

1.0 BASIC INFORMATION

1.1 Project title

RPIS Minor Rural Improvement Works Packages 1 & 2,
Reconstruction of New Pier at Pak A, Sai Kung
Project ID Code: SK-078

1.2 Purpose and nature of the project

The objective of the project is to reconstruct a pier at the same location as the existing pier to provide berthing and landing facilities for Kaitos.

1.3 Name of project proponent

Home Affairs Department
Rural Planning and Improvement Strategy Section
4/F, Centre Point Commercial Building, 181-185 Gloucester Road,
Wanchai, Hong Kong

1.4 Location and scale of project and history of site

Drawing 1 details the proposed pier location, works site boundary, dredging area and geographical location and Drawing 2 shows the location of the Fish Culture Zone (FCZ) in relation to the proposed project. The scope of works includes the reconstruction of a pier to replace the existing pier. Dredging will be required to remove loose overburden, to a maximum depth of 4m, with a total of 2150m³ of material being removed during the works. Rock bedding will be deposited in the dredged void to form a level foundation. The pier base will be formed by laying pre-cast concrete blocks on the rock bedding foundation, the upper part of the pier will be formed from *in-situ* concrete. The finishing works will incorporate the provision of handrails, navigation light, bollards and fendering systems. The proposed pier is 5.5m wide and 50m long and the dredging covers an area of approximately 1800m² of foreshore and sea bed. Cross-sectional views of the pier are shown in Drawing 3.

The site has previously and is currently used as a berthing point for smaller boats carrying villagers and visitors.

1.5 Number and types of designated projects to be covered by the project profile

A designated project under section C.12 (a) v) of schedule 2, Environmental Impact Assessment Ordinance, that is, dredging operation less than 500m from the nearest boundary of an existing fish culture zone namely the Leung Shuen Wan Fish Culture Zone, and the application is pursuant to Section 5(1) (b) and 5(11) of the EIA Ordinance for the purpose of applying for approval to apply directly for an environmental permit.

1.6 Name and telephone number of contact person(s)**2.0 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME****2.1 How will the project be planned and implemented**

The Consultants (Mouchel Asia Limited) will design the project. The construction works will be planned and implemented by the Contractor.

2.2 What is the project time table

Construction is expected to commence in April 1999. The contract period will be 12 months, ending in March 2000. The timing of construction events within this 12 month period will be dependant upon the Contractor's programme. However, each construction phase will generally take the following periods to complete:

Dredging -	2-4 weeks.
Laying of pier foundations -	6 weeks.
Pier construction -	3-12 weeks.
Finishing works -	4 weeks.

There will then be a 6 months maintenance period. The indicative programme, presenting the longest periods of activity, is shown in Drawing 4.

2.3 Are there any interactions with broader programme requirements or other projects that shall be considered

None.

3.0 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 Outline existing and planned sensitive receivers and sensitive parts of the natural environment which might be affected by the proposed project

Planning Areas:-

Leung Shuen Wan Fish Culture Zone is approximately 380m away from the site boundary, as shown in Drawing 2.

Noise:-

The area is rural with no major noise sources and therefore it is likely to have an "A" Area Sensitivity Rating. Background daytime noise levels are expected to be around 60 dB(A). The nearest noise sensitive receiver is 50m from the dredging area, with the two buildings next to the shoreline being uninhabited (as shown in Drawing 1).

Ecology:-

No gazetted areas of conservation interest have been identified for the area. However, a diving survey and associated report *Baseline Marine Benthic Survey*, February 1998, confirmed the presence of coral along the sub-littoral western coastal fringe in Leung Shuen Wan. Within the construction site boundary, coral was found mainly in the south east corner below the low water mark. The coral heads within the dredging area were all attached to loose boulders lying on a sandy-silt bottom. Coral density expressed as area of coral per unit area of sea bed was approximately 50% within the dredging site.

The trees and vegetation located along the shore, while not unusual, are considered to be valuable components of the landscape and of some importance to the local ecosystem.

Marine Water Quality and Aquaculture:-

Sensitive receivers include the cultivated fish stock located in the Leung Shuen Wan Fish Culture Zone (shown in Drawing 2). The nearest point of which is 380 metres from the site. Wild stocks of commercial fish and crustacea and benthic fauna species located in the Bay are also considered to be sensitive receivers. There are no terrestrial water bodies or catchment areas that would be affected by the proposed works.

4.0 POSSIBLE IMPACTS ON THE ENVIRONMENT

4.1 Outline any processes involved, including process flow diagrams, site plans, storage requirements and information on emissions and discharges

Drawing 1 details the proposed pier location, works site boundary, dredging area and geographical location. The main process will be initial dredging works to prepare suitable bed on which to lay the foundation of the pier. Cross-sectional views of the pier are shown in Drawing 3. The site will be dredged to a maximum depth of 4m with a total of 2150m³ material being removed. As indicated in the borehole log, the dredged material will consist of fine to coarse gravel and cobbles of rock and fine to coarse sand with occasional shell or coral fragments. The location of the borehole is indicated as BH1 on Drawing 5a and the borehole log in Drawing 5b. Subsequent to the dredging and foundation works, pre-cast concrete blocks will then be laid to form the pier base, with

in-situ concrete poured to form the upper pier. On completion of the main pier structure, the fittings will be attached.

4.2 Describe the environmental impacts or issues that arise during the construction, operation or decommissioning of the project, where applicable

4.2.1 During Construction

Noise :-

Dredging of marine deposits for the new pier foundations will be carried out using a small grab dredger and possibly an excavator. Both pieces of equipment will not be operated concurrently in order to avoid cumulative noise impacts. The pier will be constructed using a derrick barge and an excavator which will operate simultaneously at times. None of these operations are expected to exceed the daytime construction noise criteria of 75 dB(A) at any of the noise sensitive receivers.

