

### By Post

WWF Hong Kong 15/F, Manhattan Centre, 8 Kwai Cheong Road, Kwai Chung, NT Level 5 Festival Walk 80 Tat Chee Avenue Kowloon Tong Kowloon Hong Kong **t** +852 2528 3031 **d** +852 2268 3437 **f** +852 2268 3380

ricky-kh.chui@arup.com

www.arup.com

For the attention of Ms. Nicole Wong

\_\_\_\_\_

10 July 2023

Dear Ms. Wong

### Mai Po Nature Reserve Infrastructure Upgrade Water Quality Mitigation Measures Plan (EP Condition 2.14)

Reference is made to Environmental Team's captioned plan (Version 6.0) by email on 7 July 2023. Pursuant to Condition 2.14 of the Environmental Permit No. EP-598/2022, we are pleased to inform you that we have no comments on the captioned plan. We hereby verify the captioned report for onward submission.

If you require further information, please do not hesitate to contact the undersigned.

Yours sincerely

Ricky Chui

**Independent Environmental Checker** 

### Water Quality Mitigation Measures Plan

### for

### Mai Po Nature Reserve Infrastructure Upgrade Project (Environmental Permit No. EP-598/2022)

July 2023

(Version 6.0)

Certified By Environmental Team Leader:\_

(Joan Choi)

Company: Ka Shing Management Consultancy Ltd.

### **Table of Content**

Pag No	
1.PROJECT BACKGROUND	
2.REQUIREMNTS OF WATER QUALITY MITIGATION MEASURES PLAN	2
List of Appendices	
Appendix A – The location of the Project	
Appendix B – Locations of Gei Wai and TH2-3	
Appendix C – The scheduled plan of water draining and re-filling of Gei Wai 7, 8a and 19 and 20e	b
Appendix D – The recommended mitigation measures	
Appendix E – Indicative Construction Programme	

### 1. PROJECT BACKGROUND

- 1.1 The Mai Po Nature Reserve has served Hong Kong as one of the most valuable ecological assets in the city, and is managed by the World Wide Fund for Nature Hong Kong ("WWF"). WWF proposes to update of an existing concrete footpath of about 1.5m wide to a raised wooden boardwalk of about 1.65m wide, construction of a new three-storey tower hide (TH2) and the associated access wooden boardwalk of about 156m long and 1.65m wide; and construction of a new three-storey tower hide (TH3) and the associated access wooden boardwalk of about 85m long and 1.65m wide. The location of the Project as shown in the Appendix A of this report.
- 1.2 The project site is located in Mai Po Nature Reserve (MPNR) where has been managed by World Wide Fund for Nature Hong Kong ("WWF") since 1984. More than 20,000 people per year visiting the MPNR and growing in visitor numbers is anticipated. Most of the existing facilities have been in use for more than 20 years, in order to cater for an increasing number of visitors and providing the good condition of facilities in the future, the upgrade of infrastructure is proposed. The WWF had completed an Environmental Impact Assessment (EIA) and is the Permit Holder.
- 1.3 The Project under Mai Po Nature Reserve Infrastructure Upgrade Project (Register No. AEIAR-233/2022) is approved by the EIA report and later granted an Environmental Permit (EP) No.: EP-598/2022. The approved EIA report described both the construction phase and operational phase.
- 1.4 Pursuant to Condition 2.14 of the EP No.: EP-598/2022, the Permit Holder shall, no later than one month before the commencement of construction of the Project, deposit with the Director 4 hard copies and 1 electronic copy of a Water Quality Mitigation Measures Plan (WQMMP) of the Project.

