Drainage Proposal

Project : Proposed Temporary Logistic Centre and Warehouse
with Ancillary Open Storage for Machinery,
Solar Panels and Facilities for a Period of 3 Years

1. Site particulars

1.1 The application site is located at Lot.751 S.B RP, 751 S.B ss.1 in D.D. 82 . The site area is approximately 6454 m². The site location is shown in Plan 1.

1.2 The existing site area of Lot.751 S.B RP is partly hard-paved with approximate levels of +9.10 mPD. For the Lot. 751 S.B ss.1,the land area will be filled to the same hard-paved level of Lot.751 S.B RP upon approval of application .

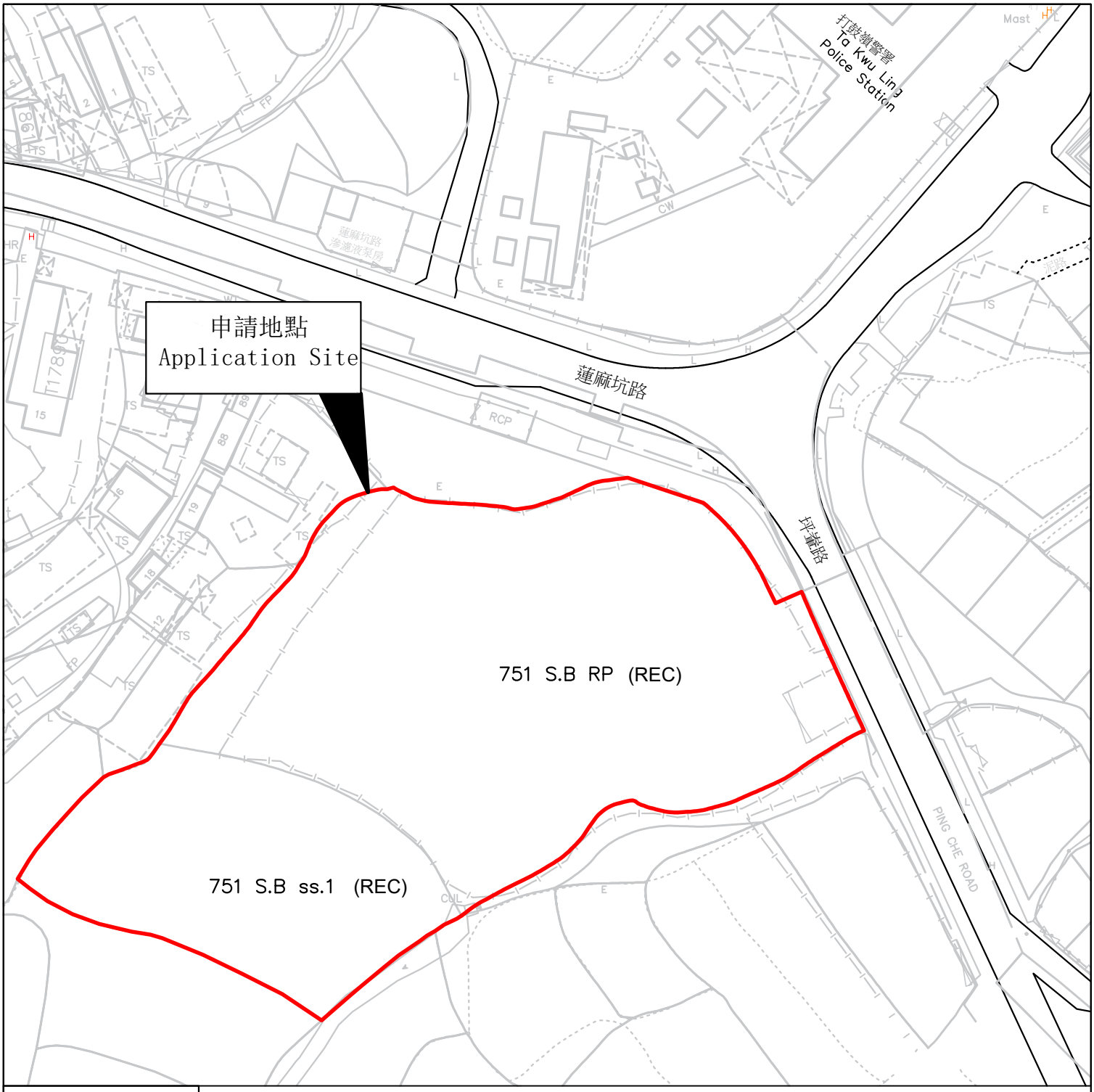
1.3 At the proposed discharge point, the existing watercourse is approximately 2 m wide.

1.4 The site can access from Ping Che Road. The surrounding area is predominantly rural, comprising temporary structures Village House and government facilities.

1.5 The 270 m2 non-building area will not be filled at any time.

1.6 Part of the 108 m² non-building area will be filled. The existing streamcourse and a culvert will not be affected by the proposed land-filling works. Please refer to the Land filling Plan.

1.7 The applicant will ensure all the proposed structures would be placed at least 3m away from the top of the bank of the streamcourse.



Legend

Site Boundary

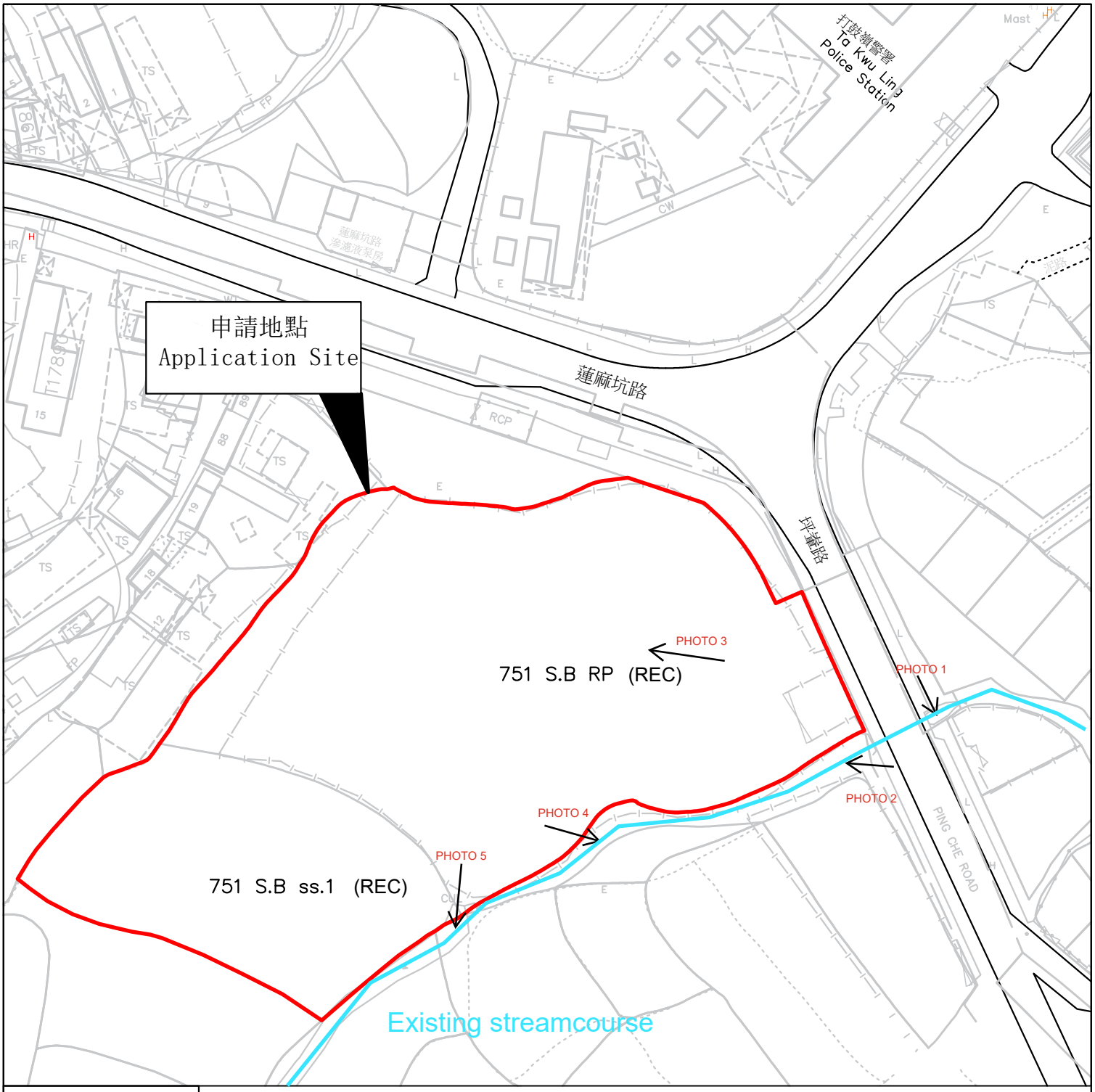
Location Plan

Proposed Warehouse at Lot,751 S.B RP,
751 S.B ss.1 in D.D.82 Ta Kwu Ling

Scale

1:1000

Plan 1



Legend

Site Boundary

Scale	Site Photo Plan	Plan 1
1:1000	Proposed Warehouse at Lot,751 S.B RP, 751 S.B ss.1 in D.D.82 Ta Kwu Ling	

PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4

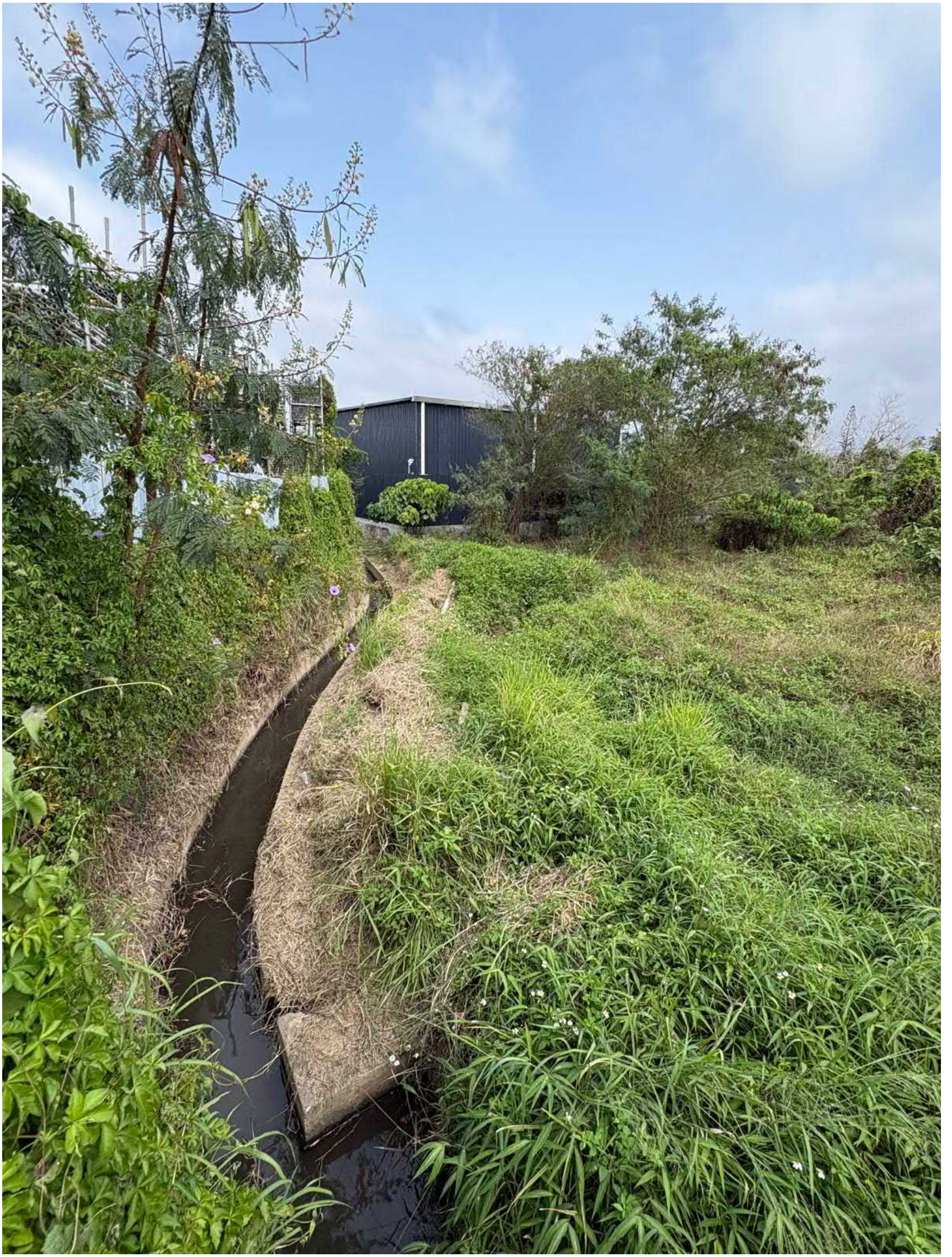
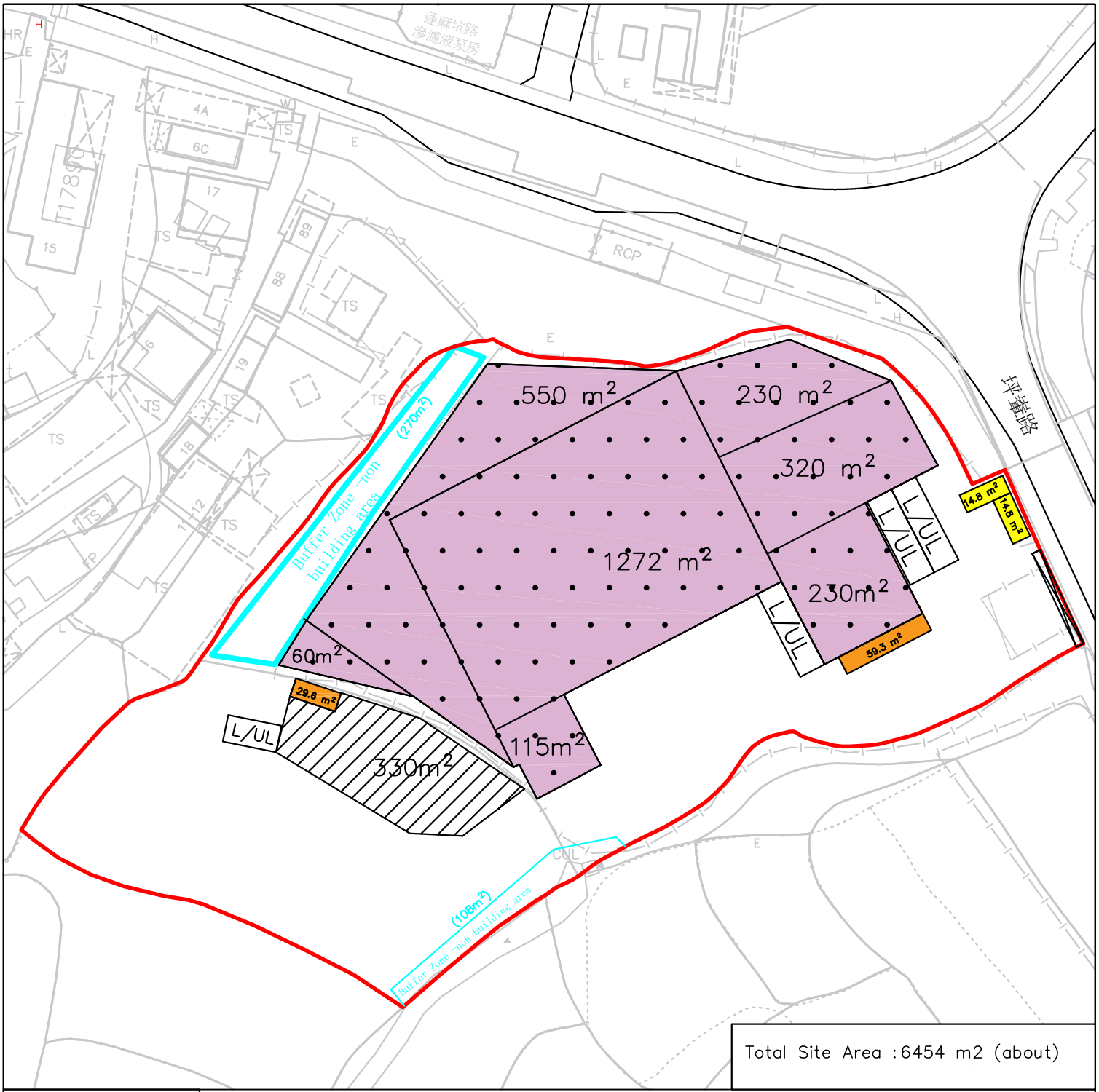



PHOTO 5
GRASS NEED TO BE REMOVED



Legend

- Office (88.90 m²)
- Toilet (29.6 m²)
- Enclosed Warehouse (2,777 m2 ≈ 30000 sf)
- Site Boundary
- Buffer Zone Boundary
- Ingress/Egress (11 m wide)
- L/UL — 16 tons trucks Loading /Unloading space 3.5m(w) x 12 m(L)
- L/UL — Light Goods Vehicle Loading /Unloading space 3.5m(w) x 7 m(L)
- Open Storage Area (about 330 m²)
- Proposed Solar Panel Area

