

# Youth Stewards for Nature 2022 Project Infographics



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Project Mentors: Amanda Ng, Rachel Loh

Project Members: Chia Shin Yin, Ivan Neo, Jerryl Tan Kim Han, Quek Chui Qing, Rachael Ger Ye Ni, Shuna Maekawa, Sng Wen Xin, Than Shermaine, Yee Zi Yin (Hannah), Lee Ming De Samuel

## 2. Conserving rare trees by studying their cultivation requirements

Project Mentors: Elango Velautham, Chia Hui Tong

Project Members: Aristia Ho Zhen Yi, Au Tsi Ying (Aly), Christian Luis Zepeda Gaona (Topaz Zega), Ling Yi-En Ian, Malcolm Luther Ng, Ong Xiang Ting Alicia, See Zhe Yuan James, Shaylie Yu Shihui, Tey Shi Jie Sebastian, Yichen Shen

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Project Mentors: Alyssa Tan, Collin Tong

Project Members: Amelia Hong Tze Qi, Angel Joy Seah, Chee Koi Jun, Ian Douglas Wright, Lim Huile, Liu Yixuan, Tan Khai Yan, Yin Chuan, Joie Kong Ling Ci, Chan Chen

## 4. Operation No Release

Project Mentors: Fadzleen Arriffin, Jeanne Tan

Project Members: Chang Jing Wen Carmellia, Chua Wanying, Heagan Huey Min En, Ho Ying Rui, Randall, Kieron Quek Chon Hann (Rons), Nabilah Binte Mohd Haleem Shah, Sandy Foo Yock Li, Tan Yean Ai Jolin, Wong Si Xuan, Ashley

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Project Mentors: Rekha Mohan, Cyrena Lin

Project Members: Celeste Goh Jia Rui, Chenoa Bo Kannan, Chia Pei Ying Seraphina, Muhammad Irsyad Bin Abdul Aziz, Ng Ying Xuan, Ong Su-Mae, Scormon Ho Rui Sheng, Tan Wan Xian Priscilla, Tang Yong Jen (Co-Mentor)

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Project Mentors: Astri Noorbaini, Cyrena Lin

Project Members: Choo Min Yi, Clara, Dana Yam, Abdul Hannan bin Mohamed Gazali, Zuraidah Binte Mohamed Zulkifli, Yashica d/o Ramesh Sanjay Jamal, Darnesh Ramu (Co-Mentor)

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Project Mentors: Natalie Tan, Denise Yang

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Project Mentors: Tok Ming Li, Sunshine Sim

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Project Members: B Gayathiri, Joshua Teoh Ee-An, Lim Qian Hui, Michelle Lee Zi Yi, Nur Chee Kiat, Timothy, Wang YuTing

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Project Mentors: Hazelina Yeo, Petrina Teo

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Project Mentors: Sin Yeou

Project Members: Teng ZhenYi

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Project Mentors: Alex Tam, Chin How Kian

Project Members: Chen Hui Lin Tammy, Lee Wen Qi Sherly, Nur Leila Binte Laqman Hakem, Tan Sok Vin, Yeoh E Ming, Zhang Wen

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Project Mentors: Jasmine Koh, Koh Yong Kwang, Damien Qiu, Ronnie Mak, Esther Lim, Jason Yong

Project Members: Deepika Shanmuga Sundaram, Ho Sze Koy, Joshua Liang, Leia Tang Jia Ern, Wong Ka Jun Travis, Yosephine Jessica ADLPB, Muhammad Nasry Bin Abdul Nasir

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Project Mentors: Nurafiqah Ishak, Anne Ng

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Project Mentors: Ng Ting Yu, Alicia Soh

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Project Mentors: Natalie Cheong, Steffi Loe

Project Members: Teoh Ming Huan (Rae), Dhivya Priya Kanisan

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Project Mentors: Mayura Patil, Mukta Kasturia

Project Members: Ling Chun Yi, Andrea, Phoebe Chua Lin'er, Sih Chee Seng (CS)

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Project Mentors: Evelyn Chong, Chew Chi Sin

Project Members: Lewis Low Jie Qi, Lim Zoe, Lin Zai Zeng, Ng Jia Le, Sow Jeng Wei, Wong Wei Zhi (Johannes), Yeo Cai Ying Melody (Mel), Zikry Nasrullah

# YOUTH STEWARDS FOR NATURE

## MONITORING OF BIODIVERSITY ALONG RAIL CORRIDOR



### Birds

Identification of birds using sight and call  
- Species count, bird behaviour, flight direction, bird-plant interactions



### Insects

Identification of insects using sight  
Day/Night Surveys, Pitfall Trapping



### Methodology



KADUT

43

species of birds

85

species of insects

24

other species\*

17

species in pitfall traps

### SUNGEI KADUT

Bird Species Diversity ( $H'$ ): 2.2  
(Grassland/marsh species)

Bird Flight Headings:

- Toward Mandai Forest
- Toward Kranji Reservoir

Bird Locations:

- In the Canopy (98/143) of
  - *Falcataria moluccana* (85/227)
  - Dead trees (67/225)

Activity: Perching (140/152)

Special Observations:

Nesting Collared Kingfisher (*Falcataria moluccana*)

Pitfall Traps: Species Diversity by Transects

Species Diversity appears to be relatively high throughout, perhaps due to the presence of a stream



### BT TIMAH

Bird Species Diversity ( $H'$ )

1.7

(Rainforest species)

Bird Flight Headings:

- Toward BTNR
- Along the Rail Corridor

Bird Locations:

In the Canopy and Understorey

(37/38) of

*Cassia fistula* (15/123)

*Falcataria moluccana* (13/123)

*Spatibodea campanulata* (16/123)

Activity: Perching and Preening

(31/44)

Special Observations:

Territorial Laced Woodpeckers

(*Falcataria moluccana*)

Mating Coppersmith Barbets

(*Ficus religiosa*)

Courting Crimson Sunbirds

(*Syzygium myrtifolium*)

### CLEMENTI

Bird Species Diversity ( $H'$ )

2.1

(Secondary forest species)

Birds Flight Headings:

- Along the Rail Corridor
- Into Clementi Forest

Bird Locations:

In the Canopy (58/63) of

*Falcataria moluccana* (65/162)

Activity: Calling and Singing

(48/65)

Special Observations:

Territorial Red-breasted

Parakeets and Coconut Lorikeets

(*Falcataria moluccana*)

Nesting Black-naped Orioles,

Javan Mynas, Tanimbar Corella

(*Ficus microcarpa*, *Falcataria*

*moluccana*)

Pitfall Traps: Species Diversity by Transects



32 40

(Bt. Timah) (Clementi)  
species of birds

79  
species of insects

49  
other species\*

24  
species in pitfall traps

BT TIMAH



CLEMENTI

ALEXANDRA

41 36

(Alexandra) (Bt Merah)  
species of birds

97  
species of insects

28  
other species\*

22  
species in pitfall traps

### ALEXANDRA

Bird Locations:

In the Canopy (51/70) of *Falcataria moluccana* (72/190)

Activity: Perching (52/72)

Special Observations:

Territorial Coconut Lorikeets and Rose-ringed Parakeets

Nesting site for Long-tailed Parakeets, Pin-striped Tit-babbler,

Dollarbirds, Javan Mynas (*Falcataria moluccana*, *Caryota mitis*,

*Alstonia scholaris*)

Pitfall Traps: Species Diversity by Transects



Bird Species Diversity ( $H'$ ): 3.2  
(Most diverse)

Bird Flight Headings (Alexandra):

- Into Alexandra Forest and Warwick Estate
- Toward Alexandra Hospital

### BUKIT MERAH

Bird Species Diversity ( $H'$ ): 1.7  
(Urban colonizers)

Bird Locations:

In the Canopy (30/30) of

*Samanea saman* (30/125)

Activity: Perching (25/30)

Special Observations:

Courting Olive-backed Sunbird (*Leucaena leucocephala*)

Nesting Yellow-vented Bulbuls (Dead Tree)

Nesting Collared Kingfishers (*Samanea saman*)

Territorial Asian Koels and House Crow (*Samanea saman*)

Bird Flight Headings:

Across the Rail Corridor

Between Bt Merah

and Kent Ridge



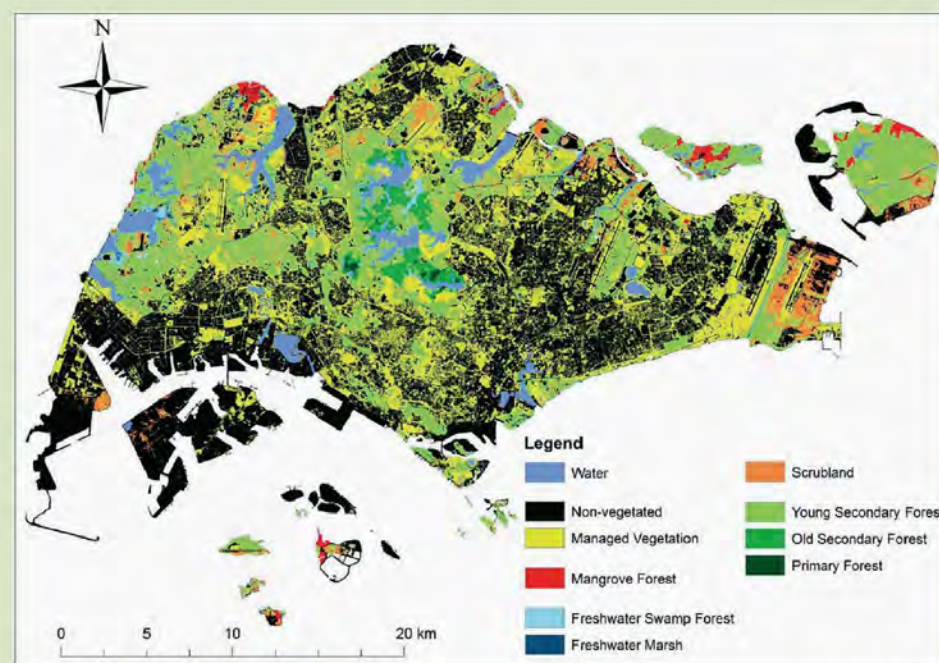
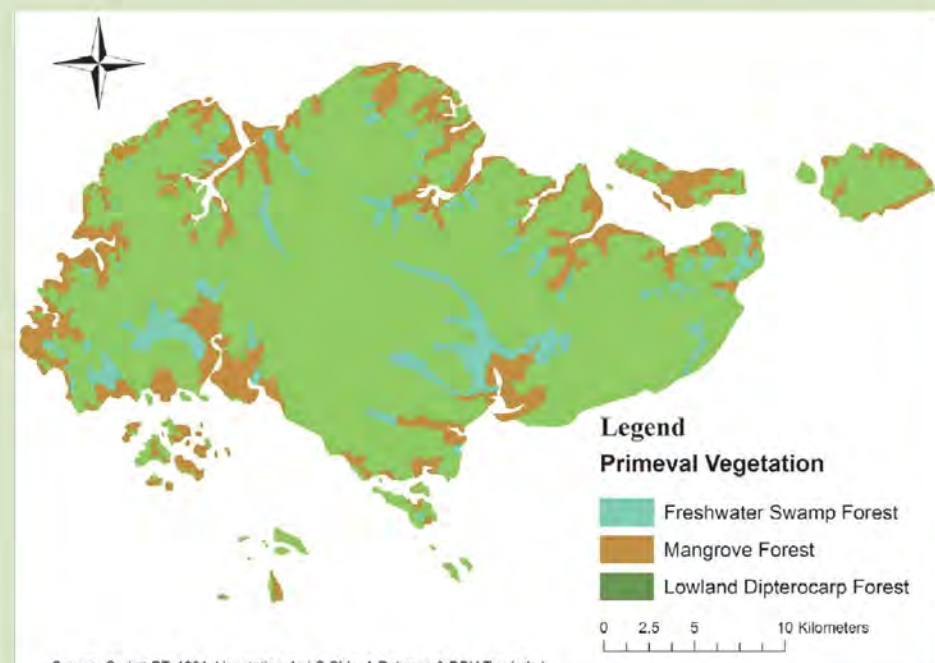
BUKIT MERAH

\*Other refers to Amphibians, Arachnids, Crustaceans, Diplopoda, Gastropoda, Mammals, Reptiles



# CONSERVING RARE TREE SPECIES BY STUDYING THEIR CULTIVATION REQUIREMENTS

## INTRODUCTION TO DIPTEROCARPACEAE



Primeval Singapore (left) vs. Singapore, 2011 (right). Only about 0.28% of its original dipterocarp forest remains today (Yee et al., 2011)

The **Dipterocarpaceae** family includes hardwood trees that are **commonly found in tropical forests**. These trees are important; they **provide shelter and food for forest wildlife**, and serve as important **carbon sinks**. However, widespread deforestation and land use change have rendered them **critically endangered** in the region. As such, effective restoration efforts for them and other important tree families must be established.

## AIM OF PROJECT

**Supra-annual mast-fruiting** observed in dipterocarps makes seeds hard to collect for regular planting. **Recalcitrance** in dipterocarp seeds **renders seed-banking impossible**.

With limited seedlings available seasonally, **without in-depth understanding of species growth requirements especially sunlight**, trees planted could be underexposed or overexposed **leading to death**. Underexposure is easily studied as **low light intensities induce dormancy first before further decline** leads to death. Once low light and the resulting dormancy is established, the exposure can be incrementally explored until optimal sunlight for best growth is determined.

This project aims to determine the **light levels that induces bud dormancy**. "**Bud dormancy**" refers to **temporary suspension of visible growth and emergence of new leaves** in seedlings.

## METHODOLOGY

### 1) SOIL & TRAY PREPERATION

- Two parts of sand were mixed with one part of clayey soil to form **soil mix**.
- Soil was **dried and tested** with a soil moisture tester to ensure that **moisture level was kept below 10%**.
- Trays were drilled** with regularly-spaced holes and were tested to ensure the holes were sufficient for water to be drained.
- The **soil was sieved** into the trays and **weighed** (29kg).
- Water was poured into the filled tray to **test water drainage** to prevent waterlogging.



sieving soil into trays



light meter

The species of dipterocarp grown for this project is called **Hopea nutans**, also known as Giam.



Hopea nutans



seedling

### 2) SEEDLING TRANSPLANTING

The **60 dormant seedlings** used were

- single leader** (only one stem)
- of **similar height** (8.5 cm - 25.0 cm)
- had **no emergence of new leaves**



6 seedlings were transplanted into each tray, and were then **evenly spaced out** to minimise leaf overlapping. **Water content of the trays were maintained** by placing the trays in a tub filled with water of 1 cm depth.

### 3) SET UP & MEASUREMENTS

After the seedlings have been established in the trays, they will be placed under different light levels. **Shade nets** were used to create the **3 different light levels**. Light level (Trotec BF06 Lux Meter) and PAR (LightScout Light Sensor Reader) were **measured** at three points under each condition and averaged, daily at 1330h.

control - no shade net (highest light level)



2 layers of shade net (lowest light level)



1 layer of shade net

Conditions	Light Level (lx)		PAR ( $\mu\text{mol}/\text{m}^2/\text{s}$ )	
	Mean	SD	Mean	SD
Two shade nets	624	339	15	9
One shade net	1602	1105	44	32
Control (no shade net)	4561	2135	133	71

Table 1: Average light intensity from 7 - 11 June 2022.

## RESULTS & DISCUSSION

At the time of writing, the seedlings have **shown no sign of decline**. They are **expected to recover** and be **ready for light manipulation in 2 months** time. The seedlings will then be **observed for the next 2 years** under the designated light condition to see if any growth/decline happens.

A limitation of the project was that the **experiment environment was prone to inconsistent light level fluctuations** e.g., from cloud cover; more **consistent light level may be achieved in controlled lab settings**. Another limitation was the **limited time availability of the participants** in the project due to school and work, slowing preparations for the experiment.

As part of the effort to conserve as many rare tree species, **future studies could explore the conditions that can induce dormancy in seedlings of species beyond *H. nutans***.

# YSN Project #3

## Research and Design Coral Tanks for Coral Propagation & Outreach

St. John's Island Marine Laboratory (SJIML) conducts coral aquaculture by propagating and growing coral fragments in efforts to repopulate them in the wild. To develop effective aquaculture methods, we tested abiotic and biotic factors on coral growth.



### Perception Survey

Most of the visitors at SJIML were 1st timers or infrequent visitors who visited the museum for recreational activities instead of educational purposes. They learnt about our coral recovery programme as well as SJI's marine animals but felt the museum could have had more information, interactive displays and hands-on activities. They also felt that we should have more information on global warming and other climate issues.



#### What are corals?

Corals are invertebrates that are made up of numerous polyps. The symbiotic relationship between the polyps and zooxanthallae keep the corals alive.

#### Why are corals important?

Coral reefs provides breeding habitats and food for marine life, creating a sustainable ecosystem. Coral reefs also protect our shores from rapid erosion by reducing the energy of the waves that reach the shoreline.

