

DRAINAGE PLAN

- 450 mm 600 mm COVER U-CHANNEL (FALL 1:150)
- LOT BOUNDARY
- NEW LEVEL
- EXISTING LEVEL
- SCALE = 1:400
- CP1 CATCHPIT NO CP1 C.L. = COVER LEVEL I.L. = INVERT LEVEL INFALL & OUTFALL LEVEL OF CATCHPIT TO BE THE SAME



BLOCK PLAN 1:1000

John Kwan Chi Ming - 1 MAR 2024

Registered Professional Engineer

PROPOSED DRAINAGE WORK
Lots 2186(Part), 2187 RP (Part), 2381 RP (Part), 2382 (Part),
2384 S.A (Part) and 2384 S.B (Part)
in D.D. 129 Ha Tsuen, Yuen Long, NT

DATE: **15 OCT 2023** DRAWING: **D-1**

RATIONAL METHOD

200 years

a = 766

Checking of Channel size

Calculation of Flow Rate

b = 4.1

roughness factor (n) = 0.013

c = 0.4

Refer to the attached drawing no SKETCH A

Channel	Catchment	Length L1 (m)	Length L2 (m)	Channel Gradient S (1 in)	Measured Catchment Area Am (m ²)	Run off Coeff C	Catchment Ave Slope H (m per 100 m)	Inlet Time t ₀ (mins)	Travel Time t _f (mins)	Time of Conc. t _c (mins)	Rain Intensity i (mm/hr)	Required Flow Rate Q (req) (m ³ /s)	Channel Size D (mm)	Type	Free Board (mm)	Hydraulic Perimeter P (m)	Hydraulic Area Ah (m ²)	Hydraulic Radius R = Ah/P (m)	Flow Vel. Vf (m/s)	Flow Rate Q (des) (m ³ /s)	Ratio of Q(des)/Q(Areq)	Status (1*Q(Areq)<Q(des)?)	Remarks
UC 1	AR1	36	95	150	1890	1	1	2.45	0.89	3.34	343.19	0.1803	450	Channel	50	1.06	0.16	0.15	1.77	0.28	1.55	OK!	
UC 2	AR2	35	110	150	1900	1	1	2.38	1.04	3.41	341.87	0.1806	450	Channel	50	1.06	0.16	0.15	1.77	0.28	1.55	OK!	
UC 3	AR1+AR2+self catchment area	1	1	150	3940	1	1	0.06	0.01	0.07	432.65	0.4739	600	Channel	50	1.44	0.29	0.20	2.16	0.63	1.33	OK!	

General Formulas :

- $S = (USIL - DSIL)/L$
- $t_0 = 0.14465 \cdot L / (H^{0.2} \cdot A^{0.1})$
- $i = a / (tc + b)^c$
- $V_f = (1/n) \cdot R^{2/3} \cdot S^{0.5}$
- $Q = Ah \cdot V_f$
- $t_c = t_0 + t_f$

(I.D.F Relationship)
(Manning's formula)

i - extreme mean intensity in mm/hr. where a, b, and c are storm constants given in table 3 of Stormwater Drainage Manual by DSD.

L - Distance in metres measured on the line of natural flow between the design section and that point of the catchment from which water would take the longest time to reach the design section.

Note : Equation 2-5 from Geotechnical Manual For Slopes

Filename : A200a/b

CALCULATION

Pipe Checking
Using The Colebrook-White Equation

roughness factor (n) = 0.013
Roughness (Ks) = 0.6
Kinematic viscosity of fluid (ν) = 1.141E-06 m²/s (at Temp =150 C)

Pipe	Length L (m)	Pipe Gradient S (1 in)	Accumulated Flow Rate Q(Areq) (m ³ /s)	Pipe Size D (mm)	Hydraulic Perimeter P (m)	Hydraulic Area A (m ²)	Flow Vel Vf (m/s)	Flow Rate Q [des] (m ³ /s)	Rate of Q(Des)/Q (Areq)	Status (1.05Q(Areq)<Q(des)?)
Pipe A1	5.00	150.00	0.4739	600	1.88	0.28	2.00	0.57	1.19	OK!

General Formulas :

