

Drainage Services Department

**Drainage Improvement in Tsuen Wan,
Kwai Chung & Tsing Yi**

Tsuen Wan Drainage Tunnel

Project Profile

March 2001

SECTION 1	BASIC INFORMATION	
1.1	PROJECT TITLE	1
1.2	PURPOSE & NATURE OF THE PROJECT	1
1.3	NAME OF PROJECT PROPONENT	1
1.4	LOCATION AND SCALE OF PROJECT	2
1.5	NUMBERS AND TYPES OF DESIGNATED PROJECTS	2
1.6	NAME(S) AND TELEPHONE NUMBER(S) OF CONTACT PERSON(S)	2
SECTION 2	OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME	
2.1	PLANNING & IMPLEMENTATION	3
2.2	PROJECT PROGRAMME	3
2.3	OTHER PROJECTS IN THE VICINITY OF THE STUDY AREA	3
SECTION 3	POSSIBLE IMPACT ON THE ENVIRONMENT	
3.1	OUTLINE OF PROCESS INVOLVED	4
3.2	POSSIBLE ENVIRONMENTAL IMPACT	4
3.2.1	<i>Construction Phase</i>	4
3.2.2	<i>Operational Phase</i>	6
SECTION 4	MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT	
4.1	EXISTING AND PLANNED SENSITIVE RECEIVERS	8
4.1.1	<i>Air Sensitive Receivers (ASRs)</i>	8
4.1.2	<i>Noise Sensitive Receivers (NSRs)</i>	8
4.1.3	<i>Water Quality Sensitive Receivers</i>	9
4.1.4	<i>Ecological Sensitive Receivers</i>	9
4.1.5	<i>Landscape and Visual Sensitive Receivers</i>	9
4.1.6	<i>Cultural Heritage Sensitive Receivers</i>	9
4.2	EXISTING ENVIRONMENTAL ELEMENTS	9
SECTION 5	ENVIRONMENTAL PROTECTION MEASURES & FURTHER ENVIRONMENTAL IMPLICATIONS	
5.1	POTENTIAL MEASURES TO MINIMISE ENVIRONMENTAL IMPACTS	10
5.1.1	<i>Construction Phase</i>	10
5.1.2	<i>Operational Phase</i>	12
5.2	POSSIBLE SEVERITY, DISTRIBUTION AND DURATION OF ENVIRONMENTAL EFFECTS	13
5.3	FURTHER IMPLICATIONS	13
SECTION 6	USE OF PREVIOUSLY APPROVED EIA REPORTS	
6.1	USE OF PREVIOUSLY APPROVED EIA REPORTS	14

1. BASIC INFORMATION

1.1 Project Title

Drainage Improvement in Tsuen Wan, Kwai Chung & Tsing Yi.

1.2 Purpose & Nature of the Project

Under the Governor's Address in 1995, seven drainage master plan studies were endorsed, and the Tsuen Wan, Kwai Chung and Tsing Yi Stormwater Drainage Master Plan Study (the DMP) was proposed to cover a study area of about 48 square kilometres in Tsuen Wan, Kwai Chung and Tsing Yi.

The DMP has identified widespread under-capacity in Tsuen Wan and Kwai Chung in the existing drainage system caused by large flows entering the urban drainage system from the large and steep upper rural catchment. The study has also shown that the existing drainage system is unable to meet current standards of flood protection. Based on the results of the hydraulic and fabric performance analyses and the stormwater improvement strategy developed under the study, the project "Drainage Improvements in Tsuen Wan, Kwai Chung and Tsing Yi" is proposed to rectify the drainage problem in the study area. The proposed drainage improvement works comprise the following key components:

- Package A - Tsuen Wan Drainage Tunnel
- Package B - Urban Drainage Improvement Works

The Tsuen Wan Drainage Tunnel will capture the upland stormwater runoff from the major catchments to the north of Tsuen Wan and Kwai Chung and will divert these flows away from the Chung Hang Nullah, Tai Ho Nullah and Kwai Chung Nullah to the sea to the south west of the study area near Yau Kom Tau. With the tunnel system, the flood protection level of trunk drains in most of the Tsuen Wan and Kwai Chung areas will be improved to a 200-year return period in general.

The Urban Drainage Improvement Works will involve upgrading works for a limited number of existing stormdrains, so as to raise the performance of these drains to a flood protection level similar to the rest of the branch drainage system in the study area. In addition, the Urban Drainage Improvement Works will also include limited works to improve structural deficiencies of certain drains.

In the preliminary environmental reviews undertaken for the Preliminary Project Feasibility Study (PPFS) for the Project "Drainage Improvement in Tsuen Wan, Kwai Chung and Tsing Yi", it was concluded that Package A is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499), and Package B is not a designated project under of the EIA Ordinance.

1.3 Name of Project Proponent

The Drainage Services Department (DSD) of the Government of the Hong Kong Special Administrative Region.

1.4 Location and Scale of Project

Figure 1 illustrates the preferred alignment and shaft locations of the Tsuen Wan Drainage Tunnel.

The tunnel system comprises a 5.35km long tunnel with three intake structures and an outfall structure. The design allows a maximum tunnel flow of up to 213m³/s. The tunnel section, with an internal diameter of 6.5m, flows from the junction of Shing Mun Road and Wo Yi Hop Road and discharges to south of Yau Kom Tau underneath Castle Peak Road. At three specific locations along the tunnel alignment, intake structures (Intake I-1, I-2 and I-3) will be provided. These intakes will be located in the stream beds of the three largest streams draining the upland catchment and will function as flow intercepting points, at which the runoff will be diverted vertically down through vortices and through smaller diameter connecting tunnels to the main tunnel section. Locations of the intake structures are described as follows:

- Intake I-1: In Kwai Chung, adjacent to the junction of Wo Yi Hop Road and Shing Mun Road
- Intake I-2: At Lo Wai, adjacent to Lo Wai Road
- Intake I-3: At Tso Kung Tam, about 350m off Route Twisk

At the discharge point, the outfall structure, O-1 is envisaged to comprise a stepped cascade connecting the tunnel to four 9m by 6.5m box culverts which will cross underneath the existing Castle Peak Road at Yau Kom Tau.

