



## Tai Shue Wan Development at Ocean Park 海洋公園大樹灣發展計劃

Environmental Impact Assessment - Executive Summary  
環境影響評估報告－行政摘要  
Document No. 文件編號: 328011/03/03/E

May 2014  
二零一四年五月  
Ocean Park Corporation  
海洋公園

# Tai Shue Wan Development at Ocean Park 海洋公園大樹灣發展計劃

Environmental Impact Assessment – Executive Summary

環境影響評估報告 – 行政摘要

Document No. 文件編號: 328011/03/03/E

May 2014

二零一四年五月

Ocean Park Corporation

海洋公園

Ocean Park, Aberdeen, Hong Kong

香港香港仔海洋公園

# Content

Chapter	Title	Page
1.	Introduction	1
2.	Project Description	2
2.1	Need for the Project	2
2.2	Project Location and Scale	2
2.3	Scope of the Project	3
2.4	Consideration of Alternatives	4
2.5	Implementation Programme	9
3.	Summary of the Environmental Impact Assessment	10
3.1	Air Quality Impact	10
3.2	Hazard to Life	12
3.3	Noise Impact	12
3.4	Water Quality Impact	13
3.5	Sewerage and Sewage Treatment Implications	14
3.6	Waste Management Implications	14
3.7	Land Contamination	15
3.8	Ecological Impact	15
3.9	Fisheries Impact	17
3.10	Landscape and Visual Impact	18
4.	Environmental Monitoring and Audit	20
5.	Conclusion	21

## Tables

Table 2.1:	Levels and Corresponding Major Facilities for the Project	3
Table 2.2:	Summary of Layout and Design of Scheme Options Considered	4
Table 2.3:	Summary of Recommended Option of Construction Methods	8
Table 2.4:	Summary of Construction Programme	9
Table 3.1:	Summary of Predicted Cumulative TSP, RSP and FSP Concentrations for Tier 1 Construction Dust at All ASRs (Mitigated and Unmitigated)	10
Table 3.2:	Summary of Predicted Cumulative RSP and FSP Concentrations for Annual Construction Dust at All ASRs (Mitigated and Unmitigated)	11
Table 3.3:	Summary of Predicted Operation Cumulative RSP, FSP and NO <sub>2</sub> Concentrations for All ASRs	11

## Figures

Figure 1.1	Project Location
Figure 2.1	Artistic Impression of the Preferred Scheme – front view
Figure 2.2	Artistic Impression of the Preferred Scheme – back view
Figure 2.3	Artistic Impression of the Indoor Water Park
Figure 2.4	Artistic Impression of the Outdoor Water Park
Figure 2.5	Proposed Layout Plan of the Preferred Scheme

Figure 2.6	Vertical Sections of the Preferred Scheme
Figure 2.7	Layout Plan and Artistic Impression of the Original Scheme
Figure 3.1	Habitat Affected
Figure 3.2	Compensation and Enhancement Areas
Figure 3.3	Landscape Plan

# 1. Introduction

The "Tai Shue Wan Development at Ocean Park" (hereinafter known as "the Project") is proposed by Ocean Park Corporation (OPC) to be implemented at its existing site of Ocean Park in Aberdeen. Ocean Park is an exempted designated project (DP) under Category O.8 in Part I Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), as it was already in operation before the enactment of the EIAO.

In the project entitled "Repositioning and Long Term Operation Plan of Ocean Park" (the Repositioning project), it involved construction/modification of existing facilities and expansion of the Park, which constituted a material change to the exempted DP, and therefore an environmental impact assessment (EIA) was carried out for obtaining an environmental permit (EP) for construction and operation of the Repositioning project under the EIAO. The EP was issued by Environmental Protection Department (EPD) on 28 July 2006, which was subsequently varied in October 2006, November 2010 and December 2013.

The facilities currently residing in Tai Shue Wan (TSW) area include Entrance/Exit Building, Aviary, Bird Paradise Pond, Flamingo Pond, Treasure Palace and the Middle Kingdom Restaurant. The TSW entrance has been temporarily closed since January 2011. The aim of this Project is to redevelop the existing TSW area into a Water Park together with related retail, dining and associated facilities. **Figure 1.1** shows the location of the Project.

A portion of this Project area is within the boundary of the Repositioning project while the remaining part of the Project falls within the exempted DP area of Ocean Park. Therefore the current Project constitutes: (a) a material change to the environmental impact of the Repositioning project; and (b) a material change to the exempted DP area of Ocean Park. Both (a) and (b) require an EIA to be conducted under EIAO in order for OPC to apply for an EP for the Project and to surrender the TSW area covered in the EP of Repositioning project.

An EIA study was conducted in accordance with EIA Study Brief (No. ESB-261/2013) to provide information on the nature and extent of environmental impacts arising from the construction and operation of the proposed Project and related activities taking place concurrently.

This Executive Summary presents the key findings of the EIA for the Project as required under the EIAO, including an assessment of potential environmental impacts from the construction and operation phases of the Project, and recommendations for mitigation measures to comply with environmental legislation and standards.

## 2. Project Description

### 2.1 Need for the Project

To accommodate the increasing visitor demand, the OPC's Repositioning project has improved the park's facilities and attractions and elevated the park's tourism appeal. However, in achieving the long term sustainability of Ocean Park by enhancing its attractiveness and providing a "must see" experience of visitors, there is a further need to strategically redevelop the Ocean Park at TSW. To be located at the picturesque TSW, the Water Park will be a significant design statement for Hong Kong, as it will feature a translucent and sweeping roof, along with world class facilities and services. The Project will have state-of-the-art water rides, a variety of attractions, as well as unique and innovative experiences for locals and guests from around the world.

Though the Project is a stand-alone development, it also serves to provide benefit and to draw additional attendance to the Ocean Park. The planned Water Park should complement the existing theme park by facilitating a longer length-of-stay for visitors.

The state-of-the-art indoor/outdoor Water Park shall have an instantaneous capacity of approximately 7,000 visitors and an estimated highest daily attendance of approximately 10,500 visitors. The all-season Water Park together with its retail, dining and entertainment areas will allow year round visits to the Ocean Park. The design will focus on the experience of visitors to ensure that there is a multitude of activities and fun for all ages. This provision of a mix of amenities and attractions will help encourage repeat attendance throughout the year. As a multi-gate offering (i.e. theme park and water park), OPC will encourage longer lengths of stay amongst visitors both in the Ocean Park and in Hong Kong, thereby elevating the destination market presence locally and throughout the region.

As the only local Water Park, the Project will cater to the needs and demands for such services from the local market, as well as offer the depth of tourism infrastructure that continues to make Hong Kong a desired destination. Countless memories and precious moments of the Hong Kong community were previously intertwined with Ocean Park's original Water World for years. The proposed Water Park will provide a return of a place that the people of Hong Kong have missed, and a chance to create future lasting and fond memories.

In addition, the Project is expected to enrich the overall tourism appeal of Hong Kong and diversify tourist attraction. Given that visits to the Park are expected to be a full-day experience, it is estimated that the length of stay for non-local visitors will be extended by 0.75 day with the addition of the Water Park. The Project is projected to contribute significantly to the local economy and drastically stimulate industry growth – it is estimated to create 2,900 jobs, as well as generate HK\$842 million in tourism growth, for the local economy. Furthermore, the proposed Project will be a new recreation destination for locals.

### 2.2 Project Location and Scale

The TSW development area, i.e. the Project area, is located to the south-western side of Brick Hill facing the Aberdeen Channel. The Project area comprises predominately Ocean Park facilities and peripheral plantation, tall shrubland and woodland on hillside. **Figure 1.1** shows the proposed Project area.

## 2.3 Scope of the Project

The Project will redevelop the existing theme park areas at TSW into a Water Park to enhance the attractiveness of Ocean Park into a world-class theme park and provide a must-see destination to visitors. Artistic impressions of the preferred scheme for the Project are shown in **Figure 2.1** and **Figure 2.2**. The Project area, of approximately 6.63 ha, is expected to comprise of a series of platforms matching with the natural topography of TSW and will not involve any marine works. The Project can be largely categorised into the following parts:

- **An Indoor Zone** – water park with a wave pool, lazy river, play structure, water slides, surf-rider, various pools, food and beverage (F&B) facilities, electrical and mechanical (E&M) utilities, back of house and car-parking (see **Figure 2.3** for artistic impression of the indoor water park).
- **An Outdoor Zone** – water park with a wave pool, lazy river, water slides, ride platforms, various pools; ‘sea turtle’ exhibit; and some small-scale F&B facilities (see **Figure 2.4** for artistic impression of the outdoor water park).
- **General Approach Area** – coach and taxi drop-off point and Emergency Vehicular Access Road (EVA).
- **Sewerage Facilities** – sewage sump pit and twin above-ground rising mains of 150mm diameter each

The opening hours of the Water Park will be from 9 a.m. to 11 p.m. daily. The proposed Project layout plan of the preferred scheme is shown in **Figure 2.5**. The current design includes the following levels as presented in **Figure 2.6** and corresponding facilities listed in **Table 2.1**:

Table 2.1: Levels and Corresponding Major Facilities for the Project

Level	Major Facilities
Basement Level	<ul style="list-style-type: none"> <li>• Parking</li> <li>• Mechanical and Electrical Plant (MEP)</li> </ul>
Level 1	<ul style="list-style-type: none"> <li>• Entrance and Ticketing Office</li> <li>• ‘Sea Turtle’ exhibit</li> <li>• Flamingo Pond</li> <li>• Interactive Water Element</li> <li>• Lobby</li> <li>• Changing rooms</li> <li>• F&amp;B</li> <li>• Retail stores</li> </ul>
Level 2	<ul style="list-style-type: none"> <li>• Outdoor wave pool</li> <li>• Lazy rivers (indoor and outdoor)</li> <li>• Plunge pools for slides</li> <li>• Indoor surf rider</li> <li>• Slides</li> </ul>
Level 3	<ul style="list-style-type: none"> <li>• Indoor wave pool</li> <li>• Indoor play structure</li> <li>• Outdoor infinity pools</li> <li>• Outdoor spa pools</li> <li>• Outdoor activity pool</li> </ul>
Platform Level	<ul style="list-style-type: none"> <li>• Platforms of water slides</li> <li>• Mat racer platform</li> <li>• Water slides</li> </ul>

The preliminary design is based on the best available information. The assessment adopts a conservative approach wherever possible in terms of the design options presented.

## 2.4 Consideration of Alternatives

### 2.4.1 “Without Project” Alternative

If the Project were not to proceed, the need for the Project would not be met and the increasing visitor demand could not be entertained, hence missing the golden opportunity to provide an unique Water Park facility as a fresh local recreation, which would in turn compromise the opportunities to strengthen the tourism industry and local employment rate in Hong Kong.

### 2.4.2 Alternative Development Options

At the Technical Feasibility Study (TFS) stage, an original Project scheme was developed (as presented in **Figure 2.7**). It was arranged in the original layout that: (1) a stand-alone structure located south-west of the site which incorporates a definitive indoor Water Park facility under a singular large span roof, and (2) a separate outdoor Water Park component linked at the north-east corner via a lazy river. The building form was adopted to achieve the maximum utilization of space for major activities/function. A large ‘clam shell-like’ building structure thus result as the iconic feature in the original scheme.

