

Tai Shue Wan Development at Ocean Park

Ecological Enhancement Plan

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Tai Shue Wan Development at Ocean Park

Ecological Enhancement Plan

Pursuant to Condition 2.8 of Environmental Permit No. EP-487/2014/A, this Ecological Enhancement Plan has been reviewed and certified by the Environmental Team Leader (ETL) and verified by the Independent Environmental Checker (IEC).

Certified by:

Gary Chow

Environmental Team Leader (ETL)
Mott MacDonald Hong Kong Limited

Date:

24/05/2021

Verified by:

Sam Tsoi

Independent Environmental Checker (IEC)
Ove Arup & Partners Hong Kong Limited

Date:

Pursuant to Conditions 2.3 and 2.8 of Environmental Permit

No. EP-487/2014/A, this Ecological Enhancement Plan has been

prepared by the Qualified Ecologist.

Prepared by:

Heidi Yu

Qualified Ecologist

Mott MacDonald Hong Kong Limited

Date

Information class: Standard

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Contents

1	Introd	Introduction		
	1.1 1.2 1.3	Background Objective of Establishment of Ecological Enhancement Area Personnel	1 2 2	
2	Ecolo	gical Enhancement Proposal	3	
	2.1 2.2 2.3 2.4	Proposed Compensation on Ardeid Roosting Site in the EIA Report Extent of Ecological Enhancement Area Design of Freshwater Pond Selected Planting	3 3 4	
3	Monitoring Programme			
Appe	endix A	Curriculum vitae of the Qualified Ecologist	6	
Tabl	es			
Table	2.1: Pr	oposed Planting for the Ecological Enhancement Area	4	
Figu	res			
Figur	e 2.1	Proposed Ecological Enhancement Area		
Figur	e 2.2	Design of Freshwater Pond		
Figur	e 2.3	Tree Planting Plan		
Figur	e 2.4	Shrub Planting Plan		
Figur	e 3.1	Proposed Observation Point for Monitoring		

1

1 Introduction

1.1 Background

Under the Environmental Impact Assessment (EIA) Ordinance, the EIA Report and the Environmental Monitoring and Audit (EM&A) Manual (Register No.: AEIAR-184/2014) prepared for the "Tai Shue Wan Development at Ocean Park" (the Project) have been approved by the Environmental Protection Department (EPD) on 27 August 2014. The Environmental Permit (EP) has been subject to variation and the current Permit No. is EP-487/2014/A issued on 10 January 2018.

As mentioned in Section 10.6.3 of the EIA report, the plantation area at the fringe and in the vicinity of the Flamingo Pond and Bird Paradise that was used by ardeids as roosting site will be affected due to site clearance and construction of the Project. Vegetation used by the ardeids will be removed during site clearance, causing loss of ardeid roosting site.

In the event of aggregation of large roosting population (as happened when the Wong Chuk Hang population of ardeids relocated to Tai Shue Wan), the ecological impact would be moderate-minor owing to the high abundance of species of conservation interest. However, in view of the situation during the EIA stage, the population tended to diminish, and the significance of the impact tended to down scale to minor, given the relatively small number of birds affected. Therefore, the impact of loss of ardeid roosting site was evaluated to be in the range between moderate-minor and minor depending on the number of birds affected.

In Section 10.7.3.1 of the EIA report, the southern part of the Project area is recommended to be reserved for enhancement of vegetated habitat and re-provision of Flamingo Pond as a mitigation measure of compensation for the loss of ardeid roosting site, as shown in Figure 2 of the EP. This Ecological Enhancement Area (EEA) is selected for ardeid roost compensation because it is protected from strong wind from the south and near waterfront in which both factors are favourable for night roost (both are common factors for ardeids night roost in Hong Kong); and disturbance from operation of the Water Park including noise and light to this EEA at the southern edge of the Project area will be relatively minor. The EEA is proposed inside Ocean Park's own lot boundaries, therefore Ocean Park Corporation, the Permit Holder, will be the maintenance party of the EEA.

