HONG KONG UNITED DOCKYARDS
EXTENSION TO TYTL 108RP
PROPOSED RECLAMATION AND
RELOCATION OF
UNITED FLOATING DOCK
EXECUTIVE SUMMARY

JULY 1996

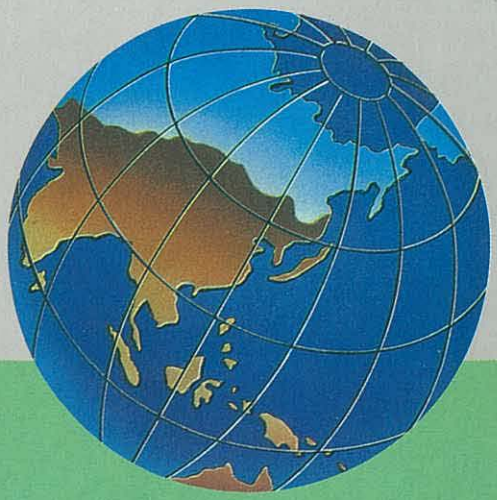
延展青衣島地段 TYTL 108RP. 填海計劃及搬遷

執行摘要"聯合"號浮塢1996年7月

（中文翻譯）

AXIS

Environmental



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AXIS Environmental

AXIS Environmental Consultants Ltd.

Hongkong United Dockyards

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1. 引言

1.1 計劃大綱

香港聯合船塢有限公司爲搬遷其4萬噸舉力的“聯合”號浮塢經已委託匯亞環保顧問公司進行一項“環境影響評估”（EIA）。此項計劃是將“聯合”號浮塢由現在位於大嶼山北陰澳灣碇泊處遷回聯合船塢在青衣島西岸的現有廠房岸邊碇泊，此新碇泊處是鄰近聯合船塢所有另外一個已自1988年便在青衣島碇泊的“黃埔”號浮塢。此評估的結論將在此報告中被概述。

擬建的所在位置是在青衣島西岸的工業用地（見圖一及照片一）及在聯合船塢現有廠房設施隔鄰，計劃中包括一塊填海地面積 11640平方米以延展青衣島地段 TYTL 108RP，此填海地連同現有岸邊土地形成一塊總面質 14858平方米土地，此塊土地作用首要爲使能由岸登上在對開碇泊的聯合號浮塢，而其他作用使有岸上土地以興建一個水櫃來收集用過的清洗用水作出處理。此項計劃選定時間是爲重要因爲安全計搬遷浮塢只能夠在颱風季節之外進行。

在環境影響評估被認可之後,聯合船塢須向城市規劃署申請將現有一塊岸邊面積3218平方米綠地改變用途及申請撥地。其後直至在登憲報再獲得城市規劃署及海岸及海床填海條例批准之後,才可獲撥地及進行填海工程。

聯合船塢擁有及使用3個浮塢，即“黃埔”號,“太古”號及“聯合”號。其中“聯合”號浮塢（見圖二及照片二）是于1994年在星加坡建造，在1995年初被拖帶至香港以替換不能再使用的舊有“青衣”浮塢。在1995年3月完成一項環境影響評估之後，“聯合”號浮塢就碇泊在大嶼山北部的陰澳灣,此是香港海事處認爲適合浮塢運作地區。“聯合”號浮塢在該區運作已有一年，期中蒙受持續的環境監察及稽核。

1. INTRODUCTION

1.1 Overview

Hongkong United Dockyards Ltd. (HUD) have commissioned AXIS Environmental to undertake an Environmental Impact Assessment (EIA) for the relocation of the 40,000 ton lifting capacity floating dock "United". The project will involve moving the dock from her existing location, Yam O Wan, north of Lantau Island, to a new location off the dockyard premises at Tsing Yi Island, a short distance from HUD's 24,000 ton lifting capacity floating dock "Whampoa" which has been moored there since 1988. The findings of the assessment are summarised in this report.

The proposed site lies within an industrial area on the south-west of Tsing Yi island, Hong Kong (Figure 1 and Photograph 1). The project site is adjacent to HUD's land based facility and the project will involve the extension of lot TYTL 108RP by the formation of a small reclamation of some 11,640m^2 (Figure 1). The reclaimed land together with existing land would form an area of 14, 858 m^2. The purpose of the reclamation is mainly to gain access to the floating dock "United" once relocated but it will also provide the land area required for a collection tank in which washwaters from the dock will be treated. The timing of this project is of importance for safety reasons as the dock can only be moved outside of a typhoon season.

Following endorsement of this EIA, it will be necessary for HUD to submit the related rezoning of 3,218 m^2 of Green Belt request to the Town Planning Board for approval. HUD is also required to apply for a land grant. Only after carrying out the necessary gazettal procedures, i.e. under the Town Planning Ordinance (if the Town Planning Board approve the rezoning request) and the Foreshore and Seabed (Reclamations) Ordinance, can the land grant be executed and the proposed reclamation proceed.

HUD currently operate three floating docks; 'Whampoa', 'Taikoo' and 'United'. The floating dock 'United' (Figure 2 and Photograph 2) was built in Singapore in 1994 and towed to Hong Kong at the beginning of 1995 to replace HUD's floating dock 'Tsing Yi' which had reached the end of her useful life. Following an EIA in March 1995, United was moored at Yam O Wan, an area identified by the Marine department as being suitable for such operations. United has been operational for almost a year and has been subject to an ongoing Environmental Monitoring and Audit programme.

1.2 The need for the development

The relocation of the dock to Tsing Yi Island will enable land access to United bringing very significant commercial, productivity and safety benefits to the company. Improved efficiency of operations on the dock will be a direct result of reduced traveling time for workers; reduced distances over which waste and supplies must be transported; and improvements to the safety on the dock for workers who may require emergency services.

Environmental monitoring under the EM&A and Water Pollution Control Ordinance (WPCO) requirements has indicated that the dock is having adverse impacts on the marine environment in its current location, adding to the impact of the five other docks in the area. The relocation will provide the opportunity to significantly reduce the environmental impacts of the floating dock operations, as described below, since a land based operation offers the potential to collect and treat contaminated washwaters which would normally be discharged directly to the marine environment. The increased efficiency of the dock will enable HUD to decommission their older dock, Taikoo, which will soon reach the end of her useful life, thus ending all HUD's operations at Yam O Wan and significantly reducing environmental impacts in this area.

2. PROJECT DESCRIPTION

The project can be separated into two distinct phases, the construction phase which involves the dredging, reclamation and relocation of United and the operational phase of the dock once it is moored in Tsing Yi.

2.1 Phase 1 - Construction

The construction work is anticipated to cover an 11 month period following gazettal of the reclamation and land rezoning. The proposed area for reclamation lies adjacent to HUD's existing land based facility where the floating dock Whampoa is moored. The key activities during construction will be dredging, reclamation and blasting.

1.2 需要的發展

搬遷“聯合”浮塢至青衣島靠岸使能由岸直接登上浮塢會令船塢本身帶來商務上,生產及安全方面深遠效益。減少往返浮塢時間令運作效能增加,同時減少搬運供應物料及廢料距離，增進浮塢本身及工作人員的安全性。

環境監察及稽核與及水污染管制條例規定過程中顯示“聯合”號浮塢在現時碇泊位置是對該處海中生態有不利影響及加重其他五個已在該處的浮塢對海中生態的影響。搬遷浮塢將顯著地將環境影響減少，因浮塢在近岸處運作可有機會將已受污染的清洗用水收集及加以處理，不然就只會直接被排放入海中。近岸運作增加效能可引致船塢本身其他一個在該處的“太古”號浮塢提早退役，因而全部結束聯合船塢在陰澳灣的全部運作及對該處的環境影響。

2. 計劃說明

此項計劃可以分爲兩個不同階段，第一階段爲建築階段即挖泥，填海及搬遷“聯合”號浮塢，第二階段是“聯合”號浮塢在青衣島碇泊後繼續運作。

2.1 建築階段

建築工程預計在刊登憲報有關填海及劃分地區獲批准後需時11個月完工。填海土地爲在聯合船塢現有設施及其碇泊“黃埔”號浮塢之旁。建築過程主要活動爲挖泥，填海及爆石。

2.1.1 挖泥

挖泥通常在此地區不會需要因只有甚少沉澱泥積聚。填海之前會先建造方石塊堆成防波堤，而爲建防波提地基要作少許挖泥。

在海灣內碇泊浮塢地區，沉澱泥積聚可有8米深度。在乎最終設計所定，預算挖去約8萬至14萬立方米淤泥以達到浮塢升沉深度及藏下錨碇的穴,此堆淤泥中約有3萬立方米會被列爲已受污染“C”等淤泥，另外又有約3萬立方米全剝蝕花崗岩石及沖積層要被移走。藏下錨碇穴的大小需依照海床斜度及穩定設計，會被挖至6.7米深及有些海底岩石被移去以達至浮塢所需運作深度—18.50米。

2.1.1 Dredging

Dredging will generally not be required in the area proposed for reclamation since there is very little sediment accumulation there. A minimal amount of dredging will be required for the preparation of foundations for the block work seawall which will be constructed prior to the reclamation.