1.5 Numbers and Types of Designated Projects

This Project is a designated project under *Part 1 Category Q - Miscellaneous* of the *Schedule 2* of the EIAO. Part of the proposed Tsuen Wan Drainage Tunnel will pass underneath the existing Tai Mo Shan Country Park.

1.6 Name(s) and Telephone Number(s) of Contact Person(s)

SECTION 2

OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Planning & Implementation

The whole project will be planned and implemented by Drainage Services Department with consultants. Construction will be carried out by contractors. The operation and maintenance of completed works will be taken up by the Drainage Services Department.

2.2 Project Programme

Current target dates for the construction of the project are:

Tsuen Wan Drainage Tunnel

- Preliminary Design & Site Investigation November 2001 – August 2003
- EIA Study & Environmental Permit November 2001 – August 2003
- Detailed Design & Tendering August 2003 – May 2006
- Construction May 2006 – May 2011

2.3 Other Projects in the Vicinity of the Study Area

Major projects identified which may occur concurrently in close proximity to the proposed drainage tunnel works:

- KCRC's West Rail;
- HyD's Castle Peak Road Improvement Work;
- HyD's Tuen Mun Road Improvement Works;
- HyD's Route 5;
- HyD's Route 9;
- TDD's Tsuen Wan Bay Further Reclamation; and
- RSD's Tso Kung Tam Ecological Park.

3. POSSIBLE IMPACT ON THE ENVIRONMENT

3.1 Outline of Process Involved

Potential environmental impacts of Drainage Improvement in Tsuen Wan, Kwai Chung and Tsing Yi are associated with construction and operation.

The construction phase works will involve site clearance, site preparation, earthworks, tunnelling by using tunnel boring machine, excavation of production shaft and other general construction activities etc. The following sections consider the likely construction activities taking place and the potential for environmental impacts that may arise. Based upon an initial evaluation as to the local significance of these impacts, the requirement for mitigation can then be determined.

Operational phase impacts are discussed in Section 3.2.2.

3.2 Possible Environmental Impact

3.2.1 *Construction Phase*

Air Quality

Some of the construction activities have the potential to generate dust. This mainly includes dust generated by spoil transfer/transport, construction traffic, excavation works and general construction activities. However, spoil removal is planned to take place at the tunnel outlet, location O-1 where it will be transferred to barge for removal from site, no stock piling is envisaged and no haulage operation will be required for spoil removal. Dust emissions will vary substantially from day to day depending on the size of the works site, the level of activity, the specific construction operation and the prevailing climatic conditions. Dry and windy conditions have the potential to enhance wind erosion and thus dust generation. Contractors shall be required to follow the Air Pollution Control (Construction Dust) Regulation and other relevant guidelines to minimize any potential dust emission during construction stage.

Noise

Construction equipment expected to be utilised during the works has the potential to generate noise and to impact upon Noise Sensitive Receivers (NSRs). Noise associated with the construction of tunnel shafts and initial tunnel excavation will require specific noise attenuation measures to control noise levels within acceptable specified levels. Further construction noise assessment should be carried out in the EIA stage.

Water Quality

Water quality impacts of site runoff into water courses and marine waters is regarded as the main potential source of water pollution during construction. Runoff associated with washout water from concrete batching, vehicle wheel and body washing facilities and water contaminated by oil, grease, bentonite slurry, sediments or chemicals used in the finishing processes for buildings should be intercepted and treated prior to discharge off site.

Traffic

As the construction of the outfall structure will cross underneath the existing Castle Peak Road at Yau Kom Tau, only minimal impact will affect the traffic on the Castle Peak Road. Traffic flow will increase in the vicinity of the intake structures and outfall structure due to the addition of construction traffic.

The disposal of excavated material from tunnel excavation works may be carried out via marine route. There may be slight impact on the nearby marine traffic.

Waste Management

The works will result in the generation of a number of waste materials which will require appropriate treatment, handling and disposal in order to avoid knock-on environmental impacts associated with noise, dust, silt-laden or contaminated runoff and vermin. It is expected that wastes likely to be generated during the works phase include the following:

- waste spoil from site clearance, site preparation, tunnel excavation and earthworks;
- waste construction material such as wood, metal scraps and concrete;
- worker generated general waste.

It is envisaged that land contamination will not be an issue arising from the proposed works for the following reasons:

1. About 97% of the tunnel alignment shown in Drawing DCM/2001/013 falls within areas zoned as Green Belt, Country Park and Open Space, which represent the bulk of the steep, upper rural catchment areas. The remaining alignment goes through areas designated as Residential (Group B) and G/IC. The proposed tunnel will be at a depth ranging from 40m to 220m below ground level in virgin bedrock. Due to the relatively undeveloped nature of the upland catchments, encountering of contaminated excavated rock/soil wastes is potentially minimal.
2. The only surface structures in the proposed tunnel system are the three intake structures and an outlet structure. These intake structures are designed to be located in the river beds at the upland catchments. Due to the upstream locations and the relatively undeveloped nature of the area, land contamination is not envisaged to be an issue for these works.

The bulk of the waste materials would consist of excavated rock from the tunnelling works. It is estimated that a volume of approximately 350,000 m³ of rock spoils would be produced over a period of 48 to 54 months. As discussed above, it is not anticipated that contaminated rock/soil would be encountered.

Ecology

Terrestrial ecological impacts will not occur at most sites given the lack of nearby ecological sensitive receivers. However, over 100m natural stream courses downstream of inlet location I-2 and I-3 may be affected; therefore, further assessment is needed to determine the requirement for mitigation measures during construction.

