise mitigation measures and noise control requirements stipulated in Recommended Pollution Control

Clauses for Construction Contracts.

13.3.1.2 During the operational phase, given that the planned fixed plants are properly designed to meet the maximum permissible SWL, no adverse noise impacts would be anticipated.

13.4 Water Quality Impact

13.4.1.1 Water quality impacts would mainly arise from land-based construction activities, including wastewater generated from general construction activities, construction site run-off, accidental spillage of chemicals and potential contamination of surface water and groundwater, and sewage from construction workforce. Impacts can be controlled by implementing the recommended mitigation measures. No adverse water quality impact during the construction phase would be anticipated.

13.4.1.2 The operation of the Project does not constitute any elements that would be water pollution sources and would not generate any new pollution load to the catchment. No water quality impact would be expected during the operational phase.

13.5 Waste Management Implications

13.5.1.1 During construction phase, waste types generated from the Project are likely to include inert and non-inert C&D materials from construction and excavation works, chemical wastes from the maintenance of construction works and vehicles, and general refuse from the workforce. Subject to the results of the GI works to be conducted upon agreement of the SSTP, land-based sediment may be generated during excavation works. Provided that these wastes are handled, transported and disposed of according to the recommended good site practices and mitigation measures, no adverse environmental impacts (including potential hazard, air and odour emissions, noise and wastewater discharges) would be anticipated during the construction phase.

13.5.1.2 During the operational phase, small quantities of silt and debris, as well as chemical wastes would be anticipated from the maintenance of drains. With implementation of the recommended mitigation measures, adverse environmental impacts would not be anticipated during the operational phase.

13.6 Ecological Impact

13.6.1.1 The Project site is located within the existing Tai Po Old Market Playground as well as existing man-made slope and footpath / cycle track by Lower Lam Tsuen River, which constitute solely developed area habitat dominated by low diversity of exotic and/or ornamental flora species and very low diversity and abundance of fauna species, all the which were either very common or common. No species of conservation importance nor roosting site were recorded within the Project site.

13.6.1.2 No recognised sites of conservation importance are located within the 500m assessment area. Within the assessment area, the recorded fauna diversity and abundance was also low and dominated by very common or common species. Four avifauna species of conservation importance were recorded within the assessment area, all of which were along Lower Lam Tsuen River, including Black-crowned Night Heron, Chinese Pond Heron, Great Egret and Little Egret.

13.6.1.3 Given the limited scale of the Project and low ecological value of the affected

habitat, the ecological impact of direct habitat loss is considered low. Indirect construction disturbance impacts would be also anticipated (e.g. increased human activities, glare, noise and dust). The Project site is mostly surrounded by developed area and adjacent to existing trafficked Tai Po Tai Wo Road and / or existing footpath / cycle track. As such, considering the existing high level of disturbance and that the proposed works are small scale and localized in nature, indirect impact to the surrounding habitats and ardeid pre-roosting sites is anticipated to be negligible.

13.6.1.4 Consider that construction works during restricted hours would not be required for the proposed TPOMPSPS based on the current design of the Project, the limited scale of works and that the areas in the vicinity of the proposed works are already urbanised and highly disturbed, disturbance impact to the ardeid night roost is anticipated to be negligible.

13.6.1.5 During operational phase, the proposed TPOMPSPS would be unmanned that limited disturbance impacts would be anticipated. Likewise, the proposed low-rise aboveground structures of TPOMPSPS (around 8 to 10.5m tall) and the aboveground portion of its associated discharge chamber (at similar level of the existing man-made slope) are not anticipated to affect the flight paths of ardeids forage along Lower Lam Tsuen River as the proposed works are surrounded by existing developments and high-rise residential building and no flight path towards / through the Project site were observed.

13.7 Fisheries Impact

13.7.1.1 The proposed works would not result in direct impact to any fisheries resources and the potential indirect impacts are expected to be insignificant. No fisheries impact is anticipated during the construction and operation of the Project, and hence, specific mitigation measure and environmental audit and monitoring programme for fisheries impact are not necessary.

13.8 Cultural Heritage Impact

13.8.1.1 The Project site with the existing Tai Po Old Market Playground is situated on reclaimed land. No Declared Monument, Proposed Monument, Graded Historic Sites/Building/Structure, Sites/Buildings/Structures in the new list of proposed grading items, Government Historic Site or Sites of Archaeological Interest identified by AMO was identified within 50m from the Project site. Therefore, no cultural heritage impacts would be anticipated from the proposed works and no mitigation measures would be required.

13.9 Land Contamination

13.9.1.1 A site appraisal, in the form of desktop review and site walkover, had been carried out from August to September 2023 to identify the past and current potentially contaminating land uses within the proposed TPOMPSPS. Based on findings of the site appraisal, no potentially contaminating land uses were identified within the proposed TPOMPSPS. No adverse land contamination impact is therefore anticipated for construction of the proposed TPOMPSPS.

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APPENDICES

Appendix 2.1
General Layout of the Proposed Tai Po OldMarket Stormwater Pumping Station

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

PROPOSED MAINTENANCE ACCESS

PROPOSED TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION

EXISTING PUBLIC TOILET AND LCSD OFFICE TO BE RETAINED

PROPOSED ABOVEGROUND STRUCTURES

DISCHARGE CHAMBER

LEGEND:

- PROPOSED STORMWATER DRAIN
- PROPOSED DRAIN TO BE CONSTRUCTED BY PIPE JACKING
- PROPOSED RISING MAINS TO BE CONSTRUCTED BY PIPE JACKING
- EXISTING STORMWATER DRAIN
- EXISTING PIPE AND MANHOLE TO BE ABANDONED
- EXISTING STORMWATER DRAIN
- APPLICATION BOUNDARY
- EXISTING STORMWATER MANHOLE
- PROPOSED STORMWATER MANHOLE
- EXISTING STORMWATER MANHOLE TO BE RECONSTRUCTED
- EXISTING REGISTERED FEATURES

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

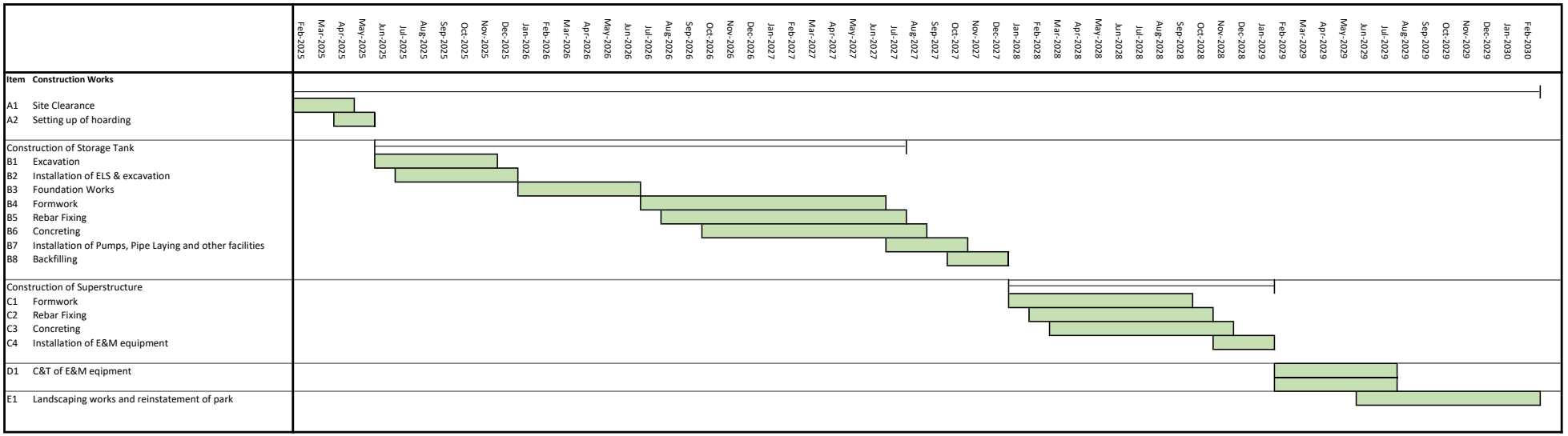
PROPOSED TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION

SHEET NUMBER
圖紙編號

60700410/R28/402

Plot File by: iu.yang 2024/1/29
PATH: P:\PROJECTS\60700410\DRAWING\REPORT\R28\R28_402.dgn

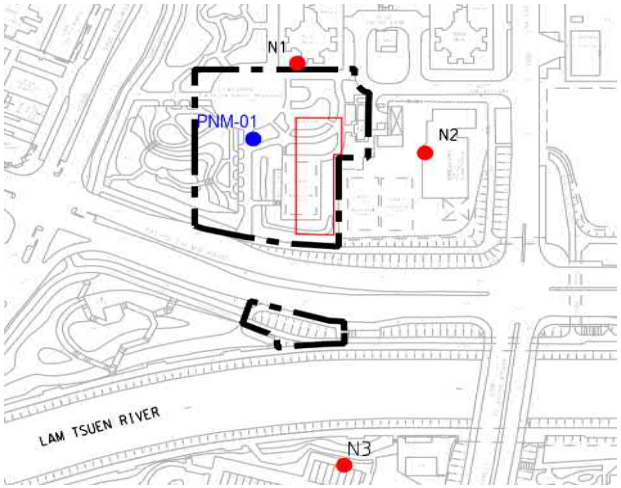
Appendix 2.2
Tentative Construction Programme


Item Construction Works
A1 Site Clearance
A2 Setting up of hoarding
Construction of Storage Tank
B1 Excavation
B2 Installation of ELS & excavation
B3 Foundation Works
B4 Formwork
B5 Rebar Fixing
B6 Concreting
B7 Installation of Pumps, Pipe Laying and other facilities
B8 Backfilling
Construction of Superstructure
C1 Formwork
C2 Rebar Fixing
C3 Concreting
C4 Installation of E&M equipment
D1 C&T of E&M eqipment
E1 Landscaping works and reinstatement of park
Feb-2025 Mar-2025 Apr-2025 May-2025 Jun-2025 Jul-2025 Aug-2025 Sep-2025 Oct-2025 Nov-2025 Dec-2025 Jan-2026 Feb-2026 Mar-2026 Apr-2026 May-2026 Jun-2026 Jul-2026 Aug-2026 Sep-2026 Oct-2026 Nov-2026 Dec-2026 Jan-2027 Feb-2027 Mar-2027 Apr-2027 May-2027 Jun-2027 Jul-2027 Aug-2027 Sep-2027 Oct-2027 Nov-2027 Dec-2027 Jan-2028 Feb-2028 Mar-2028 Apr-2028 May-2028 Jun-2028 Jul-2028 Aug-2028 Sep-2028 Oct-2028 Nov-2028 Dec-2028 Jan-2029 Feb-2029 Mar-2029 Apr-2029 May-2029 Jun-2029 Jul-2029 Aug-2029 Sep-2029 Oct-2029 Nov-2029 Dec-2029 Jan-2030 Feb-2030

Appendix 4.1
Fixed Plant Noise Impact Assessment

Appendix 4.1 Fixed Plant Noise Impact Assessment

1. Determination of Fixed Plant Noise Criteria



Legend:
- Project Site Boundary
- Proposed Tai Po Old Market Playground Stormwater Pumping Station (TPOMPSPS)
- Representative Noise Sensitive Receivers
- Noise Measurement Points from PER Report prepared under the Investigation Study (Agreement No. CE 11/2019(DS))

NSR	Description	Type of Area Containing the Representative NSR	Degree to which NSR is affected by Influencing Factor	Area Sensitive Rating	Acceptable Noise Level (ANL), dB(A)		Planning Criteria (ANL-5), dB(A)		Relevant Prevailing Background Measurement Location	Minimum Measured Prevailing Background Noise Level, $L_{90(1\ hour)}$, dB(A)		Fixed Plant Noise Criterion Adopted, dB(A)	
					Daytime / Evening [1]	Night-time [1]	Daytime / Evening [1]	Night-time [1]		Daytime / Evening [1]	Night-time [1]	Daytime / Evening [1]	Night-time [1]
N1	Eightland Gardens	Area other than urban, rural or low density residential area	Not Affected	B	65	55	60	50	PNM-01	55	47	55	47
N2	Tai Po Old Market Public School	Area other than urban, rural or low density residential area	Not Affected	B	65	N/A [2]	60	N/A [2]	PNM-01	55	47	55	N/A [2]
N3	No. 29, Po Yick Lane	Area other than urban, rural or low density residential area	Not Affected	B	65	55	60	50	PNM-01	55	47	55	47

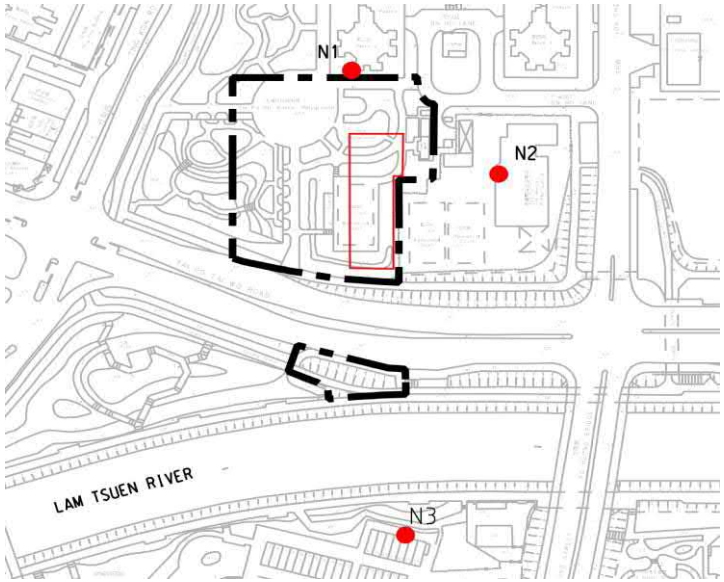
Notes:

[1] Daytime refers to 0700 to 1900 hours, while evening refers to 1900 to 2300 hours, and night-time refers to 2300 to 0700 hours

[2] It is assumed that there would be no night-time activities (2300 to 0700) for education institutes. Only the noise criteria for day-time / evening (0700 to 2300 hrs) are adopted for education institutes.

Appendix 4.1 Fixed Plant Noise Im

2. Maximum Allowable Sound Power Levels of Proposed Fixed Noise Sources



Legend:
- Project Site Boundary
- Proposed TPOMPSPS
- Representative Noise Sensitive Receivers

ii. Fixed Plant Noise Criteria Adopted

NSR	Description	Noise Criteria, dB(A) [1] [2]	Minimum Horizontal Distance to Proposed TMOMPSPS, m	Correction, dB(A)			Maximum Allowable Sound Power Level, dB(A)
				Distance	Tonal	Façade	
N1	Eightland Gardens	47	30	-38	6	3	76
N2	Tai Po Old Market Public School	55	38	-40	6	3	86
N3	No. 29, Po Yick Lane	47	123	-50	6	3	88
Allowable SWL for Proposed TPOMPSPS							=76

Notes:

[1] Noise Criteria is the minimum of the 5 dB(A) below the Acceptable Noise Level (ANL-5) stated in the IND-TM and Prevailing Background Noise level suggested in the PER Report undertaken in the Investigation Study.

[2] The fixed plants of the propsoed TPOMPSPS would be in operation/standby for 24 hours that daytime and night-time operation of the fixed noise sources have been assumed. Night-time noise criteria has been adopted for residential uses (N1 & N3) and daytime noise criteria for educational uses (N2).

[3] Based on the latest engineering design, all the fixed plants of the proposed TPOMPSPS would be housed/enclosed in a concrete structure with soundproof doors and openings of the ventilation fans / louver would be facing away from the nearest NSRs, i.e. towards to the southern or western side of the Project site.

Appendix 6.1
Relevant Drillhole Records

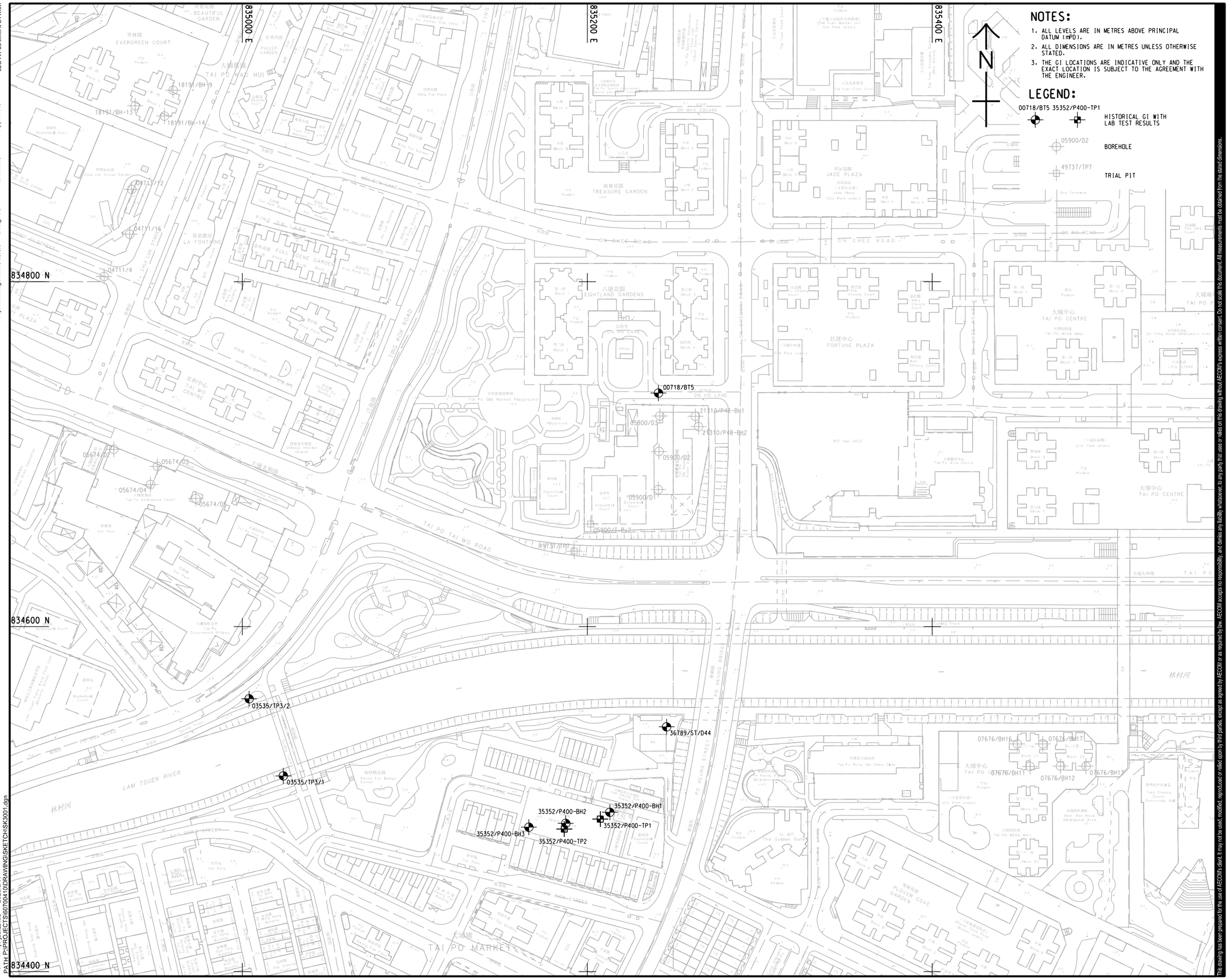
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



Plot File by: jack.zhou 2023/8/11
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AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 1000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

HISTORICAL DRILLING IN TAI PO OLD MARKET

SHEET NUMBER
圖紙編號

60700410/SK3001

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73828

P.W.D. Contract 10/G.C.O./83
Client Office G. C. O.

~~Borehole~~/Drillhole No. D 1

Job No & Location: W.O. P.W. 7/2/11.56 NEW PRIMARY SCHOOL In TAI PO AREA 4 Sheet 1 of 3

Method: ROTARY Ground Level: +5.7 mPD Coords E. 35241.33

Machine: D3B ACKER Orientation: VERTICAL N. 34679.46

Hole dia.: 0.0m 130 mm 29.0m 101.3mm 30.4m Date: from 30-11 to 3-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
13:00 30-11-84	PX	NIL AT 13:00	90				5.2, 2.3, 4.6 N=15	1	0.0	+5.7		Medium dense, light brown clayey SILT with GRAVEL (FILL)		
									1.0					
									1.5	+4.2		Medium dense light brown and dark sandy GRAVEL (FILL)		
							3.2, 4.5, 7.9 N=25	2	2.5	+3.2				
									3.0			Dense, light brown & reddish brown Sandy GRAVEL (FILL)		
							4.7, 10.11, 13.16 N=50	3	4.0	+1.7				
									4.5					
							2.1, 1.1, 2.1 N=5	4	5.0			Loose Greyish green, Silty medium SAND with shell fragment (Marine Sand)		
									5.5					
									6.0					
							1.1, 1.1, 1.2 N=5	5	7.0					
									8.0					
							1.1, 0.1, 1.1 N=3	6	8.5					
									9.0					
							1.1, 2.2, 1.2 N=7	7	10.0					
	10.5m								10.5	-4.8				

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test
- U 76 undisturbed

Remarks

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73828

P.W.D. Contract 10/G.C.O./83
Client Office G. C. O.

Borehole/Drillhole No. D1

Job No & Location: W. O. D. W. 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4 TAI PO
Sheet 2 of 3

Method: ROTARY Ground Level: +5.7 mPD Coords E. 35241.33
Machine: D38 ACKER Orientation: VERTICAL N. 34679.46
Hole dia.: AS SHEET 1 Date: from 30-11 to 3-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
	PX		80	50	0	NI	T2 10 1		10.5	-4.8		Very dense greyish green silty medium SAND with COBBLE <ALLUVIUM>		
		3.05m AT 18:30					7,10, 15,20, 27,32, N=94	8	11.0					
7:30 1-12-84		3.41m AT 7:30		67	0	NI	5.7, 11.13, 16.20, N=60	9	12.5	-6.8		Dark & White BOULDER <ALLUVIUM>		
							T2 10 1		12.6					
									12.9	-7.2		Dense, light brown & greyish green, silty medium SAND with GRAVEL <ALLUVIUM>		
							4.5, 7.7, 8,10, N=32	10	13.5					
									14.0					
									14.5	-8.8		Very dense, light brown & dark brown sandy GRAVEL <ALLUVIUM>		
							8.9, 9.12, 13.21 N=55	11	15.0					
									15.5					
									16.0	-10.3		Medium dense light brown & reddish brown, sandy SILT <ALLUVIUM>		
							2.2, 3.4, 5.7, N=19	12	16.5					
									17.0					
									17.5	-11.8		Medium dense light brown & white sandy SILT <ALLUVIUM>		
							3.2, 4.4, 5.6, N=19	13	18.0					
									18.5					
									19.0	-13.3		Medium dense brown sandy SILT <C. D. V.>	V	
	20.0m						3.3, 4.7, 9.12, N=32	14	19.5					
									20.0	-14.3				

Legend

Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test
- U 76 undisturbed

Remarks

C.D. V. : COMPLETELY DECOMPOSED VOLCANIC

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
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P.W.D. Contract 10/G.C.O./83
Client Office G.G.O.

Borehole/Drillhole No. D1

Job No & Location: W.O. P.W. 7/2/1156 NEW PRIMARY SCHOOL IN ARAE 4 TAI PO

Sheet 3 of 3

Method: ROTARY Ground Level: +5.7 mPD Coords E. 35241.33

Machine: D38 ACKER Orientation: VERTICAL N. 34679.46

Hole dia.: AS SHEET 1 Date: from 30-11 to 3-12-84

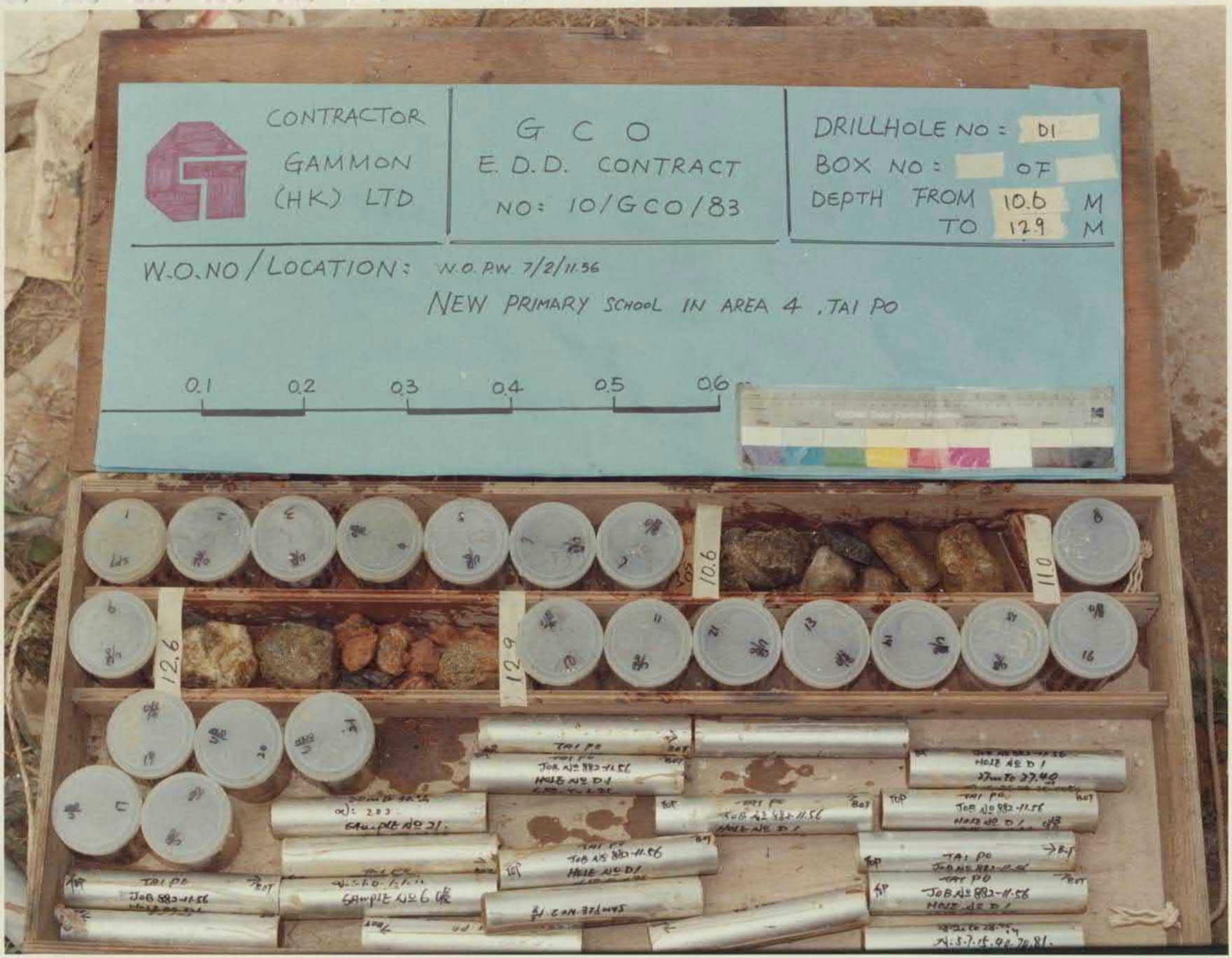
Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
	PX		80				5.10. 12.16. 16.20. N=64	15.	20.0	-14.3		AS SHEET 2	V	
									20.5	-14.8		Dense, light brown & black, clayey SILT <C.D.V.>	V	
							7.10. 13.18. 18.26. N=75	16.	21.5				V	
									22.0	-16.3		Dense light brown, clayey SILT <C.D.V.>	V	
							8.16 20.25 36.42. N=123	17.	23.5	-17.8		Dense, greyish brown clayey SILT with GRAVEL <C.D.V.>	V	
							9.15. 22.29. 37.46. N=134	18.	25.0	-19.3		Dense greyish brown slightly sandy SILT <C.D.V.>	V	
									26.5	-20.8		Dense greyish brown Sandy SILT <C.D.V.>	V	
							10.21. 34.75. 105. N=34	19.	27.4				V	
	29.0m	2.5m AT 18:30					5.7. 15.40. 70.81. N=286	20.	28.0	-22.3		Very dense dark brown sandy GRAVEL <C.T. H.D.V.>	IV	
7:30 3-12-84	30.0m	3.0m AT 7:30	90						29.0					
12:00 3-12-84	30.4m	2.0m AT 12:00							30.4	-24.7		Operation stopped at 30.4m as instruction given on Works Order.		

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test
- U76 undisturbed

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

H.D.V. : HIGHLY DECOMPOSED VOLCANIC


CONTRACTOR
GAMMON
(HK) LTD
G C O
E.D.D. CONTRACT
NO: 10/GCO/83
DRILLHOLE NO = D1
BOX NO = OF
DEPTH FROM 10.6 M
TO 12.9 M
W.O.NO/LOCATION: W.O. P.W. 7/2/11.56
NEW PRIMARY SCHOOL IN AREA 4, TAI PO
0.1
0.2
0.3
0.4
0.5
0.6
10.6
11.0
12.6
12.9
TAI PO
JOB NO 882-11.56
HOLE NO D1

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Contract No: [illegible]
Client Office: G.C.O.
Borehole/Drillhole No: D 2

Job No & Location: W.O. PW7/2/11.56, NEW PRIMARY SCHOOL IN AREA 4, TAI PO. Sheet 1 of 6

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35241.74

Machine: D77 Orientation: VERTICAL N. 34701.54

Hole dia.: 0.0m 140mm – 30.0m 120mm – 40.0m 89mm – 51.5m Date: from 7-12 to 14-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									0.0	+5.6				
15:50 7/12	PX		90	90	0		3,3,3, 3,4,4, N=14	PX 1	0.5	+5.1		Brown BOULDER. (FILL)		
									1.0			Medium dense brown clayey silty SAND. (FILL)		
				90	44			PX	1.3	+4.3		Brown BOULDER. (FILL)		
							6,7,5, 4,4,4, N=17	2	1.8	+3.8		Medium dense, brown & white sandy SILT with gravel. (FILL)		
									2.0					
									2.5	+3.1				
									3.0			Loose to medium dense grey silty medium SAND. (MARINE DEPOSIT)		
		2.1m BT 18:00					2,1,1, 2,1,1, N=5	3	4.0					
18:00 7:30 8/12		4.5m BT 7:30							5.0					
							3,2,3, 2,3,3, N=11	4	5.5	+0.1				
									6.0			Dense to medium dense dark grey silty fine to medium SAND. (MARINE DEPOSIT)		
							7,13,14, 10,7,4, N=37	5	7.0					
									8.0					
							11,12,6, 4,3,3, N=16	6	8.5					
									9.0					
	10.0m	3.2m BT 12:00					11,11,9, 4,4,5, N=22	7	10.0	-4.4				

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

GI 51

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73828

Contract No: 10/GCO/83
Client Office: GCO.

~~Borehole~~/Drillhole No. D 2

Job No & Location: W.O. PN 7/2/11.56, NEW PRIMARY SCHOOL IN AREA 4, TSY PO

Sheet 2 of 6

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35241.74

Machine: D77 Orientation: VERTICAL N. 34701.54

Hole dia.: AS SHEET 1 Date: from 7-12 to 14-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									10.0	-4.4				
	PX	4.2m BT 13:00	90									Medium dense dark grey silty medium sand with gravel. (MARINE DEPOSIT)		
				43	0			T 2 101	11.0	-5.4		Brown & grey BOULDER. (ALLUVIUM)		
							5,13,8 9,15,8 N=45	8	12.0	-6.4		Dense grey silty medium SAND. (ALLUVIUM)		
18:00		3.1m BT 18:00							13.0					
7:30 10/12		6.1m BT 7:30		54	0			T 2 101	13.8	-8.2		Grey BOULDER. (ALLUVIUM)		
									14.0					
									14.5	-8.9		Very dense, silty SAND with GRAVEL (ALLUVIUM)		
									15.0					
9:00		4.2m BT 12:00					4,9,16 16,20,18 N=78	9	16.0	-10.4		Brown BOULDER IN cobble size (ALLUVIUM)		
7:30 11/12		6.1m BT 7:30		20	0			T 2 101	16.5	-10.9				
							13,8,4 4,3,4 N=15	10	17.0			Medium dense, light brown & white Clayey SILT (C.D.V.)	V	
									17.5					
									18.0					
							2,4,4 3,5,6 N=20	11	19.0					
	20.0m								20.0	-14.4				

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Contract No: [illegible] | Client Office: G.C.O. | Borehole/Drillhole No.: D 2

Job No & Location: N.O. PM 7/6/11-56, NEW PRIMARY SCHOOL IN AREA 4, TAI PO | Sheet 3 of 6

Method: ROTARY | Ground Level: +5.6 mPD | Coords E. 35241.74

Machine: D77 | Orientation: VERTICAL | N. 34701.54

Hole dia.: AS SHEET 1 | Date: from 7-12 to 14-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									20.0	-14.4				
11/12	PX		90				12,8,9, 10,10,12 N=42	12	20.5			Medium dense, brown, Clayey SILT (C.D.V.)		
									21.0	-15.4				
							3,4,5, 7,6,8, N=26	13	22.0			Soft, light brown & white silty CLAY (C.D.V.)		
							3,5,7, 9,8,11 N=35	14	23.0					
		3.2m BT 12:00							23.5					
		4.6m BT 13:00							24.0	-18.4				
							2,2,4, 3,7,9 N=25	15	25.0			Soft, brown, silty CLAY (C.D.V.)		
							3,3,3, 7,7,12 N=29	16	26.0					
									26.5					
									27.0	-21.4				
							6,7,11, 12,12,14 N=47	17	28.0			Medium dense, greyish brown, Clayey SILT (C.D.V.)		
									28.5	-22.9				
							7,10,13 13,14,12 N=54	18	29.0			Dense, light brown, & white, Clayey SILT (C.D.V.)		
									29.5					
	30.0m								30.0	-24.4				

Legend

Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

GI 51

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Client Office: G.C.O.

D2

Job No & Location: N.D. PW7/2/11.56, NEW PRIMARY SCHOOL IN AREA 4, TSI PO

Sheet 4 of 6

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35241.74

Machine: D77 Orientation: VERTICAL N. 34701.54

Hole dia.: AS SHEET 1 Date: from 7-12 to 14-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									30.0	-24.4				
	106		90				10,22, 33,50, 50/1. N=204	19	31.0			Dense, brown & white, slightly Sandy clayey SILT (C.D.V.)	V	
									31.5	-25.9				
		3.0m BT 18:00					13,20, 38,51, 89/4. N=242	20	32.0			Dense, brown, slightly clayey SILT (C.D.V.)	V	
18:30									32.5					
7:30		6.2m BT 7:30							33.0	-27.4				
13/12							19,30, 33,35, 50/2. N=208	21	34.0			Dense, yellowish brown, clayey SILT (C.D.V.)	V	
									34.5	-28.9				
							23,36, 38,56, 89/18. N=301	22	35.0			Very dense, yellowish brown Sandy SILT (C.D.V.)	V	
									35.5					
									36.0	-30.4				
							28,35, 40,62, 80/13 N=314	23	37.0			Very dense, dark brown, Sandy SILT (C.D.V.)	V	
							35,43, 68,92 150 N=316/225mm	24	38.0					
									38.4					
							83,210 N=293/190mm	25	39.0	-33.4				
									39.2			Very dense, greyish brown & white. Sandy SILT (C.D.V.)	V	
	40.0m	3.3m BT 12:00							40.0	-34.4				

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

GI 51

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73828

Contract No: 10/GCO/83
Client Office: G.C.O.

~~Borehole~~/Drillhole No. D 2

Job No & Location: NO. DN7/2/11.56, NEW PRIMARY SCHOOL IN AREA 4, TAI PO

Sheet 5 of 6

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35241.74

Machine: D77 Orientation: VERTICAL N. 34701.54

Hole dia.: AS SHEET 1 Date: from 7-12 to 14-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									40.0	-34.4				
	NX	4.0m BT 13:00	90				84,200 N=280/100mm	26	41.0			Very dense, brown, Silty Sandy GRAVEL (H~C.D.V.)	V/IV	
									41.1					
									42.0					
				10 0	0	N.I.			42.1	-36.5		Moderately weak to moderately strong dark green, fine gained, highly decomposed VOLCANIC. Very closely spaced joints.	IV	
				10 0	0	N.I.			42.5					
				10 0	0	12			43.0	-37.4		Strong, dark green, fine gained, moderately decomposed VOLCANIC, closely to very closely spaced joints.	III	
				10 0	66	6		TNW	44.0	-38.4		Strong, dark green, fine gained, slightly to moderately decomposed VOLCANIC. medium closely to closely spaced joints.	II/III	
		3.0m BT 18:00							45.0					
18:00 7:30 13/12		6.1m BT 7:30		7 8	43	7			45.1	-39.5		Strong, dark grey, fine gained, slightly to moderately decomposed VOLCANIC, closely to very closely spaced joints.	II/III	
				25	0	N.I.			45.6	-40.0				
					0	N.I.			46.1			Very weak, dark green, fine gained, highly decomposed VOLCANIC, very closely spaced joints.	IV	
				10					47.0					
									47.6	-42.0				
							N=200/50mm	27	48.0			Dense, dark green, Sandy GRAVEL (H.~C.D.V.)	V/IV	
									48.6					
									49.0					
	50.1m						N=200/50mm	28	50.1	-44.5				

Legend

Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

H.D.V. : HIGHLY DECOMPOSED VOLCANIC

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 6-283941 Cables: GAMMONCO Telex: HX 73826

Contract No.: [illegible]

Client Office: G.C.O.

D 2

Job No & Location: W.O.P.N. 7/2/11.86, NEW PRIMARY SCHOOL IN AREA 4, TAI PO

Sheet 6 of 6

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35241.74

Machine: D77 Orientation: VERTICAL N. 34701.54

Hole dia.: AS SHEET 1 Date: from 7-12 to 14-12-1988

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
7:30	NX	6.2m BT 7:30	9 0						50.1	-44.5	0·0 ·0· 0·0 ·0· 0·0 ·0·	Dense, dark green, Sandy GRAVEL (H. ~ C.D.V.)	V/IV	
9:00	51.5m	4.5m BT 9:00							51.0					
							↓ 200/40mm	29	51.5	-45.9				
												Operation stopped at 51.5 m as instruction given on Works Order.		

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

H.D.V. : HIGHLY DECOMPOSED VOLCANIC

GI 51


CONTRACTOR
GAMMON
(HK) LTD
G C O
E. D. D. CONTRACT
NO: 10/GCO/83
DRILLHOLE NO: D2
BOX NO: OF
DEPTH FROM 0.0 M
TO 16.5 M
W.O. NO / LOCATION: W.O. P.W. 7/2/11.36
NEW PRIMARY SCHOOL IN AREA 4, TAI PO
0.1
0.2
0.3
0.4
0.5
0.6
0.0
0.5
1.3
11.0
12.0
13.0
13.8
14.5
16.0
16.5


CONTRACTOR
GAMMON
(HK) LTD
G C O
E. D. D. CONTRACT
NO: 10/GCO/83
DRILLHOLE NO: D2
BOX NO: OF
DEPTH FROM 42.1 M
TO 47.6 M
W.O.NO/LOCATION: N.O. P.W. 7/2/11.56
NEW PRIMARY SCHOOL IN AREA 4, TAI PO
0.1 0.2 0.3 0.4 0.5 0.6
42.1
43.2
42.4
45.1
45.6
46.1
47.6
D2
NO:28
42.10 M

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73828

Client Office: GCO

D3

Job No & Location: W.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN AREA TAIPO

Sheet 1 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35242.23

Machine: D41 ACKER Orientation: VERTICAL N. 34722.13

Hole dia.: 0.0m 140mm – 20.5m 120mm – 38.5m Date: from 1-12 to 4-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
10:00 1-12-84	PX	NIL AT 10:00	90				5,4, 2,1, 1,2. N=6	1	0.0	+5.6		Loose to medium dense, light brown & reddish brown Sandy SILT with GRAVEL (FILL)		
							4,3, 3,1, 2,6 N=12	2	2.0					
							3,1, 1,3, 4,2 N=10	3	3.0	+2.6		Loose, reddish brown, Sandy SILT (FILL)		
							2,2, 3,2, 3,3, N=11	4	4.5	+1.1		Medium dense, light brown, COBBLE (FILL)		
12:00 13:00		1.2m AT 12:00 1.5m AT 13:00					1,1, 1,2, 2,2, N=7	5	6.0	-0.4		Loose to medium dense, dark green, Silty SAND with shell fragment. (MARINE SAND)		
							2,3, 3,3, 3,3, N=12	6	7.0					
	10.0m						1,2, 2,4, 6,10 N=32	7	8.0	-3.4		Medium dense, dark green Sandy GRAVEL with shell fragment (MARINE DEPOSIT)		
									9.0	-4.4				
									10.0					

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

GI 51

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73828

Contract No: 10/GCO/83
Client Office: G.C.O.

~~Borehole~~/Drillhole No. D3

Job No & Location: W.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4, TAI PO

Sheet 2 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35242.23

Machine: D41 ACKER Orientation: VERTICAL N. 34722.13

Hole dia.: AS SHEET 1 Date: from 1-12 to 4-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
	PX		90						10.0	-4.4				
							13,13, 18,14, 18,13, N=63	8	11.0			Very dense, dark green, Sandy GRAVEL with COBBLE (MARINE DEPOSIT)		
1-12-84 18:30		0.0m AT 18:30							11.5					
11:00		5.0m AT 11:00					11,14, 18,20, 20,33 N=91	9	12.0					
3-12-84 12:00		4.0m AT 12:00	4	0	0	N.I.		T2.101	12.5					
13:00		4.0m AT 13:00							13.0	-7.4		Brown BOULDER (ALLUVIUM)		
									13.8	-8.2				
							11,28, 26,20, 17,13, N=76	10	14.0			Very dense, light brown & white, silty SAND with GRAVEL (ALLUVIUM)		
									14.5					
									15.0	-9.4				
							12,14, 20,22, 13,10 N=65	11	15.5			Very dense, dark brown, slightly Clayey Sandy SILT (ALLUVIUM)		
									16.0					
									16.5	-10.9				
							1,2, 2,1, 2,3, N=8	12	17.0			Very Soft, reddish brown, Slightly Silty CLAY (C.D.V.)	V	
									17.5					
									18.0					
							2,2, 5,5, 5,4, N=19	13	18.5					
	20.0m								19.0					
									20.0	-14.4				

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test

Remarks
C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Contract No.:
Client Office: GCIO

D3

Job No & Location: W.O. PW. 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4, TAI PO
Sheet 3 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35242.23

Machine: D41 ACKER Orientation: VERTICAL N. 34722.13

Hole dia.: AS SHEET 1 Date: from 1-12 to 4-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
3-12-84 16:45 7:30 4-12-84	PX 20.5m 106	3.0m AT 16:45 6.2m AT 7:30	90				7,8, 7,10, 9,7, N=33	14	20.0	-14.4		Soft, reddish brown, silty CLAY (C.D.V.)		
							4,6, 5,7, 9,10 N=32	15	20.5 21.0 21.5 22.0					
							5,7, 8,9, 11,12 N=40	16	23.0 23.5					
							7,7, 9,10, 11,10 N=40	17	24.0 24.5 25.0	-18.4		Soft, yellowish brown, silty CLAY (C.D.V.)		
							7,9, 9,13, 17,17, N=56	18	25.5 26.0 26.5 27.0	-19.9 -21.4		Firm, light brown & white, silty CLAY (C.D.V.)		
12:00 13:00		5.0m AT 12:00 6.0m AT 13:00					16,15, 14,18, 17,21 N=70	19	27.5 28.0			Dense, light brown & white clayey SILT (C.D.V.)		
	30.0m						12,15, 20,18, 17,20 N=75	20	29.0 29.5 30.0	-24.4				

Legend

Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

GI 51

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Client Office: GCO

D3

Job No & Location: W.O. DW 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4, TAIPO

Sheet 4 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35242.23

Machine: D41 ACKER Orientation: VERTICAL N. 34722.13

Hole dia.: 0.0m AS SHEET 1 Date: from 1-12 to 4-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
	106		90				3,4, 12,13, 21,25 N=71	21	30.0	-24.4		Dense to Very dense light brown & white Sandy SILT (C.D.V.)	V	
							10,15, 20,31, 35,39 N=125	22	32.0					
							10,11, 12,15, 17,17 N=61	23	33.0					
							23, 36, 149, 51 N=200/85	24	34.0					
							36,57 60,78 62 N=200/190	25	35.0	-30.4		Dense, light brown & white Silty SAND (C.D.V.)	V	
							89 111 N=200/85	26	36.0	-31.9		Dense, light brown & dark brown, silty SAND with GRAVEL (H~C.D.V.)	V/IV	
4-12-84 17:00	38.5m	3.5m AT 17:00							38.5	-32.9		Operation stopped at 38.5 m as instruction given on Works Order.		

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

H.D.V. : HIGHLY DECOMPOSED VOLCANIC

GI 51


CONTRACTOR
GAMMON (HK) LTD
G C O
E. D. D. CONTRACT NO: 10/GCO/83
DRILLHOLE NO: D2
BOX NO: OF
DEPTH FROM 13.0 M
TO 13.7 M
W.O.NO/LOCATION: W.O. P.W. 7/2/11.56
NEW PRIMARY SCHOOL IN AREA 4, TAI PO
0.1 0.2 0.3 0.4 0.5 0.6
13.0
LEI

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73838

P.W.D. Contract 10/G.C.O./83
Client Office G.C.O.

~~Borehole~~/Drillhole No. D4

Job No & Location: W.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4 TAI PO
Sheet 1 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35259.29
Machine: D38 ACKER Orientation: VERTICAL N. 34678.18
Hole dia.: 0.0 — 140mm — 31.9m Date: from 3-12 to 5-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
15:00 3-12-84	PX	NIL AT 15:00	90				2.3. 5.5. 4.3. N=17	1.	0.0	+5.6		Medium dense dark brown sandy SILT <FILL>		
7:30 4-12-84		NIL AT 7:30							1.5	+4.1		Medium dense light brown silty SAND <FILL>		
							5.3. 3.4. 3.4. N=16	2.	3.0	+2.6		Very soft dark green slightly silty CLAY <MARINE DEPOSIT>		
							2.2. 2.2. 2.3. N=9	3.	4.5	+1.1		Loose dark grey medium to coarse SAND <MARINE SAND>		
							1.1. 2.2. 2.2. N=8	4.	6.0	-0.4		Loose dark green silty fine SAND with shell fragment <MARINE SAND>		
							1.1. 1.1. 2.2. N=6	5.	7.0					
							1.1. 1.2. 1.2. N=6	6.	8.5					
							5.7. 9.10. 12.13. N=43	7.	9.0	-3.4		Dense brownish grey sandy GRAVEL with cobble <ALLUVIUM>		
	10.0m								10.0	-4.4				

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test
- U76 undisturbed

Remarks

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73628

P.W.D. Contract 10/G.C.O./83
Client Office G.C.O.

~~Borehole~~/Drillhole No. D4

Job No & Location: W.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4 TAI PO

Sheet 2 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35259.29

Machine: D38 ACKER Orientation: VERTICAL N. 34678.18

Hole dia.: 0.0 — 140mm — 31.9m Date: from 3-12 to 5-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
4-12	PX		90				6.7. 9.9. 12.14. N=44	8.	10.0	-4.4		Dense brownish grey sandy GRAVEL with cobble <ALLUVIUM>		
							5.9 11.14. 20.23 N=68	9.	12.0	-6.4		Dense yellowish grey sandy SILT <ALLUVIUM>		
							5.12 12.10. 10.13 N=45	10.	13.5	-7.9		Dense yellowish brown silty SAND <ALLUVIUM>		
							7.12. 12.15. 18.22 N=67	11.	16.0	-10.4		Yellowish brown & grey boulder <ALLUVIUM>		
		3.04m AT 18:30		38	0	NI			17.5	-11.9		Soft light brown & white silty CLAY < C. D. V. >	V	
18:30 7:30 5-12-84		5.0m AT 7:30	80				3.4. 4.5. 6.6. N=21	12.	19.0	-13.4		AS SHEET 3	V	
	20.0m						3.5. 5.6. 7.8. N=26	13.	20.0	-14.4				

12-10

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Standard penetration test
- Permeability test
- U76 undisturbed

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-282041 Cables: GAMMONCO Telex: HX 73826

Client Office G.C.O. D4

Job No & Location: W.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4 TAI PO Sheet 3 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35259.29

Machine: D38 ACKER Orientation: VERTICAL N. 34678.18

Hole dia.: 0.0 — 140mm — 31.9m Date: from 3-12 to 5-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
5-12	PX		80				4.4. 6.7. 7.8. N=28	14.	20.0	-14.4		Medium dense yellowish brown & white silty CLAY <C.D.V.>	V	
							4.3. 7.7. 8.8. N=30	15.	22.0	-16.4		Medium dense light brown & white silty SAND <C.D.V.>	V	
							7.7. 10.10. 11.13. N=44	16.	23.5	-17.9		Medium dense brown sandy clayey SILT <C.D.V.>	V	
							9.9. 13.14. 18.20. N=64	17.	25.0	-19.4		Dense light brown & white sandy SILT <C.D.V.>	V	
							9.15. 25.28. 34.37. N=138	18.	27.0					
							11.20. 36.47. 72.81. N=238	19.	28.5					
	30.0m								29.0					
									30.0	-24.4				

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test
- U 76 undisturbed

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73828

Client Office G. C. O. | D4

Job No & Location: W.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN TAI PO AREA 4 | Sheet 4 of 4

Method: ROTARY | Ground Level: +5.6 MPD | Coords E. 35259.29

Machine: D38 ACKER | Orientation: VERTICAL | N. 34678.18

Hole dia.: 0.0 — 140mm — 31.9 m | Date: from 3-12 to 5-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
									30.0	-24.4				
	PX		80				10.22 30.54 67.78 N=229	20	30.5			Dense. light brown & white sandy SILT < C. D. V.>	IV	
12:00 5-12-84	31.9 m	3.1m AT 12:00 pm					201/ 350 mm	21	31.0	-25.4		Dense light brown & white silty SAND (C.D.V.)	V	
									31.5					
									31.9	-26.3		Operation stopped at 31.85m as instruction given on Works Order.		

Legend

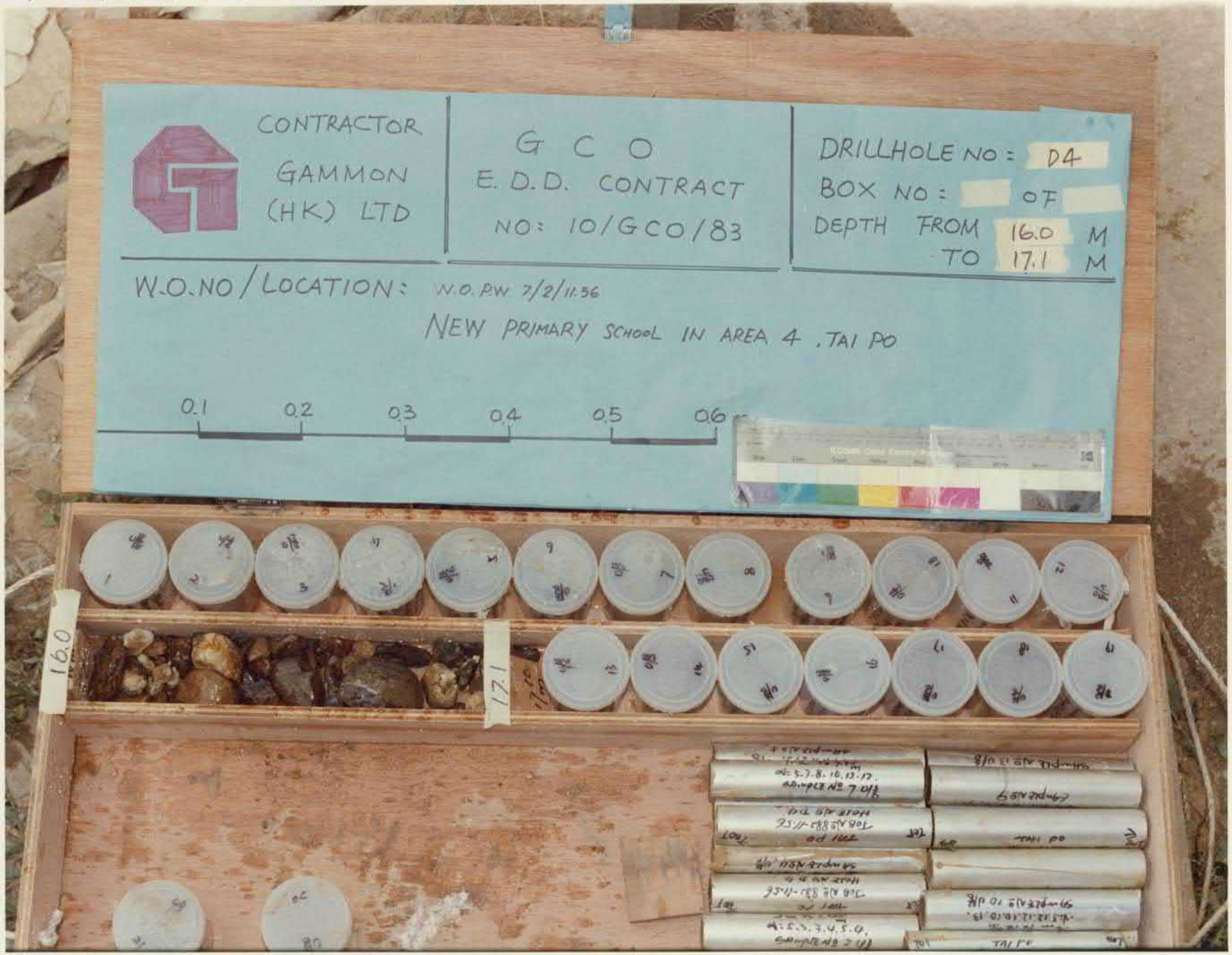
Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test
- U 76 undisturbed

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

GI 51


CONTRACTOR
GAMMON
(HK) LTD
G C O
E. D. D. CONTRACT
NO: 10/GCO/83
DRILLHOLE NO: D4
BOX NO: OF
DEPTH FROM 16.0 M
TO 17.1 M
W.O. NO / LOCATION: W.O. P.W 7/2/11.56
NEW PRIMARY SCHOOL IN AREA 4, TAI PO
0.1
0.2
0.3
0.4
0.5
0.6
16.0
17.1

CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Client Office: G.C.O.

D 5

Job No & Location: W.O. PW 7/2/11.56, NEW PRIMARY SCHOOL IN AREA 4, TAI PO Sheet 1 of 3

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35258.71

Machine: D 77 Orientation: VERTICAL N. 34702.72

Hole dia.: 0.0 m 140mm — 23.0 m 120mm — 30.0 m Date: from 5-12 to 7-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									0.0	+5.6				
7:30 5/12	PX		80				4,4,3, 3,3,4, N=13	1	1.0			Medium dense brown silty SAND with gravel. (FILL)		
		NIL AT 12:00					4,3,2, 2,3,3, N=10	2	2.5					
		NIL AT 13:00							3.0					
							3,2,2, 1,2,2, N=7	3	4.0	+1.6				
		3.5m AT 18:00							5.0			Loose to medium dense green silty medium to fine SAND. (MARINE DEPOSIT)		
15:00 7:30 6/12		4.5m AT 7:30					2,3,3, 3,3,3, N=12	4	5.5					
									6.0					
									7.0					
							1,2,2, 2,2,3, N=9	5	8.0					
									8.5					
									9.0					
							2,3,3, 3,3,4, N=13	6	10.0	-4.4				
	10.2 m													

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

An inspection pit was excavated down to 1.5 m.

G151

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283041 Cables: GAMMONCO Telex: HX 73828

Contract No: 10/GCO/83
Client Office: G.C.O.

~~Borehole~~/Drillhole No. D 5

Job No & Location: H.D. PN 7/2/1156, NEW PRIMARY SCHOOL IN BREA & TAI PO
Sheet 2 of 3

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35258.71
Machine: D77 Orientation: VERTICAL N. 34702.72
Hole dia.: AS SHEET 1 Date: from 5-12 to 7-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
6/12	PX	2.1m AT 12:00 3.0m AT 13:00	80	52	0		16,15,8 8,6,4 N=26	7	10.0	-4.4				
									11.0			Medium dense, greenish yellow silty SAND. (ALLUVIUM)		
									11.5	-5.9				
							6,9,8, 11,20,17 N=56	8	12.0			Very dense, greenish yellow sandy GRAVEL. (ALLUVIUM)		
									13.0	-7.4				
							13,15,6 31,11,17 N=84	9	12.0			Very dense, yellowish brown slightly clayey sandy SILT with gravel. (ALLUVIUM)		
									14.5					
									15.0	-9.4				
				47	0		T_2 101		16.1			Light brown BOULDER. (ALLUVIUM)		
							0,3,2, 2,2,3, N=9	10	17.0	-11.4				
									17.5			Medium dense light brown & white clayey SILT. (C. D. V.)		
									18.0					
							2,3,3, 3,3,4, N=13	11	19.0					
									20.0	-14.4				
									20.0m					

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC.

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Client Office: G.C.O.

D 5

Job No & Location: N.D. PW 7/2/11-56, NEW PRIMARY SCHOOL IN AREA 4, TAI PO

Sheet 3 of 3

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35258.71

Machine: 077 Orientation: VERTICAL N. 34702.72

Hole dia.: As SHEET 1 Date: from 5-12 to 7-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									20.0	-14.4				
	PX		80				3,4,6, 5,7,7, N=25	12	20.5			Medium dense, light brown clayey SILT.		
									21.0			(C. D. V.)		
							5,5,5, 6,8,14, N=33	13	22.0	-16.4				
18:00	23.0m	2.0m AT 18:00							23.0			Dense to very dense light brown & white fine sandy SILT.		
7:30 7/12	106	6.0m AT 7:30					10,12, 16,16, 15,17, N=64	14	23.5					
									24.0					
							12,14,15, 16,18,18, N=67	15	25.0					
									26.0					
							10,13, 22,33, 76,154, N=265	16	26.5			(C. D. V.)		
									27.0					
							16,40, 83,200 N=283/150mm	17	27.8	-22.2				
									28.0			Very dense, brown silty fine SAND.		
							N=200/50mm	18	29.0 29.1			(H. D. V.)		
12:00	30.0m	2.5m AT 12:00							30.0	-24.4				
												Operation stopped at 30.0m as instruction given on Works Order.		

Legend

Samples:

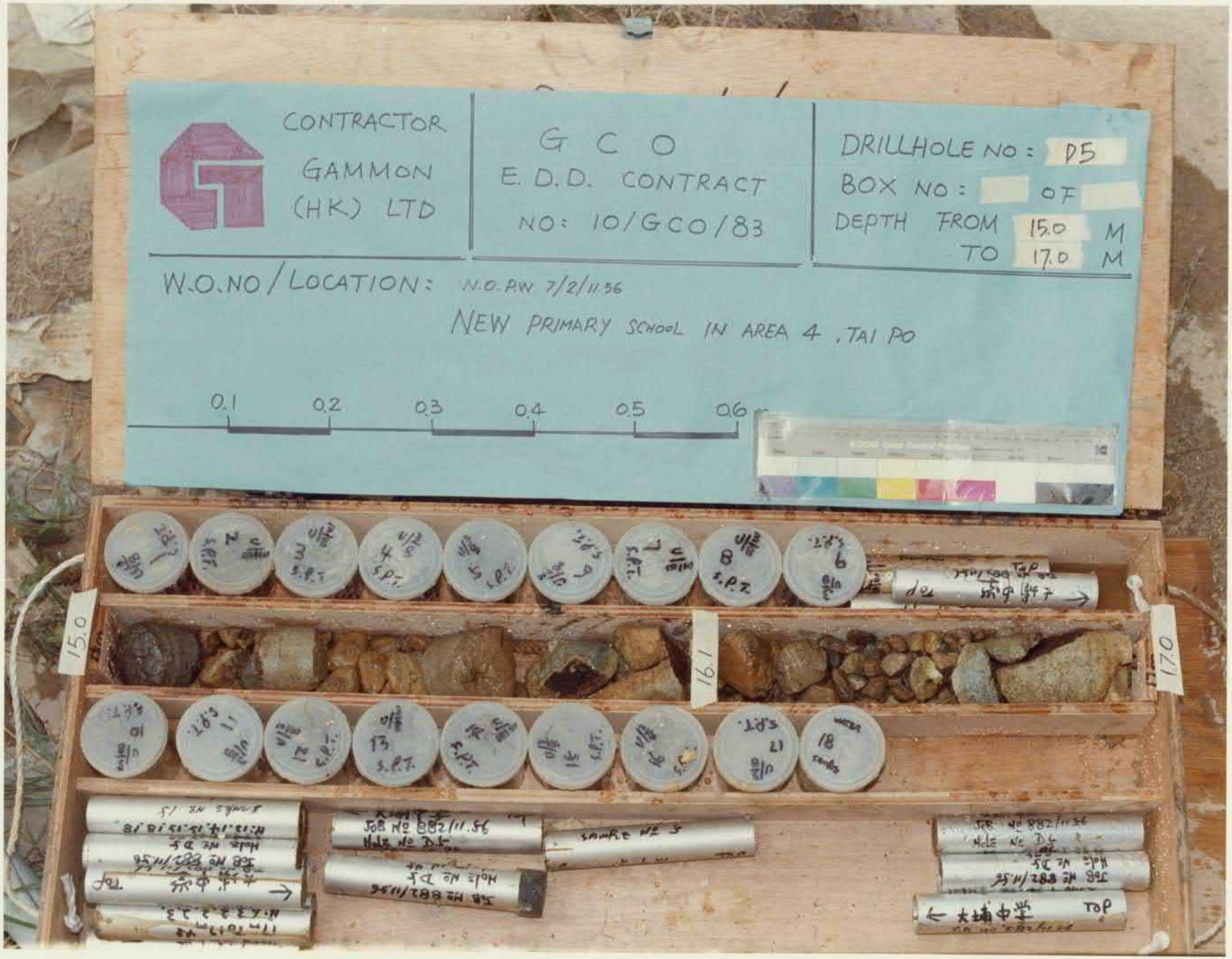
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

H.D. V. : HIGHLY DECOMPOSED VOLCANIC.

C.D. V. : COMPLETELY DECOMPOSED VOLCANIC.

GI 51


CONTRACTOR
GAMMON
(HK) LTD
G C O
E. D. D. CONTRACT
NO: 10/GCO/83
DRILLHOLE NO: D5
BOX NO: OF
DEPTH FROM 15.0 M
TO 17.0 M
W.O.NO / LOCATION: N.O. P.W. 7/2/11.56
NEW PRIMARY SCHOOL IN AREA 4, TAI PO
0.1
0.2
0.3
0.4
0.5
0.6
15.0
16.1
17.0

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 2365 9123-6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

HOLE NO. **P48-BH1**

CONTRACT TC C309

SHEET 1 of 5

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**	CO-ORDINATES **E 835262.84 N 834721.97**	W.O. No **ASD3745 (Vol.10of19)**
MACHINE & No. **DR90**		DATE from **20/02/95** to **27/02/95**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL **5.68** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
20/02/95	PW							0.00	5.48	0.20			Concrete slab
													Loose, reddish brown, clayey silty fine to coarse SAND with some angular medium to coarse gravel. (FILL)
			75					1 2.00					
								2 3.00					
								3.05					
							2,7, 2,3, 1,1, N=7	3 3.60					
		1.47m at 18:00						4 3.95					
								5 4.50	1.18	4.50			
21/02/95		2.13m at 08:00	35										Brownish to reddish grey, angular medium to coarse GRAVEL with some cobbles in clayey silty sand matrix. (FILL)
								6 5.50	0.08	5.60			
								5.55					Reddish to brownish grey, clayey silty fine to coarse SAND with much angular to subangular medium to coarse gravel. (FILL)
									-0.32	6.00			
							1,0, 0,1, 0,1, N=2	7 6.10					Very loose to medium dense, dark brownish grey, clayey silty fine to medium SAND with occasional subangular fine gravel and some shell fragments. (MARINE DEPOSIT)
								8 6.45					
			70					9 7.00					
								10 8.00					
								8.05					
							2,2, 2,3, 3,4, N=12	11 8.60					
								12 8.95					
								13 9.50	-3.82	9.50			
			70										Very dense, brownish grey, clayey silty sandy subangular medium to coarse GRAVEL with

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED **Y.K.Lee**

DATE **28/02/95**

CHECKED **T.Lo**

DATE **29/02/95**

REMARKS
Installed a piezometer at depth 39.80m
Inspection pit to depth of 2.00m

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 2365 9123 – 6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

HOLE NO. **P48-BH1**

CONTRACT TC C309

SHEET 2 of 5

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**

MACHINE & No. **DR90**

FLUSHING MEDIUM **Water**

CO-ORDINATES
E 835262.84
N 834721.97

ORIENTATION **Vertical**

W.O. No **ASD3745 (Vol.10of19)**

DATE from 20/02/95 to 27/02/95

GROUND LEVEL 5.68 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
21/02/95	PW							14 10.50 10.55 11.00	-5.32	11.00			occasional cobbles. (ALLUVIUM)
11			10					T2101 12.15					Brownish to yellowish grey, subangular to subrounded COBBLES and medium to coarse GRAVEL in sandy clayey silt matrix. (ALLUVIUM)
12			11										
13								13.50					
14			20										
15		5.27m at 18:00						15.00					
22/02/95	HW	5.43m at 08:00	25										
16													
17			90					17.00	-11.32	17.00			
								15 17.20				V	Extremely weak, reddish to yellowish brown, completely decomposed, coarse ash TUFF with relict black stained joints. (Medium dense, reddish to yellowish brown, sandy SILT.)
18								16 18.00	-12.32	18.00			
								18.05				V	Extremely weak, reddish brown, completely decomposed, coarse ash TUFF with relict brown and black stained joints. (Medium dense, reddish brown, sandy SILT)
19							2,4, 5,8, 11,15, N=39	17 18.60 18 18.95					
			90					19 19.50					
20									-14.32	20.00			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 28/02/95

CHECKED T.Lo

DATE 29/02/95

REMARKS
See sheet 1 of 5 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 2365 9123-6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

HOLE NO. **P48-BH1**

CONTRACT TC C309

SHEET 3 of 5

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**

MACHINE & No. **DR90**

FLUSHING MEDIUM **Water**

CO-ORDINATES
E 835262.84
N 834721.97

ORIENTATION **Vertical**

W.O. No **ASD3745 (Vol.10of19)**

DATE from **20/02/95** to **27/02/95**

GROUND LEVEL **5.68** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
22/02/95	HW							20 20.50 20.55				V	See sheet 2 of 5 for details
21							3,5, 4,6, 8,10, N = 28	21 21.10 22 21.45	-15.32	21.00		V	Extremely weak, yellowish to reddish brown, completely decomposed, coarse ash TUFF with relict black stained joints. (Medium dense, yellowish to reddish brown, sandy SILT)
22			100					23 22.00	-16.32	22.00		V	Extremely weak, brown, completely decomposed, coarse ash TUFF with relict brown stained joints. (Medium dense, brown, very silty fine to medium SAND with occasional subangular fine gravelly sized rock fragments)
23								24 23.00 23.05					
24							5,12, 11,11, 10,11, N = 43	25 23.60 26 23.95					
25			100					27 24.50					
26		4.32m at 18:00						28 25.50 25.55					
23/02/95		5.43m at 08:00					6,7, 8,10, 12,15, N = 45	29 26.10 30 26.45					
27			100					31 27.00					
28								32 28.00 28.05	-22.82	28.50			
29							6,11, 13,13, 12,13, N = 51	33 28.60 34 28.95				V	Extremely weak, yellowish brown and brown, completely decomposed, coarse ash TUFF with relict black stained joints. (Dense, yellowish brown and brown, very silty fine to coarse SAND with occasional subangular fine gravel sized rock fragments)
30			100					35 29.50	-24.32	30.00			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED **Y.K.Lee**

DATE **28/02/95**

CHECKED **T.Lo**

DATE **29/02/95**

REMARKS
See sheet 1 of 5 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 2365 9123–6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

HOLE NO. **P48-BH1**

CONTRACT TC C309

SHEET 4 of 5

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**	CO-ORDINATES **E 835262.84 N 834721.97**	W.O. No **ASD3745 (Vol.10of19)**
MACHINE & No. **DR90**		DATE from **20/02/95** to **27/02/95**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL **5.68** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
23/02/95	HW											V	See sheet 3 of 5 for details.
31							6,10, 12,13, 17,21, N=63	36 30.50 30.55 37 31.10 38 31.45					
32			100					39 32.00					
33								40 33.00 33.05	-27.82	33.50			
34							6,8, 13,17, 24,35, N=89	41 33.60 42 33.95	-28.32	34.00		V V/IV	Extremely weak, brownish grey, completely decomposed, coarse ash TUFF with relict black stained joints. (Dense, brownish grey, very silty fine to coarse SAND) Extremely weak to very weak, brown, completely to highly decomposed, coarse ash TUFF with relict brown and black stained joints. (Very dense, brown, very silty fine to coarse SAND)
35			85					43 34.50					
36							16,184, 200/120mm	44 35.50 35.55 45 36.12					
37			85					46 37.00	-31.32	37.00		IV	Weak, greyish brown, highly decomposed, coarse ash TUFF with relict black stained joints. (Very dense, greyish brown, silty sandy angular to subangular medium to coarse GRAVEL sized rock fragments)
38		4.11m at 18:00						47 38.00 38.05					
24/02/95 39		5.85m at 08:00					38,162, 200/100mm	48 38.60					
			0					39.50 49 39.70 39.75	-34.14	39.82			
40													

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED **Y.K.Lee**

DATE **28/02/95**

CHECKED **T.Lo**

DATE **29/02/95**

REMARKS
See sheet 1 of 5 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 2365 9123-6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

HOLE NO. **P48-BH1**

CONTRACT TC C309

SHEET 5 of 5

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**

MACHINE & No. **DR90**

FLUSHING MEDIUM **Water**

CO-ORDINATES
E 835262.84
N 834721.97

ORIENTATION **Vertical**

W.O. No **ASD3745 (Vol.10of19)**

DATE from 20/02/95 to 27/02/95

GROUND LEVEL 5.68 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
24/02/95			100	77	47	>20			39.82	-34.52	40.20	III	Moderately weak to moderately strong, brownish grey, spotted with white and dark green, moderately decomposed, coarse ash TUFF. Joints are very closely to closely spaced, rough planar, extremely narrow, limonite, manganese stained and silt coated, dipping at 10-20°, 30-40°, 60-70° and occasional 80-90°. Moderately to slightly decomposed from 40.20m to 41.24m. Highly to moderately decomposed from 41.60m to 42.10m and 42.60m 42.77m. Fractured from 39.82m to 40.20m, 41.24m to 41.40m, 41.60m to 42.10m, 42.60m 42.77m, 42.97m to 43.30m and 43.40m to 43.60m.
						6.7			40.20			III/II	
41									41.24	-35.56	41.24		
			100	40	0	NI			41.32			III	
						10			41.40	-35.92	41.60		
						>20			41.60			IV/III	
42						NI			41.82	-36.42	42.10		
		3.61m at 18:00	100	45	15	8			41.92			III	
									42.10				
						NI			42.60	-36.92	42.60		
									42.77	-37.09	42.77	IV/III	
43		5.43m at 08:00	100	38	38	5			42.97			III	
25/02/95						NI			43.30				
			100	55	42	>20			43.75	-38.07	43.75	III	Moderately strong, brownish grey and some brownish to greenish grey, spotted with white and dark green, moderately decomposed, coarse ash TUFF. Joints are closely to medium spaced (occasional very closely spaced), rough planar, extremely narrow, limonite, manganese stained and some silt coated, dipping at 10-20°, 30-40°, 50-60° and occasional 80-90°. Moderately to slightly decomposed from 45.60m to 46.95m. General fractured from 45.00m to 45.40m, 48.45m to 48.78m, 48.93m to 49.04m, 4926m to 49.42m and 49.52m to 49.70m, angular gravel from 42.70m to 42.77m.
44						7.2			44.25				
			100	50	27				45.00				
45						>20			45.40	-39.92	45.60		
			100	93	81	5.6						III/II	
46													
									46.80	-41.27	46.95		
47		4.02m at 18:00	100	98	68							III	
									47.71				
27/02/95		5.61m at 08:00	100	81	81								
48									48.45				
						NI			48.64				
			100	42	0				48.78				
						10.8			49.00				
49		3.71m at 18:00	100	46	23				49.52	-44.02	49.70		
						>20							End of investigation hole at 49.70m.
50													

T2101

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 28/02/95

CHECKED T.Lo

DATE 29/02/95

REMARKS
See sheet 1 of 5 for details

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH1

DEPTH: 0.00 M. TO 39.82 M. DATE: 4-14-95

BOX 1 OF 4

0M 0.5M 1M

KODAK Color Control Patches

0.00
4.50
5.60
11.00
12.15
13.50
15.00
17.00
17.00M
39.82

A.S.D. TERM CONTRACT A.S.D. CONTRACT NO. TC C309
GROUND INVESTIGATION

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH1

DEPTH: 39.82 M. TO 43.30 M. DATE: 4-14-95

BOX 2 OF 4

0M 0.5M 1M

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH1

DEPTH: 43.30 M. TO 46.80 M. DATE: 4-14-95

BOX 3 OF 4

0M 0.5M 1M

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH1

DEPTH: 46.80 M. TO 49.70 M. DATE: 4-14-95

BOX 4 OF 4

0M 0.5M 1M

4680

4771

48.64

49.00

49.70 END

48.64

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
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DRILLHOLE RECORD

HOLE NO. **P48-BH2**

CONTRACT TC C309

SHEET 1 of 6

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**	CO-ORDINATES	W.O. No **ASD3745 (Vol.10of19)**
MACHINE & No. **DR90**	**E 835264.70** **N 834715.98**	DATE from **28/02/95** to **10/03/95**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL **5.67** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
28/02/95	PW							0.00	5.47	0.20			Concrete slab
													Loose, reddish brown, clayey silty fine to coarse SAND with much angular medium to coarse gravel. (FILL)
			95					1 2.00					
								2 3.00					
								3.05					
							1,2, 3,2, 1,2, N=8	3 3.60					
								4 3.95					
								4.50	1.17	4.50			
			35					T2101					Brownish to reddish grey, angular to subangular COBBLES and medium to coarse GRAVEL in clayey silty sand matrix. (FILL)
									0.17	5.50			
													Loose, dark brownish grey, clayey silty fine to medium SAND with some shell fragments. (MARINE DEPOSIT)
							1,2, 3,2, 2,3, N=10	5 6.10					
								6 6.45					
			80					7 7.00					
								8 8.00					
								8.05					
							2,2, 2,1, 2,2, N=7	9 8.60					
								10 8.95					
		2.31m at 18:00						11 9.50	-3.83	9.50			
	HW		88										Very dense, brownish to greenish grey, clayey silty sandy subangular to subrounded medium

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 11/03/95

CHECKED T.Lo

DATE 13/03/95

REMARKS
Inspection pit to depth of 2.00m

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
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DRILLHOLE RECORD

HOLE NO. **P48-BH2**

CONTRACT TC C309

SHEET 2 of 6

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**	CO-ORDINATES **E 835264.70 N 834715.98**	W.O. No **ASD3745 (Vol.10of19)**
MACHINE & No. **DR90**		DATE from **28/02/95** to **10/03/95**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL **5.67** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
28/02/95	HW							12 10.20	-4.63	10.30			to coarse GRAVEL. (ALLUVIUM)
01/03/95		5.50m at 08:00	27					T2101 10.25 10.30 10.80					Brownish grey, subangular to subrounded COBBLES and medium to coarse GRAVEL and occasional boulders from 13.50m to 13.70m, in sandy clayey silt matrix. (ALLUVIUM)
11													
12			47					11.80 T2101					
13			56					13.00					
14		3.71m at 18:00	40					13.80					
15 02/03/95		5.13m at 08:00	41					14.80					
16			41					15.90					
17			100					17.00 13 17.10	-11.33	17.00		V	Extremely weak, yellowish brown and reddish brown, completely decomposed, coarse ash TUFF with relict brown stained joints. (Medium dense, yellowish brown and reddish brown, sandy SILT)
18								14 18.00 18.05					
19							5,8, 11,12, 10,10, N=43	15 18.60 16 18.95					
			95					17 19.50	-13.83	19.50			
20									-14.33	20.00		V	Extremely weak, greyish brown, completely decomposed, coarse ash TUFF with relict

- SMALL DISTURBED SAMPLE
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- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 11/03/95

CHECKED T.Lo

DATE 13/03/95

REMARKS
See sheet 1 of 6 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
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DRILLHOLE RECORD

HOLE NO. P48-BH2

CONTRACT TC C309

SHEET 3 of 6

PROJECT School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po

METHOD Rotary

MACHINE & No. DR90

FLUSHING MEDIUM Water

CO-ORDINATES
E 835264.70
N 834715.98

ORIENTATION Vertical

W.O. No ASD3745 (Vol.10of19)

DATE from 28/02/95 to 10/03/95

GROUND LEVEL 5.67 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
02/03/95	HW							18 20.50 20.55				V	brown stained joints. (Dense, greyish brown, very silty fine to coarse SAND with much angular to subangular medium to coarse gravel sized rock fragments)
21		4.06m at 18:00					4,7, 16,25, 22,35, N=98	19 21.10 20 21.45	-15.83	21.50			
03/03/95 22		5.21m at 08:00	60	7	0	NI		T2101 21.50 22.50	-16.19 -16.83	21.86 22.50		III IV/III	Weak to moderately weak, brownish grey, highly to moderately decomposed, coarse ash TUFF Fractured, moderately decomposed from 21.50m to 21.86m. (CORESTONE)
23												V	Extremely weak, reddish to yellowish brown, completely decomposed, coarse ash TUFF with relict black stained joints. (Dense, reddish to yellowish brown, sandy SILT)
24							3,6, 7,8, 13,26, N=54	21 23.60 22 23.95					
			100					23 24.50	-18.83	24.50		V	Extremely weak, yellowish brown, completely decomposed, coarse ash TUFF with relict brown stained joints. (Medium dense to dense, yellowish brown, sandy SILT)
25								24 25.50 25.55					
26							5,7, 9,13, 13,15, N=50	25 26.10 26 26.45					
27			100					27 27.00					
28								28 28.00 28.05					
29							9,17, 21,19, 20,26, N=86	29 28.60 30 28.95					
		4.13m at 18:00	100					31 29.50	-23.83	29.50		V	Extremely weak, brown, completely decomposed, coarse ash TUFF with relict
30									-24.33	30.00			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 11/03/95

CHECKED T.Lo

DATE 13/03/95

REMARKS
See sheet 1 of 6 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
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DRILLHOLE RECORD

HOLE NO. **P48-BH2**

CONTRACT TC C309

SHEET 4 of 6

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**	CO-ORDINATES E 835264.70 N 834715.98	W.O. No **ASD3745 (Vol.10of19)**
MACHINE & No. **DR90**		DATE from **28/02/95** to **10/03/95**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL **5.67** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
03/03/95	HW							32 30.20 / 30.25 / 30.56	-24.89	30.56		V	black stained joints. (Very dense, brown, very silty fine to coarse SAND with much angular to subangular medium to coarse gravel of sized rock fragments)
04/03/95		5.01m at 08:00	47	0	0	NI		T2101 33 32.00	-26.33	32.00		IV/III	Moderately weak, greyish brown, highly to moderately decomposed, coarse ash TUFF with some quartz veins. Fractured, silty sandy subangular medium to coarse gravel and occasional cobble sized rock fragments and some quartz. (CORESTONE)
31			100					34 32.40 / 32.45				V/IV	Extremely weak, yellowish brown, completely to highly decomposed, coarse ash TUFF with relict brown stained joints. (Very dense, yellowish brown, very silty fine to medium SAND with occasional subangular fine to medium gravel sized rock fragments)
32								35 33.62	-28.33	34.00			
33							↓ 47,153, 200/120mm						
34								36 34.50				IV	Weak, greyish brown, highly decomposed, coarse ash TUFF with relict black stained joints. (Very dense, greyish brown, silty sandy angular to subangular medium to coarse gravel sized rock fragments)
35			100					37 35.00 / 35.05					
								35.50	-29.83	35.50			
36		4.13m at 18:00	100	73	36	10.8		T2101 35.95				III	Moderately weak to moderately strong, brownish grey, spotted with white and dark green, moderately decomposed, coarse ash TUFF. Joints are very closely to closely spaced, rough planar, extremely narrow, limonite, manganese stained and silt coated, dipping at 10°-20°, 30°-40°, 60°-70° and occasional 70°-80°. Fractured and moderately weak from 36.15m to 36.30m, 38.30m to 38.50m, 40.47m to 40.77m, 42.23m to 42.43m and 42.87m to 44.02m.
			100	70	0			36.15					
			100	24	0	>20		36.40					
06/03/95		5.04m at 08:00	100	86	64	8.4							
37													
38			100	44	0			37.80					
			100	0	0	NI		38.30					
			100	53	49			38.50					
39						6.7		38.80					
								39.25					
		3.98m at 18:00	100	79	64			39.72					
40			100	26	0			39.85	-34.33	40.00			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED **Y.K.Lee**

DATE **11/03/95**

CHECKED **T.Lo**

DATE **13/03/95**

REMARKS
See sheet 1 of 6 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
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DRILLHOLE RECORD

HOLE NO. **P48-BH2**

CONTRACT TC C309

SHEET 5 of 6

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**	CO-ORDINATES	W.O. No **ASD3745 (Vol.10of19)**
MACHINE & No. **DR90**	**E 835264.70** **N 834715.98**	DATE from **28/02/95** to **10/03/95**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL **5.67** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
06/03/95						>20						III	See sheet 3 of 6 for details
		5.13m at 08:00	100	0	0								
07/03/95			100	23	0								
41			100	89	72	8							
			100	67	0								
42			100	51	0	>20							
		3.74m at 18:00	100	57	0	11.4							
43		5.01m at 08:00	100	10	0	>20							
08/03/95			100	22	0								
44			100	0	0								
			100	0	0								
			100	32	0	NI							
						16.1							
45			100	20	0	NI							
						>20							
			100	32	0								
		3.62m at 18:00											
46			100	0	0	NI							
			100	84	25	17.6 8.2							
09/03/95		5.23m at 08:00											
47			100	94	85	4.8							
			100	95	83								
48													
			100	96	57	18							
49						7.7							
		3.62m at 18:00			-								
50			100	51	0	>20							

TNW T2101

Samples	Reduced Level	Depth (m)	Grade	Description
40.10				
40.22				
40.47				
40.77				
41.66				
41.90				
42.43				
42.87				
43.35				
43.80				
44.02	-38.35	44.02	III	Moderately strong, dark grey and some brownish grey, spotted with white and dark green, moderately decomposed, coarse ash TUFF. Joints are very closely to closely spaced, rough planar, extremely narrow, limonite, manganese stained and some silt coated and chlorite infill, dipping at 10°-20°, 30°-40° and 60°-70°. General fractured.
44.44				
44.60				
44.91				
45.10				
45.45				
46.08				
46.18	-40.68	46.35		
46.35			II	Strong, dark grey, spotted with white and dark green, slightly decomposed, coarse ash TUFF. Joints are closely to medium spaced(occasional very closely spaced), rough and some smooth planar, extremely narrow, chlorite infill and some silt coated, dipping at 40°-50°, 50°-60° and 80°-90°. Subvertical joints from 49.80m to 52.01m. General fractured from 50.40m to 50.77 and 51.10m to 51.55m, occasional Basalt vein from 50.00m to 50.20m and quartz veins(20mm thick) at 49.15m.
46.90				
47.20				
47.55				
48.65				
49.15				
49.80	-44.33	50.00		

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
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- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 11/03/95

CHECKED T.Lo

DATE 13/03/95

REMARKS
See sheet 1 of 6 for details

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DRILLHOLE RECORD

HOLE NO. P48-BH2

CONTRACT TC C309

SHEET 6 of 6

PROJECT School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po

METHOD Rotary

MACHINE & No. DR90

FLUSHING MEDIUM Water

CO-ORDINATES
E 835264.70
N 834715.98

ORIENTATION Vertical

W.O. No ASD3745 (Vol.10of19)

DATE from 28/02/95 to 10/03/95

GROUND LEVEL 5.67 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
09/03/95												II	See sheet 5 of 6 for details
			100	55	55			TNW 50.31					
								50.51					
		5.11m at 08:00	100	36	19			50.77					
10/03/95						6.1		51.10					
51						>20		51.41					
		4.83m at 11:00	100	37	27			51.55					
						8.7			-46.34	52.01			
52													End of investigation hole at 52.01m.
53													
54													
55													
56													
57													
58													
59													
60													

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 11/03/95

CHECKED T.Lo

DATE 13/03/95

REMARKS
See sheet 1 of 6 for details

A.S.D. TERM CONTRACT A.S.D. CONTRACT NO. TC C309
GROUND INVESTIGATION

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH2

DEPTH: 0.00 M. TO 17.00 M. DATE: 4-14-95

BOX 1 OF 6

0M 0.5M 1M

0.00
4.50
5.50
10.30
11.80
13.00
13.80
14.80
15.90
17.00
14.80M 17.00M

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH2

DEPTH: 17.00 M. TO 36.40 M. DATE: 4-14-95

BOX 2 OF 6

0M 0.5M 1M

17.00 21.50 22.50 30.56 32.00 35.50 35.95 36.15 36.40

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD00374.5 HOLE NO: P48 BH2

DEPTH: 36.40 M. TO 40.22 M. DATE: 4-14-95

BOX 3 OF 6

0M 0.5M 1M

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH2

DEPTH: 40.22 M. TO 44.02 M. DATE: 4-14-95

BOX 4 OF 6

0M 0.5M 1M

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH2

DEPTH: 44.02 M. TO 48.65 M. DATE: 4-14-95

BOX 5 OF 6

0M 0.5M 1M

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH2

DEPTH: 48.65 M. TO 52.01 M. DATE: 4-14-95

BOX 6 OF 6

0M 0.5M 1M

48.65

49.80

50.31

50.51

51.41

52.01 END

Appendix 11.1
Reviewed Aerial Photographs

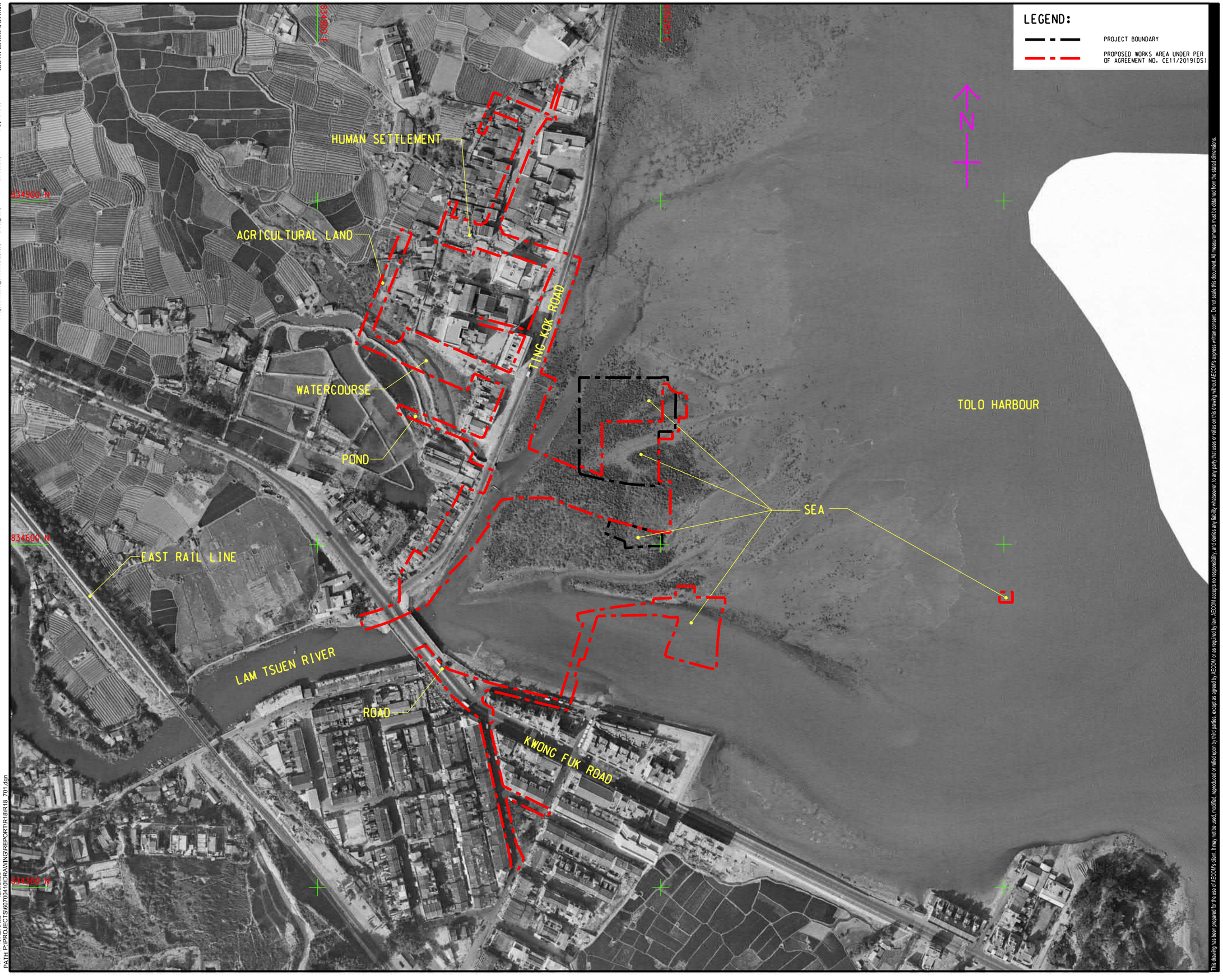
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

AERIAL PHOTOGRAPH 1963

SHEET NUMBER
圖紙編號

60700410/R18/AP1

ISO A1 594mm x 841mm

Approved:

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Designer:

Project Management Initials:

Plot File by: LIANJ2 12/8/2023
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STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

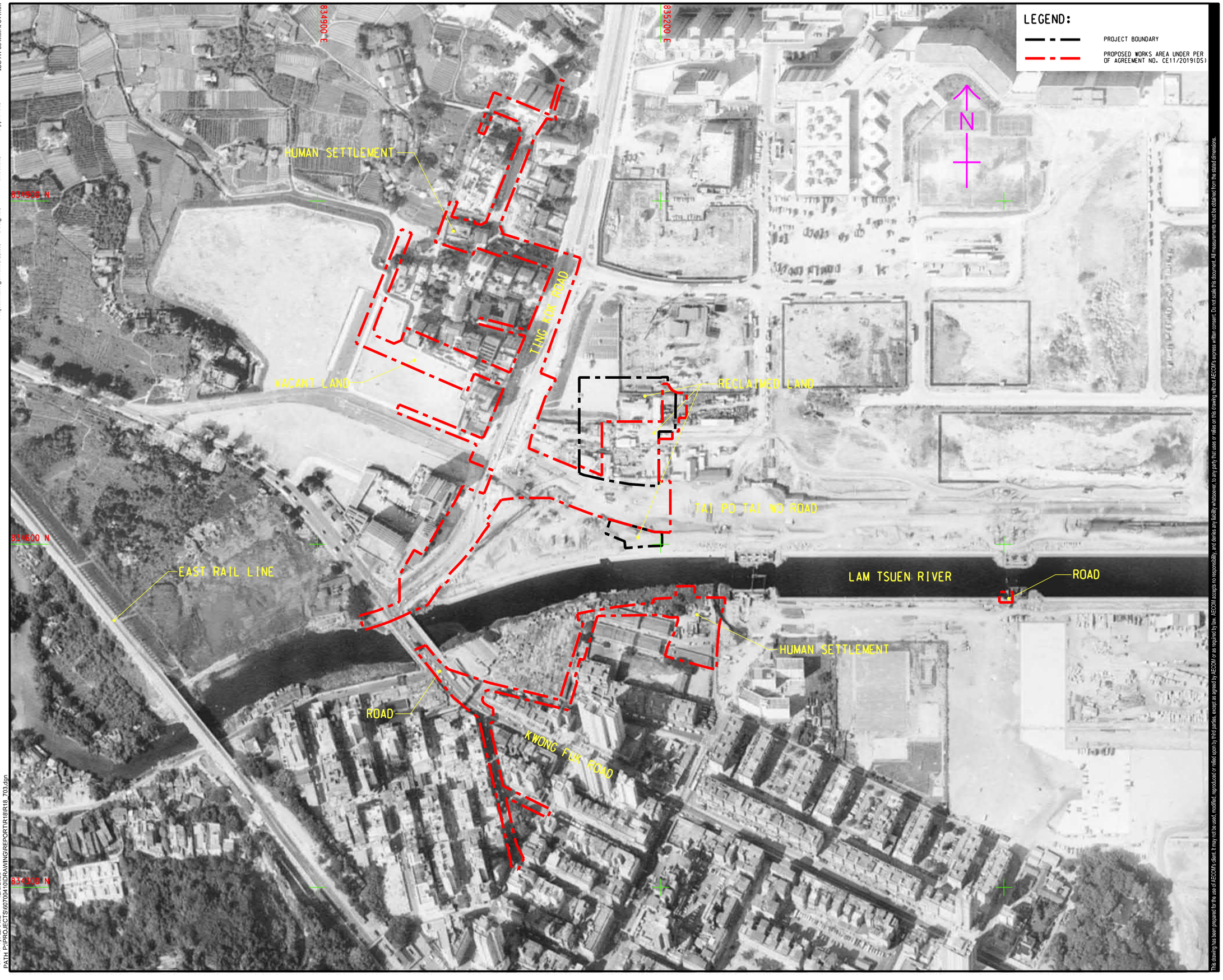
CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

AERIAL PHOTOGRAPH 1973

SHEET NUMBER
圖紙編號

60700410/R18/AP2



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Approved:

Checked:

Designer:

Project Management Initials:

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STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

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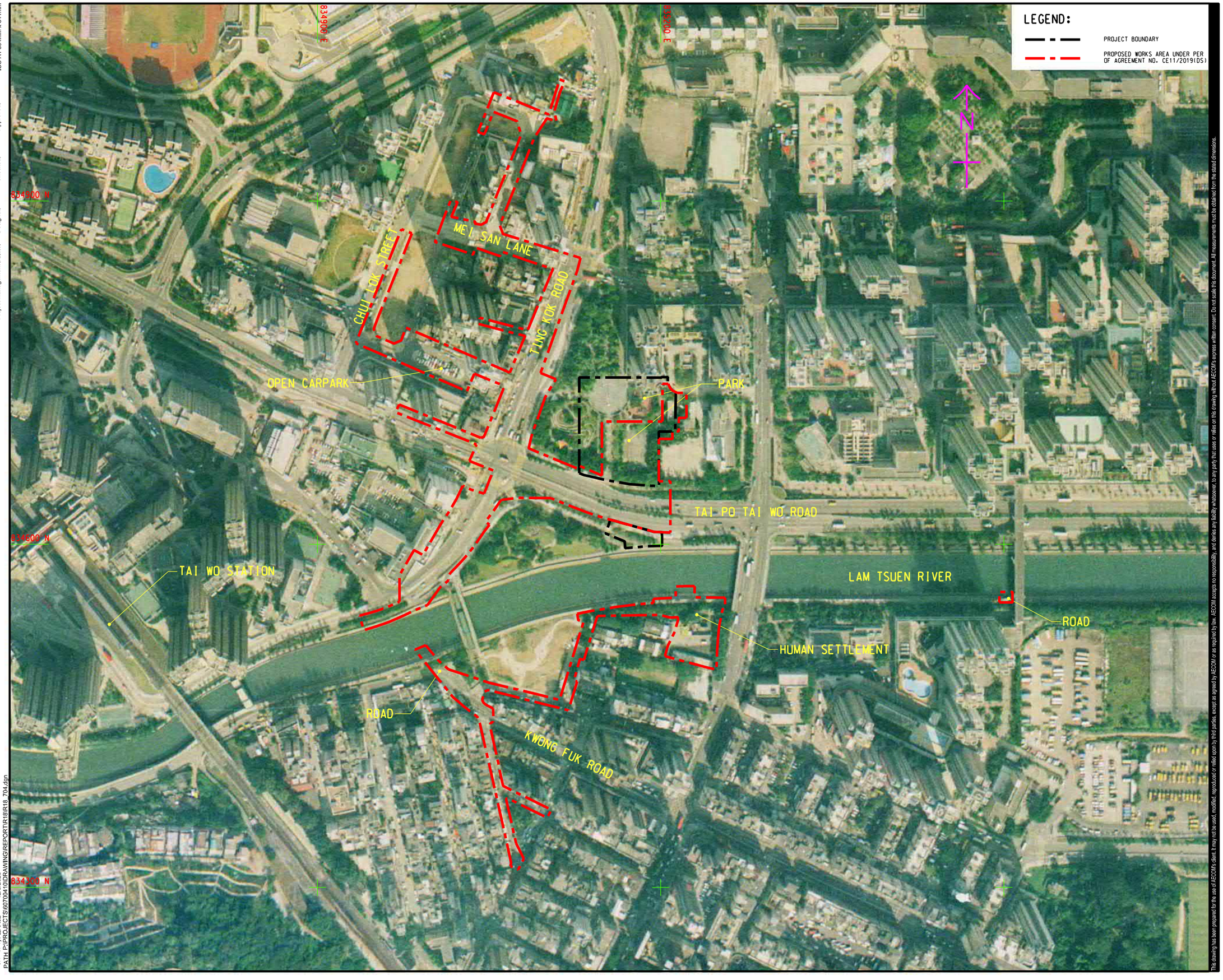
SHEET NUMBER
圖紙編號

60700410/R18/AP3



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Designer:

Project Management Initials:

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STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

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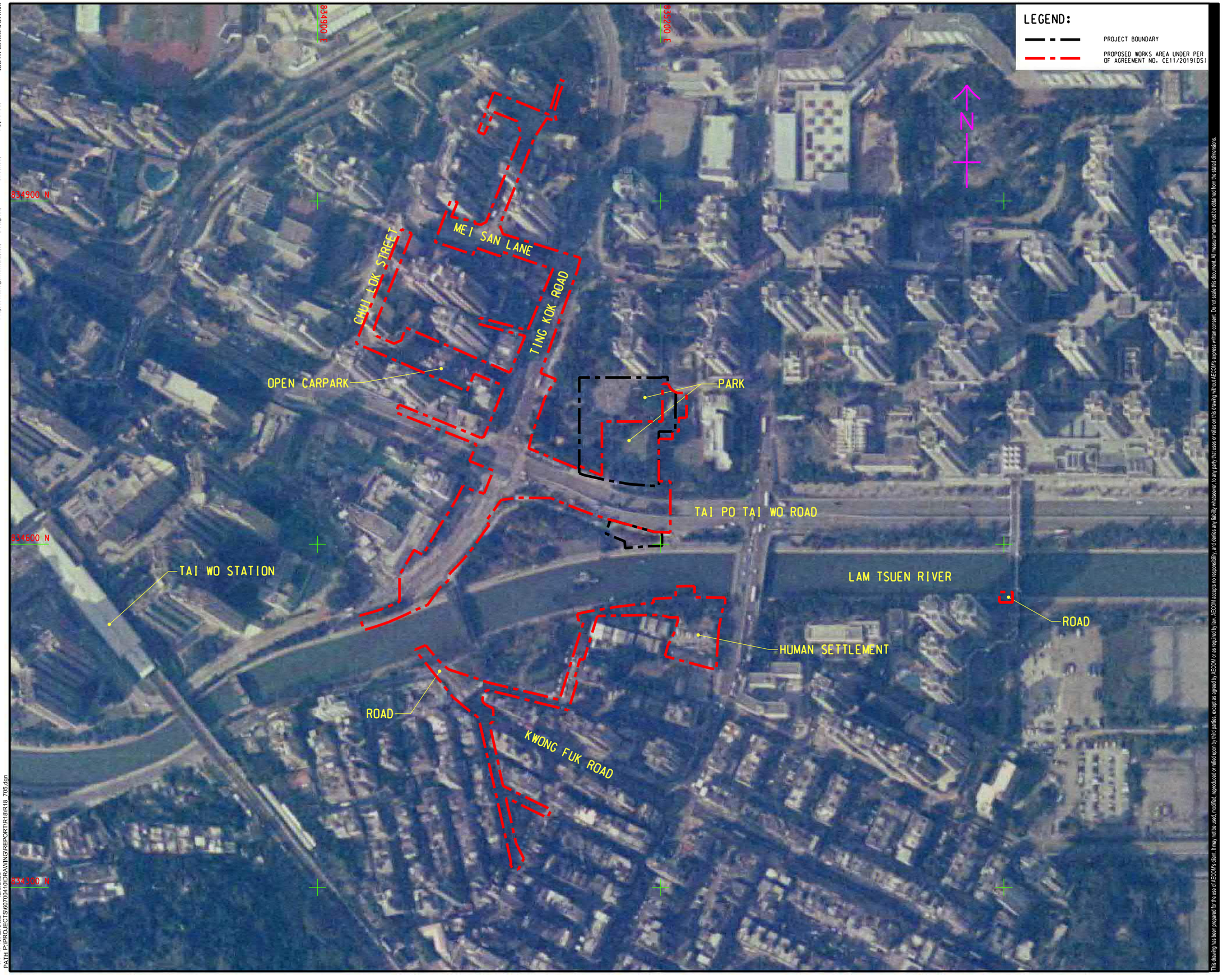
SHEET NUMBER
圖紙編號

60700410/R18/AP4



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Designer:

Project Management Initials:

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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

AERIAL PHOTOGRAPH 2001

SHEET NUMBER
圖紙編號

60700410/R18/AP5

ISO A1 594mm x 841mm

Approved:

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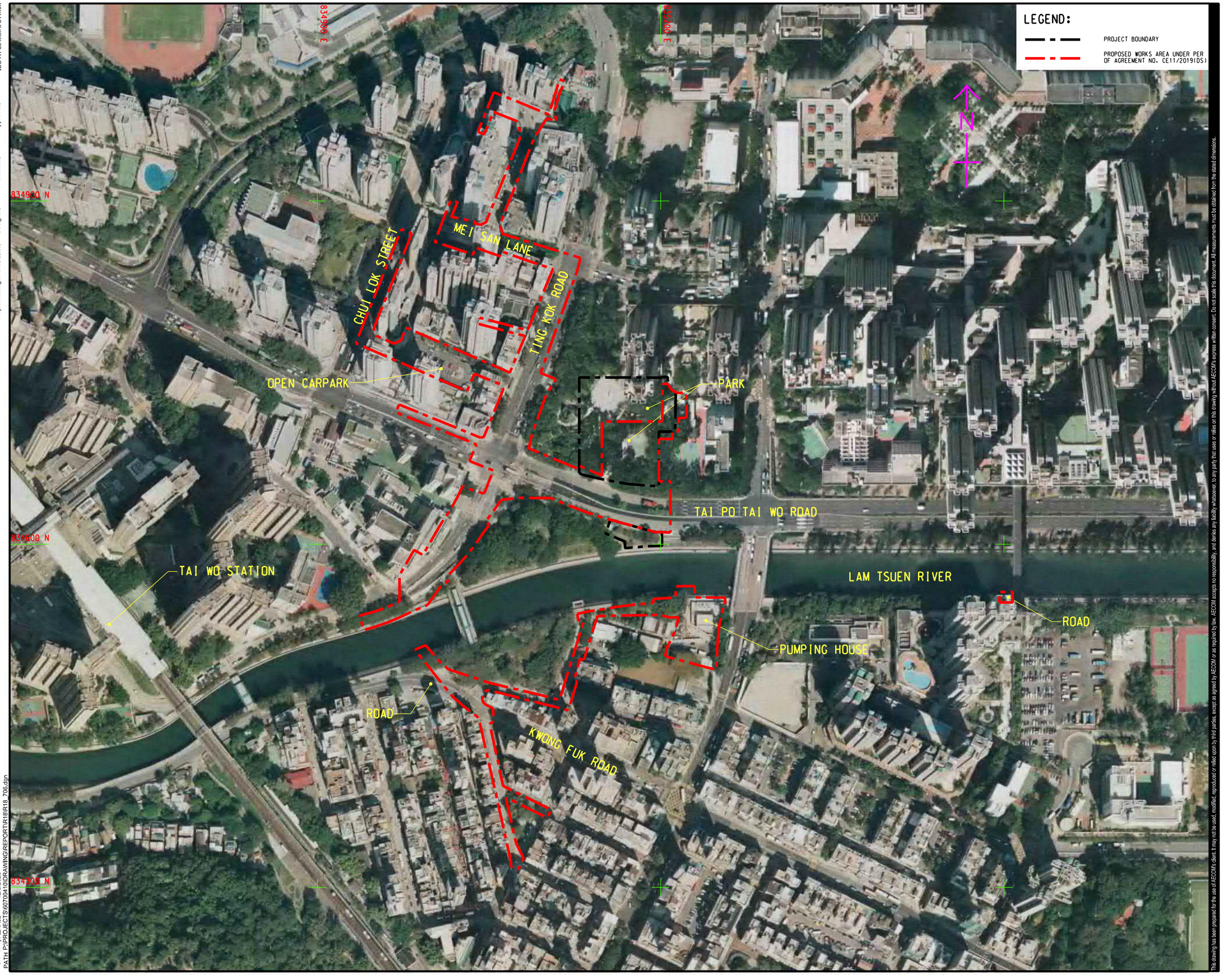
Designer:

Project Management Initials:



AECOM

PROJECT
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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱
AERIAL PHOTOGRAPH 2011

SHEET NUMBER
圖紙編號
60700410/R18/AP6

Plot File by: LIANJ2 12/8/2023
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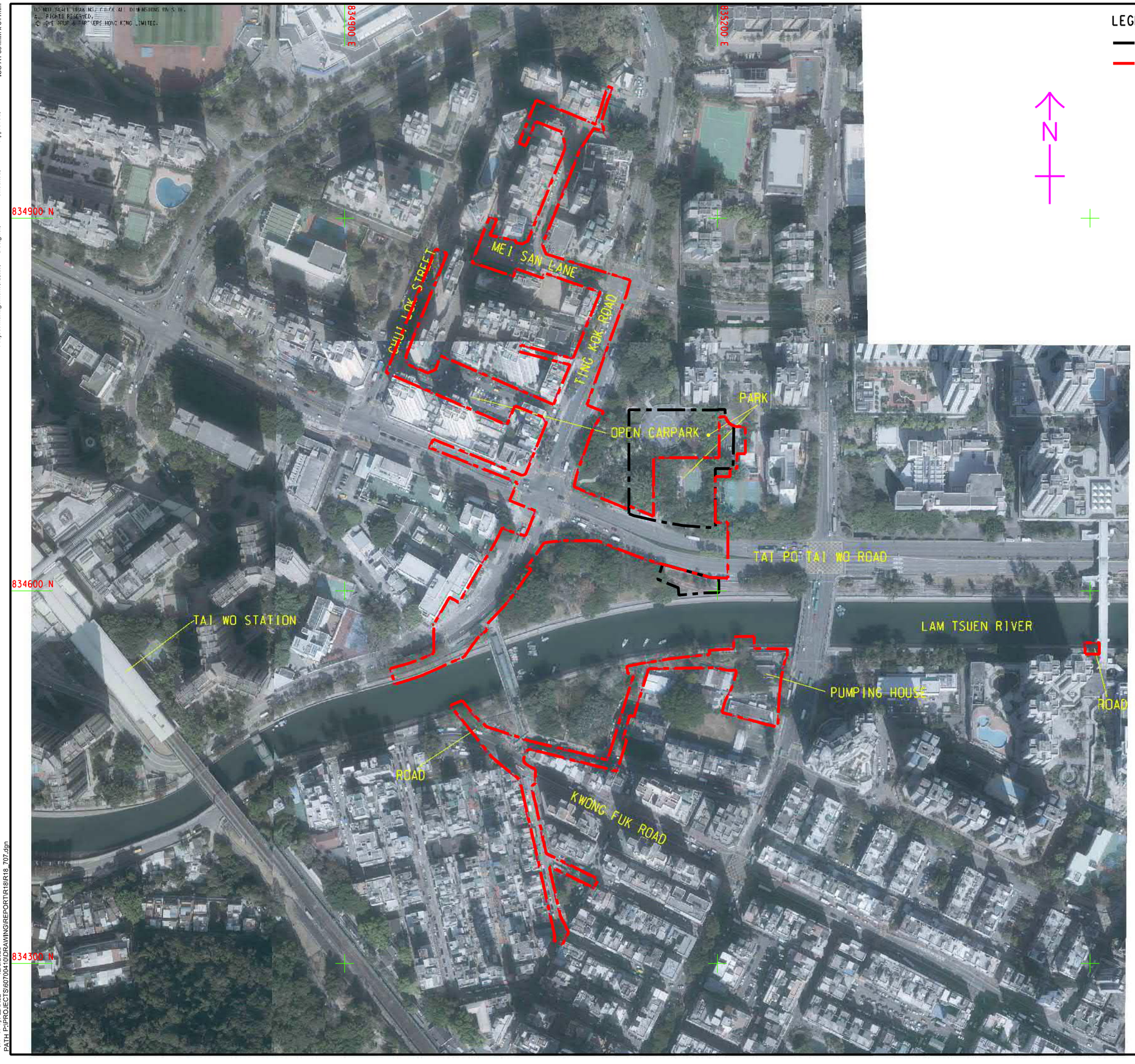

LEGEND:

PROJECT BOUNDARY

PROPOSED WORKS AREA UNDER PER OF AGREEMENT NO. CE11/2019(DS)

N

AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT 業主

渠務署 Drainage Services Department

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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例 A1 1 : 1500

DIMENSION UNIT 尺寸單位 METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號 60700410

CONTRACT NO. 合約編號 CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

AERIAL PHOTOGRAPH 2021

SHEET NUMBER 圖紙編號

60700410/R18/AP7

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

Plot File by: LIANJ2 12/8/2023
PATH: P:\PROJECTS\60700410\DRAWING\REPORT\R18\R18_707.dgn

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Initials:

Project Management

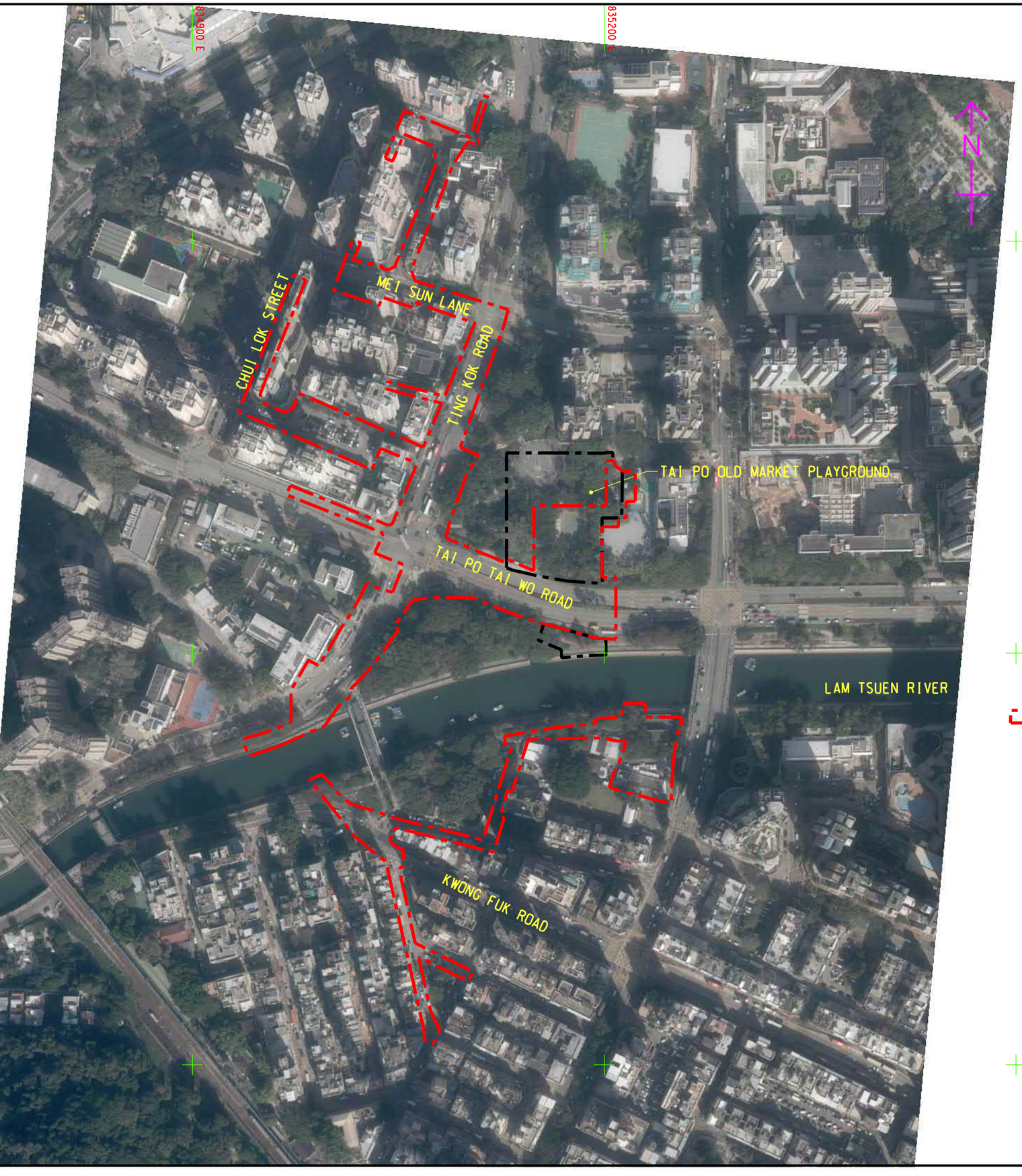
834900 E

835200 E

834900 N

834600 N

834300 N



LEGEND:

PROJECT BOUNDARY

PROPOSED WORKS AREA UNDER PER OF AGREEMENT NO. CE11/2019(DS)

AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT 業主

渠務署
Drainage Services Department

CONSULTANT 工程顧問公司

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ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例

A1 1 : 1500

DIMENSION UNIT 尺寸單位

METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號

60700410

CONTRACT NO. 合約編號

CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

AERIAL PHOTOGRAPH 2022

SHEET NUMBER 圖紙編號

60700410/R18/AP8

Plot File by: LIANJ2 12/8/2023
PATH: P:\PROJECTS\60700410\DRAWING\REPORT\R18\R18_708.dgn

Appendix 11.2
Site Walkover Checklists

Annex C1

Site Walkover Checklist

Site Walkover Date: 30 August 2023

GENERAL SITE DETAILS

~~SITE OWNER~~/CLIENT Drainage Services Department

PROPERTY ADDRESS Tai Po Old Market Playground,
On Ho Lane, Tai Po

PERSON CONDUCTING THE QUESTIONNAIRE

NAME Ms. Chloe Ng

POSITION Project Environmental Consultant, AECOM

AUTHORIZED OWNER/CLIENT REPRESENTATIVE (IF APPLICABLE)

NAME Not Available

POSITION --

TELEPHONE --

SITE ACTIVITIES

Briefly describe activities carried out on site, including types of products/chemicals/materials handled.
Obtain a flow schematic if possible.

Number of employees:	Full-time:	N/A
	Part-time:	N/A
	Temporary/Seasonal:	N/A
Maximum no. of people on site at any time:		N/A
Typical hours of operation:		N/A
Number of shifts:		N/A
Days per week:		N/A
Weeks per year:		N/A
Scheduled plant shut-down:		N/A

Detail the main sources of energy at the site:

Gas	~~Yes~~/No
Electricity	~~Yes~~/No
Coal	~~Yes~~/No
Oil	~~Yes~~/No
Other	~~Yes~~/No

SITE DESCRIPTION

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area: Approx. 4,380 m^2

What area of the site is covered by buildings (%): 0 %

Please list all current and previous owners/occupiers if possible. Government land

Is a site plan available? If yes, please attach. Yes/~~No~~ Refer to **Figure 11.1**

Are there any other parties on site as tenants or sub-tenants? ~~Yes~~/No

If yes, identify those parties:

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North: Eightland Gardens (Residential), On Ho Lane

South: Tai Po Tai Wo Road

East: Tai Po Old Market Public School

West: Park / garden in Tai Po Old Market Playground

Annex C1
Site Walkover Checklist

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.).

Generally flat terrain with vegetation.

State the size and location of the nearest residential communities.

Eightland Gardens to the north of the Site, area of about 5240 m^2.

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?

No.

Questionnaire with Existing/Previous Site Owner or Occupier

		Yes/No	Notes*
1.	What are the main activities/operations at the above address?	--	Vegetation, park / garden, playground, basketball court and footpath.
2.	How long have you been occupying the site?	--	Information not available.
3.	Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	N/A	
4.	Prior to your occupancy, who occupied the site?	N/A	Information not available.
5.	What were the main activities/operations during their occupancy?	N/A	Information not available.
6.	Have there been any major changes in operations carried out at the site in the last 10 years?	N/A	Information not available.
7.	Have any polluting activities been carried out in the vicinity of the site in the past?	N/A	Information not available.
8.	To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	N/A	Based on the review of historical information and site observation, no petrol filing station / car service garage were noted within the site.
9.	Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	N/A	Information not available.
10.	Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	N/A	No registered hazardous installations were observed on site.
11.	Are any chemicals used in your daily operations? (If yes, please provide details.)	N/A	No chemicals were observed on site.
•	Where do you store these chemicals?	--	
12.	Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	N/A	Information not available.
13.	Has the facility produced a separate hazardous substance inventory?	N/A	No hazardous substances were observed on site.
14.	Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	N/A	Information not available.

* No interview was able to be conducted. Notes shown are based on observation from site walkover.

		Yes/No	Notes*
15.	How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	N/A	
16.	Do you have any underground storage tanks? (If yes, please provide details.)	N/A	Information not available.
	• How many underground storage tanks do you have on site?	N/A	
	• What are the tanks constructed of?	N/A	
	• What are the contents of these tanks?	N/A	
	• Are the pipelines above or below ground?	N/A	
	• If the pipelines are below ground, has any leak and integrity testing been performed?	N/A	
	• Have there been any spills associated with these tanks?	N/A	
17.	Are there any disused underground storage tanks?	N/A	
18.	Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	N/A	No chemicals were observed within the site.
19.	How are the wastes disposed of?	N/A	
20.	Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	N/A	Information not available.
21.	Have any spills occurred on site? (If yes, please provide details.)	N/A	No traces of oil stains /stressed vegetation observed on site.
	• When did the spill occur?	N/A	
	• What were the substances spilled?	N/A	
	• What was the quantity of material spilled?	N/A	
	• Did you notify the relevant departments of the spill?	N/A	
	• What were the actions taken to clean up the spill?	N/A	
	• What were the areas affected?	N/A	
22.	Do you have any records of major renovation of your site or re-arrangement of underground utilities, pipe work/underground tanks (If yes, please provide details.)	N/A	Information not available.
23.	Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	N/A	Information not available.
24.	Are there any known contaminations on site? (If yes, please provide details.)	N/A	Information not available.
25.	Has the site ever been remediated? (If yes, please provide details.)	N/A	Information not available.

* No interview was able to be conducted. Notes shown are based on observation from site walkover.

Annex C1
Site Walkover Checklist

Observations

		Yes/No	Notes
1.	Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	N/A	No chemicals or chemical storage areas were observed on site.
2.	What are the conditions of the bund walls and floors?	N/A	
3.	Are any surface water drains located near to drum storage and unloading areas?	No	No drum storage or unloading areas were observed on site.
4.	Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	No	
5.	Is there a storage site for the wastes?	No	
6.	Is there an on-site landfill?	No	
7.	Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	
8.	Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	No	
9.	Are there any potential off-site sources of contamination?	No	
10.	Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	No	
11.	Are there any sumps, effluent pits, interceptors or lagoons on site?	No	
12.	Any noticeable odours during site walkover?	No	
13.	Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	No	

Appendix 11.3
Information from Government Departments

AECOM
12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong
香港新界沙田鄉事會路 138 號
新城市中央廣場第 2 座 12 樓
www.aecom.com

+852 3922 9000 tel
+852 3922 9797 fax

Our Ref.: AYFW:etly:60700410/08.10-0058 (2023006127W)

17 August 2023

By Hand

Environmental Protection Department
Environmental Compliance Division
Regional Office (North)
10/F., Sha Tin Government Offices,
No.1 Sheung Wo Che Road, Sha Tin,
New Territories

Dear Sir/Madam,

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po - Design and Construction

Request for Information of Chemical Waste Producer and Chemical Spillage Accident

We are the Consultant commissioned by Drainage Project Division of Drainage Services Department (DSD/DP) for the captioned Agreement. The memo ref. (00XVAL) in DP 8/4183CD/CE5722/1 dated 30 January 2023 issued by DSD/DP is enclosed for your reference.
As part of the land contamination assessment and following the *Practice Guide for Investigation and Remediation of Contaminated Land* issued by EPD, we have to collect historical information regarding the past and present activities of the Concerned Area as attached in the Site Location Plan. In order to facilitate our assessment, we would like to request for the following information regarding the Concerned Area:

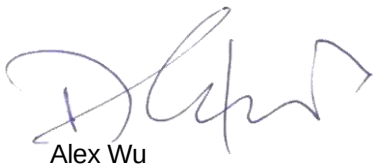
1. Current and past (as early as the records are available) registered Chemical Waste Producer(s) within the Concerned Area (preferably with the registration date, status (moved out or active), nature and quantity of the chemical waste); and
2. Reported accidents of spillage / leakage of chemicals within the Concerned Area.

We would be grateful if you could forward the requested information to us by **31 August 2023**.

Should you have any queries, please feel free to contact our Chloe Ng at 3856 5662 (chloe.ng@aecom.com) or Howie Law at 3729 3227 (Howie.Law@aecom.com).

Thank you very much for your kind assistance.

Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.

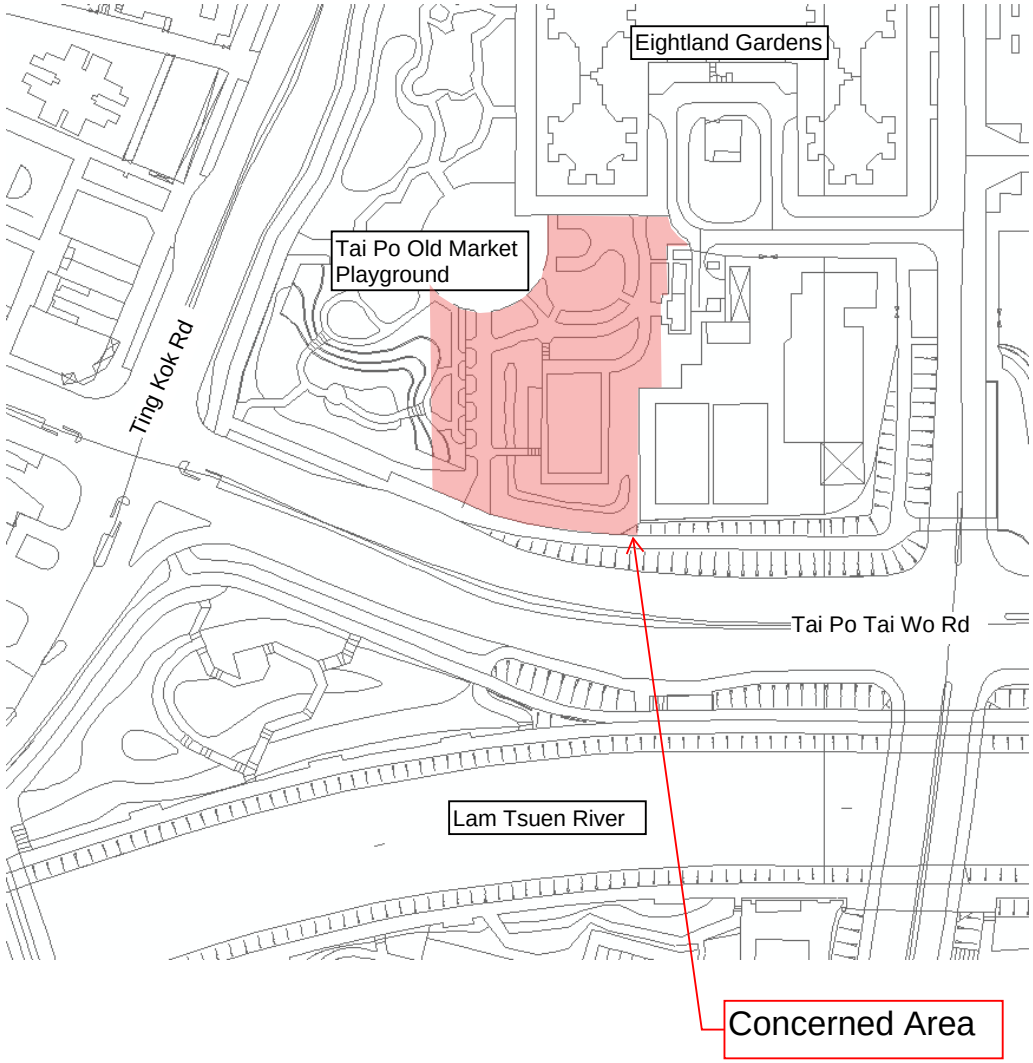


Alex Wu
Executive Director
Water, Hong Kong

Encl.

cc DSD/DP – Attn: Ms. YUEN Pui Shan, Priscilla (w/e, By Hand & Email)

Site Location Plan



By Fax

MEMO

From CE/DP, DSD	To Distribution
Ref. (00XVAL) in DP 8/4183CD/CE5722/1	(Attn.:)
Tel. No. 2594 7347	Your Ref. ( ) in
Fax. No. 3104 6420	Dated Fax. No.
Date 30 January 2023	Total Pages 3 + Encl

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po – Design and Construction

Notification of Award of Consultancy

I am pleased to inform you that AECOM Asia Company Limited (AECOM) has been appointed by this Department to undertake the captioned consultancy Agreement which commenced on 20 January 2023 for completion in 2033.

2. The scope of the Project comprises construction of stormwater pumping scheme in Tai Po Old Market; expansion of the existing Tai Po Market Floodwater Pumping Station; drainage upgrading works in Tai Mei Tuk, Ng Uk Tsuen, Ting Kok, Po Sam Pai, San Uk Pai, Ping Long, Che Ha, Sai Sha Road; and river training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Ma Po Mei, Sha Pa and She Shan River. The layout plan of the project is enclosed for reference.

3. During the period of the above Agreement, AECOM may approach your office to request for information in relation to the Agreement. I should be grateful if you would offer your kind assistance to them such that the Agreement could be carried out successfully. Should you have any enquiry, please feel free to contact the undersigned at 2594 7347. Thank you for your kind assistance.

(C Y YIP)
for Chief Engineer/Drainage Projects
Drainage Services Department

Encl

DRAINAGE PROJECTS
SEWERAGE PROJECTS
CAVERN PROJECTS
DIVISION, DSD
31 JAN 2023
FAXED

DRAINAGE PROJECTS
SEWERAGE PROJECTS
CAVERN PROJECTS
DIVISION, DSD
31 JAN 2023
DESPATCHED

AECOM
12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong
香港新界沙田鄉事會路 138 號
新城市中央廣場第 2 座 12 樓
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+852 3922 9797 fax

Our Ref.: AYFW:etly:60700410/08.10-0057 (2023006126W)

17 August 2023

By Hand

Fire Services Department
Licensing and Certification Command
5/F, South Wing, Fire Services HQ Building,
1 Hong Chong Road, Tsim Sha Tsui East,
Kowloon.

Dear Sir/Madam,

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po - Design and Construction

Request for Information about Dangerous Goods Store and Incidents Records

We are the Consultant commissioned by Drainage Project Division of Drainage Services Department (DSD/DP) for the captioned Agreement. The memo ref. (00XVAL) in DP 8/4183CD/CE5722/1 dated 30 January 2023 issued by DSD/DP is enclosed for your reference.

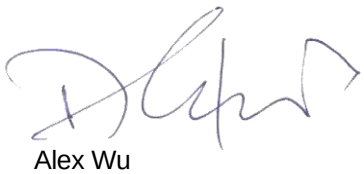
As part of the land contamination assessment and following the *Practice Guide for Investigation and Remediation of Contaminated Land* issued by EPD, we have to collect historical information regarding the past and present activities of the Concerned Area as attached in the Site Location Plan. In order to facilitate our assessment, We would like to request for the following information regarding the Concerned Area:

1. Records of current and past (as early as the records are available) registration of Dangerous Goods storage (with the type of dangerous goods, storage method, quantity, license no., date of issue, and storage location) within the Concerned Area;
2. Any records of reported accidents of spillage / leakage of dangerous goods stored within the Concerned Area; and
3. Any records of fire incidents within the Concerned Area.

We would be grateful if you could forward the requested information to us by **31 August 2023**.

Should you have any queries, please feel free to contact our Chloe Ng at 3856 5662 (chloe.ng@aecom.com) or Howie Law at 3729 3227 (Howie.Law@aecom.com).

Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.

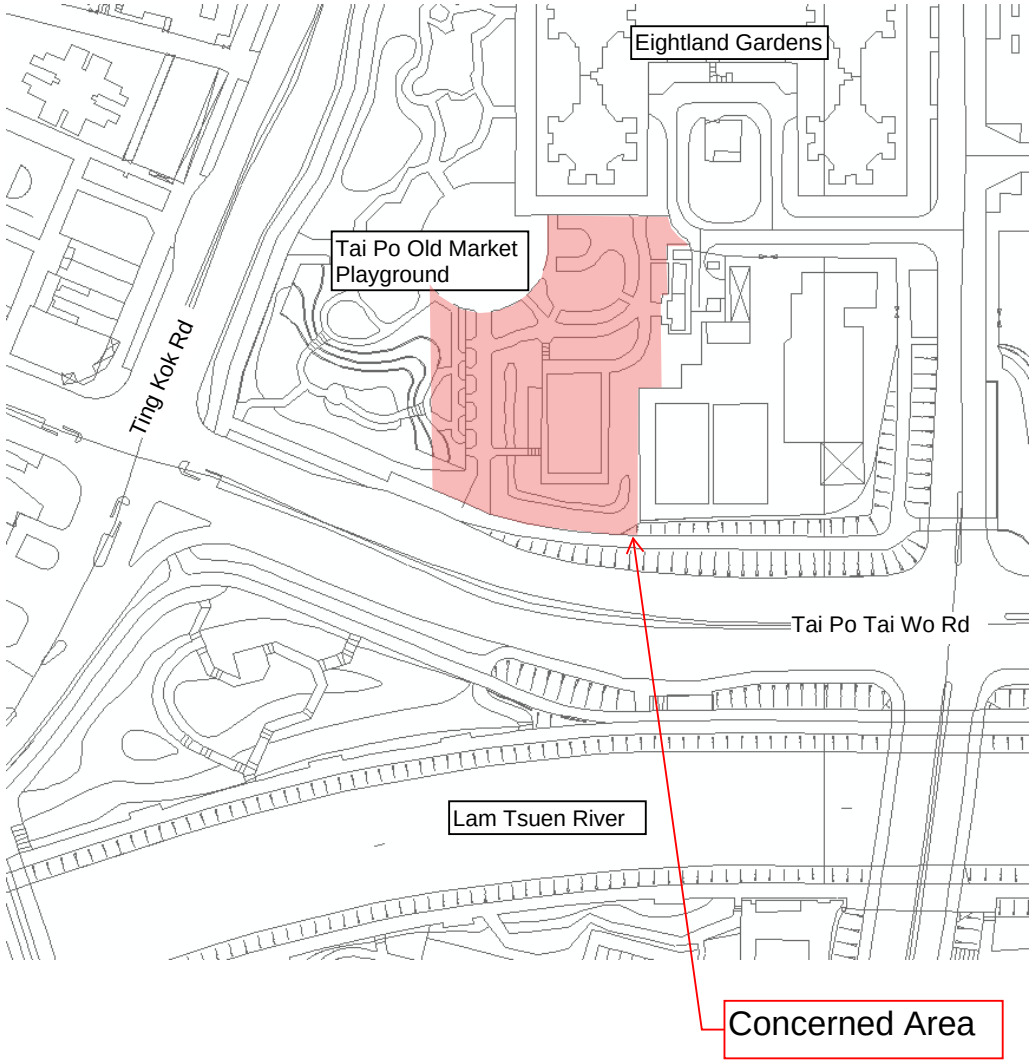


Alex Wu
Executive Director
Water, Hong Kong

Encl.

cc DSD/DP – Attn: Ms. YUEN Pui Shan, Priscilla (w/e, By Hand & Email)

Site Location Plan



By Fax

MEMO

From CE/DP, DSD	To Distribution
Ref. (00XVAL) in DP 8/4183CD/CE5722/1	(Attn.:)
Tel. No. 2594 7347	Your Ref. ( ) in
Fax. No. 3104 6420	Dated Fax. No.
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Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po – Design and Construction

Notification of Award of Consultancy

I am pleased to inform you that AECOM Asia Company Limited (AECOM) has been appointed by this Department to undertake the captioned consultancy Agreement which commenced on 20 January 2023 for completion in 2033.

2. The scope of the Project comprises construction of stormwater pumping scheme in Tai Po Old Market; expansion of the existing Tai Po Market Floodwater Pumping Station; drainage upgrading works in Tai Mei Tuk, Ng Uk Tsuen, Ting Kok, Po Sam Pai, San Uk Pai, Ping Long, Che Ha, Sai Sha Road; and river training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Ma Po Mei, Sha Pa and She Shan River. The layout plan of the project is enclosed for reference.

3. During the period of the above Agreement, AECOM may approach your office to request for information in relation to the Agreement. I should be grateful if you would offer your kind assistance to them such that the Agreement could be carried out successfully. Should you have any enquiry, please feel free to contact the undersigned at 2594 7347. Thank you for your kind assistance.

(C Y YIP)
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DIVISION, DSD
31 JAN 2023
FAXED

DRAINAGE PROJECTS
SEWERAGE PROJECTS
CAVERN PROJECTS
DIVISION, DSD
31 JAN 2023
DESPATCHED

本署檔案
OUR REF:( ) in EP550/W2/4
來函檔案
YOUR REF: AYFW:etly:60700410/
08.10-0058(2023006127W)
電　話
TEL. NO.: 2158 5801
圖文傳真
FAX NO.: 2650 6033
網　址
HOMEPAGE: http://www.epd.gov.hk/

Environmental Protection Department
Environmental Compliance Division
Regional Office (North)
10/F., Shatin Governmental Offices,
1 Sheung Wo Che Road,
Sha Tin, New Territories,
Hong Kong

環境保護署
環保法規管理科
區域辦事處 (北)
香港新界沙田
上禾輋路一號
沙田政府合署 10 樓

By Email: alex.yf.wu@aecom.com

5 September 2023

AECOM
12/F., Grand Central Plaza Tower 2,
138 Shatin Rural Committee Road, Shatin, New Territories
(Attn.: Mr. Alex WU)

Dear Mr. WU,

Agreement No. CE 57/2022(DS)
Drainage Improvement Works in Tai Po – Design and Construction
Re: Request for Information of Chemical Waste Producer and Chemical Spillage Accident

I refer to your letter dated 17August 2023 and your follow up email on 5 September 2023 on the captioned subject.

According to the records in this office, there are no record of chemical spillage accident and submission relating to land contamination assessment at the subject site in the past 3 years.

As regards registered Chemical Waste Producer(s) at the location concerned, a registry of chemical waste producers is available in the Territorial Control Office of this department. Please contact our Chief Environmental Protection Inspector (Territorial Control)5, Mr. TSANG Ching Kau at 2835 1017 for making an appointment to view the records.

While we have made a reasonable effort to ensure the completeness and accuracy of the information provided, you should comprehend that the information is provided as is and EPD is not responsible or liable for any claim, loss or damage resulting from the use of this information.

Yours sincerely,

(Maverick AU)
Regional Office (North)
for Director of Environmental Protection

c.c. TCO/EPD (Attn.: Mr. TSANG Ching Kau) Fax: 2305 0453

Appendix F – Drainage Impact Assessment Report

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TABLE OF CONTENTS

Drawings

1 INTRODUCTION

1.1 Background

1.1.1.1 The Review of Drainage Master Plan in Tai Po – Feasibility study and the Review of Drainage Master Plan in Sha Tin and Sai Kung – Feasibility Study (the DMP Review Study) identified that some areas in Tai Po, Lam Tsuen, Ting Kok and Ma On Shan would be subject to high flood risks.

1.1.1.2 The flooding incidents reported in the areas of Tai Po Old Market and Tai Po Market on 22 July 2010, Lam Tsuen Valley on 19 October 2016, and Ting Kok and Sai Sha Road on 18 July 2017 are some examples to substantiate the above findings.

1.1.1.3 To relieve the flood risk, the Study proposed various drainage improvement measures in these areas, the DMP Review Study has proposed by adopting drainage improvement measures in a combination of stormwater pumping scheme and associated drainage upgrading and river training works. Upon completion of the project, the flood risks in the areas can be significantly reduced.

1.1.1.4 In May 2018, Development Bureau (DEVB) signed out a Project Definition Statement (PDS) to justify and define the scope of the "Drainage Improvement Works in Tai Po". The Drainage Services Department (DSD) then completed a Technical Feasibility Statement (TFS) confirming its technical feasibility. The TFS was subsequently approved by DEVB in August 2018. The project was included into Cat B under PWP No. 4183CD in September 2018.

1.1.1.5 In January 2020, the DSD commissioned Agreement No. CE 11/2019(DS) "Drainage Improvement Works in Tai Po – Investigation" (referred to hereinafter as the "Investigation Study") to carry out various reviews, surveys, investigation, impact assessments and preliminary design for the Project.

1.1.1.6 AECOM Asia Company Limited was appointed by DSD on 13 January 2023 to undertake Agreement No. CE 57/2022 (DS) "Drainage Improvement Works in Tai Po – Design and Construction" (referred to hereinafter as "the Project", of which the *starting date* of the Project is 26 January 2023. The Project comprises the drainage improvement works as briefly described in the following:

(a) Stormwater pumping scheme in Tai Po Old Market, including an underground storage tank, a pump house and the associated pipeworks and E&M works in Tai Po Old Market Playground, as well as the drainage upgrading works in Tai Po Tai Wo Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Ting Kok Road, Mei Sun Lane and Kau Hui Chik Street, floodwall modification and new floodwall along Lam Tsuen River and ancillary works including temporary relocation and reinstatement of playgrounds and associated facilities;

(b) Expansion of existing Tai Po Market Floodwater Pumping Station, including upgrading of existing pump house and the associated pipeworks and E&M works, as well as the drainage upgrading works in Tsing Yuen Street, Wai Yan Street, Pak Shing Street, Fu Shin Street, Yan Hing Street, Kwong Fuk Bridge Garden, Plover Cove Road, Tung Cheong Street, cycle track and footpath along southside of Lower Lam Tsuen River (between existing pumping station and elevated walkway at Tai Po Centre (structure no. NF97);

(c) Drainage upgrading works at Tai Mei Tuk, Ng Uk Tsuen, Ting Kok Shan Liu, Po Sam Pai, Ma Po Mei, San Uk Pai, Ping Long, Che Ha, Nam Hang and Tsung Tsai Yuen and Sai Sha Road (sections near Sai O, Kwun Hang, Tai Tung and Sai Keng); and

(d) River training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Sha Pa and She Shan River.

1.2 Scope of the Project

1.2.1.1 The scope of the Project comprises the drainage improvement works for Tai Po are presented on the plans at the attached drawings and are described below.

(a) adoptive review based on the findings in the Investigation phase;

(b) update of studies conducted in the Investigation phase, including hydraulic modelling, impact assessment studies (environmental, traffic, drainage, sewerage, geotechnical, utility etc.), architectural, landscaping and environmental design and land requirements;

(c) supervision of site investigations, surveys and testing;

(d) consultation with relevant stakeholders in relation to the proposed works;

(e) conduct the necessary gazettal procedures that are required to facilitate taking the project forward to the subsequent construction stages;

(f) detailed design of the proposed works;

(g) detailed design on the proposed works, including but not limited to architectural and landscaping aspects proposed stormwater pumping stormwater pumping storage schemes at Tai Po Old Market Playground and Tai Po Market, proposed floodwalls and floodwall modification works, flood warning and early alert system at Lower Lam Tsuen River;

(h) preparation of tender documents and assessment of tenders; and

(i) construction supervision and commissioning of the works.

1.3 Scope of this Report

1.3.1.1 The objective of the Drainage Impact Assessment (DIA) is to introduce a structural and systematic approach to identifying, assessing and upgrading the drainage networks up to standard, and mitigating potential drainage impacts and enhancement arising from the Project.

1.3.1.2 With the implementation of necessary mitigation measures if required, the Project shall not cause an unacceptable increase in the risk of flooding in areas upstream of, adjacent to or downstream of the project site both during construction and will enhance the entire drainage performance of the network upon completion.

1.3.1.3 The Consultant reviews the DIA Report prepared under the Investigation Study of this Project and prepares an Updated DIA Report based on the latest design of the Project and other circumstances that may have changed since the start of the services.

2 METHODOLOGY OF DRAINAGE IMPACT ASSESSMENT

2.1 Hydraulic Model

2.1.1.1 1D/2D hydraulic models were constructed in InfoWorks ICM under DMP Review and upgraded to version 10.5 in the Investigation Study. InfoWorks ICM 10.5 is used in this Project.

2.2 Hydrological Parameters

2.2.1 *SCS CN value*

2.2.1.1 The SCS Curve Number for the DMP Review are adopted as they had been calibrated. The SCS Curve Number adopted for rural catchment under AMC II condition, CN(II), for different land uses are presented in **Table 2.1**.

Table 2.1 Recommended SCS Curve Number for Different Land Uses

Land Use	SCS Curve Number, CN(II)
Agriculture and Upland	
Woodland	67
Scrubland	70
Grassland	78
Agriculture	78
Drainage	
River Channel	100
Reservoir	100
Wetland	100
Highway and Road	
Major Road and Junction	100
Special Use	
Government, Institution or Community	90 to 100
Fire Station	-
Hospital	-
Cemetery	65
Racecourse	-
Urban	
Commercial / Residential	95
Comprehensive Development Area	-
Residential	95
Village	
Village	78 to 80
Storage and Industrial	
Industrial	90
Open Space	90
Rail	
Rail	100
Boulder and Rocky Area	
Boulder and Rocky Area	100

2.2.2 *Time of Concentration*

2.2.2.1 The design rainfall intensities were determined with consideration for the maximum time of concentration. The time of concentration is defined as the time needed for water to flow from the remotest point in the catchment to the outlet. In the deterministic rational method, the critical rainfall duration is considered to be equal to the time of concentration and this assumption is also made for most runoff routing models.

2.2.2.2 The time of concentration (t_c) for an urban drainage system was estimated by the following equations:

$$t_c = t_o + t_f$$

where

t_c = time of concentration (minutes)
t_o = inlet time (water travelling time from the remotest point to reach the most upstream point of the urban drainage system)
t_f = flow time

2.2.2.3 In view of generally good agreement between the time of observed and simulated peak flow in the calibration process, it is considered suitable to adopt the Brandsby William's Equation for estimating the time of concentration for the rural catchments. It is given as:

$$t_o = \frac{0.14465L}{H^{0.2}A^{0.1}}$$

where

t_o = time of concentration of a natural catchment (min.)
A = catchment area (m2)
H = average slope (m per 100 m), measured along the line of natural flow, from the summit of the catchment to the point under consideration
L = distance (on plan) measured on the line of natural flow between the summit and the point under consideration (m)

2.2.2.4 The time of concentration for each catchment in Tai Po was reviewed in the DMP Review Study. A 4-hour design event was found sufficient to cover the peak intensity and catchment discharge throughout the study area.

2.2.2.5 Same rainfall duration was adopted in this Project. 4-hour design rainfalls for various return periods were generated using the symmetrically rainfall profile and used as an input in the hydrological model.

2.2.3 *Fixed Runoff Coefficient*

2.2.3.1 Fixed Percentage Runoff method is adopted for the runoff volume model of urban catchment.

2.2.3.2 The recommended fixed runoff coefficients to be adopted thus are:

Paved area	0.90
Unpaved area	0.30

2.3 Hydraulic Parameters

2.3.1 *Roughness Coefficient*

2.3.1.1 The values of surface roughness, ks, and Manning coefficient, n, to be adopted are summarized in **Table 2.2** and **Table 2.3.**

Table 2.2 Adopted Values of Surface Roughness, k_s

Description	Surface Roughness (mm)
Existing Pipeline / Culvert	3.0
Proposed Pipeline / Culvert	0.6

Table 2.3 Adopted Values of Manning's Coefficient, n

Description	Manning Coefficient
Engineered channels with concrete lining	0.020
Engineered channels with masonry sides	0.020-0.025
Engineered channels with grasscrete lining	0.025-0.035
Engineered channels with gabions	0.035-0.050
Natural channels	0.030-0.060

2.3.2 *Siltation*

2.3.2.1 The following siltation (or sometimes called sediment depth) based on the recommendation given in Section 9.3 of Stormwater Drainage Manual (SDM) was applied in the model, for assessing the drainage performance of the pipeline system (except WSD catchwater pipes):

- 5% reduction in flow area for gradients greater than 1 in 25
- 10% reduction in flow area for other cases

2.3.2.2 For those cross-sections of the watercourses extracted from the sounding record by CEDD and LiDAR data, and those surveyed under this Project which indicate the exact conditions of the watercourses, no additional siltation was added in the hydraulic model.

2.3.3 *Manhole Headloss*

2.3.3.1 Headloss condition has to be specified at each end of a conduit. Normal head loss condition was generally assumed, and the head loss equation used is as follows:

$$\Delta h = k_u k_s k_v \frac{v^2}{2g}$$

where

Δh = headloss
ku = user defined headloss factor
ks = surcharge ratio coefficient
kv = velocity coefficient
v = flow velocity (m/s)
g = acceleration due to gravity (m/s^2)

2.3.3.2 According to the recommended values by InfoWorks ICM, the chosen user defined head loss factors are shown in **Table 2.4**.

Table 2.4 User Defined Headloss Factor

Bend (degree)	Head loss Value (k_u)
0 (Straight through manhole)	1.0
30	3.3
60	6.0
90	6.6
>90	8.0

2.4 Design Criteria

2.4.1 *Design Return Periods*

2.4.1.1 The drainage system shall be assessed based on the design criteria for the return periods of 2, 5, 10, 20, 50, 100 and 200 years as defined in the Stormwater Drainage Manual (SDM).

2.4.2 *Combination of Rainfall and Sea Level*

2.4.2.1 Since the hydraulic performance of the drainage system is affected by both rainfall and sea level, the design flood levels of the drainage system are to be assessed based on the joint probabilities of rainfall dominated and sea level dominated events.

2.4.2.2 The following approximate pragmatic rule for determining the T-year flood level in the fluvial-tidal zone of a drainage system is adopted. Take the T-year flood level as the higher of those flood levels due to the following two cases:

Case A: an X-year sea level in conjunction with a T-year rainfall
Case B: a T-year sea level in conjunction with an X-year rainfall

In the above rule,
X=10, when T=50, 100 or 200
X=2, when T=2, 5 or 10
X=5, when T=20

2.4.2.3 A summary of design event combinations is shown in **Table 2.5**.

Table 2.5 Design Return Period Combinations of Rain and Tide Events

Flood Protection Return Period	The More Critical of the 2 Cases	
	Case A	Case B
200-year	200-year rain + 10-year sea level	10-year rain + 200-year sea level
100-year	100-year rain + 10-year sea level	10-year rain + 100-year sea level
50-year	50-year rain + 10-year sea level	10-year rain + 50-year sea level
20-year	20-year rain + 5-year sea level	5-year rain + 20-year sea level
10-year	10-year rain + 2-year sea level	2-year rain + 10-year sea level
5-year	5-year rain + 2-year sea level	2-year rain + 5-year sea level
2-year	2-year rain + 2-year sea level	N/A

2.4.3 *Design Rainfall*

(i) Rainfall Profile

2.4.3.1 As recommended in SDM, a symmetrically distributed rainfall with the following formulation based on RO (1991) was adopted for the rainfall profile in DMP Review.

$$F(t) = \begin{cases} \dfrac{a[b+2(1-c)t]}{(2t+b)^{c+1}} & , \quad 0 \le t \le \dfrac{t_d}{2} \\ F(-t) & , \quad -\dfrac{t_d}{2} \le t \le 0 \end{cases}$$

where

F(t) = Rate of rainfall or instantaneous intensity in mm/hr at time t (in minutes)
t_d = Rainfall duration (in minutes) td $\leqslant$ 240
a,b,c = Storm constants given in **Table 2.6** and **Table 2.7**

(ii) Rainfall Duration

2.4.3.2 After the review of time of concentration for each catchment in DMP Review, a 4-hour design event was considered sufficient to ensure that the peak intensity in both short and longer duration events have been considered throughout the Study Area.

2.4.3.3 Therefore, same rainfall duration will be adopted in this Project. A 4-hour design rainfalls for various return periods were generated using the symmetrically rainfall profile and used as an input in the hydrological model.

(iii) Storm Constants

2.4.3.4 Stormwater Drainage Manual (SDM) has been updated and released in year 2018. In SDM2018, Hong Kong is divided into 4 rainfall zones according to their rainfall characteristics. Each zone has a set of storm constants.

2.4.3.5 As shown in **Figure 2.2.1**, part of Tai Po Catchment falls into Tai Mo Shan area. Therefore, the storm constants of Tai Mo Shan (SDM2018 (TMS)) is applied to this part of Tai Po Catchment. And the storm constants of HKO Headquarters (SDM2018 (HKO)) will be adopted in the remaining area of Tai Po and Ma On Shan.

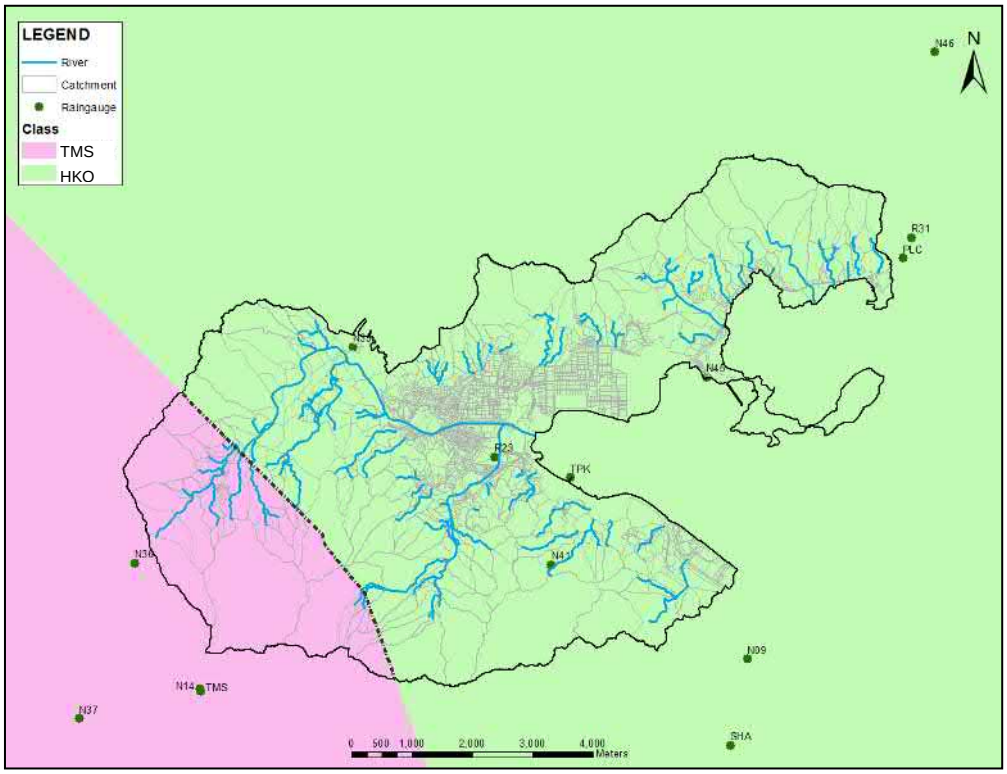

Figure 2.2.1 Variation of Design Rainstorm within Study Boundary

2.4.3.6 The latest storm constants in SDM 2018 was adopted for the review and design of the proposed drainage improvement works in this Project. The adopted storm constants of HKO Headquarters and Tai Mo Shan Area are provided in **Table 2.6** and **Table 2.7** respectively.

Table 2.6 Storm Constants of HKO Headquarters (SDM)

Return Period (Yr)	a	b	c
2	499.8	4.26	0.494
5	480.2	3.36	0.429
10	471.9	3.02	0.397
20	463.6	2.76	0.369
50	451.3	2.46	0.337
100	440.8	2.26	0.316
200	429.5	2.05	0.295

Table 2.7 Storm Constants of Tai Mo Shan Area (SDM)

Return Period (Yr)	a	b	c
2	1743.9	22.12	0.694
5	2183.2	27.12	0.682
10	2251.3	27.46	0.661
20	2159.2	25.79	0.633
50	1740.1	19.78	0.570
100	1307.3	12.85	0.501
200	1005.0	7.01	0.434

(iv) Areal Reduction Factor

2.4.3.7 To account for the spatial variability of rainfall across a catchment, it can be done by multiplying the design rainfall with an areal reduction factor. An areal reduction factor of 1.0 was adopted in this Project.

2.4.4 *Design Sea Level*

2.4.4.1 The design sea levels at Tai Po Kau in SDM Corrigendum No. 1/2022 (SDM2022) was adopted for the review and design of the proposed drainage improvement works in this Report. The adopted design sea levels are provided in **Table 2.8**.

Table 2.8 Design Sea Levels at Tai Po Kau in SDM2022

Return Period (Yr)	Design Sea Levels (mPD)
2	2.82
5	3.03
10	3.20
20	3.38
50	3.66
100	3.91
200	4.19

2.4.5 *Climate Change Scenario*

2.4.5.1 The potential rise in mean sea level and increase in rainfall and storm surge due to the effect of climate change have been considered in this Project. The projection of rainfall increase and sea level rise, storm surge increase and design allowance up to end of 21st century are presented in **Table 2.9**, **Table 2.10** and **Table 2.11** respectively. The projection based on will be added to the design rainfall and sea levels respectively. The projected rainfall and sea levels will be used to assess the hydraulic performance of the proposed drainage improvement works.

Table 2.9 Rainfall Increase and Sea Level Rise due to Climate Change Scenario (SDM2022)

Climate Change Scenario	Rainfall Increase	Sea Level Rise (m)
Mid 21st Century (2041-2060)	11.1%	0.20
End of 21st Century (2081-2100)	16.0%	0.47

Table 2.10 Storm Surge Increase due to Climate Change Scenario in Mid-21st Century (SDM2022)

Return Period (Yr)	Storm Surge Increase at Tai Po Kau (m)
2	0.05
5	0.07
10	0.08
20	0.10
50	0.13
100	0.15
200	0.17

Table 2.11 Design Allowance in Mid-21st Century (SDM2022)

Return Period (Yr)	Rainfall Increase	Extreme Sea Level Rise at Tai Po Kau (m)
2	0%	0.05
5		0.06
10		0.07
20		0.07
50		0.08
100		0.09
200		0.10

2.4.6 *Freeboard*

2.4.6.1 A 300mm freeboard was adopted for assessing the total drainage system to account for inaccuracies in flood level computations in this Project.

2.4.7 *Interface with WSD Facilities*

2.4.7.1 The scenario assuming the absence of WSD facilities is the critical scenario and therefore was adopted for the formulation and design of the drainage improvement works in this Project.

3 DRAINAGE IMPACT ASSESSMENT

3.1 Tai Po Town Centre

3.1.1 *Existing Network*

3.1.1.1 Tai Po Old Market, in particular Kau Hui Chik Street and Mei Sun Lane, is a local low-lying area with ground level ranging from 4.0 – 4.5mPD. Surface runoff in Tai Po Old Market is mainly conveyed by the branch pipes that connects to the trunk 2900mm x 2900mm twin-cell box culvert underneath the junction of Tai Po Tai Wo Road and Ting Kok Road.

3.1.1.2 The Tai Po Market drainage basin can be divided into three catchments according to the three main drains, including Nam Wan Road Resting Area box culvert, Po Heung Street box culvert and the existing Tai Po Market Stormwater Pumping Station.

3.1.1.3 For the east side of Tai Po Market, surface runoff at Po Heung Street, Wan Tau Street, Kwong Fuk Road, Heung Sze Wui Street and the surrounding area is conveyed by the branch pipes to the Nam Wan Road Resting Area box culvert and Po Heung Street box culverts and then towards the Lower Lam Tsuen River.

3.1.2 *Hydraulic Performance of the Existing Network*

3.1.2.1 Tai Po Market near Mei Sun Lane is a problematic flood prone area identified in the DMP Review Study. Flooding at Mei Sun Lane and Kau Hui Chu Street reported on 22 July 2010 and the primary causes of flooding were reported to be low-lying topography and high water level of Lower Lam Tsuen river (exceed 3.8mPD).

3.1.2.2 The hydraulic performance of the concerned drainage system was assessed with the latest design parameters as discussed in **Section 2.4**.

3.1.2.3 According to the hydraulic model results, significant flooding was observed at Ting Kok Road, Po Nga Road and the connecting branch streets. The major causes of flooding include high water level at Lower Lam Tsuen River obstructing discharge from upstream branch pipes, the relatively low ground level of the topography and insufficient capacity of existing drainage system.

3.1.2.4 Similar situation applies for the east side of Tai Po Market. Significant flooding was observed at Kwong Fuk Road, Wan Tau Road and the connecting branch streets. The major causes of flooding include high water level at Lower Lam Tsuen River obstructing discharge from upstream branch pipes and the relatively low ground level of the topography.

3.1.3 *Proposed Drainage Improvement Works*

3.1.3.1 The proposed drainage improvement work for Tai Po Old Market is the Tai Po Old Market Stormwater Pumping Scheme, which includes a new stormwater pumping station at Tai Po Old Market Playground, as well as the drainage upgrading works around Tai Po Tai Wo Road, Ting Kok Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Mei Sun Lane and Kau Hui Chik Street.

3.1.3.2 The following enhancement works are proposed to the existing storm drains:

- Existing 300mm – 1050mm dia. pipes on Kau Hui Chik Street and Mei Sun Lane to be upgraded to 600mm – 1800mm dia.
- Existing 450mm – 675mm dia. pipe on Chui Wo Lane and Chui Lok Street to be upgraded to 900mm – 1350mm dia. and be diverted to the drainage system at Ting Kok Road
- Existing 1050mm – 1200mm dia. pipe at Ting Kok Road near Tai Po Old Market Playground to be upgraded to 1800mm dia.

3.1.3.3 New 1050mm to 1950mm pipes are proposed at Po Nga Road and junction of Tai Po Tai Wo Road and Ting Kok Road to intercept the flow from branch pipes at Ting Kok Road and Po Nga Road for diversion to the new Tai Po Old Market Playground Stormwater Pumping Station (TPOMPSPS).

3.1.3.4 A 1950mm deep drain is proposed to intercept the flow through an overflow weir from Nam Wan Road Sitting-out Area box culvert, and divert it across Lower Lam Tsuen River and along Tai Po Tai Wo Road towards the TPOMPSPS.

3.1.3.5 The TPOMPSPS would have a pumping capacity of 16m^3/s and wet volume of 25,000m^3. The runoff would be discharged via rising mains across the Tai Po Tai Wo Road towards a discharge chamber at the Park and then towards the Lower Lam Tsuen River. The excessive water would be stored in the underground tank.

3.1.3.6 The details of the recommended drainage improvement works are shown in **Drawing Nos. 60700410/R13/401** to **6070410/R13/404**.

3.1.4 *Hydraulic Performance of the Proposed Network*

3.1.4.1 After implementing the proposed drainage improvement works, the hydraulic performance of the drainage network would be significantly enhanced. Local transient flooding would still exist in several locations including Chui Lok Street, Chui Wo Lane and Wan Tau Street.

4 CONCLUSION

4.1.1.1 An integrated hydrological and 1D/2D hydraulic model was developed in InfoWorks ICM to conduct the drainage impact assessment for Tai Po.

4.1.1.2 Flood risks assessment for the Study Area was carried out by adopting the new design criteria and parameters provided in SDM(2022), including the mid-century rainfall increase, sea level rise, storm surge increase and design allowance due to climate change.

4.1.1.3 Drainage improvement works in the proposed schemes were reviewed using the hydraulic model. Modelling results illustrated that with the provision of the drainage improvement works, the flood risks in all the concerned areas can be significantly reduced.

4.1.1.4 It is concluded that there is no adverse drainage impact due to the proposed drainage improvement works.

Drawings

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

NOTE:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60700410/R13/401 TO 404.

LEGEND:

- PROPOSED SITE BOUNDARY
- 600Ø (750Ø) PROPOSED STORMWATER DRAIN
- PROPOSED DRAIN TO BE CONSTRUCTED BY PIPE JACKING
- RM PROPOSED RISING MAINS TO BE CONSTRUCTED BY PIPE JACKING
- EXISTING STORMWATER DRAIN
- EXISTING PIPE AND MANHOLE TO BE ABANDONED
- 2900x2900 B.C. EXISTING STORMWATER DRAIN
- EXISTING STORMWATER MANHOLE
- PROPOSED OUTLET STRUCTURE
- PROPOSED STORMWATER MANHOLE
- R EXISTING STORMWATER MANHOLE TO BE RECONSTRUCTED

834300 E

835000 E

835100 E

835000 N

834900 N

TING TAI ROAD

TING KOK ROAD

CHUI LOK STREET

PING ON LANE

TAI PO KAU HUI

600Ø (750Ø)

450Ø (600Ø)

300Ø (600Ø)

375Ø (600Ø)

225Ø (750Ø)

750Ø (900Ø)

825Ø (900Ø)

900Ø (1500Ø)

1050Ø (1650Ø)

1050Ø (1800Ø)

1500 (1350Ø)

CUT LINE A-A

SEE DRAWING NO. 60700410/R13/402

Plot File by: LIO
2023/11/28
PATH: P:\PROJECTS\60700410\DRAWING\REPORT\R13\R13_401.dgn

AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT 業主

渠務署 Drainage Services Department

CONSULTANT 工程顧問公司

AECOM Asia Company Ltd.
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SUB-CONSULTANTS 分判工程顧問公司

ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS 階段

SCALE 比例
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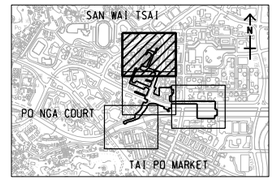
DIMENSION UNIT 尺寸單位
METRES

KEY PLAN A1 1 : 20000 索引圖



PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE 圖紙名稱
PROPOSED DRAINAGE IMPROVEMENT WORKS IN TAI PO OLD MARKET (TP1)

SHEET 1 OF 4

SHEET NUMBER 圖紙編號
60700410/R13/401

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

834000 E

835000 E

835100 E

CUT LINE A-A
SEE DRAWING NO. 60700410/R13/401

834800 N

834700 N

834600 N

CUT LINE B-B
SEE DRAWING NO. 60700410/R13/403

CUT LINE C-C
SEE DRAWING NO. 60700410/R13/404

NOTES:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60700410/R13/401.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60700410/R13/401 TO 404.

15000m³ UNDERGROUND STORAGE TANK WITH PS (FLOW RATE 10m³/s)

STORMWATER MANHOLE WITH FLAP VALVE AT D1950 OUTGOING PIPE TO EXISTING BOX CULVERT AND WITH OVERFLOW WEIR AT D1950 OUTGOING PIPE TO PROPOSED STORAGE TANK

CONNECT TO EXISITNG 2 CELLS 2900(W) x 2900(H) BOX CULVERT

STORMWATER MANHOLE WITH FLAP VALVE AT D1350 OUTGOING PIPE TO EXISTING BOX CULVERT AND WITH OVERFLOW WEIR AT D1350 OUTGOING PIPE TO PROPOSED OUTGOING PIPE

TAI PO OLD MARKET PLAYGROUND

SCREEN ROOM

TRANSFORMER ROOM 2

TRANSFORMER ROOM 1

LV SWITCHROOM

PUMP HOUSE

BASKETBALL COURT

DISCHARGE CHAMBER

TAI PO TAI WO ROAD

TING KOK ROAD

ON CHEE ROAD

PO NGA COURT

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PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT 業主

渠務署 Drainage Services Department

CONSULTANT 工程顧問公司

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STATUS 階段

SCALE 比例 A1 1 : 500

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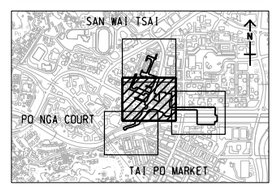
KEY PLAN 索引圖 A1 1 : 20000



PROJECT NO. 項目編號 60700410

CONTRACT NO. 合約編號 CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

PROPOSED DRAINAGE IMPROVEMENT WORKS IN TAI PO OLD MARKET (TP1)

SHEET 2 OF 4

SHEET NUMBER 圖紙編號

60700410/R13/402

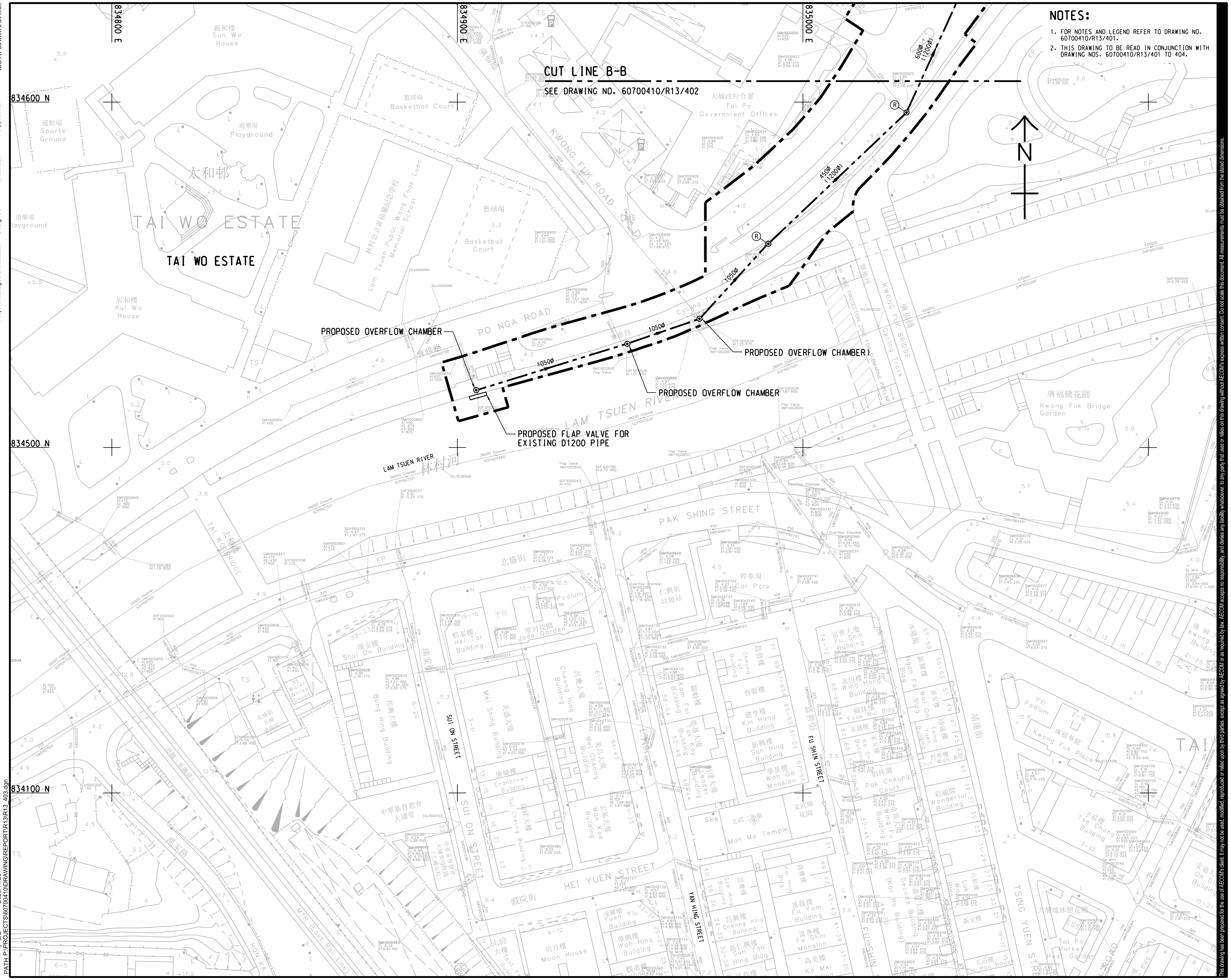
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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Drainage Services Department

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A1 1 : 500 | METRES

KEY PLAN 索引圖 A1 1 : 20000

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60700410 | CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

PROPOSED DRAINAGE IMPROVEMENT WORKS IN TAI PO OLD MARKET (TP1)

SHEET 3 OF 4

SHEET NUMBER 圖紙編號

60700410/R13/403

ISO A1 594mm x 841mm

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Designer:

Project Management Initials:

NOTES:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60700410/R13/401.
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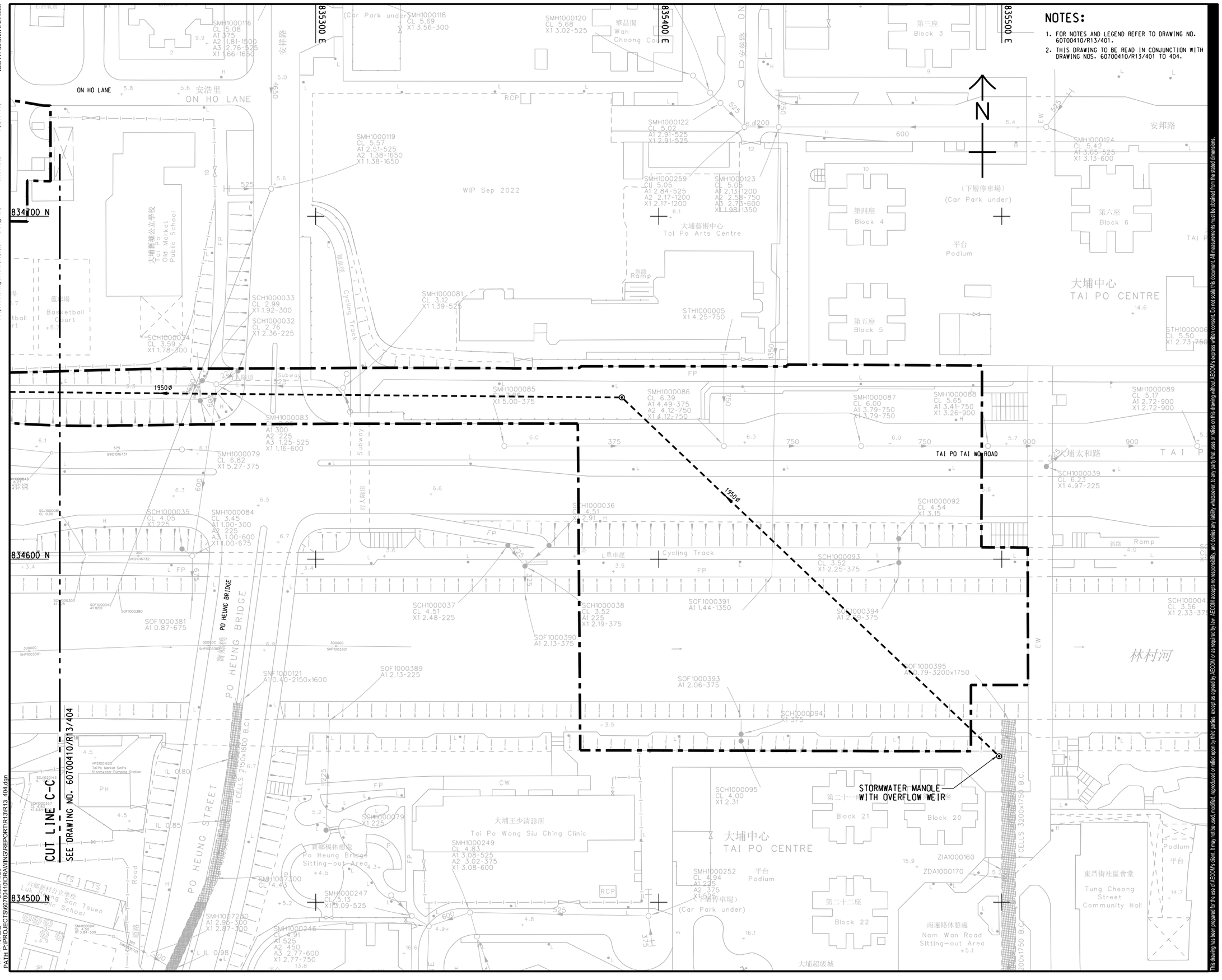

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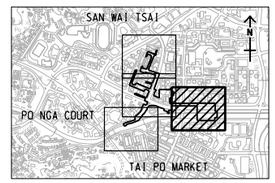

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CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

PROPOSED DRAINAGE IMPROVEMENT WORKS IN TAI PO OLD MARKET (TP1)

SHEET 4 OF 4

SHEET NUMBER 圖紙編號

60700410/R13/404

Appendix G – Traffic Impact Assessment Report

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APPENDICES

TABLES

DRAWINGS

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1 Introduction

1.1 Background

1.1.1 The Review of Drainage Master Plan in Tai Po - Feasibility Study and the Review of Drainage Master Plan in Sha Tin and Sai Kung - Feasibility Study identified that some areas in Tai Po, Lam Tsuen, Ting Kok and Ma On Shan would be subject to high flood risks. To relieve the flood risk, the studies proposed various drainage improvement measures in the areas. The flooding incidents reported in the areas of Tai Po Old Market and Tai Po Market on 22 July 2010, Lam Tsuen Valley on 19 October 2016, and Ting Kok and Sai Sha Road on 18 July 2017 are some examples to substantiate the above findings. Flooding impacts on traffic, residential and business activities in the flood prone areas will

1.1.2 To relieve the flood risks in the above areas, the studies have proposed by adopting pragmatic approach taking into account the cost effectiveness and limited land availability, drainage improvement measures in a combination of stormwater pumping scheme and associated drainage upgrading and river training works. Upon completion of the project, the flood risks in the areas can be significantly reduced.

