

Fig 7.1: Design development sketches. [Author, 2016]

“And I dream that these garden-closes  
With their shade and their sun-flecked sod  
And their lilies and bowers of roses,  
Were laid by the hand of God.”

Dorothy Frances Gurney  
(Willis, 2006: 11)

## 7.1 Introduction

In the following chapter, the final conceptual resolution was translated into a more refined architecture in two different ways. First by taking the landscape elements that exist on site and forming an architecture that aims to re-appropriate them into non-prescriptive landscape elements that facilitate experiential play and the second translation which, instead of re-appropriating the landscape as separate elements, garden spaces of specific identities were identified and translated into architecture.

Each translation is critiqued in terms of the concept and a final design decision was made.

## 7.2 Design Translation 1

Water: sculptor and unifier of all aspects of landscape and building.

Natural Systems: the trees and the ground form non-prescriptive landscape elements that can be interpreted differently through the different scenarios created by children through experiential play.

The Child: Integration of cognitive development through the facilitation of experiential play taking place, immersed in natural surroundings. The learning will take place through play in the architecture that mimics the physical attributes and the functions that each landscape element plays in the larger ecosystem that makes up the site as well as creates sensory awareness of systems, physical characteristics and their place in a larger ecosystem of each landscape feature.

The Architecture: Through this conceptual approach, notional plans were explored, together with the initial placement of programs, as well as the design of the garden in order to develop spaces to facilitate learning. They are a further development of the fourth conceptual approach which combined the approaches of the other preceding conceptual diagrams. The central movement pathway remained key to the design of plan

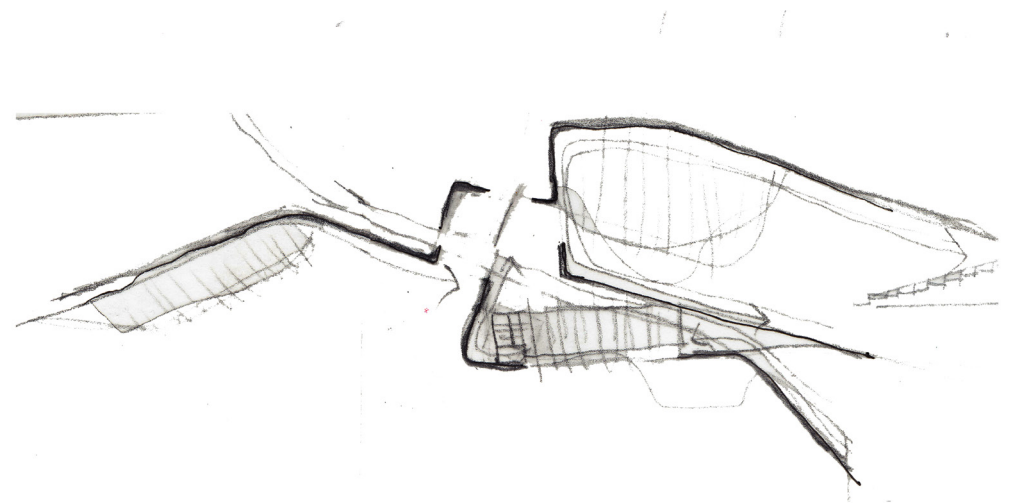


Fig 7.2 Development of plan (Author, 2016)

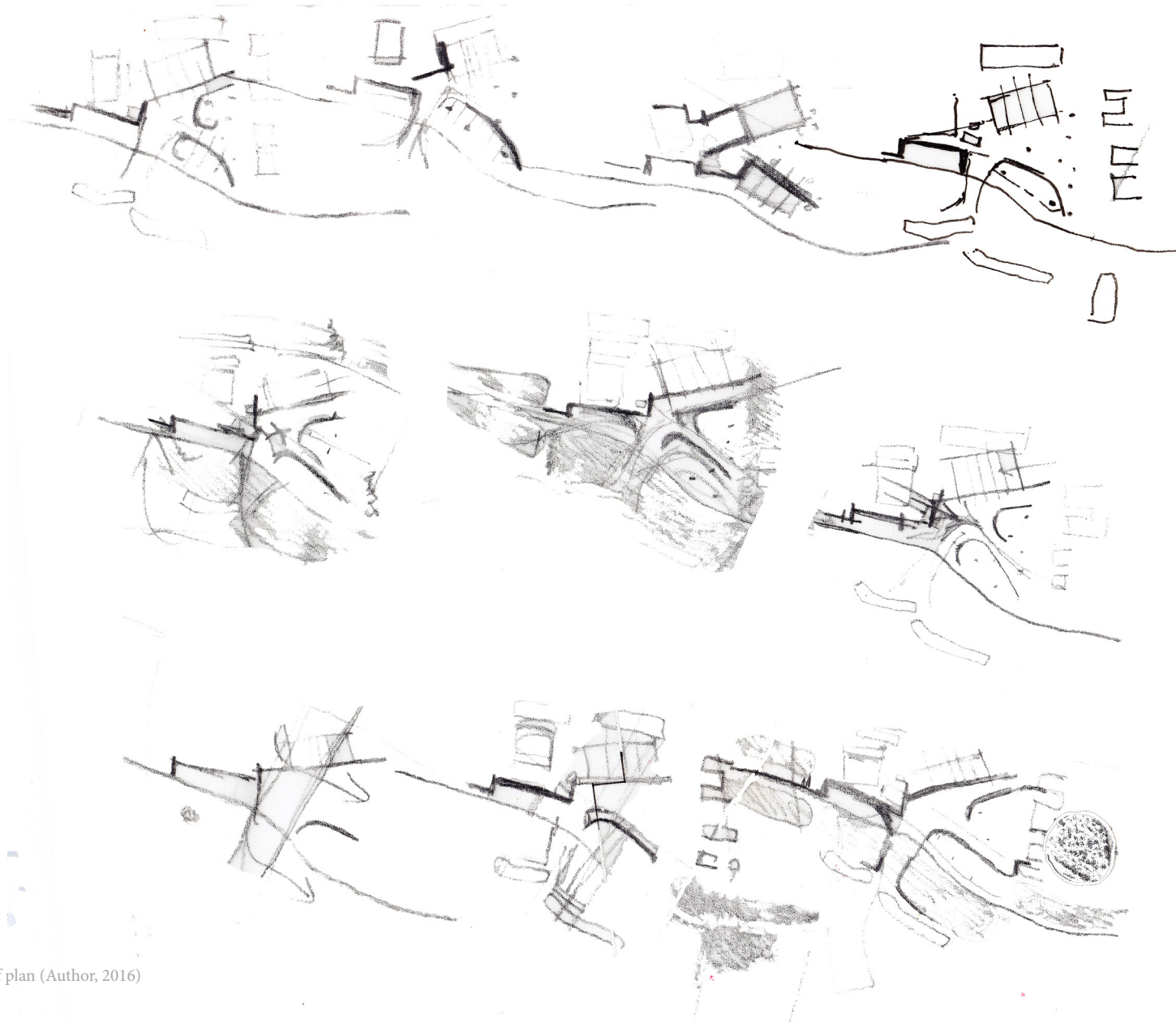


Fig 7.3 Development of plan (Author, 2016)

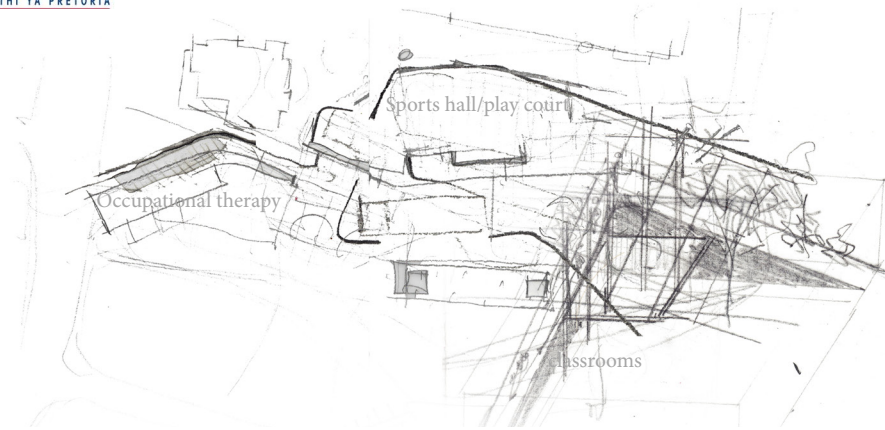


Fig 7.4 plan development, with sports hall becoming the dominant feature on site. (Author, 2016)

## 7.2.1 Architectural development

The four conceptual resolutions, developed the plan, section and garden further. The architecture began to form into stereotomic, guiding walls that meander through the landscape, forming alongside the central movement pathway. These were juxtaposed alongside spaces made up of light tectonic columns and light roofs, letting in natural light from high level windows. The Reggio Emilia classrooms sat as a light structure in the landscape, where the sports hall had a heavy backing towards the flats on the northern side, due to the corner being mostly cast in shadow. The occupational therapy suites, to the west, had a heavy wall to the rear, opening up towards the river to create private spaces for therapy and making use of the river as a therapeutic mechanism.

The play court, at the time, was in the form of a large sports hall with indoor seating and changing facilities below. It formed the largest space on site with a ramp that connected to the street park on the east. In Fig 6.14, the sports hall is seen on the top right of the image, connecting to the street condition. In Figure 6.15, the section of the sports hall alongside the classrooms is shown. In an earlier section, the basic principle of the architecture is explored, with lightweight towers resolving issues such as scale, as well as serving as didactic water tanks.

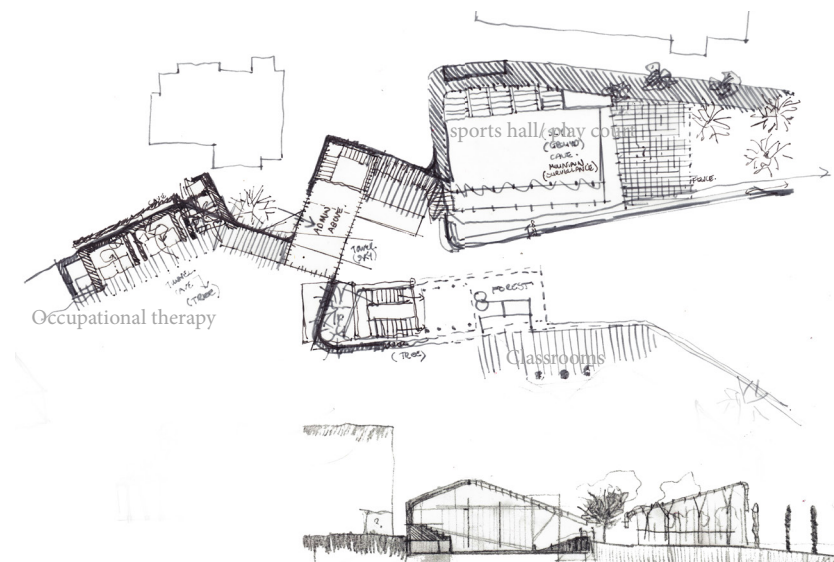


Fig 7.5 Section development, showing relationships between tectonic and stereotomic. (Author, 2016)

Fig 7.7 Archetypal landscape elements relating to architectural language (Author, 2016)

