Summary of Response to Feedback on Environmental Impact Assessment for CRL Phase 2

1. Overview: Approach to Planning and Greenery

With the vision to strengthen the connectivity and resilience of the land transport network in Singapore to support a car-lite nation, LTA has set off with an ambitious journey with one of the key targets being the expansion of the rail network to about 360km by 2030. This means connecting eight in 10 households to within 10 minutes of a train station.

As part of the vision, LTA's eighth MRT line, the Cross Island Line (CRL) will be Singapore's longest fully underground line at more than 50 km long. It will serve existing and future developments in the eastern, western, and north-eastern corridors, connecting major hubs such as Jurong Lake District, Punggol Digital District and Changi Region.

When operational, it will have the highest number of interchange stations, with almost half the stations on the line being linked to existing rail stations. This means more alternative travel routes to reach the desired destination.

As part of the sustainable development of the CRL Phase 2 (CRL2) alignment, LTA has engaged AECOM in 2019 to conduct an Environmental Impact Assessment (EIA), in consultation with Nature Groups and technical agencies, to assess the potential environmental impacts arising from, and associated with, the construction and operation of the CRL2. The process involves a thorough examination of the topography, hydrology, flora and fauna, air, noise, and vibration of the study areas so that a science-based approach can be adopted towards greenery and wildlife management. Any decision to develop green areas were made only after detailed studies of the trade-offs and alternatives, including the assessment of ecological and biodiversity value as well as implementation of mitigation measures to minimise impact to the surrounding biodiversity. Given the physical land constraints in Singapore, such an approach is key in balancing nature conservation and Singapore's transportation needs.

2. Site Context

The CRL2 alignment is approximately 15 kilometres long and comprises six underground stations – Turf City, King Albert Park, Maju, Clementi, West Coast and Jurong Lake District. The CRL2 Environmental Impact Study (see Figure 1) covers:

A) CRL2 Environmental Impact Study – Windsor & Eng Neo Avenue Forest
B) CRL2 Environmental Impact Study – Turf City and Holland Plain
C) CRL2 Environmental Impact Study – Clementi Forest and Maju Forest

Please refer to the full reports here.

