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Ng Hang Kwong, BBS
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Honorary World Valuer (WAVO)

宋樹鴻
Sung Shu Hung
FRICS MHKIS R.P.S.(GP)(PD) MCIREA
MHIREA BSc (Hons)

Consultant :

劉志光
Lau Chi Kwong
FRICS FHKIS ALS MHKIUS
R.P.S.(LS)(PFM) MSc

李霧儀
Lee Mo Yi
MPIA RPP MUDD BA (Hons)

林桂金
Daniel K.K. Lam
MRICS MHKIS MCIREA R.P.S.(GP) BSc

趙慧姿
Chiu Wai Chi
MRICS MHKIS MSc BBus (MKtg)

陳志凌
Elwyn C. Chan
RPE PMgr CEnv FIHE FCIOB MICE
MHKIE MSOE FCMI MCIArb MSc

潘孝維
Pun How Wai
B.Arch.HK RIBA

By Email and Post

Date : 17 June 2026
Your Ref : TPB/A/NE-TKLN/124
Our Ref. : LDS/PLAN/7252

Secretary
Town Planning Board
15/F, North Point Government Offices
333 Java Road
North Point, Hong Kong

Dear Sir/Madam,

Application for Planning Permission for Proposed Temporary Green Fuel Station for Electric Private Vehicles with Ancillary Facilities for a Period of 3 Years at Lots 1343RP(Part), 1356RP in D.D. 78 and Adjoining Government Land, Lin Chuk Road, Ta Kwu Ling North, N.T.
(Application No. A/NE-TKLN/124)

We refer to the captioned application and herewith submit our responses to the comments from Drainage Services Department and a revised Drainage Proposal for your consideration.

Should there be any queries, please contact our Ms. Cannis Lee or Ms. Yancy Fung at [redacted]

Yours faithfully,
For and on behalf of
Lawson David & Sung Surveyors Limited

Lawson David & Sung

Encl.

c.c. DPO/STN (Attn: Timothy WU) – By Email
Client

[redacted]

Drainage Proposal in support of

Planning Application No. A/NE-TKLN/124

for Temporary Green Fuel Station for Electric Private Vehicles with Ancillary Facilities for a Period of 3 Years
at Lots 1343 RP (Part), 1356 RP in D.D. 78
and Adjoining Government Land, Lin Chuk Road, Ta Kwu Ling North, New Territories

(HT26049)

June 2026

Drainage Consultant:

何田顧問工程師有限公司
HO TIN & ASSOCIATES
CONSULTING ENGINEERS LIMITED

Prepared & approved by	LEE Kwok Cheung *RPE(Civil)* *(Registration No. RP0159301)*	

Responses to Comments from Government Departments on Drainage Proposal of Planning Application No. A/NE-TKLN/124 (refer to the submission to PlanD on 1 June 2026)

COMMENTS	RESPONSES
Drainage Services Department (DSD)	**Applicant**
General Comments	
1. the limited desk-top checking by Government on the drainage proposal covers only the fundamental aspects of the drainage design which will by no means relieve the obligations to ensure that (i) the proposed drainage works will not cause any adverse drainage or environmental impacts in the vicinity; and (ii) the proposed drainage works and the downstream drainage systems have the adequate capacity and are in good conditions to accommodate all discharge water collected from the subject lots and all upstream catchments. The applicant shall effect any subsequent upgrading of these proposed works and the downstream drainage systems whenever necessary;	Noted and agreed.
2. the cover levels of proposed u-channels and catch pits should be flush with the adjoining ground level;	Noted and amended. Corresponding details are shown in **Figure D8**.
3. the applicant should check and ensure that the existing drainage system to which the proposed connection will be made have adequate capacity and satisfactory condition to cater for the additional discharge from the subject lots. The applicant should also ensure that the flow from the application site will not overload the existing drainage system;	Noted and checked to have adequate capacity and satisfactory condition to cater for the additional discharge from the subject lots.

COMMENTS	RESPONSES
4. where walls are erected or kerbs are laid along the boundary of the application site, peripheral channels should be provided on both sides of the walls or kerbs with details to be agreed by DSD;	Where solid security hoarding/fence is to be constructed, 100mm high gap will be formed at the bottom of the solid security hoarding/fence along the subject site boundary.
5. the existing discharge location to which the applicant proposed to discharge the stormwater from the application site is not maintained by DSD. The applicant should identify the owner of the existing discharge location to which the proposed connection will be made and obtain agreement from the owner prior to commencement of proposed works;	Noted and will strictly follow.
6. all existing flow paths as well as the run-off falling onto and passing through the application site should be intercepted and disposed of via proper discharge points. The applicant shall also ensure that no works, including any site formation works, shall be carried out as may adversely interfere with the free flow condition of the existing drain, channels and watercourses on or in the vicinity of the application site any time during or after the works;	Noted and will strictly follow. Peripheral channel of appropriate size will be constructed along the subject site boundary to intercept any overland flows.
7. the proposed drainage works, whether within or outside the lot boundary, should be constructed and maintained by the applicant at his/her own expense;	Noted and agreed.
8. for works to be undertaken outside the lot boundary, the applicant should obtain prior agreement from the District Lands Officer/North, Lands Department and/or relevant private lot owners;	Noted and agreed.
9. the applicant should make good all the adjacent affected areas upon the completion of the drainage works;	Noted and agreed.

COMMENTS	RESPONSES
10. the applicant should construct and maintain the proposed drainage works properly and rectify the system if it is found to be inadequate or ineffective during operation;	Noted and agreed.
11. as usual, Government should be empowered to inspect conditions of the private drainage system and to enforce its cleansing by the owners, if necessity arises (e.g. upon receipt of complaints);	Noted and agreed.
12. The existing drainage facilities, watercourse, river, channel and the like should not be affected and obstructed by the construction materials, waste or debris from the proposed use.	Noted and will strictly follow.
Specific Comments	
13. Drawing no. Figure D4 refers:	
(a) the applicant should indicate the proposed site formation levels/ground levels of the application site if no site formation will be carried out;	The proposed site formation levels/ground levels of the application site are added into **Figure D2**.
(b) catchpit should be provided at a location of a change of flow direction of the proposed u-channel (e.g. at the northern part of the application site); and	Catchpit is added at location of a change of flow direction of the proposed u-channel, in particular, at the northern part of the application site
(c) thickness of concrete cover/grating should be considered when determining the invert levels of catch pits and u-channels to ensure the depths of u-channels are adequate. For instance, the depth of 750UC is less than 750mm at CP2;	Thickness of concrete cover/grating is now considered when determining the invert levels of catch pits and u-channels to ensure the depths of u-channels are adequate.

COMMENTS	RESPONSES
14. the applicant should provide sectional views of the application site in two different directions showing clearly any walls would be erected or kerbs would be laid along the boundary of the application site, the proposed and existing drainage facilities, flow direction, the existing ground level of the adjacent lands and the formation level of the application site; and	Section 'X'-'X' and 'Y'–'Y' are shown in a new **Figure D5**.
15. the applicant should supplement connection details between the existing channel and the proposed drainage facilities. Invert levels of the existing channel at the connection points should be indicated in the details.	Connection details between the existing channel and the proposed drainage facilities are shown in **Figure D6**. Details of the proposed outfall is shown in **Figure D7**.

1. Background

With respect to Planning Application No. A/NE-TKLN/124 for a Temporary Green Fuel Station for Electric Private Vehicles with Ancillary Facilities for a Period of 3 Years at Lots 1343 RP (Part), 1356 RP in D.D. 78 and Adjoining Government Land, Lin Chuk Road, Ta Kwu Ling North, New Territories, Ho Tin & Associates Consulting Engineers Limited was appointed to prepare a drainage proposal.

2. The Subject Site and Proposed Development

2.1 The subject site with a total site area of about 2,582m^2 comprises of Lots 1343 RP (Part), 1356 RP in D.D. 78 and adjoining Government land, Lin Chuk Road, Ta Kwu Ling North, New Territories. It is located at the east side of Heung Yuen Wai Highway, south side of Lin Chuk Road, and at about 100 meters to the south of the junction of Lin Ma Hang Road and Lin Chuk Road. A Site Location Plan is shown in **Figure D1**.

2.2 The subject proposed development consists of a Transformer Room and Switch Room, a Site Office, a Washroom, 2 waiting spaces for private vehicles, 1 parking space for staff, and 22 charging spaces with an open-sided shelter for private vehicles. A Layout Plan is shown in **Figure D2**.

3. Existing Drainage Conditions of the Subject Site

3.1 At present, the subject site is a piece of flat grassland with ground levels ranging between +9.9mPD and +10.83mPD. It generally slopes from its eastern to its western boundary (refer to **Photo Nos. 1** and **2**). There is an existing gully running across the northern portion of the subject site from the eastern to the western boundary. The gully receives flow from the drainage ditch of the adjacent farmland to its east (refer to **Photo Nos. 3** and **4**), and discharges its flow into an existing stormwater inlet under the elevated Heung Yuen Wai Highway from which the flow will pass through twin 900mm diameter drains and go to the west (refer to **Photo Nos. 5** and **6**).

3.2 Besides, there is an existing streamcourse running from the east to the west close to the southern boundary of the subject site (i.e. without crossing the subject site). The existing streamcourse conveys significant portion of the surface runoff of the concerned area to the east of the subject site to an existing stormwater inlet under the elevated

Heung Yuen Wai Highway and from which via twin 900mm diameter drains to the further west of the area (refer to **Photo Nos. 7** and **8**).

3.3 Current conditions of the subject site and its surrounding areas are shown in the following photos (photo taking locations are shown in **Figure D3**):

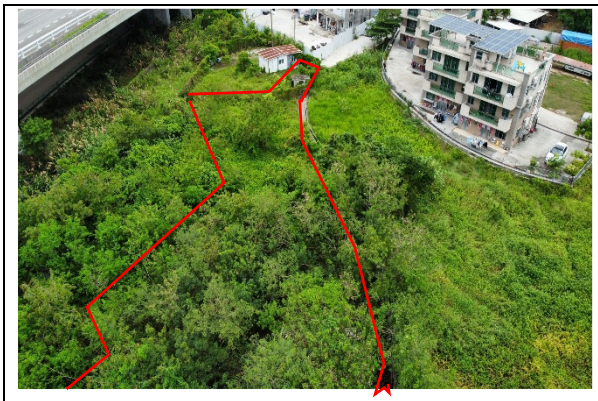


Photo No. 1 – The northern part of the subject site	Photo No. 2 – The southern part of the subject site
	
Photo No. 3 – Existing gully receives flow from the drainage ditch of the adjacent farmland and runs across the northern portion of the subject site from the eastern to the western boundary (bird's eye view)	Photo No. 4 – Existing gully receives flow from the drainage ditch of the adjacent farmland and runs across the northern portion of the subject site from the eastern to the western boundary (close-up of the intersection between the drainage ditch of the adjacent farmland and the existing gully)

	
Photo No. 5 – Existing stormwater inlet under the elevated Heung Yuen Wai Highway from which the flow will pass through twin 900mm diameter drains and go to the west	Photo No. 6 – View toward the downstream of the existing stormwater inlet under the elevated Heung Yuen Wai Highway
	
Photo No. 7 – Existing streamcourse running from the east to the west close to the southern boundary of the subject site	Photo No. 8 – Existing streamcourse and stormwater inlet close to the southern boundary of the subject site under the elevated Heung Yuen Wai Highway from which the flow will pass through twin 900mm diameter drains and go to the west

4. Potential Drainage Impact and proposed drainage works

4.1 No significant site formation works is proposed. Filling of land of not exceeding 0.2m with concrete for forming hard surface is proposed. There is no change in the flowing directions nor obstruction of the existing flows of the concerned area.

4.2 Peripheral channels are proposed at the subject site to intercept overland flows across the subject site boundary. Besides, in order to ensure no surface runoff from the surroundings flowing towards the subject site, if occurs, being obstructed, 100mm high gap will be formed at the bottom of solid security hoarding/fence, when erected, along the subject site boundary.

4.3 Surface runoff collected by the proposed channels would be conveyed to a proposed terminal catchpit with trap located on the west side of the subject site and from which the collected surface runoff would be discharged into an existing pond. At present, there are twin 900mm dia. discharge drains to discharge the surface runoff from the existing pond to the further western downstream area. A Proposed Stormwater Drainage Layout Plan and Site Sections is shown in **Figure D4** and **D5** respectively. Besides, connection details between the existing channel and the proposed drainage facilities are shown in **Figure D6**, and details of the proposed outfall is shown in **Figure D7**. Details of the cover levels of proposed u-channels and catch pits flush with the adjoining ground level are shown in **Figure D8**.

4.4 The Applicant is committed to obtain consents from relevant Government departments and/or owners of adjacent relevant land/lots prior to commencement of the proposed drainage works outside the subject site and to maintain regularly whether within or outside the subject site at his own expense to avoid blockage of the drainage system to the satisfaction of relevant Government departments.

4.5 Details of proposed drainage provisions shall follow relevant details shown in Government Departments' Standard Drawings except the cover levels of the proposed u-channels and catch pits should be flush with the adjoining ground level, as follows:

Proposed Drainage Provisions	*Standard Drawings*	*Drawing No. & Title*
Catchpit	CEDD Standard Drawings	C 2405/1 to /5 – Standard Catchpit Details

Proposed Drainage Provisions	*Standard Drawings*	*Drawing No. & Title*
Catchpit with trap		C 2406/1 to /2A – Catchpit with Trap
Catchpit precast concrete cover		C 2407B – Precast Concrete Covers for Catchpit and Sand Trap
U-channel		C 2409J – Details of Half-round and U-channels
Channel cover		C 2412E – Cover Slab and Cast Iron Grating for Channels

5. Hydraulic Calculation

5.1 Assessment criteria is based on the recommendation set out in the Stormwater Drainage Manual (Fifth edition, Jan 2018) (SDM) and its Corrigendum No. 1/2022, 1/2024 and 2/2024 issued by DSD. Design Return Period of 50 years (recommended for 'Main Rural Catchment Drainage Channel' in SDM) is adopted.

