



PROJECT No.: TCS/00874/16

**CEDD CONTRACT NO. CV/2012/05 –
BATHING BEACH AT LUNG MEI, TAI PO**

**POST-CONSTRUCTION MONITORING AND AUDIT
REPORT (JANUARY TO FEBRUARY 2022)**

PREPARED FOR
WELCOME CONSTRUCTION CO., LTD.

Quality Index

Date	Reference No.	Prepared By	Certified By
14 March 2022	TCS00874/16/600/R0794v2	 Nicola Hon Environmental Consultant	 T.W. Tam Environmental Team Leader

Revision	Date	Description
1	10 March 2022	First submission
2	14 March 2022	Amended according to the IEC's comment on 11 March 2022

Environmental Permit No. EP-388/2010

Development of a Bathing Beach at Lung Mei, Tai Po

Independent Environmental Checker Verification

Reference Document/Plan

Document/Plan to be Certified/ Verified:	3 rd Post-Construction Phase Landscape EM&A
Date of Report:	14 March 2022
Date received by IEC:	14 March 2022

Reference EP Condition / Updated EM&A Manual Requirement

Environmental Permit Condition / Updated EM&A Manual Reference	Section 11.4.2
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The post-construction phase landscape EM&A will be reported on a bi-monthly basis for a period of one year after completion of the project. The ET will prepare post-construction phase EM&A Reports on a bi-monthly (once every two months) basis to be submitted within two weeks of the end of the reporting period. The reports will be submitted to the Contractor(s), IEC, ER and EPD, as appropriate.

IEC Verification

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced ~~condition~~ / section of ~~EP-388/2010~~ / Updated EM&A Manual

Mr Kelvin So

Date: 14 March 2022

Independent Environmental Checker



Our ref: P:\Projects\0206709 IEC for Lung Mei EM&A\07_ET Submission\47_Post Construction EM&A Report

EXECUTIVE SUMMARY

- ES.01 Civil Engineering and Development Department (hereafter referred as “CEDD”) is the Project Proponent and the Permit Holder of *Agreement No. CE 59/2005 (EP) Development of a Bathing Beach at Lung Mei, Tai Po* (hereinafter referred as “the Project”), which is a Designated Project to be implemented under Environmental Permit number EP-388/2010 (hereinafter referred as “the EP-388/2010” or “the EP”).
- ES.02 Welcome Construction CO., Ltd is a Main Contractor (hereinafter referred as “Contractor”) responsible for construction of the Project. Action-United Environmental Services & Consulting (hereinafter referred as “AUES”) has been commissioned by the Contractor as the Environmental Team for the Project (hereinafter referred as “the ET”) to perform relevant Environmental Monitoring and Audit (EM&A) programme in accordance with the EM&A Manual approved under the Environmental Impact Assessment Ordinance (EIAO).
- ES.03 All civil works under the Project were substantial completed in late August 2020 with substantial completion of works/substantial completion certificate issued by CEDD. According to the updated EM&A Manual (Jan 2018) S.2.2, cessation of EM&A programme is subject to the satisfactory completion of the EM&A Final Review Report, agreement with the IEC and approval from EPD. The Final Review EM&A Report for Construction Phase prior verified by IEC was submitted EPD on 7 July 2021.
- ES.04 According to the EM&A Manual Section 9.2, post-construction phase Landscape and Visual auditing is required during a 12-month establishment period. Moreover, mangrove seedling planting was implemented according to the approved Mangrove Seedling Planting Proposal before the operation of the beach. After planting, 1 year monitoring will be undertaken to check the performance and health conditions of the planted individuals on month basis.
- ES.05 According the EM&A Manual Section 11.4.2, the post-construction phase landscape EM&A will be reported on a bi-monthly basis for a period of one year after completion of the project. As clarified by CEDD, post-construction phase monitoring commenced in September 2021.
- ES.06 This is the 3rd Post-construction Monitoring and Audit Report presents the result of landscape EM&A and mangrove seedling planting monitoring for 1st **January** and 28th **February 2022** (hereinafter referred as “the Reporting Period”).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

- ES.07 The post-construction phase monitoring activities under the EM&A programme in the Reporting Period are summarized in the following table.

Issues	Monitoring Parameters / Inspection	Date
Landscape & Visual	Landscape and visual inspection	12 th & 26 th January 2022 10 th & 24 th February 2022
Ecology	Mangrove post-monitoring	26 th January 2022 24 th February 2022

- ES.08 The bi-weekly landscape and visual inspection were undertaken in the Reporting Period. The Contractor was reminded to follow the observation provided in the checklist with their horticulture sub-contractor. The Contractor advised that the follow up plantings will be carried out after the winter, tentatively in March / April 2022.
- ES.09 Although the mortality of the mangrove seedling were more than 50%, as the cause(s) of the event has been identified in the report. AFCD expressed no comment on the proposed remedial actions and the proposed resumption of normal monitoring frequency via email on 6th January 2022. In the Reporting Period, monthly mangrove post-monitoring were undertaken on 26th **January 2022** and 24th **February 2022**.

ES.10 Based on the observation from Sep 2021 to Feb 2022, only the seedlings at the landward side thrive. The seedlings at the seaward side showed poor health and death, even Location #3 at the seaward side which usually provide the best result for the growth of the seedlings among all three locations, the seedlings showed poor health and death. For the poor health seedlings, there is no sign to re-sprout and is expected to decline and be washed away by the tidal over time. The Contractor is recommended to replant the seedlings and review if the planting location should be moved to a more landward side or other locations (like next to location 3 which the current condition of the seedlings is good) to improve the survival rate.

ES.11 According to the Event and Action Plan, a proposal should be submitted to relevant government departments for remedial action and implement the action to solve the event. Proposal of Mangrove Seedling Replanting has been prepared by the Contractor and it is under review by ET and IEC.

ENVIRONMENTAL COMPLAINT

ES.12 No environmental complaint was recorded or received in the Reporting Period.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.13 No environmental summons or successful prosecutions were recorded in the Reporting Period.

REPORTING CHANGE

ES.14 No reporting changes were made in the Reporting Period

FUTURE KEY ISSUES

ES.15 The Contractor is recommended to replant the mangrove seedlings and review if the planting location should be moved to a more landward side or other locations (like next to location 3 which the current condition of the seedlings is good) to improve the survival rate.

ES.16 The Contractor was reminded that the environmental mitigation measures shall be properly implemented and maintained where applicable, as per the Mitigation Implementation Schedule, in the operational phase.