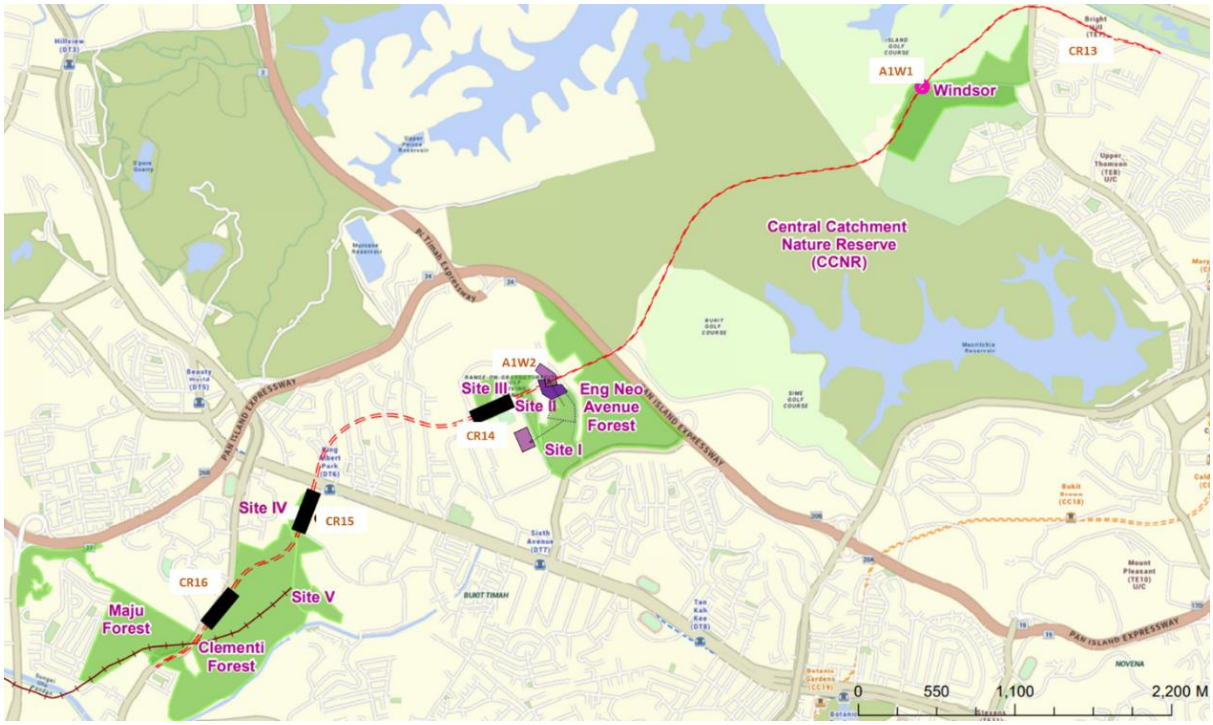

Figure 1: CRL Phase 2 Environmental Study Areas

Based on the Master Plan 2019, the CRL2 alignment passes through a variety of land zoning such as residential, educational, commercial etc. The current land uses or buildings situated within and/or across different URA's land zoning were identified through 2020 Street Directory Map and/or Google Map (See Figure 2, Figure 3, and Figure 4).

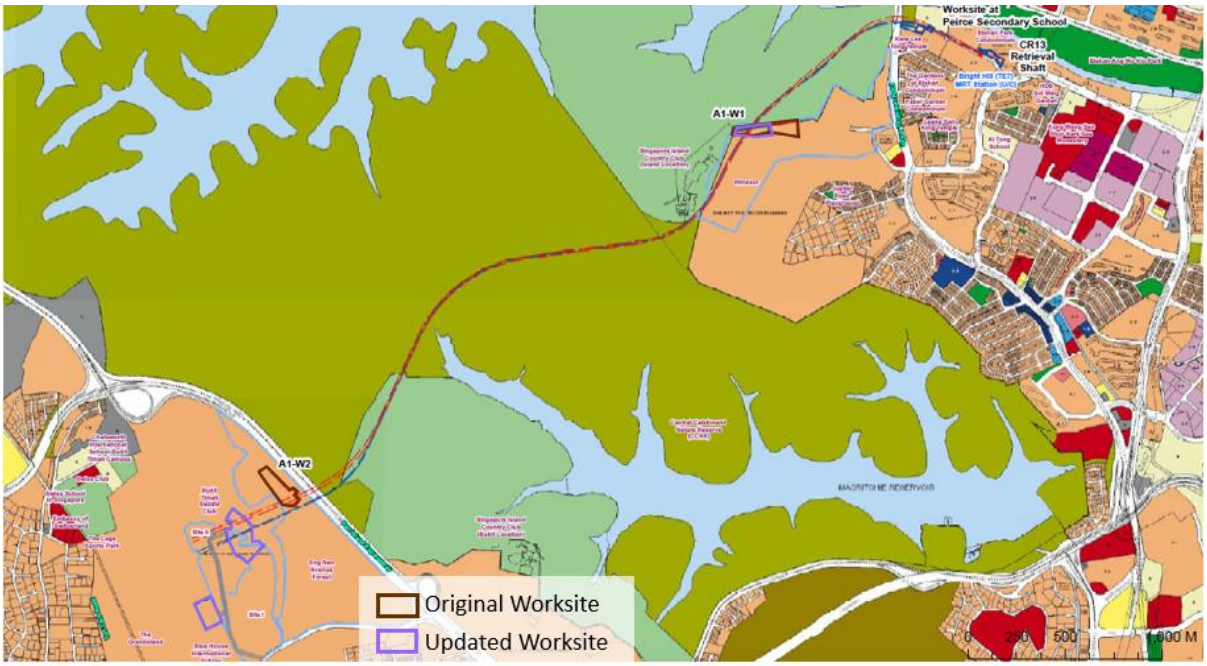

Figure 2: Zoning of Windsor and Eng Neo Avenue Forest Site According to Master Plan 2019

