TEMPORARY DRAINAGE PROPOSAL

APPLICATION SITE OF PROPOSED TEMPORARY SHOP AND SERVICES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND AT LOT 443 (PART) IN D.D. 112 AND ADJOINING GOVERNMENT LAND, SHEK KONG, YUEN LONG

Application No.: A_YL-SK_392

Project No.: ALPL/TDM/005
Revision No.: 0
22 October 2024

1 Content

2 Introduction

2.1 Background

This report presents the Drainage Proposal for supporting the Proposed Temporary Shop and Services for a period of 3 years and associated filling of land at Lot 443 (part) in D.D. 112 and adjoining government land, Shek Kong, Yuen Long.

2.2 Objectives of the Report

This report shall be prepared to include the following:

- Identify the potential drainage impact assessment from the proposed Application Site
- Recommend and implement all necessary measures to mitigate adverse drainage impacts arising from the application site

2.3 Report Structure

The report contains the following sections:

- Section 1 on Introduction;
- Section 2 on Development Proposal;
- Section 3 on Assessment Criteria;
- Section 4 on Potential Drainage Impact; and
- Section 5 on Conclusion.

3 Development Proposal

3.1 Location of the Application Site

The application Site is located within the Shek Kong, Yuen Long, with an area of around 260m^2 (including Government Land of about 8m^2) and ground level varying between + 23.5mPD and + 23.7mPD. The layout plan is provided in **Appendix B**.

This application site is "Agriculture" zoning, the type of application is the Temporary Use/Development in Rural Areas for a Period of 3 Years.

There is a existing Drainage Service Department 12000mm width nullah (feature no.: SCP1005080) vicinity of the application site, with reference to Geoinfo Map, the location and site photos of the existing nullah are provided in **Appendix C**.

4 Assessment Criteria

4.1 Design Return Periods

The drainage system in the Application site is to collect surface flows and convey to downstream village drain. The recommended design return periods based on the flood levels for the various drainage systems depend on the drainage system, land use, hazard to public safety and community expectations. The recommended design return period is reproduced in Table 4-1 below:

DESCRIPTION	DESIGN RETURN PERIODS
Intensively Used Agricultural Land	2 – 5 Years
Village Drainage including internal Drainage System under a polder Scheme	10 Years
Main Rural Catchment Drainage Channels	50 Years
Urban Drainage Trunk System	200 Years
Urban Drainage Branch System	50 Years

Table 4-1 Recommended Design Return Periods based on Flood Levels

As per Storm Drainage Manuel (SDM) Section 6.6.2 Urban Drainage Branch and Urban Drainage Trunk Systems "An 'Urban Drainage Branch System' is defined as a group or network of connecting drains collecting runoff from the urban area and conveying stormwater to a trunk drain, river or sea. For a simple definition, the largest pipe size or the equivalent diameter in case of a box culvert in a branch system will normally be less than 1.8m.

An 'Urban Drainage Trunk System' collects stormwater from branch drains and/or river inlets, and conveys the flow to outfalls in river or sea. Pipes with size or diameter equal to or larger than 1.8m are normally considered as trunk drains."

As per SDM, since the proposed U-channels are sized smaller than 1.8m, the drainage system would be defined as an urban drainage branch with recommended design return period of 50 years.

The 50 years design return period will be considered to ensure adequacy of the stormwater drainage system.

4.2 Calculation Methodology for Runoff

Peak instantaneous runoff values before and after the development were calculated based on the Rational Method and with recommended physical parameters including runoff coefficient (C) and storm constants for different return periods referred to the SDM, based on the following equation:

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

where

Q_p	=	Peak Runoff, m^3/s
C	=	Runoff Coefficient
i	=	Rainfall Intensity, mm/hr
A	=	Catchment Area, km^2

The paved area of the site will account for 5240m2. For conservative, the runoff coefficient of 0.9 is assumed, such that the all the run-off would be collected from the catchment area without any infiltration as the critical scenario.

Based on the storm constants for 50-year return period recommended in the SDM, the appropriate rainfall intensities (i) are calculated as detailed in Appendix D

4.3 Calculation Methodology for Pipe Capacity Checking

Due to the catchment areas are less than 1ha, U-channels are recommended to be constructed to collect the stormwater runoff of the open area within the site. For the catchment area within the roofing of the one-story warehouse, stormwater would be collected by the gutter, and then be diverted to U-channel system at ground level via downpipe. The collected stormwater should finally be diverted to the downstream via the proposed U-channel system.

For the worst-case scenario, bad condition of concrete pipe is assumed for the Manning's roughness coefficient (coefficient value is 0.016) for calculating capacities of concrete U-channel using Manning's Equation.

Manning's Equation for calculating the channel and pipe capacities is adopted.

5 Potential Drainage Impact

5.1 Existing Site Condition

The application Site is located within the Shek Kong with an area of around 260m^2 and ground level varying between + 23.5mPD and + 23.7mPD.

5.2 Changes in Drainage Characteristics

Since the ground level of application site is generally higher than the adjacent ground surface. No external catchment shall be considered in the calculation.

The characteristics of the sub-catchment areas are altered due to the proposed application, which are changed from unpaved site area to paved area. The change in sub-catchment is summarized in Table 5-1.

	Before	After
Grassland (m^2)	0	0
Paved Area (m^2)	260	260
External Catchment Area(m^2)	0	0
Total Catchment Area (m^2)	260	260

Table 5-1 Change in sub-catchment within the site

5.3 Potential Drainage Impact

The details of the proposed drainage works are illustrated in **Appendix C**.

To effectively convey stormwater away from the application site and minimize the potential impact to the drainage infrastructure of the village area, drainage works consists of U-channels, are proposed to convey the stormwater runoff to the terminate catchpit with sand trap (TCP).

The runoff within application site is collected by one 150mm U-channel and one 225mm U-channel along the lower level boundary and convey to the existing terminate catchpit with sand trap (TCP)within the application site, before discharging to the existing nullah at the Northern direction of the application site, and eventually discharge to the further downstream as indicated in the **Appendix C**.

Drainage System	Estimated Flow (L/min)	Capacity (L/min)	Reserve Capacity
150mm u-channel	1053	1200	13%
225mm u-channel	1404	3600	61%

Table 4-2 Design calculation of the proposed drainage work

1. Rainfall increase due to climate change at the end of 21st century is considered according to stormwater drainage manual Table 28.
2. The reserve capacity is calculated by assuming that the U-channel reach its full capacity.

The design runoff arise from the proposed Application Site is to be discharged into the proposed terminate catchpit with the runoff anticipated to be 1404L/min, which is within the drainage capacity of the proposed 225mm u-channel of 3600L/min, the reserve capacity is 61%.

It is considered that the drainage discharge from the Application Site will not cause adverse impact to the entire downstream drainage system.

All u-channels & catch pits will be constructed according to the CEDD's standard drawings, please refer to the **Appendix E**.

6 Construction Stage

6.1 Temporary Drainage Arrangements

Proper measures shall be taken to maintain the existing drainage characteristics of the catchment areas and to minimize drainage impacts associated with the construction works. The principal drainage impacts which are associated with construction of the works have been identified as follows:
(i) Erosion of ground materials;
(ii) Sediment transportation to existing downstream drainage system; and
(iii) Obstruction to drainage systems.

Regular inspections shall be carried out to ensure integrity of the works. These inspections shall cover works under construction as well as recently completed areas.