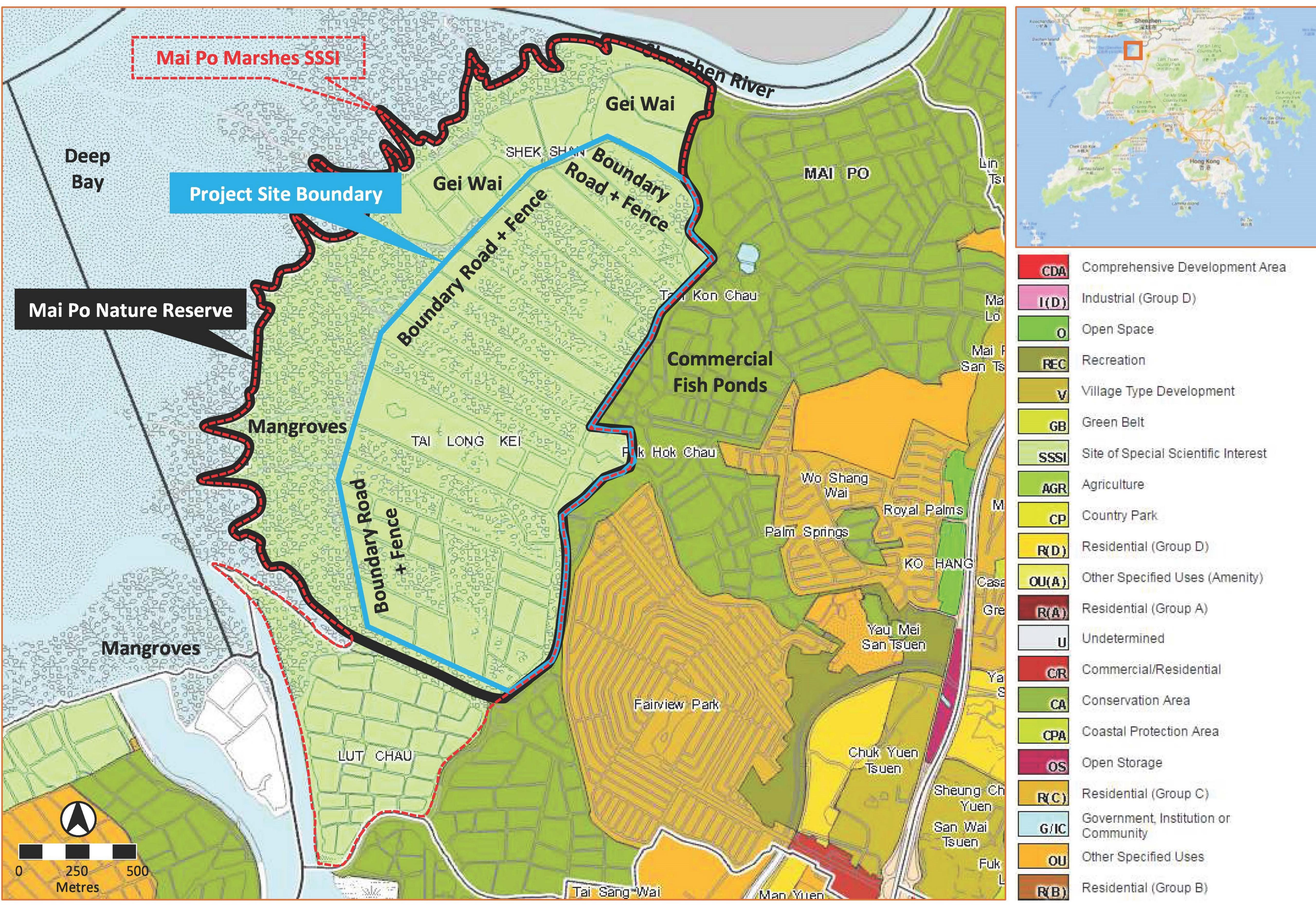
### 2. REQUIREMNTS OF WATER QUALITY MITIGATION

### **MEASURES PLAN**

- 2.1 The Water Quality Mitigation Measures Plan (WQMMP) shall include a schedule of draining, reprofiling and re-filling of Gei Wai 7, 8a, 19 and 20e by taking into account the construction programme of TH2 and TH3 indicated in Appendix E to ensure these Gei Wais adjacent to the construction sites of TH2 and TH3 shall be drained before the commencement and refilled after the completion of the foundation works. Appendix B shows locations of Gei Wai and TH2-3.
- 2.2 The Scheduled plan of draining and re-filling of Gei Wai 7, 8a, 19b and 20e as shown in Appendix C state the latest construction programme of Tower Hide 2, Tower Hide 3 and enhancement work of Footpath which will be done from 30 May to 16 October 2023. All works has conformed with the latest Mai Po Habitat Management work 2023.
- 2.3 The Appendix D demonstrates an implementation schedule in table form to clearly list out the mitigation measures to be implemented, the implementation party, location, timing and environmental performance required for implementation of the mitigation measures.
- 2.4 All mitigation measures recommended and requirements specified in the approved EIA and EM&A Manual and the implementation schedule shall be fully implemented as shown in the Appendix D of this report.