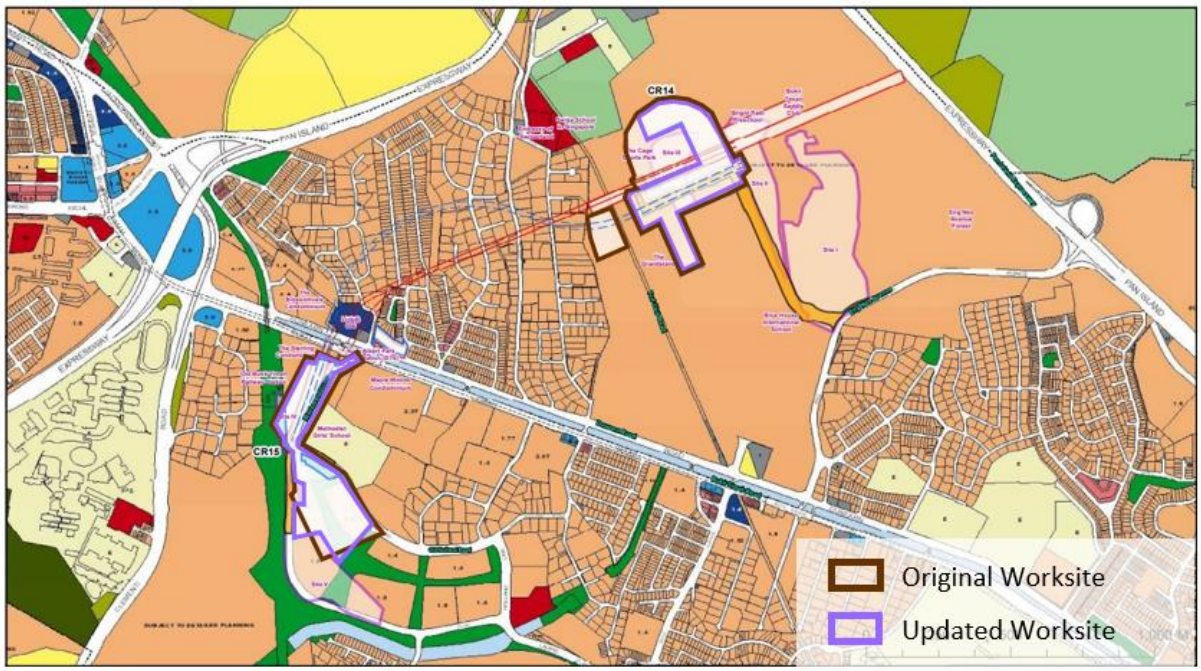

Figure 3: Zoning of Turf City and Holland Plain Site According to Master Plan 2019

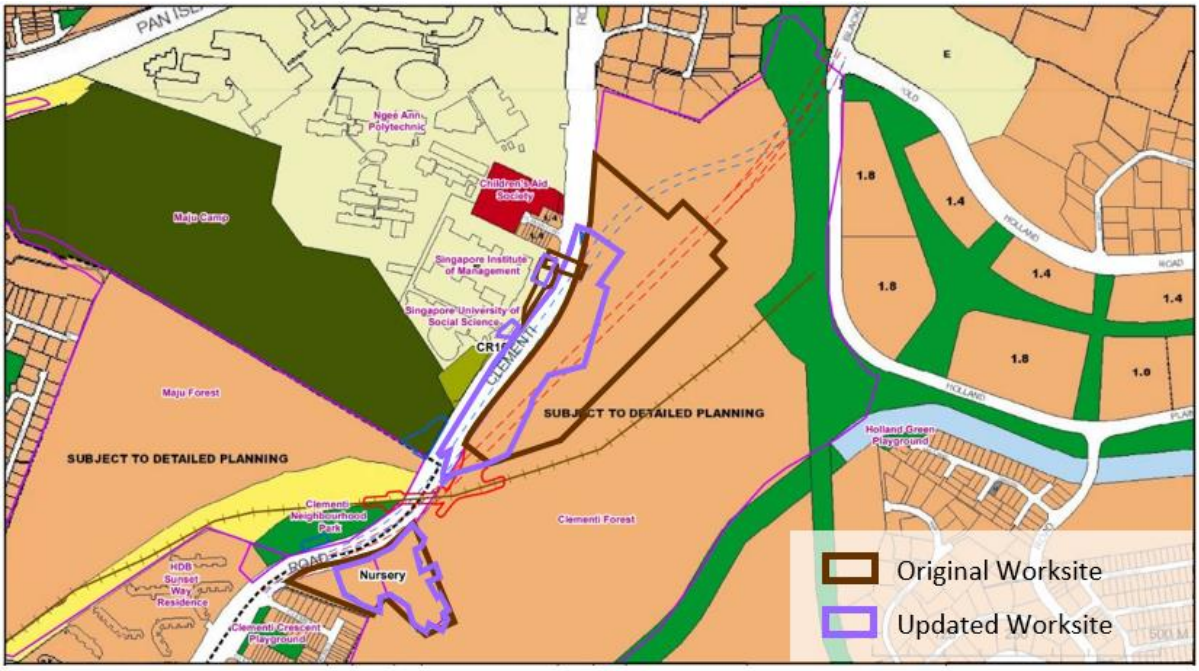

Figure 4: Zoning of Clementi Forest and Maju Forest Site According to Masterplan 2019

3. Key EIA Findings and Areas of High Conservation Value

The CRL2 alignment encompasses different groups of forests, and within these forests contain rich biodiversity hotspots and natural water bodies. All of these forests provide foraging, nesting and ecological connectivity with the Central Catchment Nature Reserve (CCNR) comprising Windsor, Turf City and Eng Neo Avenue Forest (see Figure 2) along with the West Central Forest regions comprising Holland Plain (see Figure 3), as well as Clementi Forest and Maju Forest (See Figure 4). The field assessment conducted at all the Study Areas documented a total of approximately 3007 flora and fauna species, of which 367 species are of conservation significance.