To ensure proper operation of the site drainage channels and desilting facilities, inspection of the perimeter drains shall be carried out on a weekly basis and the desilting facilities shall be cleaned on a daily basis.

If excavated materials are not possible to transport away the excavated material within the same day, the material should be covered by tarpaulin/impervious sheets. Stockpiles of construction materials (for examples aggregate, fill materials) of more than 50 m3 in an open area shall also be covered with tarpaulin or similar fabric during rainstorms.

All runoff discharged into the existing drainage system will be settled in a silt trap to ensure no sediment will be discharged into the channel. Silt traps will normally be provided along the site drainage immediately upstream of the proposed discharge point to the existing Site. The silt traps will be inspected daily and immediately after each rainstorm.

Liaison will be carried out with relevant parties regarding temporary drainage arrangements to ensure that the drainage system is functioning adequately.

7 Conclusions

7.1 Conclusions

The analysed catchment area of 260m2 consists of the site area of the proposed Application Site only and no external catchment area had been identified.

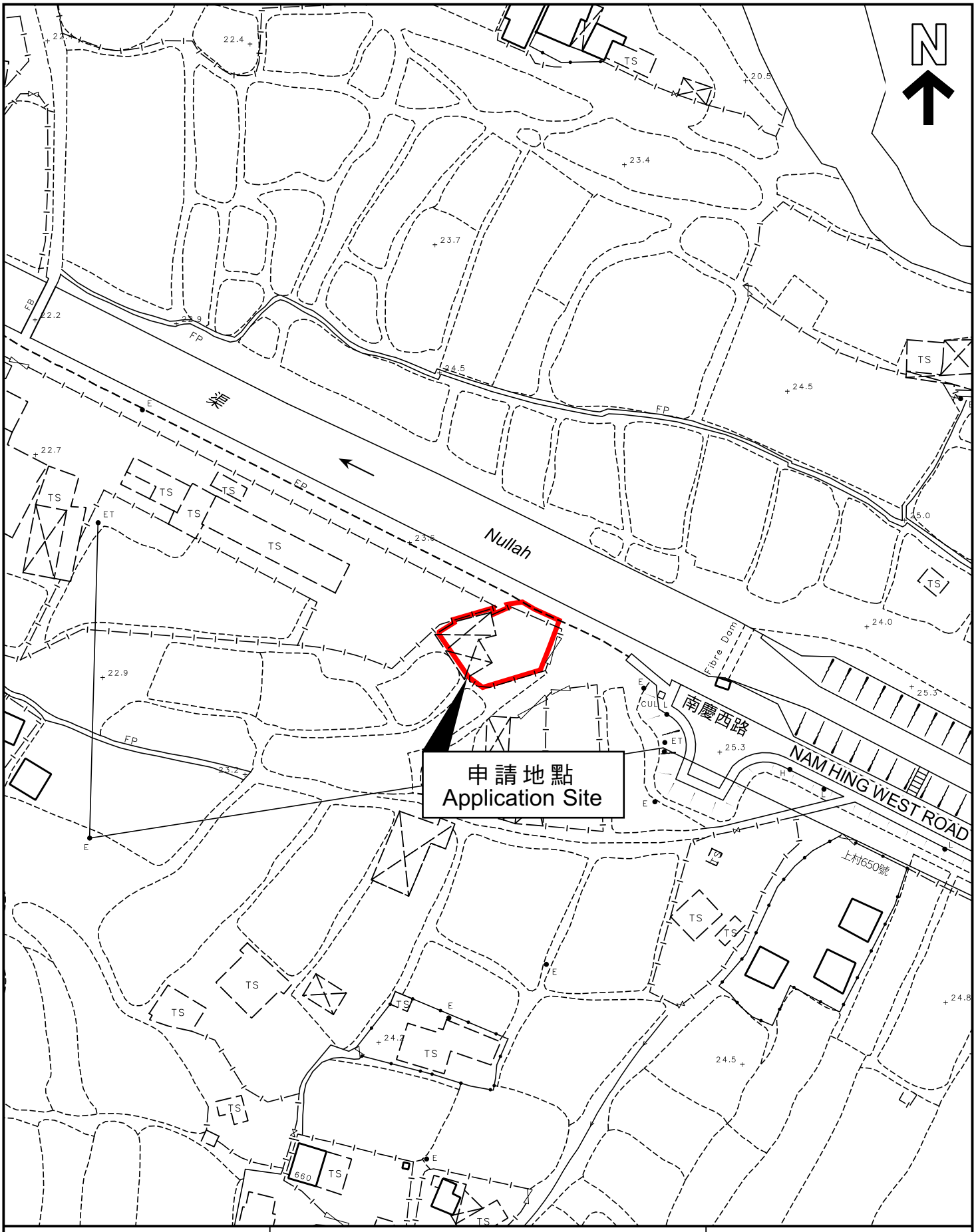
U-channels are proposed to convey runoff from the application site for collection. The proposed U-channels are located along the lower-level boundary which is subject to change to suit the building layout.

The assessment reviews the drainage pipe have the sufficient capacity to cater for the drainage flow from the Application Site.

Mitigation measures are proposed during the construction period and to ensure that the existing drainage system within the site will not be affected during the construction stage.

