

1c2001

Environmental Resources Management

21/F Lincoln House
979 King's Road
Taikoo Place
Island East
Hong Kong
Telephone : (852) 2271
Facsimile : (852) 2723 5
E-mail : posthk@erm.com
http:// www.erm.com

28 September 2005

CCECC & CRWJ Joint Venture
PO Box No. 214
Tung Chung Post Office
Hong Kong

Attn: Mr Y C Tang, Project Manager (By Fax 2988 1601 & Post)

Our ref: 0019715 let certify detailed design 4.1 & 4.2_280905.doc



Dear Sirs,

Contract No. HY/2003/19
Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha
Environmental Permit No. EP_170/2003
Condition 4.1 - Detailed Design of Wildlife Tunnels and
Condition 4.2 - Detailed Design of Animal Escape Ramps or Similar Structures

We refer to the captioned document prepared by Mott Connell under cover of letter ref: KWL/TI/MK/mk/C203358/M45/900/L3017. We are pleased to provide our certification for the document pursuant to Conditions 4.1 and 4.2 of Environmental Permit (EP) No. EP-170/2003.

Yours faithfully
For ERM Hong Kong, Ltd

Marcus Ip
Environmental Team Leader

Direct Tel: (852) 2271 3102
E-mail: marcus.ip@erm.com

- cc Mott Connell (Attn: Mr KW Lee) (Fax 2827 1823)
- Meinhardt-Mouchel (Attn: Ms Helen Cochrane) (Fax 2807 1577)
- CCECC & CRWJ JV (Attn: Mr Mr Frankie Lui) (Fax 2988 1677)
- CCECC & CRWJ JV (Attn: Mr Winston Yeung) (Fax 2827 4313)



790 10012000
Office No. CC 479



Registered Office
ERM-Hong Kong, Ltd
21/F Lincoln House
979 King's Road
Taikoo Place
Island East
Hong Kong

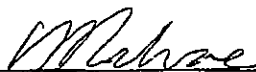
MEINHARDT
Mouchel**INDEPENDENT ENVIRONMENTAL CHECKER
CHECK CERTIFICATE**

Contract No. HY/2003/19

Improvement to Tung Chung Road between
Lung Tseng Tau and Cheung ShaCondition 4.2 of EP-170/2003/A - Detailed Design of Animal Escape Ramps or Similar Structures

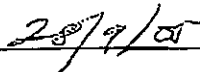
We confirm having used reasonable skill and care in the checking of this report and we certify that we can verify the report.

Signed:



Independent Environmental Checker
H. J. Cochrane
Director and IEC

Date:



**Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha
Environmental Permit No. EP-170/2003
Condition 4.2 – Detailed Design of the Animal Escape Ramps or Similar Structures**

1. FUNCTION AND PURPOSE

In accordance with EIA Report Section 8.9.2.5 and Table 8.3.3, escape ramps have been provided to permit animals to climb out of the drainage channels. The conceptual design of the ramps were shown in the EIA Report Figure 8.22