Overall, the conservation value of the habitats and biodiversity found within all the study areas appear to be high within Singapore's context, given the high species richness, the high proportion of species of conservation significance, and the dominance of native flora and fauna species particularly in the native-dominated secondary forest, mixed forests and waterbodies, some of which are species rarely found outside of CCNR. Four key areas of high conservation value were identified.

a) Windsor

The first study area is Windsor (see Figure 5). This area encompasses the Windsor Nature Park, abandoned-land forest, native-dominated secondary forest, and managed vegetation along with three waterbodies (two forest streams within the northern fragment and a single stream running from west to east within Windsor Nature Park). The Windsor study area plays a crucial role in supporting local populations of floral (e.g *Enkleia malaccensis* and *Elaeocarpus rugosus*) and faunal (e.g *Sunda Slow Loris* and *Raffles Banded Langur*) species of conservation significance which are usually restricted to the nature reserves.

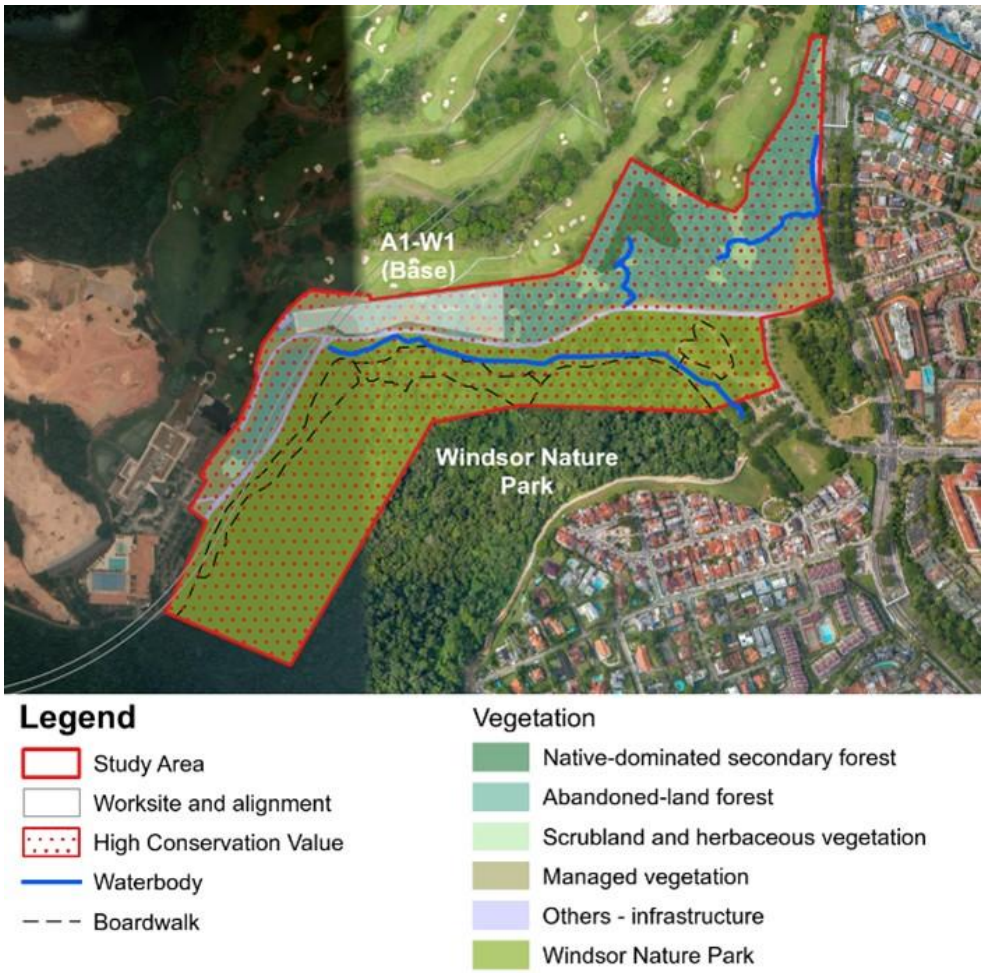

Figure 5: Area of High Conservation Value for Windsor (shaded in red)