Landscape and Visual

Construction activities at the proposed intake locations I-1 and I-3 are not considered to generate significant visual impacts due to the industrial/urban setting and no residentially buildings within the works areas. However, the visual impacts about the nearby recreational centre at intake location I-3 and its associated access roads will be minimal because it is

considered to be far enough away from the construction site. The construction sites at intake location I-2 and outlet location O-1 will cause visual impact while they are situated close to residential buildings within the site's visual envelope and residents who overlook the site. Screens and high enclosing walls may be used at these locations to shield the sites and reduce adverse impacts, including visual and noise impacts.

Dredging

No dredging operation is anticipated during construction of the proposed works.

Potential Hazardous Installations

Part of the tunnel alignment will pass through WSD's Potential Hazardous Installations (PHI) consultation zone for the Yau Kom Tau Water Treatment Works. However, it is envisaged that potential hazard to life will not occur during the construction of tunnel because the tunnel within this area will be constructed below ground using a tunnel boring machine and practically no human exposure within the WSD's PHI consultation zone will arise from the tunnelling works.

3.2.2 Operational Phase

Air Quality

There will be no air quality impacts as a result of the tunnel operation.

Noise

Operational noise impacts are considered to be minimal as there are no mechanical devices involved with the scheme.

Water Quality

There are potential water quality impacts due to the transfer of sediment carried by storm flow to Rambler channel. However, the same storm flows currently discharge into Tsuen Wan Bay only a small distance from the proposed outlet so little difference from the existing effects are envisaged;

Traffic

No traffic impact is anticipated during the operational phase.

Waste Management

Waste sources during operation phase will be general wastes such as wood and leaves while storm water runs from the steep upland catchments into the tunnel, however, it is considered as an insignificant impact.

Ecology

No adverse ecological impacts are anticipated during the operational phase.

Landscape and Visual

Visual impact during operation phase is considered to be minimal. While the tunnel intake structures will be partially buried in the stream bed, landscaping should be able to conceal outlook view of these structures. Also the tunnel cascade will be covered and the hill side will

reinstate above the structures. The outlet culvert will pass and discharge underneath the planned elevated highways at this section of the Castle Peak Road improvement scheme.

Cultural Heritage

No significant heritage impacts are anticipated during the operation stage.

Dredging

No dredging operation is anticipated during operation of the proposed works.

Potential Hazardous Installations

During operation, the tunnel, which will carry stormwater, will basically be maintenance free and practically no human exposure within the WSD's PHI consultation zone will arise. Therefore, it is envisaged that no hazard to life due to the tunnel alignment being within the PHI zone is expected at the operation stage.

4. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT**4.1 Existing and Planned Sensitive Receivers****4.1.1 *Air Sensitive Receivers (ASRs)***

Several ASRs have been identified in the vicinity of all of the proposed works sites under the Technical Memorandum on Environmental Impact Assessment (TMEIA). Figure 4.1.1 - 4.1.4 show the locations of ASRs. The following lists the ASRs in the vicinity of each of works site:

Outfall, O-1

- AO1-1: Grandview Terrace No. 6
- AO2-2: Long Beach Garden
- AO3-3: Blossom Terrace

Intake, I-1

- AI1-1 Lei Muk Shue Estate
- AI1-2 Ho Fung College

Intake, I-2

- AI2-1: Hilltop Country Club
- AI2-2: Home for aged

Intake, I-3

- AI3-1 Ho Koon Nature Education Cum Astronomical Centre

4.1.2 *Noise Sensitive Receivers (NSRs)*

Some NSRs have been identified in the vicinity of all of the proposed works sites under the Technical Memorandum on Environmental Impact Assessment (TMEIA). Figure 4.1.1 – 4.1.4 show the locations of NSRs. The following lists the NSRs in the vicinity of each of works site:

Outfall, O-1

- NO1-1: Grandview Terrace No. 6
- NO2-2: Long Beach Garden
- NO3-3: Blossom Terrace

Intake, I-1

- NI1-1 Lei Muk Shue Estate
- NI1-2 Ho Fung College

Intake, I-2

- NI2-1: Hilltop Country Club
- NI2-2: Home for aged

Intake, I-3

- NI3-1 Ho Koon Nature Education Cum Astronomical Centre

4.1.3 *Water Quality Sensitive Receivers*

Under the Technical Memorandum “Standard for Effluents Discharged into Drainage, and Sewerage Systems, Inland and Coastal Waters”, all of the discharge and site runoff should be within discharge standards for the relevant Water Control Zones. Impacts on these area need to be assessed in future EIA.

4.1.4 *Ecological Sensitive Receivers*

Future EIA is recommended prior to land clearance at the proposed works sites where there are local tree stands and the mixture of shrub land. Tree surveys should also be undertaken at all proposed work sites to determine the importance of local trees that would be lost and the requirement for replacement/mitigation. Ecological field surveys are required to investigate the sites ecological significance at the proposed Tso Kung Tam site or intake structure I-3.

4.1.5 *Landscape and Visual Sensitive Receivers*

Mitigation measures for landscape and visual impacts are required at the proposed intake location I-2 and outlet location O-1 since there are potential visual impacts caused by the tunnel construction which are close to residential areas. However, visual impacts at intake locations I-1 and I-3 will be insignificant compared to the surrounding industrial areas.

4.1.6 *Cultural Heritage Sensitive Receivers*

It can be referred to Section 3.2.1 that there is no major cultural heritage sensitive receiver in the immediate vicinity of most of the proposed site area.

4.2 **Existing Environmental Elements**

The proposed intake locations I-1, I-2 and I-3 and outlet location O-1 are located away from urban settings and therefore their background noise and air levels are low.

SECTION 5
ENVIRONMENTAL PROTECTION MEASURES &
FURTHER ENVIRONMENTAL IMPLICATIONS

5. ENVIRONMENTAL PROTECTION MEASURES & FURTHER ENVIRONMENTAL IMPLICATIONS

5.1 Potential Measures to Minimise Environmental Impacts

Various mitigation measures to minimise potential environmental impacts are outlined in the following section. Future EIA will recommend and investigate these measures in more detail.