The design concept and the scheme for the Project have evolved since then. The current Project boundary is carefully defined based on minimising the need of site preparation works for sheet piling, excavation, fill and temporary cut slopes. The extent of natural vegetation removal is also minimised in the current preferred scheme design.

The preferred scheme now takes good advantage of the existing slope conditions by locating ride platforms on or near the slopes to minimise the amount of structural support required. The building forms are an extension of the existing slope topography integrating the Water Park rides and spaces blurring the edges between indoor/ outdoor zones and maximising views towards the bay. Cascading pools integrated with the natural surroundings thus result as an iconic feature in the preferred scheme.

The design concept for blending with natural environment and optimisation of development option in environmental perspective has been adopted which has resulted in the selection of the current scenario. The preferred scheme (shown in **Figure 2.1** and **Figure 2.2**) is thus the recommended option for the Project as it has minimised, and avoided wherever possible, environmental impacts in its layout and design of structures. The following summarises the key environmental considerations that have been incorporated into the preferred scheme to improve the environmental performance of the Project.

Overall speaking, the preferred scheme has taken into account the main ecological concerns arising from the Project and has been incorporated with appropriate design features which make it ecologically more preferable when compared to the original design. Such design features are summarised in **Table 2.2**.

Table 2.2: Summary of Layout and Design of Scheme Options Considered

Aspect	Original Scheme	Preferred scheme	Environmental Benefits / Dis-benefits
Footprint on hillside	Outdoor swimming pools sitting on the hillside; cut/excavation into the slope	Swimming pools to be built on platforms supported by stilts;	The need of large-scale slope works and subsequent loss of woodland/ shrubland in the periphery; the natural

Aspect	Original Scheme	Preferred scheme	Environmental Benefits / Dis-benefits
	at the valley requiring clearance of natural habitat at both northern and southern side of the Project Site.	Make good use of the already developed areas; Establishing series of platform and applied to the relatively gentle slopes on the east, north-east and south-east which require clearance of natural habitat at northern side.	landscape and ecological environment are preserved as far as possible. The preferred scheme limits the clearance of natural habitat to the northern side of the Project Site only and preserves the southern side as an enhancement area for wild bird use. Potential visual impacts are minimised in the preferred scheme.
Main Building Structure	Stand-alone structure located south-west of the site which incorporates a definitive indoor water park facility under a singular large span roof.	“Terrace” concept with cascading pools, which streamlines the artificial structure to match with hillside landscape	Visual impact of the indoor zone enclosure in the original design is more prominent and substantial. Lack of green and natural landscape to be integrated into the indoor and outdoor structures in the original scheme and hence low compatibility with the surroundings. The enclosure adopts extensive glazing which pose higher risk of bird collision. Preferred scheme reduces visual impact of the park with the hillscape and increased compatibility with the surroundings; minimised use of glazing which reduces bird collision risk and is a more bird friendly design
Flamingo Pond	Flamingo pond is located at the centre of the Water Park (near the entrance) next to the Indoor Zone building structure.	Flamingo pond is located at southern part of the site with separation from the main building structure.	<u>Compatibility with natural environment and favourable for wildlife</u> Original scheme – area around the Flamingo Pond can only provide very limited planting; its location (near the entrance) receives high degree of anthropogenic disturbance and highly glazed building structure. The whole setting is not favourable for matching with natural environment and for wildlife use Preferred scheme – large area of plants and vegetation available behind the pond; relatively undisturbed by anthropogenic activities by the Project. The setting is more compatible to natural environment and favourable for wildlife

#### 2.4.2.1 Key Environmental Benefits

Given that the overall theme of the Project is to combine nature with water elements of the development, the Project has given great consideration in maximum utilisation of existing landscape features, including the topography and geographic location of the site. Key environmental benefits that will be generated from the Project include the following:

- Development of a Water Park with various landscape and amenity planting which enhance the environmental setting. Landscape and visual enhancement will be achieved via provision of new aesthetic structures that complement the surroundings.
- Greening and landscape elements will be incorporated at the roofs and platform structures to maximise the planting and landscape area.

#### **2.4.2.2 Key Environmental Impacts Avoided or Minimised**

A number of environmental impacts have been avoided or minimised in the preferred scheme. These include the following:

- The preferred scheme makes good use of the already developed areas and establishes a series of platforms so that large-scale slope excavation for outdoor park and subsequent loss of natural environment are avoided; also vegetation clearance/tree felling and visual impacts are minimised.
- Minimising footprint on the existing hillside slopes by reducing the amount of structural support required so that ecological impact on natural habitats especially woodland and streams are minimised.
- Adoption of “terrace” concept to avoid substantial visual impact and minimise incompatibility with the surrounding environment; also to minimise the use of glazing and the potential collision impact on birds.
- Re-provision of the Flamingo Pond at the southern side of the Project Area which is compatible with natural environment and more suitable for wildlife use.

#### **2.4.2.3 Environmental Friendly Design Incorporated**

A number of environmental friendly design features have been incorporated in the current design of the preferred scheme. These include:

- Blending of the building structure with nature environment and preserving the natural landscape and topography with a series of cascading platforms positioned within the Brick Hill valley. The building forms are an extension of the existing slope topography integrating the Water Park rides; spaces blurring the edges between indoor/ outdoor zones while maximizing views towards the bay;
- The orientation of building has been positioned where building faces predominantly south-west to receive maximum daylight;
- Taking advantage of the existing slope conditions by locating ride platforms on or near the slope to minimise the amount of support structure required;
- Landscaping would permeate into the indoor and outdoor spaces, and the surrounding landscape emerging into the existing valley to minimise visual impact;
- Providing green roof and skylights to minimise reflection from roofing materials and blending into the existing hillscape. Reduced use of large glazing or transparent screening to minimise the risk of bird collision;

- Indoor area to be categorised into different thermal zones according to functional requirement to minimise the energy consumption;
- Adopting natural ventilation for the indoor Water Park area during summer with minimal mechanical ventilation to achieve both the thermal comfort and energy saving;
- Adopting heat exchangers for retrieving waste heat from the Air Conditioning System for pre-heating of hot water for general ablution and pool heating;
- Alteration to existing seawall and marine works have been avoided hence no impact on surrounding marine life;
- Adopting Building Information Modeling (BIM) to facilitate a more efficient design and construction coordination and to avoid unforeseen clashes which subsequently generate abortive work and construction waste.

#### **2.4.2.4 Environmental Friendly Design Considered**

A number of environmental friendly designs will be considered in detailed design, construction and operation phases. These include:

- Selection of environmental friendly and sustainable building materials;
- Introducing rainwater harvesting system for recycling storm water on irrigation or cleaning purpose;
- Using renewable energy systems and energy efficient device, such as solar landscape lighting, lighting control management system, low energy consumption signs, low flow shower heads, dual flushing cisterns and co-generation/ tri-generation;
- For selection of mechanically efficient systems, the following measures for high energy efficiency will be used in HVAC system: evaporative cooling tower & gas absorption chiller, variable outside air quantity and economiser free cooling off system;
- Consideration of pre-bored rock socket steel H-piles for foundation which could generate less noise and vibration as well as impose least disruption to the terrain;
- Earth retaining structures and temporary cut slopes, and excavation lateral support system for pile caps to generate smaller volumes of excavated materials and balance the cut and fill volume in order to reduce any surplus earth material disposal and minimise waste management implications;
- Using electric vehicles for guest shuttle service and staff transportation subject to the development of available technology.

#### **2.4.3 Alternative Construction Methods and Work Sequences**

In the course of planning the Project, OPC has confirmed that no reclamation, no hydraulic/marine work, no dredging and no seawall construction will be carried out under this Project.

The major construction activities involved in the Project are foundation works, site formation, slope stabilization works, main building and superstructure construction and sewerage facilities. A number of alternative construction methods and sequence of works has been reviewed and compared prior to recommending the preferred scheme. Consideration of environmental impacts during construction stage has been one of the main factors affecting the choice of construction method and construction sequence. The recommended option has aimed to provide the optimum balance between environmental concerns and non-environmental considerations.

A summary of the major construction activities and the recommended option are provided in **Table 2.3**.

Table 2.3: Summary of Recommended Option of Construction Methods

Construction Activity	Options	Environmental Benefit / Dis-benefit	Recommended Option
Foundation Works	• Large diameter bored pile	• More C&D material will be generated comparing with driven H-piles	• Pre-bored rock socket steel H-piles is recommended as it generates less noise and vibration, imposes the least disruption to the terrain and involves less excavation and then reduces material disposal
	• Pre-bored rock socket steel H-piles	• Generates less noise and vibration; Reduces disruption to the sloped and forested terrain; Less excavation and so reduces material disposal	
	• Driven steel H-piles	• Generates the greatest noise and vibration which may impact nearby noise sensitive receivers (NSRs)	
Site Formation and Slope Stabilisation	• Earth retaining structures and temporary cut slopes	• Relatively smaller volumes of excavation are required in comparison with shallower angled permanent cuts, but thicker building walls (more concrete) are required as they are earth retaining structures.	<ul style="list-style-type: none"> <li>• Earth retaining structures and temporary cut slopes, and excavation lateral support system for pile caps are recommended to generate smaller volumes of excavated materials and minimise waste management implications</li> <li>• Conventional utilities, roadworks and landscaping</li> <li>• Disposal by trucks instead of barges to avoid impact to marine environment</li> </ul>
	• Permanent cut slopes	<ul style="list-style-type: none"> <li>• Relatively larger excavation volumes than for steeper temporary cuts for earth retaining structures.</li> <li>• Thinner building walls (less concrete) required as not earth retaining.</li> </ul>	
	• Placement of fill in areas where proposed building structure is above existing ground level.	<ul style="list-style-type: none"> <li>• Thicker building walls (more concrete) as walls earth retaining.</li> <li>• May utilise cut material as fill.</li> </ul>	
	• Excavation lateral support system for pile caps	• Excavation extent (and potential ground water ingress where occurs) is minimised by the use of temporary support methods such as sheet piles and soil nails.	
	• Utilities, roadworks and landscaping by conventional methods	• No difference	

Construction Activity	Options	Environmental Benefit / Dis-benefit	Recommended Option
	<ul style="list-style-type: none"> <li>Disposal by trucks</li> </ul>	<ul style="list-style-type: none"> <li>Potential increased dust in road traffic noise impact to adjacent air sensitive receivers (ASRs) / NSRs</li> </ul>	
	<ul style="list-style-type: none"> <li>Disposal by barges</li> </ul>	<ul style="list-style-type: none"> <li>Potential water quality impacts from barge loading operations</li> </ul>	
Superstructure	<ul style="list-style-type: none"> <li>Conventional in-situ reinforced concrete construction</li> </ul>	<ul style="list-style-type: none"> <li>More C&amp;D waste will be generated compared to precast concrete. Noise generation due to concreting works</li> </ul>	<ul style="list-style-type: none"> <li>Owing to the given constraints, conventional cast <i>in-situ</i> reinforced concrete construction and particularly the flatslab system is preferred to precast concrete.</li> <li>Steelwork for long span roof structures.</li> </ul>
	<ul style="list-style-type: none"> <li>Precast concrete</li> </ul>	<ul style="list-style-type: none"> <li>Less C&amp;D waste will be generated. Construction of concrete panels is carried out off-site and potential environmental impact could be minimised</li> </ul>	
	<ul style="list-style-type: none"> <li>Steelwork</li> </ul>	<ul style="list-style-type: none"> <li>Steel members are fabricated off-site and connected on-site, minimising potential environmental impacts</li> </ul>	

As outlined in **Table 2.2**, the preferred layout and scheme design option has taken consideration of main ecological concerns arising from the Project and incorporated with appropriate design features which make it ecologically more preferable when compared to the original design. As summarised in **Table 2.3**, the adopted construction method has aimed to provide the optimum balance between environmental concerns and non-environmental considerations.