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1. INTRODUCTION

1.1 BACKGROUND

- 1.1.1 Civil Engineering and Development Department (hereafter referred as “CEDD”) is the Project Proponent and the Permit Holder of *Agreement No. CE 59/2005 (EP) Development of a Bathing Beach at Lung Mei, Tai Po* (hereinafter referred as “the Project”), which is a Designated Project to be implemented under Environmental Permit number EP-388/2010 (hereinafter referred as “the EP-388/2010” or “the EP”).
- 1.1.2 Welcome Construction CO., Ltd is a Main Contractor (hereinafter referred as “Contractor”) responsible for construction of the Project. Action-United Environmental Services & Consulting (hereinafter referred as “AUES”) has been commissioned by the Contractor as the Environmental Team for the Project (hereinafter referred as “the ET”) to perform relevant Environmental Monitoring and Audit (EM&A) programme in accordance with the EM&A Manual approved under the Environmental Impact Assessment Ordinance (EIAO).
- 1.1.3 The major construction activities of the Project comprise construction of 200-metre long bathing beach with a groyne at each end, a shark prevention net; a public car park; retaining walls; and the associated roadworks, drainage and sewerage works. Layout plan of the Project is shown in [Appendix A](#).
- 1.1.4 All civil works under the Project were substantially completed in late August 2020 with substantial completion of works/substantial completion certificate issued by CEDD. According to the updated EM&A Manual (Jan 2018) S.2.2, cessation of EM&A programme is subject to the satisfactory completion of the EM&A Final Review Report, agreement with the IEC and approval from EPD. The Final Review EM&A Report for Construction Phase prior verified by IEC was submitted EPD on 7 July 2021.
- 1.1.5 According to the EM&A Manual Section 9.2, post-construction phase Landscape and Visual auditing is required during a 12-month establishment period. Moreover, mangrove seedling planting was implemented according to the approved Mangrove Seedling Planting Proposal before the operation of the beach. After planting, 1 year monitoring will be undertaken to check the performance and health conditions of the planted individuals on monthly basis.
- 1.1.6 According the EM&A Manual Section 11.4.2, the post-construction phase landscape EM&A will be reported on a bi-monthly basis for a period of one year after completion of the project. As clarified by CEDD, post-construction phase monitoring commenced in September 2021.
- 1.1.7 This is the 3rd Post-construction Monitoring and Audit Report presents the result of landscape EM&A and mangrove seedling planting monitoring for **1st January** and **28th February 2022**.

2. PROJECT ORGANIZATION AND MONITORING REQUIREMENT

2.1 PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

2.1.1 Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in *Appendix B*.

2.2 PARAMETERS AND REQUIREMENTS

2.2.1 Landscape mitigation are detailed in the Landscape Plan which approved by EPD on 14 July 2021. According to the EM&A Manual Section 9.2, measures undertaken by both the Contractor(s) and the specialist Landscape Sub-Contractor during the construction phase and first year post-construction will be audited by the Registered Landscape Architect of the ET, to ensure compliance with the intended aims of the measures. Site inspections should be undertaken at least once every two weeks throughout the landscaping plants establishment period when planting works are being undertaken.

2.2.2 Mangrove seedling planting was implemented according to the approved Mangrove Seedling Planting Proposal before the operation of the beach. After planting, 1 year monitoring will be undertaken to check the performance and health conditions of the planted individuals on monthly basis. Remedial action will be discussed with AFCD in the event of unsuccessful mangrove seedling planting and follow an approved Event and Action Plan.

2.3 EVENT AND ACTION PLAN

2.3.1 Event and Action Plan for Mangrove Seedling Planting under the EM&A Manual Table 7.1 will be followed.

Monitoring Criteria	Event	Action	
		Environmental Team Leader/ Environmental Manager (Employed by CEDD)	CEDD
Mangrove Seedling Survival	More than 25 % of mortality of mangrove seedling recorded during the establishment of planting.	1. Notify CEDD and check with horticulturist to find out the cause of the event(s).	1. Identify and report the cause(s) of the event.
		2. Undertake bi-weekly monitoring to observe the growth performance of the seedling. The normal monitoring schedule will be resumed if the cause(s) of the event have been identified.	2. Notify relevant government departments (i.e. EPD and AFCD).
	More than 50 % of mortality of mangrove seedling recorded during the establishment of planting.	1. Notify CEDD and check with horticulturist to find out the cause of the event(s).	1. Identify and report the cause(s) of the event.
		2. Undertake weekly monitoring to observe the growth performance of the seedling. The normal monitoring schedule will be resumed if the cause(s) of the event have been identified.	2. Submit proposal to relevant government departments (ie EPD and AFCD) for remedial action and implement the action to solve the event.

3. MONITORING RESULTS OF POST-CONSTRUCTION MONITORING

3.1 GENERAL

- 3.1.1 As clarified by CEDD, post-construction phase monitoring commenced on 1st September 2021. The following sub-section summarized the post-construction monitoring results.

3.2 RESULTS OF LANDSCAPE AND VISUAL

- 3.2.1 The landscape and visual inspection were undertaken on **12th and 26th January 2022 and 10th and 24th February 2022**. The inspection results in form of checklists are shown in **Appendix C**. An updated as-plant drawings for the part under ArchSD has been provided to ET in early Jan 2022, those items related to [art under ArchSD in last inspections were closed. The Contractor was reminded to follow the observation provided in the checklist with their horticulture sub-contractor. The Contractor advised that the follow up plantings will be carried out after the winter, tentatively in March / April 2022.
- 3.2.2 The landscape and visual inspection in next Reporting Period is scheduled on 2nd and 4th week of March 2022 and 2nd and 4th week of April 2022, subject to the weather condition.

3.3 RESULTS OF MANGROVE MONITORING

- 3.3.1 Mangrove post-monitoring was undertaken on **26th January 2022 and 24th February 2022**. and the mortality were all over 50%. Although the mortality of the mangrove seedling were more than 50%, as the cause(s) of the event has been identified in the report. AFCD expressed no comment on the proposed remedial actions the proposed resumption of normal monitoring frequency via email on 6th January 2022.
- 3.3.2 According to the Event and Action Plan, a proposal should be submitted to relevant government departments for remedial action and implement the action to solve the event. Proposal of Mangrove Seedling Replanting has been prepared by the Contractor and it is under review by ET and IEC.
- 3.3.3 Based on the observation from Sep 2021 to Feb 2022, only the seedlings at the landward side thrive. The seedlings at the seaward side showed poor health and death, even Location #3 at the seaward side which usually provide the best result for the growth of the seedlings among all three locations, the seedlings showed poor health and death. For the poor health seedlings, there is no sign to re-sprout and is expected to decline and be washed away by the tidal over time.
- 3.3.4 Since the mangrove distribution and survival is primarily determined by sea level and its fluctuations, other secondary factors are air temperature, salinity, ocean currents, storms, shore slope, and soil substrate also affect the establishment rate. Both *Aegiceras corniculatum* and *Avicennia marina* are mostly at the outer fringe (seaward) among other mangroves and *Avicennia marina* is also a pioneer species, however, even those species fail to establish at location 1 and location 2.
- 3.3.5 From our observation, it is suspected that the condition of location 1 and location 2, especially the seaward side is not optimal for the seedlings to establish and grow. The Contractor is recommended to replant the seedlings and review if the planting location should be moved to a more landward side or other locations (like next to location 3 which the current condition of the seedlings is good) to improve the survival rate.
- 3.3.6 Detailed post-planting monitoring reports of the mangrove seedling planting are shown in **Appendix D**.
- 3.3.7 The post-monitoring in next Reporting Period is scheduled on 4th week of March 2022 4th week of April 2022, subject to the weather condition.

3.4 ENVIRONMENTAL COMPLAINT

- 3.4.1 No environmental complaint was recorded or received in the Reporting Period.