The employed equipment is not anticipated to work simultaneously and the predicted noise levels, at the nearest noise sensitive receiver, are as follows:

	Predicted Noise levels	
Dredging -	Dredger	73dB(A)
Local Excavation-	Excavator	73 dB(A)
Laying Seawall Block -	Excavator	73 dB(A)
	Derrick barge	65 dB(A)
Mixing Concrete -	Concrete Mixer	57 dB(A)

Calculations for the above noise results are given in Table 1. Other construction activities, such as provision of a navigation light, bollards, fendering system are also not anticipated to cause adverse noise impacts.

Ecology:-

Direct Impacts:-

The coral communities along the sub-littoral fringe are the only important elements of the ecology in the area that will be directly effected by the project. The coral communities are confined to the south-east corner of the site boundary. The new pier footprint will result in a permanent loss of in the region of 130m² of coral habitat based upon the extent of corals identified in the *Baseline Marine Benthic Survey Report*. However, the pier is not considered to have any significant permanent ecological impacts through habitat loss. The foundations of the pier may in fact enhance the coral presence in the site by providing a greater surface area of anchor points for recolonisation.

Indirect Impacts:-

Dredging activities and excavation near the shoreline will generate suspended solids, which can drift and settle out on the bottom. High levels of suspended solids for prolonged periods can induce corals to expel their symbiotic algae and eventually die. As tidal currents in the bay are not expected to be high, the bay water is between 3-5m deep and the sediments being dredged are coarse in nature, it is predicted that the majority of suspended solids will settle out within 100m of the dredging site. Extensive

areas of coral are therefore not expected to be affected.

Marine Water Quality and Aquaculture:-

Dredging or excavation of marine deposits may increase the suspended solid content in the water column. Dredging will be carried out at an approximate rate of 30-40 m³/hr. As indicated in the borehole log provided in Drawings 5a and 5b (location of the borehole is shown in Drawing 5a as BH1), the dredged material will consist of coarse gravel and cobbles of rock, fine to coarse sand with rock fragments and occasional shell and coral fragments. It is not classified as contaminated mud and therefore no special handling or disposal requirements are needed.

An important consideration in this study is the impact of the dredging on the farmed fish. Suspended solids mainly affect fish by clogging respiratory surfaces which in severe cases results in asphyxiation. It is unlikely that the dredging plume may affect the fish farm cages as the Leung Shuen Wan Fish Culture Zone, which is 380m away from the site boundary, as shown in Drawing 2. As noted above, it is predicted that the large proportion of suspended material will settle out of the water column before any reaches the zone. It is not therefore considered likely that high suspended solid levels will be encountered in the Fish Culture Zone as a result of the dredging and foundation laying activities.

The *in-situ* mixing and pouring of concrete to form the upper pier section may result in the generation of aqueous discharges of waste water into the marine environment. Any discharge will be controlled by the requirements of the Water Pollution Control Ordinance and standard pollution control clauses will be stipulated in the construction Contract documents for implementation. It is not anticipated that any adverse impacts will occur as concrete processing will be controlled and monitored closely.

4.2.2 During Operation

No major or significant impacts are expected during operation.

5.0 ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED

5.1 Describe measures to minimise environmental impacts

Ecology and Aquaculture:-

To protect the coral resource and mariculture, the Contractor will be required to employ a silt curtain which will fully enclose the dredging activities and screen any excavation works. This will be installed before any dredging/excavation work is carried out and remain in place throughout the dredging/excavation period. In addition, the Contractor will use a grab capable of taking contained buckets of sediments without leakage (a 'closed grab'), for the duration of the dredging works.

In order to mitigate the loss of coral heads through dredging, corals found within the dredging zone will be transplanted to the south of the site at a safe distance from the works, as shown in Drawing 6. This will be carried out prior to the commencement of the construction works. They will be placed among existing coral heads to supplement the already established coral community. The corals growing within the dredging zone are attached to movable medium sized boulders and can therefore be moved with minimal disturbance. This will be achieved by using divers to remove the coral encrusted rocks, who will move them with the aid of buoyancy bags, or some other suitable technique, to the relocation site. The relocation site will be at the same depth below mPD and the rocks will be inserted to the same depth as found. Extreme care will be taken to ensure that minimal damage will be incurred by the fragile coral heads.

A coral Environmental Monitoring and Audit (EM&A) programme will be implemented to monitor coral health and control suspended solid concentrations during dredging and laying of pier foundations. The EM&A programme includes the collection of baseline data prior to construction works and monitoring coral heads during construction for changes in percentage bleaching, as an indication of coral health. In the unlikely event that adverse impacts do occur an event contingency plan will also be implemented. Personnel carrying out the survey work will be qualified divers experienced in scientific diving and with some experience of coral survey. A qualified marine biologist will analyse the data. All technical personnel will be agreed with EPD prior to the works commencing.

A water quality EM&A programme will be implemented to identify and control suspended solid concentrations during dredging and laying of pier foundations. The EM&A programme includes the collection of background data prior to construction works and monitoring water quality within the Fish Culture Zone boundary and around the coral relocation site. In the unlikely event that adverse impacts do occur, an event contingency plan will also be implemented. Personnel carrying out the survey work will be experienced in water monitoring. A qualified scientist will analyse the data. All technical personnel will be agreed with EPD prior to the works commencing.

The EM&A programme for coral and water quality will be agreed with the Directors of Environmental Protection one month before commencement of construction.

In order to protect the surrounding area, no construction operations will occur outside the

site designated site boundary.

5.2 Comment on the possible severity, distribution and duration of environmental effects

The dredging works are short in duration and minor in nature. Any environmental impacts will be short lived and unlikely to be adverse. However, the implementation of the mitigation measures as described in Section 5.1 above will further reduce the environmental impacts of the project to a minimum.

