Public Consultation on Environmental Impact Assessment for Reconstruction of Choa Chu Kang Waterworks

Executive Summary

The reconstruction of Choa Chu Kang Waterworks (CCKWW), to renew and upgrade aged infrastructure, ensures that the plant can continue to provide a sustainable and resilient supply of good and safe drinking water to meet Singapore's needs, amidst climate change and a projected increase in water demand. In enhancing our water infrastructure to safeguard Singapore's water supply resilience, PUB is committed to addressing potential impacts our projects may have on the environment, including taking actions to minimise impacts during construction.

2 Being the only waterworks in western Singapore, it is important that CCKWW remains operational during the proposed reconstruction works. We had initially explored restricting the reconstruction works to within the existing plant footprint. However, there is insufficient space to build new infrastructure while keeping CCKWW running. In selecting the additional 3.2-hectare plot adjacent to CCKWW for the reconstruction works, we had carefully considered factors such as the potential impact to the environment and biodiversity, topography, construction time and cost. The site chosen was assessed to be the most appropriate as it would result in the least environmental impact compared to the other areas surrounding CCKWW.

3 As the CCKWW project will involve the clearance of vegetation and implementation of earthworks for working spaces to facilitate the proposed reconstruction works, PUB engaged a consultant to conduct an Environmental Impact Assessment (EIA) of CCKWW's surrounding areas. Findings from the detailed EIA have helped us to identify and assess the potential environmental impacts and the adequacy of proposed mitigation measures.

4 We consulted the nature groups throughout the study and their comments on scoping the EIA consultancy study and the subsequent EIA report helped us to further plan the necessary steps to minimise or avoid adverse effects on the surrounding areas of CCKWW.

5 The four-week long public consultation exercise on the Environmental Impact Assessment (EIA) for the CCKWW project ended on 1 Aug 2022. In total, PUB received 121 responses. Besides feedback received as part of this exercise, we have also consolidated suggestions and views reported in the media and those emailed directly to us and considered them holistically. We are appreciative of the partnership with nature groups and the feedback from members of the public as we undertake the planning of this project.

6 Generally, respondents acknowledged that ensuring Singapore's water security is important. But they also have concerns over deforestation and the loss of green spaces, as well as the potential impact to biodiversity when coupled with other development projects, such as the Land Transport Authority's Jurong Region Line MRT station in the Western Water Catchment Area. They urged PUB to explore alternative solutions that would not require the clearance of land for CCKWW reconstruction works, or to relocate CCKWW.

7 Respondents also asked PUB to ensure that the proposed mitigation measures are implemented as proposed. There are concerns over potential movement of wildlife towards Nanyang Drive and the Nanyang Technological University campus, as well as the impact to the nearby freshwater stream. In addition, some asked about the survivability of the newly discovered fern, *Helminthostachys zeylanica*, after transplanting.

8 We thank the public for providing feedback and suggestions to enhance mitigation measures proposed in the EIA report. We will be adopting some of these suggestions as outlined below and are fully committed to ensuring all mitigation measures will be carried out properly.

a) Extend the Environmental Management Monitoring Program (EMMP) post-construction, from 3 months to 24 months, to allow for longer-term monitoring of a nearby freshwater stream;

b) Provide regular training for workers on the project including courses on biodiversity to better equip them with skills to manage wildlife encounters and manage potential incidents;

c) Conduct engagement with stakeholders in the vicinity of the construction site, such as NTU Earthlink/residents on the management of potential wildlife displacement to the surrounding built up areas; and

d) Enhance plant salvaging efforts and improve the plants' survival after transplanting. PUB will work closely with National Parks Board (NParks) to translocate the plants to suitable locations and monitor their growth.

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Annex

Response to Feedback on Environmental Impact Assessment for Reconstruction of Choa Chu Kang Waterworks

1. About Choa Chu Kang Waterworks and the proposed reconstruction of the facility

Choa Chu Kang Waterworks (CCKWW) is Singapore's second largest waterworks – currently occupying a land area of approximately 10.5 hectares – and the only one located in western Singapore. The plant was constructed in phases between 1975 and 1981 and its aged infrastructure requires renewal and upgrading works to ensure that it can continue to supply good and safe drinking water to meet Singapore's water needs.

