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GIG1005: Social Engagement

Semester 3, Session 2018/2019

PROGRAM 'KEBUN-KEBUN SENTOSA'

in Taman Seri Sentosa

by

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for

Associate Prof. Dr. Hazreena Hussein

1.0 INTRODUCTION

"Rejuvenating Public Space Through Reimagining Recyclable Plastic & Construction Waste"

Faculty of Built Environment researchers and Architecture Undergraduates students (Session 18/19) of University of Malaya were participated in designing public Kebun-kebun Sentosa urban garden. We promote recycled materials in order to upscale the construction materials of the urban garden. We also provide an easy-constructible design for the community to yet low maintenance to ensure the sustainability of the urban garden in long term.

Our project includes designing & renovating Kebun-kebun Sentosa in Taman Seri Sentosa which is 7.3 km from University of Malaya. The tasks are to design roof shade for outdoor gym roof, mushroom house, playground, plantation box, scaffolding maze and compost box. Most of the components are compulsory to be constructed by using recycled and environmental-friendly materials.

16 students, 1 lecturer, Dr Nurshuhada Zainon and 1 research assistant, Mohd Nur Adli Ismail from University of Malaya were involved in this program and we are delighted as this is our first time involving in this kind of program. However, there are few more lecturers and university partner that were also involved for the preparation of the workshop.

Dr Nurshuhada Zainon (Principal Investigator)

Assoc. Prof. Dr Faizul Azli Mohd Rahim

Dr Noor Suzaini Mohamed Zaid

Dr Nik Elyna Myeda Nik Mat

Dr Zafirah Zyed Al-Sadat

Dr Nur Mardhiyaz Aziz

Dr Loo Siaw Chuing

AP. Dr Aniza Abu Bakar (University Partner)

Mohd Nur Adli Ismail (Research Assistant)

2.0 FIRST MEETING

Venue : Bilik Kuliah 6

Date : 2 July 2019

Time : 10.00am – 12.00pm

We had our first meeting with Dr. Nurshuhada Zainon (Principal Investigator) and En. Mohd Nur Adli Ismail (Research Assistant). They explained the project brief and distribute the tasks to us accordingly. Firstly, we decide on group organisation and form sub-groups within line with particular tasks.

Leader : Johanese Mega Anak Learned Musa

Assistant : Siti Na'ilah binti Morad

Secretary : Irene Sim Hui Ling & Renugeswary Manogaran

Treasurer : Nur Asmida Bt Hanafi

Publicity : Woon Chee Man, Chia Kai Xin & Aiman Haqeem bin Asro

Photographer : Nor 'Ain Atika Bt Sawandi, Ainin Sofiya Bt Rafiee & Lim Woan Teng

Videographer : Muhammad Faiz Muqree bin Mohd Shukri, Hamza Alsheikh Mahmoud, Ahmad Aizat bin Azman, Yugenraj a/l Manimaran & Ahmed Madi

3.0 SITE VISIT

Venue : 'Kebun-kebun Sentosa', Taman Seri Sentosa

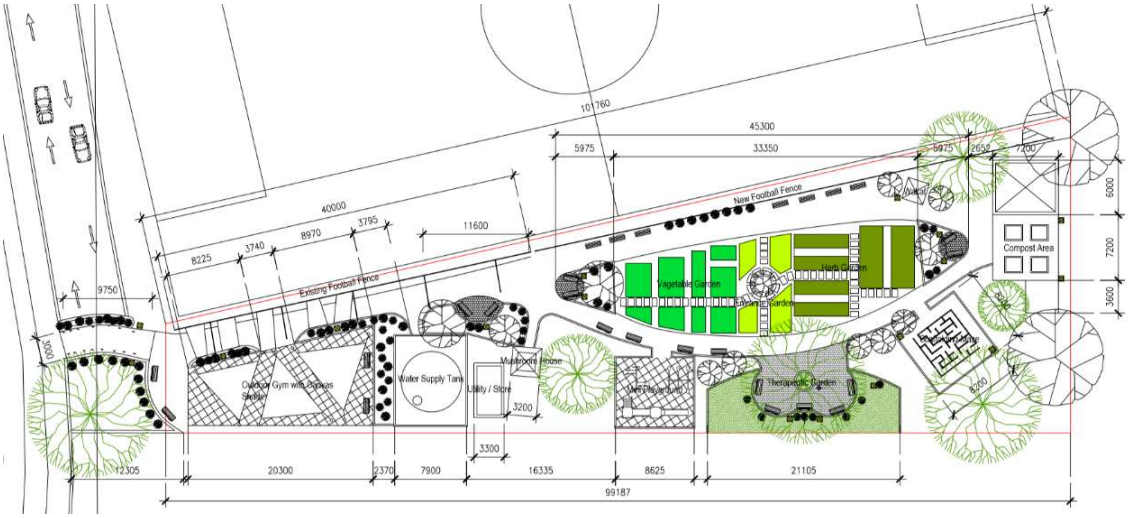
Date : 2 July 2019

Time : 2.00pm – 3.30pm

We had our first site visit with En. Adli. The site visit gave us an opportunity to look around and observe the surrounding environment of the site in Kebun-kebun Sentosa which will help us in our site analysis. This also helped us to create a suitable design based the site condition.

Group photo during site visit

The site is nearby Dewan Masyarakat Taman Seri Sentosa. It is between Block 1C Pinang Apartment & Football Field. The length of the site is 325 ft while the width of the site is 114.5 ft x 82 ft x 39 ft.

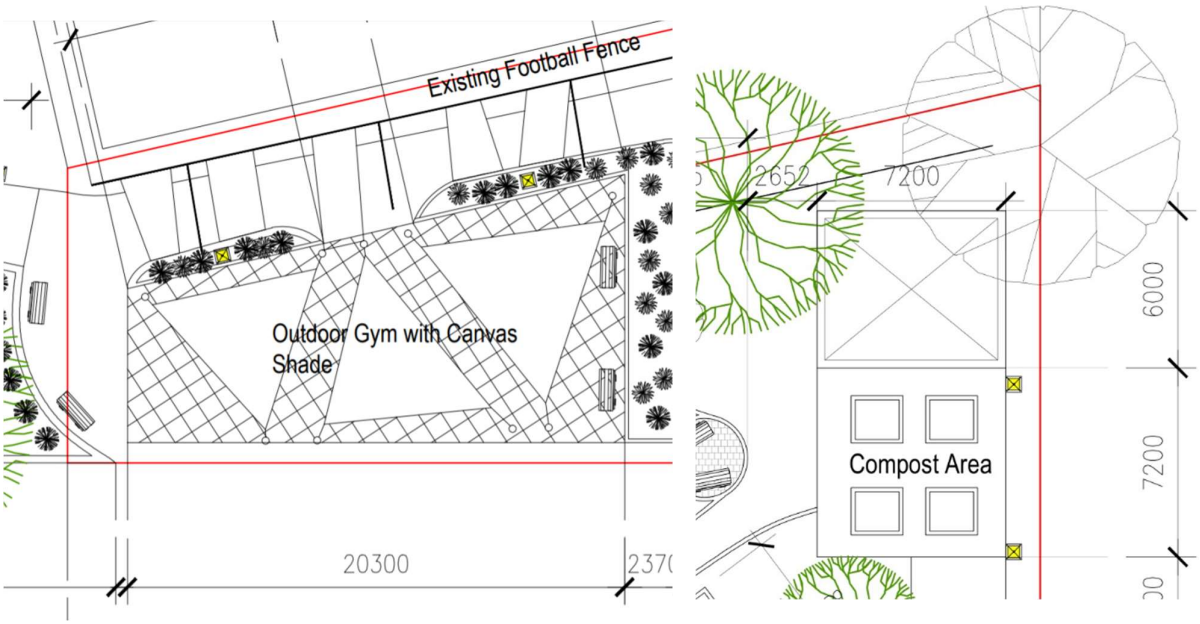


4.0 TASKS AND PROGRESS

After discussion, we were divided into 6 sub-groups and each sub-group was assigned with a task.

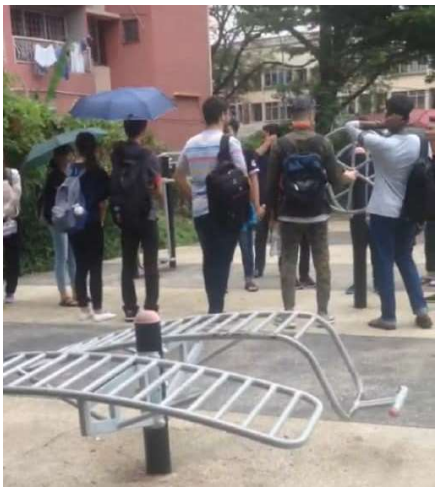
Outdoor gym roof	: Ainin Sofiya Bt Rafiee, Nur Asmida Bt Hanafi & Renugeswary Manogaran
Mushroom house	: Woon Chee Man, Chia Kai Xin & Hamza Alsheikh Mahmoud
Mini Playground	: Johanese Mega Anak Learned Musa, Siti Na'ilah binti Morad & Aiman Haqeem bin Asro
Plantation box	: Ahmed Madi & Nor 'Ain Atika Bt Sawandi
Scaffolding maze	: Irene Sim Hui Ling, Lim Woan Teng & Muhammad Faiz Muqree bin Mohd Shukri
Compost box	: Yugenraj a/l Manimaran & Ahmad Aizat bin Azman

4.1 OUTDOOR GYM ROOF AND COMPOST BOX AREA ROOF



FIRST MEETING (2/7/2019): BRIEFING AND SITE VISIT

We were given a task to design and construct a roof using recycled materials for the outdoor gym and compost box area in Kebun-kebun Sentosa. The width of the outdoor gym is 20300mm and the dimension for compost box area is 7200mm x 6000mm. The purpose of the roof is to provide shading around the gym area from the hot sun especially during the afternoon and to protect the electrical machine at the compost box area.

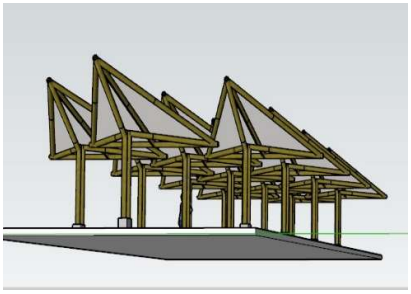
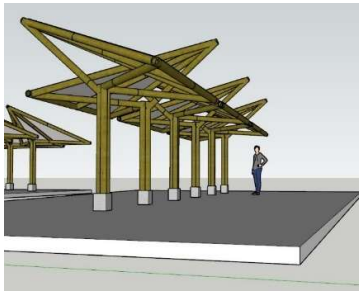



Condition of outdoor gym area

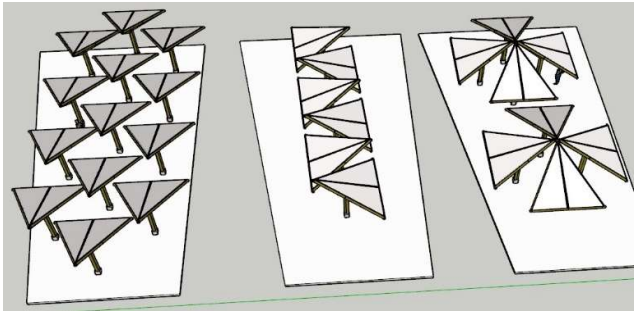
SECOND MEETING (11/7/2019): CRIT SESSION

Outdoor gym:

First design: Second Design: Third Design:


Aerial view of all designs:

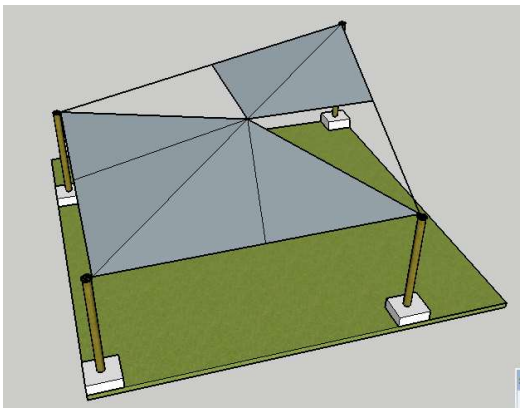


Feedbacks:

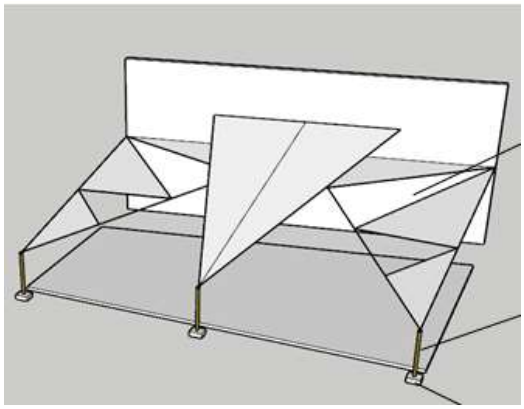
1. The roof needs to cover partially the outdoor gym
2. Not necessary to cover the full area but to serve as roof shading only.
3. Maximise the use of recycle materials to be eco-friendly design
4. To make an easy construct method so that less manpower is needed.
5. To take note on sun path to ensure to utilize the sun light properly.
6. To think of construction method.

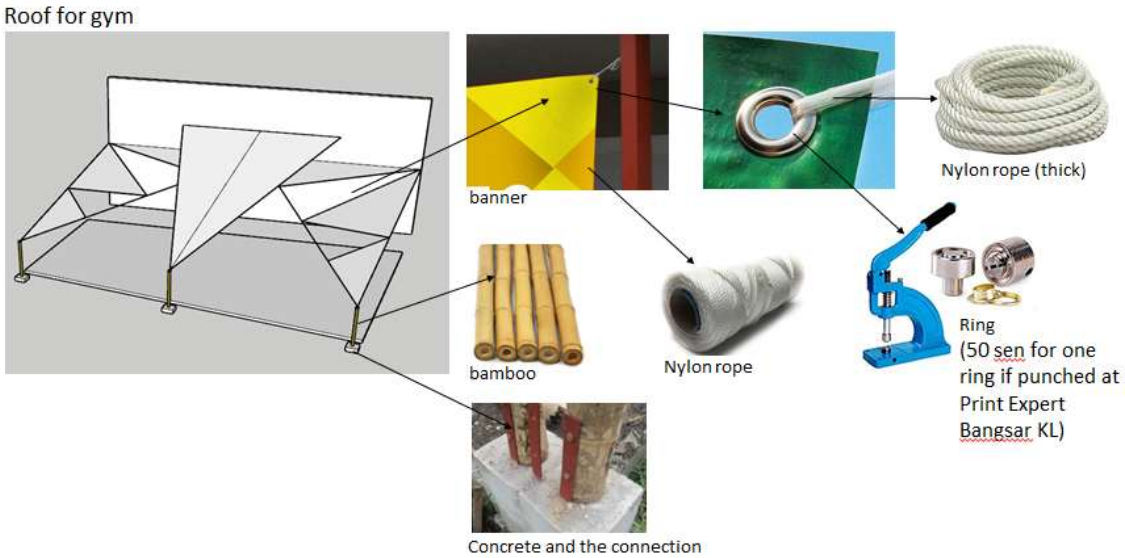
THIRD MEETING (16/7/2019): CRIT SESSION

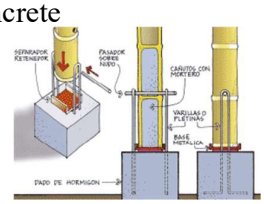
Proposal design for compost box area:



Finalize design:





	Materials	Functions
1.	Banners 	Act as the roof cover tied on poles and fences
2.	Nylon rope (2 type – thin and thick) 	Thick: To tie and hold the banners to the bamboo and the football field fence Thin: To tie the banners together to make roof shade
3.	Eyelet Grommet 	To tie connect the rope into the banners
4.	Bamboo 	Act as the support structure in a form of poles for the roof Quantity needed: Around 9 units
5.	Concrete 	To make foundation as support structure for the bamboo poles
6.	Grommet Puncher  OR 	To punch in the Eyelet grommets into the banners.

Method:

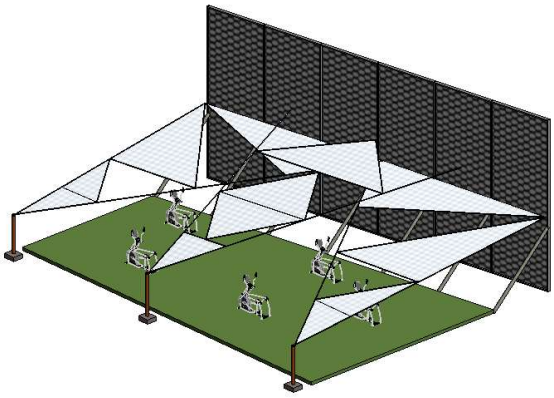
1. Set up the concrete foundation as the base.
2. Set up the bamboo as the column and each column consist of three bamboos for a strong support.
3. Make hole and fix with grommet in the banner
4. Join together many banners to form one large banner for roof shade using thin nylon ropes.
5. Tied one end banner at bamboo and the other end at football field fence using thick nylon ropes.