5.3 Comment on any further implications

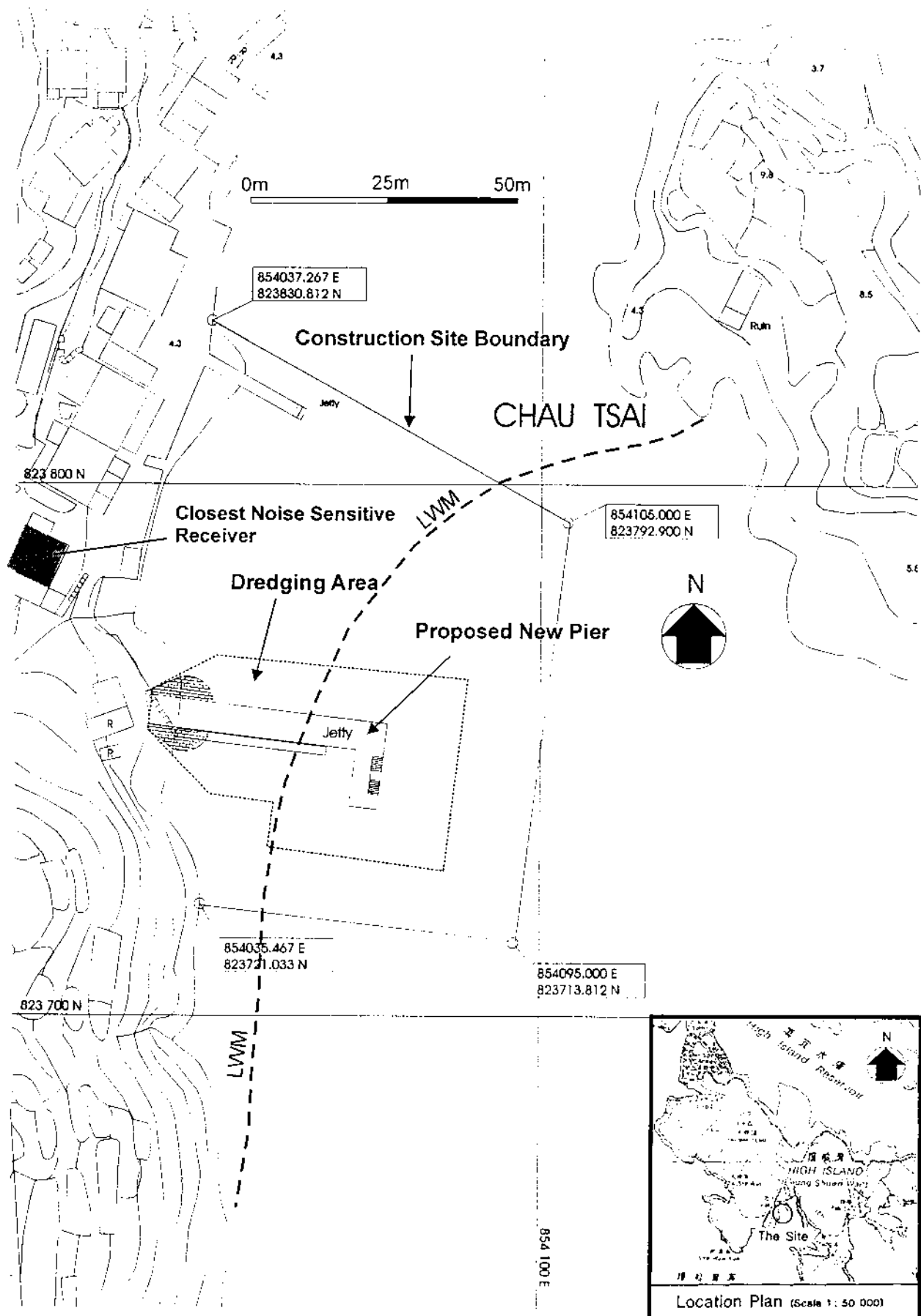
The project was gazetted under the Foreshore and Sea-Bed (Reclamations) Ordinance in April 1997. No objections to the project were received during the public inspection of the gazettal process. The project was subsequently authorised in May 1998.