2. LOCATIONS OF THE ANIMAL ESCAPE RAMPS OR SIMILAR STRUCTURES

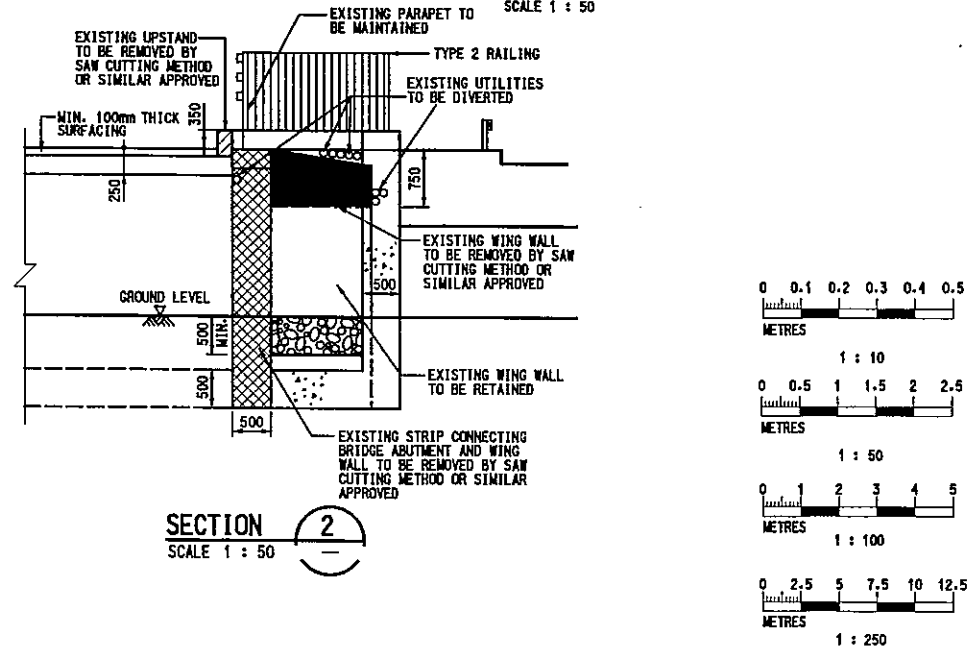
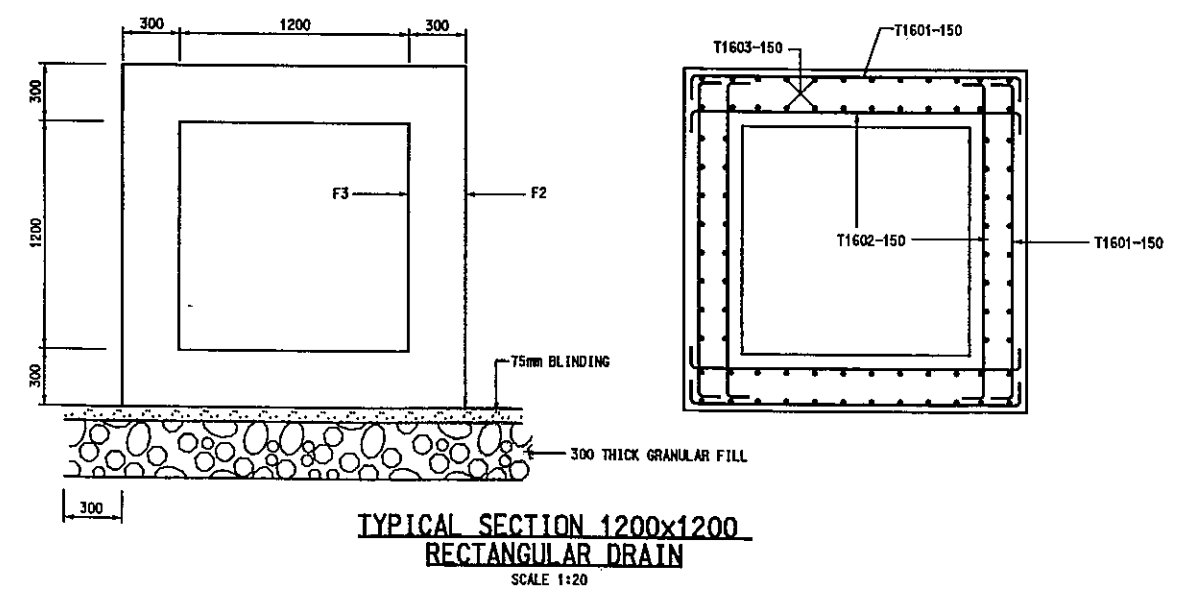
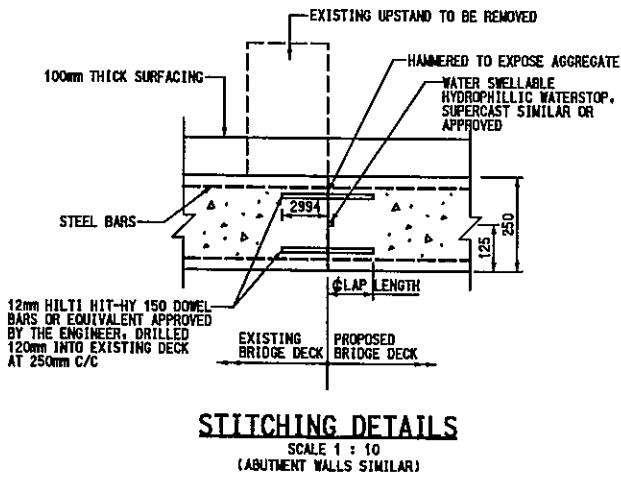
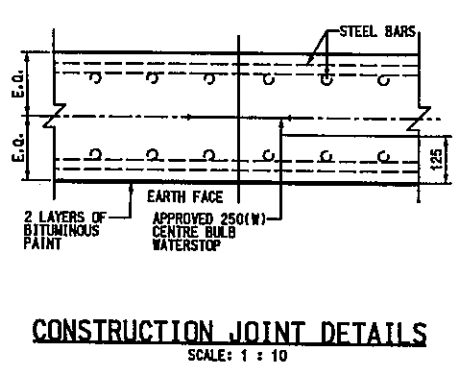
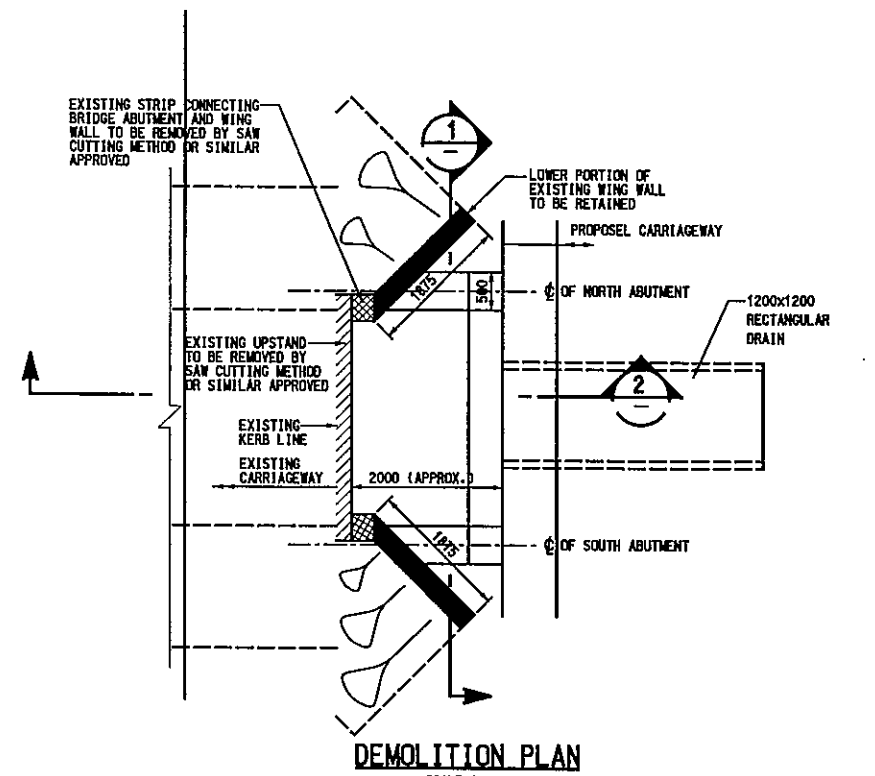
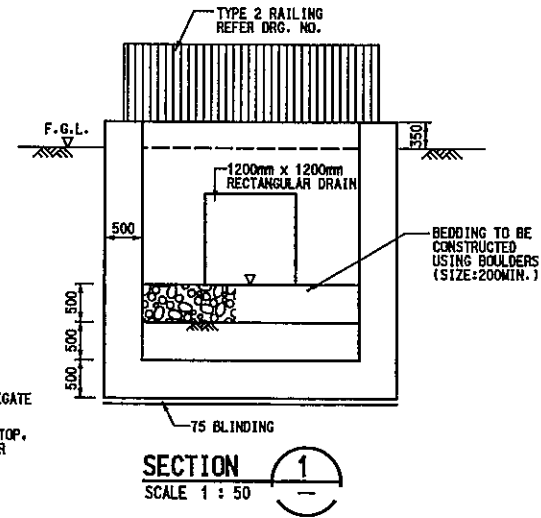
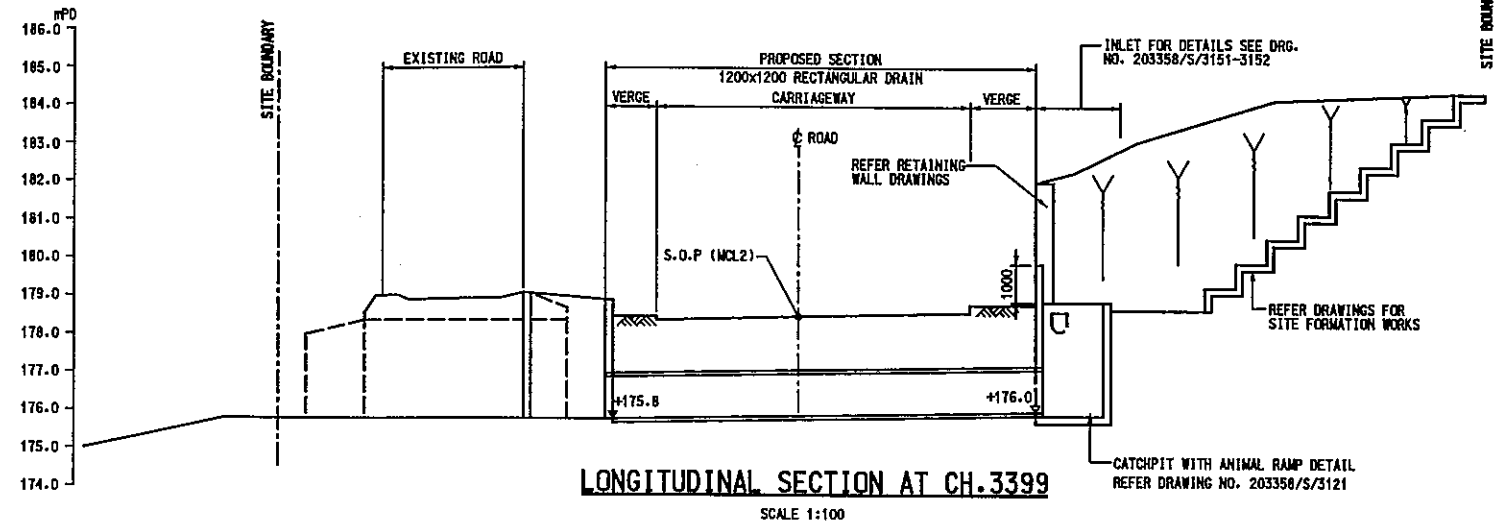
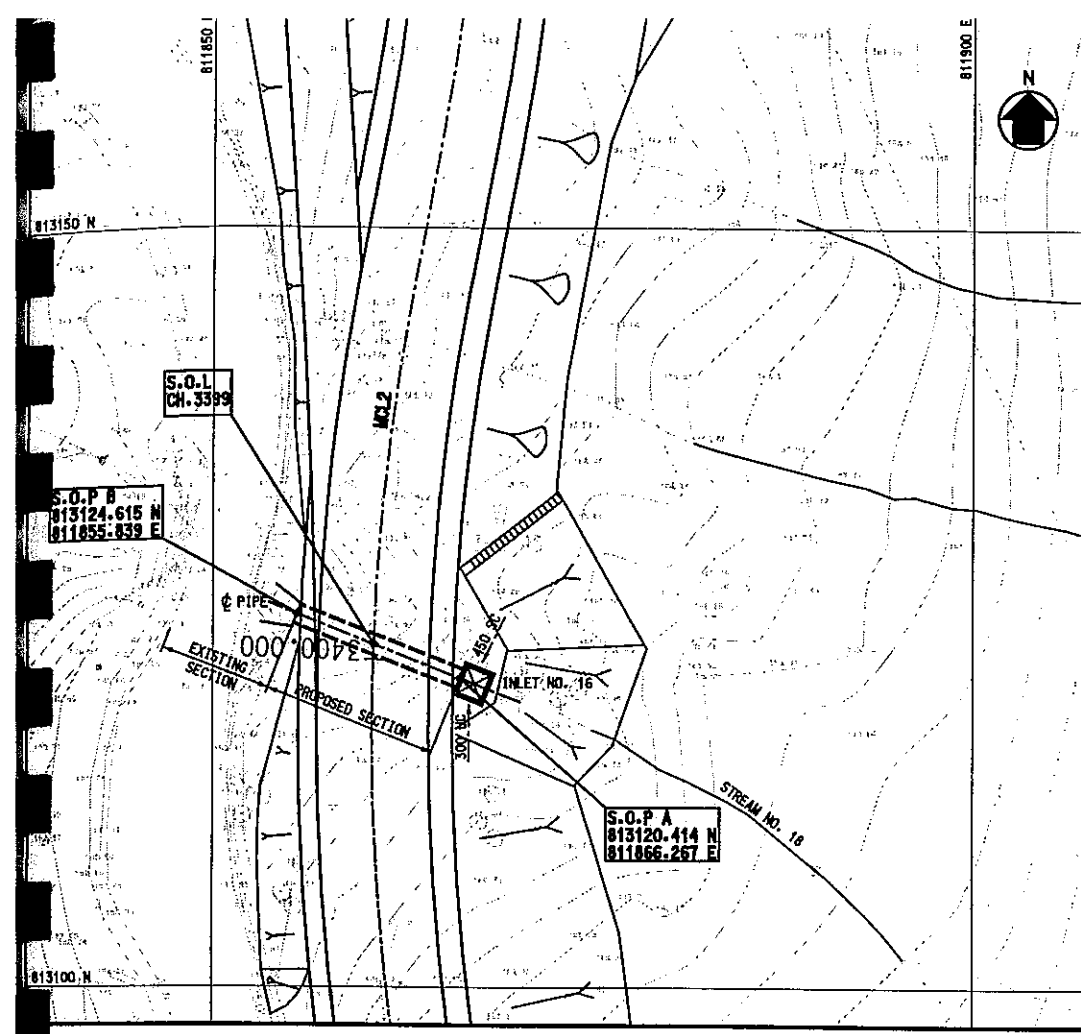
Please refer to Drawings 203358/S/3120, 203358/S/3121, 203358/S/3124, 203358/R/1722, 203358/R/1723, 203358/R/1771.

3. DESIGN FEATURES INCORPORATED IN THE DRAINAGE CHANNELS AND/OR RAMPS TO FACILITATE/ENHANCE THE FUNCTION

The design features incorporated in the channels/ramps to facilitate/enhance the function are shown on Drawing 203358/R/1771.

The approximate dimensions of the drainage channels and ramps are shown on the above referenced drawings.

NOTES:
 1. FOR GENERAL NOTES SEE DRAWING NO. 203358/S/3151.
 2. FOR STANDARD DETAILS SEE DRAWING NOS. 203358/S/3151 TO 3153.



Rev.	Date	Drn.	Description	Dgn.	Chd.	App'd.
A	JUN 04	YN	ISSUED FOR CONSTRUCTION IDENTICAL TO TENDER DRAWING REVISION 01	KW	AL	AL
Designed:	KWN/KWA		Date: JUN 2003	Checked:	AL	
Drawn:	YN		Date: JUN 2003	Checked:	KWN/KWA	
Approved:	KWN		For MCL	Date of Issue:	OCT 2003	

Client
 The Government of the Hong Kong Special Administrative Region
 Highways Department