3.5 NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

3.5.1 No environmental summons or successful prosecutions were recorded in the Reporting Period.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

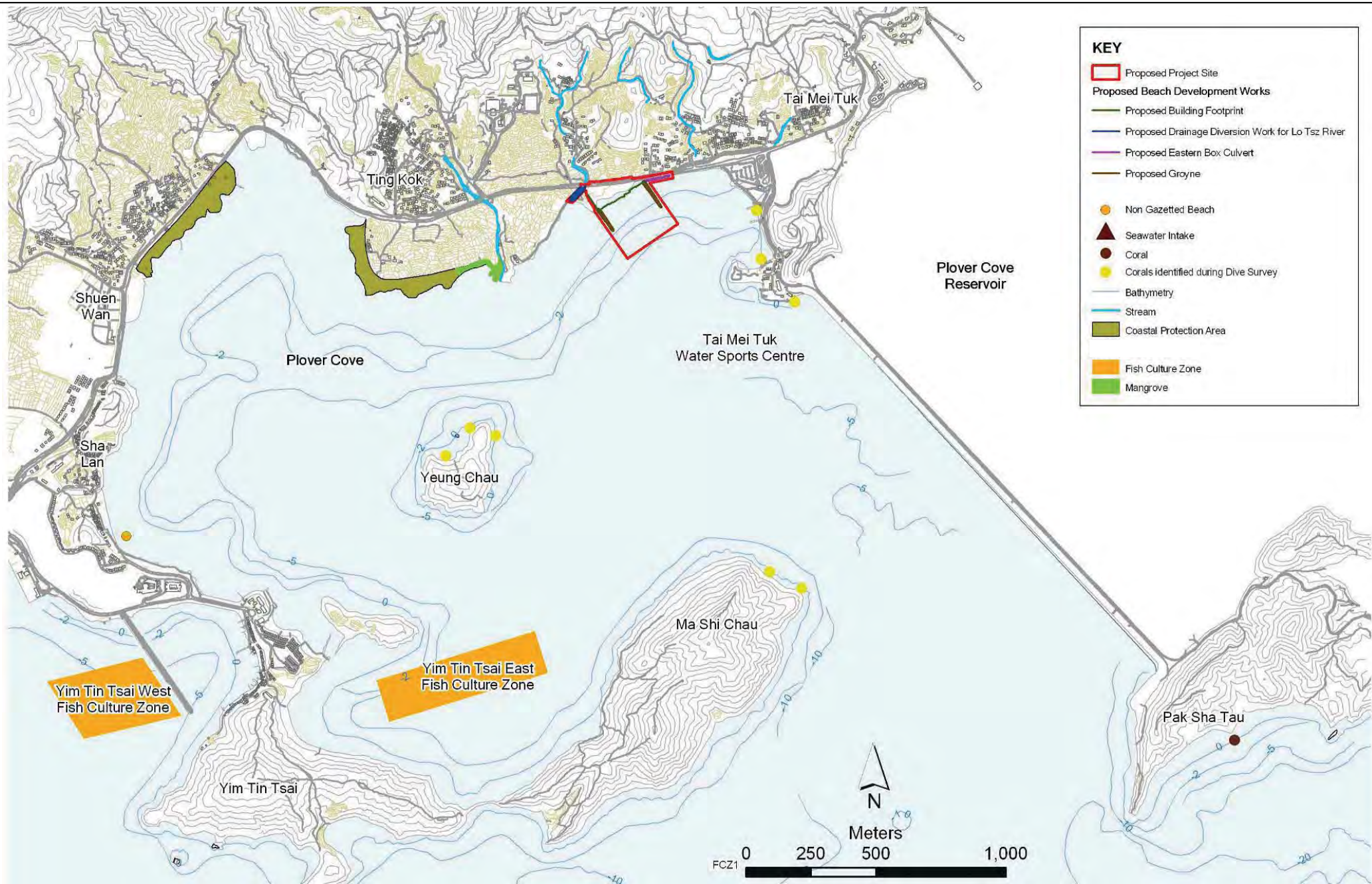
- 4.1.1 This is the 3rd Post-construction Monitoring and Audit Report presents the result of landscape EM&A and mangrove seedling planting monitoring for **January and February 2022**.
- 4.1.2 The landscape and visual inspection were undertaken on **12th and 26th January 2022 and 10th and 24th February 2022**. The Contractor was reminded to follow the observation provided in the checklist with their horticulture sub-contractor. The Contractor advised that the follow up plantings will be carried out after the winter, tentatively in March / April 2022.
- 4.1.3 Mangrove post-monitoring was undertaken on **26th January 2022 and 24th February 2022** and the mortality were all over 50%. Although the mortality of the mangrove seedling were more than 50%, as the cause(s) of the event has been identified in the report. AFCD expressed no comment on the proposed remedial actions and the proposed resumption of normal monitoring frequency via email on 6th January 2022.
- 4.1.4 Based on the observation from Sep 2021 to Feb 2022, only the seedlings at the landward side thrive. The seedlings at the seaward side showed poor health and death, even Location #3 at the seaward side which usually provide the best result for the growth of the seedlings among all three locations, the seedlings showed poor health and death. For the poor health seedlings, there is no sign to re-sprout and is expected to decline and be washed away by the tidal over time. The Contractor is recommended to replant the seedlings and review if the planting location should be moved to a more landward side or other locations (like next to location 3 which the current condition of the seedlings is good) to improve the survival rate.
- 4.1.5 According to the Event and Action Plan, a proposal should be submitted to relevant government departments for remedial action and implement the action to solve the event. Proposal of Mangrove Seedling Replanting has been prepared by the Contractor and it is under review by ET and IEC.

4.2 RECOMMENDATIONS

- 4.2.1 The Contractor is recommended to replant the mangrove seedlings and review if the planting location should be moved to a more landward side or other locations (like next to location 3 which the current condition of the seedlings is good) to improve the survival rate.
- 4.2.2 The Contractor was reminded that the environmental mitigation measures shall be properly implemented and maintained where applicable, as per the Mitigation Implementation Schedule, in the operational phase.