1.1.3 In May 2018, Development Bureau (DEVB) signed out a Project Definition Statement (PDS) to justify and define the scope of the “Drainage Improvement Works in Tai Po”. The Drainage Services Department (DSD) then completed a Technical Feasibility Statement (TFS) confirming its technical feasibility. The TFS was subsequently approved by DEVB in August 2018. The project was included into Cat B under PWP Item No. 4183CD in September 2018.

1.1.4 In January 2020, the DSD commissioned Agreement No. CE 11/2019(DS) “Drainage Improvement Works in Tai Po - Investigation” (referred to hereinafter as the “Investigation Study”) to carry out various reviews, surveys, investigation, impact assessments and preliminary design for the Project.

1.1.5 AECOM Asia Company Limited was appointed by DSD on 13 January 2023 to undertake Agreement No. CE 57/2022 (DS) “Drainage Improvement Works in Tai Po – Design and Construction” (referred to hereinafter as “the Project”, of which the starting date of the Project is 26 January 2023. The Project comprises the drainage improvement works as briefly described in the following:

(a) Stormwater pumping scheme in Tai Po Old Market, including an underground storage tank, a pump house and the associated pipeworks and E&M works in Tai Po Old Market Playground, as well as the drainage upgrading works in Tai Po Tai Wo Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Ting Kok Road, Mei Sun Lane and Kau Hui Chik Street, floodwall modification and new floodwall along Lam Tsuen River and ancillary works including temporary relocation and reinstatement of playgrounds and associated facilities;

(b) Expansion of existing Tai Po Market Floodwater Pumping Station, including upgrading of existing pump house and the associated pipeworks and E&M works, as well as the drainage upgrading works in Tsing Yuen Street, Wai Yan Street, Pak Shing Street, Fu Shin Street, Yan Hing Street, Kwong Fuk Bridge Garden, Plover Cove Road, Tung Cheong Street, cycle track and footpath along southside of Lower Lam Tsuen River (between existing pumping station and elevated walkway at Tai Po Centre (structure no. NF97);

(c) Drainage upgrading works at Tai Mei Tuk, Ng Uk Tsuen, Ting Kok Shan Liu, Po Sam Pai, Ma Po Mei, San Uk Pai, Ping Long, Che Ha, Nam Hang and Tsung Tsai Yuen and Sai Sha Road (sections near Sai O, Kwun Hang, Tai Tung and Sai Keng); and

(d) River training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Sha Pa and She Shan River.

1.2 Description of the Assignment

1.2.1 This Report comprises Preliminary Traffic Impact Assessment for the stormwater pumping station at Tai Po Old Market Playground**.**

2 Existing Traffic condition

2.1 Existing Road Network

2.1.1 The stormwater pumping scheme at Tai Po Old Market Playground is bounded by Tai Po Tai Wo Road and On Ho Lane.

2.1.2 Tai Po Tai Wo Road is a 3-lane dual carriageway. It is an East-West corridor running along the Lam Tsuen River, providing connections to the key north-south distributors such as Yuen Shin Road, Nam Wan Road and Po Heung Street. It is also a key routing to the Tai Po New Market Area from Tolo Highway and also links with slip roads onto expressways at Tai Wo.

2.1.3 On Ho lane is a single 2-lane carriageway providing accesses to Eightland Gardens and adjacent community facilities including Tai Po Old Market Public School and Tai Po Old Market Playground.

2.2 Traffic Surveys

2.2.1 The key junctions and road links to be reviewed in this TIA are illustrated in **Figure 2.1**.

2.2.2 In order to assess the traffic impact induced by the stormwater pumping station to the existing road network, traffic surveys were conducted on 15 June 2023 (Thursday), 24 June 2023 (Saturday), 10 January 2024 (Wednesday) and 13 January 2024 (Saturday) with clear weather and no special event. With reference to the latest ATC and in-house survey databank, survey periods were identified. **Table 2-1** summarises the survey locations and the associated survey periods.

Table 2-1 Summary of Traffic Surveys

Survey Location	Survey Period		
	Weekday AM Peak	Weekday PM Peak	Weekend Peak
Tai Po	07:30 – 09:30	17:00 – 19:00	07:00 – 19:00

2.2.3 The assessment peak hours were derived based on the traffic survey results. The observed peak hours at different locations are summarised in **Table 2-2** and the observed traffic flows during peak hours are presented in **Figure 2.2**.

Table 2-2 Observed Peak Hour

Survey Location	Observed Peak Hour		
	Weekday AM Peak	Weekday PM Peak	Weekend Peak
Tai Po	07:45 – 08:45	17:15 – 18:15	12:15 – 13:15

3 The Works

3.1 Stormwater Pumping Scheme at Tai Po Old Market Playground

3.1.1 Stormwater pumping scheme in Tai Po Old Market consists of an underground storage tank, a pump house and the associated pipeworks and E&M works in Tai Po Old Market Playground, as well as the drainage upgrading works, floodwall modification and new floodwall and ancillary works.

3.1.2 The works will also include temporary relocation and reinstatement of playgrounds and associated facilities.

3.2 Construction Programme

3.2.1 According to the latest tentative construction programme, the construction for stormwater pumping scheme in Tai Po Old Market Playground is tentatively scheduled to commence in 2024.

4 Construction Stage Traffic Impact Assessment

4.1 Works on Public Road

4.1.1 To minimize traffic impact, trenchless method will be adopted for most of the road works, except for conducting essential trench excavation, e.g. existing pipes replacement and connection, manholes modification etc.

4.1.2 Temporary traffic management schemes (TTMS) for the works, construction traffic volume and construction traffic routing will be planned carefully with Transport Department and Hong Kong Police Force, to minimise construction stage traffic impact on the surrounding road network.

4.1.3 The construction traffic routing will be planned carefully to avoid passing through Tai Po town centre so as to minimise traffic impact on the road network.

4.2 Stormwater Pumping Station at Tai Po Old Market Playground

4.2.1 A new stormwater pumping station will be constructed at Tai Po Old Market Playground. Construction site vehicular accesses will be provided accordingly during construction stage.

4.2.2 On Ho Lane is considered the most suitable location for the construction site vehicular access, taking account of the lower traffic volume and road hierarchy of On Ho Lane as compared with Tai Po Tai Wo Road.

4.3 Discharge Chamber at Feature No. 7NW-B F/193

4.3.1 A new discharge chamber will be constructed at Feature No. 7NW-B F/193 near Tai Wo Road Rest Garden. No construction vehicular accesses will be required during construction stage.

4.4 Construction Traffic Volume

4.4.1 Construction traffic for the new stormwater pumping station have been estimated with reference to the number of trips from similar projects. The quantification of construction traffic is shown in **Table 4-1**.

Table 4-1 Estimated Construction Traffic Generation and Attraction

Traffic Direction	Number of goods vehicles (vehicles per day)	Maximum number of goods vehicles (vehicles per hour)	pcu factor	Maximum number of goods vehicles (pcu per hour)
Pumping Station				
Generation	15	5	2.5	13
Attraction	15	5	2.5	13
Two-way	**30**	**10**		**26**

4.4.2 Taking account of the scale of works of the discharge chamber, it is anticipated that only minimal construction traffic will be generated during day-time off-peak period and hence the construction traffic volume would be insignificant.

4.5 Construction Traffic Routing

4.5.1 Based on experience from other similar projects, construction materials would be stored at depot locating at rural areas in New Territories. Excavation soils would be delivered to landfill in Tseung Kwan O.

4.5.2 Therefore, the following construction traffic routing assumptions were adopted: -

- Materials Inbound: To / From North District direction;
- Materials Outbound: To / From Tseung Kwan O direction.

4.5.3 The construction traffic for the drainage works involved for pumping station installations would be distributed to the existing road network according to the construction site location and the directions to which the construction vehicles are destined based on the type of materials to be transported.

4.5.4 The proposed construction vehicle routings for the works locations are illustrated in **Figure 4.1**.

4.6 2023 Base Year Traffic Assessment

4.6.1 Based on the observed traffic flows in 2023, road link and junction capacity assessments were carried out to determine the existing traffic conditions in the study area. The junction and link performance results are summarised in **Table 4-2** and **Table 4-3** respectively. The calculations for the 2023 base year traffic assessments are attached in **Appendix II**.

Table 4-2 2023 Base Year Junction Performance

Area	Junction	Location	Junction Type (1)	2023 Base Year		
				RC / DFC		
				Weekday AM Peak	Weekday PM Peak	Weekend Peak
Tai Po	J2	Junction of Mei Sun Lane / Kau Hui Chik Street	P	0.11	0.15	0.19
Tai Po	J3	Junction of Ting Kok Road / Mei Sun Lane / On Chee Road	S	48%	39%	30%
Tai Po	J4	Junction of Chui Lok Street/ Chui Wo Lane	P	0.18	0.13	0.18
Tai Po	J5	Junction of Tai Po Tai Wo Road / Po Nga Road / Tai Po Road - Tai Wo	S	-18%	-9%	4%
Tai Po	J6	Junction of Ting Tai Road / Tai Po Tai Wo Road	S	16%	18%	33%
Tai Po	J7	Junction of Ting Kok Road / Tai Po Tai Wo Road	S	27%	37%	31%
Tai Po	J8	Junction of Tai Po Tai Wo Road / On Cheung Road	S	43%	47%	56%
Tai Po	J9	Junction of Tai Po Tai Wo Road / Nam Wan Road	S	6%	18%	31%
Tai Po	J10	Junction of Tai Po Tai Wo Road / Yuen Shin Road	S	22%	54%	79%
Tai Po	J11	Junction of Ting Kok Road / Kwong Fuk Road / Po Nga Road	S	32%	21%	50%
Tai Po	J12	Junction of Pak Shing Street / Yan Hing Street	P	0.19	0.22	0.21
Tai Po	J13	Junction of Kwong Fuk Road / On Fu Road	S	>100%	>100%	>100%
Tai Po	J14	Junction of Kwong Fuk Road/ Po Heung Street	S	69%	68%	60%
Tai Po	J15	Junction of On Cheung Road/ On Chee Road	S	60%	46%	31%
Tai Po	J16	Junction of On Cheung Road/ On Ho Lane	P	0.23	0.16	0.35

Notes:
(1) S – Signalised Junction, R – Roundabout, P – Priority Junction

4.6.2 Results in **Table 4-2** indicated that all assessed junctions except J5 - Junction of Tai Po Road / Tai Po Tai Wo are operating within their design capacities.

Table 4-3 2023 Base Year Road Link Performance

Area	Link	Road	Direction	Capacity (pcu/hr) (1)	2023 Base Year					
					Weekday AM Peak		Weekday PM Peak		Weekend Peak	
					Flow (pcu/ hr)	V/C	Flow (pcu/ hr)	V/C	Flow (pcu/ hr)	V/C
Tai Po	L2	Tai Po Tai Wo Road (between Ting Kok Road and On Cheung Road)	EB	5,040	1,150	0.23	1,015	0.20	1,075	0.21
			WB	5,040	1,050	0.21	1,110	0.22	995	0.20

Note:
(1) The design capacity is estimated based on TPDM Vol.2 Chapter 2 Table 2.4.1.1 and PCU Factor of 1.2 is adopted based on the results of traffic survey.

4.6.3 Results in **Table 4-3** indicated that all assessed road links are operating within their design capacities.

4.7 Traffic Forecast

4.7.1 Traffic forecast will be developed to assess the construction traffic impact of the proposed drainage improvement works.

4.7.2 Based on tentative works programme, the construction of the stormwater pumping station will be carried out from 2024 to 2030. Therefore, 2030 has been taken as the design years of the construction traffic impact assessment for stormwater pumping station, considering the background traffic would be most critical at the furthest year.

4.7.3 The implementation programme may vary the design year of the construction traffic impact assessment and may be updated subject to further discussion with DSD and would be in line with Report on Implementation Strategy, Form of Procurement and Contract Strategy of this Project.

4.7.4 Historical traffic data from Annual Traffic Census (ATC), and population and employment projection in future years from 2019-based Territorial and Employment Data Matrix (2019-based TPEDM) have been referred for identifying growth factors.

4.7.5 Owing to the social events and Coronavirus outbreak between 2019 and 2022, the historical traffic flows in ATC between 2014 and 2018 are considered more representative for deriving growth factor for traffic forecast. **Table 4-4** shows historical traffic data from ATC in the study area, with annual growth rates that have been identified based on the historical traffic data.

Table 4-4 Historical Traffic Data from Annual Traffic Census (ATC)

Station No.	Road	From	To	AADT				
				2014	2015	2016	2017	2018
5621	Tai Po Tai Wo Rd	Tolo Highway	Ting Tai Rd	29,370	31,010	33,160	32,920	33,970
6064	Tai Po Tai Wo Rd	Ting Kok Rd	Ting Tai Rd	23,430	24,520	25,900	20,100	20,360
5821	Tai Po Tai Wo Rd	Po Heung St	Ting Tai Rd	25,020	26,180	27,720	29,560	30,500
6016	Tai Po Tai Wo Rd	On Cheung Rd	Nam Wan Rd	26,430	27,660	29,220	23,230	23,060
5862	Tai Po Tai Wo Rd	Nam Wan Rd	Yuen Shin Rd	24,320	25,440	27,240	28,340	29,240
5266	Ting Tai Rd	Tai Po Tai Wo Rd	Ting Kok Rd	19,220	19,060	19,850	19,540	21,440
5243	Ting Kok Rd	Nam Wan Rd	Tai Po Tai Wo Rd	16,630	16,490	17,170	16,900	16,450
5869	Ting Kok Rd	Ting Tai Rd	Tai Po Tai Wo Rd	14,950	14,820	16,740	17,830	18,270
6621	Ting Kok Rd	Tai Po Tai Wo Rd	Kwong Fuk Rd	13,440	12,660	15,370	13,910	13,070
6620	On Cheung Rd	Tai Po Tai Wo Rd	On Chee Rd	13,570	12,260	14,780	13,940	13,730
5421	Nam Wan Rd	Tai Po Tai Wo Rd	Ting Kok Rd	23,820	25,540	26,980	26,780	27,640
5216	Nam Wan Rd	Kwong Fuk Rd	Tai Po Tai Wo Rd	21,480	22,470	23,740	23,570	21,850
6057	Yuen Shin Rd	Tolo Highway	Ting Kok Rd	43,300	45,300	47,860	37,750	38,630
6040	Po Heung St	Kwong Fuk Rd	Tai Po Tai Wo Rd	31,830	31,570	32,880	32,850	29,520
5646	Kwong Fuk Rd	Wan Tau St	Po Heung St	15,140	14,830	14,920	14,690	15,050
5009	Kwong Fuk Rd	Nam Wan Rd	Wan Tau St	20,400	20,150	20,570	20,100	20,210
Total				362,350	369,960	394,100	372,010	372,990
Growth Per Annum				0.58%				

4.7.6 The 2019-based Territorial Population and Employment Data Matrix (TPEDM) issued by the Planning Department (PlanD) is also referred as the basis to establish the annual growth rate for traffic forecast for the design years. A summary of the population and employment distribution in Tai Po area are shown in **Table 4-5**.

Table 4-5 2019-based Territorial Population and Employment Data Matrix (TPEDM)

Area	Item	Data			Growth p.a. (%)	
		2019	2026	2031	2019 to 2026	2026 to 2031
Tai Po	**Population**	250,050	285,850	263,800	1.9%	-1.6%
	Employment	86,750	83,700	78,550	-0.5%	-1.3%
	Total	336,800	369,550	342,350	1.3%	-1.5%

4.7.7 Based on the growth rates as shown in **Table 4-4** and **Table 4-5**, the traffic forecast for design years is derived by applying the growth rate per annum of 1.3% from 2023 to 2026 and a growth rate per annum of 1.0% from 2026 to 2030, in a conservative approach, on the observed traffic flows.

4.8 Traffic Assessments

4.8.1 The forecasted traffic flows for the design year of 2030 during Weekday AM, Weekday PM and Weekend Peaks are presented in **Figure 4.2** and **Figure 4.3.**

4.8.2 Based on the proposed construction traffic and routing as described in **Sections 4.4** and **4.5**, the performance for key junctions and road links were assessed. A summary of the assessment results are shown in **Table 4-6 – Table 4-9**, with reference case and design case presenting the scenarios without and with construction traffic respectively. The detailed calculations are provided in **Appendix II**.

Table 4-6 Performance of Key Junctions in 2030 Reference Year

Junction	Location	Junction Type (1)	2030 Reference Year		
			RC / DFC		
			Weekday AM Peak	Weekday PM Peak	Weekend Peak
J2	Junction of Mei Sun Lane / Kau Hui Chik Street	P	0.11	0.16	0.22
J3	Junction of Ting Kok Road / Mei Sun Lane / On Chee Road	S	36%	30%	20%
J4	Junction of Chui Lok Street/ Chui Wo Lane	P	0.19	0.14	0.19
J5	Junction of Tai Po Tai Wo Road / Po Nga Road / Tai Po Road - Tai Wo	S	-25%	-17%	-5%
J6	Junction of Ting Tai Road / Tai Po Tai Wo Road	S	6%	9%	22%
J7	Junction of Ting Kok Road / Tai Po Tai Wo Road	S	17%	27%	21%
J8	Junction of Tai Po Tai Wo Road / On Cheung Road	S	32%	37%	44%
J9	Junction of Tai Po Tai Wo Road / Nam Wan Road	S	-2%	10%	21%
J10	Junction of Tai Po Tai Wo Road / Yuen Shin Road	S	13%	42%	65%
J11	Junction of Ting Kok Road / Kwong Fuk Road / Po Nga Road	S	22%	11%	39%
J12	Junction of Pak Shing Street / Yan Hing Street	P	0.21	0.24	0.22
J13	Junction of Kwong Fuk Road / On Fu Road	S	>100%	>100%	99%
J14	Junction of Kwong Fuk Road/ Po Heung Street	S	56%	56%	47%
J15	Junction of On Cheung Road/ On Chee Road	S	51%	37%	23%
J16	Junction of On Cheung Road/ On Ho Lane	P	0.25	0.17	0.39

Notes:
(1) S – Signalised Junction, R – Roundabout, P – Priority Junction

Table 4-7 Performance of Key Road Links in 2030 Reference Year

Link	Road	Direction	Capacity (pcu/hr) (1)	2030 Reference Year					
				Weekday AM Peak		Weekday PM Peak		Weekend Peak	
				Flow (pcu/ hr)	V/C	Flow (pcu/ hr)	V/C	Flow (pcu/ hr)	V/C
L2	Tai Po Tai Wo Road (between Ting Kok Road and On Cheung Road)	EB	5,040	1245	0.25	1095	0.22	1165	0.23
		WB	5,040	1135	0.23	1205	0.24	1080	0.21

Note:
(1) The design capacity is estimated based on TPDM Vol.2 Chapter 2 Table 2.4.1.1 and PCU Factor of 1.2 is adopted based on the results of traffic survey.

Table 4-8 Performance of Key Junctions in 2030 Design Year

Junction	Location	Junction Type (1)	2030 Design Year		
			RC / DFC		
			AM Peak	PM Peak	Weekend Peak
J2	Junction of Mei Sun Lane / Kau Hui Chik Street	P	0.11	0.16	0.22
J3	Junction of Ting Kok Road / Mei Sun Lane / On Chee Road	S	34%	28%	18%
J4	Junction of Chui Lok Street/ Chui Wo Lane	P	0.19	0.14	0.19
J5	Junction of Tai Po Tai Wo Road / Po Nga Road / Tai Po Road - Tai Wo	S	-26%	-17%	-6%
J6	Junction of Ting Tai Road / Tai Po Tai Wo Road	S	5%	8%	21%
J7	Junction of Ting Kok Road / Tai Po Tai Wo Road	S	17%	26%	20%
J8	Junction of Tai Po Tai Wo Road / On Cheung Road	S	31%	36%	42%
J9	Junction of Tai Po Tai Wo Road / Nam Wan Road	S	-2%	10%	21%
J10	Junction of Tai Po Tai Wo Road / Yuen Shin Road	S	12%	42%	64%
J11	Junction of Ting Kok Road / Kwong Fuk Road / Po Nga Road	S	22%	11%	39%
J12	Junction of Pak Shing Street / Yan Hing Street	P	0.21	0.24	0.22
J13	Junction of Kwong Fuk Road / On Fu Road	S	>100%	>100%	99%
J14	Junction of Kwong Fuk Road/ Po Heung Street	S	56%	56%	47%
J15	Junction of On Cheung Road/ On Chee Road	S	50%	37%	22%
J16	Junction of On Cheung Road/ On Ho Lane	P	0.31	0.23	0.46

Notes:
(1) S – Signalised Junction, R – Roundabout, P – Priority Junction

Table 4-9 Performance of Key Road Links in 2030 Design Year

Link	Road	Direction	Capacity (pcu/hr) (1)	2030 Design Year					
				Weekday AM Peak		Weekday PM Peak		Weekend Peak	
				Flow (pcu/ hr)	V/C	Flow (pcu/ hr)	V/C	Flow (pcu/ hr)	V/C
L2	Tai Po Tai Wo Road (between Ting Kok Road and On Cheung Road)	EB	5,040	1255	0.25	1105	0.22	1175	0.23
		WB	5,040	1135	0.23	1205	0.24	1080	0.21

Note:
(1) The design capacity is estimated based on TPDM Vol.2 Chapter 2 Table 2.4.1.1 and PCU Factor of 1.2 is adopted based on the results of traffic survey.

4.8.3 Results in **Table 4-6** to **Table 4-9** indicated that some of the assessed junctions may operate over their design capacities during the reference and design scenarios. **Table 4-10** summarises the junctions with capacity issues.

Table 4-10 Summary of Junctions with Capacity Issues

Junction ID	Description	Year	Scenario	Peak	RC (%)
J5	Junction of Tai Po Road / Tai Po Tai Wo Road	2030	Reference	Weekday AM	-25%
				Weekday PM	-17%
				Weekend	-5%
			Design	Weekday AM	-26%
				Weekday PM	-17%
				Weekend	-6%
J9	Junction of Tai Po Tai Wo Road / Nam Wan Road	2030	Reference	Weekday AM	-2%
			Design	Weekday AM	-2%

4.8.4 It is identified from the traffic assessment that Junction J5 and J9 would be over their design capacities in the reference scenario in the reference year 2030 even without proposed construction traffic.

4.8.5 Taking into account that the construction traffic volume induced by the proposed drainage improvement works via junctions J5 and J9 would be minimal, the construction traffic impact on the junctions would be insignificant.

4.8.6 To minimize the construction traffic impact and avoid over-congest the traffic condition during weekday AM peak hour, it is proposed to restrict the construction vehicles during the weekday AM peak (07:00-09:00) and PM peak (17:00-19:00) hours from Monday to Friday (except public holidays) and weekend peak (12:00-14:00) hours on Saturday, Sunday and public holidays, subject to further review by the Contractor and discussion with relevant government departments in construction stage.

5 Operation Stage Traffic Impact Assessment

5.1 Tai Po Old Market Playground

5.1.1 Tai Po Old Market Playground consist of barrier free accesses leading to the external public footpaths, which will be maintained after reinstatement.

5.2 Stormwater Pumping Station at Tai Po Old Market Playground

5.2.1 A permanent maintenance access cum emergency vehicle access (EVA) for the new stormwater pumping station at Tai Po Old Market Playground will be located on On Ho Lane.

5.2.2 On Ho Lane is considered the most suitable location for the permanent maintenance access, taking account of the lower traffic volume and road hierarchy of On Ho Lane as compared with Tai Po Tai Wo Road. Swept path analysis was presented in **Appendix III**.

5.2.3 The new stormwater pumping station will not have any public parking facility. Therefore, it will not attract or generate additional road traffic on the surrounding public roads during peak hours.

5.2.4 It is reasonable to anticipate that only minimal maintenance traffic will access the stormwater pumping station during day-time off-peak period occasionally and hence the operation traffic impact would be insignificant.

6 Summary and Conclusion

6.1 Summary

6.1.1 To relieve the flood risks in the areas of Tai Po, Lam Tsuen, Ting Kok and Ma On Shan, drainage improvement measures in a combination of stormwater pumping scheme and associated drainage upgrading and river training works have been proposed. Upon completion of the project, the flood risks in the areas can be significantly reduced.

6.1.2 This report assesses construction stage and operation stage traffic impact for the Stormwater Pumping Scheme at Tai Po Old Market Playground.

6.1.3 To minimize traffic impact, trenchless method will be adopted for most of the works, except for conducting essential trench excavation, e.g. existing pipes replacement and connection.

6.1.4 Temporary traffic management schemes (TTMS) for the works, construction traffic volume and construction traffic routing will be planned carefully with Transport Department and Hong Kong Police Force, to minimise construction stage traffic impact on the surrounding road network.

6.1.5 Construction site vehicular accesses will be provided for site of new stormwater pumping station during construction stage. On Ho Lane is considered the most suitable location for the construction site vehicular access, taking account of the lower traffic volume and road hierarchy of On Ho Lane as compared with Tai Po Tai Wo Road.

6.1.6 Taking into account that the construction traffic volume induced by the proposed drainage improvement works would be minimal, the construction traffic impact on the junctions would be insignificant.

6.1.7 To minimize the construction traffic impact and avoid over-congest the traffic condition during weekday AM peak hour, it is proposed to restrict the construction vehicles during the weekday AM peak (07:00-09:00) and PM peak (17:00-19:00) hours from Monday to Friday (except public holidays) and weekend peak (12:00-14:00) hours on Saturday, Sunday and public holidays, subject to further review by the Contractor and discussion with relevant government departments in construction stage.

6.1.8 Tai Po Old Market Playground consist of barrier free accesses leading to the external public footpaths, which will be maintained after reinstatement.

6.1.9 The new stormwater pumping station will not have any public parking facility. Therefore, it will not attract or generate additional road traffic on the surrounding public roads during peak hours.

6.1.10 It is reasonable to anticipate that only minimal maintenance traffic will access the stormwater pumping station during day-time off-peak period occasionally and hence the operation traffic impact would be insignificant.

6.2 Conclusion

6.2.1 In conclusion, the TIA has demonstrated that the stormwater pumping scheme at Tai Po Old Market Playground at construction stage and operation stage would not adversely affect the surrounding road network and are considered feasible from traffic point of view.

Drawings

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ISO A1 594mm x 841mm

Project Management Initials: Designer: Checked: Approved:

834600 E

835400 E

836200 E

835200 N

834400 N

833600 N

LEGEND:

KEY JUNCTION

KEY ROAD LINK

N

TAI PO TAU

TAI YUEN ESTATE

FU SHIN ESTATE

TAI PO OLD MARKET

TAI PO TAI SHUI WAI

PO NGA COURT

TAI PO CENTRE

TAI PO

KAM SHAN

TAI PO MARKET

KWONG FUK ESTATE

WANG FUK COURT

YUEN SHIN PARK

YUEN CHAU TSAI

元洲仔

J2 J3 J4 J5 J6 J7 J8 J9 J10 J11 J12 J13 J14 J15 J16 L2

TAI PO ROAD — TAI WO

TAI PO TAI WO ROAD

TING TAI ROAD

TING KOK ROAD

ON CHEUNG ROAD

NAM MAN ROAD

ON PONG ROAD

YUEN SHIN ROAD

LAM TSUEN RIVER

PO NGA ROAD

ON FU ROAD

PO HEUNG STREET

KWONG FUK ROAD

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PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT 業主

渠務署 Drainage Services Department

CONSULTANT 工程顧問公司

AECOM Asia Company Ltd.
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STATUS 階段

SCALE 比例 — A3 1 : 8000

DIMENSION UNIT 尺寸單位 — METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號 — 60700410

CONTRACT NO. 合約編號 — CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

LOCATION PLAN FOR KEY ROAD LINKS AND JUNCTIONS IN TAI PO

SHEET NUMBER 圖紙編號

60700410/S16/Figure 2.1

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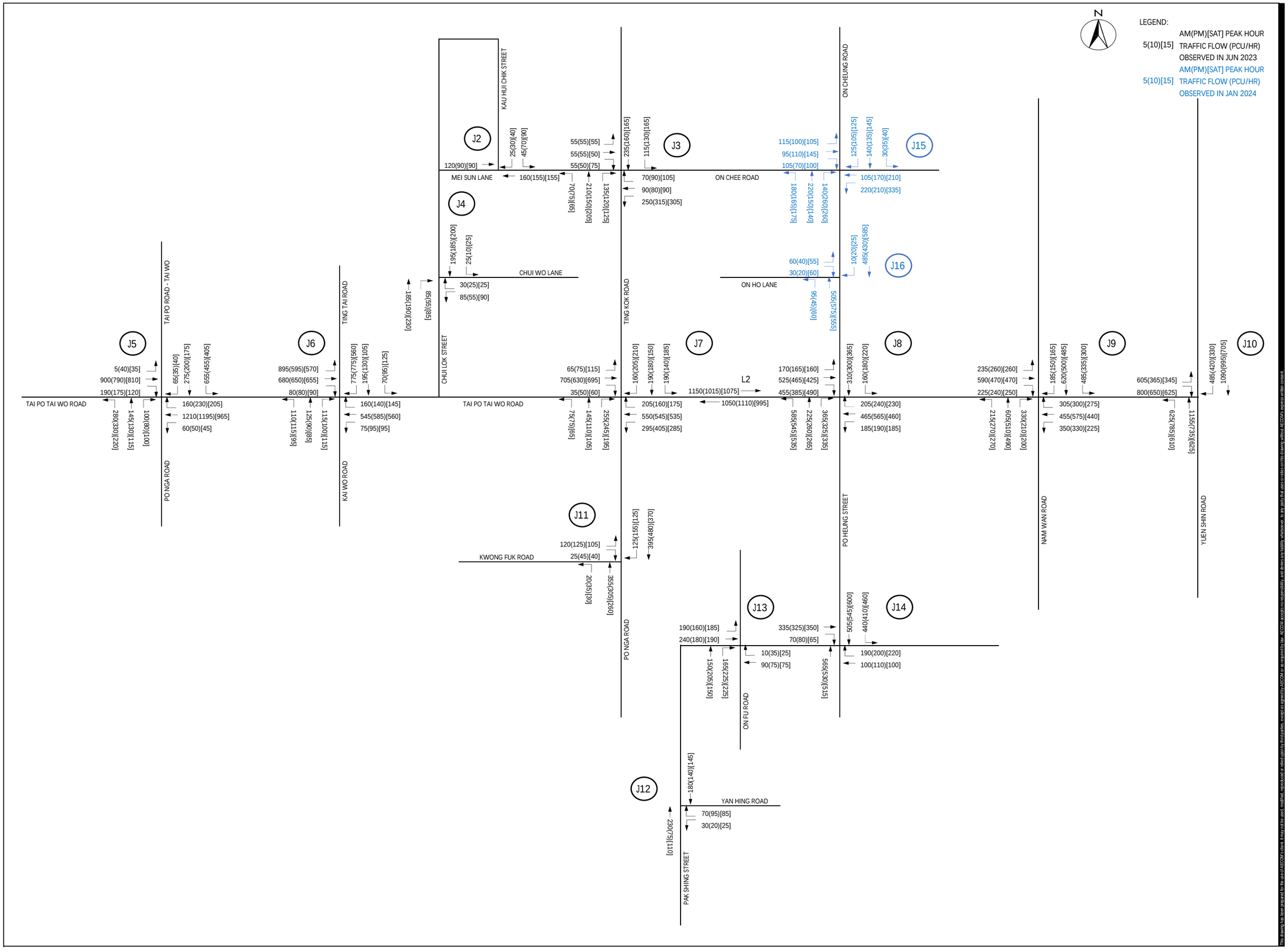

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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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-	NOV 23	FIRST ISSUE	TLW

STATUS

SCALE

NOT TO SCALE

KEY PLAN

PROJECT NO. 60700410

CONTRACT NO. CE 57/2022 (DS)

SHEET TITLE

YEAR 2023 OBSERVED TRAFFIC FLOW

SHEET NUMBER

60700410/S16/FIGURE 2.2

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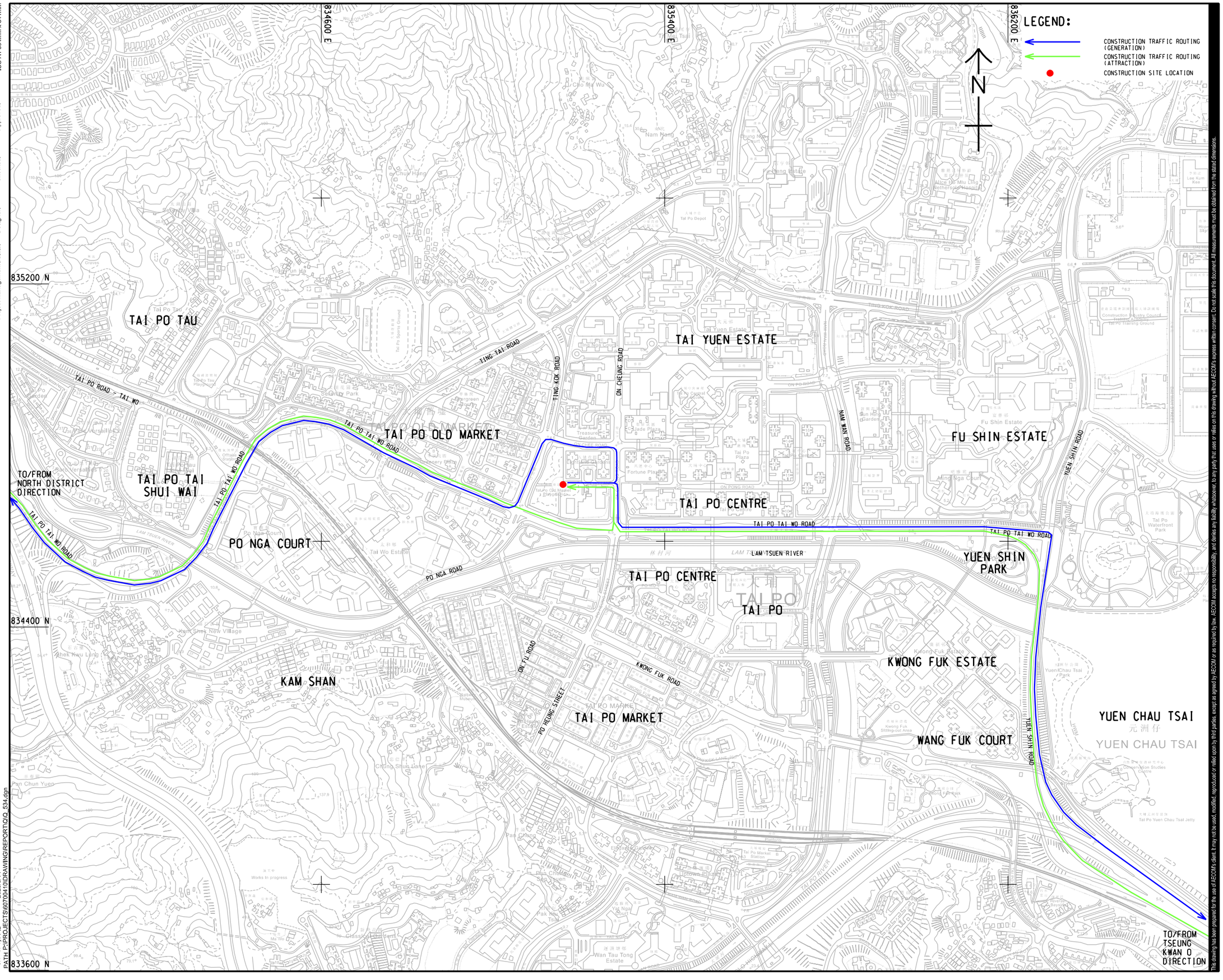
Approved:

Checked:

Designer:

Project Management Initials:



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2023/8/14

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A3 1 : 8000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
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PROJECT NO. 項目編號
60700410

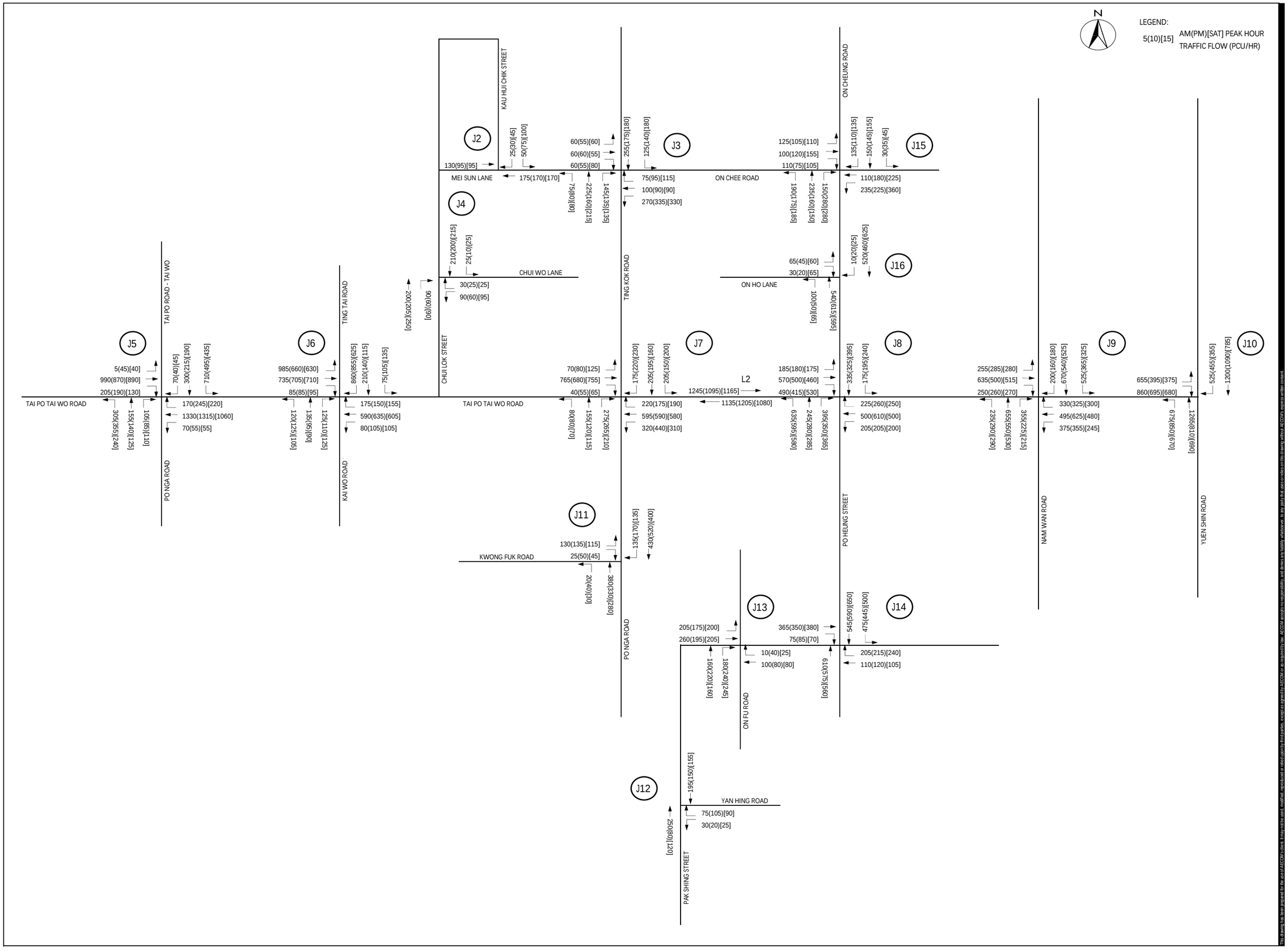
CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

PROPOSED CONSTRUCTION TRAFFIC ROUTING

SHEET NUMBER
圖紙編號

60700410/S16/Figure 4.1



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STATUS

SCALE

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KEY PLAN

PROJECT NO. 60700410

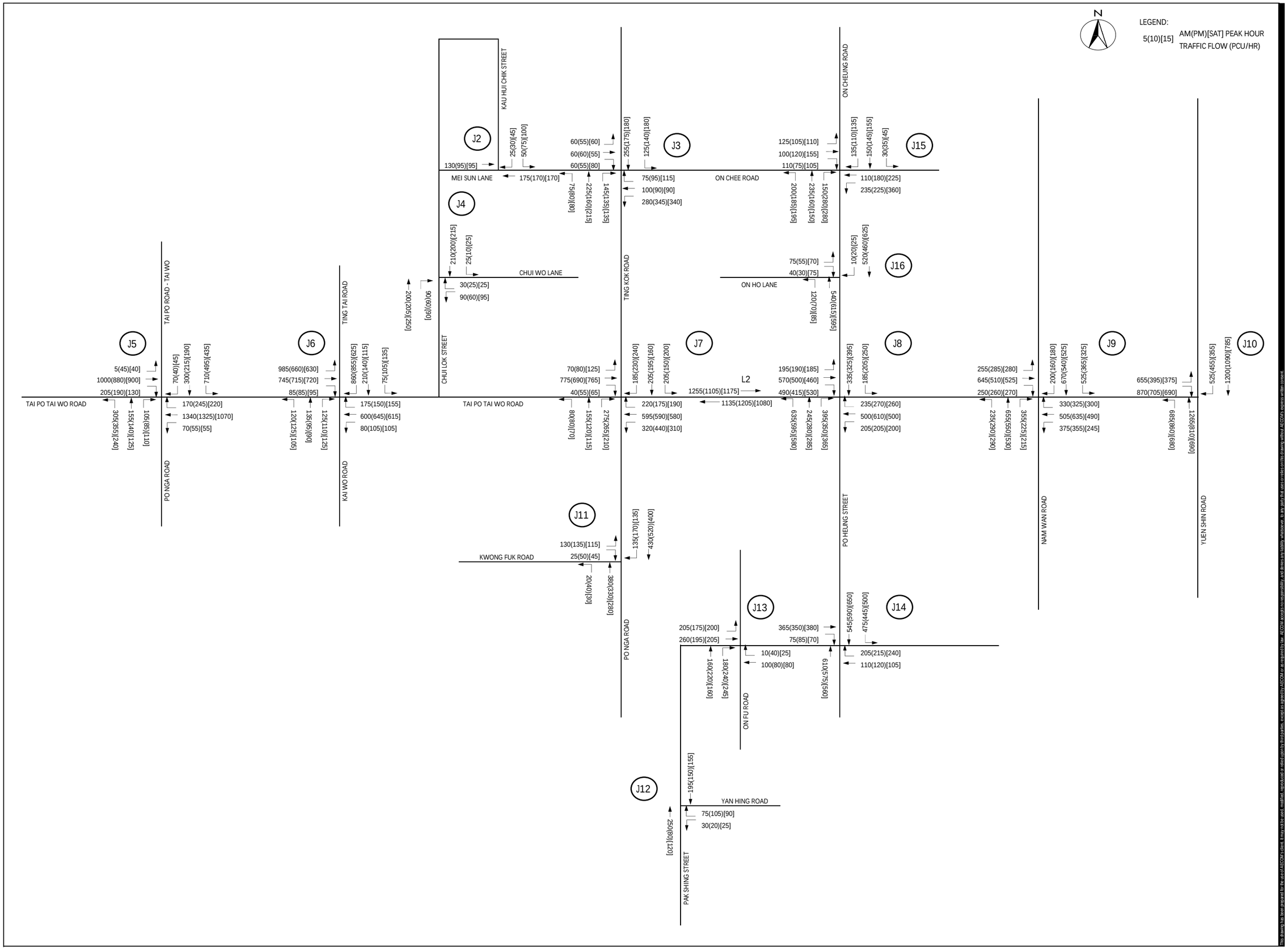
CONTRACT NO. CE 57/2022 (DS)

SHEET TITLE

YEAR 2030 REFERENCE FORECAST TRAFFIC FLOW

SHEET NUMBER

60700410/S16/FIGURE 4.2



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STATUS

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KEY PLAN

PROJECT NO. 60700410

CONTRACT NO. CE 57/2022 (DS)

SHEET TITLE

YEAR 2030 DESIGN FORECAST TRAFFIC FLOW

SHEET NUMBER

60700410/S16/FIGURE 4.3

Appendix I

Layout Plans of Proposed Works

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ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

PROPOSED MAINTENANCE ACCESS

PROPOSED TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION

EXISTING PUBLIC TOILET AND LCSD OFFICE TO BE RETAINED

PROPOSED ABOVEGROUND STRUCTURES

DISCHARGE CHAMBER

LEGEND:

- PROPOSED STORMWATER DRAIN
- PROPOSED DRAIN TO BE CONSTRUCTED BY PIPE JACKING
- PROPOSED RISING MAINS TO BE CONSTRUCTED BY PIPE JACKING
- EXISTING STORMWATER DRAIN
- EXISTING PIPE AND MANHOLE TO BE ABANDONED
- EXISTING STORMWATER DRAIN
- APPLICATION BOUNDARY
- EXISTING STORMWATER MANHOLE
- PROPOSED STORMWATER MANHOLE
- EXISTING STORMWATER MANHOLE TO BE RECONSTRUCTED
- EXISTING REGISTERED FEATURES

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PROJECT
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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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A1 1 : 500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

PROPOSED TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION

SHEET NUMBER
圖紙編號

60700410/R28/402

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Appendix II

Detailed Junction Calculation Sheets

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PRIORITY JUNCTION CAPACITY CALCULATION

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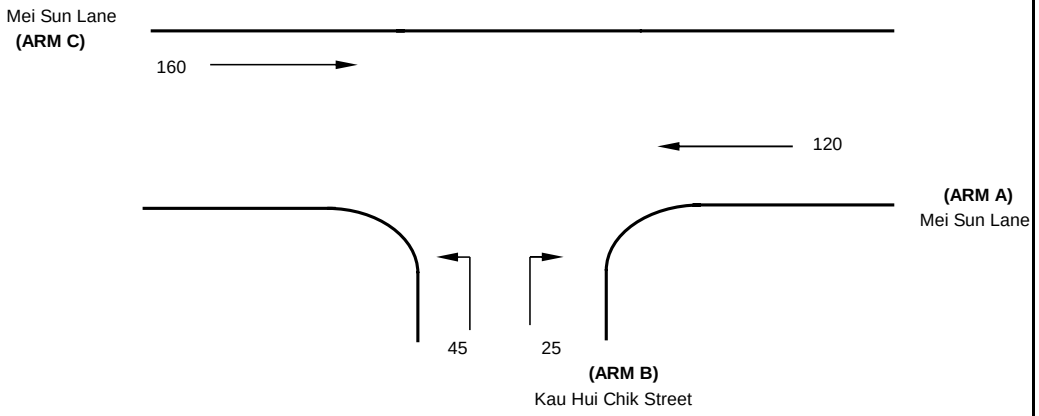
Junction J2 - Mei Sun Lane/ Kau Hui Chik Street	2023 AM Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J2

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	120	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	100	(metres)
q c-a	=	160	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.7	(metres)
W b-c	=	4.7	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	50	(metres)
Vr b-c	=	50	(metres)
q b-a	=	25	(pcu/hr)
q b-c	=	45	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.962771
E	=	1.029482
F	=	0.982000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	546
Q b-c	=	733
Q c-b	=	699
Q b-ac	=	653

CRITICAL DFC = 0.11

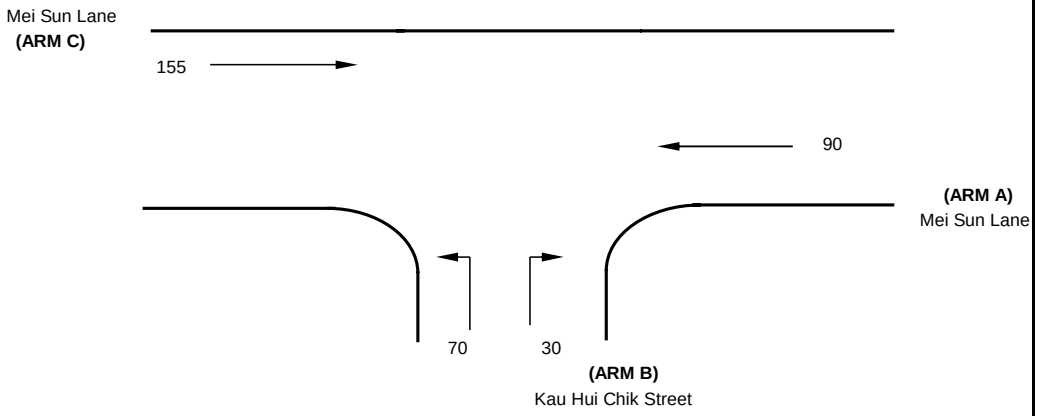
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.06
DFC c-b	=	0.00
DFC b-ac	=	0.11

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J2 - Mei Sun Lane/ Kau Hui Chik Street	2023 PM Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J2

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	90	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	50	(metres)
q c-a	=	155	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.7	(metres)
W b-c	=	4.7	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	50	(metres)
Vr b-c	=	50	(metres)
q b-a	=	30	(pcu/hr)
q b-c	=	70	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.962771
E	=	1.029482
F	=	0.937000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	554
Q b-c	=	742
Q c-b	=	675
Q b-ac	=	674

CRITICAL DFC = 0.15

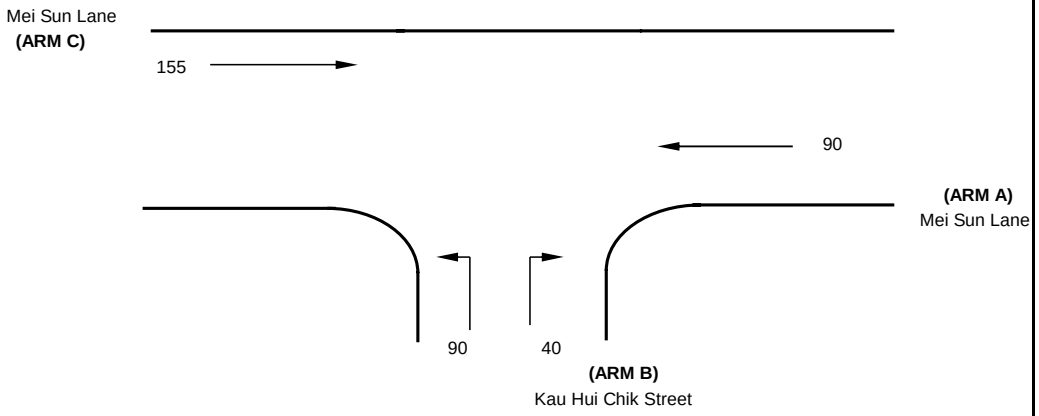
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.09
DFC c-b	=	0.00
DFC b-ac	=	0.15

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J2 - Mei Sun Lane/ Kau Hui Chik Street	2023 Weekend Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J2

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	90	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	50	(metres)
q c-a	=	155	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.7	(metres)
W b-c	=	4.7	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	50	(metres)
Vr b-c	=	50	(metres)
q b-a	=	40	(pcu/hr)
q b-c	=	90	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.962771
E	=	1.029482
F	=	0.937000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	554
Q b-c	=	742
Q c-b	=	675
Q b-ac	=	672

CRITICAL DFC = 0.19

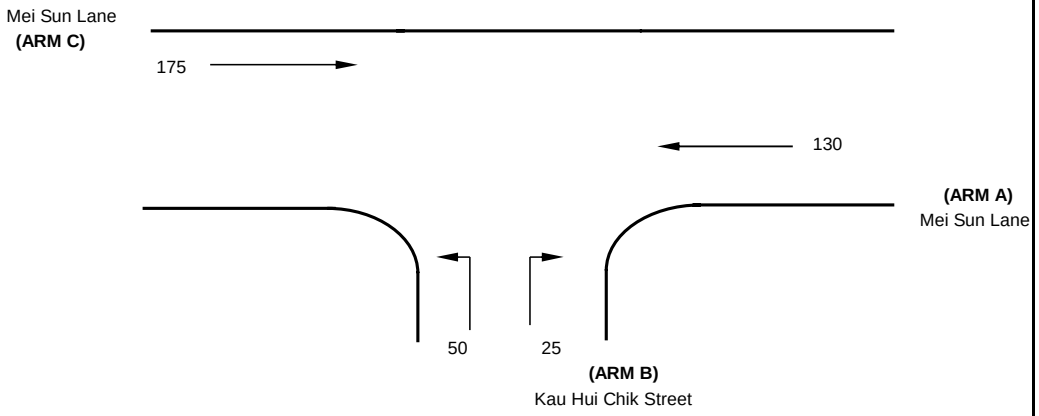
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.07
DFC b-c	=	0.12
DFC c-b	=	0.00
DFC b-ac	=	0.19

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J2 - Mei Sun Lane/ Kau Hui Chik Street	2030 AM Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J2

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	130	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	100	(metres)
q c-a	=	175	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.7	(metres)
W b-c	=	4.7	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	50	(metres)
Vr b-c	=	50	(metres)
q b-a	=	25	(pcu/hr)
q b-c	=	50	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.962771
E	=	1.029482
F	=	0.982000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	541
Q b-c	=	731
Q c-b	=	697
Q b-ac	=	654

CRITICAL DFC = 0.11

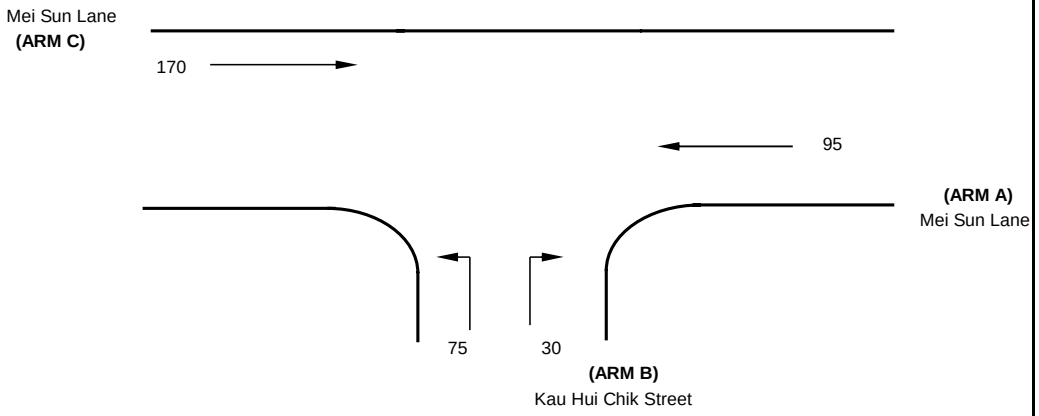
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.07
DFC c-b	=	0.00
DFC b-ac	=	0.11

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J2 - Mei Sun Lane/ Kau Hui Chik Street	2030 PM Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J2

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	95	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	100	(metres)
q c-a	=	170	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.7	(metres)
W b-c	=	4.7	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	50	(metres)
Vr b-c	=	50	(metres)
q b-a	=	30	(pcu/hr)
q b-c	=	75	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.962771
E	=	1.029482
F	=	0.982000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	551
Q b-c	=	740
Q c-b	=	706
Q b-ac	=	674

CRITICAL DFC = 0.16

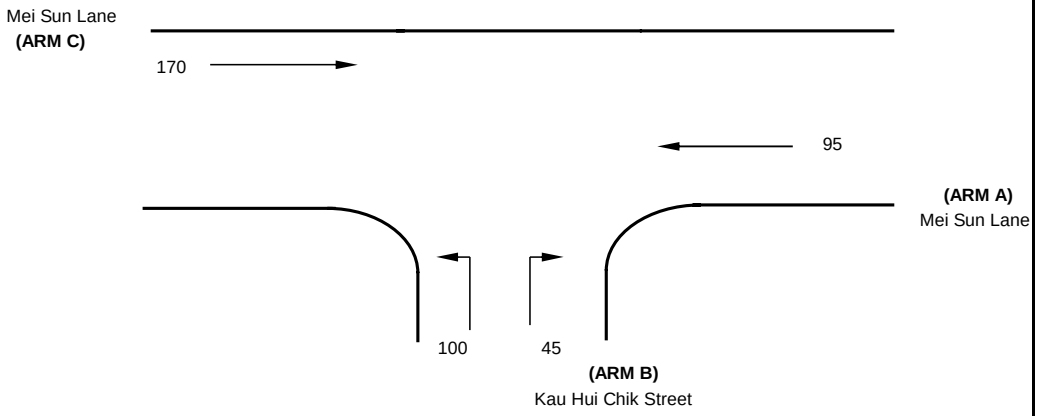
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.10
DFC c-b	=	0.00
DFC b-ac	=	0.16

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J2 - Mei Sun Lane/ Kau Hui Chik Street	2030 Weekend Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J2

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	95	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	100	(metres)
q c-a	=	170	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.7	(metres)
W b-c	=	4.7	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	50	(metres)
Vr b-c	=	50	(metres)
q b-a	=	45	(pcu/hr)
q b-c	=	100	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.962771
E	=	1.029482
F	=	0.982000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	551
Q b-c	=	740
Q c-b	=	706
Q b-ac	=	669

CRITICAL DFC = 0.22

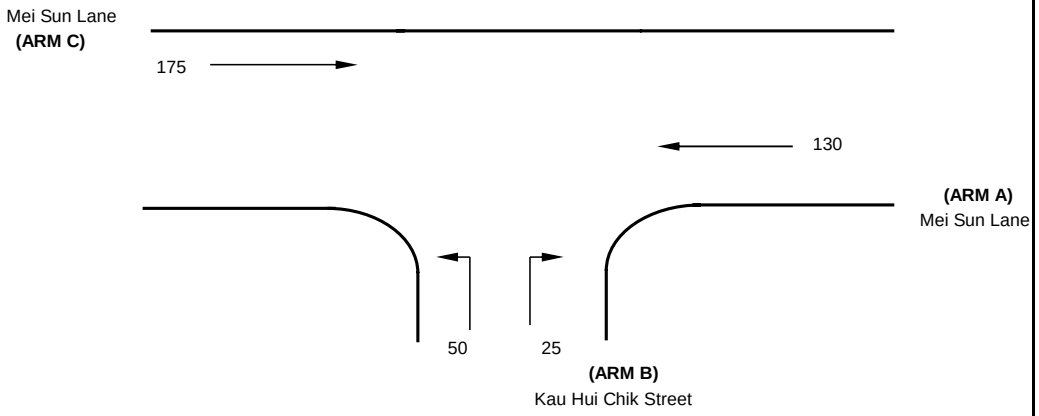
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.08
DFC b-c	=	0.14
DFC c-b	=	0.00
DFC b-ac	=	0.22

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J2 - Mei Sun Lane/ Kau Hui Chik Street	2030 AM Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J2

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	130	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	100	(metres)
q c-a	=	175	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.7	(metres)
W b-c	=	4.7	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	50	(metres)
Vr b-c	=	50	(metres)
q b-a	=	25	(pcu/hr)
q b-c	=	50	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.962771
E	=	1.029482
F	=	0.982000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	541
Q b-c	=	731
Q c-b	=	697
Q b-ac	=	654

CRITICAL DFC = 0.11

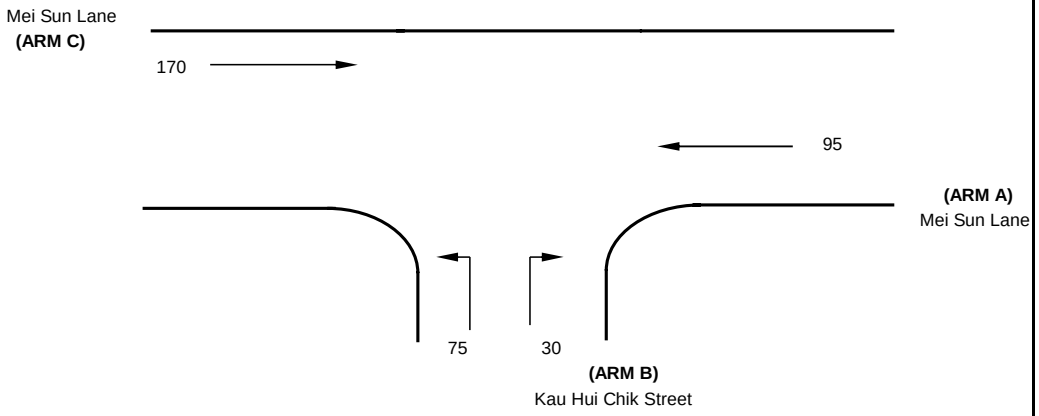
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.07
DFC c-b	=	0.00
DFC b-ac	=	0.11

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J2 - Mei Sun Lane/ Kau Hui Chik Street	2030 PM Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J2

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	95	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	100	(metres)
q c-a	=	170	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.7	(metres)
W b-c	=	4.7	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	50	(metres)
Vr b-c	=	50	(metres)
q b-a	=	30	(pcu/hr)
q b-c	=	75	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.962771
E	=	1.029482
F	=	0.982000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	551
Q b-c	=	740
Q c-b	=	706
Q b-ac	=	674

CRITICAL DFC = 0.16

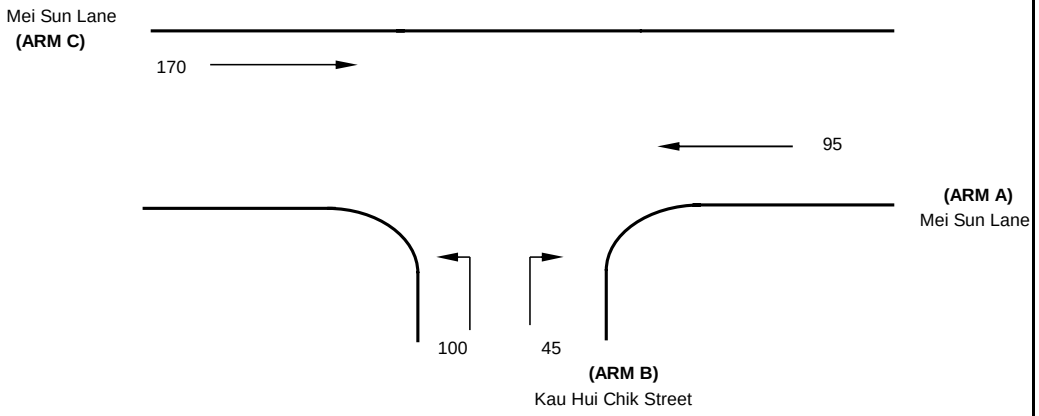
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.10
DFC c-b	=	0.00
DFC b-ac	=	0.16

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J2 - Mei Sun Lane/ Kau Hui Chik Street	2030 Weekend Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J2

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	95	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	100	(metres)
q c-a	=	170	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.7	(metres)
W b-c	=	4.7	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	50	(metres)
Vr b-c	=	50	(metres)
q b-a	=	45	(pcu/hr)
q b-c	=	100	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.962771
E	=	1.029482
F	=	0.982000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	551
Q b-c	=	740
Q c-b	=	706
Q b-ac	=	669

CRITICAL DFC = 0.22

COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.08
DFC b-c	=	0.14
DFC c-b	=	0.00
DFC b-ac	=	0.22

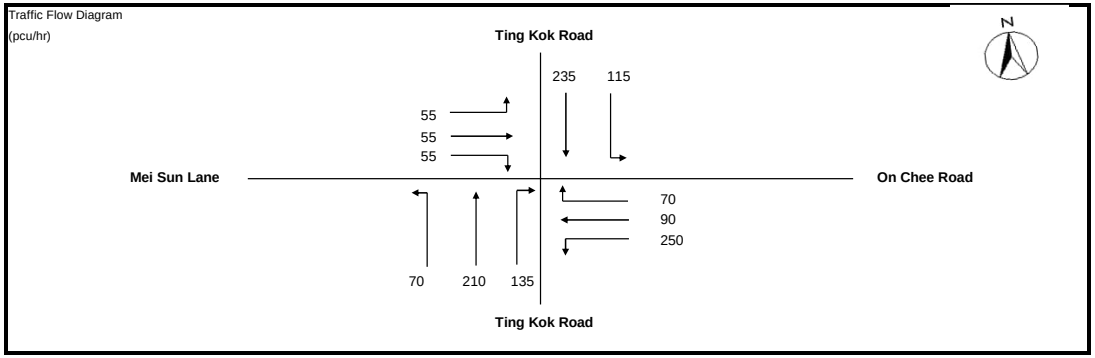
JUNCTION CAPACITY CALCULATION

AECOM

Junction J3 - Ting Kok Road/ On Chee Road/ Mei Sun Lane	2023 AM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J3

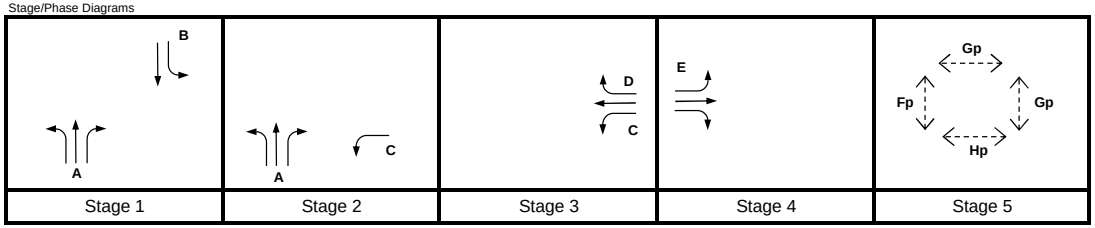
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	90	sec
Sum(y)	Y =	0.311	
Lost time	L =	44	sec
Total Flow	=	1,340	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	103	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	64	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	83.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	67	sec
Y_{max}	$= 1-L/C$	=	0.511	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G =	I/G = 8	I/G = 10	G = 8 I/G = 15

Critical Case : B,C,E,Hp

R.C.(C) $= (0.9 \times Y_{max}-Y)/Y \times 100\%$ = 48%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1,2	3.450	1	15			1		0		1960	70	62		132	53%		1861	0.071	
	A	1,2	3.400	1				0		0		2095		148		148			2095	0.071	
	A	1,2	3.400	1		25	1	0		0		2095			135	135		100%	1759	0.077	
	B	1	3.700	1	15			1		0		1985	115	48		163	71%		1854	0.088	0.088
	B	1	3.750	1				0		0		2130		187		187			2130	0.088	
	D	3	3.500	1		25	0	0		0		2105		90	70	160		44%	2051	0.078	
	C	2,3	3.800	1	15			1		0		1995	250			250	100%		1814	0.138	0.138
	E	4	3.800	1	30	25	0	1		0		1995	55	55	55	165	33%	33%	1924	0.086	0.086
Pedestrian Crossing				GM		FGM															
	Fp	5	min.	7	+	16	=	23	sec												
	Gp	5	min.	11	+	10	=	21	sec												
	Hp	5	min.	8	+	12	=	20	sec												*

JUNCTION CAPACITY CALCULATION

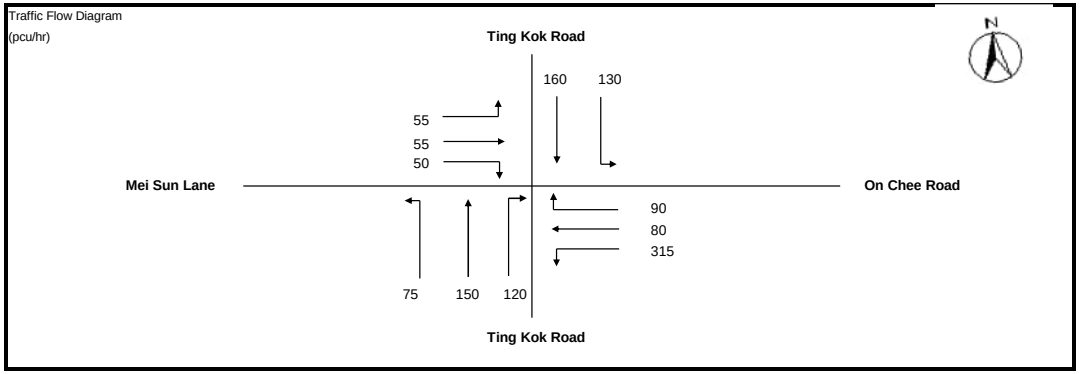
AECOM

Junction J3 - Ting Kok Road/ On Chee Road/ Mei Sun Lane	2023 PM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J3

Traffic Flow Diagram

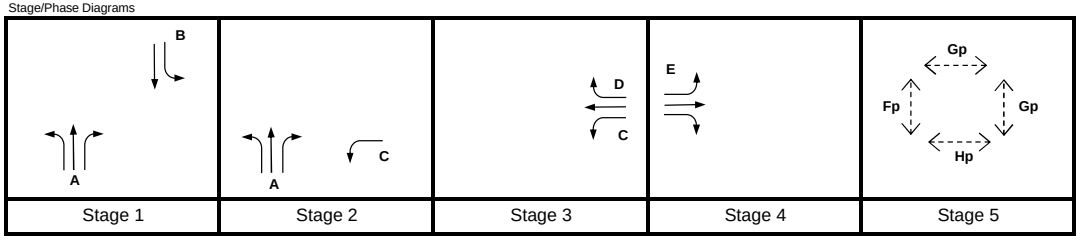
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	90	sec
Sum(y)	Y =	0.330	
Lost time	L =	44	sec
Total Flow	=	1,280	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	106	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	66	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	72.5	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	70	sec
Y_{max}	$= 1-L/C$	=	0.511	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G =	I/G = 8	I/G = 10	G = 8 I/G = 15

Critical Case : B,C,E,Hp

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 39%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1,2	3.450	1	15			1		0		1960	75	30		105	72%		1829	0.057	
	A	1,2	3.400	1				0		0		2095		120		120			2095	0.057	
	A	1,2	3.400	1		25	1	0		0		2095			120	120		100%	1759	0.068	
	B	1	3.700	1	15			1		0		1985	130	3		133	98%		1808	0.074	0.074
	B	1	3.750	1				0		0		2130		157		157			2130	0.074	
	D	3	3.500	1		25	0	0		0		2105		80	90	170		53%	2040	0.083	
	C	2,3	3.800	1	15			1		0		1995	315			315	100%		1814	0.174	0.174
	E	4	3.800	1	30	25	0	1		0		1995	55	55	50	160	34%	31%	1926	0.083	0.083
Pedestrian Crossing				GM		FGM															
	Fp	5	min.	7	+	16	=	23	sec												
	Gp	5	min.	11	+	10	=	21	sec												
	Hp	5	min.	8	+	12	=	20	sec												*

JUNCTION CAPACITY CALCULATION

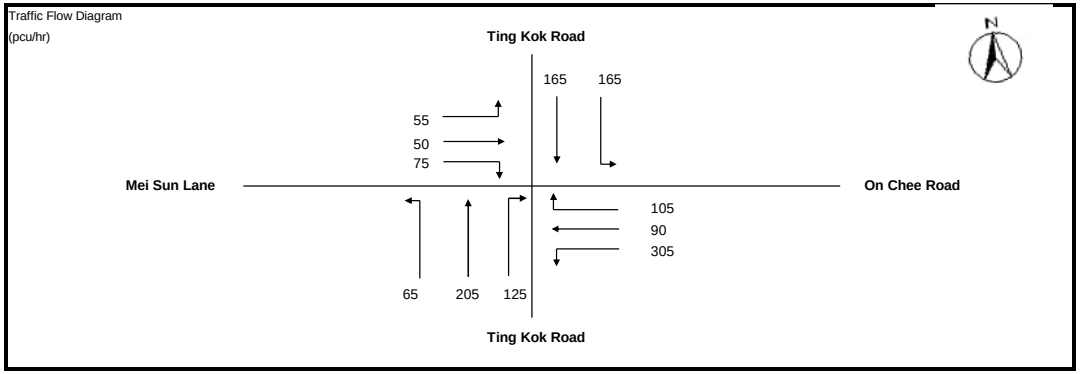
AECOM

Junction J3 - Ting Kok Road/ On Chee Road/ Mei Sun Lane	2023 Weekend Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J3

Traffic Flow Diagram

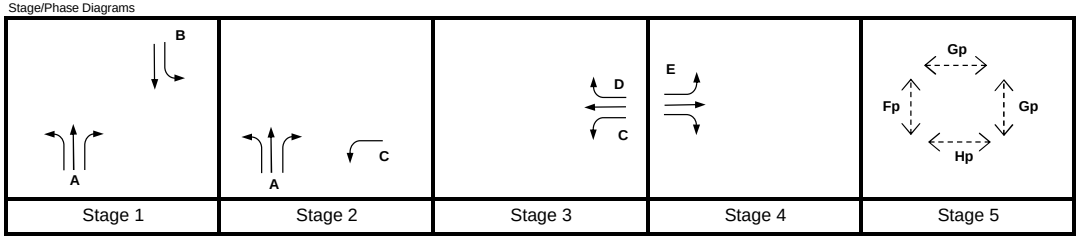
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	90	sec
Sum(y)	Y =	0.353	
Lost time	L =	44	sec
Total Flow	=	1,405	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	110	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	68	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	61.3	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	72	sec
Y_{max}	$= 1-L/C$	=	0.511	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G =	I/G = 8	I/G = 10	G = 8 I/G = 15

Critical Case : B,C,E,Hp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 30%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1,2	3.450	1	15			1		0		1960	65	62		127	51%		1865	0.068	
	A	1,2	3.400	1				0		0		2095		143		143			2095	0.068	
	A	1,2	3.400	1		25	1	0		0		2095			125	125		100%	1759	0.071	
	B	1	3.700	1	15			1		0		1985	165	0		165	100%		1805	0.091	0.091
	B	1	3.750	1				0		0		2130		165		165			2130	0.077	
	D	3	3.500	1		25	0	0		0		2105		90	105	195		54%	2039	0.096	
	C	2,3	3.800	1	15			1		0		1995	305			305	100%		1814	0.168	0.168
	E	4	3.800	1	30	25	0	1		0		1995	55	50	75	180	31%	42%	1918	0.094	0.094
Pedestrian Crossing				GM		FGM															
	Fp	5	min.	7	+	16	=	23	sec												
	Gp	5	min.	11	+	10	=	21	sec												
	Hp	5	min.	8	+	12	=	20	sec												*

JUNCTION CAPACITY CALCULATION

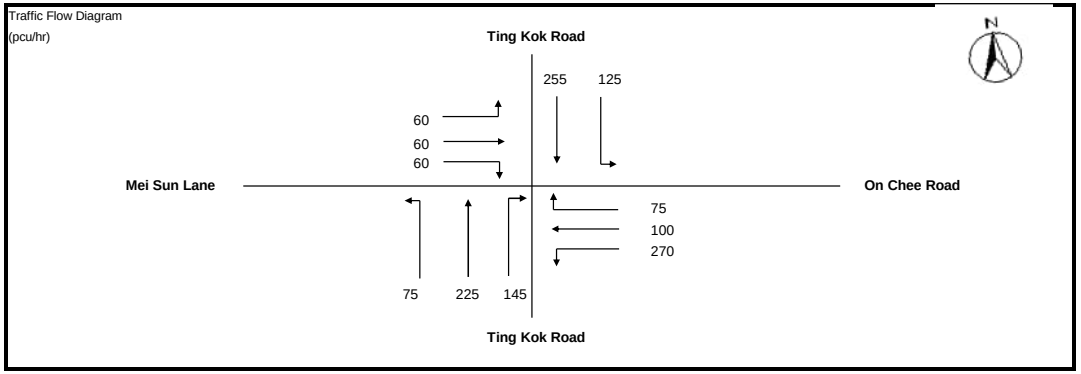
AECOM

Junction J3 - Ting Kok Road/ On Chee Road/ Mei Sun Lane	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J3

Traffic Flow Diagram

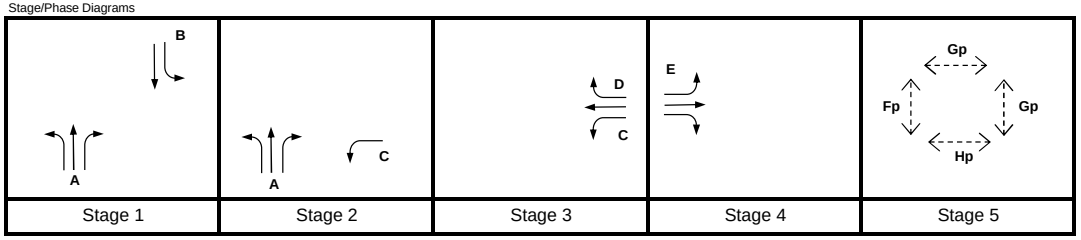
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	90	sec
Sum(y)	Y =	0.338	
Lost time	L =	44	sec
Total Flow	=	1,450	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	107	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	66	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	68.7	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	70	sec
Y_{max}	$= 1-L/C$	=	0.511	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G =	I/G = 8	I/G = 10	G = 8 I/G = 15

Critical Case : B,C,E,Hp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 36%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1,2	3.450	1	15			1		0		1960	75	66		141	53%		1861	0.076	
	A	1,2	3.400	1				0		0		2095		159		159			2095	0.076	
	A	1,2	3.400	1		25	1	0		0		2095			145	145		100%	1759	0.082	
	B	1	3.700	1	15			1		0		1985	125	52		177	71%		1854	0.095	0.095
	B	1	3.750	1				0		0		2130		203		203			2130	0.095	
	D	3	3.500	1		25	0	0		0		2105		100	75	175		43%	2052	0.085	
	C	2,3	3.800	1	15			1		0		1995	270			270	100%		1814	0.149	0.149
	E	4	3.800	1	30	25	0	1		0		1995	60	60	60	180	33%	33%	1924	0.094	0.094
Pedestrian Crossing				GM		FGM															
	Fp	5	min.	7	+	16	=	23	sec												
	Gp	5	min.	11	+	10	=	21	sec												
	Hp	5	min.	8	+	12	=	20	sec												*

JUNCTION CAPACITY CALCULATION

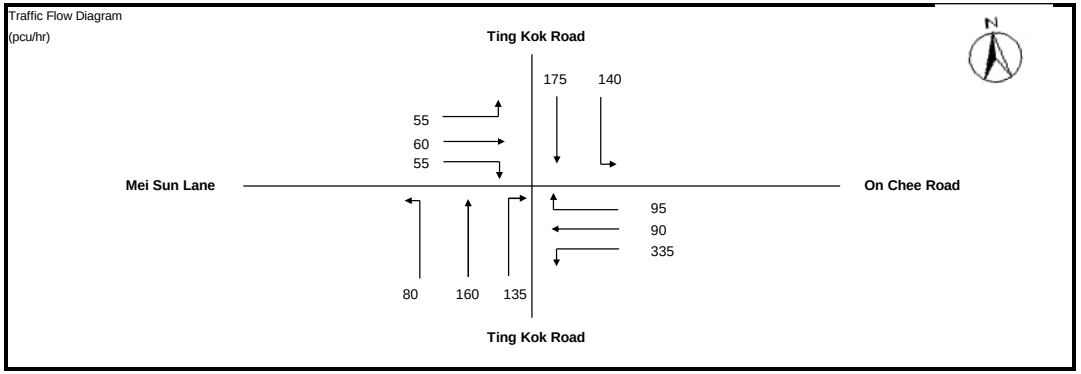
AECOM

Junction J3 - Ting Kok Road/ On Chee Road/ Mei Sun Lane	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J3

Traffic Flow Diagram

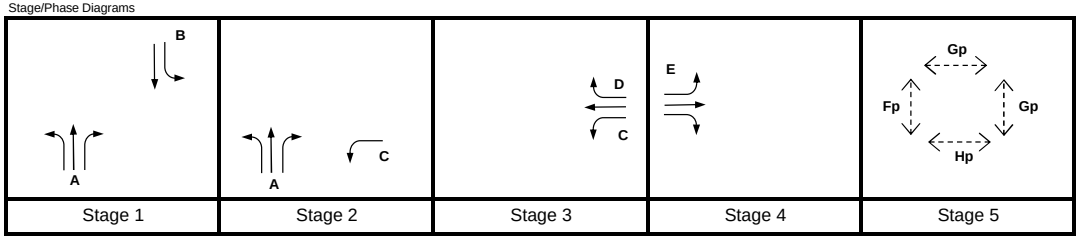
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	90	sec
Sum(y)	Y =	0.353	
Lost time	L =	44	sec
Total Flow	=	1,380	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	110	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	68	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	61.5	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	72	sec
Y_{max}	$= 1-L/C$	=	0.511	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G =	I/G = 8	I/G = 10	G = 8 I/G = 15

Critical Case : B,C,E,Hp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 30%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1,2	3.450	1	15			1		0		1960	80	32		112	72%		1829	0.061	
	A	1,2	3.400	1				0		0		2095		128		128			2095	0.061	
	A	1,2	3.400	1		25	1	0		0		2095			135	135		100%	1759	0.077	
	B	1	3.700	1	15			1		0		1985	140	5		145	97%		1810	0.080	0.080
	B	1	3.750	1				0		0		2130		170		170			2130	0.080	
	D	3	3.500	1		25	0	0		0		2105		90	95	185		51%	2042	0.091	
	C	2,3	3.800	1	15			1		0		1995	335			335	100%		1814	0.185	0.185
	E	4	3.800	1	30	25	0	1		0		1995	55	60	55	170	32%	32%	1926	0.088	0.088
Pedestrian Crossing				GM		FGM															
	Fp	5	min.	7	+	16	=	23	sec												
	Gp	5	min.	11	+	10	=	21	sec												
	Hp	5	min.	8	+	12	=	20	sec												*

JUNCTION CAPACITY CALCULATION

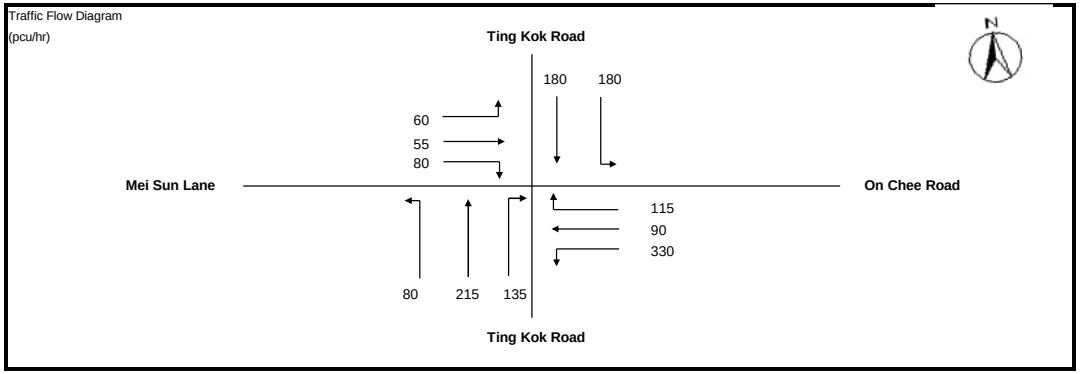
AECOM

Junction J3 - Ting Kok Road/ On Chee Road/ Mei Sun Lane	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J3

Traffic Flow Diagram

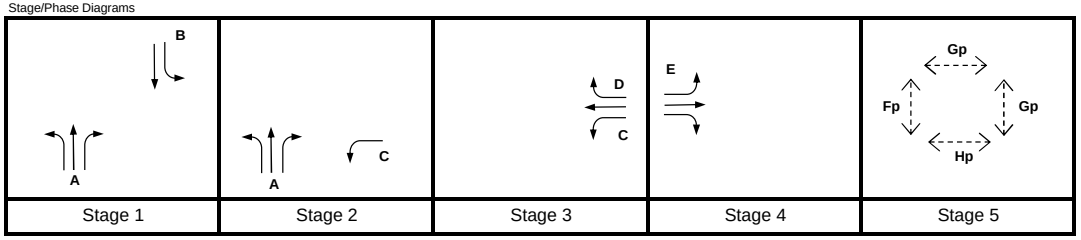
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	90	sec
Sum(y)	Y =	0.383	
Lost time	L =	44	sec
Total Flow	=	1,520	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	115	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	71	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	48.7	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	77	sec
Y_{max}	$= 1-L/C$	=	0.511	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G =	I/G = 8	I/G = 10	G = 8 I/G = 15

Critical Case : B,C,E,Hp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 20%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1,2	3.450	1	15			1		0		1960	80	58		138	58%		1853	0.075	
	A	1,2	3.400	1				0		0		2095		157		157			2095	0.075	
	A	1,2	3.400	1		25	1	0		0		2095			135	135		100%	1759	0.077	
	B	1	3.700	1	15			1		0		1985	180	0		180	100%		1805	0.100	0.100
	B	1	3.750	1				0		0		2130		180		180			2130	0.085	
	D	3	3.500	1		25	0	0		0		2105		90	115	205		56%	2036	0.101	
	C	2,3	3.800	1	15			1		0		1995	330			330	100%		1814	0.182	0.182
	E	4	3.800	1	30	25	0	1		0		1995	60	55	80	195	31%	41%	1918	0.102	0.102
Pedestrian Crossing				GM		FGM															
	Fp	5	min.	7	+	16	=	23	sec												
	Gp	5	min.	11	+	10	=	21	sec												
	Hp	5	min.	8	+	12	=	20	sec												*

JUNCTION CAPACITY CALCULATION

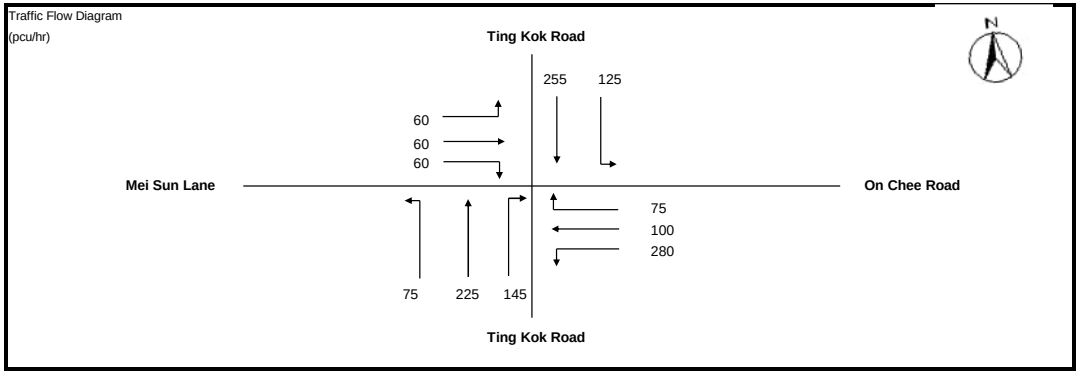
AECOM

Junction J3 - Ting Kok Road/ On Chee Road/ Mei Sun Lane	2030 AM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J3

Traffic Flow Diagram

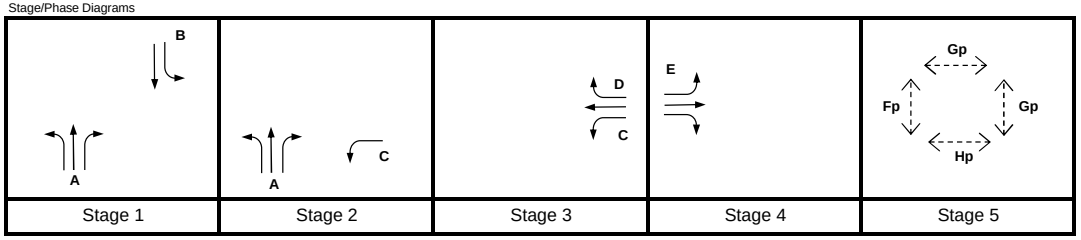
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	90	sec
Sum(y)	Y =	0.343	
Lost time	L =	44	sec
Total Flow	=	1,460	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	108	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	67	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	66.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	71	sec
Y_{max}	$= 1-L/C$	=	0.511	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G =	I/G = 8	I/G = 10	G = 8 I/G = 15

Critical Case : B,C,E,Hp

R.C.(C) = $(0.9xY_{max}-Y)/Yx100\%$ = 34%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1,2	3.450	1	15			1		0		1960	75	66		141	53%		1861	0.076	
	A	1,2	3.400	1				0		0		2095		159		159			2095	0.076	
	A	1,2	3.400	1		25	1	0		0		2095			145	145		100%	1759	0.082	
	B	1	3.700	1	15			1		0		1985	125	52		177	71%		1854	0.095	0.095
	B	1	3.750	1				0		0		2130		203		203			2130	0.095	
	D	3	3.500	1		25	0	0		0		2105		100	75	175		43%	2052	0.085	
	C	2,3	3.800	1	15			1		0		1995	280			280	100%		1814	0.154	0.154
	E	4	3.800	1	30	25	0	1		0		1995	60	60	60	180	33%	33%	1924	0.094	0.094
Pedestrian Crossing				GM		FGM															
	Fp	5	min.	7	+	16	=	23	sec												
	Gp	5	min.	11	+	10	=	21	sec												
	Hp	5	min.	8	+	12	=	20	sec												*

JUNCTION CAPACITY CALCULATION

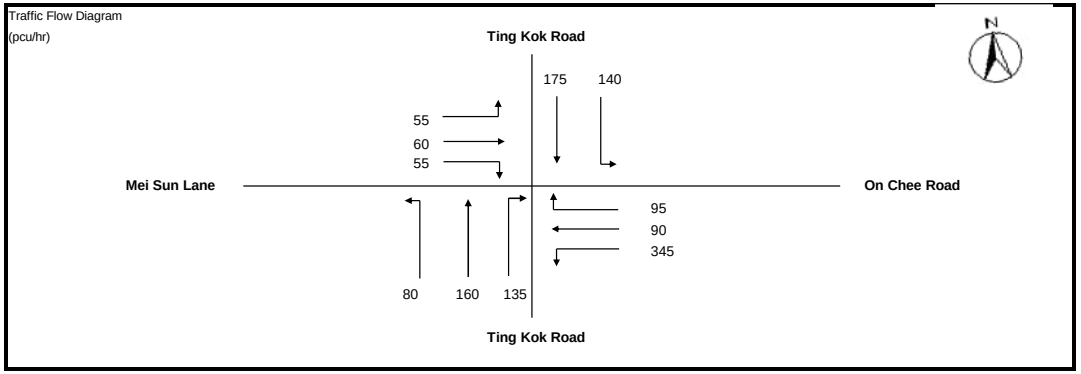
AECOM

Junction J3 - Ting Kok Road/ On Chee Road/ Mei Sun Lane	2030 PM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J3

Traffic Flow Diagram

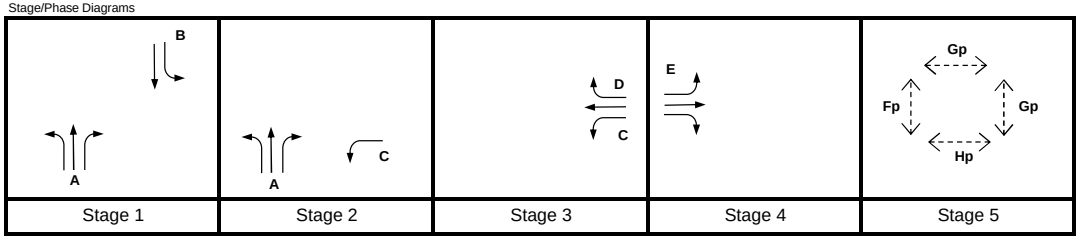
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	90	sec
Sum(y)	Y =	0.358	
Lost time	L =	44	sec
Total Flow	=	1,390	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	111	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	69	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	59.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	73	sec
Y_{max}	$= 1-L/C$	=	0.511	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G =	I/G = 8	I/G = 10	G = 8 I/G = 15

Critical Case : B,C,E,Hp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 28%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1,2	3.450	1	15			1		0		1960	80	32		112	72%		1829	0.061	
	A	1,2	3.400	1				0		0		2095		128		128			2095	0.061	
	A	1,2	3.400	1		25	1	0		0		2095			135	135		100%	1759	0.077	
	B	1	3.700	1	15			1		0		1985	140	5		145	97%		1810	0.080	0.080
	B	1	3.750	1				0		0		2130		170		170			2130	0.080	
	D	3	3.500	1		25	0	0		0		2105		90	95	185		51%	2042	0.091	
	C	2,3	3.800	1	15			1		0		1995	345			345	100%		1814	0.190	0.190
	E	4	3.800	1	30	25	0	1		0		1995	55	60	55	170	32%	32%	1926	0.088	0.088
Pedestrian Crossing				GM		FGM															
	Fp	5	min.	7	+	16	=	23	sec												
	Gp	5	min.	11	+	10	=	21	sec												
	Hp	5	min.	8	+	12	=	20	sec												*

JUNCTION CAPACITY CALCULATION

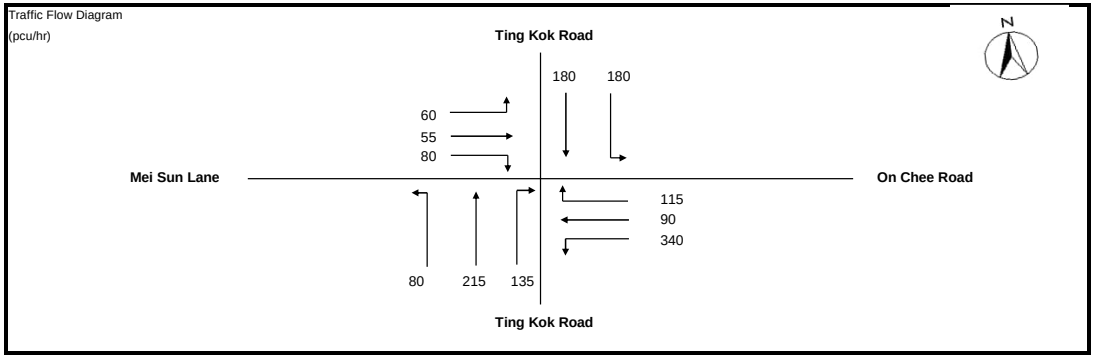
AECOM

Junction J3 - Ting Kok Road/ On Chee Road/ Mei Sun Lane	2030 Weekend Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J3

Traffic Flow Diagram

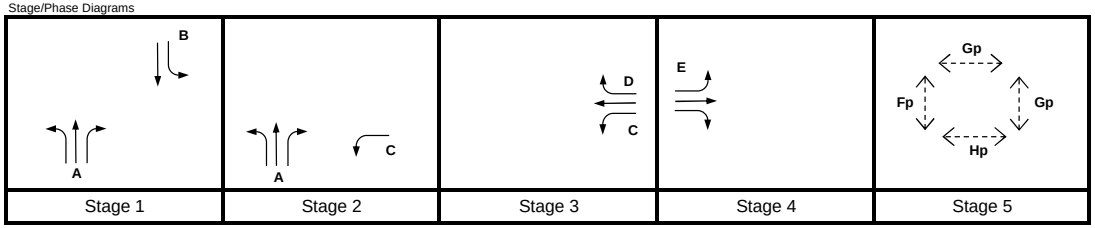
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	90	sec
Sum(y)	Y =	0.389	
Lost time	L =	44	sec
Total Flow	=	1,530	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	116	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	72	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	46.6	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	77	sec
Y_{max}	$= 1-L/C$	=	0.511	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G =	I/G = 8	I/G = 10	G = 8 I/G = 15

Critical Case : B,C,E,Hp

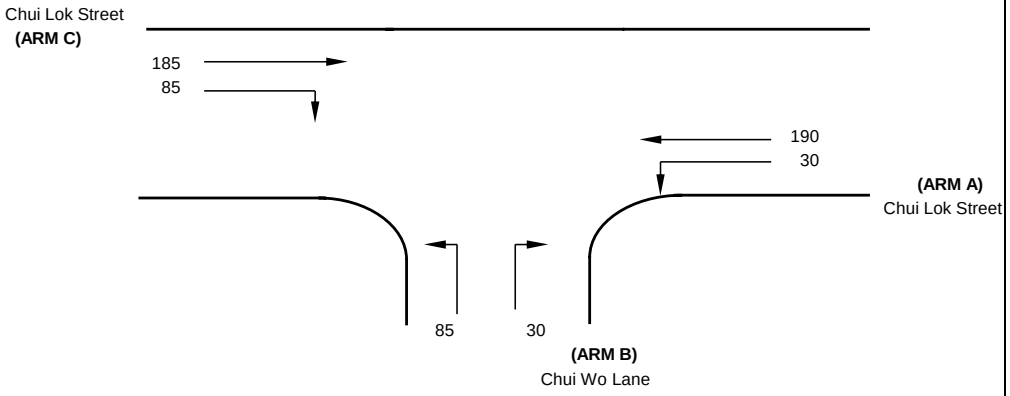
R.C.(C) $= (0.9 \times Y_{max}-Y)/Y \times 100\%$ = 18%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1,2	3.450	1	15			1		0		1960	80	58		138	58%		1853	0.075	
	A	1,2	3.400	1				0		0		2095		157		157			2095	0.075	
	A	1,2	3.400	1		25	1	0		0		2095			135	135		100%	1759	0.077	
	B	1	3.700	1	15			1		0		1985	180	0		180	100%		1805	0.100	0.100
	B	1	3.750	1				0		0		2130		180		180			2130	0.085	
	D	3	3.500	1		25	0	0		0		2105		90	115	205		56%	2036	0.101	
	C	2,3	3.800	1	15			1		0		1995	340			340	100%		1814	0.187	0.187
	E	4	3.800	1	30	25	0	1		0		1995	60	55	80	195	31%	41%	1918	0.102	0.102
Pedestrian Crossing				GM		FGM															
	Fp	5	min.	7	+	16	=	23	sec												
	Gp	5	min.	11	+	10	=	21	sec												
	Hp	5	min.	8	+	12	=	20	sec												*

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J4 - Chui Lok Street/ Chui Wo Lane	2023 AM Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jul 23



NOTES : (GEOMETRIC INPUT DATA)

J4

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.9	(metres)
W cr	=	0	(metres)
q a-b	=	30	(pcu/hr)
q a-c	=	190	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	4.7	(metres)
Vr c-b	=	66	(metres)
q c-a	=	185	(pcu/hr)
q c-b	=	85	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.24	(metres)
W b-c	=	4.24	(metres)
Vl b-a	=	35	(metres)
Vr b-a	=	69	(metres)
Vr b-c	=	69	(metres)
q b-a	=	30	(pcu/hr)
q b-c	=	85	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.937530
E	=	1.007014
F	=	1.045303
Y	=	0.727450

THE CAPACITY OF MOVEMENT :

Q b-a	=	479
Q b-c	=	696
Q c-b	=	718
Q b-ac	=	623

CRITICAL DFC = 0.18

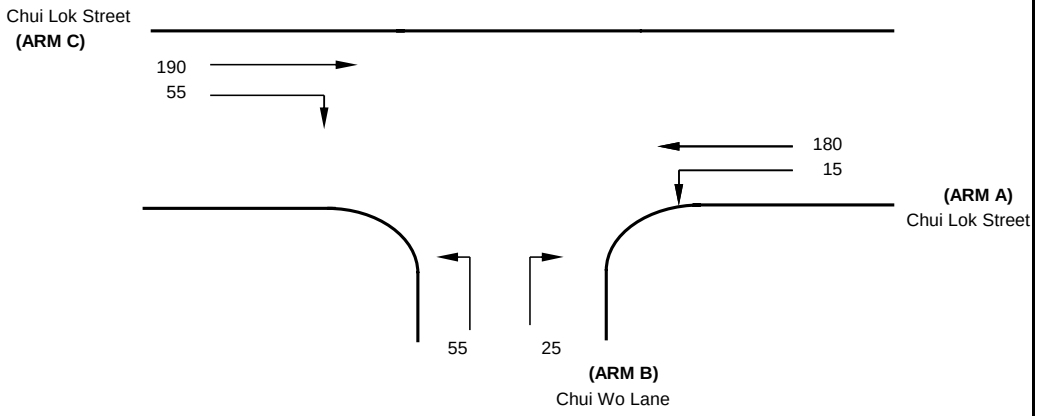
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.06
DFC b-c	=	0.12
DFC c-b	=	0.12
DFC b-ac	=	0.18

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J4 - Chui Lok Street/ Chui Wo Lane	2023 PM Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jul 23



J4

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.9	(metres)
W cr	=	0	(metres)
q a-b	=	15	(pcu/hr)
q a-c	=	180	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	4.7	(metres)
Vr c-b	=	66	(metres)
q c-a	=	190	(pcu/hr)
q c-b	=	55	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.24	(metres)
W b-c	=	4.24	(metres)
Vl b-a	=	35	(metres)
Vr b-a	=	69	(metres)
Vr b-c	=	69	(metres)
q b-a	=	25	(pcu/hr)
q b-c	=	55	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.937530
E	=	1.007014
F	=	1.045303
Y	=	0.727450

THE CAPACITY OF MOVEMENT :

Q b-a	=	492
Q b-c	=	701
Q c-b	=	725
Q b-ac	=	619

CRITICAL DFC = 0.13

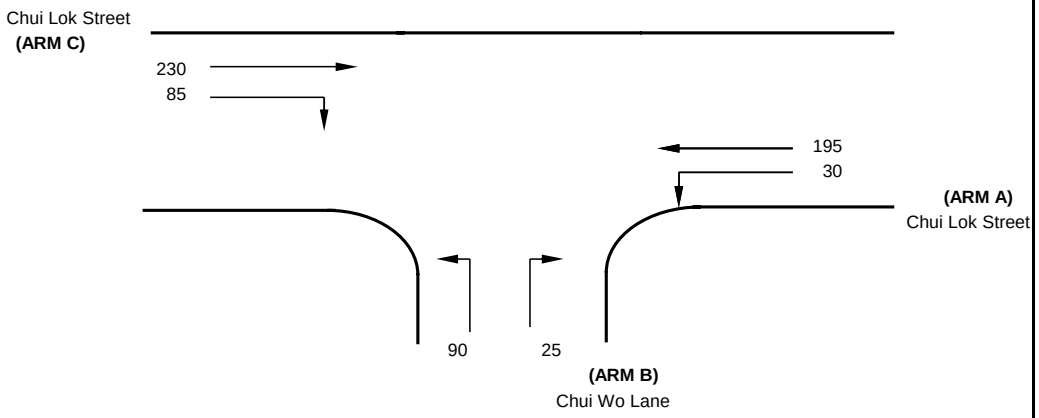
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.08
DFC c-b	=	0.08
DFC b-ac	=	0.13

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J4 - Chui Lok Street/ Chui Wo Lane	2023 Weekend Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jul 23



J4

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.9	(metres)
W cr	=	0	(metres)
q a-b	=	30	(pcu/hr)
q a-c	=	195	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	4.7	(metres)
Vr c-b	=	66	(metres)
q c-a	=	230	(pcu/hr)
q c-b	=	85	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.24	(metres)
W b-c	=	4.24	(metres)
Vl b-a	=	35	(metres)
Vr b-a	=	69	(metres)
Vr b-c	=	69	(metres)
q b-a	=	25	(pcu/hr)
q b-c	=	90	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.937530
E	=	1.007014
F	=	1.045303
Y	=	0.727450

THE CAPACITY OF MOVEMENT :

Q b-a	=	470
Q b-c	=	695
Q c-b	=	716
Q b-ac	=	630

CRITICAL DFC = 0.18

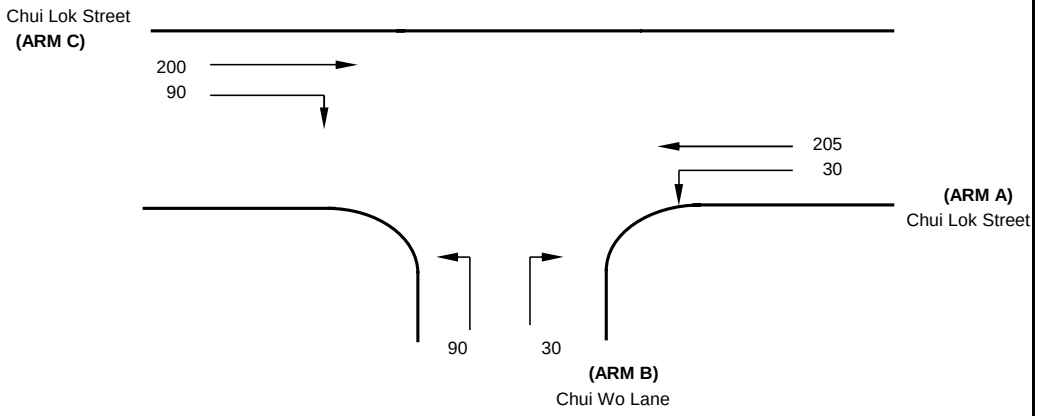
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.13
DFC c-b	=	0.12
DFC b-ac	=	0.18

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J4 - Chui Lok Street/ Chui Wo Lane	2030 AM Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jul 23



J4

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.9 (metres)
W cr	=	0 (metres)
q a-b	=	30 (pcu/hr)
q a-c	=	205 (pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	4.7 (metres)
Vr c-b	=	66 (metres)
q c-a	=	200 (pcu/hr)
q c-b	=	90 (pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.24 (metres)
W b-c	=	4.24 (metres)
Vl b-a	=	35 (metres)
Vr b-a	=	69 (metres)
Vr b-c	=	69 (metres)
q b-a	=	30 (pcu/hr)
q b-c	=	90 (pcu/hr)

GEOMETRIC FACTORS :

D	=	0.937530
E	=	1.007014
F	=	1.045303
Y	=	0.727450

THE CAPACITY OF MOVEMENT :

Q b-a	=	471
Q b-c	=	692
Q c-b	=	714
Q b-ac	=	620

CRITICAL DFC = 0.19

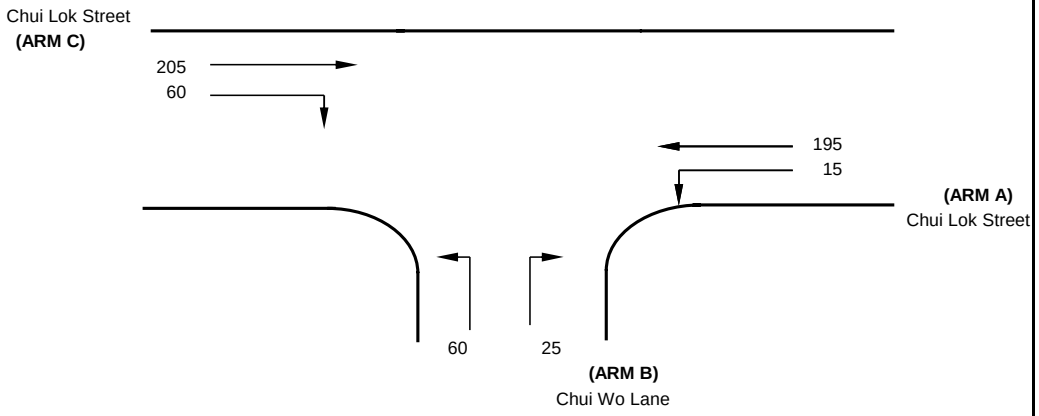
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.06
DFC b-c	=	0.13
DFC c-b	=	0.13
DFC b-ac	=	0.19

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J4 - Chui Lok Street/ Chui Wo Lane	2030 PM Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jul 23



J4

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.9	(metres)
W cr	=	0	(metres)
q a-b	=	15	(pcu/hr)
q a-c	=	195	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	4.7	(metres)
Vr c-b	=	66	(metres)
q c-a	=	205	(pcu/hr)
q c-b	=	60	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.24	(metres)
W b-c	=	4.24	(metres)
Vl b-a	=	35	(metres)
Vr b-a	=	69	(metres)
Vr b-c	=	69	(metres)
q b-a	=	25	(pcu/hr)
q b-c	=	60	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.937530
E	=	1.007014
F	=	1.045303
Y	=	0.727450

THE CAPACITY OF MOVEMENT :

Q b-a	=	485
Q b-c	=	697
Q c-b	=	721
Q b-ac	=	617

CRITICAL DFC = 0.14

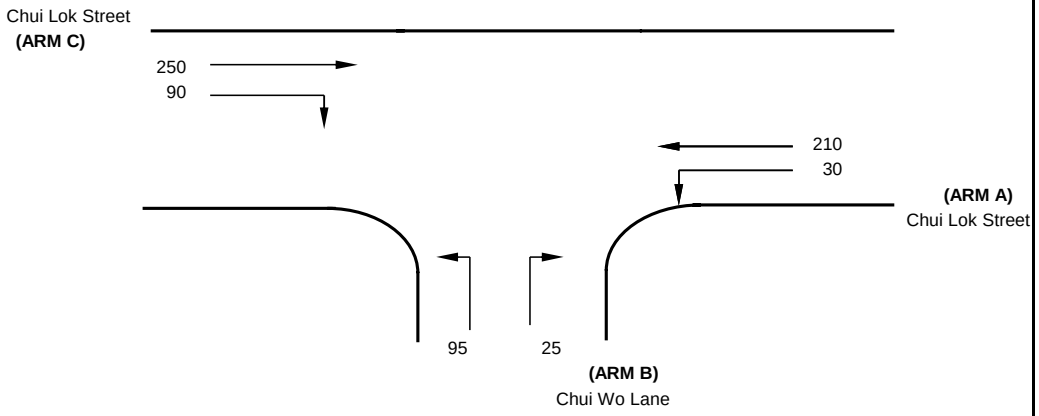
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.09
DFC c-b	=	0.08
DFC b-ac	=	0.14

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J4 - Chui Lok Street/ Chui Wo Lane	2030 Weekend Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jul 23



J4

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.9 (metres)
W cr	=	0 (metres)
q a-b	=	30 (pcu/hr)
q a-c	=	210 (pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	4.7 (metres)
Vr c-b	=	66 (metres)
q c-a	=	250 (pcu/hr)
q c-b	=	90 (pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.24 (metres)
W b-c	=	4.24 (metres)
Vl b-a	=	35 (metres)
Vr b-a	=	69 (metres)
Vr b-c	=	69 (metres)
q b-a	=	25 (pcu/hr)
q b-c	=	95 (pcu/hr)

GEOMETRIC FACTORS :

D	=	0.937530
E	=	1.007014
F	=	1.045303
Y	=	0.727450

THE CAPACITY OF MOVEMENT :

Q b-a	=	462
Q b-c	=	691
Q c-b	=	712
Q b-ac	=	626

CRITICAL DFC = 0.19

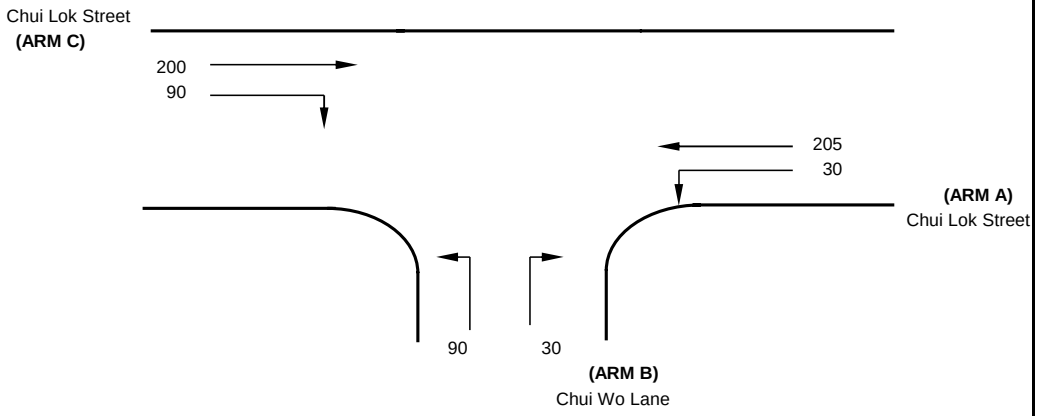
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.14
DFC c-b	=	0.13
DFC b-ac	=	0.19

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J4 - Chui Lok Street/ Chui Wo Lane	2030 AM Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jul 23



J4

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.9 (metres)
W cr	=	0 (metres)
q a-b	=	30 (pcu/hr)
q a-c	=	205 (pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	4.7 (metres)
Vr c-b	=	66 (metres)
q c-a	=	200 (pcu/hr)
q c-b	=	90 (pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.24 (metres)
W b-c	=	4.24 (metres)
Vl b-a	=	35 (metres)
Vr b-a	=	69 (metres)
Vr b-c	=	69 (metres)
q b-a	=	30 (pcu/hr)
q b-c	=	90 (pcu/hr)

GEOMETRIC FACTORS :

D	=	0.937530
E	=	1.007014
F	=	1.045303
Y	=	0.727450

THE CAPACITY OF MOVEMENT :

Q b-a	=	471
Q b-c	=	692
Q c-b	=	714
Q b-ac	=	620

CRITICAL DFC = 0.19

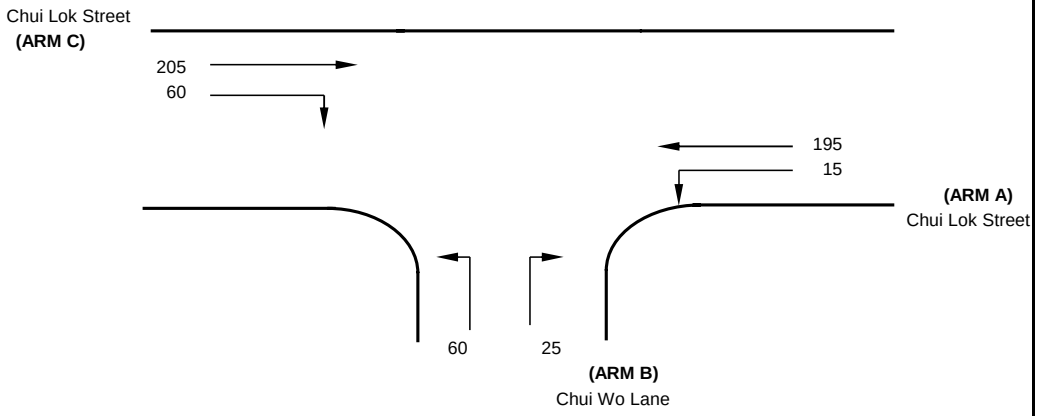
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.06
DFC b-c	=	0.13
DFC c-b	=	0.13
DFC b-ac	=	0.19

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J4 - Chui Lok Street/ Chui Wo Lane	2030 PM Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jul 23



J4

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.9	(metres)
W cr	=	0	(metres)
q a-b	=	15	(pcu/hr)
q a-c	=	195	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	4.7	(metres)
Vr c-b	=	66	(metres)
q c-a	=	205	(pcu/hr)
q c-b	=	60	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.24	(metres)
W b-c	=	4.24	(metres)
Vl b-a	=	35	(metres)
Vr b-a	=	69	(metres)
Vr b-c	=	69	(metres)
q b-a	=	25	(pcu/hr)
q b-c	=	60	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.937530
E	=	1.007014
F	=	1.045303
Y	=	0.727450

THE CAPACITY OF MOVEMENT :

Q b-a	=	485
Q b-c	=	697
Q c-b	=	721
Q b-ac	=	617

CRITICAL DFC = 0.14

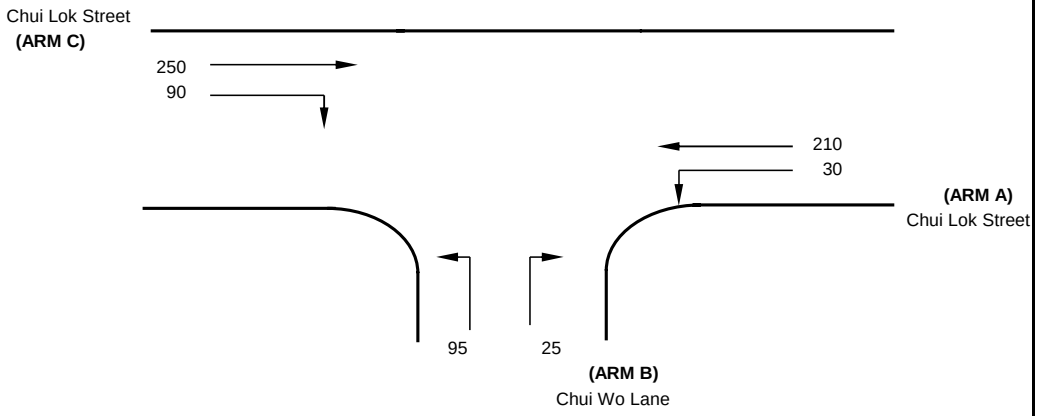
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.09
DFC c-b	=	0.08
DFC b-ac	=	0.14

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J4 - Chui Lok Street/ Chui Wo Lane	2030 Weekend Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jul 23



J4

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.9 (metres)
W cr	=	0 (metres)
q a-b	=	30 (pcu/hr)
q a-c	=	210 (pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	4.7 (metres)
Vr c-b	=	66 (metres)
q c-a	=	250 (pcu/hr)
q c-b	=	90 (pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	4.24 (metres)
W b-c	=	4.24 (metres)
Vl b-a	=	35 (metres)
Vr b-a	=	69 (metres)
Vr b-c	=	69 (metres)
q b-a	=	25 (pcu/hr)
q b-c	=	95 (pcu/hr)

GEOMETRIC FACTORS :

D	=	0.937530
E	=	1.007014
F	=	1.045303
Y	=	0.727450

THE CAPACITY OF MOVEMENT :

Q b-a	=	462
Q b-c	=	691
Q c-b	=	712
Q b-ac	=	626

CRITICAL DFC = 0.19

COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.05
DFC b-c	=	0.14
DFC c-b	=	0.13
DFC b-ac	=	0.19

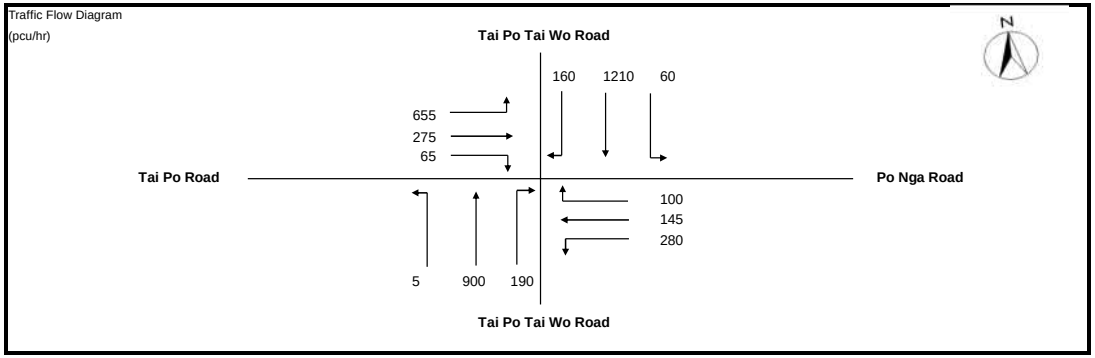
JUNCTION CAPACITY CALCULATION

AECOM

Junction J5 - Tai Po Road / Tai Po Tai Wo Road	2023 AM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jul 23

J5

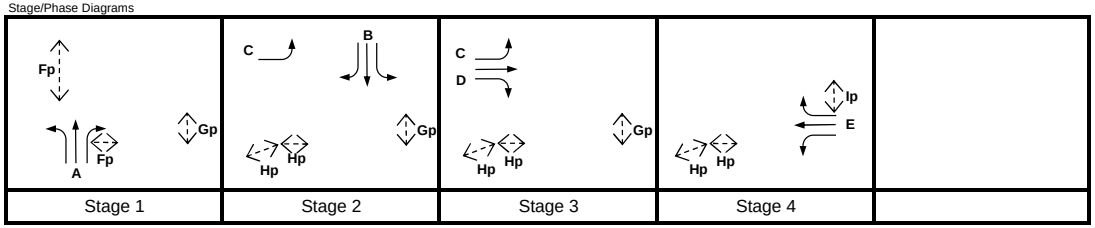
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.912	
Lost time	L =	24	sec
Total Flow	=	4,045	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	465	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	272	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.720	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	-21.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	-1823	sec
Y_{max}	$= 1-L/C$	=	0.829	

Stage/Phase Diagrams



Critical Case : A,B,D,E

R.C.(C) $= (0.9 \times Y_{max}-Y)/Y \times 100\%$ = -18%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.400	1	50			1		0		1955	5	429		434	1%		1954	0.222	0.222
	A	1	3.700	1				0		0		2125		471		471			2125	0.222	
	A	1	3.100	1		15	0	0		0		2065			190	190		100%	1877	0.101	
	B	2	4.000	1	10			1		0		2015	60	554		614	10%		1986	0.309	
	B	2	3.700	1				0		0		2125		656		656			2125	0.309	0.309
	B	2	3.500	1		15	0	0		0		2105			160	160		100%	1914	0.084	
	C	2,3	3.700	1	20			1		0		1985	443			443	100%		1847	0.240	
	D	3	3.600	1	15			0		0		2115	212	275		487	43%		2027	0.240	0.240
	D	3	3.700	1		15	0	0		0		2125			65	65		100%	1932	0.034	
	E	4	3.600	1	10			1		0		1975	242			242	100%		1717	0.141	0.141
	E	4	3.500	1	15	15	0	0		0		2105	38	145	100	283	13%	35%	2007	0.141	

Pedestrian Crossing			GM		FGM				
Fp	1	min.	5	+	11	=	16	sec	
Gp	2,3	min.	5	+	8	=	13	sec	
Hp	2,3,4	min.	5	+	9	=	14	sec	
Ip	4	min.	5	+	7	=	12	sec	

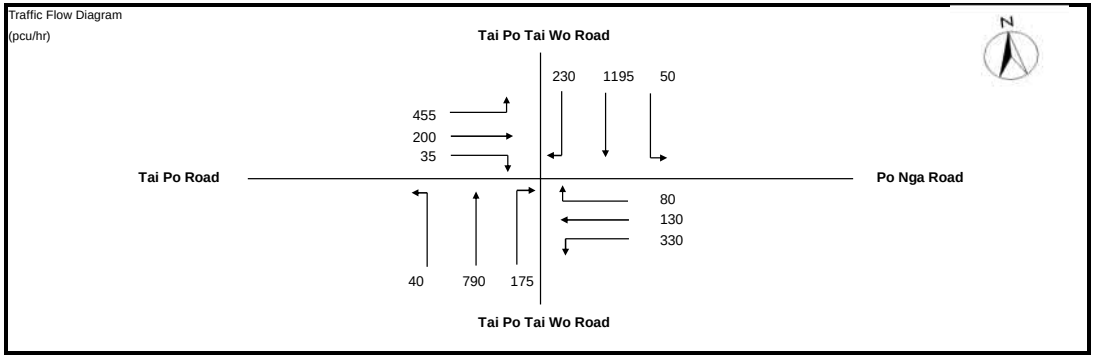
JUNCTION CAPACITY CALCULATION

AECOM

Junction J5 - Tai Po Road / Tai Po Tai Wo Road	2023 PM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jul 23

J5

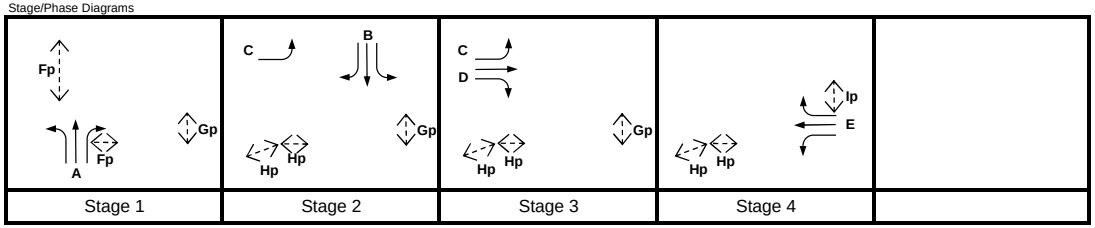
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.821	
Lost time	L =	24	sec
Total Flow	=	3,710	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	229	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	134	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.720	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	-12.3	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	272	sec
Y_{max}	$= 1-L/C$	=	0.829	

Stage/Phase Diagrams



Critical Case : A,B,D,E

R.C.(C) $= (0.9 \times Y_{max}-Y)/Y \times 100\% =$ -9%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.400	1	50			1		0		1955	40	357		397	10%		1949	0.204	
	A	1	3.700	1				0		0		2125		433		433			2125	0.204	0.204
	A	1	3.100	1		15	0	0		0		2065			175	175		100%	1877	0.093	
	B	2	4.000	1	10			1		0		2015	50	552		602	8%		1990	0.303	
	B	2	3.700	1				0		0		2125		643		643			2125	0.303	0.303
	B	2	3.500	1		15	0	0		0		2105			230	230		100%	1914	0.120	
	C	2,3	3.700	1	20			1		0		1985	312			312	100%		1847	0.169	
	D	3	3.600	1	15			0		0		2115	143	200		343	42%		2030	0.169	0.169
	D	3	3.700	1		15	0	0		0		2125			35	35		100%	1932	0.018	
	E	4	3.600	1	10			1		0		1975	250			250	100%		1717	0.145	0.145
	E	4	3.500	1	15	15	0	0		0		2105	80	130	80	290	28%	28%	1995	0.145	

Pedestrian Crossing			GM		FGM				
Fp	1	min.	5	+	11	=	16	sec	
Gp	2,3	min.	5	+	8	=	13	sec	
Hp	2,3,4	min.	5	+	9	=	14	sec	
Ip	4	min.	5	+	7	=	12	sec	

JUNCTION CAPACITY CALCULATION

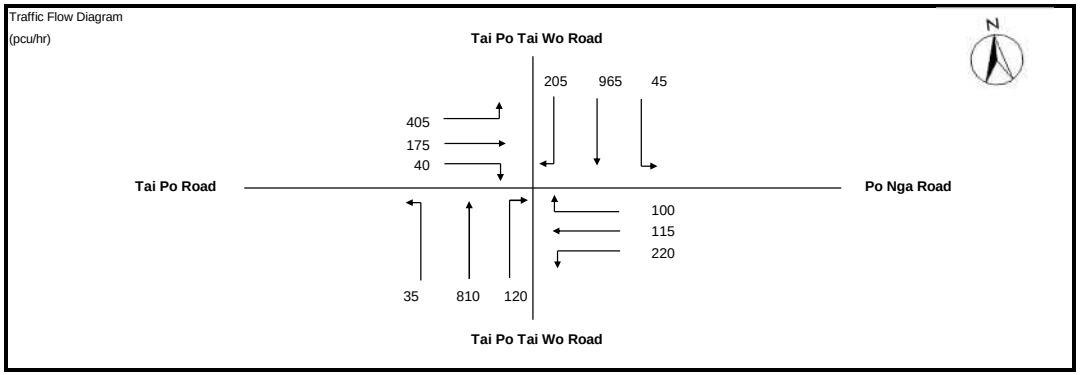
AECOM

Junction J5 - Tai Po Road / Tai Po Tai Wo Road	2023 Weekend Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jul 23

J5

Traffic Flow Diagram

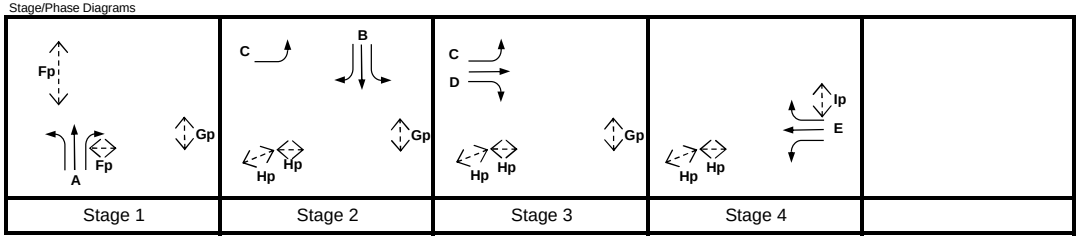
(pcu/hr)



No. of stages per cycle	N =	4
Cycle time	C =	140 sec
Sum(y)	Y =	0.720
Lost time	L =	24 sec
Total Flow	=	3,235 pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$ =	146	sec
Min. Cycle Time C_m	$= L/(1-Y)$ =	86	sec
Y_{ult}	$= 0.9-0.0075 \times L$ =	0.720	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$ =	0.1	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$ =	120	sec
Y_{max}	$= 1-L/C$ =	0.829	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
I/G = 8	I/G = 5	I/G = 7	I/G = 8	

Critical Case : A,B,D,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 4%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.400	1	50			1		0		1955	35	369		404	9%		1950	0.207	
	A	1	3.700	1				0		0		2125		441		441			2125	0.207	0.207
	A	1	3.100	1		15	0	0		0		2065			120	120		100%	1877	0.064	
	B	2	4.000	1	10			1		0		2015	45	443		488	9%		1988	0.246	0.246
	B	2	3.700	1				0		0		2125		522		522			2125	0.246	
	B	2	3.500	1		15	0	0		0		2105			205	205		100%	1914	0.107	
	C	2,3	3.700	1	20			1		0		1985	276			276	100%		1847	0.150	
	D	3	3.600	1	15			0		0		2115	129	175		304	42%		2029	0.150	0.150
	D	3	3.700	1		15	0	0		0		2125			40	40		100%	1932	0.021	
	E	4	3.600	1	10			1		0		1975	201			201	100%		1717	0.117	
	E	4	3.500	1	15	15	0	0		0		2105	19	115	100	234	8%	43%	2003	0.117	0.117

Pedestrian Crossing			GM		FGM				
Fp	1	min.	5	+	11	=	16	sec	
Gp	2,3	min.	5	+	8	=	13	sec	
Hp	2,3,4	min.	5	+	9	=	14	sec	
Ip	4	min.	5	+	7	=	12	sec	

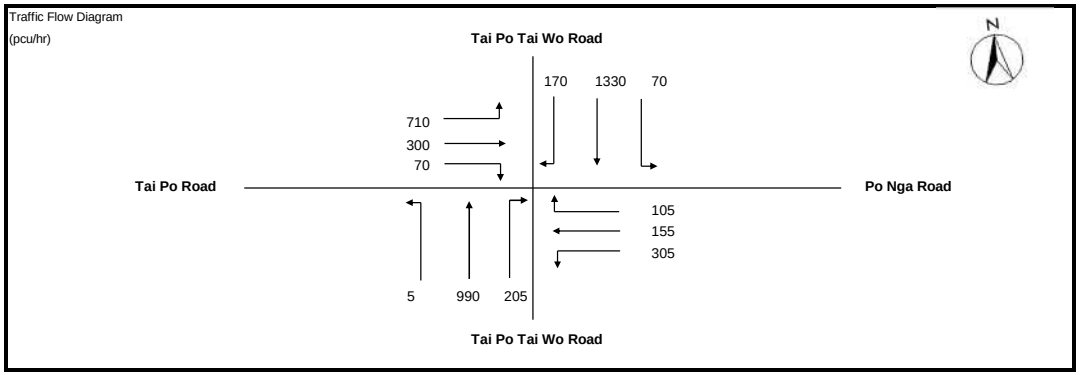
JUNCTION CAPACITY CALCULATION

AECOM

Junction J5 - Tai Po Road / Tai Po Tai Wo Road	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jul 23

J5

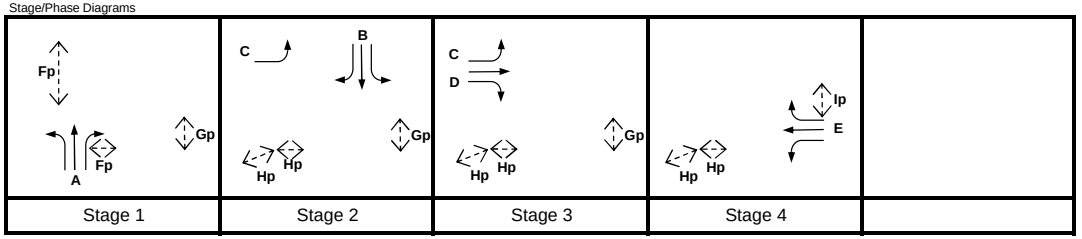
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.997	
Lost time	L =	24	sec
Total Flow	=	4,415	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	13924	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	8151	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.720	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	-27.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	-223	sec
Y_{max}	$= 1-L/C$	=	0.829	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
I/G = 8	I/G = 5	I/G = 7	I/G = 8	

Critical Case : A,B,D,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = -25%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.400	1	50			1		0		1955	5	472		477	1%		1954	0.244	0.244
	A	1	3.700	1				0		0		2125		518		518			2125	0.244	
	A	1	3.100	1		15	0	0		0		2065			205	205		100%	1877	0.109	
	B	2	4.000	1	10			1		0		2015	70	606		676	10%		1984	0.341	
	B	2	3.700	1				0		0		2125		724		724			2125	0.341	0.341
	B	2	3.500	1		15	0	0		0		2105			170	170		100%	1914	0.089	
	C	2,3	3.700	1	20			1		0		1985	481			481	100%		1847	0.261	
	D	3	3.600	1	15			0		0		2115	229	300		529	43%		2027	0.261	0.261
	D	3	3.700	1		15	0	0		0		2125			70	70		100%	1932	0.036	
	E	4	3.600	1	10			1		0		1975	261			261	100%		1717	0.152	0.152
	E	4	3.500	1	15	15	0	0		0		2105	44	155	105	304	15%	34%	2007	0.152	

Pedestrian Crossing			GM		FGM				
Fp	1	min.	5	+	11	=	16	sec	
Gp	2,3	min.	5	+	8	=	13	sec	
Hp	2,3,4	min.	5	+	9	=	14	sec	
Ip	4	min.	5	+	7	=	12	sec	

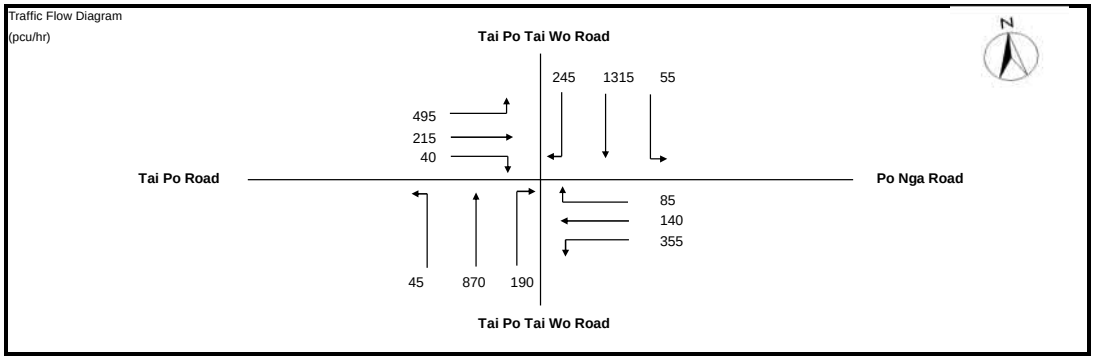
JUNCTION CAPACITY CALCULATION

AECOM

Junction J5 - Tai Po Road / Tai Po Tai Wo Road	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jul 23

J5

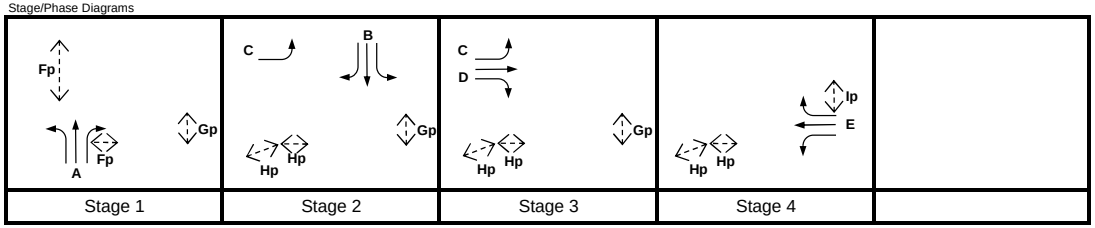
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.897	
Lost time	L =	24	sec
Total Flow	=	4,050	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	398	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	233	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.720	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	-19.7	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	7006	sec
Y_{max}	$= 1-L/C$	=	0.829	

Stage/Phase Diagrams



Critical Case : A,B,D,E

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = -17%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.400	1	50			1		0		1955	45	393		438	10%		1949	0.225	
	A	1	3.700	1				0		0		2125		477		477			2125	0.225	0.225
	A	1	3.100	1		15	0	0		0		2065			190	190		100%	1877	0.101	
	B	2	4.000	1	10			1		0		2015	55	608		663	8%		1990	0.333	
	B	2	3.700	1				0		0		2125		707		707			2125	0.333	0.333
	B	2	3.500	1		15	0	0		0		2105			245	245		100%	1914	0.128	
	C	2,3	3.700	1	20			1		0		1985	338			338	100%		1847	0.183	
	D	3	3.600	1	15			0		0		2115	157	215		372	42%		2029	0.183	0.183
	D	3	3.700	1		15	0	0		0		2125			40	40		100%	1932	0.021	
	E	4	3.600	1	10			1		0		1975	268			268	100%		1717	0.156	0.156
	E	4	3.500	1	15	15	0	0		0		2105	87	140	85	312	28%	27%	1995	0.156	

Pedestrian Crossing			GM		FGM				
Fp	1	min.	5	+	11	=	16	sec	
Gp	2,3	min.	5	+	8	=	13	sec	
Hp	2,3,4	min.	5	+	9	=	14	sec	
Ip	4	min.	5	+	7	=	12	sec	

JUNCTION CAPACITY CALCULATION

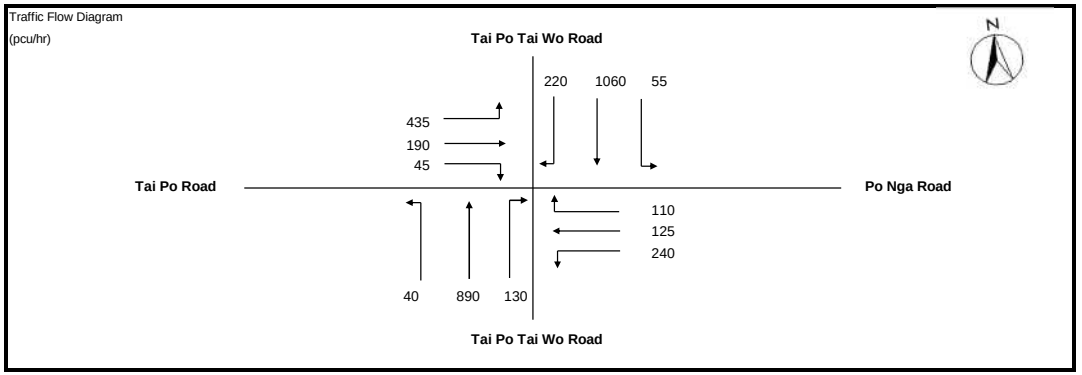
AECOM

Junction J5 - Tai Po Road / Tai Po Tai Wo Road	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jul 23

J5

Traffic Flow Diagram

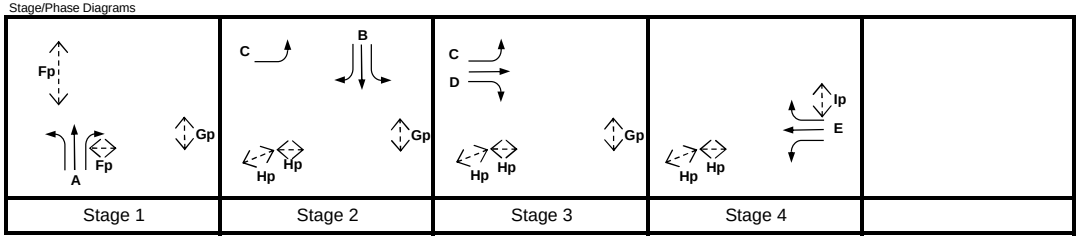
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.788	
Lost time	L =	24	sec
Total Flow	=	3,540	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	194	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	113	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.720	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	-8.7	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	194	sec
Y_{max}	$= 1-L/C$	=	0.829	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
	I/G = 8	I/G = 5	I/G = 7	I/G = 8

Critical Case : A,B,D,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = -5%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.400	1	50			1		0		1955	40	405		445	9%		1950	0.228	
	A	1	3.700	1				0		0		2125		485		485			2125	0.228	0.228
	A	1	3.100	1		15	0	0		0		2065			130	130		100%	1877	0.069	
	B	2	4.000	1	10			1		0		2015	55	483		538	10%		1985	0.271	0.271
	B	2	3.700	1				0		0		2125		577		577			2125	0.271	
	B	2	3.500	1		15	0	0		0		2105			220	220		100%	1914	0.115	
	C	2,3	3.700	1	20			1		0		1985	298			298	100%		1847	0.161	
	D	3	3.600	1	15			0		0		2115	137	190		327	42%		2030	0.161	0.161
	D	3	3.700	1		15	0	0		0		2125			45	45		100%	1932	0.023	
	E	4	3.600	1	10			1		0		1975	219			219	100%		1717	0.128	
	E	4	3.500	1	15	15	0	0		0		2105	21	125	110	256	8%	43%	2003	0.128	0.128

Pedestrian Crossing			GM		FGM				
Fp	1	min.	5	+	11	=	16	sec	
Gp	2,3	min.	5	+	8	=	13	sec	
Hp	2,3,4	min.	5	+	9	=	14	sec	
Ip	4	min.	5	+	7	=	12	sec	

JUNCTION CAPACITY CALCULATION

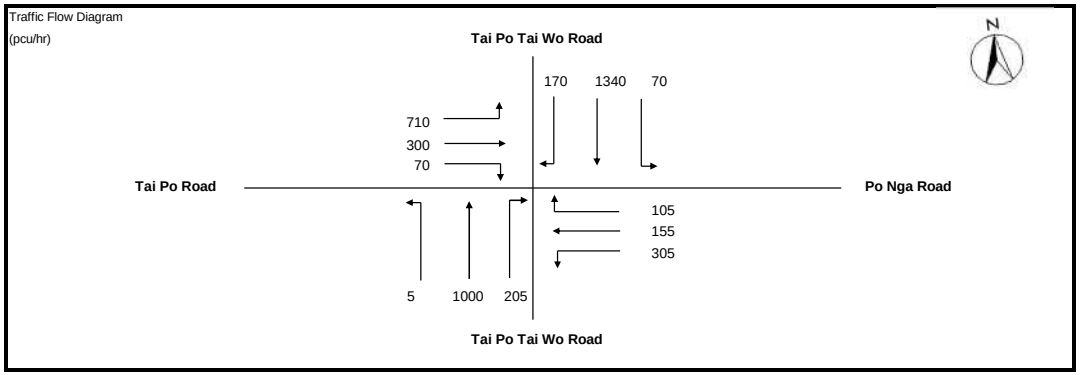
AECOM

Junction J5 - Tai Po Road / Tai Po Tai Wo Road	2030 AM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jul 23

J5

Traffic Flow Diagram

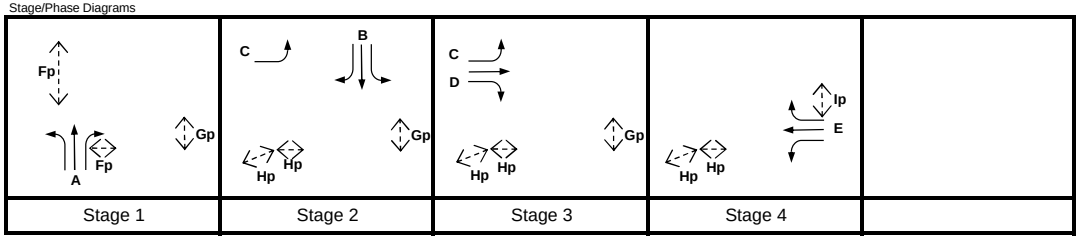
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	1.002	
Lost time	L =	24	sec
Total Flow	=	4,435	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	-21333	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	-12488	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.720	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	-28.1	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	-212	sec
Y_{max}	$= 1-L/C$	=	0.829	

Stage/Phase Diagrams



Critical Case : A,B,D,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = -26%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.400	1	50			1		0		1955	5	476		481	1%		1954	0.246	0.246
	A	1	3.700	1				0		0		2125		524		524			2125	0.246	
	A	1	3.100	1		15	0	0		0		2065			205	205		100%	1877	0.109	
	B	2	4.000	1	10			1		0		2015	70	611		681	10%		1984	0.343	
	B	2	3.700	1				0		0		2125		729		729			2125	0.343	0.343
	B	2	3.500	1		15	0	0		0		2105			170	170		100%	1914	0.089	
	C	2,3	3.700	1	20			1		0		1985	481			481	100%		1847	0.261	
	D	3	3.600	1	15			0		0		2115	229	300		529	43%		2027	0.261	0.261
	D	3	3.700	1		15	0	0		0		2125			70	70		100%	1932	0.036	
	E	4	3.600	1	10			1		0		1975	261			261	100%		1717	0.152	0.152
	E	4	3.500	1	15	15	0	0		0		2105	44	155	105	304	15%	34%	2007	0.152	
Pedestrian Crossing				GM		FGM															
	Fp	1	min.	5	+	11	=	16	sec												
	Gp	2,3	min.	5	+	8	=	13	sec												
	Hp	2,3,4	min.	5	+	9	=	14	sec												
	Ip	4	min.	5	+	7	=	12	sec												

JUNCTION CAPACITY CALCULATION

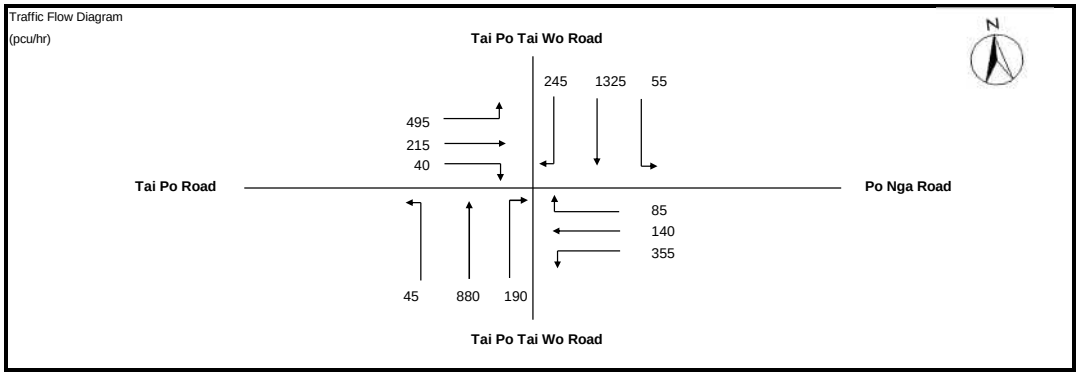
AECOM

Junction J5 - Tai Po Road / Tai Po Tai Wo Road	2030 PM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jul 23

J5

Traffic Flow Diagram

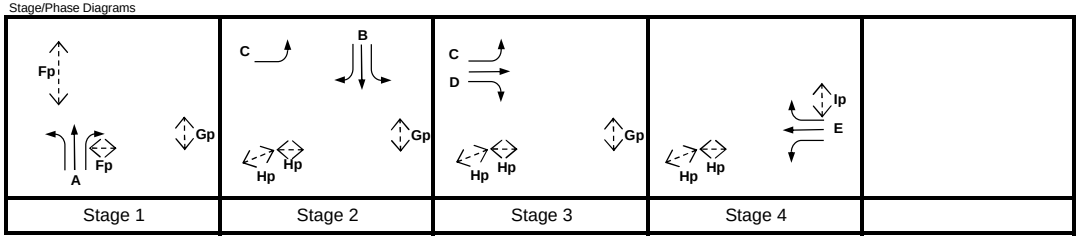
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.902	
Lost time	L =	24	sec
Total Flow	=	4,070	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	417	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	244	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.720	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	-20.2	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	-12112	sec
Y_{max}	$= 1-L/C$	=	0.829	

Stage/Phase Diagrams



Critical Case : A,B,D,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = -17%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.400	1	50			1		0		1955	45	398		443	10%		1949	0.227	0.227
	A	1	3.700	1				0		0		2125		482		482			2125	0.227	
	A	1	3.100	1		15	0	0		0		2065			190	190		100%	1877	0.101	
	B	2	4.000	1	10			1		0		2015	55	612		667	8%		1990	0.335	
	B	2	3.700	1				0		0		2125		713		713			2125	0.335	0.335
	B	2	3.500	1		15	0	0		0		2105			245	245		100%	1914	0.128	
	C	2,3	3.700	1	20			1		0		1985	338			338	100%		1847	0.183	
	D	3	3.600	1	15			0		0		2115	157	215		372	42%		2029	0.183	0.183
	D	3	3.700	1		15	0	0		0		2125			40	40		100%	1932	0.021	
	E	4	3.600	1	10			1		0		1975	268			268	100%		1717	0.156	0.156
	E	4	3.500	1	15	15	0	0		0		2105	87	140	85	312	28%	27%	1995	0.156	

Pedestrian Crossing			GM		FGM				
Fp	1	min.	5	+	11	=	16	sec	
Gp	2,3	min.	5	+	8	=	13	sec	
Hp	2,3,4	min.	5	+	9	=	14	sec	
Ip	4	min.	5	+	7	=	12	sec	

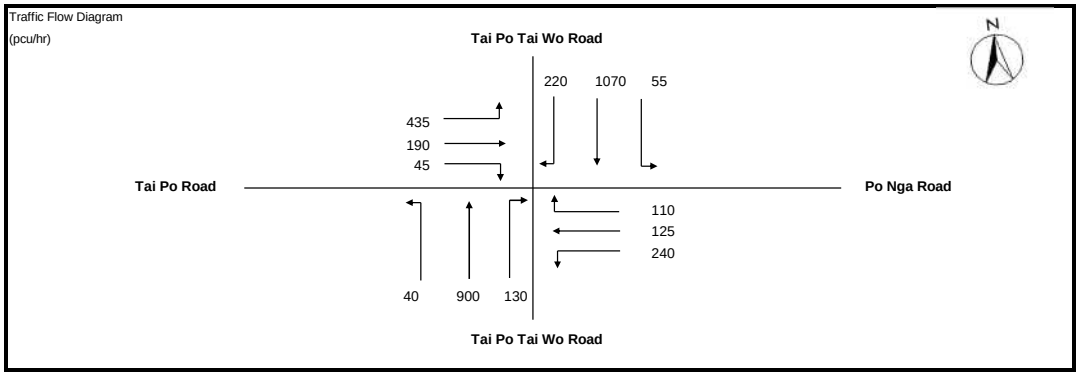
JUNCTION CAPACITY CALCULATION

AECOM

Junction J5 - Tai Po Road / Tai Po Tai Wo Road	2030 Weekend Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jul 23

J5

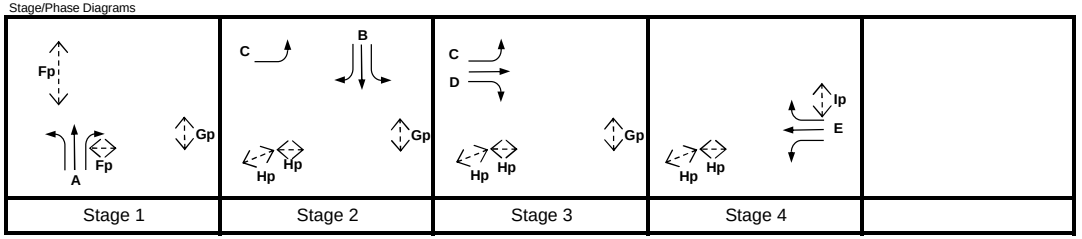
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.793	
Lost time	L =	24	sec
Total Flow	=	3,560	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	198	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	116	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.720	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	-9.2	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	203	sec
Y_{max}	$= 1-L/C$	=	0.829	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
I/G = 8	I/G = 5	I/G = 7	I/G = 8	

Critical Case : A,B,D,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = -6%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.400	1	50			1		0		1955	40	410		450	9%		1950	0.231	0.231
	A	1	3.700	1				0		0		2125		490		490			2125	0.231	
	A	1	3.100	1		15	0	0		0		2065			130	130		100%	1877	0.069	
	B	2	4.000	1	10			1		0		2015	55	488		543	10%		1985	0.274	
	B	2	3.700	1				0		0		2125		582		582			2125	0.274	0.274
	B	2	3.500	1		15	0	0		0		2105			220	220		100%	1914	0.115	
	C	2,3	3.700	1	20			1		0		1985	298			298	100%		1847	0.161	
	D	3	3.600	1	15			0		0		2115	137	190		327	42%		2030	0.161	0.161
	D	3	3.700	1		15	0	0		0		2125			45	45		100%	1932	0.023	
	E	4	3.600	1	10			1		0		1975	219			219	100%		1717	0.128	0.128
	E	4	3.500	1	15	15	0	0		0		2105	21	125	110	256	8%	43%	2003	0.128	

Pedestrian Crossing			GM		FGM				
Fp	1	min.	5	+	11	=	16	sec	
Gp	2,3	min.	5	+	8	=	13	sec	
Hp	2,3,4	min.	5	+	9	=	14	sec	
Ip	4	min.	5	+	7	=	12	sec	

JUNCTION CAPACITY CALCULATION

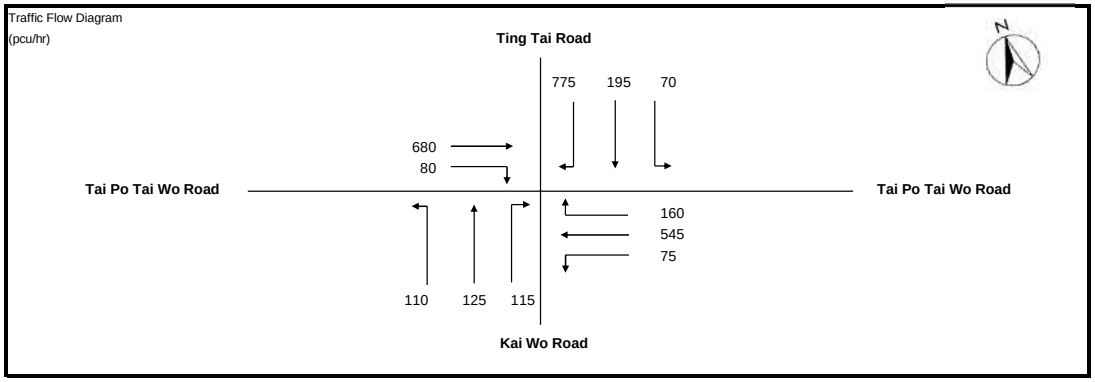
AECOM

Junction J6 - Tai Po Tai Wo Road / Ting Tai Road	2023 AM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J6

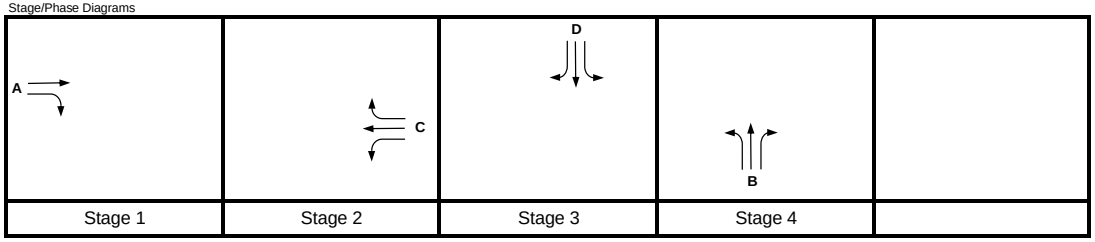
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	140	sec
Sum(y)		Y =	0.656	
Lost time		L =	22	sec
Total Flow		=	2,930	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	111	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	64	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.735	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	12.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	81	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,C,D,B

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 16%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
↓	A	1	3.500	1			0	1		0		1965		369		369			1965	0.188	0.188
↓↱	A	1	3.600	1		20	0	0		0		2115		311	80	391		20%	2083	0.188	
↰	B	4	3.700	1	10			1		0		1985	110	125		235	47%		1855	0.127	0.127
↱	B	4	3.700	1		20	0	0		0		2125			115	115		100%	1977	0.058	
↰↑	C	2	3.500	1	15			1		0		1965	75	174		249	30%		1907	0.130	
↑	C	2	3.300	1						0		2085		272		272			2085	0.130	0.130
↑↱	C	2	3.300	1		20	0	0		0		2085		100	160	260		62%	1993	0.130	
↰	D	3	3.500	1	10			1		0		1965	70	195		265	26%		1890	0.140	
↱	D	3	3.500	2		10	0	0		0		4210			775	775		100%	3661	0.212	0.212

JUNCTION CAPACITY CALCULATION

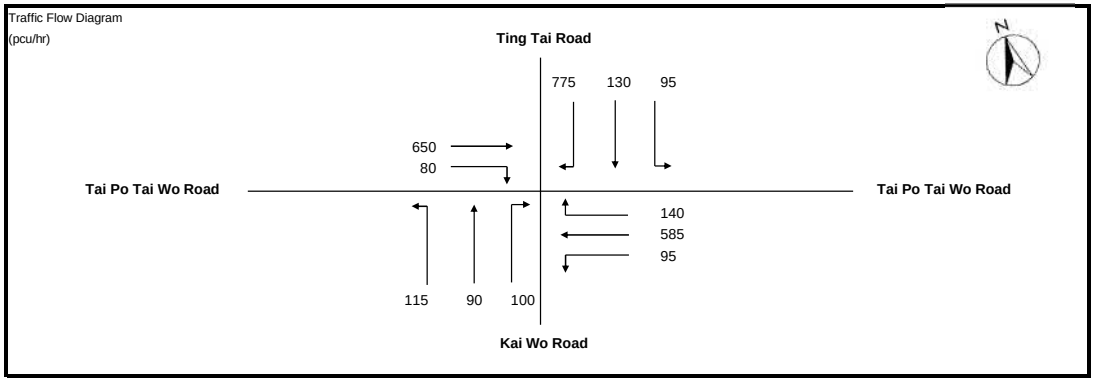
AECOM

Junction J6 - Tai Po Tai Wo Road / Ting Tai Road	2023 PM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J6

Traffic Flow Diagram

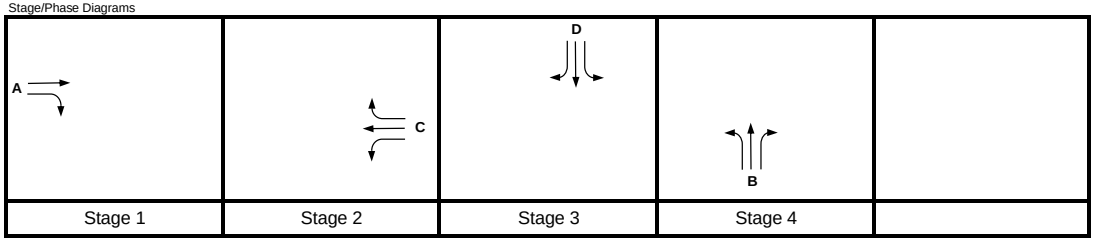
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.641	
Lost time	L =	22	sec
Total Flow	=	2,855	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	106	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	61	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.735	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	14.7	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	76	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,C,D,B

R.C.(C) = $(0.9xY_{max}-Y)/Y \times 100\%$ = 18%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1			0	1		0		1965		354		354			1965	0.180	0.180
	A	1	3.600	1		20	0	0		0		2115		296	80	376		21%	2082	0.180	
	B	4	3.700	1	10			1		0		1985	115	90		205	56%		1831	0.112	0.112
	B	4	3.700	1		20	0	0		0		2125			100	100		100%	1977	0.051	
	C	2	3.500	1	15			1		0		1965	95	165		260	37%		1896	0.137	0.137
	C	2	3.300	1						0		2085		285		285			2085	0.137	
	C	2	3.300	1		20	0	0		0		2085		135	140	275		51%	2008	0.137	
	D	3	3.500	1	10			1		0		1965	95	130		225	42%		1848	0.122	
	D	3	3.500	2		10	0	0		0		4210			775	775		100%	3661	0.212	0.212

JUNCTION CAPACITY CALCULATION

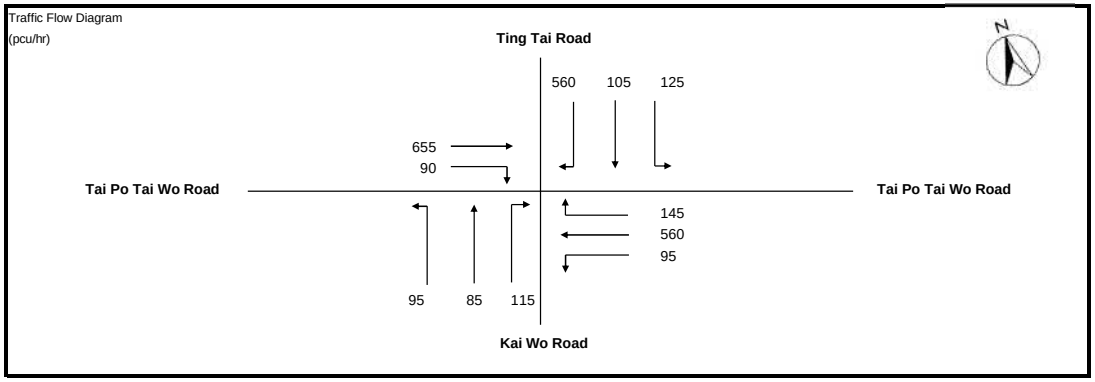
AECOM

Junction J6 - Tai Po Tai Wo Road / Ting Tai Road	2023 Weekend Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J6

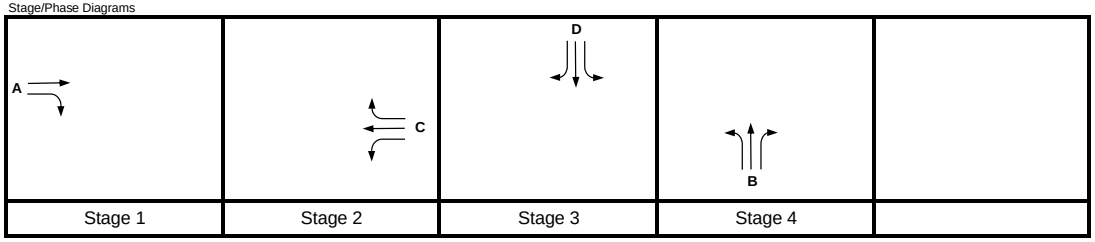
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	140	sec
Sum(y)		Y =	0.569	
Lost time		L =	22	sec
Total Flow		=	2,630	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	88	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	51	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.735	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	29.2	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	60	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,C,D,B

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 33%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
	A	1	3.500	1			0	1		0		1965		362		362			1965	0.184	0.184
	A	1	3.600	1		20	0	0		0		2115		293	90	383		24%	2078	0.184	
	B	4	3.700	1	10			1		0		1985	95	85		180	53%		1839	0.098	0.098
	B	4	3.700	1		20	0	0		0		2125			115	115		100%	1977	0.058	
	C	2	3.500	1	15			1		0		1965	95	158		253	38%		1894	0.134	0.134
	C	2	3.300	1						0		2085		279		279			2085	0.134	
	C	2	3.300	1		20	0	0		0		2085		123	145	268		54%	2004	0.134	
	D	3	3.500	1	10			1		0		1965	125	105		230	54%		1817	0.127	
	D	3	3.500	2		10	0	0		0		4210			560	560		100%	3661	0.153	0.153

JUNCTION CAPACITY CALCULATION

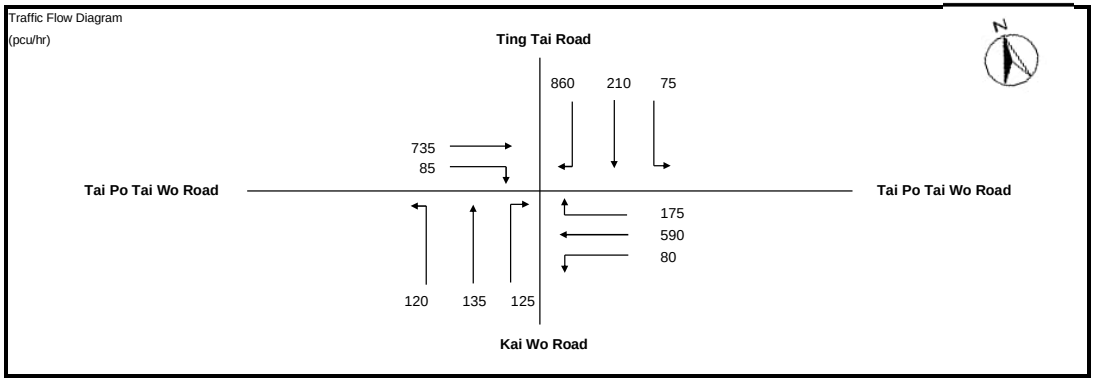
AECOM

Junction J6 - Tai Po Tai Wo Road / Ting Tai Road	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J6

Traffic Flow Diagram

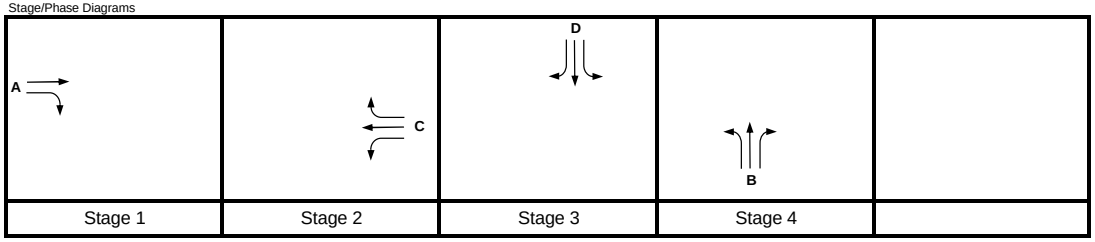
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.716	
Lost time	L =	22	sec
Total Flow	=	3,190	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	134	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	78	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.735	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	2.6	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	108	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,C,D,B