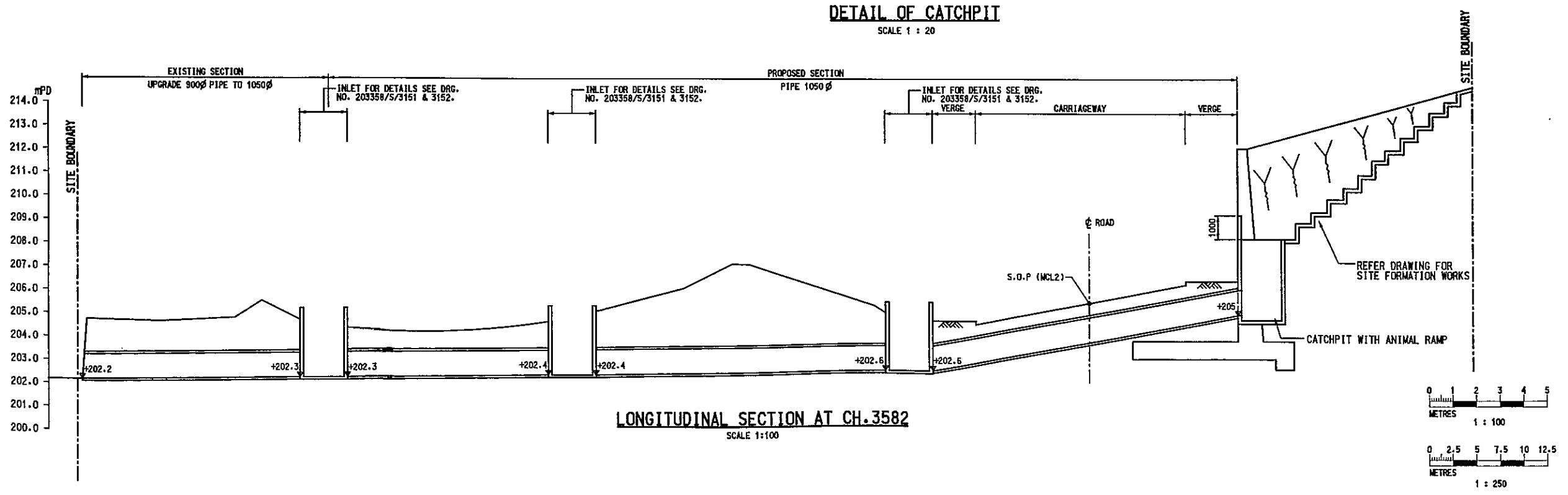
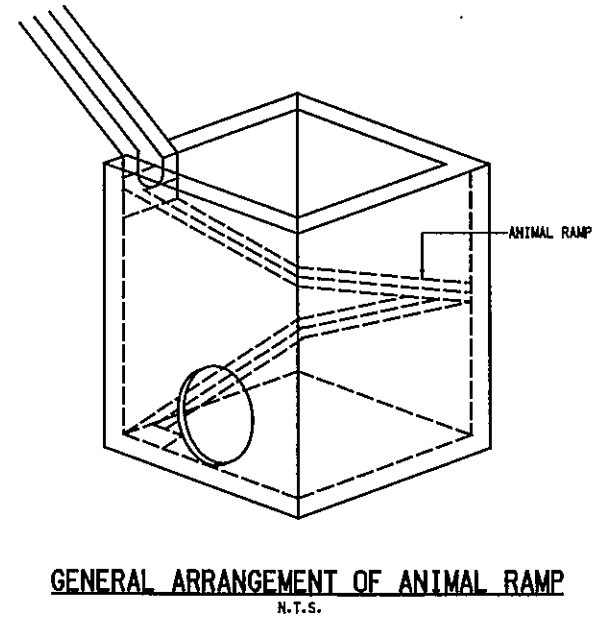
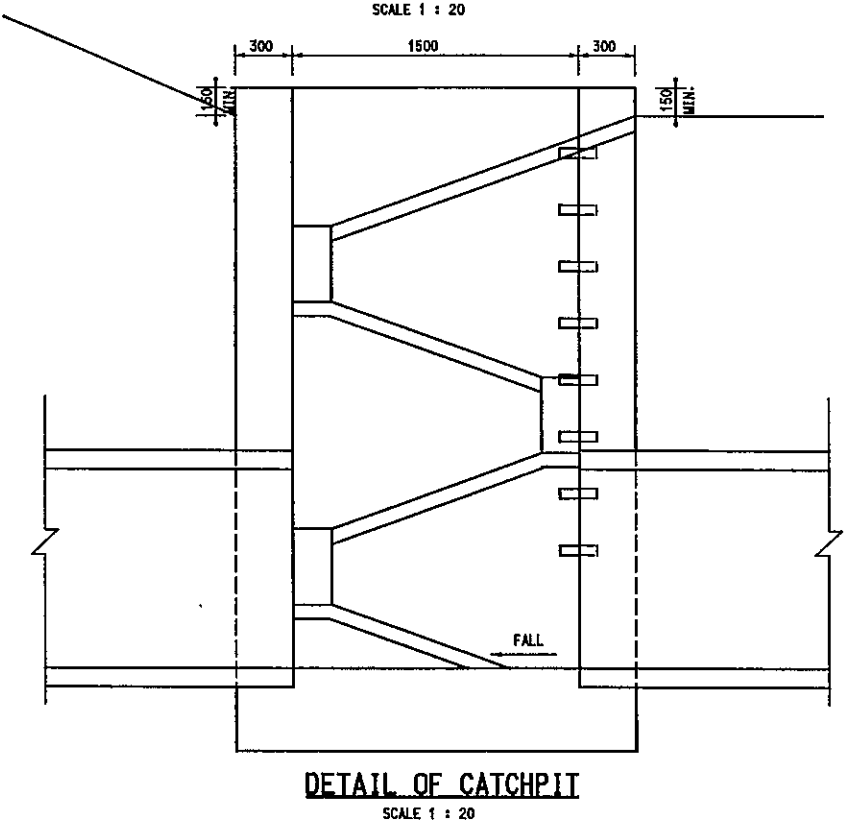
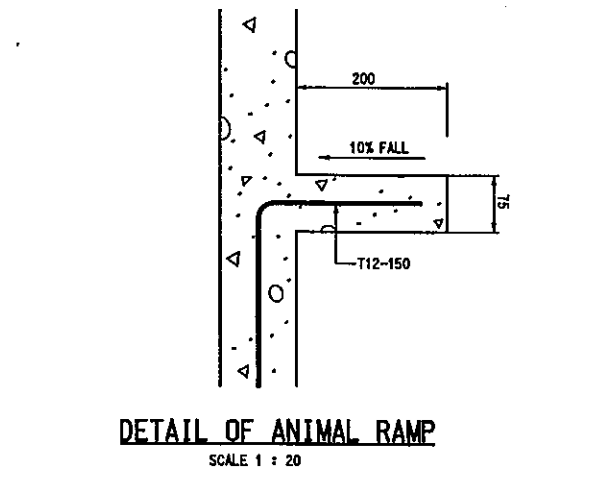
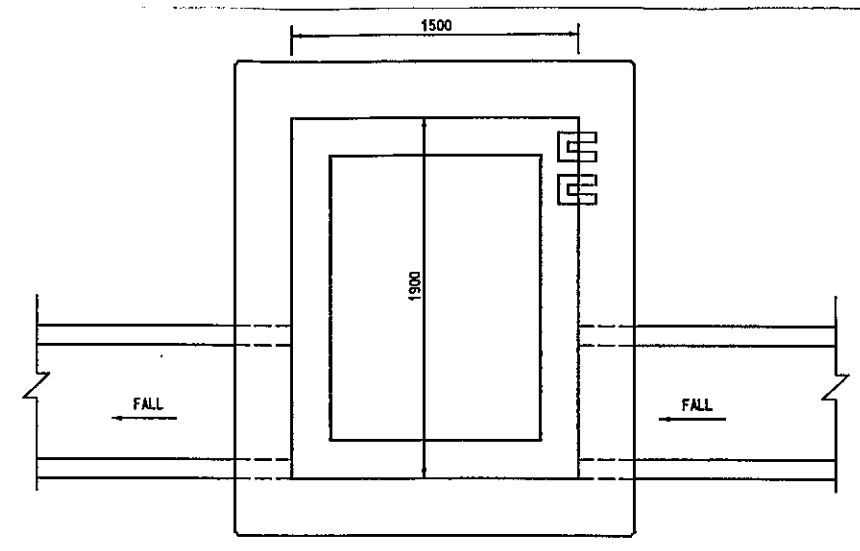
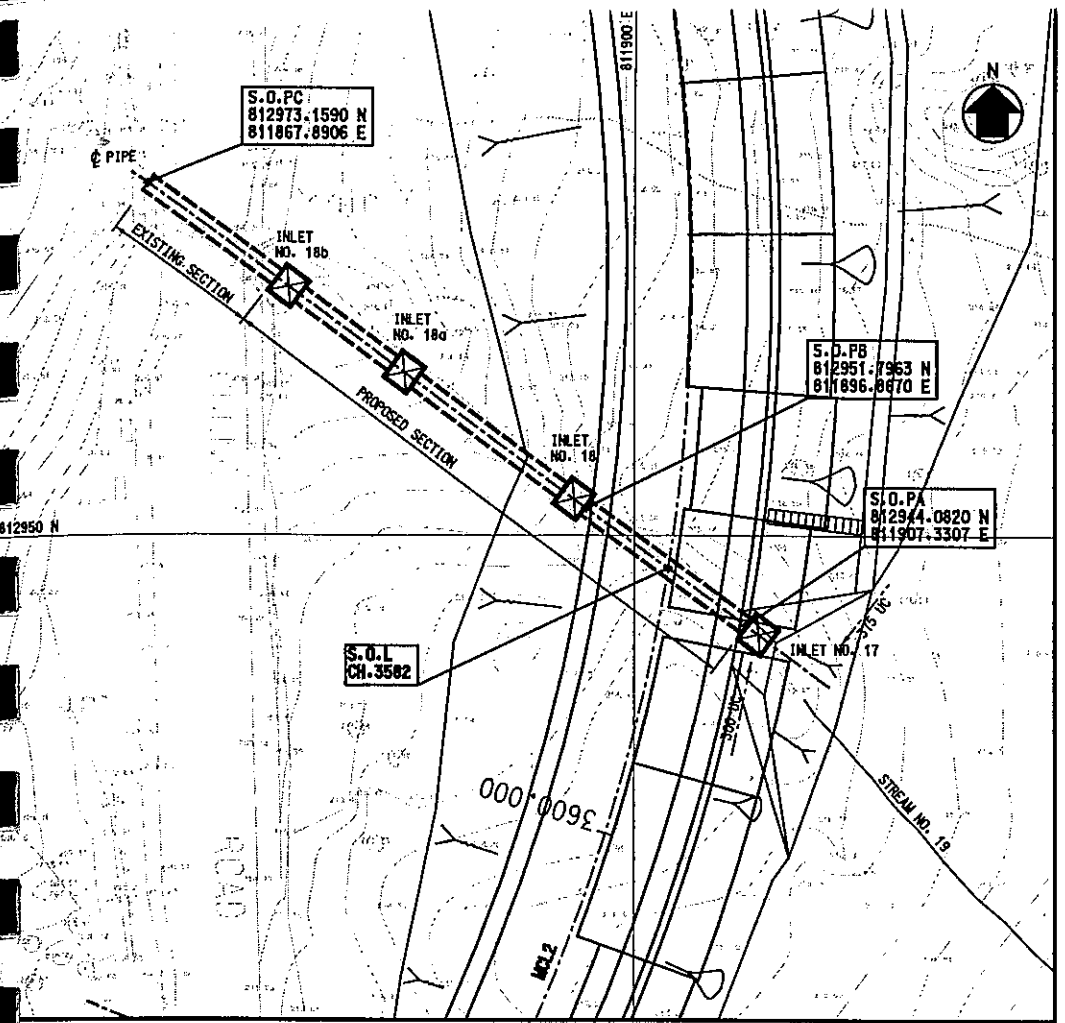
Consulting Engineers
Mott Connell Ltd.
 In Association with
 Halrow China Ltd MVA Hong Kong Ltd Urbis Ltd
 Milich & Co Archaeological Assessments HDS Preston Ltd

Project
 Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha

Title
CULVERT AT CH.3399

Scale:	AS SHOWN
Contract No. / Unit	HY/2003/19
Drawing No.	203358/S/3120
Rev.	A
Copyright Reserved	
CAD File:	E:\203358\WORKING\vol000\15320.dwg
Status:	CONST.