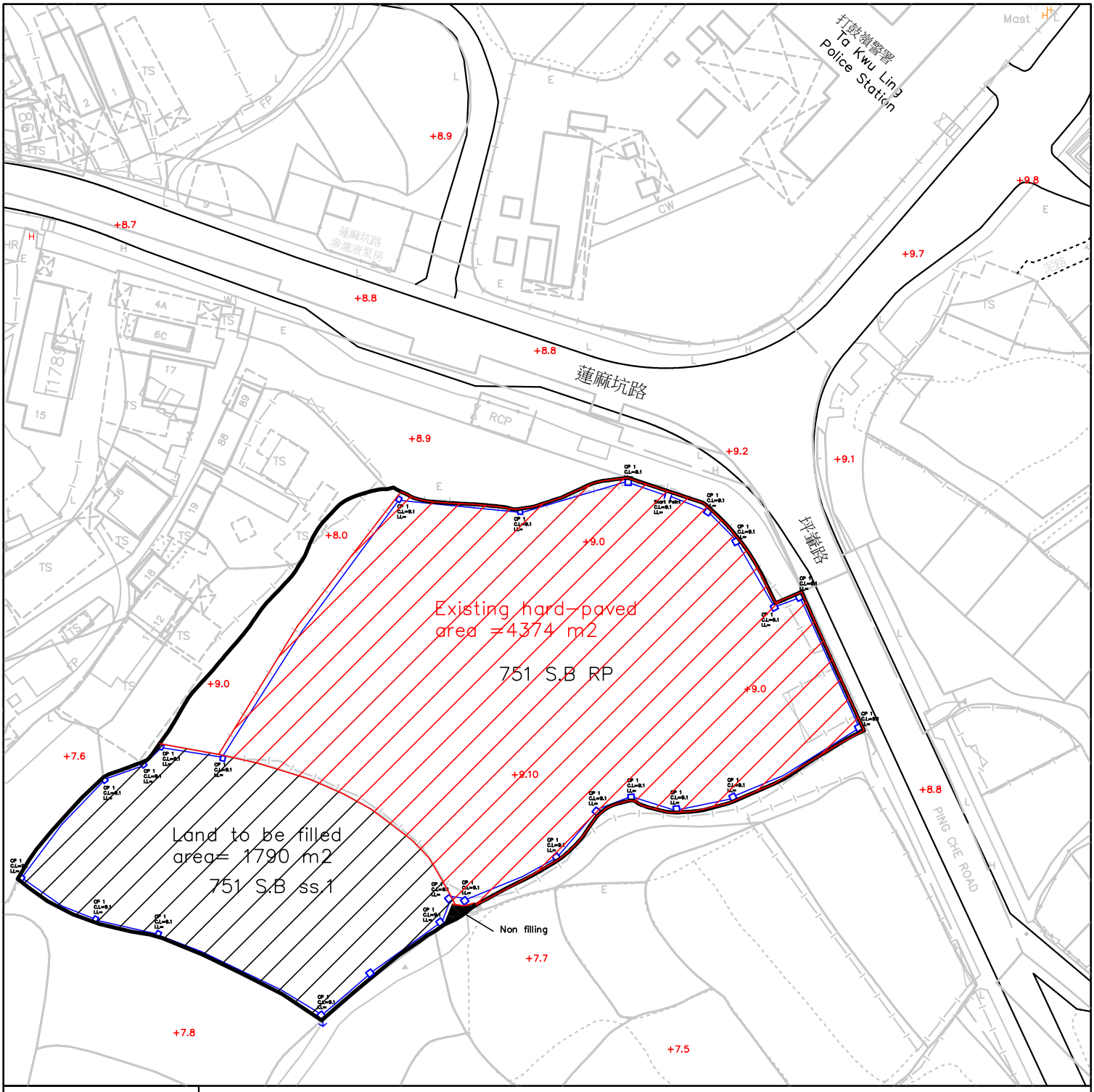
Scale

Not to Scale

Layout Plan

Lot.751 S.B RP,.751 S.B ss.1 in D.D.82 Ta Kwu Ling

Plan 2

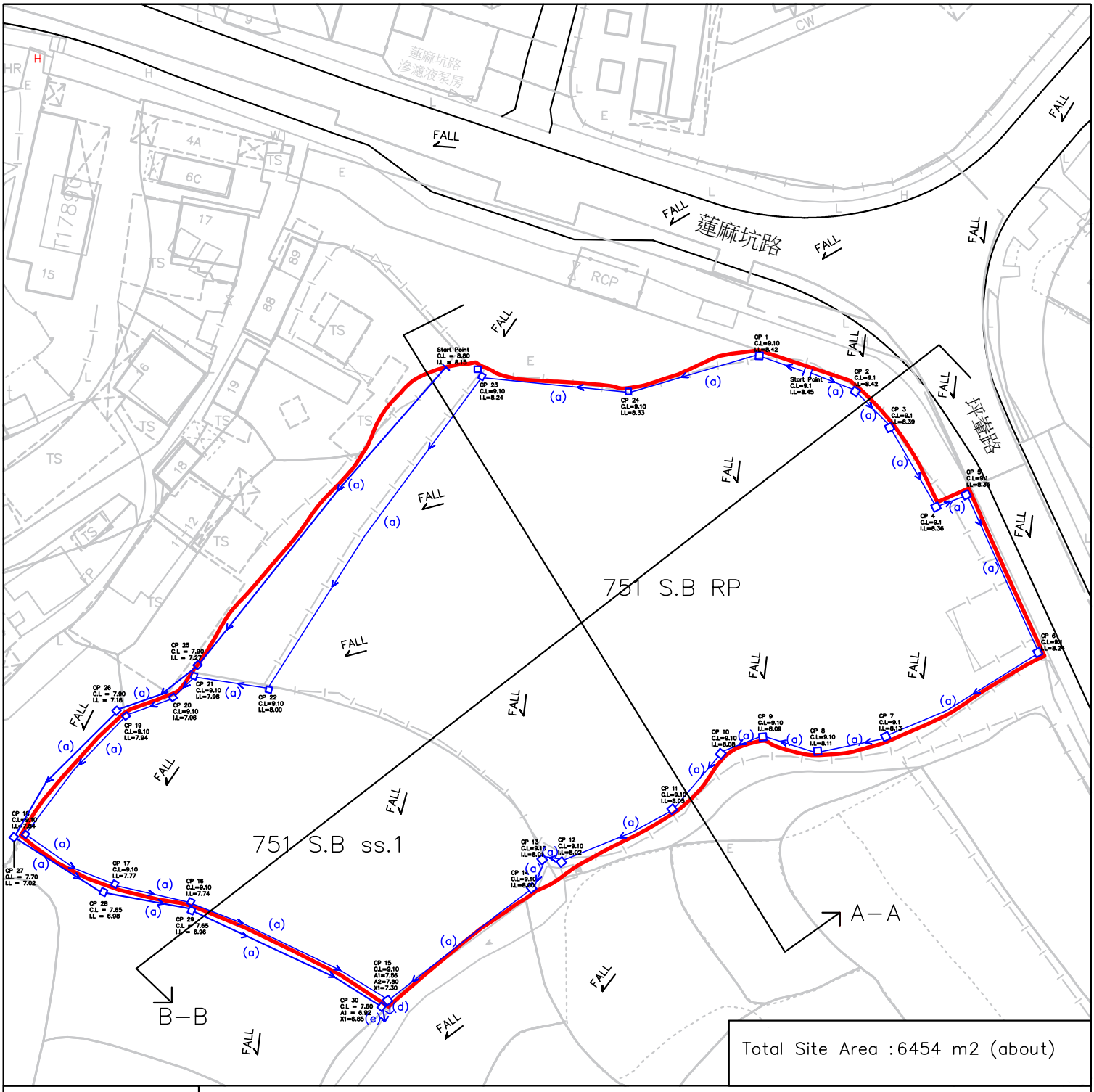


Legend

Scale

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Land Filling Plan



Total Site Area : 6454 m2 (about)

Legend

(a) ⟶ Proposed 600mm U-Channel(1:200)

Site Boundary

Proposed Catch Pit

(d) ⟶ Proposed 800mm Concrete Pipe(1:200)

(e) ⟶ Proposed 600mm Concrete Pipe(1:200)

CP 15 will use backdrop manhole

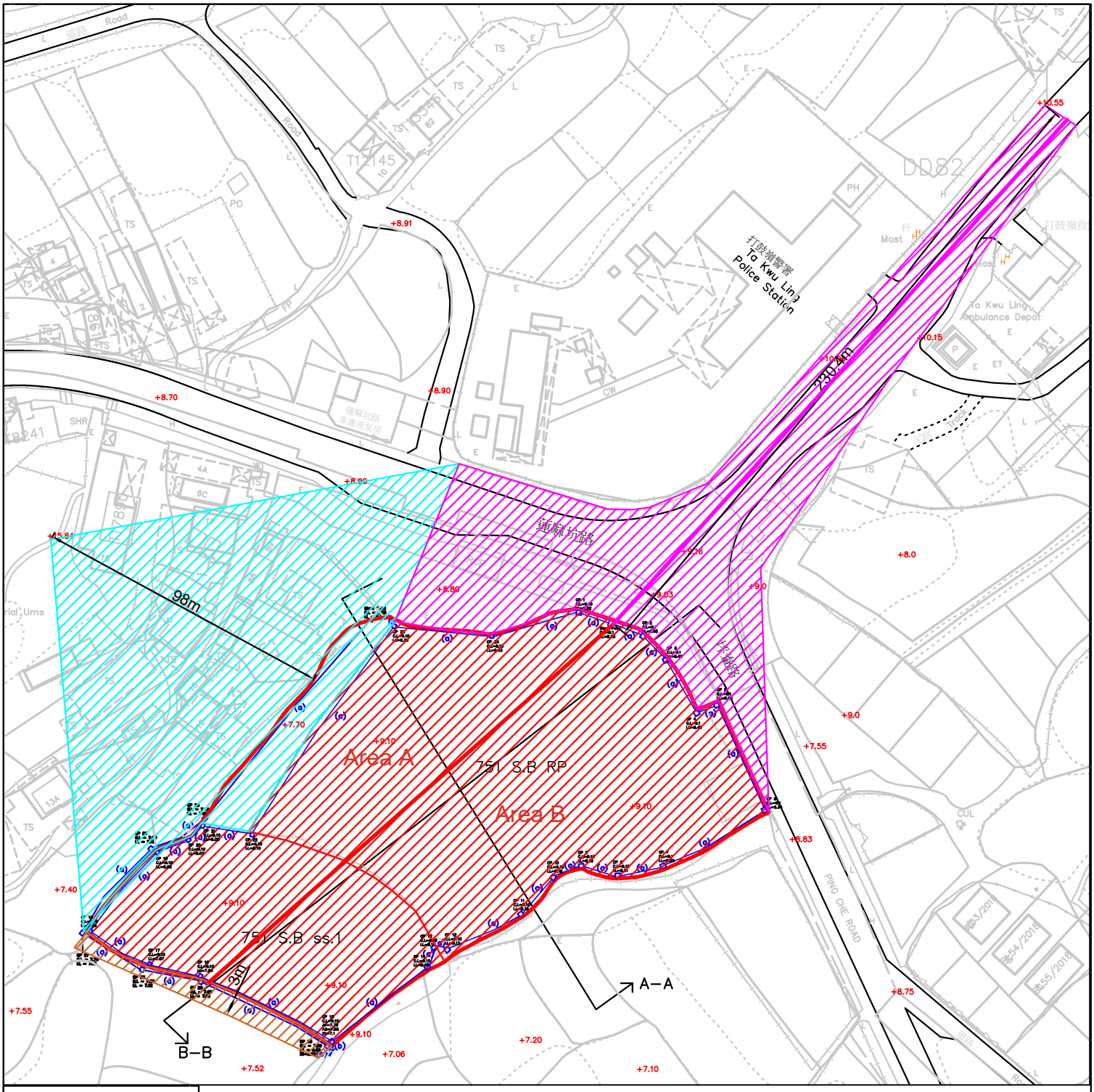
CP 30 will use catch pits with trap.

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Not to Scale

Drainage Layout Plan

Proposed Warehouse at Lot.751 S.B RP,
751 S.B ss.1 in D.D.82 Ta Kwu Ling



Legend

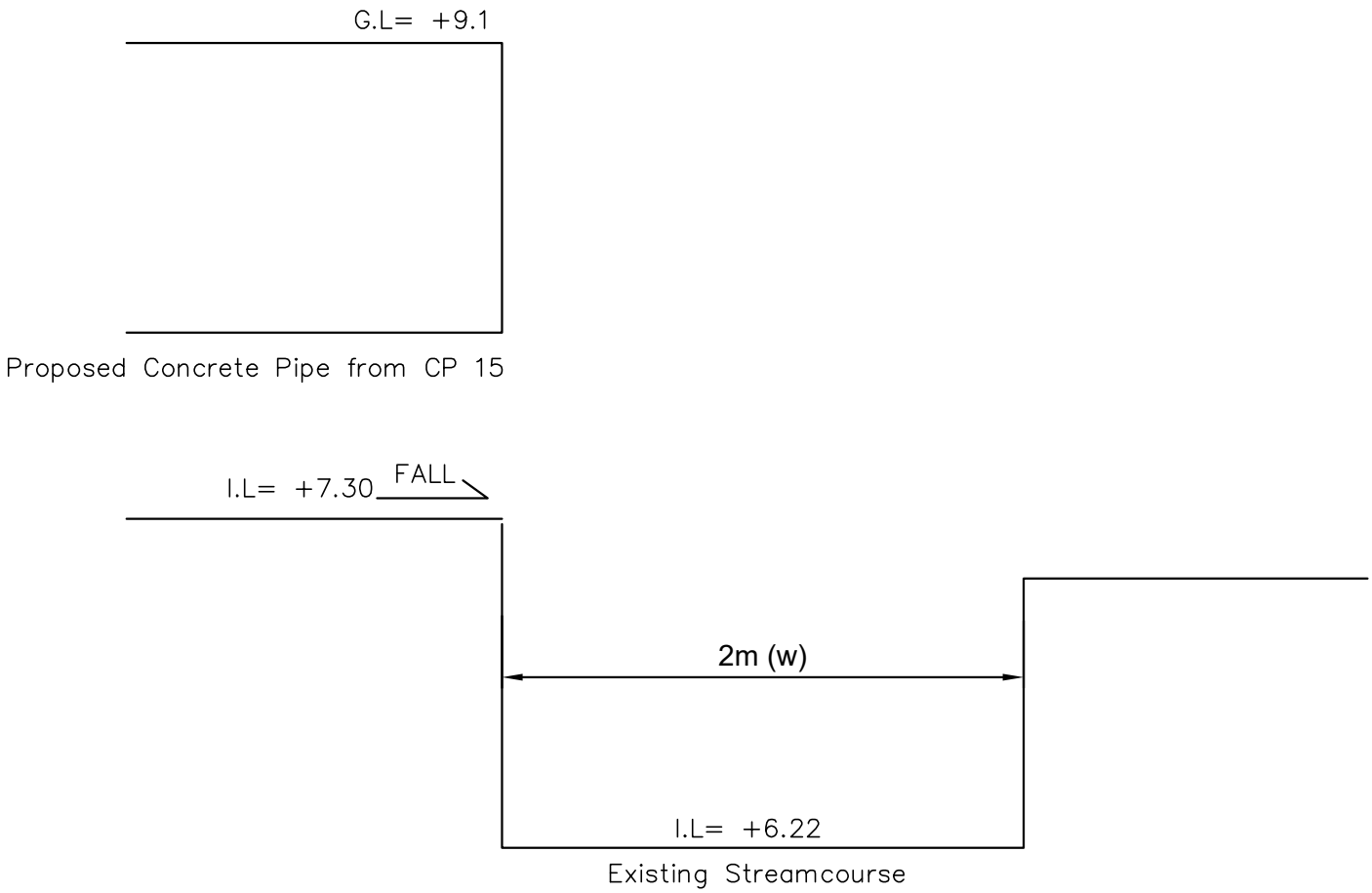
- Catchment Area A = 2574 m^2 (about)
- Catchment Area B = 3237 m^2 (about)
- Catchment Area 2 = 5034 m^2(about)
- Catchment Area 3 = 3997 m^2 (about)
- Catchment Area 4 = 441 m^2 (about)

