RECONNECT, RESTORE, REGENERATE

Creating restorative environments by regenerating the human-nature connection

by **Lucille Witthuhn**

Submitted in partial fulfilment of the requirements for the degree Master of Architecture (Professional) in the Department of Architecture, Faculty of Engineering, Built Environment and Information Technology of the University of Pretoria

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To my parents, Pierre and Marieta.
Thank you for praying without ceasing.

To my Lord and Savior, Jesus Christ.

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PROJECT SUMMARY

Programme: Skills Development Centre and Shared Services NPO-Hub

Site Description: Brownfield site with historical building in Salvokop across the railway line from the Pretoria Train Station.

Client: POPUP (People Upliftment Programme).

Users: POPUP staff and students, public visitors and volunteers.

Site Location: Salvokop, Pretoria.

Address: Off Skietpoort Avenue, Salvokop, Pretoria, South Africa.

Design Theoretical Premise: Non-profit Organizations can function more effectively when they share facilities, resources and service delivery areas.

Design Approach: Creating restorative environments by regenerating the human-nature connection.

Research Field: Human Settlements and Urbanism, Heritage and Cultural Landscapes.

Keywords: human-nature connection, biophilic design, restorative environmental design, service integration, skills training programmes, railway heritage, natural landscape.

DECLARATION

In accordance with Regulation 4(e) of the General Regulations (G.57) for dissertations and theses, I declare that this thesis, which I hereby submit for the degree Master of Architecture (Professional) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of my thesis has already been, or is currently being, submitted for any such degree, diploma or other qualification.

I further declare that this thesis is substantially my own work. Where reference is made to the works of others, the extent to which that work has been used is indicated and fully acknowledge in the text and list of references.

Lucille Witthuhn

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ABSTRACT

The dissertation investigates how non-profit organisations (NPOs) can function more efficiently by sharing resources and services. The design responds with the strategy of service integration, by transforming the facilities of POPUP, a single NPO, into a shared services hub for multiple NPOs.

POPUP is a People Upliftment Programme in Salvokop, Pretoria, and serves the under-privileged communities of Pretoria with skills development courses. The dissertation aims to create restorative environments for these students and explores the theoretical approaches of *regenerative design, biophilic design and restorative environmental design*. The premise of the investigation is that humanity has an inherent inclination towards nature and that a healthy human-nature connection enables the healing process.

Furthermore, the dissertation follows a contextual approach that responds to the railway heritage significance of Salvokop, the urban condition of disconnection from the Central Business District, as well as the self-restoration of the natural landscape. The study seeks to regenerate the human-nature connection, a manifestation of the connection between the current natural landscape and the urban condition. In this way, restorative environments are created that contribute to the regeneration of people.

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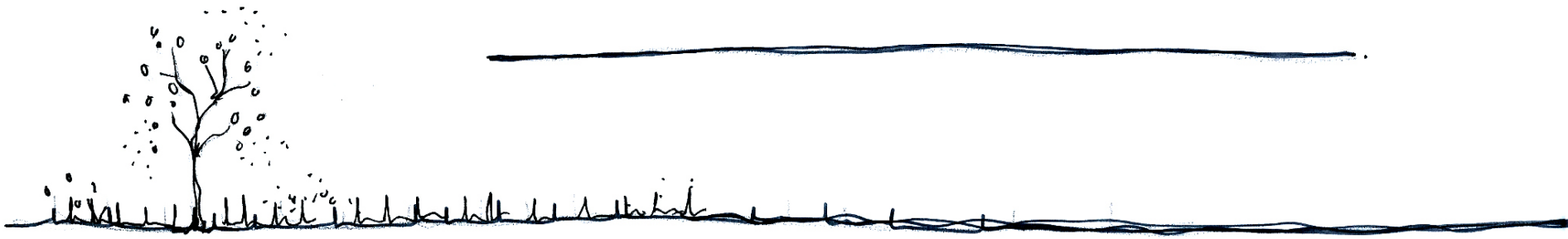

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1. INTRODUCTION

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1.1. INTRODUCTION

The chapter serves as the introduction to the dissertation. The dissertation investigates how non-profit organisations (NPOs) in the Social Welfare Sector can operate more efficiently by sharing resources and services. The dissertation explores the hypothesis by means of an architectural intervention that transforms the facilities of a singular NPO into a shared services hub for multiple NPOs.

Firstly, the chapter will elaborate on the historic background, as well as the present condition of the social welfare realm. In addition, the demand for the service integration of NPOs in South Africa will be discussed. Secondly, the client and site will be introduced. The urban and architectural issues pertaining to the site will also be discussed. Thirdly, the chapter will elaborate on the hypothesis, related sub-questions, methodology, methods, delimitations and assumptions.

1.2. BACKGROUND

1.2.1. WESTERN MEDIEVAL EUROPE

It is believed that the first monastery in Western Europe was founded by St. Benedict of Nursia at Monte Cassino, Italy in 529. He drew up a rule that stated how monasteries should be run, and between the 6th and 11th century thousands of Benedictine monasteries were founded in Western Medieval Europe. Aside from praying, the Benedictine rule required monks and nuns to work, and many monasteries supported themselves by manufacturing and selling goods in order to exist self-sufficiently [Lambert, 2009].

Initially, monasteries focused on an inward-looking existence; seclusion from the world in order to pray for the world. At the end of the 11th century new orders of monks were established, which encouraged missionary and parochial work beyond the cloister [Martindale, 1992]. The Carthusian monks continued with a life of solitude, considering their prayers as their contribution to the world, whereas the Cistercians, Augustines, Franciscans, Dominicans and Carmelites went out to preach and help the poor [Lambert, 2009].

The typical medieval monastery consisted of a cloister structured to form a courtyard, around which the monastic life revolved. General monastery spaces were the church, chapter house for communal meetings, dormitory, refectory and storage space [Martindale, 1992]. More often than not, monasteries also had an almonry where food and money were distributed to the poor, an

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infirmary and hospice that tended the sick, and rooms for travelers and pilgrims. Each monk or nun had a different vocation: almoner, infirmarian or hospitaller [Lambert, 2009]. Agriculture was also a common trade of the monastic life, producing food for the monastery as well as the local community. Furthermore, the focus on teaching the local community and the provision of education encouraged the establishment of universities in the second millennium.

Different orders of monks had different interests. The Carthusians practiced carpentry and wood-carving as a form of relaxation [The Carthusian Order, 2013], while the Cistercians were shepherds and wool-traders as a means to generate an income [Lambert, 2009]. They were also excellent ironmongers and masters of metals, which influenced the technology that lead to gothic architecture [Brandenberg, 1995].

Fig. 1.1. Monastery of St. Benedict at Monte Cassino [monte cassino, 2011].

Fig. 1.2. Monastery of St. Benedict at Monte Cassino [mstecker, 2011].

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1.2.2. MODERN WESTERN AND CENTRAL EUROPE AND NORTH AMERICA

During the Middle Ages monasteries played an integral role as charitable institutions in local communities, providing food and shelter for the poor, as well as health care for the sick. They also preserved learning after the collapse of the Roman Empire. However, the significance of this role in society has diminished since 1789, on account of the political and social reformation as inspired by the French Revolution [Martindale, 1992].

A few decades after the French Revolution, in the early and mid-nineteenth century, modern social welfare started to develop in Western and Central Europe, as well as North America. Various social insurance schemes manifested in pensions for the aged and voluntary remedies. Furthermore, new institutions and organizations were founded for the mentally ill, public health, public education, and to assist entrepreneurs, artisans, mechanics and the poor [Cravens, 2008].

Nevertheless, these programmes only affected a small portion of the nation's population. For this reason social insurance schemes were accepted and incorporated with civil governments between the 1870's and 1920's. But it was only after the Great Depression in the1930's and World War II (WWII), that social welfare became nationalized. The government and the private sector started to join forces and new social welfare organizations such as, private pension, unemployment insurance, disability insurance, first-rate public health and sanitation schemes were founded. Especially in Germany after WWII, families were encouraged to have more children to rebuild the nation's population, and money for children, nursery schools, day-care centres, paid vacations and free higher education was introduced [Coninck-Smith, 2008].

1.2.3. CONTEMPORARY SOUTH AFRICA

Today, social welfare organizations are known as Non-profit Organisations (NPOs). In South Africa, NPOs generally exist as non-governmental organisations (NGOs), community-based organisations (CBOs) and faith-based organisations (FBOs). Section 1 of the Non-profit Organisations Act 71 *of 1997 defines an NPO as a trust, company or other association of persons that has been established for a public purpose and the income and property of which are not to be distributed to its members or office bearers accept as reasonable compensation for service rendered* [DSD, 2011:4].

NPOs are classified in South Africa according to the International Classification of Non-profit Organisations (ICNPO). Accordingly, 34% of the Non-profit Classification Sector comprises of Social Services, 21% Community Development and Housing, 12% Religion, 11% Health, 11% Education and Research, 5% Culture and Recreation, 2% Law, Advocacy and Politics, 1% Environment, 1% Philanthropic Intermediaries and Voluntarism Promotion, 0,5% Business and Professional Associations, Unions and 0,06% International Organisations [DSD, 2011].

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1.3. GENERAL ISSUE

1.3.1. THE SOCIAL WELFARE SECTOR

In August 2012, at the National NPO Summit, the Department of Social Development presented the commission for the *transformation of Welfare Services Sector*. The aim of the commission was to highlight the need for transformation in the social welfare system [DSD, 2012:3].

According to the Department of Social Development, the South African social welfare sector has undergone marked transformation since 1995, when South Africa adopted a developmental approach to social welfare in line with the *United Nations Declaration on Social Development*. There has been much improvement in transforming the previous discriminatory and inequitable welfare model, but South Africa is still experiencing rapid change and there is a crucial need for transformation in the social development sector [DSD, 2012:4].

Furthermore, according to the Department of Social Development, institutional challenges in the social development administration hinder effective service delivery. Services should be transformed to ensure that government resources are distributed evenly and uniformly. Access to services in previously disadvantaged and under-resourced areas should be facilitated. CBOs that are better placed to respond to the need of the community, should also be empowered in cases where they are disadvantaged and lack the ability to access resources [DSD, 2012].

1.3.2. DEMAND FOR SERVICE INTEGRATION

In order to address the need for transformation in the social welfare sector, the Department of Social Development has identified the strategy of service integration. Service integration refers to service providers in the developmental social services system working together to ensure empowerment of the poor and vulnerable sectors of society, and to provide care and support to those that have special needs such as the disabled, women, children and youth. In addition this involves that government should cooperate with other stakeholders to address needs and problems experienced by communities more effectively [DSD, 2012:12].

Service integration would improve service to individuals, families, the community and organisations in the systems. It would allow service delivery to be based on outcomes for individuals, families, groups and the community needs, instead of organisational structures. Complex community problems could be addressed more effectively and holistically. Sharing of resources and the elimination of duplication pertaining to services would save costs [DSD, 2012].

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1.4. THE CLIENT, POPUP

POPUP is a People Upliftment Programme and non-profit organisation, situated in Pretoria, that serves the local under-privileged communities by means of restoration and skills development courses. POPUP was initiated by the *Doxa Deo* Church group and follows a holistic approach that addresses the mental, physical, emotional and spiritual needs of learners [POPUP, 2013].

Currently there are three training centres in Tshwane, i.e. in Salvokop, Shoshanguve and Ga-Rankuwa. The head offices in Salvokop are contemplating the possibility to expand and invest in a formal building that will provide for their needs more effectively [Wakelin, 2013]. Aside from the offices in the existing heritage building, the training facilities and day-care centre are functioning mainly from temporary structures such as containers, *Wendy houses* and marquee tents. The dissertation will prove that there is a need for architectural intervention to improve the existing functions and increase service delivery.

1.5. LOCALITY

Salvokop precinct is located on the southern edge of Pretoria's central business district (CBD). The railway on the north of the precinct isolates it from the rest of the city. The precinct is mainly a low-density residential neighbourhood with limited access into the precinct. Salvokop is the southern hill of the precinct and overlooks the whole of Pretoria. It forms a visual triangle with the Voortrekker Monument, Fort Schanskop and Fort Klapperkop. It is also home to the cultural heritage site, Freedom Park. *Freedom Park* is a memorial site that commemorates the struggle of those that sacrificed their lives for freedom [Gauteng Tourism Authority, 2013].

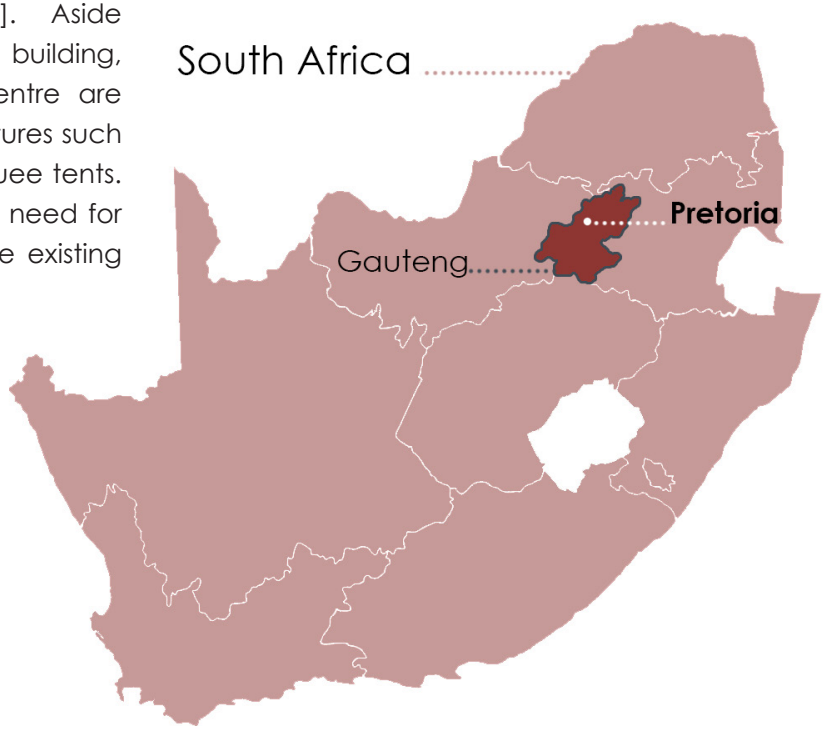

Fig. 1.3. Map of South Africa and Gauteng province [Author, 2013].

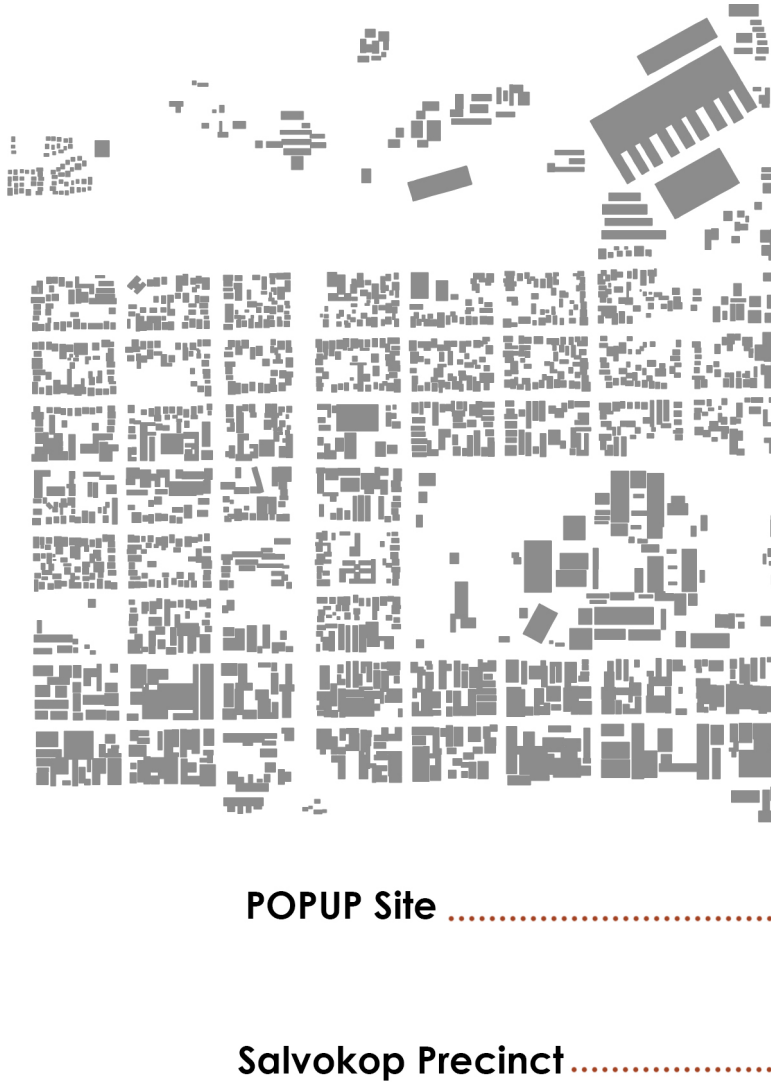

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Fig. 1.4. Nolli map of Pretoria showing the locality of Salvokop and the POPUP site [Author, 2013].

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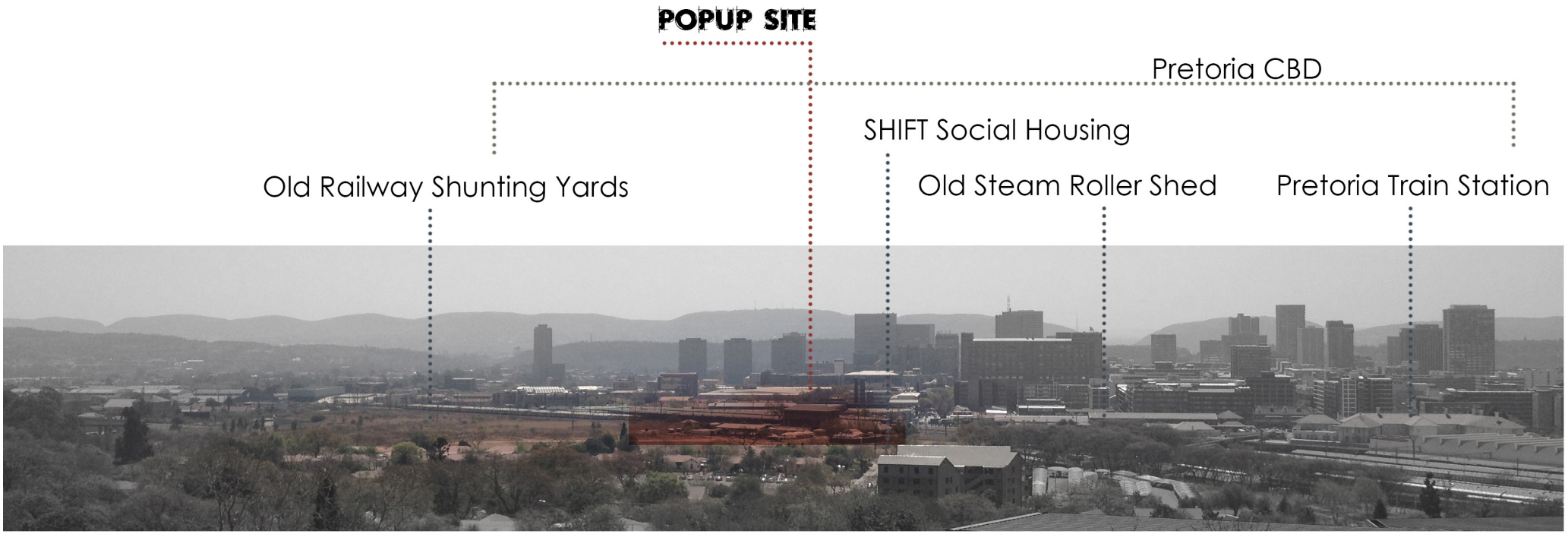

Fig. 1.5. View of the POPUP site from Freedom Park [Author, 2013].

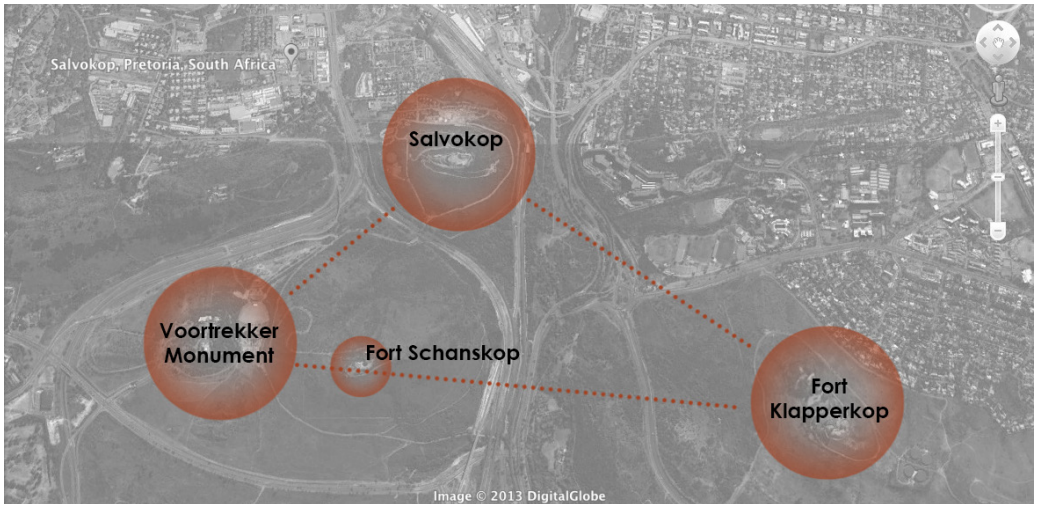

Fig. 1.6. Visual triangle link of Salvokop, Voortrekker Hill and Fort Klapperkop [Author, 2013].

Fig. 1.7. Visual axis from Freedom Park to Bosman Street [Author, 2013].

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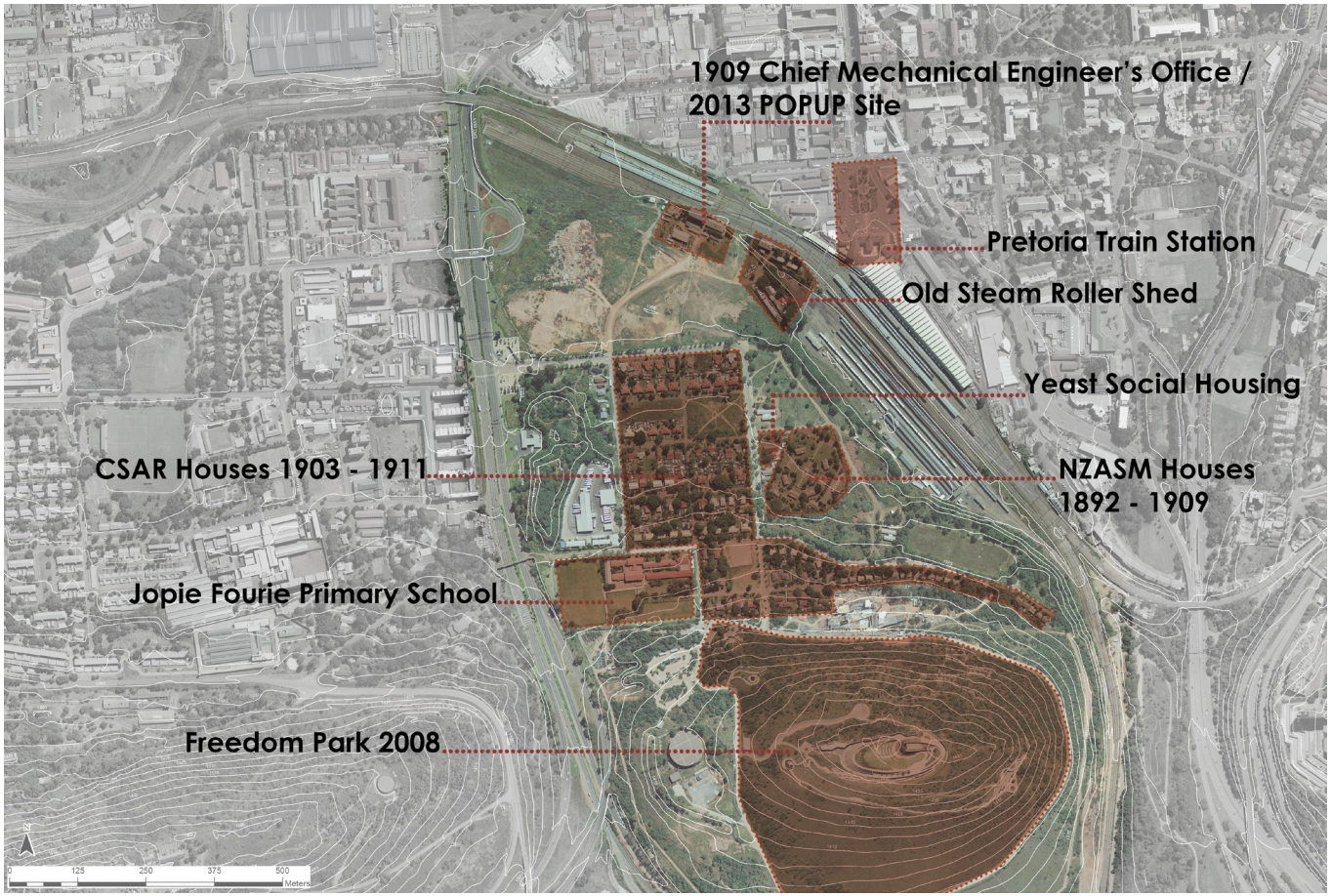

Fig. 1.8. Map of Salvokop precinct, illustrating important landmarks and places of historical significance [Author, 2013].

1.6. URBAN ISSUE

1.6.1. HERITAGE

POPUP's head offices are situated in Salvokop in the old *Chief Mechanical Engineer's Office* (CMEO) building that was erected by the *Central South African Railways* (CSAR) in 1909. After about six administration changes the building now belongs to Transnet and has been occupied by POPUP since 2000. The precinct of Salvokop has a rich history linked to the heritage of Tshwane. Salvokop was established in 1892 as a railway camp for employees of the *Dutch South African Railway Company* (NZASM), and is one of the best preserved railway suburbs in Pretoria [Jansen, 2011].

1.6.2. ISOLATION

Due to Salvokop's isolated location there was no pressure for urban development along with the Pretoria CBD. The lack of urban development is the main reason for the current lack of infrastructure. The precinct consists of many gravel roads, informal housing and unmaintained vegetation that are a safety hazard. Squatters have made themselves at home under trees and there is also no formal retail development [Van den Heever, 2006].

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1.7. ARCHITECTURAL ISSUE

1.7.1. HERITAGE

The 1909 *Chief Mechanical Engineer's Office* (CMEO) is one of very few buildings with railway heritage significance that still exists in Salvokop. In the late 1960's many buildings and workshops of the railway company were deconstructed and removed, and only a few remained. One of them was the CMEO building, which today is protected by heritage legislation as a building with historical significance older than 60 years.

1.7.2. ISOLATION

The existing POPUP site is located off Skietpoort Avenue in Salvokop. Currently the site is isolated within the precinct. On the northern edge is the railway that disconnects the whole precinct from the CBD. The southern edge consists of a gravel road that leads to the site, surrounded by undeveloped areas and untended vegetation.

The building used to be connected to the Bosman Station with a pedestrian bridge, but the bridge was later removed, increasing its isolated nature. Additionally, the existing building does not respond to the railway edge and the site fences itself in, instead of integrating with its historical connection to the railway line [Khan, 2011].

Furthermore, the building is isolated within its physical context. It is disconnected from the nearby and also dilapidated railway building on the eastern side. Neither does it affiliate with the distant buildings of the CBD to the north. It is moreover not integrated with the surrounding natural landscape that disconnects it from the buildings further to the south, and the natural vegetation has become a threat rather than an asset.

1.7.3. PROGRAMME AND LEGIBILITY

The existing heritage building was designed as offices for the railway administrations. Therefore the administrative section of the current occupant functions well within the building. However, the office building is not the ideal location for the training programmes it currently contains. Simultaneously, the clinic and day-care centre are situated in container structures that are also limiting their capacities to function optimally.

The above-mentioned and other programmes are scattered over the site. These programmes need to be contained in a formal building that will allow for increased functionality and physical expansion. Henceforth, this will allow for the opportunity to create effective learning and healing environments, which the site currently lacks.

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1.8. HYPOTHESIS

The dissertation serves to investigate how *non-profit organisations (NPOs) can function more effectively if resources and services are shared*. As identified by the Department of Social Development, there is a need for service integration in the social welfare realm [DSD, 2012]. The design project is driven by the investigation that, if NPOs share buildings, staff, intellectual resources and service delivery areas, the operational costs can be reduced and capital funding for service delivery can be effectively increased.

The design project investigates the transformation of a single non-profit organisation, POPUP, into a *Shared Services NPO-hub* where multiple NPOs can share physical amenities and intellectual resources to increase the effectiveness of service delivery. The current functions of the POPUP site would therefore be redesigned to be integrated with the requirements of additional non-profit organisations.

Fig. 1.9. Proposed master plan and site in Salvokop [Author, 2013].

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1.9. SUB-QUESTIONS

In addition to the evaluation and transformation of the programme, the investigation of the following aspects are inherent to the design dissertation:

1.9.1. HERITAGE

The railway heritage of the site and Salvokop as a precinct plays an important role in the history and development of Pretoria and the greater Tshwane region. It is therefore important to assess the heritage significance of the building and evaluate its importance for future generations of Salvokop. Furthermore, the extent of a railway language in the design will be explored.

1.9.2. NATURAL LANDSCAPE

The natural landscape surrounding the site, was once filled with railway lines and workshops. After these structures were removed in the late 1960's, the landscape has begun to naturally restore itself. The regeneration of the natural landscape will be evaluated and explored as a method of integration with the context.

1.9.3. RESTORATIVE ENVIRONMENTS

The aim of the client, to holistically restore under-privileged people, suggests an approach to design that enables the creation of environments that are restorative and catalyses the aim of POPUP. The dissertation will investigate the theories of *regenerative design, biophilic design and restorative environmental design* as an approach to design in order to create healing environments.

1.10. METHODOLOGY

The methodologies that will be utilised with regard to the design dissertation, are a combination of literature reviews, legislation and precedent studies.

1.10.1. LITERATURE REVIEW

Firstly, the supporting literature consists of research provided by the Department of Social Development that highlights the current demand for service integration within the social welfare sector. Several conventions and publications have been made by the Department of Social Development to cast light on the matter.

Secondly, the literature consists of a theoretical investigation of *regenerative design, biophilic design and restorative environmental design*, with the aim to form a theoretical design approach that enables the restoration and holistic healing of people. The research will theoretically support the main design informants; *the regeneration of heritage, of natural landscape and of programme*. Chapter 2 discusses the theoretical approach in detail.

1.10.2. HERITAGE LEGISLATION

In the early 2000's, a *Heritage Impact Assessment* (HIA) was done by the University of Pretoria under the guidance of professor Karel Bakker. The report and proposal deriving from the assessment are an important design guideline to the dissertation. It also elaborates on the heritage legislation applicable to the precinct of Salvokop and the specific site. Chapter 3 discusses the outcome of the HIA more thoroughly.

1.10.3. PRECEDENT STUDIES

The precedent studies can be divided into four categories. These are: the regeneration of railway heritage in an urban environment; *buildings that become landscape; buildings of a shared nature, and technical precedents*. These categories derived from the design concept and the main design informants that will be further elaborated in Chapter 5.

The precedent studies to be evaluated (in Chapter 6) are: *Schöneberger Südgelände Park* by Odious; *New York High Line* by James Corner Field Operations and Diller Scofidio & Renfro Architects; *Landesgartenschau* by Zaha Hadid Architects; *IBN Institute for Forestry and Nature Research* by Behnisch Architekten; *The Convent of La Tourette* by Le Corbusier, and *To Spin a Yard* by Atelier Altern.

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1.11. METHODS

Different methods of site analysis and data collection were used. They are briefly discussed below.

1.11.1. FLÂNEUR

The *Flâneur* method of investigation will be used to evaluate the initial impressions of the precinct and site. The term *Flâneur* derives from the French word that means to stroll. Hence, it is also known as the method of *walking the city* in order to experience it [Baudelaire, 1964]. The *Flâneur* method will inform the sub-conscious, emotional and intuitive responses to the site.

1.11.2. SYSTEMATIC OBSERVATION

The method of *Systematic Observation* [Spradley, 1980] will be used for documentation of the site and the precinct. Assisted by historical maps and existing aerial photography and plans, the visual documentation for the design dissertation will be compiled by this method.

1.11.3. PARTICIPANT OBSERVATION

Participant Observation refers to *observation carried out when the researcher is playing an established participant role in the scene studied* [Atkinson, 1998]. The method of *Participant Observation* will be used to observe and assess the needs of the users of the site. Spending time with the students and staff, and exposure to their daily routine will enable the research to clearly identify and evaluate their holistic needs on the site.

1.11.4. INTERVIEWS

Interviews with the POPUP staff will be conducted to inform the requirements for the design investigation. Informal interviews with students will be done to assess their needs and expectations pertaining to the design project. Furthermore, regarding the proposed programme, various professionals will be interviewed to assist with the respective functions, i.e. the medical clinic, day-care centre, and urban agriculture.

1.12. AIM OF THE STUDY

The aim of the study is to investigate whether non-profit organisations would function more efficiently if facilities, resources and service delivery areas are collaborated. The aim of the study is furthermore to create healthy, sustainable and appropriate learning environments that enhance the regeneration of landscape, heritage and programme.

1.13. DELIMITATIONS

The area of study for the design dissertation is limited to the POPUP site. However, the conceptual design of the master plan will include the immediate surrounding environment to enhance the design project.

1.14. ASSUMPTIONS

For the purpose of the design dissertation and the development thereof, the urban design frameworks of the University of Pretoria & GAPP 2003 and ARUP 2013 will be assumed as applicable to the design investigation. Where appropriate, amendments will be introduced to assist and enrich the design dissertation.

1.15. CONCLUSION

The chapter has served as an introduction to the dissertation, describing the background of the current social conditions and the reason for the study. The structure and relevant aspects of the social welfare system were explained, as well as the urban and architectural considerations. Furthermore, the chapter has elaborated on the hypothesis, sub-questions, methodology, methods, delimitations and assumptions.

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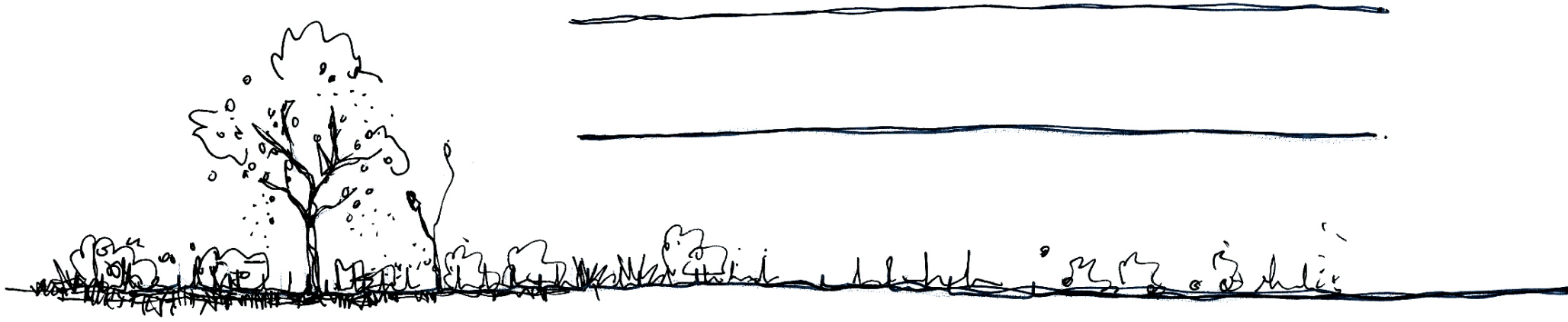

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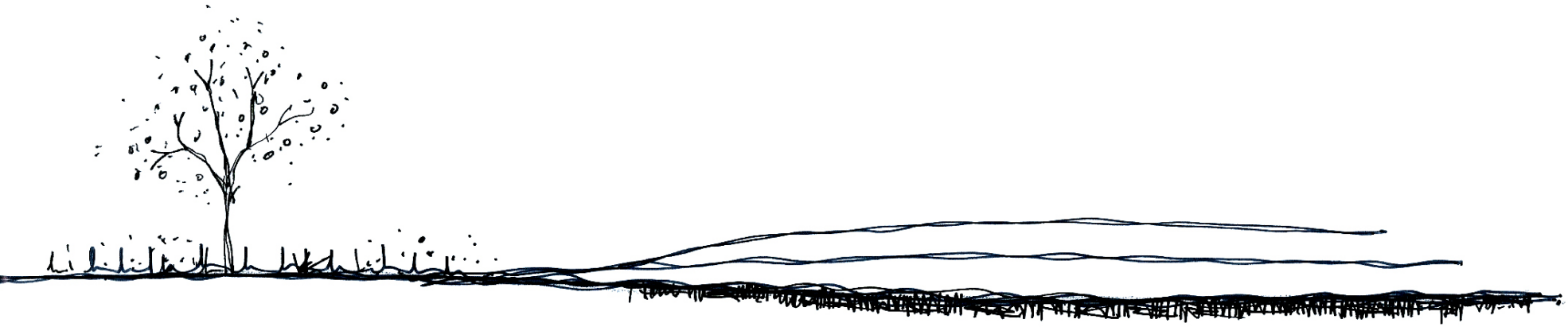
2. THEORETICAL APPROACH



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2.1. INTRODUCTION

The aim of the chapter is to create a theoretical platform for the design dissertation. Early in the analysis, the existing theme of regeneration emerged in the natural landscape, as it showed evidence of how nature has been restoring itself on site for the last 50 years. Furthermore, from the nature of the client, the general condition of the social welfare system and the identified urban and architectural issues, the conclusion can be drawn that a need for regeneration exists on various levels: social, historical, physical, and emotional.

The existing theme of *regeneration* will therefore be explored, evaluated and discussed to varying extents, in order to form the theoretical basis for the design dissertation. Firstly, the chapter discusses the need for *regeneration* with regard to *people, natural landscape, heritage and programme*. In turn, these will become the design informants for the dissertation.

Secondly, the chapter investigates the theories of *regenerative design, biophilic design and restorative environmental design*. The common areas of the theories are then combined to form the theoretical approach of the dissertation. The two main emphases of the theoretical approach are; the use of biophilic features and low-impact technologies to create restorative environments [Hartig, 2008], and the restorative qualities of a healthy human-nature connection [Bender, 2008]. Thirdly, the chapter discusses the *Dimension, Elements and Attributes of Biophilic Design* as proposed by Stephen R. Kellert [Kellert, 2008].

2.2. THE NEED FOR REGENERATION

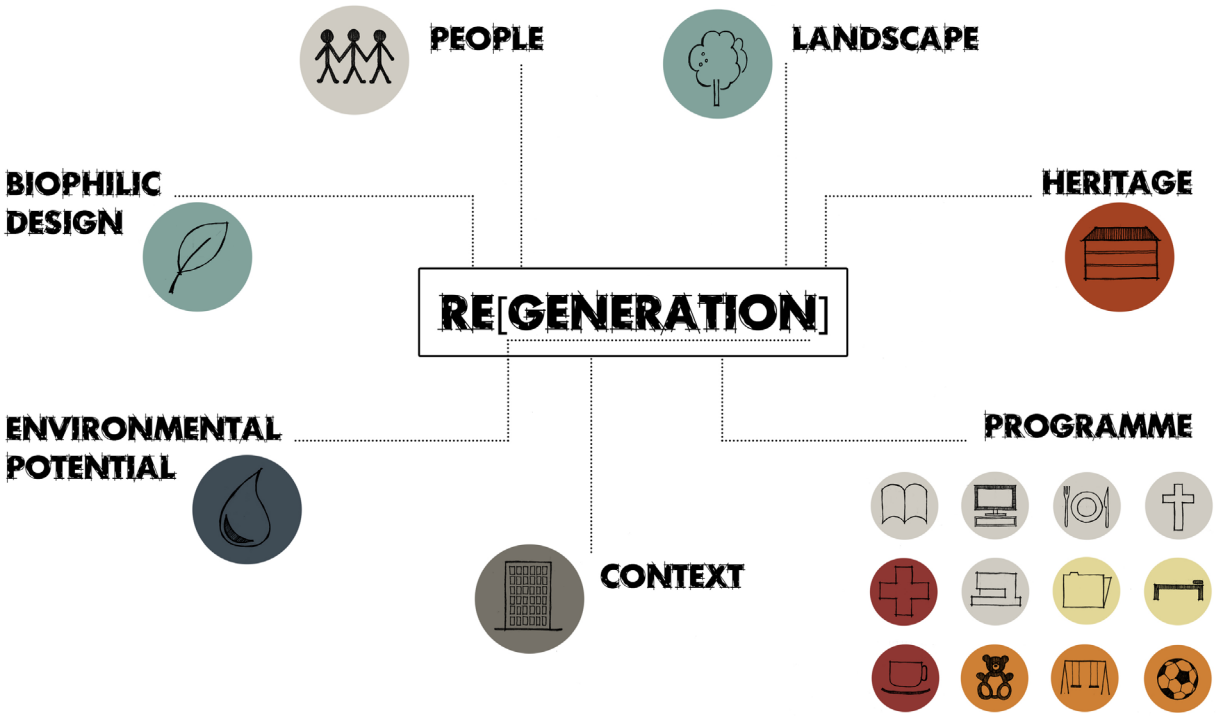

Fig. 2.1. The diagram illustrates the various areas in need of regeneration [Author, 2013].

2.2.1. THE CONCEPT OF REGENERATION

For the purpose of the dissertation, the term *regeneration* must be understood not only as synonymous to restoration, but as a step further. The aim of the design intervention is not only to restore the natural landscape, or the value of the heritage significance to what it was, but also to make it better and more profound than it used to be. In this sense regeneration means not only to restore, but to regenerate and add value to the environment.

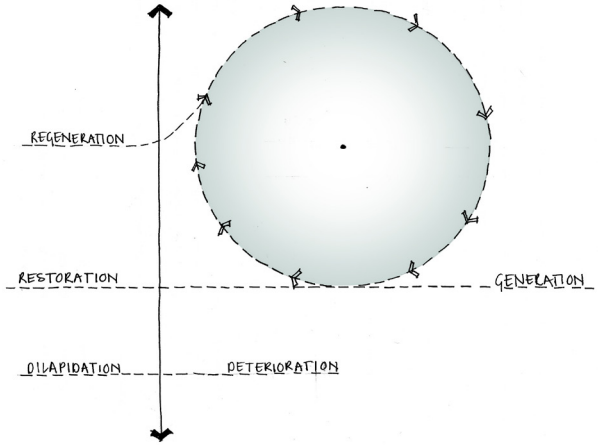

Fig. 2.2. The diagram illustrates the concept of regeneration [Author, 2013].

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2.2.3. REGENERATION OF PEOPLE

As discussed in the previous chapters, POPUP's aim in the community is the cultivation of a self-sustainable lifestyle by enabling learners to generate their own income. They work with under-privileged, under-educated people and help them to develop market-related skills and find employment. POPUP follows a holistic approach that addresses the mental, physical, emotional and spiritual needs of every individual, thereby regenerating human beings one by one [POPUP, 2013].

The staff of POPUP achieves to create a regenerative and restorative atmosphere on site. The presence of this regenerative atmosphere is evident on many different levels;
Beautiful gardens are well-maintained.
Vegetable tunnels were recently added to generate supplies for the food programme.
Existing containers were renovated and rearranged to be used as classrooms and storage areas.
The main building was restored in the early 2000's and has been well-maintained since.

Old pictures of the dilapidated building (see Chapter 4) and a series of Google Earth aerial images bear evidence of the progression and regeneration on site. Since POPUP started in the main building in 2000, they have made great effort to restore the main building and reuse the available on-site resources to accommodate their needs. This continuous flow of energy that drives the regeneration on site and in people, is a platform to be built on and used as an important design informant.

Fig. 2.3. Series of Google Earth aerial images that illustrate the progression and regeneration on site [Google Earth, 2013].

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2.2.4. REGENERATION OF NATURAL LANDSCAPE

The master plan area used to be a railway switchyard and workshop area. After the railway workshops were removed and moved to the Koedoespoort Station in the late 1960's, the area has become derelict and dilapidated. However, it was not long before nature intervened and slowly started to restore itself.

The natural restorative qualities of the surrounding environment present an opportunity for regeneration. By careful human intervention the natural landscape can be altered and manipulated not only to become fully restored, but also to *give back* to the environment. By purposefully altering it for the better of the landscape and using it to influence the design of the building it becomes an important design informant.

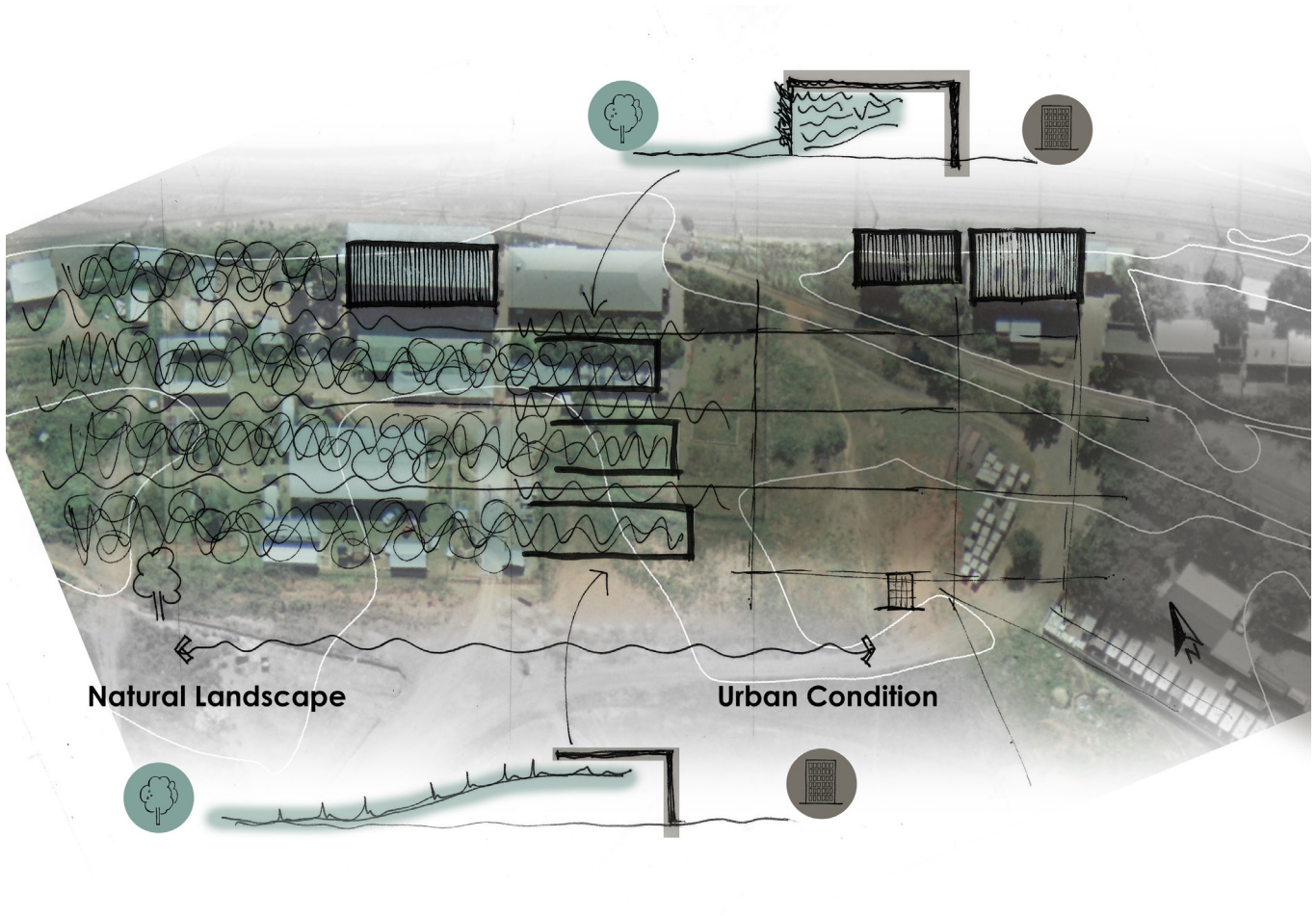

Fig. 2.4. Regeneration of landscape in relation to the urban condition [Author, 2013].

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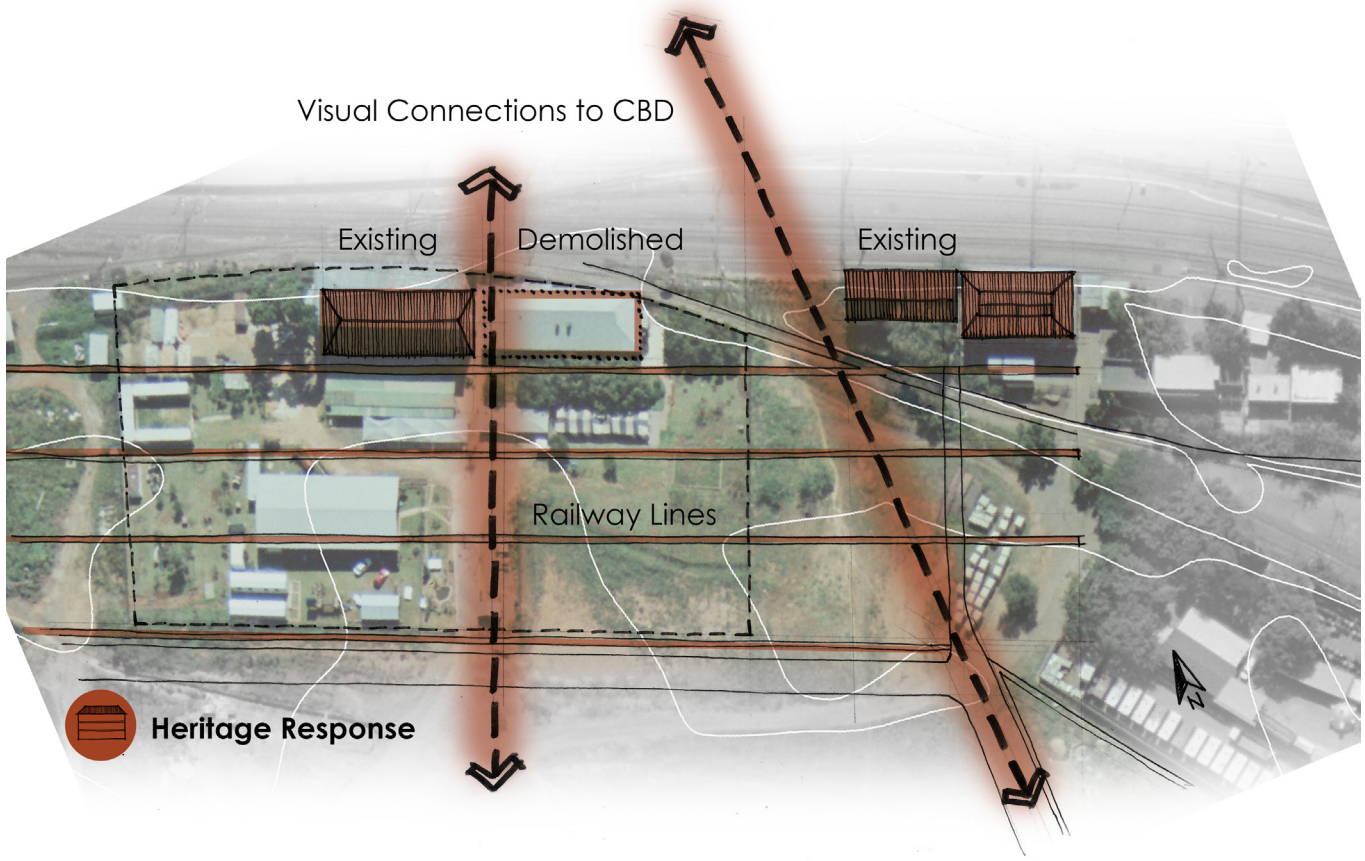

Fig. 2.5. Response to the regeneration of heritage [Author, 2013].

2.2.5. REGENERATION OF HERITAGE

As previously mentioned, Salvokop is one of only two remaining precincts in Pretoria with a significant railway heritage. In the late 1880's, members of the *Zuid-Afrikaansche Republiek* (ZAR), also known as the *Transvaal Republic*, collectively acted as the drivers of railway development in the area. Their aim was progression and advancement, since their mission was independence through acquiring an open *line to the sea*. POPUP has a similar vision of enabling their learners with independence. But apart from the importance of regenerating this intangible vision in the design intervention, it is also important to look at the tangible heritage of the precinct and the existing buildings.

In terms of the master plan, elements such as the old railway lines to the west, the *Old Steam Roller Shed* to the east and the main building, i.e. the *Chief Mechanical Engineer's Office*, are important aspects to be regenerated through the design intervention. These physical structures bear the heritage significance in the area. As they are currently separated from one another, their value as energy nodes in the precinct are suppressed. Regeneration of the old railway lines that originally connected them, will not only restore these structures, but transform them into activators of energy in the area.

The regeneration of heritage is an important design informant. Not only should the original value and significance be restored, but its regeneration is a design attribute that energizes its future significance.

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2.2.6. REGENERATION OF PROGRAMME

POPUP started in 2000 in the main building as a shelter for 150 homeless people. Since then their philosophy of restoration was evident in the three-month restoration programme that shelter residents had to participate in. After the personal restoration project, residents participated in two on-site projects; hydroponic vegetable cultivation tunnels and waste recycling. In 2001 new projects were added, such as the Arts & Culture and Sports project. Since then the variety of programmes has been changed and transformed.

Currently the main programmes on site are: the day-care centre, the medical clinic, the food and agriculture programme, the clothing store, the sewing factory, hospitality services, literacy and numeracy courses, and the personal restoration and life skills programme. The only remaining original programme is the restoration and life skills programme, the evidence of POPUP's philosophy of restoration.

In terms of the regeneration of programme in the design intervention, two main aspects should be considered: Firstly, there is room, and even a need, for transformation and change with regard to the programme, and this form of regeneration should be celebrated in the design. Secondly, the importance of personal restoration and the value that POPUP ascribes to it should be respected, reinterpreted and regenerated to enhance the value and character of the programme.

Furthermore, the design intervention explores the regeneration of programme on a social level, as it also responds to the need for *service*

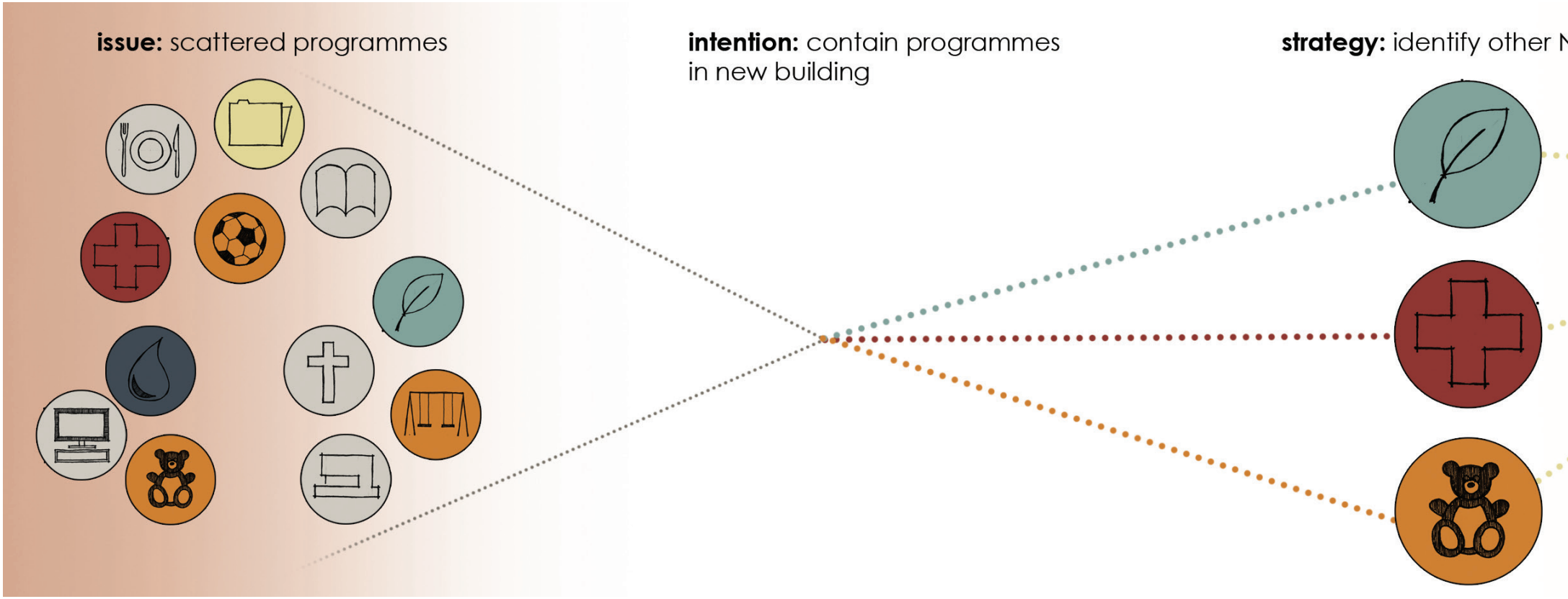

Fig. 2.6. The diagram illustrates the programmatic intention [Author, 2013].

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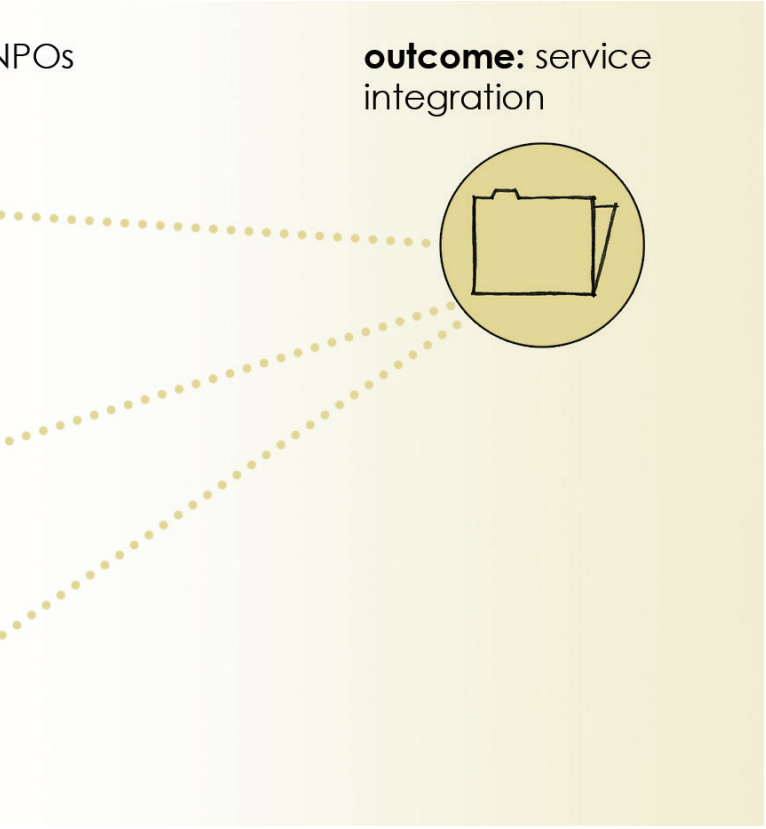
2.3. THEORETICAL INVESTIGATION

integration as identified by the Department of Social Development [DSD, 2012]. With regard to the hypothesis that non-profit organisations can function more efficiently when they share resources and service delivery areas, the dissertation identifies possible organisations to collaborate with the existing POPUP site. The additional organisations are identified to be incorporated into the proposed programme according to the needs of POPUP and will be further discussed in Chapter 4.