5.1.1 *Construction Phase*

Air Quality

Dust generation is the largest potential impact on air quality during the construction of the tunnel works. Contractors should ensure that all construction work is carried out in accordance with the Air Pollution Control (Construction Dust) Regulations. Standard dust mitigation measures include:

Excavation

- dust emission should be minimised during any surface excavation by limiting the extent of excavation;
- surfaces of excavation works should be compacted;
- temporary fabric covers may be required during windy conditions;
- completed earthworks should be promptly revegetated.

Material Handling

- the dropping height of material/waste should be minimised as far as practicable to limit fugitive emissions during loading and unloading of spoil;
- water should be applied to stockpiles of spoil of more than 50m³ during dry or windy conditions;
- stockpiles should be covered with tarpaulins.

Control of Vehicle Dust

- frequent watering should be used on unpaved haul routes and active construction areas;
- material/waste should be fitted with side boards and trail boards and also be covered by a tarpaulin properly secured and extended over the edges of the trail boards and side boards;
- vehicle speeds should be restricted to 8km/hr on site to minimise suspension and dispersion of dusts on site;
- wheel washing facilities should be provided on site to prevent track-out of mud and dusts on to the public highways;
- vehicle should be in well maintained that excessive vehicle emissions are not released.

Noise

Any construction requires Construction Noise Permit (CNP) and mitigation measures must be taken to comply with the applicable criteria. These mitigation measures include:

- silencing of noisy equipment and working methods should be used;

- all equipment and plant should be well maintained and not excessively noisy due to poor maintenance;
- movable noise barriers and enclosures can be used;
- good site practice should be used to limit noise emission at sources;
- intrusive noisy activities should be scheduled for periods to ensure the minimum numbers of persons are affected and limit the amount of concurrent activities;
- alternative construction method will be replaced blasting whenever circumstance allows.

Water Quality

To meet standards in “Technical Memorandum on Effluents Discharged into Drainage and Sewerage System, Inland and Coastal Waters”, the following mitigation measures should be taken:

- appropriate drainage facilities and standard good site management and practices can control construction site runoff and protect the marine environment near the works sites;
- settling lagoons and grease/oil traps should be designed to control runoff from site areas;
- settled slurry or mud should be disposed of to the nearest landfill site;
- proper site management to prevent debris and harmful material from reaching drainage facilities and water bodies;
- all domestic effluent from Contractor and RSS facilities should be disposed of via foul sewers.

Traffic

For the construction works at the intake structures and outfall structure, temporary traffic arrangement measures will be undertaken to maintain traffic flow and minimise traffic impacts. Temporary marine traffic arrangement scheme will be undertaken to maintain marine traffic flow and minimise the traffic impacts, provided that the disposal of excavated material from tunnel excavation works is carried out via marine route.

Waste Management

In order to meet the relevant standards as specified in the Waste Disposal Ordinance, the following waste mitigation measures should be undertaken to minimise impact from construction waste arisings:

- general good waste management plan and practice should be identified;
- inert material deemed suitable for fill should, if possible, be re-used and recycled;
- re-used and recyclable material should be handled and stored in an appropriate manner which is without loss and leakage;
- other construction waste/inert materials deemed unsuitable for reuse or recycle should be ensured to dispose of in an appropriate manner and they should be separated by category;
- chemical waste should be stored in accordance with approved methods defined in the regulations;
- alternative method will be replaced transporting excavated wastes to the marine barging point using trucks whenever circumstance allows.

Ecology

Specific ecological mitigation measures are required in the proposed intake and outlet locations due to the land clearance at these sites. A tree survey should be undertaken in order to define the number of trees affected by the tunnel construction and their potential significance and compensation can be suggested such as re-provisioning and replanting.

Landscape and Visual

Mitigation measures can be taken to minimise visual intrusion and site disruption such as appropriate construction phasing and programming, siting of site equipment/plant and site screening.

Cultural Heritage

No mitigation measures for cultural heritage impacts is required at the proposed site areas due to the insignificant cultural heritage impacts.

5.1.2 Operational Phase

Air Quality

No mitigation measures is required for air quality control because there will be no air quality issues anticipated during operation phase.

Noise

No particular noise mitigation measures are required during the operational phase. This will be confirmed through detailed noise modelling undertaken as part of the future EIA.

Water Quality

No specific mitigation measure is required for water quality due to the existing stormwater discharging into Tsuen Wan Bay which is close to the proposed outlet location O-1.

Traffic

No specific mitigation measures will be required.

Waste Management

No specific mitigation measures will be required.

Ecology

No specific mitigation measures will be required.

Landscape and Visual

Visual impacts of all tunnel intake structures and tunnel cascade will be minimised by the incorporation of landscaping. Vegetation planting designs can also be a mitigation measure by screening works from local residents and the general public.

Cultural Heritage

No specific mitigation measures will be required.

5.2 Possible Severity, Distribution and Duration of Environmental Effects

The impacts on air, noise, water quality, traffic, waste, ecology, visual and cultural heritage will be an issue for the duration of construction between early 2006 to early 2011. Their severity and distribution is outlined in Section 3.

Air and noise impact will be most severe during construction procedures such as earthworks, excavation, piling and concreting.

Information concerning the impact of the cumulative effects of the proposed stormwater drainage system is limited at this stage due to the lack of definitive programming for other developments, works and adjacent projects.

5.3 Further Implications

Public interest is expected to be moderate as surface excavations are taken at two intake locations in the vicinity of residential districts. However, these tunnel constructions are designed for the solution of flooding problems in Tsuen Wan and Kwai Chung areas, for the benefit of the public, creating jobs and providing additional service.

SECTION 6
USE OF PREVIOUSLY APPROVED EIA REPORTS

6. USE OF PREVIOUSLY APPROVED EIA REPORTS

6.1 Use of Previously Approved EIA Reports

No previously approved EIA reports have been referred to during the preparation of this Project Profile.

