

*Annex 1-C San Tin Western MDC Preliminary Environmental Assessment*

San Tin is an area of historical recurrent flooding. The need for the construction of the *Main Drainage Channels and Poldered Village Protection Scheme for San Tin, North West New Territories* (the Project) was established in the *Territorial Land Drainage and Flood Control Strategy Study, Phase 2 (TELADFLOCOSS-2 Study)* completed by the Drainage Services Department (DSD) in 1993, to alleviate the recurrent floods in the San Tin basin.

The proposed works in the basin comprise 35CD covering the village flood protection works for the San Tin villages and Chau Tau Tsuen, 73CD consisting of the Eastern Main Drainage Channel (MDC) for San Tin, and another non-itemized work for the Western MDC for San Tin. *Figure 1* shows the locations of the main drainage channels and village flood protection works.

The on-going *Drainage Master Plan Study in Northern New Territories (NNT)* undertaken by DSD includes the planning and feasibility study of the non-itemised Western MDC work. Should the Western MDC be recommended for implementation in the study, an EIA Study will be undertaken for the proposed works. The Western MDC EIA Study, if needed, will address all potential alignment options and the cumulative impacts arising from the San Tin Eastern MDC and Village Flood Protection works.

This Annex provides a preliminary assessment and comparison of the potential environmental implications of the Western MDC works, based on the two alternative alignment options given in the Study Brief as shown in *Figure 1*, and provides background reference for future studies. The baseline ecological survey data for the Western MDC undertaken in 1997-98 are presented at the end of this Annex for reference. Both alignment options start at the same location at the Castle Peak Road near Tsing Lung Tsuen. After running for approximately 500 m, Option 1 bends northward generally following the existing stream but Option 2 bends further south.

The preliminary environmental assessment and comparison of the two options is presented in Table below.

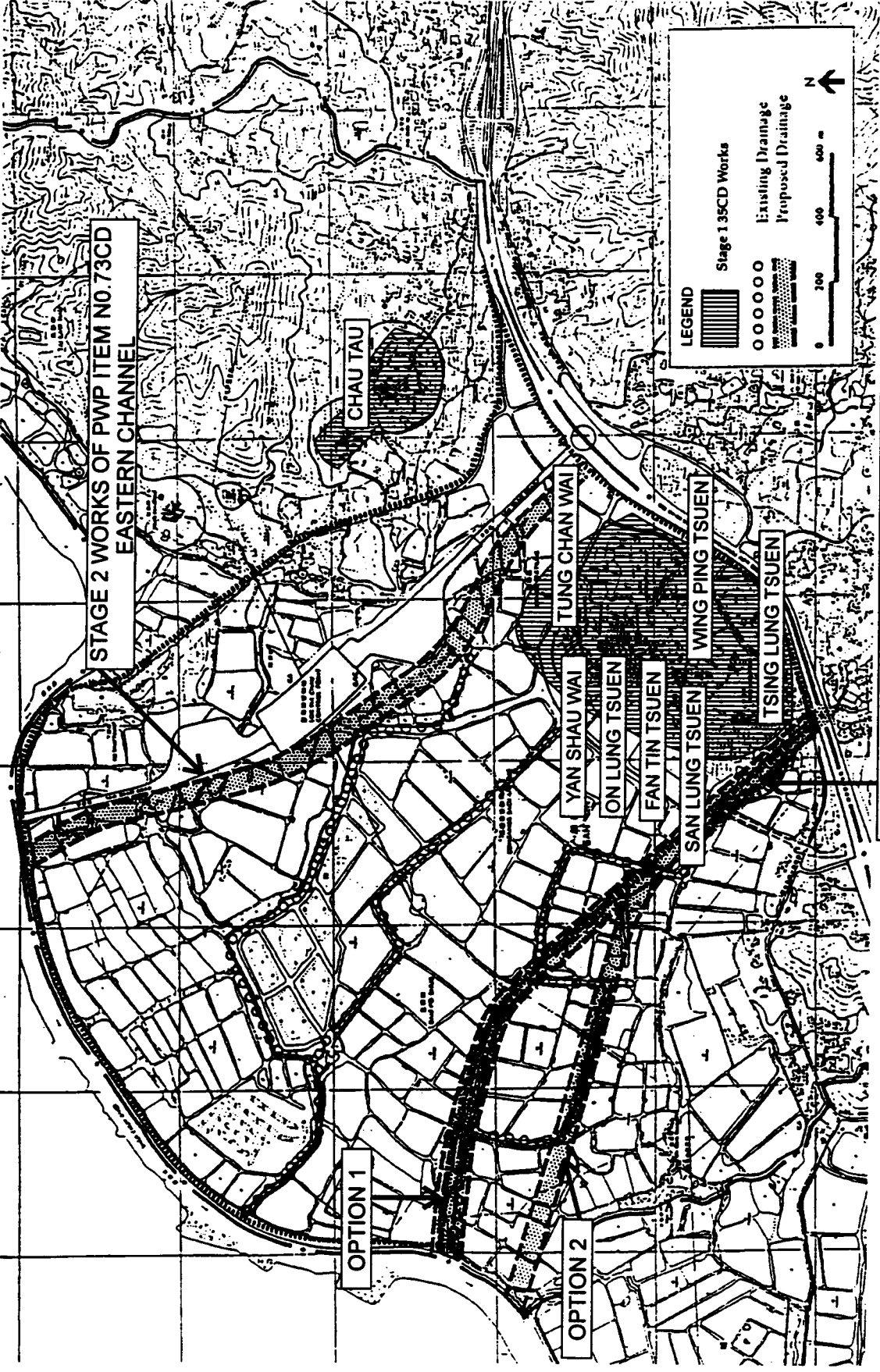
Environmental Issues	Preliminary Assessment	
	Option 1	Option 2
<i>Ecology</i> Mangrove losses	Minor loss	1.5 ha loss of <i>Acanthus ilicifolius</i> and <i>Aegiceras corniculatum</i> of HKSAR significance to birds of the Ardeidae, Rallidae, Alcedinidae, Muscipidae, Emberizidae and other families
Stream (nullah) habitat loss	1050 m length x 10 m width = 1.05 ha Supported 39 species of birds based on sampling in 1993.	1250 m length x 10 m width = 1.25 ha Supported 39 species of birds based on sampling in 1993.
Fish pond losses	15 ha of major significance to HKSAR resident and migrant birds	13 ha of major significance to HKSAR resident and migrant birds