NOTES:
 1. FOR GENERAL NOTES SEE DRAWING NO. 203358/S/3151.
 2. FOR STANDARD DETAILS SEE DRAWING NOS. 203358/S/3151 TO 3153.



Rev.	Date	Drn.	Description	Dgn.	Chd.	App'd.
A	JUN 04	VN	ISSUED FOR CONSTRUCTION. IDENTICAL TO TENDER DRAWING REVISION 01	KWN	WVA	WVA
Designed:	KWN		Date: JUN 2003	Checked:	AL	
Drawn:	VN		Date: JUN 2003	Checked:	KWN	
Approved:	KWN		Date of Issue: OCT 2003			

Client
 The Government of the Hong Kong Special Administrative Region
 Highways Department

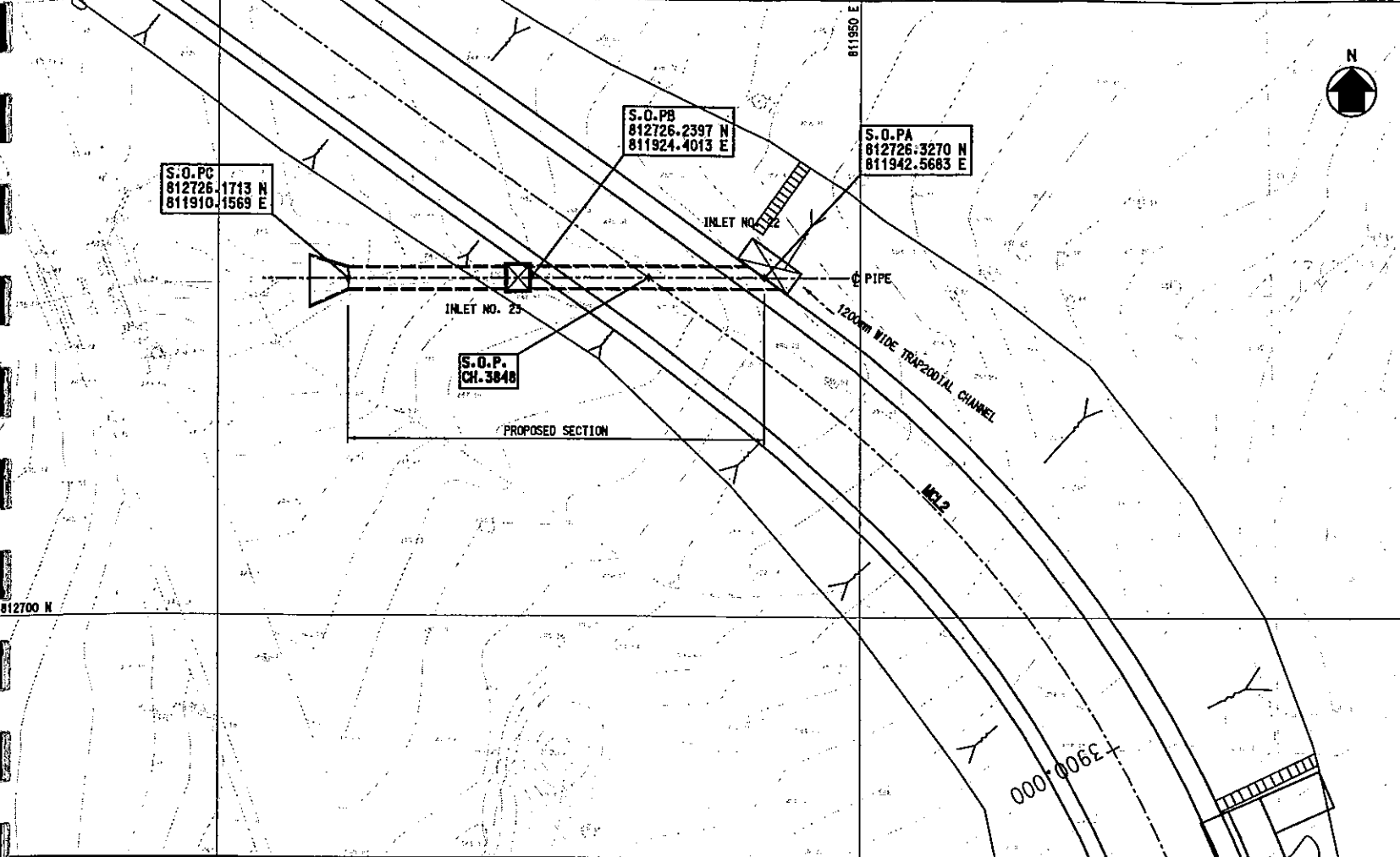
Consulting Engineers
Mott Connell Ltd.
 in Association with
 Halcrow China Ltd MVA Hong Kong Ltd Urbis Ltd
 Millich & Co Archaeological Assessments HDS Preston Ltd

Project
 Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha

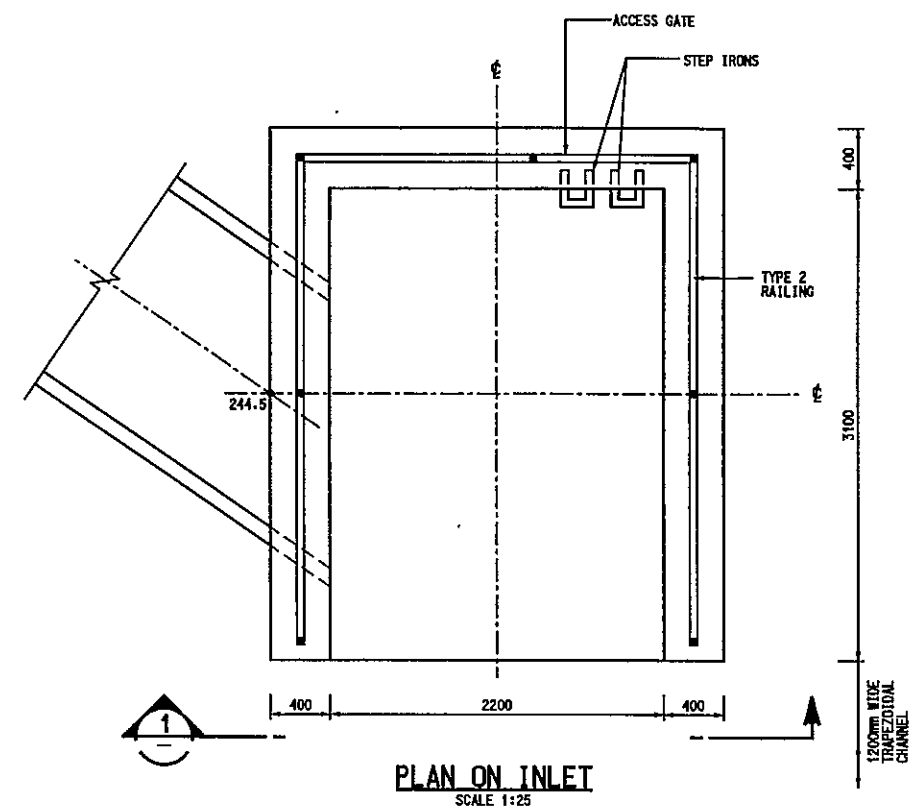
Title
CULVERT AT CH. 3582

Scale: AS SHOWN
 Contract No. / Unit HY/2003/19
 Drawing No. 203358/S/3121 Rev. A

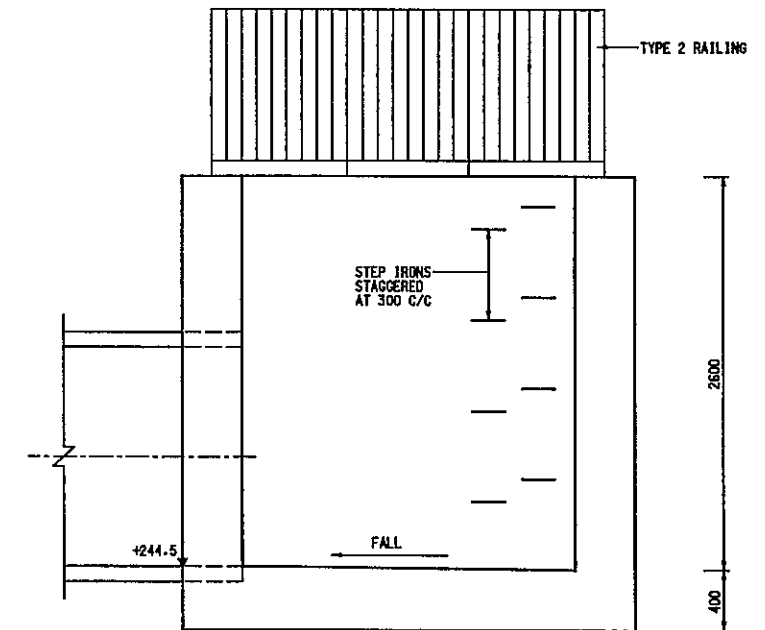
NOTES:
 1. FOR GENERAL NOTES SEE DRAWING NO. 203358/S/3151.
 2. FOR STANDARD DETAILS SEE DRAWING NOS. 203358/S/3151 TO 3153.