Feedbacks:

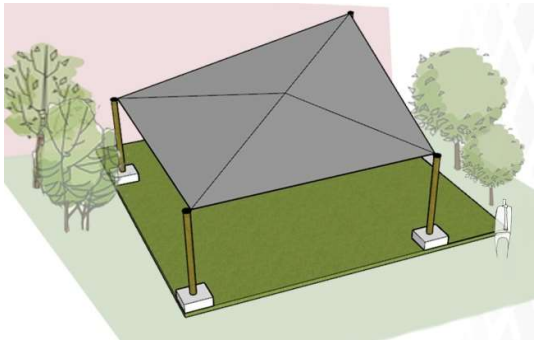
1. The design was finalised but need to prepare the list of materials' cost.
2. To make a closed roof for compost box area using same method as gym roof.

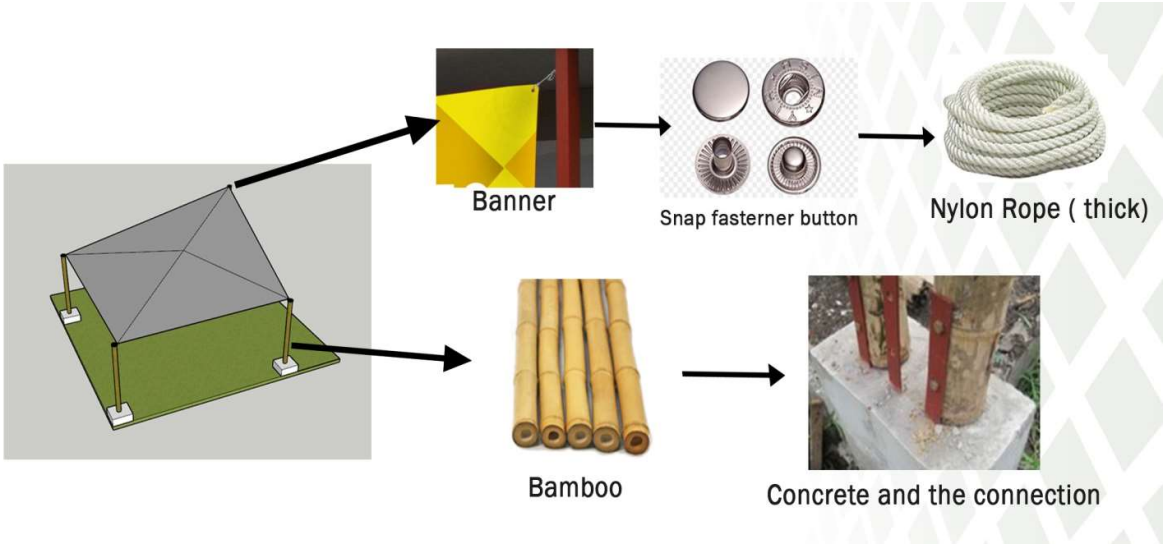
FOURTH MEETING (23/7/2019): CRIT SESSION

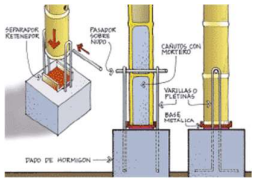
Finalize design for outdoor gym:



Finalize design for compost box area:





	Materials	Functions
1.	Banners 	Act as the roof cover tied on poles and fences
2.	Nylon rope (2 type – thin and thick) 	Thick: To tie and hold the banners to the bamboo and the football field fence Thin: To tie the banners together to make roof shade
3.	Snap fastener button 	To connect the banners to each other by fastening its edges together.
4.	Bamboo 	Act as the support structure in a form of poles for the roof Quantity needed: Around 4 units
5.	Concrete 	To make foundation as support structure for the bamboo poles

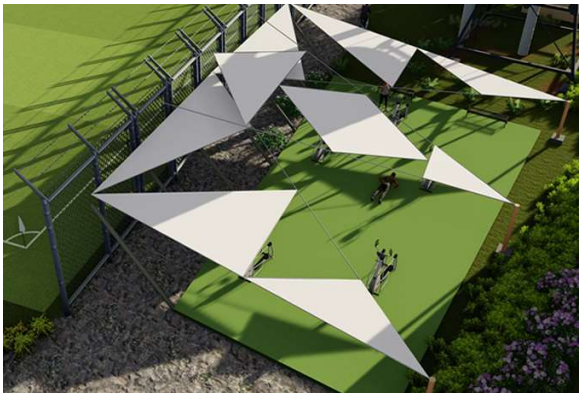
Method:

1. Set up the concrete foundation as the base.
2. Set up the bamboo as the column at each end.
3. Make hole and fix with snap fastener button in the banner to join the banners.
4. Join together many banners to form one large banner for roof shade.
5. Tie the large banner to each bamboo column using thick nylon ropes.
6. The main function of this roof is to protect the electrical machine at the compost box area.

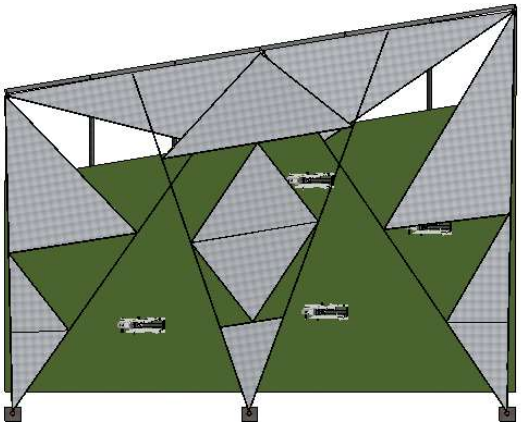
FINALIZED DESIGN: DETAIL DRAWING

Outdoor gym:

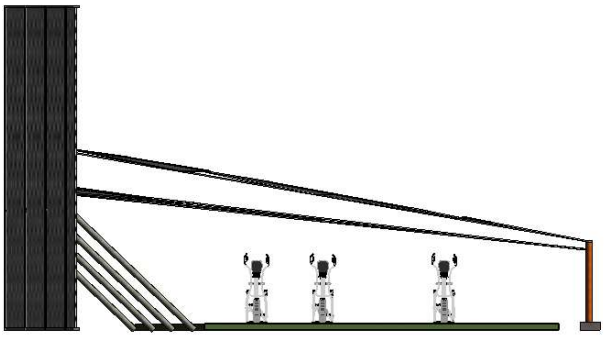
Perspective:



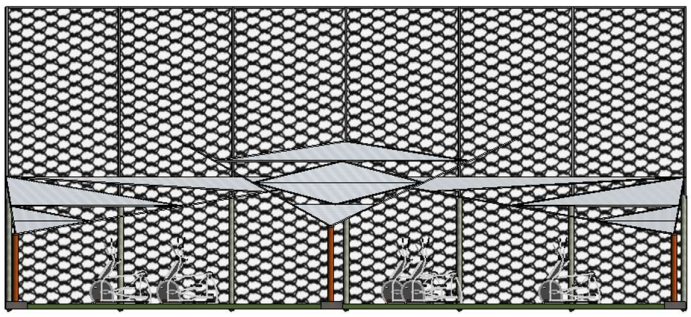
Roof plan:



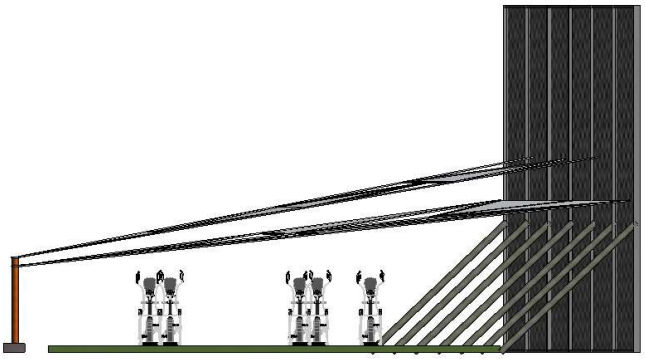
Section:



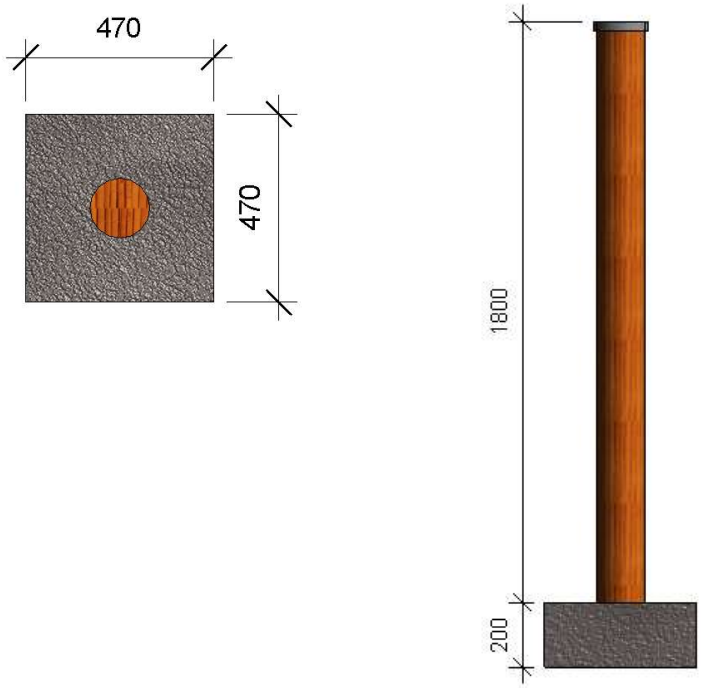
Front elevation:



Right elevation:

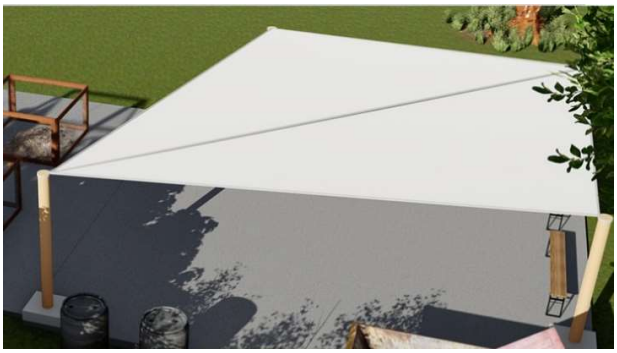


Detail:

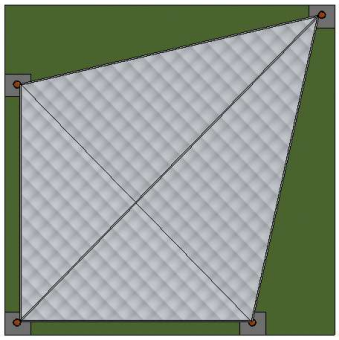


Compost box area:

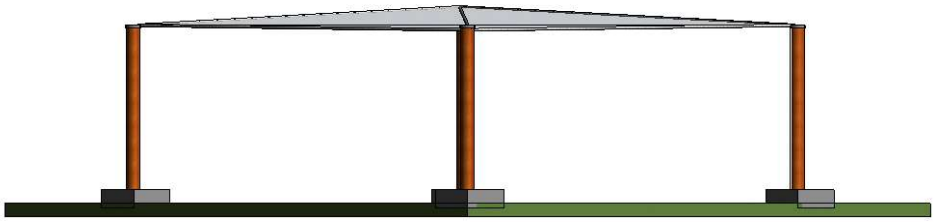
Perspective:



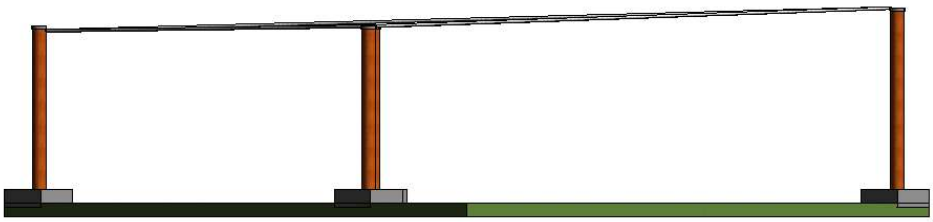
Roof plan:



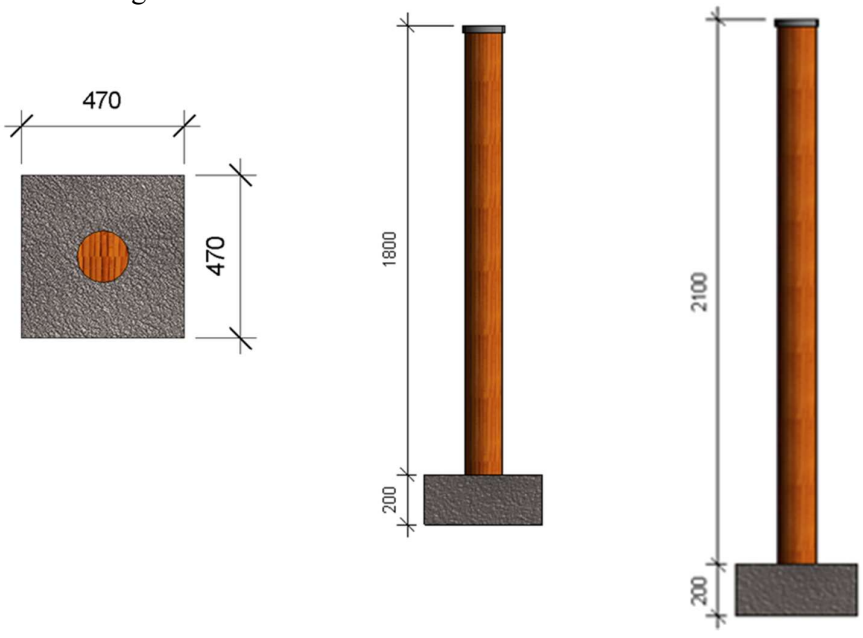
Front elevation:



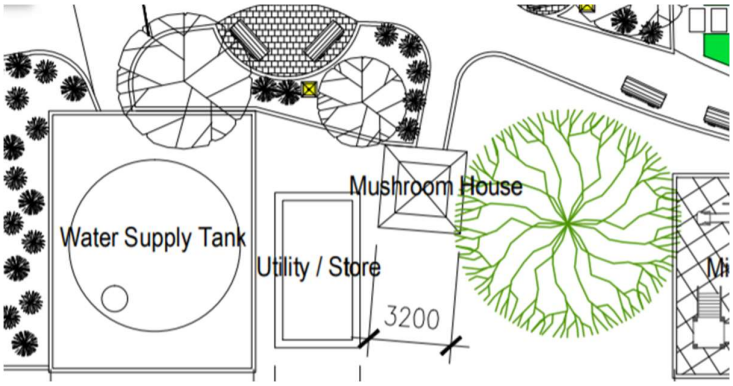
Right elevation:



Detail drawing:



4.2 MUSHROOM HOUSE



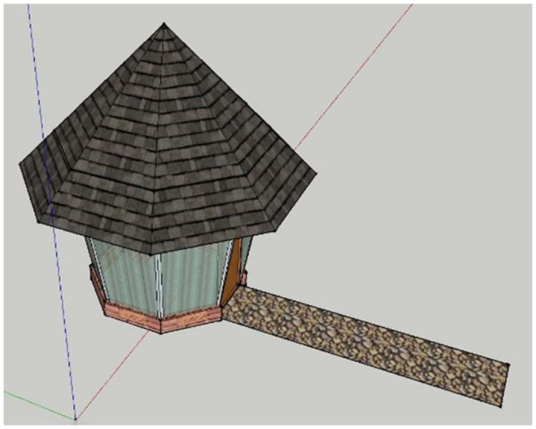
FIRST MEETING (2/7/2019): BRIEFING AND SITE VISIT

We were given task to design a mushroom house in Kebun-kebun Sentosa. The mushroom house is meant for the growth of mushroom and will be taken care by the community there.

Site for Mushroom House

SECOND MEETING (11/7/2019): CRIT SESSION

Design proposed:



Materials proposed:

1. Steel frame

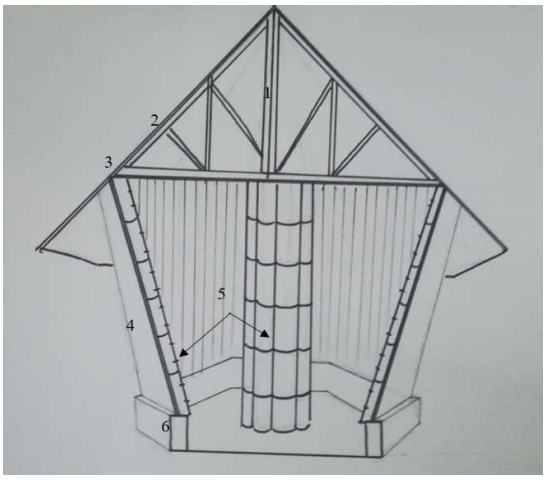
2.Woven asbestos roof top

3. 5mm plywood

4. Timber pallet wall finishes with one layer 14% UV transparent plastic

5. Plastic bottle as container to plant mushroom

6. 300mm height concrete foundation



THIRD MEETING (16/7/2019): MEETING WITH DR. TAN

We had a meeting with Dr. Tan who is an expert in mushroom and got to have a look at the mushroom house in University Malaya. After discussing with Dr. Tan's team, we found out the basic needs of mushroom and the criteria needed for a mushroom house. Information for mushroom house is as below:

1. Good air ventilation
2. Shady and humid environment
3. Nettings to prevent excessive sunlight and threats from outside
4. 80-90% of humidity is needed
5. Racks to place mushroom bags; each mushroom bag is approximately 900g
6. Water vapour is a necessity for mushroom
7. Hanging of mushroom on the walls is possible, but not with plastic bottle
8. Each rack can fit 500-1000 bags of mushroom
9. Measurements of a bag of mushroom

Meeting with Dr. Tan's team in the meeting room

Visit to the mushroom laboratory

Exterior View of The Mushroom House in UM

FOURTH MEETING (16/7/2019): CRIT SESSION

We had a discussion with our mushroom house group and brainstormed ideas together. We researched on materials such as, timber pallet, plastic bottles, bamboo and steels which are easily collected as construction waste.

