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Representation in respect of The Draft Fanling/Sheung Shui Extension Area OZP No. S/FSSE/1

June 2023

Chinese Swamp Cypress

Global Status IUCN 2020

Chinese Swamp Cypress *Glyptostrobus pensilis* was formerly very widespread in China, Viet Nam and possibly Lao PDR. In China and Viet Nam most of the natural plants have been killed due to expanding agriculture.

Although the total number of trees is more than 250, very few, if any are producing viable seed and the majority of trees in Viet Nam are in decline. The species is therefore listed as Critically Endangered.

Given current trends this species could well become Critically Endangered (Possibly Extinct in the Wild) in the near future.

Chinese Swamp Cypress

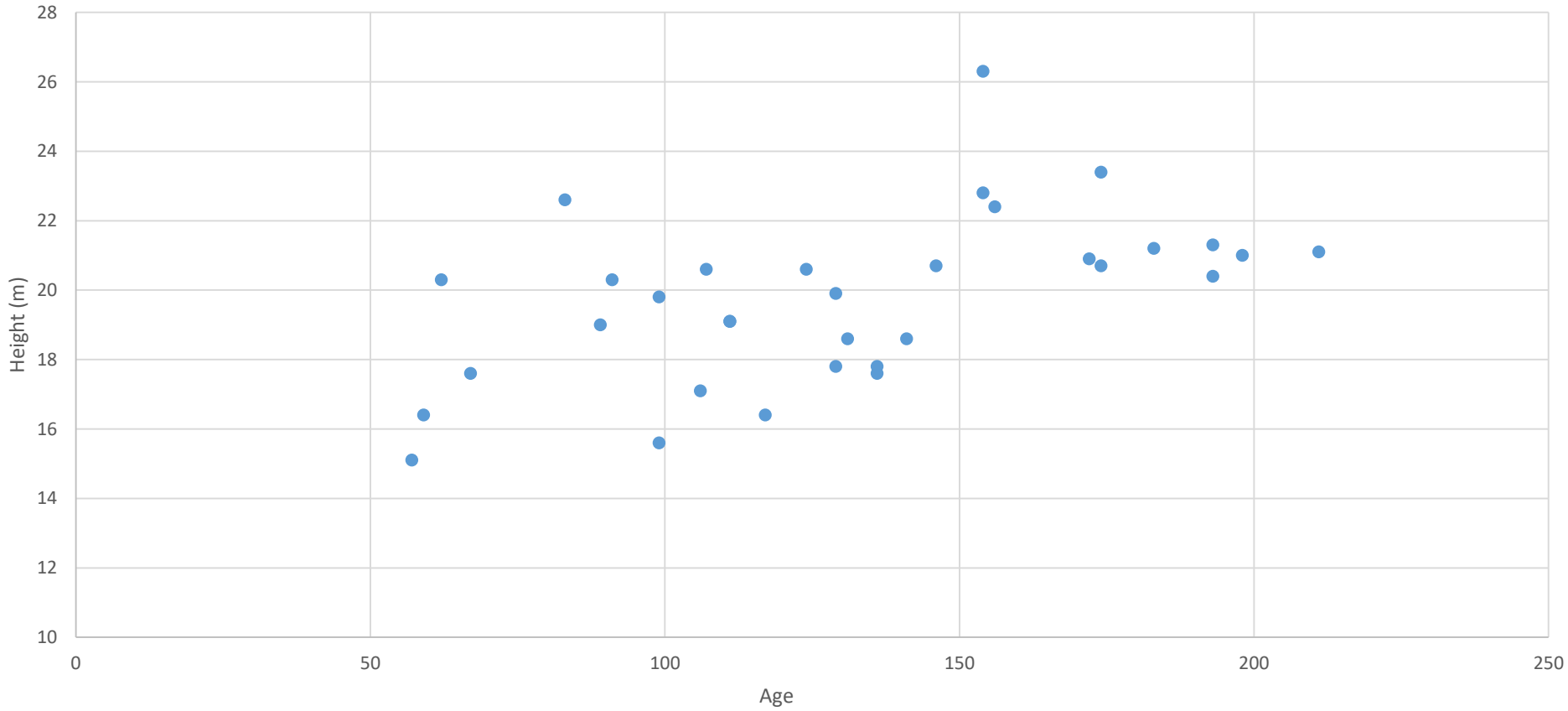
The Swampy Woodland

- Includes 38 mature Chinese Swamp Cypress and up to 50 seedlings have been recorded