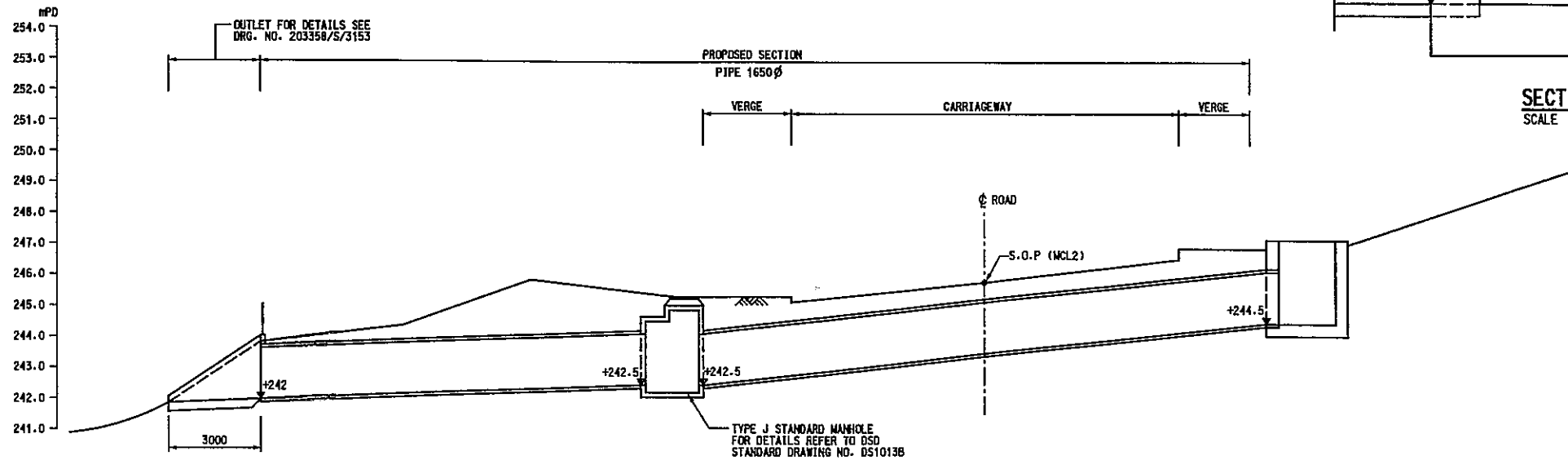
PLAN
SCALE 1 : 250



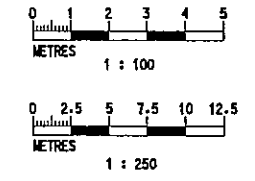
PLAN ON INLET
SCALE 1:25



SECTION 1
SCALE 1 : 25



LONGITUDINAL SECTION CH.3848
SCALE 1:100



Rev.	Date	Drn.	Description	Dgn.	Chd.	App'd.
A	JUN 04	VN	ISSUED FOR CONSTRUCTION. IDENTICAL TO TENDER DRAWING REVISION 01	KW/KWA	GL/...	
Designed:	KW/KWA		Date: JUL 2003	Checked:	AL/...	
Drawn:	VN		Date: JUL 2003	Checked:	KW/KWA	
Approved:	KW/...		For MCL	Date of Issue:	OCT 2003	

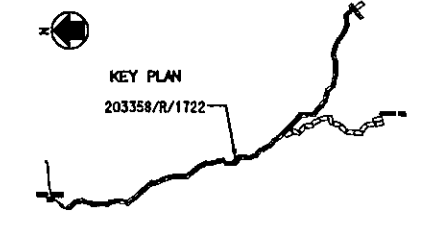
Client
 The Government of the Hong Kong Special Administrative Region
 Highways Department

Consulting Engineers
Mott Connell Ltd.
 In Association with
 Halcrow China Ltd MVA Hong Kong Ltd Urbis Ltd
 Miflich & Co Archaeological Assessments HDS Preston Ltd

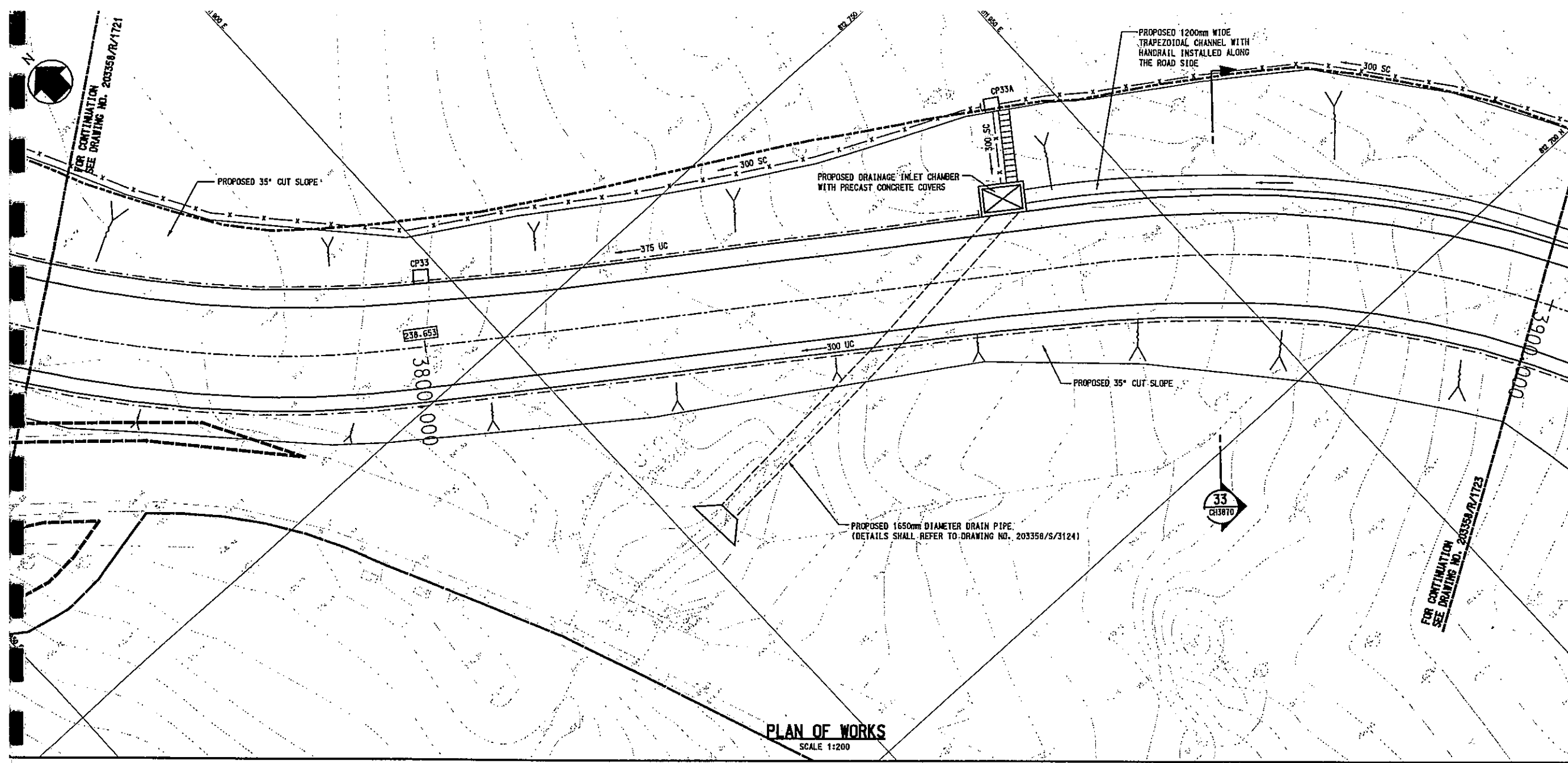
Project
 Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha

Title
CULVERT AT CH.3848

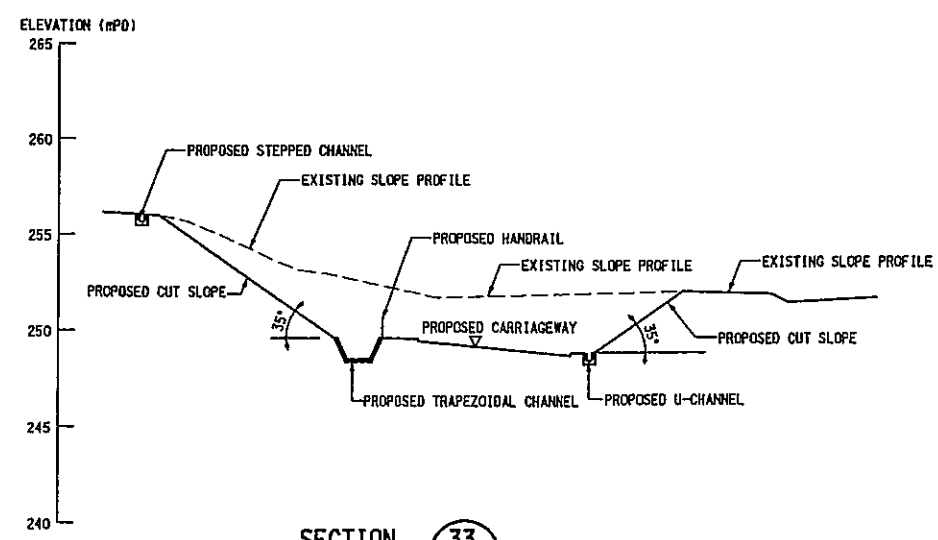
Scale: AS SHOWN
 Contract No. / Unit: HY/2003/19
 Drawing No. 203358/S/3124 Rev. A
 © Copyright Reserved
 CAD File: E:\203358\WORKING\vol009\3124\A.DWG Status: CONST.



- NOTES :**
- COORDINATES SHALL REFER TO HONG KONG METRIC GRID (1980).
 - ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (P.D.)
 - ALL CUT AND FILL SLOPE SURFACES SHALL BE HYDROSEEDED.
 - NO TREES SHALL BE FELLED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.
 - NO STOCKPILING ON THE EXISTING SLOPE IS PERMITTED.
 - DETAILS OF DRAINAGE CHANNELS AND CATCHPITS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DRAWING NO. 203358/R/1766.
 - MINIMUM GRADIENT SHALL BE 1 IN 10 FOR SURFACE CHANNELS ON SLOPE FACE AND 1 IN 50 FOR OTHER SURFACE CHANNELS.
 - ALL STANDPIPES/PIEZOMETERS INSTALLED IN THE EXISTING DRILLHOLES SHALL BE SAFELY PROTECTED FROM ANY DAMAGE DURING THE CONSTRUCTION PERIOD. IN CASE OF ANY DAMAGE OF THE STANDPIPES/PIEZOMETERS CAUSED BY THE CONTRACTOR WITHOUT THE APPROVAL OF THE ENGINEER, THE CONTRACTOR SHALL IMMEDIATELY RE-INSTALL THE DAMAGED STANDPIPES/PIEZOMETERS AT HIS OWN COST.
 - DETAILS OF HANDRAIL INSTALLED ON THE TRAPEZOIDAL CHANNEL SHALL REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H2130B AND H2131A.