2.3.1. REGENERATIVE DESIGN

In 1987 the United Nations World Commission on Environment and Development (WCED) defined *sustainable development as development that meets the needs of the present without compromising the ability of the future to meet its own needs* [WCED,1987: 42]. In his book, *Regenerative Design for Sustainable Development*, John Lyle says that this publicly accepted measurement that aims to not damage the environment [Persinger, 2012], is no longer good enough; to sustain resources for future generations, it is necessary to further develop or generate them. True sustainability therefore implies that resources are self-renewing or regenerative [Lyle, 1994:3,10].

Bill Reed, a prominent figure in the field of Regenerative Design and Architecture, reinforces this argument. When asked about carbon neutral buildings, he says *if the ultimate goal is to replicate nature and to create systems for sheltering and feeding ourselves that are truly regenerative, it is important to recognize that sustainability is not the same as zero* [Connected by Nature, 2010].

The concept of regenerative design takes sustainable development to a new, enhanced level of design. Bill Reed defines regenerative design as: *a conservation, or high performance approach, focused on reducing our impact AND a living system understanding focused on learning how to engage nature as a co-equal partner* [Reed, 2007].

Jacob Littman clarifies this statement in his thesis, Regenerative Architecture: a Pathway beyond Sustainability. He says that: *Regenerative architecture is the practice of engaging the natural world as the medium for, and generator of the architecture. It responds to and utilizes the living and natural systems that exist on a site that become the building blocks of the architecture. Regenerative architecture has two focuses; it is an architecture that focuses on conservation and performance through a focused reduction on the environmental impacts of a building. It is embodied in the material selection, reduced energy consumption, and intelligent design. The second, more profound piece of regenerative architecture is the treatment of the environment as an equal shareholder in the architecture. It is a practice that employs a full and comprehensive understanding of natural and living systems in the design of a structure* [Littman, 2009].

The conclusion is that regenerative design is becoming the new norm, as it pushes the boundaries of sustainability.

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2.3.2. BIOPHILIA AS A MEANS OF REGENERATIVE DESIGN

Stephen R. Kellert defines biophilic design as: *the deliberate attempt to translate an understanding of the inherent human affinity to affiliate with natural systems and processes – known as biophilia – into the design of the built environment* [Kellert, 2008:3]. According to Kellert, physical, emotional and intellectual fitness has always depended on nature, and light, sounds, odour, wind, weather, water, vegetation, animals and landscapes have created positive environments for human development [Kellert, 2008].

In Kellert's article, *Building for Life: Designing and Understanding the Human-Nature Connection, he makes the statement that that low-impact or green buildings will not suffice if their users do not enjoy them, see fit to maintain them, and so keep them in use over the long run* [Hartig et al, 2008]. In order to overcome this obstacle, he suggests that the built environment should call on humanity's innate affinity for nature – or *biophilia* – for inspiration to enhance and make the built environment more delightful. Nature, views to nature and representations of nature, brings to mind positive experiences in the users of buildings [Hartig et al, 2008].

2.3.3. RESTORATIVE ENVIRONMENTAL DESIGN

Restorative environmental design is an approach to building, by Kellert, that combines low-impact technologies and biophilic features [Hartig et al, 2008]. The aim of *restorative environmental design* is to restore the relationship between nature and humanity in the built environment [Kellert, 2005]. And Tom Bender says: *We, and our architecture, are already part of nature. That is the first and most important thing to shift in our viewpoint* [Bender, 2008].

In the article, *Restorative Environmental Design: What, When, Where, and for Whom?* the writer says that: *the design (Kellert's) approach aims not only to reduce the harm that stems from the built environment, but also to make the built environment more pleasing and enjoyable. It seeks both to avoid and minimize harmful impacts on the natural environment, as well as to provide and restore beneficial contacts between people and nature in the built environment* [Hartig et al, 2008].

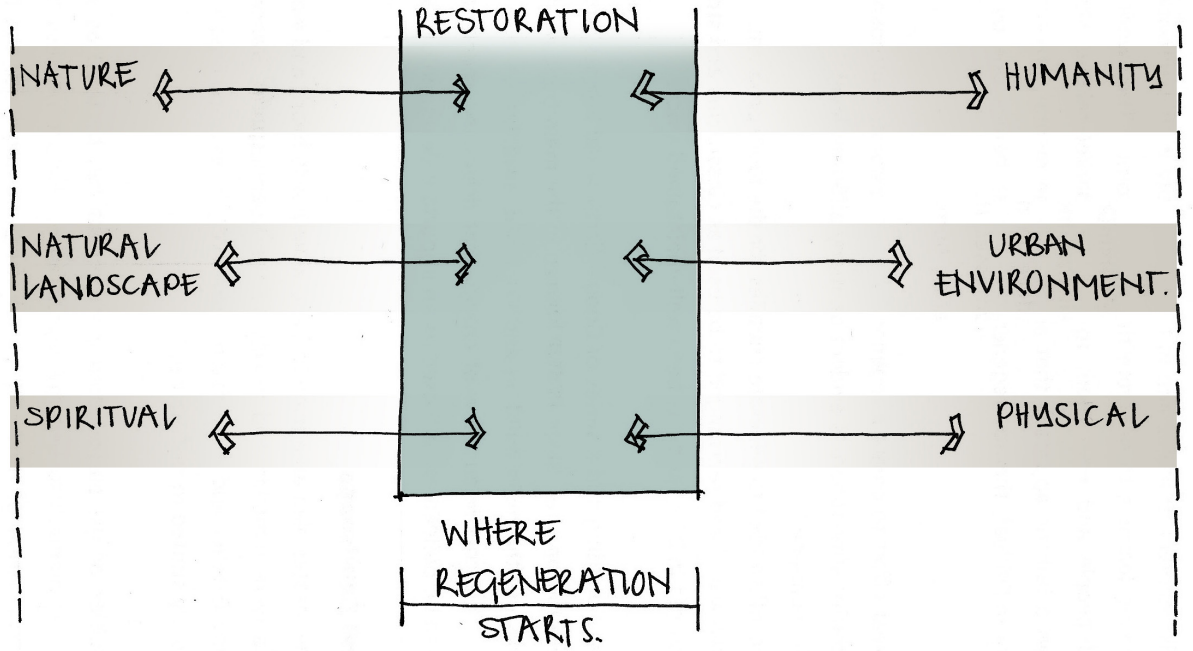

Fig. 2.7. The diagram illustrates the human-nature connection with regard to restorative environments [Author, 2013].

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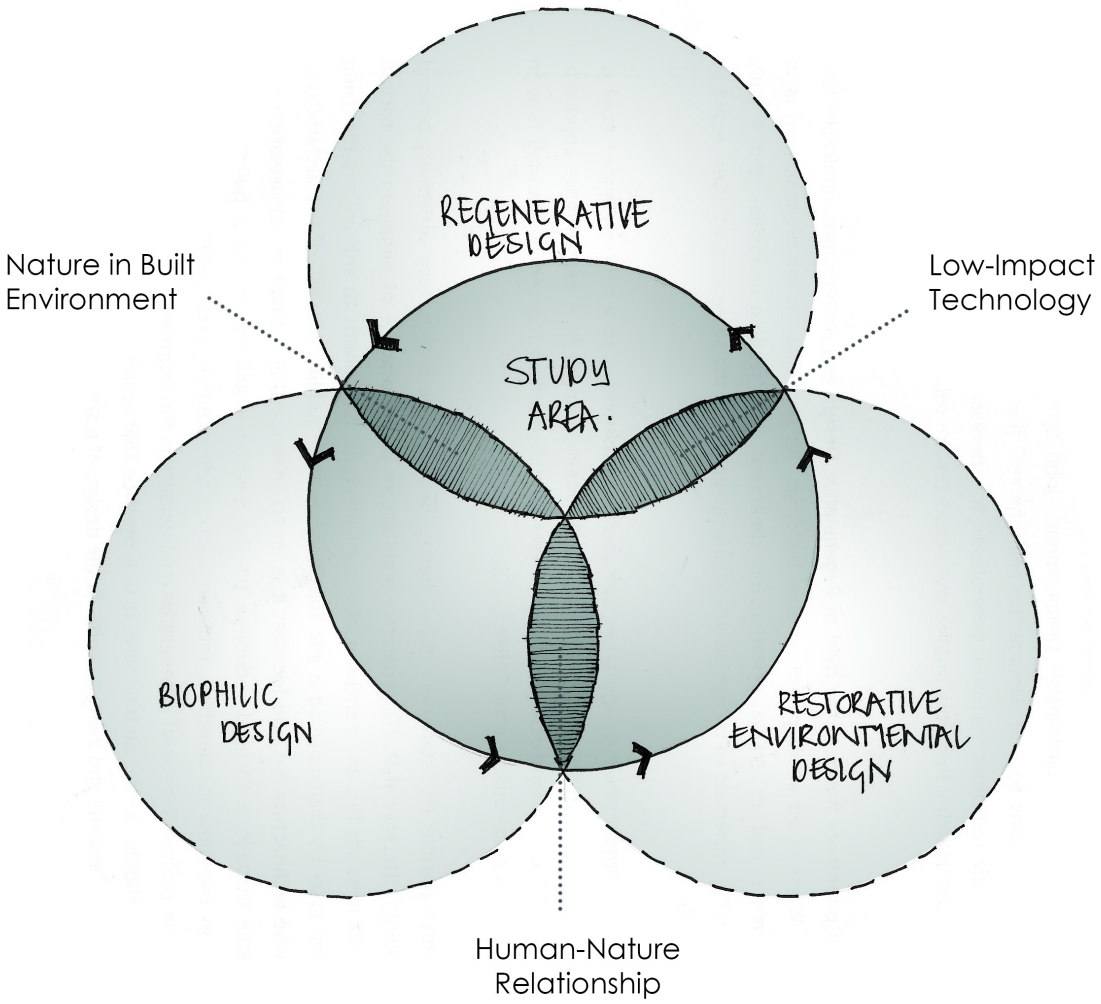

Fig. 2.8. The diagram illustrates the different theories, their relation to one another and the area of investigation [Author, 2013].

2.3.4. THEORETICAL APPROACH

The theoretical platform for the dissertation consists of three theories; *regenerative design, biophilic design and restorative environmental design.* Although the theories can be seen as separate approaches to architecture, for the purpose of the dissertation a combination of the approaches is proposed.

According to Littman, regenerative design consists of two parts; low-impact technologies and nature as an equal shareholder or building block of architecture [Littman, 2009]. According to Kellert, biophilic design is the representation of the relationship between nature and humanity [Kellert, 2008]. In turn, he argues that restorative environmental design combines biophilic features with low-impact technologies [Kellert, 2005].

According to the above-mentioned exploration, the conclusion can be drawn that *regenerative design, biophilic design and restorative environmental design* have closely related ties and spring from one another to a certain degree. The common and overlapping parts of the theories will serve as the area of investigation. Furthermore, the need for *regeneration of the heritage, natural landscape, programme and people*, will serve as design informants to the dissertation.

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2.4. DIMENSIONS, ELEMENTS AND ATTRIBUTES OF BIOPHILIC DESIGN

According to Stephen R. Kellert, the theory of biophilic design can be divided into two basic dimensions of biophilic design, which in turn can be related to six biophilic design elements as revealed in over 70 design attributes to be discussed below.

2.4.1. DIMENSIONS OF BIOPHILIC DESIGN

The first dimension of biophilic design is the *organic or naturalistic* dimension. In this dimension the built environment reflects the human inclination towards nature on a direct, indirect or symbolic level. The direct reflections of nature can be experienced through elements such as daylight, plants, animals, natural habitats, and ecosystems. The indirect reflections can be experienced in ongoing human input, such as potted plants or water features. The symbolic reflections can be experienced through the representation of nature through images, pictures or design metaphors, and so forth [Kellert, 2008].

The second dimension of biophilic design is the *place-based or vernacular* dimension. This dimension can be experienced in buildings and landscapes that have meaning to people and inherently become part of their identity, thus the spirit of place. Kellert says: People are rarely motivated to act as responsible stewards of the built environment unless they have strong attachment to the culture and ecology of place [Kellert, 2008:6].

2.4.2. ELEMENTS AND ATTRIBUTES OF BIOPHILIC DESIGN ACCORDING TO STEPHEN R. KELLERT

Environmental Features are the most obviously recognized characteristics of biophilic design. They are: colour, water, air, sunlight, plants, animals, natural materials, views and vistas, facade greening, geology, habitats and ecosystems, and fire.

Natural Shapes and Forms are representations and simulations of the natural world. These are seen in: botanical motifs, tree and columnar supports, animal motifs, shells and spirals. Also in egg, oval and tubular forms, arches, vaults and domes. Also true of shapes resisting straight lines and right angles, simulation of natural features, biomorphy, geomorpholgy and biomimicry.

Fig. 2.9. Fallingwater, by Frank Lloyd Wright, Fayette County, Pennsylvania [Long, 2012].

Natural Patterns and Processes incorporate properties found in nature into the built environment. These attributes are: sensory variability, information richness, age and change, growth and efflorescence, a central focal point, patterned wholes, bounded spaces, transitional spaces, linked series and chains, integration of parts to wholes, complementary contrasts, dynamic balance and tension, fractals, hierarchically organized ratios and scales.

Light and Space. Attributes that focus on qualities of light are: natural light, filtered and diffused, light and shadow, reflected light, light pools, warm light and light as shape and form. Attributes that focus on the quality of spatial relationships include spaciousness, spatial variability, space as shape and form, spatial harmony and inside-outside spaces.

Fig. 2.10. Thorncrown Chapel, by Fay Jones, Eureka Springs, Arkansas [Homesthetics, 2012].

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Place-based Relationships are the merging of culture and ecology in a geographical context. These attributes are: the geographic, historic, ecological and cultural connection to place, as well as indigenous materials, landscape orientation, landscape features and landscape ecology, furthermore including integration of culture and ecology, spirit of place and placelessness.

Evolved Human-Nature Relationships are the fundamental aspects of the inherent human relationship to nature. These attributes are: prospect and refuge, order and complexity, change and metamorphosis, security and protection, mastery and control, affection and attachment, attraction and beauty, exploration and discovery, information and cognition, fear and awe, reverence and spirituality.

Fig. 2.12. Parc Güell by Antoni Gaudi, Barcelona [Author, 2011].

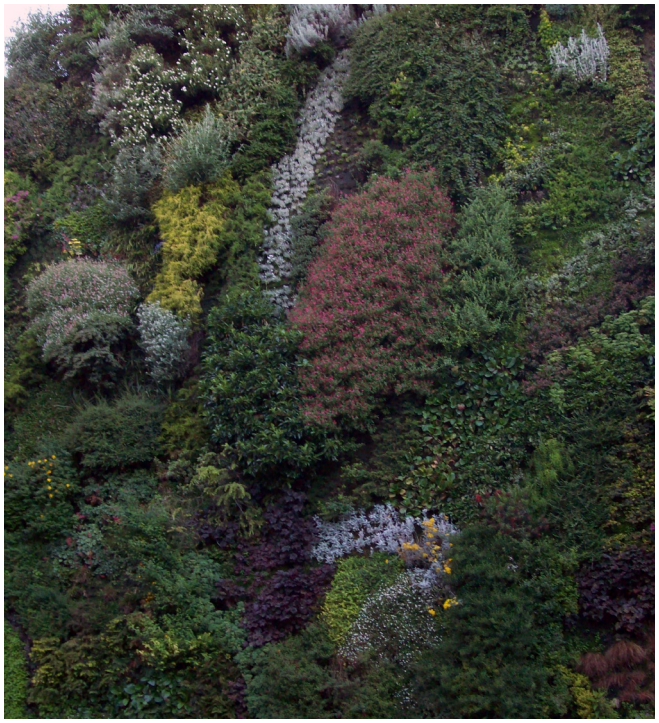

Fig. 2.14. Caixa Forum Museum, Madrid [Author, 2011].

Fig. 2.11. Untamed Exhibition by Daffonchio and Associates, Kirstenbosch National Botanical Gardens, Cape Town [Daffonchio, 2011].

Fig. 2.13. New York High Line [ArchDaily, 2009].

2.5. CONCLUSION

The chapter has served to create a theoretical platform for the design dissertation. The need for and concept of regeneration have been discussed with regard to the design informants: *regeneration of people, natural landscape, heritage and programme*. The theories of *regenerative design, biophilic design and restorative environmental design* have been discussed and combined to serve as a theoretical approach to the dissertation. Furthermore, the *dimensions, elements and attributes of biophilic design* according to Stephen R. Kellert have been discussed.

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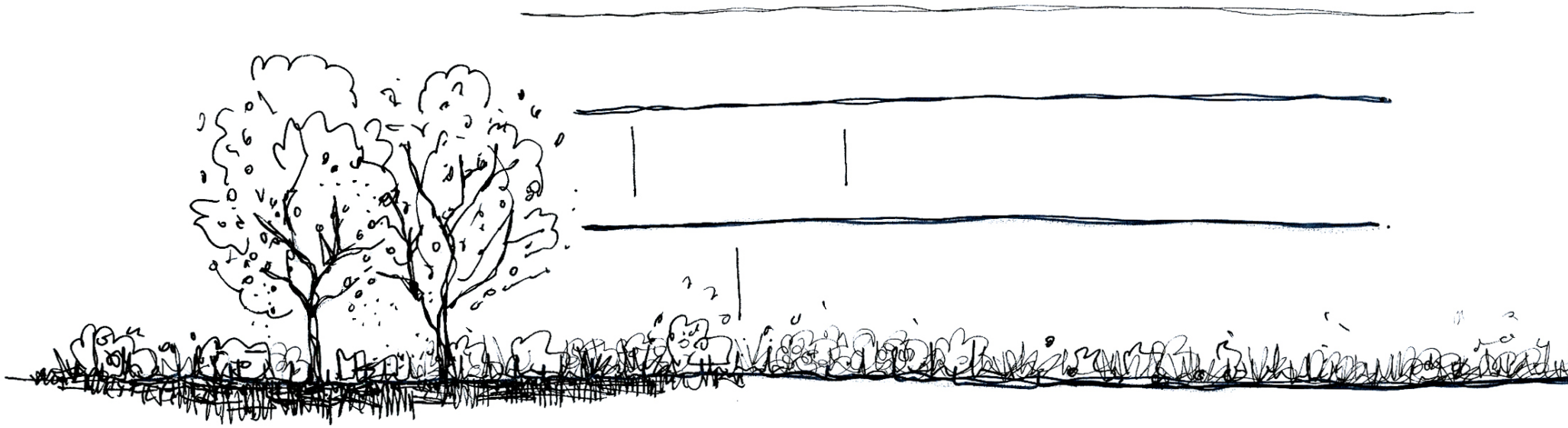

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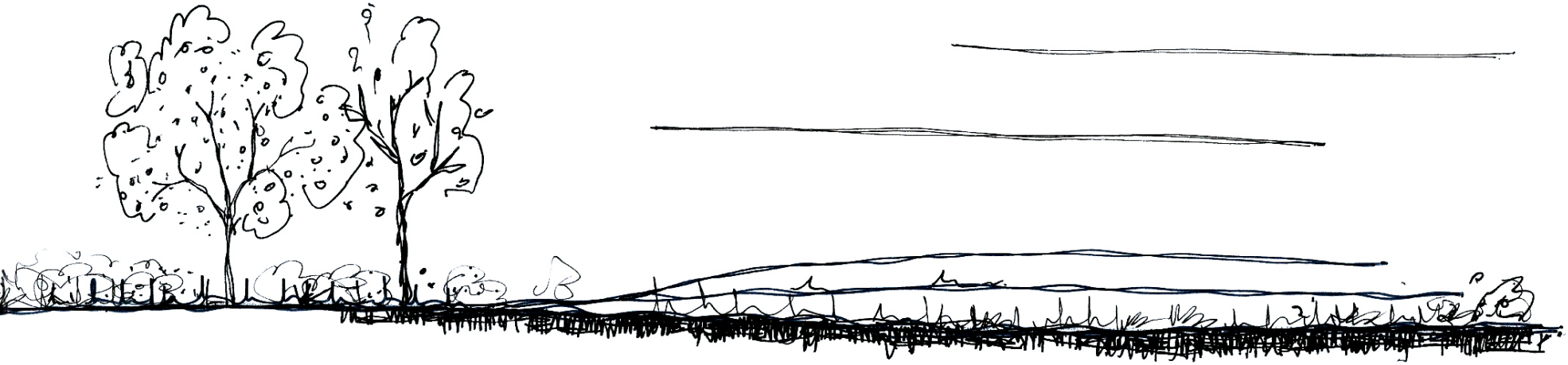
3. CONTEXT



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3.1. INTRODUCTION

The chapter serves to explain the contextual influences regarding the chosen site. Firstly, a thorough urban analysis and urban vision will be elaborated on. The historical, cultural and physical influences on the Salvokop precinct will be discussed and an appropriate urban design framework introduced.

Secondly, a comprehensive site analysis will be done, mainly explaining the historical significance and physical qualities of the POPUP site. The chapter will be concluded with appropriate site design possibilities.

Fig. 3.1. Pretoria – Surveyor General 1932 update of 1911 survey [Bakker, 2002].

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3.2. URBAN ANALYSIS

3.2.1. HISTORY OF SALVOKOP AND POLITICAL INFLUENCE

Salvokop is located in line with Church Square, an extension of Paul Kruger Street. According to the oldest maps of Pretoria it was previously known as *Time Ball Hill*. At the highest point of the hill was a gallows where objects with different shapes could be hoisted. One or a combination of the different shapes was used to announce the arrival of specific postal carriages on Church Square [Jansen, 2011].

In time the gallows was replaced with a single mast to which a black round disc was hoisted and dropped at a certain time of day. According to this the inhabitants of Pretoria could set their watches. The name *Time Ball* has nothing to do with the round disc, but is a navy term of the British Fleet that used to drop a ball from a mast at 12 o'clock. In the early 1880's the British fired canon shots from the hill to announce the arrival of a high officer in Pretoria, hence the name *Salvokop* [Jansen, 2011].

Development of the precinct began in the early 1890's, when it came into being as a railway camp for the employees of the *Nederlandsche Zuid-Afrikaansche Spoorweg Maatschappije* (NZASM) that was established in 1887. The precinct served as a residential neighbourhood for employees of the railway company and was developed to service the railway line.

After the Second Anglo Boer War, in 1902, NZASM, the *Free State Railway* and the *Pietersburg Spoorweg Maatschappije* (PPSM) combined to form the Central South African Railway Company (CSAR). The CSAR was responsible for the addition of more houses and the Jopie Fourie Primary School, in order to continue development of the area [Bakker, 2002].

In 1910, the CSAR merged with the Cape and Natal railway administrations to form the South African Railways and Harbours (SAR&H). The period from 1912 up to the 1950's was the busiest time of the SAR&H administration, when they erected numerous buildings including new staff houses and railway workshops. They were also responsible for the new Pretoria station building designed by Sir Herbert Baker and inaugurated in 1912 [Bakker, 2002].

The shunting yard and railway maintenance facilities were moved to the Koedoespoort station and the workshop structures removed in the late 1950's. With the advent of apartheid, the compound for black employees was closed and resettled in Mamelodi between 1948 and 1955. In 1956 the SAR&H allowed white occupants to purchase company houses, and additional houses were built in the 1960's. The railway houses of Salvokop gradually deteriorated however, and in 1974 residents petitioned for better maintenance from the SAR&H [Bakker, 2002].

Administration of the railways were re-organised in 1981 when the *South African Transport Services* (SATS) were founded. In 1990 they became the public company, Transnet [Bakker, 2002]. Numerous houses were demolished in the 1980's and the deterioration of Salvokop became evident. The democratisation of South Africa in the early 1990's had the consequence of drastic changes in the demographics of the area. Dilapidated houses abandoned by white residents were occupied by black tenants in need of shelter in close proximity of the CBD [Setshedi, 2004].

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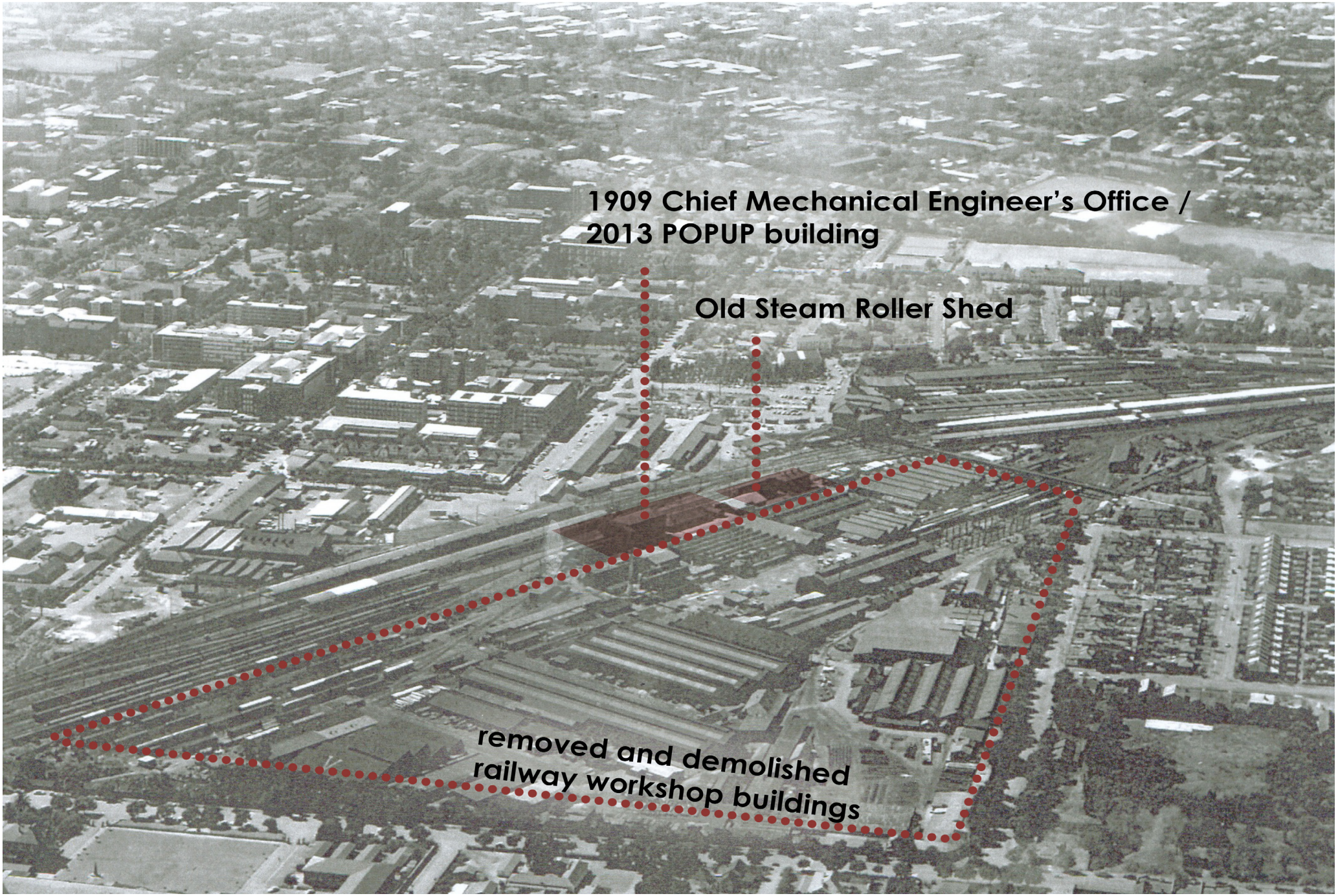

Fig. 3.2. Pretoria marshalling yards (circa 1962), in Pretoria Chamber of Commerce (sine anno, p.16) [Bakker, 2002].

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Fig. 3.3. Central Workshop, exterior [Bakker, 2002].

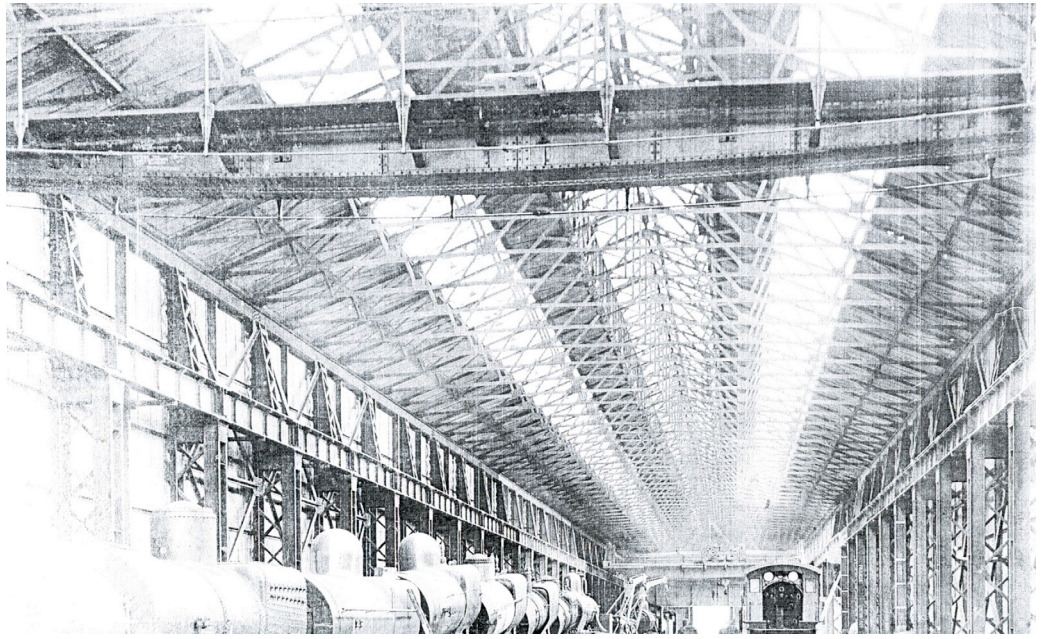

Fig. 3.4. Interior of a workshop building in 1909 (Transnet Heritage Foundation P1210) [Bakker, 2002].

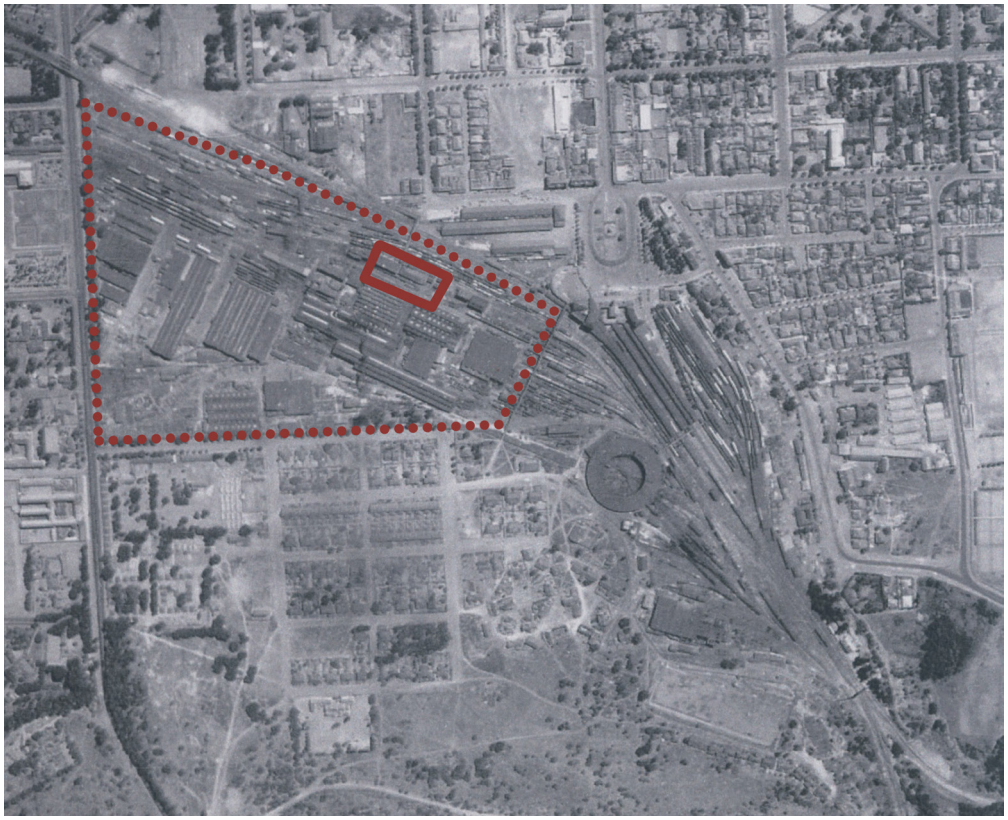

Fig. 3.5. Pretoria aerial photograph 1937 - Surveyor General aerial survey Job 125/37 strip 1 photo 22/484 [Bakker, 2002].

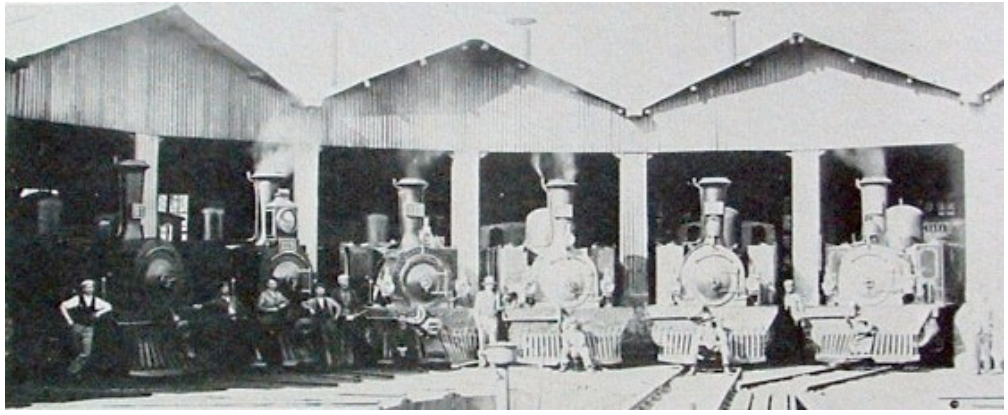

Fig. 3.6. Roundhouse (at Waterval-Onder) interior, circa 1895 [The Pretoria and W-O roundhouses were identical] (De Jong et al, 1988, p.120) [Bakker, 2002].

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3.2.2. ECONOMIC IMPACT

Salvokop and the numerous railway administrations played an integral role in the industrial growth of Pretoria, as it enabled logistic access to the northern regions of the country, especially during the Colonial era and the subsequent Union and Republic.

The railway administrations that helped shape the economic development of South Africa were:

- NZASM (1892 – 1900)
- Imperial Military Railways (1900 – 1902)
- CSAR (1902 – 1910)
- South African Railways (1910 – 1981)
- South African Transport Services (1981 – 1990)
- Transnet (1990 – present) [Bakker, 2002].

3.2.3. CULTURAL SIGNIFICANCE

Today, Salvokop is predominantly associated with the heritage destination and place of cultural significance, Freedom Park. The memorial site tells the story of South Africa's struggle against apartheid, her fight for democracy and strife for unity as a nation. *Freedom Park stands as a monument to democracy, which was founded on the values of human dignity, rights and freedom* [Freedom Park, 2013].

Salvokop was chosen as the location for the monument, because it is a place of historic significance and would allow the monument to penetrate the Pretoria skyline in juxtaposition to the Voortrekker Monument, emphasising the importance of all influences embedded in the history of South Africa [Jansen, 2011].

Freedom Park is a significant tourist attraction in the Pretoria area, but is currently not accomplishing contribution of its full potential to Salvokop. The precinct has the opportunity to build upon the tourist destination as a form of income and investment. Furthermore it has the prospective to be a landmark gateway into the CBD, but this opportunity is missed as well.

3.2.4. SOCIAL CONTEXT

The social demographics of Salvokop has transformed alongside the transformation of the South African government, which in turn influenced the many changes in administration of the railway companies. Currently, the precinct is a low-density, low income area consisting of large numbers of informal housing.

As previously mentioned, the railway houses were abandoned by the white residents and subsequently occupied by black tenants with the change of the government system in the early 1990's. Due to the increased need for residence near the CBD, the new tenants grabbed the opportunity to sublet parts of their property [Setshedi, 2004]. Consequently the existing urban fabric is a combination of masonry railway houses and informal corrugated iron structures.

After analysis and multiple site visits, the conclusion can be drawn that there is a demand for housing in the area, since several homeless people are currently seeking refuge on sidewalks and within the naturally vegetated areas. The need for shelter is becoming a safety risk in the area and motivates the need for housing development in Salvokop. Non-profit organisations like POPUP and Yeast City Housing are committed to uplifting the community of Salvokop.

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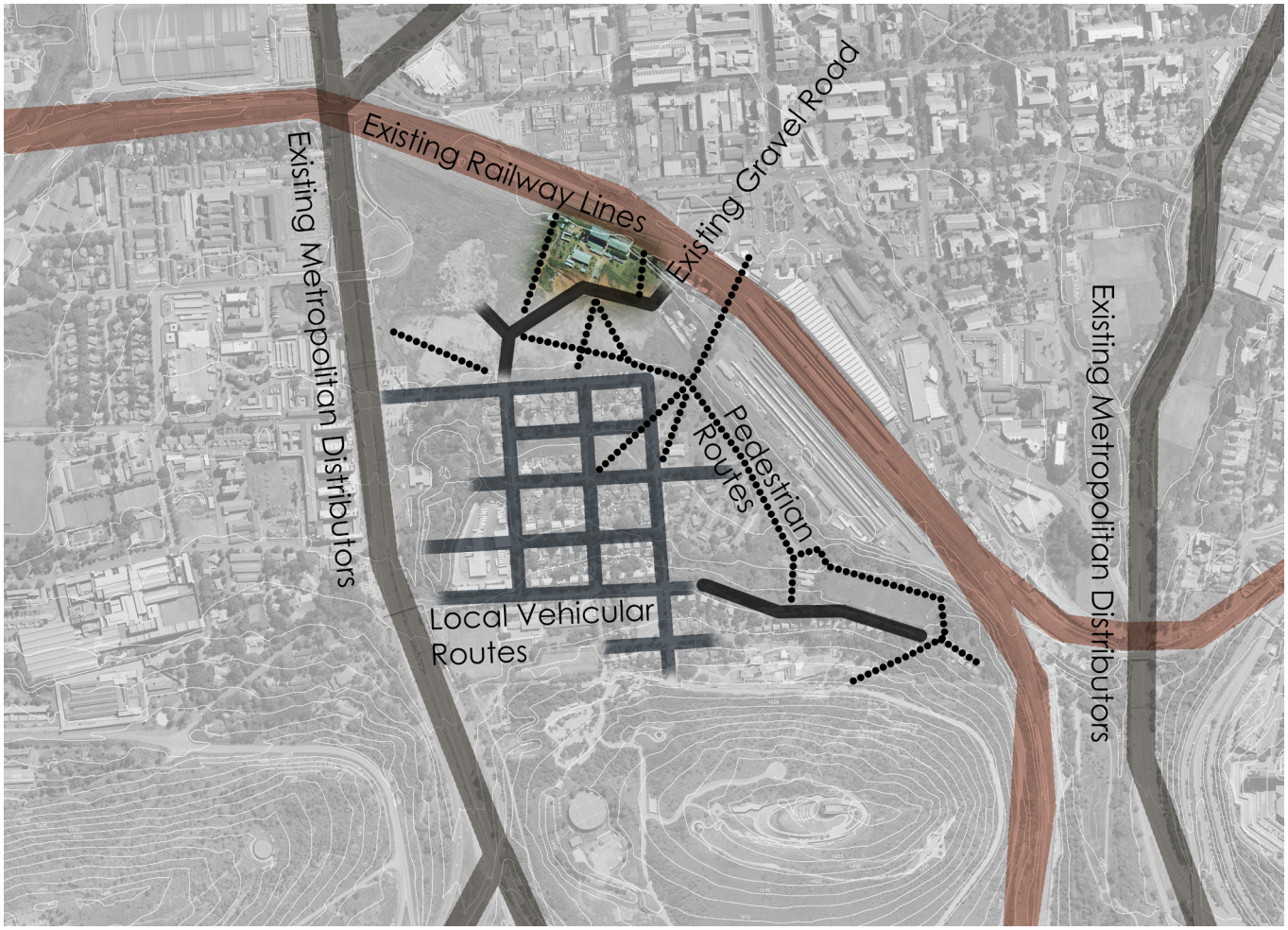

Fig. 3.7. The existing movement of the Salvokop precinct [Author, 2013].

3.2.5. PHYSICAL ANALYSIS

As previously mentioned, the limited access to Salvokop makes it a very isolated precinct. The physical barrier of the railway is the main reason for the lack of infrastructure, since the precinct did not feel under pressure to develop along with the city.

The only vehicular route to the neighbourhood is Skietpoort Avenue, originating in Potgieter Street on the West and terminating at Freedom Park. Pedestrians can access the precinct from the Pretoria Train Station by means of a pedestrian bridge. Consequently there is limited movement – mainly by residents – through the area. There is moreover no formal retail development in the precinct. Informal *spaza* shops sell only the basic fruits and vegetables while other groceries need to be acquired from elsewhere.

The CSAR houses have become dilapidated and a second layer of informal housing has risen between them, resulting in an aesthetic mixture of brick and zinc, emphasising the old and new essence of Salvokop. The sidewalks along Skietpoort Avenue and Kock Street have been upgraded as part of the Freedom Park project, but other streets lack sidewalks and maintenance.

The low-density residential scale does not integrate visually with the high-density commercial massing of the CBD. There is also a large amount of unmaintained vegetation and derelict buildings in the precinct, and these areas present a great safety hazard, through becoming the refuge of illegal occupants.

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Fig. 3.8. Old brick houses vs. new informal settlement layer [Author, 2013].

Fig. 3.10. Old railway houses – note lack of infrastructure [Author, 2013].

Fig. 3.11. Homeless people sleeping under the trees [Author, 2013].

Fig. 3.9. View of the POPUP site from Skietpoort Avenue [Author, 2013].

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Fig. 3.12. View of the existing railway lines from the POPUP site [Author, 2013].

Fig. 3.15. Old Steam Roller Shed next to the POPUP site [Author, 2013].

Fig. 3.13. View of the existing railway lines [Author, 2013].

Fig. 3.14. Gravel road leading up to the POPUP site [Author, 2013].

3.2.6. SUMMARY OF MAIN URBAN ISSUES

- **Heritage:** Salvokop has a very rich railway heritage that needs to be restored, preserved and celebrated.
- **Isolation:** There is a need for more access into the precinct to reconnect it with the rest of Pretoria.
- **Lack of Development:** Formal retail and investment will upgrade and uplift the precinct.
- **Natural Landscape:** The natural vegetation needs to be maintained to liberate it from its present hazardous state.

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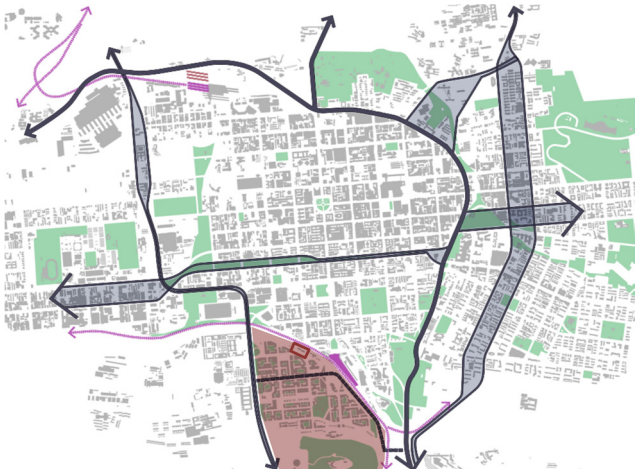
3.3. URBAN DESIGN FRAMEWORK

3.3.1. ARUP MOVEMENT FRAMEWORK

ARUP is a global firm of consulting engineers, designers, planners and project managers that was commissioned by the City of Tshwane government to propose an urban development framework for the city of Tshwane. The aim of the project was the regeneration of the inner city. The Salvokop precinct forms part of the development area [ARUP, 2013].

The ARUP movement framework proposes for Skietpoort Avenue, that runs from Potgieter Street on the west, to be extended and to reconnect with Nelson Mandela Avenue on the east. It also proposes a *Bus Rapid Transport* (BRT) route that will run through Salvokop and will increase human activity in the area.

The ARUP movement proposal will address the issues of isolation and lack of urban development. It will make access to and from the CBD easier for residents, and allow new visitors through the site. The new main route will establish investment opportunities for formal retail development, as well as high-density residential development close to the CBD.



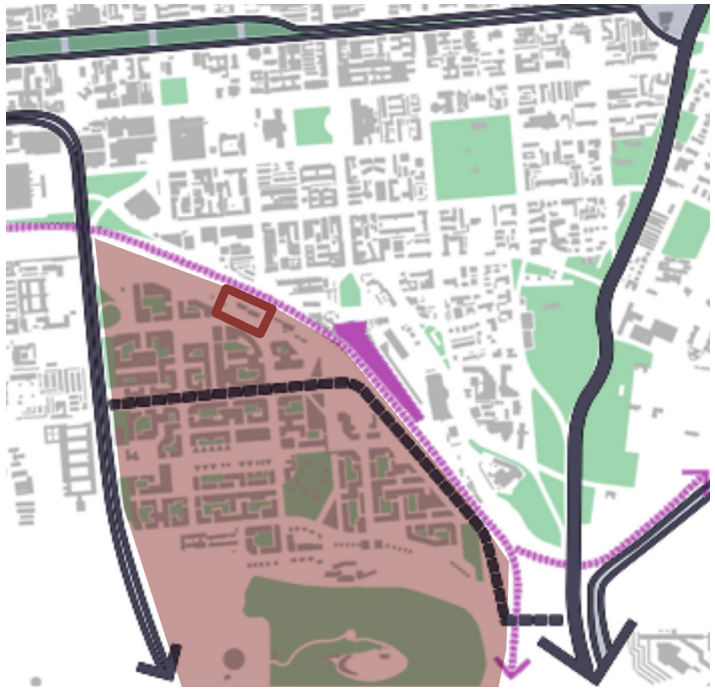


Fig. 3.16. Vehicular Movement [ARUP, 2013].

Fig. 3.17. BRT Routes [ARUP, 2013].

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Fig. 3.18. Up & GAPP Urban Design Framework [Bakker, 2003].

3.3.2. UP & GAPP FRAMEWORK

The University of Pretoria, along with GAPP proposed an urban design framework that was part of a *Heritage Impact Assessment* (HIA) in 2003. The framework inherently preserves the railway heritage of Salvokop and reconnects it physically, visually and culturally with the Pretoria CBD. The framework will be accepted for the design dissertation to address issues of heritage preservation within the urban analysis.

The UP & GAPP framework proposes a visual axis of places with cultural significance in Paul Kruger street. The axis starts with Freedom Park on the South. It then continues through the Pretoria Train Station, Church Square and then ends in the north at the Zoological Gardens. On this axis, next to the railway in Salvokop, it proposes a public interface that will attract and enable more pedestrians to visit the precinct, as well as allow for retail opportunities for residents on their way back from work [Bakker, 2003].

The framework proposes Salvokop as a high-density residential precinct. It allows for formal investment opportunities that will in turn upgrade the land value of the precinct. According to the Heritage Impact Assessment the framework proposes that the railway heritage be respected with regard to new developments. It suggests that new buildings be orientated according to the railway lines and that the historic, demolished buildings inform the footprints of new buildings [Bakker, 2003].

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3.3.3. PROPOSED FRAMEWORK

The UP & GAPP development framework addresses the need for the preservation and regeneration of the railway heritage significance of Salvokop. The framework identifies heritage links that reconnect the precinct to the CBD. These visual links address the issue of isolation, as well as enhance the regeneration of heritage.

Pertaining to the vehicular movement and public transport routes, the ARUP development framework is a more recent proposal and current project of the Tshwane city council. It also forms part of the BRT system and vision for the city. However, the ARUP development framework does not thoroughly propose further development zonings and visions for Salvokop and is not a comprehensive urban design framework for the purpose of the dissertation.

The strengths of UP & GAPP framework are the regeneration of heritage, the visual and physiological reconnection with the CBD, as well as the vision of Freedom Park as a gateway to the city. The strengths of the ARUP framework are the vehicular movement and public transport routes that address the physical isolation of the precinct. Therefore, the dissertation proposes a combination of the strengths of the UP & GAPP and ARUP frameworks. However, it does not yet address the issue of natural landscape regeneration.

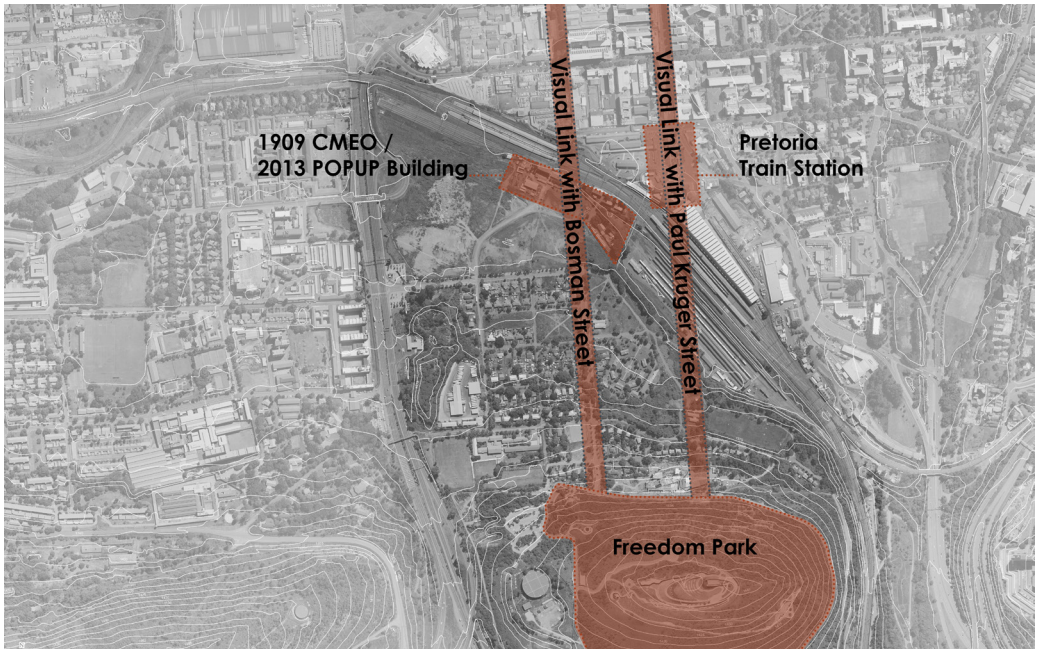

Fig. 3.19. Proposed visual heritage links [Author, 2013].

Fig. 3.20. Proposed movement [Author, 2013].

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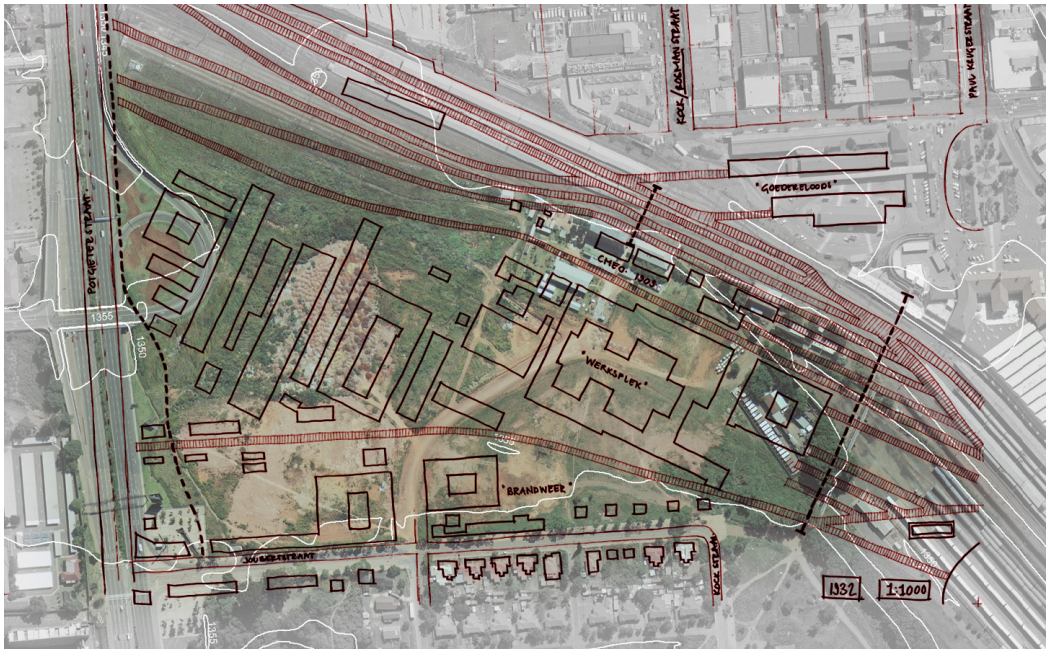

Fig. 3.21. Heritage analysis and demolished building footprints [Author, 2013].

Fig. 3.22. Site analysis of current conditions [Author, 2013].

Aside from the movement alterations, the modifications to the UP & GAPP framework will be proposed in the master plan. The most extensive alteration, is the proposal to formally regenerate the natural landscape. Assuming that the first formal development will occur around the main traffic routes and public nodes, the framework proposes that the natural landscape be preserved in the area least likely to be developed.

The framework suggests that the existing theme of natural regeneration be incorporated with the regeneration of the forgotten railway heritage to form a public green space for recreational purposes. In the larger context of Pretoria this will connect the master plan with Freedom Park, the Zoological Gardens and other public green spaces. In the immediate context it will re-establish an awareness of the railway significance of Salvokop, as well as the human need to be close to nature.

The master plan also proposes a public interface on the eastern side of the site, between the existing railway buildings and the new buildings. After analysis of the main pedestrian routes and with support of the UP & GAPP framework, the proposed public interface will attract new life and new investment to the POPUP site.

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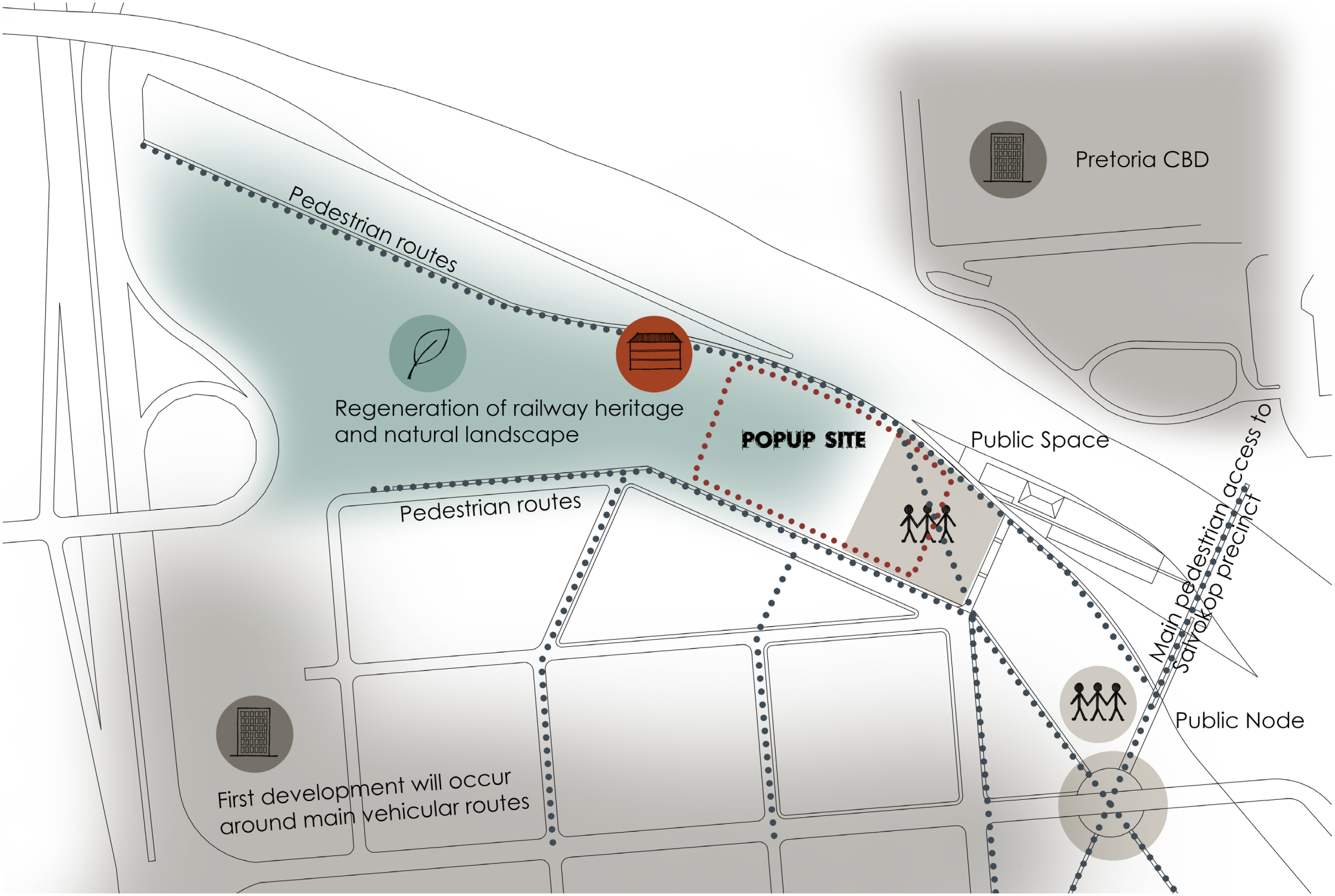

Fig. 3.23. Proposed master plan. [Author, 2013].

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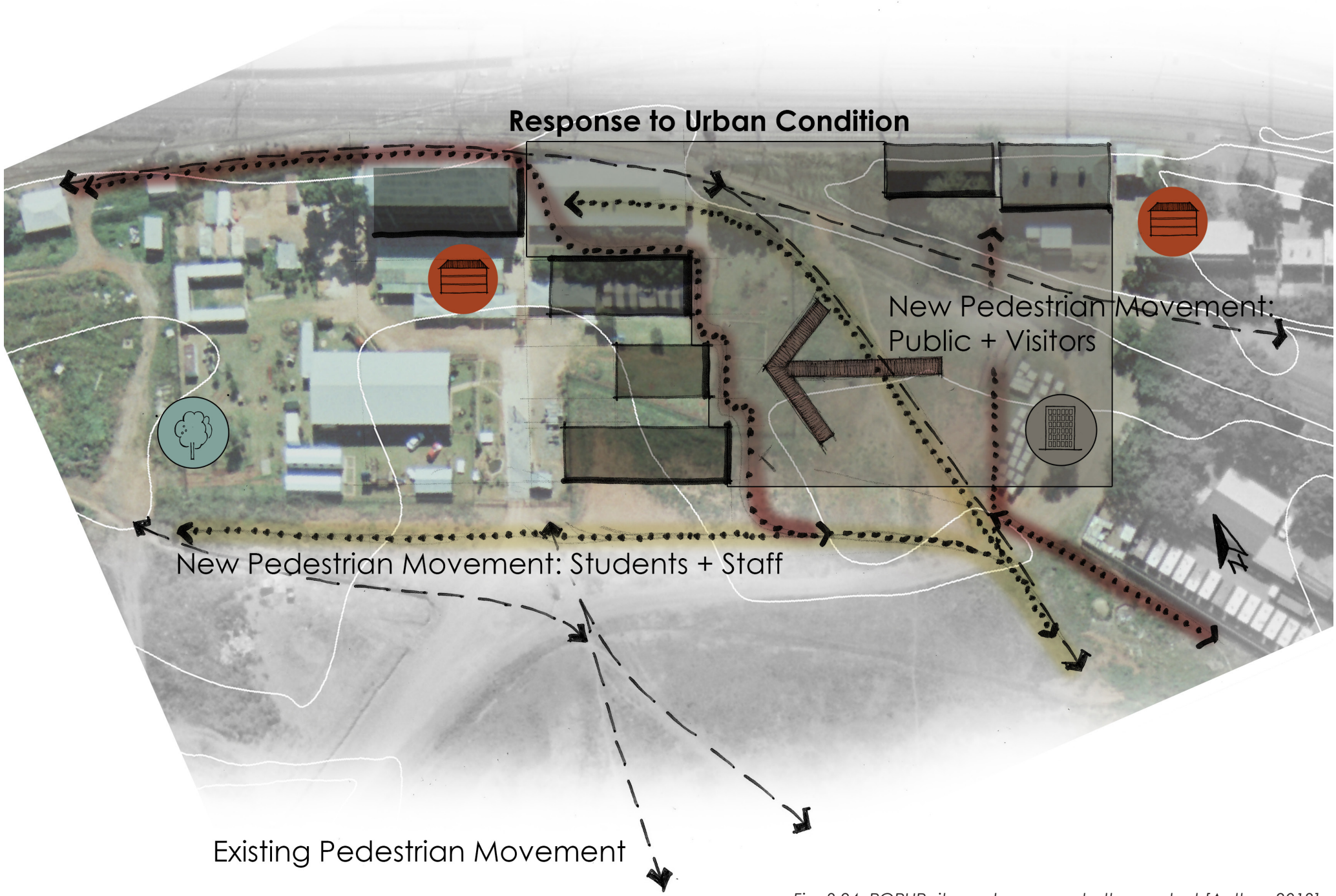

Fig. 3.24. POPUP site and response to the context [Author, 2013].