APPENDIX A

SITE LAYOUT PLAN



本摘要圖於2024年10月15日擬備，
所根據的資料為測量圖編號6-NE-14C及19A

EXTRACT PLAN PREPARED ON 15.10.2024 BASED ON SURVEY SHEETS No. 6-NE-14C & 19A

平面圖 SITE PLAN

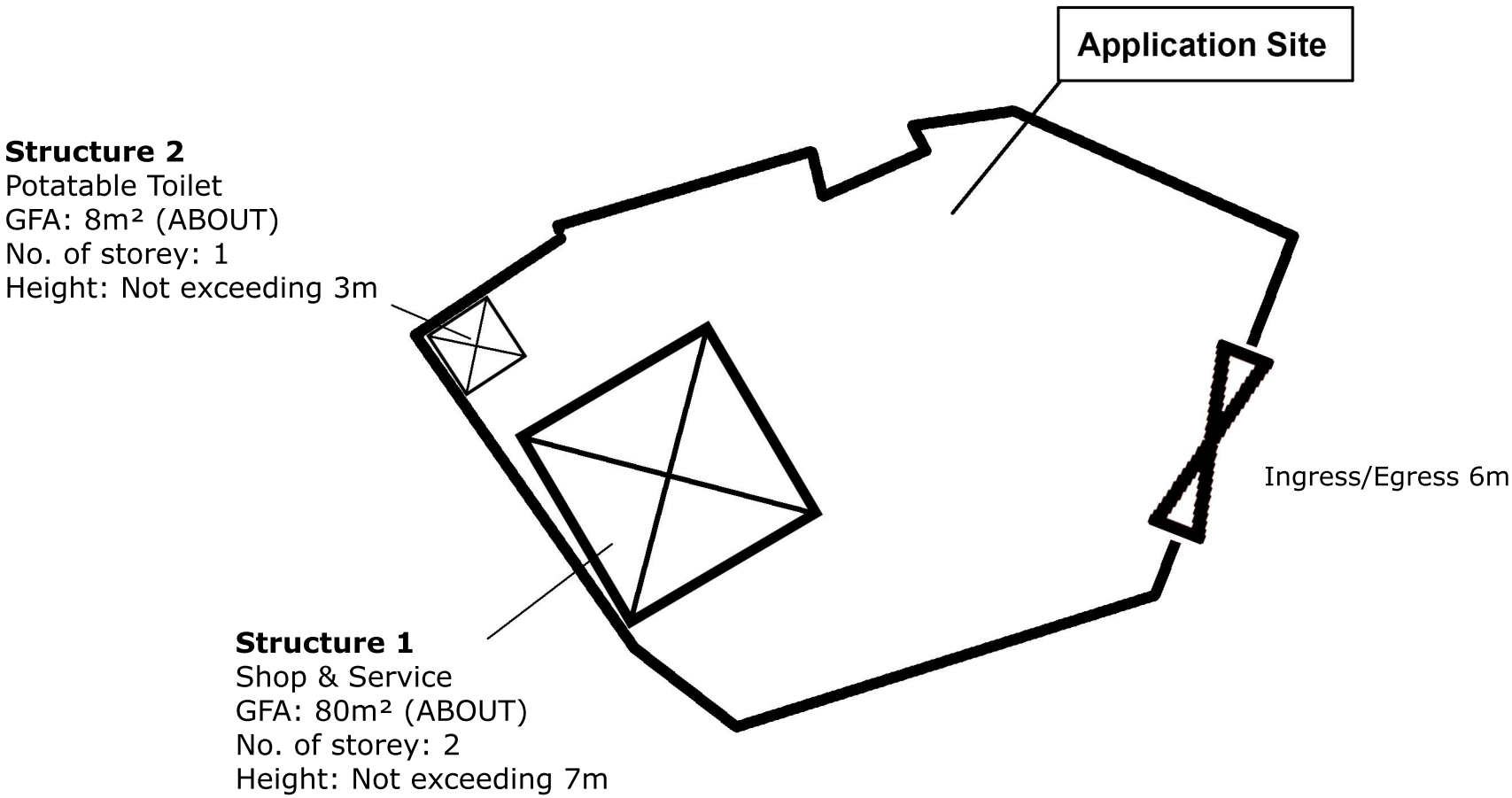
申請地點界線只作識別用
APPLICATION SITE BOUNDARY FOR IDENTIFICATION PURPOSE ONLY

參考編號
REFERENCE No.

A/YL-SK/392

APPENDIX B

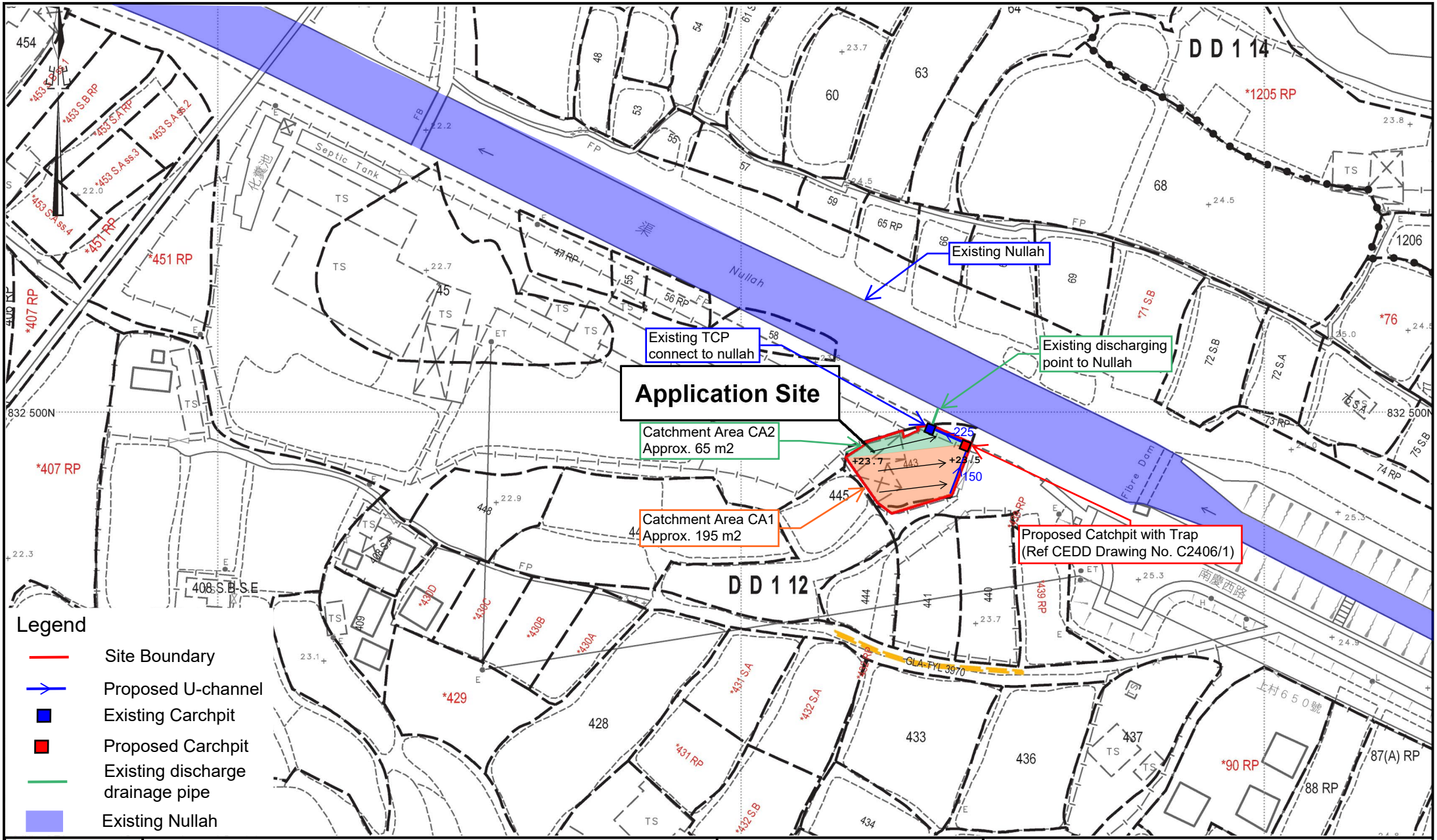
LAYOUT PLAN



Allgain Land Planning 全堅土地規劃	Project 項目名稱: Proposed Temporary Shop and Service for a Period of 3 Years and Associated Filling of Land at Lot 443 (Part) in D.D.112 and Adjoining Government Land,Shek Kong, Yuen Long, New Territories	Drawing Title 圖紙標題: Layout Plan Drawing No. 圖號: 20241004	Remarks 備註: ☒ Structure

APPENDIX C

PROPOSED DRAINAGE PLAN



Allgain Land Planning
全堅土地規劃

Project 項目名稱:

Proposed Temporary Shop and Service for a Period of 3 Years and Associated Filling of Land at Lot 443 (Part) in D.D.112 and Adjoining Government Land,Shek Kong, Yuen Long, New Territories

Drawing Title 圖紙標題:

Proposed Drainage Plan

Drawing No. 圖號:

20241004

Remarks 備註:

APPENDIX D

DESIGN CALCULATION OF THE PROPOSED DRAINAGE SYSTEM

PROJECT: *APPLICATION SITE OF PROPOSED TEMPORARY SHOP AND SERVICES FOR A PERIOD OF 3 YEARS AND ASSOCIATED FILLING OF LAND*
JOB NO : *ALPL/TDM/005*
TITLE : ***Temporary Drainage Design Calculation***

Revision : *0*
Date : *22-Oct-24*
Prepare By: *JW*

DETERMINE THE CATCHMENT OF AREA

CA1 = 195 (m^2)
CA2 = 65 (m^2)

