

Site Formation and Associated Infrastructural Works for
Development of Columbarium, Crematorium and Related
Facilities at Sandy Ridge Cemetery
Grassland Reinstatement Plan



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JOB No.: TCS0881/18

AGREEMENT No. CE 11/2013 (CE)
SITE FORMATION AND ASSOCIATED INFRASTRUCTURAL
WORKS DEVELOPMENT OF COLUMBARIUM,
CREMATORIUM AND RELATED FACILITIES AT SANDY
RIDGE

GRASSLAND REINSTATEMENT PLAN
(SUBMISSION UNDER EP-534/2017 & FEP-01/534/2017)

PREPARED FOR
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Rev.5	14 September 2022	Updated according to EPD's comments and new planting arrangement
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1. INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 The scope of the Project comprises site formation and infrastructural works for the development of Columbarium & Crematorium (C&C) facilities at Sandy Ridge Cemetery, including:

- Site formation and associated works of about 10 hectares of land including landscaping, geotechnical, drainage and sewerage works, waterworks, and other utilities services for development of C&C facilities at the Sandy Ridge Cemetery;
- Road works including access road, tunnel and viaducts within Sandy Ridge Cemetery;
- Widening a section of Lin Ma Hang Road (about 1.4km in length) from 6.5m to 7.3m;
- Provision of off-site pick-up / drop-off points for shuttle buses at MTR Kwu Tung Station, MTR Fanling Station, existing Sheung Shui Landmark North Public Transport Interchange (PTI) and layby at Pak Wo Road near Flora Plaza; and
- Barging point at Siu Lam, Lok On Pai.

1.1.2 The Project was submitted to Environmental Protection Department (EPD) for approval on 21st March 2016 and approved with condition on 8th Aug 2016 (AEIAR-198/2016). Sequent to the approval, an Environmental Permit (EP-534/2017) was issued on 7th April 2017.

1.1.3 Given that the EIA report has concluded that the ecological impacts of the unavoidable loss of 10.4 ha of Upland Grassland, and impacts on fauna arising from the loss, disturbance and fragmentation of these habitats, would be "low to moderate", reinstatement of 0.9 ha Upland Grassland habitat on the engineered slopes to be formed under the Project have been recommended to mitigate this impact.

1.1.4 Subsequently, submission of a "Grassland Reinstatement Plan" (GRP) has been required under the Clause 2.14 of the EP-534/2017 of the Project - which read "*The Permit Holder shall, no later than one month before the commencement of construction of the Project, submit four hard copies and one electronic copy of a Grassland Reinstatement Plan to the Director of Environmental Protection for approval. The Plan shall be prepared by a qualified ecologist/botanist and shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the approved EIA Report (Register No. AEIAR-198/2016). All recommended measures as set out in the approved Grassland Reinstatement Plan shall be fully and properly implemented*".

1.2 MITIGATION OBJECTIVES

1.2.1 According to the EIA report, the reinstatement work aims to put *in situ* hillside grassland soil on the engineering slopes so that the seed bank in the grassland would be preserved and the regenerated floristic composition could be similar to the hillside grassland. Furthermore; it is anticipated that once the surface soils have weathered on those slopes, natural colonisation and natural succession will produce grasslands of similar composition because of the proximity of a good seed source from the adjacent grasslands that were retained *in situ*.

1.2.2 Whilst the supporting document for an VEP application of the project prepared in 2018 has updated the size of upland grassland affected by the Project to 7.7 ha (for the project as a

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whole) in 2018, it is considered that the mitigation proposed for this habitat in the approved EIA (Section 9.7.2) remains the same, including the grassland reinstatement work.

1.3 PURPOSES OF THIS SUBMISSION

1.3.1 The engineering slope proposed for the grassland re-instatement work, i.e., the grassland reinstatement area (GRA), has already identified during the detail design stage of the Project (see *Appendix A*). Under the current arrangement, the whole Project will be implemented by three construction contracts (see *Appendix B* for their respective demarcation*); the Contract 1 and Contract 2 has already commenced in 2017 and 2018, the Contract 3 is yet to be awarded. The identified GRA is located within the site boundary of Contract 3, and tentatively the reinstatement work will be commenced in the wet season in 2024 by the prospective Main Contractor. (**the Project demarcation as shown in the approved EIA report (AEIAR-198/2016) has been adjusted to suit the latest requirements, including engineering works such as slopes and the latest site platform design for the future crematorium*).

1.3.2 However, since the Contract 3 of the Project have been shelved by the Government in early 2022, the feasibility and practicality to undertake the grassland reinstatement within the engineering slopes already formed under the Contract 1 and Contract 2 of the Project has been reviewed. The proposed alternative GRA sites is shown in *Appendix C*, and this revised Grassland Reinstatement Plan describes the methodology, implementation programme, as well as post-reinstatement monitoring and maintenance programme of the work.

1.4 STRUCTURE OF THE GRASSLAND REINSTATEMENT PLAN

1.4.1 After this introductory section, this Grassland Reinstatement Plan consists of the following Sections:

- *Section 2 – Brief describe the Upland Grassland habitat to be affected by the Project and the findings of the Baseline Grassland Survey*
- *Section 3 – Details the Reinstatement approach, planting methodology and maintenance requirement*
- *Section 4 – Describe the ecological monitoring requirements and contingency and action plans*

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2. UPLAND GRASSLAND WITHIN THE PROJECT AREA

2.1 HABITAT DESCRIPTION AND ECOLOGICAL VALUE

- 2.1.1 The updated habitat map presented in the supporting document of the VEP application in **2018** is shown in *Appendix D* to illustrate the distribution of this habitat within and in the vicinity of the Project Area. According to approved Environmental Impact Assessment (EIA) report, the affected upland grassland within the project area and its vicinity are fire maintained, and it was primarily dominated by a mosaic of common herbaceous and shrubby plant species which are typical to such habitat type elsewhere in the upland area of New Territory, in particularly the fern *Dicranopteris pedata*, the grasses *Ischaemum barbatum*, *Imperata cylindrica* var. *major*, *Neyraudia reynaudiana* and *Miscanthus floridulus*; as well as the shrub *Baeckea frutescens*. On the other hand, cluster of woody plant species composed with common species such as the shrubs *Rhodomyrtus tomentosa*, *Rhaphiolepis indica*, *Breynia fruticosa*, *Helicteres angustifolia*, the climbing vines *Smilax china*, *Smilax glabra* and *Embelia laeta*, or young trees of *Cratoxylum cochinchinense* and *Rhus chinensis* were also be found around ravine or rock boulder where the plant communities may have been sheltered from hill-fire.
- 2.1.2 Floristically, several species of common orchid (including Bamboo Orchid *Arundina graminifolia* and Toothed Habenaria *Habenaria dentata* found on the upland grassland within the Project boundary; as well as Pale Purple Eulophia *Eulophia graminea*, Common Pecteilis *Pecteilis susannae* and Buttercup Orchid *Spathoglottis pubescens* found on other upland grassland outside the project site). On the other hand, good assemblages of terrestrial, non-flying mammals (including seven native species such as the East Asian Porcupine, Leopard Cat and Red Muntjac), a suite of rare to very rare butterfly species particular to grasslands (such as Great Swift, Tamil Grass Dart, Small Three-ring and Small Grass Yellow), as well as breeding activities of a scarce breeding species Golden-headed Cisticola were recorded from the upland grassland within the environs of Project boundary. As such, the upland grassland has been considered to have a “Moderate” ecological value due to the record of a number of species of conservation concern within this habitat type.