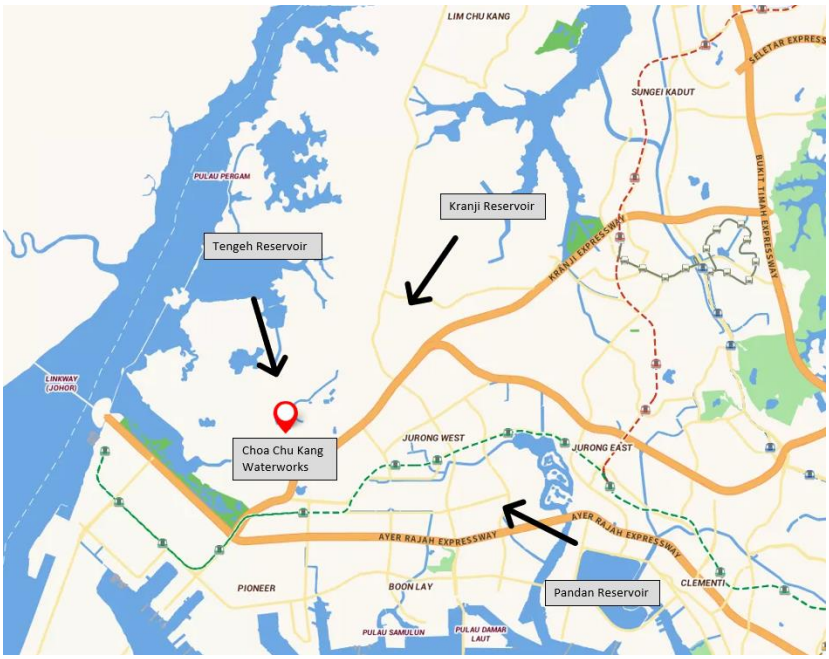

Figure 1: Location of CCKWW and surrounding reservoirs. Arrows indicate direction of water flow from the reservoirs to CCKWW.

CCKWW is situated strategically within Singapore's Western Water Catchment to receive water from Kranji, Pandan and Tengeh reservoirs for treatment. It is a critical water treatment infrastructure as it supplies drinking water to towns in the western part of Singapore such as Jurong East, Jurong West, Tuas, Penjuru,

Boon Lay, West Coast and Nanyang Technological University (NTU). Being the only waterworks in western Singapore, it is thus important that CCKWW remains operational during the proposed reconstruction works. PUB had initially explored restricting the reconstruction works to within the existing plant footprint. However, there is insufficient space to build new infrastructure while also keeping CCKWW running. Therefore, it was assessed that additional land adjacent to CCKWW is required and a 3.2-hectare plot south of the plant, currently zoned as Open Space in the Master plan 2019 (refer to Fig 2) and consisting mainly of abandoned plantation and scrubland-type[1] vegetation, was identified.

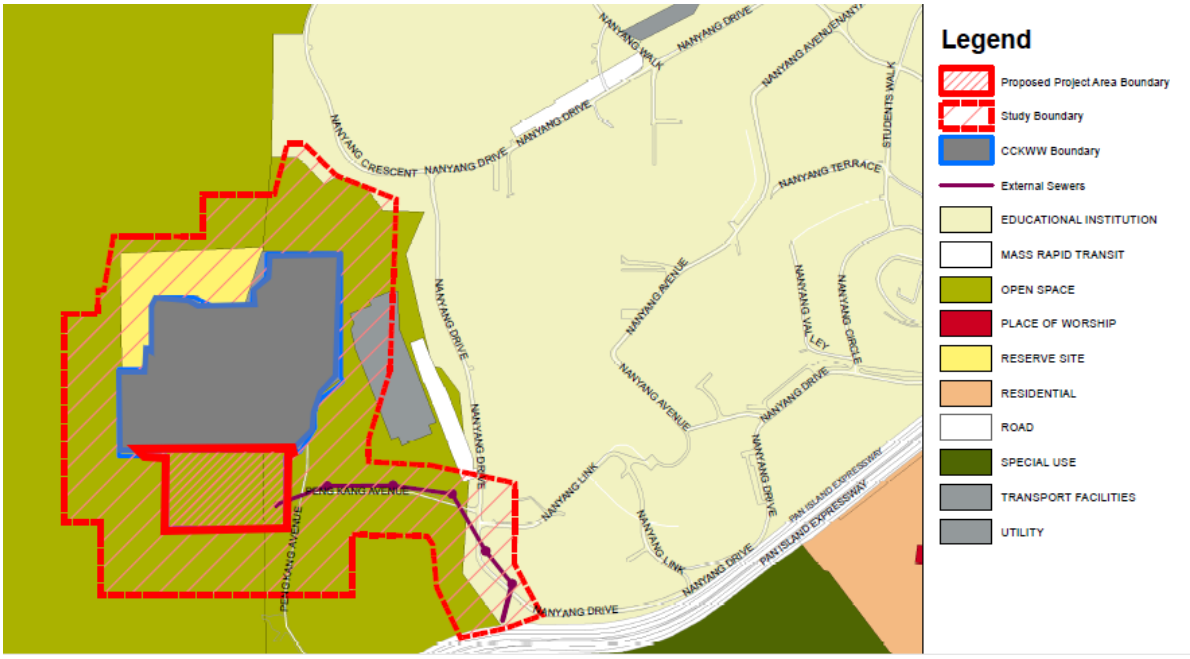

Figure 2: Land use of the study area as per URA Master Plan 2019

In selecting this particular plot, PUB had carefully considered factors such as the potential impact to the environment and biodiversity, topography, construction time and cost. The subject site chosen for the project was assessed to be the most appropriate as it would result in the least environmental impact compared to the other areas surrounding CCKWW. The good soil condition is also suitable for construction works, which would allow us to complete the works in a shorter period of time and thus minimising the disturbance period to flora and fauna.

