

Fig. 107: Conceptual sketch of the park's entrance (Author, 2012)

CHAPTER **6**
Design Development

CHAPTER 6: Design Development

6.1 Introduction

The development of a design is a time consuming and reiterative process. Often times it is necessary to go back a few steps to find the best possible solution.

The extensiveness of the design development process will be discussed in this chapter; taking a closer look at the development of a master plan for the site.

Before this process can commence it is important to, firstly, clarify the vision, objectives and approach of the design after which the site program can be developed and the design development can commence with the help of design guidelines derived from the theoretical investigation in Chapter 2 as well as the findings from the site analysis completed in Chapter 4.

6.2 Design guidelines

The following design guidelines were formulated by the theoretical concepts investigated in Chapter 2 and will guide the conceptualisation process of the design:

- Use resources without diminishing their future availability;
- Maintain biodiversity;
- Project should be economically, environmentally, socially and aesthetically sustainable;
- Turn the problem into something playful, a process of discovery;
- Transform a space into a place with meaning through storytelling;
- Embrace natural features and processes;
- Reuse waste as renewable resources and
- Design sustainable human habitats that revitalize and support ecological health.

These design guidelines together with the design objectives will act as

design drivers and will guide the design development process.

6.3 Analysis summary

A SWOT analysis was conducted in the site analysis chapter (Refer to Chapter 4, section 4.5) to determine the current strengths and weaknesses of Berea Park.

As a summary of the analysis, the following strengths were observed: The park was once regarded as the gateway to Pretoria; has historical value because of the site and buildings that are older than 60 years; the park is close to a natural water source, the Apies river; the land is arable making it suitable for urban agriculture; the park is adjacent to densely populated residential communities; close to public transport routes; and close to educational facilities.

The following weaknesses of Berea Park were observed: The park has lost its identity during the past few years; derelict buildings on site; there are no activities along the Apies river, causing it to be quiet and under-observed, making it unsafe; the site is environmentally disturbed; not in the proximity of existing garden refuse sites; poor visibility from the road; no identified entrance to the site; no bus stop in close proximity and the residents have low average household income and a high unemployment rate.

These findings, even the weaknesses, can be used as opportunities in the development of Berea Park as a waste park. The opportunities will help formulate design objectives.

6.4 Vision

The vision is to provide Pretoria South CBD and Sunnyside with a waste park where visitors will be informed about the enormity and significance of the waste problem, the impact they have and could have on the earth and how they can contribute to and cooperate with this attempt to make a difference.

It will not only be a place where people's perception of waste will be challenged and the value of waste appreciated, but also a place where:

visitors and locals can interact socially and enjoy themselves in the recreational areas, where they can take part in workshops, make their own artwork or grow their own vegetables. They will also have the opportunity to sell their produce and buy vegetables and artwork.

6.5 Design objectives

The design intervention will strive to accomplish the following objectives:

- Design a waste park that will relieve the pressure from the surrounding garden refuse sites (as identified in Chapter 3, section 3.2.1.1) with the main theme being “the recycling of waste” where waste is recycled into different forms throughout the park by using various methods such as the recycling of organic waste, composting green waste, vermicomposting and recycling of hard waste as described in Chapter 2, section 2.2.3.1;
- Design a multifaceted park that provides a variety of activities, for example telling the story of waste throughout the park by means of recycling and educating visitors regarding the recycling methods, the reuse of waste and growing their own vegetables;
- Allow visitors to interact with and experience the processes of recycling and urban agriculture;
- Reuse the recycled waste at the workshops offered in the park;
- Practice different sustainable methods (according to the Sustainable Sites Initiative)
- Introduce the three main design strategies on site, namely the waste, water and agriculture strategies;
- Reinstate Berea Park as a core of social activities;
- Create awareness of the historical significance of the site;
- Enhance the environmental condition of Berea Park and
- Make the park more accessible and visible from the streets.

6.6 Design approach

To initiate the design development process it is important to establish how

the design intervention intends to achieve these different objectives. The design will be approached by:

- Following the design guidelines set out in section 6.2;
- Carefully considering the findings of the site analysis (Refer to section 6.3);
- Following the design vision and objectives set out in section 6.4 and 6.5;
- Establishing the site program and program requirements (Refer to section 6.7);
- Developing a design concept by taking the program of the site into consideration (Refer to section 6.8);
- Spatially exploring (Refer to section 6.9):
 - connections to surrounding buildings and activities and
 - the layout of the site program and the different relationships between the activities;
- Developing a master plan (Refer to section 6.9);
- Developing the three main design strategies (waste recycling, water recycling and urban agriculture, Refer to Chapter 7) as well as the recreation strategy;
- Developing a sketch plan (Refer to Chapter 8) and
- Technically resolving the design for that specific section (the sketch plan area) of the site (Refer to Chapter 8).

6.7 Site program

The program for the site derived from the design objectives and the initial concept: to produce the ‘ideal’ place: a multifaceted park where all the activities successfully work together in a sustainable manner with the ability to maintain economic, environmental, social and aesthetically sustainable practices.

Originally, the program for the site was limited to recycling of garden waste, but with time the program evolved into much more, a park that

deals with different important issues revolving around the story of waste.

Berea Park will be the 'storybook' in which the story of waste will be told...

The program of the site includes the following:

- Restoring derelict buildings and allocating new and appropriate functions to the restored buildings;
- Providing a bus and taxi drop-off, modifying the existing informal taxi rank in Rhodes avenue into a formalised bus and taxi drop-off system;
- Providing a market area;
- Creating a well-lit river walk all along the Apies River and allowing access to the site over the Apies River;
- Practicing urban agriculture;
- Providing more than one well-defined entrance;
- Creating job opportunities;
- Educating students (visitors) about reducing and reusing waste (recycling);
- Providing exhibition space for artwork made during workshops and
- Provide a functional recreation area to allow for various park activities with an interactive play area in close proximity.

The design revolves around three main strategies and the following is a breakdown of the facilities and activities required to support the program:

6.7.1 Waste strategy

Recycling of organic waste

The organic waste recycling facility will require a drop-off point, a sorting area, a chipper (every six weeks), area for chipped garden waste, a concrete base (with a slight slope for the composting lanes), sufficient water, a compost sifter, area for sifting the material and a compost heap.

Requirements:

- Drop-off point
- Sorting
- Mulching
- Composting
- Water
- Security – supervision, fenced-off and gates closed at night

The operation and functionality of the waste management area was also investigated (Refer to Fig. 108 and 109) and developed (Refer to Fig. 110).

The relations between the different phases of the waste management process of green waste were explored in order to find the most functional layout (Refer to Fig. 108).

The waste management area started to evolve into functional spaces; mainly addressing the recycling of green waste (Refer to Fig. 109). The

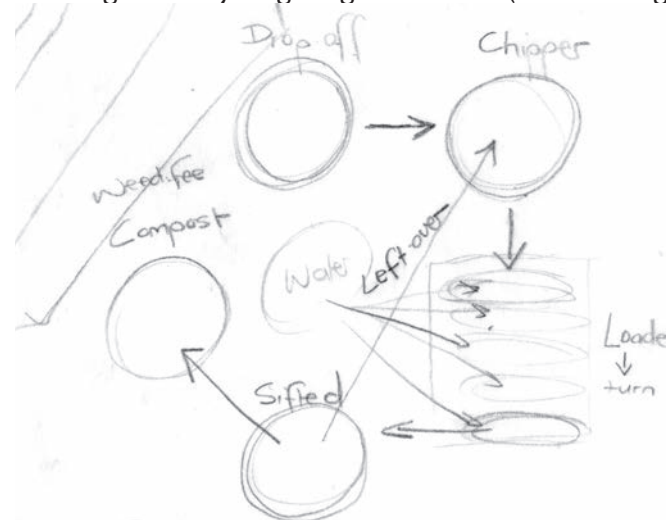


Fig. 108: Spatial Exploration of Waste Management Area (Author, 2012)

recycling of hard waste, which comprises of the sorting and cleaning of the waste, was included in Fig. 110. The waste management process in terms of the operation and layout of the green waste recycling was also

finalised.

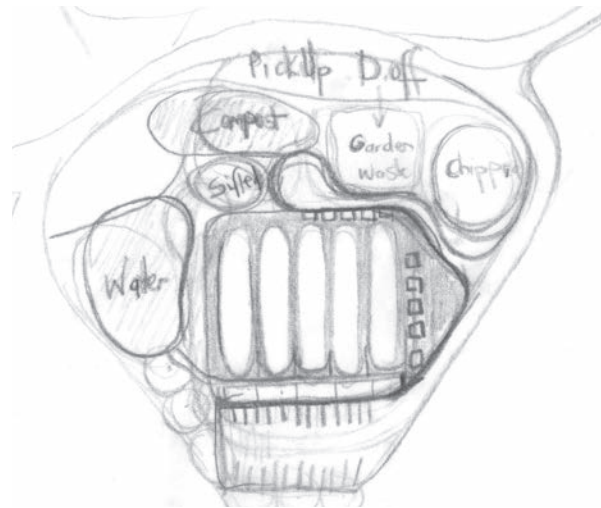


Fig. 109 Waste Management Area (Author, 2012)

This process is explained more comprehensively in Chapter 7 (Refer to section 7.2).

Composting of organic waste – Vermicompost

Vermicomposting will be incorporated at the waste park where containers with working worms (red wigglers) will be used to break down food and garden waste into Vermicompost and 'tea' (Refer to Chapter 2, section 2.2.3.1.1). This will allow the public to come into contact with the interesting process of working worms and how they operate. Demonstration projects will illustrate how this form of 'composting' can be integrated at the people's homes.

The Vermicompost and 'tea' produced by the worms will be used for the vegetables grown on-site. The public will be able to buy the plants and compost from the park.

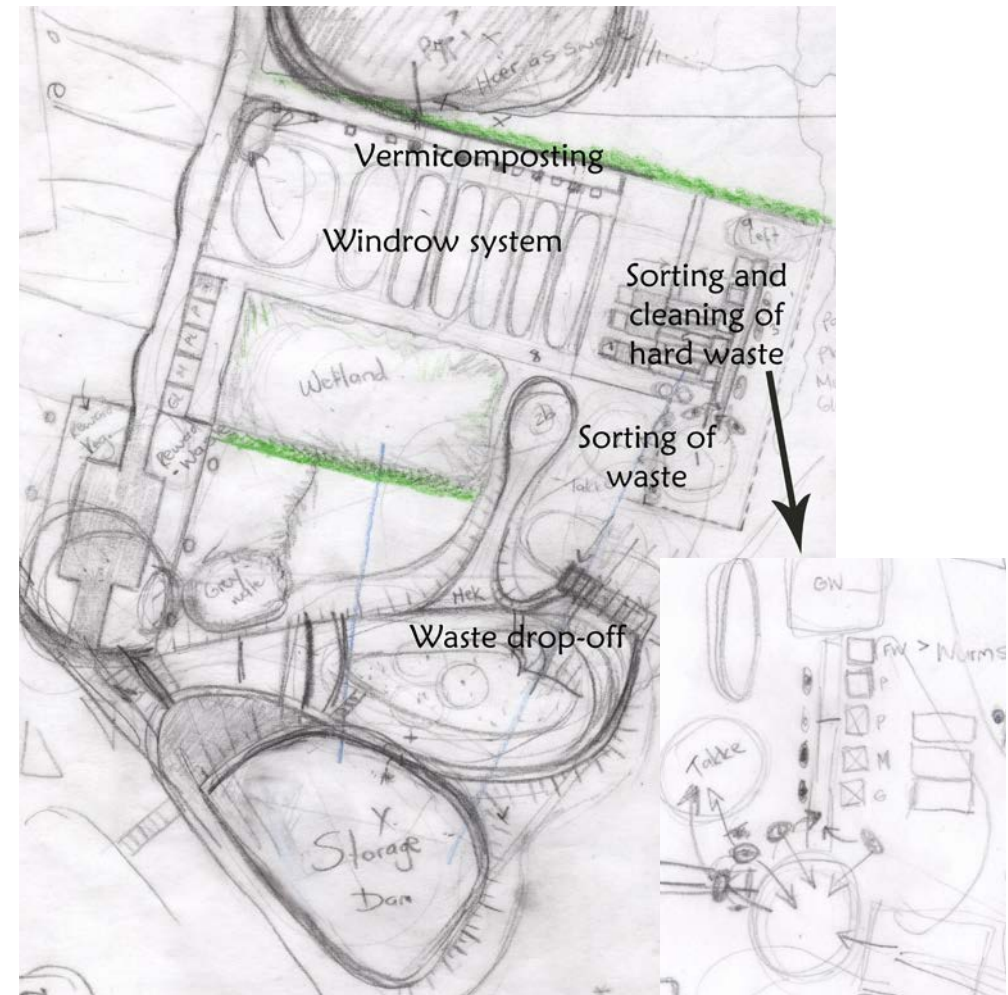


Fig. 110: Waste Management (Author, 2012)

Requirements:

- Red Wiggler worms
- Bins (stacked bin worm farm)
- Bedding material
- Water
- Organic waste

Recycling of Hard waste

Even though the main focus will be on organic waste recycling and the provision of an inner city park to host these activities; bins will be provided for the recycling of glass, paper, metal and plastics. The hard waste will be sorted and cleaned on site for reuse (Refer to Fig. 116).