Within the bay where the dock will be moored, sediment has in places accumulated up to 8m in thickness. Subject to final detailed design, it is anticipated that between 80,000-140,000 m^3 of marine mud will have to be dredged for the preparation of anchor pockets for the dock and to provide an adequate working depth for the dock. Of this material, it is anticipated that 30,000m^3 at most will be classified as grade C contaminated marine mud. In addition to marine mud, approximately 30,000m^3 of Completely Degraded Granite (CDG) and alluvium will have to be removed. The size of the anchor pockets will depend on the outcome of studies into slope stability but will be excavated to approximately 6.7m below the existing sea bed and some rock removal will be required to provide a working depth of -18.50m PD for the dock itself.

2.1.2 Blasting

Blasting will be required to remove rock to provide an adequate working depth for the dock and for the preparation of anchor pockets. It is estimated that 20,000 m^3 of rock will be removed through blasting.

2.1.3 Reclamation/Seawall Construction

The block work seawalls will be created using rockfill and, concrete blockworks will be placed on top of the foundations to form the seawall. Fill material will then be imported to the site and deposited in areas bounded by the proposed block work seawalls. Rock and sand removed from the anchor pockets and dock area will be used as fill and additional fill may be imported from the Peoples Republic of China (PRC) to create a finished level of 5.3mPD.

2.1.4 Dock Relocation

The dock will be relocated once the reclamation is complete. Timing for the relocation is critical as the dock can only be moved outside of the typhoon season. Relocation will be undertaken in accordance with the requirements of the Marine Department.

2.2 Phase 2 - Operation of United Dock

The United has a 40,000 ton lifting capacity and was built to comply with the Rules and Regulations of the Lloyd's Register of Shipping. All materials, equipment and machinery used on the dock are of approved type and standard. The dock is currently the largest in Hong Kong and its mooring consists of 30 sets of Lloyd's approved U3 stud link cables and 150 tonne concrete anchors which are designed to withstand typhoons.

The main activities carried out on the United dock are:

- Hull repairs;
- Mechanical overhauls and repairs;
- Electrical overhauls and repairs;
- Hull cleaning and painting; and
- Regulatory surveys and inspections.

Summarised below are the key operations on the dock which can result in an environmental impact.

2.2.1 High Pressure Water Washing

The first operation carried out on the majority of ships moved into the floating dock is high pressure water washing, which is used to clean the hull of the ship for regulatory inspection and recoating. Water washing involves the application of water under high pressure (about 2000 psi) through a small nozzle at the end of a wand. The pressure is sufficient to remove any marine growth, loose or flaking paint and tends to simultaneously remove the surface layer (up to about one micron thickness) of antifouling material. This operation takes about 2 days per ship and typically requires 200 to 400 tonnes of water per ship at a rate of about 40 litres per square metre.

The design of the ship is such that during the washdown period, water drains through the drainage port holes and the ends of the dock. Following the recommendations of the EIA for the operation of the dock in Yam O Wan, sand bags are placed along the side of the dock to ensure discharge is via the drainage port and not over the edge of the dock. Cloth filters are also used in an effort to remove paint chips from the washwaters.

All solid material which settles on the deck of the floating dock is collected using manual implements

2.1.2 爆石

爆石方法將被採用以達至浮塢運作深度及形成藏下錨碇的穴。估計爆石總量爲2萬立方米。

2.1.3 填海/建造防波堤

防波堤是用石塊堆填成地基然後放上混凝土方塊形成。防波堤範圍內會被填平，所需砂石填料會由中國輸入而挖出海床及錨碇穴岩石亦被用作填海，填高地平爲5.30米。

2.1.4 搬遷浮塢

“聯合”號浮塢會在填海工程完成後立即被搬遷至青衣島，維搬遷日期是爲重要因爲只能在颱風季節之外進行。搬遷“聯合”號浮塢需遵照香港海事處規定來完成。

2.2 “聯合”號浮塢運作階段

“聯合”號浮塢具有 4 萬噸舉力及係依據英國勞埃德船級社規格建造，所用材料及機械設備均是經核准型號及指定標準，乃是現時在香港最大的浮塢，被30套U3級有檔鋼鏈及每個150噸重混凝土錨碇泊定至可抵受颱風。

在“聯合”號浮塢上進行的主要各項工程爲對大型海洋航行船隻作出檢驗及維修：—

●修理船體外殼　●機械檢查及修理　●電器設備檢查及修理
●清潔洗淨船身及重新塗上油漆　●船級社定期檢驗船的各部份

下列概述爲可能對環境有影響的塢上主要運作項目。

2.2.1 高壓水清洗

大部份船隻在進塢後會被高壓水將船身外殼清洗乾淨以被船級社人員檢驗及重新塗上油漆，淡水以每平方吋2000磅高壓由水鎗噴嘴射出，此高壓力足以沖走船殼附生物及鬆浮油漆層，同時可移走約壹微米厚度面層防污漆。每壹條船的此項工作需時約2天及用去200至400噸淡水,即約爲每平方米船殼需用水40公升。

(brooms and shovels) and machines (small carts and bobcat loaders). The solid wastes are placed into skips until they are taken to HUD's waste storage facility at the Tsing Yi shipyard. The skip contents are then collected by licensed waste disposal contractors for disposal to landfill. The dock master is responsible for checking the cleanliness of the dock floor.

2.2.2 Dry Grit Blasting

Dry grit blasting is an abrasive process used to remove primers, paints and anti-fouling applications to prepare the hull for new protective coatings. It involves the application of copper slag pellets propelled by compressed air of about 100 psi issued out of a ceramic nozzle.

Grit blasting of entire hulls is unusual but more often only spot blasting of rusty areas and areas with defective paint coatings is necessary. Any areas subjected to grit blasting are also cleaned by fresh water washing prior to application of primers and antifoulants.

Good housekeeping measures are employed on the dock to minimise environmental impacts. The operators are trained to direct the blasting guns in a downward direction to minimise the air transport of the grits. Dock inspections are undertaken to ensure that waste materials are cleared from the dock floor. using a combination of manual implements (brooms and shovels) and machines to collect all grits from the deck at the end of the operation. Collected grits are placed in steel skips which are transported to the shipyard at Tsing Yi for subsequent collection by licensed waste contractors. All solid waste is held in a designated storage area until collected and disposed of to landfill by the contractors.

2.2.3 Leakages and Spills

Procedures are implemented on the dock to ensure that any spillages or leakages of paints, thinners, kerosene, fuel, oil and any liquid wastes, will be cleaned up immediately. Used material is collected in solid waste bins for transport ashore to Tsing Yi and collection and disposal by licensed contractors.

With respect to prevention of oil pollution , HUD have an Operational procedure, *Oil Pollution Controls* (ref HUD-MAR-006) which ensures all staff are aware of company procedures to prevent and deal with oil spills. A key feature of the procedure is prevention and readiness. Best practices are employed for pumping or transporting oil and chemicals from ships for storage or disposal and collected oils are stored or transported in dedicated holding tanks.