## 2.5 Implementation Programme

The tentative programme for operation of the Project will be in 2017. Given the scale of the Project, construction will be implemented according to the general description as shown in **Table 2.4** below.

Table 2.4: Summary of Construction Programme

Item	Description	Timeframe
1	EVA, slope stabilisation & site formation works	Q3 2014-Q2 2015
2	Foundation	Q4 2014-Q2 2015
3	Main building construction	Q2 2015-Q4 2016
4	Superstructure	Q2-Q4 2015
5	Roof steel erection	Q4 2015-Q1 2016
6	Glass curtain wall installation	Q1-Q3 2016
7	Water rides installation	Q1-Q2 2016
8	Interior fitting out	Q2 2016-Q1 2017

## 3. Summary of the Environmental Impact Assessment

### 3.1 Air Quality Impact

Potential air quality impacts associated with the construction and operation phase of the Project have been assessed in the EIA report. Representative Air Sensitive Receivers (ASRs) within 500 m of the Project area and the broader area where air quality may be potentially affected by the Project have been identified and the worst case impacts on these receivers have been assessed. Suitable mitigation measures, where necessary, have been recommended to protect the sensitive receivers and to achieve compliance with legislative criteria and guidelines.

With the Government's on-going and planned programmes to tackle various air pollution issues in Hong Kong, it is anticipated that the future background air quality will be improved. To predict the future background air pollutant concentration, the Pollutants in the Atmosphere and the Transport over Hong Kong (PATH) model, has been used. PATH background concentrations of the relevant pollutants for year 2015 have been adopted. As the PATH model does not generate Total Suspended Particulates (TSP) results, the PATH Respirable Suspended Particulates (RSP) results were taken to represent the background contributions to TSP at the ASRs.

#### 3.1.1 Construction Phase

Potential air quality impacts from the construction works of the Project would mainly be related to construction dust from site clearance, excavation, foundation and site formation works. Dust generated from construction activities is the primary concern during the construction phase. The air quality model Fugitive Dust Model (FDM) was used to predict the air pollutant concentrations due to open dust source impacts. With proper implementation of the recommended mitigation measures, it has been assessed that all ASRs are predicted to comply with the TSP criterion as well as the relevant AQO for RSP and FSP (see **Table 3.1** and **Table 3.2**).

During the construction phase, construction vehicles are assumed to use Wong Chuk Hang Road, Nam Long Shan Road, Shum Wan Road, Heung Yip Road and Police School Road. It is expected that a maximum of fifteen construction trucks per hour will be arriving or exiting the construction site. Minor increase to Wong Chuk Hang Road due to construction traffic and the associated coach diversion is expected. Therefore, potential air quality impact from the limited movements of construction trucks would unlikely be significant.

Hence, there are no adverse residual air quality impacts anticipated during the construction phase.

Table 3.1: Summary of Predicted Cumulative TSP, RSP and FSP Concentrations for Tier 1 Construction Dust at All ASRs (Mitigated and Unmitigated)

Air Pollutant	Averaging Time	Criteria ( $\mu\text{g}/\text{m}^3$ )	Allowable Exceedances in a Year	Scenario	Range of Concentrations ( $\mu\text{g}/\text{m}^3$ )	Remark	Compliance with Criteria
TSP	1 hour	500	0	Unmitigated	166 - 1490	Maximum values	No
				Mitigated	147 - 165		Yes
RSP	24 hours	100	9	Unmitigated	73 - 87	10 <sup>th</sup> maximum values	Yes
				Mitigated	72 - 74		Yes

Air Pollutant	Averaging Time	Criteria ( $\mu\text{g}/\text{m}^3$ )	Allowable Exceedances in a Year	Scenario	Range of Concentrations ( $\mu\text{g}/\text{m}^3$ )	Remark	Compliance with Criteria
FSP	24 hours	75	9	Unmitigated	54 - 56	10 <sup>th</sup> maximum values	Yes
				Mitigated	54 - 55		Yes

Table 3.2: Summary of Predicted Cumulative RSP and FSP Concentrations for Annual Construction Dust at All ASRs (Mitigated and Unmitigated)

Air Pollutant	Averaging Time	Criteria ( $\mu\text{g}/\text{m}^3$ )	Scenario	Range of Maximum Concentrations ( $\mu\text{g}/\text{m}^3$ )	Compliance with Criteria
RSP	Annual	50	Unmitigated	39 - 45	Yes
			Mitigated	38 - 39	Yes
FSP	Annual	35	Unmitigated	29*	Yes
			Mitigated	29*	Yes

\* Note: all concentrations within the range are equal to the listed value after rounding off to zero decimal place.

Proposed mitigation measures for construction phase are highlighted as follows:

- Use of regular water spraying (once every 2.5 hours or 4 times per day) at all active works area, exposed site surfaces and unpaved roads.;
- Covering 80% of stockpiling area by impervious sheets and spraying all dusty material with water immediately prior to any loading transfer operations ;
- The speed of the trucks within the Project area should be controlled to about 10 km/hour;
- Vehicles used for transporting dusty materials/ spoils should be covered with tarpaulin or similar material, and the cover should extend over the edges of the sides and tailboards;
- Vehicle wheel washing facilities should be provided at each construction site exit; immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.

### 3.1.2 Operation Phase

Vehicular emissions due to the increased traffic along the Shum Wan Road from the operation of the Project was identified as a major source of air emissions. Based on the modelling results (see **Table 3.3**), it is predicted that all the identified ASRs would be in compliance with the AQOs for daily RSP, annual RSP, daily FSP, annual FSP, hourly NO<sub>2</sub> and annual NO<sub>2</sub>. Hence, no adverse residual air quality impacts are anticipated during the operation phase.

Table 3.3: Summary of Predicted Operation Cumulative RSP, FSP and NO<sub>2</sub> Concentrations for All ASRs

Air Pollutant	Averaging Time	AQO ( $\mu\text{g}/\text{m}^3$ )	Allowable Exceedances in a Year	Range of Concentrations ( $\mu\text{g}/\text{m}^3$ )	Remark	Compliance with Criteria
NO <sub>2</sub>	1 hour	200	18	130 – 157	19 <sup>th</sup> maximum values	Yes
	1 year	40	0	22 – 36		

Air Pollutant	Averaging Time	AQO ( $\mu\text{g}/\text{m}^3$ )	Allowable Exceedances in a Year	Range of Concentrations ( $\mu\text{g}/\text{m}^3$ )	Remark	Compliance with Criteria
RSP	24 hours	100	9	73*	10 <sup>th</sup> maximum values	Yes
	1 year	50	0	38 – 39	Annual average	Yes
FSP	24 hours	75	9	55*	10 <sup>th</sup> maximum values	Yes
	1 year	35	0	29*	Annual average	Yes

\* Note: all concentrations within the range are equal to the listed value after rounding off to zero decimal place.

## 3.2 Hazard to Life

It is proposed to use the combination of ozone and electro-chlorinator as the sterilisation and disinfection system. Ozone will act as the primary disinfectant and the residual chlorine as secondary disinfection agent. Electro-chlorinator is to generate sodium hypochlorite solution. Only sodium hypochlorite solution will be stored. There is no on-site storage of liquefied chlorine. There will not be any potentially hazardous installation (PHI) within the Project area. The Project area does not fall within the consultation zone of any PHI for the operation of the Project.

There is no overnight storage of explosives for the construction of this Project.

On the basis that no on-site storage of liquefied chlorine or explosives for this Project, hazard is not a concern. Hazard to life to evaluate the potential hazard is therefore not required.

## 3.3 Noise Impact

### 3.3.1 Construction Phase

The major construction activities of the Project will involve site formation, foundation and construction of main building. Two representative noise sensitive receivers (NSRs) were identified for construction noise impact assessment. The noise impact associated with unmitigated construction activities for the Project would cause 2 to 3 dB(A) exceedance of daytime construction noise criteria at the representative Noise Sensitive Receivers (NSRs) only during the examination periods. Therefore, good site practices and mitigation measures including the use of quiet plant and erection of movable noise barriers have been proposed to alleviate the noise impact. With the good site practices and mitigation measures in place, no residual impacts exceeding the relevant noise criteria are predicted at all NSRs.

During the construction phase, construction vehicles are assumed to use Wong Chuk Hang Road, Nam Long Shan Road, Shum Wan Road, Heung Yip Road and Police School Road. It is expected that a maximum of fifteen construction trucks per hour will be arriving or exiting the construction site. Minor increase to Wong Chuk Hang Road due to construction traffic and the associated coach diversion is expected. Therefore, potential noise impact from the limited movements of construction trucks would unlikely be significant.

### 3.3.2 Operation Phase

Eight representative noise sensitive receivers (NSRs) were identified for road traffic noise impact assessment. The increased traffic flow under the operation of the Project is expected to cause less than 1

dB(A) increase in road traffic noise level. Therefore, significant adverse off-site road traffic noise impact is not anticipated from the Project.

With the specification of maximum allowable Sound Power Levels (SWLs) for the proposed fixed plants including air intake/ exhaust openings, pumps, Public Address (PA) system, full compliance of relevant noise criteria will be achieved and no residual impact exceeding the relevant noise criteria is anticipated.

The Project does not comprise of a designated venue for open air entertainment. However, open air entertainment activities are expected to occur at various locations within the water park at different times of day. Noise impact from these open air shows is expected to be from the use of loudspeaker systems for amplification of voice and potentially instrumental music. With the adoption of the proposed maximum allowable SWLs, all representative NSRs is expected to comply with the relevant noise criteria for the daytime and evening time periods. No adverse open air entertainment noise impact is anticipated.

The following measures should be considered as far as practicable during operation stage:

- use small clusters of small power loudspeakers rather than a few large power loudspeakers; and
- loudspeakers should be pointed away from nearby NSRs.

### **3.4 Water Quality Impact**

Water quality impact assessment has been carried out for areas within 500m of the Project site boundary and other areas in the vicinity that might be impacted by the Project. Two watercourses, Ocean Park seawater intake, Aberdeen Typhoon Shelter, Deep Water Bay Beach and some coral communities within the Western Buffer and Southern Water Control Zones (WCZs) were identified as water sensitive receivers (WSRs).

During the construction phase, potential water quality impact would be generated from site formation, foundation works, expansion of existing storm u-channel, construction of sewage sump pit and rising mains, site run-off, sewage from workforce, accidental spillage and discharge of wastewater from various construction activities. With the implementation of the recommended mitigation measures, no adverse water quality impact from the construction works for the Project is anticipated.