The application of recycled materials throughout the park, for example as paving, retaining walls, wall finishes, etc., will be considered as far as possible.

“There are many opportunities for using reclaimed materials in landscape design, and many more emerge with a bit of lateral thinking.... Reclaimed materials can stimulate the creative process much more effectively than new products.” (Porter, 1999:9)

The following are some of the applications that could be considered:

Glass

One way of using recycled glass (cullet), because of its compatibility and permeability, is as construction aggregate for improved drainage systems, base course materials and backfill applications.

Glassphalt (glass mixed with asphalt) (Gagnon and Ryder, 1995:28), or glass aggregate mixed with concrete are other uses of recycled glass in the landscape, for example as a paving material and to create artwork.

Paper

Recycled paper can be used in the landscape as mulch which is environmentally friendly. The mulch contains a minimum of 85% recycled paper, 13% moisture and 2% ash.

Plastic

Park benches, roof insulation (for the restored buildings) and plastic lumber (wood) are only a few of the applications recycled plastics are used for. Plastic lumber is used for wood applications outdoors because it won't rot and doesn't require any preservatives.

Requirements:

- Drop-off point (Waste management area)
- Area for the sorting of waste (conveyer belt system, similar to the University of Witwatersrand recycling facility)
- Area for the cleaning of recyclable waste
- Recycled water from storage dam to be used at the waste cleaning area
- Security - supervision, fenced-off and gates closed at night
- Demarcated recycling bins for glass, plastic, metal and paper at more than one location

Workshops

The value of waste and how to recycle hard waste will be illustrated and taught at the workshops. The visitors will have the opportunity to develop skills and to experience the recycling of hard waste hands-on by making artwork from the recycled waste.

Annual competitions and events will be hosted in the park where the artworks can be exhibited or sold; this will help to motivate visitors to take part in the workshops.

Requirements:

- “Teachers”/tutors (Job opportunities)
- Equipment for making artwork
- Clean recycled material (glass, paper, metal and plastic) from the waste management area
- Storage for tools and artwork

6.7.2 Agriculture strategy

Urban agriculture

Urban agriculture will be introduced on site through demonstration vegetable gardens to teach visitors how to design their own sustainable human habitats at home by growing their own vegetables.

Residents of Sunnyside and Pretoria CBD will also have the opportunity to become land owners of the community farm and take part in growing their own vegetables. Only the land owners will have access to the

community farm.

Requirements:

- Community farm
- Demonstration vegetable gardens
- Gravity-fed irrigation
- Process & packaging area
- Water
- Compost & fertilizers
- Storage
- Equipment
- Security - supervision, fenced-off

6.7.3 Water strategy

Recycling of water

Water will be recycled throughout the site. There will be four catchment areas capturing the rainwater to be used in specified areas. The runoff will be collected in wetlands and pumped to a storage dam (The water strategy is discussed in more depth in Chapter 8, section 8.1.3).

Storage tanks will be used to harvest rainwater from the buildings' rooftops. The stored rainwater can be reused in the vegetable gardens and toilets.

Requirements:

- Storage dam
- Storage tanks
- Bioswales
- Wetlands

6.7.4 Activities supporting the three design strategies

The following activities relate to either two or all three design strategies, stipulating general requirements to ensure the three strategies and all the activities work together successfully.

Creating job opportunities

Not only will the waste park create job opportunities by employing people to go around and collect waste, or to sort the unsorted waste into different categories, or by growing and selling their own vegetables, but it will also provide different workshops and demonstration projects and appoint “teachers” or tutors to illustrate and teach people the value of waste, how to recycle organic waste and how to use recycled waste.

Requirements:

- Accommodation for workers (existing buildings)
- Service pathway
- Golf cart for the collection and delivering of waste, artworks and vegetables
- Equipment for growing vegetables
- Storage for equipment and vegetables

Environmental education

Several activities will be hosted to educate the visitors about waste recycling, water recycling, composting and growing vegetables. The demonstration gardens will be interactive, allowing for social interaction and skills development.

Requirements:

- Gardening shop (environmental centre)
- Demonstration gardens
- Informative signage
- Workshops

Vegetables, compost and artworks sold from the park

The vegetables produced on site will be sold in the market area and restaurant on site. The compost produced on site will also be sold in the market area and at another allocated area on site. The artworks created during the workshops will be sold at the workshops itself or in the market area.

Requirements:

- Workshops
- Restaurant (sells organic food)
- Market area (fresh produce)

Reward system – reward public with vouchers or food when they deliver waste

A reward system will be implemented on site as motivation for visitors to bring waste to the site to be recycled. The visitors will be rewarded with a food voucher at the restaurant or with a package of fresh produce when they deliver waste.

Requirements:

- Drop-off and collection point (demonstration centre)
- Supervisor
- Vegetables (stored packages)
- Storage

Leisure and recreational activities

Every park has the need for leisure and functional recreational areas allowing for various park activities where visitors can socially interact and enjoy themselves. A soccer field, river walks, interactive play areas, etc. can be incorporated.

Requirements:

- Park furniture
- Pathways
- Enough shade (trees)
- River walk
- Picnic/Braai areas
- Toilets
- Soccer field
- Play area
- Interactive play structures

- Security - supervision and sufficient lighting

6.7.5 Further requirements

- The use of recycled materials for park furniture, paving, retaining walls, etc.;
- Guided tours explaining the different processes on site – especially for school kids;
- Informative signage and
- More than one well-defined entrance.

6.8 Concept development and spatial exploration



Fig. 111: Concept Development 1 (Author, 2012)

After developing the program it is possible to further develop the concept of the park – to introduce the problem to the public in a fun and playful manner and - being multifaceted - carefully consider and review all the facets and characteristics thereof.

The connections and relationships between different spaces and activities, such as waste recycling and composting, the entrance building, nursery and crops, recreation area and river walk, exhibition space and green shop in the buildings and play area/activities, were explored and different scenarios for these relationships were considered. The most suitable scenarios were selected to be designed and further developed into possible master plan proposals (Refer to Figs. 111 – 114).

The scenarios comprise of: an arrival plaza, a northern entrance, vegetable

gardens at the entrance, an orientation point, recreation and leisure area, separated with an earth mound from the rest of the activities on site and a waste recycling area.

The waste recycling and composting facility were initially situated at the entrance to the site for everyone to see as they enter the site (Refer to Figs. 111 – 113), but as illustrated in Fig. 114 it was moved to the southern side of the site because of the general direction of the wind and solicitude that the waste area will cause a smell at the entrance. Vegetable gardens (urban agriculture) were proposed to be placed at the entrance instead.



Fig. 112: Concept Development 2 (Author, 2012)

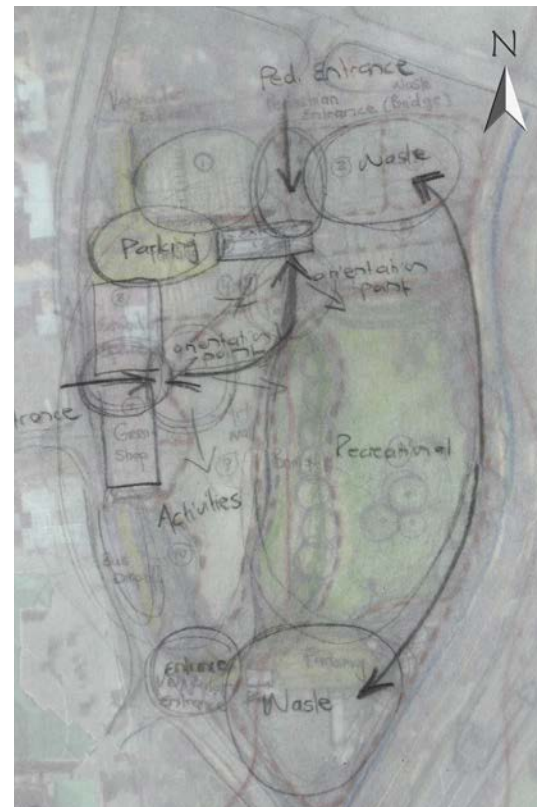


Fig. 113: Spatial Exploration 1 (Author, 2012)

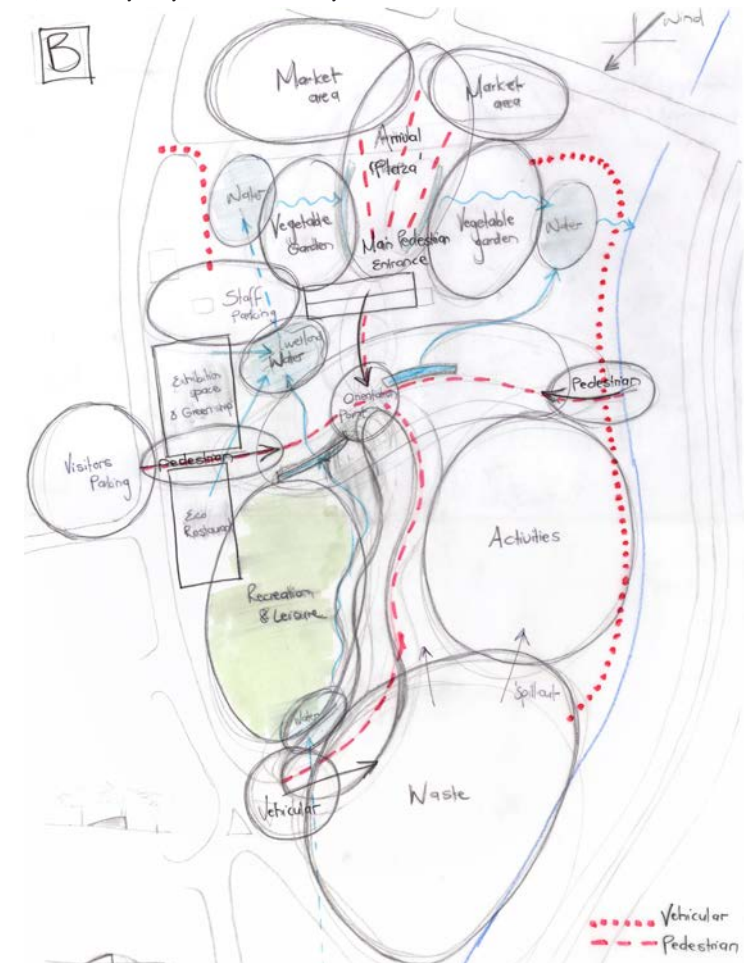


Fig. 114: Spatial Exploration 2 (Author, 2012)

6.9 Landscape Master plan development

Similar to the proposed concept in Fig. 114, the vegetable gardens (urban agriculture) remain at the entrance of the site. The activities such as outdoor workshops, interactive play areas and performance/demonstration areas are located next to the Apies River in an attempt to activate the river edge. The recreational area is next to the restored buildings (western side of the site). In this diagram this space was proposed to be restaurants and exhibition space. Visitors will be able to buy picnic baskets at the restaurant. The entrance building, also an existing building, will be restored and used as an entrance gate to the site. The vegetable gardens, recreational and waste management areas are provided with water from their own wetland (Refer to Fig. 115).