2.2 BASELINE GRASSLAND SURVEY

- 2.2.1 A baseline grassland survey by means of the same survey technique as described in the EIA report of the Project, i.e., direct observation along a survey transect, has been undertaken in October 2022 to identify the floristic characteristics of the unaffected upland grassland within and in the vicinity to the Project Area in October 2022, with particular focus on the plant communities where species of conservation importance have been previously recorded. All of the plant species and their respective relative abundance have been identified and recorded. The information collected could supplement those described in the EIA report, and facilitate the formulation of the reinstatement strategy under the current circumstance and effective planning of the implementation approach proposed in the GRP.
- 2.2.2 A total number of 107 plant species were recorded along the survey transect during the baseline grassland survey, and all of them are species typical and commonly be found in such habitat type elsewhere in Hong Kong. A completed list of species recorded is shown in *Appendix E*.
- 2.2.3 It is noted that the floristics composition of this habitat within and in the vicinity of the Project Area is composed with a spectrum of plant communities with different herbs to woody plants ratio, in which those located alongside the east-west axis of the ridgeline as well as the south facing slope of the Sandy Ridge are mostly dominated by the members of

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Poaceae, in particularly the *Arundinella setosa*, *Cymbopogon mekongensis*, *Ischaemum ciliare*, *Ischaemum aristatum* and *Eulalia sp.*; where those located on the north-facing slope is generally densely covered by a thick mat of the fern *Dicranopteria pedata*, which either appeared in sole-dominance, co-dominated with the shrub *Beckea fruticosa*, or co-dominated with *Miscanthus sinensis* and *Neyraudia reynaudiana* with cluster of woody plants interspersed among the area.

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3. REINSTATEMENT APPROACH AND METHODOLOGY

3.1 ALTERNATIVE SITES FOR GRASSLAND REINSTATEMENT

3.1.1 With respect to the latest status of the Project and the fact that all of the engineering slopes under the Contract 1 and 2 has already been formed, part of the engineering slopes ref. CS11/CS12/CS13 and CS15/CS16/CS17 as shown in *Appendix C* has been identified as the alternative grassland reinstatement area (GRA) after due consideration of the following factors:

- The proposed slopes are located in proximity to the unaffected grassland habitat within or in the vicinity of the Project Site, and hence would maximize the ecological linkage and potential of the reinstated habitat to those unaffected by the Project.
- Topsoil from the excavated slope has already been strategically placed on the toe wall planter of those engineering slopes, and hence would promote and facilitate the natural regeneration of the plant species within the GRA.
- Natural weathering of substrate as well as natural colonization and/or regeneration of the plant species of the adjacent upland grassland habitat has already recorded on the proposed slope (including several dominant species of this habitat type i.e., *Neyraudia reynaudiana* and *Miscanthus sinensis* and *Dicranopteris pedata*); and
- Planting of native plant species including those commonly recorded on the upland grassland habitat has already been scheduled in the proposed GRA under the Master Landscaping Plan of the Project.

3.2 RE-INSTATEMENT APPROACH

3.2.1 The reinstatement approach of the upland grassland has already been recommended in the EIA Report and briefly described in previous section, i.e., by collecting topsoil or turves from the development area and storing these appropriately during the construction phase, and applied them to the targeted engineering slopes once they been constructed to facilitate the natural development of the habitat through natural regeneration and colonization from those topsoil or turves transplanted from original upland grassland. Therefore, in essence, any plant species recorded in the unaffected upland grassland habitat during the baseline survey could be regarded as target species - except those species exotic in origin.

3.2.2 As mentioned in previous section, topsoil from the excavated slopes within the Project Area has been strategically placed on the toe wall planter of the proposed GRA and colonization/regeneration of “target species” has already been noted. On the other hand, with respect to the Master Landscape Plan as well as the latest status of the project, the upland grassland within the project site where whips planting has been scheduled would be proposed as donor site for the turves (**Appendix F**), where the vegetation dig up during the whip plantings would be transplanted to the GRA.

3.2.3 In order to preserve the desired plant communities already established within the GRA, an “enrichment planting” approach is recommended for the re-instatement work, i.e. undertake active planting within the proposed GRA without the elimination of individual and floristic structure which already existed and favorable for the development of the upland grassland

habitat, include the turves from the donor site as well as nursery stocks of several species.

3.3 PLANTING MANAGEMENT

Principle

- 3.3.1 The enrichment planting will be implemented under the Contract 1 of the Project, and preferably to be undertaken during the onset of the growing season in Hong Kong as far as practicable. Since the site preparation works would include selective vegetation clearance on the formed engineering slopes, the site preparation and planting work will be undertaken and completed in one growing season to avoid invasion and/or re-colonization of weedy plant species in those openings after the selective vegetation clearance.
- 3.3.2 In order to maintain the aesthetic of the engineering slope, the original planting arrangement proposed for the toe wall planter next to the access road as shown in the Master Landscape Plan would be retained and excluded from the enrichment planting work; and the area available for enrichment planting on the toe wall planters would subject to the distribution and abundance of the plant species to be retained (i.e., those native plant species recorded in the upland grassland habitat nearby, referred as “target plant species”), and hence the size and shape of planting space to be opened from the selective vegetation clearance.
- 3.3.3 All of the planting works will follow the applicable requirements as stipulated under the relevant P.S. of the Contract, and to be carried out under the supervision of a Horticulturalist/Ecologist with relevant experience in habitat enhancement and rehabilitation approved by the Project Manager.
- 3.3.4 A method statement detailed with the site preparation work, planting methodology and maintenance program should be prepared and submitted by the Horticulturalist/Ecologist to the Project Manager for approval prior the commencement of the planting work.

Site Preparation

- 3.3.5 The site preparation works include selective vegetation clearance with the wall planters and the planting pits on the slopes, in particularly the removal of invasive and weedy species (such as the tree *Leucaena leucocephala*, the herb *Biden pilosa*, the climbing/creeping plants *Mikania micrantha*, *Wedelia trilobata* and *Mimosa indica*, as well as any extensive cover of exotic grasses). Native herbaceous and woody plant species, if they have already recorded in the upland grassland habitat adjacent to the project site, i.e., the target plant species, will be retained as far as practicable. The Horticulturalist/Ecologist should also review their local abundance and recommend selectively thinning when considered necessary.
- 3.3.6 Whilst the selective vegetation clearance could be undertaken by mechanical means, such works if near clumps or cluster of plants to be retained should be undertaken by hand tools as far as practicable. Furthermore, should chemical approach such as application of weed killer is considered necessary and recommended by the Horticulturalist/Ecologist, prior approval from the Project Manager should be sought with details of the weed killer and method of application submitted, and such application should avoid any potential impact to the plant communities to be retained on those slopes, and carry out at least a month prior the planting work.
- 3.3.7 Wherever possible stripping the topsoil and then ripping the underlying subsoil to avoid compaction and potential waterlogging will also be undertaken. On the other hand, all of the weedy species or exotic grassy species within the openings of the erosion control mat should be removed within the pit planting area prior the planting work.

Turf Collection

- 3.3.8 Only hand tools such as shovels should be deployed to dig-up variable sized sections of

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mostly native grasses and some other native plant sods as far as practicable; and any dead, dying and old flowering stalk should be removed with the remaining foliage reduced by half to lower the transpiration loss and water stress of the turves/sods. All of the native plants dig up during the planting of whips in the donor site should be properly handled to retain and preserve the root mass (fibrous roots for monocots or root plate for dicots) as much as possible.

- 3.3.9 Site preparation of the donor site and the logistic arrangement, such as access route and planting pits of the whip trees should be marked prior the commencement of the planting/transplanting work; and all of the collected turves/sod should be properly shaded to minimize desiccation stress, and directly transplanted to the GRA for planting on the same day of whip planting. Plant establishment aids such as water retention crystals should also be applied to each transplant at planting to assist with plant survival and establishment. The transplants should be watered-in initially and on subsequent occasions, depending on prevailing soil moisture conditions and weather condition, not less than a daily basis for at least 30 days after transplanting.

3.4 PLANTING SCHEDULE

- 3.4.1 By making reference to the Guiding Principles on Use of Native Plant Species in Public Works Projects published by Greening, Landscape and Tree Management Section of Development Bureau, the Master Landscape Plan of the Project, as well as the commercial availability of the potential target species (i.e., the plant species recorded in the unaffected upland grassland nearby), a planting schedule recommended for the enrichment planting in the toe wall planters and pit planters are shown in the **Table 3.1** and **Table 3.2** below.

