Proposed Temporary Open Storage of Construction Materials, Construction Machineries and Vehicles with Ancillary Facilities for A Period of 3 Years and Associated Filling of Pond/Land and Excavation Of Land

Various Lots in D.D. 125 And Adjoining Government Land, Ha Tsuen, Yuen Long, New Territories

Drainage Impact Assessment Report

Applicant
First Champion Limited

April 2023

AMENDMENT RECORD

REVISION NO.	DESCRIPTION	PREPARED BY (Date)	REVIEWED BY (Date)	APPROVED BY (Date)
1.0	Final DIA	12/10/2023	13/10/2023	13/10/2023
2.0	Final DIA	07/11/2023	09/11/2023	09/11/2023
3.0	Final DIA	25/3/2024	2/4/2024	3/4/2024

CONTENT PAGE

APPENDICES

LIST OF TABLES

1 Project Background

1.1 Introduction

1.1.1 The Applicant intends to develop a open storage of construction materials, construction machineries and vehicles with ancillary facilities for a period of 3 years and associated filling of pond, filling of land and excavation of land at various lots in D.D. 125 and adjoining Government Land in Ha Tsuen, Yuen Long, New Territories.

1.1.2 According to the Approved Ha Tsuen Fringe Outline Zoning Plan ("OZP") No. S/YL-HTF/12, the application site currently falls within "Green Belt" ("GB") zone. A planning permission for the proposed open storage of construction materials, construction machineries and vehicles as well as the proposed filling of pond, filling of land and excavation of land, are required on application to the Town Planning Board ("TPB") under Section 16 of the Town Planning Ordinance.

1.1.3 In order to assess possible drainage impact may be generated from the proposed development, a Drainage Impact Assessment ("DIA") is conducted to support this Section 16 planning application.

1.2 Objective of the Assessment

1.2.1 The objectives of this DIA are to assess the potential drainage impact that may be generated from the proposed development and recommend the mitigation measures, if necessary, to alleviate the impacts.

2 Site Description

2.1 Description of Existing Environment

2.1.1 The area of the application site is about 41,569m^2 and is located at Ha Tsuen, Yuen Long District. Existing site levels ranging from +17.9mPD to +29.1mPD.

2.2 Existing Baseline Conditions

2.2.1 According to the site inspection conducted in September 2023, the site is currently a vacant land overgrown with weeds and different tree groups. Moreover, several ditches/watercourses were found next to the Site, which are connected to surrounding catchments to South China Sea. The location of the Site is shown on Drawing No. PLAN 1 in **Appendix A**.

2.3 Proposed Development Scheme

2.3.1 The site is proposed to be a temporary open storage of construction materials, construction machineries and vehicles with ancillary facilities for a period of 3 years and associated filling of pond/land and excavation of land. A proposed master layout plan with Drawing No. PLAN 6 is enclosed in **Appendix A**.

2.3.2 The following uses or facilities will be provided:

- Open Storage of Vehicles;
- Open Storage of Construction Materials;
- Open Storage of Construction Machineries.

3 Methodology

3.1 Assessment Method

3.1.1 Rational Method is used to estimate the peak runoff from the catchment according to "Stormwater Drainage Manual – Planning, Design and Management" (SDM). The peak runoff is given by the following expression:

$$\boldsymbol{Q_p = 0.278\ C\ i\ A}$$

Where $\boldsymbol{Q_p}$ = peak runoff in m^3/s
$\mathbf{C}$ = runoff coefficient (dimensionless)
$\mathbf{i}$ = rainfall intensity in mm/hr
$\mathbf{A}$ = catchment area in km^2

3.1.2 According to the Stormwater Drainage Manual, the runoff coefficient C is considered below:

Table 1: Runoff Coefficients

Surface Characteristics	Runoff Coefficient
Asphalt	0.70 - 0.95
Concrete	0.80 - 0.95
Brick	0.70 - 0.85
Grassland (Heavy Soil)	
Flat	0.13 - 0.25
Steep	0.25 - 0.35
Grassland (Sandy Soil)	
Flat	0.05 - 0.15
Steep	0.15 - 0.20

3.1.3 The rainfall intensity $\boldsymbol{i}$ is determined by using the Gumbel Solution:

$$\boldsymbol{i = a/(td + b)c}$$

Where $\boldsymbol{i}$ = extreme mean intensity in mm/hr
$\boldsymbol{td}$ = duration in minutes (*td≤240)*
$\boldsymbol{a, b, c}$ = storm constants given in the table below

Table 2: Storm Constants for Different Return Periods of HKO Headquarters (based on Table 3a of SDM)

Return Period T(years)	2	5	10	20	50	100	200
a	499.8	480.2	471.9	463.6	451.3	440.8	429.5
b	4.26	3.36	3.02	2.76	2.46	2.26	2.05
c	0.494	0.429	0.397	0.369	0.337	0.316	0.295

3.1.4 The Brandsby William's Equation is used to determine the time of concentration etc.

$$t_o = 0.14465L / (H^{0.2}A^{0.1})$$

Where t_o = time of concentration of a natural catchment (min.);
A = catchment area (m^2);
H = average slope (m per 100m), 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)

3.1.5 The Manning's Equation is used to determine the capacity of U-channel and Stream:

$$V = \frac{R^{\frac{1}{6}}}{n}\sqrt{Rs}$$

where V = mean velocity (m/s)
R = hydraulic radius (m)
n = Manning coefficient ($s/m^{1/3}$)
s = hydraulic gradient (energy loss per unit length due to friction)

3.1.6 The application site is proposed to be temporary open storage of construction materials, construction machineries and vehicles with ancillary facilities for a period of 3 years and associated filling of pond/land and excavation of land. Rainfall increase due to climate change is not adopted in the runoff assessment in **Appendix B**.

4 Existing Drainage

4.1 Existing Drainage Routes and Arrangements

4.1.1 The Site is located almost immediately adjacent to (to the north of) a substantial (in the order of 2m wide) natural streamcourse which serves a large upstream catchment, leading up to Yuen Tau Shan. The overall catchment is shown on Drawing No. DIA1 in **Appendix A**. The overall catchment measures approximately 41,569m^2.

4.1.2 Within the Site, there are no apparent main drainage systems, with runoff generally passing overland from South to North, towards the main natural streamcourse as indicated on Drawing No. DIA1 in **Appendix A**.

4.1.3 There are no flooding blackspots in the vicinity of the Site and there is no history of flooding in the area (apart from the natural pond within the Site).

4.1.4 There are no known Ecologically Important Streams/Rivers in the catchment in which the Site is located.

5 Drainage Impact Assessment (DIA)

5.1 Project Site

5.1.1 The site is proposed to be concrete paved. The proposed site levels are ranging from +22.0 mPD to +26.0 mPD. There would be additional concrete paving area compared to the existing situation, with a resultant increase in runoff. The increase is quantified and discussed in Section 5.4. The proposed site catchment is shown on Drawing No. DIA2 in **Appendix A**

5.1.2 According to the topographical data and the existing drainage facilities on the surveys map obtained from Lands Department, there is an External Catchment located at the adjacent to the project site. The runoff from the External Catchment will flow from the Eastern and Southern Boundary of the Project Site, this extra runoff will potentially further drain into the proposed drainage system. As such, runoff arising from the External Catchment should be considered in this DIA using Rational Method.

5.1.3 Three main catchment areas were identified based on the proposed site layout plan including the local natural upstream catchment, external catchment adjacent to the proposed site and the proposed site itself. The runoffs are further collected into the existing public open rectangular channel next to the Site. The proposed site condition is shown on Drawing No. PLAN 11 and PLAN 12 in **Appendix A**.

5.2 Proposed Drainage Arrangement

5.2.1 The Site currently receives runoff from the External Catchment and this will continue after the proposed development as shown in Drawing No. DIA2. The runoff is expected to be widespread (rather than at discrete locations), U-channels will be proposed to collect the internal and external drainage. The flow capacities of the proposed U-channel are calculated using the Chart for the Rapid Design of Channels. Runoff from corresponding Site Catchments (calculated based on a return period of 50 years), the capacity estimation and checking for the proposed U-channels are included in **Appendix C**. The overall drainage is proposed to discharge into Existing 6m open rectangular channel. The exact arrangement(s) for the U channels will be determined during later stages of Project implementation.

5.3 Assessment Assumptions

5.3.1 Runoff coefficient of C=0.25 is adopted for the naturally vegetated hillsides and steep vegetated soil. For the Proposed Development, the whole site coverage will be paved with impervious concrete, runoff coefficient of C = 0.95 is adopted. However, the development is proposed to introduce a range of different materials for various parts of the Site and different runoff coefficients are adopted. Details of the runoff assessment, please refer to the calculation in **Appendix B**.

5.4 Drainage Impact Assessment

5.4.1 The Site currently receives runoff from the local upstream catchment and this will continue after the proposed development. The runoff is expected to be widespread (rather than at discrete locations), U-channels are proposed for both Existing Site Catchment and the External Catchment. For the drainage system, flow capacities of the proposed U-channel are calculated using the Chart for the Rapid Design of Channels. A proposed UC is designed to collect the runoff collected by the U channels and discharge to the existing open rectangular channel next to the site. The preliminary drainage layout and capacity checking of the internal UC are shown in **Drawing No. DIA3** in **Appendix A** and **Appendix C** based on the runoff assessment.

5.4.2 The 1 in 50-year peak discharge from the Site alone will increase from 0.439 to 1.561 m^3/s, i.e. an increase of 1.122 m^3/s. The existing and future runoff flows from the proposed site, external and overall catchment are presented in **Appendix B**. It is understood that the proposed development would cause additional flow to the public drainage system. The overall drainage flow is estimated to be 7.630 m^3/s for 1 in 50-year peak discharge. To avoid adverse drainage impact on the existing natural stream, the capacity of Existing 6m open rectangular channel is calculated using Manning Equation, please refer to the calculation shown in **Appendix D**. The design capacity of the Existing 2.5m open rectangular Channel is found to be 9.84m^3/s. Therefore, the existing drainage system is adequate to cater the additional flow from the proposed development.

6 CONCLUSION

6.1.1 The Project Proponent will be responsible for the construction and ongoing maintenance of the drainage facilities. The runoff to the existing natural stream during rainstorm would be discharged by means of 300mm, 900mm U-channels and 1200mm pipe connecting to existing 2.5m open rectangular channel.

6.1.2 The proposed development will result in slightly greater runoff than the existing Site comparing to the design capacity of the Existing 6m rectangular Channel. The incremental runoff before and after the development was estimated using the rational method. The existing 2.5m rectangular Channel is adequate to collect the incremental runoff during the heavy rainstorm. As a result, no adverse drainage impact to the existing drainage system is anticipated after the development of the Site with 50 year return period.

6.1.3 This DIA Report presents the initial findings regarding drainage impact and indicative drainage layout. A qualified engineer should be engaged by the Applicant of the Proposed Development to review and provide detailed designs for the internal Site drainage layout. A “Drainage Proposal” including detailed designs based on calculations and quantitative assessments shall be prepared by the qualified engineer and submitted to DSD, for their review and approval prior to the commencement of work.