Age (years)	No of individuals
50-100	9
100-150	17
150-200	10
>200	2

- **Oldest individuals are 201 and 214 years old**
- Tallest individuals > 26 m
- Reference in the literature to planted Swamp Cypress at Fanling Golf Course refers to a group of trees at Beas River, which was part of the Golf Course until the late 1980s.

Chinese Swamp Cypress



Chinese Swamp Cypress

Two key references overlooked by the EIA:

Thomas, P., Yang, Y., Farjon, A., Nguyen, D. & Liao, W. 2020. *Glyptostrobus pensilis* (amended version of 2011 assessment). The IUCN Red List of Threatened Species 2020.

Zhang, J-L. and Fischer, G.A., 2021. "Reconsideration of the native range of the Chinese Swamp Cypress (*Glyptostrobus pensilis*) based on new insights from historic, remnant and planted populations". Global Ecology and Conservation. Volume 32, December 2021.

Zhang and Fischer work(ed) at Kadoorie Farm and Botanic Garden

Chinese Swamp Cypress

Thomas *et al.* 2020

"Red List Category & Criteria: **Critically Endangered** C2a(i)

Justification: *Glyptostrobus pensilis* was formerly very widespread in China, Viet Nam and possibly Lao PDR. In China and Viet Nam most of the natural plants have been killed due to expanding agriculture.

Although the total number of trees is more than 250, very few have been known to produce viable seed or to reproduce vegetatively.

Within the context of the IUCN definitions, the number of mature individuals is less than 250.

Chinese Swamp Cypress

Thomas *et al.* 2020

Current Population Trend: **Decreasing**

Threats In China and Viet Nam habitat loss due to intensive agriculture has been the main cause of decline. **The subpopulations in Viet Nam are within coffee plantations, the water table has been altered and the trees are no longer producing fertile seed.**

Chinese Swamp Cypress

Zhang & Fischer 2021:

Tree species, which exclusively grow in flat lowland areas, for example, in a swampy habitat, are the **ones facing the most serious human disturbance caused by the conversion of natural habitat to agricultural land and urban development**.

We argue that, therefore, the species should be considered native in a wider area than previously anticipated… should include the modelled areas in Mainland China, **Hong Kong SAR** and Macao SAR, as well as Hainan Island, Vietnam, Laos, Cambodia, Burma and Northeast India.

Chinese Swamp Cypress

Zhang & Fischer 2021

For example, recently a population of **Chinese Swamp Cypress trees was discovered at the Hong Kong SAR Golf Club** in a small patch of forest squeezed in between the main road and a fairway. Within a 2.1 ha area **38 large reproducing Chinese Swamp Cypress trees and numerous seedlings grow together** with ~120 other native plant species, including other rare and restricted species such as *Ardisia villosa*.

Chinese Swamp Cypress

Summary of the ecology of Swamp Cypress based on these two references:

Chinese Swamp Cypress is a species of tree that likes well-lit, flat, seasonally or permanently flooded habitats. Young trees are shade tolerant. It is entirely reliant on such inundated habitats and is uniquely adapted in that it will develop pneumatophores (modified, above-ground roots that grow vertically upwards and which assist the root system in obtaining oxygen for respiration)

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Chinese Swamp Cypress

Averyanov *et al.* 2009 (referenced by Thomas *et al.* 2020) referenced both the **reduction** in ground water levels (due to extraction of water from wells to irrigate crops such as coffee plantations) and **increases** in ground water levels (through dam construction for the construction of a water storage pond) as detrimental to the survival or health of the species.

Highlighting the potential for **serious or irreversible damage** to the Swamp Cypress at FGC should there be any changes to the ground water levels there.