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3.4. POPUP SITE ANALYSIS

3.4.1. HERITAGE SIGNIFICANCE

The old *Chief Mechanical Engineer's Office* (CMEO) building was erected in 1909 by the *Central South African Railway Company* (CSAR). Its original purpose was to service the railway. It originally consisted of two 4m high storeys, but in the 1950's an additional 3m high second storey was added.

A pedestrian bridge linked the building directly to the Bosman station on the other side of the railway, but this was eventually removed and in time the building was left for abandonment [Van den Heever, 2006]. The CMEO building deteriorated along with the rest of the Salvokop neighbourhood, as administration of the railway company was changing along with the changes in the South Africa government.

POPUP was initiated by the *Doxa Deo* Church Group and registered as a non-governmental organisation in 2000. It started in the CMEO building as a shelter for the homeless. In 2002 a restoration project of the building was launched and the POPUP developed into a skills training facility. Great effort has been made by POPUP to restore and renovate the building, which is still owned by Transnet [POPUP, 2013].

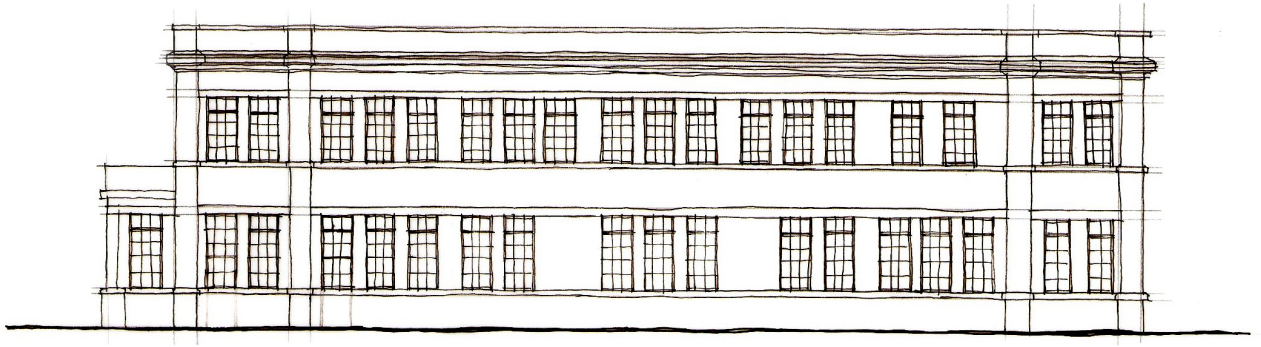

Fig. 3.25. South elevation of the original building [Author, 2013].

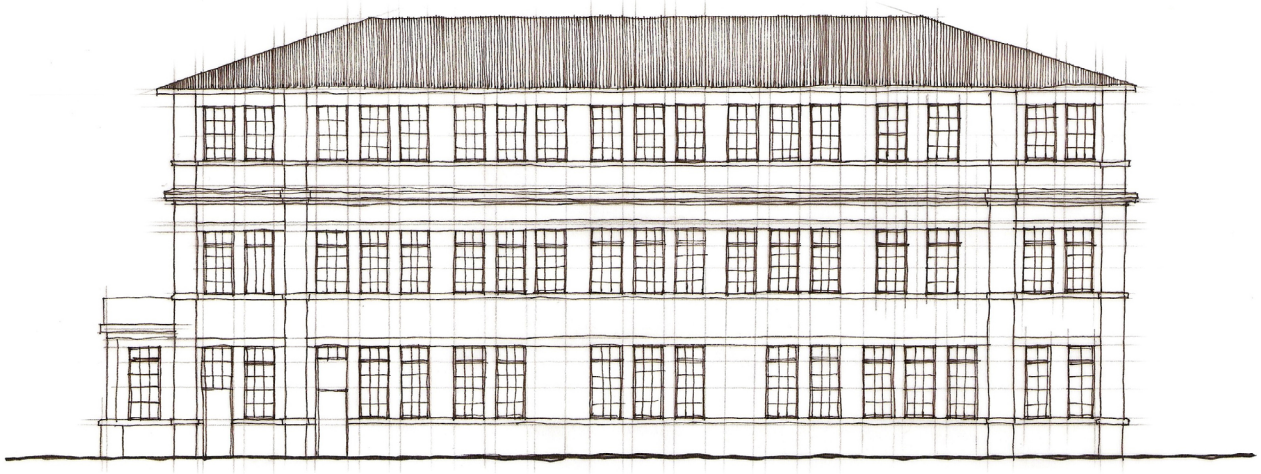

Fig. 3.26. South elevation of the existing building [Author, 2013].

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Fig. 3.27. East elevation of the original building [Author, 2013].

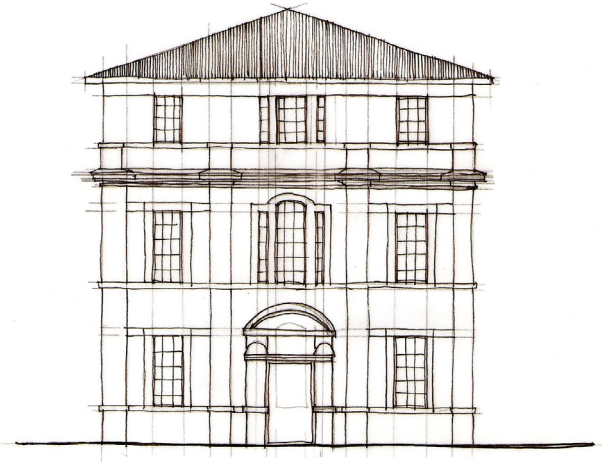

Fig. 3.28. East elevation of the original building [Author, 2013].

STATEMENT OF HERITAGE SIGNIFICANCE

The *Chief Mechanical Engineer's Office* (CMEO) building forms part of an entire railway precinct and its heritage significance lies within its relation to and the entirety of the other railway buildings. However, most of these have been removed and thus the CMEO building has become derelict, dilapidated and *insignificant* in the 1960's. Nevertheless, from 2000, its current use as a skills development centre has regenerated the significance and value of the building as a place of restoration, a beacon of hope and a symbol of regeneration, already evident in the physical restoration and development on the site.

Fig. 3.29. CSAR Chief Mechanical Engineers office, completed 1909, just west of Koch St alignment. Note pedestrian bridge which connected to staircase (Transnet Heritage Foundation) [Bakker, 2002].

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3.4.2. PHYSICAL ANALYSIS

The POPUP site is isolated from its surrounding context, and access to the site via a gravel road is difficult. There are few pavements and formal walkways, and although everybody seems to know where they are going, the site has a rural, undeveloped nature. There are also no thresholds between spaces.

However, the main issue on the site as a whole is that it is scattered with temporary structures containing different training programmes and functions. After 13 years of occupying the site, it is clear that POPUP is here to stay. The architectural intention is therefore to contain the programmes in a new, more appropriate building.

Temporary structures such as containers, Wendy houses and marquee tents are used to accommodate certain training programmes. The temporary structures, especially the containers, have been occupied and altered to become classrooms and clinic rooms since they were already on site, available and financial resources were limited. However, the container structures are limiting the further development of the programmes and do not ascribe to the current needs of the functions on the site according to the client [Wakelin, 2013].

Furthermore the container structures cannot be described as healthy, restorative environments; a premise that is so inherently part of POPUP's vision for the regeneration of their students and their vision for the site. Also according to Kellert's *restorative environmental design* theory that consists of low-impact design technologies and biophilic features, the container structures are not restorative environments [Hartig et al, 2008] on account of limited views, ventilation and connection to natural features.

In his supporting argument to Kellert's theory, Hartig refers to empirical research suggesting that the cumulative benefits of restorative environments are large over a long period of time. Therefore the research implies that restoration occurs more easily when people are exposed to restorative environments where they spend the larger portion of their day in the long run. Typically the residential context and workplace are environments with opportunities for restoration [Hartig et al, 2008]. Furthermore, Hartig refers to *Kaplan's workplace studies, which concluded that workers with window views onto natural features were more satisfied with their jobs* [Hartig et al, 2008:138]. It is therefore important that the POPUP programmes, where the staff and students spend their *working hours*, meet the requirements of restorative environments to enable opportunities for restoration.

The existing theme of natural restoration and regeneration on the site enhances and even becomes a starting point for the supporting theories of *biophilic and restorative environmental design*. Other contributive elements on the site include; the friendliness of the people on the site and the sense of security, the container language that integrates the site with the surrounding railway buildings, and the humane scale of the buildings and spaces.

Fig. 3.30. Existing medical clinic in container structures [Author, 2013].

Fig. 3.31. Existing day-care centre in container structures [Author, 2013].

Fig. 3.32. Marquee tent on site [Author, 2013].

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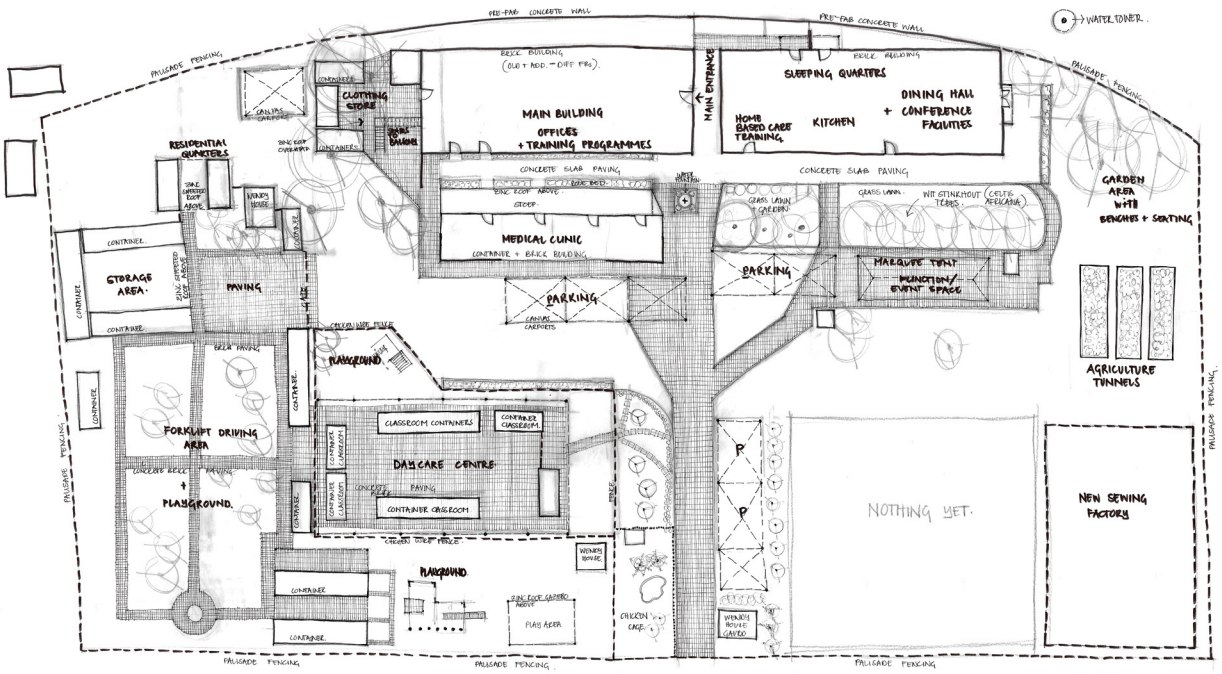

Fig. 3.33. Existing site plan [Author, 2013].

Fig. 3.35. Existing vegetable tunnels on site [Author, 2013].

Fig. 3.36. Existing walkway and annex building [Author, 2013].

Fig. 3.34. View of POPUP building and day-care centre from main entrance [Author, 2013].

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3.4.3. PEOPLE AND PROGRAMME

The POPUP building has become a beacon of hope to the community of Salvokop. Apart from the training programmes, the soup kitchen gives food to 600 people per week day [POPUP, 2013] and 41% of the community's children attend the day-care centre [UEC, 2011].

Since their occupation of the building in 2000, POPUP has enabled great changes to the site in order to restore and add value to the building and the community. This is a metaphoric view for the purpose of community upliftment, people empowerment and personal restoration that drives the organisation.

Regardless of restoration and good maintenance of the existing building, the legibility thereof is poor. This is due to the fact that the building was originally designed to be offices and was strongly associated with the railway. Today the building is poorly suited for a great variety of the training programmes and it has no psychological link to the railway heritage. Chapter 4 will discuss the programme in detail. Thus, the container structures are unsuited for the training programmes because it is not a restorative environment. However, the main issue with the existing heritage building is that it does not meet the specific needs of the training programmes, and functions more effectively as its original intent: an office building.

The premise of the dissertation, i.e. that non-profit organisations will function more effectively when they share services and resources, creates the opportunity for the CMEO building to function merely as an office building again. The opportunity exists for multiple organisations to share the office building and the resources on site. The increase of financial resources and the sharing of service delivery areas also enhance the programmatic expansions on the site and the development of the training programmes.

Fig. 3.37. Scattered container structures with various programmes [Author, 2013].

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3.5. SITE POSSIBILITIES

3.5.1. REGENERATION OF HERITAGE

After analysis of the historical context of the site, the conclusion can be drawn that the heritage significance of the site and the *Chief Mechanical Engineer's Office* lies within its ties to the surrounding railway heritage context. In response to the existing context and the proposed urban design framework, the *regeneration of heritage* aims to reconnect the site to the surrounding environment.

The dissertation proposes that reconnection to the CBD and the Salvokop precinct be accomplished through visual links, the regeneration of old railway lines, the restoration of existing buildings and the use of demolished building footprints as design guidelines. The *Heritage Impact Assessment* also suggests the use of the orientation of the existing railway lines as guidelines for the orientation of new buildings [Bakker, 2003].

Fig. 3.38. Old Steam Roller Shed [Author, 2013].

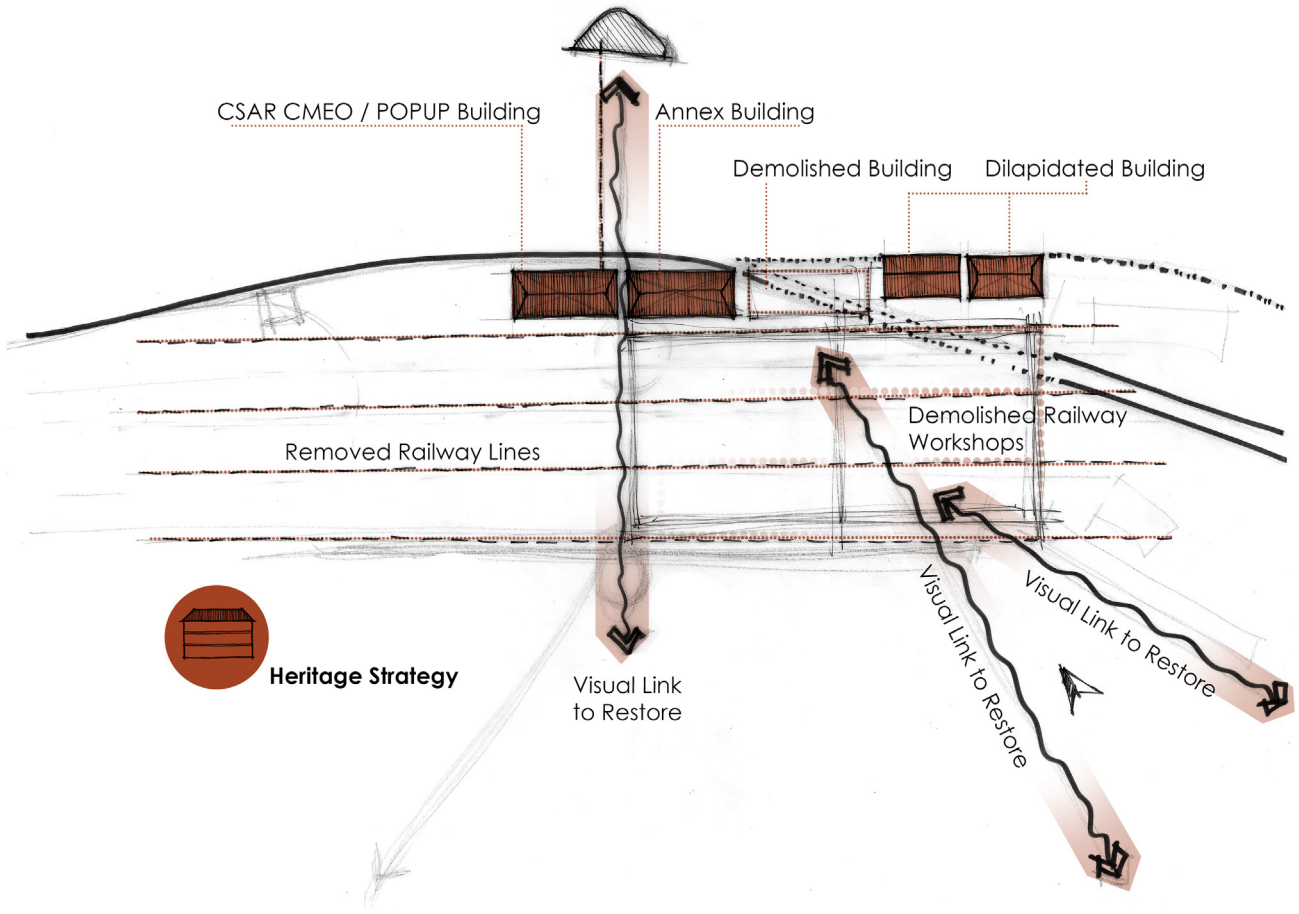

Fig. 3.39. Regeneration of heritage [Author, 2013].

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3.5.2. REGENERATION OF NATURAL LANDSCAPE

The existing theme of regeneration of the natural landscape stands opposed to the existing urban condition of the master plan area. Also, within the precinct as a whole, there exists a contrast between the natural landscape of Freedom Park and the urban condition of the CBD. The tension between these opposites suggests an opportunity for transition, transformation and movement between them.

With regard to the previously discussed theories of *regenerative design, biophilic design and restorative environmental design*, the existing natural landscape serves as a grounded existing platform for the incorporation of nature and natural elements into the design. It also creates the conditions for the regeneration of the relationship between nature and humanity.

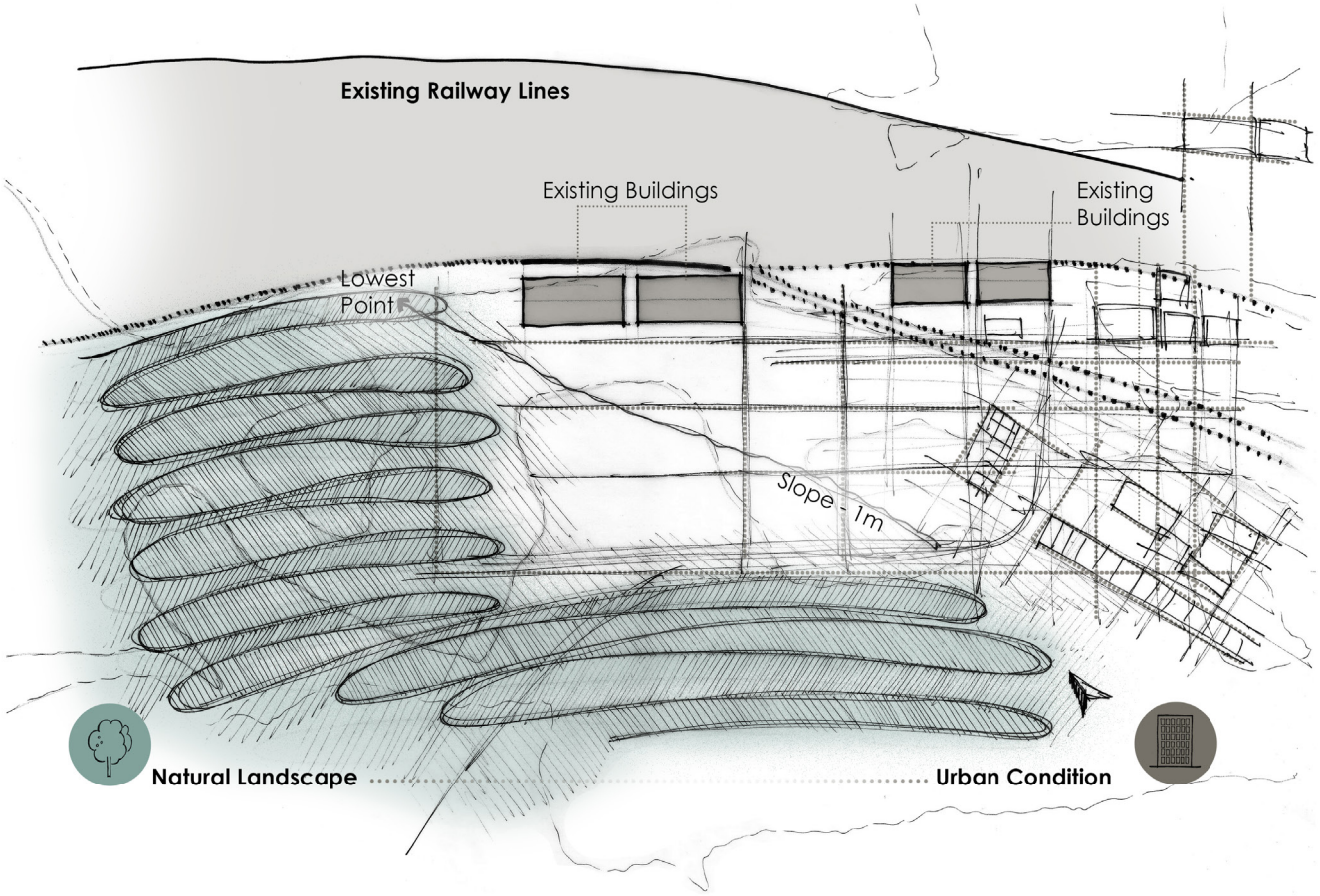

Fig. 3.41. Regeneration of natural landscape [Author, 2013].

Fig. 3.40. View of POPUP site from Skietpoort Avenue – note pedestrians [Author, 2013].

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3.5.3. REGENERATION OF PROGRAMME

The regeneration of programme consists of two parts. The first part is the re-organising of the different functions on site and the design of restorative environments, suitable for each function. The second part is the incorporation of other non-profit organisations (NPOs) onto the site in order to share staff, services and resources.

The re-organising of the site (which includes the containment and arrangement of the different programmes in a formal building) are guided by the surrounding environment. The main informants of the surrounding environment are the above-mentioned informants of the natural landscape and the urban condition. The new structure of the programme is also guided by the proposed urban design framework. The creation of restorative environments is based on the theoretical investigation of *regenerative architecture, biophilic design and restorative environmental design*.

Furthermore, the incorporation of new NPOs into the POPUP site are based on the existing need for *service integration* as identified by the Department of Social Development [DSD, 2012]. The new NPOs are determined by the existing training programmes and functions on site, in order to collaborate resources and share service delivery areas more effectively (see Chapter 4).

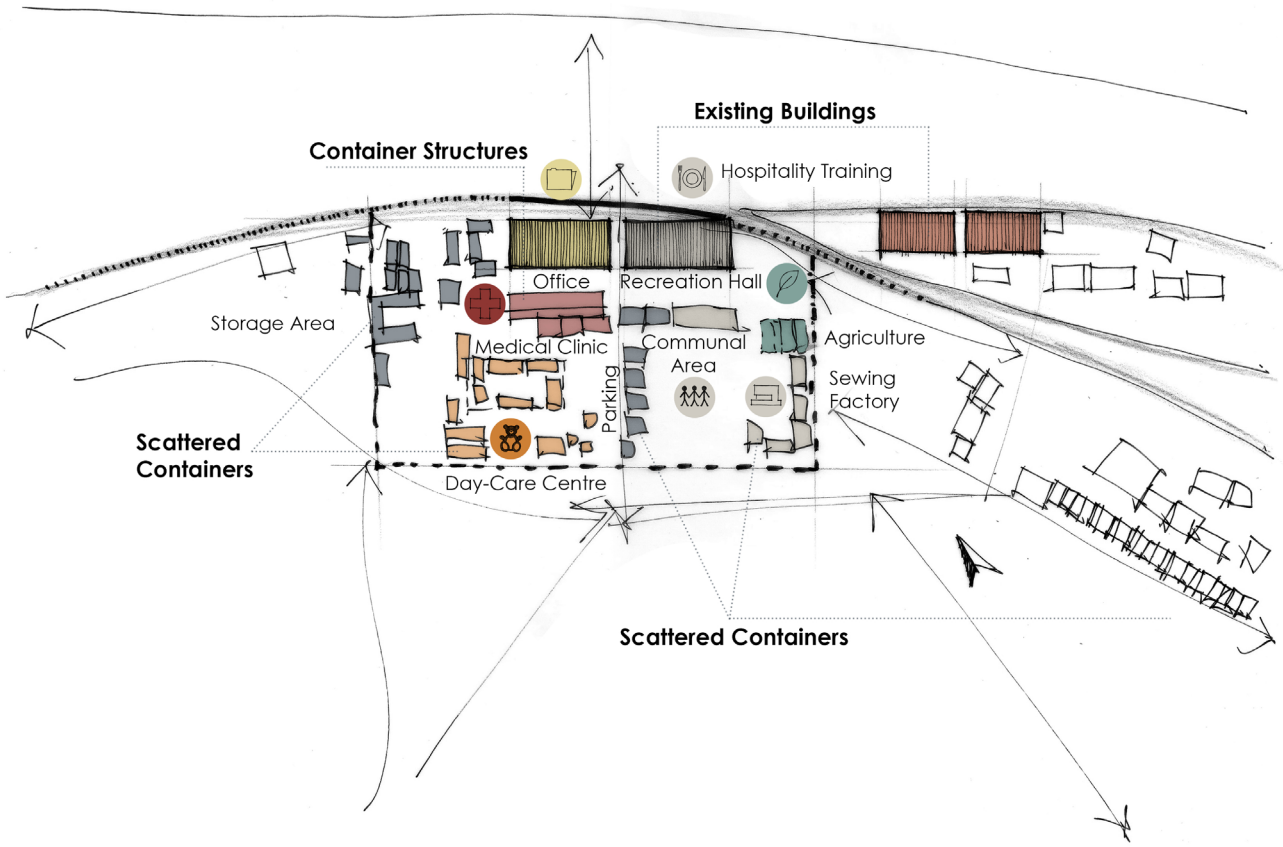

Fig. 3.42. Regeneration of programme [Author, 2013].

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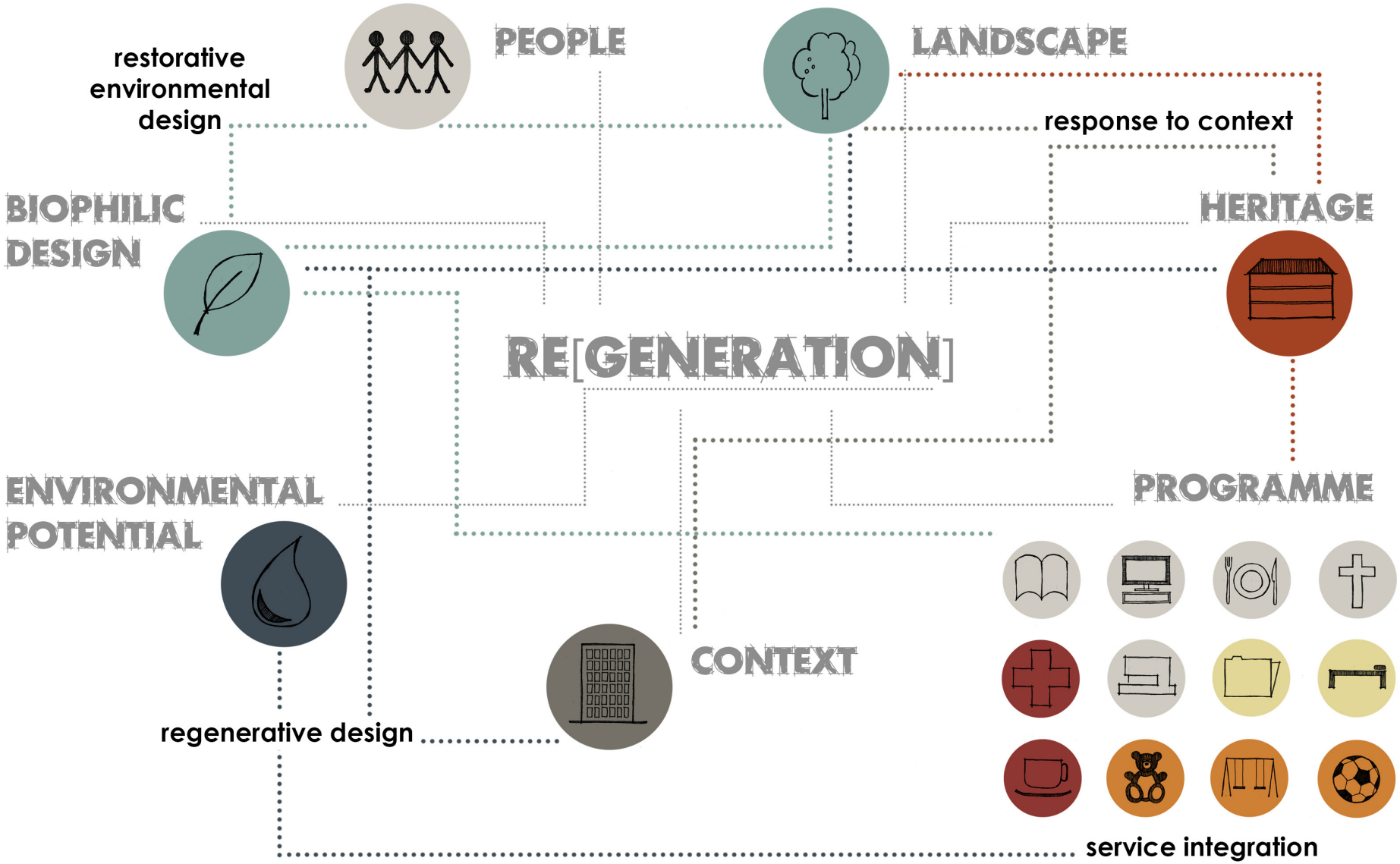

Fig. 3.43. Diagram that illustrates the relationships between the design informants and theoretical approach [Author, 2013].

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3.5.4. REGENERATION OF PEOPLE

The regeneration of people is essential to the dissertation, as it is the main driving force behind the client, POPUP. It is therefore essential that the design intervention commemorates this premise, which in turn becomes evident in the design informants mentioned; the regeneration of heritage, of natural landscape and of programme.

The *regeneration of people*, is mainly grounded in Kellert's theory of *biophilic features* as restorative environments [Hartig et al, 2008]. Kellert also argues that a healthy connection between humans and nature has restorative properties, because of humanity's inherent affinity towards nature [Kellert, 2005]. Therefore the elements of biophilic design, as discussed in Chapter 2, are a representation of the regeneration of people.

3.5.5. ENVIRONMENTAL POTENTIAL

The environmental potential of the design intervention is best supported by the investigation of regenerative design. The description of *regenerative design* as a *step beyond sustainable design*, implies that not only should a building have a *net zero carbon footprint*, but it should also generate its own energy and *give back* to the environment [Connected by Nature, 2010].

The environmental potential of the dissertation will focus on water harvesting, protection against solar heat gain, passive ventilation, comfort management, local materials and urban agriculture. The technical investigation of the strategies will be discussed in detail in Chapter 8.

3.6. CONCLUSION

The chapter has served to analyse and evaluate the POPUP site within its context. The locality of the site was discussed and orientated within the broader Pretoria context. The urban analysis of the Salvokop precinct was evaluated with regard to the historical, cultural and physical context. The urban vision for the site was proposed in response to the urban issues.

Furthermore, the POPUP site analysis was conducted with regard to the heritage significance, the physical condition, the programmes and the users. In response to the analysis and the urban condition, site design possibilities were explored by means of the design informants: *regeneration of heritage, regeneration of natural landscape, regeneration of programme, regeneration of people and environmental potential.*

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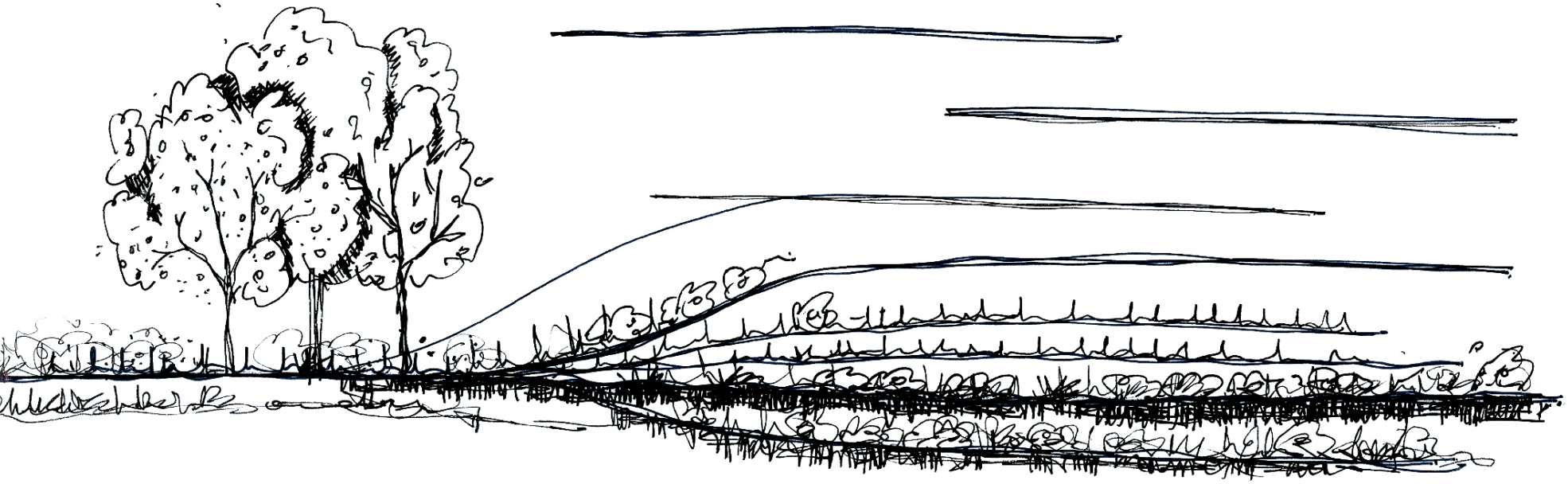
4. PROGRAMME



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4.1. INTRODUCTION

The chapter consists of two main layers that inform the programme of the dissertation. The first layer is the renovation and regeneration of the existing facilities on the POPUP site, according to the needs of the client. The second layer is the theoretical exploration of the *service integration* and shared resources of multiple non-profit organisations. The aim of the chapter is therefore to elaborate and explain the two layers as design informants to the dissertation.

The need for *service integration* has been identified in the social welfare sector as a method for non-profit organisations to function more efficiently and economically [DSD, 2012]. Furthermore, POPUP has a need for expansion of their facilities, as well as their training programmes [POPUP, 2013]. Therefore the dissertation proposes that POPUP utilise the opportunity for service integration by incorporating other organisations to share facilities and to delegate training programmes to them.

The chapter will firstly elaborate on the client and the existing programmes, facilities and services. Secondly, the current social condition of the social welfare sector in South Africa will be discussed. Thirdly, the chapter will explain the programmatic vision for the site with regard to the physical condition and the theoretical approach. Thereafter the programmatic requirements of the different programmes will be discussed – the offices, sewing factory, training programmes' classrooms, hospitality training, recreation hall, coffee shop and main kitchen, urban agriculture, medical clinic, day-care centre, and volunteer residence.

Fig. 4.3. Southern facade of the 1909 CMEO building, in 2002, two years after POPUP transformed it into a shelter for the homeless [Bakker, 2002].

Fig. 4.1. POPUP Building in 2000 [Bakker, 2002].

Fig. 4.2. Western facade in 2002 [Bakker, 2002].

Fig. 4.4. The first day-care centre [Bakker, 2002].

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4.2. THE CLIENT, POPUP

As previously mentioned, POPUP is a People Upliftment Programme. They have a holistic approach that focuses on the mental, physical, emotional and spiritual needs of learners. POPUP was initiated by *Doxa Deo* Church group and are mainly supported and funded by them [POPUP, 2013]. They started as a shelter for the homeless, but eventually transformed into a skills development centre [Van den Heever, 2006]. POPUP offers market-related skills programmes to enable learners to generate an income and cultivate a self-sustainable lifestyle [POPUP, 2013].

Prospective learners must be between the ages 18 and 45, as well as have a family income of less than R 3 000 a month. Programmes are offered at a minimal amount of R 100 and students receive coffee or tea and a rusk in the morning, as well as a meal at lunch hour. For 12 % of these students it is their only meal of the day. The soup kitchen gives food to 600 people per workday [POPUP, 2013].

The POPUP centre in Salvokop is situated in a heritage building that was unused and dilapidated. When POPUP occupied the building in 2000, they restored the building and transformed the site. At first the main building was used as dormitories for homeless people, but as POPUP grew and changed into a skills development centre, the main building became the organisation's offices and workshop space for the training programmes.

Over the past 13 years the skills training programmes have changed, developed and expanded. The personal restoration programme is the only remaining original programme and the vehicle for holistic healing and restoration that POPUP aims for. Attendance is also compulsory for every student. To accommodate the growing programmes, the main building soon reached its limitations and additional facilities needed to be acquired. Numerous old shipping containers from the old shunting yard and railway workshops were left on the site and were consequently occupied and transformed to become workshops, classrooms, storage space and clinic rooms.

Fig. 4.5. View of the site in 2002 [Bakker, 2002].

Fig. 4.6. Dilapidated stairs [Bakker, 2002].

Fig. 4.7. Shelter dormitories [Bakker, 2002].

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4.3. EXISTING PROGRAMME AND FACILITIES

The current facilities on the existing site includes the following: offices and counseling rooms, day-care centre, workshop space (inside and outside), medical clinic (medical, dental and eye care), conference facilities, sewing factory, and an urban agriculture program.

4.3.1. TRAINING PROGRAMMES

- Adult Education and Training (AET) (English literacy and numeracy)
- Personal Restoration and Life Skills (PRLS)
- Sewing
- Hospitality Services (Cooking, Cleaning & Laundry)
- Computer and Office Administration
- Home-based Care
- Project and Enterprise Development (PED) [POPUP, 2013].

4.3.2. SOCIAL SUPPORT SERVICES

- Food Programme (600 learners per week day)
- Soup Kitchen (150 homeless people per week day)
- Clothing Store (hands out free clothing as needed)
- Counseling
- POPkids (day care centre for 77 toddlers between 1 and 5 years) [POPUP, 2013].

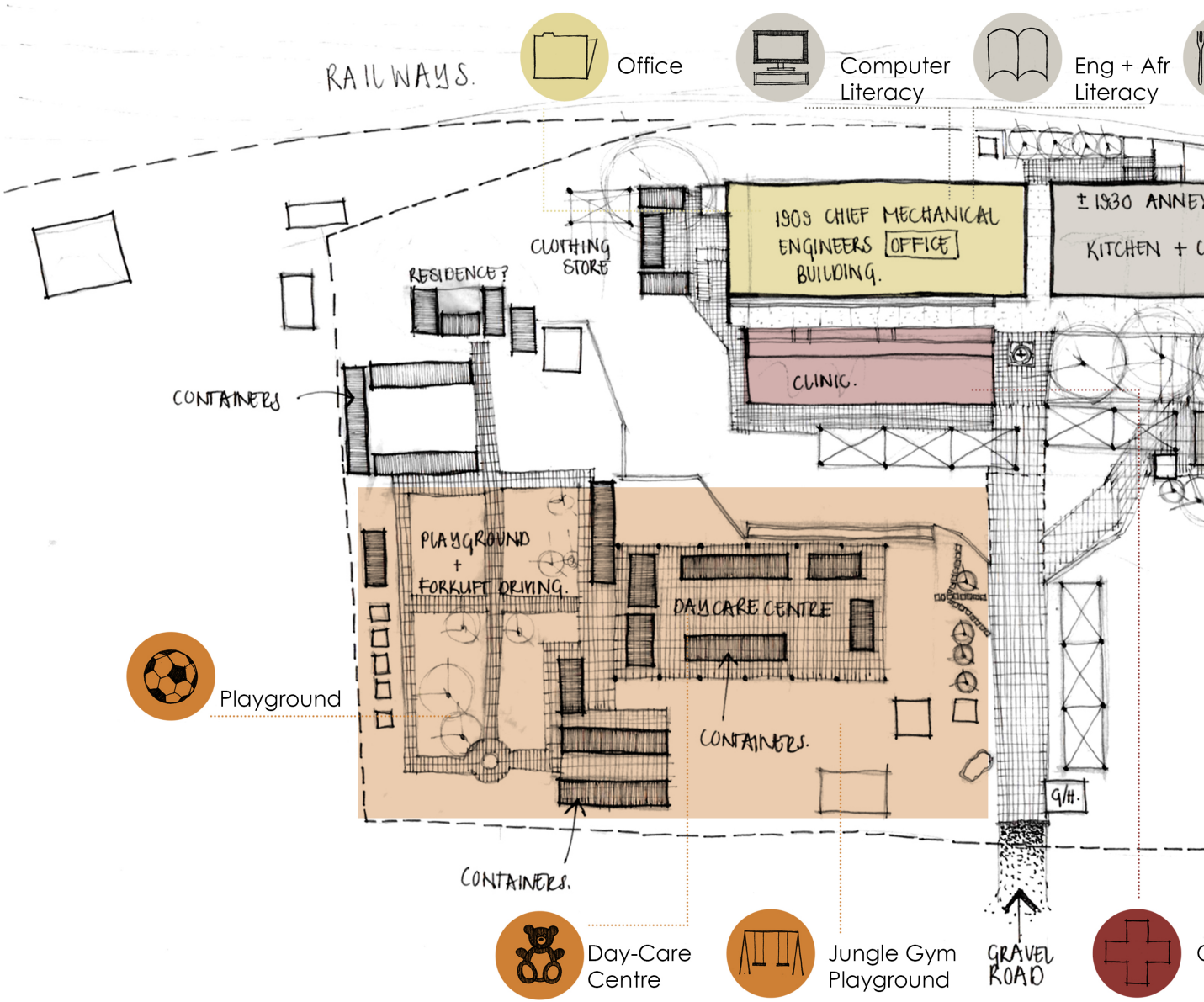

Fig. 4.8. The existing site and facilities [Author, 2013].

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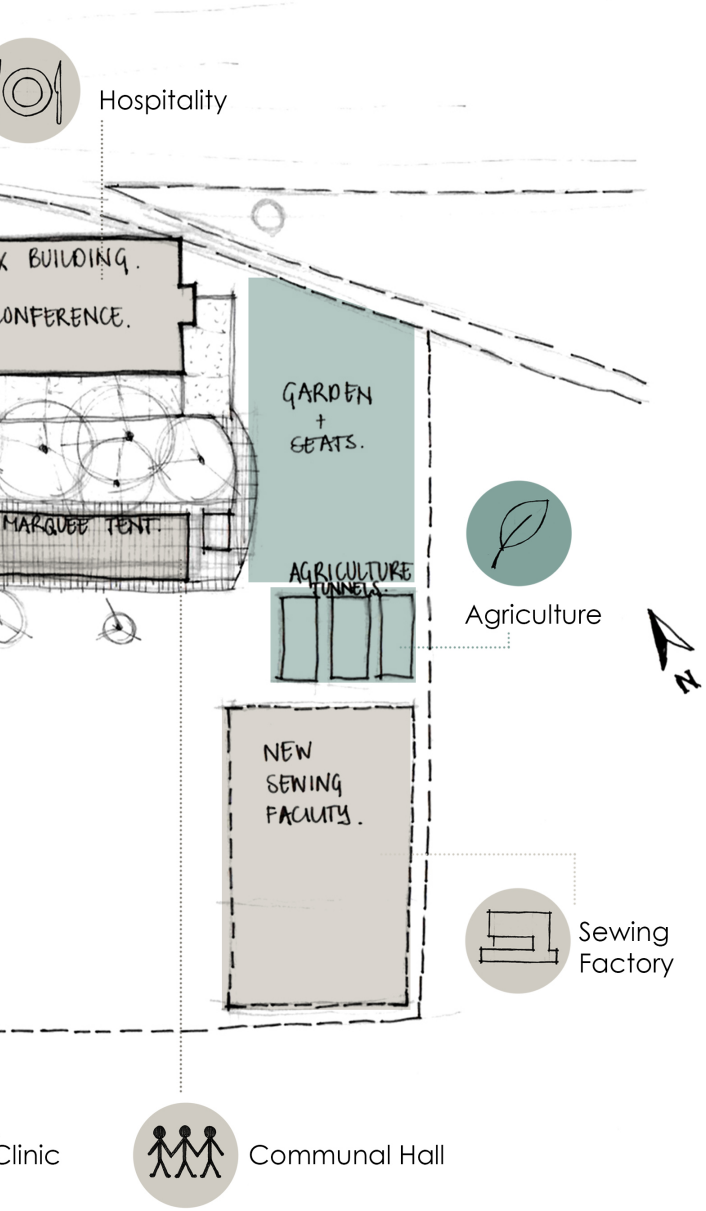

4.3.3. MEDICAL SERVICES

Medical Services include a medical, dentistry and eye care clinic that provides free services for households with a monthly income lower than R 3000. POPMed is run by a full-time qualified nursing sister. POPUP is also registered as an HIV/AIDS Testing and Counseling Centre, and a medical practitioner is available on site one day per week, for required prescriptions [POPUP, 2013].

The dentistry, POPDent, is fully equipped and relies on private dentists who assist with services at specific intervals. POPEye, the eye care clinic offers eye testing and supplies frames and glasses at a reasonable cost to patients. The clinic is partnered with an optometrist practice, and new students receive a free eye test [POPUP, 2013].

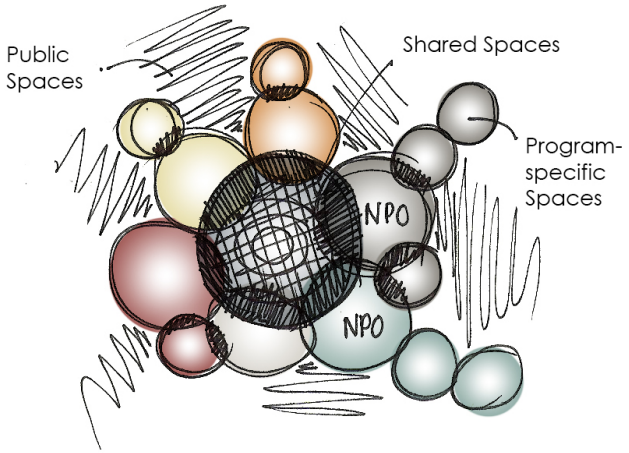

Fig. 4.9. The diagram illustrates the programmatic intention with regard to the service integration strategy [Author, 2013].

4.4. SOCIAL CONDITION

The term social welfare generally refers to the *well-being of the entire society. Social welfare is concerned with the quality of life that includes factors such as the quality of the environment (air, soil, water), level of crime, extent of drug abuse, availability of essential social services, as well as religious and spiritual aspects of life* [Business Dictionary, 2013]. For the under-privileged communities in South Africa, these basic needs are provided for by either the government or non-profit organisations (NPOs).

As discussed in Chapter 1, NPOs generally exist as non-government organisations (NGOs), community-based organisations (CBOs) and faith-based organisations (FBOs) [DSD, 2011:4]. POPUP is an NGO and receives 65% of their income from the corporate sector, in addition to 20% from the Department of Health and Social Development [POPUP, 2013].

According to the Department of Social Development there is a need for *service integration* that will lead to increased funding and more effective service delivery of organisations [DSD, 2012]. Furthermore, the social welfare sector is divided into different categories, including social services, community development, housing, and employment and training [DSD, 2011:10]. The wide range of POPUP's training programmes, social services and medical services allows the organisation to ascribe to the requirements of a variety of the categories.

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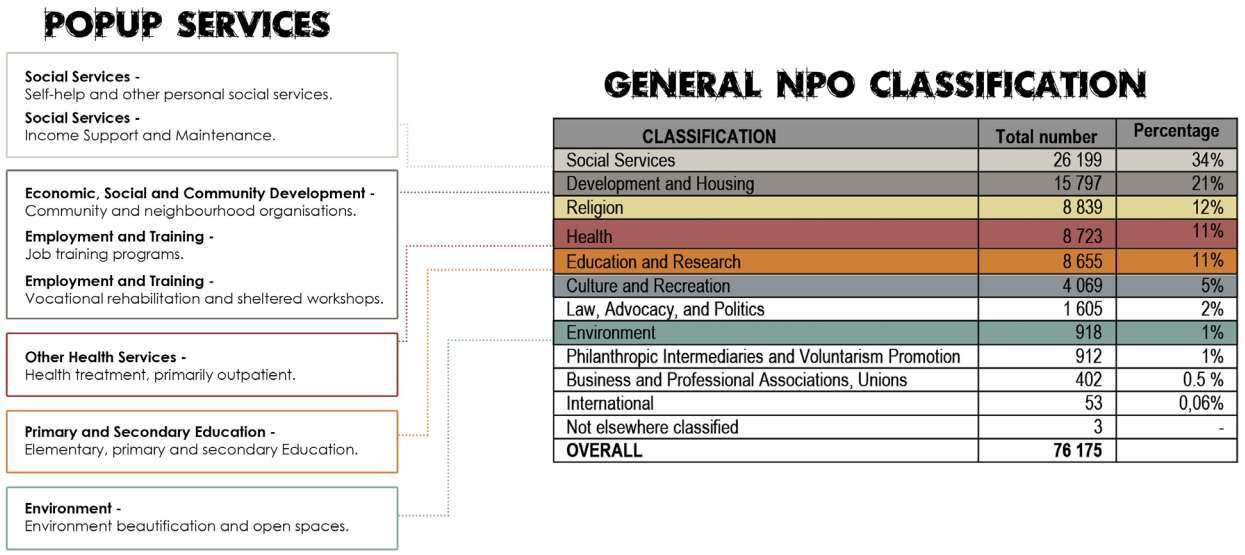
4.5. PROGRAMME VISION

The programme vision is based on two theoretical approaches. The first is the concept of *service integration*, based on the current social condition as discussed above. The second is the regeneration of the programme based on the combined theories of *regenerative design, biophilic design and restorative environmental design*.

4.5.1. STRATEGIC APPROACH

The strategic approach to the regeneration of the programme is to seize the opportunity of *service integration* while expanding the current facilities of POPUP. The range of different programmes, such as the day-care centre, medical clinic, agriculture and literacy programmes, covers different categories of non-profit organisations. The opportunity exists for organisations that specialises in the above fields to collaborate and consolidate with POPUP.

There are two main incentives that support the concept of *service integration* as suggested by the Department of Social Development. The first is that the different organisations will be able to share facilities, staff and service delivery areas, that will in turn increase their financial resources. The second is that the different fields of specialisation and increased financial resources will give the organisations the opportunity to increase and expand their service delivery and specialised facilities [DSD, 2012].



CLASSIFICATION	Total number	Percentage
Social Services	26 199	34%
Development and Housing	15 797	21%
Religion	8 839	12%
Health	8 723	11%
Education and Research	8 655	11%
Culture and Recreation	4 069	5%
Law, Advocacy, and Politics	1 605	2%
Environment	918	1%
Philanthropic Intermediaries and Voluntarism Promotion	912	1%
Business and Professional Associations, Unions	402	0.5 %
International	53	0,06%
Not elsewhere classified	3	-
OVERALL	**76 175**	

Fig. 4.10. The diagram illustrates the range of categories to which the POPUP training programmes ascribe [Author, 2013].

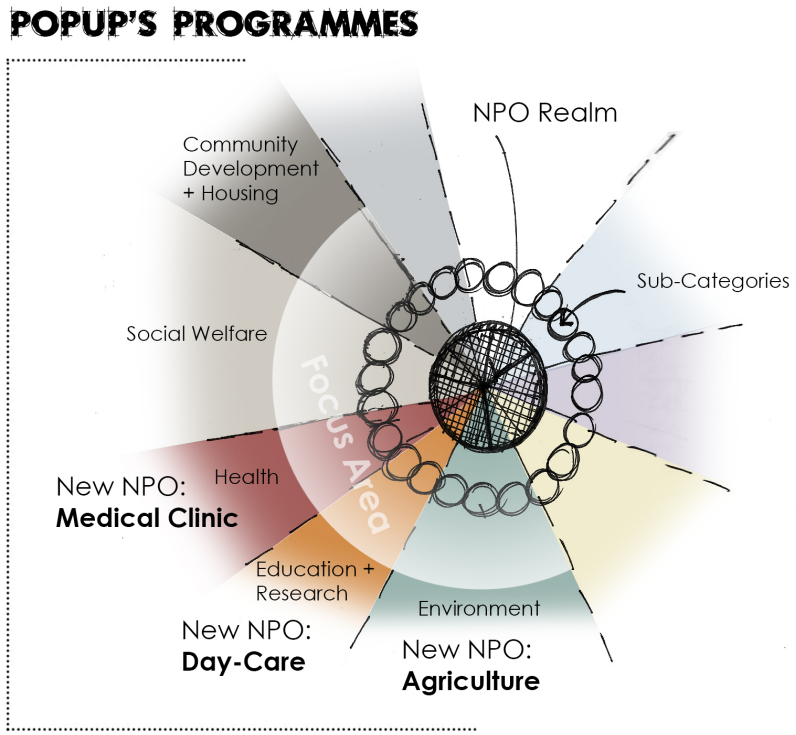


Fig. 4.11. The diagram illustrates the NPO sector and its relevant categories relating to the service integration strategy [Author, 2013].

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4.5.2. THEORETICAL APPROACH

The theoretical approach to the regeneration of programme requires the use of biophilic features and low-impact technologies in creating restorative environments [Hartig, 2008]. According to Kellert a healthy relationship between humanity and nature enhances the restorative quality of environments [Kellert, 2005]. Therefore the theoretical approach implies that restorative environments will enhance and strenghten the restoration of the people.

The combined use of *regenerative design, biophilic design and restorative environmental design* as an approach to the regeneration of programme promotes the use of natural elements such as water, sunlight, air, colour, plants, natural materials and views of nature. Accordingly, the human-nature connection and its restorative qualities will be increased [Kellert, 2005]. Furthermore, the approach also suggests the use of low-impact technologies such as passive ventilation strategies, water harvesting, protection against solar gain, comfort management, thermal mass, and the use of local materials.

4.5.3. PROGRAMME PROPOSAL

The dissertation proposes the regeneration of the programme of the client, POPUP, according to the strategic and theoretical approaches discussed above. By collaborating resources with other organisations, POPUP will gain the opportunity to delegate the responsibility of their various programmes to organisations that specializes in the respective fields, and the administrative facilities and service delivery areas will be shared.

According to the strategic approach of *service integration*, the author suggests that the urban agriculture programme, the day-care centre and the medical clinic be delegated to organisations that specialize in these fields. In turn, POPUP will have more resources available to focus on their field of expertise; *the empowerment and restoration of people through skills development programmes*.

With regard to the incorporation of new organisations on the POPUP site, the author suggests the following:

Urban Agriculture:

1. Soil for Life is an NPO that teaches people in urban and rural poor communities to build soil and grow healthy plants. Their aim is for all people to always have access to healthy, nutritious food [Soil for Life, 2013].

2. Nutri-Kids is an NPO with the objective of poverty alleviation, income generation and sustainability through vegetable gardening. They train adults in the community in gardening skills and always aim to include children in the training [Nutri-Kids, 2013].

Medical Clinic:

The proposed *Primary Care Medical Centre* amounts to the requirements of the current *City of Tshwane* clinics. Currently there is not a *City of Tshwane* clinic in the precinct or surrounding area, which renders the clinic a good candidate [City of Tshwane, 2010].

Day-care centre:

Yeast City Housing currently have a day-care centre in Salvokop. Collaboration with POPUP will enable them to serve the same community and maintain the service delivery area, apart from sharing resources and facilities.

Furthermore, the design of new buildings that accommodate the elaborated programmes will provide for the use of *regenerative, biophilic and restorative environmental design* approaches to be incorporated into the new buildings from the start as well as guide the design process.

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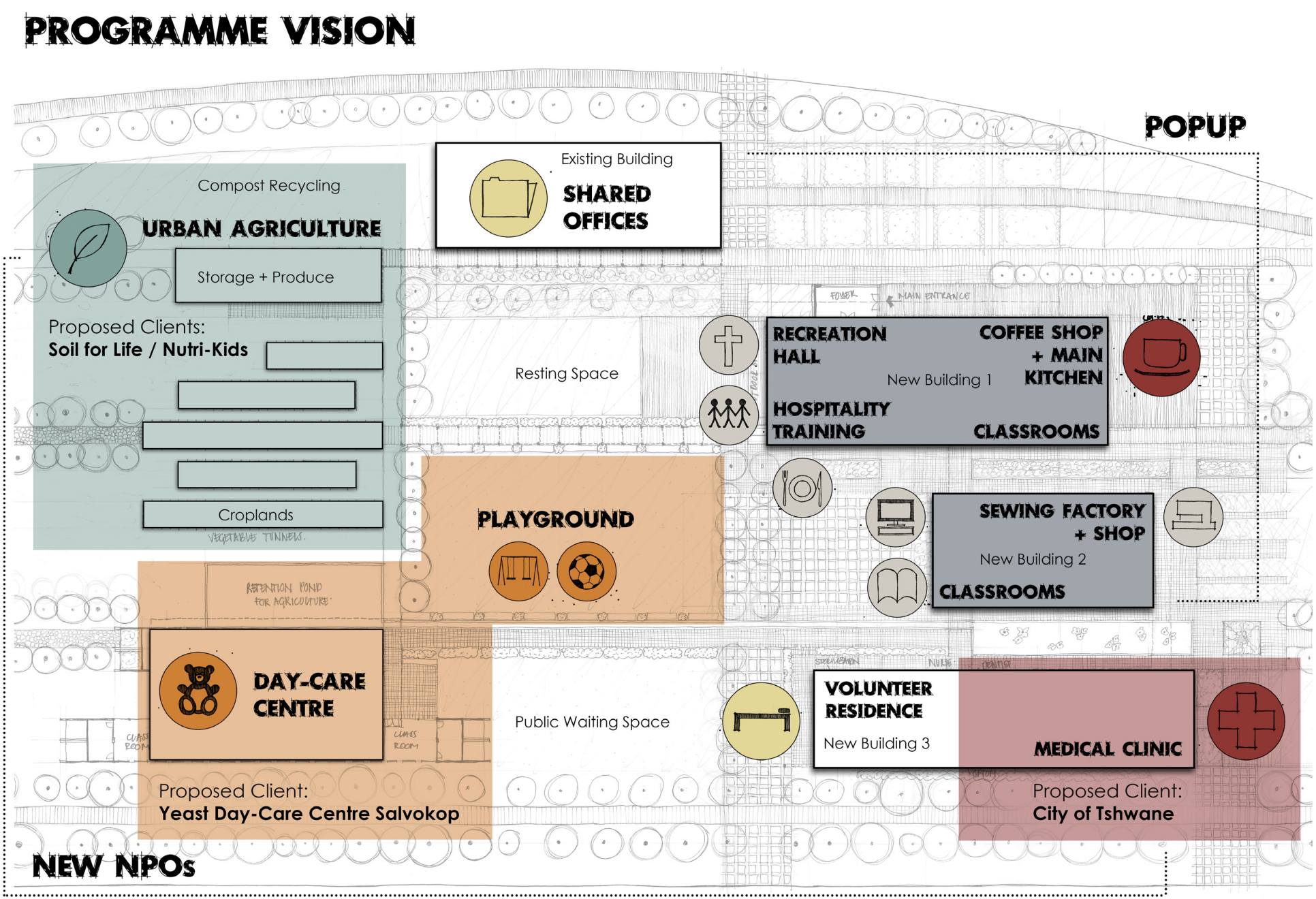

Fig. 4.12. Proposed programme vision [Author, 2013].