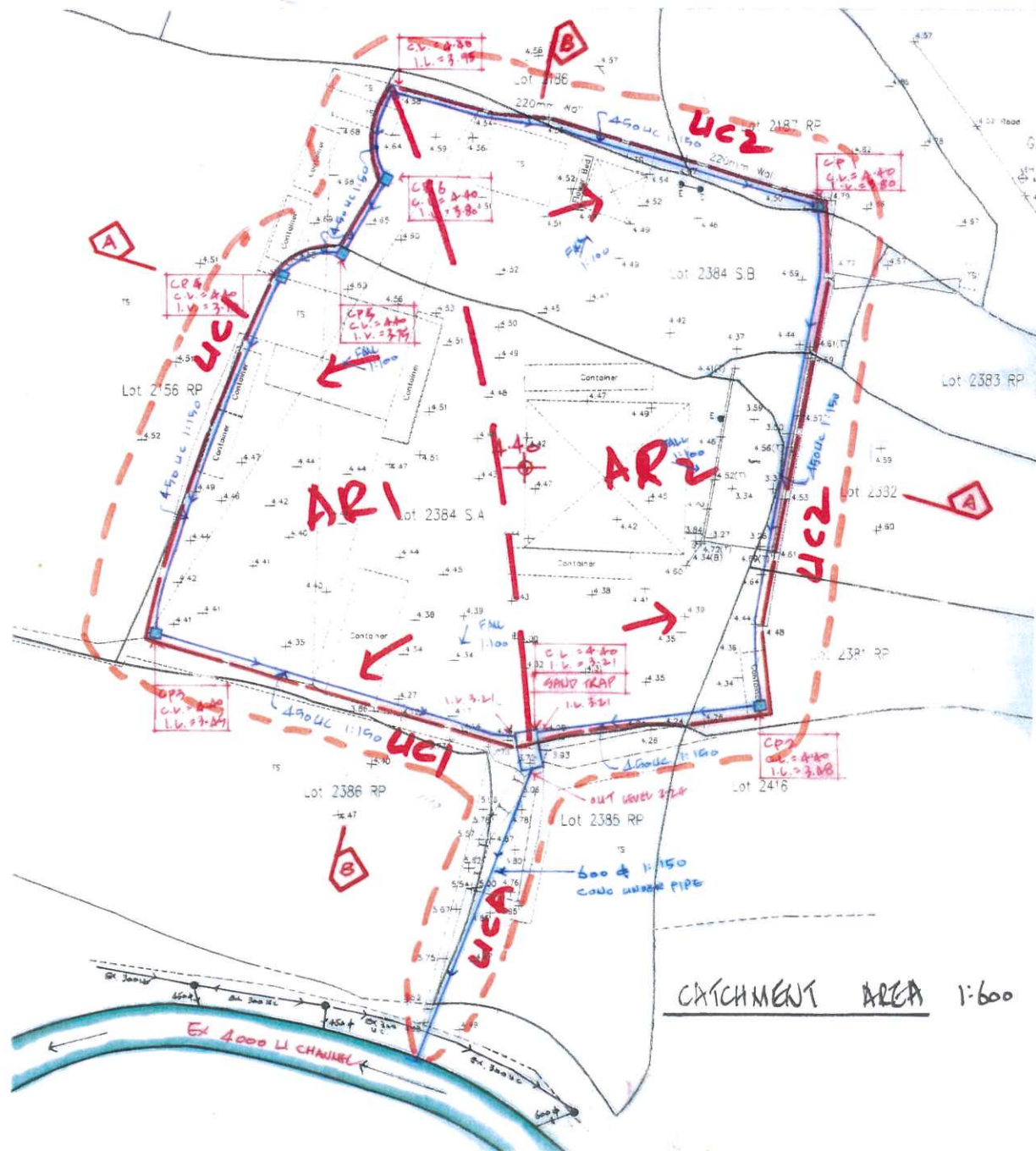
- $S = (USIL - DSIL)/L$
- $V_f = -2 \cdot (2 \cdot g \cdot D \cdot S)^{0.5} \cdot \log (K_s / (3.7 \cdot D) + 2.51 \cdot \nu / (D \cdot (2 \cdot g \cdot D \cdot S)^{0.5}))$
- $Q = Ah \cdot V_f$

(The Colebrook-White Equation)

L - Distance in metres measured on the line of natural flow between the design section and that point of the catchment from which water would take the longest time to reach the design section.