Chinese Swamp Cypress

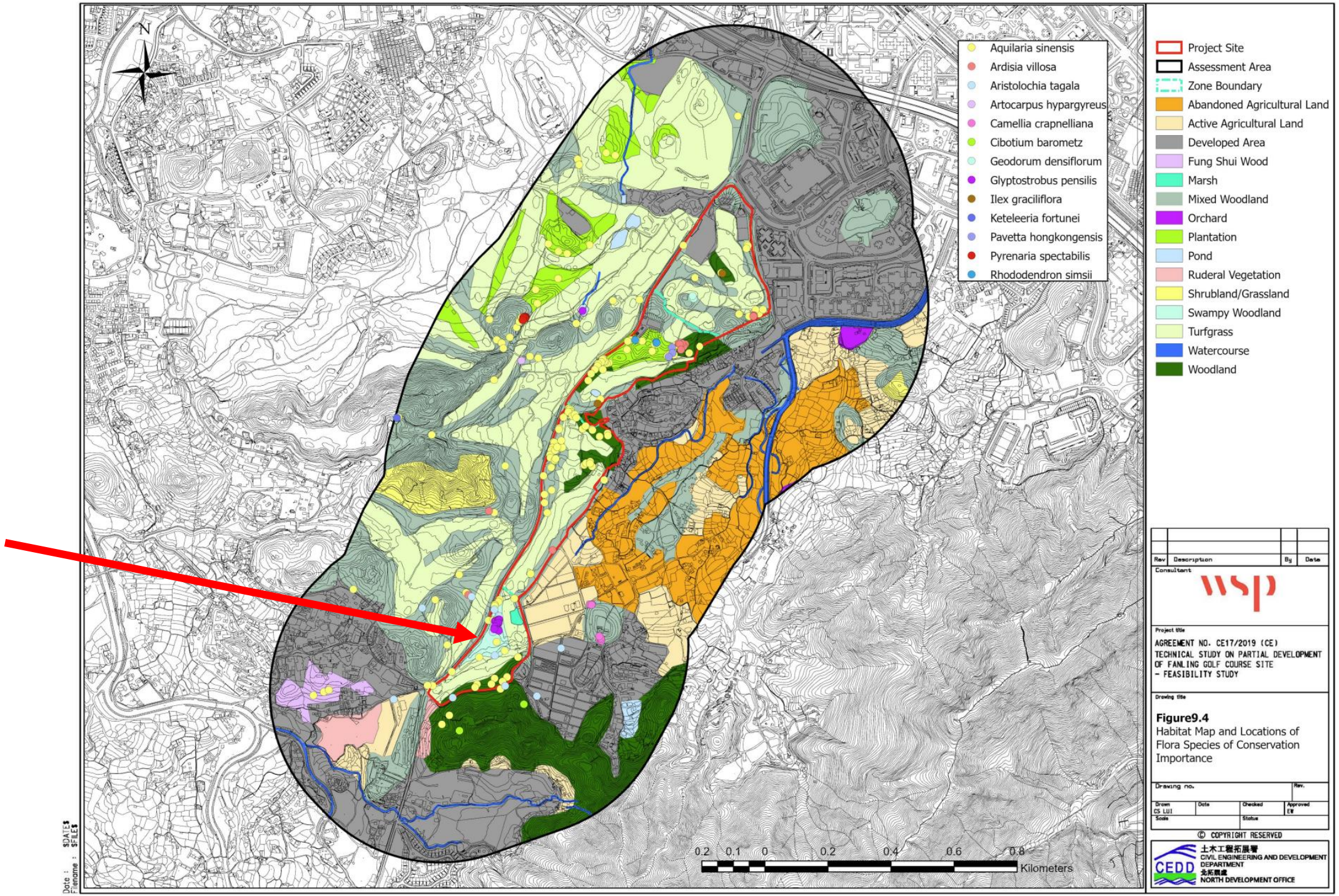
The Fanling Golf Course Swamp Cypress stand

- **Comprises > 15% of the WORLD POPULATION OF THE SPECIES**
- Possibly the only population that is producing viable seed

The EIA recorded '*about 30*' individuals (although less than 20 are actually mapped) and **seedlings were not recorded**.