The next diagram illustrates that the composting facility moved to the entrance of the site and the waste drop-off remained at the southern side of the site. This was done to prevent the waste recycling process from being separated from the rest of the site. The activities, outdoor workshops, interactive play areas and performance/demonstration areas moved away from the river to be closer to the restaurant and other activities in the buildings while the recreation area moved next to the river - providing a more serene and relaxing atmosphere along the river walk (Refer to Fig. 116).

The following diagrams indicate that the waste recycling and composting facility of the waste management area was kept at the southern side of the site, to reduce the handling of waste. The initial idea of agriculture at the entrance of the site changed into a big arrival plaza where visitors can socialize and wait for a bus or taxi. The taxis are kept out of the park by providing a bus and taxi drop-off. Demonstration gardens are proposed to introduce urban agriculture to the visitors. The agriculture is now located next to the waste management area and workshops are proposed next to the buildings. An earth mound still functions as a barrier and a viewing platform that separates the recreation area from the waste management area. One big storage dam provides the entire site with water. A vehicle entrance is proposed at the southern side of the site to drop off waste (Refer to Fig. 117 and 118).



Fig. 115: Master plan development 1 (Author, 2012)



Fig. 116: Master plan development 2 (Author, 2012)

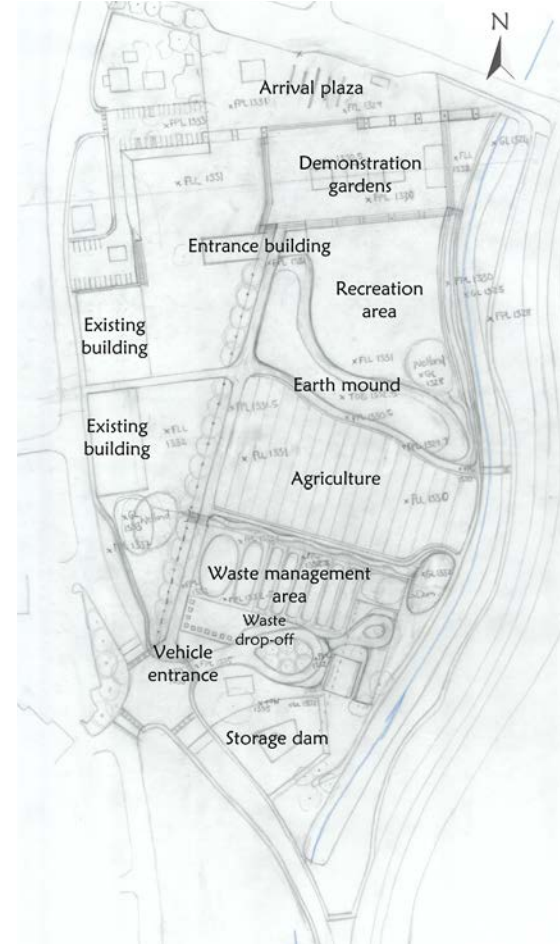


Fig. 117: Master plan development 3 (Author, 2012)

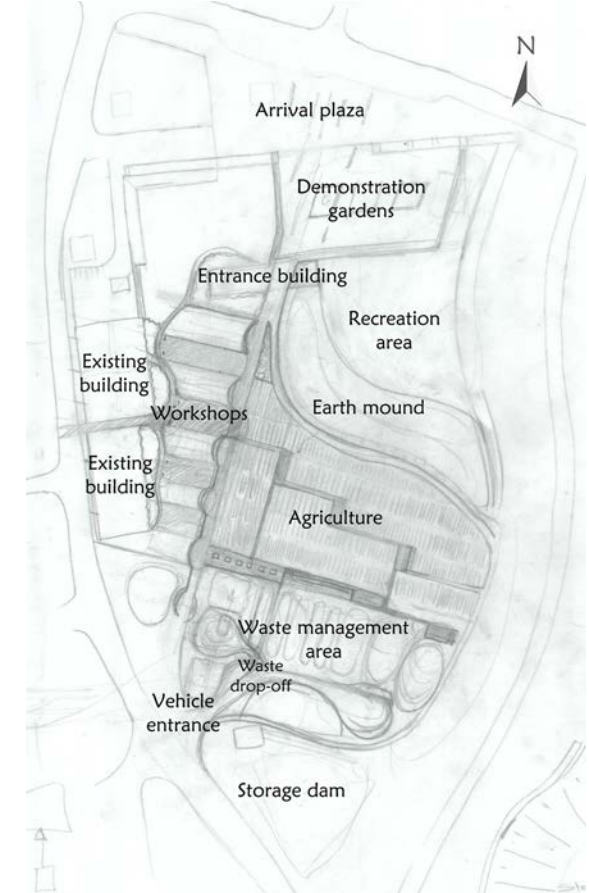


Fig. 118: Master plan development 4 (Author, 2012)

All the ideas and possible solutions obtained from the master plan development diagrams (Refer to Figs. 115 - 118) were consolidated and synthesised into a diagram that illustrates the final layout proposed for the master plan consisting of different nodes and connections to the surrounding environment (Refer to Fig. 119 and 120).

A northern node as main entrance to the site and southern node for vehicular entrance was proposed in Fig. 121 with a physical link – a pedestrian boulevard serving as the main route through the site (moves through the entrance building) – between the northern and southern nodes. On the western side, parking with a physical and visual link to UNISA registration building and an orientation point where the two pathways meet was proposed as well as a pedestrian bridge where the pathway crosses the Apies River.

Functional relationships between the different activities such as the drop-off area, market and arrival plaza, arrival plaza and demonstration gardens, recreation, river walk and retention dam, agriculture and demonstration gardens, agriculture and workshops, buildings and agriculture and waste management and water storage were explored and the most sensible connections were proposed as shown in Fig. 122. For instance, a connection between UNISA registration building and the northern node was proposed. It comprises a drop-off and pick-up area for all the students from UNISA and a market area for visitors. Connections from the commercial and business areas and the Gautrain Station to the park's southern node were also proposed.

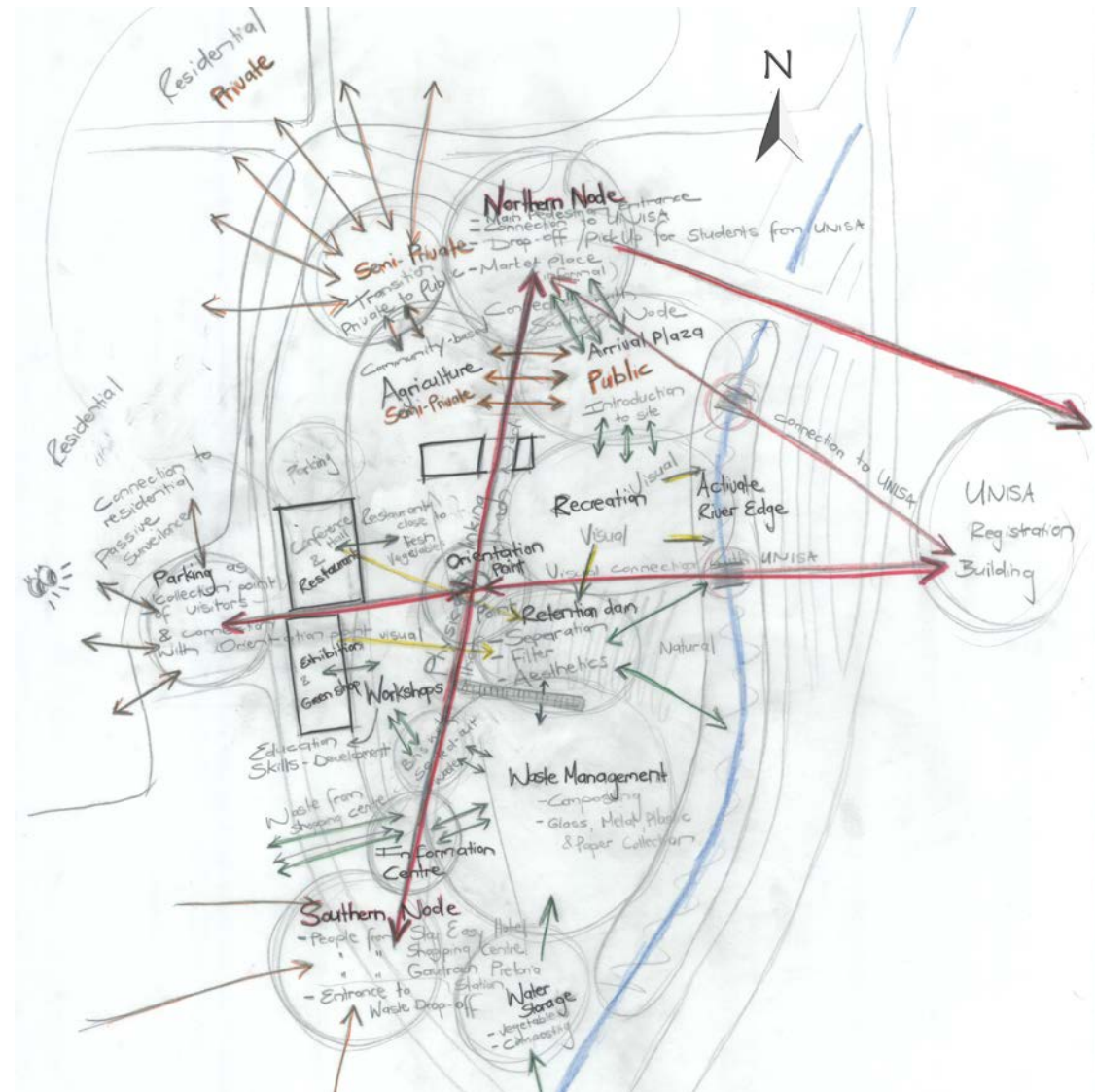


Fig. 119: Spatial exploration 3 (Author, 2012)

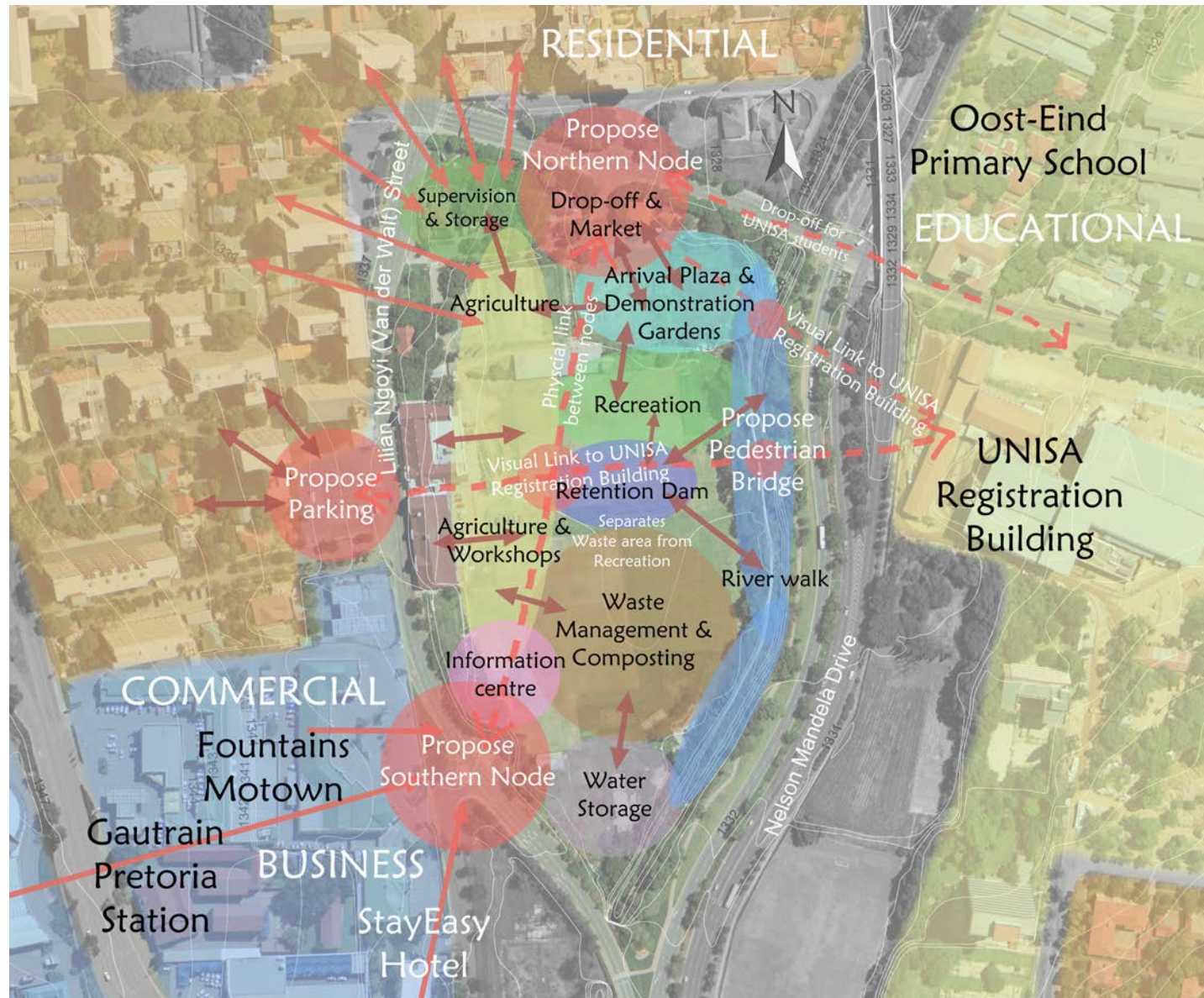


Fig. 120: Master plan proposal (Author, 2012)