Sewage effluent from operation of the Project would be discharged to the Aberdeen Preliminary Treatment Works (APTW) via a new sewer connection to the existing sewerage network at Nam Long Shan Road and no overflow is anticipated from the new sewage sump pit. Other potential impacts during operation phase include discharge of used pool water, spent cooling water, Flamingo Pond and 'Sea Turtle' exhibit, and runoff from road surfaces and planting areas. As the Water Park will maintain operation throughout the year, discharge of approximate 10,500 m<sup>3</sup> used pool water generated from the swimming pools annually will be performed in phases and the daily discharge volume from pool, Flamingo Pond and 'Sea Turtle' exhibit will not exceed 6,000 m<sup>3</sup>. The used pool water will contain 0.2 mg/L of residual chlorine that is within the TM-DSS effluent criteria, thus impact due to residual chlorine discharge is anticipated to be minimal. Backwash water from the daily operation of the pool will be collected and treated by the on-site filtration system and then discharged to the sewage system. Water discharged from the Flamingo Pond and 'Sea Turtle' exhibit is anticipated to be less than 60 m<sup>3</sup> per day, and will be disinfected and filtered, hence, water quality impact due to discharge from Flamingo Pond and 'Sea Turtle' exhibit is considered insignificant. On the other hand, the spent cooling water generated will be fully reused on site for flushing purposes, thus no spent cooling water will be directly discharged. As no direct discharge of sewage, cleaning agents or spent

cooling water is expected at any time during operation phase, no adverse water quality impact is anticipated. Runoff from road surfaces and planting areas are not anticipated to cause adverse water quality impact with the recommended mitigation measures in place.

### **3.5 Sewerage and Sewage Treatment Implications**

The impact assessment has been carried out on the existing public sewerage network and treatment works to collect the sewage flow generated from the Project. The sewage flow from the Project is proposed to be discharged to the 450mm diameter sewer at Nam Long Shan Road and then conveyed to the APTW for treatment.

The hydraulic assessment results have revealed that the existing 450mm diameter gravity sewer along the Nam Long Shan Road should be able to handle all the sewage flows from the Project. Therefore, no adverse impact is anticipated on the existing 450mm diameter gravity sewers and the downstream sewerage system due to the Project.

In view of the assessment findings, it is considered that the design capacity of the existing APTW is sufficient to handle the estimated total Average Dry Weather Flow (ADWF) and Peak Flow from the Project and the relevant Planning Data Zones (PDZs) during the ultimate scenario year of 2021. In conclusion, no adverse impact is anticipated on the existing APTW due to the Project.

### **3.6 Waste Management Implications**

The major waste types generated by the construction activities will include construction and demolition (C&D) materials from excavation of hill slopes, foundation and site formation as well as from construction of new buildings and superstructures works; chemical waste from maintenance and servicing of construction plant and equipment; general refuse from the workforce and floating refuse trapped / accumulated on the artificial seawall. No excavation/dredging of sediment for this Project is anticipated. Provided that all these identified wastes are handled, transported and disposed of in strict accordance with the relevant legislative and recommended requirements and that the recommended good site practices and mitigation measures are properly implemented, no adverse environmental impact is expected during the construction phase.

During the operation phase, the key waste types generated will include general refuse from recreational activities, retail stores and restaurants within the Project; as well as chemical waste from routine servicing and maintenance activities for different electrical and mechanical equipment. There would also be entrapment or accumulation of floating refuse on the artificial seawall of the Project but it is anticipated to be negligible. Provided that all these wastes are handled, transported and disposed of in strict accordance with the relevant legislative requirements and the recommended mitigation measures are properly implemented, no adverse environmental impact is expected during the operation phase.

Recommended mitigation measures for waste management are:

- Good site practices such as staff training in proper waste management and chemical handling procedures; providing sufficient waste disposal points; and employing licensed waste collectors.
- Waste reduction measures such as sorting demolition debris and excavated materials from demolition works to recover reusable/recyclable portions; and segregating and storing different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal.

- Following the DEVB Technical Circular (Works) No. 6/2010 for *Trip Ticket System for Disposal of Construction & Demolition Materials* to monitor the disposal of inert and non-inert C&D materials at respectively PFRFs and the designated landfill site, and to control fly-tipping.
- Preparing and implementing a Waste Management Plan detailing various waste arising and waste management practices in accordance with the relevant requirements of the ETWB Technical Circular (Works) No. 19/2005 *Environmental Management on Construction Site*.

### 3.7 Land Contamination

The land contamination assessment has been conducted by reviewing the historical and current land uses, desktop appraisal and site reconnaissance survey with respect to the potential land contamination at the Project area. Other relevant information collected from the related government departments has been reviewed.

Based on the findings of the desktop appraisal of the historical and current land uses and the site survey in the Project area, land contamination impacts associated with the construction and operation of the proposal project is not anticipated.

In case contaminated material is discovered after the commencement of works, mitigation measures for handling of contaminated materials and regular site audits are recommended to minimise the potential adverse impacts on workers' health and safety and remediation/ disposal of potentially contaminated materials.

### 3.8 Ecological Impact

#### 3.8.1 Baseline Ecological Condition and Impact Assessment

The Project area comprises mainly developed area maintained with plantation and landscape planting, therefore most of the ecological resources within the Project area is limited by its artificial nature. Only the loss of 0.75 ha woodland and the pond/plantation area that were used by ardeids for night-roosting (as indicated in **Figure 3.1**) are considered as moderate-minor impact and need specific mitigation measures. On-site reinstatement and compensation of woodland and enhancement of an area with pond and pond-side plantation similar to existing setting for ardeid night roost will be provided to mitigate the impact of habitat loss.

Two streams were identified within the Project area. The main "Eastern Stream" has stable flow adjoining to the "Aviary". The preferred scheme has avoided this stream and impact is expected to be limited. The "Northern Stream" has only seasonal, thin and low flow over high gradient bedrock without any megafauna sustained, so the ecological value of this stream is considered as low. It will be foreshortened by approximately 75m (as indicated in **Figure 3.1**) due to site formation works for Water Park building, the ecological impact on this stream will be minor.

A community of ardeid was identified in the Project area, but after investigation the community was found only in temporary nature. Therefore, the ecological impact associated with the Project is very limited. During the course of field survey, it was found the ardeid community that temporarily hosted in TSW has largely left the site and resettled in another suitable roosting site in Aberdeen Channel. On this account, TSW is considered as lesser important to the roosting ardeids. Nonetheless, it is recommended to allocate

a portion of the Project area to be enhanced with pond and tree to provide an alternative habitat option for the ardeid community.

Marine ecology including coral communities and intertidal habitats are identified at TSW. Coral communities at TSW were in good condition with no coral bleaching and acceptable sedimentation, though partial mortality in low percentage of coral species was recorded. As there will not be any marine-based construction works for the Project, no direct impacts on marine ecological resources are anticipated. Potential indirect impacts will be minimised by water quality mitigation measures, thus no unacceptable impacts on coral communities and intertidal habitats would occur.

Given that majority of the habitat affected (i.e. developed area and landscape planting) is artificial, the disturbed habitats of conservation value will be reinstated or compensated, and the ardeid community used to roost in the Project area has resettled to other roosting site, the ecological impact due to construction and operation of the Project is considered as minor and acceptable with various mitigation measures mentioned in **Section 3.8.2** in place.

### **3.8.2 Ecological Mitigation Measures**

#### **Avoidance of Habitat Loss**

The current Project design largely follows the footprint of the existing park area. The current Project boundary has been carefully defined to avoid unnecessary loss of natural habitat. Compared to the original scheme, the preferred scheme affect only the natural habitat at the northern side of the Project area but preserve the natural hillside vegetation at southern side. As a result, the flora species of conservation concern at the southern side can be preserved and the location can be enhanced for ardeid community use.

As mentioned in **Section 2.4.2.2** and **Section 3.8.1**, the main “Eastern Stream” has been avoided in the preferred scheme for preservation of natural environment. Furthermore, any works encroaching onto marine habitat is not considered in the Project to avoid any direct impact on the marine environment and the associated fauna, noticeably hard coral communities.

#### **Avoidance of Impacts on Birds**

Risk of bird collision is largely avoided by optimising design of Project structure. Previous design adopts a large stadium-like indoor structure at the centre of Project area. The Project design adopts a “terrace” concept. The terrace landscape harmonises the Water Park into a natural landscape which reduce impediment to bird’s activities over the area. The reduced use of large glazing or transparent screening in this design would significantly avoid the risk of bird collision.

Although there is no egret record during the field study period, the vegetated pond side will be inspected prior to site clearance works to confirm no active ardeid nest is present. The ardeid community that temporarily roosted in TSW has largely left and resettled in another roosting site, but the site clearance and tree felling works at the existing ardeid night roost location (as indicated in **Figure 3.1**) will still be avoided during the peak wintering season of ardeids (i.e. between November and March) so that the number of birds affected would be minimised. Works area will be demarcated clearly and good site practice will be properly implemented to minimise disturbance impact on roosting ardeids during construction phase.

## Minimisation

Timing of site clearance at the existing ardeid night roost location will indirectly minimise disturbance effect on ardeids roosting at TSW during construction phase. Given that the number of ardeids is much smaller in non-wintering season, the overall disturbance impact on the ardeids will be further minimised with suitable timing of site clearance works.

## Compensation

After consideration of alternative for avoiding and minimising impact on woodland, the permanent loss of woodland which is reduced to approximately 0.75 ha will be mitigated by provision of a woodland compensation area of 0.84 ha. The location of the woodland compensation area is presented in **Figure 3.2**. The woodland compensation area will be planted with predominately native tree species similar to the affected woodland and maintained by the project proponent.

For compensating the loss of pond and plantation areas that were used by a small group of ardeids for night-roosting, it is recommended to reserve part of the TSW area for ardeid use. The enhancement area will be wind-shielded, near waterfront and away from the core park area to favour ardeid use (as indicated in **Figure 3.2**). Within the enhancement area, a Flamingo Pond together with plantation habitat will be provided.

### 3.8.3 Ecological Monitoring

Post-construction monitoring for the compensation and enhancement areas will be conducted. A 3-year monitoring programme is recommended to monitor the woodland compensation area with covering planting phases. The general health condition and survival of planted trees will be monitored. Trigger and Action Levels for monitoring and Action Plan are set out for appropriate action to be taken if poor health condition or survival rate of plants is observed. Regarding the enhancement area for ardeid community, after establishment it will be monitored monthly for one year during operation phase to check the effectiveness of the setting.

## 3.9 Fisheries Impact

Review of existing information on commercial fisheries resources and fishing operations within the study area shows that the importance of capture fisheries resources in the study area is moderately-low in terms of overall fishing operations, and moderate in terms of fisheries production (both weight and value). Fish fry production is absent from the assessment area and no fish culture zones, artificial reefs, important spawning areas or nursery grounds for commercial species are present, and therefore, these resources would not be affected by the Project implementation.

During the construction phase, disturbance to fisheries may arise from construction vessel activities, and indirect impact of water quality change associated with land-based construction works. However the impact on fisheries resources/production and fishing activity is predicted to be temporary and insignificant. During the operation phase, change in water quality may also occur due to discharge of sewage and runoffs. However, only negligible impact to fisheries resources/production is expected.