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4.6. PROGRAMME DEVELOPMENT AND ELABORATED PROPOSAL

4.6.1. OFFICES AND ADMINISTRATION

The 1909 CMEO / 2013 POPUP building was originally designed as office accommodation for the railway company. Currently POPUP uses the ground floor for their offices. The first and second floors are divided into training classrooms and a sewing factory. The training programmes that are housed on these levels, are *english literacy and numeracy, computer literacy, and a sewing class*.

The programmatic proposal for the 1909 CMEO / 2013 POPUP building is for its restoration to its original use and function as offices. According to the *service integration strategy* the new organisations will share the office building for their administrative needs, i.e. offices, boardrooms, staff accommodation, etc. Regarding the heritage significance of the building, its value will be regenerated in the sense that its original programme as *office building* is restored, and also regenerated with new users that respond to the current conditions.

The conceptual approach to the programme proposes that the shared, communal and more public spaces, such as the boardrooms, staffroom, kitchen and reception area, be on the ground floor and entry level. The specific offices for each organisation and the more private spaces will be grouped together on the first and second floor level. The existing activities on the first and second floor level – *English literacy and numeracy, computer literacy, sewing classes and sewing factory*, will be accommodated in the new buildings.

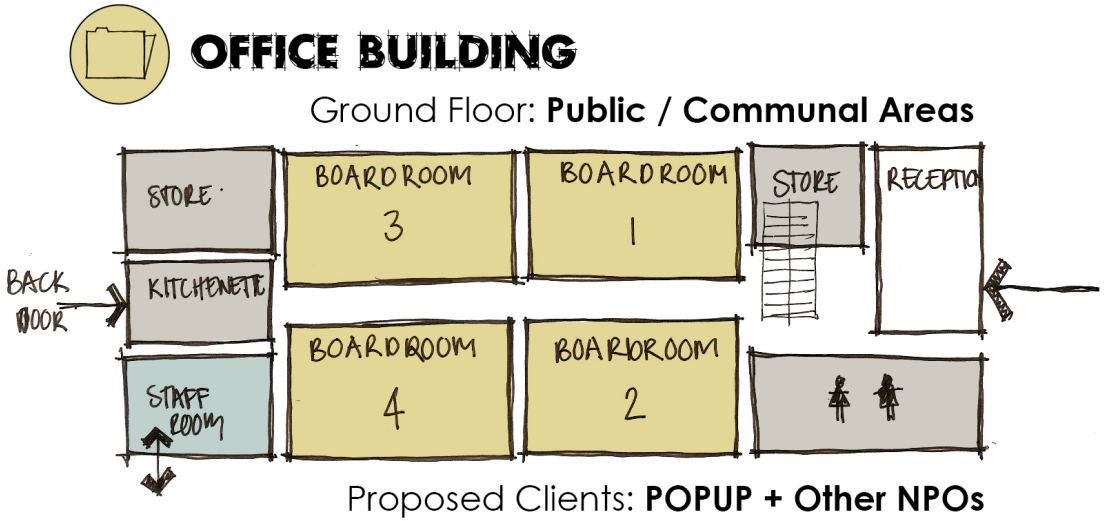

Fig. 4.13. The diagram illustrates the shared and communal spaces on ground floor level in the existing building [Author, 2013].

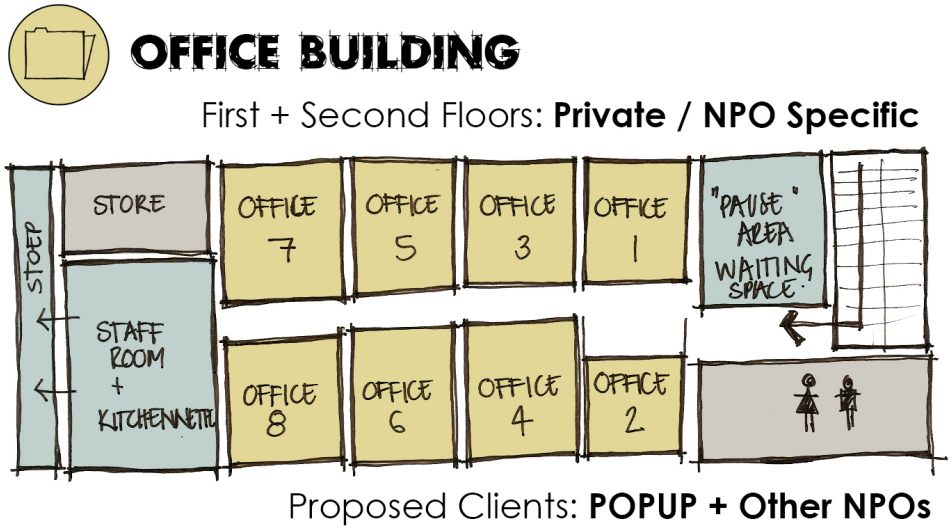

Fig. 4.14. The diagram illustrates the private and specific spaces on the first and second floor [Author, 2013].

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4.6.2. SEWING FACTORY AND TRAINING

The existing sewing factory and training centre are currently on the first floor of the main building. The service integration strategy suggests that the functions be accommodated in the new buildings. Henceforth the theoretical approach will enable the creation of restorative environments. Additionally, the existing facilities do not meet the requirements of the client. According to the sewing teacher the existing classroom and factory facilities are too small and not operating efficiently [POPUP, 2013].

The sewing programme consists of three parts: *training, production, and enterprise*. Students receive their training in the sewing classroom that needs to accommodate both the theoretical and practical facilities. After the training programme is completed, students move to full-time employment in the sewing factory. The sewing factory enables previous students with the opportunity to generate an income for themselves as employees. The products manufactured in the factory are then sold as a means of generating an income for POPUP.

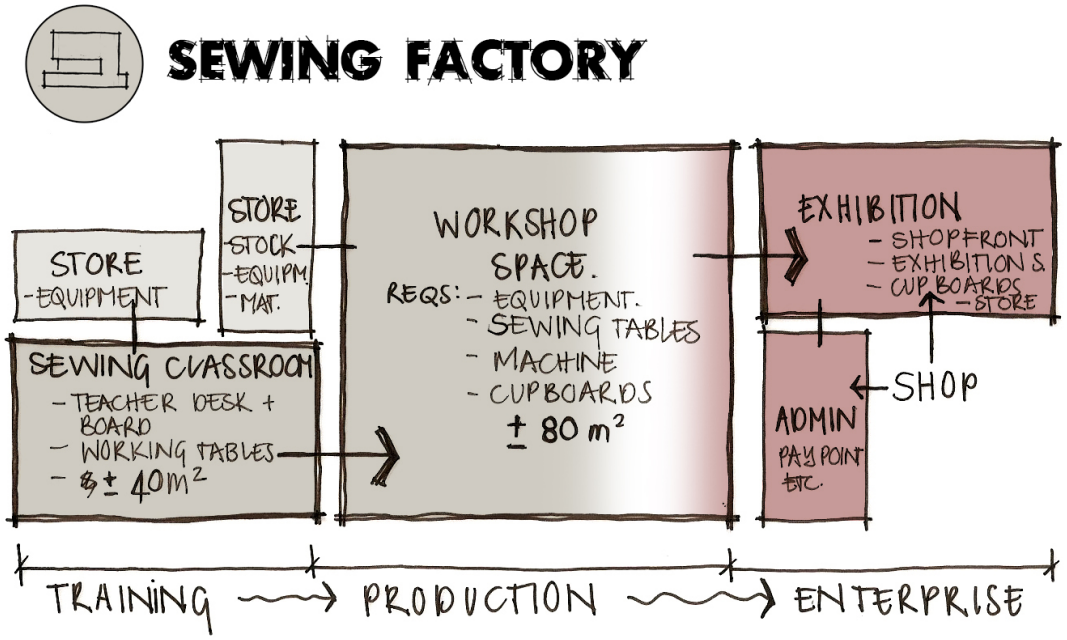

Fig. 4.15. The diagram illustrates the basic requirements and spatial relations of the sewing training programme [Author, 2013].

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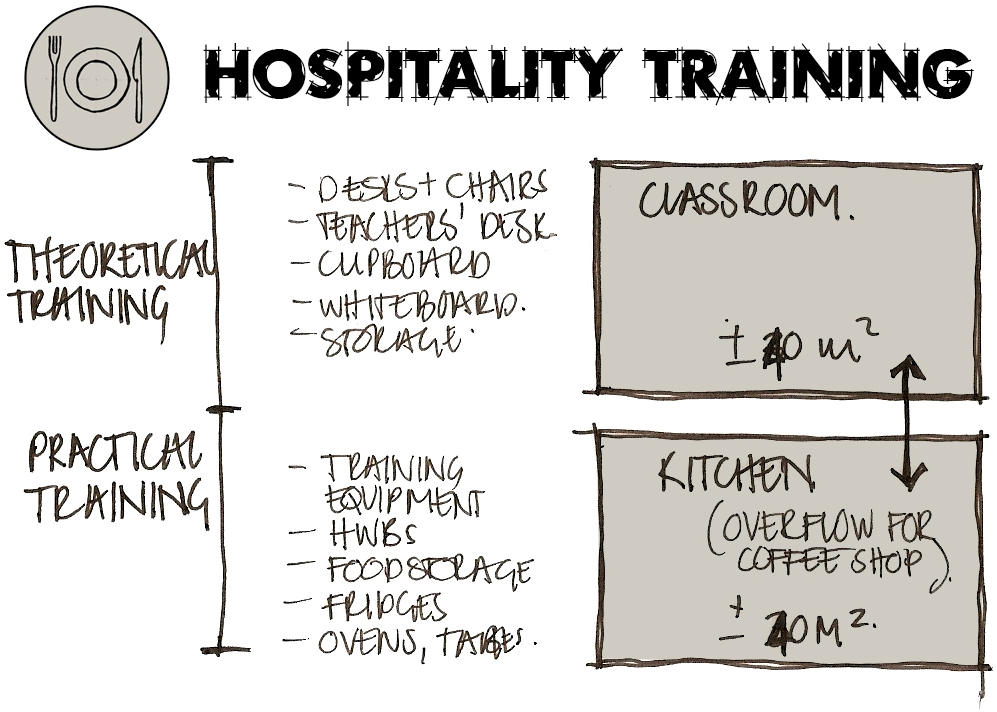

Fig. 4.16. The diagram illustrates the basic requirements for the hospitality training programme [Author, 2013].

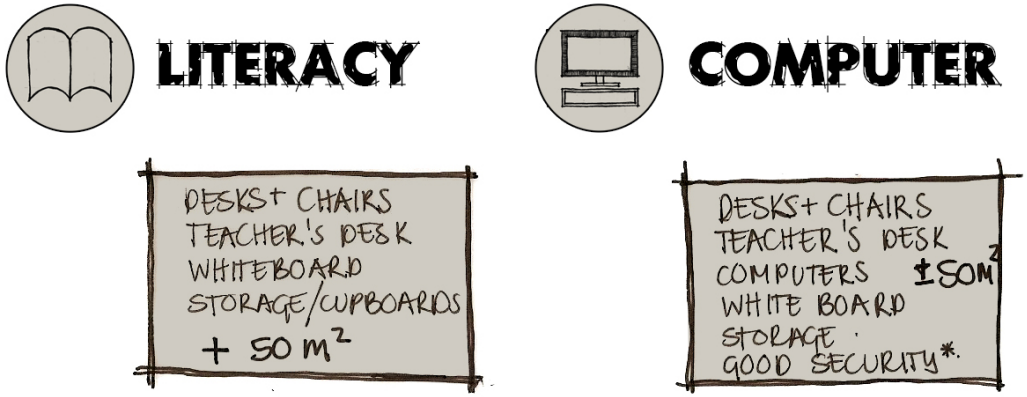

Fig. 4.17. The diagram illustrates the different requirements for each classroom [Author, 2013].

4.6.3. HOSPITALITY SERVICES

The existing hospitality facilities are accommodated in the annex building. The proposal for the *regeneration of heritage* implies that the annex building be demolished in order for the heritage significance of the main building to be restored (see Chapter 6). Additionally, the theoretical approach for restorative environments also suggests that the training facilities be accommodated in the new buildings.

The hospitality training facilities will therefore be accommodated in the new buildings. The training programme requires a classroom for the theoretical training of the programme, whereas the practical training requires a kitchen with basic facilities for the cooking programme. The hospitality kitchen will also be used as a supporting kitchen of the coffee shop, for large and overflow catering events.

4.6.4. OTHER CLASSROOMS

The existing classrooms for *English literacy and numeracy and computer literacy* activities are situated in the main building. The *service integration strategy* implies that the classrooms be accommodated in the new building. Accordingly, the theoretical approach will enable the design of the new classrooms and building to meet the requirements of restorative environments, emphasising the use of biophilic features and low-impact technologies.

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4.6.5. RECREATION HALL

The existing recreation hall is part of the annex building. It accommodates about 150 people and a variety of different functions. The most common functions are the *Personal Restoration and Life Skills* programme that mainly involves large groups, group lectures and gatherings. It also has a dual purpose as an event and conference space, that can generate an income for both POPUP and the site.

According to the theoretical approach to restorative environments, the existing recreation hall does not comply with the requirements thereof. Additionally, the *regeneration of heritage strategy* implies the demolition of the annex building to enhance the heritage significance of the main building. Therefore, the recreation hall facilities will be accommodated in the new buildings.

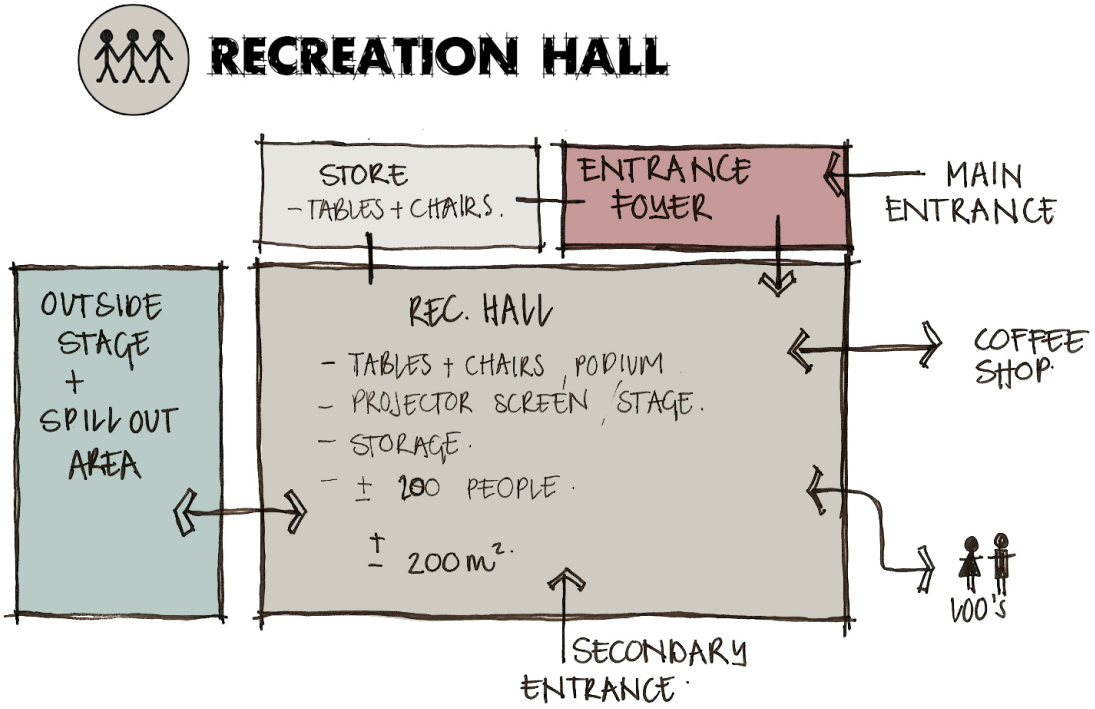

Fig. 4.18. The diagram illustrates the spatial aspects and relations of the recreation hall [Author, 2013].

4.6.6. COFFEE SHOP AND MAIN KITCHEN

The coffee shop is proposed as a new addition to the programme. The conceptual reason for this being that it is part of a new public interface that will attract more visitors to the site (see Chapter 6). It is however one of the client's needs and serves as a method of generating an income for POPUP. It serves to attract new clients and sponsors to the centre, as relaxation and breakaway space for the staff, as well as accommodation of larger functions and events.

Part of the coffee shop will be the main kitchen of the site. The main kitchen will cater mostly for the coffee shop. It will also prepare the daily meals for the learners, an average of 100 per day. Additionally, it will cater for large events and functions and will be assisted by the hospitality training kitchen as needed.

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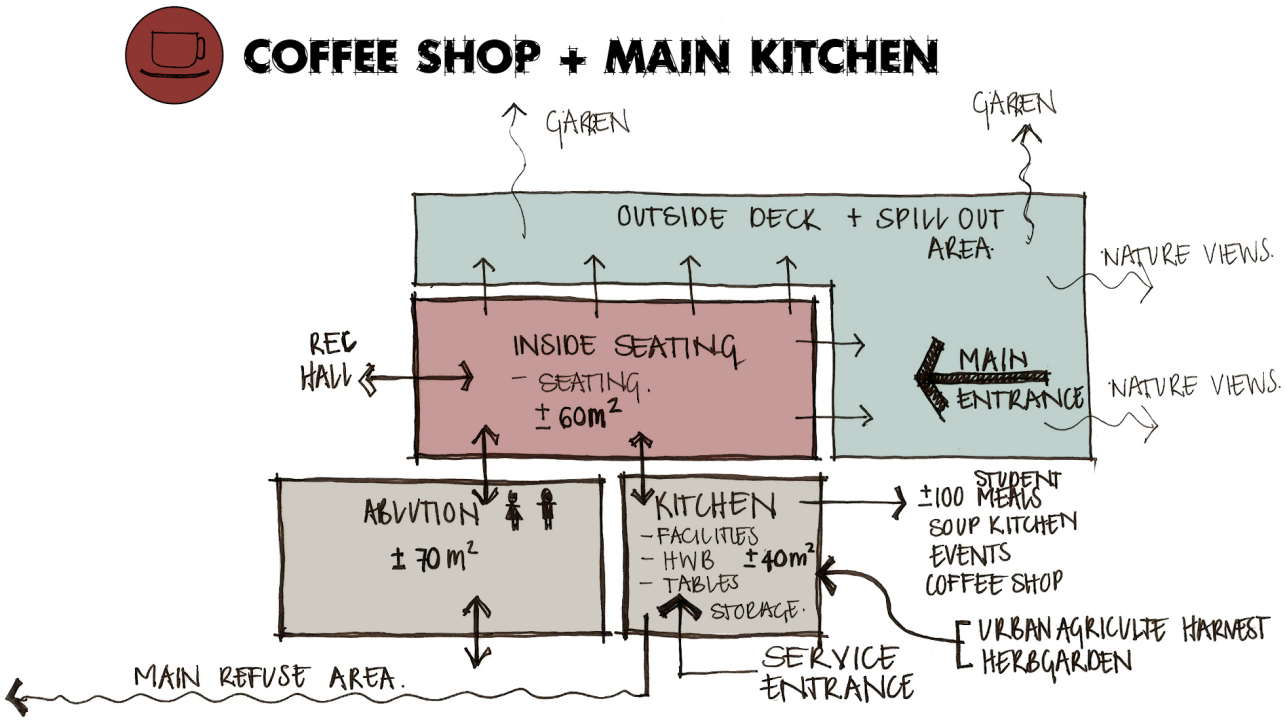
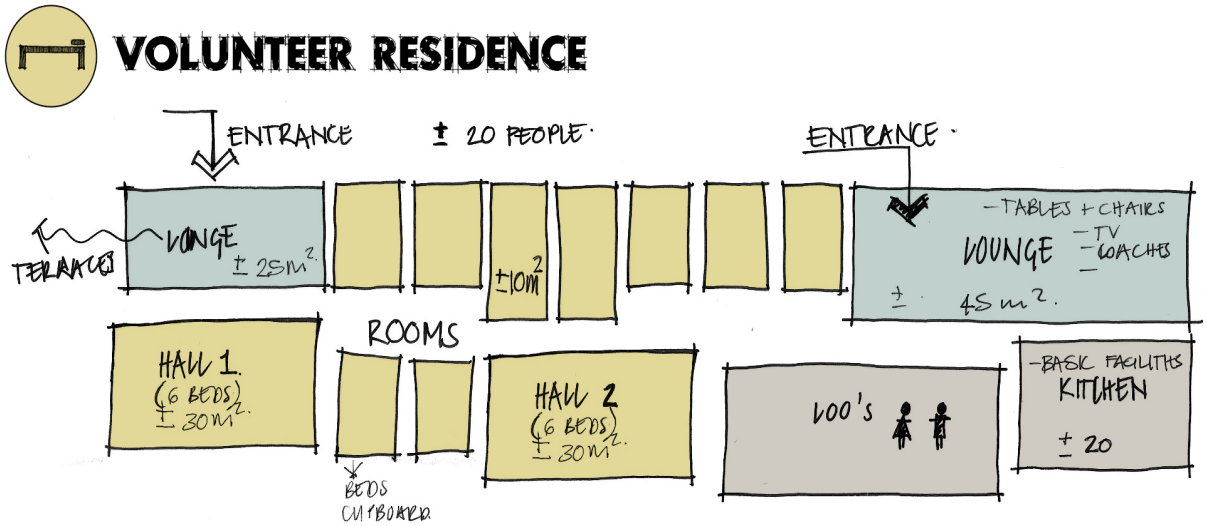


Fig. 4.19. The diagram illustrates the coffee shop and main kitchen areas [Author, 2013].



4.6.7. VOLUNTEER RESIDENCE

The proposed volunteer residence is a new programme to be introduced to the POPUP site. According to POPUP's 15 year vision there is a need for volunteer accommodation. The organisation partially rely on local volunteers to assist with the training programmes and the soup kitchen. The addition of on-site accommodation will widen the array of volunteers beyond the Tshwane perimeters. Also, with the collaboration of the NPOs, more financial resources will be available to incorporate a residential component on the site and consequently more organisations will benefit from the proposal.

Fig. 4.20. The diagram illustrates the basic requirements for the volunteer residence [Author, 2013].

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4.6.8. URBAN AGRICULTURE

The existing vegetable tunnels on site are an initiative of the local ladies that live in Salvokop and do training programmes at POPUP. They grow seasonal vegetables and sell them to the local community. According to the *service integration strategy* the proposal is that an organisation which specialises in urban agriculture be incorporated in the POPUP site, and to expand the agriculture into a *training and food production programme*.

The natural character of the urban agriculture programme supports the design approach towards restorative environments. The use of biophilic elements, such as water, air, sunlight, natural materials and plants are inherent to the programme. Its also a tangible manifestation of the regeneration of human-nature connections that create restorative environments.

In accordance with the service integration strategy and consequent expansion of the urban agriculture programme, the proposed distribution unit of the croplands' harvest is the main kitchen, where it is used for the menu of the coffee shop and meals for the learners and staff on-site. The organic waste is recycled to produce compost, that is in turn deposited back into the croplands. The agriculture programme also has an educational feature that requires a classroom for the theoretical training. Excess produce are furthermore sold in the local community.

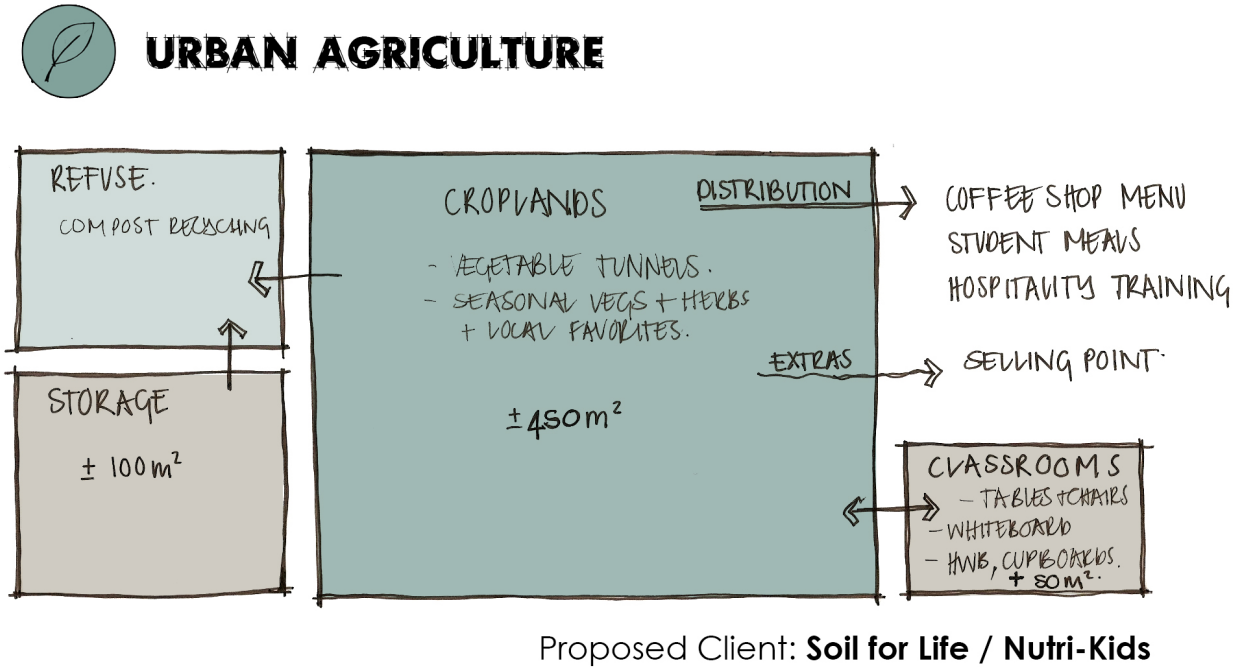

Fig. 4.21. The diagram illustrates the process of the urban agriculture programme [Author, 2013].

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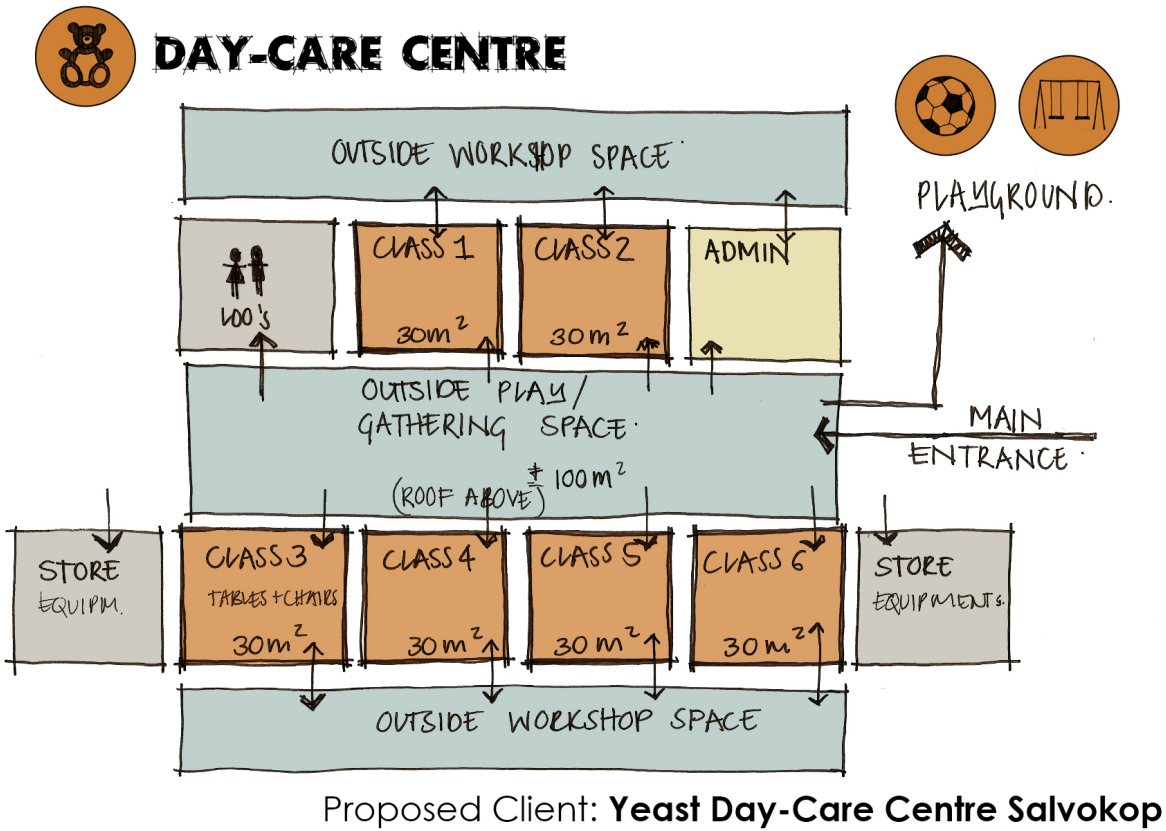

Fig. 4.22. The diagram illustrates the different functions of the day-care centre [Author, 2013].

4.6.9. DAY-CARE CENTRE

The existing day-care centre serves about 77 toddlers of the Salvokop community. It is situated in old shipping containers and train trucks that are scattered over the POPUP site. The container units give a humane scale to the classrooms, to which the little children can more easily relate. However, the current facilities and classrooms cannot be described as *restorative environments*, according to the theoretical approach. The scattered container units also devalue the heritage significance of the main building and its relation to the site.

Therefore, according to the *regeneration of heritage and programme* responses, the dissertation proposes that the day-care centre be removed from the current position and re-designed as a new building. The new day-care centre will be expanded to cater for more children and emphasis will be placed on the *human-nature* connection, to create restorative environments. The programmatic proposal also suggests an agriculture-education component that will expose the children from a young age to nature and agriculture, in order to cultivate a self-sustainable lifestyle.

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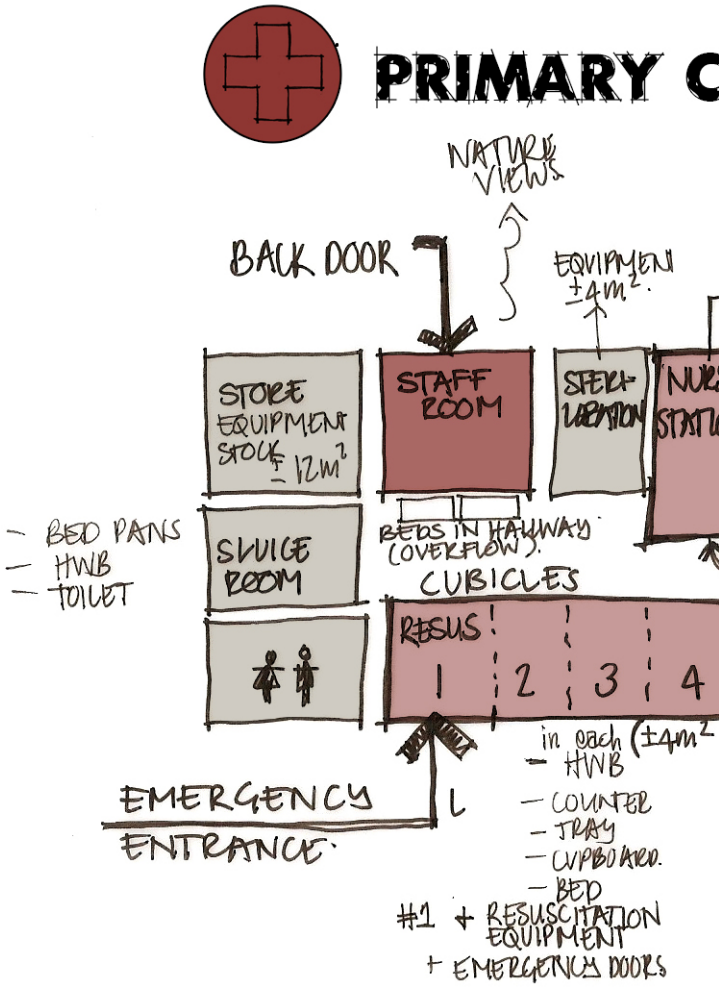
4.6.10. PRIMARY CARE MEDICAL CENTRE

The existing medical clinic facilities include consultation rooms for a nurse, a doctor (general practitioner), a dentist and an optometrist. The *service integration strategy* implies that the medical clinic be delegated to a health care organisation. Currently, POPUP receives 20% of their income from the Department of Health and Social Development [POPUP 2011]. It is also the only form of medical support service in the Salvokop precinct. Accordingly, the proposal implies that the POPUP medical services can be upgraded and expanded to a Primary Care Medical Centre. Additionally, the restorative environmental design approach suggests the use of biophilic features and emphasises a healthy human-nature connection in the design.

The programme includes the following:

- The reception and communal waiting area for at least 20 people.
- The dentist's consultation room, with the patient's chair, standard dental equipment and efficient lighting. Other requirements for the room are cupboards for the storage of utensils and dental supplies, as well as a working / writing surface for the dentist.
- The optometrist's consultation rooms are divided into sections; a desk and verbal consultation area, and the physical consultation area with eye-testing equipment.
- The general practitioner's consultation room requires a desk and seating for the patient, as well as a bed and examination area with relevant equipment.
- All of the above-mentioned rooms require adequate lighting and hand-wash basins.
- Four examination cubicles, with a hand-wash basin, adequate lighting, a bed and relevant equipment. One with added resuscitation equipment and a door that opens to the outside of the building for emergency vehicles.
- The nurse's station that controls the access to the cubicle area.
- The nurse's consultation room, with a desk and examination area, adequate lighting and hand-wash basin. The primary care nurse sees most of the patients first, examining them and giving prescriptions when the doctor is not there, and referring them to the doctor if necessary.
- The dispensary requires shelves for the storage of medicine. Access control requires that the space be completely lockable, with one door and only one person (nurse or pharmacist) having access to that area.
- Other general required spaces of a primary care clinic are the sluice room with adequate cleaning facilities, the sterilisation room with relevant equipment, and adequate storage space for supplies.



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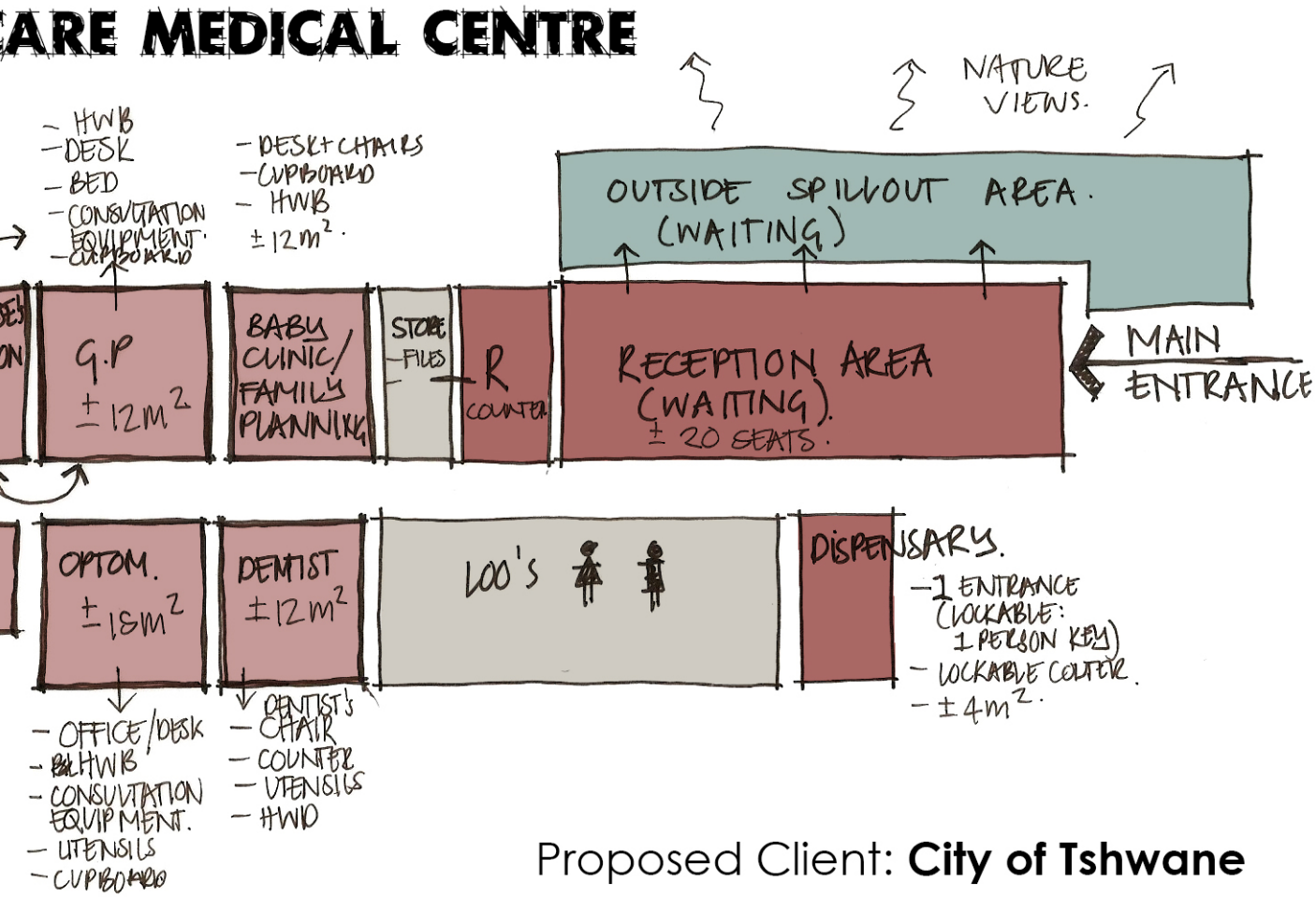

Fig. 4.23. The diagram illustrates the primary care clinic spaces in more detail [Author, 2013].

4.7. CONCLUSION

The need for regeneration of the programme exists on two layers; the re-design of the facilities on the POPUP site, and the need for service integration as a result of the social condition. Consequently, the dissertation has proposed two main approaches to the regeneration of the programme: the strategic approach, that focuses on viewpoints of the Department of Social Development, and the theoretical approach, that consists of *regenerative design, biophilic design, and restorative environmental design.* The chapter has furthermore explored the proposals for the different programmatic functions on the site.

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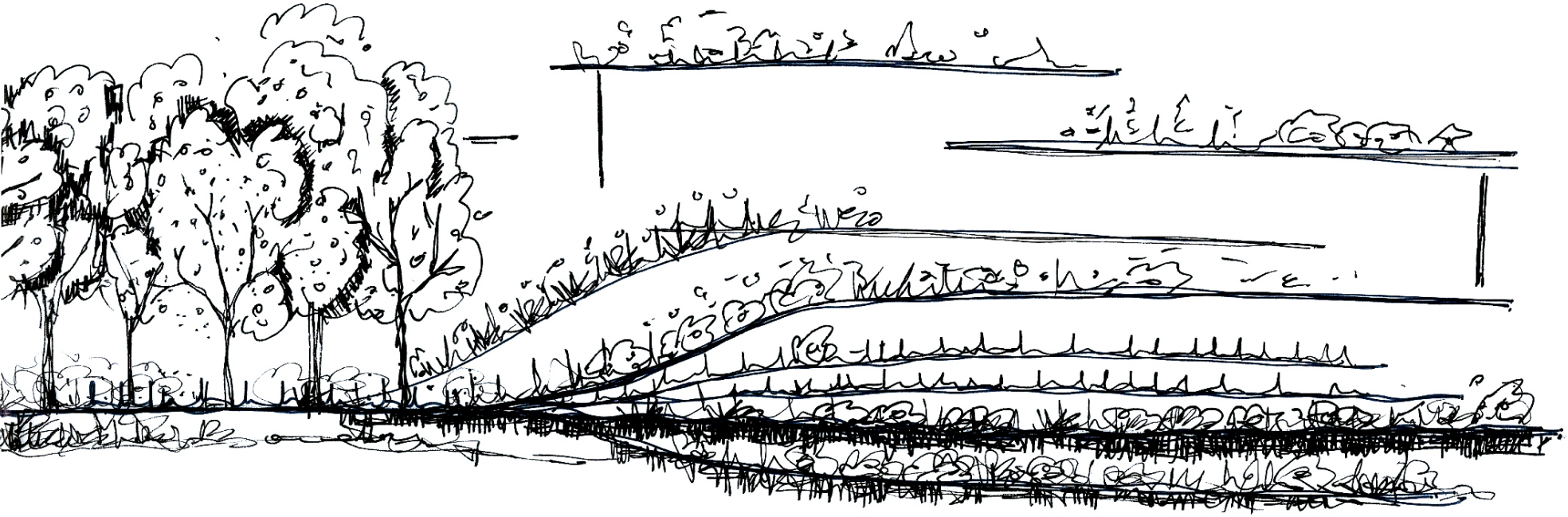
5. CONCEPT



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5.1. INTRODUCTION

The aim of the chapter is to elaborate and explain the design concept of the dissertation. The chapter will explore the conceptual ideas, scenarios and design informants in order to form a concrete base and point of departure for the design intervention.

Firstly, the chapter gives an overview of the concept development process. Secondly, two conceptual ideas will be discussed – the conceptual idea of the new building as a *monastery*, and the conceptual idea of *regeneration*. The conceptual idea of the monastery is rooted in the history of social welfare, the metaphoric attributes of refuge, hope and life, as well as its shared nature. The conceptual idea of regeneration originated in the contextual need thereof, and is grounded in the theoretical approach of *regenerative design, biophilic design and restorative environmental design*.

Thirdly, the chapter will elaborate on the conceptual scenario. The development of the conceptual scenario is a result of the amalgamation of the conceptual ideas and sets the scene for the design dissertation. Fourthly, the main design informants, as determined by the conceptual scenario, will be discussed. The main design informants are: *the regeneration of landscape, the regeneration of heritage, the regeneration of programme, the monastery concept, and the contextual response*. The chapter concludes by synthesizing the above mentioned informants as a parti diagram, in order to constitute the point of departure for the design development.

5.2. OVERVIEW

The aim of the concept development process is to create a platform and point of departure for the design development. The process consists of the exploration and synthesis of different conceptual ideas, scenarios, informants and decisions. The diagram (fig. 1) illustrates the overall concept development process and train of thought concerning early conceptual decisions.

5.3. CONCEPTUAL IDEA: THE MONASTERY

The conceptual idea of the monastery originated from the metaphoric attributes and programmatic parallel it has to the POPUP site. The history of social welfare is also closely linked to the historic development of the monastic culture. Furthermore, the typical courtyard layout of traditional monasteries have always emphasized a visual and physical connection to nature.

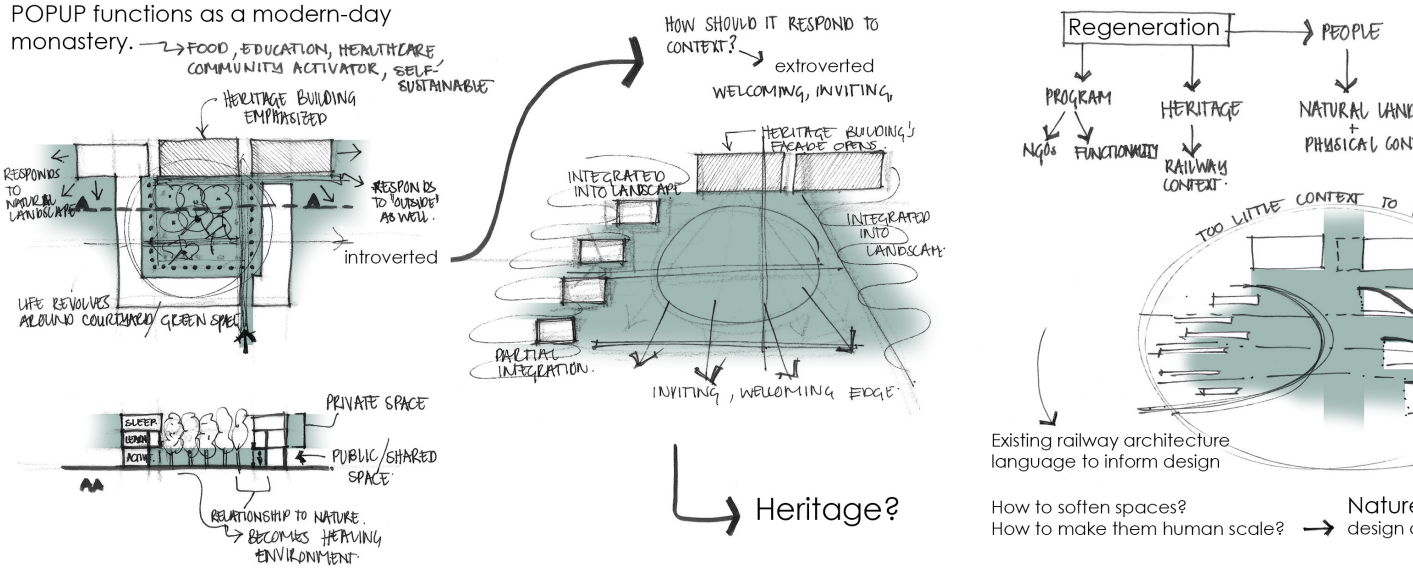

Fig. 5.1. The diagram illustrates the overall concept development process [Author, 2013].

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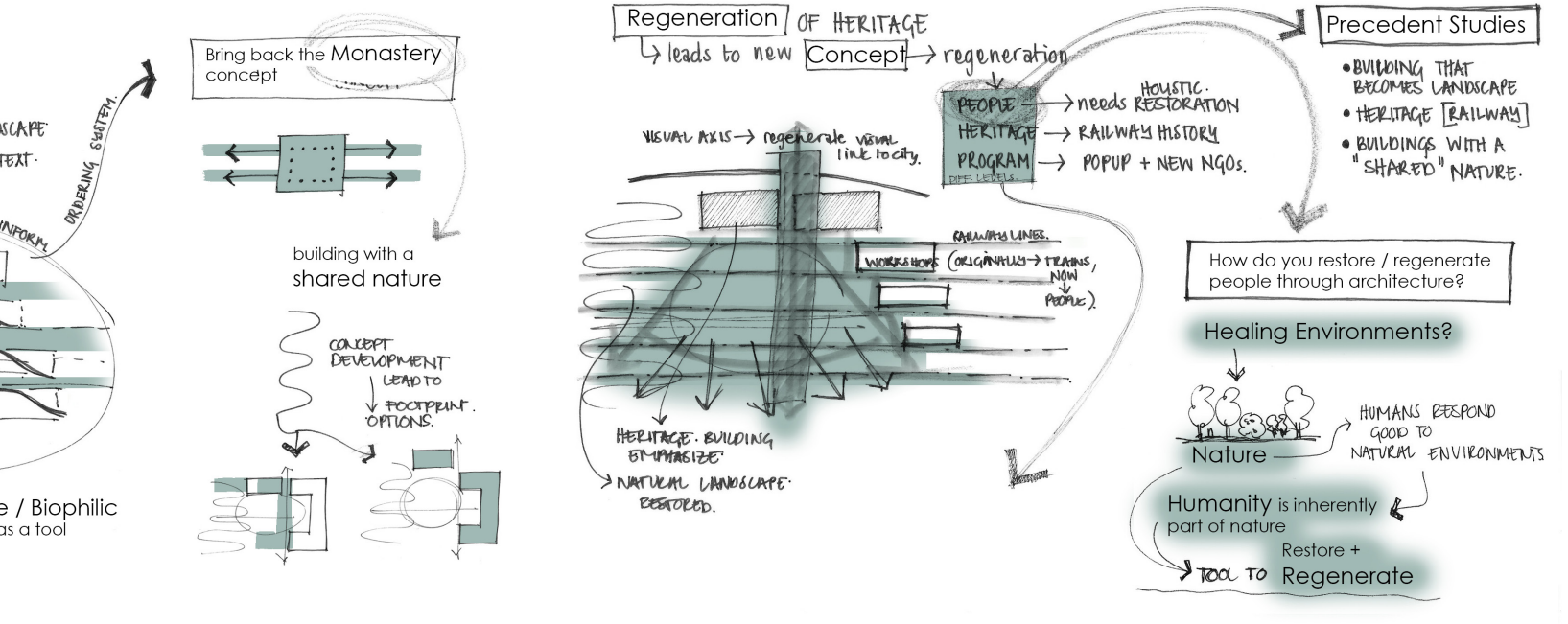
5.3.1. METAPHORIC ATTRIBUTES

POPUP operates as a *modern-day monastery*. Similar to traditional monasteries, POPUP serves the community with medical services and a daily soup kitchen, and teaches the community skills to enable them to generate their own income. Since 2000, when POPUP began as a shelter for the homeless in the old *Chief Mechanical Engineer's Office*, it has become a place of refuge for many underprivileged people in desperate need of restoration. POPUP has become a beacon of hope, light and life in the community of Salvokop, as their aim is the holistic restoration of underprivileged people.

The strategy of *service integration* further enhances the conceptual idea that POPUP operates as a modern-day monastery: The typical monastery consists of both shared spaces and private spaces. Monks and nuns have communal spaces for their communal duties, but also have their own private, secluded spaces, since each of the inmates has their individual vocations and skills to contribute. The wide variety of programmes on the POPUP site and the different organisations responsible for them fulfill similar roles as do the traditional monks and nuns. Communal space is required for communal activities, whereas every organisation and every programme requires private, programme-specific spaces as well.



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5.3.2. PROGRAMMATIC PARALLEL

Monastery

* Church: most important building
* Dormitory
* Infirmary
* Agriculture
* Lecture rooms
* Refectory
* Common rooms
*Manufacturing space
* Library

NPO-Hub

* POPUP building: heritage significance
* Volunteer residence
* Medical clinic
* Agriculture
* Lecture rooms
* Kitchen + dining area
* Shared spaces
* Workshop space
* Training rooms

5.3.3. HUMAN-NATURE CONNECTION

The traditional monastery exhibits a close relationship to nature. Typically the monastery consists of a courtyard, around which monastic life revolves. The theoretical approach suggests that the restorative qualities of nature are evident from humanity's inherent affinity towards nature. In accordance to the theoretical approach, a close human-nature connection exists and plays an integral part in the traditional monastery.

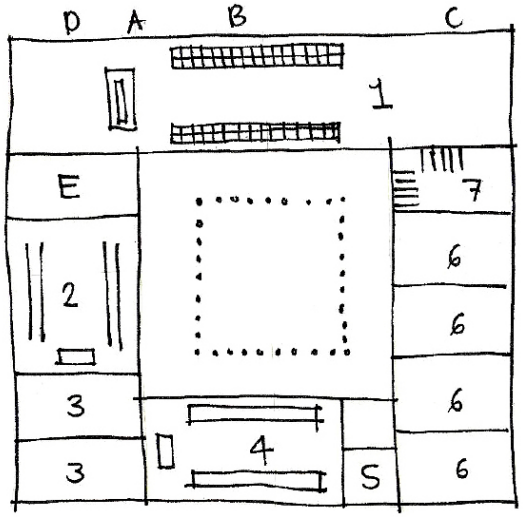

Fig. 5.3. Typical layout of a traditional monastery, based on a drawing by Le Corbusier [Le Corbusier,1960].

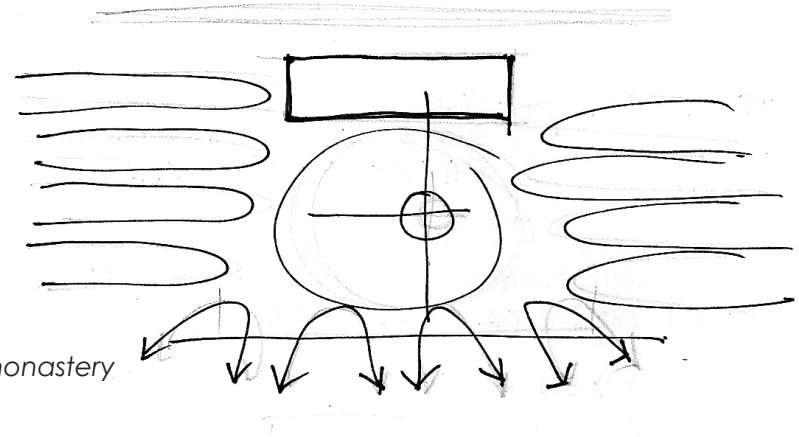

Fig. 5.2. Reinterpretation of the typical monastery to become extroverted [Author, 2013].

5.3.4. DIAGRAMMATIC DEVELOPMENT

The series of diagrams illustrates the application of the above-mentioned metaphoric attributes, programmatic parallel, and human-nature connection to the POPUP site.

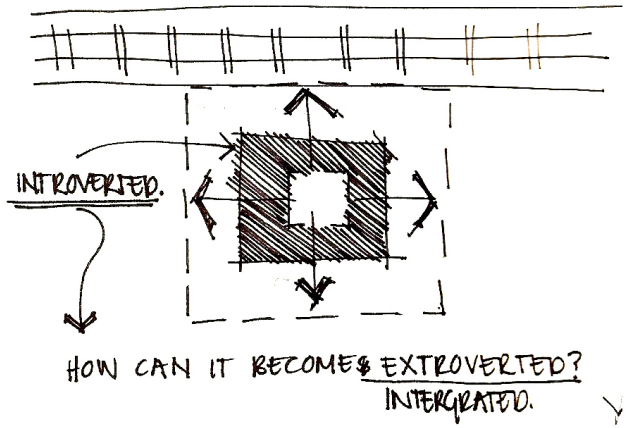

Fig. 5.4. The diagram illustrates the introverted nature of a monastery with regard to the POPUP site [Author, 2013].

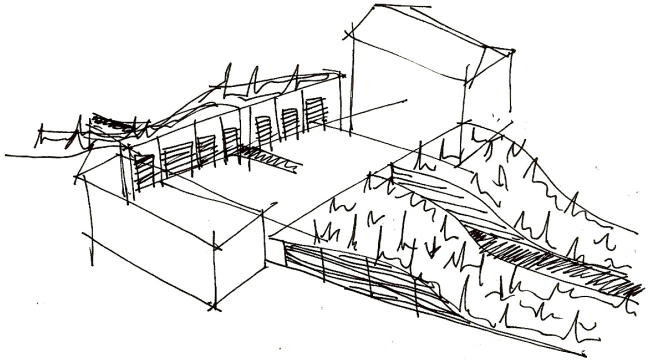

Fig. 5.5. Reinterpretation of the typical monastery with regard to the context of the site [Author, 2013].

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5.4. CONCEPTUAL IDEA: REGENERATION

As discussed in Chapter 2, the theoretical platform for the dissertation consists of three separate but collaborate theoretical approaches: *Regenerative design,* that consists of low-impact technologies and nature as an equal shareholder or building block of architecture [Littman, 2009]; *biophilic design*, that is the representation of the relationship between nature and humanity [Kellert, 2008]; and *restorative environmental design* that combines biophilic features with low-impact technologies [Kellert, 2005]. Furthermore, Chapter 3 identifies the contextual need for regeneration and explores various site possibilities with regard to the design informants.

The conceptual idea of regeneration is based on the above-mentioned theoretical approach and contextual need for regeneration. The conceptual idea is explored in the identified design informants – *the regeneration of natural landscape, the regeneration of heritage, and the regeneration of programme*.

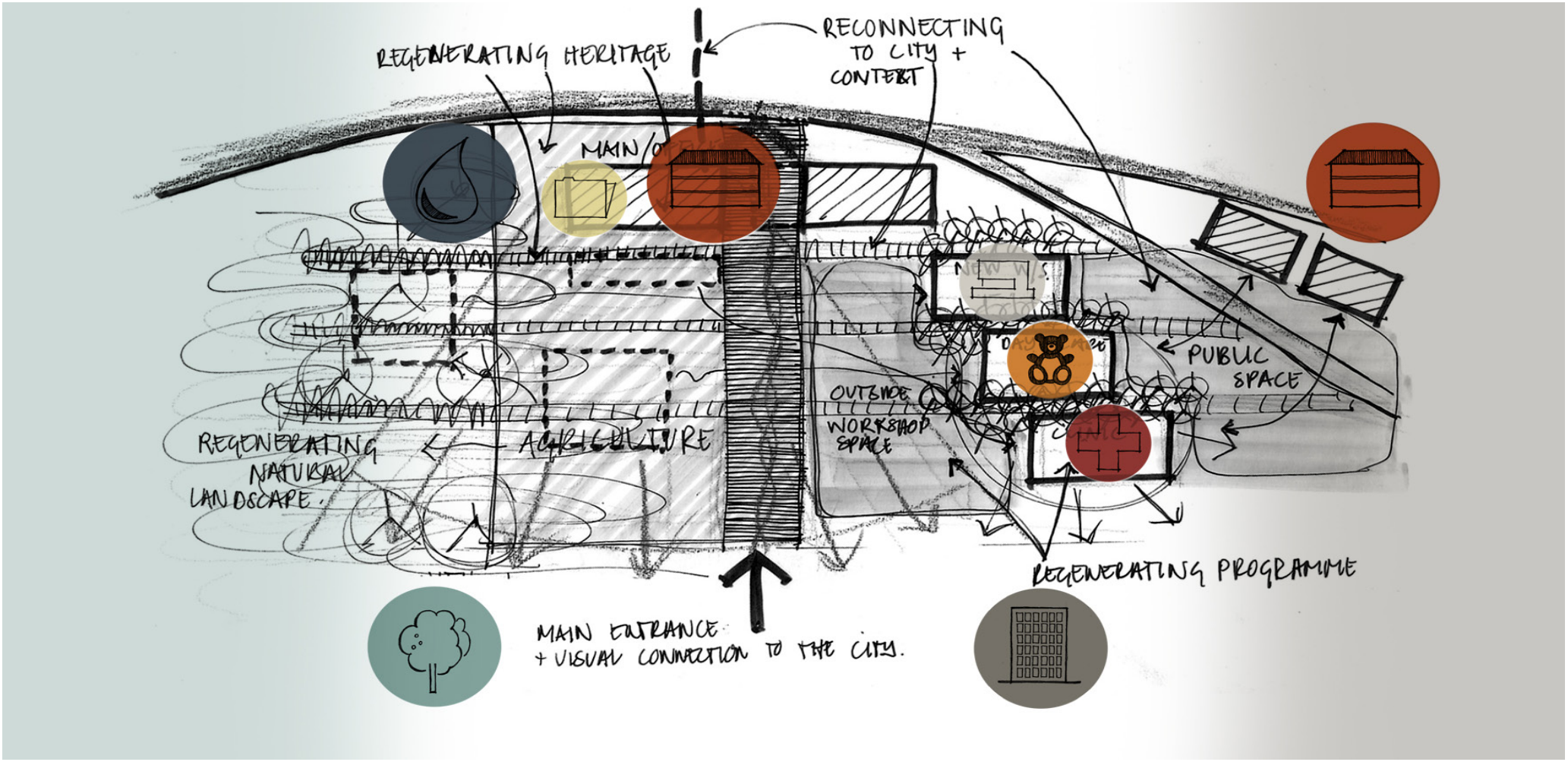

Fig. 5.6. The application of the conceptual idea of regeneration to the site [Author, 2013].