R-riches Property Consultants Limited
April 2023

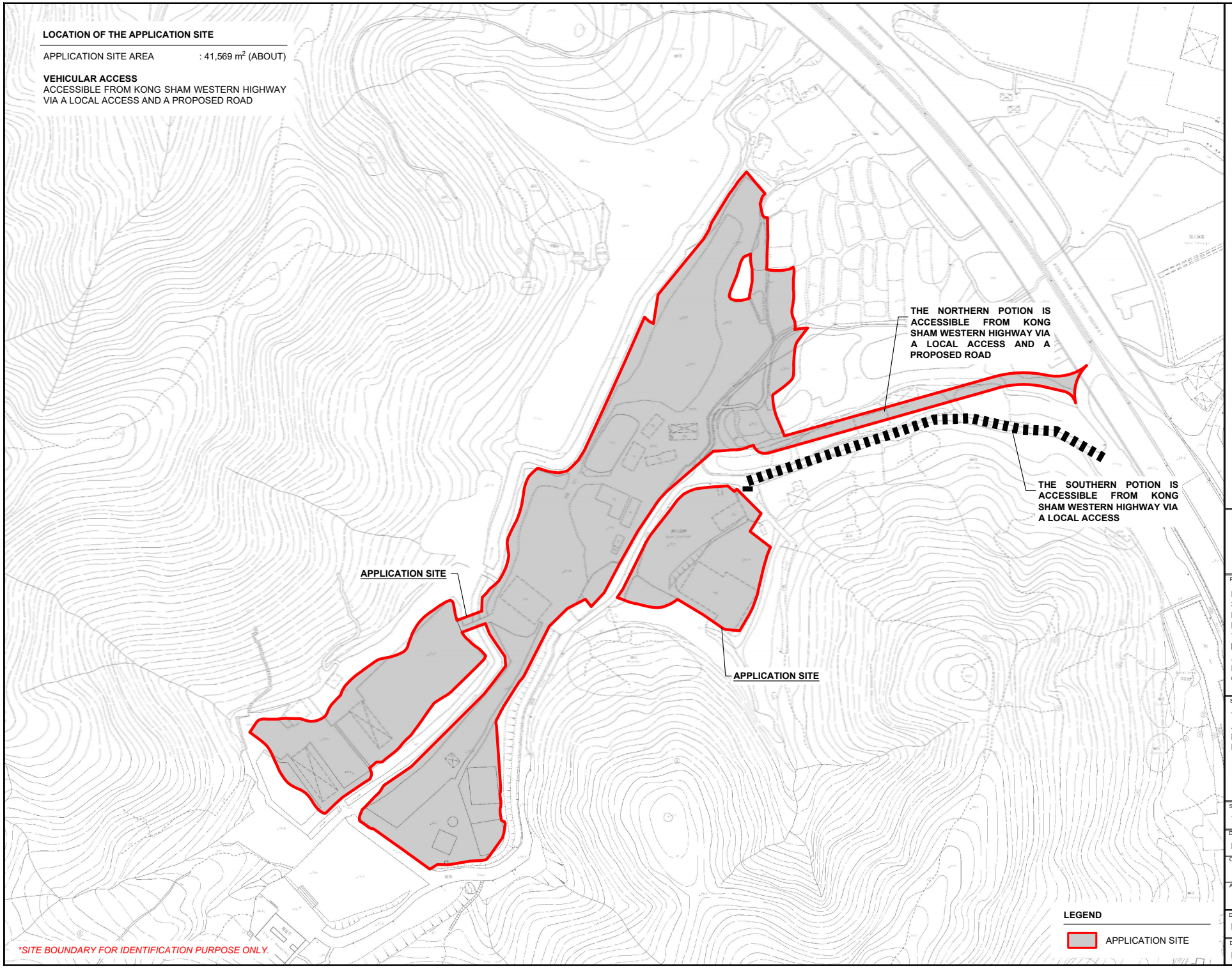
Appendix A

Drawings

LOCATION OF THE APPLICATION SITE

APPLICATION SITE AREA : 41,569 m^2 (ABOUT)

VEHICULAR ACCESS
ACCESSIBLE FROM KONG SHAM WESTERN HIGHWAY VIA A LOCAL ACCESS AND A PROPOSED ROAD



*SITE BOUNDARY FOR IDENTIFICATION PURPOSE ONLY.

NORTH
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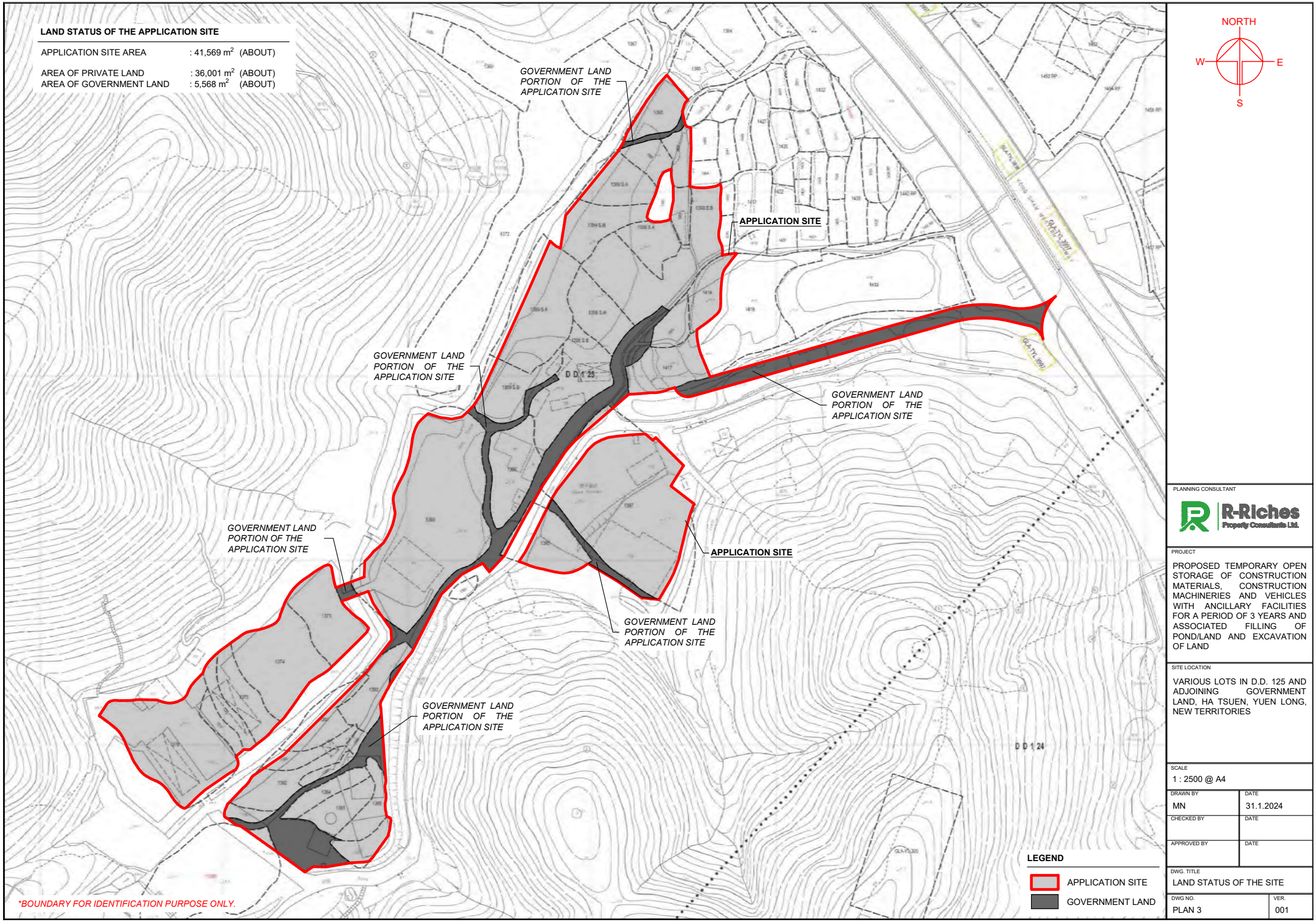
PROJECT
PROPOSED TEMPORARY OPEN STORAGE OF CONSTRUCTION MATERIALS, CONSTRUCTION MACHINERIES AND VEHICLES WITH ANCILLARY FACILITIES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF POND/LAND AND EXCAVATION OF LAND

SITE LOCATION
VARIOUS LOTS IN D.D. 125 AND ADJOINING GOVERNMENT LAND, HA TSUEN, YUEN LONG, NEW TERRITORIES

SCALE	1 : 3000 @ A4
DRAWN BY	MN
DATE	31.1.2024
CHECKED BY	
DATE	
APPROVED BY	
DATE	
DWG. TITLE	LOCATION PLAN
DWG NO.	PLAN 1
VER.	001



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SITE LOCATION

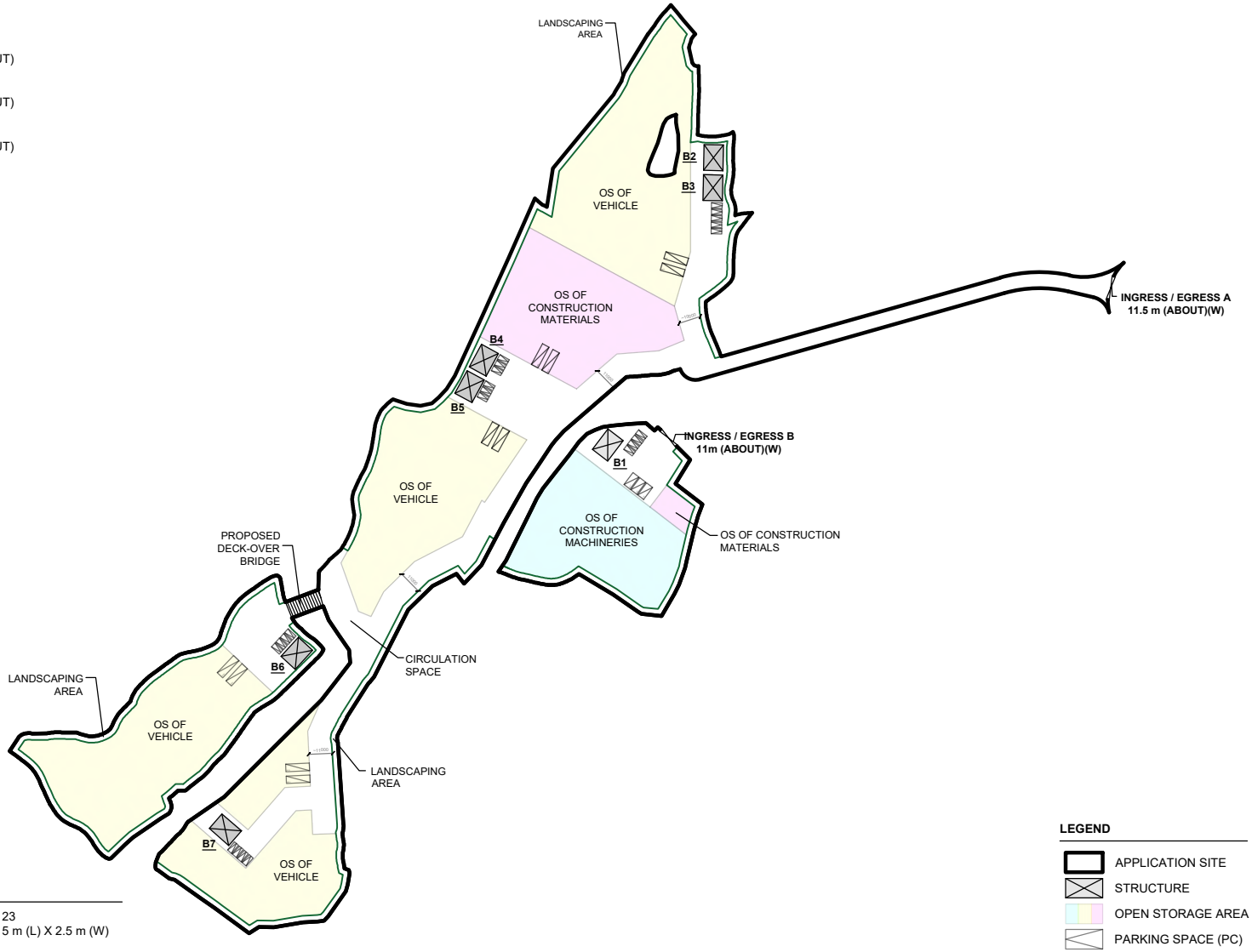
VARIOUS LOTS IN D.D. 125 AND ADJOINING GOVERNMENT LAND, HA TSUEN, YUEN LONG, NEW TERRITORIES

SCALE	1 : 2500 @ A4
DRAWN BY	MN
DATE	31.1.2024
CHECKED BY	
DATE	
APPROVED BY	
DATE	
DWG. TITLE	LAND STATUS OF THE SITE
DWG NO.	PLAN 3
VER.	001

DEVELOPMENT PARAMETERS

APPLICATION SITE AREA	: 41,569 m^2	(ABOUT)
COVERED AREA	: 756 m^2	(ABOUT)
UNCOVERED AREA	: 40,813 m^2	(ABOUT)
PLOT RATIO	: 0.04	(ABOUT)
SITE COVERAGE	: 1.8 %	(ABOUT)
NO. OF STRUCTURE	: 7	
DOMESTIC GFA	: NOT APPLICABLE	
NON-DOMESTIC GFA	: 1,512 m^2	(ABOUT)
TOTAL GFA	: 1,512 m^2	(ABOUT)
BUILDING HEIGHT	: 7 m	(ABOUT)
NO. OF STOREY	: 2	
OPEN STORAGE OF CONSTRUCTION MATERIALS	: 4,102 m^2	(ABOUT)
OPEN STORAGE OF CONSTRUCTION MACHINERIES	: 3,440m^2	(ABOUT)
OPEN STORAGE OF VEHICLES	: 17,989m^2	(ABOUT)

