

**Proposed Extension of Public Golf Course
at Kau Sai Chau Island, Sai Kung**
西貢滘西洲公眾高爾夫球場擬建擴建工程

Environmental Impact Assessment
環境影響評估

Final Report
最後報告

Executive Summary
行政摘要

Report Authorized For
Issued By:

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EXECUTIVE SUMMARY

1. INTRODUCTION

1.1 Background to the Study

1.1.1 In the mid 1990s a public golf course was proposed by the Hong Kong Jockey Club (HKJC) at Kau Sai Chau for providing a recreational golf facility with the effect of restoring the land degraded by its use as an artillery range. In late 1995 the first 18-hole golf course was opened to the public, followed by a second 18-hole golf course, driving range and associated support facilities 9 months later. Since opening, utilisation of the golf courses has increased considerably. The existing courses are in heavy demand, and therefore the Hong Kong Jockey Club has decided to expand the existing facilities by building the third golf course with supporting facilities. The "Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung" will provide additional golfing capacity for the public next to the existing public golf course on Kau Sai Chau.

1.1.2 The location of the proposed 18-hole third Golf Course is on the east side of Kau Sai Chau immediately south of the existing public golf course ([Figure 1](#)). The proposed site is currently unzoned and comprises an approximately 300 metres wide and 1.5 km long strip of undulating scrubland. The site is bounded to the west by steep rugged uplands and incised valleys and to the south and east by steep rocky coastline. North of the site is the existing Jockey Club Kau Sai Chau Public Golf Course that occupies the northern half of the island.

1.2 Purpose and Scope of EIA

1.2.1 The proposed third golf course is a Designated Project (the Project) under Schedule 2 [Part 1, Item O.1] under the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499) and requires an environmental permit under the EIAO for its construction and operation.

1.2.2 The EIA provides a detailed assessment of the potential environmental impacts associated with the Project, in relation to the issues specified in the EIA Study Brief No. ESB-064/2000, including air quality, noise impact, water quality, marine and terrestrial ecology, fisheries, waste management, landscape and visual impact, cultural heritage implications and land contamination.

2. PROJECT DESCRIPTION

2.1 Location and Scale of Project

2.1.1 The location of the proposed 18-hole third Golf Course is on the east side of Kau Sai Chau immediately south of the existing public golf course ([Figure 2](#)). The proposed turfed area is approximately 20 hectare. The proposed golf course will be 7,000 yards in play length and players will use electric golf carts to drive along the dedicated cart paths along the fairways of the 18 holes. Unlike the first two courses the proposed course will be turfed with *Seashore Paspalum*. Besides higher tolerance to stress (heavy traffic), this grass is salt tolerant which means less fresh water will be needed for irrigation. In addition, as it is more resistant to diseases and insects and has a low nitrogen requirement, less fertilizer and pesticide will be needed in future.

2.1.2 Certain elements of infrastructure support are already available in the existing golf course facilities (administration building, maintenance building, sewage treatment work and water supply) and will be shared or extended to provide additional capacity for the proposed third golf course.

2.2 Need for the Project

2.2.1 Since the opening of the Existing Course in 1995, the game of golf has become extremely popular with the Hong Kong public and the demand for it is on the rise.

2.2.2 The heavy demand at Kau Sai Chau can be demonstrated by the following facts:

- Over 60,000 telephone calls in the first hour of opening the daily booking system at 9:30 am for Saturday/Sunday/public holiday (maximum of 500 players per day);
- Almost 100% utilisation of tee-times on weekends/public holidays and 72% for weekdays (during good weather months). Average utilisation at 80% per year;
- Over 8,000 golf students including 3,600 juniors (under 21 years) attending each year; and
- A daily record of 1,200 visitors visiting the island, including golfers, golf students, driving range users and general visitors over the weekend.

2.2.3 The growing popularity of the game is also demonstrated by the establishment of 10 commercially-run driving range facilities throughout Hong Kong and the New Territories in the last 8 years.

2.2.4 By increasing the economy of scale in using the existing supporting facilities, the proposed third golf course will be able to generate cash for establishing a new Kau Sai Chau sports development fund to finance new services for the benefit of the people of Hong Kong:

- golf academy for people interested in pursuing a career in the golf industry;
- adaptive golf for people with disabilities (the blind, the mentally retarded, wheelchair users, etc);
- elite training for grass-root level juniors; and
- other sport and recreational facilities.

2.3 Construction and Operational Activities

2.3.1 The major activities involved during the construction stage of the Project are cut and fill earthworks, slope works, earth retaining walls, irrigation buffer lake, detention ponds and tanks, sand bunkers and golf course capping and turfing. The temporary works will involve the formation of temporary working platforms and material storage areas.

2.3.2 During the operation stage, the main on-site activities are routine maintenance of the golf course and operation of the desalination plant for irrigation purposes during the dry season.

2.4 Project Programme

2.4.1 The proposed construction programme (from December 2005 to July 2007) will cover 20 months with major construction activities carried out in the first 9 months.