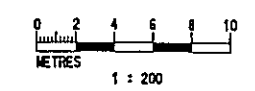


PLAN OF WORKS
SCALE 1:200



SECTION 33
SCALE 1 : 200 CH3870

- LEGEND:**
- LIMIT OF ROAD WORKS AREA
 - - - EXISTING FEATURE BOUNDARY
 - ⊕ BH1 EXISTING DRILLHOLE
 - PROPOSED R.C. RETAINING WALL
 - PROPOSED CARRIAGEWAY
 - YY PROPOSED FILL SLOPE
 - YY PROPOSED CUT SLOPE
 - 80.115 PROPOSED FINAL FORMATION LEVEL AT CENTRE LINE OF CARRIAGEWAY
 - CP1 PROPOSED CATCHPIT
 - 300 UC PROPOSED 300mm U-CHANNEL
 - 450 SC PROPOSED 450mm STEPPED CHANNEL
 - ||||| PROPOSED 600mm WIDE CONCRETE MAINTENANCE STAIRWAY



ISSUED FOR CONSTRUCTION, IDENTICAL TO TENDER DRAWING REVISION 02				Dgn. Chd. App'd.	
Rev.	Date	Drn.	Description	Dgn.	Chd.
A	JUN 04	GYZ			
Designed:	LA	Date:	NOV 02	Checked:	WCP
Drawn:	GYZ	Date:	NOV 02	Checked:	WCP
Approved:	KML		For MCL	Date of Issue:	OCT 2003

Client

 The Government of the Hong Kong Special Administrative Region Highways Department

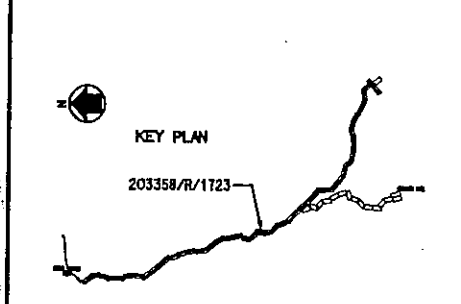
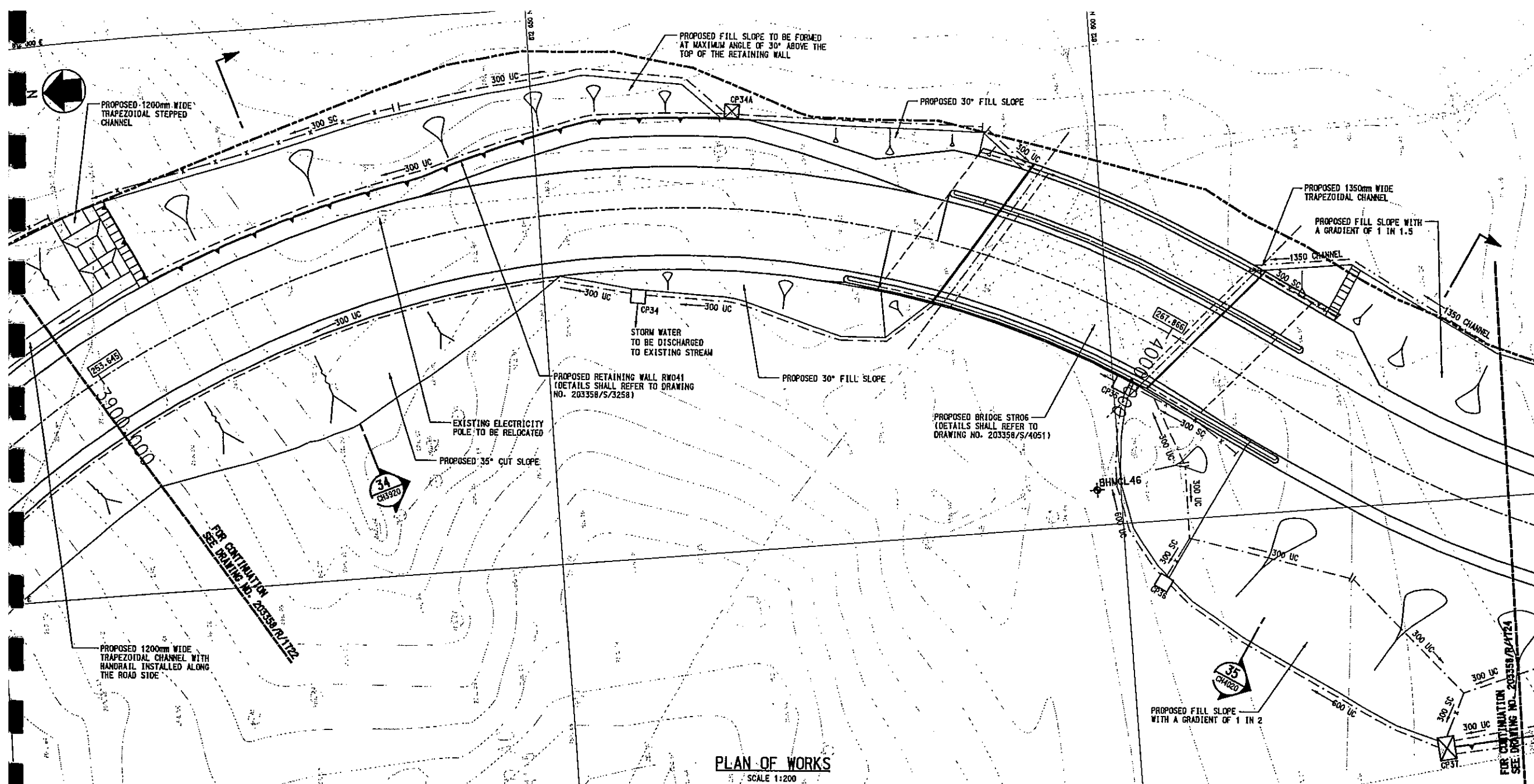
Consulting Engineers
Mott Connell Ltd.
 In Association with
 Halcrow China Ltd. MVA Hong Kong Ltd. Urbis Ltd.
 Mifclieb & Co. Archaeological Assessments HDS Preston Ltd.

Project
 Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha

Title
SITE FORMATION WORKS LAYOUT PLAN AND SECTION

SHEET 22 OF 50

Scale: 1 : 200	
Contract No. / Unit	HY/2003/19
Drawing No.	203358/R/1722
Rev.	A
© Copyright Reserved	
CAD File: c:\203358\working\vol\m04\1722a.dgn	Status: CONST.



- NOTES :**
- COORDINATES SHALL REFER TO HONG KONG METRIC GRID (1980).
 - ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM (P.D.).
 - ALL CUT AND FILL SLOPE SURFACES SHALL BE HYDROSEEDED.
 - NO TREES SHALL BE FELLED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.
 - NO STOCKPILING ON THE EXISTING SLOPE IS PERMITTED.
 - DETAILS OF DRAINAGE CHANNELS AND CATCHPITS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DRAWING NO. 203358/R/1766.
 - MINIMUM GRADIENT SHALL BE 1 IN 10 FOR SURFACE CHANNELS ON SLOPE FACE AND 1 IN 50 FOR OTHER SURFACE CHANNELS.
 - ALL STANDPIPES/PIEZOMETERS INSTALLED IN THE EXISTING DRILLHOLES SHALL BE SAFELY PROTECTED FROM ANY DAMAGE DURING THE CONSTRUCTION PERIOD. IN CASE OF ANY DAMAGE OF THE STANDPIPES/PIEZOMETERS CAUSED BY THE CONTRACTOR WITHOUT THE APPROVAL OF THE ENGINEER, THE CONTRACTOR SHALL IMMEDIATELY RE-INSTALL THE DAMAGED STANDPIPES/PIEZOMETERS AT HIS OWN COST.
 - PROPOSED CONCRETE MAINTENANCE STAIRWAY SHALL BE CONSTRUCTED WITH SINGLE HANDRAILING IN ACCORDANCE WITH DRAWING NO. 203358/R/1767.
 - LOCKABLE GATE SHALL BE PROVIDED TO THE CONCRETE MAINTENANCE STAIRWAY IN ACCORDANCE WITH DRAWING NO. 203358/R/1767.
 - IN ORDER TO LIMIT THE EXTENT OF EXCAVATION ON THE UPHILL SLOPE ALL TEMPORARY UPHILL CUT SLOPES FORMED BEHIND THE PROPOSED RETAINING WALL SHALL BE AT A SLOPE ANGLE NOT LESS THAN 70° UNLESS OTHERWISE APPROVED BY THE ENGINEER.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ANY TEMPORARY WORKS FOR THE CONSTRUCTION OF THE RETAINING WALL. IF NECESSARY, THE CONTRACTOR IS REQUIRED TO SUPPORT THE UNSTABLE TEMPORARY CUT SLOPE BY MEANS OF SOIL NAILS, BUT NOT LIMITED TO THIS, OR OTHER APPROPRIATE AND ACCEPTABLE SHORING SYSTEM.