5.2 The corresponding runoffs under rainfall intensity for various return period are worked out with reference to Rational Method. Brandy-Williams method is used in calculation of the time of concentration. A uniformly distributed rainfall with an intensity is determined by the Intensity-Duration-Frequency. With reference to Table 3d - Storm Constants for different return periods of North District Area from SDM (Corrigendum No. 1/2024 (26 March 2024)), the rainfall profiles are derived based on the following equation:

$$i = \frac{a}{(t+b)^c}$$

where i = mean rainfall intensity (mm/hr)
t = duration time of concentration (min)
a, b and c = storm constants given in Table below

Table : Storm Constants

Return Period (years)	50
a	474.6
b	2.90
c	0.371

A 16.0% rainfall increase is adopted in the hydraulic calculation to cater for effects due to climate change in accordance with the table 28 with projection to End of 21st Century as stipulated in the item (e) and (k) of the SDM - Corrigendum No. 1/2022.

Besides, taking into consideration of design allowance in End of 21st Century, a further 12.1% rainfall increase is incorporated into the hydraulic assessment.

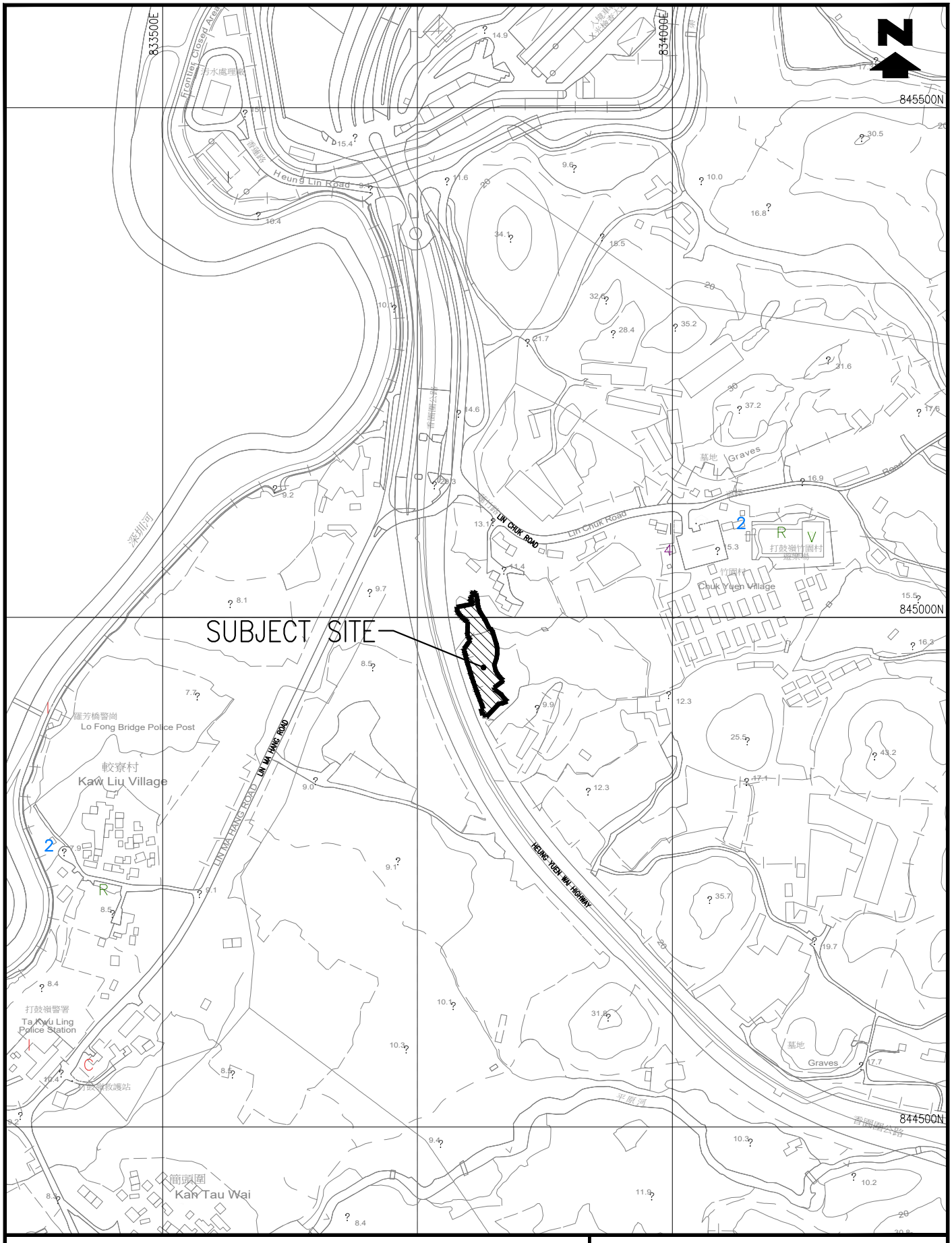
5.3 Hydraulic assessment is enclosed in the **Appendix**. 10% reduction in flow area has been incorporated to cater for potential deposition of sediment in stormwater channels and pipes as recommended in the SDM. The proposed channels and underground drainage are designed to cater for the estimated runoff under the designed rainstorms. With respect to the calculation, the proposed stormwater drainage system is capable to cater for the surface runoff without causing any adverse drainage impacts on the Application Site and its surroundings.

5.4 Since all drainage would have sufficient spare capacity, no water backup will occur at the upstream under rainstorms of 50-year (or lower) return periods.

6. Conclusion and Recommendations

6.1 The subject proposed development is for a Temporary Green Fuel Station for Electric Vehicles with Ancillary Facilities for a Period of 3 Years at Various Lots 1343 RP (Part), 1356 RP in D.D 78 and adjoining Government land, Lin Chuk Road, Ta Kwu Ling North, New Territories. The existing site levels would only be slightly altered, i.e. filling of land of not exceeding 0.2m with concrete for forming a paving area is proposed.

6.2 The subject proposed development would not alter the existing drainage conditions and pattern of the area and the proposed drainage system would be maintained with appropriate drainage clearance and repair works, i.e. debris clearance and damage repair. The proposed internal drainage system will have only one discharge point (in the form of a catchpit with trap) discharging the flow via the existing twin 900mm dia. stormwater drains, to its western downstream area. The subject proposed development is committed to obtain all necessary permits/consents from relevant public and/or private parties whenever necessary for carrying out the proposed drainage works outside the subject site boundary. Therefore, in conclusion, the subject proposed development would not cause any adverse drainage impact onto the area.



TITLE

SITE LOCATION PLAN

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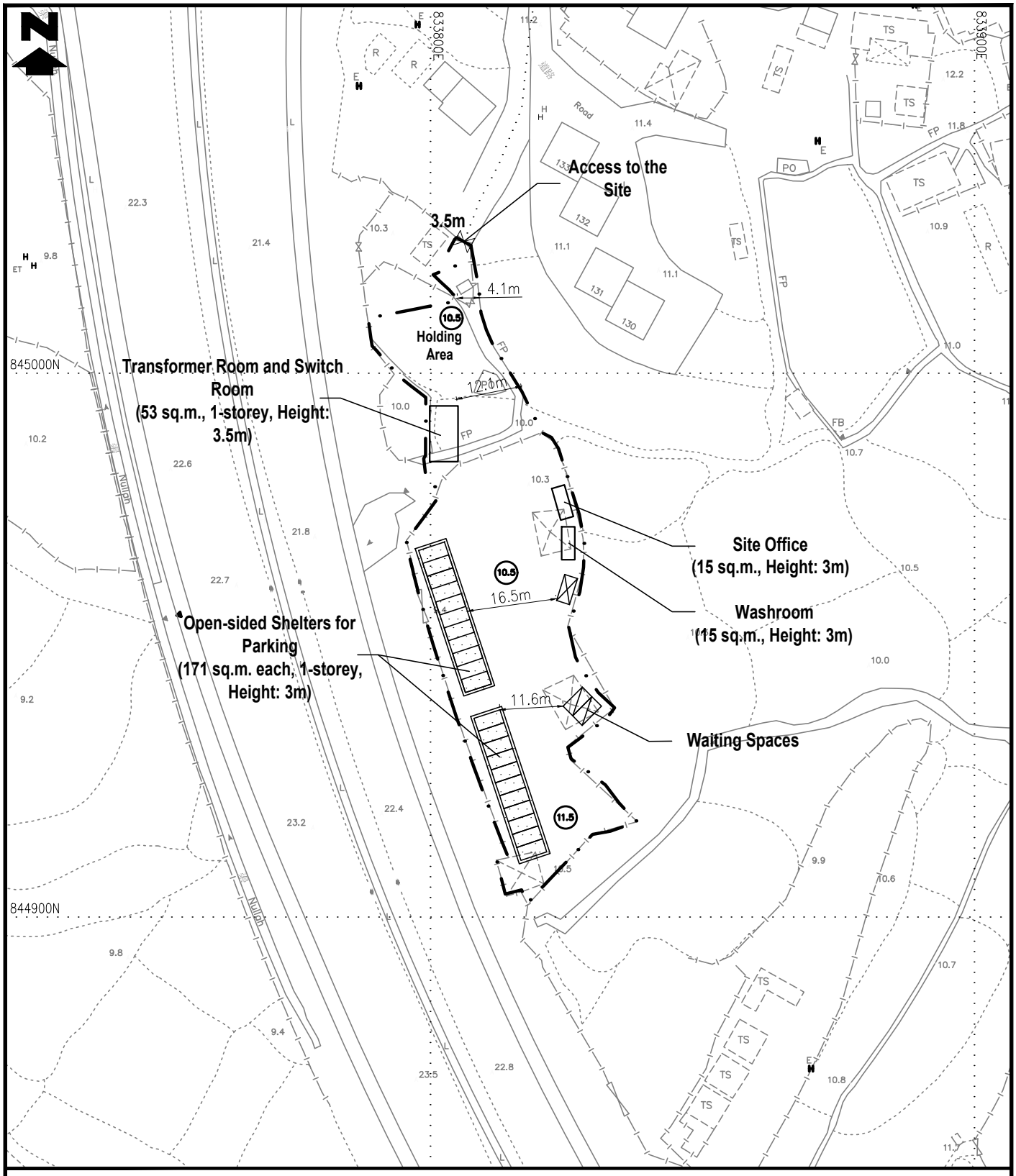
HO TIN & ASSOCIATES
CONSULTING ENGINEERS LIMITED

SCALE
1 : 5000 – A4

DRAWING No.
FIGURE D1

H:\26049_LinChukRoad\DRAWING\26049_FIGD1_00.dwg, 8/5/2026 11:49:35



Legend:

- Application Site (Area: about 2,582m²)
- Open-sided Shelters for Charging Spaces
- Charging Spaces for Private Vehicles (22 nos.) (2.5m x 5m)
- Waiting Spaces for Private Vehicles (2 nos.) (2.5m x 5m)
- Parking Space for Staff (1 no.) (2.5m x 5m)
- N Existing Ground Level
- (N) Proposed Ground Level

TITLE

LAYOUT PLAN

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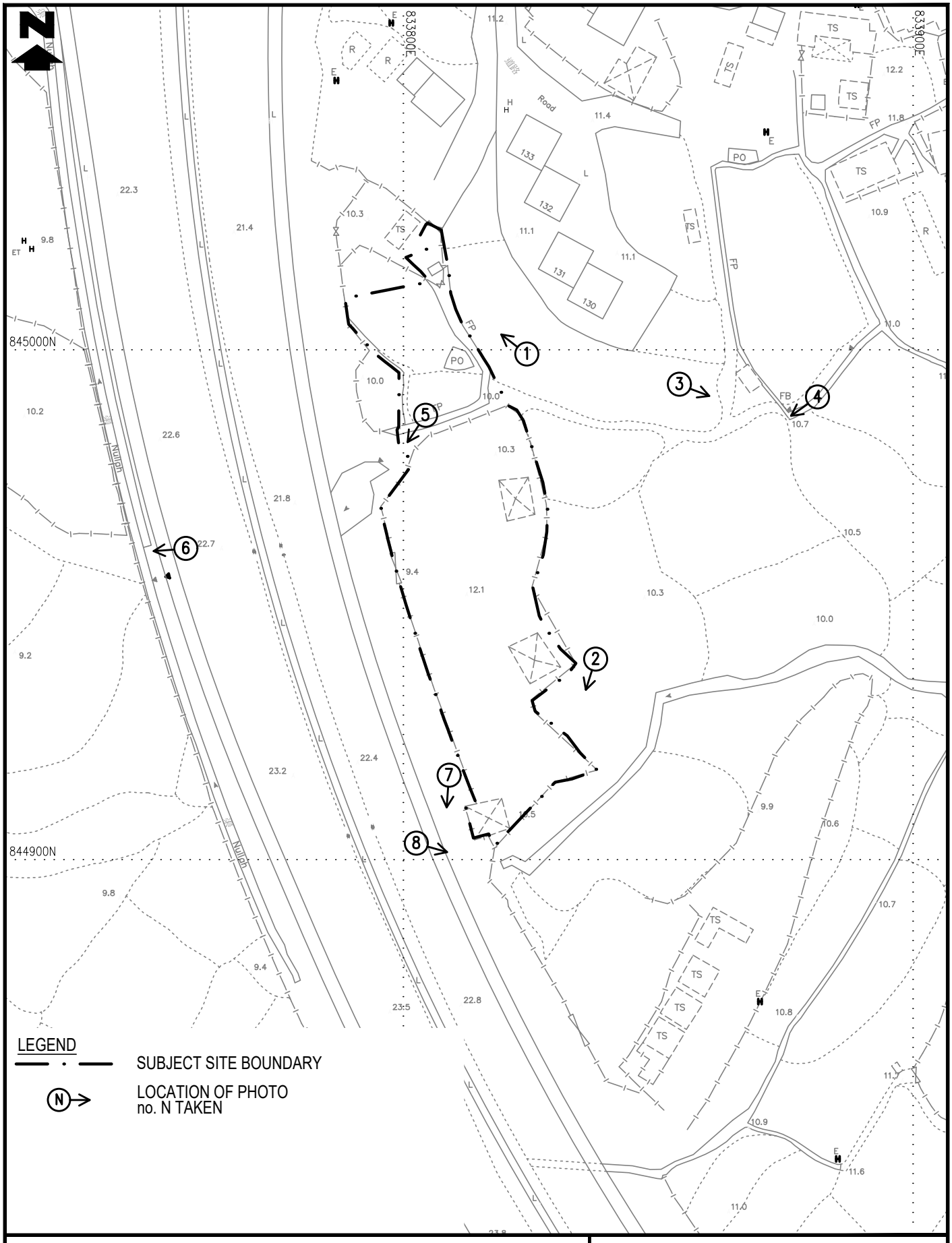
HO TIN & ASSOCIATES CONSULTING ENGINEERS LIMITED