As stipulated in Condition 2.8 of the EP, the Permit Holder shall, no later than one month before the commencement of tree planting at the EEA, submit Ecological Enhancement Plan to EPD for approval. The Ecological Enhancement Plan shall be prepared by the Qualified Ecologist(s) appointed under Condition 2.3 and shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the approved EIA report. All recommended mitigation measures as set out in the approved Plan shall be fully and properly implemented. No tree planting in the Ecological Enhancement Area shall be allowed prior to the approval of the Plan.

Mott MacDonald Hong Kong Limited has been commissioned by the Ocean Park Corporation to prepare and submit the Ecological Enhancement Plan to meet Condition 2.8 of the EP.

1.2 Objective of Establishment of Ecological Enhancement Area

The objective of establishing the EEA is to compensate for the loss of ardeid roosting site due to site clearance and construction of the Project, by providing a pond and suitable planting at wind-shielded and waterfront location with landscape setting similar to the lost roosting site.

This Ecological Enhancement Plan will form the basis of guiding the implementation of the proposed compensation and mitigation in the EEA as recommended in the EIA report to improve the overall ecological benefits of the Tai Shue Wan area. As stipulated in Condition 2.8 of the EP, the Ecological Enhancement Area shall consist of a freshwater pond and planting areas with selected species. The Ecological Enhancement Plan shall contain:

- (a) design of the freshwater pond including the details of pond size, depth and recommendations of favourable conditions and settings for ardeids or wild birds to roost (detailed in **Section 2.3**);
- (b) number, location and species of plant to be selected for planting, which shall include but not limited to *Macaranga tanarius*, *Celtis sinensis*, *Mallotus paniculatus*, *Ficus hispida* and *Cratoxylum cochinchinense* (detailed in **Section 2.4**);
- (c) number and location of heavy standard trees to be planted (detailed in Section 2.4); and
- (d) a detailed monthly monitoring programme (for one year during operation phase of the Project) to check the effectiveness of the setting in attracting ardeids roosting activities (detailed in **Section 3**).

1.3 Personnel

This Ecological Enhancement Plan prepared in accordance with Condition 2.8 of the Environmental Permit No. EP-487/2014/A has been checked and endorsed by Qualified Ecologist(s) who have at least 5 or more years of relevant experience in ardeids monitoring or survey. The qualification of the qualified ecologist has been reviewed and agreed with ET Leader and the IEC. The CV of the Qualified Ecologist who prepared this Ecological Enhancement Plan is provided in **Appendix A**.

2 Ecological Enhancement Proposal

2.1 Proposed Compensation on Ardeid Roosting Site in the EIA Report

As mentioned in Section 10.7.3.1 of the EIA report, within the enhancement area, a Flamingo Pond will be provided to replace the removed Flamingo Pond, although flamingo will no longer be kept due to public health concern. These areas provide landscape setting similar to the lost roosting site, which is also established aside the Flamingo Pond. For providing suitable roosting substrate for ardeids, native tree species at the existing planting area that was used by ardeids including *Macaranga tanarius* and *Celtis sinensis*, and other native tree species previously found to be used by ardeids at Wong Chuk Hang Nullah roosting site including *Mallotus paniculatus*, *Ficus hispida* and *Cratoxylum cochinchinense* will be provided where feasible. Heavy standard sized trees will be used for such planting which will be implemented at the earliest possible opportunity to allow early establishment of the trees around the Flamingo Pond. The Flamingo Pond and the tree planting area are located at Level 1 open area of the Project Site which offers a clear view of surrounding and direct view without obstruction towards the sea to facilitate the utilization of birds. With suitable planting, wind-shielded and waterfront location and similar landscape setting to the lost roosting site, the enhancement area will provide an option for ardeids as a roosting site.

2.2 Extent of Ecological Enhancement Area

The designed EEA locates at the southern part of the Project area, as shown in **Figure 2.1**. The location is protected from strong wind from the south and near waterfront. The southern periphery of the EEA overlaps with the Seaside Area of the Woodland Compensation Area.