Furthermore, with good site practices and mitigation measures in place, it is expected that there would be no significant impacts to fisheries and no fisheries-specific mitigation measures are required given that the water quality mitigation measures are implemented properly.

### **3.10 Landscape and Visual Impact**

#### **Review of Planning and Development Control Framework**

The entire Project area is within the land use type “Other Specified Uses” “OU” for “Ocean Park” only. The planning intention of this zone is primarily for comprehensively planned low-density and generally low- to medium-rise marine-themed park development in Hong Kong with related retail, dining and entertainment facilities serving visitors as well as the general public. Height restrictions apply to buildings in this zone. The proposed redevelopment is in line with the planning intention of this “OU” zone. No re-zoning under Section 12A of the Town Planning Ordinance will be required for the implementation of the Project. However, should the building height restrictions of this “OU” zone be violated by the proposed redevelopment, planning application under Section 16 of the Town Planning Ordinance will be required.

#### **Potential Impact on Existing Trees**

To facilitate implementation of the Project, tree felling will be unavoidable. Recommended compensatory tree planting in **Figure 3.3** includes heavy standard trees and whips, which can fully compensate for the loss of the trees in terms of quantity.

#### **Sources of Potential Landscape and Visual Impacts**

During the construction phase, sources of potential landscape and visual impacts would arise from the following:

- Site clearance for the proposed structures, particularly at the existing woodland and tall shrubland area.

During the operation phase, sources of potential landscape and visual impacts would arise from the following:

- Operation of the Indoor Zone of the Water Park (with a wave pool, lazy river, play structure, water slides, surf-rider, various pools, F&B facilities, E&M utilities, back of house and car-parking);
- Operation of the Outdoor Zone of the Water Park (with a wave pool, lazy river, water slides, ride platforms, various pools, ‘sea turtle’ exhibit and some small-scale F&B facilities; and
- Operation of the General Approach Area with coach and taxi drop-off point and EVA.

#### **Recommended Landscape and Visual Mitigation Measures**

Proposed construction phase mitigation measures are highlighted as follows:

- Minimization of Works Areas
- Preservation of Existing Vegetation
- Transplantation of Existing Vegetation
- Setting up “No Intrusion Zones”

- Provision of temporary tree nurseries
- Advance Planting
- Construction Lighting Control

Proposed operation phase mitigation measures are highlighted as follows:

- Sensitive Design and Disposition
- Compensatory Tree Planting
- Enhancement Planting
- Green Roofs and Vertical Greening
- Responsive Lighting Design
- Woodland Compensation

### **Landscape Impact**

With the implementation of proposed mitigation measures, the anticipated landscape impacts are generally moderate adverse to insubstantial during the construction phase due to site clearance and removal of existing vegetation. Upon completion of the Project, compensatory planting, enhancement planting, green roofs and vertical greening will be provided to compensate for the loss of vegetation during construction. A new “Flamingo Pond” will also be constructed to replace the removed semi-natural ponds. However, the loss of some of the landscape resources will not be fully compensated. The residual landscape impact in operation phase is therefore generally insubstantial with slight adverse impacts expected for some landscape resources.

### **Visual Impact**

With the implementation of proposed mitigation measures, the anticipated visual impacts are generally slight adverse to insubstantial for daytime and largely insubstantial for night-time during the construction phase due to unobstructed or partially obstructed views of construction activities and screen hoarding. Upon completion of the Project, planting within the Project can act as visual screen to visual sensitive receivers. The residual visual impact in operation phase is generally slight adverse to insubstantial in daytime and largely insubstantial in night-time with slight adverse impacts expected on some VSRs.

### **Overall Acceptability**

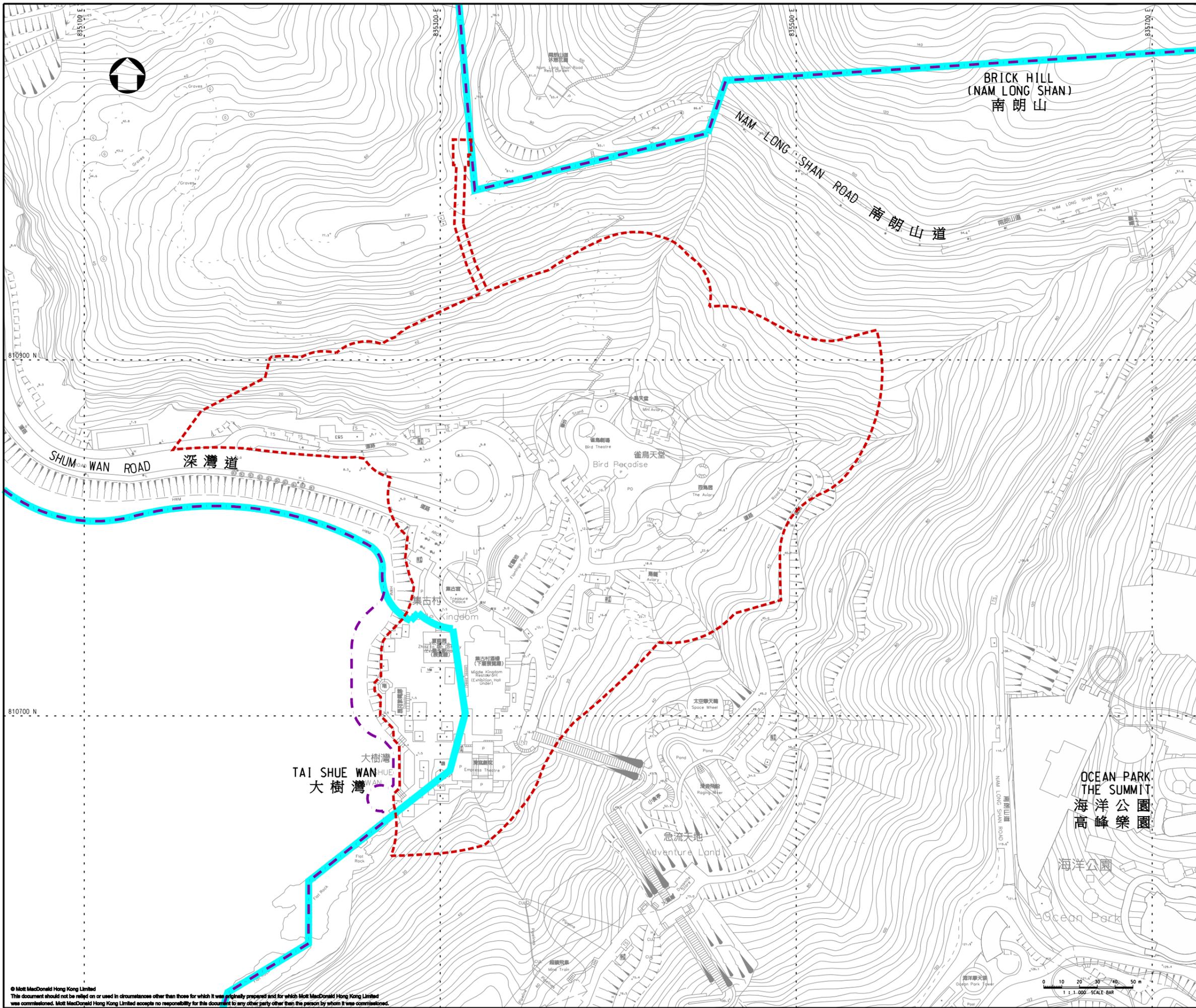
Overall, in terms of Annex 10, Clause 1.1 (c) of the EIAO-TM, it is concluded that the landscape and visual impacts are acceptable with mitigation measures.

## 4. Environmental Monitoring and Audit

An environmental monitoring and audit (EM&A) programme will be implemented during the construction and operation of the Project to check the effectiveness of the recommended mitigation measures and compliance with relevant statutory requirements. Details of the EM&A works have been specified in the EM&A Manual. The EM&A Manual contains details of the proposed EM&A requirements, implementation schedule of the environmental protection / mitigation measures, EM&A reporting procedures and complaint handling procedures.

## 5. Conclusion

This EIA study has identified and assessed the potential environmental impacts that may arise from construction and operation of the Project in accordance with the guidelines of the EIAO-TM and the EIA Study Brief. Based on the results of the assessments of the worst case scenario, the EIA study concludes that with implementation of the recommended mitigation measures, the potential impacts arising from the Project are considered to be environmentally acceptable and the Project would be in compliance with the environmental legislation and standards. No significant adverse residual impacts from the Project are anticipated. A comprehensive environmental monitoring and audit programme will be implemented to check the implementation of mitigation measures and environmental compliance.



**KEY PLAN 索引圖**  
(1:30000)

**LEGEND: 圖例:**

- - - - - PROJECT BOUNDARY  
項目範圍
- - - - - WORKS BOUNDARY OF REPOSITIONING PROJECT  
海洋公園重建計劃的工程邊界
- - - - - LOT BOUNDARY OF OCEAN PARK  
海洋公園的地段界線

Reference drawings

Rev	Date	Drawn	Description	Ch'kd	App'd
P1	MAR 14	MING	FIRST ISSUE	PK	AFK

20/F Two Landmark East  
100 How Ming Street  
Kowloon, Hong Kong  
☎ +852 2828 5757  
☎ +852 2827 1823  
www.mottmac.com.hk

Client

Project  
**TAI SHUE WAN DEVELOPMENT  
AT OCEAN PARK  
海洋公園大樹灣發展**

Title  
**PROJECT LOCATION  
項目位置**

Designed	HY	Eng check	FW
Drawn	MING	Coordination	FW
Dwg check	HY	Approved	AFK
Scale at A1	1:1000	Status	PRE P1
Drawing Number	FIGURE 1.1 圖 1.1		



Notes

Key to symbols

Reference drawings

P1	MAR 14	HY	FIRST ISSUE	FW	EC
Rev	Date	Drawn	Description	Ch'k'd	App'd

**Mott MacDonald**  
 20/F Two Landmark East  
 100 How Ming Street  
 Kowloon, Kowloon  
 Hong Kong  
 T +852 2828 5757  
 F +852 2827 1823  
 www.mottmac.com.hk



Project

**TAI SHUE WAN DEVELOPMENT  
 AT OCEAN PARK  
 海洋公園大樹灣發展**

Title

**ARTISTIC IMPRESSION OF THE  
 PREFERRED SCHEME – FRONT VIEW  
 首選方案的藝術構想圖 – 正面圖**

Designed	HY	Eng check	FW
Drawn	HY	Coordination	FW
Dwg check	FW	Approved	EC
Scale at A1	N.T.S.	Status	PRE
		Rev	P1

Drawing Number

**FIGURE 2.1 圖2.1**



Notes

Key to symbols

Reference drawings

P1	MAR 14	HY	FIRST ISSUE	FW	EC
Rev	Date	Drawn	Description	Ch'k'd	App'd



20/F Two Landmark East  
100 How Ming Street  
Kowloon, Kowloon  
Hong Kong  
T +852 2828 5757  
F +852 2827 1823  
W www.mottmac.com.hk