Environmental Issues	Preliminary Assessment	
	Option 1	Option 2
Avian fauna	<ul style="list-style-type: none"> <li>• loss of foraging, roosting and breeding habitats.</li> <li>• 126 bird species were recorded on the site, of which 61 (48%) are wetland dependent</li> <li>• 6 wetland-dependent species bred on the site</li> <li>• Critically endangered Black-faced Spoonbill has been recorded feeding on Western Channel area</li> <li>• Species recorded include Vulnerable (Imperial Eagle, Greater Spotted Eagle) and Near-threatened (Grey-headed Lapwing, Silky Starling) species</li> </ul>	(same as Option 1)
Deep Bay Wetland Conservation Area	Mostly Inside	Mostly Inside
Ramsar Site	Outside	Partly inside
Habitat fragmentation	Introduction of new barrier to movements of reptiles, amphibians, mammals	Introduction of new barrier to movements of reptiles, amphibians, mammals
<i>Water Quality</i>	Potential impact from dredging/excavation leading to increased suspended solids or release of pollutants	Potential impact from dredging/excavation leading to increased suspended solids or release of pollutants
<i>Waste</i>	Proper arrangements for dredging and disposal of river and fish pond sediment is required.	Proper arrangements for dredging and disposal of river and fish pond sediment is required.
<i>Land Contamination</i>	Minor potential contamination at container storage/ lorry parking sites, such as from oil leakage	Minor potential contamination at container storage/ lorry parking sites, such as from oil leakage.
<i>Noise</i>	Potential impact from construction noise and pumping station noise during operation.	Potential impact from construction noise and pumping station noise during operation.
<i>Air Quality</i>	Potential construction dust and odour nuisance.	Potential construction dust and odour nuisance.
<i>Landscape and Visual</i>	Change of local landscape character due to introduction of an artificial channel and visual impact on nearby residents	Change of local landscape character due to introduction of an artificial channel and visual impact on nearby residents

Environmental Issues	Preliminary Assessment	
	Option 1	Option 2
<i>Socio-economic</i>	<p>Option 1 follows the drainage reserve alignment in the San Tin OZP.</p> <p>Public consultations with locals indicated more constrain to local village development</p>	<p>Less development constraint.</p>

From the preliminary assessment and comparison, the main significant difference between these two options appear to be that Option 2 lies within the boundary of the Ramsar Site. Given the sensitivity of the surrounding environment of the Western MDC area, the potential environmental impacts particularly the ecological issues should be assessed in details to develop an environmentally acceptable scheme.