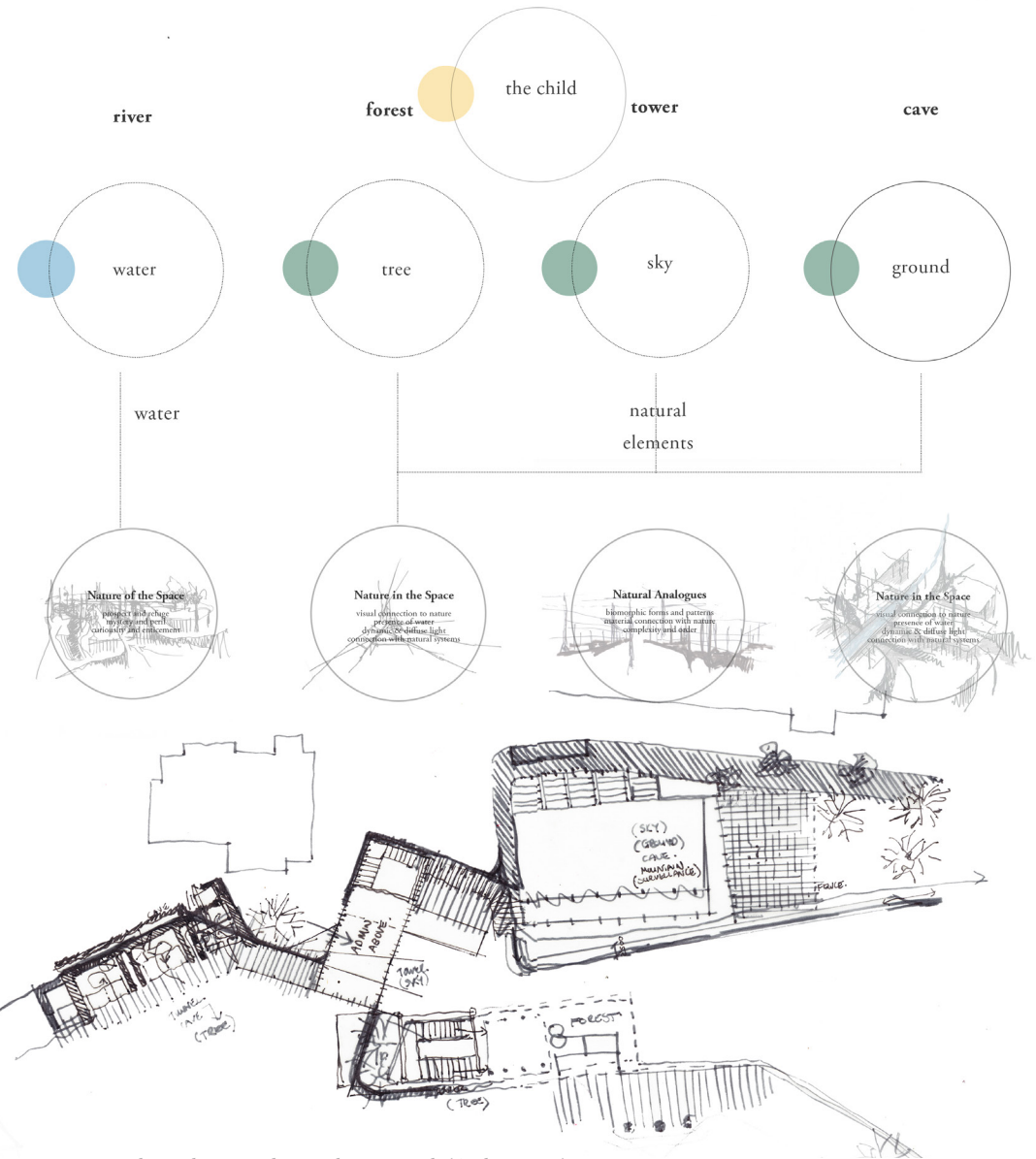
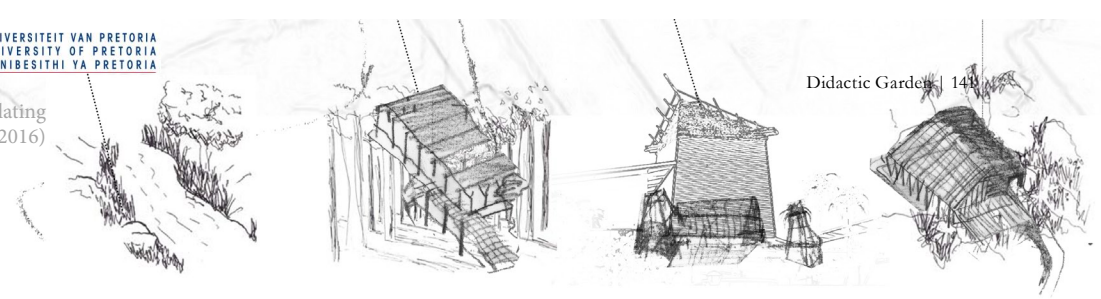


Fig 7.6 Resultant plan according to this approach (Author, 2016)

## 7.2.2 Typological development

Due to the investigations in Chapter 4, the benefits of abstract objects in the environment was identified as beneficial to children’s play as they form a non-prescriptive platform for children’s play to take place, offering an environment which stimulates cognitive development in children while at the same using the natural setting to ignite the child’s biophilia.

In an attempt to create a meaningful architectural language that is appropriate to children and the site, archetypal landscape objects that related to site conditions were identified as the forest, the cave, the river, the tower. In Fig 6.17 these archetypes are identified and translated into architectural form that mimic the physical attributes of each to stimulate imaginative play, and therefore learning, in and around the buildings. The physical and functional attributes of each were explored in terms of what the child can learn from each archetypal form.

Four key natural elements on site (namely the tree, the river, the sky and the ground) are related to the key informants on site as well as incorporating typological resolutions from the conceptual diagrams.



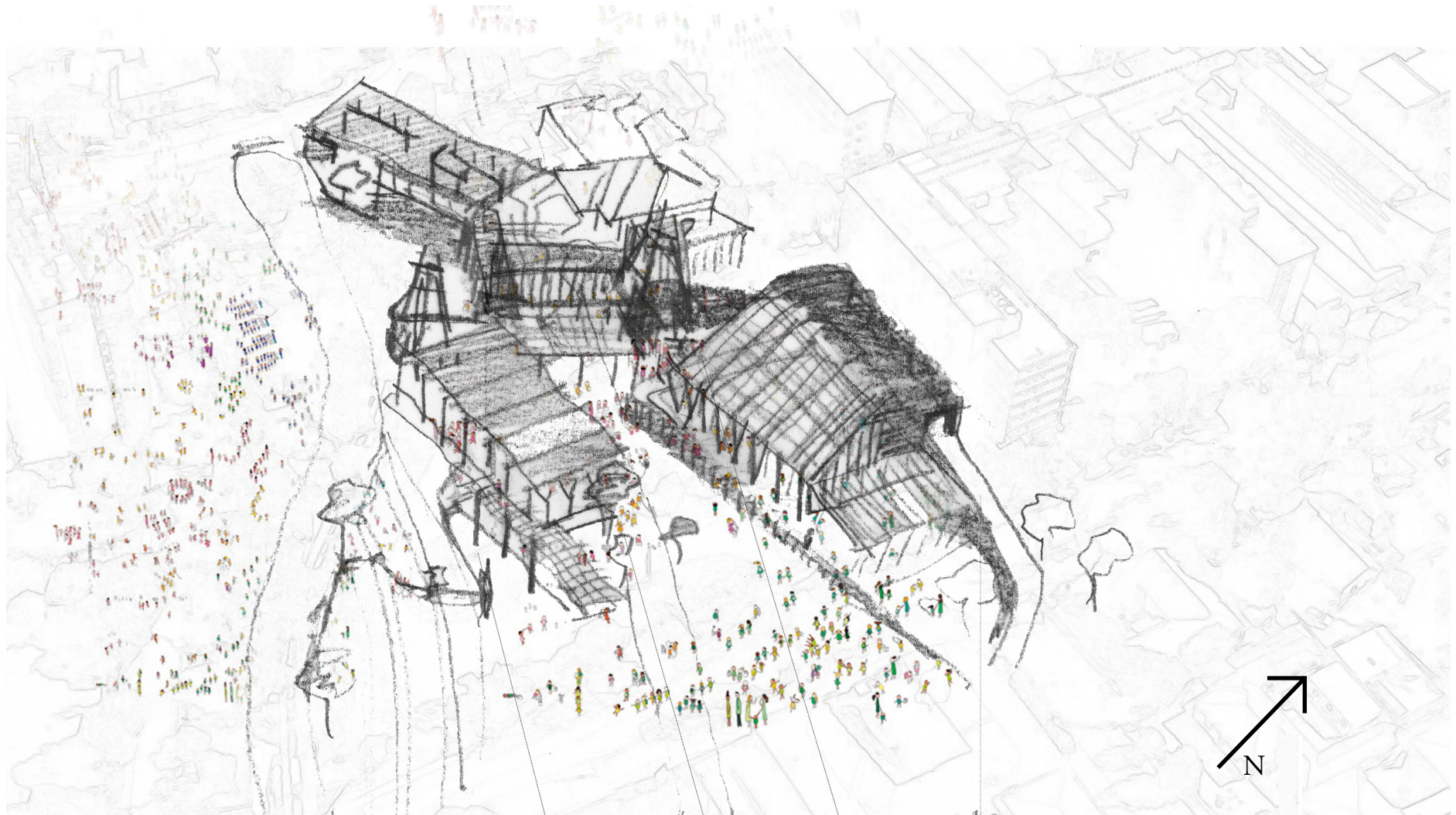
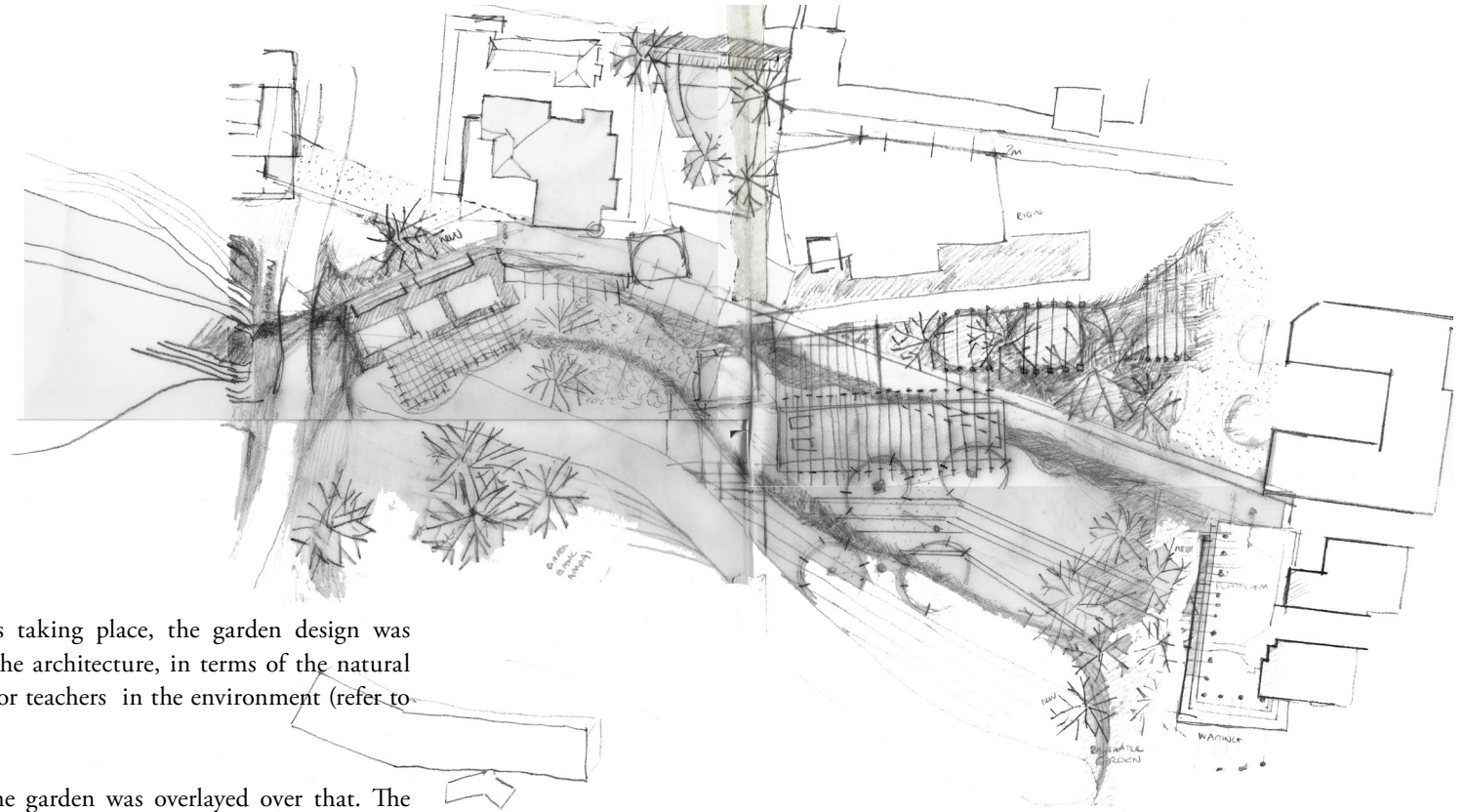


Fig 7.8 Resultant Aerial view of site (Author, 2016)



### 7.2.3 Garden development

While the design of the architecture was taking place, the garden design was concurrently being designed as a layer to the architecture, in terms of the natural elements of site becoming didactic entities or teachers in the environment (refer to figure 7.9).

The architecture was designed first and the garden was overlaid over that. The central movement pathway remained key to the ordering of the garden design. The result of this approach proved to be problematic due to the building becoming more of a sculpture in the landscape rather than part of the landscape, which were not the intentions, shown conceptually in Figure 6.11 in Chapter 6.

Fig 7.9 building outlines, guiding the garden design  
(Author, May 2016)

### 7.3 Final Resolution of Translation 1

The following figures (fig 7.10 - 7.15) show the final resolution of translation 1 of the concept. The architecture resulted in a design that did not completely integrate itself with its landscape and became a sculptural form in the landscape, appearing to be placed on top of rather than part of the landscape. A different translation was needed to be investigated in order to create an architecture more connected to site and more didactic in essence.