### Abiotic Factors

#### Substrate Experiments

A study of the effect of using various materials as substrates to grow corals.



Coral Nubbin Growing On Dead Coral



Coral Nubbin Growing On Epoxy

Results: Coral nubbins that were grown on coral skeletons had better colouration throughout the experiment compared to those grown on epoxy

Conclusion: Dead coral skeletons will dissolve in water to provide carbonate and metal ions to the nubbin that grows on it, enhancing it's growth

#### Blue Light Experiment

A study of the effects of different colours of light on corals.



Blue Light Box Created Using Recycled Materials

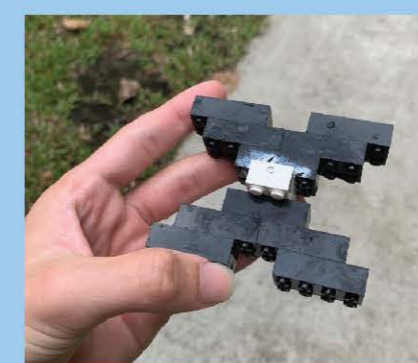
Results: Coral nubbins grown under blue light had lower rates of bleaching than those grown under sunlight.

Conclusion: Blue light reduces stress on coral nubbins than sunlight and reduces the risk of bleaching.

#### Lego Substrate!

A study of using lego platforms to increase the number of nubbins grown per tank

Results: The LEGO columns increased the number of coral nubbins that could be grown in the same sized tank, but there was no significant difference in th health of the corals compared to the control setup.



Lego Platform



Columns of corals growing on LEGO platforms

#### Seagrass Experiment

A study of the effects of sea grass on the growth of coral nubbins



Tank With Tape Seagrass

Seagrasses are known to protect corals in the wild from:

1. Ocean Acidificaiton
2. Eutrophication
3. Settling Sediments
4. Diseases

Results: All the coral nubbins experienced growth, however there is no significant difference in the growth rates in the different tanks.

Conclusion: There is no conclusive result from our initial experiment that seagrasses affect the growth of corals.

Maybe more time will give us better results!

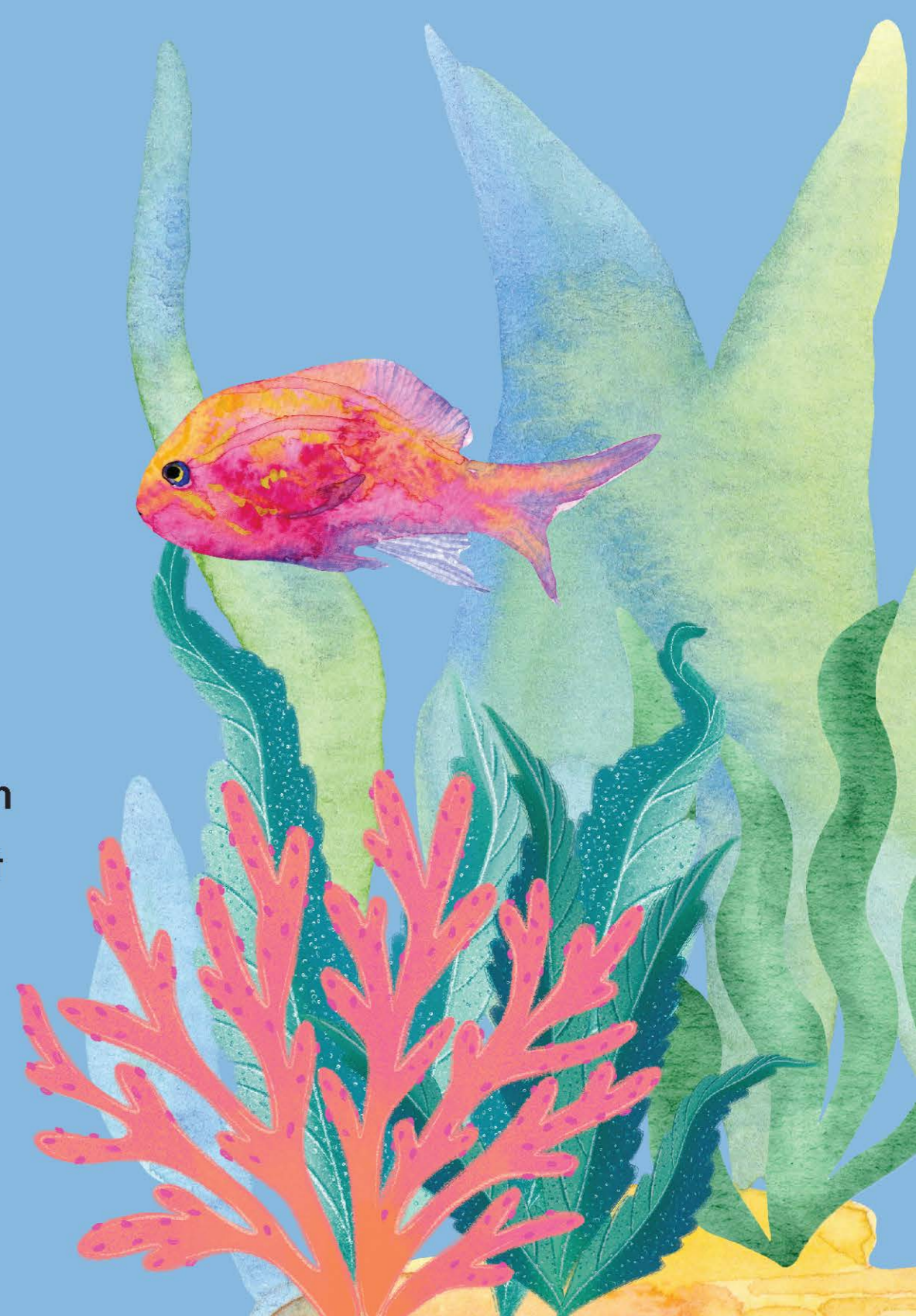


Control Tank



Mangrove Tank

### Biotic Factors





# @NPARKSONR OPERATION NO RELEASE



## MEET THE TEAM!



Check out our team members on our Instagram page @nparksonr



## OUR GOAL?



Our goal is to raise awareness about pet abandonment and the release of non-native species into the wild by the public, and the adverse effects these actions bring about to the animals released and to our native species in the ecosystem.

## Site Visits



Our team members visited Lower Peirce Reservoir, a notable site for "mercy" release. Such acts not only impacts the ecosystem, it is also cruel to the animals released.

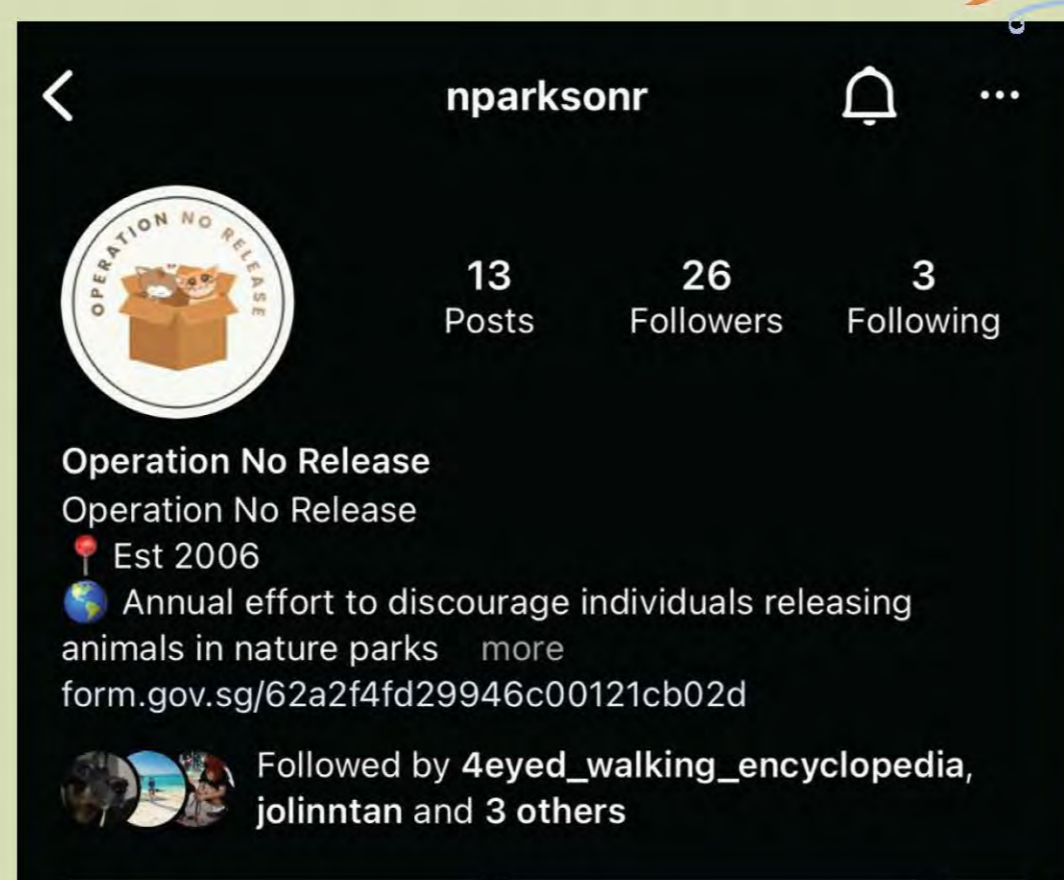


Red-Eared Sliders found in Singapore Quarry, another "mercy" release hotspot. One of Singapore's most notorious invaders, they are neglected by irresponsible pet owners buying them on impulse 😞 Always remember to do your research before buying a pet so you can give it a long and happy life!



## INSTAGRAM

Our Instagram account, @nparksonr, features the different posts on proper pet care, invasive species as well as more information on mercy release.



In this workshop, we aim to gather people of all ages virtually to learn more about Responsible Pet Ownership and the impacts invasive fauna brings to native biodiversity through games and activities.

## VIRTUAL WORKSHOP

# Youth Stewards for Nature

## Civet Distribution Study

### Objectives

- To understand the **ecology of civets** and **factors affecting civet occurrence** in residential areas.
- To design and implement **outreach activities** to **promote human-wildlife coexistence**



### Outreach

Scan to find out more

- Linktree platform** that can be scanned via a QR code, which houses:
  - Outreach and educational materials (flickr that has photos of civet scats)
  - Quiz on civets to engage residents
  - Civet sighting form for follow-up by residents
- Brochures** that will be distributed to residents during the survey
- Standees** that will be installed in areas with high civet population
- Script** that surveyors can refer to when interviewing residents

### Social Media



- Platform for education and outreach
  - Sharing of our **project journey** from start to finish, including **findings and outcomes**
  - Sharing of our **thoughts and experiences** (night walks, surveys, night safari visit etc)

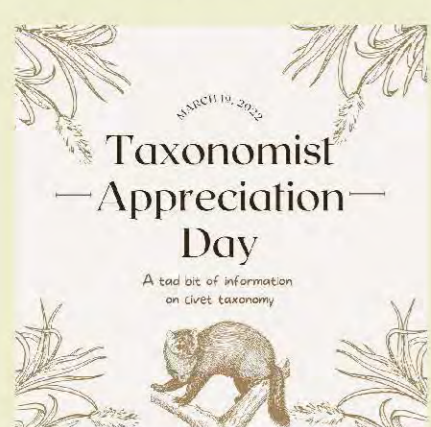
**308**

**Instagram followers**, of which, **45.3%** are 25-34 yrs old and **31.5%** are 18-24 yrs old

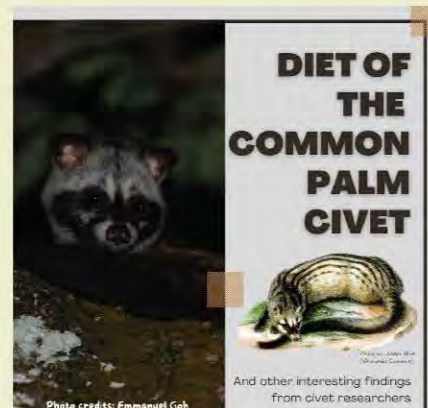
**863**

**Instagram accounts reached**, since our first elucivets post, and **17%** of them engaged with our content

### Most popular posts



Reach: 340  
Impressions: 480



Reach: 295,  
Impressions: 379



Reach: 280  
Impressions: 394

### Research Overview

- Carried out **interviews** with residents living in **landed housing estates** around Singapore
- Conducted on weekends, 1030 to 1900 hrs
  - Interview questions include:



Whether they have **encountered civets** in their household before and the types of encounter



Whether they have **fruit trees** present in/around their household



Whether there are **resting structures** or **overhanging cables** in/around their household

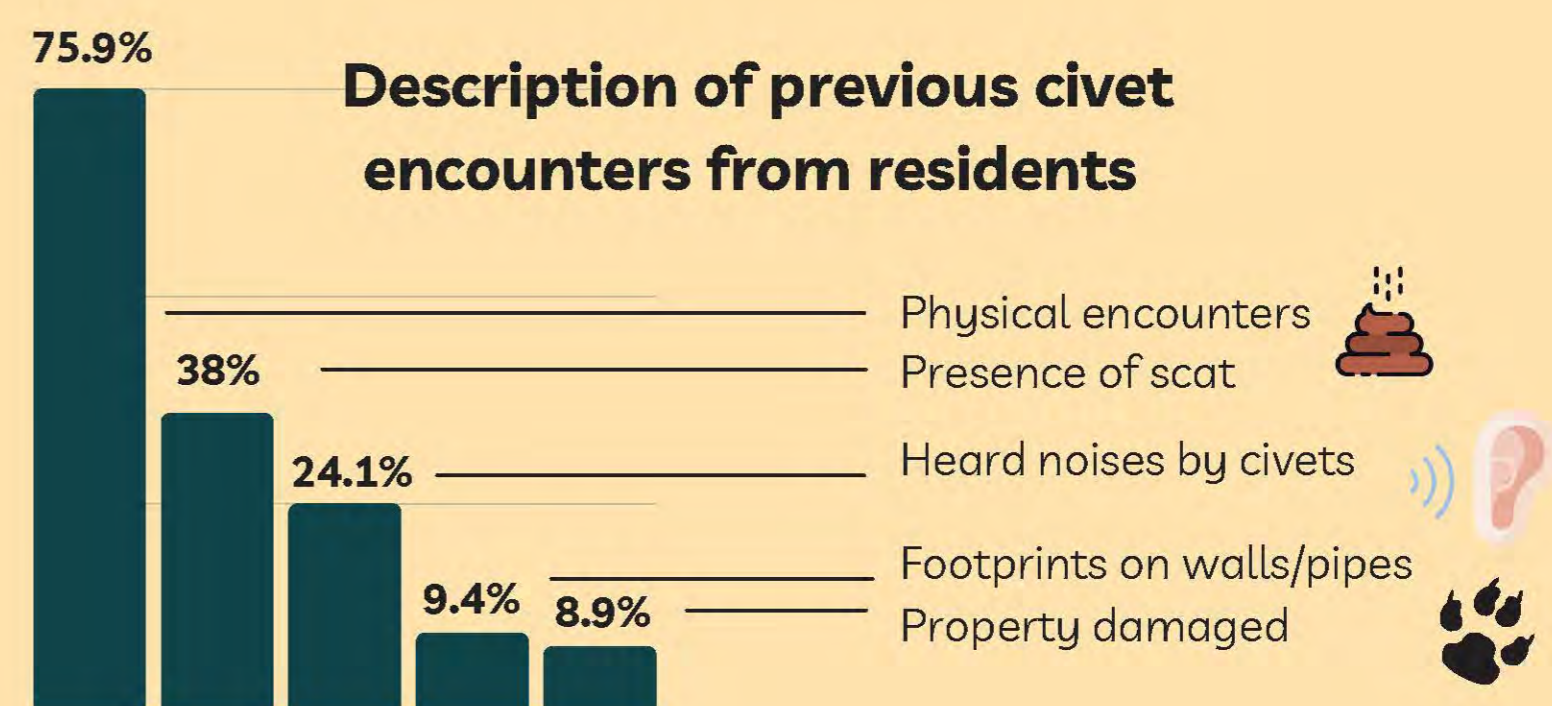
### Research Findings

**179** **interviews were conducted** between 8 May & 19 June 22

**39.7%** of houses surveyed have reported **previous civet encounters** in/around their household

**66.4%** had **fruit trees** present. Banana, mango and papaya were the most common trees

**91%** had **resting structures** present.. Common structures include awnings, open balcony and false ceilings



### Video

#### Introduction to The Common Palm Civet

- Basic ecology of The Common Palm Civet
  - Footages of civets in the wild/urban areas
- History of civet species in Singapore
  - Footages of civet specimens, interview with Wei Ting

#### Rescue & Rehab

- Footages: Release of civets into the wild/outdoor enclosure, interview with Dr Charlene



# Youth Stewards For Nature: PROMOTING RESPONSIBLE HUMAN-PIGEON ENCOUNTERS IN CHAI CHEE

## Project objectives:

- Understand the different perceptions that residents in Chai Chee have about pigeons and feeding of pigeons
- Develop targeted education and outreach initiatives to promote responsible human-wildlife encounters
- Work with grassroots and the community to mitigate pigeon-related dis-amenities in Chai Chee
- To promote responsible human-wildlife interaction
  - Raise awareness about pigeons and pigeon feeding



### FIRST SITE RECCE

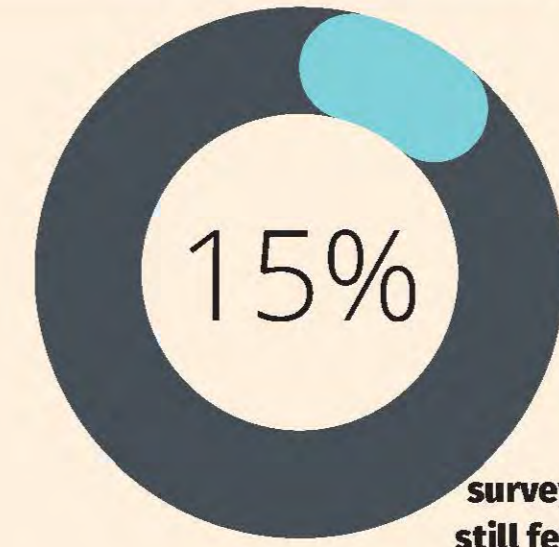


To understand the issue surrounding pigeon feeding and the ground situation better, our team visited Chai Chee estate in Mid-February.