File name : A10a/b

Note : Equation 3-6 from STORMWATER DRAINAGE MANUAL



- 1 MAR 2024

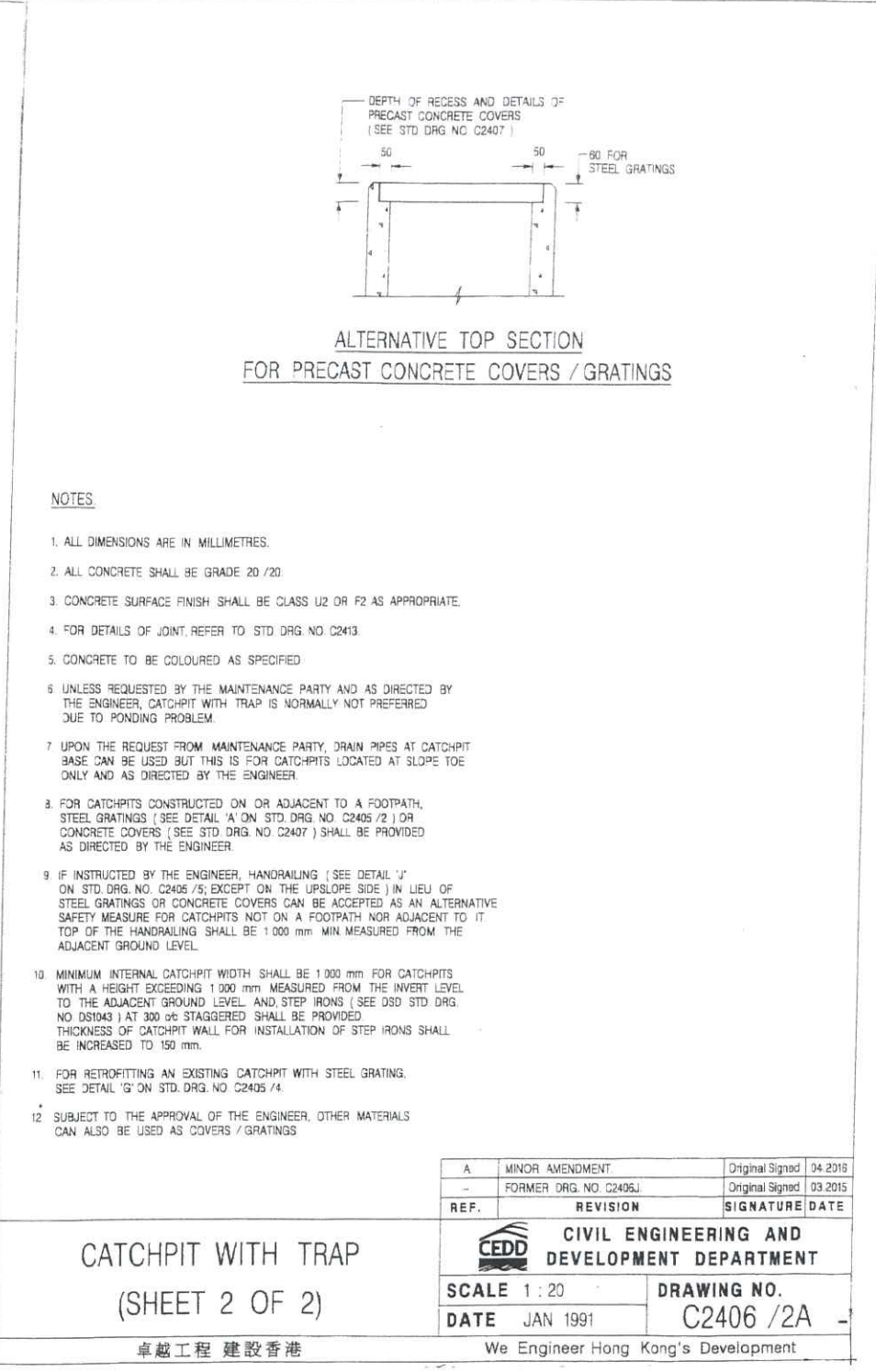