In the event of an oil spill there are two oil contingency plans brought into action. Firstly HUD's in-house operating procedure on Oil Pollution Controls (ref HUD-MAR-006) contains an oil spill contingency plan. These procedures set out the responsibilities of personnel in the event of an oil spill, reporting procedures, risk assessment and emergency responses. In addition to these operational procedures there are 12 x 25 litres of Oil Spill Dispersant stored in drums on United with additional dispersant stored on the Taikoo and in the main yard, and 6 x 50ft lengths and 2 x 30ft lengths of oil boom stowed on the dock which complies with the Marine Department's Hong Kong Oil Pollution Contingency Plan (HKOPCP) requirements. When a high risk situation (serious oil spill has/is likely to occur and source of spilling oil cannot be stopped) is identified then the Marine Department Port Services Division is immediately notified whereupon assistance can be obtained.

The Marine Department's HKOPCP sets out procedures for the Government's response to oil pollution in Hong Kong's waters. The primary aim during an oil spill is to protect specific areas deemed to be of importance (Sites of Special Scientific Interest, Fish Culture Zones, gazetted beaches etc.,) and to limit the extent of pollution damage. The secondary aim is to clean up stranded oil.

All spills, regardless of size, are documented under HUD's Operating Procedure and reported to Marine Department. Following an oil pollution event appropriate clean up measures are used and all equipment used in the oil spill is cleaned and once again made ready for use. Major oil spills are extremely unusual and minor spills will be minimised following relocation as there will no longer be the need to transport hazardous material from the main shipyard to Yam O thus minimising the risk of minor spillages at sea.

The Operating Procedure will be revised for the relocated dock to ensure that all areas of importance are identified within the procedure as priority areas for protection. These will include the Ma Wan Fish Culture Zone and the gazetted beaches in Ma Wan and along the Tseun Wan - Sham Tseng coastline.

浮塢的設計爲清洗用過的水可由浮塢上排水孔及兩端排放出海，但當浮塢在陰澳灣運作時作出的環境影響評估後，決定將浮塢兩端用沙包堵住使洗船身用過的水只由浮塢上排水孔排放出海，及用過濾布放在排水孔上使能濾去油漆屑片。

全部積在浮塢甲板面的固體廢料會被人手用掃把及鏟或用機械掃地車倒入鐵斗內再運送回青衣島上船塢廠房廢料貯存處，廢料定期由有牌照承包商運走至堆填區。浮塢長需負責確保浮塢甲板的收拾乾淨。

2.2.2 乾式噴砂

乾式噴砂是一磨蝕過程用以除去鋼板面上防銹漆與防污漆及令船殼可再被塗上新油漆層，過程是將銅礦渣砂粒用每平方吋壹百磅壓力壓縮空氣由壹個陶磁噴嘴射出撞擊鋼板表面除去油漆及銹。

船隻進入浮塢一般不會將全個船殼噴砂，通常是噴砂清理有銹及損壞油漆部份。噴砂部份在被塗上新防銹漆及防污漆前亦先被淡水沖淨。

在浮塢上是採取良好設備管理來達至減少對環境影響。在噴砂時工人被訓示要將噴嘴向下以減少砂粒在空中擴散。用過跌在浮塢甲板上砂粒會被人手用掃把及鏟或用機械掃地車在每次噴砂後倒入鐵斗搬回青衣島上船塢廠房再其後由有牌照承包商運走至堆填區。

2.2.3 漏泄及溢出

浮塢上有沿用運作程序如果有溢漏油漆，油漆稀釋液，火水，燃油，潤滑油及其他液體廢料等意外都會立即被清理，用過物料及廢料會被放入鐵斗內運回青衣島上船塢廠房再由有牌照承包商運走。

在防止漏油污染，聯合船塢本身有內部的“漏油污染控制運作程序”（HUD-MAR-006）,此程序確保各員工知曉在防止及處理漏油時的運作，主要特色爲防止及處於準備狀態。使用最佳方法來泵送及搬運油類及化學料由船前往貯存或處置，收集油液會被存於在指定油槽。

如有漏油污染事件現時有2階段緊急應變計劃，首先是聯合船塢內部指引“漏油污染控制運作程序”（HUD-MAR-006）。此程序定下各員工在處理漏油污染時的職責、報告步驟、風險評估及緊急應變。另外“聯合”號浮塢上經常存放有12桶25公升化油劑，另有大量化油劑存於在鄰近的“太古”號浮塢上及青衣上船塢廠房內可取用，浮塢上放有6條50呎長及2條30吹長浮水防油帶，符合香港海事處“漏油污染應變計劃”（HKOPCP）條例要求。第2階段倘若有高風險漏油污染（即嚴重漏油事

3. EXISTING ENVIRONMENT

3.1 Water Quality

Ongoing monitoring work as part of the post project EM&A requirements for United has indicated that there are increasing amounts of TBTs in the water column around the dock. Given that the Whampoa discharges process waters into the marine environment, it is assumed that there will also be detectable amounts of TBTs present in the water column in the Tsing Yi area.

The project site lies within the Western Buffer Water Control Zone (WCZ) which was designated in 1993. Within the Western Buffer Water Control Zone, there are 8 gazetted beaches none of which are on Tsing Yi. The majority of these beaches are ranked as 'poor' with the exception of Angler's Beach which was ranked 'very poor' in 1993 and 1994 and closed for swimming purposes in the 1994 bathing season. Poor bathing water quality in the Tsuen Wan district is a result of discharges from squatter districts and unsewered developments. The Government plan to resolve this through the provision of sewerage along the coastal strip between Tsing Lung Tau in the west and Ting Kau which will collect waste from currently unsewered areas. Once these measures are in place bathing water quality is likely to improve significantly.

In terms of other receivers sensitive to impacts on water quality, the closest fish culture zone to the project site is on the western coast of Ma Wan Island. There are no sensitive marine sites in the vicinity of the project in terms of ecology.

3.2 Sediment Quality

Contaminants found in the sediment are indicative of dockyard activities. Surface sediments are contaminated with copper, zinc and Tributyl tin (TBT). The surface metre of sediment would be classified in places as class C under the EPD Technical Circular TC-1-1-92 for the disposal of marine sediment and would therefore require isolation from the environment upon final disposal.

3.3 Ecology

In terms of ecological importance and conservation status, there are no sites of conservation, marine, agricultural or scientific interest in close proximity to the site, and the site is approximately 3km from the Ma Wan fish culture zone (FCZ). Terrestrial ecology is minimal despite the zoning of this area as green belt due to general absence of vegetation in the area and the proximity of Tsing Ma Bridge and Lantau Fixed Crossing construction projects.

In terms of marine ecology the site consists of two different areas; the main channel and the bay where the dock is to be located. Preliminary site investigations (geophysical surveys and dives to locate submarine cable) have found that the seabed in the main channel in this area is largely rocky with limited sediment accumulation due to the fast water currents.

In the bay area, which is sheltered to a certain extent by the Whampoa dock, soft sediment has accumulated to up to 8m in places. The area is however not considered to be of ecological value due to the long history of contamination in this area.

4. POTENTIAL IMPACTS AND PROPOSED MITIGATION

4.1 Phase 1 - Construction

4.1.1 Dredging Impacts on the Marine Environment

The impact of dredging was considered a key issue since the surface sediment in the area was found to be contaminated with copper, zinc and TBT. The sediment plume produced by dredging was modelled using a plume dispersion model. The modelling results indicated that the plume would be dispersed over a wide area, passing close to gazetted beaches along the Tsuen Wan coastline. This impact will be short term and is not considered to be significant given that the bathing water quality along this stretch of coast is currently very poor and therefore not generally used as a recreational resource. In any event it will be recommended that a sealed grab and a silt curtain be used, where currents allow, to minimise loss of material during dredging. Wherever possible dredging will also be undertaken outside of the bathing season.