Fig 7.10 Site plan (Author, June 2016)



Fig 7.11 Section bb through site (Author, June 2016)

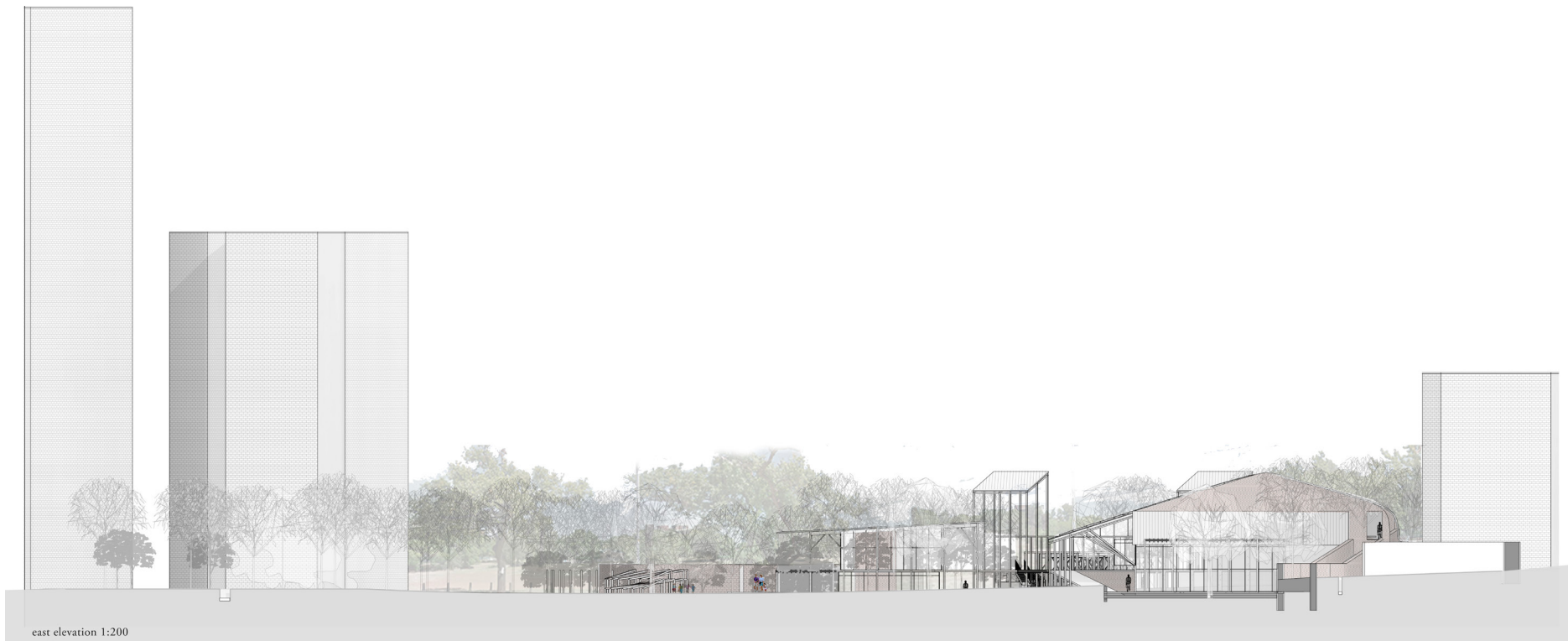


Fig 7.12 West elevation (Author, June 2016)

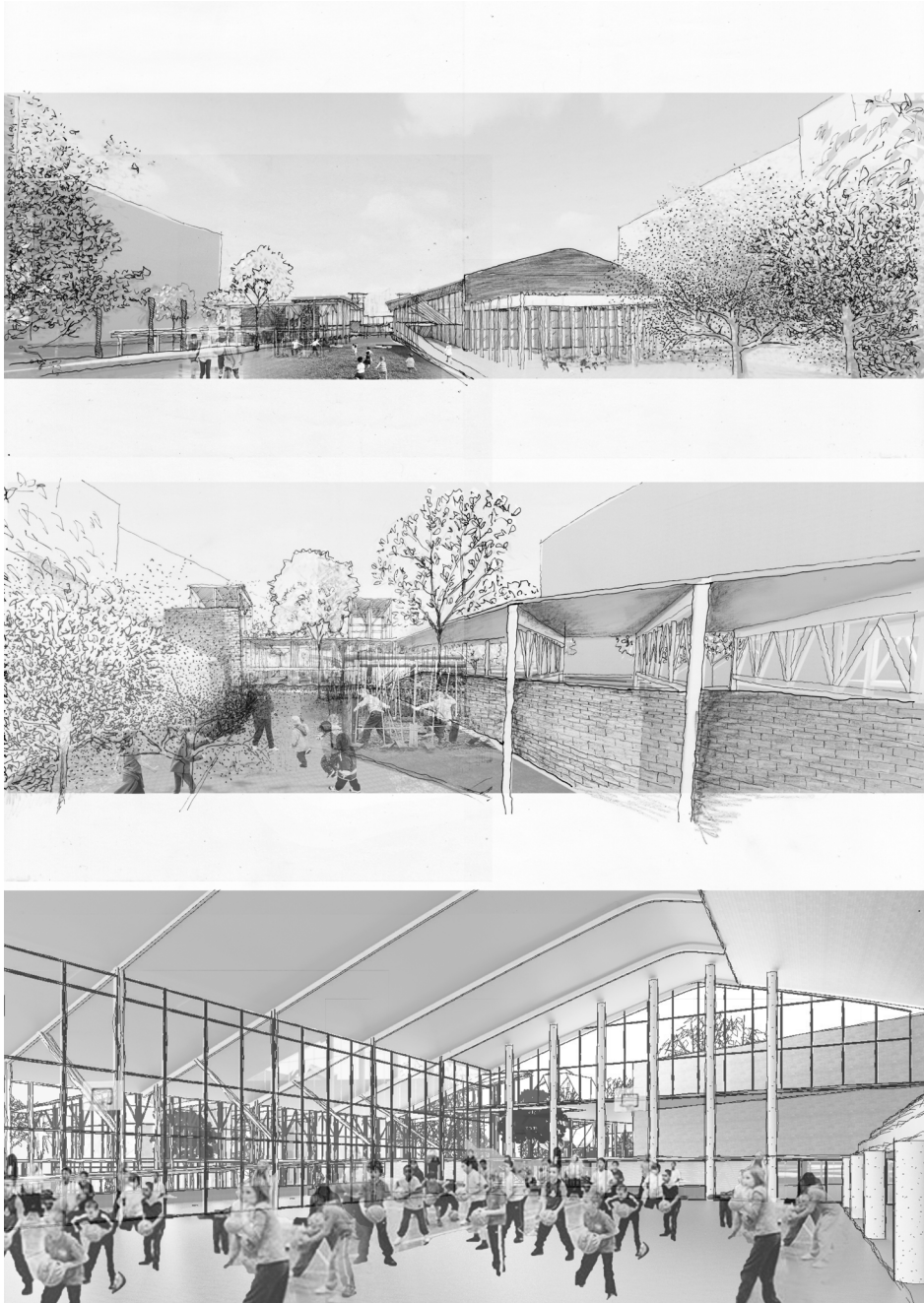


Fig 7.13 Perspectives of approach from street on east side, approach from western side and sports hall respectively (Author, June 2016)



Fig 7.14 Site perspective aerial view (Author, June 2016)

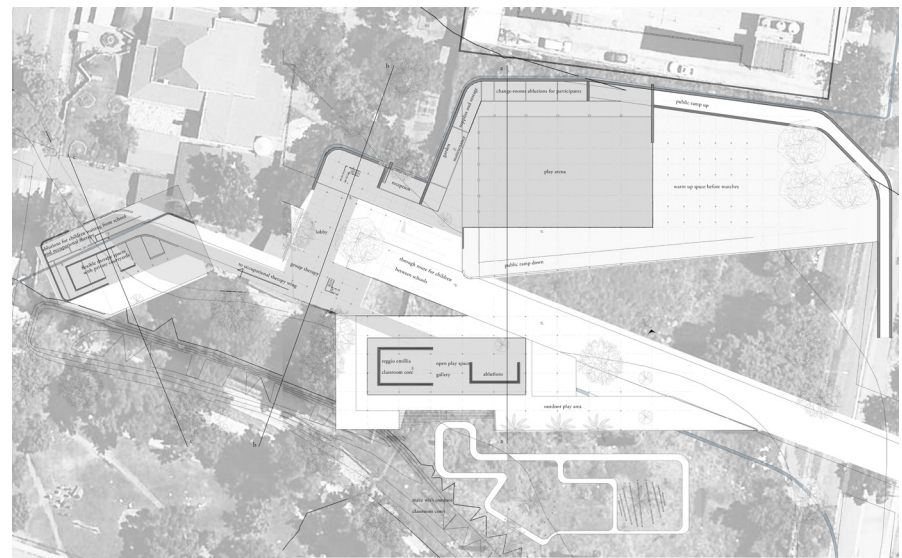


Fig 7.15 Ground floor plan (Author, June 2016)

## 7.4 Design Translation 2

In an attempt to connect the architecture to the site, the concept was translated through a different response. Instead of the building coming first and the garden being designed as an overlay to building, the garden spaces were identified first for their didactic potential with the building following suit.

The child and the spaces perceived by children was addressed through the investigation of the site in terms of potential didactic “garden” spaces. An identity for each “garden” was derived from, firstly, the natural elements that already existed in each garden and secondly, how the importance of natural ecologies and systems can be taught through their rehabilitation and conservation. The architecture fills the role of the latter by facilitating the didactic rehabilitation, awareness and conservation of each garden space. A central movement pathway that served as the linking element between the existing child institutions in the areas, was designed to serve two functions rather than simply circulation. It serves as a connection between the existing schools, a way in which physical barriers between child and nature is reconnected and secondly, it serves as an architectural ordering device which connects each garden while at the same time establishing control of form.

Each garden received an identity according to the nature of the garden space. The nature of the gardens gave rise to how and what activities of learning will take place in the architecture that framed and facilitated each garden.

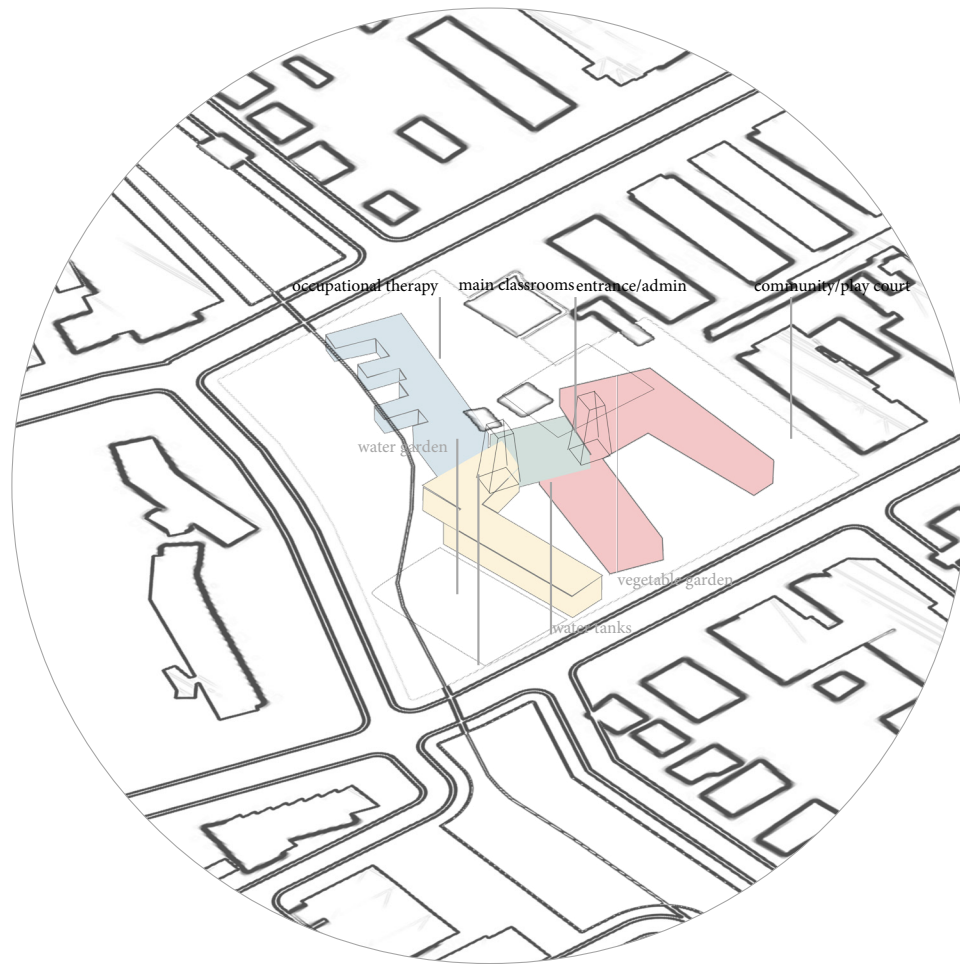


Fig 7.16 Development of program layout according to design translation (Author, 2016)