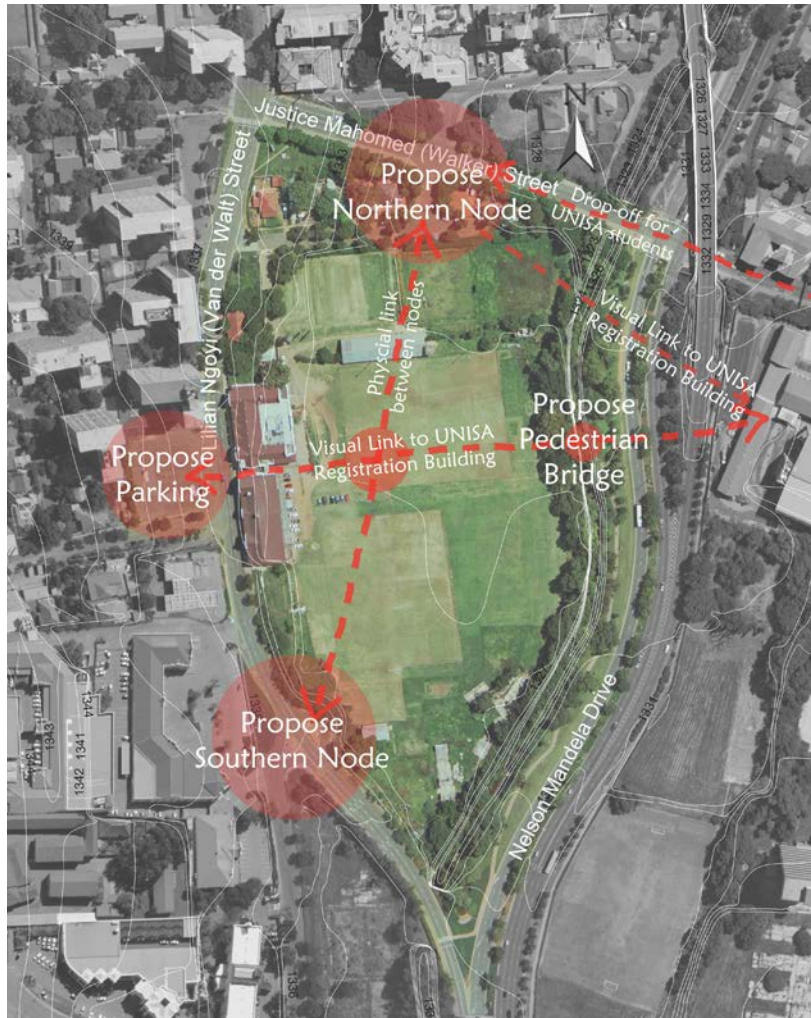


Fig. 121: Proposed Nodes and Visual Connections (Author, 2012)

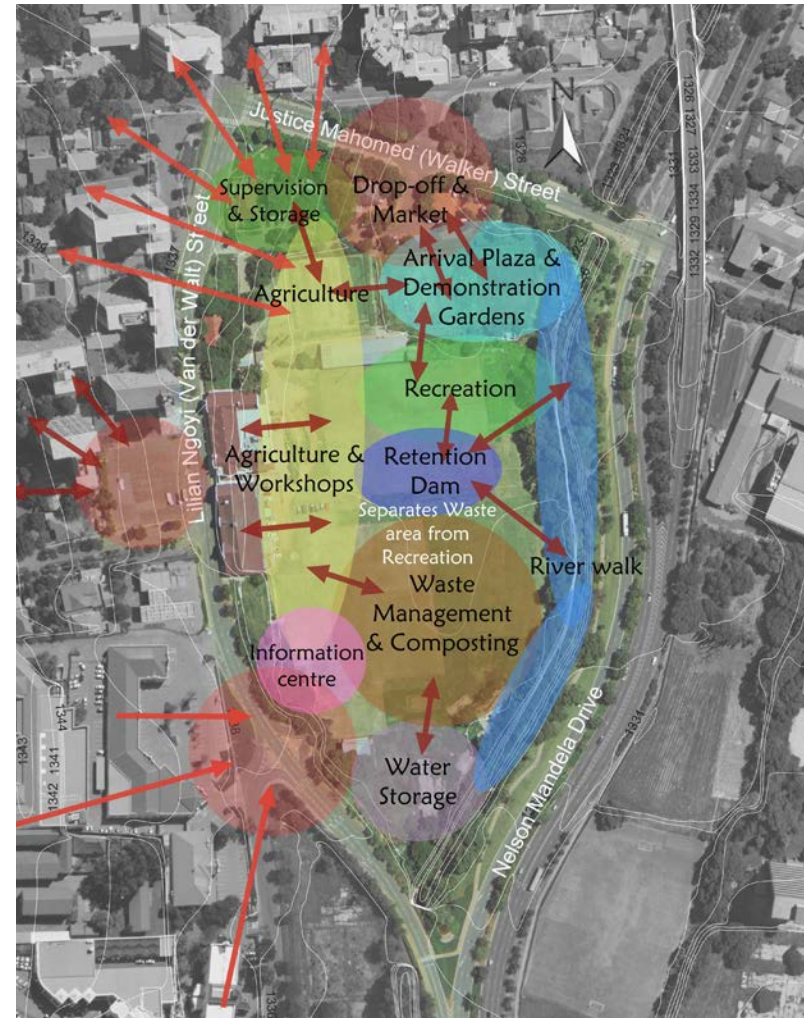


Fig. 122: Activity zones and Relationships (Author, 2012)

The master plan proposal was developed further (Refer to Fig. 123 and 124) and consists of the following: a market area, an arrival plaza with demonstration gardens (east of entrance building), agriculture and workshops in front of the buildings, a retention dam and recreation area. The northern building is proposed to be used as conference facilities and a restaurant. The southern building is proposed as a green shop and exhibition space. The southern entrance was explored in terms of adequate space for vehicles entering, dropping of waste at the waste management



Fig. 123: Master plan development 5 (Author, 2012)

area, turning and exiting.

An information centre is proposed, as shown in Fig. 123, at the southern entrance, but it was moved to the northern entrance of the site as a new function to an old, existing building, because most visitors will enter the site from the main (northern) entrance (Refer to Fig. 130).

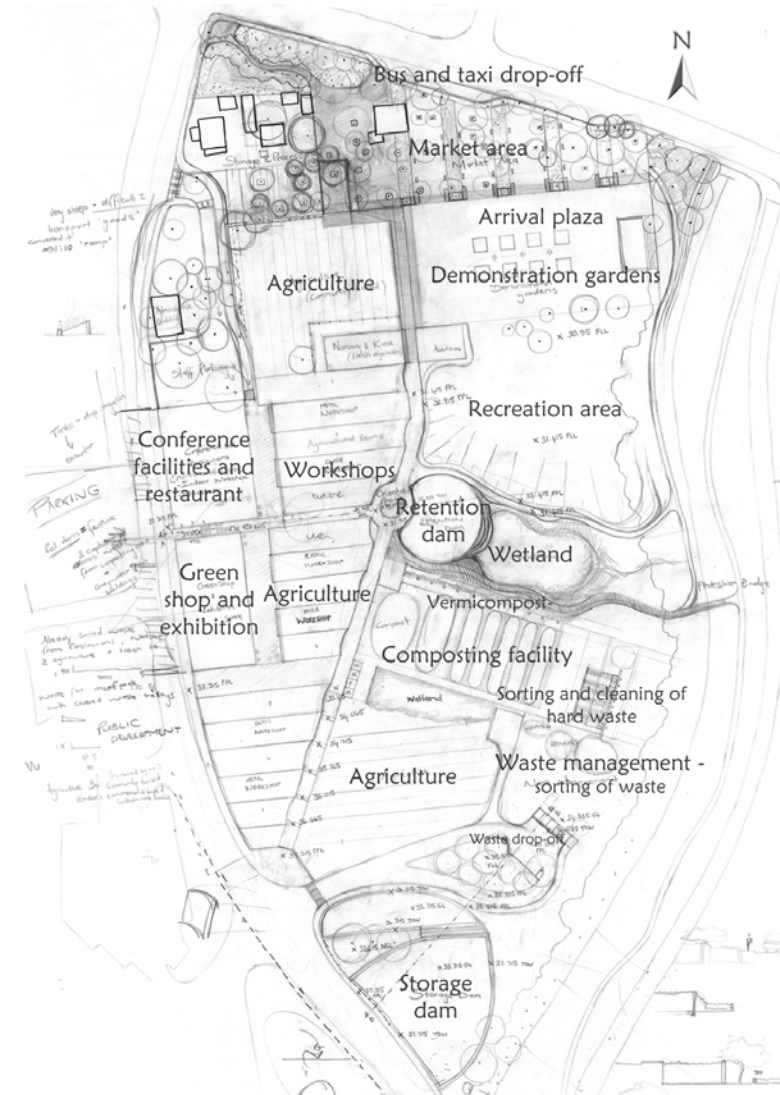


Fig. 124: Master plan development 6 (Author, 2012)

A retention dam flowing into a wetland is proposed (Refer to Fig. 124), but as shown in Fig. 125 it was decided that a wetland alone would be sufficient. The wetland acts as a filter to clean the water and, at the same time, has aesthetic value and separates the waste management area from

the recreational area. The size of the storage dam was also investigated and determined in order to provide the entire site with water.