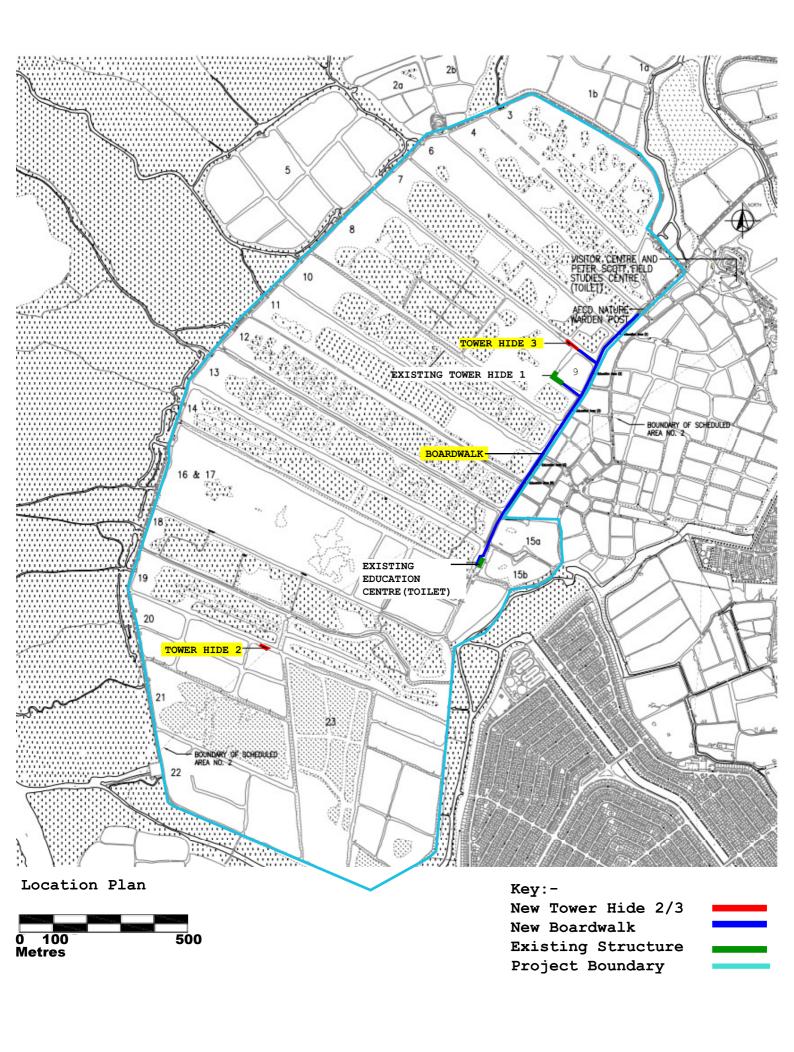
### Appendix A The location of the Project

### Statutory Plan Showing Location of Project and its Environments



Source: Extract from the approved Mai Po and Fairview Park OZP No. S/YL-MP/6, from PlanD Statutory Planning Portal 2.

### Appendix B Locations of Gei Wai and TH2-3



# Appendix C The scheduled plan of water draining and refilling of Gei Wai 7, 8a and 19b and 20e

### Mai Po Habitat Management Work for Summer 2023

### Scheduled plan of draining and re-filling of Gei Wai 7, 8a, 19b and 20e

- 1. Mai Po Habitat Management work 2023 was endorsed by Mai Po Management Committee members with members from experts, academia and AFCD on 22 February 2023.
- 2. Mai Po Management Committee members noted that the latest construction programme of Tower Hide 2, Tower Hide 3 and enhancement work of Footpath which will be done from 16 April to 15 October 2023. All works will conform with the latest Mai Po Habitat Management work 2023.
- 3. Habitat enhancement work will be done between April to October 2023. The scheduled plan of water draining and re-filling of Gei Wai 7, 8a and 19b and 20e is listed in Table 1,2&3 below: -

Gei Wai 7 and Gei Wai	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
8a										
Drain down GW #8a and GW 7 completely										
Build two temporary bunds to separate landward and seaward sides of GW 7										
Refill water into the seaward sides of GW7										
Remove temporary bunds at GW 7										
Refill water into GW 7 and GW8a and keep it at prescribed operational water level										
TABLE 1										
Gei Wai 19b	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Drain down GW 19b										
Refill water into GW19b and keep it at prescribed operational water level										

TABLE 2

Gei Wai 20	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Drain down GW 20										
Refill water into GW20 and keep it at prescribed operational water level										