DETERMINE THE INLET TIME

Section	*A = Catchment of Area (m^2)*		*Level of remote point (mPD)*	*Level of inlet point (mPD)*	*L (m)*	*H (m/100m)*	*t_e = Time of Natural flow (min)*
1	*CA1*	*195*	*23.7*	*23.5*	*24.2*	*0.83*	*2.15*
2	*CA2*	*65*	*23.7*	*23.5*	*24.2*	*0.83*	*2.40*

Ref.: ***Brandsby Williams Equation***

Note: $t_e = \frac{0.14465.L}{H^{0.2}.A^{0.1}}$

H = average slope (m per 100m), measured along the line of natural flow, from the summit of the catchment to the point under consideration

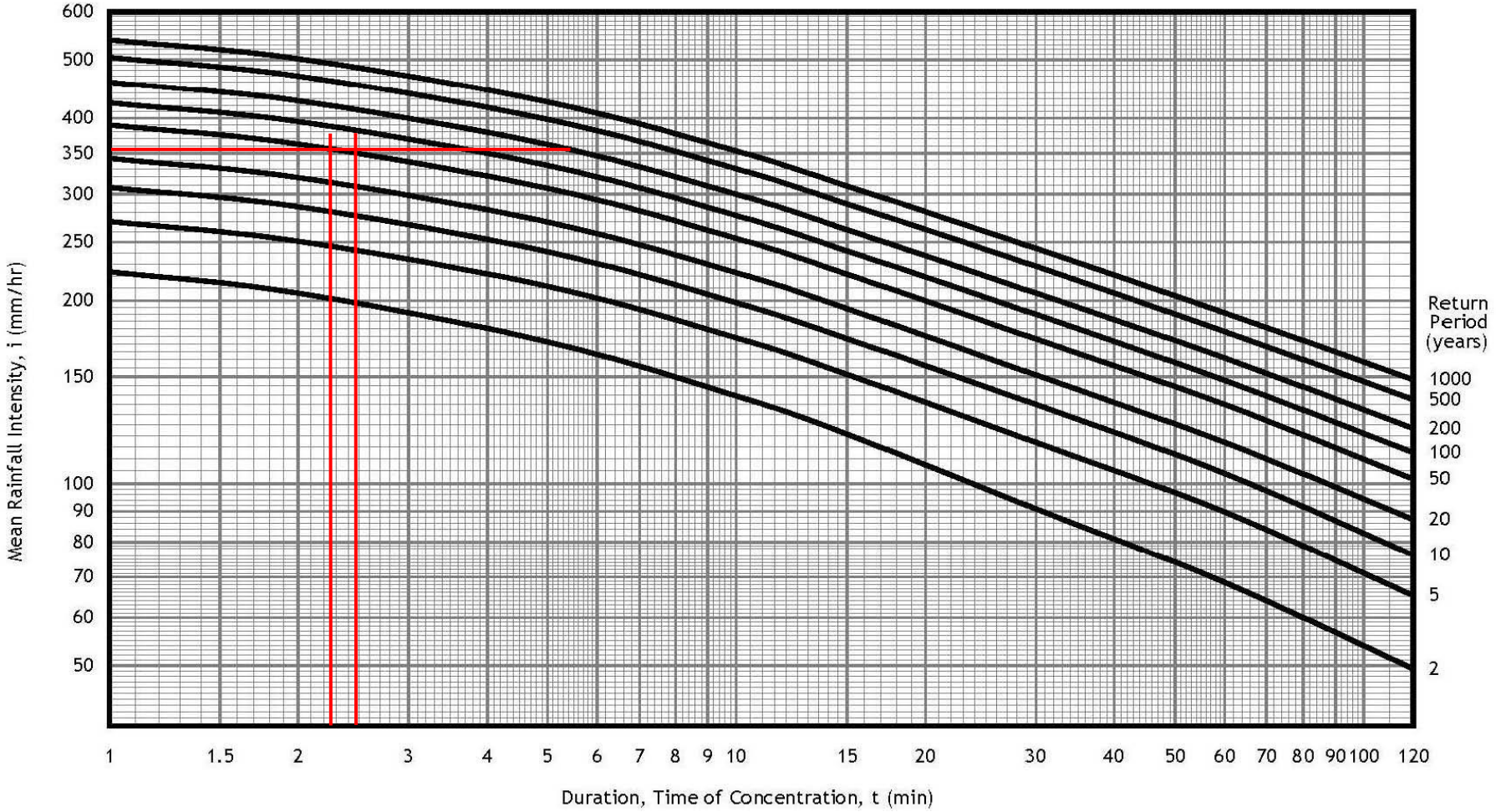
L = distance (on plan) measured on the line of natural flow between the summit and the point under consideration (m).

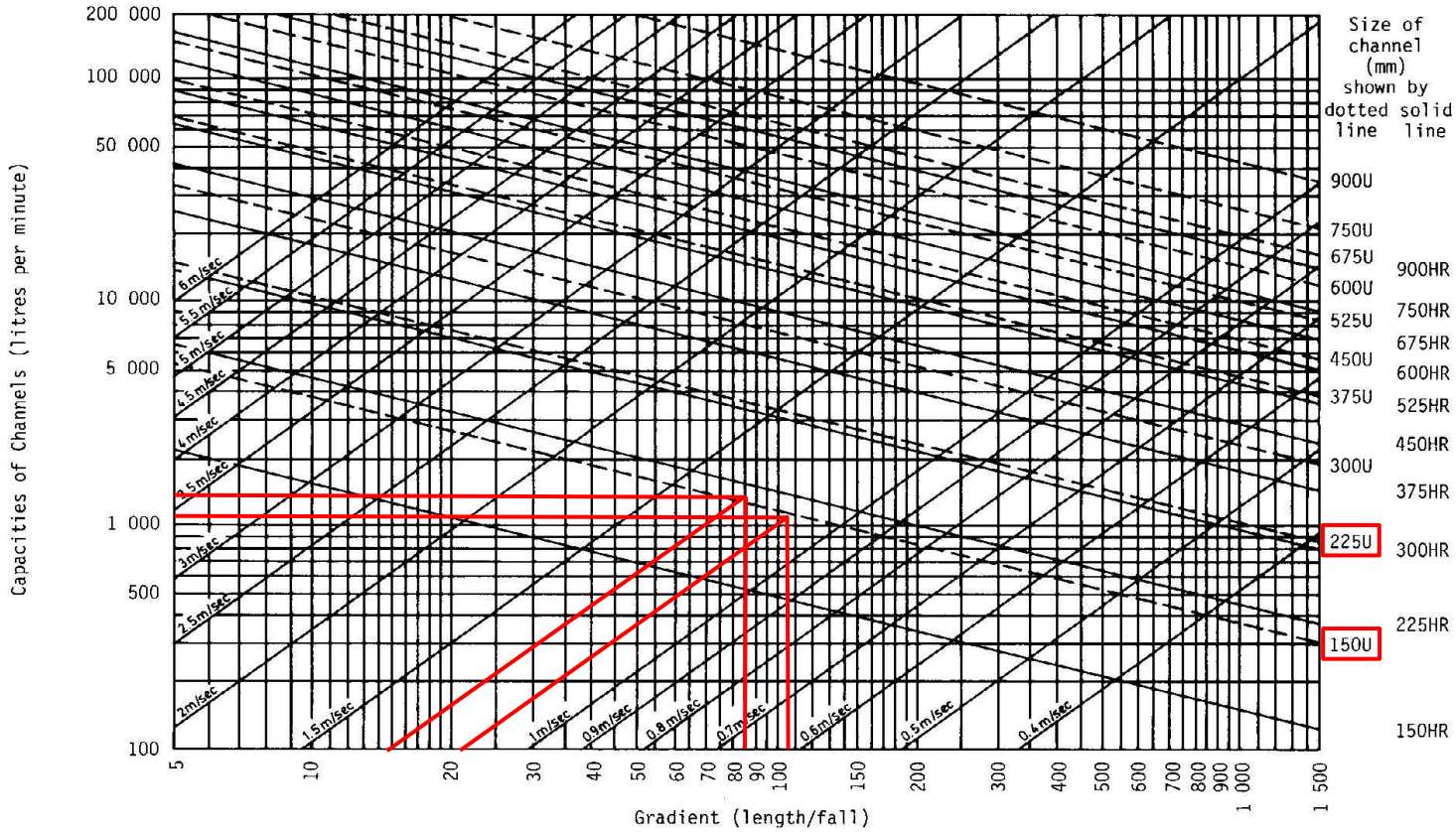
DETERMINE THE SIZE OF STEPPED / U-CHANNEL