2.3 Design of Freshwater Pond

A freshwater pond with a size of about 520 m² will be provided in the EEA, as shown in **Figure 2.1**. Its size and location are close to that set out during the EIA stage. Water depth of the pond will be about 0.4 m which will be maintained by Ocean Park Corporation, similar to the setting for the original Flamingo Pond.

Recommendations of favourable conditions and settings for roosting of ardeids

Design of the freshwater pond is provided in Figure 2.2.

An island is incorporated into the pond design, which will provide more space near shallow water for resting and foraging activities by wild birds. Trees, shrubs and ground cover vegetation will be planted on the island to create complexity in habitat and provide roosting grounds for birds, so as to attract ardeid roosting activities.

A layer of fine sand will be used for substrate of the pond and topped by pebbles. Larger pebbles will also be used for pond embankment. Large and small feature rocks are designed to be placed in the pond and for forming the pond banks respectively. These substrates provide areas with shallow water, resulting in variation of water level and increase irregular edges and surfaces, creating complexity in the pond habitat.

Natural rock structure of the feature rocks can enhance biodiversity in some extent. The spaces in between rocks provide habitats for different range of species, both above and below water. Below water, the created space provides shelter and microhabitat for invertebrates, whereas above-water habitat for range of insects, birds and plants.

2.4 Selected Planting

Large area of plants and vegetation will be available surrounding the pond. Tree and shrub species proposed for planting in the EEA are presented in **Table 2.1**. Species of climbers and groundcover plants are also proposed to be planted in the EEA.

The number of heavy standard trees to be planted in the EEA are tabulated in Table 2.1 and their locations are presented in **Figure 2.3**. These tree species are particularly selected for their tolerance to salt spray near the seashore, as well as for providing landscape setting similar to the ardeid roosting site at the previous Flamingo Pond and Bird Paradise. The proposed tree planting area at the north-west side of the Pond provides roosting vegetation as well as essential screening function.

The number and location of shrubs and groundcover plants selected for planting within the EEA are shown in **Table 2.1** and **Figure 2.4**.

Table 2.1: Proposed Planting for the Ecological Enhancement Area

Botanical Name	Chinese Name	Quantity
Heavy Standard Tree		
Alstonia scholaris	糖膠樹	3
Celtis sinensis	朴樹	5
Elaeocarpus balansae	大葉杜英	10
Liquidambar formosana	楓香	15
Taxodium distichum	落羽杉	5
Terminalia mantaly 'Tricolor'	錦葉欖仁	6
Tree Planting at the southern periphery ((overlapping with the Seaside Area of th)
Acacia confusa	台灣相思	504
Ficus hispida	對葉榕	336
Cratoxylum cochinchinense	黄牛木	336
Macaranga tanarius var. tomentosa	血桐	419
Mallotus paniculatus	白楸	252
Celtis sinensis	朴樹	252
Shrub		
Alocasia odora	海芋	135
Arundo donax	蘆竹	25
Cyathea lepifera	筆筒樹	17
Livistona chinensis	蒲葵	71
Gunnera manicata	大葉蟻塔	28
Rhapis excelsa	棕竹	133
Ground cover		
Nephrolepis auriculata (syn N. cordifolia)	腎蕨	2540

3 Monitoring Programme

As discussed in Section 10.7.3.1 of the EIA report, the EEA should be monitored monthly after establishment, for one year during operation phase to check the effectiveness of the setting for the EEA. A monthly monitoring programme is detailed in this Section to check the effectiveness of the setting in attracting ardeids roosting activities.

Monthly monitoring survey will be conducted for 12 months during operation phase using point count method at the evening time from an hour before sunset, and last until the nightfall. Before conducting point count survey, the EEA will be inspected and searched for any ardeids, other birds or faunal groups utilising the habitat. Any aggregation of night roosting ardeids in the EEA or adjacent area will be located, and the ardeid species will be identified and counted throughout the monitoring survey. Moreover, day roost of Black-crowned Night Heron in the EEA or adjacent area will also be recorded throughout the monitoring survey.