Rev.	Date	Drn.	Description	Dgn.	Chd.	App'd.
A	JUN 04	GYZ	ISSUED FOR CONSTRUCTION. IDENTICAL TO TENDER DRAWING REVISION 02			

Designed: LA Date: NOV 02 Checked: WCP
 Drawn: GYZ Date: NOV 02 Checked: WCP
 Approved: KM For MCL Date of Issue: OCT 2003

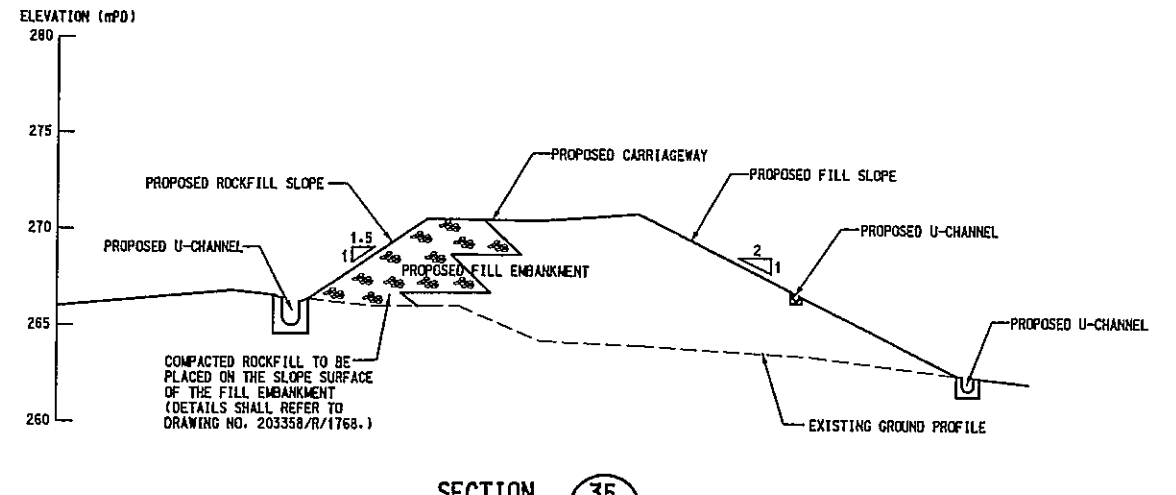
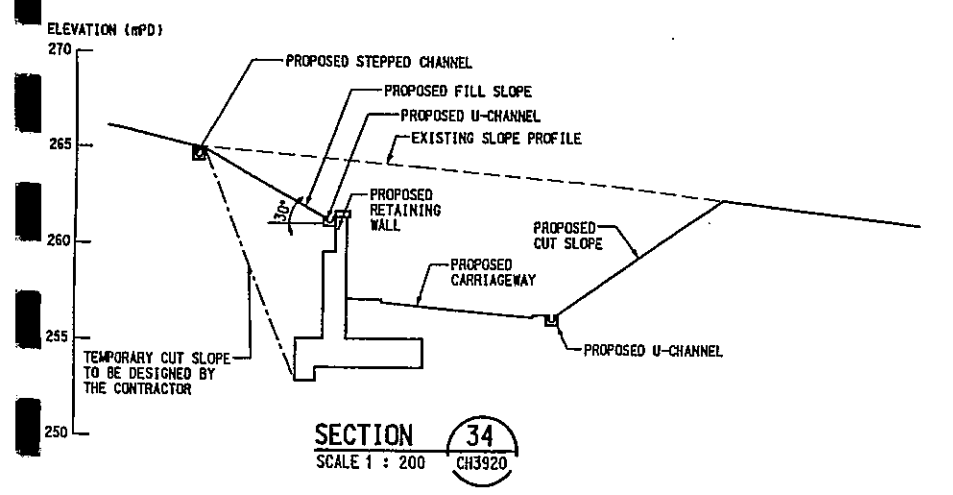
Client
The Government of the Hong Kong Special Administrative Region
 Highways Department

Consulting Engineers
Mott Connell Ltd.
 In Association with
 MVA Hong Kong Ltd
 Archaeological Assessments
 Urbis Ltd
 IDS Preston Ltd

Project
 Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha

Title
SITE FORMATION WORKS LAYOUT PLAN AND SECTION

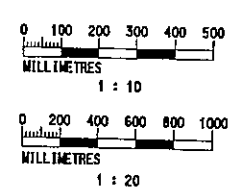
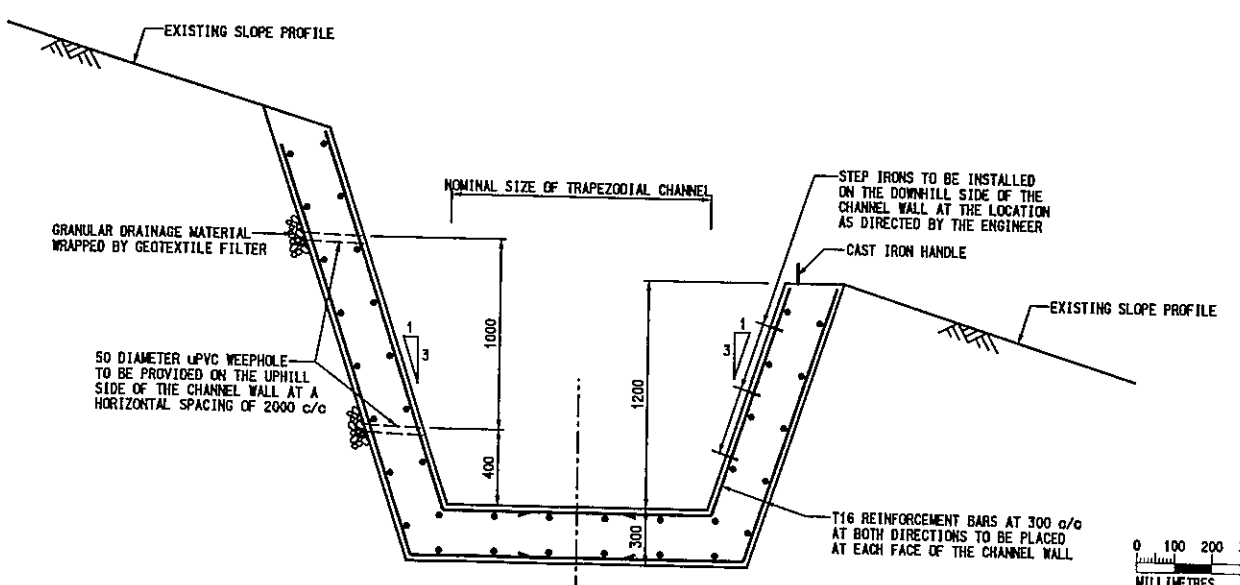
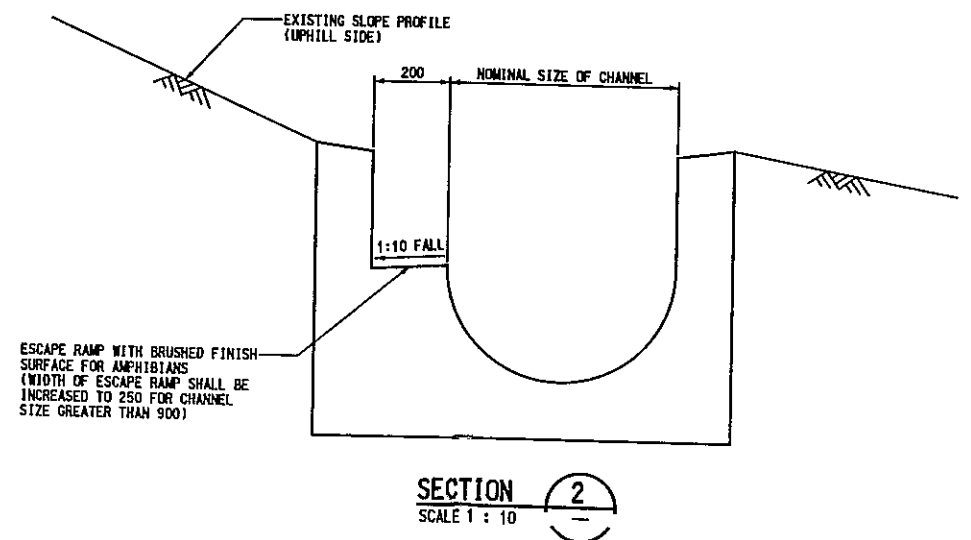
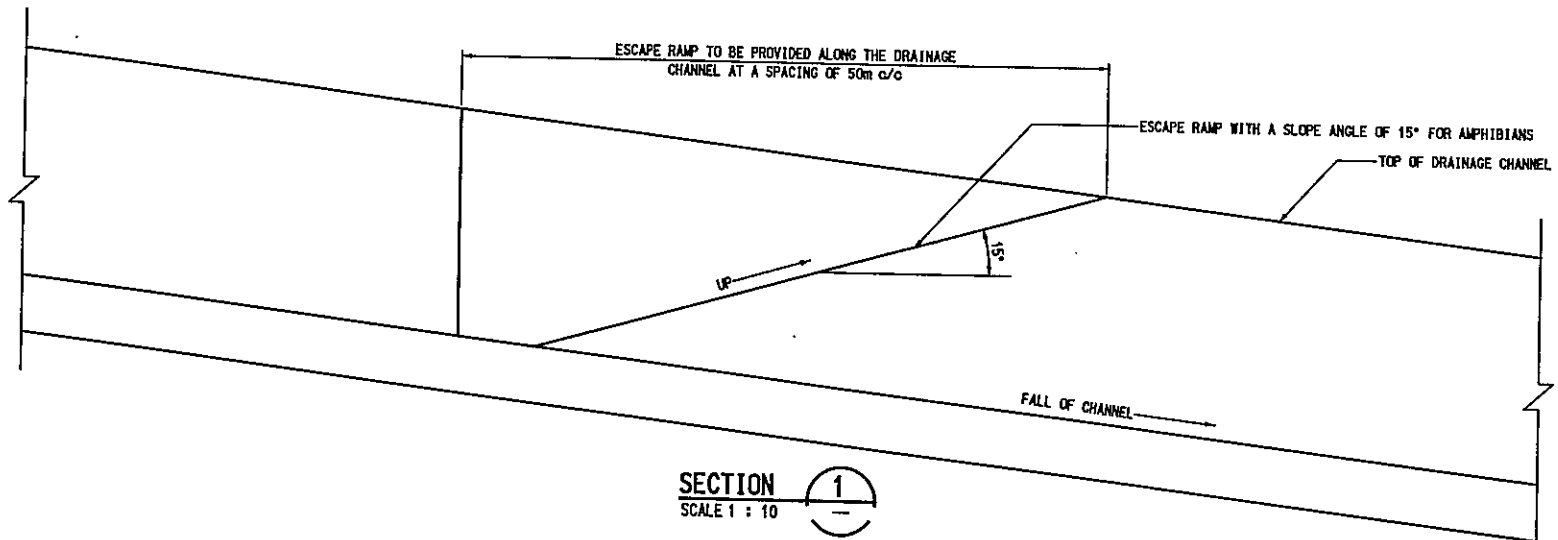
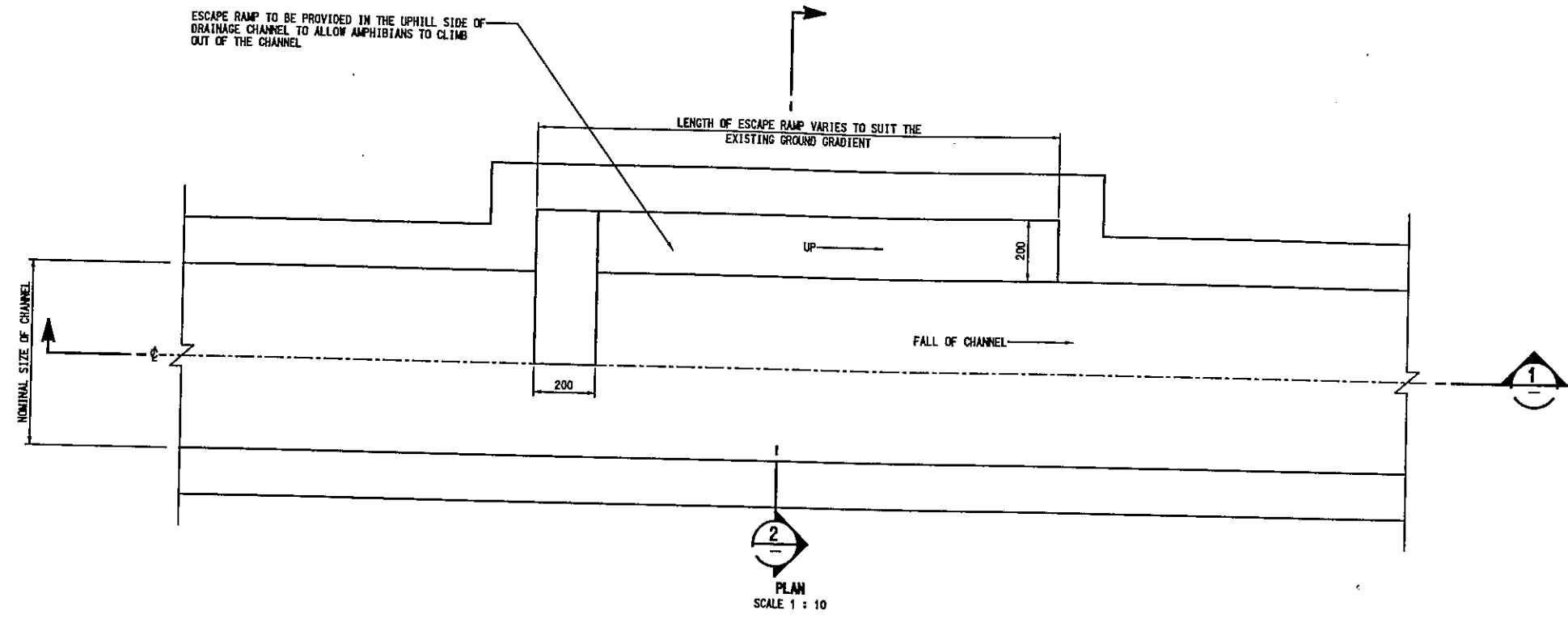
SHEET 23 OF 50