FIFTH MEETING (23/7/2019): CRIT SESSION

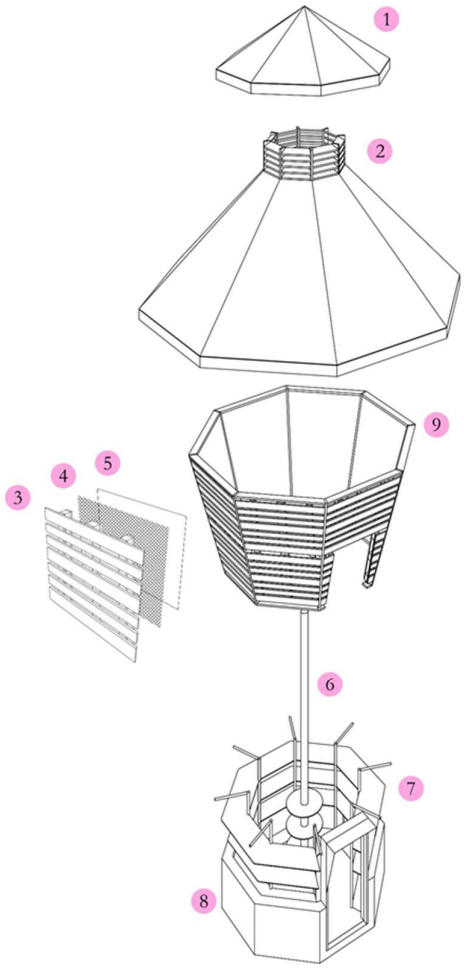
We had a discussion with our lecturer in charge and talked about the planning and solutions to overcome problems we might face with the current design.

3D Perspective Views for The Improved Design:

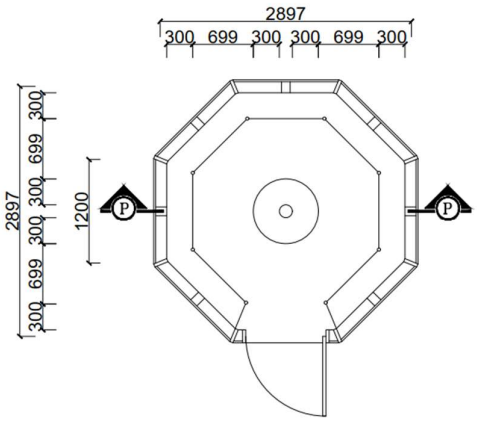
Interior views:

FINAL DISCUSSION WITH DR. TAN (31/7/2019~2/8/2019)

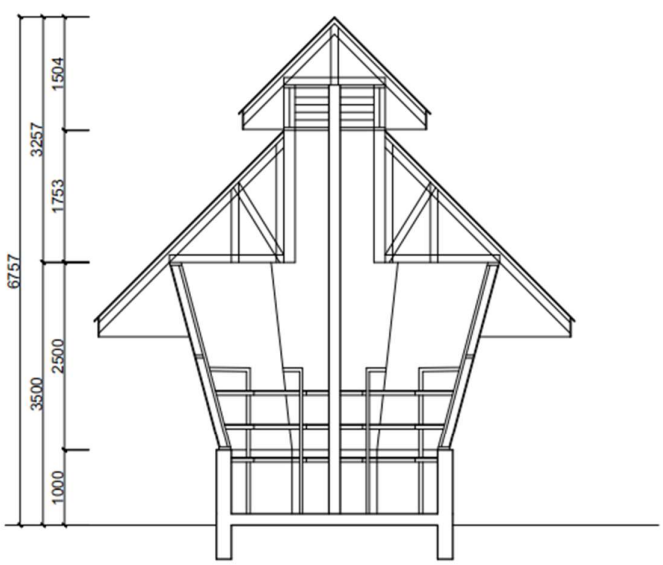
Since Dr. Tan is away from Malaysia, our group's representative, Woon Chee Man communicated with her through email. We showed our final design and ideas on powerpoint slides and emailed to get feedback from Dr. Tan. Throughout the discussion, we finalised on the material used on the wall, which is mainly the wooden pallet on the outer layer, steel netting, then lastly will be the uv transparent plastic. The wooden pallet is functioned to prevent the entering of wild animals. For the steel netting, since it is with mesh size of 1.2mm, the insects will be prevented from entering the mushroom cultivation house. UV transparent plastic can prevent excessive sunlight from entering the house because mushroom needs a dark and humid place to grow well. The house designed achieved the requirements of mushroom cultivation, which are good ventilation, pest prevention and also humidity respectively.



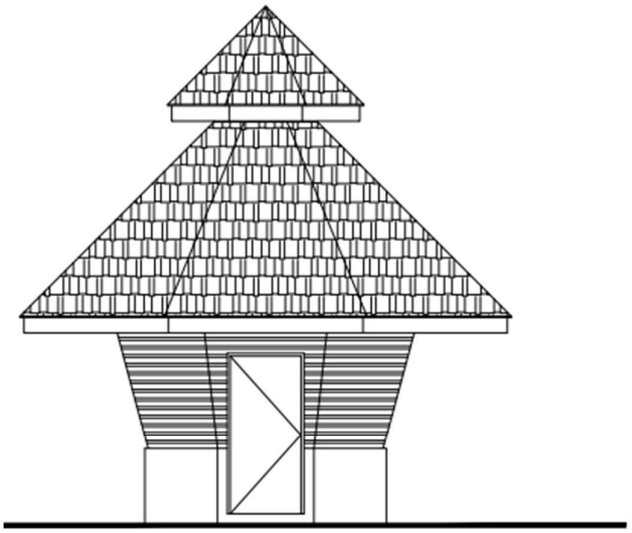
1. Metal deck roof/fiber cement roof tile
2. Metal louvers
3. Timber pallet
4. Steel netting with mesh size 1.2mm
5. UV transparent plastic
6. Hollow steel column
7. Steel rack with 4mm Ø PVC piping as supportive system
8. 1000mm high concrete footing
9. Steel frame



FLOOR PLAN SCALE 1 : 25



SECTION SCALE 1 : 50

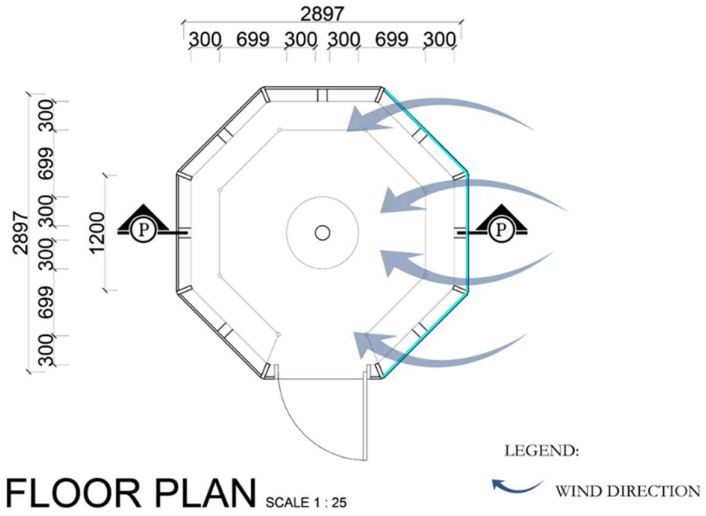


ELEVATION SCALE 1 : 50

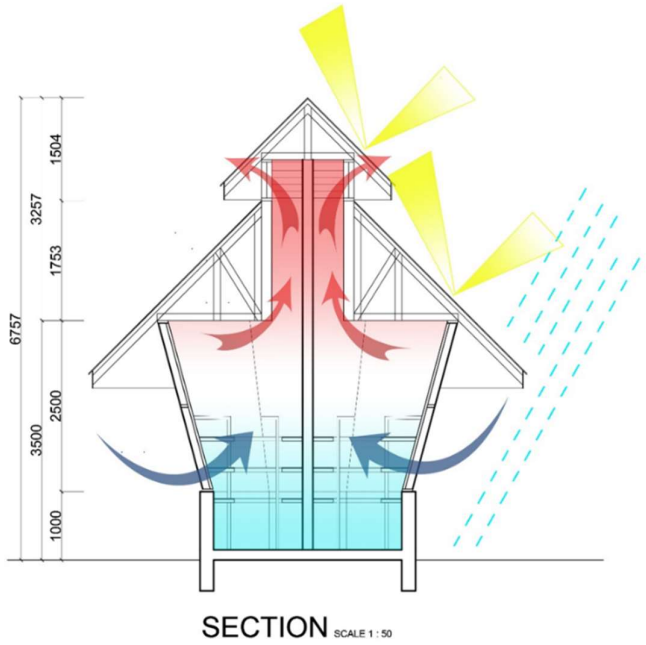
FINALIZED DESIGN: DETAIL DRAWING

As a landmark that can portray the purpose of the building, which is to grow mushroom, the design is inspired by mushroom. Its sharp and forward design will make the people understand and clear about the usage of this building. Recyclable materials are used such as wood pallets, pipes are used in this mushroom house.

The plan of the mushroom plantation house is octagon shape. By using octagon shape the rate of ventilation is more efficiency compare to square shape due to increase of surface area.

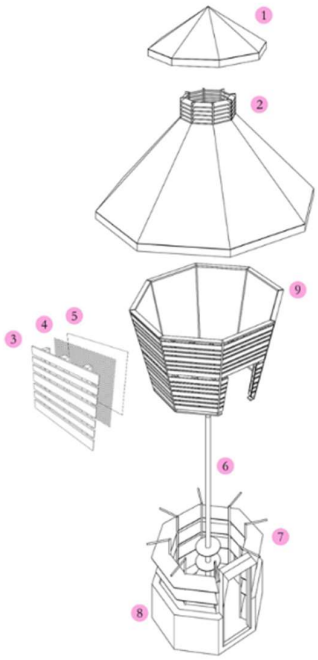


With the large overhang and slanted wall, it can prevent the timber pallet wall exposed to the rain, therefore the timber pallet wall more durable. Large overhang roof penetrate the sunlight and prevent the building directly exposed to the sunlight. High ceiling level let stack affect occur, which is hot air rises and cold air condense. Double roof system with louvers installation improve the ventilation system by letting hot air flow out through the opening.



Components:

1. Metal deck roof/fiber cement roof tile
2. Metal louvers
3. Timber pallet
4. Steel netting with mesh size 1.2mm
5. UV transparent plastic
6. Hollow steel column
7. Steel rack with 4mm Ø PVC piping as supportive system
8. 1000mm high concrete footing
9. Steel frame



Construction materials

- **Steel frame** as supportive system for wall and roof.
- **1000mm high concrete footing** to prevent entering of animals.
- **steel intermediary column.**
- **Treated Timber pallet** as an exterior wall finish to provide sufficient ventilation and also prevent entering of animals.
- **Steel netting with mesh size 1.2mm** to prevent insects entering.
- **UV transparent plastic** to prevent excessive of sunlight.
- **Metal decking roofing/fibre cement roof tile** to provide shading and protect from direct sunlight and rainwater.
- **4" Ø PVC piping** as a supportive structure for shelves that to be used for mushroom racks.

Assembly of Mushroom Racks with Pipes

- 4" Ø PVC Pipe
- 4" Ø PVC fittings Elbow
- 4" Ø PVC fittings Tee
- 4" Ø PVC fittings Socket
- 4" Ø PVC fittings 4-way

- Act as connections for structures

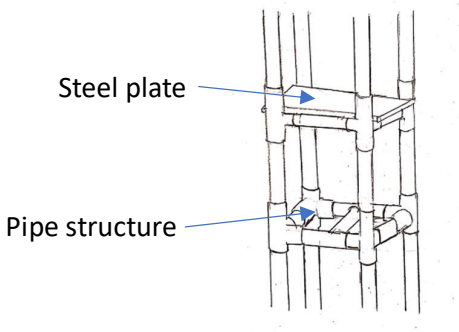
- PVC pipe cutter or hacksaw

- To cut the pipes

Studies on Pipe Racks

How to assemble?

Glue or external ways are not needed to strengthen the connection between pipes. Simply push the pipe and fittings together and it will lock in place firmly. After making the structure by connecting pipes together, the steel plates are placed each tier.



Preservation for Wood Pallet Wall

- specially treated with a mixture of chemicals to make the timber more durable and long lasting.
- treatment is done under pressure which forces chemicals into the wood.
- -copper-based chemicals such aschromated copper arsenic (CCA), borate are used.
- Wood that has been pressure treated will be more resistant to rot, fungus, mould, and insects, as well as hardier in extreme weather conditions.
- Lifespan of pressured wood will be more than 40 years.

Benefits of Using Pressured Wood

1. Moisture, fungal and insect resistance

- copper-based compounds are used to protect wood from decaying, fungal growth and insects such as termites.

2. Fire Resistance

- By employing the same pressure-treating process, fire-retardant chemicals can also be added to create pressure treated lumber that is resistant to fire damage.

3. Cost

- Compared to other materials like stone, concrete, aluminum or steel, pressure treated wood is typically less expensive to purchase and install due to its ease of installation and use.

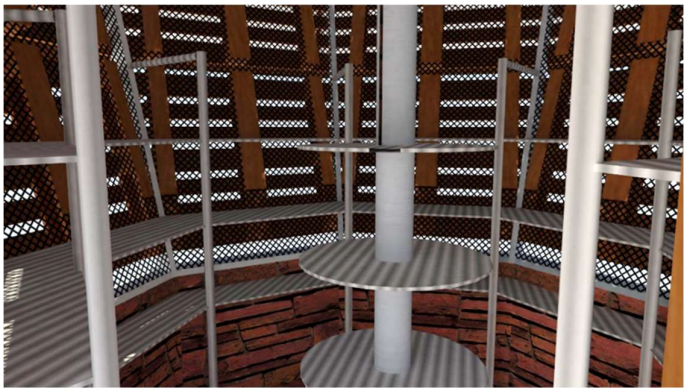
4.Durable

- Can last more than 40 years

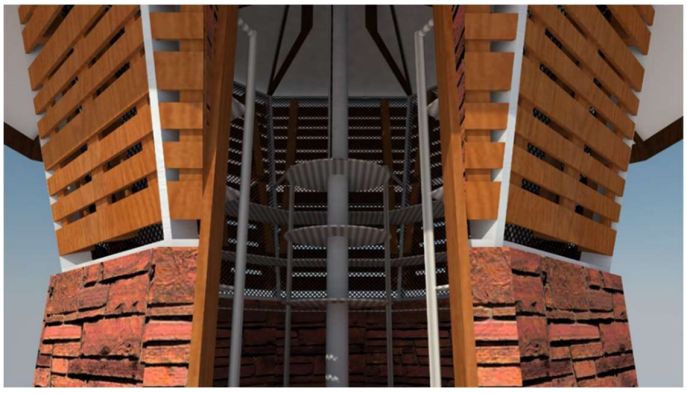
Exterior View of Mushroom Plantation House

Interior Views

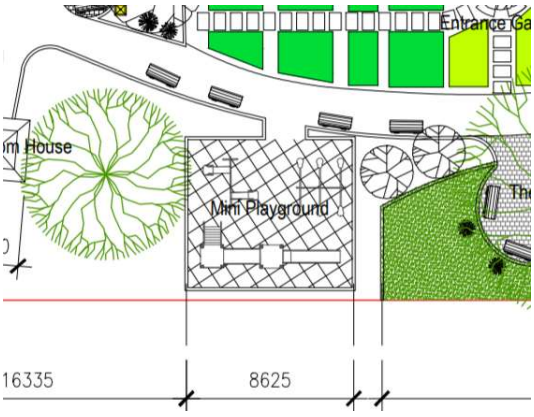
Mushroom plant surrounding the wall and column provide a feeling that surrounded by nature.



Walls with timber pallets is based on the idea that mushroom/fungus are grown on tree trunk



4.3 MINI PLAYGROUND

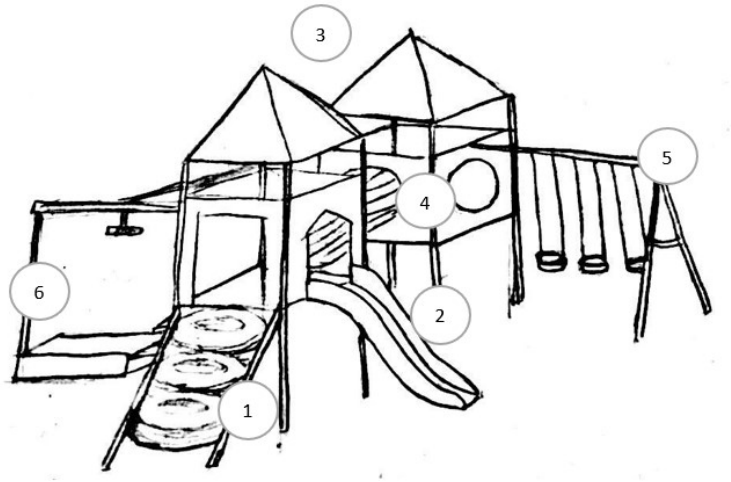


FIRST MEETING (2/7/2019): BRIEFING AND SITE VISIT

We were given a task to construct a mini playground made of recycled materials in Kebun-kebun Sentosa.