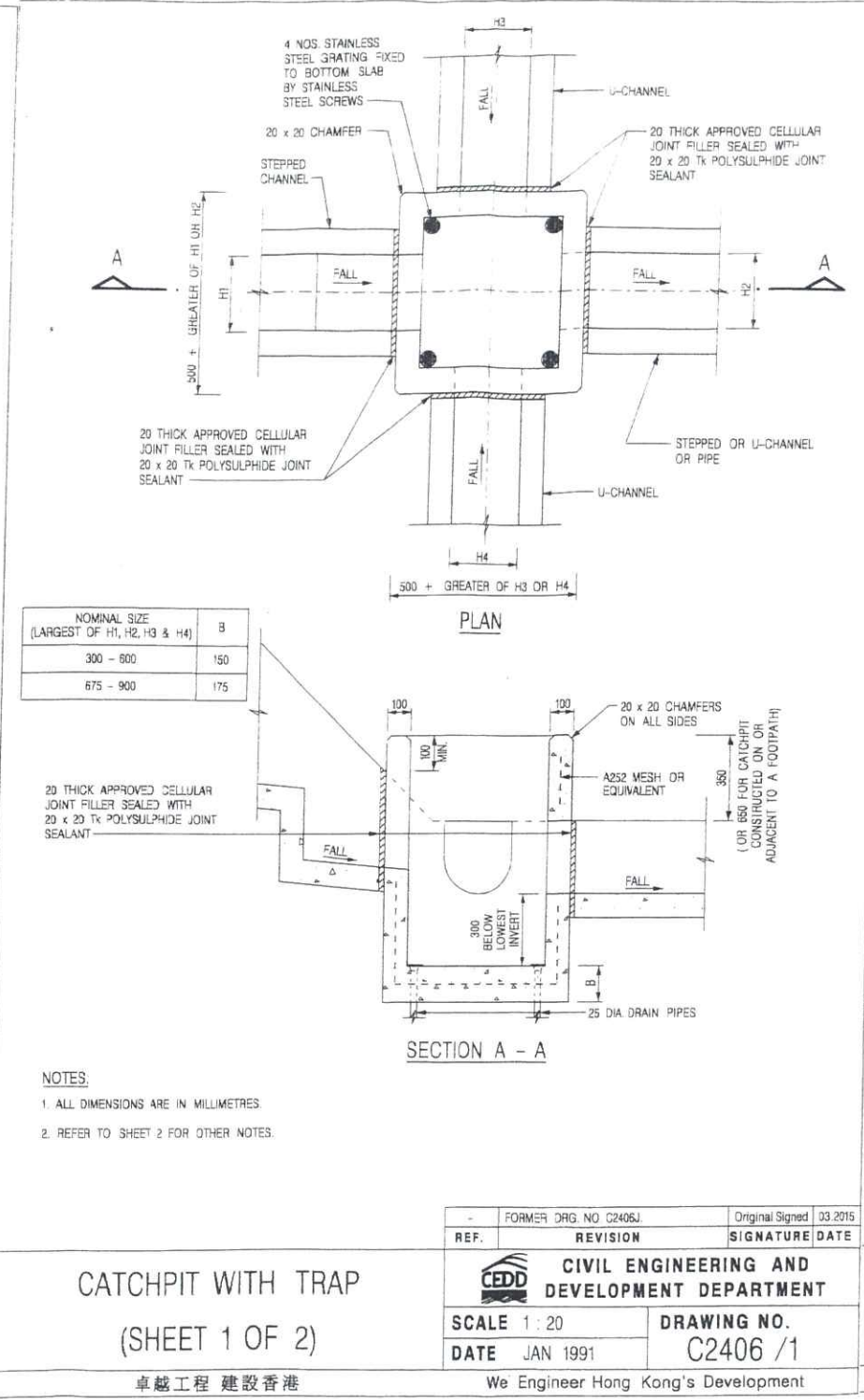
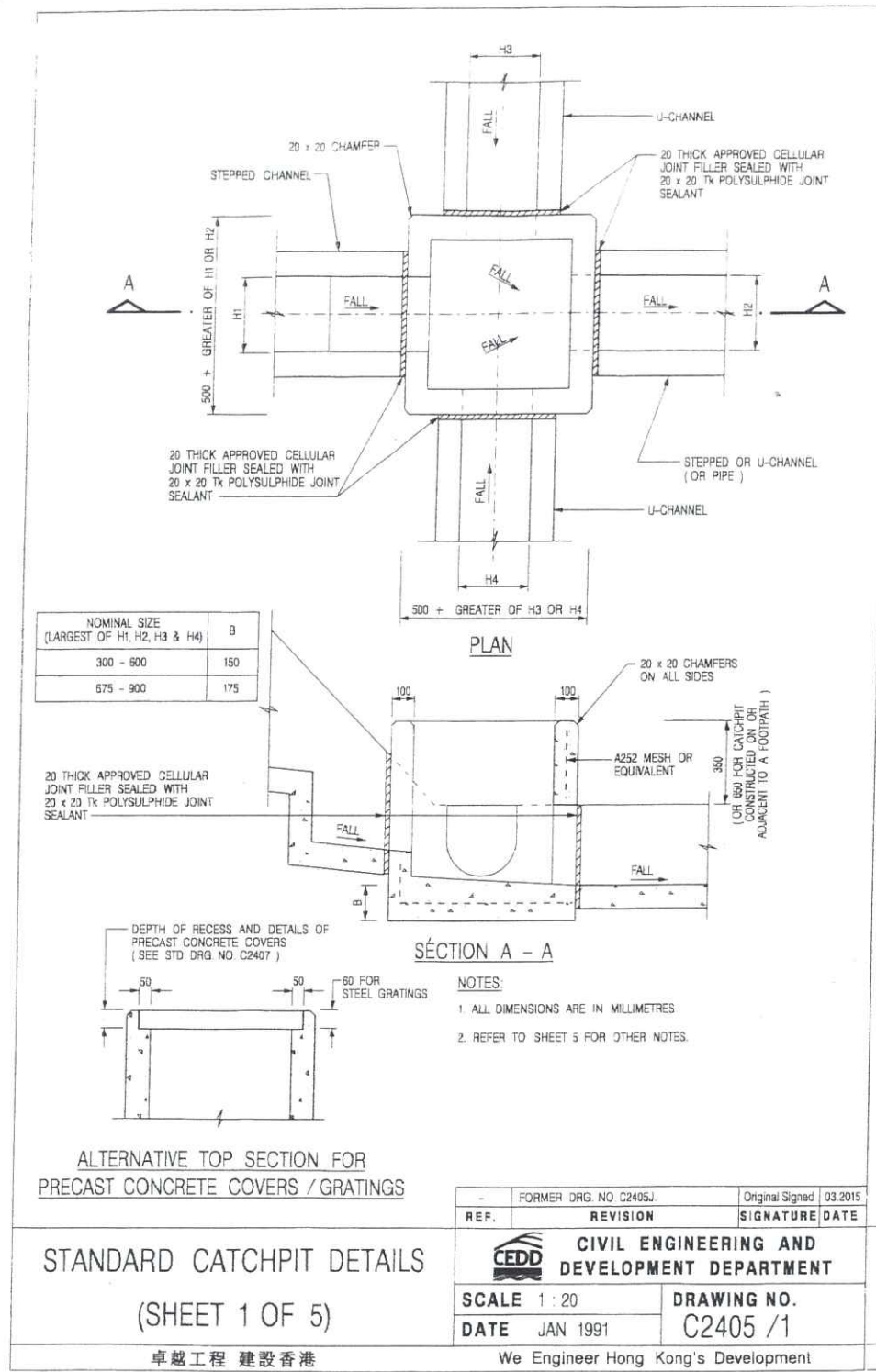
John Kwan Chi Ming