4.1.2 Impact of Explosives used in Excavation on the Marine Environment

Explosives will be used for the excavation of rock in the area. Underwater blasting was identified as a potential issue of concern in the EIA due to its potential to harm marine life. In order to minimise impacts, explosives will be placed in drilled holes to focus the blast and limit the amplitude of pressure waves transmitted through the water column. Blasting is unlikely to cause any impact of concern

件將或已經發生及漏油來源不能被停止），則海事處港口控制室立即被通知，以求獲得援助。

海事處沿用的“漏油污染應變計劃”內列明香港政府方面對本港水域內如有漏油污染時採取的應變，主要作用是當有漏油事件時保護指定重要地區（如有特殊科學價值、養魚區、憲報上海灘等），及去局限污染損害程度，隨後目的是進行清理油污。

任何大少漏油事件都有在公司內部指引下被記錄在案及向海事處報告，油污被清理後所使用設備亦被清理準備可再用，嚴重漏油污染極少有機會發生，而少量漏油事件可再被減少因如將“聯合”號浮塢搬遷回青衣島後再無需要由陰澳灣來回搬運有危險物料（漆油、燃油等）。

運作程序會因浮塢在新位置將被修訂來確定鄰近重要被保護地區，此應包括馬灣養魚區及沿荃灣至深井岸線的憲報有登的泳灘。

3. 現有環境狀況

3.1 海水質素

“聯合”號浮塢在現時陰澳灣位置所持續進行的環境監察及稽核顯示在其周圍水域水中的三丁基錫（TBT）含量正日益增多。另一座在青衣島碇泊的“黃埔”號浮塢現時亦將用過清洗船身用水直接排放出海因而該處水中的三丁基錫應有可查覺含量。

此計劃搬往的地點位於1993年訂下的“西部緩衝水質船制區”，在此區內有8個登在憲報但不在青衣島的泳灘。 大部份此些泳灘的水質現時是劣等,其中釣魚灣的水質在1993/94年被列爲極劣因而在1994年泳季被停止供作游泳用途，荃灣區的劣等水質是由於非法潛建者排放污水及有開拓地段無污水處理系統，政府現時已計劃提供污水排放水道沿青龍頭至汀九以解決此問題，到時該處水質應有重大改善。

其他會受水質影響地區爲就近的馬灣西岸養魚區，而之後附近再無其他地區其海洋生態會被影響。

3.2 沖積物質素

船塢周圍近海中沖積層的污染乃由於船塢的運作，表層含有銅，鋅及三丁基錫，表層壹公尺深淤泥經環境保護署工業公告TC-1-1-92內被列爲“c”等而在處置時需與其他環境分隔。

since the area is considered to be of low ecological value. Also, impacts were monitored during blasting works for much larger scale projects in the area such as Ting Kau Bridge where no significant fish kills were detected.

4.1.3 Impacts of Reclamation

The proposed reclamation is small, approximately 100m by 100m in size and therefore unlikely to have any significant environmental impacts. The area to be reclaimed currently does not support a rich diversity of marine life partly due to historical contamination precluding the presence of anything but pollution tolerant marine organisms and partly due to the fact that there is minimal sediment in the area to provide a suitable habitat for benthic organisms.

The potential for solids from fill material to be lost into the marine environment will be minimised through the construction of the block work sea wall which will help to retain fill material within the reclamation area.

Works will take place from the marine side thus minimising impacts on traffic. Air and noise impacts were not considered to be an issue of concern given that there are no sensitive receivers in the vicinity of the proposed works.

4.1.4 Impacts of Relocation

The relocation of the dock from Yam O Wan to Tsing Yi will take place once the reclamation is complete and anchor pockets have been prepared. Marine traffic impacts during relocation are not anticipated to be significant given that the dock will be moved at a time agreed with the Marine Department.

The relocation of up to 22 anchor blocks from Yam O Wan to Tsing Yi will reduce project costs and minimise disposal requirements. Although the removal of anchor blocks will result in some sediment disturbance this will be a very short lived impact and is therefore not considered significant.

4.2 Phase 2 - Operation

4.2.1 Impact of Process Waters on the Marine Environment

TBTs

The release of process waters from the dock was identified in the first EIA for the mooring of United at Yam O Wan as being a key concern due to potential for the washwaters from hull maintenance operations to contaminate the marine environment. The key contaminant is TBT, an antifouling agent used in paints to prevent growth of marine organisms on the submerged surface of ship's hulls. TBT is of concern because of its ability to affect non target marine organisms at concentrations as low as 20 *n*g TBT/l. In the UK, this value was adopted as a target value for marine waters in 1985 with an improved target of 2 *n*g/l for 1989 (Goldberg, 1986); this level has since been adopted by Canada and Australia (NSW EPA, 1990). Hong Kong legislation does not specify a safe level of TBTs but the water quality objective for toxicants in Hong Kong Waters is that they should not be present at levels causing a significant effect.

The wash waters from United have been monitored as part of the ongoing EM&A work for the dock. The typical concentration of TBTs lost in the washwaters is approximately 600µg TBT/l. Monitoring around the dock in Yam O Wan would indicate that despite good housekeeping measures, this is resulting in a significant accumulation of TBTs in surrounding sediments.

As part of the EIA the fate of paint flakes discharged in the washwaters from the dock was modelled for 3 scenarios:

- The dock in its current location in Yam O Wan;
- The dock in the proposed location at Tsing Yi; and
- The dock in Tsing Yi, if the discharge was collected and redirected 100m into the embayment in an effort to minimise dispersion.

The modelling indicated that the area where peak deposition rates (0.78mg TBT/sq m based on a discharge of 600 µg TBT/s) occurred was largest for the existing situation at Yam O Wan and covered a greater area than previously thought. The plume extent reached the Ma Wan Fish Culture Zone and the general area observed to be used by the Chinese White Dolphin.

For the Tsing Yi scenarios, modelling indicated that redirecting the discharge into the embayment actually increased the area over which the peak TBT deposition would occur but the extent of the plume was slightly less than under Scenarios 1 and 2 where the waters drain directly from the dock.

3.3 生態

計劃搬往的地點在青衣島西，但離開馬灣養魚區約3公里,其鄰近地區海域無重要受保護的海洋與漁農及科學價值，又鄰近岸上地區雖被列爲綠地維因貼近青馬大橋及大嶼山通道建築地盤一般沒有植物生長所以此處陸棲生態亦無甚影響。

有關海洋生態此地區可分爲2處,即主海溝（馬灣航道）及碇泊浮堝的海灣，初期現場探測（地質測量及水底電纜定位）顯示主海溝海床大部份是石質甚少沖積物因受快速水流引致。在海灣內由於“黃埔”號浮堝有些阻擋,海床的沖積泥可有8公尺深，但由於長期遭受污染，此處海洋生態被認爲無甚價值。

4. 潛在影響及減緩建議

4.1 第一階段 — 建設過程

4.1.1 挖泥對海中環境影響

挖泥產生的影響被認爲是一個主要問題因爲海底沖積泥表層已遭受銅，鋅及三丁基錫的污染。挖泥時水柱擴散已用模型被進行分析，經分析有顯示指出因挖泥而引起水柱會擴散至很大面積，會靠近及經過荃灣沿岸泳灘，但影響只會在施工期間而只是短期所以應該不大，尤其該處泳灘現時水質不佳而不用作水上活動。而就此在施工挖泥時，會提議採用密封泥夾及在水流強度許可時加用擋板以減少淤泥流失，及使挖泥工程在泳季之外進行。

4.1.2 爆石對海中環境影響

爆石方法將被採用,維水下爆石曾有報告指出可能傷害海洋生物，爲減少影響,首先在岩石鑽孔才放入炸藥來使爆炸力集中及限制水柱傳播壓力,由於此地區生態屬低值因此爆石影響應不會嚴重。在附近進行建造汀九橋時更大爆石工程曾進行過，當時監察下發現無值得注意數目的魚類被擊殺。

4.1.3 填海影響

進行填海是一塊少土地，面積100公尺乘100公尺，因此不會對環境造成影響。該填海地由於長期受污染及只有極少沖積泥使能供給與海底動植物適當生存產地，所以除卻耐抗污染的海中生物外此處沒有其他類海中生物得以維生。

For both Scenarios 2 and 3, the plume had the potential to carry pollutants into bathing waters off gazetted beaches along the Tuen Mun coastline but the concentration of TBT in the water column would be negligible and in the order of 0.2 ng TBT/l.