Scale

Not to Scale

Catchment Area Plan

Lot.751 S.B RP, 751 S.B ss.1 in D.D.82
Ta Kwu Ling



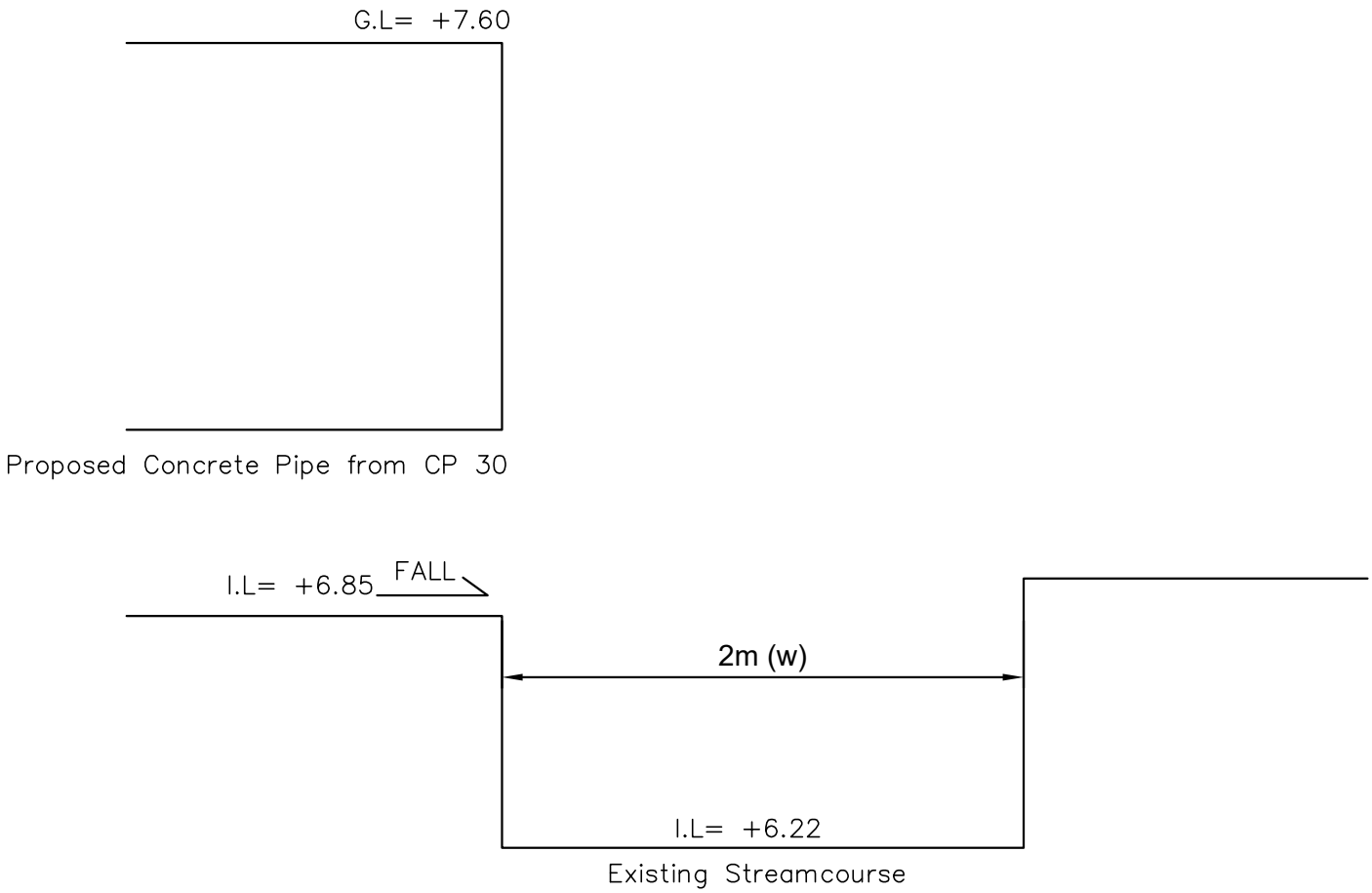
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Connection Detail

(CP 15 to Existing Streamcourse)



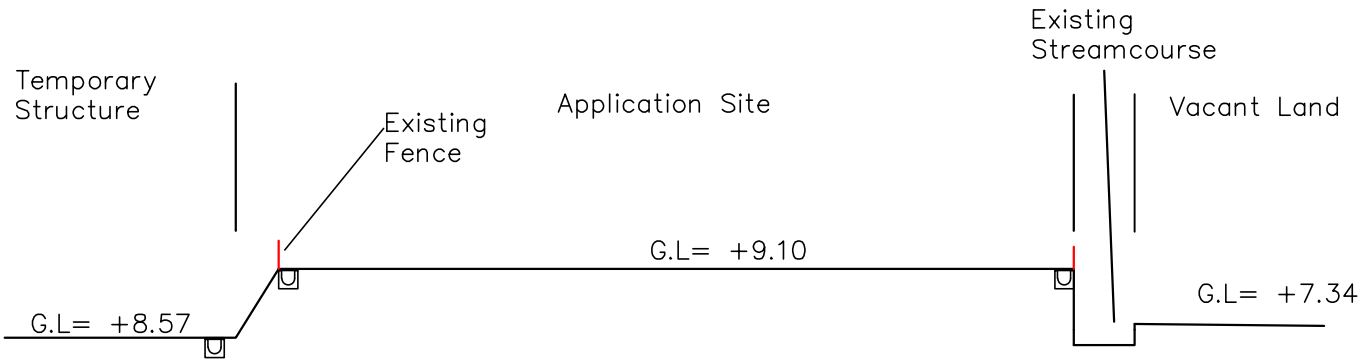
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Scale

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Connection Detail

(CP 30 to Existing Streamcourse)

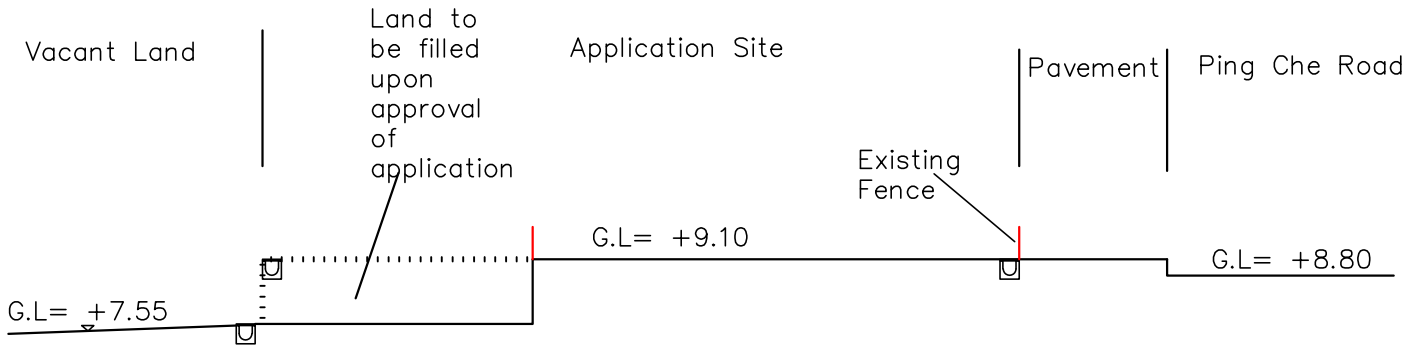


Legend

Scale

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Section Plan (A-A)



Legend

Scale

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Section Plan (B-B)

Calculations Content:

1. U-channel design for Site catchment area A & half catchment area 3.

2. Checking U-channel design for Site catchment area A & half catchment Area 3
3. U-channel design for Site catchment area B & half catchment area 3

4. Checking U-channel design for Site catchment area B & half catchment Area 3
5. Checking Concrete pipe design for CP 15

6. U-channel design for catchment area 2 & 4

7. Checking U-channel design for catchment area 2 & 4

8. Checking Concrete pipe design for CP 30

9. Calculation of checking sufficiency of existing streamcourse (Part 1)

10. Calculation of checking sufficiency of existing streamcourse (Part 2)

11. Calculation of checking sufficiency of existing streamcourse (Part 3)

Catchment Area = 1,998.5 m² (C = 0.950)

The Site Area — RED A = 2,574.0 m² (C = 0.950)

U-channel design for Site catchment area A & haif catchment area 3

$$\Sigma Q = \Sigma\ 0.278CiA$$

A = 1,998.5 + 2,574.0 = 4,572.5 m²

= 0.0045725 km²

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

Adopted rainfall duration = 1.000 min

$$i = \text{multiplier} \times a / (t + b)^{c}$$

= 1.111 × 474.600 / (1.000 + 2.900)^0.371

= 318.242 mm/hr

(50 years return period, North District, Table 3d, Corrigendum 2024, SDM; multiplier = 1.111)

Therefore, Q = 0.278 × 0.950 × 318.242 × 0.0019985 + 0.278 × 0.950 × 318.242 × 0.0025740

= 0.3843 m³/s

= **23,058.5 L/min**

U-channel allowable capacity = 36,860.4 L/min; velocity = 1.912 m/s

n = 0.013; freeboard = 0 mm; capacity factor = 1.000; utilization = 62.6%

Provide 600 mm U-channel (1:200) is OK

Check 600 mm U-channel by Manning Equation — RED A

Checking U-channel design for Site catchment area A & haif catchment area 3

$$V = (1/n) \times R^{(2/3)} \times S^{(1/2)}; \; R = A/P$$

where:

V	=	1.912 m/s	mean channel velocity
n	=	0.013 —	Manning roughness coefficient
H	=	0.600 m	channel size H
A	=	0.321372 m²	wetted flow area
P	=	1.542478 m	wetted perimeter
S	=	0.005000 —	hydraulic gradient
R	=	0.208348 m	hydraulic radius

Therefore, mean channel velocity = 1.912 m/s

Qallow = 1.000 × V × A

y = 0.600 m; freeboard = 0 mm

Allowable U-channel capacity	=	0.614339 m³/s
Allowable U-channel capacity	=	**36,860.4 L/min**
Design runoff	=	**23,058.5 L/min**
Capacity utilization	=	62.6% —

Provide 600 mm U-channel (1:200) is OK

Catchment Area = 1,998.5 m² (C = 0.950)

The Site Area — RED B = 3,237.0 m² (C = 0.950)

U-channel design for Site catchment area B & haif catchment area 3

$$\Sigma Q = \Sigma\ 0.278CiA$$

A = 1,998.5 + 3,237.0 = 5,235.5 m²

= 0.0052355 km²

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

Adopted rainfall duration = 1.000 min

$$i = \text{multiplier} \times a / (t + b)^{c}$$

= 1.111 × 474.600 / (1.000 + 2.900)^0.371

= 318.242 mm/hr

(50 years return period, North District, Table 3d, Corrigendum 2024, SDM; multiplier = 1.111)

Therefore, Q = 0.278 × 0.950 × 318.242 × 0.0019985 + 0.278 × 0.950 × 318.242 × 0.0032370

= 0.4400 m³/s

= 26,401.9 L/min

U-channel allowable capacity = 36,860.4 L/min; velocity = 1.912 m/s

n = 0.013; freeboard = 0 mm; capacity factor = 1.000; utilization = 71.6%

Provide 600 mm U-channel (1:200) is OK.

Check 600 mm U-channel by Manning Equation — RED B

Checking U-channel design for Site catchment area B & haif catchment area 3

$$V = (1/n) \times R^{(2/3)} \times S^{(1/2)};\ R = A/P$$

where:

V	=	1.912 m/s	mean channel velocity
n	=	0.013 —	Manning roughness coefficient
H	=	0.600 m	channel size H
A	=	0.321372 m²	wetted flow area
P	=	1.542478 m	wetted perimeter
S	=	0.005000 —	hydraulic gradient
R	=	0.208348 m	hydraulic radius

Therefore, mean channel velocity = 1.912 m/s

Qallow = 1.000 × V × A

y = 0.600 m; freeboard = 0 mm

Allowable U-channel capacity	=	0.614339 m³/s
Allowable U-channel capacity	=	**36,860.4 L/min**
Design runoff	=	**26,401.9 L/min**
Capacity utilization	=	71.6% —

Provide 600 mm U-channel (1:200) is OK.