SCALE	DRAWING No.
1 : 1000 - A4	FIGURE D2

H:\26049_LinChukRoad\DRAWING\26049_FIGD2_01 FIGD3_00 FIGD4_01 & FIGD5_00.dwg, 15/6/2026 13:51:07



TITLE

EXISTING DRAINAGE CONDITIONS AND LOCATIONS OF PHOTO TAKEN

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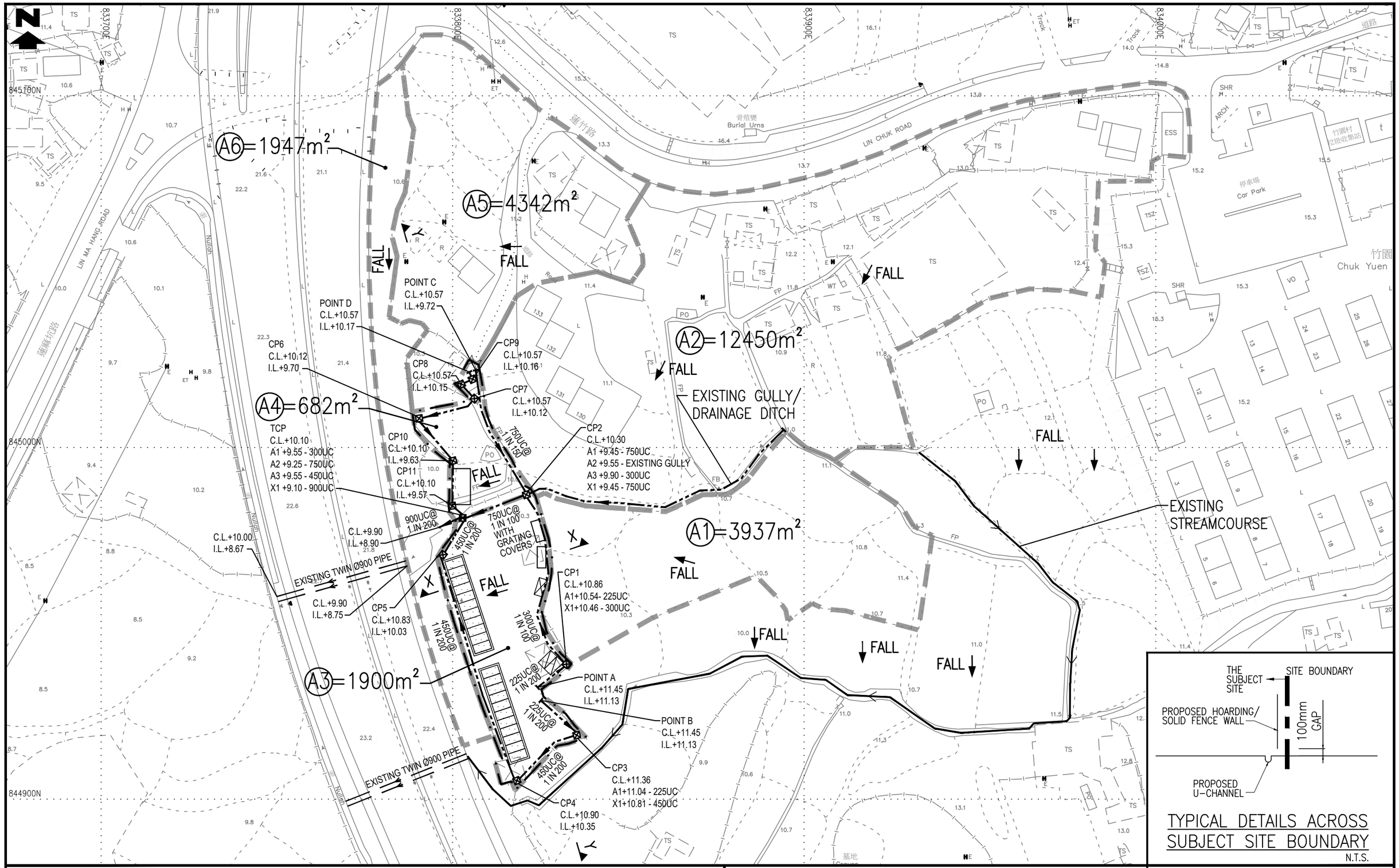
HO TIN & ASSOCIATES
CONSULTING ENGINEERS LIMITED

SCALE
1 : 1000 - A4

DRAWING No.
FIGURE D3

H:\26049_LinChukRoad\DRAWING\26049_FIGD2_00 FIGD3_00 FIGD4_00 & FIGD5_00.dwg, 14/5/2026 12:01:37



TYPICAL DETAILS ACROSS SUBJECT SITE BOUNDARY

N.T.S.

LEGEND

- SUBJECT SITE BOUNDARY
- PROPOSED 300mm U-CHANNEL@ 1 IN 200 EXCEPT OTHERWISE STATED
- PROPOSED CATCHPIT (CEDD STANDARD DRAWING NOS.C2405/1 TO /5)
- PROPOSED TERMINAL CATCHPIT WITH TRAP (CEDD STANDARD DRAWING NOS.C2406/1 TO /2A)
- CATCHMENT BOUNDARY

PROJECT

何田顧問工程師有限公司
HO TIN & ASSOCIATES
CONSULTING ENGINEERS LIMITED

TITLE

PROPOSED STORMWATER DRAINAGE LAYOUT PLAN

SCALE

1 : 1000 - A3

DRAWING No.

FIGURE D4

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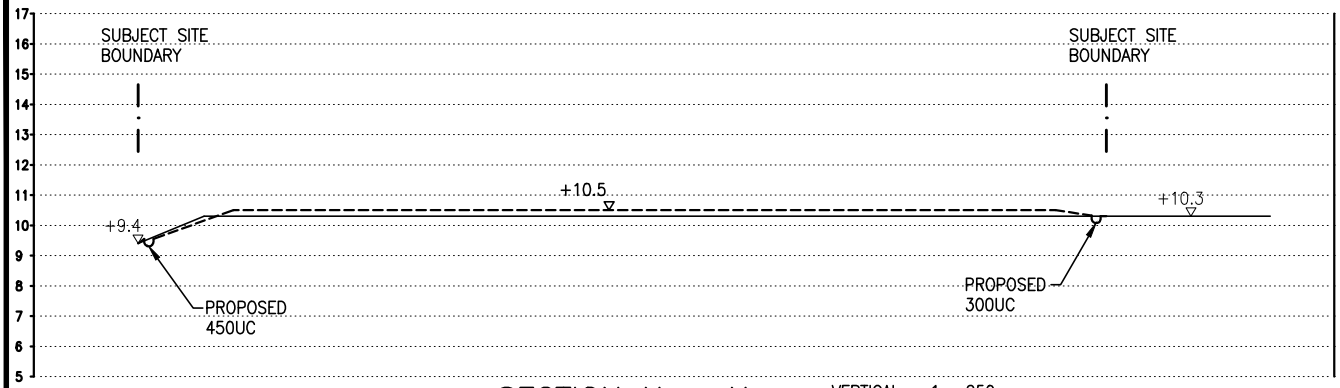
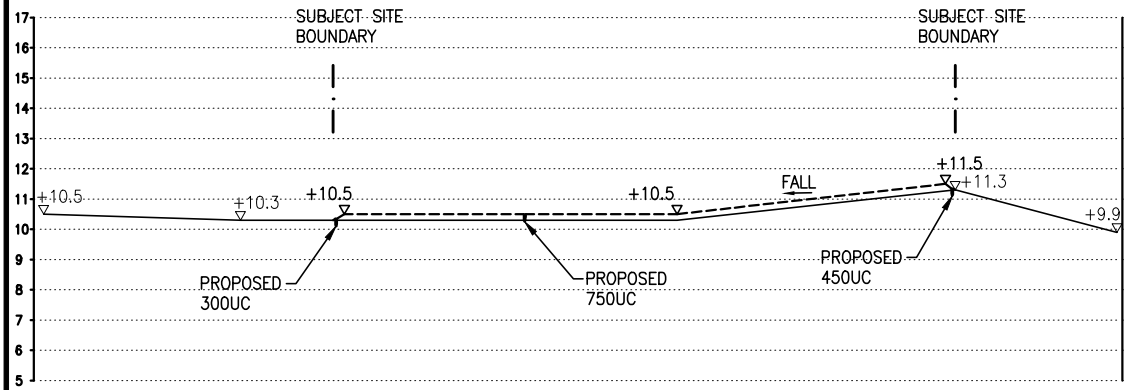


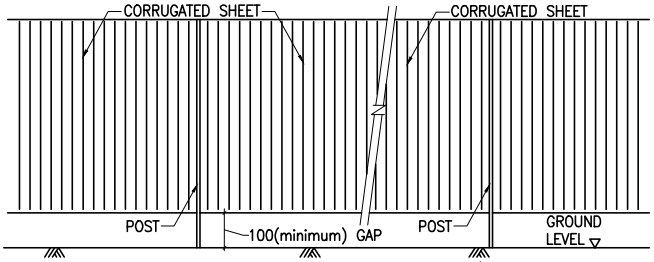
SECTION X – X

VERTICAL 1 : 250
HORIZONTAL 1 : 250



SECTION Y – Y

VERTICAL 1 : 250
HORIZONTAL 1 : 1250



TYPICAL ELEVATION OF THE HOARDING/FENCE WITH 100mm HIGH GAP AT BOTTOM N.T.S.

LEGEND

PROPOSED PROFILE

EXISTING PROFILE

TITLE

SITE CROSS SECTIONS

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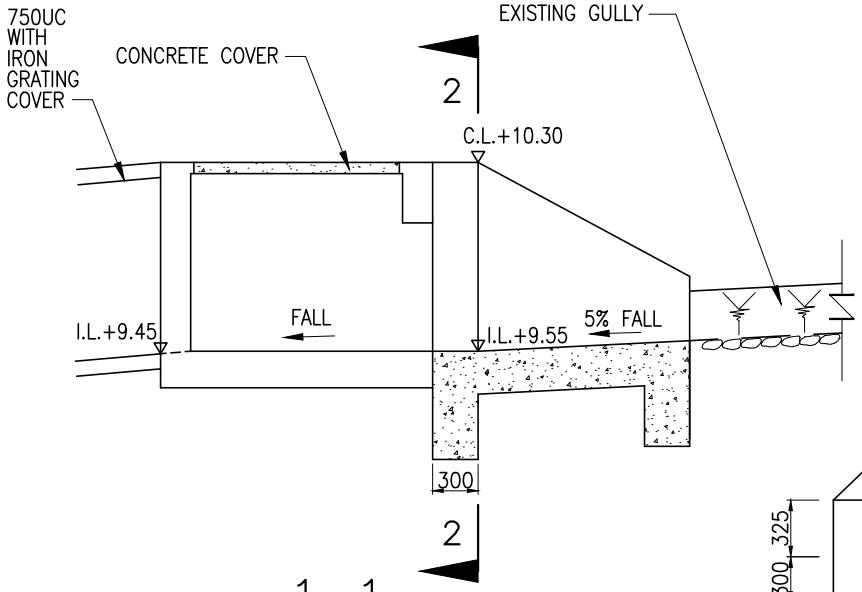
CONSULTING ENGINEERS LIMITED

SCALE

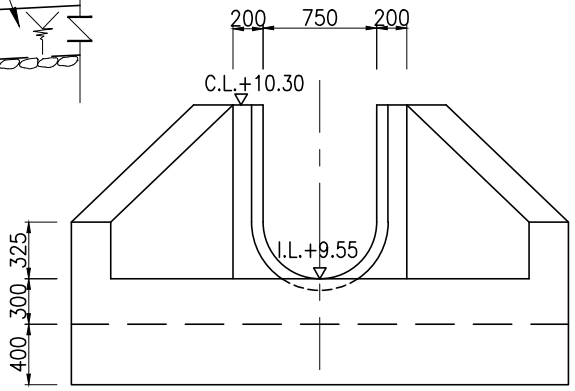
AS SHOWN

DRAWING No.