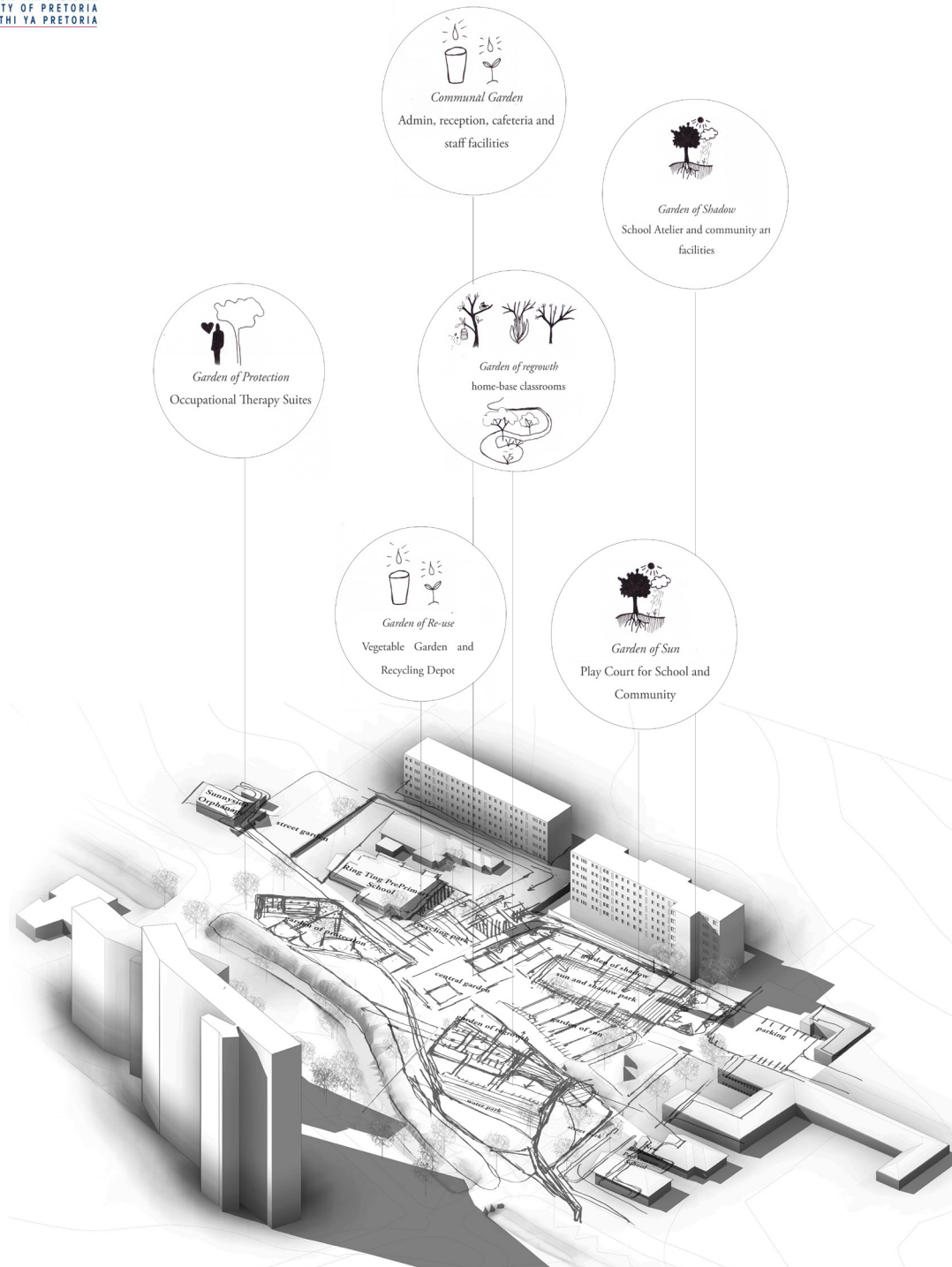


Fig 7.17 Identified gardens as the third teachers with the buildings facilitating learning (Author, August 2016)

## 7.5 Development of Final Design Resolution

Through the identification of each garden and the building which facilitates the learning of the nature of the garden, the language of the architecture needed refinement according to each garden's identity together with the linking pathway that offers views to the different didactic garden conditions.

The conceptual resolutions resulted in the design of the section following a combination between the biomimicry of the vertical and horizontal axis of the physical, emotional and functional aspects of the tree (Fig 7.18). This developed into a more refined 3D resolution to the scheme as well as answering the question: what is learnt in each garden and the biophilic approach to how it can be learnt (Fig 7.19). The tree is analysed in terms of tectonic and stereotomic relationships that are mimicked in the architecture. In section, the roots of the tree as well as thick trunks are identified as stereotomic elements as well as in plan, where the trunks and roots serve as service cores to the canopy or roof above, transporting minerals and water from the ground to its branches. The architecture will have stereotomic service cores serving the learning spaces juxtaposed to lighter, tectonic materials becoming dependent on these in terms of function and structural support.



*Concept gardens*

*What is learnt*

*How it is learnt*

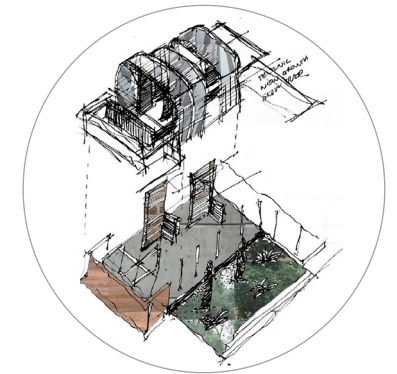
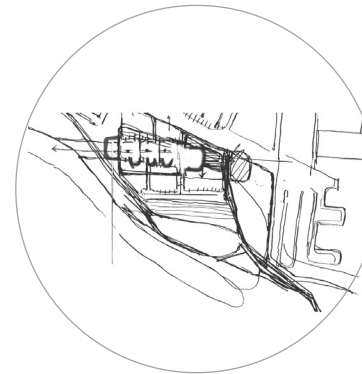
*Vertical*

*Horizontal Axis*



The garden was identified due to three date palm trunks remaining after a fire. One of nature's wonders include the life that grows back after fire. The contrast between living and dead needs to be evident to show how new life can occur after death and how fostering the new life is crucial. Sensory and biophilic awareness of nature is established through site, touch, smell of plants, and the sound of water moving.

Together with the primary tectonic concept, the structure will foster the new life or regrowth through the incorporation of a planted shading system or living skin fixed to the facade of the building, where the plants are supported by a formally light steel beam system. The skin will puncture the interior as well as form shading on the outside. The aim is that the skin will be maintained by the children.



This garden aims to orientate the user, both child and staff, to the rest of the school by becoming a datum point of identification and control. What can be learnt through this garden is its centrality and communality. The services of the building are provided from this point and is made visible. Sensory and biophilic awareness is established through a central focus point on the site where the integration of parts to whole is gives a datum

Together with the primary tectonic concept, the structure will be heavy and grounded with two tall tectonic towers on either side serving a multitude of functions: first to hold the water tanks at pressure, then to contain circulation routes to the first floor, to become towers of identity and relation and lastly to balance the scale difference on the site by the alteration of scale between the towers and the rest

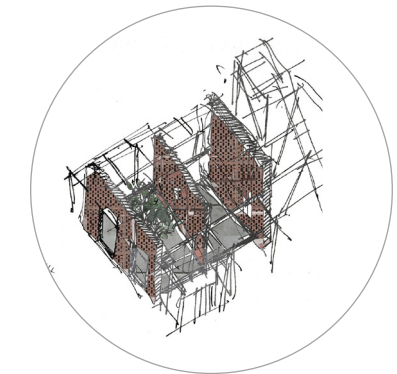
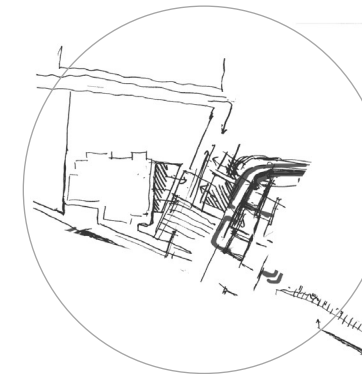
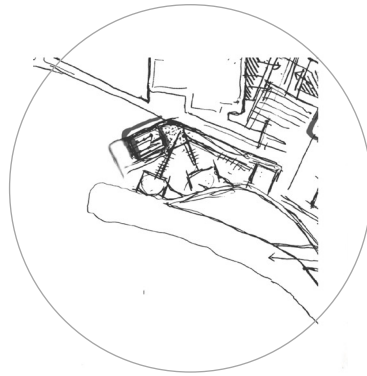
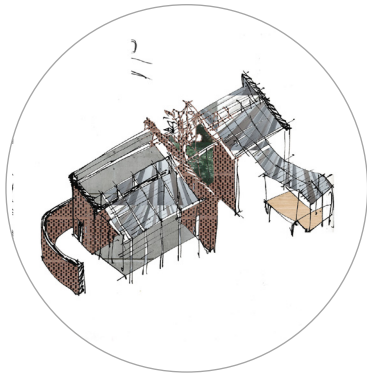
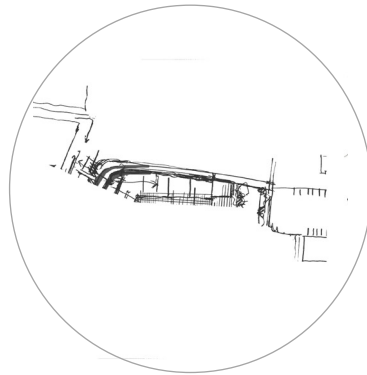
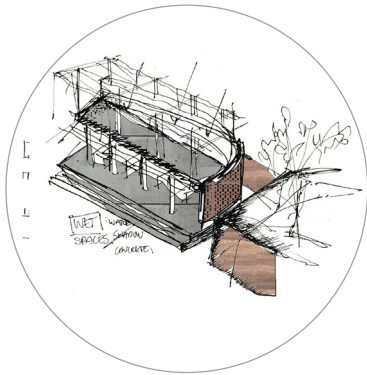


Fig7.18 Tectonic concept diagrams for each of the spaces



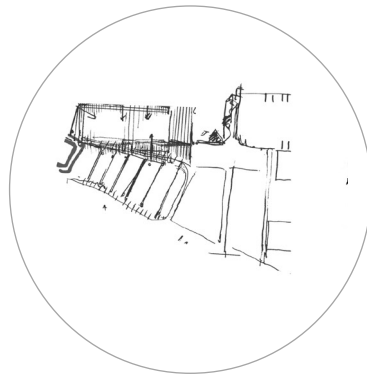
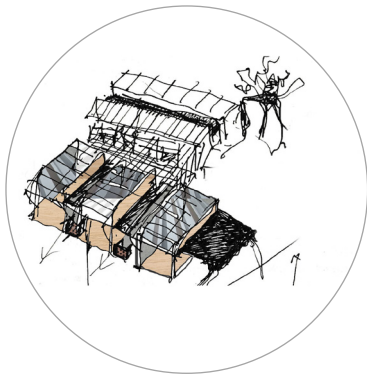
This garden aims to make the child aware of the protective nature of trees and how they allow you to breathe and relax. This was identified due to the protective nature of the cluster of trees situated here. The occupational therapy program allowed for the layout of the therapy rooms around clusters of trees so to create awareness of trees at the same time of positive therapy treatments. Biophilic principles include

Together with the primary tectonic concept, the structure will be heavily backed by a strong guiding wall and lighter elements or pods that branch off from this that sit in the landscape. The architecture aims to group therapy pods around trees so to create an awareness of the positive effects that trees have as well create a sense of prospect and refuge through the juxtapositions of stereotomic and tectonic.



The garden of shadow aims to teach how elements of the earth or ground can aid in growing new life. The garden is chosen due to the area on site cast in shadow of the neighbouring buildings. Therefore earthy, grounded activities will occur in this garden. Biophilic principles include prospect and refuge and landscape features defining building form.

Together with the primary tectonic concept, the structure will be predominantly stereotomic to mimic the shadow cast by the buildings as well as to allow dirty or wet activities to occur such as clay art and growing plants that like to shady conditions so as to clean out easily. A light steel structure will sit on the roof as



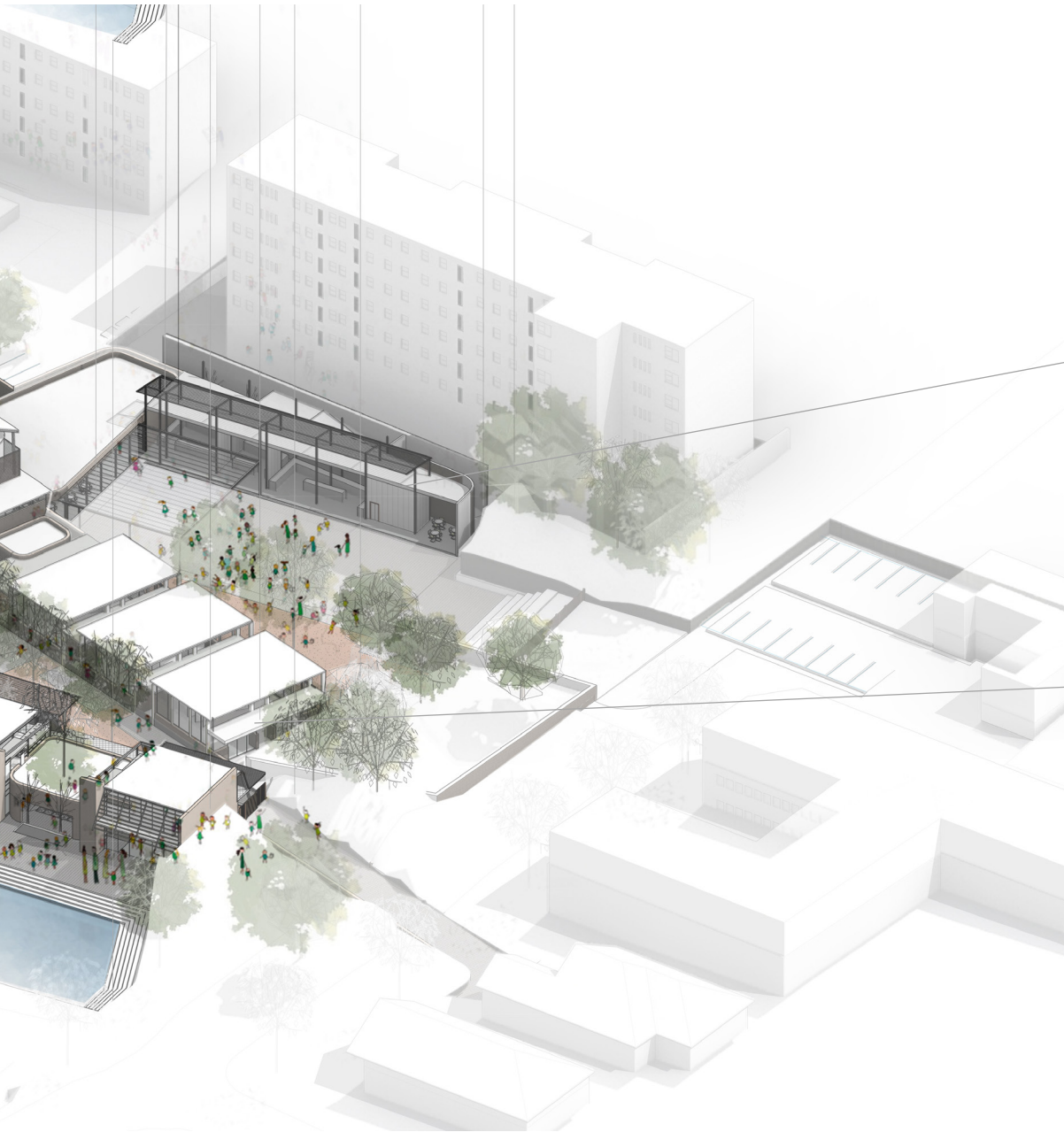
The garden of sun was identified due to the large area of ground almost always in sun. The movement of the sun throughout the seasons will be learnt in this garden and how the sun's movement will create an understanding and bring about biophilic connections. This deals with a multitude of biophilic principles such as ecological connection to place and landscape features and natural processes defining building form.