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18				
Section No.	Ldr (m)	Lh (m)	L (m)	Gradient (1 in)	Site area (m^2)	others area (m^2)	Total area (m^2)	A (m^2)	channel size	Capacity (l/min)	Assumed Flow	t_f (min)	t_e (min)	t_c (min)	I (mm/hr)	Runoff (l/min)	Remark				
1.00	0.10	10.60	10.60	106.00	195.00	0.00	195.00	195.00	150	1200	1.50	0.12	2.15	2.26	360.00	1053.0	*O.K.*	*CAPACITY > RUNOFF*	**[Use new**	**150**	**U, so it is**	**O.K.]**
2.00	0.10	8.50	8.50	85.00	65.00	195.00	260.00	260.00	225	3600	1.50	0.09	2.40	2.49	360.00	1404.0	*O.K.*	*CAPACITY > RUNOFF*	**[Use new**	**225**	**U, so it is**	**O.K.]**

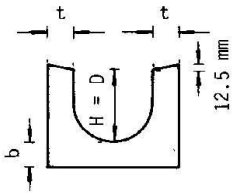
Note:
Ldr = Different level between U-channel section
Gradient = 1 in (Lh/Ldr)
Total area = Site area + others area
A=Cumulative area = Total area + others section area
Capacity = Refer to the extracted Figure 8.7 - Chart for the Rapid Design of Channels (Geotechnical Manual for Slopes P.253)
Assumed flow velocity = Assumed velocity of runoff
Actual Flow velocity = Refer to the extracted Figure 8.7 - Chart for the Rapid Design of Channels (Geotechnical Manual for Slopes P.253)
t_f = Flow time = L / assumed flow velocity
t_e = inlet time (time taken for flow from the remotest point to reach the most upstream point of the urban drainage system)
t_c = Time of concentration = $t_f + t_e$ (Min. t_c = 1 min. for conservative design)
I = Intensity Refer to the extracted Figure 8.2 - Curves Showing Duration and Intensity of Rainfall in H.K. for Various Return Periods (Geotechnical Manual for Slopes P.248)
K = Runoff coefficient = 0.9 refer to Character of Surface (refer DSD(2013))
Design Return Period = 50 years
Runoff = K.I.A./3600 (l/s) = K.I.A./60 (l/min)
UC U-channel
SC Stepped channel

For section no. 1.00 , **Actual** Flow Velocity = **1.10** m/s < **4m/s, O.K.**
For section no. 2.00 , **Actual** Flow Velocity = **1.30** m/s < **4m/s, O.K.**

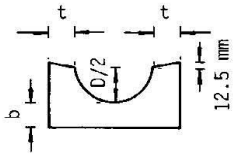

600
500
400
350
300
250
200
150
100
90
80
70
60
50
Mean Rainfall Intensity, i (mm/hr)
1
1.5
2
3
4
5
6
7
8
9
10
15
20
30
40
50
60
70
80
90
100
120
Duration, Time of Concentration, t (min)
Return Period (years)
1000
500
200
100
50
20
10
5
2



Channel dimensions



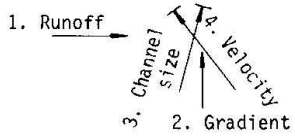
U-shaped channel (U)



Half-round channel (HR)

DESIGN METHOD USING CHART

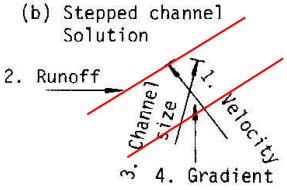
(a) Normal channel Solution



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



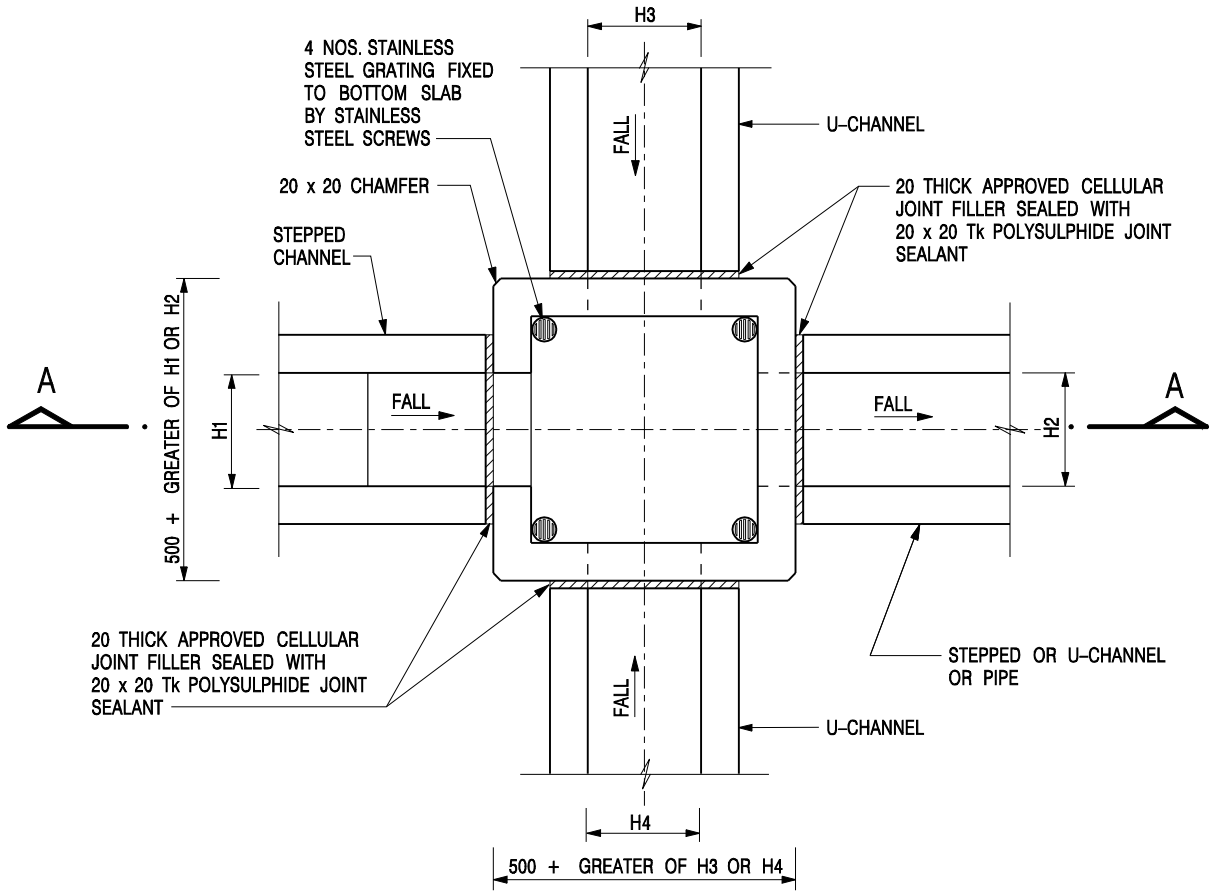
Example :