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Table 3.1 Recommended Planting Schedule for Enrichment Planting in Toe Wall Planter

Species	Chinese Name	Spacing/mm	Size	Percentage Mix (%)	Remarks
Tree					
<i>Phyllanthus emblica</i>	餘甘子	1500	Whip tree	40	To be randomly planted in the toe wall planter, and no more than 4 trees of the same species to be planted consecutively
<i>Bridelia tomentosa</i>	土蜜樹			30	
<i>Celtis sinensis</i>	朴樹			30	
Shrub					
<i>Rhodomyrtus tomentosa</i>	桃金娘	1000	200 x 200	40	Shrubs to be planted in a group of 3 nos. to 5 nos. of the same species.
<i>Melastoma sanguineum</i>	毛萼	1000	350 x 350	30	
<i>Rhaphiolepis indica</i>	石斑木	1000	350 x 350	30	
Herbaceous Ground Cover					
<i>Dicranopteris pedata</i>	芒萁	400	150x200	30	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken
Turf of grass	n/a	400	≥ 100 x 100	70	

Table 3.2 Recommended Planting Schedule for Enrichment Planting in Planting Pit

Species	Chinese Name	Spacing/mm	Size/mm	Percentage Mix (%)	Remarks
Shrub					
<i>Rhodomyrtus tomentosa</i>	桃金娘	n/a	200 x 200	50	1 no. of shrub, 1 no. of climber and one herb per planting pit
<i>Melastoma sanguineum</i>	毛萼	n/a	350 x 350	50	
Climber					
<i>Bauhinia glauca</i>	粉葉羊蹄甲	n/a	100 long	n/a	
<i>Lonicera jappnica</i>	忍冬	n/a	100 long	n/a	
Herb					
<i>Dicranopteris pedata</i>	芒萁	n/a	150x200	100	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken

3.4.2 Whip size refers to the plant size with total height above soil level exceed 900mm but not exceed 2000mm. The quality of whips should fulfill the requirement stipulated in the relevant P.S. All of the whips should be planted randomly at 1.5 m spacing, and no more than 4 trees of the same species to be planted consecutively. Planting of shrubs and herbaceous ground cover should be in cluster of 3 nos. to 5 nos. of the same species wherever applicable and site condition allowed.

3.4.3 **Appendix G** presents the planting arrangement at different part of the GRA as proposed above.

3.5 REINSTATEMENT PROGRAM

3.5.1 The reinstatement work will be commenced in 2023, and tentatively the selective vegetation clearance will be completed before the onset of growing season, i.e., March 2023, and the turves transplanting and enrichment planting work will be completed in the early growing season, i.e. April 2023. The implementation of the GRP will be audited by the qualified ecologist of the Environmental Team at least once a week and/or during each stage of the re-instatement work to ensure the works is conformed to the approved GRP. The tentative program is presented in Table below:

Table 3.3 Tentative Program for the Reinstatement Work at the Grassland Reinstatement Area

Reinstatement task/ Monitoring	Year 1			
	Jan	Feb	Mar	Apr
Site Preparation at GRA	√	√		
Site Preparation at donor site	√	√		
Enrichment Planting at GRA			√	√
Transplanting of turves from donor site to GRA			√	√

3.6 MAINTENANCE MANAGEMENT

3.6.1 After the planting works are completed and accepted by the Project Manager, the Main Contractor would thereafter responsible for a minimum of 3-year post-planting maintenance period. Should the establishment of the reinstated grassland areas by end of Year 3 is less satisfactory (including poor vegetation coverage (less than 50%) of the reinstated grassland areas, and undesirable, weedy plant species (referred as weeds) cover more than 30% of the reinstated grassland areas, the duration of the maintenance may be adjusted subject to the situation and advice provided by the qualified ecologist of the Environmental Team.

3.6.2 Horticultural maintenance and inspection of the GRA generally follows those specified in the relevant P.S., including but not limited to watering, weeding, fertilizing, as well as pest control, etc.. A maintenance program should be included in the method statement to be submitted for the planting work; and the program should also be reviewed on an annual basis during the 3 years post-planting maintenance period.

3.6.3 After the three-year post-planting maintenance period, the GRA should be handed over to the FEHD/ArshSD for future maintenance should the overall vegetation coverage and undesirable plant species of the GRA more than 50% and less than 30% respectively. Thereafter the further development of the GRA would subject to the natural process, and any vegetation management or horticultural maintenance of the GRA would be on a passive and on an as needed basis.

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4. ECOLOGICAL MONITORING

4.1 MONITORING REQUIREMENTS

- 4.1.1 In order to gauge the success and review the progress of the grassland reinstatement, post-planting monitoring on the establishment of the GRA should be undertaken by a qualified ecologist of the Environmental Team for a minimum of 3-year period. The monitoring of the GRA aims to examine the regeneration of the grassy and herbaceous species from the imported grassland topsoil/turves, as well as the establishment and natural colonisation of the planted or self-seeded within the GRA. Should the establishment of the reinstated grassland areas by the end of Year 3 is less satisfactory as described in S. 3.5.1 above, the duration of the monitoring would be adjusted subject to the situation and advice provided by the qualified ecologist of the Environmental Team.
- 4.1.2 The ecological monitoring will be undertaken qualitatively by means of walk-through survey to cover all representative areas of the GRA, as well as quantitatively by 6 number of 2 m x 5m quadrats on the toe wall planter and 6 number of 5m x 5m on the sloped area where enrichment planting has been undertaken.
- 4.1.3 The Qualitative monitoring should be undertaken by direct observation along several fixed transects within the GRA, and during which the general status of the species regeneration or recruitment, phenology of the target plant species (such as budding, sprouting or flowering), as well as presence of weedy plants or pest and human/animal disturbance will be inspected and recorded. The total vegetation coverage of the toe wall planter and sloped area of the GRA will be estimated for individual slope and as a whole for the GRA respectively.
- 4.1.4 For quantitatively monitoring, plant species within each quadrat, including all vegetation type such as grass, fern, climber, herb, shrub and tree, will be identified and counted wherever feasible or have their percentage coverage estimated, and their health condition will also be noted. Furthermore, total aerial coverage by each vegetation type and overall exposed area within the quadrats will also be estimated in percentage.
- 4.1.5 Since the planting works for grassland reinstatement would subject to the planting space make available during the selective clearance work, as well as partially the species and quantity to be transplanted from the donor site, a baseline monitoring with the aim to collect a baseline reference within the planting area for the future comparison and evaluation of the reinstated grassland will be undertaken after the completion of the planting work. All of the monitoring parameter for qualitative and quantitative monitoring will be collected during the baseline monitoring.
- 4.1.6 The location of the quadrats and transects will be determined in accordance with the areas in which planting has been undertaken, and proposed by the qualified ecologist of the Environmental Team for the agreement of AFCD after the completion of the planting work, and a week before the commencement of monitoring.

Table 4.1 Monitoring of vegetation establishment for Upland Grassland Reinstatement Scheme

Event	Year 1			Year 2				Year 3				Year 4
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Baseline Monitoring	√ (#)											
Quantitative			√		√		√		√		√	

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Event	Year 1			Year 2				Year 3				Year 4
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
monitoring												
Walk-through monitoring	M	M	M	M	Q	Q	Q	Q	Q	Q	Q	Q

Notes:

“√” – the reinstatement task or monitoring will be conducted once in the selected quarter;

“M” – the monitoring will be conducted on a monthly basis in the selected quarter;

“Q” – the monitoring will be conducted on a quarterly basis in the selected quarter.

“#” – the baseline monitoring will be conducted after the completion of planting works.

4.2 CONTINGENCY AND EVENT ACTION PLAN

4.2.1 Given that the re-instatement is largely depend on the natural regeneration and colonization process, the recommendation of any remedial actions will take into account the health condition of the target plant species recorded within the quadrats, the observations made during the qualitative monitoring, as well as the possible cause of poor progress to be identified/postulated by the Ecologist. Potential remedial actions include strengthen the horticultural maintenance of the GRA, improve the site-keeping or condition of the planting area, or undertake replanting with or without species substitution. Any remedial actions for any poor performance of the reinstatement work will be promptly undertaken by the Main Contractor after approval sought from AFCD.

4.2.2 The recommended Trigger and Action Levels for the monitoring and the Action Plan of the GRA are shown in Table 4.2 below.

Table 4.2 Trigger and Action Levels for Monitoring and Action Plan

Parameters	Trigger and Action Level	Action Plan
Qualitative monitoring – total percentage vegetation cover of individual slope	Trigger Level: when compared with previous monitoring event, >20% reduction in the total percentage vegetation cover of an individual slope; <i>OR</i> reduction of the total percentage vegetation cover recorded in two successive monitoring events on an individual slope of GRA	The Ecologist should inform Contractor, identify the causes(s) and advise Contractor the necessity of any remedial actions, and if needed seek AFCD’s approval.