Direct observation and counting of ardeids will be made from a vantage point which enables an unobstructed view over the area. In the EIA report, it was mentioned that the seawall at TSW should be taken as the first priority of the vantage point. However, further checking on the difference between height levels at the seawall and the EEA has brought to a concern that vantage point at the seawall is likely to have obstructed view and difficulty in counting ardeids in the EEA. The proposed observation point is indicated in **Figure 3.1** locating between the seaside and the EEA where it has a vantage and unobstructed view over the area so that night roosting ardeids in the EEA can be clearly observed and counted during operation phase. The location of the vantage point may be adjusted depending on the exact roosting location found.

Monitoring of the EEA should be supervised by a qualified ecologist who have at least 5 or more years of relevant experience in ardeids monitoring or survey.

Appendix A Curriculum vitae of the Qualified Ecologist

Tai Shue Wan Development at Ocean Park

Ecological Enhancement Plan

Curriculum Vitae Heidi Yu

Position: Ecologist

Name: Heidi YU

Education/ Professional Member, The Hong Kong Institute of Qualified Environmental

Qualifications: Professionals, 2020

Corporate Member, The Hong Kong Institute of Environmental Impact

Assessment, 2019

MSc Environmental Science, The Hong Kong University of Science and

Technology, 2007

BSc (Hons) Applied Chemistry (Environmental Concentration), Hong Kong

Baptist University, 2006

Key Experience:

Ms Yu has 12 years of experience in environmental study specializing in ecological assessment and monitoring. She has carried out ecological impact assessment and field surveys for high profiled EIA projects including intertidal field survey for the Expansion of Hong Kong International Airport into a Three-Runway System and terrestrial ecological field for MTR South Island Line (East). She is experienced in liaison with government department for co-ordination of EIA and PER works, which include infrastructures project such as Organic Waste Treatment Facilities Phase 2 and land use planning such as Kwu Tung (South) Feasibility Study.

Other than EIA, she is also knowledgeable in ecological study and provides technical advice for ecological habitat management, which is shown in her co-ordination works for Yuen Long Bypass Floodway project and Eco-hydraulics Study on Green Channels.

Relevant Project Experience in Ecological Enhancement:

Ecological Survey and Assessment for Yuen Long Bypass Floodway – (2013-2020) – Drainage Services Department – project coordinator and ecologist for managing ecological assessment and proposing ecological improvement measures for Stage 1 and ecological surveys for Stage 2, in which the surveys have been extended to end of 2018 for a focus study on the effectiveness of ecological improvement measures.

Enhancement of Shek Sheung River – Investigation – (2020-present) – Drainage Services Department – Ecology specialist for conducting ecological review and assessment, and preparation of project profile for application for permission to apply directly for an environmental permit.

Ecological Survey of Avifauna at Shui Hau – (2020-present) – Sustainable Lantau Office – Ecology specialist for studying the ecological significance of the habitats in Shui Hau for avifauna.

Ecological Survey for Eco-hydraulics Study on Green Channels – Stage 3 – (2019-present) – Drainage Services Department – Ecology specialist for reviewing the ecological survey results including habitat, vegetation and fauna surveys conducted for a total of 26 selected channels in Hong Kong.

Drainage Improvement Works at North District (Package B) – (2015-present) – Drainage Services Department – Ecologist providing inputs related to environmental aspects including preparation of EIA and environmental review for the proposed drainage improvement works at seven locations in the North district and also support on incorporating ecological enhancement and blue-green design for the proposed works.

Comprehensive Development at Wo Shang Wai Environmental Team – (2012-2013) – Private Developer – Ecologist responsible for reviewing and reporting of ecological monitoring data for the construction of comprehensive development in Wo Shang Wai, which is situated close to a Ramsar site supporting important winter migratory wetland birds and ardeids reside throughout the year.