In 2021, PUB engaged an external environmental consultant to conduct an Environmental Impact Assessment (EIA) for the construction and operational phases of the proposed reconstruction of CCKWW (for more details, please see the full report here; summary of EIA findings may be found in the non-technical summary published earlier here).

The purpose of the EIA is to provide a baseline assessment of the site, identify the sensitive receptors, assess the potential impacts, as well as recommend appropriate mitigation measures to reduce the residual impacts to acceptable levels. PUB is fully committed to implementing these measures to mitigate the project's impact to the environment.

The key findings from the EIA are as follows:

a) The study area consists of Area 1 (within CCKWW), Area 2 (South of CCKWW) near two natural streams (i.e. Stream 2 and Stream 3), and Area 3 with pipejacking works near natural Stream 1. The selected plot is predominantly abandoned plantation and scrubland-type vegetation.

[1] Scrubland refers to exposed areas with very little tree cover, typically dominated by grasses, shrubs, and herbs.

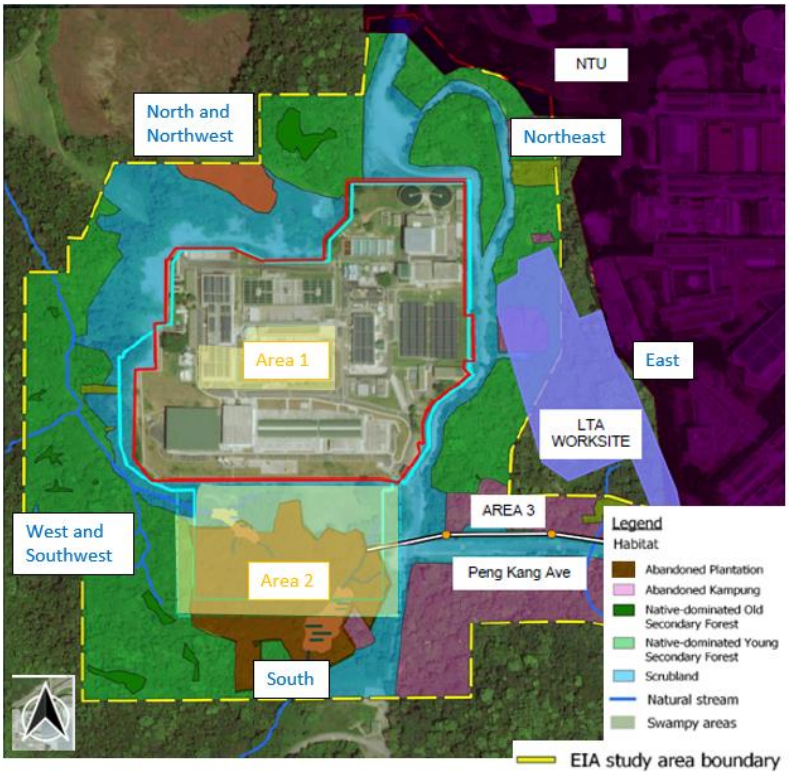

Figure 3: Abandoned Plantation and Scrubland type vegetation in Area 2

b) A total of 307 flora species (including trees, climbers, shrubs) were found. 89 species (29%) are of conservation significance.

c) 191 fauna species were observed within the study area. Overall, 26 species of conservation significance were observed, notably the straw-headed bulbul, sunda pangolin and elf dragonfly.

The reconstruction of CCKWW is planned to commence in 2023 and for completion by 2026.

2. Engagement with Stakeholders

In planning for the construction and upgrading of our water infrastructure, PUB is cognisant of the need to be environmentally sensitive and strives to minimise potential impacts on the environment. As the plot of land identified is located near areas of ecological significance, PUB worked closely with relevant agencies to scope a comprehensive EIA. PUB subsequently sought feedback from nature groups on the EIA findings, which were incorporated in the EIA report.