Together with the primary tectonic concept, the structure is an extension of a timber pergola system with timber beams and columns forming kinetic classrooms that each have timber screens that can be adjusted by the children themselves. This allows for direct engagement with the sun's movements.



*Concept gardens*





*Concept gardens*



*Garden of Shadow*

School Atelier and community art facilities



*Garden of Sun*

Play Court for School and Community

Fig 7.19 3D view of building indicating each garden and what is learnt in each and the biophilic approaches to methods of learning (Author, 2016)





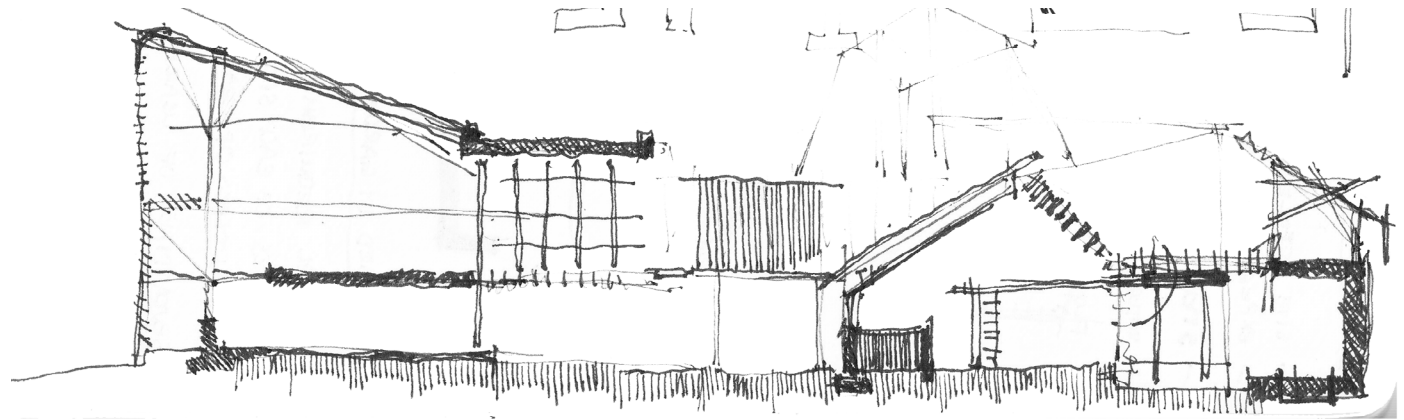


Fig 7.22 Initial design sketch of vertical axis resolution (Author, 2016)

## 7.6 Development of the Section

The vertical axis (or section) was developed according to how the architecture can facilitate the learning of each garden and how the learning of the garden can make the children aware of the benefits of nature through biophilic and/or sensory stimulation. In Figure 7.19 an in-depth exploration into each garden is carried out according to the biophilic/sensory qualities of each. The design translations and conceptual resolutions are all taken into account in this exploration. The exploration is also related to the specific aspects of the landscape that can be learnt by the “biophilic being” i.e. the child.

At first, the section was a simple angled roof that created a singular space that opened up towards the river. The large column that supported the roof has secondary supports to form the shape of a tree. The second level was proposed as a lighter timber suspended floor that sat separately from the primary envelop of the building (refer to Fig 7.22)

As the section developed, the structure slowly began to develop together with the design. The kinetic classrooms developed alongside the main classrooms (shown in Fig 7.23) as an extension of an outdoor pergola space, connected to the language of the play court. The shape of the towers as an element of identity for the school developed as steel framed structures with angulating columns supporting the tanks above.

In Fig 7.24, the section began to develop into the latest section resolution which is the incorporation of the solar stack as part of the stereotomic support for the roof as well as service core and the roof began to form a canopy like structure, branching off from the dominant stack. The kinetic classrooms became a flat roofed structure in order to not take away from the hierarchy of the main classrooms and also to form a more integrated extension of the outdoor play court, blurring the thresholds between inside and outside with pivoting doors that open up to the outside according to the season and time of day.

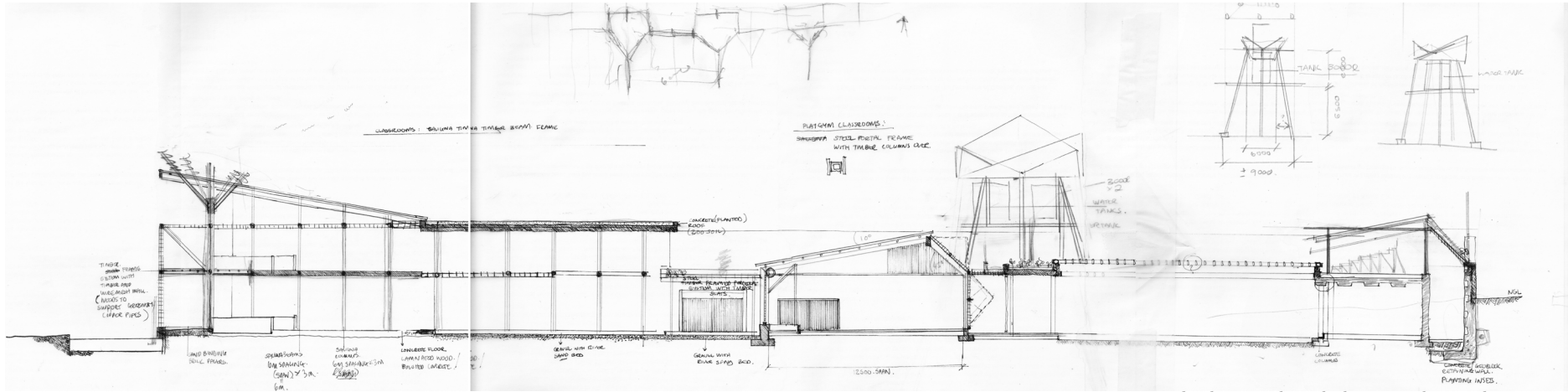
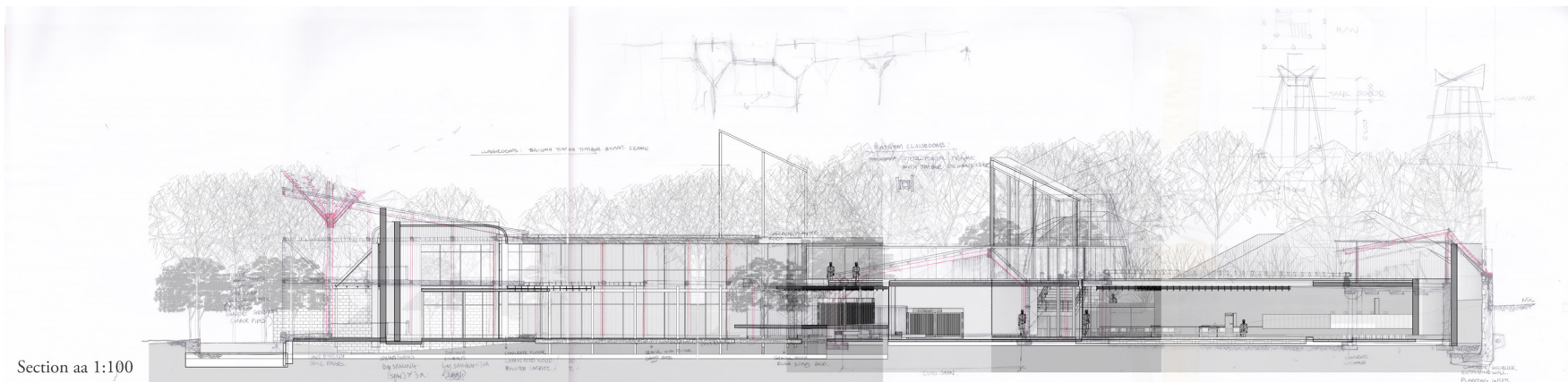


Fig 7.23 section development through classrooms, kinetic classrooms and atelier (Author, 2016)



Section aa 1:100

Fig 7.24 section development through classrooms, kinetic classrooms and atelier (Author, 2016)



## 7.7 Development of the route

The route serves as the linkage and ordering device to the different wings of the plan. It connects all the existing didactic elements together as well as the new. The route also aims to capture the biophilic qualities of each garden as the user moves through the site.

Walking along the route, from east to west, it begins at the New Beginnings pre-primary school. At first the route is more of a platform that attaches itself to the old school. This represents the old model of learning, disengaged from the surrounding environment. The platform slowly becomes steps that lead down to the paved pathway. As the user walks west, towards the new school, the topography on either side of the path begins to morph to becoming a gateway to the site, allowing only the pathway itself to cut through. The didactic gardens are hidden at first but as one moves through the site, the gardens open up and the essence of each becomes visible. When you reach the first garden (the garden of regrowth) the pathway's paved surface becomes gravel and grass, opening up and merging with a courtyard on the right. Three dead date palms stand tall in the centre of the courtyard with new classrooms framing the space and at the time, juxtaposed as their façades are shaded with a screen of living plants, currently being watered by the children. On the left hand side is the kinetic classrooms, with glimpses of children jumping through hoops and over

logs are caught through the open-able walls, some wide open to allow the cool breeze from the courtyard to filter through into the classrooms. Moving further along, the route is met with a folding glass door, that is the entrance of the school. Once inside, there are three medium sized leopard trees that look up to an open atrium with sunlight filtering through from above. The route moves outside again, through another smaller glass door and opens up to the left to an urban vegetable garden where children are seen planting carrots and spinach that will in a few months time be cooked and eaten for school lunch. The old Ring Ting pre-primary school is seen beyond the vegetable garden with small-scale brick shelters attached to its facade. There, one can see children helping the teacher to move plastic bottles to the one shelter and cardboard to the next all to be later recycled. On the right, benches are placed along a low wall running beneath a timber pergola. Beyond the low wall, to the left, one can see children taking part in occupational therapy sessions taking place underneath a cluster of trees as well as in small timber screened buildings scattered in the landscape. After taking a rest on the bench in the shade, one walks beyond the vegetable garden and small recycling depot, and catches a glimpse of the Sunnyside orphanage where children are gathering on a verandah platform that attaches to the building's facade, with steps leading down to the same pathway once more.