Registered Professional Engineer

PROPOSED DRAINAGE WORK

Lots 2186(Part), 2187 RP (Part), 2381 RP (Part), 2382 (Part),
2384 S.A (Part) and 2384 S.B (Part)
in D.D. 129 Ha Tsuen, Yuen Long, NT

DATE : 15 OCT 2023	DRAWING : 0-2
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- 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 OSD STD DRG. NO. D51043) AT 300 mm 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 GRATINGS, 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.

-1 MAR 2024

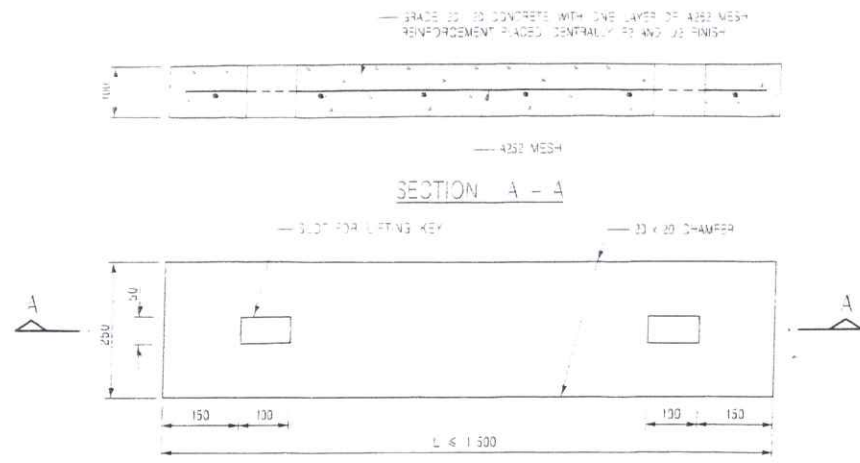
John Kwan Chi Ming

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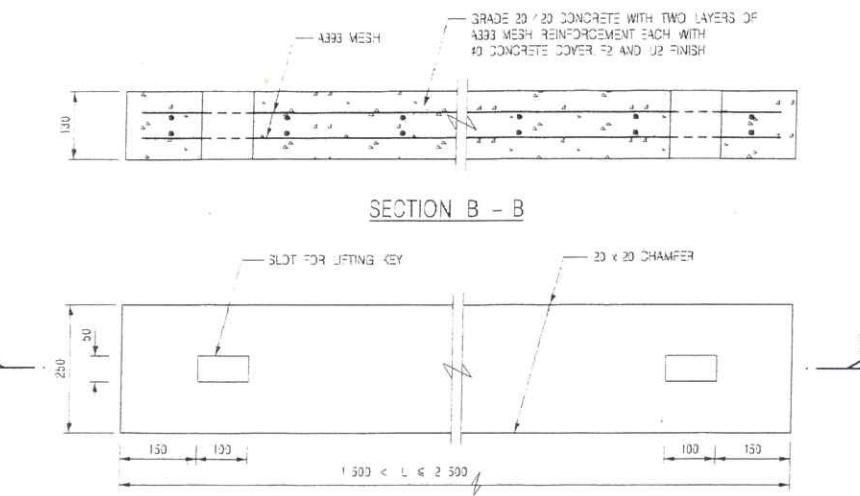
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PLAN
TYPE 1 - FOR SPAN UP TO 1.5 m