5.4 Use of previously approved EIA reports

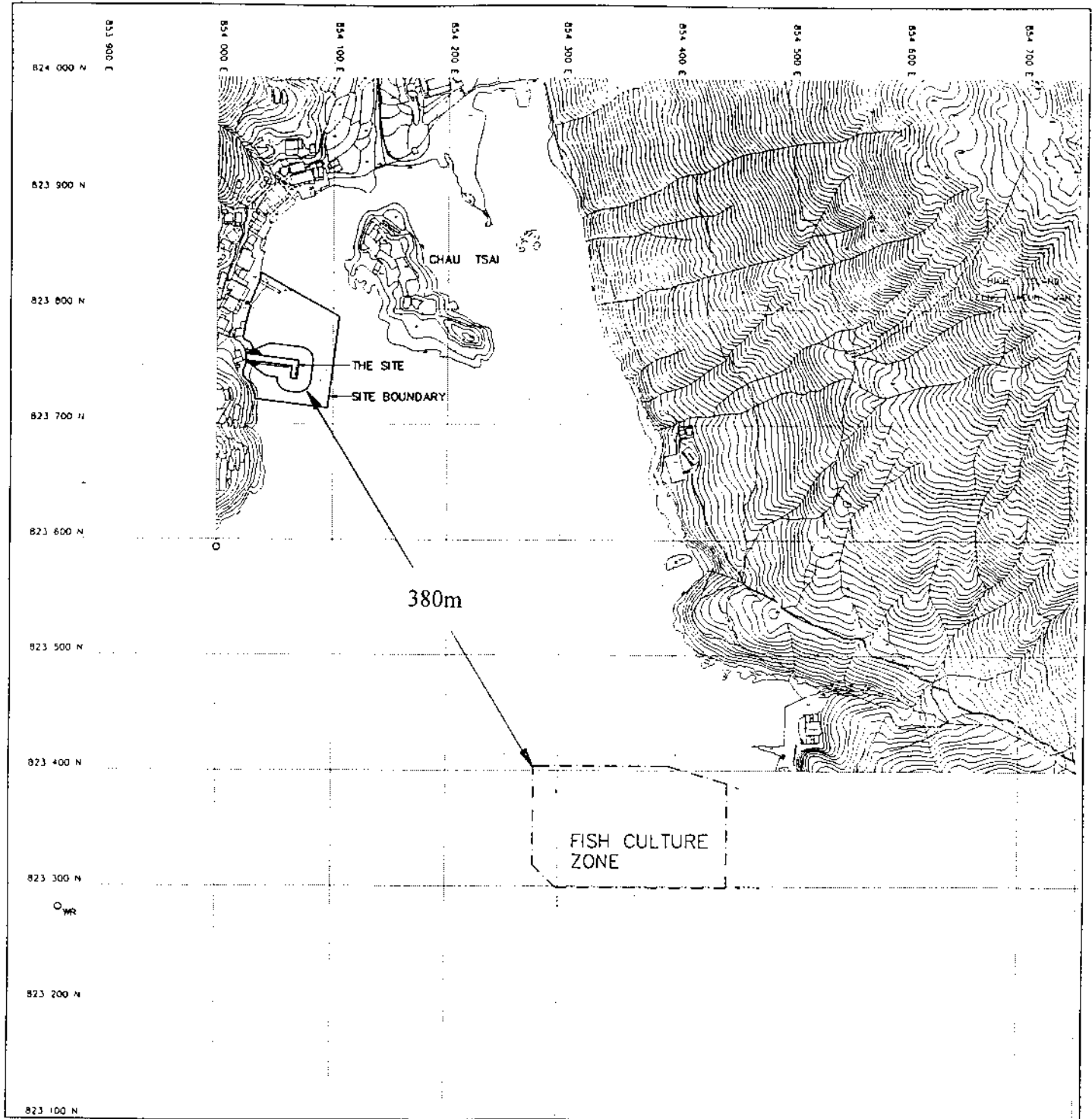
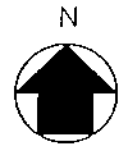
None.

Table 1: Noise Levels at Nearest Sensitive Receivers Calculation Sheet

Activity	Equipment Employed	Sound Power Levels	Distance Attenuation dB(A) (50m from closest NSRs)	Facade Effect	Noise Levels Before Mitigation	Cumulative Noise Level	Mitigation	Mitigated Noise Levels dB(A)
Marine Dredging	Dredger	112	-42	3	73	n/a	Not required	Will not exceed 75 dB(A)
Terrestrial Excavating	Excavator	112	-42	3	73	n/a	Not required	Will not exceed 75 dB(A)
Laying Seawall Blocks	Excavator	112	-42	3	73	74	Not required	Will not exceed 75 dB(A)
	Derrick Barge	104	-42	3	65			
Mixing Concrete	Concrete Mixer	96	-42	3	57	n/a	Not required	Will not exceed 75 dB(A)



Location of Proposed Pier, Dredging Area and Noise Sensitive Receiver at Pak A, Sai Kung, SK 078



SK-078 Location of the Leung Shuen Wan Fish Culture Zone

Mouchel

Drawing 2

- NOTES**
1. Check that all work in construction is done in accordance with the approved drawings.
 2. All dimensions are in millimetres unless otherwise stated.
 3. All levels are in metres with reference to the datum.
 4. The exact location of the work to be done shall be indicated on the drawings.
 5. All dimensions, levels, alignment, etc. shall be checked by the contractor at all stages of construction.
 6. The contractor shall be responsible for the maintenance of the site during the construction.
 7. Approval of all foundations and structures shall be obtained from the Engineer and the contractor shall be responsible for the maintenance of the site during the construction.
 8. Existing trees shall be preserved.
 9. All work shall be done in accordance with the approved drawings.
 10. All work shall be done in accordance with the approved drawings.
 11. The Contractor shall identify and mark all existing utilities and structures on the site before commencing work.
 12. The Contractor shall protect existing structures and utilities on the site.
 13. The Contractor shall be responsible for the maintenance of the site during the construction.
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Rural Planning & Improvement Strategy