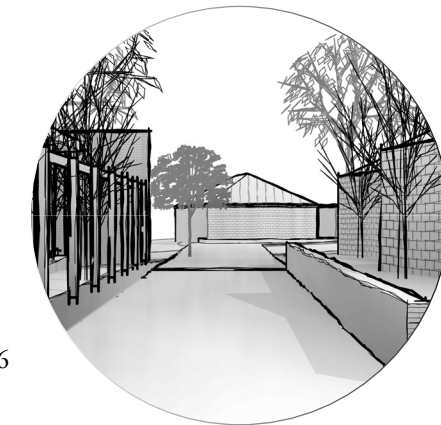
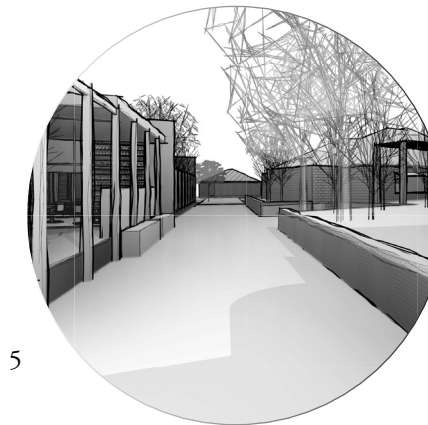
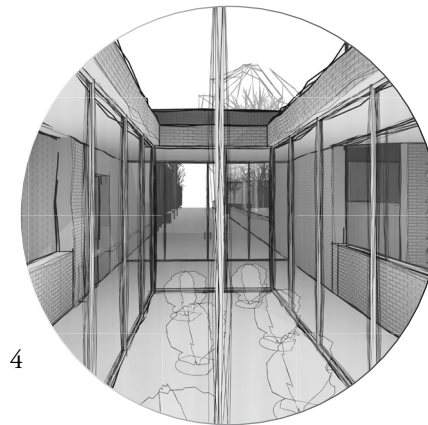
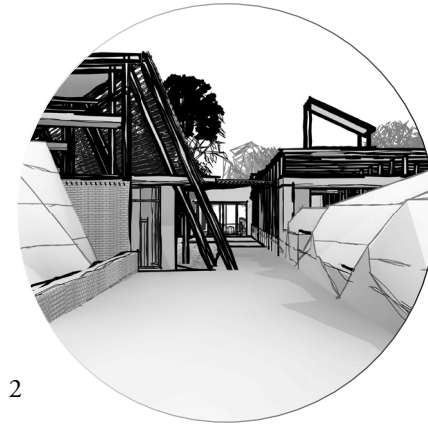
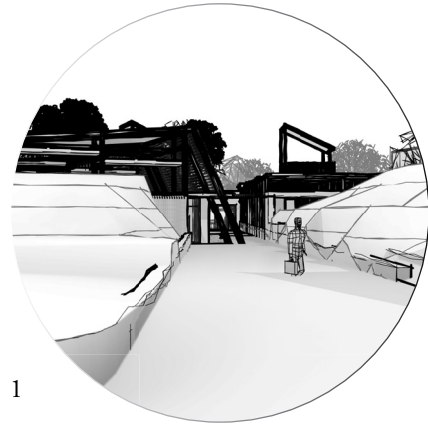


Fig 7.25 Route exploration (Author, 2016)

## 7.8 Home-base Classroom development

The exterior of the classrooms design was influenced by the identity of the garden that the classrooms frame. The garden of regrowth was centred around the classrooms having a living skin that becomes part of the building's facade as well as penetrate into the classrooms spaces. The roof canopy developed from pivoting roofs to a more integrated roof and skin system that fully incorporated the skin with the roof to emphasise the continuity of the roof as a canopy. The solar stack became not only a passive climate control mechanism but a design resolution in the modularity between each classroom, serving as the service core between each classroom space.

The interior of each classroom was dealt with according to the Reggio Emilia design guidelines which require classrooms awash with natural light as well as indoor plants and plenty of storage space for materials and display spaces for the children's art. With this in mind, as well as the exact activities that will take place in the classrooms according to the schedule (refer to Chapter 4), the classrooms were designed in terms of blurred thresholds between quiet and noisy spaces as well as between more private spaces and more public spaces to hold group activities such as painting and drawing (refer to Fig 7.29). The quiet, private spaces are designed for reading and nap times. This condition is evident in the home-base classrooms. Each classroom contains a service core that facilitates shelving for children's day bags, materials and books. The reading/napping space drops lower to create a separation between the loud activities and the quiet ones.

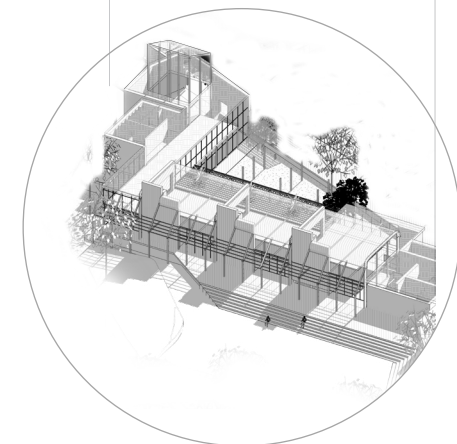
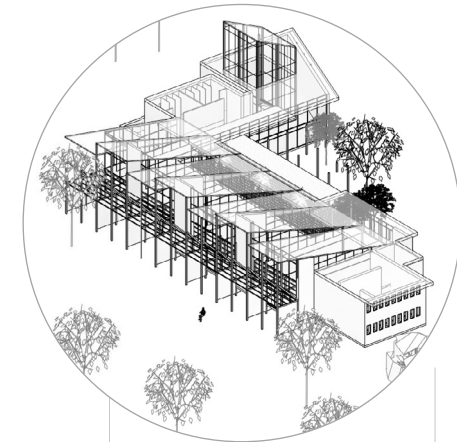
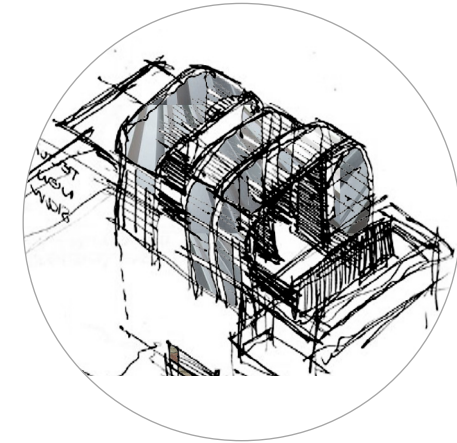


Fig 7.26 development of the classroom building from sketch phase to final design phase (Author, 2016)

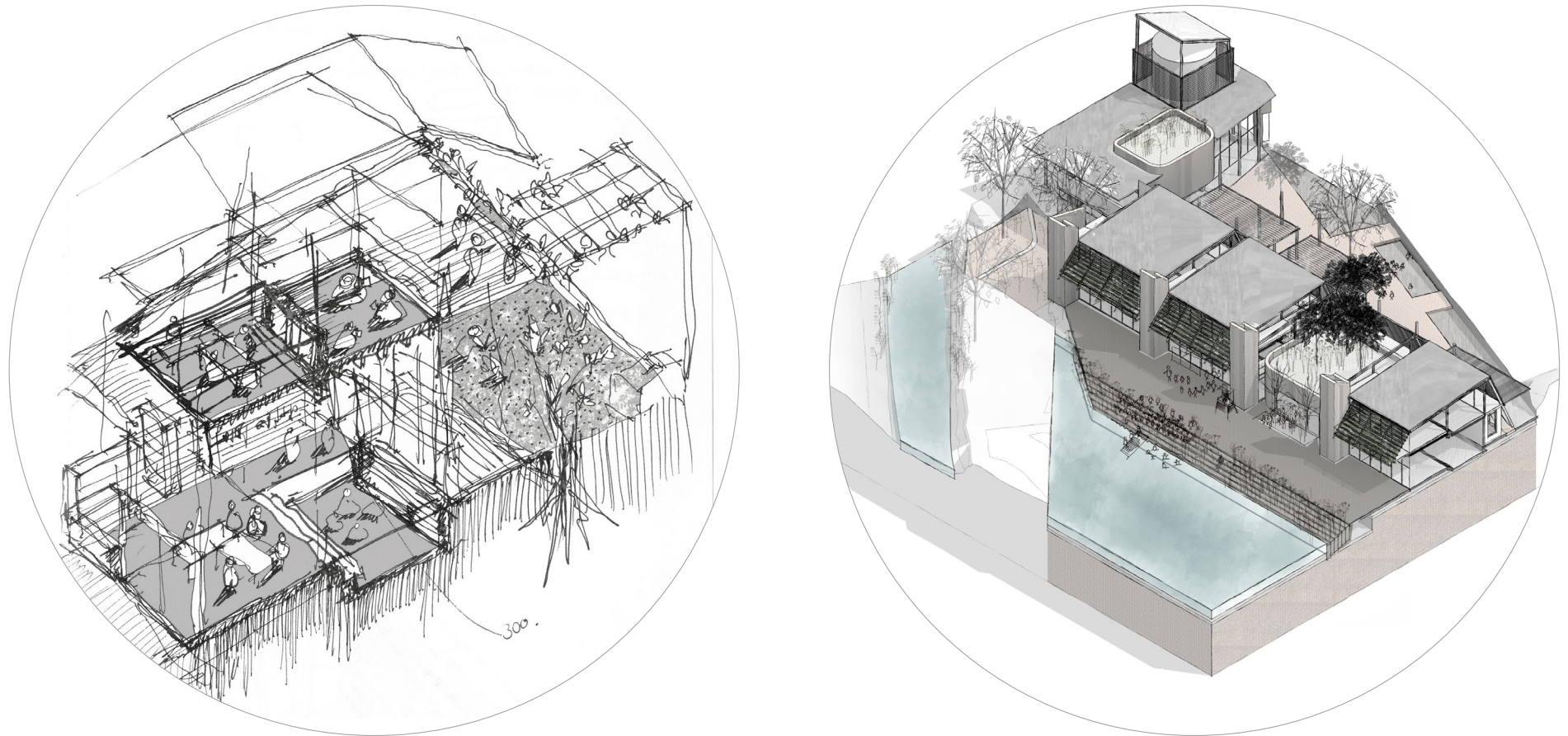


Fig 7.27 Final development of the classrooms and the activities that take place within them (Author, 2016)

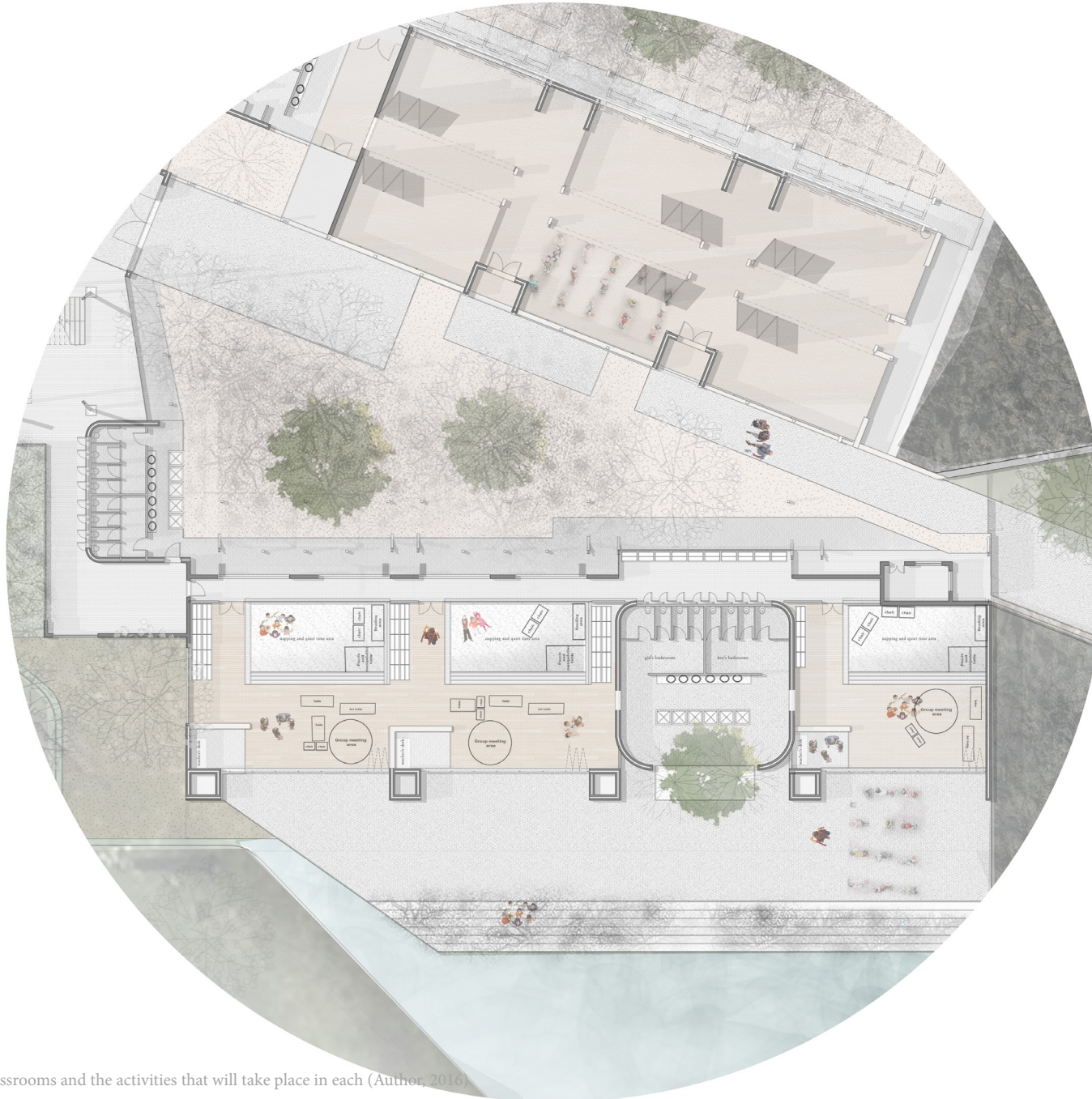


Fig 7.28 Zoomed in plan of classrooms and the activities that will take place in each (Author, 2016)