Client



Project

TAI SHUE WAN DEVELOPMENT  
AT OCEAN PARK  
海洋公園大樹灣發展

Title

ARTISTIC IMPRESSION OF THE  
PREFERRED SCHEME – BACK VIEW  
首選方案的藝術構想圖 – 背面圖

Designed	HY	Eng check	FW
Drawn	HY	Coordination	FW
Dwg check	FW	Approved	EC
Scale at A1	N.T.S.	Status	PRE
		Rev	P1

Drawing Number

FIGURE 2.2 圖2.2

Notes

Key to symbols

Reference drawings

P1	MAR 14	HY	FIRST ISSUE	FW	EC
Rev	Date	Drawn	Description	Ch'k'd	App'd



20/F Two Landmark East  
100 How Ming Street  
Kowloon, Kowloon  
Hong Kong  
T +852 2828 5757  
F +852 2827 1823  
www.mottmac.com.hk

Client



Project

TAI SHUE WAN DEVELOPMENT  
AT OCEAN PARK  
海洋公園大樹灣發展

Title

ARTISTIC IMPRESSION OF THE  
INDOOR WATER PARK  
戶內水上樂園的藝術構想圖

Designed	HY	Eng check	FW
Drawn	HY	Coordination	FW
Dwg check	FW	Approved	EC

Scale at A1	Status	Rev
N.T.S.	PRE	P1

Drawing Number  
**FIGURE 2.3 圖2.3**



Notes

Key to symbols

Reference drawings

P1	MAR 14	HY	FIRST ISSUE	FW	EC
Rev	Date	Drawn	Description	Ch'k'd	App'd



20/F Two Landmark East  
100 How Ming Street  
Kowloon, Kowloon  
Hong Kong  
T +852 2828 5757  
F +852 2827 1823  
www.mottmac.com.hk

Client



Project

TAI SHUE WAN DEVELOPMENT  
AT OCEAN PARK  
海洋公園大樹灣發展

Title

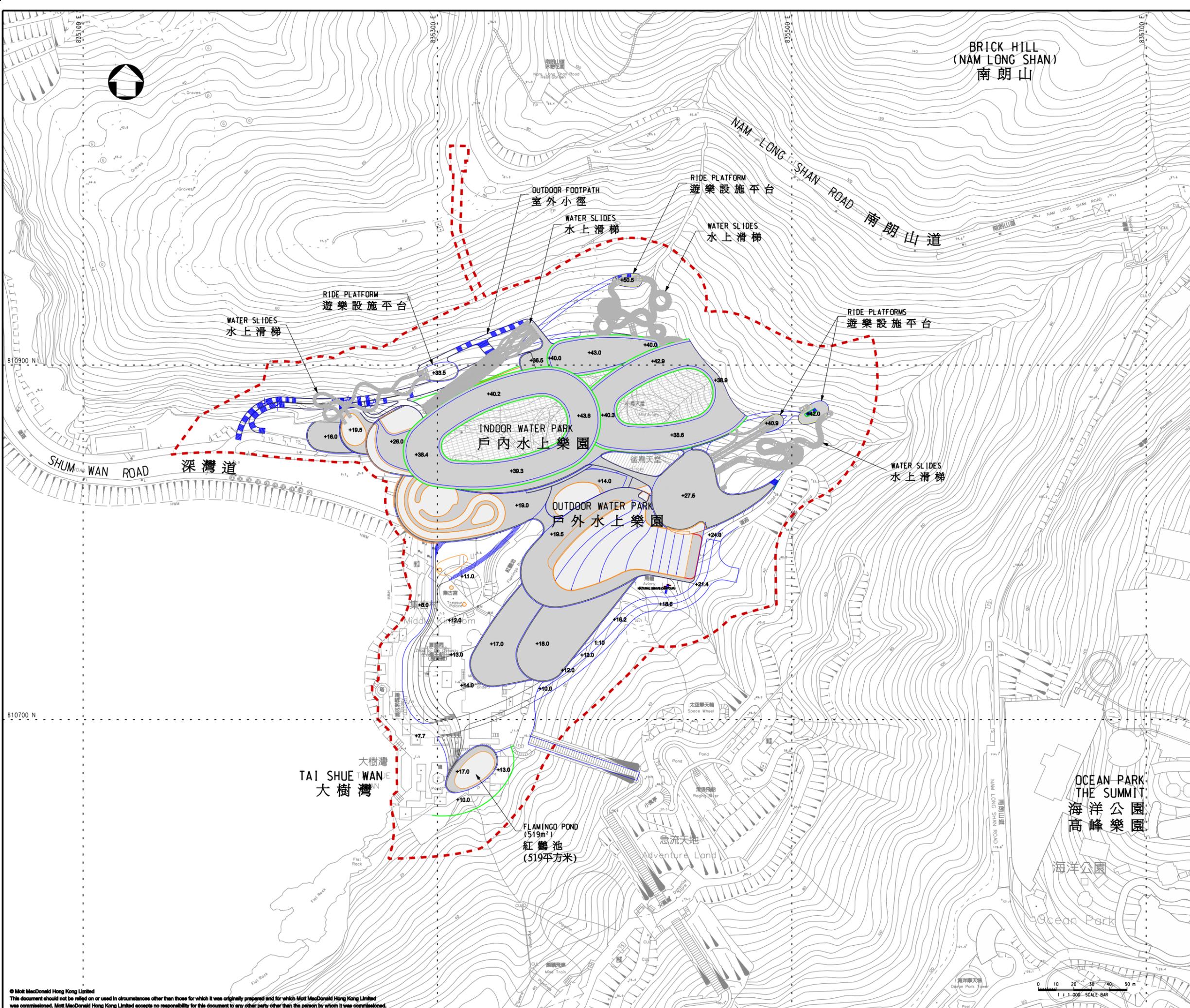
ARTISTIC IMPRESSION OF THE  
OUTDOOR WATER PARK  
戶外水上樂園的藝術構想圖

Designed	HY	Eng check	FW
Drawn	HY	Coordination	FW
Dwg check	FW	Approved	EC
Scale at A1	N.T.S.	Status	PRE
		Rev	P1

Drawing Number

FIGURE 2.4 圖2.4





Notes

Key to symbols

--- PROJECT BOUNDARY  
項目範圍

Reference drawings

Rev	Date	Drawn	Description	Ch'kd	App'd
P1	MAR 14	MING	FIRST ISSUE	PK	AFK

20/F Two Landmark East  
100 How Ming Street  
Kowloon, Hong Kong  
T +852 2828 5757  
F +852 2827 1823  
www.mottmac.com.hk



Client

Project

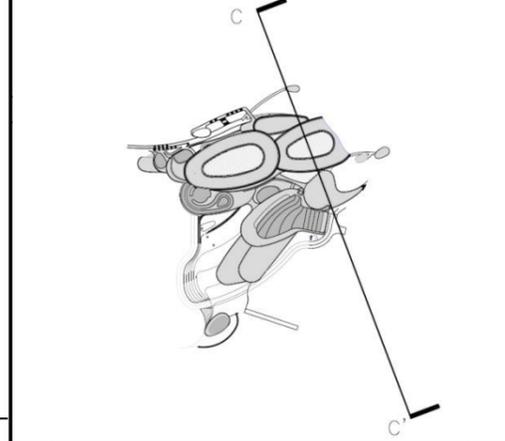
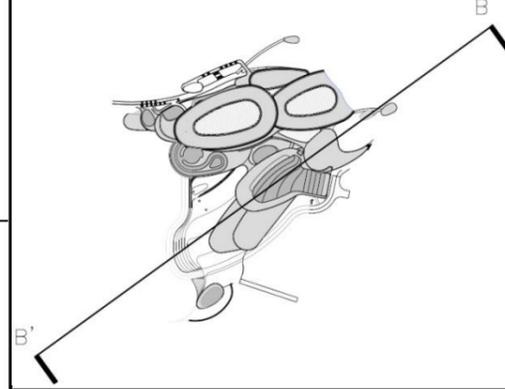
TAI SHUE WAN DEVELOPMENT  
AT OCEAN PARK  
海洋公園大樹灣發展

Title

PROPOSED LAYOUT PLAN OF THE  
PREFERRED SCHEME  
首選方案的擬建佈局圖

Designed	HY	Eng check	FW
Drawn	MING	Coordination	FW
Dwg check	HY	Approved	AFK
Scale at A1	Status	Rev	
1:1000	PRE	P1	
Drawing Number	FIGURE 2.5 圖 2.5		

Notes



P1	MAR 14	HY	FIRST ISSUE	FW	EC
Rev	Date	Drawn	Description	Ch'k'd	App'd

**Mott MacDonald**

20/F Two Landmark East  
100 How Ming Street  
Kowloon, Kowloon  
Hong Kong  
T +852 2828 5757  
F +852 2827 1823  
www.mottmac.com.hk



Project

**TAI SHUE WAN DEVELOPMENT  
AT OCEAN PARK  
海洋公園大樹灣發展**

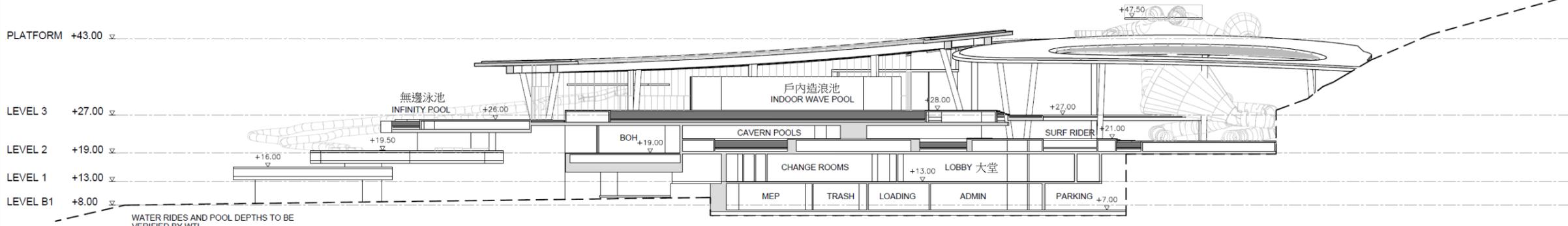
Title

**VERTICAL SECTIONS OF THE  
PREFERRED SCHEME  
首選方案的垂直切面圖**

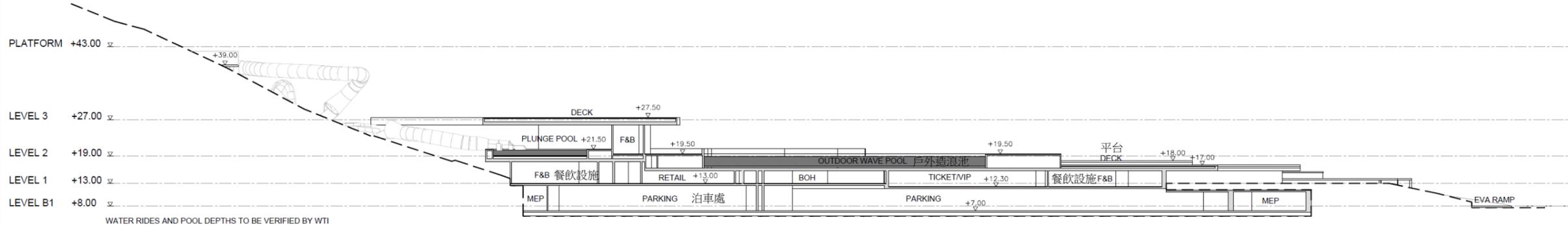
Designed	HY	Eng check	FW
Drawn	HY	Coordination	FW
Dwg check	FW	Approved	EC
Scale at A1	N.T.S.	Status	PRE
		Rev	P1