The boundary given is 8625mm x 8625mm. The purpose of the mini playground is to create a recreational and play area for kids of Taman Sentosa in the morning or evening.

SECOND MEETING (11/7/2019): CRIT SESSION



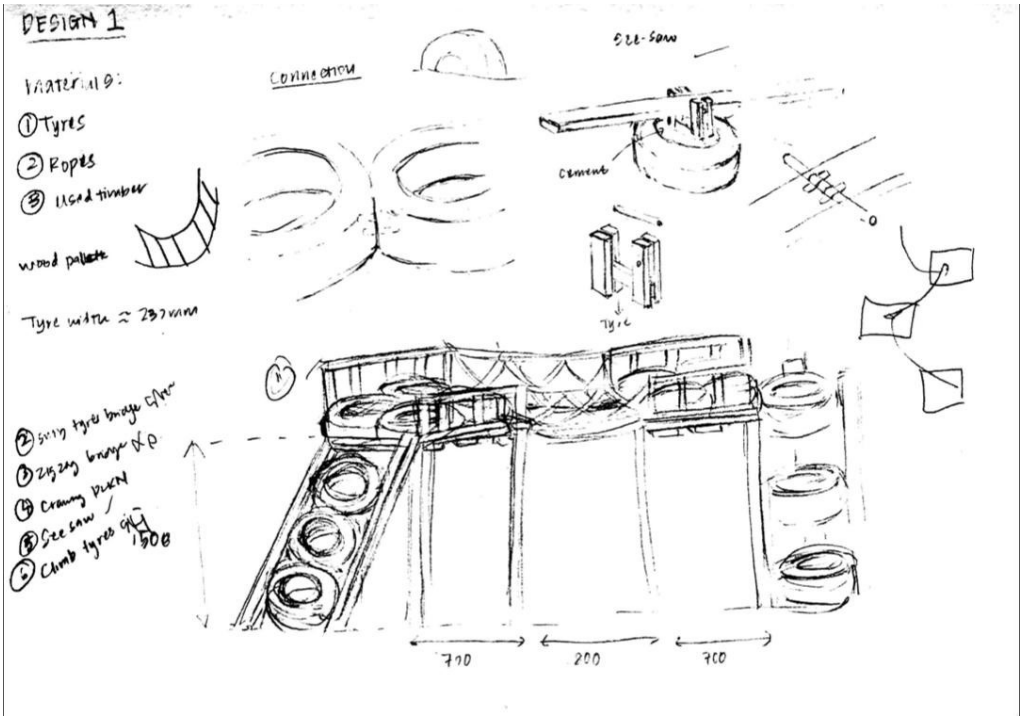
Components:

1. Stairs
2. Slides
3. Two-winged playground
4. Connecting rope bridge
5. Tyre swings
6. Flying fox

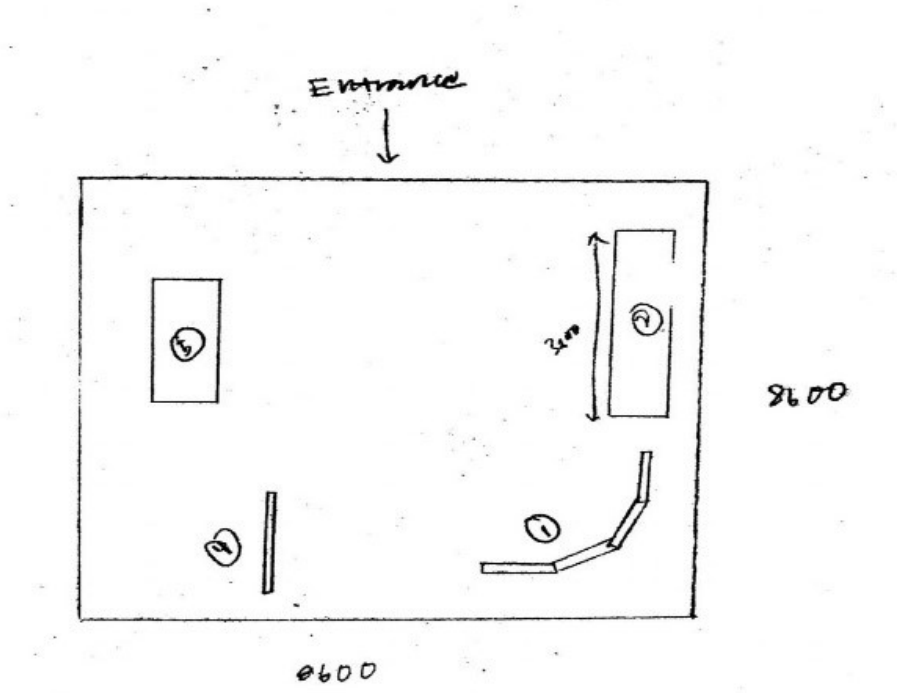
	Materials	Functions
1.	Treated timber 	Act as a main structure of the playground as they are very durable and ensure the safety of the users. The price is quite expensive and unusually to be found in recycled centres. Hard to find as the unit needed is quite a number.
2.	Tyres 	Used as the stairs to get up to the playground, also for the swings. Different sizes of tyres required as it serves for different function. For the stairs, bigger size needed to minimize and fit the height of the playground, while for swings, smaller size needed to fit the kids' body size and ensure the safety. Units needed approximately 6 tyres.
3.	Vinyl banner 	Serve as a roof of the playground that we designed to protect the kids from direct sunlight in the morning and evening or even rains. The cons is easy to get dirty and hard to maintain it clean in our weather.
4.	Nylon rope 	A little element of weave that will act as a bridge between two-winged mini playground. The rope structure need to be very strong to ensure the safety of the kids when they are crossing from one wing to another.
5.	PVC pipes (small) 	Act as a smoother slide elements and more playful for the kids. Needed to be test for the durability up to different kids' weights and sizes.

Precedent studies:

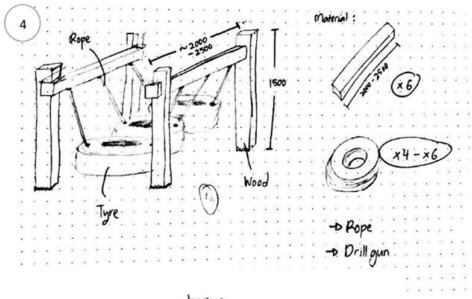
THIRD MEETING (16/7/2019): CRIT SESSION

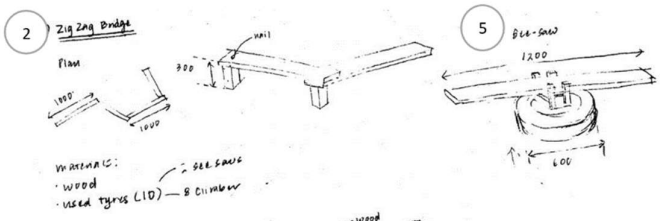


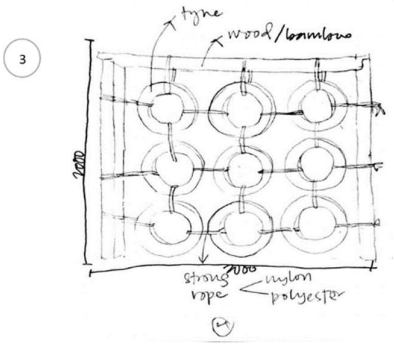
Developed design; Changed most of parts to make it friendlier with kids and more challenging. Added and eliminate few parts. Same materials being used. Eliminated roofs, flying fox and slides. Meanwhile, added tyre climbing tower and see-saw. In developing to more sections of games.

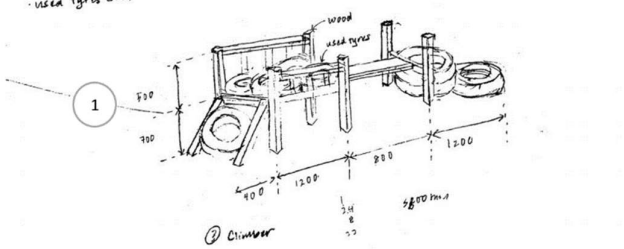


Overall plan of mini playground









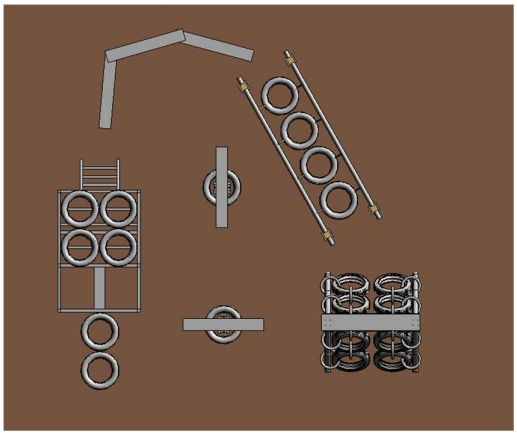
Finalise design; adjusting safe heights depending on materials durability. Exploration of new recyclable materials. Added more sections of games for kids;

1. Playhouse
2. Zig zag bridge
3. Climbing tyres wall
4. Tyres hanging bridge
5. See saw

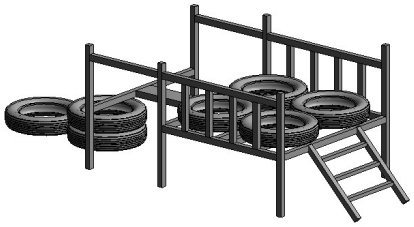
Recycled bamboos are the added material which act as structure to certain section of games. It is very durable and safe to be used for kids.

Precedent studies:

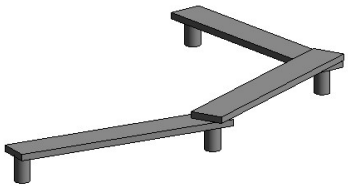
FOURTH MEETING (23/7/2019): CRIT SESSION



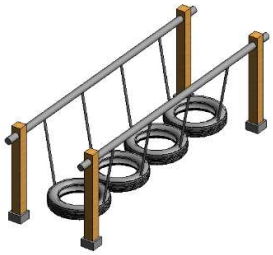
Overall plan of mini playground



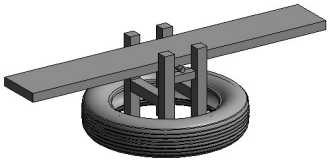
CLIMBER



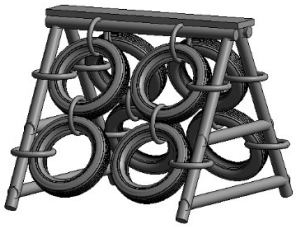
ZIG ZAG MINI BRIDGE



TYRE BRIDGE



SEE-SAW

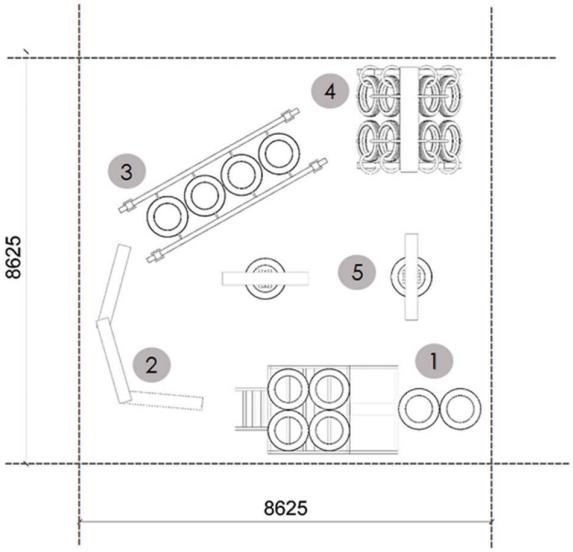


TYRE WALL

Feedback: Rethink about the stability and durability of the playground components also consider the safety of kids when they are utilizing the mini playground.

FINALIZED DESIGN: DETAIL DRAWING

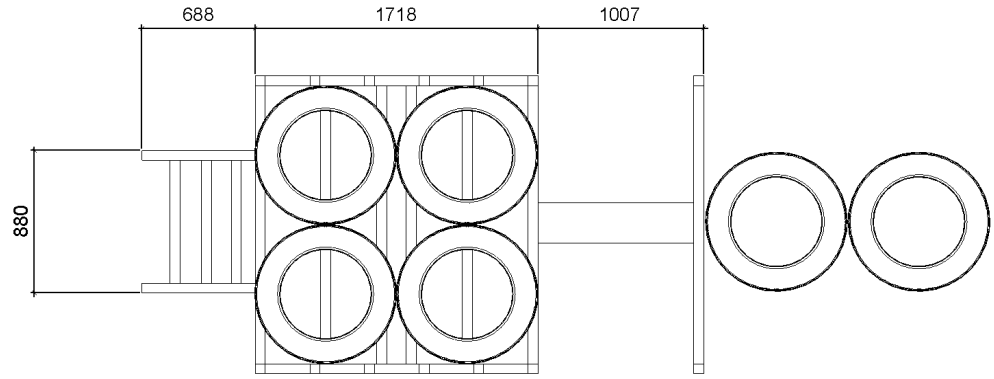
Digital perspective



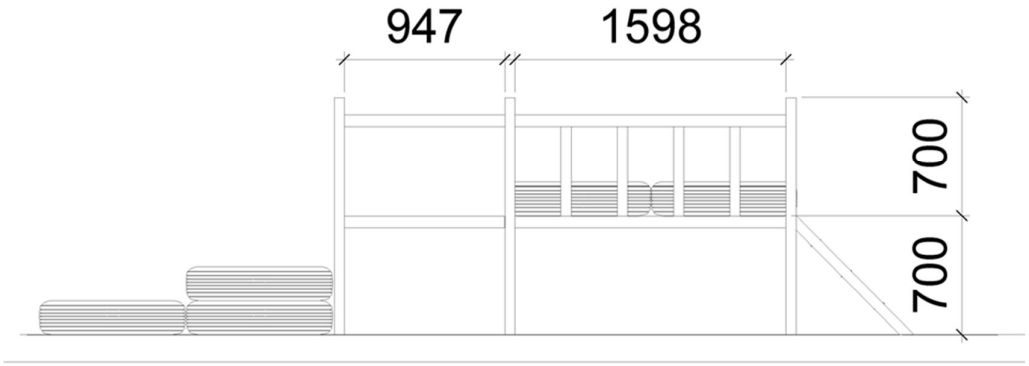
Overall plan

We successfully designed a set of mini playground for the kids in the community by using recyclable materials. The construction is found to be easy, fast and safe to be used. The boundary is fully utilized which is 8625 x 8625 mm. The final design finally get to highlight the purpose of this playground other than just a play area, this mini playground actually help the kids in the community to improve their cognitive, sensory, physical and social. The playground finally being put digitally on site and definitely suit the area.