3. ENVIRONMENTAL IMPACTS

3.1 Potential environmental impacts associated with the construction and operation phases of the proposed Project are summarized below:

Air Quality

3.2 Construction dust impact has been assessed and evaluated. With the implementation of the appropriate dust suppression measures, such as regular watering and covering the exposed stockpiles with tarpaulin, the construction dust impacts can be reduced to acceptable levels. No significant

construction and operational dust impact would be expected at any of the air sensitive receivers in the vicinity of the study area.

Noise

- 3.3 Representative noise sensitive receivers were identified. During the construction phase, the construction noise predicted at the representative noise sensitive receivers will not exceed the noise standard due to natural geographic shielding and the remoteness from the construction site. No noise impact is expected during the operational phase of Project.

Ecology

- 3.4 The ecological resources recorded within the Assessment Area include shrubland, stream/ravine, coastal/backshore and reservoir/pond/marsh. Plant species to be impacted are all common and typically found in this habitat type. Impacts to plant species of conservation concern are considered minimal as these species and their ravine habitats will be preserved during site formation.
- 3.5 All bird species recorded in the shrubland are common and widespread in Hong Kong. Species richness of shrubland in the Project Area is considered very low. Bird density in shrublands on the Project Area is also very low by Hong Kong standards. Unusually low bird density is due to many years of habitat degradation that has removed trees, eroded soils, and maintained grass-shrub cover over most of the island. Kau Sai Chau has seen prolonged disturbance by semi-annual hillfires and nearly four decades of use as a firing range. Topsoil on most of the Project Area is highly eroded and there is little vegetation cover except in the ravines.
- 3.6 Shrubland will be converted to a golf course, which will provide a replacement habitat for wildlife as it has on the existing golf course over the last 10 years. The golf course extension will extend the fire-break effect over a larger area, thus providing greater protection to more of the remaining natural areas on the island. This will encourage natural succession on shrublands and other unaffected habitats. The impact is expected to be temporary and minor.
- 3.7 Ravine habitats of perennial streams in the Project Area will be preserved and protected by buffer zones. Construction works at the desalination plant and barging point will only affect small areas of coastal habitats, which account for a small proportion of the daily home range of fauna of conservation concern in the coastal areas. Bird abundance along the shoreline of Kau Sai Chau was low. The ecological importance of the coastal area around the ferry pier as habitat for birds and other fauna is low. The impact to fauna in coastal areas is considered minimal.
- 3.8 The operational impact to habitat and flora is considered positive due to protection of habitats from fire. This will accelerate natural succession and will ultimately lead to greater numbers of trees and more complex habitats, this benefiting and supporting wildlife species and population numbers. Creation of additional freshwater ponds will also benefit waterbirds and herpetofauna.

Marine Ecology

- 3.9 The Project has no insurmountable impacts on marine ecology during construction and operational phases. The marine benthic communities in the waters around Kau Sai Chau were not of special conservation concern, and the intertidal zone was basically natural and typical. The construction of the desalination plant's intake and outfall and temporary barging point will result in minor losses of intertidal (40m² temporary at the barging point, 130m² permanently at the desalination plant) and subtidal (1,500 m² temporary at the dredging area) habitats. Given the short construction durations (about one year for temporary barging point and about 3 months for dredging area), a negative impact

on marine ecology is not expected. Mitigation and precautionary measures will be provided during construction and operation phases in order to minimize water quality impacts. In the site for the desalination plant, 79 small and common coral colonies were found and would be transplanted. The residual impacts are acceptable. A well-planned program of site practices and coral transplantation should maintain the impacts within acceptable levels.

Water Quality

- 3.10 The EIA has dealt with the assessment of impacts on water quality from the construction and operation phase of the proposed third golf course. During the construction phase, it was determined that minor water quality impacts to water bodies could arise directly from land-based construction works. No direct construction runoff is expected. Impacts can be controlled to comply with WPCO standards by implementing the recommended mitigations which provide a series of good site management options to minimise the impact of stormwater runoff.
- 3.11 With the implementation of a closed low flow drainage system for the collection of runoff from the proposed third golf course, and lower fertilizer and pesticides requirements for *Seashore Paspalum*, no operational water quality impact is expected. Predicted overflow water quality from new lakes and existing reservoir will comply with the Water Quality Objectives at Port Shelter. The Water Quality modelling results indicate that the predicted concentrations of salinity from the desalination plant discharge will satisfy the Water Quality Objectives at Port Shelter and the ecological sensitive sites, including seagrass and fish culture zones.

Waste Management

- 3.12 The construction work will involve site formation and earthwork excavation, which will necessitate the removal of spoil. There will be no net import or export of material from earthworks operations and ground-shaping. All cut material will be used within the works site as fill material. A small quantity of demolition waste, non-inert waste generated from site formation, municipal waste generated by site staff and chemical waste will be generated during the construction phase. No waste impact during the operational phase is anticipated.