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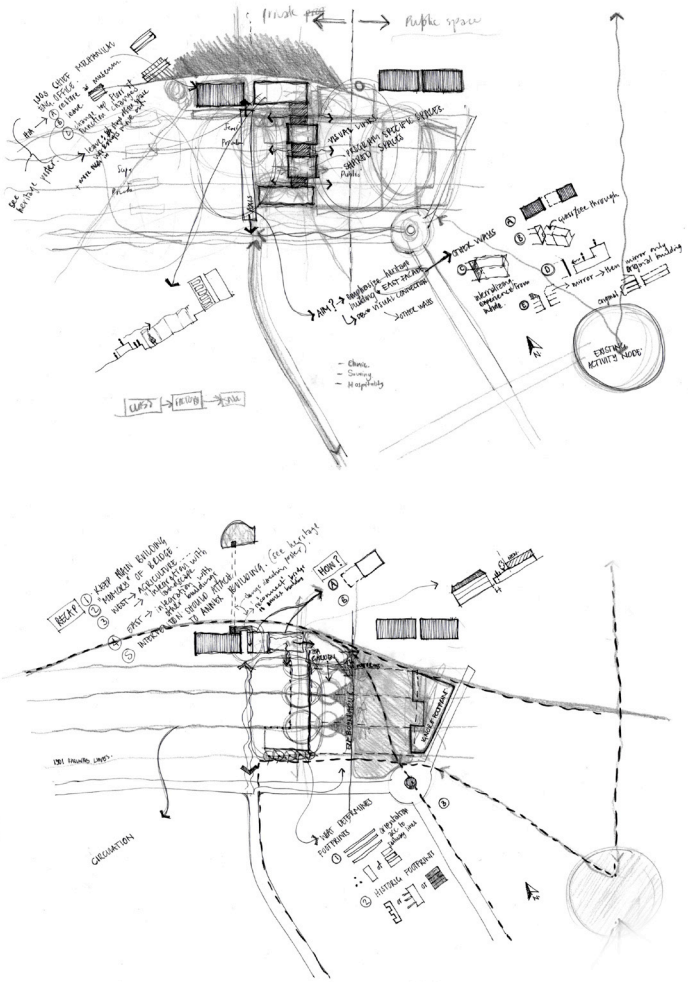
5.5. CONCEPTUAL SCENARIO

The conceptual scenario is a combination of the conceptual ideas of *the monastery and regeneration* in context to the site. The following diagrams explore the site possibilities with regard to the conceptual scenario and synthesize the possibilities in order to establish a point of departure for the design development.



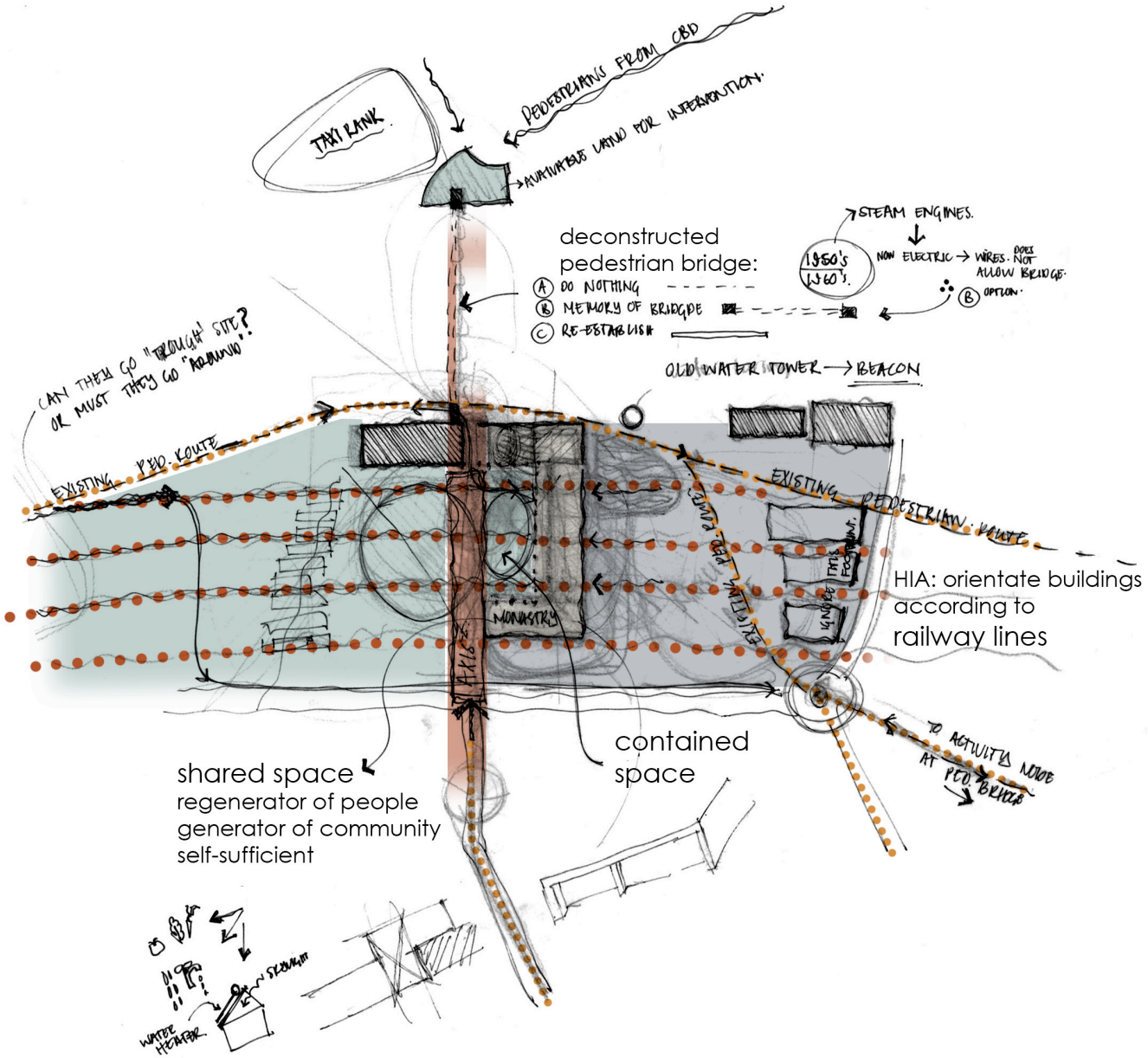


Fig. 5.7. Conceptual scenario exploration [Author, 2013].

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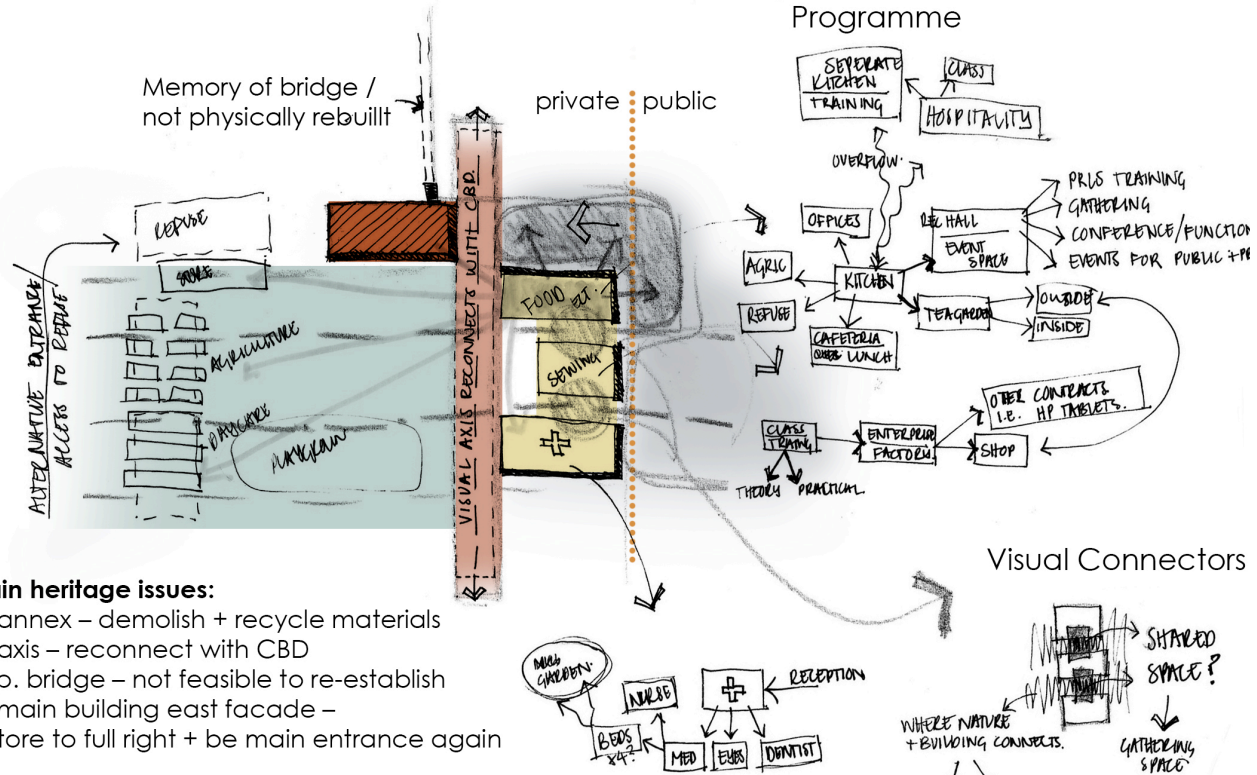
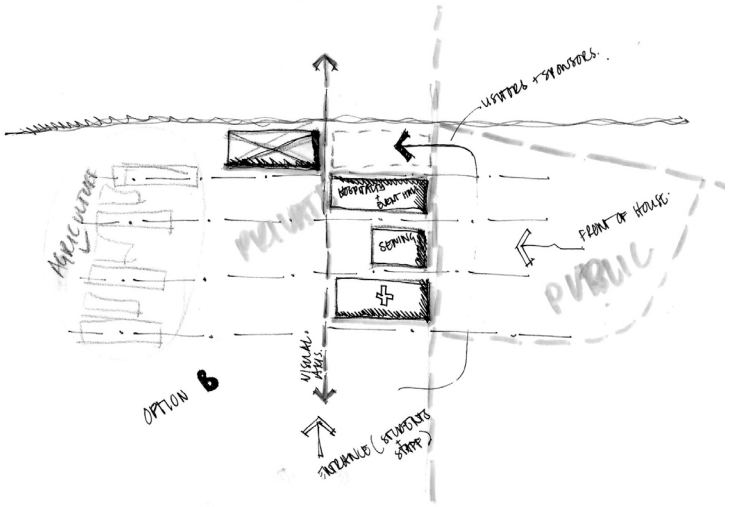
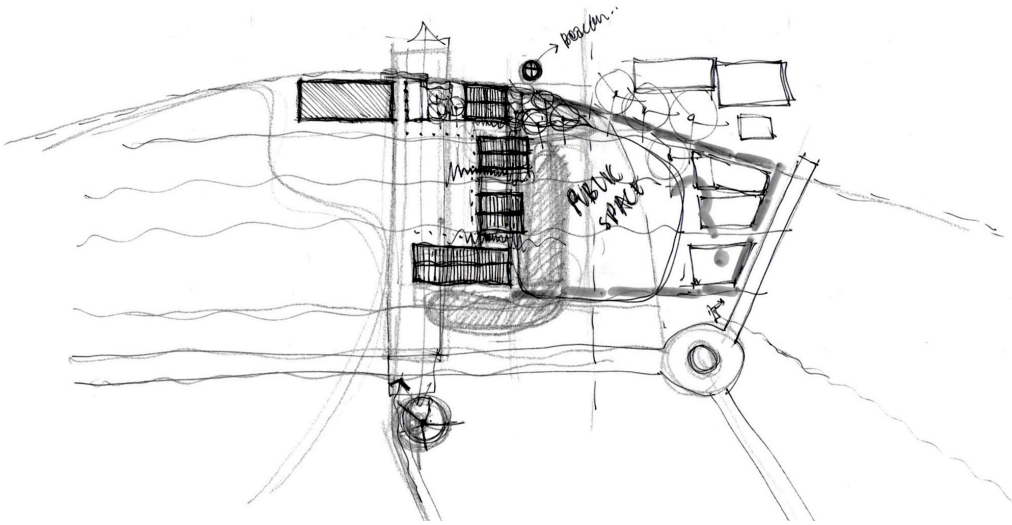
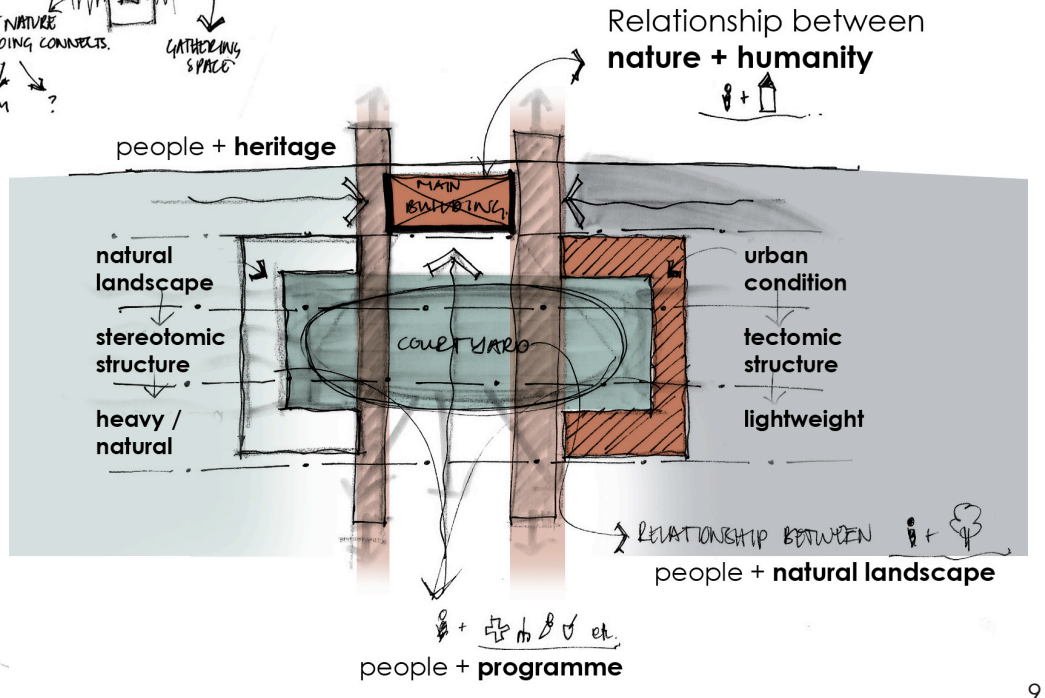




Main heritage issues:
a) annex – demolish + recycle materials
b) axis – reconnect with CBD
c) p. bridge – not feasible to re-establish
d) main building east facade –
restore to full right + be main entrance again





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5.6. DESIGN INFORMANTS

The design informants, as identified by the theoretical and contextual responses to the dissertation, are illustrated in the following diagrams.

5.6.1. REGENERATION OF NATURAL LANDSCAPE

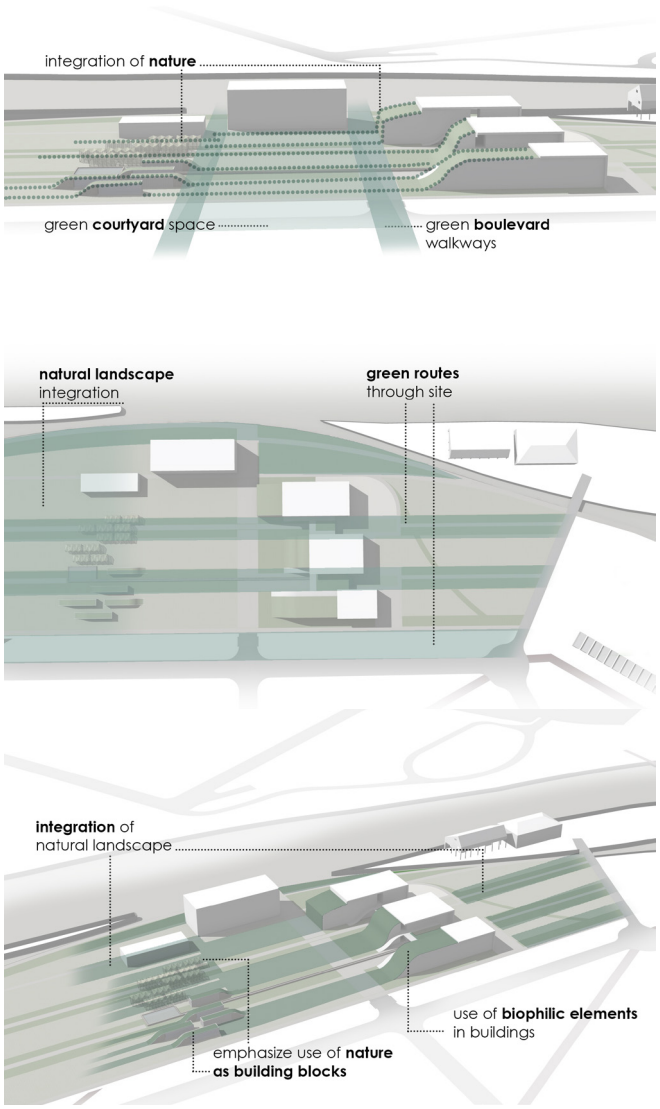

Fig. 5.8. The diagrams illustrate the regeneration of natural landscape [Author, 2013].

5.6.2. REGENERATION OF HERITAGE

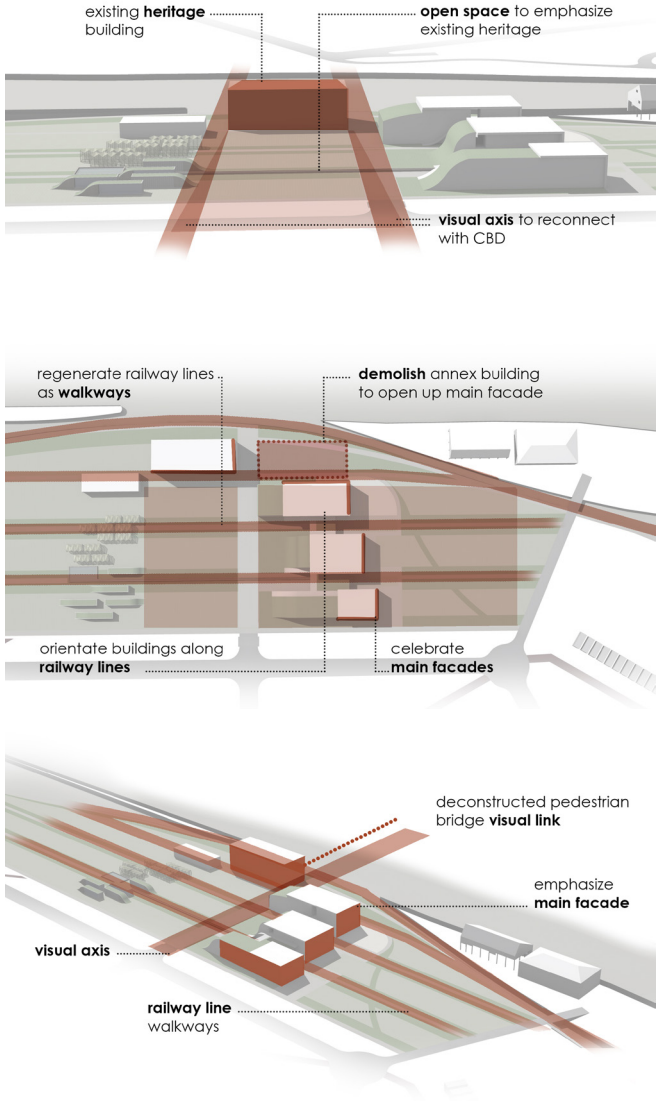

Fig. 5.9. The diagrams illustrate the regeneration of heritage [Author, 2013].

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5.6.3. REGENERATION OF PROGRAMME

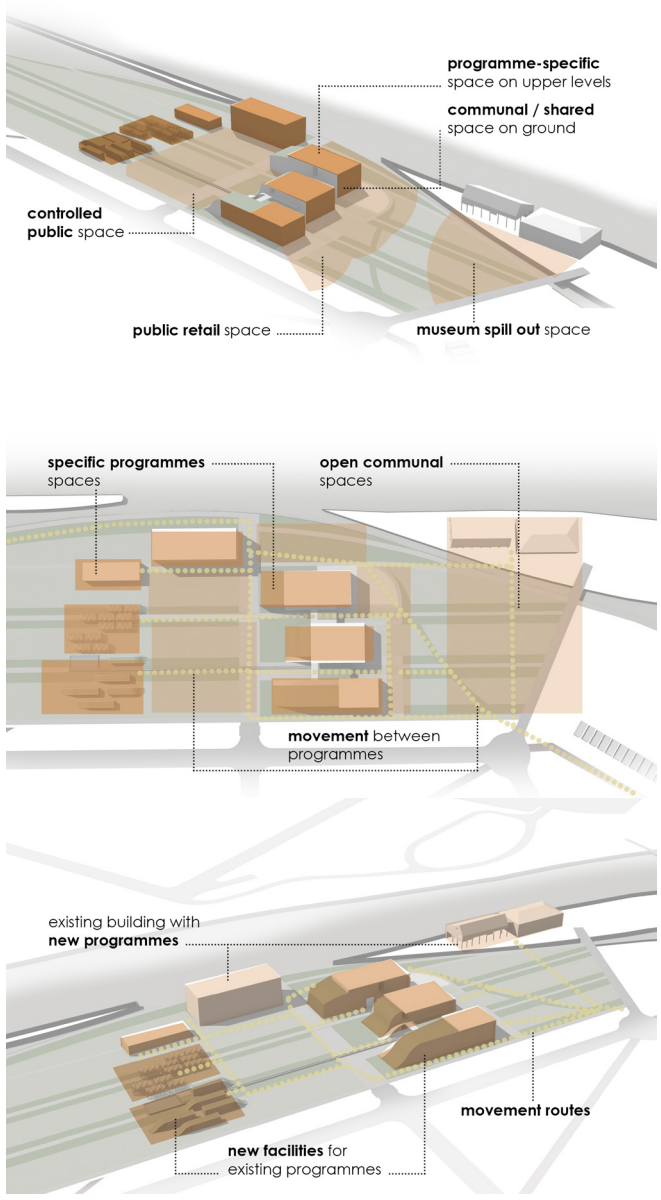

Fig. 5.10. The diagrams illustrate the regeneration of programme [Author, 2013].

5.6.4. MONASTERY CONCEPT

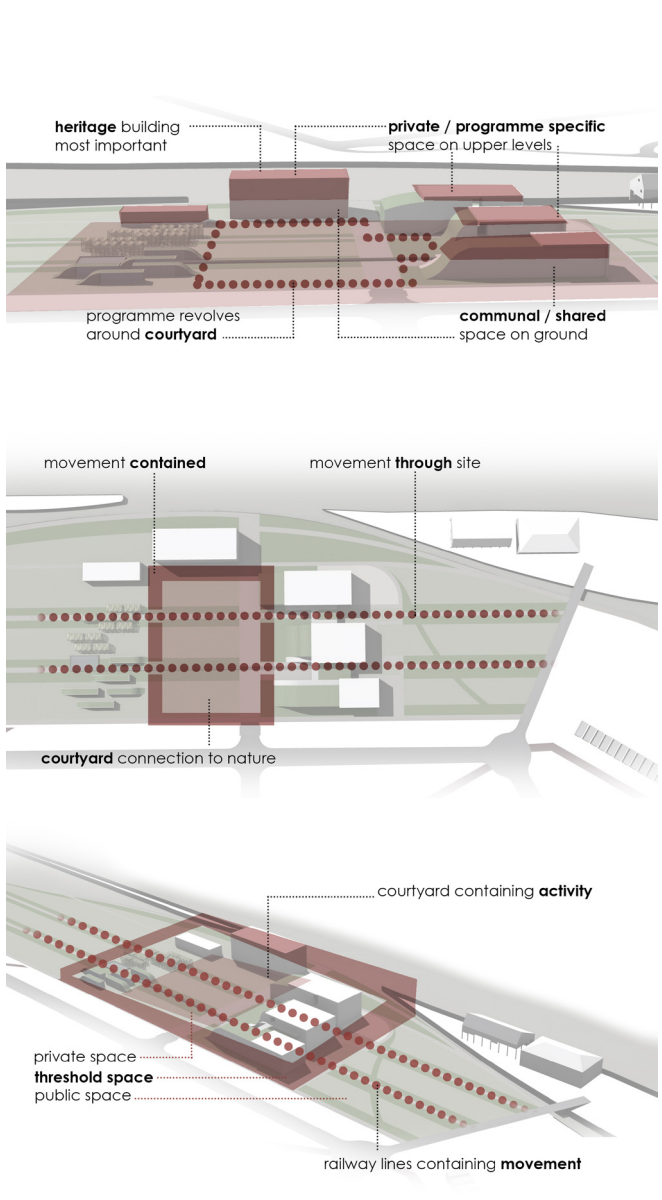

Fig. 5.11. The diagrams illustrate the monastery concept [Author, 2013].

5.6.5. RESPONSE TO CONTEXT

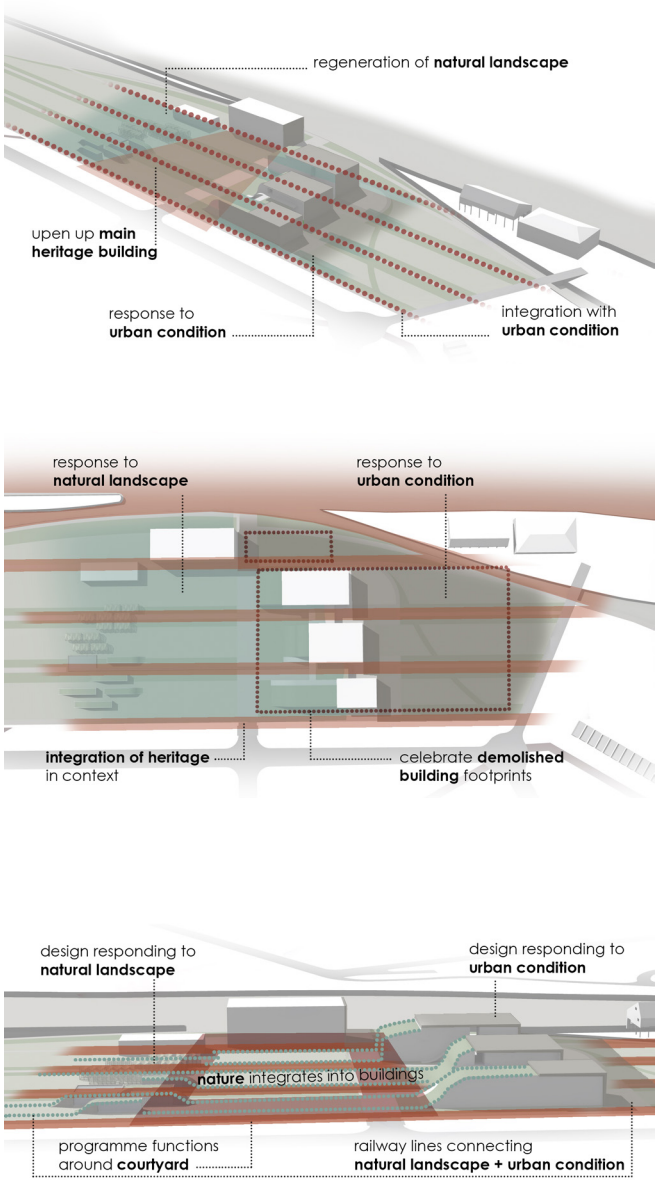

Fig. 5.12. The diagrams illustrate the response to the context [Author, 2013].

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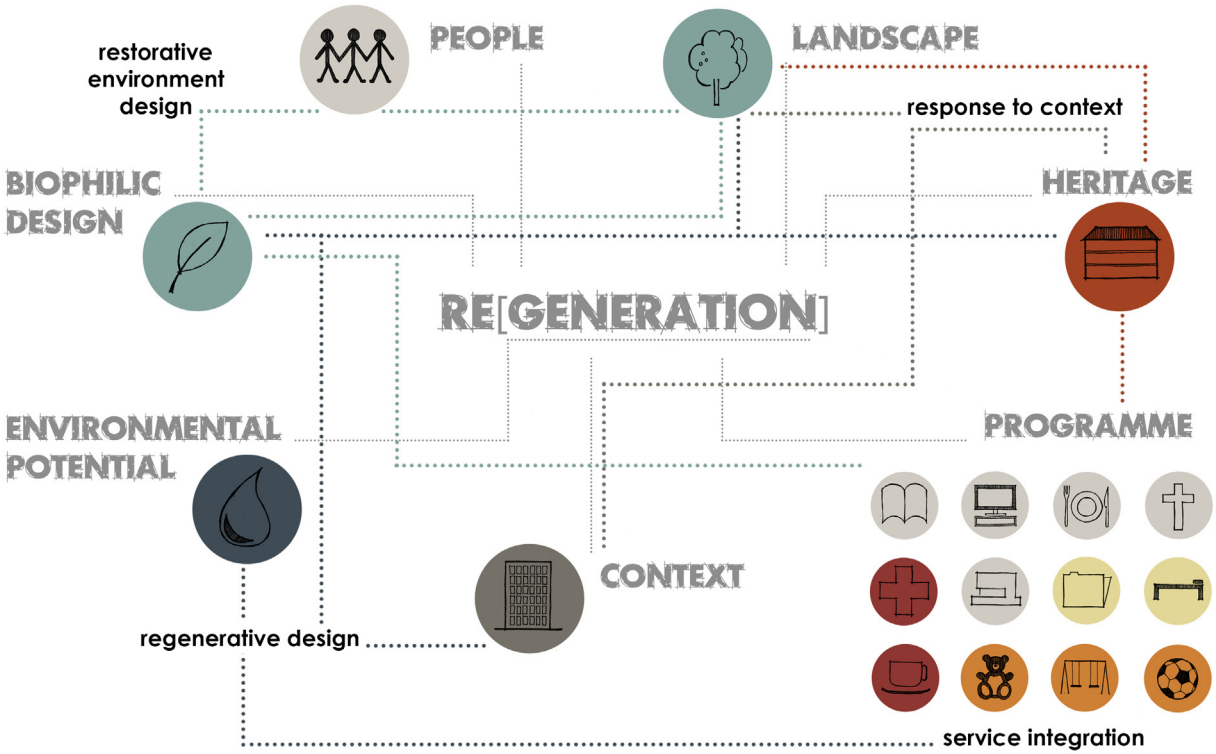
5.7. CONCEPT PARTI DIAGRAM

The concept parti diagram is a synthesis of the conceptual scenario and the design informants with regard to the site and context. The diagram illustrates the point of departure for the design development.

5.8. CONCLUSION

The chapter has served to elaborate and explain the design concept for the dissertation. The conceptual ideas of the building as a monastery, and regeneration have been discussed. The conceptual scenario with regard to the site and context has been explored and elaborated. The design informants have been illustrated and synthesized in a parti diagram in order to form the starting point for the design development.



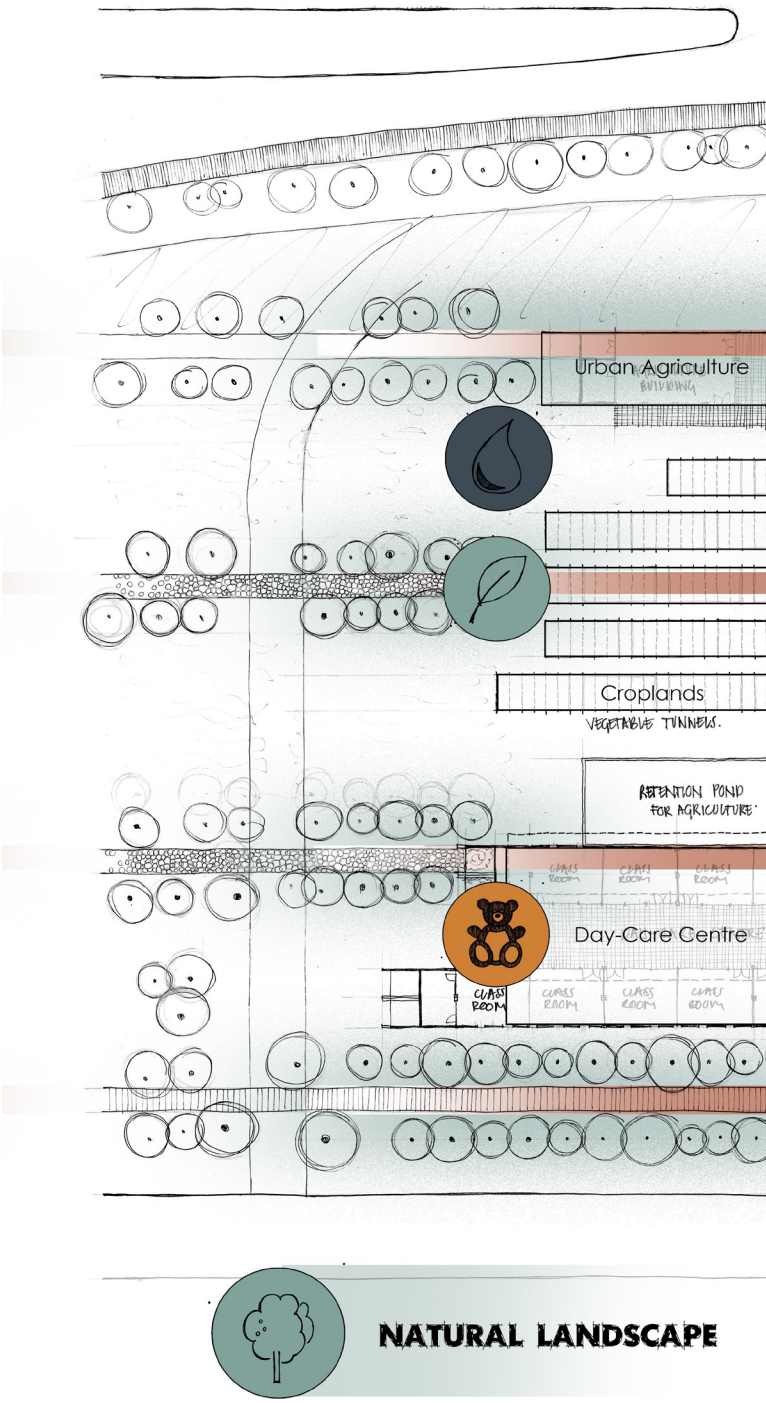


Fig. 5.13. Design informants and theoretical approach [Author, 2013].

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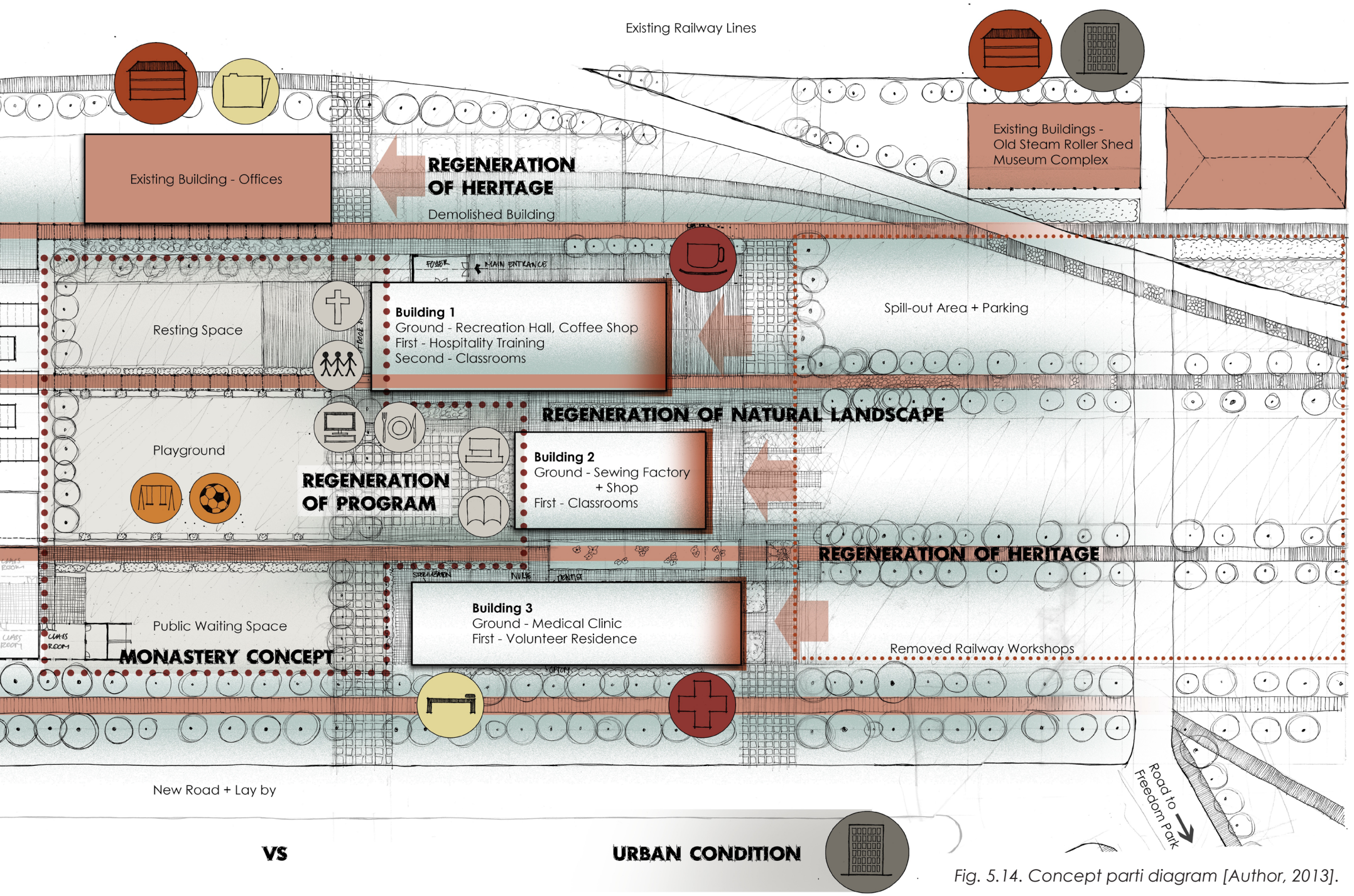

Fig. 5.14. Concept parti diagram [Author, 2013].

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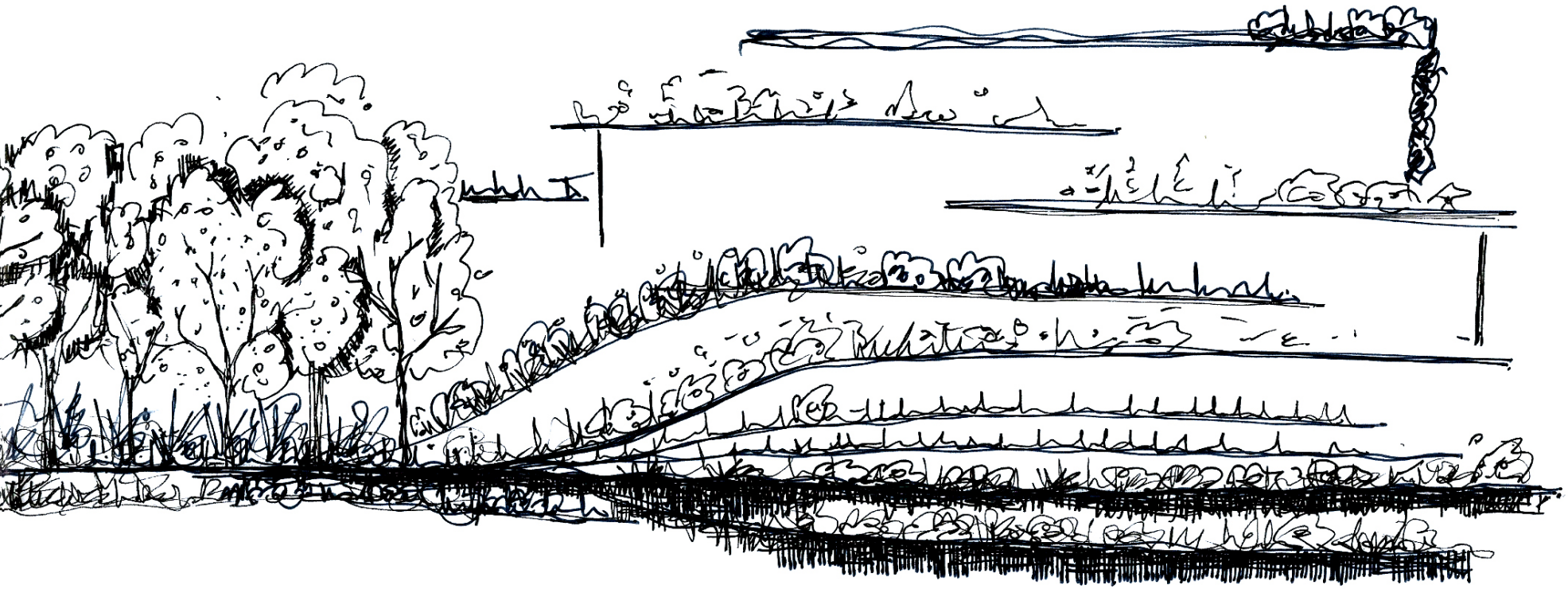
6. PRECEDENT STUDIES



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6.1. INTRODUCTION

The aim of the chapter is to elaborate and evaluate the precedent studies of the dissertation. The selected precedents assist the design development on an urban and architectural scale. According to the theoretical-, contextual-, programmatic and conceptual approaches, three categories of precedents were identified that will be discussed in the chapter.

In recapitulation: The theoretical approach consists of *regenerative design, biophilic design, and restorative environmental design* (see Chapter 2). The contextual approach emphasizes a *regenerative response to heritage and the relationship between natural landscape and the urban condition* (see Chapter 3). The programmatic approach incorporates the strategy of service integration in response to the social condition (see Chapter 4). The conceptual approach is composed of the main design informants: *the regeneration of landscape, the regeneration of heritage, the regeneration of programme, the monastery concept, and the contextual response* (see Chapter 5).

According to the above approaches and design informants the precedent studies' categories were identified as: *regeneration of railway heritage in an urban environment, building that becomes landscape, and building with a shared nature*.

6.2. REGENERATION OF RAILWAY HERITAGE IN AN URBAN ENVIRONMENT

6.2.1. SCHÖNEBERGER SÜDGELÄNDE PARK - ODIOUS

Location: Berlin, Germany
Date: 2008-2009

The Tempelhof switchyard was once a lively railway site, but was shut down after World War II in 1952 and has become derelict and dilapidated. After the railway life of the site ceased, nature has emerged again in and around the site. After 50 years of natural regeneration and communal efforts by local citizens, the site is now a public park. Today it is a natural oasis in the heart of the city [Landezine, 2013].

The Südgelände Nature Park consists of a rich and diverse species of vegetation, including dry grassland, jungle-like woodland and herbaceous vegetations. Dilapidated buildings and constructions on the site were restored and are used today by experimental and performance artists, as well as filmmakers [Landezine, 2013].

The Südgelände Nature Park has a history similar to that of Salvokop and, more specifically, the proposed master plan (see Chapter 3). The Tempelhof switchyard, like the Salvokop switchyard, was also shut down (after WWII) and the site has become derelict and dilapidated. Over the years nature has gradually intervened by regenerating the site with new vegetation, proving that nature can restore itself.

Furthermore, the Südgelände Nature Park informs the conceptual idea of using the existing theme of natural regeneration, rather than destroying

Fig. 6.1. Südgelände Nature Park Master Plan [Stadtentwicklung, 2011].

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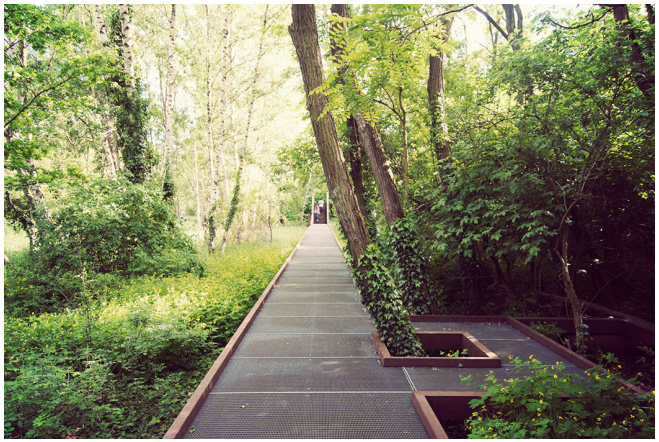

Fig. 6.2. View of a pathway / regenerated railway line in the park [Landezine, 2013].

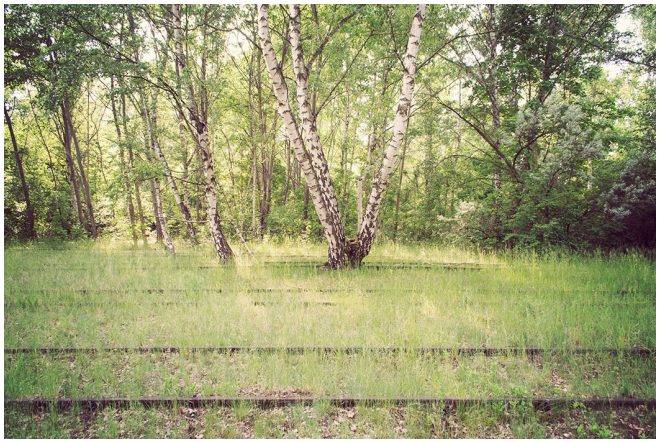

Fig. 6.3. Old railway lines covered by new vegetation [Landezine, 2013].

Fig. 6.5. Picnic area in the park [Landezine, 2013].

nature for commercial development. Although this urban green space has arisen on its own, the formal intervention of landscape architecture has proven to create a powerful, recreational and rejuvenating public space for all.

Similar to the Südgelände Nature Park, the master plan also proposes a natural, recreational public space that celebrates the heritage significance of Salvokop and creates the opportunity for the local community to become an active part of it.

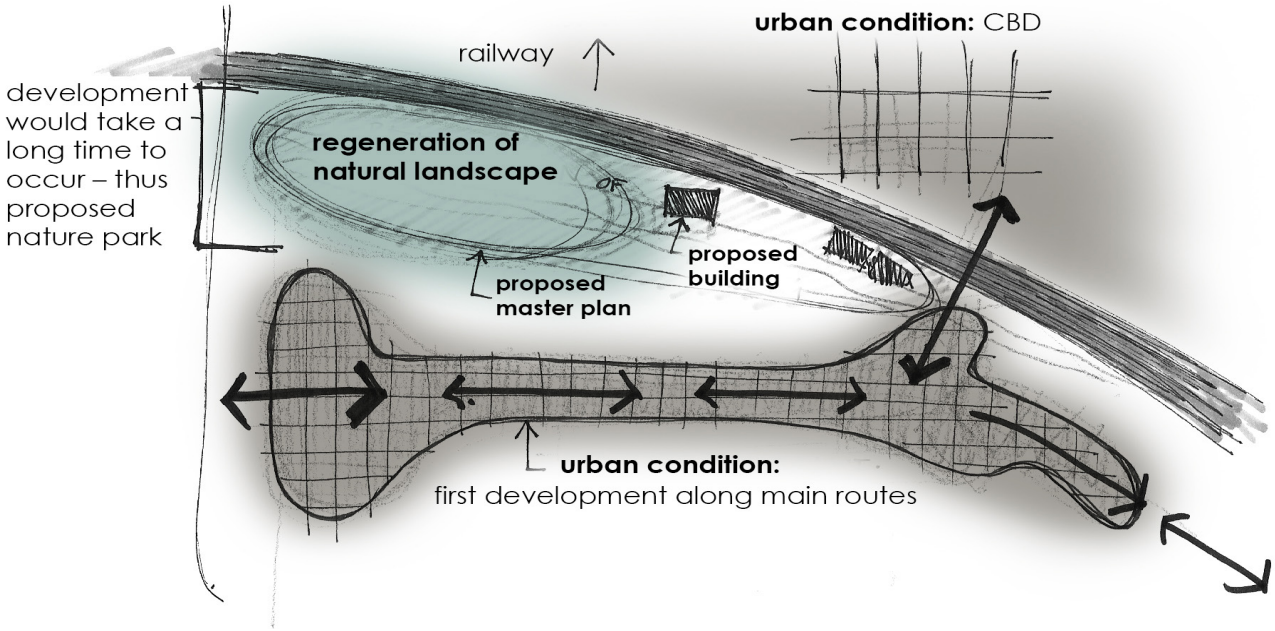

Fig. 6.4. Diagram of the proposed master plan illustrating the conceptual idea of natural regeneration from the Südgelände Nature Park [Author, 2013].

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6.2.2. NEW YORK HIGH LINE - JAMES CORNER FIELD OPERATIONS AND DILLER SCOFIDIO & RENFRO ARCHITECTS

Location: New York, USA
Date: 2004-2009

The New York High Line was the former West Side industrial railway. It was built in the 1930's for freight trains and spans 2,4 km on an elevated steel structure. Since 1980 it has been out of use and has become derelict. Instead of removing the dilapidated structure it has been converted into an elevated park that overlooks the city skyline and the Hudson River [Cilento, 2009].

The park consists of more than a dozen access points with different key components at every entrance to attract visitors. The enticing components include the sun deck and water feature, open lawn and seating steps, and viewing areas [Cilento, 2009].

The wild vegetation and the paved pathway gradually integrates with one another, resulting in areas with pure vegetation, areas with pure walkways, and areas with a combination of both. This gives the public a subtle, natural experience of the space in contrast to the dominating surrounding buildings. Indigenous and endemic plant species were selected to revive the local natural environment [Cilento, 2009].

The High Line project was described by Mayor Michael Bloomberg as: *an extraordinary gift to our city's future... It really does live up to its highest expectation*. The High Line has become a community activator that offers various social benefits and has initiated over 30 new recreational projects [Cilento, 2009].

Fig. 6.8. Walkway and seating area of the High Line [ArchDaily, 2009].

Fig. 6.9. City buildings surrounding the High Line [ArchDaily, 2009].

Fig. 6.6. Aerial view of the New York High Line [ArchDaily, 2009].

Fig. 6.7. Seating area and view of the High Line [ArchDaily, 2009].

Fig. 6.10. Seating area and view from the High Line [ArchDaily, 2009].

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The High Line demonstrates the adaptive reuse of a historic railway that has been transformed into a carrier of people instead of trains. It recognizes the existing railway heritage of the city, while at the same time offering a beautiful, rejuvenating park that addresses the existing need for public green space in the city.

It reveals a gentle way of integrating the physical and natural environment. In the broader context it merges a living landscape into an artificial built environment. On a more detailed level, it seamlessly amalgamates the paved walkways and wild vegetation. With regard to the design dissertation, the New York High Line illustrates the successful integration of building and landscape, the restoration of heritage and the regeneration that natural environment brings forth.

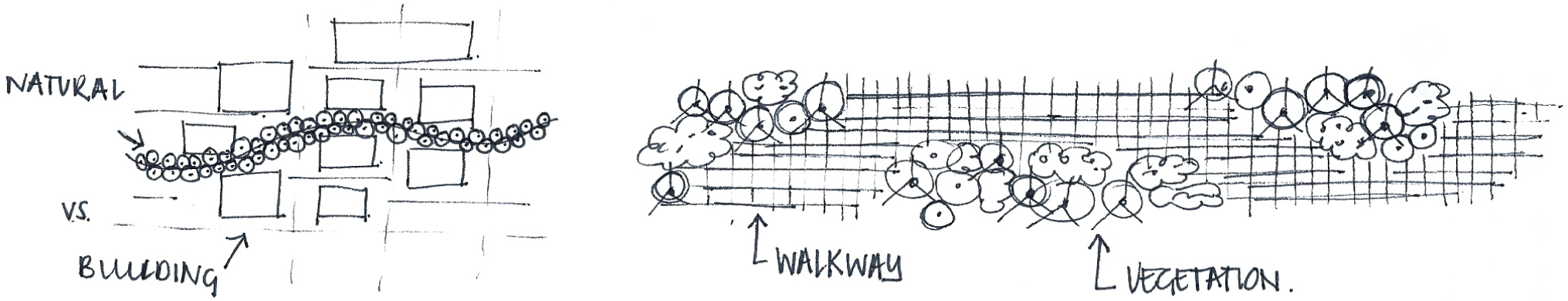

Fig. 6.11. Relationship between building and landscape in the larger context and detailed level of the walkways [Author, 2013].

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6.3. BUILDING THAT BECOMES LANDSCAPE

6.3.1. LANDESGARTENSCHAU / LANDSCAPE FORMATION ONE - ZAHA HADID ARCHITECTS

Location: Weil am Rhein, Germany
Date: 1996-1999
Client: City of Weil am Rhein
Area: 845 m2

Landscape Formation One is an event and exhibition space designed for the 1999 garden festival in Weil am Rhein, Germany. Based on the study on natural landscapes, the building evokes fluid spatiality. It rejects the concept of the building as an *isolated object* and rather integrates itself into the surrounding context by dissolving into the natural topography [Zaha Hadid Architects, 2013].

The design consists of different organically shaped pathways that twist and connect to form the building. These entangled paths and interwoven spaces create the exhibition hall, café and environmental centre. These main spaces run along the *natural sunlight*, a south facing terrace and solar energy sources [Zaha Hadid Architects, 2013].

The topographical formations of landscape, such as river deltas, mountain ranges, forests, deserts, canyons, ice flows and oceans, become the source of inspiration and not the simple imitation of nature. The building acquires its form through an abstraction of nature rather than surrendering to nature [Jodidio, 2006].

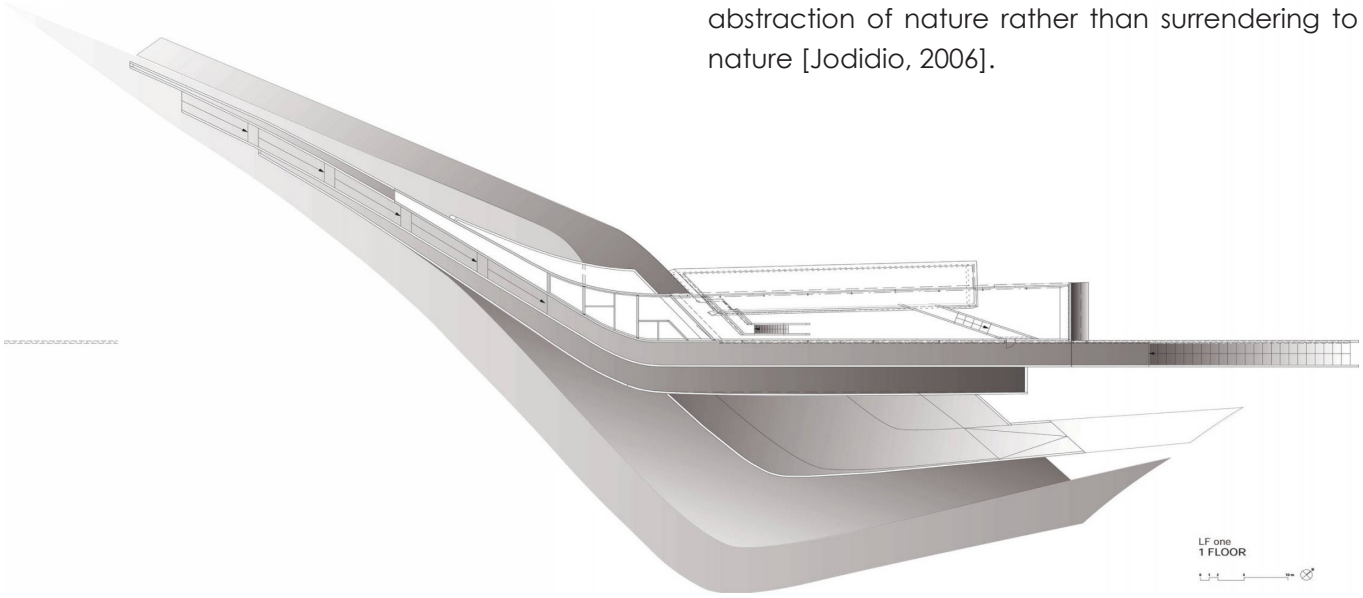

Fig. 6.12. First floor plan [Zaha Hadid Architects, 1999].

Fig. 6.13. Pathways around and through the building [Zaha Hadid Architects, 1999].

Fig. 6.14. Western facade and ramp leading up and over the building [Zaha Hadid, 1999].

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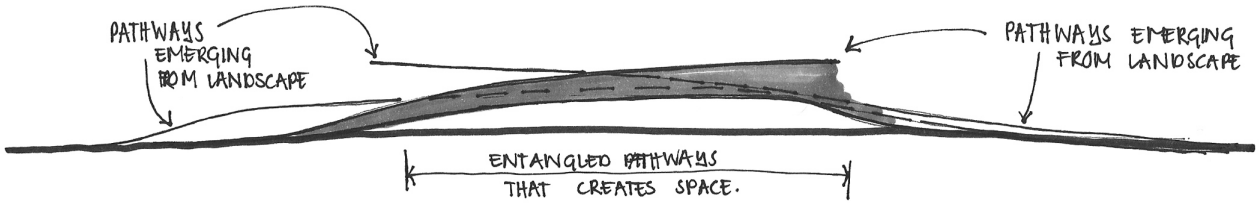


Fig. 6.15. The integration between building and landscape on elevation [Author, 2013].

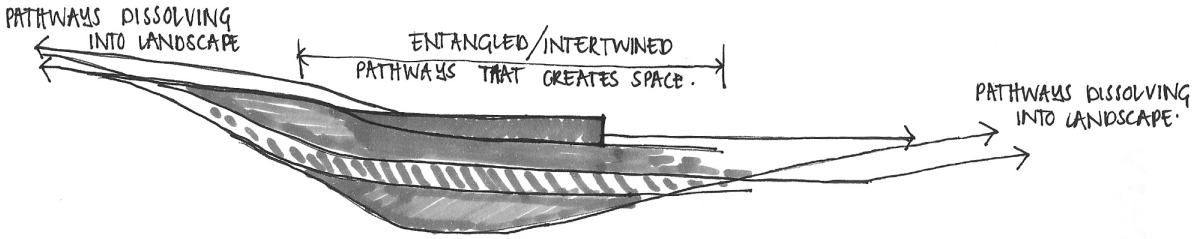
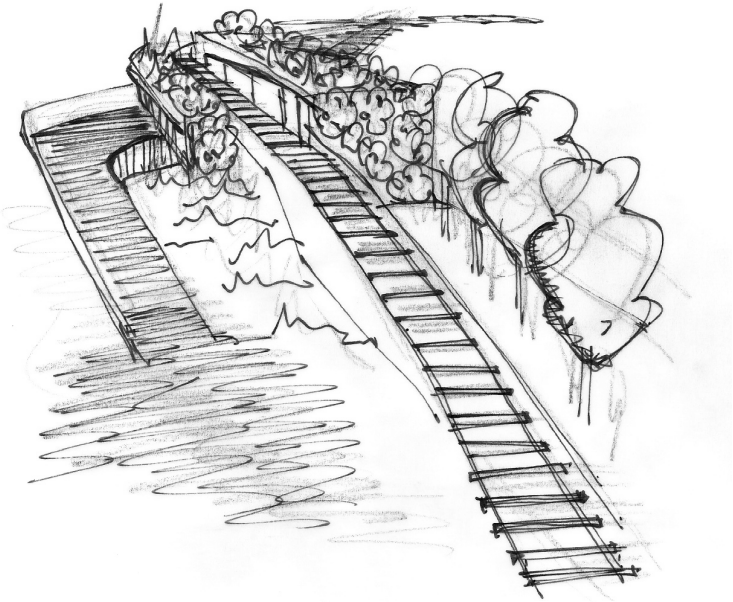


Fig. 6.16. The integration with landscape using different ramps and pathways [Author, 2013].