The need of the Western MDC will be reviewed, in the ongoing DSD's Drainage Master Plan Study in Northern New Territories, and should the Western MDC be recommended for implementation, an EIA Study will be required for the proposed work, a Designated Project, to fulfill the requirements for the Environmental Impact Assessment Ordinance.



STAGE 3 NON-ITEMIZED WORKS  
WESTERN CHANNEL

FIGURE 1 LOCATION OF SAN TIN MAIN DRAINAGE CHANNELS AND POLDERED VILLAGE PROTECTION SCHEME WORKS

FILE: C16182  
DATE: 02/03/98

Common name	Scientific name	Status	Global status (Collar <i>et al.</i> 1994)	Abundance	Breeding	Foraging	Roosting
Common Redshank	<i>T. totanus</i>	W/P		U	-	-	
Marsh Sandpiper	<i>T. stagnatilis</i>	W/P		U	-	-	
Greenshank	<i>T. nebularia</i>	W/P		U	-	-	
Green Sandpiper	<i>T. ochropus</i>	W		C	-	-	
Wood Sandpiper	<i>T. glareola</i>	W		C	-	-	
Terek Sandpiper	<i>Xenus cinereus</i>	P		U	-	-	
Common Sandpiper	<i>Actitis hypoleucos</i>	W		C	-	-	
Black-headed Gull	<i>Larus ridibundus</i>	W		U	-	-	
Gull-billed Tern	<i>Sterna nilotica</i>	P		U	-	-	
White-throated Kingfisher	<i>Halycon smyrnensis</i>	R		U	-	-	
Black-capped Kingfisher	<i>H. pileata</i>	R		U	-	-	
Common Kingfisher	<i>Alcedo atthis</i>	R		C	-	-	
Pied Kingfisher	<i>Ceryle rudis</i>	S		U	-	-	
Yellow Wagtail	<i>Motacilla flava</i>	W/P		C	-	-	
Grey Wagtail	<i>M. cinerea</i>	W/P		C	-	-	
White Wagtail	<i>M. alba</i>	R/W/ P		C	-	-	
Pallas's Grasshopper Warbler	<i>Locustella certhiola</i>	P		U	-	-	
Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	P		U	-	-	
Paddyfield Warbler	<i>A. agricola</i>	Va		R	-	-	
Oriental Reed Warbler	<i>A. orientalis</i>	P		C	-	-	
Dusky Warbler	<i>Phylloscopus fuscatus</i>	W/P		C	-	-	
Red-billed Starling	<i>Sturnus sericeus</i>	W	NT	C	-	-	

R	Resident
S	Summer visitor
W	Winter visitor
P	Passage migrant
Va	Vagrant
V	Vulnerable
NT	Near-threatened
C	Common in study area
U	Uncommon in study area
R	Rare in study area

**Table 2** Summary of Results of Quantitative Survey of Flora in the Western MDC study area in summer 1997 and winter 1997-8 and photographs of stream channels and mangrove habitats (SP 1-4).

Species	SITE					
	A	B	C	D	A	B
	summer				winter*	
<i>Amaranthus viridus</i>				16		
<i>Commelina nudiflora</i>					84	
<i>Eleusine indica</i>	20			2		
<i>Emilia sonchifolia</i>				1		
<i>Gynura bicolor</i>			1			
<i>Ipomoea cairica</i>			8			
<i>Mikania micrantha</i>	6				44	
<i>Panicum maximum</i>		98	100	64		83
<i>Paspalum conjugatum</i>	14					
<i>Paspalum distichum</i>				21		
<i>Paspalum sp.</i>	2					
<i>Phyllanthus sp.</i>				0.4		
<i>Digitaria sp.</i>	66					
Total Cover (%)	108	98	109	104.4	128	83
Bare	2	2	8	16	0	17
Height (cm)	36	68	42	34	34	55
No. Species	5	1	3	6	2	1

\*Sites C and D were destroyed during the winter survey and therefore were not sampled.

- A = active fish pond bund, Site A
- B = grassy fish pond bund, Site B
- C = abandoned fish pond bund, Site C
- D = planted fish pond bund, Site D

Table 3 Plant species and relative abundance recorded along Western MDC study area, 1997.