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Parameters	Trigger and Action Level	Action Plan
	Action Level: when compared with previous monitoring event, >30% reduction in the total percentage vegetation cover of an individual slope; <i>OR</i> reduction of the total percentage vegetation cover recorded in three successive monitoring events on an individual slope	The Ecologist should inform Contractor and Project Manager immediately, identify the cause(s) and recommend remedial actions for the acceptance of the AFCD/Project Manager. The Contractor should implement the approved remedial actions after approval. The monitoring frequency should also be doubled.
Quantitative monitoring -Vegetation Coverage within the quadrats (to be in effect after the first year of reinstatement work)	Trigger Level: the area of vegetation cover less than 30% of the size of the quadrats	The Ecologist should inform Contractor, identify the causes(s) and advise Contractor the necessity of any remedial actions.
	Action Level: the area of vegetation cover less than 45% of the size of the quadrats	The Ecologist should inform Contractor and Project Manager immediately, identify the cause(s) and recommend remedial actions for the acceptance of the AFCD/Project Manager. The Contractor should implement the approved remedial actions after approval. The monitoring frequency should also be doubled.
Quantitative monitoring -Total number and abundance of weedy species	Trigger Level: the total percentage cover of all weedy species is more than 20 % of the total percentage cover of the target plant species	The Ecologist should inform Contractor, identify the causes(s) and advise Contractor the necessity of any remedial actions.

**Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery
Grassland Reinstatement Plan**

AUES

Parameters	Trigger and Action Level	Action Plan
	Action Level: the total percentage cover of all weedy species is more than 30 % of the total percentage cover of the target plant species	The Ecologist should inform Contractor and Project Manager immediately, identify the cause(s) and recommend remedial actions for the acceptance of the AFCD/Project Manager. The Contractor should implement the approved remedial actions after approval. The monitoring frequency should also be doubled.

4.3 MONITORING PROGRAM AND REPORTING

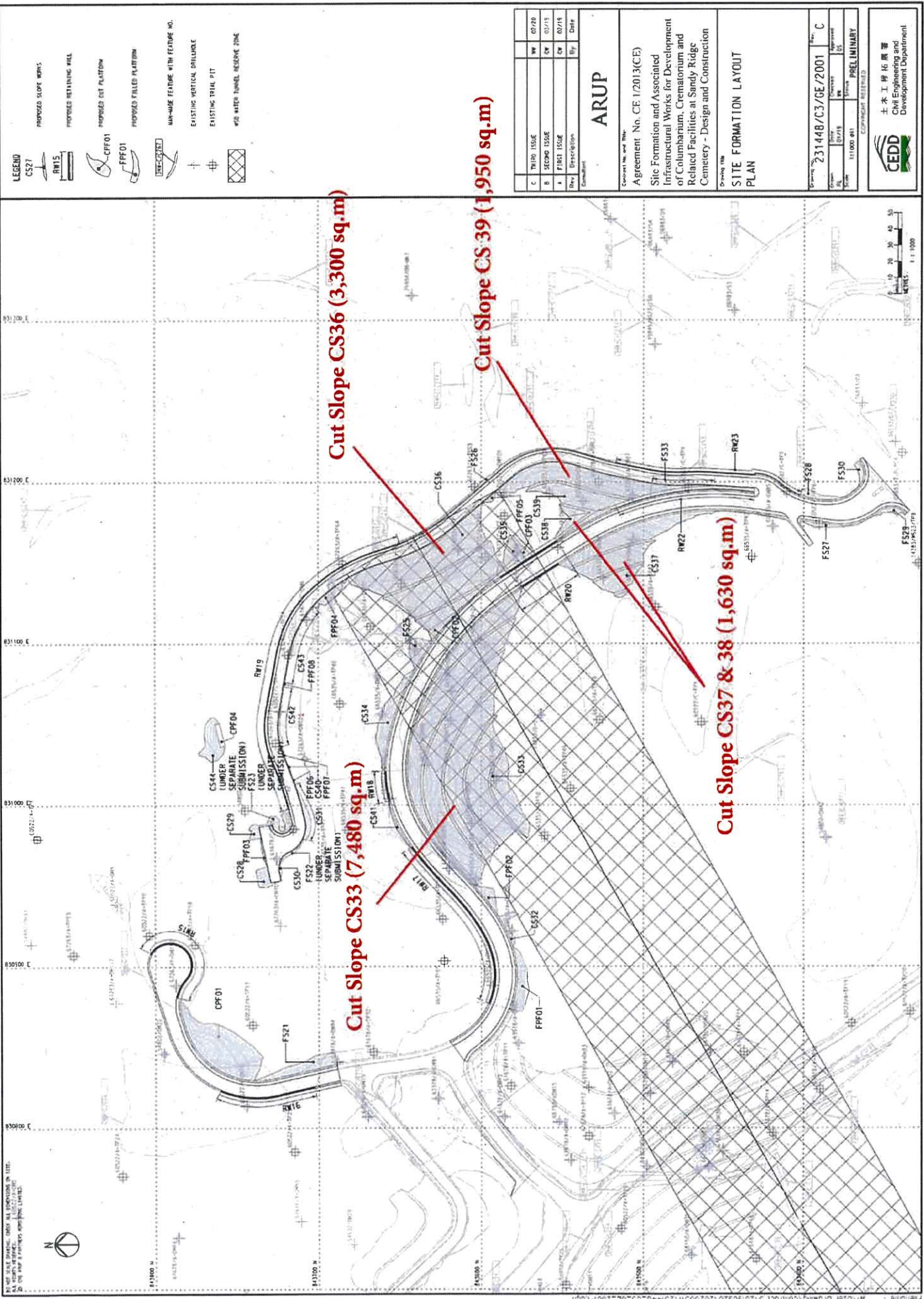
- 4.3.1 It is recommended that a baseline monitoring (both of the qualitative and quantitative monitoring) to be undertaken within the GRA prior the commencement of the enrichment planting work as such to provide a reference for the future evaluation of the development and establishment of the GRA.
- 4.3.2 On the other hand, in order to ensure any adaptive or proactive management measurement to be implemented on a timely manner (such as the need to eradicate invasive vegetation), the qualitative monitoring should be conducted on a monthly basis for a 12-months period after the completion of the enrichment planting work; thereafter the monitoring would be reduced to a quarterly basis unless the event and action plan as presented in next section triggered during the course of the monitoring program. Quantitative Monitoring, on the other hand, should be carried out on a 6-months basis after the completion of the planting work.
- 4.3.3 The monitoring findings and advice on any adaptive/ proactive site management measure will be reported in a regular Ecological Monitoring Report of the Grassland Reinstatement Area, which is to be reviewed by the Environmental Team Leader and submitted to the IEC and relevant government department(s) (e.g.EPD/ AFCD) within 10 working days from the end of the reporting month.
- 4.3.4 The monitoring report will include at least but not be limited to the following:
- Project Background
 - Monitoring Requirements
 - Monitoring Results
 - Analysis and interpretation of the Monitoring Results, with particular focus on the establishment status of the grassland habitat, i.e., total vegetation cover (%) of the GRA and the regeneration/colonization of target plant species.

****End****

Appendix A

**Original Location of the Grassland Reinstatement Area
under the Contract 3 of the Project**

PLEASE SCALE DRAWING ACCORDING TO ALL DIMENSIONS IN TITLE BLOCK. THIS DRAWING IS THE PROPERTY OF CEDD. IT IS TO BE USED ONLY FOR THE PROJECT SPECIFICALLY MENTIONED IN THE TITLE BLOCK. ANY REUSE OR MODIFICATION OF THIS DRAWING WITHOUT THE WRITTEN PERMISSION OF CEDD IS STRICTLY PROHIBITED.