### SURVEY CONDUCTED @ CHAI CHEE

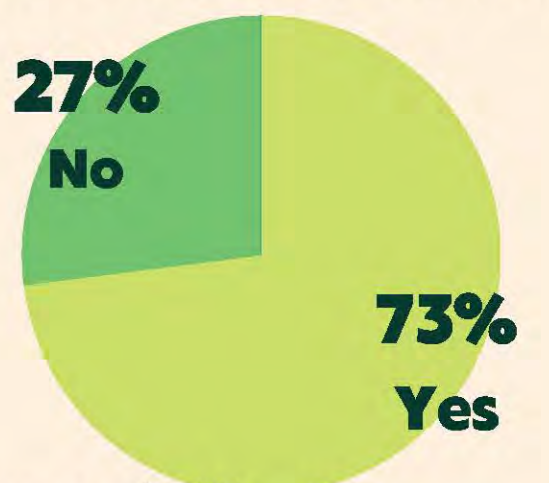


Carried out surveys during mid-March at the Chai Chee estate



73% of residents know that feeding pigeons is illegal, and are aware that pigeon feeding increases their population and harms the pigeons, but 15% would still choose to feed the pigeons.

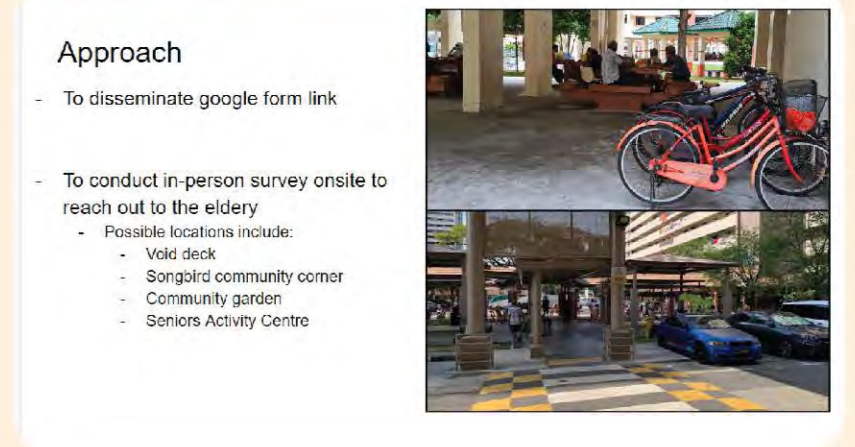
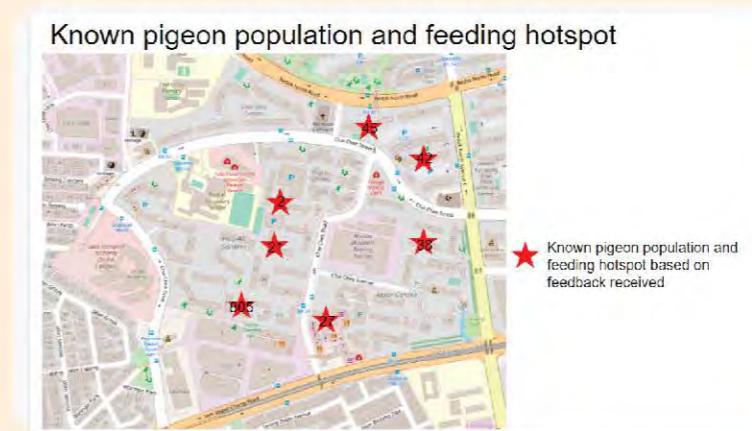
Do you know that feeding pigeons is illegal in Singapore?



### Liaising with Grassroots Leaders to conceptualise and execute outreach and education activities

Top 3 activities suggested by residents

1. Nature Walk
2. Education Posters
3. Educational Talks



We met with the Chai Chee RC in March to share our survey results and proposal. We will be meeting RC again to discuss future collaboration plans for July i.e. compost demo session and nature walk

### EDUCATIONAL POSTERS/PAMPHLET

WHY IS FEEDING BAD?  
RECOMMENDED STEPS YOU CAN TAKE WHEN ENCOUNTERING WILDLIFE!

### FESTIVAL OF BIODIVERSITY 2022



- We joined NParks' Wildlife Management team at the Singapore Botanic Gardens to reach out to the public
- We shared our educational materials such as pamphlets and posters focusing on the introduction to pigeons, refraining from pigeon-feeding, and a list of do's and don'ts when encountering wildlife

### EASY DIY COMPOST BIN

1. Choose the type of compost bin suitable for you.
2. Drill 8-10 holes in your bin as organic waste requires oxygen for composting process. To be done for lid and bottom side of container.
3. Add dry leaves or twigs as your first layer. Fill about 1/8 - 1/4 full.
4. Add dirt onto container in 1/2 full. This can be topsoil.
5. Now, for your green base, you may add food scraps or paper products that you have. Scraps of fruits, vegetables, coffee grounds, tea bags, and egg shells are some great compostable materials.
6. Time to stir your compost with a shovel or stick!
7. Remember to spray your compost with lukewarm water. Do not over-water as it may lead to bad smell.
8. Lastly, place your bin at a shaded area with no full sun exposure as it can cause the compost to dry out.

8 simple steps on how to make your own DIY Compost bin

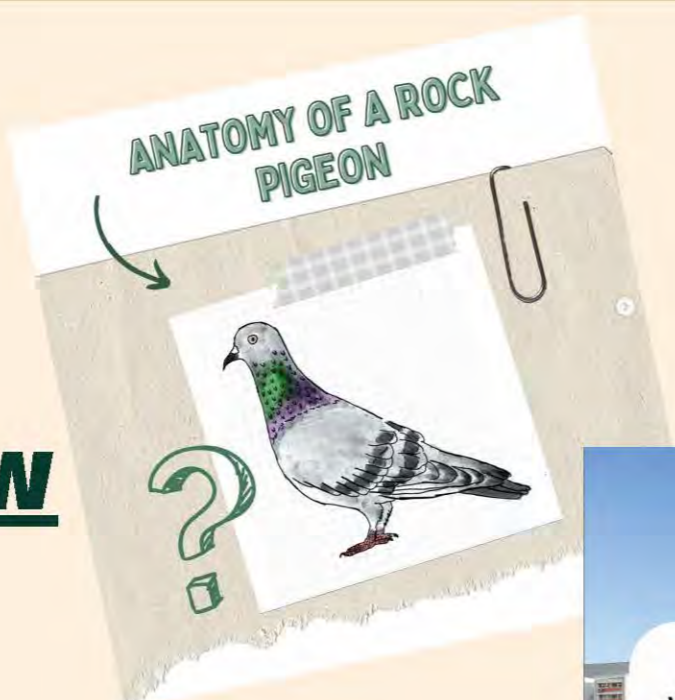
### COMPOSTING DEMO & GUIDED NATURE WALK



- We have liaised with Chai Chee RC to organise and host a composting demo and guided nature walk together in July.
- We will also be working very closely with Chai Chee RC to share resources.



@wilds.eyevew



- Through research and guidance from our mentors, we created instagram posts on topics such as human-wildlife conflict and pigeons to raise awareness on how we can have responsible encounters with pigeons.
- This includes posts such as the anatomy of pigeons, sharing on the origin and distribution of rock pigeons, and interactive post on common misconceptions of human-wildlife and human-pigeon conflicts

The Team: Clara, Dana, Darnesh, Hannan, Yashica, Zuraidah



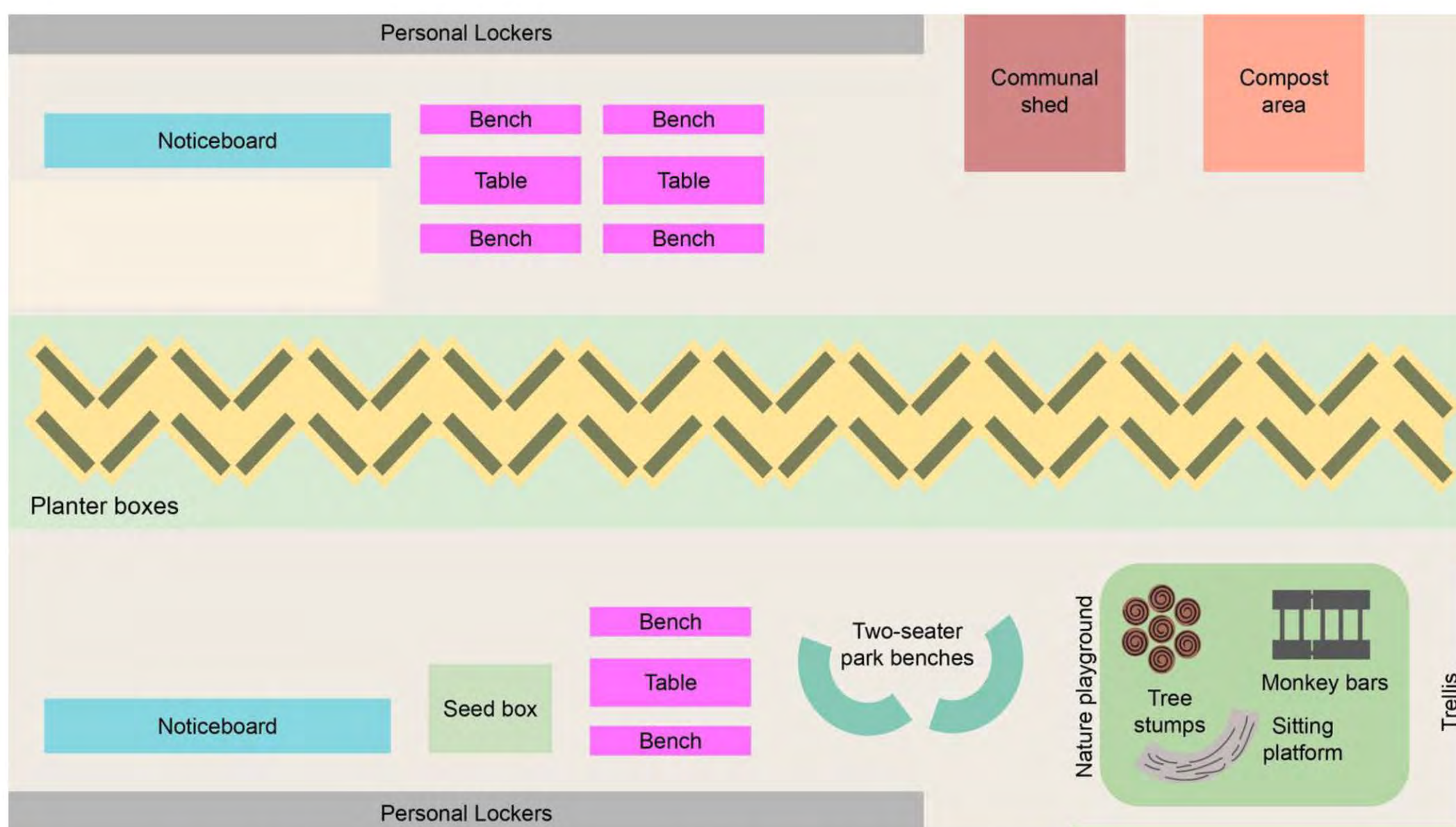
# Youth Stewards for Nature Design & Implementation of Community/ Allotment Gardens

Community in Bloom



AYU • RONNIE • DANA • MARCUS • RACHEL • JESS • SZE MIN • JENEVIEVE • JIE YING • XI NING

## Design Layout for Rooftop Allotment Garden



Location: Blk 682 Jurong West Central 1 (Multistory Carpark)

We crafted and proposed a design for a rooftop allotment garden. Our aim was to create a welcoming and conducive gardening environment, accessible to all residents.

Our design includes:

- Resting & storing areas
- Nature playground
- Educational noticeboard
- Communal seedbox
- Composting bin



## Seeding @ PPN

- Seed propagation workshop at Pasir Panjang Nursery
- Learnt about different soil types suitable for growing edibles and how to perform seedling of plants
- Seedlings were used in the allotment gardening session at Boon Lay Meadow Grove RN for 15 allotment gardeners



## Gardening Workshop with the Community

For our final event, we will be assisting in the launch of Boon Lay Meadow-Grove RN communal plots, as well as participate in an interactive session with the allotment gardeners.

We're delighted to have followed the residents thus far on their journey as allotment gardeners.



## Garden Preparation

- Measured and assembled PVC pipes to outline each individual garden plot
- Created an educational video (DIY allotment garden plot demarcation using PVC piping) which was shared to the residents



Community in Bloom



# Public Engagement at Coastal & Mangrove Arboretum



## 02 IMPORTANCE OF MANGROVES

Pulau Ubin has the greatest mangrove forested area in Singapore, and is home to many endangered species! They also act as a nature-based solution (NbS) against coastal erosions & the mitigating effects of climate change.



## 01 OBJECTIVES

To develop creative ways to engage the public on:

- the diverse biodiversity of Ubin's coastal & mangrove plants
- the role that these habitats play as a nature-based solution (NbS) at the Ubin Living Lab (ULL) coastal & mangrove arboretum.

## 03 RESEARCH & PLANNING

The team gathered for meetings to brainstorm on how we could bring awareness on mangroves. Literature reviews and interesting facts on Ubin's mangrove and coastal plants were conducted and gathered. After our research, we decided to create an engagement trail for citizens.



## 04 FIELD TRIPS TO UBIN

Multiple field trips were conducted to reconce for suitable station locations for the engagement trail. Mangrove & coastal plant species were documented through 360° videos and photographs. A Google My Maps was also created to track locations and interesting facts about mangroves and coastal trees.



## 05 ENGAGEMENT TRAIL & WEBSITE

Finally, mangrove engagement trail is born! The trail consists of a virtual and narrated guided tour to the coastal & mangrove trees along the north of Ubin. They are all housed under a website which visitors can access via the QR codes found at the physical stations in Pulau Ubin.