EIA treats as exotic

Glyptostrobus pensilis	水松	Tree	Exotic	Very rare	IUCN Red List of Threatened Species (2020): Critically Endangered [2] China Plant Red Data Book (Recorded, No status indicated) [5] State Protection (Category I) [9]	


N
Aquilaria sinensis
Ardisia villosa
Aristolochia tagala
Artocarpus hypargyreus
Camellia crapnelliana
Cibotium barometz
Geodorum densiflorum
Glyptostrobus pensilis
Ilex graciliflora
Keteleeria fortunei
Pavetta hongkongensis
Pyrenaria spectabilis
Rhododendron simsii
Project Site
Assessment Area
Zone Boundary
Abandoned Agricultural Land
Active Agricultural Land
Developed Area
Fung Shui Wood
Marsh
Mixed Woodland
Orchard
Plantation
Pond
Ruderal Vegetation
Shrubland/Grassland
Swampy Woodland
Turfgrass
Watercourse
Woodland
0.2 0.1 0 0.2 0.4 0.6 0.8
Kilometers
Rev Description By Date
Consultant
wsp
Project title
AGREEMENT NO. CE17/2019 (CE)
TECHNICAL STUDY ON PARTIAL DEVELOPMENT OF FANLING GOLF COURSE SITE
- FEASIBILITY STUDY
Drawing title
Figure9.4
Habitat Map and Locations of Flora Species of Conservation Importance
Drawing no.
Rev.
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NORTH DEVELOPMENT OFFICE
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12FEET
3.5m


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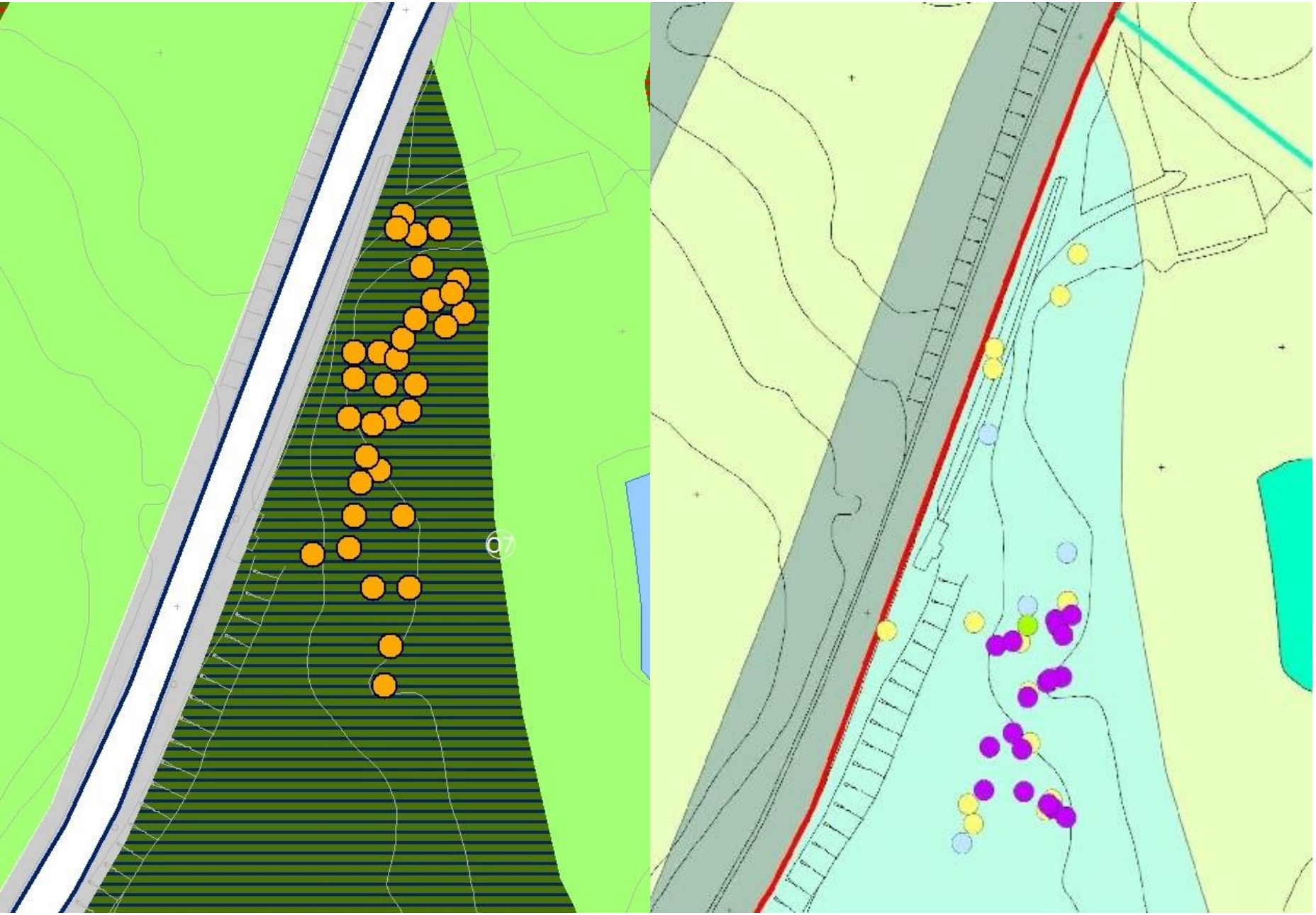