Check Concrete Pipe Calculations - Downstream of CP15 (800 mm)

Combined discharge from RED A and RED B

QCP15 = 23,058.454 + 26,401.867 = 49,460.321 L/min

$$\mathbf{V = -\sqrt{(8gDS)}\ \log_{10}[ks/(3.7D) + 2.51v/(D\sqrt{(2gDS)})]}$$

where:

V	=	2.352 m/s	mean full-pipe velocity
g	=	9.810 m/s²	gravitational acceleration
D	=	0.800 m	effective internal pipe diameter
ks	=	0.000150 m	hydraulic pipeline roughness
v	=	1.14E-06 m²/s	kinematic viscosity of water
S	=	0.005000	hydraulic gradient
Re	=	1,650,430	Reynolds number

Therefore, full-pipe mean velocity = 2.352 m/s

Qallow = 0.800 × V × πD²/4

= 0.800 × 2.351863098 × π × 0.800²/4

Allowable pipe capacity	=	0.945740 m³/s
Allowable pipe capacity	=	**56,744.4 L/min**
Combined design runoff - CP15	=	**49,460.3 L/min**
Capacity utilization	=	87.2%

Provide 800 mm dia. pipe (1:200) is OK.

Catchment Area — BLUE = 5,034.0 m² (C = 0.950)

The Site Area — BROWN = 441.0 m² (C = 0.250)

U-channel design for catchment area 2 & 4

$$\Sigma Q = \Sigma\ 0.278CiA$$

A = 5,034.0 + 441.0 = 5,475.0 m²

= 0.0054750 km²

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

Adopted rainfall duration = 1.000 min

$$i = \text{multiplier} \times a / (t + b)\text{^}c$$

= 1.111 × 474.600 / (1.000 + 2.900)^0.371

= 318.242 mm/hr

(50 years return period, North District, Table 3d, Corrigendum 2024, SDM; multiplier = 1.111)

Therefore, Q = 0.278 × 0.950 × 318.242 × 0.0050340 + 0.278 × 0.250 × 318.242 × 0.0004410

= 0.4328 m³/s

= 25,971.0 L/min

U-channel allowable capacity = 36,860.4 L/min; velocity = 1.912 m/s

n = 0.013; freeboard = 0 mm; capacity factor = 1.000; utilization = 70.5%

Provide 600 mm U-channel (1:200) is OK.

Check 600 mm U-channel by Manning Equation — BLUE + BROWN

Checking U-channel design for catchment area 2 & 4

$$V = (1/n) \times R^{(2/3)} \times S^{(1/2)};\ R = A/P$$

where:

V	=	1.912 m/s	mean channel velocity
n	=	0.013 —	Manning roughness coefficient
H	=	0.600 m	channel size H
A	=	0.321372 m²	wetted flow area
P	=	1.542478 m	wetted perimeter
S	=	0.005000 —	hydraulic gradient
R	=	0.208348 m	hydraulic radius

Therefore, mean channel velocity = 1.912 m/s

Qallow = 1.000 × V × A

y = 0.600 m; freeboard = 0 mm

Allowable U-channel capacity	=	0.614339 m³/s
Allowable U-channel capacity	=	**36,860.4 L/min**
Design runoff	=	**25,971.0 L/min**
Capacity utilization	=	70.5% —

Provide 600 mm U-channel (1:200) is OK.

Check Concrete Pipe Calculations — BLUE + BROWN (600 mm)

Checking Concrete pipe design for CP 30

$$V = -\sqrt{(8gDS)}\ \log_{10}[ks/(3.7D) + 2.51v/(D\sqrt{(2gDS)})]$$

where:

V	=	1.970 m/s	mean full-pipe velocity
g	=	9.810 m/s²	gravitational acceleration
D	=	0.600 m	internal pipe diameter
ks	=	0.000150 m	hydraulic pipeline roughness
v	=	1.14E-06 m²/s	kinematic viscosity of water
S	=	0.005000 —	hydraulic gradient
Re	=	1,036,679 —	Reynolds number

Therefore, full-pipe mean velocity = 1.970 m/s

$Qallow = 0.800 \times V \times \pi D^2/4$

Allowable pipe capacity	=	0.445533 m³/s
Allowable pipe capacity	=	**26,732.0 L/min**
Design runoff	=	**25,971.0 L/min**
Capacity utilization	=	97.2% —

Provide 600 mm dia. pipe (1:200) is OK

Calculation of Combined Design Runoff - CP15 + CP30

CP15: Catchment Area - PURPLE = 3,997.0 m² (C = 0.950)

CP15: Site Area - RED A + RED B = 2,574 + 3,237 = 5,811.0 m² (C = 0.950)

CP30: BLUE = 5,034.0 m² (C = 0.950); BROWN = 441.0 m² (C = 0.250)

$$\Sigma Q = \Sigma\ 0.278CiA$$

A = 3,997 + 2,574 + 3,237 + 5,034 + 441 = 15,283.0 m²

= 0.015283 km²

Σ(CA) = 0.950 × (9,808 + 5,034) + 0.250 × 441 = 14,210.15 m²

Adopted rainfall duration = 1.000 min

$$i = \text{multiplier} \times a / (t + b)^c$$

where:

t	=	1.000 min	adopted rainfall duration
multiplier	=	1.111	rainfall multiplier
a	=	474.600	rainfall coefficient
b	=	2.900	rainfall coefficient
c	=	0.371	rainfall exponent

i = 1.111 × 474.600 / (1.000 + 2.900)^0.371

= 318.241508 mm/hr

(50 years return period, North District, Table 3d, Corrigendum 2024, SDM; multiplier = 1.111)

QCP15 = 0.278 × 0.950 × 318.241508 × 0.009808 = 0.824338687 m³/s

QCP30 = 0.278 × 318.241508 × (0.950 × 0.005034 + 0.250 × 0.000441)

= 0.432849472 m³/s

Therefore, Qcombined = 0.824338687 + 0.432849472 = 1.257188 m³/s

= 75,431.3 L/min

QCP15 = 49,460.3 L/min; QCP30 = 25,971.0 L/min

Other stream inflow adopted for this check = 0.000000 m³/s

Adopt combined CP15 + CP30 runoff = 75,431.3 L/min.

Check Existing Streamcourse by Manning Equation - CP15 + CP30

Rectangular clear section: width b = 2.000 m; assumed depth to bank H = 0.700 m.

Adopted stream gradient S = 1:200; n = 0.035; steady uniform flow; no downstream backwater.

$$V = (1/n)\, R^{2/3}\, S^{1/2}$$

where:

V	=	1.118192 m/s	mean velocity at bank level
n	=	0.035	adopted Manning coefficient
b	=	2.000 m	clear section width
H	=	0.700 m	assumed depth to bank
A	=	1.400000 m²	flow area = 2.000 × 0.700
P	=	3.400000 m	wetted perimeter = 2 + 2H
S	=	0.005000	adopted stream gradient
R	=	0.411765 m	hydraulic radius = 1.4 / 3.4

$$V = (1/0.035) \times (1.4/3.4)^{2/3} \times (0.005)^{1/2}$$

Therefore, mean streamcourse velocity = 1.118192 m/s

Qbank = V × A

= 1.118191973 × 1.400 = 1.565469 m³/s

Streamcourse capacity at bank level	=	1.565469 m³/s
Streamcourse capacity at bank level	**=**	**93,928.1 L/min**
Combined runoff - CP15 + CP30	**=**	**75,431.3 L/min**
Qcombined / Qbank	=	80.3%

Combined runoff is below bank-level capacity under the adopted conditions.

Qbank is calculated at zero bank clearance; normal depth and bank clearance are checked on page 3.

Manning n reference: DSD Stormwater Drainage Manual (2018), Table 13, natural-stream channels.

Check Normal Water Depth and Bank Clearance - CP15 + CP30

Common receiving reach; other stream inflow = 0; no downstream backwater.

Steady uniform flow; local outlet and pipe backwater effects are not assessed.

Level comparison uses stream bed +6.720 mPD at the checked section.

$$Q = (1/n)(by)\,[by / (b + 2y)]^{2/3}\,S^{1/2}$$

where:

Q	=	1.257188 m³/s	combined design runoff
b	=	2.000 m	clear section width
n	=	0.035	adopted Manning coefficient
S	=	0.005000	adopted stream gradient
H	=	0.700 m	assumed depth to bank
ILstream	=	+6.720 mPD	stream bed level
ILoutlet15	=	+7.300 mPD	CP15 outlet pipe invert
ILoutlet30	=	+6.850 mPD	CP30 outlet pipe invert

Solving for normal water depth y:

$$1.257188159 = (1/0.035)(2y)\,[2y / (2 + 2y)]^{2/3}\,(0.005)^{1/2}$$

Therefore, normal water depth y = 0.598813 m.

A = 2 × 0.598812749 = 1.197625 m²

P = 2 + 2 × 0.598812749 = 3.197625 m

R = 1.197625498 / 3.197625498 = 0.374536 m

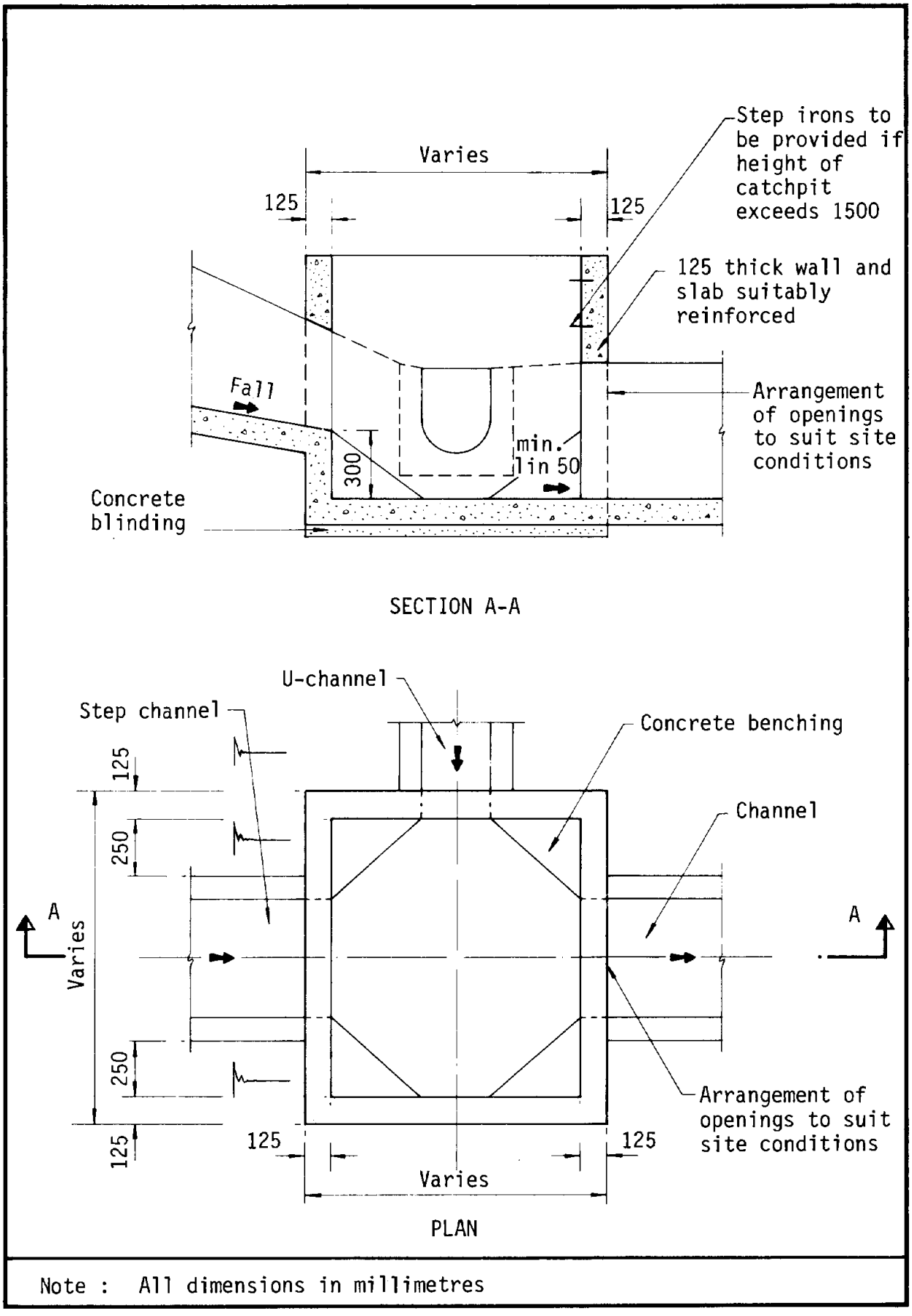
$$V = (1/0.035)(0.374535886)^{2/3}\,(0.005)^{1/2} = 1.049734 \text{ m/s}$$

