



FUGRO

4th Post-transplantation Monitoring and Audit Report (13th January 2023)

Northeast New Territories Landfill Extension (NENTX) | Contract No. EP/SP/77/15

0092/22/ED/0316 02 | 3 February 2023

Formal Submission

Veolia Environmental Services Hong Kong Limited



Our Ref.: CL/91823/0330-VES
Date: 3 April 2023

By Email

Veolia Hong Kong Holding Limited
40/F, One Taikoo Place
979 King's Road
Quarry Bay
Hong Kong

Attn.: Mr. Alvin Kam

**Meinhardt Infrastructure and
Environment Ltd**
邁進基建環保工程顧問有限公司

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Dear Sir

Re: Contract No. EP/SP/77/15
North-East New Territories Landfill Extension (NENTX)
4th Post-Transplantation Monitoring Report (13 January 2023)

I refer to Conditions 2.7 and 2.9 under Environmental Permit No. EP-292/2007 and Conditions 2.5 and 2.7 of Further Environmental Permit No. FEP-01/292/2007, regarding the submission of Post-Transplantation Monitoring Report. I hereby verified the captioned "4th Post-Transplantation Monitoring Report (13 January 2023)" dated 3 February 2023.

Should you have any queries, please do not hesitate to contact the undersigned at 2859 5409.

Yours faithfully
MEINHARDT INFRASTRUCTURE AND ENVIRONMENT LTD



Claudine Lee
Independent Environmental Checker

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Ref: P521530-0000-REV-NN-0037

23 March 2023

By Email

Meinhardt Infrastructure & Environment Ltd.
10/F Genesis
33-35 Wong Chuk Hand Road
Hong Kong

Attn: Ms. Claudine Lee,

Dear Claudine,

Re: Contract No. EP/SP/77/15
Northeast New Territories Landfill Extension
Submission of 4th Post-Transplantation Monitoring Report (13 January 2023)

In accordance with the requirement specified in Conditions 2.7 and 2.9 of Environmental Permit No. EP-292/2007 and Conditions 2.5 and 2.7 of Further Environmental Permit No. FEP-01/292/2007, we are pleased to submit the certified "4th Post-Transplantation Monitoring Report (13 January 2023)" dated on 3 February 2023 for your verification.

Should you require any further information or clarification, please do not hesitate to contact the undersigned or our Mr. Keith Chau on 3664 6788.

Yours faithfully,
For and on behalf of
Aurecon Hong Kong Limited

A handwritten signature in blue ink, appearing to read "Fredrick Leong".

Fredrick Leong
Environmental Team Leader

Encl.

1. 4th Post-Transplantation Monitoring Report (13 January 2023)

cc.

1. IEC - Ms. Claudine Lee (By email: claudinelee@meinhardt.com.hk)
2. IEC Representative - Mr. Jimmy Lui (By email: jimmylui@meinhardt.com.hk)

Document Control

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1. INTRODUCTION

1.1 Background of the Project

- 1.1.1 The North East New Territories Landfill Extension (the NENTX Project) is a designated project. The Environmental Impact Assessment (EIA) Report was approved (AEIAR-111/2007) with conditions on 20 September 2007 and the Environmental Permit (EP) EP-292/2007 (the "EP") was issued on 26 November 2007. Moreover, a Further Environmental Permit FEP-01/292/2007 (the "FEP") was also issued under the EIA Ordinance on 28 April 2022.
- 1.1.2 The transplantation works were conducted in fulfilment of Conditions 2.7 and 2.9 of the EP and Conditions 2.5 and 2.7 of the FEP and in accordance with the approved Transplantation Proposal for Plant Species of Conservation Importance (Rev.1) (NENTX-FUG-RP-E-EM-002-I02) (the "approved Proposal"). The Transplantation Report (NENTX-AURE-RP-ZZ-E-007-I-I01) was prepared by a qualified ecologist certified by the Environmental Team (ET) Leader and Independent Environmental Checker (IEC) in accordance with Condition 2.7 of the EP and Condition 2.5 of the FEP.
- 1.1.3 The Transplantation Report details the methodology of the transplantation activities. The actual transplantation works for the plant species of conservation importance was described along with the post-transplantation maintenance. The post-transplantation monitoring and audit and the implementation programme was also detailed. The vegetation survey which investigated the plant species of conservation importance before the transplantation work was detailed in the approved Transplantation Proposal.
- 1.1.4 Before the transplantation activities, a detailed vegetation survey was conducted by direct observation to record the plant species of conservation importance present in NENTX. A total of four floral species of conservation importance were identified within the Project Site, namely Incense Tree *Aquilaria sinensis*, Endospermum *Endospermum chinense*, Lamb of Tartary *Cibotium barometz* and Bottlebrush Orchid *Goodyera procera*. Individuals that were directly impacted by the proposed construction of NENTX Landfill had been selected for transplantation. More details to be found in the approved Transplantation Proposal.
- 1.1.5 Based on the findings of the detailed vegetation survey and verification survey, three plant species of conservation importance were considered suitable for transplantation, i.e., two nos. of Incense Tree saplings, one cluster of Lamb of Tartary, and 19 clusters of Bottlebrush Orchid. The transplantation works was carried out by a landscape contractor and supervised by a qualified ecologist. The qualified ecologist has at least five years of relevant experience in transplantation and/or vegetation survey and assessment and is also an ISA Certified Arborist.