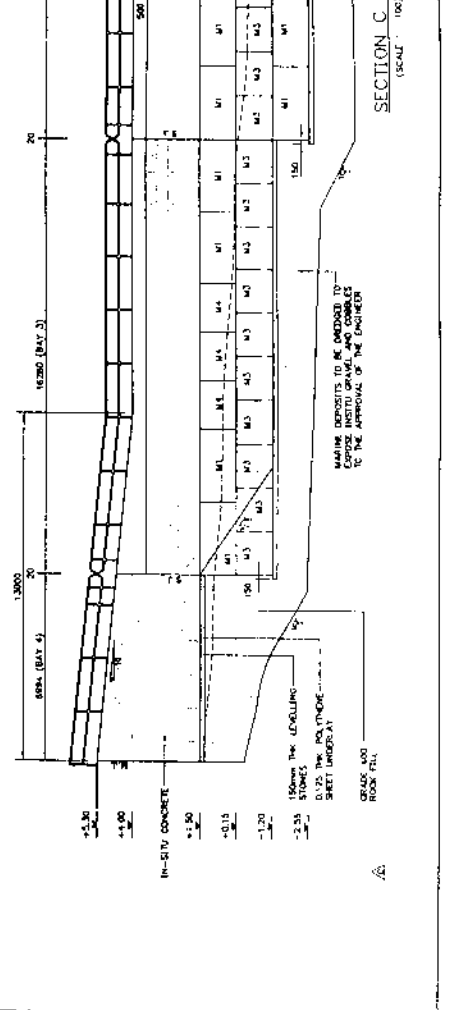
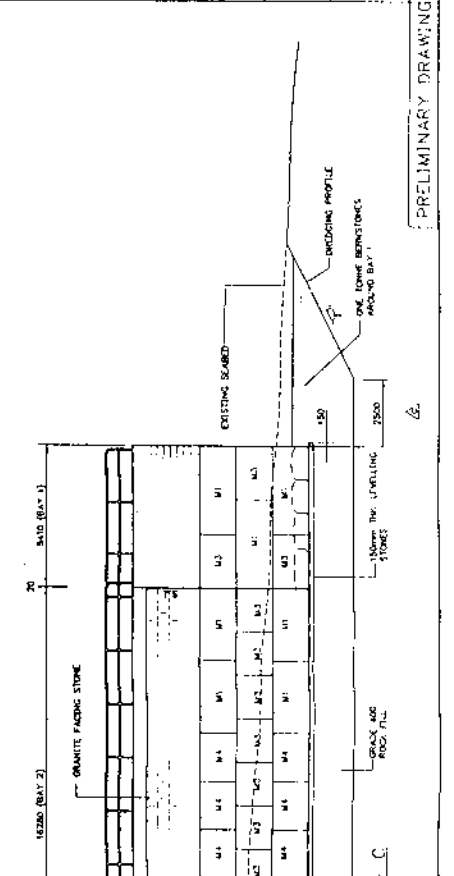
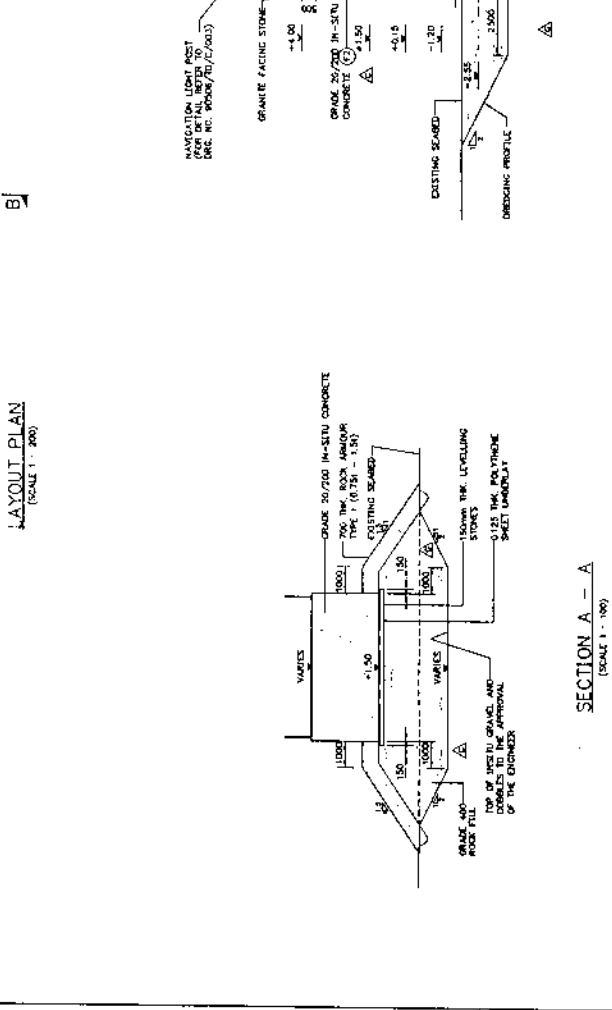
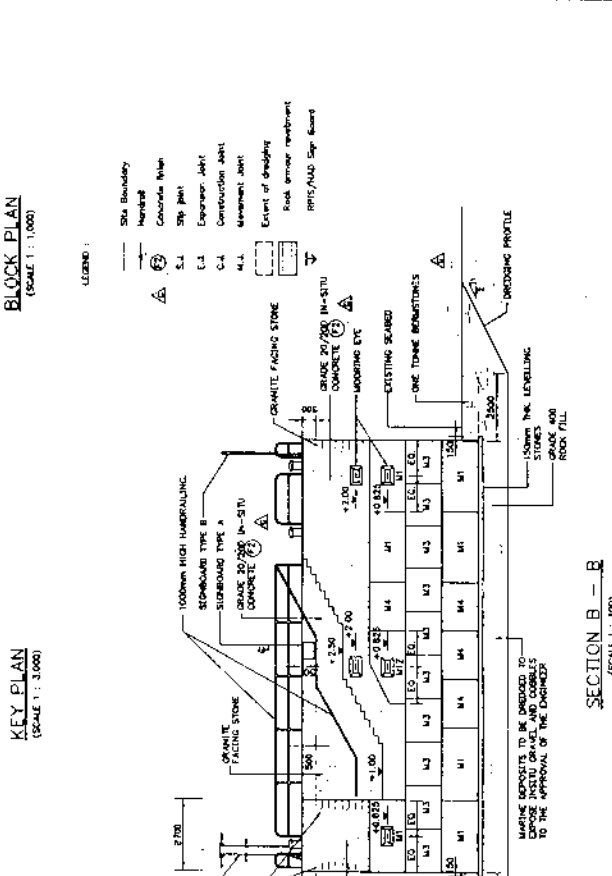
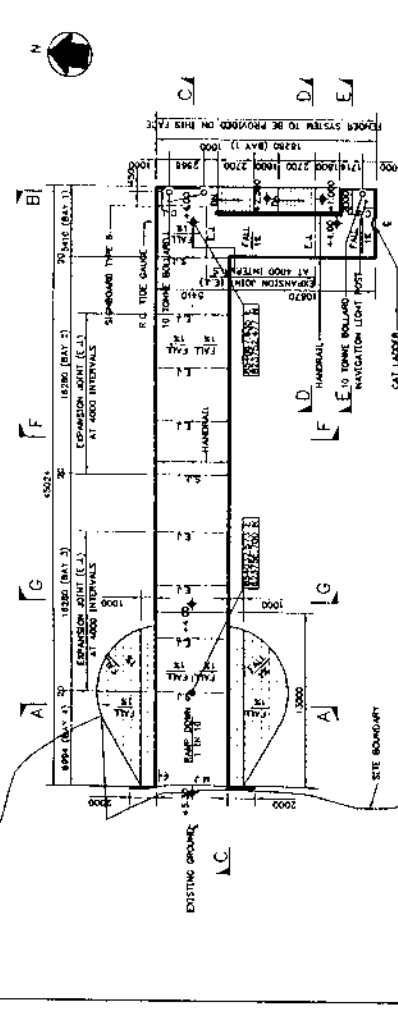
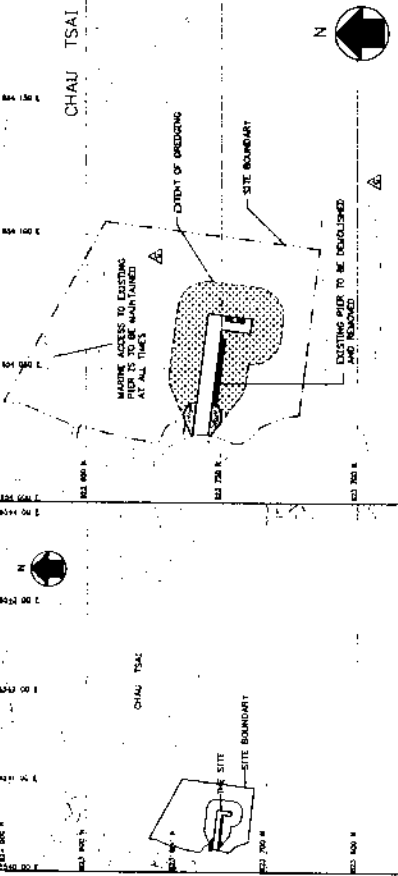
Key Policy: Development of the Rural Area