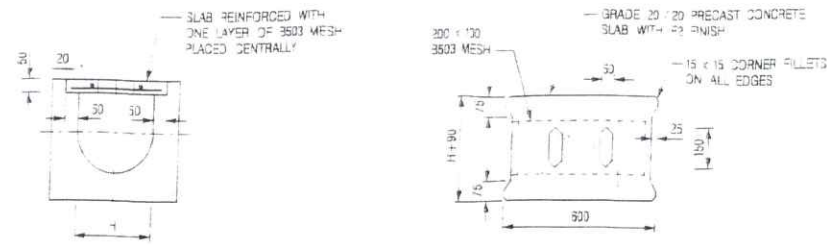
PLAN
TYPE 2 - FOR SPANS 1.5 m TO 2.5 m

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

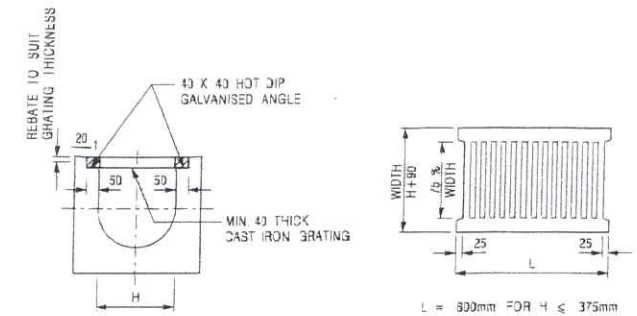
3	NAME OF DEPARTMENT AMENDED.	Original Signed	01.2005
A	GENERAL REVISION	Original Signed	12.2002
REF.	REVISION	SIGNATURE	DATE

PRECAST CONCRETE COVERS
FOR CATCHPIT AND SAND TRAP
興土木 利民生 齊拓展 創明天
We bring the best engineering to life

CEDD CIVIL ENGINEERING AND
DEVELOPMENT DEPARTMENT
SCALE 1:10 DRAWING NO. C2407B
DATE JAN 1991



TYPICAL SECTION
PLAN OF SLAB
U-CHANNELS WITH PRECAST CONCRETE SLABS
(UP TO H OF 525)



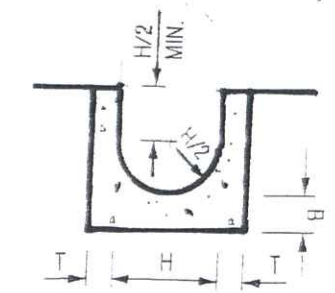
TYPICAL SECTION
CAST IRON GRATING
U-CHANNEL WITH CAST IRON GRATING
(DIMENSIONS ARE FOR GUIDANCE ONLY, CONTRACTOR MAY SUBMIT EQUIVALENT TYPE)
(UP TO H OF 525)

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.

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
REF.	REVISION	SIGNATURE	DATE

COVER SLAB AND CAST IRON
GRATING FOR CHANNELS
卓越工程 建設香港
We Engineer Hong Kong's Development

CEDD CIVIL ENGINEERING AND
DEVELOPMENT DEPARTMENT
SCALE 1:20 DRAWING NO. C2412E
DATE JAN 1991



DETAIL OF
U CHANNEL

DIMENSION TABLE

NOMINAL SIZE H	T	B	D
225	90	100	350
375	100	150	540
450	100	150	575
525	100	150	615
600	100	150	650
675	125	175	740
750	125	175	775
900	125	175	850

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. FOR DIMENSIONS OF CHANNELS SEE TABLE.
3. ALL CONCRETE SHALL BE GRADE 20 / 20.
4. CONCRETE SURFACE FINISH SHALL BE CLASS U2 OR F2 AS APPROPRIATE.
5. EXPANSION JOINTS SHALL BE PROVIDED AT A MAXIMUM SPACING OF 10 METRES WITH DETAILS AS SHOWN ON STD. DRG. NO. C2413.
6. 675 - 900 CHANNELS SHALL BE REINFORCED AS SHOWN ON STD. DRG. NO. C2410.

-1 MAR 2024

John Kwan Chi Ming

Registered Professional Engineer

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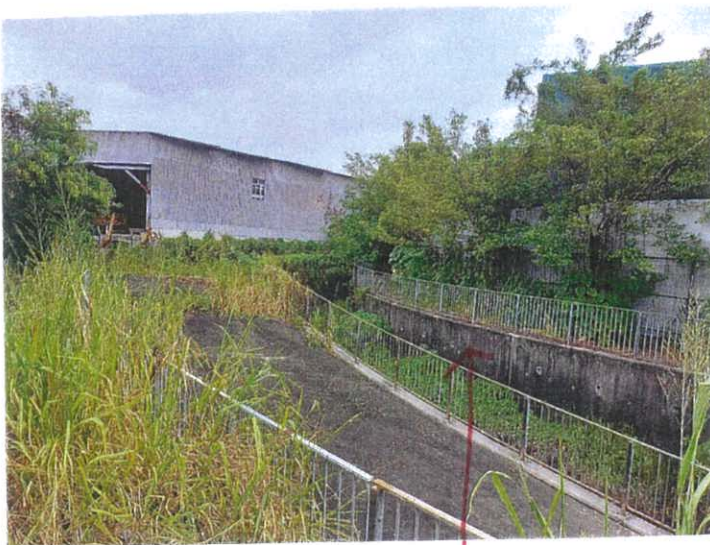