- Left: Chinese Swamp Cypress as mapped in 2020 (CY Jim *et al.* 2020)
- Right: c.18 individuals as per Fig 9.4d of the EIA (purple dots)

Chinese Swamp Cypress

The Swamp Cypress has a unique ecology which makes it particularly sensitive to hydrological change.

As this unique ecology has not been discussed in the EIA Report, this sensitivity is not recognised.

No seedlings recorded in the EIA results in this additional sensitivity being overlooked

Table 9.16 Evaluation of Swampy Woodland

Nursery/breeding Ground – **‘*No significant record*’**

Chinese Swamp Cypress

Potential impacts to the Swamp Cypress include:

- **silty run-off** (either directly to the Swampy Woodland or to the drainage points of the Swampy Woodland catchment), and
- hydrological impacts arising from the run-off differences between turfgrass and the proposed compensation woodland and **changes to the water table as the woodland matures**.

SB requires that direct and indirect impacts such as to hydrology be identified and quantified using suitable methodologies. **No methodology is presented in the EIA for the assessment of hydrological impacts to Swamp Cypress**

Chinese Swamp Cypress

Annex 16 to the TM:

§4.4.3(a)(viii) specifies that **more weight** shall be given to those adverse environmental impacts that occur in areas or regions that are **ecologically fragile** and/or rare or undisturbed or which have **little resilience to imposed stresses**.

Furthermore, 2(viii) of the SB requires ‘evaluate ecological impacts based on the **best and latest information available** during the course of the EIA Study.’; this has patently not been undertaken with regards to Swamp Cypress.

Chinese Swamp Cypress

Regarding hydrological disruption to the Swamp Cypress in §9.7.2.25 of the EIA Report:

"Besides, large scale of planting works might potentially affect the hydrology for sensitive habitats i.e., marsh and swampy woodland in Sub-Area 4, **it is recommended the location for woodland compensation and compensatory planting should avoid Sub-Area 4 to preserve the hydrology that supports the wetland habitats**. Hydrological disruption is not expected if woodland compensation planting works are conducted in Sub-Areas 2 and 3, which contain large area of open area (turfgrass) with gentle topography and sufficient sunlight."

This statement fails to address:

- Any hydrological connectivity between Sub-Area 4 and 2 and 3 (it assumes these are different hydrological units)
- That the compensatory tree planting is less than **150m from the Swampy Woodland (close enough to risk significant impacts)**
- That the Swampy Woodland "*was generally wet in nature probably due to its lower elevation in the topography*" (9.5.1.15 in the EIA)

Chinese Swamp Cypress

Professor Jiu Jimmy Jiao (HKU) Hydrology Study 2023

The groundwater flow model is used to simulate the water level changes in East FGC before and after the construction of buildings in Sub-Area 1 and the compensatory tree planting in Sub-Areas 2-3. The model predictions indicate that the construction of buildings in Sub-Area 1 would result in a slightly increase in water levels in the upstream of Sub-Area 1.