## Appendix D The recommended mitigation measures

EIA REPORT REF.	EM&A ACTION REF.	RECOMMENDED MITIGATION MEASURES	OBJECTIVES OF THE MEASURE AND MAIN CONCERNS TO ADDRESS	LOCATION OF MEASURE	WHO TO IMPLEMENT MEASURE?	IM	HEN TO PLEMENT ASURE?*	STANDARD OR REQUIREMENTS FOR MEASURE TO ACHIEVE?
WATER C		RECOMMENDED WITHOUT IN MEASURES	WAIN CONCERNS TO ADDITESS	WEASONE	WIEASONE			
5.4.17	WQ.1	Foundation works at TH2 and TH3 shall be aligned with the schedule of draining the adjacent gei wai set out in the MPNR Management Plan 2019-2024.	Making use of hydraulic isolation of adjacent gei wai to avoid pollution of other gei wai and Deep Bay	TH2 and TH3 for foundation works	Engineer + Construction Contractor	<b>√</b>	✓	MPNR Management Plan 2019-2024
5.4.27	WQ.2	A perimeter bund will be constructed around the work sites for TH2 and TH3 to ensure that any runoff generated from within these sites is discharged only into the adjacent drained gei wai	To ensure pollutants cannot discharge into other water-filled gei wai and so provide a pathway for pollutants to enter Deep Bay	TH2 and TH3 for foundation works	Engineer + Construction Contractor	<b>√</b>	<b>✓</b>	Additional measure for minimisation of detrimental impacts to wildlife and the
5.4.27	WQ.3	The majority of construction components shall be pre-fabricated off-site to avoid any impacts associated with construction on-site	To achieve zero polluted runoff from works areas by minimising onsite construction of building components	Off-site	Engineer + Construction Contractor	<b>√</b>	<b>√</b>	•
5.4.27	WQ.4	All concrete will be mixed off-site and brought into each works area only when needed and only in the quantities required, so that there is no need to store (or dispose of) any surplus concrete	To achieve zero polluted runoff from works areas by avoiding concrete mixing, storage and/or disposal on site	Off-site	Construction Contractor		<b>✓</b>	
5.4.27	WQ.5	Any concrete spilled within the works area will be immediately cleaned up and removed from the area	To achieve zero polluted runoff from works areas by immediate cleaning up and removal of spilled concrete	All works areas	Construction Contractor		<b>✓</b>	
5.4.27	WQ.6	Plant, equipment and vehicles shall not be maintained or repaired within any works area in the Project Site	To achieve zero polluted runoff from works areas by handling and treating any resulting oil, chemical waste or other polluting substances off-site in an appropriate manner	Off-site	Construction Contractor		<b>√</b>	
5.4.27	WQ.7	During re-fuelling, drip trays shall be provided at any fuel connection point. Any spilled fuel shall be collected and taken off-site for proper treatment/disposal	To achieve zero polluted runoff from works areas by carrying out the refuelling with extreme care	All works areas	Construction Contractor		<b>√</b>	Good Site Practice
5.4.27	WQ.8	Materials, plant or equipment that could give rise to contaminated runoff during extreme rainfall will be	To minimise the quantity of contaminated runoff during	All works areas	Construction Contractor		✓	

Note: \* D = Deign Stage | C = Construction Stage | O = Operation Stage

EIA REPORT	EM&A ACTION		OBJECTIVES OF THE MEASURE AND	LOCATION OF	WHO TO	IMI	/HEN PLEM :ASUF	ENT	STANDARD OR REQUIREMENTS FOR MEASURE TO
REF.	REF.	RECOMMENDED MITIGATION MEASURES	MAIN CONCERNS TO ADDRESS	MEASURE	MEASURE?	D	С	0	ACHIEVE?
		protected by being covered, either by tarpaulin or by small gazebos that can be erected within minutes	extreme rainfall						
5.4.27	WQ.9	Each works area will be provided with at least one chemical toilet for use by workers. Sewage collected in these chemical toilets will be treated off-site	To ensure sewage is collected and treated off-site properly	All works areas	Construction Contractor		<b>√</b>		
5.4.27	WQ.10	Each works area will be provided one bunded and covered area for the temporary storage of C&D material – one section for inert C&D material and one area for C&D waste. These areas will be emptied frequently, using construction material delivery vehicles that are empty on their return journey	To ensure proper storage of C&D material to avoid polluting adjacent gei wai or fishponds	All works areas	Construction Contractor		✓		
5.4.27	WQ.11	Each works area will be provided with at least one set of waterproof waste receptacles – one for recyclable waste and one for non-recyclable waste. These areas will be emptied frequently	To ensure proper storage of wastes to avoid polluting adjacent gei wai or fishponds	All works areas	Construction Contractor		<b>√</b>		
5.6.2	WQ.12	<ol> <li>Perimeter channels at site boundaries shall be provided to intercept storm runoff from outside the works areas so that it will not wash across the works areas and to direct all site runoff only into adjacent drained gei wai</li> <li>For the purpose of preventing soil erosion, exposed slope surfaces shall be covered e.g. by tarpaulin, and temporary access roads shall be protected by crushed stone or gravel</li> <li>Intercepting channels shall be provided (e.g. along the crest/edge of excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements shall always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm</li> <li>Earthworks final surfaces shall be well compacted and subsequent permanent works</li> </ol>	To minimise the quantity of contaminated runoff and muddy water from works areas by following the good site practice	All works areas	Construction		•		ProPECC PN 1/94 Construction Site Drainage