b) Turf City and Eng Neo Avenue Forest

The second area is Turf City (See Figure 6). The Turf City Study Area consists of three distinct sites (Sites I, II and III) near Eng Neo Avenue Forest, which collectively comprise seven habitat types of high ecological value, namely native-dominated secondary forest, abandoned-land forest, mixed forest, waste woodland, scrubland and herbaceous vegetation, managed vegetation, and three naturalized waterbodies. Given the site's proximity to the Central Catchment Nature Reserve (CCNR) and Eng Neo Avenue Forest, the entire Study Area provides important forest connectivity between the larger forest patches to the north and to the east (Eng Neo Avenue Forest), which allows for the dispersal of flora and fauna. In addition, the native-dominated secondary forest, natural streams and surrounding forest within the neighbouring Eng Neo Avenue Forest have been identified as areas of high ecological value that play a crucial role in supporting populations of floral and faunal species of conservation significance. The range and rarity of the flora and fauna species found within Eng Neo Avenue Forest also suggests that the forest fragment continues to retain part of its complex biodiversity even after the PIE fragments it from the core CCNR.

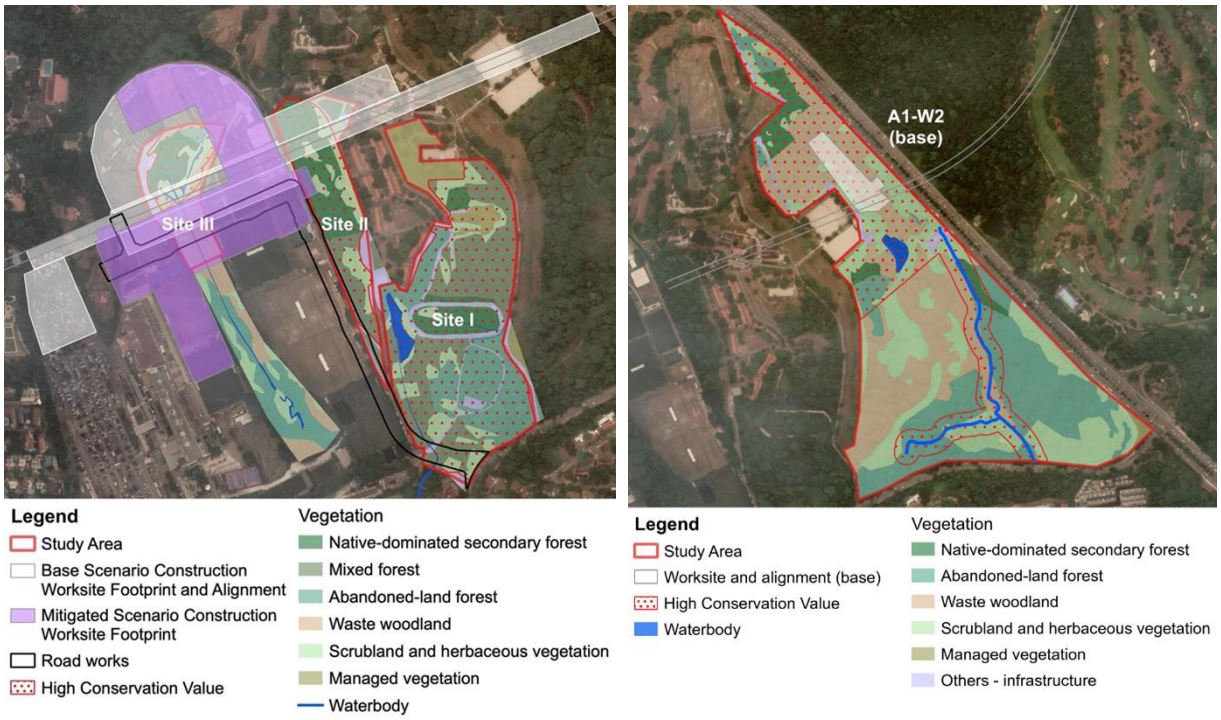

Figure 6: Areas of High Conservation Value for Turf City Sites I, II and III and Neighbouring Eng Neo Avenue Forest Respectively

c) Holland Plain

The third area is Holland Plain (See Figure 7), which consists of two distinct sites (Sites IV and V) near Clementi Forest, which also collectively comprise seven habitat types of high ecological value, namely two native-dominated secondary forests, abandoned-land forest, waste woodland, scrubland and herbaceous vegetation, managed vegetation, and a freshwater marsh. The freshwater marsh is a unique habitat supporting high richness of marsh-specific odonates. In addition, the extensive patch of scrubland in Site V is one of the few locations for a variety of native pitcher plant species outside the nature reserves in Singapore.