However, compensatory tree planting in Sub-Areas 2 and 3 can lead to about 0.7m decrease of water level in Sub-Areas 2-4, which may influence the hydrological environment for the living of Chinese Swamp Cypress.

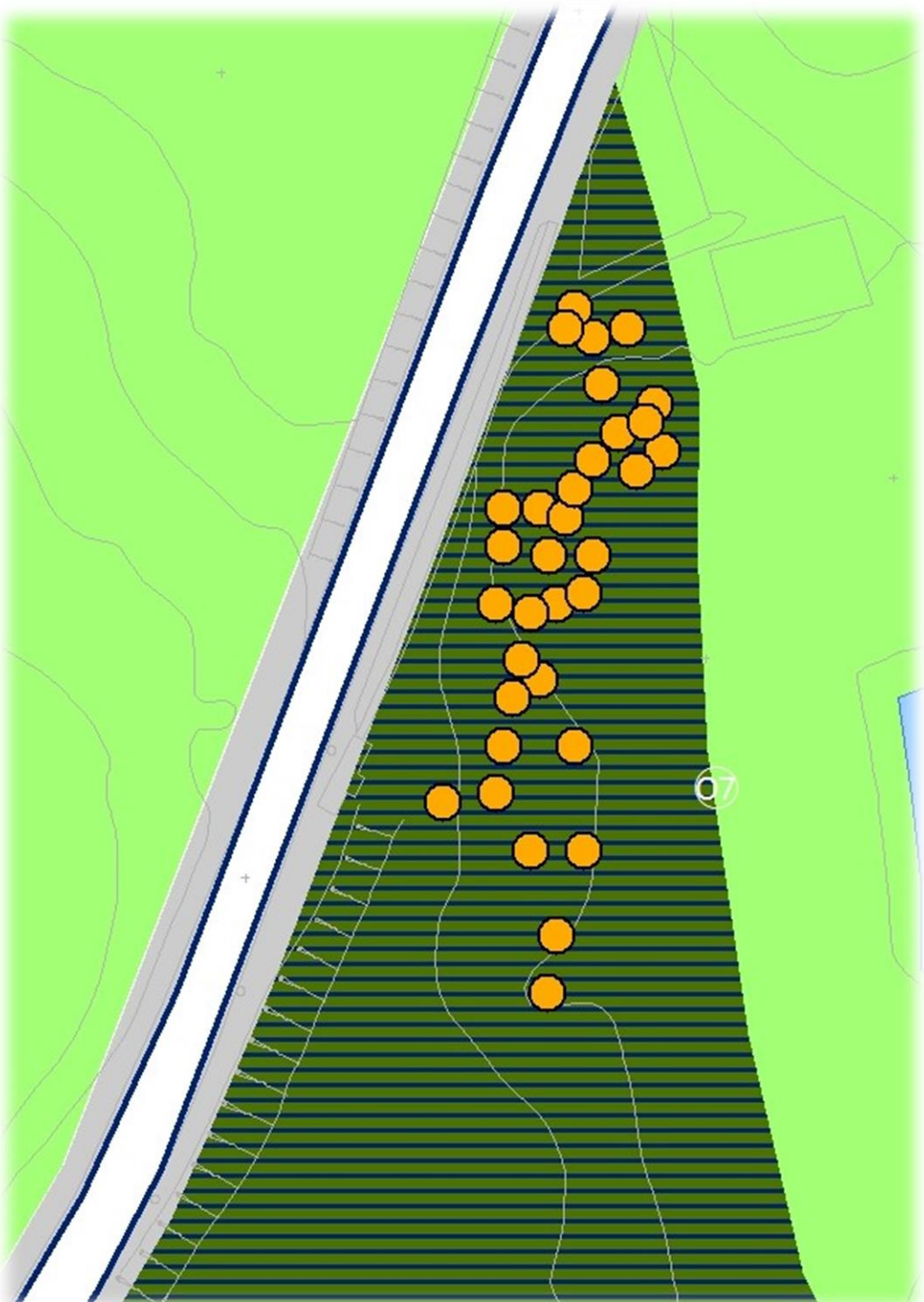
Chinese Swamp Cypress

Assessment of cumulative impacts

Cumulative Impacts are detailed in Table 9.25 of the EIA Report. This references the HYD project ‘Road Improvement Works at Fan Kam Road’; for Potential Cumulative Impacts (Construction Phase) that