STRUCTURE	USE	COVERED AREA	GFA	BUILDING HEIGHT
B1	SITE OFFICE, WASHROOM AND METER ROOM	108 m^2 (ABOUT)	216 m^2 (ABOUT)	7 m (ABOUT)(2-STOREY)
B2	SITE OFFICE, WASHROOM AND METER ROOM	108 m^2 (ABOUT)	216 m^2 (ABOUT)	7 m (ABOUT)(2-STOREY)
B3	SITE OFFICE, WASHROOM AND METER ROOM	108 m^2 (ABOUT)	216 m^2 (ABOUT)	7 m (ABOUT)(2-STOREY)
B4	SITE OFFICE, WASHROOM AND METER ROOM	108 m^2 (ABOUT)	216 m^2 (ABOUT)	7 m (ABOUT)(2-STOREY)
B5	SITE OFFICE, WASHROOM AND METER ROOM	108 m^2 (ABOUT)	216 m^2 (ABOUT)	7 m (ABOUT)(2-STOREY)
B6	SITE OFFICE, WASHROOM AND METER ROOM	108 m^2 (ABOUT)	216 m^2 (ABOUT)	7 m (ABOUT)(2-STOREY)
B7	SITE OFFICE, WASHROOM AND METER ROOM	108 m^2 (ABOUT)	216 m^2 (ABOUT)	7 m (ABOUT)(2-STOREY)
	TOTAL	**756 m^2** (ABOUT)	**1,512 m^2** (ABOUT)	



PARKING AND LOADING/UNLOADING PROVISIONS

NO. OF PRIVATE CAR PARKING SPACE	: 23
DIMENSIONS OF PARKING SPACE	: 5 m (L) X 2.5 m (W)
NO. OF L/UL SPACE FOR LIGHT GOODS VEHICLE	: 3
DIMENSION OF L/UL SPACE	: 7 m (L) X 3.5 m (W)
NO. OF L/UL SPACE FOR MEDIUM GOODS VEHICLE	: 10
DIMENSION OF L/UL SPACE	: 11 m (L) X 3.5 m (W)

LEGEND

- APPLICATION SITE
- STRUCTURE
- OPEN STORAGE AREA
- PARKING SPACE (PC)
- L/UL SPACE (LGV)
- L/UL SPACE (MGV)
- INGRESS / EGRESS

NORTH
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SITE LOCATION
VARIOUS LOTS IN D.D. 125 AND ADJOINING GOVERNMENT LAND, HA TSUEN, YUEN LONG, NEW TERRITORIES

SCALE
1 : 3000 @ A4

DRAWN BY	DATE
MN	5.3.2024
CHECKED BY	DATE
LT	12.04.2024
APPROVED BY	DATE

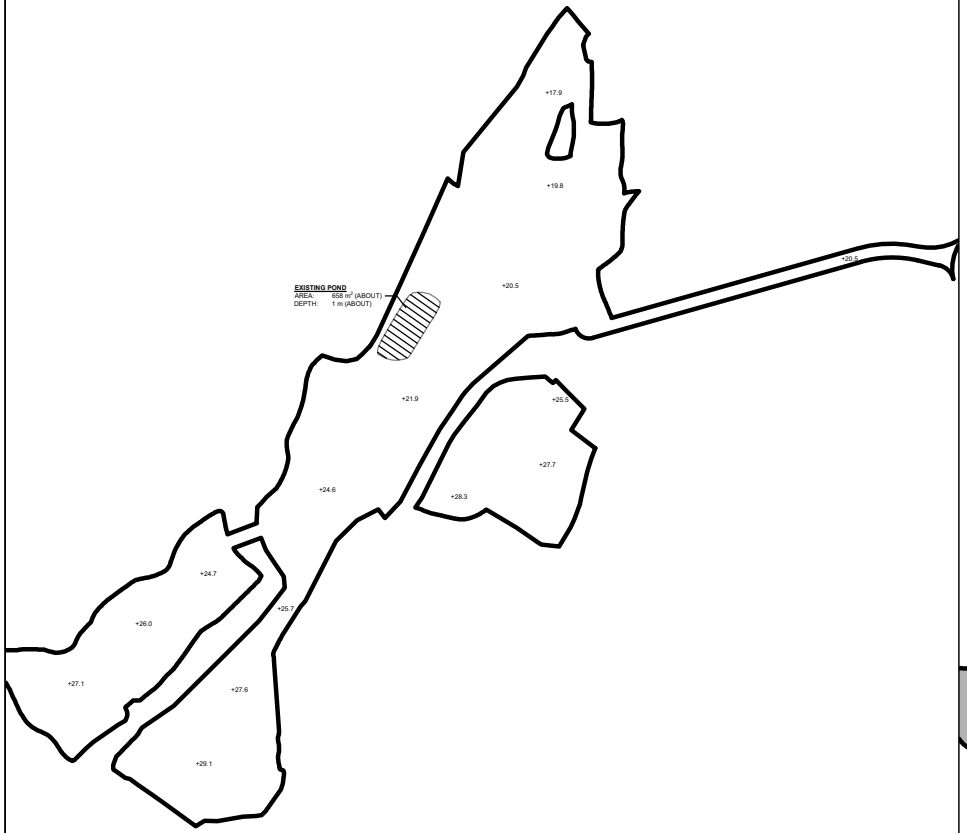
DWG. TITLE
LAYOUT PLAN

DWG NO.	VER.
PLAN 11	002

EXISTING SITE LEVEL OF THE APPLICATION SITE

APPLICATION SITE AREA	: 41,569 m^2	(ABOUT)
EXISTING SITE LEVELS	: +17.9 mPD - 29.1 mPD	(ABOUT)
AREA OF THE EXISTING POND	: 658 m^2	(ABOUT)
DEPTH OF EXISTING POND	: 1 m	(ABOUT)

THE EXISTING SITE LEVELS ARE FOR REFERENCE ONLY. EXACT DEPTH OF FILLING AND EXCAVATION ARE SUBJECT TO DETAILED SURVEY.



LEGEND

APPLICATION SITE

+3.0 EXISTING SITE LEVEL

PROPOSED FILLING AND EXCAVATION OF LAND AND FILLING OF POND

APPLICATION SITE AREA	: 41,569 m^2	(ABOUT)
PROPOSED SITE LEVELS	: +22.0 mPD - 26.0 mPD	(ABOUT)

DETAILS OF FILLING OF LAND

FILLING OF LAND AREA	: 40,911 m^2	(ABOUT)
DEPTH OF FILLING	: NOT MORE THAN 4.1 m	
MATERIAL OF FILLING	: SOIL AND CONCRETE	

DETAILS OF EXCAVATION OF LAND

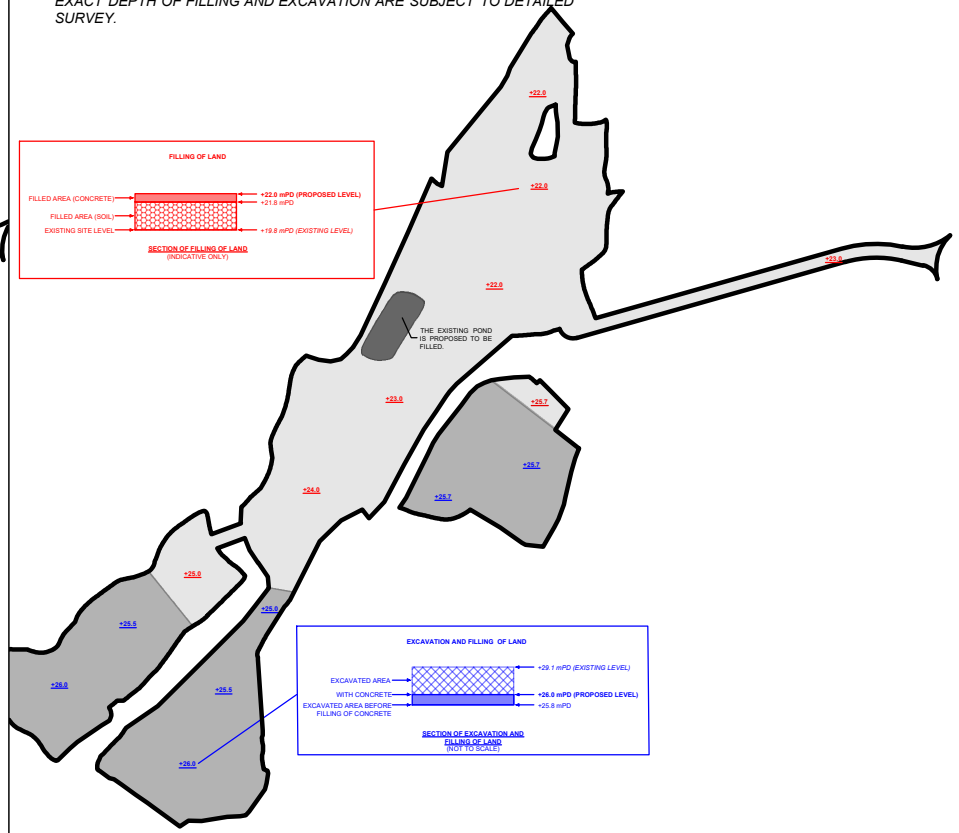
EXCAVATION OF LAND AREA	: 16,116 m^2	(ABOUT)
DEPTH OF FILLING	: NOT MORE THAN 3.3 m	

DETAILS OF FILLING OF POND

FILLING OF POND AREA	658 m^2	(ABOUT)
DEPTH OF EXISTING POND	: 1 m	(ABOUT)

SITE LEVELS OF THE PROPOSED FILLING AND EXCAVATION WORKS ALREADY INCLUDED THE 0.2m OF CONCRETE TO FACILITATE A FLAT SURFACE FOR SITE FORMATION OF STRUCTURE, OPEN STORAGE AND CIRCULATION PURPOSES.

EXACT DEPTH OF FILLING AND EXCAVATION ARE SUBJECT TO DETAILED SURVEY.



LEGEND

APPLICATION SITE

AREA COVERED BY CONCRETE

+3.0 PROPOSED SITE LEVEL AFTER FILLING OF LAND

+3.0 PROPOSED SITE LEVEL AFTER EXCAVATION AND FILLING OF LAND

NORTH

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SITE LOCATION

VARIOUS LOTS IN D.D. 125 AND ADJOINING GOVERNMENT LAND, HA TSUEN, YUEN LONG, NEW TERRITORIES

SCALE

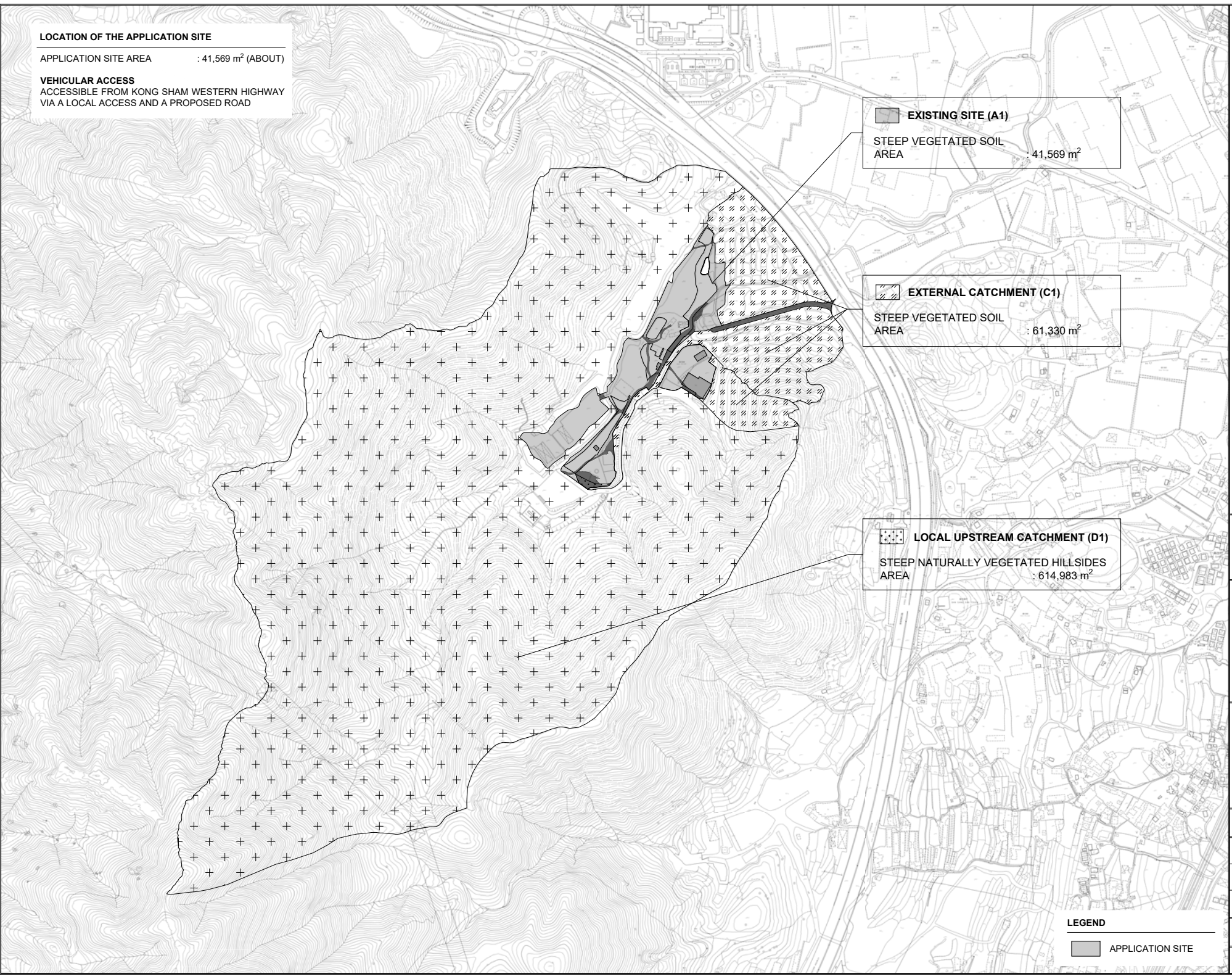
1 : 4000 @ A4

DRAWN BY	DATE
MN	16.2.2024
CHECKED BY	DATE
APPROVED BY	DATE

DWG. TITLE

FILLING AND EXCA. OF LAND

DWG NO.	VER.
PLAN 12	001



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PROPOSED TEMPORARY OPEN STORAGE OF CONSTRUCTION MATERIALS, CONSTRUCTION MACHINERIES AND VEHICLES WITH ANCILLARY FACILITIES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF POND/LAND AND EXCAVATION OF LAND