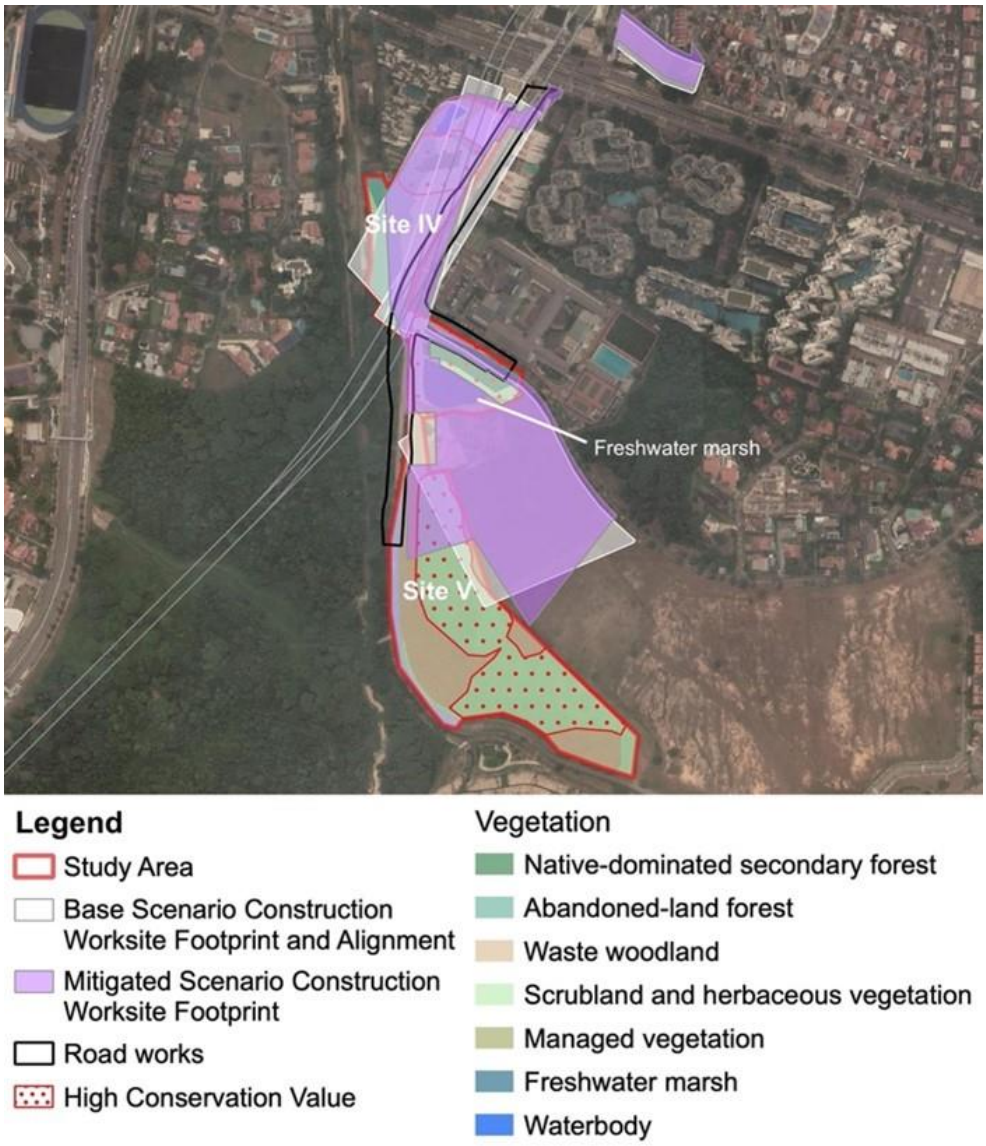

Figure 7 Area of High Conservation Value for Holland Plain

d) Clementi Forest and Maju Forest

The fourth area is Clementi Forest and Maju Forest (see Figure 8), which are separated by Clementi Road. Both Clementi and Maju forests are characterised by five vegetation types, mainly dominated by abandoned-land forest and native-dominated secondary forest, along with waterbodies such as a natural stream flowing through Clementi Forest and several disconnected shallow pools of water in the Maju Forest. Clementi Forest and Maju Forest play a crucial role in supporting populations of floral and faunal species of conservation significance, with the native-dominated secondary forest, natural streams and contiguous forest connecting these habitats as areas of high ecological value.