RFR RURAL IMPROVEMENT WORKS PACKAGE 10

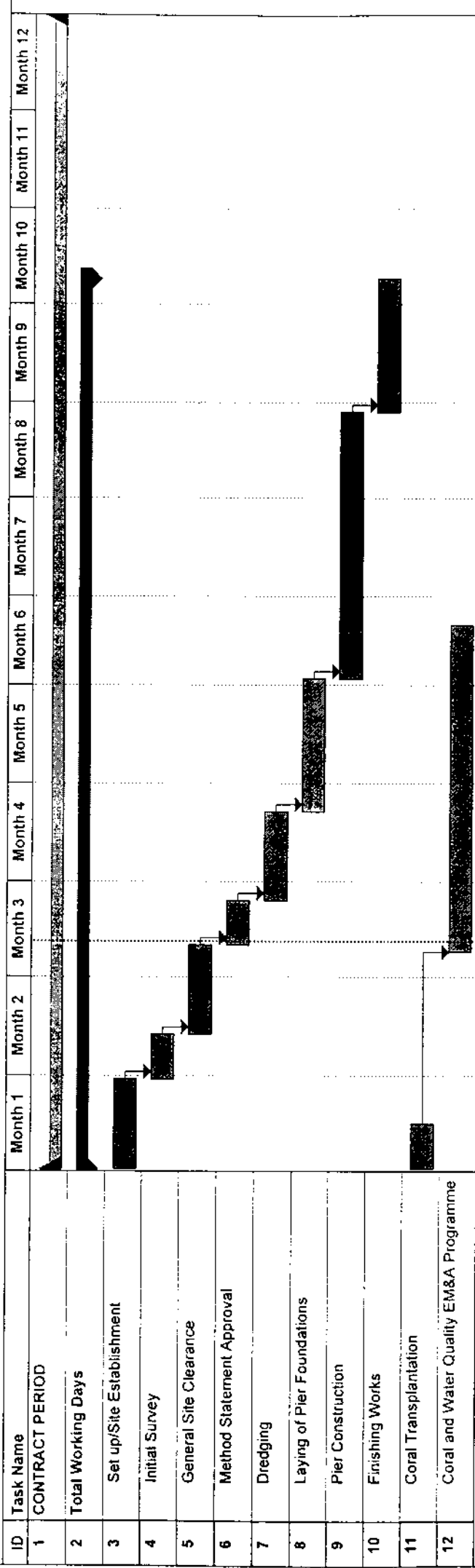
RECONSTRUCTION OF PIER AT PAK A, SAI KUNG