SCAN ME

# Youth Stewards for Nature OneMillionTrees Movement (OMT)



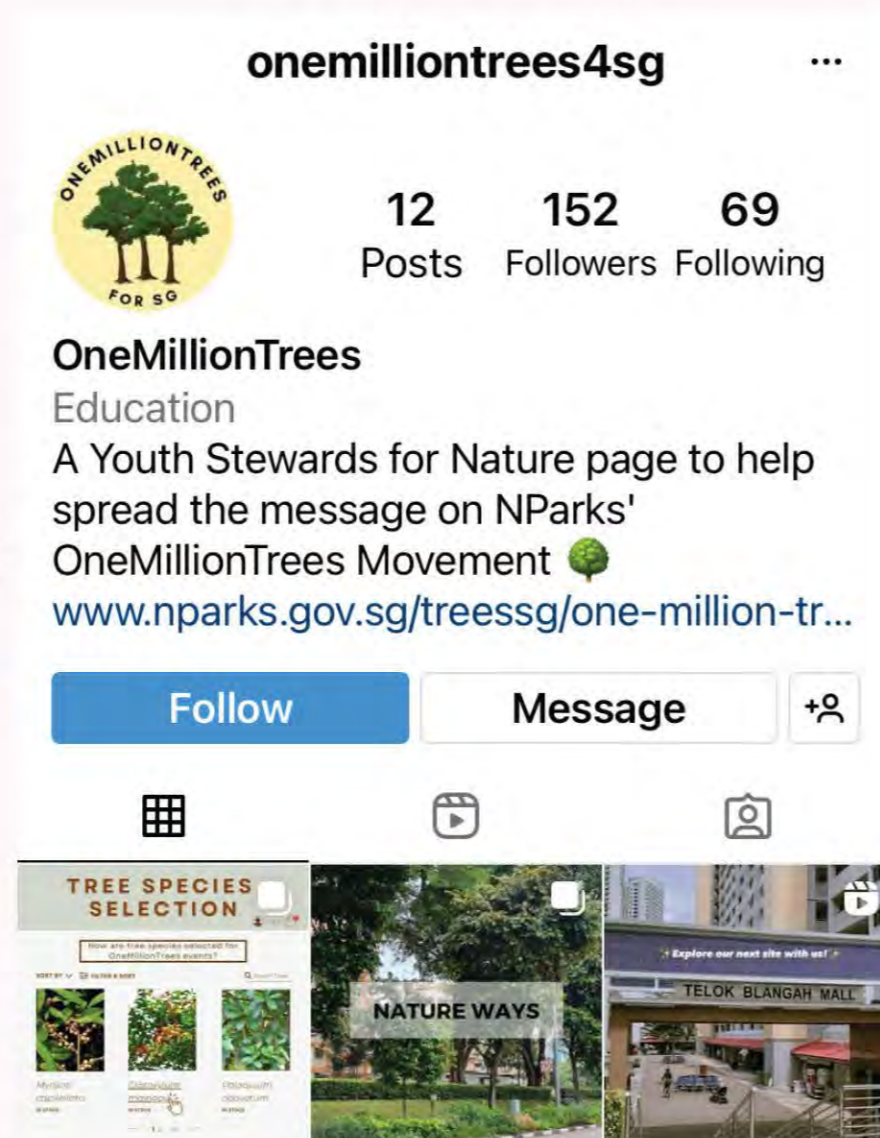
## AIM OF THE PROJECT

To spread awareness  
about the OneMillionTrees  
Movement by NParks



## VISIT TO PASIR PANJANG NURSERY

## SOCIAL MEDIA PUBLICITY



- Created Instagram Page OneMillionTrees4SG
  - To Promote OMT
  - To Engage Community
  - To Educate
  - Target Audience: Young Families, First-Time Tree Planters

- Shortlisted native species for OMT to create a multi-tiered facade
- What we learnt & shared with the public:
  - Planting palettes consider various factors – site history, planting space, existing datum trees, foliage colours, tree sizes to complement a tiered structure
  - Different species help enhance local biodiversity by attracting native fauna too!

## TREE PLANTING EVENTS



- Attended 4 tree planting events
  - Planted our own trees as a group
  - Co-organized 2 tree planting events
  - Made posters for 3 tree planting events
  - Facilitated 4 tree planting events



## REFLECTIONS

152 Followers



- Proud of building a following in just 3 months
- Greatly enjoyed connecting with the community living in the area; created memories for many first-time planters
- Main takeaway: A lot of work goes behind planning for tree planting events, but it always pays off when eager participants come to plant trees!





# Innovation in Waste Management at Pulau Ubin



## The Ubin Project

"Ubin to remain as a familiar and rustic getaway, where we can reminisce the past and celebrate the present, where our children can learn about and enjoy thriving biodiversity, where we can come together to enhance its idyllic charm through sustainable means and practices for future generations of Singapore."

### 5 Key Thrusts

Biodiversity Conservation

Education & Research

Community, Heritage & History

Nature-based Recreation

Sustainable Design & Practices

## Waste in Ubin



Rubbish that is collected throughout the island were shipped out of Ubin to mainland for disposal. Multiple trips were needed during high season.



## Interview with villagers

Business owners with larger scale operation produces roughly about 2-4 bags per week



## Plan and Initiatives

We established proposals to up-cycle and recycle the rubbish

### Working with villagers

-Provide bins for sorting trash their daily trash

-Engage volunteers to aid villagers who need help in sorting the trash



### Composting, up-cycling and recycling

-Composting organic waste, can distribute compost to villagers for their own plants.

-Look into companies that can reduce plastic through pyrolysis, which can provide diesel to use for the villager's generator



-Setup up-cycling workshop to transform plastics into useful items

-Husk from coconuts can be used as planting medium and burning fuel for campsites

### Collaborating with Organisation

Approach organisations that can help raise awareness and methods of up-cycle and recycling certain waste



\*Meeting with "The Plastic Project"



# Co-facilitating Therapeutic Horticulture & Therapeutic Garden Programmes in Community Organisations



## Our Team

A Team from **Diverse Backgrounds**, with a **Common Interest** in Therapeutic Gardens and Therapeutic Horticulture



Qian Hui



Timothy



YuTing



Gayathiri



Michelle



Joshua

## Project Brief

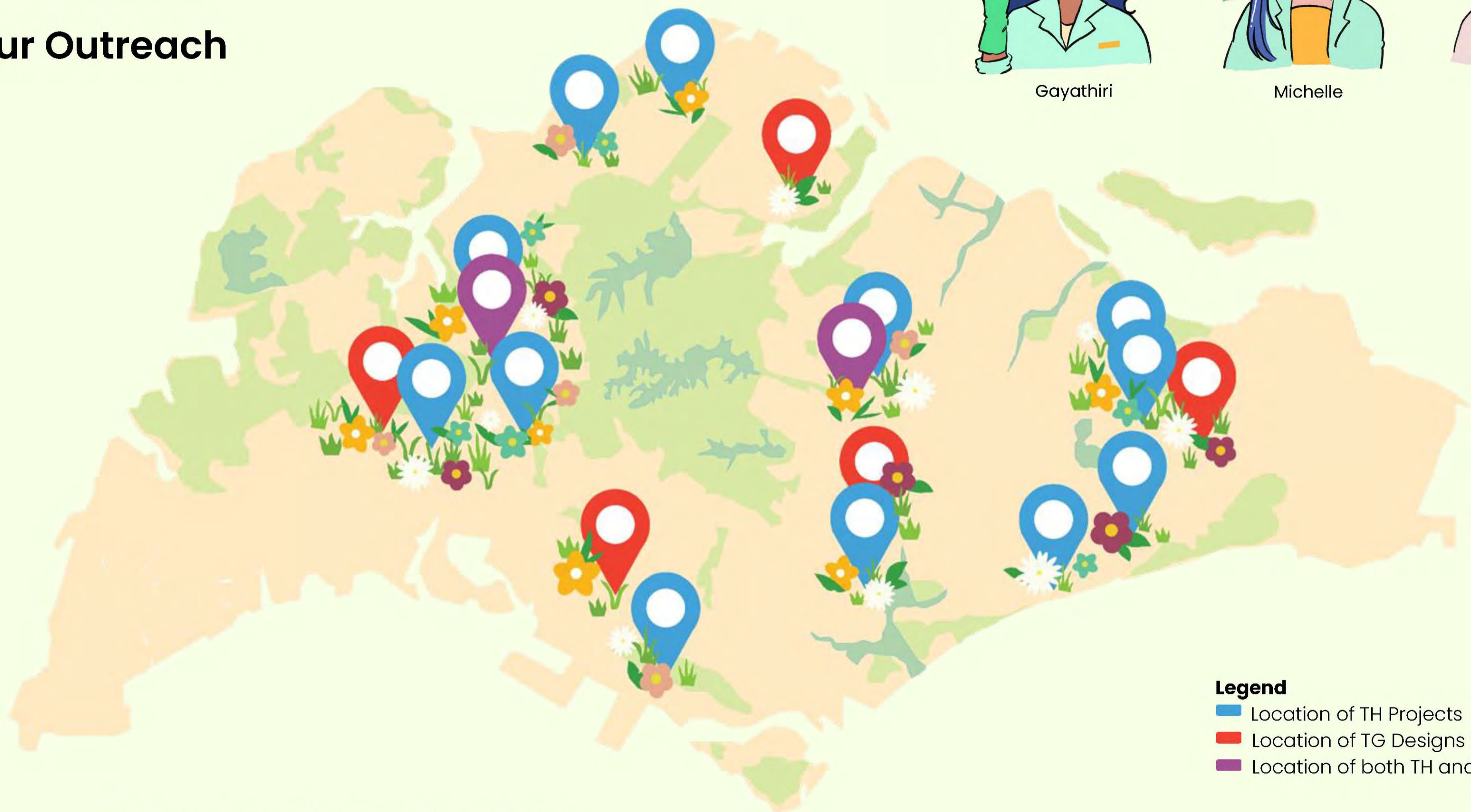


To facilitate the outreach of Therapeutic Horticulture (TH) and Therapeutic Garden (TG) programmes to community organizations across Singapore



Improve physical, mental and emotional wellbeing of the community

## Our Outreach



### Legend

- Blue pin: Location of TH Projects
- Red pin: Location of TG Designs Meetings/Projects
- Purple pin: Location of both TH and TG Projects

## Therapeutic Horticulture Workshops



Kampong Glam Kelantan RC, 16 April 2022



Tampines Care Home, 25 April 2022



St Andrew's Senior Care, 8 June 2022

Facilitated the training of staff in external organizations to conduct TH activities for their beneficiaries

### Did you know?

Making use of secateurs or spray bottles during the TH activity can help seniors improve fine motor skills

### The power of plants!

Plants in a TG serve many roles such as providing shade, engaging the five senses and can even evoke memories in people with dementia

## Therapeutic Garden Design Projects

Assisted in providing ideas for TG designs to external organizations

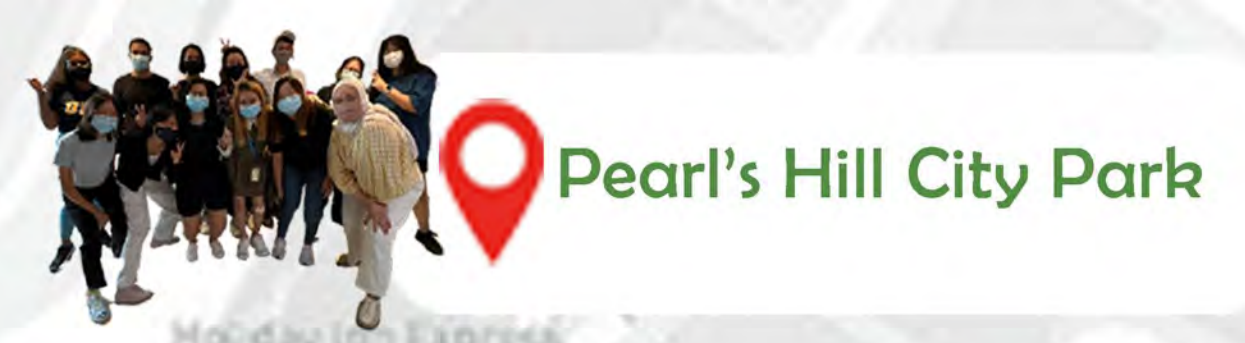


APSN Delta Senior School @ Choa Chu Kang, 17 Feb 2022



# CREATING PARKS & EVENTS FOR THE FUTURE!

Youth Stewards For Nature



We were tasked to redesign Pearl's Hill City Park (PHCP), so that  
 (i) it has a distinct identity,  
 (ii) it is adaptable to changing needs, while  
 (iii) creating a strong ownership for park users.

## Explore! Features of PHCP

- A 8.5 Ha green space
- In the midst of the city
- In a historically-rich district
- A future hillside enclave
- ✓ Surveys/Interviews
- ✓ Preliminary Research
- ✓ 2 Site Recces
  - + examine infrastructure
  - + determine usership
  - + adjacent accessibility points
  - + key landmarks



## Empathise!

To analyze the data collected, we adopted the Think-Place Design System™ from a two-day 'Introduction to Design Thinking' workshop organized by NParks. e.g. Affinity Mapping, Persona Creation



Notably, our findings shed light into three aspects characterising PHCP's unique identity:

1. Peacefulness
2. City+Nature
3. Hilly terrain

## Envision!

From observations to surveys, we spoke to many park users to better understand their views. From all the interviewees, three park user profiles have been generated.

- HIKER HARRY**  
To regularly exercise, to maintain health and fitness.
- EXPLORER EMMA**  
Stumble across parks and come to discover new places.
- NATURE NATALIA**  
Destress and appreciate nature.

### Pain Points

For the elderly, the hilly nature of PHCP poses a challenge for them.  
 No signages or info boards to educate oneself about the park.  
 Unable to locate seating areas.

We identified 3 gaps to be filled from above:  
 -To improve visibility and accessibility  
 -To improve users' interaction with the park's environment.  
 -To integrate and link PHCP with nearby green areas and heritage sites

I get a sense of accomplishment when I make my way to the summit since I get to test my limits. I feel like traveling back in time and immersing myself in Singapore's history as I soak in the surrounding historic architecture.

I feel connected with this earth and I am part of the community of nature. Nature is filled with so much beauty, life & wisdom that it's only natural to feel uplifted in the presence of big trees & singing birds.

I enjoy a break from the bustling city and feel comfortable in my own skin, I experience my own quiet peace strength, and sense the inner self that is the true me.

## Experiment!

To address the gaps above, we created an exploratory prototype of officialising four different themed trails in PHCP. We then conducted another intercept survey on a sample of PHCP users to assess their receptivity towards the idea.

### + 4 NEW TRAILS FOR YOUR EXPLORATION!

- =FITNESS TRAIL** 1.0 KM  
Come together with your friends and family! Enjoy the fun of conquering and challenging the fitness and adventurous goals.
- =NATURE TRAIL** 0.7 KM  
Take a camera and appreciate the nature along the gentle pathway to get closely connected with the biodiversity! You will pass a trove of trees, shrubs and ferns where several resident birds can be commonly seen perching on.
- =TRANQUILITY TRAIL**  
The trail passes through aesthetic garden landscape and luscious trees that satisfy your senses of sight, sounds of leaves rustling as well as birds chirping. Trail includes several stop points great for meditation sessions and other indulgence activities.
- =HISTORY TRAIL**  
Experience for yourself the untold stories behind the neighbourhoods and parks of Singapore where we live, work and play.

### + ROLL OUT STAGES

1. Post 4 Trails on NParks website.
2. Guided walks.
3. Erect signages & info boards with QR codes.

## LEGEND

### Amenities

### Attractions

1. Heritage Tree
2. Butterfly Spotting
3. Stone Bridge
4. Colourful Path
5. Squirrel Spotting
6. Aquatic Pond
7. Birdwatching Spots
8. Flora Clusters
9. Hard Court
10. Shelter
11. Fitness Corner

### Conclusion

The park can be redesigned through officialising four trails that allows it to be: (i) more visible and accessible, (ii) enable park users to feel immersed and rejuvenated in nature, and (iii) be well-integrated / inter-connected with nearby green areas and heritage sites. By making PHCP a 'city park of trails' and encouraging park users to explore when they visit, this will hopefully bring people back to PHCP and instil some ownership in park users.