- 1.1.6 The three plant species of conservation importance were transplanted to suitable receptor sites. To further safeguard these species, the selected receptor sites were within or adjacent to the facilities managed by the Contractor. Moreover, the similarity in site conditions between the collection site and receptor site and the accessibility of the receptor for future maintenance and monitoring were also considered in the selection. More details to be found in the Transplantation Report.
- 1.1.7 All the transplanted individuals will be maintained by the Contractor for 12 months (establishment period) after planting to the receptor sites in accordance with Section 4 of the approved Proposal. Moreover, their survival and growth will be monitored by a qualified ecologist or botanist of Fugro in accordance with Section 5 of the approved Proposal.

1.2 Purpose of this Document

- 1.2.1 This 4th Post-transplantation Monitoring Report (the "Report") was prepared to present the survival and growth of plant species of conservation importance after transplantation works. Moreover, key maintenance activities conducted this reporting month and recommendations on post-transplantation maintenance are presented in this Report.
- 1.2.2 The post-transplantation monitoring and audit of the transplanted plant species of conservation importance was carried out in accordance with Section 5 of the approved Transplantation Proposal.

1.3 Structure of this Document

Succeeding this introductory section, the remainder of this Report is presented as follows:

- Section 2 details the monitoring results, including the key maintenance activities conducted this reporting month;
- Section 3 presents the succeeding post-transplantation monitoring schedule; and
- Section 4 summarizes the findings of the post-transplantation monitoring and way forward.

2. MONITORING RESULTS

Following the transplantation works on 10 November 2022, the 4th post-transplantation monitoring and audit was carried out on 13 January 2023 to check the condition of the transplanted plant individuals.

2.1 Condition of the Transplanted Individuals

2.1.1 The transplanted individuals of the 19 clusters of Bottlebrush Orchid *Goodyera procera* were all in fair to good condition with minor health issues observed in some individuals, i.e., slightly chlorotic leaves and presences of holes in the leaves. The Lamb of Tartary *Cibotium barometz*, however, exhibited further discoloration and wilting of leaves following the last monitoring period. Its stems also showed some decay but its roots were still in fair condition. The two saplings of the Incense Tree *Aquilaria sinensis* also both demonstrated poor health conditions with die back and fallen leaves.

2.1.2 Albeit strict compliance of the transplantation works and post-transplantation maintenance to the approved Transplantation Proposal, transplanted individuals would require time to adapt and establish in the new environment/substrate of the receptor site. Hence, signs of leaf discoloration and/or wilting, dehydration, and even die-off are expected. Thus, succeeding post-transplantation maintenance and monitoring and audit are crucial to assess the progress of recovery and establishment of transplanted individuals in the receptor site.

2.1.3 The numbers, measurements, and health conditions of the transplanted plant species of conservation importance during the current monitoring period are shown in **Appendix A**.

2.1.4 The photographic records of the transplanted plant species of conservation importance during the current monitoring period are shown in **Appendix B**.