Appendix A

Layout Plan of the Project



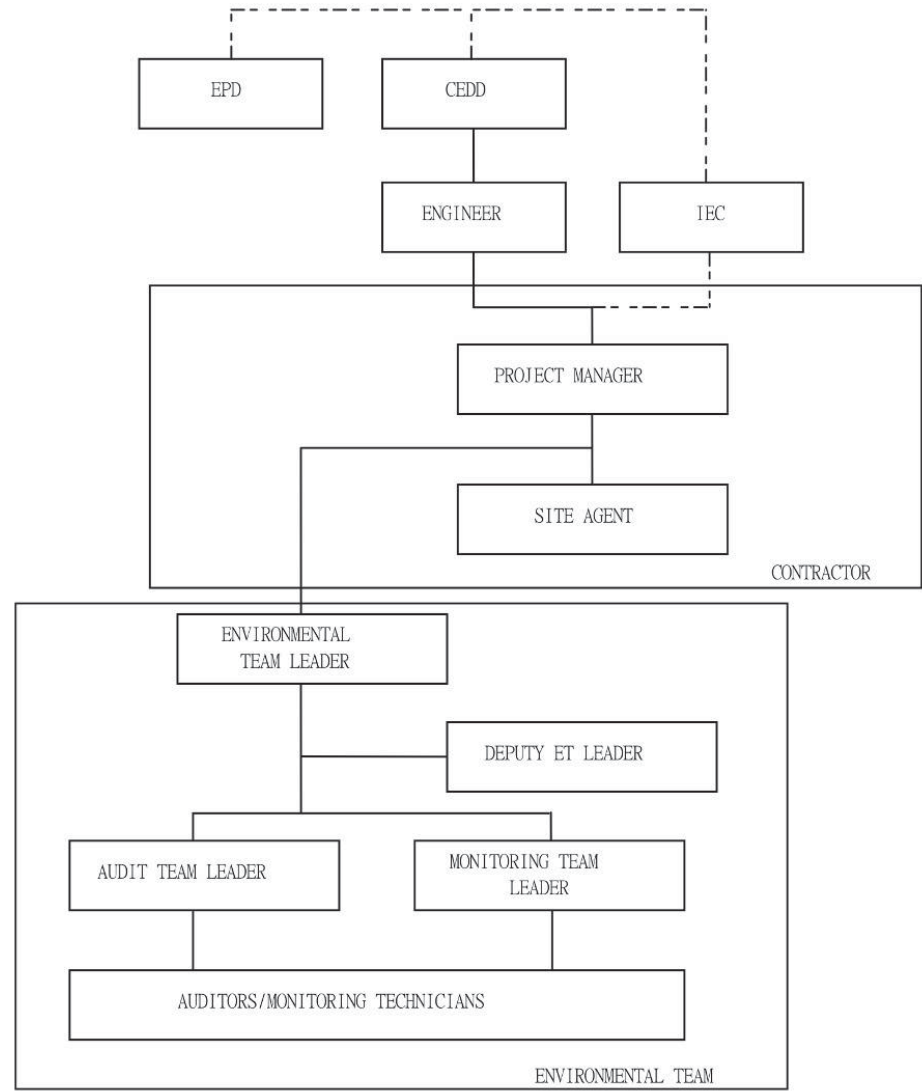
KEY

- Proposed Project Site
- Proposed Beach Development Works
- Proposed Building Footprint
- Proposed Drainage Diversion Work for Lo Tsz River
- Proposed Eastern Box Culvert
- Proposed Groyne
- Non Gazetted Beach
- ▲ Seawater Intake
- Coral
- Corals identified during Dive Survey
- Bathymetry
- Stream
- Coastal Protection Area
- Fish Culture Zone
- Mangrove

Client CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Main Contractor 偉金建築有限公司 Welcome Construction Co., Ltd.	Agreement No.: CE 59/2005(EP) Project Title: DEVELOPMENT OF A BATHING BEACH AT LUNG MEI, TAI PO	ENVIRONMENTAL MONITORING AND AUDIT MANUAL Figure Title: PROJECT LOCATION AND ENVIRONMENTAL SENSITIVE RECEIVERS	FIGURE 1.1 <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Checked</td> <td style="width: 25%;">TF</td> <td style="width: 25%;">Scale</td> <td style="width: 25%;">AS SHOWN</td> </tr> <tr> <td>Designed</td> <td>-</td> <td>Drawn</td> <td>AM</td> </tr> <tr> <td>Rev.</td> <td>1</td> <td>Date</td> <td>13/03/2007</td> </tr> </table>	Checked	TF	Scale	AS SHOWN	Designed	-	Drawn	AM	Rev.	1	Date	13/03/2007
Checked	TF	Scale	AS SHOWN													
Designed	-	Drawn	AM													
Rev.	1	Date	13/03/2007													

Appendix B

Organization Structure and Contact Details



* EPD may contact any parties if necessary

KEY
 - - - - COMMUNICATION CHANNEL
 ——— LINE OF PROJECT MANAGEMENT RESPONSIBILITY

Client



CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Main Contractor



偉金建築有限公司
Welcome Construction Co., Ltd.

Agreement No.: **CE 59/2005(EP)**
 Project Title:
DEVELOPMENT OF A BATHING BEACH AT LUNG MEI, TAI PO

ORGANISATION STRUCTURE



Contact Details of Key Personnel – CV/2012/05

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
CEDD	Engineer's Representative	Ms. June Kwong	2762 5532	2714 2054
ERM	Independent Environmental Checker	Mr. Kelvin So	2271 3156	2723 5660
Welcome	Project Manager	Mr. Frankie Lui	9420 4834	2682 3222
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079

Legend:

CEDD (Engineer) – Civil Engineering and Development Department

Welcome (Contractor) – Welcome Construction Company Limited

ERM (IEC) – Environmental Resources Management

AUES (ET) – Action-United

Appendix C

Landscape and Visual Inspection Checklist



Date/ Time: 12th Jan 2022 Weather: Fine/ Overcast/ Rain/ Windy

Item	Mitigation Measures				Actions/ Remarks
		Yes	No	N/A	
1	Vegetation Management				
1.1	Is the irrigation sufficient?	✓			
1.2	Any physical damage observed on the plant?		✓		The planters at the Eastern box culvert were repaired and enlarged. The plants in the planters were removed without replacement.
1.3	Any potential incursion, fire, pollution, and surface erosion, etc.		✓		Some of the plants in the planters on the Western groyne were wilted without replacement.
1.4	Is the soil drain well?	✓			
1.5	Are the weeds controlled at an acceptable level?	✓			
1.6	Are the debris controlled at an acceptable level?	✓			
1.7	Are the plants planted in right place according to the landscape plan?		✓		There is no plant in the planter outside the male (Planter P14) and female (Planter P3b) changing room.
1.8	Are the plantings including species, size and plants quality completed following the landscape plan?		✓		<ul style="list-style-type: none"> ● The plant near the male changing room (Planter P7) is <i>Schefflera arboricola</i> instead of <i>Rhapis excelsa</i> in the plan). ● No <i>Bauhinia glauca</i> was found.
2	Protection of trees				
2.1	The physical protection (fencing) is in place?	✓			
2.2	Any poor health condition or dead tree observed?		✓		
2.3	Any poor practice of pruning observed?		✓		
2.4	Are the trees planted in right place according to the landscape plan?	✓			
2.5	The tree supporting system are in good condition?		✓		Some ties and stakes were detached at Western Box Culvert.



Item	Mitigation Measures				Actions/ Remarks
		Yes	No	N/A	
2.6	Any event(s) observed may properly hinder the tree growth?		✓		
3	Architectural design and treatment of all structures (where practicable), retaining walls, elevated road structures and other engineering works.				
3.1	Implementation and maintenance of mitigation measures, to ensure conformity with agreed designs?	✓			

Summary and follow up actions / Remarks:

1. Some of the plants in the planters on the Western groyne were wilted and should be removed and replaced. (Photo I)
2. Some ties and stakes were detached at Western Box Culvert which should be tightened up to standard. (Photo J)
3. The planters at the Eastern box culvert were repaired and enlarged and the plants in the planters were removed. Replacement planting should be provided. (Photo K and Photo L)
4. There is no planting and bare soil in the planters outside the male (Planter P14) and female (Planter P3b) changing rooms, which should be fully planted as required in the approved planting schedule of the plan.
5. The contractor is required to plant *Schefflera arboricola* instead of *Rhapis excelsa* as shown on the plan for the planter (Planter P7) close to the male changing room.
6. *Bauhinia glauca* is required to plant as shown on plan but it was not found within the site. The Contractor is required to follow the approved plan and complete all planting including the planting of *Bauhinia glauca* before the next audit checking.

Follow up action by contractor:

1. Two nos. of dead trees (*Michelia x alba*) were replaced. (Photo M)
2. The Contractor was reminded to follow the observation provided in the checklist with their horticulture sub-contractor.
3. The updated as-planted drawing received.
 Planter P14 and P3B: Confirmed Plant material is removed and replaced by grey pebbles.
 Planter P7: Confirmed change of plant species from *Rhapis exceisa* to *Schefflera arboricola*
 Confirmed *Bauhinia glauca* is not shown on the plan.