Drawing Number

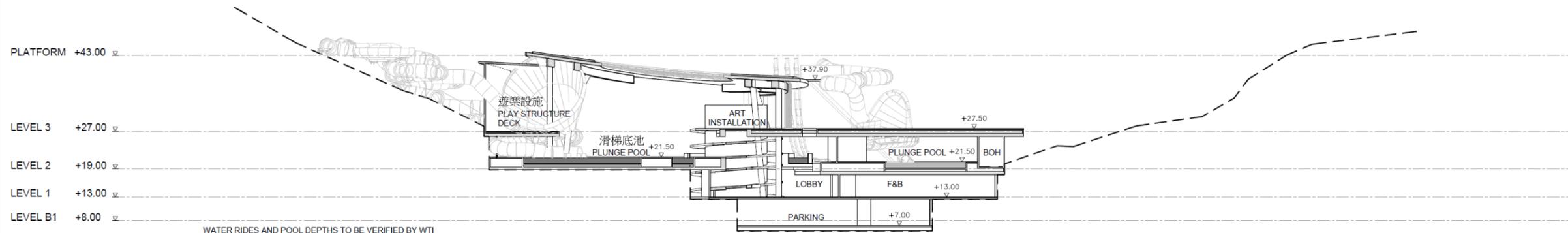
**FIGURE 2.6 圖2.6**



**SECTION A-A' 垂直切面A-A'**



**SECTION B-B' 垂直切面B-B'**



**SECTION C-C' 垂直切面C-C'**

Notes

Key to symbols

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	MAR 14	HY	FIRST ISSUE	FW	EC



20/F Two Landmark East  
100 How Ming Street  
Kowloon  
Hong Kong  
T +852 2828 5757  
F +852 2827 1823  
www.mottmac.com.hk

Client



Project

**TAI SHUE WAN DEVELOPMENT  
AT OCEAN PARK**  
海洋公園大樹灣發展

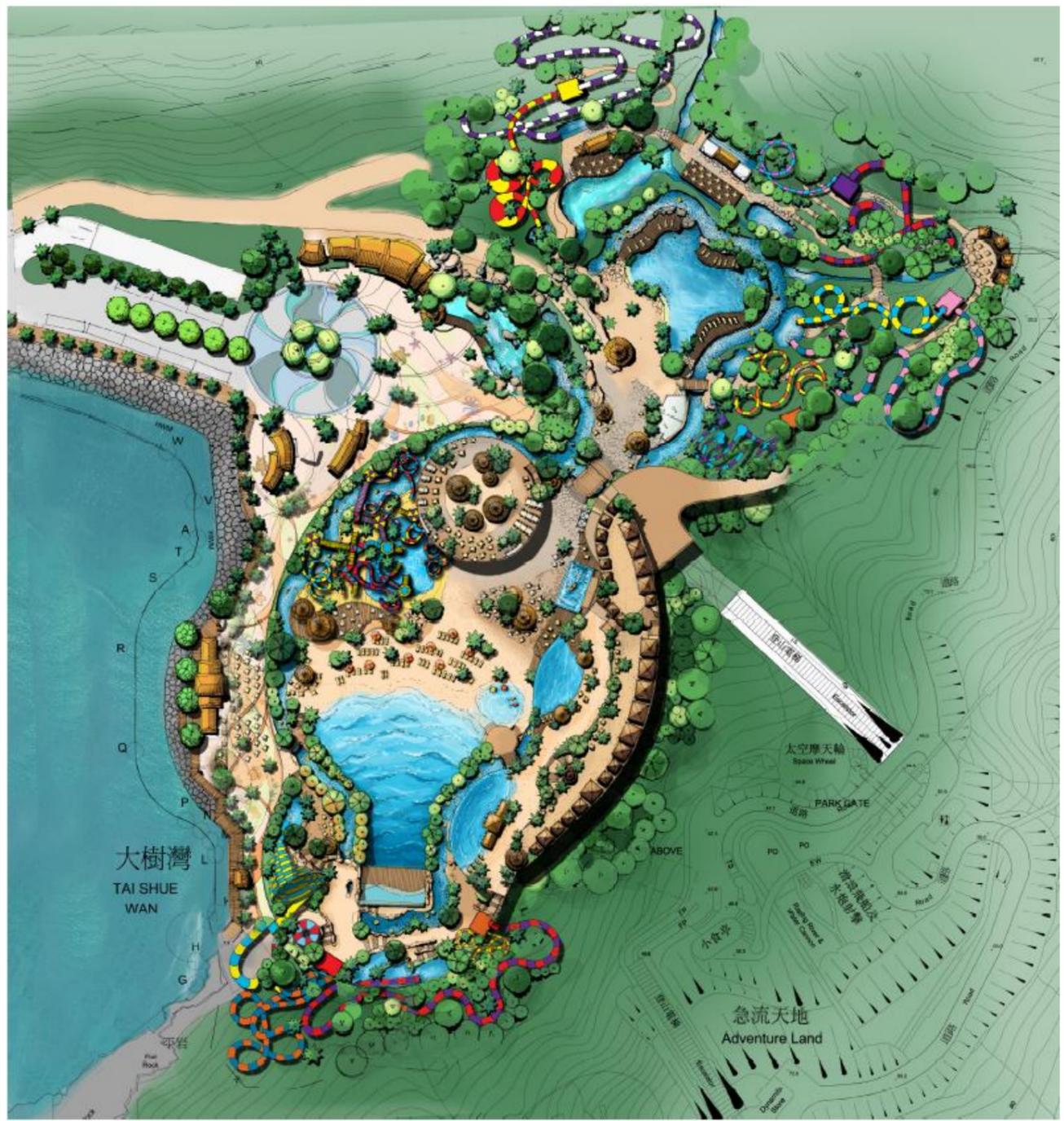
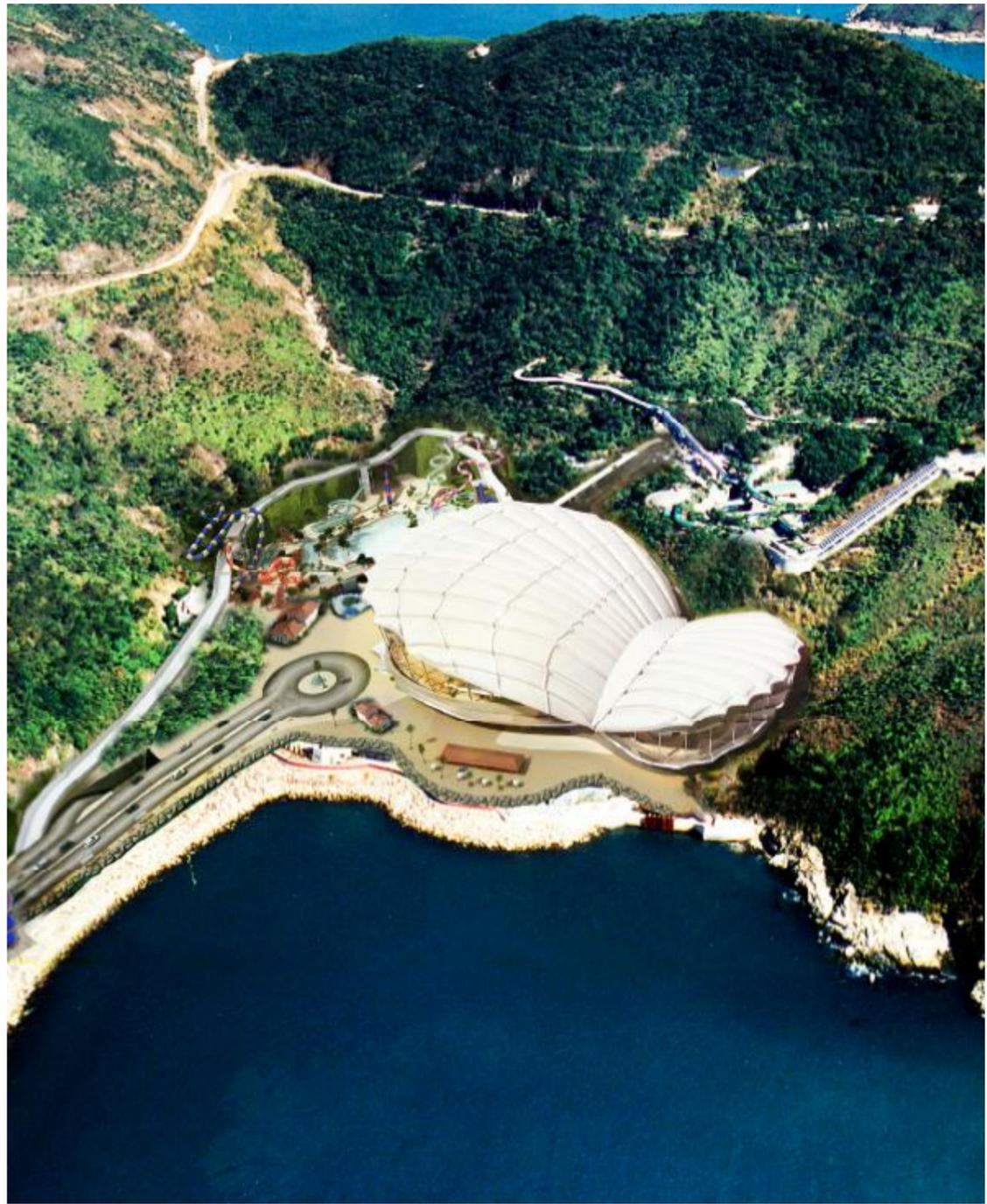
Title