LEGEND 圖例

- 隧道路線
Tunnel Alignment
- - - 連接隧道
Connecting Tunnel
- (S) Intake Structure
進水口
- ▲ (O) Outlet Structure
排水出口

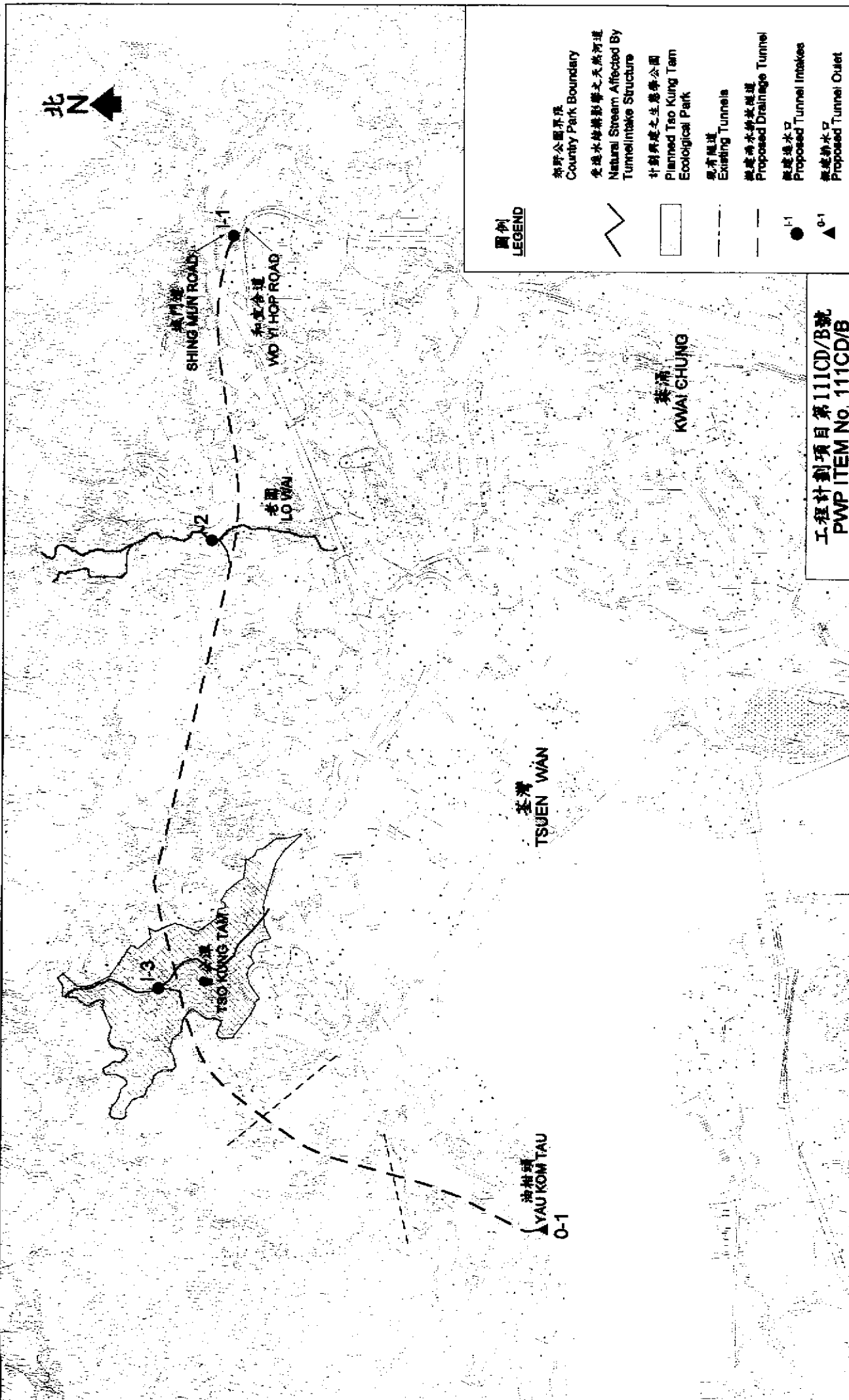


**DRAINAGE IMPROVEMENTS IN TSUEN WAN,
KWAI CHUNG AND TSING YI**
荃灣、葵涌及青衣雨水排放改善計劃








FIGURE 1
圖一

PROJECT A - TSUEN WAN DRAINAGE TUNNEL
計劃甲 荃灣排水隧道

SCALE 1:15000
比例



圖例
LEGEND

-  郊野公園界線
Country Park Boundary
-  受洪水結構影響之天然河道
Natural Stream Affected By
Tunnel Intake Structure
-  計劃興建之生態學公園
Planned Tao Kung Tam
Ecological Park
-  現有隧道
Existing Tunnels
-  擬建雨水排放隧道
Proposed Drainage Tunnel
-  I-1
擬建進水口
Proposed Tunnel Intakes
-  O-1
擬建出水口
Proposed Tunnel Outlet


工程計劃項目第 111CD/B 號
PWP ITEM No. 111CD/B

繪圖 Drawing by	T.C. CHAN	日期 Date	30-01-2001
核對 Checked	Y.T.D. CHEUNG	日期 Date	30-01-2001
繪圖 Drawing by	顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION		

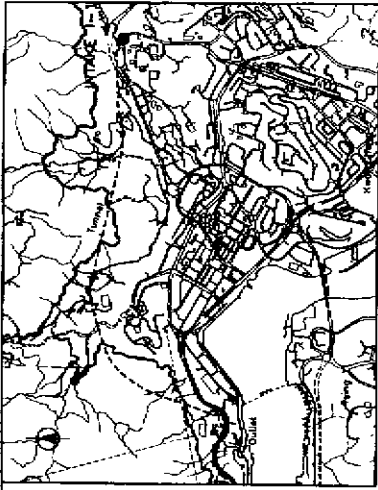
葵涌、葵涌及青衣雨水排放系統改善計劃
葵涌雨水排放隧道
DRAINAGE IMPROVEMENTS IN TSUEN WAN, KWAI CHUNG AND TSING YI
TSUEN WAN DRAINAGE TUNNEL