Reminders:

1. The Contractor(s) is/are reminded to check the guying and staking of all retained/newly planted trees to ensure the tree supporting systems are properly installed, in order and not causing any damage to the trees.
2. The Contractor(s) is/are reminded to replant the plants at Western groyne and Eastern box culvert.



Photo Record:

Photo A.



General view (1)

Photo B.



General view (2)

Photo C.



General view (3)

Photo D.



General view (4)



Photo E.



General view (5)

Photo F.



General view (6)

Photo G.



General view (7)

Photo H.



General view (8)



Photo I.



Some of the plants in the planters on the Western groyne were wilted and removed

Photo J.



Some ties and stakes were detached at Western Box Culvert

Photo K.



The planters at the Eastern box culvert were repaired and enlarged

Photo L.



The plants in the planters were removed



Photo M.



The dead tree (*Michelia x alba*) was replaced



Date/ Time: 26th Jan 2022 Weather: Fine/ Overcast/ Rain/ Windy

Item	Mitigation Measures				Actions/ Remarks
		Yes	No	N/A	
1	Vegetation Management				
1.1	Is the irrigation sufficient?	✓			
1.2	Any physical damage observed on the plant?		✓		The planters at the Eastern box culvert were repaired and enlarged. The plants in the planters were removed without replacement.
1.3	Any potential incursion, fire, pollution, and surface erosion, etc.		✓		Some of the plants in the planters on the Western groyne were wilted without replacement.
1.4	Is the soil drain well?	✓			
1.5	Are the weeds controlled at an acceptable level?	✓			
1.6	Are the debris controlled at an acceptable level?	✓			
1.7	Are the plants planted in right place according to the landscape plan?	✓			
1.8	Are the plantings including species, size and plants quality completed following the landscape plan?	✓			
2	Protection of trees				
2.1	The physical protection (fencing) is in place?	✓			
2.2	Any poor health condition or dead tree observed?		✓		
2.3	Any poor practice of pruning observed?		✓		
2.4	Are the trees planted in right place according to the landscape plan?	✓			
2.5	The tree supporting system are in good condition?		✓		<ul style="list-style-type: none"> ● Some ties and stakes were detached at Western Box Culvert. ● Some ties and stakes already girdled and affected the growth of the trees.



Item	Mitigation Measures				Actions/ Remarks
		Yes	No	N/A	
2.6	Any event(s) observed may properly hinder the tree growth?		✓		
3	Architectural design and treatment of all structures (where practicable), retaining walls, elevated road structures and other engineering works.				
3.1	Implementation and maintenance of mitigation measures, to ensure conformity with agreed designs?	✓			

Summary and follow up actions / Remarks:

1. Some of the plants in the planters on the Western groyne were wilted and should be removed and replaced. (Photo I)
2. Some ties and stakes were detached at Western Box Culvert should be tightened up to standard. (Photo J and Photo K)
3. The planters at the Eastern box culvert were repaired and enlarged and the plants in the planters were removed. Replacement planting should be provided. (Photo L)
4. Some ties and stakes already girdled and affected the growth of the trees. (Photo M and Photo N)

Follow up action by contractor:

1. The updated as-planted drawing received.
2. The Contractor was reminded to follow the observation provided in the checklist with their horticulture sub-contractor.

Reminders:

1. Girdling by the ties and stakes was observed on some of the trees. Contractors are required to adjust the ties to avoid the damage of the tree.
2. The Contractor(s) is/are reminded to check the guying and staking of all retained/newly planted trees to ensure the tree supporting systems are properly installed, in order and not causing any damage to the trees.
3. The Contractor(s) is/are reminded to replant the plants at Western groyne and Eastern box culvert.



Photo Record:

Photo A.



General view (1)

Photo B.



General view (2)

Photo C.



General view (3)

Photo D.



General view (4)



Photo E.



General view (5)

Photo F.



General view (6)

Photo G.



General view (7)

Photo H.



General view (8)



Photo I.



Some of the plants in the planters on the Western groyne were wilted and removed

Photo J.



Some ties and stakes were detached at Western Box Culvert

Photo K.



Some ties and stakes were detached at Western Box Culvert

Photo L.



The planters at the Eastern box culvert were repaired and enlarged and the plants in the planters were removed



Photo M.



Some ties and stakes already girdled and affected the growth of the trees.

Photo N.



Some ties and stakes already girdled and affected the growth of the trees.



Date/ Time: 26th Jan 2022 Weather: Fine/ Overcast/ Rain/ Windy

Item	Mitigation Measures				Actions/ Remarks
		Yes	No	N/A	
1	Vegetation Management				
1.1	Is the irrigation sufficient?	✓			
1.2	Any physical damage observed on the plant?		✓		The planters at the Eastern box culvert were repaired and enlarged. The plants in the planters were removed.
1.3	Any potential incursion, fire, pollution, and surface erosion, etc.		✓		Some of the plants in the planters on the Western groyne were wilted and should be removed.
1.4	Is the soil drain well?	✓			
1.5	Are the weeds controlled at an acceptable level?	✓			
1.6	Are the debris controlled at an acceptable level?	✓			
1.7	Are the plants planted in right place according to the landscape plan?	✓			
1.8	Are the plantings including species, size and plants quality completed following the landscape plan?	✓			
2	Protection of trees				
2.1	The physical protection (fencing) is in place?	✓			
2.2	Any poor health condition or dead tree observed?		✓		
2.3	Any poor practice of pruning observed?		✓		
2.4	Are the trees planted in right place according to the landscape plan?	✓			
2.5	The tree supporting system are in good condition?		✓		<ul style="list-style-type: none"> ● Some ties and stakes were detached at Western Box Culvert. ● Some ties and stakes already girdled and affected the growth of the trees.



Item	Mitigation Measures				Actions/ Remarks
		Yes	No	N/A	
2.6	Any event(s) observed may properly hinder the tree growth?		✓		
3	Architectural design and treatment of all structures (where practicable), retaining walls, elevated road structures and other engineering works.				
3.1	Implementation and maintenance of mitigation measures, to ensure conformity with agreed designs?	✓			

Summary and follow up actions / Remarks:

1. Some of the plants in the planters on the Western groyne were wilted and should be removed. (Photo I)
2. Some ties and stakes were detached at Western Box Culvert. (Photo J and Photo K)
3. The planters at the Eastern box culvert were repaired and enlarged and the plants in the planters were removed. (Photo L)
4. Some ties and stakes already girdled and affected the growth of the trees. (Photo M and Photo N)

Follow up action by contractor:

1. The Contractor was reminded to follow the observation provided in the checklist with their horticulture sub-contractor.

Reminders:

1. Girdling by the ties and stakes was observed on some of the trees. Contractors are required to adjust the ties to avoid the damage of the tree.
2. The Contractor(s) is/are reminded to check the guying and staking of all retained/newly planted trees to ensure the tree supporting systems are properly installed, in order and not causing any damage to the trees.
3. The Contractor(s) is/are reminded to replant the plants at Western groyne and Eastern box culvert.



Photo Record:

Photo A.



General view (1)

Photo B.



General view (2)

Photo C.



General view (3)

Photo D.