LEGEND

CS27	PROPOSED SLOPE WORKS
RW15	PROPOSED RETAINING WALL
PPF01	PROPOSED CUT PLATFORM
PPF01	PROPOSED FILLED PLATFORM
REC-CR20	MAN-HOLE FEATURE WITH FEATURE NO.
+	EXISTING VERTICAL DRILLHOLE
⊕	EXISTING TIAL PIT
⊗	FOR WATER TUNNEL RESERVE ZONE

C	THIRD ISSUE	By	02/20
B	SECOND ISSUE	By	02/15
A	FIRST ISSUE	By	02/15
Title Description		By	Date
Consultant			

ARUP

Contract No. and Title
 Agreement No. CE 1/2013(CE)
 Site Formation and Associated
 Infrastructural Works for Development
 of Columbarium, Crematorium and
 Related Facilities at Sandy Ridge
 Cemetery - Design and Construction

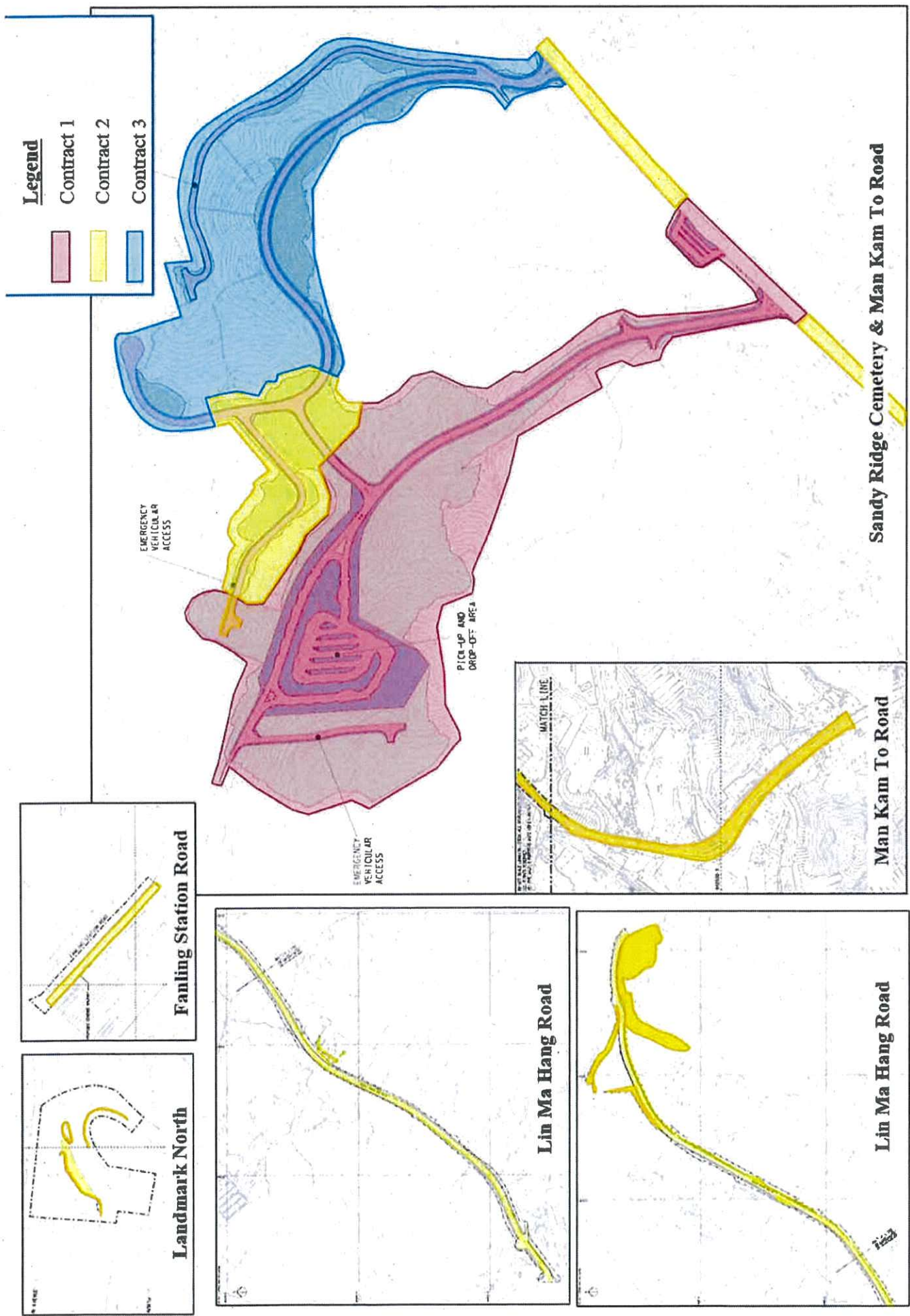
Drawing No.
**SITE FORMATION LAYOUT
 PLAN**

Project No.	231448/C3/CE/2001	Rev.	C
Issue No.	03	Issue Date	02/20
Issue Description	PRELIMINARY	By	
Scale	1:1000 (SI)	Checked By	
CONTRACT REFERRED			

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 Civil Engineering and
 Development Department

Printed by : 9/7/2020
 Filename : M:\User\Bromley\Contract\3\2019\9230\20200311\3144-C3-CE-2001-1.dwg