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

APPENDIX E

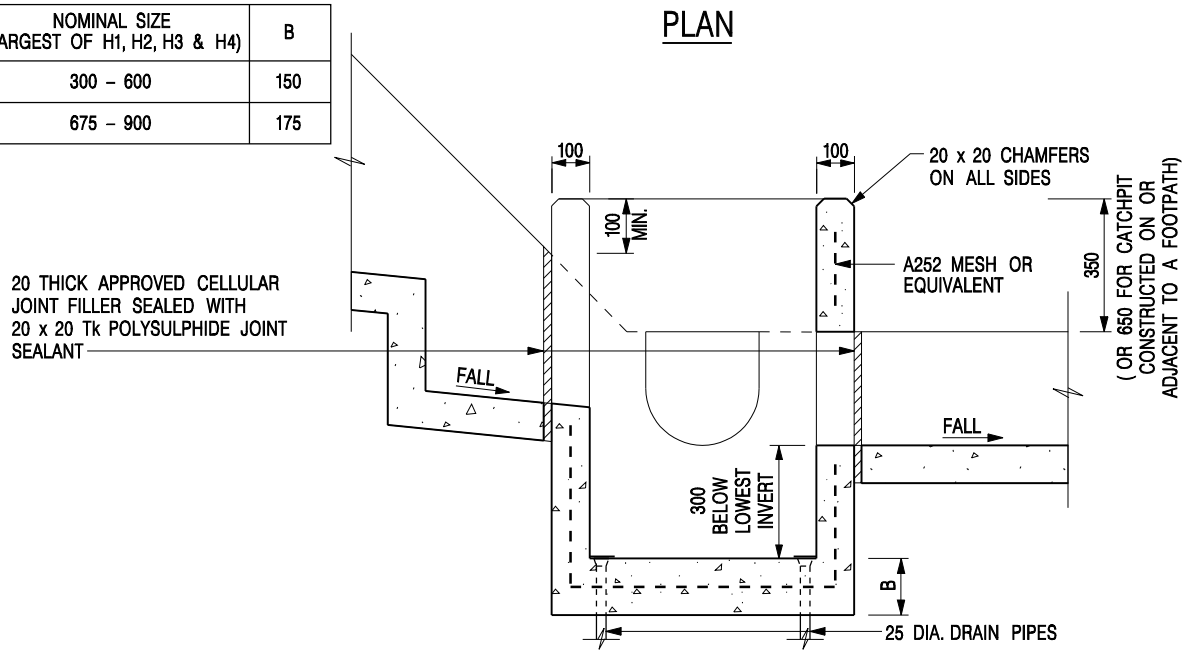
TYPICAL STANDARD DRAWINGS OF U-CHANNEL AND CATCHPIT

(EXTRACTED FROM CEDD, FOR REFERNCE ONLY)



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

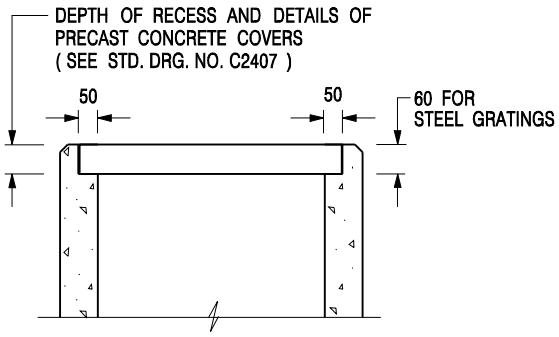
(SHEET 1 OF 2)

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

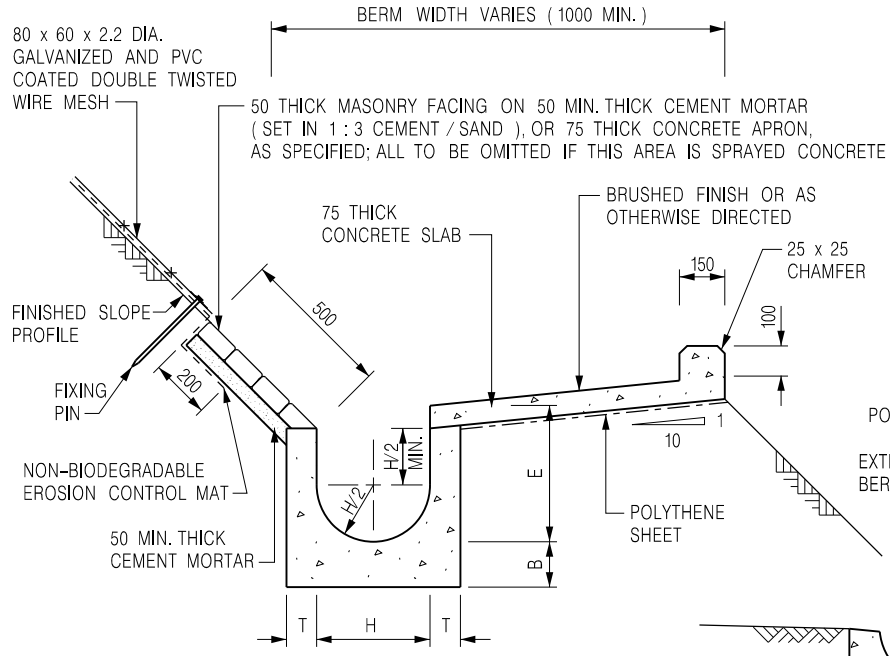
CATCHPIT WITH TRAP
(SHEET 2 OF 2)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