Metals

Additives to antifoulants include heavy metals, particularly copper and zinc. The dock also uses significant quantities of copper slag for grit blasting. Sediments in Yam O Wan around both the United and the Taikoo contain elevated levels (Class C) of copper and zinc as do sediments around the Whampoa floating dock in Tsing Yi. The operation of the dock in Tsing Yi therefore has the potential to increase metal contamination in marine sediments.

Unlike TBTs, metals are persistent in the environment and therefore release of these metals over a prolonged period could result in significant concentrations of heavy metals accumulating in the sediment. Again the area affected by Scenario 1, the existing situation is more sensitive than the area affected along the industrial coastline of Tsing Yi. However, future improvements to water quality in bathing waters could mean that the discharge would affect more sensitive receivers in the future.

Proposed Mitigation

Currently housekeeping measures are the only practical solutions to minimise release of contaminants from dockyards moored at sea. This study has concluded that relocation offers benefits in terms of mitigating impacts in Yam O Wan as all of HUD's activities there would cease. The overall discharge of TBTs into Hong Kong Waters would therefore be reduced as a result of the improved efficiency on United Dock. However, modelling has indicated that the dock in the proposed location would contribute to TBT and metal loading along the Tsing Yi and Tsuen Wan Coastline which could become an issue of concern once the bathing waters are improved in this area.

A fourth scenario is therefore the preferred option whereby HUD will implement a collection system, which is only practical for docks moored adjacent to land, and all wash water will be collected and pumped to a treatment tank on the reclamation through a series of pipes linking the drainage ports along the outside of the dock (Figure 3). The treatment tank will incorporate a filtration system to remove paint flakes contaminated with TBTs, copper and zinc and also remove copper grit that may otherwise have entered the marine environment. Although filtration will not remove all of the TBT in the washwater as some will inevitably be in the dissolved form, filtration will remove a significant proportion (90-98% according to a study by Haskoning, 1989) of the particulate TBT. The effluent will then be discharged into the part of the bay where circulation is restricted due to the presence of the docks and where the area is known to be ecologically poor. A significant proportion of the dissolved TBT will be removed from the water column in the vicinity of the dock as dissolved TBT is highly surface active and will readily adsorb onto particulates and settle onto the seabed. Subject to confirmation through monitoring, it is thought that up to 70% less TBT will be discharged into the marine environment from the dock once this system is in operation.

Naval dry dockyards in the UK and New Zealand are attempting to collect and treat washwaters from their docks but as yet no details on the systems or their efficiencies have been published. United Dock will be the first known floating dock to implement such a collection and filtration system. Should the project prove successful then HUD will extend this collection system to the Whampoa dock which is also moored at Tsing Yi. This would mean that washwaters from all of HUD's docks are collected and treated.

4.2.2 Sewage

United was the first dock to be fitted with its own sewage treatment plant. The discharge from the plant is currently licensed under the WPCO and residual chlorine is measured on a weekly basis. Provided that the revised discharge licence for the dock includes this effluent stream, the discharge will continue to be monitored closely thus minimising the risk of water pollution. Sewage effluent is therefore not considered to be a discharge of concern.

4.2.3 Noise

Given the industrial nature of the area and the high proportion of heavy goods vehicles in the area, the additional noise generated by activities on the dock are not expected to be significant. There are no sensitive receivers within a 500m radius from the site and operational noise is not considered to be a problem.

在填海前將首先建造石塊堆成防波堤以防止堆填用沙石流失至海中。堆填用沙石大多數從海上運來以減少對岸上交通影響。空氣及聲浪影響被認爲不成問題因施工地附近無易受影響接收者。

4.1.4 搬遷影響

"聯合"號浮塢將會在填海工程完成時及在用作碇泊的錨穴準備好後就被由陰澳灣搬遷至青衣島。搬遷過程對海上交通應無影響，至於搬遷日期則需得海事處同意。

搬遷"聯合"號浮塢過程會將現有22個錨碇再用以減省費用及免卸棄置問題，當將錨碇從海底起出時會將沖貿積泥有所攪動，維此乃極短期間應無甚影響。

4.2 第二階段 — 浮塢運作

4.2.1 排放清洗用水對海中環境影響

三丁基錫（TBT）

在以前爲碇泊"聯合"號浮塢在陰澳灣時作出的第一個"環境影響評估"報告中曾指出在浮塢運作中所排出清洗船身用水有潛在污染海中環境，其中主要污染物爲三丁基錫（TBT），此是現用防污漆中成份，爲用作防止海藻及貝殼生物附在船隻水下船殼上。三丁基錫是爲重要因其在濃度低至每公升水內有十億分之二十克時仍能影響其他海中生物，在英國此數值是在1985年時曾被採用爲目標，維在1989年將已將目標更改減至此數值十分之一,此數值自1990年起被加拿大及澳洲採納,香港法例沒有三丁基錫的安全數值標準，維量度含毒素水質標準應該不能低於能引致重大影響的標準。

在現仍持續的環境監察及稽核過程顯示，在陰澳灣運作時，三丁基錫溶失於清洗船身用水的代表性濃度是爲每公升含有十億分之六百。雖然採用良好設備管理，仍發現在陰澳的浮塢所在地點周圍海底有顯著的三丁基錫積聚。

"環境影響評估"報告中曾對油漆碎片在洗用水中被排放出海作出3個行動分析：—

●浮塢在現時陰澳灣位置

●浮塢在預算在青衣島的碇泊位置

In terms of traffic noise, the facility is not anticipated to generate any additional traffic as the container storage facility, which will be moved from the land adjacent to the shipyard to the reclamation, will serve the same amount of traffic and all supplies for United are already brought via Tsing Yi.

4.2.4 Air Quality

Air quality impacts from the dock are minimal given that every precaution is taken on the dock to minimise drift of both paint and copper slag during hull maintenance. There is however a requirement under the Air Pollution Control (Furnaces, ovens and chimneys) (installation and alteration) Regulations, 1989, Section 2, Regulation 2 for approval for the installation of diesel generators on board the United once it becomes a land based operation. Approval will be sought for the two main 1,550KVA generating sets, the third 1,550KVA standby generating set and an emergency 900KVA generating set.

5. ENVIRONMENTAL MONITORING AND AUDIT

5.1 INTRODUCTION

Environmental Monitoring and Audit (EM&A) schedules are essential in order to ensure that environmental impacts which may arise during the construction phase or operation of the dock are minimised and kept at acceptable levels. They are particularly important for this study as there will be a need to assess the benefits of the proposed collection system in terms of minimising TBT and metal, particularly copper and zinc release. The schedules will also ensure that procedures are in place for checking that not only are the mitigation measures effective but also that appropriate corrective action is taken, if and when required.

The schedules for EM&A will be detailed in the EM&A manual for both construction and operation.

5.2 CONSTRUCTION PHASE EM&A

Through baseline monitoring, 2 control stations, one upstream and the other downstream of the site will be established prior to the commencement of construction works. Baseline data will be used together with Water Quality Objectives for the Western Buffer Water Control Zone (Appendix 3) to determine a Compliance level which should not be exceeded and an Action level to initiate action to prevent a breach of the Compliance level. Monitoring will then be undertaken at stations within the area expected to be affected by the sediment plume for suspended solids, turbidity and dissolved oxygen throughout the dredging period.

Elutriate tests are currently being undertaken on all samples previously taken where grade C contamination of copper and zinc was found in order to assess potential availability of contaminants during dredging.

Monitoring data will be sent to EPD on a monthly basis in the form of an EM&A report throughout the construction period and EPD will be advised of any exceedances as and when they occur.

All analytical work will be undertaken at a HOKLAS approved laboratory using standards methods and procedures.

5.3 OPERATIONAL PHASE EM&A

During the operation of the dock it is proposed that monitoring of sediments and marine waters continues around United once it is relocated to Tsing Yi. Monitoring should include heavy metals and TBTs. Preliminary tests on the effluent collected should be undertaken before and after filtering in order to determine the effectiveness of the system.