2



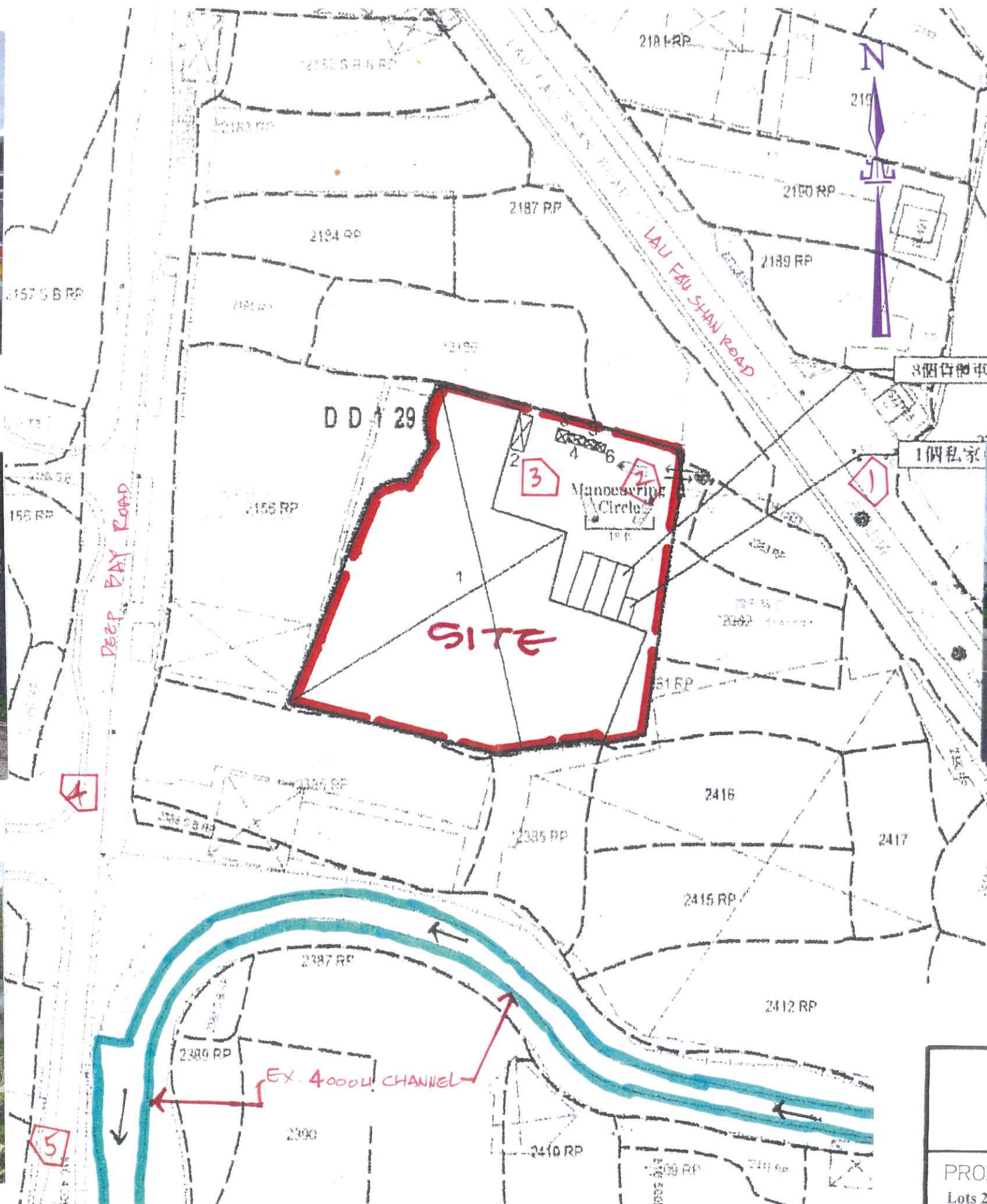
DEEP BAY ROAD

4



EX. 3000 U CHANNEL

5



3個貨車上落車位面積16米 x 3.5米

1個私家

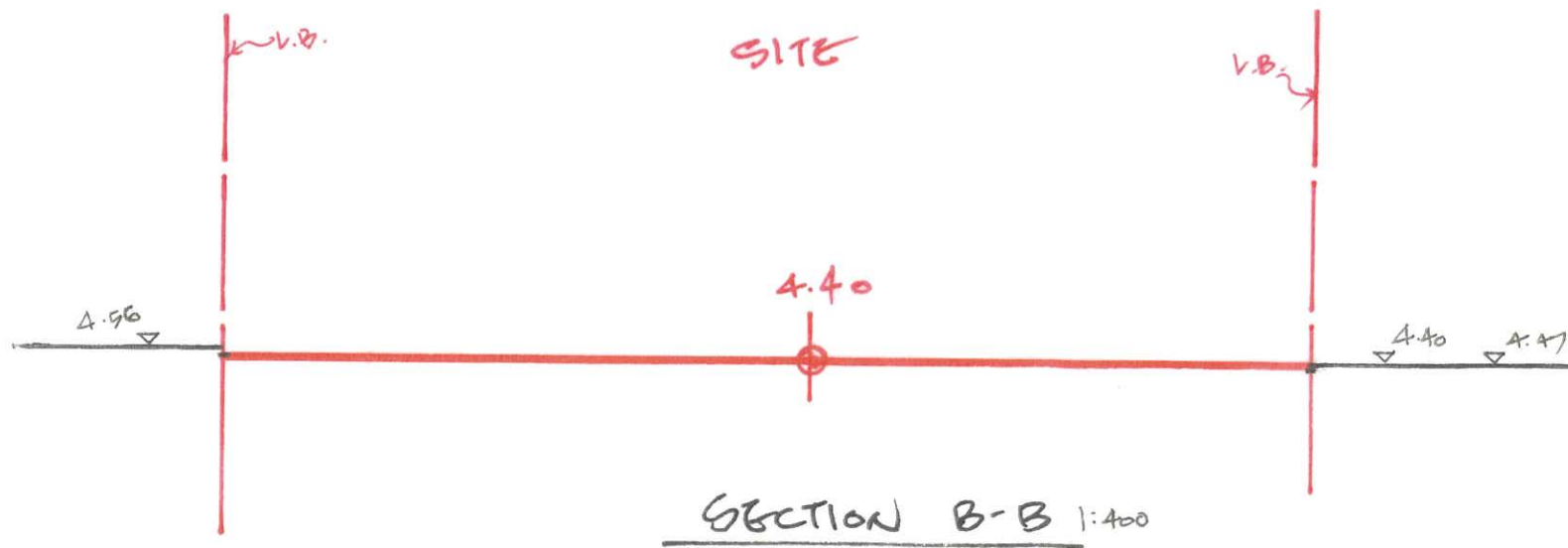
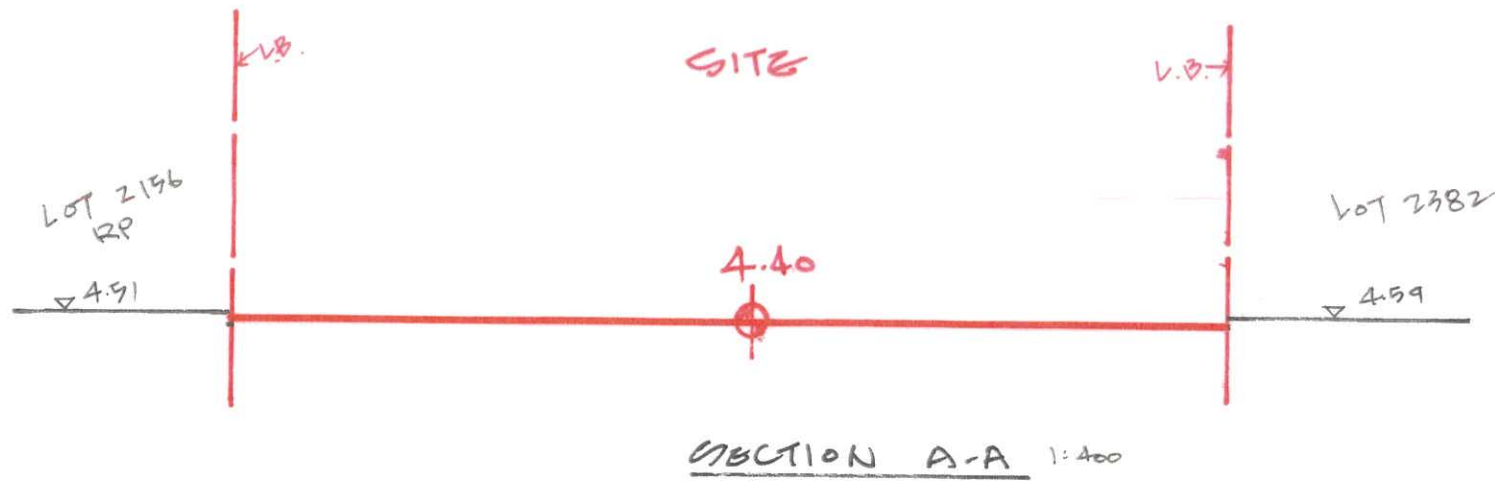