Note: \* D = Deign Stage | C = Construction Stage | O = Operation Stage

EIA REPORT	EM&A ACTION		OBJECTIVES OF THE MEASURE AND	LOCATION OF	WHO TO	IM	HEN PLEM ASUR	ENT	STANDARD OR REQUIREMENTS FOR MEASURE TO
REF.	REF.	RECOMMENDED MITIGATION MEASURES	MAIN CONCERNS TO ADDRESS	MEASURE	MEASURE?	D	С	0	ACHIEVE?
		or surface protection shall be carried out immediately after the final surfaces are formed to prevent erosion. Appropriate drainage like intercepting channels shall be provided where necessary  5. Measures shall be taken to minimise the ingress of rainwater into trenches – they shall be dug and backfilled in short sections							
5.5.1	WQ.13	The two new tower hides will not be provided with toilets or washrooms. Runoff from the roof of the tower hides and from the boardwalks will not be contaminated	No wastewater will be generated during operation.	TH2 and TH3	Construction Contractor			<b>√</b>	Additional measure for minimisation of detrimental impacts to wildlife and the local community

### Supplementary information for specific mitigation measures

- Procedures of day-to-day works to ensure the correct implementation of the measures.

Check Weather forecast, provide daily site briefing before works starts, schedule of Works, delivery to site prepared in advance for site and traffic coordination. All works must be carried out in accordance with approved method statement and assessed against pollution impact.

- Precautionary measures during extreme weather e.g. rainstorm signal, typhoon, strong monsoon, how to secure site equipments and materials etc.

Light weight materials, i.e. Roofing Panels will be removed from site, all heavy equipment will be switched off and power disconnected, any glass to be boarded up and doors securely closed, other equipment/tools will be removed from the site. Gazebo and temporary structure to be taken down or partly dismantled and stored securely on site or in permanent building structure, all loose items must be cleared, all rubbish and site waste to be taken away/or collected in advance to avoid pollution to the area. Fuel and fuel trays must be taken away from the site to avoid contamination to Gei Wai.

- Briefing to workers.

Site Induction sections on site rules and restriction to all site personnel and workers, include water, noise and air pollution and relevant EIA's requirement will be provided by contractor.

### - Drip tray to avoid leakage of oil, grease and grout.

Drip tray (photo 3) to be placed directly below the fill-cap before refilling (photo 1). Oversized drip tray to be placed underside of Fuel tank (photo 2) to as a mitigation measure against fuel dripping and leaking onto the ground.





Photo. 1

Photo. 2



Photo. 3

- WQ3.

5.4.27	WQ.3	The majority of construction components shall be pre-fabricated off-site to avoid any impacts associated with construction on-site	To achieve zero polluted runoff from works areas by minimising onsite construction of building	Off-site	Engineer + Construction Contractor	✓	<b>V</b>	
			components					

### Proposed design: -

Pre-fabricate components that are manufactured and/or prefabricate off-site are as follow: -

- 1 Reinforcement bars for foundation
- 2 Structural steel frame and connection joints
- 3 -Timber wall cladding
- 4 Internal stairs
- 5 Doors, ventilation panels and Louvres
- 6 Roof cladding

- WQ4&5.

5.4.27	WQ.4	All concrete will be mixed off-site and brought into each works area only when needed and only in the quantities required, so that there is no need to store (or dispose of) any surplus concrete	To achieve zero polluted runoff from works areas by avoiding concrete mixing, storage and/or disposal on site	Off-site	Construction Contractor	<b>~</b>
5.4.27	WQ.5	Any concrete spilled within the works area will be immediately cleaned up and removed from the area	To achieve zero polluted runoff from works areas by immediate cleaning up and removal of spilled concrete	All works areas	Construction Contractor	<b>~</b>

### Proposed design: -

Off-site ready-mixed concrete will be delivered to site in concrete mixer trucks, the concrete mix will be unloaded by tail slide, directly into the foundation pit from the truck, the concrete mix is securely contained inside the drum along the delivery route. This method is to eliminate all connection of pipe and pumps on site to reduce the chance of dripping.