Landscape Formation One is a good example of a building that physically integrates itself into the landscape. The building and the landscape become one. Various pathways and routes of curiosity pulls the observer naturally into the main spaces.

With regard to the dissertation, Landscape Formation One evokes principles of how the regenerated railway lines can be used as the *pathways* that lead the observer into the new building and even generate the form of the proposed building. Contrasting the use of railway lines as carriers of trains, it now becomes the carrier of people that escorts the observer along, through, over and in the new building.



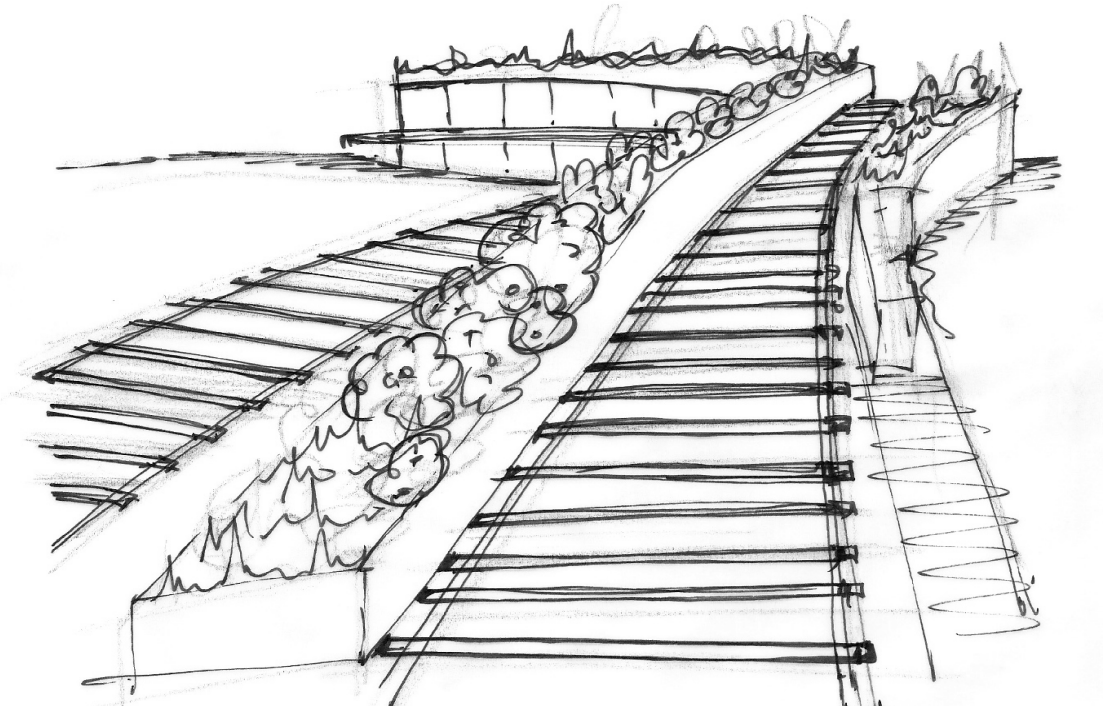


Fig. 6.17 & 6.18. The diagrams illustrate the conceptual idea that arises from the precedent study [Author, 2013].

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6.3.2. IBN INSTITUTE FOR FORESTRY AND NATURE RESEARCH - BEHNISCH ARCHITEKTEN

Location: Wageningen, The Netherlands
Date: 1994-1998
Area: 11800m2

The IBN Institute for Forestry and Nature Research is a user-friendly research facility that is designed in harmony with nature. Rather than dominating its rural setting, it embraces the surrounding landscape and all workplaces are in contact with indoor or outdoor gardens. The two indoor gardens form informal meeting and activity spaces that reconnect the users and building to nature [Behnisch Architekten, 1998].

The building emphasizes the use of ecological construction and energy performance. It bears evidence that the incorporation of sustainable building techniques can be realized without additional costs [Behnisch Architekten, 1998].

The plan and section of the building resembles formalistic similarities to the design dissertation proposal and demonstrates the use of integrative indoor garden spaces. The IBN Institute successfully creates spaces that amalgamate interior and exterior spaces, along with indoor and outdoor environments. On plan and section the building demonstrates and utilizes the surrounding natural landscape to create efficient spaces between the two extremes.

Fig. 6.19 & 6.20. Indoor gardens with informal meeting and activity spaces [Behnisch Architekten, 1998].

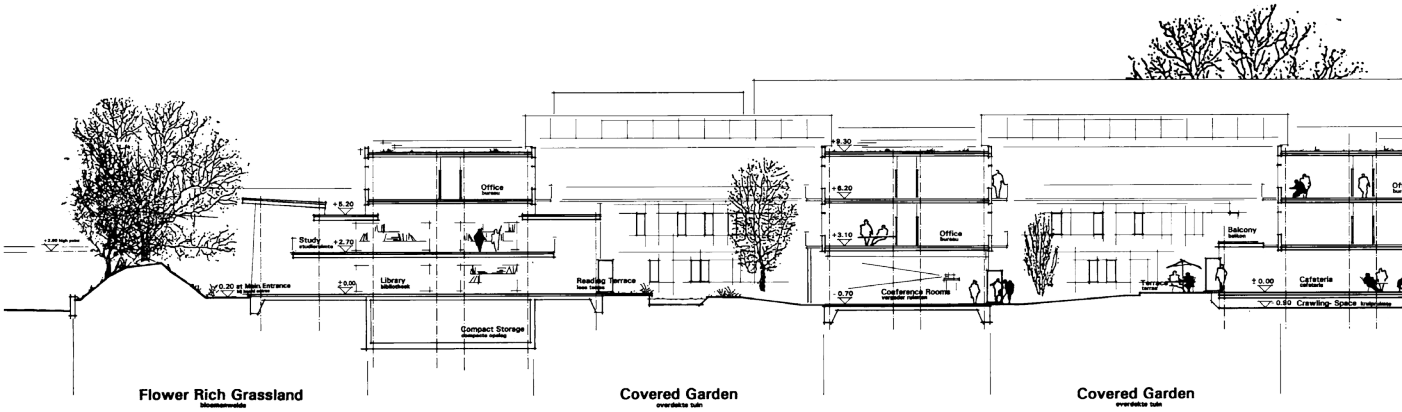

Fig. 6.21. Section of the building illustrating the relationship between indoor and outdoor spaces, as well as informal and formal workplaces [Behnisch Architekten, 1998].

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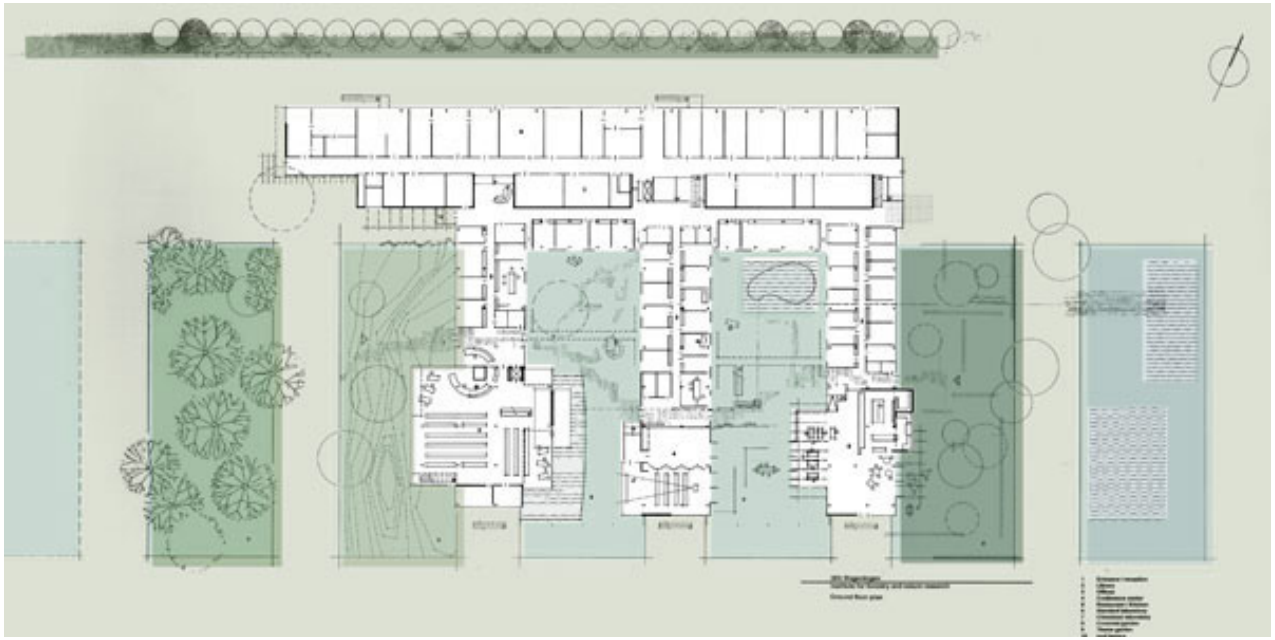


Fig. 6.22. Ground floor plan of the building illustrating the indoor and outdoor gardens and the integrative relationship of the building with the surrounding landscape [Behnisch Architekten, 1998].

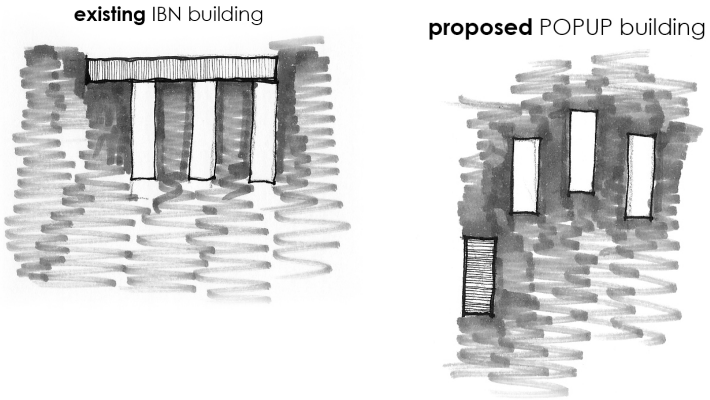
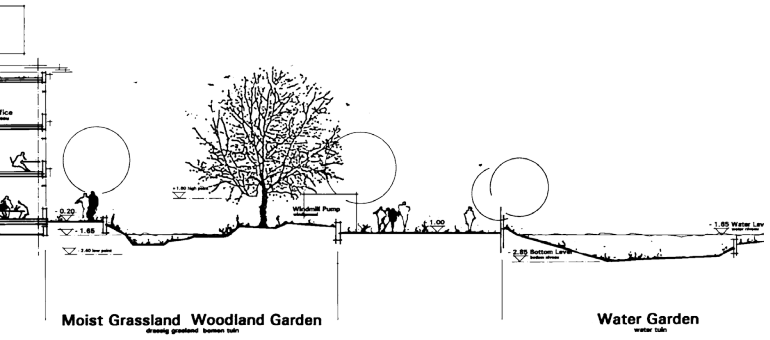


Fig. 6.25 & 6.26. Relationship between building and landscape [Author, 2013].



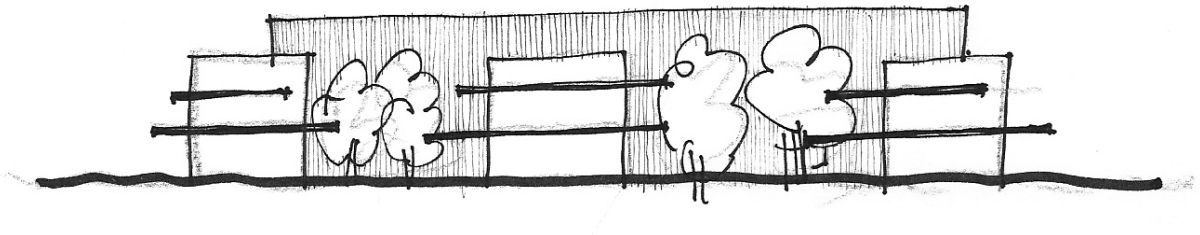


Fig. 6.23. Diagram illustrating a section of the existing IBN building [Author, 2013].

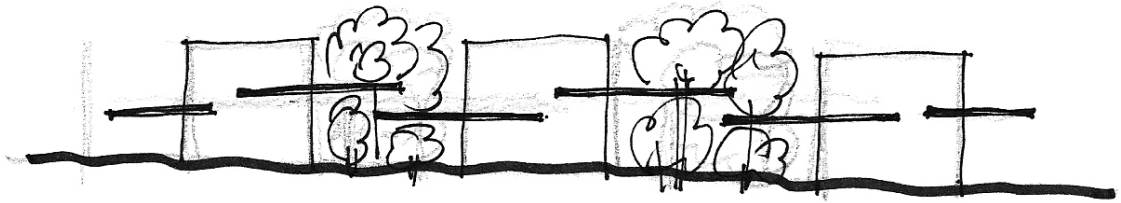


Fig. 6.24. Diagram illustrating a section through the proposed building that formalistically resembles the IBN building [Author, 2013].

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6.3.3. TO SPIN A YARD - ATELIER ALTERN

Location: Amiens, France
Date: 2009-2010
Area: 300m2

To Spin a Yard is a landscape architecture project designed by Atelier Altern for the *Centre of Art Programmes of Amiens* (Maison de la Culture d'Amiens). The project represents the profession of landscape architecture at the *Imaginez Maintenant* festival and transforms the emblematic French heritage site; the Islands of the Hortillonnages [Landezine, 2011].

The Islands of the Hortillonnages is a site of floating gardens and emblematic French heritage in the town of Amiens. The design intervention takes place on a part of these islands, called Salad Harbour, and has become a way of development and communication for old and forgotten varieties of salad.

The intervention regenerates the contextual heritage of Salad Harbour through the utilization of urban agriculture. It reinterprets the traditional form of vegetable tunnels and revives the landscape by re-introducing forgotten vegetable types. The intervention consists of a contemporary structure of slanted framings and protective nets that house the salad crops [Landezine, 2011].

Fig. 6.27 & 6.28. The slanted framings and protective net structures [Landezine, 2011].

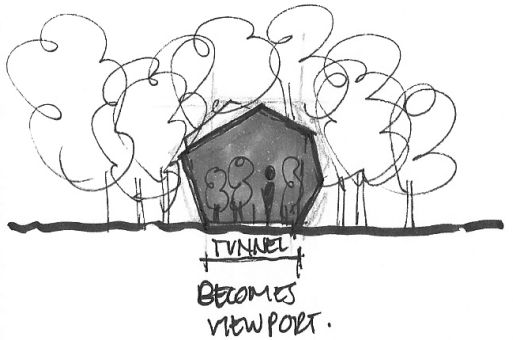

Fig. 6.29. Elevation of vegetable tunnel in context [Author, 2013].

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Fig. 6.30. Vegetable tunnel structure on Salad Harbour [Landezine, 2011].

Fig. 6.32. Vegetable garden in the structure [Landezine, 2011].

With regard to the design dissertation, the precedent study illustrates the use of contemporary and non-traditional structures as vegetable tunnels. The programmatic component of urban agriculture and the theoretical informant of the regeneration of natural landscape plays an integral role in the design intervention.

To spin a yard illustrates how subtle the intervention of urban agriculture can be. It integrates the structure into the context with sensitivity towards the natural landscape and the heritage. Thereby, it celebrates the human-nature connection, as it reinterprets the traditional form of a vegetable tunnel. It demonstrates the contextual response that the urban agriculture component should follow with regard to the design development.

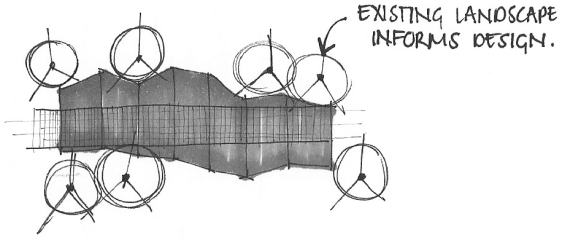

Fig. 6.31. Plan of vegetable tunnel in context [Author, 2013].

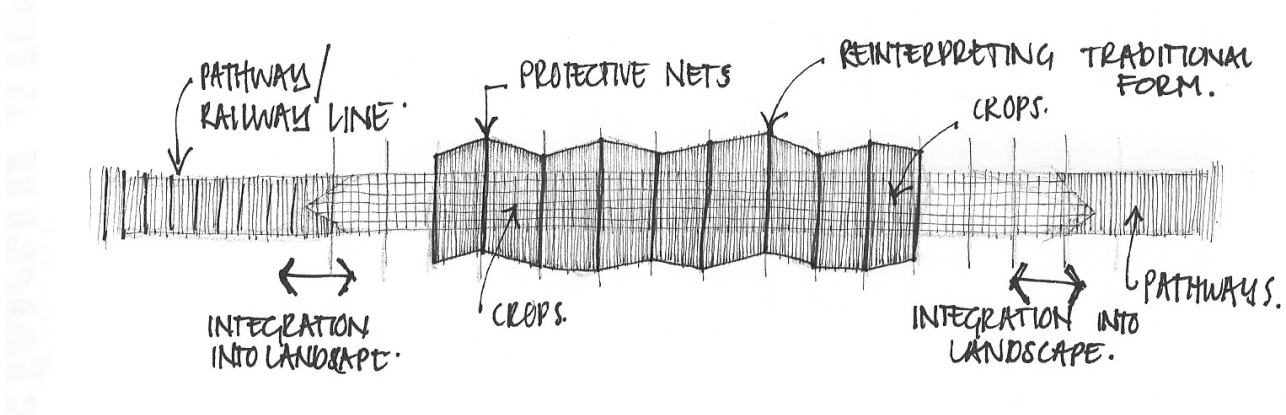

Fig. 6.33. Conceptual idea of contemporary vegetable garden structures [Author, 2013].

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6.4. BUILDING WITH A SHARED NATURE

6.4.1. THE CONVENT OF LA TOURETTE - LE CORBUSIER

Location: Eveux-sur-Arbresle, Lyon, France
Date: 1957-1960

The Convent of La Tourette was designed for a community of silent monks. It consists of hundred dormitory cells, a library, a refectory, a rooftop cloister, a church and classrooms. It is one of Le Corbusier's final building projects and exhibits his key *Modernist* elements, mainly including *pilotís*, or load-bearing columns and grass rooftops [Sveiven, 2010].

The monastery is situated on a steeply sloping bank with powerful views. The hundred private cells compose the upper levels, whereas the communal spaces are on the lower levels. The building consists of a reinforced concrete structure with glass surfaces on three of the exterior facades. The building is grouped around a central courtyard with the interior facades consisting of glazing and opening up to the public spaces. The *life* of the building is contained on the inside and revolves around the courtyard [Sveiven, 2010].

With regard to the design dissertation, the Convent of La Tourette is significant for two main reasons. Firstly, it informs the conceptual scenario of basing the proposed building on a monastery, and secondly, it exhibits a clear understanding of the relationship between private and shared spaces.

The communal spaces, shared by all the monks, are the refectory, the library and the church. These are positioned on the ground floor level with access to the public spaces. It is also important to note how the cloister is designed around the courtyard and that the public spaces live out onto and have access to the courtyard. This is evident of man's inherent desire to be aware of and close to nature. As a result the cloister *contains* life on a spiritual, as well as a physical level.

As the building rises upward, the level of privacy increases to the top floors, where every monk has a private cell that projects to the outside of the monastery. By visually and physically separating itself from the public spaces, the private cells become spaces of retreat and solitude for specific users.

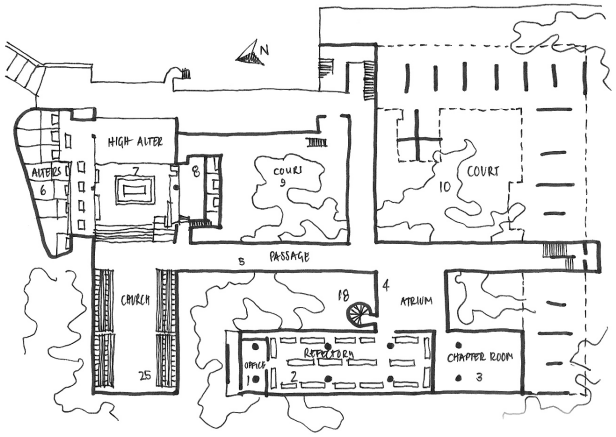

Fig. 6.34. Lower level floor plan showing communal areas [Le Corbusier, 1965].

The Convent of La Tourette is a functional informant that assists the design project with regard to the placement of shared and specific spaces, as well as the metaphoric attribute of *containing* life.

Fig. 6.35 (on right). Interior facade with glazing facing to courtyard [Le Corbusier, 1965].

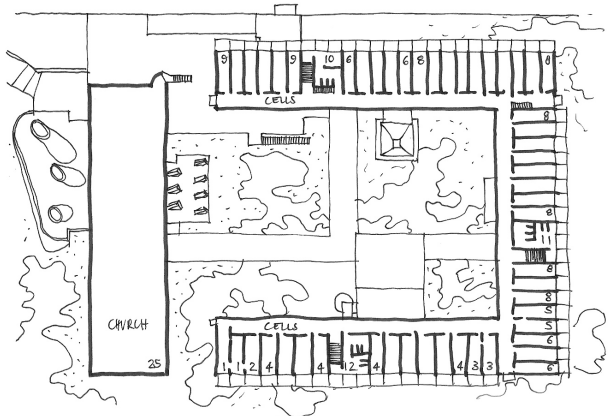

Fig. 6.36. Upper level floor plan showing private dormitory cells [Le Corbusier, 1965].

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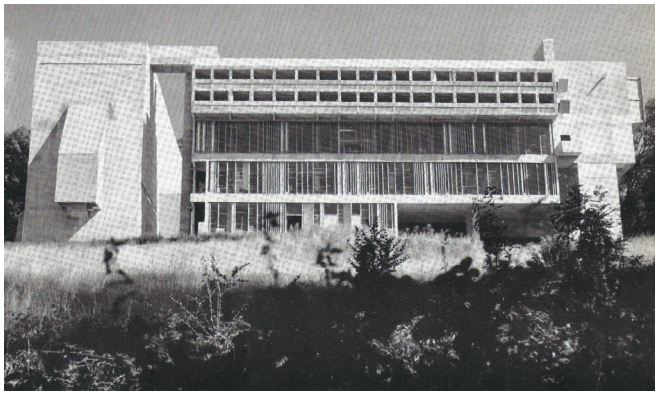

Fig. 6.37. Western exterior facade. Cells on upper floors project outward [Le Corbusier, 1965].

Fig. 6.39. South western view of La Tourette showing its position in the landscape [Le Corbusier, 1965].

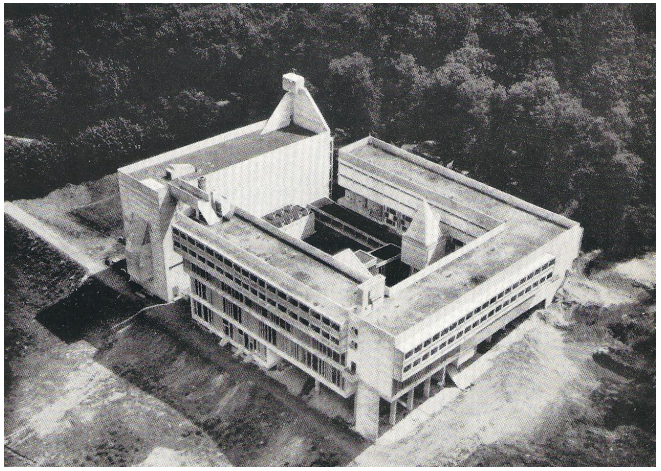

Fig. 6.41. Rooftop cloister garden [Le Corbusier, 1965].

6.5. CONCLUSION

The chapter has served to elaborate and evaluate the precedent studies. The precedent studies have assisted to visualize and communicate the ideas regarding the theoretical-, contextual-, programmatic and conceptual approach. It responds to the urban condition and the POPUP site. Furthermore, the precedent studies have served to explore different options for the design development. It also illustrates the conceptual scenario with respect to the design informants – *the regeneration of landscape, the regeneration of heritage, the regeneration of programme, the monastery concept, and the contextual response.*

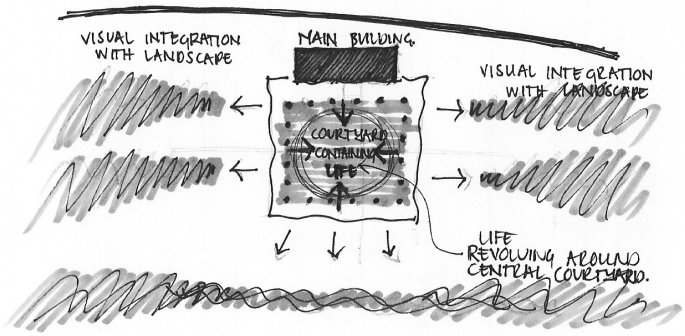

Fig. 6.38. The conceptual scenario [Author, 2013].

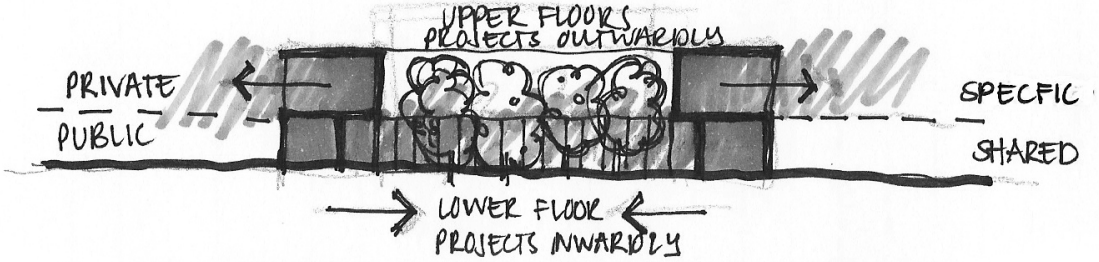

Fig. 6.40. Relationship between private and public / specific and shared spaces [Author, 2013].

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7. DESIGN DEVELOPMENT

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7.1. INTRODUCTION

The aim of the chapter is to illustrate the design development of the dissertation. The chapter will elaborate and explain contextual issues and design decisions that have an impact on the outcome of the design proposal.

Firstly, the design parti diagram and conceptual approach, as discussed in Chapter 5, will be evaluated and developed to serve as a platform for the design development. Secondly, the chapter will discuss the contextual response and the development thereof in detail. Thirdly, the design informants, as identified and discussed in the previous chapters, will be re-evaluated to illustrate the design progression according to the concept.

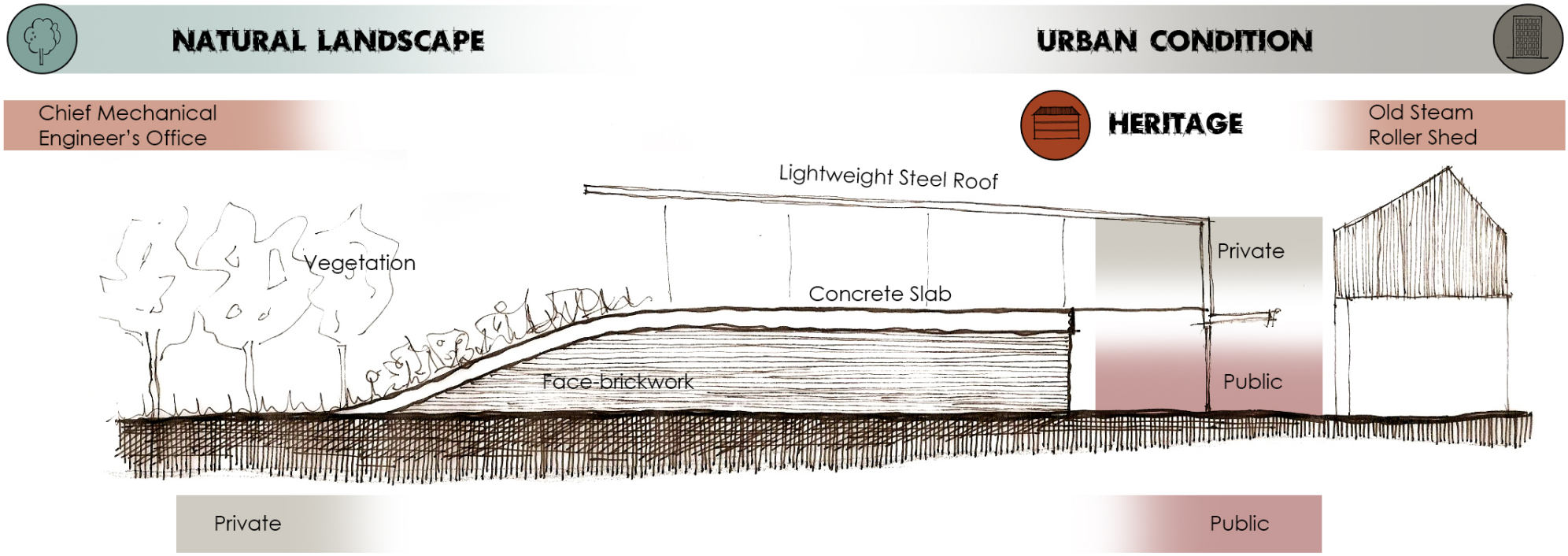

Fig. 7.1. Elevation parti diagram [Author, 2013].

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7.2. PARTI DIAGRAM

The parti diagram encapsulates the conceptual essence of the dissertation. It illustrates the theoretical, contextual and programmatic approach to the design development. It also graphically explains the design informants – *the regeneration of natural landscape, the regeneration of heritage, the regeneration of programme, the monastery concept, and the response to context.*

The parti diagram is also further developed in section and elevation, in order to broaden the graphic dimensions of the conceptual approach. The response to the natural landscape on the one extent and the urban condition on the other extent, is illustrated in the new diagrams. The beginning of a spatial quality is also dedicated to the concept.

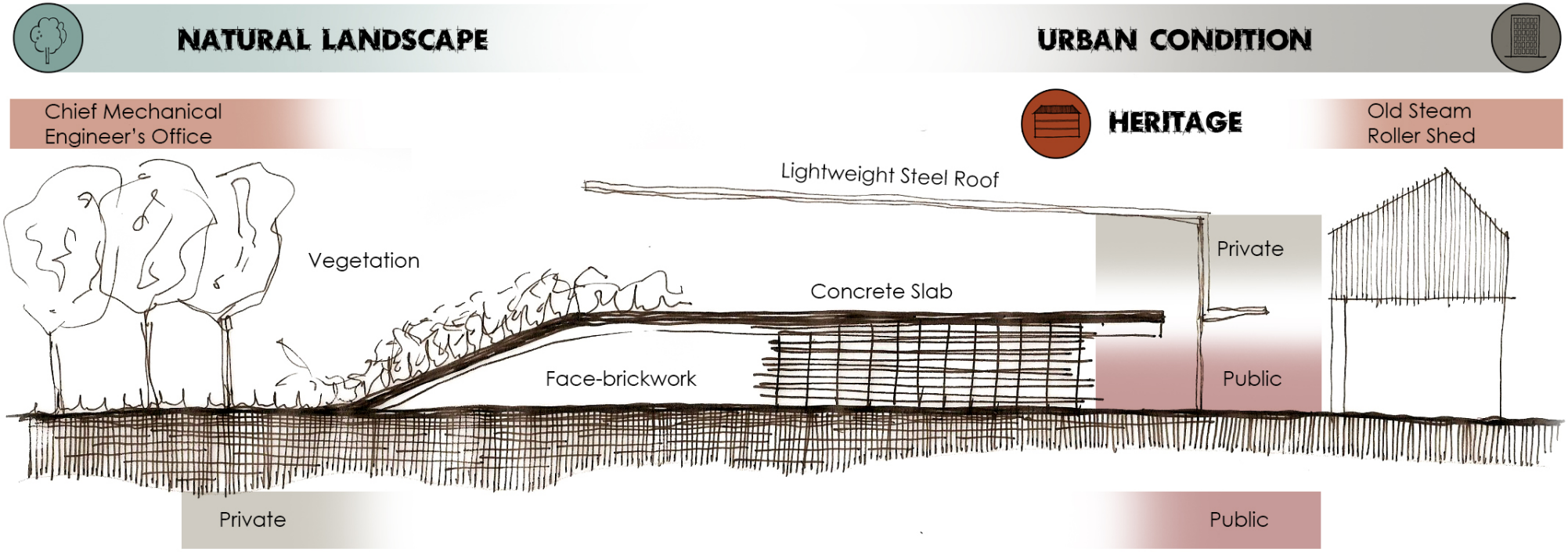

Fig. 7.2. Section parti diagram [Author, 2013].

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7.3. CONTEXTUAL RESPONSE

The design development inherently follows a contextual response. As illustrated in the above diagrams, the context consists of the natural landscape on the one extent and the urban condition on the other. Furthermore, the dilapidated railway lines are regenerated to become the routes of movement through the site. The design development will discuss issues, decisions and informants with regard to the contextual response.

7.3.1. HUMAN-NATURE CONNECTION

The theoretical approach suggests the use of biophilic elements and low-impact technologies to create restorative environments. It also emphasize the importance of a healthy human-nature connection because of its healing properties [Kellert, 2008]. Furthermore, the existing theme of the regeneration of natural landscape also indicates the importance of designing along with nature and natural elements. The design development therefore indicates an intricate relationship with nature, the natural landscape, and the use of natural elements as *building blocks of architecture* [Littman, 2008].

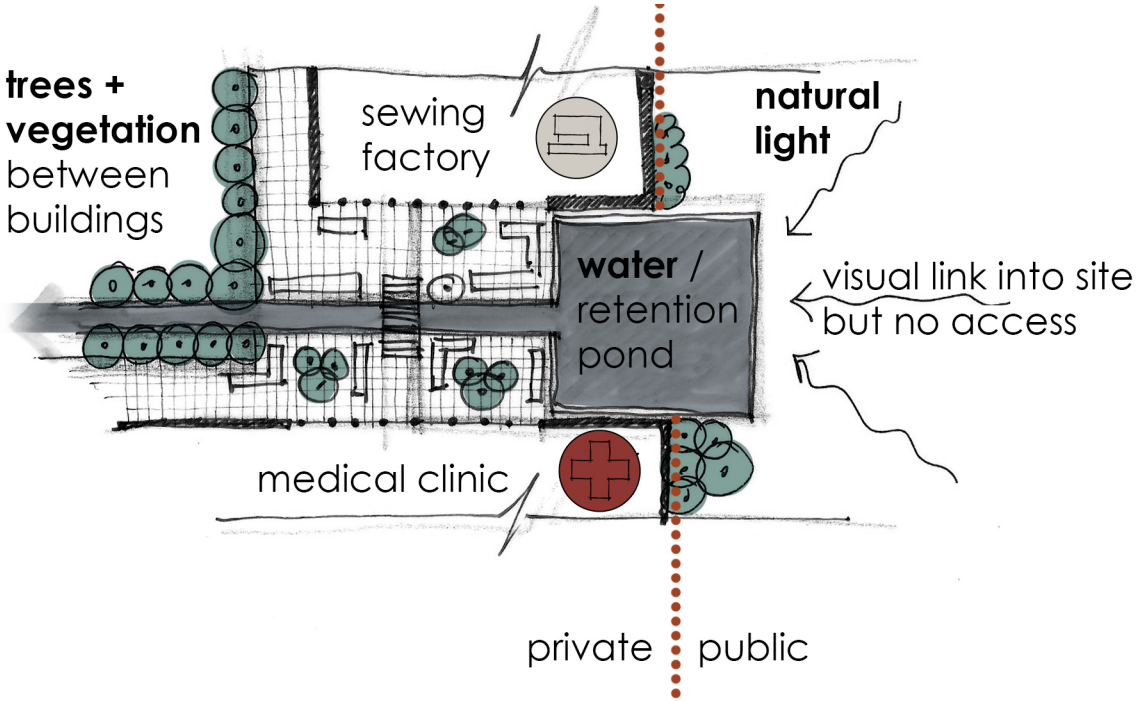

Fig. 7.4. Atrium spaces between buildings [Author, 2013].

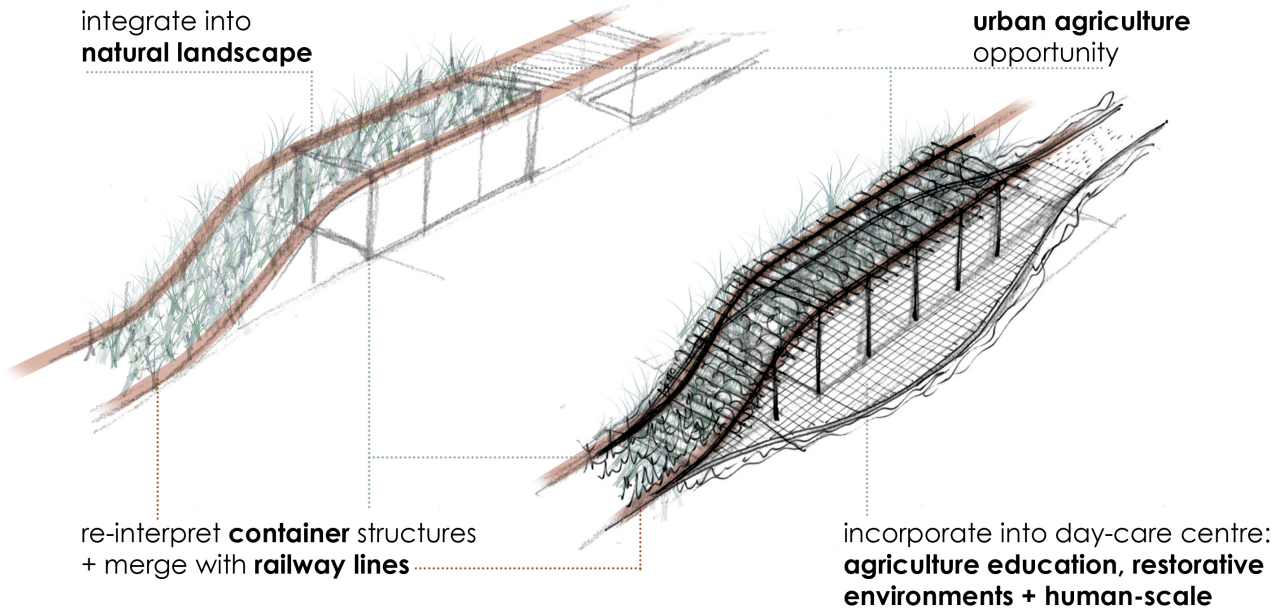

Fig. 7.3. Integration of container structures with natural landscape [Author, 2013].

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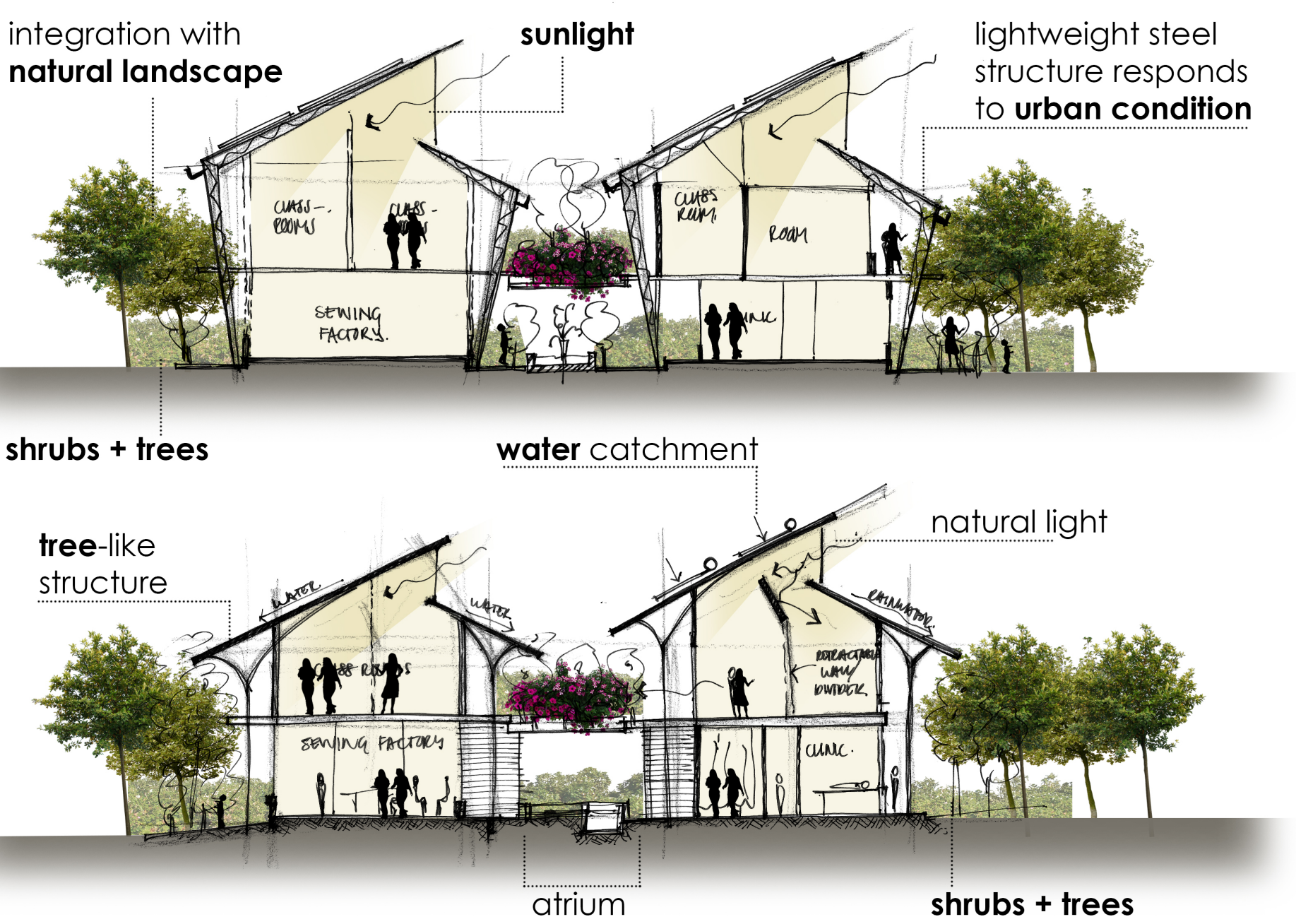

Fig. 7.5. Sectional interpretation of the human-nature connection [Author, 2013].

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7.3.2. REINTERPRETATION OF RAILWAY HERITAGE

The contextual approach to the regeneration of heritage, informed by the Heritage Impact Assessment, suggests the orientation of buildings according to the railway lines. It also suggests the use of a railway architecture language and a design approach that will integrate the new and existing buildings into the surrounding context. For this reason the design development proposes that the buildings be orientated as mentioned above.

The design development further proposes that the dilapidated railway lines be regenerated as walkways through the site. It celebrates the railway, formerly used to be carriers of trains, now re-interpreted as carriers of people. It also serves to reconnect the site to its historical and current context. It commemorates the heritage significance by increasing the value and meaning of the contemporary building.

Additionally, the design intervention responds to the existing heritage buildings on site. The POPUP building is constructed of concrete floor slabs and face-brickwork. Its composition is dominated by horizontal lines, but also contains strong vertical lines. The old Steam Roller Shed consists of a lightweight steel structure cladded with corrugated steel sheeting.

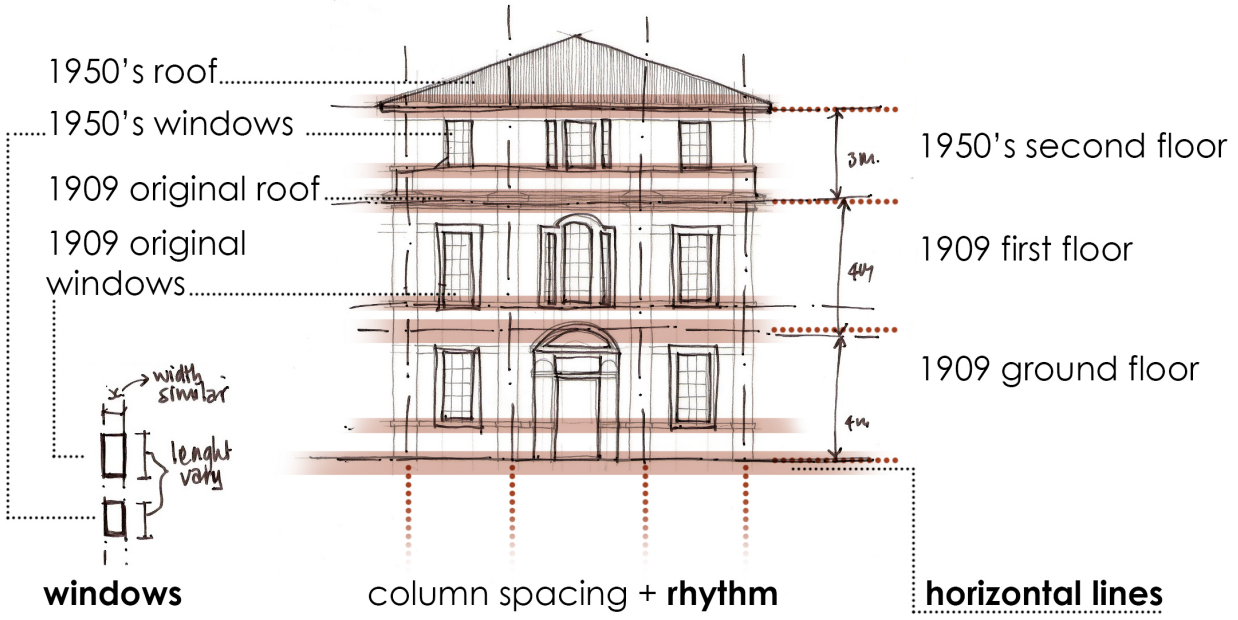

Fig. 7.6. East / main facade heritage analysis [Author, 2013].

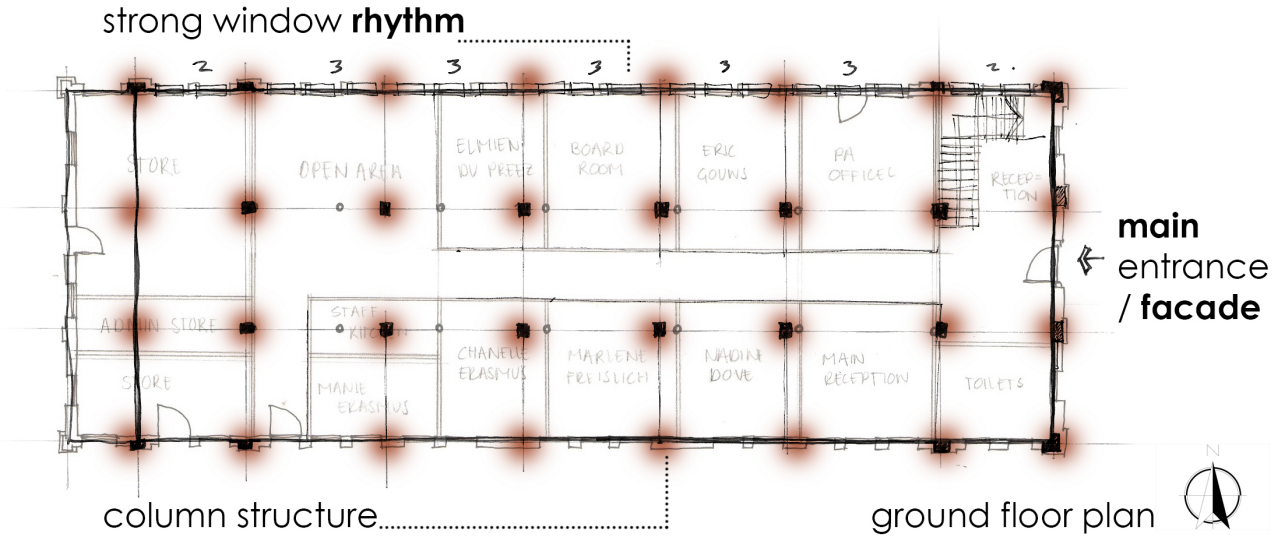

Fig. 7.7. Ground floor – heritage structure analysis [Author, 2013].

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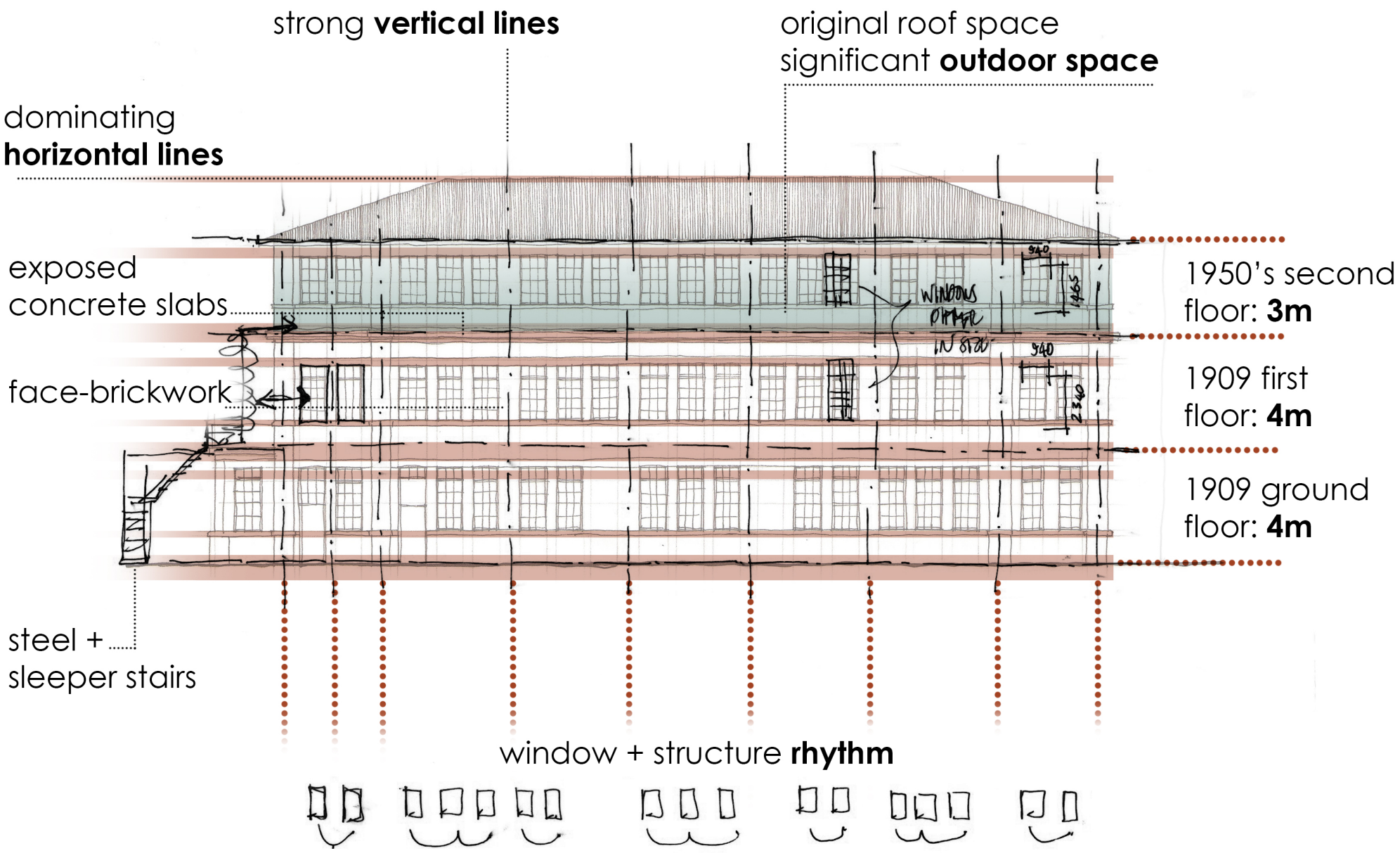

Fig. 7.8. South facade heritage analysis [Author, 2013].

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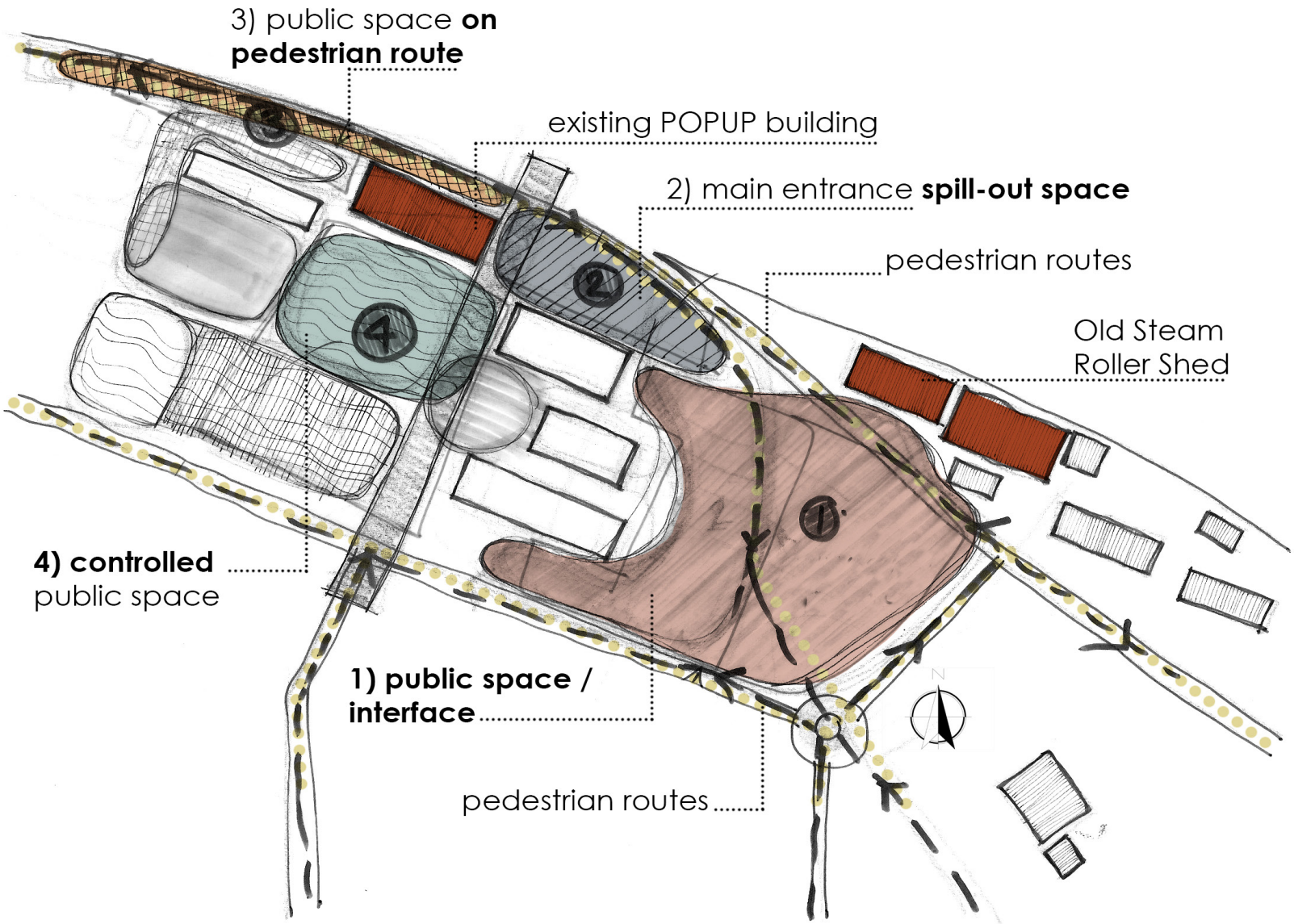

Fig. 7.9. The diagrams illustrate the development of the public spaces [Author, 2013].

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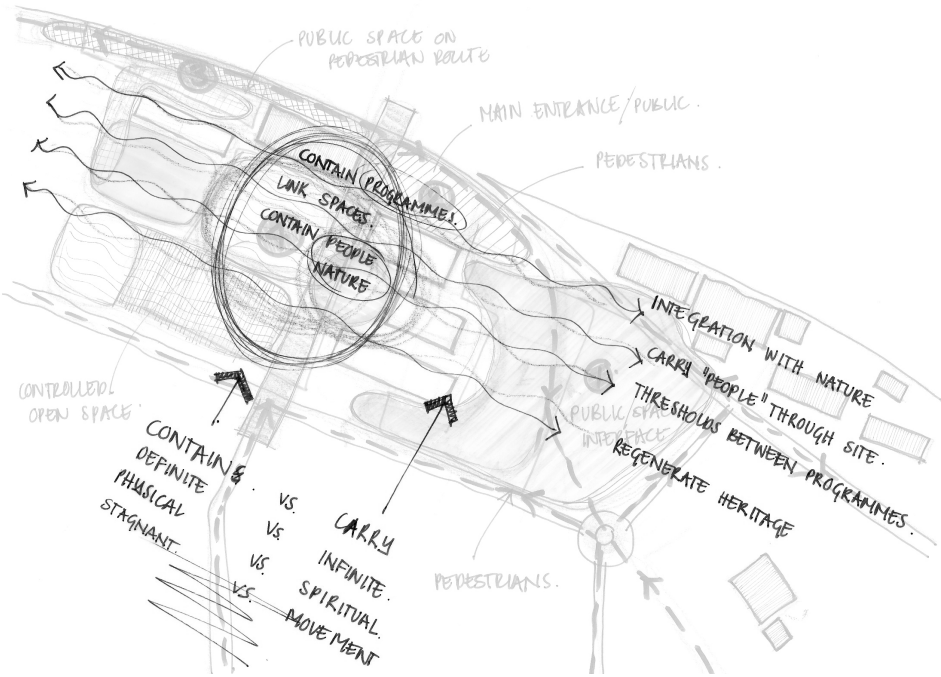
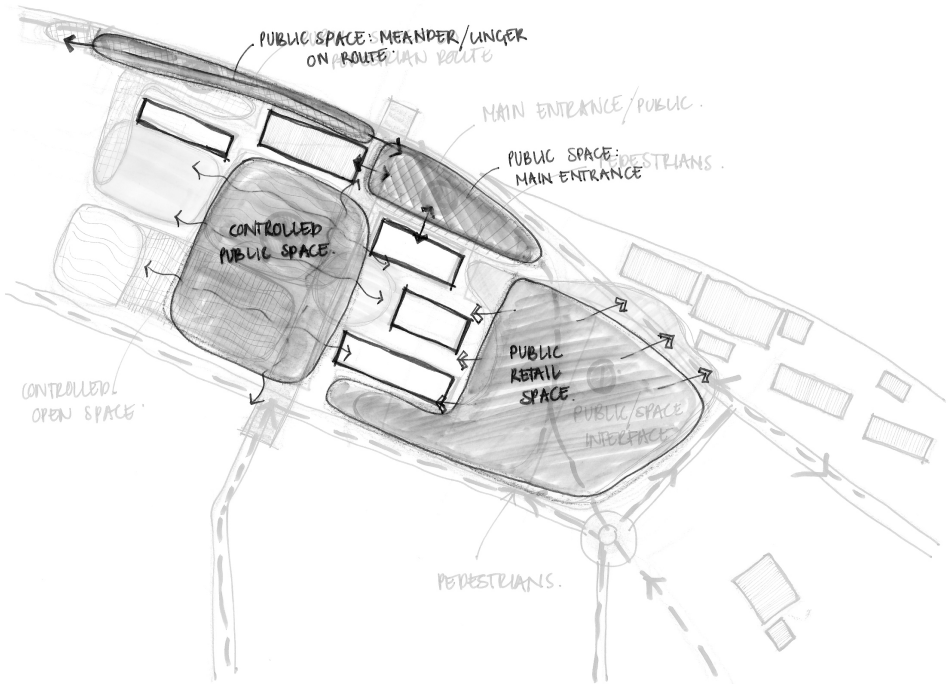
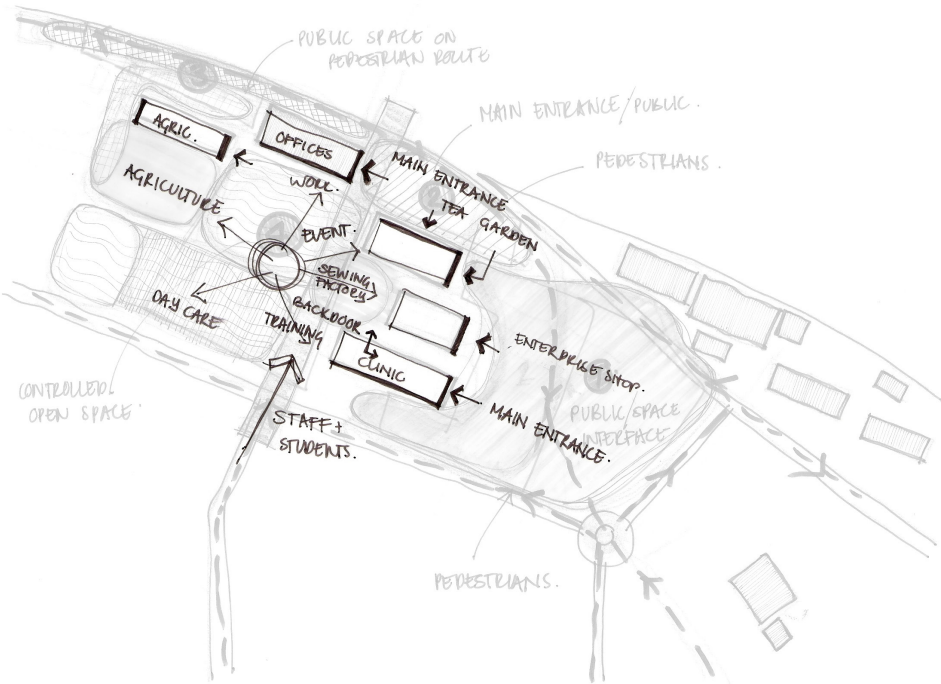
7.3.3. PUBLIC SPACES

The design development requires the design of a master plan in order to create the conditions for the design intervention on the POPUP site. The surrounding context consists mainly of natural landscape and dilapidated railway buildings, but only limited current context exists around the POPUP site. Therefore, the master plan proposes a series of public spaces to assist the design development towards integration within the surrounding context.