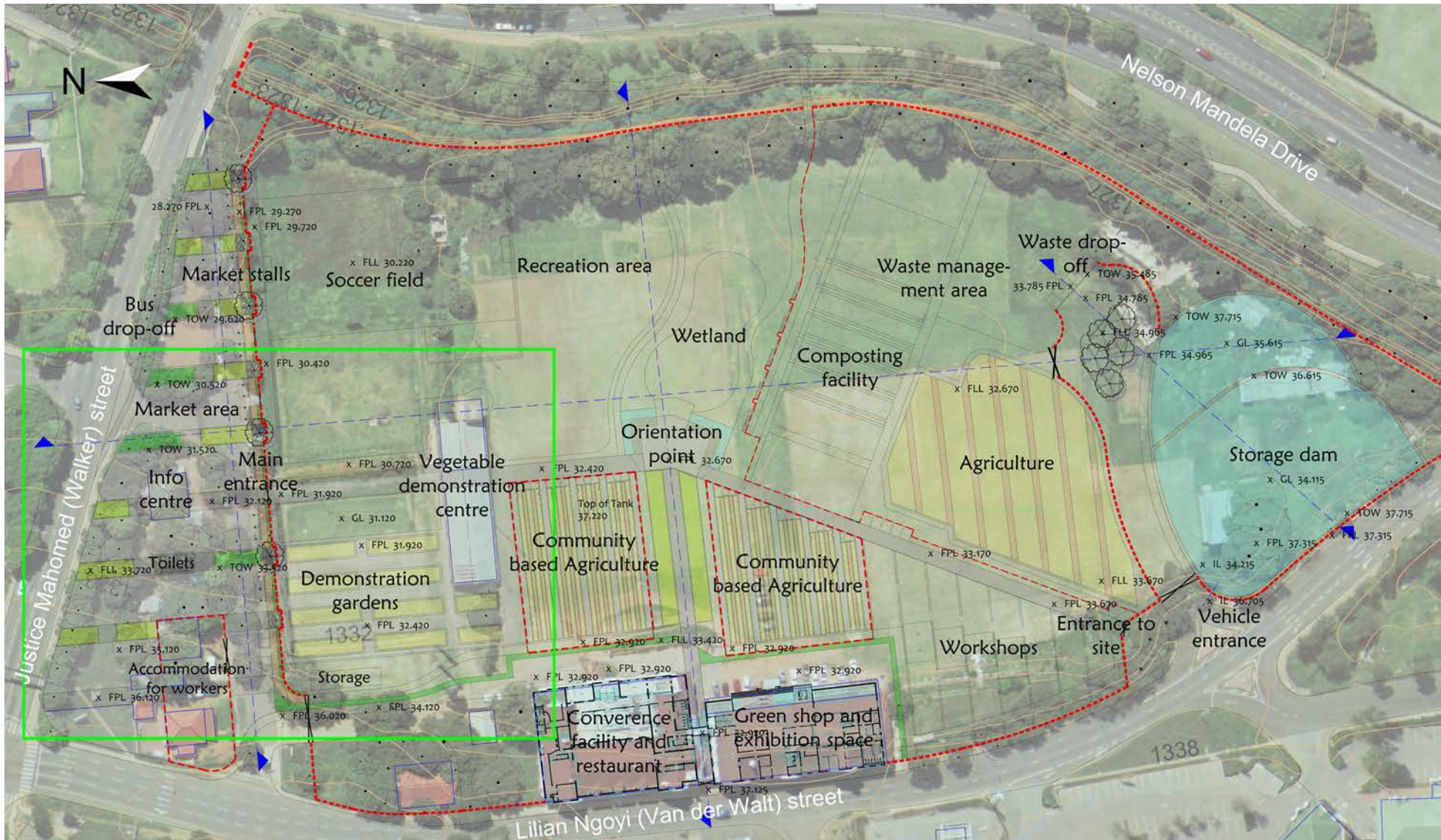


Fig. 125: Master plan development 7 (Author, 2012) - Due to practical reasons the layout of the site on plan will be developed further in landscape format (rotating the layout of the site 90° counter clockwise)

The general circulation on site is illustrated in Fig. 126 and the different views as seen by the visitors at different locations on site are illustrated in Fig. 127.



Fig. 126: General circulation on site (Author, 2013)

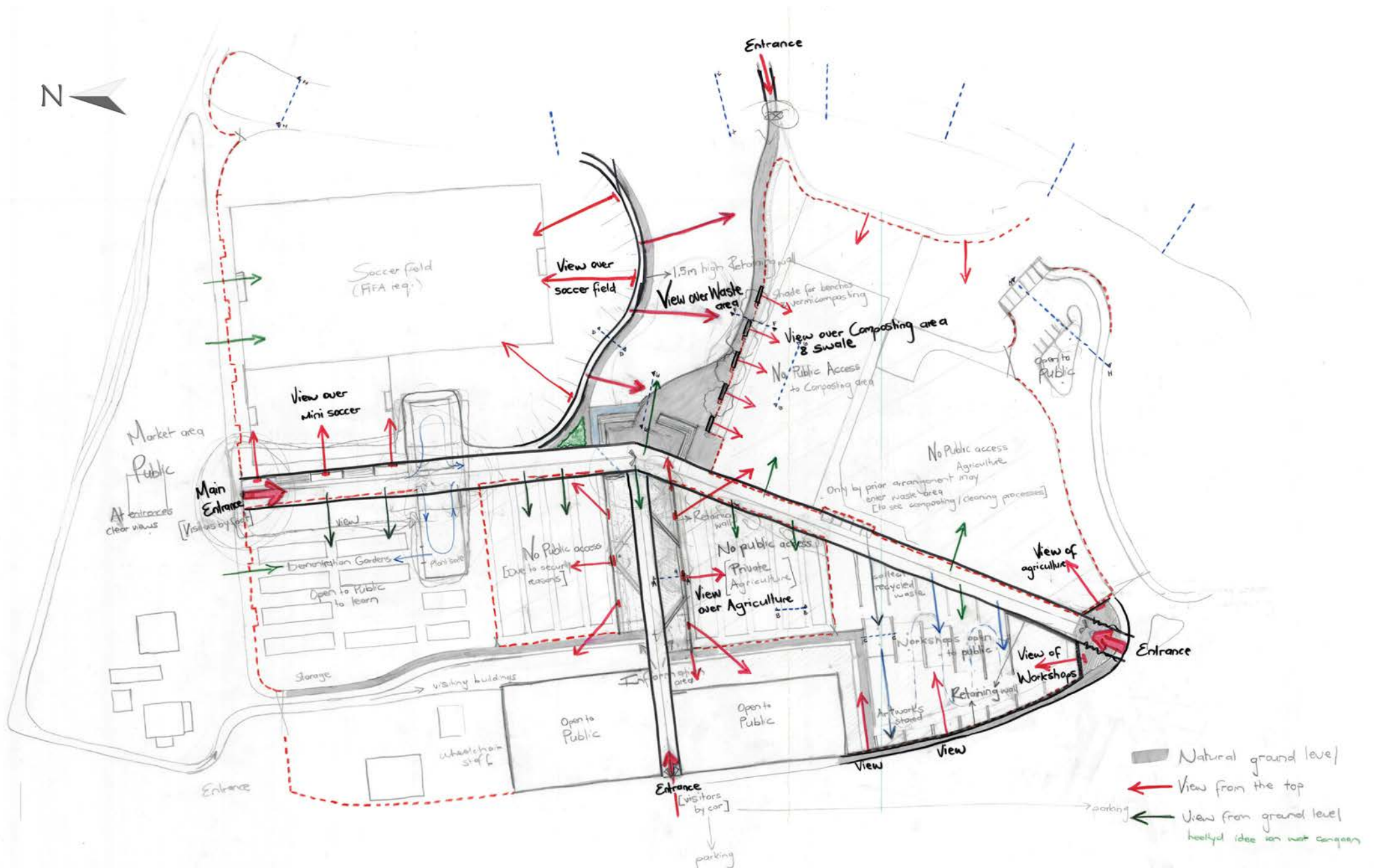


Fig. 127: Views as seen by visitors at different locations on site (Author, 2013)

The arrival plaza changed from the previous diagrams and evolved into a market area (Refer to Figs. 125, 128 and 129). The demonstration gardens moved to the west side of the entrance building to provide space for a soccer field in the recreation area. The entrance building will function as

a gardening shop with toilet facilities. The workshops are no longer in front of the buildings, but were moved next to the southern building to be closer to the waste management area to be able to obtain the cleaned, recycled waste.

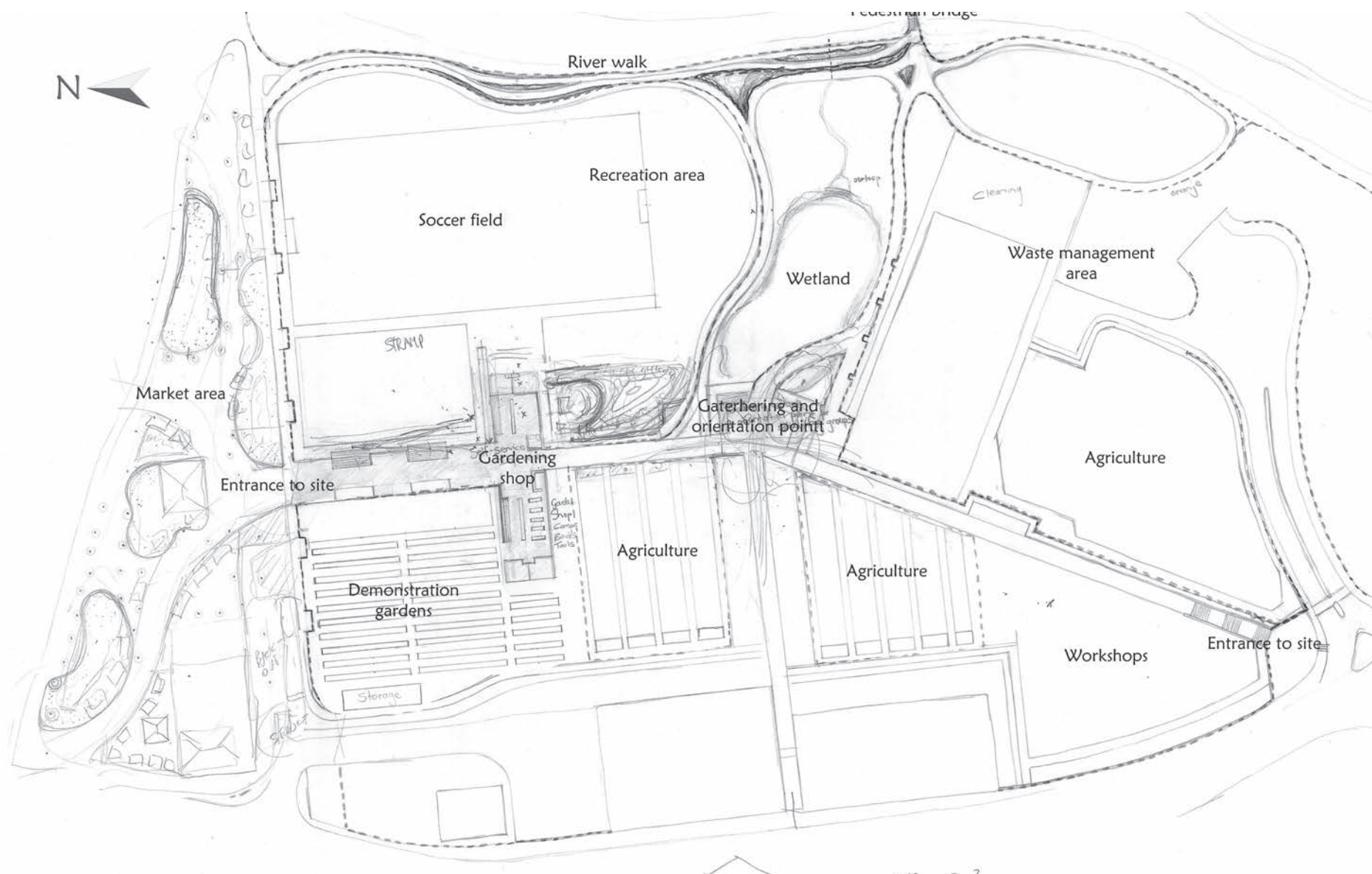
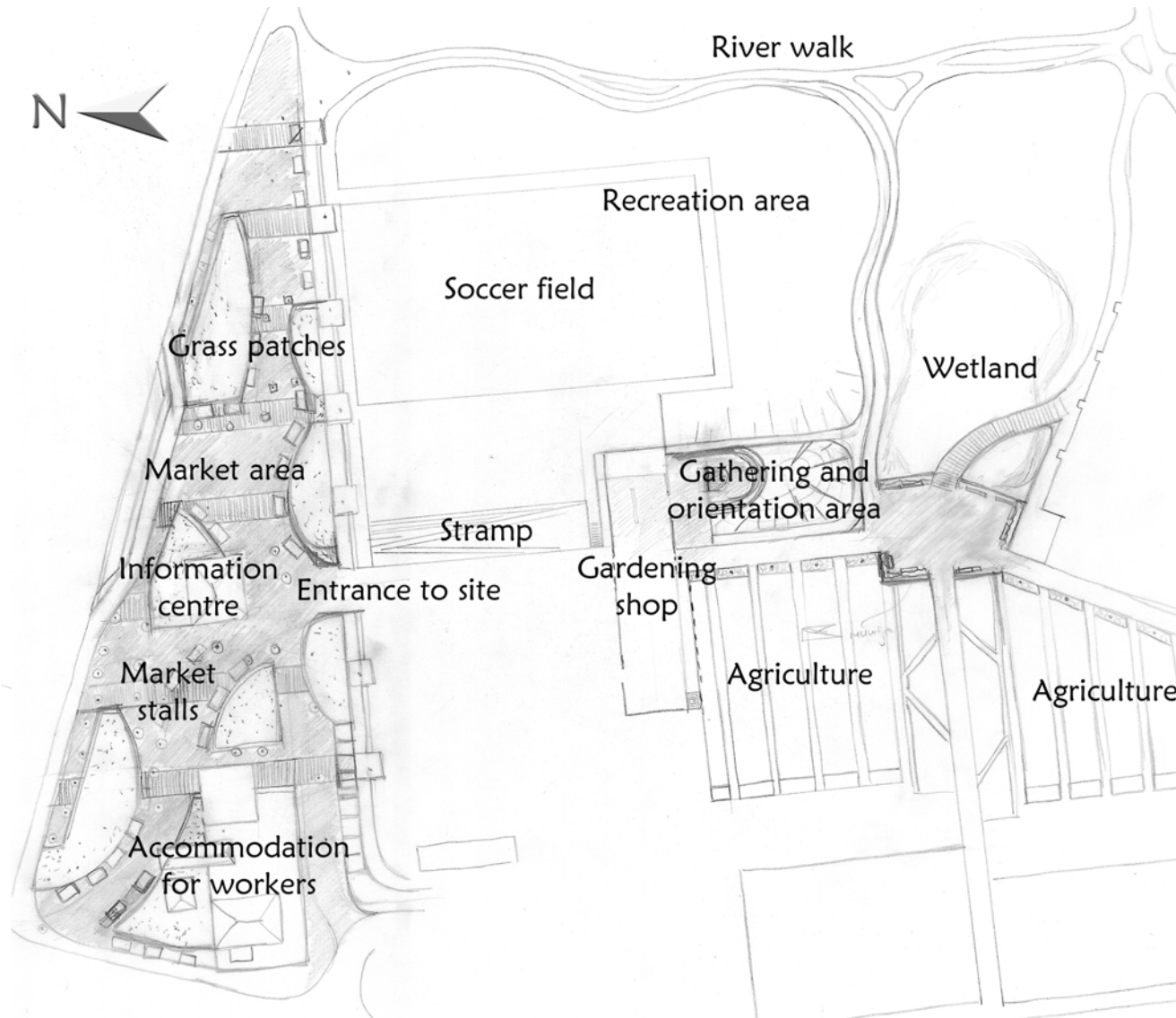