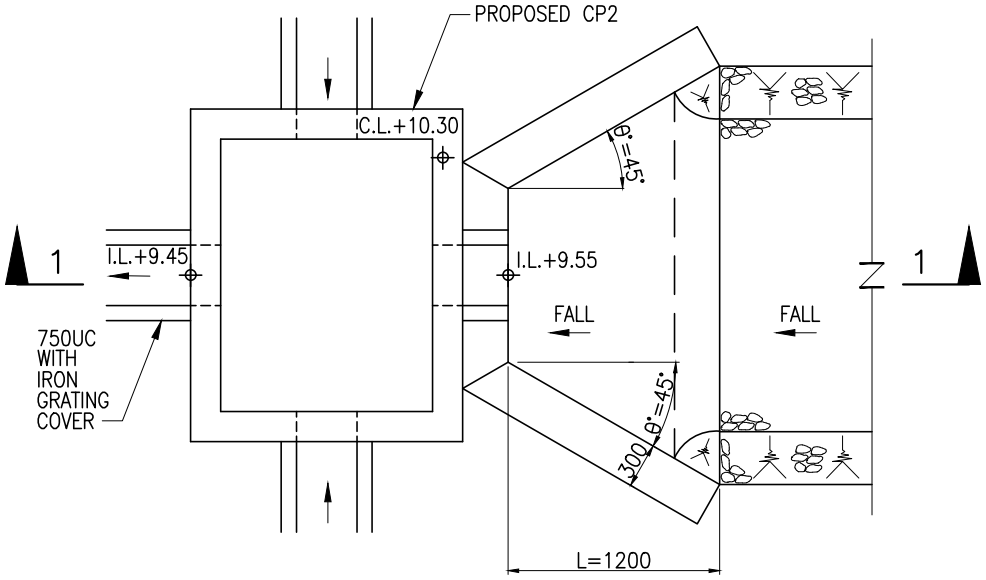
FIGURE D5



1—1



2—2



PLAN

NOTES :

1. CONCRETE : GRADE 30D/20

WING WALL FLARE θ°	DIAMETER OF CHANNEL H			
	450–750	900–1200	1350–1650	1800–1950
	L			
0°	1800	2400	3000	3600
30°	1400	1800	2300	2700
45°	1200	1500	1900	2300

TITLE

CONNECTION DETAILS BETWEEN THE EXISTING CHANNEL AND THE PROPOSED DRAINAGE FACILITIES

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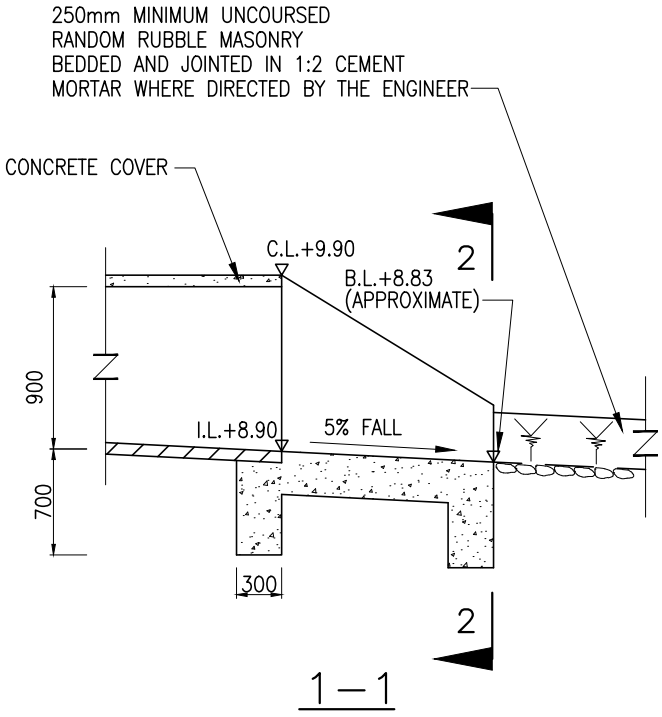
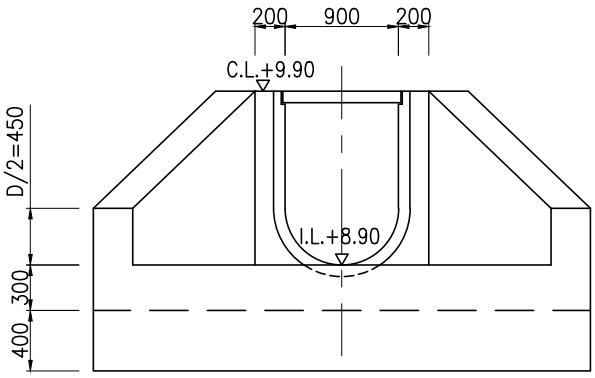
CONSULTING ENGINEERS LIMITED

SCALE
AS SHOWN

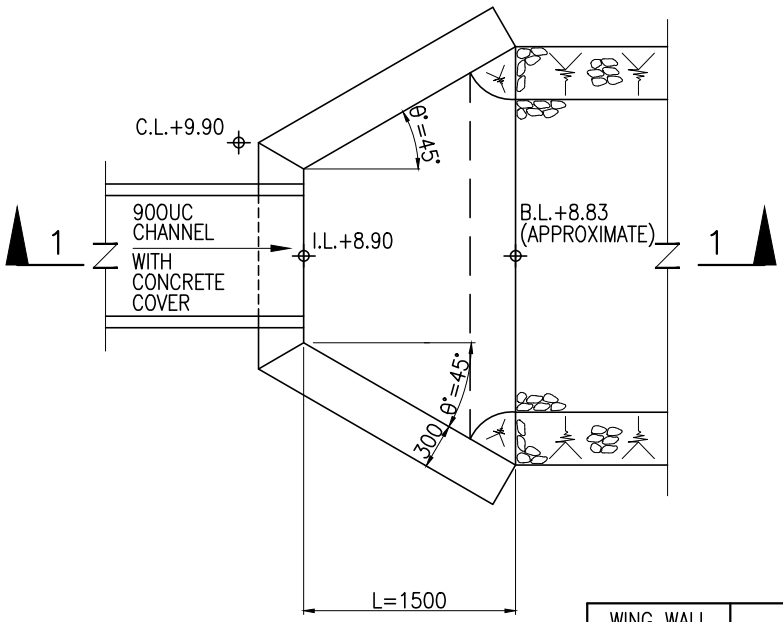
DRAWING No.
FIGURE D6



1—1



2—2



PLAN

NOTES :

1. CONCRETE : GRADE 30D/20

WING WALL FLARE θ°	DIAMETER OF CHANNEL H			
	450–750	900–1200	1350–1650	1800–1950
	L			
0°	1800	2400	3000	3600
30°	1400	1800	2300	2700
45°	1200	1500	1900	2300

TITLE

DETAILS OF OUTFALL

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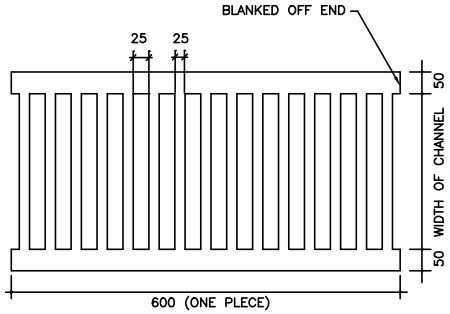
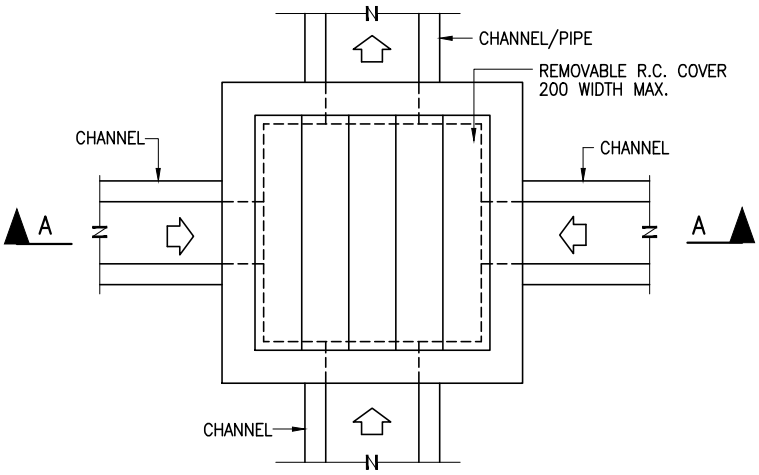
SCALE
AS SHOWN