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 6%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
	A	1	3.500	1				1		0		1965		398		398			1965	0.203	0.203
	A	1	3.600	1		20	0	0		0		2115		337	85	422		20%	2084	0.203	
	B	4	3.700	1	10			1		0		1985	120	135		255	47%		1854	0.138	0.138
	B	4	3.700	1		20	0	0		0		2125			125	125		100%	1977	0.063	
	C	2	3.500	1	15			1		0		1965	80	189		269	30%		1908	0.141	
	C	2	3.300	1						0		2085		294		294			2085	0.141	0.141
	C	2	3.300	1		20	0	0		0		2085		106	175	281		62%	1992	0.141	
	D	3	3.500	1	10			1		0		1965	75	210		285	26%		1890	0.151	
	D	3	3.500	2		10	0	0		0		4210			860	860		100%	3661	0.235	0.235

JUNCTION CAPACITY CALCULATION

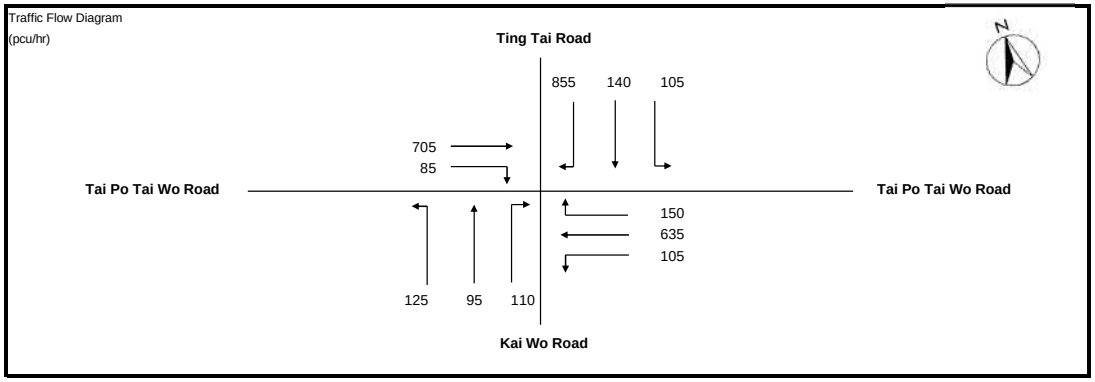
AECOM

Junction J6 - Tai Po Tai Wo Road / Ting Tai Road	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J6

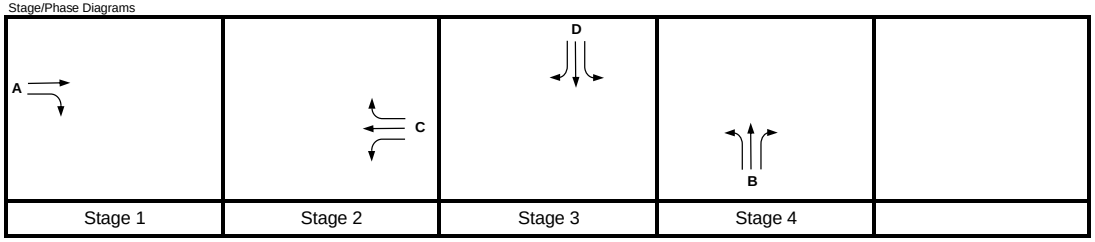
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	140	sec
Sum(y)		Y =	0.698	
Lost time		L =	22	sec
Total Flow		=	3,110	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	126	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	73	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.735	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	5.4	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	98	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,C,D,B

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 9%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1			0	1		0		1965		384		384			1965	0.195	0.195
	A	1	3.600	1		20	0	0		0		2115		321	85	406		21%	2082	0.195	
	B	4	3.700	1	10			1		0		1985	125	95		220	57%		1829	0.120	0.120
	B	4	3.700	1		20	0	0		0		2125			110	110		100%	1977	0.056	
	C	2	3.500	1	15			1		0		1965	105	177		282	37%		1894	0.149	0.149
	C	2	3.300	1						0		2085		310		310			2085	0.149	
	C	2	3.300	1		20	0	0		0		2085		149	150	299		50%	2009	0.149	
	D	3	3.500	1	10			1		0		1965	105	140		245	43%		1846	0.133	
	D	3	3.500	2		10	0	0		0		4210			855	855		100%	3661	0.234	0.234

JUNCTION CAPACITY CALCULATION

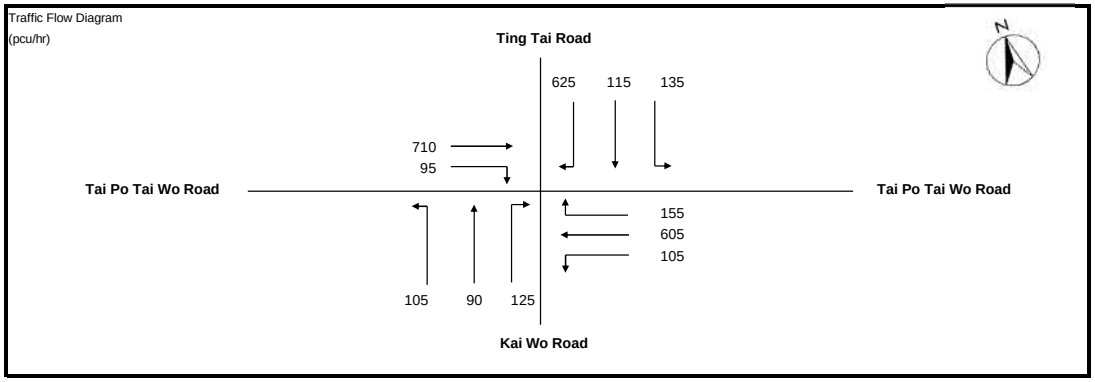
AECOM

Junction J6 - Tai Po Tai Wo Road / Ting Tai Road	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J6

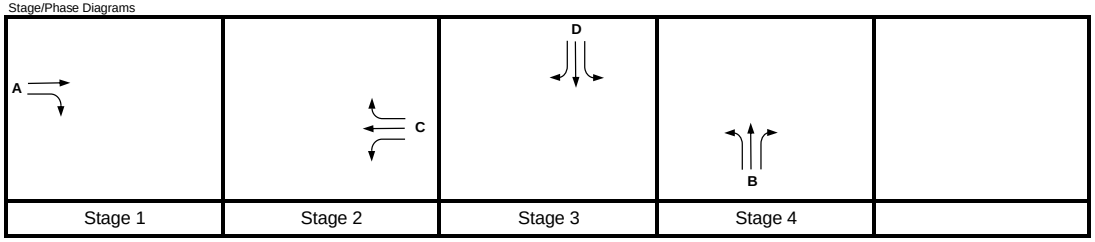
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	140	sec
Sum(y)		Y =	0.621	
Lost time		L =	22	sec
Total Flow		=	2,865	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	100	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	58	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.735	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	18.4	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	71	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,C,D,B

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 22%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1			0	1		0		1965		391		391			1965	0.199	0.199
	A	1	3.600	1		20	0	0		0		2115		319	95	414		23%	2079	0.199	
	B	4	3.700	1	10			1		0		1985	105	90		195	54%		1837	0.106	0.106
	B	4	3.700	1		20	0	0		0		2125			125	125		100%	1977	0.063	
	C	2	3.500	1	15			1		0		1965	105	169		274	38%		1892	0.145	0.145
	C	2	3.300	1						0		2085		301		301			2085	0.145	
	C	2	3.300	1		20	0	0		0		2085		135	155	290		53%	2005	0.145	
	D	3	3.500	1	10			1		0		1965	135	115		250	54%		1818	0.138	
	D	3	3.500	2		10	0	0		0		4210			625	625		100%	3661	0.171	0.171

JUNCTION CAPACITY CALCULATION

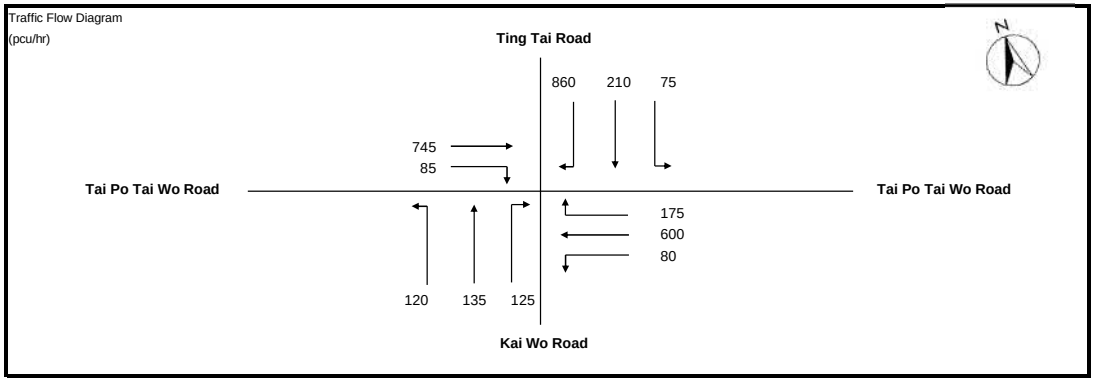
AECOM

Junction J6 - Tai Po Tai Wo Road / Ting Tai Road	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J6

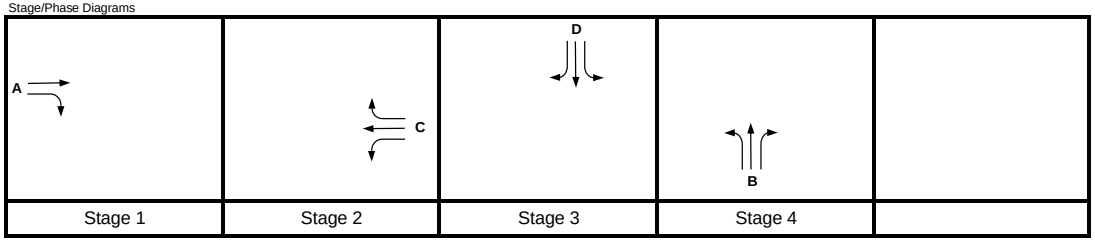
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	140	sec
Sum(y)		Y =	0.720	
Lost time		L =	22	sec
Total Flow		=	3,210	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	136	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	79	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.735	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	2.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	110	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,C,D,B

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 5%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1			0	1		0		1965		403		403			1965	0.205	0.205
	A	1	3.600	1		20	0	0		0		2115		342	85	427		20%	2084	0.205	
	B	4	3.700	1	10			1		0		1985	120	135		255	47%		1854	0.138	0.138
	B	4	3.700	1		20	0	0		0		2125			125	125		100%	1977	0.063	
	C	2	3.500	1	15			1		0		1965	80	193		273	29%		1909	0.143	
	C	2	3.300	1						0		2085		298		298			2085	0.143	0.143
	C	2	3.300	1		20	0	0		0		2085		110	175	285		61%	1993	0.143	
	D	3	3.500	1	10			1		0		1965	75	210		285	26%		1890	0.151	
	D	3	3.500	2		10	0	0		0		4210			860	860		100%	3661	0.235	0.235

JUNCTION CAPACITY CALCULATION

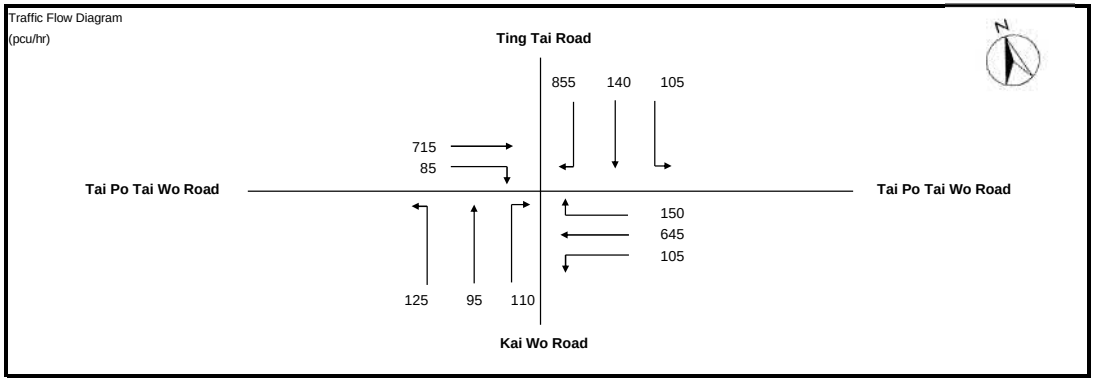
AECOM

Junction J6 - Tai Po Tai Wo Road / Ting Tai Road	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J6

Traffic Flow Diagram

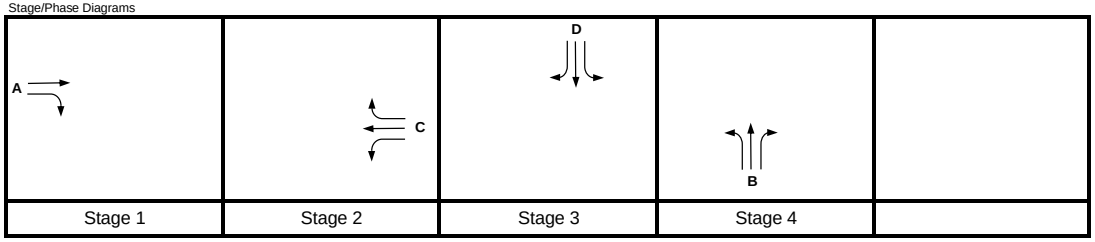
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	140	sec
Sum(y)	Y =	0.702	
Lost time	L =	22	sec
Total Flow	=	3,130	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	127	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	74	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.735	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	4.7	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	100	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,C,D,B

R.C.(C) = $(0.9xY_{max}-Y)/Y \times 100\%$ = 8%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1			0	1		0		1965		388		388			1965	0.198	0.198
	A	1	3.600	1		20	0	0		0		2115		327	85	412		21%	2083	0.198	
	B	4	3.700	1	10			1		0		1985	125	95		220	57%		1829	0.120	0.120
	B	4	3.700	1		20	0	0		0		2125			110	110		100%	1977	0.056	
	C	2	3.500	1	15			1		0		1965	105	180		285	37%		1895	0.150	0.150
	C	2	3.300	1						0		2085		313		313			2085	0.150	
	C	2	3.300	1		20	0	0		0		2085		152	150	302		50%	2010	0.150	
	D	3	3.500	1	10			1		0		1965	105	140		245	43%		1846	0.133	
	D	3	3.500	2		10	0	0		0		4210			855	855		100%	3661	0.234	0.234

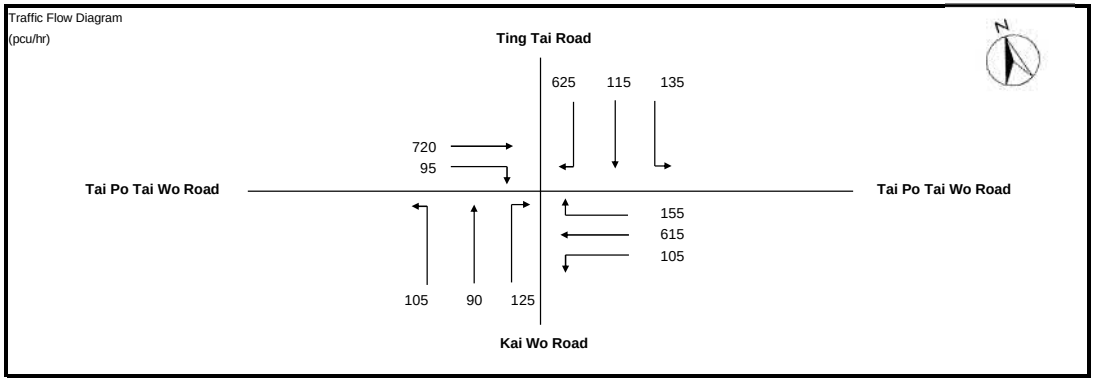
JUNCTION CAPACITY CALCULATION

AECOM

Junction J6 - Tai Po Tai Wo Road / Ting Tai Road	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

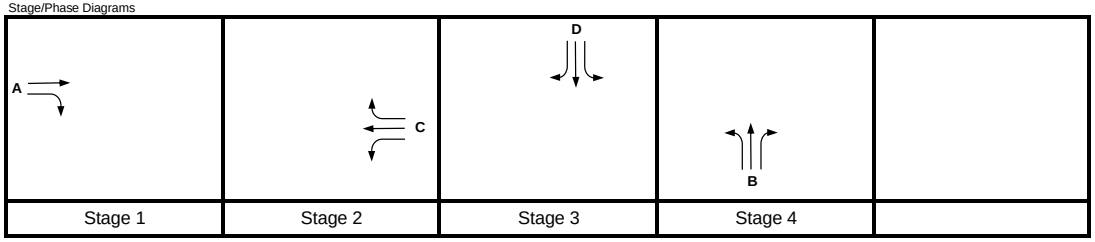
J6

Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	140	sec
Sum(y)		Y =	0.625	
Lost time		L =	22	sec
Total Flow		=	2,885	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	101	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	59	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.735	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	17.7	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	72	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,C,D,B

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 21%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
↑	A	1	3.500	1			0	1		0		1965		396		396			1965	0.202	0.202
↑↱	A	1	3.600	1		20	0	0		0		2115		324	95	419		23%	2080	0.202	
↰↑	B	4	3.700	1	10			1		0		1985	105	90		195	54%		1837	0.106	0.106
↱	B	4	3.700	1		20	0	0		0		2125			125	125		100%	1977	0.063	
↰↑	C	2	3.500	1	15			1		0		1965	105	172		277	38%		1893	0.146	0.146
↑	C	2	3.300	1						0		2085		305		305			2085	0.146	
↑↱	C	2	3.300	1		20	0	0		0		2085		138	155	293		53%	2006	0.146	
↰↑	D	3	3.500	1	10			1		0		1965	135	115		250	54%		1818	0.138	
↱	D	3	3.500	2		10	0	0		0		4210			625	625		100%	3661	0.171	0.171

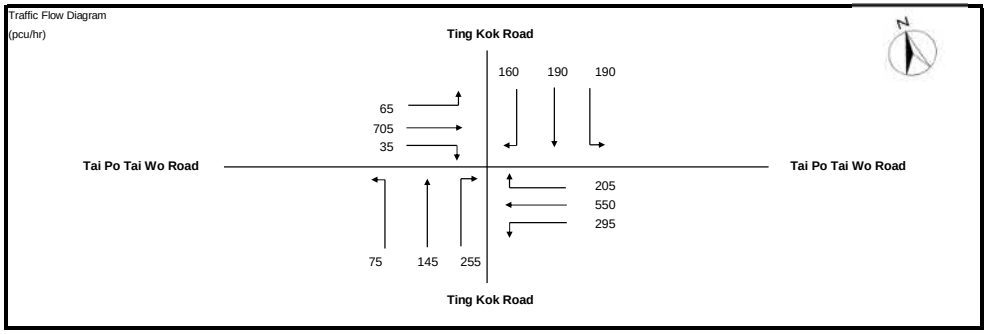
JUNCTION CAPACITY CALCULATION

AECOM

Junction J7 - Tai Po Tai Wo Road / Ting Kok Road	2023 AM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Aug 23

J7

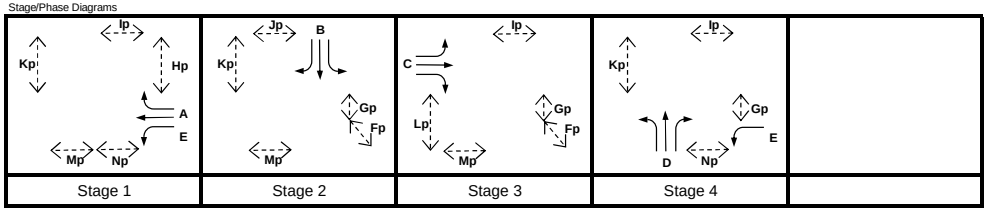
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4		
Cycle time	C =	90	sec	
Sum(y)	Y =	0.378		
Lost time	L =	42	sec	
Total Flow	=	2,870	pcu	

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$ =	109	sec	
Min. Cycle Time C_m	$= L/(1-Y)$ =	68	sec	
Y_{ult}	$= 0.9-0.0075 \times L$ =	0.585		
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$ =	54.7	%	
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$ =	72	sec	
Y_{max}	$= 1-L/C$ =	0.533		

Stage/Phase Diagrams



G = 6 I/G = 12 I/G = 8 I/G = 6 I/G = 13

Critical Case : Hp,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 27%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
↰	E	1,4	4.200	1	25			1		0		2035	295			295	100%		1920	0.154	
↑	A	1	3.100	2				0		0		4130		550		550			4130	0.133	
↱	A	1	3.100	1		25	0	0		0		2065			205	205		100%	1948	0.105	
↰	B	2	3.100	1	10			1		0		1925	171			171	100%		1674	0.102	0.102
↑	B	2	3.000	1	15	20	0			0		2055	19	190	0	209	9%	0%	2037	0.102	
↱	B	2	3.500	1		15	0	0		0		2105			160	160		100%	1914	0.084	
↰	C	3	3.400	1	10			1		0		1955	65	304		369	18%		1905	0.193	0.193
↑	C	3	3.200	1				0		0		2075		401		401			2075	0.193	
↱	C	3	3.400	1		15	0	0		0		2095			35	35		100%	1905	0.018	
↰	D	4	3.400	1	15			1		0		1955	75	78		153	49%		1864	0.082	
↑	D	4	3.400	1		20	0			0		2095		67	98	165		60%	2005	0.082	0.082
↱	D	4	3.400	1		15	0	0		0		2095			157	157		100%	1905	0.082	
Pedestrian Crossing				GM		FGM															
	Fp	2,3	min.	8	+	6	=	14	sec												
	Gp	2,3,4	min.	8	+	9	=	17	sec												
	Hp	1	min.	6	+	10	=	16	sec												*
	Ip	1,3,4	min.	8	+	10	=	18	sec												
	Jp	2	min.	6	+	6	=	12	sec												
	Kp	1,2,4	min.	8	+	9	=	17	sec												
	Lp	3	min.	6	+	6	=	12	sec												
	Mp	1,2,3	min.	6	+	10	=	16	sec												
	Np	1,4	min.	5	+	6	=	11	sec												

JUNCTION CAPACITY CALCULATION

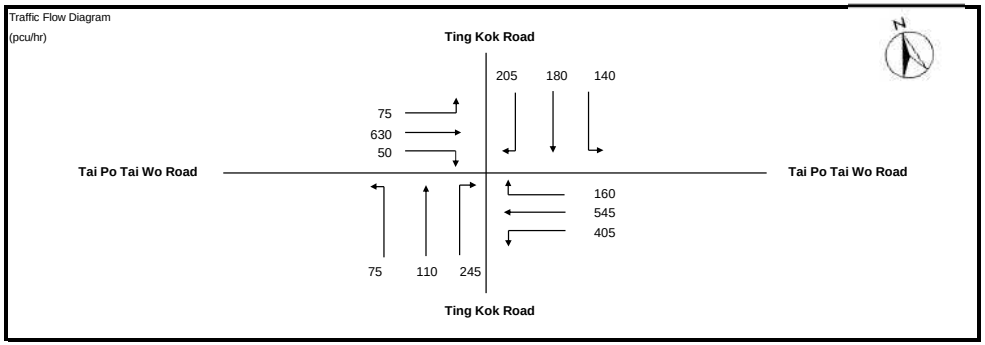
AECOM

Junction J7 - Tai Po Tai Wo Road / Ting Kok Road	2023 PM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Aug 23

J7

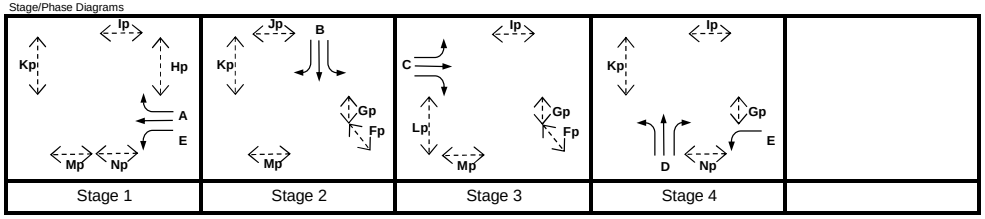
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.482	
Lost time	L =	24	sec
Total Flow	=	2,820	pcu
Optimum Cycle C_o = (1.5×L+5)/(1-Y)	=	79	sec
Min. Cycle Time C_m = L/(1-Y)	=	46	sec
Y_{ult} = 0.9-0.0075×L	=	0.720	
$R.C._{ult}$ = $(Y_{ult}-Y)/Yx100\%$	=	49.4	%
Practical Cycle Time C_p = 0.9×L/(0.9-Y)	=	52	sec
Y_{max} = 1-L/C	=	0.733	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
I/G = 7	I/G = 8	I/G = 6	I/G = 7	

Critical Case : A,B,C,D

R.C.(C) = $(0.9xY_{max}-Y)/Yx100\%$ = 37%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR y	CRITICAL y
	E	1,4	4.200	1	25			1		0		2035	405			405	100%		1920	0.211	
	A	1	3.100	2				0		0		4130		545		545			4130	0.132	0.132
	A	1	3.100	1		25	0	0		0		2065			160	160		100%	1948	0.082	
	B	2	3.100	1	10			1		0		1925	140			140	100%		1674	0.084	
	B	2	3.000	1	15	20	0			0		2055	0	180	19	199	0%	9%	2041	0.097	
	B	2	3.500	1		15	0	0		0		2105			186	186		100%	1914	0.097	0.097
	C	3	3.400	1	10			1		0		1955	75	261		336	22%		1892	0.178	0.178
	C	3	3.200	1				0		0		2075		369		369			2075	0.178	
	C	3	3.400	1		15	0	0		0		2095			50	50		100%	1905	0.026	
	D	4	3.400	1	15			1		0		1955	75	64		139	54%		1855	0.075	
	D	4	3.400	1		20	0			0		2095		46	103	149		69%	1992	0.075	0.075
	D	4	3.400	1		15	0	0		0		2095			142	142		100%	1905	0.075	
Pedestrian Crossing				GM		FGM															
	Fp	2,3	min.	8	+	6	=	14	sec												
	Gp	2,3,4	min.	8	+	9	=	17	sec												
	Hp	1	min.	6	+	10	=	16	sec												
	Ip	1,3,4	min.	8	+	10	=	18	sec												
	Jp	2	min.	6	+	6	=	12	sec												
	Kp	1,2,4	min.	8	+	9	=	17	sec												
	Lp	3	min.	6	+	6	=	12	sec												
	Mp	1,2,3	min.	6	+	10	=	16	sec												
	Np	1,4	min.	5	+	6	=	11	sec												

JUNCTION CAPACITY CALCULATION

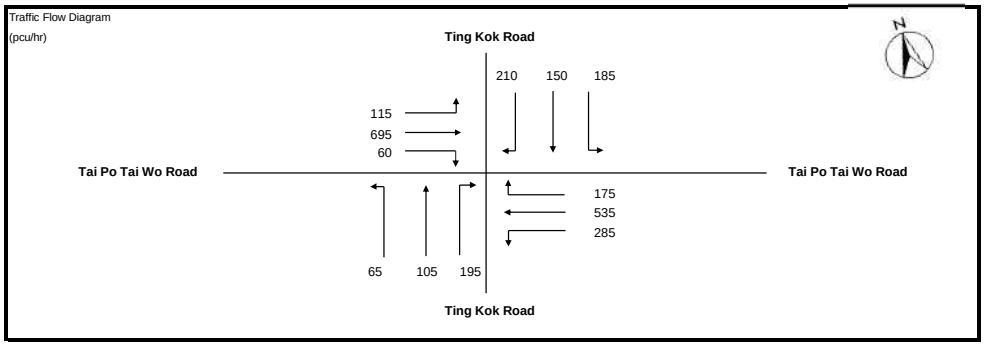
AECOM

Junction J7 - Tai Po Tai Wo Road / Ting Kok Road	2023 Weekend Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Aug 23

J7

Traffic Flow Diagram

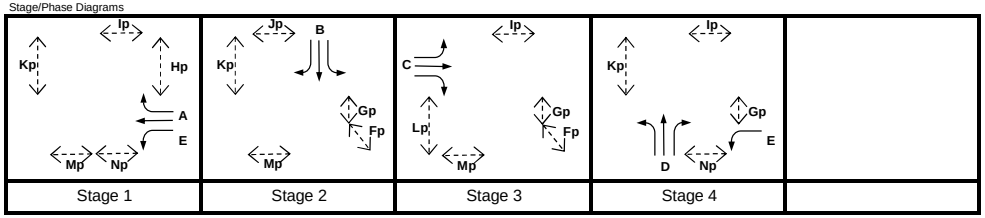
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.366	
Lost time	L =	42	sec
Total Flow	=	2,775	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	107	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	66	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.585	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	59.9	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	71	sec
Y_{max}	$= 1-L/C$	=	0.533	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
G = 6	I/G = 12	I/G = 8	I/G = 6	I/G = 13

Critical Case : Hp,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 31%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR y	CRITICAL y
	E	1,4	4.200	1	25			1		0		2035	285			285	100%		1920	0.148	
	A	1	3.100	2				0		0		4130		535		535			4130	0.130	
	A	1	3.100	1		25	0	0		0		2065			175	175		100%	1948	0.090	
	B	2	3.100	1	10			1		0		1925	163			163	100%		1674	0.097	
	B	2	3.000	1	15	20	0			0		2055	22	150	24	196	11%	12%	2014	0.097	0.097
	B	2	3.500	1		15	0	0		0		2105			186	186		100%	1914	0.097	
	C	3	3.400	1	10			1		0		1955	115	269		384	30%		1871	0.205	0.205
	C	3	3.200	1				0		0		2075		426		426			2075	0.205	
	C	3	3.400	1		15	0	0		0		2095			60	60		100%	1905	0.032	
	D	4	3.400	1	15			1		0		1955	65	52		117	55%		1852	0.063	
	D	4	3.400	1		20	0			0		2095		53	74	127		59%	2007	0.063	0.063
	D	4	3.400	1		15	0	0		0		2095			121	121		100%	1905	0.063	
Pedestrian Crossing				GM		FGM															
	Fp	2,3	min.	8	+	6	=	14	sec												
	Gp	2,3,4	min.	8	+	9	=	17	sec												
	Hp	1	min.	6	+	10	=	16	sec												*
	Ip	1,3,4	min.	8	+	10	=	18	sec												
	Jp	2	min.	6	+	6	=	12	sec												
	Kp	1,2,4	min.	8	+	9	=	17	sec												
	Lp	3	min.	6	+	6	=	12	sec												
	Mp	1,2,3	min.	6	+	10	=	16	sec												
	Np	1,4	min.	5	+	6	=	11	sec												

JUNCTION CAPACITY CALCULATION

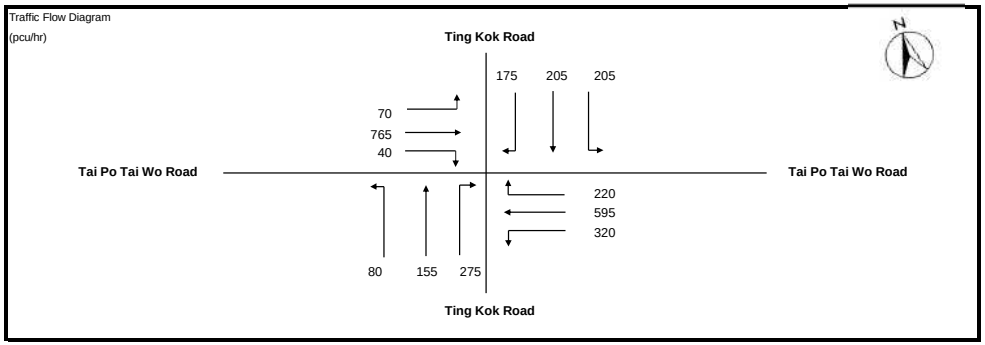
AECOM

Junction J7 - Tai Po Tai Wo Road / Ting Kok Road	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Aug 23

J7

Traffic Flow Diagram

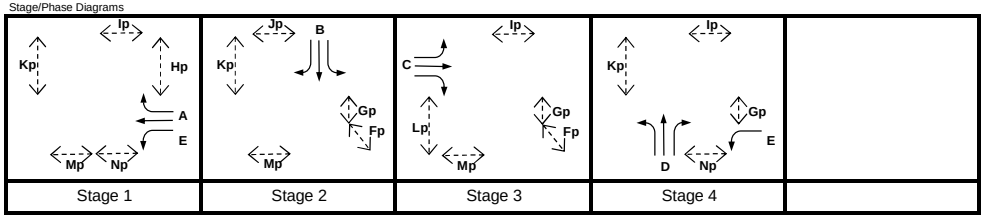
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.409	
Lost time	L =	42	sec
Total Flow	=	3,105	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$ =		115	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	71	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.585	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	43.2	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	77	sec
Y_{max}	$= 1-L/C$	=	0.533	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
G = 6	I/G = 12	I/G = 8	I/G = 6	I/G = 13

Critical Case : Hp,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 17%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR y	CRITICAL y
	E	1,4	4.200	1	25			1		0		2035	320			320	100%		1920	0.167	
	A	1	3.100	2				0		0		4130		595		595			4130	0.144	
	A	1	3.100	1		25	0	0		0		2065			220	220		100%	1948	0.113	
	B	2	3.100	1	10			1		0		1925	185			185	100%		1674	0.110	0.110
	B	2	3.000	1	15	20	0			0		2055	20	205	0	225	9%	0%	2037	0.110	
	B	2	3.500	1		15	0	0		0		2105			175	175		100%	1914	0.091	
	C	3	3.400	1	10			1		0		1955	70	330		400	18%		1905	0.210	
	C	3	3.200	1				0		0		2075		435		435			2075	0.210	0.210
	C	3	3.400	1		15	0	0		0		2095			40	40		100%	1905	0.021	
	D	4	3.400	1	15			1		0		1955	80	85		165	49%		1864	0.088	0.088
	D	4	3.400	1		20	0			0		2095		70	107	177		60%	2004	0.088	
	D	4	3.400	1		15	0	0		0		2095			168	168		100%	1905	0.088	
Pedestrian Crossing				GM		FGM															
	Fp	2,3	min.	8	+	6	=	14	sec												
	Gp	2,3,4	min.	8	+	9	=	17	sec												
	Hp	1	min.	6	+	10	=	16	sec												*
	Ip	1,3,4	min.	8	+	10	=	18	sec												
	Jp	2	min.	6	+	6	=	12	sec												
	Kp	1,2,4	min.	8	+	9	=	17	sec												
	Lp	3	min.	6	+	6	=	12	sec												
	Mp	1,2,3	min.	6	+	10	=	16	sec												
	Np	1,4	min.	5	+	6	=	11	sec												

JUNCTION CAPACITY CALCULATION

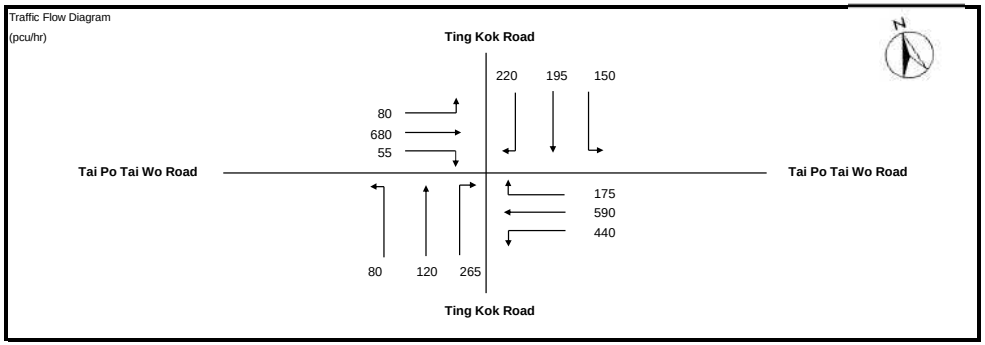
AECOM

Junction J7 - Tai Po Tai Wo Road / Ting Kok Road	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Aug 23

J7

Traffic Flow Diagram

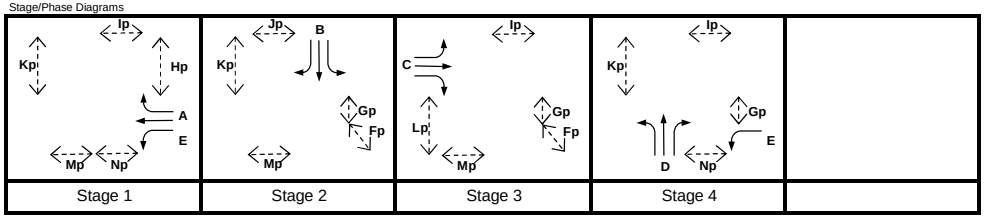
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.520	
Lost time	L =	24	sec
Total Flow	=	3,050	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	85	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	50	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.720	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	38.4	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	57	sec
Y_{max}	$= 1-L/C$	=	0.733	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
I/G = 7	I/G = 8	I/G = 6	I/G = 7	

Critical Case : A,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 27%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR y	CRITICAL y
	E	1,4	4.200	1	25			1		0		2035	440			440	100%		1920	0.229	
	A	1	3.100	2				0		0		4130		590		590			4130	0.143	0.143
	A	1	3.100	1		25	0	0		0		2065			175	175		100%	1948	0.090	
	B	2	3.100	1	10			1		0		1925	150			150	100%		1674	0.090	
	B	2	3.000	1	15	20	0			0		2055	0	195	19	214	0%	9%	2041	0.105	
	B	2	3.500	1		15	0	0		0		2105			201	201		100%	1914	0.105	0.105
	C	3	3.400	1	10			1		0		1955	80	283		363	22%		1892	0.192	
	C	3	3.200	1				0		0		2075		397		397			2075	0.192	0.192
	C	3	3.400	1		15	0	0		0		2095			55	55		100%	1905	0.029	
	D	4	3.400	1	15			1		0		1955	80	70		150	53%		1856	0.081	
	D	4	3.400	1		20	0			0		2095		50	111	161		69%	1992	0.081	0.081
	D	4	3.400	1		15	0	0		0		2095			154	154		100%	1905	0.081	
Pedestrian Crossing				GM		FGM															
	Fp	2,3	min.	8	+	6	=	14	sec												
	Gp	2,3,4	min.	8	+	9	=	17	sec												
	Hp	1	min.	6	+	10	=	16	sec												
	Ip	1,3,4	min.	8	+	10	=	18	sec												
	Jp	2	min.	6	+	6	=	12	sec												
	Kp	1,2,4	min.	8	+	9	=	17	sec												
	Lp	3	min.	6	+	6	=	12	sec												
	Mp	1,2,3	min.	6	+	10	=	16	sec												
	Np	1,4	min.	5	+	6	=	11	sec												

JUNCTION CAPACITY CALCULATION

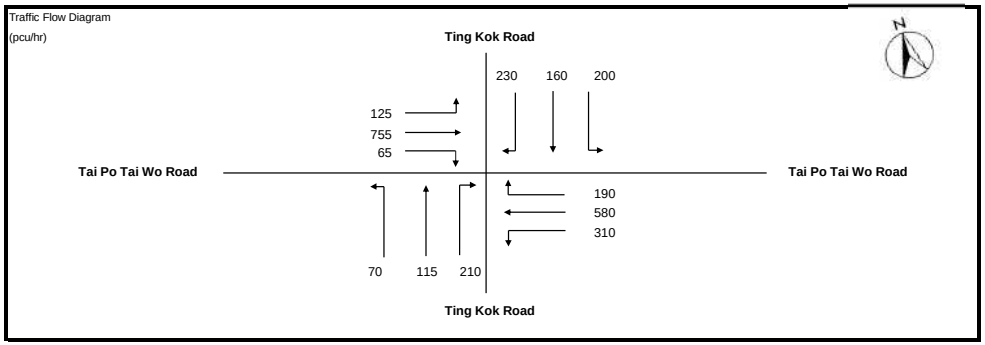
AECOM

Junction J7 - Tai Po Tai Wo Road / Ting Kok Road	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Aug 23

J7

Traffic Flow Diagram

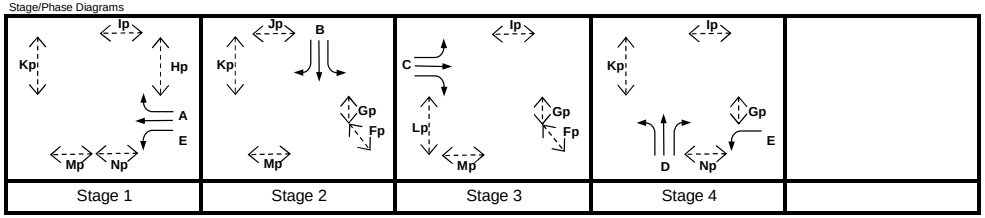
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.397	
Lost time	L =	42	sec
Total Flow	=	3,010	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$ =	113	sec
Min. Cycle Time C_m	$= L/(1-Y)$ =	70	sec
Y_{ult}	$= 0.9-0.0075 \times L$ =	0.585	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$ =	47.4	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$ =	75	sec
Y_{max}	$= 1-L/C$ =	0.533	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
G = 6	I/G = 12	I/G = 8	I/G = 6	I/G = 13

Critical Case : Hp,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 21%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR y	CRITICAL y
	E	1,4	4.200	1	25			1		0		2035	310			310	100%		1920	0.161	
	A	1	3.100	2				0		0		4130		580		580			4130	0.140	
	A	1	3.100	1		25	0	0		0		2065			190	190		100%	1948	0.098	
	B	2	3.100	1	10			1		0		1925	176			176	100%		1674	0.105	
	B	2	3.000	1	15	20	0			0		2055	24	160	28	212	11%	13%	2012	0.105	0.105
	B	2	3.500	1		15	0	0		0		2105			202	202		100%	1914	0.105	
	C	3	3.400	1	10			1		0		1955	125	292		417	30%		1871	0.223	
	C	3	3.200	1				0		0		2075		463		463			2075	0.223	0.223
	C	3	3.400	1		15	0	0		0		2095			65	65		100%	1905	0.034	
	D	4	3.400	1	15			1		0		1955	70	57		127	55%		1853	0.069	
	D	4	3.400	1		20	0			0		2095		58	80	138		58%	2008	0.069	0.069
	D	4	3.400	1		15	0	0		0		2095			130	130		100%	1905	0.069	
Pedestrian Crossing				GM		FGM															
	Fp	2,3	min.	8	+	6	=	14	sec												
	Gp	2,3,4	min.	8	+	9	=	17	sec												
	Hp	1	min.	6	+	10	=	16	sec												*
	Ip	1,3,4	min.	8	+	10	=	18	sec												
	Jp	2	min.	6	+	6	=	12	sec												
	Kp	1,2,4	min.	8	+	9	=	17	sec												
	Lp	3	min.	6	+	6	=	12	sec												
	Mp	1,2,3	min.	6	+	10	=	16	sec												
	Np	1,4	min.	5	+	6	=	11	sec												

JUNCTION CAPACITY CALCULATION

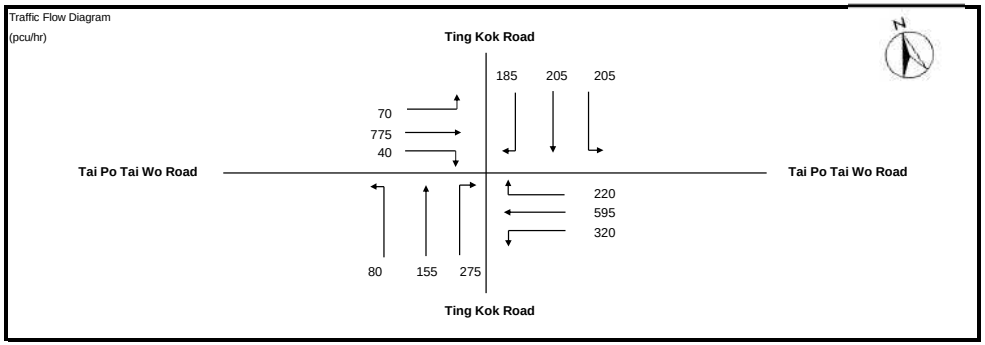
AECOM

Junction J7 - Tai Po Tai Wo Road / Ting Kok Road	2030 AM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Aug 23

J7

Traffic Flow Diagram

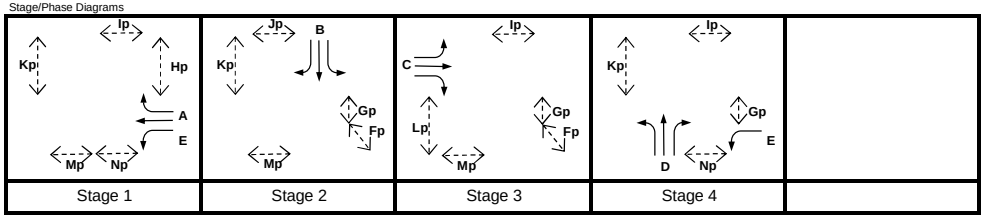
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.411	
Lost time	L =	42	sec
Total Flow	=	3,125	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$ =	115	sec
Min. Cycle Time C_m	$= L/(1-Y)$ =	71	sec
Y_{ult}	$= 0.9-0.0075 \times L$ =	0.585	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$ =	42.3	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$ =	77	sec
Y_{max}	= 1-L/C =	0.533	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
G = 6	I/G = 12	I/G = 8	I/G = 6	I/G = 13

Critical Case : Hp,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 17%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR y	CRITICAL y
↰	E	1,4	4.200	1	25			1		0		2035	320			320	100%		1920	0.167	
↑	A	1	3.100	2				0		0		4130		595		595			4130	0.144	
↱	A	1	3.100	1		25	0	0		0		2065			220	220		100%	1948	0.113	
↰	B	2	3.100	1	10			1		0		1925	185			185	100%		1674	0.110	0.110
↑	B	2	3.000	1	15	20	0			0		2055	20	205	0	225	9%	0%	2037	0.110	
↱	B	2	3.500	1		15	0	0		0		2105			185	185		100%	1914	0.097	
↰	C	3	3.400	1	10			1		0		1955	70	335		405	17%		1906	0.212	0.212
↑	C	3	3.200	1				0		0		2075		440		440			2075	0.212	
↱	C	3	3.400	1		15	0	0		0		2095			40	40		100%	1905	0.021	
↰	D	4	3.400	1	15			1		0		1955	80	85		165	49%		1864	0.088	0.088
↑	D	4	3.400	1		20	0			0		2095		70	107	177		60%	2004	0.088	
↱	D	4	3.400	1		15	0	0		0		2095			168	168		100%	1905	0.088	

Pedestrian Crossing			GM		FGM						
Fp	2,3	min.	8	+	6	=	14	sec			
Gp	2,3,4	min.	8	+	9	=	17	sec			
Hp	1	min.	6	+	10	=	16	sec			*
Ip	1,3,4	min.	8	+	10	=	18	sec			
Jp	2	min.	6	+	6	=	12	sec			
Kp	1,2,4	min.	8	+	9	=	17	sec			
Lp	3	min.	6	+	6	=	12	sec			
Mp	1,2,3	min.	6	+	10	=	16	sec			
Np	1,4	min.	5	+	6	=	11	sec			

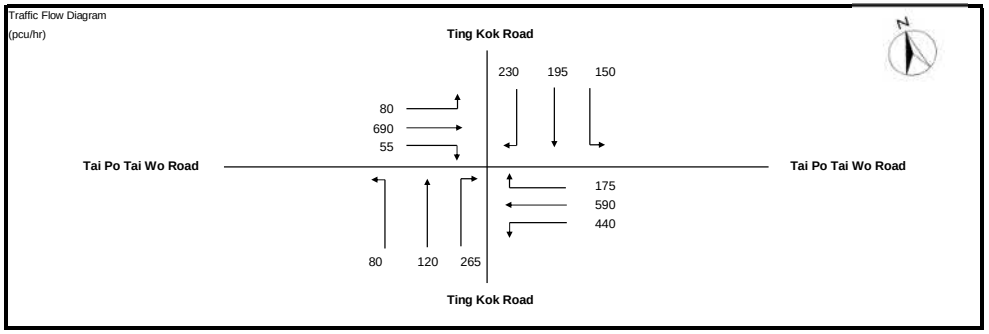
JUNCTION CAPACITY CALCULATION

AECOM

Junction J7 - Tai Po Tai Wo Road / Ting Kok Road	2030 PM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J7

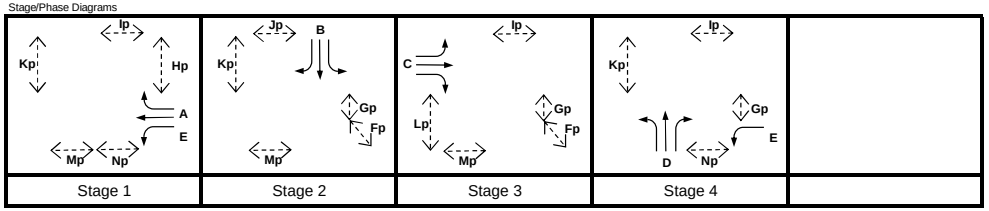
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.382	
Lost time	L =	42	sec
Total Flow	=	3,070	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$ =		110	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	68	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.585	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	53.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	73	sec
Y_{max}	$= 1-L/C$	=	0.533	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
G = 6	I/G = 12	I/G = 8	I/G = 6	I/G = 13

Critical Case : Hp,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 26%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
↰	E	1,4	4.200	1	25			1		0		2035	440			440	100%		1920	0.229	
↑	A	1	3.100	2				0		0		4130		590		590			4130	0.143	
↱	A	1	3.100	1		25	0	0		0		2065			175	175		100%	1948	0.090	
↰	B	2	3.100	1	10			1		0		1925	150			150	100%		1674	0.090	
↑	B	2	3.000	1	15	20	0			0		2055	0	195	24	219	0%	11%	2038	0.108	
↱	B	2	3.500	1		15	0	0		0		2105			206	206		100%	1914	0.108	0.108
↰	C	3	3.400	1	10			1		0		1955	80	287		367	22%		1893	0.194	
↑	C	3	3.200	1				0		0		2075		403		403			2075	0.194	0.194
↱	C	3	3.400	1		15	0	0		0		2095			55	55		100%	1905	0.029	
↰	D	4	3.400	1	15			1		0		1955	80	70		150	53%		1856	0.081	
↑	D	4	3.400	1		20	0			0		2095		50	111	161		69%	1992	0.081	0.081
↱	D	4	3.400	1		15	0	0		0		2095			154	154		100%	1905	0.081	
Pedestrian Crossing				GM		FGM															
	Fp	2,3	min.	8	+	6	=	14	sec												
	Gp	2,3,4	min.	8	+	9	=	17	sec												
	Hp	1	min.	6	+	10	=	16	sec												*
	Ip	1,3,4	min.	8	+	10	=	18	sec												
	Jp	2	min.	6	+	6	=	12	sec												
	Kp	1,2,4	min.	8	+	9	=	17	sec												
	Lp	3	min.	6	+	6	=	12	sec												
	Mp	1,2,3	min.	6	+	10	=	16	sec												
	Np	1,4	min.	5	+	6	=	11	sec												

JUNCTION CAPACITY CALCULATION

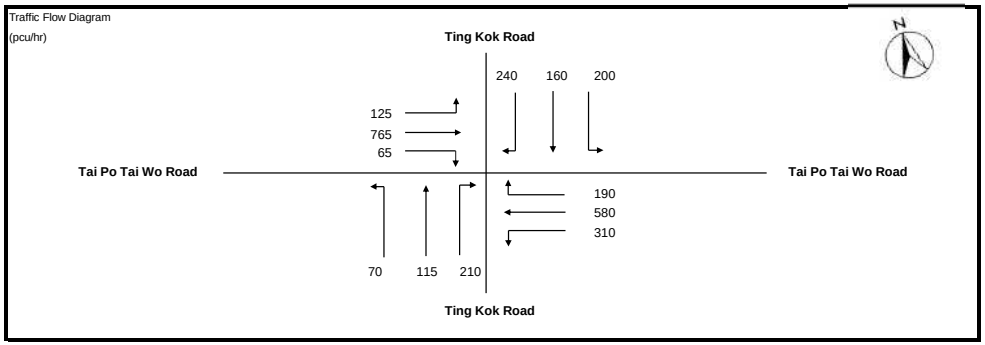
AECOM

Junction J7 - Tai Po Tai Wo Road / Ting Kok Road	2030 Weekend Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Aug 23

J7

Traffic Flow Diagram

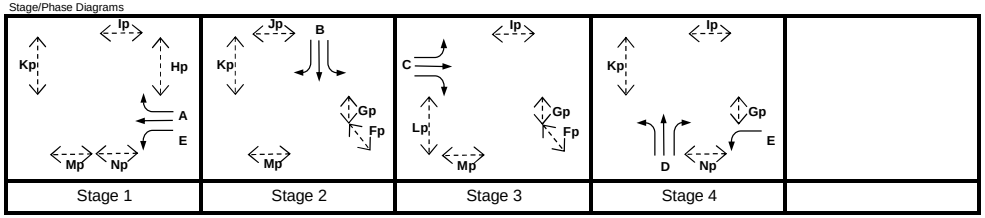
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.401	
Lost time	L =	42	sec
Total Flow	=	3,030	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$ =		114	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	70	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.585	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	45.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	76	sec
Y_{max}	$= 1-L/C$	=	0.533	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
G = 6	I/G = 12	I/G = 8	I/G = 6	I/G = 13

Critical Case : Hp,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 20%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR y	CRITICAL y
	E	1,4	4.200	1	25			1		0		2035	310			310	100%		1920	0.161	
	A	1	3.100	2				0		0		4130		580		580			4130	0.140	
	A	1	3.100	1		25	0	0		0		2065			190	190		100%	1948	0.098	
	B	2	3.100	1	10			1		0		1925	179			179	100%		1674	0.107	
	B	2	3.000	1	15	20	0			0		2055	21	160	35	216	10%	16%	2011	0.107	0.107
	B	2	3.500	1		15	0	0		0		2105			205	205		100%	1914	0.107	
	C	3	3.400	1	10			1		0		1955	125	297		422	30%		1872	0.225	
	C	3	3.200	1				0		0		2075		468		468			2075	0.225	0.225
	C	3	3.400	1		15	0	0		0		2095			65	65		100%	1905	0.034	
	D	4	3.400	1	15			1		0		1955	70	57		127	55%		1853	0.069	
	D	4	3.400	1		20	0			0		2095		58	80	138		58%	2008	0.069	0.069
	D	4	3.400	1		15	0	0		0		2095			130	130		100%	1905	0.069	
Pedestrian Crossing				GM		FGM															
	Fp	2,3	min.	8	+	6	=	14	sec												
	Gp	2,3,4	min.	8	+	9	=	17	sec												
	Hp	1	min.	6	+	10	=	16	sec												*
	Ip	1,3,4	min.	8	+	10	=	18	sec												
	Jp	2	min.	6	+	6	=	12	sec												
	Kp	1,2,4	min.	8	+	9	=	17	sec												
	Lp	3	min.	6	+	6	=	12	sec												
	Mp	1,2,3	min.	6	+	10	=	16	sec												
	Np	1,4	min.	5	+	6	=	11	sec												

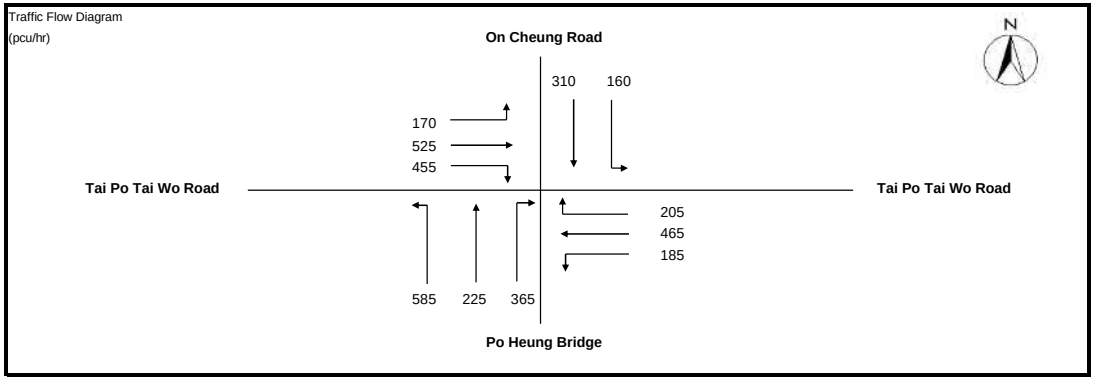
JUNCTION CAPACITY CALCULATION

AECOM

Junction J8 - Tai Po Tai Wo Road / On Cheung Road	2023 AM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J8

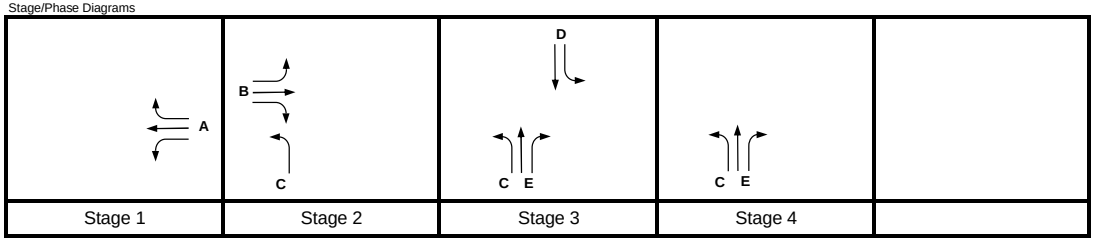
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.482	
Lost time	L =	21	sec
Total Flow	=	3,650	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	70	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	41	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	54.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	45	sec
Y_{max}	$= 1-L/C$	=	0.767	

Stage/Phase Diagrams



Critical Case : A,B,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 43%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1	10			1		0		1965	185			185	100%		1709	0.108	
	A	1	3.500	1				0		0		2105		233		233			2105	0.110	0.110
	A	1	3.500	1		20	0			0		2105		233	0	233		0%	2105	0.110	
	A	1	3.500	1		15	0	0		0		2105			205	205		100%	1914	0.107	
	B	2	3.200	1	10			1		0		1935	170	151		321	53%		1793	0.179	0.179
	B	2	3.300	1				0		0		2085		374		374			2085	0.179	
	B	2	3.200	2		15	0	0		0		4150			455	455		100%	3773	0.121	
	C	2,3,4	3.200	1	10			1		0		1935	585			585	100%		1683	0.348	
	E	3,4	3.300	1				0		0		2085		225		225			2085	0.108	
	E	3,4	3.300	1		15	0	0		0		2085			365	365		100%	1895	0.193	0.193
	D	3	3.600	1	10			1		0		1975	160	57		217	74%		1779	0.122	
	D	3	3.100	1				0		0		2065		253		253			2065	0.122	

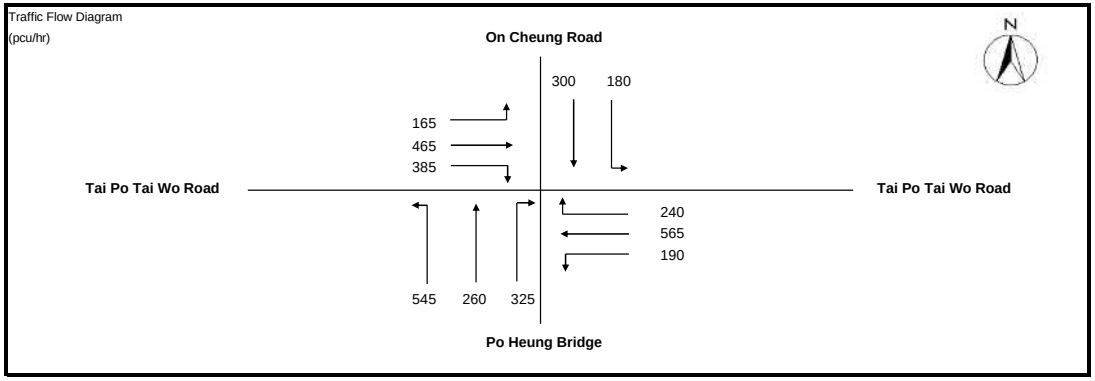
JUNCTION CAPACITY CALCULATION

AECOM

Junction J8 - Tai Po Tai Wo Road / On Cheung Road	2023 PM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J8

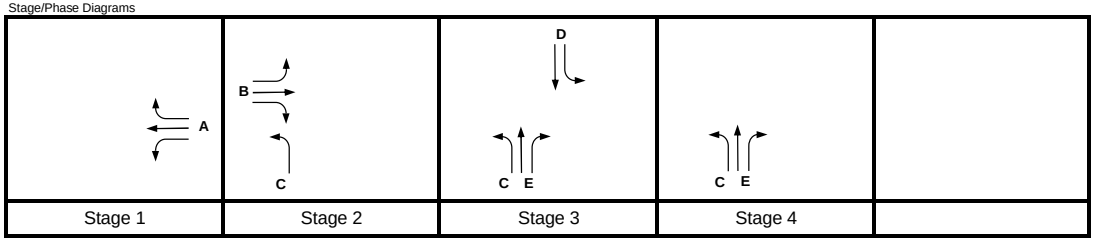
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.469	
Lost time	L =	21	sec
Total Flow	=	3,620	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	69	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	40	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	58.5	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	44	sec
Y_{max}	= 1-L/C	=	0.767	

Stage/Phase Diagrams



Critical Case : A,B,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 47%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1	10			1		0		1965	190			190	100%		1709	0.111	
	A	1	3.500	1				0		0		2105		283		283			2105	0.134	0.134
	A	1	3.500	1		20	0			0		2105		283	0	283		0%	2105	0.134	
	A	1	3.500	1		15	0	0		0		2105			240	240		100%	1914	0.125	
	B	2	3.200	1	10			1		0		1935	165	125		290	57%		1783	0.163	
	B	2	3.300	1				0		0		2085		340		340			2085	0.163	0.163
	B	2	3.200	2		15	0	0		0		4150			385	385		100%	3773	0.102	
	C	2,3,4	3.200	1	10			1		0		1935	545			545	100%		1683	0.324	
	E	3,4	3.300	1				0		0		2085		260		260			2085	0.125	
	E	3,4	3.300	1		15	0	0		0		2085			325	325		100%	1895	0.171	0.171
	D	3	3.600	1	10			1		0		1975	180	41		221	82%		1760	0.125	
	D	3	3.100	1				0		0		2065		259		259			2065	0.125	

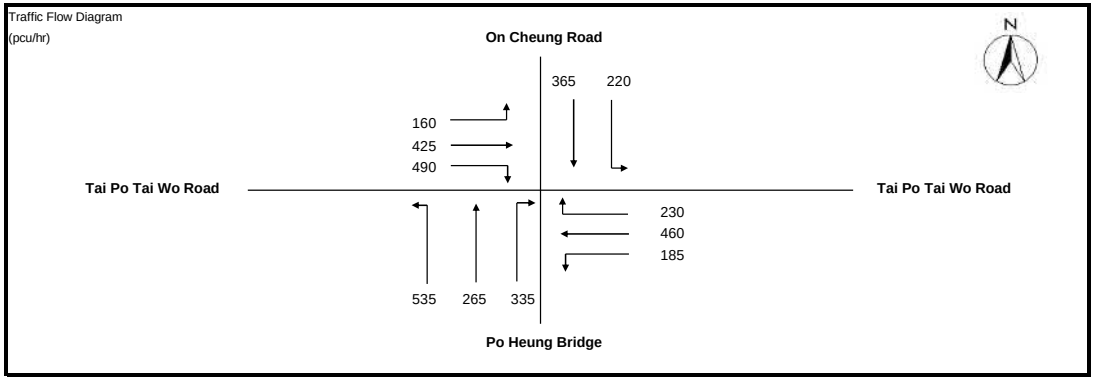
JUNCTION CAPACITY CALCULATION

AECOM

Junction J8 - Tai Po Tai Wo Road / On Cheung Road	2023 Weekend Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J8

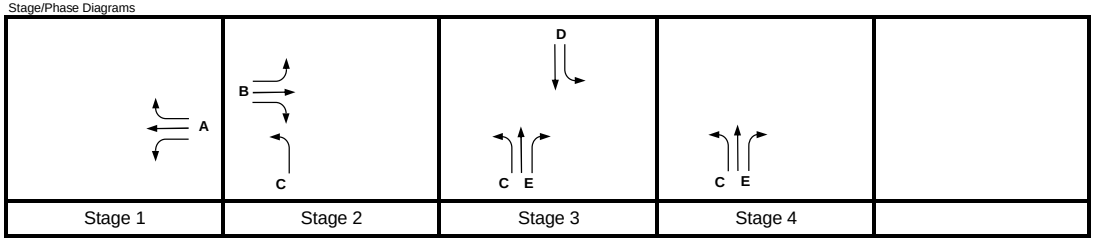
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.441	
Lost time	L =	21	sec
Total Flow	=	3,670	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	65	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	38	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	68.3	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	41	sec
Y_{max}	= 1-L/C	=	0.767	

Stage/Phase Diagrams



Critical Case : A,B,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 56%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1	10			1		0		1965	185			185	100%		1709	0.108	
	A	1	3.500	1				0		0		2105		238		238			2105	0.113	
	A	1	3.500	1		20	0			0		2105		222	14	236		6%	2096	0.113	
	A	1	3.500	1		15	0	0		0		2105			216	216		100%	1914	0.113	0.113
	B	2	3.200	1	10			1		0		1935	160	109		269	59%		1777	0.151	
	B	2	3.300	1				0		0		2085		316		316			2085	0.151	0.151
	B	2	3.200	2		15	0	0		0		4150			490	490		100%	3773	0.130	
	C	2,3,4	3.200	1	10			1		0		1935	535			535	100%		1683	0.318	
	E	3,4	3.300	1				0		0		2085		265		265			2085	0.127	
	E	3,4	3.300	1		15	0	0		0		2085			335	335		100%	1895	0.177	0.177
	D	3	3.600	1	10			1		0		1975	220	49		269	82%		1759	0.153	
	D	3	3.100	1				0		0		2065		316		316			2065	0.153	

JUNCTION CAPACITY CALCULATION

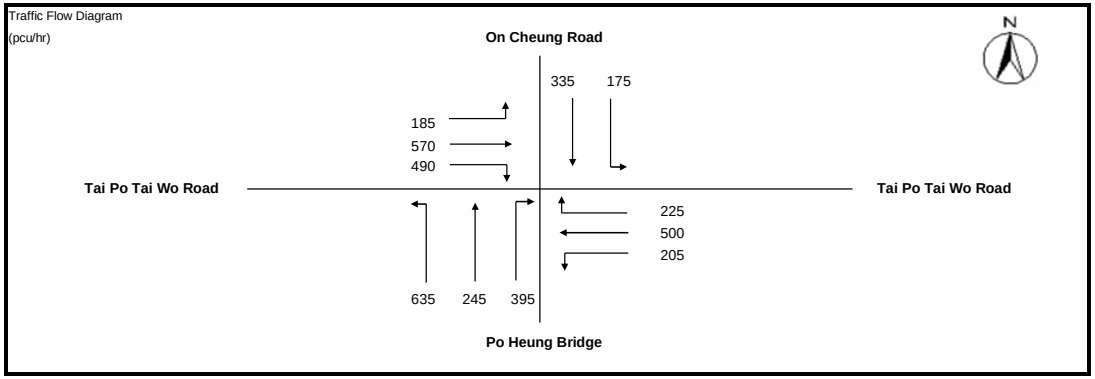
AECOM

Junction J8 - Tai Po Tai Wo Road / On Cheung Road	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Aug 23

J8

Traffic Flow Diagram

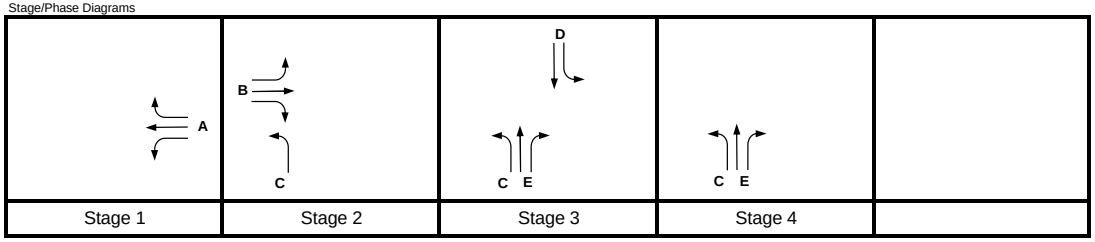
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.523	
Lost time	L =	21	sec
Total Flow	=	3,960	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	77	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	44	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	41.9	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	50	sec
Y_{max}	$= 1-L/C$	=	0.767	

Stage/Phase Diagrams



I/G = 8 I/G = 9 I/G = I/G = 7

Critical Case : A,B,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 32%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1	10			1		0		1965	205			205	100%		1709	0.120	0.120
	A	1	3.500	1				0		0		2105		250		250			2105	0.119	
	A	1	3.500	1		20	0			0		2105		250	0	250		0%	2105	0.119	
	A	1	3.500	1		15	0	0		0		2105			225	225		100%	1914	0.118	
	B	2	3.200	1	10			1		0		1935	185	164		349	53%		1792	0.195	0.195
	B	2	3.300	1				0		0		2085		406		406			2085	0.195	
	B	2	3.200	2		15	0	0		0		4150			490	490		100%	3773	0.130	
	C	2,3,4	3.200	1	10			1		0		1935	635			635	100%		1683	0.377	
	E	3,4	3.300	1				0		0		2085		245		245			2085	0.118	
	E	3,4	3.300	1		15	0	0		0		2085			395	395		100%	1895	0.208	0.208
	D	3	3.600	1	10			1		0		1975	175	61		236	74%		1777	0.133	
	D	3	3.100	1				0		0		2065		274		274			2065	0.133	

JUNCTION CAPACITY CALCULATION

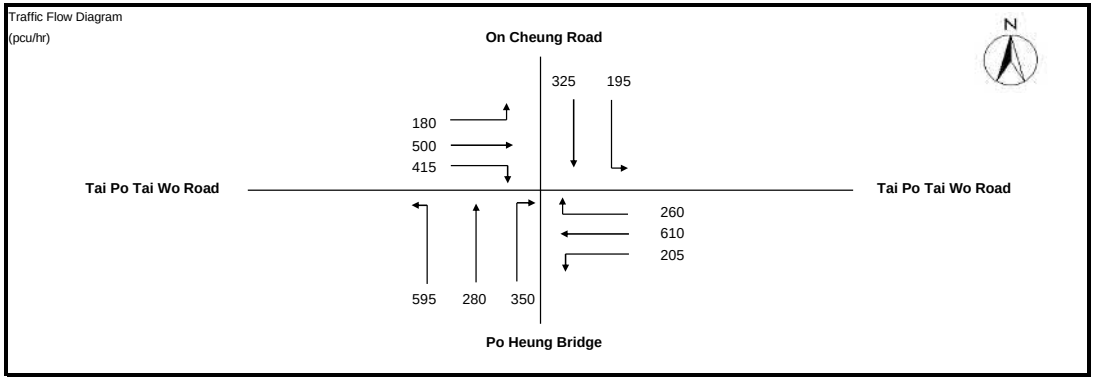
AECOM

Junction J8 - Tai Po Tai Wo Road / On Cheung Road	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J8

Traffic Flow Diagram

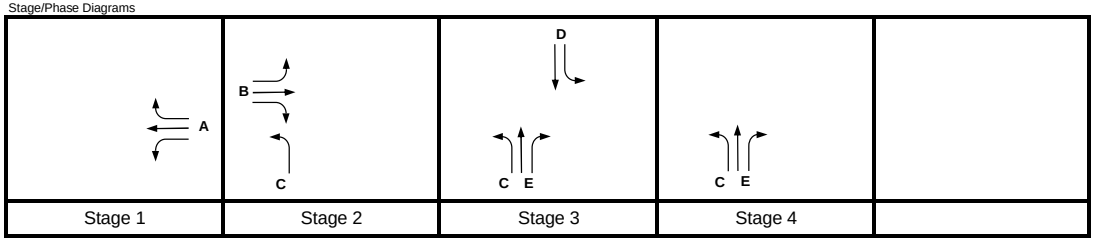
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.505	
Lost time	L =	21	sec
Total Flow	=	3,915	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	74	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	42	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	46.9	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	48	sec
Y_{max}	$= 1-L/C$	=	0.767	

Stage/Phase Diagrams



Critical Case : A,B,E

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 37%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1	10			1		0		1965	205			205	100%		1709	0.120	
	A	1	3.500	1				0		0		2105		305		305			2105	0.145	0.145
	A	1	3.500	1		20	0			0		2105		305	0	305		0%	2105	0.145	
	A	1	3.500	1		15	0	0		0		2105			260	260		100%	1914	0.136	
	B	2	3.200	1	10			1		0		1935	180	133		313	57%		1781	0.176	
	B	2	3.300	1				0		0		2085		367		367			2085	0.176	0.176
	B	2	3.200	2		15	0	0		0		4150			415	415		100%	3773	0.110	
	C	2,3,4	3.200	1	10			1		0		1935	595			595	100%		1683	0.354	
	E	3,4	3.300	1				0		0		2085		280		280			2085	0.134	
	E	3,4	3.300	1		15	0	0		0		2085			350	350		100%	1895	0.185	0.185
	D	3	3.600	1	10			1		0		1975	195	44		239	82%		1760	0.136	
	D	3	3.100	1				0		0		2065		281		281			2065	0.136	

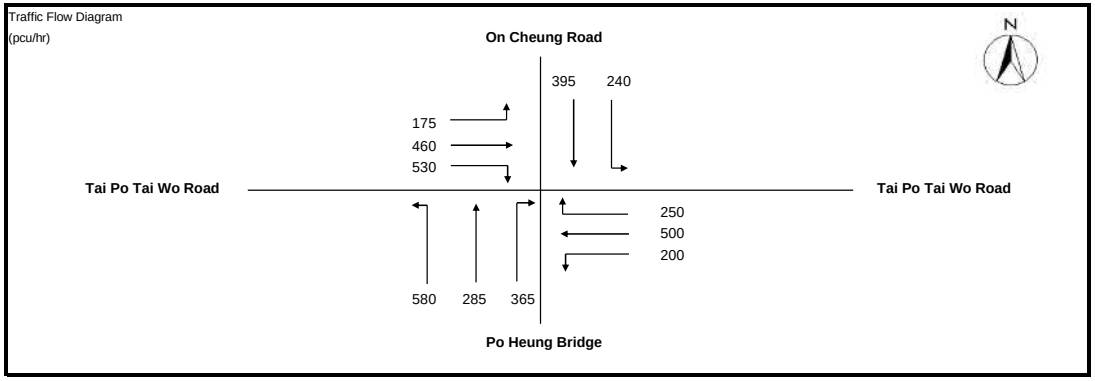
JUNCTION CAPACITY CALCULATION

AECOM

Junction J8 - Tai Po Tai Wo Road / On Cheung Road	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J8

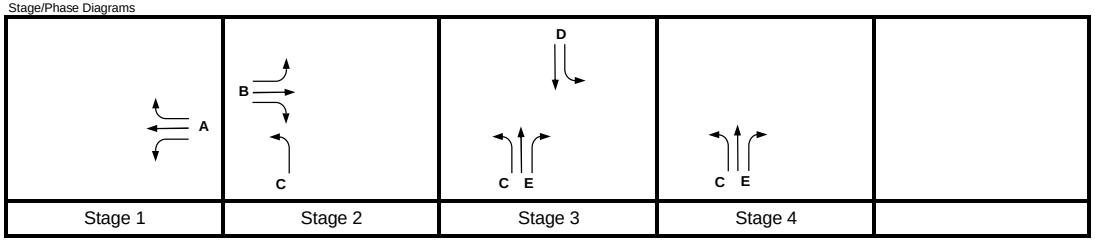
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.480	
Lost time	L =	21	sec
Total Flow	=	3,980	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	70	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	40	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	54.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	45	sec
Y_{max}	$= 1-L/C$	=	0.767	

Stage/Phase Diagrams



Critical Case : A,B,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 44%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
↰	A	1	3.500	1	10			1		0		1965	200			200	100%		1709	0.117	
↑	A	1	3.500	1				0		0		2105		258		258			2105	0.123	
↑↱	A	1	3.500	1		20	0			0		2105		242	15	257		6%	2096	0.123	
↱	A	1	3.500	1		15	0	0		0		2105			235	235		100%	1914	0.123	0.123
↰	B	2	3.200	1	10			1		0		1935	175	117		292	60%		1775	0.164	
↑	B	2	3.300	1				0		0		2085		343		343			2085	0.164	0.164
↱	B	2	3.200	2		15	0	0		0		4150			530	530		100%	3773	0.140	
↰	C	2,3,4	3.200	1	10			1		0		1935	580			580	100%		1683	0.345	
↑	E	3,4	3.300	1				0		0		2085		285		285			2085	0.137	
↱	E	3,4	3.300	1		15	0	0		0		2085			365	365		100%	1895	0.193	0.193
↰	D	3	3.600	1	10			1		0		1975	240	52		292	82%		1758	0.166	
↑	D	3	3.100	1				0		0		2065		343		343			2065	0.166	

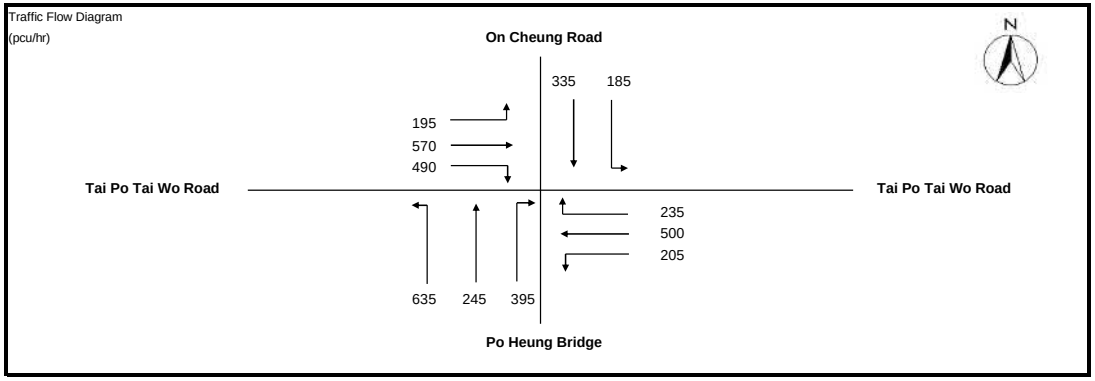
JUNCTION CAPACITY CALCULATION

AECOM

Junction J8 - Tai Po Tai Wo Road / On Cheung Road	2030 AM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J8

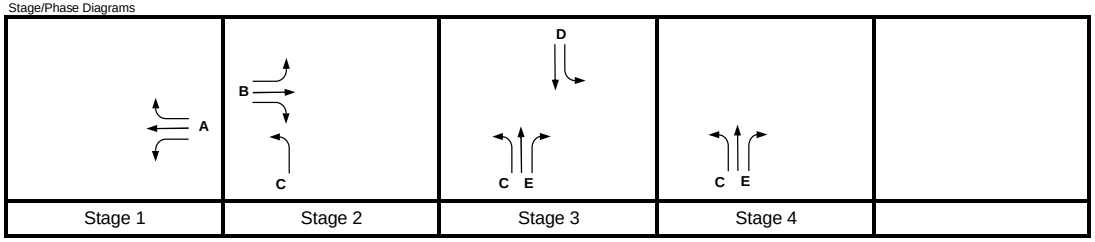
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.526	
Lost time	L =	21	sec
Total Flow	=	3,990	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	77	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	44	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	41.1	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	51	sec
Y_{max}	$= 1-L/C$	=	0.767	

Stage/Phase Diagrams



I/G = 8 I/G = 9 I/G = I/G = 7

Critical Case : A,B,E

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 31%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1	10			1		0		1965	205			205	100%		1709	0.120	
	A	1	3.500	1				0		0		2105		253		253			2105	0.120	0.120
	A	1	3.500	1		20	0			0		2105		247	5	252		2%	2102	0.120	
	A	1	3.500	1		15	0	0		0		2105			230	230		100%	1914	0.120	
	B	2	3.200	1	10			1		0		1935	195	158		353	55%		1787	0.198	
	B	2	3.300	1				0		0		2085		412		412			2085	0.198	0.198
	B	2	3.200	2		15	0	0		0		4150			490	490		100%	3773	0.130	
	C	2,3,4	3.200	1	10			1		0		1935	635			635	100%		1683	0.377	
	E	3,4	3.300	1				0		0		2085		245		245			2085	0.118	
	E	3,4	3.300	1		15	0	0		0		2085			395	395		100%	1895	0.208	0.208
	D	3	3.600	1	10			1		0		1975	185	55		240	77%		1770	0.136	
	D	3	3.100	1				0		0		2065		280		280			2065	0.136	

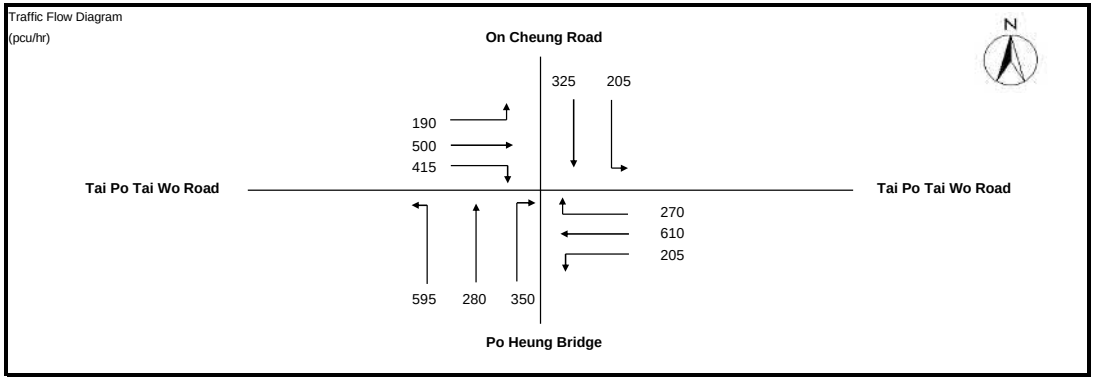
JUNCTION CAPACITY CALCULATION

AECOM

Junction J8 - Tai Po Tai Wo Road / On Cheung Road	2030 PM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J8

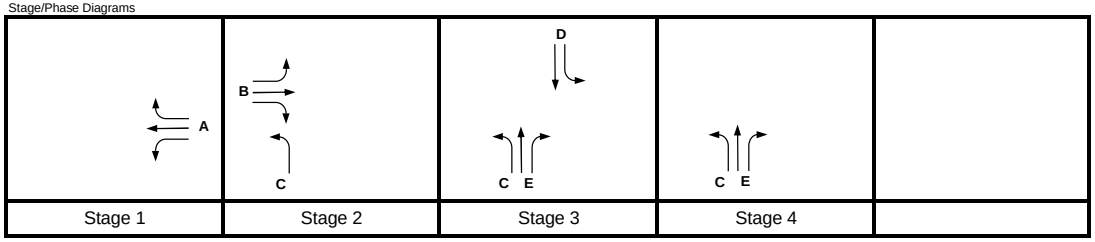
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.508	
Lost time	L =	21	sec
Total Flow	=	3,945	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	74	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	43	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	46.1	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	48	sec
Y_{max}	$= 1-L/C$	=	0.767	

Stage/Phase Diagrams



Critical Case : A,B,E

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 36%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1	10			1		0		1965	205			205	100%		1709	0.120	
	A	1	3.500	1				0		0		2105		305		305			2105	0.145	0.145
	A	1	3.500	1		20	0			0		2105		305	0	305		0%	2105	0.145	
	A	1	3.500	1		15	0	0		0		2105			270	270		100%	1914	0.141	
	B	2	3.200	1	10			1		0		1935	190	127		317	60%		1776	0.179	
	B	2	3.300	1				0		0		2085		373		373			2085	0.179	0.179
	B	2	3.200	2		15	0	0		0		4150			415	415		100%	3773	0.110	
	C	2,3,4	3.200	1	10			1		0		1935	595			595	100%		1683	0.354	
	E	3,4	3.300	1				0		0		2085		280		280			2085	0.134	
	E	3,4	3.300	1		15	0	0		0		2085			350	350		100%	1895	0.185	0.185
	D	3	3.600	1	10			1		0		1975	205	38		243	84%		1753	0.139	
	D	3	3.100	1				0		0		2065		287		287			2065	0.139	

JUNCTION CAPACITY CALCULATION

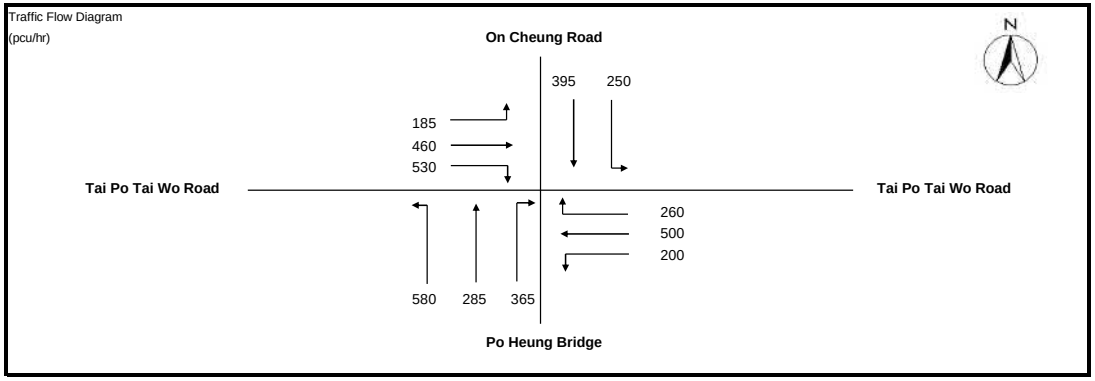
AECOM

Junction J8 - Tai Po Tai Wo Road / On Cheung Road	2030 Weekend Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J8

Traffic Flow Diagram

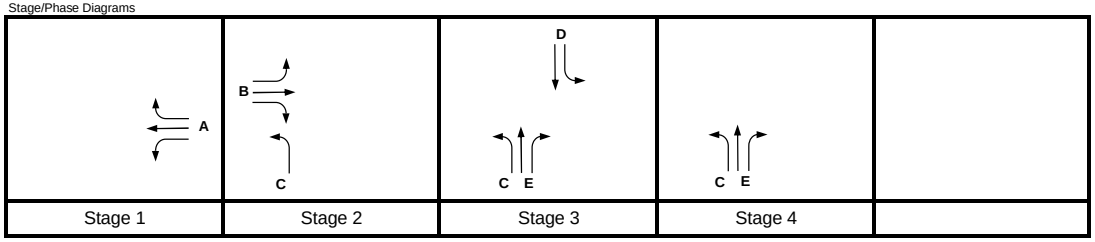
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	90	sec
Sum(y)	Y =	0.484	
Lost time	L =	21	sec
Total Flow	=	4,010	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	71	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	41	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	53.3	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	45	sec
Y_{max}	= 1-L/C	=	0.767	

Stage/Phase Diagrams



Critical Case : A,B,E

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 42%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.500	1	10			1		0		1965	200			200	100%		1709	0.117	
	A	1	3.500	1				0		0		2105		262		262			2105	0.124	
	A	1	3.500	1		20	0			0		2105		238	22	260		8%	2092	0.124	
	A	1	3.500	1		15	0	0		0		2105			238	238		100%	1914	0.124	0.124
	B	2	3.200	1	10			1		0		1935	185	111		296	62%		1769	0.167	
	B	2	3.300	1				0		0		2085		349		349			2085	0.167	0.167
	B	2	3.200	2		15	0	0		0		4150			530	530		100%	3773	0.140	
	C	2,3,4	3.200	1	10			1		0		1935	580			580	100%		1683	0.345	
	E	3,4	3.300	1				0		0		2085		285		285			2085	0.137	
	E	3,4	3.300	1		15	0	0		0		2085			365	365		100%	1895	0.193	0.193
	D	3	3.600	1	10			1		0		1975	250	46		296	84%		1753	0.169	
	D	3	3.100	1				0		0		2065		349		349			2065	0.169	

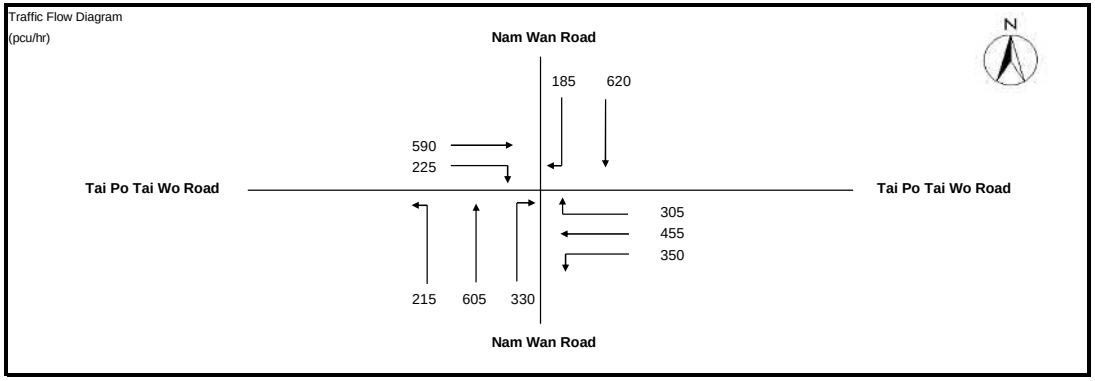
JUNCTION CAPACITY CALCULATION

AECOM

Junction J9 - Tai Po Tai Wo Road / Nam Wan Road	2023 AM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J9

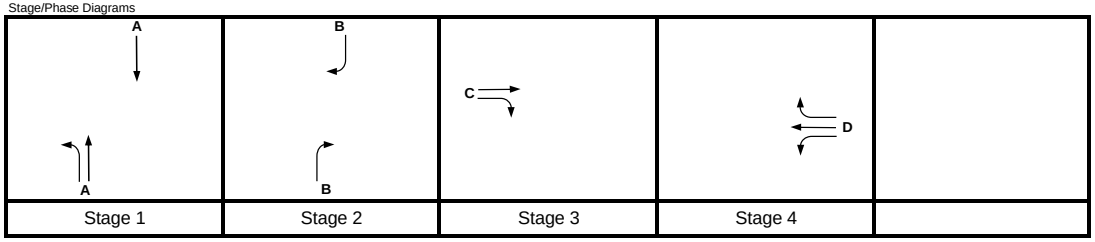
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	134	sec
Sum(y)	Y =	0.716	
Lost time	L =	21	sec
Total Flow	=	3,880	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	129	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	74	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	3.6	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	103	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 6%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
	A	1	3.300	2				1		0		4030		620		620			4030	0.154	
	B	2	3.300	1		20	0	0		0		2085			185	185		100%	1940	0.095	
	A	1	3.100	1	10			1		0		1925	215	163		378	57%		1774	0.213	0.213
	A	1	3.200	1				0		0		2075		442		442			2075	0.213	
	B	2	3.200	1		25	0	0		0		2075			330	330		100%	1958	0.169	0.169
	C	3	3.700	2				0		0		4250		590		590			4250	0.139	0.139
	C	3	3.200	1		10	0	0		0		2075			225	225		100%	1804	0.125	
	D	4	3.500	1	15			1		0		1965	350	0		350	100%		1786	0.196	0.196
	D	4	3.500	1						0		2105		284		284			2105	0.135	
	D	4	3.500	1		15	1			0		2105		171	75	246		30%	1820	0.135	
	D	4	3.500	1		15	1	0		0		2105			230	230		100%	1705	0.135	

JUNCTION CAPACITY CALCULATION

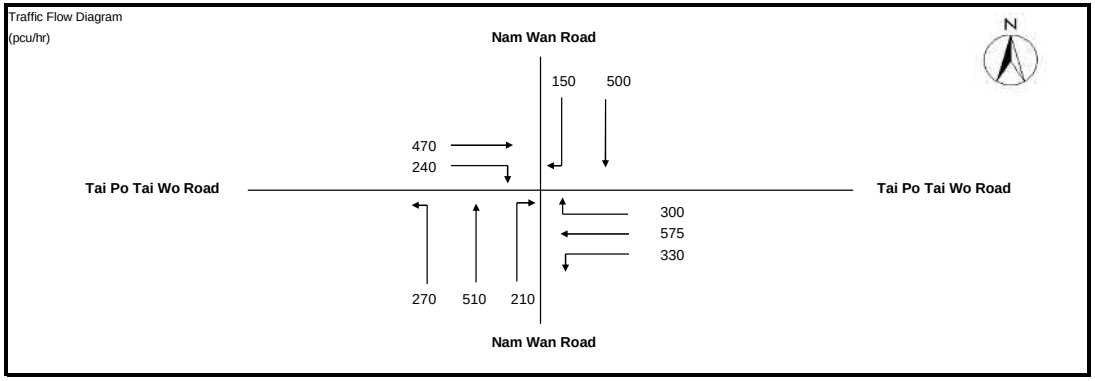
AECOM

Junction J9 - Tai Po Tai Wo Road / Nam Wan Road	2023 PM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J9

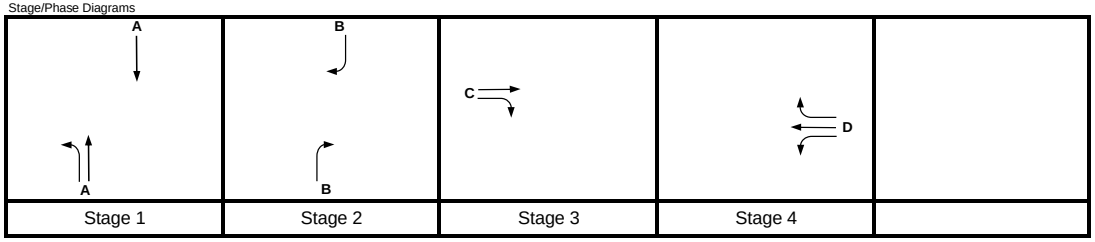
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	122	sec
Sum(y)		Y =	0.630	
Lost time		L =	21	sec
Total Flow		=	3,555	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	99	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	57	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	17.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	70	sec
Y_{max}	$= 1-L/C$	=	0.828	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
I/G = 5	I/G = 5	I/G = 7	I/G = 8	

Critical Case : A,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 18%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
	A	1	3.300	2				1		0		4030		500		500			4030	0.124	
	B	2	3.300	1		20	0	0		0		2085			150	150		100%	1940	0.077	
	A	1	3.100	1	10			1		0		1925	270	84		354	76%		1728	0.205	0.205
	A	1	3.200	1				0		0		2075		426		426			2075	0.205	
	B	2	3.200	1		25	0	0		0		2075			210	210		100%	1958	0.107	0.107
	C	3	3.700	2				0		0		4250		470		470			4250	0.111	
	C	3	3.200	1		10	0	0		0		2075			240	240		100%	1804	0.133	0.133
	D	4	3.500	1	15			1		0		1965	330	0		330	100%		1786	0.185	0.185
	D	4	3.500	1						0		2105		325		325			2105	0.155	
	D	4	3.500	1		15	1			0		2105		250	37	286		13%	1851	0.155	
	D	4	3.500	1		15	1	0		0		2105			263	263		100%	1705	0.155	

JUNCTION CAPACITY CALCULATION

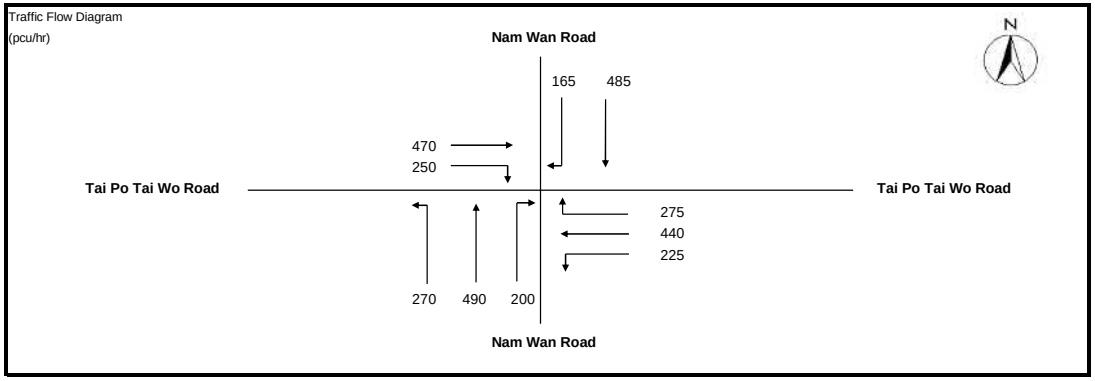
AECOM

Junction J9 - Tai Po Tai Wo Road / Nam Wan Road	2023 Weekend Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J9

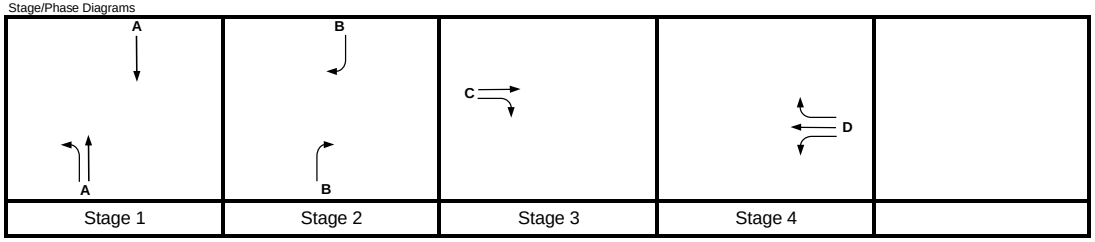
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	120	sec
Sum(y)		Y =	0.567	
Lost time		L =	21	sec
Total Flow		=	3,270	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	84	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	49	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	30.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	57	sec
Y_{max}	$= 1-L/C$	=	0.825	

Stage/Phase Diagrams



Critical Case : A,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 31%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.300	2				1		0		4030		485		485			4030	0.120	
	B	2	3.300	1		20	0	0		0		2085			165	165		100%	1940	0.085	
	A	1	3.100	1	10			1		0		1925	270	75		345	78%		1723	0.200	0.200
	A	1	3.200	1				0		0		2075		415		415			2075	0.200	
	B	2	3.200	1		25	0	0		0		2075			200	200		100%	1958	0.102	0.102
	C	3	3.700	2				0		0		4250		470		470			4250	0.111	
	C	3	3.200	1		10	0	0		0		2075			250	250		100%	1804	0.139	0.139
	D	4	3.500	1	15			1		0		1965	225	1		226	99%		1787	0.127	
	D	4	3.500	1						0		2105		266		266			2105	0.127	0.127
	D	4	3.500	1		15	1			0		2105		172	59	231		26%	1828	0.127	
	D	4	3.500	1		15	1	0		0		2105			216	216		100%	1705	0.127	

JUNCTION CAPACITY CALCULATION

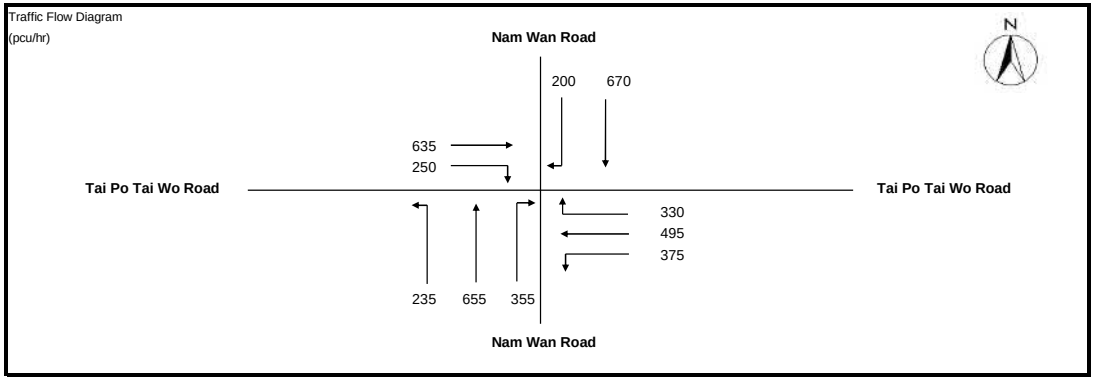
AECOM

Junction J9 - Tai Po Tai Wo Road / Nam Wan Road	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J9

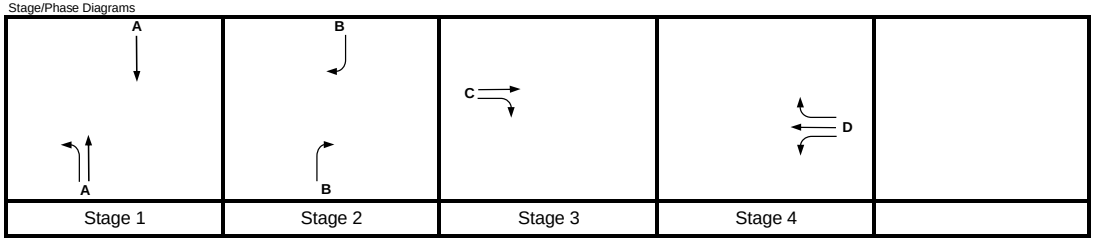
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	134	sec
Sum(y)		Y =	0.772	
Lost time		L =	21	sec
Total Flow		=	4,200	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	160	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	92	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	-3.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	148	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = -2%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.300	2			0	1		0		4030		670		670			4030	0.166	
	B	2	3.300	1		20	0	0		0		2085			200	200		100%	1940	0.103	
	A	1	3.100	1	10			1		0		1925	235	175		410	57%		1773	0.231	0.231
	A	1	3.200	1				0		0		2075		480		480			2075	0.231	
	B	2	3.200	1		25	0	0		0		2075			355	355		100%	1958	0.181	0.181
	C	3	3.700	2				0		0		4250		635		635			4250	0.149	0.149
	C	3	3.200	1		10	0	0		0		2075			250	250		100%	1804	0.139	
	D	4	3.500	1	15			1		0		1965	375	0		375	100%		1786	0.210	0.210
	D	4	3.500	1						0		2105		308		308			2105	0.147	
	D	4	3.500	1		15	1			0		2105		187	80	267		30%	1820	0.147	
	D	4	3.500	1		15	1	0		0		2105			250	250		100%	1705	0.147	

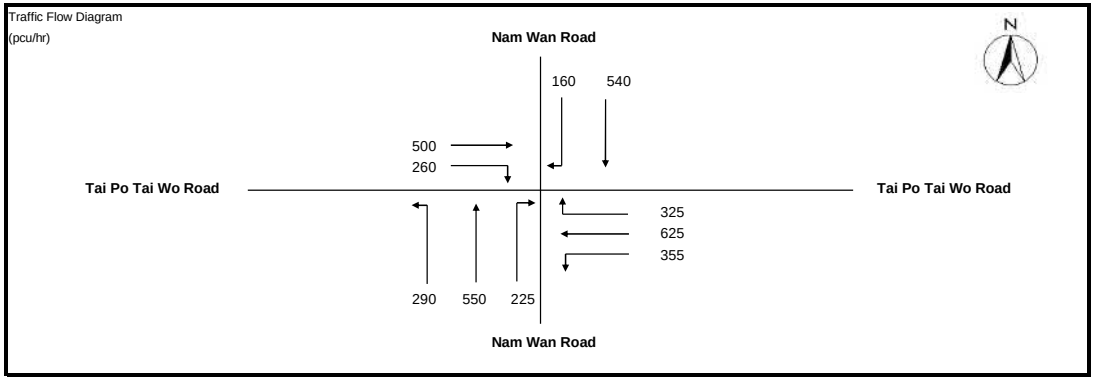
JUNCTION CAPACITY CALCULATION

AECOM

Junction J9 - Tai Po Tai Wo Road / Nam Wan Road	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J9

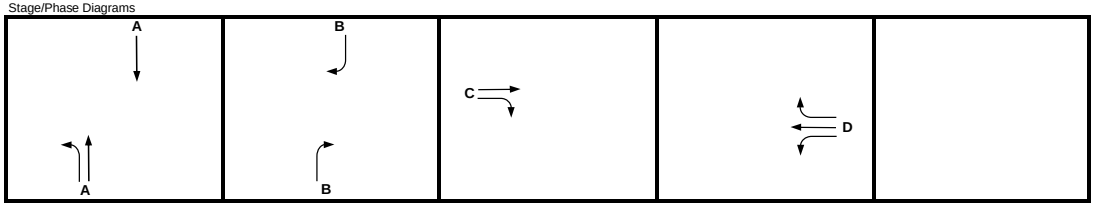
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	122	sec
Sum(y)	Y =	0.679	
Lost time	L =	21	sec
Total Flow	=	3,830	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	114	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	65	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	9.4	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	85	sec
Y_{max}	$= 1-L/C$	=	0.828	

Stage/Phase Diagrams



Critical Case : A,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 10%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
	A	1	3.300	2				1		0		4030		540		540			4030	0.134	
	B	2	3.300	1		20	0	0		0		2085			160	160		100%	1940	0.082	
	A	1	3.100	1	10			1		0		1925	290	92		382	76%		1728	0.221	0.221
	A	1	3.200	1				0		0		2075		458		458			2075	0.221	
	B	2	3.200	1		25	0	0		0		2075			225	225		100%	1958	0.115	0.115
	C	3	3.700	2				0		0		4250		500		500			4250	0.118	
	C	3	3.200	1		10	0	0		0		2075			260	260		100%	1804	0.144	0.144
	D	4	3.500	1	15			1		0		1965	355	0		355	100%		1786	0.199	0.199
	D	4	3.500	1						0		2105		353		353			2105	0.168	
	D	4	3.500	1		15	1			0		2105		272	39	311		13%	1852	0.168	
	D	4	3.500	1		15	1	0		0		2105			286	286		100%	1705	0.168	

JUNCTION CAPACITY CALCULATION

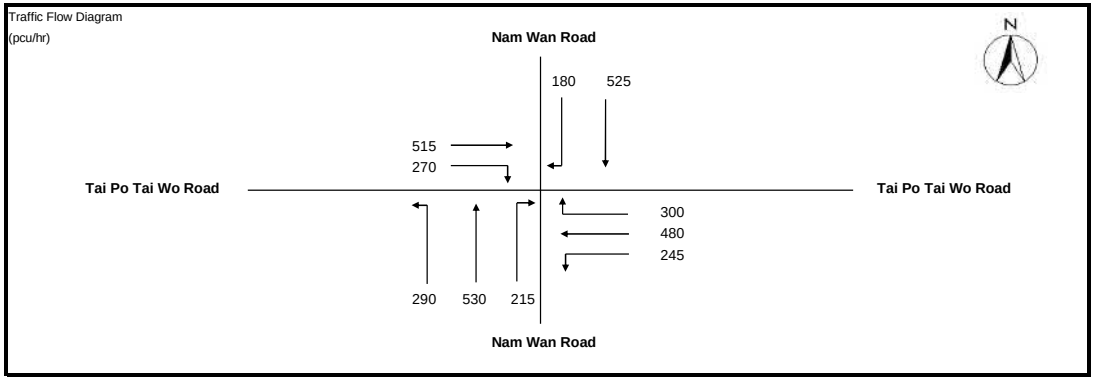
AECOM

Junction J9 - Tai Po Tai Wo Road / Nam Wan Road	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J9

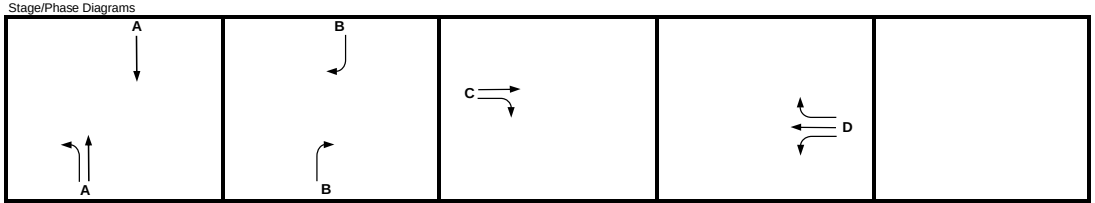
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	120	sec
Sum(y)		Y =	0.613	
Lost time		L =	21	sec
Total Flow		=	3,550	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	94	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	54	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	21.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	66	sec
Y_{max}	$= 1-L/C$	=	0.825	

Stage/Phase Diagrams



Critical Case : A,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 21%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
	A	1	3.300	2				1		0		4030		525		525			4030	0.130	
	B	2	3.300	1		20	0	0		0		2085			180	180		100%	1940	0.093	
	A	1	3.100	1	10			1		0		1925	290	82		372	78%		1723	0.216	0.216
	A	1	3.200	1				0		0		2075		448		448			2075	0.216	
	B	2	3.200	1		25	0	0		0		2075			215	215		100%	1958	0.110	0.110
	C	3	3.700	2				0		0		4250		515		515			4250	0.121	
	C	3	3.200	1		10	0	0		0		2075			270	270		100%	1804	0.150	0.150
	D	4	3.500	1	15			1		0		1965	245	2		247	99%		1788	0.138	
	D	4	3.500	1						0		2105		291		291			2105	0.138	0.138
	D	4	3.500	1		15	1			0		2105		188	65	252		26%	1828	0.138	
	D	4	3.500	1		15	1	0		0		2105			235	235		100%	1705	0.138	

JUNCTION CAPACITY CALCULATION

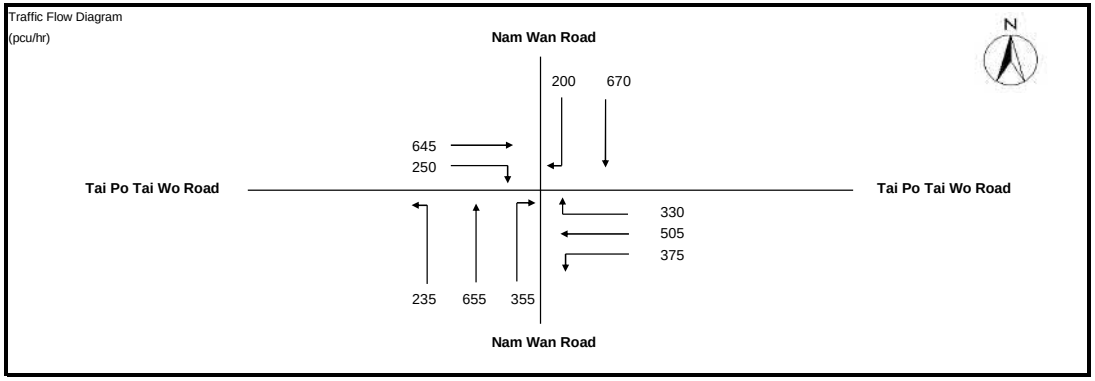
AECOM

Junction J9 - Tai Po Tai Wo Road / Nam Wan Road	2030 AM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J9

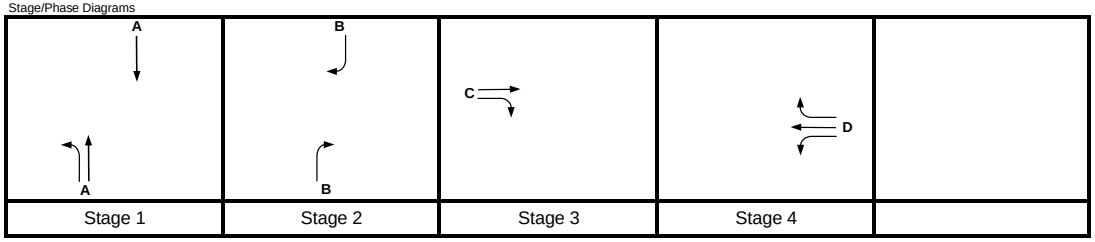
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	134	sec
Sum(y)		Y =	0.774	
Lost time		L =	21	sec
Total Flow		=	4,220	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	162	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	93	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	-4.1	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	150	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = -2%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.300	2			0	1		0		4030		670		670			4030	0.166	
	B	2	3.300	1		20	0	0		0		2085			200	200		100%	1940	0.103	
	A	1	3.100	1	10			1		0		1925	235	175		410	57%		1773	0.231	0.231
	A	1	3.200	1				0		0		2075		480		480			2075	0.231	
	B	2	3.200	1		25	0	0		0		2075			355	355		100%	1958	0.181	0.181
	C	3	3.700	2				0		0		4250		645		645			4250	0.152	0.152
	C	3	3.200	1		10	0	0		0		2075			250	250		100%	1804	0.139	
	D	4	3.500	1	15			1		0		1965	375	0		375	100%		1786	0.210	0.210
	D	4	3.500	1						0		2105		312		312			2105	0.148	
	D	4	3.500	1		15	1			0		2105		193	77	270		29%	1823	0.148	
	D	4	3.500	1		15	1	0		0		2105			253	253		100%	1705	0.148	

JUNCTION CAPACITY CALCULATION

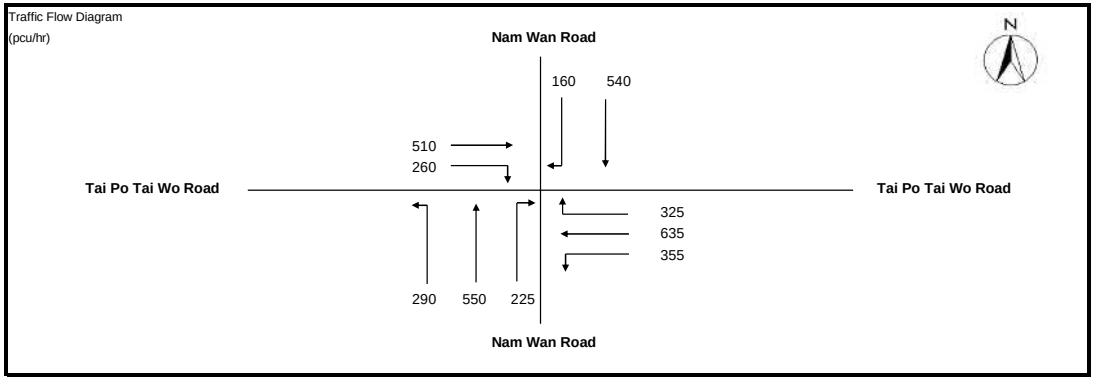
AECOM

Junction J9 - Tai Po Tai Wo Road / Nam Wan Road	2030 PM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J9

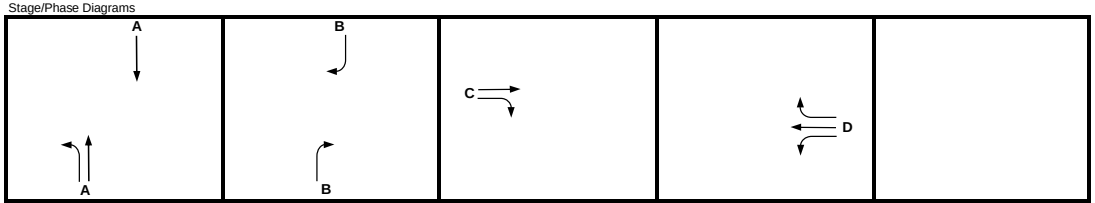
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	122	sec
Sum(y)		Y =	0.679	
Lost time		L =	21	sec
Total Flow		=	3,850	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	114	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	65	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	9.4	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	85	sec
Y_{max}	$= 1-L/C$	=	0.828	

Stage/Phase Diagrams



Critical Case : A,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 10%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
	A	1	3.300	2				1		0		4030		540		540			4030	0.134	
	B	2	3.300	1		20	0	0		0		2085			160	160		100%	1940	0.082	
	A	1	3.100	1	10			1		0		1925	290	92		382	76%		1728	0.221	0.221
	A	1	3.200	1				0		0		2075		458		458			2075	0.221	
	B	2	3.200	1		25	0	0		0		2075			225	225		100%	1958	0.115	0.115
	C	3	3.700	2				0		0		4250		510		510			4250	0.120	
	C	3	3.200	1		10	0	0		0		2075			260	260		100%	1804	0.144	0.144
	D	4	3.500	1	15			1		0		1965	355	0		355	100%		1786	0.199	0.199
	D	4	3.500	1						0		2105		357		357			2105	0.170	
	D	4	3.500	1		15	1			0		2105		278	36	314		11%	1854	0.170	
	D	4	3.500	1		15	1	0		0		2105			289	289		100%	1705	0.170	

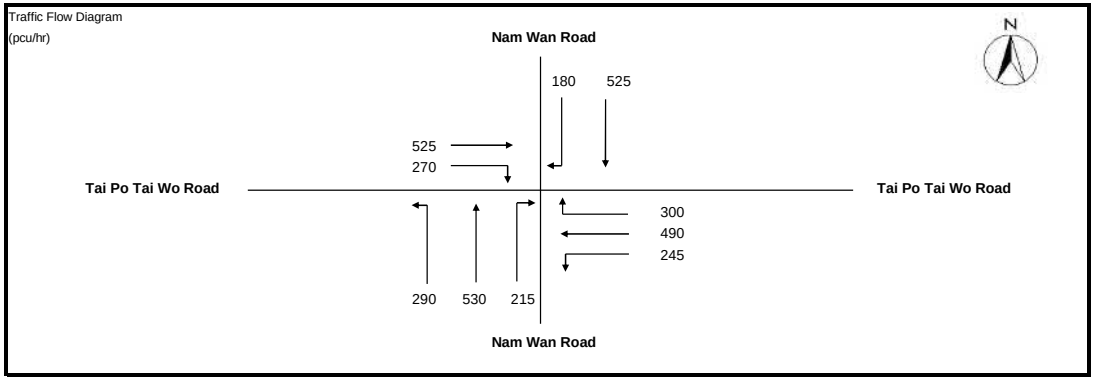
JUNCTION CAPACITY CALCULATION

AECOM

Junction J9 - Tai Po Tai Wo Road / Nam Wan Road	2030 Weekend Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

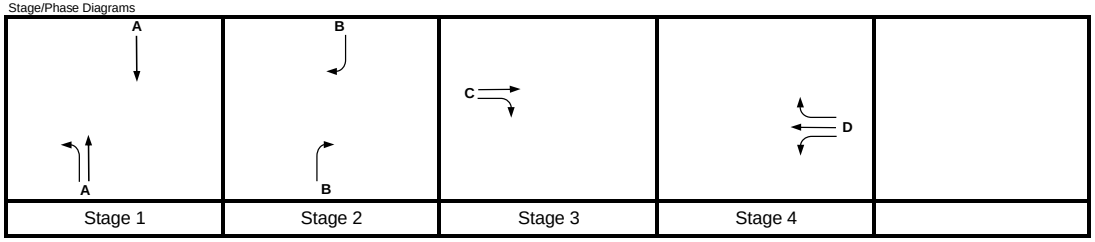
J9

Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle		N =	4	
Cycle time		C =	120	sec
Sum(y)		Y =	0.615	
Lost time		L =	21	sec
Total Flow		=	3,570	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	95	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	54	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.743	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	20.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	66	sec
Y_{max}	$= 1-L/C$	=	0.825	

Stage/Phase Diagrams



Critical Case : A,B,C,D

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\% =$ 21%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.300	2			0	1		0		4030		525		525			4030	0.130	
	B	2	3.300	1		20	0	0		0		2085			180	180		100%	1940	0.093	
	A	1	3.100	1	10			1		0		1925	290	82		372	78%		1723	0.216	0.216
	A	1	3.200	1				0		0		2075		448		448			2075	0.216	
	B	2	3.200	1		25	0	0		0		2075			215	215		100%	1958	0.110	0.110
	C	3	3.700	2				0		0		4250		525		525			4250	0.124	
	C	3	3.200	1		10	0	0		0		2075			270	270		100%	1804	0.150	0.150
	D	4	3.500	1	15			1		0		1965	245	4		249	98%		1789	0.139	
	D	4	3.500	1						0		2105		293		293			2105	0.139	0.139
	D	4	3.500	1		15	1			0		2105		192	63	255		25%	1830	0.139	
	D	4	3.500	1		15	1	0		0		2105			237	237		100%	1705	0.139	

JUNCTION CAPACITY CALCULATION

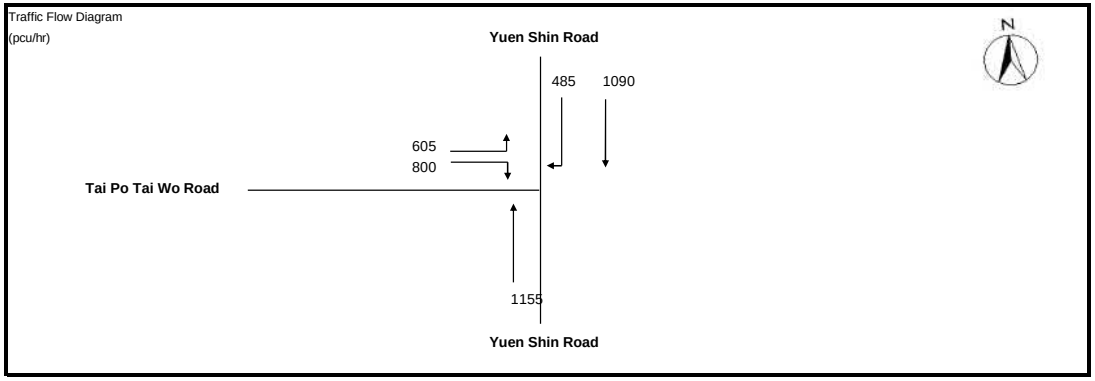
AECOM

Junction J10 - Tai Po Tai Wo Road / Yuen Shin Road	2023 AM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J10

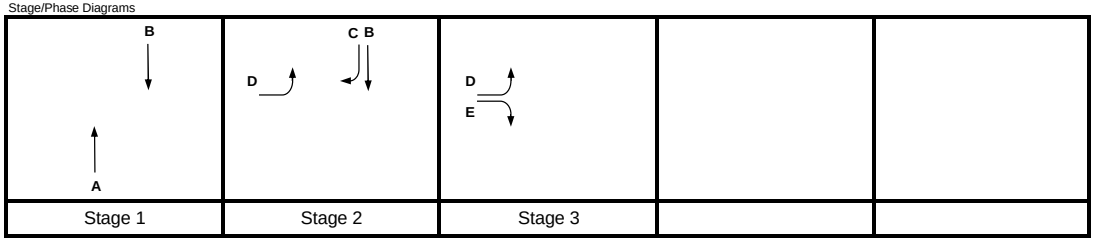
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	104	sec
Sum(y)		Y =	0.645	
Lost time		L =	13	sec
Total Flow		=	4135	pcu
Optimum Cycle C_o	= (1.5×L+5)/(1-Y)	=	69	sec
Min. Cycle Time C_m	= L/(1-Y)	=	37	sec
Y_{ult}	= 0.9-0.0075×L	=	0.803	
$R.C._{ult}$	= $(Y_{ult}-Y)/Yx100\%$	=	24.5	%
Practical Cycle Time C_p	= 0.9×L/(0.9-Y)	=	46	sec
Y_{max}	= 1-L/C	=	0.875	

Stage/Phase Diagrams



Critical Case : A,C,E

R.C.(C) = $(0.9xY_{max}-Y)/Yx100\%$ = 22%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
↑	A	1	3.600	3				1		0		6205		1155		1155			6205	0.186	0.186
↑	B	1,2	3.500	2				1		0		4070		1090		1090			4070	0.268	
↱	C	2	3.500	1		15	0	0		0		2105			485	485		1	1913.6364	0.253	0.253
↰	D	2,3	3.300	1	10			1		0		1945	605			605	1		1691.3043	0.358	
↱	E	3	3.400	2		20	0	0		0		4190			800	800		1	3897.6744	0.205	0.205

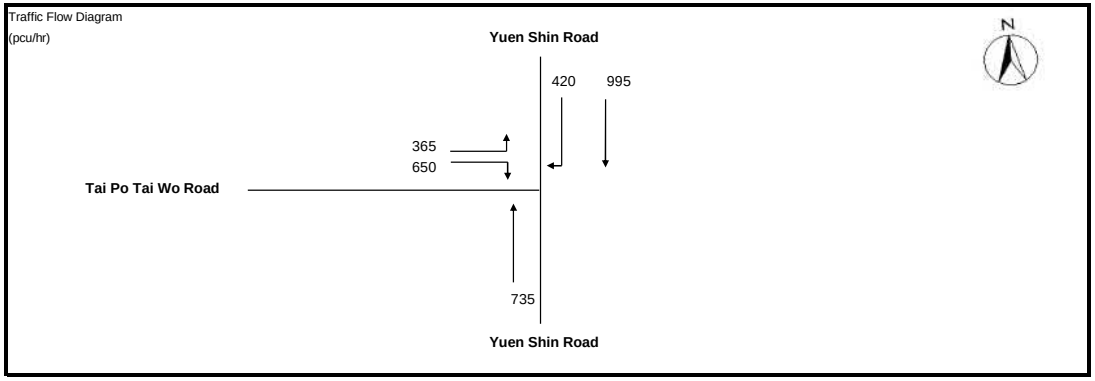
JUNCTION CAPACITY CALCULATION

AECOM

Junction J10 - Tai Po Tai Wo Road / Yuen Shin Road	2023 PM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J10

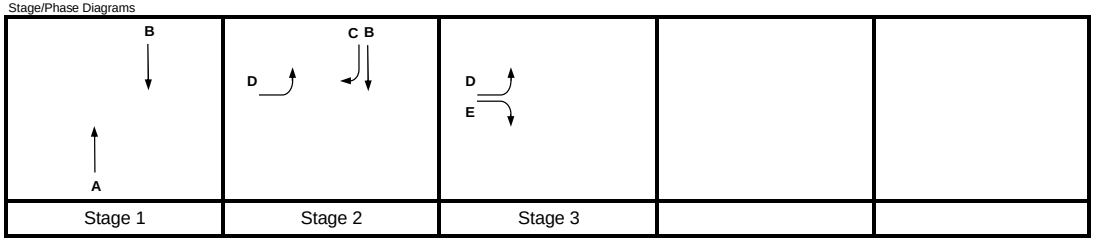
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	3	
Cycle time	C =	96	sec
Sum(y)	Y =	0.505	
Lost time	L =	13	sec
Total Flow	=	3165	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	49	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	26	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.803	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	59.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	30	sec
Y_{max}	$= 1-L/C$	=	0.865	

Stage/Phase Diagrams



Critical Case : A,C,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 54%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
↑	A	1	3.600	3				1		0		6205		735		735			6205	0.118	0.118
↑	B	1,2	3.500	2				1		0		4070		995		995			4070	0.244	
↱	C	2	3.500	1		15	0	0		0		2105			420	420		1	1913.6364	0.219	0.219
↰	D	2,3	3.300	1	10			1		0		1945	365			365	1		1691.3043	0.216	
↱	E	3	3.400	2		20	0	0		0		4190			650	650		1	3897.6744	0.167	0.167

JUNCTION CAPACITY CALCULATION

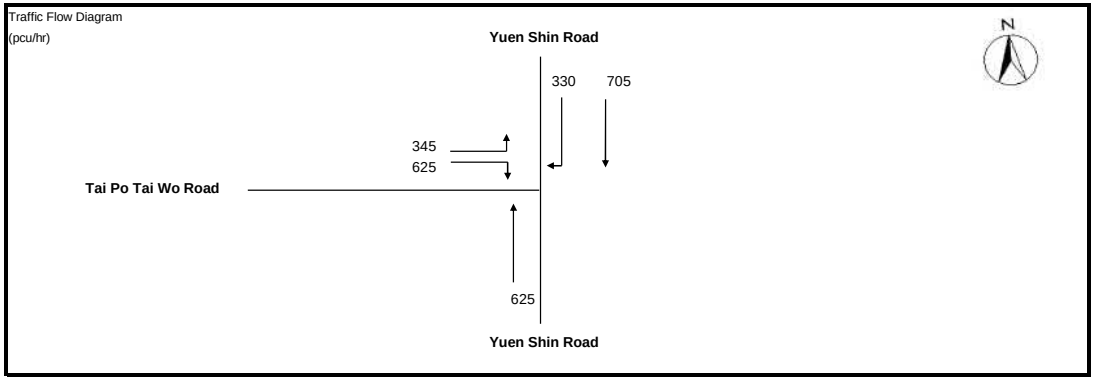
AECOM

Junction J10 - Tai Po Tai Wo Road / Yuen Shin Road	2023 Weekend Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J10

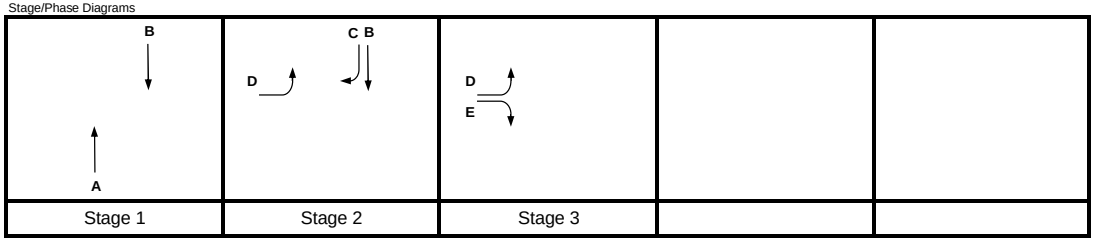
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	96	sec
Sum(y)		Y =	0.434	
Lost time		L =	13	sec
Total Flow		=	2630	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	43	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	23	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.803	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	85.1	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	25	sec
Y_{max}	$= 1-L/C$	=	0.865	

Stage/Phase Diagrams



Critical Case : A,C,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 79%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
↑	A	1	3.600	3				1		0		6205		625		625			6205	0.101	0.101
↑	B	1,2	3.500	2				1		0		4070		705		705			4070	0.173	
↱	C	2	3.500	1		15	0	0		0		2105			330	330		1	1913.6364	0.172	0.172
↰	D	2,3	3.300	1	10			1		0		1945	345			345	1		1691.3043	0.204	
↱	E	3	3.400	2		20	0	0		0		4190			625	625		1	3897.6744	0.160	0.160

JUNCTION CAPACITY CALCULATION

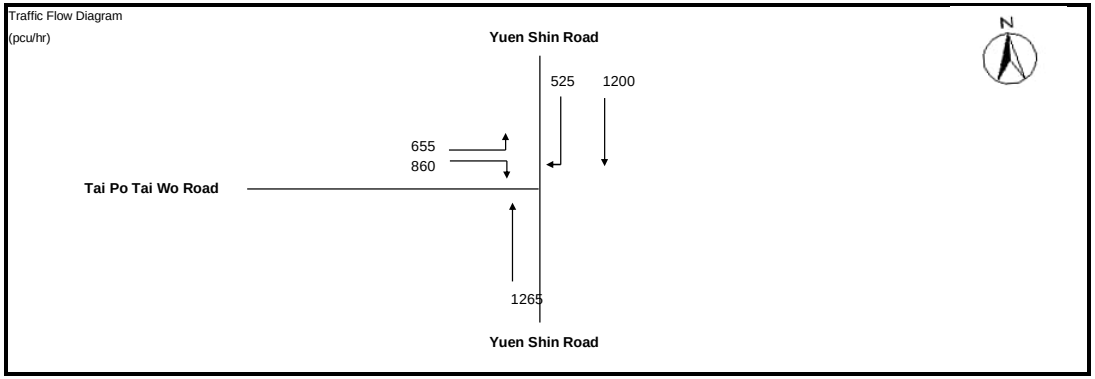
AECOM

Junction J10 - Tai Po Tai Wo Road / Yuen Shin Road	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J10

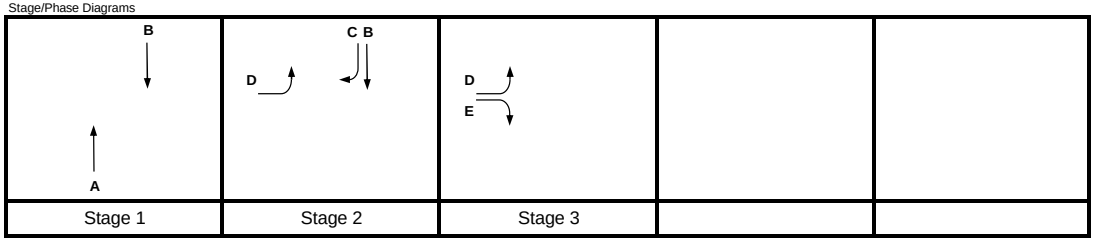
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	104	sec
Sum(y)		Y =	0.699	
Lost time		L =	13	sec
Total Flow		=	4505	pcu
Optimum Cycle C_o	= (1.5×L+5)/(1-Y)	=	81	sec
Min. Cycle Time C_m	= L/(1-Y)	=	43	sec
Y_{ult}	= 0.9-0.0075×L	=	0.803	
$R.C._{.ult}$	= $(Y_{ult}-Y)/Yx100\%$	=	14.8	%
Practical Cycle Time C_p	= 0.9×L/(0.9-Y)	=	58	sec
Y_{max}	= 1-L/C	=	0.875	

Stage/Phase Diagrams



Critical Case : A,C,E

R.C.(C) = $(0.9xY_{max}-Y)/Yx100\%$ = 13%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
↑	A	1	3.600	3				1		0		6205		1265		1265			6205	0.204	0.204
↑	B	1,2	3.500	2				1		0		4070		1200		1200			4070	0.295	
↱	C	2	3.500	1		15	0	0		0		2105			525	525		1	1913.6364	0.274	0.274
↰	D	2,3	3.300	1	10			1		0		1945	655			655	1		1691.3043	0.387	
↱	E	3	3.400	2		20	0	0		0		4190			860	860		1	3897.6744	0.221	0.221

JUNCTION CAPACITY CALCULATION

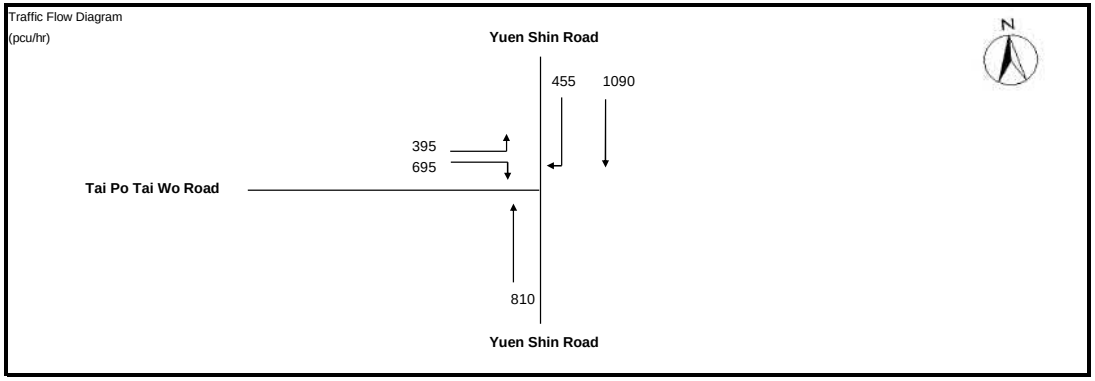
AECOM

Junction J10 - Tai Po Tai Wo Road / Yuen Shin Road	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J10

Traffic Flow Diagram

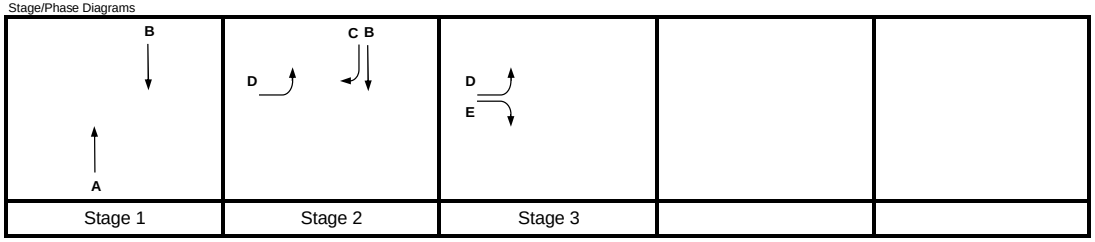
(pcu/hr)



No. of stages per cycle	N =	3	
Cycle time	C =	96	sec
Sum(y)	Y =	0.547	
Lost time	L =	13	sec
Total Flow	=	3445	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	54	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	29	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.803	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	46.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	33	sec
Y_{max}	$= 1-L/C$	=	0.865	

Stage/Phase Diagrams



Critical Case : A,C,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 42%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
↑	A	1	3.600	3				1		0		6205		810		810			6205	0.131	0.131
↑	B	1,2	3.500	2				1		0		4070		1090		1090			4070	0.268	
↱	C	2	3.500	1		15	0	0		0		2105			455	455		1	1913.6364	0.238	0.238
↰	D	2,3	3.300	1	10			1		0		1945	395			395	1		1691.3043	0.234	
↱	E	3	3.400	2		20	0	0		0		4190			695	695		1	3897.6744	0.178	0.178

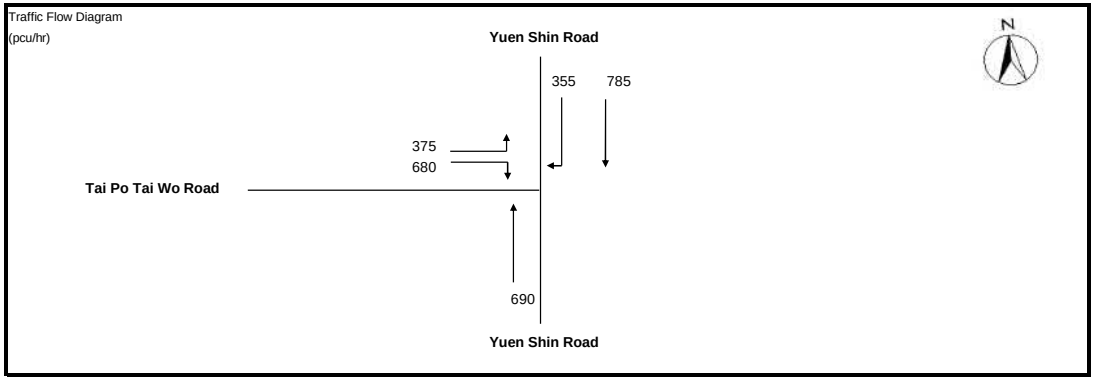
JUNCTION CAPACITY CALCULATION

AECOM

Junction J10 - Tai Po Tai Wo Road / Yuen Shin Road	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

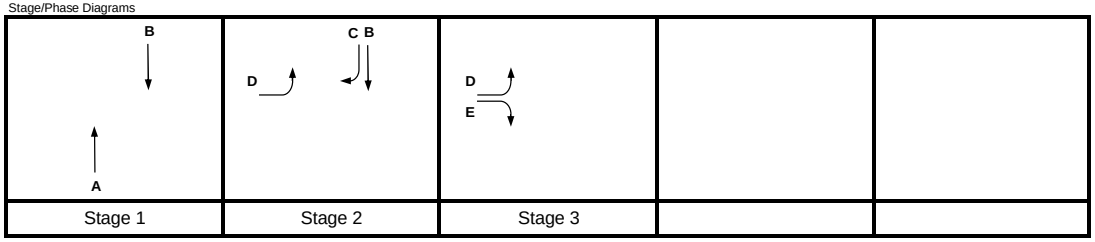
J10

Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	96	sec
Sum(y)		Y =	0.471	
Lost time		L =	13	sec
Total Flow		=	2885	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	46	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	25	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.803	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	70.3	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	27	sec
Y_{max}	$= 1-L/C$	=	0.865	

Stage/Phase Diagrams



Critical Case : A,C,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 65%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
↑	A	1	3.600	3				1		0		6205		690		690			6205	0.111	0.111
↑	B	1,2	3.500	2				1		0		4070		785		785			4070	0.193	
↱	C	2	3.500	1		15	0	0		0		2105			355	355		1	1913.6364	0.186	0.186
↰	D	2,3	3.300	1	10			1		0		1945	375			375	1		1691.3043	0.222	
↱	E	3	3.400	2		20	0	0		0		4190			680	680		1	3897.6744	0.174	0.174

JUNCTION CAPACITY CALCULATION

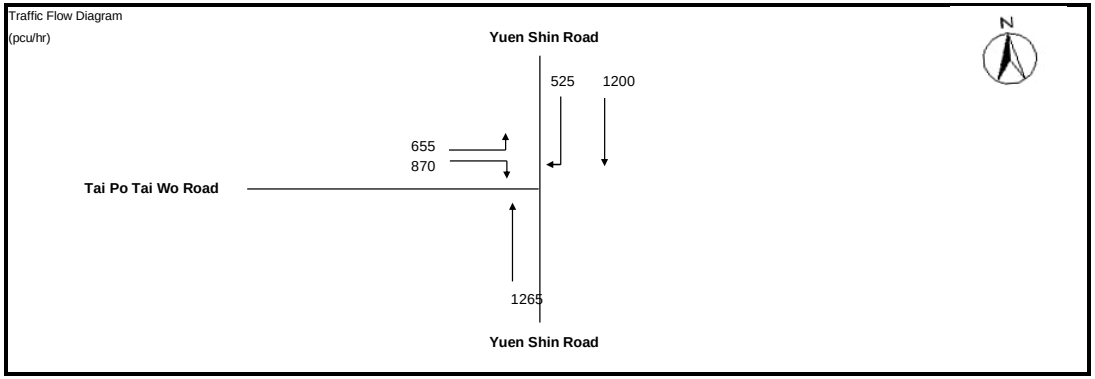
AECOM

Junction J10 - Tai Po Tai Wo Road / Yuen Shin Road	2030 AM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J10

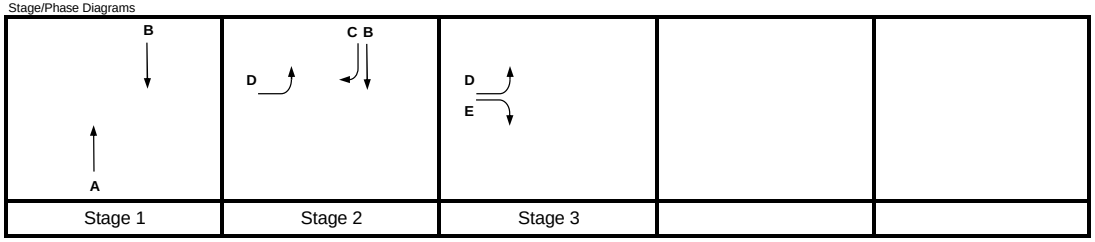
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	104	sec
Sum(y)		Y =	0.701	
Lost time		L =	13	sec
Total Flow		=	4515	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	82	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	44	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.803	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	14.4	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	59	sec
Y_{max}	$= 1-L/C$	=	0.875	

Stage/Phase Diagrams



Critical Case : A,C,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 12%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
↑	A	1	3.600	3				1		0		6205		1265		1265			6205	0.204	0.204
↑	B	1,2	3.500	2				1		0		4070		1200		1200			4070	0.295	
↱	C	2	3.500	1		15	0	0		0		2105			525	525		1	1913.6364	0.274	0.274
↰	D	2,3	3.300	1	10			1		0		1945	655			655	1		1691.3043	0.387	
↱	E	3	3.400	2		20	0	0		0		4190			870	870		1	3897.6744	0.223	0.223

JUNCTION CAPACITY CALCULATION

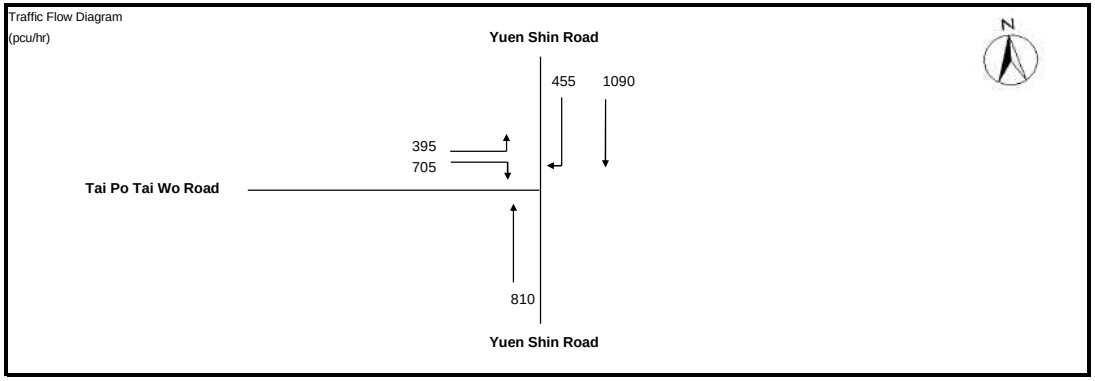
AECOM

Junction J10 - Tai Po Tai Wo Road / Yuen Shin Road	2030 PM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J10

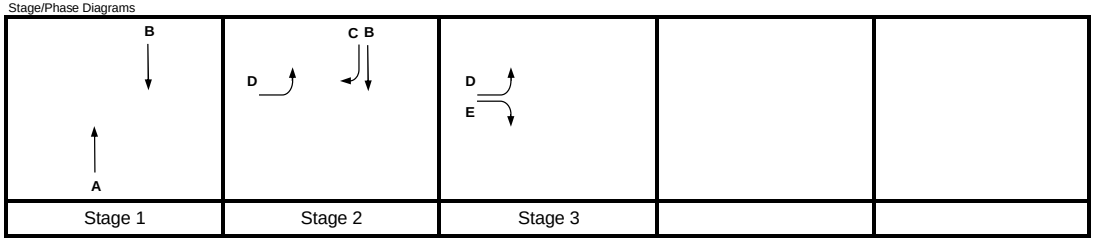
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	96	sec
Sum(y)		Y =	0.549	
Lost time		L =	13	sec
Total Flow		=	3455	pcu
Optimum Cycle C_o	= (1.5×L+5)/(1-Y)	=	54	sec
Min. Cycle Time C_m	= L/(1-Y)	=	29	sec
Y_{ult}	= 0.9-0.0075×L	=	0.803	
$R.C._{ult}$	= $(Y_{ult}-Y)/Yx100\%$	=	46.1	%
Practical Cycle Time C_p	= 0.9×L/(0.9-Y)	=	33	sec
Y_{max}	= 1-L/C	=	0.865	

Stage/Phase Diagrams



Critical Case : A,C,E

R.C.(C) = $(0.9xY_{max}-Y)/Yx100\%$ = 42%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
↑	A	1	3.600	3				1		0		6205		810		810			6205	0.131	0.131
↑	B	1,2	3.500	2				1		0		4070		1090		1090			4070	0.268	
↱	C	2	3.500	1		15	0	0		0		2105			455	455		1	1913.6364	0.238	0.238
↰	D	2,3	3.300	1	10			1		0		1945	395			395	1		1691.3043	0.234	
↱	E	3	3.400	2		20	0	0		0		4190			705	705		1	3897.6744	0.181	0.181

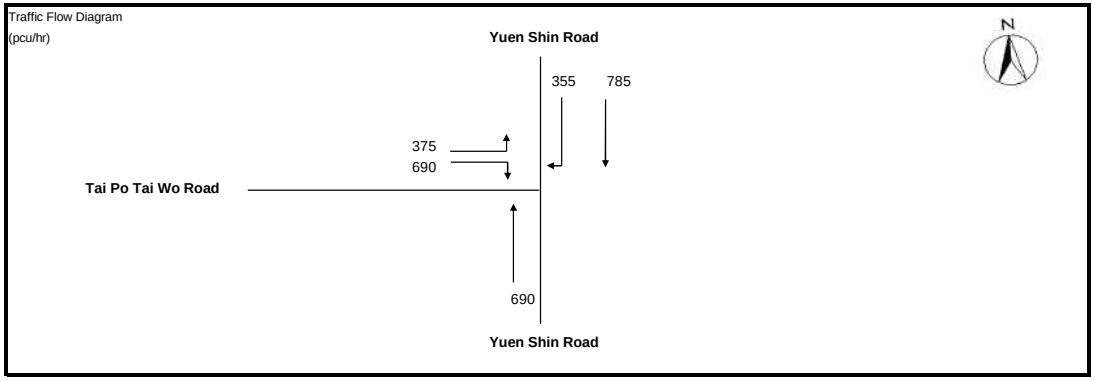
JUNCTION CAPACITY CALCULATION

AECOM

Junction J10 - Tai Po Tai Wo Road / Yuen Shin Road	2030 Weekend Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

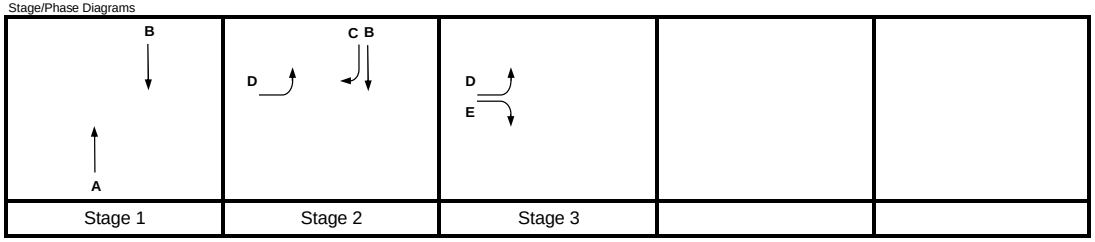
J10

Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	96	sec
Sum(y)		Y =	0.474	
Lost time		L =	13	sec
Total Flow		=	2895	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	47	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	25	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.803	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	69.4	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	27	sec
Y_{max}	$= 1-L/C$	=	0.865	

Stage/Phase Diagrams



Critical Case : A,C,E

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 64%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
↑	A	1	3.600	3				1		0		6205		690		690			6205	0.111	0.111
↑	B	1,2	3.500	2				1		0		4070		785		785			4070	0.193	
↱	C	2	3.500	1		15	0	0		0		2105			355	355		1	1913.6364	0.186	0.186
↰	D	2,3	3.300	1	10			1		0		1945	375			375	1		1691.3043	0.222	
↱	E	3	3.400	2		20	0	0		0		4190			690	690		1	3897.6744	0.177	0.177

JUNCTION CAPACITY CALCULATION

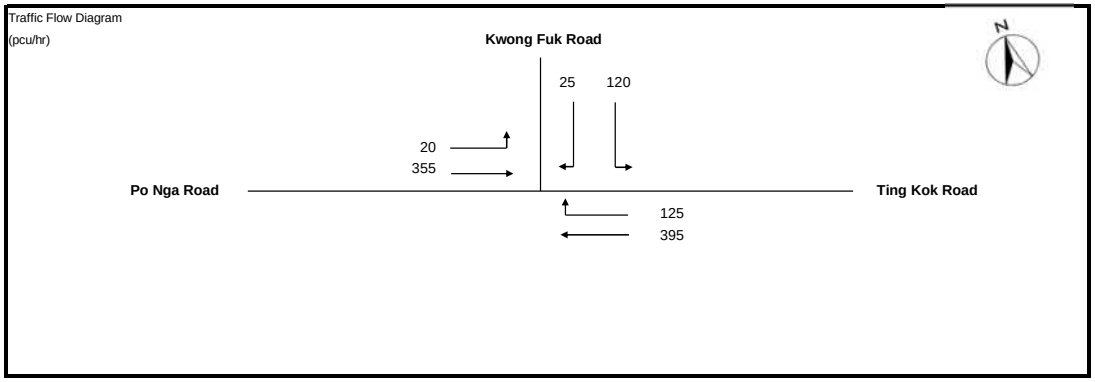
AECOM

Junction J11 - Ting Kok Road / Kwong Fuk Road	2023 AM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J11

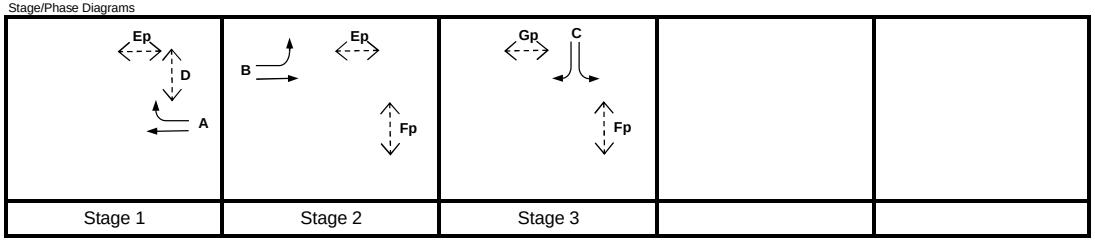
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.455	
Lost time		L =	30	sec
Total Flow		=	1,040	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	92	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	55	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.675	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	48.3	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	61	sec
Y_{max}	$= 1-L/C$	=	0.667	

Stage/Phase Diagrams



I/G = 6 I/G = 10 G = 5 I/G = 11

Critical Case : A,B,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 32%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	4.000	1		20	0	1		0		2015		395	125	520		24%	1979	0.263	0.263
	B	2	3.500	1	10			1		0		1965	20	355		375	5%		1949	0.192	0.192
	C	3	4.300	1	15	10	0	1		0		2045	120		25	145	83%	17%	1845	0.079	
Pedestrian Crossing				GM		FGM															
	Dp	1	min.	5	+	6	=	11	sec												
	Ep	1,2	min.	19	+	6	=	25	sec												
	Fp	2,3	min.	19	+	6	=	25	sec												
	Gp	3	min.	5	+	6	=	11	sec												*

JUNCTION CAPACITY CALCULATION

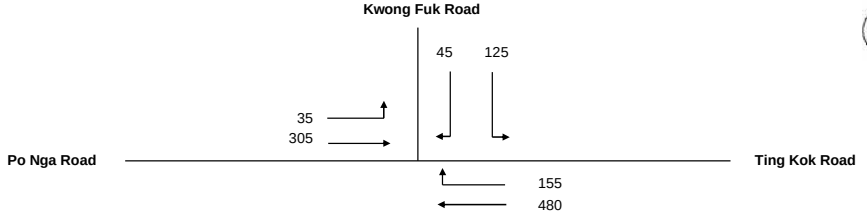
AECOM

Junction J11 - Ting Kok Road / Kwong Fuk Road	2023 PM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J11

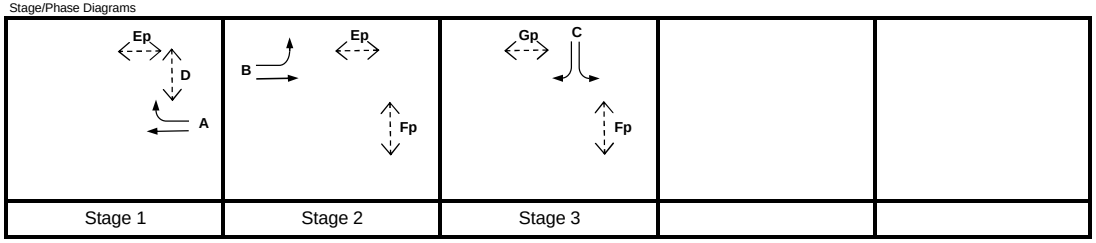
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.497	
Lost time		L =	30	sec
Total Flow		=	1,145	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	99	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	60	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.675	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	35.9	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	67	sec
Y_{max}	$= 1-L/C$	=	0.667	

Stage/Phase Diagrams



I/G = 6 I/G = 10 G = 5 I/G = 11

Critical Case : A,B,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 21%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
	A	1	4.000	1		20	0	1		0		2015		480	155	635		24%	1979	0.321	0.321
	B	2	3.500	1	10			1		0		1965	35	305		340	10%		1935	0.176	0.176
	C	3	4.300	1	15	10	0	1		0		2045	125		45	170	74%	26%	1837	0.093	
Pedestrian Crossing				GM		FGM															
	Dp	1	min.	5	+	6	=	11	sec												
	Ep	1,2	min.	19	+	6	=	25	sec												
	Fp	2,3	min.	19	+	6	=	25	sec												
	Gp	3	min.	5	+	6	=	11	sec												*

JUNCTION CAPACITY CALCULATION

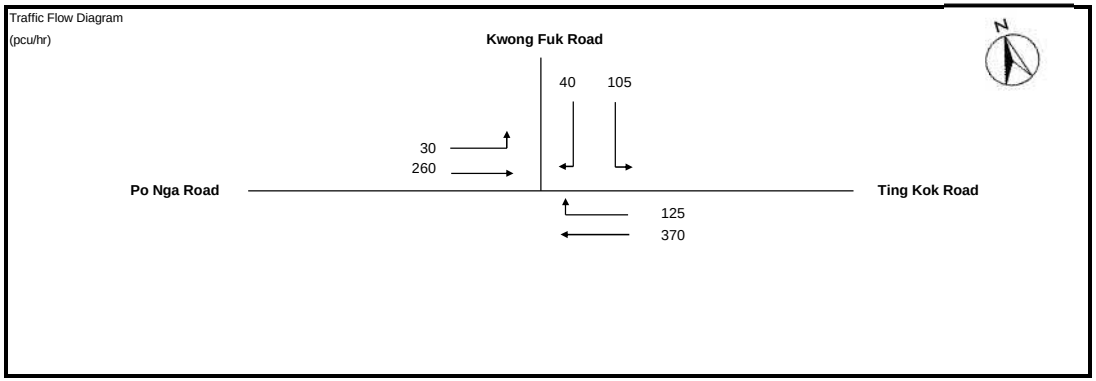
AECOM

Junction J11 - Ting Kok Road / Kwong Fuk Road	2023 Weekend Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J11

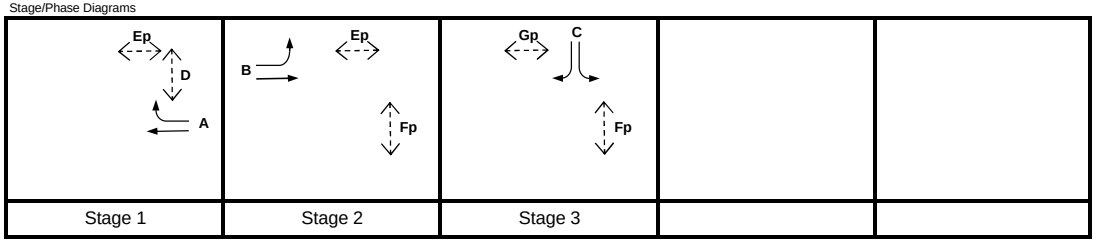
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.400	
Lost time		L =	30	sec
Total Flow		=	930	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	83	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	50	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.675	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	68.7	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	54	sec
Y_{max}	$= 1-L/C$	=	0.667	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3		
I/G = 6	I/G = 10	G = 5	I/G = 11	

Critical Case : A,B,Gp

R.C.(C) $= (0.9 \times Y_{max}-Y)/Y \times 100\%$ = 50%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
	A	1	4.000	1		20	0	1		0		2015		370	125	495		25%	1978	0.250	0.250
	B	2	3.500	1	10			1		0		1965	30	260		290	10%		1935	0.150	0.150
	C	3	4.300	1	15	10	0	1		0		2045	105		40	145	72%	28%	1836	0.079	
Pedestrian Crossing				GM		FGM															
	Dp	1	min.	5	+	6	=	11	sec												
	Ep	1,2	min.	19	+	6	=	25	sec												
	Fp	2,3	min.	19	+	6	=	25	sec												
	Gp	3	min.	5	+	6	=	11	sec												*

JUNCTION CAPACITY CALCULATION

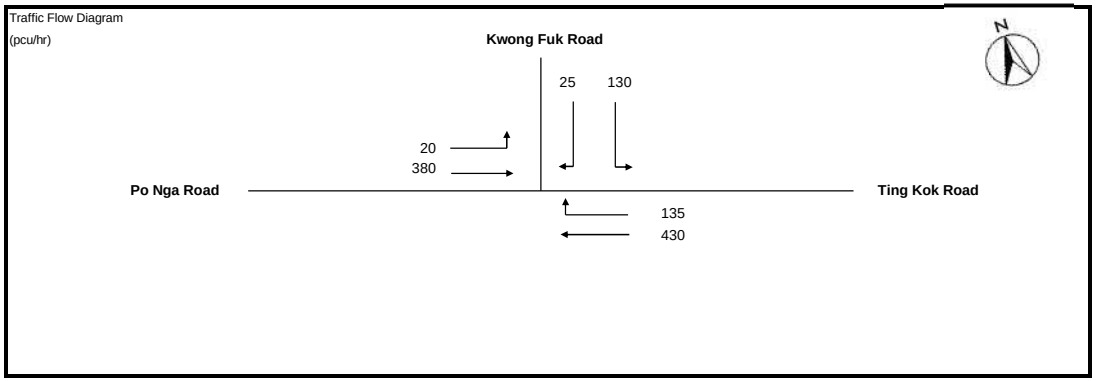
AECOM

Junction J11 - Ting Kok Road / Kwong Fuk Road	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J11

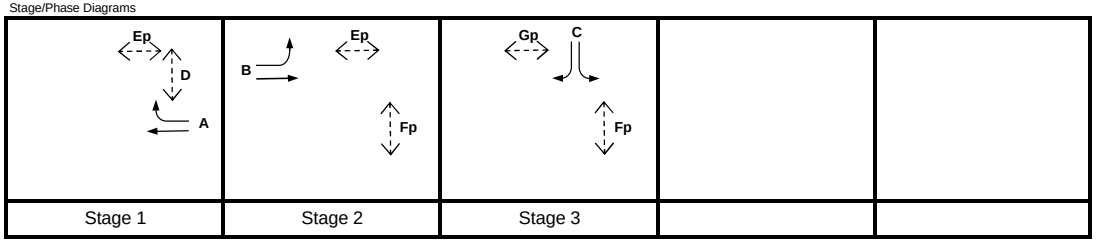
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.491	
Lost time		L =	30	sec
Total Flow		=	1,120	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	98	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	59	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.675	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	37.6	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	66	sec
Y_{max}	$= 1-L/C$	=	0.667	

Stage/Phase Diagrams



I/G = 6 I/G = 10 G = 5 I/G = 11

Critical Case : A,B,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 22%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	4.000	1		20	0	1		0		2015		430	135	565		24%	1980	0.285	0.285
	B	2	3.500	1	10			1		0		1965	20	380		400	5%		1950	0.205	0.205
	C	3	4.300	1	15	10	0	1		0		2045	130		25	155	84%	16%	1846	0.084	
Pedestrian Crossing				GM		FGM															
	Dp	1	min.	5	+	6	=	11	sec												
	Ep	1,2	min.	19	+	6	=	25	sec												
	Fp	2,3	min.	19	+	6	=	25	sec												
	Gp	3	min.	5	+	6	=	11	sec												*

JUNCTION CAPACITY CALCULATION

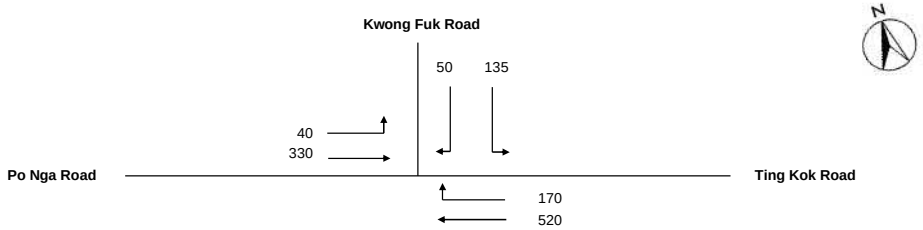
AECOM

Junction J11 - Ting Kok Road / Kwong Fuk Road	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J11

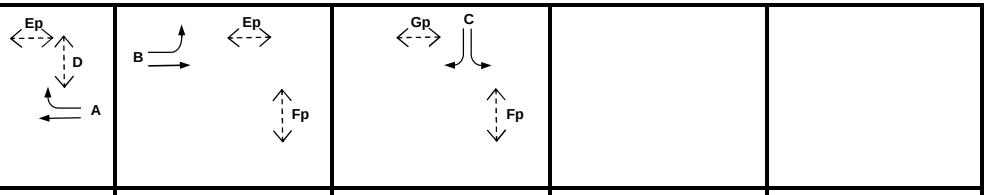
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.540	
Lost time		L =	30	sec
Total Flow		=	1,245	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	109	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	65	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.675	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	25.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	75	sec
Y_{max}	$= 1-L/C$	=	0.667	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3		
I/G = 6	I/G = 10	G = 5	I/G = 11	

Critical Case : A,B,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 11%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	4.000	1		20	0	1		0		2015		520	170	690		25%	1978	0.349	0.349
	B	2	3.500	1	10			1		0		1965	40	330		370	11%		1934	0.191	0.191
	C	3	4.300	1	15	10	0	1		0		2045	135		50	185	73%	27%	1837	0.101	
Pedestrian Crossing				GM		FGM															
	Dp	1	min.	5	+	6	=	11	sec												
	Ep	1,2	min.	19	+	6	=	25	sec												
	Fp	2,3	min.	19	+	6	=	25	sec												
	Gp	3	min.	5	+	6	=	11	sec												*

JUNCTION CAPACITY CALCULATION

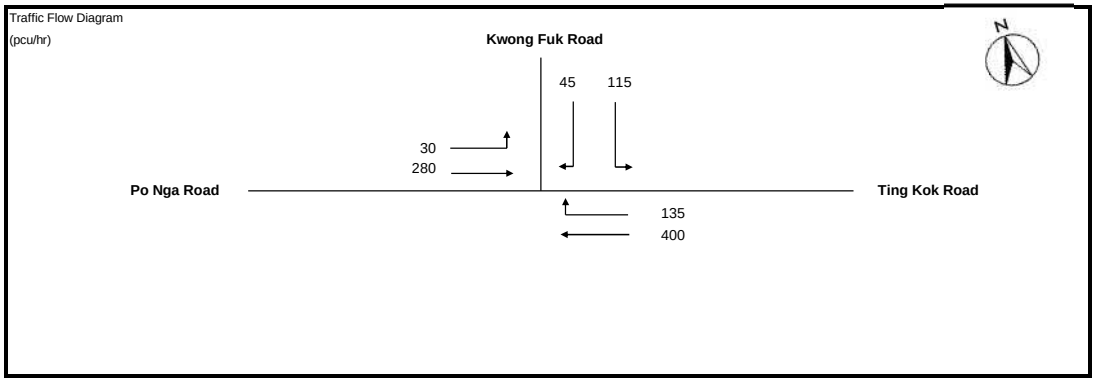
AECOM

Junction J11 - Ting Kok Road / Kwong Fuk Road	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J11

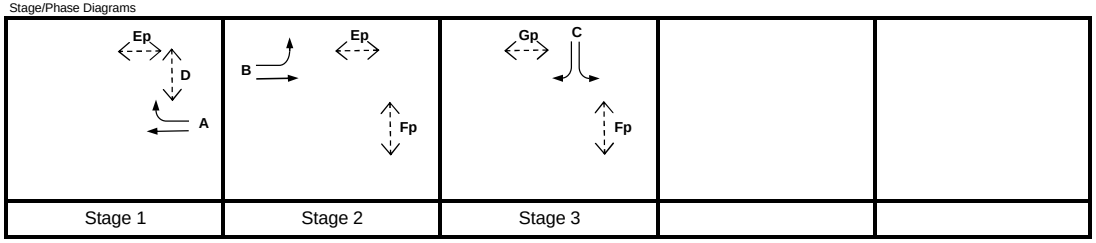
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.431	
Lost time		L =	30	sec
Total Flow		=	1,005	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	88	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	53	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.675	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	56.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	58	sec
Y_{max}	$= 1-L/C$	=	0.667	

Stage/Phase Diagrams



I/G = 6 I/G = 10 G = 5 I/G = 11

Critical Case : A,B,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 39%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	4.000	1		20	0	1		0		2015		400	135	535		25%	1978	0.271	0.271
	B	2	3.500	1	10			1		0		1965	30	280		310	10%		1937	0.160	0.160
	C	3	4.300	1	15	10	0	1		0		2045	115		45	160	72%	28%	1836	0.087	
Pedestrian Crossing				GM		FGM															
	Dp	1	min.	5	+	6	=	11	sec												
	Ep	1,2	min.	19	+	6	=	25	sec												
	Fp	2,3	min.	19	+	6	=	25	sec												
	Gp	3	min.	5	+	6	=	11	sec												*

JUNCTION CAPACITY CALCULATION

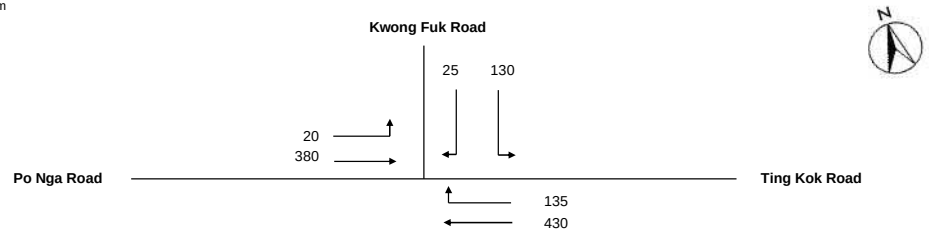
AECOM

Junction J11 - Ting Kok Road / Kwong Fuk Road	2030 AM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J11