- Entrance
- Restroom
- Directory Map
- Car Park



# YSN 2022: PAWER TRAINERS

## Project objectives

To teach primary school children the importance of dog training, through a board game and presentation



### In Progress/ Add Ons

1. Creating an instagram page to keep the primary school children engaged even after the session!
2. Expanding beyond primary school to also reach out to secondary school students

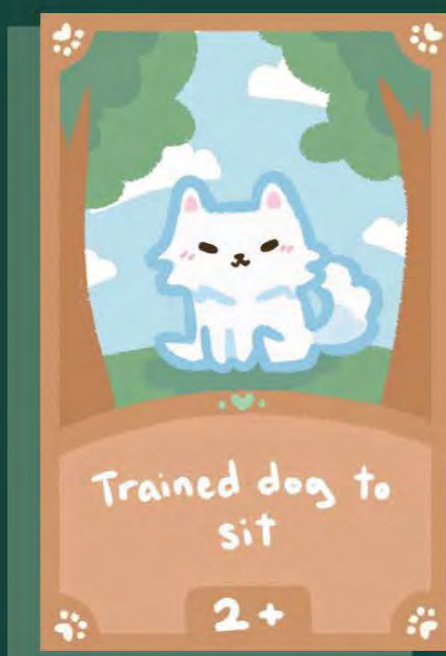


## Project initiative: Board game Pawer Trainers!

### Our board game layout



example of power up card that players can draw

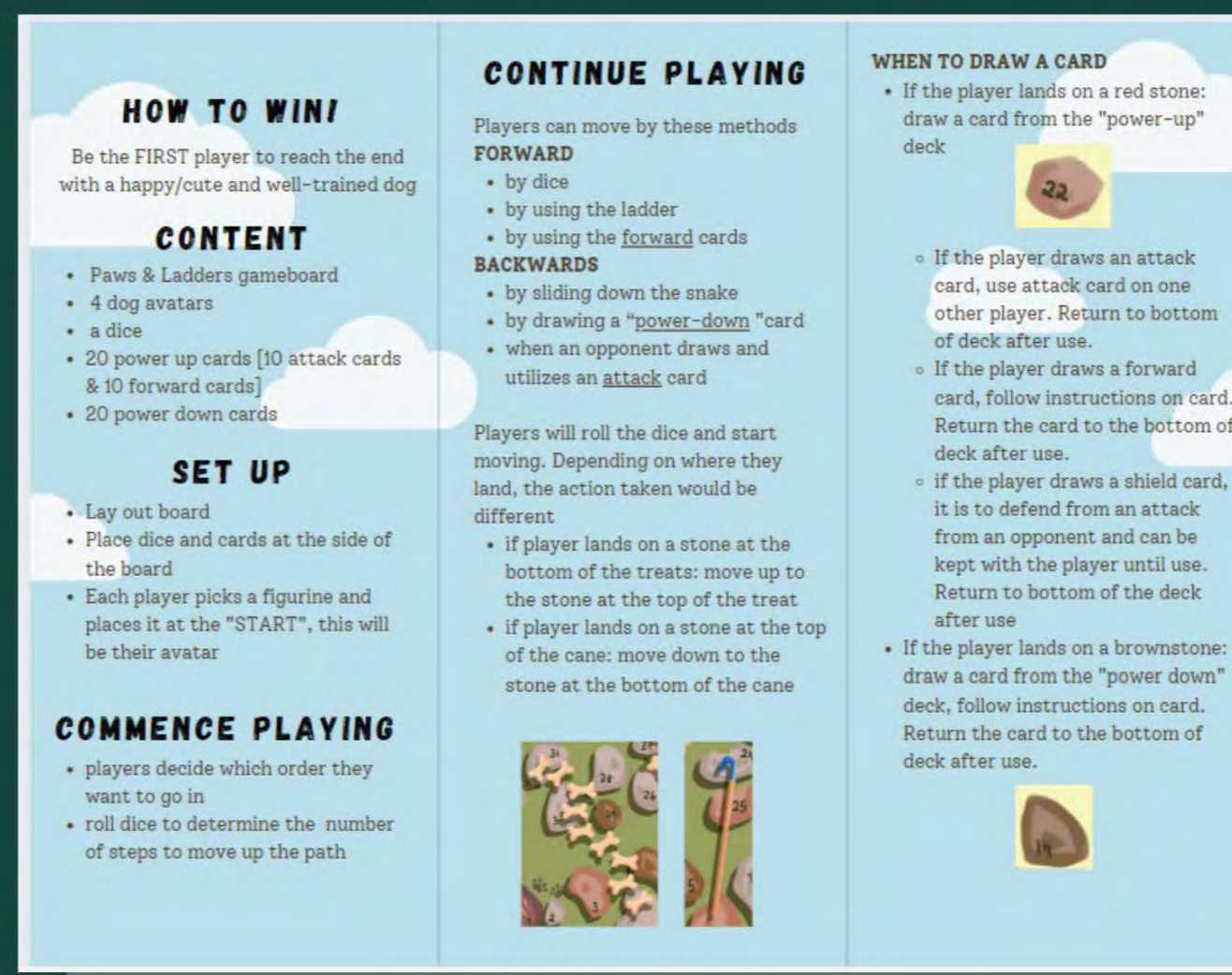


### Challenges faced:

- Creating a game simple enough for primary schoolers to understand but comprehensive enough to reach our objectives



### Board Game Instruction sheet

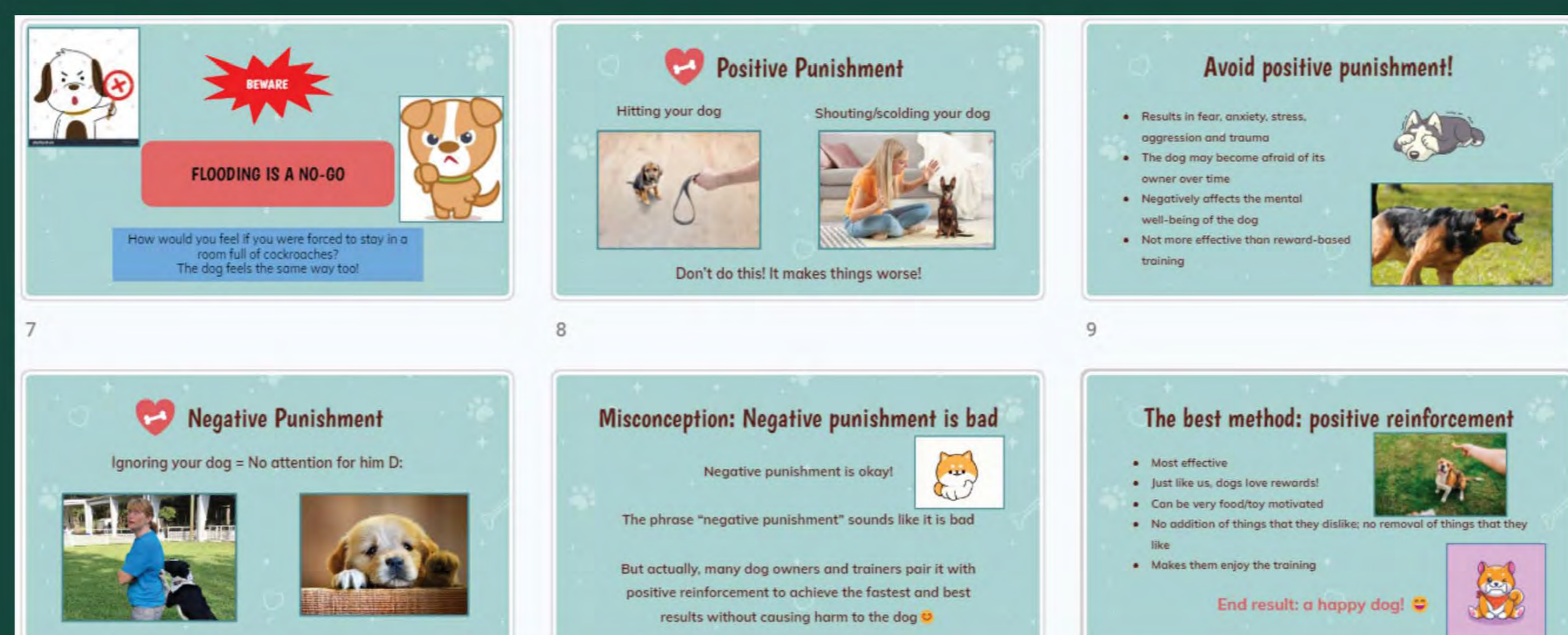


### Crafting of prototypes and figurines needed for the game

### Creating a comprehensive set of slides for an assembly talk for the primary school children



## Project initiative: Assembly sharing



### Challenges faced:

- Deciding content to be included in the sharing to ensure they are engaging enough to appeal to primary schoolers

## Key takeaways

Through this programme, we have learnt that

- Raising awareness in proper dog training is crucial for saving many pet's lives and keeping pet's happy
- Games can be useful in engaging and educating young target audiences

# WORLD WILDLIFE DAY REGIONAL YOUTH SYMPOSIUM 2022

## KEY STATS!

- 5 Youth Volunteers
- 22 Expert Speakers
- 40+ Facilitators
- 200+ Participants
- 13 Nationalities
- 80+ Affiliations from environmental groups, government organizations & academic institutions



## OPENING SEGMENT

### GUEST SPEAKERS



Mr Desmond Lee



Dr Theresa Mundita S. Lim



Ms Ivonne Higuero



Dr Madhu Rao

### OUR KEY TAKEAWAYS

World Wildlife Day is both a celebration and a call to action. Wildlife and nature are extremely important to humans. Key species provide important ecosystem services to people and are an important part of our culture and identity. However, they are under steep declines and serious threats. Biodiversity loss is caused by unsustainable exploitation, habitat and ecosystem destruction. Nature can still be conserved, restored, and used sustainably if we take urgent and coordinated actions.

## TRACK 1: WILDLIFE TRADE

### GUEST SPEAKERS



Prof. Gopalasamy Reuben Clements



Ms Kanitha Krishnasamy



Ms Sallie Yang



Dr Adrian Loo



Dr Giovanni Broussard



Dr Klairroong Poonpon

### OUR KEY TAKEAWAYS

Illegal wildlife trade is a fast-moving and complicated issue to tackle. The rise of the age of internet has also exacerbated the challenges in combating this issue. The fight against illegal wildlife trade requires multinational collaboration across different sectors - governments, NGOs, private organisations and the general public. Additionally, multifaceted strategies should be employed, such as having powerful legislation and boots on ground to enforce these laws.

## TRACK 2: SPECIES RECOVERY

### GUEST SPEAKERS



Ms Nerissa Chao



Mr Vorsak Bou



Dr Kalyar Platt



Mr Low Bing Wen



Dr Wong Siew Te



Dr Andie Ang

### OUR KEY TAKEAWAYS

The conservation of species requires collaboration, community and creativity. It requires the support of the people and we must consider the needs of the communities that are concerned. Soft skills are crucial in engaging and communicating with various stakeholders. Nonetheless, everyone can be involved in conservation regardless of background given the broad skillsets needed in this field. Sometimes, the best solutions may be the simplest.

## TRACK 3: ECOSYSTEM RESTORATION

### GUEST SPEAKERS



Dr Karenne Tun



Dr Frida Sidik



Dr Stephen Elliott



Dr Rahayu Sukri



Mr Muhammad Ridwan



Dr Simplicia A. Pasicolan

### OUR KEY TAKEAWAYS

Restoring entire ecosystems is a difficult and surmounting task. This can be done by leveraging the wider community to be involved. Citizen science is a great way of being able to collect more information and data. We need to work with communities and build on their existing intimate knowledge of the surrounding and make use of novel technologies that can provide insights and allow for better monitoring. Most importantly, we must be adaptable in today's volatile climate.

ILLUSTRATED BY:

*Earth to Dorcas*

FOLLOW US ON INSTAGRAM!

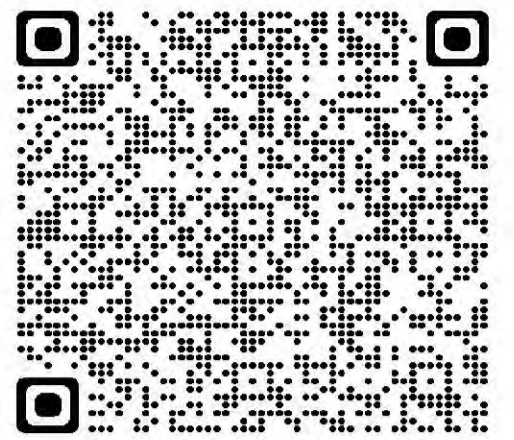
JOIN THE 2023 WWD TEAM!





# YSN Project 18: Study and Curate a DIY Nature Guided Trail in Civic District

Scan me to try  
out the digital  
trail!



Project member: Teng Zhenyi  
Project Mentor: Bai Sin Yeou

## 1. Project Background and Objective:

The aim of the project is to create an interactive DIY nature guide for members of the public to explore the various parks and park connectors independently through an interactive digital platform. Currently, the nature trails developed by NParks are offered to the public through volunteer-led guided walks and PDF e-guides.

The COVID-19 pandemic has halted many of the physical tours and programmes in 2020 and 2021, limiting NParks ability to engage nature lovers. Through this project, we hope to harness the power of digital tools and provide an alternative digital nature trail guide that users can embark on a curated Do-It-Yourself (DIY) nature walk. Such digital tools will prepare us for to adopt a hybrid-style outreach programme which has gained popularity after the pandemic. Nature lovers will have a greater freedom and choice to decide how they wish to experience the nature trail, whether physically or virtually in the comfort of their home.

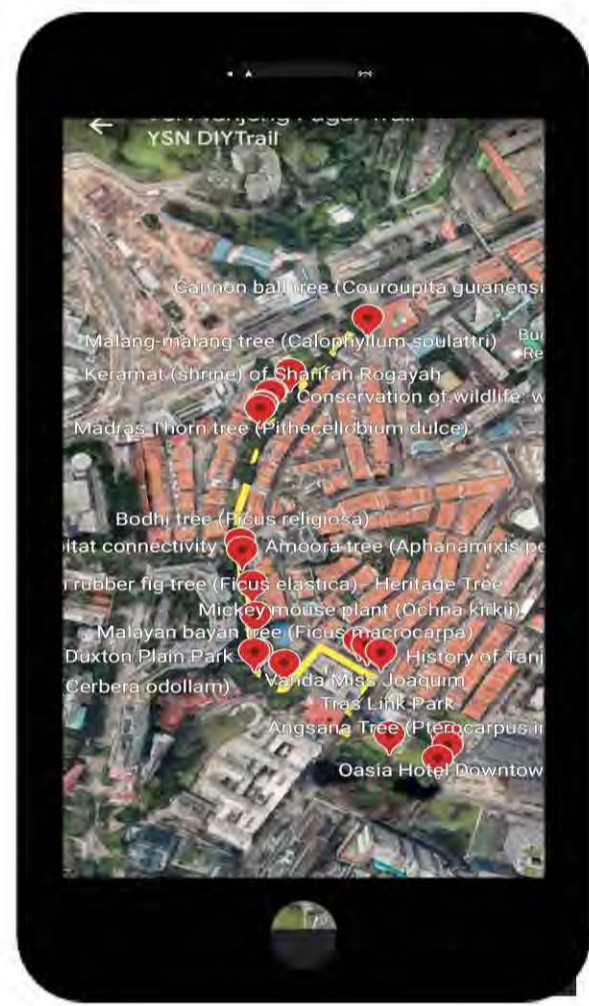
## 3. Using Google Earth for Tanjong Pagar Nature Trail:

In this project, a new neighbourhood trail called Tanjong Pagar Nature Trail was developed by NParks Parks Central South and an NParks volunteer. The trail highlights the rich biodiversity within the neighbourhood parks of Tanjong Pagar. Along the trail, we highlighted some of the plants and trees that have played an important role in shaping the neighbourhood of Tanjong Pagar that we see today. To test out our proposed hybrid-style outreach programme for nature trails, we decided to digitalise this Tanjong Pagar Nature Trail. We reced the route and identified various points of interest that has cultural, historical and biological significance. Google Earth was our main choice of digital tool due to its myriad of functions and editable features:

## 2. Digital tools available for virtual tours:

We explored 3 different digital tools that have the potential for hosting virtual tours. The first is Google Earth, a platform provided by Google that helps users to navigate and map out a walking route. The second is YouTube 360-degree Video, a video hosting platform where users can upload interactive 360-degree videos. The third tool is Story Sphere, a digital tool that allows editors to upload 360-degree street view images and audio recordings.