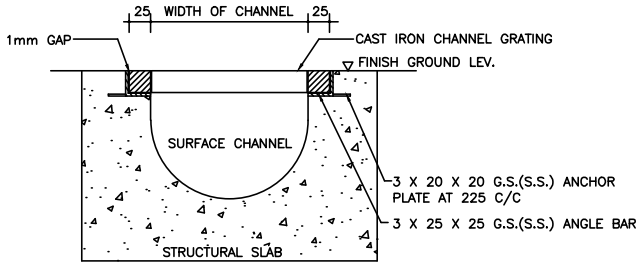
DRAWING No.
FIGURE D7



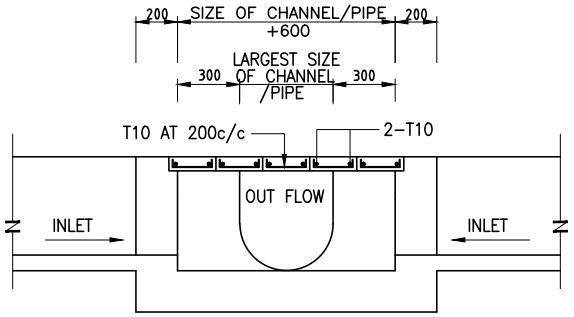
HEAVY DUTY CAST IRON CHANNEL GRATING
(MINIMUM 80MM THICK)
N.T.S



PLAN OF CATCH-PIT
N.T.S



SECTIONAL DETAIL OF SURFACE CHANNEL
WITH HEAVY DUTY CAST IRON GRATING
N.T.S



SECTION A – A
N.T.S

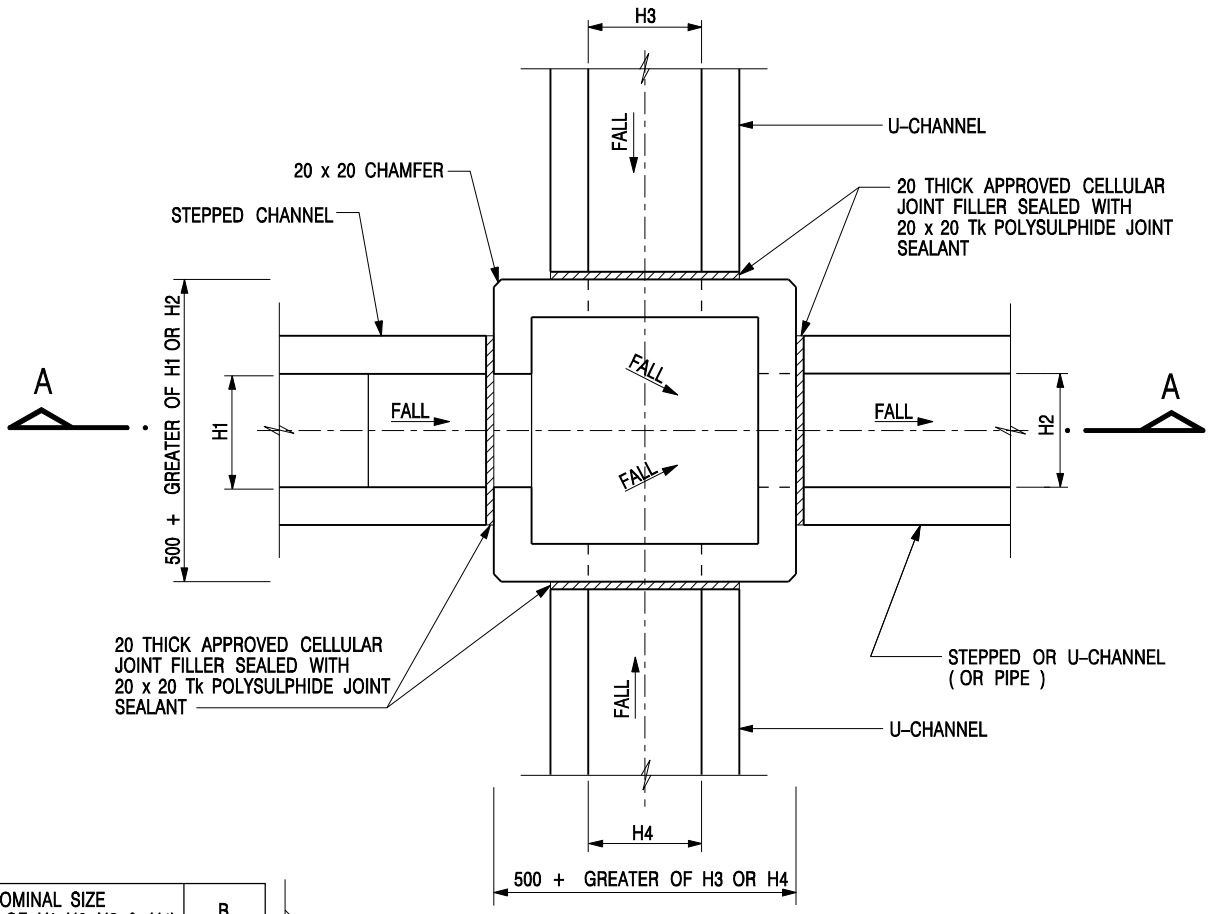
TITLE

TYPICAL DETAILS OF CHANNEL AND CATCHPIT
FLUSH WITH THE ADJOINING GROUND LEVEL

何田顧問工程師有限公司
HO TIN & ASSOCIATES
CONSULTING ENGINEERS LIMITED

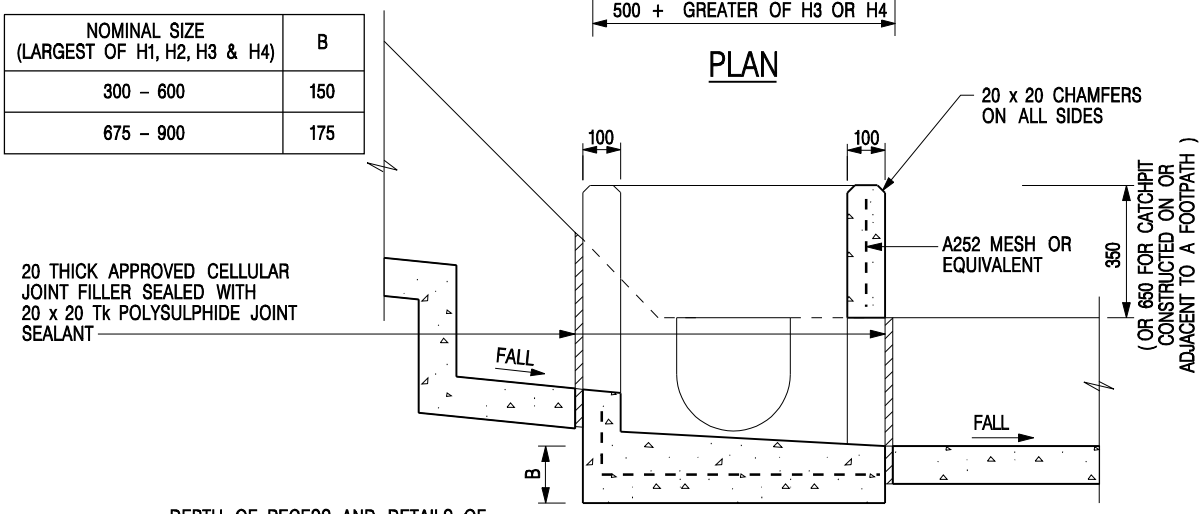
SCALE
AS SHOWN

DRAWING No.
FIGURE D8

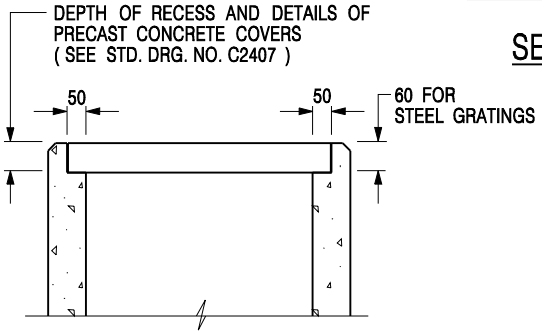


PLAN

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

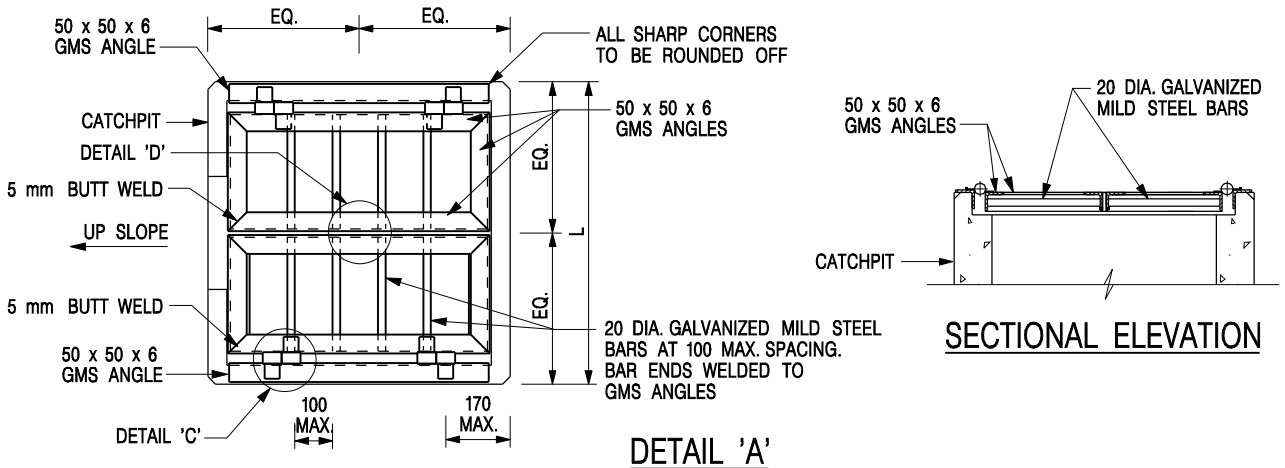
REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2405J.	Original Signed	03.2015

STANDARD CATCHPIT DETAILS

(SHEET 1 OF 5)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

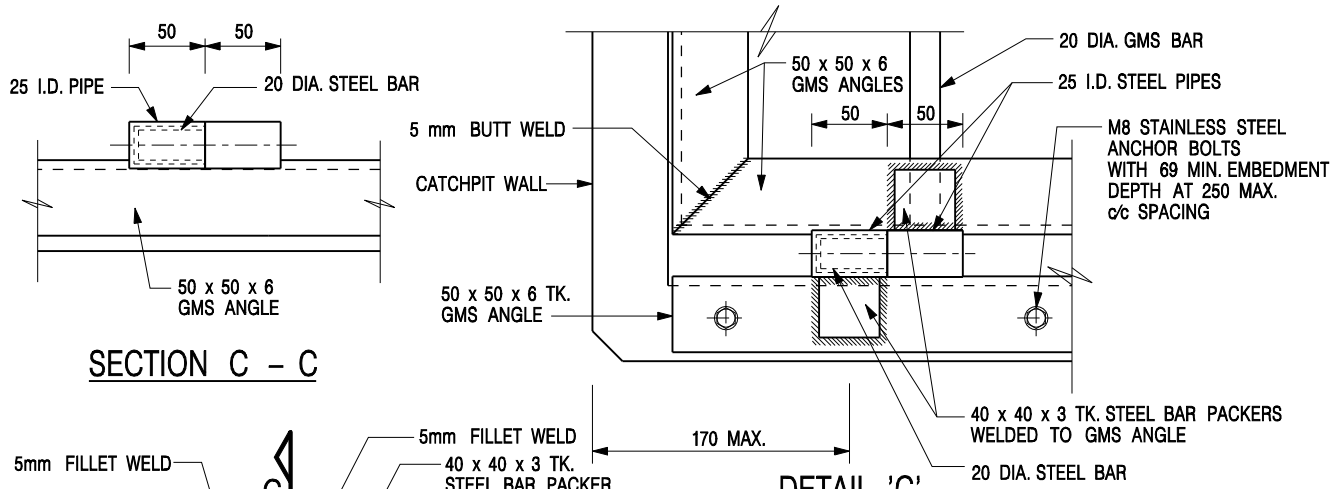
SCALE	1 : 20	DRAWING NO.
DATE	JAN 1991	C2405 /1



DETAIL 'A'

(DETAILS OF DOUBLE SIDE OPENING STEEL GRATING FOR L>900mm)

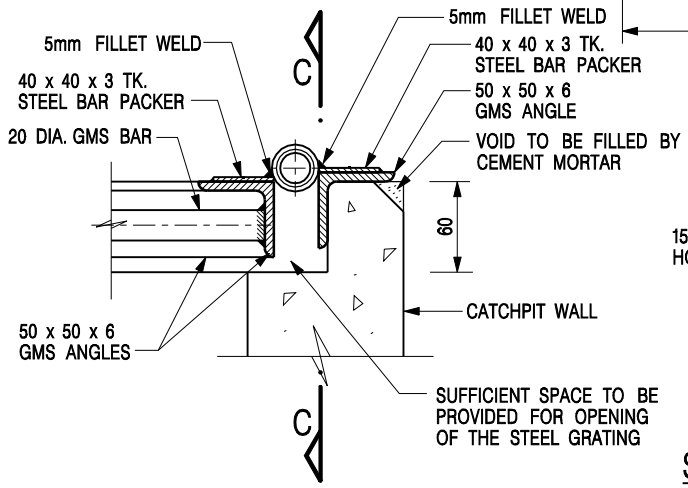
SCALE 1 : 20



DETAIL 'C'

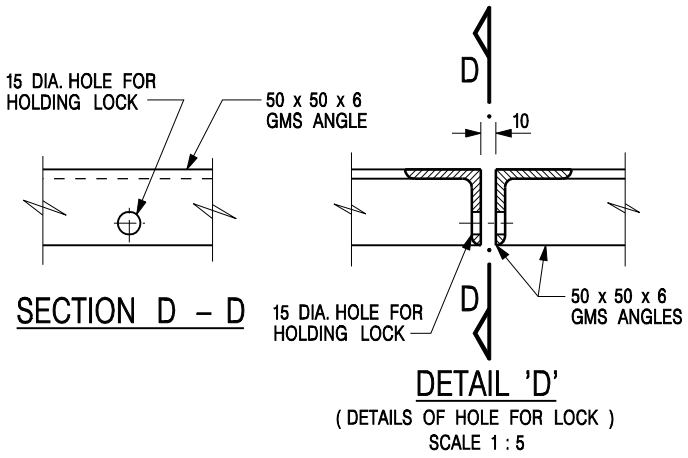
(DETAILS OF HINGE)

SCALE 1 : 5



SECTIONAL ELEVATION

(DETAIL 'C')



DETAIL 'D'

(DETAILS OF HOLE FOR LOCK)

SCALE 1 : 5

NOTES:

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

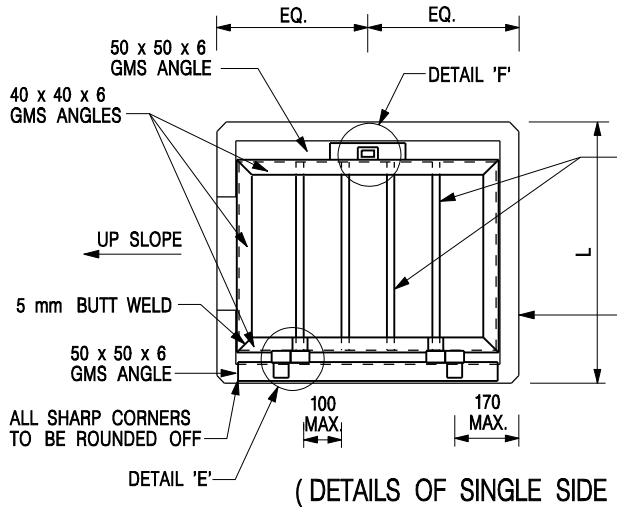
REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2405J.	Original Signed	03.2015

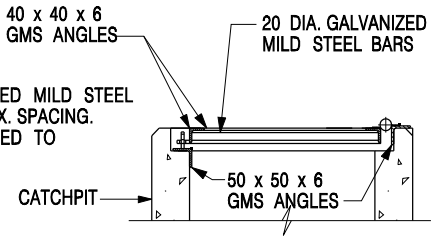
STANDARD CATCHPIT DETAILS

(SHEET 2 OF 5)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE	AS SHOWN	DRAWING NO.
DATE	JAN 1991	C2405 /2



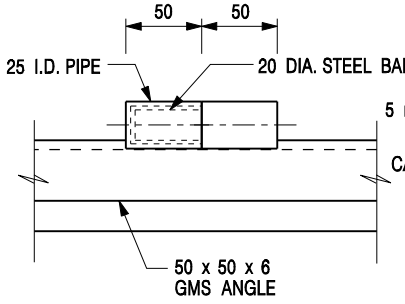


SECTIONAL ELEVATION

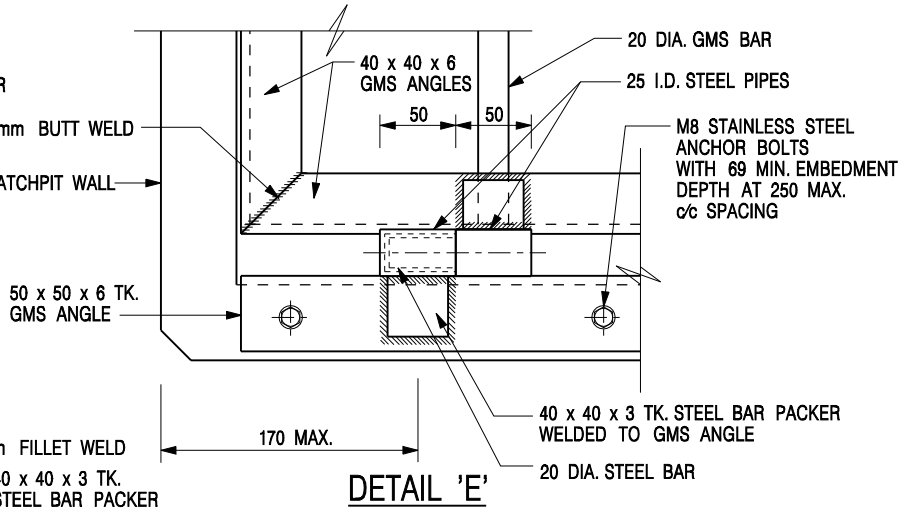
DETAIL 'B'

(DETAILS OF SINGLE SIDE OPENING STEEL GRATING FOR L≤900mm)