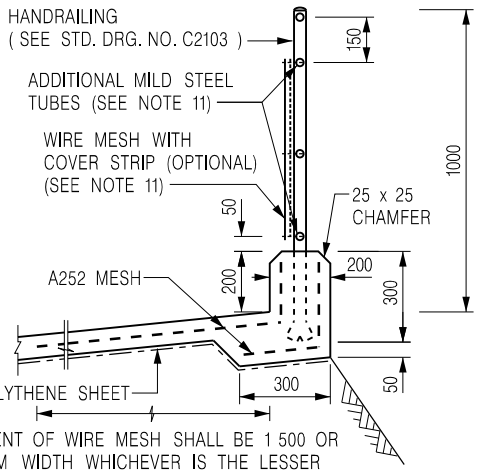
SCALE 1 : 20

DATE JAN 1991

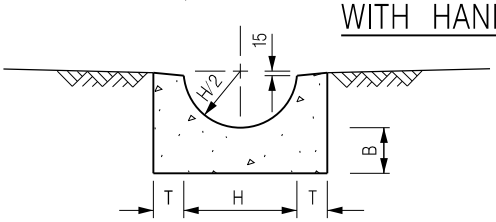
DRAWING NO. C2406 /2A



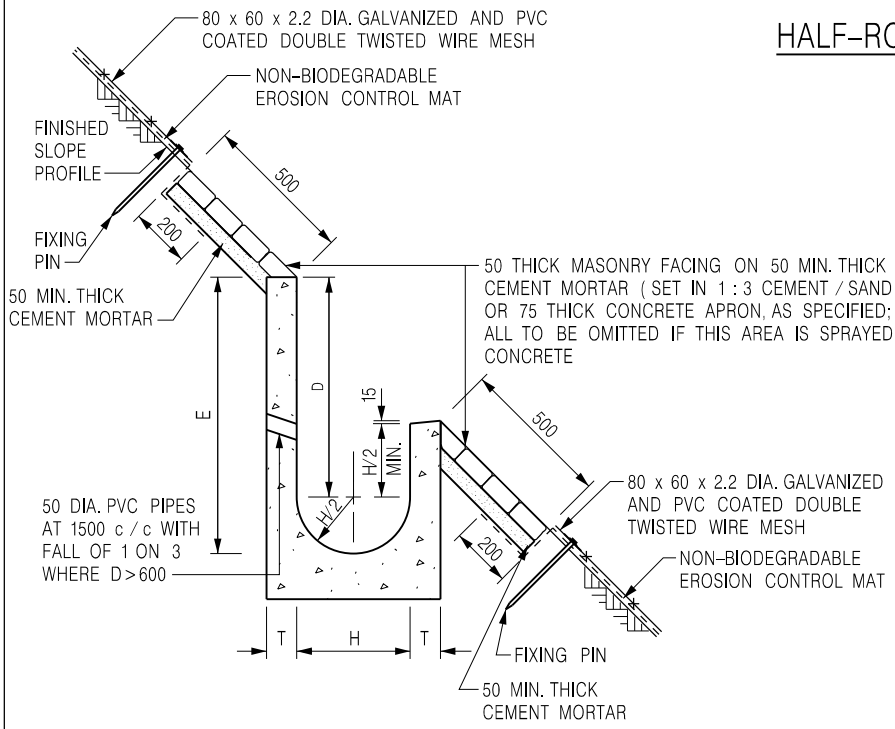
U-CHANNELS CONSTRUCTED ON BERM



DETAILS OF BERM WITH HANDRAILING



HALF-ROUND CHANNEL



U-CHANNELS NOT CONSTRUCTED ON BERM

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL CONCRETE TO BE GRADE 20 / 20.
3. CONCRETE SURFACE FINISH SHALL BE CLASS U2, F2 OR BRUSHED FINISH AS DIRECTED.
4. SPACING OF EXPANSION JOINT IN CHANNELS, BERM SLABS AND APRONS TO BE 10 METRES MAXIMUM, SEE STD. DRG. NO. C2413 FOR DETAILS.
5. JOINTS FOR CHANNELS, BERM SLABS, APRONS AND WALLS, ETC. TO BE ON THE SAME ALIGNMENT.
6. FOR DIMENSIONS T, H, & B, SEE TABLE BELOW.
7. BIODEGRADABLE EROSION CONTROL MAT IF REQUIRED, SEE STD. DRG. NO. C2511/1E.
8. CONCRETE TO BE COLOURED AS SPECIFIED.
9. CONCRETE U-CHANNEL CAN BE CAST IN-SITU OR PRECAST CONCRETE SUBJECT TO THE ENGINEER'S AGREEMENT ON THE DETAILS.
10. DETAILS OF EROSION CONTROL MAT AND WESH MESH ON BERM. (SEE STD DRG. NO. C2511/1E)
11. THE WIRE MESH ON HANDRAILING IS OPTIONAL. THE COVER STRIP AND ADDITIONAL MILD STEEL TUBES ARE NEEDED ONLY IF WIRE MESH IS PROVIDED. (SEE STD. DRG. NO. C2103)

NOMINAL SIZE H	T	B	REINFORCEMENT
300	80	100	A252 MESH PLACED CENTRALLY AND T=100 WHEN E>650
375 – 600	100	150	
675 – 900	125	175	A252 MESH PLACED CENTRALLY

REF.	REVISION	SIGNATURE	DATE
J	DETAILS OF HANDRAILING AMENDED.	Original Signed	08.2024
I	MINOR AMENDMENT.	Original Signed	07.2018
H	THICKNESS OF MASONRY FACING AMENDED.	Original Signed	01.2005
G	MINOR AMENDMENT.	Original Signed	01.2004
F	GENERAL REVISION.	Original Signed	12.2002

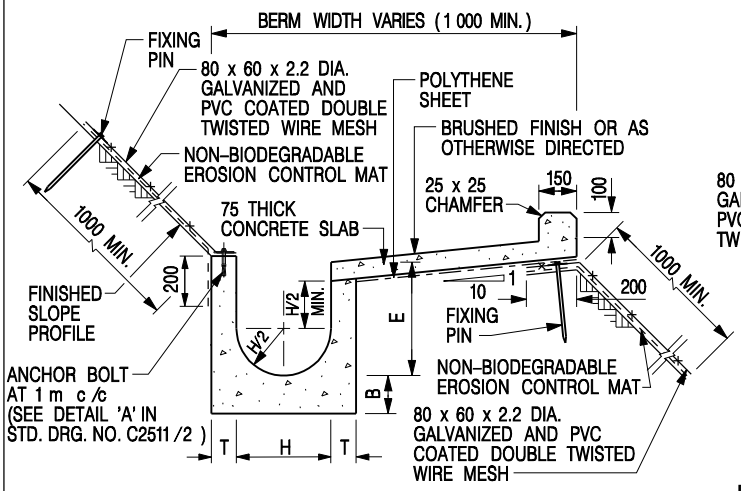
DETAILS OF HALF-ROUND AND U-CHANNELS (TYPE A – WITH MASONRY APRON)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