Species	Exotic	Life Form	Stream		
			pond bund	aquatic	marginal
<i>Acanthus ilicifolius</i>		S			++
<i>Acrostichum aereus</i>		F			+
<i>Aegiceras corniculatum</i>		S			++
<i>Alocasia macrorrhiza</i>		H	+	+++	
<i>Alternanthera sessilis</i>		H	++		
<i>Amaranthus viridus</i>		H	+		
<i>Amygdalus persica</i>	✓	T	+		
<i>Araucaria heterophylla</i>	✓	T	+		
<i>Bambusa sp.</i>		B			++
<i>Bidens pilosa</i>		H	++		
<i>Bougainvillea glabra</i>	✓	C	+		
<i>Canna indica</i>	✓	H	+		+
<i>Capsicum sp.</i>	✓	S	+		
<i>Carica papaya</i>	✓	T	+		
<i>Catharanthus roseus</i>	✓	S	+		
<i>Celtis sinensis</i>		T	+		+
<i>Centella asiatica</i>		H	++		
<i>Chenopodium album</i>		H	+		+
<i>Citrullus lanatus</i>	✓	C	+		
<i>Citrus maxima</i>	✓	T	+		
<i>Clausena lansium</i>	✓	T	+		
<i>Clerodendrum inerme</i>		S			+
<i>Clerodendrum thomsonae</i>	✓	S	+		
<i>Commelina nudiflora</i>		H	++		
<i>Conza sp.</i>	✓	H	+	+	
<i>Cyperus malaccensis</i>		SE			
<i>Cyperus spp.</i>		SE		++	
<i>Delonix regia</i>	✓	T	+		
<i>Derris trifoliata</i>		C			+
<i>Digitaria sp.</i>		G	+++		
<i>Dimocarpus longan</i>	✓	T	+		++
<i>Echinochloa crus-galli</i>		G			++
<i>Eichhornia crassipes</i>	✓	H		+++	
<i>Eleusine indica</i>		G	+		+
<i>Eleusine indica</i>		G	+		+
<i>Emilia sonchifolia</i>		H	+		
<i>Ficus elastica</i>		T			+
<i>Ficus superba</i>		T			+
<i>Glochidion sp.</i>		H		+	+
<i>Gynura bicolor</i>		H	++		+
<i>Hedychium coronarium</i>	✓	H	+		
<i>Ipomoea batatas</i>	✓	C			+++
<i>Ipomoea aquatica</i>	✓	C			+
<i>Ipomoea batatas</i>	✓	C	+		

Species	Exotic	Life Form	pond bund	Stream	
				aquatic	marginal
<i>Ipomoea brassiliensis</i>		C	+		
<i>Ipomoea cairica</i>		C			++
<i>Lantana camara</i>	✓	S		+	+
<i>Lemna minor</i>		H		++	
<i>Macaranga tanarius</i>		T	+		+
<i>Malvastrum coromandelinum</i>		S			+
<i>Melia azedarach</i>	✓	T	++		+
<i>Mikania micrantha</i>	✓	C	+++	++	
<i>Morus alba</i>	✓	T	+		
<i>Musa paradisiaca</i>	✓	T			++
<i>Oxalis reticulata</i>		H	+		
<i>Panicum maximum</i>	✓	G	++	+++	+++
<i>Paspalum conjugatum</i>		G	++		+
<i>Paspalum distichum</i>		G	+		
<i>Paspalum longifolia</i>		G	+		
<i>Paspalum sp.</i>		G			+
<i>Passiflora foetida</i>	✓	C	+		
<i>Pennisetum purpureum</i>	✓	G	++	+	++
<i>Phaseolus vulgaris</i>	✓	C	+		
<i>Phragmites communis</i>		G		++	+++
<i>Polygonum chinense</i>		H			+
<i>Polygonum hydropiper</i>		H		++	
<i>Praxelis clematidea</i>	✓	H	+		
<i>Psidium guajava</i>	✓	T	+		
<i>Pulchea indica</i>		H			++
<i>Rhynchelytrum repens</i>		G	+		
<i>Ricinus communis</i>		S			+
<i>Rumex maritimus</i>		H			+
<i>Saccharum officinarum</i>	✓	G	+		
<i>Sapium sebiferum</i>		T		+	+
<i>Solanum nigrum</i>	✓	H	+		
<i>Syzygium jambos</i>	✓	T	+		
<i>Thuia chinensis</i>	✓	T	+		