SITE LOCATION

VARIOUS LOTS IN D.D. 125 AND ADJOINING GOVERNMENT LAND, HA TSUEN, YUEN LONG, NEW TERRITORIES

SCALE

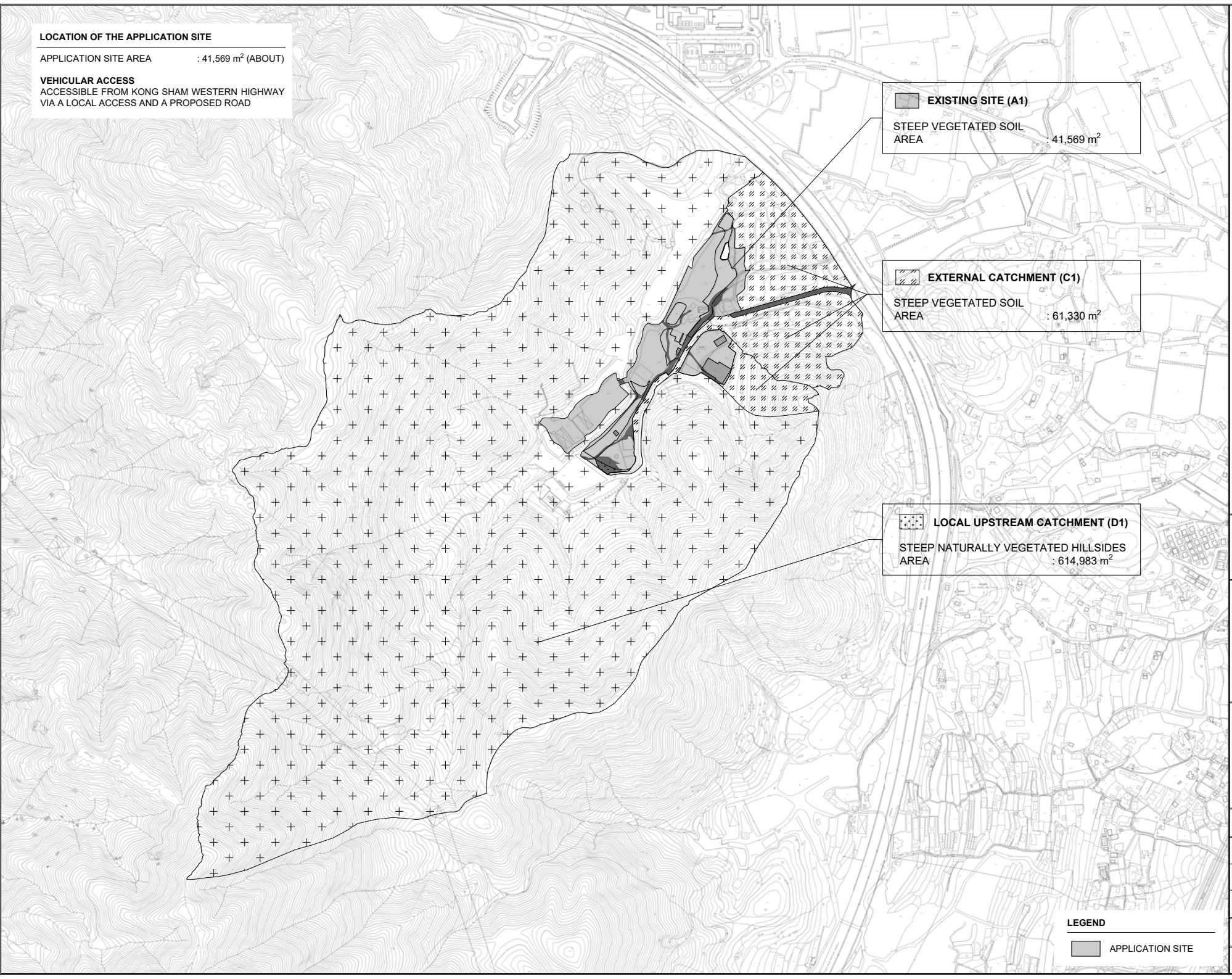
1 : 8000 @ A4

DRAWN BY	DATE
TL	29.01.2024
CHECKED BY	DATE
APPROVED BY	DATE

DWG. TITLE

CATCHMENT PLAN WITH EXISTING SITE

DWG NO.	VER.
DIA 1	001



PLANNING CONSULTANT

PROJECT

PROPOSED TEMPORARY OPEN STORAGE OF CONSTRUCTION MATERIALS, CONSTRUCTION MACHINERIES AND VEHICLES WITH ANCILLARY FACILITIES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF POND/LAND AND EXCAVATION OF LAND