圖號
Drawing No. **DCM/2001/013**

比例
Scale **N.T.S.**






香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION



LOCATION MAP
SCALE 1:3000

LEGEND

-  LAND REQUIREMENT LIMIT
-  ACCESS ROAD
-  TURNING AREA/FUTURE OPERATION AND MAINTENANCE AREA


NOT FOR CONSTRUCTION

DATE	REVISED	ISSUED	APPROVED	BY	REVISION DESCRIPTION

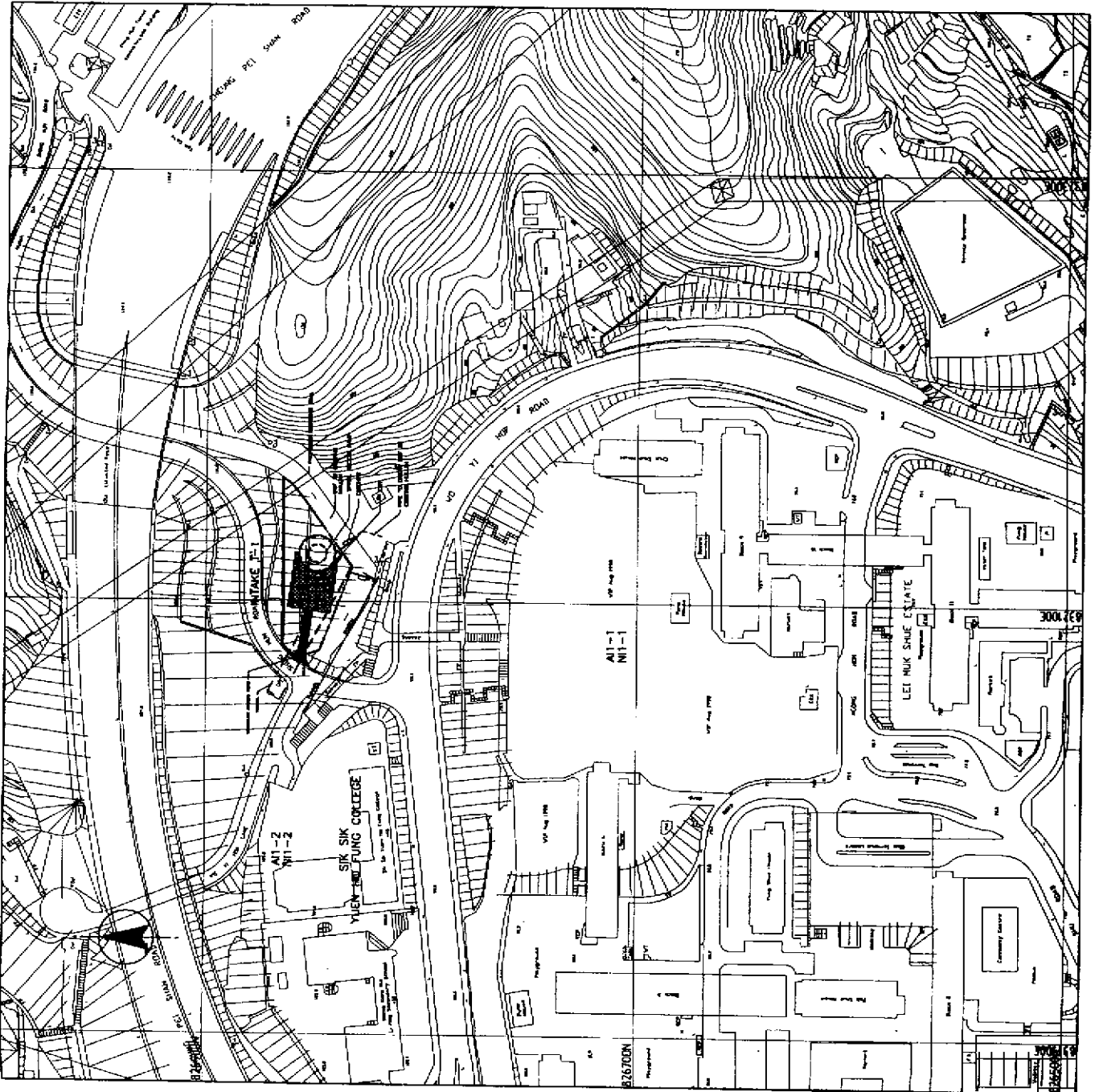
THE GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION

DRAINAGE IMPROVEMENT IN TSIEN WAN,
KWAI CHUNG & TSIANG YI

NOISE & AIR SENSITIVE RECEIVERS
AT INTAKE (1-1)

	DRAWING NO.	YES 4.1.1.3	SHEET 1 OF 1
	DESIGNED BY	MONTGOMERY WATSON	
	DRAWN BY	BSE 1	

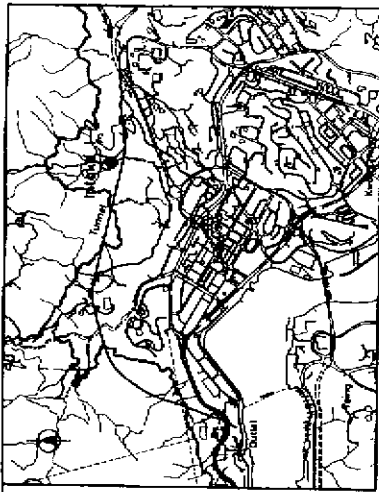
MONTGOMERY WATSON
MONTGOMERY WATSON



NUMERICAL SCALES APPLY TO ALL
SIZE DRAWINGS. FOR REDUCED
SETS, LINEAR SCALES APPLY.