(A) CLIMBERS



Plan



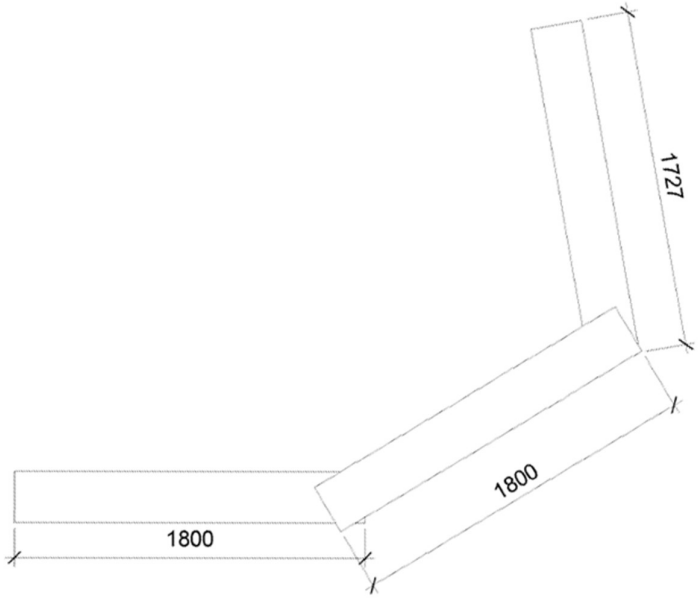
Elevation

Way to construct:

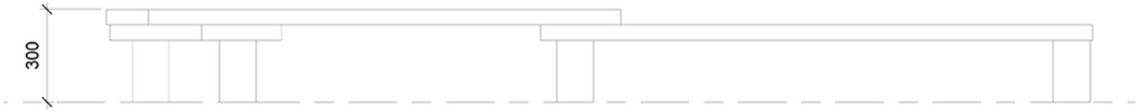
1. The connection for the woods is nails
2. The tyres are connected by using bolts and nuts
3. The foundation to secure the climber is concrete

Materials: Wood & tyres

(B) ZIG ZAG MINI BRIDGE



Plan



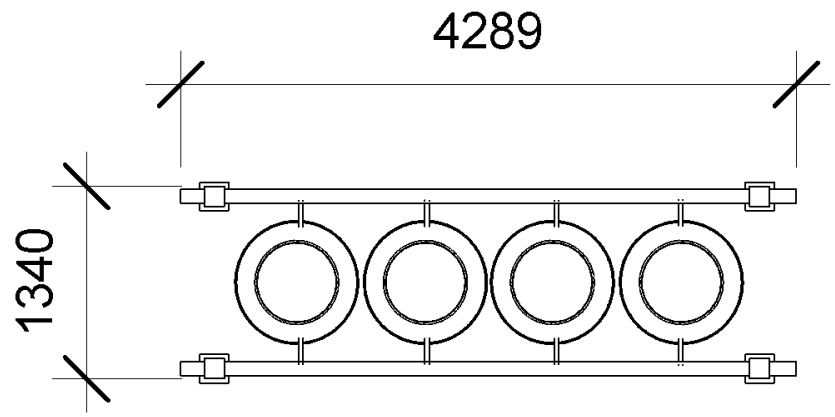
Elevation

Way to construct:

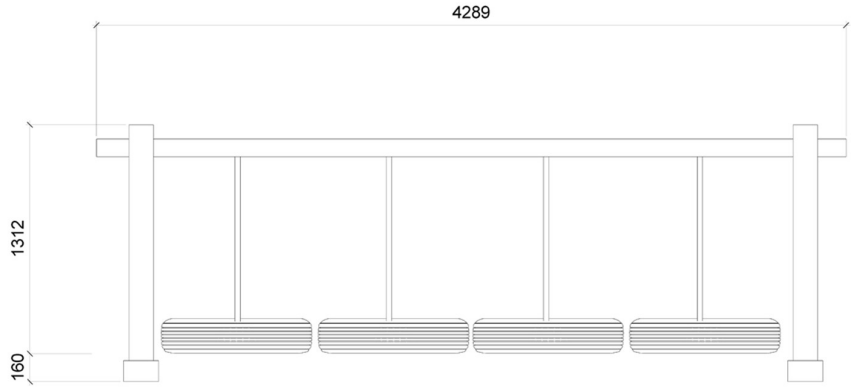
1. The joinery for this bridge is nails
2. Bamboo are used for the base

Materials: Wood and bamboo

(C) TYRE BRIDGE



Plan



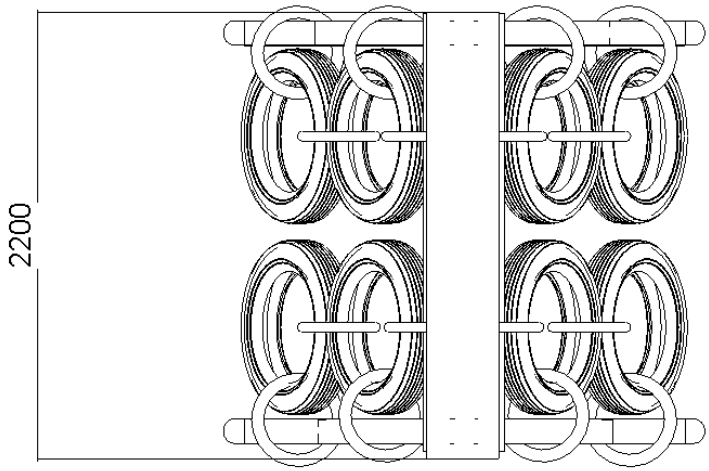
Elevation

Way to construct:

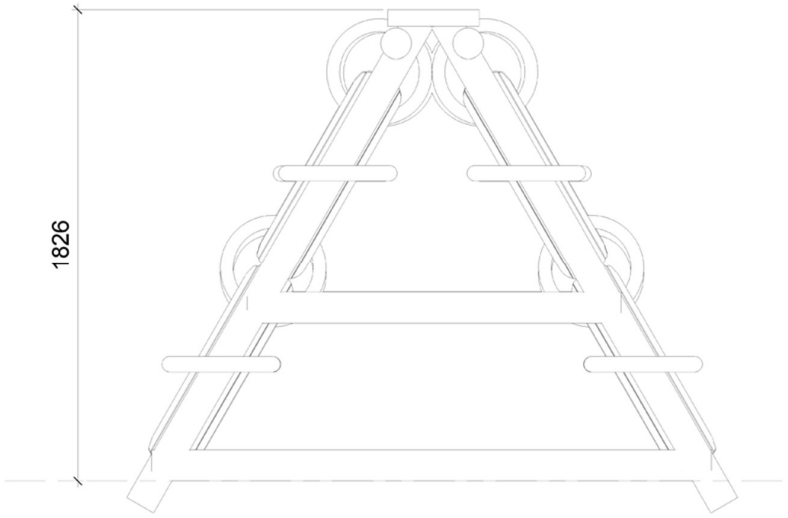
1. The wooden column is attach to the bamboo by using bolts and nuts
2. The tyres are hanged by using metal chain and connected to the bamboo by using bolts and nut as well
3. Concrete is used for the foundation

Materials: Wood, bamboo, metal chain and tyres

(D) TYRE WALL



Plan



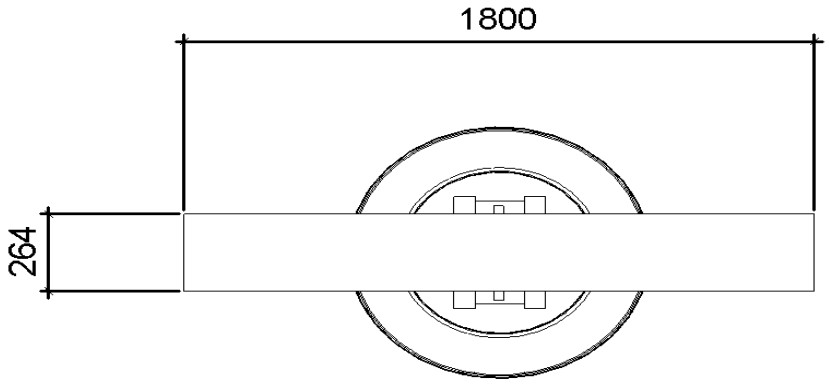
Elevation

Way to construct:

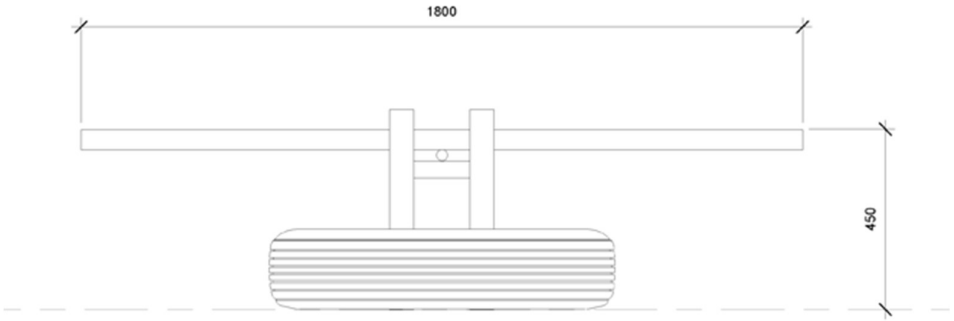
1. The tyres are connected by using nylon rope and bolts
2. The bamboo are connected by using bolts
3. Concrete is used for the foundation

Materials: Bamboo, wood, nylon rope

(E) SEE-SAW



Plan



Elevation

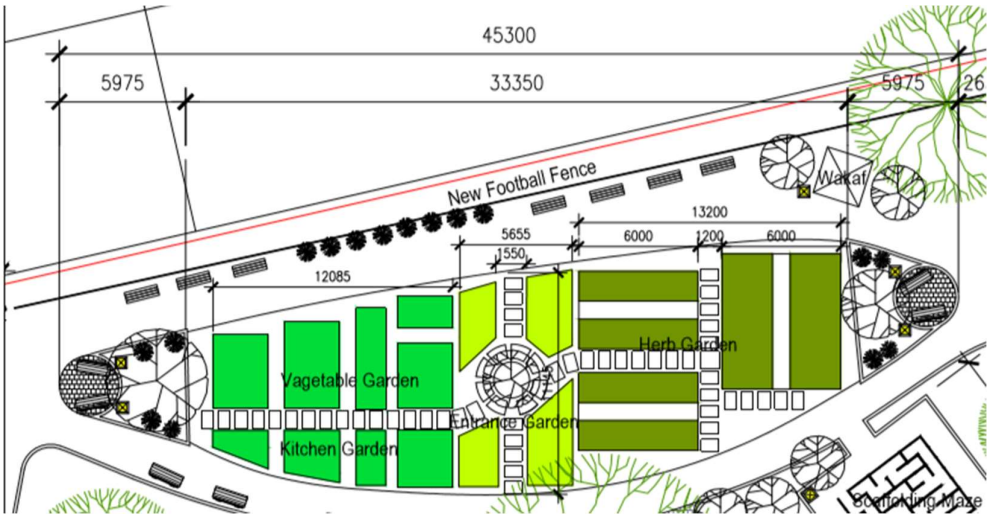
Way to construct:

1. Very easy construction
2. Concrete is used to secure the structure (foundation)

Materials: Wood, used metal and tyre

Materials	Function
	As main structure or support some components
	As structure for tyre wall and tyre bridge
	Part for most of components
	To connect tyres for tyre wall
	To hang the tyres for tyre bridge

4.4 PLANTATION BOX



FIRST MEETING (2/7/2019): BRIEFING AND SITE VISIT

We were given a task to construct a plantation box made of recycled materials in Kebun-kebun Sentosa. The purpose of this project was to provide and encourage community in Taman Sentosa to plant their vegetations. The planting are divided into 4 different gardens, entrance garden (5655mm x 11145mm), herb garden (13200mm x 11145mm), kitchen garden (12085mm x 11145mm)and, vegetable garden (12085mm x 5572mm).

SECOND MEETING (11/7/2019): CRIT SESSION

(A) Kitchen garden,

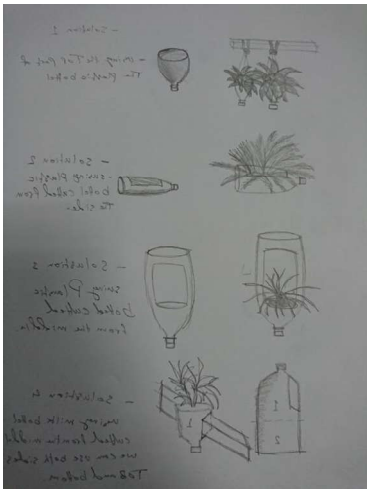
Main idea: green wall plant.

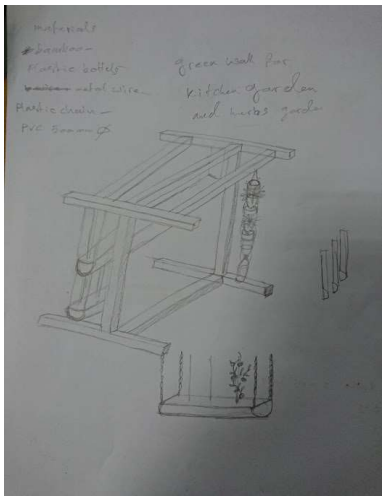
The kitchen garden would be made and constructed from pvc pipe 500 diameter cutted into 2 equals halves hanged by using metal wire on a wooden skeletal. The materials are pvc pipe, metal wire and wooden skeletal. Pvc pipes are durable and have variety of sizes for different plant types.

(B) Herb garden,

Main idea: green wall garden

The herbs garden would be constructed by using plastic bottles. There are cut into two halves hanged by using ropes on wooden skeletal. The materials used are plastic bottles, ropes and, wooden skeletal.





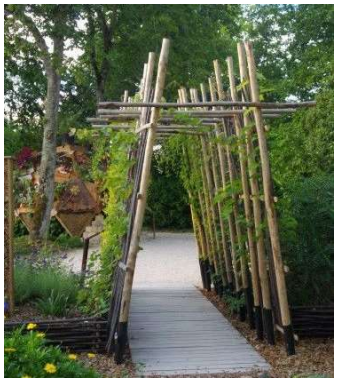
Design for both herb garden and kitchen garden

(C) Vegetables garden

Main idea: ground plants

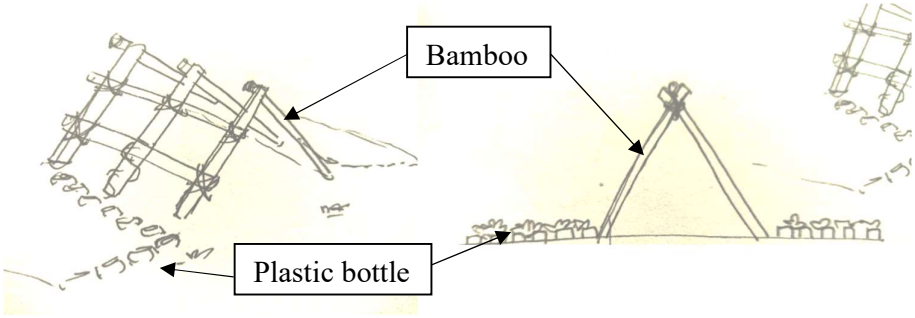
The area of vegetable garden would be separate by using plastic bottle as border surrounding the area. Materials used is plastic bottles which are easy to collect and construct.

Main idea: climbing plants



The spaces between the paths would have archways in rectangular or triangular design by using steel or bamboo for climbing plants. Materials used is bamboo which are easy to construct and durable

Sketches/designs



(D) Entrance garden

Main idea: ground plants

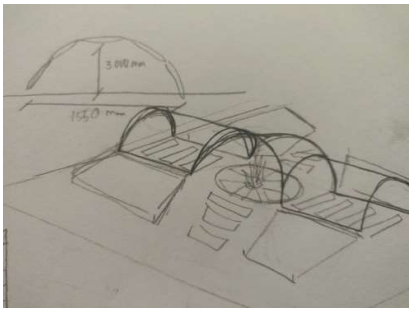
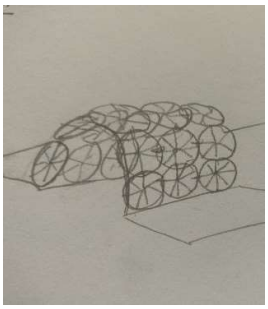
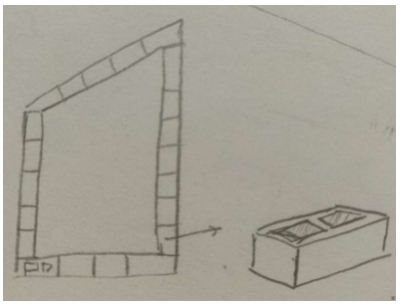
The area of entrance garden would be separate by using bricks or rocks as border surrounding the area. Materials used are bricks or rocks which are adjustable

Main idea: climbing plants



The spaces between the paths would have archways design by using old bicycle wheels for climbing plants. They are connecting each part by steel wire. Materials used are old bicycle wheels which are durable, easy to construct and aesthetic.

Sketches/designs

Feedbacks:

(A) Kitchen garden

- cannot use green wall because the big vegetable in the kitchen garden needs a big growing medium because the roots of the vegetables grow everywhere so that it would be better to plant them on the ground.
- Kitchen garden can be plants on the ground using tiers and we need to cover the boundaries

(B) Herbs garden

- Green wall design approved
- can use green wall the plans are smalls and the roots of the plants Can growing a small medium.

(C) Vegetable garden

- Try to start collecting the plastic bottles
- Try not to use timber material; cost

(D) Entrance garden

- Try to search the materials required

THIRD MEETING (16/7/2019): CRIT SESSION

Feedbacks:

(A) Kitchen Garden

- collecting the materials
- Using low cost materials

(B) Herb Garden

- collecting the materials
- Using low cost materials

(C) Vegetables Garden

- The vegetables would be plant on the ground
- Stick with the same design
- Materials used for archways would change from bamboo/steel to hard branches
- Do the estimation of amounts of materials needed

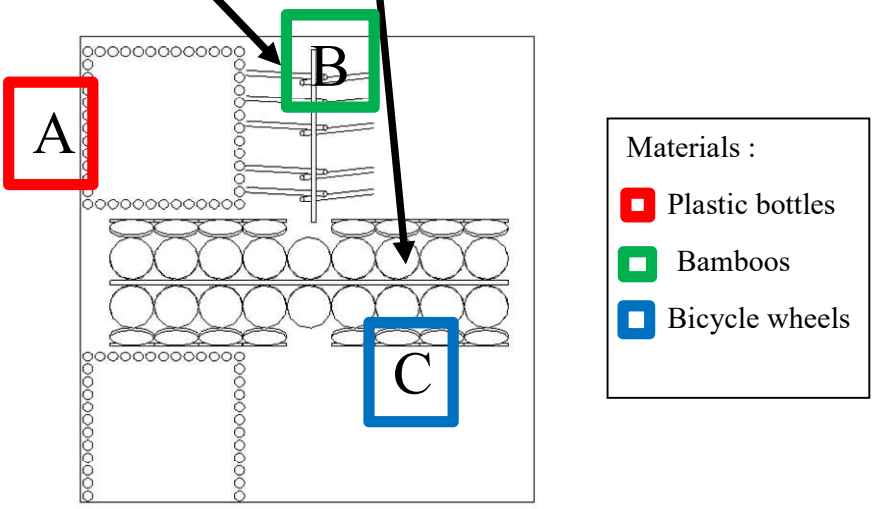
(D) Entrance Garden

- Try to build in actual scale for archways
- Stick with the same design
- The archway design would build starting along the path between vegetables garden and kitchen garden until path at entrance garden
- Design the several void at archways to connect with kitchen garden path

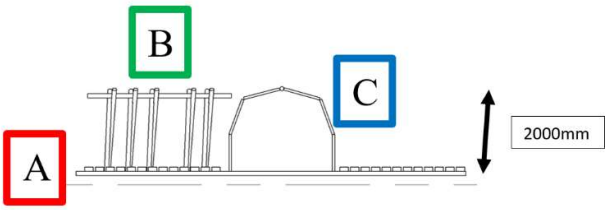
FOURTH MEETING (23/7/2019): CRIT SESSION

Entrance Garden & Vegetable Garden:

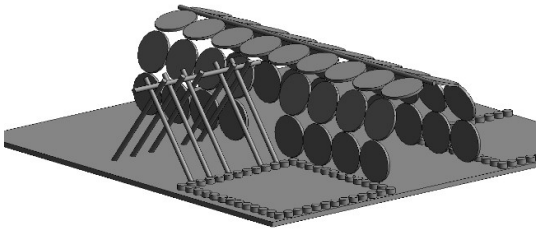
Plan design



Elevation



3D persepctive

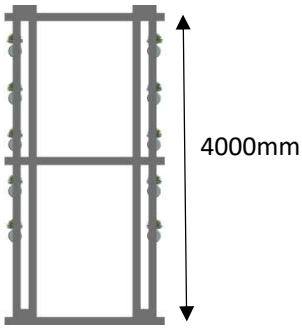


Kitchen garden & Herb & spice garden:

Plan

Elevation

Section



Feedbacks :

(A) Entrance Garden

- still waiting responds from old steel center manager (old bicycle wheels)
- only path surrounding garden have archway
- second option ; using bamboo as archway as same as vegetable garden design.