Q = A × V = 1.197625498 × 1.049733962 = 1.257188 m³/s

Bank clearance, H - y	=	**0.101187 m**
Calculated water level, 6.720 + y	=	+7.318813 mPD
Assumed bank level, 6.720 + 0.700	=	+7.420000 mPD
Water above CP15 invert (7.300)	=	0.018813 m
Water above CP30 invert (6.850)	=	0.468813 m

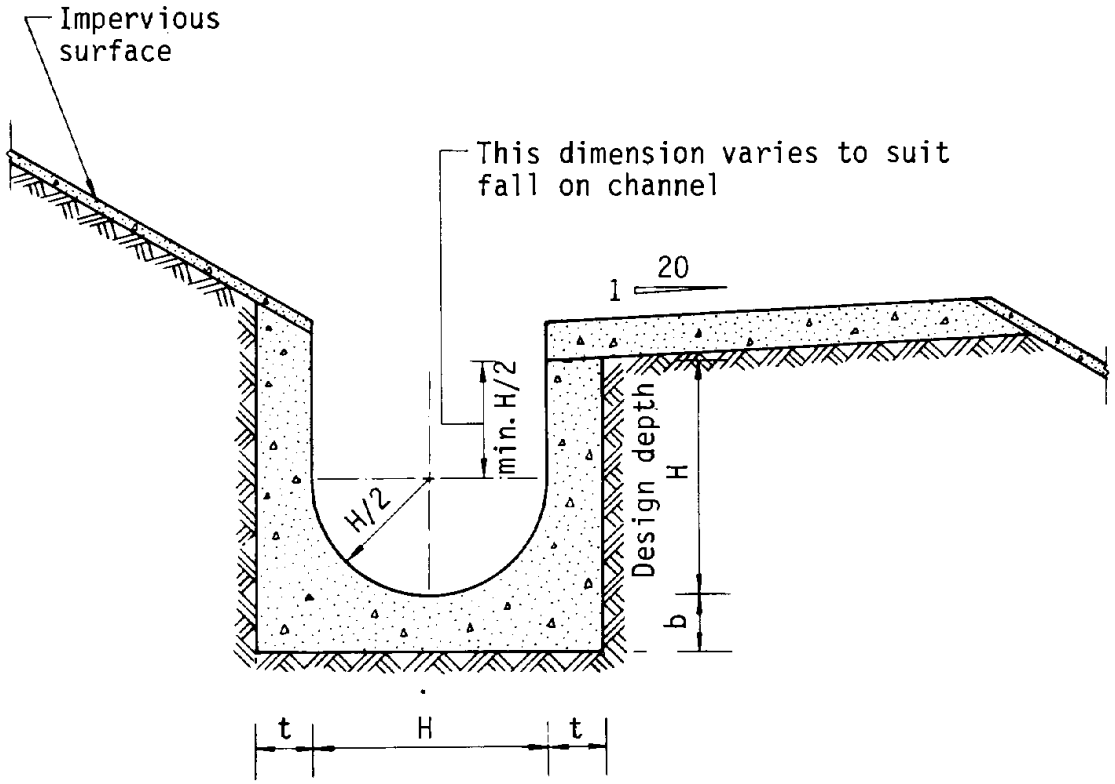
Calculated normal depth = 0.599 m < 0.700 m; bank clearance = 0.101 m.

No overtopping in the adopted uniform-flow calculation.



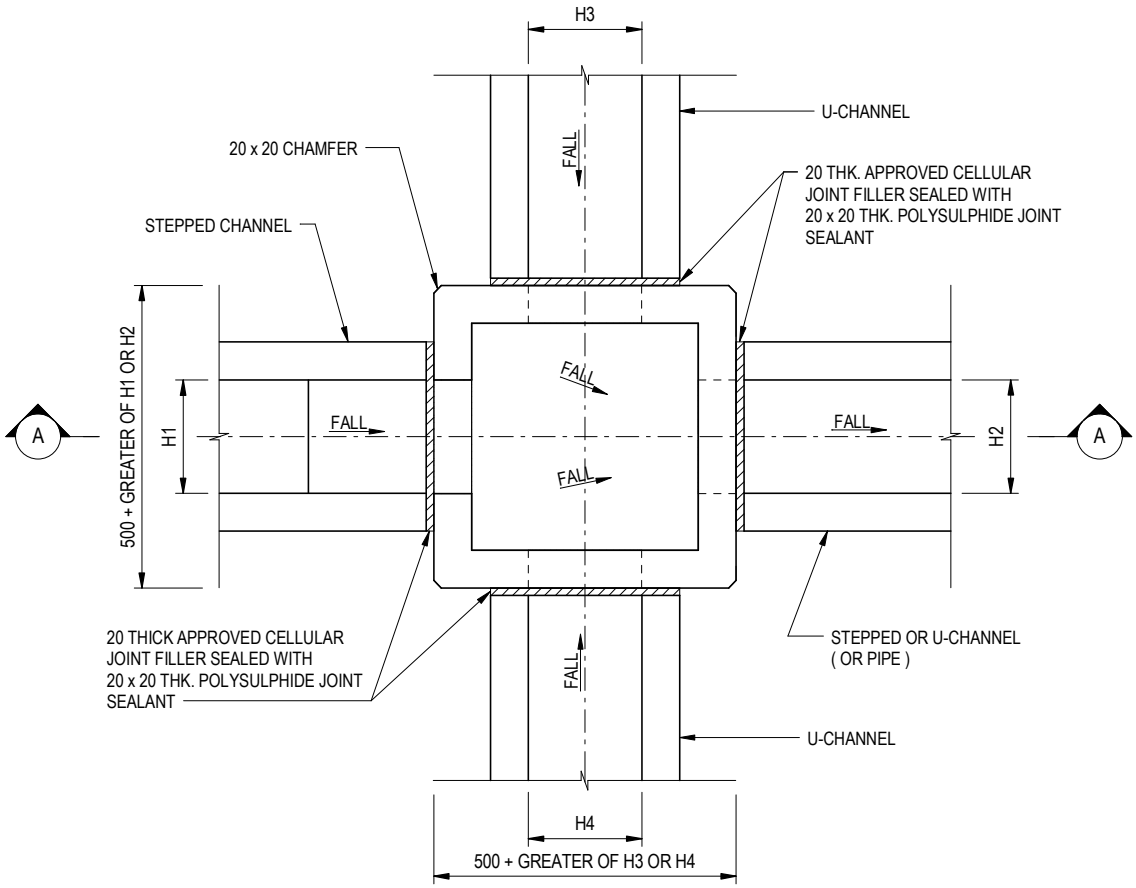
Note : All dimensions in millimetres

Figure 8.10 - Typical Details of Catchpits



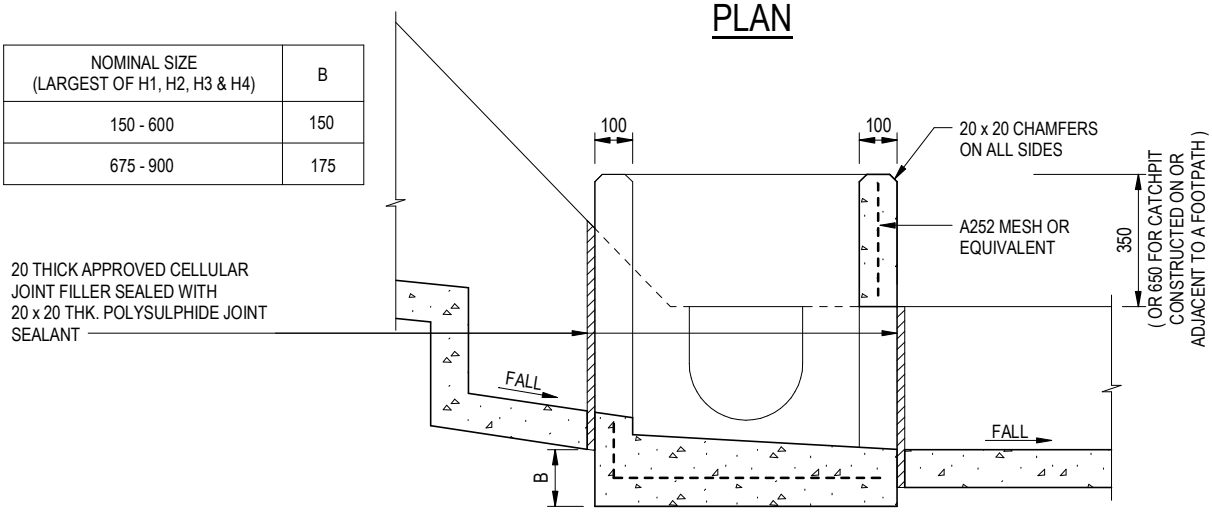
Dimensions of U - channel		
Nominal size of channel H (mm)	Thickness t (mm)	Thickness b (mm)
225 to 600	150	150
675 to 1200	175	225

Figure 8.11 - Typical U-channel Details

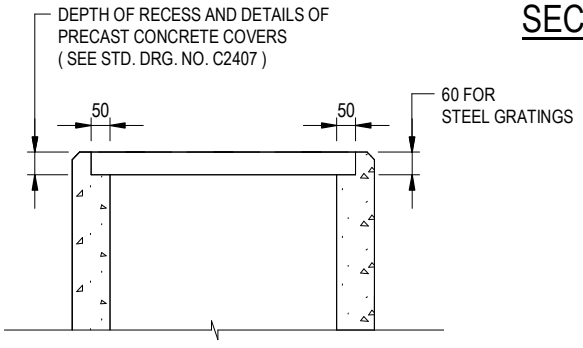


PLAN

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



SECTION A - A



ALTERNATIVE TOP SECTION FOR PRECAST CONCRETE COVERS / GRATINGS

NOTES:

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

REF.	REVISION	SIGNATURE	DATE
A	BIM OBJECT REVISION.	Original Signed	12.2025
–	FORMER DRG. NO. C2405J.	Original Signed	03.2015

STANDARD CATCHPIT DETAILS (SHEET 1 OF 5)