Monitoring positions for marine sediments will be set out in the EM&A manual and will follow the circulation in the area enabling dispersion of TBTs and metals to be monitored. Baseline monitoring will establish current sediment quality prior to the commencement of operations on United. Sediment will be analysed for TBT and metals; Arsenic, Cadmium, Chromium, Copper, lead, Nickel, Zinc and Tin. Marine water quality will also be monitored for TBT close to the point of discharge from the treatment tank between the docks, and 50m down current of the dock.

The washwaters will also be sampled for TBT and suspended solids prior to filtering and after filtering and before release to the marine environment. This will provide valuable information on the effectiveness of the collection system.

The dock is currently adversely affecting sediment at Yam O Wan. Removal of the dock from this area will therefore have a beneficial effect on sediment quality as TBTs degrade. TBTs are not persistent in

●浮塢在預算在青衣島的碇泊位置，如果清洗船身用水被引至排放進入碇泊的海灣內100公尺處

此項分析發現浮塢在陰澳灣當含最大三丁基錫濃度的水被排放時其擴散面積是爲最大與及比較以前想像中更大，擴散遠至馬灣養魚區及一般中華白海豚游戈的海域。

分析浮塢在青衣島的情況爲如排放用水進入海灣內其實會增加三丁基錫沈澱頂點面積，但擴散略少於第一及第二個分析即當清洗用水由浮塢直接排放出海。

第二及第三個分析顯示污染物有潛在被擴散至荃灣沿岸憲報登有的泳灘對開但該時該處三丁基錫的濃度會是很少至不關重要數值約是每公升含有十億分之零點二。

重金屬防污漆油內的另外的附加劑亦包括重金屬，如銅及鋅，船塢方面亦使用甚多銅礦渣砂粒進行噴砂工程，在陰澳灣在“聯合”號浮塢與“太古”號浮塢其周圍海床淤泥均含有高量（C級）銅及鋅，而在青衣島的“黃埔”號浮塢情況亦一樣，浮塢在青衣島運作有潛在令水中重金屬污染增加。

與三丁基錫不同，重金屬留在環境中是永久的，因此長期排放會令重金屬在淤泥中大量積聚。與青衣島的工業區岸線比較，第一個分析地區，即陰澳灣，是爲更加易受影響及重要，維如將來泳灘水質如被改善時，此些排放將會引致影響被關注。

減緩建議

現時在現地保持良好設備管理是唯一實際可行方法來減少由浮塢排放污染物出海，而此項研究得出結論是搬遷浮塢帶來的效益是可減緩在陰澳灣的影響因爲聯合船塢將終止其在該區的運作，及如果能令“聯合”號浮塢運作效能有增進則排放三丁基錫入香港海域亦會被減少。維分析亦顯示其後青衣島及荃灣沿岸水中的三丁基錫及重金屬含量亦會增加，將來泳灘水質如能被改善時，到時可有所顧慮。

再有第四個分析，因此是個可取選擇，就是聯合船塢將進行安裝一個收集清洗用水系統，維此安裝只有浮塢靠近岸邊時才可實際施行，到時清洗船身用水將被收集及利用浮塢外旁新裝水管及水泵運送至填海地上一個水槽處理（見附圖三），此水槽裝置有過濾系統以濾去含三丁基錫油漆碎片及銅與鋅碎粒，不然此就會被直接排放出海。雖然過濾系統不能全部濾去清洗用水內的三丁基錫，因有少量已溶解於水中，但可濾去大部份粒狀

the environment and can break down into dibutyl and harmless monobutyl tins over a period of several weeks depending on the conditions (de Mora *et al*, 1995). The sediment monitoring programme will therefore continue in Yam O Wan for a limited period as part of the site decommissioning to determine the rate of breakdown of TBTs.

It is recommended that monitoring of waters and sediments should continue every four months subject to review, commencing just after the dock is relocated.

Full environmental audits will be undertaken on an annual basis commencing 3 months after operations begin at Tsing Yi. By this stage some routine will have been re-established on the dock and the efficiency of the collection system can be reviewed and recommendations for amendments made. It is proposed that reports are sent to EPD as data and information is obtained.

6. References:

Goldberg, E.D (1988) *Information needs for Marine Pollution Studies.* In: Environmental Monitoring and Assessment 11; pp293 - 298

Haskoning Royal Dutch Consulting Engineers and Architects (1989) *Technical and Economic aspects of measures to Reduce Water Pollution caused by the Discharge of Tributyl Tin Compounds.* Report prepared for the European Commission

de Mora S J, C Stewart and D Phillips (1995) *Sources and Rate of Degradation of Tri n-butyl tin in Marine Sediments Near Auckland, New Zealand.* Elsevier Science, Vol 30, No 1, January 1995.

三丁基錫（可達百份之90-98，根據1989年外國研究），其後清洗用水才被排放往灣內水流有阻限及低生態區，其餘已溶解於水中的三丁基錫因其表面活動性高可被吸附成粒子沉至海底。預計此系統運作後，三丁基錫的排放入海可被減少達百份之七十，維此需其後作出監察來證實。

有數個海軍船塢在英國及紐西蘭現在嘗試進行收集船身清洗用水，但迄今仍未有關於其運作資料及效能被公佈。“聯合”號浮塢將會是第一個安裝有收集洗船身用水及過濾系統的浮塢，如果此項計劃實施成功，則此系統會被擴展至鄰旁的另一個“黃埔”號浮塢使用到時聯合船塢所有浮塢上的清洗船身用水都將被收集及處理。

4.2.2 污水

“聯合”號浮塢上本身裝有污水處理系統來處理日常生活產生的污水，污水排放現時是被水污染管制條例監管，爲此每週都量度殘餘氯數值。搬遷後浮塢將被用另一地區污水排放牌照繼續監管，所以排放生活污水應不是顧慮。

4.2.3 聲浪

因青衣島乃工業地區及有大量重型車輛行走，多一個浮塢產生的聲浪應對整體無大影響，計劃地段在半公里範圍內無易受影響接收者，因而運作聲浪應不是問題。船塢將來的運作不會增加交通流量，因各項運輸數量沒有改變，而船塢內貨櫃存放只是移位但總存量不變。

4.2.4 空氣質素

浮塢對空氣質素的影響甚少，因在船身維修工程中已使用各種步驟來減少油漆及銅礦渣砂粒擴散。維將來浮塢靠近岸運作時，浮塢上的柴油發電機組可受空氣污染（火爐，烤爐及煙窗）1989年訂下法例管制，浮塢上一共有四台柴油發電機，其中兩台（1550KVA）爲主，壹台(1550KVA)爲待命及壹台（900KVA）作應急用。

5. 環境監察及稽核

5.1 引言

環境監察及稽核（EM&A）是爲需要以確保在建築中及浮塢運作中的環境影響被減少及保持在可接受範圍內。對此次研究尤其重要是在進行評定裝置收集清洗用水系統後的效能及有無顯著減少三丁基錫與銅及鋅的排放，及定下步驟來檢查採取的減緩措施是否有效及如有需要可採取更多改

正行動。環境監察及稽核步驟將在另訂手册中被排定及施行，其中包括在建築中及運作中過程。

5.2 建築階段環境監察及稽核

採用基線監察，在建築開始之前將安裝兩個控制站，一個在上游另一個在下游，就以基線資料連同緩衝區水質控制區的水質目標來決定不能超越的容許水平及如超越後採取行動的水平，在挖泥過程中在控制站進行監察因攪動沖積泥而引致水中粒子懸浮，污濁及氧氣溶解。

現時已安排將海底沖積層樣本進行沖洗淘淨試驗以找出在挖泥中銅及鋅的放出。在建築期內監察得資料每個月都被整頓然後以環境監察及稽核報告型式交付環境保護署，進行審核及向其報告任何超越事件的發生。

5.3 運作階段環境監察及稽核

茲提議當“聯合”號浮塢被搬遷往青衣島後運作時要繼續進行監察浮塢周圍沉殿物及海水，包括重金屬及三丁基錫含量，清洗用水被排放之前及後都被檢驗以查出過濾系統的效能，監察海中沉殿物位置會在另訂手册中說明，此將包括水流範圍以找出三丁基錫及重金屬如何擴散，基線監察將找出運作前沉澱物的質素，在沉澱物中要找出含量要是：三丁基錫及重金屬如砒、鎘、銅、鉛、鎳、鋅、錫、等等。海水質素在處理水槽近處浮塢之間及50公尺下游都被監察及找出三丁基錫含量。