Fig. 128: Master plan development 8 (Author, 2013)

A gathering and orientation point is proposed in the center of the site as well as a river walk along the Apies River with a pedestrian bridge crossing the river. The market area was further developed according to the movement patterns of the locals and visitors moving through the market area to enter the site. Grass patches were provided to be used

for seating and as a waiting area. The gardening shop spills out into a gathering space for big school groups.

Following a very long and reiterative process a final landscape master plan was proposed (Refer to Fig. 130).



The master plan consists of: a bus and taxi drop-off from where visitors can move through the market area and obtain a map and other information from the information centre. Visitors enter the site through the main (Northern) entrance. School groups come together at the gathering area where a tour guide will orientate them and guide them through the park. The recreational area comprises of a soccer field and lawn area serving as a play area for children or a space to be used for functions. Demonstration gardens are located next to the gardening shop where visitors will be educated on how to grow their own vegetables. Urban agriculture is located in front of the existing buildings proposed as a restaurant, offices, accommodation and toilets for workers, as well as exhibition space. Workshops where visitors and workers will make artwork from recycled waste (obtained from the waste management area) are hosted next to the existing buildings. Recycling and composting of organic waste takes place in the waste management area as well as the recycling and cleaning of hard waste. Vehicles have access to the waste management area from the southern entrance to drop off waste. The storage dam, located at the southern end of the park, provides the entire park, including the agriculture, waste management area, demonstration gardens and the recreation area with recycled water. A well-lit river walk is also provided along the Apies River.

Fig. 129: Master plan development 9 (Author, 2013)

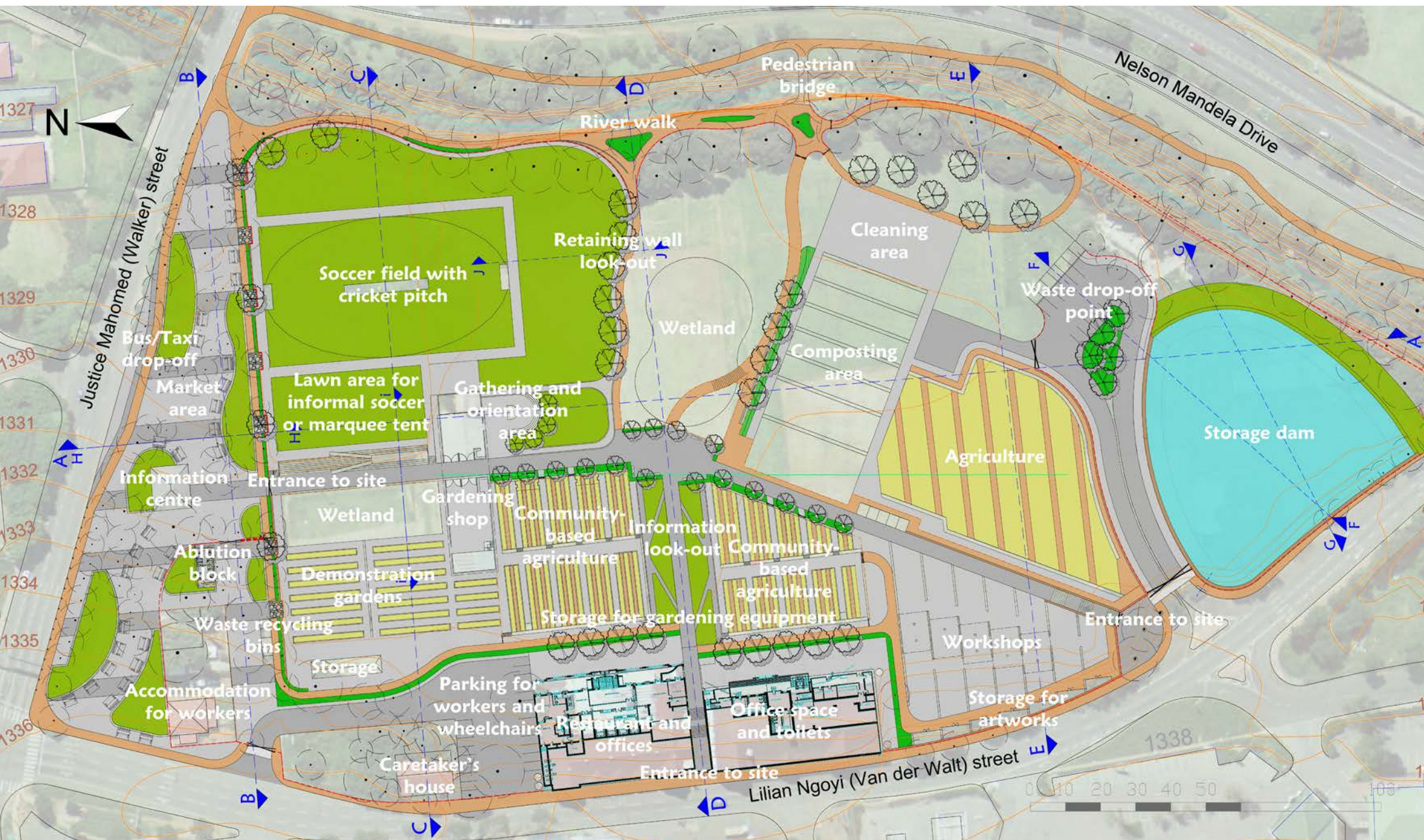


Fig. 130: Landscape master plan (Author, 2013)

Figs. 131 - 134 illustrates some of the spaces proposed on the master plan.

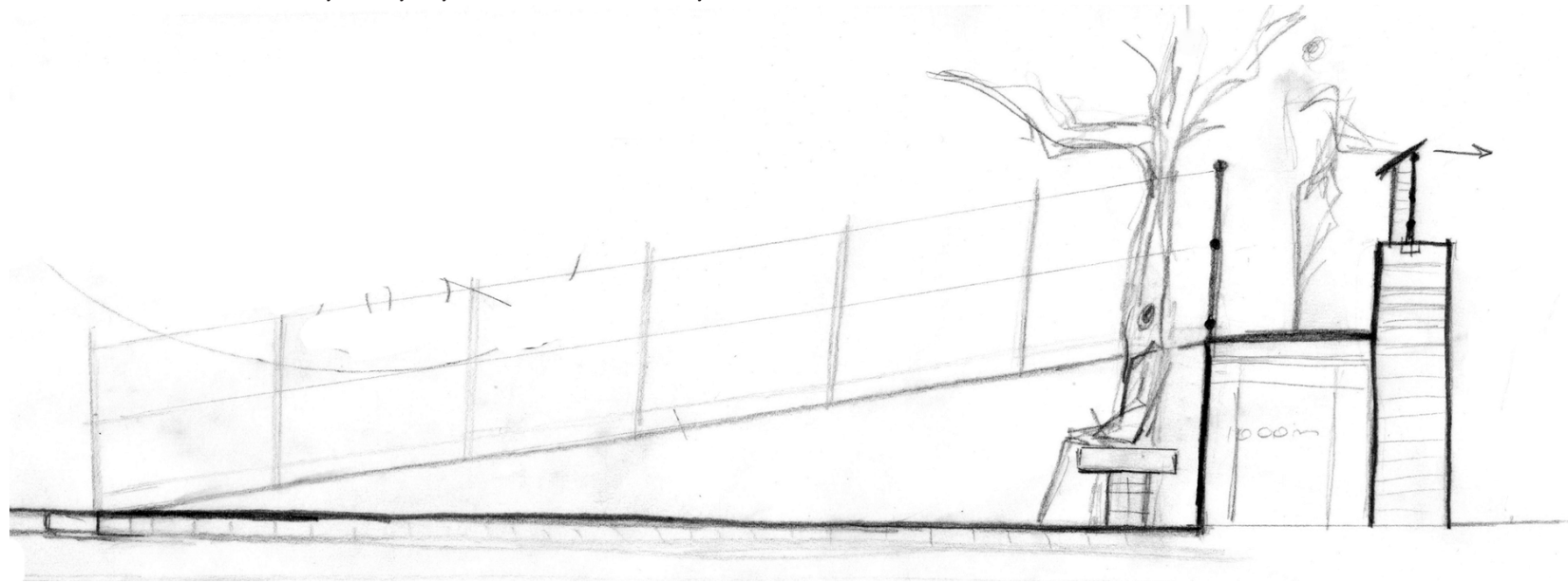


Fig. 131: Section through information look-out (Author, 2013)