- 1. Truck reverse near foundation pit,
- 2. Place a 2m X 2m metal tray underneath tail slide,
- 3. Unload concrete mix directly into the foundation pit,
- 4. After unloading, retract tail slide, inspected for drips, cleaned up/remove any loose debris before the truck is being dispatched.
- 5. Spillage will be cleaned up immediately with contaminated soil, and stored in water proof container.
- 6. Unloading of concrete mix will not be carry-out under heavy rain.
- WQ6&7.

5.4.27	WQ.6	Plant, equipment and vehicles shall not be maintained or repaired within any works area in the Project Site	To achieve zero polluted runoff from works areas by handling and treating any resulting oil, chemical waste or other polluting substances off-site in an appropriate manner	Off-site	Construction Contractor	<b>✓</b>
5.4.27	WQ.7	During re-fuelling, drip trays shall be provided at any fuel connection point. Any spilled fuel shall be collected and taken off-site for proper treatment/disposal	To achieve zero polluted runoff from works areas by carrying out the refuelling with extreme care	All works areas	Construction Contractor	<b>✓</b>

### Proposed: -

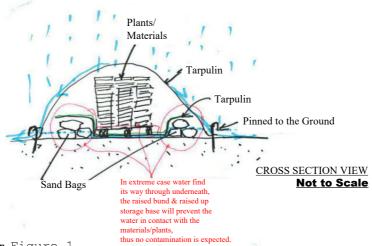
- Contractor confirmed no maintenance of equipment would be carried-out on site.
- Before refueling, drip tray will be placed immediately underneath of fuel filling cap and fuel container, refueling will not be carried-out under raining and/or high wind condition.

### - WQ8.

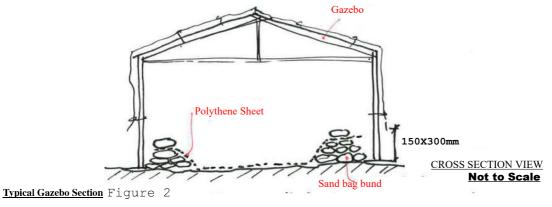
5.4.27	WQ.8	Materials, plant or equipment that could give rise to contaminated runoff during extreme rainfall will be	To minimise the quantity of contaminated runoff during	All works areas	Construction Contractor	✓	
		protected by being covered, either by tarpaulin or by small gazebos that can be erected within minutes	extreme rainfall				

### Proposed: -

Materials, plant or equipment will be protected by small tarpaulin covered tarpaulin (Figure 1) and gazeboo (Figure 2).



### Typical Tarpaulin Cover Section Figure 1



### - WQ9.

5.4.27	WQ.9	Each works area will be provided with at least one	To ensure sewage is collected and	All works	Construction	✓
		chemical toilet for use by workers. Sewage collected	treated off-site properly	areas	Contractor	
		in these chemical toilets will be treated off-site				

### Proposed: -

No toilets will be provided on site. Workers will use the existing toilets in the Education Centre.

Bicycles are provided for workers to travel between sites and Education Centre.

5.4.27 WQ.1		To ensure proper storage of C&D material to avoid polluting adjacent gei wai or fishponds	All works areas	Construction Contractor	<b>*</b>	
-------------	--	---	--------------------	----------------------------	----------	--

### Proposed: -

The Inert waste will be emptied on the same day as a target, the waste will be covered in tarpaulin (Figure 1) or gazeboo (Figure 2) when stored, and emptied before heavy rain.

C&D material and C&D waste storage areas are provided to each works area, locations are indicated on Tower Hide 2 Site Plan (Figure 3), Tower Hide 3 Site Plan (Figure 4) and Boardwalk Works Area Site Plan (Figure 5).