LAU FAU SHAN ROAD

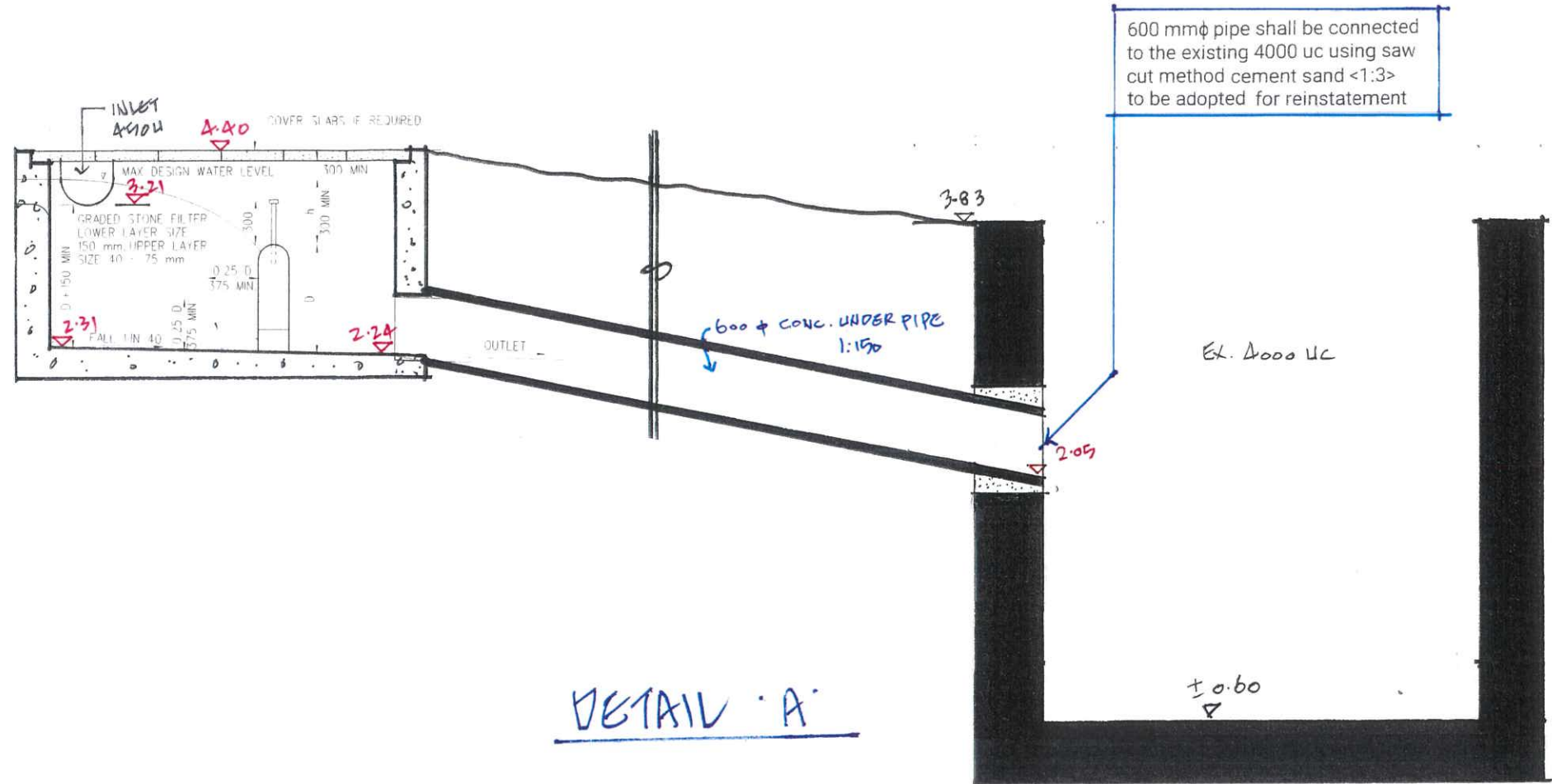
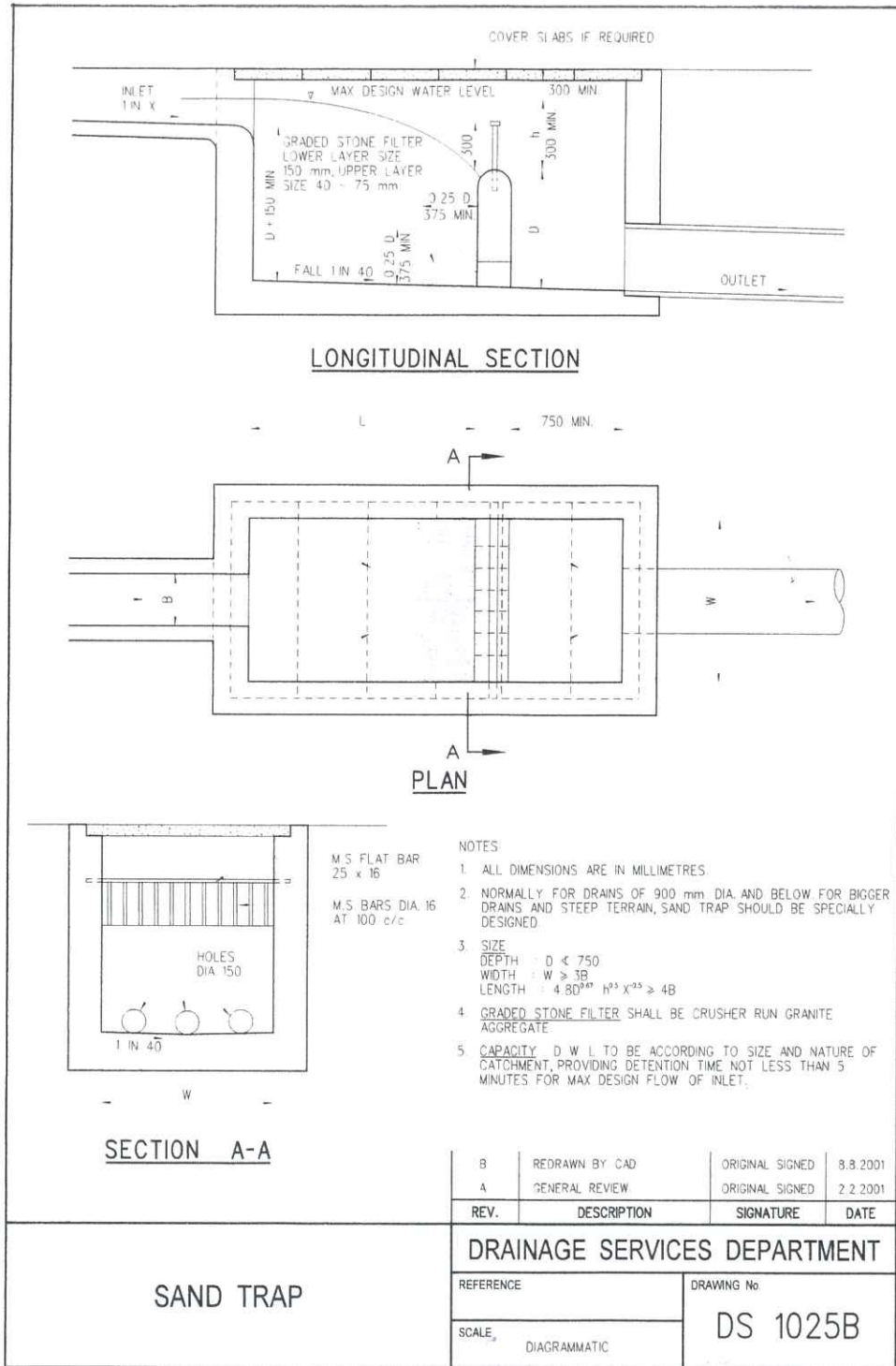
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PHOTO PLAN

John Kwan Chi Ming ^{-1 MAR 2024}	
Registered Professional Engineer	
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DATE: 15 OCT 2023	DRAWING: D-9



John Kwan Chi Ming - 1 MAR 2024	
Registered Professional Engineer	
PROPOSED DRAINAGE WORK <u>Lots 2186(Part), 2187 RP (Part), 2381 RP (Part), 2382 (Part),</u> <u>2384 S.A (Part) and 2384 S.B (Part)</u> <u>in D.D. 129 Ha Tsuen, Yuen Long, NT</u>	
DATE: 15 OCT 2023	DRAWING: D-6



- 1 MAR 2024

John Kwan Chi Ming

Registered Professional Engineer

PROPOSED DRAINAGE WORK
 Lots 2186(Part), 2187 RP (Part), 2381 RP (Part), 2382 (Part),
 2384 S.A (Part) and 2384 S.B (Part)
 in D.D. 129 Ha Tsuen, Yuen Long, NT

DATE: 19 DEC 2023 DRAWING: V-7/11