Appendix B
Demarcation of Construction Contracts



Legend

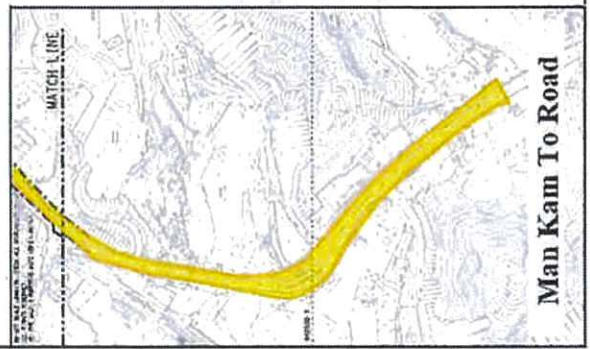
- Contract 1
- Contract 2
- Contract 3

Sandy Ridge Cemetery & Man Kam To Road

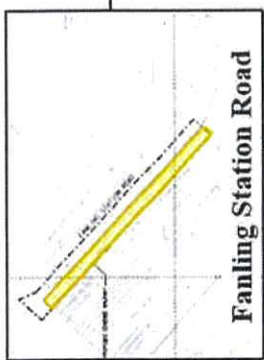
EMERGENCY VEHICULAR ACCESS

PICK-UP AND DROP-OFF AREA

EMERGENCY VEHICULAR ACCESS



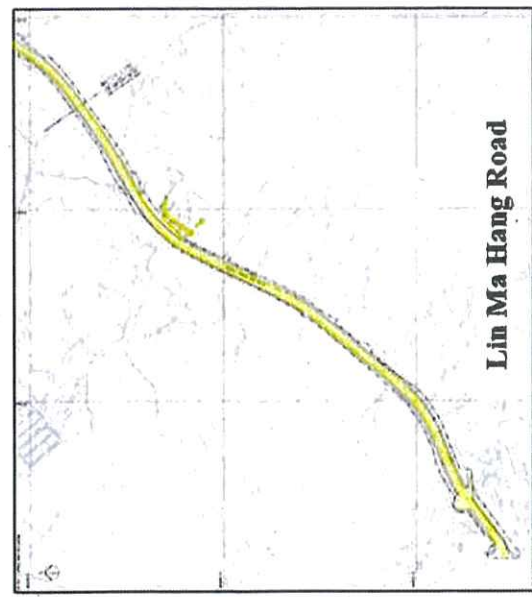
Man Kam To Road



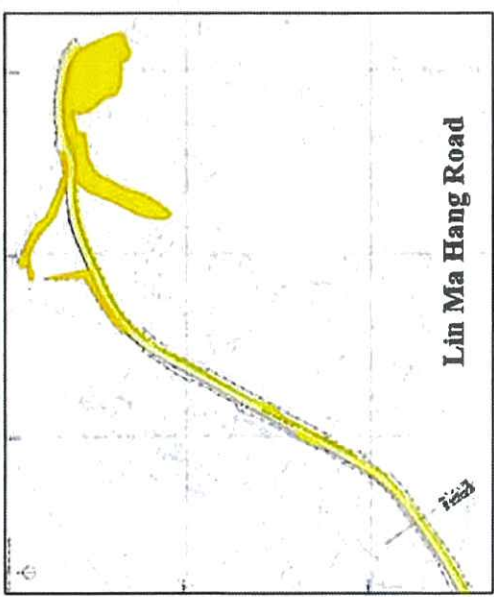
Fanling Station Road



Landmark North



Lin Ma Hang Road

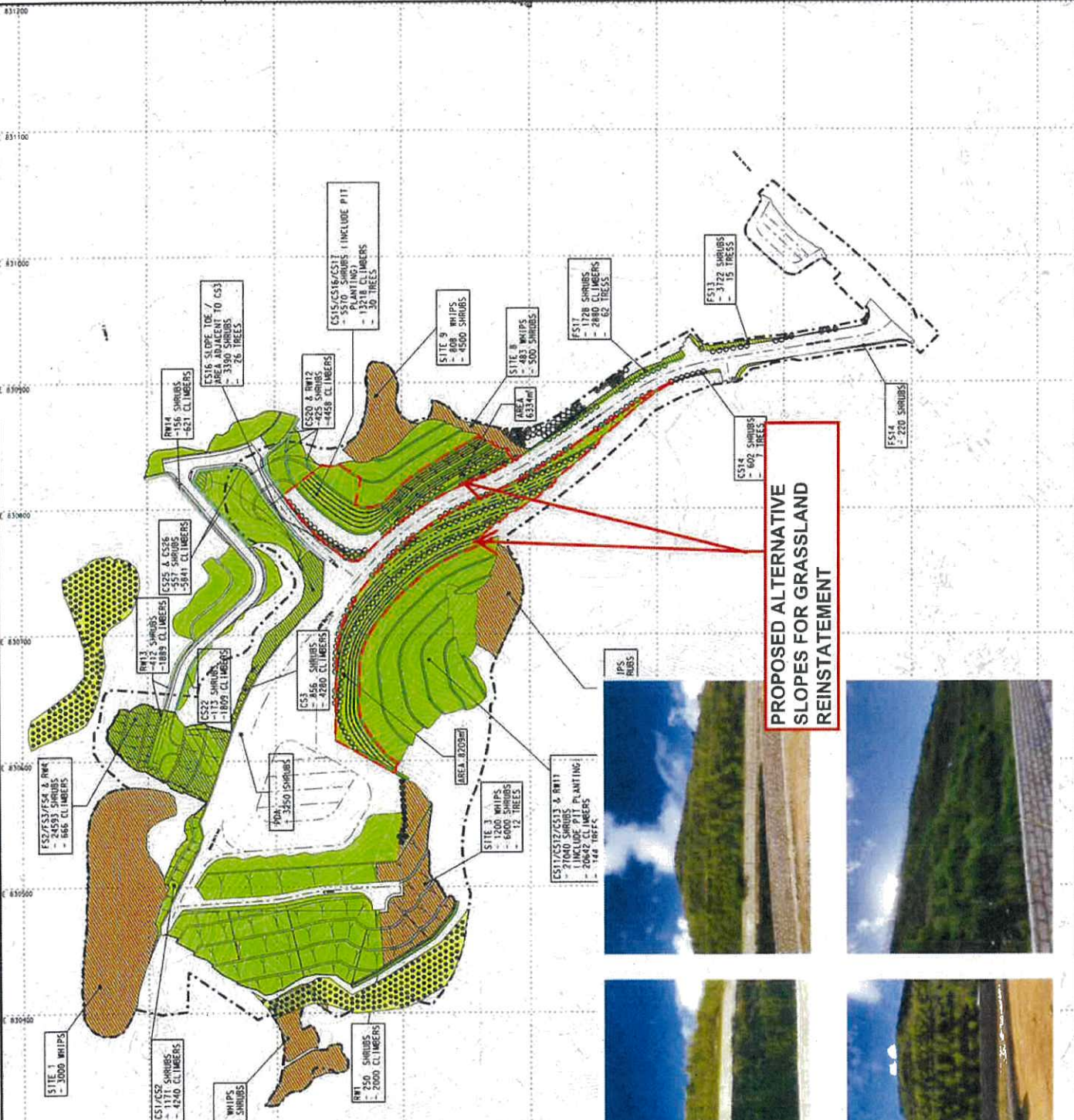


Lin Ma Hang Road

Appendix C

Alternative Location of the Grassland Reinstatement Area under Contract 1 and Contract 2 of the Project

PRINTED DATE: 15/8/2022
 DRAWN BY: W-MONKHY
 CHECKED BY: W-MONKHY
 PROJECT NO: 15/8/2022-07



Rev.	Description	By	Date

ARUP

Contract No. CV/2016/10
 Site Formation and Associated
 Infrastructural Works for
 Development of Columbarium at
 Sandy Ridge Cemetery

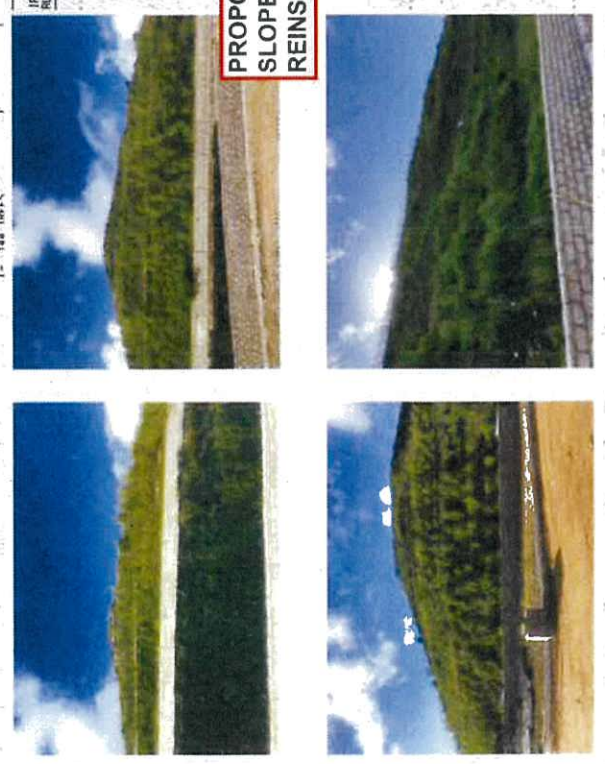
Drawing title
**MASTER PLAN OF
 LANDSCAPE WORKS**

Scale	1:1000 (A1)
Author	W-MONKHY
Checker	W-MONKHY
Drawn	W-MONKHY
Project No.	15/8/2022-07

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土木工程师康蒙
 Civil Engineering and
 Development Department