Third Runway Reclamation Design Consultancy Services – (2012-2015) – Airport Authority Hong Kong – As isolated colonies of corals have been identified along the existing airport island artificial

Tai Shue Wan Development at Ocean Park

Ecological Enhancement Plan

Curriculum Vitae Heidi Yu

seawall, Mott MacDonald was commissioned to study the potential for enhancement via 'eco-enhancement seawall design'. Reviewed marine resources in western waters of Hong Kong, studied ecological enhancement designs applied to artificial seawall in other places (eg New Jersey, Sydney, Vancouver) and proposed preliminary suggestions of feasible enhancement measures for the third runway seawall design.

Eco-hydraulics Study on Green Channels – Stage One – (2012-2014) – Drainage Services Department – Conducted desktop study and literature review on enhancement of drainage channels. Assisted co-ordination in the study, meetings and preparation of deliverables; attended workshops and meetings with green groups concerning design and ecological enhancement in drainage channels.

Tai Shue Wan Development at Ocean Park – (2013-2015) – Ocean Park Corporation – an EIA study for development of a new waterpark at Tai Shue Wan where it was a roosting and breeding site for egrets. Conducted egretry survey, baseline monitoring of ardeid roosting site, inspection of alternative roosting sites in the territory and ecological impact assessment.

Expansion of Hong Kong International Airport into a Three-Runway System – (2012-2015) – Airport Authority Hong Kong – Conducted survey of ardeid nests at Sha Chau Egretry and avifauna survey at Chek Lap Kok and Sha Chau island; also carried out intertidal study for marine ecological impact assessment in the EIA Study; coordinated intertidal survey at Chek Lap Kok and Lantau Island, including the northwestern seashore of Lantau, Sha Chau, Brothers Island and the artificial seawalls at the airport island.

South Island Line (East) EIA (2008-2009) – Mass Transit Railway (MTR) Corporation – The new line comprises approximately 7km of part-underground and part-viaduct railway alignment and from Ap Lei Chau island to the existing Admiralty station, including a railway bridge across Aberdeen Channel. Conducted terrestrial and intertidal ecological baseline surveys for the construction and operation of the proposed railway and associated structures, noticeably ardeid night roost survey at Wong Chuk Hang Nullah and follow-up investigation at other parts of Hong Kong.

Development of Organic Waste Treatment Facilities Phase 2 Feasibility Study – (2012-2013) – Environmental Protection Department – EIA for the development of OWTF at Sha Ling, North District; Conducted ecological field surveys including inspection of Man Kam To Road Egretry, and ecological and fisheries impact assessment; Acted as EIA Coordinator: liaised with subconsultants and government officers; coordinated inputs for EIA submissions; responded public comments.

Review, Design and Tender Documentation for Drainage Improvement Works at Tsung Yuen, Kwu Tung North – (2011-2012) — Drainage Services Department — Conducted ecological field survey including inspection of Ho Sheung Heung Egretry and impact assessment for the Environmental Review of the project.