2.2 Key Maintenance Activities Conducted in The Reporting Month

2.2.1 The key maintenance activities carried out for the current reporting month are the following:

- Watering frequency of the two Incense Tree saplings was 2-3 times per week. The watering dates were 23 Dec, 28 Dec, 30 Dec, 2 Jan, 4 Jan, 6 Jan, 10 Jan, 13 Jan.
- The watering frequency of the cluster of Lamb of Tartary was 2 times a week. The watering dates were 23 Dec, 28 Dec, 30 Dec, 4 Jan, 6 Jan, 10 Jan, 13 Jan.
- Once a week watering of Bottlebrush Orchid. The watering dates were 23 Dec, 30 Dec, 6 Jan, 13 Jan.
- Manual removal of weeds when observed during watering activities; and
- Checking of insect attacks and/or fungal infestation during watering activities.
- Prevention of human disturbance by fencing off area around the two Incense Tree saplings.

2.3 Recommendation on Post-Transplantation Maintenance

Immediately after the monitoring and audit activity, the following post-transplantation maintenance was discussed with the Contractor for their prompt implementation:

- The watering frequency for the two saplings of Incense Tree should be maintained at 2-3 times a week. Improve/place organic mulch around the two saplings of Incense Tree to retain soil moisture, protect damaged roots against extreme temperatures, and improve soil quality.
- The watering frequency of the cluster of Lamb of Tartary should be maintained at twice a week. Wilted leaves should be pruned away.
- The watering frequency for all 19 clusters of Bottlebrush Orchid should remain the same. During watering activities, the surrounding dead branches and dry leaves should be removed to ensure no plants are damaged by them.

3. POST-TRANSPLANTATION MONITORING SCHEDULE

- 3.1.1 As per Section 10.3 and Table 10.1 of the EM&A Manual, the survival and growth of the transplanted species will be monitored by a qualified ecologist or botanist at least twice a month during the first three months after transplantation and once a month in the following nine months.
- 3.1.2 As only one monitoring activity was conducted in November, the forthcoming monitoring and audit activities will be conducted twice a month for December, January and February. Then, the monitoring activities will be conducted monthly until October 2023.
- 3.1.3 The need for any further monitoring will be reviewed and determined according to the monitoring results of the 12-month monitoring.

4. SUMMARY AND CONCLUSION

- 4.1.1 The health of the transplanted individuals of Bottlebrush Orchid were all in fair to good condition. The minor deficiencies on some individuals did not have a large impact on their health. The two individuals of Incense Tree saplings were both in poor health condition. The individuals had dieback and fallen leaves. This could be due to transplantation shock brought about by the changes in the environment and the individual has not acclimated to these changes yet. Lastly, the transplanted cluster of Lamb of Tartary was also under poor health condition with more of its leaves have wilted and showed discoloration. As aforementioned, it takes time for newly transplanted plants to grow accustomed to the new environment of the recipient site. Therefore, signs of leaf discoloration and/or wilting, dehydration, and even die-off are expected.

4.1.2 It is recommended to pay additional attention to the health conditions of the Lamb of Tartary cluster and the Incense Tree saplings. Moreover, should there be drastic change in the health conditions of these individuals observed during post-transplantation maintenance activities, the Contractor is advised to immediately advise the ecologist to discuss possible remedial actions.

Appendix A

Conditions of Transplanted Plant
Species of Conservation
Importance

13 Jan 2023

Post-Transplantation Monitoring
Conditions of Transplanted Plants at Receptor Sites