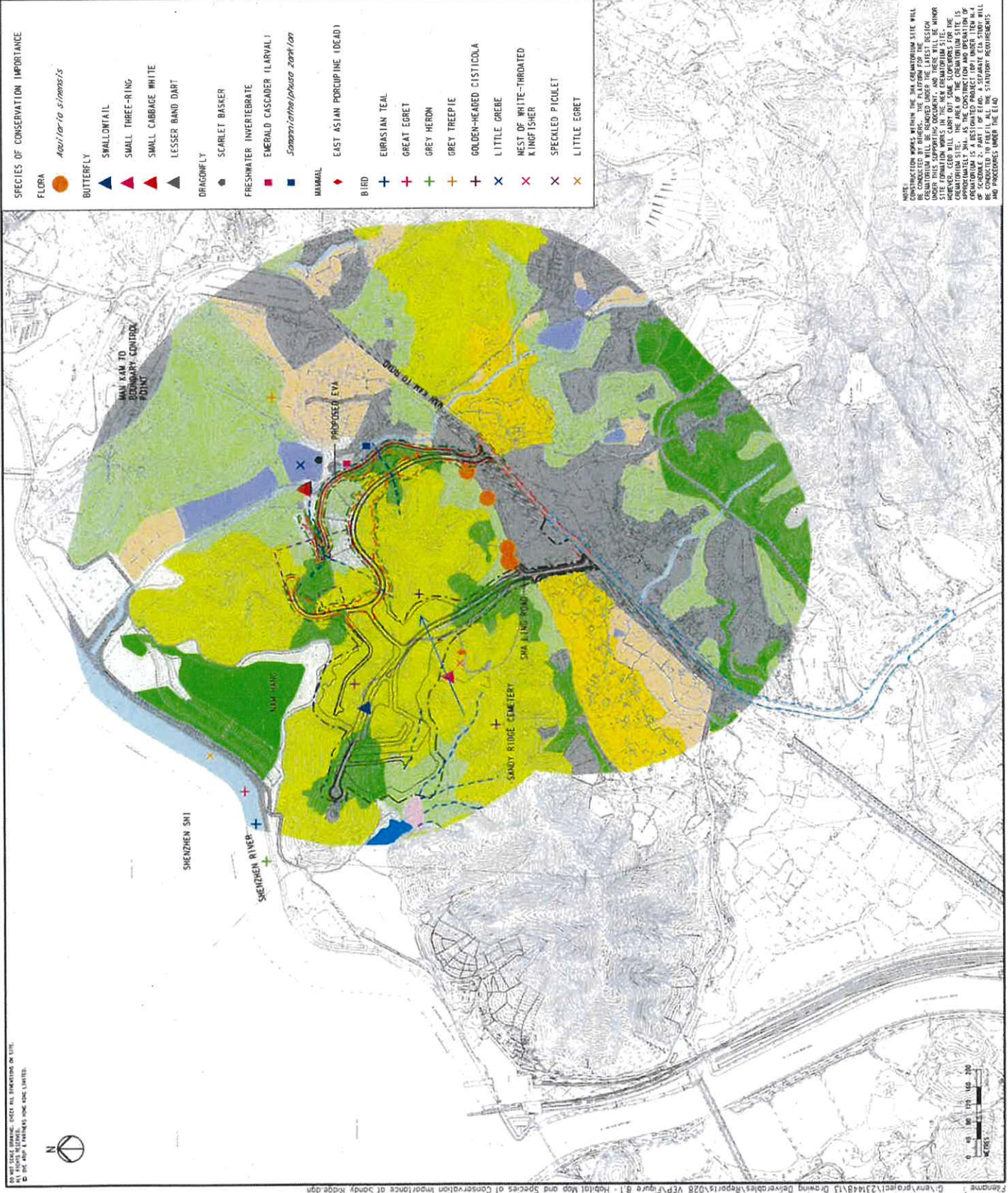


PROPOSED ALTERNATIVE SLOPES FOR GRASSLAND REINSTATEMENT

Appendix D

**Habitat Map showing the Distribution of Upland Grassland within
and in the proximity of the Project Site**

FOR THE STUDY, THE CLIENT HAS PROVIDED ALL INFORMATION ON THE SITE. THE CLIENT HAS ADVISED THAT THE INFORMATION PROVIDED IS TRUE AND CORRECT TO THE BEST OF HIS KNOWLEDGE AND BELIEF. THE CLIENT HAS ADVISED THAT THE INFORMATION PROVIDED IS TRUE AND CORRECT TO THE BEST OF HIS KNOWLEDGE AND BELIEF.



- SPECIES OF CONSERVATION IMPORTANCE**
- FLORA**
- *Azadirachta indica*
- BUTTERFLY**
- ▲ SWALLOWTAIL
 - ▲ SMALL THREE-RING
 - ▲ SMALL CABBAGE WHITE
 - ▲ LESSER BAND DART
- DRAGONFLY**
- SCARLET BASKER
- FRESHWATER INVERTEBRATE**
- EMERALD CASCAIDER (LARVAL)
 - *Semanniopsis/pleuro zork/lan*
- MAMMAL**
- ◆ EAST ASIAN PORCUPINE (DEAD)
- BIRD**
- + EURASIAN TEAL
 - + GREAT EGRET
 - + GREY HERON
 - + GREY TREEPIE
 - + GOLDEN-HEADED CISTICOLA
 - × LITTLE GREBE
 - × NEST OF WHITE-THROATED KINGFISHER
 - × SPECKLED PICULET
 - × LITTLE EGRET

- LEGEND**
- PROJECT BOUNDARY ACCORDING TO APPROVED EIA REPORT (AEIAR-198/2016)
 - CONSTRUCTION UTILITIES ACCORDING TO APPROVED EIA REPORT (AEIAR-198/2016)
 - PROJECT BOUNDARY IN THIS STUDY
 - PROPOSED AMENDMENTS IN THIS STUDY
 - 500m ASSESSMENT AREA
 - LAYOUT ACCORDING APPROVED EIA REPORT (AEIAR-198/2016)
 - PROJECT BOUNDARY FOR CREMATORIUM AND RELATED FACILITIES (BY OTHERS)
 - HABITAT MAP
 - WATERCOURSE
 - SEASONAL WATERCOURSE
 - POND
 - DEVELOPED AREA
 - AGRICULTURAL LAND
 - WASH
 - WASTELAND
 - GRASSLAND
 - UPLAND GRASSLAND
 - PLANTATION
 - WOODLAND
 - NET WOODLAND
 - VILLAGE AREA

Revised	By	Date

ARUP

Company No. and File
 Agreement No. CE 1/2013(CE)
 Site Formation and Associated
 Infrastructural Works for Development
 of Columbarium, Crematorium and
 Related Facilities at Sandy Ridge
 Cemetery - Design and Construction

Drawing No.
**HABITAT MAP AND SPECIES
 OF CONSERVATION IMPORTANCE
 AT SANDY RIDGE**

Drawn	Checked	Approved

FIGURE B.1

Scale: 1:5000

DATE: 15/08/2018

PROJECT: PRELIMINARY

NOTE: CONSTRUCTION WORKS WITHIN THE SHIA CONSERVATION SITE WILL BE CONDUCTED BY OTHERS. THE PLATFORM FOR THE CREMATORIUM WILL BE CONDUCTED UNDER THE LATEST DESIGN. HOWEVER, CEDD WILL CARRY OUT SOME CHECKS FOR THE SHIA CONSERVATION WORKS IN THE SHIA CONSERVATION SITE. CEDD WILL CARRY OUT SOME CHECKS FOR THE SHIA CONSERVATION WORKS IN THE SHIA CONSERVATION SITE. APPROXIMATELY 50% OF THE CONSTRUCTION AND OPERATION OF CREMATORIUM IS A DESIGNATED PROJECT (DP) UNDER ITEM 4.4 OF THE SHIA CONSERVATION AGREEMENT. ALL CONSTRUCTION AND OPERATIONS WILL BE CONDUCTED TO FULFIL ALL THE STATUTORY REQUIREMENTS AND PROCEDURES UNDER THE EIA/D.

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 Civil Engineering and
 Development Department

Appendix E

Results of the Baseline Grassland Survey

Site Formation and Associated Infrastructural Works for
Development of Columbarium, Crematorium and Related
Facilities at Sandy Ridge Cemetery