SCALE 1:3000

YES 4.1.1.3



LOCATION MAP
SCALE 1 : 3000

LEGEND

-  LAND REQUIREMENT LIMIT
-  ACCESS ROAD
-  TURNING AREA/FUTURE OPERATION AND MAINTENANCE AREA

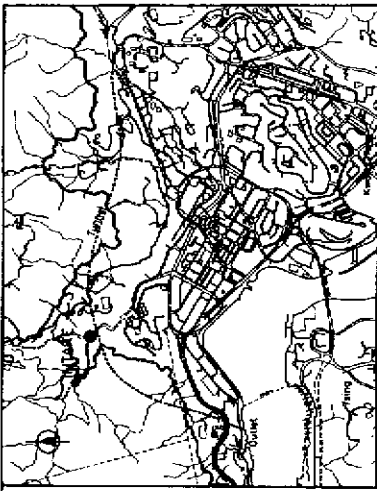
NOT FOR CONSTRUCTION

Doc. No.	CS	CCS	1	PRELIMINARY DESIGN
Date	REVISED	REVISED	REVISED	REVISED
THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION				
DRAINAGE IMPROVEMENT IN TSOEN WAN, KWAI CHUNG A YING VI				
NOISE & AIR SENSITIVE RECEIVERS AT INTAKE 1-2				
Sheet No.	PG 4.1.2	SHEET 1 OF 1		DATE
REVISIONS				
1				



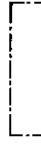


NUMERICAL SCALES APPLY TO ALL SIZE DRAWINGS. FOR REDUCED SETS LINEAR SCALES APPLY.





LOCATION MAP
SCALE 1:2000

LEGEND

-  LAND REQUIREMENT LIMIT
-  ACCESS ROAD
-  TURNING AREA/FUTURE OPERATION AND MAINTENANCE AREA


NOT FOR CONSTRUCTION

DATE	DES	CCS	PRELIMINARY DESIGN
DATE	DES	CCS	PRELIMINARY DESIGN
DATE	DES	CCS	PRELIMINARY DESIGN

THE GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION

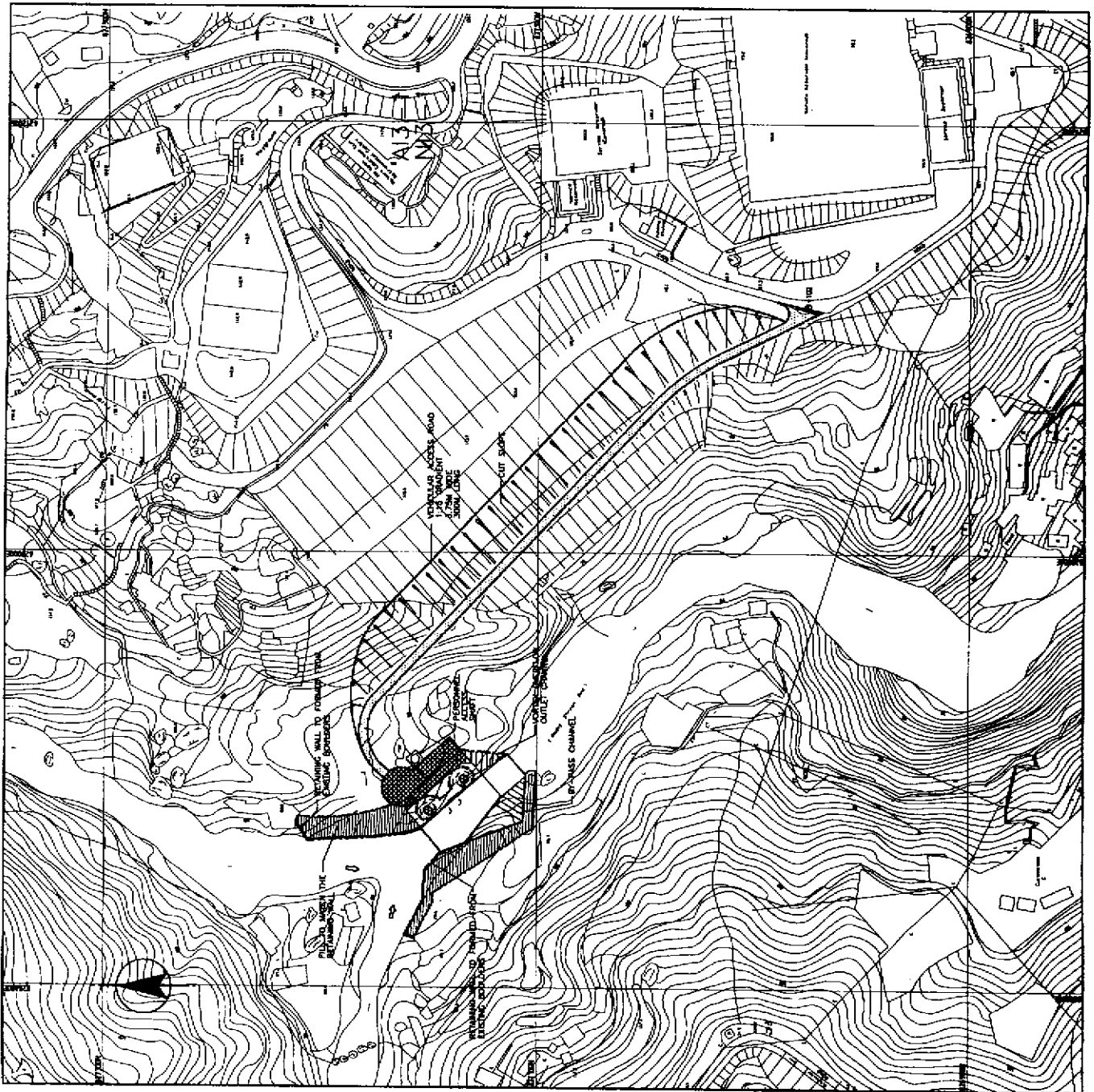
DRAINAGE IMPROVEMENT IN TSDEN WAN,
KWAI CHING & TSIANG YI

NOISE & AIR SENSITIVE RECEIVERS
AT INTAKE 1-3

 NORTH U.T.M.	SHEET NO. 710 4.1.3 DRAWN BY: MONTGOMERY WATSON SCALE 1:1
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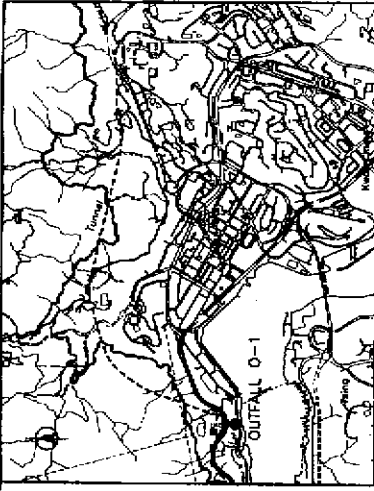