	5.4.27 WQ.11 Each works area will be provided with at least one set of waterproof waste receptacles – one for recyclable waste and one for non-recyclable waste.	<b>√</b>
--	--	----------

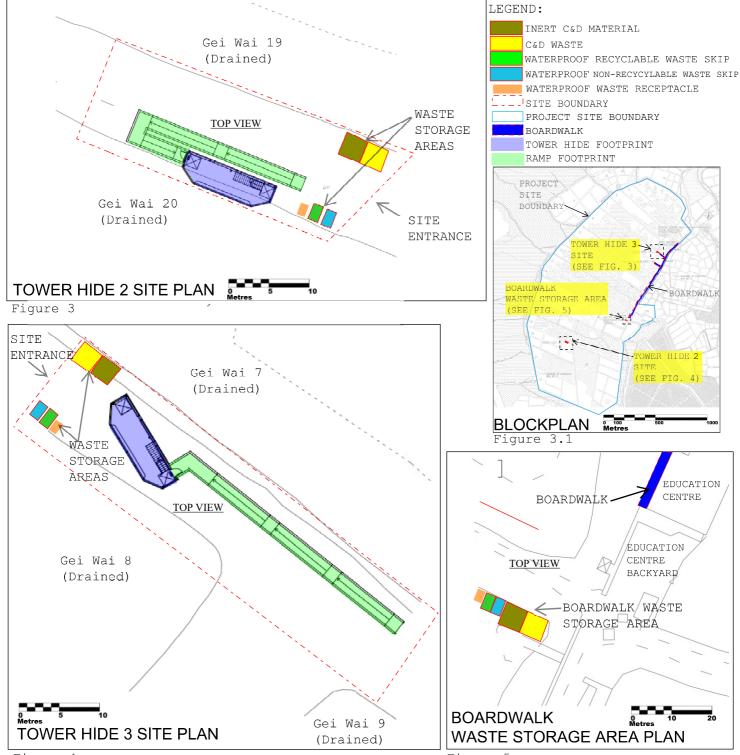
### Proposed: -

Covered Skips will be provided as waterproof waste receptables, to be transport away by skip loader regularly.

The recyclable waste and non-recyclable waste will be separated into recyclable waste and non-recyclable waste waterproof skips/receptacles, and transported off site to dispose of in approved disposal facilities.

General waste to be stored in waterproof receptacles and taken away daily by site staff.

Recyclable and Non-recyclable waste waterproofed skips locations are indicated in Tower Hide 2 Site Plan (Figure 3), Tower Hide 3 Site Plan (Figure 4) and Boardwalk Waste Storage Area Site Plan (Figure 5). Location of each site in relation to the Project Site Boundary can be found on Blockplan (Figure 3.1).

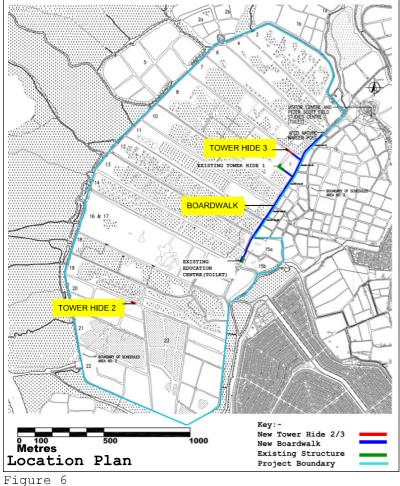


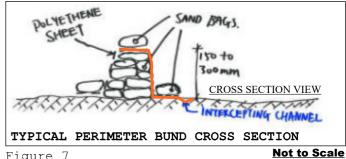
- WQ12.

5.6.2	WQ.12	Perimeter channels at site boundaries shall be provided to intercept storm runoff from outside the works areas so that it will not wash across the works areas and to direct all site runoff only into adjacent drained gei wai      For the purpose of preventing soil erosion, exposed slope surfaces shall be covered e.g. by tarpaulin, and temporary access roads shall be protected by crushed stone or gravel      Intercepting channels shall be provided (e.g. along the crest/edge of excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements shall always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm      Earthworks final surfaces shall be well compacted and subsequent permanent works	To minimise the quantity of contaminated runoff and muddy water from works areas by following the good site practice	All works areas	Construction Contractor	•
		or surface protection shall be carried out immediately after the final surfaces are formed to prevent erosion. Appropriate drainage like intercepting channels shall be provided where necessary  5. Measures shall be taken to minimise the ingress of rainwater into trenches – they shall be dug and backfilled in short sections				