SCALE 1 : 20



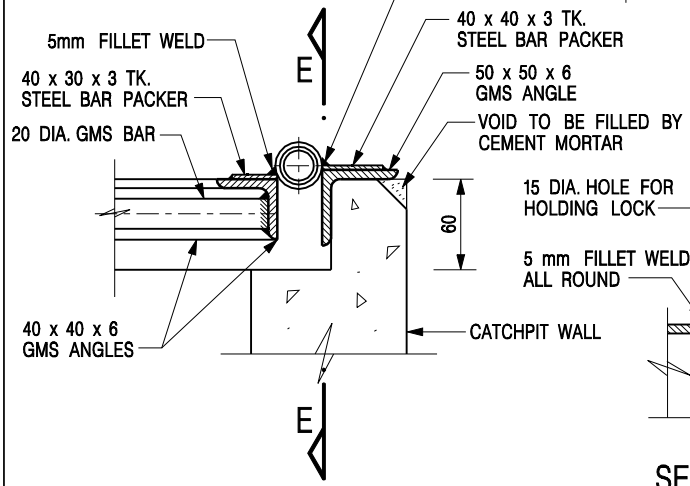
SECTION E – E



DETAIL 'E'

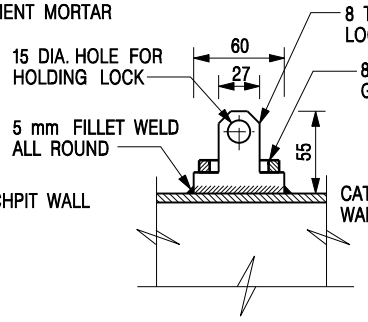
(DETAILS OF HINGE)

SCALE 1 : 5

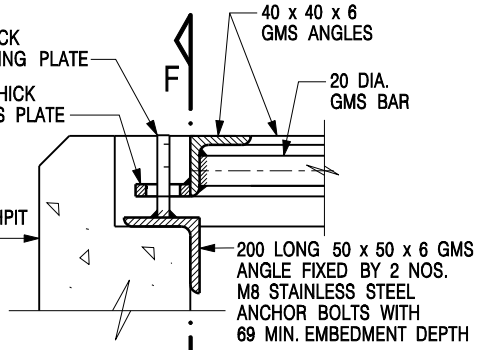


SECTIONAL ELEVATION

(DETAIL 'E')



SECTION F – F



DETAIL 'F'

(DETAILS OF LOCKING PLATE)

SCALE 1 : 5

NOTES:

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

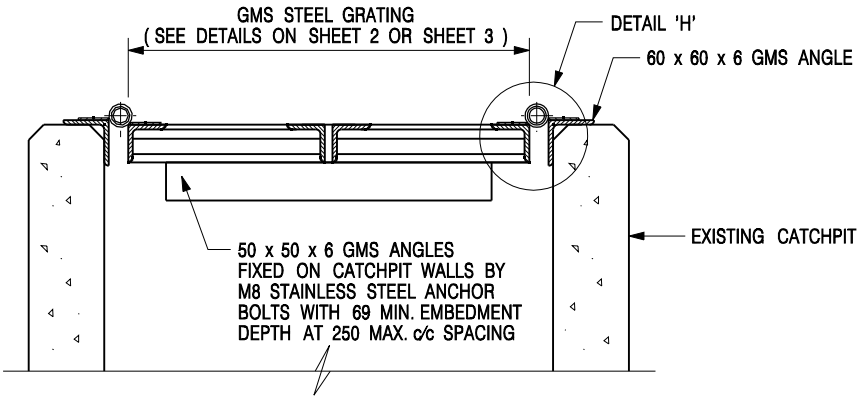
REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2405J.	Original Signed	03.2015

STANDARD CATCHPIT DETAILS

(SHEET 3 OF 5)

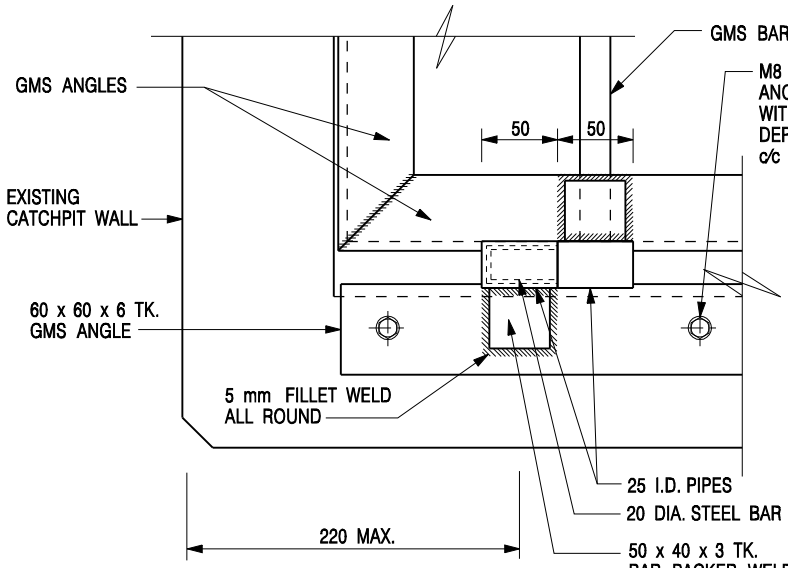
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE AS SHOWN	DRAWING NO. C2405 /3
DATE JAN 1991	



DETAIL 'G' – DETAILS OF STEEL GRATING CONSTRUCTED ON EXISTING CATCHPIT

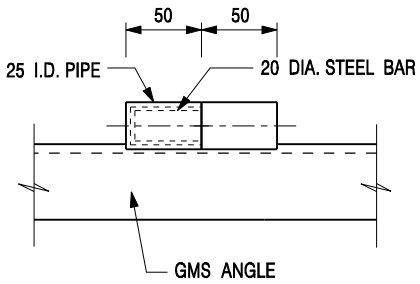
SCALE 1 : 10



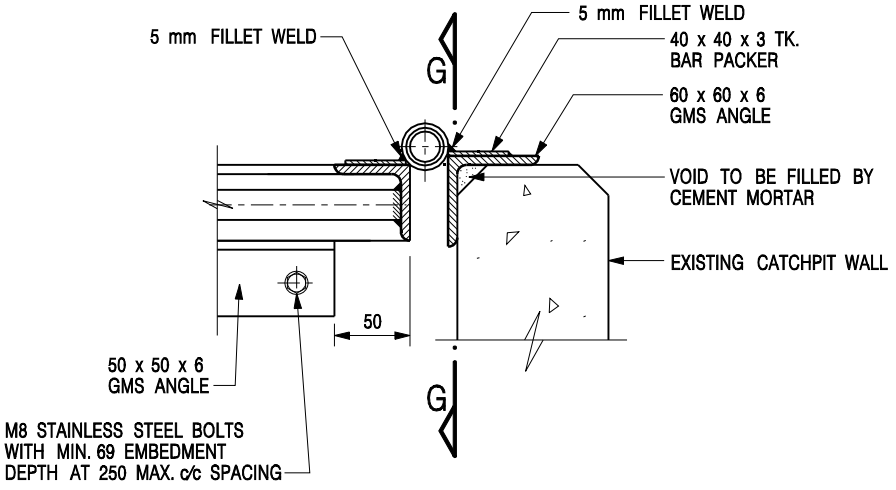
DETAIL 'H'

(DETAILS OF HINGE)

SCALE 1 : 5



SECTION G – G



SECTIONAL ELEVATION

(DETAIL 'H')

NOTES:

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

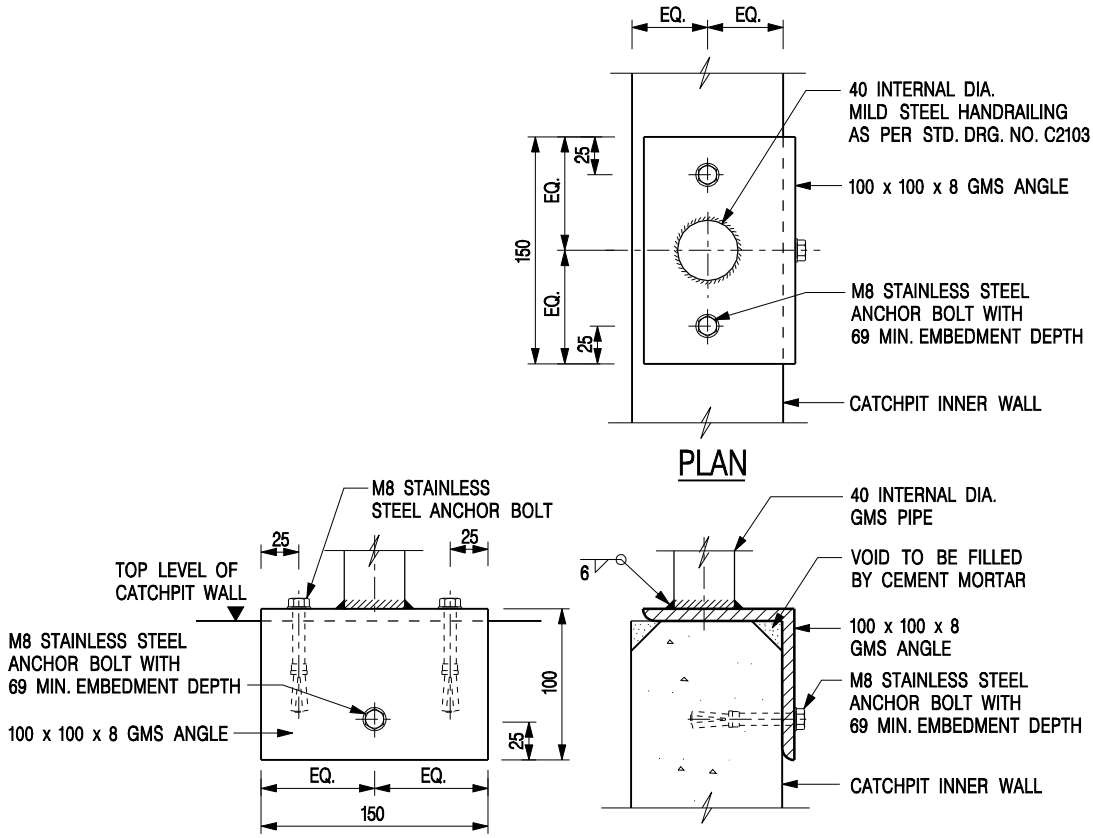
REF.	REVISION	SIGNATURE	DATE
–	FORMER DRG. NO. C2405J.	Original Signed	03.2015

STANDARD CATCHPIT DETAILS

(SHEET 4 OF 5)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE AS SHOWN	DRAWING NO. C2405 /4
DATE JAN 1991	



DETAIL 'J' – FIXING DETAILS FOR HANDRAILING ON TOP OF CATCHPIT WALL

SCALE 1 : 5

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. FOR CATCHPITS CONSTRUCTED ON OR ADJACENT TO A FOOTPATH, STEEL GRATINGS (SEE DETAILS ON SHEET 2 OR SHEET 3) OR CONCRETE COVERS (SEE STD. DRG. NO. C2407) SHALL BE PROVIDED AS DIRECTED BY THE ENGINEER.
7. IF INSTRUCTED BY THE ENGINEER, HANDRAILING (SEE DETAIL 'J' ON SHEET 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.
8. 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 mm c/c STAGGERED SHALL BE PROVIDED. THICKNESS OF CATCHPIT WALL FOR INSTALLATION OF STEP IRONS SHALL BE INCREASED TO 150 mm.
9. FOR RETROFITTING AN EXISTING CATCHPIT WITH STEEL GRATING, SEE DETAIL 'G' ON SHEET 4.
10. ALL STEEL ANGLES SHALL COMPLY WITH BS EN 10025 AND BS EN 10056.
11. UNLESS OTHERWISE SPECIFIED, ALL WELDS SHALL BE 5 mm CONTINUOUS FILLET WELDS.
12. ALL WELDS SHALL BE CHIPPED, GROUND SMOOTH, BRUSHED TO REMOVE SLAG PRIOR TO HOT-DIP GALVANIZATION.
13. ALL STEELWORK SHALL BE HOT-DIP GALVANIZED TO BS EN ISO 1461. ALL EXPOSED STEELWORK SURFACES SHALL BE TREATED AND PAINTED IN ACCORDANCE WITH THE GENERAL SPECIFICATION.
14. SUBJECT TO THE APPROVAL OF THE ENGINEER, OTHER MATERIALS CAN ALSO BE USED AS COVERS / GRATINGS.