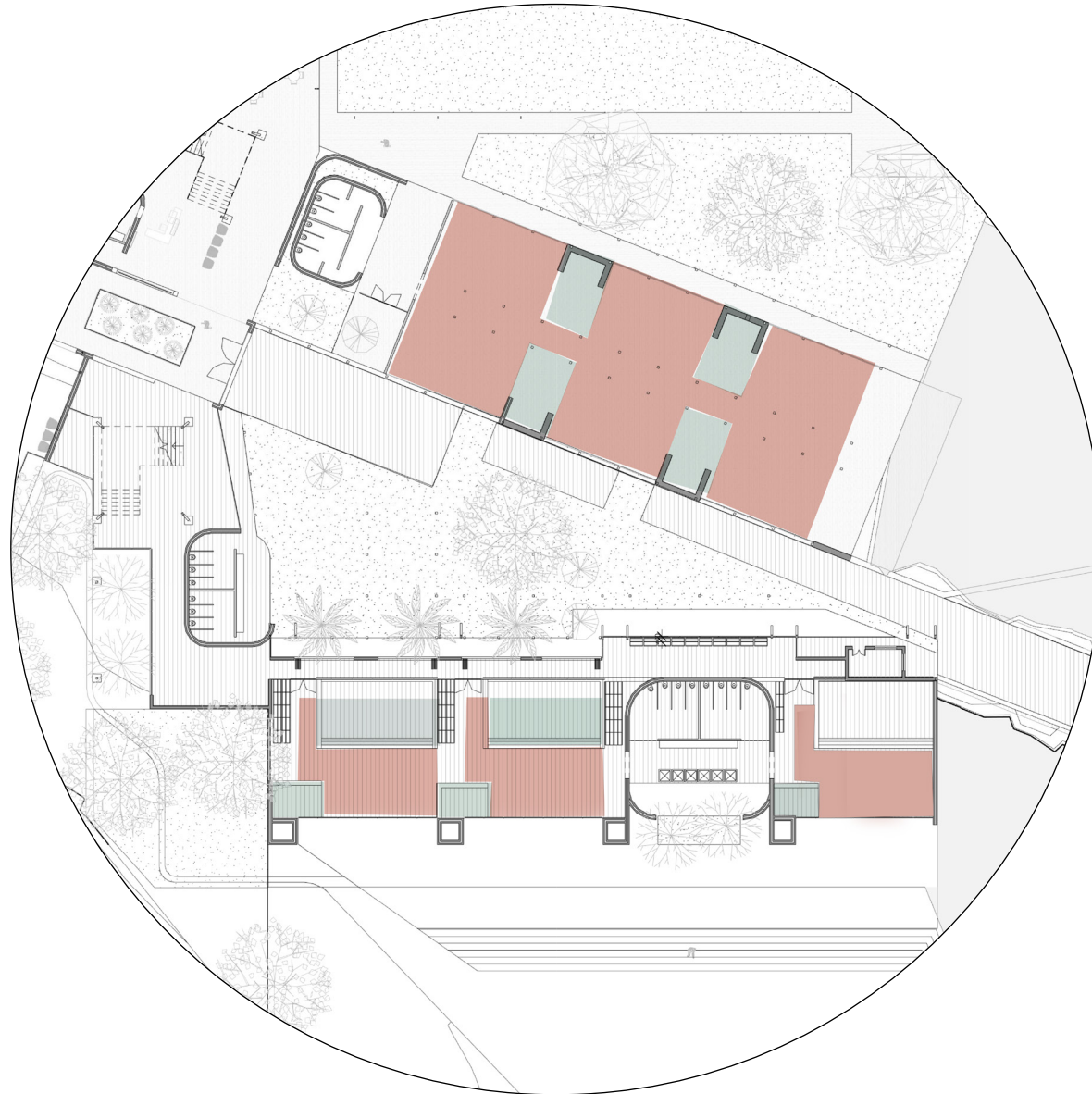


Fig 7.29 Diagram showing quiet(green) and noisy(red) spaces in the classrooms  
(Author, 2016)

## 7.9 Wet vs. Dry Spaces

The activities with regards to wet vs. dry activities were split between the schools main atelier and the water park outside the home-base classrooms becoming the wet spaces accommodating for activities that accommodate for easy cleaning of the children and the spaces after the activities have taken place. Attention to finishing materials needs to be given to ensure easy cleaning to take place such as self-levelling concrete screed for the main-atelier and brick paving for the water park (refer to Fig 7.30).

The wet and dry spaces were also placed according to the identity of the gardens. The wet spaces are placed firstly closest to the river as well as in the area on site cast in shadow. Both these spaces are dealing with wet spaces in different ways, one being water and the other being wet ground. Therefore the art activities taking place will consist of small scale clay pot making and large scale painting.

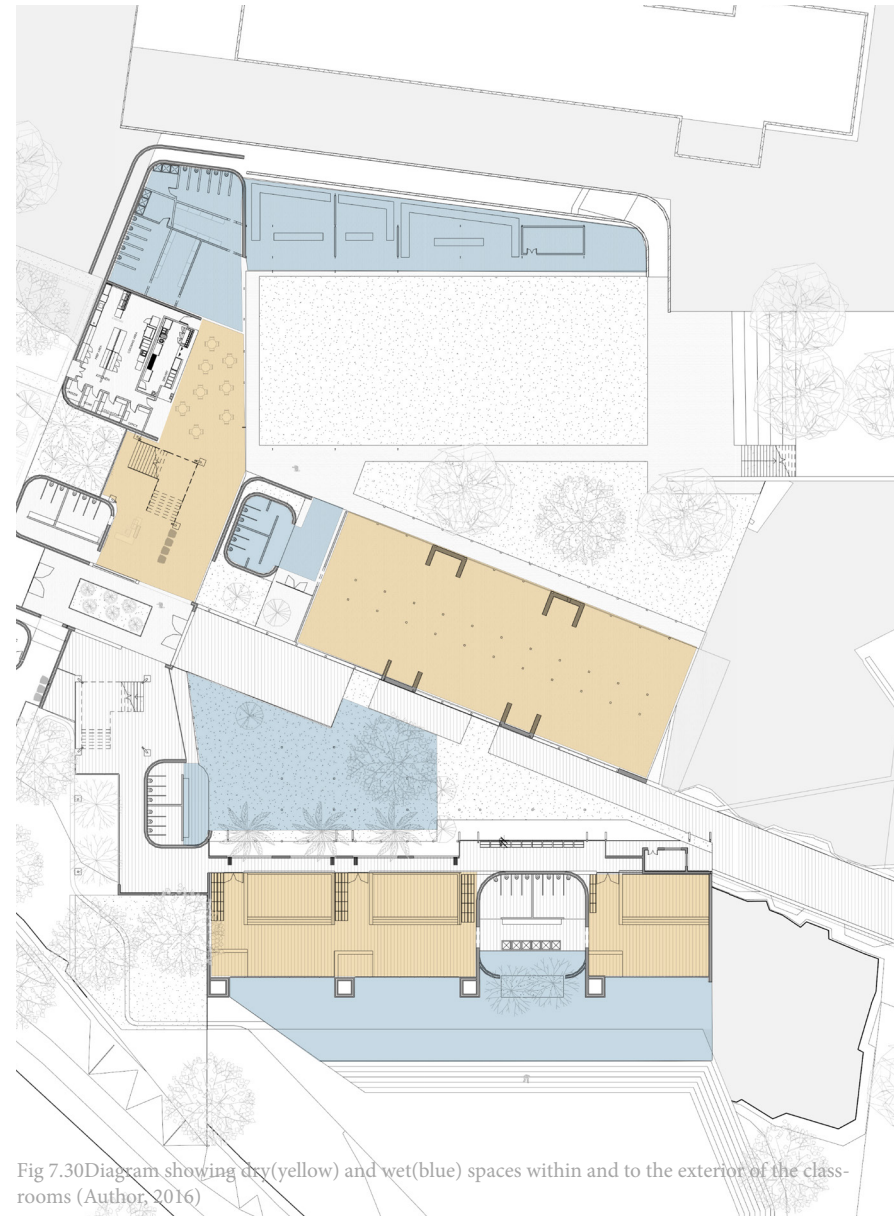


Fig 7.30 Diagram showing dry (yellow) and wet (blue) spaces within and to the exterior of the classrooms (Author, 2016)

## 7.10 Interior and Exterior Circulation

In terms of circulation, each classroom is accessible via the courtyard on the northern side, however, a undercover corridor is also provided and provides access to each classroom alongside the courtyard space to provide connection to natural spaces even in rainy weather (refer to Fig 7.31).

In the image, it can be seen that internal circulation is formalised while external circulation is a lot more haphazard and organic, showing how the planning of landscape planning allows for free movement while internal circulation frames the organic movement of the garden while guiding the user along a rigid path.



Fig 7.31 Diagram showing interior(blue) and yellow(exterior circulation routes and suggestive routes (Author, 2016)



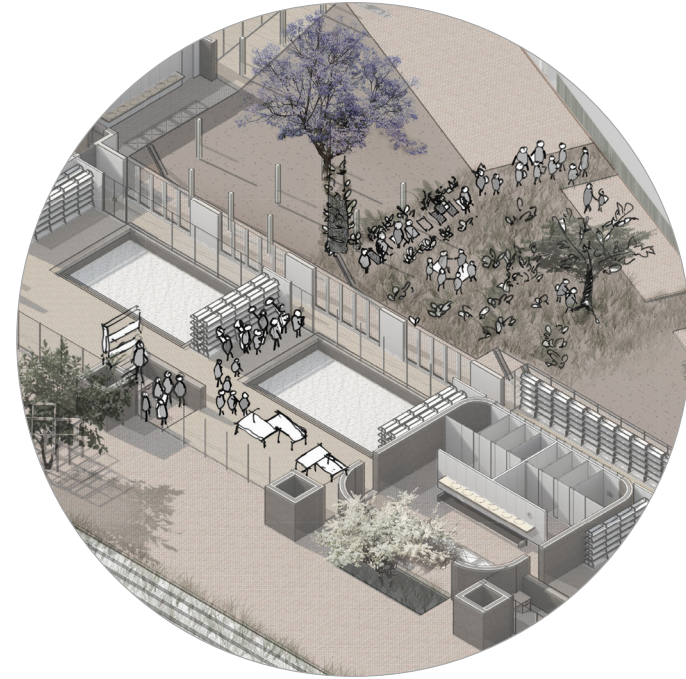


Fig 7.32 Daily Arrival (Author, 2016)

### 7.11 Daily Activities

The schedule of activities discussed in Chapter 4, is related to how these activities will occur in the building and garden spaces of the home base classrooms and the meaning these activities give to the nature of the spaces.

In the morning, the children arrive at school and are taken to the classrooms where they put their bags into the shelves and meet up with friends and greet the teacher (refer to Fig 7.32).

The second activity is gross motor activities that involve the children with the water element of the site where the children will be attending to the water plants, interacting with the bio-pool and attending to their plants on the shading system. The children will then file through to the foot washing area attached to the bathrooms and wash off before going back into the classrooms again (refer to Fig 7.33).

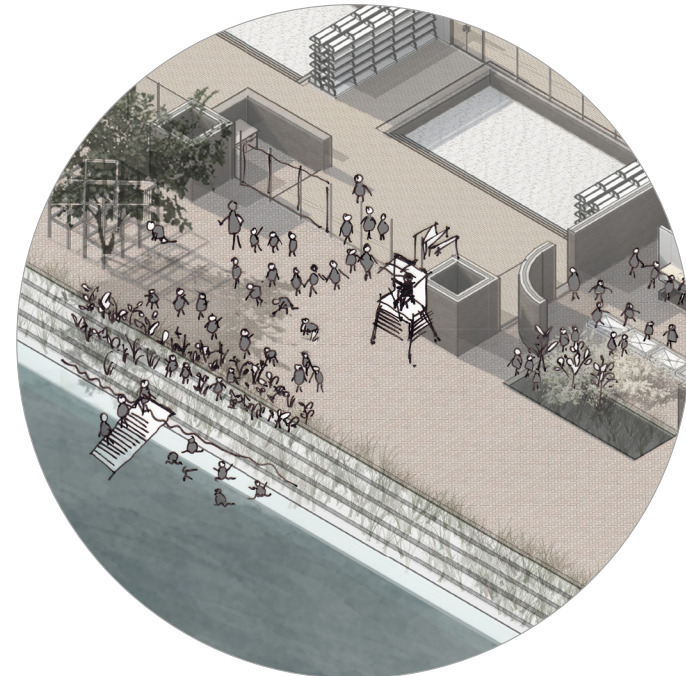


Fig 7.33 gross motor activities (Author, 2016)

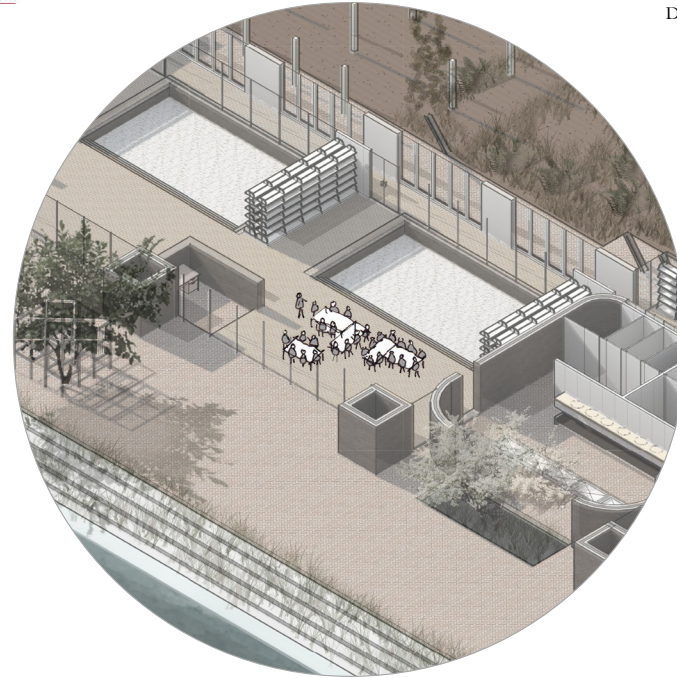


Fig 7.34 Group activities (Author, 2016)

After gross motor activities, the children take part in group activities facilitated by the teacher which involve drawing and writing while sitting down at large tables where the children use a multimedia of materials to express their understanding of different concepts (refer to Fig 7.34).