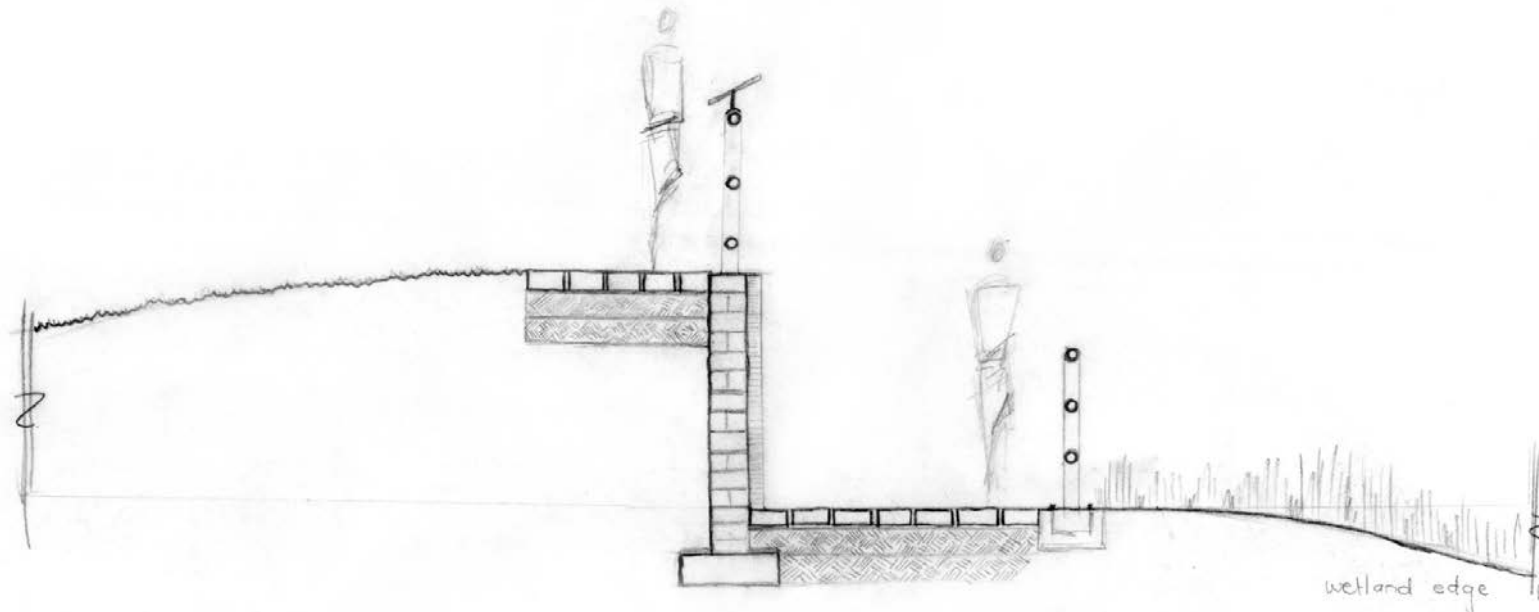


Fig. 132: Section through retaining wall look-out (Author, 2013)

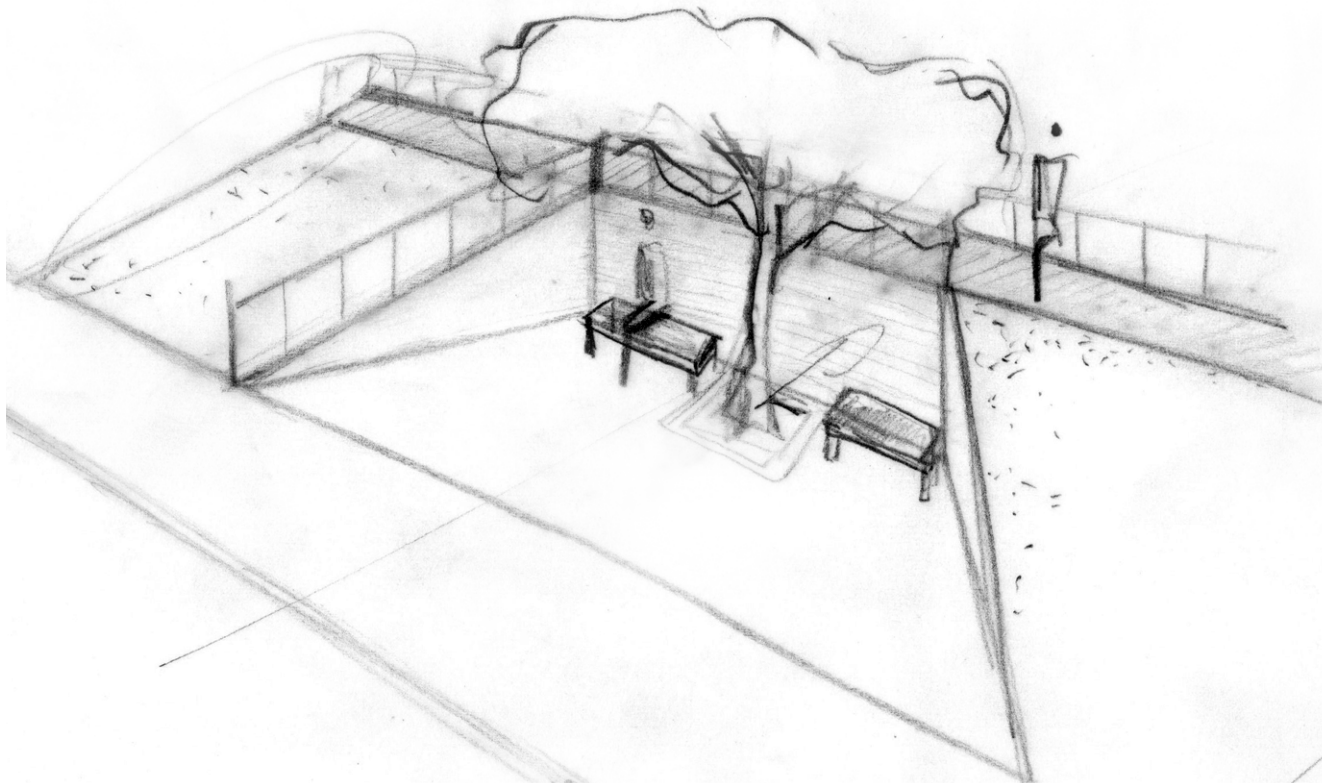


Fig. 133: 3D drawing of information look-out (Author, 2013)

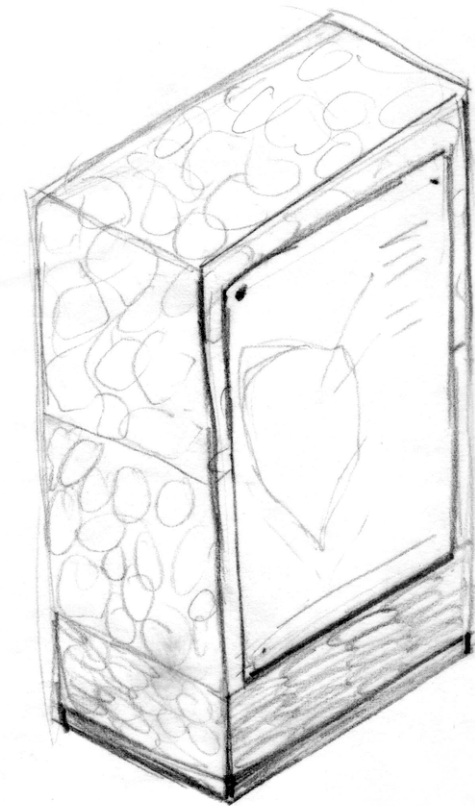


Fig. 134: Informative signage (Author, 2013)

Creative ideas for fence applications throughout the park will be implemented:

- Recycled material fence (Johnson, 2009). See Fig. 135.1
- Road sign fence (Vanderlinden, 2011). See Fig. 135.2
- Recycled PVC pipe fence (Bring, no date). See Fig. 135.3
- Bicycle fence 1 (Diamond, 2012). See Fig. 135.4
- Fence from old boards, scrap metal and bicycle wheels (Neiman, 2012). See Fig. 135.5
- Creative fence (Chow, 2012). See Fig. 135.6
- Bicycle fence 2 (Loper, 2010). See Fig. 135.7
- Recycled plastic bottles (Lushome, 2012). See Fig. 135.8
- Recycled steel fence (Johnson, 2009). See Fig. 135.9



Different circulation routes on site are illustrated in Figs. 136 - 138.



Fig. 136: Service routes (Author, 2013)

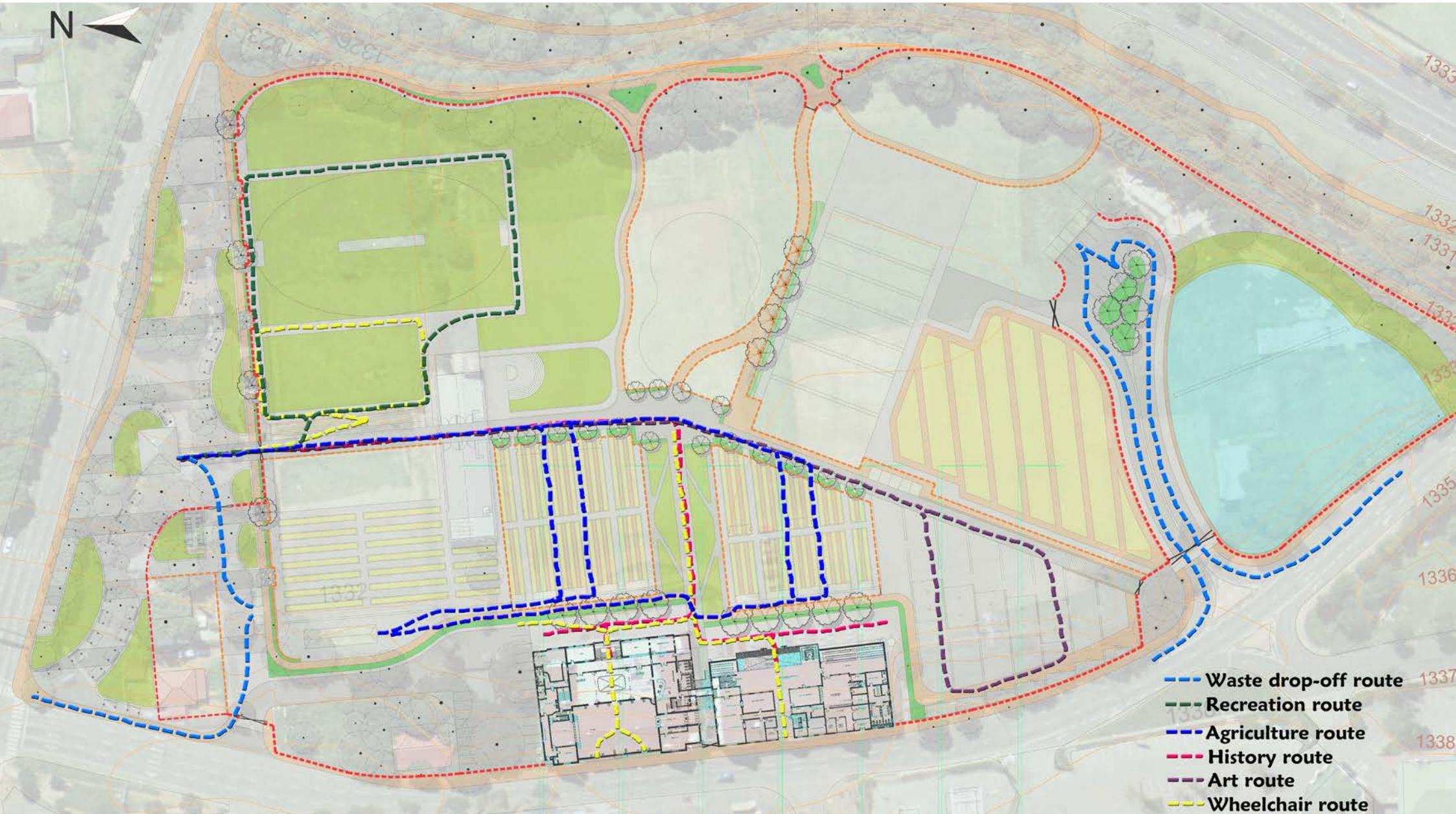


Fig. 137: Circulation routes of different visitors (Author, 2013)



Fig. 138: Educational routes (Author, 2013)

6.10 Cross-sections

For cross-sections indicating the different activities across the site refer to Figs. 139 - 143.

6.11 Conclusion

Between the ‘first stab’ at a design and the final master plan the design development process involves many decisions and many factors need to be taken into consideration. It is a continuous exploration of different designs and scenarios until you find the most suitable and appropriate solution.

The landscape master plan evolved from a loose, disintegrated program on a site into an organised, well-functioning design with different activities integrated and working together successfully to form the best and most suitable solution for the Berea Waste Park.