‘*The road improvement works are over 1km from Sub-Area 1, cumulative impacts to ecology are not expected*’.

However, cumulative impacts should be considered to the EIA Project Area as a whole, especially given the **Fan Kam Road runs directly adjacent to the Swampy Woodland**.



- Closest Swamp Cypress less than 5m to Fan Kam Road
- Proposed to widen and add footpaths on both sides

Chinese Swamp Cypress

Application of the **precautionary principal** to the Swamp Cypress at Fanling has been proposed in scientific literature, Zhang & Fischer 2021:

‘Indeed, some of these trees no matter whether they were planted or not could well be the descendants of historical natural populations and probably play a very important role in conserving the genetic diversity of this species and therefore **deserve a high level of protection under a precautionary conservation principle until proven otherwise**. For example, **recently a population of Chinese Swamp Cypress trees was discovered at the Hong Kong SAR Golf Club** in a small patch of forest squeezed in between the main road and a fairway…

…within a 2.1 ha area 38 large reproducing Chinese Swamp Cypress trees and numerous seedlings grow together with ~120 other native plant species, including other rare and restricted species such as *Ardisia villosa*. It is important to note that the occurrence of seedlings of Chinese Swamp Cypress trees has rarely been observed even within the 12 km^2 core area of occupancy (Thomas *et al*., 2020), **indicating that this population is potentially a remnant or a successfully rewilded natural population deserving the highest protection status**’

Chinese Swamp Cypress

The precautionary principle

The precautionary principle is an established scientific principles that requires that in the very rare instance where there is even the smallest risk of (or uncertainty as to the risk of) irreversible catastrophic impact (e.g. to a critical endangered species), then nothing should be done.

Although the precautionary principle often gets mentioned, the general approach in Hong Kong is that the precautionary principle should only be applied in the very rare cases where there is a risk of **serious or irreversible damage**.

"*The Precautionary Principle in Biodiversity Conservation and Natural Resource Management: An Issues paper for policy-makers, researchers and practitioners",* Cooney, R., IUCN Policy and Global Change Group, (2004), available at: https://portals.iucn.org/library/sites/library/files/documents/pgc-002.pdf.

Chinese Swamp Cypress

The conclusion of the Ecological Impact Assessment (9.12.1.2 of the EIA) states:

'Besides, **the hydrological disruption due to the proposed development is not expected**, potential **impacts to the swampy woodland are thus not likely**. With the implementation of the proposed management with the aims to protect the important habitats and species of conservation importance in Sub-Areas 2 to 4, the ecological conditions will be conserved and probably enhanced'.

This conclusion is flawed or misleading as follows:

- Whilst it is acknowledged that residual impacts to the Swampy Woodland remain (an unquantified) possibility - if so, then the Precautionary Principal should be applied.
- The proposed management is not described in the EIA.

Summary

- The Fanling Chinese Swamp Cypress stand accounts for >15% of the global population of the species and is possibly the only population that produces viable seeds.
- '*Best and latest information available*' has not been used in the EIA.
- The species is highly susceptible to hydrological change.
- 0.7m decrease of water level in Sub-Areas 2-4 predicted.
- Hydrological impacts have not been properly assessed in the EIA.
- It deserves the highest possible protection and is a rare instance where the precautionary principal should be applied.
- Any action which runs even the slightest risk of changes to the hydrology of the Swampy Woodland should not be permitted.
- Rezoning to 'Undetermined' does not safeguard the management of the site for conservation. LCSD have no track record in managing sites with hydrological/ecological sensitivity.