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7.3.4. SURROUNDING CONTEXT

As mentioned above, the limited context requires the design of a master plan in order to integrate the design into the current context. Apart from the POPUP building, the other buildings in the master plan area are the dilapidated Steam Roller Shed buildings that are currently not in use. In accordance with POPUP's *15 year vision* [POPUP, 2011], the master plan proposes that these buildings be re-allocated as a Railway Heritage Museum.

The proposal to make the old Steam Roller Shed buildings a Railway Heritage Museum assists the design development in various ways. Firstly, the amount of people that visit the POPUP site will be immensely increased as more visitors are attracted to the surrounding site. Secondly, the design of the public spaces are enhanced by dedicating specific functions to them. Thirdly, the regeneration of heritage is emphasized and the design intervention is further integrated into the surrounding context.

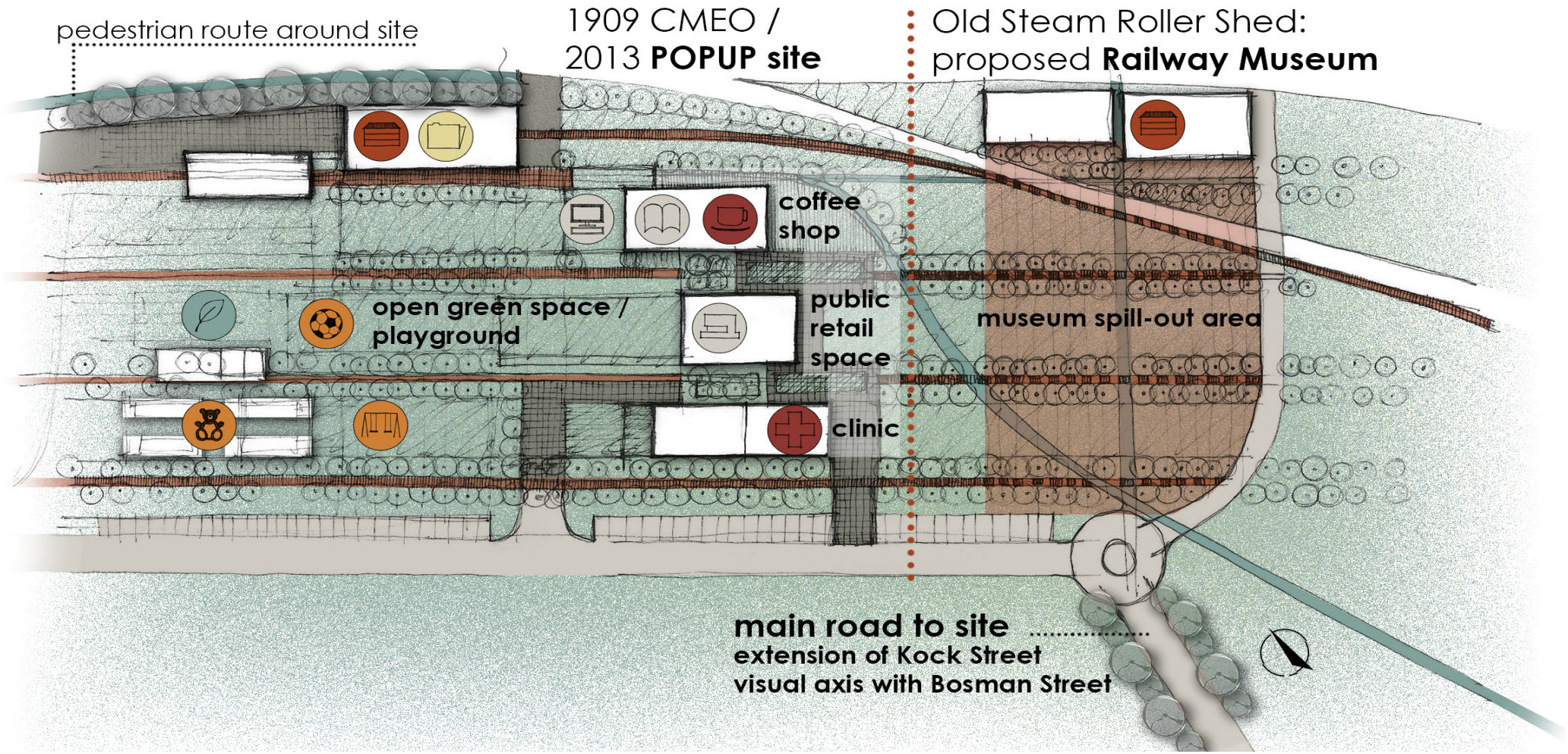

Fig. 7.10. The master plan illustrating the Railway Heritage Museum [Author, 2013].

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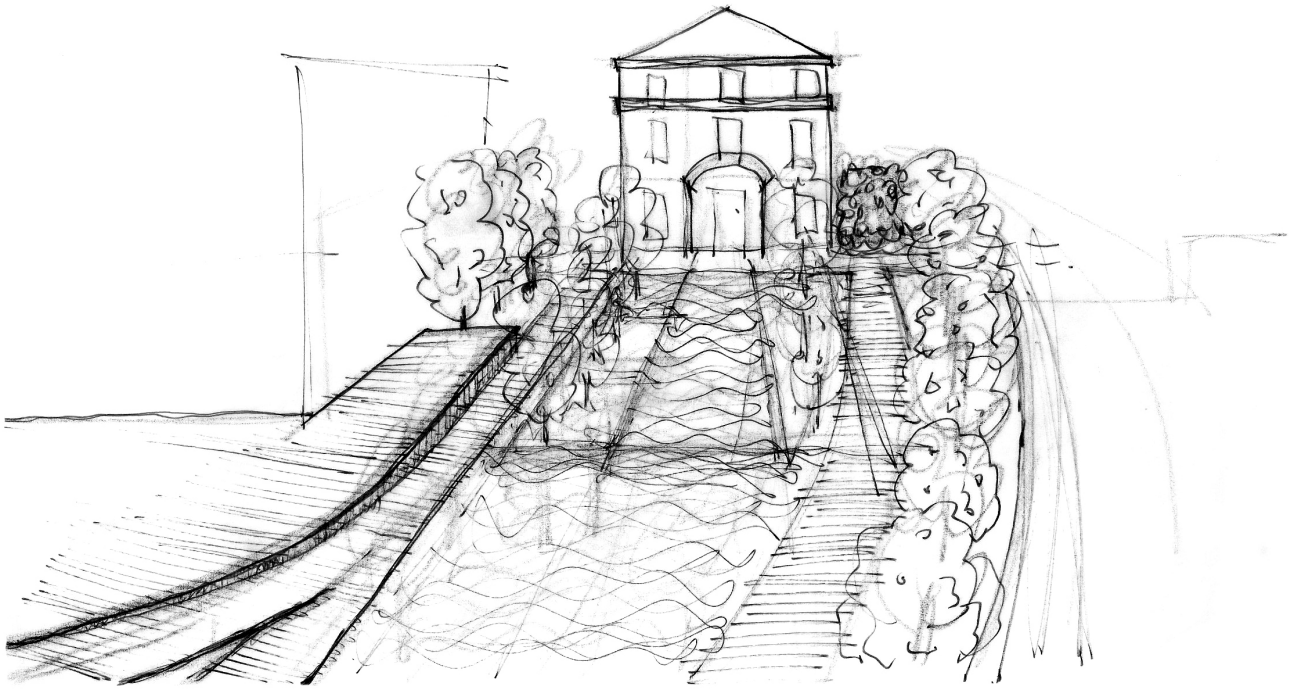

Fig. 7.11. Approach to the east / main facade [Author, 2013].

7.3.5. APPROACH TO THE SITE

The contextual response, the regeneration of heritage, and the design of the master plan assisted to identify important views with regard to the approach to the site. The site has two main access points (see fig. 9). Firstly, the main entrance on the north-eastern edge used by the POPUP staff and public visitors; the entrance spills out onto the public relaxation and retail space. Secondly, the student entrance, situated on the south-western edge and used by the POPUP students and day-care toddlers; the entrance spills out onto a public waiting area and a taxi drop-off zone.

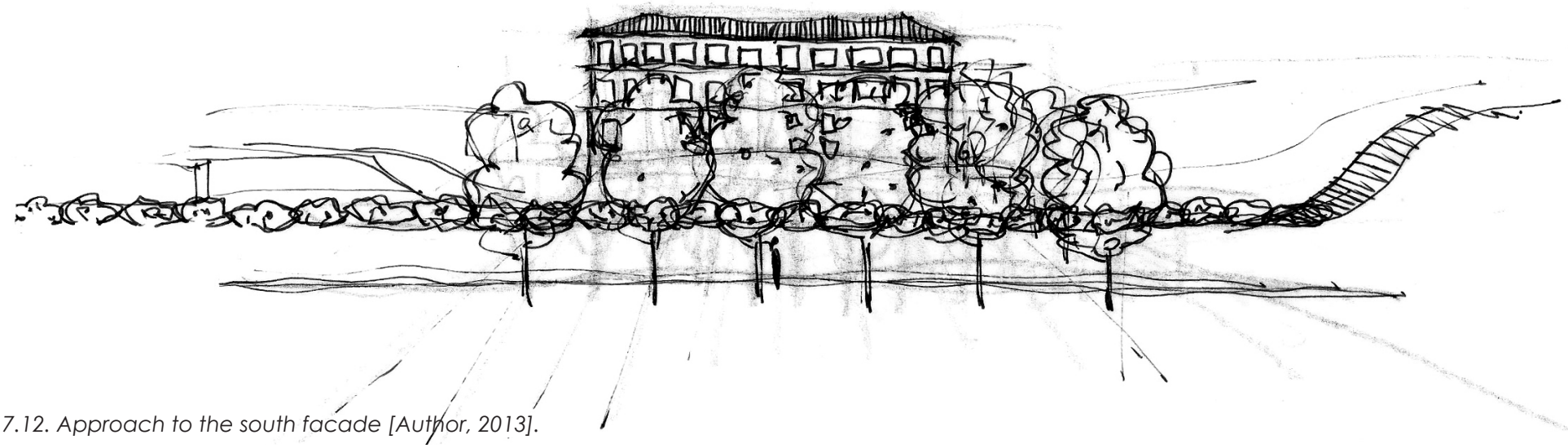

Fig. 7.12. Approach to the south facade [Author, 2013].

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7.3.6. MOVEMENT

As previously discussed, the railway lines are regenerated as walkways through the site. These walkways become the main circulation routes through, to and within the site. They are a representation of the railway heritage and an articulation of the movement between the various extents of the site; the natural landscape and the urban condition, respectively. The regenerated railway lines are a catalyst for human-nature connection, as they physically reintegrate the site into its surrounding context.

The design development of the building footprints and plans further articulates the movement and significance of the railway lines. Throughout the buildings the circulation emphasizes the direction of the railway lines that are ultimately a manifestation of the human-nature connection.

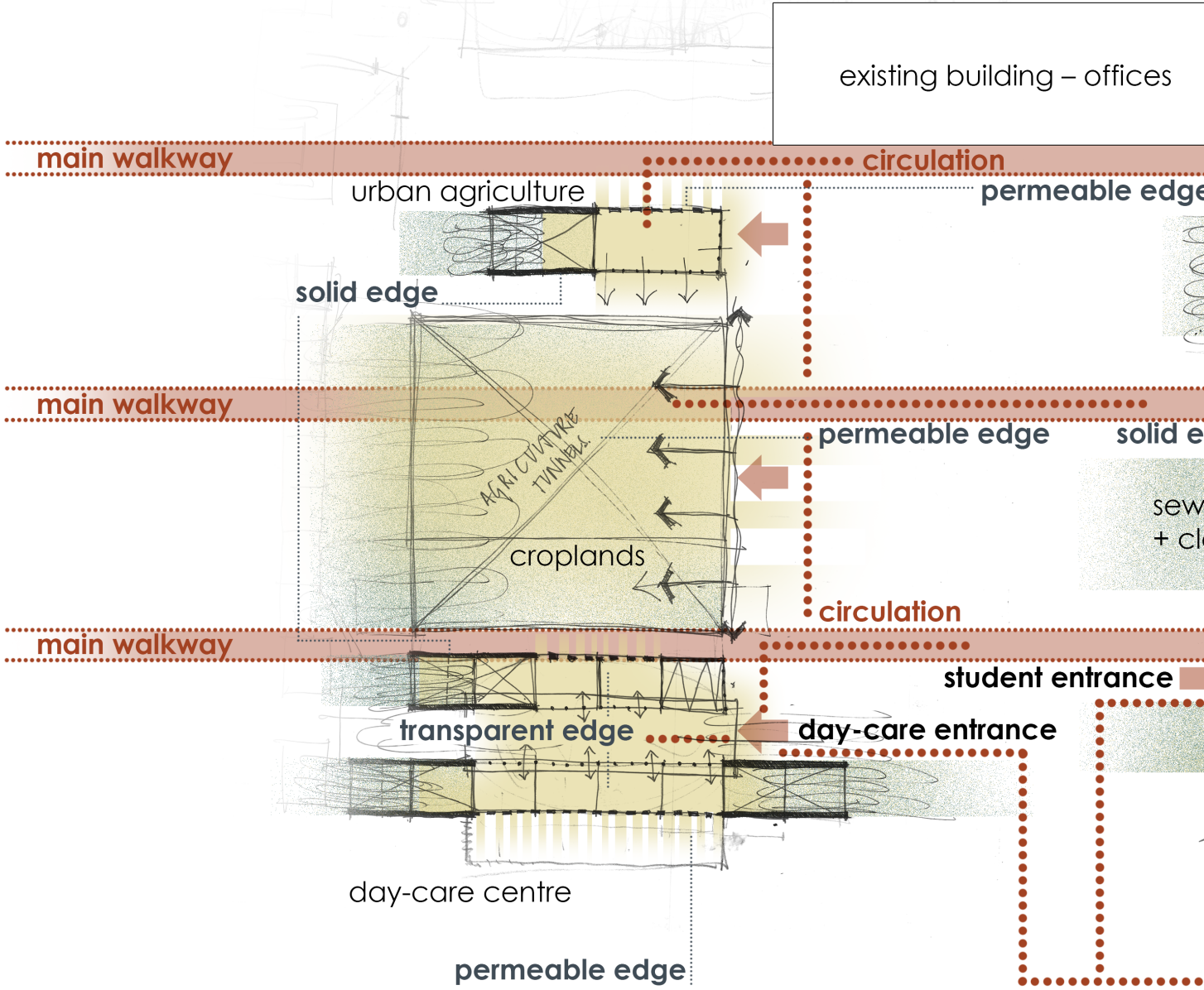

Fig. 7.13. The diagram illustrates the circulation, movement and edge conditions [Author, 2013].

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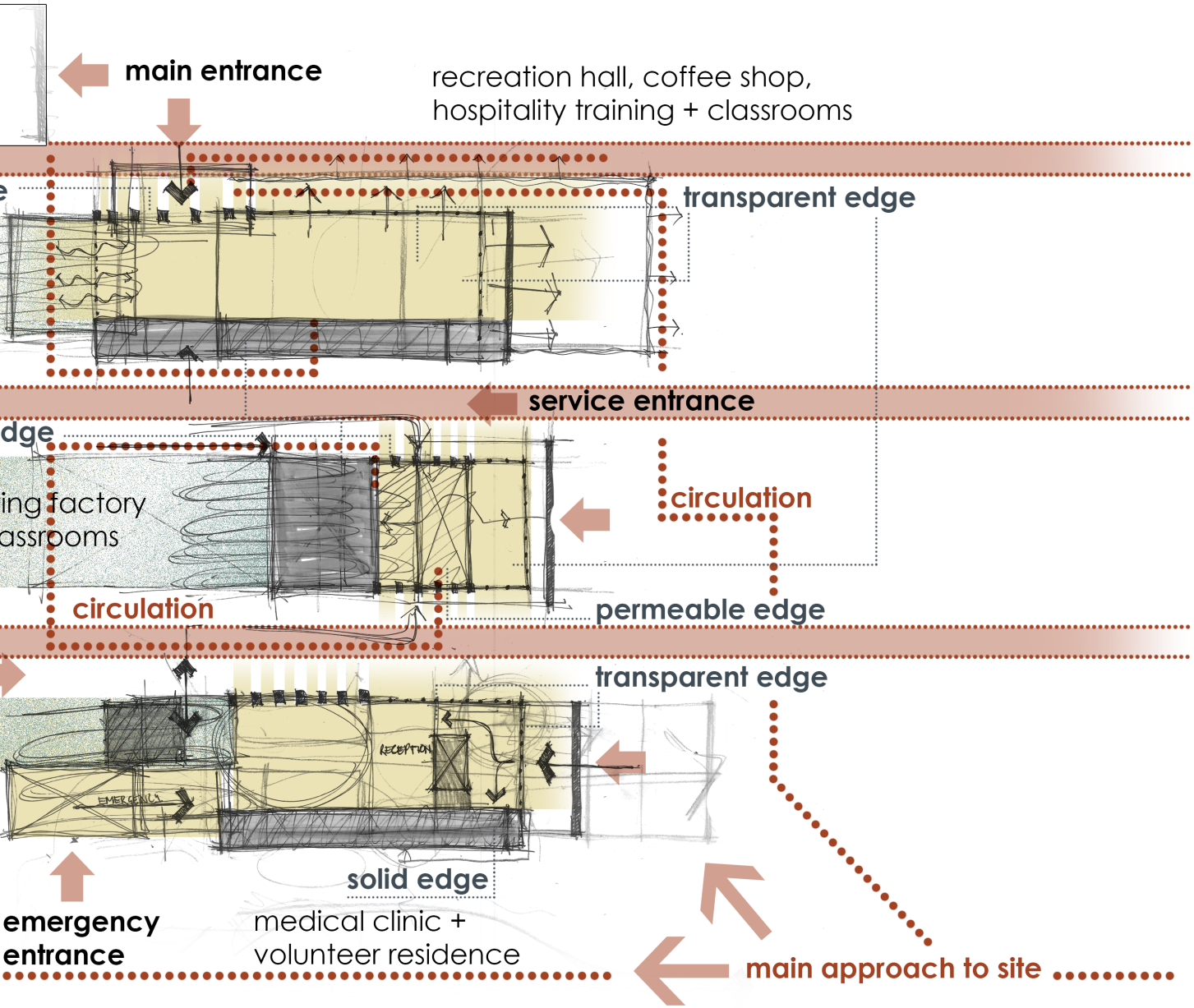

7.3.7. EDGE CONDITIONS

The edge conditions consist of factors such as functions inside and outside of the building, public and private spaces, threshold spaces, services, and circulation. The design development of the building footprints is a representation of the desired edge conditions.

The regeneration of the human-nature connection is inherently part of the building footprints. The heavy, stereotomic structure is a manifestation of the natural landscape, whereas the light, tectonic structure is a manifestation of the urban condition. Additionally, the regeneration of programme and the nature of the programme, also play an integral role in the development of the building footprints.

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7.4. DESIGN EXPLORATION

The design intervention mainly consists of the three buildings that contain the training programme classrooms, the recreation hall, the coffee shop, the sewing factory, the medical clinic, and the volunteer residence. The design exploration of the buildings is illustrated in a series of drawings that aims to illustrate the design development process and thoughts behind it.

The design development process is influenced by the theoretical approach that suggests the use of biophilic elements and low-impact technologies [Kellert, 2008]. The design development is also informed by the contextual-, programmatic- and conceptual approaches discussed in the previous chapters. These are summarized in the design informants – *the regeneration of natural landscape, the regeneration of heritage, the regeneration of programme, the monastery concept, and the response to context.* The aim of the following drawings is to illustrate the above informants graphically.

7.4.1. SITE PLAN DEVELOPMENT

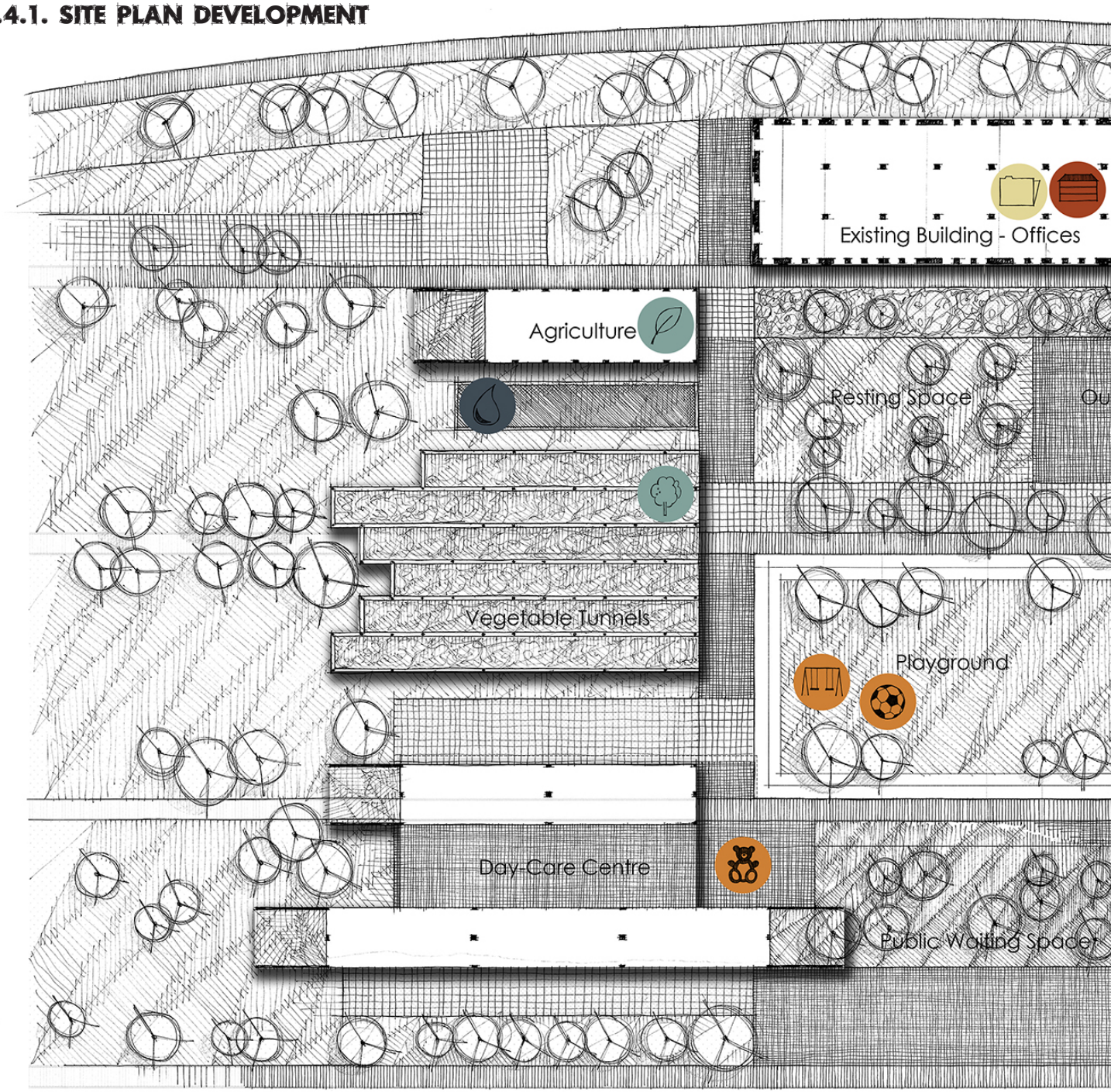

Fig. 7.14. Site plan [Author, 2013].

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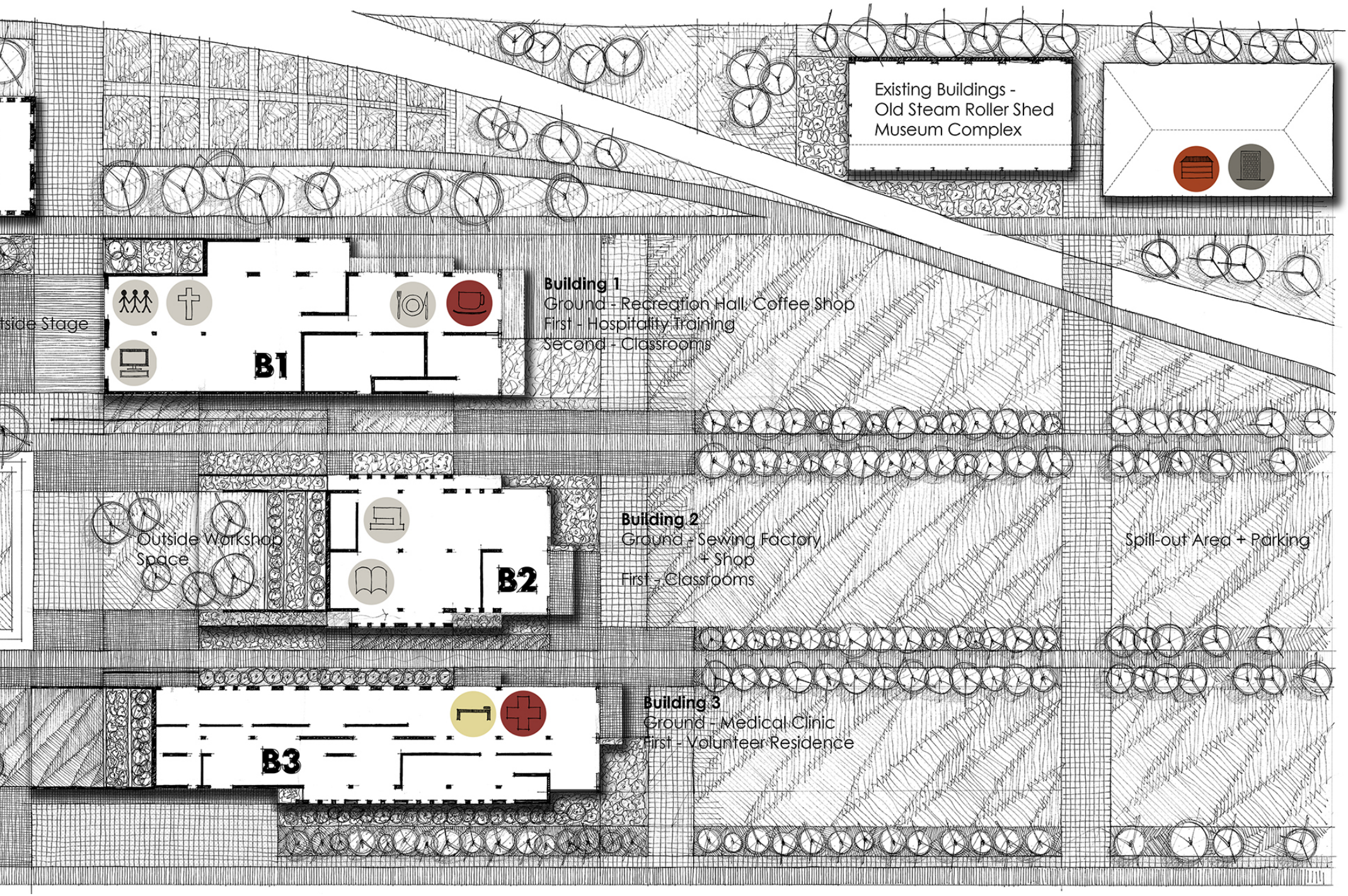

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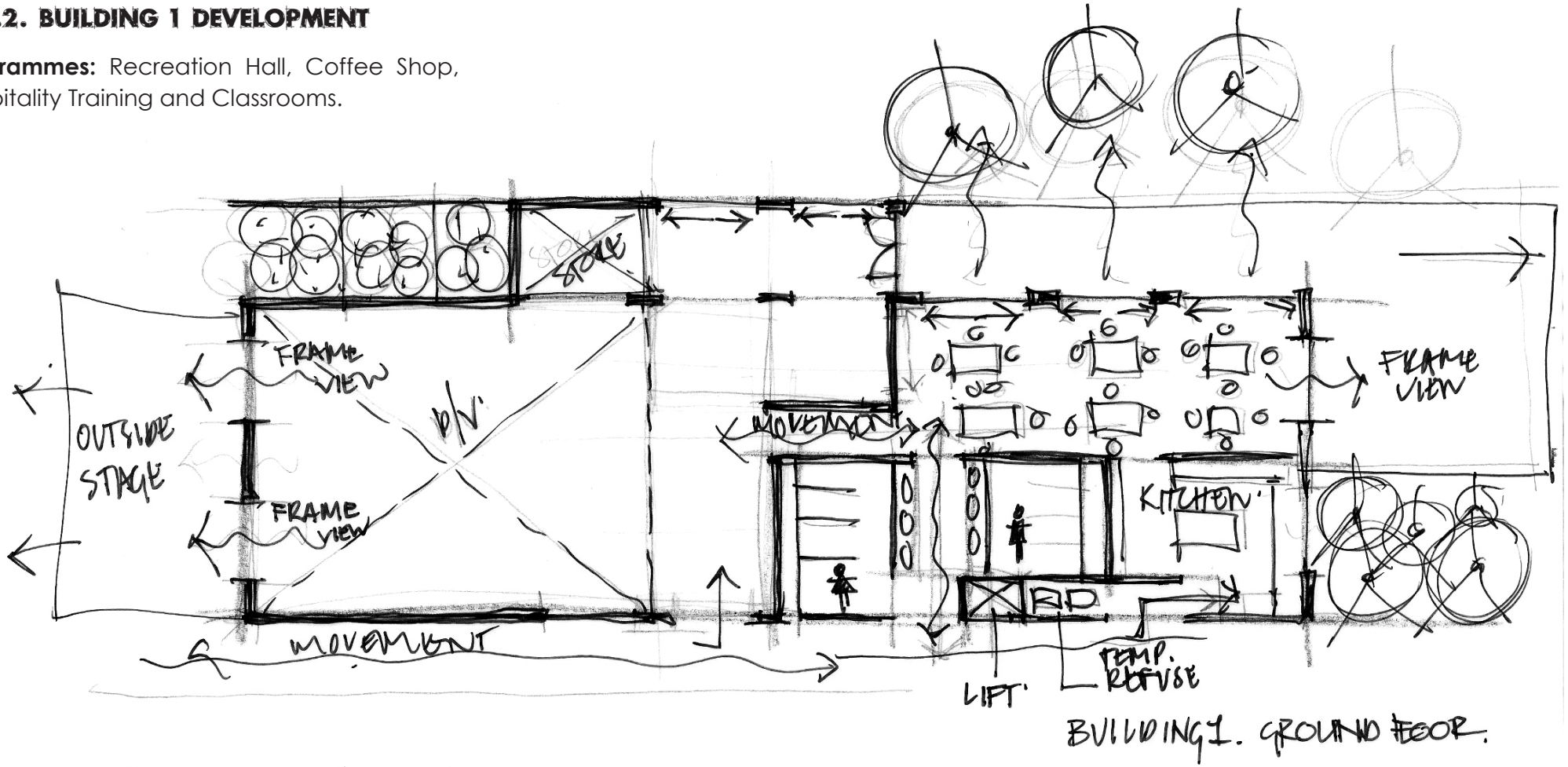
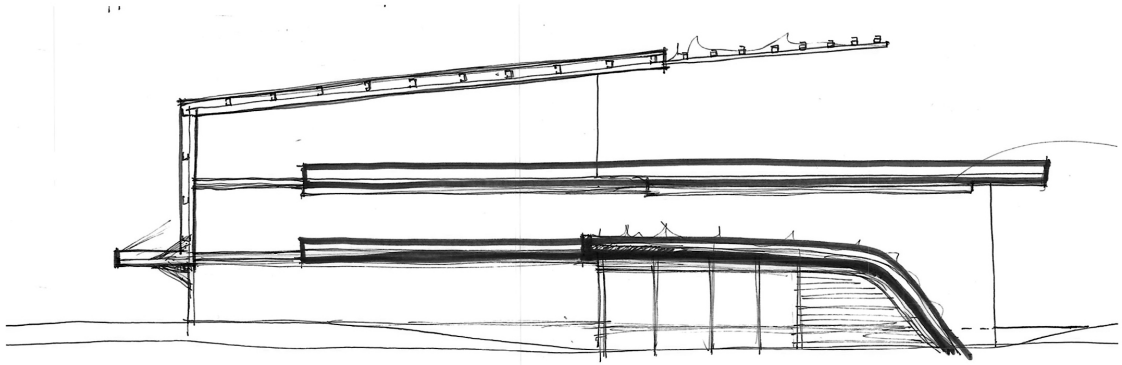
7.4.2. BUILDING 1 DEVELOPMENT

Programmes: Recreation Hall, Coffee Shop, Hospitality Training and Classrooms.





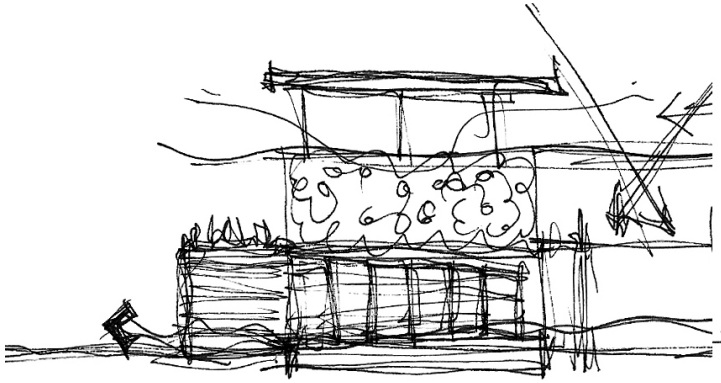


Fig. 7.15. The diagrams illustrate the design exploration of Building 1 [Author, 2013].

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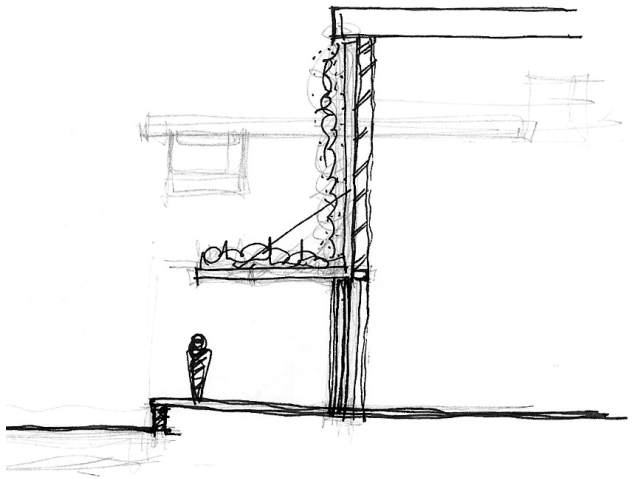

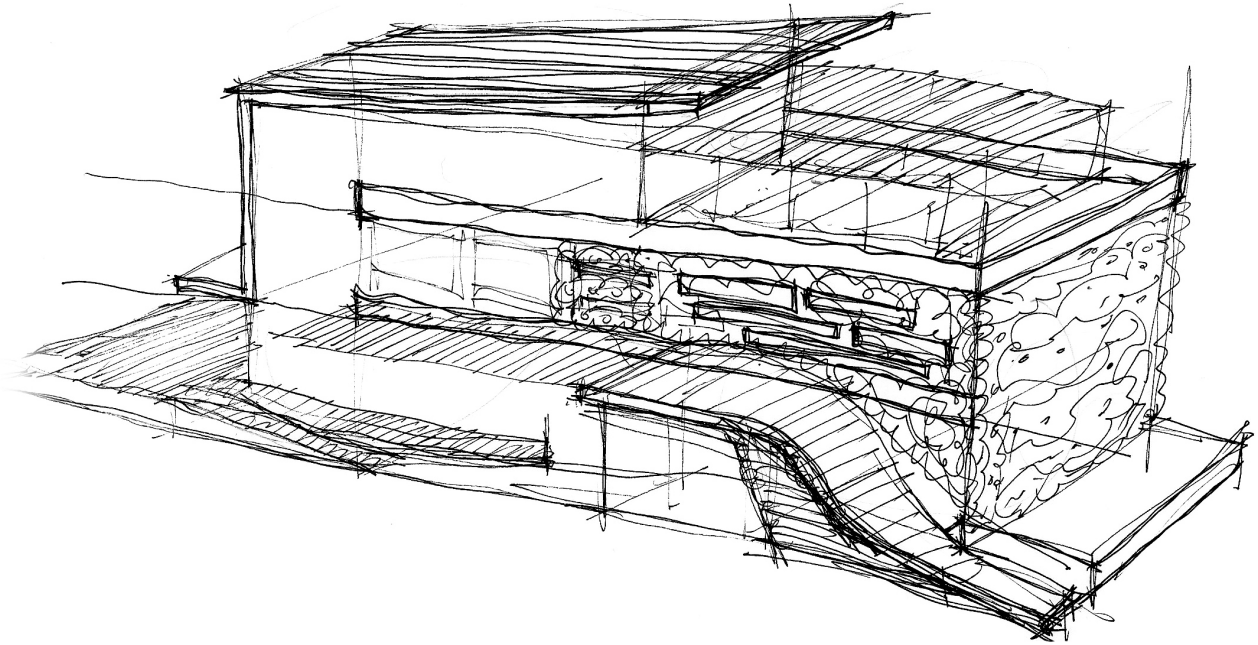

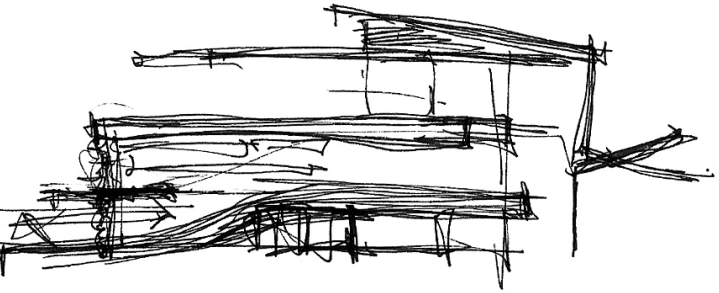

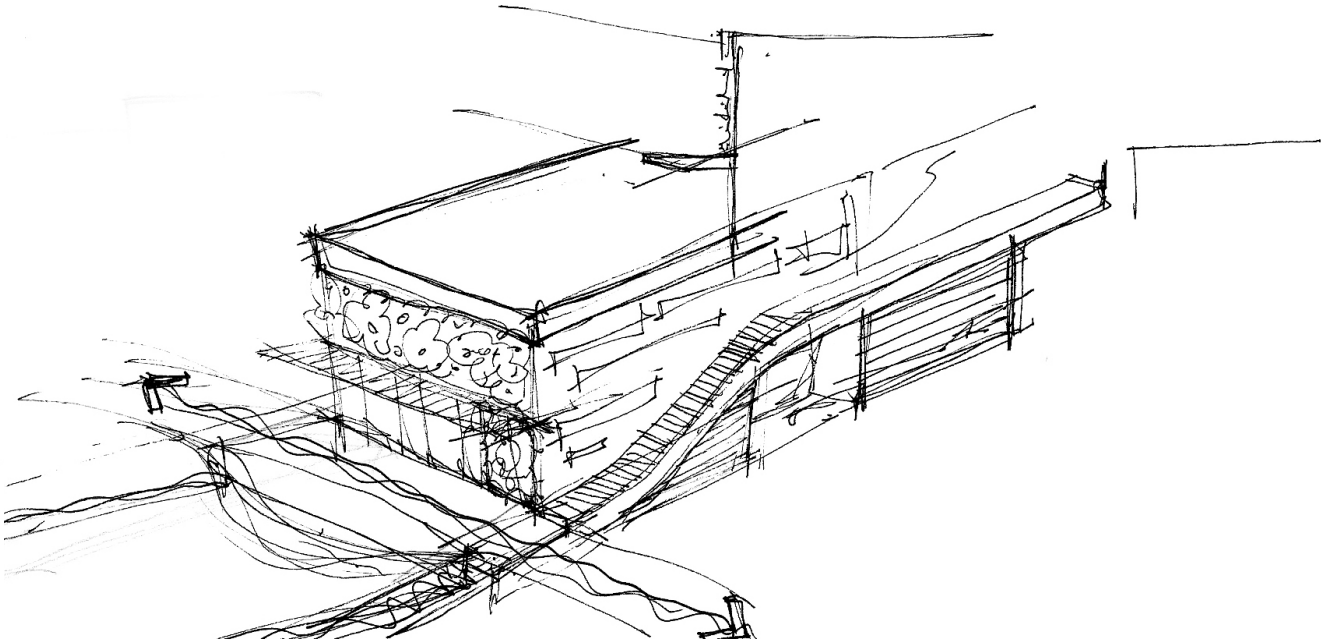

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7.4.3. BUILDING 2 DEVELOPMENT

Programmes: Sewing Factory, Exhibition Shop and Classrooms.

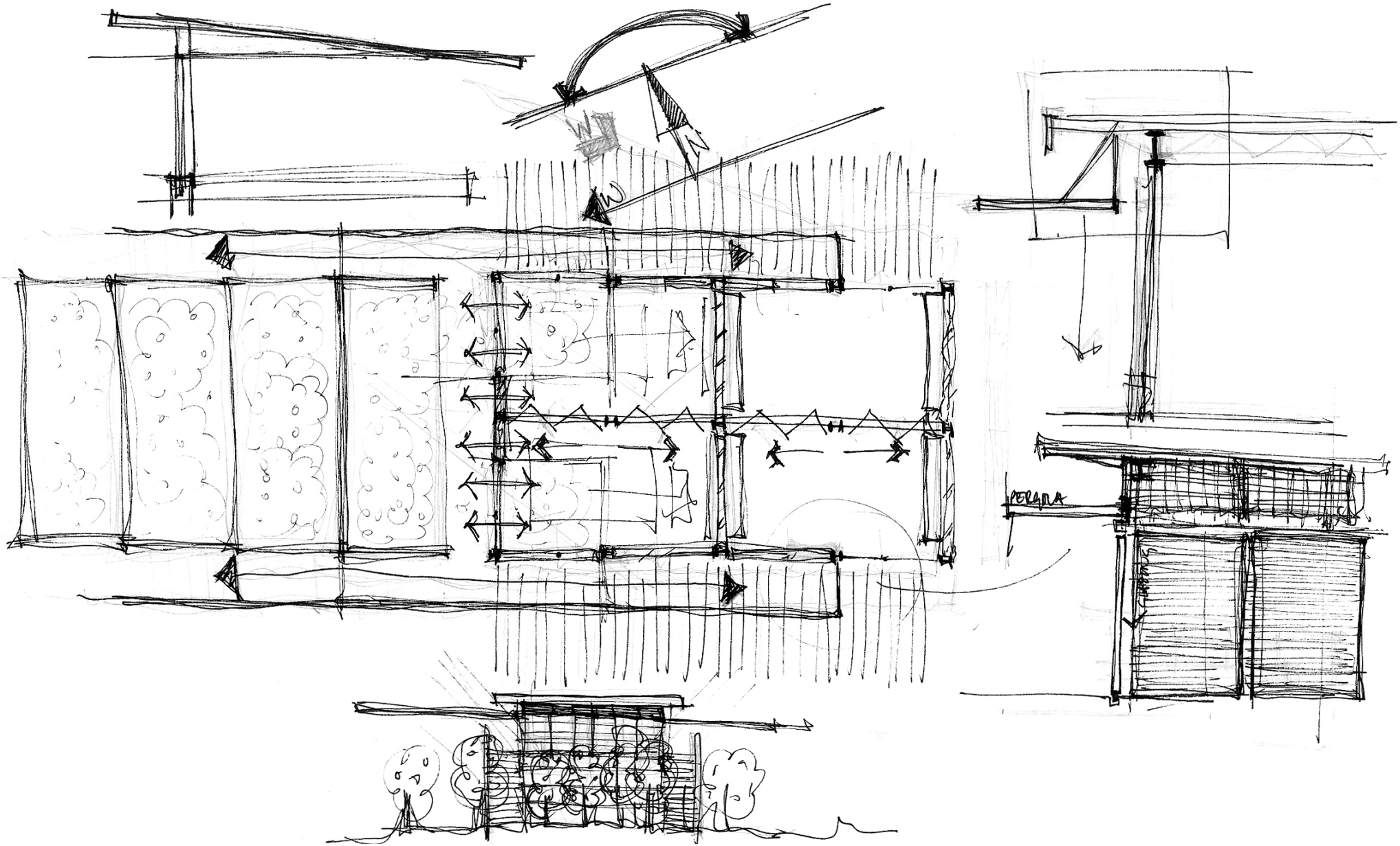

Fig. 7.16. The diagrams illustrate the design exploration of Building 2 [Author, 2013].

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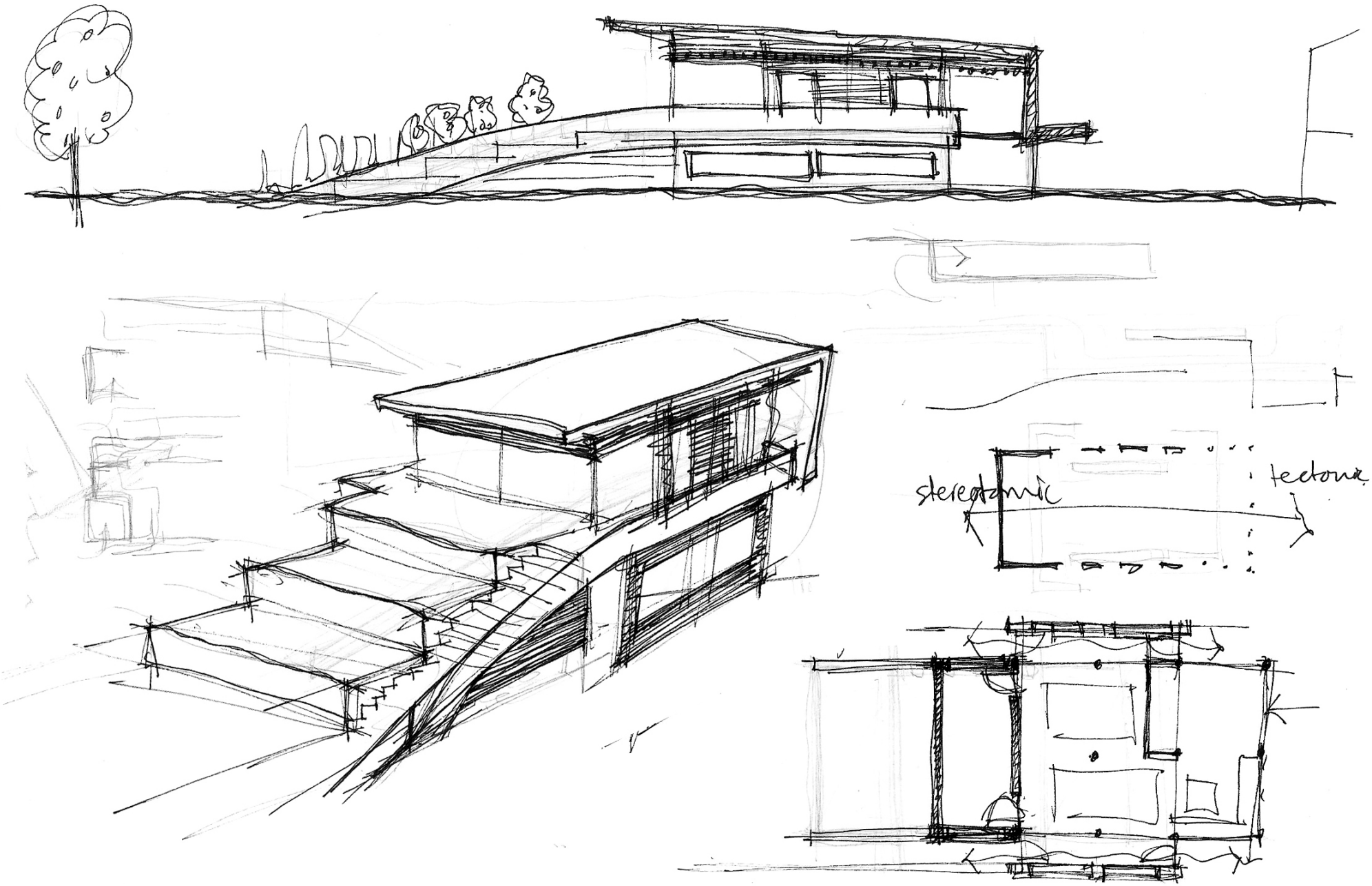

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7.4.4. BUILDING 3 DEVELOPMENT

Programmes: Medical Clinic and Volunteer Residence.

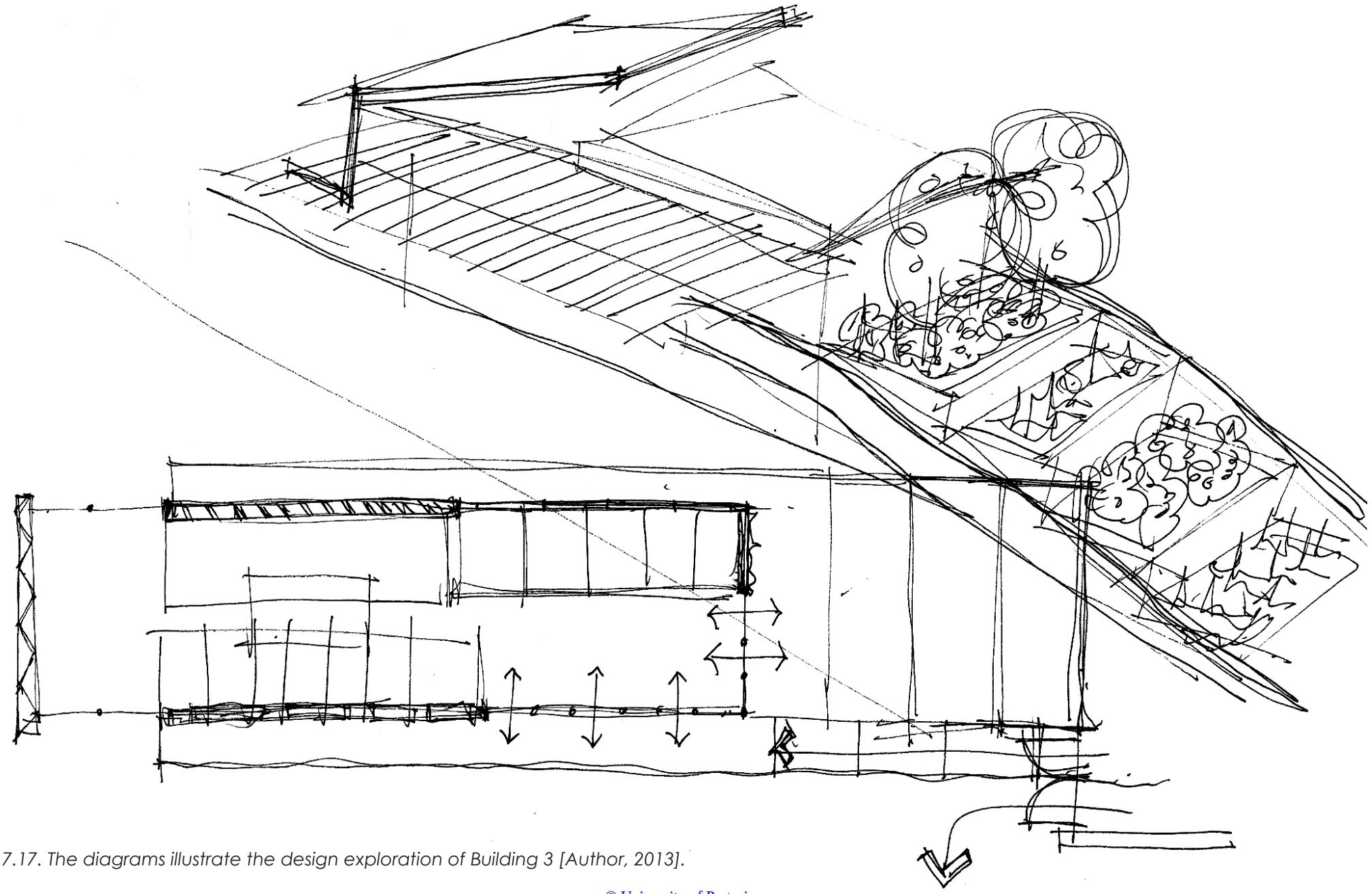

Fig. 7.17. The diagrams illustrate the design exploration of Building 3 [Author, 2013].

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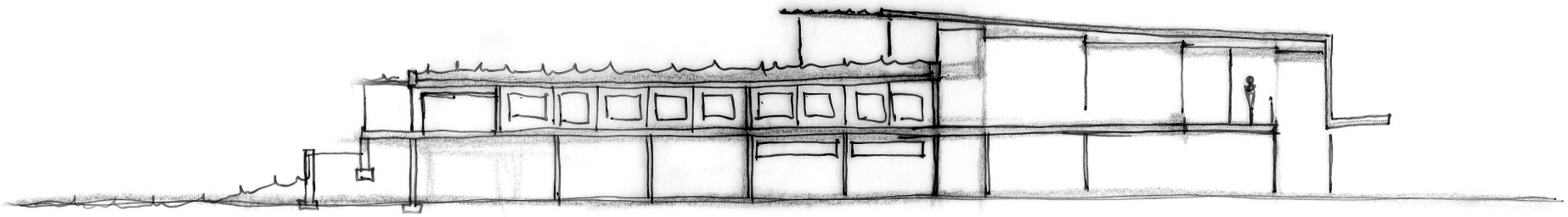

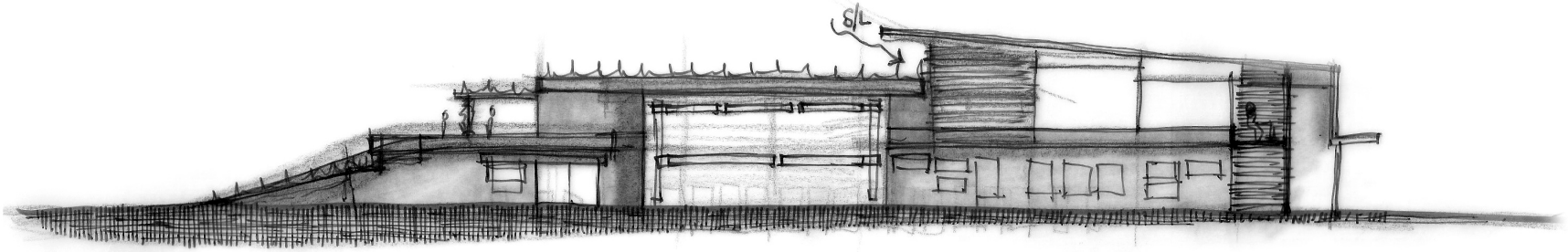

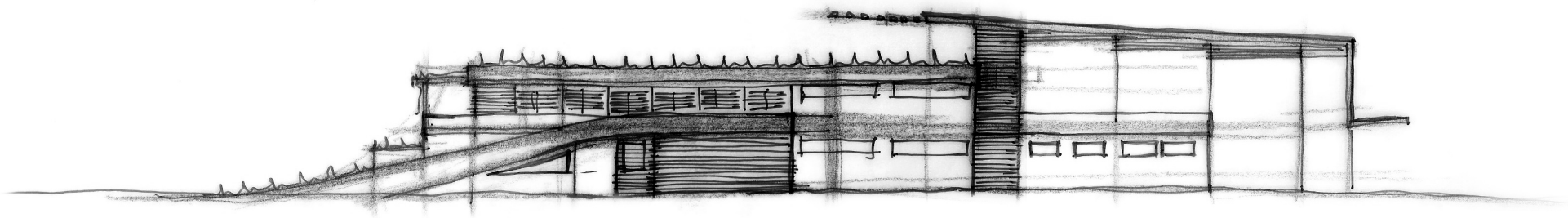

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7.4.5. REFLECTION

The following drawings reflect upon the design development and illustrate the progression of the process. The process starts with the basic massing of the building, and progress as to the development of the master plan, the building design and the relation to the surrounding context.