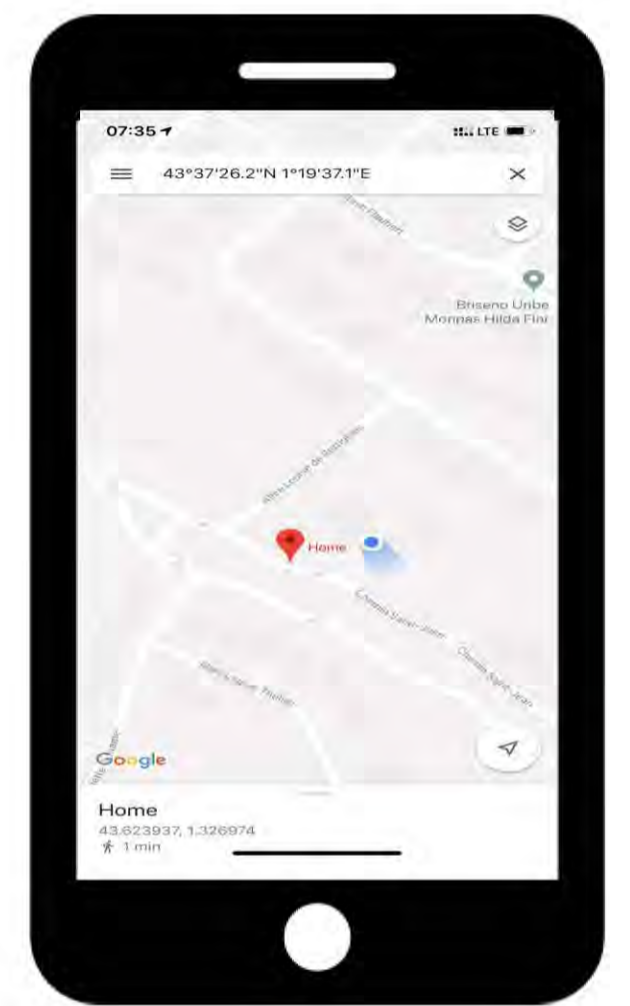
Google Earth	YouTube 360 degree Video	Story Sphere
Can be used for virtual tours		
Street-View provided by Google	Have to use a 360 degree camera to capture the street-view	
Interactive points of interests with image and texts display	Points of interest can only be viewed in video.	Interactive points of interest only with sounds.
Live navigation is possible	No live navigation	



1. Able to map out the full route with a bird's eye view

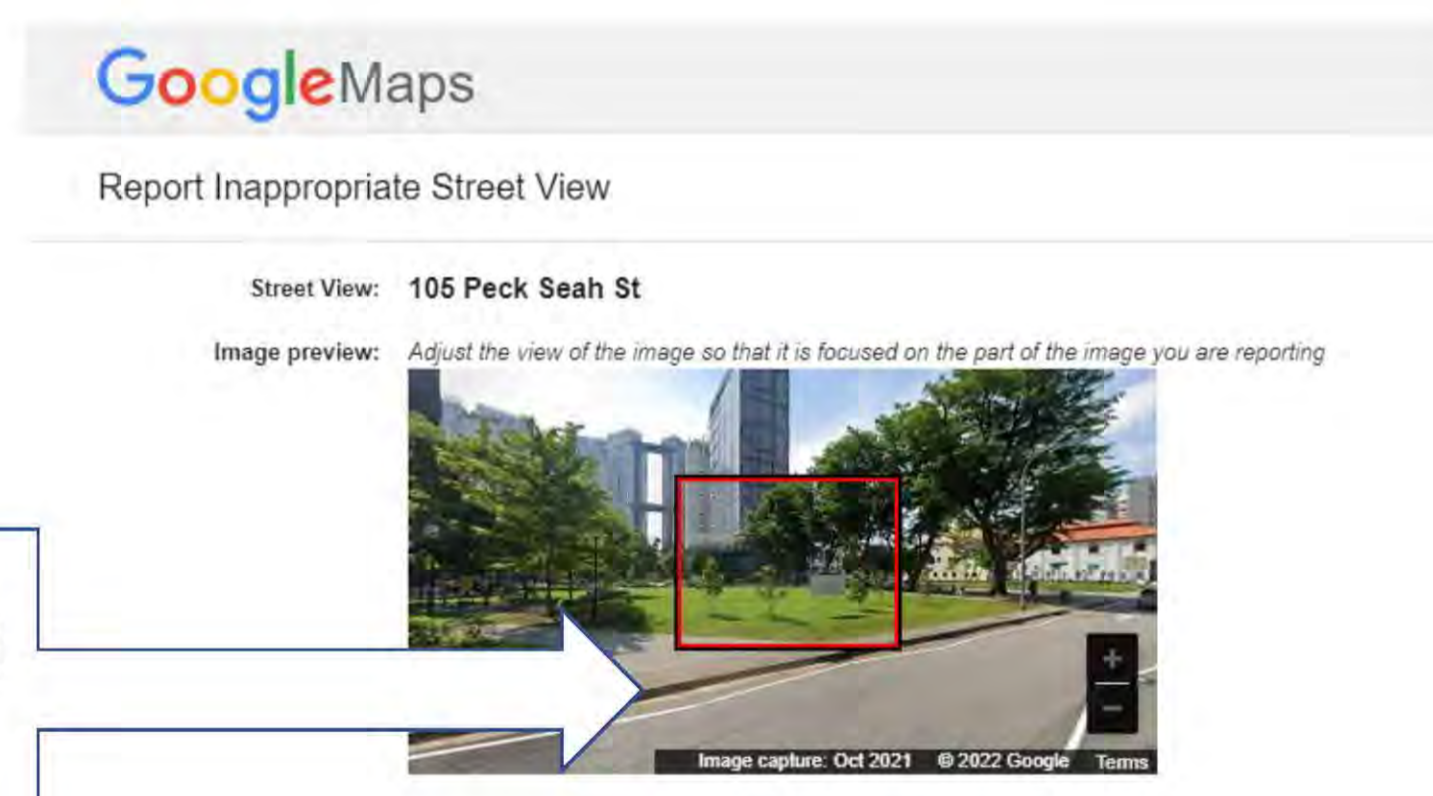


2. Able to display the photos and information of the points of interest along the route



3. Able to show the live navigation of the user in relation to the trail

4. Able to show the latest updated street view and bird's eye view



## "How to use" manual detail:

A "How to use" manual was created to help participants learn how to use the Google Earth and explain the different functions and features on the app. It was created as most users would be unfamiliar with Google Earth and would benefit from having an easy to read manual to navigate the app.

## 4. Test Trial and Feedback

We invited 10 participants to try out our digital trail as part of the test trial to gather feedback on the experience of using a digital trail guide. The participants were from a good mix of different age groups, from 16 to above 75 years old. This allowed us to analyse how the different age groups respond to the digital guide. The participants tested the trail virtually using their mobile phone and laptops.

From the survey results, 60% of the participants were satisfied with the duration of the trail (~45 mins – 1 hour) and 70% found the overall experience of using a digital trail to be pleasant and easy to use.

Some of the participants provided suggestions on improving the digital trail guide:

- Include more animal-related points of interest
- Provide an offline version of the guide for participants without internet access
- Provide a high resolution photos of the points of interest

With their suggestions, we have implemented changes to the trail guide to improve the overall user experience:

- Research on the types of animals frequently found along the route
- Take our own photos of the points of interest
- Develop a PDF version of the guide for offline participation.

## 5. Potential Synergy with NEAR APP:

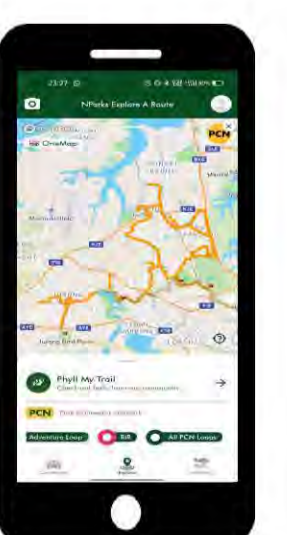
NParks Explore A Route (NEAR) APP is a mobile app developed by NParks to help users to navigate the parks and park connector network (PCNs) around Singapore.

Both Google Earth and NEAR app allow users to follow and navigate a drawn route on the map. However, the NEAR app is limited in its ability to allow users to experience the nature trail digitally and learn about biodiversity that can be found along the different trails and park connectors.

NEAR app has the potential to leverage on the functions of Google Earth such as the live location navigation, providing a 360-degree street view and plotting of points of interest along a marked trail or park connector. These functions will improve the overall user experience in our trails and park connectors.

## 6. Conclusion:

In conclusion, our project found Google Earth to be a useful digital tool to digitalise our nature trails and offer the public an alternative way to experience nature trails. The test trial of digitalising the Tanjong Pagar was successful and received good feedback from the participants. There is potential for the NParks' NEAR app to adopt such features so as to enhance the users' experience of using the app to navigate our parks and park connectors.

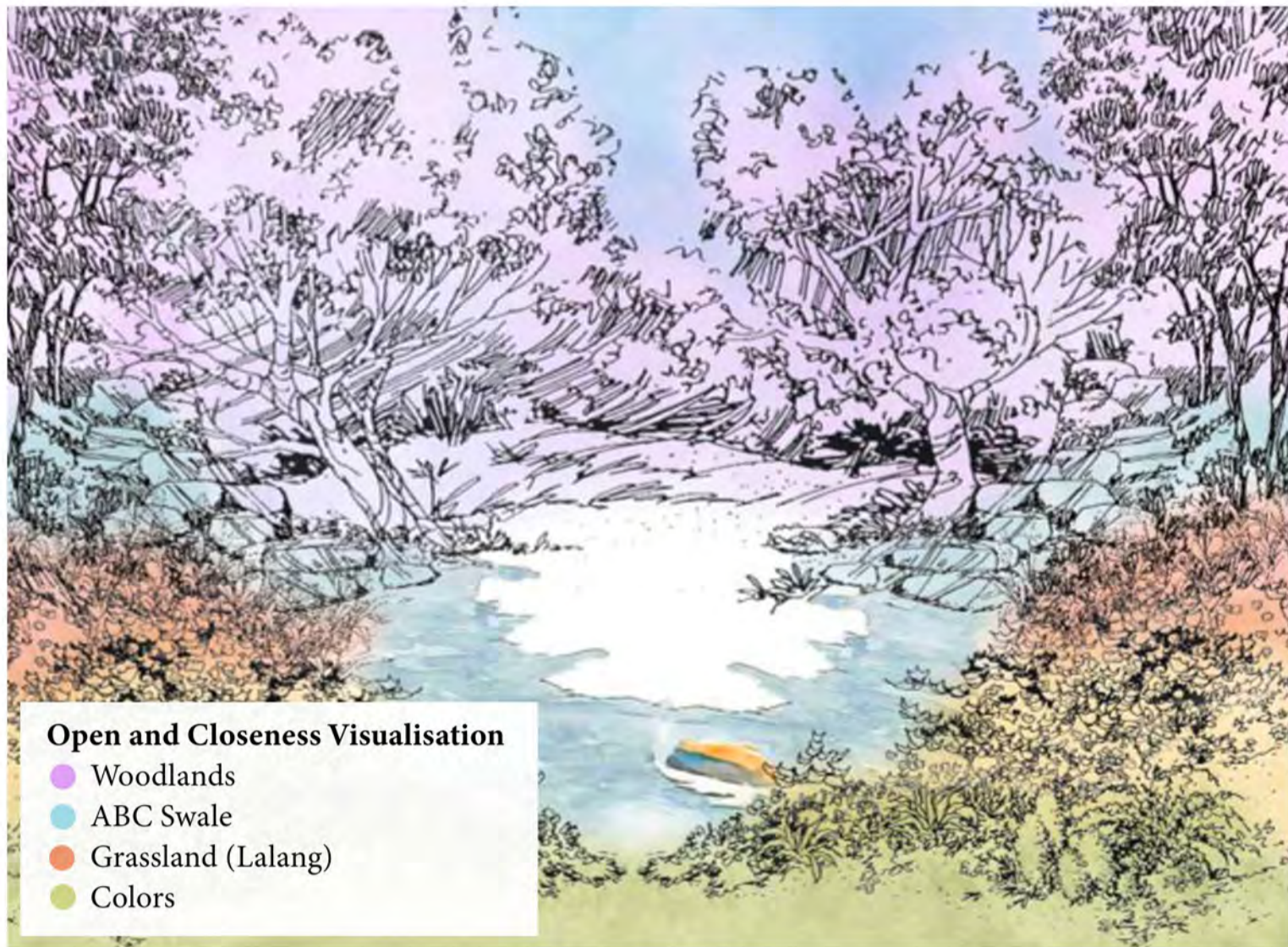
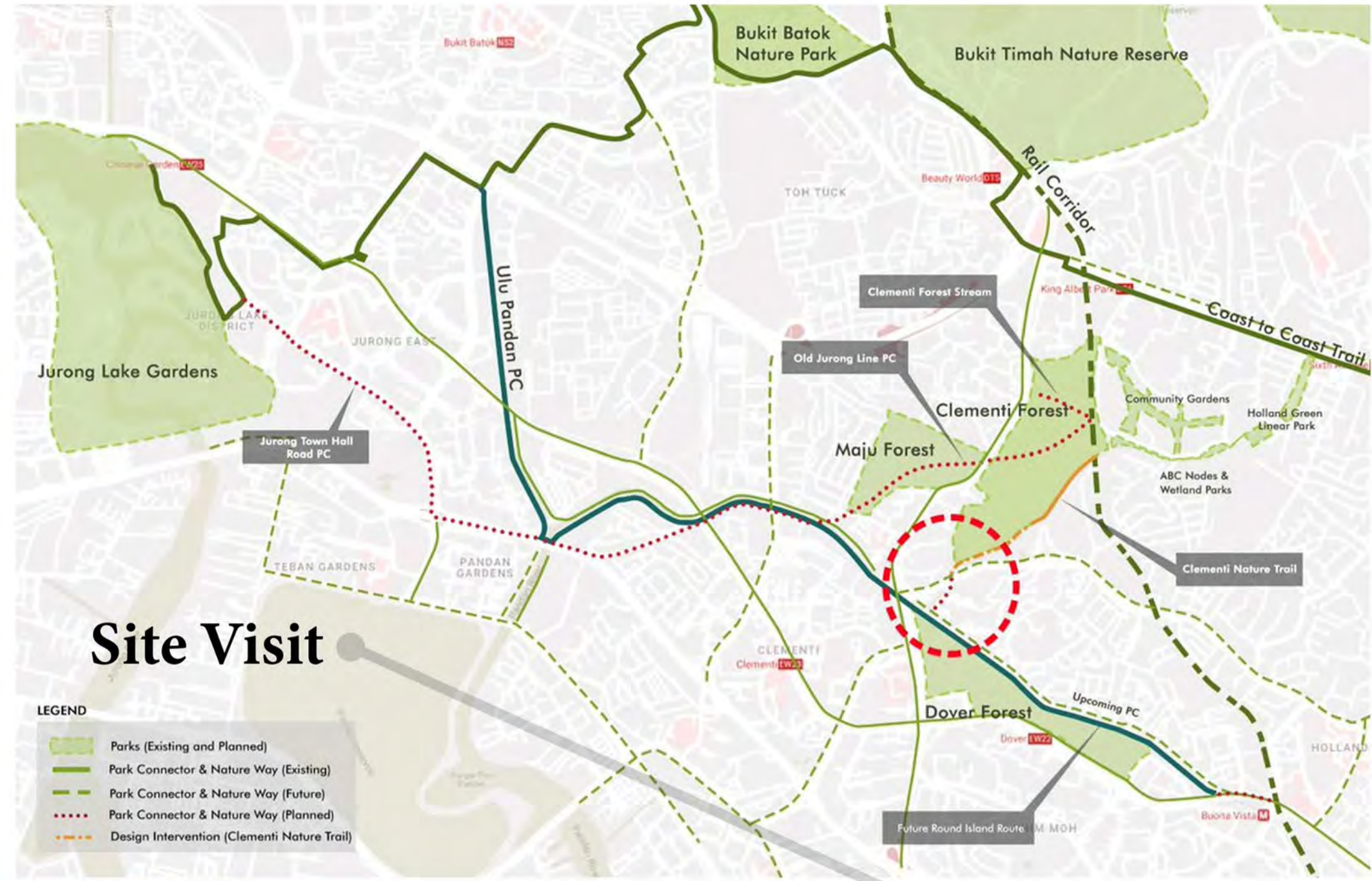


# Youth Stewards for Nature Clementi Nature Trail

## An Ecological and Experiential Trail

### Overview

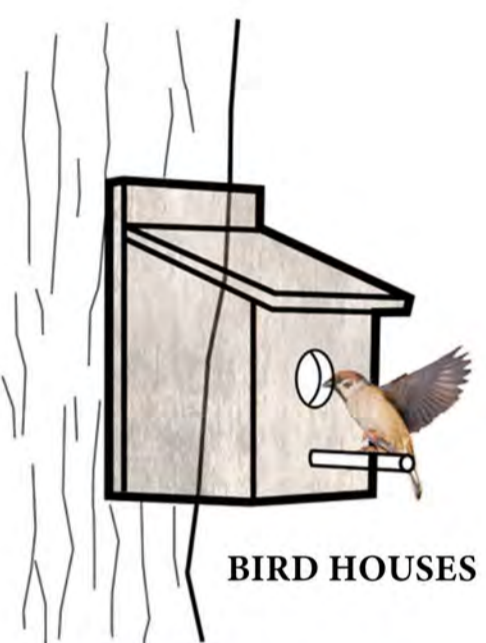
Rich with historical and biodiversity values, the establishment of the Clementi Nature trail would form a crucial node that links Rail Corridor and Coast-to-Coast trail to the Ulu Pandan park connector which would be integrated as a part of the Round Island Route in the near future years. The experiential and educational nature trail would also dual function as a connecting route which helps to circulate users from Clementi to other parks in the region, completing the user friendly network for cyclist and recreation enthusiasts.



### Site Analysis Understanding the Site Conditions

#### Site (Existing Challenges and Constraints)

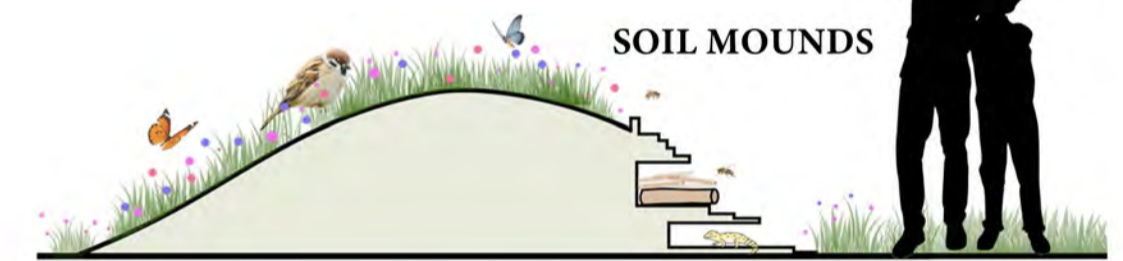
The site is located at Bukit Timah, Ulu Pandan Road near Clementi and Dover Forest. Currently, the site offers a lack of shelter and shade but offers promising biodiversity due to existing water bodies and its close distance from forested areas. This enhanced connection will accommodate users such as joggers, cyclists and hikers due to it being part of a park connector.