(B) Vegetable Garden

- bamboo as main material used for climbing plants.

(C) Kitchen garden

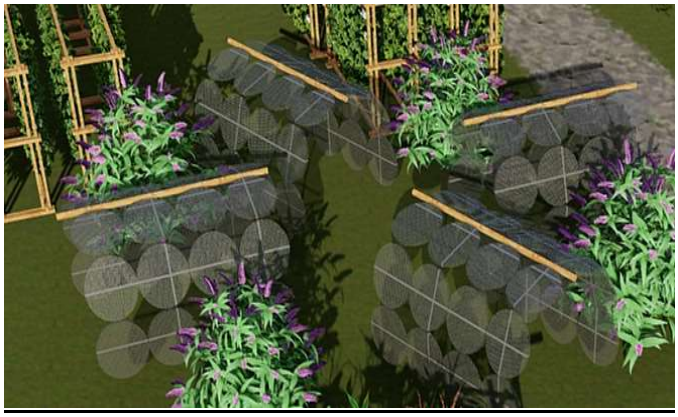
- Design approved. Need to show assembly manual and 3D design view. The design is 3000 mm length, 1000 mm width and, 2000 mm height.

(D) Herb & spice garden

- Design approved. Need to show assembly manual and 3D design view. The design is 3000 mm length, 1000 mm width and, 2000 mm height.

FINALIZED DESIGN: DETAIL DRAWING

A) <u>Entrance garden</u>



3D perspective

<u>Materials</u>

	Materials	**Functions**
1.	Old wheel bicycle 	as the walls of garden.
2.	Bricks 	as border surrounding the garden.
3.	Cable ties 	tie the wheels each other.

Steps to construct

Step 1: connect the wheels using cable ties to make archway in semi-circle shape.

Step 2: put bricks surrounding the garden

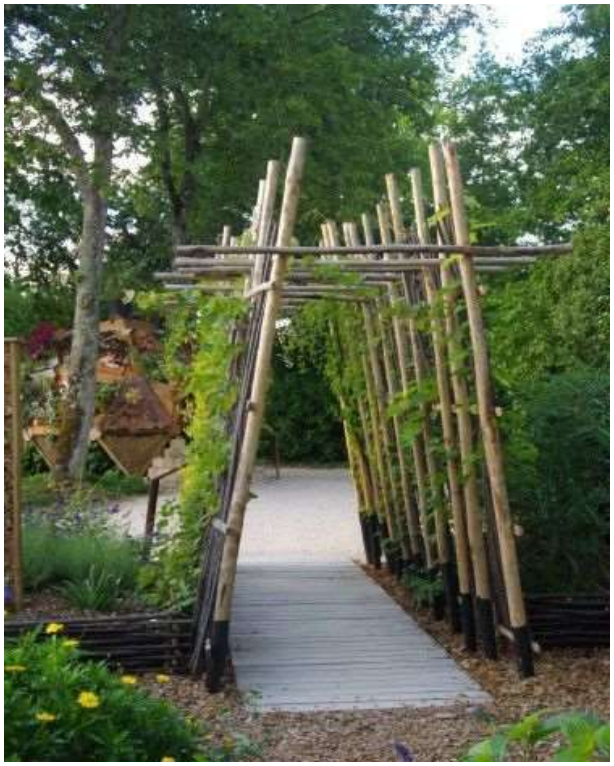
B) <u>Vegetable garden</u>

3D perspective

	Materials	**Functions**
1.	Plastic bottles 	As border surrounding the garden
2.	Bamboo 	Main elements to construct arcways
3.	Cable ties 	Tie the wheels each other.

Steps to construct

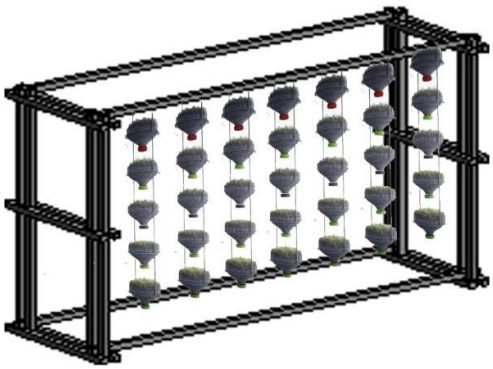
Step 1: connect the bamboos vertically each other using cable ties
Step 2: connect one bamboo horizontally on the 2 vertical bamboos as support.



Step 3: put plastic bottle surrounding the vegetable space as boundary

C) <u>Kitchen garden</u>

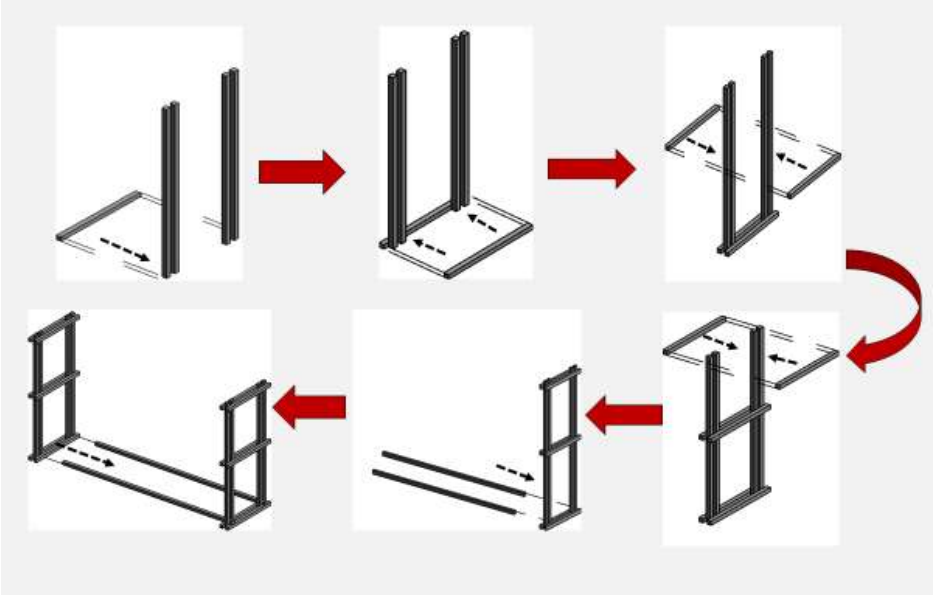
D) <u>Herb & spice garden</u>



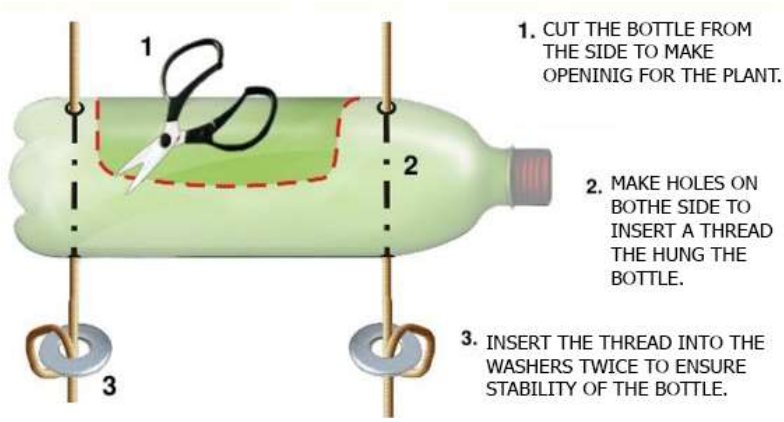
3D perspective

	Materials	**Functions**
1.	Timber 	Main material to construct frame structure
2.	Old steel 	As support material of frame structure
3.	Metal screw rod 	Tie the wheels each other.

Steps to construct (framing structure)

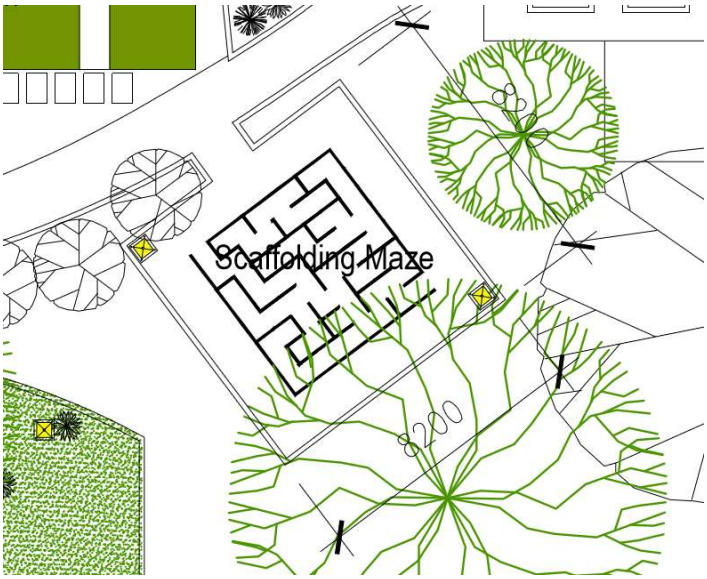


Steps to construct (planting bottle)



Materials

4.5 SCAFFOLDING MAZE

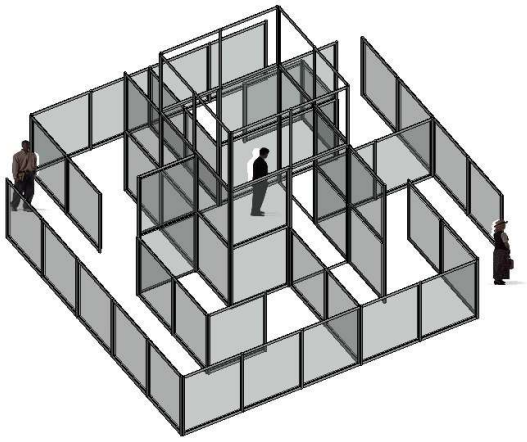


FIRST MEETING (2/7/2019): BRIEFING AND SITE VISIT

We were given a task to construct a scaffolding maze in Kebun-kebun Sentosa. The boundary given is 8200 x 8200mm. The purpose of the scaffolding maze is to create a recreational and resting area for the residents of Taman Sentosa.

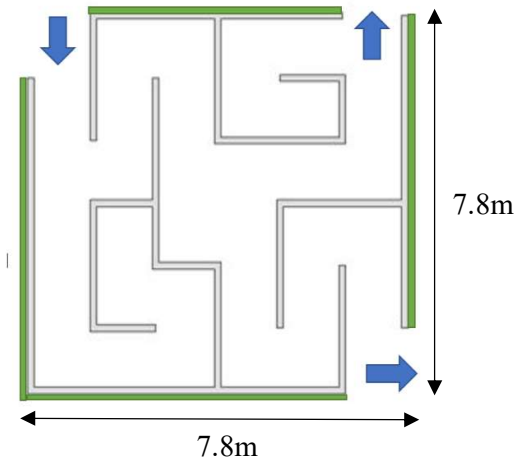
SECOND MEETING (11/7/2019): CRIT SESSION

First design:

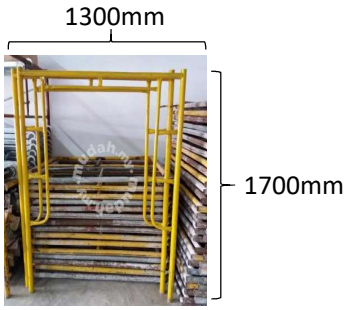
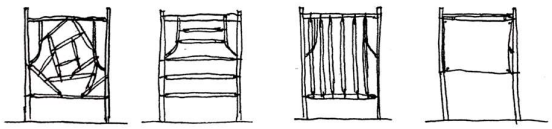


Perspective

Plantations lining the outer walls of the maze.



Plan

	Materials	Functions
1.	Scaffolds 	As the walls of scaffolding maze Quantity needed: Around 44 units
2.	Paint (White) 	Coat the scaffolds in a layer of white paint to enhance aesthetic and to prevent rusting.
3.	Banners 	Tied at the scaffolds and acts as barrier. For example: 
4.	Ropes 	Tied at the scaffolds for plantations
5.	Plastic bottles 	As the planter pots and decoration for walls. For examples, detergent bottles, transparent bottles, coloured bottles

Feedbacks:

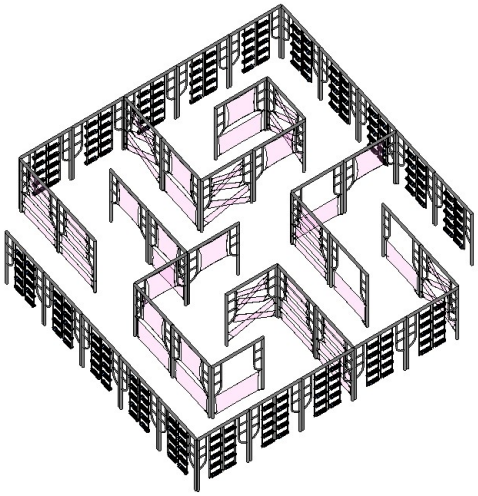
1. Use simpler design
    - Use one tier of scaffold
    - Easy to build

2. Play with colours to make it more interesting
    - Use colourful water bottles and banners

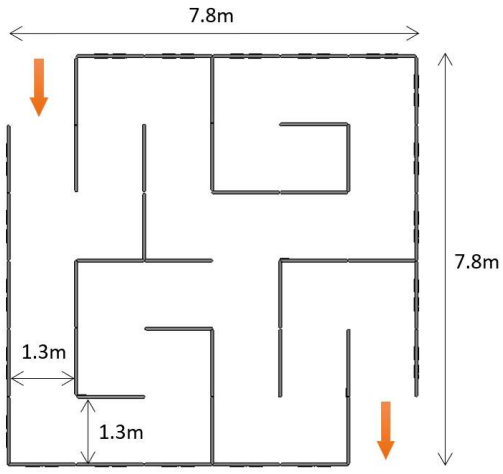
THIRD MEETING (16/7/2019): CRIT SESSION

Second design:

1. One entrance and one exit.
2. One dead end only.
3. Use one tier of scaffold only



Perspective



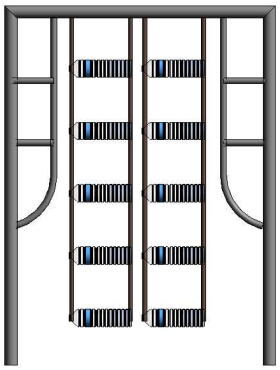
Plan

Maze Partitions:

<u>(A) With plantations:</u>

1. Plastic bottles of the same sizes can be used as planting pots.

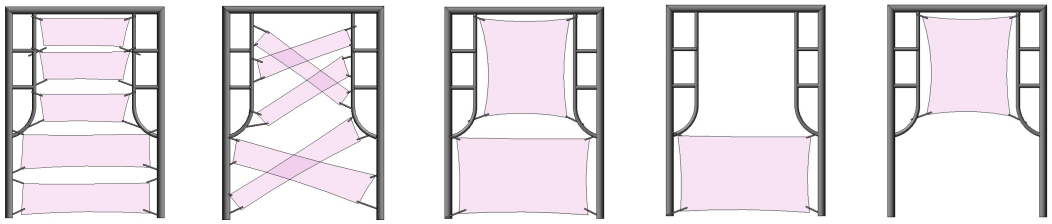
2. Rope can be used to tie and hang the plastic bottles on the scaffolding.



(B) With banners:

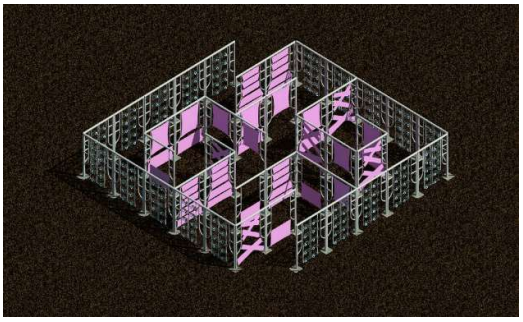
1. Banners are for separation between two lanes and to create a variety of partition to make the maze interesting.