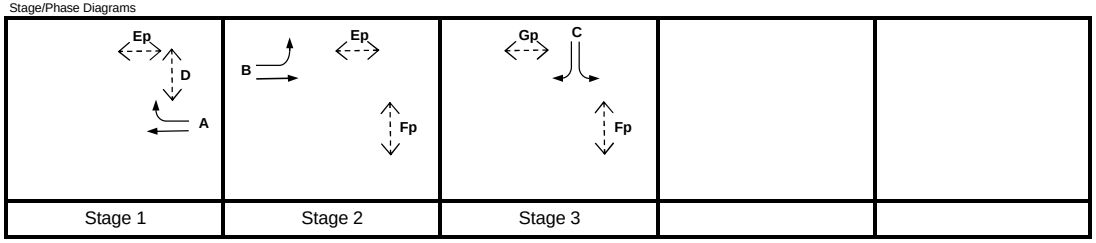
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.491	
Lost time		L =	30	sec
Total Flow		=	1,120	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	98	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	59	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.675	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	37.6	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	66	sec
Y_{max}	$= 1-L/C$	=	0.667	

Stage/Phase Diagrams



I/G = 6 I/G = 10 G = 5 I/G = 11

Critical Case : A,B,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 22%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	4.000	1		20	0	1		0		2015		430	135	565		24%	1980	0.285	0.285
	B	2	3.500	1	10			1		0		1965	20	380		400	5%		1950	0.205	0.205
	C	3	4.300	1	15	10	0	1		0		2045	130		25	155	84%	16%	1846	0.084	
Pedestrian Crossing				GM		FGM															
	Dp	1	min.	5	+	6	=	11	sec												
	Ep	1,2	min.	19	+	6	=	25	sec												
	Fp	2,3	min.	19	+	6	=	25	sec												
	Gp	3	min.	5	+	6	=	11	sec												*

JUNCTION CAPACITY CALCULATION

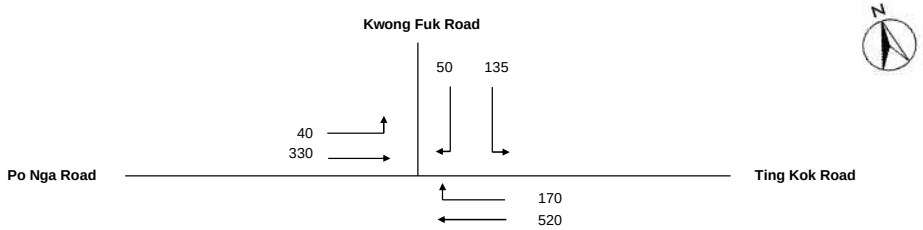
AECOM

Junction J11 - Ting Kok Road / Kwong Fuk Road	2030 PM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J11

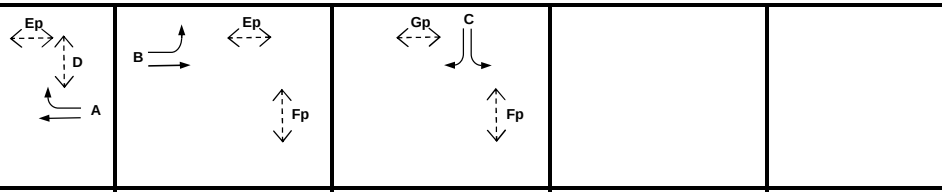
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.540	
Lost time		L =	30	sec
Total Flow		=	1,245	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	109	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	65	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.675	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	25.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	75	sec
Y_{max}	$= 1-L/C$	=	0.667	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3		
I/G = 6	I/G = 10	G = 5	I/G = 11	

Critical Case : A,B,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 11%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
	A	1	4.000	1		20	0	1		0		2015		520	170	690		25%	1978	0.349	0.349
	B	2	3.500	1	10			1		0		1965	40	330		370	11%		1934	0.191	0.191
	C	3	4.300	1	15	10	0	1		0		2045	135		50	185	73%	27%	1837	0.101	
Pedestrian Crossing				GM		FGM															
	Dp	1	min.	5	+	6	=	11	sec												
	Ep	1,2	min.	19	+	6	=	25	sec												
	Fp	2,3	min.	19	+	6	=	25	sec												
	Gp	3	min.	5	+	6	=	11	sec												*

JUNCTION CAPACITY CALCULATION

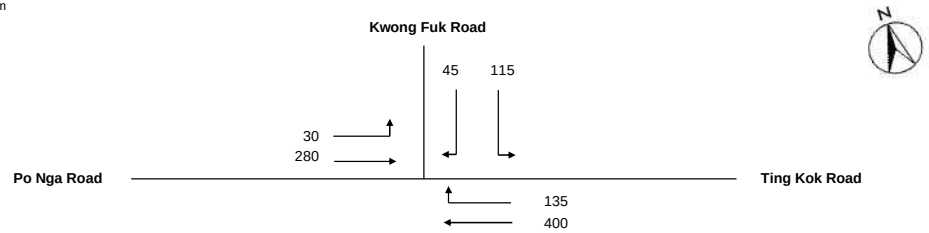
AECOM

Junction J11 - Ting Kok Road / Kwong Fuk Road	2030 Weekend Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J11

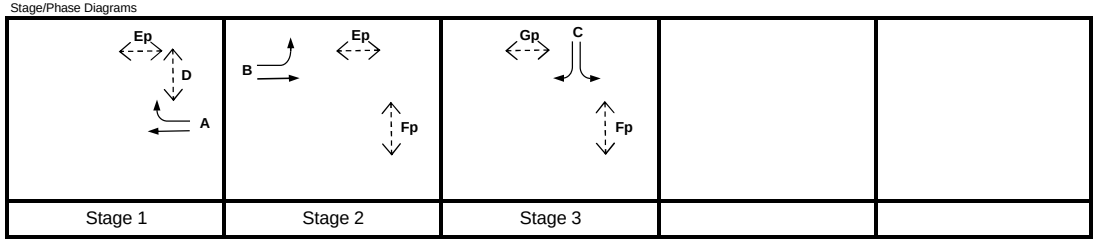
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	90	sec
Sum(y)		Y =	0.431	
Lost time		L =	30	sec
Total Flow		=	1,005	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	88	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	53	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.675	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	56.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	58	sec
Y_{max}	$= 1-L/C$	=	0.667	

Stage/Phase Diagrams



I/G = 6 I/G = 10 G = 5 I/G = 11

Critical Case : A,B,Gp

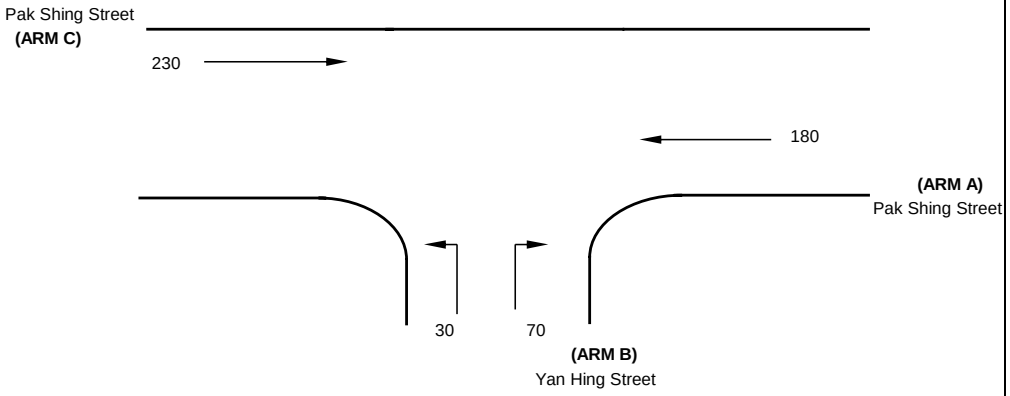
R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 39%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m)		OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr)			TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%)		REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
					LEFT	RIGHT							LEFT	STRAIGHT AHEAD	RIGHT		LEFT	RIGHT			
A	A	1	4.000	1		20	0	1		0		2015		400	135	535		25%	1978	0.271	0.271
B	B	2	3.500	1	10			1		0		1965	30	280		310	10%		1937	0.160	0.160
C	C	3	4.300	1	15	10	0	1		0		2045	115		45	160	72%	28%	1836	0.087	
Pedestrian Crossing				GM		FGM															
	Dp	1	min.	5	+	6	=	11	sec												
	Ep	1,2	min.	19	+	6	=	25	sec												
	Fp	2,3	min.	19	+	6	=	25	sec												
	Gp	3	min.	5	+	6	=	11	sec												*

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J12 - Pak Shig Street/ Yan Hing Street	2023 AM Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J12

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	180	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	50	(metres)
q c-a	=	230	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	3.85	(metres)
W b-c	=	3.85	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	35	(metres)
q b-a	=	70	(pcu/hr)
q b-c	=	30	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.875606
E	=	0.940862
F	=	0.937000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	472
Q b-c	=	655
Q c-b	=	652
Q b-ac	=	515

CRITICAL DFC = 0.19

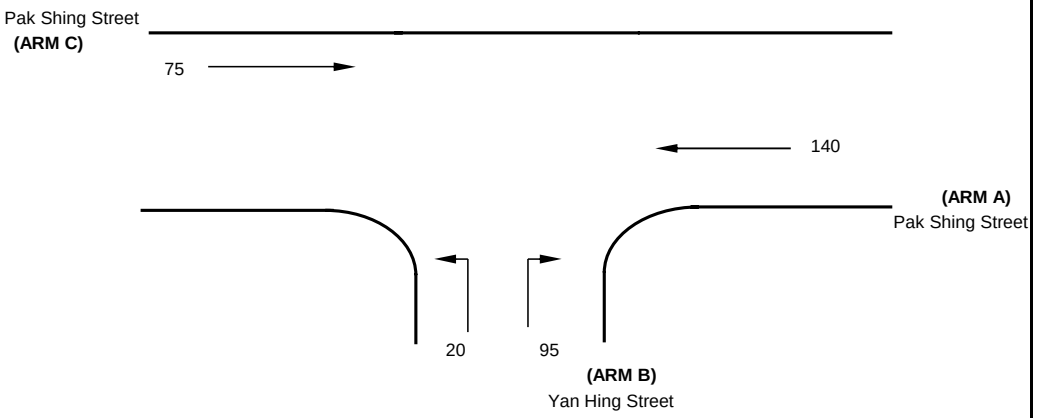
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.15
DFC b-c	=	0.05
DFC c-b	=	0.00
DFC b-ac	=	0.19

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J12 - Pak Shig Street/ Yan Hing Street	2023 PM Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J12

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	140	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	50	(metres)
q c-a	=	75	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	3.85	(metres)
W b-c	=	3.85	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	35	(metres)
q b-a	=	95	(pcu/hr)
q b-c	=	20	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.875606
E	=	0.940862
F	=	0.937000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	504
Q b-c	=	665
Q c-b	=	662
Q b-ac	=	526

CRITICAL DFC = 0.22

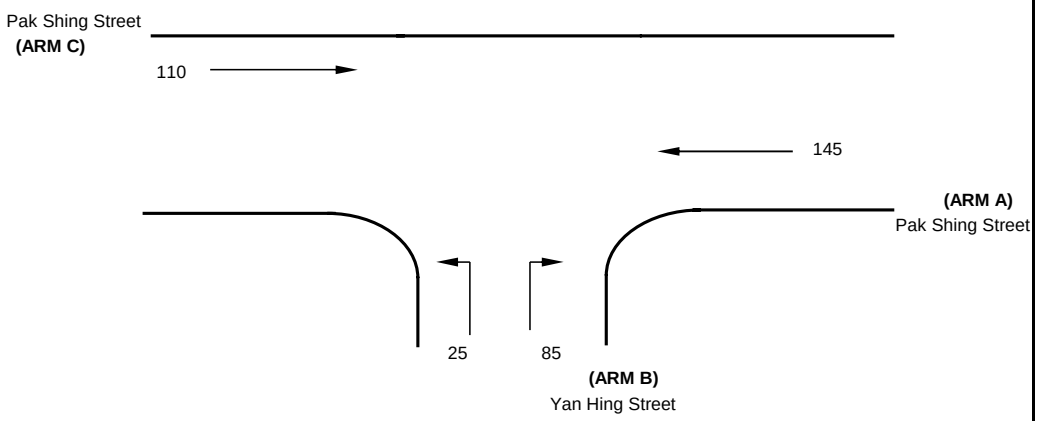
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.19
DFC b-c	=	0.03
DFC c-b	=	0.00
DFC b-ac	=	0.22

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J12 - Pak Shig Street/ Yan Hing Street	2023 Weekend Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J12

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	145	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	50	(metres)
q c-a	=	110	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	3.85	(metres)
W b-c	=	3.85	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	35	(metres)
q b-a	=	85	(pcu/hr)
q b-c	=	25	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.875606
E	=	0.940862
F	=	0.937000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	498
Q b-c	=	664
Q c-b	=	661
Q b-ac	=	528

CRITICAL DFC = 0.21

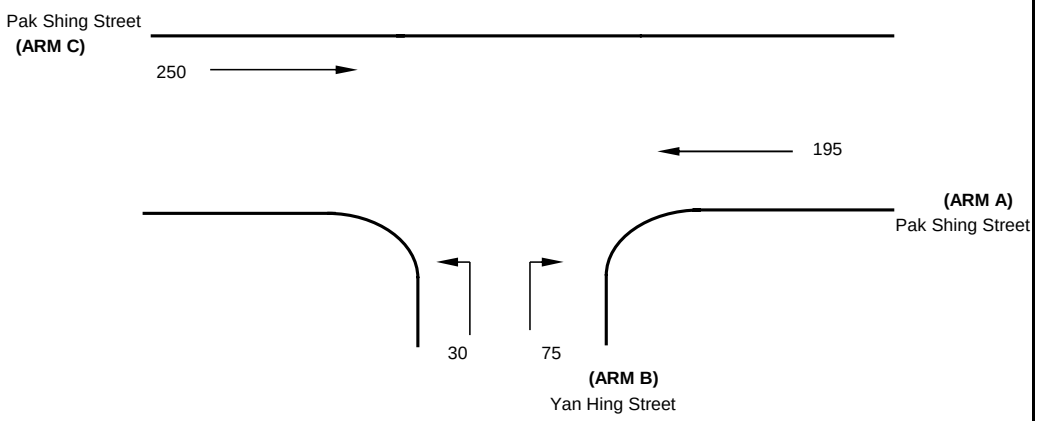
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.17
DFC b-c	=	0.04
DFC c-b	=	0.00
DFC b-ac	=	0.21

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J12 - Pak Shig Street/ Yan Hing Street	2030 AM Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J12

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	195	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	50	(metres)
q c-a	=	250	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	3.85	(metres)
W b-c	=	3.85	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	35	(metres)
q b-a	=	75	(pcu/hr)
q b-c	=	30	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.875606
E	=	0.940862
F	=	0.937000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	465
Q b-c	=	651
Q c-b	=	648
Q b-ac	=	506

CRITICAL DFC = 0.21

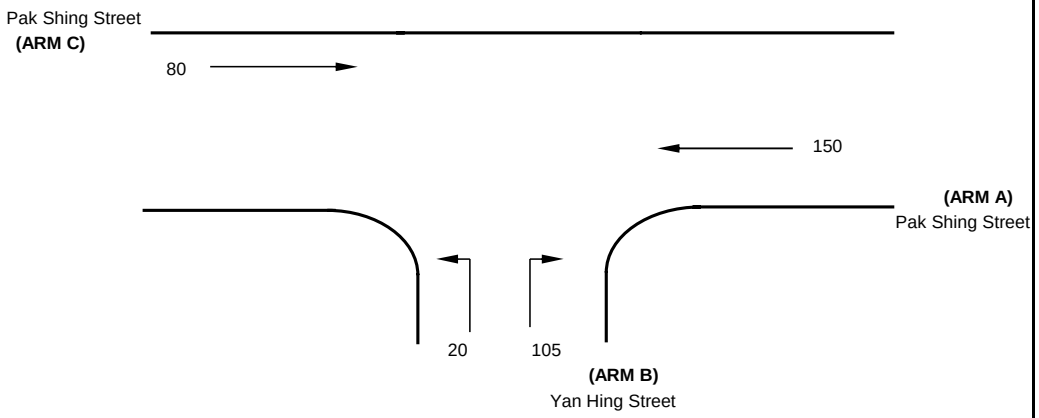
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.16
DFC b-c	=	0.05
DFC c-b	=	0.00
DFC b-ac	=	0.21

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J12 - Pak Shig Street/ Yan Hing Street	2030 PM Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J12

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	150	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	50	(metres)
q c-a	=	80	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	3.85	(metres)
W b-c	=	3.85	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	35	(metres)
q b-a	=	105	(pcu/hr)
q b-c	=	20	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.875606
E	=	0.940862
F	=	0.937000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	501
Q b-c	=	663
Q c-b	=	660
Q b-ac	=	522

CRITICAL DFC = 0.24

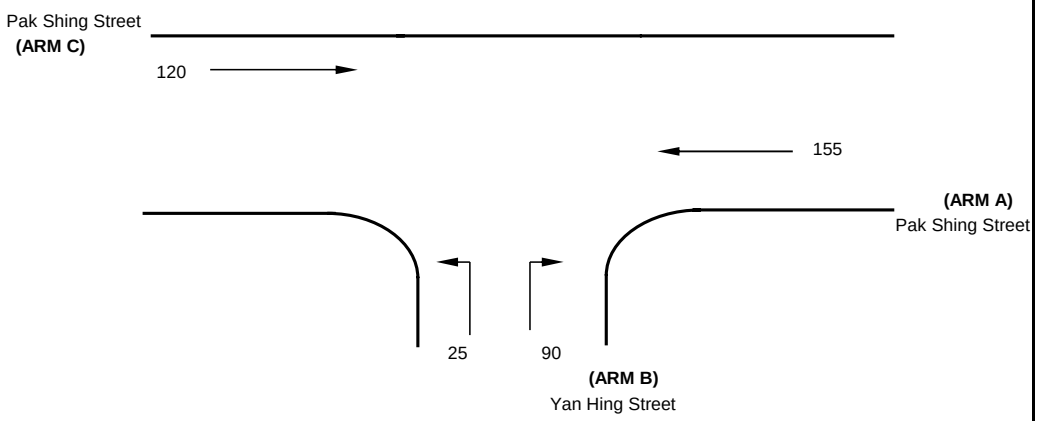
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.21
DFC b-c	=	0.03
DFC c-b	=	0.00
DFC b-ac	=	0.24

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J12 - Pak Shig Street/ Yan Hing Street	2030 Weekend Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J12

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	155	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	50	(metres)
q c-a	=	120	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	3.85	(metres)
W b-c	=	3.85	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	35	(metres)
q b-a	=	90	(pcu/hr)
q b-c	=	25	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.875606
E	=	0.940862
F	=	0.937000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	494
Q b-c	=	661
Q c-b	=	659
Q b-ac	=	523

CRITICAL DFC = 0.22

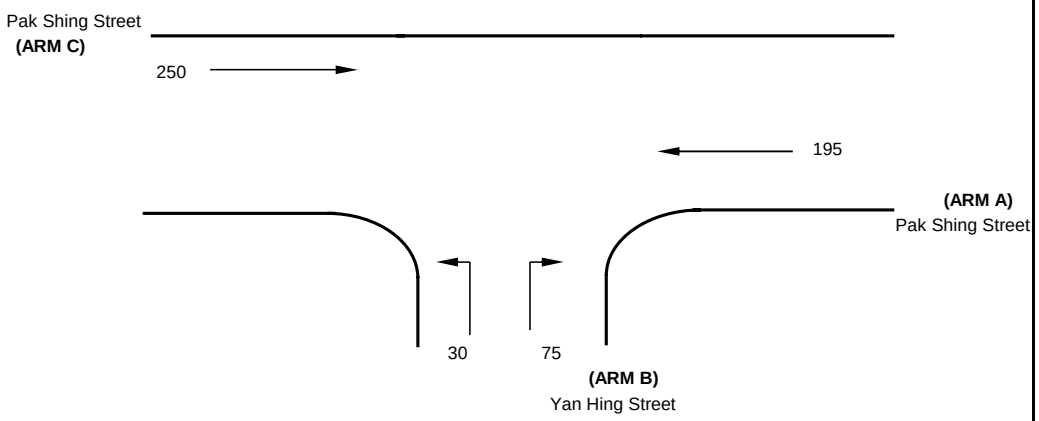
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.18
DFC b-c	=	0.04
DFC c-b	=	0.00
DFC b-ac	=	0.22

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J12 - Pak Shig Street/ Yan Hing Street	2030 AM Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J12

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	195	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	50	(metres)
q c-a	=	250	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	3.85	(metres)
W b-c	=	3.85	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	35	(metres)
q b-a	=	75	(pcu/hr)
q b-c	=	30	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.875606
E	=	0.940862
F	=	0.937000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	465
Q b-c	=	651
Q c-b	=	648
Q b-ac	=	506

CRITICAL DFC = 0.21

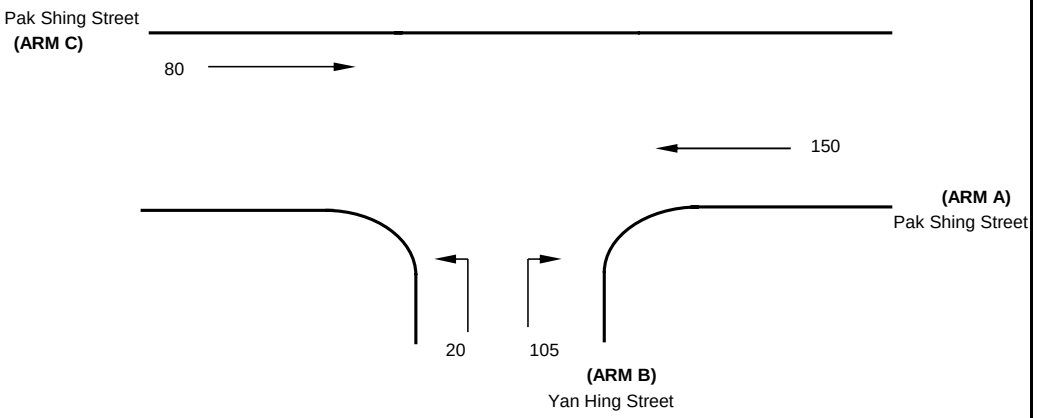
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.16
DFC b-c	=	0.05
DFC c-b	=	0.00
DFC b-ac	=	0.21

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J12 - Pak Shig Street/ Yan Hing Street	2030 PM Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J12

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	150	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	50	(metres)
q c-a	=	80	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	3.85	(metres)
W b-c	=	3.85	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	35	(metres)
q b-a	=	105	(pcu/hr)
q b-c	=	20	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.875606
E	=	0.940862
F	=	0.937000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	501
Q b-c	=	663
Q c-b	=	660
Q b-ac	=	522

CRITICAL DFC = 0.24

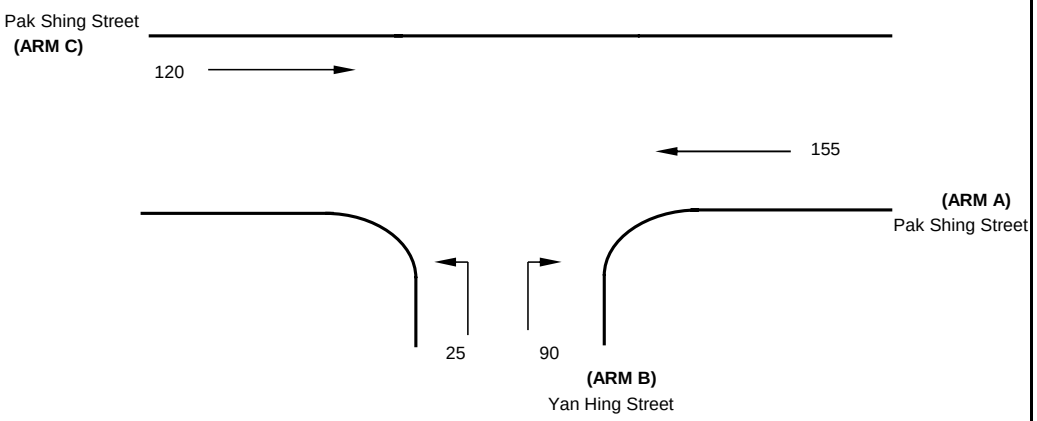
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.21
DFC b-c	=	0.03
DFC c-b	=	0.00
DFC b-ac	=	0.24

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J12 - Pak Shig Street/ Yan Hing Street	2030 Weekend Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J12

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.07)
W b-c	= Lane width available to vehicle waiting in stream b-c (2.05 - 4.07)
W c-b	= Lane width available to vehicle waiting in stream c-b (2.05 - 4.07)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibilitu to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	7.3	(metres)
W cr	=	0	(metres)
q a-b	=	0	(pcu/hr)
q a-c	=	155	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.65	(metres)
Vr c-b	=	50	(metres)
q c-a	=	120	(pcu/hr)
q c-b	=	0	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	3.85	(metres)
W b-c	=	3.85	(metres)
Vl b-a	=	42	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	35	(metres)
q b-a	=	90	(pcu/hr)
q b-c	=	25	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.875606
E	=	0.940862
F	=	0.937000
Y	=	0.748150

THE CAPACITY OF MOVEMENT :

Q b-a	=	494
Q b-c	=	661
Q c-b	=	659
Q b-ac	=	523

CRITICAL DFC = 0.22

COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.18
DFC b-c	=	0.04
DFC c-b	=	0.00
DFC b-ac	=	0.22

JUNCTION CAPACITY CALCULATION

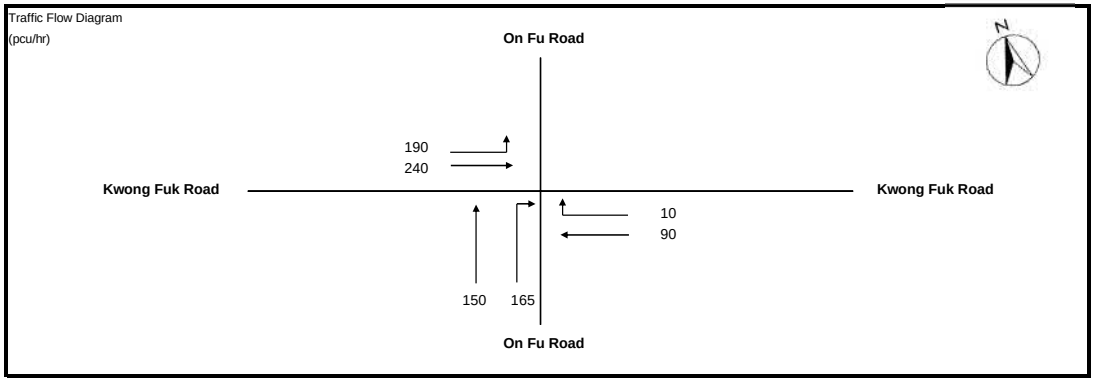
AECOM

Junction J13 - Kwong Fuk Road / On Fu Road	2023 AM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J13

Traffic Flow Diagram

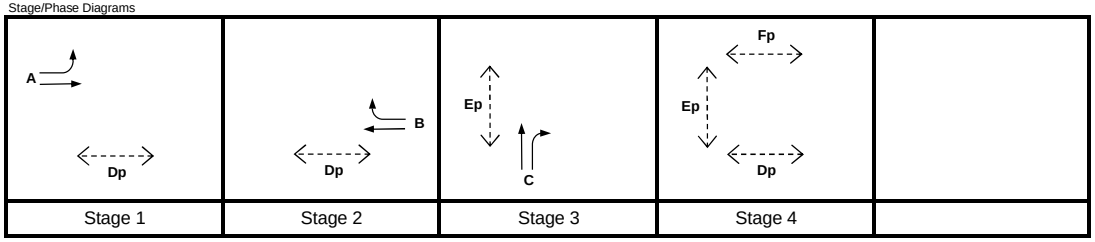
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	128	sec
Sum(y)	Y =	0.258	
Lost time	L =	32	sec
Total Flow	=	845	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	71	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	43	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.660	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	155.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	45	sec
Y_{max}	$= 1-L/C$	=	0.750	

Stage/Phase Diagrams



Critical Case : A,B,C,Fp

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 162%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.600	1	10			1		0		1975	190	5		195	97%		1723	0.113	0.113
	A	1	3.200	1				0		0		2075		235		235			2075	0.113	
	B	2	3.700	1		10	0	1		0		1985		90	10	100		10%	1956	0.051	0.051
	C	3	4.100	1				1		0		2025		150		150			2025	0.074	
	C	3	4.100	1		10	0	1		0		2025			165	165		100%	1761	0.094	0.094
Pedestrian Crossing				GM		FGM															
	Dp	1,2,4	min.	5	+	7	=	12	sec												
	Ep	3,4	min.	6	+	12	=	18	sec												
	Fp	4	min.	5	+	7	=	12	sec												*

JUNCTION CAPACITY CALCULATION

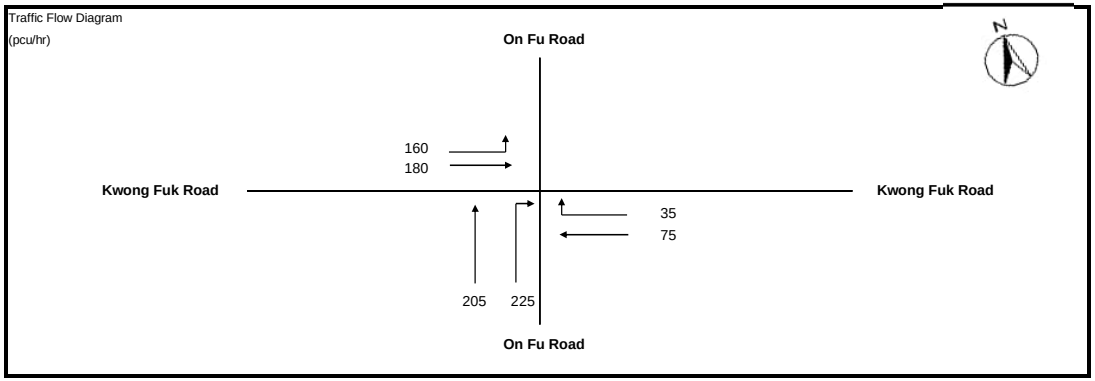
AECOM

Junction J13 - Kwong Fuk Road / On Fu Road	2023 PM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J13

Traffic Flow Diagram

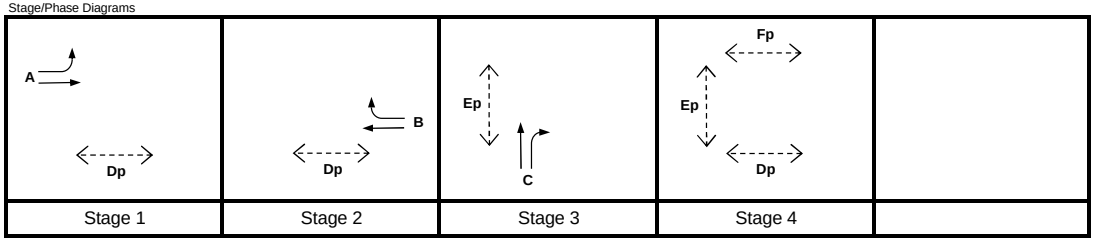
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	102	sec
Sum(y)	Y =	0.279	
Lost time	L =	32	sec
Total Flow	=	880	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	74	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	44	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.660	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	136.6	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	46	sec
Y_{max}	$= 1-L/C$	=	0.686	

Stage/Phase Diagrams



I/G = 6 I/G = 6 I/G = 8 G = 5 I/G = 10

Critical Case : A,B,C,Fp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 121%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.600	1	10			1		0		1975	160	0		160	100%		1717	0.093	0.093
	A	1	3.200	1				0		0		2075		180		180			2075	0.087	
	B	2	3.700	1		10	0	1		0		1985		75	35	110		32%	1895	0.058	0.058
	C	3	4.100	1				1		0		2025		205		205			2025	0.101	
	C	3	4.100	1		10	0	1		0		2025			225	225		100%	1761	0.128	0.128
Pedestrian Crossing				GM		FGM															
	Dp	1,2,4	min.	5	+	7	=	12	sec												
	Ep	3,4	min.	6	+	12	=	18	sec												
	Fp	4	min.	5	+	7	=	12	sec												*

JUNCTION CAPACITY CALCULATION

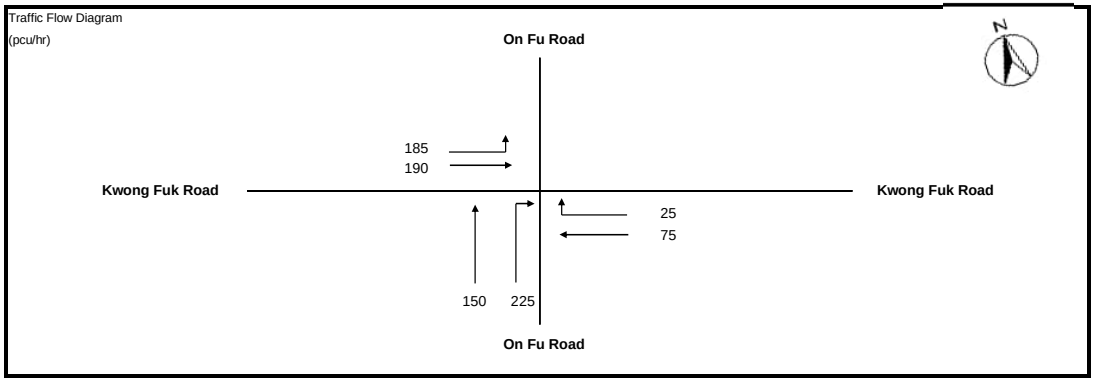
AECOM

Junction J13 - Kwong Fuk Road / On Fu Road	2023 Weekend Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J13

Traffic Flow Diagram

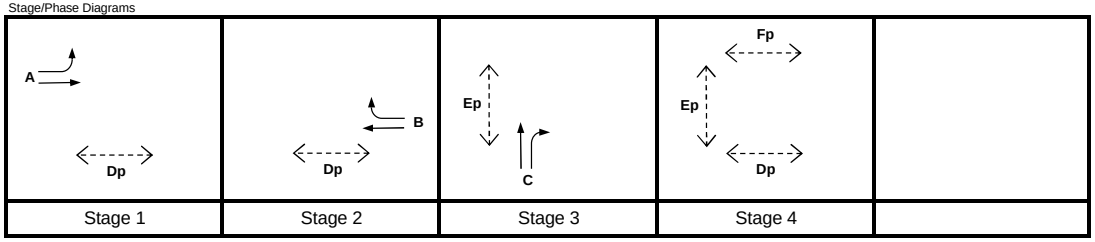
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	102	sec
Sum(y)	Y =	0.288	
Lost time	L =	32	sec
Total Flow	=	850	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	74	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	45	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.660	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	129.4	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	47	sec
Y_{max}	$= 1-L/C$	=	0.686	

Stage/Phase Diagrams



I/G = 6 I/G = 6 I/G = 8 G = 5 I/G = 10

Critical Case : A,B,C,Fp

R.C.(C) = $(0.9xY_{max}-Y)/Yx100\%$ = 115%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.600	1	10			1		0		1975	185	0		185	100%		1717	0.108	0.108
	A	1	3.200	1				0		0		2075		190		190			2075	0.092	
	B	2	3.700	1		10	0	1		0		1985		75	25	100		25%	1913	0.052	0.052
	C	3	4.100	1				1		0		2025		150		150			2025	0.074	
	C	3	4.100	1		10	0	1		0		2025			225	225		100%	1761	0.128	0.128
Pedestrian Crossing				GM		FGM															
	Dp	1,2,4	min.	5	+	7	=	12	sec												
	Ep	3,4	min.	6	+	12	=	18	sec												
	Fp	4	min.	5	+	7	=	12	sec												*

JUNCTION CAPACITY CALCULATION

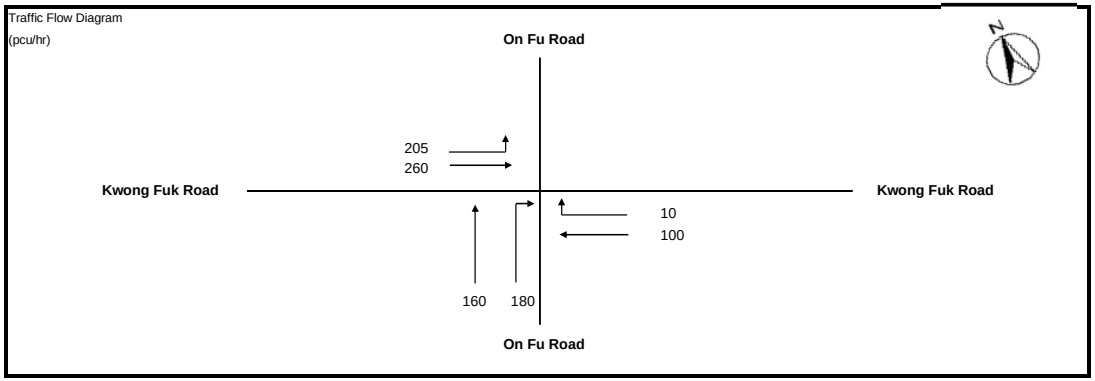
AECOM

Junction J13 - Kwong Fuk Road / On Fu Road	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J13

Traffic Flow Diagram

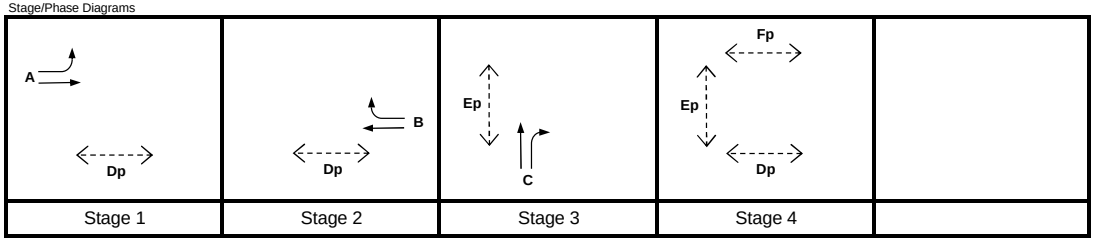
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	128	sec
Sum(y)	Y =	0.281	
Lost time	L =	32	sec
Total Flow	=	915	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	74	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	44	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.660	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	135.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	47	sec
Y_{max}	$= 1-L/C$	=	0.750	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
I/G = 6	I/G = 6	I/G = 8	G = 5	I/G = 10

Critical Case : A,B,C,Fp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 140%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.600	1	10			1		0		1975	205	6		211	97%		1724	0.122	0.122
	A	1	3.200	1				0		0		2075		254		254			2075	0.122	
	B	2	3.700	1		10	0	1		0		1985		100	10	110		9%	1958	0.056	0.056
	C	3	4.100	1				1		0		2025		160		160			2025	0.079	
	C	3	4.100	1		10	0	1		0		2025			180	180		100%	1761	0.102	0.102
Pedestrian Crossing				GM		FGM															
	Dp	1,2,4	min.	5	+	7	=	12	sec												
	Ep	3,4	min.	6	+	12	=	18	sec												
	Fp	4	min.	5	+	7	=	12	sec												*

JUNCTION CAPACITY CALCULATION

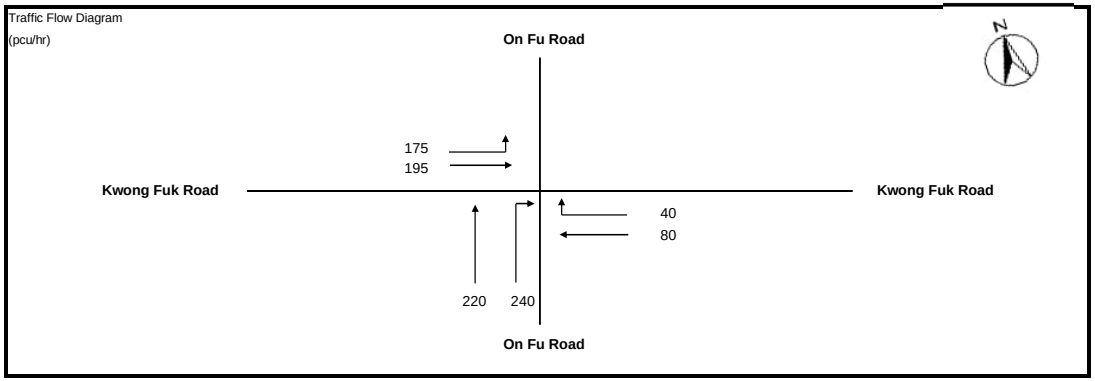
AECOM

Junction J13 - Kwong Fuk Road / On Fu Road	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J13

Traffic Flow Diagram

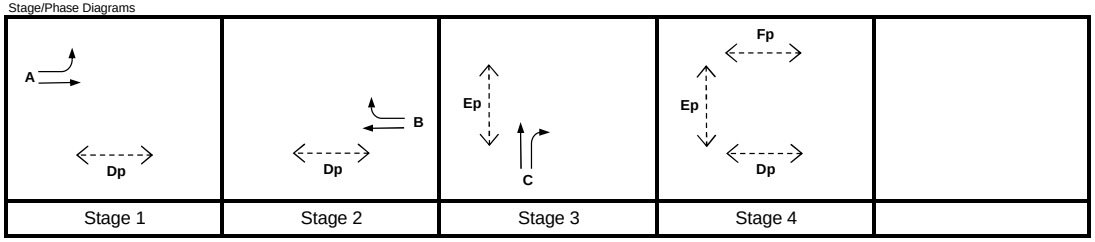
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	102	sec
Sum(y)	Y =	0.302	
Lost time	L =	32	sec
Total Flow	=	950	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	76	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	46	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.660	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	118.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	48	sec
Y_{max}	$= 1-L/C$	=	0.686	

Stage/Phase Diagrams



I/G = 6 I/G = 6 I/G = 8 G = 5 I/G = 10

Critical Case : A,B,C,Fp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 105%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.600	1	10			1		0		1975	175	0		175	100%		1717	0.102	0.102
	A	1	3.200	1				0		0		2075		195		195			2075	0.094	
	B	2	3.700	1		10	0	1		0		1985		80	40	120		33%	1890	0.063	0.063
	C	3	4.100	1				1		0		2025		220		220			2025	0.109	
	C	3	4.100	1		10	0	1		0		2025			240	240		100%	1761	0.136	0.136
Pedestrian Crossing				GM		FGM															
	Dp	1,2,4	min.	5	+	7	=	12	sec												
	Ep	3,4	min.	6	+	12	=	18	sec												
	Fp	4	min.	5	+	7	=	12	sec												*

JUNCTION CAPACITY CALCULATION

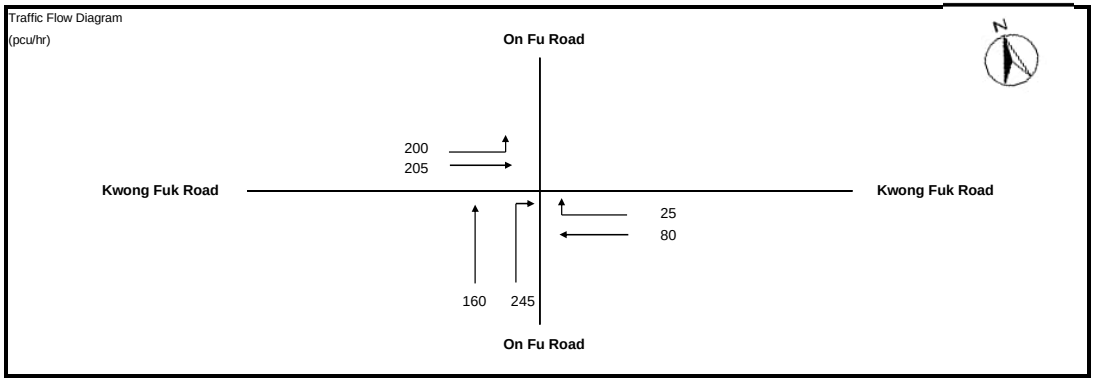
AECOM

Junction J13 - Kwong Fuk Road / On Fu Road	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J13

Traffic Flow Diagram

(pcu/hr)



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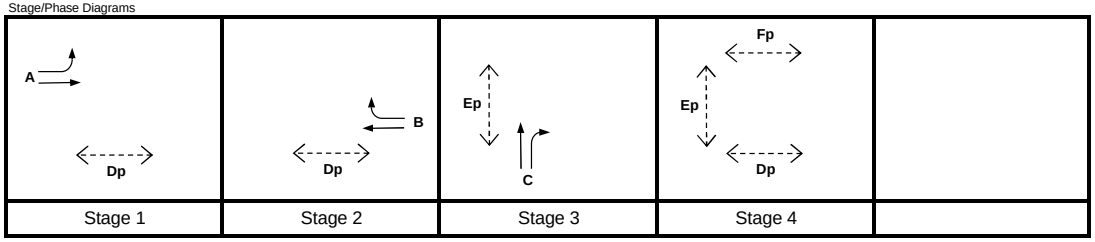
Sum(y)	Y =	0.310	
Lost time	L =	32	sec
Total Flow	=	915	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	77	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	46	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.660	
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	112.6	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	49	sec
Y_{max}	$= 1-L/C$	=	0.686	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
I/G = 6	I/G = 6	I/G = 8	G = 5	I/G = 10

Critical Case : A,B,C,Fp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 99%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.600	1	10			1		0		1975	200	0		200	100%		1717	0.116	0.116
	A	1	3.200	1				0		0		2075		205		205			2075	0.099	
	B	2	3.700	1		10	0	1		0		1985		80	25	105		24%	1917	0.055	0.055
	C	3	4.100	1				1		0		2025		160		160			2025	0.079	
	C	3	4.100	1		10	0	1		0		2025			245	245		100%	1761	0.139	0.139
Pedestrian Crossing				GM		FGM															
	Dp	1,2,4	min.	5	+	7	=	12	sec												
	Ep	3,4	min.	6	+	12	=	18	sec												
	Fp	4	min.	5	+	7	=	12	sec												*

JUNCTION CAPACITY CALCULATION

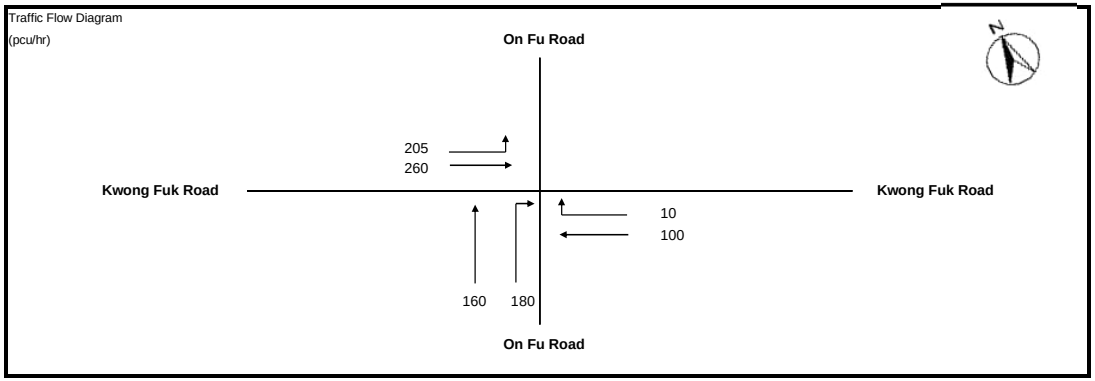
AECOM

Junction J13 - Kwong Fuk Road / On Fu Road	2030 AM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J13

Traffic Flow Diagram

(pcu/hr)



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Sum(y)	Y =	0.281	
Lost time	L =	32	sec
Total Flow	=	915	pcu

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Min. Cycle Time C_m	$= L/(1-Y)$	=	44	sec
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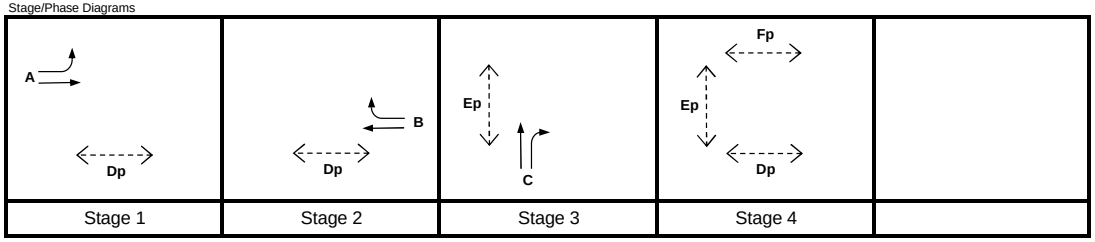
$R.C._{ult}$	$= (Y_{ult}-Y)/Yx100\%$	=	135.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	47	sec
Y_{max}	$= 1-L/C$	=	0.750	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	
I/G = 6	I/G = 6	I/G = 8	G = 5	I/G = 10

Critical Case : A,B,C,Fp

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 140%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.600	1	10			1		0		1975	205	6		211	97%		1724	0.122	0.122
	A	1	3.200	1				0		0		2075		254		254			2075	0.122	
	B	2	3.700	1		10	0	1		0		1985		100	10	110		9%	1958	0.056	0.056
	C	3	4.100	1				1		0		2025		160		160			2025	0.079	
	C	3	4.100	1		10	0	1		0		2025			180	180		100%	1761	0.102	0.102
Pedestrian Crossing				GM		FGM															
	Dp	1,2,4	min.	5	+	7	=	12	sec												
	Ep	3,4	min.	6	+	12	=	18	sec												
	Fp	4	min.	5	+	7	=	12	sec												*

JUNCTION CAPACITY CALCULATION

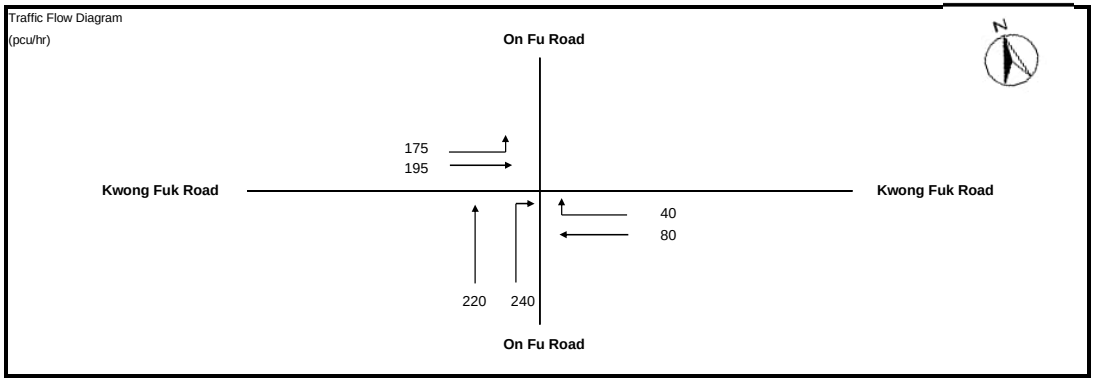
AECOM

Junction J13 - Kwong Fuk Road / On Fu Road	2030 PM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J13

Traffic Flow Diagram

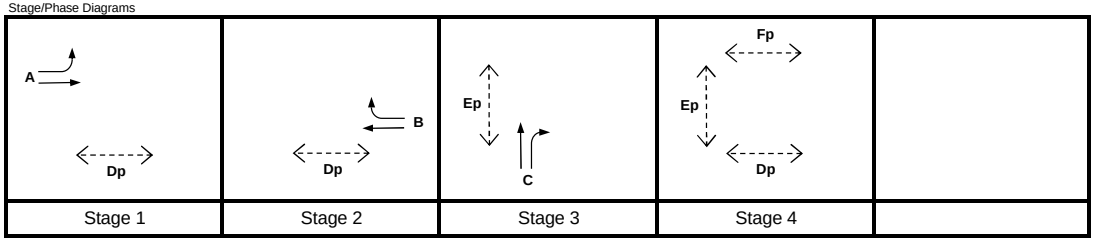
(pcu/hr)



No. of stages per cycle	N =	4	
Cycle time	C =	102	sec
Sum(y)	Y =	0.302	
Lost time	L =	32	sec
Total Flow	=	950	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	76	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	46	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.660	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	118.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	48	sec
Y_{max}	$= 1-L/C$	=	0.686	

Stage/Phase Diagrams



Critical Case : A,B,C,Fp

R.C.(C) = $(0.9xY_{max}-Y)/Y \times 100\%$ = 105%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.600	1	10			1		0		1975	175	0		175	100%		1717	0.102	0.102
	A	1	3.200	1				0		0		2075		195		195			2075	0.094	
	B	2	3.700	1		10	0	1		0		1985		80	40	120		33%	1890	0.063	0.063
	C	3	4.100	1				1		0		2025		220		220			2025	0.109	
	C	3	4.100	1		10	0	1		0		2025			240	240		100%	1761	0.136	0.136
Pedestrian Crossing				GM		FGM															
	Dp	1,2,4	min.	5	+	7	=	12	sec												
	Ep	3,4	min.	6	+	12	=	18	sec												
	Fp	4	min.	5	+	7	=	12	sec												*

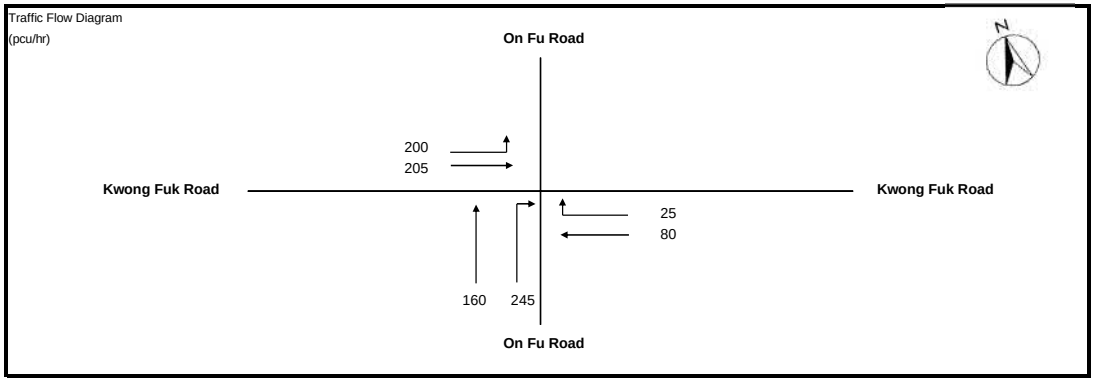
JUNCTION CAPACITY CALCULATION

AECOM

Junction J13 - Kwong Fuk Road / On Fu Road	2030 Weekend Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J13

Traffic Flow Diagram
(pcu/hr)



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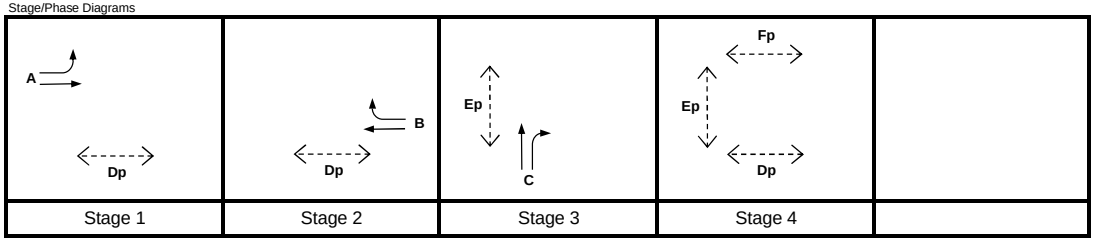
Lost time	L =	32	sec
Total Flow	=	915	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	77	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	46	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.660	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	112.6	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	49	sec
Y_{max}	$= 1-L/C$	=	0.686	

Stage/Phase Diagrams



Critical Case : A,B,C,Fp

R.C.(C) = $(0.9xY_{max}-Y)/Y \times 100\%$ = 99%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.600	1	10			1		0		1975	200	0		200	100%		1717	0.116	0.116
	A	1	3.200	1				0		0		2075		205		205			2075	0.099	
	B	2	3.700	1		10	0	1		0		1985		80	25	105		24%	1917	0.055	0.055
	C	3	4.100	1				1		0		2025		160		160			2025	0.079	
	C	3	4.100	1		10	0	1		0		2025			245	245		100%	1761	0.139	0.139
Pedestrian Crossing				GM		FGM															
	Dp	1,2,4	min.	5	+	7	=	12	sec												
	Ep	3,4	min.	6	+	12	=	18	sec												
	Fp	4	min.	5	+	7	=	12	sec												*

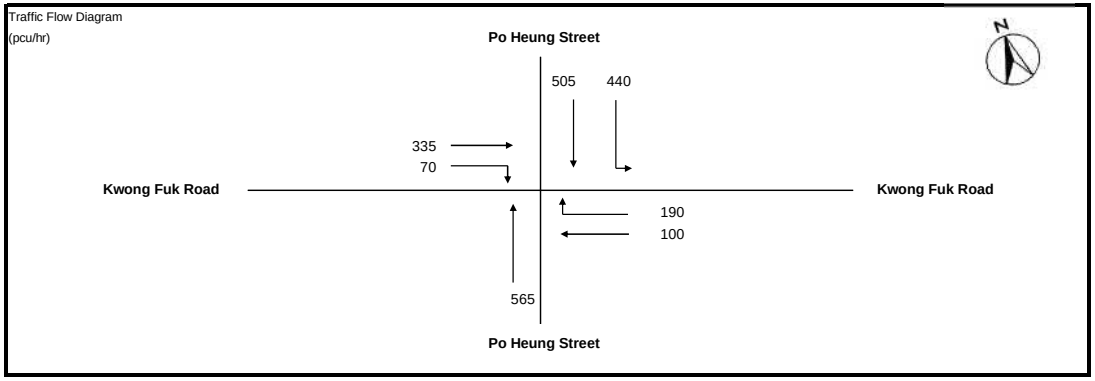
JUNCTION CAPACITY CALCULATION

AECOM

Junction J14 - Kwong Fuk Road / Po Heung Street	2023 AM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

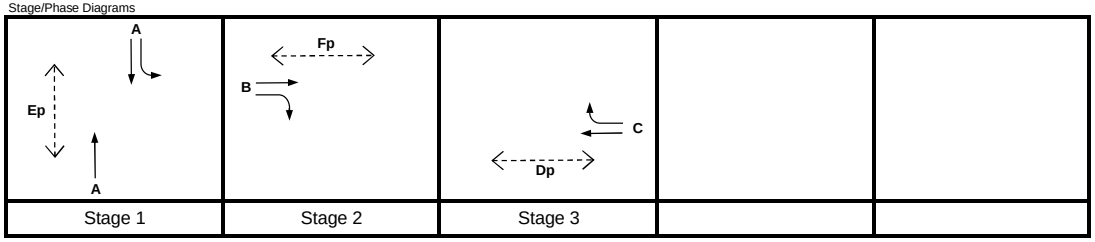
J14

Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	128	sec
Sum(y)		Y =	0.466	
Lost time		L =	16	sec
Total Flow		=	2,205	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	54	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	30	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.780	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	67.5	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	33	sec
Y_{max}	$= 1-L/C$	=	0.875	

Stage/Phase Diagrams



I/G = 6 I/G = 6 I/G = 7

Critical Case : A,B,C

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 69%

	MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
		A	1	3.700	1	10			1		0		1985	440	0		440	100%		1726	0.255	
		A	1	3.600	1				0		0		2115		505		505			2115	0.239	
*		A	1	3.700	1				1		0		1985		565		565			1985	0.285	0.285
		B	2	3.700	2				1		0		4110		335		335			4110	0.082	0.082
		B	2	3.600	1		15	0	0		0		2115			70	70		100%	1923	0.036	
		C	3	3.600	1				1		0		1975		100		100			1975	0.051	
		C	3	3.000	1		20	0	0		0		2055			190	190		100%	1912	0.099	0.099
	Pedestrian Crossing				GM		FGM															
		Dp	3	min.	5	+	9	=	14	sec												
		Ep	1	min.	5	+	11	=	16	sec												
		Fp	2	min.	5	+	9	=	14	sec												

* The nearside lane of Po Heung Street northbound approach is occupied by illegal parking vehicle

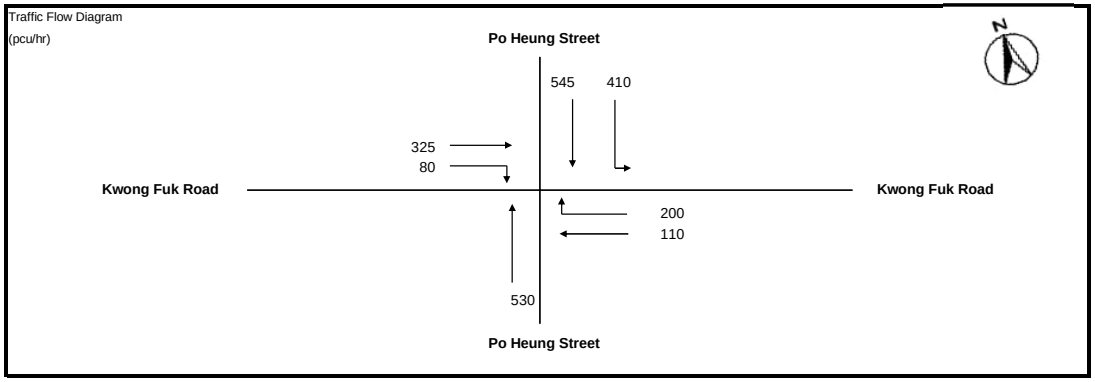
JUNCTION CAPACITY CALCULATION

AECOM

Junction J14 - Kwong Fuk Road / Po Heung Street	2023 PM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

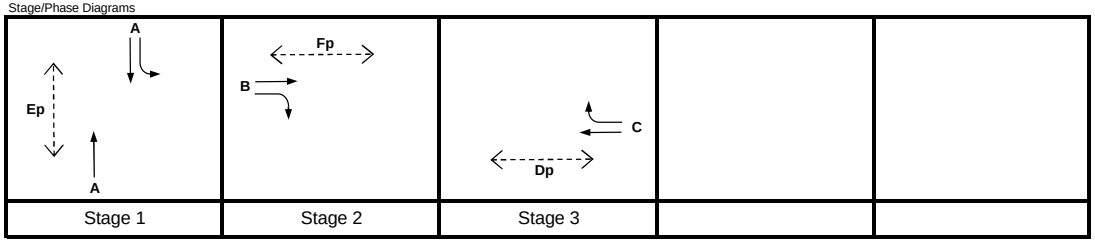
J14

Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	102	sec
Sum(y)		Y =	0.451	
Lost time		L =	16	sec
Total Flow		=	2,200	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	53	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	29	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.780	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	73.1	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	32	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,B,C

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 68%

	MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
		A	1	3.700	1	10			1		0		1985	410	21		431	95%		1737	0.248	
		A	1	3.600	1				0		0		2115		524		524			2115	0.248	
*		A	1	3.700	1				1		0		1985		530		530			1985	0.267	0.267
		B	2	3.700	2				1		0		4110		325		325			4110	0.079	0.079
		B	2	3.600	1		15	0	0		0		2115			80	80		100%	1923	0.042	
		C	3	3.600	1				1		0		1975		110		110			1975	0.056	
		C	3	3.000	1		20	0	0		0		2055			200	200		100%	1912	0.105	0.105
Pedestrian Crossing					GM		FGM															
		Dp	3	min.	5	+	9	=	14	sec												
		Ep	1	min.	5	+	11	=	16	sec												
		Fp	2	min.	5	+	9	=	14	sec												

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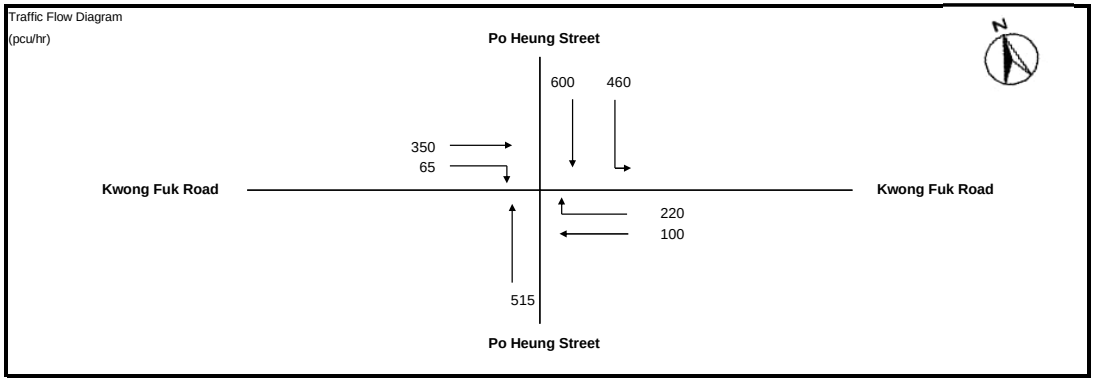
JUNCTION CAPACITY CALCULATION

AECOM

Junction J14 - Kwong Fuk Road / Po Heung Street	2023 Weekend Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J14

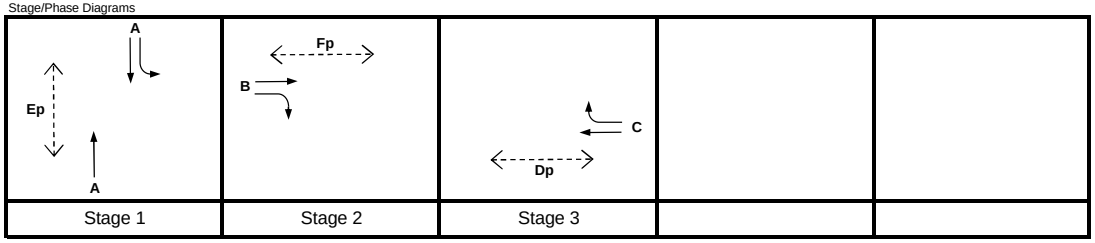
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle	N =	3	
Cycle time	C =	102	sec
Sum(y)	Y =	0.476	
Lost time	L =	16	sec
Total Flow	=	2,310	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	55	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	31	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.780	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	64.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	34	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



I/G = 6 I/G = 6 I/G = 7

Critical Case : A,B,C

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 60%

	MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
		A	1	3.700	1	10			1		0		1985	460	18		478	96%		1734	0.275	0.275
		A	1	3.600	1				0		0		2115		582		582			2115	0.275	
*		A	1	3.700	1				1		0		1985		515		515			1985	0.259	
		B	2	3.700	2				1		0		4110		350		350			4110	0.085	0.085
		B	2	3.600	1		15	0	0		0		2115			65	65		100%	1923	0.034	
		C	3	3.600	1				1		0		1975		100		100			1975	0.051	
		C	3	3.000	1		20	0	0		0		2055			220	220		100%	1912	0.115	0.115
	Pedestrian Crossing				GM		FGM															
		Dp	3	min.	5	+	9	=	14	sec												
		Ep	1	min.	5	+	11	=	16	sec												
		Fp	2	min.	5	+	9	=	14	sec												

* The nearside lane of Po Heung Street northbound approach is occupied by illegal parking vehicle

JUNCTION CAPACITY CALCULATION

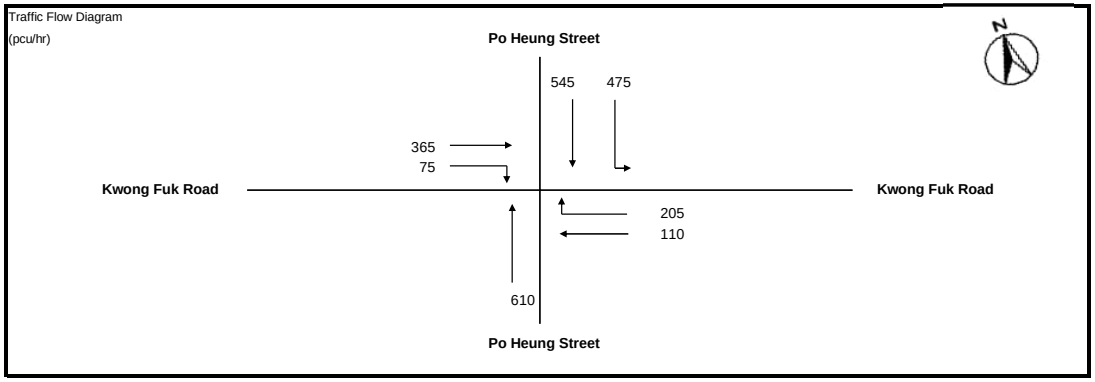
AECOM

Junction J14 - Kwong Fuk Road / Po Heung Street	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J14

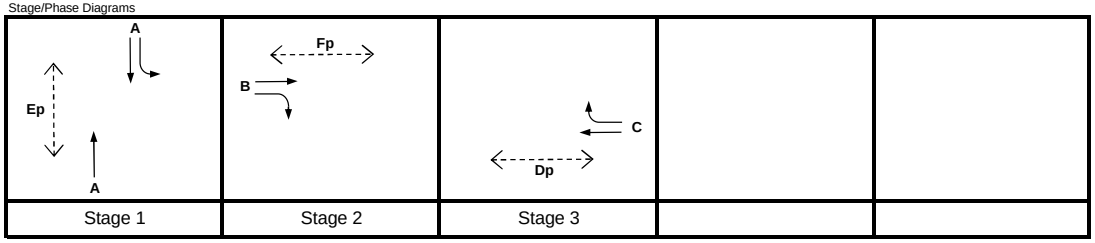
Traffic Flow Diagram

(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	128	sec
Sum(y)		Y =	0.503	
Lost time		L =	16	sec
Total Flow		=	2,385	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	58	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	32	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.780	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	55.0	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	36	sec
Y_{max}	$= 1-L/C$	=	0.875	

Stage/Phase Diagrams



Critical Case : A,B,C

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 56%

	MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
		A	1	3.700	1	10			1		0		1985	475	0		475	100%		1726	0.275	
		A	1	3.600	1				0		0		2115		545		545			2115	0.258	
*		A	1	3.700	1				1		0		1985		610		610			1985	0.307	0.307
		B	2	3.700	2				1		0		4110		365		365			4110	0.089	0.089
		B	2	3.600	1		15	0	0		0		2115			75	75		100%	1923	0.039	
		C	3	3.600	1				1		0		1975		110		110			1975	0.056	
		C	3	3.000	1		20	0	0		0		2055			205	205		100%	1912	0.107	0.107
	Pedestrian Crossing				GM		FGM															
		Dp	3	min.	5	+	9	=	14	sec												
		Ep	1	min.	5	+	11	=	16	sec												
		Fp	2	min.	5	+	9	=	14	sec												

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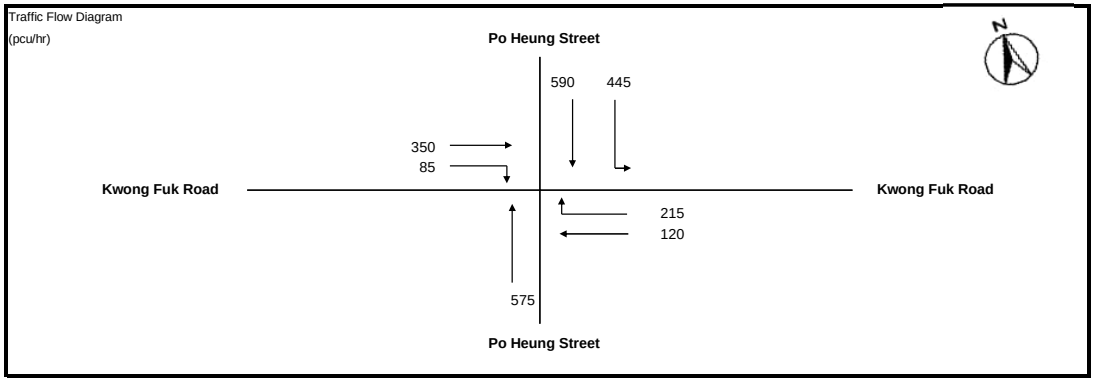
JUNCTION CAPACITY CALCULATION

AECOM

Junction J14 - Kwong Fuk Road / Po Heung Street	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

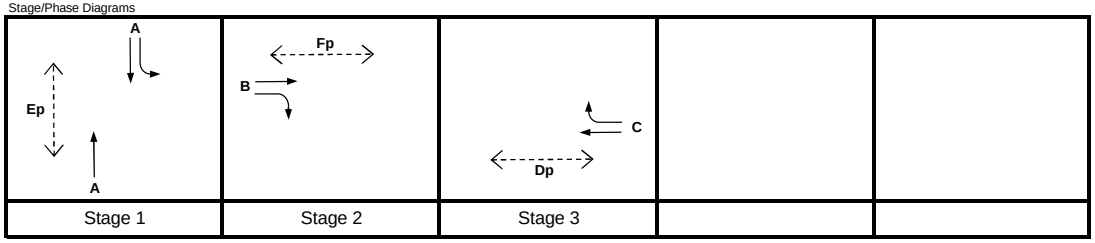
J14

Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	102	sec
Sum(y)		Y =	0.487	
Lost time		L =	16	sec
Total Flow		=	2,380	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	57	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	31	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.780	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	60.1	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	35	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,B,C

R.C.(C) $= (0.9xY_{max}-Y)/Yx100\%$ = 56%

	MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
		A	1	3.700	1	10			1		0		1985	445	22		467	95%		1737	0.269	
		A	1	3.600	1				0		0		2115		568		568			2115	0.269	
*		A	1	3.700	1				1		0		1985		575		575			1985	0.290	0.290
		B	2	3.700	2				1		0		4110		350		350			4110	0.085	0.085
		B	2	3.600	1		15	0	0		0		2115			85	85		100%	1923	0.044	
		C	3	3.600	1				1		0		1975		120		120			1975	0.061	
		C	3	3.000	1		20	0	0		0		2055			215	215		100%	1912	0.112	0.112
	Pedestrian Crossing				GM		FGM															
		Dp	3	min.	5	+	9	=	14	sec												
		Ep	1	min.	5	+	11	=	16	sec												
		Fp	2	min.	5	+	9	=	14	sec												

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JUNCTION CAPACITY CALCULATION

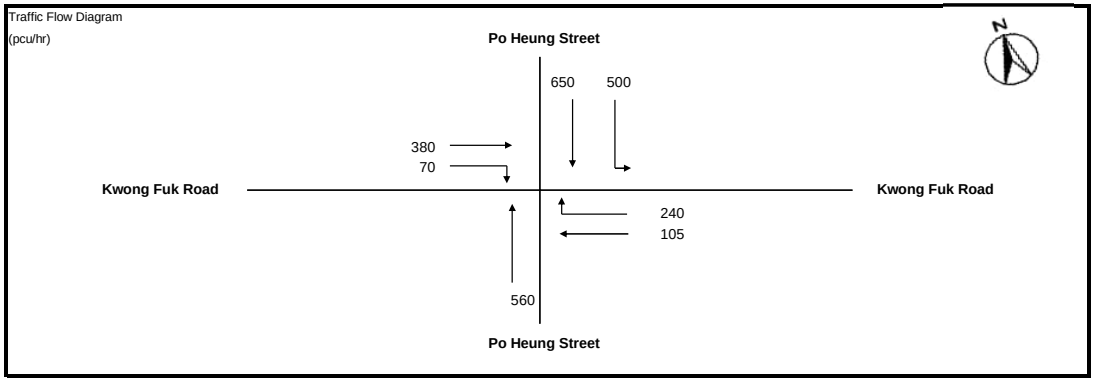
AECOM

Junction J14 - Kwong Fuk Road / Po Heung Street	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J14

Traffic Flow Diagram

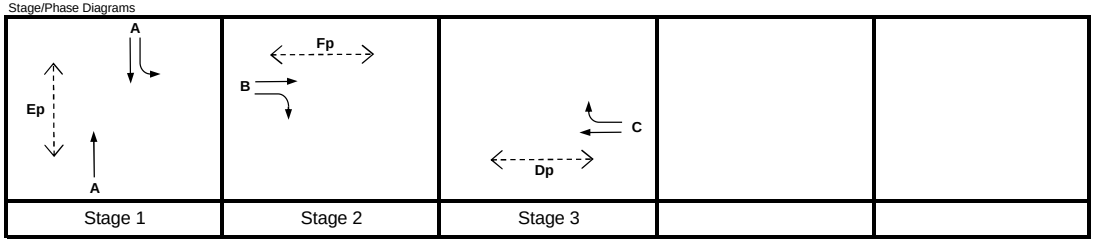
(pcu/hr)



No. of stages per cycle	N =	3	
Cycle time	C =	102	sec
Sum(y)	Y =	0.517	
Lost time	L =	16	sec
Total Flow	=	2,505	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	60	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	33	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.780	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	50.9	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	38	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,B,C

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 47%

	MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
		A	1	3.700	1	10			1		0		1985	500	18		518	97%		1734	0.299	0.299
		A	1	3.600	1				0		0		2115		632		632			2115	0.299	
*		A	1	3.700	1				1		0		1985		560		560			1985	0.282	
		B	2	3.700	2				1		0		4110		380		380			4110	0.092	0.092
		B	2	3.600	1		15	0	0		0		2115			70	70		100%	1923	0.036	
		C	3	3.600	1				1		0		1975		105		105			1975	0.053	
		C	3	3.000	1		20	0	0		0		2055			240	240		100%	1912	0.126	0.126
	Pedestrian Crossing				GM		FGM															
		Dp	3	min.	5	+	9	=	14	sec												
		Ep	1	min.	5	+	11	=	16	sec												
		Fp	2	min.	5	+	9	=	14	sec												

* The nearside lane of Po Heung Street northbound approach is occupied by illegal parking vehicle

JUNCTION CAPACITY CALCULATION

AECOM

Junction J14 - Kwong Fuk Road / Po Heung Street	2030 AM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

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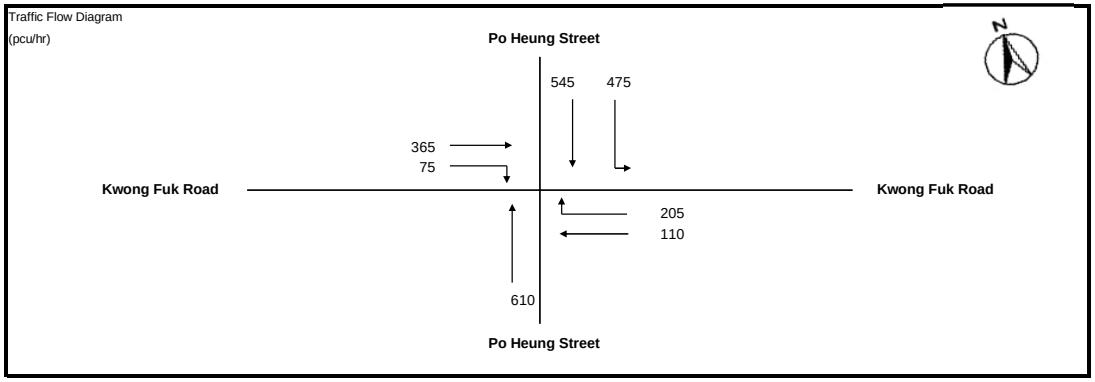
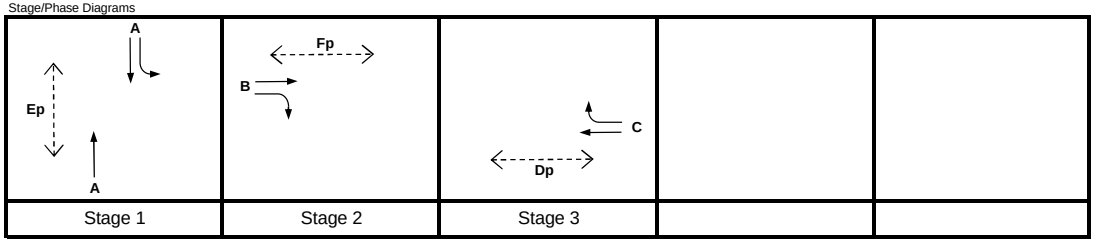
Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	128	sec
Sum(y)		Y =	0.503	
Lost time		L =	16	sec
Total Flow		=	2,385	pcu
Optimum Cycle C_o	= (1.5×L+5)/(1-Y)	=	58	sec
Min. Cycle Time C_m	= L/(1-Y)	=	32	sec
Y_{ult}	= 0.9-0.0075×L	=	0.780	
$R.C._{ult}$	= $(Y_{ult}-Y)/Yx100\%$	=	55.0	%
Practical Cycle Time C_p	= 0.9×L/(0.9-Y)	=	36	sec
Y_{max}	= 1-L/C	=	0.875	

Stage/Phase Diagrams



I/G = 6 I/G = 6 I/G = 7

Critical Case : A,B,C

R.C.(C) = $(0.9xY_{max}-Y)/Yx100\%$ = 56%

	MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
		A	1	3.700	1	10			1		0		1985	475	0		475	100%		1726	0.275	
		A	1	3.600	1				0		0		2115		545		545			2115	0.258	
*		A	1	3.700	1				1		0		1985		610		610			1985	0.307	0.307
		B	2	3.700	2				1		0		4110		365		365			4110	0.089	0.089
		B	2	3.600	1		15	0	0		0		2115			75	75		100%	1923	0.039	
		C	3	3.600	1				1		0		1975		110		110			1975	0.056	
		C	3	3.000	1		20	0	0		0		2055			205	205		100%	1912	0.107	0.107
	Pedestrian Crossing				GM		FGM															
		Dp	3	min.	5	+	9	=	14	sec												
		Ep	1	min.	5	+	11	=	16	sec												
		Fp	2	min.	5	+	9	=	14	sec												

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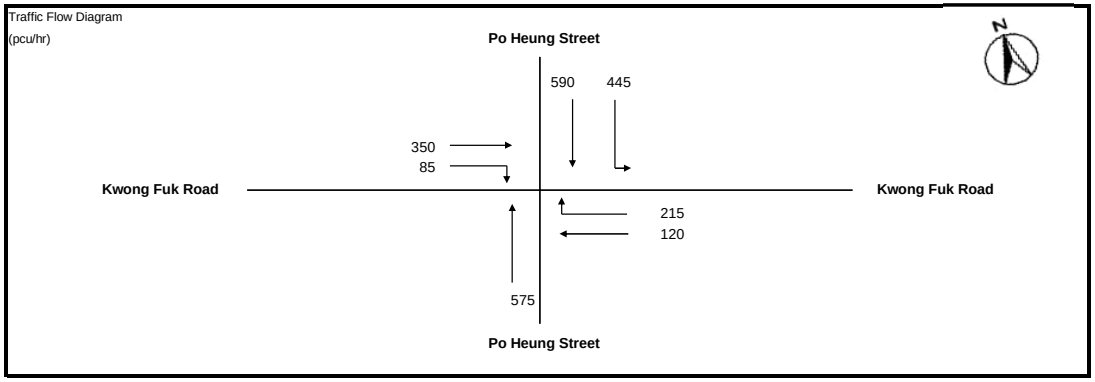
JUNCTION CAPACITY CALCULATION

AECOM

Junction J14 - Kwong Fuk Road / Po Heung Street	2030 PM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

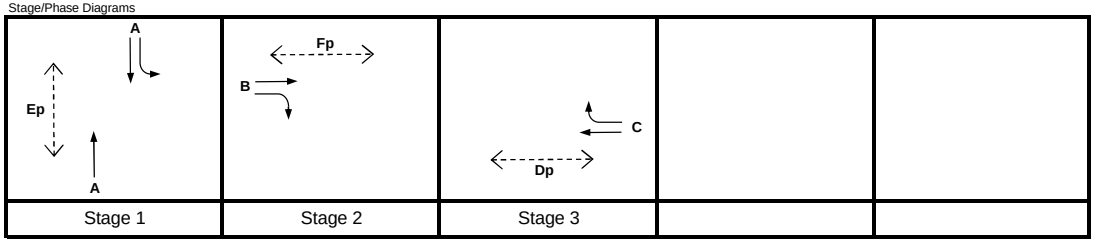
J14

Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	102	sec
Sum(y)		Y =	0.487	
Lost time		L =	16	sec
Total Flow		=	2,380	pcu
Optimum Cycle C_o	= (1.5×L+5)/(1-Y)	=	57	sec
Min. Cycle Time C_m	= L/(1-Y)	=	31	sec
Y_{ult}	= 0.9-0.0075×L	=	0.780	
$R.C._{ult}$	= (Y_{ult}-Y)/Yx100%	=	60.1	%
Practical Cycle Time C_p	= 0.9×L/(0.9-Y)	=	35	sec
Y_{max}	= 1-L/C	=	0.843	

Stage/Phase Diagrams



Critical Case : A,B,C

R.C.(C) = (0.9xY_{max}-Y)/Yx100% = 56%

	MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
		A	1	3.700	1	10			1		0		1985	445	22		467	95%		1737	0.269	
		A	1	3.600	1				0		0		2115		568		568			2115	0.269	
*		A	1	3.700	1				1		0		1985		575		575			1985	0.290	0.290
		B	2	3.700	2				1		0		4110		350		350			4110	0.085	0.085
		B	2	3.600	1		15	0	0		0		2115			85	85		100%	1923	0.044	
		C	3	3.600	1				1		0		1975		120		120			1975	0.061	
		C	3	3.000	1		20	0	0		0		2055			215	215		100%	1912	0.112	0.112
	Pedestrian Crossing				GM		FGM															
		Dp	3	min.	5	+	9	=	14	sec												
		Ep	1	min.	5	+	11	=	16	sec												
		Fp	2	min.	5	+	9	=	14	sec												

* The nearside lane of Po Heung Street northbound approach is occupied by illegal parking vehicle

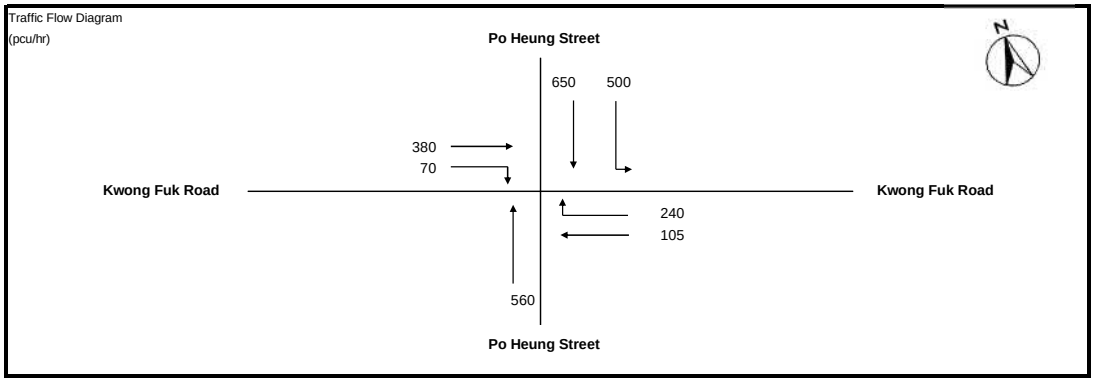
JUNCTION CAPACITY CALCULATION

AECOM

Junction J14 - Kwong Fuk Road / Po Heung Street	2030 Weekend Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

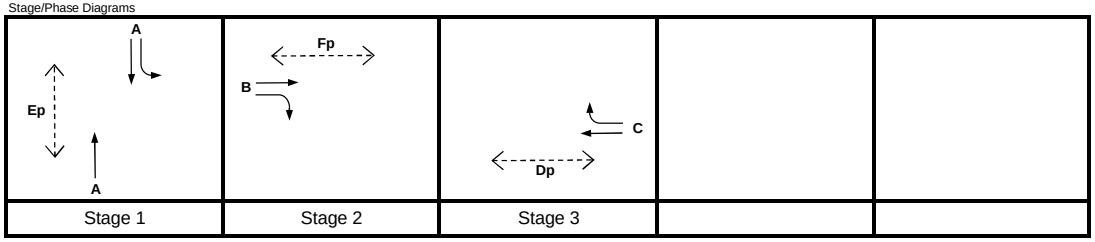
J14

Traffic Flow Diagram
(pcu/hr)



No. of stages per cycle		N =	3	
Cycle time		C =	102	sec
Sum(y)		Y =	0.517	
Lost time		L =	16	sec
Total Flow		=	2,505	pcu
Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	60	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	33	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.780	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	50.9	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	38	sec
Y_{max}	$= 1-L/C$	=	0.843	

Stage/Phase Diagrams



Critical Case : A,B,C

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\% =$ 47%

	MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
		A	1	3.700	1	10			1		0		1985	500	18		518	97%		1734	0.299	0.299
		A	1	3.600	1				0		0		2115		632		632			2115	0.299	
*		A	1	3.700	1				1		0		1985		560		560			1985	0.282	
		B	2	3.700	2				1		0		4110		380		380			4110	0.092	0.092
		B	2	3.600	1		15	0	0		0		2115			70	70		100%	1923	0.036	
		C	3	3.600	1				1		0		1975		105		105			1975	0.053	
		C	3	3.000	1		20	0	0		0		2055			240	240		100%	1912	0.126	0.126
	Pedestrian Crossing				GM		FGM															
		Dp	3	min.	5	+	9	=	14	sec												
		Ep	1	min.	5	+	11	=	16	sec												
		Fp	2	min.	5	+	9	=	14	sec												

* The nearside lane of Po Heung Street northbound approach is occupied by illegal parking vehicle

JUNCTION CAPACITY CALCULATION

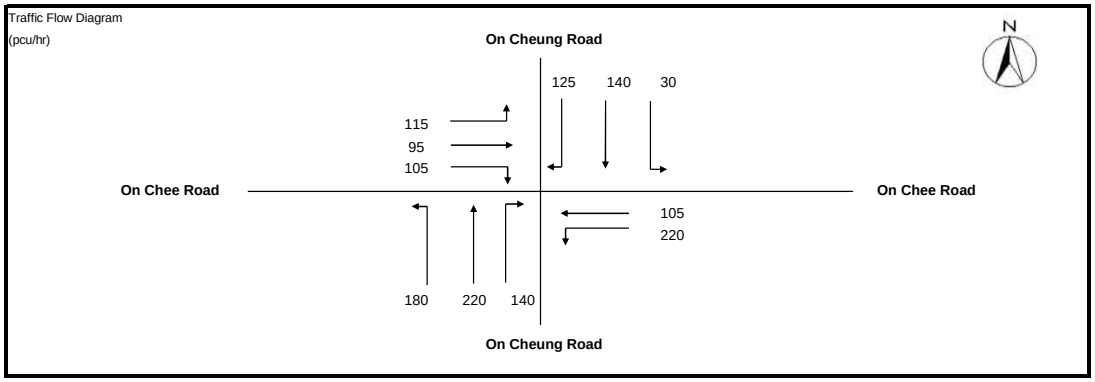
AECOM

Junction J15 - On Cheung Road / On Chee Road	2023 AM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J15

Traffic Flow Diagram

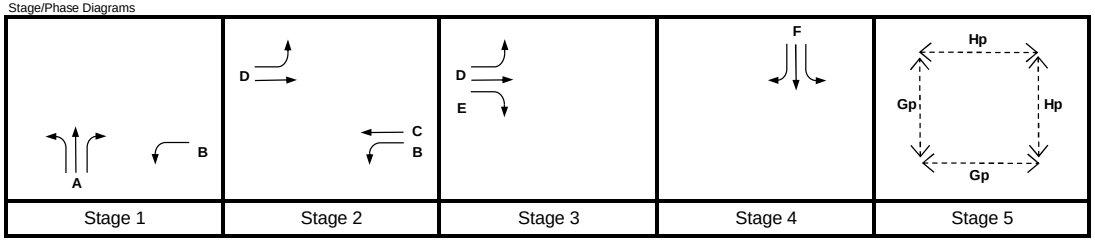
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	128	sec
Sum(y)	Y =	0.369	
Lost time	L =	44	sec
Total Flow	=	1,475	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	113	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	70	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	54.5	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	75	sec
Y_{max}	$= 1-L/C$	=	0.656	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G = 6	I/G = 8	I/G = 11	G = 5 I/G = 12

Critical Case : A,C,E,F,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 60%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.000	1	15			1		0		1915	180	81		261	69%		1791	0.145	0.145
	A	1	3.100	1		10	0	0		0		2065		139	140	279		50%	1921	0.145	
	B	1,2	3.100	1	10			1		0		1925	220			220	100%		1674	0.131	
	C	2	3.100	1				0		0		2065		105		105			2065	0.051	0.051
	D	2,3	3.300	1	10			1		0		1945	115	33		148	78%		1742	0.085	
	E	3	3.300	1		15	0	0		0		2085		62	105	167		63%	1962	0.085	0.085
	F	4	3.600	1	15	20	0	1		0		1975	30	140	0	170	18%	0%	1941	0.088	0.088
	F	4	3.500	1		15	0	0		0		2105			125	125		100%	1914	0.065	
Pedestrian Crossing				GM		FGM															
	Gp	5	min.	5	+	8	=	13	sec												*
	Hp	5	min.	8	+	8	=	16	sec												

JUNCTION CAPACITY CALCULATION

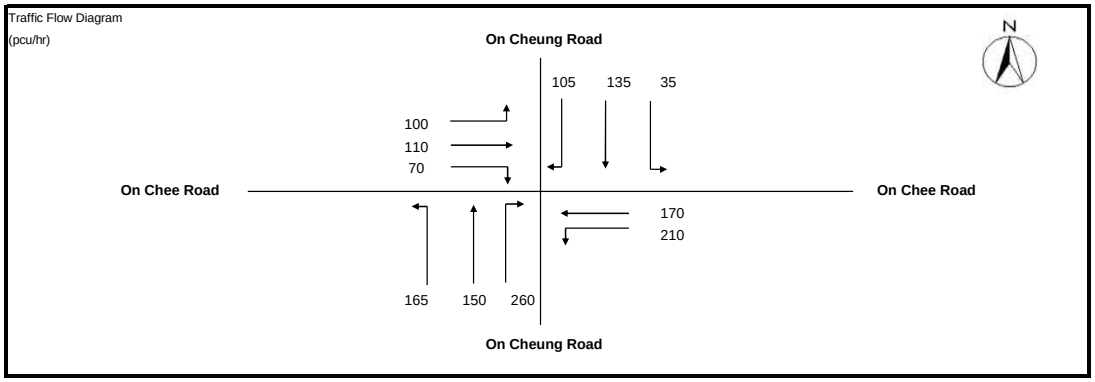
AECOM

Junction J15 - On Cheung Road / On Chee Road	2023 PM Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J15

Traffic Flow Diagram

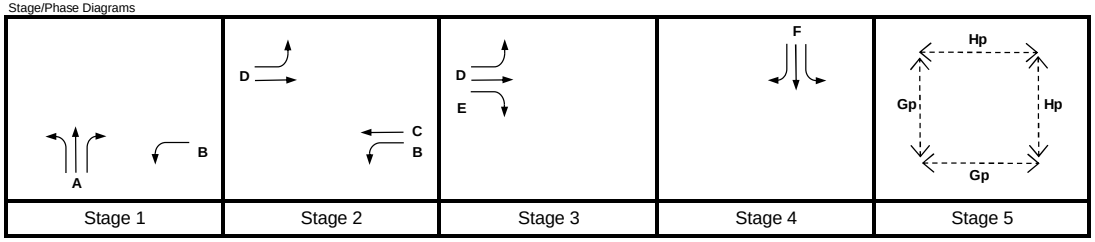
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	128	sec
Sum(y)	Y =	0.404	
Lost time	L =	44	sec
Total Flow	=	1,510	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	119	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	74	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	41.3	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	80	sec
Y_{max}	$= 1-L/C$	=	0.656	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G = 6	I/G = 8	I/G = 11	G = 5 I/G = 12

Critical Case : A,C,E,F,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 46%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.000	1	15			1		0		1915	165	122		287	58%		1811	0.158	0.158
	A	1	3.100	1		10	0	0		0		2065		28	260	288		90%	1819	0.158	
	B	1,2	3.100	1	10			1		0		1925	210			210	100%		1674	0.125	
	C	2	3.100	1				0		0		2065		170		170			2065	0.082	0.082
	D	2,3	3.300	1	10			1		0		1945	100	31		131	76%		1745	0.075	
	E	3	3.300	1		15	0	0		0		2085		79	70	149		47%	1992	0.075	0.075
	F	4	3.600	1	15	20	0	1		0		1975	35	135	0	170	21%	0%	1935	0.088	0.088
	F	4	3.500	1		15	0	0		0		2105			105	105		100%	1914	0.055	
Pedestrian Crossing				GM		FGM															
	Gp	5	min.	5	+	8	=	13	sec												*
	Hp	5	min.	8	+	8	=	16	sec												

JUNCTION CAPACITY CALCULATION

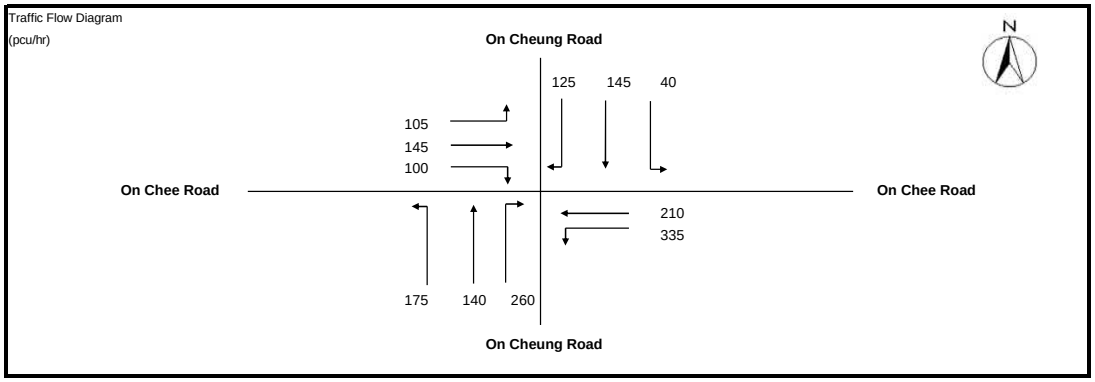
AECOM

Junction J15 - On Cheung Road / On Chee Road	2023 Weekend Observed	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J15

Traffic Flow Diagram

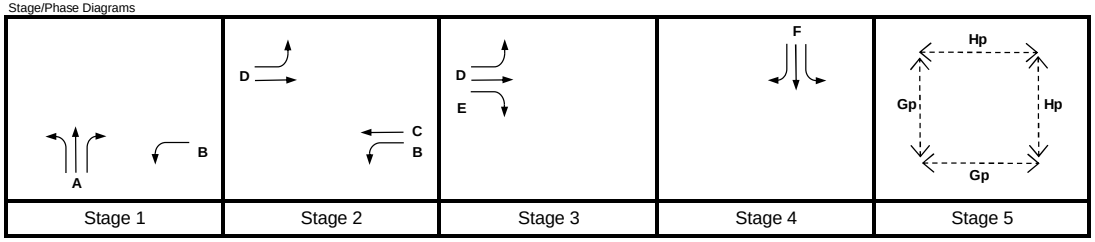
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	128	sec
Sum(y)	Y =	0.449	
Lost time	L =	44	sec
Total Flow	=	1,780	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	129	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	80	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	26.9	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	88	sec
Y_{max}	$= 1-L/C$	=	0.656	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G = 6	I/G = 8	I/G = 11	G = 5 I/G = 12

Critical Case : A,C,E,F,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 31%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.000	1	15			1		0		1915	175	111		286	61%		1805	0.159	0.159
	A	1	3.100	1		10	0	0		0		2065		29	260	289		90%	1819	0.159	
	B	1,2	3.100	1	10			1		0		1925	335			335	100%		1674	0.200	
	C	2	3.100	1				0		0		2065		210		210			2065	0.102	0.102
	D	2,3	3.300	1	10			1		0		1945	105	61		166	63%		1776	0.093	
	E	3	3.300	1		15	0	0		0		2085		84	100	184		54%	1978	0.093	0.093
	F	4	3.600	1	15	20	0	1		0		1975	40	145	0	185	22%	0%	1933	0.096	0.096
	F	4	3.500	1		15	0	0		0		2105			125	125		100%	1914	0.065	
Pedestrian Crossing				GM		FGM															
	Gp	5	min.	5	+	8	=	13	sec												*
	Hp	5	min.	8	+	8	=	16	sec												

JUNCTION CAPACITY CALCULATION

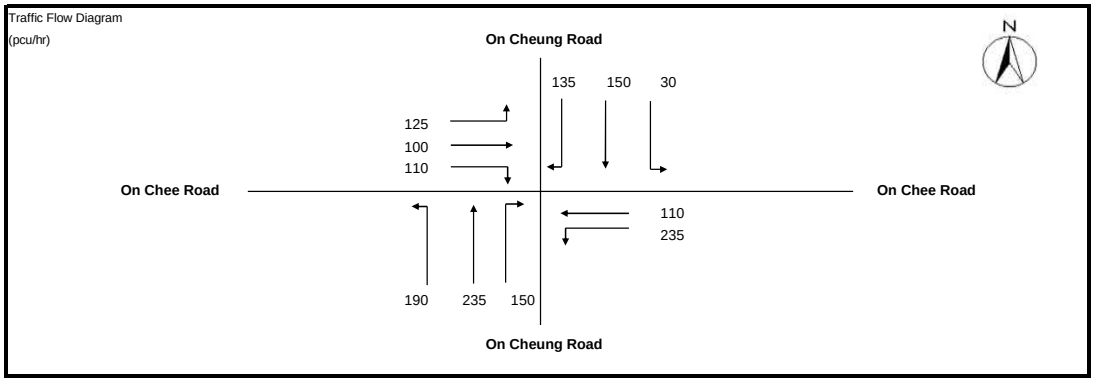
AECOM

Junction J15 - On Cheung Road / On Chee Road	2030 AM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J15

Traffic Flow Diagram

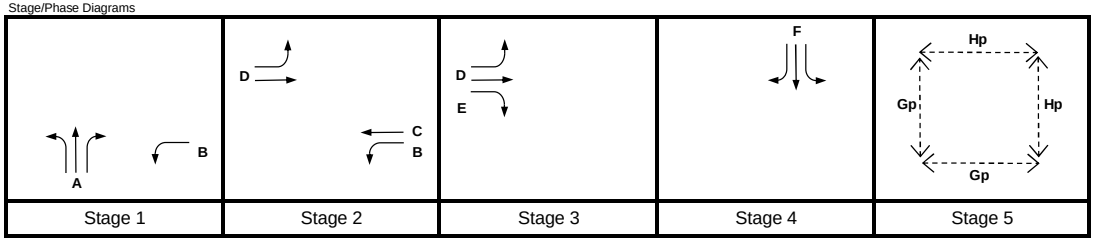
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	128	sec
Sum(y)	Y =	0.391	
Lost time	L =	44	sec
Total Flow	=	1,570	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	117	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	72	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	45.7	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	78	sec
Y_{max}	$= 1-L/C$	=	0.656	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G = 6	I/G = 8	I/G = 11	G = 5 I/G = 12

Critical Case : A,C,E,F,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 51%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.000	1	15			1		0		1915	190	88		278	68%		1792	0.155	0.155
	A	1	3.100	1		10	0	0		0		2065		147	150	297		50%	1920	0.155	
	B	1,2	3.100	1	10			1		0		1925	235			235	100%		1674	0.140	
	C	2	3.100	1				0		0		2065		110		110			2065	0.053	0.053
	D	2,3	3.300	1	10			1		0		1945	125	32		157	79%		1738	0.091	
	E	3	3.300	1		15	0	0		0		2085		68	110	178		62%	1963	0.091	0.091
	F	4	3.600	1	15	20	0	1		0		1975	30	150	0	180	17%	0%	1943	0.093	0.093
	F	4	3.500	1		15	0	0		0		2105			135	135		100%	1914	0.071	
Pedestrian Crossing				GM		FGM															
	Gp	5	min.	5	+	8	=	13	sec												*
	Hp	5	min.	8	+	8	=	16	sec												

JUNCTION CAPACITY CALCULATION

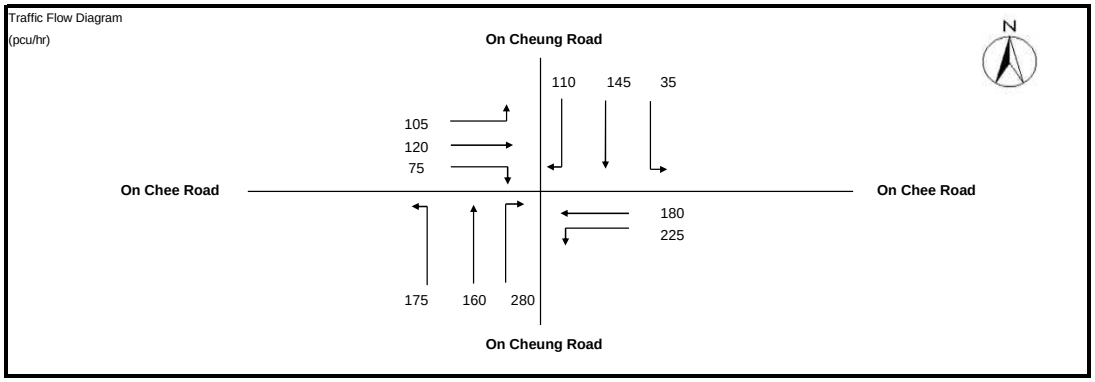
AECOM

Junction J15 - On Cheung Road / On Chee Road	2030 PM Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J15

Traffic Flow Diagram

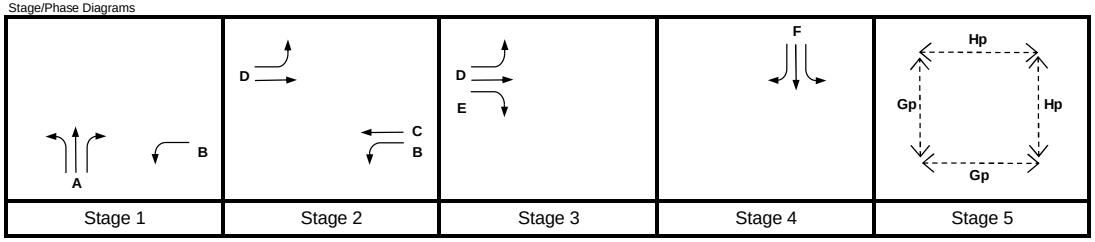
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	128	sec
Sum(y)	Y =	0.430	
Lost time	L =	44	sec
Total Flow	=	1,610	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	125	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	77	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	32.6	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	84	sec
Y_{max}	$= 1-L/C$	=	0.656	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G = 6	I/G = 8	I/G = 11	G = 5 I/G = 12

Critical Case : A,C,E,F,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 37%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.000	1	15			1		0		1915	175	132		307	57%		1812	0.169	
	A	1	3.100	1		10	0	0		0		2065		28	280	308		91%	1817	0.169	0.169
	B	1,2	3.100	1	10			1		0		1925	225			225	100%		1674	0.134	
	C	2	3.100	1				0		0		2065		180		180			2065	0.087	0.087
	D	2,3	3.300	1	10			1		0		1945	105	35		140	75%		1749	0.080	
	E	3	3.300	1		15	0	0		0		2085		85	75	160		47%	1991	0.080	0.080
	F	4	3.600	1	15	20	0	1		0		1975	35	145	0	180	19%	0%	1937	0.093	0.093
	F	4	3.500	1		15	0	0		0		2105			110	110		100%	1914	0.057	
Pedestrian Crossing				GM		FGM															
	Gp	5	min.	5	+	8	=	13	sec												*
	Hp	5	min.	8	+	8	=	16	sec												

JUNCTION CAPACITY CALCULATION

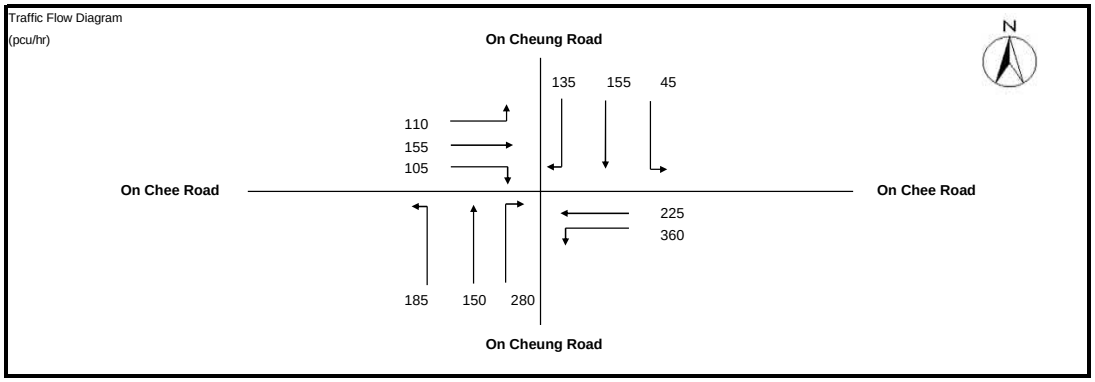
AECOM

Junction J15 - On Cheung Road / On Chee Road	2030 Weekend Reference	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J15

Traffic Flow Diagram

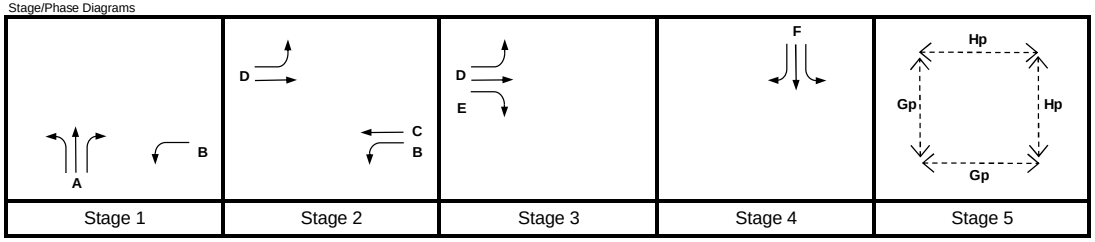
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	128	sec
Sum(y)	Y =	0.481	
Lost time	L =	44	sec
Total Flow	=	1,905	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	137	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	85	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	18.6	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	94	sec
Y_{max}	$= 1-L/C$	=	0.656	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G = 6	I/G = 8	I/G = 11	G = 5 I/G = 12

Critical Case : A,C,E,F,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 23%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.000	1	15			1		0		1915	185	122		307	60%		1806	0.170	0.170
	A	1	3.100	1		10	0	0		0		2065		28	280	308		91%	1818	0.170	
	B	1,2	3.100	1	10			1		0		1925	360			360	100%		1674	0.215	
	C	2	3.100	1				0		0		2065		225		225			2065	0.109	0.109
	D	2,3	3.300	1	10			1		0		1945	110	65		175	63%		1778	0.099	
	E	3	3.300	1		15	0	0		0		2085		90	105	195		54%	1978	0.099	0.099
	F	4	3.600	1	15	20	0	1		0		1975	45	155	0	200	23%	0%	1932	0.104	0.104
	F	4	3.500	1		15	0	0		0		2105			135	135		100%	1914	0.071	
Pedestrian Crossing				GM		FGM															
	Gp	5	min.	5	+	8	=	13	sec												*
	Hp	5	min.	8	+	8	=	16	sec												

JUNCTION CAPACITY CALCULATION

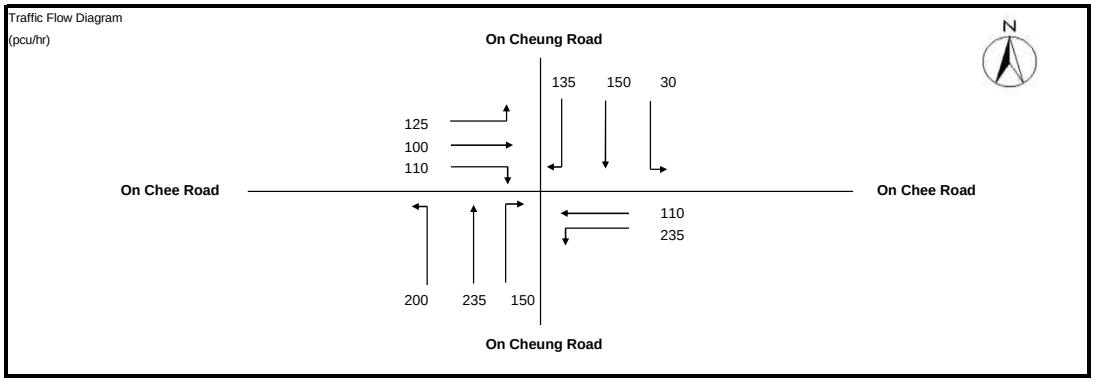
AECOM

Junction J15 - On Cheung Road / On Chee Road	2030 AM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J15

Traffic Flow Diagram

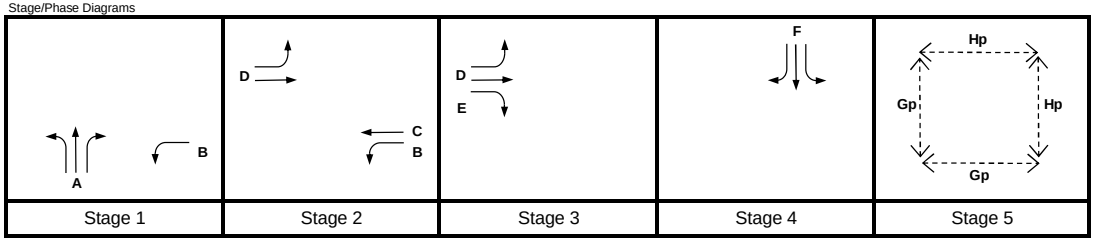
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	128	sec
Sum(y)	Y =	0.394	
Lost time	L =	44	sec
Total Flow	=	1,580	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	117	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	73	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	44.6	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	78	sec
Y_{max}	$= 1-L/C$	=	0.656	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G = 6	I/G = 8	I/G = 11	G = 5 I/G = 12

Critical Case : A,C,E,F,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 50%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.000	1	15			1		0		1915	200	82		282	71%		1788	0.158	0.158
	A	1	3.100	1		10	0	0		0		2065		153	150	303		49%	1922	0.158	
	B	1,2	3.100	1	10			1		0		1925	235			235	100%		1674	0.140	
	C	2	3.100	1				0		0		2065		110		110			2065	0.053	0.053
	D	2,3	3.300	1	10			1		0		1945	125	32		157	79%		1738	0.091	
	E	3	3.300	1		15	0	0		0		2085		68	110	178		62%	1963	0.091	0.091
	F	4	3.600	1	15	20	0	1		0		1975	30	150	0	180	17%	0%	1943	0.093	0.093
	F	4	3.500	1		15	0	0		0		2105			135	135		100%	1914	0.071	
Pedestrian Crossing				GM		FGM															
	Gp	5	min.	5	+	8	=	13	sec												*
	Hp	5	min.	8	+	8	=	16	sec												

JUNCTION CAPACITY CALCULATION

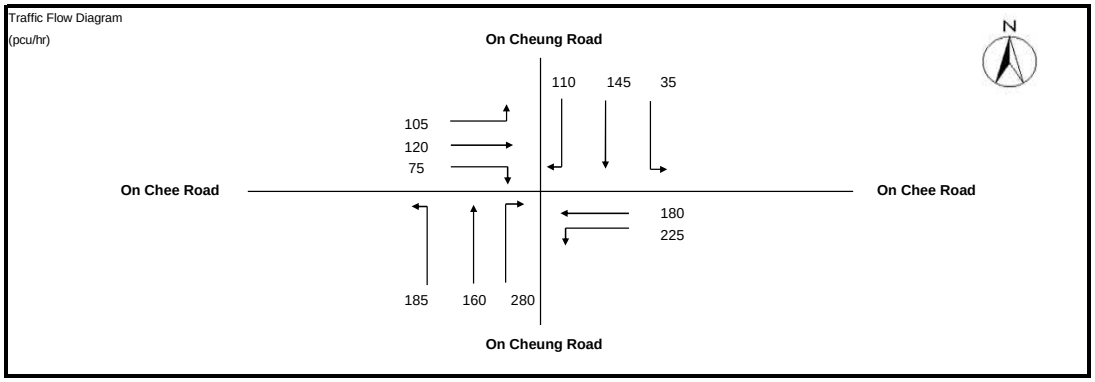
AECOM

Junction J15 - On Cheung Road / On Chee Road	2030 PM Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J15

Traffic Flow Diagram

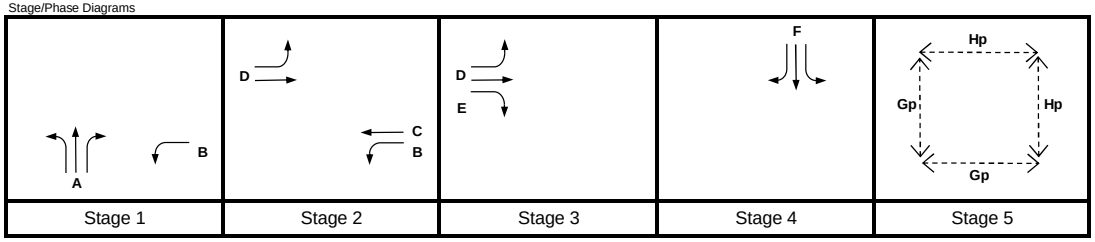
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	128	sec
Sum(y)	Y =	0.433	
Lost time	L =	44	sec
Total Flow	=	1,620	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	125	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	78	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	31.8	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	85	sec
Y_{max}	$= 1-L/C$	=	0.656	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G = 6	I/G = 8	I/G = 11	G = 5 I/G = 12

Critical Case : A,C,E,F,Gp

R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 37%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.000	1	15			1		0		1915	185	126		311	59%		1808	0.172	
	A	1	3.100	1		10	0	0		0		2065		34	280	314		89%	1821	0.172	0.172
	B	1,2	3.100	1	10			1		0		1925	225			225	100%		1674	0.134	
	C	2	3.100	1				0		0		2065		180		180			2065	0.087	0.087
	D	2,3	3.300	1	10			1		0		1945	105	35		140	75%		1749	0.080	
	E	3	3.300	1		15	0	0		0		2085		85	75	160		47%	1991	0.080	0.080
	F	4	3.600	1	15	20	0	1		0		1975	35	145	0	180	19%	0%	1937	0.093	0.093
	F	4	3.500	1		15	0	0		0		2105			110	110		100%	1914	0.057	
Pedestrian Crossing				GM		FGM															
	Gp	5	min.	5	+	8	=	13	sec												*
	Hp	5	min.	8	+	8	=	16	sec												

JUNCTION CAPACITY CALCULATION

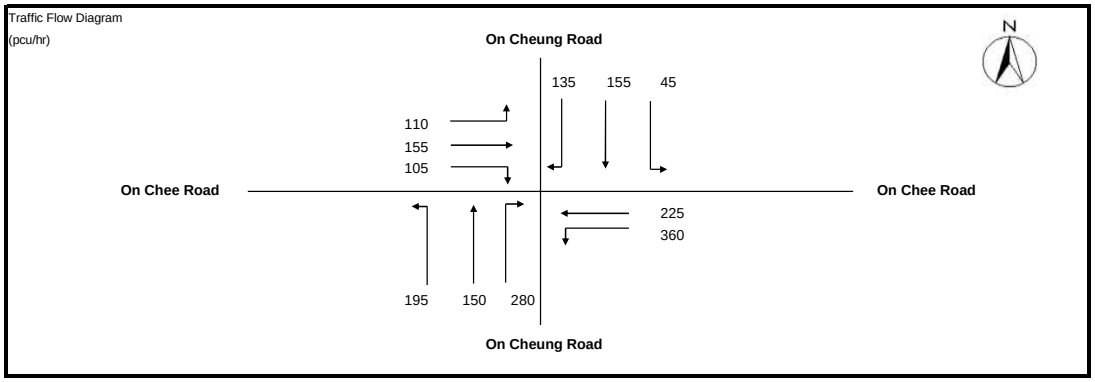
AECOM

Junction J15 - On Cheung Road / On Chee Road	2030 Weekend Design	DESIGN: AY	CHECK: TL	JOB NO: 60700410	DATE: Jan 24

J15

Traffic Flow Diagram

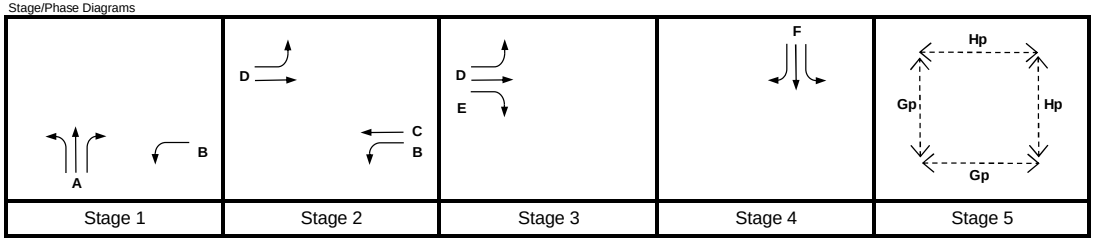
(pcu/hr)



No. of stages per cycle	N =	5	
Cycle time	C =	128	sec
Sum(y)	Y =	0.484	
Lost time	L =	44	sec
Total Flow	=	1,915	pcu

Optimum Cycle C_o	$= (1.5 \times L+5)/(1-Y)$	=	137	sec
Min. Cycle Time C_m	$= L/(1-Y)$	=	85	sec
Y_{ult}	$= 0.9-0.0075 \times L$	=	0.570	
$R.C._{ult}$	$= (Y_{ult}-Y)/Y \times 100\%$	=	17.9	%
Practical Cycle Time C_p	$= 0.9 \times L/(0.9-Y)$	=	95	sec
Y_{max}	$= 1-L/C$	=	0.656	

Stage/Phase Diagrams



Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
I/G = 6	I/G = 6	I/G = 8	I/G = 11	G = 5 I/G = 12

Critical Case : A,C,E,F,Gp

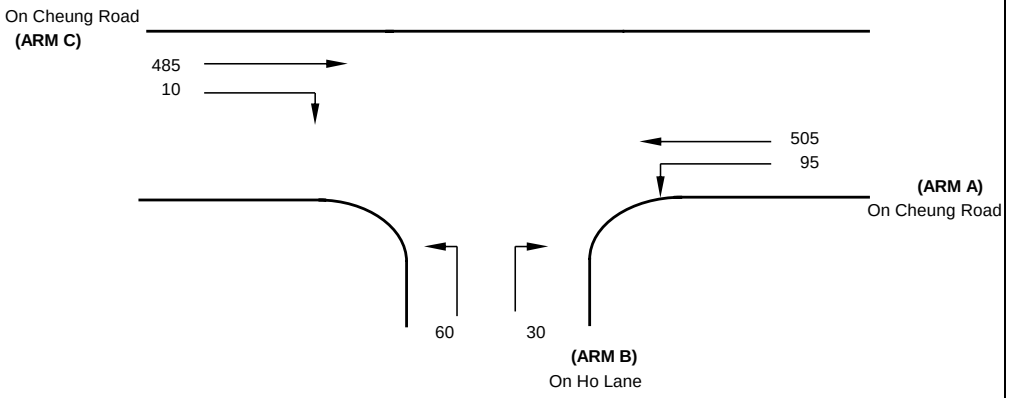
R.C.(C) $= (0.9xY_{max}-Y)/Y \times 100\%$ = 22%

MOVEMENT	PHASE	STAGE	LANE WIDTH (m)	NO. OF LANES	RADIUS (m) LEFT	RADIUS (m) RIGHT	OPPOSING TRAFFIC	NEAR SIDE LANE	UPHILL GRADIENT (%)	GRADIENT EFFECT (pcu/hr)	ADDITIONAL CAPACITY (pcu/hr)	STRAIGHT-AHEAD SAT. FLOW (pcu/hr)	FLOW (pcu/hr) LEFT	FLOW (pcu/hr) STRAIGHT AHEAD	FLOW (pcu/hr) RIGHT	TOTAL FLOW (pcu/hr)	PROPORTION OF TURNING VEHICLES (%) LEFT	PROPORTION OF TURNING VEHICLES (%) RIGHT	REVISED SAT. FLOW (pcu/hr)	FLOW FACTOR *y*	CRITICAL *y*
	A	1	3.000	1	15			1		0		1915	195	116		311	63%		1802	0.172	0.172
	A	1	3.100	1		10	0	0		0		2065		34	280	314		89%	1822	0.172	
	B	1,2	3.100	1	10			1		0		1925	360			360	100%		1674	0.215	
	C	2	3.100	1				0		0		2065		225		225			2065	0.109	0.109
	D	2,3	3.300	1	10			1		0		1945	110	65		175	63%		1778	0.099	
	E	3	3.300	1		15	0	0		0		2085		90	105	195		54%	1978	0.099	0.099
	F	4	3.600	1	15	20	0	1		0		1975	45	155	0	200	23%	0%	1932	0.104	0.104
	F	4	3.500	1		15	0	0		0		2105			135	135		100%	1914	0.071	
Pedestrian Crossing				GM		FGM															
	Gp	5	min.	5	+	8	=	13	sec												*
	Hp	5	min.	8	+	8	=	16	sec												

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J16 - On Cheung Road/ On Ho Lane	2023 AM Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J16

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W b-c	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W c-b	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibility to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.3	(metres)
W cr	=	0	(metres)
q a-b	=	95	(pcu/hr)
q a-c	=	505	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.4	(metres)
Vr c-b	=	60	(metres)
q c-a	=	485	(pcu/hr)
q c-b	=	10	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.42	(metres)
W b-c	=	2.42	(metres)
Vl b-a	=	25	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	23	(metres)
q b-a	=	30	(pcu/hr)
q b-c	=	60	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.751789
E	=	0.807174
F	=	0.923769
Y	=	0.782650

THE CAPACITY OF MOVEMENT :

Q b-a	=	287
Q b-c	=	477
Q c-b	=	530
Q b-ac	=	390

CRITICAL DFC = 0.23

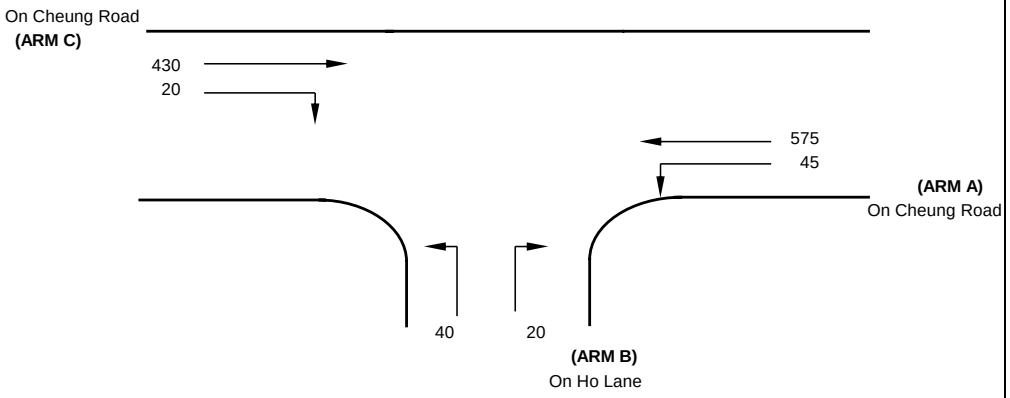
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.10
DFC b-c	=	0.13
DFC c-b	=	0.02
DFC b-ac	=	0.23

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J16 - On Cheung Road/ On Ho Lane	2023 PM Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J16

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W b-c	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W c-b	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibility to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.3	(metres)
W cr	=	0	(metres)
q a-b	=	45	(pcu/hr)
q a-c	=	575	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.4	(metres)
Vr c-b	=	60	(metres)
q c-a	=	430	(pcu/hr)
q c-b	=	20	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.42	(metres)
W b-c	=	2.42	(metres)
Vl b-a	=	25	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	23	(metres)
q b-a	=	20	(pcu/hr)
q b-c	=	40	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.751789
E	=	0.807174
F	=	0.923769
Y	=	0.782650

THE CAPACITY OF MOVEMENT :

Q b-a	=	280
Q b-c	=	465
Q c-b	=	525
Q b-ac	=	381

CRITICAL DFC = 0.16

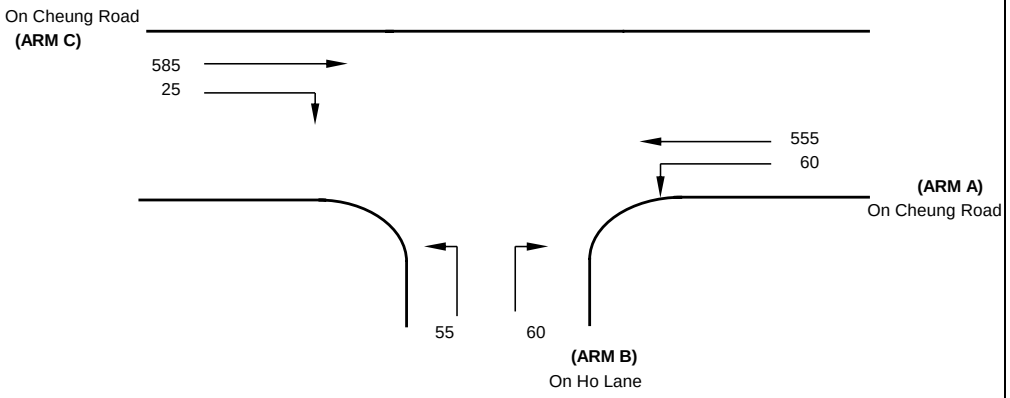
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.07
DFC b-c	=	0.09
DFC c-b	=	0.04
DFC b-ac	=	0.16

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J16 - On Cheung Road/ On Ho Lane	2023 Weekend Observed	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J16

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W b-c	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W c-b	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibility to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.3	(metres)
W cr	=	0	(metres)
q a-b	=	60	(pcu/hr)
q a-c	=	555	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.4	(metres)
Vr c-b	=	60	(metres)
q c-a	=	585	(pcu/hr)
q c-b	=	25	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.42	(metres)
W b-c	=	2.42	(metres)
Vl b-a	=	25	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	23	(metres)
q b-a	=	60	(pcu/hr)
q b-c	=	55	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.751789
E	=	0.807174
F	=	0.923769
Y	=	0.782650

THE CAPACITY OF MOVEMENT :

Q b-a	=	261
Q b-c	=	468
Q c-b	=	526
Q b-ac	=	331

CRITICAL DFC = 0.35

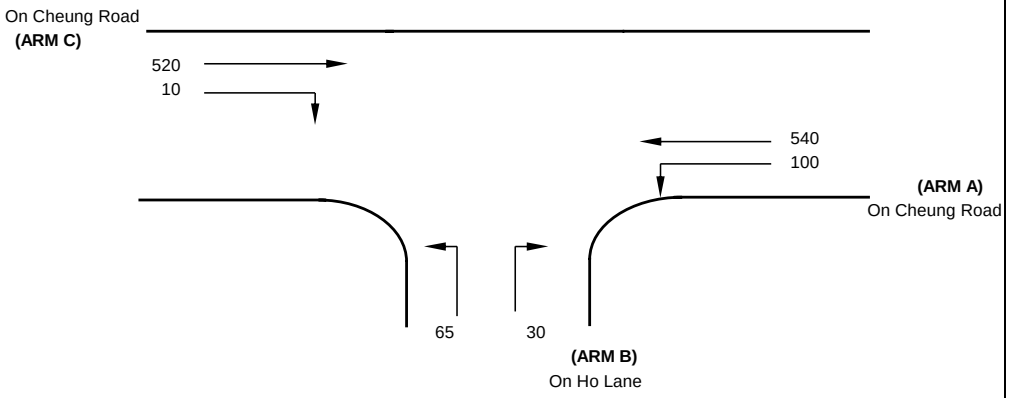
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.23
DFC b-c	=	0.12
DFC c-b	=	0.05
DFC b-ac	=	0.35

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J16 - On Cheung Road/ On Ho Lane	2030 AM Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J16

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W b-c	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W c-b	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibility to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.3	(metres)
W cr	=	0	(metres)
q a-b	=	100	(pcu/hr)
q a-c	=	540	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.4	(metres)
Vr c-b	=	60	(metres)
q c-a	=	520	(pcu/hr)
q c-b	=	10	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.42	(metres)
W b-c	=	2.42	(metres)
Vl b-a	=	25	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	23	(metres)
q b-a	=	30	(pcu/hr)
q b-c	=	65	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.751789
E	=	0.807174
F	=	0.923769
Y	=	0.782650

THE CAPACITY OF MOVEMENT :

Q b-a	=	274
Q b-c	=	468
Q c-b	=	520
Q b-ac	=	383

CRITICAL DFC = 0.25

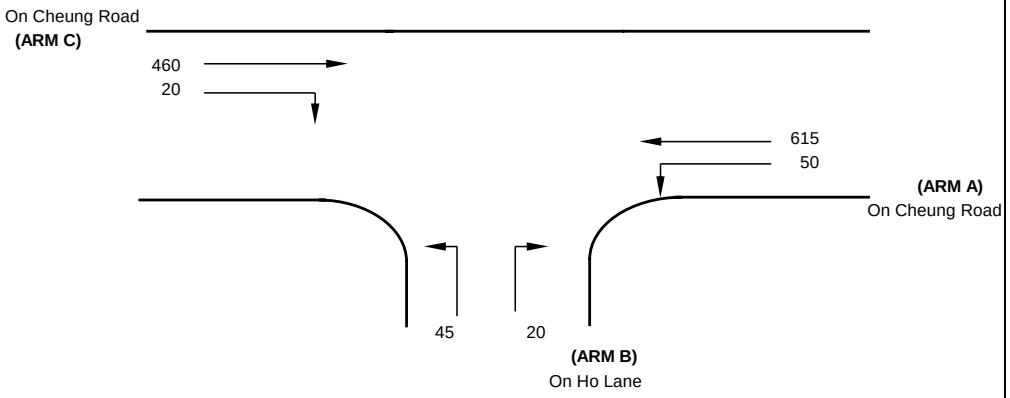
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.11
DFC b-c	=	0.14
DFC c-b	=	0.02
DFC b-ac	=	0.25

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J16 - On Cheung Road/ On Ho Lane	2030 PM Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



NOTES : (GEOMETRIC INPUT DATA)

J16

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W b-c	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W c-b	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibility to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.3	(metres)
W cr	=	0	(metres)
q a-b	=	50	(pcu/hr)
q a-c	=	615	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.4	(metres)
Vr c-b	=	60	(metres)
q c-a	=	460	(pcu/hr)
q c-b	=	20	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.42	(metres)
W b-c	=	2.42	(metres)
Vl b-a	=	25	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	23	(metres)
q b-a	=	20	(pcu/hr)
q b-c	=	45	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.751789
E	=	0.807174
F	=	0.923769
Y	=	0.782650

THE CAPACITY OF MOVEMENT :

Q b-a	=	267
Q b-c	=	455
Q c-b	=	513
Q b-ac	=	374

CRITICAL DFC = 0.17

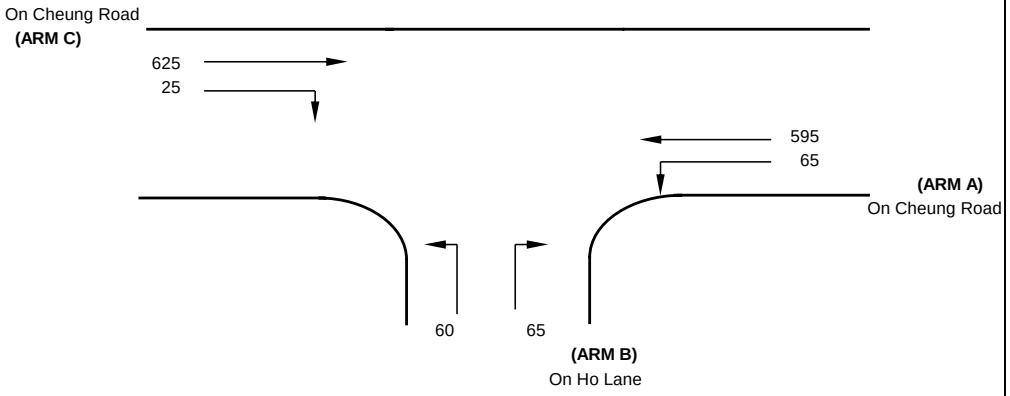
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.07
DFC b-c	=	0.10
DFC c-b	=	0.04
DFC b-ac	=	0.17

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J16 - On Cheung Road/ On Ho Lane	2030 Weekend Reference	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



NOTES : (GEOMETRIC INPUT DATA)

J16

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W b-c	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W c-b	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibility to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.3	(metres)
W cr	=	0	(metres)
q a-b	=	65	(pcu/hr)
q a-c	=	595	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.4	(metres)
Vr c-b	=	60	(metres)
q c-a	=	625	(pcu/hr)
q c-b	=	25	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.42	(metres)
W b-c	=	2.42	(metres)
Vl b-a	=	25	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	23	(metres)
q b-a	=	65	(pcu/hr)
q b-c	=	60	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.751789
E	=	0.807174
F	=	0.923769
Y	=	0.782650

THE CAPACITY OF MOVEMENT :

Q b-a	=	247
Q b-c	=	459
Q c-b	=	515
Q b-ac	=	317

CRITICAL DFC = 0.39

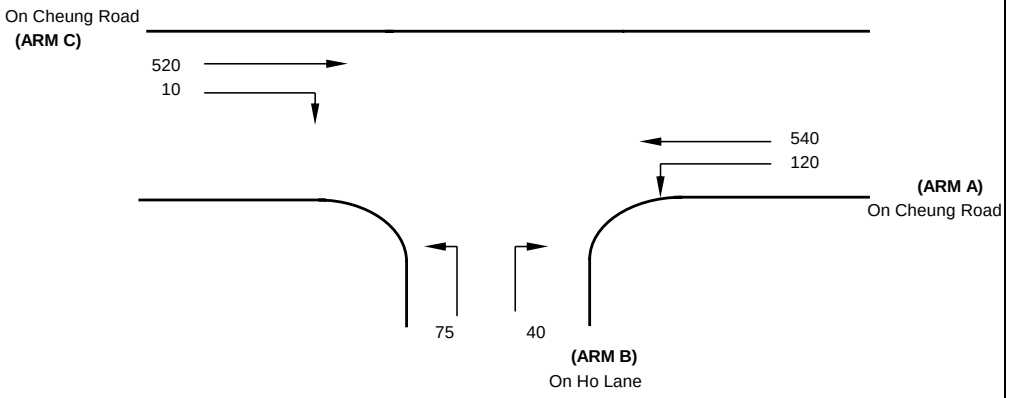
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.26
DFC b-c	=	0.13
DFC c-b	=	0.05
DFC b-ac	=	0.39

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J16 - On Cheung Road/ On Ho Lane	2030 AM Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



J16

NOTES : (GEOMETRIC INPUT DATA)

W	= Major Road Width (6.4 - 20.0)
W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W b-c	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W c-b	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibility to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.3	(metres)
W cr	=	0	(metres)
q a-b	=	120	(pcu/hr)
q a-c	=	540	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.4	(metres)
Vr c-b	=	60	(metres)
q c-a	=	520	(pcu/hr)
q c-b	=	10	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.42	(metres)
W b-c	=	2.42	(metres)
Vl b-a	=	25	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	23	(metres)
q b-a	=	40	(pcu/hr)
q b-c	=	75	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.751789
E	=	0.807174
F	=	0.923769
Y	=	0.782650

THE CAPACITY OF MOVEMENT :

Q b-a	=	272
Q b-c	=	466
Q c-b	=	515
Q b-ac	=	374

CRITICAL DFC = 0.31

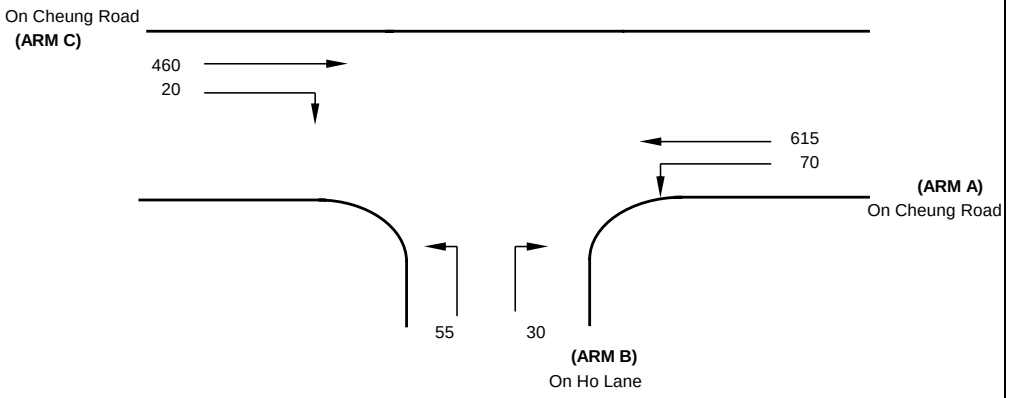
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.15
DFC b-c	=	0.16
DFC c-b	=	0.02
DFC b-ac	=	0.31

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J16 - On Cheung Road/ On Ho Lane	2030 PM Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



NOTES : (GEOMETRIC INPUT DATA)

J16

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W cr	= Central Reserve width (1.2 - 9.0, kerbed central reserve only)
W b-a	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W b-c	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
W c-b	= Lane width available to vehicle waiting in stream b-a (2.05 - 4.70)
Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibility to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.3	(metres)
W cr	=	0	(metres)
q a-b	=	70	(pcu/hr)
q a-c	=	615	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.4	(metres)
Vr c-b	=	60	(metres)
q c-a	=	460	(pcu/hr)
q c-b	=	20	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.42	(metres)
W b-c	=	2.42	(metres)
Vl b-a	=	25	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	23	(metres)
q b-a	=	30	(pcu/hr)
q b-c	=	55	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.751789
E	=	0.807174
F	=	0.923769
Y	=	0.782650

THE CAPACITY OF MOVEMENT :

Q b-a	=	266
Q b-c	=	454
Q c-b	=	508
Q b-ac	=	363

CRITICAL DFC = 0.23

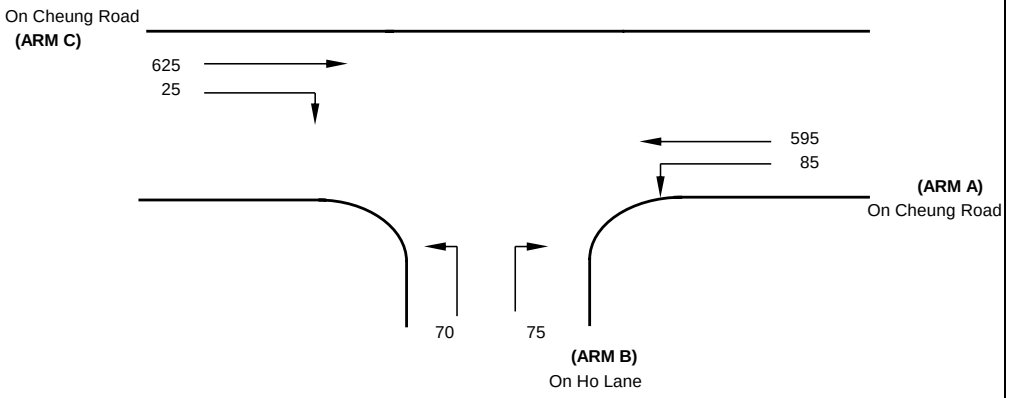
COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.11
DFC b-c	=	0.12
DFC c-b	=	0.04
DFC b-ac	=	0.23

PRIORITY JUNCTION CAPACITY CALCULATION

AECOM

Junction J16 - On Cheung Road/ On Ho Lane	2030 Weekend Design	Designed By : AY	Checked By : TL	Job No. : 60700410	Date : Jan 24



NOTES : (GEOMETRIC INPUT DATA)

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Vl b-a	= Visibility to the left for vehicles waiting in stream b-a (22.0 - 250.0)
Vr b-a	= Visibility to the right for vehicles waiting in stream b-a (17.0 - 250.0)
Vr b-c	= Visibility to the right for vehicles waiting in stream b-c (17.0 - 250.0)
Vr c-b	= Visibility to the right for vehicles waiting in stream c-b (17.0 - 250.0)
D	= Stream-specific B-A
E	= Stream-specific B-C
F	= Stream-specific C-B
Y	= (1-0.0345W)

GEOMETRIC DETAILS:

MAJOR ROAD (ARM A)

W	=	6.3	(metres)
W cr	=	0	(metres)
q a-b	=	85	(pcu/hr)
q a-c	=	595	(pcu/hr)

MAJOR ROAD (ARM C)

W c-b	=	3.4	(metres)
Vr c-b	=	60	(metres)
q c-a	=	625	(pcu/hr)
q c-b	=	25	(pcu/hr)

MINOR ROAD (ARM B)

W b-a	=	2.42	(metres)
W b-c	=	2.42	(metres)
Vl b-a	=	25	(metres)
Vr b-a	=	30	(metres)
Vr b-c	=	23	(metres)
q b-a	=	75	(pcu/hr)
q b-c	=	70	(pcu/hr)

GEOMETRIC FACTORS :

D	=	0.751789
E	=	0.807174
F	=	0.923769
Y	=	0.782650

THE CAPACITY OF MOVEMENT :

Q b-a	=	245
Q b-c	=	457
Q c-b	=	509
Q b-ac	=	316

CRITICAL DFC = 0.46

COMPARISION OF DESIGN FLOW TO CAPACITY :

DFC b-a	=	0.31
DFC b-c	=	0.15
DFC c-b	=	0.05
DFC b-ac	=	0.46

Appendix III

Swept Path Analysis for Proposed Access at On Ho Lane

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ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

835100 E

835150 E

835200 E

834750 N

834700 N

834650 N

Cycling Track

FP

第二座
Block 2

石油氣倉

大埔舊墟遊樂場
TAI PO OLD MARKET PLAYGROUND

Tai Po Old Market Playground

遊樂場
Playground

Stand

籃球場
Basketball Court

大埔舊墟公立學校
Tai Po Old Market Public School

TAI PO TAI WO ROAD

PROPOSED ABOVEGROUND STRUCTURE

LEGEND:

APPLICATION SITE

PROPOSED MAINTENANCE ACCESS

N

Plot File by: LiQ
2023/11/13
PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK7004.dgn

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 250

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約簡號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION - SWEPT PATH FOR PROPOSED EVA

SHEET NUMBER
圖紙編號

60700410/SK7004

Appendix H – Geotechnical Assessment Report

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TABLE OF CONTENTS

TABLES

DRAWINGS

APPENDICES

1 INTRODUCTION

1.1.1.1 The Review of Drainage Master Plan in Tai Po – Feasibility study and the Review of Drainage Master Plan in Sha Tin and Sai Kung – Feasibility Study (the DMP Review Study) identified that some areas in Tai Po, Lam Tsuen, Ting Kok and Ma On Shan would be subject to high flood risks.

1.1.1.2 The flooding incidents reported in the areas of Tai Po Old Market and Tai Po Market on 22 July 2010, Lam Tsuen Valley on 19 October 2016, and Ting Kok and Sai Sha Road on 18 July 2017 are some examples to substantiate the above findings.

1.1.1.3 To relieve the flood risk, the Study proposed various drainage improvement measures in these areas, the DMP Review Study has proposed by adopting drainage improvement measures in a combination of stormwater pumping scheme and associated drainage upgrading and river training works. Upon completion of the project, the flood risks in the areas can be significantly reduced.

1.1.1.4 In May 2018, Development Bureau (DEVB) signed out a Project Definition Statement (PDS) to justify and define the scope of the "Drainage Improvement Works in Tai Po". The Drainage Services Department (DSD) then completed a Technical Feasibility Statement (TFS) confirming its technical feasibility. The TFS was subsequently approved by DEVB in August 2018. The project was included into Cat B under PWP No. 4183CD in September 2018.

1.1.1.5 In January 2020, the DSD commissioned Agreement No. CE 11/2019(DS) "Drainage Improvement Works in Tai Po – Investigation" (referred to hereinafter as the "Investigation Study") to carry out various reviews, surveys, investigation, impact assessments and preliminary design for the Project.

1.1.1.6 AECOM Asia Company Limited was appointed by DSD on 13 January 2023 to undertake Agreement No. CE 57/2022 (DS) "Drainage Improvement Works in Tai Po – Design and Construction" (referred to hereinafter as "the Project", of which the *starting date* of the Project is 26 January 2023. The Project comprises the drainage improvement works as briefly described in the following:

(a) Stormwater pumping scheme in Tai Po Old Market, including an underground storage tank, a pump house and the associated pipeworks and E&M works in Tai Po Old Market Playground, as well as the drainage upgrading works in Tai Po Tai Wo Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Ting Kok Road, Mei Sun Lane and Kau Hui Chik Street, floodwall modification and new floodwall along Lam Tsuen River and ancillary works including temporary relocation and reinstatement of playgrounds and associated facilities;

(b) Expansion of existing Tai Po Market Floodwater Pumping Station, including upgrading of existing pump house and the associated pipeworks and E&M works, as well as the drainage upgrading works in Tsing Yuen Street, Wai Yan Street, Pak Shing Street, Fu Shin Street, Yan Hing Street, Kwong Fuk Bridge Garden, Plover Cove Road, Tung Cheong Street, cycle track and footpath along southside of Lower Lam Tsuen River (between existing pumping station and elevated walkway at Tai Po Centre (structure no. NF97);

(c) Drainage upgrading works at Tai Mei Tuk, Ng Uk Tsuen, Ting Kok Shan Liu, Po Sam Pai, Ma Po Mei, San Uk Pai, Ping Long, Che Ha, Nam Hang and Tsung Tsai Yuen and Sai Sha Road (sections near Sai O, Kwun Hang, Tai Tung and Sai Keng); and

(d) River training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Sha Pa and She Shan River.

1.2 Scope of the Project

1.2.1.1 The scope of the Project comprises the drainage improvement works for Tai Po are presented on the plans at the attached drawings and are described below.

(a) adoptive review based on the findings in the Investigation phase;

(b) update of studies conducted in the Investigation phase, including hydraulic modelling, impact assessment studies (environmental, traffic, drainage, sewerage, geotechnical, utility etc.), architectural, landscaping and environmental design and land requirements;

(c) supervision of site investigations, surveys and testing;

(d) consultation with relevant stakeholders in relation to the proposed works;

(e) conduct the necessary gazettal procedures that are required to facilitate taking the project forward to the subsequent construction stages;

(f) detailed design of the proposed works;

(g) detailed design on the proposed works, including but not limited to architectural and landscaping aspects proposed stormwater pumping stormwater pumping storage schemes at Tai Po Old Market Playground and Tai Po Market, proposed floodwalls and floodwall modification works, flood warning and early alert system at Lower Lam Tsuen River;

(h) preparation of tender documents and assessment of tenders; and

(i) construction supervision and commissioning of the works.

1.3 Scope of this Report

1.3.1.1 The scope of this Geotechnical Assessment Report is summarised as the follows:

(a) review the Geotechnical Assessment Report prepared under the Investigation Study of the Project, and incorporates the review findings in the Preliminary Review Report and the Adoptive Review Report.

(b) review the preliminary geotechnical design and recommends alternative schemes which could bring benefits to the Project in terms of cost and programme.

(c) submit the necessary submission to GEO timely in accordance with PAH and the technical guidance note documents listed in the GEO Technical Guidance Note (TGN) No.1, but not limited to, ETWB TC(W) Nos. 29/2002, 4/2004, 20/2004 and 13/2005.

This report will only focus on the geotechnical assessment of the proposed works in Tai Po Old Market Playground and at slope feature no. 7NW-B/F193.

2 SITE DESCRIPTIONS AND BACKGROUND STUDY

2.1 General

2.1.1.1 The proposed Tai Po drainage improvement works are along existing roads, open areas and parks in the Tai Po Old Market and Tai Po Market areas. The following describe the general setting of the sites and the proposed works.

(a) Stormwater pumping scheme in Tai Po Old Market, including an underground storage tank, a pump house and E&M works in the Tai Po Old Market Playground; a discharge chamber at the existing slope 7NW-B/F193; and associated pipeworks.

2.1.1.2 The layout of the proposed works has been included in **Appendix A.**

2.1.1.3 The available geological and geotechnical information obtained from the Geotechnical Information Unit (GIU), Civil Engineering and Development Department (CEDD), Lands Department (LandsD) and major utility undertakers have been collated to review.

2.2 Published Geology

2.2.1.1 According to the 1:20,000 Hong Kong Geological Map Sheet 7, 2nd Edition (GEO, 2008). The solid Geology at the Tai Po sites is composed of the Shing Mun Formation which is comprised of tuff breccia (Jts_bt) and is overlain by the porphyritic, medium to fine grained granodiorite (Jmt_gd). Surficial Geology at the sites is composed of alluvium (Qfa) (Fanling formation), intertidal deposits (Qhi) and marine sand (Qhs) (Hang Hau formation)

2.2.1.2 Reclamation land was formed in the Tai Po Old Market area from 1963 to 1973.

2.2.1.3 According to the published 1:20,000 Geological Map Sheet 7, two geological fault lines (NNE – SSW and NW-SE trending) are recorded in close proximity of the Tai Po area. No fault is noted to pass directly through the site area.

2.2.1.4 A summary drawing of the site geology is available in **Appendix A (Drawing No. 60700410/SK3016A).**

2.3 Aerial Photograph Interpretation

2.3.1.1 A preliminary Aerial Photograph Interpretation (API) has been conducted to review photos taken between 1961 and 2021 in order to determine the site history of the sites and their surroundings. The key observations for the project site are summarised below:

- Pre 1974 the area east of Ting Kok Road used to be estuary with mangrove swamps. Clustered settlement and farmland were observed at Tai Po Old Market area and Yan Hing Street.

- Between 1974 and 1983, Tai Po Hoi area was reclaimed for the Tai Po Centre area. Construction of the Tai Yuen Market and Eightland Garden were observed. Redevelopment around Yan Hing Street was also noted along with construction of the Po Heung Bridge.

- Further development was noted in 1985, which included the Tai Po Centre, Fortune Plaza and Jade Plaza

- No significant observable changes were noted post 1989

2.4 Archival Ground Investigation Records

2.4.1.1 A desk study of the archival ground investigation (GI) data for the Tai Po Old Market, Tai Po Market area were completed by Ove Arup & Partners Hong Kong Ltd in 2020 under “DSD Contract No. CE 11/2019 – Drainage Improvement Works in Tai Po - Investigation”. This desk study includes the review of geological conditions, existing laboratory testing, existing registered man made features and underground utilities.

2.5 Groundwater Monitoring Record

2.5.1.1 A review of historical groundwater monitoring reports noted there were two monitoring stations (standpipes) 35352/BH1 and 36789/ST/D44 near the site area. No groundwater monitoring locations were noted to be on the site.

2.5.1.2 7 and 10 day monitoring periods were noted in 2002 for 35352/BH1 and 36789/ST/D44 respectively

2.5.1.3 Copies of the summary groundwater monitoring results can be found in **Appendix B.**

2.6 Landslide and Natural Terrain Instability Records

2.6.1.1 Under this Study, no natural terrain catchments are identified at a location where the hillside is sloping at more than 15° within 100m horizontally upslope of the site boundaries and overlooking Group 1, 2 or 3 facilities in the sites. In accordance with GEO Report 138 (GEO, 2016), the sites do not satisfy the “Inclusion” guidelines and therefore not likely to be affected by natural terrain hazards.

2.7 Land Status

2.7.1.1 Following the preliminary review of the land status, the proposed pump station and discharge chamber works at the existing slope 7NW-B/F 193 and Tai Po Old Market Playground were located within government land which maintained by Highways Department (HyD) and Leisure and Cultural Services Department (LCSD) respectively. In view of this, consultation with the relevant government department was conducted prior to the proposed geotechnical works.

3 PROJECT SPECIFIC GROUND INVESTIGATION FIELD WORKS

3.1 Previous Project Ground Investigation Records

3.1.1.1 The Investigation (I) Stage ground investigation works were undertaken by Ove Arup & Partners Hong Kong Ltd under "DSD Contract No. CE 11/2019 – Drainage Improvement Works in Tai Po - Investigation". This consisted of two separate reports, "Final Desk Study Report for Ground Investigation, Laboratory Testing and Groundwater Table Survey" and "Draft Ground Investigation Report". Both reports aimed to provide geological information across the study areas in the Feasibility Study stage. Both reports covered multiple sites as part of the Tai Po Drainage improvement works study and were not specifically focused on the site area referenced in this report.

3.1.1.2 The I-Stage ground investigation works comprised the following.

- Summary of all the available relevant records and data from previous and project-specific ground investigation works.
- Discussion on the recommended geotechnical parameters for design works on the project.
- Proposed Site Investigation works

3.1.1.3 A summary of the ground investigation records can be found in **Appendix C**

3.1.1.4 The findings of the ground investigation are discussed in Section 4.

3.2 Proposed Further Site Investigation Works

3.2.1.1 The main objectives of the proposed SI are as follows:

- To assess the geological conditions for design of the site formation and infrastructure works for the proposed drainage design works
- To assess the geological properties of soil in order to facilitate the design of the proposed works; and
- To assess the subsurface ground conditions for the proposed works.

3.2.1.2 In total seven geotechnical boreholes have been planned (six proposed and one under a provisional item) to verify the site condition and the uncertainties.

3.2.1.3 Two environmental boreholes have been proposed to meet the statutory requirements for development of the site.

3.2.1.4 The recommended geotechnical design parameters will be further reviewed and updated after the completion of the proposed SI works.

3.2.1.5 Details of the proposed drill sites are provided in the **Appendix E.**

4 GEOLOGY AND GROUND CONDITION

4.1 General

4.1.1.1 The published geological information covering the proposed drainage improvements and their surroundings have been reviewed, including the 1:20,000 and 1:10,000 scale geological maps and the accompanying geological memoirs. The site condition has been reviewed based on the geological and geotechnical information of the previous studies and available ground investigation records.

4.1.1.2 For the purposes of this study, the “bedrock level” or “rockhead level” is defined as the surface below which there is continuous 5 m (or more) rock cores that is moderately decomposed (decomposition grade III) or better and with total core recovery of 85% or higher.

4.2 Superficial Geology

4.2.1.1 Based on the 1:20,000-scale geological map sheet 7, the area around Tai Po Old Market and Tai Po Market is primarily comprised of intertidal deposits (Qhi) from the Hang Hau Formation and alluvium (Qfa) from the Fanling Formation. The materials generally consist of clay, silt, sand and gravel, while the alluvium is well to semi sorted.

4.2.1.2 The site is underlain by reclamation fill. The fill layer is generally described as medium dense, greyish brown and brown, clayey silt and silty fine to coarse SAND with angular to sub-angular fine to coarse gravel sized rock fragments with some concrete and brick fragments at the top.

4.2.1.3 Marine and beach deposits is expected to be present under the fill and is typically around 7 m thick. This layer has been described as loose to dense, yellowish brown, dark grey and greyish green, clayey silty fine to medium SAND with shell fragments and occasionally sub-angular fine gravel sized rock fragments.

4.2.1.4 Alluvium in the area is characterised by dense to very dense, greyish green and brown, clayey, silty fine to coarse SAND with some sub-angular, fine gravel-sized rock fragments.

4.3 Solid Geology

4.3.1.1 According to the 1:20,000 Hong Kong Geological Map Sheet 7, 2nd Edition (GEO, 2008) the solid geology around the Tai Po area is located between the Shing Mun Formation of the Tsuen Wan Volcanic Group and the Tai Po Granodiorite of the Lamma Suite. The Shing Mun Formation (Jts) in Tai Po areas is generally comprised of tuff breccia (Jts_bts) and it is overlain by the medium to fine grained porphyritic granodiorite (Jmt_gd). Localised tuffaceous sandstone (Jts_st) from the Shing Formation is also noted to be present in the site area.

4.3.1.2 Completely to highly decomposed TUFF is expected to be present within the Tai Po area. The recorded thickness typically ranges around 22 to 25m thick. Completely decomposed tuff is described as soft to very dense, light brown and white, sandy/clayey SILT to silty CLAY, while the highly decomposed as very weak.

4.3.1.3 The engineering rockhead which is defined as 5 m grade III or better rock with total core recovery greater than 85 % is anticipated between 30 – 50 mbgl on the site.

4.3.1.4 There is very limited GI data near the proposed site. The engineering rockhead is typically around 30 to 50 m below ground level. However, drillhole no. 36789/ST/D44 located at the expansion of the existing Tai Po Market Floodwater Pumping Station reached rockhead at approximately 13.55 m below ground level. The bedrock is described as moderately strong, brownish grey and dark greenish grey spotted white and dappled grey, moderately decomposed TUFF BRECCIA, occasionally with marble clasts. Joints are very closely to moderately spaced, rough to smooth-planar, extremely to very narrow, iron and manganese oxide stained, chlorite coated, occasional silt infilled and dipping at various angles.

4.4 Structural Geology

4.4.1.1 According to the published 1:20,000 map, two geological fault lines (NNE – SSW and NW – SE trending) are recorded in proximity of the Tai Po area. The fault line trending in the NNE-SSW direction is named as Lead Mine Pass Fault in the 1:10,000-scale geological map.

4.5 Hydrogeology

4.5.1.1 A shallow groundwater table is noted in the Tai Po Old Market area, with the monitoring stations (standpipes) 35352/BH1 and 36789/ST/D44 showing maximum recorded groundwater levels at 3.34 and 3.52 mbgl level for monitoring periods of 7 and 10 days respectively.

5 PARAMETERS

5.1 Soil Parameters

5.1.1.1 All the field and laboratory test data utilised in this section was taken from existing ground investigation (GI) information in the vicinity of the study area. The values are taken into consideration to estimate the maximum, minimum and average values of various soil parameters.

5.1.1.2 The data used in the summaries for this section are from a combination of sites in the vicinity of the project area and may not accurately represent ground conditions at the site. These parameters will be updated on completion of site-specific ground investigation works at a later date.

5.1.1.3 Results from laboratory tests in historical GI programs were reviewed including particle size distribution (PSD) tests, bulk/dry density tests, moisture content tests, triaxial tests, oedometer test, compaction test, and chemical tests. The relevant test results obtained from field and laboratory test data are presented and summarised in **Appendix D, Table D1**.

5.1.2 *Soil Strength*

5.1.2.1 The effective shear strength parameters for in-situ soils are estimated from the triaxial tests. The estimated shear strength parameters, including the angle of shear resistance and cohesion is derived from the s'-t plots as shown in **Appendix D.** The proposed parameters are summarised in **Table 5.1**.

Table 5.1 Summary of estimated Shear Strength Parameters

Soil Type	Cohesion c' (kN/m2)	Friction Angle ϕ' (degree)
Fill	0	33
Alluvium	4	33
Marine Deposits	4	35
Residual Soil	4	33
C/HDG	5	35

5.1.3 *Soil Density*

5.1.4 The dry density and bulk unit weight for various soils are presented in this section. The minimum, maximum and mean values for each soil types are summarized in **Table 5.2.**

Table 5.2: Summary of Bulk and Dry Density values (existing GI)

Soil Type	No. of Test	Bulk Density (Mg/m3)			Dry Density (Mg/m3)		
		Max.	Min.	Ave.	Max.	Min.	Ave.
Alluvium	1	-	-	2.1	-	-	-
Residual Soil	6	2.1	1.8	1.9	-	-	-
C/HDG	60	2.3	1.8	2.3	2.1	1.3	1.7

5.1.5 The adopted estimated bulk unit weight of each soil type is shown in **Table 5.3**

Table 5.3: Estimated Bulk Unit Weight Parameters

Soil Type	Design Bulk Unit Weight (kN/m3)
Fill	19
Alluvium	19
Colluvium	19
Residual Soil	19
CDT	19
HDT	19

5.1.6 *Moisture Content*

5.1.7 The moisture content for each soil type is summarized in **Table 5.4.** The maximum and minimum values are reported together with the average values.

Table 5.4 Summary of Moisture Content values (existing GI)

Location	Soil Type	Moisture Content (%)		
		Max.	Min.	Ave.
Tai Po	Fill	-	-	18
	Residual Soil	43.2	25.3	33.8
	Marine Deposits	19.8	14	16
	Alluvium	36	18.7	30.2
	CDG	35	7.4	21.5

5.2 Rock Parameters

5.2.1.1 The laboratory test for intact rock were conducted using uniaxial compressive strength test (UCS).

5.2.1.2 USC samples that were taken during historical ground investigation works near the site are not representative of the bedrock at the site and have not been used for this report.

5.3 Recommended Geotechnical Design Parameters

5.3.1 Due to a lack of sufficient data no geotechnical recommendations for the subsequent design are available at this time.

5.3.2 Geotechnical design parameters will be further updated on completion of site specific ground investigation works at a later date.

6 EXISTING STRUCTURES/ FEATURES/UTILITIES

6.1 Existing Structures

6.1.1.1 The proposed Tai Po Old Market Playground Stormwater Pumping Station is located at the basketball court. No affected or to be affected existing structure is identified to the proposed work.

6.2 Existing Registered Man-Made Feature

6.2.1.1 In accordance with Works Bureau Technical Circular (WBTC) No. 29/2002, all geotechnical features, which could affect or be affected by the project, should be assessed and included in the GEO submission. Based on the data from SMRIS and SIS, the existing man-made features which affect or be affected by the project are summarised in the following Table 6.1. The future Consequence-to-Life (CTL) and Economic Consequence (EC) category of existing features are determined based on Tables 3 and 4 of WBTC No. 13/99 and GEO Technical Guidance Note No. 15. The required Factor of Safety (FOS) against failure is recommended in accordance with Table 1 of the WBTC No. 13/99.

6.2.1.2 There are only 1 registered man-made feature affected or to be affected to the proposed work. The summary of it attributes is presented in **Table 6.1**. The location of the Man-Made Features is presented in **Appendix A.**

Table 6.1 Registered man-made features which affect or be affected by proposed works

Slope No.	Type	Height (m)	Length (m)	Avg. Angle (Deg)	Consequence -to-life	Maintenance Responsibility	Future Status
7NW-B/F193	Fill Slope	3	45	40	2	HyD	To be modified

Slope Stability Assessment for Existing Slope 7NW-B/F193

6.2.1.3 The proposed discharge chamber would be found on the feature. The design of the discharge chamber and the stability assessment will be presented in **Appendix H**. The feature 7NW-B/F193 is likely to be partly removed with formation of discharge chamber, and the remaining part of the feature whose stability has been assessed.

6.2.1.4 Stability analysis for existing feature is carried out based on the detailed topographic survey and with inferred geological profiles and assumed geotechnical parameters as discussed under Sections 5. The design groundwater level based on 1 in 10 years return period rainfall is conservatively assumed to be at one-third of slope height. Computer programme SLOPE/W Version 2012 from GEO-SLOPE was used and Morgenstern-Price method was adopted for the stability analyses. The minimum FOS obtained for the corresponding critical slip surfaces on the cross-sections are summarised in the table below. The topographic survey, slope information system and slope stability analysis results have been included in **Appendix I**.

Table 6.2 Summary of Slope Stability Assessment for Existing Feature 7NW-B/F193

Cross Section	Minimum FOS	Required FOS
7NW-B/F193 Section CC	2.286	1.2

6.2.1.5 The FOS of the remaining part of the feature have been achieved to it required standard.

6.3 Existing Utilities

6.3.1.1 Various utilities are identified in the vicinity of the sites. The major utility undertakers WSD, CLP, Town Gas, HKT, HKCG and TGT were requested to provide information on their existing utilities/services located within or in the vicinity of the sites.

7 PROPOSED FOUNDATION TYPES

7.1 Comparison on Different Piling Schemes

7.1.1.1 There are different commonly used foundation piling schemes in Hong Kong. Some comparisons between different piling schemes have been made between cost effectiveness, constructability, duration of works, environmental impact and shown in the **Table 7.1**.

Table 7.1 Comparison on different piling schemes

Types of piles	Advantages	Disadvantages
Socket H-piles	1. Non percussive pile: Low noise, Low vibration - Less disturbance to neighbours. 2. Lower plant costs. 3. Ease of handling and driving (12m long, about 2. Tons per pile) 4. Able to penetrate hard materials.	1. To be embedded into bedrock which may be very deep in the site at Hoi Bun Road which in turn lower cost-effectiveness. 2. Risk of loosening soils during pile excavation and causing ground loss and hence settlement.
Driven H-piles	1. Relatively low cost as it can be rest upon stiff soil irrespective of depth and grade of bedrock. 2. Lower plant costs. 3. Ease of handling and driving (12m long, about 2Tons per pile)	1. Pile load test is required. 2. Percussive piles: High noise and vibration - More disturbance to neighbours. 3. Operation duration may be restricted subject to the CNP application, usually limited to 3 working hours per day in urban areas in Hong Kong. 4. Pile section may become damaged during driving. 5. Predrilling may be required if encountering hard materials, such as boulders.
Bored piles	1. Non percussive pile: Low noise, Low vibration - Less disturbance to neighbours. 2. High structural capacity and load bearing capacity. 3. Less piles are required	1. Needs relatively larger works area for pile installation. 2. Relatively higher construction cost, particularly in plant mobilization.

Types of piles	Advantages	Disadvantages
	4. Can be installed at great depths, can overcome large underground obstructions	3. Excavated material requires disposal, special treatment shall be required if it is contaminated. 4. Need good workmanship to ensure the pile integrity

7.2 Cost Effectiveness, Time Implication and Constructability

7.2.1.1 Some comparisons have been made in respect of construction cost effectiveness, time implication and constructability and shown in the **Table 7.2**.