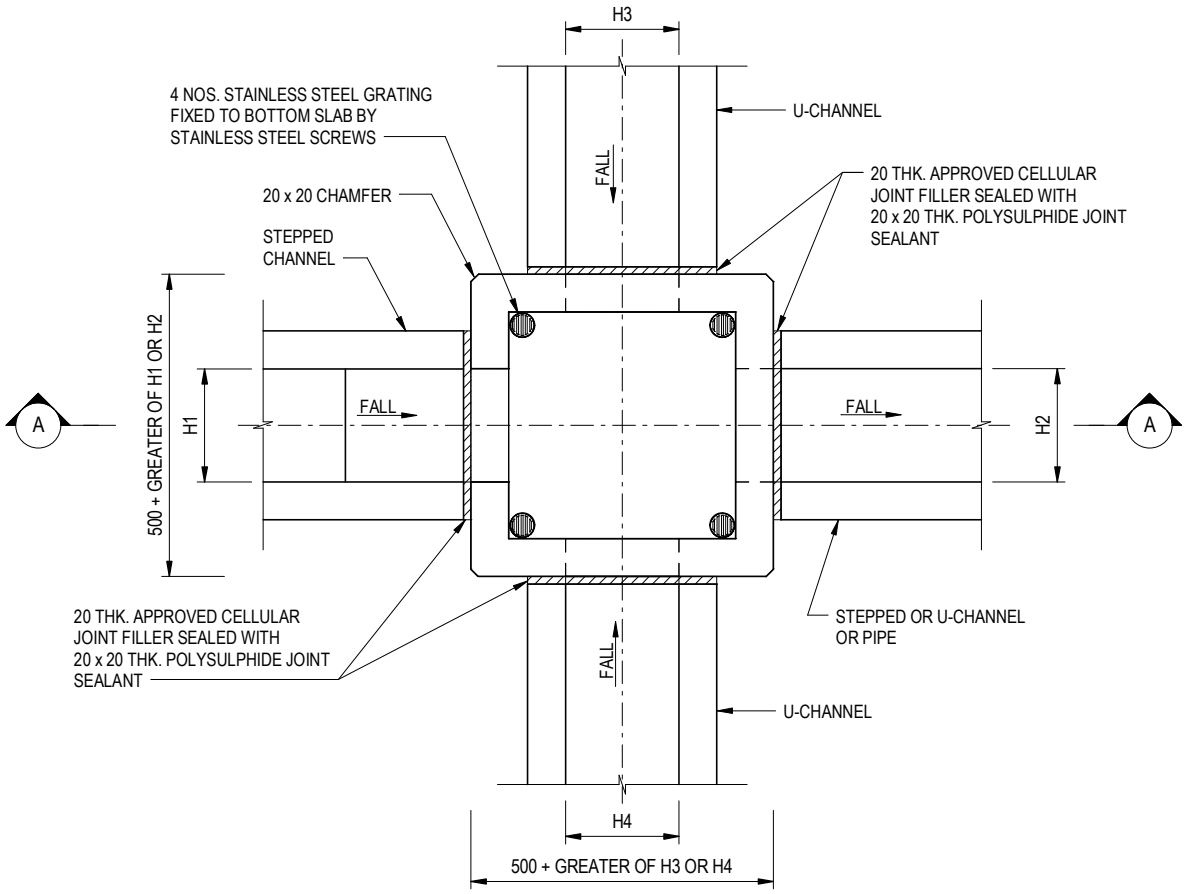
CEDD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 20

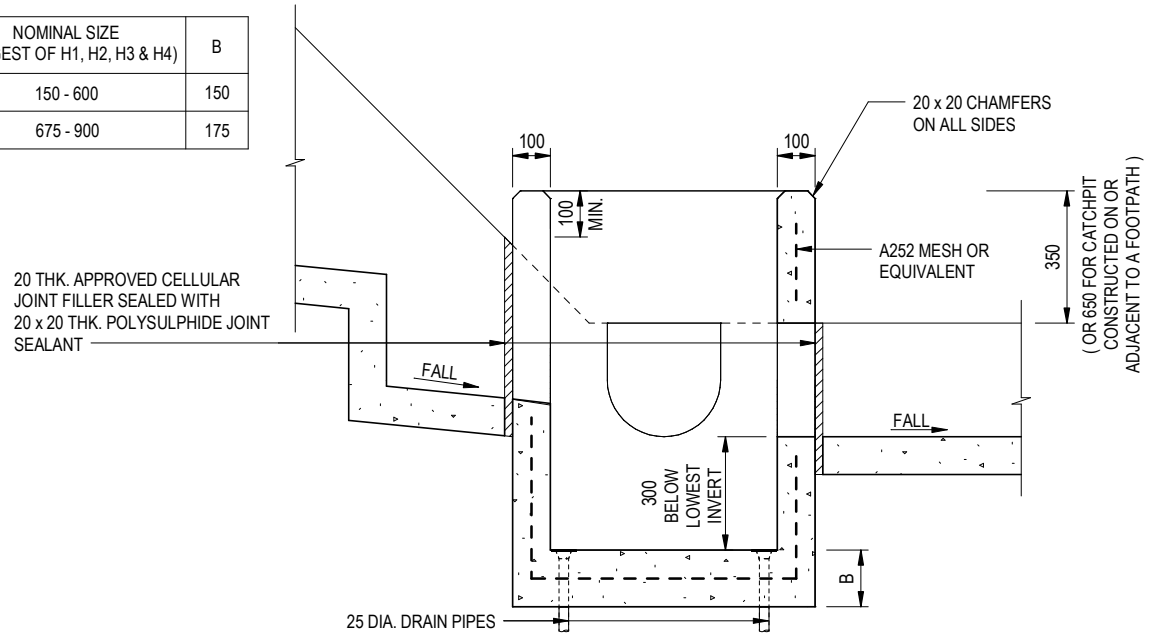
DATE JAN 1991

DRAWING NO. C2405 /1A



PLAN

NOMINAL SIZE (LARGEST OF H1, H2, H3 & H4)	B
150 - 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
A	BIM OBJECT REVISION.	Original Signed	12.2025
–	FORMER DRG. NO. C2406J.	Original Signed	03.2015

CATCHPIT WITH TRAP (SHEET 1 OF 2)

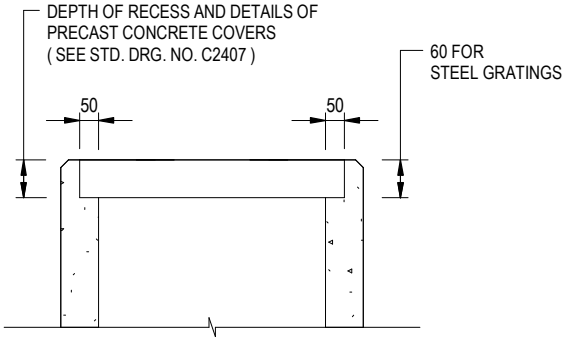
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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 20

DATE JAN 1991

DRAWING NO. C2406 /1A



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 1000 mm MIN. MEASURED FROM THE ADJACENT GROUND LEVEL.

10. MINIMUM INTERNAL CATCHPIT WIDTH SHALL BE 1000 mm FOR CATCHPITS WITH A HEIGHT EXCEEDING 1000 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
B	BIM OBJECT REVISION.	Original Signed	12.2025
A	MINOR AMENDMENT.	Original Signed	04.2016
–	FORMER DRG. NO. C2406J.	Original Signed	03.2015

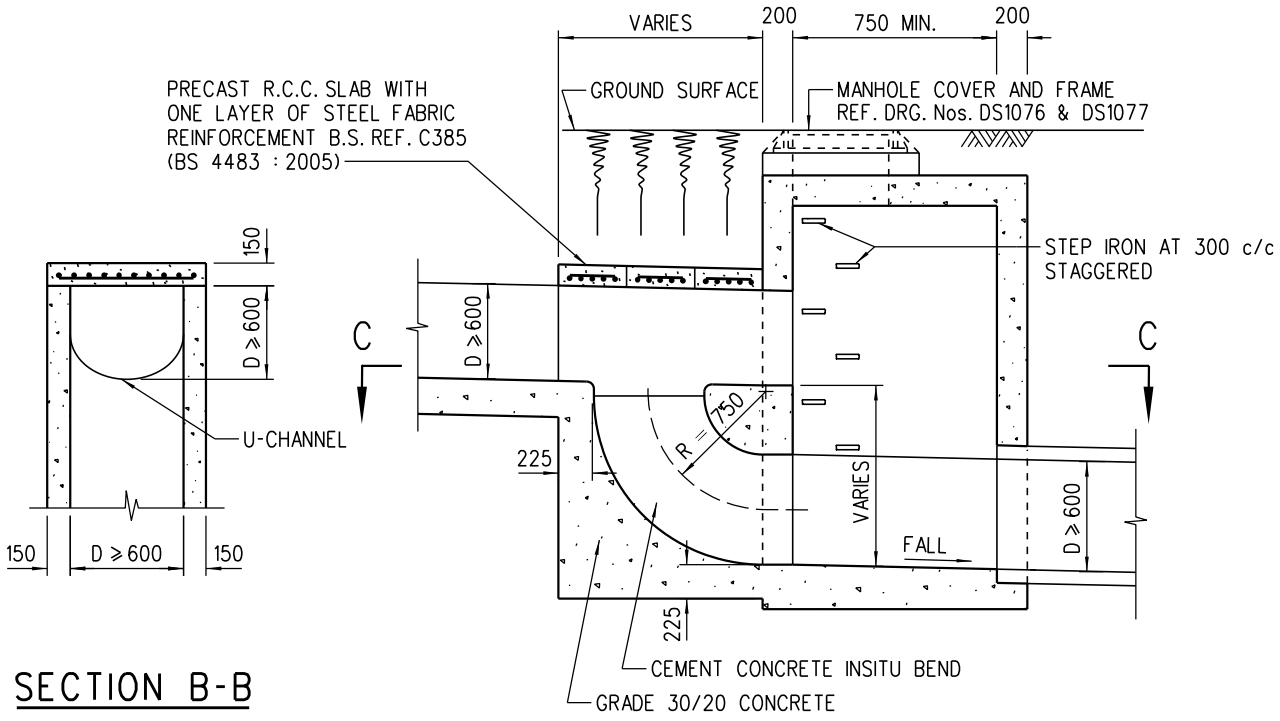
CATCHPIT WITH TRAP
(SHEET 2 OF 2)

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1 : 20

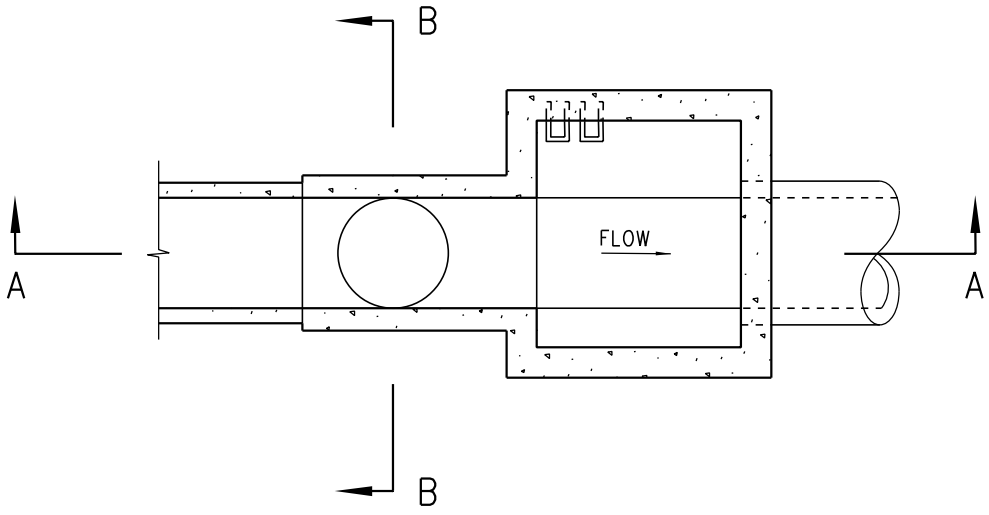
DATE JAN 1991

DRAWING NO.
C2406 /2B



SECTION B-B

SECTION A-A



SECTION PLAN C-C

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. RECESS WITH SQUARE STEEL ROD SHALL BE PROVIDED AT TOP OF MANHOLE CHAMBER FOR INSTALLING MONITORING DEVICE(S). DETAILS REFER TO DSD STANDARD DRAWING NO. DS 1099.