GENERAL ARRANGEMENT SHEET 1 OF 2

Mouchel
Mouchel Asia Limited
Consulting Engineers

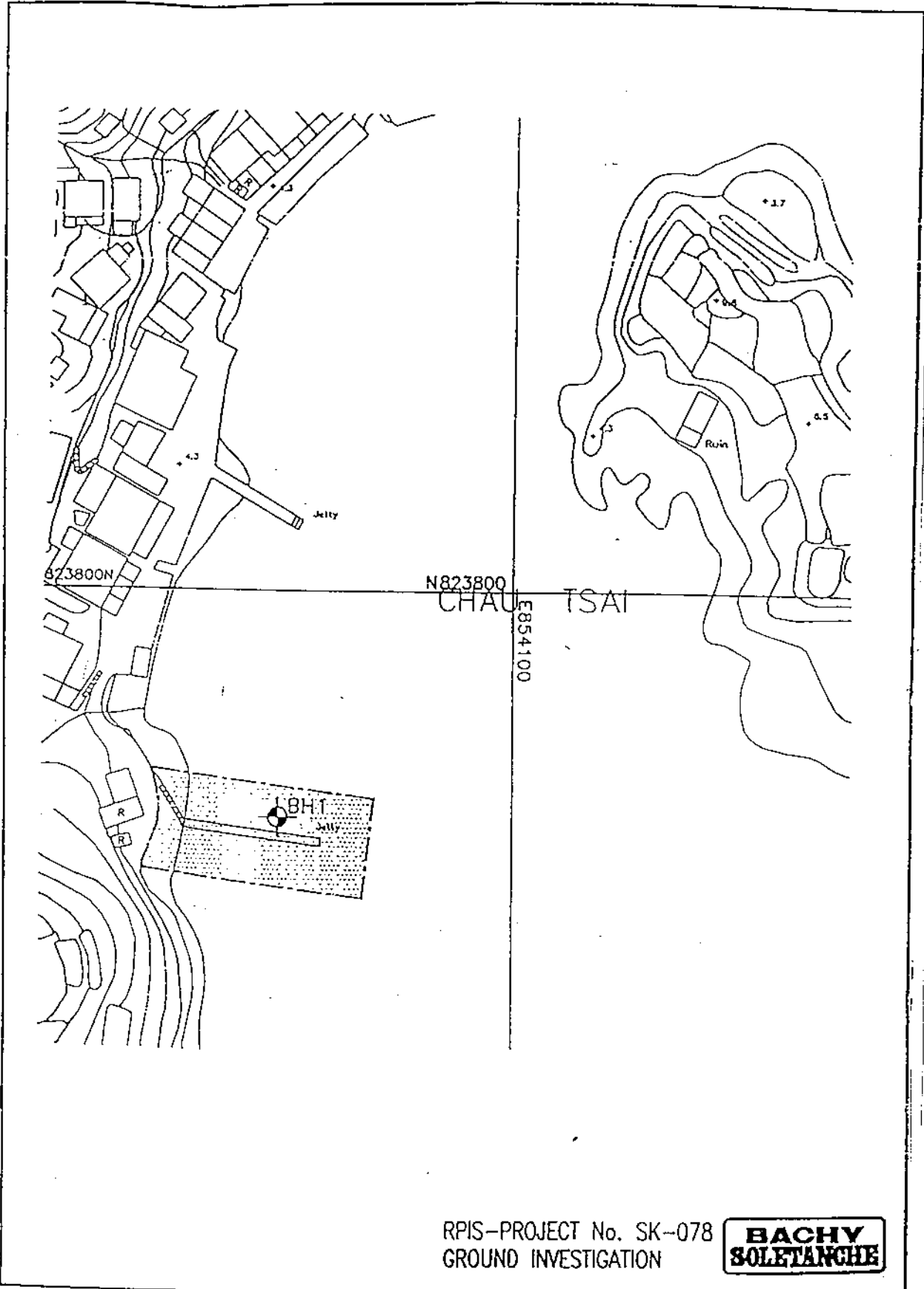


RPIS Minor Improvement Works, Packages 1 & 2
SK-078 Reconstruction of Pier at Pak A, Sai Kung
INDICATIVE WORKS PROGRAMME



Project Date: Thu 12/11/98	Task	[Solid black bar]	Milestone	[Diamond symbol]	Rolled Up Task	[Dotted bar]	Rolled Up Progress	[Dotted bar]
	Progress	[Solid black bar]	Summary	[Arrow symbol]	Rolled Up Milestone	[Dotted bar]		

Please Note: All construction periods are estimated. The duration and times may vary according to the Contractor's actual programme.



RPIS-PROJECT No. SK-078
GROUND INVESTIGATION



Reconstruction of Pier at Pak A, Sai Kung
SK-078, Borehole Location

Mouchel
Drawing number 5a

RPIS Package 1 & 2



DRILLHOLE RECORD

HOLE NO. SK0788H1

CONTRACT NO. GE/95/00

SHEET 1 of 2

PROJECT RPIS MINOR RURAL IMPROVEMENT WORKS PACKAGE 1 AND 2 MARINE GROUND INVESTIGATION

METHOD	CP + RO + RC	CO-ORDINATES	W.O. NO.	GE/95/00.9	
MACHINE & No.	CLAIRE	E 854050.90 N 823754.40	DATE	13/6/96 to 21/6/96	
FLUSHING MEDIUM	WATER	ORIENTATION	Vertical	GROUND LEVEL	0.00 mPD