Table 7.2 General comparison for proposed foundation types

Foundation Type	Cost	Time	Potential Issues
Raft Foundation	Relatively lower cost as piles are not required	Relatively shorter construction time as it constructed for shallow depths and hence required less excavation.	1. Noise generated by drilling and breaking of rock causes disturbance to neighbours. 2. Special attention on raft foundations is required in case of concentrated loads, 3. There is a chance of edge erosion if they are not treated properly. 4. Skilled workers are required to construct the raft foundations.
Socket H-piles	Relatively low plant cost	Relatively shorter construction time.	1. Risk of loosening soils during pile excavation and causing ground loss and hence settlement. 2. Approximate limit to 80m to 90m

Foundation Type	Cost	Time	Potential Issues
Driven H-piles	Relatively lower in construction cost.	Potentially longer construction time because the working hour and number of pile rigs for percussive piling may be limited by the noise impact brought along.	1. Pile load test is required. 2. High noise and vibration - More disturbance to neighbours. 3. Not suitable for site next to sensitive structures or utility installations. 4. Operation duration may be restricted subject to the CNP application, usually limited to 3 working hours per day in urban areas in Hong Kong 5. Preboring is required if encountering obstructions
Bored piles	Relatively higher in construction cost, particularly for plant mobilization.	Relatively shorter construction time.	1. Not suitable for small site which is difficult for manoeuvring of bored piling plant. 2. Need good workmanship to ensure the pile integrity and clean pile toe. 3. Lower risk in inducing undue ground movement during bored pile construction.

7.2.1.2 The proposed dimensions and depth of the stormwater pumping station have been further updated to suit the drainage works and ancillary works. Several foundation types are evaluated and considered in the geotechnical assessment for the proposed TPOMPSPS. Driven piles are not suggested for the schemes due to the long construction time and raft foundation is not suggested due to the flotation controls. The adoption of another two foundation types would be suggested subject to cost effectiveness, site constraints and construction programme under detailed design.

7.3 Proposed Foundation Options

Option 1 – Large Diameter Bored Pile

7.3.1.1 The underground stormwater pumping station is proposed to be supported by large diameter bored pile. All vertical loads are taken by combination of end bearing of large diameter bored pile founding on Cat 1(c) rock with allowable bearing capacity of 5000kPa and rock socket friction between rock and concrete (700kPa).

7.3.1.2 The underground stormwater pumping station would be supported by total 86 numbers of 1m diameter bored piles with 5m rock socket.

Option 2 – Socketed H-pile

7.3.1.3 The underground stormwater pumping station is proposed to be supported by socketed H-pile. Socketed H-pile (SKHP) found on cat. 1(c) rock will be adopted to carry down the loading from underground structure to foundation and to earth. All vertical loads are taken by shaft friction between Cat. 1(c) rock and concrete with allowable friction of 700kPa and the allowable bond stress between steel and grout with allowable friction of 480kPa when grouting under water.

7.3.1.4 The underground stormwater pumping station would be supported by total 210 numbers of socket H-piles with 7m rock socket.

7.3.1.5 The calculation of the proposed two options is shown in **Appendix G**.

7.4 Proposed Construction Method

7.4.1 Bottom Up Method

7.4.1.1 Deep excavation of bottom up method is conventionally adopted for the site without time constraints on the topside development

7.4.1.2 This method involves first sinking temporary pipe/pile diaphragm walls to the required depth below ground, digging and removing soil, installing temporary steel strutting and then completing excavation with a concrete slab base and open to the sky. After the completion of excavation, the building work then rises from the concrete slab base.

7.4.2 Top Down Method

7.4.2.1 Top down method begins by sinking the pipe pile/diaphragm walls, plus central supporting ‘plunge’ columns (can be temporary or permanent), and then excavating enough of the earth to complete a ground-level slab. This slab is substantial enough to carry the weight of construction equipment including cranes and incorporates openings though which soil can be lifted up and removed. The excavation then takes place under the ground slab, and permanent floors are cast on the way down to the desired depth. It also means that simultaneously construction above ground can start or the topside space can be available before completion of the underground structure.

Table 7.3 Comparison of top-down method and bottom-up method

Bottom-Up Method	1. Less complex in design 2. Fewer constraints to the design of permanent structures 3. Heavy foundations, such as large-diameter piled foundations for the high rise are required and are generally installed from the ground surface before excavation for top down and for bottom up. 4. Waterproofing can be installed around the whole outside, including the outside the permanent walls. 5. Access for cranes is not restricted up and down the sides of the excavation. For sites large enough to have a perimeter area to accommodate construction equipment, and when the excavation is not wide then this method is quicker than the top-down approach.	1. Construction is usually slower and more expensive than the top-down approach. 2. It is not possible to carry out simultaneous upwards and downwards construction until the bottom of the basement is concreted. 3. Cranes can be located only on firm ground outside the excavation or on heavy-capacity temporary decks within the excavated area. For wide sites cranes may not be able to reach the middle of the excavation, whereas the top-down method can provide openings at many locations across the site area. 4. For very deep projects, the thickness of the temporary walls plus the permanent walls is greater than for the top-down method using diaphragm walls plus skin wall. Therefore, bottom-up working needs more space for the combined walls or the finished floor area is smaller. 5. The temporary walls serve little or no purpose after completion and, therefore, are wasted. 6. If the scheme design is for bottom-up construction, the time for tendering might be longer since contractors need to prepare a tender design.
Top-Down Method	1. This offers very quick site coverage which includes a robust working platform. The superstructure construction can proceed at the same time as the substructure 2. For large sites, openings can be provided in the floors at many locations within the site and not just around the perimeter.	1. Complex in design. 2. Because work needs to be carried out through openings in the slab, access is only via the openings below the slabs during excavation. 3. The excavation works and substructure construction are slower and more expensive due to the restrictions on the

	3. For smaller sites, the ground floor structure provides a site working area and a temporary steel decking is not required. 4. Temporary propping is replaced by the use of the permanent slabs/beams. Requires little or no temporary steel shoring – producing good cost savings. 5. For combined development that includes a substantial structure above ground, the top-down approach makes it possible to get an early start on construction.	size of the plant and the limited access. 4. Holes may have to be left in the slabs to provide access for the subsequent excavation. 5. Vertical support for the permanent slabs is required in the temporary condition. 6. Inability to install external waterproofing. 7. The stiffer construction during the intermediate construction stages attracts higher loads into the permanent structure.

8 CONCLUSIONS AND RECOMMENDATION

8.1 Additional Ground Investigation

8.1.1.1 The proposed further site investigation as mentioned in **Section 3.2** has been scheduled to be carried out in coming few months tentatively. The recommended design geotechnical parameters and the options of foundations shall be reviewed and updated upon completion of the further GI works.

Appendix A

Drawings

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

835000 E

835200 E

835400 E

834800 N

834600 N

834400 N

LEGEND:

APPLICATION BOUNDARY

N

MEI SUN LANE
CHUI YI STREET
CHUI LOK STREET
PING ON LANE
CHUI WO LANE
TING KOK ROAD
ON MAU SQUARE
ON CHEE ROAD
ON HO LANE
ON CHEUNG ROAD
ON PO ROAD
TAI PO TAI WO ROAD
KWONG FUK ROAD
PO NGA ROAD
LAM TSUEN RIVER
PAN SHING STREET
PO TICK LANE
PO TICK STREET
PO HEUNG BRIDGE
PO HEUNG STREET
PO YU LANE
PLOVER COVE ROAD
SUI ON STREET
HEI YUEN STREET
FU SHIN STREET
TSING YUEN STREET

TREASURE GARDEN
EIGHTLAND GARDENS
FULL SCENE GARDEN
JADE PLAZA
FORTUNE PLAZA
TAI PO CENTRE
TAI PO MARKET
PLOVER COVE GARDEN

林村河

Plot File by: chengxt 2023/12/20
PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK3005.dgn

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - SITE LOCATION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
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SUB-CONSULTANTS
分項工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 1000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱
SITE LOCATION

SHEET NUMBER
圖紙編號
60700410/SK3005

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

835000 E

835200 E

835400 E

834800 N

834600 N

834400 N

NOTES:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60700410/SK3015.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (mPD).
3. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
4. THE LOCATIONS ARE INDICATIVE ONLY AND THE EXACT LOCATION IS SUBJECT TO THE AGREEMENT WITH THE ENGINEER BEFORE THE COMMENCEMENT OF THE WORKS.

LEGEND:

TP-EDH01 — PROPOSED SEDIMENT SAMPLING LOCATION

DRILLHOLE NO.	EASTING	NORTHING
TP-EDH01	835154.551	834706.746
TP-EDH02	835153.579	834665.356

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

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CONSULTANT
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ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS
階段

SCALE 比例: A1 1 : 1000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60700410

CONTRACT NO. 合約號碼: CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

PROPOSED SEDIMENT SAMPLING LOCATION

SHEET NUMBER
圖紙編號

60700410/SK3015

Plot File by: chengz1 2023/12/20
PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK3015.dgn

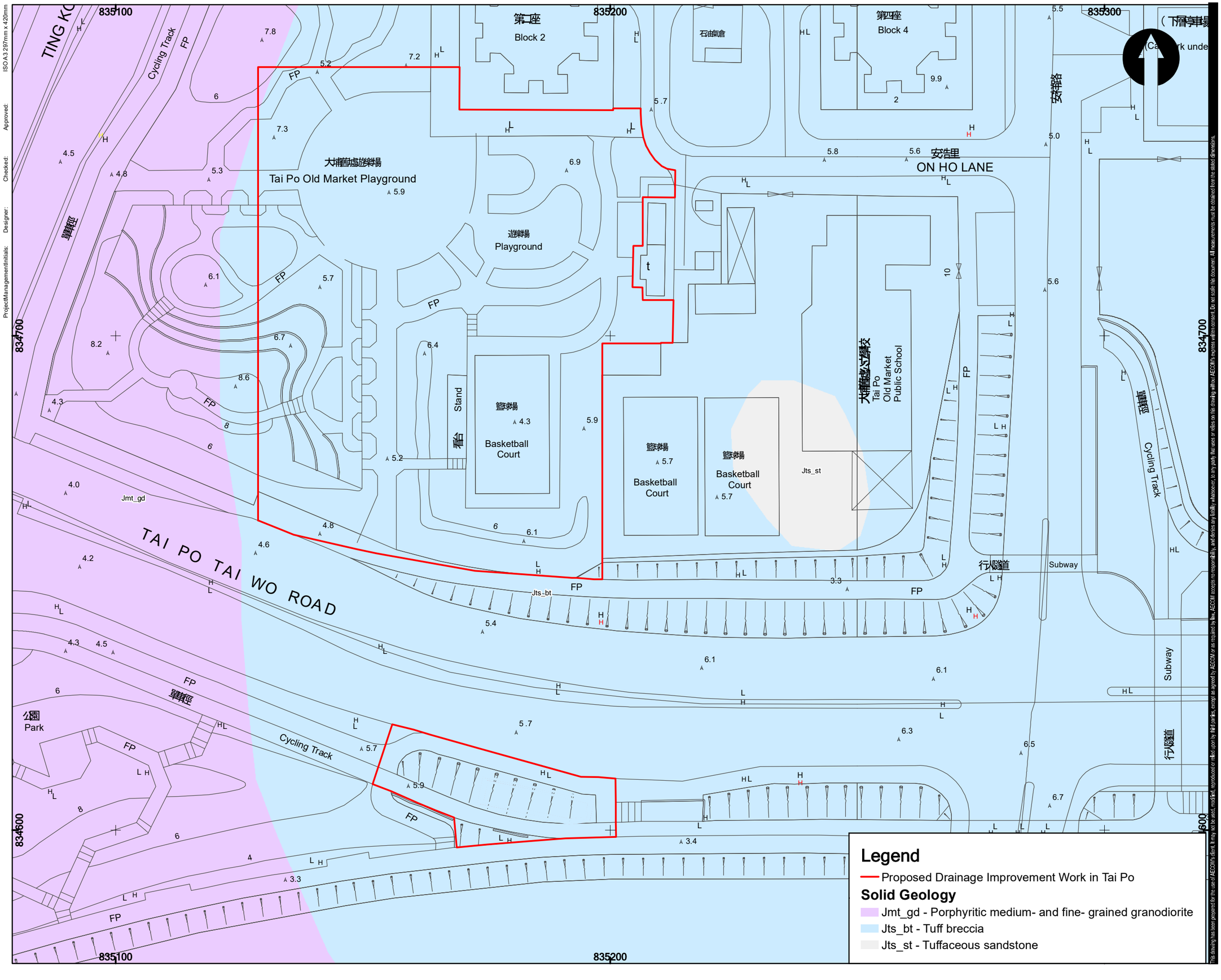
ISO A3 297mm x 420mm

Approved:

Checked:

Designer:

ProjectManagementInitials:



Legend

- Proposed Drainage Improvement Work in Tai Po

Solid Geology

- Jmt_gd - Porphyritic medium- and fine- grained granodiorite
- Jts_bt - Tuff breccia
- Jts_st - Tuffaceous sandstone

AECOM

PROJECT
項目

DRAINAGE IMPROVEMNT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

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Drainage Services Department

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ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK 核查

STATUS
階段

SCALE
比例

A3 1:700

DIMENSION UNIT
尺寸單位

METERS

KEY PLAN
索引圖

PROJECT NO.
項目編號

60700410

CONTRACT NO.
合約編號

CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

Geological Profile

SHEET NUMBER
圖紙編號

60700410/SK3016A

Appendix B

Summary of Available GW Records

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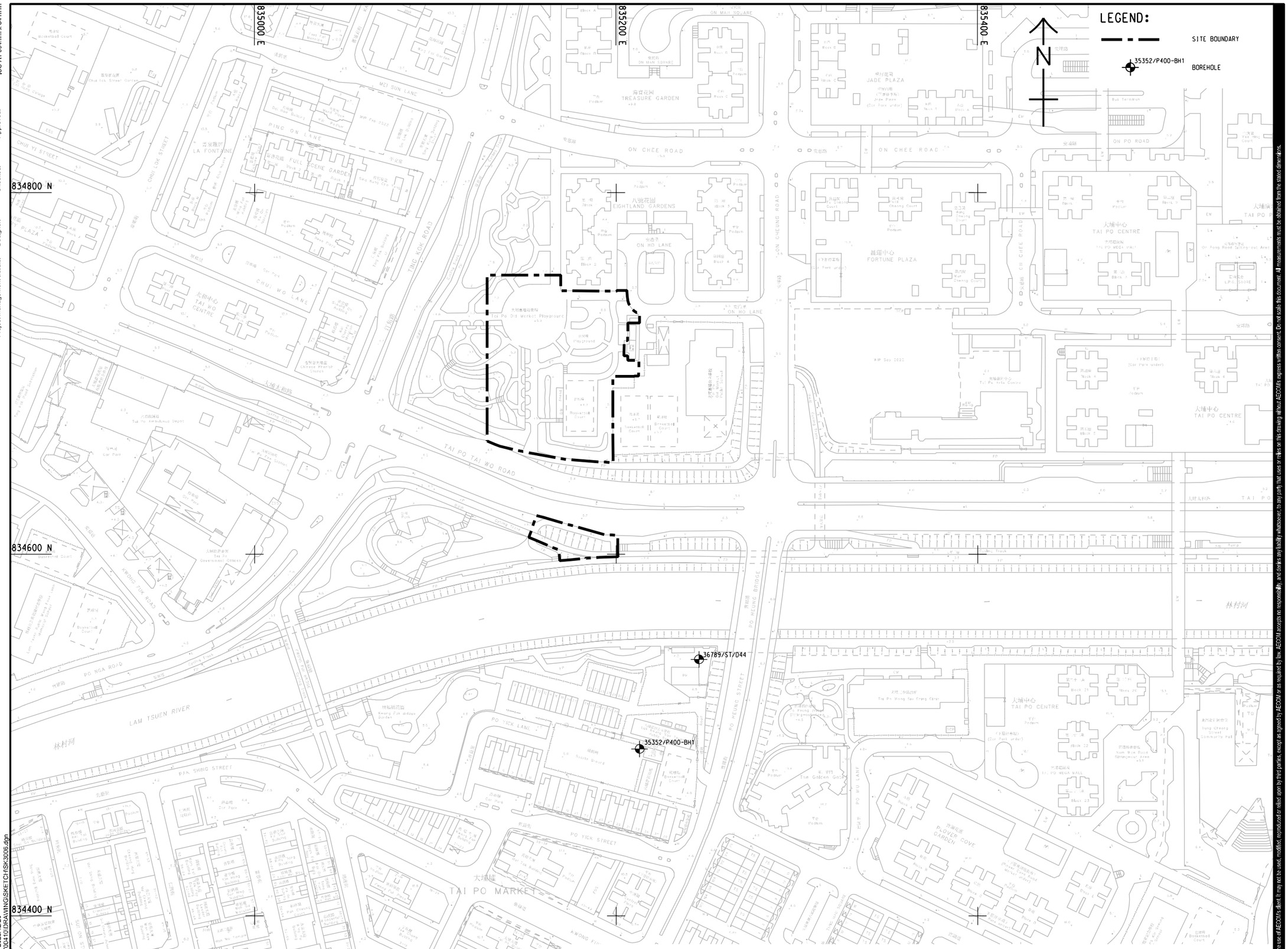

LOCATION	GI REPORT NO.	GI STATION NO.	INSTRUMENTATION	TOP LEVEL (mPD)	DEPTH OF TIP (m)	TIP LEVEL (mPD)	MAXIMUM RECORDED GW LEVEL		MONITORING PERIOD
							MBGL	mPD	
TAI PO	35352	BH1	STANDPIPE	4.84	12	-7.16	3.34	1.5	12 JAN 2002 - 19 JAN 2002
TAI PO	36789	DH44	STANDPIPE	4.9	13.5	-8.6	3.52	1.38	21 DEC 2002 - 31 DEC 2002

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

Plot File by: chengz1 2023/12/20
PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK3006.dgn

AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - GROUNDWATER MONITORING LOCA - TIONS

CLIENT 業主

渠務署
Drainage Services Department

CONSULTANT 工程顧問公司

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ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例
A1 1 : 1000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

HISTORICAL GROUNDWATER MONITORING RECORD NEAR THE APPLICATION SITE

SHEET NUMBER 圖紙編號

60700410/SK3006

Appendix C

Summary of Available GI Records

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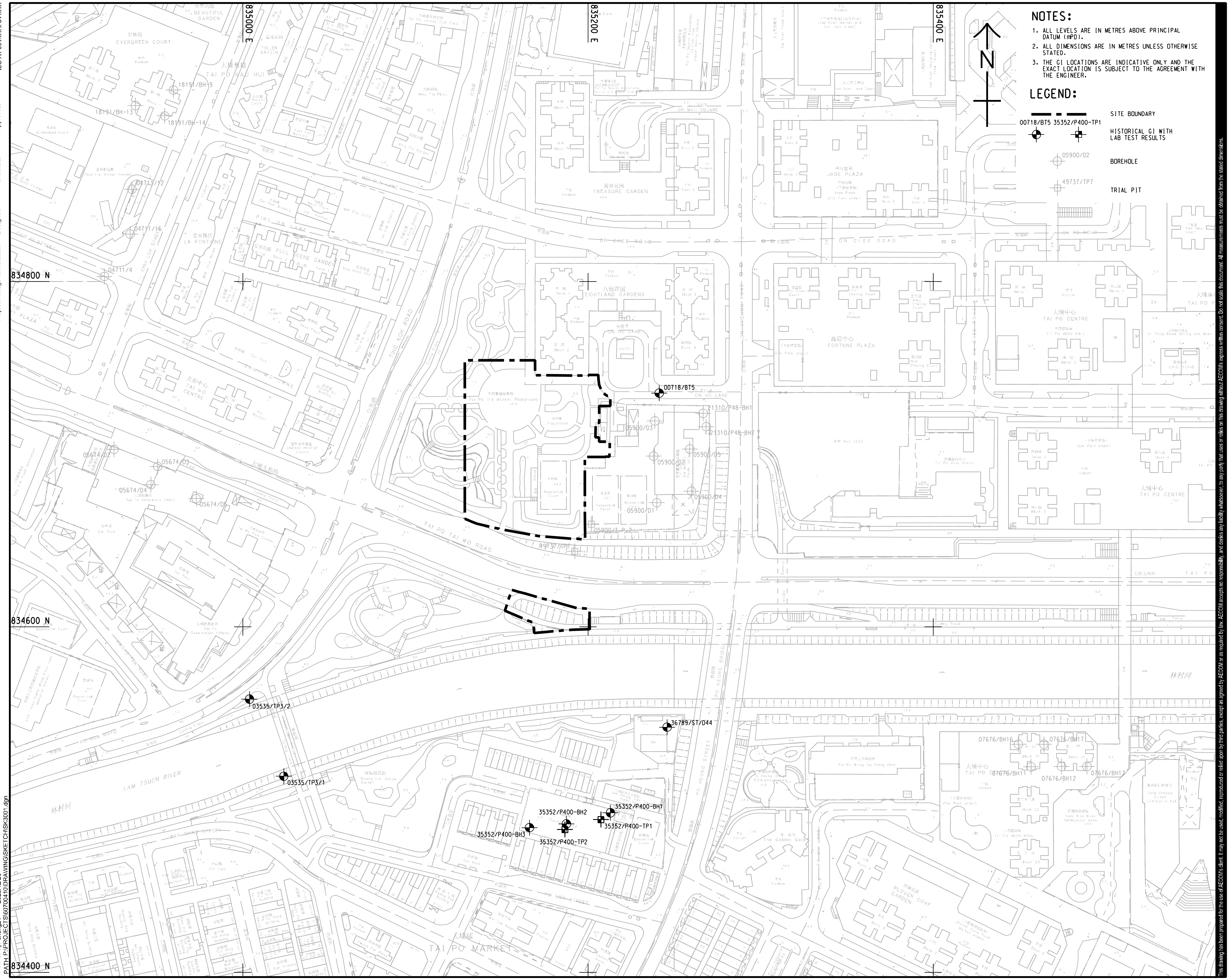

NOTES:

1. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (mPD).
2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
3. THE GI LOCATIONS ARE INDICATIVE ONLY AND THE EXACT LOCATION IS SUBJECT TO THE AGREEMENT WITH THE ENGINEER.

LEGEND:

SITE BOUNDARY

00718/BT5 35352/P400-TP1 HISTORICAL GI WITH LAB TEST RESULTS

05900/D2 BOREHOLE

49737/TP7 TRIAL PIT

AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT 業主

渠務署 Drainage Services Department

CONSULTANT 工程顧問公司

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ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例 — A1 1 : 1000

DIMENSION UNIT 尺寸單位 — METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號 — 60700410

CONTRACT NO. 合約編號 — CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

LAYOUT PLAN OF HISTORICAL GI NEAR THE APPLICATION SITE

SHEET NUMBER 圖紙編號

60700410/SK3001

ISO A1 594mm x 841mm
Approved:
Checked:
Designer:
Project Management Initials:
Plot File by: chengz1 2023/12/20
PATH P:\PROJECTS\60700410\DRAWING\SKETCH\SK3001.dgn

HISTORICAL GI

REFERENCE NO.		LOCATION		EXPLORATORY HOLE INFORMATION				BASE OF UNITS (MBGL)									THICKNESS OF UNIT (m)								ENGINEERING ROCKHEAD DEPTH (MBGL)	ENGINEERING ROCKHEAD ELEVATION (mPD)	LOCALITY
REPORT NO	GI STATION NO	EASTING	NORTHING	GROUND LEVEL (mPD)	HOLE DEPTH (MBGL)	HOLE BASE LEVEL (mPD)	HOLE TYPE	TOP SOIL	FILL	POND MARINE DEPOSITS	COLLUVIUM	ALLUVIUM	RESIDUAL SOIL	CDG & HDG (V-IV)	ENGINEERING ROCK DEPTH (MBGL)	CS OR MDG/SDG/FG (III/II/I), WHICHEVER IS DEEPER	TOP SOIL	FILL	POND/MARINE DEPOSITS	COLLUVIUM	ALLUVIUM	RESIDUAL SOIL	CDG & HDG (V-IV)	TOTAL SOIL THICKNESS			
718	00718/BT5	835241.400	834735.400	+0.41	11.10	-10.69	DH	-	-	11.00	-	-	-	11.10	-	-	-	-	11.00	-	-	-	0.10	11.10	-	-	TAI PO
3535	03535/TP3/2	835004.060	834558.180	+4.78	33.45	-28.67	DH	-	3.00	8.70	-	11.75	33.45	-	-	-	-	3.00	5.70	-	3.05	21.70	-	33.45	-	-	TAI PO
3535	03535/TP3/1	835023.930	834513.490	+4.39	33.45	-29.06	DH	-	3.50	-	-	13.10	25.00	33.45	-	-	-	3.50	-	-	9.60	11.90	8.45	33.45	-	-	TAI PO
4711	04711/12	834936.000	834853.500	+2.20	27.10	-24.90	DH	-	0.50	5.50	-	14.50	-	23.10	-	27.10	-	0.50	5.00	-	9.00	-	8.60	23.10	-	-	TAI PO
4711	04711/16	834934.900	834827.500	+1.89	36.65	-34.76	DH	-	-	5.30	-	14.50	-	36.65	-	-	-	-	5.30	-	9.20	-	22.15	36.65	-	-	TAI PO
4711	04711/4	834920.000	834803.000	+2.20	37.20	-35.00	DH	-	0.50	5.00	-	18.50	-	37.20	-	-	-	0.50	4.50	-	13.50	-	18.70	37.20	-	-	TAI PO
5674	05674/D4	834946.900	834682.400	+5.10	37.10	-32.00	DH	-	3.00	9.10	-	17.00	-	37.10	-	24.60	-	3.00	6.10	-	7.90	-	19.80	36.80	-	-	TAI PO
5674	05674/D3	834950.900	834692.900	+5.30	36.60	-31.30	DH	-	5.00	9.10	-	18.00	-	31.00	31.00	-	-	5.00	4.10	-	8.90	-	13.00	31.00	31.00	-25.70	TAI PO
5674	05674/D5	834973.200	834674.300	+4.90	33.50	-28.60	DH	-	3.00	8.60	-	18.00	-	27.00	27.00	-	-	3.00	5.60	-	9.40	-	9.00	27.00	27.00	-22.10	TAI PO
5674	05674/D2	834925.600	834702.800	+5.80	37.10	-31.30	DH	-	5.00	9.30	-	16.00	-	30.50	30.50	-	-	5.00	4.30	-	6.70	-	14.50	30.50	30.50	-24.70	TAI PO
5900	05900/D2	835241.740	834701.540	+5.60	51.50	-45.90	DH	-	2.50	11.00	-	16.50	-	50.10	-	45.60	-	2.50	8.50	-	5.50	-	31.00	47.50	-	-	TAI PO
5900	05900/T.P.2	835202.100	834659.500	+5.50	1.90	+3.60	TP	-	1.90	-	-	-	-	-	-	-	-	1.90	-	-	-	-	-	1.90	-	-	TAI PO
5900	05900/D1	835241.330	834679.460	+5.70	30.40	-24.70	DH	-	4.00	10.50	-	19.00	-	30.40	-	-	-	4.00	6.50	-	8.50	-	11.40	30.40	-	-	TAI PO
5900	05900/D3	835242.230	834722.130	+5.60	38.50	-32.90	DH	-	6.00	13.00	-	16.50	-	38.50	-	-	-	6.00	7.00	-	3.50	-	22.00	38.50	-	-	TAI PO
7676	07676/BH12	835474.500	834519.140	+4.94	47.83	-42.89	DH	-	4.00	11.20	-	19.00	-	44.00	-	47.83	-	4.00	7.20	-	7.80	-	25.00	44.00	-	-	TAI PO
7676	07676/BH13	835489.270	834519.120	+5.31	57.77	-52.46	DH	-	4.50	12.30	-	17.77	-	57.77	-	-	-	4.50	7.80	-	5.47	-	40.00	57.77	-	-	TAI PO
7676	07676/BH16	835449.490	834532.020	+4.86	50.53	-45.67	DH	-	4.20	12.00	-	18.00	-	44.80	44.80	-	-	4.20	7.80	-	6.00	-	26.80	44.80	44.80	-39.94	TAI PO
7676	07676/BH17	835464.270	834532.030	+4.62	59.80	-55.18	DH	-	4.00	11.20	-	15.40	-	54.80	54.80	-	-	4.00	7.20	-	4.20	-	39.40	54.80	54.80	-50.18	TAI PO
7676	07676/BH11	835456.850	834518.990	+4.94	41.40	-36.46	DH	-	4.20	11.40	-	17.00	-	36.62	-	41.40	-	4.20	7.20	-	5.60	-	19.62	36.62	36.62	-31.68	TAI PO
18191	18191/BH-9	834960.000	834911.000	+5.60	25.90	-20.30	DH	-	4.50	9.00	-	14.00	-	21.30	-	25.90	-	4.50	4.50	-	5.00	-	7.30	21.30	-	-	TAI PO
18191	18191/BH-14	834955.000	834896.000	+5.60	31.05	-25.45	DH	-	4.50	8.70	-	13.50	-	25.70	25.70	-	-	4.50	4.20	-	4.80	-	12.20	25.70	25.70	-20.10	TAI PO
18191	18191/BH-13	834938.000	834902.000	+5.80	29.76	-23.96	DH	-	4.50	9.00	-	15.50	-	24.90	-	29.76	-	4.50	4.50	-	6.50	-	9.40	24.90	-	-	TAI PO
35352	35352/P400-BH3	835166.270	834483.750	+4.82	24.24	-19.42	DH	-	5.20	7.20	-	15.20	-	24.24	-	-	-	5.20	2.00	-	8.00	-	9.04	24.24	-	-	TAI PO
35352	35352/P400-BH2	835187.640	834485.940	+4.87	28.24	-23.37	DH	-	4.00	9.80	-	13.80	-	28.24	-	-	-	4.00	5.80	-	4.00	-	14.44	28.24	-	-	TAI PO
35352	35352/P400-TP2	835186.820	834482.670	+4.87	3.00	+1.87	TP	-	3.00	-	-	-	-	-	-	-	-	3.00	-	-	-	-	-	3.00	-	-	TAI PO
35352	35352/P400-BH1	835213.230	834492.380	+4.84	24.02	-19.18	DH	-	5.70	9.80	-	-	-	24.02	-	-	-	5.70	4.10	-	-	-	14.22	24.02	-	-	TAI PO
35352	35352/P400-TP1	835207.690	834488.420	+4.88	3.00	+1.88	TP	-	3.00	-	-	-	-	-	-	-	-	3.00	-	-	-	-	-	3.00	-	-	TAI PO
36789	36789/ST/D44	835246.120	834541.910	+4.90	18.80	-13.90	DH	-	3.10	9.60	-	13.55	-	-	13.55	-	-	3.10	6.50	-	3.95	-	-	13.55	13.55	-8.65	TAI PO
49737	49737/TP7	835192.570	834643.810	+4.95	3.30	+1.65	TP	-	3.30	-	-	-	-	-	-	-	-	3.30	-	-	-	-	-	3.30	-	-	TAI PO
21310	21310/P48-BH1	835262.840	834721.970	+5.68	49.70	-44.02	DH	-	6.00	9.50	-	17.00	-	42.77	43.75	49.70	-	5.80	3.50	-	7.50	-	25.77	-	43.75	-38.07	TAI PO
21310	21310/P48-BH2	835264.700	834715.980	+5.67	52.01	-46.34	DH	-	5.50	9.50	-	17.00	-	35.50	35.50	52.01	-	5.30	4.00	-	7.50	-	18.50	-	35.50	-29.83	TAI PO

AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT 業主

渠務署 Drainage Services Department

CONSULTANT 工程顧問公司

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ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例 N.I.L.

DIMENSION UNIT 尺寸單位 -

KEY PLAN 索引圖

PROJECT NO. 項目編號 60700410

CONTRACT NO. 合約編號 CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

HISTORICAL GI RECORD NEAR THE APPLICATION SITE

SHEET NUMBER 圖紙編號

60700410/SK3003

ISO A1 594mm x 841mm
Approved:
Checked:
Designer:
Project Management Initials:
Plot File by: jack.zhou 2023/9/11
PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK3003.dgn

Appendix D

Summary of Available Laboratory Test Results

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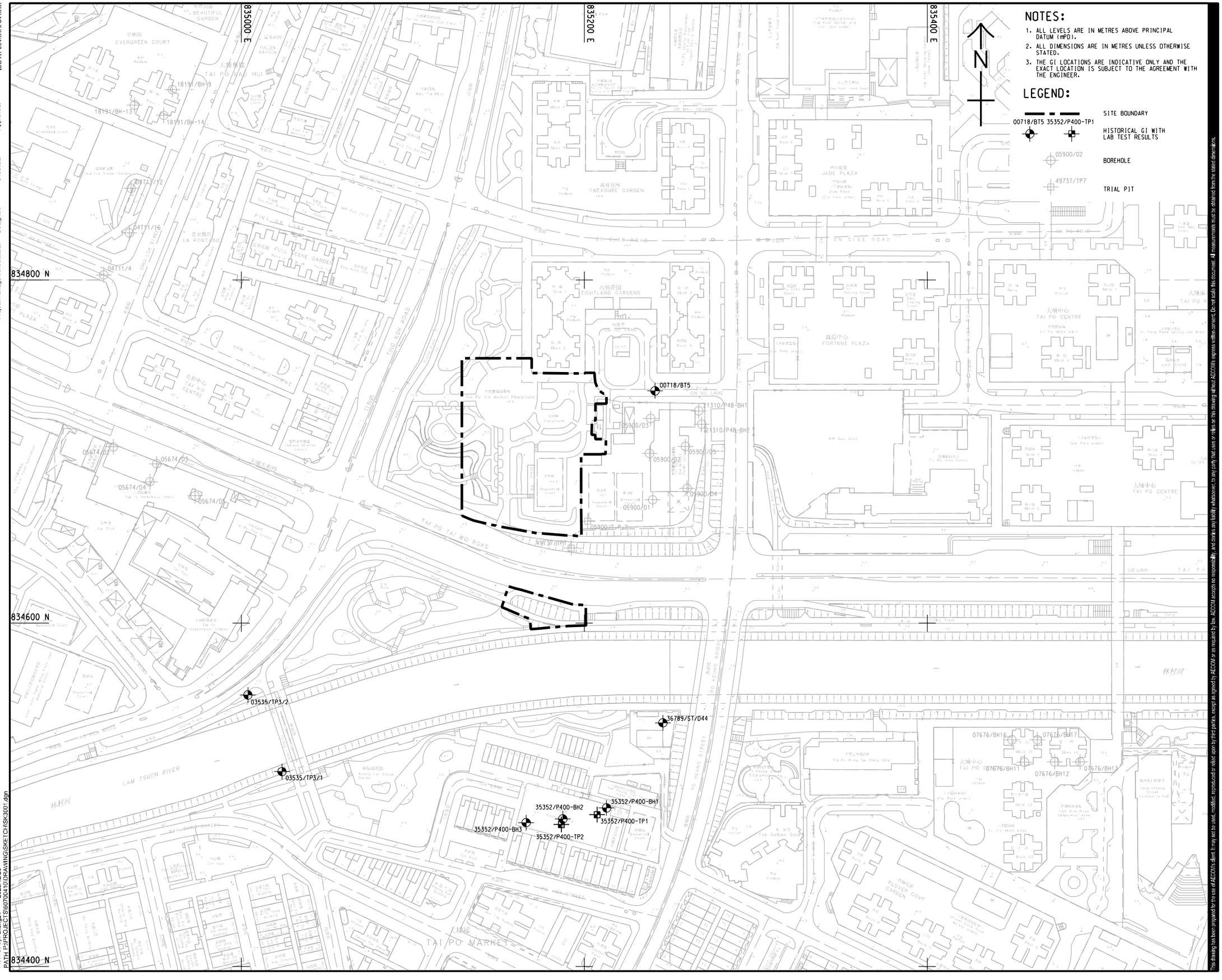
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分項工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS
階段

SCALE 比例
A1 1 : 1000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

LAYOUT PLAN OF HISTORICAL GI NEAR THE APPLICATION SITE

SHEET NUMBER
圖紙編號

60700410/SK3001

LABORATORY TESTING

AREA	REPORT NO	BH	DEPTH (m)		MATERIAL TYPE (EG. III, ALL ETC)	FOR SORTING	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	DENSITY Mg/m³			PSD PERCENTAGE (%)				TRIAXIAL					CHEMICAL TEST				OEDOMETER TEST			COMPACTION TEST		ROCK TEST
			FROM	TO					BULK	Dry	SG	GRAVEL	SAND	SILT	CLAY	TYPE	s'	t	p'	q	SULPHATE CONTENT (%)	WATER SOLUBLE CHLORIDE CONTENT (%)	PH	SOIL RESISTIVITY	PRESSURE (kPa)	LOG CV (m²/yr)	mv (m²/MN)	MAX.RD (Mg/m³)	O.M.C (%)	UNI. COMP TEST (Mpa)
TAI PO	718	00718/BT5	2.00	-	MD	-	SAND	-	-	-	-	5.00	89.50	2.00	3.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	718	00718/BT5	7.00	-	MD	-	SAND	14.17	-	-	-	6.00	65.00	20.00	9.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	718	00718/BT5	10.99	-	MD	-	SAND	-	-	-	-	20.00	49.00	18.50	12.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	4.50	4.95	ALL	-	SAND	-	-	-	-	22.00	76.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TAI PO	03535A	03535/TP3/1	7.50	7.95	ALL	-	SAND	18.70	2.15	-	-	4.00	75.00	20.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	7.50	7.95	ALL	-	SAND	-	-	-	-	-	-	-	-	CDM	-	-	262.25	192.25	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	7.50	7.95	ALL	-	SAND	-	-	-	-	-	-	-	-	CDM	-	-	454.80	314.80	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	7.50	7.95	ALL	-	SAND	-	-	-	-	-	-	-	-	CDM	-	-	643.35	433.35	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	16.00	16.45	RES. SOIL	-	SILT	42.60	1.79	-	-	0.00	21.00	71.00	8.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	16.00	16.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CDM	-	-	294.55	154.55	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	16.00	16.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CDM	-	-	513.25	233.25	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	16.00	16.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CDM	-	-	722.80	303.30	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	21.00	21.45	RES. SOIL	-	SILT	25.30	2.08	-	-	9.00	41.00	45.00	5.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	27.00	27.45	V	-	SILT	29.90	19.50	-	-	7.00	41.00	48.00	4.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	6.00	6.45	MD	-	SAND	-	-	-	-	14.00	74.00	12.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	12.00	12.45	RES. SOIL	-	SILT	30.20	1.99	-	-	2.00	27.00	57.00	14.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	12.00	12.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CDM	-	-	219.40	119.40	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	12.00	12.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CDM	-	-	402.15	202.15	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	12.00	12.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CDM	-	-	574.80	275.80	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	18.00	18.45	RES. SOIL	-	SILT	43.20	1.77	-	-	0.00	41.00	51.00	8.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	18.00	18.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CUM	-	-	152.40	95.40	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	18.00	18.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CUM	-	-	238.35	140.85	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	18.00	18.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CUM	-	-	346.90	199.90	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	24.00	24.45	RES. SOIL	-	SILT	32.20	1.89	-	-	1.00	46.00	47.00	6.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	24.00	24.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CUM	-	-	219.65	130.65	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	24.00	24.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CUM	-	-	354.35	202.35	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	24.00	24.45	RES. SOIL	-	SILT	-	-	-	-	-	-	-	-	CUM	-	-	548.75	299.75	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	28.50	29.50	RES. SOIL	-	SILT	29.40	1.90	-	-	0.00	54.00	46.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	4.50	4.95	ALL	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	0.27	-	6.83	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/2	6.00	6.45	MD	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	0.16	-	7.65	-	-	-	-	-	-	-
TAI PO	03535A	03535/TP3/1	4.50	4.95	ALL	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50.00	37.13	0.09	-	-	-
TAI PO	03535A	03535/TP3/1	4.50	4.95	ALL	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.00	44.20	0.05	-	-	-
TAI PO	03535A	03535/TP3/1	4.50	4.95	ALL	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200.00	26.27	0.02	-	-	-
TAI PO	03535A	03535/TP3/1	4.50	4.95	ALL	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400.00	22.59	0.02	-	-	-
TAI PO	03535A	03535/TP3/1	4.50	4.95	ALL	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00	23.34	0.01	-	-	-
TAI PO	03535A	03535/TP3/2	6.00	6.45	MD	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50.00	24.20	0.00	-	-	-
TAI PO	03535A	03535/TP3/2	6.00	6.45	MD	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.00	20.25	0.00	-	-	-
TAI PO	03535A	03535/TP3/2	6.00	6.45	MD	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200.00	14.19	0.00	-	-	-
TAI PO	03535A	03535/TP3/2	6.00	6.45	MD	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400.00	30.36	0.00	-	-	-
TAI PO	03535A	03535/TP3/2	6.00	6.45	MD	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00	15.68	0.00	-	-	-
TAI PO	38722	35352/P400-TP1	2.00	-	FILL	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.98	12.00	-
TAI PO	38722	35352/P400-TP2	2.00	-	FILL	-	SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.81	15.00	-
TAI PO	37556	36789/ST/D44	2.60	2.70	FILL	-	SAND	-	-	-	2.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	37556	36789/ST/D44	2.70	2.80	FILL	-	SAND	18.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	37556	36789/ST/D44	2.80	3.00	FILL	-	SAND	-	-	-	-	8.00	68.00	19.00	5.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	37556	36789/ST/D44	6.10	6.35	MD	-	SAND	19.00	-	-	2.68	5.00	82.00	11.00	2.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	37556	36789/ST/D44	6.35	6.55	MD	-	SAND	19.80	-	-	-	-	-	-	-	CUM	-	-	307.20	207.20	-	-	-	-	-	-	-	-	-	-
TAI PO	37556	36789/ST/D44	6.35	6.55	MD	-	SAND	-	-	-	-	-	-	-	-	CUM	-	-	605.00	394.00	-	-	-	-	-	-	-	-	-	-
TAI PO	37556	36789/ST/D44	6.35	6.55	MD	-	SAND	-	-	-	-	-	-	-	-	CUM	-	-	1189.20	784.20	-	-	-	-	-	-	-	-	-	-
TAI PO	37556	36789/ST/D44	9.10	9.35	MD	-	SAND	14.00	-	-	-	34.00	53.00	8.00	5.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAI PO	37556	36789/ST/D44	9.35	9.55	MD	-	SAND	14.80	-	-	-	-	-	-	-	CUM	-	-	231.10	136.10	-	-	-	-	-	-	-	-	-	-
TAI PO	37556	36789/ST/D44	9.35	9.55	MD	-	SAND	-	-	-	-	-	-	-	-	CUM	-	-	463.50	290.50	-	-	-	-	-	-	-	-	-	-
TAI PO	37556	36789/ST/D44	9.35	9.55	MD	-	SAND	-	-	-	-	-	-	-	-	CUM	-	-	871.20	541.20	-	-	-	-	-	-	-	-	-	-
TAI PO	37556	36789/ST/D44	14.90	15.07	III	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	136.60

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

Plot File by: jack.zhou 2023/9/11
PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK3004.dgn

AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT 業主

渠務署 Drainage Services Department

CONSULTANT 工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS 分判工程顧問公司

ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例 N.I.L.

DIMENSION UNIT 尺寸單位 -

KEY PLAN 索引圖

PROJECT NO. 項目編號 60700410

CONTRACT NO. 合約編號 CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

LABORATORY TEST RESULTS FOR HISTORICAL GI RECORD NEAR THE APPLICATION SITE

SHEET NUMBER 圖紙編號

60700410/SK3004

Appendix E

Proposed Ground Investigation

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Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

835000 E

835200 E

835400 E

N

834800 N

834600 N

834400 N

BH-1
BH-2
BH-3
BH-4
BH-5
BH-6
BH-1P
TP-1
TP-1P

NOTES:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60700410/SK3011.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60700410/SK3011 TO SK3014.
3. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (mPD).
4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
5. THE GI LOCATIONS ARE INDICATIVE ONLY AND THE EXACT LOCATION IS SUBJECT TO THE AGREEMENT WITH THE ENGINEER. BEFORE THE COMMENCEMENT OF THE WORKS.

LEGEND:

BH-1	BOREHOLE LOCATION (INDICATIVE ONLY)
BH-1P	BOREHOLE LOCATION UNDER PROVISIONAL ITEM (INDICATIVE ONLY)
TP-1	TRIAL PIT LOCATION (INDICATIVE ONLY)
TP-1P	TRIAL PIT LOCATION UNDER PROVISIONAL ITEM (INDICATIVE ONLY)

DRILLHOLE NO.	EASTING	NORTHING
BH-1	835396.064	834646.196
BH-2	835220.143	834720.574
BH-3	835154.277	834711.524
BH-4	835152.859	834666.247
BH-5	835162.531	834612.908
BH-6	835056.699	834622.324
BH-1P	835502.304	834536.393
TP-1	835386.431	834649.291
TP-1P	835494.512	834539.748

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

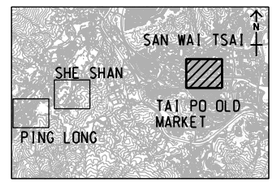
I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例: A1 1 : 1000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖 A1 1 : 30000



PROJECT NO. 項目編號: 60700410

CONTRACT NO. 合約編號: DP 06/2023

SHEET TITLE 圖紙名稱

PROPOSED GI WORKS IN TAI PO OLD MARKET

SHEET NUMBER 圖紙編號

60700410/SK3011

Plot File by: jack.zhou 2023/9/12
PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK3011.dgn

GI SCHEDULE

BOREHOLE NUMBER	NOMINAL SETTING OUT			INCLINATION FROM HORIZONTAL	TERMINATION CRITERIA	APPROX. TERMINATION DEPTH (m BGL)	SPT/ VANE SHEAR TESTS	MAZIERS/ U76/PISTON	PERMEABILITY TEST(NOS.)	INSTRUMENTATION (STANDPIPE AND PIEZOMETER)	SOIL LABORATORY TESTING							ROCK LABORATORY TESTING	
	EAST	NORTH	GROUND LEVEL (mPD)								MOISTURE CONTENT (NOS.)	ATTERBERG LIMIT TEST (NOS.)	PARTICLE SIZE DISTRIBUTION (NOS.)	BULK DENSITY (NOS.)	OEDOMETER TEST (NOS.)	TRIAXIAL COMPRESSION TEST (NOS.)	CHEMICAL TEST (NOS.) (SEE NOTE D)	POINT LOAD TEST (NOS.)	UCS (ROCK COMPRESSION TEST)(NOS.)
BH-1P	835502.304	834536.393	5.00	VERTICAL	TERMINATE AT 18m BELOW GROUND LEVEL	18.00	2m INTERVAL	2m INTERVAL	1	1	3	3	3	3	-	6	1	-	-
BH-1	835484.914	834644.435	5.92	VERTICAL		18.00	2m INTERVAL	2m INTERVAL	1	-	3	3	3	3	-	6	-	-	-
BH-2	835220.143	834720.574	5.66	VERTICAL	TERMINATE AT 5m PENETRATION INTO MODERATELY STRONG GRADE III OR BETTER ROCK WITH A TOTAL CORE RECOVERY OF NOT LESS THAN 85%	55.00	2m INTERVAL	2m INTERVAL	3	-	3	3	3	3	2	9	-	3	2
BH-4	835152.859	834666.247	5.04	VERTICAL		55.00	2m INTERVAL	2m INTERVAL	3	-	3	3	3	3	2	9	-	3	2
BH-5	835162.531	834612.908	6.00	VERTICAL		55.00	2m INTERVAL	2m INTERVAL	3	1	3	3	3	3	2	9	-	3	2
BH-6	835086.490	834634.071	4.56	VERTICAL	TERMINATE AT 10m BELOW GROUND LEVEL	10.00	2m INTERVAL	2m INTERVAL	1	-	3	3	3	3	-	6	-	-	-
BH-2P	835372.244	834646.138	4.30	VERTICAL	TERMINATE AT 6m BELOW GROUND LEVEL	6.00	2m INTERVAL	2m INTERVAL	1	-	3	3	3	3	-	6	-	-	-
SS-1	832601.275	834256.117	38.81	VERTICAL	TERMINATE AT 5m PENETRATION INTO MODERATELY STRONG GRADE III OR BETTER ROCK WITH A TOTAL CORE RECOVERY OF NOT LESS THAN 85%	35.00	2m INTERVAL	2m INTERVAL	1	1	3	3	3	3	-	3	1	2	2
PL-1	831677.674	833850.569	57.29	VERTICAL	TERMINATE AT 12m BELOW GROUND LEVEL	12.00	2m INTERVAL	2m INTERVAL	1	-	3	3	3	3	-	3	1	-	-
PL-2	831577.263	833948.688	53.35	VERTICAL		12.00	2m INTERVAL	2m INTERVAL	1	-	3	3	3	3	-	3	1	-	-
TP-1	835386.431	834649.291	5.92	VERTICAL	3m BELOW EXISTING GROUND LEVEL	2.92	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-2	831676.742	833858.492	57.29	VERTICAL		54.29	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-3	831570.680	833944.422	53.35	VERTICAL		50.35	-	-	-	-	-	-	-	-	-	-	-	-	-
TP-1P	835494.512	834539.7483	5.00	VERTICAL		2.00	-	-	-	-	-	-	-	-	-	-	-	-	-

A. GENERAL NOTES OF GROUND INVESTIGATION AND TESTING

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS. STANDARD DRAWINGS. THE SPECIFICATIONS AND INSTRUCTIONS ISSUED BY THE ENGINEER ON SITE.
2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
3. ALL LEVELS ARE IN METRES ABOVE P.D.
4. STATION NUMBERING SEQUENCE IS NOT INDICATIVE OF INSTALLATION SEQUENCE. SEQUENCE OF INSTALLATION FOLLOW THE CONTRACT REQUIREMENTS AND AGREED WITH THE ENGINEER.
5. STATION NUMBERING MAY CHANGE FROM THOSE SHOWN ON THE DRAWINGS. IF SUCH CHANGES ARE MADE. THE REVISED NUMBERING WILL BE USED IN ITS ENTIRETY FOR FUTURE REPORT SUBMISSIONS.
6. THE EXISTING GROUND/SEABED LEVEL ARE APPROX. ROCKHEAD LEVEL AS SHOWN IN THE TABLE ARE ESTIMATED LEVELS. ACTUAL LEVELS SHALL BE VERIFIED ON SITE.
7. THE COORDINATES ARE APPROX. TERMINATION LEVEL AS SHOWN IN THE TABLE ARE INDICATIVE ONLY. THE ACTUAL COORDINATES AND BOTTOM LEVEL OF EACH BOREHOLE SHALL BE AGREED BY THE ENGINEER ON SITE.
8. FIELD TESTS SHALL BE CARRIED OUT WHEN INSTRUCTED BY THE ENGINEER. TESTING METHODS SHALL BE BASED ON THE REQUIREMENTS OF SEPCIFICATION UNLESS OTHERWISE AGREED WITH THE ENGINEER.
9. THE INCLINATION AND ORIENTATION OF INCLINED BOREHOLES SHALL BE THE ANGLE REFERENCE TO THE HORIZONTAL AND THE TRUE NORTH RESPECTIVELY.
10. THE CONTRACTOR SHALL DIVERT THE DRILLING FLUSH, MUDDY WATER , CEMENT SLURRY AND POLLUTED WATER TO THE NEAREST STORM WATER DISCHANGE POINT VIA ANY SUITABLE SCREEN TO PREVENT SILTING OF EXISTING DRAINS. ANY BLOCKAGE OF DRAINS DUE TO THE GROUND INVESTIGATION WORKS CLEARED BY EMPLOYER WILL BE AT THE EXPENSE OF THE CONTRACTOR.
11. SOIL AND ROCK ENCOUNTERED SHALL BE DESCRIBED IN ACCORDANCE WITH GEOGUIDE 3 - GUIDE TO ROCK AND SOIL DESCRIPTION.
12. ALL FLUSH WATER FOR GI DRILLING WORKS SHALL BE TREATED PRIOR TO DISCHARGE.
13. THE CONTRACTOR SHALL PREPARE AND SUBMIT A METHOD STATEMENT SHOWING THE DETAILS OF BOREHOLE DRILLING, SUCH AS SIZE, DEPTH, SAFETY PRECAUTIONARY MEASURES, SITE SUPERVISION ARRANGEMENT, PROGRAMME ETC. AT LEAST 3 WEEKS PRIOR TO THE COMMENCEMENT OF THE SITE WORK. WHEN CARRYING OUT GI WORKS WITHIN THE MTR RPOTECTION AREA. DETAILS SHALL BE AGREED ON SITE WITH THE ENGINEER AND RELEVANT GOVERNMENT DEPARTMENTS.
14. BEFORE THE WORKS COMMENCES, THE CONTRACTOR SHALL CONSULT THE VARIOUS SERVICE AND UTILITY AUTHORITIES TO ACCURATELY LOCATE AND DETERMINE ACCEPTABLE METHODS OF PROTECTION AND/OR RELOCATION OF ALL SERVICES AND UTILITIES AFFECTED BY THE WORKS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORKS NECESSARY FOR THE PROTECTION AND/OR RELOCATION OF SERVICES AND UTILITIES. THE CONTRACTOR SHALL DIG AN INSPECTION PIT, SIZE AS SMALL AS POSSIBLE, TO ENSURE THAT THERE IS NO UTILITIES AT THE PROPOSED DRILLHOLE LOCATION PRIOR TO COMMENCEMENT OF DRILLING WORKS.
15. DRILLING THROUGH SOIL SHALL BE BY MEANS OF WASH BORING WITH PROVISION FOR OBTAINING UNDISTURBED SAMPLES AND IN-SITU TESTING. DRILLING IN ROCK SHALL BE BY MEANS OF ROTARY CORE BORING FOR THE RECOVERY OF UNDISTURBED CORES.
16. THE CONTRACTOR SHALL SET OUT THE EXACT LOCATIONS OF THE DRILLHOLES PRIOR TO COMMENCEMENT OF EXCAVATION AND DRILLING. THE EXACT LOCATION OF THE GROUND INVESTIGATION STATIONS SHALL BE DETERMINED ON SITE BY THE PROJECT MANAGER.
17. THE CONTRACTOR SHALL TAKE DUE CARE TO AVOID ANY ADVERSE EFFECTS CAUSED TO THE ADJACENT STRUCTURES, LAND AND EXISTING SERVICES DURING THE COURSE OF THE GROUND INVESTIGATION WORKS.
18. THE CONTRACTOR SHALL IMPLEMENT SAFETY MEASURES INCLUDING PROTECTIVE TEMPORARY BARRIERS TO ENCLOSE THE WORKING AREA AND COVERS TO THE EXCAVATED INPSECTION PITS/ TRIAL PITS DURING THE COURSE OF WORKS AND OUTSIDE NORMAL WORKING HOURS.
19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY NECESSARY EXCAVATION PERMIT FROM THE RELEVANT AUTHORITIES. PRIOR TO COMMENCEMENT OF THE GROUND INVESTIGATION FIELD WORKS. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESPONSE TO ANY QUERY RAISED AND FULLY COMPLY WITH ANY REQUIREMENTS AND CONDITIONS THAT MAY BE IMPOSED BY THE UTILITIES UNDERTAKERS ON THE GROUND INVESTIGATION WORKS.
20. THE CONTRACTOR SHALL TAKE DUE CARE OF THE EXISTING UTILITIES ACCORDING TO THE UTILITIES RECORDS WHEN SETTING OUT THE EXACT LOCATIONS OF THE DRILLHOLES AND TRIAL PITS.
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL NECESSARY TEMPORARY WORKS TO SUPPORT THE EXISTING UTILITIES TO AVOID ANY ADVERSE EFFECTS CAUSED DURING THE COURSE OF THE GROUND INVESTIGATION WORKS.
22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL NECESSARY BUILDER'S WORKS SUCH AS TEMPORARY PLATFORM ON SLOPE AND PROPPING RELATED TO THE GROUND INVESTIGATION WORKS.
23. THE CONTRACTOR SHALL BACKFILL ANY DRILLHOLE DUE TO THE COURSE OF THE GROUND INVESTIGATION.
24. THE CONTRACTOR SHALL REINSTATE ANY TEMPORARY OPENINGS ON THE EXISTING ROAD, STREET, FOOTPATH AND ON SLOPE DUE TO THE COURSE OF THE GROUND INVESTIGATION PRIOR TO THE HANDOVER OF THE SITE.
25. THE CONTRACTOR SHALL TAKE NECESSARY HEALTH AND SAFETY MEASURES DURING SAMPLING AND TRANSPORTING OF THE SOIL SAMPLES WITH ARSENIC CONTENT.

§ 26. ALL NECESSARY MEASURES SHALL BE TAKEN TO PREVENT CONTAMINATED WATER FROM BEING DISCHARGED INTO PUBLIC DRAINS.

§ 27. IF ANY PARK AREA, EMERGENCY VEHICULAR ACCESS (EVA) OR PLANTING AREA IN SLOPE ARE AFFECTED, THE CONTRACTOR SHALL SEEK COMMENT FROM RELEVANT GOVERNMENT DEPARTMENTS.

§ 28. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING THE PIEZOMETER AND STANDPIPE, AT LEAST TWO METERS BELOW GROUND LEVEL, AND REINSTATING THE PAVER UPTO THE SATISFACTORY OF THE RELEVANT GOVERNMENT DEPARTMENTS AND A METHOD STATEMENT SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE COMMENCENG OF WORKS.

B. LAND GI BOREHOLE REQUIREMENTS

1. THE CONTRACTOR SHALL CARRY OUT INSPECTION PIT AT EACH DILLHOLES BEFORE COMMENCEMENT OF THE DRILLING, MAX DEPTH OF 3m, AS INSTRUCTED BY THE ENGINEER. THE SIZE OF THE INSPECTION PIT ON PLAN IS TO BE INSTRUCTED BY THE ENGINEER.
2. ALL BOREHOLE SHALL BE BACKFILLED WITH CEMENT GROUT ON COMPLETION OF WORKS.
3. THE SIZE OF BOREHOLE SHALL GENERALLY BE AS FOLLOW OR AS INSTRUCTED BY THE ENGINEER.
   (A) H SIZE IN MATERIAL OTHER THAN ROCK,BOULDER OR ARTIFICIAL HARD MATERIALS BELOW EXISTING GROUND LEVEL.
   (B) H SIZE IN BOULDER OR ARTIFICIAL HARD MATERIALS ,
   (C) H SIZE OR N SIZE IN ROCK CASING SHALL BE USED TO STABILIZE THE BOREHOLES.

SAMPLING AND IN-SITU TESTING REQUIREMENTS

1. ALL BOREHOLES TERMINATION CRITERIA SHALL BE REFERRED TO DRAWING NO. 60700410/SK3014 AND SHALL BE TERMINATED AS ADVISED ON SITE.
2. IN SOIL STRATA OTHER THAN SAPROLITE.
   (A) MAZIER SAMPLES WITH CLEAR ABS PLASTIC LINER SHALL BE TAKEN AT 2m INTERVALS IN THE BOREHOLE IN SOIL STRATA OTHER THEN SAPROLITE, COMMENCING AT 0.5m BELOW THE BASE OF THE INSPECTION PIT OR AS AGREED BY THE ENGINEER ON SITE.
   (B) SPT/L SHALL BE CARRIED OUT AT THE BASE OF MAZIER SAMPLES IN THE BOREHOLE OR AS AGREED BY THE ENGINEER ON SITE.
3. IN SAPROLITE.
   (A) MAZIER SAMPLES WITH CLEAR ABS PLASTIC LINER SHALL BE TAKEN AT 2m INTERVALS IN THE BOREHOLE IN SAPROLITE OR AS AGREED BY THE ENGINEER ON SITE.
   (B) SPT/L SHALL BE CARRIED OUT AT THE BASE OF MAZIER SAMPLES IN THE BOREHOLE OR AS AGREED BY THE ENGINEER ON SITE.
4. IN SANDY MATERIAL
   (A) U100 SAMPLES SHALL BE TAKEN AT 2m INTERVALS IN THE BOREHOLE WHEN SANDY MATERIAL IS ENCOUNTERED OR AS AGREED BY THE ENGINEER ON SITE.
   (B) SPT/L SHALL BE CARRIED OUT AT THE BASE OF U100 SAMPLES IN THE BOREHOLE OR AS AGREED BY THE ENGINEER ON SITE.
5. IN VERY SOFT OR SOFT CLAY.
   (A) PISTON SAMPLE (P76) SHALL BE TAKEN AT 2m INTERVALS IN THE BOREHOLE WHEN VERY SOFT OR SOFT CLAY IS ENCOUNTERED OR AS AGREED BY THE ENGINEER ON SITE.
   (B) VANE SHEAR TESTS SHALL BE CARRIED OUT AT 0.5m BELOW THE BASE OF PISTON SAMPLES IN THE BOREHOLE OR AS AGREED BY THE ENGINEER ON SITE.
6. CONTINUOUS SAMPLE BY DOUBLE OR TRIPLE TUBE CORE BARREL SHALL BE TAKEN IN THE BOREHOLES WHEN ROCK IS ENCOUNTERED OR AS AGREED BY THE ENGINEER ON SITE.
7. PERMEABILITY TESTS WILL BE CARRIED OUT IN THE BOREHOLE AS AGREED BY THE ENGINEER ON SITE.

§C. INSTRUMENTATION AND MONITORING:

1. STANDPIPE / PIEZOMETER SHALL BE INSTALLEO AS ADVISEO BY THE PROJECT MANAGER AT SITE.THE DEPTH OF TIP SHALL BE INSTRUCTEO AND CONF I RMEO BY THE PROJECT MANAGER. STANDPIPE /PIEZOMETER SHALL BE INSTALLED AS PER THE TYPICAL DETAILS PROVIDED BELOW OR AS DETAILEDIN FIGURES 19 AND 21, GEOGUIDE 2 GUIDE TO SITE INVESTIGATION.
2. ALL PIEZOMETERS AND STANDPIPES SHALL BE MONITORED BY AUTOMATIC GROUNDWATER MONITORING DEVICE (AGMD) THE MEASUREMENT INTERVAL FOR AGMD SHALL BE IN 30-MINUTE INTERVAL.
3. THE MATERIALS AND METHOD STATEMENT FOR INSTALLATION OF STANDPIPE / PIEZOMETER SHALL BE SUBMITTED BY THE CONTRACTOR TO THE PROJECT MANAGER FOR APPROVAL BEFORE THE COMMENCE MENT OF THE WORKS.
4. RESPONSE TESTS SHALL BE CARRIED OUT WITHIN 3 WORKING DAYS AF TER THE COMPLETION OF INSTALLATION OF STANDPIPE / PIEZOMETER AND THE RESPONSE TEST RESULTS SHALL BE SUBMITTED TO THE PROJECT MANAGER WITHIN 3 WORKING DAYS AF TER THE TESTS ARE CARRIED OUT.
5. INSTALLATION, TESTING AND MONITORING OF THE INSTRUMENTS SHALL BE CARRIED OUT UNDER THE SUPERVISION OF THE PROJECT MANAGER.
6. MON I TORING OF WATER LEVELS IN STANDPIPES / PIEZOMETERS SHALL BE CARRIED OUT DAILY FOR 7 CONSECUTIVE DAYS FOLLOWING THE COMPLETION OF RESPONSE TEST. PRELIMINARY RESUL TS SHALL BE SUBMITTED TO THE PROJECT MANAGER WITHIN 5 WORKING DAYS OF COMPLETION OF THE MONITORING PERIOD AT EACH INSTRUMENT.
7. UNLESS OTHERWISE SPECIFIED, PIEZOMETERS SHALL BE MONITORED WEEKLY BY MANUAL DIPPING UNTIL THE INSTALLATION OF AGMD IS COMPLETED TO THE SATISFACTION OF THE PROJECT MANAGER.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL STANDPIPES / PIEZOMETERS AND THE INSTRUMENTS DURING THE CONTRACT PERIOD INCLUDING THE MAINTENANCE PERIOD. ANY DAMAGE TO THE STANDPIPES / PIEZOMETERS AND THE INSTRUMENTS SHALL BE REPAIRED, REINSTATED, OR REPLACED AS DIRECTED BY THE PROJECT MANAGER. FLUSHING OF PIEZOMETERS FOLLOWED BY RESPONSE TEST SHALL BE CARRIED OUT IF INSTRUCTED BY THE PROJECT MANAGER TO CLEAR ANY BLOCKAGES IN THE PIEZOMETERS.
9. DETAILS OF STANDPIPE / PIEZOMETER REFER TO TYPICAL DETAILS SHOWN BELOW.

D. LABORATORY TESTING:

1. SPT TO BE TAKEN IN ALL SOIL STRATA AT 2m INTERVAL, GENERALLY AT THE BASE OF EACH MAZIER OR TO BE ADVISED AT SITE (LINER SAMPLE TO BE TAKEN FOR EACH SPT).
2. MAZIER SAMPLES TO BE TAKEN IN ALL SOIL STRATA AT 2m INTERVAL, COMMENCING AT THE BASE OF THE INSPECTION PIT OR TO BE ADVISED AT SITE.
3. WHEN SANDY MATERIAL IS ENCOUNTERED, U76 INSTEAD OF MAZIER SAMPLE SHALL BE TAKEN AT 2m INTERVAL.
4. WHEN VERY SOFT TO SOFT CLAY IS ENCOUNTERED, PISTON INSTEAD OF MAZIER SAMPLE SHALL BE TAKEN AT 2m INTERVAL.
5. MC, AL, PSD STAND FOR MOISTURE CONTENT TEST, ATTERBERG LIMIT TEST AND PARTICLES SIZE DISTRIBUTION TEST RESPECTIVELY.

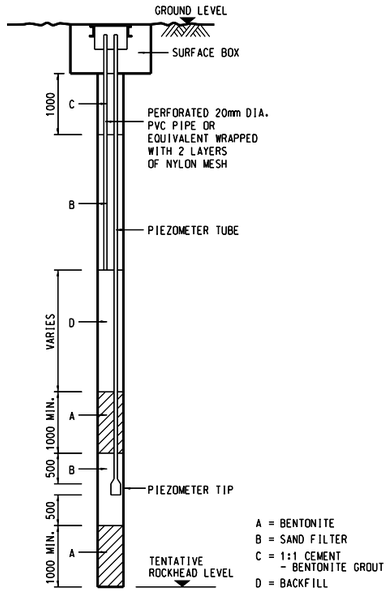
§ 6. CHEMICAL TEST INCLUDES PH VALUE TEST, TOTAL SULPHATE CONTENT, CHLORIDE CONTENT, ORGANIC CONTENT, CARBONATE CONTENT DETERMINATION TESTS, AND RESISTIVITY TEST.

7. LOCATIONS AND DETAILS OF THE INSTALLATIONS OF STANDPIPE AND PIEZOMETER SHALL BE ADVISED ON SITE.
8. PERMEABILITY TEST TO BE ADVISED ON SITE-DEPENDENT ON MATERIAL HORIZON.

§ 9. CARBONATE CONTENT AND RESISTIVITY TEST REFER TO BS 1377:PART 3: 1990 CL. 6 AND 10 RESPECTIVELY.

§10. PH VALUE TEST, TOTAL SULPHATE CONTENT, CHLORDIE CONTENT AND ORGANIC CONTENT REFER GEOSPEC 3 TEST NOS. 9.5, 9.3, 9.4 AND 9.1 RESPECTIVELY.

§11. TRIAXIAL TESTING WILL BE EITHER SINGLE STAGE OR MULTI-STAGE AS INSTRUCTED. MINOR VARIATIOS TO PROCEDURE MAY BE INSTRUCTED. THE SIZE OF THE SPECIMEN TO BE TESTED WILL BE GENERALLY BE 76mm OR 100mm NOMINAL DIAMETER.



TYPICAL PIEZOMETER / STANDPIPE DETAILS
N.T.S.

AECOM

PROJECT
項目
DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主
渠務署
Drainage Services Department

CONSULTANT
工程顧問公司
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核
A	16/10	MINOR AMENDMENT	KYM

STATUS
階段

SCALE 比例	DIMENSION UNIT 尺寸單位
N.T.S.	-

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60700410
CONTRACT NO. 合約編號: DP 06/2023

SHEET TITLE
圖紙名稱
GROUND INVESTIGATION WORKS SCHEDULE AND GENERAL NOTES

SHEET NUMBER
圖紙編號
60700410/SK3014

Appendix F

Land Status Plan

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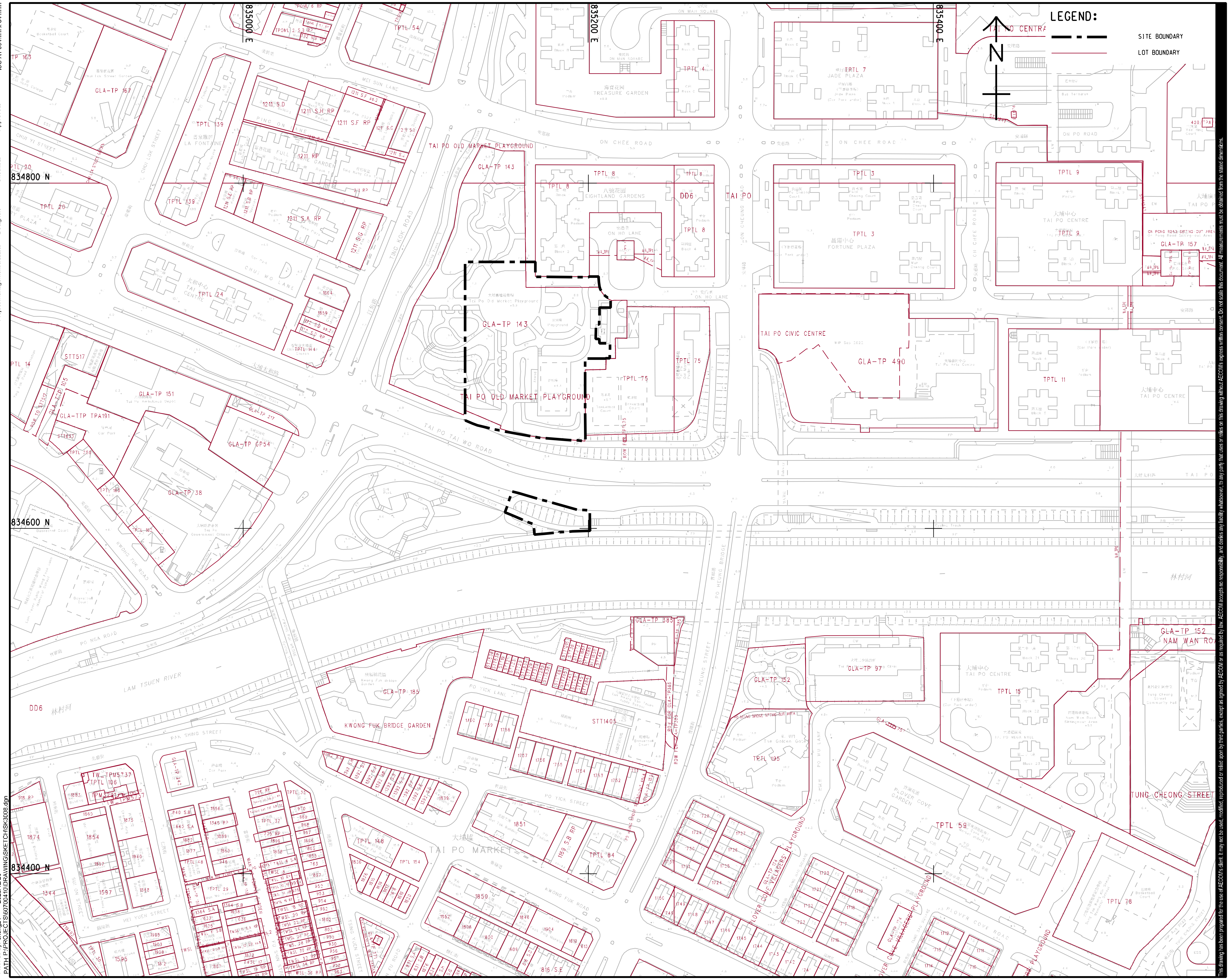
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



Plot File by: chengz1 2023/12/20
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AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - SITE LOCATION

CLIENT 業主

渠務署 Drainage Services Department

CONSULTANT 工程顧問公司

AECOM Asia Company Ltd.
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SUB-CONSULTANTS 分判工程顧問公司

ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例 — A1 1 : 1000

DIMENSION UNIT 尺寸單位 — METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號 — 60700410

CONTRACT NO. 合約編號 — CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

LAND STATUS PLAN - TAI PO OLD MARKET

SHEET NUMBER 圖紙編號

60700410/SK3008

Appendix G

Foundation Calculations

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Tai Po Old Market Playground Stormwater Pumping Station (TPOMPSPS)

tank size (m2)	2984		
Item	**Load**		
Selfweight of storage tank	461819.5	kN	(295000kN indicated in the drawing?)
Soil load, Load from aboveground structure	278306.7	kN	
water load, access load, E&M Equipment,EVA,Live Load from Recreational Area, other live load	372274.77	kN	
Total Dead Load (for uplift checking)	**740126.2**	kN	
Total Loading	**1112400.97**	kN	
Design Loading	**1112401**	kN	**(less water pressure, mean sea level = -0.5 mPD)**
Ground Level	5.5	mPD	
Design Groundwater Level	5	mPD	
Excavation Level	-12	mPD	

Uplift Checking

Total Dead Load	740126.2	kN	
Total Water Pressure	497641.68	kN	**(highest anticipated groundwater table = 5mPD)**
	1.487267304	<1.5	COP for Foundations 2017,5.1.6
		i.e requires pile tension capacity checking, raft foundation is not workable due to the floatation case	
Total Water Pressure	512278	kN	**(highest possible groundwater table = existing ground level = 5.5mPD)**
Factor of Safety	1.445	>1.1	COP for Foundations 2017,5.1.6
		i.e. The pile are mainly in compression	

Bored Pile Design

Bedrock Bearing capacity	5000	kPa	COP for Foundations 2017,Table 2.1 Cat 1c
Bond Friction under compression	700	kPA	COP for Foudations 2017, Table 2.2 1c
Bond Friction under tension	350	kPA	
Safety Factor	1.15		
Total Uplift Force (DL-1.5u)	**-6336.32**	kN	
Design Loading	**1112401**	kN	

Bored Pile Bearing Capacity Check

Bored Pile Dia. (m)	Socket Length (m)	Each Pile Capacity (m)	Min. Nos. of Pile	Designed Nos. of Pile	Total Pile Capacity (kN)
1	5	14923	85.7	86	**1283341**
1.2	5	18850	67.9	68	**1281770**
1.5	5	25329	50.5	51	**1291784**
2	5	37699	33.9	34	**1281770**

***Total Pile Capacity > Design Loading**

Bored Pile Tension Capacity Check

Bored Pile Dia. (m)	Socket Length (m)	Each Pile Capacity (kN)	Designed Nos. of Pile	Total Pile Tension Capacity (kN)
1.0	5	5498	86	**472810**
1.2	5	6597	68	**448619**
1.5	5	8247	51	**420581**
2.0	5	10996	34	**373850**

> Total Uplift Force

Socketed steel H-Piles Design

Design Loading	**1112401**	kN
Total Uplift Force (DL-1.5u)	**-6336.32**	kN
Safety Factor	1.15	

Socket H Pile Axial Capacity Check

Size of H pile	Each Pile Capacity (kN)	Min. Nos. of Pile	Designed Nos. of Pile	Total Pile Capacity (kN)
305 x 305 x 223 kg/m	6106	210	210	**1282260**
sectional area of steel,mm2				***Total Pile Capacity**
28400				**> Design Loading**
Steel grade Mpa				
430				
28400X430/1000*0.5=6106				
(0.5 refer to COP Foundation P.30)				

Friction between grout and rock

Bond Friction under compression	700	kPA	COP for Foundations 2017, Table 2.2 1c
pile diameter	550	mm2	
Socket Length	**7**	m	
Each Pile Friction	**8467**	>Each Pile Capacity = 6106	
		i.e OK	

Bond Stress between steel and grout

perimeter of steel	1918	mm
Bond Stress between steel and grout	480	kPa
Socket Length	**7**	m
Each Pile Bond Stress	**6444**	>Each Pile Capacity = 6106
		i.e OK

Socket H Pile Tension Capacity Check

Bond Friction under tension 350 kPa COP for Foundations 2017, Table 2.2 1c

Size of H pile	Socket Length (m)	Each Pile Tension Capacity (kN)	Designed Nos. of Pile	Total Pile Tension Capacity (kN)
305 x 305 x 223 kg/m	7	4233	210	**886913**
sectional area of steel,mm2				**> Total Uplift Force**
28400				
Steel grade Mpa				
430				

Appendix H

Stability Assessment for Discharge Chamber

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1. Dimension and Design Contants

1.1 Dimension of Structure

Front opening	=	5x1.5
	=	7.5 m^2
Bottom opening	=	4xDN1600+1xDN700
	=	8.699154001 m^2

1.2 Design Constants

Friction Angle ϕ' (^{o})	33
δ (^{o})	29.7
At Rest Earth Pressure Coefficient K_o	0.455
γ (kN/m^3)	19
γ_{water} (kN/m^3)	9.81
γ' (kN/m^3)	9.19
$\gamma_{concrete}$ (kN/m^3)	25
Surchage (kPa)	20
Top Width (m)	22.3
Bottom Width (m)	22.3
Height (m)	8
Length (m)	5.7

2. Levels

2.1 Levels

Finished Ground Level (mPD):	8
Base Slab Bottom Level (mPD):	0
Wet Season Grouind Water Table (mPD):	6.5

3. Loadings and Stability Checking

3.1 Permanent Stage (Assume Water level at 6.5mPD)

3.1.1 Horizontal Driving Force and Overturning Moment

Loadings	Force (kN/m)		Lever Arm (m)	Moment (kN/m)
Soil Load	182.77		2.17	396.00
Water Load	207.24		2.17	449.01
Surchage Load	59.20		3.25	192.39
	Subtotal Force	449.20	**Subtotal Moment**	1037.40

3.1.2 Vertical Driving Force and Overturning Moment (Uplift)

Loadings	Force (kN/m)		Lever Arm (m)	Moment (kN/m)
Uplift	710.98		7.43	5284.95
	Subtotal Force	710.98	**Subtotal Moment**	5284.95
			Total Overturning Moment	**6322.35**

3.1.3 Horizontal Resisting Force and Moment

Assume NO Horizontal Resisting

Loadings	Pressure (kPa)			Force (kN/m)		Lever Arm (m)	Moment (kN/m)
	at top slab top level	at watertable	at bottom slab bottom level				
			Subtotal Force	0.00		**Subtotal Moment**	0.00

3.1.4 Vertical Resisting Force and Moment

Loadings	Weight (kN)	Force (kN/m)		Lever Arm (m)	Moment (kN/m)
Outer Concrete Self-weight	10719.03	1880.53		11.15	20967.93
	Subtotal Force	1880.53		**Subtotal Moment**	20967.93
				Total Resisting Moment	**20967.93**

3.1.5 Checking Against Factor of Safety

3.1.5.1 Overturning

Eccentricity =	3.36	<	3.72	OK
FOS =	3.32	>	2	OK

3.1.5.2 Sliding

FOS =	1.69	>	1.5	OK

3.1.5.3 Floating

FOS=	2.645	>	1.1	OK

Appendix I

Layout of Discharge Chamber, Topographic Survey, SIS and Slope W Analysis

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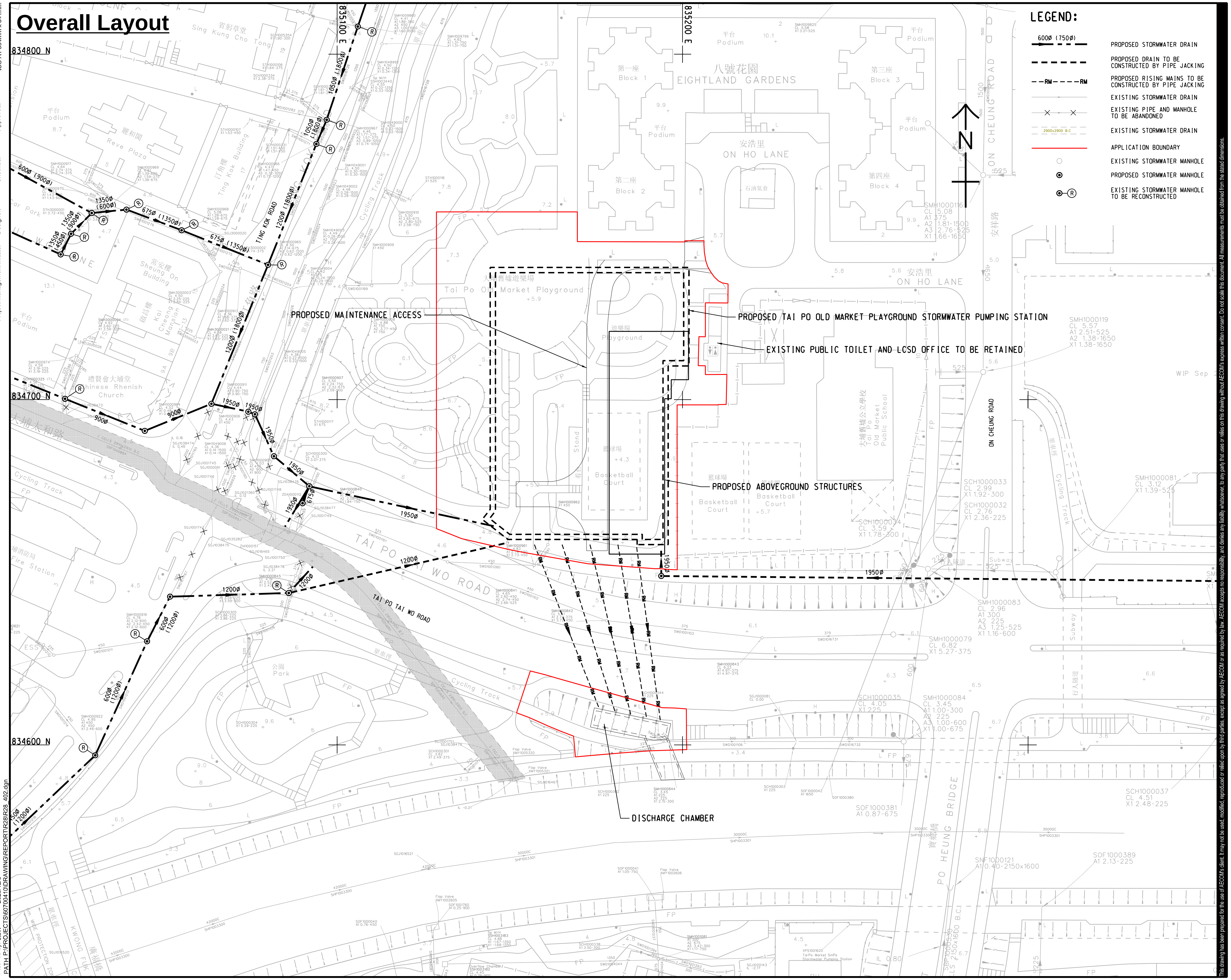
Overall Layout



ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

Plot File by: JiaW 2023/12/8

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AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT 業主

渠務署 Drainage Services Department

CONSULTANT 工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS 分判工程顧問公司

ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例: A1 1 : 500

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號: 60700410

CONTRACT NO. 合約編號: CE 57/2022 (DS)

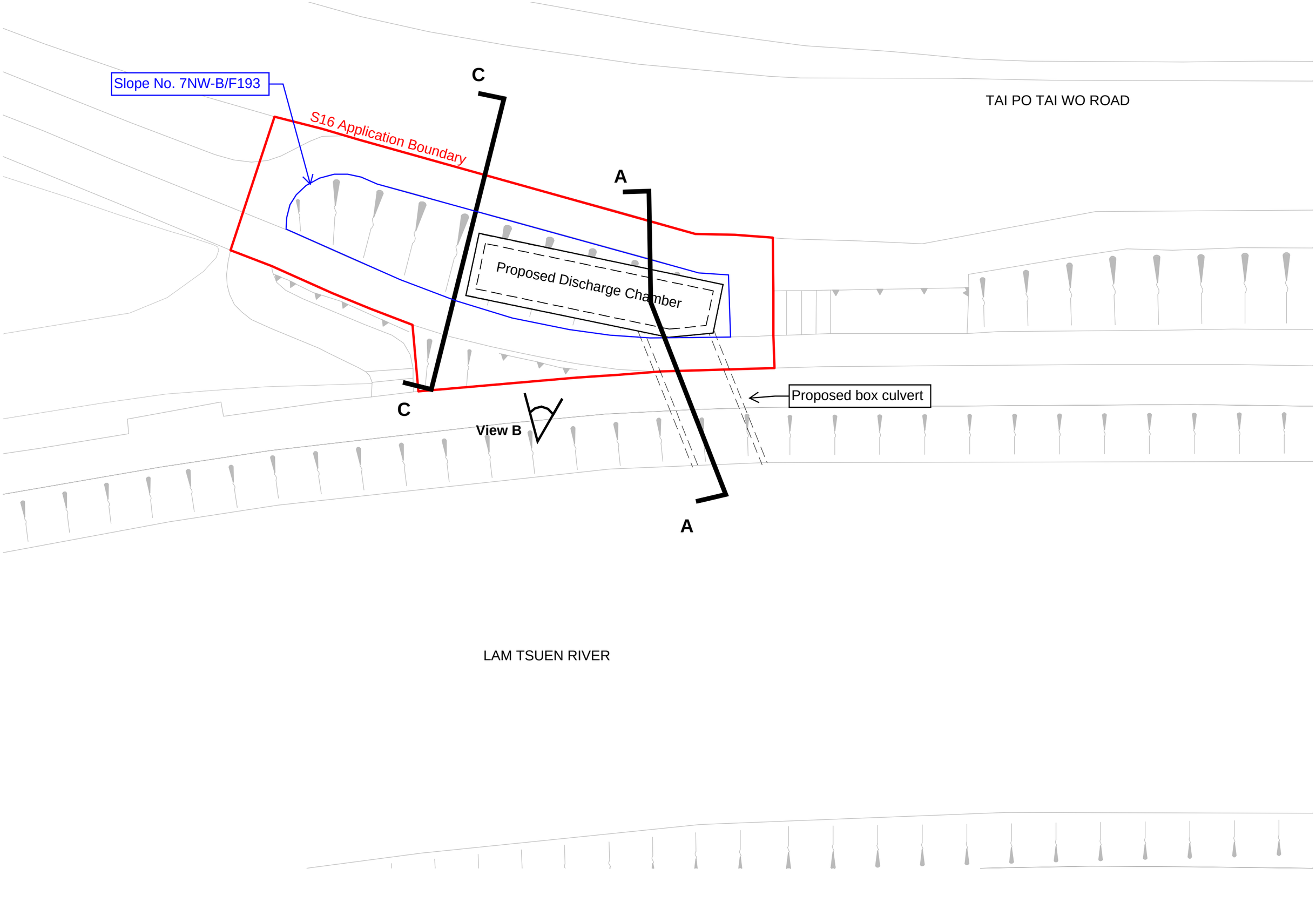
SHEET TITLE 圖紙名稱

PROPOSED TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION

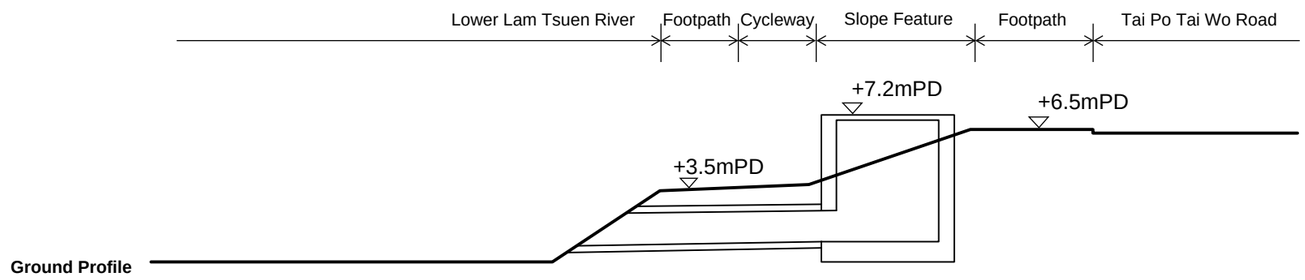
SHEET NUMBER 圖紙編號

60700410/R28/402

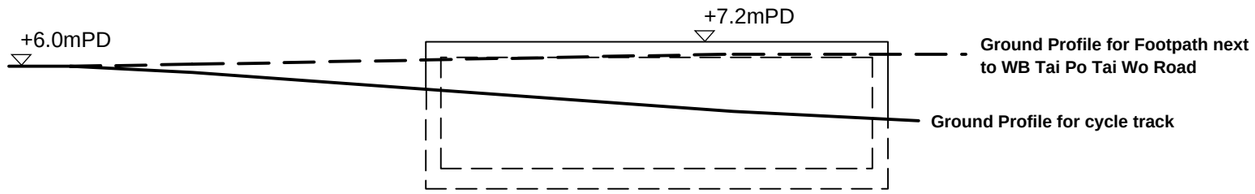
Preliminary Layout of Proposed Discharge Chamber



Preliminary Sections of Proposed Discharge Chamber



Section A-A



View B

NOTES :

1. ALL LEVELS ARE IN METRES REFERRED TO HONG KONG PRINCIPAL DATUM.
2. CO-ORDINATES ARE OF HONG KONG 1980 GRID SYSTEM.

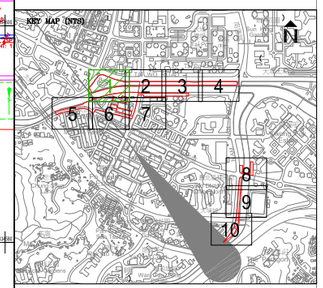
LEGEND:

- HAND RAILING / FENCE / HOARDING
- CHANNEL WITH SIZE AND FLOW DIRECTION
- GATE
- GULLY
- SEPTIC TANK MANHOLE
- MANHOLE
- DOWNPIPE WITH SIZE
- BUILDING EDGE
- WALL
- TEMPORARY STRUCTURE
- ARTIFICIAL SLOPE
- EXPOSED PIPELINE
- KERB BOTTOM
- TOPOGRAPHIC SURVEY BOUNDARY
- BOLLARD
- FIRE HYDRANT
- ROAD SIGN
- LAMP POST
- NOTICE BOARD
- ELECTRIC POLE
- TELEPHONE POLE
- PARKING METER
- TREE
- SPOT LEVEL

ABBREVIATION:

BN	BENCH
BS	BOUNDARY STONE
CO	COLUMN
CB	CONCRETE BLOCK
CA	CATCH PIT
DP	DOWN PIPE
EP	ELECTRIC POLE
EB	ELECTRIC BOX
ET	ELECTRIC TRANSFORMER
FB	FLOWER BED
FP	FOOTPATH
G	GULLY
H	FIRE HYDRANT
INC	INCINERATOR
KB	KERB BOTTOM
L	LAMP POST
MH	MANHOLE
MS	MANHOLE (STORM WATER)
MF	MANHOLE (FOUL WATER/SEWER)
MT	MANHOLE (TELEPHONE)
MU	MANHOLE (UTILITY)
NB	NOTICE BOARD
PL	PIPELINE
PAV	PAVILION
RCP	REFUSE COLLECTION POINT
PF	PLATFORM
RS	ROAD SIGN
SCR	SECURITY CONTROL ROOM
SHR	SHRINE
SP	SIGN POLE
TB	TRAFFIC BOX
TL	TRAFFIC LIGHT POLE
TS	TEMPORARY STRUCTURE
TP	TELEPHONE POLE
UC	U CHANNEL
WM	WATER METER
VW	VALVE (WATER)
VF	VALVE (FIRE)
VG	VALVE (GAS)

KEY MAP (NTS)



CERTIFIED BY:
LAU CHI KWONG, MSc, FHKIS, FRICS, RPS(LS), ALS
AUTHORIZED LAND SURVEYOR
SIGNATURE :

DATE :

No.	Date	Description
1	03/22	DRAFT

REVISION :

	Name	Date
Surveyed	WONG K.M.	01/2022
Drawn	KING Y.F.	03/2022
Checked	LAI K.Y.	03/2022

Agreement no. : CE 11/2019 (DS)

Contract :
DRAINAGE IMPROVEMENT WORKS IN TAI PO – INVESTIGATION
CONTRACT NO. DPW 02/2021
TRIAL PITS, UTILITY AND TOPOGRAPHICAL SURVEYS FOR DRAINAGE IMPROVEMENT WORKS IN TAI PO

Drawing title :
TOPOGRAPHICAL SURVEY IN TAI PO
TAI PO MARKET
(SHEET 1 OF 10)

Drawing no. : SS1370/TOPO/03

Scale : 1 : 200

Consultant :
Ove Arup & Partners HK Limited

Client :
Drainage Services Department

Surveyor :
EGS (Asia) Limited

JOB NO: SS137021

Match Line Sheet 2 of 10

Match Line Sheet 6 of 10

TAI PO TAI WO ROAD

LAM TSUEN RIVER

LAM TSUEN RIVER

BASIC INFORMATION

Location:	TAI PO ROAD - TAI WO, TP
Registration Date:	03-01-2003
Ranking Score (NPRS):	0 (EI)
Date of Formation:	post-1977
Date of Construction/ Modification:	
Data Source:	EI(HyD)
Approximate Coordinates:	Easting : 835173 Northing : 834607

CONSEQUENCE-TO-LIFE CATEGORY

Facility at Crest:	Road/footpath with moderate traffic density
Distance of Facility from Crest (m):	0
Facility at Toe:	Road/footpath with low traffic density
Distance of Facility from Toe (m):	0
Consequence-to-life Category:	2
Remarks:	N/A

SLOPE PART

(1) Max. Height (m): 3 Length (m): 45 Average Angle (deg): 40

WALL PART

N/A

MAINTENANCE RESPONSIBILITY

(1) Sub Div.: 0 Government Feature Party: HyD Agent: HyD Land Cat.: 5b(iii) Reason Code: 56 MR Endorsement Date: 02-02-2016

DETAILS OF SLOPE / RETAINING WALL

Date of Inspection: 06-02-2015
Data Source: EI(HyD)
Slope Part Drainage: (1) Position: Toe Size(mm): 225

Wall Part Drainage: N/A

SLOPE PART

Slope Part (1)
Surface Protection (%): Bare: 0 Vegetated: 100 Chunam: 0 Shotcrete: 0 Other Cover: 0
Material Description: Material type: Soil Geology: N/A
Berm: No. of Berms: N/A Min. Berm Width (m): N/A
Weepholes: Size (mm): N/A Spacing (m): N/A

WALL PART

N/A

SERVICES

N/A

CHECKING STATUS INFORMATION

Tagmark: 21884_0_4 Part: 0 Checking Status: No checking records Checking Certificate No.: N/A

BACKGROUND INFORMATION

GIU Cell Ref.:	7NW9A-3
Map Sheet Reference (1:1000):	7NW- 9A
Aerial Photos:	CN4645 (1993), CN4646 (1993)
Nearest Rainguage Station (Station Number):	Booster Pumping Station, Hong Lok Yuen(N35)
Data Collected On:	06-02-2015
Date of Construction, Subsequent Modification and Demolition:	Modification: Constructed Before: 1985 After: 1982
Related Reports/Files or Documents:	N/A
Remarks:	N/A
Follow Up Actions:	N/A

DH-Order (To Be Confirmed with Buildings Department): None

Advisory Letter (To Be Confirmed with Buildings Department): None

LPMIS: None

ENHANCED MAINTENANCE INFORMATION

From Maintenance Department: (Last Updated Date: 25/09/2023)

STAGE 1 STUDY REPORT

Inspected On:
Weather:
District: ME

Section No: 1-1
Height(m):
Type of Toe Facility: Road/footpath with low traffic density

Distance from Toe(m): 0
Type of Crest Facility: Road/footpath with moderate traffic density

Distance from Crest(m): 0
Consequence Category:
Engineering Judgement:

Section No: 2-2
Type of Toe Facility:

Distance from Toe(m):
Type of Crest Facility:

Distance from Crest(m):
Consequence Category:
Engineering Judgement:

Sign of Seepage:

Criterion A satisfied:

Sign of Distress:

Criterion D satisfied:

Non-routine maintenance required:

Note:

Masonry wall/Masonry facing:

Note:

Consequence category (for critical section):

Observations: N/A

Emergency Action Required:

Action By: N/A

ACTION TO INITIATE PREVENTIVE WORKS

Criterion A/Criterion D: N/A

Action By: N/A

Further Study:

Action By: N/A

OTHER EXTERNAL ACTION

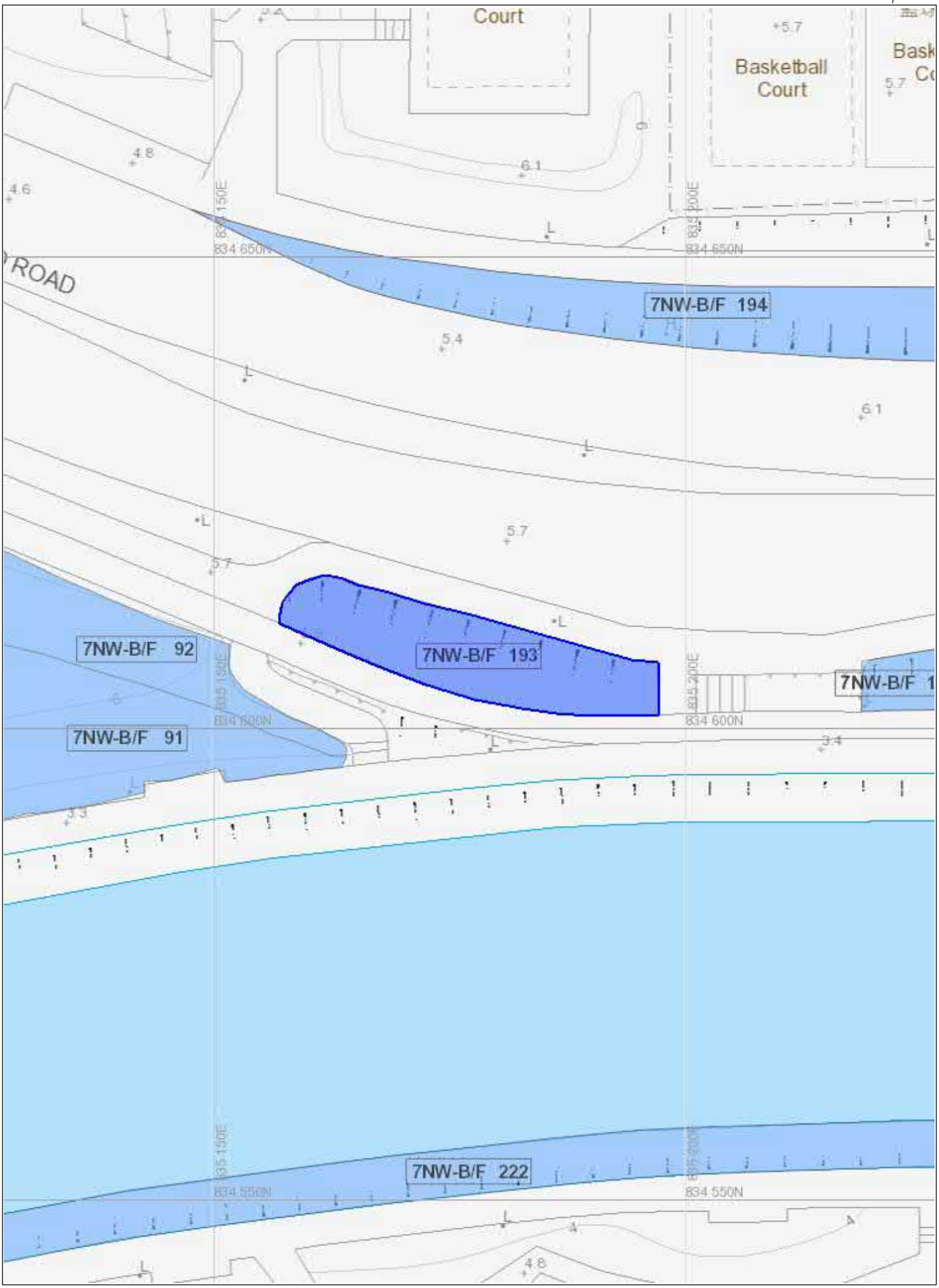
Check / repair Services:

Action By: N/A

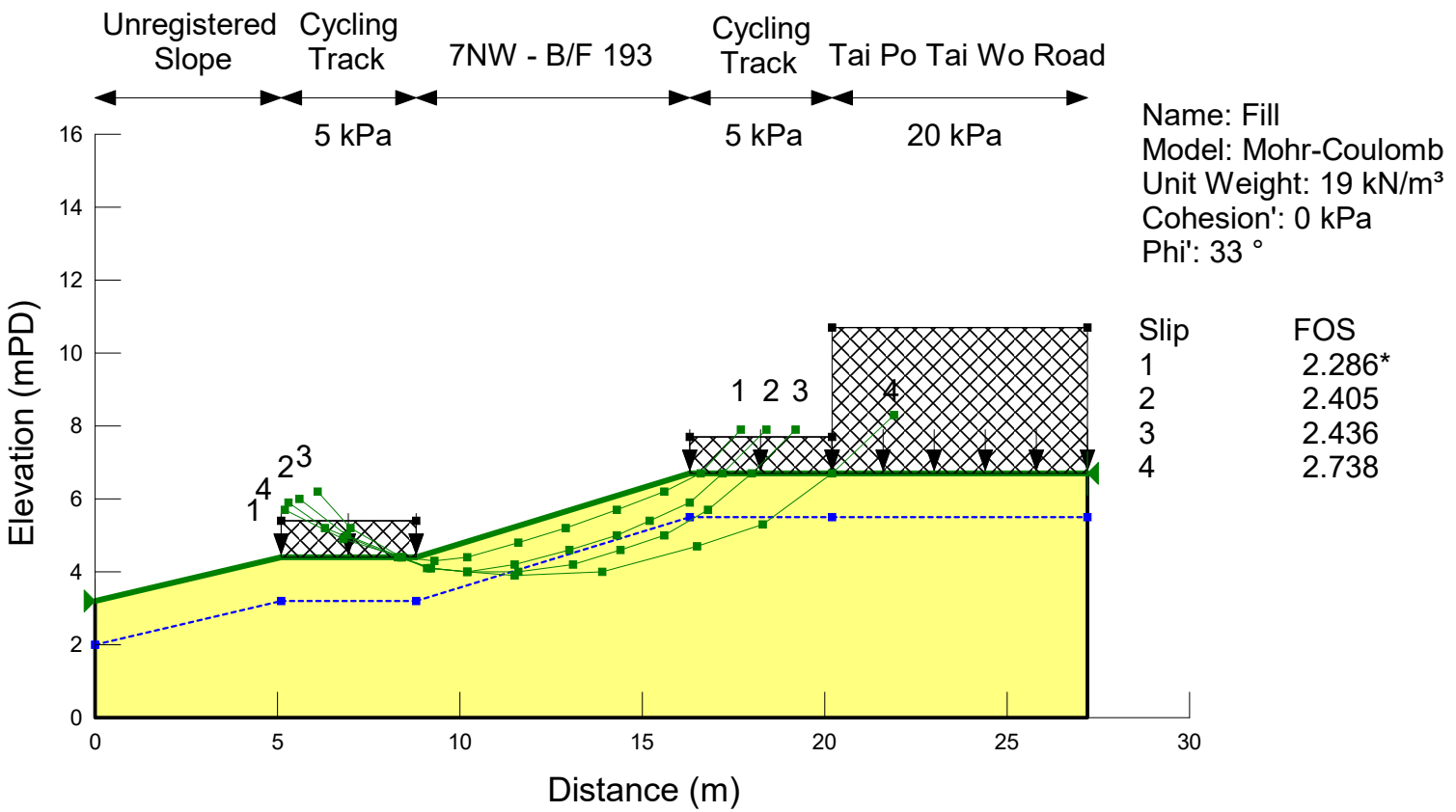
Non-routine Maintenance:

Action By: N/A

PHOTO


Court
Basketball Court
ROAD
7NW-B/F 194
7NW-B/F 92
7NW-B/F 193
7NW-B/F 91
7NW-B/F 222
834 650N
834 600N
834 550N
835 150E
835 200E

Section CC



Name: Fill
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion': 0 kPa
Phi': 33 °

Slip	FOS
1	2.286*
2	2.405
3	2.436
4	2.738

Appendix I – Sewerage Impact Assessment Report

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TABLE OF CONTENTS

DRAWINGS

1 INTRODUCTION

1.1 Background

1.1.1.1 The Review of Drainage Master Plan in Tai Po – Feasibility study and the Review of Drainage Master Plan in Sha Tin and Sai Kung – Feasibility Study (the DMP Review Study) identified that some areas in Tai Po, Lam Tsuen, Ting Kok and Ma On Shan would be subject to high flood risks.

1.1.1.2 The flooding incidents reported in the areas of Tai Po Old Market and Tai Po Market on 22 July 2010, Lam Tsuen Valley on 19 October 2016, and Ting Kok and Sai Sha Road on 18 July 2017 are some examples to substantiate the above findings.

1.1.1.3 To relieve the flood risk, the Study proposed various drainage improvement measures in these areas, the DMP Review Study has proposed by adopting drainage improvement measures in a combination of stormwater pumping scheme and associated drainage upgrading and river training works. Upon completion of the project, the flood risks in the areas can be significantly reduced.

1.1.1.4 In May 2018, Development Bureau (DEVB) signed out a Project Definition Statement (PDS) to justify and define the scope of the "Drainage Improvement Works in Tai Po". The Drainage Services Department (DSD) then completed a Technical Feasibility Statement (TFS) confirming its technical feasibility. The TFS was subsequently approved by DEVB in August 2018. The project was included into Cat B under PWP No. 4183CD in September 2018.

1.1.1.5 In January 2020, the DSD commissioned Agreement No. CE 11/2019(DS) "Drainage Improvement Works in Tai Po – Investigation" (referred to hereinafter as the "Investigation Study") to carry out various reviews, surveys, investigation, impact assessments and preliminary design for the Project.

1.1.1.6 AECOM Asia Company Limited was appointed by DSD on 13 January 2023 to undertake Agreement No. CE 57/2022 (DS) "Drainage Improvement Works in Tai Po – Design and Construction" (referred to hereinafter as "the Project", of which the *starting date* of the Project is 26 January 2023. The Project comprises the drainage improvement works as briefly described in the following:

(a) Stormwater pumping scheme in Tai Po Old Market, including an underground storage tank, a pump house and the associated pipeworks and E&M works in Tai Po Old Market Playground, as well as the drainage upgrading works in Tai Po Tai Wo Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Ting Kok Road, Mei Sun Lane and Kau Hui Chik Street, floodwall modification and new floodwall along Lam Tsuen River and ancillary works including temporary relocation and reinstatement of playgrounds and associated facilities;

(b) Expansion of existing Tai Po Market Floodwater Pumping Station, including upgrading of existing pump house and the associated pipeworks and E&M works, as well as the drainage upgrading works in Tsing Yuen Street, Wai Yan Street, Pak Shing Street, Fu Shin Street, Yan Hing Street, Kwong Fuk Bridge Garden, Plover Cove Road, Tung Cheong Street, cycle track and footpath along southside of Lower Lam Tsuen River (between existing pumping station and elevated walkway at Tai Po Centre (structure no. NF97);

(c) Drainage upgrading works at Tai Mei Tuk, Ng Uk Tsuen, Ting Kok Shan Liu, Po Sam Pai, Ma Po Mei, San Uk Pai, Ping Long, Che Ha, Nam Hang and Tsung Tsai Yuen and Sai Sha Road (sections near Sai O, Kwun Hang, Tai Tung and Sai Keng); and

(d) River training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Sha Pa and She Shan River.

1.2 Scope of the Report

1.2.1.1 This report will cover the proposed works at Tai Po Old Market Playground Stormwater Pumping Station (TPOMPSPS) only.

1.3 Objectives of the SIA

1.3.1.1 The objective of the Sewerage Impact Assessment (SIA) is to introduce a structural and systematic approach in identifying, assessing, and mitigating potential adverse impacts which might arise from the Project.

1.3.1.2 According to Clause 6.13.2 of the Study Brief, the consultant:

(a) Undertakes the SIA in accordance with the standards set out in DSD Sewerage Manual and latest version of the EPD's "Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning";

(b) If required by the *Service Manager*, obtains and reviews the latest version of the GIS and mathematical models in the vicinity of the Project area based on the latest available information by incorporating the proposed works of the Project into the models to assess the impact due to the Project on the existing and planned downstream sewerage system;

(c) Further to sub-Clause (b) above, provides if requested by the *Service Manager* and in an agreed format the updated parts of the GIS and mathematical models with incorporation of the features given in Appendix D and prepared with due regard to the information, requirements and procedures contained in the "Guidelines for Sewer Networks Hydraulic Model-Build and Verification" and also in the "Requirements on Submission of InfoWorks CS Models and Related Information", or any updated version prepared by EPD;

(d) Recommends and implements all necessary measures to mitigate adverse sewerage impacts arising from the Project;

(e) monitors the sewerage performance of the Project during construction; and

(f) takes all measures necessary to prevent every anticipated and unacceptable sewerage impacts arising during project construction.

2 SEWERAGE IMPACT ASSESSMENT

2.1 Flow and Load Estimation

2.1.1.1 Since only drainage works are proposed for flood mitigation purpose, no additional sewage flow and loading to the existing sewerage system are envisaged.

2.2 Impact on Existing or Planned Sewerage System

2.2.1.1 The Drainage Record Plans collected from the DSD, results from underground utilities surveys, have been reviewed to identify the potential interfaces between the proposed drainage improvement works and the existing sewerage system. Part-prints of drainage record plan at the proposed drainage improvement work locations are attached in **Drawings**.

2.2.1.2 Detailed checking on the underground space has been carried out to study whether the recommended drainage improvement works would be in the vicinity of the existing sewer systems.

3 SEWERAGE IMPACT AND PROPOSED MITIGATION MEASURES

3.1 Drainage Improvement Works at Tai Po Old Market

3.1.1.1 The recommended drainage improvement works at Tai Po Old Market include:-

- construction of a new stormwater pumping station at Tai Po Old Market Playground with wet volume of 25,000m^3 and pumping capacity of 16m^3/s;
- construction of new stormwater pipes ranged from 600mm to 1950mm dia. at Tai Po Tai Wo Road and Ting Kok Road; (not discussed in the submission)
- upgrade of existing stormwater pipes in Tai Po Tai Wo Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Ting Kok Road, Mei Sun Lane and Kau Hui Chik Street from diameter of 225 - 1200mm to 600 - 1800mm (not discussed in the submission); and
- construction of at-grade flood barrier along Lam Tsuen River (not discussed in the submission)

The proposed layout and the existing sewerage record are shown **in Drawing No. 60700410/R18/421**.

3.1.1.2 The existing 350mm sewers (i.e. FWD1001224 and FWD1001223) are identified within the boundary of the proposed pumping station. The two sewers and the associated manholes will be diverted and re-provided along the adjacent footpath to avoid conflict with the proposed works.

3.1.1.3 The proposed drainage will be planned to avoid with the existing sewerage system. Thus, it will not affect the existing sewerage system.

4 MONITORING MEASURES FOR POTENTIAL SEWERAGE IMPACTS

4.1.1.1 Unauthorized connections of sewers to the drainage systems are not uncommon in Hong Kong, especially in rural areas such as villages. This could impose adverse impacts on both sewerage and drainage systems. If this occurs to the proposed drainage improvement works, monitoring measures could be conducted to identify the sources and locations causing the sewerage impacts, before further rectifying the systems.

4.1.1.2 Typical monitoring measures consist of a pollution source identification survey and a flow survey. The former is the visual inspection of the drainage outlets along the systems to identify outlets with substandard water quality (e.g. debris, colour, odour, etc.), and to identify outlets with relatively stable flows. Subsequently, water quality sampling and testing would be conducted to verify the existing water quality conditions of selected outlets. While the latter is to install flow sensors at the selected drainage outlets to detect any anomalies in flow.

5 SUMMARY

5.1.1.1 No additional sewage flow and loadings will be caused by the proposed drainage improvement works.

5.1.1.2 The existing and planned sewerage systems in the vicinity of the proposed drainage improvement works under Tai Po Old Market Stormwater Pumping Station are reviewed under this report.

5.1.1.3 Close monitoring of the sewage flow and settlement of the existing sewers in the vicinity of the works areas are recommended to be carried out by the future contractors during the construction phase of the project.

5.1.1.4 This Report concludes that with the implementation of the mitigation measures, no adverse sewerage impact is anticipated due to this Project.

Drawings

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ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

834900 E

835000 E

835100 E

834800 N

834700 N

834600 N

LEGEND:

APPLICATION BOUNDARY

EXISTING SEWERAGE SYSTEM NEAR

NOT INCLUDED IN THE SUBMISSION

PROPOSED REPROVISION OF SEWERS

TAI PO OLD MARKET PLAYGROUND

SCREEN ROOM

TRANSFORMER ROOM 2

TRANSFORMER ROOM 1

LV SWITCHROOM

PUMP HOUSE

BASKETBALL COURT

STAND

DISCHARGE CHAMBER

CHUI LOK STREET

TING KOK ROAD

TAI PO TAI WO ROAD

KWONG FUK ROAD

DUNG LANE

ON CHEE ROAD

ON HO LANE

LA FONTAINE

FULL SCENE GARDEN

EIGHTLAND GARDENS

TAI WO CENTRE

Tai Po Old Market Playground

Tai Po Ambulance Depot

Tai Po Fire Station

Tai Po Government Offices

Chinese Rhenish Church

Drainage Services Department

AECOM Asia Company Ltd.
www.aecom.com

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE
比例

A1 1 : 500

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60700410

CONTRACT NO.
合約編號

CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

EXISTING SEWERAGE SYSTEM NEAR PROPOSED DRAINAGE IMPROVEMENT WORKS IN TAI PO OLD MARKET (TP1)

SHEET NUMBER
圖紙編號

60700410/R28/421

Plot File by: liu.yang 2023/12/28
PATH: P:\PROJECTS\60700410\DRAWING\REPORT\R28\R28_421.dgn

AECOM
12/F Grand Central Plaza, Tower 2
138 Shatin Rural Committee Road
Shatin, Hong Kong
香港新界沙田鄉事會路 138 號
新城市中央廣場第 2 座 12 樓
www.aecom.com
+852 39
+852 39

Your Ref.: Application No.: A/TP/693
Our Ref.: AYFW:etly:60700410/13.28-0118 (2024001768W)

7 March 2024

By Hand

Town Planning Board
15/F, North Point Government Offices
333 Java Road
North Point, Hong Kong

Attn.: Secretary of Town Planning Board

Dear Sir/Madam,

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po – Design and Construction

Application No.: A/TP/693
Section 16 Planning Application for Proposed "Public Utility Installation" in "Open Space" Zone for Drainage Services Department Proposed Stormwater Pumping Station at Tai Po Old Market Playground, Tai Po, New Territories

We are pleased to submit Further Information (Response-to-Comment Table and corresponding amendment pages) for the captioned Section 16 Planning Application.

Should you have any queries, please feel free to contact our Ms. Melaine Keung.

Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.

Alex Wu
Executive Director
Water, Hong Kong

Encl.

cc DSD/DP – Attn: Ms. YUEN Pui Shan, Priscilla (w/e, By Hand & Email)

APPLICATION NO. A/TP/693

SUBMISSION OF FURTHER INFORMATION

7 March 2024

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po – Design and Construction

S16 Planning Application A_TP_693 (Rev. 0)

Responses to Comments

	Comments Received	Date Received
1.	WSD/ Construction	16 February 2024
2.	PlanD/STNDPO	27 February 2024
3.	PlanD/UD&L	27 February 2024
4.	LandsD/DLO	27 February 2024
5.	TD	27 February 2024
6.	HyD	28 February 2024
7.	EPD/ EAD	1 March 2024

S16 Planning Application A_TP_693 (Rev. 0)

Responses to Comments

Item	Comments	Responses
1.	**Water Services Department** **New Works Branch** **Construction Division** **System Planning Section** **Email received on 27 February 2024** **Mr. SUEN Wai Ham, Victoria**	
	1. Existing 600mm diameter water mains as shown in the enclosed MRP inside the proposed site and very close to the proposed discharge chamber at south of Tai Po Tai Wo Road may be affected. The applicant is required to either divert or protect the water mains found on site.	The concerned 600mm dia. water mains and the proposed discharge chamber are shown in the attached plan. The proposed discharge chamber is approx. 2.4m from the centreline of the concerned water main based on the utility survey results conducted in January 2024. Hence it is not required to divert the concerned water main, with reference on the requirements in below comment #3(c). During construction, the watermain would be protected in accordance with the requirements as stated in below comment #3 and the relevant guidelines such as Guidelines for Excavation near Water Mains.
	2. If diversion is required, existing water mains inside the proposed site areas are needed to be diverted outside the site boundary of the proposed site to lie in Government land. A strip of land of minimum 1.5m in width should be provided for the diversion of existing water mains. The cost of diversion of existing water mains upon request will have to be borne by the applicant; and the applicant shall submit all the relevant proposal to WSD for consideration and agreement before the works commence.	Noted. As aforementioned, diversion for the concerned 600mm watermain is not required.

	3. If diversion is not required, the following conditions shall apply: (a) Existing water mains are affected as indicated on the site plan and no development which requires resiting of water mains will be allowed. (b) Details of site formation works shall be submitted to the Director of Water Supplies for approval prior to commencement of works. (c) No structures shall be built or materials stored within 1.5 metres from the centre line(s) of water main(s) shown on the plan. Free access shall be made available at all times for staff of the Director of Water Supplies or their contractor to carry out construction, inspection, operation, maintenance and repair works. (d) No trees or shrubs with penetrating roots may be planted within the Water Works Reserve or in the vicinity of the water main(s) shown on the plan. No change of existing site condition may be undertaken within the aforesaid area without the prior agreement of the Director of Water Supplies. Rigid root barriers may be required if the clear distance between the proposed tree and the pipe is 2.5m or less, and the barrier must extend below the invert level of the pipe. (e) No planting or obstruction of any kind except turfing shall be permitted within the space of 1.5 metres around the cover of any valve or within a distance of 1 metre from any hydrant outlet. (f) Tree planting may be prohibited in the event that the Director of Water Supplies considers that there is any likelihood of damage being caused to water mains.	Noted with thanks. The stated conditions would be applied during construction works. No trees or shrubs planting work is proposed at the site for the discharge chamber.

Item	Comments	Responses
2.	**Planning Department** **District Planning Branch** **New Territories District Planning Division** **Sha Tin, Tai Po and North District Planning Office** **Email received on 27 February 2024** **Mr. YU Wai Kin, Nicol**	
	General comment 1. Please revise the master layout plan indicating the components of the proposed pumping station including the pump house, transformer room (two TX rooms instead of one in the application?), switch room, screen room and discharge chamber and their respective building heights (main roof) for clarity sake (and the dimensions whether the same as per the application form) and inert name of facilities on section plans A-A' and B-B'.	Master Layout Plan is supplemented. Section plans A-A' and B-B' in Figures 3.2.2 and 3.2.3 has been updated. Section 6(iii)(a) of the application form has been updated. Besides, please find some key areas regarding the application listed below: a. Area of application site in Tai Po Old Market Playground = 7,200m2 b. Footprint of aboveground pumping station = 1,150m2 c. Park area within the application site to be reinstated = 5,630m2 d. Footpath within the application site to be reinstated = 420m2 e. Total area of Existing Tai Po Old Market Playground = 12,340m2
	2. Please advise if there is any temporary reprovisioning site of the affected facilities.	During the construction period, a temporary half basketball court would be provided in Chui Lok Street Garden. The existing elderly fitness area in Chui Lok Street Garden would be relocated on-site to accommodate the temporary half basketball court. Liaison with LCSD is being conducted regarding the temporary provision arrangement. Upon completion of the works, all affected facilities, including the children's play area, elderly fitness area, basketball court and the sundial would be reprovided. As advised by LCSD, the existing pebble walking trail is not required due to low usage and hygiene concern.

Item	Comments	Responses
	3. Please advise the locations of the similar facilities which could serve the demand during the closure of the affected facilities.	Within 500m from the application site, similar facilities to the affected children's play area could be found in Chui Lok Street Garden, Po Heung Bridge Sitting-out Area, Ting Tai Road Children's Playground and Tai Po Central Town Square. Within 500m from the application site, similar facilities to the affected elderly fitness corner could be found in Chui Lok Street Garden, Kwong Fuk Bridge Garden, Nam Wan Road Sitting-out Area and Tai Po Central Town Square. Temporary half basketball court would be provided at Chui Lok Street Garden during construction as compensation to the affected basketball court.
	4. It is noted from para. 2.3.2 that the construction works would take around five years from Q1 2025 to Q2 2030, please clarify if the affected facilities e.g. basketball court and children's playground will be suspended during the entire period or if it is possible to speed up construction and re-open the facilities for early enjoyment of the public. If not, what are the considerations for occupation the site for full construction term (e.g. site planning and phasing of construction?)	The affected facilities, including basketball court, children's playground and elderly fitness corner would be temporarily suspended throughout the construction period. The whole of the site area is necessary for the construction of the underground structure and to provide sufficient works area for maneuvering of construction vehicles and storage of materials. In view of the complexity for project and the constraints of the site, it is anticipated that the construction works can only be completed in 5 years. Phasing of construction to re-open part of the facilities has been explored. However, due to the limited works area, if the works were to be implemented in phases, the construction difficulties would increase, thereby the overall construction period would be significantly lengthened, resulting in greater inconvenience to the nearby residents. Therefore, it is proposed to re-provide the affected facilities after the completion of the pumping station.

Item	Comments	Responses
	5. Please advise whether the roof top greenery area of the stormwater pumping station will be open for public enjoyment. If not, what are the considerations?	The roof top greenery area would not be opened for public because there is no active facility provided at the roof top, thus reducing the incentive for public assesses it. Besides, there are associated potential safety issue and increased maintenance demands that arise from opening the rooftop greenery area.
	Specific comments 6. Clarify whether area of Pump House is 350m2 or 380 m2 as stated in ES and para 2.2.2.	The area of the Pump House is 380m2. Para 2.2.2 has been updated.
	7. Para. 2.2.1 – please supplement with a plan showing the "Tai Po Old Market drainage catchment" and/or any other catchment that the proposed works will serve.	Noted with thanks. Drawing No. 60700410/R28/401 has been supplemented in Appendix A.
	8. Para. 2.2.2 – it is noted that the application site involves a section of cycle track to the south of the proposed discharge chamber. Please clarify whether the cycle track will be affected by proposed works temporarily / permanently and its arrangement.	Part of the cycle track would be affected by the proposed works temporarily and would be reinstated upon completion of construction of the discharge chamber. Operation of the cycle track is proposed to be maintained, and the detailed temporary traffic arrangement would be subject to liaison with TD and HyD.
	9. Figure 3.2.2. – the name of the facilities for some parts of the proposed pumping station is missing. Please clarify.	Noted with thanks. Figure 3.2.2 has been updated.
	10. Para. 4.2 – please supplement with justifications for not choosing other parts of the Tai Po Old Market Playground for the proposed development.	The application site of the Tai Po Old Market Playground is located nearest to the Lam Tsuen River, allowing for minimization of the required discharge pipeworks as well as the associated construction cost. Besides, the proposed application site has a lower intensity of trees comparing to the rest of the Tai Po Old Market Playground. Hence the construction works at this area have a comparatively lower impact to vegetation.
	11. All figures in Appendix E – Preliminary Environmental Review Report are missing	Noted with thanks. The figures are supplemented.

Item	Comments	Responses
	12. Table 5.1 of Tree Preservation and Removal Proposal – Please clarify what does the size of the compensatory trees refer (e.g. 4000 x 1500) and correct the typo "Indicative".	Noted with thanks. The size refers to height and spread. Table 5.1 has been updated.
	13. Appendix V Compensatory Tree Planting Plan of Tree Preservation and Removal Proposal – Typo of title to be corrected.	Noted with thanks. The plan has been updated.
	14. Appendix VI Tree Protection Plan of Tree Preservation and Removal Proposal – Please clarify why some retained trees are outside the tree protective fence (i.e. T35, 52, 53 and 68).	The plan has been updated to include the retained trees.
		The proposed construction works under this Planning Application is not a designated project as it does not fall into any category in Schedule 2 of EIAO.
3.	**Planning Department** **District Planning Branch** **Urban Design and Landscape Section** **Email received on 27 February 2024** **Mr. Ivan WONG**	
	1. Some of our comments on the pre-submission via email to DPO dated 16.1.2024 are still valid and are recapped as follow: i. Figure 3.1.3 & 3.2.4:- It is noted that stone-looking façade is proposed for the proposed discharge chamber. The applicant is encouraged to explore opportunities to improve the aesthetics of the proposed discharge chamber (e.g. architectural feature, vertical greening, etc.) considering it is a major public frontage from Tai Wo Road and Lam Tsuen Riverside.	Noted. Stone-looking façade is proposed in harmony to the existing staircase at the east of the proposed discharge chamber. Liaison with maintenance parties is being conducted to explore further aesthetic provisions to improve the outlook of the chamber.

Item	Comments	Responses
	ii. It is observed that the location of proposed VG in fig. 3.1.2, 3.2.2 and 3.2.3 is different from the VG location as indicated in fig. 3.2.1 and 3.2.5. The applicant should review all drawings and ensure consistency.	Noted with thanks. Figure 3.2.1 and 3.2.5 has been updated.
	iii. RtC item 13:- It is acknowledged that T329 is unavoidably affected by required works area for temporary earth lateral support and excavation, and the feasibility of transplanting of the subject tree is low considering its condition and established root system. The applicant is advised that the justification for removing T329 under RtC should be reflected in the planning statement.	Noted. Justification for removing T329 has been added as Para. 4.2.6 in the Tree Preservation and Removal Proposal.
	iv. It is noted that about 60% of the compensatory trees are small trees species proposed for hedge planting. The applicant is encouraged to explore opportunity on off-site compensatory planting in proximity to the project site to achieve the compensatory planting ratio of 1:1 in terms of aggregated DBH as far as practicable. In situations where this compensatory planting criterion cannot be achieved, the difficulties should be demonstrated in the planning statement.	Please be clarified that the trees compensation and transplanting has achieved 1:1 compensation ratio in quantity on-site as required in Para. 1(v)(b)(1). Other compensatory planting site in proximity to the project site would be explored during construction stage.
	2. Appendix B:- The applicant is advised to review and ensure the description of photo V7 and V8 is correct.	Noted with thanks. Appendix B has been updated.

Item	Comments	Responses
4.	**Lands Department** **District Land Officer** **Email received on 27 February 2024** **Ms Algie LEUNG**	
	One more departmental comment received for your follow-up. Pls advise your proposed arrangement, e.g. reinstatement or reprovision at other location. (i) for the Tai Po Old Market Playground, the bus shelter and seating area on the adjoining public footpath of Tai Po Tai Wo Road are included in the Application Site.	Noted. The existing bus shelter would be retained and minimum width of 1.5m would be maintained to allow pedestrian access to the bus shelter. The seating area would be reinstated. Liaison with relevant maintenance parties is being conducted to discuss the reprovision arrangement.
	(ii) the public footpath leading from On Ho Lane to the proposed stormwater pumping station appears to be used as future maintenance access. Please seek comments of TD and HyD on the management and maintenance issues of the said public footpath and affected bus shelter and seating area as mentioned in item (i) above.	Noted with thanks. Liaison with TD and HyD is being conducted to discuss the management and maintenance issue of the concerned public footpath.
5.	**Transport Department** **NT Regional Office** **Traffic Engineering (NTE) Division** **Project & Tai Po Section** **MEMO Ref: (NQ2FQ) in TD NR 146/194-T57** **MEMO dated 27 February 2024** **Ms. LI Oi Yin, Yanny**	
	I refer to the MUR. Please find our comments to the Traffic Impact Assessment below. **General comment** 2. The existing access at the north of the subject development site is connecting to On Chee Road with a crash gate, please consult FSD and LandsD on the run-in/out arrangement.	Noted with thanks. The proposed run-in/out would be located at the existing footpath towards On Ho Lane. Liaison with responsible departments is being conducted.

Item	Comments	Responses
	Specific comments 3. The para. 1.1.1 is incomplete. Please review.	Noted with thanks. Para 1.1.1 has been updated.
	4. Appendix III - the vehicle type and speed adopted in the swept path analysis shall be specified.	12m Fire Engines with assumed vehicle speed of 10km/hr is adopted for the swept path analysis. Drawing No. 60700410/SK7004 in Appendix III has been updated.
6.	**Highways Department** **New Territories Region** **New Territories East District and Maintenance Division** **NE New Territories District Section** **Email received on 28 February 2024** **Ms. LI Tsz Yau, Roy**	
	I refer to your referenced memo and your email on 27 February 2024. We have no objection to the captioned application from highways maintenance point of view. Please find our minor comments below: (a) Please be advised that DSD should take up the maintenance responsibility of the discharge chamber and the associated works within HyD's slope. As mentioned in the applicant's email to us on 18 December 2023, the M&M matrix would be supplemented to this Office for comment in due course;	Noted with thanks. The M&M matrix would be supplemented when available.
	(b) Please be advised that the maintenance party of Tree T350, T354 and T355 would be further subjected to the M&M matrix of the concerned slope (SIMAR Slope No. 7NW-B/F193);	Noted with thanks. The M&M matrix would be supplemented when available.
	(c) It is noted that Tree T350 will be transplanted to a new receptor site located at the LCSD maintenance department area. Please revise the Tree Assessment Schedule to account for this change under the column of "Maintenance department to provide comments on TPRP", and	Noted with thanks. The Appendix III Tree Assessment Schedule in Appendix D Tree Preservation and Removal Proposal has been updated.

Item	Comments	Responses
	(d) The applicant is reminded to supplement the interface details for the road interface between relevant departments for the access from On Ho Lane to the proposed stormwater pumping station, as mentioned in the applicant's email to us on 18/12/2023,	Noted. The detailed design for the road interface would be supplemented when available.
6.	**Environmental Protection Department** **Environmental Assessment Division** **Territory North Group** **EIAO Statutory Coordination** **Email received on 1 March 2024** **Ms. CHANG Chia Chi, Maureen**	
	I refer to your preceding email seeking our comments on the s.16 application No. A/TP/693. 2. The applicant (DSD) seeks planning permission for the proposed stormwater storage facility (a public utility installation) at the application site, of about 7900m2, which falls within an area zoned "Open Space " on the Tai Po OZP. 'Public utility installation' is under Column 2 use. The proposed facility includes an underground stormwater storage tank, a block of aboveground pumping facility and a block of discharge chamber. Excavation of land (4200m2X20m2) is required. A Preliminary Environmental Review Report and the Sewerage Impact Assessment Report are provided in Appendices E and I respectively of the Planning Submission to support the planning application.	

Item	Comments	Responses
	5. Having review the above technical assessments, we have no objection to the subject application since adverse environmental impacts (air quality, noise, water quality, waste and sewerage) associated with the proposed stormwater storage facility are not anticipated with implementation of the recommended mitigation measures. Having said that, technical comments are provided in the word document attached below for forwarding to the applicant for follow up. You may wish to impose a condition to require the applicant to submit a revised ERR to address our below comments and implement the environmental mitigation measures as recommended in the relevant submissions upon approval of the subject application.	Noted with thanks.
	Minor Comments on Appendix E Environmental Review Report (ERR) *General* 1. Please note that environmental monitoring and audit programme is not normally required for non-designated projects.	Noted with thanks.
	Air Quality No further comments	Noted with thanks.
	Noise 1. Section 4.4.1.2 and 4.4.2.1: Please add the wording "without noise mitigation measures" at the end of 1st sentence.	Noted and supplemented in Section 4.4.1.2.

Item	Comments	Responses
	2. Section 4.4.2.1: Please revise the 2nd sentence as "Noise control requirements stipulated in Recommended Pollution Control Clauses for Construction Contracts and Contract Specification for Noise Mitigation Measures in Annex B of the PN 1/24, Contract Specifications for Imposition of Construction Noise Management Plan in Annex C of the PN 1/24, as well as the below mitigation measures should be implemented in all work sites to ensure compliance of relevant noise criteria under the NCO and the PN 1/24."	Noted and revised.
	3. Section 4.4.2.4: Please add a sentence "Particular specifications to adopt noise mitigation measures, including quieter construction methods and equipment for minimizing noise from the concerned noisy construction activities will be included in the contact document in accordance with the Annex B of the PN 1/24." at the end of this section.	Noted and supplemented in Section 4.4.2.4.
	4. Appendix 4.1: Please add a footnote in Appendix 4.1 that a +6 dB(A) correction for tonality is applied in the fixed plant noise assessment as conservative approach.	Noted and supplemented in Appendix 4.1
	Water Quality 1. Section 5.4.2: It is noted that regular maintenance/desilting works of stormwater tanks and pump chambers would be conducted during operation phase, and water jetting would be deployed to wash away the accumulated silts inside pipes and tanks. Please clarify if there would be any WQ impacts associated with the desilting works and propose mitigation measures where applicable.	The accumulated silt inside the pipes / tank be collected by mechanical means through a desilting opening to be deposited. The pumping station itself does not constitute a source of pollution. No water quality impact from operation of similar kind was identified from the approved EIA for Drainage Improvement Works in Mui Wo (Register No.: AEIAR-252/2023) either.
	2. Figure 5.1: The figure is missing from the submissions	Noted with thanks. Figure 5.1 has been supplemented.

Item	Comments	Responses
	Waste Management Implications and Land Contamination 1. Table 6.1: According to Section 2.2.2 of the Planning Application Report, the underground storage tank is approximately 4,200m2 with a height of 18m. While the estimated quantity of inert C&D materials is generally in the right magnitude, the Consultant shall clarify whether there is a double-counting of the quantity of marine deposits mentioned in Section 6.2.1.11. If affirmative, the Consultant is advised to update the quantity in Table 6.1 and incorporate a footnote for further elaboration.	The 86,000m3 of all C&D materials include marine deposits. Table 6.1 has been updated.
	2. Sections 6.2.1.3 and 6.2.1.4: (a) The Consultant is advised to share the calculation for the estimation of truck trips for the disposal of inert and non-inert C&D materials off-site during the construction phase. Please also specify the assumption on the duration of construction period (e.g., 60 months) and working days per month (e.g., 25 working days / month).	The estimated maximum truck trip number is a conservative estimation derived with consideration on the variation of production rates throughout the construction process. The truck trip number is also constrained by the available site accesses and possible traffic restriction. The current estimation of 15 truck trips per day is derived by assuming the transportation is to be conducted via one site access during the whole working period except peak hours.
	(b) According to Table 6.1, 77,400m3 and 2,000m3 of inert and non-inert C&D materials are anticipated. Considering the significant difference between their quantity, please clarify why a maximum of 15 truck trips each will be required for the disposal of these C&D materials	Since the Contractor is allowed to arrange transportation for the inert and non-inert C&D material to suit their site management and cost control, the maximum allowable number of trip is taken as a conservative estimation.

Item	Comments	Responses
	(c) Given that part of the Project Site is covered with vegetation, a certain amount of non-inert C&D materials, such as timber and woody materials, are anticipated during site clearance. The Consultant is advised to review whether such materials will be sent to the Yard Waste Recycling Centre in Y-Park for recycling prior to disposal at the designated landfill site	Noted. The recycle centre will be approached on recycling the timber and woody materials prior to disposal at the designated landfill site.
	3. Sections 6.2.1.5 & 6.3.1.10: Please revise "licensed collector" to "licensed chemical waste collector" for clarity.	Noted with thanks. Section 6.2.1.7 and 6.3.1.10. have been revised.
	4. Section 6.2.1.8: Please consider revising "residents" to "nearby sensitive uses".	Noted and revised.
	5. Section 6.2.1.10: (a) The Consultant is advised to append relevant parts or the entire SSTP in the ERR for reference.	Tai Po Old Market Playground is currently under operation and the site discharge chamber is covered by trees. The current available locations for GI can show the geological profile of Project Site and the location of sediment. The SSTP would be prepared in the next stage prior the commencement of the construction works in accordance with the latest guidelines. Section 6.2.1.11 is supplemented.
	(b) Please share the calculation rationale for the preliminary estimation of the quantity of marine deposit	The total proposed excavation area is about 4,160 m2 and the average depth of sediment is about 5.45m based on the latest GI record. The estimate excavation volume of sediment is about 22,670m3. Section 6.2.1.13 is supplemented.
	(c) Apart from the top level of marine deposit and marine sand in the vicinity of the proposed underground stormwater storage tank, the Consultant is advised to further elaborate on the vertical profile of the previous GI records and specify the range of depth where marine deposits were identified.	Marine deposit / marine sand with top levels ranging from 2.5 m bgl to 6.0 m bgl (i.e. from +3.1mPD to -0.4mPD), and the thickness of marine sediment ranges from 4.0m to 8.5m are found under the desktop study. Based on the recent GI results, the marine deposit was encountered at 5.1m bgl and 6m bgl (i.e. +0.4mPD and -0.5mPD) and the depths of the sediment ranges from 6.7m and 4.2m. Sections 6.2.1.13 and 6.2.1.14 are supplemented.

Item	Comments	Responses
	6. Appendix 6.1: Locational Plan of Historical Drilling: The Consultant shall incorporate the Project Boundary to better illustrate the relevance of the historical drilling marked on the figure.	The figure (Drawing No. 60700410/SK3001) has been updated.
	7. Appendix 6.1: Drillhole Log: Some of the drillhole records marked on the locational plan were not enclosed in this submission; the Consultant shall review and update the appendix as appropriate.	The drillhole records in Appendix 6.1 has been updated.
	8. Section 6.2.1.11: The Consultant is advised to supplement the proposed land-based sampling locations.	The GI location was supplemented in Appendix 6.2.
	9. Section 6.2.2.1: The Consultant is advised to elaborate on the preliminary estimation of the quantity of silt and debris to be generated during the O&M of TPOMPSPS.	Since the proposed pumping station is designed to serve stormwater, it is associated silt and debris would be much lower than that for sewage pumping station. Besides, mechanical bar screens are proposed at the inlet area, which could filter most of the silt and debris before entering into the storage area. Moreover, the need for operation of the stormwater pumping station is dependent on the frequency and intensity of rainfall. The runoff would be intercepted to the proposed pumping station under high rainfall event only. Considering the low silts/debris content in stormwater and the irregularity of pumping station operation, the estimated generation of silt and debris during O&M is considered insignificant.
	10. Section 6.3.1.7: Please revise “public filling area” to “public fill reception facility” for clarity.	Noted and revised.
	11. Section 11.4.1.1: (a) In addition to the northern portion of the proposed TPOMPSPS, the site boundary south of Tai Wo Road (proposed drain) was also not covered in the previous study; please update the description as appropriate.	Section 11.4.1.1 was updated accordingly.

Item	Comments	Responses
	(b) Relevant parts of the previous PER Study shall be appended for further vetting.	The relevant parts of the previous PER Study were appended in Appendix 11.1 (re-numbered). Sections 11.4.1.1 and 11.4.1.2 were revised.
	12. Section 11.4.4.2: (a) According to Appendix 11.3, EPD replied on 5 September 2023, stating there is no record of chemical spillage accident and submission relating to land contamination assessment at the subject site in the past three years. Please review and confirm whether there are still outstanding items pending responses from the EPD. If not, please update the content as appropriate.	Please note that further information had been requested from EPD and the latest correspondences were attached in Appendix 11.4 (re-numbered). Section 11.4.4.2 and Figure 11.2 were added accordingly.
	(b) In addition to the letter dated 17 August 2023, please clarify whether the Consultant has made a further enquiry to the EPD on issues related to land contamination assessment. If affirmative, please append the relevant correspondence for further review.	Please refer to response to Item 12(a) above.
	13. Appendix 11.3: (a) Please clarify whether further information is required on the southern part of the application site (i.e., south of Tai Wo Road for the proposed drain).	Please note that further information had been requested from EPD and FSD on the latest Project boundary for the proposed TPOMPSPS and the latest correspondences were attached in updated Appendix 11.4.
	(b) It is understood the response from FSD is currently outstanding. Thus, we reserve the right to comment further in the subsequent submission.	Noted with thanks.
	14. Section 11.4.3, Appendix 7.2 and Figure 11.1: Please note that Figure 11.1 (with site photographic records) was not enclosed in this submission. Please supplement all essential figures and information in the subsequent submission to facilitate vetting and viewing. We reserve our right to offer further comments on the findings of the site walkovers.	Noted with thanks. Figure 11.1 was enclosed accordingly.

Item	Comments	Responses
	Comments on Appendix I Sewerage Impact Assessment 1. According to the SIA, no additional flow and loadings will be caused by the proposed drainage improvement works. Therefore, we have no comment from sewerage planning perspective.	Noted with thanks

Application No.: A/TP/693

Proposed Public Utility Installation (Stormwater Storage Facility)

Government Land at Tai Po Old Market Playground near On Ho Lane, Tai Po, New Territories (GLA-TP 143) (Part); and Government Land at slope feature no. 7NW-B/F193, Tai Po, New Territories

Responses to Public Comments

Item	Comments	Responses
1.		
	是項工程工地範圍緊貼大埔舊墟公立學校及民宅大埔八號花園，在建築工期產生之噪音及塵埃散逸，將嚴重影響本校學生之學習和校園生活。	擬議發展的環境影響審查 (包括就空氣質素、噪音、水質、廢物管理、生態及漁業和文化遺產影響所進行的影響評估) 指出，預計有關工程在施工和運作期間不會對環境造成不可接受的影響。此外，渠務署將採取適當的緩解措施，及實施良好施工管理，以減少和控制擬議工程對環境所造成的不良影響。為避免影響學校運作，渠務署會與學校緊密合作，適當調整施工安排以配合學校需要。
	再者，工程需要挖掘土地及砍伐植物，無疑對現時的生態環境造成嚴重影響，包括雀鳥、蝴蝶，並會滋擾到附近林村河的河岸、河床，甚有可能因工地管理原因導致工地徑流，加劇本校渠道瘀塞情況及加劇蚊患問題。	渠務署在工程設計上已儘量將受影響樹木的數目減到最少，只移走與主要工程有無可避免的衝突的樹木。 渠務署已為因工程而受影響樹木提出綠化補償措施，例如在康樂及文化事務署公園區重新種植合適的樹木品種。 擬議實施大埔舊墟遊樂場雨水蓄洪及抽水計劃，旨在於高峰流量時截取及分流上游地區的徑流進行臨時儲存，並進一步利用水泵有效排入林村河下游。工程完成後，大埔舊墟的的防洪能力會顯著提升，達到雨水排放整體計劃檢討中的標準並減低該區的水浸風險。渠務署將要求承建商施工期間將採取適當的臨時排水措施，確保不會對周圍排水造成不良影響。

Item	Comments	Responses
2.		
	本人是業主，本人反對在大埔舊墟遊樂場建地下蓄洪池和雨水泵房。雨水蓄洪池會影響土地的穩固性，擬訂的蓄洪池位置離住宅大樓非常貼近，旁邊就是八號花園，會影響到八號花園地基，危害住宅樓體。 所以本人反對在該位置建立蓄洪池。本人建議蓄洪池應且遠離住宅大樓的空曠處。據悉，八號花園廣大業主均有意見，誠請城市規劃委員會廣泛征詢意見並重新審視規劃。	基於以往的地面勘察工作、現場試驗和實驗室試驗的結果，顧問確定了岩土工程參數並提出了相應的建議，根據本工程地基可行方案的建議，預計擬議建築工程不會對鄰近地面及構築物造成不利影響。 經研究附近其他可行地點後，渠務署認為申請地點是最適合闢設雨水蓄洪池及泵房的位置， 因為該地點位於大埔舊墟排水網下游端，是隔離暴雨期間林村河下游水位影響最有效的解決方案。 在暴雨期間，擬議排水網絡可截流大埔舊墟集水區內的雨水，儲存於蓄水池內，並進一步利用水泵有效排入林村河下游。該地點對現有排水網絡所需的改動最少，對公眾和環境造成的相關滋擾亦是最少。

3.		
	Dear TPB Members, Members of the community have not been able to access the documents because the file is too big, 589 pages with colour and images, and will not download on the regular laptop. While I could download at one of the offices I use with an IT team at hand, we found the print function would not work so consequently I was reduced to taking notes as I could not print out layout etc to study at home. I am using quotes from previous applications as they are invariable cut and paste. STRONG OBJECTIONS to another trashing of OS and downsizing and downgrading of community facilities. This project takes away one third of the park. Another week and another park trashing. The government is giving money to couples to have babies while at the same time taking away the already inadequate recreation facilities and open spaces that make life in small homes in high rise towers bearable and allow residents, especially young families, and the elderly to enjoy some time outdoors without having to travel too far. $20,000 will not compensate from the fact that for at least 5 years one's local park is a construction site.	Regarding your objections to the application, we appreciate your feedback and understand your concerns about the potential impact on the local park. We want to assure you that this drainage improvement project has been carefully planned to minimize adverse effects on the community while enhancing public amenities. We understand your concerns about the reduction in park size due to the proposed development. Our goal is to strike a balance between providing essential drainage infrastructure and preserving green spaces for community enjoyment. To address the flood risk effectively in Tai Po Old Market, the Tai Po Old Market Playground Stormwater Pumping Scheme has been proposed under this application. This scheme aims to intercept and divert the runoff from Tai Po Old Market drainage catchment at upstream area for temporary storage and discharge by pumps during the peak flow condition. Upon completion of the works, the flood risks at Tai Po Old Market can be significantly reduced. The existing park facilities within the site, such as the basketball court, children's playground, elderly fitness corner, park access and associated LCSD's leisure facilities, would be reprovisioned after the construction of the proposed underground stormwater storage tank and aboveground pumping facility. The size of the aboveground structures, including the DSD pump house, screen room, switch room and transformer room at Tai Po Old Market Playground, as well as a discharge chamber at slope feature no. 7NW-B/F 193, has been optimized to meet the operational requirements. This optimization aims to minimize the impact on public's enjoyment of open space in the future.

	The justifications of this application are: ***having considered other potential sites*** *in the neighbourhood, the Application Site is the most suitable site for the proposed development due to its location; strategic integrated design by utilizing underground space for essential infrastructure and* ***allowing public amenities to be reprovided above ground****.* That the overpaid and intellectually challenged consultant trots out the 'having considered potential sites' line again is a sad reflection of the misinformation that has sadly become the norm when it comes to planning issues. It is quite clear that all DSD did was roll out the map and look for the green coloured space. **No data provided re location of other potential sites** The application site is located at the centre of Tai Po and surrounded by multiple estates. The above ground buildings will reduce the size of the park by a whopping 1,280sq.mts and that is not counting the additional paving and access points. With structures over 14mPD the centre of the park will no longer we a green oasis. Visual Impact will be considerable as indicated by the images I scrolled through at the offices and the applicant acknowledges this.	Regarding the selection of site location, the available government land with equivalent size has been reviewed. Please be advised that the application site, located at the downstream end of the drainage network in Tai Po Old Market, offers the most effective solution to isolate the influence of the Lower Lam Tsuen River's water level during heavy rainstorms. During high rainstorm events, the stormwater within Tai Po Old Market drainage catchment can be intercepted, stored in the storage tank, and further discharged to Lower Lam Tsuen River effectively with pumps. The site location was selected considering the cost-effectiveness with minimum modification made on the existing drainage network and creating the least nuisance to the public and the environment. The site is also selected because of its low-impact development which could avoid the large-scale upstream and downstream drainage improvement works. The construction of the proposed stormwater storage and pumping facility at the application site would avoid private land resumption and substantial road opening on some high-volume carriageways. The disturbance to the public, traffic and environmental impacts would be lessened.

	In addition with every additional application the encroachment on the park is greater. **QUESTIONS** - why the differences This project takes up more land and is much higher A/K1/262 TST height is 10m Site Area 2,900sq.m A/TW/539 Tsuen Wan height 7.5m above ground. Site Area practically the same but this facility is at 3 locations not a composite A/ST/1025 Sha Tin height 13m above ground. Site Area 4,530sq.m. A/K14/829 Kwun Tong height 10mts above ground Site Area 6,400sq.m Tai Po at 7,900sq.mts is three times the size of the first projects It appears that DSD recognizes how easy it easy to encroach on our parks and is now expanding its horizons. This on Open Space where any building should be ancillary to the recreational use of the park. **I NOTE FROM THE MINUTES OF THE PREVIOUS APPLICATIONS THAT BOARD MEMBERS HAVE NOT QUESTIONED THE INCREMENTAL INCREASE IN SIZE OF THESE PROJECTS. I WOULD REMIND MEMBERS THAT IT IS THEIR DUTY TO 'INQUIRE INTO MATTERS' AND THE COMMUNITY HAS REASONABLE EXPECTATION THAT CLARIFICATION BE CALLED FOR WHEN THERE IS VISIBLE ANOMALY.** Many citizens consider that taking away a big chunk of a playground and replacing it with a much smaller facility, and that after a 4-5 year construction phase is a BIG NUISANCE. They also consider that land zoned for recreation is best used for this purpose.	The differences in height and land usage among the projects can be attributed to several factors: Site constraints: The topography and geographical constraints of each location can influence the height and land usage of the project. For instance, sites with limited access or irregular shapes may require larger land areas to optimize equipment placement and operational efficiency. Operational and maintenance requirements: Each project may have different operational and maintenance requirements, leading to differences in the height needed for structures and the amount of land required to accommodate equipment, infrastructure, operational and maintenance needs. Hydraulic requirement: Different locations may have distinct hydraulic characteristics based on its size of drainage catchment, topography, downstream water levels, flood risks etc. Consequently, the design of a stormwater storage scheme must accommodate these unique hydraulic characteristics, which can influence the size and layout of the facility. Currently, the high-water level at Lower Lam Tsuen River, particularly during heavy rainstorm events, is obstructing the discharge from upstream branch pipes. Additionally, due to the relatively low ground level of the topography and the inadequacy of the existing drainage system in Tai Po Old Market, there is a necessity for a pumping station with a capacity of 16m^3/s and a storage volume of 25,000 m^3. The proposed application site has been strategically selected to balance operational space needs with excavation requirements, taking into consideration the geographical constraints of the site.

	But then we get to the crux of the matter, it is more cost effective. That is will negatively impact popular recreational facilities is of no consequence.	
	Pollution and noise impact: *the expected impact to air quality would be **minor and localised** during construction phase* But no worries it will impact mostly youngsters and the elderly, and they are not important. In addition, the construction noise will deter many from enjoying the adjacent areas. **Trees:** 133 mature trees are to be chopped and replaced with saplings, or more like those puny flowering trees LCSD is so enamoured of. There is mention of 1:1 replacement but this is dubious as with on third of the park filled in with reinforced tank the only way additional trees can be planted on the remaining area is to squeeze them in odd corners or close together. This will affect the outcome. There has not been a credible public consultation as ordinary folk cannot download the files and printing out data is not possible. Members should reject this application because of inadequate public consultation and excessive erosion of public recreational facilities.	We understand your concerns about environmental impacts arising from the project and tree preservation. Environmental sustainability is a key consideration in our project planning process. The proposed environmental review (including assessments on air quality, noise, water quality, waste management, ecological and fisheries, and cultural heritage impacts) indicates that the project is expected to have no unacceptable environmental impacts during construction and operation. Additionally, appropriate mitigation measures will be implemented by the Drainage Services Department to minimize and control any adverse effects of the proposed project on the environment. Moreover, the Drainage Services Department has endeavored to minimize the number of affected trees in the project design. Only trees that unavoidably conflict with the project will be removed. The department has implemented greening compensation measures for trees affected by the project including replanting suitable tree species with LCSD park. The proposed compensation arrangement is most suitable for tree sustainable growth based on the available planting area.

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po – Design and Construction

S16 Planning Application A_TP_693

List of Amendments

	Reference	Amendment
1.	Application Form, Section 6(iii)(a)	**Amended** the dimensions in "Dimension of each installation/building/structure(m) (LxWxH)"
2.	Planning Application Report, Section 5	**Amended** the title to "Potential Impact From the Works"
3.	Planning Application Report, Section 2.2.2	**Amended** the following phase: …associated DSD pump house (approx.. ~~350m^2~~ **380m2**), …
4.	Appendix A Proposed Works	**Added** Drawing No. 60700410/R28/401 – Drainage Catchment and Network Plan for Stormwater Pumping Scheme at Tai Po Old Market Playground **Added** Drawing No. 60700410/SK7007 – Master Layout Plan
5.	Appendix B Current Condition with Surrounding Environment	**Amended** the description for V7 and V8
6.	Appendix C Architectural Design, Figure 3.2.1	**Amended** typo for "LAM TSUEN RIVER" **Amended** extent of vertical greening **Amended** annotation for proposed underground storage tank
7.	Appendix C Architectural Design, Figure 3.2.2	**Amended** annotation for aboveground structures.
8.	Appendix C Architectural Design, Figure 3.2.3	**Amended** annotation for aboveground structures.
9.	Appendix C Architectural Design, Figure 3.2.5	**Amended** extent of vertical greening **Amended** annotation for proposed underground storage tank
10.	Appendix C Architectural Design, Figure 3.2.7	**Deleted** white line in the centre of drawing

	Reference	Amendment
11.	Appendix D Tree Preservation and Removal Proposal, Para 4.2.6	**Added** Para 4.2.6.
12.	Appendix D Tree Preservation and Removal Proposal, Table 4.1	**Amended** table content
13.	Appendix D Tree Preservation and Removal Proposal, Table 5.1	**Amended** typo for “Indicative” in title **Added** “Height x Spread” below “Size(mm)”
14.	Appendix D Tree Preservation and Removal Proposal, Appendix III Tree Assessment Schedule	**Amended** Additional Remarks for T329 **Amended** “Maintenance department to provide comments on TPRP - After” for T350 to “LCSD”
15.	Appendix D Tree Preservation and Removal Proposal, Appendix V Compensatory Tree Planting Plan	**Amended** typo for “Compensatory” in drawing title in Drawing No. 60700410/SK7003
16.	Appendix D Tree Preservation and Removal Proposal, Appendix VI Tree Protection Plan	**Amended** Extent of tree protective fence in Drawing No. 60700410/SK7006
17.	Appendix E Preliminary Environmental Review Report, Section 4.4.1.2	**Added** the wording "without noise mitigation measures" at the end of 1st sentence.

	Reference	Amendment
18.	Appendix E Preliminary Environmental Review Report, Section 4.4.2.1	**Amended** the 2nd sentence as "Noise control requirements stipulated in Recommended Pollution Control Clauses for Construction Contracts and Contract Specification for Noise Mitigation Measures in Annex B of the PN 1/24, Contract Specifications for Imposition of Construction Noise Management Plan in Annex C of the PN 1/24, as well as the below mitigation measures should be implemented in all work sites to ensure compliance of relevant noise criteria under the NCO and the PN 1/24."
19.	Appendix E Preliminary Environmental Review Report, Section 4.4.2.4	**Added** "Particular specifications to adopt noise mitigation measures, including quieter construction methods and equipment for minimizing noise from the concerned noisy construction activities will be included in the contact document in accordance with the Annex B of the PN 1/24." at the end of this section.
20.	Appendix E Preliminary Environmental Review Report, Table 6.1	**Amended** quantity and breakdowns.
21.	Appendix E Preliminary Environmental Review Report, Section 6.2.1.7 & 6.3.1.10	**Amended** “licensed collector” to “licensed chemical waste collector”
22.	Appendix E Preliminary Environmental Review Report, Section 6.2.1.8	**Amended** “residents” to “nearby sensitive uses”.
23.	Appendix E Preliminary Environmental Review Report, Section 6.2.1.10, 6.2.1.11, 6.2.1.12, 6.2.1.13 & 6.2.1.14	**Amended and added** relevant parts of the SSTP. **Renumbered** previous Section 6.2.1.12 to 6.2.1.15
24.	Appendix E Preliminary Environmental Review Report, Section 6.3.1.7	**Amended** “public filling area” to “public fill reception facility”
25.	Appendix E Preliminary Environmental Review Report, Section 11.4.1.1	**Amended** to include description for the application site at south of Tai Wo Road.

	Reference	Amendment
26.	Appendix E Preliminary Environmental Review Report, Section 11.4.1.2	**Amended** second sentence of the paragraph.
27.	Appendix E Preliminary Environmental Review Report, Section 11.4.4.2	**Amended** to describe the latest information record regarding chemical spillage / leakage records.
28.	Appendix E Preliminary Environmental Review Report, Figures	**Added** Figures 2.1, 2.2, 3.1, 3.2, 4.1, 5.1, 7.1, 11.1 and 11.2
29.	Appendix E Preliminary Environmental Review Report, Appendix 4.1	**Added** a footnote in Appendix 4.1 that a +6 dB(A) correction for tonality is applied in the fixed plant noise assessment as conservative approach.
30.	Appendix E Preliminary Environmental Review Report, Appendix 6.1	**Amended** drillhole records **Added** site boundary
31.	Appendix E Preliminary Environmental Review Report, Appendix 6.2	**Added** Appendix 6.2 Proposed GI Locations
32.	Appendix E Preliminary Environmental Review Report, Appendix 11.1 to 11.4	**Added** new Appendix 11.1 Land Contamination Assessment under Previous PER Study **Renumbered** previous Appendix 11.1 to 11.2 ;11.2 to 11.3; and 11.3 to 11.4. **Amended** Appendix 11.4 (previous Appendix 11.3) to include latest correspondence with EPD and FSD.
33.	Appendix G Traffic Impact Assessment Report, Para 1.1.1	**Deleted** “Flooding impacts on traffic, residential and business activities in the flood prone areas will” in the back of the paragraph.
34.	Appendix G Traffic Impact Assessment Report, Appendix III Swept Path Analysis for Proposed Access at On Ho Lane	**Added** assumption for swept path in Drawing No. 60700410/SK7004.

(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 ..... sq.m 平方米 ☐About 約 Depth of filling 填土厚度 ..... m 米 ☐About 約 ☐ Excavation of land 挖土 Area of excavation 挖土面積 ..... sq.m 平方米 ☐About 約 Depth of excavation 挖土深度 ..... 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	

(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

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)
Underground stormwater storage tank	1	80.1m(L)x53.5m(W)x18m(H)*
Aboveground Pumping Facility	1	Pump House: 27m(L)x16.1m(W)x10.5m(H)* Screen Room: 19.5m(L)x23m(W)x10.5m(H)* CLP Transformer Room No. 1: 20.2m(L)x6.1m(W)x8m(H) CLP Transformer Room No. 2: 20.2m(L)x6.1m(W)x8m(H) LV Switch Room: 18m(L)x9.5m(W)x8m(H)
Discharge Chamber	1	22.5m(L)x6m(W)x8m(H)*

(Please illustrate on plan the layout of the installation 請用圖則顯示裝置的布局)

* Remarks: The structure is irregular in shape. The longest side is recorded.

TABLE OF CONTENTS

APPENDICES

*Appendix D-I will show the context relevant to the Application Site (refer **Drawing No. 60700410/R28/401**) only.

REMARKS:
This planning application submission is about the stormwater storage and pumping facility exclusively. The proposed pipes which are not located in the subject site which are shown in this submission for reference only and would not be discussed in details. According to Approved Tai Po Outline Zoning Plan No. S/TP/30 Notes (7)(b), drainage works are always permitted on land falling within the boundaries of the Plan except where the uses or developments are specified in Column 2 of the Notes of individual zones.

2 DESCRIPTION OF PROPOSED STORMWATER STORAGE AND PUMPING FACILITY

2.1 Description of the Site

2.1.1 The application site is located at a portion of Tai Po Old Market Playground and the slope feature no. 7NW-B/F 193 in Tai Po. It covers an area of about 7,900m^2 with an existing park including basketball court, children's playground, elderly fitness corner, park access and associated LCSD's leisure facilities, as well as the existing slope feature no. 7NW-B/F 193 between Lam Tsuen River and Tai Po Tai Wo Road.

2.1.2 The subject site is visible to the public nearby and to the users of the park. The current condition with surrounding environment is shown in **Appendix B**.

2.2 Proposed Stormwater Pumping Scheme

2.2.1 The proposed pumping station consists of a pump well with maximum pump rate of 16m^3/s and an underground stormwater tank with a capacity of 25,000m^3. During high rainstorm event, the runoff from Tai Po Old Market drainage catchment will be diverted into the pumping station via the new drainage network and then discharge into Lower Lam Tsuen River by pump. The excessive water will be temporarily stored in the underground tank. After provision of these proposed improvement works, the flood protection level at areas concerned will be largely enhanced to that specified in the standard of the Stormwater Drainage Manual (SDM) and the flood risks thereon can be significantly reduced.

2.2.2 The footprint of the underground storage tank is approximately 4,200m^2 with a height of approximately 16m. The above-ground structure consists of the associated DSD pump house (approx. 380m^2), screen room (approx. 350m^2), switch room (approx. 170m^2) and transformer room (approx. 250m^2) at the Tai Po Old Market Playground, as well as a discharge chamber (approx. 130m^2) at slope feature no. 7NW-B/F 193. The existing LCSD facilities (e.g. basketball court, elderly fitness corner, children's play area, park access, etc.) will be demolished during construction and re-provided at the space above the storage tank upon completion.

2.2.3 Details of the proposed drainage improvement works, sections of the stormwater storage tank and layout/sections of the aboveground structure are presented in **Appendix A**. The layout of the stormwater storage tank and the above-ground structures are preliminary and would be further finetuned subject to discussion with relevant authorities.

5 POTENTIAL IMPACT FROM THE WORKS

5.1 Environmental Impact

5.1.1 Air Quality

5.1.1.1 Potential fugitive impacts to nearby ASRs would mainly arise from excavation works, handling, transportation and removal of excavated spoil / material, stockpiling and wind erosion etc. Given the nature and limited scale of the proposed works, potential air quality impact dust emissions would be minor and localised. With the implementation of regular site watering and good construction practices for dust minimization, construction dust impacts are not expected to be significant on the surrounding sensitive receivers. Requirements of Air Pollution Control (Construction Dust) Regulation and EPD's Recommended Pollution Control Clauses for Construction Contracts are proposed to be incorporated into the contract.

5.1.1.2 No air pollution source is identified from the operation of any elements of the Project itself that no air quality impacts would be anticipated during operational phase.

5.1.2 Noise Impact

5.1.2.1 During the construction phase, the use of powered mechanical equipment (PME) for the construction of the Project such as excavation, steel fixing and concreting of structure, backfilling, electrical and mechanical (E&M) installations and associated pipeworks, and reinstatement and landscaping works, would pose potential impact on nearby NSRs. In view of the limited scale of the Project, no adverse construction noise impact would be anticipated with the implementation of recommended good site practices, noise mitigation measures including use of quality powered mechanical equipment (QPME) or quieter construction method (e.g. silent piling by press-in method as an alternative of traditional sheet piling), use of movable noise barrier, noise enclosure, acoustic mat and / or purpose-built barrier, proper scheduling of construction activities during examination period of Tai Po Old Market Public School and noise control requirements stipulated in Recommended Pollution Control Clauses for Construction Contracts.

5.1.2.2 It is assumed that the fixed plants at the proposed stormwater pumping station would be in operation / standby for 24 hours. During the operational phase, given that the planned fixed plants are properly designed to meet the maximum permissible SWL, no adverse noise impacts would be anticipated. The maximum permissible SWL would be specified as design criteria of the proposed fixed noise sources in the contract documents. The Contractor should design and select equipment that could comply with the specified design criteria in the contract. A Compliance Test Report demonstrating the compliance should be conducted before the operation of the Project.