### Design Planning Planting Scheme and Discussions

#### Objectives

To create a seamless connection for users from the Ulu Pandan PCN to the future Ulu Pandan Linear Green Park via a residential hub. The focus on catering to urban ecological opportunities and as an experiential and educational trail for the users.



### Strategies and Proposed Designs

Soil mounds, leaf litter, log piles, bird houses, and insect hotels are suggested for the site, providing a variety of options for biodiversity to thrive and nest within the site. The node would also be a space where users can appreciate the historical elements to remind people about the history of the military barracks.

### Implementation

#### New Stream

Planting placement and rock arrangement was done on day of implementation. Rock arrangement assists in slowing down water flow while creating pockets of safe spaces for dragonflies and damsel flies nymphs to grow. Vegetation was then selected and placed based on their characteristics to soften the hard edges while providing perching opportunities for the many dragonflies on site.



# YSN 2022

## Designing a Nature Way

Joshua · Nasry · Leia · Travis · Jessica · Sze Koy

### What are Nature Ways?

Nature ways are corridors of native flora planted along roads in our urban spaces to connect our green spaces.

Designed to mimic forests, they host fauna like birds and butterflies and allow them to move between these green spaces.



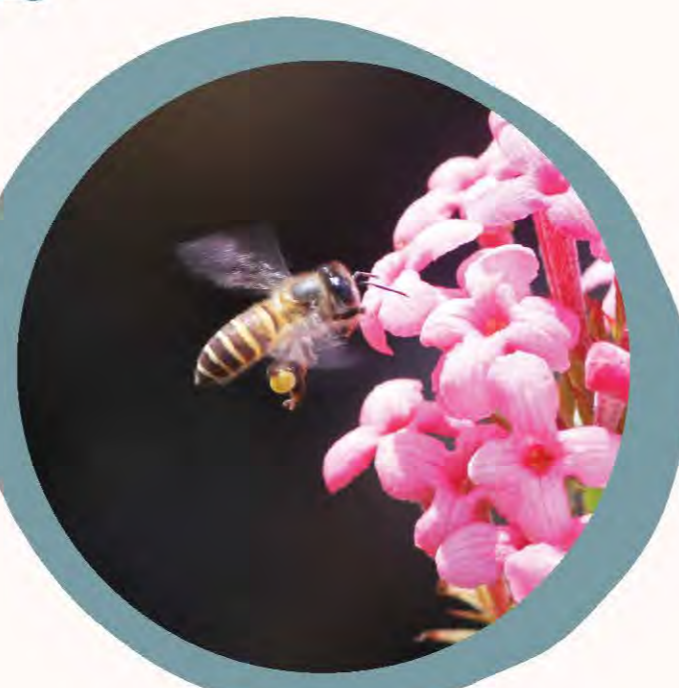
Our newly planted Nature Way along Simei Ave

### Nature Way Biodiversity



Tawny Coster

Asian Honey Bee



Lime Butterfly

Brown Throated Sunbird



### What did we do?

We designed and implemented a Nature Way along Simei Ave, Streets 1 and 3 to connect existing Nature Ways along Upper Changi Rd with Simei Park.

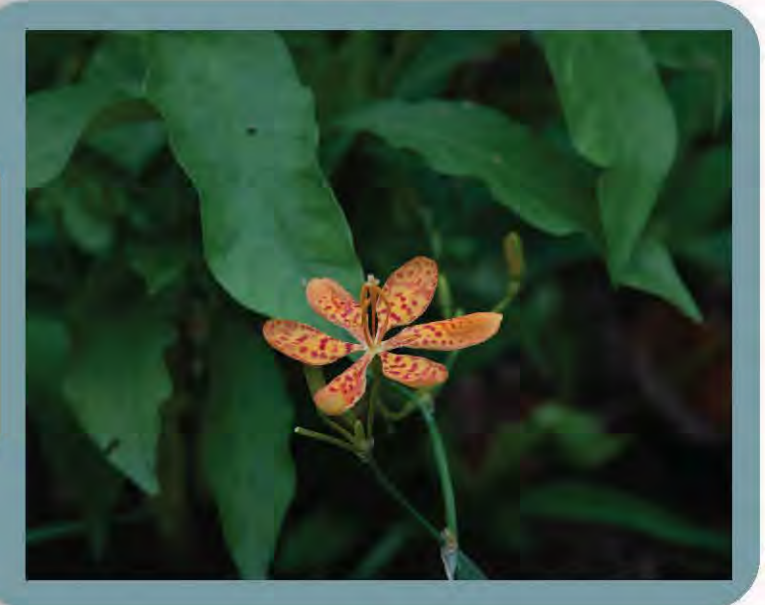
To engage and educate the community about Nature Ways, we also held a tree planting event in conjunction with NPark's OneMillionTrees (OMT) movement.

### Timeline

Survey of existing nature ways



Pre-planting site recce



Plant selection



OMT tree planting

Post-planting site survey



### Special thanks to:

Jason · Esther · Yong Kwang · Damien · Jasmine · Ronnie from the NParks team!

# WEST COAST PARK

## HABITAT ENHANCEMENT PROJECT



### Background

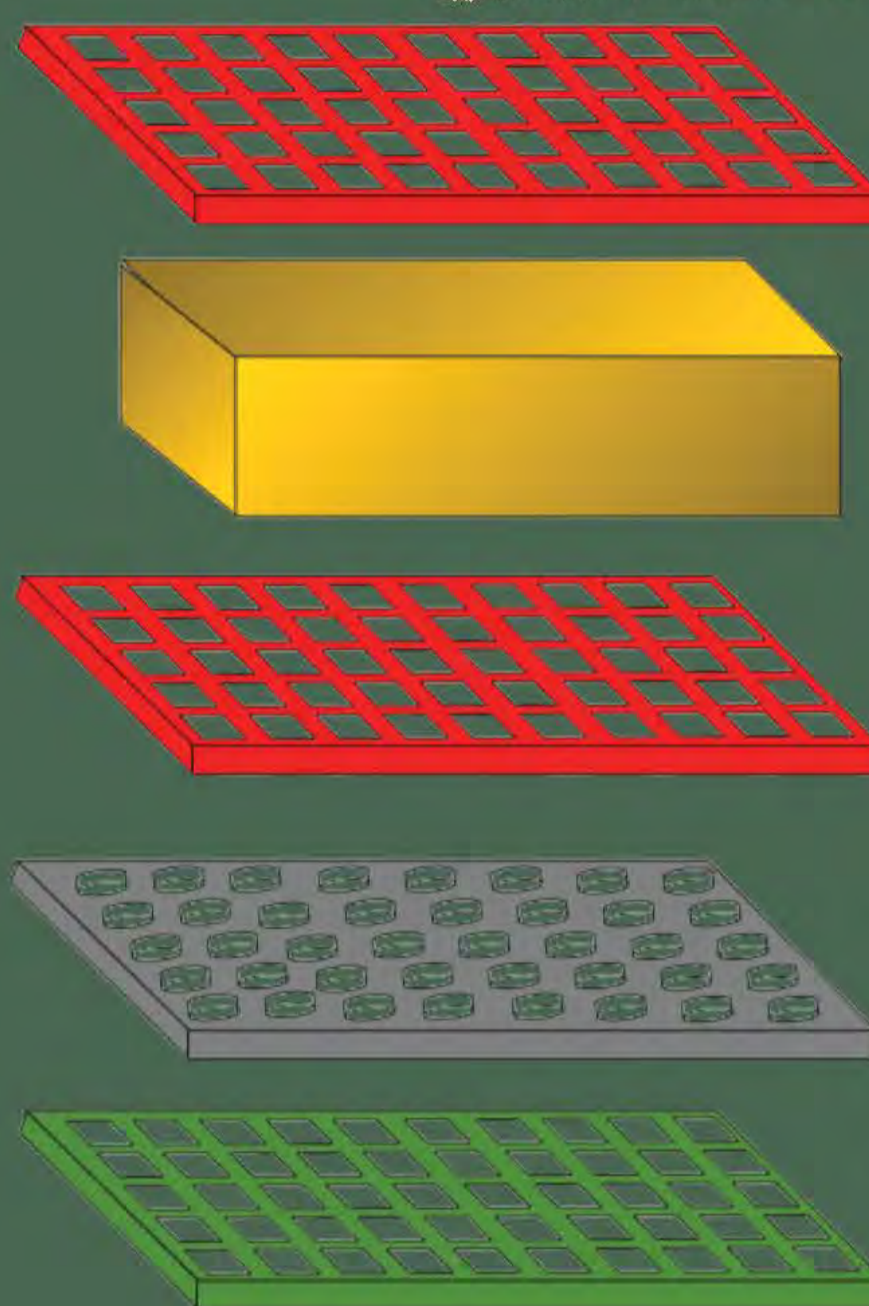
As part of the ongoing rewilding efforts, the 1 hectare pond at West Coast Park Area 1 has been naturalized. This includes the creation of a floating island habitat within the pond and landscaping of the surrounding vegetation with the aim of enhancing biodiversity around the area.

### Building our platform



An outer frame made from PVC pipes keeps the platform buoyant.

### Platform design



#### Erosion control blanket

Holds cocopeat down to reduce dispersion and erosion

#### Cocopeat

Serves as a porous, lightweight medium for plants to grow on

#### Drainage cells

Allows water movement between layers to prevent stagnant water from forming

#### Plastic mesh

Serves as a supporting structure which holds the other layers above



### Enhanced habitat for wildlife

#### Powdery Alligator Flag



#### Common Senduduk

#### Mexican Petunia



#### Common Flangetail



#### Olive-backed sunbird



#### Yellow-vented Bulbul



#### Chocolate Pansy



# Therapeutic Garden

Group Members: Dhivya Priya Kanisan  
Mentors: Alicia Soh & Ng Ting Yu

## SITE ANALYSIS

Site is in close proximity to seniors in the community with an interest in gardening



## CHARACTERISTICS OF TARGET USER

Depression & Emotional Support

Objective:  
- Opportunities for Social Interaction

Frailty & Dementia Prevention

Objective:  
- Opportunities for Physical Activity and Mental Stimulation

## CASE STUDY SITE VISIT



TELOK BLANGAH HILL PARK

- 1) Bench orientation is essential to create a comfortable and enriching visitor experience
- 2) Design concept should consider broader context of surrounding features
- 3) Inclusive design is key to create safe spaces for seniors



HORT PARK

- 1) Colours and texture make for a more enriching experience
- 2) Musical instruments add an interactive element
- 3) Secluded benches and tall shrubs provide privacy and relief

### Theory Application (Mental Strength Theory)



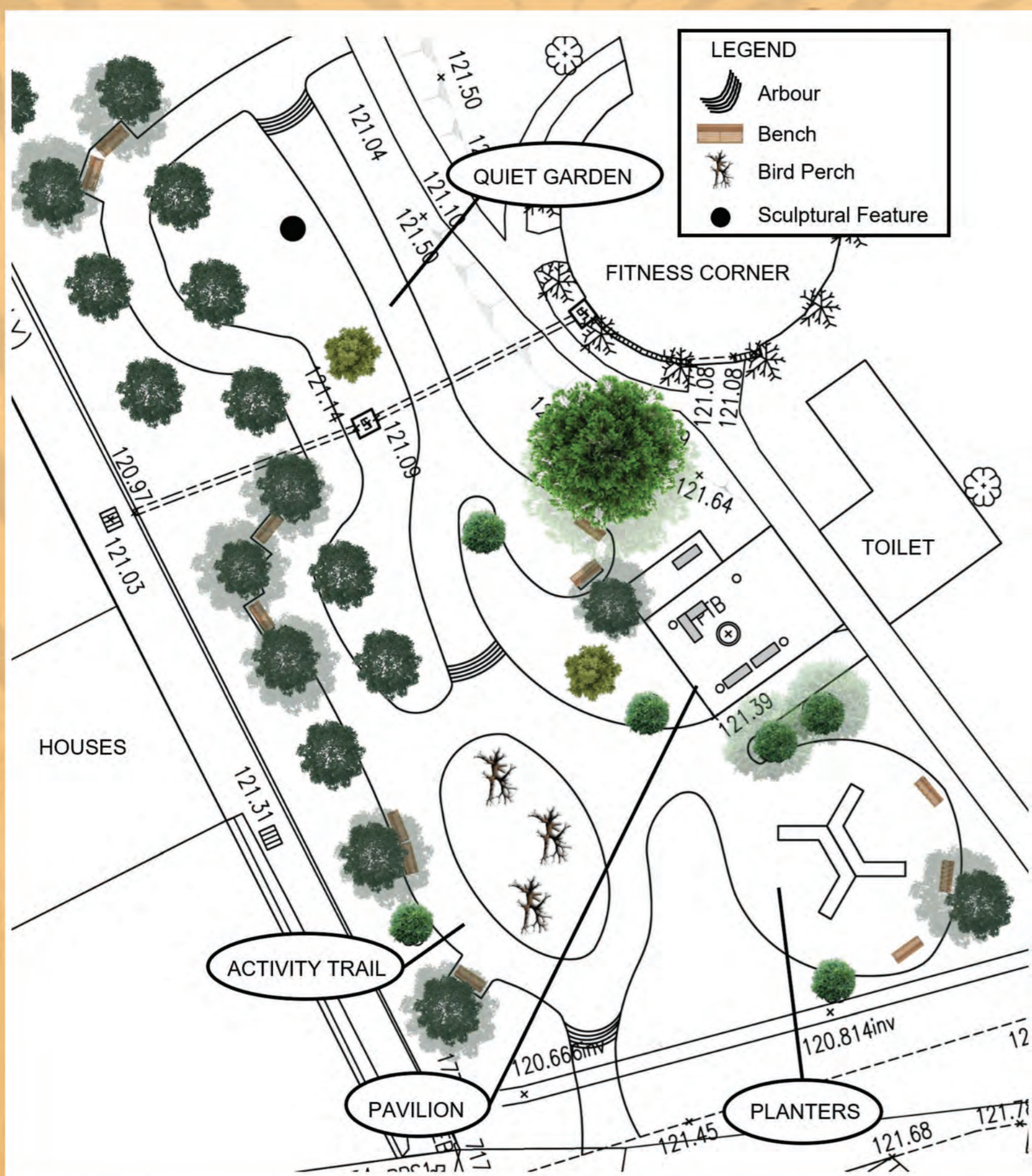
### Design Concept: Kampong + Birds

Both design concepts were selected to evoke nostalgia, preserve local cultural heritage and create opportunities for interaction between the older and younger generation.

The latter concept is also a nod to the nearby Kebun Bahru Birdsinging Club, a cultural icon many residents hold close to their hearts.

## concept and theory

## PROPOSED LAYOUT PLAN



### Shelter



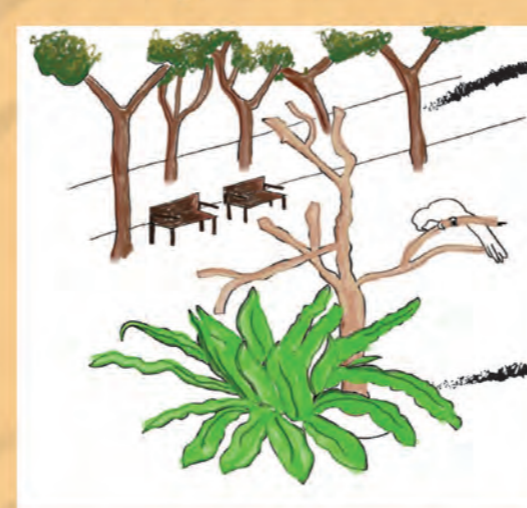
Bird cage lamp



Floor extension for stretching exercises

Social Support (Stress Reduction Theory)

### Activity Trail



Downlit trees



Meandering path with bird motif peranakan tiles



Bird perch with naturalistic landscaping



Positive Natural Distraction (Stress Reduction Theory)

### Quiet Garden



Birdcage inspired arbours with vines trailing up



Central feature: Large pot with plants growing out of it



Biodiversity -attracting plantings

Complexity (Attention Restoration Theory)

### Planters

Wheelchair-friendly planters with musical instruments to promote intergenerational interaction and function as a multi-use space



Physical Movement (Stress Reduction Theory)



# JACOB BALLAS CHILDREN'S GARDEN INTERPRETIVES

## Objectives

- Design signs in 5 shelters
- Identify suitable huts for each theme
- Gather photographs for signs
- Engage visitors to create Nature Art

## Site familiarisation



- Site visits
- On site measurements
- Observation of flora and fauna



Themes  
NATURE PLAY  
TOUCH & SMELL  
POND LIFE  
FLOWERS  
POETRY

## Designing



- Graphic design
- Proposals for location, size and positioning of signs

## Research and writing

Do you see what I see?  
There on the garden floor.  
Leaves, twigs, flowers, fruits  
All that you need and more!