Fisheries

- 3.13 The construction of the desalination plant and temporary barging point will result in minor temporary losses of fishing grounds, but it is not expected to be a significant impact on capture fisheries. A well-planned programme of site practices and the water quality monitoring should be able to prevent construction phase impacts on fisheries. Though operation phase impacts are not anticipated, there are also water quality precautionary measures to further protect the fisheries resources. No residual impacts on capture fisheries and fish culture operations are anticipated.

Landscape and Visual Assessment

- 3.1 With the proposed implementation mitigation measures, the impact on landscape resources and character areas is considered to be acceptable. Beneficial impacts on landscape resources will result from the partial restoration of eroded slopes. All affected areas will be covered with golf course turf or hydroseeding. The hydroseeding areas will be managed to allow for the reestablishment of shrubland. The hydroseeding mix, which will comprise native shrubs with grass seeds, will encourage this process.
- 3.2 Impacts on visually sensitive receivers are acceptable with the implementation of mitigation measures. The majority of visual sensitive receiver groups are located at distances greater than 1 km away from

the development. Golf players on the existing golf course will be the nearest receivers and will be mostly affected temporarily during the construction phase. Beneficial impacts will result from the partial restoration of eroded slopes.

Cultural Heritage

- 3.3 The archaeological impact assessment for the extension of the golf course concluded that the bay at Wan Chai is an archaeological site. The site was excavated and it was assessed that some potential for archaeological material remains. A watching brief is recommended to fully record this site.
- 3.4 The built heritage impact assessment, identified an excellent example of a Late Qing Dynasty grave. This will be kept in-situ by adjusting the golf course layout and by providing three meters buffer zone protection as a mitigation measure during the construction phase, no impact is anticipated. Grave#5 and Grave#20 will be removed and a full recording will be conducted.

Land Contamination

- 3.5 An account of the present and historical land uses at the proposed third golf course areas indicated that there may exist potential land contamination. A preliminary Contamination Assessment Plan (CAP) has been prepared which proposed further investigation on the construction areas. The potential residual impacts will be insignificant provided that any identified contaminated land will be remediated to the acceptable standards prior to the site clearance/excavation works, and the mitigation measures recommended will be properly implemented during the construction stage of the Project.

Environmental Outcome

- 3.6 Within the study area of the proposed third golf course, major environmental sensitive receivers are streams and marine water. For the identified sensitive streams, buffer zones on both sides of the streams and no direct contact with natural streams are proposed in order to preserve the integrity of the streams during and after the construction of the bridges. The buffer zones will be maintained throughout the construction and operational phases of the proposed third golf course.
- 3.7 To protect the streams and the marine water quality, a closed low flow drainage system is proposed and golf course runoff will be eventually diverted to the existing reservoir for irrigation purpose. Use of environmentally friendly biopesticides to control turf diseases and insects up to the expected threshold is proposed at Hole 5 and part of Hole 6 as a preventative mitigation measures.
- 3.8 Summary of Key Outcomes are shown as follows:
- The whole concept of the collection of golf course runoff by the proposed closed low flow drainage system can facilitate water recycle, reuse and reduction during the future operational phase of the proposed third golf course.
 - Major elements of infrastructure support are already available in the existing golf courses. These facilities will be shared or extended to cater for additional requirements for the proposed third golf course.
 - The proposed third course will be turfed with *Seashore Paspalum*. This plant species has high tolerance to drought and salty conditions and high resistance to diseases and insects. Reductions in pesticide and fertilizer applications and irrigation to the proposed third golf course are expected in future.

- To provide sufficient irrigation water to the proposed third golf course during dry periods, a desalination plant has been incorporated into the Project. With this installation, a supply of irrigation water can be proactively managed depending on usage, as compared to a fixed volume of an inland reservoir, thus consuming water in a more effective manner.
- The site is currently undeveloped, comprising scrubland and incised stream courses. There are several areas where the former use as an artillery firing range have removed the thin surface vegetation and allowed rainwater to wash out soil. The proposed golf course will restore the scarred area within the proposed golf course boundary.

Environmental Monitoring and Audit (EM&A)

- 3.9 During construction and operational of the Project, environmental monitoring will be necessary to assess the effectiveness of mitigation measures implemented to mitigate air quality, water quality, terrestrial ecology, marine ecology, land contamination impacts. Regular environmental auditing is also recommended to ensure that potential impacts are adequately addressed through the implementation of mitigation measures defined in this EIA report.

Overall Conclusions

- 3.10 The EIA has critically assessed the overall acceptability of any environmental impacts likely to arise as a result of the construction and operation of the proposed third golf course. Where necessary and practicable, the EIA has specified the conditions and requirements for the detailed design, construction and operation of the Project in order to mitigate environmental impacts to acceptable levels.
- 3.11 With the recommended mitigation measures applied, the Project would be environmentally acceptable and no unacceptable residual impacts are anticipated. The schedule of implementation of the recommended mitigation measures has been provided in the EIA report. Monitoring requirements have also been specified in a separate EM&A Manual to ensure proper implementation of the recommended mitigation measures.