Grassland Reinstatement Plan

Form	Species Name	Native	Relative Abundance
Tree	<i>Acacia confusa</i>	N	1
Tree	<i>Acronychia pedunculata</i>	N	1
Tree	<i>Alangium chinense</i>	N	1
Tree	<i>Aporosa dioica</i>	N	1
Tree	<i>Bombax ceiba</i>	E	1
Tree	<i>Bridelia tomentosa</i>	N	1
Tree	<i>Casuarina equisetifolia</i>	E	1
Tree	<i>Celtis sinensis</i>	N	1
Tree	<i>Cratogeomys cochinchinense</i>	N	2
Tree	<i>Ficus hirta</i>	N	1
Tree	<i>Ficus hispida</i>	N	2
Tree	<i>Glochidion lanceolarium</i>	N	1
Tree	<i>Leucaena leucocephala</i>	E	1
Tree	<i>Litsea cubeba</i>	N	2
Tree	<i>Litsea glutinosa</i>	N	1
Tree	<i>Macaranga tanarius var. tomentosa</i>	N	1
Tree	<i>Mallotus paniculatus</i>	N	1
Tree	<i>Phyllanthus emblica</i>	N	1
Tree	<i>Rhus hypoleuca</i>	N	1
Tree	<i>Rhus succedanea</i>	N	1
Tree	<i>Trema tomentosa</i>	N	2
Tree	<i>Zanthoxylum avicennae</i>	N	1
Shrub	<i>Baeckea frutescens</i>	N	3
Shrub	<i>Breynia fruticosa</i>	N	2
Shrub	<i>Clerodendrum fortunatum</i>	N	2
Shrub	<i>Croton crassifolius</i>	N	1
Shrub	<i>Ficus variolosa</i>	N	2
Shrub	<i>Helicteres angustifolia</i>	N	3
Shrub	<i>Ilex asprella</i>	N	1
Shrub	<i>Lantana camara</i>	N	1
Shrub	<i>Litsea rotundifolia var. oblongifolia</i>	N	2
Shrub	<i>Melastoma dodecandrum</i>	N	2
Shrub	<i>Melastoma malabathricum</i>	N	2
Shrub	<i>Phyllanthus cochinchinensis</i>	N	1
Shrub	<i>Rhaphiolepis indica</i>	N	2
Shrub	<i>Rhodomyrtus tomentosa</i>	N	3
Shrub	<i>Tadehagi triquetrum</i>	N	1
Shrub	<i>Wikstroemia nutans</i>	N	1
Herb	<i>Adiantum flabellulatum</i>	N	2
Herb	<i>Aeschynomene indica</i>	N	1
Herb	<i>Ageratum conyzoides</i>	E	2
Herb	<i>Arundinella setosa</i>	N	3
Herb	<i>Bidens pilosa</i>	N	3
Herb	<i>Blechnum orientale</i>	N	1
Herb	<i>Bothriochloa ischaemum</i>	N	2
Herb	<i>Cenchrus echinatus</i>	E	1
Herb	<i>Chloris barbata</i>	N	1
Herb	<i>Coryza canadensis</i>	E	2
Herb	<i>Cymbopogon sp.</i>	N	3
Herb	<i>Cynodon dactylon</i>	N	2
Herb	<i>Desmodium gangeticum</i>	N	1
Herb	<i>Desmodium heterocarpon</i>	N	2
Herb	<i>Dianella ensifolia</i>	N	3
Herb	<i>Dicranopteris pedata</i>	N	4

Form	Species Name	Native	Relative Abundance
Herb	<i>Dicranopteris pedata</i>	N	4
Herb	<i>Digitaria ciliaris</i>	N	2
Herb	<i>Echinochloa crusgalli</i>	N	1
Herb	<i>Eclipta prostrata</i>	N	1
Herb	<i>Emilia sonchifolia</i>	N	1
Herb	<i>Eragrostis atrovirens</i>	N	2
Herb	<i>Eragrostis pilosa</i>	N	2
Herb	<i>Eragrostis unioides</i>	N	2
Herb	<i>Eremochloa ciliaris</i>	N	2
Herb	<i>Eulalia sp.</i>	N	2
Herb	<i>Gahnia tristis</i>	N	1
Herb	<i>Hedyotis auricularia</i>	N	1
Herb	<i>Hedyotis hedyotideae</i>	N	1
Herb	<i>Heteropogon contortus</i>	N	2
Herb	<i>Hypoxis aurea</i>	N	1
Herb	<i>Imperata cylindrica var. major</i>	N	2
Herb	<i>Inula cappa</i>	N	2
Herb	<i>Ischaemum barbatum</i>	N	3
Herb	<i>Ischaemum ciliare</i>	N	3
Herb	<i>Melinis repens</i>	E	1
Herb	<i>Microstegium ciliatum</i>	N	3
Herb	<i>Mimosa indica</i>	E	1
Herb	<i>Miscanthus sinensis</i>	N	2
Herb	<i>Neyraudia reynaudiana</i>	N	2
Herb	<i>Osbeckia chinensis</i>	N	1
Herb	<i>Palhinhaea cernua</i>	N	1
Herb	<i>Panicum maximum</i>	N	2
Herb	<i>Paspalum conjugatum</i>	N	2
Herb	<i>Pennisetum alopecuroides</i>	N	2
Herb	<i>Rhynchospora rubra</i>	N	2
Herb	<i>Setaria geniculata</i>	N	1
Herb	<i>Sporobolus fertilis</i>	N	1
Herb	<i>Urena lobata</i>	N	1
Herb	<i>Vernonia cinerea</i>	N	1
Climber/Creeper	<i>Alysicarpus vaginalis</i>	N	1
Climber/Creeper	<i>Cassytha filiformis</i>	N	3
Climber/Creeper	<i>Centella asiatica</i>	N	1
Climber/Creeper	<i>Cuscuta chinensis</i>	N	3
Climber/Creeper	<i>Embelia laeta</i>	N	3
Climber/Creeper	<i>Ipomoea cairica</i>	N	1
Climber/Creeper	<i>Lygodium flexuosum</i>	N	2
Climber/Creeper	<i>Lygodium japonicum</i>	N	2
Climber/Creeper	<i>Merremia hederacea</i>	N	1
Climber/Creeper	<i>Mikania micrantha</i>	E	1
Climber/Creeper	<i>Paederia scandens</i>	N	2
Climber/Creeper	<i>Polygonum chinense</i>	N	1
Climber/Creeper	<i>Pueraria lobata</i>	N	1
Climber/Creeper	<i>Rourea minor</i>	N	1
Climber/Creeper	<i>Rubus reflexus</i>	N	2
Climber/Creeper	<i>Smilax china</i>	N	3
Climber/Creeper	<i>Smilax glabra</i>	N	3
Climber/Creeper	<i>Strophanthus divaricatus</i>	N	1
Climber/Creeper	<i>Wedelia trilobata</i>	E	1
Climber/Creeper	<i>Zanthoxylum nitidum</i>	N	2

Appendix F

Proposed Donor Site Locations

Appendix G

Proposed Planting Arrangement of the Grassland Reinstatement Area

SCALE: 1:500
 DATE: 11/15/2022
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

KEY PLAN

LEGEND:

- WOODLAND PLANTING
- ADDITIONAL TREE PLANTING
- HYDRANGEAS
- SHRUBS AND CLIMBERS ON PLANTER WALLS
- WHIPS, SHRUBS AND CLIMBERS
- PIT PLANTING (SHRUBS AND CLIMBERS)
- HEAVY STANDARD TREE
- LIGHT STANDARD TREE

ARUP

Contract No. CV2016/10
 Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery

Drawing Title: **MASTER PLAN OF LANDSCAPE WORKS**

Revision Table:

Rev.	Description	By	Date

Client: CEDD (Civil Engineering and Development Department)



Recommended Planting Schedule for Enrichment Planting in The Wall Planter

Species	Chinese Name	Spacing/mm	Size	Percentage Mix (%)	Remarks
<i>Phytolacca emblica</i>	酸漿	Whip tree	1500	40	To be randomly planted in the toe wall planter, and no more than 4 trees of the same species to be planted consecutively.
<i>Buddleia tonsoniana</i>	紫藤	1500	1000	30	Shrubs to be planted in a group of 3 nos. to 5 nos. of the same species.
<i>Celtis sinensis</i>	木荷	1500	1000	30	Shrubs to be planted in a group of 3 nos. to 5 nos. of the same species.
<i>Rhodomyrtus tomentosa</i>	山欖	1000	200 x 200	40	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken
<i>Melastoma sanguinum</i>	山欖	1000	350 x 350	30	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken
<i>Rhopaphysalis indica</i>	山欖	1000	350 x 350	30	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken
Herbaceous Ground Cover	草	400	150x200	30	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken
<i>Dieracopteris pedata</i>	蕨	n/a	≥ 100 x 100	70	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken
Turf of grass	n/a	400	100	70	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken

Recommended Planting Schedule for Enrichment Planting in Planting Pit

Species	Chinese Name	Spacing/mm	Size/mm	Percentage Mix (%)	Remarks
<i>Rhodomyrtus tomentosa</i>	山欖	n/a	200 x 200	50	1 no. of shrub, 1 no. of climber and one herb per planting pit
<i>Melastoma sanguinum</i>	山欖	n/a	350 x 350	50	1 no. of shrub, 1 no. of climber and one herb per planting pit
<i>Bambusa glauca</i>	竹	n/a	100 long	n/a	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken
<i>Lonicera japonica</i>	忍冬	n/a	100 long	n/a	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken
Herb	草	n/a	150x200	100	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken
<i>Dieracopteris pedata</i>	蕨	n/a	n/a	100	To be transplanted from the upland grassland within the Project Area where whip/shrub planting to be undertaken