T = tree, S = shrub, G = grass, H = Herb, F = fern, B = bamboo, SE = sedge

+++ = common, ++ = occasional, + = rare

**boldface** = mangrove and mangrove associates



**Table 4** *Damselflies and dragonflies recorded at each site in the Western MDC study area in Summer 1997. The presence of a species is indicated by "✓". Names and status follow Wilson (1995). FC = fairly common, C = common and W = widespread.*

Species	Site					Status
	A	B	C	D	E	
Odonata						
Zygoptera (Damselfly)						
Coenagrionidae						
<i>Agriocnemis femina</i>			✓	✓	✓	FC, W
<i>Ceriagrion auranticum</i>			✓		✓	C, W
<i>Ischnura senegalensis</i>	✓	✓	✓	✓	✓	C, W
Anisoptera (Dragonfly)						
Gomphidae						
<i>Ictinogomphus pertinax</i>	✓	✓	✓	✓	✓	C, W
Libellulidae						
<i>Brachythemis contaminata</i>	✓				✓	C, W
<i>Diplacodes trivialis</i>	✓	✓	✓	✓	✓	C, W
<i>Orthetrum sabina</i>	✓	✓	✓	✓	✓	C, W
<i>Pantala flavescens</i>	✓		✓	✓	✓	C, W
<i>Rhyothemis variegata</i>			✓		✓	C, W
<i>Tramea virginia</i>		✓	✓			C, W

**Table 5** *Butterflies recorded at each Site in the Western MDC Study Area in Summer 1997. The presence of a species is indicated by "✓". Names follow Bascombe 1995<sup>(1)</sup>. Status: VC = very common, C = common.*

Species	Site					
	Status	A	B	C	D	E
Lepidoptera (butterflies and moths)						
Arctiidae (Moth)						
<i>Dysphania militaris</i>				✓	✓	✓
Papilionidae (Butterfly)						
<i>Papilio polytes</i>	VC			✓	✓	
Pieridae						
<i>Eurema hecabe</i>	VC				✓	✓
<i>Pieris canidia</i>	VC	✓		✓		✓
Nymphalidae						
<i>Ariadne ariadne</i>	C		✓	✓		✓
<i>Danaus limniace</i>	6		✓			✓
<i>Euploea midamus</i>	VC			✓		✓
<i>Hypolimnas bolina</i>	C		✓			

**Table 6** *Total number of chironomids caught per 15 sweep nets at each site in the western MDC study area in Spring and Summer 1997.*

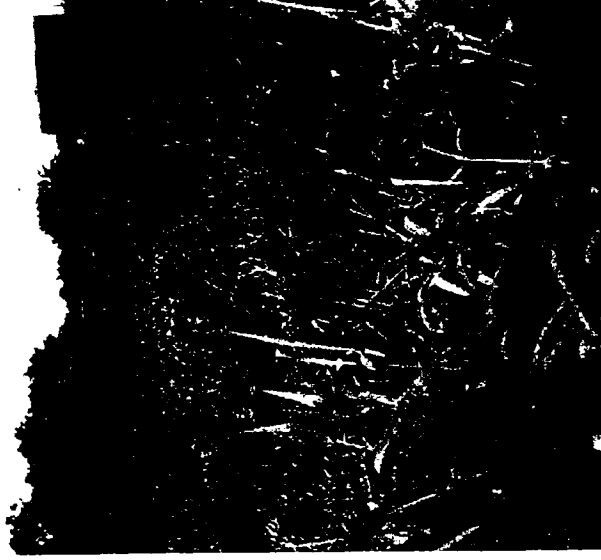
SITE	Habitat type	Spring	Summer
		Total Number	Total Number
A	Grass	59	36
B	Grass	35	19
C	Reed	67	70
D	Grass	42	10
E	Reed	71	4

<sup>(1)</sup> Bascombe, M.J. 1995. Check list of the butterflies of South China. *Mem. Hong Kong Nat. Hist. Soc.* 20:1-206.

**Typical stream channel sections within the study areas of the proposed Western MDC**

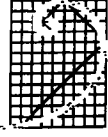


**Photo SP1 Stream channel profile at Site B**



**Photo SP2 Stream channel profile in the vicinity of Site B**

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9 Chatham Road  
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Hong Kong



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**Mangrove Community within the study area of Western MDC**



**Photo SP3 Mangrove community in the stream channel at Site C**



**Photo SP4 Individuals of mangrove plants in the stream channel at Site D**

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