- LEGEND:**
- LIMIT OF ROAD WORKS AREA
 - - - - - EXISTING FEATURE BOUNDARY
 - BH1 EXISTING DRILLHOLE
 - PROPOSED R.C. RETAINING WALL
 - PROPOSED CARRIAGEWAY
 - YY PROPOSED FILL SLOPE
 - YY PROPOSED CUT SLOPE
 - BD.115 PROPOSED FINAL FORMATION LEVEL AT CENTRE LINE OF CARRIAGEWAY
 - CP1 PROPOSED CATCHPIT WITH PRECAST CONCRETE COVERS
 - CP2 PROPOSED CATCHPIT WITHOUT PRECAST CONCRETE COVERS
 - 300 UC PROPOSED 300mm U-CHANNEL
 - 450 SC PROPOSED 450mm STEPPED CHANNEL
 - ||||| PROPOSED 600mm WIDE CONCRETE MAINTENANCE STAIRWAY



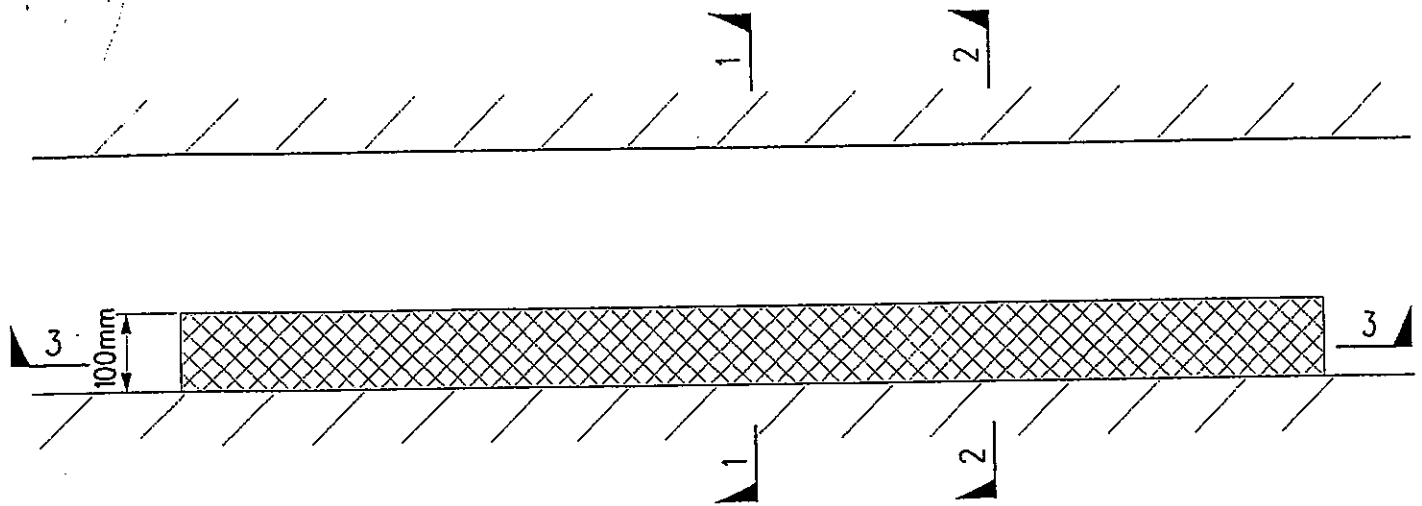
- NOTES:**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 2. ALL CONCRETE SHALL BE GRADE 20/20.
 3. CONCRETE SURFACE FINISH SHALL BE CLASS U2 OR F2 AS APPROPRIATE OR BRUSHED FINISH AS SPECIFIED ON THE DRAWINGS.
 4. EXPANSION JOINTS SHALL BE PROVIDED IN CHANNELS AT A MAXIMUM SPACING 10 METRES.
 5. EXACT LOCATION OF THE ESCAPE RAMP IN DRAINAGE CHANNEL FOR AMPHIBIANS SHALL BE INSTRUCTED ON SITE BY THE ENGINEER.



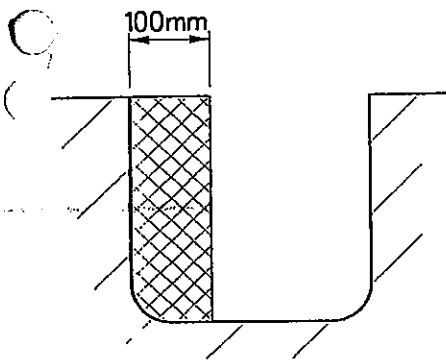
DETAILS OF ESCAPE RAMP IN DRAINAGE CHANNEL FOR AMPHIBIANS

TYPICAL DETAILS OF TRAPEZOIDAL CHANNEL
SCALE 1 : 20

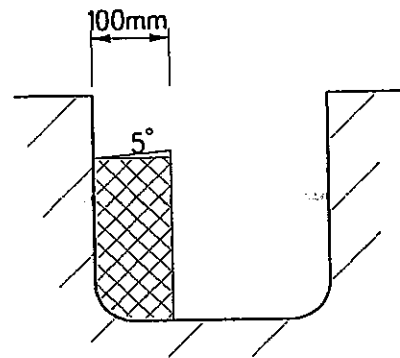
A	JUN 04	KL	ISSUED FOR CONSTRUCTION, IDENTICAL TO TENDER DRAWING REVISION 01		
Rev.	Date	Drn.	Description	Dgn.	Chd. App'd.
Designed:	LA	Date:	JUL 03	Checked:	WCP
Drawn:	KL	Date:	JUL 03	Checked:	WCP
Approved:	KL	For MCL:	Date of Issue:	OCT 2003	
Client					
<p>The Government of the Hong Kong Special Administrative Region Highways Department</p>					
Consulting Engineers					
<p>Mott Connell Ltd. in Association with Halcyon China Ltd MVA Hong Kong Ltd Urbis Ltd Milich & Co Archaeological Assessments HDS Preston Ltd</p>					
Project					
Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha					
Title					
DETAILS OF TRAPEZOIDAL CHANNEL AND ESCAPE RAMP IN DRAINAGE CHANNEL FOR AMPHIBIANS					
Scale: AS SHOWN					
Contract No./Unit HY/2003/19					
Drawing No. 203358/R/1771					
Rev. A					
© Copyright Reserved					
CAD File: 203358/R/1771.dwg Status: CONST.					



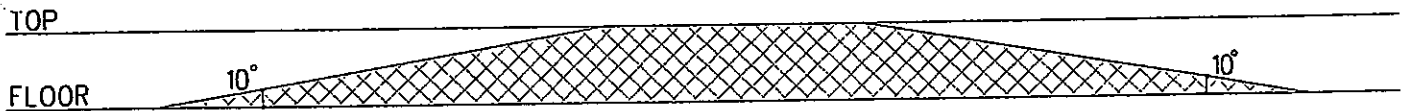
PLAN VIEW



SECTION 1 - 1



SECTION 2 - 2
CROSS-FALL ANGLE OF 5° TO MINIMIZE POSSIBILITY OF ANIMALS FALLING OFF RAMP



SECTION 3 - 3
LONGITUDINAL SECTION - RAMP SLOPES AT ANGLE OF 10° TO FLOOR OF CHANNEL

RAMP EXTENDS 100mm FROM WALL OF CHANNEL, HAS A CROSS-FALL ANGLE OF 5° DIPPING INTO WALL OF CHANNEL, AND RISES FROM FLOOR TO TOP OF CHANNEL AT AN ANGLE OF 10°. RAMP FACES BOTH UPSTREAM AND DOWNSTREAM AND SHOULD BE INSTALLED WHERE U-CHANNEL IS 200-300mm DEEP.