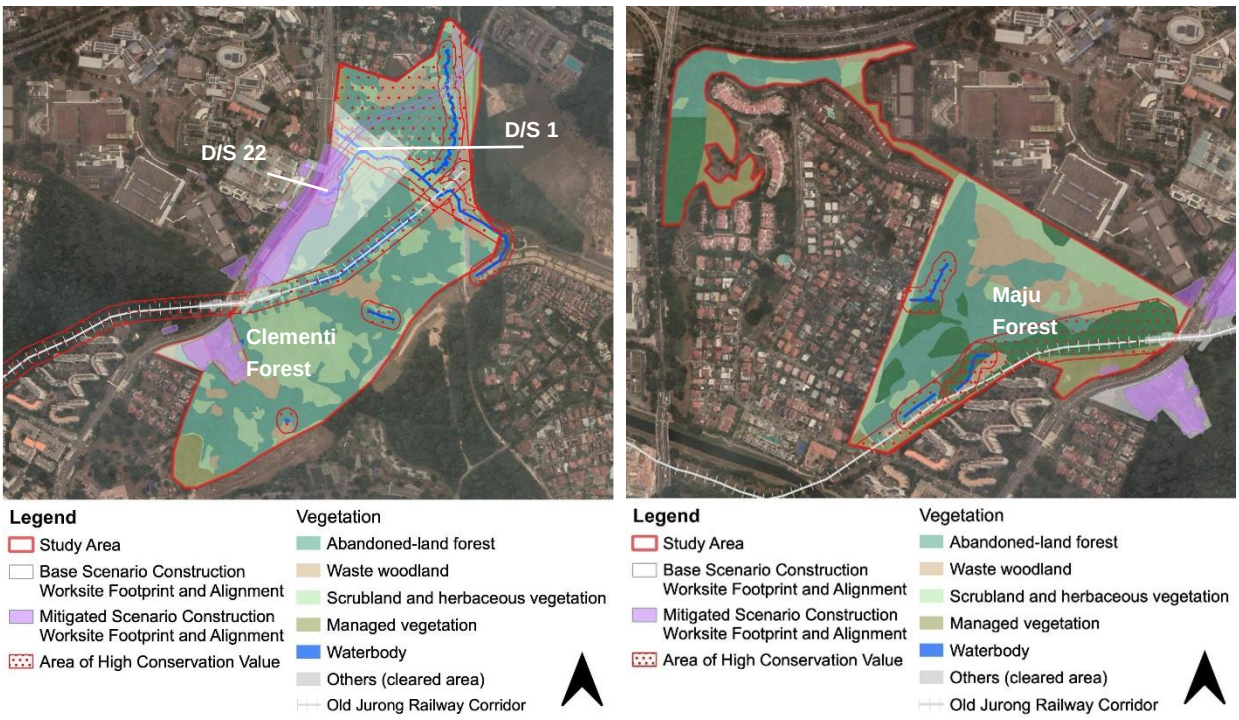

Figure 8: Areas of High Conservation Value for Clementi Forest and Maju Forest respectively

4. Engagement with Stakeholders

Together with URA and NParks, LTA has worked together with Nature Group members extensively since 2013 to discuss the various alignment options, optimise the worksites and co-create mitigation measures arising from the environmental impact assessment. These sessions provided opportunities for parties to share their ideas and perspectives on how we can better co-create solutions to address the various concerns.

The CRL2 EIA reports were published online for public feedback from 10 October 2022 to 07 November 2022. In total, 13 responses were received via LTA's feedback channels, with 2 open letters from SG Youth Voices for Biodiversity (SYVB) and Weblog "Nature & Us".

5. Feedback Received and Responses to Feedback

We value all the feedback and have considered every suggestion that has been submitted. The feedback received and responses to CRL2 works were:

a) Impact of CRL2 Works on Humans and Biodiversity

There were concerns on the general loss of greenery, the importance of providing ecological connectivity between the forested areas along the CRL2 alignment, as well as the irreversible habitat loss due to CRL2 works. Concerns were also raised on the impact of construction works to the residences nearby due to the air pollution, noise pollution and vibration generated. The measures that LTA has adopted in our response to the feedback include:

- **Optimisation of Worksites:** To minimise environmental impact, the design of CRL2 has undergone many iterations over a 3-year period. These iterations were done in consultation with Nature Groups representatives and relevant technical agencies to optimise the worksite footprint to avoid excessive vegetation removal. In addition,

mitigating measures such as locating worksites outside the identified areas of high biodiversity conservation value are implemented as detailed in the EIA reports.