清洗船身用水在被過濾前及後都被提採樣本來分析找出三丁基錫及懸浮粒子。此可得出有用資料來顯示收集系統的效能。

“聯合”號浮塢現時在陰澳灣是爲對該處海中沉澱物有不利影響，浮塢遷走對該處海中沉澱物大有益處因三丁基錫會逐漸衰敗，因爲三丁基錫不是持久，就情況可以在數星期後分解成二丁基錫及無害的單丁基錫，在陰澳灣的沉澱物監察將會在浮塢被搬遷後仍然持續進行一個短暫時期以確定其衰敗率。

在此提議在浮塢被搬遷後立即每四個月進行一次監察海水及沉澱物直至再決定更改步驟,浮塢在青衣島運作後3個月就進行全套環境稽核,因到時該時浮塢上例行職務已重新被訂立，到時洗船身用水收集系統的效能將被檢討及給予建議來再作出改進，有關資料及報告將被交付環境保護處。

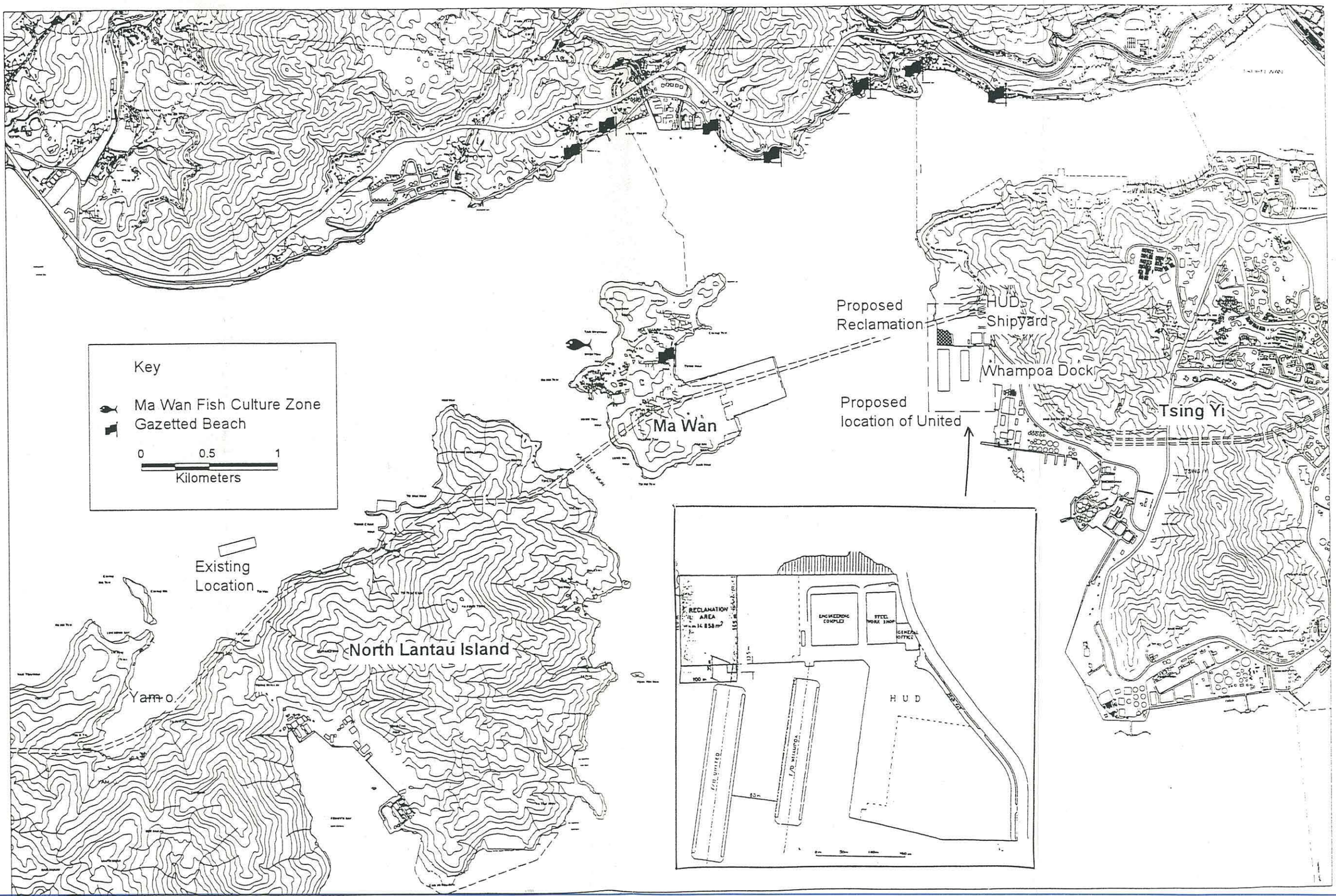

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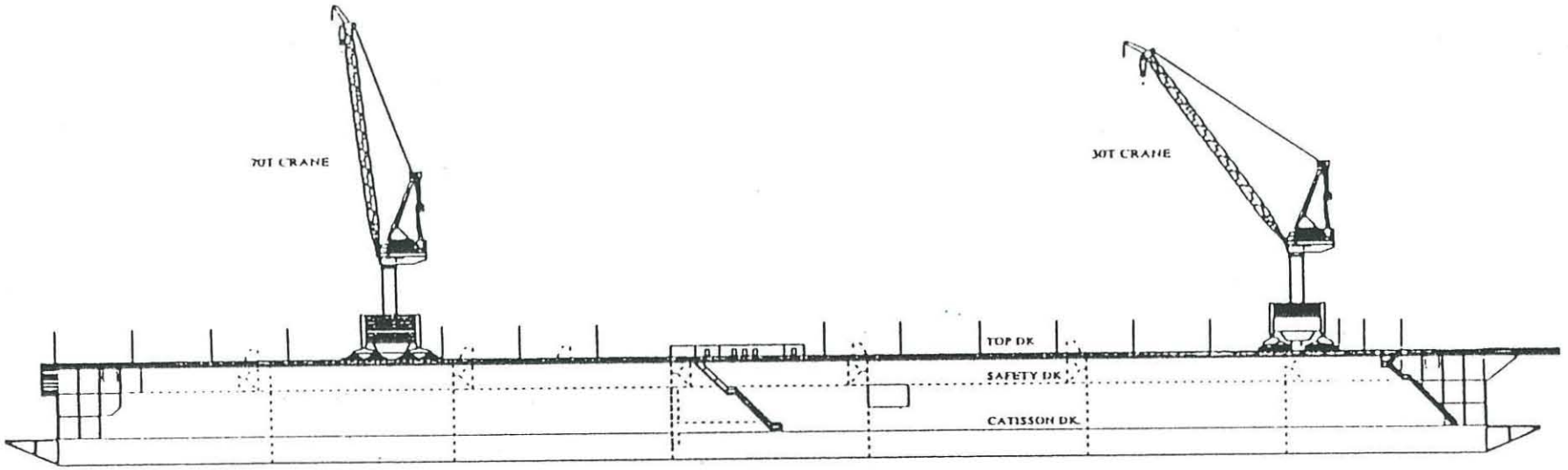
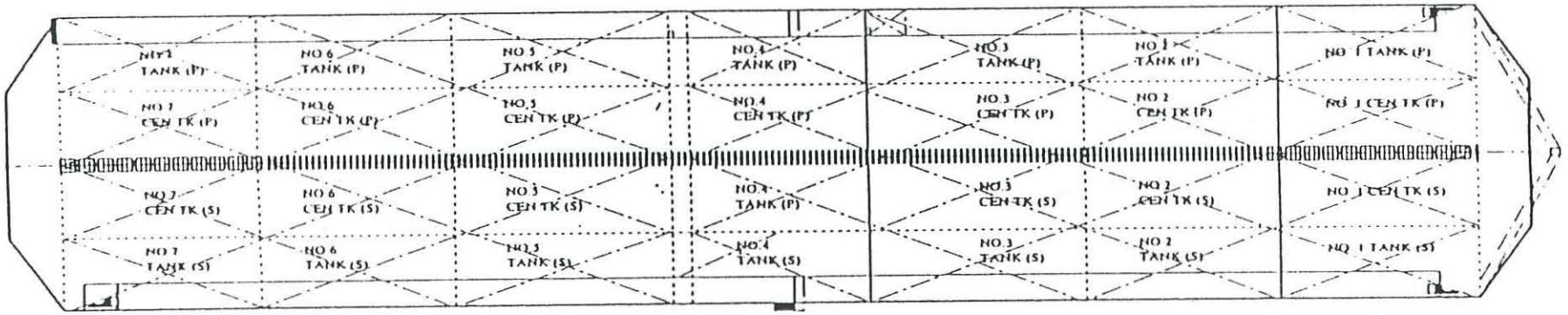
Figure 1 Existing and Proposed Site Location