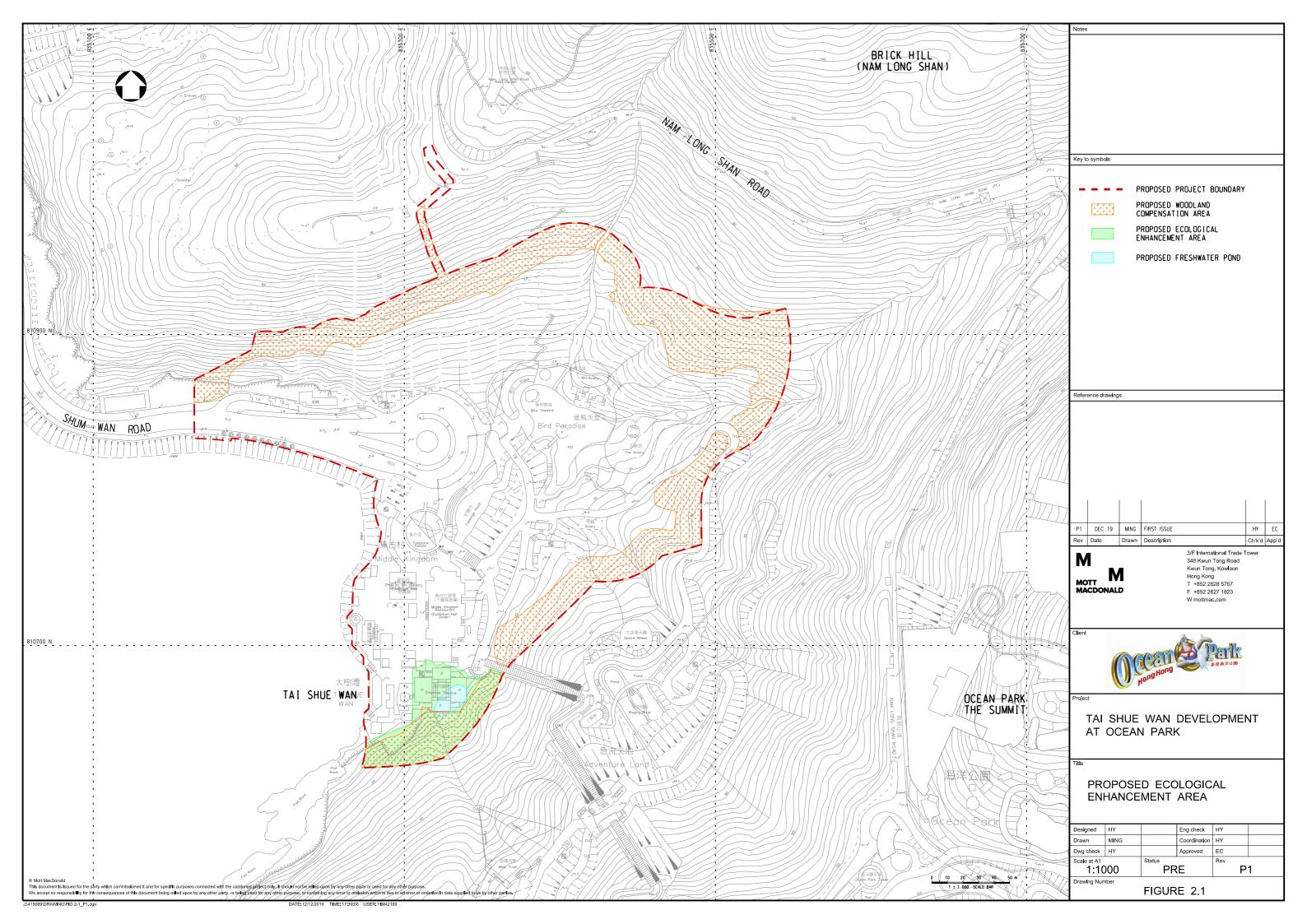
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works – (2010-2011) – Civil Engineering and Development Department – The project is to establish a new Boundary Crossing Point in the eastern part of the Hong Kong-Shenzhen boundary, also comprising a village resite, a connecting road from the boundary to Fanling Highway, and the associated infrastructural works. Assisted in ecological impact assessment and conducted ecological baseline surveys (including inspection of Ping Che Egretry), tree surveys and literature review on ecological resources in the study area.

Voluntary Work

Waterbird Monitoring at the Mai Po Inner Deep Bay Ramsar Site – (2011) – Hong Kong Bird Watching Society – conducted monthly waterbird monitoring in Mai Po and Inner Deep Bay Ramsar Site, a project commissioned by AFCD to facilitate the management of the Ramsar Site.