General view (4)



Photo E.



General view (5)

Photo F.



General view (6)

Photo G.



General view (7)

Photo H.



General view (8)



Photo I.



Some of the plants in the planters on the Western groyne were wilted and removed

Photo J.



Poor soil drainage is found in one planter in Eastern Groyne

Photo K.



Some ties and stakes were detached at Western Box Culvert

Photo L.



The planters at the Eastern box culvert were repaired and enlarged and the plants in the planters were removed



Photo M.



Some ties and stakes already girdled and affected the growth of the trees.

Photo N.



Some ties and stakes already girdled and affected the growth of the trees.



Date/ Time: 24th Feb 2022 Weather: Fine/ Overcast/ Rain/ Windy

Item	Mitigation Measures				Actions/ Remarks
		Yes	No	N/A	
1	Vegetation Management				
1.1	Is the irrigation sufficient?	✓			
1.2	Any physical damage observed on the plant?		✓		The planters at the Eastern box culvert were repaired and enlarged. The plants in the planters were removed without replacement.
1.3	Any potential incursion, fire, pollution, and surface erosion, etc.		✓		Some of the plants in the planters on the Western groyne were wilted without replacement.
1.4	Is the soil drain well?	✓			Poor soil drainage is found in one planter in Eastern Groyne
1.5	Are the weeds controlled at an acceptable level?	✓			
1.6	Are the debris controlled at an acceptable level?	✓			
1.7	Are the plants planted in right place according to the landscape plan?	✓			
1.8	Are the plantings including species, size and plants quality completed following the landscape plan?	✓			
2	Protection of trees				
2.1	The physical protection (fencing) is in place?	✓			
2.2	Any poor health condition or dead tree observed?		✓		
2.3	Any poor practice of pruning observed?		✓		
2.4	Are the trees planted in right place according to the landscape plan?	✓			
2.5	The tree supporting system are in good condition?		✓		<ul style="list-style-type: none"> ● Some ties and stakes were detached at Western Box Culvert. ● Some ties and stakes already girdled and affected the growth of the trees.



Item	Mitigation Measures				Actions/ Remarks
		Yes	No	N/A	
2.6	Any event(s) observed may properly hinder the tree growth?		✓		
3	Architectural design and treatment of all structures (where practicable), retaining walls, elevated road structures and other engineering works.				
3.1	Implementation and maintenance of mitigation measures, to ensure conformity with agreed designs?	✓			

Summary and follow up actions / Remarks:

1. Some of the plants in the planters on the Western groyne were wilted and should be removed. (Photo I)
2. Poor soil drainage is found in one planter in Eastern Groyne which should be urgently mitigated. (Photo J)
3. Some ties and stakes were detached at Western Box Culvert. (Photo K)
4. The planters at the Eastern box culvert were repaired and enlarged and the plants in the planters were removed. (Photo L)
5. Some ties and stakes already girdled and affected the growth of the trees. (Photo M)

Follow up action by contractor:

1. The Contractor was reminded to follow the observation provided in the checklist with their horticulture sub-contractor.

Reminders:

1. Girdling by the ties and stakes was observed on some of the trees. Contractors are required to adjust the ties to avoid the damage of the tree as a matter of urgency or trees replacement may be required before rejection from maintenance authority during handover.
2. The Contractor(s) is/are reminded to check the guying and staking of all retained/newly planted trees to ensure the tree supporting systems are properly installed, in order and not causing any damage to the trees.
3. The Contractor(s) is/are reminded to replant the plants at Western groyne and Eastern box culvert, and tackle the poor soil drainage issue in Eastern Groyne.



Photo Record:

Photo A.



General view (1)

Photo B.



General view (2)

Photo C.



General view (3)

Photo D.



General view (4)



Photo E.



General view (5)

Photo F.



General view (6)

Photo G.



General view (7)

Photo H.



General view (8)



Photo I.



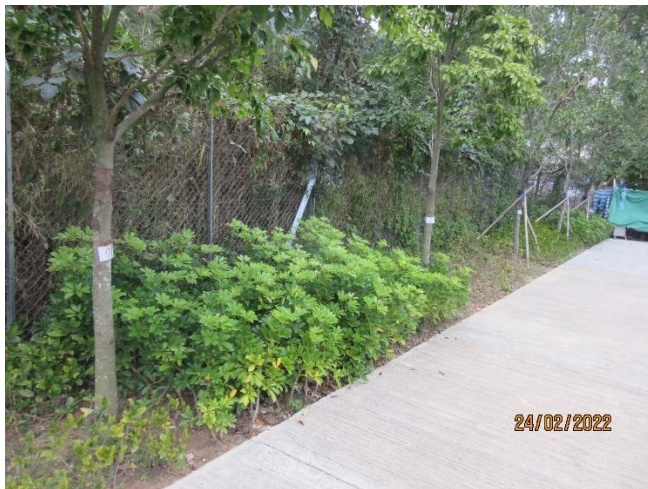
Some of the plants in the planters on the Western groyne were wilted and removed

Photo J.



Poor soil drainage is found in one planter in Eastern Groyne

Photo K.



Some ties and stakes were detached at Western Box Culvert

Photo L.



The planters at the Eastern box culvert were repaired and enlarged and the plants in the planters were removed



Photo M.



Some ties and stakes already girdled and affected the growth of the trees.



Signature:

		Signature	Date
Audited by	Registered Landscape Architect	 	7/3/2022
Checked by	Environmental Team Leader		
	Independent Environmental Checker		

Appendix D

Detailed Post-planting Monitoring Reports of Mangrove Seedling Planting

**INSPECTION REPORT
FOR POST-PLANTING MONITORING OF
THE MANGROVE SEEDLING PLANTING AT
BATHING BEACH AT LUNG MEI**

26TH JANUARY 2022





Contents

1	Introduction	2
2	The site and Mangrove Seedlings Location	2
3	Mangrove Seedlings Description	4
4	Summary and Remedial actions	8
5	Appendix A – Location of the planting sites	9



1 Introduction

Saraca Urban Forest (SUF) has been appointed to carry out the post-planting monitoring of the mangrove seedling planting at Bathing Beach at Lung Mei, Tai Po. The mangrove seedlings were inspected by Desmond Tang on 26th January 2022 on the ground during low tide.

The objectives of the report are:

- 1) To evaluation of the current condition, the performance and health conditions of the planted mangrove seedlings; and
- 2) To recommend the remedial actions.

2 The site and Mangrove Seedlings Location

The mangrove seedlings are in 3 planting locations, that are at Portion B near Western Open Channel and Western Groyne and near Eastern Groyne at the tidal zone of 1.2 to 1.6 mPD (Appendix A)



Photo 2.1 General view of the mangrove in location 1



Photo 2.2 General view of the mangrove in location 2



Photo 2.3 General view of the mangrove in location 3



3 Mangrove Seedlings Description

All the seedlings in all 3 locations were inspected. The condition of all the seedlings was comparable to the previous inspection. In general, no *Mikania micrantha* and observable pollution in the 3 plantings locations and nearby environment. Only a few seedlings have the sign of pest but which is insignificant to the health of the seedlings. According to the Mangrove Seedling Proposal, the total number of seedlings was 382. However, only 342 seedlings could be found during the initial post-planting monitoring. The total number of seedlings was gradually decreasing and those seedlings were dead, decayed and washed away by the tidal wave between the period of planting and the initial post-planting monitoring.