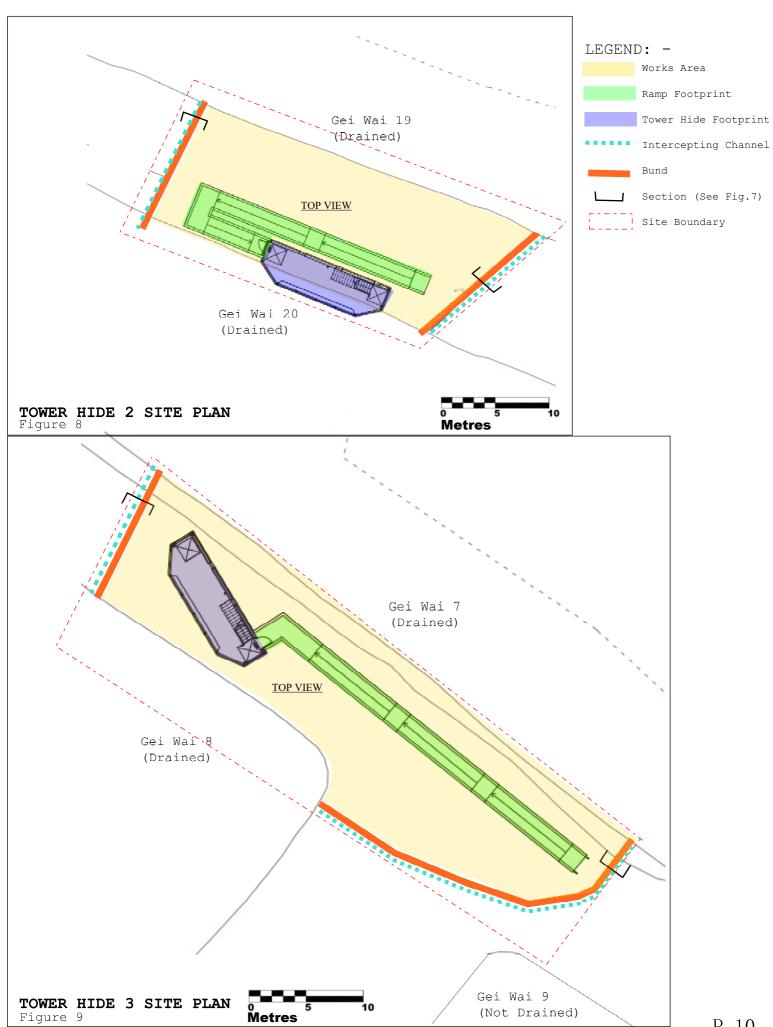
### Proposed: -

- Perimeter bund made up of sand bags and lined with polyethene sheet, between 150-300mm around the site. (See Figure 7),
- The form of the bund itself act as an intercepting channel on either side preventing water runoffs entering from the outside of the site, and waters will be diverted into the drained Gei Wais by the natural fall of the bund. (See Figure 8&9 for TH2 and TH3 Site Plan)
- See below Typical Perimeter Bund Arrangement sketch for detail. (See Figure 7)





re 6 Figure 7 Not to Scale P. 9



# Appendix E<br/>Indicative<br/>Construction<br/>Programme

Indicative Construction Programme

indicative Constituction Frogramme			Year 2023								
Major Activities Sta		Finish	Mar	Apr May		June	Jul	Aug Sep		Oct	Nov
			W1 W2 W3 W4	W1 W2 W3 W	4 W1 W2 W3 W4	W1 W2 <mark>W3 V</mark>	/4 W1 W2 W3 W4				
Tower Hide 2 & 3 Works External Works											
Mobilization and site setup	17-Apr-23	29-May-23									
Foundation construction	30-May-23	21- Jun-23									
Steel structure installation	28 Jun-23	24 -Jul-23									
External ramp installation	3-Jul-23	8-Aug-23									
External facade installation	18-Jul-23	31-Aug-23									
Internal works Door installation	17-Aug-23	20-Aug-23	Bird Seaso	n H							Bird Season
Mechincal ventilation works	17-Aug-23	21-Sep-23									
Electrical works	17-Aug-23	6-Oct-23									
Drainage works	17-Aug-23	6-Oct-23									
Cleaning and defect rectification	7-Oct-23	14-Oct-23									
Footpath Works Floor decking installation (Section 1s)	3-Jul-23	17-Jul-23									
Floor decking installation (Section 2s)	18-Jul-23	1-Aug-23									
Floor decking installation (Section 3s)	2-Aug-23	16-Aug-23									
Floor decking installation (Section 4s)	17-Aug-23	31-Aug-23									
Floor decking installation (Section 5s)	1-Sep-23	15-Sep-23									
Floor decking installation (Section 6s)	16-Sep-23	30-Sep-23									
Cleaning and defect rectification	1-Oct-23	8-Oct-23									

Date: 27 Mar 2023