Employment History:

Employment history:			
Senior Environmental Consultant –			
Mott MacDonald HK Ltd			
Environmental Consultant – Mott MacDonald HK Ltd			
Assistant Environmental Consultant – Mott MacDonald HK Ltd.			
Project Assistant – The Hong Kong University of Science and Technology			



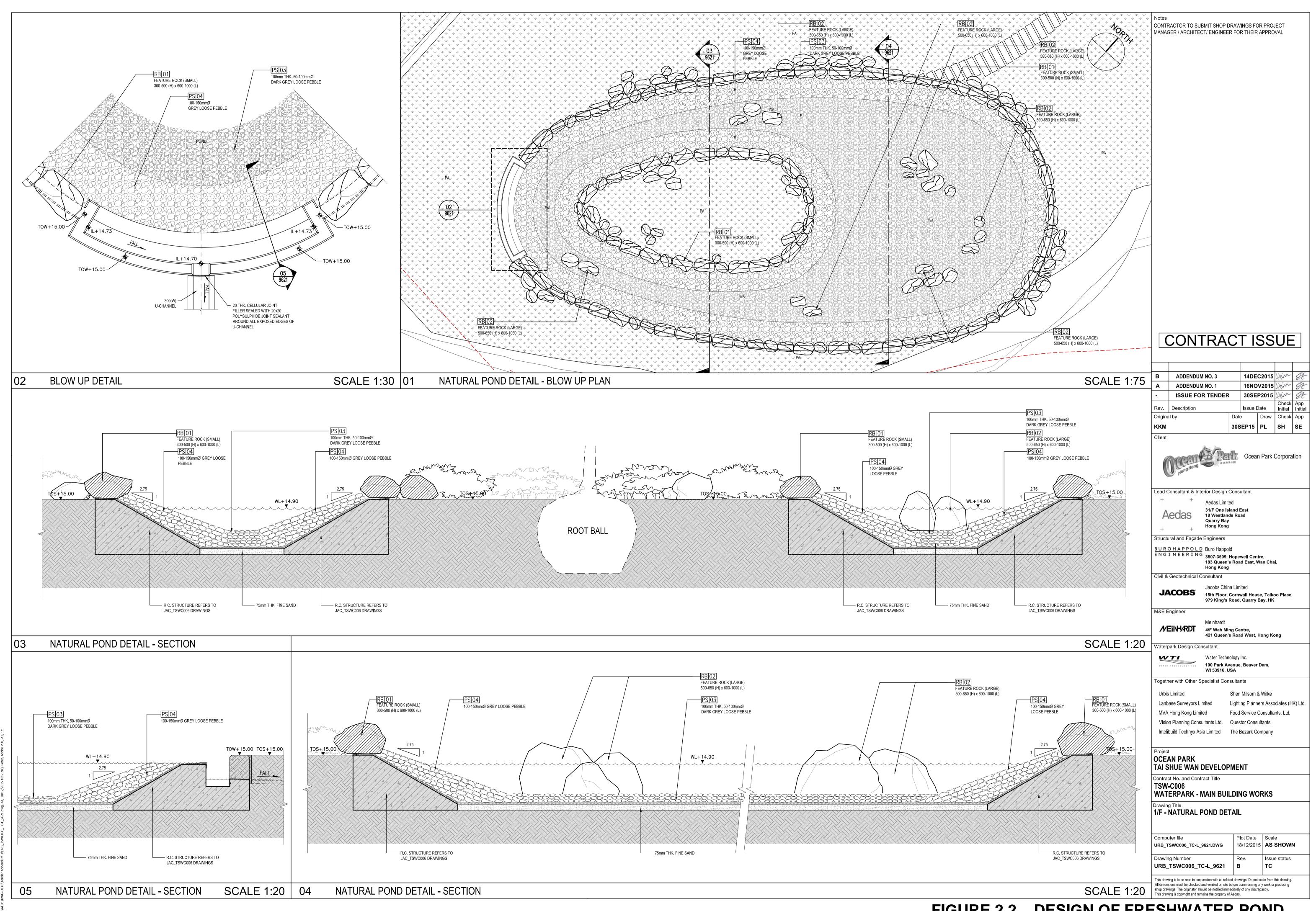


FIGURE 2.2 DESIGN OF FRESHWATER POND