Use these things to make some art  
Then snap a picture, come on let's start!

Please only pick what's on the ground,  
And return the materials that you found.



Butterflies flit, flutter and fly,  
Their wings so vibrant against the sky.  
Some yellow, some orange, some brown, some blue,  
Can you spot them near the flowers around you?

- Reference online content & NParks signs
- Adapting content for children ages 5-7
- Writing rhymes & shortlisting poems

## Visitor Engagement

- Encouraging visitors to create art and images that can be used on signs.



Young visitors having fun creating nature art in the Gardens.



By Jolene Ong & Tay Lin Zhen



# Youth Stewards for Nature 2022

## Butterfly Garden & Nature Playgarden

### @ Villa Verde Park Extension



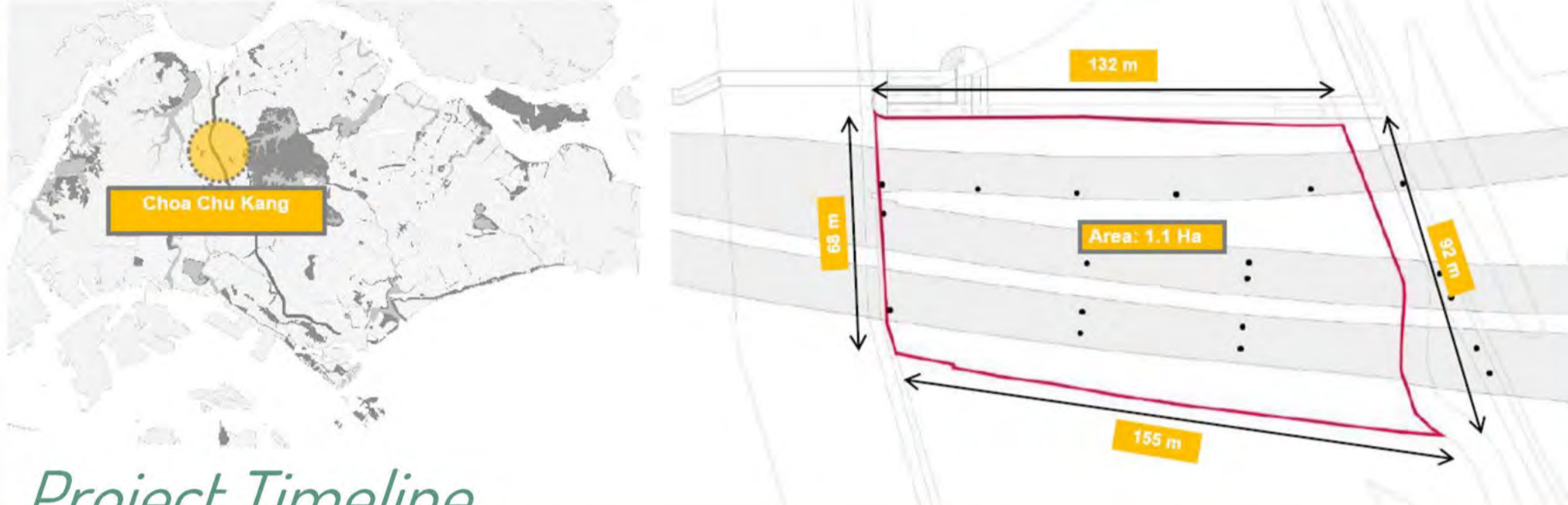
**MEMBERS**  
PHOEBE LING  
PHOEBE CHUA  
SIH CHEE SENG

**MENTORS**  
MAYURA PATIL  
MUKTA KASTURIA

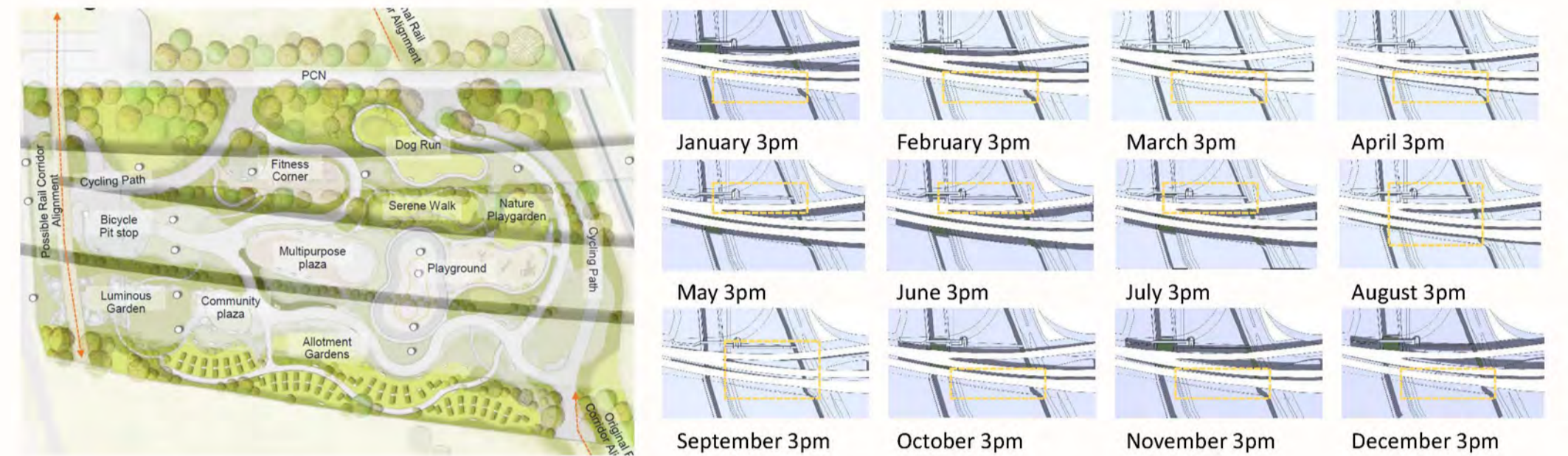
### Project Overview

Villa Verde Park Extension is a neighbourhood park serving the surrounding residential area. The park is uniquely positioned underneath the Kranji expressway flyovers and is located alongside Pang Sua canal and the rail corridor. The 1.1 hectares park also has the potential to serve future upcoming HDB residential areas in the area. Based on the concept design by NParks and unique site context, we were given the opportunity to ideate on the planting arrangement and play features to be incorporated in certain portions of the park such as the nature playgarden area and the butterfly garden area. Under the guidance of our mentors, we learnt a lot about landscape design and planting strategies. Some of the exciting features in our scheme include curated grass mounds for kids to run about, bioswale features, stepping planks that reflect the historic context of the site, curated butterfly trails and bird-friendly structures.

### Project Location



### Concept Design & Shade Analysis (by NParks)



### Project Timeline

HortPark Visit

Site Investigation

Site Analysis



1: Entrance Sign  
2: Teepee  
3: Tunnel Feature  
4: Water play feature  
5: Seating logs  
6: Timber decking



Existing site conditions

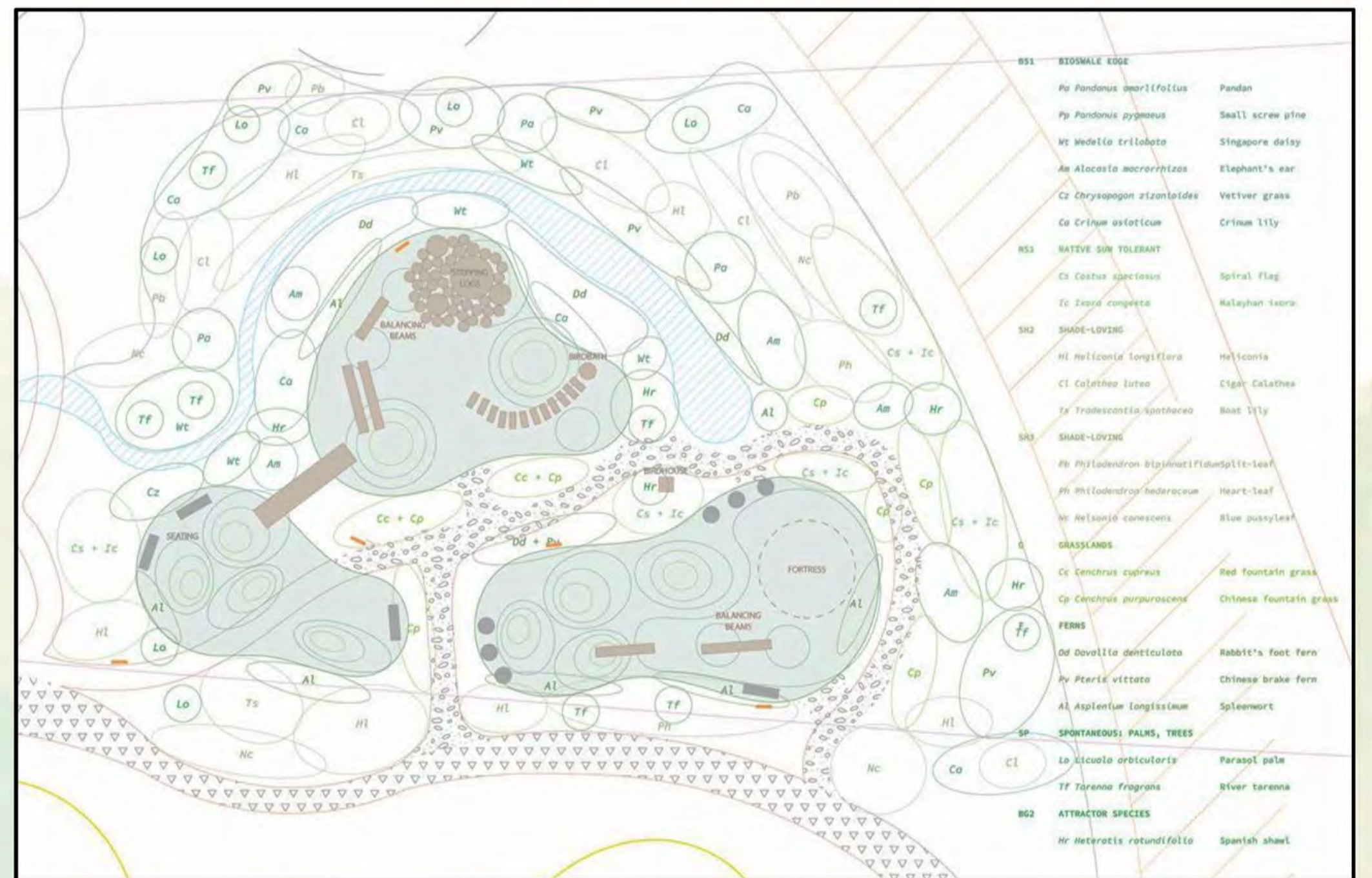
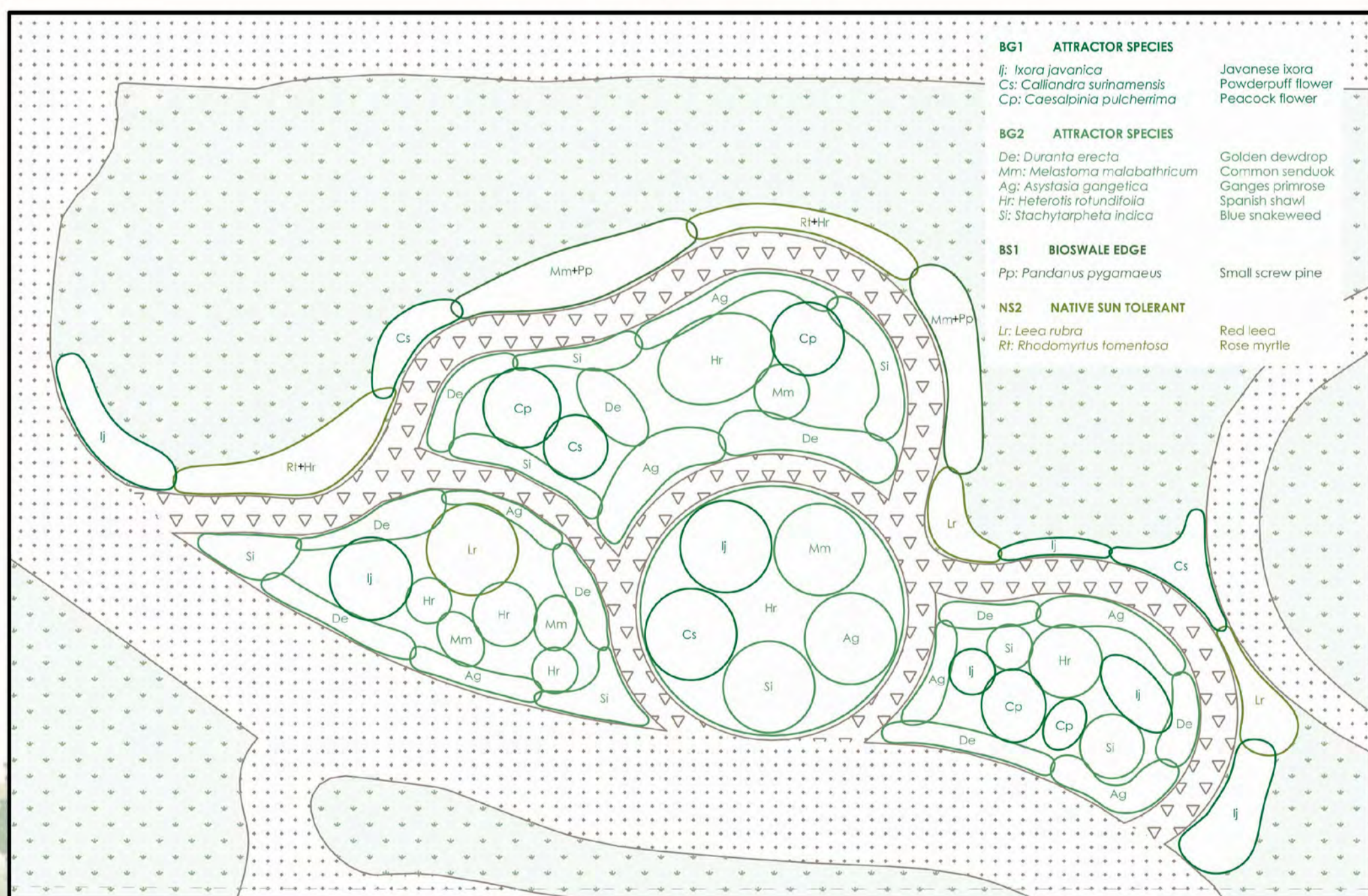
Feature	Strengths	Weaknesses	Opportunities	Threats
Viaduct	✓ Sense of scale – Vastness ✓ Good shade	✓ Certain areas are dark ✓ Safety issues	✓ Light installations ✓ Makeshift, rugged aesthetic	-
Pillars	-	✓ Need to be kept flat and without obstructions for maintenance	✓ Potential to create playful circulation paths ✓ Buffers needed to protect pillars – illusion of trees	-
Noise of expressway	-	✓ White noise from constant traffic above	-	-
Existing wild vegetation	✓ Existing vegetation has (personally, very beautiful) horizontal layering effect	-	✓ Preserve original vegetation ✓ Layered greenery with interesting aesthetic quality	✓ Weeds are not present ✓ Buffers needed to protect new plant species
Views to hill of army camp	✓ Serves as interesting backdrop	-	✓ Seating areas with view towards the hills	-
Grove of trees	✓ Congregation of large trees ✓ Serves as a visual buffer to more open areas	-	✓ Can be imagined as mysterious and fairy tale-like	-
Future HDB development	✓ Able to serve more local residents	✓ Lush greenery and shady trees will be removed	-	-
Water runoff	✓ Clear water flows due to proximity to canal	✓ Surface runoff from flyover results in uneven flow of water	✓ Incorporation of water feature into the park ✓ Growing a water ecosystem in the park	✓ Localized ponding may happen if drainage is not done well ✓ Concrete cancer + Mud
Connectivity to PCN	✓ Ideal for biodiversity connection	-	✓ Bring public to the site ✓ Integration of PCN with site to form one coherent whole	-
Remnants of Rail Corridor tracks	✓ Rail motifs relate to kids and adults alike	✓ Remnant of the rail corridor track may be hard to find and costly to maintain	✓ Heritage of site	-

**V** VISUAL    **P** PROGRAMMATIC/CONTEXTUAL    **N** NATURAL  
**S** SPATIAL    **A** AUDITORY    **T** TACTILE

  MOST POTENTIAL FOR EXPLORATION

### Butterfly Garden

### Nature Playgarden



### Planting Palette

#### BUTTERFLY GARDEN



#### SUN-LOVING PLANTS



#### BIOSWALE EDGE



#### SHADE LOVING PLANTS



#### STEPPING LOGS



#### BALANCING BEAMS



#### BIRD HOUSE



#### BIRD BATH