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

STANDARD CATCHPIT DETAILS

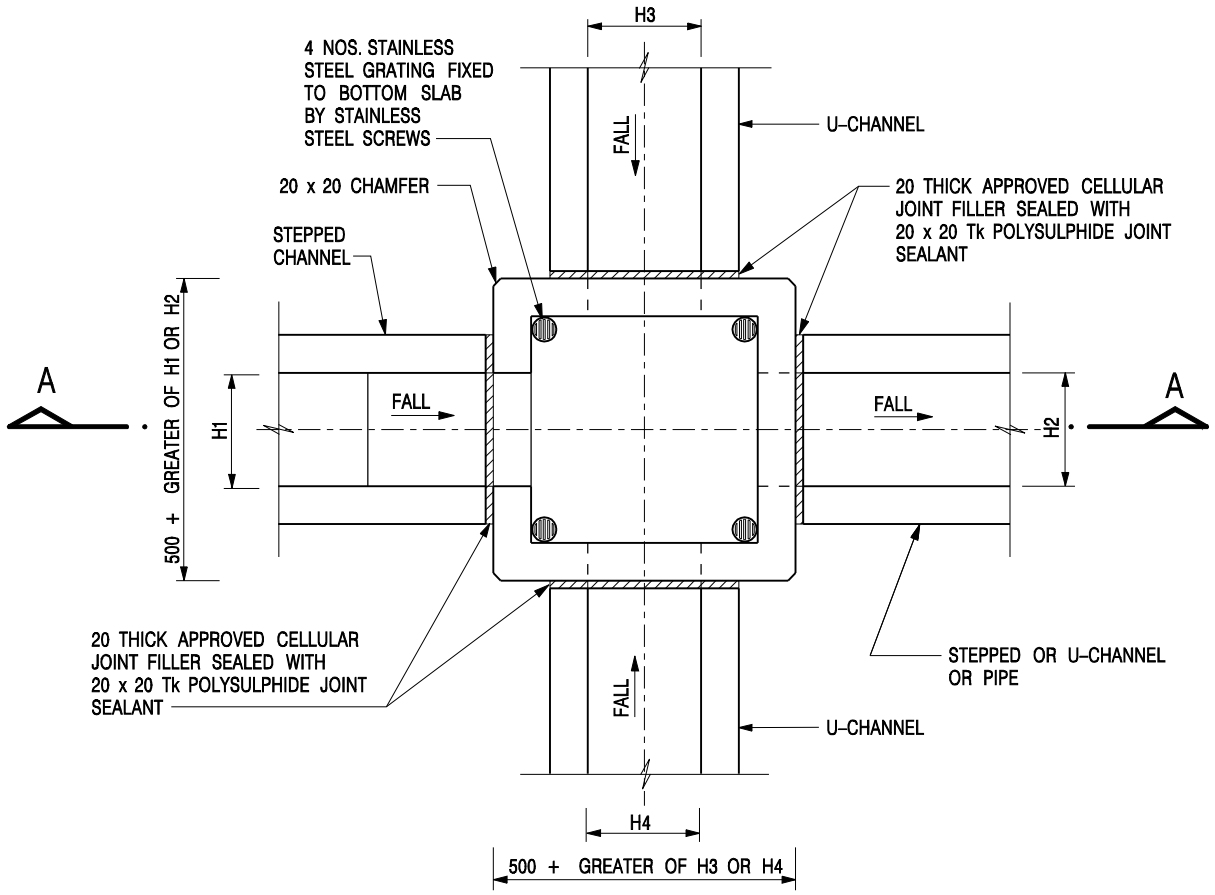
(SHEET 5 OF 5)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE AS SHOWN

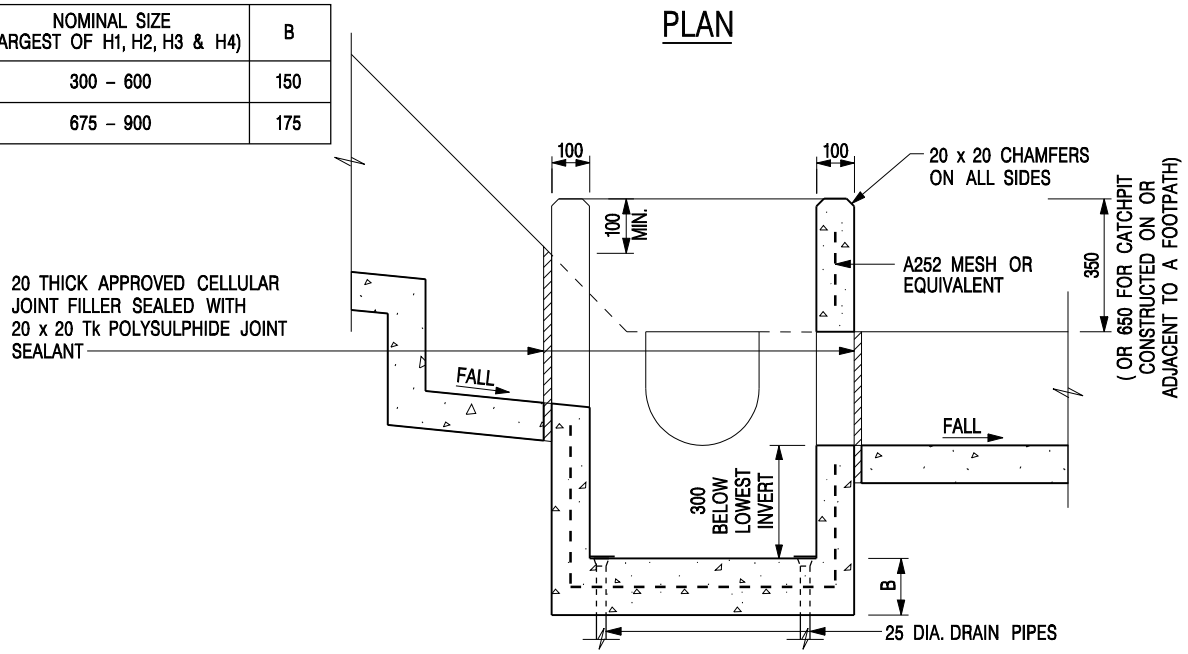
DATE JAN 1991

DRAWING NO. C2405 /5



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

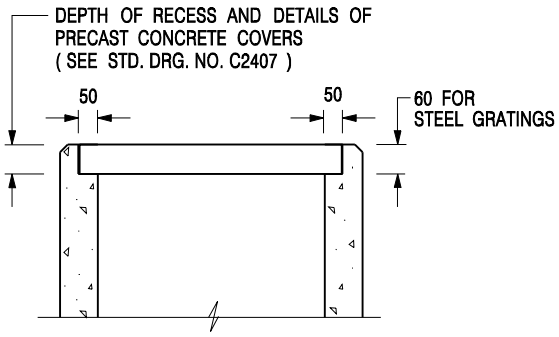
(SHEET 1 OF 2)

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

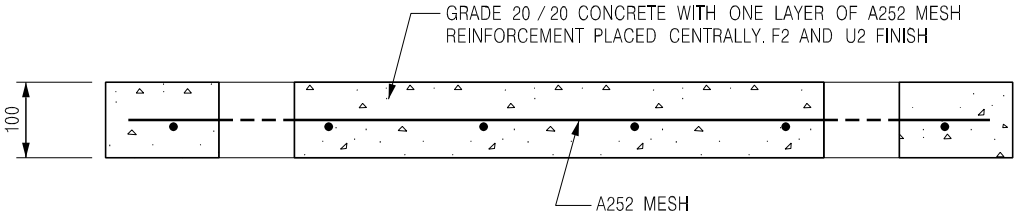
CATCHPIT WITH TRAP
(SHEET 2 OF 2)