SITE LOCATION

VARIOUS LOTS IN D.D. 125 AND ADJOINING GOVERNMENT LAND, HA TSUEN, YUEN LONG, NEW TERRITORIES

SCALE

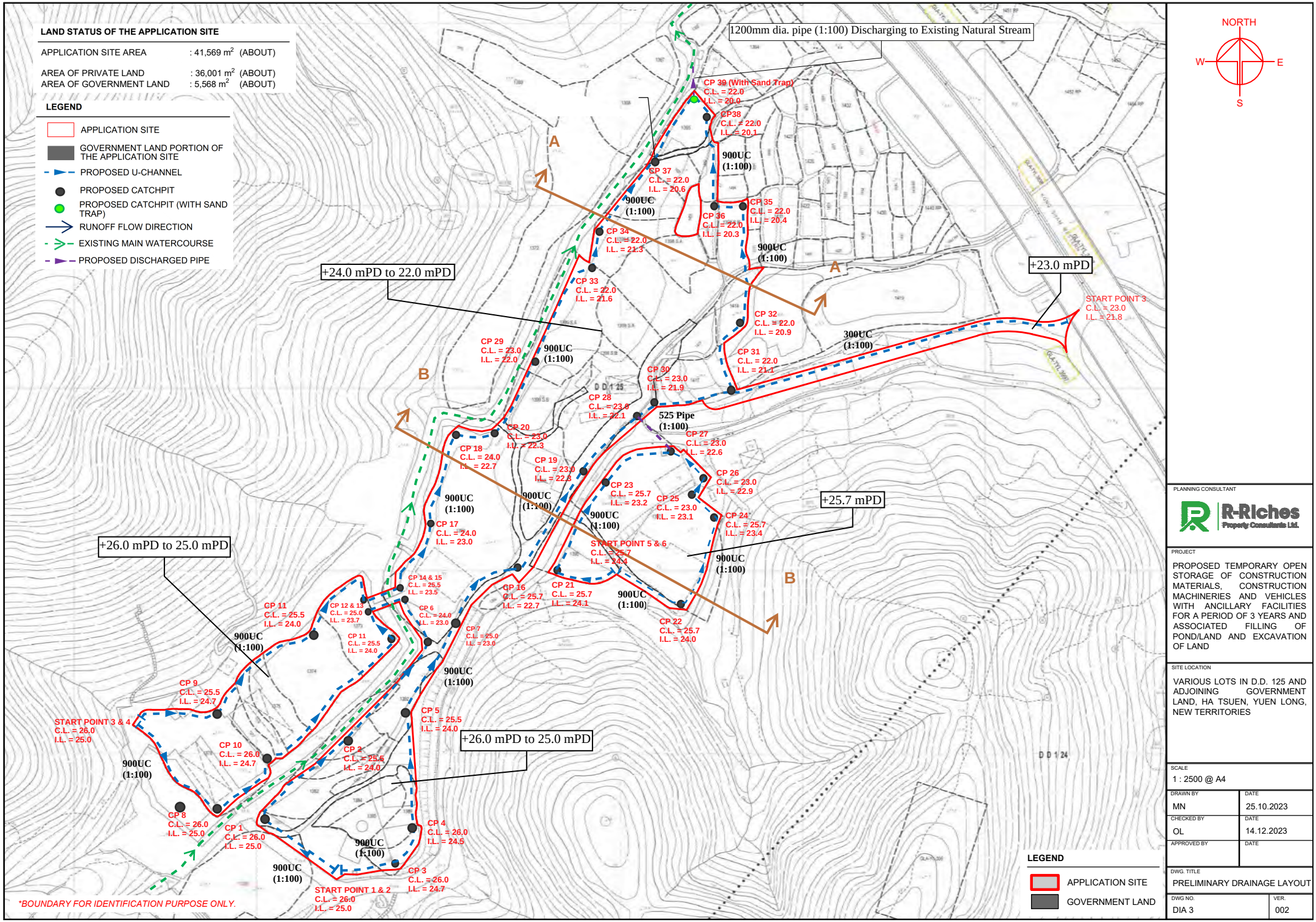
1 : 8000 @ A4

DRAWN BY	DATE
TL	29.01.2024
CHECKED BY	DATE
APPROVED BY	DATE

DWG. TITLE

CATCHMENT PLAN WITH PROPOSED SITE DEVELOPMENT

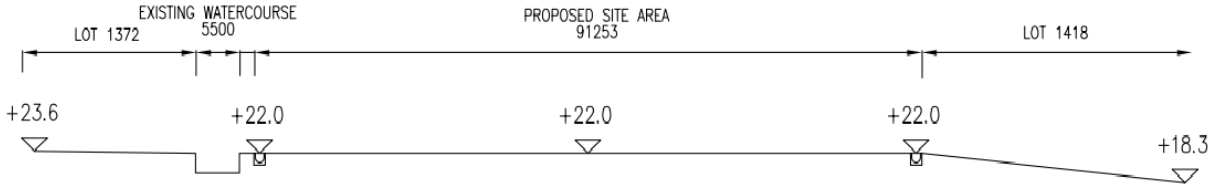
DWG NO.	VER.
DIA 2	001


LAND STATUS OF THE APPLICATION SITE
APPLICATION SITE AREA : 41,569 m² (ABOUT)
AREA OF PRIVATE LAND : 36,001 m² (ABOUT)
AREA OF GOVERNMENT LAND : 5,568 m² (ABOUT)
LEGEND
APPLICATION SITE
GOVERNMENT LAND PORTION OF THE APPLICATION SITE
PROPOSED U-CHANNEL
PROPOSED CATCHPIT
PROPOSED CATCHPIT (WITH SAND TRAP)
RUNOFF FLOW DIRECTION
EXISTING MAIN WATERCOURSE
PROPOSED DISCHARGED PIPE
1200mm dia. pipe (1:100) Discharging to Existing Natural Stream
CP 39 (With Sand Trap) C.L. = 22.0 I.L. = 20.0
CP38 C.L. = 22.0 I.L. = 20.1
CP 37 C.L. = 22.0 I.L. = 20.6
CP 35 C.L. = 22.0 I.L. = 20.4
CP 36 C.L. = 22.0 I.L. = 20.3
CP 34 C.L. = 22.0 I.L. = 21.3
CP 33 C.L. = 22.0 I.L. = 21.6
CP 32 C.L. = 22.0 I.L. = 20.9
CP 31 C.L. = 22.0 I.L. = 21.1
CP 30 C.L. = 23.0 I.L. = 21.9
CP 29 C.L. = 23.0 I.L. = 22.0
CP 28 C.L. = 23.0 I.L. = 22.1
CP 27 C.L. = 23.0 I.L. = 22.6
CP 26 C.L. = 23.0 I.L. = 22.9
CP 25 C.L. = 23.0 I.L. = 23.1
CP 24 C.L. = 25.7 I.L. = 23.4
CP 23 C.L. = 25.7 I.L. = 23.2
CP 22 C.L. = 25.7 I.L. = 24.0
CP 21 C.L. = 25.7 I.L. = 24.1
CP 20 C.L. = 23.0 I.L. = 22.3
CP 19 C.L. = 23.0 I.L. = 22.8
CP 18 C.L. = 24.0 I.L. = 22.7
CP 17 C.L. = 24.0 I.L. = 23.0
CP 16 C.L. = 25.7 I.L. = 22.7
CP 14 & 15 C.L. = 25.5 I.L. = 23.5
CP 12 & 13 C.L. = 25.0 I.L. = 23.7
CP 11 C.L. = 25.5 I.L. = 24.0
CP 11 C.L. = 25.5 I.L. = 24.0
CP 9 C.L. = 25.5 I.L. = 24.7
CP 10 C.L. = 26.0 I.L. = 24.7
CP 8 C.L. = 26.0 I.L. = 25.0
CP 1 C.L. = 26.0 I.L. = 25.0
CP 2 C.L. = 25.5 I.L. = 24.0
CP 6 C.L. = 24.0 I.L. = 23.0
CP 7 C.L. = 25.0 I.L. = 23.0
CP 5 C.L. = 25.5 I.L. = 24.0
CP 4 C.L. = 26.0 I.L. = 24.5
CP 3 C.L. = 26.0 I.L. = 24.7
START POINT 1 & 2 C.L. = 26.0 I.L. = 25.0
START POINT 3 & 4 C.L. = 26.0 I.L. = 25.0
START POINT 3 C.L. = 23.0 I.L. = 21.8
START POINT 5 & 6 C.L. = 25.7 I.L. = 24.4
525 Pipe (1:100)
300UC (1:100)
900UC (1:100)
+24.0 mPD to 22.0 mPD
+23.0 mPD
+25.7 mPD
+26.0 mPD to 25.0 mPD
+26.0 mPD to 25.0 mPD
A
A
B
B
D D 1 25
D D 1 24
*BOUNDARY FOR IDENTIFICATION PURPOSE ONLY.
NORTH
W
E
S
LEGEND
APPLICATION SITE
GOVERNMENT LAND
PLANNING CONSULTANT
R-Riches Property Consultants Ltd.
PROJECT
PROPOSED TEMPORARY OPEN STORAGE OF CONSTRUCTION MATERIALS, CONSTRUCTION MACHINERIES AND VEHICLES WITH ANCILLARY FACILITIES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF POND/LAND AND EXCAVATION OF LAND
SITE LOCATION
VARIOUS LOTS IN D.D. 125 AND ADJOINING GOVERNMENT LAND, HA TSUEN, YUEN LONG, NEW TERRITORIES
SCALE
1 : 2500 @ A4
DRAWN BY MN
DATE 25.10.2023
CHECKED BY OL
DATE 14.12.2023
APPROVED BY
DATE
DWG. TITLE
PRELIMINARY DRAINAGE LAYOUT
DWG NO. DIA 3
VER. 002

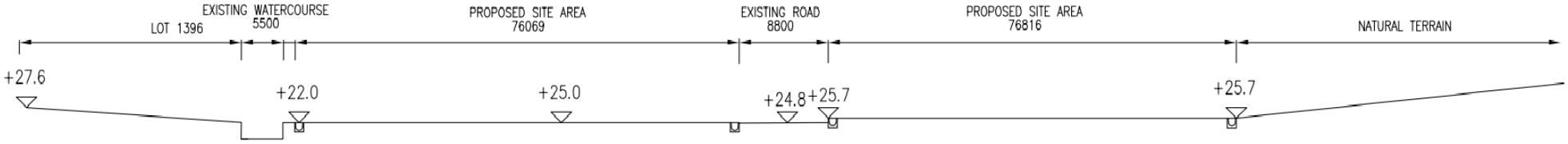
LOCATION OF THE APPLICATION SITE

APPLICATION SITE AREA	: 41,569 m^2 (ABOUT)
PROPOSED SITE LEVEL	: +22mPD - +26mPD (ABOUT)

VEHICULAR ACCESS
ACCESSIBLE FROM KONG SHAM WESTERN HIGHWAY
VIA A LOCAL ACCESS AND A PROPOSED ROAD



SECTION A–A



SECTION B–B

NORTH
W E
S

PLANNING CONSULTANT

PROJECT
PROPOSED TEMPORARY OPEN STORAGE OF CONSTRUCTION MATERIALS, CONSTRUCTION MACHINERIES AND VEHICLES WITH ANCILLARY FACILITIES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF POND/LAND AND EXCAVATION OF LAND

SITE LOCATION
VARIOUS LOTS IN D.D. 125 AND ADJOINING GOVERNMENT LAND, HA TSUEN, YUEN LONG, NEW TERRITORIES

SCALE

DRAWN BY	DATE
TL	22.03.2024
CHECKED BY	DATE
APPROVED BY	DATE

DWG. TITLE
CROSS SECTION

DWG NO.	VER.
DIA 4	001

Appendix B

Runoff Calculations

Runoff Estimation

Rational method is used for calculation of the peak runoff. The formula is extracted from Section 7.5.2 (a) of SDM.
The parameters and assumptions refer to section 3.

The local upstream catchment comprises mainly naturally vegetated hillsides; C = 0.25
The existing site comprises mainly steep vegetated soil; C = 0.25
The Proposed Site comprise Heavy Goods Vehicle Parking Space and Container Vehicle Parking Space (Concrete Paved Area (Impervious); C=0.95

Area of the Development Site = 41,569 m^2
Area of the local upstream catchment = 614983 m^2
The Site is proposed to be "Proposed Temporary Open Storage of Construction Materials, Construction Machineries and Vehicles with Ancillary Facilities for A Period of 3 Years and Associated Filling of Pond/Land and Excavation of Land",
so check the 1 in 50-year Scenario.

Existing Site Catchment (A1)

Catchment (m^2)	Flow Distance (m)	Highest (mPD)	Lowest (mPD)	Gradient (per 100m) = $(h_1-h_2)/L \times 100$	to (min) = 0.14465L/ ($H^{0.2}A^{0.1}$)	tc = to + t_f (min)	Storm Constants	Runoff coeff.	Total Catch. Area (m^2)	50 year Intensity (mm/hr)	50 year design runoff = 0.278CiA	50 year Total runoff (m^3/s)	50 year Total runoff (L/min)
41569	535	29.7	17.9	2.21	22.81	22.81	HKO headquarters	0.25	41569	151.98	0.44	0.439	26345
								0.95	0	151.98	0.00		

Proposed Site Catchment (B1)

Catchment (m^2)	Flow Distance (m)	Highest (mPD)	Lowest (mPD)	Gradient (per 100m) = $(h_1-h_2)/L \times 100$	to (min) = 0.14465L/ ($H^{0.2}A^{0.1}$)	tc = to + t_f (min)	Storm Constants	Runoff coeff.	Total Catch. Area (m^2)	50 year Intensity (mm/hr)	50 year design runoff = 0.278CiA	50 year Total runoff (m^3/s)	50 year Total runoff (L/min)
41569	535	26	22	0.75	28.32	28.32	HKO headquarters	0.25	0	142.21	0.00	1.561	93674
								0.95	41569	142.21	1.56		

External Catchment (C1)

Catchment (m^2)	Flow Distance (m)	Highest (mPD)	Lowest (mPD)	Gradient (per 100m) = $(h_1-h_2)/L \times 100$	to (min) = 0.14465L/ ($H^{0.2}A^{0.1}$)	tc = to + t_f (min)	Storm Constants	Runoff coeff.	Total Catch. Area (m^2)	50 year Intensity (mm/hr)	50 year design runoff = 0.278CiA	50 year Total runoff (m^3/s)	50 year Total runoff (L/min)
61330	395	25	22	0.76	20.05	20.05	HKO headquarters	0.25	61330	158.03	0.67	0.674	40415
								0.95	0	158.03	0.00		

Existing Site Catchment (A1) + External Catchment (C1)

Catchment (m^2)	Flow Distance (m)	Highest (mPD)	Lowest (mPD)	Gradient (per 100m) = $(h_1-h_2)/L \times 100$	to (min) = 0.14465L/ ($H^{0.2}A^{0.1}$)	tc = to + t_f (min)	Storm Constants	Runoff coeff.	Total Catch. Area (m^2)	50 year Intensity (mm/hr)	50 year design runoff = 0.278CiA	50 year Total runoff (m^3/s)	50 year Total runoff (L/min)
102899	535	26	22	0.75	25.86	25.86	HKO headquarters	0.25	102899	146.25	1.05	1.046	62754
								0.95	0	146.25	0.00		

Proposed Site Catchment (B1) + External Catchment (C1)

Catchment (m^2)	Flow Distance (m)	Highest (mPD)	Lowest (mPD)	Gradient (per 100m) = $(h_1-h_2)/L \times 100$	to (min) = 0.14465L/ ($H^{0.2}A^{0.1}$)	tc = to + t_f (min)	Storm Constants	Runoff coeff.	Total Catch. Area (m^2)	50 year Intensity (mm/hr)	50 year design runoff = 0.278CiA	50 year Total runoff (m^3/s)	50 year Total runoff (L/min)
102899	535	26	22	0.75	25.86	25.86	HKO headquarters	0.25	61330	146.25	0.62	2.229	133737
								0.95	41569	146.25	1.61		

Existing Site Catchment (A1) + External Catchment (C1) + The Local Upstream Catchment (D1)

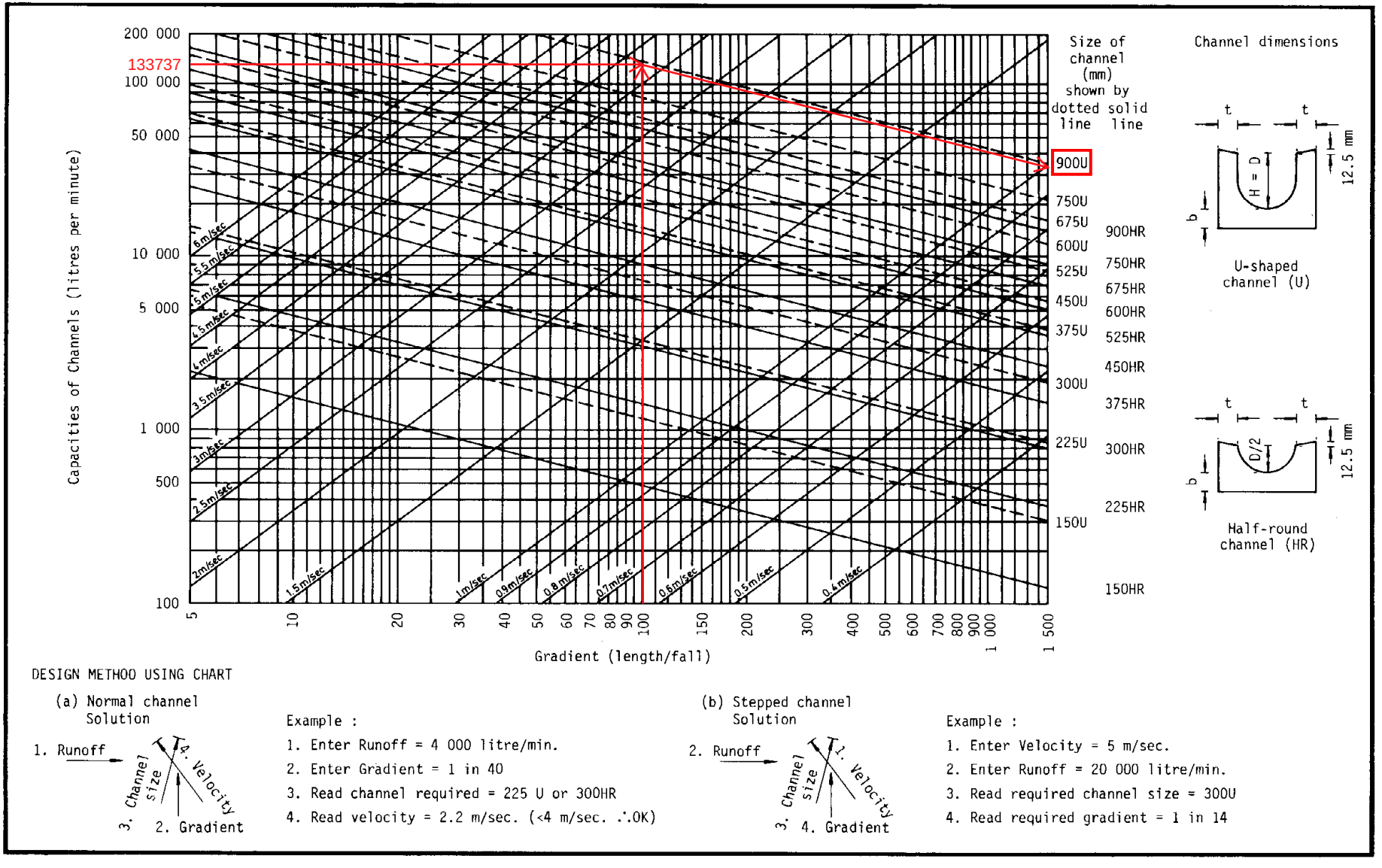
Catchment (m^2)	Flow Distance (m)	Highest (mPD)	Lowest (mPD)	Gradient (per 100m) = $(h_1-h_2)/L \times 100$	to (min) = 0.14465L/ ($H^{0.2}A^{0.1}$)	tc = to + t_f (min)	Storm Constants	Runoff coeff.	Total Catch. Area (m^2)	50 year Intensity (mm/hr)	50 year design runoff = 0.278CiA	50 year Total runoff (m^3/s)	50 year Total runoff (L/min)
717882	1473	307.7	22	19.40	30.58	30.58	HKO headquarters	0.25	717882	138.86	6.93	6.928	415679
								0.95	0	138.86	0.00		