REV.	DESCRIPTION	SIGNATURE	DATE
D	NOTE 2 ADDED	ORIGINAL SIGNED	2.8.2022
C	MANHOLE COVER & FRAME UPDATED	ORIGINAL SIGNED	10.5.2010
B	REDRAWN BY CAD	ORIGINAL SIGNED	8.8.2001
A	GENERAL REVIEW	ORIGINAL SIGNED	2.2.2001

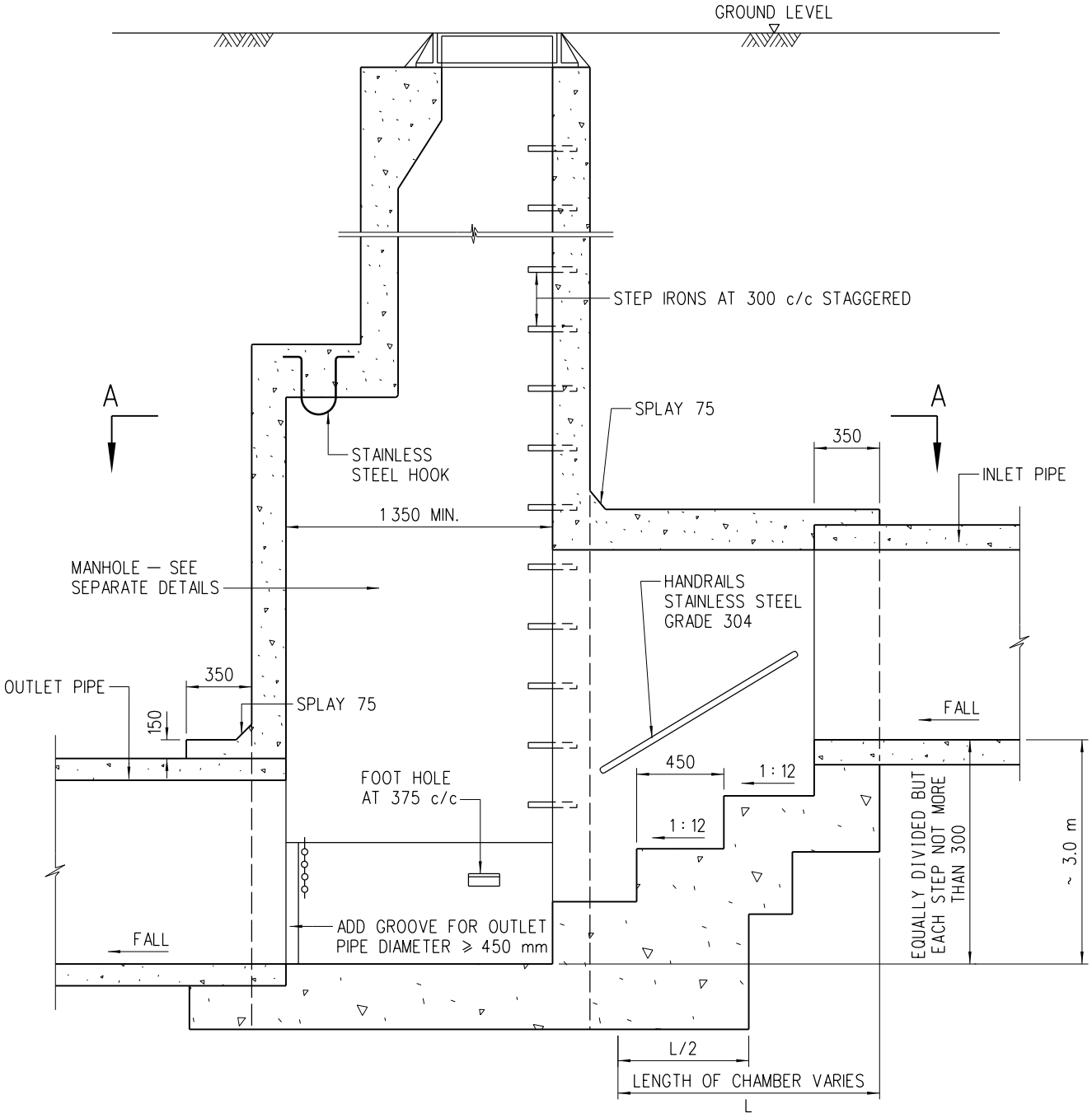
BACKDROP MANHOLE TYPE 1

DRAINAGE SERVICES DEPARTMENT

REFERENCE

SCALE 1 : 50

DRAWING No. DS 1018D



SECTIONAL ELEVATION

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. STRUCTURE OF MANHOLE INCLUDING THE CHAMBER TO BE DESIGNED BY THE ENGINEER.
3. THIS TYPE OF BACKDROP MANHOLE IS PREFERABLY USED IN STORMWATER DRAIN.
4. RECESS WITH SQUARE STEEL ROD SHALL BE PROVIDED AT TOP OF MANHOLE CHAMBER FOR INSTALLING MONITORING DEVICE(S). DETAILS REFER TO DSD STANDARD DRAWING NO. DS 1099.

REV.	DESCRIPTION	SIGNATURE	DATE
D	NOTE 4 ADDED	ORIGINAL SIGNED	2.8.2022
C	REDRAWN BY CAD	ORIGINAL SIGNED	8.8.2001
B	GENERAL REVIEW	ORIGINAL SIGNED	2.2.2001
A	GENERAL REVISION	ORIGINAL SIGNED	22.7.1994

BACKDROP MANHOLE TYPE 2

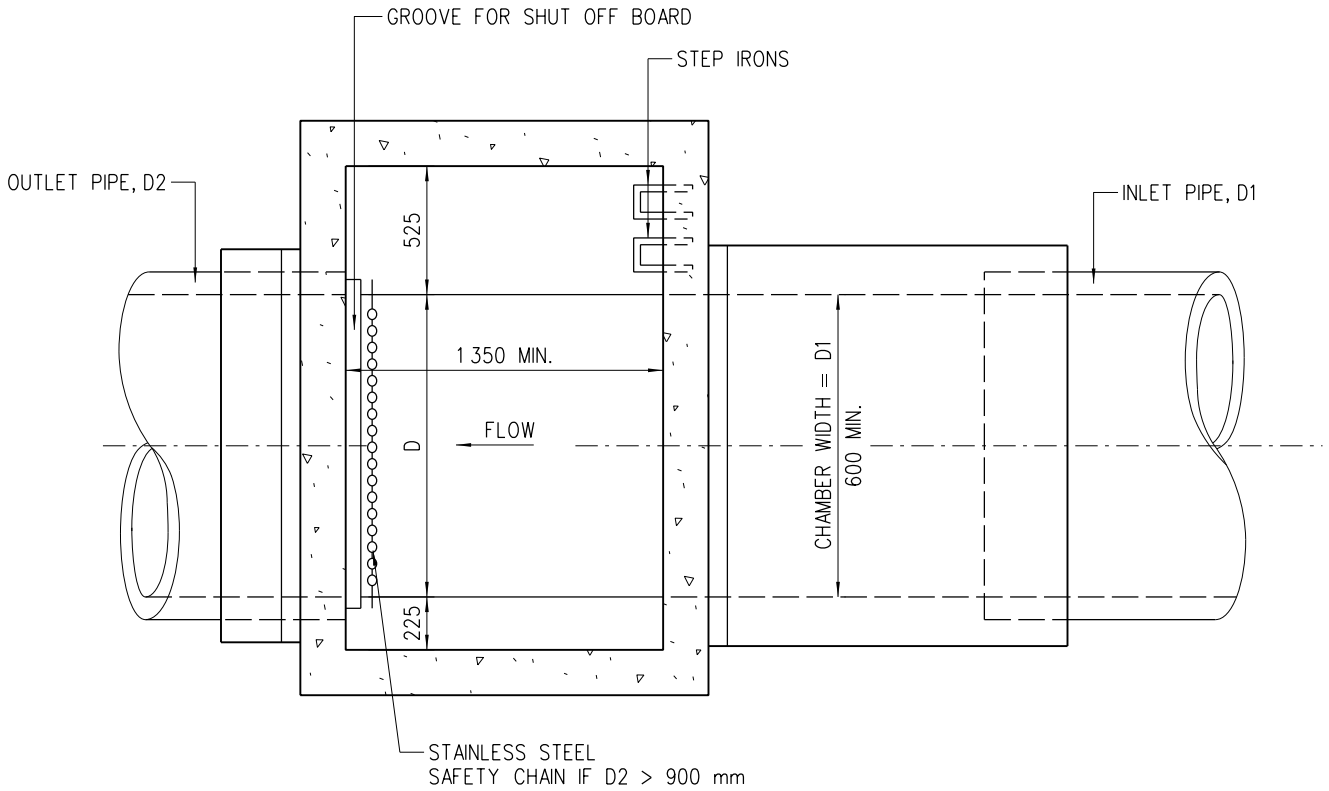
DRAINAGE SERVICES DEPARTMENT

REFERENCE

SCALE DIAGRAMMATIC

DRAWING No. DS 1019D

(SHEET 1 OF 2)



SECTION A-A

REV.	DESCRIPTION	SIGNATURE	DATE
D	NOTE 4 ADDED	ORIGINAL SIGNED	2.8.2022
C	REDRAWN BY CAD	ORIGINAL SIGNED	8.8.2001
B	GENERAL REVIEW	ORIGINAL SIGNED	2.2.2001
A	GENERAL REVISION	ORIGINAL SIGNED	22.7.1994

BACKDROP MANHOLE TYPE 2

DRAINAGE SERVICES DEPARTMENT

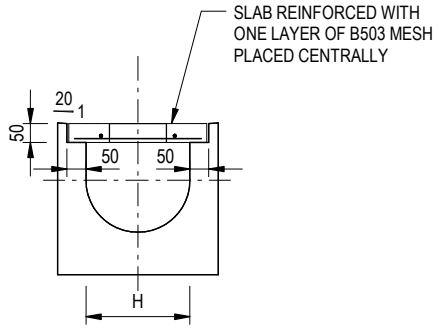
REFERENCE

SCALE DIAGRAMMATIC

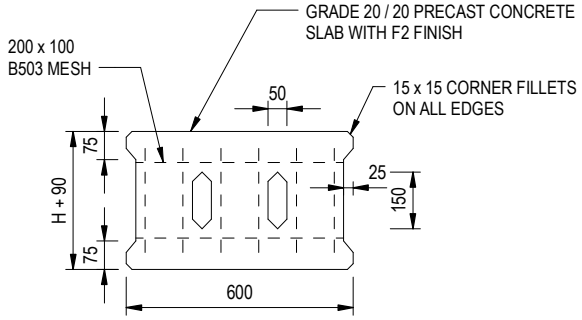
DRAWING No.

DS 1019D

(SHEET 2 OF 2)



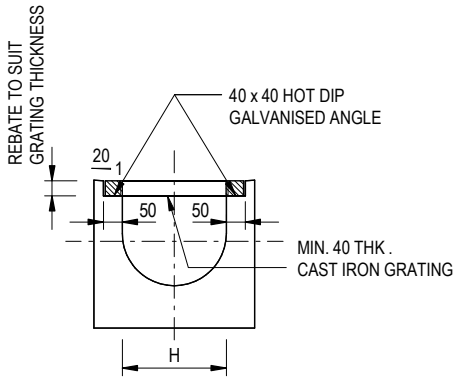
TYPICAL SECTION



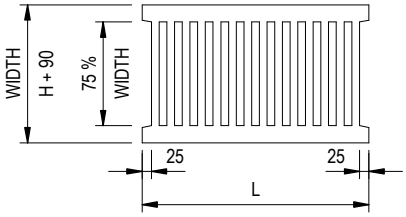
PLAN OF SLAB

U-CHANNELS WITH PRECAST CONCRETE SLABS

(UP TO H OF 525)



TYPICAL SECTION



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

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
F	BIM OBJECT REVISION.	Original Signed	12.2025
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. C2412F