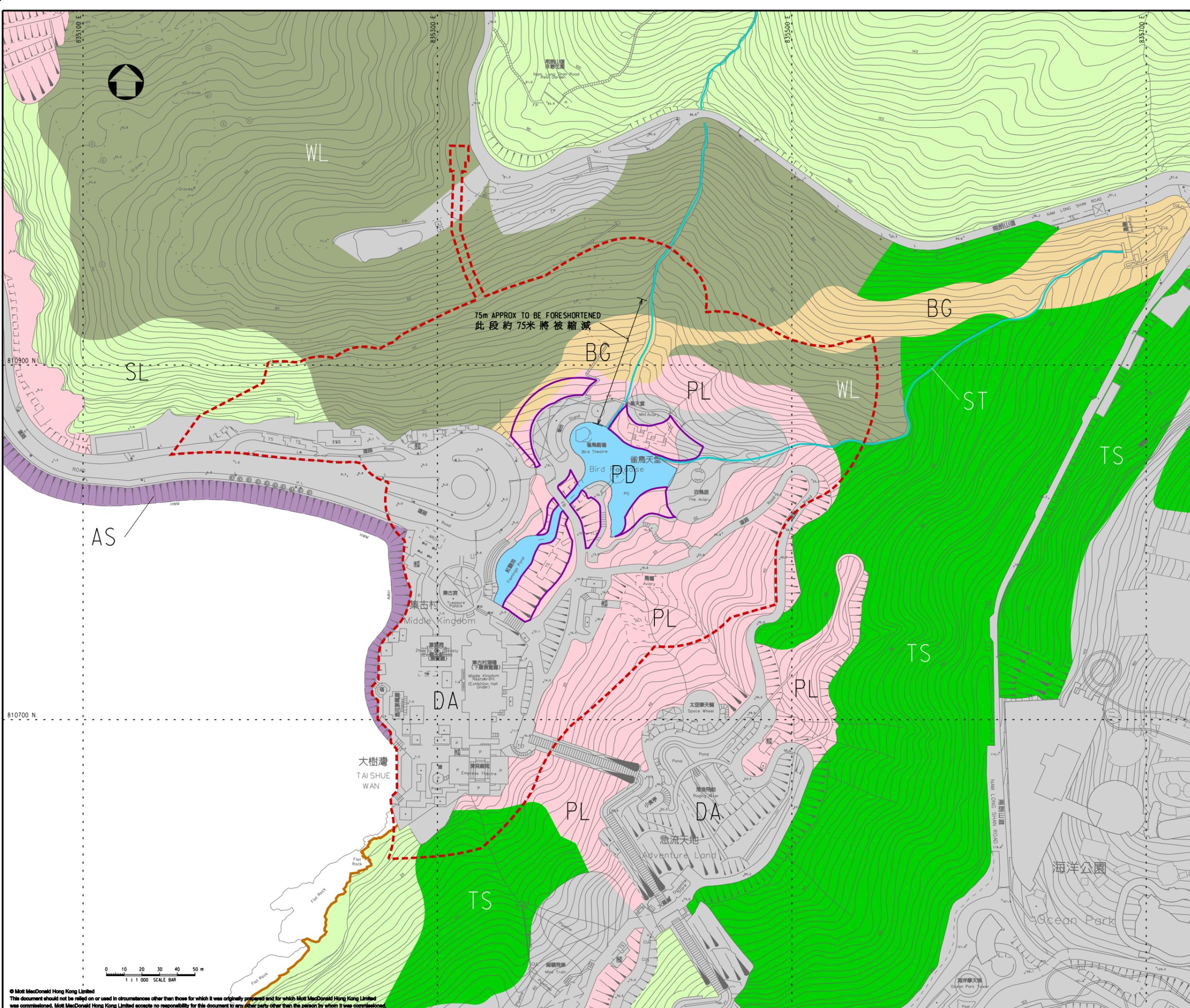
**LAYOUT PLAN AND ARTISTIC  
IMPRESSION OF THE ORIGINAL  
SCHEME**  
原有方案的佈局圖及藝術構想圖

Designed	HY	Eng check	FW
Drawn	HY	Coordination	FW
Dwg check	FW	Approved	EC
Scale at A1	N.T.S.	Status	PRE
		Rev	P1

Drawing Number

**FIGURE 2.7 圖2.7**





Notes

Key to symbols

- PROJECT BOUNDARY  
項目範圍
- INDICATIVE BOUNDARY OF ROOSTING SITES OF ARDEIDS  
鷺鳥棲息處的指示範圍
- WL WOODLAND  
林地
- TS TALL SHRUBLAND  
高灌木林
- SL SHRUBLAND  
灌木林
- PL PLANTATION  
植林
- DA DEVELOPED AREA  
已發展地區
- AS ARTIFICIAL SHORE  
人工堤岸
- BG BARE GROUND  
禿地
- PD POND  
池塘
- ST STREAM  
溪澗
- RS ROCKY SHORE  
岩岸

Reference drawings

P1	MAR 14	MING	FIRST ISSUE	HY	AFK
Rev	Date	Drawn	Description	Ch'kd	App'd

20/F Two Landmark East  
100 How Ming Street  
Kowloon, Kowloon  
Hong Kong  
T +852 2828 5757  
F +852 2827 1823  
www.mottmac.com.hk

Client



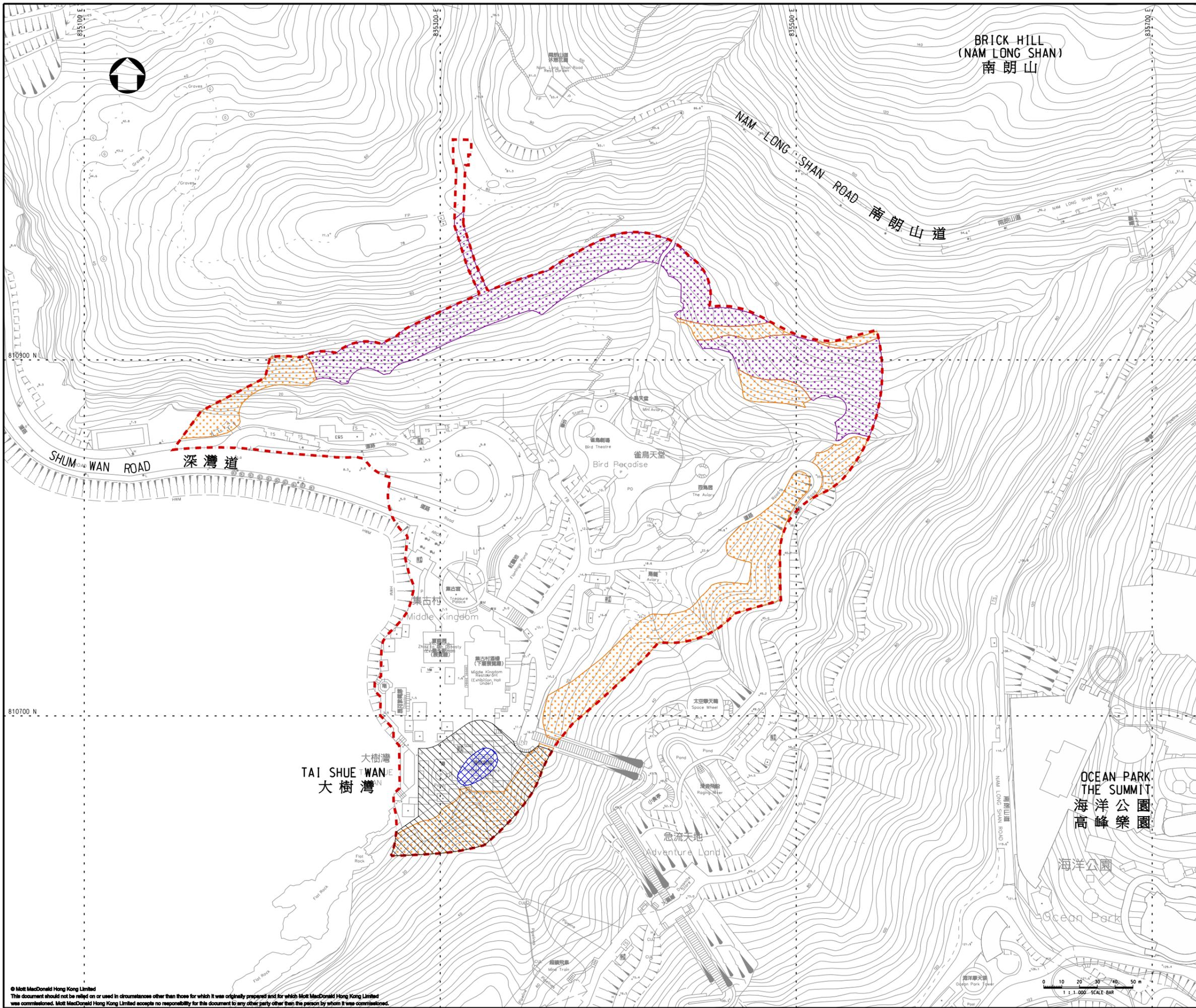
Project

**TAI SHUE WAN DEVELOPMENT  
AT OCEAN PARK  
海洋公園大樹灣發展**

Title

**HABITAT AFFECTED  
受影響生境**

Designed	HY	Eng check	FW		
Drawn	MING	Coordination	FW		
Dwg check	HY	Approved	AFK		
Scale at A1	Status		Rev		
<b>1:1000</b>	<b>PRE</b>		<b>P1</b>		
Drawing Number	<b>FIGURE 3.1 圖 3.1</b>				



Notes

- Key to symbols
- PROJECT BOUNDARY  
項目範圍
  - PROPOSED ENHANCEMENT AREA (INDICATIVE)  
擬定提高生態價值地區 (指示性質)
  - PROPOSED FLAMINGO POND  
擬建紅鶴池
  - PROPOSED WOODLAND COMPENSATION AREA  
擬定林地彌償區
  - PROPOSED WOODLAND REINSTATEMENT  
擬定林地修復區

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	MAR 14	MING	GENERAL REVISION	HY	AFK
P1	MAR 14	MING	FIRST ISSUE	HY	AFK

20/F Two Landmark East  
100 How Ming Street  
Kowloon, Kowloon  
Hong Kong  
☎ +852 2828 5757  
☎ +852 2827 1823  
www.mottmac.com.hk

Client

Project  
**TAI SHUE WAN DEVELOPMENT  
 AT OCEAN PARK**  
 海洋公園大樹灣發展

Title  
**COMPENSATION AND  
 ENHANCEMENT AREAS**  
 彌償及提高生態價值地區

Designed	HY	Eng check	FW
Drawn	MING	Coordination	FW
Dwg check	HY	Approved	AFK
Scale at A1	1:1000	Status	PRE
Drawing Number	FIGURE 3.2 圖 3.2		P2

Notes

Key to symbols

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	MAY 14	PKC	SECOND ISSUE	FW	AFK
P1	MAR 14	PKC	FIRST ISSUE	FW	AFK



20/F Two Landmark East  
100 How Ming Street  
Kowloon, Kowloon  
Hong Kong  
T +852 2828 5757  
F +852 2827 1823  
www.mottmac.com.hk

Client



Project

**TAI SHUE WAN DEVELOPMENT  
AT OCEAN PARK**  
海洋公園大樹灣發展

Title

**LANDSCAPE PLAN**  
景觀設計圖

Designed	PKC	Eng check	FW
Drawn	PKC	Coordination	FW
Dwg check	FW	Approved	AFK
Scale at A1	Status	PRE	Rev P2

Drawing Number

**FIGURE 3.3 圖3.3**



**LEGEND**

-  PROJECT BOUNDARY
-  WOODLAND TO BE RETAINED
-  NEW WHIP PLANTING
-  NEW TREE PLANTING
-  TREE TO BE RETAINED
-  TREE TO BE TRANSPLANTED
-  HARD PAVED LANDSCAPE AREA GROUND LEVEL
-  LANDSCAPE AREA AT PODIUM LEVEL
-  HARD PAVED DRIVEWAY
-  55° SLOPE GREENING
-  AREAS TO BE FURTHER DEVELOPED SUBJECT TO WATER SLIDE ALIGNMENTS
-  GREEN ROOF
-  SKY LIGHT
-  WATERBODY
-  SLIDE