Proposed Site Catchment (B1) + External Catchment (C1) + The Local Upstream Catchment (D1)

Catchment (m^2)	Flow Distance (m)	Highest (mPD)	Lowest (mPD)	Gradient (per 100m) = $(h_1-h_2)/L \times 100$	to (min) = 0.14465L/ ($H^{0.2}A^{0.1}$)	tc = to + t_f (min)	Storm Constants	Runoff coeff.	Total Catch. Area (m^2)	50 year Intensity (mm/hr)	50 year design runoff = 0.278CiA	50 year Total runoff (m^3/s)	50 year Total runoff (L/min)
717882	1473	307.7	22	19.40	30.58	30.58	HKO headquarters	0.25	676313	138.86	6.53	8.051	483074
								0.95	41569	138.86	1.52		

Appendix C

Calculation of Drainage Capacity of U Channels



DESIGN METHOD USING CHART

(a) Normal channel Solution

Example :

1. Enter Runoff = 4 000 litre/min.
2. Enter Gradient = 1 in 40
3. Read channel required = 225 U or 300HR
4. Read velocity = 2.2 m/sec. (<4 m/sec. ∴OK)

(b) Stepped channel Solution

Example :

1. Enter Velocity = 5 m/sec.
2. Enter Runoff = 20 000 litre/min.
3. Read required channel size = 300U
4. Read required gradient = 1 in 14

Figure 8.7 - Chart for the Rapid Design of Channels

Drainage Assessment for 1200mm Concrete Pipe discharging to Existing Open Rectangular Channel

50 year Runoff Generated from the Proposed Site and External Catchment (m^3/s)	Length (m)	Nominal Diameter (mm)	No. of Pipe	Gradient, S_f		Velocity [7] (m/s)	50 year Runoff [1] (m^3/s)	Capacity (m^3/s)	Utilization (%)	Pipe Capacity > Runoff ?
				(%)	1 in					
2.229	6	1200	1	1.0	66.7	3.363	2.229	3.423	65%	Yes

Mean Velocity is calculated by Colebrook- White equation
Where:
V =Mean Velocity (m/s)
R =Hydraulic Diameter (m)
Ks =Surface Roughness (m)
V =Kinematic viscosity (kg/ms)
S =Slope of Hydraulic Gradient
g =Gravity (m/s2)

$$\bar{V} = -\sqrt{32gRS_f}\log\left[\frac{k_s}{14.8R} + \frac{1.255\nu}{R\sqrt{32gRS_f}}\right]$$

The Roughness Coefficient Ks is assumed to be 1.5 for Concrete (Monolithic construction against rough forms)

Appendix D

Calculation of Existing Open Rectangular Channel

Calculation Sheet	Sheet No. 1	Rev. 1
	Lot No. DD125	
Job Tilte: Proposed Temporary Open Storage of Construction Materials, Construction Machineries and Vehicles with Ancillary Facilities for A Period of 3 Years and Associated Filling of Pond/Land and Excavation Of Land Various Lots in D.D. 125 And Adjoining Government Land, Ha Tsuen, Yuen Long, New Territories	Date	10/10/2023

Checking of Capacity of Existing Rectangular Channel

Input Data

Width of Existing Rectauglar Channel = 2.5 m
Height of Existing Rectauglar Channel = 1 m
Design Flow Generated from the Proposed Site
= 8.051 m^3/s 1

Flow capacity, Q

$$Q = \frac{A \times r^{2/3} \times s^{1/2}}{n}$$

2.5

where
A = cross sectional area of flow (m^2) = 2.5 m^2
A' = Adjusted cross sectional area (SDM Section 9.3) = 2.5 x 0.9
with 10% reduction in flow area = 2.25 m^2
r = hydraulic radius (m)
s = slope of the water surface or the linear hydraulic head loss (m/m)
n = Manning coefficient of roughness

Hydraulic radius

$r = \frac{A'}{P}$

p = wetted perimeter (m) = 4.50 m

r = 0.50 *m*

Slope

s = 0.010 m/m (Gradient = 1:100)

Manning coefficient of roughness

n = 0.016 Fair Condition for Concrete-lined channels

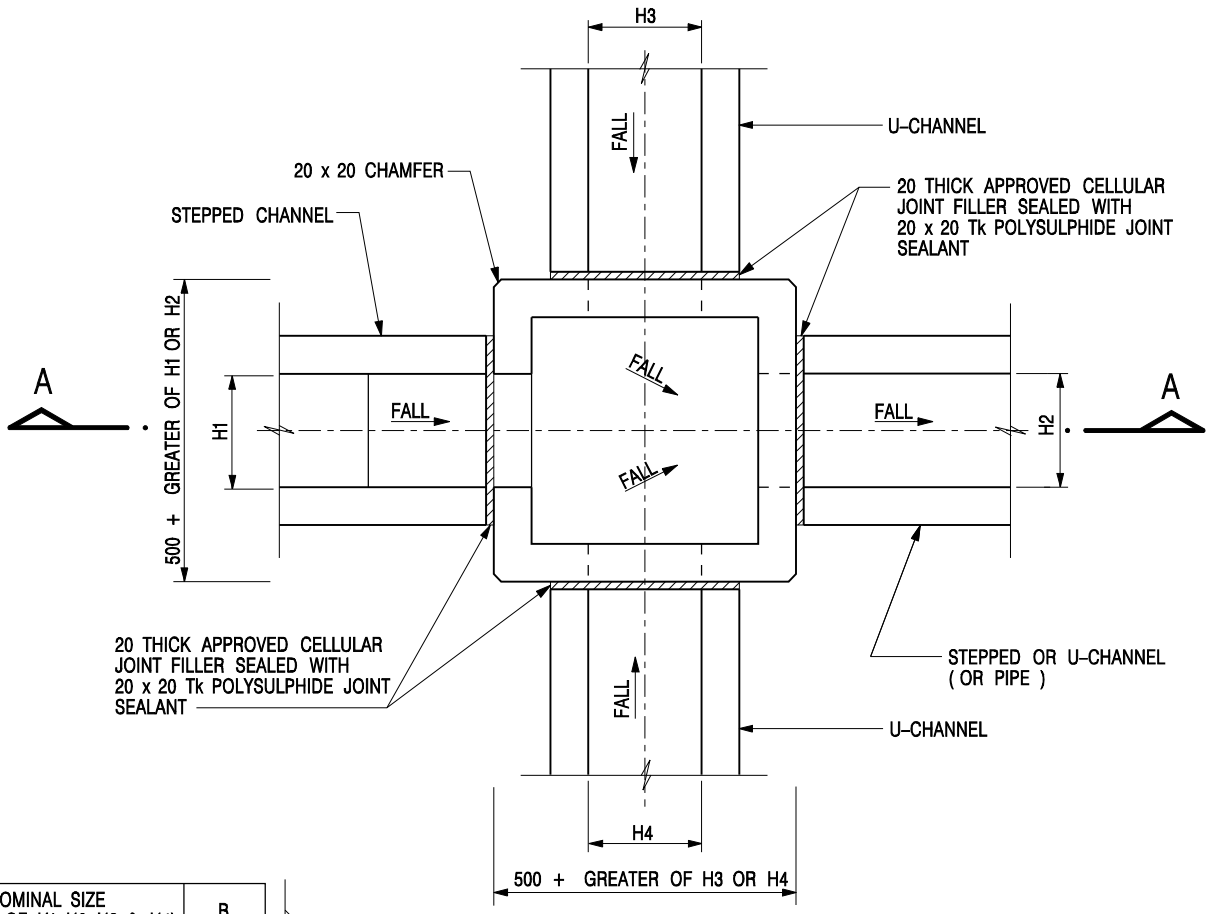
Therefore,

Q = 9.84313 m^3/s > Design flow, OK!

Utilization = 81.79%

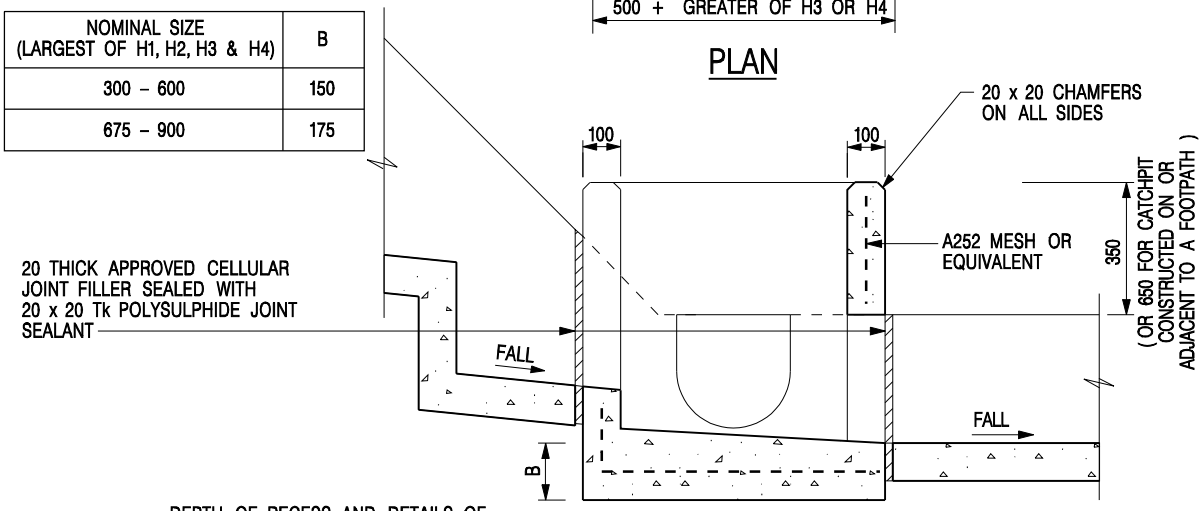
Appendix E

Standard Details

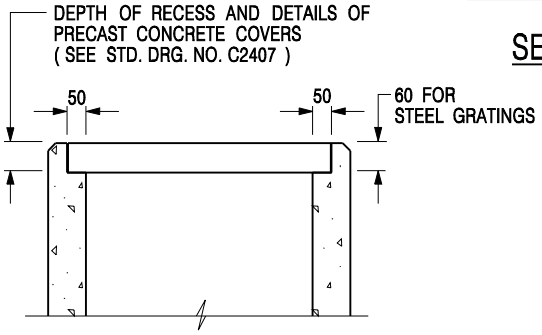


PLAN

NOMINAL SIZE (LARGEST OF H1, H2, H3 & H4)	B
300 – 600	150
675 – 900	175



SECTION A – A



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFER TO SHEET 5 FOR OTHER NOTES.