This is followed by SMART time where the children take part in activities in the courtyard that develop their cognitive skills. Bulbs are planted by each child, counting of fruits harvested is completed and maintenance and care of the shading skin system is carried out. Various outdoor cognitive activities take place in addition such as making art out of outdoor materials that help the children's thinking skills and understanding of concepts (refer to Fig 7.35)

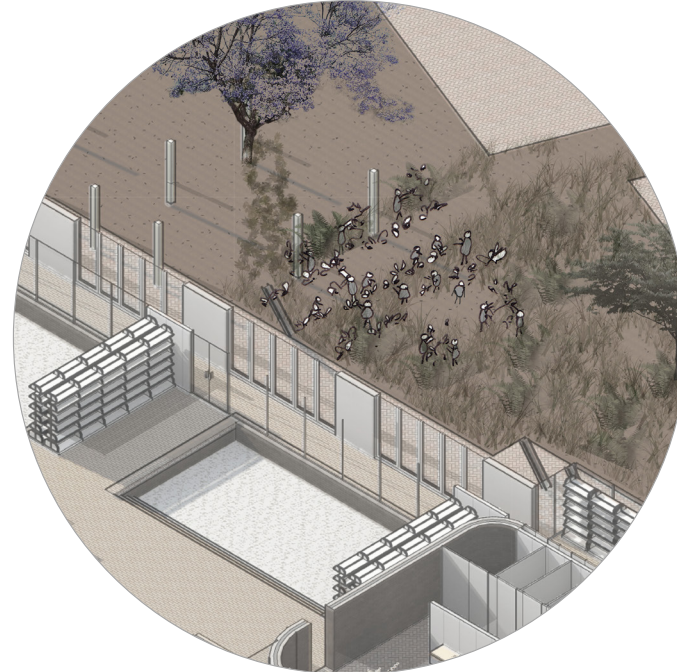


Fig 7.35 SMART time (Author, 2016)

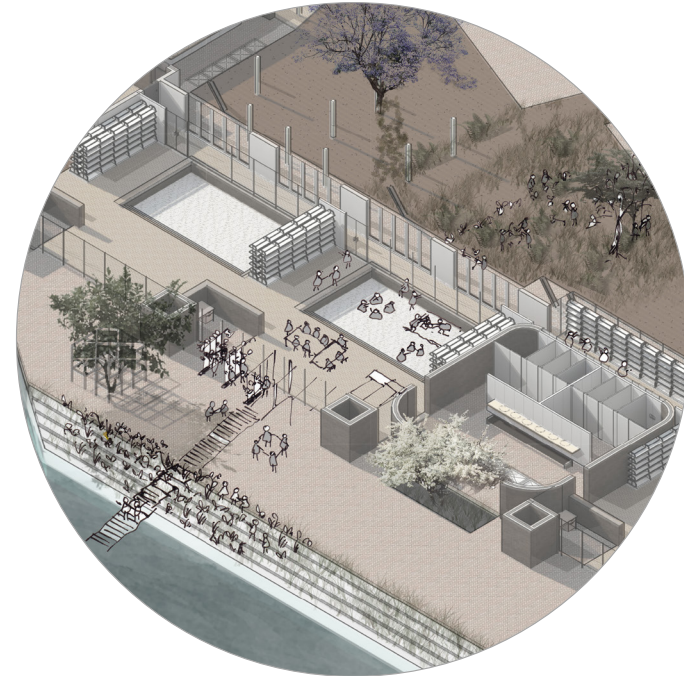


Fig 7.36 Whole body development. (Author, 2016)

Next is a the whole body development hour where children take part in various activities that develop their cognitive and gross motor skills. They use the various elements of the garden, classroom and water garden to develop these skills in the most appropriate way according to the learning method of each child. The visual learner will develop skills using drawing and painting while the kinesthetic learner will learn through attending to the living shading system or skin and watering and harvesting fruits in the courtyard (refer to Fig 7.36).

The whole body development hour is followed by story time where the children gather in the quiet nook and the teacher reads them a story. The quiet nook is at this time of day, shaded by the plant system in summer and letting in afternoon sun in winter, and so becomes the most comfortable spot to sit and read (refer to Fig 7.37).

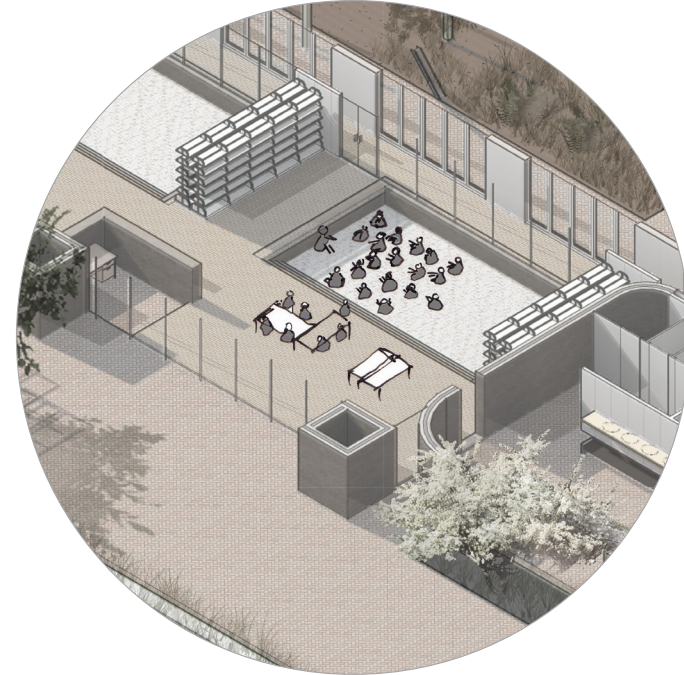


Fig 7.37 Story time (Author, 2016)

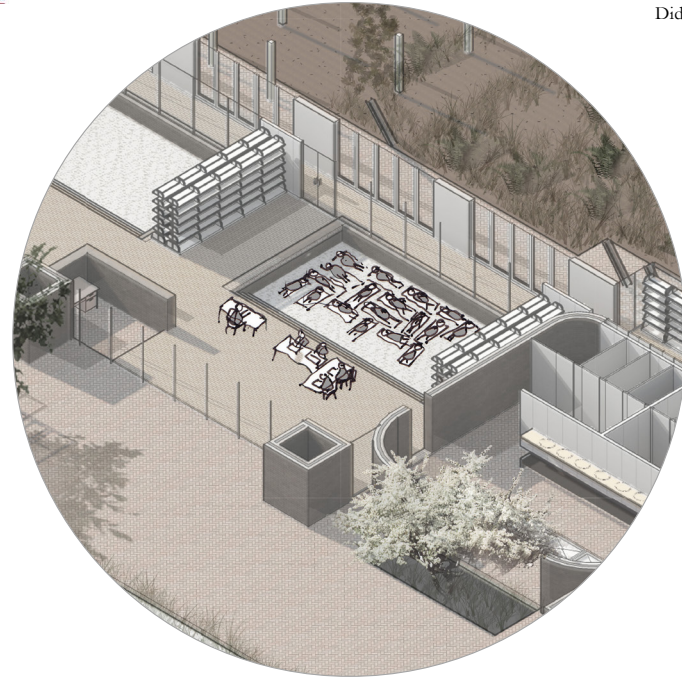


Fig 7.37 Quiet time. (Author, 2016)

Nap or quiet time follows suit with some children napping in the quiet nook and some drawing quietly alongside (refer to Fig 7.37).

Not long after this daily winding down, the children are picked up by their parents/guardians and they slowly disembark. The courtyard is filled with low sunlight and children can sit and wait under the trees to be picked up and have a last chat to their friends before home time (refer to Fig 7.38).

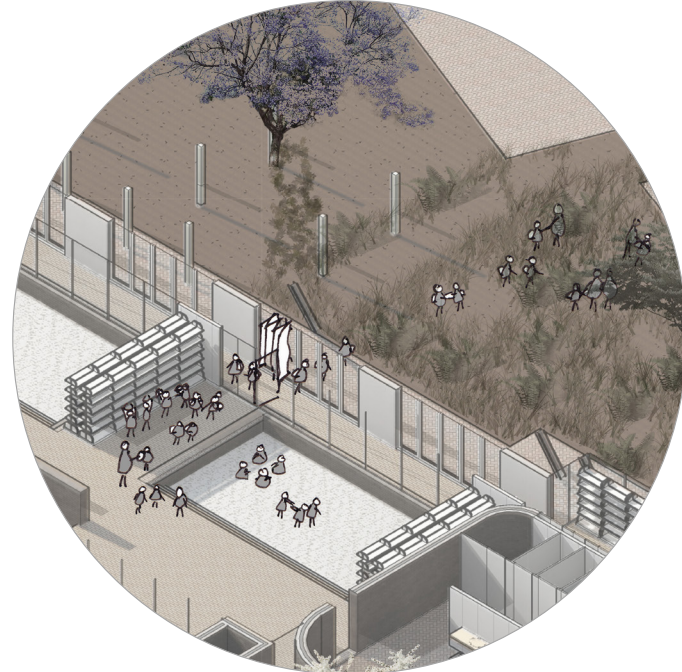


Fig 7.38 Home time (Author, 2016)



## 7.12 Kinetic Classrooms

As a supporting classroom, the kinetic classrooms address the need for open indoor play spaces for children to develop their gross motor skills. The kinetic Classrooms or Garden of Sun, relate to the identity of garden through movable pivoting doors that adjust according to the sun's movements. The building is kinetic itself as the doors open up to the play court and become an extension of the outdoor play space. In colder months, the doors can be closed up and outdoor activities can be moved indoors. All of these doors are operable by the children themselves in order to enable the building to become didactic.



Fig 7.39 Kinetic Classroom in plan and section , showing its connection to the outdoor play court (Author, 2016)

### 7.13 Supporting Functions: Occupational Therapy

The occupational therapy suites is planned as a progression from public to private. As one enters the suites through the main lobby of the school, one is guided towards a secondary reception as children outside the school will be attending occupational therapy sessions according to their level of developmental disability. The reception area is also closely situated to the occupational therapists' offices so parents and/or teachers can have meetings with the therapists and discuss the child's needs. In Fig 7.40, one can see that there are two types of therapy spaces. The one is group based therapy that takes place in an open plan room looking onto a courtyard. This group area then narrows to form a walkway with timber columns on either side with three private therapy pods leading off of the walkway where private one-on-one therapy sessions will occur. The association of trees with protection occurs here as children undergo helpful therapy.



Fig 7.40 Plan of occupational therapy suites (Author, 2016)

## 7.14 Providing Security Without Creating Barriers

Security is essential on site as the children need to be kept safe at all times from various risks such as the water hazard that the Walkerspruit poses. Sunnyside is also a low socio-economic neighbourhood and therefore protection from outsiders is necessary.

With regards to the water hazard berms are proposed all the edge where the river runs together with planted gabion walls to deter the children from nearing the water's edge. The berms will also address the flooding risk and decrease the flood plane to the river area and not into the site. In Fig 7.41, the security barriers are shown according to the different times of day. In Fig 7.42, the type of security barrier is shown.



Fig 7.41 security lines according to times of day (Author, 2016)



Fig 7.42 security types (Author, 2016)

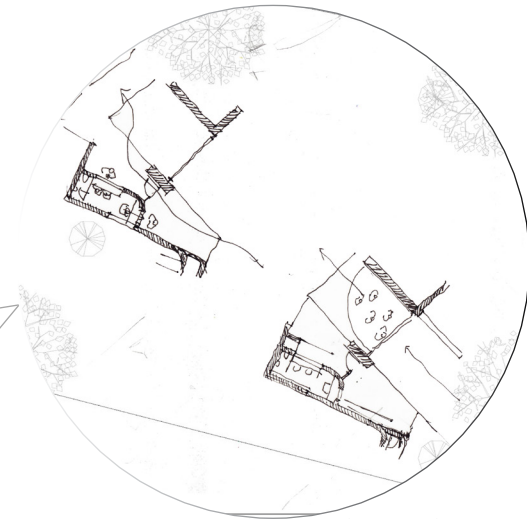


Fig 7.43 Security checkpoint alternating between school children and after hours. (Author, 2016)

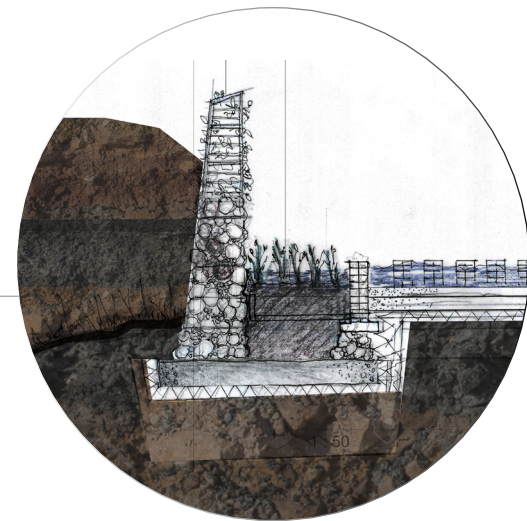


Fig 7.44 Gabion wall with berm in section (Author, 2016)