2. Ropes are used to tie the banners to the scaffold.



Horizontal | Criss-cross | Solid covering | Solid covering (lower) | Solid covering (upper)

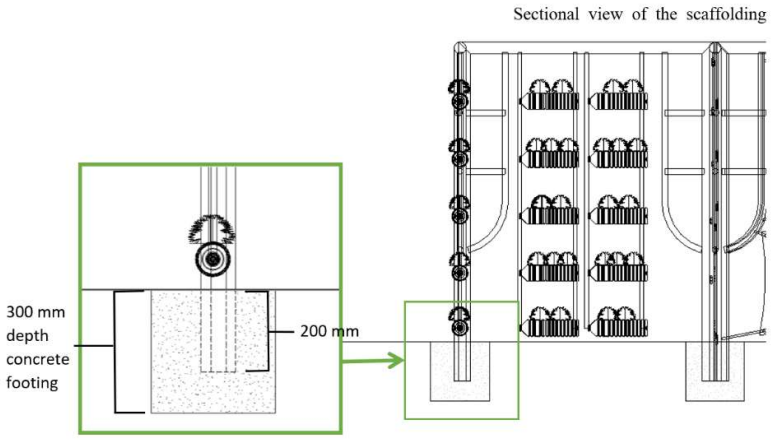
FOURTH MEETING (23/7/2019): CRIT SESSION



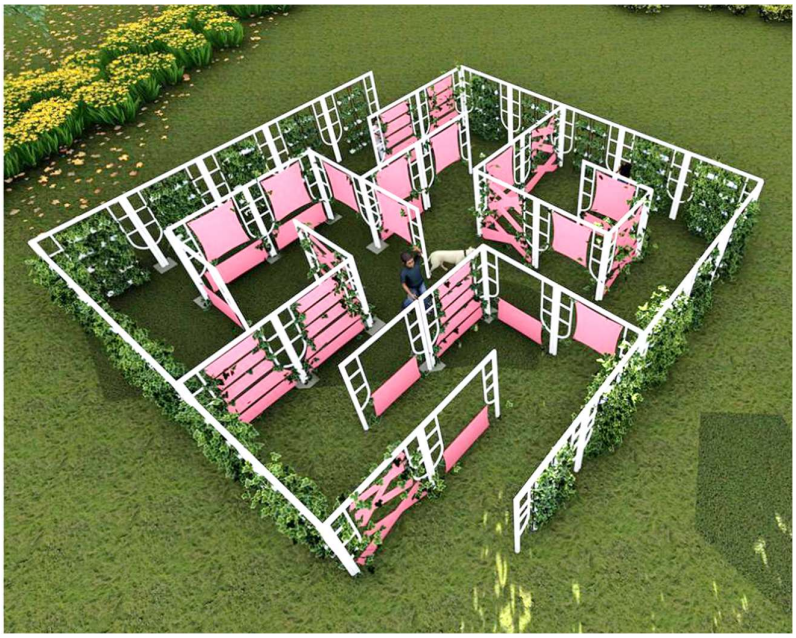
Feedbacks:

1. Think about the foundation of scaffolding maze to ensure its stability.

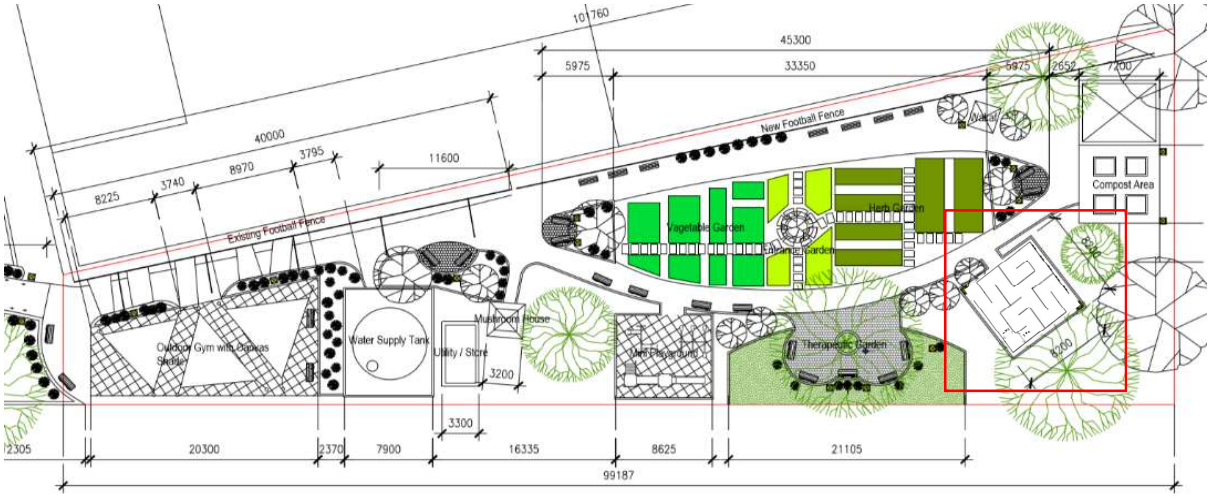
2. Banners can be tied to scaffolding using cable tie.



FINALIZED DESIGN: DETAIL DRAWING

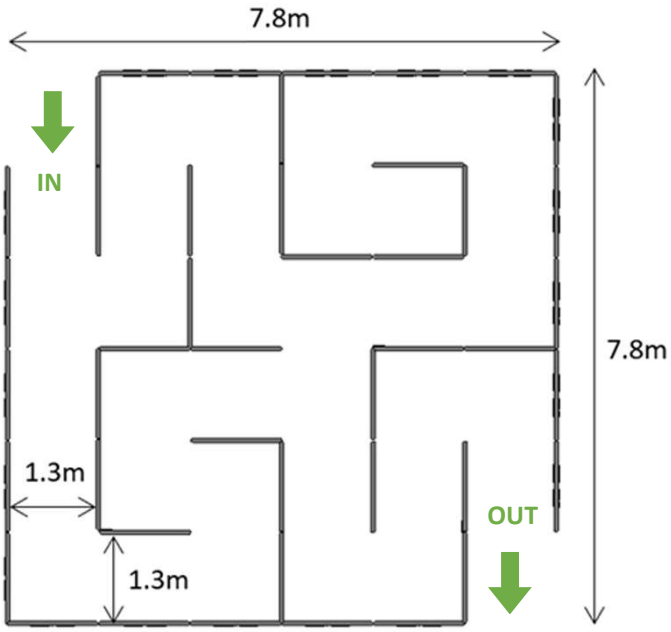


Digital perspective

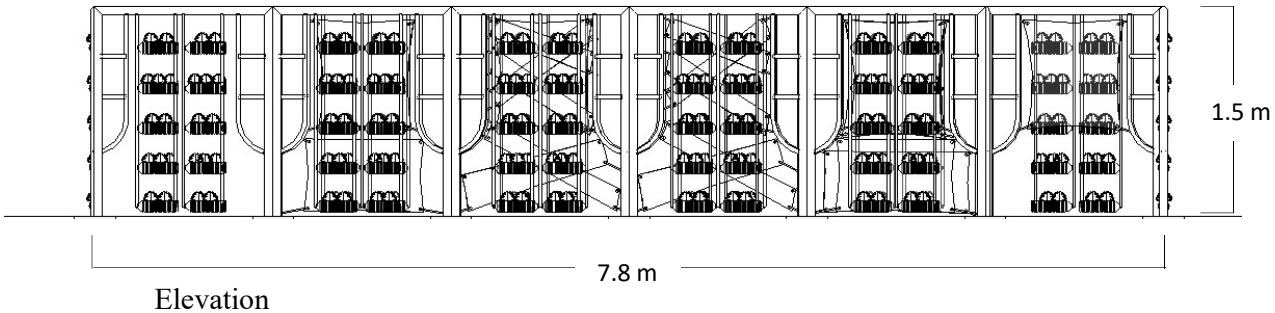


Site plan

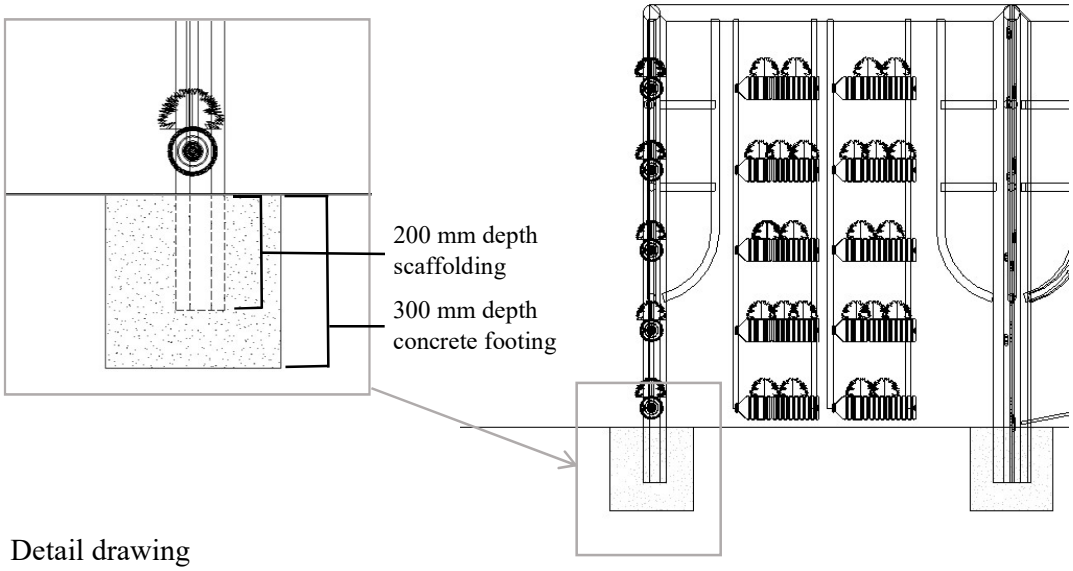
The scaffolding maze is a recreational area for the kids and residents of Taman Sri Sentosa. The materials used for the maze are mainly scaffolds. The objective of the maze is to create a recreational space using recyclable materials that can be easily constructed by the community. The maze combines the function of a space where people can have fun and a vertical garden with plastic bottle planters at the outer walls of the maze.



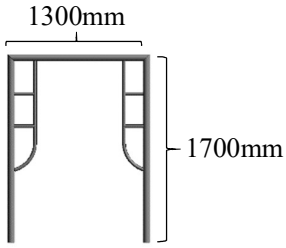
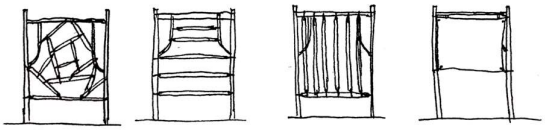
Overall plan



Elevation



Detail drawing

	Materials	Functions
1.	Scaffolds 	As the walls of the scaffolding maze Quantity needed: 44 units
2.	Paint (White) 	To coat the scaffolds in a layer of white paint to enhance aesthetic and to prevent rusting.
3.	Banners 	Tied at the scaffolds as separation between two lanes. For example: 
4.	Ropes 	To tie at the plastic bottle pots to the scaffolds for plantations.
5.	Plastic bottles 	As planter pots and decoration for the scaffolds.
6.	Cable ties 	To tie the banners on scaffolds.
7.	Concrete 	To make foundation as a supporting structure for the scaffolding.

Ways to construct:

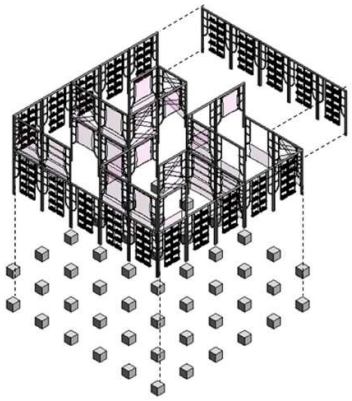
1. Paint the scaffolds in a layer of white paint.

2. Set up the foundation.

3. Digging Holes (Depth: 25cm)

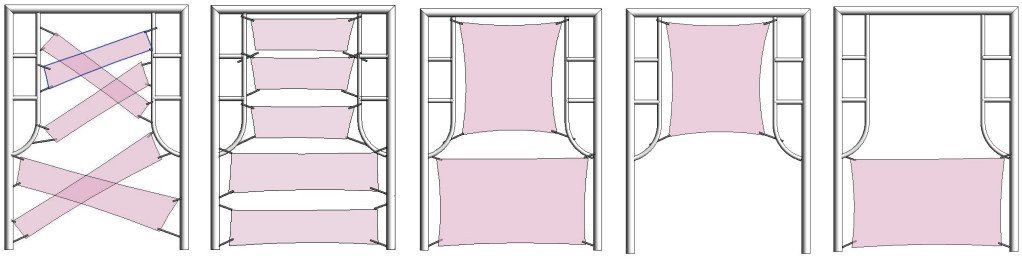
4. Pouring Concrete

5. Insert the scaffolds into the concrete.



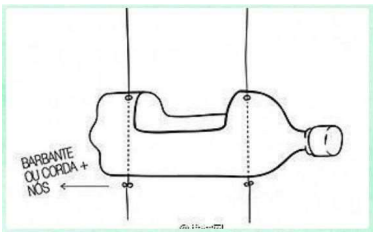
6. Cut the banners into different sizes and punch holes at their corners.

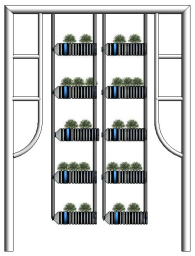
7. Tie the banners to the scaffolds using cable tie.



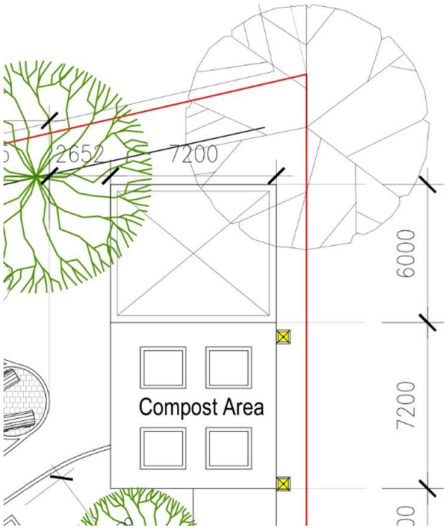
8. Cut the plastic bottles to make them into planter pots.

9. Tie the plastic bottles to the scaffold using rope.





4.6 COMPOST BOX

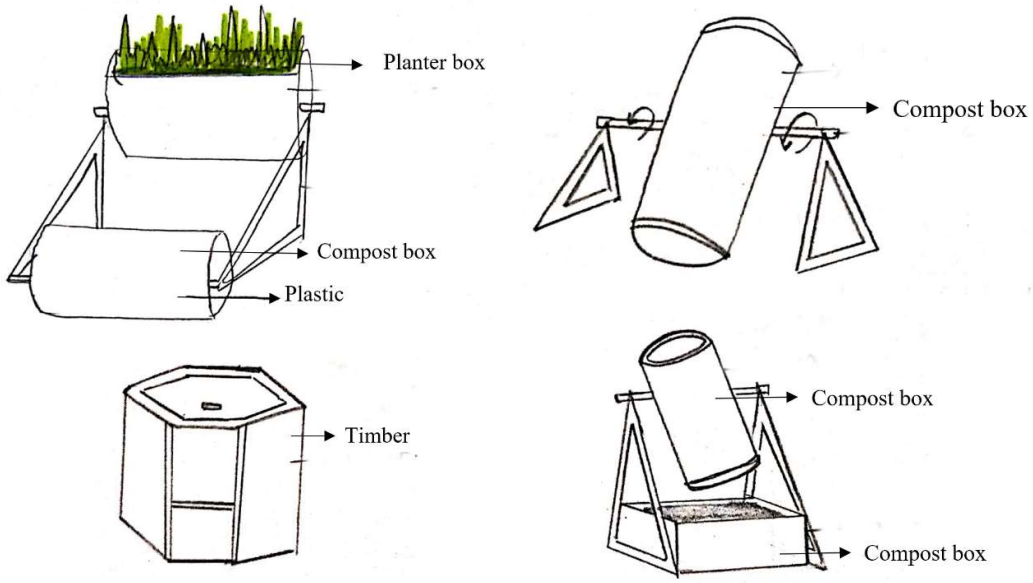


FIRST MEETING (2/7/2019): BRIEFING AND SITE VISIT

We were given a task to construct a compost box in Kebun-kebun Sentosa. The boundary given is 7200 x 7200mm. The purpose of the compost box is to compost waste material.

SECOND MEETING (11/7/2019): CRIT SESSION

4 designs:

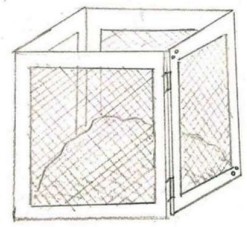


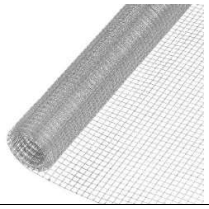
Feedbacks:

- Simplify the design
- Do not make it complicated as the community might not appreciate the design
- Make it as a box shape, hexagon is acceptable

THIRD MEETING (16/7/2019): CRIT SESSION

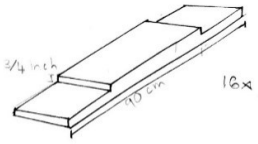
Finalised design:



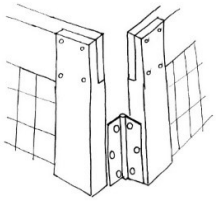
	Materials	Functions
1.	32x of 1inch nails 	Attach the timber together in place
2.	8x of 3inch door hinge 	Allow each frame of compose box to be rotated at a limited angle
3.	Waterproof construction adhesive 	Attach the timber together
4.	Hardware cloth 	Protect the compost from animal
5.	16x of 900mm timber 	Use act the frame for the compose box
6.	2x of barn door latch 	Lock the compost box and avoid it to be accidentally opened.