ALTERNATIVE TOP SECTION FOR PRECAST CONCRETE COVERS / GRATINGS

REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2405J.	Original Signed	03.2015

STANDARD CATCHPIT DETAILS

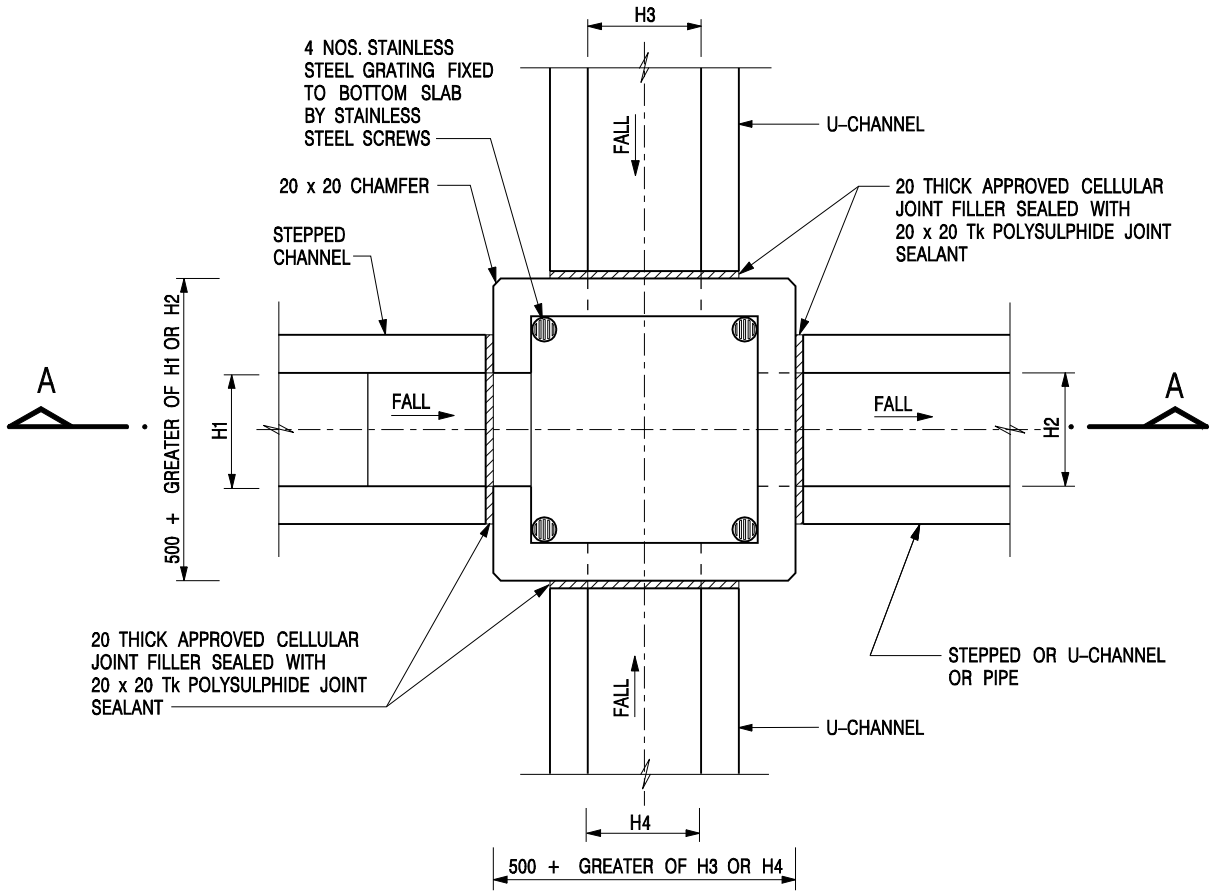
(SHEET 1 OF 5)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE	1 : 20	DRAWING NO.
DATE	JAN 1991	C2405 /1

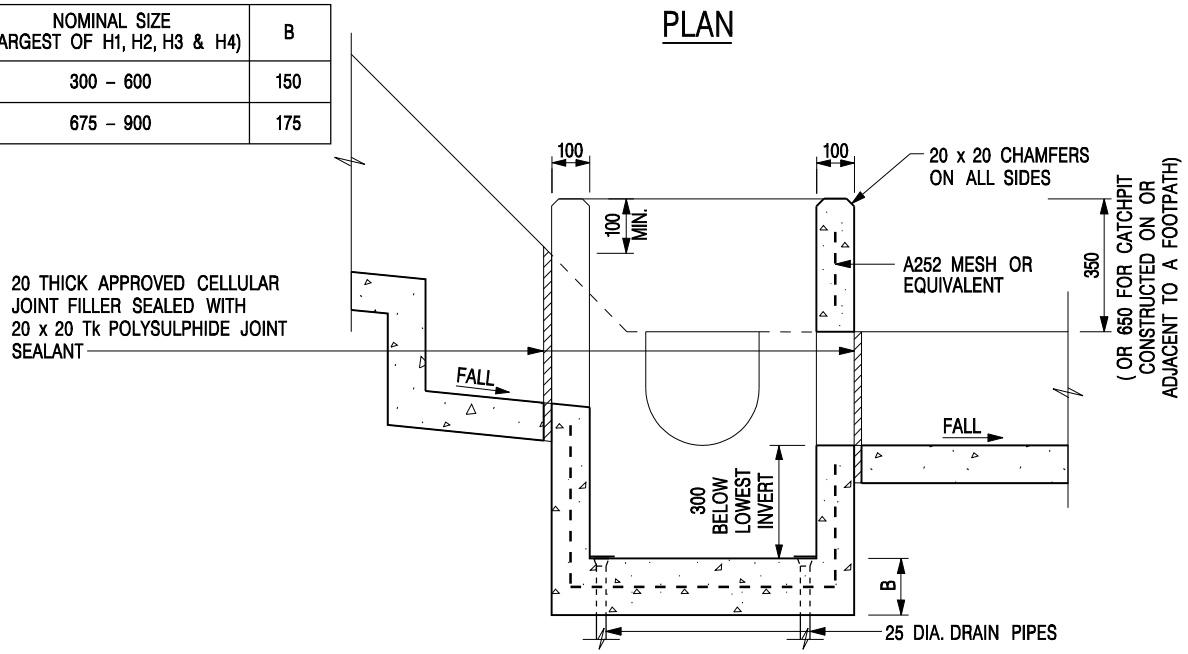
卓越工程 建設香港

We Engineer Hong Kong's Development



PLAN

NOMINAL SIZE (LARGEST OF H1, H2, H3 & H4)	B
300 – 600	150
675 – 900	175



SECTION A – A

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFER TO SHEET 2 FOR OTHER NOTES.

REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2406J.	Original Signed	03.2015

CATCHPIT WITH TRAP

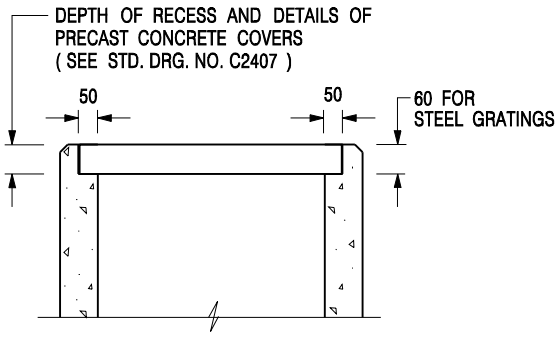
(SHEET 1 OF 2)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 20

DATE JAN 1991

DRAWING NO. C2406 /1



ALTERNATIVE TOP SECTION
FOR PRECAST CONCRETE COVERS / GRATINGS

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL CONCRETE SHALL BE GRADE 20 /20.
3. CONCRETE SURFACE FINISH SHALL BE CLASS U2 OR F2 AS APPROPRIATE.
4. FOR DETAILS OF JOINT, REFER TO STD. DRG. NO. C2413.
5. CONCRETE TO BE COLOURED AS SPECIFIED.
6. UNLESS REQUESTED BY THE MAINTENANCE PARTY AND AS DIRECTED BY THE ENGINEER, CATCHPIT WITH TRAP IS NORMALLY NOT PREFERRED DUE TO PONDING PROBLEM.
7. UPON THE REQUEST FROM MAINTENANCE PARTY, DRAIN PIPES AT CATCHPIT BASE CAN BE USED BUT THIS IS FOR CATCHPITS LOCATED AT SLOPE TOE ONLY AND AS DIRECTED BY THE ENGINEER.
8. FOR CATCHPITS CONSTRUCTED ON OR ADJACENT TO A FOOTPATH, STEEL GRATINGS (SEE DETAIL 'A' ON STD. DRG. NO. C2405 /2) OR CONCRETE COVERS (SEE STD. DRG. NO. C2407) SHALL BE PROVIDED AS DIRECTED BY THE ENGINEER.
9. IF INSTRUCTED BY THE ENGINEER, HANDRAILING (SEE DETAIL 'J' ON STD. DRG. NO. C2405 /5; EXCEPT ON THE UPSLOPE SIDE) IN LIEU OF STEEL GRATINGS OR CONCRETE COVERS CAN BE ACCEPTED AS AN ALTERNATIVE SAFETY MEASURE FOR CATCHPITS NOT ON A FOOTPATH NOR ADJACENT TO IT. TOP OF THE HANDRAILING SHALL BE 1 000 mm MIN. MEASURED FROM THE ADJACENT GROUND LEVEL.
10. MINIMUM INTERNAL CATCHPIT WIDTH SHALL BE 1 000 mm FOR CATCHPITS WITH A HEIGHT EXCEEDING 1 000 mm MEASURED FROM THE INVERT LEVEL TO THE ADJACENT GROUND LEVEL. AND, STEP IRONS (SEE DSD STD. DRG. NO. DS1043) AT 300 c/c STAGGERED SHALL BE PROVIDED. THICKNESS OF CATCHPIT WALL FOR INSTALLATION OF STEP IRONS SHALL BE INCREASED TO 150 mm.
11. FOR RETROFITTING AN EXISTING CATCHPIT WITH STEEL GRATING, SEE DETAIL 'G' ON STD. DRG. NO. C2405 /4.
12. SUBJECT TO THE APPROVAL OF THE ENGINEER, OTHER MATERIALS CAN ALSO BE USED AS COVERS / GRATINGS.

REF.	REVISION	SIGNATURE	DATE
A	MINOR AMENDMENT.	Original Signed	04.2016
–	FORMER DRG. NO. C2406J.	Original Signed	03.2015

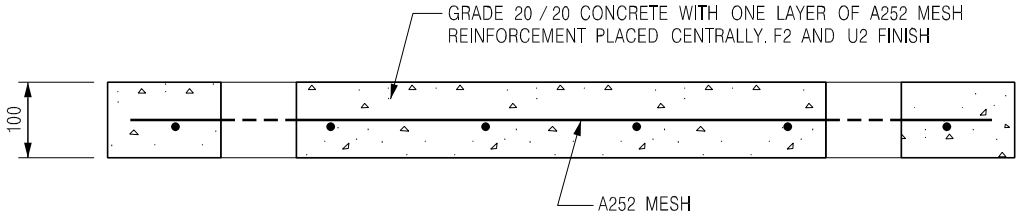
CATCHPIT WITH TRAP
(SHEET 2 OF 2)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