- **Safeguarding ecological connectivity in the Windsor Study Area:** Agencies and Stakeholders will review the ecological connectivity between Windsor Nature Park and the forest north of it. These include suggestions such as replanting and reinstating the vegetated environment to enhance connectivity, on top of the already planned culvert enhancement and rope bridges that will be constructed.

- **Mitigations for Holland Plain Freshwater Marsh**: The location of the future CR15 King Albert Entrance will directly impact the marsh, which can lead to loss of habitat especially for marsh-specific odonates (e.g. nationally Vulnerable restless demon [*Indothemis limbate*]). LTA is working with relevant technical agencies and the environmental consultant, to engineer a conducive replacement habitat based on a science-based approach for the flora and fauna to continue to thrive. A monitoring program will be carried out throughout the creation and establishment period and additional mitigating measures will be recommended, if necessary, in order to monitor its stabilisation and redevelopment during and after creation.

- **Mitigations for construction dust, noise and vibration**: As with all of LTA infrastructure works, LTA will carry out Project Environmental Study and implement necessary mitigation measures to manage construction dust and noise while ensuring safety at all times. LTA has also conducted noise and vibration impact studies for the area and noise barriers will be installed for locations where noise levels could potentially be higher. During construction, LTA will closely monitor the situation and together with the appointed contractor will do more if necessary. Noise and vibration assessment arising from train operation on residential developments in close proximity to the CRL2 alignment has been carried out and the assessment shows the vibration limit during CRL2 operation is with the criteria of internationally accepted standards.

- **Implementing a robust Environmental Monitoring and Management Plan (EMMP):** The Contractors will engage a specialist EMMP consultant during Design & Build stage to develop an EMMP to mitigate and manage any potential environmental impact. As part of LTA's commitment to minimise environmental impact, an independent EMMP auditor will be engaged to audit the documentation (e.g. Air Pollution Control Plan, Noise Management plan etc) submitted by the Contractors' EMMP consultant and to ensure the effective implementation of the mitigating measures in the EMMP.

The abovementioned measures only represent a portion of a comprehensive set of mitigation measures that the EIA has presented which include, amongst others, erection of noise barriers, transplanting of conservation-significant plants and retention of existing trees. For further information, please refer to the link in paragraph 2 for the full report.

b) Enhancing Ecological Connectivity during construction

Feedback received suggested proposals to improve ecological connectivity through development of a green corridor or eco-link(s) to facilitate safe animal crossings. While there will be land use considerations in introducing such measures, LTA will work with relevant agencies to look at how best we can achieve these green connectivity pathways. In addition, LTA has adopted several mitigation measures in the EIA to ensure that there remains a safe path for fauna to travel. These include:

- Passive wildlife shepherding and pre-felling fauna inspection will be implemented prior to any construction works commencing to prevent injury to fauna.

- Strategic pangolin specific barriers will be erected along roads/forest edges adjacent to worksites where there is no hoarding. These barriers will help to minimize the possibility of pangolins wandering onto roads and becoming roadkill and guide them towards safe passages to other forest patches within Turf City.

- Alongside the barriers and hoarding, other speed calming measures such as speed bumps and speed limits will be installed along the access roads.

- Rope bridges and underground culvert will be installed to facilitate fauna movement across roads.

c) Enhancing Mitigation Measures for Upstream Tributary (D/S22) of Clementi Forest Natural Stream D/S1

Feedback was raised if the proposed mitigation measures for the drain D/S22 in Clementi Forest had accounted for potential high levels of discharge originating from the worksite, as this might potentially affect downstream ecology of D/S1 (See Fig 8 for location of D/S22 and D/S1).

In response the above concern, LTA has adopted several mitigation measures in the EIA for drain D/S22:

- The design of the proposed drain diversion for drain D/S22 at Clementi Forest will comply with PUB Code of Practice on Surface Water Drainage, taking into consideration all of the discharge from existing upstream and the worksite.

- Through close monitoring of the stream, a retention pond will be built, if necessary, should there be high levels of discharge originating from the worksite.

In summary, there is no proposed changes to the published EIA reports. As with all of LTA infrastructure works, LTA will continue to monitor our development work throughout the construction stage to ensure that any additional concerns that may arise are addressed adequately.