For location 1, fewer than half of the seedlings were alive, only a few of the seedlings on the most landward side have leaves (Photo 3.1). The poor health seedlings (no leaves but still alive) are gradually declining and more than half of the seedlings were dead.

For location 2, A large amount of the seedlings were dead (Photo 3.2) and disappeared, some of them with very short dead stem remain. A certain amount of the dead seedlings was disappeared, it is suspected that the dead seedling is dried out, decayed and washed away by the tidal wave. Few of the seedlings on the most landward side have leaves (Photo 3.3) and several poor health seedlings (no leaves but still alive) are also gradually declining.

For location 3, most of the seedlings have normal foliage density and are in good condition (Photo 3.4). A small portion of the seedlings at the seaward side was in poor condition (no leaves but still alive) and dead (Photo 3.5).



General information of the seedlings at the 3 locations is summarized in the table below:
 (Figures in the table are the actual seedlings number on site, as some of the dead and decayed seedlings were expected to be washed away by the tidal wave, it will be listed as “Suspected decayed and washed away”)

	Location 1	Location 2	Location 3	Total
<i>Aegiceras Corniculatum</i>	13	14	32	59
<i>Avicennia Marina</i>	4	0	38	42
<i>Kandellia Obovata</i>	5	0	32	37
Live (unidentifiable as no leaves)	8	1	6	15
Dead	43	28	7	78
Total	73	43	115	231
Suspected decayed and washed away				382-231=151

Mortality Rate = 60%



Photo 3.1 The seedling on the most landward side has leaves and is in good condition



Photo 3.2 large amount of the seedlings were dead and in poor condition, some of them with very short dead stem remain



Photo 3.3 The seedling on the most landward side has leaves and is in good condition



Photo 3.4 Seedling with good condition



Photo 3.5 Dead and poor condition seedlings at the seaward side



4 Summary and Remedial actions

Based on the observation from Sep to Jan, only the seedlings at the landward side thrive. The seedlings at the seaward side showed poor health and death even at location 3, which the general condition of the seedling is the best among those 3 locations. Those poor health seedlings with no sign to re-sprout and are expected to decline and be washed away by the tidal over time, which could be concluded in the recent inspections.

Since the mangrove distribution and survival is primarily determined by sea level and its fluctuations, other secondary factors are air temperature, salinity, ocean currents, storms, shore slope, and soil substrate also affect the establishment rate. Both *Aegiceras corniculatum* and *Avicennia marina* are mostly at the outer fringe (seaward) among other mangroves and *Avicennia marina* is also a pioneer species, however, even those species fail to establish at location 1 and location 2. From our observation, it is suspected that the condition of location 1 and location 2, especially the seaward side is not optimal for the seedlings to establish and grow. The contractor is recommended to replant the seedlings and review if the planting location should be moved to a more landward side or other locations (like next to location 3 (Photo 3.6) which the current condition of the seedlings is good) to improve the survival rate.



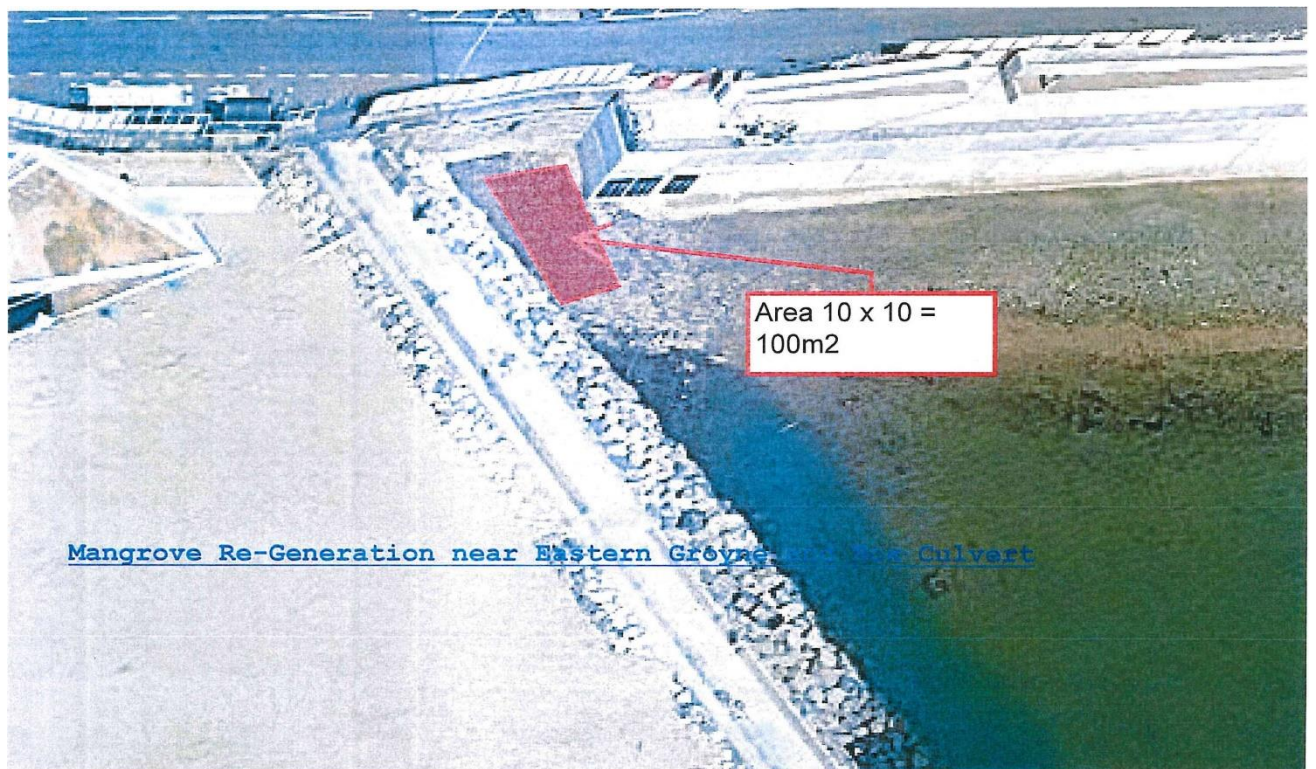
Photo 3.6 The area next to location 3



5 Appendix A – Location of the planting sites



Map 5.1 Location 1 and 2 (near Western Open Channel and Western Groyne)



Map 5.2 Location 3 (Near Eastern Groyne)

**INSPECTION REPORT
FOR POST-PLANTING MONITORING OF
THE MANGROVE SEEDLING PLANTING AT
BATHING BEACH AT LUNG MEI**

24TH FEBURARY 2022





Contents

1	Introduction	2
2	The site and Mangrove Seedlings Location	2
3	Mangrove Seedlings Description	4
4	Summary and Remedial actions	8
5	Appendix A – Location of the planting sites	9



1 Introduction

Saraca Urban Forest (SUF) has been appointed to carry out the post-planting monitoring of the mangrove seedling planting at Bathing Beach at Lung Mei, Tai Po. The mangrove seedlings were inspected by Desmond Tang on 24th FEBRUARY 2022 on the ground during low tide.

The objectives of the report are:

- 1) To evaluation of the current condition, the performance and health conditions of the planted mangrove seedlings; and
- 2) To recommend the remedial actions.