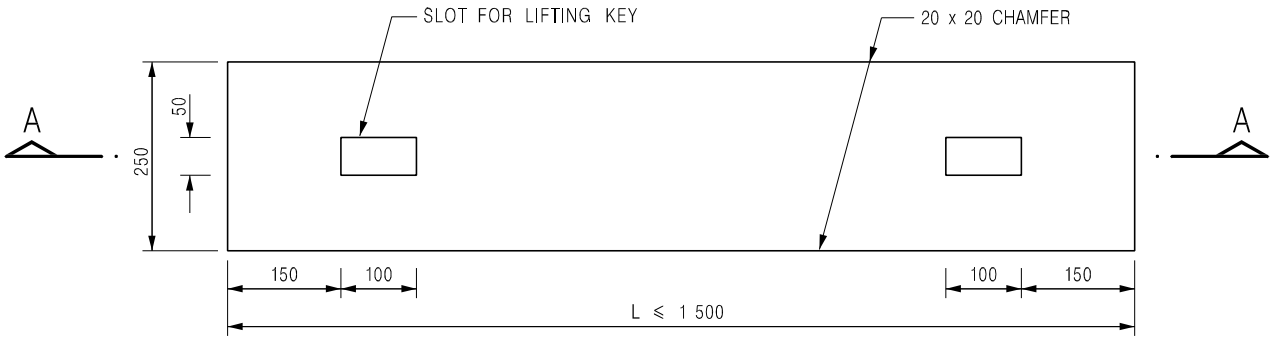
SCALE 1 : 20

DATE JAN 1991

DRAWING NO. C2406 /2A

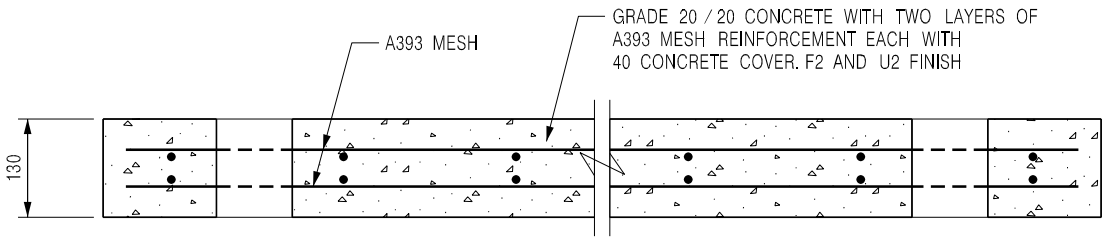


SECTION A – A

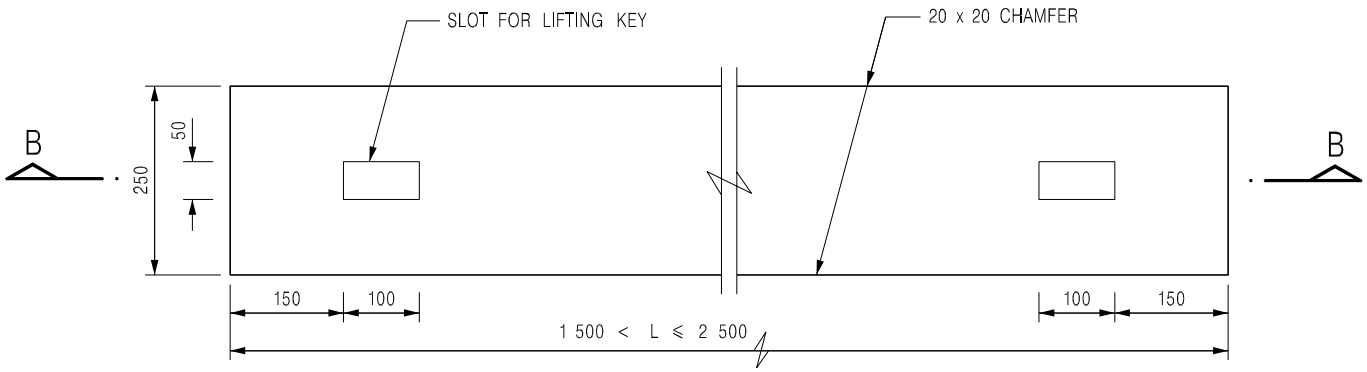


PLAN

TYPE 1 – FOR SPAN UP TO 1.5 m



SECTION B – B



PLAN

TYPE 2 – FOR SPANS 1.5 m TO 2.5 m

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL EXTERNAL EDGES OF THE COVERS SHALL BE 20mm CHAMFERED.

REF.	REVISION	SIGNATURE	DATE
B	NAME OF DEPARTMENT AMENDED.	Original Signed	01.2005
A	GENERAL REVISION	Original Signed	12.2002

PRECAST CONCRETE COVERS FOR CATCHPIT AND SAND TRAP

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 10

DATE JAN 1991

DRAWING NO. C2407B

興土木 利民生 齊拓展 創明天

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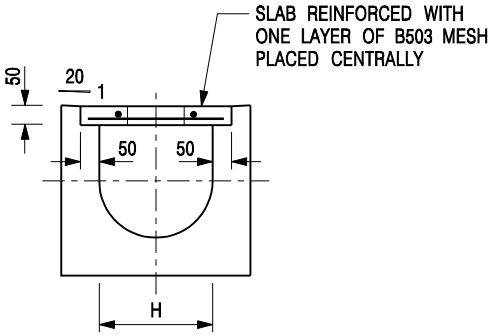
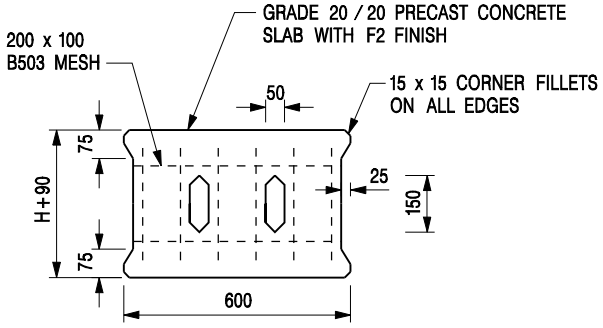


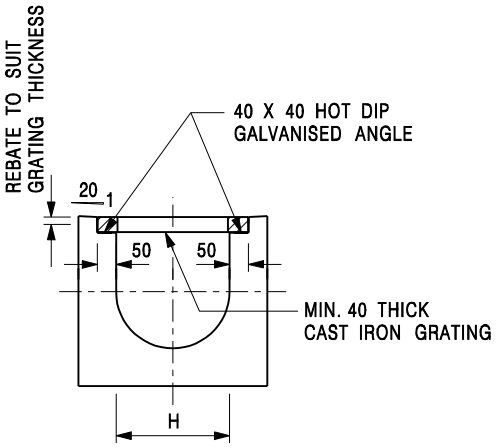
TYPICAL SECTION



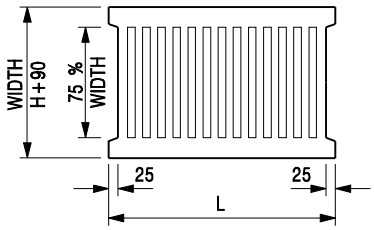
PLAN OF SLAB

U-CHANNELS WITH PRECAST CONCRETE SLABS

(UP TO H OF 525)



TYPICAL SECTION



L = 600mm FOR H ≤ 375mm
L = 400mm FOR H > 375mm

CAST IRON GRATING

(DIMENSIONS ARE FOR GUIDANCE ONLY, CONTRACTOR MAY SUBMIT EQUIVALENT TYPE)

U-CHANNEL WITH CAST IRON GRATING

(UP TO H OF 525)

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. H=NOMINAL CHANNEL SIZE.
3. ALL CAST IRON FOR GRATINGS SHALL BE GRADE EN-GJL-150 COMPLYING WITH BS EN 1561.
4. FOR COVERED CHANNELS TO BE HANDED OVER TO HIGHWAYS DEPARTMENT FOR MAINTENANCE, THE GRATING DETAILS SHALL FOLLOW THOSE AS SHOWN ON HyD STD. DRG. NO. H3156.

REF.	REVISION	SIGNATURE	DATE
E	NOTES 3 & 4 AMENDED.	Original Signed	12.2014
D	NOTE 4 ADDED.	Original Signed	06.2008
C	MINOR AMENDMENT. NOTE 3 ADDED.	Original Signed	12.2005
B	NAME OF DEPARTMENT AMENDED.	Original Signed	01.2005
A	CAST IRON GRATING AMENDED.	Original Signed	12.2002

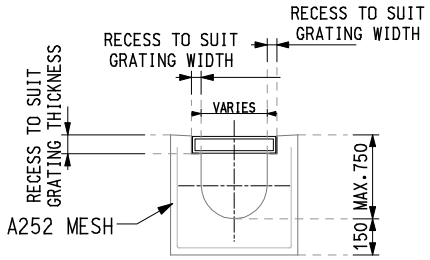
COVER SLAB AND CAST IRON GRATING FOR CHANNELS

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 20

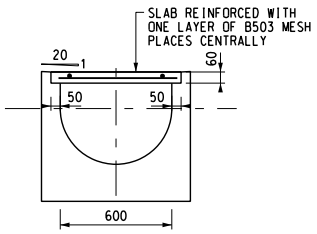
DATE JAN 1991

DRAWING NO. C2412E

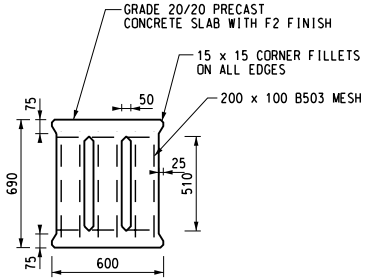


TYPICAL CROSS SECTION OF U-CHANNEL WITH COVER

SCALE N.T.S.



TYPICAL SECTION



PLAN OF SLAB

U-CHANNELS WITH PRECAST CONCRETE SLABS

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED
2. DETAILS OF CATCHPIT REFER TO STANDARD DRAWING NO. C2405/1.
3. DETAILS OF CATCHPIT WITH TRAP STANDARD DRAWING NO. C2406/1.

PLANNING CONSULTANT

PROJECT

PROPOSED TEMPORARY OPEN STORAGE OF CONSTRUCTION MATERIALS, CONSTRUCTION MACHINERIES AND VEHICLES WITH ANCILLARY FACILITIES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF POND/LAND AND EXCAVATION OF LAND

SITE LOCATION

VARIOUS LOTS IN D.D. 125 AND ADJOINING GOVERNMENT LAND, HA TSUEN, YUEN LONG, NEW TERRITORIES

SCALE

AS SHOWN

DRAWN BY	DATE
TL	9.10.2023
CHECKED BY	DATE
APPROVED BY	DATE

DWG. TITLE

STANDARD DETAILS OF U-CHANNEL

DWG NO.	VER.
SD 1	001

Appendix F

Photo Records of the Existing Water Course
next to the Site

Photo Records of the Existing Water Course next to the Site

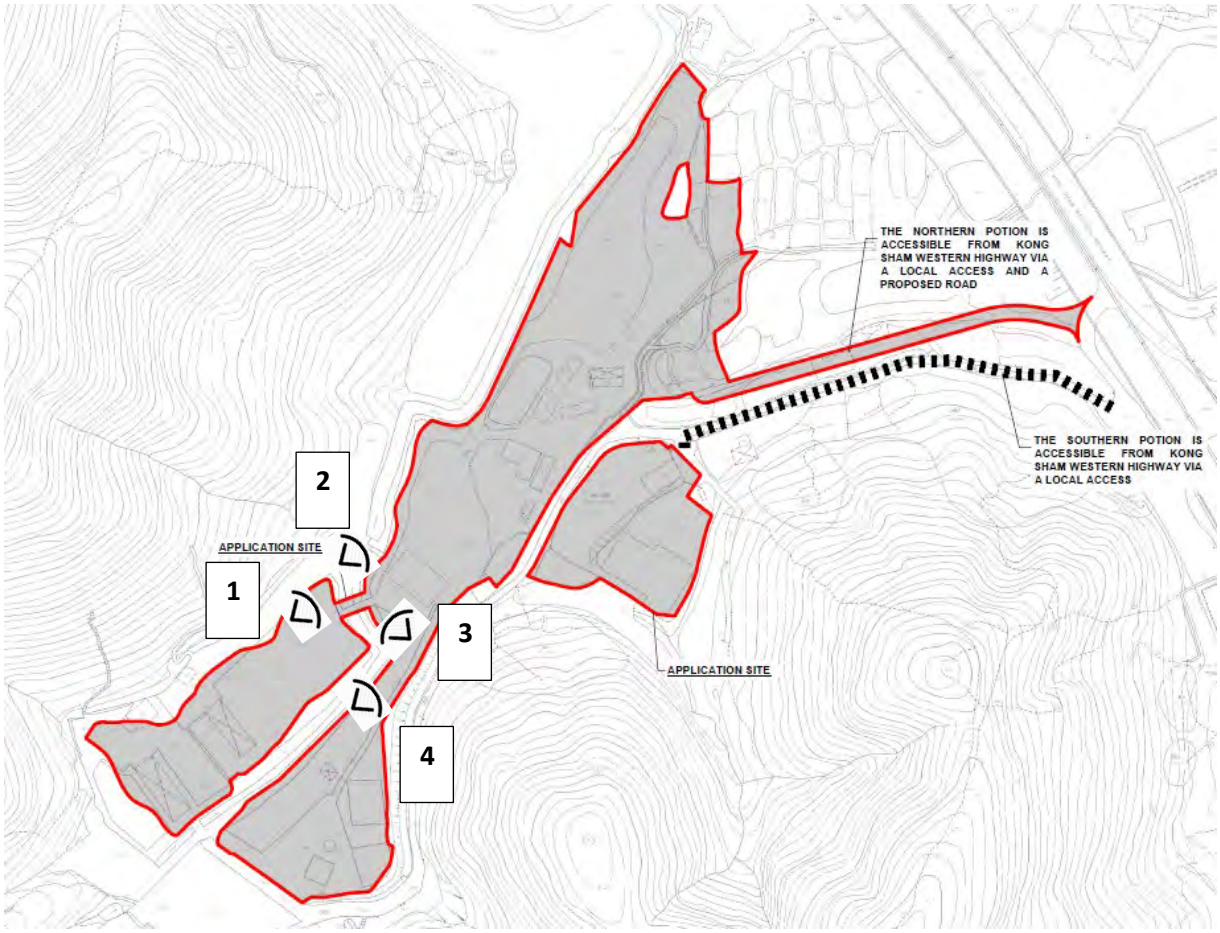


Photo Records of the Existing Water Course next to the Site

1

2

3

4