Date of Submission: _____

P. of _____

Surveyor: Yuen, Andy & Tillo, Thomas

Date of Monitoring and Maintenance	Receptor Site	No.	Species	Plant Size Measurements			Amenity Value (High/ Medium/ Low)	Form (Good/ Fair/ Poor)	Health Condition (Good/ Fair/ Poor)	Structural Condition (Good/ Fair/ Poor)	Recommendation on Post-Transplantation Maintenance	Key Maintenance Activities Conducted	Remark
				DBH (mm)	Crown Spread (m)	Height (m)							
13/01/2023	A	AS-53	A. sinensis		-	1.75							no leaves; branches are dry
13/01/2023	A	AS-52	A. sinensis		-	1.15							no leaves; branches are dry
13/01/2023	B	CB-01	C. barometz			1.8							wilted leaves; weak stems
13/01/2023	B	GP-15	G. procera			0.13							20% green leaves
13/01/2023	B	GP-13	G. procera			0.07							chlorotic leaf
13/01/2023	B	GP-19	G. procera			0.20							some parts of a leaf are wilted
13/01/2023	B	GP-11	G. procera			0.18							chlorotic leaf; some parts of a leaf are wilted
13/01/2023	B	GP-07	G. procera			0.13							some parts of the leaves are wilted
13/01/2023	B	GP-05	G. procera			0.19							chlorotic leaf
13/01/2023	B	GP-06	G. procera			0.17							chlorotic leaves
13/01/2023	B	GP-04	G. procera			0.24							chlorotic leaves
13/01/2023	B	GP-12	G. procera			0.07							chlorotic leaf; wilted leaves
13/01/2023	B	GP-03	G. procera			0.07							leaves has holes
13/01/2023	B	GP-18	G. procera			0.10							some parts of the leaves are wilted
13/01/2023	B	GP-02	G. procera			0.07							chlorotic
13/01/2023	B	GP-01	G. procera			0.15							chlorotic leaf
13/01/2023	B	GP-16	G. procera			0.13							
13/01/2023	B	GP-08	G. procera			0.11							wilted leaves
13/01/2023	B	GP-09	G. procera			0.14							chlorotic
13/01/2023	B	GP-10	G. procera			0.24							chlorotic leaves
13/01/2023	B	GP-14	G. procera			0.15							wilted leaf
13/01/2023	B	GP-17	G. procera			0.10							some leaves are chlorotic
													chlorotic leaf

Note:

1. Measurements of spread and DBH are not applicable for undersized tree, shrubs, herbs and ferns.

Appendix B

Photographic Records of
Transplanted Plant Species

B.1 Incense Tree *Aquilaria sinensis*



Photo B.1.1 : General view of the transplanted individual AS-03.

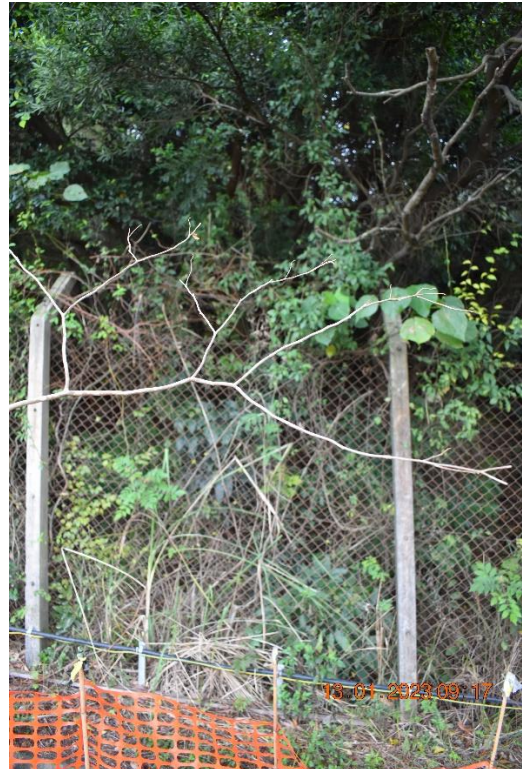


Photo B.1.2 : Branch condition of the transplanted individual AS-03.



Photo B.1.3 : General view of the transplanted individual AS-02.



Photo B.1.4 : Branch condition of the transplanted individual AS-02.

B.2 Lamb of Tartary *Cibotium barometz*



Photo B.2.1 : General view of the transplanted individual CB-01.



Photo B.2.2 : Leaf condition of the transplanted individual CB-01.



Photo B.2.3 : Leaf condition of the transplanted individual CB-01.



Photo B.2.4 : Leaf condition of the transplanted individual CB-01.

B.3 Bottlebrush Orchid *Goodyera procera*



Photo B.3.1: Individual GP-01. Partially wilted leaf.