Appendix A – Proposed Works

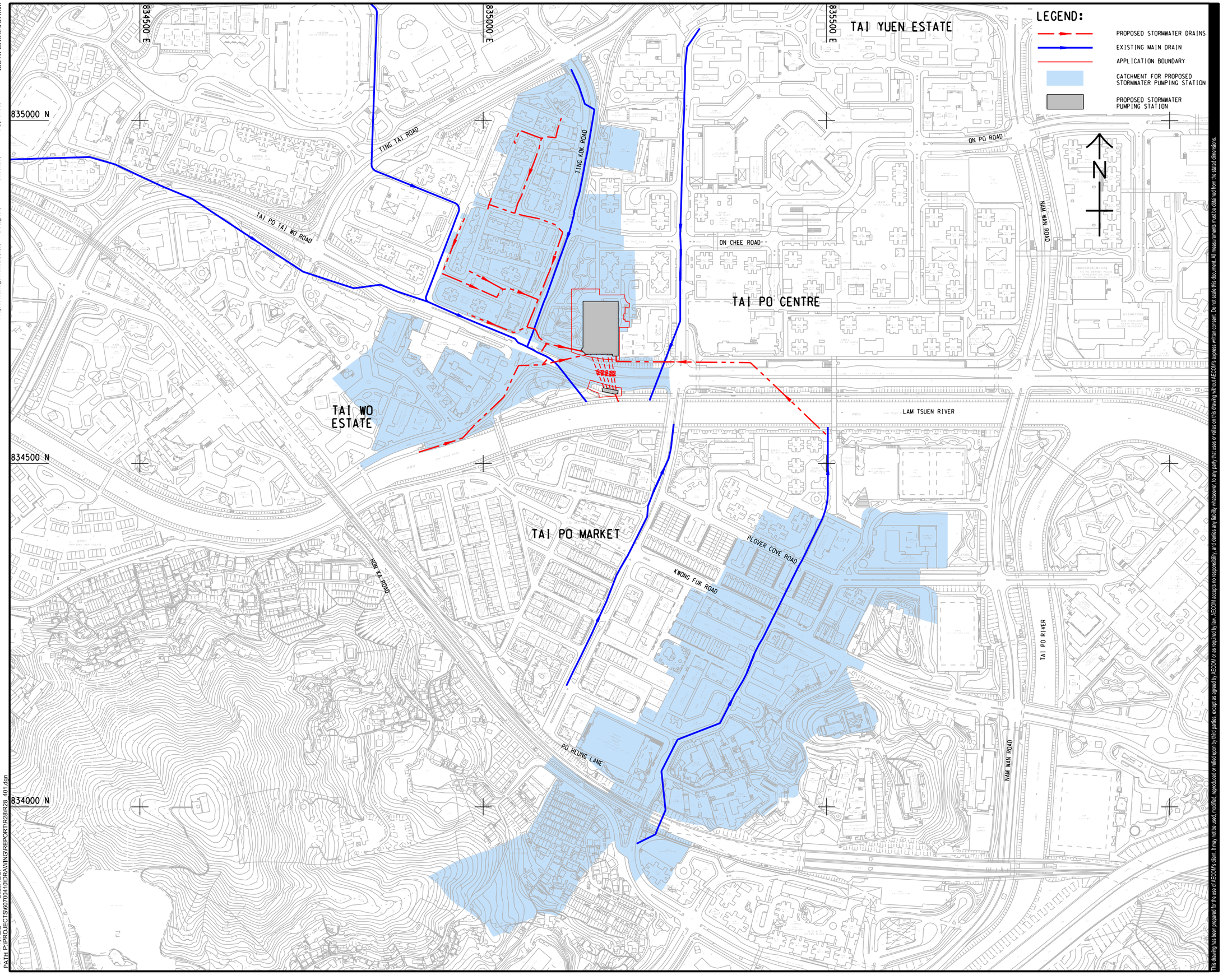
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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2023/12/27
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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
階段

SCALE 比例
A1 1 : 2500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

DRAINAGE CATCHMENT AND NETWORK PLAN FOR STORMWATER PUMPING SCHEME AT TAI PO OLD MARKET PLAYGROUND

SHEET NUMBER
圖紙編號

60700410/R28/401

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

LEGEND:

PROJECT BOUNDARY

EMERGENCY VEHICLE ACCESS

TREES TO BE RETAINED

PROPSOED TREE

N

834750 N

834700 N

834650 N

835150 E

835200 E

835250 E

第二座
Block 2

石油氣倉

第四
Bloc

安浩里
ON HO LANE

PROPOSED UNDERGROUND STORAGE TANK

PROPOSED STORMWATER PUMPING STATION

SCREEN ROOM

23m

+16.0mPD

+5.5mPD

CLP TRANSFORMER ROOM 2

+13.5mPD

LV SWITCHROOM

+13.5mPD

CLP TRANSFORMER ROOM 1

+13.5mPD

+16.0mPD

PUMP HOUSE

80.1m

64.5m

16.1m

53.5m

籃球場
+5.7
Basketball Court

籃球場
Basketball Court
+5.7

大埔舊墟公立學校
Tai Po Old Market Public School

TAI PO TAI WO ROAD

PROPOSED DISCHARGE CHAMBER

6m

+7.2mPD

22.5m

834600 N

TAI PO
OLD MARKET

TAI PO

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PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK7007.dgn

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STATUS
階段

SCALE 比例
A1 1 : 250

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖 A1 1 : 10000

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

MASTER LAYOUT PLAN

SHEET NUMBER
圖紙編號

60700410/SK7007

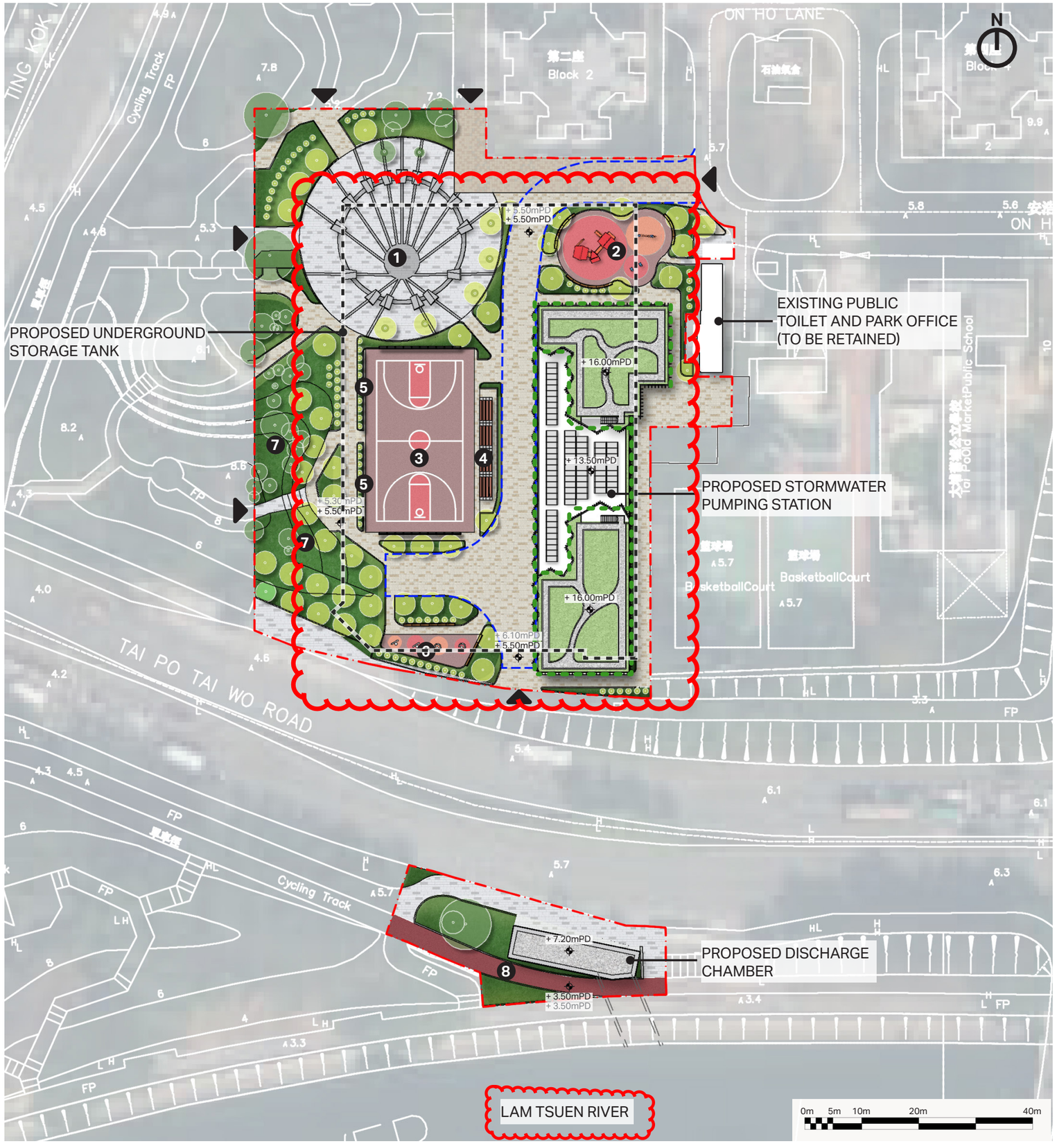
Appendix B – Current Condition with Surrounding Environment

Feature No. 7NW-B/F 193

V7) View from Footpath at westbound of Tai Po Tai Wo Road

V8) View from the North Riverside of Lam Tsuen River

Appendix C – Architectural and Landscape Design



LEGEND

- PROJECT BOUNDARY
- EMERGENCY VEHICLE ACCESS
- PROPOSED OPEN SPACE ENTERY POINT
- + x.xx mPD — EXISTING LEVEL
- + x.xx mPD — PROPOSED LEVEL
- PROPOSED HARD PAVED AREA
- PROPOSED SEATING
- PROPOSED AT-GRADE PLANTING AREA
- PROPOSED ROOF GREENING
- PROPOSED VERTICAL GREENING
- TREES PROPOSED TO BE RETAINED
- PROPOSED RECIPIENT LOCATION FOR TRANSPLANTED TREES
- PROPOSED COMPENSATORY TREE PLANTING
- 1 TAI PO SUNDIAL
- 2 CHILDREN'S PLAY AREA
- 3 BASKETBALL COURT (W/ BACKSTOP)
- 4 SPECTATOR STAND
- 5 FENCE WALL
- 6 ELDERLY FITNESS CORNER
- 7 PLANTING TERRACE
- 8 CYCLE TRACK

ISO A1 594mm x 841mm
Approved:
Checked:
Designer:
Project Management Initials:

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PROJECT 項目
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STATUS 階段

SCALE 比例
A3 1:750

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖


PROJECT NO. 項目編號
60700410

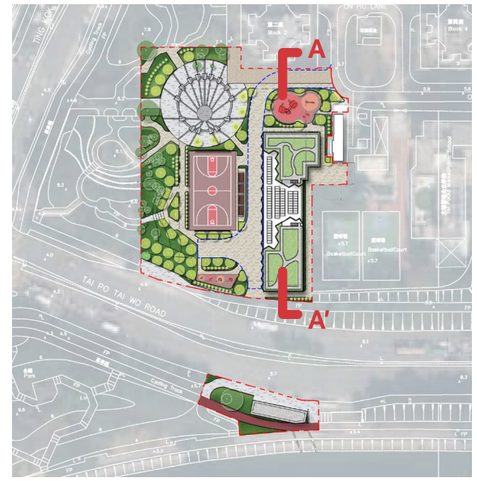
CONTRACT NO. 合約編號
CE 57/2022 (DS)

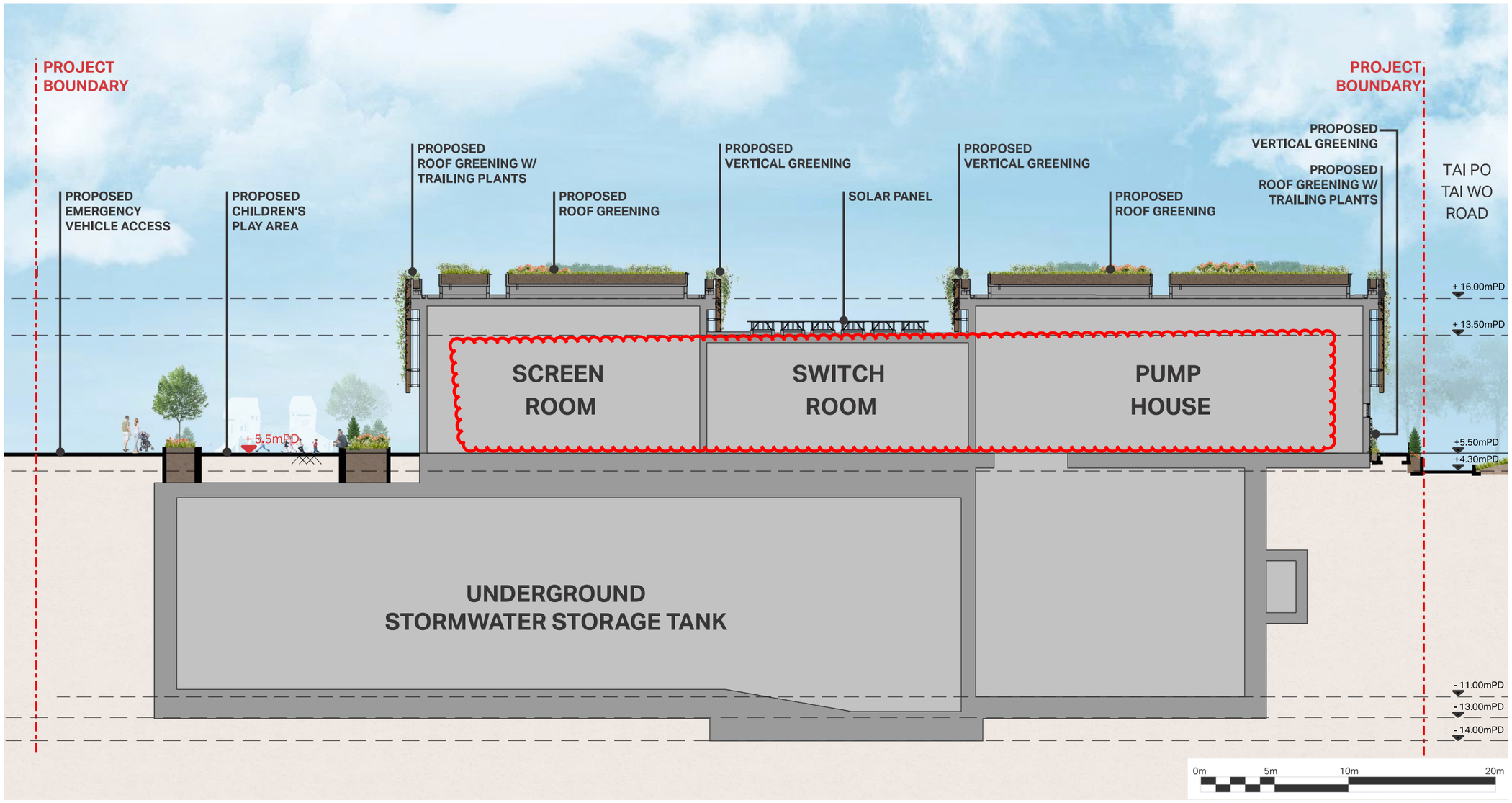
SHEET TITLE 圖紙名稱
LANDSCAPE MASTER PLAN

SHEET NUMBER 圖紙編號
FIGURE 3.2.1

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

KEY PLAN





SECTION A-A'

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PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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STATUS
階段

SCALE
比例

A3 1:300

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60700410

CONTRACT NO.
合約編號

CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

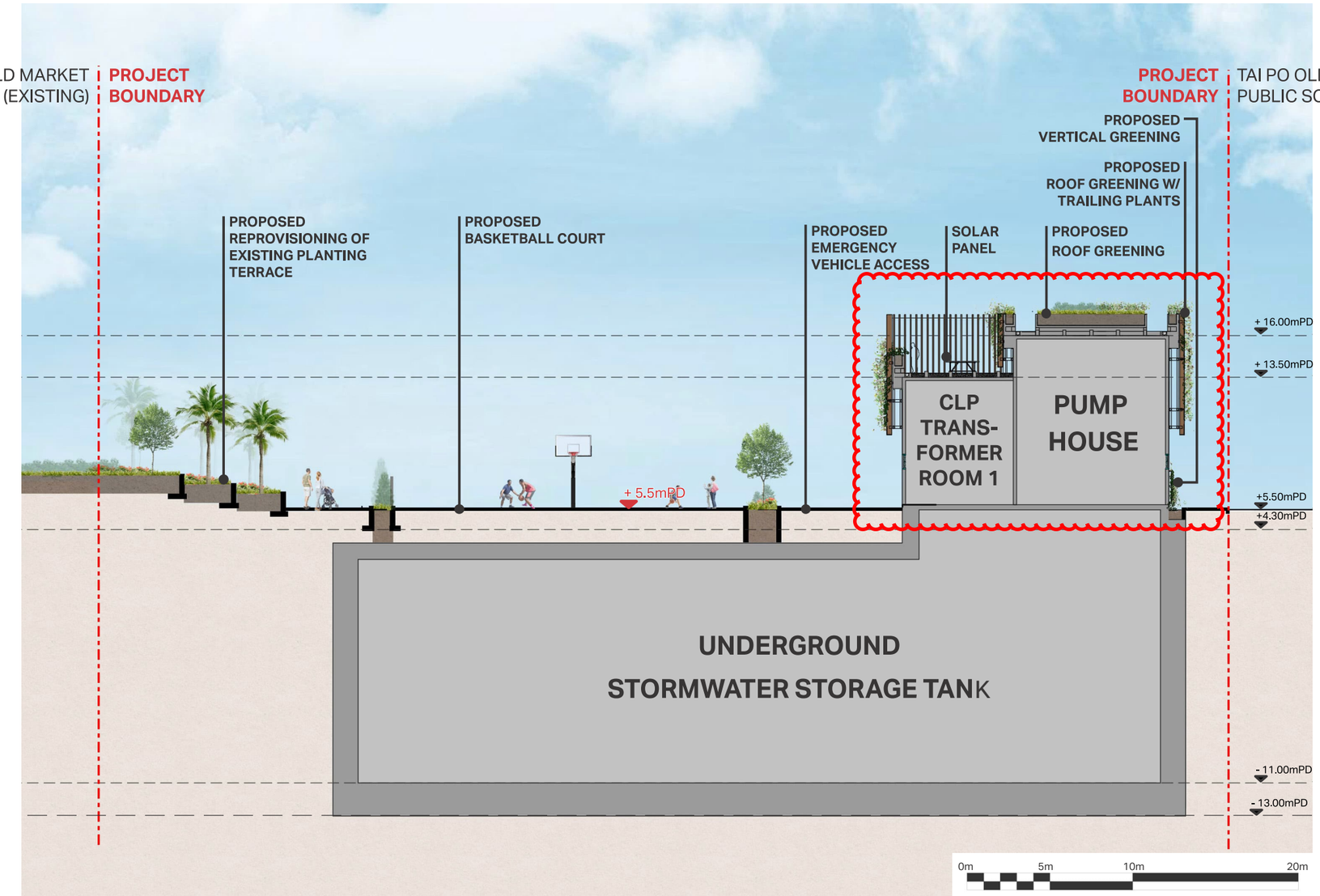
ANTICIPATED SITE SECTION 01

SHEET NUMBER
圖紙編號

FIGURE 3.2.2

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

KEY PLAN



SECTION B-B'

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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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STATUS
階段

SCALE 比例: A3 1:300

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60700410

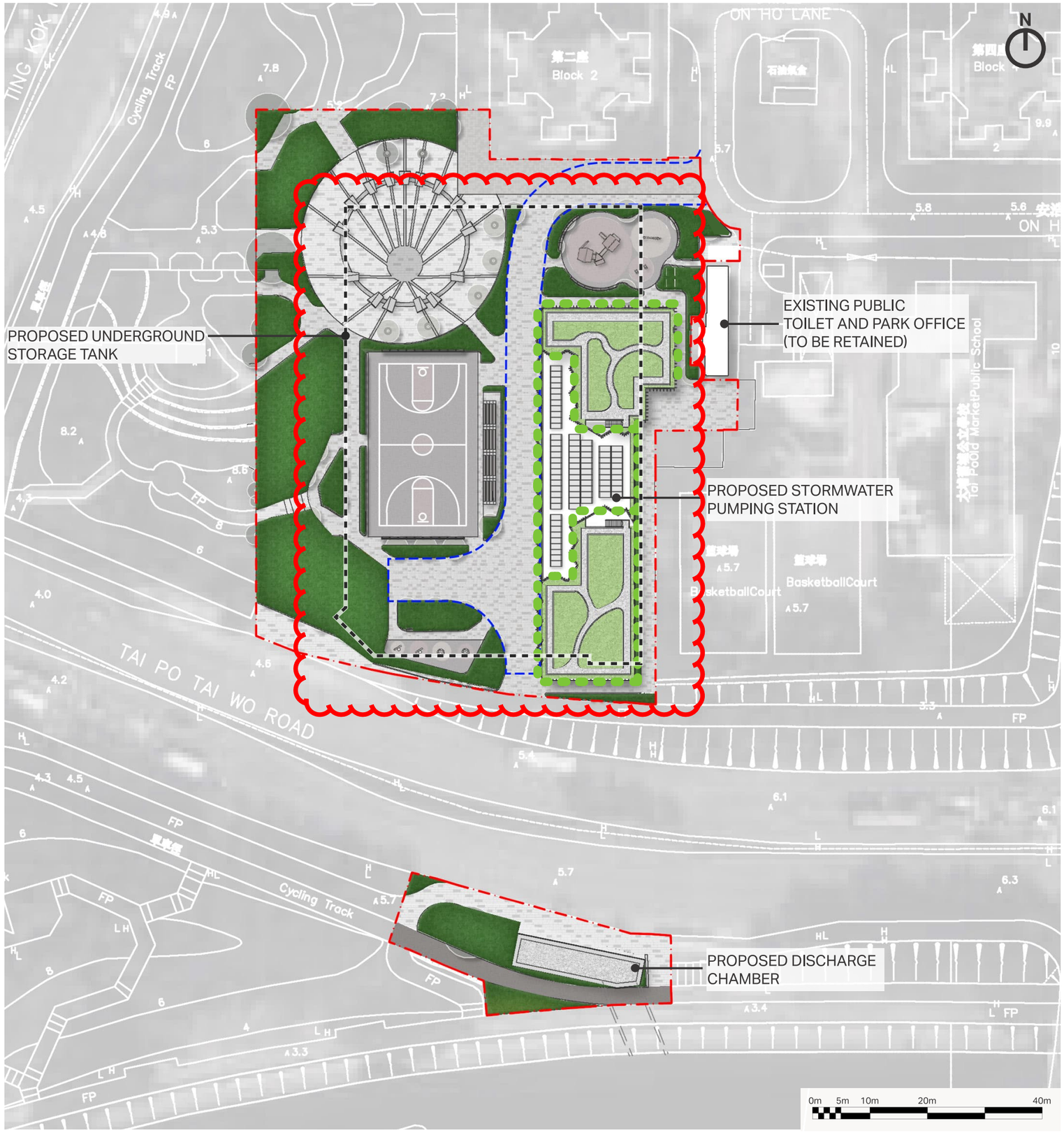
CONTRACT NO. 合約編號: CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

ANTICIPATED SITE SECTION 02

SHEET NUMBER
圖紙編號

FIGURE 3.2.3



LEGEND

- PROJECT BOUNDARY
- EMERGENCY VEHICLE ACCESS
- AT-GRADE PLANTING AREA
- ROOF GREENING
- VERTICAL GREENING

Greenery Requirnment (in accordance to DEVB TC(W) 3/2012)		
Site Area (Project Boundary)	**TPOMP**	**Tai Wo Road**
	7200 sqm	700 sqm
	7900 sqm	
Required Greenery Provision (20%)	1,580 sqm	

Greenery Provision		
	TPOMP	**Tai Wo Road**
At-grade Planting	~1685 sqm	~185 sqm
Roof Greening	~450 sqm	N/A
Vertical Greening	~700 sqm	N/A
Total	**~3,020 sqm (38%)**	
Attaining the minimum total Greenery Areas	**YES >20%**	

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PROJECT
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DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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STATUS
原稿

SCALE 比例: A3 1:750
DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60700410
CONTRACT NO. 合約編號: CE 57/2022 (DS)

SHEET TITLE
圖紙名稱
GREENERY PROVISION

SHEET NUMBER
圖紙編號
FIGURE 3.2.5

Project Management Initials: Designer: Checked: Approved: ISO A1 594mm x 841mm

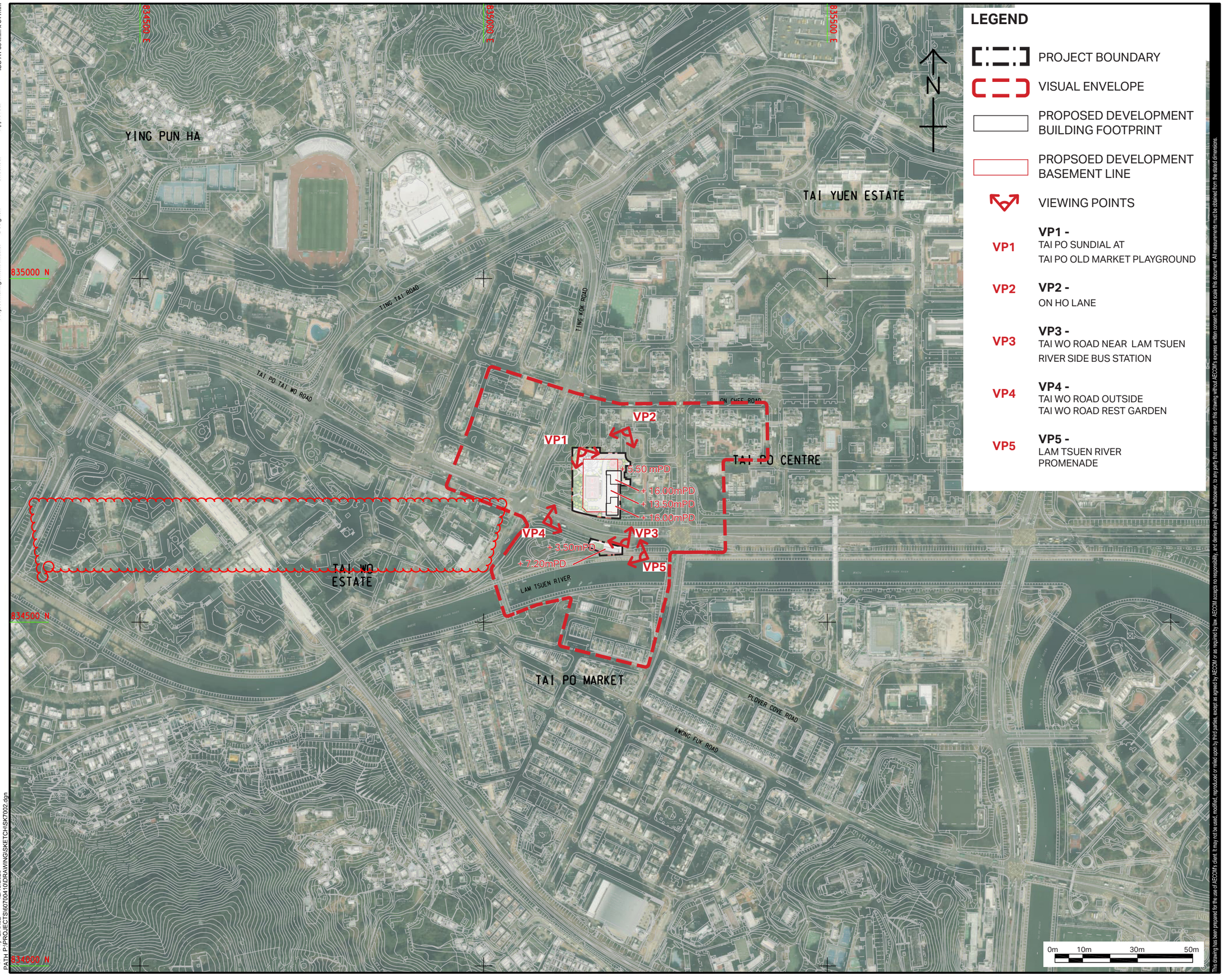
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



LEGEND

- PROJECT BOUNDARY
- VISUAL ENVELOPE
- PROPOSED DEVELOPMENT BUILDING FOOTPRINT
- PROPSOED DEVELOPMENT BASEMENT LINE
- VIEWING POINTS

VP1 — **VP1 -** TAI PO SUNDIAL AT TAI PO OLD MARKET PLAYGROUND

VP2 — **VP2 -** ON HO LANE

VP3 — **VP3 -** TAI WO ROAD NEAR LAM TSUEN RIVER SIDE BUS STATION

VP4 — **VP4 -** TAI WO ROAD OUTSIDE TAI WO ROAD REST GARDEN

VP5 — **VP5 -** LAM TSUEN RIVER PROMENADE

AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

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STATUS 階段

SCALE 比例 — A1 1 : 2500

DIMENSION UNIT 尺寸單位 — METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號 — 60700410

CONTRACT NO. 合約編號 — CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

SITE LOCATION WITH VIEWING POINTS AND VIUSAL ENVELOPE

SHEET NUMBER 圖紙編號

FIGURE 3.2.7

Plot File by: LIANJ2 12/19/2023
PATH: P:\PROJECTS\60700410\DRAWINGS\SKETCH\SK7002.dgn

Appendix D – Tree Preservation and Removal Proposal

4 TREE SURVEY FINDINGS AND RECOMMENDATIONS

4.1 Tree Survey Plans

4.1.1 The tree survey and subsequent proposed treatment are in accordance to criteria as stipulated in DEVB TC(W) No. 4/2020.

4.1.2 In order to determine whether or not the existing trees will be affected by the proposed works, reference has been made to the latest design layout. Please refer to General Project Layout Plan enclosed in **Appendix I** and Tree Survey and Treatment Plan enclosed in **Appendix II**.

4.1.3 Total 169 nos. of existing trees are surveyed, where are located within the existing Tai Po Old Market Playground and the Feature No. 7NW-B/F 193. The tree species recorded are mostly common species in Hong Kong, including but not limited to *Cinnamomum camphora*, *Ficus benjamina* and *Bauhinia x blakeana*. There are 29 species identified, their height ranges from 3m to 16m; crown spread from 0.5m to 18m; and DBH from 100mm to 950mm. They are generally poor - average in form, health & structural condition; and low - medium in amenity value. Please refer to their detail condition and remarks in Tree Assessment Schedule enclosed in **Appendix III**.

Old and Valuable Trees (OVTs) & Trees of Particular Interest (TPIs)

4.1.4 No Old and Valuable Trees (OVT) is identified within survey boundary. 1 no. of Trees of Particular Interest (TPIs) is identified within survey boundary. T354 (*Dalbergia assamica*) is identified as TPI as it is protected under Cap. 586.

4.2 Tree Preservation, Transplanting and Removal Proposals

4.2.1 Any trees surveyed which are in conflict with the proposed works will be proposed to be transplanted or removed. Justifications and remarks for affected trees are summarized in the Tree Assessment Schedule enclosed in **Appendix III**. Please refer to Photographic Record enclosed in **Appendix IV** for their detail images.

4.2.2 The summary of tree survey and treatment recommendations is shown in **Table 4.1** and the summary of tree species in terms of quantity and proposed treatment is shown in **Table 4.2**. The summary of proposed maintenance party of the proposed compensatory trees is shown in **Table 4.3.**

Tree Preservation & Removal Proposal

4.2.3 There is total 35 nos. of trees to be retained. Retained trees shall not be affected by proposed works and should be preserved in-situ on site. During construction period, retained trees will be protected from impact and construction activity as per General Specification for Civil Engineering Works (2020 Edition), Section 26 Preservation and Protection of Trees. **Tree Survey and Treatment Plan, Tree Protection Plan** in **Appendix II**.

4.2.4 On the other hand, trees to be affected are due to proposed excavation works and direct conflict to proposed structure. 134 nos. of trees cannot be retained in-situ due to excavation work within the site boundary. 133 nos. of trees are recommended to be removed and 1 no. of tree is recommended to be transplanted.

4.2.5 There is one TPI found, T354 *Dalbergia assamica* is under Cap. 586, will not be affected by the proposed works, will be retained in-situ.

4.2.6 Tree T329 *Ficus virens* is located in a planter closely growing with other large Ficus trees, with restricted roots system and root growing across planter in different levels. Under such condition and established root system of the concerned tree, the feasibility of transplanting is considerably low. Therefore, T329 is proposed to be removed.

Table 4.1 Summary of Tree Survey and Treatment Recommendations

Department to provide expert advice	Total Trees Surveyed	Trees to be Retained	Trees to be Removed	Trees to be Transplanted
LCSD	161	33	128	0
HyD	8	2	5	1
Total	**169**	**35**	**133**	**1**

Table 4.2 Summary of Tree Species and their Proposed Treatment in terms of Quantity

Venue	Botanical Name	Chinese Name	No. of Trees to be Removed	No. of Trees to be Retained	No. of Trees to be Transplanted	Total No.
Tai Po Old Market Playground	*Acacia confusa*	台灣相思	7	-	-	7
	Archontophoenix alexandrae	假檳榔	6	11	-	17
	Bauhinia variegata	宮粉羊蹄甲	1	-	-	1
	Bauhinia x *blakeana*	洋紫荊	17	2	-	19
	Caryota mitis	短穗魚尾葵	-	4	-	4
	Cassia fistula	臘腸樹	6	-	-	6
	Chukrasia tabularis	麻楝	-	2	-	2
	Cinnamomum camphora	樟	20	1	-	21
	Delonix regia	鳳凰木	5	-	-	5
	Dracontomelon duperreanum	人面子	-	1	-	1
	Dypsis lutescens	散尾葵	9	5	-	14
	Ficus benjamina	垂葉榕	23	--	-	23
	Ficus elastica	印度榕	2	-	-	2
	Ficus microcarpa	細葉榕	-	1	-	1
	Ficus virens	大葉榕	1	-	-	1
	Juniperus chinensis	圓柏	3	-	-	3
	Liquidambar formosana	楓香	-	1	-	1
	Livistona chinensis	蒲葵	-	2	-	2
	Lophostemon confertus	紅膠木	10	-	-	10
	Michelia × alba	白蘭	-	1	-	1
	Phoenix roebelenii	日本葵	-	2	-	2
	Plumeria rubra	雞蛋花	9	-	-	9
	Ravenala madagascariensis	旅人蕉	5	-	-	5
	Syagrus romanzoffiana	皇后葵	3	-	-	3
	Dead tree	死樹	1	-	-	1
Feature No. 7NW-B/F 193	*Albizia lebbeck*	大葉合歡	-	1	-	1
	Bischofia javanica	秋楓	-	-	1	1
	Celtis sinensis	朴樹	1	-	-	1
	*Dalbergia assamica**	南嶺黃檀	-	1	-	1
	Melaleuca cajuputi subsp. cumingiana	白千層	4	-	-	4
Total			**133**	**35**	**1**	**169**

*Tree of Particular Interest (DBH>1m and protected under Cap. 586)

5 COMPENSATORY TREE PLANTING PROPOSALS

5.1 Compensatory Planting Proposal

5.1.1 Any trees to be removed under the Project shall be compensated in accordance with DEVB TC(W) No. 4/2020 – Tree Preservation.

5.1.2 According to previous section, 133 nos. of existing trees are proposed to be removed due to direct conflict with proposed works and compensatory planting in a ratio of 1:1 in terms of number to be achieved as far as possible.

5.1.3 The compensatory of 133 nos. trees are proposed within the project site. Space for tree compensation within the Site Boundary has been explored as much as possible.

5.1.4 Please refer to **Table 5.1** for their indicative size, species and other specification; and **Appendix V – Compensatory Tree Planting Plan** for the detailed location of the compensatory trees proposed within project boundary.

5.1.5 Sufficient space shall be provided for the planting of new trees taking into the account the adequate space required to cater for the establishment and healthy growth of the trees up to maturity. The following table shows the suggested tree species which are referenced to “Theme Plants for Tai Po” of Greening Master Plan (GMP) by CEDD and Street Tree Selection Guide (STSG) by DEVB.

5.1.6 12 months establishment period by project department shall be provided for any planting to be handed over to LCSD.

Table 5.1 Summary of Compensatory Indicative Tree Planting List (On-Site)

Abbreviation	Botanical Name	Chinese Name	Size (mm) Height x Spread	Spacing (mm)	Remarks	Quantity
BRA. ACE.	*Brachychiton acerifolius*	槭葉蘋婆	Heavy Standard: 4000 x 1500	5000	GMP & STSG	7 Nos.
CIN. CAM.	*Cinnamomum camphora*	樟樹	Heavy Standard: 4500 x 2500	5000	Native & GMP	11 Nos.
GAR. SUB.	*Garcinia subelliptica #*	菲島福木	Standard: 2750 x 1000	1500	GMP & STSG	50 Nos.
JUN. CHI.	*Juniperus chinensis ‘Kaizuca’ #*	龍柏	Standard: 2750 x 800	1500	GMP & STSG	32 Nos.
PLU.RUB.	*Plumeria rubra*	紅雞蛋花	Standard: 2750 x 1500	5000	GMP & STSG	7 Nos
STE. LAN.	*Sterculia lanceolata*	假蘋婆	Heavy Standard: 4000 x 1500	5000	Native & GMP	8 Nos.
TAB. PEN.	*Tabebuia pentaphylla*	紅花風鈴木	Heavy Standard: 4000 x 2000	5000	GMP	12 Nos.
WOD.BIF	*Wodyetia bifurcata*	狐尾椰子	3000 x 2000	5000	GMP & STSG	6 Nos
				Total Number of Compensatory Trees		**133 Nos.**

Spacing and size are proposed for hedge planting and to achieve the compensation ratio of 1:1 in terms of quantity within the limited space available on site, in accordance to DEVB TC(W) 4/2020 – Tree Preservation.

6 CONCLUSION

6.1.1 In summary, 169 nos. of trees have been surveyed within project site, of which 35 nos. of trees are proposed to be retained; 133 nos. of trees are proposed to be removed; while 1 no. of tree is proposed to be transplanted. To compensate the loss of existing trees, 133 nos. of standard and heavy standard compensatory trees are proposed in available planting area within site.

Drawing No.	Tree No.	Photo No.	Species		Measurements			Amenity Value	Form	Health Condition	Structural Condition	Suitability for Transplanting		Conservation Status	Recommendation (Retain/ Transplant/ Remove)	Justification	Maintenance department to provide comments on TPRP		Additional Remarks	SIMAR Slope No.
			Scientific Name	Chinese Name	Height (m)	DBH (mm)	Crown Spread (m)	(High(H)/ Medium (M)/ Low(L))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A)/ Poor(P))	(High(H)/ Medium(M) / Low(L))	Remarks				Before	After		
60700410/SK7005	T326	T326	*Ficus benjamina*	垂葉榕	12.0	700	8.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio; co-dominant branches	
60700410/SK7005	T327	T327	*Ficus benjamina*	垂葉榕	12.0	480	4.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T328	T328	*Ficus benjamina*	垂葉榕	11.0	460	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T329	T329	*Ficus virens*	大葉榕	16.0	950	18.0	M	A	A	A	L	b d	NIL	remove	conflict with proposed underground tank	LCSD	-	co-dominant trunks, restricted roots,growing closely with T328	
60700410/SK7005	T330	T330	*Ficus benjamina*	垂葉榕	13.0	550	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio; crossed branches	
60700410/SK7005	T331	T331	*Ficus benjamina*	垂葉榕	13.0	400	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio; crossed branches	
60700410/SK7005	T332	T332	*Ficus benjamina*	垂葉榕	12.0	370	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T333	T333	*Ficus benjamina*	垂葉榕	13.0	500	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T334	T334	*Ficus benjamina*	垂葉榕	13.0	550	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T335	T335	*Ficus benjamina*	垂葉榕	15.0	600	6.0	M	P	A	A	L	b f	NIL	remove	conflict with proposed underground tank	LCSD	-	asymmetric canopy; low live-crown ratio	
60700410/SK7005	T336	T336	*Archontophoenix alexandrae*	假檳榔	5.0	150	3.0	M	P	A	A	L	c, f	NIL	remove	conflict with proposed underground tank	LCSD	-		
60700410/SK7005	T339	T339	*Chukrasia tabularis*	麻楝	8.5	280	4.0	M	A	A	A	M	-	NIL	retain	-	LCSD	LCSD	co-dominant branches	
60700410/SK7005	T340	T340	*Ficus microcarpa*	細葉榕	3.0	127	3.0	M	P	A	A	L	b f	NIL	retain	-	LCSD	LCSD	crossed branches; co-dominant trunks	
60700410/SK7005	T341	T341	*Chukrasia tabularis*	麻楝	8.5	240	5.0	M	P	A	A	L	f	NIL	retain	-	LCSD	LCSD	curved trunk	
60700410/SK7005	T342	T342	*Dracontomelon duperreanum*	人面子	8.5	240	5.0	M	P	A	A	L	f	NIL	retain	-	LCSD	LCSD	co-dominant branches	
60700410/SK7005	T345	T345	*Melaleuca cajuputi subsp. cumingiana*	白千層	9.0	480	5.0	M	A	A	A	L	c	NIL	remove	conflict with proposed above ground structure	HyD	-	co-dominant branches; on slope	7NW-B/F193
60700410/SK7005	T346	T346	*Celtis sinensis*	朴樹	5.0	134	1.5	M	P	A	A	L	b f	NIL	remove	conflict with proposed above ground structure	HyD	-	asymmetric canopy; co-dominant branches; low branch bifurcation; on slope	7NW-B/F193
60700410/SK7005	T347	T347	*Melaleuca cajuputi subsp. cumingiana*	白千層	11.5	300	4.0	M	A	A	A	L	b	NIL	remove	conflict with proposed above ground structure	HyD	-	co-dominant branches; on slope	7NW-B/F193
60700410/SK7005	T348	T348	*Melaleuca cajuputi subsp. cumingiana*	白千層	10.5	330	4.0	M	A	A	A	L	b	NIL	remove	conflict with proposed above ground structure	HyD	-	asymmetric canopy; co-dominant branches; on slope	7NW-B/F193
60700410/SK7005	T349	T349	*Melaleuca cajuputi subsp. cumingiana*	白千層	10.0	430	4.0	M	A	A	A	L	b	NIL	remove	conflict with proposed above ground structure	HyD	-	asymmetric canopy; co-dominant branches; epiphytic plant on trunk; on slope	7NW-B/F193

Drawing No.	Tree No.	Photo No.	Species		Measurements			Amenity Value	Form	Health Condition	Structural Condition	Suitability for Transplanting		Conservation Status	Recommendation (Retain/ Transplant/ Remove)	Justification	Maintenance department to provide comments on TPRP		Additional Remarks	SIMAR Slope No.
			Scientific Name	Chinese Name	Height (m)	DBH (mm)	Crown Spread (m)	(High(H)/ Medium (M)/ Low(L))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A) / Poor(P))	(Good(G)/ Average(A)/ Poor(P))	(High(H)/ Medium(M) / Low(L))	Remarks				Before	After		
60700410/SK7005	T350	T350	*Bischofia javanica*	秋楓	7.0	270	3.5	M	A	A	A	M	-	NIL	transplant	conflict with proposed above ground structure	HyD	LCSD	on slope	7NW-B/F193
60700410/SK7005	T354	T354	*Dalbergia assamica* §	南嶺黃檀	5.0	110	4.0	M	P	A	A	L	b, f	2	retain	-	HyD	HyD	crossed branches; low branch bifurcation; co-dominant trunks; leaning trunk	7NW-B/F193
60700410/SK7005	T356	T356	*Albizia lebbeck*	大葉合歡	5.5	530	2.0	M	A	A	A	L	b	NIL	retain	-	HyD	HyD	co-dominant branches; on slope	7NW-B/F193

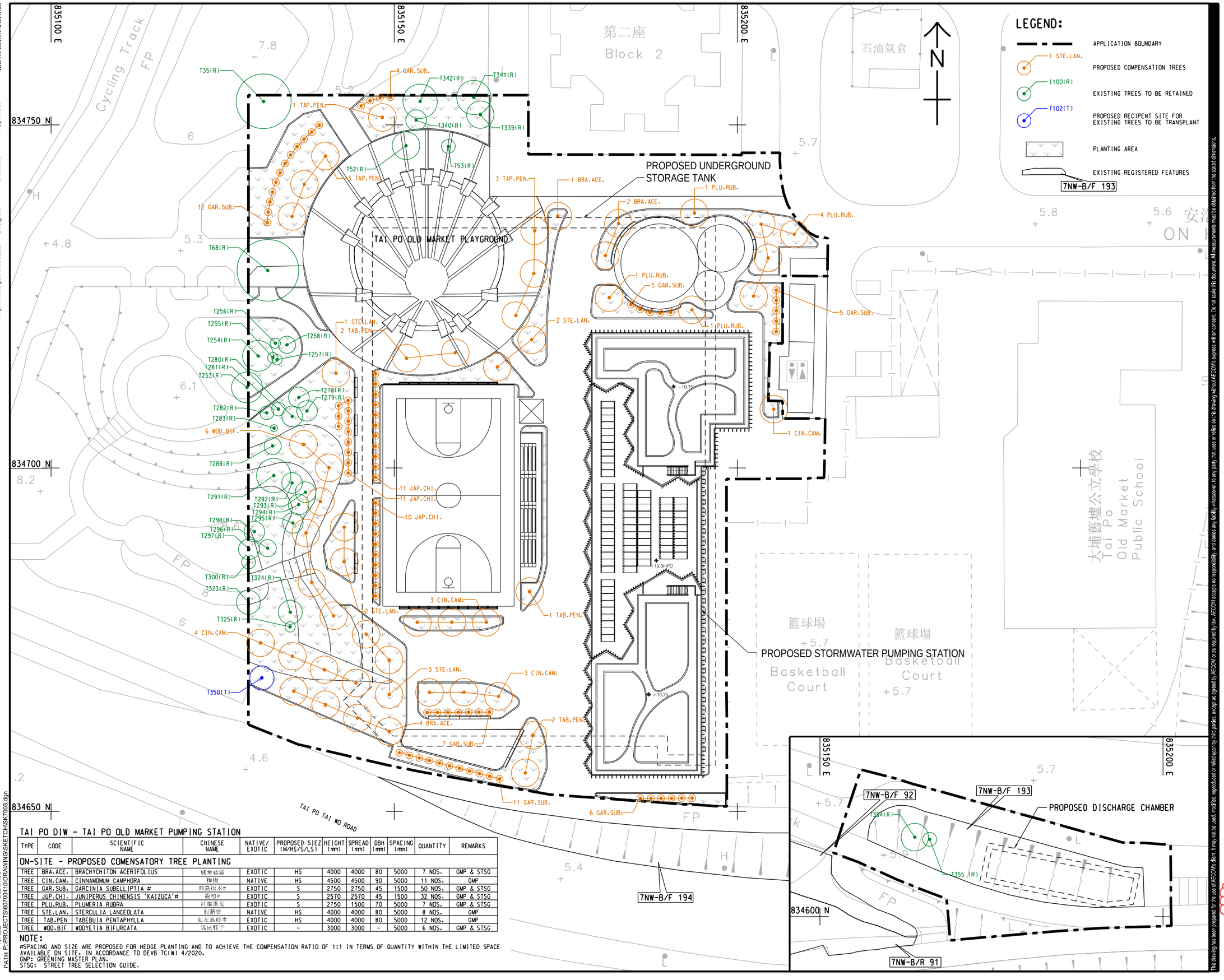
^ Dead Tree

§ TPI

Remarks:
- Site visit was conducted on 24 January 2024 to verify the DBH measurement for T329.

Suitability for Transplanting:
a - low amenity value;
b - irrecoverable form after transplanting (e.g. if substantial crown and rot pruning are necessary to facilitate the transplanting);
c - low survival rate after transplanting;
d - very large size (unless the feasibility to transplant has been considered financially reasonable and technically feasible during the feasibility stage);
e - with evidence of over-maturity and onset of senescence;
f - poor health, structure or form (e.g. Imbalanced form, leaning with major cavity / cracks / splits);
g - undesirable species (e.g. *Leucaena leucocephala* which is an invasive, exotic tree); or
h - trees grown under poor conditions which have limited the formation of proper root ball necessary for transplanting (e.g. on steep slope).

Conservation Status:
1 - Scheduled under Cap. 96
2 - Protected under Cap. 586
3 - Rare and Precious Plants of Hong Kong
4 - China Plant Red Data Book



TAI PO DIW - TAI PO OLD MARKET PUMPING STATION

TYPE	CODE	SCIENTIFIC NAME	CHINESE NAME	NATIVE/ EXOTIC	PROPOSED SIEZ (M/HS/S/LS)	HEIGHT (mm)	SPREAD (mm)	DBH (mm)	SPACING (mm)	QUANTITY	REMARKS
ON-SITE - PROPOSED COMENSATORY TREE PLANTING											
TREE	BRA.ACE.	BRACHYCHITON ACERIFOLIUS	槭葉蘋婆	EXOTIC	HS	4000	4000	80	5000	7 NOS.	GMP & STSG
TREE	CIN.CAM.	CINNAMOMUM CAMPHORA	樟樹	NATIVE	HS	4500	4500	90	5000	11 NOS.	GMP
TREE	GAR.SUB.	GARCINIA SUBELLIPTIA #	熏島楊梅#	EXOTIC	S	2750	2750	45	1500	50 NOS.	GMP & STSG
TREE	JUP.CHI.	JUNIPERUS CHINENSIS 'KAIZUCA'#	龍柏#	EXOTIC	S	2570	2570	45	1500	32 NOS.	GMP & STSG
TREE	PLU.RUB.	PLUMERIA RUBRA	紅雞蛋花	EXOTIC	S	2750	1500	70	5000	7 NOS.	GMP & STSG
TREE	STE.LAN.	STERCULIA LANCEOLATA	假蘋婆	NATIVE	HS	4000	4000	80	5000	8 NOS.	GMP
TREE	TAB.PEN	TABEBUIA PENTAPHYLLA	粘花風鈴木	EXOTIC	HS	4000	4000	80	5000	12 NOS.	GMP
TREE	WOD.BIF	WODYETIA BIFURCATA	狐尾椰子	EXOTIC	-	3000	3000	-	5000	6 NOS.	GMP & STSG

NOTE:
#SPACING AND SIZE ARE PROPOSED FOR HEDGE PLANTING AND TO ACHIEVE THE COMPENSATION RATIO OF 1:1 IN TERMS OF QUANTITY WITHIN THE LIMITED SPACE AVAILABLE ON SITE, IN ACCORDANCE TO DEVB TC(W) 4/2020.
GMP: GREENING MASTER PLAN.
STSG: STREET TREE SELECTION GUIDE.

ISO A1 594mm x 841mm
Approved:
Checked:
Designer:
Project Management Initials:
Plot File by: LIQ
2024/1/30
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AECOM

PROJECT
項目
DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主
渠務署 Drainage Services Department

CONSULTANT
工程顧問公司
AECOM Asia Company Ltd.
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SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
狀況

SCALE 比例: A1 1 : 250
DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60700410
CONTRACT NO. 合約編號: CE 57/2022 (DS)

SHEET TITLE
圖紙名稱
COMPENSATORY TREE PLANTING PLAN

SHEET NUMBER
圖紙編號
60700410/SK7003

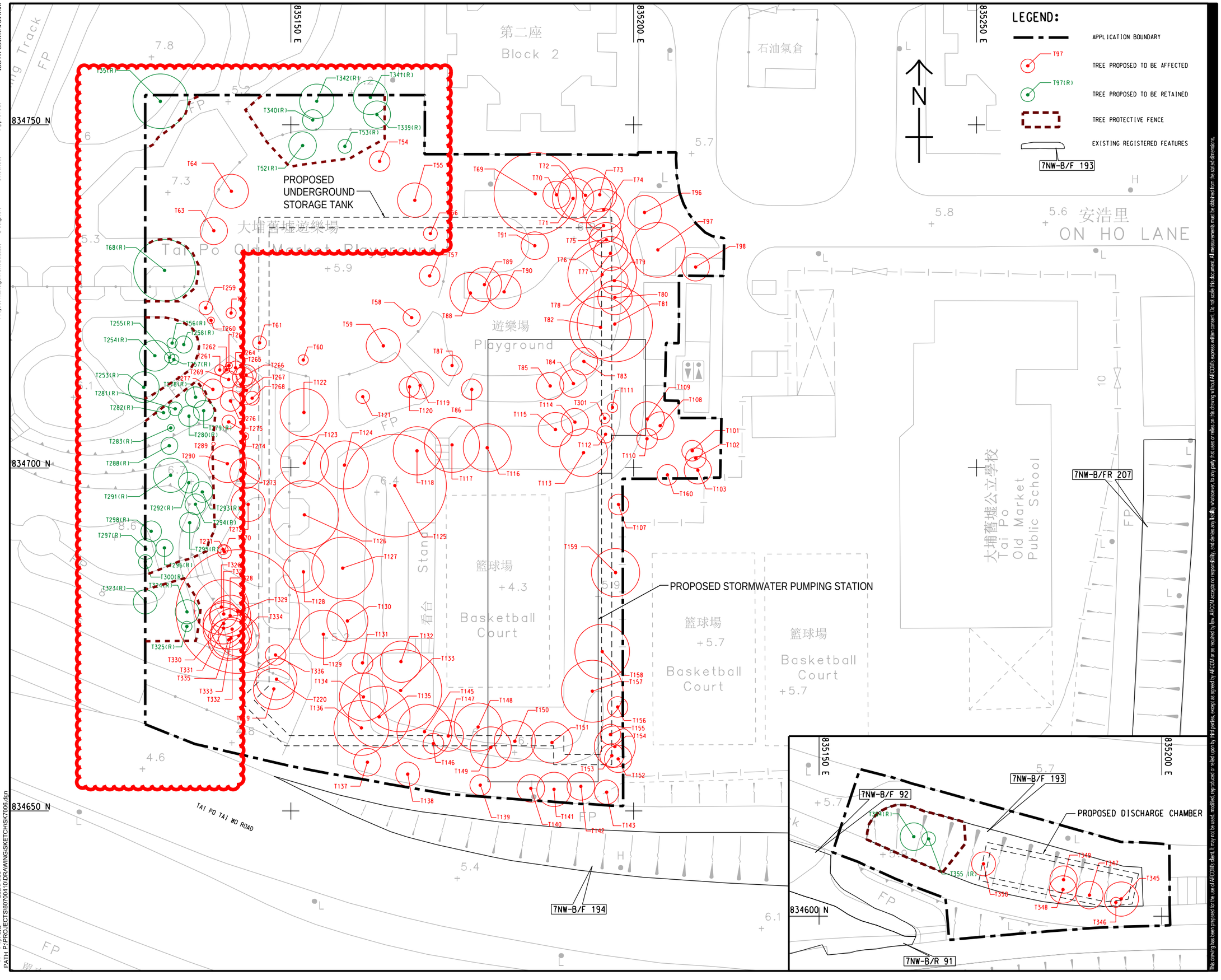
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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2024/1/30

AECOM

PROJECT
項目
DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主
渠務署
Drainage Services Department

CONSULTANT
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SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核對

STATUS
現況

SCALE 比例
A1 1 : 250

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱
TREE PROTECTION PLAN FOR APPLICATION SITE

SHEET NUMBER
圖紙編號
60700410/SK7006

Appendix E – Preliminary Environmental Review Report

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1 INTRODUCTION

1.1 Background

1.1.1.1 The Review of Drainage Master Plan in Tai Po – Feasibility study and the Review of Drainage Master Plan in Sha Tin and Sai Kung – Feasibility Study (the DMP Review Study) identified that some areas in Tai Po, Lam Tsuen, Ting Kok and Ma On Shan would be subject to high flood risks.

1.1.1.2 The flooding incidents reported in the areas of Tai Po Old Market and Tai Po Market on 22 July 2010, Lam Tsuen Valley on 19 October 2016, and Ting Kok and Sai Sha Road on 18 July 2017 are some examples to substantiate the above findings.

1.1.1.3 To relieve the flood risk, the Study proposed various drainage improvement measures in these areas, the DMP Review Study has proposed by adopting drainage improvement measures in a combination of stormwater pumping scheme and associated drainage upgrading and river training works. Upon completion of the project, the flood risks in the areas can be significantly reduced.

1.1.1.4 In May 2018, Development Bureau (DEVB) signed out a Project Definition Statement (PDS) to justify and define the scope of the "Drainage Improvement Works in Tai Po". The Drainage Services Department (DSD) then completed a Technical Feasibility Statement (TFS) confirming its technical feasibility. The TFS was subsequently approved by DEVB in August 2018. The project was included into Cat B under PWP No. 4183CD in September 2018.

1.1.1.5 In January 2020, the DSD commissioned Agreement No. CE 11/2019(DS) "Drainage Improvement Works in Tai Po – Investigation" (referred to hereinafter as the "Investigation Study") to carry out various reviews, surveys, investigation, impact assessments and preliminary design for the Project.

1.1.1.6 AECOM Asia Company Limited was appointed by DSD on 13 January 2023 to undertake Agreement No. CE 57/2022 (DS) "Drainage Improvement Works in Tai Po – Design and Construction" (referred to hereinafter as "the Project", of which the *starting date* of the Project is 26 January 2023. The Project comprises the drainage improvement works as briefly described in the following:

(a) Stormwater pumping scheme in Tai Po Old Market, including an underground storage tank, a pump house and the associated pipeworks and E&M works in Tai Po Old Market Playground, as well as the drainage upgrading works in Tai Po Tai Wo Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Ting Kok Road, Mei Sun Lane and Kau Hui Chik Street, floodwall modification and new floodwall along Lam Tsuen River and ancillary works including temporary relocation and reinstatement of playgrounds and associated facilities;

(b) Expansion of existing Tai Po Market Floodwater Pumping Station, including upgrading of existing pump house and the associated pipeworks and E&M works, as well as the drainage upgrading works in Tsing Yuen Street, Wai Yan Street, Pak Shing Street, Fu Shin Street, Yan Hing Street, Kwong Fuk Bridge Garden, Plover Cove Road, Tung Cheong Street, cycle track and footpath along southside of Lower Lam Tsuen River (between existing pumping station and elevated walkway at Tai Po Centre (structure no. NF97);

(c) Drainage upgrading works at Tai Mei Tuk, Ng Uk Tsuen, Ting Kok Shan Liu, Po Sam Pai, Ma Po Mei, San Uk Pai, Ping Long, Che Ha, Nam Hang and Tsung Tsai Yuen and Sai Sha Road (sections near Sai O, Kwun Hang, Tai Tung and Sai Keng); and

(d) River training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Sha Pa and She Shan River.

1.2 Purpose and Scope of the Updated PER

1.2.1.1 AECOM Asia Company Limited was appointed by DSD on 13 January 2023 to undertake Agreement No. CE 57/2022 (DS) "Drainage Improvement Works in Tai Po – Design and Construction" (referred to hereinafter as "the Assignment", of which the starting date of the Project is 26 January 2023. As part of the Assignment, the findings, conclusions and recommendations of the Preliminary Environmental Review (PER) carried out under the Investigation Study shall be reviewed and updated based on the latest detailed design of the recommended drainage improvement works in Tai Po, and an Updated PER Report shall be prepared.

1.2.1.2 The purpose of this Updated PER is to review the findings, conclusions, and recommendations of related environmental studies/review carried out by previous consultants, DSD, EPD, HyD, CEDD and other Government departments, making particular reference to the PER Report prepared under the Investigation Study and the PER Scope.

1.2.1.3 In accordance with Clause 6.11 of the Scope, the Updated PER should comprise the following major items:

- fully satisfies the requirements of the PER Scope
- reviews, identifies and describes any changed circumstances since the completion of the PER Report in the Investigation Study and propose measures to cater for such changes;
- highlights cumulative environmental impacts and issues of concern to the community, the levels of residual environmental impacts and benefits with cumulative effects;
- identifies the mitigation measures and the impacts arising from them;
- confirms the overall environmental acceptability of the Project;
- describes the agreed schedules and programmes for implementing the mitigation measures and monitoring and audit requirements;
- prescribes the specification for detailed design and construction of the recommendations and mitigation measures;
- addresses the potential impacts in course of regular and major maintenance works of the proposed plant; and
- provides with the impacts summary, the study findings, conclusions, recommendations and a mechanism for implementation.

1.2.1.4 The Updated PER covers only the proposed stormwater pumping station with underground storage tank at Tai Po Old Market Playground and its associated discharge chamber (hereinafter referred to as "the Project"). The other elements of the stormwater pumping scheme in Tai Po Old Market described in **Section 1.1.1.6(a)** (including drainage upgrading works along existing roads and floodwall

along Lam Tsuen River) and other drainage improvement works in Tai Po detailed in **Section 1.1.1.6(b) to 1.1.1.6(d)** will be covered by separate Updated PER Report(s).

1.3 Structure of this Report

1.3.1.1 The background of the Project and objective of the Report are introduced in **Section 1**. An overall description of the Project is provided in **Section 2**. The remainder of the Report is organised as follows:

- Section 3 – Air quality impact
- Section 4 – Noise impact
- Section 5 – Water quality impact
- Section 6 – Waste management implications
- Section 7 – Ecological Impact
- Section 8 – Fisheries impact
- Section 9 – Heritage impact
- Section 10 – Not used
- Section 11 – Land Contamination Implications
- Section 12 – Environmental monitoring and audit requirements
- Section 13 – Conclusions

2 PROJECT DESCRIPTION

2.1 Location and Scope of the Project

2.1.1.1 The proposed Tai Po Old Market Playground Stormwater Pumping Station (TPOMPSPS) is part of the Tai Po Old Market Stormwater Pumping Scheme recommended under the Investigation Study, which includes a stormwater pumping station within underground stormwater storage tank and associated E&M works at Tai Po Old Market Playground and its associated discharge chamber near Lower Lam Tsuen River as shown in **Figure 2.1**. The Project boundary is within the existing Tai Po Old Market Playground and falls within area zoned as "Open Space" ("O") on the Approved Tai Po Outline Zoning Plan (OZP) No. S/TP/30.

2.1.1.2 The TPOMPSPS will have a maximum pumping capacity of 16m^3/s a storage to detain 25,000 m^3 of stormwater. It consists of an underground stormwater storage tank, aboveground pump house (equipped with seven pumps) and screen room (about 10.5m in height), and switch and transformer rooms (about 8m in height) within the Tai Po Old Market Playground, as well as an underground discharge chamber (about 2.5m to 3.7m in height) on existing manmade slope next to Lower Lam Tsuen River (**Appendix 2.1** refers). The footprint of the proposed aboveground pump house / screen room / switch and transformer rooms would be approximately 1,150 m^2 and that of the aboveground portion of the discharge chamber would be approximately 130 m^2 whilst the total area of the Project is approximately 7,200 m^2 within Tai Po Old Market Playground and 700 m^2 next to Lower Lam Tsuen River (**Figure 2.1** refers).

2.1.1.3 The construction of the Project would mainly involve site clearance, excavation and lateral Support (ELS), foundation works, steel fixing and concreting of structure, backfilling, electrical and mechanical (E&M) installation and associated pipeworks, and reinstatement and landscaping works. The tentative works area and stockpile area are illustrated in **Figure 2.2**. The existing facilities within the Tai Po Old Market Playground (e.g. basketball court and playground) affected by the Project will be reinstated / reprovisioned within the Project boundary.

2.1.1.4 Excessive stormwater runoff from overflow pipes will be pumped by the proposed TPOMPSPS for discharge at Lower Lam Tsuen River via the upgraded drainage system (which would be covered by separate Updated PER Report as discussed in **Section 1.2.1.4**) and / or stored in proposed underground stormwater storage tank.

2.1.1.5 During operational phase, regular maintenance / desilting works of stormwater tanks and pump chambers of the proposed TPOMPSPS would be carried out by the DSD to remove excessive silts, debris and any obstructions to safeguard the hydraulic capacity of the SPS. The maintenance to the proposed TPOMPSPS would tentatively be carried out on an annual basis during dry season (November to March), except during emergency situations where the accumulated silt would adversely affect the hydraulic capacity of the SPS or where flooding risk is imminent. The maintenance practices and frequency would be similar to the existing maintenance works undertaken by the DSD. Typically, desilting is done via manual / robotic rodding / scooping in the tanks, which will be collected at a desilting opening using lifting equipment. Water jetting is also a common method to wash away the accumulated silts inside pipes and tanks.

2.2 Project Implementation Programme

2.2.1.1 The proposed upgrading works would tentatively commence in 2025 for completion and commissioning in 2030. The tentative construction programme is detailed in **Appendix 2.2**.

2.3 Interaction with Concurrent Projects

2.3.1.1 Based on the best available information, no concurrent projects are identified within 500m from the proposed works.

2.3.1.2 Based on the latest design, the other elements of the stormwater pumping scheme in Tai Po Old Market (including drainage upgrading works along existing roads and floodwall along Lam Tsuen River) (to be covered by the separate Updated PER Report as discussed in **Section 1.2.1.4**) which would be overlapped with the Project would be constructed section by section with standard pollution control measures in place (e.g. dust suppression measures, construction noise control measures, good site practices etc.). In view of the nature and limited scale of these drainage works, the associated potential environmental impacts would be localised and well controlled by the standard pollution control measures and good site practices. Likewise, given the Project is situated at over 100m from the recommended Expansion of Tai Po Market Floodwater Pumping Station (which would be covered by separate Updated PER Report as discussed in **Section 1.2.1.4**), significant cumulative impact from the construction of the floodwater pumping station would not been anticipated.

2.3.1.3 During the detailed design stage, DSD would request the contractor of this Project to closely liaise the contractors of the recommended Expansion of Tai Po Market Floodwater Pumping Station and the other elements of the stormwater pumping scheme in Tai Po Old Market in planning the interfacing works properly to minimise the potential cumulative impacts by avoiding/minimising repeated and concurrent construction works. As such, with appropriate pollution control measures and good site practices, adverse cumulative environmental impact due to the construction of the Project is not anticipated.

3 AIR QUALITY

3.1 Environmental Legislation, Policies, Plans, Standards and Criteria

Air Quality Objectives

3.1.1.1 The Air Pollution Control Ordinance (APCO) provides the statutory authority for controlling air pollutants from a variety of sources. The Hong Kong Air Quality Objectives (AQOs), which stipulate the maximum allowable concentrations over specific periods for typical pollutants, should be met. The relevant AQOs are listed in **Table 3.1**.

Table 3.1 Air Quality Objectives for Hong Kong

Pollutants	Averaging Time	Concentration Limit (µg/m^3) [1]	Number of Exceedance Allowed per Year
Respirable Suspended Particulates (RSP or PM10) [2]	24-hour	100	9
	Annual [4]	50	N/A
Fine Suspended Particulates (FSP or PM2.5) [3]	24-hour	50	18 [5]
	Annual [4]	25	N/A
Nitrogen Dioxide (NO_2)	1-hour	200	18
	Annual [4]	40	N/A
Sulphur Dioxide (SO_2)	10-min	500	3
	24-hour	50	3
Carbon Monoxide (CO)	1-hour	30,000	0
	8-hour	10,000	0
Ozone (O_3)	8-hour	160	9
Lead (Pb)	Annual [4]	0.5	NA

Notes:
[1] Gaseous pollutant measured at 293K and 101.325kPa
[2] Suspended particulates in air with a nominal aerodynamic diameter of 10µm or smaller.
[3] Suspended particulates in air with a nominal aerodynamic diameter of 2.5µm or smaller.
[4] Arithmetic mean
[5] For Government projects

Air Pollution Control (Construction Dust) Regulation

3.1.1.2 Notifiable and regulatory works are under the control of Air Pollution Control (Construction Dust) Regulation. This Project is expected to include notifiable works (superstructure construction) and regulatory works (dusty material handling and excavation). Contractors and site agents are required to inform EPD and adopt dust reduction measures to minimize dust emission while carrying out construction works to the acceptable level.

Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation

3.1.1.3 The Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation comes into effect on 1 June 2015. Under the Regulation, non-road mobile machinery (NRMMs), except those exempted, are required to comply with the prescribed emission standards. From 1 September 2015, all regulated machines sold or leased for use in Hong Kong must be approved or exempted with a proper label in a prescribed format issued by EPD. Starting from 1 December 2015, only approved or exempted NRMMs with a proper label are allowed to be used in specified activities and locations including construction sites. The Contractor is required to ensure the adopted machines or non-road vehicle under the Project could meet the prescribed emission standards and requirement.

Hong Kong Planning Standards and Guidelines (HKPSG)

3.1.1.4 Table 3.1 of Chapter 9 HKPSG has recommended the buffer distance to minimize the potential impacts from air pollution on the open space, which is also applicable to air sensitive uses in the vicinity. **Table 3.2** summarises the required buffer distance for the air sensitive uses recommended in the HKPSG.

Table 3.2 Recommended Buffer Distance for Air Sensitive Uses

Pollutant Sources	Parameter	HKPSG Recommended Buffer Distance
Road and Highways	*Type of Road*	
	Trunk Road and Primary Distributor	>20m
	District Distributor	>10m
	Local Distributor	>5m
Construction and earth moving activities	-	>50m

3.2 Baseline Conditions

3.2.1.1 The proposed TPOMPSPS is located within the existing Tai Po Old Market Playground. The dominant existing air emission source within 500m assessment area from the Project site would be vehicular emission from the adjacent Tai Po Tai Wo Road, Ting Kok Road and On Cheung Road.

3.2.1.2 The EPD general air quality monitoring stations (AQMSs) located closest to the Project site is Tai Po AQMS. The recent five years (2018 – 2022) concentrations of air pollutants relevant to the Project are summarised in **Table 3.3**. The measured concentrations of SO_2, NO_2, RSP and FSP in the past five-year all complied with the respective AQOs. In general, the results showed that there was a decreasing trend in the pollutants levels in the past 5 years. The 10th highest 8-hour O_3 concentrations exceeded the prevailing AQO criteria in 2018 to 2022. High level of ambient O_3, which is mainly influenced by the regional photochemical smog problem, is a regional air pollution problem. The HKSAR government has been strengthening its collaboration with the Guangdong Provincial Government to alleviate the photochemical smog and the associated O_3 problems in the region and continuing to restrict vehicular emission and implement other control measures to reduce local emissions.

Table 3.3 Air Quality Monitoring Data in the latest Five Years (Year 2018 to 2022) at EPD's Tai Po Air Quality Monitoring Station

Pollutant [1]	Parameter	Concentrations (μg/m^3)					Prevailing AQO (μg/m^3) [2]
		2018	2019	2020	2021	2022	
FSP ($PM_{2.5}$)	19th highest 24-hour	38	41	33	32	30	50 (18) [3]
	Annual	19	20	15	16	14	25
RSP (PM_{10})	10th highest 24-hour	69	65	58	60	48	100 (9)
	Annual	31	31	24	26	21	50
SO_2	4th highest 10-minutes	24	20	19	15	12	500 (3)
	4th highest 24-hour	8	10	7	9	5	50 (3)
NO_2	19th highest 1-hour	125	142	106	115	93	200 (18)
	Annual	36	36	30	32	27	40
O_3	10th highest 8-hour	**167**	**197**	**165**	**168**	**188**	160 (9)

Notes:
[1] CO concentration is not measured at Tai Po AQMS.
[2] The prevailing AQOs came into effect on 1 January 2022. Number of exceedance allowed under the AQO is shown in ( ).
[3] Under the prevailing AQOs, the number of exceedances allowed per year for daily FSP is 35 times. However, for new government projects, the number of exceedances allowed per year for daily FSP is 18 times only.
[4] **Bold** values indicate exceedance of relevant AQOs.

3.2.1.3 Future background air quality levels from the Pollutants in the Atmosphere and the Transport over Hong Kong Version 2.1 (PATH-v2.1) model released by EPD had been extracted. The emission sources including those in Pearl River Delta Economic Zone, roads, marine, airport, power plants and industries within Hong Kong are all considered in the PATH-v2.1 model. The emission inventory adopted in the PATH-v2.1 model has taken into account various emission control measures (such as (1) reducing roadside air pollution; (2) reducing marine emissions; (3) emission control of power plant; and (4) emission control of non-road mobile) to be implemented in HKSAR. The predicted concentrations of relevant pollutants by PATH-v2.1 model with Year 2025 emission inventory for the grid covering the Project site are summarised in **Table 3.4**. The predicted concentrations of RSP and FSP are all below the respective AQOs.

Table 3.4 Air Pollutant Concentrations Extracted from the PATH-v2.1 Model with Year 2025 Emission Inventory

Pollutant	Averaging Time		AQOs	Future Background Concentration in µg/m³ at Grid
			µg/m³	39,48
RSP	24-hr	10th Highest	100	64
	Annual		50	27
FSP	24-hr	19th Highest	50	34
	Annual		25	15
SO_2	4th highest 10-minutes		500	70
	4th highest 24-hour		50	10
NO_2	19th highest 1-hour		200	91
	Annual		40	16

Notes:
(1) The 10th highest daily RSP concentration predicted by PATH are adjusted by adding 11 µg/m³, according to EPD's Guidelines on Choice of Models and Model Parameters.
(2) The annual RSP and FSP concentrations predicted by PATH are adjusted by adding 10.3 µg/m³ and 3.5 µg/m³ respectively, according to EPD's Guidelines on Choice of Models and Model Parameters.
(3) Reference conditions of gaseous pollutants concentration data: 293 K and 101.325 kPa.
(4) 19th highest 24-hour FSP concentration is not a criterion in AQO. Nevertheless, on a best endeavours basis for government projects, a more stringent standard of 24-hour AQO for FSP at a concentration level of 50 µg/m³ and the number of allowable exceedances of 18 days per calendar year as the benchmark for conducting air quality assessment.

3.3 Representative Air Sensitive Receivers

3.3.1.1 Pursuant to Clause 3.5 of the PER Brief, the air quality impact assessment area is defined by a distance of 500 m from the boundary of the proposed works site. The representative air sensitive receivers (ASRs) within the assessment area were identified in accordance with the *Hong Kong Planning Standards and Guidelines* (HKPSG) as listed in **Table 3.5** and shown in **Figure 3.1**.

Table 3.5 Representative Air Sensitive Receivers

ID	Description	Land Use	Number of Storeys	Approximate Horizontal Distance to Project Site Boundary, m
A1	Eightland Gardens	Residential	15	<5
A2	Tai Po Old Market Public School Basketball Court	Educational Institution	N/A	<5
A3	Tai Po Old Market Playground	Recreational	N/A	35
A4	Tai Wo Road Rest Garden	Recreational	N/A	80
A5	No. 29, Po Yick Lane	Residential	5	65

3.4 Identification and Evaluation of Potential Impacts

3.4.1 Construction Phase

3.4.1.1 During construction phase, fugitive dust emissions from construction activities would be the major source of air quality impact. Potential fugitive impacts to nearby ASRs during construction phase would mainly arise from excavation works, as well as handling, transportation and removal of excavated spoil / material, stockpiling and wind erosion etc. Based on the latest design and construction programme, the excavation works would last for around 7 months (**Appendix 2.2** refers).

3.4.1.2 Some of the ASRs, A1 and A2, are located in close proximity to the northern and eastern side of the Project site– A1 is located at approximately 12m from the excavation extent and stockpile area while A2 is situated at around 7m and 11m from the excavation extent and stockpile area respectively (**Figure 2.2** and **Figure 3.1** refer). With reference to the approved EIA study of Route 11 (Section between Yuen Long and North Lantau) (Register No.: AEIAR-255/2023), which has reviewed the construction phase dust monitoring data for various recent large scale infrastructure projects involving extensive heavy construction works, including Tung Chung New Town Extension, Central-Wan Chai Bypass, Central Kowloon Route, Tseung Kwan O – Lam Tin Tunnel, Development of Anderson Road Quarry site – Road Improvement Works and Widening and Reconstruction of Tai Po Road (Sha Tin Section), there were no exceedance of measured 1-hr TSP levels caused by construction activities of those projects recorded at any dust monitoring stations (with the closest ones at around 5m to 15m from construction sites), demonstrating that dust impacts could be readily mitigated by appropriate dust suppression measures as stipulated in the *Air Pollution Control (Construction Dust) Regulation* and good site practices, such watering and tarpaulin covering of stockpiling of spoil. Given the comparatively short period of heavy construction works required as well as the nature and limited scale of the proposed works (maximum excavation extent of approximately 4,070 m^2 and stockpiling area of around 380 m^2, as well as small number of up to 10 nos. of PME to be used at a time), potential air quality impact dust emissions would be minor and localised and could be well controlled with appropriate dust suppression measures as stipulated in the *Air Pollution Control (Construction Dust) Regulation* and good site practices.

3.4.1.3 The other elements of the stormwater pumping scheme in Tai Po Old Market (including drainage upgrading works along existing roads and floodwall along Lam Tsuen River) (to be covered by the separate Updated PER Report as discussed in **Section 1.2.1.4**) would be constructed section by section with standard pollution control measures in place (e.g. dust suppression measures and good site practices etc.). In view of the nature and limited scale of these drainage works, the associated dust emission would be localised and well controlled by the standard pollution control measures and good site practices. Likewise, the Project is situated at over 100m from the recommended Expansion of Tai Po Market Floodwater Pumping Station (which would be covered by separate Updated PER Report as discussed in **Section 1.2.1.4**), significant cumulative air quality impact from the construction of the pumping station would not be expected. During the detailed design stage, DSD would request the contractor of this Project to closely liaise the contractors of the other elements of the stormwater pumping scheme in Tai Po Old Market and the recommended Expansion of Tai Po Market Floodwater Pumping Station in planning the interfacing works properly to minimise the potential cumulative impacts by avoiding/minimising repeated and concurrent construction works, particularly

dusty works. As such, with appropriate dust suppression measures as stipulated in the *Air Pollution Control (Construction Dust) Regulation* and good site practices, adverse cumulative air quality impact due to the construction of the Project is not anticipated.

3.4.1.4 Likewise, fuel combustion from the use of PMEs during construction works could be a potential source of air pollutants such as NO_2, SO_2 and CO. To improve air quality and protect public health, EPD has introduced the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* on 1 June 2015 and since 1 December 2015, only approved or exempted non-road mobile machinery are allowed to be used in construction sites. In addition, all construction plants are required to use ultra-low sulphur diesel (ULSD) (defined as diesel fuel containing not more than 0.005% sulphur by weight) as stipulated in Environment, Transport and Works Bureau Technical Circular (ETWB-TC(W)) No. 19/2005 on Environmental Management on Construction Sites. The Contractor is required to ensure the adopted machines or non-road vehicle under the Project could meet the prescribed emission standards and requirement. Given the localised and small scale of the Project, adverse air quality impacts due to emissions from the use of PMEs would be unlikely with the implementation of the said Regulations.

3.4.2 Operational Phase

3.4.2.1 The Project involves only facilities to pump and / store excessive stormwater runoff in case of heavy rainstorm event that the Project itself does not constitute any elements that would be an air pollutant emission source. No air quality impact from the Project would be expected during the operational phase.

3.4.2.2 The existing facilities within the Tai Po Old Market Playground (e.g. basketball court and playground) affected by the Project will be reinstated / reprovisioned within the Project boundary. With sufficient buffer distance between Tai Po Tai Wo Road (Primary Distributor) and the reprovisioned air sensitive uses as per requirement stated in the Chapter 9 of HKPSG as summarised in **Table 3.2** and illustrated in **Figure 3.2**, adverse air quality impact to the reprovisioned air sensitive uses due to vehicular emissions is not expected.

3.5 Recommended Mitigation Measures

3.5.1 Construction Phase

3.5.1.1 Dust suppression measures in the Air Pollution Control (Construction Dust) Regulation and good site practices should be incorporated to control dust emission from the site. Major control measures relevant to this Project are listed below, and they are recommended to be included in relevant contract documents:

- Use of regular watering, to reduce dust emissions from exposed site surfaces and unpaved roads particularly during dry weather;
- Use of frequent watering in particularly dusty construction areas close to ASRs;
- Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering should be applied to aggregate fines;
- For the work sites close to the ASR with a separation distance less than 5m, provide hoardings of not less than 5m high from ground level along the site boundary; for the work sites close to the ASRs with a separation distance between 5m and 10 m, provide hoardings of not less than 3.5 m high from

ground level along the site boundary; for other work sites, hoarding of not less than 2.4 m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit where a site boundary adjoins a road, street, service lane or other area accessible to the public;

- Open temporary stockpiles should be avoided or covered. Prevent placing dusty material storage plies near ASRs;
- Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations;
- Establishment and use of vehicle wheel and body washing facilities at the exit point of the site;
- Imposition of speed control for vehicles on unpaved site roads. 8 km/hr is the recommended limit;
- Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs;
- Avoid position of material stockpiling areas, major haul roads and dusty works within the construction site close to concerned ASRs; and
- Avoid unnecessary exposed earth.

3.5.1.2 Guidelines stipulated in EPD's *Recommended Pollution Control Clauses for Construction Contracts* should be incorporated in the contract documents to abate dust impacts. The clauses include:

- The Contractor shall observe and comply with the APCO and its subsidiary regulations, particularly the Air Pollution Control (Construction Dust) Regulation.
- The Contractor shall undertake at all times to prevent dust nuisance as a result of the construction activities.
- The Contractor shall ensure that there will be adequate water supply / storage for dust suppression.
- The Contractor shall devise, arrange methods of working and carrying out the works in such a manner so as to minimise dust impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these methods are implemented.
- Before the commencement of any work, the Contractor may be required submitting the methods of working, plant, equipment and air pollution control system to be used on the site for the Engineer inspection and approval.

3.5.1.3 In order to help reduce carbon emission and pollution, timely application of temporary electricity would be made and electric vehicles would be adopted in accordance with *DEVB TC(W) No. 13/2020 "Timely Application of Temporary Electricity and Water Supply for Public Works Contracts and Wider Use of Electric Vehicles in Public Works Contracts"* in the Project.

3.6 Environmental Monitoring and Audit

3.6.1.1 Weekly site audit is recommended to be undertaken during the construction phase to ensure the proposed dust suppression measures are implemented in an appropriate manner and are effective.

3.6.1.2 No EM&A is considered necessary during the operational phase.

3.7 Conclusion

3.7.1.1 Potential fugitive impacts to nearby ASRs would mainly arise from excavation works, handling, transportation and removal of excavated spoil / material, stockpiling and wind erosion etc. With the implementation of regular site watering and good construction practices for dust minimization, construction dust impacts are not expected to be significant on the surrounding sensitive receivers. Requirements of *Air Pollution Control (Construction Dust) Regulation* and *EPD's Recommended Pollution Control Clauses for Construction Contracts* are proposed to be incorporated into the contract.

3.7.1.2 No air pollution source is identified from the operation of any elements of the Project itself that no air quality impacts would be anticipated during the operational phase.

4 NOISE IMPACT

4.1 Environmental Legislation, Standards and Guidelines

4.1.1 Construction Noise

4.1.1.1 In accordance with EPD's Professional Persons Environmental Consultative Committee (ProPECC) Practice Note (PN) ProPECC PN 1/24, construction noise level at the façade of residential dwellings should not exceed $L_{eq\ (30\text{-}minute)}$ 75 dB(A), and construction noise level at the façade of schools should not exceed $L_{eq\ (30\text{-}minute)}$ 70 dB(A) (65 dB(A) during examinations) between the hours of 7 a.m. and 7 p.m. on any day not being a general holiday.

4.1.1.2 Apart from ProPECC PN 1/24, the Noise Control Ordinance (NCO) provided statutory framework for noise control. Assessment procedure and standards are set out in the following relevant Technical Memoranda:

- Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM);
- Technical Memorandum on Noise from Construction Work in Designated Areas (DA -TM); and
- Technical Memorandum on Noise from Percussive Piling (PP-TM).

4.1.1.3 Between 1900 and 0700 hours and all day on Sundays and public holidays, activities involving the use of PME for the purpose of carrying out construction work is prohibited unless a construction noise permit (CNP) has been obtained. In case of any construction activities required during restricted hours, it is the Contractor's responsibility to ensure compliance with the Construction Noise Permit (CNP) and the relevant TMs.

4.1.1.4 Under the DA-TM, in addition to the general controls on the use of PME during restricted hours, the use of Specified PME (SPME) and / or the undertaking of Prescribed Construction Work (PCW) as shown in **Table 4.1** within a designated area during the restricted hours would require a valid CNP. In general, it shall not be presumed that a CNP will be granted for carrying out PCW within a designated area during restricted hours. The CNP may be granted for the execution of construction works during restricted hours involving the use of PME and/or SPME if the relevant ANLs and criteria stipulated in the GW-TM and DA-TM can be met. The corresponding basic noise levels (BNLs) for evening and night-time periods are given in **Table 4.2**.

Table 4.1 Specified Powered Mechanical Equipment and Prescribed Construction Work Controlled under DA-TM

Specified Powered Mechanical Equipment (SPME)	Prescribed Construction Work (PCW)
● Hand-held Breaker ● Bulldozer ● Concrete Lorry Mixer ● Dump Truck ● Hand-held Vibratory Poker	● Erection or Dismantling of Formwork or Scaffoldings ● Loading, Unloading or Handling of Rubble, Wooden Boards, Steel Bars, Wood or Scaffolding Material ● Hammering

Table 4.2 Construction Noise Standards during Restricted Hours

Time Period	Basic Noise Levels[#], dB(A)		
	Area Sensitive Rating A	**Area Sensitive Rating** B	**Area Sensitive Rating** C
All weekdays during the evening (1900 to 2300 hours), and general holidays (including Sundays) during the day and evening (0700 to 2300 hours)	60 (45)	65 (50)	70 (55)
All days during the night-time (2300 to 0700 hours)	45 (30)	50 (35)	55 (40)

Note:
#: Noise levels in brackets denote the acceptable noise levels (ANLs) generated by construction works involving the use of SPME within a designated area during restricted hours.

4.1.1.5 Percussive piling is prohibited between 1900 and 0700 hours on any weekday not being a general holiday and at any time on Sunday or general holiday. A CNP is required for the carrying out of percussive piling between 0700 and 1900 hours on any day not being a general holiday. PP-TM sets out the requirements for working and determination of the permitted hours of operations. The permitted hours of operations would be 3, 5 or 12 hours per day depending on the types of percussive piling (diesel, pneumatic and / or steam hammer) and the predicted noise impact at NSRs. Based on the current design of the Project, alternative construction methods (e.g. bored piling) could be adopted for foundation. Should percussive piling method be required, a CNP as mentioned above, shall be applied during construction of the Project.

4.1.2 Operational Phase Fixed Plant Noise

4.1.2.1 For planning of noise sensitive developments against noise from fixed sources, the *Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites* (IND-TM) issued under Noise Control Ordinance (NCO) has stipulated appropriate Acceptable Noise Levels (ANLs). The ANLs and criteria for different Area Sensitivity Rating (ASRs) are summarised in **Table 4.3** and **Table 4.4** below.

Table 4.3 Area Sensitivity Ratings

Type of Area Containing NSR	Degree to which NSR is Affected by Influencing Factors		
	Not Affected	**Indirectly Affected**	**Directly Affected**
(i) Rural area, including country parks or village type developments	A	B	B
(ii) Low density residential area consisting of low-rise or isolated high-rise developments	A	B	C
(iii) Urban area	B	C	C
(iv) Area other than those above	B	B	C

Table 4.4 Acceptable Noise Level

Time Period	Acceptable Noise Level (ANL) for Different Area Sensitivity Rating ($L_{eq\ 30min}$, dB(A))		
	ASR A	ASR B	ASR C
Day (0700 to 1900 hrs)	60	65	70
Evening (1900 to 2300 hrs)	60	65	70
Night (2300 to 0700 hrs)	50	55	60

4.1.2.2 The Project site within Tai Po Old Market Playground or near Lower Lam Tsuen River is not rural area, low density residential area or urban area. Noise sensitive receivers (NSRs) in vicinity of the Project include both high density of high rise and low rise housing developments and education institutions and therefore are considered to be at (iv) area other than those above according to **Table 4.3**. Based on the Annual Traffic Census 2022, the annual average daily traffic (AADT) of the sections of Tai Po Tai Wo Road nearby the Project site is less than 30,000 and is not considered as an Influencing Factor (IF) according to the IND-TM. An Area Sensitivity Rating of "B" is hence assigned to the NSRs N1, N2 and N3 as they are not affected by any IF.

4.1.2.3 With reference to the HKPSG, the fixed noise criteria for the proposed fixed noise sources would be 5 dB(A) lower than the ANL, or the prevailing background noise levels (for quiet areas with level 5 dB(A) below the ANL. The prevailing background noise measurement was conducted in September 2022 in the PER under the Investigation Study. Considering that there have been no changes in land use of the surrounding area of the Project site, the prevailing background noise levels for the purpose of this Updated PER has been referenced to that in the PER Report prepared under the Investigation Study. Determination of fixed plant noise criteria are presented in **Appendix 4.1**.

4.1.2.4 In any event, the Area Sensitivity Ratings assumed in this Updated PER are for indicative assessment only. It should be noted that fixed noise sources are controlled under Section 13 of the NCO. At the time of investigation, the Noise Control Authority shall determine noise impact from concerned fixed noise sources on the basis of prevailing legislation and practices being in force and taking account of contemporary conditions / situation of adjoining land uses. Nothing in this Updated PER shall bind the Noise Control Authority in the context of law enforcement against all the fixed noise sources being assessed.

4.2 Description of Environment and Baseline Conditions

4.2.1.1 The proposed TPOMPSPS is located within the existing Tai Po Old Market Playground. The prevailing noise climate of the Project site and its vicinity mainly comprises road traffic noise from the adjacent Tai Po Tai Wo Road, Ting Kok Road and On Cheung Road.

4.3 Noise Sensitive Receivers

4.3.1.1 Pursuant to Clause 3.9 of the PER Brief, the noise impact assessment area is defined by a distance of 300 m from the boundary of the proposed works site. Representative noise sensitive receivers (NSRs) were identified in accordance with the HKPSG as listed in **Table 4.5** and shown in **Figure 4.1**.

Table 4.5 Noise Sensitive Receivers within 300m of Assessment Areas

ID	Description	Land Use	Approximate Horizontal Distance to Project Site Boundary, m
N1	Eightland Gardens	Residential	<5
N2	Tai Po Old Market Public School	Educational Institution	23
N3	No. 29, Po Yick Lane	Residential	65

4.4 Construction Noise Impact Assessment

4.4.1 Identification and Evaluation of Impacts

4.4.1.1 Construction noise impact from the proposed works would be expected from the use of powered mechanical equipment (PME) during ELS, excavation, steel fixing and concreting of structure, backfilling, E&M installations and associated pipeworks, and reinstatement and landscaping works. The extent of noise impact depends on the type and number of PMEs to be adopted in different construction activities. The tentative plant inventory of PME required is provided in **Table 4.6**.

Table 4.6 Tentative Plant Inventory for the Key Construction Activities outside of PTWs Structures / Compartments

Construction Activities	PME Types	
Excavation and lateral supports (ELS)	▪ Excavator/loader ▪ Breaker / road ripper / hydraulic crusher ▪ Water Pump, Submersible (Electric) ▪ Piling, oscillator ▪ Power rammer	▪ Giken Piler ▪ Dump Truck with grab ▪ Mobile Crane ▪ Lorry, with crane/grab ▪ Air compressor ▪ Generator, super silenced
Bulk excavation	▪ Excavator/loader ▪ Breaker / road ripper / hydraulic crusher ▪ Dump Truck with grab	▪ Roller, Vibratory ▪ Water Pump, Submersible ▪ Generator
Steel fixing and concreting of structure	▪ Mobile crane ▪ Lorry, with crane/grab ▪ Bar bender and cutter	▪ Poker, vibratory, hand-held ▪ Concrete lorry mixer ▪ Generator
Backfilling	▪ Excavator/loader ▪ Dump Truck with grab ▪ Roller, Vibratory	▪ Water Pump, Submersible (Electric) ▪ Generator, super silenced
E&M Installations and associated pipeworks	▪ Mobile crane ▪ Lorry, with crane/grab	▪ Drill/Grinder, Hand-held ▪ Generator, super silenced

Construction Activities	PME Types	
Reinstatement and landscaping works	▪ Mobile crane ▪ Excavator/loader ▪ Generator, super silenced	▪ Poker, vibratory, hand-held ▪ Concrete lorry mixer

Note:

[1] Quiet equipment or QPME would be adopted where appliable and practicable.

4.4.1.2 In view of the proximity of the nearby NSRs, particularly N1 with less than 5m away from the Project site, adverse construction noise impact would be expected. In order to minimise the noise impact from the construction of proposed works without noise mitigation measures, appropriate noise mitigation measures as recommended in **Section 4.4.2**, including use of QPME / quieter construction methods, use of movable noise barrier / enclosure / acoustic mat / purpose-built barrier, proper scheduling of construction activities during examination period, and good site practices such as locating mobile plant as far away from NSRs as practicable, would be required. Site hoarding with higher surface density and height to provide extra noise attenuation should be also considered to protect the nearby NSRs, particularly N1 and N2. Based on the current design of the Project, construction works during restricted hours would not be required and alternative construction methods (e.g. bored piling) could be adopted for foundation. In case of any construction activities required during restricted hours or percussive piling works required, the Contractor should submit CNP application to the Noise Control Authority and abide by any conditions stated in the CNP. The Noise Control Authority will consider CNP application for construction works within restricted hours as guided by the relevant TMs issued under the NCO.

4.4.2 Recommended Construction Noise Control and Mitigation Measures

4.4.2.1 In view of the proximity of the nearby NSRs, construction noise exceedances would be anticipated in the absence of proper noise mitigation measure. Noise control requirements stipulated in *Recommended Pollution Control Clauses for Construction Contracts*, *Contract Specification for Noise Mitigation Measures* in Annex B of the PN 1/24 and *Contract Specifications for Imposition of Construction Noise Management Plan* in Annex C of the PN 1/24, as well as the below mitigation measures should be implemented in all work sites to ensure compliance of relevant noise criteria under the NCO and the PN 1/24. A construction noise management plan, covering the identification of noise source inventory and assessment of the effectiveness construction noise mitigation measures, should be prepared by the Contractor before the commencement of construction works.

Good Site Practices

4.4.2.2 Good site practices listed below should be adopted to abate noise impacts during the construction phase and noise control requirements stipulated in EPD's "Recommended Pollution Control Clauses for Construction Contracts" should be followed and included in the contract document:

- Only well-maintained PME to be operated on-site and should be serviced regularly during construction works;
- Silencers or mufflers on construction equipment should be utilised (if appropriate) and should be properly maintained during construction;
- Mobile plant, if any, should be sited as far away from NSRs as possible;

- Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;
- Plant known to emit noise strongly in one direction should, wherever possible, be orientated to direct noise away from the nearby NSRs; and
- Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

Use of Quality Powered Mechanical Equipment (QPME) or Quieter Construction Method

4.4.2.3 The use of QPME is considered a practicable means to mitigate the construction noise impact. QPME is defined as a PME having actual SWL lower than the value specified in the GW-TM.

4.4.2.4 Quieter construction method shall be considered and adopted as far as practical, such as bored piling as an alternative for percussive pilling, silent piling by press-in method as an alternative of traditional sheet piling, hydraulic crusher to substitute hydraulic breaker for demolition, road ripper to substitute breaker for ground breaking, self-compacting concrete for concreting, etc. Whilst it is generally considered too restrictive to specify that the Contractor has to use specific models or items of plant, it is reasonable and practicable to set plant noise performance specifications for specific PME so that some flexibility in selection of plant is allowed. A pragmatic approach would be to request the Contractor independently verifies the noise level of the plant proposed to be used and demonstrates through furnishing of these results, that the plant proposed to be used on the site meets the requirements. Particular specifications to adopt noise mitigation measures, including quieter construction methods and equipment for minimizing noise from the concerned noisy construction activities will be included in the contact document in accordance with the Annex B of the PN 1/24.

Use of Movable Noise Barrier, Noise Enclosure, Acoustic Mat and Purpose-built Barrier

4.4.2.5 Movable noise barriers that can be placed close to the construction equipment and moved along with the PME are effective for screening noise from NSRs. A typical design which has been used locally is a wooden framed barrier with a cantilevered upper portion of superficial density no less than 10 kg/m² on a skid footing with 25mm thick internal sound absorptive lining. This measure is particularly effective for low level zone of NSRs. A longer cantilevered top cover would be required to achieve screening benefits at upper floors of NSRs. Purpose-built acoustics barrier can be used to screen noise from particular items of PME or noisy construction activities. The Contractor shall be responsible for the design and actual position of the movable noise barriers with due consideration given to the position and size of the PME, and the requirement of intercepting the line-of-sight from the NSRs to the PME, as well as ensuring that the barriers should have no opening and gap. The direct line-of-sight between the PME and the NSRs should be totally screened by a substantial barrier such that the PME will not be visible when viewed from any window, door or other opening in any façade of the NSR. Reference shall be made to the EPD

webpage[1] for the design of noise barrier.

4.4.2.6 It is anticipated that properly designed movable noise barriers would achieve a 5 dB(A) reduction for mobile PME and a 10 dB(A) reduction for static PME while a purpose-built noise barrier would achieve a 10 dB(A) reduction. Acoustic mat with surface mass of not less than 7kg/m^2 would be used for plant items such as piler and a 10 dB(A) noise reduction is anticipated. The use of full enclosure has been considered in this assessment to shelter relatively static plant including ventilation fan. This type of enclosure is expected to provide approximately 15 dB(A) noise reduction.

Proper Scheduling of Construction Activities during Examination Period

4.4.2.7 The Contractor should keep close communication with the operator of Tai Po Old Market Public School (N1) to obtain the updated schedule of examination for proper scheduling of construction activities during the examination period to avoid and minimise the potential noise impacts.

4.5 Operational Fixed Plant Noise Impacts

4.5.1 Identification of Impacts

4.5.1.1 Potential fixed plant noise impacts would be anticipated from the operation of the proposed TPOMPSPS on the nearby NSRs (e.g. pump, transformer, ventilation fan and emergency generator) (**Figure 4.1** refers). Based on the latest engineering design, all the fixed plants of the proposed TPOMPSPS would be housed/enclosed in a concrete structure with soundproof doors and openings of the ventilation fans / louver would be facing away from the nearest NSRs, i.e. towards to the southern or western side of the Project site.

4.5.2 Assessment Approach and Methodology

4.5.2.1 Since detailed design information and noise specification of proposed fixed plants have yet to be confirmed, the maximum permissible noise levels (SWL), taking into account cumulative noise levels from other committed fixed noise sources, were determined for future detailed design of the fixed plant to ensure compliance with the relevant noise criteria. It is assumed that all the fixed plant within the same location would be operated simultaneously for the worst-case scenario. A positive 3 dB(A) is added to the predicted noise levels at the NSRs due to the façade effect. The following standard acoustic formula was used for calculating the Max SWL of the fixed plant.

$$SPL = Max\ SWL - DC + FC - BC + TC$$

Where*:*

SPL	*Sound Pressure Level, in dB(A)*
Max SWL	*Maximum Permissible SWL, in dB(A)*
DC	*Distance Attenuation, in dB(A) (i.e. 20logD + 8 [where D is the distance in metres])*
FC	*Façade Correction, in dB(A) (i.e. 3 dB(A))*
BC	*Barrier Correction, in dB(A)*
TC	*Tonality correction, in dB(A)*

[1] https://www.epd.gov.hk/epd/misc/construction_noise/contents/index.php/en/road-works/item/74-mitigation-measures/157-construction-noise-barrier.html

4.5.2.2 If the noise exhibits characteristics of tonality, intermittency or impulsiveness during the detailed design or the commissioning of the plant, the recommended maximum permissible SWL should be reviewed and adjusted as appropriate in accordance with the recommendation given in Section 3.3 of IND-TM.

4.5.3 Evaluation of Fixed Plant Noise Impacts

4.5.3.1 Determination of the maximum permissible sound power levels (SWL) of proposed fixed noise sources of the Project have been presented in **Appendix 4.1**. Given that the proposed fixed plants are properly designed to meet the maximum permissible sound power levels, no adverse fixed plant noise impact would be anticipated.

4.5.4 Fixed Plant Noise Mitigation Measures

4.5.4.1 Provided that the planned fixed plants are properly designed to meet the maximum permissible SWL, no adverse operational phase noise impacts would be anticipated. Nonetheless, the following best practices should be implemented as far as practicable to further minimise any potential impacts:

- Quieter plant should be chosen as far as practicable;
- Include noise levels specification when ordering new plant items;
- Locate fixed plant / louvres away from any NSRs as far as practicable;
- Locate fixed plant in walled plant rooms or in specially designed enclosures;
- Install direct noise mitigation measures including silencers, acoustic louvres and acoustic enclosure where necessary; and
- Develop and implement a regularly scheduled plant maintenance programme so that plant items are properly operated and serviced. The programme should be implemented by properly trained personnel.

4.5.4.2 The maximum permissible SWL in **Appendix 4.1** should be specified as design criteria of the proposed fixed noise sources in the contract documents. The Contractor should design and select equipment that could comply with the specified design criteria in the contract. A Compliance Test Report demonstrating the compliance of the NCO should be conducted before the operation of the Project.

4.6 Environmental Monitoring and Audit

4.6.1.1 With the implementation of the recommended mitigation measures in **Section 4.4.2**, no unacceptable residual construction noise impact would be anticipated. A construction noise management plan, covering the identification of noise source inventory and assessment of the effectiveness construction noise mitigation measures, should be prepared by the Contractor before the commencement of construction works. Weekly site audit should be carried out during the construction phase to ensure the recommended mitigation measures are being properly implemented.

4.6.1.2 Commissioning test should be conducted for the proposed fixed plant sources prior to operation of the Project to ensure compliance with the relevant noise standards.

4.7 Conclusion

4.7.1.1 During the construction phase, the use of PME for construction activities would have potential noise impact on nearby NSRs. With the implementation of recommended good site practices, noise mitigation measures, including use of QPME / quieter construction methods, use of movable noise barrier / enclosure / acoustic mat / purpose-built barrier, proper scheduling of construction activities during examination period, and good site practices such as locating mobile plant as far away from NSRs as practicable, site hoarding with higher surface density and height, and noise control requirements stipulated in Recommended Pollution Control Clauses for Construction Contracts, no adverse construction noise impact would be anticipated. A construction noise management plan, covering the identification of noise source inventory and assessment of the effectiveness construction noise mitigation measures, should be prepared by the Contractor before the commencement of construction works.

4.7.1.2 Provided that the planned fixed plants are properly designed to meet the maximum permissible SWL, no adverse noise impacts would be anticipated during the operational phase.

5 WATER QUALITY IMPACT

5.1 Environmental Legislation, Policies, Plans, Standards and Criteria

Water Quality Objectives under Water Pollution Control Ordinance (WPCO)

5.1.1.1 The Water Pollution Control Ordinance (WPCO) provides the major statutory framework for the protection and control of water quality in Hong Kong. According to the Ordinance and its subsidiary legislation, Hong Kong waters are divided into ten Water Control Zones (WCZs). Corresponding statements of Water quality objectives (WQOs) are stipulated for different water regimes (marine waters, inland waters, bathing beaches subzones, secondary contact recreation subzones and fish culture subzones) in each WCZ based on their beneficial uses. The Project site is located in the Tolo Harbour and Channel WCZ. Relevant WQOs for the Tolo Harbour and Channel WCZ are listed in **Table 5.1**.

Table 5.1 Summary of Water Quality Objectives for Tolo Harbour and Channel WCZ

Parameters	Objectives	Sub-Zone
Offensive odour, tints	Not to be present	Whole zone
Visible foam, oil scum, litter	Not to be present	Whole zone
Colour	Should not cause the colour of waters of the subzone to exceed 50 Hazen units at any time.	Inland Waters in Shing Mun (A, C, D, E, H, I), Tai Po (B, C) subzones and other watercourses
Dissolved oxygen (DO)	Not less than 4 mg/L or 40% saturation (at 15^0C) at any time	Inland Waters
pH	Not exceed the normal pH range of 6.0 – 9.0 at any time	Inland Waters in Shing Mun (D, E, I) subzones and other watercourses
Temperature	Not to cause the natural daily temperature range to be extended by greater than ±2.0 °C at any location or time.	Inland Waters
Chemical oxygen demand (COD)	Not exceed 30 mg/L at any time	Inland Waters in Shing Mun (A, C, D, E, H, I), Tai Po (B, C) subzones and other watercourses
5-day biochemical oxygen demand (BOD_5)	Not exceed 5 mg/L at any time	Inland Waters in Shing Mun (A, C, D, E, H, I), Tai Po (B, C) subzones and other watercourses
Suspended solids (SS)	Not to cause the annual median level to exceed 25 mg/L.	Inland Waters in Shing Mun (D, E, I) subzones and other watercourses
Settleable Material	Bottom deposits or submerged objects should not adversely influence bottom-living communities, alter the basic Harbour geometry or shipping channels, present any hazard to shipping or diving activities, or affect any other beneficial use of the waters.	Whole zone
Ammonia Nitrogen (NH_3-N)	Not to exceed 0.5 mg/L at any time	Inland Waters
E. coli Bacteria	Not exceed 1000 per 100mL, calculated as a running median of the most recent 5 consecutive samples taken at intervals of between 7 and 21 days (or 14 and 42 days)	Inland Waters in Shing Mun (A, C, D, E, H, I) and Tai Po (B, C) subzones and other watercourses
Toxic substances	Should not attain such a level as to produce significant toxic effects in humans, fish or any other aquatic organisms.	Whole zone

Source: Statement of Water Quality Objectives (Tolo Harbour and Channel Water Control Zone) for Watercourses.

Technical Memorandum on Effluents Discharge Standards

5.1.1.2 Discharges of effluents are subject to control under the WPCO. The "*Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters*" (TM-DSS), issued under Section 21 of the WPCO, gives guidance on permissible effluent discharges based on the type of receiving waters (foul sewers, storm water drains, inland and coastal waters). The limits control the physical, chemical and microbial quality of effluent. Any sewage from the proposed construction and operational activities shall comply with the relevant standards as given in the *TM-DSS*.

Practice Notes and Technical Circular

5.1.1.3 The Professional Persons Environmental Consultative Committee *Practice Note on Construction Site Drainage (ProPECC PN 2/23)* issued by EPD provides good practice guidelines for dealing with various types of discharge from a construction site. Practices outlined in the PN shall be followed as far as possible during construction to minimize the water quality impact due to construction site drainage.

5.1.1.4 Environment, Transport and Works Bureau (ETWB) Technical Circular (Works) [ETWB TC(Works)] No. 5/2005 "*Protection of natural streams / rivers from adverse impacts arising from construction works*" provides an administrative framework to better protect all natural streams/rivers from the impacts of construction works. The procedures promulgated under this Circular aim to clarify and strengthen existing measures for protection of natural streams/rivers from government projects and private developments. The guidelines and precautionary mitigation measures given in the ETWB TC (Works) No. 5/2005 should be followed as far as possible to protect the inland watercourse at or near the Project area during the construction phase.

Hong Kong Planning Standards and Guidelines

5.1.1.5 The Hong Kong Planning Standards and Guidelines (HKPSG), Chapter 9 (Environment), provides additional guidelines against water pollution for sensitive uses such as aquaculture and fisheries zones, bathing waters and other contact recreational waters.

5.2 Baseline Conditions

5.2.1 Water Sensitive Receivers

5.2.1.1 Lower Lam Tsuen River is the only water sensitive receiver (WSR) identified within 500 m from the Project site. It is situated at over 60m from the Project site alongside and south to the Tai Po Tai Wo Road as illustrated in **Figure 5.1**.

5.2.2 Inland Water Quality

5.2.2.1 A section of Lower Lam Tsuen River is located within the assessment area, the corresponding EPD river water quality monitoring results at Station TR12I, is shown in **Table 5.2**.

5.2.2.2 In general, the rivers in the Tai Po District achieved high WQO compliance in 2022. Lam Tsuen River, the major river draining through the urban area of Tai Po, achieved 97% compliance rate.

Table 5.2 Baseline Water Quality Condition for Lam Tsuen River in 2022

Parameters	Lam Tsuen River	WPCO WQO
	TR12I	(in inland waters)
Dissolved Oxygen (DO) (mg/L)	4.8 (3.8 – 7.6)	≥ 4 mg/L or 40% saturation (at 15℃)
pH	7.2 (7.1 – 7.5)	within 6.0 - 9.0
Suspended Solids (SS) (mg/L)	2.6 (1.3 – 6.0)	Annual median ≤ 25 mg/L
5-day Biochemical Oxygen Demand (BOD_5) (mg/L)	2.5 (1.1 – 4.4)	≤ 5 mg/L
Chemical Oxygen Demand (COD) (mg/L)	12(7 – 26)	≤ 30 mg/L
Oil & Grease (mg/L)	<0.5 (<0.5 - <0.5)	Not available
E. coli (cfu/100mL)	58 000 (18 000 – 150 000)	Running median of the most recent 5 consecutive samples taken at intervals of between 7 and 21 days (or 14 and 42 days): ≤ 1,000 cfu/100mL
Faecal Coliforms (cfu/100mL)	180 000 (62 000 – 530 000)	Not available
Ammonia Nitrogen (mg/L)	0.595 (0.093 – 1.400)	≤ 0.5 mg/L
Nitrate Nitrogen (mg/L)	0.610 (0.190 – 0.960)	Not available
Total Kjeldahl Nitrogen (mg/L)	0.88 (0.28 – 1.90)	Not available
Orthophosphate Phosphorus (PO_4-P) (mg/L)	0.044 (0.011 – 0.110)	Not available
Total Phosphorus (mg/L)	0.11 (0.06 – 0.22)	Not available
Sulphide (mg/L)	<0.02 (<0.02 –<0.02)	Not available
Aluminium (Al) (µg/L)	<50 (<50 – <50)	Not available
Cadmium (Cd) (µg/L)	<0.1 (<0.1 - 0.1)	Not available
Chromium (Cr) (µg/L)	1 (<1 – 3)	Not available
Copper (Cu) (µg/L)	2 (<1 – 5)	Not available
Lead (Pb) (µg/L)	<1 (<1 - <1)	Not available
Zinc (Zn) (µg/L)	13 (<10 – 20)	Not available
Flow (m^3/s)	NM	Not available

Notes:
1. Data source: EPD River Water Quality in Hong Kong in 2022
2. Data presented are in annual medians of monthly samples; except those for faecal coliforms and *E. coli* and which are in annual geometric means.
3. Equal values for annual medians (or geometric means) and ranges indicate that all data are the same as or below laboratory reporting limits.
4. Figures in brackets are annual ranges.
5. "NM" indicates no measurement taken.
6. cfu – colony forming unit

5.3 Assessment Methodology

5.3.1.1 The background information on the existing water systems were collected and reviewed. The WSRs that may be affected by the Project construction have been identified. Potential sources of water quality impact that may arise during the construction works were described. The identified sources of potential water quality impact on the WSRs were evaluated and their impact significance determined. Mitigation measures to reduce any identified adverse impacts to acceptable levels were recommended as necessary.

5.4 Identification and Evaluation of Potential Impacts

5.4.1 Construction Phase

5.4.1.1 Construction of the Project would only involve land-based construction works. No marine works would be required. Potential water quality impacts arising from the construction phase include:

- General construction activities;
- Construction site runoff;
- Construction works in close proximity of inland water;
- Accidental spillage of chemicals and potential contamination of surface water and groundwater; and
- Sewage effluent from construction workforce.

Wastewater from General Construction Activities

5.4.1.2 Wastewater generated from these inland construction activities may contain high suspended solids (SS) concentrations, as well as a certain amount of grease and oil. Potential water quality impacts due to uncontrolled wastewater discharge can be avoided if construction and site management practices are implemented to ensure that litter, fuels, and solvents do not enter the water environment. It is expected that if the good site practice suggested in **Section 5.5** are followed as far as practicable, the potential water quality impacts associated with construction activities would be minimal.

Construction Site Runoff

5.4.1.3 Potential pollution sources of site run-off may include:

- Run-off and erosion of exposed bare soil and earth, drainage channels, earth working areas and stockpiles;
- Wash water from dust suppression sprays and wheel washing facilities; and
- Fuel, oil and lubricants from maintenance of construction vehicles and equipment.

5.4.1.4 During rainstorms, site run-off would wash away the soil particles on unpaved lands and areas with topsoil exposed, if any. The run-off is generally characterised by high concentrations of SS. Release of uncontrolled site run-off would increase the SS levels and turbidity in the nearby water environment. Site run-off may also wash away soil particles that were contaminated by the construction activities and therefore cause water pollution.

5.4.1.5 Wind-blown dust would be generated from exposed soil surfaces in works areas. It is possible that wind-blown dust would fall directly onto the nearby water bodies when a strong wind occurs. Dispersion of dust within the works areas may increase the SS levels in surface run-off causing a potential impact to the nearby sensitive receivers.

5.4.1.6 It is important that proper site practice and good site management should be followed to prevent run-off with high level of SS from entering the surrounding waters. Best Management Practices (BMPs) in controlling construction site discharges are recommended in **Section 5.5**. With the implementation of BMPs to control run-off and drainage from the construction site, disturbance of water bodies would be avoided and deterioration in water quality would be minimal.

Construction Works in Close Proximity to Inland Water

5.4.1.7 Construction activities in close vicinity to the inland watercourses may impact water quality due to the potential uncontrolled release of construction waste and wastewater. Construction waste and wastewater are generally characterised by high SS concentration and elevated pH. The implementation of adequate construction site drainage and BMPs, as well as provision of precautionary measures / practices to minimise the water quality impacts on surface water systems as specified in ETWB TC(Works) No. 5/2005 "*Protection of natural streams / rivers from adverse impacts arising from construction works*" as described in **Section 5.5.1**, it is anticipated that water quality impacts would be minimal.

Sewage Effluent from Construction Workforce

5.4.1.8 During the construction of the Project, the workforce on site will generate sewage effluent, which is characterised by high levels of biochemical oxygen demand (BOD), ammonia and *E. coli* counts. Potential water quality impacts upon the local drainage and freshwater system may arise from these sewage effluents, if uncontrolled.

5.4.1.9 Temporary sewage generation can be adequately treated by interim sewage treatment facilities, such as portable chemical toilets. Provided that sewage is not discharged directly into storm drains or inland waters adjacent to the construction site, temporary sanitary facilities are used and properly maintained, and control measures as recommended in **Section 5.5** are adopted as far as practicable, it is unlikely that sewage generated from construction workforce would have a significant water quality impact.

Accidental Spillage of Chemicals and Potential Contamination of Surface Water and Groundwater

5.4.1.10 The use of engine oil and lubricants, and their storage as waste materials has the potential to create impacts on the water quality of adjacent inland water bodies or storm drains if spillage occurs. Waste oil may infiltrate into the surface soil layer, or run-off into local water courses, increasing hydrocarbon levels. Groundwater pollution may also arise from the improper use and storage of chemicals and petroleum products within the site area where groundwater infiltrates into the area. Infiltration of groundwater may occur at area where there are faults and / or fissures in the rock mass. The potential impacts could however be avoided by practical precautionary measures and good site practices (as given in **Section 5.5**).

5.4.2 Operational Phase

5.4.2.1 The proposed TPOMPSPS aims to mitigate the existing flooding risk in Tai Po and has not expanded its drainage catchment in the Tai Po district. The operation of the Project does not constitute any elements that would be water pollution sources and would not generate any new pollution load to the catchment. No water quality impact would be expected during the operational phase.

5.5 Mitigation Measures

5.5.1 Construction Phase

Wastewater from General Construction Activities and Construction Site Run-off

5.5.1.1 Control of potential pollution of nearby water bodies during the construction phase of the Project should be achieved by measures to:

- prevent or minimise the likelihood of pollutants (generated from construction activities) being in contact with rainfall or run-off; and
- abate pollutants in the stormwater surface run-off prior to the discharge of surface run-off to the nearby water bodies.

5.5.1.2 These principal objectives should be achieved by implementation of the BMPs of mitigation measures in controlling water pollution. The guidelines for handling and disposal of construction site discharges as detailed in the ProPECC PN 2/23 should be followed, where applicable. Discharge license will be obtained according to the WPCO requirements before any wastewater discharge from the site to storm drains or foul sewers. All site discharges will be pre-treated as necessary, in accordance with the WPCO, the conditions of the WPCO discharge license and the relevant standards listed in the TM-DSS.

5.5.1.3 The Contractor should follow the practices, and be responsible for the design, construction, operation and maintenance of all the mitigation measures as specified in *ProPECC PN 2/23*. The design of the mitigation measures should be submitted by the Contractor to the engineer for approval. These mitigation measures should include the following practices to minimise site surface runoff and the chance of erosion, and to retain and reduce any suspended solids prior to discharge:

- At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sandbag barriers should be provided on site to direct storm water to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the Contractor prior to the commencement of construction.
- Sand / silt removal facilities such as sand / silt traps and sediment basins should be provided to remove sand / silt particles from runoff to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 2/23, which states that the retention time for silt / sand traps should be 5 minutes under maximum flow conditions. The detailed design of the sand / silt traps shall be undertaken by the Contractor prior to the commencement of construction.
- All drainage facilities and erosion and sediment control structures should always be regularly inspected and maintained to ensure proper and efficient operation and particularly during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.
- Measures should be taken to minimise the ingress of site drainage into excavations. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities.
- If surface excavation works cannot be avoided during the wet season (April to October), temporarily exposed slope / soil surfaces should be covered by a tarpaulin or other means, as far as practicable, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Interception channels should be provided (e.g. along the crest / edge of the excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. Other measures that need to be implemented before, during and after rainstorms are summarised in ProPECC PN 2/23.
- All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facility should be provided at every construction site exit where practicable. Wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains.
- Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms.

5.5.1.4 Debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby water bodies and public drainage system. Stockpiles of cement and other construction materials should be kept covered when not being used.

Construction Works in Close Proximity of Inland Waters and Potential Diversion / Rerouting of Watercourse

5.5.1.5 The precautionary measures / practices outlined in ETWB TC (Works) No. 5/2005 "*Protection of natural streams / rivers from adverse impacts arising from construction works*" should also be adopted where applicable to minimise the water quality impacts on any surface water systems. Relevant precautionary measures / practices from the ETWB TC (Works) No. 5/2005 include but not limited to the following:

- The use of less or smaller construction plants may be specified in areas close to the watercourses to reduce the disturbance to the surface water.
- Temporary storage of materials (e.g. equipment, chemicals and fuel) and temporary stockpile of construction materials should be located well away from any water courses when carrying out of the construction works.
- Stockpiling of construction materials and dusty materials should be covered and located away from any watercourses.
- Construction debris and spoil should be covered up and / or disposed of as soon as possible to avoid being washed into the nearby water receivers.
- Proper shoring may need to be erected in order to prevent soil or mud from slipping into the watercourses.

Sewage Effluent from Construction Workforce

5.5.1.6 No direct discharge of sewage to the stormwater drains and inland water will be allowed. Adequate and sufficient portable chemical toilets should be provided in the works areas to handle sewage from construction workforce. A licensed collector should be employed to clean and maintain the chemical toilets on a regular basis.

Accidental Spillage of Chemicals and Potential Contamination of Surface Water and Groundwater

5.5.1.7 Oils and fuels should only be used and stored in designated areas, which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby storm water drain or watercourse, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. Rainwater in the bunds should be cleared after each rain event. Waste oils, fuels and solvents collected within the bund should be handled and treated as chemical waste in accordance with the Waste Disposal (Chemical Waste) (General) Regulation and relevant guidelines (e.g. the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes) as detailed in **Section 6**.

5.6 Environmental Monitoring and Audit

5.6.1.1 No adverse water quality impact would be anticipated during the construction phase. Thus, water quality monitoring is considered not necessary. However, weekly site audit is recommended to be undertaken during the construction phase to ensure the proposed mitigation measures in **Section 5.5** are implemented in an appropriate manner and are effective.

5.6.1.2 No adverse water quality impacts would be anticipated during the operational phase that no EM&A requirement is considered necessary.

5.7 Conclusion

5.7.1.1 Water quality impacts would mainly arise from land-based construction activities, including wastewater generated from general construction activities, construction site run-off, accidental spillage of chemicals and potential contamination of surface water and groundwater, and sewage from construction workforce. Impacts can be controlled by implementing the recommended mitigation measures. No adverse water quality impact during construction phase would be anticipated.

5.7.1.2 The operation of the Project does not constitute any elements that would be water pollution sources and would not generate any new pollution load to the catchment. No water quality impact would be expected during the operational phase.

6 WASTE MANAGEMENT IMPLICATIONS

6.1 Environmental Legislation, Standards and Guidelines

6.1.1 General

6.1.1.1 The following legislation relates to the handling, treatment and disposal of wastes in the Hong Kong Special Administrative Region (HKSAR) and has been used in assessing potential impacts:

- Waste Disposal Ordinance WDO (Cap. 354)
- Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C)
- Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N);
- Land (Miscellaneous Provisions) Ordinance (Cap. 28);
- Public Health and Municipal Services Ordinance (Cap. 132) - Public Cleansing and Prevention of Nuisances Regulation; and
- Dumping at Sea Ordinance (Cap. 466).

Waste Disposal Ordinance (Cap. 354)

6.1.1.2 The *Waste Disposal Ordinance (WDO)* prohibits any unauthorised disposal of wastes. Construction waste is defined under Cap. 354N of the *WDO* as any substance, matter or thing that is generated and abandoned from construction works regardless of if it has been processed or stockpiled before being abandoned, excluding sludge, screenings or any matter removed or generated from desludging, desilting or dredging works. Under the *WDO*, waste can be disposed of only at designated waste disposal facilities licensed by the EPD.

Waste Disposal (Chemical Waste) (General) Regulation (Cap.354C)

6.1.1.3 Issued under the *WDO*, the *Waste Disposal (Chemical Waste) (General) Regulation (Cap.354C)* controls the possession, storage, collection, transport and disposal of chemical wastes. EPD has also issued three guidelines detailing the Contractor should comply with the regulations on chemical wastes, namely *A Guide to the Chemical Waste Control Scheme (2016), A Guide to the Registration of Chemical Waste Producers (2016) and Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes and its Addendum (1992 & 2022)*.

Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap.354N)

6.1.1.4 Under the *Waste Disposal (Charges for Disposal of Construction Waste) Regulation*, construction waste delivered to a landfill for disposal must not contain more than 50% by weight of inert material. Construction waste delivered to a sorting facility for disposal must contain more than 50% by weight of inert material, and construction waste delivered to a Public Fill Reception Facilities (PFRF) for disposal must consist entirely of inert material.

Land (Miscellaneous Provisions) Ordinance (Cap.28)

6.1.1.5 The inert portion of Construction and Demolition (C&D) materials (including rocks, soil, broken concrete, building debris, etc.) may be taken to Public Fill Reception Facilities (PFRFs) operated by the Civil Engineering and Development Department (CEDD). These facilities usually form part of land reclamation schemes and are operated by the CEDD. The *Land (Miscellaneous Provisions) Ordinance* requires that individuals or companies who deliver public fill to the public filling facilities are required to obtain Dumping Licences. The licences are issued by the CEDD under delegated authority from the Director of Lands.

Public Health and Municipal Services Ordinance

6.1.1.6 *The Public Cleansing and Prevention of Nuisances Regulation* (Cap. 132BK) under the *Public Health and Municipal Services Ordinance* provides control on illegal dumping of wastes on unauthorised / unlicensed sites. The illegal dumping of wastes can lead to a fine and / or imprisonment.

Dumping at Sea Ordinance (Cap. 466)

6.1.1.7 This Ordinance came into operation in April 1995 and empowers the Director of Environmental Protection (DEP) to control the disposal and incineration of substances and particles at sea for the protection of the marine environment. Under the Ordinance, a dumping permit from the DEP is required for the disposal of regulated substances within and outside the waters of Hong Kong. The permit contains terms and conditions which include the following specifications, but not limited to:

- Type and quantity of substances permitted to be dumped;
- Location of the disposal grounds;
- Requirement of equipment for monitoring the disposal operations; and
- Environmental monitoring requirements.

6.1.1.8 Marine disposal of any dredged/excavated sediment is subject to control under the Dumping at Sea Ordinance (DASO). Dredge/excavated sediment destined for marine disposal is classified based on its contaminant levels with reference to the Paragraph 4.2.1 of Chapter 4 of the PAH, 2022 Version – Management of Dredged/Excavated Sediment [previously Environment, Transport and Works Bureau Technical Circular (Works) No. 34/2002 – Management of Dredged/Excavated Sediment (ETWB TC(W) No. 34/2002)]. Paragraph 4.2.1 of Chapter 4 of the PAH stipulated a set of sediment quality criteria or Chemical Exceedance Levels (CEL) for contaminants including metals, metalloid and organic pollutants.

6.1.2 Other Relevant Environmental Guidelines

6.1.2.1 Other relevant circulars / guidelines are applicable to waste management practices for the Project include:

- Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992), EPD;
- A Guide to the Chemical Waste Control Scheme;
- A Guide to the Registration of Chemical Waste Producers;
- Environment, Transport and Works Bureau Technical Circular (Works) [ETWB TC(W)] No. 19/2005 'Environmental Management on Construction Site';
- Development Bureau Technical Circular (Works) [DEVB TC(W)] No.06/2010 'Trip Ticket System for Disposal of C&D Materials';

- DEVB TC(W) No. 2/2011 'Encouraging the Use of Recycled and other Green Materials in Public Works Projects';
- DEVB TC(W) No. 9/2011 'Enhanced Control Measures for Management of Public Fill';
- DEVB TCW No. 08/2010 'Enhanced Specification for Site Cleanliness and Tidiness';
- Works Branch Technical Circular (WBTC) No. 2/93 'Public Dumps';
- WBTC No. 2/93B 'Public Filling Facilities';
- WBTC No. 16/96 'Wet Soil in Public Dumps';
- WBTC No. 12/2000 'Fill Management';
- Project Administration Handbook (PAH) for Civil Engineering Works, Section 4.1.3 of Chapter 4, 2022 Edition; and
- CEDD TC No. 11/2019 'Management of Construction and Demolition Materials'.

6.1.2.2 The current policy related to the dumping of C&D materials is documented in the *WBTC No. 2/93, Public Dumps*. C&D materials that are wholly inert, namely public fill, should not be disposed of to landfill, but taken to public filling areas for reuse.

6.1.2.3 The *ETWB TC(W) No. 19/2005 on Environmental Management on Construction Site* includes procedures on waste management requiring contractors to reduce the C&D materials to be disposed of during the course of construction, the *Project Administrative Handbook for Civil Engineering Works, Section 4.1.3 "Management of Construction and Demolition Material Including Rock" (2016 Edition)* published by CEDD to enhance the management of C&D materials and to minimise their generation at source. The enhancement measures include drawing up a Construction and Demolition Material Management Plan (C&DMMP) at an early design stage to minimise C&D materials generation and encourage proper management of such materials. Projects generating less than 50,000m^3 C&D materials or importing less than 50,000m^3 of fill material are exempted from the C&DMMP. Under *ETWB TC(W) No. 19/2005*, the contractor is required to prepare and implement an Environmental Management Plan (EMP) and the Waste Management Plan (WMP) becomes part of the EMP.

6.1.2.4 Under *DEVB TCW No. 6/2010 'Trip Ticket System for Disposal of Construction and Demolition Materials'*, for all contracts that are expected to generate inert C&D materials requiring disposal from site, the project office shall write to the Public Fill Committee (PFC) through Secretary of the PFC to request a designated disposal ground for incorporation into the tender documents. For contracts where the estimated amount of non-inert C&D materials requiring disposal at landfill facilities equals to or exceeds 50 m^3, the project office shall seek confirmation from the DEP in terms of the availability of landfill facilities for disposal of such materials and the DEP will designate landfill facilities, if available, for the contracts. For contracts where the estimated amount of non-inert C&D materials to be generated from the contract is less than 50 m^3, the project office is not required to apply to DEP for designated landfill facilities but it should still specify in the tender documents of the appropriate landfill facilities for disposal.

6.2 Identification and Evaluation of Environmental Impacts

6.2.1 Construction Phase

6.2.1.1 The construction of the Project would mainly involve site clearance, excavation and lateral Support (ELS), foundation works, steel fixing and concreting of structure, backfilling, electrical and mechanical (E&M) installation and associated pipeworks, and reinstatement and landscaping works. These activities would generate a variety of wastes that can be divided into distinct categories based on their composition and ultimate method of disposal. The identified waste types include:

- Construction and Demolition (C&D) materials;
- Chemical waste;
- General refuse; and
- excavated sediment (if any).

C&D Materials

6.2.1.2 C&D materials would mainly be generated from excavation works during site clearance and formation works and construction of new buildings and infrastructure. The C&D materials would both comprise inert C&D materials (e.g. soil, rock and concrete, etc.) and non-inert C&D materials (e.g. timber, paper, etc.) generated. Estimated volumes of the waste materials are summarised in **Table 6.1** below. With the implementation of the recommended measures in **Section 6.3**, adverse environmental impacts arising from the storage, handling, and transportation of C&D materials would not be anticipated.

Table 6.1 Estimated Quantities of Different Types of C&D Materials

Type of C&D Materials	Amount of Waste Generated (m^3)
Inert C&D Materials To be Reused in the Project	6,600
Inert C&D materials to be delivered to public fill reception facilities (PFRF) for beneficially reuse in other projects	54,730
Marine deposits	22,670
Non-inert C&D materials to be reused, recycled or disposed of at landfill*	2,000
All C&D materials	86,000

Note:
* It is difficult to quantify the amount of non-inert C&D materials that would arise from the construction activities as it would be highly dependent on the contractor's on-site maintenance activities The non-inert C&D materials would be reused and recycled as much as possible before disposal of at landfill.

6.2.1.3 It is the Contractor's responsibility to separate the inert and non-inert C&D materials on-site. The inert C&D materials should be reused on-site as far as possible to minimise the net amount of inert C&D materials generated from the Project. The surplus inert C&D materials shall be delivered to public fill reception facility (PFRF) for beneficial reuse in other projects. The designated disposal site of inert C&D materials shall be confirmed with the Public Fill Committee of CEDD.

A Construction and Demolition Material Management Plan (C&DMMP) will be prepared and submitted to Public Fill Committee for approval in accordance with Project Administration Handbook for Civil Engineering Works. It is estimated that a maximum of about 15 truck trips[1] per day will be required to dispose of these materials off-site during the construction phase.

6.2.1.4 The non-inert C&D material would be reused and recycled as much as possible before disposal of at strategic landfill. The non-inert C&D materials would be disposed of at North East New Territories (NENT) Landfill via Tai Po Tai Wo Road, Tolo Highway and Fanling Highway. The disposal of non-inert C&D materials would require a maximum of 15 truck trips per day. CEDD shall enquire with EPD on the availability of landfill and acceptability of the waste.

6.2.1.5 The contractor is required to prepare and implement a Waste Management Plan (WMP) as part of the EMP. With the implementation of proper management for C&D materials and good site practices, no unacceptable environmental impacts due to handling and disposal of C&D materials arising from the Project would be anticipated.

Chemical Waste

6.2.1.6 The maintenance and servicing of construction plant and vehicles may generate some chemical wastes such as waste oil / grease, spent solvents / solutions, used oil filter and scrap batteries etc. It is difficult to quantify the amount of chemical waste that would arise from the construction activities as it would be highly dependent on the contractor's on-site maintenance activities and the quantity of plant and equipment utilized. In view of the small scale of works at each Project site, it is anticipated that the quantity of chemical waste generated would be limited in the order of a few cubic meters. The amount of chemical waste to be generated would be quantified in the WMP to be prepared by the Contractors.

6.2.1.7 Since the construction activities would be carried out in close proximity to watercourse and the sea, chemical wastes arising during the construction phase may pose environmental, health and safety hazards if not stored or disposed of in an appropriate manner as stipulated in the *Waste Disposal (Chemical Waste) (General) Regulations (Cap. 354C)*. Materials classified as chemical waste shall require special handling and storage arrangements by the Contractor. All chemical waste shall be collected by a licensed chemical waste collector and be disposed at a licensed chemical waste treatment and disposal facility such as Chemical Waste Treatment Centre (CWTC) at Tsing Yi. Unused chemical or those with remaining functional capacity would be reused and recycled on site or by licensed companies whenever possible. Mitigation and control requirements for chemical wastes are detailed in **Section 6.3**. Provided that the handling, storage and disposal of chemical wastes are to be in accordance with these requirements and the *Code of Practice on Packaging, Labelling and Storage of Chemical Wastes* published by EPD, adverse environmental impacts would not be anticipated.

General Refuse

1 Assuming a construction truck with a capacity of 7.5m^3, material bulking factor of 1.1 for general fill and 1.4 for non-inert C&D materials.

6.2.1.8 During the construction phase of the Project, the workforce will generate general refuse comprising food waste, wastepaper, empty containers, etc. Improper collection or removal of general refuse would give rise to hygiene problems and adverse environmental impacts to nearby sensitive uses, e.g. odour impacts. It is estimated that the number of workers would be up to 30 at the Project site. Based on the generation rate of 0.65 kg per worker per day, it is estimated no more than 19.5 kg general refuse per day would be generated from the construction of the Project. The amount of general refuse to be generated should be updated and quantified in the WMP to be prepared by the Contractors.

6.2.1.9 The general refuse should be collected on-site regularly, separately from C&D materials by an appropriate waste collector employed by the Contractor. Prior to disposal off-site, such refuse will be temporarily put in suitably covered storage areas / bins where they will have to be regularly cleaned and maintained to avoid attracting vermin and pests. With proper on-site handling and storage as and regular disposal of the waste, no unacceptable environmental impact (including potential hazard, air and odour emissions, noise and wastewater discharges) or public transport impact would be anticipated. Recommendations of mitigation measures for managing general refuse are presented in **Section 6.3.1.11**.

6.2.1.10 The proposed Project site falls on reclaimed land. The proposed excavation depth for the construction of the underground stormwater storage tank is approximately 18 m below ground level (bgl). Desktop study based on the nearest available ground investigation (GI) records (**Appendix 6.1** refers) was carried out. The construction of the underground stormwater storage tank would therefore require the excavation of the underlying land-based marine deposits if present. However, the existing GI was far from our Project Site and we arrange additional GI to verify the geological profile (**Appendix 6.2** refers).

6.2.1.11 GI was arranged in the design phase. However, as the Tai Po Old Market Playground was open to public and only few areas which minimize the impact to the public were allowed to conduct the GI, and trees are identified on the location of the proposed discharge chamber, as shown in **Appendix 6.2.** The GI locations shown in **Appendix 6.2** can give an insight of the geological profile and the sediment location on the Project Site. The SSTP would be prepared in the next stage prior to the commencement of the construction works. After the access to the Project Site, clearance works can be carried out and relevant environmental GI can be proposed under the SSTP submission.

6.2.1.12 A Sediment Sampling and Testing Plan (SSTP) would be prepared with reference to *Paragraph 4.2.1 of Chapter 4 of the PAH* and submitted to EPD for review and agreement. The sediment sampling results and recommended disposal method of any excavated sediment will be reported in a standalone Sediment Quality Report (SQR).

6.2.1.13 Based on the findings from the recent GI in **Appendix 6.2**, it is found that the marine deposit was encountered at 5.1m bgl and 6m bgl (i.e. +0.4mPD and -0.5mPD) and the depths of the sediment ranges from 6.7m and 4.2m. The proposed excavation area is about 4,160m^2 and the average depth of the sediment is about 5.45m. The estimated excavation volume of sediment is about 22,670m^3.

6.2.1.14 Comparing to the findings from desktop study, marine deposit / marine sand with top levels ranging from 2.5 m bgl to 6.0 m bgl (i.e. from +3.1mPD to -0.4mPD), and the thickness of marine sediment ranges from 4.0m to 8.5m are found under the desktop study. The encounter level which is located about 5m to 6m bgl is similar to the desktop study, and the marine sediment ranges from 4.2m to 6.7m

reflected from the GI record is similar to the desktop study.

6.2.1.15 Excavation of sediment should be minimised and any excavated sediment should be reused on-site as far as possible (e.g. as backfilling materials). Any excavated sediment, in particular uncontaminated sediment, should be reused as far as possible. Subject to the classification of sediment based on its contaminant levels, the sediment may need to be treated for reuse on-site. If marine disposal of sediment is required, the sediment should be disposed of at the designated marine disposal sites in accordance with *Paragraph 4.2.1 of Chapter 4 of the PAH*. Sediment, if any, should be excavated, handled, transported and disposed of in a manner that would minimise adverse environmental impacts.

6.2.2 Operational phase

6.2.2.1 During the operational phase of the Project, regular maintenance / desilting works of stormwater tanks and pump chambers of the proposed TPOMPSPS would be carried out by the DSD to remove excessive silts, debris and any obstructions to safeguard the hydraulic performance of the facilities. Small amount of silt, debris and screenings, which would be similar in nature to general refuse, would be generated from the operation and routine maintenance works. Such waste will be disposed of at landfill after the clearance works.

6.2.2.2 Very small amount of chemical waste, in the order of less than a cubic meter each time, would be generated during maintenance works and would be properly stored, labelled and removed by licensed waste collectors. No unacceptable environmental impact (including potential hazard, air and odour emissions, noise and wastewater discharges) and public transport impact would thus be anticipated.

6.3 Environmental Protection and Mitigation Measures

6.3.1 Construction Phase

Waste Management Hierarchy

6.3.1.1 The waste management hierarchy has been applied in the assessment and development of mitigation measures for waste which aims at evaluating the desirability of waste management methods and includes the followings in descending preference:

- Avoidance and reduction of waste generation;
- Reuse of materials as far as practicable;
- Recovery and recycling of residual materials where possible; and
- Treatment and disposal according to relevant laws, guidelines and good practices.

6.3.1.2 Good site practices and waste reduction measures to achieve avoidance and minimisation of waste generation in the hierarchy are recommended as follow.

Good Site Practices

6.3.1.3 Adverse impacts would not arise in the construction site, provided that good site practices are strictly followed. Recommendations for good site practices during the construction phase include:

- Nomination of approved personnel, such as a site manager, to be responsible for implementation of good site practices, arrangements for waste collection and effective disposal to an appropriate facility;

- Training of site personnel in site cleanliness, concepts of waste reduction, reuse and recycling, proper waste management and chemical waste handling procedures;
- Provision of sufficient waste reception / disposal points, and regular collection of waste;
- Adoption of appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;
- Provision of regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors;
- Adoption of a recording system for the amount of wastes generated, recycled and disposed (including the disposal sites); and
- Preparation of WMP, as a part of the EMP in accordance with ETWB TC(W) No. 19/2005 "Environmental Management on Construction Sites" for submission to the Architect/Engineer for approval.

Waste Reduction Measures

6.3.1.4 Good management and control of construction site activities / processes can minimise the generation of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction are discussed as follow:

- Segregate and store different types of construction related waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- Provide separate labelled bins to segregate recyclable waste such as aluminium cans from other general refuse generated by the work force, and to encourage collection by individual collectors;
- Recycle any unused chemicals or those with remaining functional capacity;
- Maximise the use of reusable steel formwork to reduce the amount of C&D materials;
- Adopt proper storage and site practices to minimise the potential for damage to, or contamination of construction materials;
- Plan the delivery and stock of construction materials carefully to minimise the amount of waste generated; and
- Minimise over ordering and wastage through careful planning during purchasing of construction materials.

6.3.1.5 In addition to the above good site practices and waste reduction measures, specific mitigation measures are recommended below for the identified waste arising to minimise environmental impacts during the handling, transportation and disposal of these waste.

Reducing and Reuse of C&D Materials

6.3.1.6 Careful design, planning together with good site management can reduce over-ordering and generation of C&D materials such as concrete, mortar and cement grouts. Formwork should be designed to minimise the use of standard wooden panels, so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing should be considered to increase the potential for reuse.

6.3.1.7 To minimise off-site disposal of inert C&D materials, the excavated inert materials with suitable characteristics / size should be reused on-site as fill material as far as practicable. The surplus inert C&D materials would be transported and delivered to public fill reception facility for beneficial reuse as filling material by other projects. Prior to disposal of non-inert C&D materials, wood, steel and other metals should also be separated for reuse and / or recycle where practicable so as to minimise the quantity of waste to be disposed of at landfill.

Storage of C&D Materials

6.3.1.8 Suitable areas should be designated within the works site boundaries for temporary stockpiling of C&D materials. Within stockpile areas, the following measures should be taken to control potential environmental impacts or nuisance:

- cover material during heavy rainfall;
- locate stockpiles to minimise potential visual impacts; and
- minimise land intake of stockpile areas as far as possible.

Disposal of C&D Materials

6.3.1.9 In order to monitor the disposal of C&D materials at the designated public fill reception facility and landfill and to control fly-tipping, a trip-ticket system should be included. One may make reference to DEVB TC(W) No.06/2010 for details. A recording system for the amount of waste generated, recycled and disposed, including the disposal sites, should also be set up. Warning signs should be put up to remind the designated disposal sites. CCTV should also be installed at the vehicular entrance and exit of the site as additional measures to prevent fly-tipping. When delivering inert C&D materials at a public fill reception facility for beneficial reuse, the material shall only consist of soil, rock, concrete, brick, cement plaster / mortar, inert building debris, aggregates and asphalt, and be free from marine mud, household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered to be unsuitable by the Filling Supervisor. GPS or equivalent systems are recommended to be equipped to all dump trucks for real-time tracking and monitoring of transportation of inert C&D materials to designated locations as one of the practicable means of avoiding illegal dumpling and landfilling.

Chemical Wastes

6.3.1.10 If chemical waste is produced at the construction site, the Contractor would be required to register with the EPD as a Chemical Waste Producer and must follow the guidelines stated in the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidising, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed chemical waste collector to transport and dispose of the chemical wastes at a licensed chemical waste treatment and disposal facility such as CWTC at Tsing Yi in accordance with the *Waste Disposal (Chemical Waste) (General) Regulation*.

General Refuse

6.3.1.11 General refuse should be stored in enclosed bins or compaction units separate from C&D materials and chemical wastes. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from C&D materials and chemical wastes, on a regular basis to minimise odour, pest and litter impacts. The collected general refuse will be disposed of at designated landfill. Clearly labelled recycling bins should be provided on site in order to encourage segregation and recycling of aluminium and plastic wastes, and wastepaper in order to reduce general refuse production. The contractor should carry out an education programme for workers in avoiding, reducing, reusing and recycling of materials generation. Posters and leaflets advising on the use of the bins should also be provided onsite as reminders. The recyclable waste materials should then be collected by reliable waste recycling agents on a regular basis.

Excavated Sediment

6.3.1.12 The sediment should be excavated, handled, transported and disposed of in a manner that would minimise adverse environmental impacts.

6.3.1.13 For off-site disposal, the basic requirements and procedures specified under *Paragraph 4.2.1 of Chapter 4 of the PAH* shall be followed. Marine Fill Committee (MFC) of CEDD is managing the disposal facilities in Hong Kong for the dredged / excavated sediment, while EPD is the authority of issuing marine dumping permit under the Dumping at Sea Ordinance (DASO).

6.3.1.14 For the purpose of site allocation and application of marine dumping permit, a Sediment Sampling and Testing Plan (SSTP) has been submitted to EPD for agreement under DASO. Site investigation works, based on the agreed SSTP, will be carried out in order to confirm the disposal arrangements of the excavated sediment. A Sediment Quality Report (SQR), reporting the chemical and biological screening results and the estimated quantities of sediment under different disposal options, shall then be submitted to EPD for agreement under DASO. The excavated sediments would be disposed of according to its determined disposal options and *Paragraph 4.2.1 of Chapter 4 of the PAH*.

6.3.1.15 To ensure disposal space is allocated for the Project, the project proponent should be responsible for obtaining agreement from MFC on the allocation of the disposal site. The contractor(s), on the other hand, should be responsible for the application of the marine dumping permit under DASO from EPD for the sediment disposal.

6.3.1.16 In order to minimise the potential odour / dust emissions during excavation and transportation of the sediment, the excavated sediments shall be wetted during excavation / material handling and shall be properly covered when placed on trucks or barges. Loading of the excavated sediments to the barge shall be controlled to avoid splashing and overflowing of the sediment slurry to the surrounding water.

6.3.1.17 If applicable, the barge transporting the sediments to the designated disposal sites shall be equipped with tight fitting seals to prevent leakage and shall not be filled to a level that would cause overflow of materials or laden water during loading or transportation. In addition, monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the DEP.

6.3.2 Operation Phase

6.3.2.1 The main type of wastes generated during operational phase would be silt and debris, which would be similar in nature to general refuse, as well as limit amount of chemical waste, from the maintenance of drains. The waste generated from the maintenance of the proposed drains should be stored in enclosed bins or compaction units separately. Likewise, measures stipulated in the *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes* should be strictly followed for the handling and disposal of chemical waste.

6.4 Environmental Monitoring and Audit

6.4.1.1 Waste management would be the contractor's responsibility to ensure that all wastes produced during the construction of the Project are handled, stored and disposed of in accordance with good waste management practices and EPD's regulations and requirements. The recommended mitigation measures in **Section 6.3** should form the basis of the site's WMP, as part of EMP, to be developed by the Contractors and submitted to Engineer for approval before construction in accordance with ETWB TCW No. 19/2005. Regular inspection should be conducted to ensure proper management and handling of waste, and appropriate implementation of the mitigation measures.

6.4.1.2 No EM&A requirement is considered necessary during the operational phase.

6.5 Conclusion

6.5.1.1 During construction phase, waste types generated from the Project are likely to include inert and non-inert C&D materials from construction and excavation works, chemical wastes from the maintenance of construction works and vehicles, and general refuse from the workforce. Subject to the results of the GI works to be conducted upon agreement of the SSTP, land-based sediment may be generated during excavation works. Provided that these wastes are handled, transported and disposed of according to the recommended good site practices and mitigation measures, no adverse environmental impacts (including potential hazard, air and odour emissions, noise and wastewater discharges) would be anticipated during the construction phase.

6.5.1.2 During the operational phase, small quantities of silt and debris, as well as chemical wastes would be anticipated from the maintenance of drains. With implementation of the recommended mitigation measures, adverse environmental impacts would not be anticipated during the operational phase.

7 ECOLOGICAL AND FISHERIES

7.1 Environmental Legislation, Policies, Plans, Standards and Criteria

7.1.1.1 This section makes reference to the following ordinances, regulations, standards, guidelines and documents when identifying ecological importance of habitats and species and identifying implications of the Project on ecological resources:

- Environmental Impact Assessment Ordinance (EIAO) (Cap. 499)
- EIAO-TM and Annexes 8 and 16 of EIAO-TM
- EIAO Guidance Note Nos. 3/2010, 6/2010, 7/2010 and 10/2010
- Country Parks Ordinance (Cap. 208)
- Forests and Countryside Ordinance and its subsidiary legislation (Cap. 96 & 96A)
- Wild Animals Protection Ordinance (Cap. 170)
- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)
- Town Planning Ordinance (Cap. 131)
- Water Pollution Control Ordinance (Cap. 358)
- Chapter 10 of the Hong Kong Planning Standard and Guidelines (HKPSG)
- Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TCW) No. 13/2003 Guidelines and Procedures for Environmental Impact Assessment of Government Projects and Proposals
- ETWB TCW No. 5/2005 Protection of Natural Streams/Rivers from Adverse Impacts arising from Construction Works
- Development Bureau Technical Circular (Works) (DEVB TCW) No. 4/2020 Tree Preservation
- Greening, Landscape and Tree Management Section Development Bureau (2015) Guidelines on Tree Preservation during Development
- Environmental Protection Department Practice Note for Professional Persons ProPECC PN 2/23 Construction Site Drainage

7.1.1.2 This section also makes reference to the following international conventions, national, regional and local legislation:

- The International Union for the Conservation of Nature (IUCN)'s Red List of Threatened Species
- The Lists of Key Protected Wildlife and Plant Species under the People's Republic of China's (PRC) Wild Animal Protection Law
- The Convention on Biological Diversity (CBD)

7.2 Assessment Methodology

7.2.1.1 The assessment area for terrestrial ecological impact assessment included areas within 500 m from the Project site (**Figure 7.1** refers).

7.2.1.2 The PER Report under the Investigation Study and other relevant reports, studies and available information [e.g. aerial photos, Egretry Counts in Hong Kong with particular reference to the Mai Po Inner Deep Bay Ramsar Site (Anon, 2000 to 2020), AFCD Biodiversity Survey Records (2002 to 2020) (based on territory-wide long-term monitoring survey on major taxon groups), AFCD Hong Kong Biodiversity Database, AFCD's Newsletter Hong Kong Biodiversity] were collated

and reviewed to identify the ecological characteristics and resources within assessment area.

7.2.1.3 The Project site covers the existing Tai Po Old Market Playground, as well as existing manmade slope and footpath / cycle track by Lower Lam Tsuen River . Based on desktop research and review of aerial photos, the Project site and its vicinity are primarily urbanised and surrounded by high-rise residential buildings or trafficked roads. Lower Lam Tsuen River is screened from the Tai Po Old Market Playground by the trafficked Tai Po Tai Wo Road and the Playground was not recorded as part of the flight paths of ardeids recorded along Lower Lam Tsuen River. No roosting sites were recorded within or in proximity of Tai Po Old Market Playground.

7.2.1.4 Consider that there have been no changes in land use in vicinity of the Project site as well as the nature and limited scale of the Project, additional ecological survey were considered not necessary for the ecological impact assessment for this Updated PER.

7.3 Description of the Environment

7.3.1 Recognised Sites of Conservation Importance

7.3.1.1 No recognised sites of conservation importance are located within the 500m assessment area (**Figure 7.1** refers). Tai Po Market Egretry and Tai Mo Market Egretry SSSI are situated at over 580m and 720m from the Project site respectively.

7.3.2 Habitat and Vegetation

7.3.2.1 Three types of habitat, including developed area, plantation and modified watercourse, were identified within the assessment area in previous PER Report under the Investigation Study.

7.3.2.2 The Project site covers within the existing Tai Po Old Market Playground, which is an urban park, as well as existing man-made slope and footpath / cycle track by Lower Lam Tsuen River. It is considered to constitute solely developed area habitat dominated by low diversity of exotic and/or ornamental flora species, such as Elephant's Ear (*Macaranga tanarius var. tomentosa*), Ivy Tree (*Schefflera heptaphylla*) and *Hymenocallis littoralis*. No flora species of conservation importance was recorded in previous studies.

7.3.3 Fauna

7.3.3.1 The previous PER Report under the Investigation Study recorded very low diversity and abundance of fauna species, all the which were either very common or common, were recorded within the Project site, such as Red-whiskered Bulbul (*Pycnonotus jocosus*), Eurasian Tree Sparrow (*Passer montanus*), Great Mormon (*Papilio memnon*). No fauna species of conservation importance nor roosting site were recorded within the Project site.

7.3.3.2 Within the assessment area, the recorded fauna diversity and abundance was also low and dominated by very common or common species, e.g. Domestic Pigeon (*Columba livia*), Red-whiskered Bulbul, Eurasian Tree Sparrow, Common Grass Yellow (*Eurema hecabe)*, Chinese Gecko (*Gekko chinensis*). Four avifauna species of conservation importance were recorded within the assessment area, all of which were along Lower Lam Tsuen River, including Black-crowned Night Heron (*Nycticorax nycticorax*), Chinese Pond Heron (*Ardeola bacchus*), Great Egret (*Ardea alba*) and Little Egret (*Egretta garzetta*).

7.3.3.3 Flight path surveys were also conducted in previous PER Report under the Investigation Study to study ardeid's night roost along Lower Lam Tsuen River. The major flight paths within the assessment area were all along Lower Lam Tsuen River. Ardeid's night roosts were recorded at Kwong Fuk Bridge Garden whereas the pre-roosting sites were recorded by the bankside of Lam Tsuen River near Tai Wo Road Rest Garden and Po Heung Bridge (**Figure 7.1** refers).

7.4 Identification and Evaluation of Environmental Impacts

7.4.1 Construction Phase

Direct Habitat Loss

7.4.1.1 Direct impact to the developed area habitat within the urban park of the Tai Po Old Market Playground, as well as existing man-made slope and footpath / cycle track by Lower Lam Tsuen River would be anticipated during the construction phase. The existing Playground and footpath / cycle track along Lower Lam Tsuen River have been subject to existing high level of human disturbance from visitors and the nearby trafficked Tai Po Tai Wo Road and Ting Kok Road and supported low diversity and abundance of wildlife that it is considered of low ecological value. Nonetheless, part of the affect Tai Po Old Market Playground would be reinstated upon the completion of construction works and compensatory re-vegetation / planting would be undertaken as recommended in Tree Preservation and Removal Proposal to be submitted separately. Given the limited scale of the Project and low ecological value of the affected habitat, the ecological impact of direct habitat loss is considered low.

Indirect Disturbance Impacts

7.4.1.2 Indirect construction disturbance impacts would be also anticipated (e.g. increased human activities, glare, noise and dust). However, the Project site is mostly surrounded by developed area with no structural nor functional linkage with any highly valued habitats. Consider the transient nature of the construction and limited scale of the Project, indirect impact to the surrounding habitats is anticipated to be insignificant.

7.4.1.3 Construction works during restricted hours would not be required for the Project based on the current design. The Project sites within Tai Po Old Market Playground (for the construction of the proposed main structures of TPOMPSPS and underground stormwater storage tank) and near Lower Lam Tsuen River (for the construction of the proposed discharge chamber) are situated at over 100m and around 85m from the ardeid night roosts at Kwong Fuk Bridge Garden. Consider the limited scale of works and that the areas in the vicinity of the proposed works have already been urbanised and highly disturbed, disturbance impact to the ardeid night roost is anticipated to be negligible.

7.4.1.4 Likewise, the ardeid pre-roosting sites along Lower Lam Tsuen River are separated by the existing trafficked Tai Po Tai Wo Road from the Project site within Tai Po Old Market Playground. While the proposed works near Lower Lam Tsuen River is situated near the recorded pre-roosting sites, it is also bounded by Tai Po Tai Wo Road and existing footpath / cycle track. The ardeids recorded along Lam Tsuen River (**Section 7.3.3** refers) are highly mobile and are generally tolerant to disturbance in the urban environment. Given the existing high level of disturbance and that the proposed works are small scale and localized in nature, the disturbance impact from the Project to the ardeid pre-roosting sites is anticipated to be negligible.

7.4.1.5 For ardeids recorded along Lower Lam Tsuen River, consider that Lower Lam Tsuen River separated from the Project site by the existing trafficked Tai Po Tai Wo Road and Po Heung Bridge or existing footpath / cycletrack, and that the Playground / man-made slope was not recorded to be a habitat or part of the flight path of the ardeids, the disturbance impact to these species of conservation importance is anticipated to be negligible.

Indirect Impacts from Deterioration of Water Quality

7.4.1.6 Uncontrolled released of construction site run-off or wastewater discharge, which generally consist of high concentration of suspended solids (SS) and elevated pH, could cause potential indirect water quality impacts to Lower Lam Tsuen River nearby the Project site. The high SS level could lead to clogging of respiratory and feeding systems in aquatic organisms, while increased turbidity would reduce photosynthetic rate of aquatic plants and hinder vision of fauna in turn affecting their activities. Accidental spillage of chemicals such as engine oil, fuel and lubricants could potentially follow the uncontrolled runoff into the water, affecting the aquatic communities. With the implementation of appropriate measures to control runoff from construction site, as well as adoption of good site practices for handling and disposal of construction discharges (**Section 5** refers), adverse ecological impacts arising from water quality deterioration by land-based construction works of the Project would not be anticipated.

7.4.2 Operational Phase

7.4.2.1 The proposed TPOMPSPS would be unmanned that limited disturbance impacts would be anticipated.

7.4.2.2 The existing Tai Po Old Market Playground and proposed TPOMPSPS are surrounded by existing developments and high-rise residential building and no flight path towards / through the Playground were observed. Likewise, the aboveground portion of the proposed discharge chamber would be constructed at similar level of the existing man-made slope (**Appendix 2.1** refers) along existing footpath / cycle track. As such, the proposed low-rise aboveground structures of TPOMPSPS (around 8 to 10.5m tall) and its associated discharge chamber are not anticipated to affect the flight paths of ardeids forage along Lower Lam Tsuen River.

7.5 Environmental Protection and Mitigation Measures

7.5.1.1 While no adverse ecological impact would be anticipated from the proposed Project as detailed in **Section 7.4**, construction disturbances to surrounding habitats and associated wildlife could be further minimised through the implementation of mitigation measures and good site practices on air quality, noise and water quality control as recommended in **Sections 3 to 5**, such as standard good site practices (e.g. erection of hoardings around work sites) and practical dust, noise and water control measures (e.g. regular watering, noise control measures stipulated in EPD's "*Recommended Pollution Control Clauses for Construction Contracts*", site practices outlined in *ProPECC PN 2/23 "Construction Site Drainage"* etc).

7.6 Environmental Monitoring and Audit

7.6.1.1 Adverse ecological quality impact would not be anticipated with the implementation of the recommended mitigation measures. Thus, ecological monitoring is considered not necessary. However, weekly site audit is

recommended to be undertaken during the construction phase to ensure the proposed mitigation measures and good site practices on air quality, noise and water quality control as recommended in **Sections 3 to 5** are properly implemented.

7.6.1.2 No adverse ecological impacts would be anticipated during the operational phase that no EM&A requirements are considered necessary. ,

7.7 Conclusion

7.7.1.1 The Project site is located within the existing Tai Po Old Market Playground as well as existing man-made slope and footpath / cycle track by Lower Lam Tsuen River, which constitute solely developed area habitat dominated by low diversity of exotic and/or ornamental flora species and very low diversity and abundance of fauna species, all the which were either very common or common. No species of conservation importance nor roosting site were recorded within the Project site.

7.7.1.2 No recognised sites of conservation importance are located within the 500m assessment area. Within the assessment area, the recorded fauna diversity and abundance was also low and dominated by very common or common species. Four avifauna species of conservation importance were recorded within the assessment area, all of which were along Lower Lam Tsuen River, including Black-crowned Night Heron, Chinese Pond Heron, Great Egret and Little Egret.

7.7.1.3 Given the limited scale of the Project and low ecological value of the affected habitat, the ecological impact of direct habitat loss is considered low. Indirect construction disturbance impacts would also be anticipated (e.g. increased human activities, glare, noise and dust). The Project site is mostly surrounded by developed area and adjacent to existing trafficked Tai Po Tai Wo Road and / or existing footpath / cycle track. As such, considering the existing high level of disturbance and that the proposed works are small scale and localized in nature, indirect impact to the surrounding habitats and ardeid pre-roosting sites is anticipated to be negligible.

7.7.1.4 Considering that construction works during restricted hours would not be required based on the current design of the Project, the limited scale of works and that the areas in the vicinity of the proposed works are already urbanised and highly disturbed, disturbance impact to the ardeid night roost is anticipated to be negligible.

7.7.1.5 During operational phase, the proposed TPOMPSPS would be unmanned that limited disturbance impacts would be anticipated. Likewise, the proposed low-rise aboveground structures of TPOMPSPS (around 8 to 10.5m tall) and the aboveground portion of its associated discharge chamber (at similar level of the existing man-made slope) are not anticipated to affect the flight paths of ardeids forage along Lower Lam Tsuen River as the proposed works are surrounded by existing developments and high-rise residential building and no flight path towards / through the Project site were observed.

8 FISHERIES IMPACT

8.1 Environmental Legislation, Policies, Plans, Standards, and Guidelines

8.1.1.1 Local legislations that are relevant to this fisheries impact assessment include:

- Fisheries Protection Ordinance (Cap. 171) – promotes the conservation of fish and other forms of aquatic life within Hong Kong waters by regulating fishing practices to prevent detrimental activities to the fisheries industry;
- Marine Fish Culture Ordinance (Cap. 353) – regulates and protects marine fish culture by designating areas of fish culture zone, granting license, prohibiting unauthorized vessels and any deposition of chemicals or other substance which are likely to cause injury to fish in a fish culture zone; and
- Water Pollution Control Ordinance (Cap. 358) – controls water pollution in waters of Hong Kong.

8.2 Assessment Approach

8.2.1.1 Collation and desktop review of available relevant fisheries baseline data (e.g. AFCD Port Survey 2021, EIAs and other available relevant studies) within or in vicinity of the assessment area were carried out. Given the validity and adequacy of the existing data available from literature review, no fisheries surveys were necessary. Potential fisheries impacts arising from the Project were identified and evaluated where possible.

8.2.1.2 The Project will only involve land-based construction works within Tai Po Old Market Playground. Nonetheless, capture and culture fisheries were identified in the marine waters downstream of the assessment areas, i.e. Tolo Harbour.

8.3 Baseline Fisheries Condition

8.3.1.1 No fish culture zone (FCZ) was identified within or in vicinity of the 500 m assessment areas. The nearest FCZ, i.e. Yim Tin Tsai FCZ, is situated at over 4.5 km from the Project site.

8.3.1.2 According to the Based on the report of Fisheries Resources and Fishing Operations in Hong Kong, recognised nursery areas or spawning grounds of commercial fisheries resources identified in the Tolo Harbour and Channel Water Control Zone (WCZ), i.e. the important nursery area of commercial fisheries resources in Three Fathoms Cove, is situated over 8 km away from the Project site.

8.3.1.3 Based on AFCD Port Survey 2021, the marine waters downstream of the Lower Lam Tsuen River within Tolo Harbour and Channel WCZ supported moderate amount of fishing vessels (>200 – 400) and moderate fisheries production (>100-200 kg/ha). Sampan was the dominant kind of fishing vessel used in both the assessment areas in previous years, but other vessels such as gill netters, long liners and purse seiner were also found operating. According to Hong Kong Fisheries Resources Monitoring Report (2010 – 2015), the key composition of fisheries resources according to biomass in the marine waters downstream of the assessment area consists of Clupeidae, Engraulidae, Leiognathidae, Penaeidae and Sciaenidae.

8.4 Identification and Evaluation of Potential Impacts

8.4.1 Construction Phase

8.4.1.1 Since the proposed works are all land-based, no direct fisheries impacts would be anticipated.

8.4.1.2 Uncontrolled released of construction site run-off or wastewater discharge and accidental spillage of chemicals during construction phase could cause potential indirect water quality impacts. With the implementation of appropriate measures to control runoff from construction site, as well as adoption of good site practices for handling and disposal of construction discharges (**Section 5** refers), adverse fisheries impacts arising from water quality deterioration by land-based construction works of the Project would not be anticipated.

8.4.2 Operation Phase

8.4.2.1 The proposed TPOMPSPS aims to mitigate the existing flooding risk in Tai Po and has not expanded its drainage catchment in the Tai Po district. The operation of the Project does not constitute any elements that would be water pollution sources and would not generate any new pollution load to the catchment. No fisheries impact would be anticipated during operational phase.

8.5 Environmental Protection and Mitigation Measures

8.5.1.1 No adverse fisheries impacts would be anticipated from the proposed Project with the implementation of appropriate measures to control runoff from construction site, as well as adoption of good site practices for handling and disposal of construction discharges (**Section 5** refers). No specific mitigation measures for fisheries impact are considered necessary.

8.6 Environmental Monitoring and Audit

8.6.1.1 As no unacceptable adverse fisheries impacts are anticipated during both construction and operational phases, no specific EM&A requirements for fisheries is required.

8.6.1.2 Regular weekly site inspection during the construction phase has been proposed in **Section 5** to inspect the construction activities and works area to ensure the recommended water pollution control measures are properly implemented.

8.7 Conclusion

8.7.1.1 The proposed works would not result in direct impact to any fisheries resources and the potential indirect impacts are expected to be insignificant. No fisheries impact would be anticipated during the construction and operation of the Project, and hence, specific mitigation measure and environmental audit and monitoring programme for fisheries impact are considered not necessary.

9 HERITAGE IMPACT

9.1 Environmental Legislation, Standards and Guidelines

9.1.1.1 Legislation, standards, guidelines and criteria relevant to the assessment of heritage impacts under this study include the following:

- Antiquities and Monuments Ordinance (A&MO) (Cap.53)
- Guidelines for Cultural Heritage Impact Assessment (Guidelines for CHIA)
- Hong Kong Planning Standards and Guidelines (HKPSG)
- Development Bureau Technical Circular (Works) (DEVB TC (W) No. 1/2022 – Heritage Impact Assessment Mechanism for Capital Works Projects

9.2 Assessment Methodology

9.2.1.1 According to Clause 3.16 of the PER Brief, the study area for this heritage impact assessment should include all areas within a distance of 50 m from the boundary of the Project. The methodology for heritage impact assessment is described below.

9.2.1.2 A desk-top review was conducted to identify cultural heritage resources within the study area based on examination on the following resources:

- List of Proposed and Declared Monuments as issued by the AMO;
- List of the 1,444 Historic Buildings and list of new items with Assessment Results by the Antiquities Advisory Board (AAB);
- Other heritage resources recorded by the AMO, including Government Historic Sites identified by AMO;
- Relevant information from AMO's website;
- All available literatures, including previous including previous EIA Studies, related publications on relevant historical issues, historical, cartographic and pictorial documentations; and
- Unpublished archival papers and records, and collection and libraries of tertiary institutions.

9.2.1.3 The potential direct and indirect impacts that may affect the cultural heritage resources were assessed by following the procedures and requirements of the Guideline for CHIA and DEVB TC (W) No. 1/2022.

9.3 Evaluation of Cultural Heritage Impact

9.3.1.1 The Project site with the existing Tai Po Old Market Playground and man-made slope near Lower Lam Tsuen River is situated on reclaimed land. No Declared Monument, Proposed Monument, Graded Historic Sites/Building/Structure, Sites/Buildings/Structures in the new list of proposed grading items, Government Historic Site or Sites of Archaeological Interest identified by AMO was identified within 50m from the Project site. Therefore, no cultural heritage impacts would be anticipated from the proposed works and no mitigation measures would be required.

10 NOT USED

11 LAND CONTAMINATION IMPLICATIONS

11.1 Introduction

11.1.1.1 This section presents review of the potential land contamination impacts associated with the proposed Tai Po Old Market Playground Stormwater Pumping Station (TPOMPSPS).

11.2 Environmental Legislation, Standards and Guidelines

11.2.1.1 The relevant environmental guidelines and standards for land contamination assessment include the following:

- Guidance Note for Contaminated Land Assessment and Remediation (Guidance Note) (EPD, April 2023) - The Guidance Note sets out the requirements for proper assessment and management of potentially contaminated sites such as oil installations (e.g. oil depots, petrol filling stations), gas works, power plants, shipyards/boatyards, chemical manufacturing/processing plants, steel mills/metal workshops, car repairing/dismantling workshops and scrap yards. In addition, this Guidance Note provides guidelines on how site assessments shall be conducted and analysed and suggests practical remedial measures that can be adopted for the remediation of contaminated sites.
- Practice Guide for Investigation and Remediation of Contaminated Land (Practice Guide) (EPD, April 2023) - This guide outlines typical investigation methods and remediation strategies for the range of potential contaminants typically encountered in Hong Kong.
- Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management (Guidance Manual) (EPD, April 2023) - The Guidance Manual introduces the risk-based approach in land contamination assessment and present instructions for comparison of soil and groundwater data to the Risk-Based Remediation Goals (RBRGs) for 54 chemicals of concern commonly found in Hong Kong. The RBRGs were derived to suit Hong Kong conditions by following the international practice of adopting a risk-based methodology for contaminated land assessment and remediation and were designed to protect the health of people who could potentially be exposed to land impacted by chemicals under four broad post restoration land use categories. The RBRGs also serve as the remediation targets if remediation is necessary.

11.3 Assessment Methodology

11.3.1.1 A site appraisal was conducted to identify any current / historical potentially contaminating land uses within the proposed TPOMPSPS. The site appraisal, including site walkover and desktop review, was carried out with reference to the Guidance Note, Guidance Manual and Practice Guide.

11.3.1.2 The site walkover was conducted within the proposed TPOMPSPS to identify any existing contaminative land uses and contamination sources (or 'hotspots'). For the desktop review, the following information was reviewed:

- Available records of dangerous goods, chemical wastes, chemical spillage/leakage and fire incidents from Environmental Protection Department (EPD) and Fire Services Department (FSD);
- Preliminary Environmental Review Report – Tai Po under Agreement No. CE 11/2019 (DS) – Drainage Improvement Works in Tai Po – Investigation; and

- Selected aerial photographs and topographic maps held by the Lands Department.

11.3.1.3 If potentially contaminated land use(s) were identified within the proposed TPOMPSPS, the potential land contamination impacts to the Project would be evaluated and the appropriate mitigation measures would be recommended.

11.4 Identification of Potential Land Contamination Impacts

11.4.1 Review of Previous Study

11.4.1.1 Land contamination assessment was conducted for the Preliminary Environmental Review (PER) Report under the Investigation stage of the Project. The relevant sections of the PER are provided in **Appendix 11.1**. Except for the northern portion at Tai Po Old Market Playground and the southern portion near Lower Lam Tsuen River of the proposed TPOMPSPS, the assessment covers the proposed TPOMPSPS (refer to **Appendix 11.2**). The assessment included desktop study (e.g. review of aerial photographs and relevant information from government departments) and site walkover conducted in September 2022.

11.4.1.2 Based on findings of the PER, no potentially contaminating land uses were identified. However, this finding would be further reviewed when the information from EPD on the records of accidents of chemical spillage / leakage found within the proposed TPOMPSPS is obtained.

11.4.2 Review of Historical Land Uses

11.4.2.1 A review of aerial photographs extracted from the PER Report and the latest aerial photograph available in the Survey and Mapping Office of Lands Department has been undertaken to identify any historical land uses within the proposed TPOMPSPS that may have potential contamination implications. Findings of the review are discussed below. The aerial photographs reviewed are provided in **Appendix 11.2**.

11.4.2.2 A summary of the historical land uses is presented in **Table 11.1** below.

Table 11.1 Summary of Historical Land Uses for proposed TPOMPSPS

Year	Drawing No. in Appendix 11.2	Site Description
1963	AP1	The proposed TPOMPSPS was part of the sea / Tolo Harbour.
1973	AP2	No significant land use change was observed within the proposed TPOMPSPS.
1982	AP3	Reclaimed land was observed within the proposed TPOMPSPS.
1993	AP4	The proposed TPOMPSPS was occupied by the existing park of Tai Po Old Market Playground, as well as existing man-made slope and footpath / cycle track near Lower Lam Tsuen River.

Year	Drawing No. in Appendix 11.2	Site Description
2001	AP5	No significant land use change was observed within the proposed TPOMPSPS.
2011	AP6	No significant land use change was observed within the proposed TPOMPSPS.
2021	AP7	No significant land use change was observed within the proposed TPOMPSPS.
2022	AP8	No significant land use change was observed within the proposed TPOMPSPS.

11.4.2.1 Based on the review of aerial photographs, similar to findings of the PER Report, no historical potentially contaminating land uses were identified within the proposed TPOMPSPS.

11.4.3 Site Walkover

11.4.3.1 Site walkover was conducted on 30 August 2023 to investigate any land contamination issues associated with the current land uses within the proposed TPOMPSPS. Photographic records, along with the site layout plan, are shown in **Figure 11.1**. The site walkover checklist is attached in **Appendix 11.3**.

11.4.3.2 Similar to findings of the PER Report, the proposed TPOMPSPS is currently occupied by the existing Tai Po Old Market Playground and includes a children's playground, a basketball court, vegetation and footpaths. No potentially contaminating land uses / activities were observed within the proposed TPOMPSPS during the site walkover.

11.4.4 Acquisition of Information from Government Departments

11.4.4.1 The EPD and FSD have been contacted for (i) records on any release of chemicals and chemical waste, (ii) records of dangerous goods (DG), (iii) records of Chemical Waste Producer(s) (CWP(s)) and (iv) records of reported fire incidents within the proposed TPOMPSPS. EPD and FSD's replies on the request have been received and attached in **Appendix 11.4**. The information is summarised below.

Environmental Protection Department

11.4.4.2 Based on the reply given by EPD on 23 February 2024, EPD has no chemical spillage / leakage records within the proposed TPOMPSPS for the past 3 years. In addition, EPD has provided a total of 19 (17 valid and 2 invalid) CWP records in Tai Po District, which are outside the proposed TPOMPSPS. The locations of the CWP records are shown in **Figure 11.2**. Given the locations of the CWPs are outside the proposed TPOMPSPS, no potential land contamination issues associated with these CWP records are anticipated for the Project.

Fire Services Department

11.4.4.3 The reply from FSD on the records of any DG license or fire incident records

found within the proposed TPOMPSPS is outstanding and will be furnished in the next submission.

11.5 Evaluation of Potential Land Contamination Impacts

11.5.1.1 Based on the findings of the site appraisal, the proposed TPOMPSPS has been occupied by non-contaminating land uses (i.e. reclaimed land and playground) only. No potential land contamination impact is therefore anticipated for the construction of the proposed TPOMPSPS.

11.6 Environmental Monitoring and Audit

11.6.1.1 Based on the site appraisal, no land contamination impact is anticipated for construction of the proposed TPOMPSPS. No environmental monitoring and audit are considered necessary.

11.7 Conclusion

11.7.1.1 A site appraisal, in the form of desktop review and site walkover, had been carried out from August to September 2023 to identify the past and current potentially contaminating land uses within the proposed TPOMPSPS.

11.7.1.2 Based on findings of the site appraisal, no potentially contaminating land uses were identified within the proposed TPOMPSPS. No adverse land contamination impact is therefore anticipated for construction of the proposed TPOMPSPS.

12 ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

12.1 Introduction

12.1.1.1 This section elaborates the requirements of environmental monitoring and audit (EM&A) for the construction and operation phases of the Project, based on the assessment results of the various environmental issues. The objectives of carrying out EM&A for the Project include the following:

- to provide a database against which any short- or long-term environmental impacts of the Project can be determined;
- to provide an early indication shall any of the environmental control measures or practices fail to achieve the acceptable standards;
- to monitor the performance of the Project and the effectiveness of mitigation measures;
- to verify the environmental impacts predicted;
- to determine project compliance with regulatory requirements, standards and government policies;
- to provide a plan for remedial action if unexpected problems or unacceptable impacts arise; and
- to provide data to enable an environmental audit.

12.1.1.2 The following sections summarise the recommended EM&A requirements for the various environmental impacts of this Project.

12.2 Air Quality Impact

12.2.1.1 Weekly site audit is recommended to be undertaken during the construction phase to ensure the proposed dust suppression measures are implemented in an appropriate manner.

12.2.1.2 No EM&A is considered necessary during operational phase.

12.3 Noise Impact

12.3.1.1 Weekly site audit shall be carried out to inspect the construction activities and works areas in order to ensure the recommended mitigation measures are being properly implemented.

12.3.1.2 No EM&A requirement is considered necessary during operational phase. Commissioning test should be conducted for the proposed fixed plant sources prior to operation of the Project to ensure compliance with the relevant noise standards.

12.4 Water Quality Impact

12.4.1.1 Weekly site audit is recommended to be undertaken during the construction phase to ensure proper implementation of the proposed mitigation measures.

12.4.1.2 No EM&A requirement is considered necessary during the operational phase.

12.5 Waste Management Implications

12.5.1.1 Waste management would be the contractor’s responsibility to ensure that all wastes produced during the construction of the Project are handled, stored and

disposed of in accordance with good waste management practices and EPD's regulations and requirements. The recommended mitigation measures in **Section 6** should form the basis of the site's WMP, as part of EMP, to be developed by the Contractors and submitted to Engineer for approval before construction in accordance with ETWB TCW No. 19/2005. Regular inspection should be conducted to ensure proper management and handling of waste, and appropriate implementation of the mitigation measures.

12.5.1.2 No EM&A requirement is considered necessary during the operational phase.

12.6 Ecological Impact

12.6.1.1 Specific EM&A requirements for ecology are considered not necessary during the construction and operational phases. Weekly site audit is recommended to be undertaken during the construction phase to ensure the proposed mitigation measures and good site practices on air quality, noise and water quality control as recommended in **Sections 3 to 5** are properly implemented.