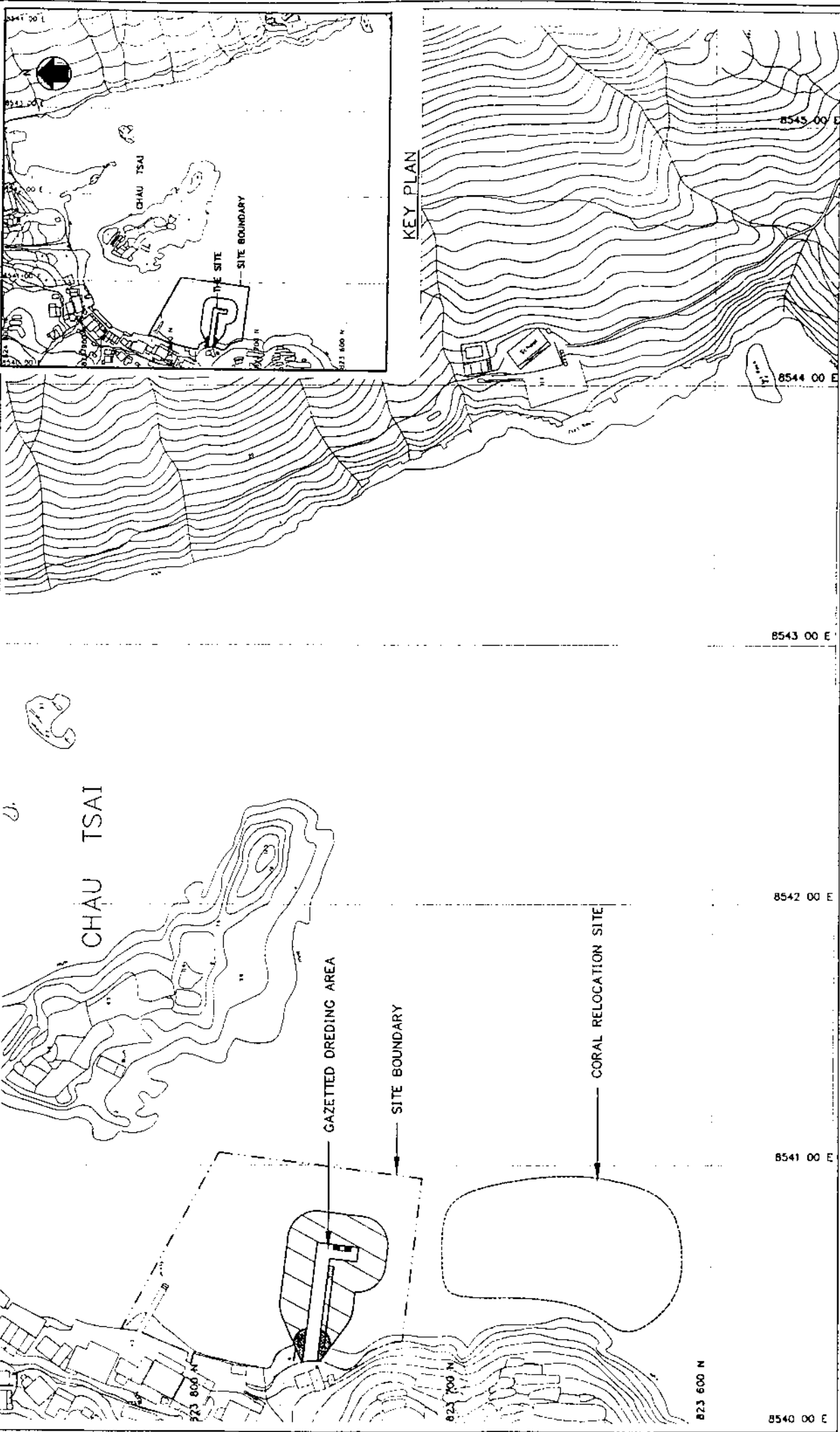
Drilling Progress	Casing size	Water level (ml) Shift start/end	TCR%	SCR%	ROD%	FI	Test	Samples	Reduced Level	Depth (m)	Legend	Grains	Description
1 14/06/96	SX	1.90m 07:30	65					T2-101		0.00			Grey (5Y), angular to subangular, coarse GRAVEL and COBBLES of rock and coral fragments. (FILL?/Beach Deposit?)
			63				T2-101	0.40					
			45				T2-101	1.10					
2 14/06/96	SX	2.35m 07:30	40					T2-101	1.90				
							T2-101	2.75					
3 14/06/96	PX	0.70m 19:30	47					T2-101	2.25	2.75			Loose greenish grey (5G 5/1), fine to coarse SAND with some subangular fine to coarse gravel of rock fragments with occasional shell fragments. (MARINE DEPOSIT) (HANG HAU FORMATION)
							T2-101	3.15					
4 18/06/96	PX	2.35m 07:30				N.A.		T2-101	4.10	4.10			Grey (5Y), angular to subangular, coarse GRAVEL and COBBLES of rock and coral fragments. (BEACH DEPOSIT) (HANG HAU FORMATION)
							T2-101	4.85					
5 18/06/96	PX	0.50m 19:30	54	27	7	N.R.		T2-101	5.50	5.50			Brown, weak to moderately weak, highly to moderately decomposed, coarse ash TUFF. (CORESTONE)
							T2-101	5.90					
6 18/06/96	PX	2.35m 07:30	100	70	0	>20		T2-101	6.20	6.20			No recovery assumed to be completely decomposed tuff washed out by flushing medium.
							T2-101	6.45					
7 19/06/96	PX	0.50m 19:30	93	27	0			T2-101	6.45	6.45			Moderately strong, brownish yellow to brown, streaked grey, moderately decomposed, coarse ash TUFF.
							T2-101	6.88					
8 19/06/96	PX	2.35m 07:30	100	32	0			T2-101	7.13	7.13			Joints, very closely spaced, rough undulating and planar, limonite stained, dipping 15° to 20°, 30°, 45°, 65° and subvertical from 5.50 to 6.20m, 8.20 to 8.44m 8.44 to 8.75m.
							T2-101	7.54					
9 21/06/96	PX	0.50m 19:30	100	75	17			T2-101	8.14	8.14			
							T2-101	8.44					
10 21/06/96	PX	1.70m 07:30	100	70	64			T2-101	8.78	8.78			
							T2-101	9.10					
			100	88	59	11		T2-101	9.78	9.78			

<ul style="list-style-type: none"> STANDARD PENETRATION TEST BY GUN VANE (SIEMENS TEST) FUNDAMENTAL TEST WATER-SHOWN PROCTOR TEST PALMER TEST 15 TONN TEST OBSERVATION WELL 14" 	LOGGED <u>R. T. WU</u> DATE <u>28/06/96</u> CHECKED <u>H.T. BURRIDGE</u> DATE <u>04/07/96</u>	REMARKS
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Reconstruction of Pier at Pak A, Sai Kung
SK-078, Borehole Log

Mouchel
Drawing number 5b

RPIS-PACKAGE 1 & 2



SK-078 RECONSTRUCTION OF PIER AT PAK A, SAI KUNG
CORAL RELOCATION AREA

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Drawing No. 6