2 The site and Mangrove Seedlings Location

The mangrove seedlings are in 3 planting locations, that are at Portion B near Western Open Channel and Western Groyne and near Eastern Groyne at the tidal zone of 1.2 to 1.6 mPD (Appendix A)



Photo 2.1 General view of the mangrove in location 1



Photo 2.2 General view of the mangrove in location 2



Photo 2.3 General view of the mangrove in location 3



3 Mangrove Seedlings Description

All the seedlings in all 3 locations were inspected. The condition of all the seedlings was comparable to the previous inspection. In general, no *Mikania micrantha* and observable pollution in the 3 plantings locations and nearby environment. Only a few seedlings have the sign of pest but which is insignificant to the health of the seedlings. According to the Mangrove Seedling Proposal, the total number of seedlings was 382. However, only 342 seedlings could be found during the initial post-planting monitoring. The total number of seedlings was gradually decreasing and those seedlings were dead, decayed and washed away by the tidal wave between the period of planting and the initial post-planting monitoring.

For location 1, fewer than half of the seedlings were alive, only a few of the seedlings on the most landward side have leaves (Photo 3.1). The poor health seedlings (no leaves but still alive) are gradually declining and more than half of the seedlings were dead.

For location 2, A large amount of the seedlings were dead (Photo 3.2) and disappeared, some of them with very short dead stem remain. A certain amount of the dead seedlings was disappeared, it is suspected that the dead seedling is dried out, decayed and washed away by the tidal wave. Few of the seedlings on the most landward side have leaves (Photo 3.3) and several poor health seedlings (no leaves but still alive) are also gradually declining.

For location 3, most of the seedlings have normal foliage density and are in good condition (Photo 3.4). A small portion of the seedlings at the seaward side was in poor condition (no leaves but still alive) and dead (Photo 3.5).



General information of the seedlings at the 3 locations is summarized in the table below:
 (Figures in the table are the actual seedlings number on site, as some of the dead and decayed seedlings were expected to be washed away by the tidal wave, it will be listed as “Suspected decayed and washed away”)

	Location 1	Location 2	Location 3	Total
<i>Aegiceras Corniculatum</i>	13	14	32	59
<i>Avicennia Marina</i>	4	0	40	44
<i>Kandellia Obovata</i>	5	0	32	37
Live (unidentifiable as no leaves)	7	1	4	12
Dead	35	25	7	67
Total	64	40	115	219
Suspected decayed and washed away				382-219=163

Mortality Rate = 60%



Photo 3.1 The seedling on the most landward side has leaves and is in good condition



Photo 3.2 large amount of the seedlings were dead and in poor condition, some of them with very short dead stem remain



Photo 3.3 The seedling on the most landward side has leaves and is in good condition



Photo 3.4 Seedling with good condition



Photo 3.5 Dead and poor condition seedlings at the seaward side



4 Summary and Remedial actions

Based on the observation from Sep to Feb, only the seedlings at the landward side thrive. The seedlings at the seaward side showed poor health and death even at location 3, which the general condition of the seedling is the best among those 3 locations. Those poor health seedlings with no sign to re-sprout and are expected to decline and be washed away by the tidal over time, which could be concluded in the recent inspections.

Since the mangrove distribution and survival is primarily determined by sea level and its fluctuations, other secondary factors are air temperature, salinity, ocean currents, storms, shore slope, and soil substrate also affect the establishment rate. Both *Aegiceras corniculatum* and *Avicennia marina* are mostly at the outer fringe (seaward) among other mangroves and *Avicennia marina* is also a pioneer species, however, even those species fail to establish at location 1 and location 2. From our observation, it is suspected that the condition of location 1 and location 2, especially the seaward side is not optimal for the seedlings to establish and grow. The contractor is recommended to replant the seedlings and review if the planting location should be moved to a more landward side or other locations (like next to location 3 (Photo 3.6) which the current condition of the seedlings is good) to improve the survival rate.



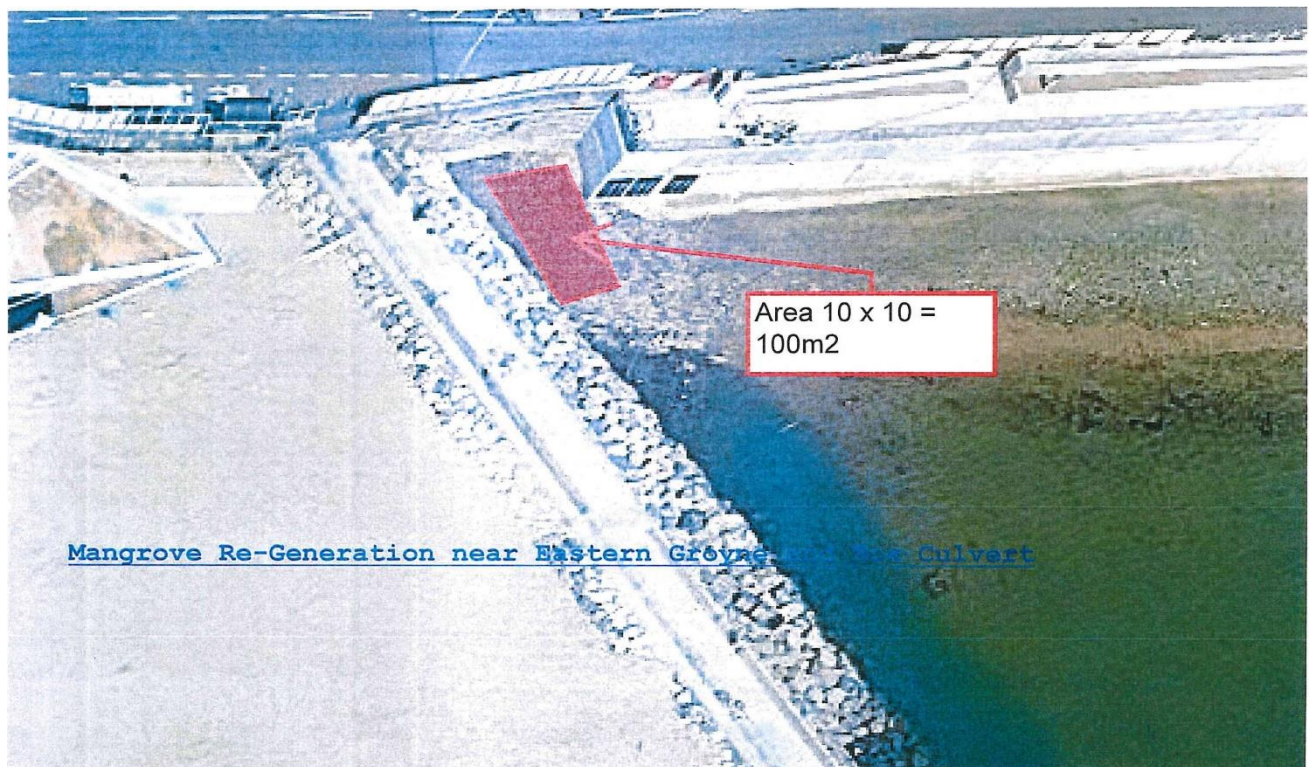
Photo 3.6 The area next to location 3



5 Appendix A – Location of the planting sites



Map 5.1 Location 1 and 2 (near Western Open Channel and Western Groyne)



Map 5.2 Location 3 (Near Eastern Groyne)