12.7 Fisheries Impact

12.7.1.1 No specific EM&A requirement for fisheries is required during the construction and operational phases.

12.8 Cultural Heritage Impact

12.8.1.1 No EM&A requirement is considered necessary during the construction and operational phases.

12.9 Landscape and Visual Impact

12.9.1.1 No EM&A requirement is considered necessary during the construction and operational phase.

12.10 Land Contamination Impact

12.10.1.1 No EM&A requirement is considered necessary during the construction and operational phases.

13 CONCLUSIONS

13.1 Introduction

13.1.1.1 This Updated PER Report has provided a review of the potential environmental impacts associated with the construction and operation of the proposed Tai Po Old Market Playground Stormwater Pumping Station, based on the latest engineering design information available at this stage and the findings, conclusions and recommendations of the PER Report prepared under the Investigation Study.

13.1.1.2 The Updated PER has been conducted in accordance with the PER Scope, covering the following environmental issues:

- Air Quality Impact
- Noise Impact
- Water Quality Impact
- Waste Management Implications
- Ecological Impact
- Fisheries Impact
- Heritage Impact
- Land Contamination Implications

13.1.1.3 The findings of this Updated PER have information on the likely nature and extent of environmental impacts arising from the construction and operation of the Project. The Updated PER has predicted that the Project would be environmentally acceptable with the implementation of the recommended mitigation measures for construction and operation phases.

13.1.1.4 The assessment results for each environmental aspect are summarised in the following sections.

13.2 Air Quality Impact

13.2.1.1 Potential fugitive impacts to nearby ASRs would mainly arise from excavation works, handling, transportation and removal of excavated spoil / material, stockpiling and wind erosion etc. With the implementation of regular site watering and good construction practices for dust minimization, construction dust impacts are not expected to be significant on the surrounding sensitive receivers. Requirements of *Air Pollution Control (Construction Dust) Regulation* and *EPD's Recommended Pollution Control Clauses for Construction Contracts* are proposed to be incorporated into the contract.

13.2.1.2 No air pollution source is identified from the operation of any elements of the Project itself that no air quality impacts would be anticipated.

13.3 Noise Impact

13.3.1.1 During the construction phase, the use of PME for the construction of the Project such as excavation, steel fixing and concreting of structure, backfilling, E&M installations and associated pipeworks, and reinstatement and landscaping works, would pose potential impact on nearby NSRs. In view of the limited scale of the Project, no adverse construction noise impact would be anticipated with the implementation of recommended good site practices, noise mitigation measures and noise control requirements stipulated in Recommended Pollution Control

Clauses for Construction Contracts.

13.3.1.2 During the operational phase, given that the planned fixed plants are properly designed to meet the maximum permissible SWL, no adverse noise impacts would be anticipated.

13.4 Water Quality Impact

13.4.1.1 Water quality impacts would mainly arise from land-based construction activities, including wastewater generated from general construction activities, construction site run-off, accidental spillage of chemicals and potential contamination of surface water and groundwater, and sewage from construction workforce. Impacts can be controlled by implementing the recommended mitigation measures. No adverse water quality impact during the construction phase would be anticipated.

13.4.1.2 The operation of the Project does not constitute any elements that would be water pollution sources and would not generate any new pollution load to the catchment. No water quality impact would be expected during the operational phase.

13.5 Waste Management Implications

13.5.1.1 During construction phase, waste types generated from the Project are likely to include inert and non-inert C&D materials from construction and excavation works, chemical wastes from the maintenance of construction works and vehicles, and general refuse from the workforce. Subject to the results of the GI works to be conducted upon agreement of the SSTP, land-based sediment may be generated during excavation works. Provided that these wastes are handled, transported and disposed of according to the recommended good site practices and mitigation measures, no adverse environmental impacts (including potential hazard, air and odour emissions, noise and wastewater discharges) would be anticipated during the construction phase.

13.5.1.2 During the operational phase, small quantities of silt and debris, as well as chemical wastes would be anticipated from the maintenance of drains. With implementation of the recommended mitigation measures, adverse environmental impacts would not be anticipated during the operational phase.

13.6 Ecological Impact

13.6.1.1 The Project site is located within the existing Tai Po Old Market Playground as well as existing man-made slope and footpath / cycle track by Lower Lam Tsuen River, which constitute solely developed area habitat dominated by low diversity of exotic and/or ornamental flora species and very low diversity and abundance of fauna species, all the which were either very common or common. No species of conservation importance nor roosting site were recorded within the Project site.

13.6.1.2 No recognised sites of conservation importance are located within the 500m assessment area. Within the assessment area, the recorded fauna diversity and abundance was also low and dominated by very common or common species. Four avifauna species of conservation importance were recorded within the assessment area, all of which were along Lower Lam Tsuen River, including Black-crowned Night Heron, Chinese Pond Heron, Great Egret and Little Egret.

13.6.1.3 Given the limited scale of the Project and low ecological value of the affected

habitat, the ecological impact of direct habitat loss is considered low. Indirect construction disturbance impacts would be also anticipated (e.g. increased human activities, glare, noise and dust). The Project site is mostly surrounded by developed area and adjacent to existing trafficked Tai Po Tai Wo Road and / or existing footpath / cycle track. As such, considering the existing high level of disturbance and that the proposed works are small scale and localized in nature, indirect impact to the surrounding habitats and ardeid pre-roosting sites is anticipated to be negligible.

13.6.1.4 Consider that construction works during restricted hours would not be required for the proposed TPOMPSPS based on the current design of the Project, the limited scale of works and that the areas in the vicinity of the proposed works are already urbanised and highly disturbed, disturbance impact to the ardeid night roost is anticipated to be negligible.

13.6.1.5 During operational phase, the proposed TPOMPSPS would be unmanned that limited disturbance impacts would be anticipated. Likewise, the proposed low-rise aboveground structures of TPOMPSPS (around 8 to 10.5m tall) and the aboveground portion of its associated discharge chamber (at similar level of the existing man-made slope) are not anticipated to affect the flight paths of ardeids forage along Lower Lam Tsuen River as the proposed works are surrounded by existing developments and high-rise residential building and no flight path towards / through the Project site were observed.

13.7 Fisheries Impact

13.7.1.1 The proposed works would not result in direct impact to any fisheries resources and the potential indirect impacts are expected to be insignificant. No fisheries impact is anticipated during the construction and operation of the Project, and hence, specific mitigation measure and environmental audit and monitoring programme for fisheries impact are not necessary.

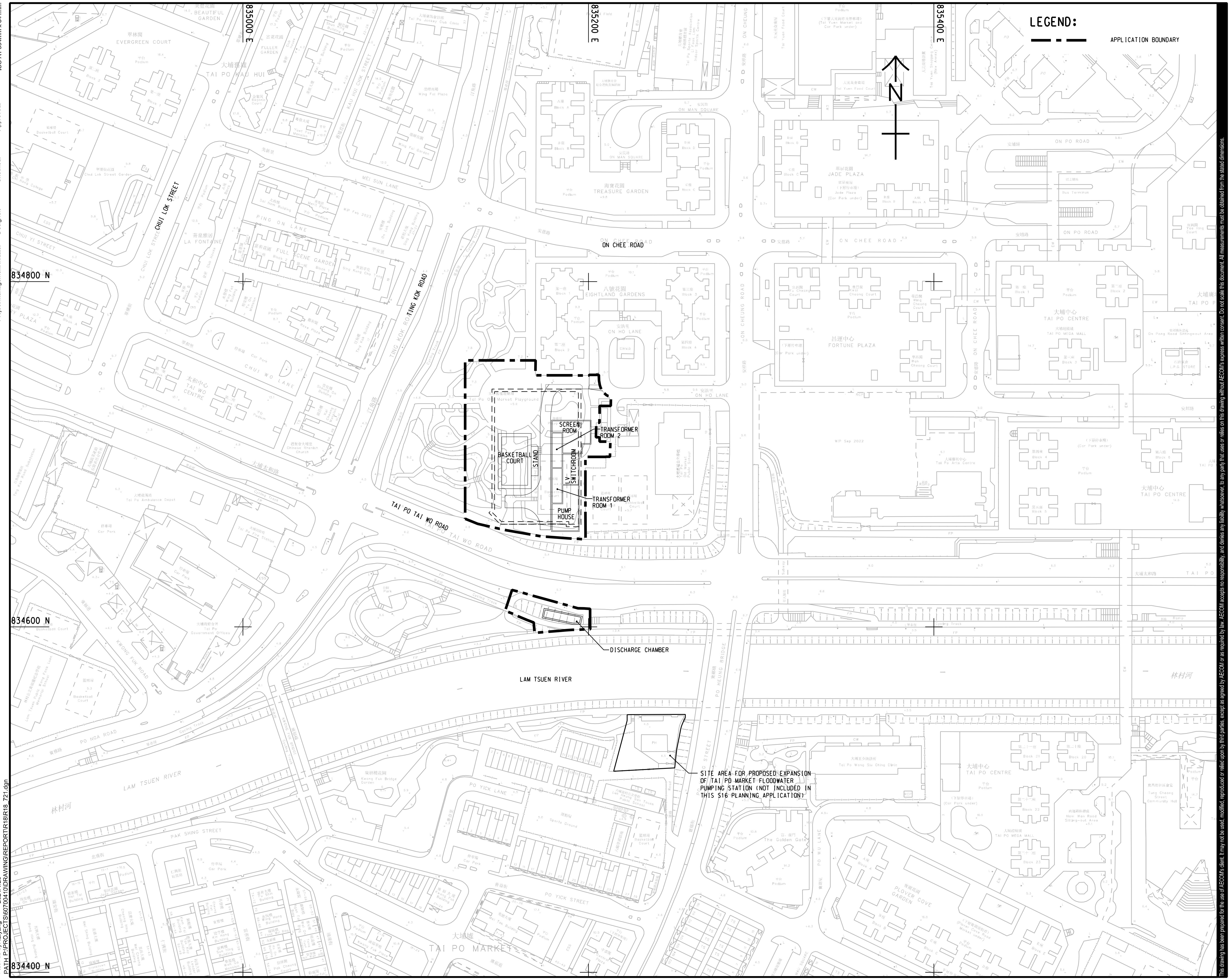
13.8 Cultural Heritage Impact

13.8.1.1 The Project site with the existing Tai Po Old Market Playground is situated on reclaimed land. No Declared Monument, Proposed Monument, Graded Historic Sites/Building/Structure, Sites/Buildings/Structures in the new list of proposed grading items, Government Historic Site or Sites of Archaeological Interest identified by AMO was identified within 50m from the Project site. Therefore, no cultural heritage impacts would be anticipated from the proposed works and no mitigation measures would be required.

13.9 Land Contamination

13.9.1.1 A site appraisal, in the form of desktop review and site walkover, had been carried out from August to September 2023 to identify the past and current potentially contaminating land uses within the proposed TPOMPSPS. Based on findings of the site appraisal, no potentially contaminating land uses were identified within the proposed TPOMPSPS. No adverse land contamination impact is therefore anticipated for construction of the proposed TPOMPSPS.

FIGURES



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SCALE 比例: A1 1 : 1000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號: 60700410

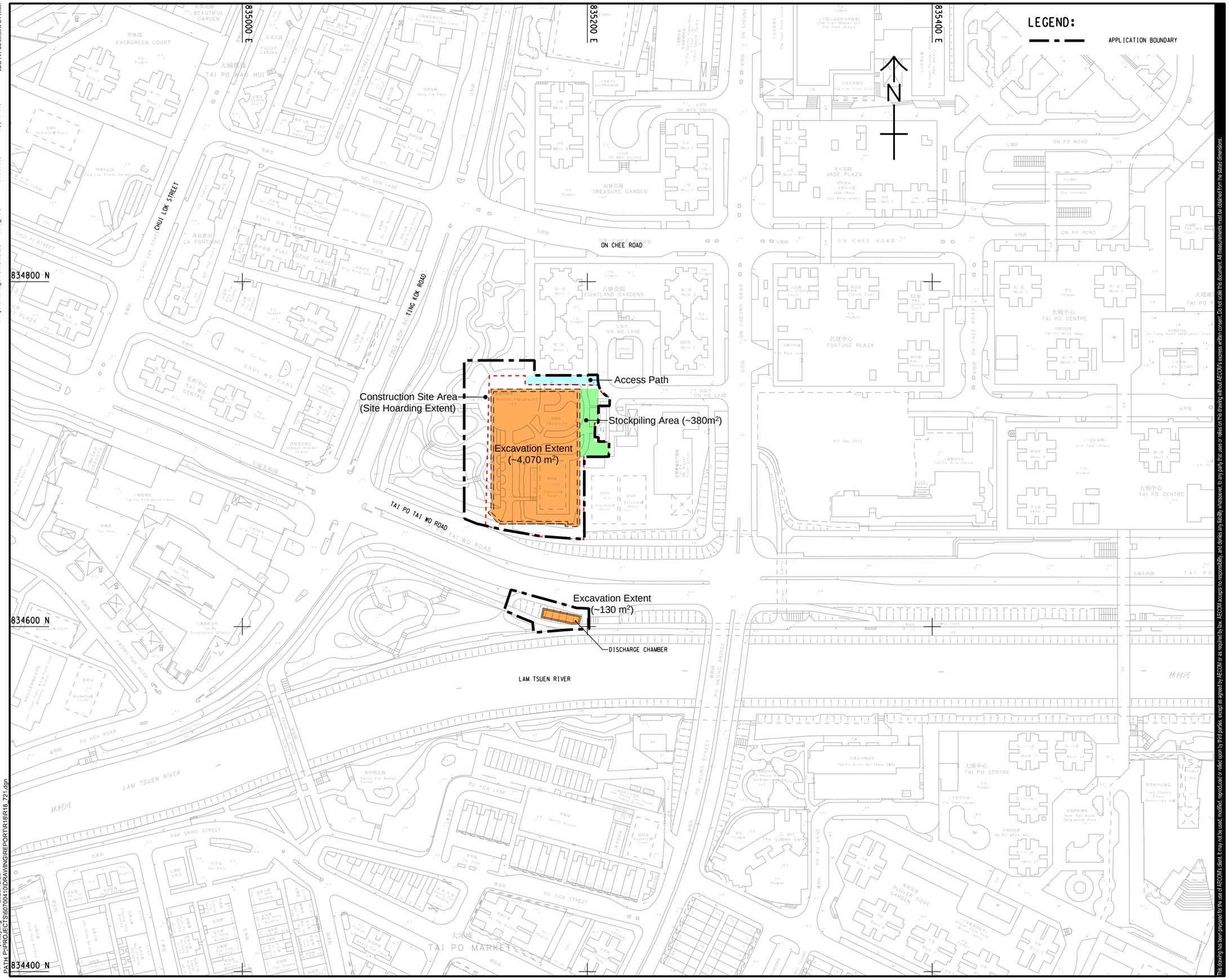
CONTRACT NO. 合約編號: CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

GENERAL LAYOUT PLAN

SHEET NUMBER 圖紙編號

60700410/R18/FIGURE 2.1



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SHEET TITLE
圖紙名稱

TENTATIVE WORKS AREA AND STOCKPILING AREA

SHEET NUMBER
圖紙編號

60700410/PER/FIGURE 2.2

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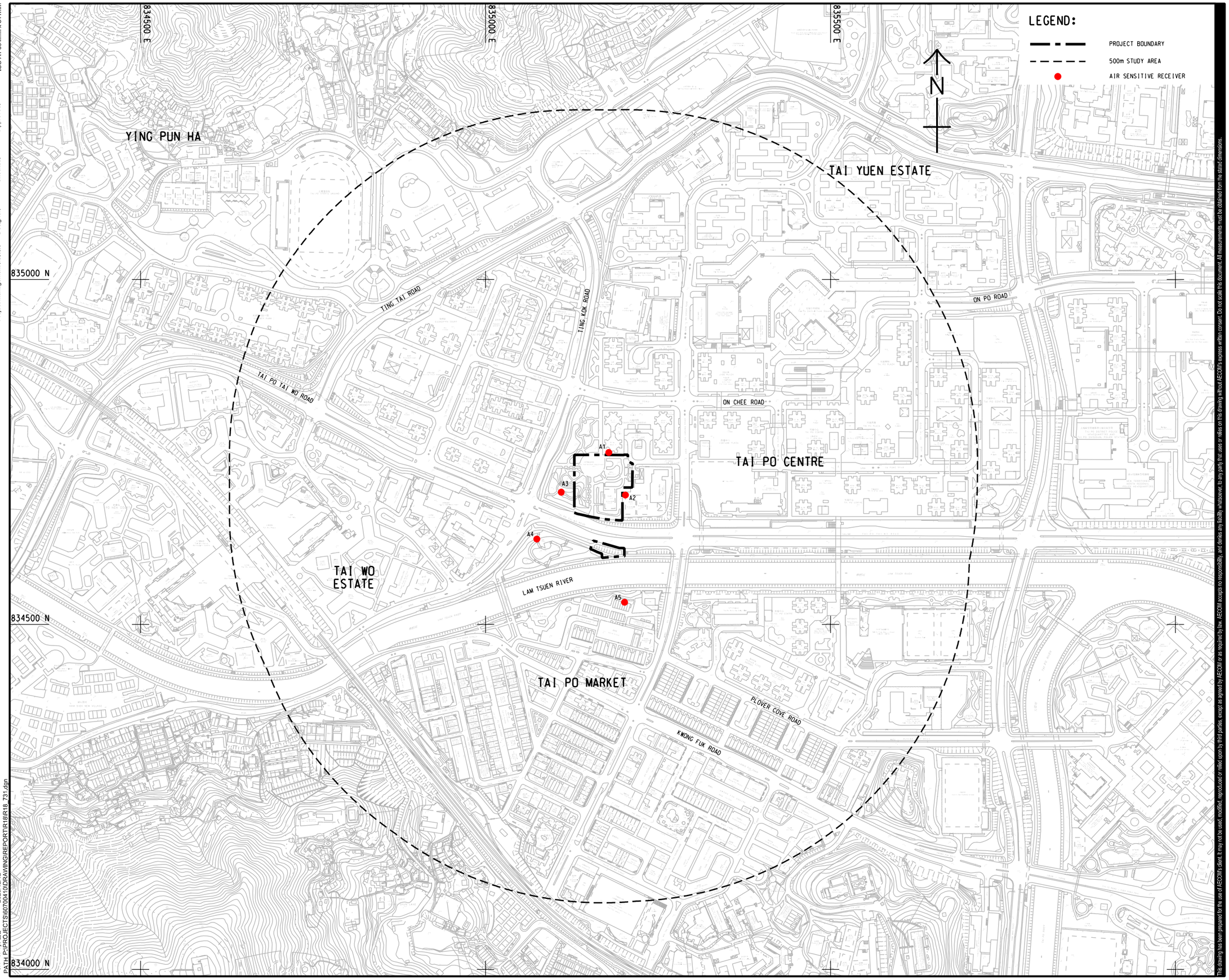

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SCALE 比例
A1 1 : 2500

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SHEET TITLE
圖紙名稱

LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS

SHEET NUMBER
圖紙編號

60700410/PER/FIGURE 3.1

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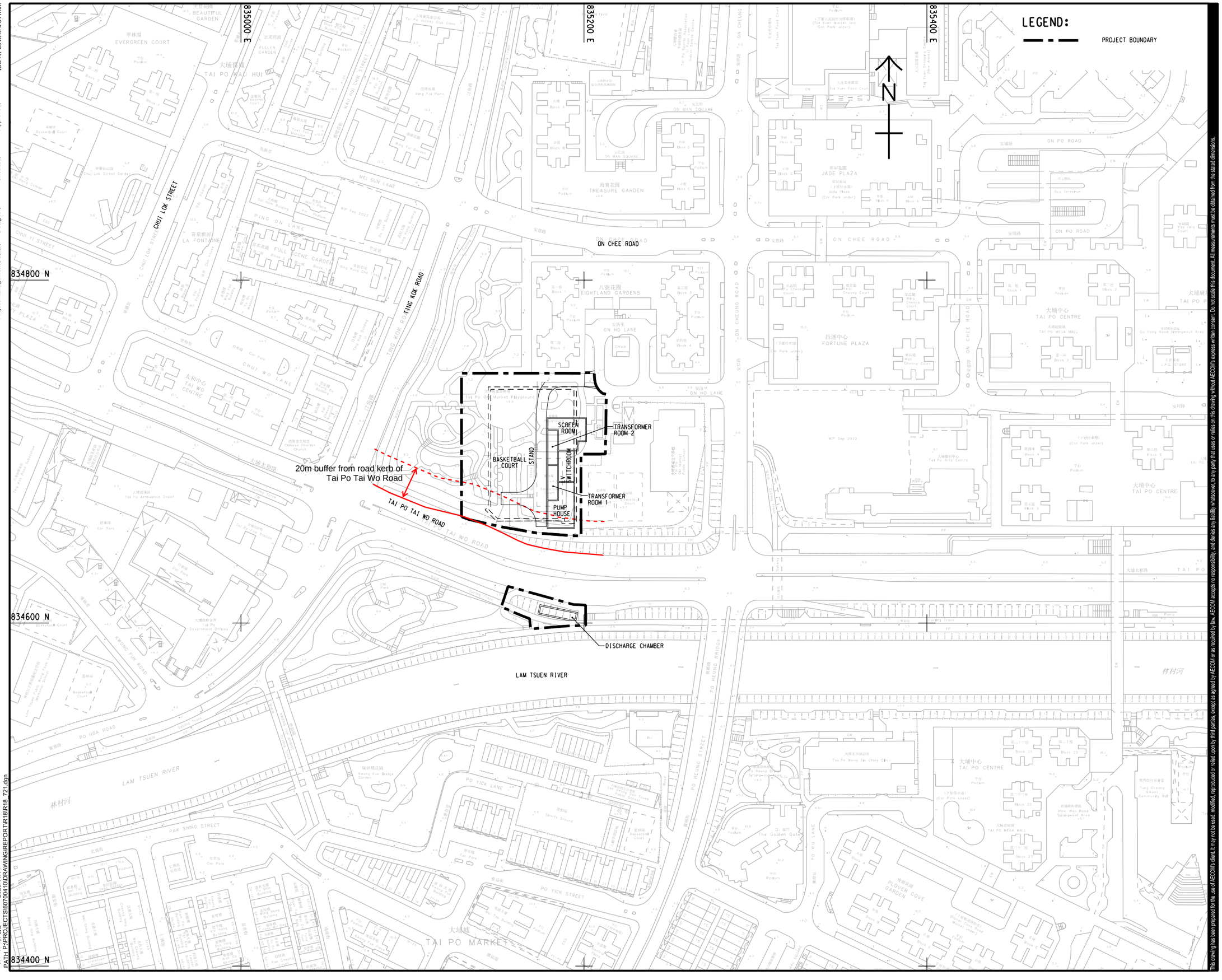

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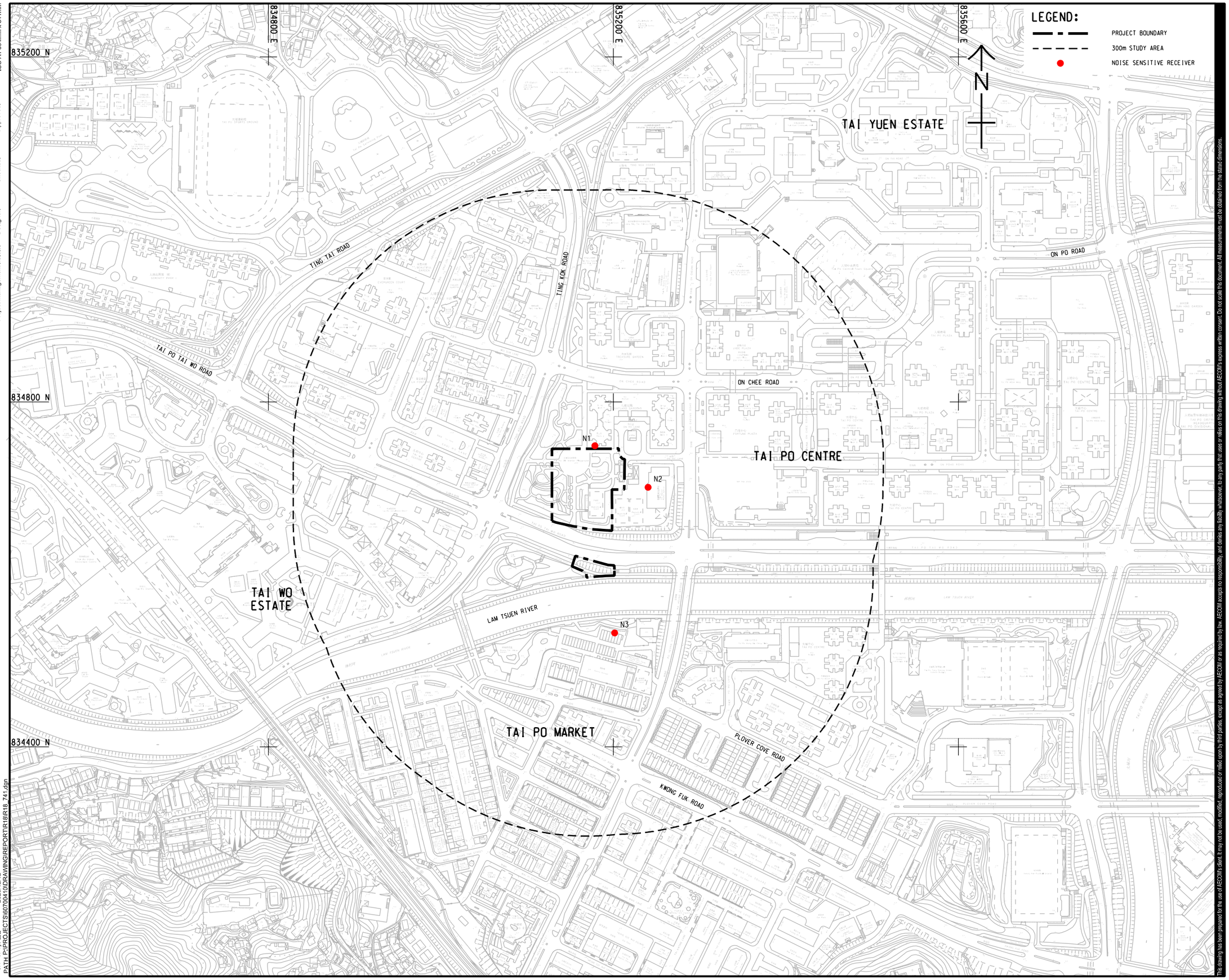
SHEET TITLE
圖紙名稱

BUFFER DISTANCE REQUIREMENT FROM TAI PO TAI WO ROAD

SHEET NUMBER
圖紙編號

60700410/PER/FIGURE 3.2



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SCALE 比例
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DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

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CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

LOCATION OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS

SHEET NUMBER
圖紙編號

60700410/PER/FIGURE 4.1

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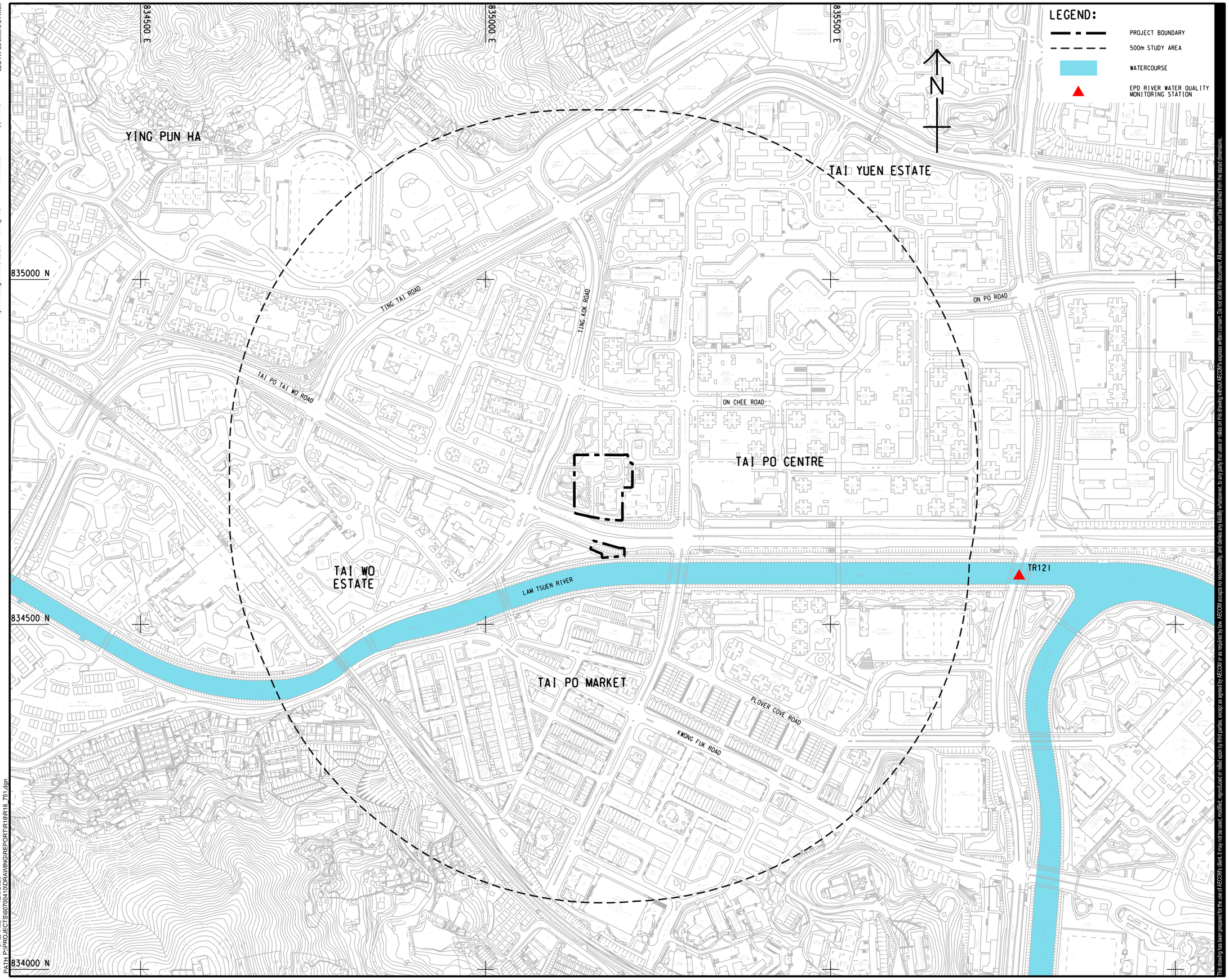

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SCALE 比例
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DIMENSION UNIT 尺寸單位
METRES

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SHEET TITLE 圖紙名稱
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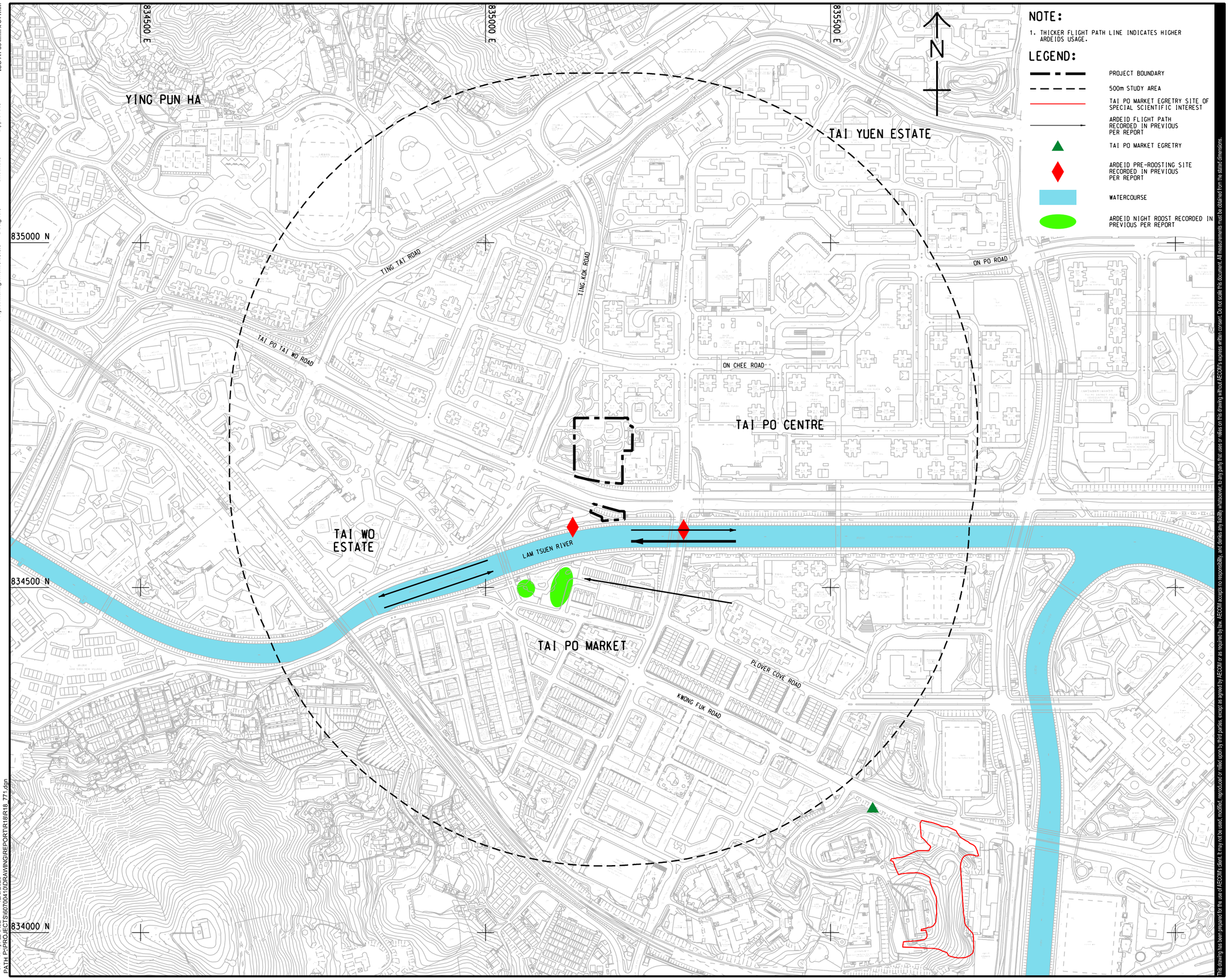
SHEET NUMBER 圖紙編號
60700410/PER/FIGURE 5.1



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SCALE 比例
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DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE 圖紙名稱
LOCATION OF RECOGNISED SITES OF CONSERVATION IMPORTANCE AND KEY ECOLOGICAL RESOURCES

SHEET NUMBER 圖紙編號
60700410/PER/FIGURE 7.1

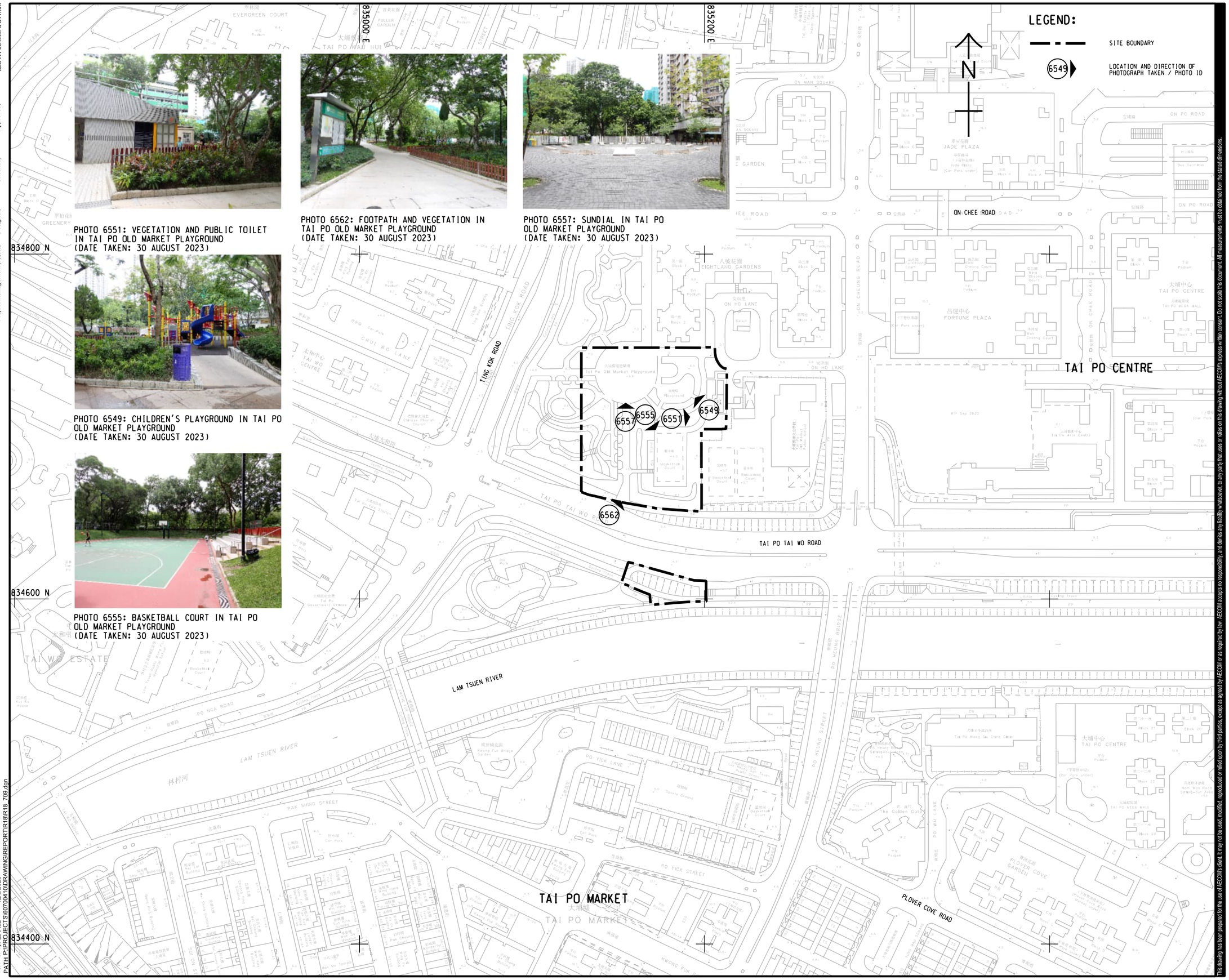
PHOTO 6551: VEGETATION AND PUBLIC TOILET IN TAI PO OLD MARKET PLAYGROUND (DATE TAKEN: 30 AUGUST 2023)

PHOTO 6562: FOOTPATH AND VEGETATION IN TAI PO OLD MARKET PLAYGROUND (DATE TAKEN: 30 AUGUST 2023)

PHOTO 6557: SUNDIAL IN TAI PO OLD MARKET PLAYGROUND (DATE TAKEN: 30 AUGUST 2023)

PHOTO 6549: CHILDREN'S PLAYGROUND IN TAI PO OLD MARKET PLAYGROUND (DATE TAKEN: 30 AUGUST 2023)

PHOTO 6555: BASKETBALL COURT IN TAI PO OLD MARKET PLAYGROUND (DATE TAKEN: 30 AUGUST 2023)



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SCALE 比例
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DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
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PROJECT NO. 項目編號
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CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

PHOTOGRAPHIC RECORDS OF SITE WALKOVER

SHEET NUMBER
圖紙編號

60700410/R18/FIGURE 11.1

ISO A1 594mm x 841mm

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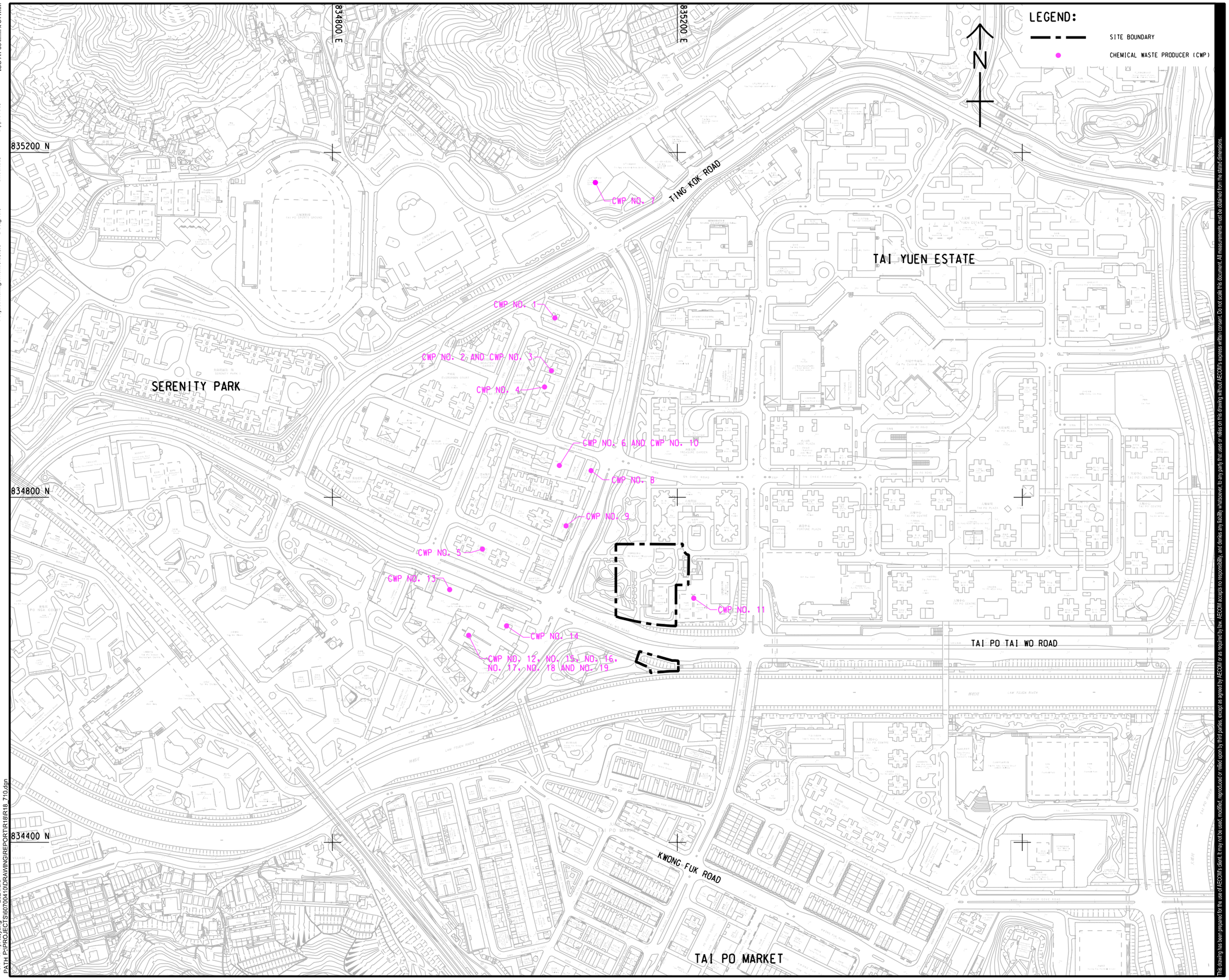
Project Management Initials:



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SCALE 比例
A1 1 : 2000

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

LOCATIONS OF CHEMICAL WASTE PRODUCERS

SHEET NUMBER 圖紙編號

60700410/R18/FIGURE 11.2

APPENDICES

Appendix 2.1
General Layout and Sections of the Proposed Tai Po Old Market Stormwater Pumping Station

ISO A1 594mm x 841mm

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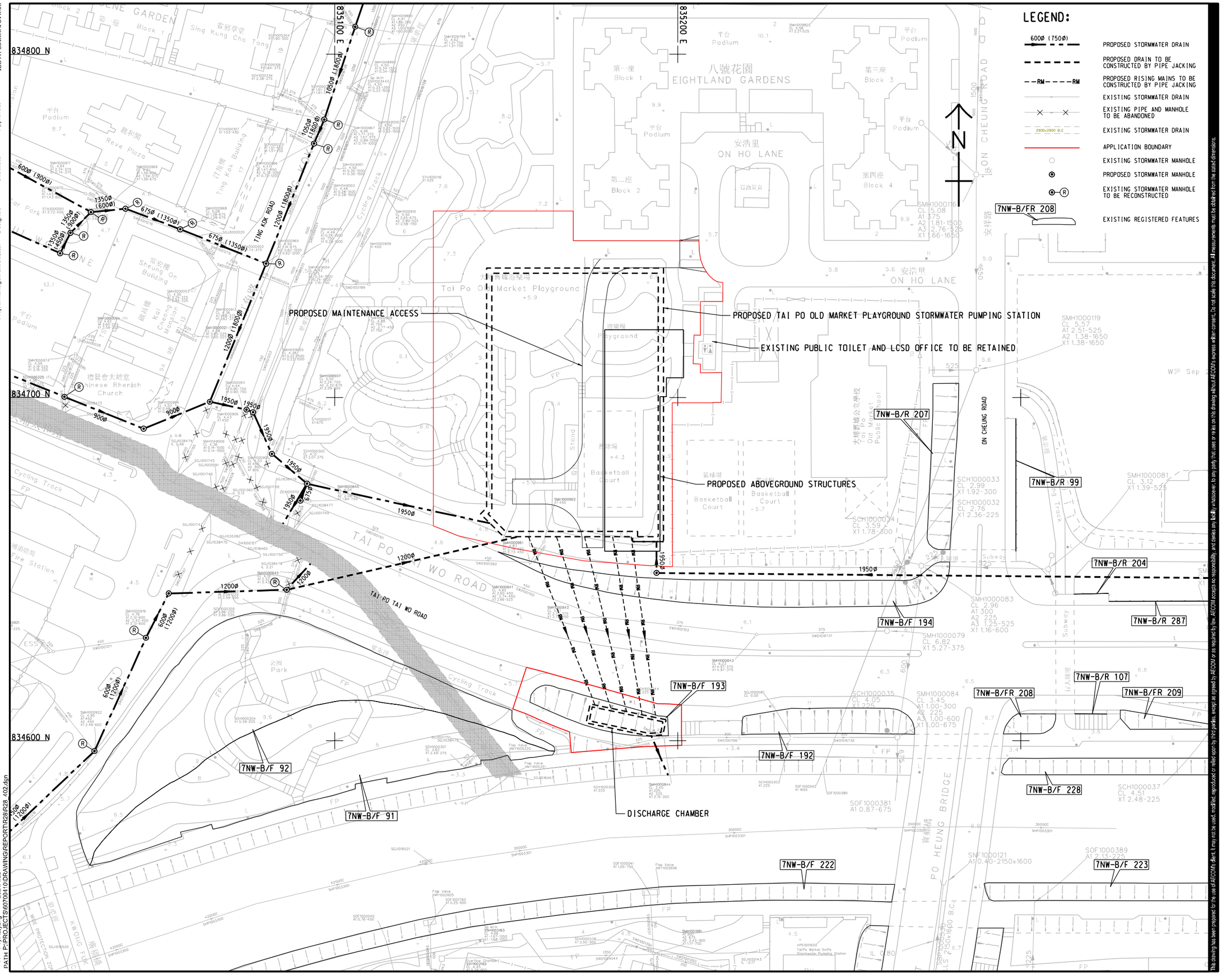
Project Management Initials:



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SCALE 比例
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DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
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CONTRACT NO. 合同編號
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SHEET TITLE
圖紙名稱

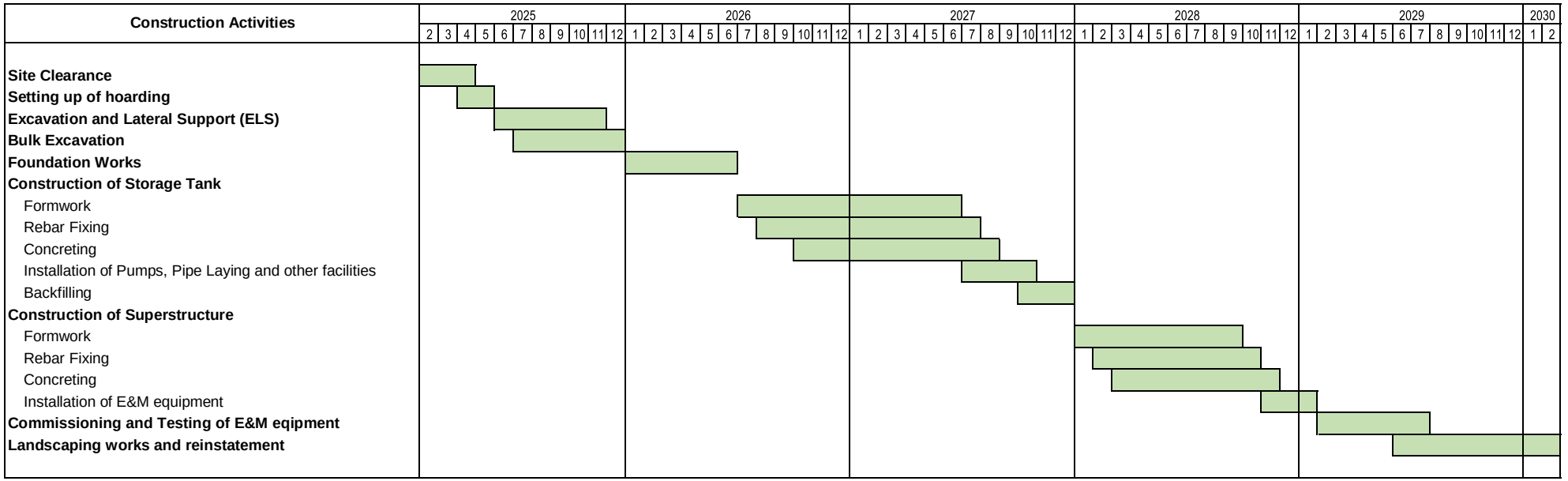
PROPOSED TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION

SHEET NUMBER
圖紙編號

60700410/R28/402

Appendix 2.2
Tentative Construction Programme

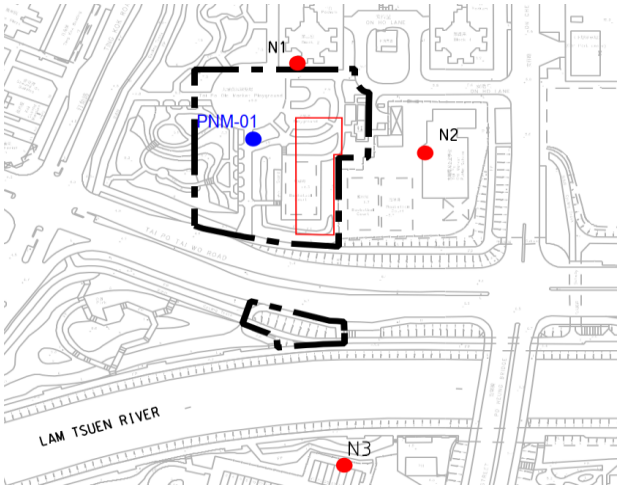
Appendix 2.2 Tentative Construction Programme



Appendix 4.1
Fixed Plant Noise Impact Assessment

Appendix 4.1 Fixed Plant Noise Impact Assessment

1. Determination of Fixed Plant Noise Criteria



Legend:
- Project Site Boundary
- Proposed Tai Po Old Market Playground Stormwater Pumping Station (TPOMPSPS)
- Representative Noise Sensitive Receivers
- Noise Measurement Points from PER Report prepared under the Investigation Study (Agreement No. CE 11/2019(DS))

NSR	Description	Type of Area Containing the Representative NSR	Degree to which NSR is affected by Influencing Factor	Area Sensitive Rating	Acceptable Noise Level (ANL), dB(A)		Planning Criteria (ANL-5), dB(A)		Relevant Prevailing Background Measurement Location	Minimum Measured Prevailing Background Noise Level, $L_{90(1\ hour)}$, dB(A)		Fixed Plant Noise Criterion Adopted, dB(A)	
					Daytime / Evening [1]	Night-time [1]	Daytime / Evening [1]	Night-time [1]		Daytime / Evening [1]	Night-time [1]	Daytime / Evening [1]	Night-time [1]
N1	Eightland Gardens	Area other than urban, rural or low density residential area	Not Affected	B	65	55	60	50	PNM-01	55	47	55	47
N2	Tai Po Old Market Public School	Area other than urban, rural or low density residential area	Not Affected	B	65	N/A [2]	60	N/A [2]	PNM-01	55	47	55	N/A [2]
N3	No. 29, Po Yick Lane	Area other than urban, rural or low density residential area	Not Affected	B	65	55	60	50	PNM-01	55	47	55	47

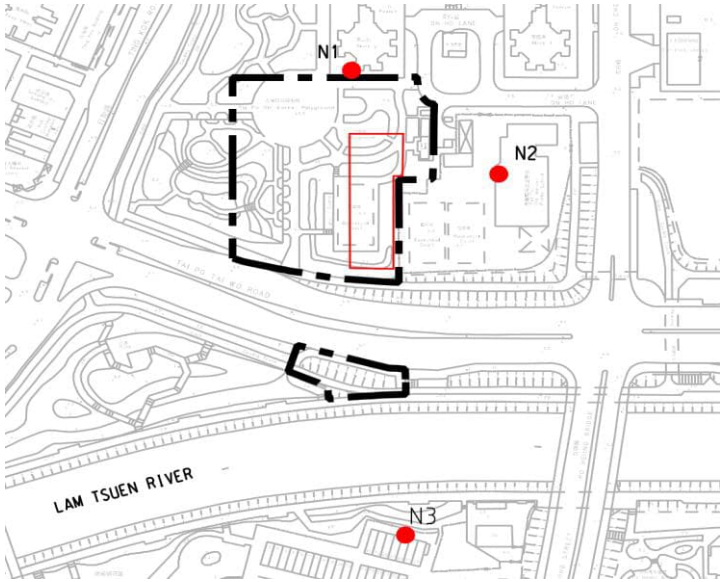
Notes:

[1] Daytime refers to 0700 to 1900 hours, while evening refers to 1900 to 2300 hours, and night-time refers to 2300 to 0700 hours

[2] It is assumed that there would be no night-time activities (2300 to 0700) for education institutes. Only the noise criteria for day-time / evening (0700 to 2300 hrs) are adopted for education institutes.

Appendix 4.1 Fixed Plant Noise Im

2. Maximum Allowable Sound Power Levels of Proposed Fixed Noise Sources



Legend:
- Project Site Boundary
- Proposed TPOMPSPS
- Representative Noise Sensitive Receivers

ii. Fixed Plant Noise Criteria Adopted

NSR	Description	Noise Criteria, dB(A) [1] [2]	Minimum Horizontal Distance to Proposed TMOMPSPS, m	Correction, dB(A)			Maximum Allowable Sound Power Level, dB(A)
				Distance	Tonal [3]	Façade	
N1	Eightland Gardens	47	30	-38	6	3	76
N2	Tai Po Old Market Public School	55	38	-40	6	3	86
N3	No. 29, Po Yick Lane	47	123	-50	6	3	88
Allowable SWL for Proposed TPOMPSPS							=76

Notes:

[1] Noise Criteria is the minimum of the 5 dB(A) below the Acceptable Noise Level (ANL-5) stated in the IND-TM and Prevailing Background Noise level suggested in the PER Report undertaken in the Investigation Study.

[2] The fixed plants of the propsoed TPOMPSPS would be in operation/standby for 24 hours that daytime and night-time operation of the fixed noise sources have been assumed. Night-time noise criteria has been adopted for residential uses (N1 & N3) and daytime noise criteria for educational uses (N2).

[3] A +6 dB(A) correction for tonality is applied in the fixed plant noise assessment as conservative approach.

[4] Based on the latest engineering design, all the fixed plants of the proposed TPOMPSPS would be housed/enclosed in a concrete structure with soundproof doors and openings of the ventilation fans / louver would be facing away from the nearest NSRs, i.e. towards to the southern or western side of the Project site.

Appendix 6.1
Relevant Drillhole Records

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

835000 E

835200 E

835400 E

834800 N

834600 N

834400 N

NOTES:

1. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (mPD).
2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
3. THE GI LOCATIONS ARE INDICATIVE ONLY AND THE EXACT LOCATION IS SUBJECT TO THE AGREEMENT WITH THE ENGINEER.

LEGEND:

SITE BOUNDARY

00718/BT5 35352/P400-TP1 HISTORICAL GI WITH LAB TEST RESULTS

00718/BT5
21310/P48-BH1
21310/P48-BH2
05900/D3
05900/D5
05900/D2
05900/D4
05900/D1

Plot File by: jack.zhou 2024/3/4
PATH: P:\PROJECTS\60700410\DRAWING\SKETCH\SK3001.dgn

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 復核

STATUS
階段

SCALE 比例: A1 1 : 1000

DIMENSION UNIT 尺寸單位: METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號: 60700410

CONTRACT NO. 合約號: CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

PROPOSED GI WORKS IN TAI PO OLD MARKET

SHEET NUMBER
圖紙編號

60700410/SK3001

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73838

P.W.D. Contract 10/G.C.O./83
Client Office G. C. O.

~~Borehole~~/Drillhole No. D 1

Job No & Location: W.O. P.W. 7/2/11.56 NEW PRIMARY SCHOOL In TAI PO AREA 4 Sheet 1 of 3

Method: ROTARY Ground Level: +5.7 mPD Coords E. 35241.33

Machine: D38 ACKER Orientation: VERTICAL N. 34679.46

Hole dia.: 0.0m 120 mm 29.0m 101.3mm 30.4m Date: from 30-11 to 3-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
13:00 30-11-84	PX	NIL AT 13:00	90				2,2, 2,3, 4,6 N=15	1.	0.0	+5.7		Medium dense, light brown clayey SILT with GRAVEL (FILL)		
									1.0					
									1.5	+4.2		Medium dense light brown and dark sandy GRAVEL (FILL)		
							3.2, 4.5, 7.9 N=25	2	2.0					
									2.5	+3.2		Dense, light brown & reddish brown Sandy GRAVEL (FILL)		
									3.0					
							4.7, 10.11, 13.16 N=50	3	4.0	+1.7				
									4.5					
							2.1, 1.1, 2.1 N=5	4	5.0			Loose Greyish green, Silty medium SAND with shell fragment (Marine Sand)		
									5.5					
									6.0					
							1.1, 1.1, 1.2, N=5	5	7.0					
									8.0					
							1.1, 0.1, 1.1, N=3	6	8.5					
									9.0					
							1.1, 2.2, 1.2, N=7	7	10.0					
	10.5m								10.5	-4.8				

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test
- U 76 undisturbed

Remarks

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

P.W.D. Contract 10/G.C.O./83
Client Office G. C. O.

Borehole/Drillhole No. D1

Job No & Location: W.O. D.W. 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4 TAI PO

Sheet 2 of 3

Method: ROTARY Ground Level: +5.7 mPD Coords E. 35241.33

Machine: D38 ACKER Orientation: VERTICAL N. 34679.46

Hole dia.: AS SHEET 1 Date: from 30-11 to 3-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
	PX		80	C0	0	N1	7,10, 15,20, 27,32, N=94	T2 to1 ● 8	10.5	-4.8		Very dense greyish green silty medium SAND with COBBLE <ALLUVIUM>		
		3.05m AT 18:30					5.7, 11.13, 16.20, N=60	● 9 T2 to1	11.5			Dark & White BOULDER <ALLUVIUM>		
7:30 1-12-84		3.41m AT 7:30		67	0	N1			12.5 12.6 12.9	-6.8 -7.2				
							4.5, 7.7, 8.10, N=32	● 10.	13.0 13.5 14.0			Dense, light brown & greyish green, silty medium SAND with GRAVEL <ALLUVIUM>		
							8.9, 9.12, 13.21, N=55	● 11.	14.5 15.0 15.5	-8.8		Very dense, light brown & dark brown sandy GRAVEL <ALLUVIUM>		
							2.2, 3.4, 5.7, N=19	● 12.	16.0 16.5 17.0	-10.3		Medium dense light brown & reddish brown, sandy SILT <ALLUVIUM>		
							3.2, 4.4, 5.6, N=19	● 13.	17.5 18.0 18.5	-11.8		Medium dense light brown & white sandy SILT <ALLUVIUM>		
	20.0m						3.3, 4.7, 9.12, N=32	● 14.	19.0 19.5 20.0	-13.3 -14.3		Medium dense brown sandy SILT <C. D. V.>	V	

Legend

Samples:

- ● Small disturbed
- ◆ Large disturbed
- ▮ U40 undisturbed
- ■ U100 undisturbed
- ▨ Mazier
- □ Liner sample
- ▲ Water sample
- ↓ Standard penetration test
- ↕ Permeability test
- ◪ U76 undisturbed

Remarks

C.D. V. : COMPLETELY DECOMPOSED VOLCANIC

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283961 Cables: GAMMONCO Telex: HX 73826

P.W.D. Contract 10/G.C.O./83
Client Office G.C.O.

~~Borehole~~/Drillhole No. D1

Job No & Location: W.O. P.W. 7/2/1156 NEW PRIMARY SCHOOL IN ARAE 4 TAI PO
Sheet 3 of 3

Method: ROTARY Ground Level: +5.7 mPD Coords E. 35241.33
Machine: D38 ACKER Orientation: VERTICAL N. 34679.46
Hole dia.: AS SHEET 1 Date: from 30-11 to 3-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
	PX		80				5.10. 12.16. 16.20. N=64	15.	20.0	-14.3		AS SHEET 2	V	
									20.5	-14.8		Dense, light brown & black, clayey SILT <C.D.V.>	V	
							7.10. 13.18. 18.26. N=75	16.	21.5				V	
									22.0	-16.3		Dense light brown, clayey SILT <C.D.V.>	V	
							8.16 20.25 36.42. N=123	17.	23.5	-17.8		Dense, greyish brown clayey SILT with GRAVEL <C.D.V.>	V	
									24.5				V	
									25.0	-19.3		Dense greyish brown slightly sandy SILT <C.D.V.>	V	
							9.15. 22.29. 37.46. N=134	18.	25.5				V	
									26.0				V	
									26.5	-20.8		Dense greyish brown Sandy SILT <C.D.V.>	V	
							10.21. 34.75. 105. N=334	19.	27.0				V	
									27.4				V	
	29.0m	2.5m AT 18:30							28.0	-22.3		Very dense dark brown sandy GRAVEL <C.T. H.D.V.>	V	
3:30 3-12-84		3.0m AT 7:30	90				5.7. 15.40. 70.81. N=286	20.	28.5				V	
									29.0				IV	
12:00 3-12-84	30.4m	2.0m AT 13:00							30.4	-24.7		Operation stopped at 30.4m as instruction given on Works Order.		

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test
- U76 undisturbed

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

H.D.V. : HIGHLY DECOMPOSED VOLCANIC


CONTRACTOR
GAMMON
(HK) LTD
G C O
E. D. D. CONTRACT
NO: 10/GCO/83
DRILLHOLE NO: D1
BOX NO: OF
DEPTH FROM 10.6 M
TO 12.9 M
W.O.NO/LOCATION: W.O. P.W. 7/2/11.56
NEW PRIMARY SCHOOL IN AREA 4, TAI PO
0.1
0.2
0.3
0.4
0.5
0.6
10.6
11.0
12.6
12.9
TAI PO
JOB NO 882-11.56
HOLE NO D1

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Contract No: 10/GCO/83
Client Office: G.C.O.
Borehole/Drillhole No: D 2

Job No & Location: W.O. PW7/2/11.56, NEW PRIMARY SCHOOL IN AREA 4, TSI PO. Sheet 1 of 6

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35241.74

Machine: D77 Orientation: VERTICAL N. 34701.54

Hole dia.: 0.0m 140mm – 30.0m 120mm – 40.0m 89mm – 51.5m Date: from 7-12 to 14-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									0.0	+5.6				
15:50 7/12	PX		90	90	0		3,3,3, 3,4,4, N=14	PX 1	0.5	+5.1		Brown BOULDER. (FILL)		
									1.0			Medium dense brown clayey silty SAND. (FILL)		
				90	44			PX	1.3	+4.3		Brown BOULDER. (FILL)		
							6,7,5, 4,4,4, N=17	2	1.8	+3.8		Medium dense, brown & white sandy SILT with gravel. (FILL)		
									2.0					
									2.5	+3.1				
									3.0			Loose to medium dense grey silty medium SAND. (MARINE DEPOSIT)		
		2.1m AT 18:00					2,1,1, 2,1,1, N=5	3	4.0					
18:00 7:30 8/12		4.5m AT 7:30							5.0					
							3,2,3, 2,3,3, N=11	4	5.5	+0.1				
									6.0			Dense to medium dense dark grey silty fine to medium SAND. (MARINE DEPOSIT)		
							7,13,16, 10,7,4, N=37	5	7.0					
									8.0					
							11,12,6, 4,3,3, N=16	6	8.5					
									9.0					
		3.2m AT 12:00					11,11,9, 4,4,5, N=22	7	10.0	-4.4				
	10.0m													

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

G1 51

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
*33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Contract No: 10/GCO/83
Client Office: GCO.

~~Borehole~~/Drillhole No. D 2

Job No & Location: H.D. PN 7/2/11.56, NEW PRIMARY SCHOOL IN AREA 4, TSY PO

Sheet 2 of 6

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35241.74

Machine: D77 Orientation: VERTICAL N. 34701.54

Hole dia.: AS SHEET 1 Date: from 7-12 to 14-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									10.0	-4.4				
	PX	4.2m AT 13:00	9 0									Medium dense dark grey silty medium sand with gravel. (MARINE DEPOSIT)		
				43	0			T_z 10 1	11.0	-5.4		Brown & grey BOULDER. (ALLUVIUM)		
							5,13,8 9,13,13 N=45	8	12.0	-6.4		Dense grey silty medium SAND. (ALLUVIUM)		
18:00		3.1m AT 18:00							13.0					
T:30 10/12		6.1m AT T:30		5/	0			T_z 10 1	13.8	-8.2				
									14.0			Grey BOULDER. (ALLUVIUM)		
									14.5	-8.9				
									15.0			Very dense, silty SAND with GRAVEL (ALLUVIUM)		
		4.2m AT 12:00					4,9,13 16,21,18 N=78	9	16.0	-10.4				
9:00 T:30 11/12		6.1m AT T:30		2.0	0			T_z 10 1	16.5	-10.9		Brown BOULDER IN cobble size (ALLUVIUM)		
							13,8,4 4,3,4 N=15	10	17.0			Medium dense, light brown & white Clayey SILT (C.D.V.)		V
									17.5					
									18.0					
							2,4,4 3,4,8 N=20	11	19.0					
	20.0m								20.0	-14.4				

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73828

Contract No: [illegible] | Client Office: G.C.O. | D 2

Job No & Location: N.D.PW 7/6/11.56, NEW PRIMARY SCHOOL IN AREA 4, TAI PO | Sheet 3 of 6

Method: ROTARY | Ground Level: +5.6 mPD | Coords E. 35241.74

Machine: D77 | Orientation: VERTICAL | N. 34701.54

Hole dia.: AS SHEET 1 | Date: from 7-12 to 14-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									20.0	-14.4				
11/2	PX		90				12,8,9, 10,10,12 N=42	12	20.5			Medium dense, brown, Clayey SILT (C.D.V.)		
									21.0	-15.4				
							3,4,5, 7,6,8, N=26	13	22.0			Soft, light brown & white silty CLAY (C.D.V.)		
									23.0					
							3,5,7, 9,8,11, N=35	14	23.5					
									24.0	-18.4				
		3.2m AT 12:00					2,2,4, 3,7,9, N=25	15	25.0			Soft, brown, silty CLAY (C.D.V.)		
		4.6m AT 13:00							26.0					
							3,3,3, 7,7,12, N=29	16	26.5					
									27.0	-21.4				
							6,7,11, 12,12,12, N=47	17	28.0			Medium dense, greyish brown, Clayey SILT (C.D.V.)		
									28.5	-22.9				
							7,10,13, 13,14,13, N=54	18	29.0			Dense, light brown, & white, Clayey SILT (C.D.V.)		
	30.0m								29.5					
									30.0	-24.4				

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

G151

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Client Office: G.C.O.

D2

Job No & Location: N.D. PN7/2/11.56, NEW PRIMARY SCHOOL IN AREA 4, TSI PO | Sheet 4 of 6

Method: ROTARY | Ground Level: +5.6 mPD | Coords E. 35241.74

Machine: D77 | Orientation: VERTICAL | N. 34701.54

Hole dia.: AS SHEET 1 | Date: from 7-12 to 14-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									30.0	-24.4				
	106		90				10,22, 33,50, 50/71. N=204	19	31.0			Dense, brown & white, slightly Sandy clayey SILT (C.D.V.)	V	
									31.5	-25.9				
		3.0m AT 18:00					12,20, 38,91. 69/84. N=242	20	32.0			Dense, brown, slightly clayey SILT (C.D.V.)	V	
18:30									32.5					
7:30		6.2m AT 7:30							33.0	-27.4				
13/12							19,30, 33,35, 50/90. N=208	21	34.0			Dense, yellowish brown, clayey SILT (C.D.V.)	V	
									34.5	-28.9				
							23,36, 38,56, 89/118. N=301	22	35.0			Very dense, yellowish brown Sandy SILT (C.D.V.)	V	
									35.5					
									36.0	-30.4				
							28,35, 40,62, 80/134 N=314	23	37.0			Very dense, dark brown, Sandy SILT (C.D.V.)	V	
							35,43, 68,92 156 N=316/225mm	24	38.0					
									38.4					
							83,210 N=293/190mm	25	39.0	-33.4				
		3.3m AT 12:00							39.2			Very dense, greyish brown & white. Sandy SILT (C.D.V.)	V	
	40.0m								40.0	-34.4				

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

G1 51

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73828

Contract No: 10/GCO/83
Client Office: G.C.O.

~~Borehole~~/Drillhole No. D 2

Job No & Location: NO. PN7/3/11.56, NEW PRIMARY SCHOOL IN AREA 6, TBI PO
Sheet 5 of 6

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35241.74
Machine: D77 Orientation: VERTICAL N. 34701.54
Hole dia.: AS SHEET 1 Date: from 7-12 to 14-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									40.0	-34.4				
	NX	4.0m AT 13:00	90				N=30/100mm	26	41.0			Very dense, brown, Silty Sandy GRAVEL (H ~ C.D.V.)	V/IV	
									41.1					
									42.0					
				10 0	0	N.I.			42.1	-36.5		Moderately weak to moderately strong dark green, fine gained, highly decomposed VOLCANIC, very closely spaced joints.	IV	
				10 0	0	N.I.			42.5					
				10 0	0	12			43.0	-37.4		Strong, dark green, fine gained, moderately decomposed VOLCANIC, closely to very closely spaced joints.	III	
		3.0m AT 18:00		10 0	66	6		TNM	44.0	-38.4		Strong, dark green, fine gained, slightly to moderately decomposed VOLCANIC, medium closely to closely spaced joints.	II/III	
18:00									45.0					
7:30 13/12		6.1m AT 7:30		7 8	43	7			45.1	-39.5		Strong, dark grey, fine gained, slightly to moderately decomposed VOLCANIC, closely to very closely spaced joints.	II/III	
				25	0	N.I.			45.6	-40.0				
					0	N.I.			46.1			Very weak, dark green, fine gained, highly decomposed VOLCANIC, very closely spaced joints.	IV	
				10					47.0					
									47.6	-42.0				
							N=20/50mm	27	48.0			Dense, dark green, Sandy GRAVEL (H. ~ C.D.V.)	V/IV	
									48.6					
									49.0					
	50.1m						N=20/50mm	28	50.1	-44.5				

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test

Remarks
C.D.V. : COMPLETELY DECOMPOSED VOLCANIC
H.D.V. : HIGHLY DECOMPOSED VOLCANIC

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Contract No.: [illegible]
Client Office: G.C.O.

D 2

Job No & Location: W.O.P.N. 7/2/11.55, NEW PRIMARY SCHOOL IN AREA 4, TAI PO

Sheet 6 of 6

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35241.74

Machine: D77 Orientation: VERTICAL N. 34701.54

Hole dia.: AS SHEET 1 Date: from 7-12 to 14-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									50.1	-44.5				
7:30	NX	6.2m at 7:30	90								0·0 ·0· 0·0 ·0· 0·0 ·0·	Dense, dark green, Sandy GRAVEL (H. ~ C.D.V.)	V/IV	
		4.5m at 9:00							51.0					
9:00	51.5m						N=200/60mm 29		51.5	-45.9				
												Operation stopped at 51.5 m as instruction given on Works Order.		

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

H.D.V. : HIGHLY DECOMPOSED VOLCANIC

GI 51


CONTRACTOR
GAMMON
(HK) LTD
G C O
E. D. D. CONTRACT
NO: 10/GCO/83
DRILLHOLE NO : D2
BOX NO : OF
DEPTH FROM 0.0 M
TO 16.5 M
W.O. NO / LOCATION : W.O. P.W. 7/2/11.56
NEW PRIMARY SCHOOL IN AREA 4 , TAI PO
0.1
0.2
0.3
0.4
0.5
0.6
0.0
0.5
1.3
11.0
12.0
13.0
13.8
14.5
16.0
16.5


CONTRACTOR
GAMMON
(HK) LTD
G C O
E. D. D. CONTRACT
NO: 10/GCO/83
DRILLHOLE NO: D2
BOX NO: OF
DEPTH FROM 42.1 M
TO 47.6 M
W.O. NO / LOCATION: W.O. P.W. 7/2/11.56
NEW PRIMARY SCHOOL IN AREA 4, TAI PO
0.1
0.2
0.3
0.4
0.5
0.6
42.1
43.2
42.4
45.1
45.6
46.1
47.6
D2
NO.28
42.10 M

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73828

Client Office: GCO

D3

Job No & Location: W.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN AREA, TAIPO

Sheet 1 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35242.23

Machine: D41 ACKER Orientation: VERTICAL N. 34722.13

Hole dia.: 0.0m 140mm – 20.5m – 120mm – 38.5m Date: from 1-12 to 4-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
10:00 1-12-84	PX	NIL AT 10:00	90				5,4, 2,1, 1,2. N=6	1	0.0	+5.6		Loose to medium dense, light brown & reddish brown Sandy SILT with GRAVEL (FILL)		
							4,3, 3,1, 2,6 N=12	2	2.5					
							3,1, 1,3, 4,2 N=10	3	3.0	+2.6		Loose, reddish brown, Sandy SILT (FILL)		
							2,2, 3,2, 3,3, N=11	4	4.5	+1.1		Medium dense, light brown, COBBLE (FILL)		
12:00 – 13:00		1.2m AT 12:00 – 1.5m AT 13:00					1,1, 1,2, 2,2, N=7	5	6.0	-0.4		Loose to medium dense, dark green, silty SAND with shell fragment. (MARINE SAND)		
							2,3, 3,3, 3,3, N=12	6	8.0					
	10.0m						1,2, 2,4, 6,10 N=32	7	9.0	-3.4		Medium dense, dark green Sandy GRAVEL with shell fragment (MARINE DEPOSIT)		
									10.0	-4.4				

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

GI 51

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283041 Cables: GAMMONCO Telex: HX 73826

Contract No: 10/GCO/83
Client Office: G.C.O.

~~Borehole~~/Drillhole No. D3

Job No & Location: W.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4, TAI PO
Sheet 2 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35242.23
Machine: D41 ACKER Orientation: VERTICAL N. 34722.13
Hole dia.: AS SHEET 1 Date: from 1-12 to 4-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
									10.0	-4.4				
	PX		90				13,13, 18,14, 18,13. N=63	8	11.0			Very dense, dark green. Sandy GRAVEL with COBBLE (MARINE DEPOSIT)		
1-12-84 18:30		0.0m AT 18:30							11.5					
11:00		5.0m AT 11:00					11,14, 18,20, 20,31 N=91	9	12.0					
3-12-84 12:00		4.0m AT 12:00		4	0	0	N.I.		12.5					
13:00		4.0m AT 13:00					T2101		13.0	-7.4		Brown BOULDER (ALLUVIUM)		
							11,28, 26,20, 17,13. N=76	10	13.8	-8.2				
									14.0			Very dense, light brown & white, silty SAND with GRAVEL (ALLUVIUM)		
									14.5					
									15.0	-9.4				
							12,14, 20,22, 13,10 N=65	11	15.5			Very dense, dark brown, slightly Clayey Sandy SILT. (ALLUVIUM)		
									16.0					
									16.5	-10.9				
							1,2, 2,1, 2,3. N=8	12	17.0			Very Soft, reddish brown, Slightly Silty CLAY (C.D.V.)		
									17.5					
									18.0					
									18.5				V	
							2,2, 5,5, 5,4, N=19	13	19.0					
	20.0m								20.0	-14.4				

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test

Remarks
C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Contract No.:
Client Office: GCIO

D3

Job No & Location: W.O. PW. 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4, TAI PO
Sheet 3 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35242.23

Machine: D41 ACKER Orientation: VERTICAL N. 34722.13

Hole dia.: AS SHEET 1 Date: from 1-12 to 4-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
3-12-84 16:45 7:30 4-12-84	PX 30.5m 106	3.0m AT 16:45 6.2m AT 7:30	90				7,8, 7,10, 9,7. N=33	14	20.0	-14.4		Soft, reddish brown, silty CLAY (C.D.V.)	V	
							4,6, 5,7, 9,10 N=32	15	22.0					
							5,7, 8,9, 11,12 N=40	16	23.0					
							7,7, 9,10, 11,10 N=40	17	24.0	-18.4		Soft, yellowish brown, silty CLAY (C.D.V.)	V	
							7,9, 9,13, 17,17 N=56	18	25.5	-19.9		Firm, light brown & white, silty CLAY (C.D.V.)	V	
							16,15, 14,18, 17,21 N=70	19	27.0	-21.4		Dense, light brown & white Clayey SILT (C.D.V.)	V	
12:00 13:00		5.0m AT 12:00 6.0m AT 13:00					12,15, 20,18, 17,20 N=75	20	29.0					
	30.0m								30.0	-24.4				

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

GI 51

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283041 Cables: GAMMONCO Telex: HX 73826

Client Office: GCO

D3

Job No & Location: X.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4, TAIPO

Sheet 4 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35242.23

Machine: D41 ACKER Orientation: VERTICAL N. 34722.13

Hole dia.: 0.0m AS SHEET 1 Date: from 1-12 to 4-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
	106		90				3,4, 12,13, 21,35 N=71	21	30.0	-24.4		Dense to Very dense light brown & white Sandy SILT (C.D.V.)	V	
							10,15, 20,31, 35,39 N=125	22	32.0					
							10,11, 12,15, 17,17 N=61	23	33.0					
							23, 36, 149, 51 N=200/85	24	35.0					
							36,57 60,78 62 N=200/190	25	36.0	-30.4		Dense, light brown & white Silty SAND (C.D.V.)	V	
							89 111 N=200/85	26	37.5	-31.9		Dense, light brown & dark brown, silty SAND with GRAVEL (H~C.D.V.)	V/IV	
4-12-84 17:00	38.5m	3.5m AT 17:00							38.1	-32.9		Operation stopped at 38.5 m as instruction given on Works Order.		
									38.5					

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

H.D.V. : HIGHLY DECOMPOSED VOLCANIC

GI 51


CONTRACTOR
GAMMON
(HK) LTD
G C O
E. D. D. CONTRACT
NO: 10/GCO/83
DRILLHOLE NO: D2
BOX NO: OF
DEPTH FROM 13.0 M
TO 13.7 M
W.O.NO/LOCATION: W.O. P.W. 7/2/11.56
NEW PRIMARY SCHOOL IN AREA 4 . TAI PO
0.1
0.2
0.3
0.4
0.5
0.6
13.0
13.7

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283041 Cables: GAMMONCO Telex: HX 73838

P.W.D. Contract 10/G.C.O./83
Client Office G.C.O.

~~Borehole~~/Drillhole No. D4

Job No & Location: W.O. PW 7/2/1156 NEW PRIMARY SCHOOL IN AREA 4 TAI PO

Sheet 1 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35259.29

Machine: D38 ACKER Orientation: VERTICAL N. 34678.18

Hole dia.: 0.0 — 140mm — 31.9m Date: from 3-12 to 5-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
15:00 3-12-84	PX	NIL AT 15:00 NIL AT 7:30	90				2.3. 5.5. 4.3. N=17	1.	0.0	+5.6		Medium dense dark brown sandy SILT <FILL>		
7:30 4-12-84		NIL AT 7:30					5.3. 3.4. 3.4. N=16	2.	1.5	+4.1		Medium dense light brown silty SAND <FILL>		
							2.2. 2.2. 2.3. N=9	3.	3.0	+2.6		Very soft dark green slightly silty CLAY <MARINE DEPOSIT>		
							1.1. 2.2. 2.2. N=8	4.	4.5	+1.1		Loose dark grey medium to coarse SAND <MARINE SAND>		
							1.1. 1.1. 2.2. N=6	5.	6.0	-0.4		Loose dark green silty fine SAND with shell fragment <MARINE SAND>		
							1.1. 1.2. 1.2. N=6	6.	8.0					
10.0m							5.7. 9.10. 12.11. N=43	7.	9.0	-3.4		Dense brownish grey sandy GRAVEL with cobble <ALLUVIUM>		
									10.0	-4.4				

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test
- U76 undisturbed

Remarks

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73628

P.W.D. Contract 10/G.C.O./83
Client Office G.C.O.

~~Borehole~~/Drillhole No. D4

Job No & Location: W.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4 TAI PO

Sheet 2 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35259.29

Machine: D38 ACKER Orientation: VERTICAL N. 34678.18

Hole dia.: 0.0 — 140mm — 31.9m Date: from 3-12 to 5-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
4-12	PX		90				6.7. 9.9. 12.14. N=44	8.	10.0	-4.4		Dense brownish grey sandy GRAVEL with cobble <ALLUVIUM>		
									11.0					
									11.5					
							5.9 11.14. 20.23. N=68	9.	12.0	-6.4		Dense yellowish grey sandy SILT <ALLUVIUM>		
									12.5					
									13.0					
							5.12. 12.10. 10.13. N=45	10.	13.5	-7.9		Dense yellowish brown silty SAND <ALLUVIUM>		
									14.0					
									14.5					
									15.0					
									15.5					
							7.12. 12.15. 18.22 N=67	11.	16.0	-10.4		Yellowish brown & grey boulder <ALLUVIUM>		
				38	0	NI		T2-101	16.5					
									17.0					
									17.5	-11.9		Soft light brown & white silty CLAY <C.D.V.>	V	
18:30 7:30 5-12-84		3.04m AT 18:30 5.0m AT 7:30	80				3.4. 4.5. 6.6. N=21	12.	18.0					
									18.5					
									19.0	-13.4				
							3.5. 5.6. 7.8. N=26	13.	19.5			AS SHEET 3	V	
	20.0m								20.0	-14.4				

Legend
Samples:
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Standard penetration test
- Permeability test
- U76 undisturbed

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Client Office G.C.O. D4

Job No & Location: W.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN AREA 4 TAI PO Sheet 3 of 4

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35259.29

Machine: D38 ACKER Orientation: VERTICAL N. 34678.18

Hole dia.: 0.0 — 140mm — 31.9m Date: from 3-12 to 5-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
5-12	PX		80				4.4. 6.7. 7.8. N=28	14.	20.0	-14.4		Medium dense yellowish brown & white silty CLAY <C.D.V.>	V	
							4.3. 7.7. 9.8. N=30	15.	21.5 22.0	-16.4		Medium dense light brown & white silty SAND <C.D.V.>	V	
							7.7. 10.10. 11.13. N=44	16.	23.5 24.0	-17.9		Medium dense brown sandy clayey SILT <C.D.V.>	V	
							9.9. 12.14. 18.20. N=64	17.	25.0 25.5 26.0	-19.4		Dense light brown & white sandy SILT <C.D.V.>	V	
							9.15 25.28 34.51 N=138	18.	27.0 27.5 28.0					
							11.20. 36.47. 72.81. N=238	19.	28.5 29.0					
	30.0m								30.0	-24.4				

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test
- U76 undisturbed

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

3151

CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283041 Cable: GAMMONCO Telex: HX 73838

Client Office G. C. O. | D4

Job No & Location: W.O. PW 7/2/11.56 NEW PRIMARY SCHOOL IN TAI PO AREA 4 | Sheet 4 of 4

Method: ROTARY Ground Level: +5.6 MPD Coords E. 35259.29

Machine: D38 ACKER Orientation: VERTICAL N. 34678.18

Hole dia.: 0.0 — 140mm — 31.9 m Date: from 3-12 to 5-12-84

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Grade	Zone
	PX		80				10.22 30.54 67.78 N=229	20.	30.0	-24.4		Dense. light brown & white sandy SILT < C. D. V.>	V	
12:00 5-12-84	31.9 m	3.1m AT 12:00 pm					201/ 350 mm	21.	31.0	-25.4		Dense light brown & white silty SAND (C.D.V.)	V	
									31.5	-26.3		Operation stopped at 31.85m as instruction given on Works Order.		
									31.9					

Legend

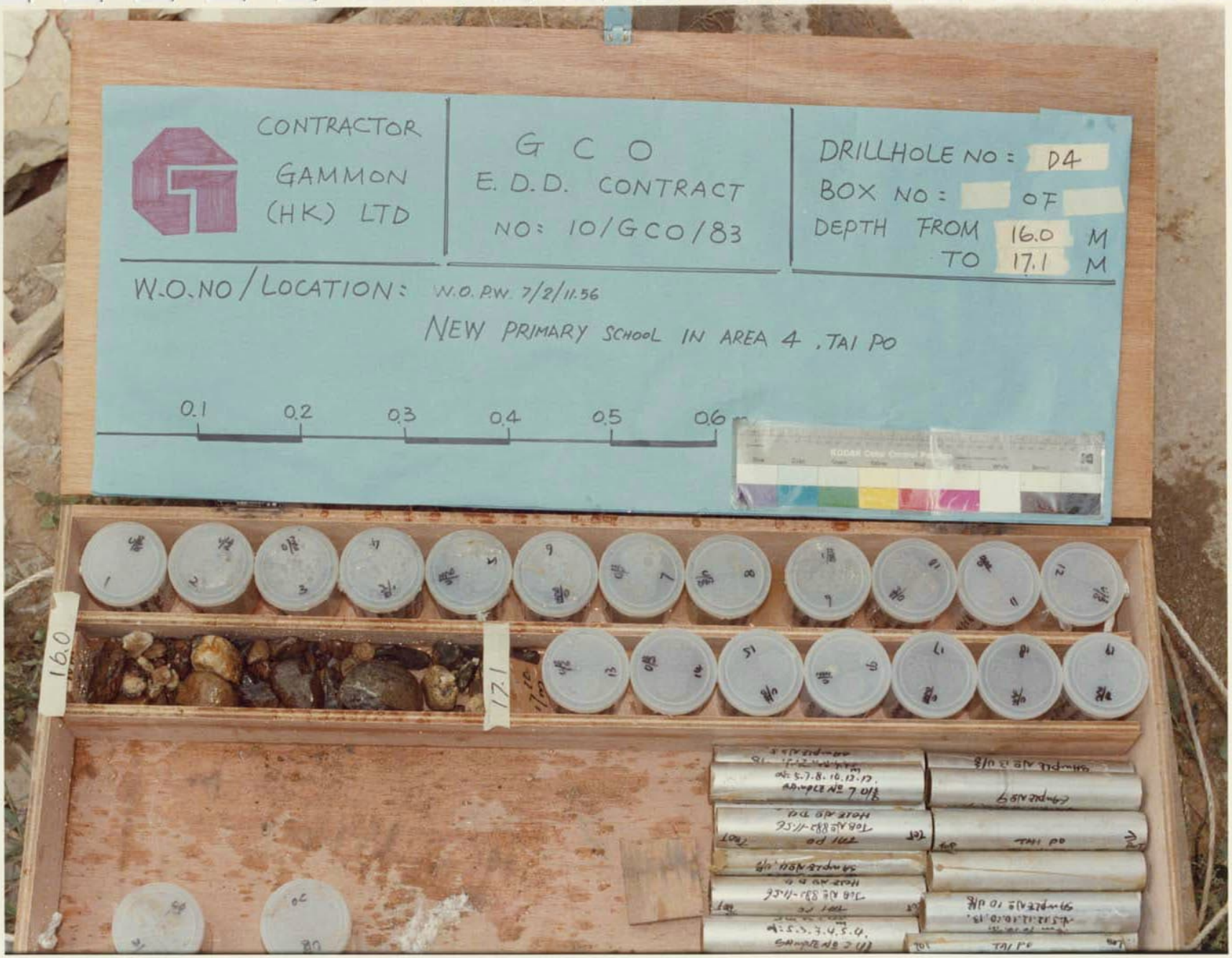
Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test
- U76 undisturbed

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC

GI 51


CONTRACTOR
GAMMON
(HK) LTD
G C O
E. D. D. CONTRACT
NO: 10/GCO/83
DRILLHOLE NO: D4
BOX NO:
OF
DEPTH FROM 16.0 M
TO 17.1 M
W.O. NO / LOCATION: W.O. P.W. 7/2/11.56
NEW PRIMARY SCHOOL IN AREA 4, TAI PO
0.1
0.2
0.3
0.4
0.5
0.6
16.0
17.1

CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Client Office: G.C.O.

D5

Job No & Location: W.O. PN 7/2/11-56, NEW PRIMARY SCHOOL IN AREA 4, TAI PO

Sheet 1 of 3

Method: ROTARY Ground Level: +5.6 MPD Coords E. 35258.71

Machine: D 77 Orientation: VERTICAL N. 34702.72

Hole dia.: 0.0 m 140mm — 23.0 m 120mm — 30.0 m

Date: from 5-12 to 7-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
7:30 5/12	PX		80				4,4,3, 3,3,4 N=13	1	0.0	+5.6		Medium dense brown silty SAND with gravel. (FILL)		
		NIL AT 12:00					4,3,2, 2,3,3 N=10	2	1.0					
		NIL AT 13:00							2.0					
									2.5					
									3.0					
									4.0	+1.6				
							3,2,2, 1,2,2, N=7	3	5.0			Loose to medium dense green silty medium to fine SAND. (MARINE DEPOSIT)		
		3.5m AT 18:00							5.5					
15:00 7:30 6/12		4.5m AT 7:30					2,3,3, 3,3,3, N=12	4	6.0					
									7.0					
							1,2,2, 2,2,3, N=9	5	8.0					
									8.5					
									9.0					
	10.0 m						2,3,3, 3,3,4, N=13	6	10.0	-4.4				

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

An inspection pit was excavated down to 1.5m.

G151

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73828

Contract No: 10/GCO/83
Client Office: G.C.O.

~~Borehole~~/Drillhole No. D 5

Job No & Location: W.D. PW 7/2/1156, NEW PRIMARY SCHOOL IN AREA 6, TAI PO

Sheet 2 of 3

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35258.71

Machine: D77 Orientation: VERTICAL N. 34702.72

Hole dia.: AS SHEET 1 Date: from 5-12 to 7-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
6/12	PX		80						10.0	-4.4				
							10,15,8 8,6,4 N=26	7	11.0			Medium dense, greenish yellow silty SAND. (ALLUVIUM)		
									11.5	-5.9				
							6,9,8, 11,20,17 N=56	8	12.0			Very dense, greenish yellow sandy GRAVEL. (ALLUVIUM)		
		2.1m AT 12:00							13.0	-7.4				
		3.0m AT 13:00					13,15,24 31,19,17 N=84	9	14.0			Very dense, yellowish brown slightly clayey sandy SILT with gravel. (ALLUVIUM)		
									14.5					
				52	0				15.0	-9.4				
							T_2 101					Light brown BOULDER. (ALLUVIUM)		
				47	0				16.1					
							6,3,2, 2,2,3, N=9	10	17.0	-11.4				
									17.5			Medium dense light brown & white clayey SILT. (C. D. V.)		
									18.0					
							2,3,3, 3,3,4, N=13	11	19.0					
									20.0	-14.4				
		20.0m												

Legend

Samples:

- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Standard penetration test
- Permeability test

Remarks

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC.

Gammon (Hong Kong) Limited
CIVIL ENGINEERS & CONTRACTORS
33rd Floor, Hopewell Centre, 183 Queen's Road, East, Hong Kong.
Tel: 5-283941 Cables: GAMMONCO Telex: HX 73826

Client Office: G.C.O.

D 5

Job No & Location: N.D. PW 7/2/11.56, NEW PRIMARY SCHOOL IN AREA 4, TAI PO

Sheet 3 of 3

Method: ROTARY Ground Level: +5.6 mPD Coords E. 35258.71

Machine: D77 Orientation: VERTICAL N. 34702.72

Hole dia.: AS SHEET 1 Date: from 5-12 to 7-12-1984

Drilling progress	Casing depth size	Water Level	Water recovery %	Core recovery %	R.Q.D. %	Fracture index	Tests	Samples	Depth metres	Reduced Level	Legend	Description	Depth	Grade
	PX		80				3,4,6, 5,7,7. N=25	12	20.0	-14.4		Medium dense, light brown clayey SILT. (C.D.V.)		
							5,5,5, 6,13,14 N=38	13	20.5					
									21.0					
									22.0	-16.4				
18:00	23.0m	2.0m AT 18:00							23.0					
7:30 7/12	106	6.0m AT 7:30					10,12, 16,16, 13,17. N=64	14	23.5			Dense to very dense light brown & white fine sandy SILT. (C.D.V.)		
									24.0					
							12,14,15 16,18,16 N=67	15	25.0					
									26.0					
							10,13, 22,33, 76,154 N=265	16	26.5					
									27.0					
							16,40, 83,200 N=283/150mm	17	27.8	-22.2				
									28.0			Very dense, brown silty fine SAND. (H.D.V.)		
							N=200/50mm	18	29.0					
									29.1					
12:00	30.0m	2.5m AT 12:00							30.0	-24.4				
												Operation stopped at 30.0m as instruction given on Works Order.		

Legend

Samples:

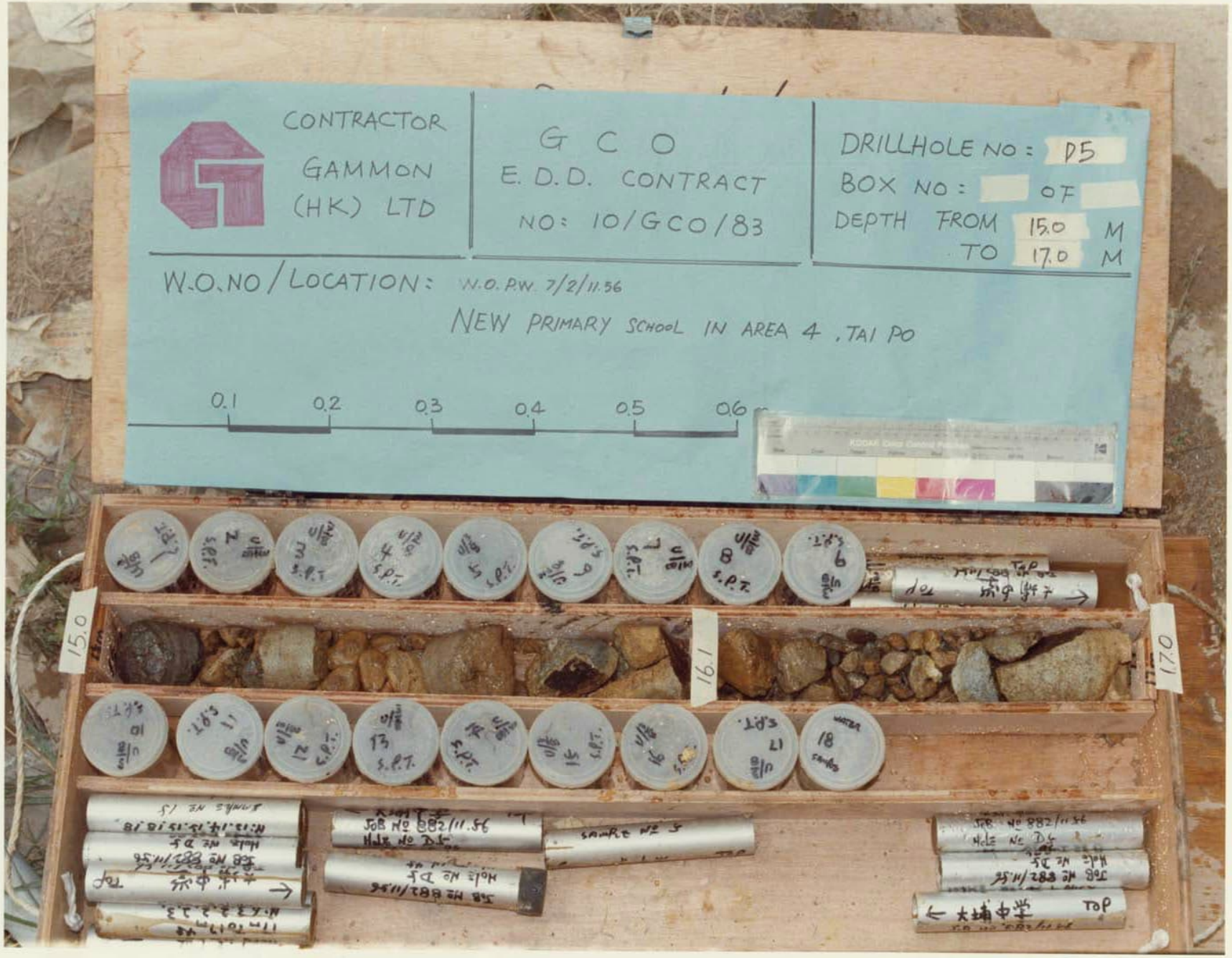
- Small disturbed
- Large disturbed
- U40 undisturbed
- U100 undisturbed
- Mazier
- Liner sample
- Water sample
- Water table
- Standard penetration test
- Permeability test

Remarks

H.D.V. : HIGHLY DECOMPOSED VOLCANIC.

C.D.V. : COMPLETELY DECOMPOSED VOLCANIC.

GI 51


CONTRACTOR
GAMMON (HK) LTD
G C O
E. D. D. CONTRACT NO: 10/GCO/83
DRILLHOLE NO: D5
BOX NO: OF
DEPTH FROM 15.0 M
TO 17.0 M
W.O. NO / LOCATION: W.O. P.W. 7/2/11.56
NEW PRIMARY SCHOOL IN AREA 4, TAI PO
0.1 0.2 0.3 0.4 0.5 0.6
15.0
16.1
17.0
TOP

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 2365 9123-6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

HOLE NO. **P48-BH1**

CONTRACT TC C309

SHEET 1 of 5

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**	CO-ORDINATES	W.O. No **ASD3745 (Vol.10of19)**
MACHINE & No. **DR90**	**E 835262.84** **N 834721.97**	DATE from **20/02/95** to **27/02/95**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL **5.68** mPD

Drilling Progress	Casing size	Water level (m) Shift start/end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
20/02/95	PW							0.00	5.48	0.20			Concrete slab
													Loose, reddish brown, clayey silty fine to coarse SAND with some angular medium to coarse gravel. (FILL)
			75					1 2.00					
								2 3.00					
								3.05					
		1.47m at 18:00					2,7, 2,3, 1,1, N=7	3 3.60					
								4 3.95					
								5 4.50	1.18	4.50			Brownish to reddish grey, angular medium to coarse GRAVEL with some cobbles in clayey silty sand matrix. (FILL)
21/02/95		2.13m at 08:00	35					6 5.50	0.08	5.60			
								5.55					Reddish to brownish grey, clayey silty fine to coarse SAND with much angular to subangular medium to coarse gravel. (FILL)
									-0.32	6.00			
							1,0, 0,1, 0,1, N=2	7 6.10					Very loose to medium dense, dark brownish grey, clayey silty fine to medium SAND with occasional subangular fine gravel and some shell fragments. (MARINE DEPOSIT)
								8 6.45					
			70					9 7.00					
								10 8.00					
								8.05					
							2,2, 2,3, 3,4, N=12	11 8.60					
								12 8.95					
								13 9.50	-3.82	9.50			Very dense, brownish grey, clayey silty sandy subangular medium to coarse GRAVEL with
			70										

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 28/02/95

CHECKED T.Lo

DATE 29/02/95

REMARKS
Installed a piezometer at depth 39.80m
Inspection pit to depth of 2.00m

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
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DRILLHOLE RECORD

HOLE NO. P48-BH1

CONTRACT TC C309

SHEET 2 of 5

PROJECT School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po

METHOD Rotary

CO-ORDINATES
E 835262.84
N 834721.97

W.O. No ASD3745 (Vol.10of19)

MACHINE & No. DR90

DATE from 20/02/95 to 27/02/95

FLUSHING MEDIUM Water

ORIENTATION Vertical

GROUND LEVEL 5.68 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
21/02/95	PW							14 10.50 10.55 11.00	-5.32	11.00			occasional cobbles. (ALLUVIUM)
11			10					T2101 12.15					Brownish to yellowish grey, subangular to subrounded COBBLES and medium to coarse GRAVEL in sandy clayey silt matrix. (ALLUVIUM)
12			11										
13								13.50					
14			20										
15		5.27m at 18:00						15.00					
22/02/95	HW	5.43m at 08:00	25					17.00	-11.32	17.00			
16								15 17.20				V	Extremely weak, reddish to yellowish brown, completely decomposed, coarse ash TUFF with relict black stained joints. (Medium dense, reddish to yellowish brown, sandy SILT.)
17			90					16 18.00	-12.32	18.00			
18								18.05				V	Extremely weak, reddish brown, completely decomposed, coarse ash TUFF with relict brown and black stained joints. (Medium dense, reddish brown, sandy SILT)
19							2,4, 5,8, 11,15, N=39	17 18.60 18 18.95					
20			90					19 19.50	-14.32	20.00			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 28/02/95

CHECKED T.Lo

DATE 29/02/95

REMARKS
See sheet 1 of 5 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
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DRILLHOLE RECORD

HOLE NO. **P48-BH1**

CONTRACT TC C309

SHEET 3 of 5

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**	CO-ORDINATES E 835262.84 N 834721.97	W.O. No **ASD3745 (Vol.10of19)**
MACHINE & No. **DR90**		DATE from 20/02/95 to 27/02/95
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL 5.68 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
22/02/95	HW							20 20.50 20.55				V	See sheet 2 of 5 for details
21							3,5, 4,6, 8,10, N = 28	21 21.10 22 21.45	-15.32	21.00		V	Extremely weak, yellowish to reddish brown, completely decomposed, coarse ash TUFF with relict black stained joints. (Medium dense, yellowish to reddish brown, sandy SILT)
22			100					23 22.00	-16.32	22.00		V	Extremely weak, brown, completely decomposed, coarse ash TUFF with relict brown stained joints. (Medium dense, brown, very silty fine to medium SAND with occasional subangular fine gravelly sized rock fragments)
23								24 23.00 23.05					
24							5,12, 11,11, 10,11, N = 43	25 23.60 26 23.95					
25			100					27 24.50					
26		4.32m at 18:00					6,7, 8,10, 12,15, N = 45	28 25.50 25.55 29 26.10 30 26.45					
23/02/95		5.43m at 08:00											
27			100					31 27.00					
28								32 28.00 28.05	-22.82	28.50			
29							6,11, 13,13, 12,13, N = 51	33 28.60 34 28.95				V	Extremely weak, yellowish brown and brown, completely decomposed, coarse ash TUFF with relict black stained joints. (Dense, yellowish brown and brown, very silty fine to coarse SAND with occasional subangular fine gravel sized rock fragments)
30			100					35 29.50	-24.32	30.00			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 28/02/95

CHECKED T.Lo

DATE 29/02/95

REMARKS
See sheet 1 of 5 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 2365 9123-6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

HOLE NO. **P48-BH1**

CONTRACT TC C309

SHEET 4 of 5

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**	CO-ORDINATES **E 835262.84 N 834721.97**	W.O. No **ASD3745 (Vol.10of19)**
MACHINE & No. **DR90**		DATE from **20/02/95** to **27/02/95**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL **5.68** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
23/02/95	HW											V	See sheet 3 of 5 for details.
31							6,10, 12,13, 17,21, N=63	36 30.50 30.55					
								37 31.10					
								38 31.45					
32			100					39 32.00					
33								40 33.00 33.05					
									-27.82	33.50			
							6,8, 13,17, 24,35, N=89	41 33.60				V	Extremely weak, brownish grey, completely decomposed, coarse ash TUFF with relict black stained joints. (Dense, brownish grey, very silty fine to coarse SAND)
34								42 33.95	-28.32	34.00		V/IV	Extremely weak to very weak, brown, completely to highly decomposed, coarse ash TUFF with relict brown and black stained joints. (Very dense, brown, very silty fine to coarse SAND)
								43 34.50					
35			85										
								44 35.50 35.55					
36							16,184, 200/120mm	45 36.12					
								46 37.00	-31.32	37.00		IV	Weak, greyish brown, highly decomposed, coarse ash TUFF with relict black stained joints. (Very dense, greyish brown, silty sandy angular to subangular medium to coarse GRAVEL sized rock fragments)
37			85										
38		4.11m at 18:00						47 38.00 38.05					
		5.85m at 08:00					38,162, 200/100mm	48 38.60					
24/02/95 39			0					39.50					
								49 39.70 39.75					
40									-34.14	39.82			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED **Y.K.Lee**

DATE **28/02/95**

CHECKED **T.Lo**

DATE **29/02/95**

REMARKS
See sheet 1 of 5 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
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TEL.: 2365 9123-6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

HOLE NO. P48-BH1

CONTRACT TC C309

SHEET 5 of 5

PROJECT School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po

METHOD Rotary

MACHINE & No. DR90

FLUSHING MEDIUM Water

CO-ORDINATES
E 835262.84
N 834721.97

ORIENTATION Vertical

W.O. No ASD3745 (Vol.10of19)

DATE from 20/02/95 to 27/02/95

GROUND LEVEL 5.68 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
24/02/95			100	77	47	> 20			39.82	-34.52	-40.20	III	Moderately weak to moderately strong, brownish grey, spotted with white and dark green, moderately decomposed, coarse ash TUFF. Joints are very closely to closely spaced, rough planar, extremely narrow, limonite, manganese stained and silt coated, dipping at 10-20°, 30-40°, 60-70° and occasional 80-90°. Moderately to slightly decomposed from 40.20m to 41.24m. Highly to moderately decomposed from 41.60m to 42.10m and 42.60m 42.77m. Fractured from 39.82m to 40.20m, 41.24m to 41.40m, 41.60m to 42.10m, 42.60m 42.77m, 42.97m to 43.30m and 43.40m to 43.60m.
						6.7			40.20			III/II	
41									41.24	-35.56	-41.24		
			100	40	0	NI			41.32	-35.92	-41.60	III	
						10			41.40				
						> 20			41.60	-36.42	-42.10	IV/III	
42						NI			41.82				
		3.61m at 18:00	100	45	15	8			41.92	-36.92	-42.60	III	
									42.10				
						NI			42.60	-37.09	-42.77	IV/III	
43		5.43m at 08:00	100	38	38	5			42.77			III	
25/02/95						NI			42.97	-38.07	-43.75	III	Moderately strong, brownish grey and some brownish to greenish grey, spotted with white and dark green, moderately decomposed, coarse ash TUFF. Joints are closely to medium spaced (occasional very closely spaced), rough planar, extremely narrow, limonite, manganese stained and some silt coated, dipping at 10-20°, 30-40°, 50-60° and occasional 80-90°. Moderately to slightly decomposed from 45.60m to 46.95m. General fractured from 45.00m to 45.40m, 48.45m to 48.78m, 48.93m to 49.04m, 4926m to 49.42m and 49.52m to 49.70m, angular gravel from 42.70m to 42.77m.
			100	55	42	> 20			43.30				
44						7.2			43.75				
			100	50	27				44.25				
45						> 20			45.00				
			100	93	81	5.6			45.40	-39.92	-45.60		
46												III/II	
									46.80	-41.27	-46.95		
47		4.02m at 18:00	100	98	68							III	
27/02/95									47.71				
48		5.61m at 08:00	100	81	81								
						NI			48.45				
			100	42	0	10.8			48.64				
49		3.71m at 18:00							48.78				
			100	46	23				49.00				
						> 20			49.52	-44.02	-49.70		
50													End of investigation hole at 49.70m.

T2101

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 28/02/95

CHECKED T.Lo

DATE 29/02/95

REMARKS
See sheet 1 of 5 for details


A.S.D. TERM CONTRACT
GROUND INVESTIGATION
A.S.D. CONTRACT NO. TC C309
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD
SITE: School Improvement Programme Phase I, Package 2
WORKS ORDER NO: ASD003745
HOLE NO: P48 BH1
DEPTH: 0.00 M. TO 39.82 M.
DATE: 4-14-95
BOX 1 OF 4
0M
0.5M
1M
KODAK Color Control Patches
0.00
4.50
5.60
11.00
12.15
13.30
15.80
17.00
39.82

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

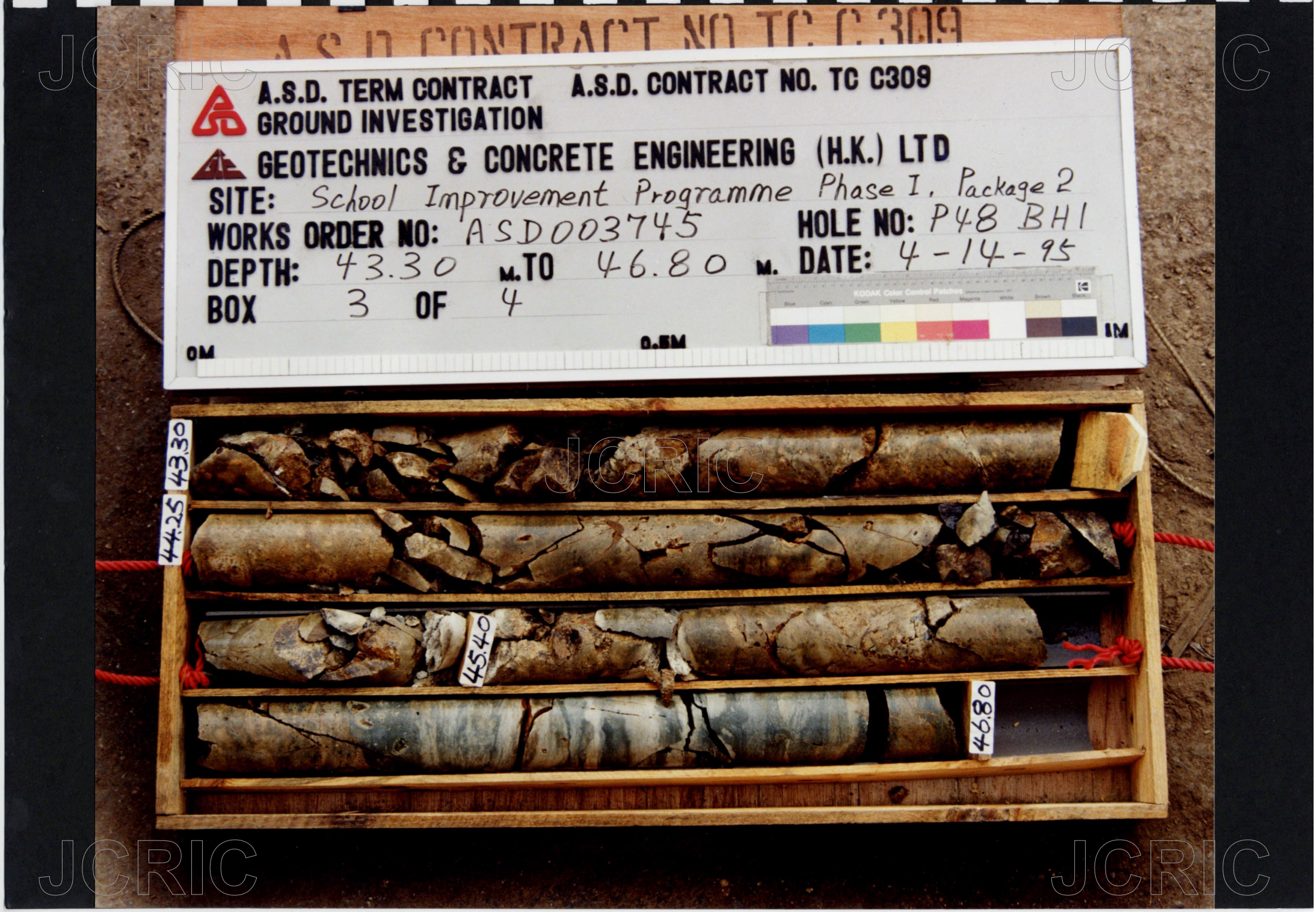
SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH1

DEPTH: 39.82 M. TO 43.30 M. DATE: 4-14-95

BOX 2 OF 4

0M 0.5M 1M


A.S.D. CONTRACT NO. TC C309
A.S.D. TERM CONTRACT
GROUND INVESTIGATION
A.S.D. CONTRACT NO. TC C309
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD
SITE: School Improvement Programme Phase I, Package 2
WORKS ORDER NO: ASD003745
HOLE NO: P48 BH1
DEPTH: 43.30 M. TO 46.80 M.
DATE: 4-14-95
BOX 3 OF 4
0M
0.5M
1M
43.30
44.25
45.40
46.80

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH1

DEPTH: 46.80 M. TO 49.70 M. DATE: 4-14-95

BOX 4 OF 4

0M 0.5M 1M

46.80

47.71

48.64

49.00

49.70 END

48.64

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 2365 9123-6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

HOLE NO. **P48-BH2**

CONTRACT TC C309

SHEET 1 of 6

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**

MACHINE & No. **DR90**

FLUSHING MEDIUM **Water**

CO-ORDINATES
E 835264.70
N 834715.98

ORIENTATION **Vertical**

W.O. No **ASD3745 (Vol.10of19)**

DATE from **28/02/95** to **10/03/95**

GROUND LEVEL **5.67** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
28/02/95	PW							0.00	5.47	0.20			Concrete slab
													Loose, reddish brown, clayey silty fine to coarse SAND with much angular medium to coarse gravel. (FILL)
			95					1 2.00					
								2 3.00					
								3.05					
							1,2, 3,2, 1,2, N=8	3 3.60					
								4 3.95					
								4.50	1.17	4.50			
			35					T2101					Brownish to reddish grey, angular to subangular COBBLES and medium to coarse GRAVEL in clayey silty sand matrix. (FILL)
									0.17	5.50			
													Loose, dark brownish grey, clayey silty fine to medium SAND with some shell fragments. (MARINE DEPOSIT)
							1,2, 3,2, 2,3, N=10	5 6.10					
								6 6.45					
								7 7.00					
			80										
								8 8.00					
								8.05					
							2,2, 2,1, 2,2, N=7	9 8.60					
								10 8.95					
		2.31m at 18:00						11 9.50	-3.83	9.50			
	HW		88										Very dense, brownish to greenish grey, clayey silty sandy subangular to subrounded medium
10													

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED **Y.K.Lee**

DATE **11/03/95**

CHECKED **T.Lo**

DATE **13/03/95**

REMARKS
Inspection pit to depth of 2.00m

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 2365 9123-6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

CONTRACT TC C309

HOLE NO. **P48-BH2**

SHEET 2 of 6

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**

MACHINE & No. **DR90**

FLUSHING MEDIUM **Water**

CO-ORDINATES
E 835264.70
N 834715.98

ORIENTATION **Vertical**

W.O. No **ASD3745 (Vol.10of19)**

DATE from **28/02/95** to **10/03/95**

GROUND LEVEL **5.67** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
28/02/95	HW							12 10.20–10.25	-4.63	10.30			to coarse GRAVEL. (ALLUVIUM)
01/03/95 11		5.50m at 08:00	27					T2101 10.30–10.80					Brownish grey, subangular to subrounded COBBLES and medium to coarse GRAVEL and occasional boulders from 13.50m to 13.70m, in sandy clayey silt matrix. (ALLUVIUM)
12			47					11.80					
13			56					T2101 13.00					
14		3.71m at 18:00	40					13.80					
15 02/03/95		5.13m at 08:00	41					14.80					
16			41					15.90					
17			100					17.00	-11.33	17.00			
18								13 17.10				V	Extremely weak, yellowish brown and reddish brown, completely decomposed, coarse ash TUFF with relict brown stained joints. (Medium dense, yellowish brown and reddish brown, sandy SILT)
19							5,8, 11,12, 10,10, N=43	14 18.00–18.05 15 18.60 16 18.95					
20			95					17 19.50	-13.83	19.50		V	Extremely weak, greyish brown, completely decomposed, coarse ash TUFF with relict
									-14.33	20.00			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED **Y.K.Lee**

DATE **11/03/95**

CHECKED **T.Lo**

DATE **13/03/95**

REMARKS
See sheet 1 of 6 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
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DRILLHOLE RECORD

HOLE NO. P48-BH2

CONTRACT TC C309

SHEET 3 of 6

PROJECT School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po

METHOD Rotary

MACHINE & No. DR90

FLUSHING MEDIUM Water

CO-ORDINATES
E 835264.70
N 834715.98

ORIENTATION Vertical

W.O. No ASD3745 (Vol.10of19)

DATE from 28/02/95 to 10/03/95

GROUND LEVEL 5.67 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
02/03/95	HW							18 20.50 20.55				V	brown stained joints. (Dense, greyish brown, very silty fine to coarse SAND with much angular to subangular medium to coarse gravel sized rock fragments)
21		4.06m at 18:00					4,7, 16,25, 22,35, N=98	19 21.10 20 21.45					
		5.21m at 08:00	60	7	0	NI		T2101 21.50	-15.83	21.50		III	Weak to moderately weak, brownish grey, highly to moderately decomposed, coarse ash TUFF Fractured, moderately decomposed from 21.50m to 21.86m. (CORESTONE)
03/03/95 22								22.50	-16.19 -16.83	21.86 22.50		IV/III	
23												V	Extremely weak, reddish to yellowish brown, completely decomposed, coarse ash TUFF with relict black stained joints. (Dense, reddish to yellowish brown, sandy SILT)
24							3,6, 7,8, 13,26, N=54	21 23.60 22 23.95					
			100					23 24.50	-18.83	24.50		V	Extremely weak, yellowish brown, completely decomposed, coarse ash TUFF with relict brown stained joints. (Medium dense to dense, yellowish brown, sandy SILT)
25								24 25.50 25.55					
26							5,7, 9,13, 13,15, N=50	25 26.10 26 26.45					
27			100					27 27.00					
28								28 28.00 28.05					
29							9,17, 21,19, 20,26, N=86	29 28.60 30 28.95					
		4.13m at 18:00	100					31 29.50	-23.83	29.50		V	Extremely weak, brown, completely decomposed, coarse ash TUFF with relict
30									-24.33	30.00			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 11/03/95

CHECKED T.Lo

DATE 13/03/95

REMARKS
See sheet 1 of 6 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 2365 9123-6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

HOLE NO. **P48-BH2**

CONTRACT TC C309

SHEET 4 of 6

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**

MACHINE & No. **DR90**

FLUSHING MEDIUM **Water**

CO-ORDINATES
E 835264.70
N 834715.98

ORIENTATION **Vertical**

W.O. No **ASD3745 (Vol.10of19)**

DATE from 28/02/95 to 10/03/95

GROUND LEVEL 5.67 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
03/03/95	HW							32 30.20–30.25–30.56	-24.89	30.56		V	black stained joints. (Very dense, brown, very silty fine to coarse SAND with much angular to subangular medium to coarse gravel of sized rock fragments)
04/03/95		5.01m at 08:00	47	0	0	NI		T2101				IV/III	Moderately weak, greyish brown, highly to moderately decomposed, coarse ash TUFF with some quartz veins. Fractured, silty sandy subangular medium to coarse gravel and occasional cobble sized rock fragments and some quartz. (CORESTONE)
31								33 32.00	-26.33	-32.00			
32			100										
33								34 32.40–32.45				V/IV	Extremely weak, yellowish brown, completely to highly decomposed, coarse ash TUFF with relict brown stained joints. (Very dense, yellowish brown, very silty fine to medium SAND with occasional subangular fine to medium gravel sized rock fragments)
34							↓ 47,153, 200/120mm	35 33.62	-28.33	-34.00			
35			100					36 34.50				IV	Weak, greyish brown, highly decomposed, coarse ash TUFF with relict black stained joints. (Very dense, greyish brown, silty sandy angular to subangular medium to coarse gravel sized rock fragments)
								37 35.00–35.05–35.50	-29.83	-35.50			
36		4.13m at 18:00	100	73	36	10.8		T2101				III	Moderately weak to moderately strong, brownish grey, spotted with white and dark green, moderately decomposed, coarse ash TUFF. Joints are very closely to closely spaced, rough planar, extremely narrow, limonite, manganese stained and silt coated, dipping at 10°-20°, 30°-40°, 60°-70° and occasional 70°-80°. Fractured and moderately weak from 36.15m to 36.30m, 38.30m to 38.50m, 40.47m to 40.77m, 42.23m to 42.43m and 42.87m to 44.02m.
			100	70	0			35.95					
			100	24	0	>20		36.15					
06/03/95		5.04m at 08:00	100	86	64	8.4		36.40					
37													
38			100	44	0			37.80					
			100	0	0	NI		38.30–38.50					
			100	53	49			38.80					
39						6.7		39.25					
		3.98m at 18:00	100	79	64			39.72–39.85	-34.33	-40.00			
40			100	26	0								

SMALL DISTURBED SAMPLE
LARGE DISTURBED SAMPLE
SPT LINER SAMPLE
U76 UNDISTURBED SAMPLE
U100 UNDISTURBED SAMPLE
MAZIER SAMPLE
PISTON SAMPLE
WATER SAMPLE
PIEZOMETER TIP
STANDPIPE
STANDARD PENETRATION TEST
PERMEABILITY TEST
IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee
DATE 11/03/95
CHECKED T.Lo
DATE 13/03/95

REMARKS
See sheet 1 of 6 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
TEL.: 2365 9123-6, 2333 6482 FAX NO.: 852-2765 8034

DRILLHOLE RECORD

HOLE NO. **P48-BH2**

CONTRACT TC C309

SHEET 5 of 6

PROJECT **School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po**

METHOD **Rotary**

MACHINE & No. **DR90**

FLUSHING MEDIUM **Water**

CO-ORDINATES
E 835264.70
N 834715.98

ORIENTATION **Vertical**

W.O. No **ASD3745 (Vol.10of19)**

DATE from **28/02/95** to **10/03/95**

GROUND LEVEL **5.67** mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
06/03/95						>20		40.10				III	See sheet 3 of 6 for details
		5.13m at 08:00	100	0	0			40.22 TNW T2101					
07/03/95			100	23	0			40.47					
41			100	89	72	8		40.77					
								41.66					
			100	67	0			41.90					
42			100	51	0	>20							
		3.74m at 18:00						42.43					
			100	57	0	11.4							
43		5.01m at 08:00	100	10	0	>20		42.87					
08/03/95			100	22	0			43.35					
								43.80					
44			100	0	0			44.02	-38.35	44.02			
			100	0	0							III	Moderately strong, dark grey and some brownish grey, spotted with white and dark green, moderately decomposed, coarse ash TUFF. Joints are very closely to closely spaced, rough planar, extremely narrow, limonite, manganese stained and some silt coated and chlorite infill, dipping at 10°-20°, 30°-40° and 60°-70°. General fractured.
			100	32	0	NI		44.44					
						16.1		44.60					
45			100	20	0	NI		44.91					
						>20		45.10					
			100	32	0			45.45					
		3.62m at 18:00											
46			100	0	0	NI		46.08					
						17.8		46.18	-40.68	46.35			
		5.23m at 08:00	100	84	25	8.2		46.35				II	Strong, dark grey, spotted with white and dark green, slightly decomposed, coarse ash TUFF. Joints are closely to medium spaced(occasional very closely spaced), rough and some smooth planar, extremely narrow, chlorite infill and some silt coated, dipping at 40°-50°, 50°-60° and 80°-90°. Subvertical joints from 49.80m to 52.01m. General fractured from 50.40m to 50.77 and 51.10m to 51.55m, occasional Basalt vein from 50.00m to 50.20m and quartz veins(20mm thick) at 49.15m.
09/03/95								46.90					
47			100	94	85			47.20					
						4.8		47.55					
			100	95	83								
48													
								48.65					
			100	96	57	18							
49								49.15					
						7.7							
		3.62m at 18:00											
50			100	51	0	>20		49.80	-44.33	50.00			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED **Y.K.Lee**

DATE **11/03/95**

CHECKED **T.Lo**

DATE **13/03/95**

REMARKS
See sheet 1 of 6 for details

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
6 KO SHAN RD., GROUND FL., HUNG HOM, KOWLOON, HONG KONG.
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DRILLHOLE RECORD

CONTRACT TC C309

HOLE NO. P48-BH2

SHEET 6 of 6

PROJECT School Improvement Programme-Phase I, Package 2, School: P48 -Tai Po Old Market Public School, Tai Po

METHOD Rotary

MACHINE & No. DR90

FLUSHING MEDIUM Water

CO-ORDINATES
E 835264.70
N 834715.98

ORIENTATION Vertical

W.O. No ASD3745 (Vol.10of19)

DATE from 28/02/95 to 10/03/95

GROUND LEVEL 5.67 mPD

Drilling Progress	Casing size	Water level (m) Shift start/ end	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
09/03/95			100	55	55			TNW 50.31				II	See sheet 5 of 6 for details
10/03/95		5.11m at 08:00	100	36	19	6.1		50.51					
51						>20		50.77					
		4.83m at 11:00	100	37	27	8.7		51.10					
								51.41					
								51.55	-46.34	52.01			
52													End of investigation hole at 52.01m.
53													
54													
55													
56													
57													
58													
59													
60													

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IN-SITU VANE SHEAR TEST

LOGGED Y.K.Lee

DATE 11/03/95

CHECKED T.Lo

DATE 13/03/95

REMARKS
See sheet 1 of 6 for details


A.S.D. TERM CONTRACT
GROUND INVESTIGATION
A.S.D. CONTRACT NO. TC C309
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD
SITE: School Improvement Programme Phase I, Package 2
WORKS ORDER NO: ASD003745
HOLE NO: P48 BH2
DEPTH: 0.00 M. TO 17.00 M.
DATE: 4-14-95
BOX 1 OF 6
0M
0.5M
1M
0.00
4.50
5.50
10.30
11.80
13.00
13.80
14.80
15.90
17.00
14.80M
13.00M

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH2

DEPTH: 17.00 M. TO 36.40 M. DATE: 4-14-95

BOX 2 OF 6

0M 0.5M 1M


A.S.D. CONTRACT NO. TC C309
A.S.D. TERM CONTRACT
GROUND INVESTIGATION
A.S.D. CONTRACT NO. TC C309
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD
SITE: School Improvement Programme Phase I, Package 2
WORKS ORDER NO: ASD003745
HOLE NO: P48 BH2
DEPTH: 36.40 M. TO 40.22 M.
DATE: 4-14-95
BOX 3 OF 6
0M
0.5M
1M
36.40
37.80
38.30
38.50
39.25
39.72
38.30 M
39.25 M
40.22

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH2

DEPTH: 40.22 M. TO 44.02 M. DATE: 4-14-95

BOX 4 OF 6

0M 0.5M 1M

A.S.D. CONTRACT NO. TC C309

A.S.D. TERM CONTRACT
GROUND INVESTIGATION

A.S.D. CONTRACT NO. TC C309

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

SITE: School Improvement Programme Phase I, Package 2

WORKS ORDER NO: ASD003745 HOLE NO: P48 BH2

DEPTH: 44.02 M. TO 48.65 M. DATE: 4-14-95

BOX 5 OF 6

0M 0.5M 1M


A.S.D. CONTRACT NO. TC C309
A.S.D. TERM CONTRACT
GROUND INVESTIGATION
A.S.D. CONTRACT NO. TC C309
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD
SITE: School Improvement Programme Phase I, Package 2
WORKS ORDER NO: ASD003745
HOLE NO: P48 BH2
DEPTH: 48.65 M. TO 52.01 M.
DATE: 4-14-95
BOX 6 OF 6
0M
0.5M
1M
48.65
49.80
50.31
50.51
51.41
52.01 END

Appendix 6.2
Proposed GI Locations

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

835000 E

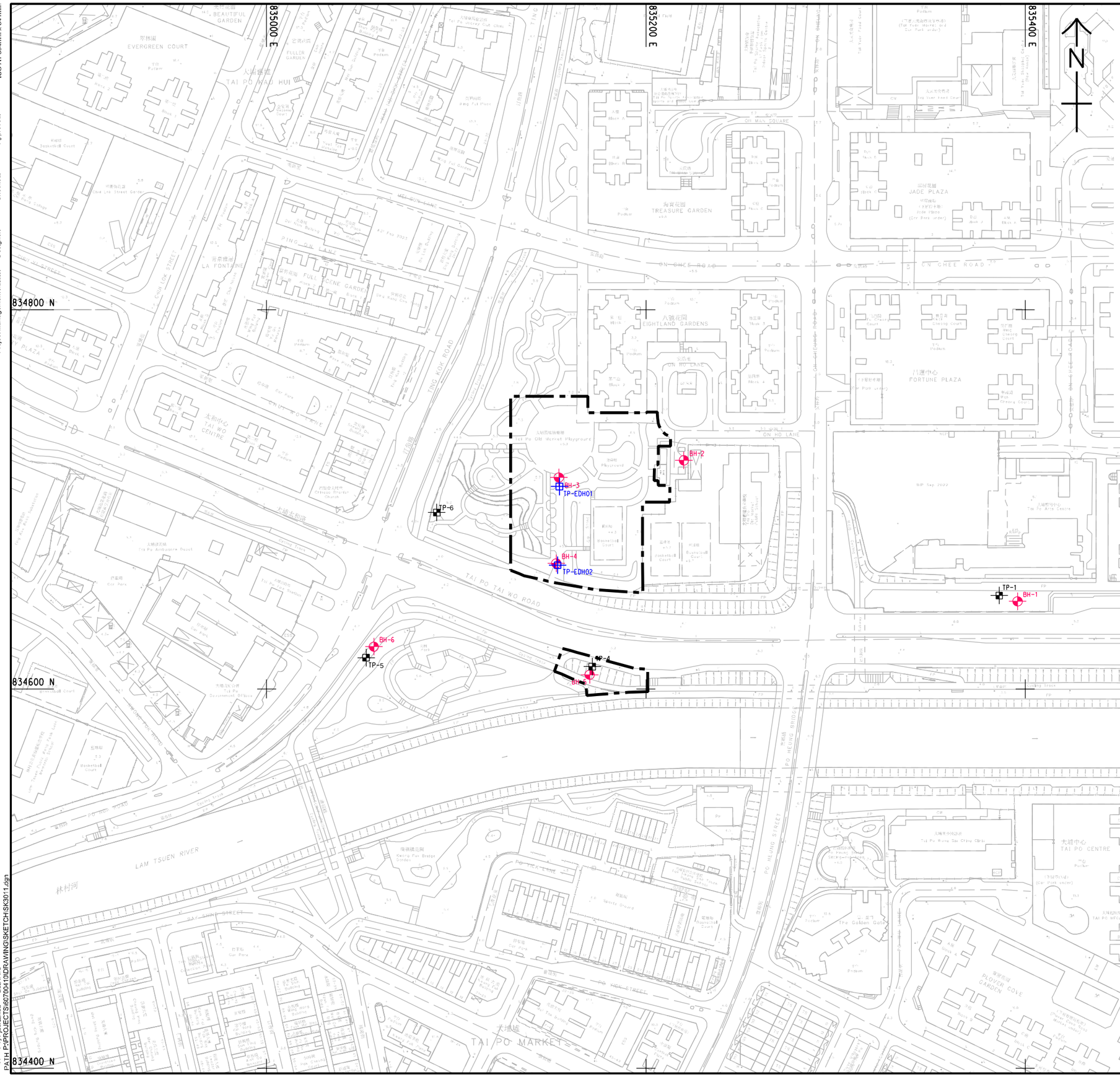
835200 E

835400 E

834800 N

834600 N

834400 N



NOTES:

1. FOR NOTES AND LEGEND REFER TO DRAWING NO. 60700410/SK3011.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60700410/SK3011 TO SK3014.
3. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (mPD).
4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
5. THE GI LOCATIONS ARE INDICATIVE ONLY AND THE EXACT LOCATION IS SUBJECT TO THE AGREEMENT WITH THE ENGINEER. BEFORE THE COMMENCEMENT OF THE WORKS.

LEGEND:

BH-1 — BOREHOLE LOCATION (INDICATIVE ONLY)

BH-1P — BOREHOLE LOCATION UNDER PROVISIONAL ITEM (INDICATIVE ONLY)

TP-1 — TRIAL PIT LOCATION (INDICATIVE ONLY)

TP-1P — TRIAL PIT LOCATION UNDER PROVISIONAL ITEM (INDICATIVE ONLY)

DRILLHOLE NO.	EASTING	NORTHING
BH-1	835396.064	834646.196
BH-2	835220.143	834720.574
BH-3	835154.277	834711.524
BH-4	835152.859	834666.247
BH-5	835170.473	834607.488
BH-6	835056.699	834622.324
BH-1P	835502.304	834536.393
TP-1	835386.431	834649.291
TP-1P	835494.512	834539.748
TP-4	835171.886	834611.813

TP-EDHO1 — PROPOSED SEDIMENT SAMPLING LOCATION

DRILLHOLE NO.	EASTING	NORTHING
TP-EDHO1	835154.551	834706.746
TP-EDHO2	835153.579	834665.356

AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT 業主

渠務署 Drainage Services Department

CONSULTANT 工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS 分判工程顧問公司

ISSUE/REVISION 修訂

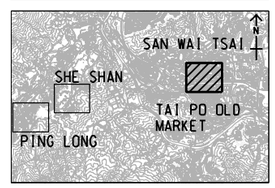
I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS 階段

SCALE 比例 — A1 1 : 1000

DIMENSION UNIT 尺寸單位 — METRES

KEY PLAN 索引圖 A1 1 : 30000



PROJECT NO. 項目編號 — 60700410

CONTRACT NO. 合約編號 — CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

PROPOSED GI WORKS IN TAI PO OLD MARKET

SHEET NUMBER 圖紙編號

60700410/SK3011

Plot File by: jack.zhou 2024/1/5
PATH P:\PROJECTS\60700410\DRAWING\SKETCH\SK3011.dgn

CHUNG SHUN BORING ENGINEERING COMPANY LIMITED	**DRILLHOLE RECORD**	DRILLHOLE No. **BH-4**
	CONTRACT No. **DP 06/2023**	SHEET **1** of **5**

PROJECT **Contract No. DP 06/2023 Ground Investigation Works for Drainage Improvement Works in Tai Po and Revitalisation of Tai Wai Nullah**

METHOD **Rotary**	CO-ORDINATES E N	WORKS ORDER No. -
MACHINE & No. **SK1**		DATE from **20-01-2024** to **30-01-2024**
FLUSHING MEDIUM **WATER**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
20/01/2024	SW												0.00			Brown, fine to coarse SAND, with some subangular, fine to coarse gravel of concrete and rock fragments. (FILL)
									1		0.50		0.50			Soft to firm, brown, clayey SILT, with some subangular, fine to coarse gravel of rock fragments. (FILL)
									2	INSPECTION PIT	1.00					
									3		1.50					
									4		1.80		1.80			
				100									2.00			Brown, angular to subangular, medium to coarse GRAVEL of rock fragments. (FILL)
				95					5		2.00					Firm, light brown and brown, spotted white, slightly clayey SILT, with some subangular, fine to medium gravel of quartz fragments. (FILL)
								3,3 3,4,4,5 N=16	6		3.00				
									7		3.10					
									8		3.55					
				0							4.00		4.00			Reddish brown and brown, subangular, coarse GRAVEL of rock fragments. Part of the sample recovered as soft, dark grey, sandy, clayey silt. (FILL)
	SW 5.00	1.50m at 18:00							9		5.00					
20/01/2024	PW								10		5.10		5.10			Medium dense to very dense, dark grey, fine to coarse SAND, with some subangular, fine to medium gravel of quartz fragments, and occasional shell fragments. (MARINE DEPOSITS)
22/01/2024		1.60m at 08:00		89				27 bls								
								2,3 3,3,4,3 N=13	11		5.50					
									12		5.55					
				0					13		6.00					
									14		7.00					
				89				35 bls	15		7.10					
								2,3 3,4,5,4 N=16	16		7.50					
									17		7.55					
				0					18		8.00					
									19		9.00					
				0				200 bls			9.10					
				58					20		9.35		9.30			
											9.50					Brown and brownish grey, subangular to rounded, coarse GRAVEL and COBBLES of rock fragments. (ALLUVIUM)
													10.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Pressuremeter test
- Permeability test
- Water Absorption Test
- Impression packer test
- Acoustic borehole televiewer survey
- In-situ vane shear test

LOGGED **B. Liu**

DATE **30-01-2024**

CHECKED **C. Lam**

DATE **31-01-2024**

REMARKS

1. 1 no. of inspection pit was excavated from 0.00-1.50m below ground level (bgl).
2. 3 nos. of constant head permeablility test were carried out at 2.00-3.50m, 7.00-8.50m and 17.00-18.50m bgl.

CHUNG SHUN BORING ENGINEERING COMPANY LIMITED	**DRILLHOLE RECORD**	DRILLHOLE No. **BH-4**
	CONTRACT No. **DP 06/2023**	SHEET **2** of **5**

PROJECT **Contract No. DP 06/2023 Ground Investigation Works for Drainage Improvement Works in Tai Po and Revitalisation of Tai Wai Nullah**

METHOD **Rotary**	CO-ORDINATES E N	WORKS ORDER No. -
MACHINE & No. **SK1**		DATE from **20-01-2024** to **30-01-2024**
FLUSHING MEDIUM **WATER**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
											10.00			As sheet 1 of 5.
				40					T6-116 10.80					
				32					T6-116 11.80					
		1.30m at 18:00							T6-116 12.90					
22/01/2024				38					T6-116 14.10					
26/01/2024		3.45m at 08:00							T6-116 15.10					
				35					T6-116 16.00		16.00			
				33										Dark brown and brown, subangular to subrounded, coarse GRAVEL of rock fragments, with some slightly silty, fine to coarse sand matrix. (ALLUVIUM)
				0					21 17.00		17.10			
				30					22 17.10				V	Extremely weak, light brown and brown, mottled white, completely decomposed, medium grained GRANODIORITE. (Stiff, slightly clayey, sandy SILT, with some angular, fine to medium gravel)
								3,4 7,9,10,12 N=38	23 18.10					17.10 - 18.20m: With some subangular, medium to coarse gravel of quartz fragments, derived from quartz vein.
									24 18.20		18.20			
									25 18.65		19.10			
				95					26 19.10				V	Extremely weak, brown, mottled and dappled white, completely decomposed, medium grained GRANODIORITE. (Stiff, clayey SILT, with some angular, fine to medium gravel)
											20.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Pressuremeter test
- Permeability test
- Water Absorption Test
- Impression packer test
- Acoustic borehole televiewer survey
- In-situ vane shear test

LOGGED **B. Liu**

DATE **30-01-2024**

CHECKED **C. Lam**

DATE **31-01-2024**

REMARKS

CHUNG SHUN BORING ENGINEERING COMPANY LIMITED	**DRILLHOLE RECORD**	DRILLHOLE No. **BH-4**
	CONTRACT No. **DP 06/2023**	SHEET **3** of **5**

PROJECT **Contract No. DP 06/2023 Ground Investigation Works for Drainage Improvement Works in Tai Po and Revitalisation of Tai Wai Nullah**

METHOD **Rotary**	CO-ORDINATES E N	WORKS ORDER No. -
MACHINE & No. **SK1**		DATE from **20-01-2024** to **30-01-2024**
FLUSHING MEDIUM **WATER**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
													20.00		V	As sheet 2 of 5.
26/01/2024 27/01/2024		2.00m at 18:00 3.45m at 08:00		100				3,4 5,7,9,9 N=30	27 28		20.10 20.20					
									29		20.65					
									30		21.10					
								3,4 5,7,8,12 N=32	31 32		22.10 22.20					
									33		22.65					
				100					34		23.10		23.10		V	Extremely weak, dark brown, spotted white, completely decomposed, medium grained GRANODIORITE. (Stiff, sandy SILT, with some angular to subangular, fine to medium gravel)
								10,12 17,23,26,33 N=99	35 36		24.10 24.20					
									37		24.65					
				100					38		25.10		25.10		V	Extremely weak, brown and dark brown, mottled and dappled white, completely decomposed, medium grained GRANODIORITE. (Very stiff, slightly clayey, sandy SILT, with some angular, fine to medium gravel)
								4,6 8,11,15,21 N=55	39 40		26.10 26.20					
									41		26.65					
				100					42		27.10					
								5,8 10,13,17,23 N=63	43 44		28.10 28.20					
									45		28.65					
				100					46		29.10		30.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Pressuremeter test
- Permeability test
- Water Absorption Test
- Impression packer test
- Acoustic borehole televiewer survey
- In-situ vane shear test

LOGGED **B. Liu**

DATE **30-01-2024**

CHECKED **C. Lam**

DATE **31-01-2024**

REMARKS

CHUNG SHUN BORING ENGINEERING COMPANY LIMITED	**DRILLHOLE RECORD**	DRILLHOLE No. **BH-4**
	CONTRACT No. **DP 06/2023**	SHEET **4** of **5**

PROJECT **Contract No. DP 06/2023 Ground Investigation Works for Drainage Improvement Works in Tai Po and Revitalisation of Tai Wai Nullah**

METHOD **Rotary**	CO-ORDINATES E N	WORKS ORDER No. -
MACHINE & No. **SK1**		DATE from **20-01-2024** to **30-01-2024**
FLUSHING MEDIUM **WATER**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
													30.00		V	As sheet 3 of 5.
								5,8 12,19,22,24 N=77	47 48		30.10 30.20					
									49		30.65					
				100					50		31.10					
								6,8 14,21,25,29 N=89	51 52		32.10 32.20					
									53		32.65					
				70					54		33.10					
									55		34.10		34.10		IV	Weak, brown and dark brown, spotted white, highly decomposed, medium grained GRANODIORITE. (Sandy, angular to subangular, fine to coarse GRAVEL)
				95					56		34.20					
								19,30 200/70mm 200 blr / 70mm	57		35.20 35.30					
									58		35.52		35.95		IV	
		2.50m at 18:00		94	81	42	NI 8.4			T2IO1	35.95		36.08		III	Weak to moderately weak, dark brown, mottled and dappled white, highly decomposed, medium grained GRANODIORITE. (Subangular, medium to coarse GRAVEL)
27/01/2024 29/01/2024		4.00m at 08:00		88	33	17	>20				37.03		36.83 36.93 37.03		IV	Moderately strong, dark brown, mottled and dappled white, moderately decomposed, medium grained GRANODIORITE, with closely spaced, rough undulating and planar, very narrow to narrow, limonite and manganese oxide stained joints, dipping at 10°-20°, 30°-40° and 60°-70°.
							10.0 NI 8.7			T2IO1			37.72		III	36.83 - 36.93m: Part of the core recovered as weak to moderately weak, highly decomposed. (Sandy, angular to subangular, fine to coarse GRAVEL)
	PW 38.30 HW			98	73	47	NI 12.1				38.36		38.20 38.30		IV III	
							>20 13.2			T2IO1			38.80 38.83			Weak to moderately weak, dark brown, mottled white, highly decomposed, medium grained GRANODIORITE. (Angular to subangular, medium to coarse GRAVEL and COBBLES)
				100	100	100	NI 1.5			T2IO1	39.50		39.28 39.33		II	Moderately strong, dark brown, mottled and dappled white, moderately decomposed, medium grained GRANODIORITE, with closely,
													40.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Pressuremeter test
- Permeability test
- Water Absorption Test
- Impression packer test
- Acoustic borehole televiewer survey
- In-situ vane shear test

LOGGED **B. Liu**

DATE **30-01-2024**

CHECKED **C. Lam**

DATE **31-01-2024**

REMARKS

CHUNG SHUN BORING ENGINEERING COMPANY LIMITED	**DRILLHOLE RECORD**	DRILLHOLE No. **BH-4**
	CONTRACT No. **DP 06/2023**	SHEET **5** of **5**

PROJECT **Contract No. DP 06/2023 Ground Investigation Works for Drainage Improvement Works in Tai Po and Revitalisation of Tai Wai Nullah**

METHOD **Rotary**	CO-ORDINATES E N	WORKS ORDER No. -
MACHINE & No. **SK1**		DATE from **20-01-2024** to **30-01-2024**
FLUSHING MEDIUM **WATER**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
											40.00		II	locally very closely spaced, rough undulating and planar, very narrow to narrow, limonite and manganese oxide stained joints, dipping at 10°-20° and 40°-50°. 38.20 - 38.30m: Weak to moderately weak, highly decomposed. (Angular to subangular, medium to coarse GRAVEL) At 38.80m: Quartz vein (<30mm thick). Highly fractured. At 38.83m: Weak to moderately weak, highly decomposed. (<50mm thick). At 39.28m: Weak to moderately weak, highly decomposed. (<50mm thick).
				97	82	82			T2IO1 40.98		41.98		IV	
	HW 42.20						NI				42.20			
				100	74	38	10.4		T2IO1 42.20		42.30		III	Strong, greenish grey, mottled and dappled white, slightly decomposed, medium grained GRANODIORITE, with medium spaced, rough undulating and planar, extremely narrow, limonite stained joints, dipping at 0°-10° and 50°-60°.
									T2IO1		43.14		II	
		3.50m at 18:00									43.20			
29/01/2024									T2IO1 43.55		43.55			
30/01/2024		3.50m at 08:00		100	98	96	2.0				43.85		III	Weak, dark brown, mottled and dappled white, highly decomposed, medium grained GRANODIORITE. (Sandy, subangular, fine to coarse GRAVEL)
											44.00		II	
									T2IO1					Strong, greenish grey, mottled and dappled white, slightly decomposed, medium grained GRANODIORITE, with medium to closely spaced, rough undulating and planar, extremely narrow to very narrow, limonite and manganese oxide stained joints, dipping at 10°-20°, 30°-40°, 50°-60° and subvertical. 42.20 - 43.14m: Moderately strong, moderately decomposed.
				100	100	86			T2IO1 44.88					
									T2IO1					
				100	100	62			T2IO1 45.96		45.98			
											46.00			At 42.30m: Quartz vein (<30mm thick). 43.20 - 43.55m: Subvertical joint. 43.55 - 45.98m: With some incipient subvertical joints. 43.85 - 44.00m: Moderately strong, moderately decomposed. 46.00 - 46.32m: Subvertical joint.
											46.32			
				100	100	98			T2IO1 46.77		47.02			At 47.02m: Quartz vein (<15mm thick).
									T2IO1					
30/01/2024		3.50m at 18:00							47.63		47.63			End of the drillhole at 47.63m.
											50.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Pressuremeter test
- Permeability test
- Water Absorption Test
- Impression packer test
- Acoustic borehole televiewer survey
- In-situ vane shear test

LOGGED **B. Liu**

DATE **30-01-2024**

CHECKED **C. Lam**

DATE **31-01-2024**

REMARKS

CHUNG SHUN BORING ENGINEERING COMPANY LIMITED	**DRILLHOLE RECORD**	DRILLHOLE No. **BH-2**
	CONTRACT No. **DP 06/2023**	SHEET **1** of **5**

PROJECT **Contract No. DP 06/2023 Ground Investigation Works for Drainage Improvement Works in Tai Po and Revitalisation of Tai Wai Nullah**

METHOD **Rotary**	CO-ORDINATES	WORKS ORDER No. **-**
MACHINE & No. **SK1**	E N	DATE from **09-01-2024** to **16-01-2024**
FLUSHING MEDIUM **WATER**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
09/01/2024	SW								1	INSPECTION PIT	0.50		0.00			Light and dark brown, fine to coarse SAND, with some subangular, fine to coarse gravel of concrete and rock fragments. (FILL)
									2		1.00		0.50			Soft, brown, clayey SILT, with some subangular, fine to coarse gravel of rock fragments. (FILL)
				60					3		1.50		1.50			Brown and grey, angular to subangular, coarse GRAVEL and COBBLES of concrete and rock fragments. (FILL)
				100					4		2.00		2.00			Firm, brown, clayey SILT, with some subangular, fine to medium gravel of quartz fragments. (FILL)
								3,3 4,4,5,6 N=19	5		3.00					
									6		3.10					
									7		3.55					
				95					8		4.00		4.00			Medium dense, dark brown, fine to coarse SAND, with some subangular, fine to medium gravel of quartz fragments. (FILL)
									9		5.00					
								4,3 3,3,4,5 N=15	10		5.10					
09/01/2024		1.20m at 18:00							11		5.55					
11/01/2024		3.50m at 08:00														
	SW 6.00								12		6.00		6.00			Medium dense, dark grey, fine to coarse SAND, with some subangular, fine to medium gravel of quartz fragments, and occasional shell fragments. (MARINE DEPOSITS)
	PW			90					13		7.00					
								1,1 2,2,3,3 N=10	14		7.10					
									15		7.55					
				0							8.00					
				89				27 bls	16		9.00					
									17		9.10					
								2,2 3,2,3,3 N=11	18		9.50					
									19		9.55		10.00			

TG-116

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Pressuremeter test
- Permeability test
- Water Absorption Test
- Impression packer test
- Acoustic borehole televiewer survey
- In-situ vane shear test

LOGGED **B. Liu**

DATE **17-01-2024**

CHECKED **C. Lam**

DATE **18-01-2024**

REMARKS

1. 1 no. of inspection pit was excavated from 0.00-1.50m below ground level (bgl).

CHUNG SHUN BORING ENGINEERING COMPANY LIMITED	**DRILLHOLE RECORD**	DRILLHOLE No. **BH-2**
	CONTRACT No. **DP 06/2023**	SHEET **2** of **5**

PROJECT **Contract No. DP 06/2023 Ground Investigation Works for Drainage Improvement Works in Tai Po and Revitalisation of Tai Wai Nullah**

METHOD **Rotary**	CO-ORDINATES E N	WORKS ORDER No. **-**
MACHINE & No. **SK1**		DATE from **09-01-2024** to **16-01-2024**
FLUSHING MEDIUM **WATER**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
													10.00			As sheet 1 of 5.
				0				42 bls	20		10.00					
				89					21		11.00					
								3,3 4,4,5,6 N=19	22		11.10					
									23		11.50					
				0					24		11.55					
									25		12.00		12.00			12.00 - 12.70m: With some subangular, coarse gravel of rock fragments.
									26		12.60		12.70			
				58							12.70					Brown, pinkish grey, dark grey and brownish grey, subangular to subrounded, coarse GRAVEL and COBBLES of quartz and rock fragments. (ALLUVIUM)
										T6-116						
		1.50m at 18:00														
11/01/2024											14.20					
12/01/2024		3.50m at 08:00		40						T6-116						
				33							14.95					
										T6-116						
				33							16.00					
										T6-116						
				45							16.90					
										T6-116						
	PW 18.00 HW			100					27		18.00		18.00		V	Extremely weak, brown, mottled and spotted white, completely decomposed, medium grained GRANODIORITE. (Stiff to very stiff, slightly clayey SILT, with some angular, fine to medium gravel)
								2,3 4,4,5,6 N=19	28		19.00				
									29		19.10					
									30		19.55		20.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Pressuremeter test
- Permeability test
- Water Absorption Test
- Impression packer test
- Acoustic borehole televiewer survey
- In-situ vane shear test

LOGGED **B. Liu**

DATE **17-01-2024**

CHECKED **C. Lam**

DATE **18-01-2024**

REMARKS

CHUNG SHUN BORING ENGINEERING COMPANY LIMITED	**DRILLHOLE RECORD**	DRILLHOLE No. **BH-2**
	CONTRACT No. **DP 06/2023**	SHEET **3** of **5**

PROJECT **Contract No. DP 06/2023 Ground Investigation Works for Drainage Improvement Works in Tai Po and Revitalisation of Tai Wai Nullah**

METHOD **Rotary**	CO-ORDINATES E N	WORKS ORDER No. **-**
MACHINE & No. **SK1**		DATE from **09-01-2024** to **16-01-2024**
FLUSHING MEDIUM **WATER**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
													20.00		V	As sheet 2 of 5.
				100					31		20.00					
									32		21.00					
		2.50m at 18:00						3,4 5,7,9,10 N=21	33		21.10					
12/01/2024									34		21.55					
13/01/2024		3.50m at 08:00														
				100					35		22.00					
									36		23.00					
								3,4 6,8,9,12 N=35	37		23.10					
									38		23.55					
				100					39		24.00					
									40		25.00					
								4,6 9,11,13,14 N=47	41		25.10					
									42		25.55					
				100					43		26.00					
									44		27.00					
								4,6 10,11,13,15 N=49	45		27.10					
									46		27.55					
				100					47		28.00					
									48		29.00					
								4,6 9,12,14,17 N=52	49		29.10					
									50		29.55		30.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Pressuremeter test
- Permeability test
- Water Absorption Test
- Impression packer test
- Acoustic borehole televiewer survey
- In-situ vane shear test

LOGGED **B. Liu**

DATE **17-01-2024**

CHECKED **C. Lam**

DATE **18-01-2024**

REMARKS

CHUNG SHUN BORING ENGINEERING COMPANY LIMITED	**DRILLHOLE RECORD**	DRILLHOLE No. **BH-2**
	CONTRACT No. **DP 06/2023**	SHEET **4** of **5**

PROJECT **Contract No. DP 06/2023 Ground Investigation Works for Drainage Improvement Works in Tai Po and Revitalisation of Tai Wai Nullah**

METHOD **Rotary**	CO-ORDINATES E N	WORKS ORDER No. **-**
MACHINE & No. **SK1**		DATE from **09-01-2024** to **16-01-2024**
FLUSHING MEDIUM **WATER**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				0							30.00		30.00		IV	Weak, brown, mottled and spotted white, highly decomposed, medium grained GRANODIORITE. (Silty, clayey, subangular, medium to coarse GRAVEL)
									51		31.00					
				100					52		31.10		31.10		V	Extremely weak, brown, mottled and spotted white, completely decomposed, medium grained GRANODIORITE. (Very stiff, sandy, clayey SILT, with some angular, fine to medium gravel)
		1.50m at 18:00						6,8 11,15,17,19 N=62	53		32.10					
13/01/2024									54		32.20					
15/01/2024		3.80m at 08:00							55		32.65					
				100					56		33.10					
									57		34.10					
								6,8 12,15,18,20 N=65	58		34.20					
									59		34.65					
				100					60		35.10					
									61		36.10					
								7,10 13,17,20,24 N=74	62		36.20					
									63		36.65					
				100					64		37.10					
									65		38.10					
								7,9 12,13,15,19 N=59	66		38.20					
									67		38.65					
				100					68		39.10		39.10		IV	Weak, dark brown, mottled and spotted white, highly decomposed, medium grained GRANODIORITE. (Sandy, silty, angular to subangular, medium to coarse GRAVEL)
													40.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Pressuremeter test
- Permeability test
- Water Absorption Test
- Impression packer test
- Acoustic borehole televiewer survey
- In-situ vane shear test

LOGGED **B. Liu**

DATE **17-01-2024**

CHECKED **C. Lam**

DATE **18-01-2024**

REMARKS

CHUNG SHUN BORING ENGINEERING COMPANY LIMITED	**DRILLHOLE RECORD**	DRILLHOLE No. **BH-2**
	CONTRACT No. **DP 06/2023**	SHEET **5** of **5**

PROJECT **Contract No. DP 06/2023 Ground Investigation Works for Drainage Improvement Works in Tai Po and Revitalisation of Tai Wai Nullah**

METHOD **Rotary**	CO-ORDINATES E N	WORKS ORDER No. **-**
MACHINE & No. **SK1**		DATE from **09-01-2024** to **16-01-2024**
FLUSHING MEDIUM **WATER**	ORIENTATION **Vertical**	GROUND LEVEL mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
											40.00		IV	As sheet 4 of 5.
								15,33 56,97,47/20mm 200 blows / 170mm	69 40.10 70 40.20 71 40.52 72 41.10 73 41.45 41.55 T2I01					
15/01/2024 16/01/2024	HW 42.60	1.50m at 18:00 3.60m at 08:00		87 71 35	25 30	0 0	NI 16.0		T2I01 41.87 T2I01 42.50		41.55 42.60		IV	Moderately weak, dark brown, mottled and spotted white, highly decomposed, medium grained GRANODIORITE, generally non-intact. Recovered as angular to subangular, medium to coarse GRAVEL and COBBLES. Where intact, joints are closely spaced, rough undulating, very narrow, limonite stained, dipping at 40°-50°.
				80 100 97	0 60 83	0 32 71	NI 11.2 13.8		T2I01 42.80 T2I01 44.06		43.18 43.70 43.92 44.19		III II III	Strong, greenish grey, mottled and dappled pink and white, slightly decomposed, medium grained GRANODIORITE, with closely to medium, locally very closely spaced, rough undulating and planar, very narrow to extremely narrow, limonite and manganese oxide stained, calcite coated joints, dipping at 20°-30°, 50°-60°, 60°-70° and occasional subvertical. 42.60 - 43.18m: Moderately strong, moderately decomposed. 43.70 - 44.19m: Subvertical joint. 43.92 - 45.17m: Moderately strong, moderately decomposed.
				100 100 100	100 72 83	92 42 63	≥20 3.2 12.2 7.2		T2I01 45.50 T2I01 46.34 T2I01 47.35		45.17 45.50 45.95		II	45.50 - 45.95m: Incipient subvertical joint.
16/01/2024		2.50m at 18:00							T2I01 48.18		48.18			
											50.00			End of the drillhole at 48.18m.

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Pressuremeter test
- Permeability test
- Water Absorption Test
- Impression packer test
- Acoustic borehole televiewer survey
- In-situ vane shear test

LOGGED **B. Liu**

DATE **17-01-2024**

CHECKED **C. Lam**

DATE **18-01-2024**

REMARKS

Appendix 11.1
Land Contamination Assessment under Previous PER Study

7 Land Contamination

7.1 Legislations and Guidelines

7.1.1.1 The relevant legislation and associated guidance notes for carrying out the assessment of land contamination include:

- Annex 19 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM), Guidelines for Assessment of Impact on Sites of Cultural Heritage and Other Impacts (Section 3: Potential Contaminated Land Issues), EPD, 1997;
- Guidance Manual for Use of Risk-Based Remediation Goals (RBRGs) for Contaminated Land Management, EPD, 2007;
- Guidance Notes for Contaminated Land Assessment and Remediation, EPD, 2007; and
- Practice Guide for Investigation and Remediation of Contaminated Land, EPD, 2011.

7.2 Assessment Methodology

7.2.1.1 The assessment of the potential land contamination concerns along the proposed DIWs of Tai Po Old Market and Tai Po Market have been carried out by reviewing the relevant information such as aerial photos and site survey.

7.3 Review of Aerial Photographs and Historical Land Use

7.3.1.1 In order to identify any past land uses which may have the potential for causing land contamination, the development history of the DIWs and its vicinity have been reviewed with the aid of selected historical aerial photos between Year 1963 and Year 2021 (i.e. 1963, 1973, 1982, 1993, 2001, 2011 and 2021). The historical aerial photographs for Tai Po Old Market and Tai Po Market are presented in **Appendix 7.1** to **Appendix 7.7**. The key findings of the historical land use for Tai Po Old Market and Tai Po Market are summarised in **Table 7.1**.

Table 7.1: Summary of historical aerial photographs for Tai Po Old Market/Tai Po Market

Year	Description	
	Tai Po Old Market	Tai Po Market
1963	The Site was situated on agricultural land, human settlement, a watercourse, a pond and road networks, e.g. Ting Kok Road. The eastern part of the Site was still part of the sea.	The Site was mainly situated on road networks with a flyover built across Lam Tsuen River. The northern part of the Site was still part of the sea.
1973	No significant change of land use was observed.	No significant change of land use was observed, except reclamation was observed at the northern part of the Site.

Year	Description	
	Tai Po Old Market	**Tai Po Market**
1982	The area which was made up of agricultural land, watercourse and pond was cleared and paved with no development observed yet. The eastern part of the Site which was part of the sea was reclaimed and construction activities was observed. Lam Tsuen River was observed to be channelized with embankments.	Some human settlement and plantation was observed on the reclaimed land at the northern part of the Site. Lam Tsuen River was observed to be channelized with embankments.
1993	The Site was mostly developed into road networks (e.g. Chui Lok Street, Mei San Lane and Tai Po Tai Wo Road). An open car park was observed near Chui Lok Street. Tai Po Old Market Playground was built.	No significant change of land use was observed, except the flyover across Lam Tsuen River was demolished.
2001	No significant change of land use was observed.	No significant change of land use was observed.
2011	No significant change of land use was observed.	No significant change of land use was observed, except the development of the floodwater pumping house.
2021	No significant change of land use was observed.	No significant change of land use was observed.

7.4 Site Survey Findings

7.4.1.1 A site survey was conducted in September 2022 to identify the existing land uses within the DIWs which may have potential for causing soil contamination. The findings of the site survey are summarised in **Table 7.2**. The site walkover checklist and site photos for the site surveys are provided in **Appendix 7.8** and **Figure 7.1**.

Table 7.2: Summary of site survey findings

Locations	Description
Tai Po Old Market	• The Site is mainly located on road networks, including pedestrian walkways and roads, and car or bike parking lots, which are well-paved with concrete in good condition. • Tai Po Old Market Playground is located at the junction between Ting Kok Road and Tai Po Tai Wo Road.
Tai Po Market	• The Site is mainly located on road networks, including pedestrian walkways and roads, which are well-paved with concrete in good condition. • An existing floodwater pumping station is located adjacent to Po Heung Lane.

7.5 Information from Environmental Protection Department and Fire Service Department

7.5.1 Information from Environmental Protection Department (EPD)

7.5.1.1 Records of accidents of chemical spillage/ leakage within the Project Site from EPD were requested. The correspondence of the information request with EPD is given in **Appendix 7.9**. Reply from EPD is still pending and will be incorporated once available. Chemical Waste Producers Registration records in EPD office have also been reviewed and there are no registered Chemical Waste Producers within the Project Site.

7.5.2 Information from Fire Services Department (FSD)

7.5.2.1 Information request on any Dangerous Goods (DG) license record and any records of DG spillage /leakage incidents with the Project Sites were made to Fire Services Department (FSD). The correspondence with FSD is attached in **Appendix 7.10**. FSD advised that there were no DG license records within the Site. Four incident records were identified, including electrical fire, rubbish fire and no. 1 alarm incident. As the incidents did not involve any dangerous goods and chemicals, land contamination within the Site is considered unlikely.

7.6 Identification of Potentially Contaminated Sites

7.6.1.1 Based on the desktop review findings of selected aerial photos, historical land uses of Tai Po Old Market and Tai Po Market are mainly residential land use, agricultural land use, watercourse, pond, vegetation and road networks. Potentially land contaminated uses are not identified. However, this finding would be further reviewed when the information from EPD is obtained as discussed in **Section 7.5**.

7.7 Future Land Use

7.7.1.1 The proposed DIWs will be constructed as pumping stations and underground drainage pipes. The future land uses would be remained as the original land uses or paved with concrete, which may consist of inlets and outlets of the drainage. Potential land contamination due to operation of the drainage pipes is not anticipated.

7.8 Site Re-appraisal

7.8.1.1 Should the DIWs at Tai Po Old Market and Tai Po Market be put forward for further studies at the next stage, site reconnaissance is suggested to identify any future change in land use occurred before the commencement of the construction works. If any potential contamination activities are observed during site re-appraisal, environmental site investigation (SI) should be proposed in a separate Contamination Assessment Plan (CAP) for EPD's agreement. All the land contamination assessment and remediation works, if necessary, will be completed in accordance with the prevailing guidelines prior to commencement of construction works.

7.9 Submission Requirements of CAP, CAR, RAP and RR

7.9.1.1 If any potentially contaminated activities are identified during site re-appraisal at the next stage, SI should be proposed in the submission of CAP. Subsequent standard procedure below would follow.

7.9.1.2 Following the submission of CAP for EPD's agreement and completion of site investigation and laboratory testing works, a Contamination Assessment Report (CAR) would be prepared. The CAR would present the findings of the site investigation and evaluate the level and extent of potential contamination in the potentially contaminated site. The CAR would evaluate the potential environmental and human health impacts based on the extent of potential contamination identified. If remediation is required, a Remediation Action Plan (RAP) would be prepared. The objectives of the RAP are:

- To undertake further site investigation where required;
- To evaluate and recommend appropriate remedial measures for the contaminated materials identified in the assessment;
- To recommend good handling practices for the contaminated materials during all stages of the remediation works;
- To recommend appropriate handling and disposal measures; and
- To formulate optimal and cost-effective mitigation and remedial measures for EPD's agreement.

7.9.1.3 A Remediation Report (RR) would also be prepared to demonstrate that the clean-up works are adequate. All remediation works shall be completed prior to the commencement of construction works.