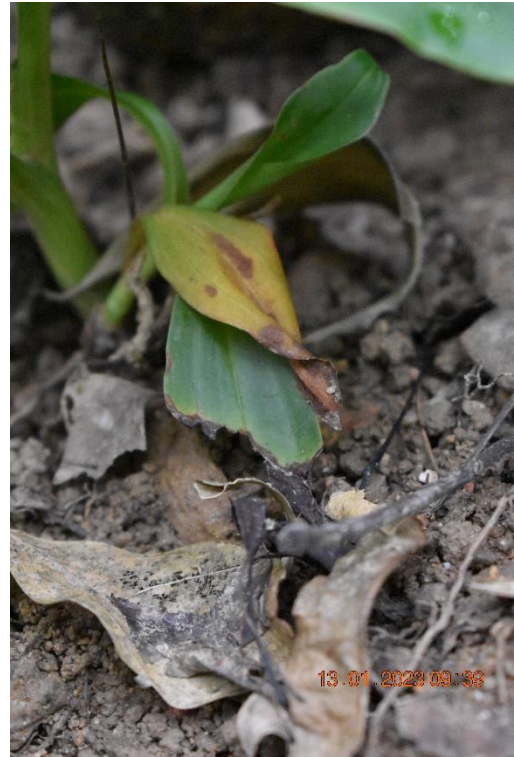


Photo B.3.2: Individual GP-01. Partially wilted leaf.



Photo B.3.3: Individual GP-02.



Photo B.3.4: Individual GP-03. Perforated leaves.



Photo B.3.5: Individual GP-03. Perforated leaves.



Photo B.3.6: Individual GP-04. Wilted leaf.



Photo B.3.7: Individual GP-04. Wilted leaf.



Photo B.3.8: Individual GP-05. Partially wilted leaf.



Photo B.3.9: Individual GP-06. Partially wilted leaf.



Photo B.3.10: Individual GP-06. Partially chlorotic and wilted leaf.



Photo B.3.11: Individual GP-07.

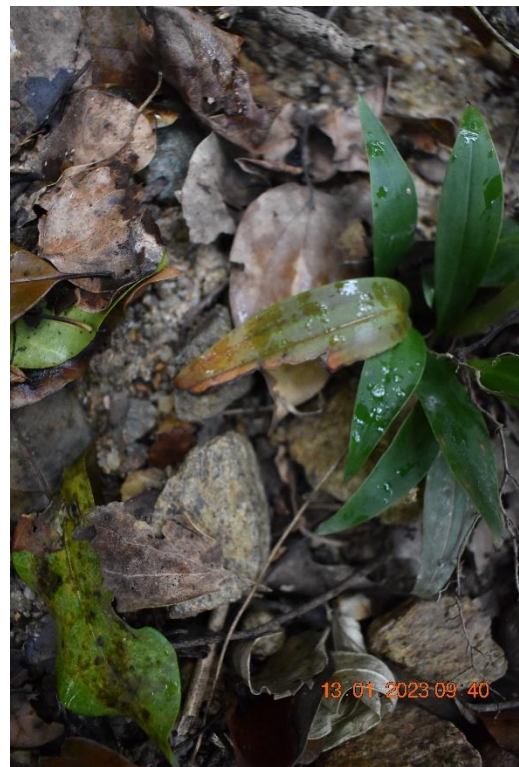


Photo B.3.12: Individual GP-07. Single chlorotic leaf.



Photo B.3.13: Individual GP-08. Chlorotic leaves.



Photo B.3.14: Individual GP-08. Minor chlorotic leaves.



Photo B.3.15: Individual GP-09.



Photo B.3.16: Individual GP-10. Holes in leaves.



Photo B.3.17: Individual GP-11. Partially wilted leaves.



Photo B.3.18: Individual GP-12. Perforated leaves.



Photo B.3.19: Individual GP-13.



Photo B.3.20: Individual GP-14. Chlorotic leaves.



Photo B.3.21: Individual GP-15. Partially chlorotic leaves.



Photo B.3.22: Individual GP-16.



Photo B.3.23: Individual GP-17. Partially wilted leaf.



Photo B.3.24: Individual GP-18. Partially wilted leaves.



Photo B.3.25: Individual GP-19.



Photo B.3.26: Individual GP-19. Chlorotic and partially wilted leaves.