Job No 192000, July 1996, Executive Summary



Elevation



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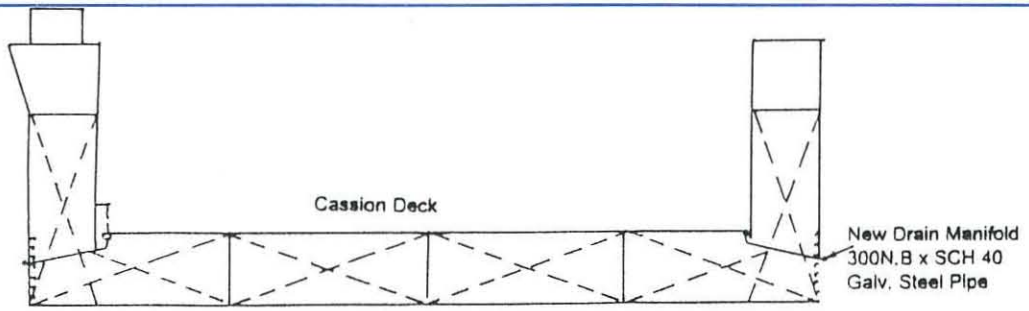
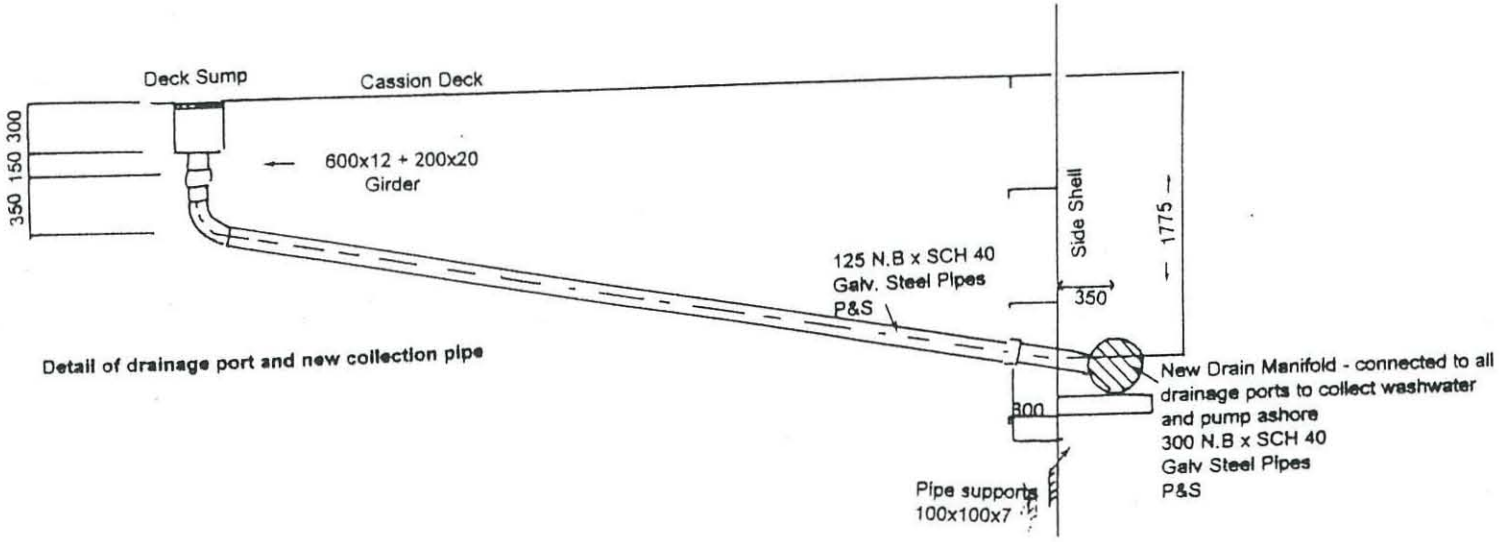
Proposed Extension to TYTL 108RP Reclamation and Relocation of United Dock

Figure 2 Cross Sectional and Plan View of United

Job No 192000, July 1996, Executive Summary



Cross Section of Dock



Detail of drainage port and new collection pipe

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Figure 3 Preliminary Design for Washwater Collection

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Photograph 1 Proposed Reclamation Site, Tsing Yi

圖一：青衣島西岸擬填海的位置

Photograph 2 Ship in for repair on United, Yam O Wan

圖二：陰澳灣'联合'號浮塢維修停泊處

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Extension to Lot TYTL 108 RP Reclamation and relocation of United Dock to Tsing Yi

Photograph 1 & 2 Reclamation site and the United Dock

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圖一及二：填海位置及'联合'號浮塢

Attachment 1 - Additional Information on Noise and Air Quality

Noise

The shipyard lies within a designated industrial area on Tsing Yi within which there are no Noise Sensitive Receivers (NSRs) such as residential blocks, schools etc. NSRs on Ma Wan and along the Tsuen Wan coastline are over 2km from the site. These NSRs are more sensitive to construction noise from airport related projects such as Ting Kau Bridge, Route 3 and the Tsing Ma Bridge, and key receivers subject to unacceptable noise levels have already been compensated with double glazing etc to reduce noise. The shipyard lies just above sea level behind a cutting created for Route 3 which in turn is seperated from the residential areas of Tsing Yi by a ridge of high land which reaches 200m above sea level. Residential areas are over 1.5km from the dock and therefore any noise emissions from the dock during construction or operation will be attenuated by natural screening and distance effects.

Prior to the mooring of the dock in Yam O Wan, noise calculations were undertaken in accordance with the *Technical Memorandum (TM) for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites*. The closest NSRs were over 1km from the site and noise from the United dock was estimated to be 32.9 dB(A) at the NSRs. Given that the greater distance and greater shielding from the ridge on Tsing Yi will reduce the noise levels at Tsing Yi's NSRs by at least a further 5-8dB(A), the noise will not be perceived above background levels at the NSRs where Acceptable Noise Levels for daytime in the TM are given as 70dB(A). The dock will not be operational during the evening and night time hours.

In terms of traffic noise, the facility is not anticipated to generate any additional traffic as the operation of the container storage facility will remain the same after relocation. Also, all supplies for United dock are already brought via the Tsing Yi shipyard and therefore there will be no additional traffic.

Air Quality

Air quality impacts from the dock are minimal given that every precaution is taken on the dock to minimise drift of both paint and copper slag during hull maintenance. There is a requirement under the *Air Pollution Control (Furnaces, ovens and chimneys) (installation and alteration) Regulations, 1989, Section 2, Regulation 2* for approval for the installation of diesel generators on board the United once it becomes a land based operation. There will not be any significant air emissions from the dock or construction works especially given the large buffer distances between the dock and any Sensitve Receivers.

Given that the project will not generate any additional traffic then there will be no impact on existing air quality from vehicle exhausts. The ability to be able to decommission the Taikoo dock will reduce the supplies required to be brought to the shipyard which may reduce vehicles and associated emissions.

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Attachment No. 2 View of Site and Surrounding Area, West Tsing Yi

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附加圖二：青衣西邊的工地和周圍地區.

AXIS Environmental Consultants Ltd.