In the next chapter the three main design strategies, namely water recycling, waste recycling and urban agriculture of the Berea Waste Park will be explained by means of diagrams and calculations.

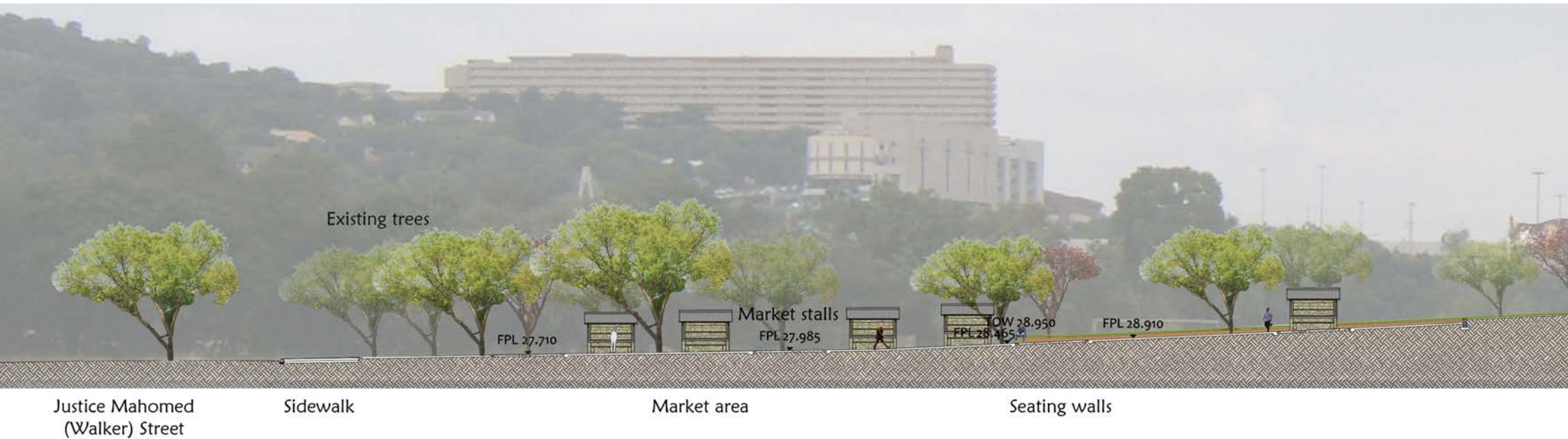
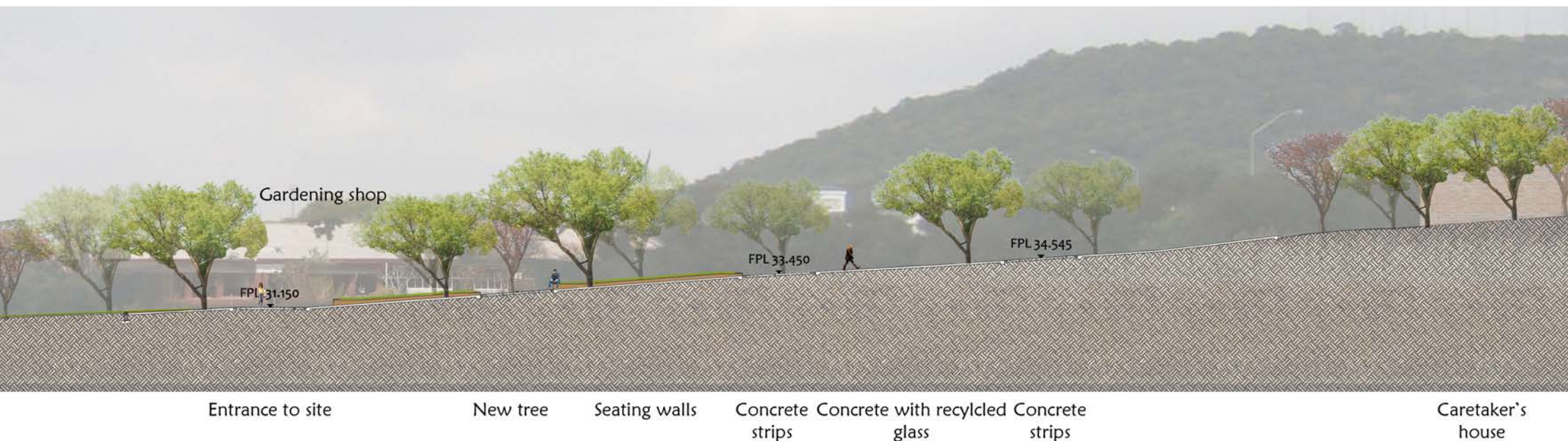


Fig. 139: Cross section A-A (Author, 2013)



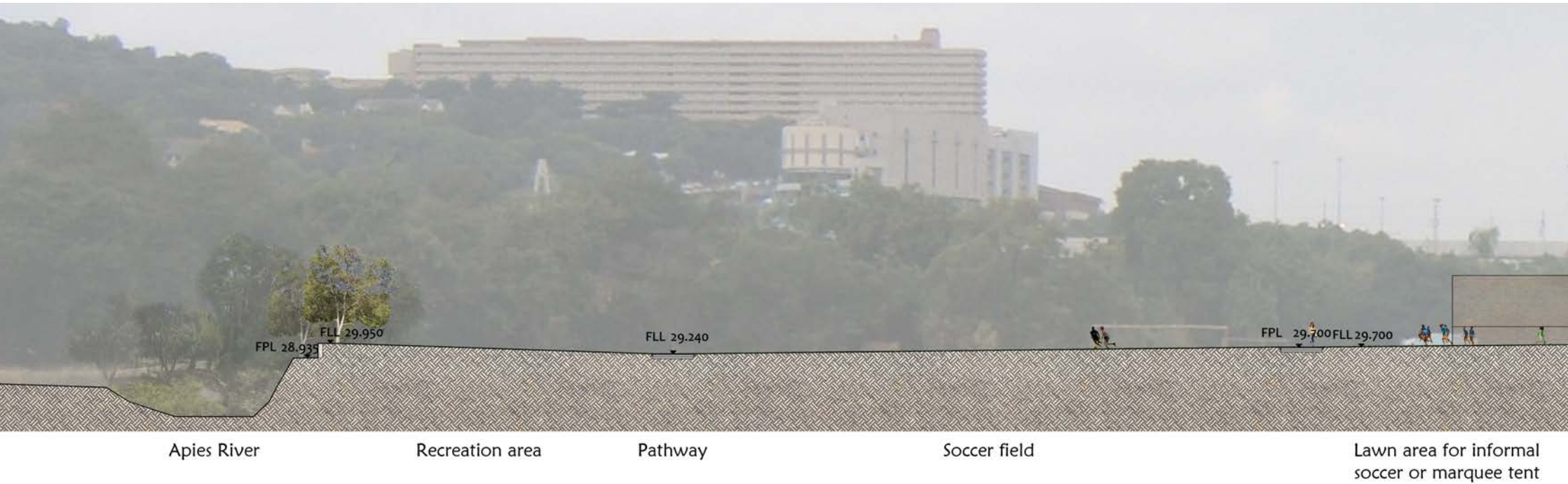


Fig. 140: Cross section B-B (Author, 2013)

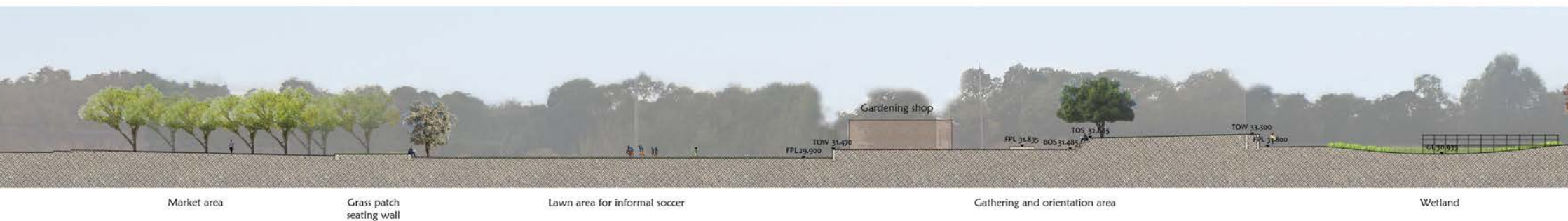


Fig. 141: Cross section C-C (Author, 2013)

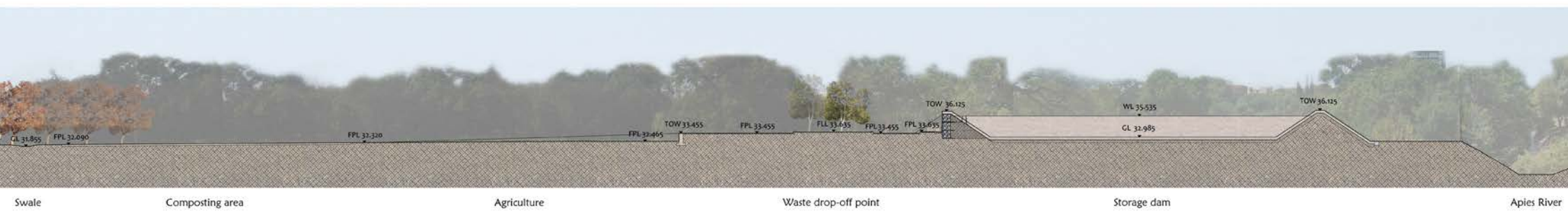




Fig. 142: Cross section D-D (Author, 2013)

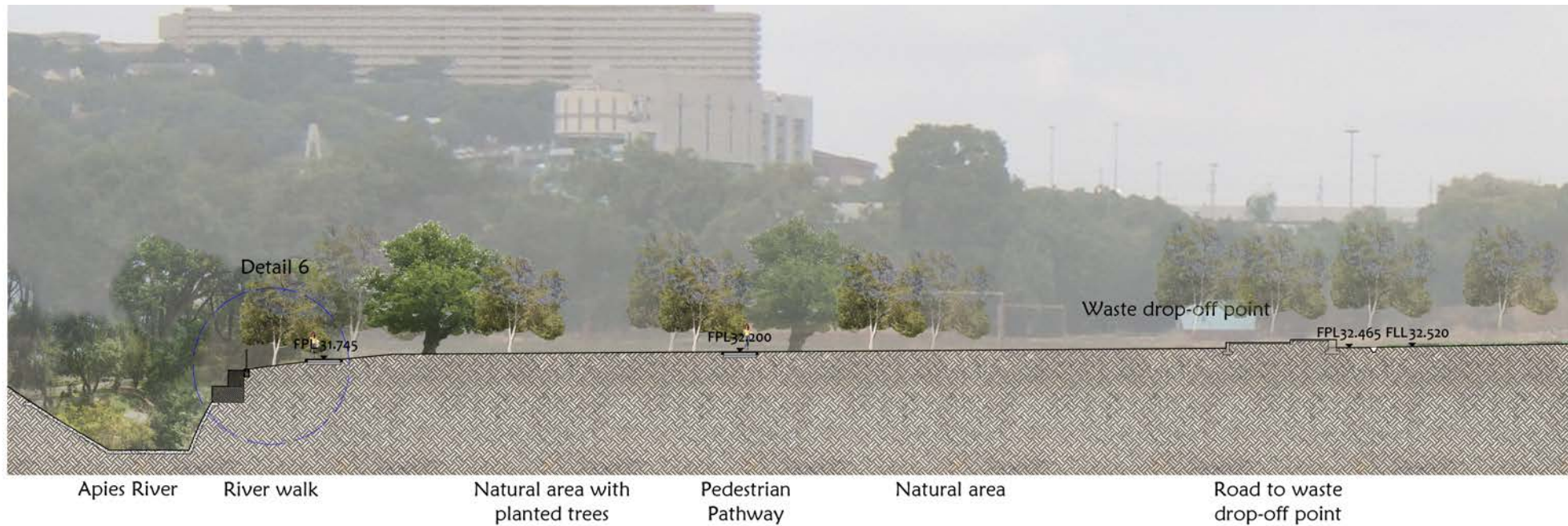


Fig. 143: Cross section E-E (Author, 2013)