PHOTO 1a

PHOTO 1c

PHOTO 1b

PHOTO 1e

PHOTO 1d

PHOTO 1f

CHU LOK STREET
MEI SUN LANE
TING KOK ROAD
TAI PO MARKET
TAI PO TAI WO ROAD
TAI PO OLD MARKET
KWONG FUK ROAD

PHOTO 1a
PHOTO 1c
PHOTO 1b
PHOTO 1e
PHOTO 1f
PHOTO 1d

N

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METRES

LEGEND

PROPOSED WORKS AREA

VIEW ANGLE

Rev	Description	By	Date
A	FIRST ISSUE	AY	09/22

Consultant

ARUP

Project Title

Agreement No. CE11/2019 (DS)

Drainage Improvement Works
in Tai Po
- Investigation

Drawing title

PHOTO RECORDS OF THE SITE SURVEY FOR TAI PO OLD MARKET AND TAI PO MARKET

Drawing no.	Rev.
FIGURE 7.1	A

Drawn	Date	Checked	Approved
AY	09/22	RC	FC

Scale	Status
1:6000 @A3	PRELIMINARY

香港特別行政區政府渠務署
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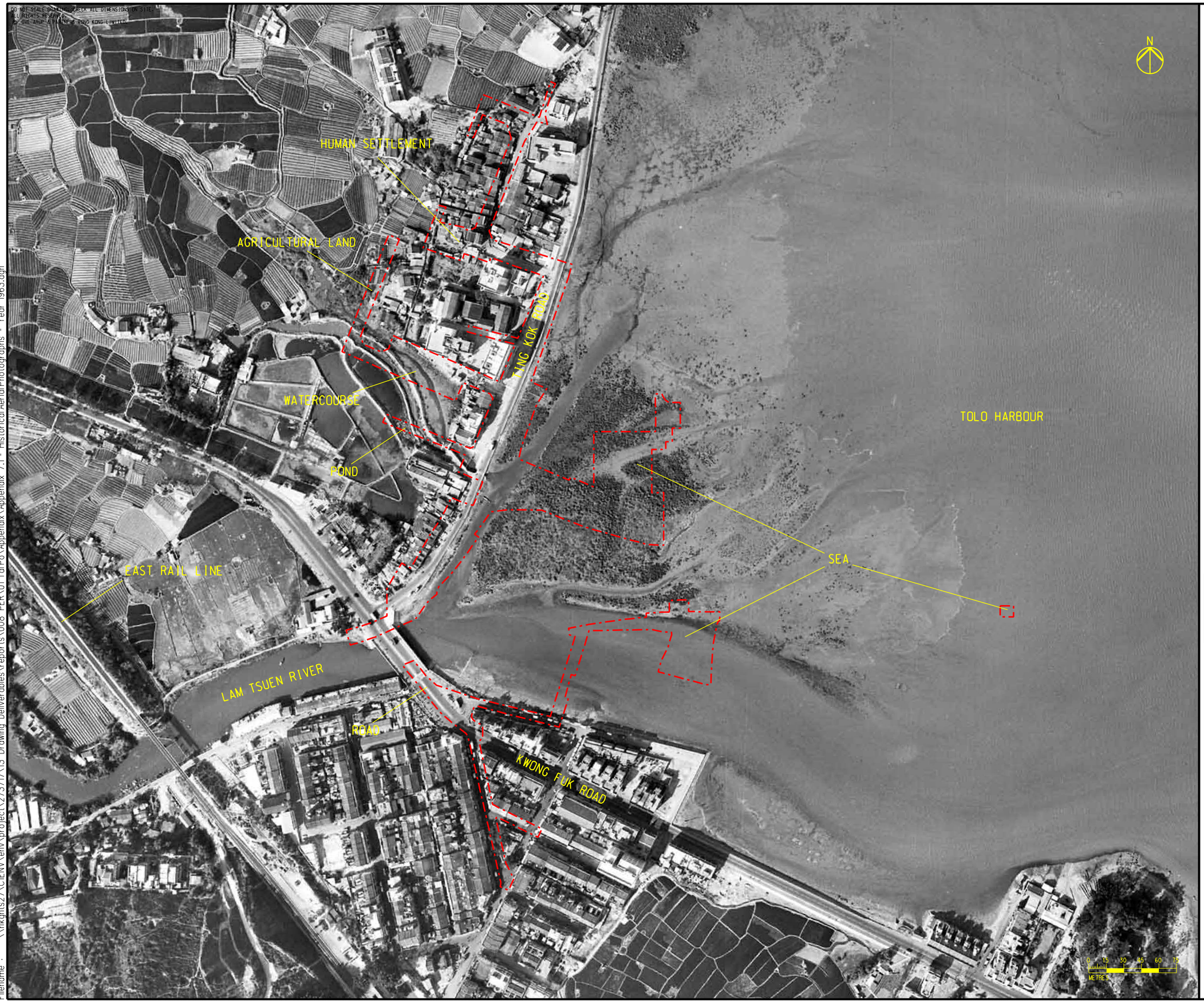
SPECIAL ADMINISTRATIVE REGION

Printed by : 9/27/2022
Filename : \\hkgnts27\CIENV\env\project\273717\13 Drawing Deliverables\reports\008 PER\01 Tai Po\Figure 7.1- Photo Records of the Site Survey for TaiPo Old Market and TaiPo Market.dgn

Appendix 7.1

Historical Aerial Photos (Year 1963)



LEGEND

PROPOSED WORKS AREA

Rev	Description	By	Date
A	FIRST ISSUE	AY	08/22

Consultant

ARUP

Project Title

Agreement No. CE11/2019 (DS)

Drainage Improvement Works in Tai Po - Investigation

Drawing title

HISTORIAL AERIAL PHOTOS - YEAR 1963

Drawing no.			Rev.
APPENDIX 7.1			A
Drawn: AY	Date: 08/22	Checked: RC	Approved: FC
Scale: 1:3000 @ A3		Status: PRELIMINARY	

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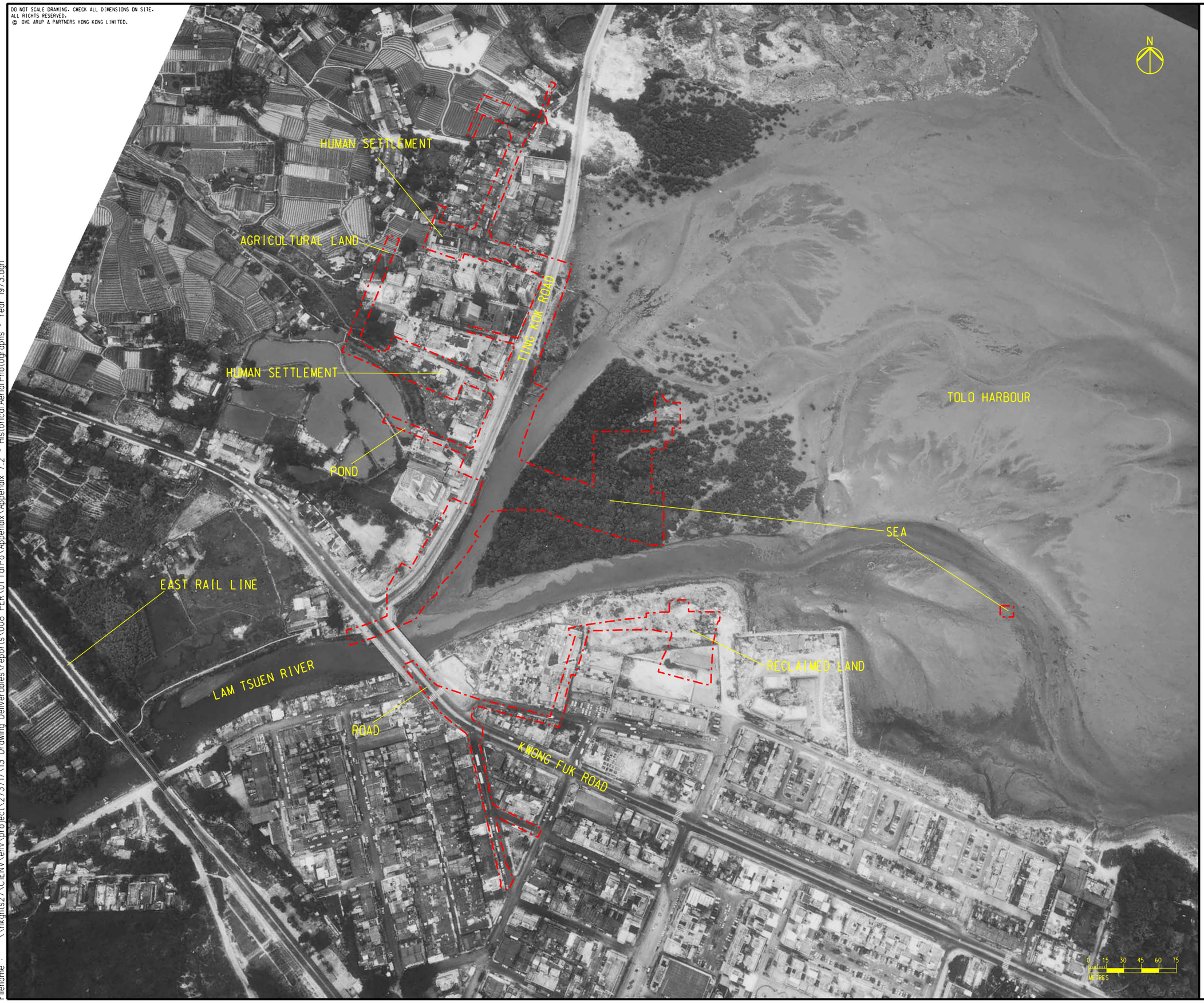
Filename : \\hkgnts27\C1ENV\env\project\273717\13 Drawing Deliverables\reports\008 PER\01 Tai Po\Appendix\Appendix 7.1 - Historical Aerial Photographs - Year 1963.dgn

Appendix 7.2

Historical Aerial Photos (Year 1973)



LEGEND

PROPOSED WORKS AREA

Rev	Description	By	Date
A	FIRST ISSUE	AY	08/22

Consultant

ARUP

Project Title

Agreement No. CE11/2019 (DS)

Drainage Improvement Works in Tai Po - Investigation

Drawing title

HISTORIAL AERIAL PHOTOS - YEAR 1973

Drawing no.	Rev.
APPENDIX 7.2	A

Drawn	Date	Checked	Approved
AY	08/22	RC	FC

Scale	Status
1:3000 @ A3	PRELIMINARY

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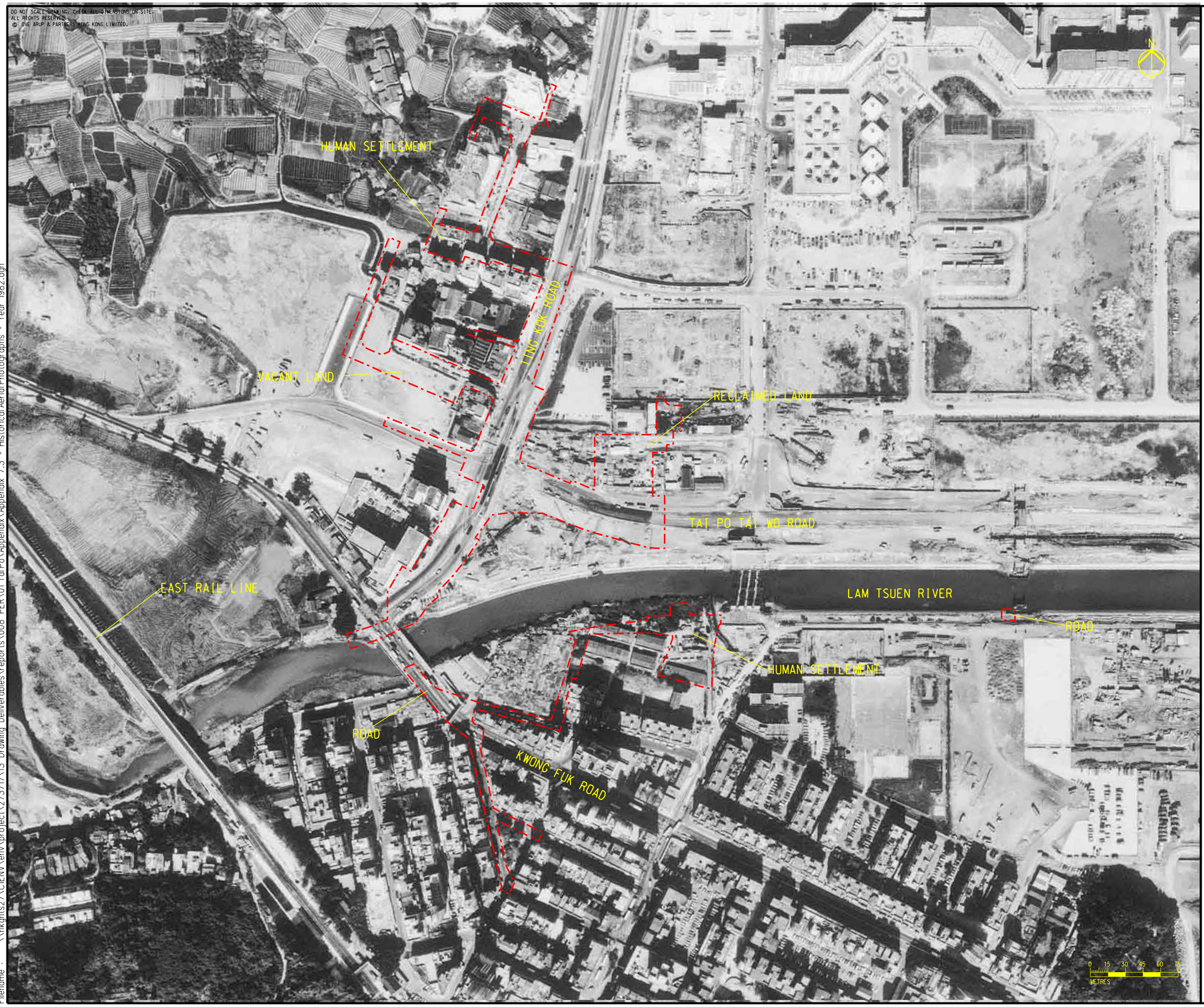
Filename : \\hkgnts27\CIENV\env\project\273717\13 Drawing Deliverables\reports\008 PER\01 Tai Po\Appendix\Appendix 7.2 - Historical Aerial Photographs - Year 1973.dgn

Appendix 7.3

Historical Aerial Photos (Year 1982)



LEGEND

PROPOSED WORKS AREA

Rev	Description	By	Date
A	FIRST ISSUE	AY	08/22

Consultant

ARUP

Project Title

Agreement No. CE11/2019 (DS)

Drainage Improvement Works in Tai Po - Investigation

Drawing title

HISTORIAL AERIAL PHOTOS - YEAR 1982

Drawing no.	Rev.
APPENDIX 7.3	A

Drawn	Date	Checked	Approved
AY	08/22	RC	FC

Scale	Status
1:3000 @ A3	PRELIMINARY

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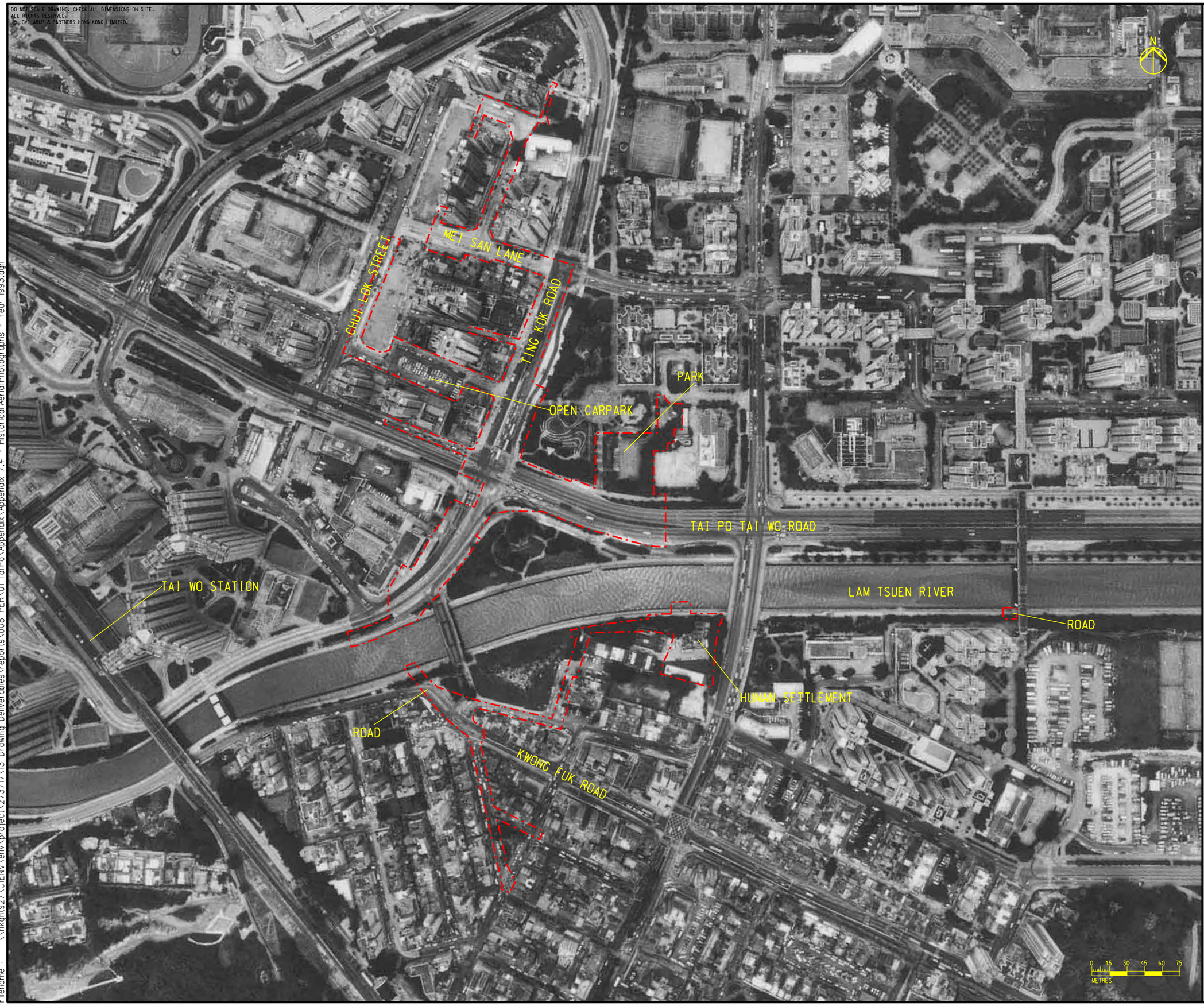
Filename : \\hkgnts27\C\ENV\env\project\273717\13 Drawing Deliverables\reports\008 PER\01 Tai Po\Appendix\Appendix 7.3 - Historical Aerial Photographs - Year 1982.dgn

Appendix 7.4

Historical Aerial Photos (Year 1993)



LEGEND

PROPOSED WORKS AREA

Rev	Description	By	Date
A	FIRST ISSUE	AY	08/22

Consultant

ARUP

Project Title

Agreement No. CE11/2019 (DS)
Drainage Improvement Works in Tai Po
- Investigation

Drawing title

HISTORIAL AERIAL PHOTOS - YEAR 1993

Drawing no.	Rev.
APPENDIX 7.4	A

Drawn	Date	Checked	Approved
AY	08/22	RC	FC

Scale: 1:3000 @ A3

Status: PRELIMINARY

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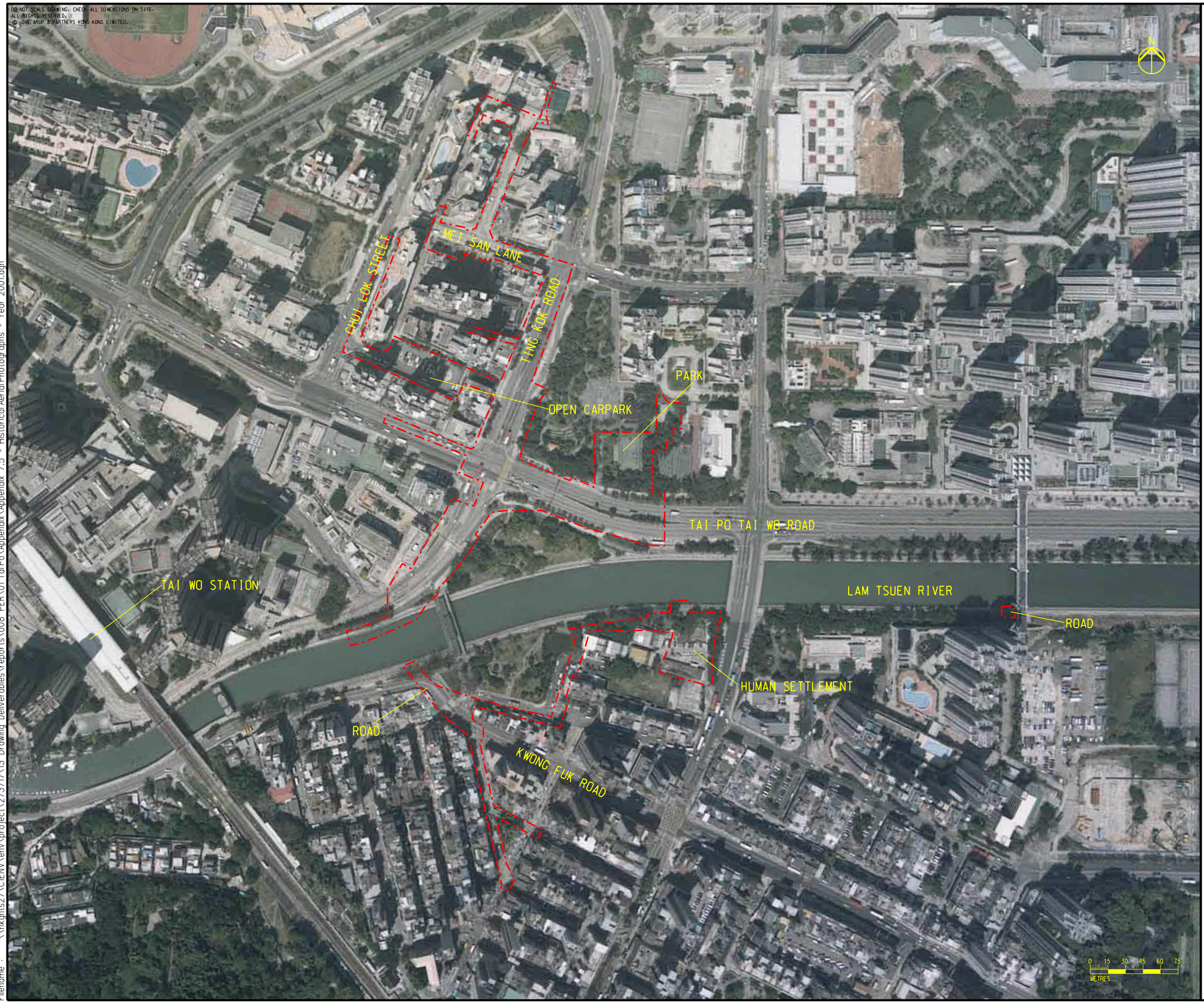
Filename : \\hkgnts27\CIENV\env\project\273717\13 Drawing Deliverables\reports\008 PER\01 Tai Po\Appendix\Appendix 7.4 - Historical Aerial Photographs - Year 1993.dgn

Appendix 7.5

Historical Aerial Photos (Year 2001)



LEGEND

PROPOSED WORKS AREA

Rev	Description	By	Date
A	FIRST ISSUE	AY	08/22

Consultant

ARUP

Project Title

Agreement No. CE11/2019 (DS)

Drainage Improvement Works in Tai Po - Investigation

Drawing title

HISTORIAL AERIAL PHOTOS - YEAR 2001

Drawing no.			Rev.
APPENDIX 7.5			A
Drawn: AY	Date: 08/22	Checked: RC	Approved: FC
Scale: 1:3000 @ A3		Status: PRELIMINARY	

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Printed by : 9/6/2022
Filename : \\hkgnts27\CIENV\env\project\273717\13 Drawing Deliverables\reports\008 PER\01 Tai Po\Appendix\Appendix 7.5 - Historical Aerial Photographs - Year 2001.dgn

Appendix 7.6

Historical Aerial Photos (Year 2011)

LEGEND

PROPOSED WORKS AREA

Rev	Description	By	Date
A	FIRST ISSUE	AY	08/22

Consultant

ARUP

Project Title

Agreement No. CE11/2019 (DS)

Drainage Improvement Works in Tai Po - Investigation

Drawing title

HISTORIAL AERIAL PHOTOS - YEAR 2011

Drawing no.			Rev.
APPENDIX 7.6			A
Drawn	Date	Checked	Approved
AY	08/22	RC	FC
Scale		Status	
1:3000 @ A3		PRELIMINARY	

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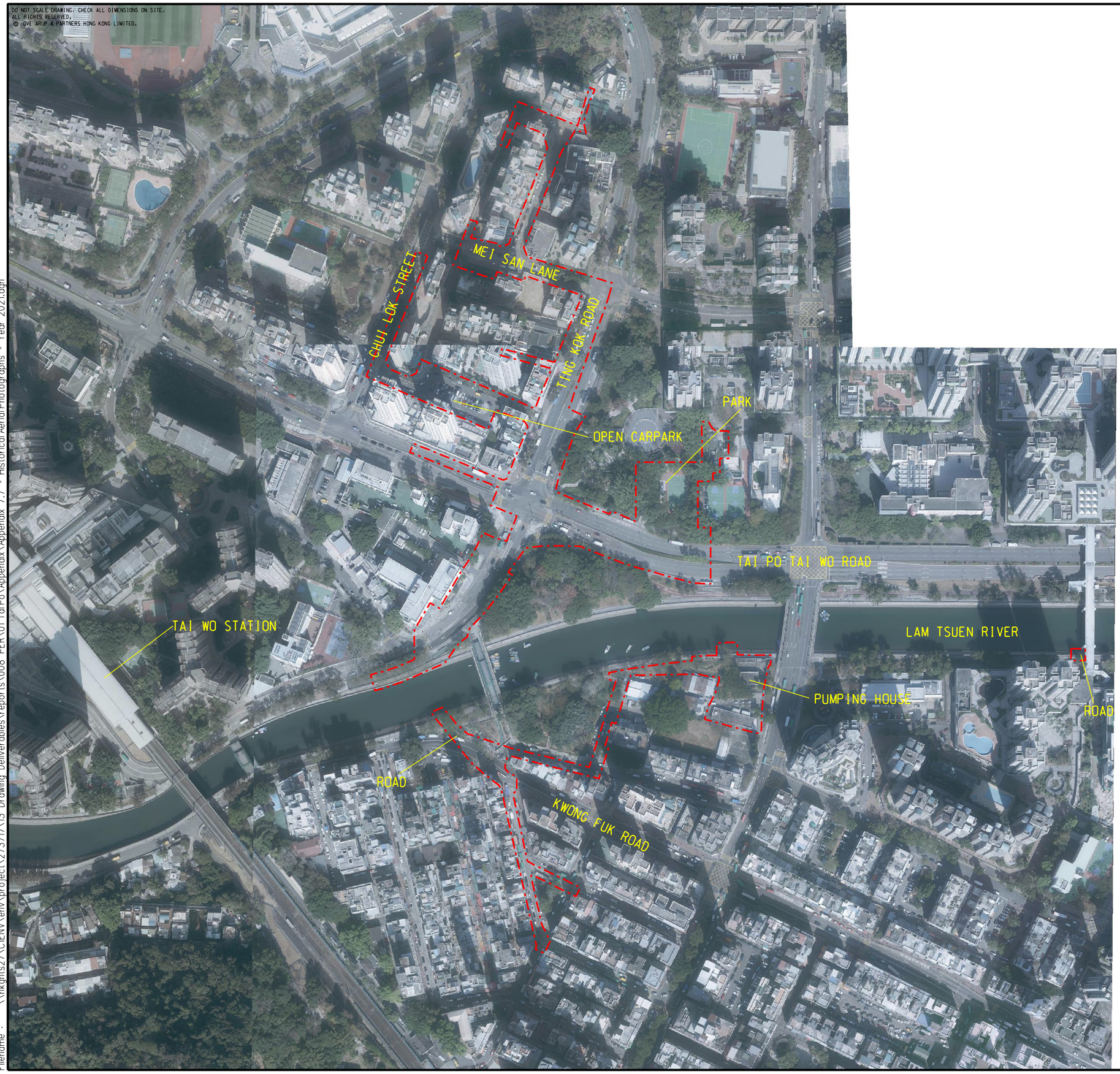
Printed by : 9/6/2022
Filename : \\hkgnts27\C\ENV\env\project\273717\13 Drawing Deliverables\reports\008 PER\01 Tai Po\Appendix\Appendix 7.6 - Historical Aerial Photographs - Year 2011.dgn

Appendix 7.7

Historical Aerial Photos (Year 2021)



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LEGEND

PROPOSED WORKS AREA

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Rev	Description	By	Date
A	FIRST ISSUE	AY	08/22

Consultant

ARUP

Project Title

Agreement No. CE11/2019 (DS)

Drainage Improvement Works in Tai Po - Investigation

Drawing title

HISTORIAL AERIAL PHOTOS - YEAR 2021

Drawing no.			Rev.
APPENDIX 7.7			A
Drawn: AY	Date: 08/22	Checked: RC	Approved: FC
Scale: 1:3000 @ A3		Status: PRELIMINARY	

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Appendix 7.8

Site Walkover Checklist

Site Walkover Checklist

1) GENERAL SITE DETAILS	
Site Owner/ Client	N/A
Property Address	Tai Po Old Market & Tai Po Market
Person Conducting the Questionnaire (name & position)	Name: Hugo Lee
Authorised Owner/ Client Representative (if applicable) (name, position & telephone)	N/A

2) ACTIVITIES	
Briefly describe activities carried out on site, including types of products/chemicals/materials handled. **Obtain a flow schematic if possible.**	No activities observed.
Number of employees: - Full-time: - Part-time: - Temporary/Seasonal:	N/A
Maximum no. of people on site at any time:	N/A
Typical hours of operation:	N/A
Number of shifts:	N/A
Days per week:	N/A
Weeks per year:	N/A
Scheduled plant shut-down:	N/A
Detail the main sources of energy at the site: Gas (Yes/No) Electricity (Yes/No) Coal (Yes/No) Oil (Yes/No) Other (Yes/No)	N/A

Site Walkover Checklist

3) SITE DESCRIPTION	
This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.	
What is the total site area:	Tai Po Old Market: ~28,660 m^2 Tai Po Market: ~ 7,510 m^2
What area of the site is covered by buildings (%):	Tai Po Old Market: ~0.5% Tai Po Market: ~6.5%
Please list all current and previous owners/occupiers if possible.	N/A
Is a site plan available? (Yes/No) If yes, please attach.	N/A
Are there any other parties on site as tenants or sub-tenants? (Yes/No) If yes, identify those parties.	N/A
Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.	
North:	Tai Po Old Market: Residential Use Tai Po Market: Lam Tsuen River
South:	Tai Po Old Market: Lam Tsuen River Tai Po Market: Residential Use
East:	Tai Po Old Market: Residential Use Tai Po Market: Residential Use
West:	Tai Po Old Market: Residential Use Tai Po Market: Residential Use
Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.).	Flat terrain, with Lam Tsuen River passing through and leading to Tolo Harbour
State the size and location of the nearest residential communities.	Tai Po Old Market: Tai Wo Centre, Reve Plaza, Eightland Gardens, etc. Tai Po Market: Tse Chong Building, Kwong Fuk Building, etc.
Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands, or sites of special scientific interest?	N/A

Site Walkover Checklist

4) QUESTIONNAIRE WITH EXISTING/ PREVIOUS SITE OWNER OR OCCUPIER		
	Yes/No	**Notes**
1. What are the main activities/operations at the above address?	-	N/A
2. How long have you been occupying the site?	-	N/A
3. Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	-	N/A
4. Prior to your occupancy, who occupied the site?	-	N/A
5. What were the main activities/operations during their occupancy?	-	N/A
6. Have there been any major changes in operations carried out at the site in the last 10 years?	-	N/A
7. Have any polluting activities been carried out in the vicinity of the site in the past?	-	N/A
8. To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	-	N/A
9. Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	-	N/A
10. Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	-	N/A
11. Are any chemicals used in your daily operations? (If yes, please provide details.) - Where do you store these chemicals?	-	N/A
12. Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	-	N/A
13. Has the facility produced a separate hazardous substance inventory?	-	N/A
14. Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	-	N/A
15. How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bays, silos, cisterns, vaults and cylinders)?	-	N/A

Site Walkover Checklist

4) QUESTIONNAIRE WITH EXISTING/ PREVIOUS SITE OWNER OR OCCUPIER (CONTINUED)		
	Yes/No	**Notes**
16. Do you have any underground storage tanks? (If yes, please provide details.) - How many underground storage tanks do you have on site? - What are the tanks constructed of? - What are the contents of these tanks? - Are the pipelines above or below ground? - If the pipelines are below ground, has any leak and integrity testing been performed? - Have there been any spills associated with these tanks?	-	Yes. The underground storage tanks only store drainage water with no chemicals being handled. Therefore, it has no land contamination issue.
17. Are there any disused underground storage tanks?	-	N/A
18. Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	-	N/A
19. How are the wastes disposed of?	-	N/A
20. Have you ever received any notices of violation of environmental regulations or received public complains? (If yes, please provide details.)	-	N/A
21. Have any spills occurred on site? (If yes, please provide details) - When did the spill occur? - What were the substances spilled? - What was the quantity of material spilled? - Did you notify the relevant departments of the spill? - What were the actions taken to clean up the spill? - What were the areas affected?	-	N/A
22. Do you have any records of major renovation of your site or re-arrangement of underground utilities, pipe work/underground tanks? (If yes, please provide details.)	-	N/A
23. Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	-	N/A
24. Are there any known contaminations on site? (If yes, please provide details.)	-	N/A
25. Has the site ever been remediated? (If yes, please provide details.)	-	N/A

Site Walkover Checklist

5) OBSERVATIONS		
	Yes/No	**Notes**
1. Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	No	There are no chemical storage areas in the site.
2. What are the conditions of the bund walls and floors?	No	-
3. Are any surface water drains located near to drum storage and unloading areas?	No	There are no drum storage or unloading areas in the site.
4. Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	No	-
5. Is there a storage site for the wastes?	No	-
6. Is there an on-site landfill?	No	-
7. Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	-
8. Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	No	-
9. Are there any potential off-site sources of contamination?	No	-
10. Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	No	-
11. Are there any sumps, effluent pits, interceptors or lagoons on site?	No	-
12. Any noticeable odours during site walkover?	No	-
13. Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives, and polyurethane foam?	No	-

Appendix 7.9

Correspondence with EPD

Your ref
Our ref 273717/3.26/KK/JW/CC/AY/0274
File ref

ARUP

Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong

t +852 25283031
d +852 22683511
f +852 22683953

kenneth.kwok@arup.com
www.arup.com

BY POST & EMAIL

Environmental Protection Department
Environmental Compliance Division
Regional Office (North)
Tai Po
10th floor, Shatin Government Offices,
No.1 Sheung Wo Che Road,
Sha Tin, New Territories

Attention: Mr. NG Hon Wing, Wallace
(Env Protection Offr(Regional N)14)

4 August 2022

Dear Madam,

Agreement No. CE 11/2019 (DS)
Drainage Improvement Works in Tai Po – Investigation
Request for Information on Chemical Waste Producer and Chemical Spillage Accident

We have been appointed by the Drainage Projects Division of the Drainage Services Department to undertake the captioned assignment. A copy of DSD's memo dated 5 February 2020 is attached for your easy reference.

This Assignment consists of investigation on the drainage improvement works in Tai Po, Ting Kok and Ma On Shan Area. The details of the works are shown on the enclosed plan.

We would like to collect the following information at Tai Po for the project:

1. Records of Chemical Waste Producers Registration at the concerned areas; and
2. Past and present chemical spillage / leakage records at the concerned areas

We would be grateful if you could provide us with the drawings at your earliest convenience. Should you have any query, please contact Mr. Ricky Chui at 2268 3437 or our project coordinator Ms Jennifer Wong at 2908 4617.

Yours faithfully

Kenneth Kwok
Deputy Project Director

Encl.
cc DSD/DP9 (Attn: Ms. YIP Chui Ying) (w/e) (By Post & Email)

Distribution

	Attention	Fax No.
DPO/ST,TP&ND, PlanD	Ms. CHUNG Wing Yee, Vanessa	2691 2806
DLO/TP, LandsD	Mr. WONG Yu Chun	2650 9896
DSO/TP, LandsD	Ms. WONG Wing Yin, Winnie	2650 5299
DO(TP), HAD	Mr. AU Wing Leuk, Markie, Ms. LEUNG Wing Yin, Tiffany	2652 1187 2654 9174
PEPO/RN, EPD	Ms. LUK Wai Yun, Connie	2685 1155
PEPO/SI, EPD	Mr. LI Key Fung, Michael	2519 0572
PEPO(SA), EPD	Mr. TANG Ho Him, Matthew Mr. TAI Lee Loi, Felix	2591 0558
PEPO(MA), EPD	Mr. LAU Yiu Cheung, Vincent	2591 0558
CTE/NTE, TD	Mr. CHEUNG Wai Fung	2381 3799
CLM/NTE, LCSD	Mr. WONG Kwok wai, Mr. WAH Kwan Ping	2651 0315
ES/A&M, AMO	Miss LAU Nga Yee, Carol	2721 6216
AD(PS), ArchSD	Mr. CHOW Chung Kwong, Cliff	2765 8584
AD/O3, FEHD	Mr. LAI Siu Kwong	2650 1171
CCE1, HD	Mr. TANG Cheuk Kwan	2761 7615
CCE2, HD	Mr. LEE Lap Man, Raymond	2129 3095
CM/M(TNS), HD	Ms. FAN Yee Lok, Pamela	2605 8912
Regional Commander/NTN, HKPF	Ms. Ng Mei Mei	2666 5258
RMO, NTN, HKPF	Mr. TSANG Ho Ming	2464 4044
Regional Commander/NTS, HKPF	Mr. LIN Sean	2697 5250
RMO, NTS, HKPF	Mr. LEUNG Chun Sing	2200 4658
SDO/Planning Group, FSD	Mr. Chan Ming Chung	2739 8775
PM/N, CEDD	Ms. MAK Pui Yan, Mr. TANG Man Kai	3547 1658, 3547 1659
CE/PW, CEDD	Mr. CHAN Chung, Jason	2714 2054
CE/SD(Works), CEDD	Mr. LEUNG Chi Foon	2714 0103
GEO, CEDD	Ms. YEUNG Fei, Jenny	2714 0245
CHE/B&S, HyD	Mr. FOK Chi Sum	2714 5219
CE/RD2-2, RDO, HyD	Ms. CHEUNG Ting Chi, Gigi	2761 1508
CHE/NTE, HyD	Mr. SIU Wai Kwan	2714 5228
CHE/Works, HyD	Mr. NG Wai Shing	3188 3418
PPC/UA, HyD	Mr. LO Chun Chung	3968 4499
Landscape Division, HyD	Ms. CHAN Tai Fung, Sandy	2310 8438
CE/Lighting, HyD	Mr. WOO Yan Ho	2310 8489
CE/Dev(2), WSD	Mr. LAW Yuk Fat, Robin	2824 2757
CE/NTE,WSD	Ms. WONG Dik Chi	2354 5737
CE/C, WSD	Mr. LEE Ka Kin	2351 6949
CE/SV, EMSD	Mr. KONG Ho, Felix	3746 1000
SNCO(C), AFCD	Dr. LEUNG Ngo Hei, June	2377 4427
GM/P,D&PS, MD	Mr. SUN You Jin	2581 1765
CEO (CIS & TCS), HKO	Mr. HUI Kin Chung	2375 2645

Internal (w/o)

TS1, DSD
SE/HQ, DSD
CE/LD, DSD
CE/HK&I, DSD
CE/MS, DSD
CE/SP, DSD
CE/PM, DSD
CE/CM, DSD
CE/ST1, DSD
CE/ST2, DSD
CE/E&MP, DSD
PPC/SDD, DSD

c.c. (w/e)

Ove Arup & Partners Hong Kong Limited	Mr. Kenneth KWOK	2865 6493

N

835000 E

835100 E

835200 E

834800 N

834700 N

834600 N

FOR CONTINUATION
SEE DRG 273717/DS/TP/005
MATCH LINE

CHUK LOK STREET

菁泉雅居
LA FONTAINE

平安里
PING ON LANE

菁華園 FULL SCENE GARDEN
第一座 Block 1
第二座 Block 2

大南樓 Dai Nam Building
美孚居 Merit Place
華安樓 Wah On Building
安樂樓 On Lok Building
省躬大廈 Sing Kung Building
會所 Club House
省躬草堂 Sing Kung Cho Tong
平台 Podium

TING KOK ROAD

ON CHEE ROAD
安慈路

八號花園
EIGHTLAND GARDENS
第一座 Block 1
第二座 Block 2

安浩里
ON HO LANE

TREASURE GARDEN

Cycling Track

大埔舊墟遊樂場
Tai Po Old Market Playground

TAI PO OLD MARKET PLAYGROUND

遊樂場 Playground

RELEASED AND EXISTING WALKWAYS /PLANTING AREA TO BE PAVED WITH CONCRETE PAVEMENT

RELOCATED OFFICE AND TOILET

OFFICE AND TOILET

BOUNDARY FENCE

MAINTENANCE ACCESS

EXISTING OFFICE AND TOILET TO BE RELOCATED

PROPOSED BASKETBALL COURT AND SPECTATOR STAND

BASKETBALL COURT

STAND

SWITCH ROOM

CLP TRANSFORMER ROOM

PUMPING STATION

3mx3m MAINTENANCE ACCESS OPENING

籃球場 Basketball Court

3.5mx1.5m ACCESS OPENING FOR INLET PENSTOCK

CLP SUBSTATION & SWITCH ROOM

TAI PO TAI WO ROAD

大埔太和路

大埔救護站
Tai Po Ambulance Depot

大埔消防局
Tai Po Fire Station

大埔政府合署
Tai Po Government Offices

KWONG FUK ROAD

公園 Park

常安樓 Sheung On Building

啟昌園 Kai Cheong Mansion

禮賢會大埔堂
Chinese Rhenish Church

停車場 Car Park

太和中心
TAI WO CENTRE

TAI WO LANE

675 (1350)
450 (1350)
525 (1350)
525 (900)
600 (900)
600 (1350)
675 (1350)
675 (1350)
450 (1350)
900
1650
1650
1650
1800
1800
1800
1500
1500
1500
1500
1500
1950
2400
1350
1350
1350
1350
600
600
900
900
450
450
450
450
450
450
1650

STORMWATER MANHOLE INSTALLED WITH 2 NOS. OF PENSTOCK AT OUTLETS

9,000m3 STORAGE TANK WITH PS WITH FLOW RATE 4m3/s

CONNECT TO EXISTING 2 CELLS 2900(W)x2900(H) BOX CULVERT

STORMWATER MANHOLE INSTALLED WITH 2 NOS. OF PENSTOCK AT OUTLETS

CONNECT TO EXISTING 2 CELLS 2900(W)x2900(H) BOX CULVERT

PROPOSED OULET STRUCTURE

7NW-B/F194
7NW-B/F193
7NW-B/F192
7NW-B/F92
7NW-B/F91

LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED STORMWATER MANHOLE
- EXISTING STORMWATER MANHOLE TO BE RECONSTRUCTED
- PROPOSED DRAIN TO BE CONSTRUCTED BY PIPE JACKING
- EXISTING PIPE AND MANHOLE TO BE ABANDONED
- EXISTING STORMWATER MANHOLE
- EXISTING STORMWATER DRAIN
- 3850x2134 B.C. EXISTING BOX CULVERT
- 7NW-B/C80 SLOPE BOUNDARY
- PROPOSED STORMWATER DRAIN BY OPEN-TRENCH METHOD

Rev	Description	By	Date
C	THIRD ISSUE	JW	02/22
B	CONFIRMED DIW SCHEME	JW	12/21
A	FIRST ISSUE	JW	01/21

Consultant

ARUP

Project Title

Agreement No. CE11/2019 (DS)

Drainage Improvement Works in Tai Po
- Investigation

Drawing title

PROPOSED DRAINAGE IMPROVEMENT WORKS IN TAI PO OLD MARKET AND TAI PO MARKET - TAI PO OLD MARKET (TP1) (SHEET 2 OF 3)

Drawing no.	Rev.
273717/DS/TP/001	C

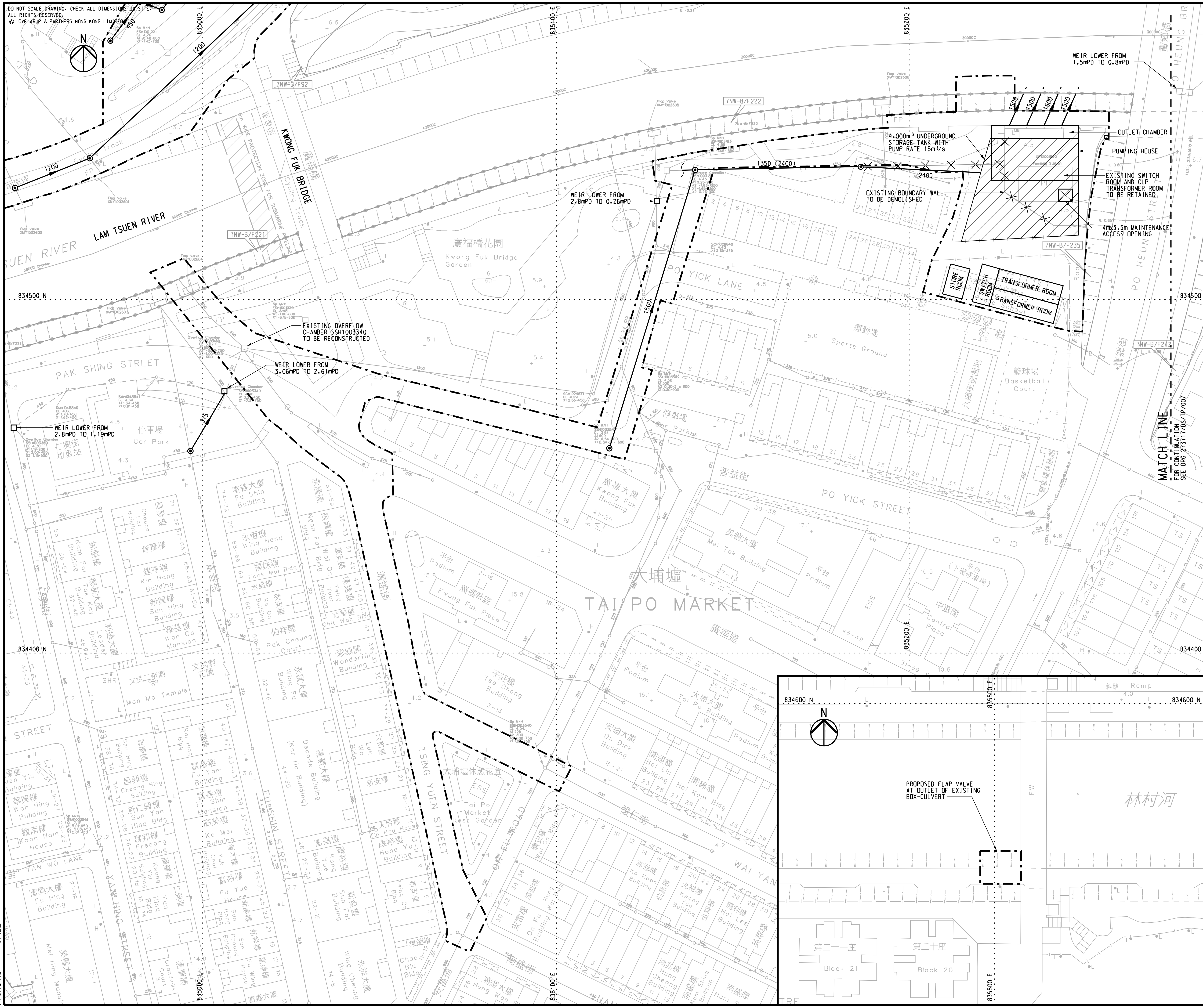
Drawn	Date	Checked	Approved
RY	01/21	JW	KK

Scale: 1:500 @ A1

Status: PRELIMINARY

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

Printed by : $DATE$
Filename : $FILE$



LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED STORMWATER MANHOLE
- EXISTING STORMWATER MANHOLE TO BE RECONSTRUCTED
- PROPOSED DRAIN TO BE CONSTRUCTED BY PIPE JACKING
- EXISTING PIPE AND MANHOLE TO BE ABANDONED
- EXISTING STORMWATER MANHOLE
- EXISTING STORMWATER DRAIN
- 3850x2134 B.C. — EXISTING BOX CULVERT
- 7NW-B/C80 — SLOPE BOUNDARY
- PROPOSED STORMWATER DRAIN

Rev	Description	By	Date
B	SECOND ISSUE	JW	02/22
A	FIRST ISSUE	JW	01/21

Consultant

ARUP

Project Title

Agreement No. CE11/2019 (DS)

Drainage Improvement Works in Tai Po - Investigation

Drawing title

PROPOSED DRAINAGE IMPROVEMENT WORKS IN TAI PO OLD MARKET AND TAI PO MARKET - TAI PO MARKET (TP5) (SHEET 1 OF 2)

Drawing no.			Rev.
273717/DS/TP/003			B
Drawn: RY	Date: 01/21	Checked: JW	Approved: KK
Scale: 1:500 @ A1		Status: PRELIMINARY	

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

Printed by : $DATE$
Filename : $FILE$

N

835000 N
834900 N
834800 N
835000 E
835100 E
835200 E

MATCH LINE
FOR CONTINUATION
SEE DRG 273717/DS/TP/001

LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED STORMWATER MANHOLE
- EXISTING STORMWATER MANHOLE TO BE RECONSTRUCTED
- PROPOSED DRAIN TO BE CONSTRUCTED BY PIPE JACKING
- EXISTING PIPE AND MANHOLE TO BE ABANDONED
- EXISTING STORMWATER MANHOLE
- EXISTING STORMWATER DRAIN
- 3850x2134 B.C. EXISTING BOX CULVERT
- 7NW-B/C80 SLOPE BOUNDARY
- PROPOSED STORMWATER DRAIN

Rev	Description	By	Date
A	CONFIRMED DIW SCHEME	JW	01/22

Consultant
ARUP

Project Title
Agreement No. CE11/2019 (DS)
Drainage Improvement Works in Tai Po
- Investigation

Drawing title
PROPOSED DRAINAGE IMPROVEMENT WORKS IN TAI PO OLD MARKET AND TAI PO MARKET - TAI PO OLD MARKET (TP1) (SHEET 1 OF 3)

Drawing no.	Rev.
273717/DS/TP/005	A

Drawn	Date	Checked	Approved
RY	01/21	JW	KK

Scale 1:500 @ A1
Status PRELIMINARY

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

Printed by : $DATE$
Filename : $FILE$

834800 E | 834900 E | 835000 E | 835100 E
834700 N | 834600 N | 834500 N

FOR CONTINUATION
SEE DRG 273717/DS/TP/001
MATCH LINE

TAI PO TAI WO ROAD
TING KOK ROAD
KWONG FUK ROAD
PO NGA ROAD
LAM TSUEN RIVER
PAK SHING STREET
TAI WO ESTATE

STORMWATER MANHOLE INSTALLED WITH 2 NOS. OF PENSTOCK AT OUTLETS
CONNECT TO EXISTING 2 CELLS 2900(W)x2900(H) BOX CULVERT
STORMWATER MANHOLE INSTALLED WITH 2 NOS. OF PENSTOCK AT OUTLETS
CONNECT TO EXISTING 2 CELLS 2900(W)x2900(H) BOX CULVERT

7NW-B/F92
7NW-B/F221

LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED STORMWATER MANHOLE
- EXISTING STORMWATER MANHOLE TO BE RECONSTRUCTED
- PROPOSED DRAIN TO BE CONSTRUCTED BY PIPE JACKING
- EXISTING PIPE AND MANHOLE TO BE ABANDONED
- EXISTING STORMWATER MANHOLE
- EXISTING STORMWATER DRAIN
- 3850x2134 B.C. — EXISTING BOX CULVERT
- 7NW-B/C80 — SLOPE BOUNDARY
- PROPOSED STORMWATER DRAIN BY OPEN-TRENCH METHOD

Rev	Description	By	Date
A	FIRST ISSUE	JW	07/22

Consultant
ARUP

Project Title
Agreement No. CE11/2019 (DS)
Drainage Improvement Works in Tai Po
- Investigation

Drawing title
PROPOSED DRAINAGE IMPROVEMENT WORKS IN TAI PO OLD MARKET AND TAI PO MARKET - TAI PO OLD MARKET (TP1) (SHEET 3 OF 3)

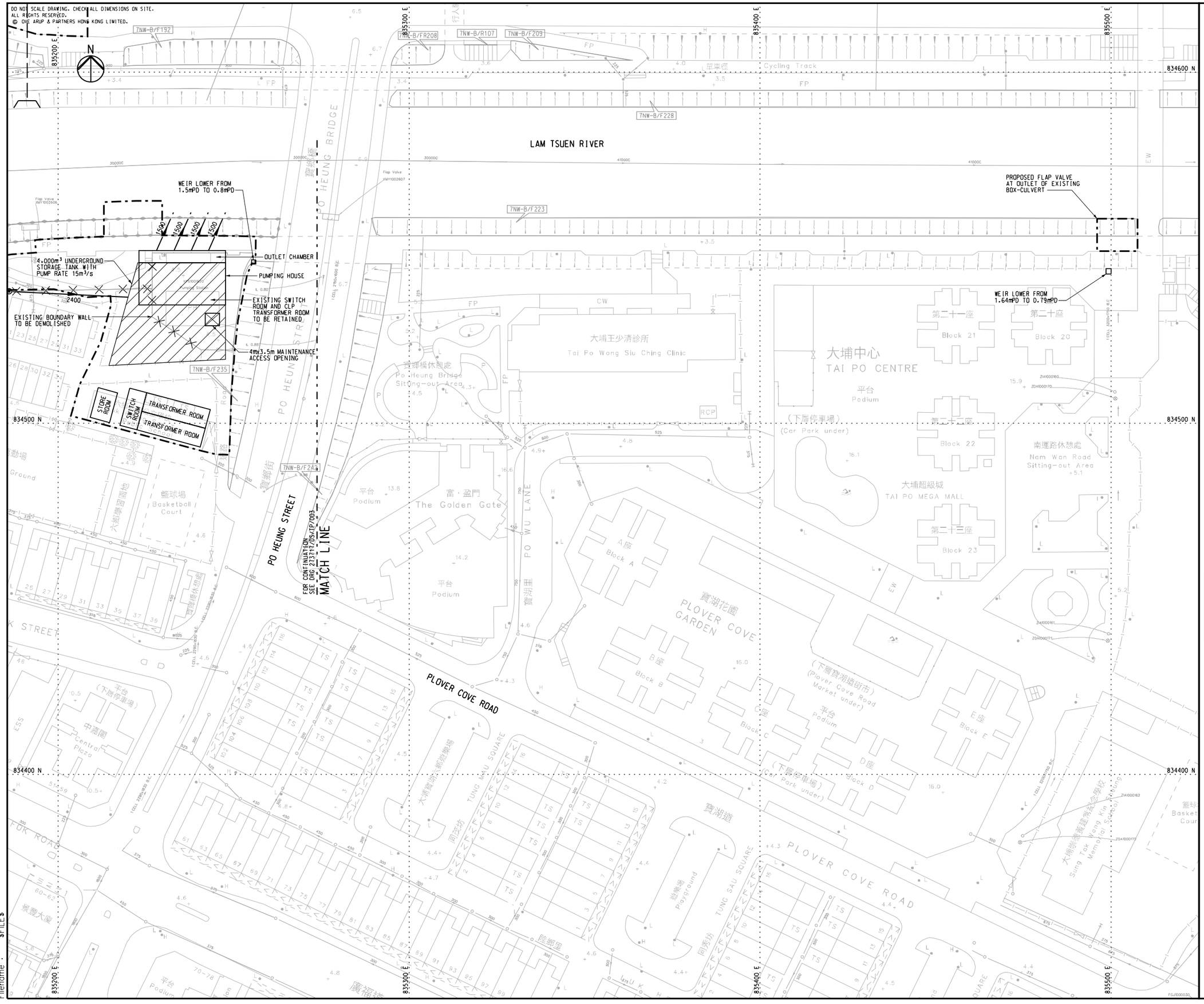
Drawing no.	Rev.
273717/DS/TP/006	A

Drawn	Date	Checked	Approved
RY	07/22	JW	KK

Scale: 1:500 @ A1
Status: PRELIMINARY

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

Printed by : $DATE$
Filename : $FILE$



LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED STORMWATER MANHOLE
- EXISTING STORMWATER MANHOLE TO BE RECONSTRUCTED
- PROPOSED DRAIN TO BE CONSTRUCTED BY PIPE JACKING
- EXISTING PIPE AND MANHOLE TO BE ABANDONED
- EXISTING STORMWATER MANHOLE
- EXISTING STORMWATER DRAIN
- 3850x2134 B.C. EXISTING BOX CULVERT
- 7NW-B/C80 SLOPE BOUNDARY
- PROPOSED STORMWATER DRAIN

Rev	Description	By	Date
A	FIRST ISSUE	JW	07/22

Consultant

ARUP

Project Title

Agreement No. CE11/2019 (DS)

Drainage Improvement Works in Tai Po - Investigation

Drawing title

PROPOSED DRAINAGE IMPROVEMENT WORKS IN TAI PO OLD MARKET AND TAI PO MARKET - TAI PO MARKET (TP5) (SHEET 1 OF 2)

Drawing no.	Rev.
273717/DS/TP/007	A

Drawn	Date	Checked	Approved
RY	07/22	JW	KK

Scale: 1:500 @ A1

Status: PRELIMINARY

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

Printed by : $DATE$
Filename : $FILE$

Appendix 7.10

Correspondence with FSD

消 防 處
香港九龍尖沙咀東部康莊道 1 號
消防處總部大廈

FIRE SERVICES DEPARTMENT
FIRE SERVICES HEADQUARTERS BUILDING,
No.1 Hong Chong Road,
Tsim Sha Tsui East, Kowloon,
Hong Kong.

本處檔號 **OUR REF.** : (8) in FSD GR 6-5/4 R Pt. 43
來函檔號 **YOUR REF.** : 273717/3.35/KK/JW/CC/AY/0275
電子郵件 **E-mail** : hkfsdenq@hkfsd.gov.hk
圖文傳真 **FAX NO.** : 2739 5879
電 話 **TEL NO.** : 2733 7741

2 September 2022

ARUP
Level 5, Festival Walk,
80 Tat Chee Avenue,
Kowloon Tong, Kowloon
(Attn: Mr. Kenneth KWOK, Deputy Project Director)

Dear Mr. KWOK,

Agreement No. CE 11/2019 (DS)
Drainage Improvement Works in Tai Po - Investigation
Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 4.8.2022 regarding the captioned request and reply below in response to your questions:-

1. No Dangerous Goods Licence was issued in respect of the captioned address.

2. A total of four incident records were found at the subject location. Please refer to **Appendix A** for details.

If you have further questions, please feel free to contact the undersigned.

Inf.1	Date	By	ARUP
	Job no. 273717		
File no. 3.35.		File original: Yes / No	
Registration no. IN-0483.			
Received - 7 SEP 2022			
Initials	KK	JW	CC	CY	
Action					
Info.					
Copy	/	/	/	/	
Archive		Dispose		Scan	

Yours sincerely,

(NG Wing-chit)
for Director of Fire Services

Appendix A

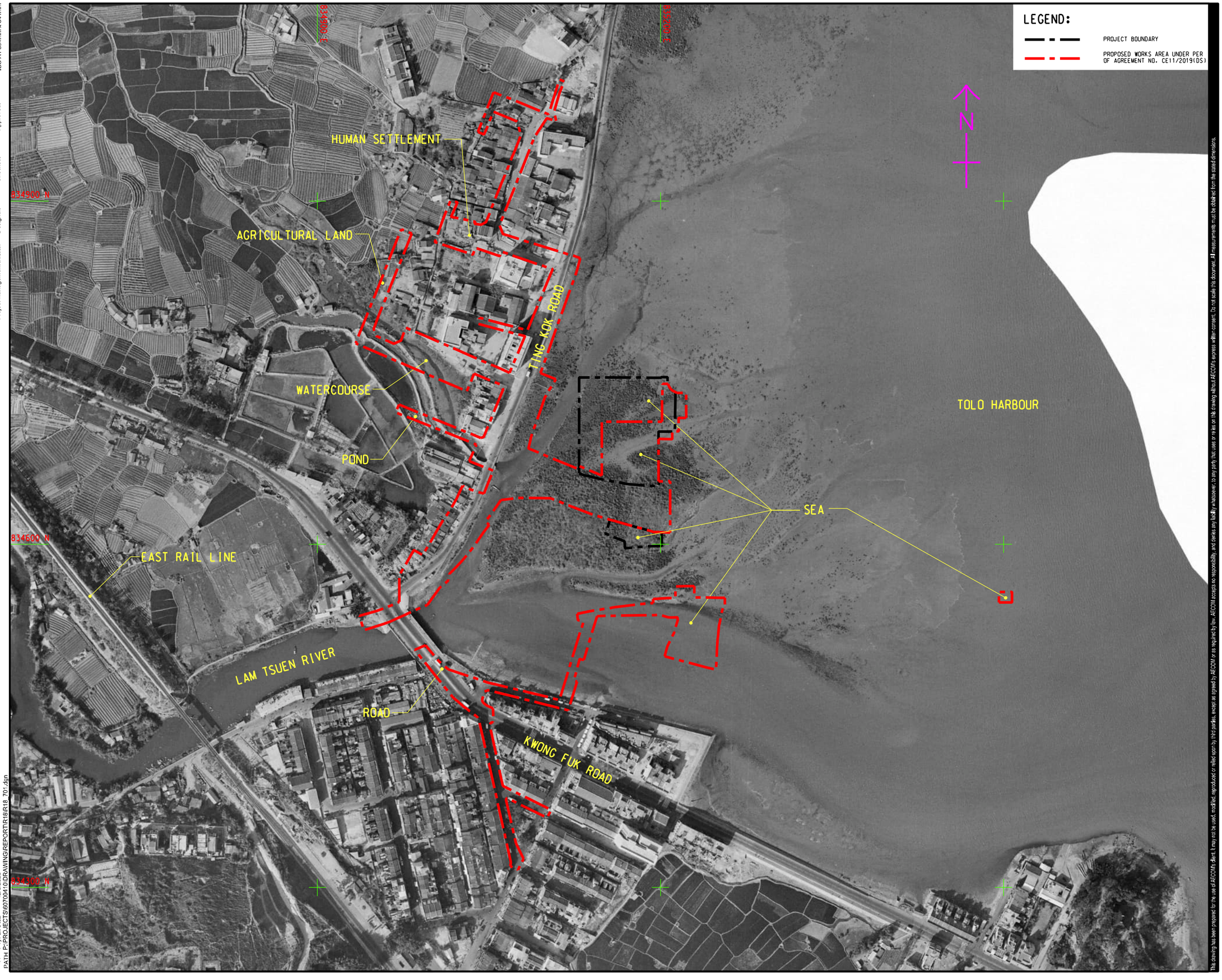
Agreement No. CE 11/2019 (DS)

Drainage Improvement Works in Tai Po - Investigation

Request for Information of Dangerous Goods & Incident Records

No.	Date	Type of Incident	Address
1.	11.11.2019	Electrical Fire	LP DE0078 Near Ting Kok Road
2.	11.11.2019	Rubbish Fire	LP DE0078 Near Ting Kok Road
3.	13.11.2019	Rubbish Fire	Tai Po Tai Wo Road / Ting Kok Road
4.	24.2.2020	No.1 Alarm	Kau Hui Chik Street

Appendix 11.2
Reviewed Aerial Photographs



ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

Plot File by: LIANJ2 12/8/2023
PATH: P:\PROJECTS\60700410\DRAWING\REPORT\R16\R18_707.dgn

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

AERIAL PHOTOGRAPH 1963

SHEET NUMBER
圖紙編號

60700410/R18/AP1

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

Plot File by: LIANJ2 12/8/2023
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AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

AERIAL PHOTOGRAPH 1973

SHEET NUMBER
圖紙編號

60700410/R18/AP2

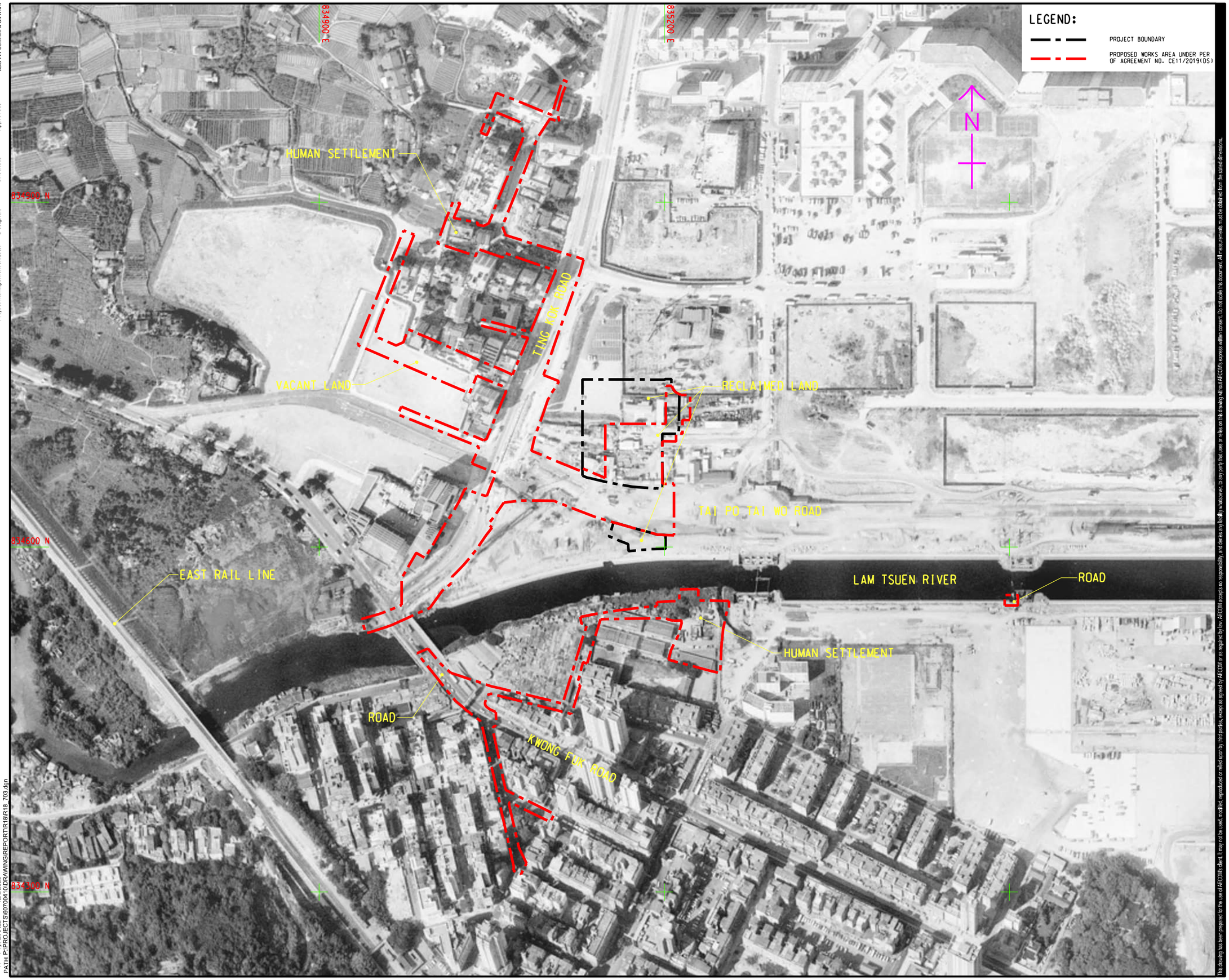
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



Plot File by: LIANJ2
PATH P:\PROJECTS\60700410\DRAWING\REPORT\R18\R18_703.dgn
12/8/2023

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核准

STATUS
狀況

SCALE
比例

A1 1 : 1500

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60700410

CONTRACT NO.
合約編號

CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

AERIAL PHOTOGRAPH 1982

SHEET NUMBER
圖紙編號

60700410/R18/AP3

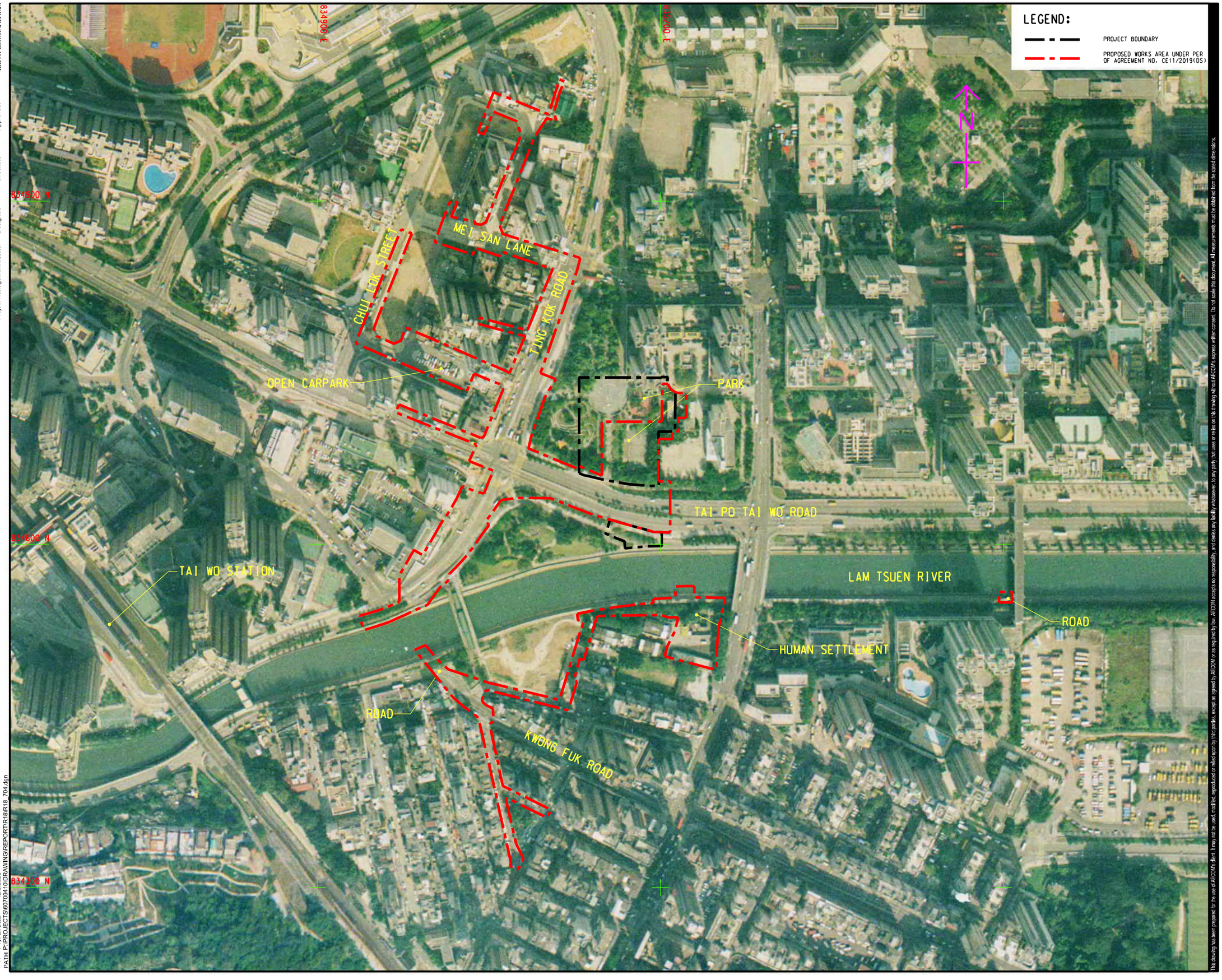
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

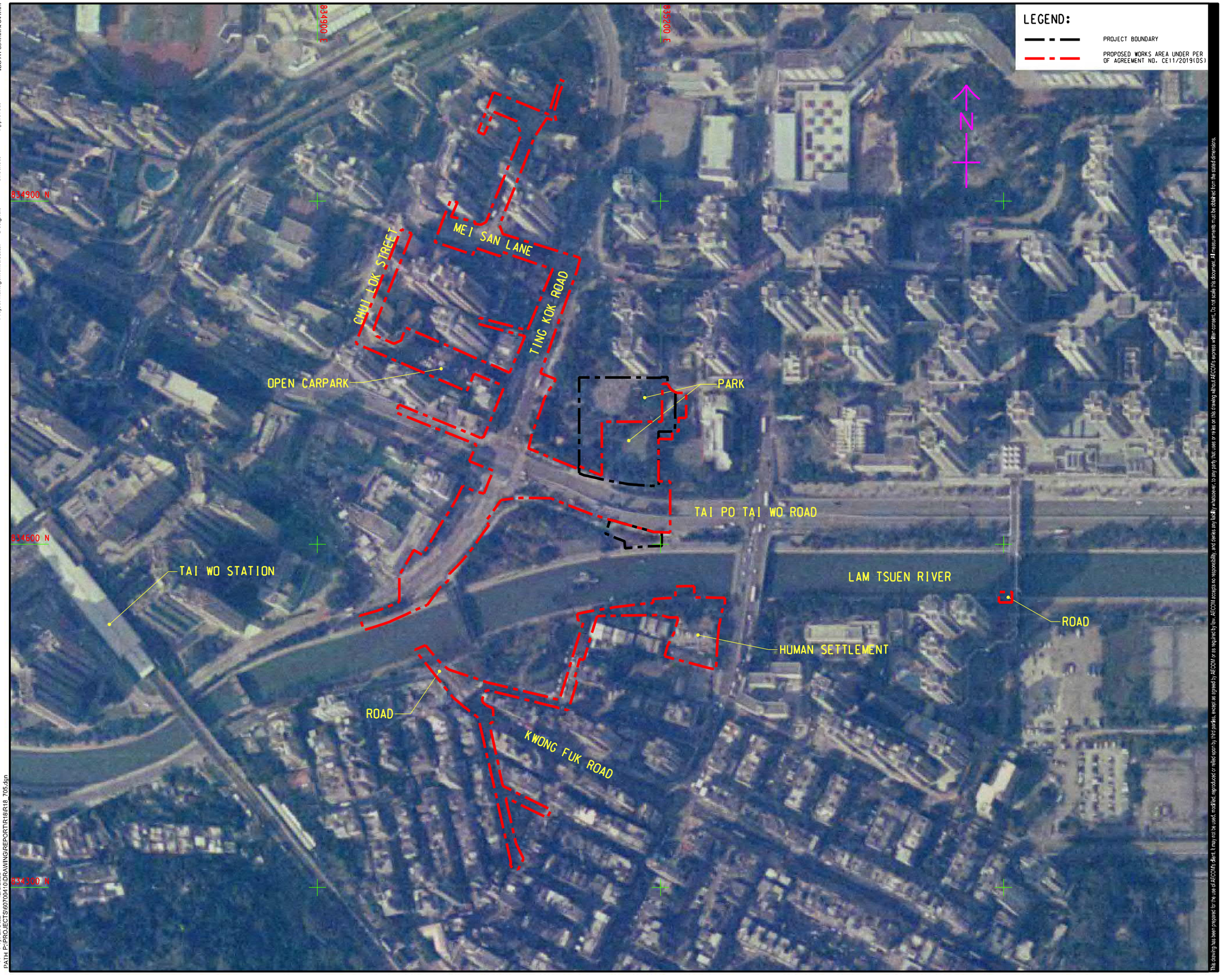
CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

AERIAL PHOTOGRAPH 1993

SHEET NUMBER
圖紙編號

60700410/R18/AP4



ISO A1 594mm x 841mm

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Checked:

Designer:

Project Management Initials:

Plot File by: LIANJ2 12/8/2023
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AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

AERIAL PHOTOGRAPH 2001

SHEET NUMBER
圖紙編號

60700410/R18/AP5

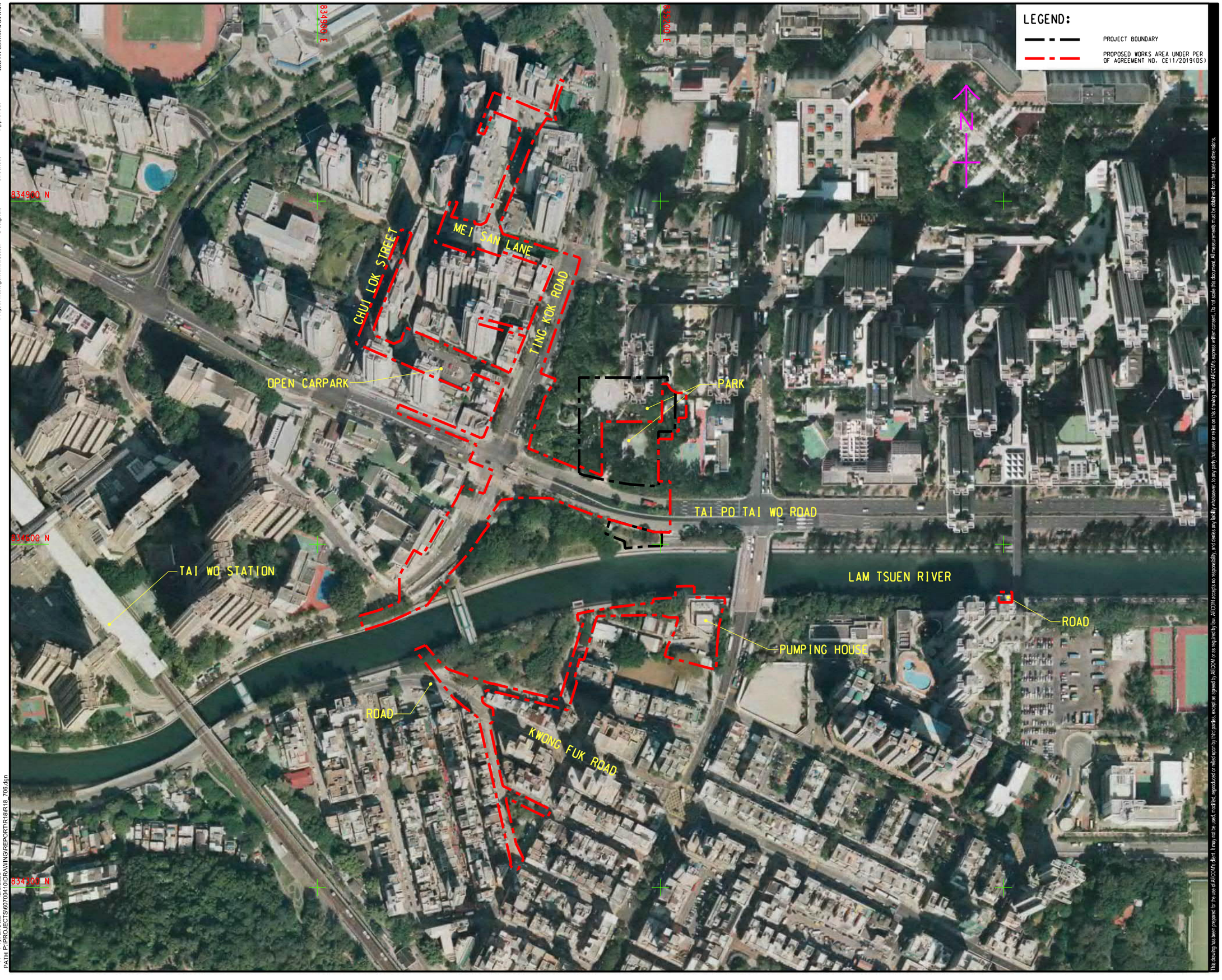
ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:



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AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
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I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

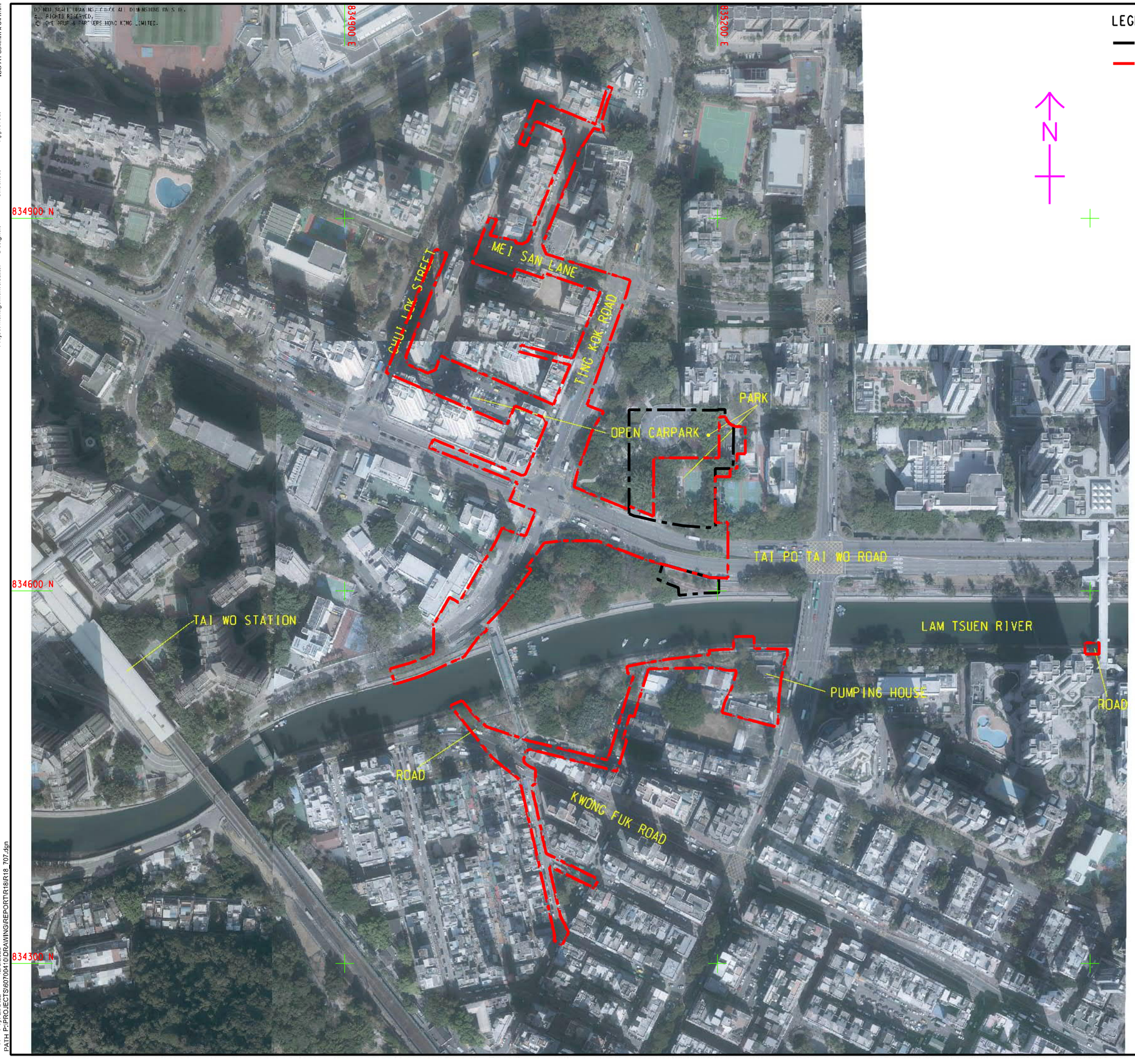
CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

AERIAL PHOTOGRAPH 2011

SHEET NUMBER
圖紙編號

60700410/R18/AP6



LEGEND:

PROJECT BOUNDARY

PROPOSED WORKS AREA UNDER PER OF AGREEMENT NO. CE11/2019(DS)

AECOM

PROJECT 項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT 業主

渠務署 Drainage Services Department

CONSULTANT 工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS 分判工程顧問公司

ISSUE/REVISION 修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS 階段

SCALE 比例 A1 1 : 1500

DIMENSION UNIT 尺寸單位 METRES

KEY PLAN 索引圖

PROJECT NO. 項目編號 60700410

CONTRACT NO. 合約編號 CE 57/2022 (DS)

SHEET TITLE 圖紙名稱

AERIAL PHOTOGRAPH 2021

SHEET NUMBER 圖紙編號

60700410/R18/AP7

ISO A1 594mm x 841mm
Approved:
Checked:
Designer:
Project Management Initials:

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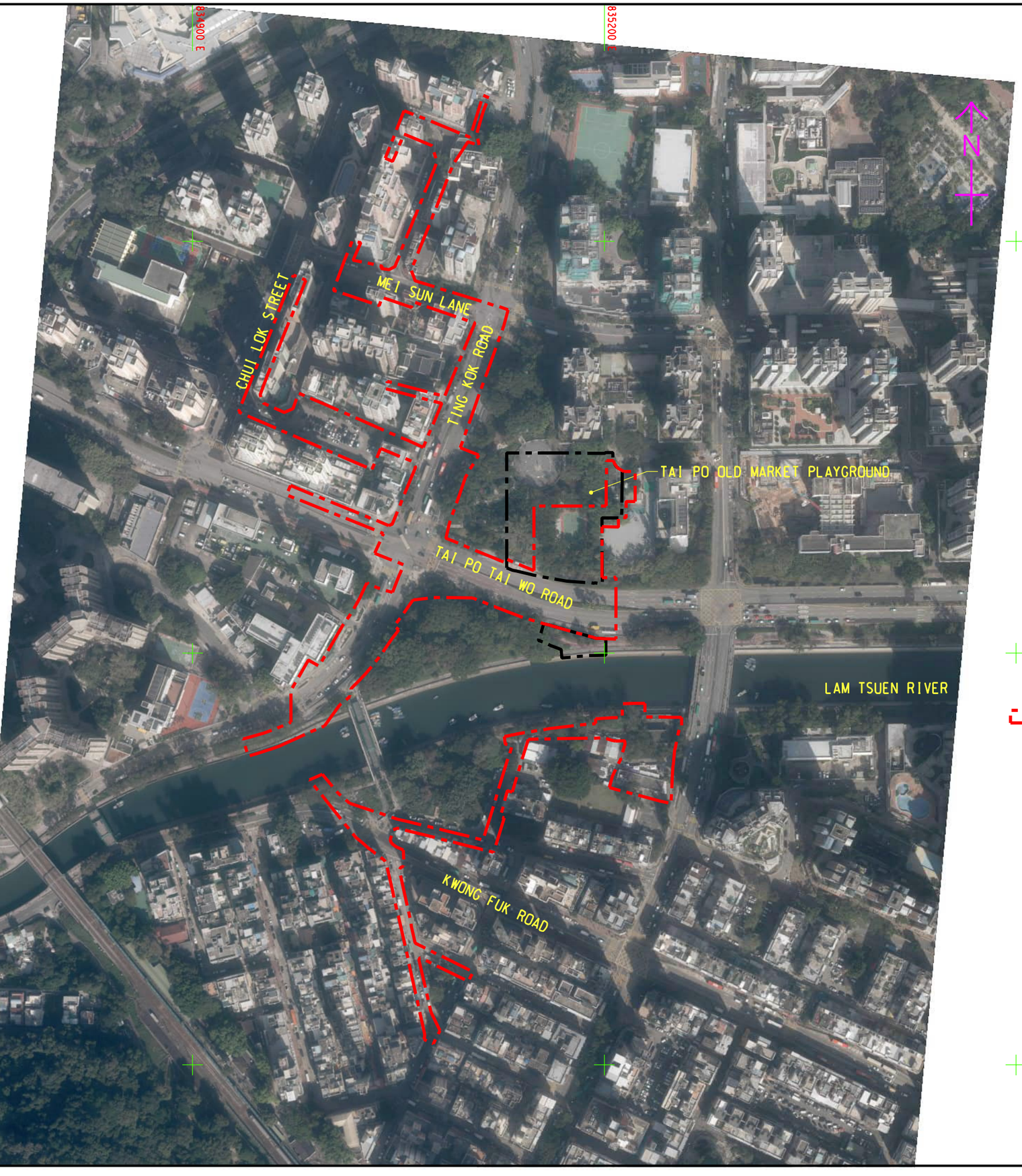
PATH: P:\PROJECTS\60700410\DRAWING\REPORT\R18\R18_707.dgn



AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 核核

STATUS
階段

SCALE 比例
A1 1 : 1500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱
AERIAL PHOTOGRAPH 2022

SHEET NUMBER
圖紙編號
60700410/R18/AP8

Appendix 11.3
Site Walkover Checklist

Annex C1

Site Walkover Checklist

Site Walkover Date: 30 August 2023

GENERAL SITE DETAILS

~~SITE OWNER~~/CLIENT Drainage Services Department

PROPERTY ADDRESS Tai Po Old Market Playground,
On Ho Lane, Tai Po

PERSON CONDUCTING THE QUESTIONNAIRE

NAME Ms. Chloe Ng

POSITION Project Environmental Consultant, AECOM

AUTHORIZED OWNER/CLIENT REPRESENTATIVE (IF APPLICABLE)

NAME Not Available

POSITION --

TELEPHONE --

SITE ACTIVITIES

Briefly describe activities carried out on site, including types of products/chemicals/materials handled. **Obtain a flow schematic if possible.**

Number of employees:	Full-time:	N/A
	Part-time:	N/A
	Temporary/Seasonal:	N/A
Maximum no. of people on site at any time:		N/A
Typical hours of operation:		N/A
Number of shifts:		N/A
Days per week:		N/A
Weeks per year:		N/A
Scheduled plant shut-down:		N/A

Detail the main sources of energy at the site:

Gas	~~Yes~~/No
Electricity	~~Yes~~/No
Coal	~~Yes~~/No
Oil	~~Yes~~/No
Other	~~Yes~~/No

SITE DESCRIPTION

This section is intended to gather information on site setting and environmental receptors on, adjacent or close to the site.

What is the total site area: Approx. 6,930 m^2

What area of the site is covered by buildings (%): 0 %

Please list all current and previous owners/occupiers if possible. Government land

Is a site plan available? If yes, please attach. Yes/~~No~~ Refer to **Figure 11.1**

Are there any other parties on site as tenants or sub-tenants? ~~Yes~~/No

If yes, identify those parties:

Describe surrounding land use (residential, industrial, rural, etc.) and identify neighbouring facilities and types of industry.

North: Eightland Gardens (Residential), On Ho Lane

South: Tai Po Tai Wo Road

East: Tai Po Old Market Public School

West: Park / garden in Tai Po Old Market Playground

Annex C1
Site Walkover Checklist

Describe the topography of the area (flat terrain, rolling hills, mountains, by a large body of water, vegetation, etc.).

Generally flat terrain with vegetation.

State the size and location of the nearest residential communities.

Eightland Gardens to the north of the Site, area of about 5240 m^2.

Are there any sensitive habitats nearby, such as nature reserves, parks, wetlands or sites of special scientific interest?

No.

Questionnaire with Existing/Previous Site Owner or Occupier

		Yes/No	Notes*
1.	What are the main activities/operations at the above address?	--	Vegetation, park / garden, playground, public toilet, basketball court and footpath.
2.	How long have you been occupying the site?	--	Information not available.
3.	Were you the first occupant on site? (If yes, what was the usage of the site prior to occupancy.)	N/A	
4.	Prior to your occupancy, who occupied the site?	N/A	Information not available.
5.	What were the main activities/operations during their occupancy?	N/A	Information not available.
6.	Have there been any major changes in operations carried out at the site in the last 10 years?	N/A	Information not available.
7.	Have any polluting activities been carried out in the vicinity of the site in the past?	N/A	Information not available.
8.	To the best of your knowledge, has the site ever been used as a petrol filling station/car service garage?	N/A	Based on the review of historical information and site observation, no petrol filing station / car service garage were noted within the site.
9.	Are there any boreholes/wells or natural springs either on the site or in the surrounding area?	N/A	Information not available.
10.	Do you have any registered hazardous installations as defined under relevant ordinances? (If yes, please provide details.)	N/A	No registered hazardous installations were observed on site.
11.	Are any chemicals used in your daily operations? (If yes, please provide details.)	N/A	No chemicals were observed on site.
•	Where do you store these chemicals?	--	
12.	Material inventory lists, including quantities and locations available? (If yes, how often are these inventories updated?)	N/A	Information not available.
13.	Has the facility produced a separate hazardous substance inventory?	N/A	No hazardous substances were observed on site.
14.	Have there ever been any incidents or accidents (e.g. spills, fires, injuries, etc.) involving any of these materials? (If yes, please provide details.)	N/A	Information not available.

* No interview was able to be conducted. Notes shown are based on observation from site walkover.

		Yes/No	Notes*
15.	How are materials received (e.g. rail, truck, etc.) and stored on site (e.g. drums, tanks, carboys, bags, silos, cisterns, vaults and cylinders)?	N/A	
16.	Do you have any underground storage tanks? (If yes, please provide details.)	N/A	Information not available.
	• How many underground storage tanks do you have on site?	N/A	
	• What are the tanks constructed of?	N/A	
	• What are the contents of these tanks?	N/A	
	• Are the pipelines above or below ground?	N/A	
	• If the pipelines are below ground, has any leak and integrity testing been performed?	N/A	
	• Have there been any spills associated with these tanks?	N/A	
17.	Are there any disused underground storage tanks?	N/A	
18.	Do you have regular check for any spillage and monitoring of chemicals handled? (If yes, please provide details.)	N/A	No chemicals were observed within the site.
19.	How are the wastes disposed of?	N/A	
20.	Have you ever received any notices of violation of environmental regulations or received public complaints? (If yes, please provide details.)	N/A	Information not available.
21.	Have any spills occurred on site? (If yes, please provide details.)	N/A	No traces of oil stains /stressed vegetation observed on site.
	• When did the spill occur?	N/A	
	• What were the substances spilled?	N/A	
	• What was the quantity of material spilled?	N/A	
	• Did you notify the relevant departments of the spill?	N/A	
	• What were the actions taken to clean up the spill?	N/A	
	• What were the areas affected?	N/A	
22.	Do you have any records of major renovation of your site or re-arrangement of underground utilities, pipe work/underground tanks (If yes, please provide details.)	N/A	Information not available.
23.	Have disused underground tanks been removed or otherwise secured (e.g. concrete, sand, etc.)?	N/A	Information not available.
24.	Are there any known contaminations on site? (If yes, please provide details.)	N/A	Information not available.
25.	Has the site ever been remediated? (If yes, please provide details.)	N/A	Information not available.

* No interview was able to be conducted. Notes shown are based on observation from site walkover.

Annex C1
Site Walkover Checklist

Observations

		Yes/No	Notes
1.	Are chemical storage areas provided with secondary containment (i.e. bund walls and floors)?	N/A	No chemicals or chemical storage areas were observed on site.
2.	What are the conditions of the bund walls and floors?	N/A	
3.	Are any surface water drains located near to drum storage and unloading areas?	No	No drum storage or unloading areas were observed on site.
4.	Are any solid or liquid waste (other than wastewater) generated at the site? (If yes, please provide details.)	No	
5.	Is there a storage site for the wastes?	No	
6.	Is there an on-site landfill?	No	
7.	Were any stressed vegetation noted on site during the site reconnaissance? (If yes, please indicate location and approximate size.)	No	
8.	Were any stained surfaces noted on-site during the site reconnaissance? (If yes, please provide details.)	No	
9.	Are there any potential off-site sources of contamination?	No	
10.	Does the site have any equipment which might contain polychlorinated biphenyls (PCBs)?	No	
11.	Are there any sumps, effluent pits, interceptors or lagoons on site?	No	
12.	Any noticeable odours during site walkover?	No	
13.	Are any of the following chemicals used on site: fuels, lubricating oils, hydraulic fluids, cleaning solvents, used chemical solutions, acids, anti-corrosive paints, thinners, coal, ash, oily tanks and bilge sludge, metal wastes, wood preservatives and polyurethane foam?	No	

Appendix 11.4

Information from Government Departments

Correspondances updated.

AECOM
12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong
香港新界沙田鄉事會路 138 號
新城市中央廣場第 2 座 12 樓
www.aecom.com

+852 3922 9000 tel
+852 3922 9797 fax

Our Ref.: AYFW:etly:60700410/08.10-0058 (2023006127W)

17 August 2023

By Hand

Environmental Protection Department
Environmental Compliance Division
Regional Office (North)
10/F., Sha Tin Government Offices,
No.1 Sheung Wo Che Road, Sha Tin,
New Territories

Dear Sir/Madam,

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po - Design and Construction

Request for Information of Chemical Waste Producer and Chemical Spillage Accident

We are the Consultant commissioned by Drainage Project Division of Drainage Services Department (DSD/DP) for the captioned Agreement. The memo ref. (00XVAL) in DP 8/4183CD/CE5722/1 dated 30 January 2023 issued by DSD/DP is enclosed for your reference.
As part of the land contamination assessment and following the *Practice Guide for Investigation and Remediation of Contaminated Land* issued by EPD, we have to collect historical information regarding the past and present activities of the Concerned Area as attached in the Site Location Plan. In order to facilitate our assessment, we would like to request for the following information regarding the Concerned Area:

1. Current and past (as early as the records are available) registered Chemical Waste Producer(s) within the Concerned Area (preferably with the registration date, status (moved out or active), nature and quantity of the chemical waste); and
2. Reported accidents of spillage / leakage of chemicals within the Concerned Area.

We would be grateful if you could forward the requested information to us by **31 August 2023**.

Should you have any queries, please feel free to contact our Chloe Ng at 3856 5662 (chloe.ng@aecom.com) or Howie Law at 3729 3227 (Howie.Law@aecom.com).

Thank you very much for your kind assistance.

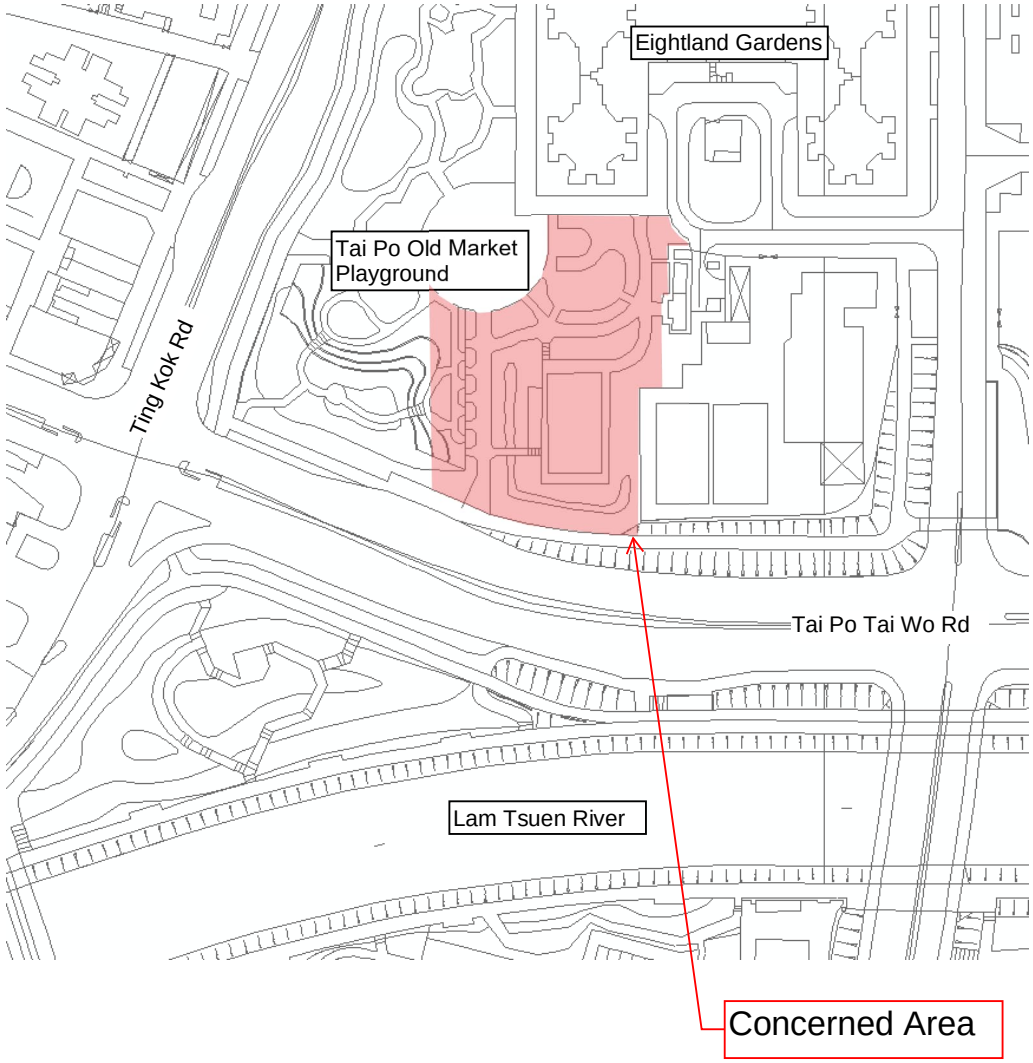
Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.

Alex Wu
Executive Director
Water, Hong Kong

Encl.

cc DSD/DP – Attn: Ms. YUEN Pui Shan, Priscilla (w/e, By Hand & Email)

Site Location Plan



By Fax

MEMO

From	CE/DP, DSD	*To*	Distribution
Ref.	(00XVAL) *in* DP 8/4183CD/CE5722/1	*(Attn.:*	*)*
Tel. No.	2594 7347	*Your Ref.*	( ) *in*
Fax. No.	3104 6420	*Dated*	*Fax. No.*
Date	30 January 2023	*Total Pages*	3 + Encl

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po – Design and Construction

Notification of Award of Consultancy

I am pleased to inform you that AECOM Asia Company Limited (AECOM) has been appointed by this Department to undertake the captioned consultancy Agreement which commenced on 20 January 2023 for completion in 2033.

2. The scope of the Project comprises construction of stormwater pumping scheme in Tai Po Old Market; expansion of the existing Tai Po Market Floodwater Pumping Station; drainage upgrading works in Tai Mei Tuk, Ng Uk Tsuen, Ting Kok, Po Sam Pai, San Uk Pai, Ping Long, Che Ha, Sai Sha Road; and river training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Ma Po Mei, Sha Pa and She Shan River. The layout plan of the project is enclosed for reference.

3. During the period of the above Agreement, AECOM may approach your office to request for information in relation to the Agreement. I should be grateful if you would offer your kind assistance to them such that the Agreement could be carried out successfully. Should you have any enquiry, please feel free to contact the undersigned at 2594 7347. Thank you for your kind assistance.

(C Y YIP)
for Chief Engineer/Drainage Projects
Drainage Services Department

Encl

DRAINAGE PROJECTS
SEWERAGE PROJECTS
CAVERN PROJECTS
DIVISION, DSD
31 JAN 2023
FAXED

DRAINAGE PROJECTS
SEWERAGE PROJECTS
CAVERN PROJECTS
DIVISION, DSD
31 JAN 2023
DESPATCHED

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138 Shatin Rural Committee Road,
Shatin, Hong Kong
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新城市中央廣場第 2 座 12 樓
www.aecom.com

+852 3922 9000 tel
+852 3922 9797 fax

Our Ref.: AYFW:etly:60700410/08.10-0057 (2023006126W)

17 August 2023

By Hand

Fire Services Department
Licensing and Certification Command
5/F, South Wing, Fire Services HQ Building,
1 Hong Chong Road, Tsim Sha Tsui East,
Kowloon.

Dear Sir/Madam,

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po - Design and Construction

Request for Information about Dangerous Goods Store and Incidents Records

We are the Consultant commissioned by Drainage Project Division of Drainage Services Department (DSD/DP) for the captioned Agreement. The memo ref. (00XVAL) in DP 8/4183CD/CE5722/1 dated 30 January 2023 issued by DSD/DP is enclosed for your reference.

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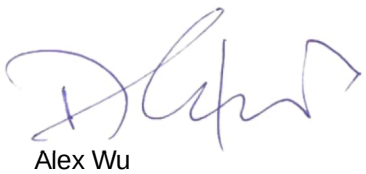
1. Records of current and past (as early as the records are available) registration of Dangerous Goods storage (with the type of dangerous goods, storage method, quantity, license no., date of issue, and storage location) within the Concerned Area;
2. Any records of reported accidents of spillage / leakage of dangerous goods stored within the Concerned Area; and
3. Any records of fire incidents within the Concerned Area.

We would be grateful if you could forward the requested information to us by **31 August 2023**.

Should you have any queries, please feel free to contact our Chloe Ng at 3856 5662 (chloe.ng@aecom.com) or Howie Law at 3729 3227 (Howie.Law@aecom.com).

Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.

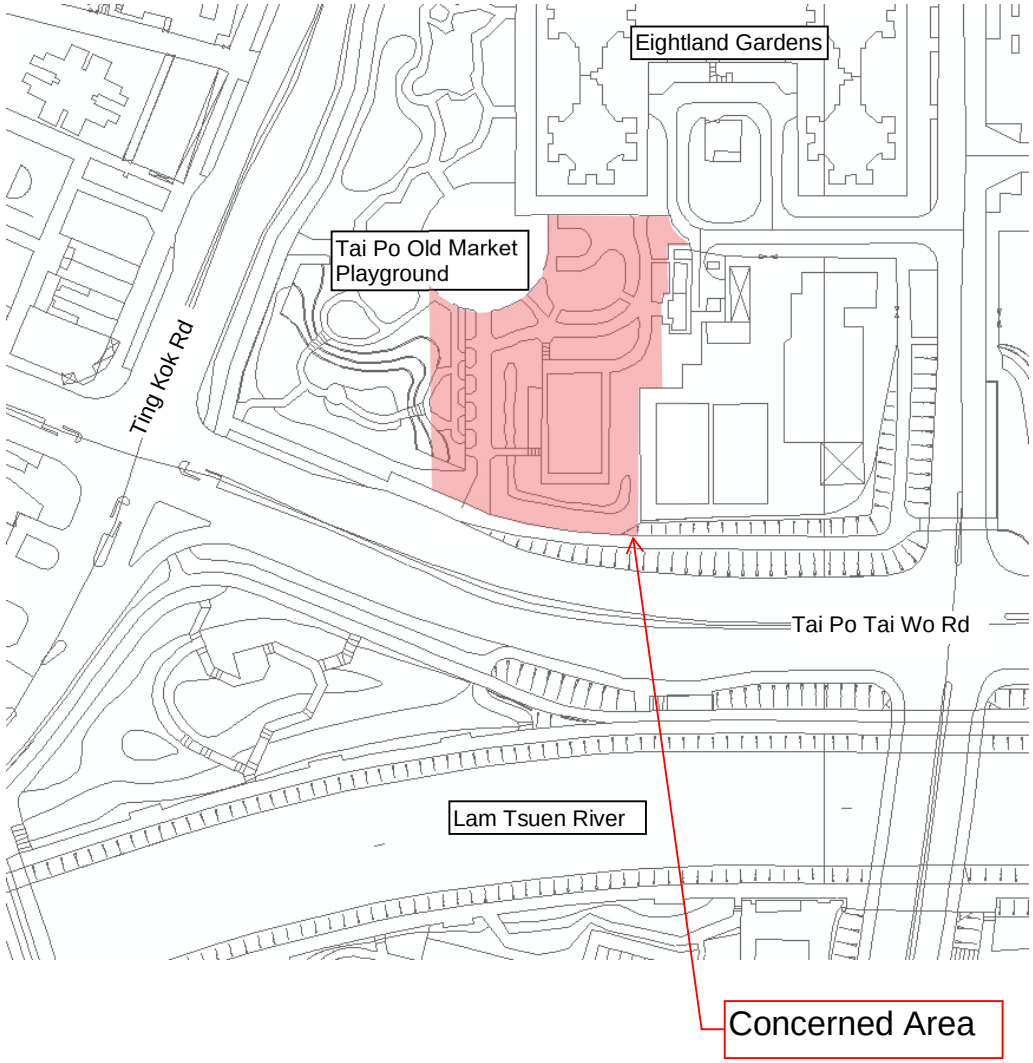


Alex Wu
Executive Director
Water, Hong Kong

Encl.

cc DSD/DP – Attn: Ms. YUEN Pui Shan, Priscilla (w/e, By Hand & Email)

Site Location Plan



By Fax

MEMO

From	CE/DP, DSD	*To*	Distribution
Ref.	(00XVAL) *in* DP 8/4183CD/CE5722/1	*(Attn.:*	*)*
Tel. No.	2594 7347	*Your Ref.*	( ) *in*
Fax. No.	3104 6420	*Dated*	*Fax. No.*
Date	30 January 2023	*Total Pages*	3 + Encl

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po – Design and Construction

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2. The scope of the Project comprises construction of stormwater pumping scheme in Tai Po Old Market; expansion of the existing Tai Po Market Floodwater Pumping Station; drainage upgrading works in Tai Mei Tuk, Ng Uk Tsuen, Ting Kok, Po Sam Pai, San Uk Pai, Ping Long, Che Ha, Sai Sha Road; and river training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Ma Po Mei, Sha Pa and She Shan River. The layout plan of the project is enclosed for reference.

3. During the period of the above Agreement, AECOM may approach your office to request for information in relation to the Agreement. I should be grateful if you would offer your kind assistance to them such that the Agreement could be carried out successfully. Should you have any enquiry, please feel free to contact the undersigned at 2594 7347. Thank you for your kind assistance.

(C Y YIP)
for Chief Engineer/Drainage Projects
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Encl

DRAINAGE PROJECTS
SEWERAGE PROJECTS
CAVERN PROJECTS
DIVISION, DSD
31 JAN 2023
FAXED

DRAINAGE PROJECTS
SEWERAGE PROJECTS
CAVERN PROJECTS
DIVISION, DSD
31 JAN 2023
DESPATCHED

本署檔案
OUR REF:( ) in EP550/W2/4
來函檔案
YOUR REF: AYFW:etly:60700410/
08.10-0058(2023006127W)
電　　話
TEL. NO.: 2158 5801
圖文傳真
FAX NO.: 2650 6033
網　　址
HOMEPAGE: http://www.epd.gov.hk/

Environmental Protection Department
Environmental Compliance Division
Regional Office (North)
10/F., Shatin Governmental Offices,
1 Sheung Wo Che Road,
Sha Tin, New Territories,
Hong Kong

環境保護署
環保法規管理科
區域辦事處 (北)
香港新界沙田
上禾輋路一號
沙田政府合署 10 樓

By Email: alex.yf.wu@aecom.com

5 September 2023

AECOM
12/F., Grand Central Plaza Tower 2,
138 Shatin Rural Committee Road, Shatin, New Territories
(Attn.: Mr. Alex WU)

Dear Mr. WU,

Agreement No. CE 57/2022(DS)
Drainage Improvement Works in Tai Po – Design and Construction
Re: Request for Information of Chemical Waste Producer and Chemical Spillage Accident

I refer to your letter dated 17August 2023 and your follow up email on 5 September 2023 on the captioned subject.

According to the records in this office, there are no record of chemical spillage accident and submission relating to land contamination assessment at the subject site in the past 3 years.

As regards registered Chemical Waste Producer(s) at the location concerned, a registry of chemical waste producers is available in the Territorial Control Office of this department. Please contact our Chief Environmental Protection Inspector (Territorial Control)5, Mr. TSANG Ching Kau at 2835 1017 for making an appointment to view the records.

While we have made a reasonable effort to ensure the completeness and accuracy of the information provided, you should comprehend that the information is provided as is and EPD is not responsible or liable for any claim, loss or damage resulting from the use of this information.

Yours sincerely,

(Maverick AU)
Regional Office (North)
for Director of Environmental Protection

c.c. TCO/EPD (Attn.: Mr. TSANG Ching Kau) Fax: 2305 0453

AECOM
12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong
香港新界沙田鄉事會路 138 號
新城市中央廣場第 2 座 12 樓
www.aecom.com

+852 3922 9000 tel
+852 3922 9797 fax

Our Ref.: AYFW:etly:60700410/08.10-0101 (2024001141W)

9 February 2024

By Hand & Email

Environmental Protection Department
Environmental Compliance Division
Regional Office (North), Tai Po
10/F., Sha Tin Government Offices,
No.1 Sheung Wo Che Road, Sha Tin,
New Territories

Attn: Mr. Au Chi Kien, Maverick (Env Protection Offr (Regional N)13)

Dear Sir,

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po – Design and Construction

Request for Information on Chemical Waste Producer and Chemical Spillage Accident – Tai Po Old Market

We write further to our previous letter ref. AYFW:etly:60700410/08.10-0058 (2023006127W) dated 17 August 2023 regarding the request for information on chemical waste producer and chemical spillage accident, and would like to collect additional historical information regarding the past and present acitivites to facilitate our land contamination assessment.

We would like to request for the following information regarding the Concerned Area, which shown in the Site Location Plan:

1) Current and past (as early as the records are available) registered Chemical Waste Producer(s) within the Concerned Area (preferably with the registration date, status (moved out or active), nature and quantity of the chemical waste); and
2) Reported accidents of spillage / leakage of chemicals within the Concerned Area.

Due to the extremely tight schedule, we would be grateful if you could forward the requested information to us by **19 February 2024**. Should you have any queries, please feel free to contact our Chloe Ng at 3856 5662 (chloe.ng@aecom.com) or Karen Mok at 6180 6058 (karen.mok1@aecom.com).

Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.

Alex Wu
Executive Director
Water, Hong Kong

Encl.

cc DSD/DP – Attn: Ms. YUEN Pui Shan, Priscilla (w/e, By Hand & Email)

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

834500_E

835000_E

835500_E

835000_N

834500_N

LEGEND:

concerned area

N

SERENITY PARK

TAI YUEN ESTATE

LAM TSUEN RIVER

TAI PO MARKET

60700410/R13/401

60700410/R13/402

60700410/R13/403

60700410/R13/404

60700410/R13/431

60700410/R13/432

60700410/R13/433

60700410/R13/434

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分項工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE
比例

A1 1 : 2500

DIMENSION UNIT
尺寸單位

METRES

KEY PLAN
索引圖

PROJECT NO.
項目編號

60700410

CONTRACT NO.
合同編號

CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

KEY PLAN

SHEET NUMBER
圖紙編號

60700410/R13/400

Plot File by: $USER$ $DATE$
PATH: $FILES

本署檔案
OUR REF:( ) in EP550/W2/4
來函檔案
YOUR REF: AYFW:etly:60700410/
08.10-0101(2024001141W)
電　　話
TEL. NO.: 2158 5801
圖文傳真
FAX NO.: 2650 6033
網　　址
HOMEPAGE: http://www.epd.gov.hk/

Environmental Protection Department
Environmental Compliance Division
Regional Office (North)
10/F., Shatin Governmental Offices,
1 Sheung Wo Che Road,
Sha Tin, New Territories,
Hong Kong

環境保護署
環保法規管理科
區域辦事處 (北)
香港新界沙田
上禾輋路一號
沙田政府合署 10 樓

By Email: alex.yf.wu@aecom.com
karen.mok1@aecom.com

23 February 2024

AECOM
12/F., Grand Central Plaza Tower 2,
138 Shatin Rural Committee Road, Shatin, New Territories
(Attn.: Mr. Alex WU)

Dear Mr. WU,

Agreement No. CE 57/2022(DS)
Drainage Improvement Works in Tai Po – Design and Construction
Re: Request for Information of Chemical Waste Producer and Chemical Spillage Accident – Tai Po Old Market

I refer to your letter dated 9 February 2024 and your follow up email on 20 February 2024 on the captioned subject.

According to the records in this office, there are no record of chemical spillage accident and submission relating to land contamination assessment at the subject site in the past 3 years.

As regards registered Chemical Waste Producer(s) at the location concerned, a registry of chemical waste producers is available in the Territorial Control Office of this department. Please contact our Chief Environmental Protection Inspector (Territorial Control)5, Mr. TSANG Ching Kau at 2835 1017 for making an appointment to view the records. Please also find the attached list (Annex 1) within the email document for your reference.

While we have made a reasonable effort to ensure the completeness and accuracy of the information provided, you should comprehend that the information is provided as is and EPD is not responsible or liable for any claim, loss or damage resulting from the use of this information.

Yours sincerely,

(Maverick AU)
Regional Office (North)
for Director of Environmental Protection

c.c. TCO/EPD (Attn.: Mr. TSANG Ching Kau) Fax: 2305 0453

Annex 1

Active Registered Chemical Waste Producer

No.	Licensee Name (Eng)	Premises Address	Nature of Business	Major Chemical Waste	Licensee Name (Chi)	English name of premises	Chinese name of premises
1	Sun-Tech Green Solutions Limited	Shop A, G/F Winnye Tower, 28 Kau Hui Chik Street, Tai Po, N.T.	Church	Spent fluorescent lamp	領域環保發展有限公司	Tsui Ping Alliance Church	
2	Shun King Home For The Aged	Shun King Home For The Aged 22-28 Kau Hui Chik Street Tai Po	Aged home service	Expired Drugs and Pharmaceutical Substances	順景護理中心	SHUN KING HOME FOR THE AGED	順景護理中心
3	Conrad Care Home (Tai Po) Limited	1/F-2/F, Shun King Building, 22-28 Kau Hui Chik Street, Tai Po, NT	Nursing for the Aged	Surplus or Expired Pharmaceuticals	康璟護老院（大埔）有限公司	Conrad Care Home (Tai Po) Limited	康璟護老院（大埔）有限公司
4	Oi Kwan Care For The Aged Home Limited	1-3/F, Mei Sun Building, 4-20 Kau Hui Chik Street, Tai Po	Care for the Aged Home	Surplus or Expired Pharmaceuticals		OI KWAN CARE FOR THE AGED HOME LIMITED	
5	YEUNG LEE MOTOR SERVICE CO.	G/F SHOP 34 COMMERCIAL COMPLEX TAI WO CENTRE TAI PO NT	MOTOR SERVICE AND PARTS SUPPLY	BATTERY		YEUNG LEE MOTOR SERVICE CO.	
6	Cheung Kee Fung Cheung Construction Co. Ltd.	No. 3 Mei Sun Lane, Tai Po, N.T.	Demolition Works	Spent lubricating oil. spent battery cell & spent diesel	祥記馮祥建築有限公司	Cheung Kee Fung Cheung Construction Co., Ltd.	祥記馮祥建築有限公司
7	JDH PHARMACEUTICAL LTD	10/F FLAT A & B TAI PING IND PARK BLK 1 DD NO. 11 LOT NO.1687,TING KOK RD TAI PO NT	IMPORT,EXPORT & WHOLESALE OF PHARMACEUTICAL PRODUCTS	PESTICIDES & PHARMACEUTICAL PRODUCTS INCLUDING POISONS,DANGEROUS DRUGS & ANTIBIOTICS		JDH PHARMACEUTICAL LTD	
8	SING KUNG CHO TONG CLINIC	G/F 21-23 TING KOK ROAD TAI PO NT	MEDICAL CLINIC	X-RAY DEVELOPER & FIXER CHEMICAL		SING KUNG CHO TONG CLINIC	
9	Hang Fung Technical (Trading) Eng. Limited	2/F, Ting Kok Building, 17 Ting Kok Road, Tai Po, NT	Educational Institutions	Spent fluorescent lamps	恆豐技術(貿易)工程有限公司	The Chinese Full Gospel Church Tai Po	基督教中華完備救恩會-大埔堂
10	Wise Trend Engineering Limited	No.3 Mei Sun Lane,Tai Po, New Territories	Design & Build Engineering	Spent mineral Oil, spent lubrication oil. mixing residue containing pesticides	駿慧工程有限公司	Wise Trend Engineering Limited	
11	Hop Lee Builders Company Limited	Tai Po Old Market Public School, 10 On Cheung Road, Tai Po, NT	Construction	Surplus paint	合利營造有限公司	Hop Lee Builders Company Limited	合利營造有限公司
12	Thorn Security (Hong Kong) Limited	G/F, Tai Po Government Offices, 1 Ting Kok Road, Tai Po, N.T.(Contract No. TD34/2016)	Security / Fire Protection System	Spent battery	科藝防火保安工程香港有限公司	Thorn Security (Hong Kong) Limited	科藝防火保安工程香港有限公司
13	FIRE SERVICES DEPARTMENT	TAI PO AMBULANCE DEPOT 21 TAI WO ROAD TAI PO NT	AMBULANCE DEPOT	RAGS AND CLOTH PIECES SOAKED WITH WASTE LUBRICATING OIL AND WASTE FUEL		FIRE SERVICES DEPARTMENT	
14	FIRE SERVICES DEPARTMENT	3 TING KOK ROAD TAI PO NT	FIRE STATION	RAGS AND CLOTH PIECES SOAKED WITH WASTE LUBRICATING OIL AND WASTE FUEL		FIRE SERVICES DEPARTMENT	
15	Labour Department	Tai Po Government Offices, Tai Po Government Offices, 1 Ting Kok Road, Tai Po, NT	Civil Servant	Spent Solvent and Acid		Labour Department	
16	OCCUPATIONAL SAFETY-OPERATIONS DIV., LABOUR DEPT	3/F., TAI PO GOVERNMENT OFFICES, TING KOK ROAD, TAI PO, NT	CIVIL SERVICE	SOLVENT, ACID		OCCUPATIONAL SAFETY-OPERATIONS DIV., LABOUR DEPT	
17	GOVERNMENT PROPERTY AGENCY			SPENT FLUORESCENT TUBES AND BULBS		TAI PO GOVERNMENT OFFICES	

Inactive Registered Chemical Waste Producer

18	IMMIGRATION DEPARTMENT	3/F TAI PO GOVT OFFICES BLDG 1 TING KOK RD TAI PO NT	IMMIGRATION	DEVELOPER AND FIXER		IMMD-ROP TAI PO OFFICE	
19	BLD-REPROGRAPHIC SECTIION, SURVEY & MAPPING OFFICE	1/F, RM 122, SMO/TAI PO TAI PO GOV OFFICES BLDG TING KOK RD TAI PO NT	PRINTING OF MAPS & PHOTOGRAPHS	DEVELOPER, FIXER & AMMONIA WATER		BLD-REPROGRAHIC SECTION, SURVEY & MAPPING OFFICE	

AECOM
12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong
香港新界沙田鄉事會路 138 號
新城市中央廣場第 2 座 12 樓
www.aecom.com

+852 3922 9000 tel
+852 3922 9797 fax

Our Ref.: AYFW:etly:60700410/08.10-0057 (2023006126W)

17 August 2023

By Hand

Fire Services Department
Licensing and Certification Command
5/F, South Wing, Fire Services HQ Building,
1 Hong Chong Road, Tsim Sha Tsui East,
Kowloon.

Dear Sir/Madam,

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po - Design and Construction

Request for Information about Dangerous Goods Store and Incidents Records

We are the Consultant commissioned by Drainage Project Division of Drainage Services Department (DSD/DP) for the captioned Agreement. The memo ref. (00XVAL) in DP 8/4183CD/CE5722/1 dated 30 January 2023 issued by DSD/DP is enclosed for your reference.

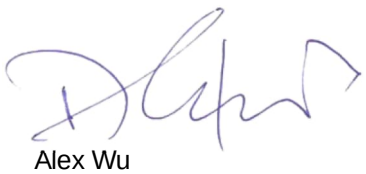
As part of the land contamination assessment and following the *Practice Guide for Investigation and Remediation of Contaminated Land* issued by EPD, we have to collect historical information regarding the past and present activities of the Concerned Area as attached in the Site Location Plan. In order to facilitate our assessment, We would like to request for the following information regarding the Concerned Area:

1. Records of current and past (as early as the records are available) registration of Dangerous Goods storage (with the type of dangerous goods, storage method, quantity, license no., date of issue, and storage location) within the Concerned Area;
2. Any records of reported accidents of spillage / leakage of dangerous goods stored within the Concerned Area; and
3. Any records of fire incidents within the Concerned Area.

We would be grateful if you could forward the requested information to us by **31 August 2023**.

Should you have any queries, please feel free to contact our Chloe Ng at 3856 5662 (chloe.ng@aecom.com) or Howie Law at 3729 3227 (Howie.Law@aecom.com).

Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.

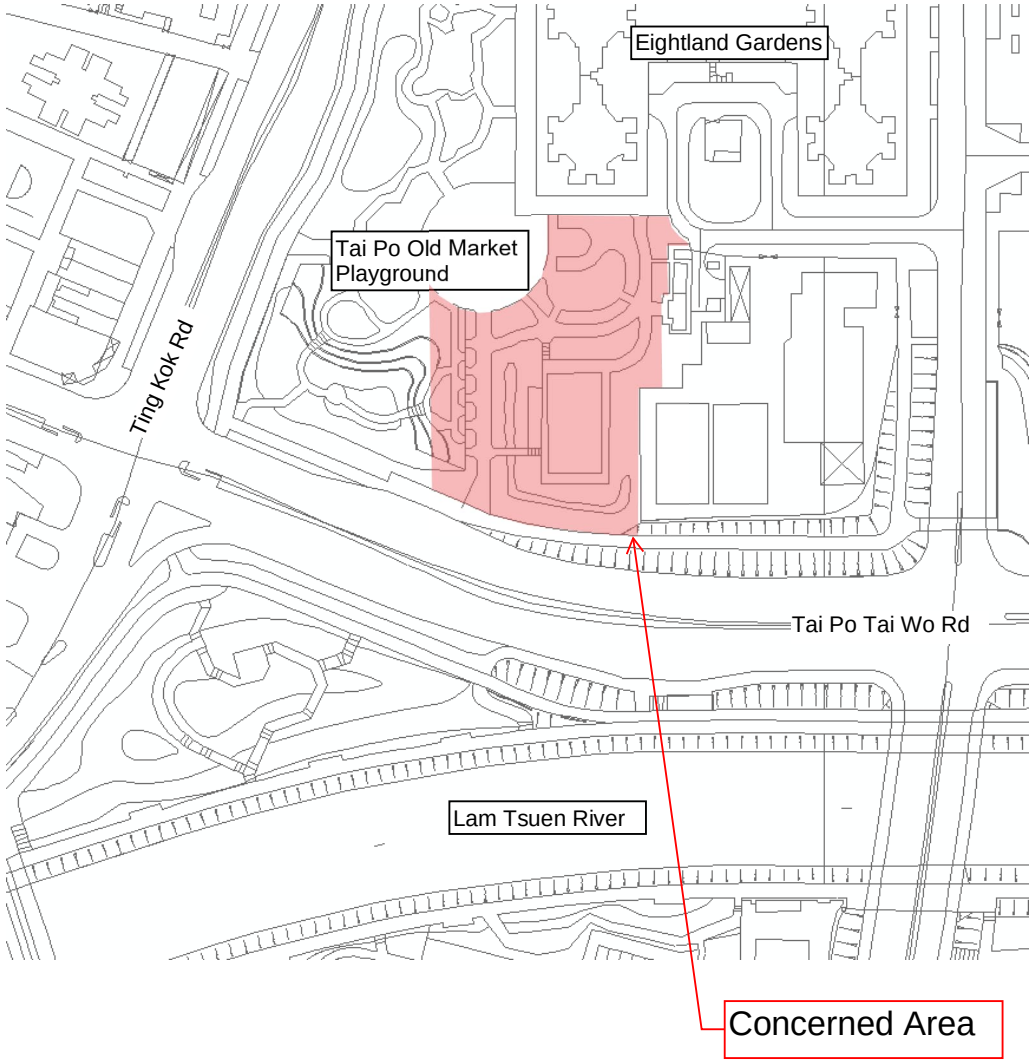


Alex Wu
Executive Director
Water, Hong Kong

Encl.

cc DSD/DP – Attn: Ms. YUEN Pui Shan, Priscilla (w/e, By Hand & Email)

Site Location Plan



By Fax

MEMO

From	CE/DP, DSD	*To*	Distribution
Ref.	(00XVAL) *in* DP 8/4183CD/CE5722/1	*(Attn.:*	*)*
Tel. No.	2594 7347	*Your Ref.*	( ) *in*
Fax. No.	3104 6420	*Dated*	*Fax. No.*
Date	30 January 2023	*Total Pages*	3 + Encl

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po – Design and Construction

Notification of Award of Consultancy

I am pleased to inform you that AECOM Asia Company Limited (AECOM) has been appointed by this Department to undertake the captioned consultancy Agreement which commenced on 20 January 2023 for completion in 2033.

2. The scope of the Project comprises construction of stormwater pumping scheme in Tai Po Old Market; expansion of the existing Tai Po Market Floodwater Pumping Station; drainage upgrading works in Tai Mei Tuk, Ng Uk Tsuen, Ting Kok, Po Sam Pai, San Uk Pai, Ping Long, Che Ha, Sai Sha Road; and river training works at Tai Mei Tuk, Long Ha, Wong Yue Tan, Ma Po Mei, Sha Pa and She Shan River. The layout plan of the project is enclosed for reference.

3. During the period of the above Agreement, AECOM may approach your office to request for information in relation to the Agreement. I should be grateful if you would offer your kind assistance to them such that the Agreement could be carried out successfully. Should you have any enquiry, please feel free to contact the undersigned at 2594 7347. Thank you for your kind assistance.

(C Y YIP)
for Chief Engineer/Drainage Projects
Drainage Services Department

Encl

DRAINAGE PROJECTS
SEWERAGE PROJECTS
CAVERN PROJECTS
DIVISION, DSD
31 JAN 2023
FAXED

DRAINAGE PROJECTS
SEWERAGE PROJECTS
CAVERN PROJECTS
DIVISION, DSD
31 JAN 2023
DESPATCHED

消 防 處
香港九龍尖沙咀東部康莊道 1 號
消防總部大廈

FIRE SERVICES DEPARTMENT
FIRE SERVICES HEADQUARTERS BUILDING,
No.1 Hong Chong Road,
Tsim Sha Tsui East, Kowloon,
Hong Kong.

本處檔號 **OUR REF.**	:	(186) in FSD GR 6-5/4 R Pt. 48
來函檔號 **YOUR REF.**	:	AYFW:etly:60700410/08.10-0057 (2023006126W)
電子郵件 **E-mail**	:	hkfsdenq@hkfsd.gov.hk
圖文傳真 **FAX NO.**	:	2739 5879
電　　話 **TEL NO.**	:	2733 7741

26 September 2023

AECOM Asia Co. Ltd
12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong.
(Attn: Mr. Alex LI, Executive Director)

Dear Mr. LI,

Agreement No. CE 57/2022 (DS)
Drainage Inprovement Works in Tai Po - Design and Construction
Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 17.8.2023 regarding the captioned request and reply below in response to your questions:-

Please be advised that neither records of dangerous goods license, fire incidents nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

If you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(NG Wing-chit)
for Director of Fire Services

AECOM
12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong
香港新界沙田鄉事會路 138 號
新城市中央廣場第 2 座 12 樓
www.aecom.com

+852 3922 9000 tel
+852 3922 9797 fax

Our Ref.: AYFW:etly:60700410/08.10-0057 (2023006126W)

17 August 2023

By Hand

Fire Services Department
Licensing and Certification Command
5/F, South Wing, Fire Services HQ Building,
1 Hong Chong Road, Tsim Sha Tsui East,
Kowloon.

Dear Sir/Madam,

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po - Design and Construction

Request for Information about Dangerous Goods Store and Incidents Records

We are the Consultant commissioned by Drainage Project Division of Drainage Services Department (DSD/DP) for the captioned Agreement. The memo ref. (00XVAL) in DP 8/4183CD/CE5722/1 dated 30 January 2023 issued by DSD/DP is enclosed for your reference.

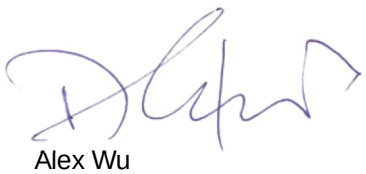
As part of the land contamination assessment and following the *Practice Guide for Investigation and Remediation of Contaminated Land* issued by EPD, we have to collect historical information regarding the past and present activities of the Concerned Area as attached in the Site Location Plan. In order to facilitate our assessment, We would like to request for the following information regarding the Concerned Area:

1. Records of current and past (as early as the records are available) registration of Dangerous Goods storage (with the type of dangerous goods, storage method, quantity, license no., date of issue, and storage location) within the Concerned Area;
2. Any records of reported accidents of spillage / leakage of dangerous goods stored within the Concerned Area; and
3. Any records of fire incidents within the Concerned Area.

We would be grateful if you could forward the requested information to us by **31 August 2023**.

Should you have any queries, please feel free to contact our Chloe Ng at 3856 5662 (chloe.ng@aecom.com) or Howie Law at 3729 3227 (Howie.Law@aecom.com).

Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.

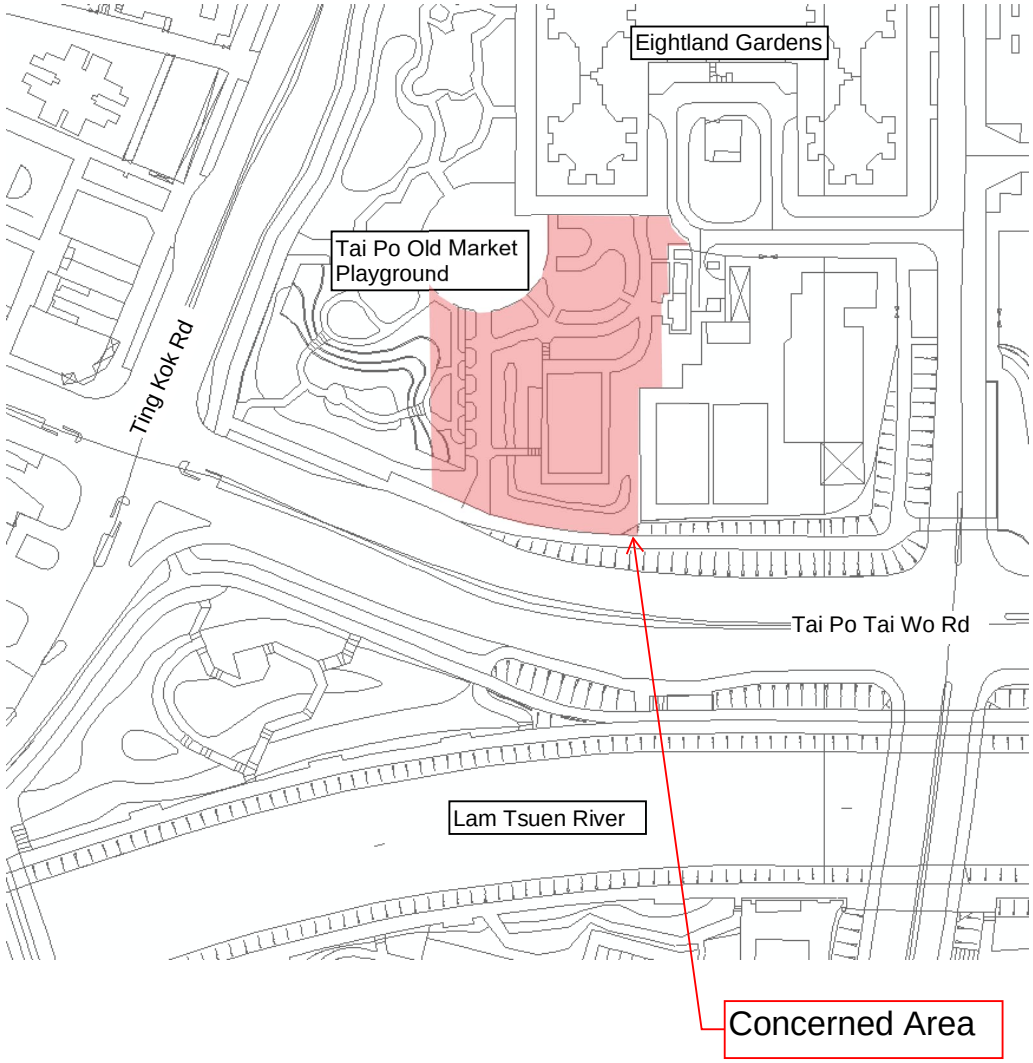


Alex Wu
Executive Director
Water, Hong Kong

Encl.

cc DSD/DP – Attn: Ms. YUEN Pui Shan, Priscilla (w/e, By Hand & Email)

Site Location Plan



消 防 處
香港九龍尖沙咀東部康莊道 1 號
消防總部大廈

FIRE SERVICES DEPARTMENT
FIRE SERVICES HEADQUARTERS BUILDING,
No.1 Hong Chong Road,
Tsim Sha Tsui East, Kowloon,
Hong Kong.

本處檔號 **OUR REF.**	:	(186) in FSD GR 6-5/4 R Pt. 48
來函檔號 **YOUR REF.**	:	AYFW:etly:60700410/08.10-0057 (2023006126W)
電子郵件 **E-mail**	:	hkfsdenq@hkfsd.gov.hk
圖文傳真 **FAX NO.**	:	2739 5879
電　　話 **TEL NO.**	:	2733 7741

26 September 2023

AECOM Asia Co. Ltd
12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong.
(Attn: Mr. Alex LI, Executive Director)

Dear Mr. LI,

Agreement No. CE 57/2022 (DS)
Drainage Inprovement Works in Tai Po - Design and Construction
Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 17.8.2023 regarding the captioned request and reply below in response to your questions:-

Please be advised that neither records of dangerous goods license, fire incidents nor incidents of spillage / leakage of dangerous goods were found in connection with the given conditions of your request at the subject location.

If you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(NG Wing-chit)
for Director of Fire Services

AECOM
12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong
香港新界沙田鄉事會路 138 號
新城市中央廣場第 2 座 12 樓
www.aecom.com

+852 3922 9000 tel
+852 3922 9797 fax

Our Ref.: AYFW:etly:60700410/08.10-0100 (2024001142W)

9 February 2024

By Hand & Email

Fire Services Department
Licensing and Certification Command
5/F, South Wing, Fire Services HQ Building,
1 Hong Chong Road, Tsim Sha Tsui East,
Kowloon.

Attn: Mr. LAI Kin-man

Dear Sir,

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po – Design and Construction

Request for Information on Dangerous Goods Store and Incidents Records – Tai Po Old Market

We write further to our previous letter ref. AYFW:etly:60700410/08.10-0057 (2023006126W) dated 17 August 2023 regarding the request for information on dangerous good store and incidents records, and would like to collect additional historical information regarding the past and present activities to facilitate our land containmination assessment.

We would like to request for the following information regarding the Concerned Area, which shown in the Site Location Plan:

1) Records of current and past (as early as the records are available) registration of Dangerous Goods storage (with the type of dangerous goods, storage method, quantity, license no., date of issue, and storage location) within the Concerned Area;
2) Any records of reported accidents of spillage / leakage of dangerous goods stored within the Concerned Area; and
3) Any records of fire incidents within the Concerned Area.

Due to the extremely tight schedule, we would be grateful if you could forward the requested information to us by **19 February 2024**. Should you have any queries, please feel free to contact our Chloe Ng at 3856 5662 (chloe.ng@aecom.com) or Karen Mok at 6180 6058 (karen.mok1@aecom.com).

Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.

Alex Wu
Executive Director
Water, Hong Kong

Encl.

cc DSD/DP – Attn: Ms. YUEN Pui Shan, Priscilla (w/e, By Hand & Email)

ISO A1 594mm x 841mm

Project Management Initials: Designer: Checked: Approved:

Plot File by: $USER$
PATH: $FILES
$DATES

834500 E
835000 E
835500 E
835000 N
834500 N

LEGEND:
CONCERNED AREA

N

60700410/R13/401
60700410/R13/402
60700410/R13/403
60700410/R13/404
60700410/R13/431
60700410/R13/432
60700410/R13/433
60700410/R13/434

SERENITY PARK
TAI YUEN ESTATE
LAM TSUEN RIVER
TAI PO MARKET

AECOM

PROJECT
項目
DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主
渠務署
Drainage Services Department

CONSULTANT
工程顧問公司
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分項工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 2500

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合同編號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱
KEY PLAN

SHEET NUMBER
圖紙編號
60700410/R13/400

消 防 處
香港九龍尖沙咀東部廣華道 1 號
消防處總部大廈

FIRE SERVICES DEPARTMENT
FIRE SERVICES HEADQUARTERS BUILDING,
No.1 Hong Chong Road,
Tsim Sha Tsui East, Kowloon,
Hong Kong.

本處檔號 OUR REF. : (165) in FSD GR 6-5/4 R Pt. 51
來函檔號 YOUR REF. : AYFW:etly:60700410/08.10-0100 (2024001142W)
電子郵件 E-mail : hkfsdenq@hkfsd.gov.hk
圖文傳真 FAX NO. : 2988 1196
電 話 TEL NO. : 2733 5848

16 February 2024

AECOM Asia Co. Ltd
12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong.
(Attn: Mr. Alex WU, Executive Director)

By fax (3922 9797) only

Dear Mr. WU,

Agreement No. CE 57/2022 (DS)
Drainage Improvement Works in Tai Po - Design and Construction
(Tai Po Old Market)
Request for Information of Dangerous Goods & Incident Records

I refer to your letter of 9.2.2024 regarding the captioned subject.

Your case is being handled, and a reply will be furnished to you as soon as possible. Please be advised that due to time lapse, this Department can only provide the following information for your requested information:

(i) Dangerous Goods Licence Record: from the year of 1990 to present moment.

(ii) Incident Record: Past three years of fire and special services incidents.

Please also submit the appointment letter from your client for record.

Should you have further questions, please feel free to contact the undersigned.

Yours sincerely,

(TSANG Chun-hei)
for Director of Fire Services

Appendix G – Traffic Impact Assessment Report

1 Introduction

1.1 Background

1.1.1 The Review of Drainage Master Plan in Tai Po - Feasibility Study and the Review of Drainage Master Plan in Sha Tin and Sai Kung - Feasibility Study identified that some areas in Tai Po, Lam Tsuen, Ting Kok and Ma On Shan would be subject to high flood risks. To relieve the flood risk, the studies proposed various drainage improvement measures in the areas. The flooding incidents reported in the areas of Tai Po Old Market and Tai Po Market on 22 July 2010, Lam Tsuen Valley on 19 October 2016, and Ting Kok and Sai Sha Road on 18 July 2017 are some examples to substantiate the above findings.

1.1.2 To relieve the flood risks in the above areas, the studies have proposed by adopting pragmatic approach taking into account the cost effectiveness and limited land availability, drainage improvement measures in a combination of stormwater pumping scheme and associated drainage upgrading and river training works. Upon completion of the project, the flood risks in the areas can be significantly reduced.

1.1.3 In May 2018, Development Bureau (DEVB) signed out a Project Definition Statement (PDS) to justify and define the scope of the “Drainage Improvement Works in Tai Po”. The Drainage Services Department (DSD) then completed a Technical Feasibility Statement (TFS) confirming its technical feasibility. The TFS was subsequently approved by DEVB in August 2018. The project was included into Cat B under PWP Item No. 4183CD in September 2018.

1.1.4 In January 2020, the DSD commissioned Agreement No. CE 11/2019(DS) “Drainage Improvement Works in Tai Po - Investigation” (referred to hereinafter as the “Investigation Study”) to carry out various reviews, surveys, investigation, impact assessments and preliminary design for the Project.

1.1.5 AECOM Asia Company Limited was appointed by DSD on 13 January 2023 to undertake Agreement No. CE 57/2022 (DS) “Drainage Improvement Works in Tai Po – Design and Construction” (referred to hereinafter as “the Project”, of which the starting date of the Project is 26 January 2023. The Project comprises the drainage improvement works as briefly described in the following:

(a) Stormwater pumping scheme in Tai Po Old Market, including an underground storage tank, a pump house and the associated pipeworks and E&M works in Tai Po Old Market Playground, as well as the drainage upgrading works in Tai Po Tai Wo Road, Chui Lok Street, Chui Wo Lane, Po Nga Road, Ting Kok Road, Mei Sun Lane and Kau Hui Chik Street, floodwall modification and new floodwall along Lam Tsuen River and ancillary works including temporary relocation and reinstatement of playgrounds and associated facilities;

(b) Expansion of existing Tai Po Market Floodwater Pumping Station, including upgrading of existing pump house and the associated pipeworks and E&M works, as well as the drainage upgrading works in Tsing Yuen Street, Wai Yan Street, Pak Shing Street, Fu Shin Street, Yan Hing Street, Kwong Fuk Bridge Garden, Plover Cove Road, Tung Cheong Street, cycle track and footpath along southside of Lower Lam Tsuen River (between existing pumping station and elevated walkway at Tai Po Centre (structure no. NF97);

Appendix III

Swept Path Analysis for Proposed Access at On Ho Lane

ISO A1 594mm x 841mm

Approved:

Checked:

Designer:

Project Management Initials:

835100 E

835150 E

835200 E

834750 N

834700 N

834650 N

Cycling Track

FP

第二座
Block 2

石油氣倉

大埔舊墟遊樂場
TAI PO OLD MARKET PLAYGROUND

Tai Po Old Market Playground

遊樂場
ayground

Stand

球場
+4.3
ketball
ourt

篮球場
+5.7
Basketball
Court

篮球場
Basketball
Court
+5.7

大埔舊墟公立學校
Tai Po
Old Market
Public School

PROPOSED ABOVEGROUND STRUCTURE

TAI PO TAI WO ROAD

LEGEND:

APPLICATION SITE

PROPOSED MAINTENANCE ACCESS

SWEPT PATH FOR 12M FIRE ENGINES
(ASSUMED VEHICLE SPEED = 10KM/HR)

N

Plot File by: LiQ
2023/11/13
PATH P:\PROJECTS\60700410\DRAWING\SKETCH\SK7004.dgn

AECOM

PROJECT
項目

DRAINAGE IMPROVEMENT WORKS IN TAI PO - DESIGN AND CONSTRUCTION

CLIENT
業主

渠務署
Drainage Services Department

CONSULTANT
工程顧問公司

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS
分判工程顧問公司

ISSUE/REVISION
修訂

I/R 修訂	DATE 日期	DESCRIPTION 內容摘要	CHK. 複核

STATUS
階段

SCALE 比例
A1 1 : 250

DIMENSION UNIT 尺寸單位
METRES

KEY PLAN
索引圖

PROJECT NO. 項目編號
60700410

CONTRACT NO. 合約簡號
CE 57/2022 (DS)

SHEET TITLE
圖紙名稱

TAI PO OLD MARKET PLAYGROUND STORMWATER PUMPING STATION - SWEPT PATH FOR PROPOSED EVA

SHEET NUMBER
圖紙編號

60700410/SK7004

☐ Urgent ☐ Return Receipt Requested ☐ Sign ☐ Encrypt ☐ Mark Subject Restricted ☐ Expand personal&publi

致城市規劃會委員會秘書_[A／TP／693]_提出意見
28/02/2024 09:55

From:
To: "tpbpd@pland.gov.hk" <tpbpd@pland.gov.hk>
Sent by: tpbpd@pland.gov.hk
File Ref:

1 attachment

致城規會委員會秘書_[A／TP／693]_提出意見.pdf

致城市規劃會委員會秘書：
本校現就規劃申請編號[A/TP/693] 提出意見 (請見附件PDF，共3頁)，
正本將會於寄到貴會秘書處，謝謝！
(書記室代行)
大埔舊墟公立學校

電話(Tel.):
傳真(fax):

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/TP/693

意見詳情 (如有需要，請另頁說明)
Details of the Comment (use separate sheet if necessary)

是項工程工地範圍緊貼大埔舊墟公立學校及民宅大埔八號花園，
在建築工期產生之噪音及塵埃散逸，將嚴重影響本校學生之學習和校園生活。

再者，工程需要挖掘土地及砍伐植物，
無疑對現時的生態環境造成嚴重影響，包括雀鳥、蝴蝶，
並會滋擾到附近林村河的河岸、河床，
甚有可能因工地管理原因導致工地徑流，加劇本校渠道瘀塞情況及加劇蚊患問題。

「提意見人」姓名/名稱 Name of person/company making this comment 大埔舊墟公立學校

簽署 Signature _____ 日期 Date 2024/02/28
(張麗珠校長)

TAI PO OLD MARKET PUBLIC SCHOOL
大埔舊墟公立學校
TAI PO MARKET N.T.

☐ Urgent ☐ Return Receipt Requested ☐ Sign ☐ Encrypt ☐ Mark Subject Restricted ☐ Expand personal&pub

反對在大埔舊墟遊樂場建地下蓄洪池和雨水泵房
29/02/2024 23:31

A/TP/693

From:
To: tpbpd@pland.gov.hk
Sent by: tpbpd@pland.gov.hk
File Ref:

致：城市規劃委員會

本人是　　業主，本人反對在大埔舊墟遊樂場建地下蓄洪池和雨水泵房。雨水蓄洪池會影響土地的穩固性，擬訂的蓄洪池位置離住宅大樓非常貼近，旁邊就是八號花園，會影響到八號花園地基，危害住宅樓體。

所以本人反對在該位置建立蓄洪池。本人建議蓄洪池應且遠離住宅大樓的空曠處。據悉，八號花園廣大業主均有意見，誠請城市規劃委員會廣泛征詢意見並重新審視規劃。

盼復！

業主
29-02-2024

☐ Urgent ☐ Return Receipt Requested ☐ Sign ☐ Encrypt ☐ Mark Subject Restricted ☐ Expand personal&publi

~~A/TP/694~~ ai Po Old Market Playground DSD
01/03/2024 22:23

From:
To: "tpbpd" <tpbpd@pland.gov.hk>
Sent by: tpbpd@pland.gov.hk
File Ref:

A/TP/694 Tai Po Old Market Playground DSD

Government Land at Tai Po Old Market Playground near On Ho Lane (Part), Tai Po

Site area: About 7,900sq.m

Zoning: "Open Space"

Applied development: Stormwater Storage Facility

Dear TPB Members,

Members of the community have not been able to access the documents because the file is too big, 589 pages with colour and images, and will not download on the regular laptop. While I could download at one of the offices I use with an IT team at hand, we found the print function would not work so consequently I was reduced to taking notes as I could not print out layout etc to study at home. I am using quotes from previous applications as they are invariable cut and paste.

STRONG OBJECTIONS to another trashing of OS and downsizing and downgrading of community facilities. This project takes away one third of the park.

Another week and another park trashing. The government is giving money to couples to have babies while at the same time taking away the already inadequate recreation facilities and open spaces that make life in small homes in high rise towers bearable and allow residents, especially young families, and the elderly to enjoy some time outdoors without having to travel too far. $20,000 will not compensate from the fact that for at least 5 years one's local park is a construction site.

The justifications of this application are: ***having considered other potential sites*** *in the neighbourhood, the Application Site is the most suitable site for the proposed development due to its location; strategic integrated design by utilizing underground space for essential infrastructure and* ***allowing public amenities to be reprovided above ground.***

That the overpaid and intellectually challenged consultant trots out the 'having

considered potential sites' line again is a sad reflection of the misinformation that has sadly become the norm when it comes to planning issues.

It is quite clear that all DSD did was roll out the map and look for the green coloured space. **No data provided re location of other potential sites**

The application site is located at the centre of Tai Po and surrounded by multiple estates. The above ground buildings will reduce the size of the park by a whopping 1,280sq.mts and that is not counting the additional paving and access points. With structures over 14mPD the centre of the park will no longer we a green oasis.

Visual Impact will be considerable as indicated by the images I scrolled through at the offices and the applicant acknowledges this.

In addition with every additional application the encroachment on the park is greater.

QUESTIONS - why the differences This project takes up more land and is much higher

A/K1/262 TST height is 10m Site Area 2,900sq.m

A/TW/539 Tsuen Wan height 7.5m above ground. Site Area practically the same but this facility is at 3 locations not a composite

A/ST/1025 Sha Tin height 13m above ground. Site Area 4,530sq.m.

A/K14/829 Kwun Tong height 10mts above ground Site Area 6,400sq.m

Tai Po at 7,900sq.mts is three times the size of the first projects

It appears that DSD recognizes how easy it easy to encroach on our parks and is now expanding its horizons. This on Open Space where any building should be ancillary to the recreational use of the park.

I NOTE FROM THE MINUTES OF THE PREVIOUS APPLICATIONS THAT BOARD MEMBERS HAVE NOT QUESTIONED THE INCREMENTAL INCREASE IN SIZE OF THESE PROJECTS. I WOULD REMIND MEMBERS THAT IT IS THEIR DUTY TO 'INQUIRE INTO MATTERS' AND THE COMMUNITY HAS REASONABLE EXPECTATION THAT CLARIFICATION BE CALLED FOR WHEN THERE IS VISIBLE ANOMALY.

Many citizens consider that taking away a big chunk of a playground and replacing it with a much smaller facility, and that after a 4-5 year construction phase is a BIG NUISANCE. They also consider that land zoned for recreation is best used for this purpose.

But then we get to the crux of the matter, it is more cost effective. That is will negatively impact popular recreational facilities is of no consequence.

Pollution and noise impact:

the expected impact to air quality would be ***minor and localised*** *during construction phase*

But no worries it will impact mostly youngsters and the elderly, and they are not important. In addition, the construction noise will deter many from enjoying the adjacent areas.

Trees:

133 mature trees are to be chopped and replaced with saplings, or more like those puny flowering trees LCSD is so enamoured of. There is mention of 1:1 replacement but this is dubious as with on third of the park filled in with reinforced tank the only way additional trees can be planted on the remaining area is to squeeze them in odd corners or close together. This will affect the outcome.

There has not been a credible public consultation as ordinary folk cannot download the files and printing out data is not possible.

Members should reject this application because of inadequate public consultation and excessive erosion of public recreational facilities.

Mary Mulvihill

Recommended Advisory Clauses

(a) to note the comments of the District Lands Officer/Tai Po, Lands Department (DLO/TP, LandsD) that:

(i) the Site mainly falls on PGLA No. TP-143 being allocated to LCSD as a Town Park and such other uses to be approved by his office. The park is now known as Tai Po Old Market Playground being managed by LCSD;

(ii) regarding the proposed Tree Felling, Transplanting, Landscaping and Compensation Proposals, the applicant is required to seek the comments and approval of appropriate authorities in accordance with the relevant DEVB Technical Circulars (Works) including DEVB Technical Circulars (Works) Nos. 4/2020, 1/2018 and 6/2015; and

(iii) should there be any amendments to the PGLA No. TP-143 required and for any works to be carried out on unleased and unallocated Government land (other than public road), at least 9 months should be allowed for his office to process the application;

(b) to note the comments of the Director of Leisure and Cultural Services (DLCS) that:

(i) the applicant is responsible for the maintenance of all trees within the boundary of TPOMP during the period of the TGLA or works period, whichever is longer;

(ii) the applicant should submit a tree survey report with detailed tree information, layout plan and photos within the TPOMP for LCSD's record before commencement of works or upon immediate possession of the site. An updated tree survey report for those trees to be handed back to LCSD with detailed tree information and layout plan is also required upon the completion of works;

(iii) if any roadside trees under his office's maintenance will be removed / transplant, the applicant is required to submit a Tree Preservation and Removal Proposal in accordance to the Technical Circular (Works) No. 4/2020 administered by the Development Bureau for his comment before submitting to relevant authority for approval (separate submission to the Tai Po District Leisure Services Office (TPDLSO) for trees situated within TPOMP);

(iv) no parking nor storage of construction materials is allowed to be conducted / stockpiled within the tree protection zone i.e. drip line of each tree;

(v) if excavation is required, please ensure all trenches should be at least 1.5m away from any tree if their DBH exceeds 250mm;

(vi) proper handover should be arranged upon expiry of the period applied or works completion, whichever is later. LCSD will take over the maintenance of the concerned trees if the condition of the trees are up to LCSD's satisfaction. Replacement of a new tree with 12-month defect liability period is required for any damaged or dying tree; and

(vii) please contact staff of LCSD by email almitnte1@lcsd.gov.hk for the hand over

arrangement;

(c) to note the comments of the Chief Highway Engineer/New Territories East, Highways Department (CHE/NTE, HyD) that:

(i) the applicant should take up the maintenance responsibility of the discharge chamber and the associated works within HyD's slope, which the management and maintenance (M&M) matrix would be supplemented to his Office for comment in due course;

(ii) the maintenance party of Tree T350, T354 and T355 would be further discussed subjected to the M&M matrix of the concerned slope (SIMAR Slope No. 7NW-B/F193); and

(iii) the applicant is reminded to supplement the interface details for the road interface between relevant departments for the access from On Ho Lane to the proposed stormwater pumping station;

(d) to note the comments of the Director of Food and Environmental Hygiene (DFEH) as follows:

(i) no Food and Environmental Hygiene Department's facilities will be affected; and

(ii) the proposed work and operation should be no encroachment on the public place and no environmental nuisance should be generated to the surroundings. It should not be a nuisance or injurious or dangerous to health and surrounding environment. For any waste generated from the such activity / operation, the applicant should arrange disposal properly at their own expenses;

(e) to note the comments of the Director of Electrical and mechanical Services (DEMS) that:

Electricity Safety

(i) 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 under the mentioned document should approach the electricity supplier (i.e. CLP Power) for the requisition of cable plans to find out whether there is any underground cable within and/or in the vicinity of the concerned site. The applicant should also be 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. He has no particular comment on the document as far as electricity supply safety is concerned;

Town Gas Safety

(ii) there is a high pressure underground town gas transmission pipeline (running along Tai Po Tai Wo Road) in the vicinity of the proposed area. The project proponent/consultant/works contractor shall therefore liaise with the Hong Kong and China Gas Company Limited in respect of the exact locations of existing or planned gas pipes/gas installations in the vicinity of the proposed work areas and

any required minimum set back distance away from them during the design and construction stages of development;

(iii) the applicant/consultant/works contractor is required to observe the requirements of the Electrical and Mechanical Services Department's Code of Practice on "Avoidance of Damage to Gas Pipes" 2nd Edition for reference. The Code can be downloaded via the following web-link: https://www.emsd.gov.hk/filemanager/en/content_286/CoP_gas_pipes_2nd_(Eng).pdf ;

(iv) if the proposed development will result in the significant increase of population, a Quantitative Risk Assessment (QRA) shall be conducted by the project proponent to assess the potential risks associated with the HP pipeline, having considered the proposed development and implement mitigation measures if necessary for compliance with the risk guidelines of the Hong Kong Planning Standards and Guidelines. The project proponent is reminded to observe the requirements of the Electrical and Mechanical Services Department's "Guidance Note on Quantitative Risk Assessment Study for High Pressure Town Gas Installations in Hong Kong" for carrying out the QRA;

LPG Safety

(v) the applicant shall conduct a Quantitative Risk Assessment for the LPG Storage Installation to ascertain that the risk levels are acceptable according to Hong Kong Planning Standards and Guidelines after taking into account the risks arisen and population change (in construction and operation stage) for his consideration; and

(vi) for any query or further information on the above, please contact our officers
Mr. Henry CHENG, EME/NUS/4 at Tel: 2808 3690
Mr CHAN Sin-cho, E/GSA3/3 at Tel: 2808 3657
Mr. C W WONG, E/GSB1/3 at Tel: 2808 3661

(f) to note the comments of the Chief Town Planner/Urban Design and Landscape, Planning Department (CTP/UD&L, PlanD) that:

(i) it is noted that stone-looking façade is proposed for the proposed discharge chamber. The applicant is encouraged to explore opportunities to improve the aesthetics of the proposed discharge chamber (e.g. architectural feature, vertical greening, etc.) considering it is a major public frontage from Tai Wo Road and Lam Tsuen Riverside;

(ii) it is noted that about 60% of the compensatory trees are small trees species proposed for hedge planting. The applicant is encouraged to explore opportunity on off-site compensatory planting in proximity to the project site to achieve the compensatory planting ratio of 1:1 in terms of aggregated DBH as far as practicable; and

(iii) approval of the application does not imply approval of tree works such as pruning, transplanting and felling under lease. The applicant is reminded to seek approval for any proposed tree works from relevant departments prior to commencement of the works;

(g) to note the comments of the Chief Engineer/Construction, Water Supplies Department (CE/C, WSD) that:

(i) existing 600mm diameter water mains as shown in the enclosed Mains Record Plans (MRP) **(Attachment I and II)** inside the proposed site and very close to the proposed discharge chamber at south of Tai Po Tai Wo Road may be affected. The applicant is required to either divert or protect the water mains found on site;

(ii) if diversion is required, existing water mains inside the proposed site areas are needed to be diverted outside the site boundary of the proposed site to lie in Government land. A strip of land of minimum 1.5m in width should be provided for the diversion of existing water mains. The cost of diversion of existing water mains upon request will have to be borne by the applicant; and the applicant shall submit all the relevant proposal to WSD for consideration and agreement before the works commence; and

(iii) if diversion is not required, the following conditions shall apply:

(a) Existing water mains are affected as indicated on the site plan and no development which requires resiting of water mains will be allowed.

(b) Details of site formation works shall be submitted to the Director of Water Supplies for approval prior to commencement of works.

(c) No structures shall be built or materials stored within 1.5 metres from the centre line(s) of water main(s) shown on the plan. Free access shall be made available at all times for staff of the Director of Water Supplies or their contractor to carry out construction, inspection, operation, maintenance and repair works.

(d) No trees or shrubs with penetrating roots may be planted within the Water Works Reserve or in the vicinity of the water main(s) shown on the plan. No change of existing site condition may be undertaken within the aforesaid area without the prior agreement of the Director of Water Supplies. Rigid root barriers may be required if the clear distance between the proposed tree and the pipe is 2.5m or less, and the barrier must extend below the invert level of the pipe.

(e) No planting or obstruction of any kind except turfing shall be permitted within the space of 1.5 metres around the cover of any valve or within a distance of 1 metre from any hydrant outlet.

(f) Tree planting may be prohibited in the event that the Director of Water Supplies considers that there is any likelihood of damage being caused to water mains.

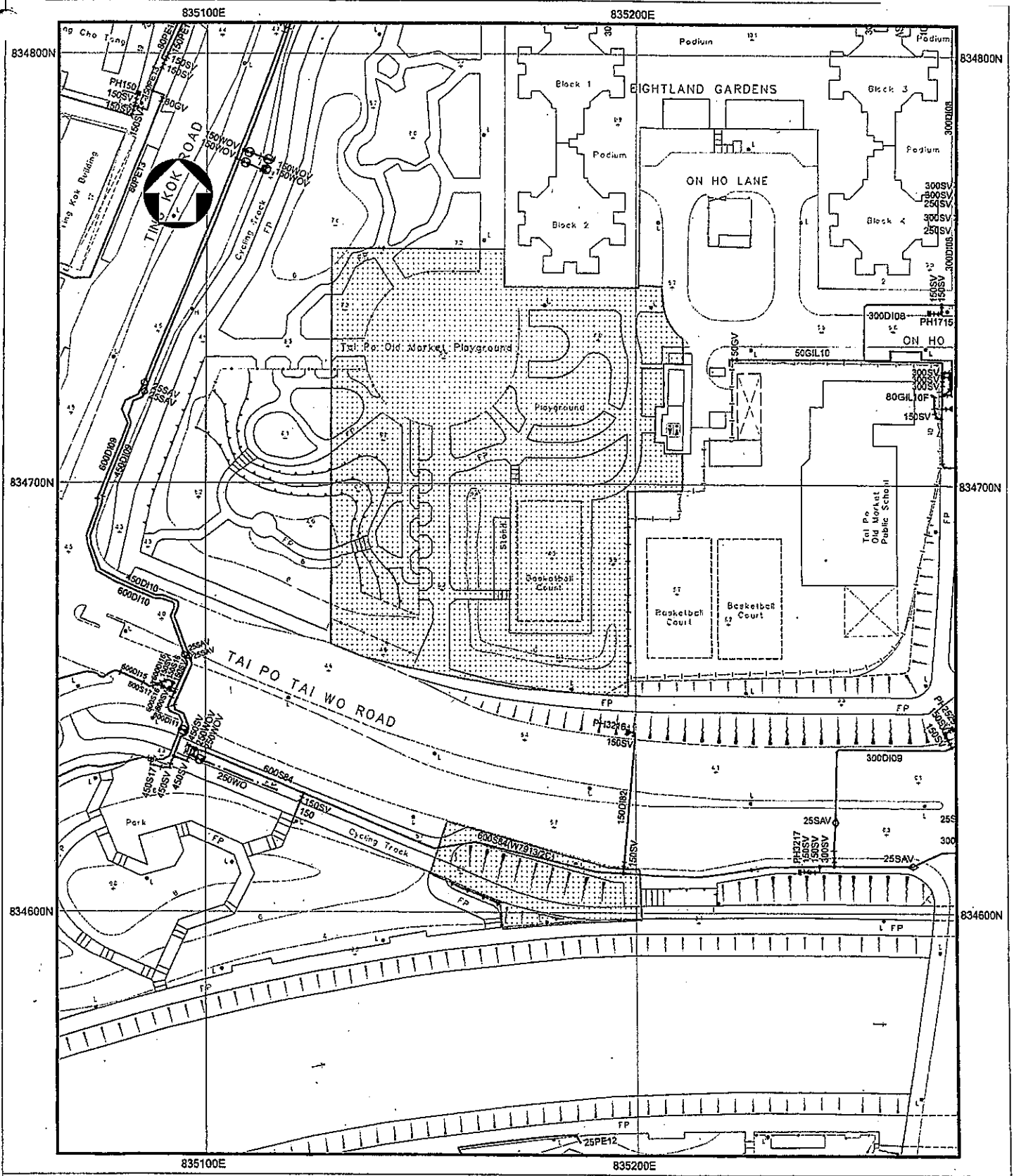
(h) to note the comments of the Commissioner for Transport (C for T) that the existing access at the north of the subject development site is connecting to On Chee Road with a crash date, the applicant should consult FSD and LandsD on the run-in / run-out arrangement;

(i) to note the comments of the Director of Environmental Protection (DEP) that the applicant is required to submit a revised ERR to address comments in **Attachment III** and implement the environmental mitigation measures as recommended in the relevant submissions upon approval of the subject application;

(j) to note the comments of the Director of Fire Services (D of FS) that:

(i) detailed fire services requirements will be formulated upon receipt of formal submission of general building plans; and

(ii) the EVA provision in the captioned work shall comply with the standard as stipulated in Section 6, Part D of the Code of Practice for Fire Safety in Buildings 2011, which is administered by the Buildings Department.



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.
3. INFORMATION ON ALIGNMENT OF MAINS IS OF INDICATIVE VALUE ONLY. WHERE POSITIONAL ACCURACY MAY BE OF IMPORTANCE, DETAILS SHOULD BE SITE CHECKED.
4. FOR MAINS RECORDS SIGN CONVENTIONS AND DESIGNATIONS SEE SKETCH NO. 3968.
5. NO PROPOSED WATER MAINS IN THE VICINITY OF THE SITE.
6. NO EXISTING WSD CABLE IN THE VICNITY OF THE SITE.
7. NO PROPOSED WSD CABLE IN THE VICNITY OF THE SITE.
8. THE SITE IS NOT WITHIN WSD GATHERING GROUNDS.
9. NO WSD LAND ALLOCATION / WWR WITHIN THE SITE AREA.
10. NO WSD SLOPES ARE AFFECTED IN THE VICINITY OF THE SITE.

SUBJECT SITE

PRIVATE LOT BOUNDARY (FOR REF. ONLY)

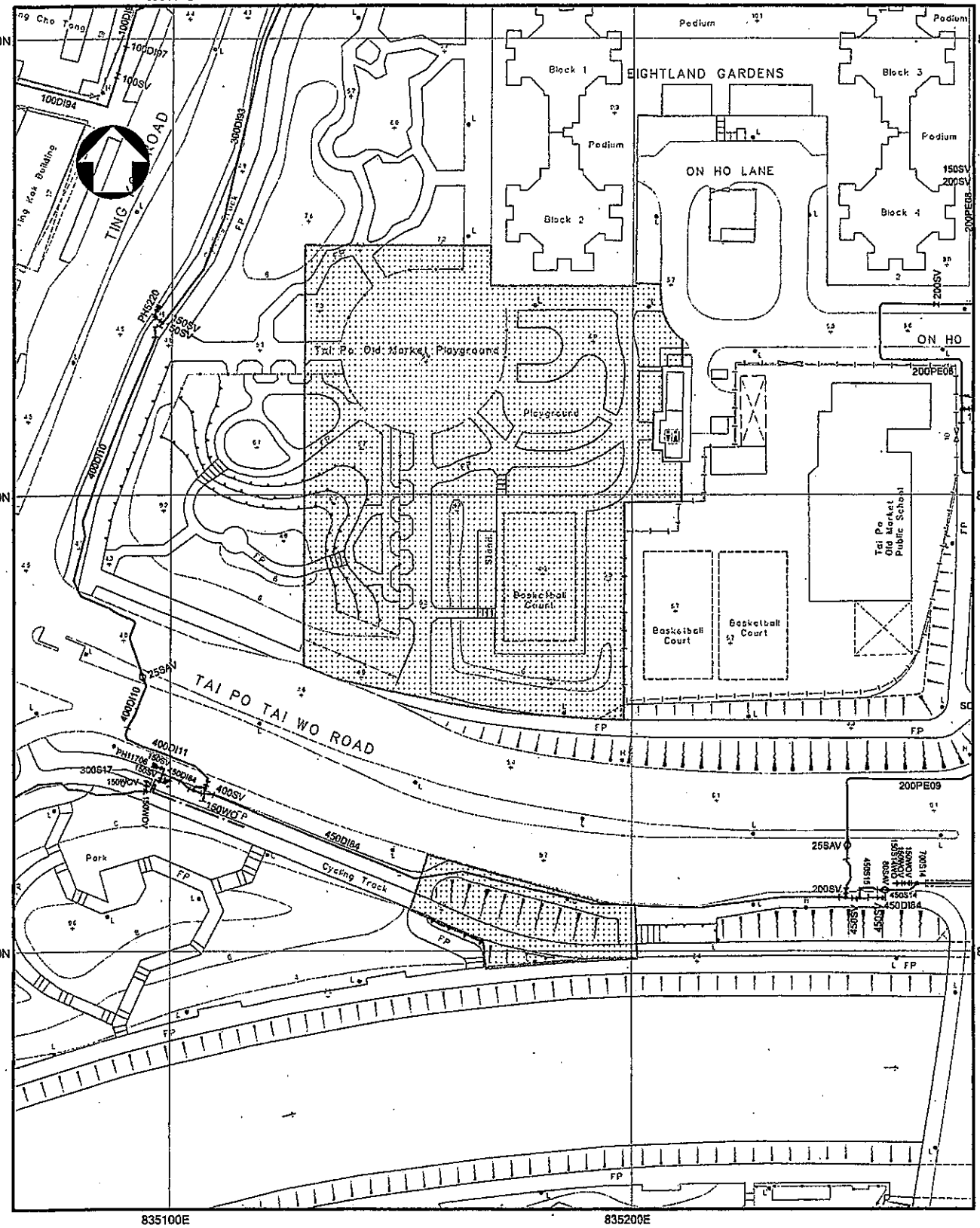
PART COPY OF FRESH WATER MAINS RECORD PLAN(S)

W67880/7-NW-4C, 4D, 9A & 9B

FILE REF: (5) IN WSD/M/SP 3051/4/226S/23 PT.1

REF. CODE: 06W24M	SHEET 1 OF 1	SCALE 1:1200

水 務 署
Water Supplies Department



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.
3. INFORMATION ON ALIGNMENT OF MAINS IS OF INDICATIVE VALUE ONLY. WHERE POSITIONAL ACCURACY MAY BE OF IMPORTANCE, DETAILS SHOULD BE SITE CHECKED.
4. FOR MAINS RECORDS SIGN CONVENTIONS AND DESIGNATIONS SEE SKETCH NO. 3988.
5. NO PROPOSED WATER MAINS IN THE VICINITY OF THE SITE.
6. NO EXISTING WSD CABLE IN THE VICINITY OF THE SITE.
7. NO PROPOSED WSD CABLE IN THE VICNITY OF THE SITE.
8. THE SITE IS NOT WITHIN WSD GATHERING GROUNDS.
9. NO WSD LAND ALLOCATION / WWR WITHIN THE SITE AREA.
10. NO WSD SLOPES ARE AFFECTED IN THE VICINITY OF THE SITE.

SUBJECT SITE

PRIVATE LOT BOUNDARY (FOR REF. ONLY)

PART COPY OF SALT WATER MAINS RECORD PLAN(S)

W67881/7-NW-4C, 4D, 9A & 9B

FILE REF: (5) IN WSD/M/SP 3051/4/226S/23 PT.1

REF. CODE: 06W24M	SHEET 1 OF 1	SCALE 1:1200

水 務 署
Water Supplies Department

Attachment III

EPD's Comments on Environmental Review Report

(i) environmental monitoring and audit programme is not normally required for non-designated projects in Appendix E - Environmental Review Report (ERR);

Waste Management Implications and Land Contamination

(ii) Section 6.2.1.4:

The Consultant shall specify that non-inert C&D materials, such as timber and woody materials, will be sent to the Yard Waste Recycling Centre in Y-Park for recycling prior to disposal at the designated landfill site;

(iii) Section. 6.2.1.13:

(a) Since some of the GI records were not enclosed in this submission in Appendix 6.2, the Consultant is advised to supplement the necessary information for our further vetting and review. If the strata log in BH2 and BH4 are the only available GI records, please specify such information to avoid confusion.

(b) Given that BH2 is located outside the Project Site, please elaborate on its relevance in the preliminary estimation.

(iv) Appendix 6.1:

Locational Plan of Historical Drilling: While the relevance of the historical drilling has been marked on the figure, the Consultant shall clearly indicate the identity and nature of the areas bounded in red to avoid confusion;

(v) Appendix 6.2:

(a) Please clarify the difference between the boreholes marked in red and blue.

(b) Only the borehole records in BH2 and BH4 were enclosed in this submission. Please clarify the reason for not appending records of BH-3, TPEDH-01,

TPEDH-02, TP4 and BH5, which are situated within the Project Site.

(c) In addition to the proposed borehole marked in blue, please clarify whether those trial pits and boreholes marked in black and red have already been conducted. If affirmative, the Consultant shall incorporate all the relevant borehole records for further vetting and review.

(vi) Appendix 11.4:

the complete response from FSD Information of Dangerous Goods & Incident Records is currently outstanding. Thus, we reserve the right to comment further in the subsequent submission; and

(vii) Figure 11.1:

The Consultant is advised to supplement the photographic record showing the site condition of the proposed TPOMPSPS's southern portion near Lower Lam Tsuen River for clarity.