NUMERICAL SCALES APPLY TO A1
SIZE DRAWINGS, FOR REDUCED
SETS LINEAR SCALES APPLY.



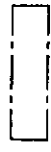


PLAN
SCALE 1:1000

SEE ALSO: PWD/DR/02-413



LOCATION MAP
SCALE 1:5000

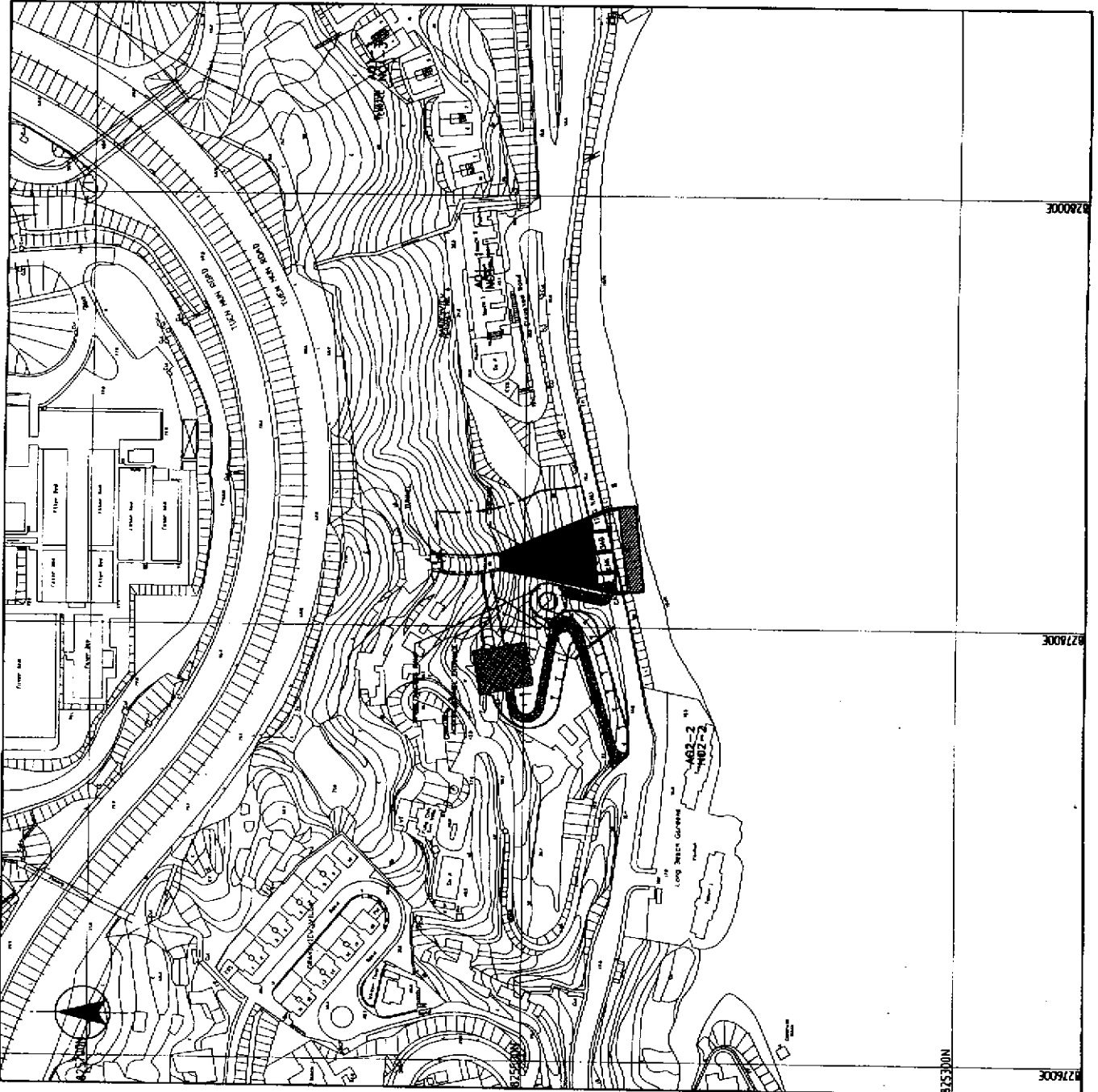
LEGEND

-  LAND REQUIREMENT LIMIT
-  ACCESS ROAD
-  TUNNING AREA/FUTURE OPERATION AND MAINTENANCE AREA

NOT FOR CONSTRUCTION

DATE	BY	CHKD	DESIGN	NO.	REVISION
PRELIMINARY DESIGN SHEET NO. PD 4.1.4 SHEET 1 OF 1 PREPARED BY MONTGOMERY WATSON U.S.S.					
THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION DRAINAGE IMPROVEMENT IN TSUEN WAN, KWAI CHUNG & TSIANG TI NOISE & AIR SENSITIVE RECEIVERS AT OUTFALL 0-1					

MONTGOMERY WATSON
 蒙 尼 遜 工 程 有 限 公 司



LAYOUT PLAN

NUMERICAL SCALES APPLY TO A1
 SIZE DRAWINGS. FOR REDUCED
 SETS LINEAR SCALES APPLY.

SCALE 1:1000