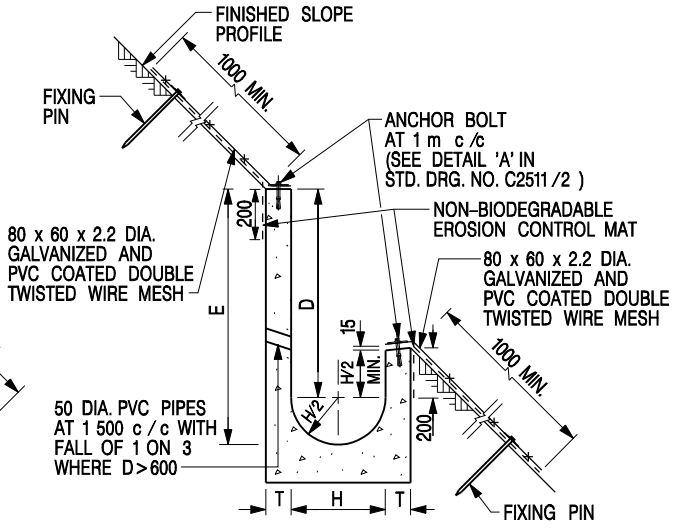
SCALE 1 : 25

DATE JAN 1991

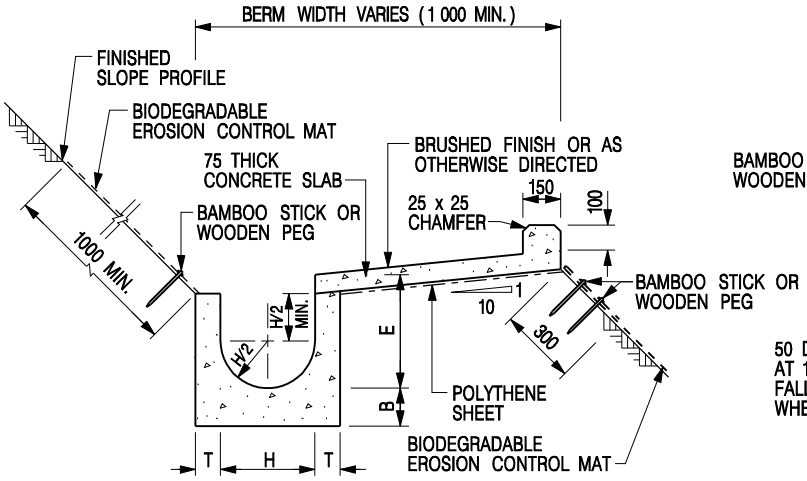
DRAWING NO. C2409J



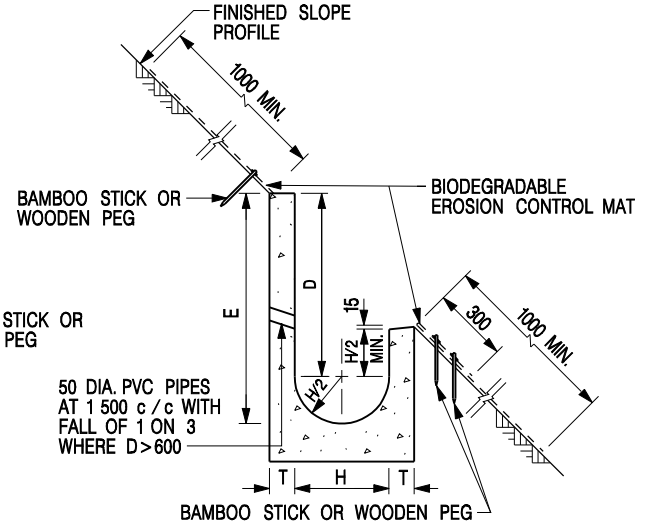
U-CHANNELS CONSTRUCTED ON BERM WITH NON-BIODEGRADABLE EROSION CONTROL MAT



U-CHANNELS NOT CONSTRUCTED ON BERM WITH NON-BIODEGRADABLE EROSION CONTROL MAT



U-CHANNELS CONSTRUCTED ON BERM WITH BIODEGRADABLE EROSION CONTROL MAT



U-CHANNELS NOT CONSTRUCTED ON BERM WITH BIODEGRADABLE EROSION CONTROL MAT

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL CONCRETE TO BE GRADE 20/20.
3. CONCRETE SURFACE FINISH SHALL BE CLASS U2, F2 OR BRUSHED FINISH AS DIRECTED.
4. SPACING OF EXPANSION JOINT IN CHANNELS, BERM SLABS AND APRONS TO BE 10 METRES MAXIMUM, SEE STD. DRG. NO. C2413 FOR DETAILS.
5. JOINTS FOR CHANNELS, BERM SLABS, APRONS AND WALLS, ETC. TO BE ON THE SAME ALIGNMENT.
6. FOR DIMENSIONS T, H, & B, SEE TABLE BELOW.
7. FOR TYPICAL FIXING PIN DETAILS, SEE STD. DRG. NO. C2511/2.
8. MINIMUM SIZE OF 25 x 50 x 300mm SHALL BE PROVIDED FOR WOODEN PEG.
9. MINIMUM SIZE OF 10mm DIAMETER WITH 200mm LONG SHALL BE PROVIDED FOR BAMBOO STICK.
10. THE FIXING DETAILS OF NON-BIODEGRADABLE AND BIODEGRADABLE EROSION CONTROL MATS ON EXISTING BERM SHALL REFER TO STD. DRG. NO. C2511/1.

NOMINAL SIZE H	T	B	REINFORCEMENT
300	80	100	A252 MESH PLACED CENTRALLY AND T=100 WHEN E>650
375 - 600	100	150	
675 - 900	125	175	A252 MESH PLACED CENTRALLY

REF.	REVISION	SIGNATURE	DATE
I	MINOR AMENDMENT.	Original Signed	07.2018
H	FIXING DETAILS OF BIODEGRADABLE EROSION CONTROL MAT ADDED.	Original Signed	12.2017
G	DIMENSION TABLE AMENDED.	Original Signed	01.2005
F	MINOR AMENDMENT.	Original Signed	01.2004
E	GENERAL REVISION.	Original Signed	12.2002
D	MINOR AMENDMENT.	Original Signed	08.2001
C	150 x 100 UPSTAND ADDED AT BERM.	Original Signed	6.99
B	MINOR AMENDMENT.	Original Signed	3.94
A	MINOR AMENDMENT.	Original Signed	10.92

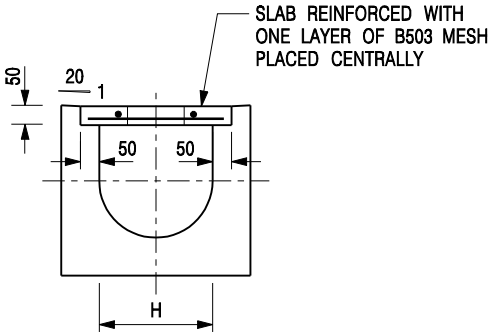
DETAILS OF HALF-ROUND AND U-CHANNELS (TYPE B - WITH EROSION CONTROL MAT APRON)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

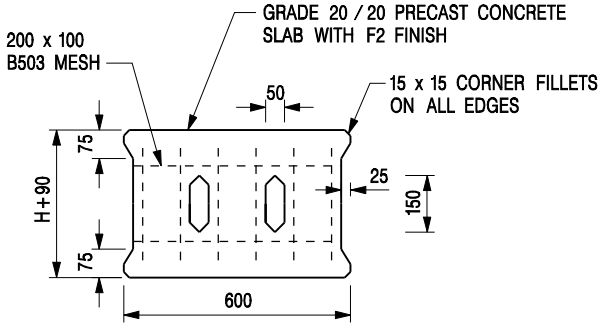
SCALE DIAGRAMMATIC

DATE JAN 1991

DRAWING NO. C2410I



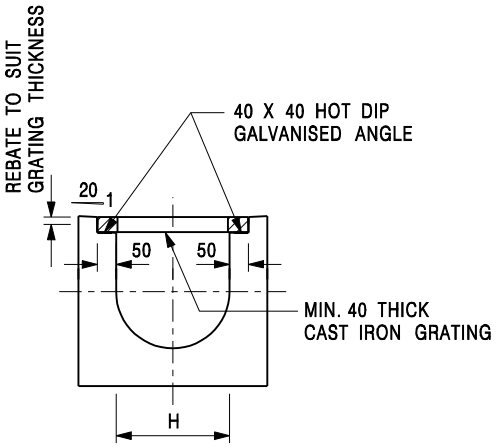
TYPICAL SECTION



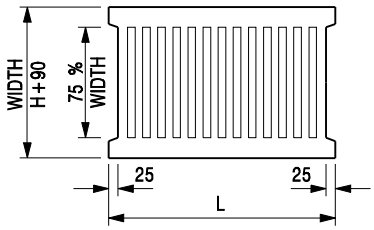
PLAN OF SLAB

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