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

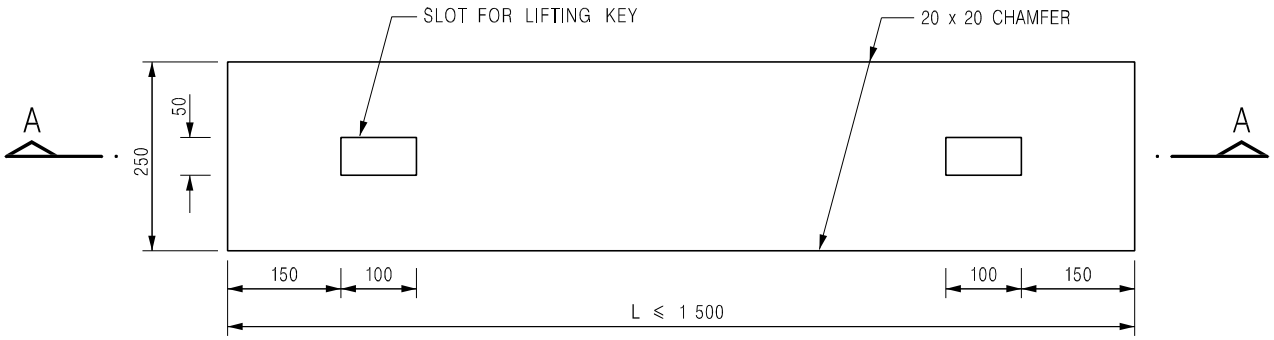
SCALE 1 : 20

DATE JAN 1991

DRAWING NO. C2406 /2A

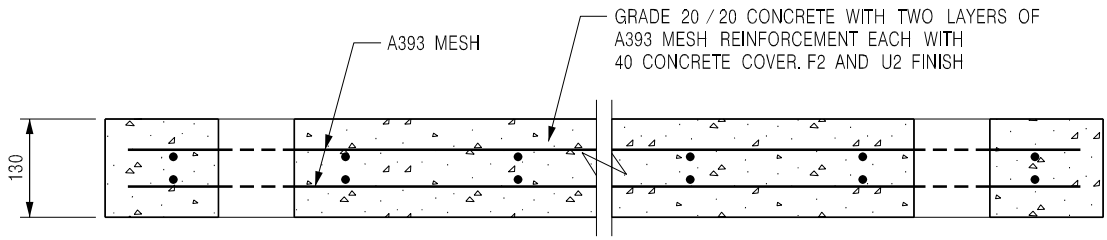


SECTION A – A

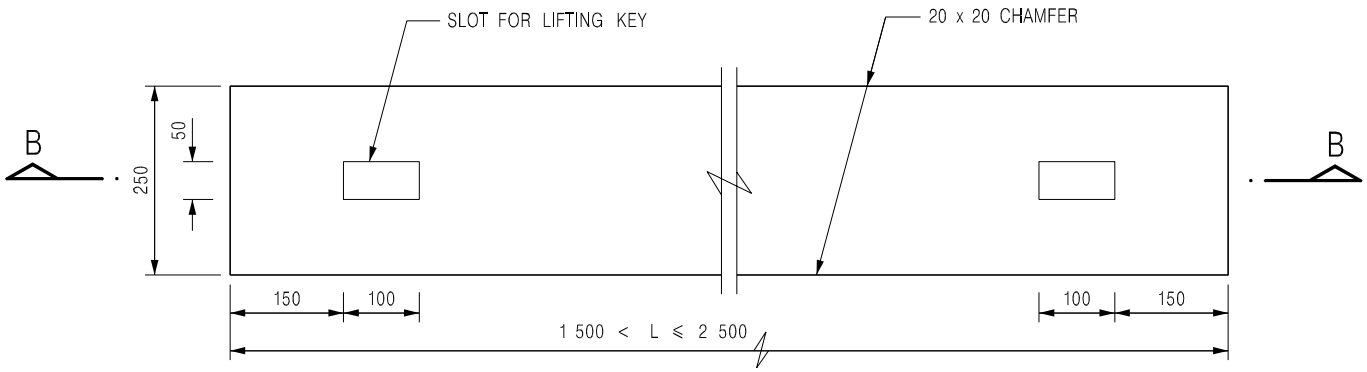


PLAN

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

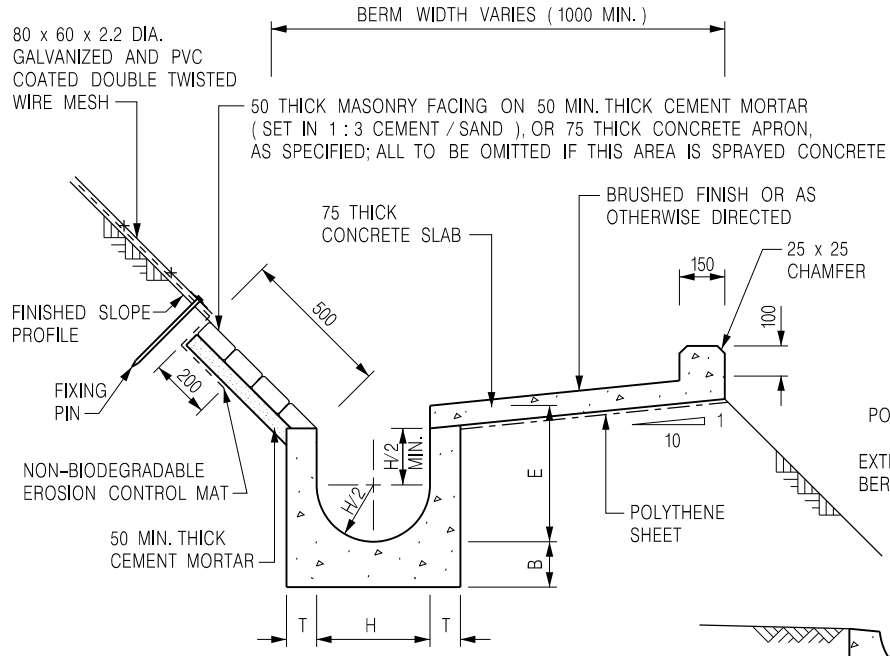
SCALE 1 : 10

DATE JAN 1991

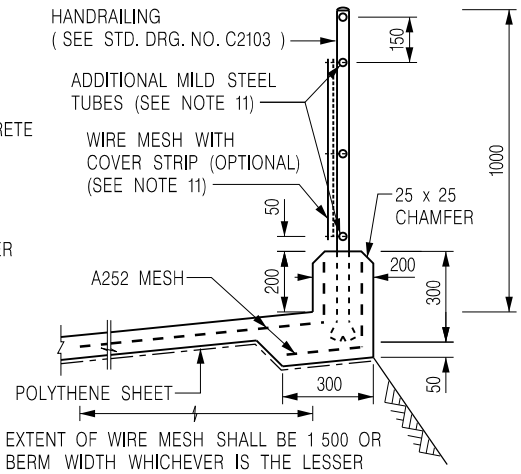
DRAWING NO. C2407B

興土木 利民生 齊拓展 創明天

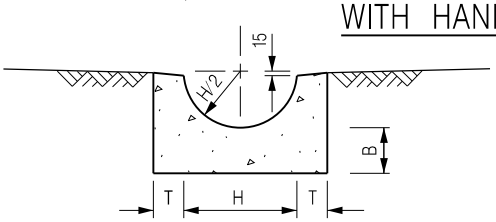
We bring the best engineering to life



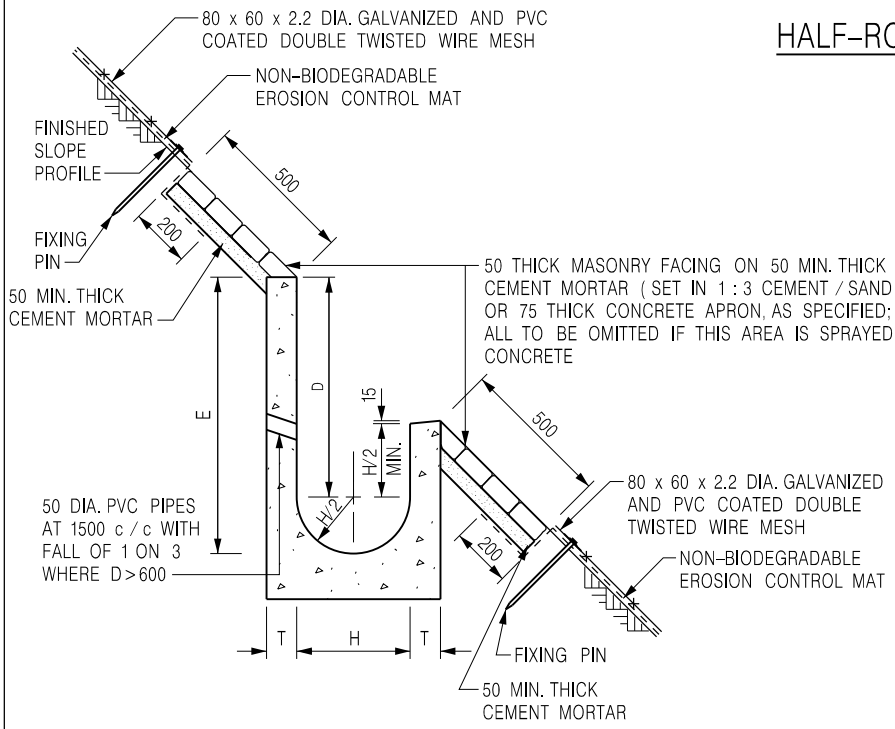
U-CHANNELS CONSTRUCTED ON BERM



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

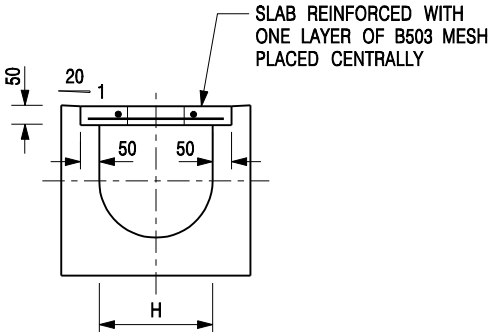
DETAILS OF HALF-ROUND AND U-CHANNELS (TYPE A – WITH MASONRY APRON)

CEDD **CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT**

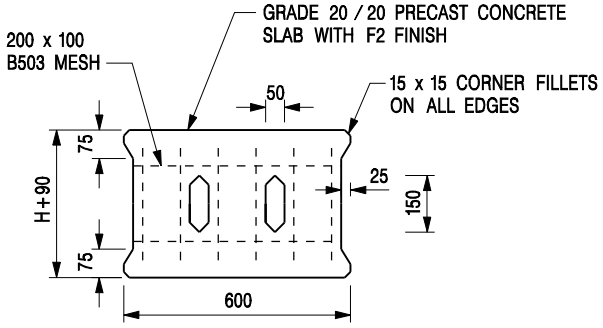
SCALE 1 : 25

DATE JAN 1991

DRAWING NO. C2409J



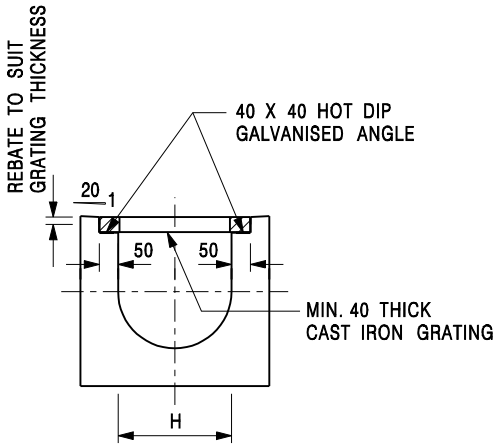
TYPICAL SECTION



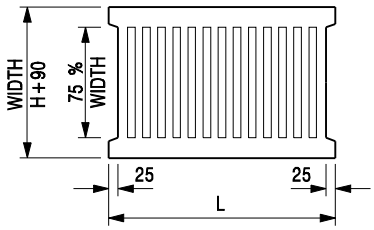
PLAN OF SLAB

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

Assessment of Hydraulic Capacities of the Proposed Drainage System for 1 in 50 year design return period

Using Rational Method

Design Flow = 0.278CiA m^3/s for grassland (heavy soil) - steep, C = 0.35 for grassland (heavy soil) - flat, C = 0.25
for concrete surface, C = 0.95

Using Manning Equation (for channel flow)

Design Mean Velocity = $R^{1/6}/n(RS_f)^{1/2}$ where n = 0.016 for concrete-lined open channel with fair surface
0.045 for natural stream channels, winding some pools and shoals with some weeds and stones with fair surface
(ref. Table13 in SDM)

Using GEV distribution model in frequency analysis

Rainfall intensity = $a / (t_d+b)^c$ where a = 474.6 , b= 2.90 and c= 0.371 in 50 year design return period (for 'Main Rural Catchment Drainage Channel' in SDM is adopted)
referenced from Table 3a in SDM Corrigendum No. 1/2022 - Storm Constants for Different Return Periods of North District Area

Using Bransby William's Equation

Inlet time t_0 = $0.14465L/ (H^{0.2}A^{0.1})$ or 2 when the distance is too short

Using Colebrook's White Equation (for pipe flow)

V = - Sqt (8gDs) x log [(k_s / 3.7D) + (2.51v / D x Sqt (2gDs))]
For precast concrete pipes with 'O' ring joints with poor condition,
k_s (mm) = 0.6 k_s (m) = 0.0006
v (m^2/s) = 1.00E-06
g (m^2/s) = 9.81

(1) USCP/USMH	(2) DSCP/DSMH	(3) Collected Runoff from Catchment (refer to Figure D4)	(4) USGL (mPD)	(5) DSGL (mPD)	(6) USIL (mPD) [100mm depth is allowed for channel cover]	(7) DSIL (mPD)	(8) INVERT DIFF. (m)	(9) LENGTH OF CHANNEL / DRAIN l (m)	(10) SLOPE s	(11) SLOPE 1 IN	(12) LENGTH FOR CALCULATION OF INLET TIME L (m)	(13) AVERAGE SLOPE OF GROUND FOR CALCULATION OF INLET TIME H (m per 100m)	(14) INLET TIME t_0 (min) = 0.14465 x [L/($H^{0.2}$ x $A^{0.1}$)]	(15) TIME OF FLOW INSIDE CHANNEL/ DRAIN t_f (min) = l/V (i.e. Column (9) ÷ Column (26) ÷ 60)	(16) TIME OF CONCENTRATION t_c (min) = t_0 + t_f	(17) RAINFALL INTENSITY i (mm/hr)	(18) RAINFALL INTENSITY INCLUDING EFFECT OF CLIMATE CHANGE (+16.0%") (mm/hr) [refer to item (e) and (k) in SDM Corrigendum No. 1/2022]	(19) ADOPTED RAINFALL INTENSITY INCLUDING EFFECT OF CLIMATE CHANGE (+16.0%) & DESIGN ALLOWANCE (12.1%) (mm/hr) [refer to item (e), (k) and (n) in SDM Corrigendum No. 1/2022]	(20) RUNOFF COEF. C	(21) SUB-CATCHMENT AREA A (m^2)	(22) EFFECTIVE CATCHMENT AREA (m^2)	(23) CUM. EFFECTIVE CATCHMENT AREA (m^2)	(24) DESIGN FLOW (m^3/s)	(25) SIZE (mm)	(26) CHANNEL TYPE	(27) VELOCITY (m/s)	(28) FLOW CAPACITY (m^3/s)	(29) 90% FLOW CAPACITY (m^3/s) (to cater for potential deposition of sediment)	(30) SPARE CAPACITY (m^3/s)	(31) Occupancy of the Proposed Pipe / Channel	
Point C	CP2	A2	10.57	10.30	9.72	9.45	0.27	40.00	0.007	150	220.00	2.05	10.74	0.32	11.06	178.49	207.05	232.10	0.95	12,450	11,828	11,828	0.763	750	UC	2.08	1.05	0.94	0.177	81.1%	OK!
Point A	CP1	nominal	11.45	10.86	11.13	10.54	0.05	10.00	0.005	200	-	-												225	UC						OK!
CP1	CP2	A1	10.86	10.30	10.46	9.90	0.45	45.00	0.010	100	107.00	1.02	6.74	0.54	7.28	200.66	232.77	260.94	0.25	3,937	984	984	0.071	300	UC	1.38	0.11	0.10	0.029	71.4%	OK!
CP2	TCP	A1+A2	10.30	10.10	9.45	9.25	0.20	20.00	0.010	100	-	-	7.28	0.13	7.41	199.72	231.67	259.70	0.95	0	0	12,812	0.925	750	UC	2.55	1.28	1.15	0.227	80.3%	OK!
Point B	CP3	nominal	11.45	11.36	11.13	11.04	0.08	16.00	0.005	200	-	-												225	UC						
CP3	CP4	A3	11.36	10.90	10.81	10.35	0.10	19.00	0.005	200	-	-	2.00	0.25	2.25	258.43	299.78	336.05	0.95	1,900	1,805	1,805	0.169	450	UC	1.28	0.23	0.21	0.040	80.8%	OK!
CP4	CP5	ditto	10.90	10.83	10.35	10.03	0.33	65.00	0.005	200	-	-	2.25	0.84	3.09	244.26	283.34	317.62	0.95	0	0	1,805	0.159	450	UC	1.28	0.23	0.21	0.049	76.4%	OK!
CP5	TCP	ditto	10.83	10.10	10.03	9.55	0.06	12.00	0.005	200	-	-	3.09	0.16	3.25	241.94	280.65	314.61	0.95	0	0	1,805	0.158	450	UC	1.28	0.23	0.21	0.051	75.7%	OK!
Point D	CP9	A4	10.57	10.57	10.17	10.16	0.01	2.00	0.005	200	-	-	2.00	0.03	2.03	262.51	304.51	341.36	0.95	682	648	648	0.061	300	UC	0.98	0.08	0.07	0.009	86.9%	OK!
CP9	CP8	ditto	10.57	10.57	10.16	10.15	0.02	3.00	0.005	200	-	-	2.03	0.05	2.09	261.51	303.35	340.06	0.95	0	0	648	0.061	300	UC	0.98	0.08	0.07	0.010	86.6%	OK!
CP8	CP7	ditto	10.57	10.57	10.15	10.12	0.03	5.00	0.005	200	-	-	2.09	0.09	2.17	259.87	301.45	337.93	0.95	0	0	648	0.061	300	UC	0.98	0.08	0.07	0.010	86.0%	OK!
CP7	CP6	ditto	10.57	10.10	10.12	9.70	0.08	15.00	0.005	200	-	-	2.17	0.26	2.43	255.17	296.00	331.82	0.95	0	0	648	0.060	300	UC	0.98	0.08	0.07	0.011	84.5%	OK!
CP6	CP10	ditto	10.10	10.10	9.70	9.63	0.08	15.00	0.005	200	-	-	2.43	0.26	2.68	250.78	290.90	326.10	0.95	0	0	648	0.059	300	UC	0.98	0.08	0.07	0.012	83.0%	OK!
CP10	CP11	ditto	10.10	10.10	9.63	9.57	0.06	12.00	0.005	200	-	-	2.68	0.20	2.89	247.45	287.05	321.78	0.95	0	0	648	0.058	300	UC	0.98	0.08	0.07	0.013	81.9%	OK!
CP11	TCP	ditto	10.10	10.10	9.57	9.55	0.02	4.00	0.005	200	-	-	2.89	0.07	2.95	246.38	285.80	320.38	0.95	0	0	648	0.058	300	UC	0.98	0.08	0.07	0.013	81.6%	OK!
Discharge Point																															
TCP	outfall	A1+A2+A3+A4	10.10	9.90	9.10	8.90	0.03	6.00	0.005	200.00	-	-	7.41	0.05	7.46	199.36	231.26	259.24	0.95	0	0	15265	0.981	900	UC	2.04	1.47	1.32	0.343	74.1%	OK!
outfall	twin 900 dia. pipe culvert	A1+A2+A3+A4+A5+A6	9.90	11.00	8.75	8.67	0.08	38.00	0.002	200.00	-	-	7.46	0.29	7.75	197.36	228.93	256.64	0.73	6289	4612	19876	1.265	900	Twin Pipe	2.21	2.81	2.53	1.268	49.9%	OK!

25,258

catchment	m^2	
A1	3,937	Grassland (flat)
A2	12,450	hardpaved
A3	1,900	hardpaved
A4	682	hardpaved
A5	4,342	hardpaved
A6	1,947	Grassland (flat)
total =	25,258	