The EIA concluded that the environmental impacts from the project are expected to range from moderate to high. With mitigation measures implemented, the potential impact can be reduced to minor levels. Taking into consideration the nature groups' feedback, some of the key mitigation measures proposed are as follows:

- Reducing the original project footprint to protect a natural stream of conservation significance;
- Implementing an Earth Control Measures (ECM) plan that includes enhancements beyond the standard requirements, so as to better manage and contain silty run-off generated within the project site. For example, ECM pond storage capacity was designed to be larger to treat a larger volume of silty run-off and minimise impact to the freshwater streams ;
- Implementing lighting management plan to minimise light pollution to the surroundings;
- Conducting wildlife shepherding prior to any land clearance works;
- Erecting noise barriers of 6 metres in height, beyond the standard height requirements of 2.4m, and minimising nightworks;
- Using low-vibration equipment where possible;

- Training of construction personnel to better handle response when encountering wildlife.

PUB has thoroughly considered the suggestions put forth and adopted those that are feasible as additional mitigation measures in the EIA report to safeguard the biodiversity and natural hydrology in the surrounding areas. The EIA report was subsequently published online for public feedback from 4 July 2022 to 1 Aug 2022.

3. Feedback received

In total, we received 121 responses. We are appreciative of the partnership with nature groups as well as the interest and feedback from members of the public. We have reviewed all feedback and carefully considered the suggestions that were submitted.

Many of the feedback pertained to concerns over deforestation and the loss of green spaces, as well as the potential impact to biodiversity in the Western Water Catchment. While it was acknowledged that ensuring Singapore's water security is important, members of the public also urged PUB to explore alternative solutions that would not require the clearance of land for CCKWW reconstruction works, or to relocate CCKWW.

We have also received feedback on ensuring that the proposed mitigation measures are implemented effectively. There were concerns over potential movement of wildlife towards Nanyang Drive and the Nanyang Technological University campus, as well as the impact to the nearby freshwater stream. In addition, some asked about the survivability of the newly discovered fern, *Helminthostachys zeylanica*, after transplanting.

4. Responses to feedback

We have studied the public's suggestions to explore alternative land parcels to relocate CCKWW. Given CCKWW's strategic location to receive water from our western catchment reservoirs and serve the population in Jurong East, Jurong West, Tuas, Penjuru, Boon Lay, West Coast and NTU areas, relocating CCKWW would be a major and significantly more expensive undertaking and it would result in disruptions to the water supply in these areas. Acquiring a plot of land next to the existing plant for the reconstruction is deemed the least disruptive to CCKWW's operations to supply drinking water, as well as the most economically feasible. The use of this site will also present an opportunity to harness the benefits of its lower terrain, which enables water to be conveyed via gravity flow and eliminates the need for additional pumping. In the long run, this would reduce the plant's energy consumption and overall carbon footprint by 0.126 gigawatt hours (GWh) annually – about the equivalent of powering 400 four-room HDB flats.

While PUB was unable to avoid acquiring additional land for the reconstruction, due consideration was taken to reduce the overall reconstruction footprint and ensure minimal land take. After evaluating the EIA findings, we will reduce the original project footprint to preserve a portion of a freshwater stream – which is home to aquatic species of conservation significance – and will also retain a 10-metre-wide strip of vegetation to serve as a buffer between the stream and the construction site.

PUB has noted the feedback from members of the public and will be taking up the following suggestions:

A) Enhancement to the Environmental Management and Monitoring Plan (EMMP)

A comprehensive Environmental Management and Monitoring Plan (EMMP) will be implemented throughout the entire length of the reconstruction project. As part of the EMMP, measures to be taken include shepherding of wildlife and targeted relocation of animals before site clearance, enhanced earth control measures and noise monitoring.

PUB will extend the post-construction monitoring period from 3 months to 24 months to allow for longer-term monitoring of the freshwater Stream 3. PUB and our appointed consultant will closely monitor the construction works and ensure that they are carried out in an environmentally sensitive manner, as well as monitor for any adverse environmental impact to the stream.

B) Wildlife protection training for workers to minimise human-wildlife conflict

There were suggestions to carry out training for the workers of the project to raise awareness of biodiversity and minimise human-wildlife conflict during the construction phase. PUB will work with the EMMP contractor to implement a training regime for all workers. This training would equip the workers with the skills and knowledge to manage wildlife encounters and seek appropriate assistance should an incident occur. PUB also intends to conduct engagement with stakeholders in the vicinity of the construction site, such as residents in NTU, due to the potential displacement of wildlife to the surrounding built up areas.

C) Salvaging and translocation of affected plants with NParks

Plant species of conservation value, as well as other common native species, will be salvaged from the areas to be cleared. For the newly discovered *Helminthostachys zeylanica*, PUB will work closely with NParks to study the growing environment of the fern and translocate it to suitable locations, which will be monitored and managed by the latter to improve their long-term survival chances. Some of the salvaged plant species will be used to reinstate temporary working areas, as well as areas along the edges of the proposed development, after the project is completed. Such planting efforts will contribute to conserving the salvaged species.

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