Steps to construct:

1)

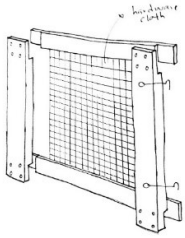


- Cut using circular saw
- 3/4inch deep notch
- Use hammer and chisel to break out the wood
- Smoothen the wood



2)

- Fit notch together
- Use construction adhesive to attach the joint
- Nail the joint together
- Attach 2 hinges at each corner of the structure
- Install the barn door latch at one part of the structure



Feedbacks:

- Design is simpler
- Compost box can be just an open space to compost material and shaded
- Materials is accepted

FOURTH MEETING (23/7/2019): CRIT SESSION

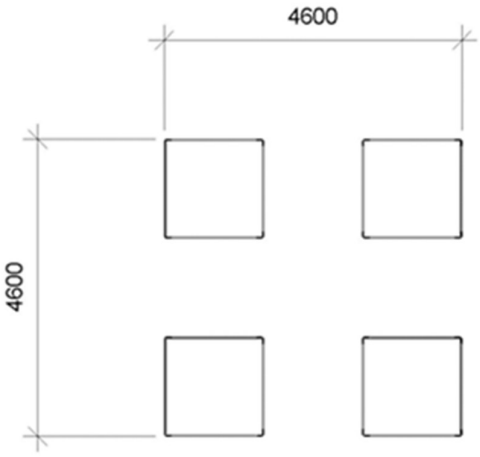
Feedback: Visit UM ZERO WASTE to identify the machines used to create the compost.

Used to break the compost into smaller pieces

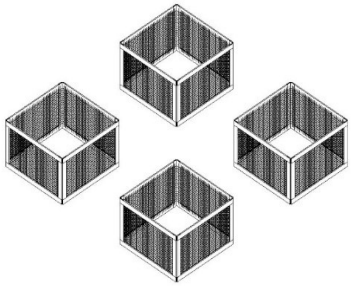
Used to transform the smaller pieces of compost into fertilizer

FINALIZED DESIGN: DETAIL DRAWING

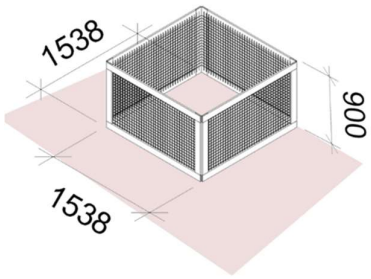
Digital perspective



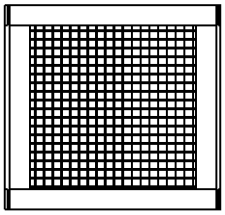
Overall plan



3d perspective



Dimension



Detail

We successfully designed a set of compost box for the Sentosa community by using recyclable materials. The construction is very easy and fast. The compost box was built within the boundary which was 7200x7200.The compost box will ensure that the domestic waste is compost properly and beneficially for the plants. The compost box was put digitally on site and definitely will suit the area.

5.0 MEETING FOR COMMUNITY ENGAGEMENT WORKSHOP

Venue : ISB, Faculty Science, SE10

Date : 2 August 2019 (Friday)

Time : 11.30am – 12.30pm

Attendance : 1. Johanese Mega Anak Learned Musa

2. Irene Sim Hui Ling

3. Lim Woan Teng

We had a meeting with our lecturers, and persons in charge of Community Engagement Workshop. We discussed about the flow and details of the workshop. The workshop will be held on 7 August 2019 in Pejabat Parlimen Lembah Pantai, Taman Seri Sentosa, L1-11, Times Business Plaza.

The students are involved in presenting about our proposed design during the workshop. This will help the community in getting ideas of what Kebun-kebun Sentosa will be made up of from our designs, materials and ways to build generally. Also, we will have the chance to communicate and discuss our designs with the community who lives in Taman Seri Sentosa. In the meantime, we can get feedbacks from the community based on what we presented. They also encourage us to mingle around the community throughout the event as social engagement.

We were also notified that we should prepare a brochure about our design of Kebun-kebun Sentosa. The brochure will be distributed to the community during the workshop so that they can have a look of our designs and the materials needed.

6.0 REHEARSAL FOR COMMUNITY ENGAGEMENT WORKSHOP

Venue : Discussion room, level 5, Faculty of Built Environment

Date : 7 August 2019 (Wednesday)

Time : 3.00pm – 4.30pm

We had a meeting at Faculty of Built Environment before going to Kebun-kebun Sentosa Community Engagement Workshop. The purpose of this meeting is to prepare ourselves for the presentation. We had a run through of the programme flow from start to end to ensure a flawless presentation.

7.0 COMMUNITY ENGAGEMENT WORKSHOP

Venue : Pejabat Parlimen Lembah Pantai, Taman Seri Sentosa, L1-11, Times Business Plaza

Date : 7 August 2019

Time : 7:45pm – 10:00pm

At 4.30pm, we gathered at lobby of Faculty of Built Environment before depart Kebun-kebun Sentosa Community Engagement Workshop.

We were advised to arrive at the destination at 6.30pm to set up the slides for the presentation. Therefore, we took grab at 5.00pm and arrived there at 5.45pm which early than our expected time so we had some time to snacking at the nearby restaurant to pass our time.

We reached the venue at 6.30pm and start to prepare for our presentation together with En. Mohd Nur Adli Ismail. At 7.15pm, some of the community has arrived. After that, the food arrived at venue and we had a delicious dinner together with the community before the programme starts. All of us enjoy the food so much.

After dinner, the event started at 8.00pm with opening speech by Encik Mohd Rashidi, president of MPP Lembah Pantai Zone 6. He delivered a wonderful speech and keep up to UM representative, En. Mohd Nur Adli Ismail (Research Assistant). Dr Rosazlin Abdullah, the event manager also had a slot to explain the motive of the meeting and encouraging the community to put their hands together for the success of Kebun Kebun Sentosa from scratch.

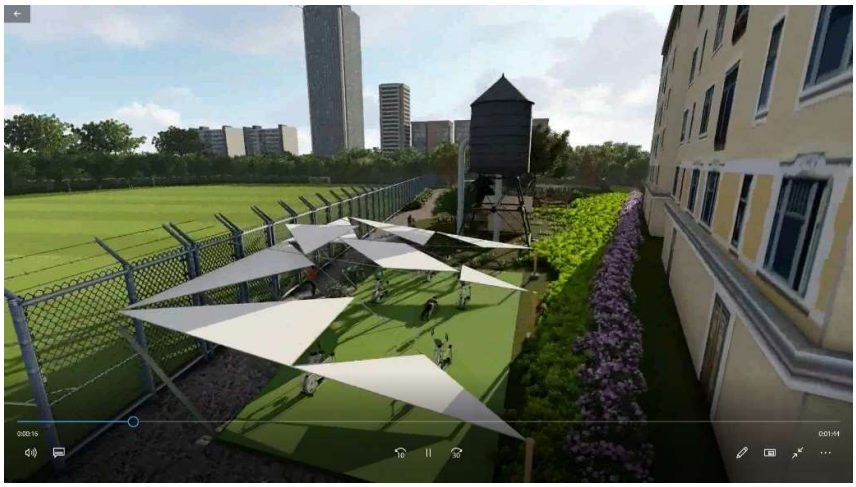
Encik Mohd Rashidi

En. Mohd Nur Adli Ismail (Research Assistant)

Dr Rosazlin Abdullah (Event Manager)

Before our presentation, we distribute our brochures of Kebun-kebun Sentosa which prepared by publicity team to the community present. The brochure demonstrates our designs through perspective view, short brief and materials needed.

The presentation kick-off with a walkthrough video of Kebun-kebun Sentosa which was prepared by our multimedia team. At the same time, our leader, Johanese Mega Anak Learned Musa explained about the video so that everyone can get an overall idea about our design before we go through it one by one.



The presentation began, each sub-group sent a representative to explain briefly about their designs for the community for 5 minutes.

Representatives:

Outdoor gym roof	: Nur Asmida Bt Hanafi
Mushroom house	: Chia Kai Xin
Mini Playground	: Aiman Haqeem bin Asro
Plantation box	: Nor Ain Atika
Scaffolding maze	: Muhammad Faiz Muqree bin Mohd Shukri
Compost box	: Yugenraj a/l Manimaran

After the presentation, Dr Rosazlin Abdullah took over for closing speech. She eventually got approval from the community regarding our proposed design and promised to get the project approval as soon as possible. She also encouraged everyone in the community to get involved in making Kebun-kebun Sentosa a success programme.

At 9.10 pm, we discussed more about mushroom cultivation demonstration. Everyone got a chance to learn about the methods of mushroom cultivation and had a look of mushroom samples. It was prepared by Prof. Madya Dr. Tan Yee Shin, Mushroom Research Centre, Institut Sains Biology, Fakulti Sains, University Malaya.

Prof. Madya Dr. Tan Yee Shin

Community observing the mushroom samples

Also, everyone got a brochure about mushroom cultivation. It shows the methods and steps to cultivate the mushrooms correctly. The mushroom supposed to be cultivated in mushroom cultivation house in Kebun-kebun Sentosa.

Next, we had a Q&A session at 9.40pm, everyone grabs a chance to ask questions and gave opinions about Kebun-kebun Sentosa project. Most of the community agreed with our design and promised that they will bring their family members to participate in to the construction of Kebun-kebun Sentosa. Finally, Dr Rosazlin Abdullah ended the programme by thanking everyone for coming to the event.

Community was giving opinions

We approached the community after the community engagement workshop. We were glad as we had a chance to communicate and discuss about our designs with the community. We also got the feedbacks and opinions about Kebun-kebun Sentosa from the community.

Finally, we took a photo together with Encik Mohd Rashidi, lecturers, researchers and community presented. We helped to clean up the venue before we leave and went back and also took a group photo before going back UM.

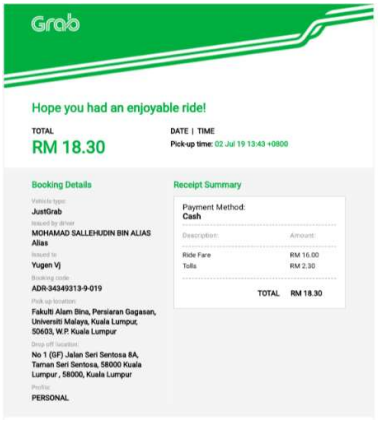
8.0 FINANCIAL REPORT

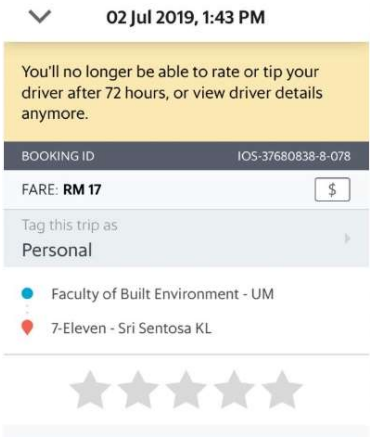
8.1 EXPENDITURE

No.	Date	Item	Quantity	Price per unit	Total (RM)
1	2/7/19	From Faculty Alam Bina to site	16.6km	RM 2.5/km	17.00
2	2/7/19	From Faculty Alam Bina to site	16.6km	RM 2.5/km	18.00
3	2/7/19	From Faculty Alam Bina to site	16.6km	RM 2.5/km	17.00
4	2/7/19	From site to Faculty Alam Bina	16.6km	RM 2.5/km	26.00
5	2/7/19	From site to Faculty Alam Bina	16.6km	RM 2.5/km	10.00
6	2/7/19	From site to Faculty Alam Bina	16.6km	RM 2.5/km	10.00
7	7/8/19	From Faculty Alam Bina to site	16.6km	RM 2.5/km	37.00
8	7/8/19	From Faculty Alam Bina to site	16.6km	RM 2.5/km	40.00
9	7/8/19	From Faculty Alam Bina to site	16.6km	RM 2.5/km	23.00
10	7/8/19	From site to Faculty Alam Bina	16.6km	RM 2.5/km	18.00
11	7/8/19	From site to Faculty Alam Bina	16.6km	RM 2.5/km	18.00
12	7/8/19	From site to Faculty Alam Bina	16.6km	RM 2.5/km	15.00
				Grand Total	249.00

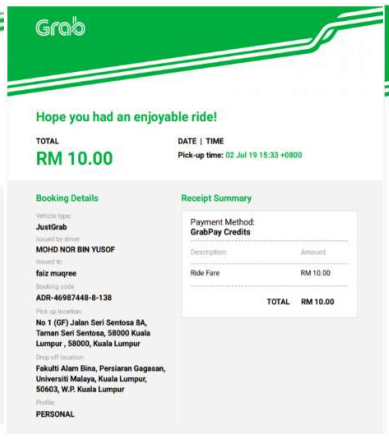
8.2 EVIDENCE

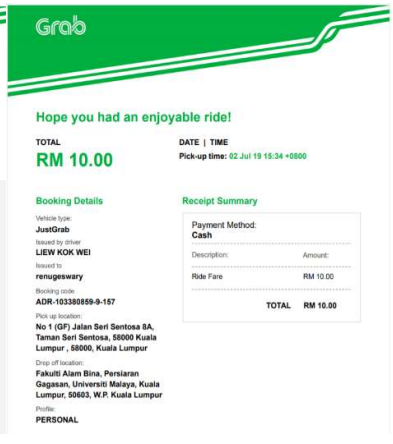
2nd July 2019: From Faculty Alam Bina to site



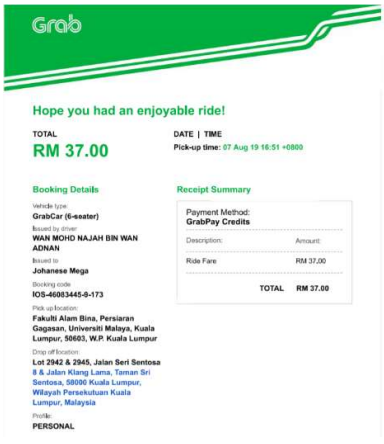


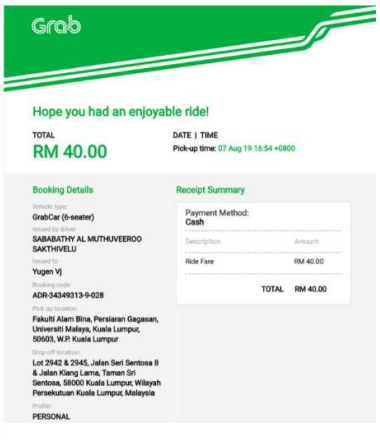
2nd July 2019: From site to Faculty Alam Bina



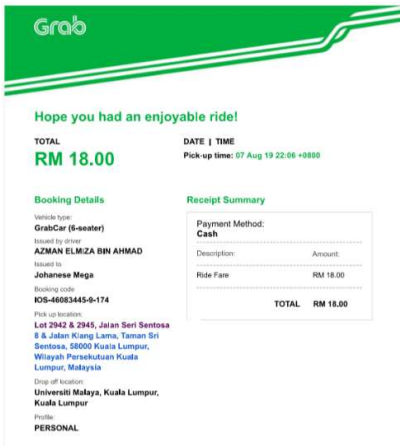


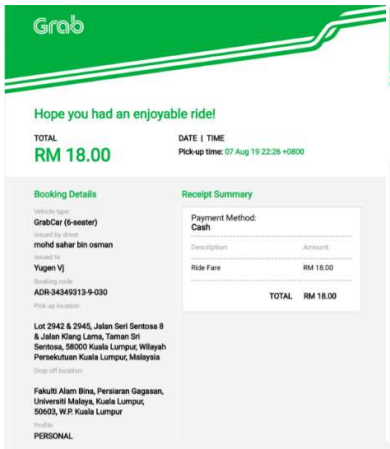
7th August 2019: From Faculty Alam Bina to site

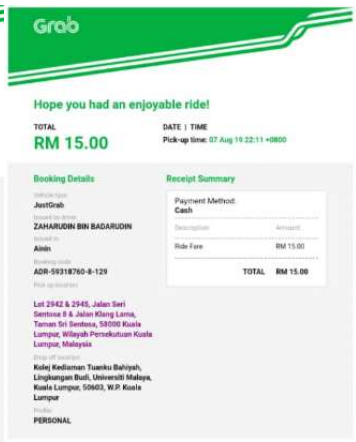




7th August 2019: From site to Faculty Alam Bina







9.0 CONCLUSION

Everyone involved gave their full cooperation and commitment in making the program a great success. Through this program, our team learnt a lot. Even though it was quite a hasten, but eventually filled with happiness and excitement as we had a chance to design for the community. Exchange of knowledge and views were happened during the community engagement workshop too. We hope that similar program could be carried out again, apart from this curriculum requirement. We have fostered our bonding, as well as, be thankful with what we have today.

"To Move Forward, We Must Give Back."