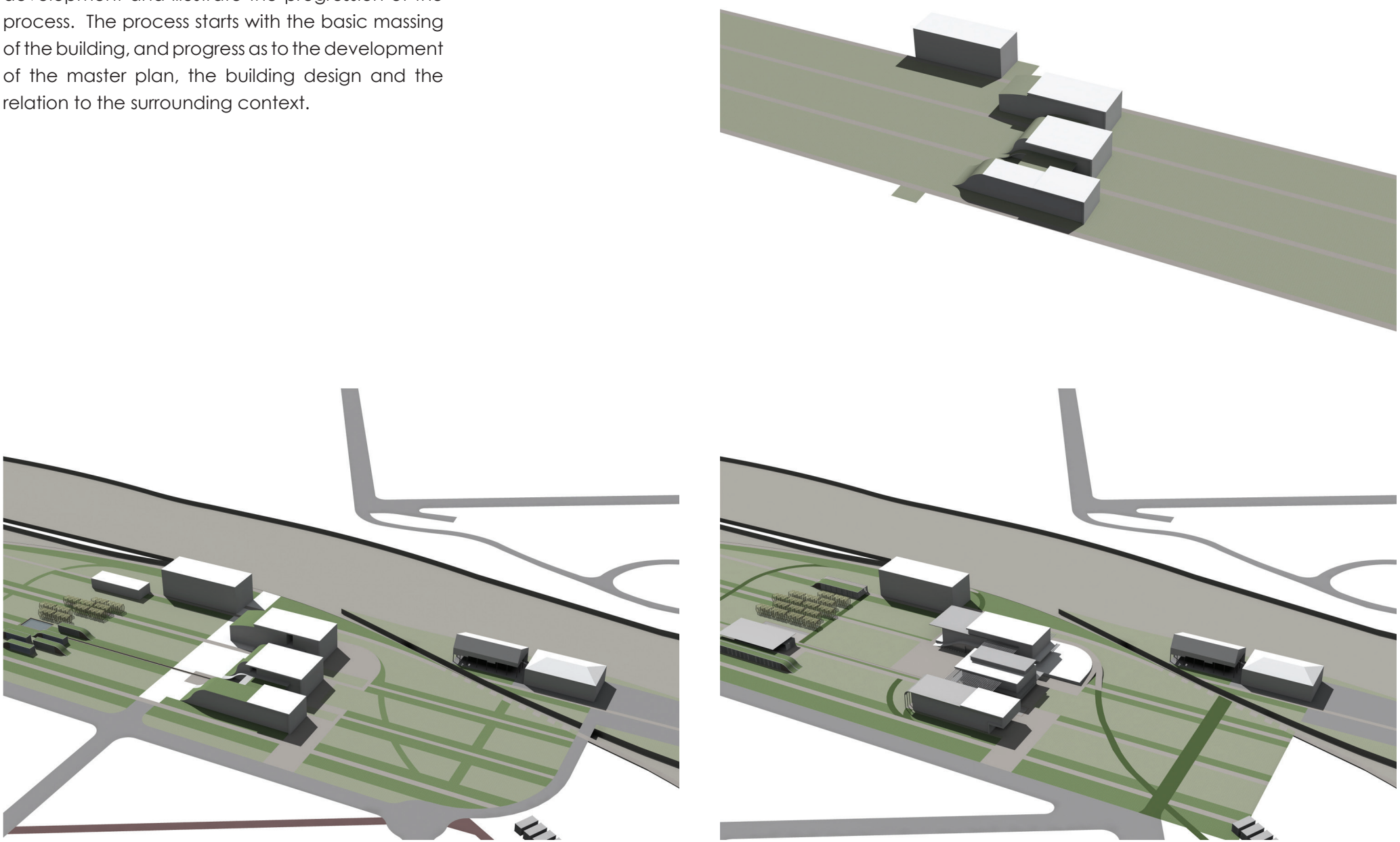

Fig. 7.18. The diagrams illustrate the design process in retrospect [Author, 2013].

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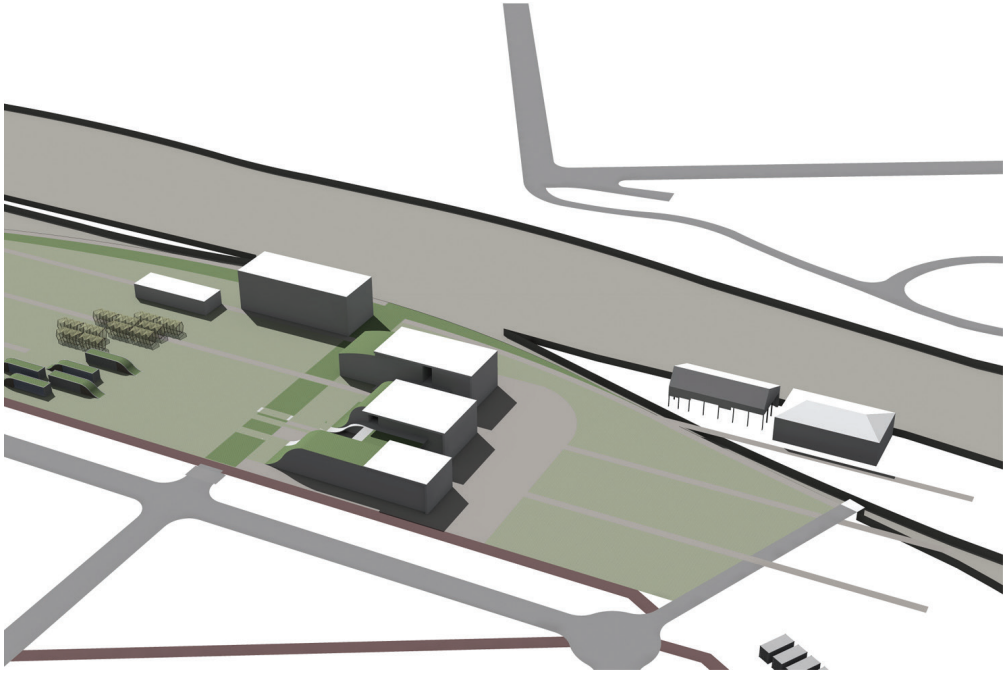

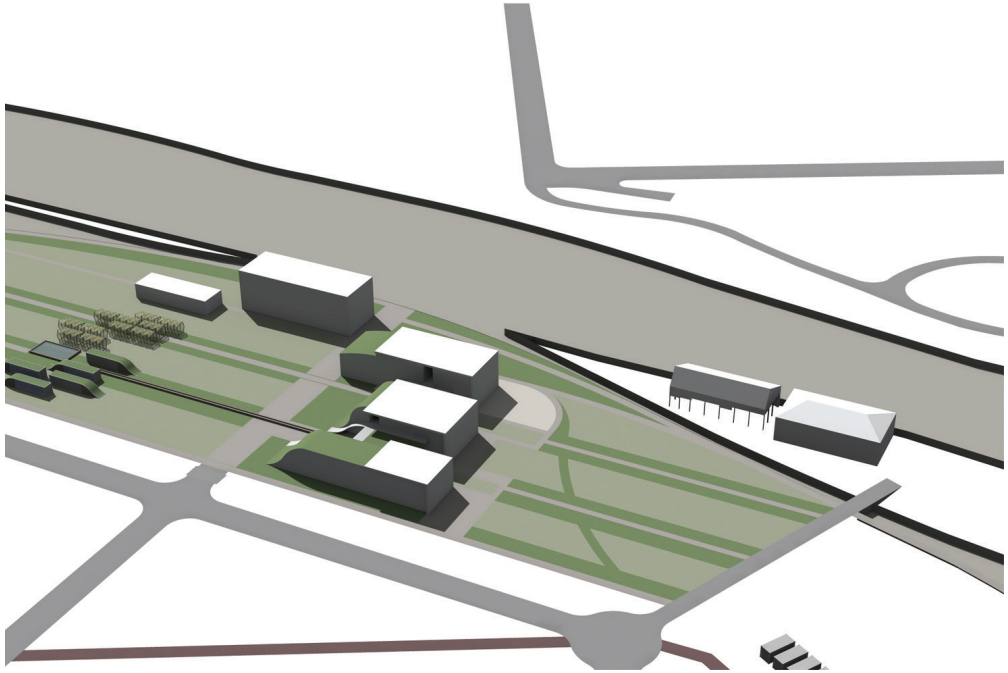

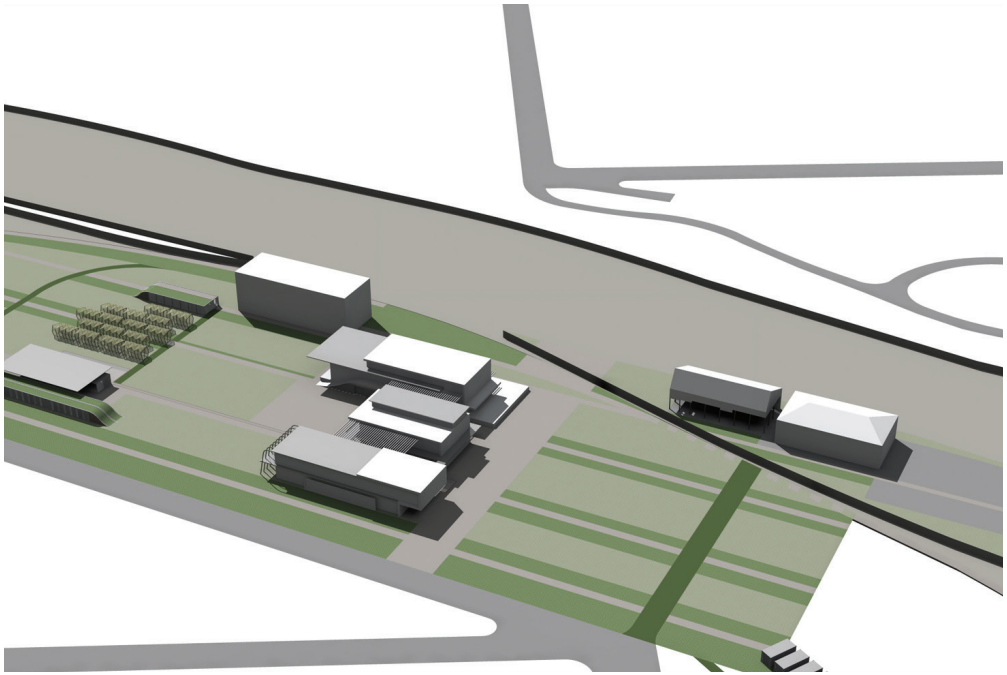

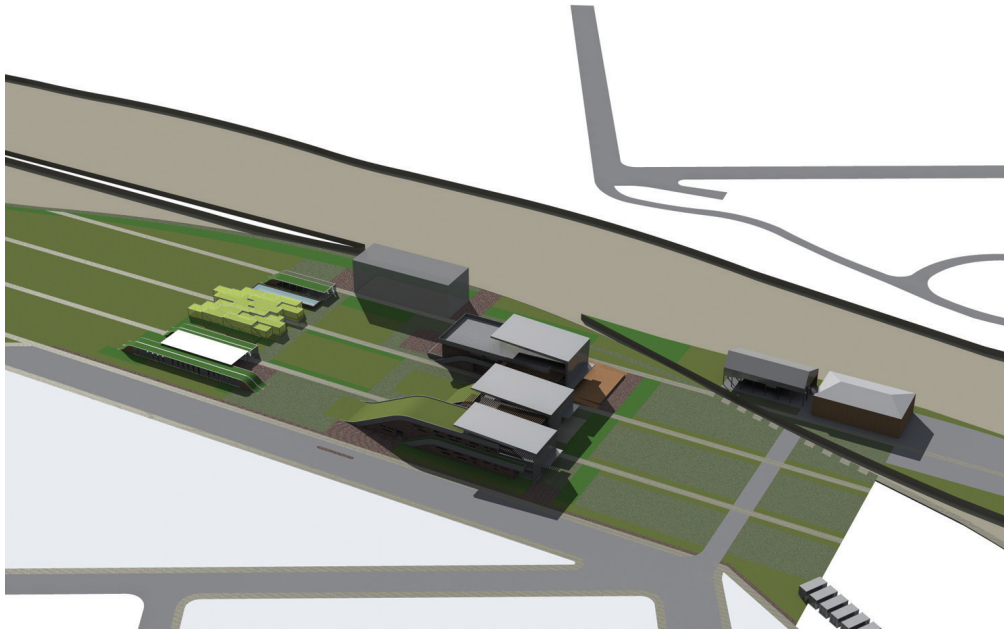

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7.4.6. PERSPECTIVES

Fig. 7.19. Perspective of the eastern facades from the main approach [Author, 2013].

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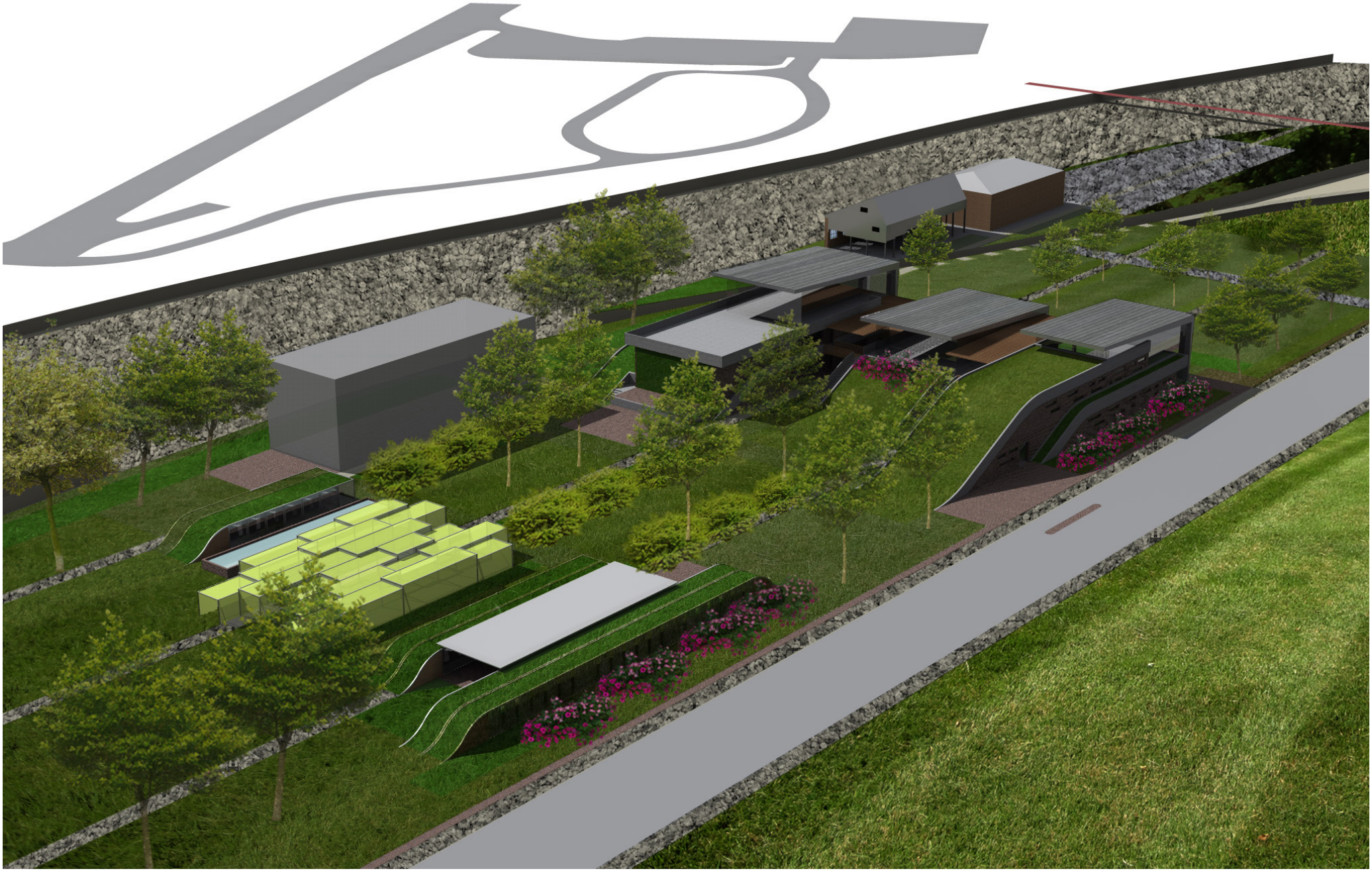

Fig. 7.20. Perspective from the west [Author, 2013].

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7.5. DESIGN INFORMANTS

7.5.1. REGENERATION OF NATURAL LANDSCAPE

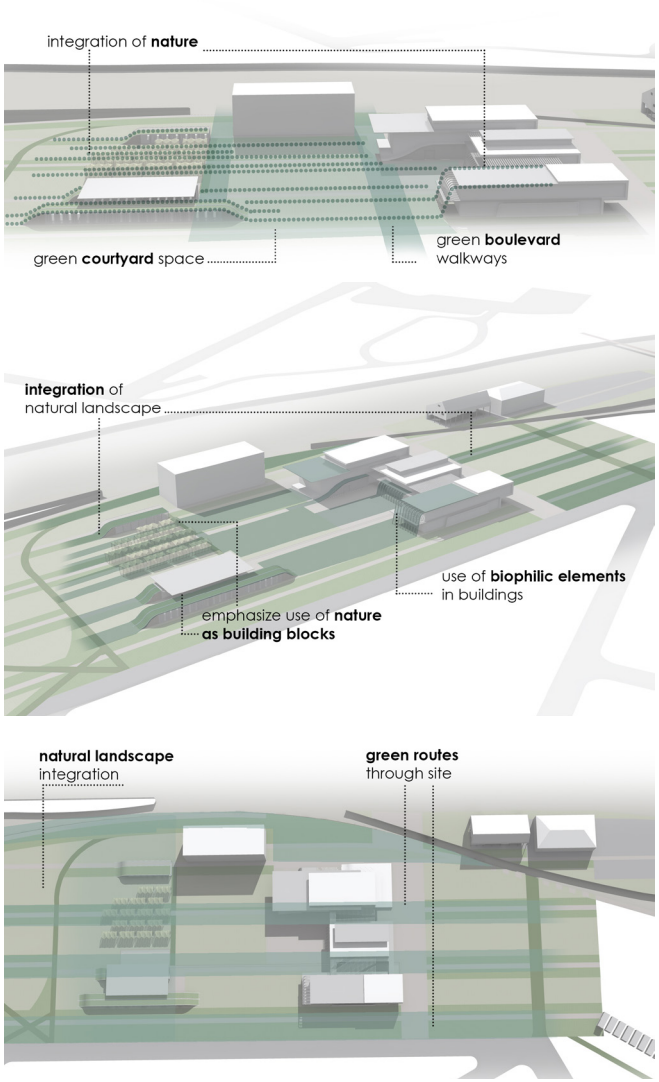

Fig. 7.21. The diagrams illustrate the regeneration of natural landscape [Author, 2013].

7.5.2. REGENERATION OF HERITAGE

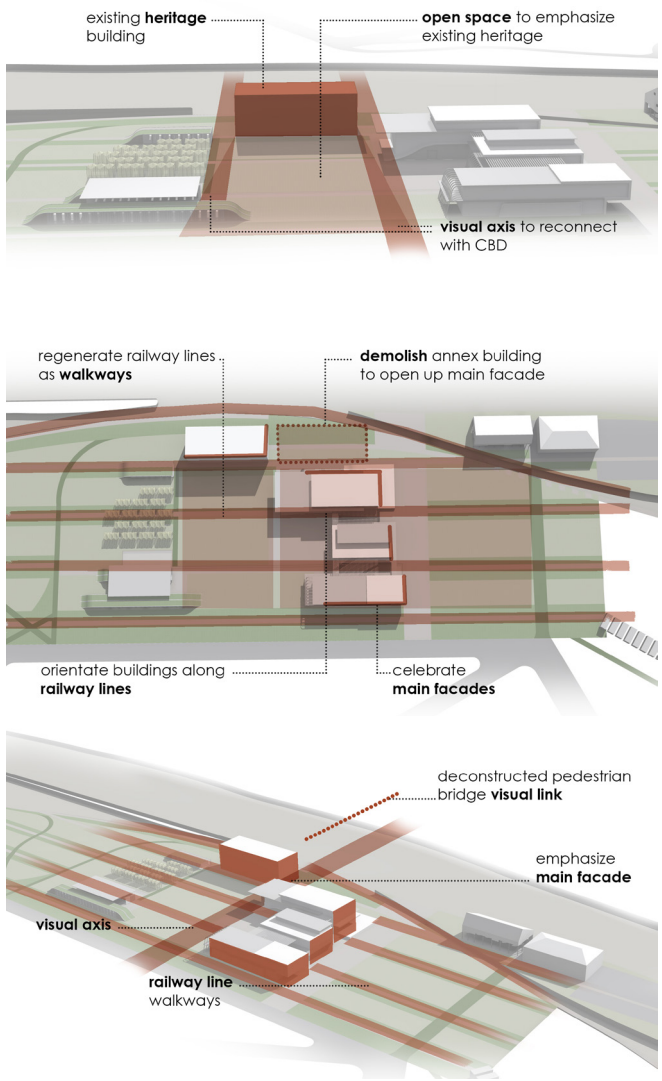

Fig. 7.22. The diagrams illustrate the regeneration of heritage [Author, 2013].

7.5.3. REGENERATION OF PROGRAMME

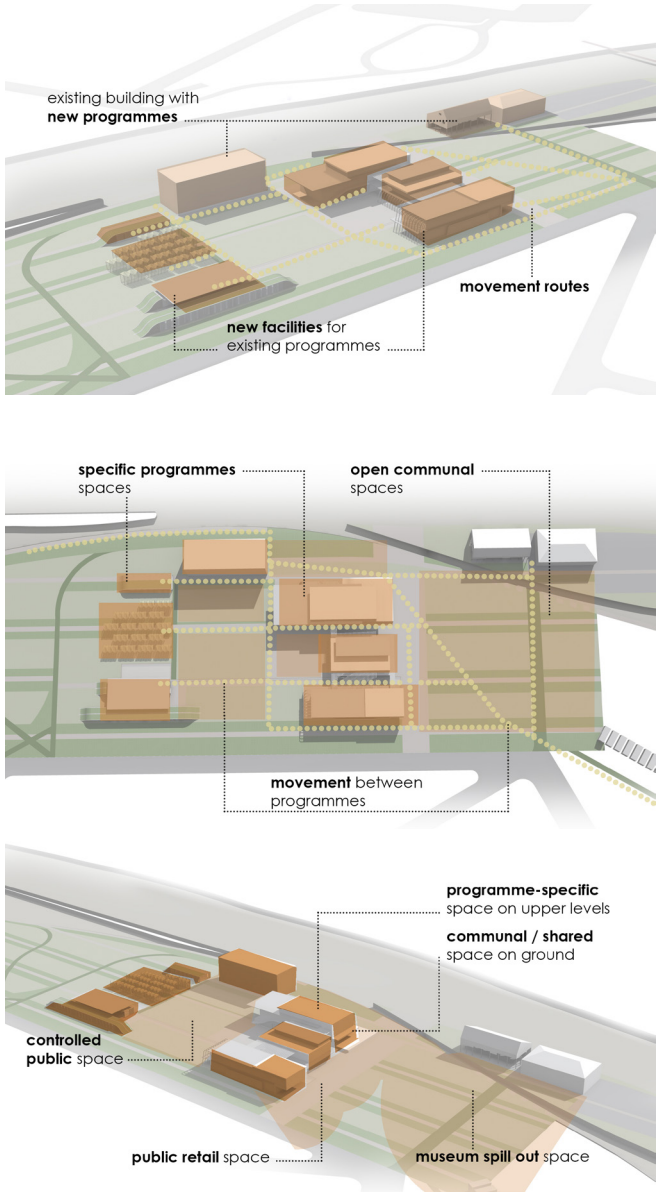

Fig. 7.23. The diagrams illustrate the regeneration of programme [Author, 2013].

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7.5.4. MONASTERY CONCEPT

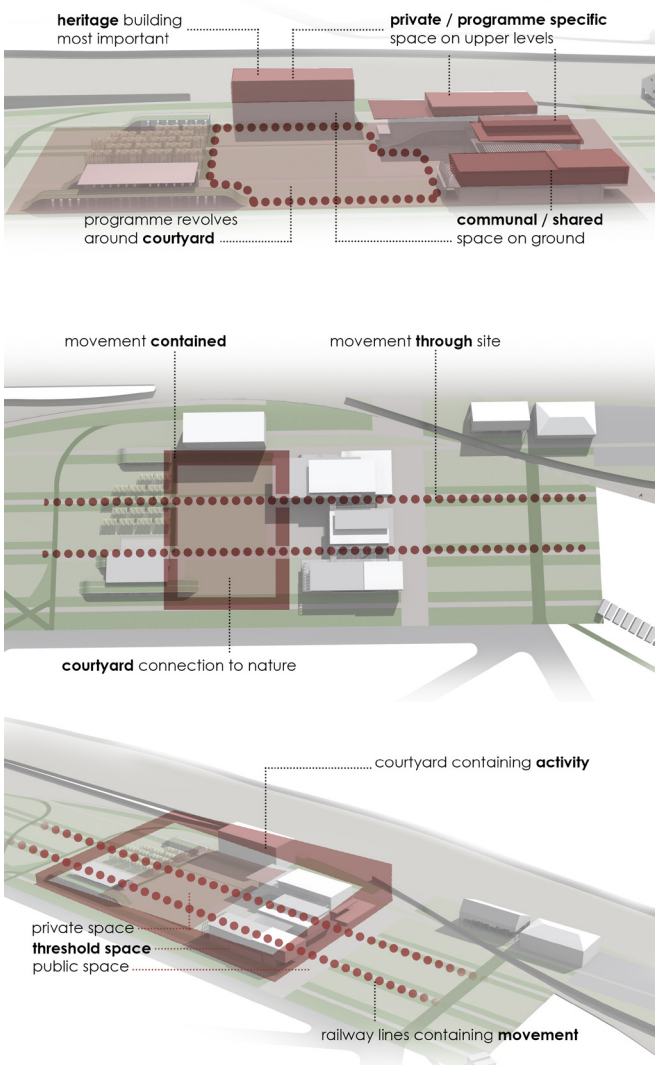

Fig. 7.24. The diagrams illustrate the monastery concept [Author, 2013].

7.5.5. RESPONSE TO CONTEXT

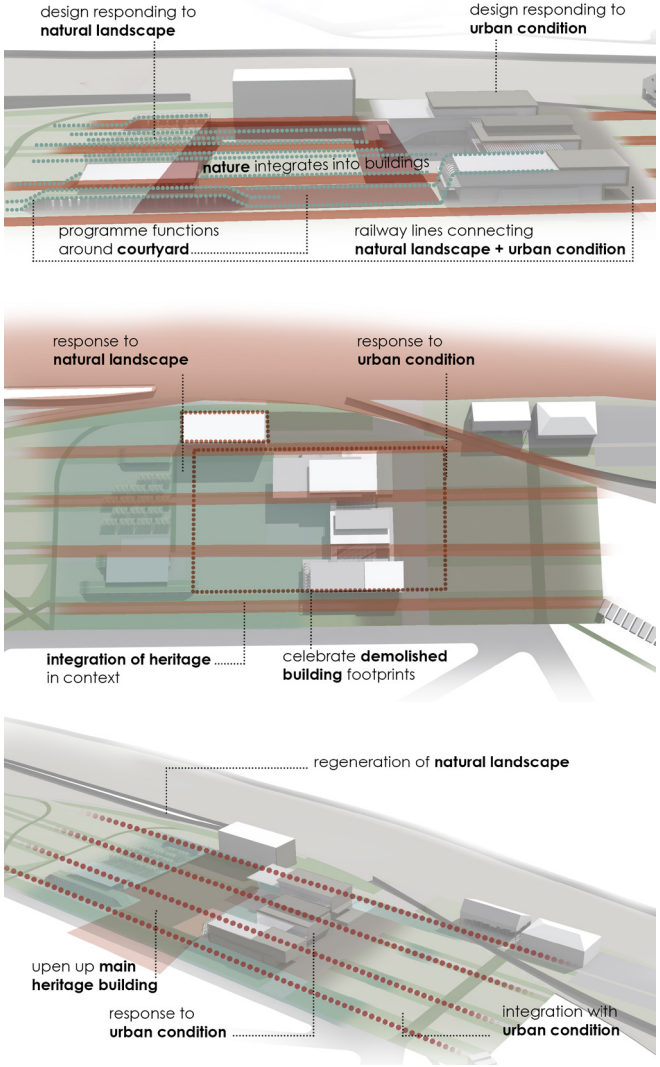

Fig. 7.25. The diagrams illustrate the response to the context [Author, 2013].

7.6. CONCLUSION

The chapter illustrated the design development of the dissertation. The contextual issues and design decisions were discussed and the development thereof illustrated. The contextual response was elaborated and explained. The design informants were re-evaluated and illustrated the design development according to the conceptual approach.

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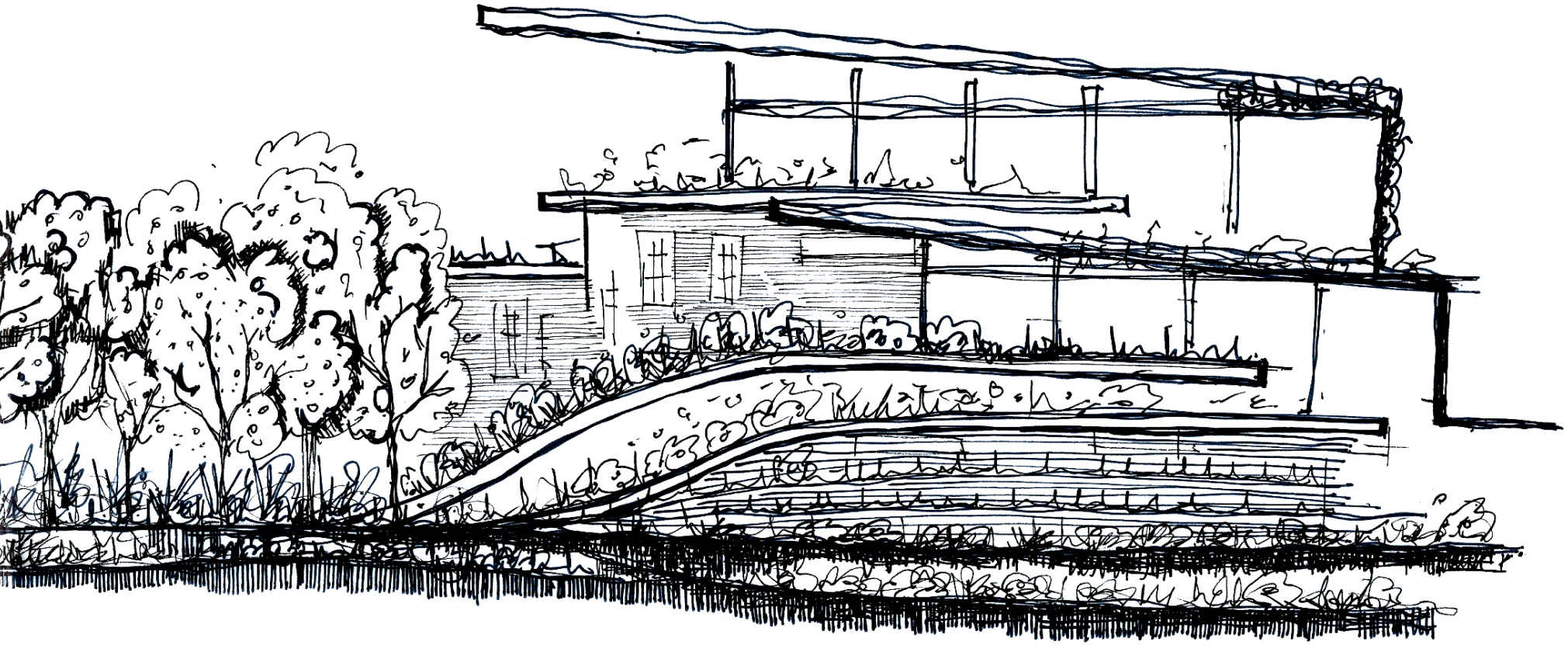
8. TECHNICAL RESOLUTION



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8.1. INTRODUCTION

The chapter serves to illustrate the technical resolution of the design dissertation. The chapter will firstly explain the structural concept, as derived from the concept and design development in the previous chapters. Secondly, the technological development of the building will be elaborated with regard to the technological aesthetic, structural systems, services. Furthermore, the environmental potential investigations will consist of water harvesting, protection against solar heat gain, cross ventilation, endemic vegetation, and local materials. Thirdly, the technical resolution will be illustrated in plans, sections and detail drawings.

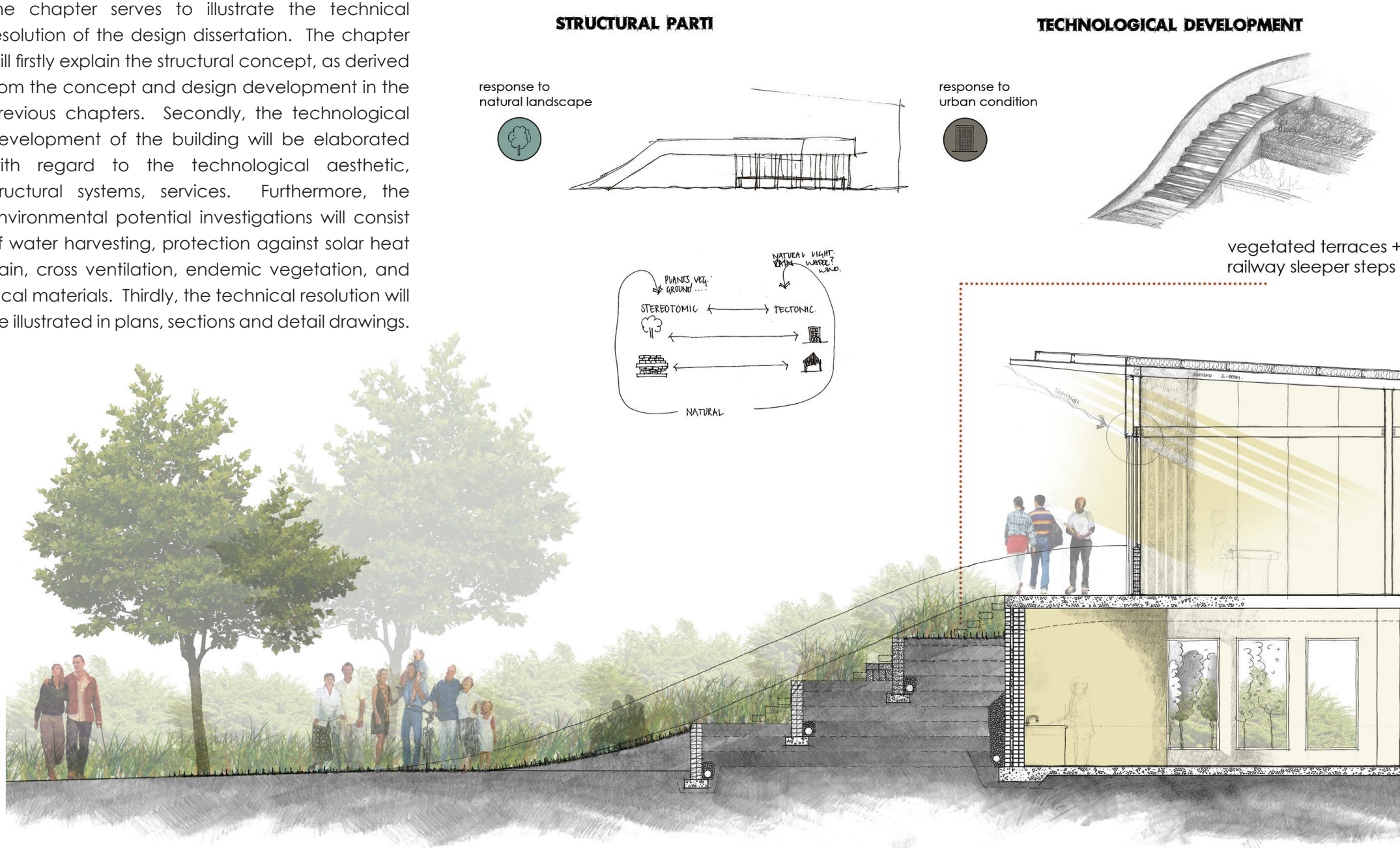

Fig. 8.1. Section parti diagram of the structural concept [Author, 2013].

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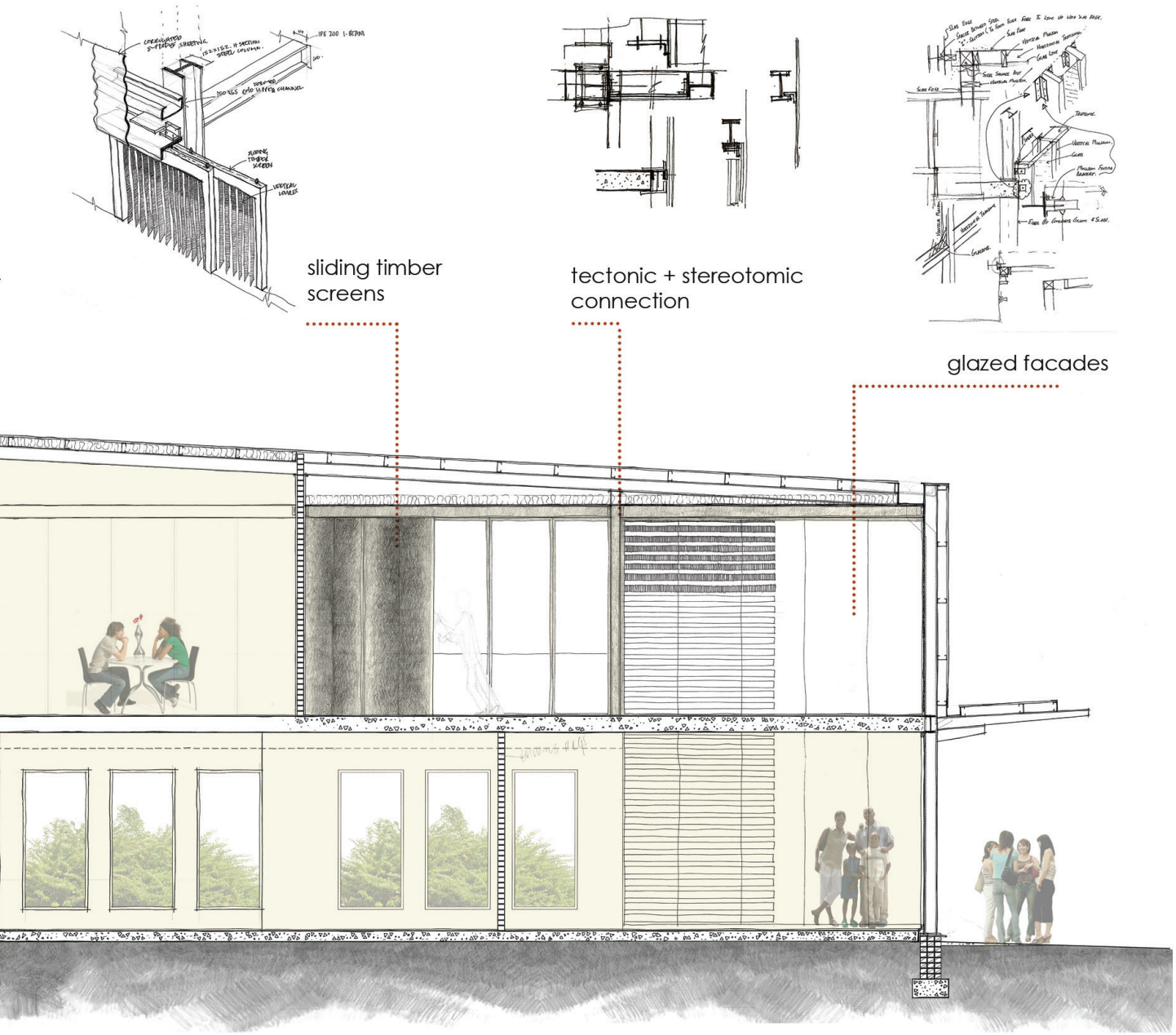

8.2. STRUCTURAL CONCEPT

The structural concept is inherently part of the contextual response. On the one extent, the stereotomic structure is a manifestation of the natural landscape. The ground-filled, organic structure rises from the earth to be encapsulated by the tectonic lightweight steel structure, respectively a manifestation of the urban condition on the other extent. The concrete and brick structure responds to the existing POPUP building, whereas the lightweight steel structure responds to the old Steam Roller Shed.

The use of the materials is re-interpreted to serve as an expression of the current backdrop of the site, as well as an utterance of the need for regeneration as indicated by the conceptual approach. The strong horizontal lines are an articulation of the railway lines and hence the regeneration of the heritage significance and the reconnection of the site to the surrounding context.

The theoretical approach implies that the use of *biophilic elements* such as water, sunlight, air, plants, views and vistas, and facade greening constitute one of the two building blocks of *restorative environmental design* [Kellert, 2005]. The other building block is the use of *low-impact technologies* [Kellert, 2008], such as: passive ventilation, water harvesting, daylighting, thermal mass, and the use of materials with a low-embodied energy. The attributes mentioned plays an integral role in the structural development of the building, since it is essential for the formation of restorative environments.

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8.3. TECHNOLOGICAL AESTHETIC

The technological aesthetic is a composition of the stereotomic, the tectonic, and the natural. In turn these elements respond to the surrounding context and serve to reconnect the building with the natural landscape, the urban condition and the railway heritage.

The stereotomic structure consists of three basic elements that merge the new building with the existing POPUP building and natural landscape – the exposed concrete balustrade, face-brick walls and vegetation covered terraces that step out into the landscape. The tectonic, lightweight steel structure consists of the same corrugated steel sheeting used for the old Steam Roller Shed and railway workshop structures.

Furthermore, the use of natural and biophilic elements is a deliberate attempt to soften the harsh railway language of the design intervention. The composition of these elements, i.e. the sunlight, air, water, views and vistas, facade greening, screens and plants capacitates the building to provide the conditions for the restoration of people [Kellert, 2008]. Furthermore, it contributes a humane scale to the building, and increases the regeneration of the human-nature connection.

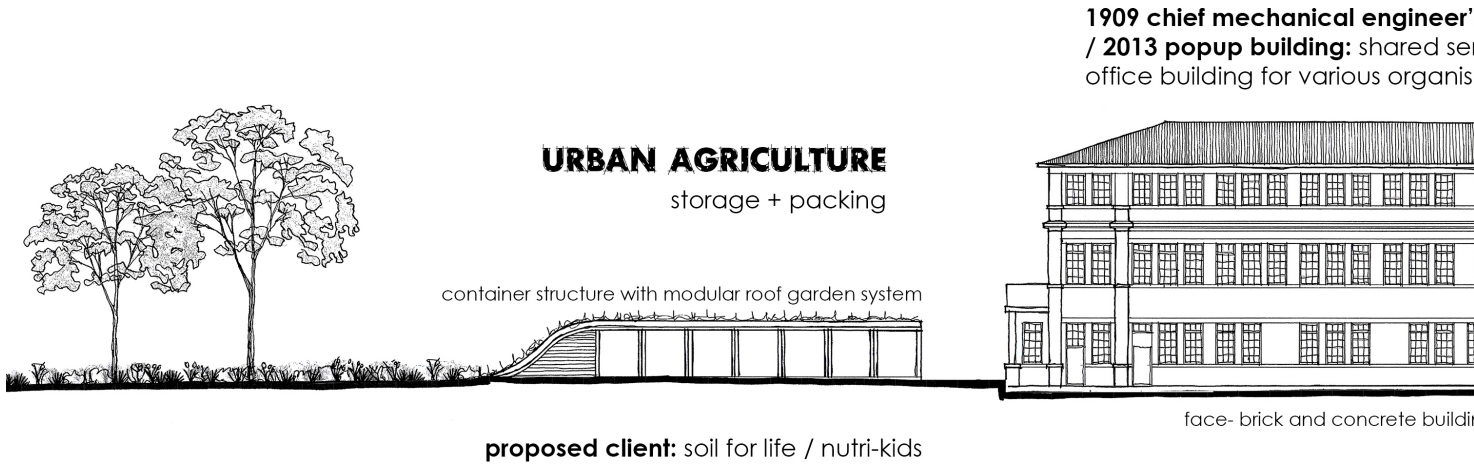

Fig. 8.2. Site elevation of Building 1 illustrating the technological aesthetic [Author, 2013].

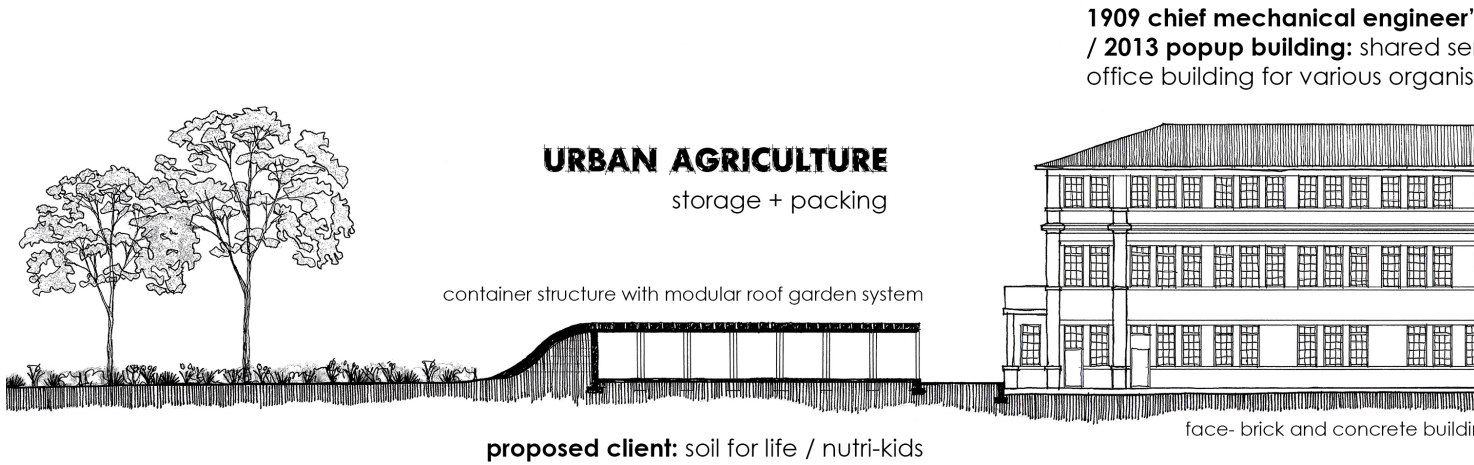

Fig. 8.3. Site section through Building 1 illustrating the technological aesthetic [Author, 2013].

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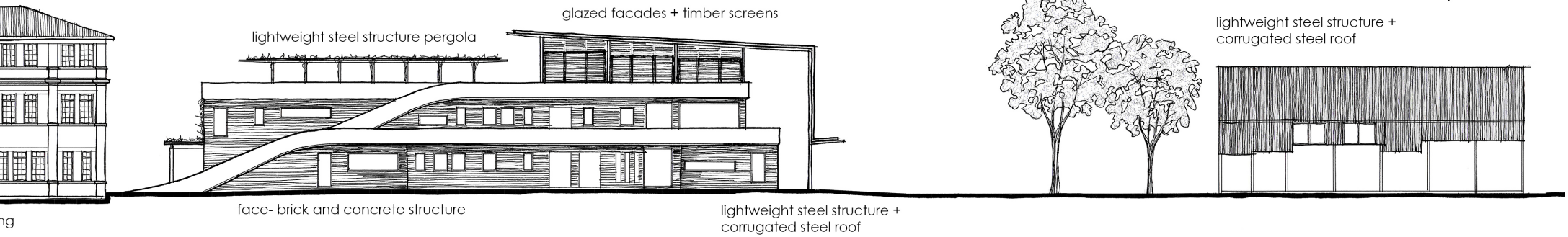
BUILDING 1

ground: recreation hall, coffee shop
first: hospitality training
second: classrooms

s office
rvices +
ations



old steam roller shed: railway museum

ng

BUILDING 1

ground: recreation hall, coffee shop
first: hospitality training
second: classrooms

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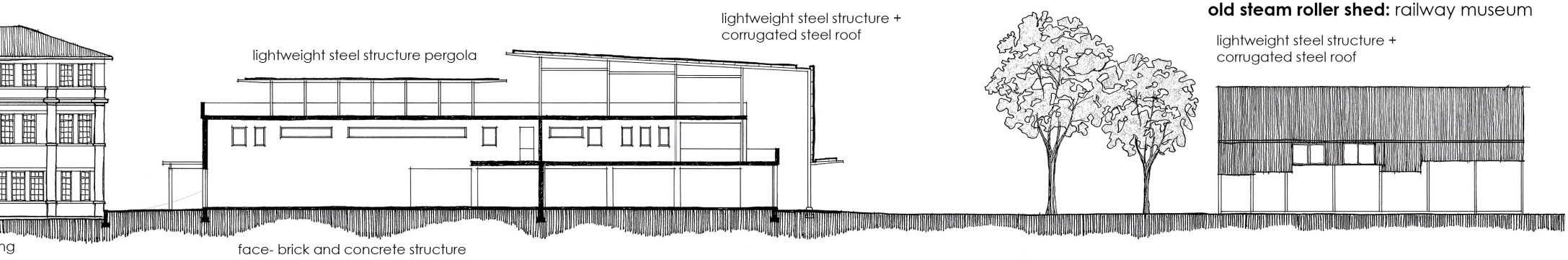

old steam roller shed: railway museum

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Fig. 8.4. Site elevation of Building 2 illustrating the technological aesthetic [Author, 2013].

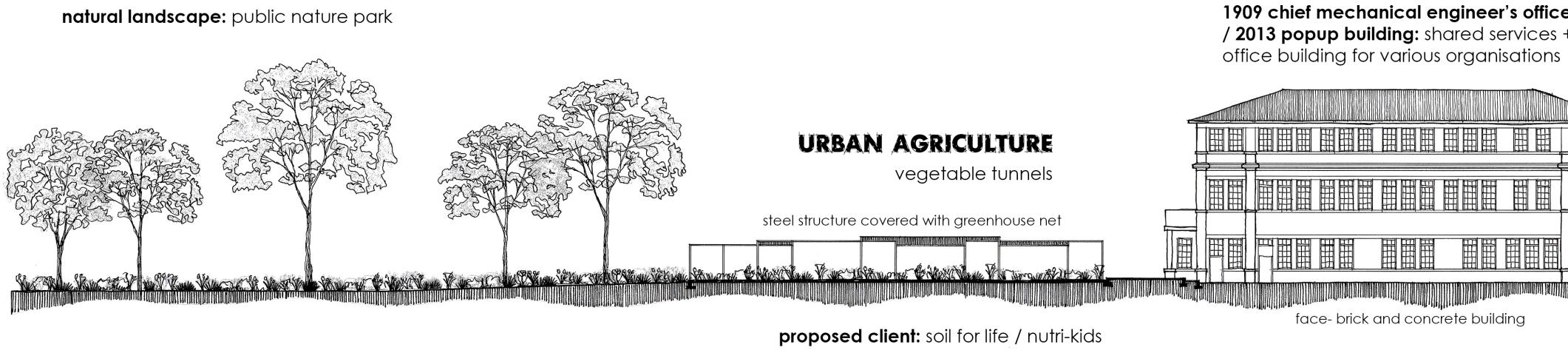

Fig. 8.5. Site section through Building 2 illustrating the technological aesthetic [Author, 2013].

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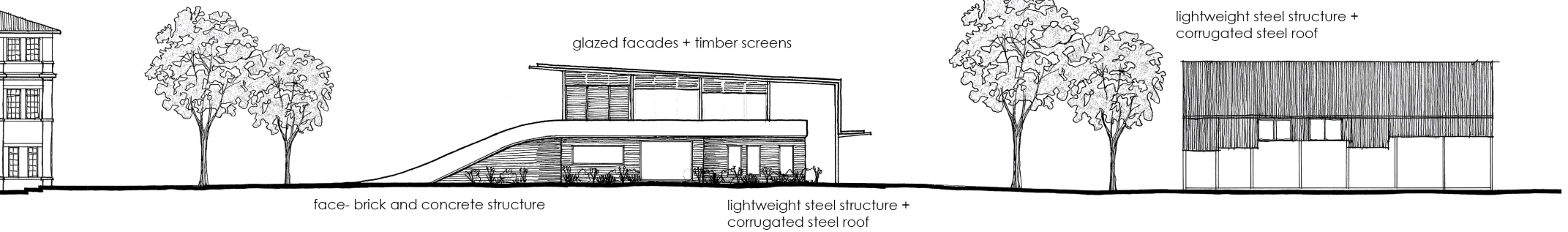
BUILDING 2

ground: sewing factory + shop
first: classrooms

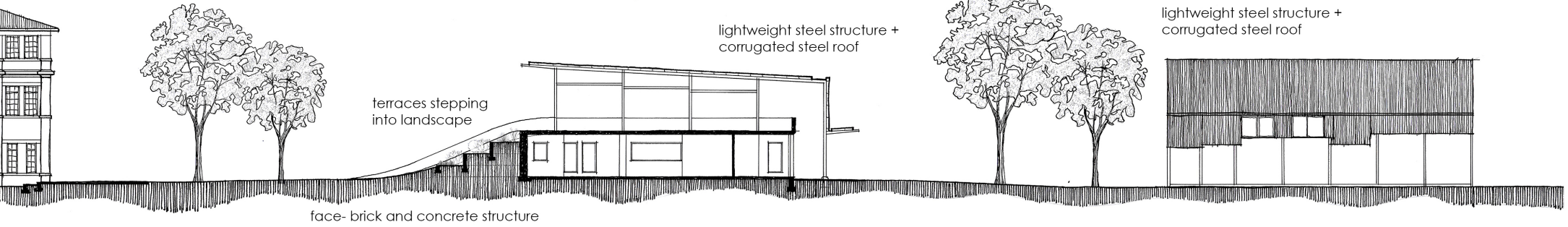


old steam roller shed: railway museum

lightweight steel structure +
corrugated steel roof

BUILDING 2

ground: sewing factory + shop
first: classrooms



old steam roller shed: railway museum

lightweight steel structure +
corrugated steel roof

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Fig. 8.6. Site elevation of Building 3 illustrating the technological aesthetic [Author, 2013].

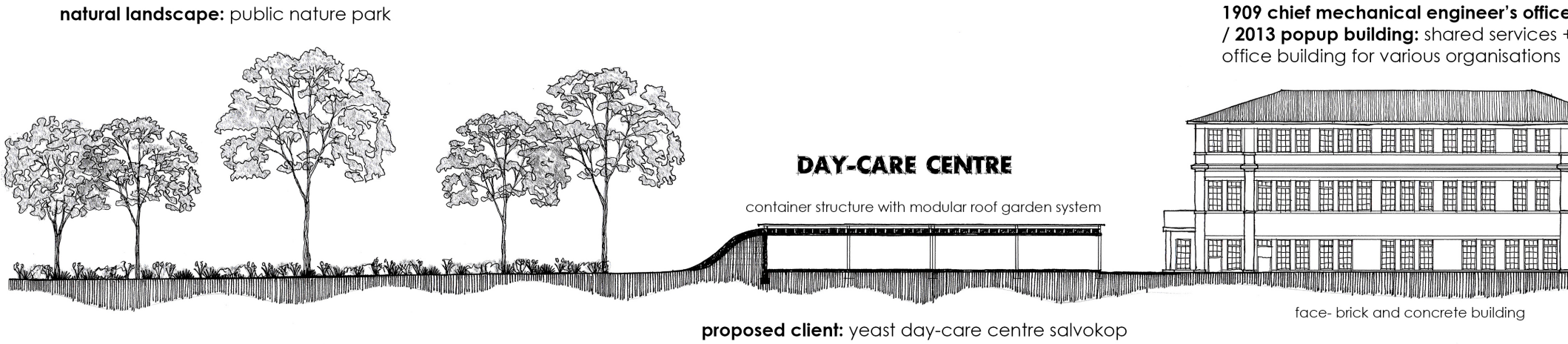

Fig. 8.7. Site section through Building 3 illustrating the technological aesthetic [Author, 2013].

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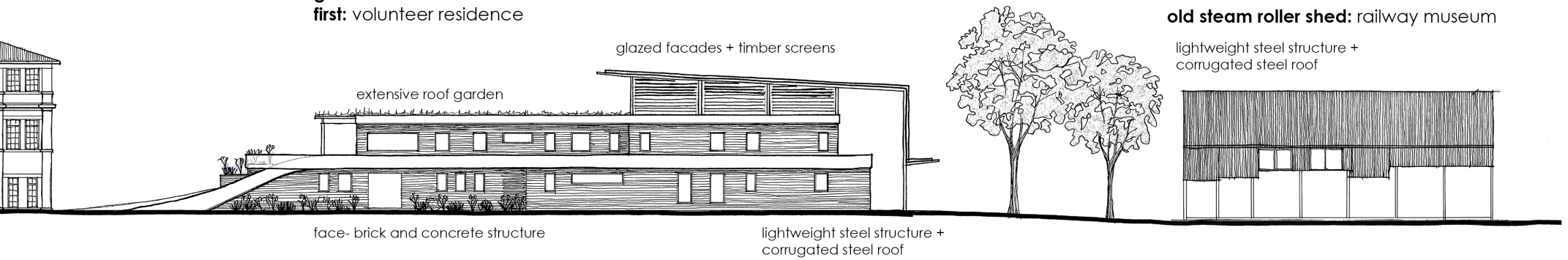
BUILDING 3

ground: medical clinic
first: volunteer residence

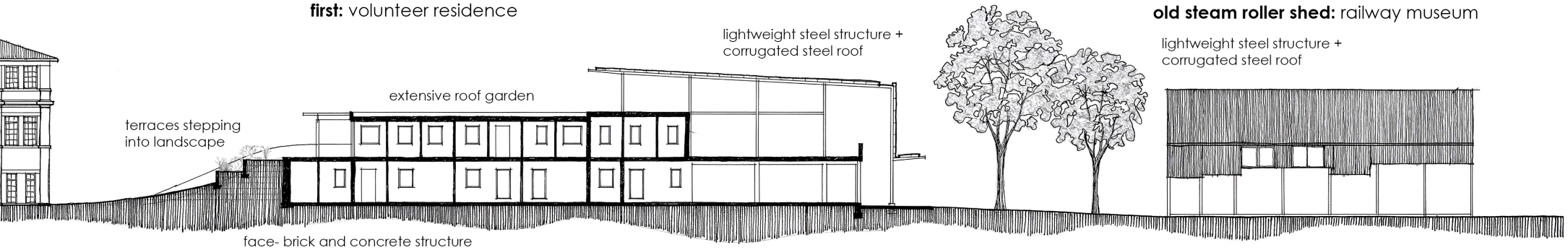


old steam roller shed: railway museum

proposed client for clinic: city of tshwane

BUILDING 3

ground: medical clinic
first: volunteer residence



old steam roller shed: railway museum

proposed client for clinic: city of tshwane

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8.4. ENVIRONMENTAL POTENTIAL

With regard to the environmental potential of the building, the design respond with investigations of rainwater harvesting, protection against solar heat gain, cross ventilation, the construction of the stereotomic and tectonic structures, as well as the use of natural elements and endemic vegetation.

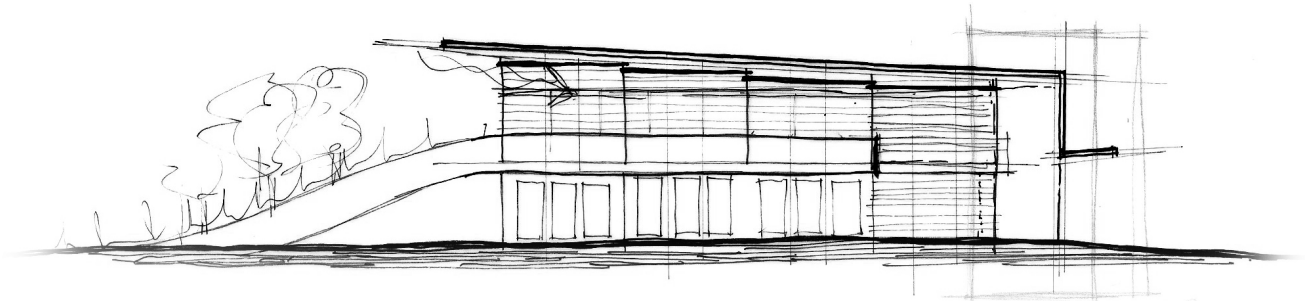

Fig. 8.9. South elevation of Building 2 to indicate area of investigation [Author, 2013].

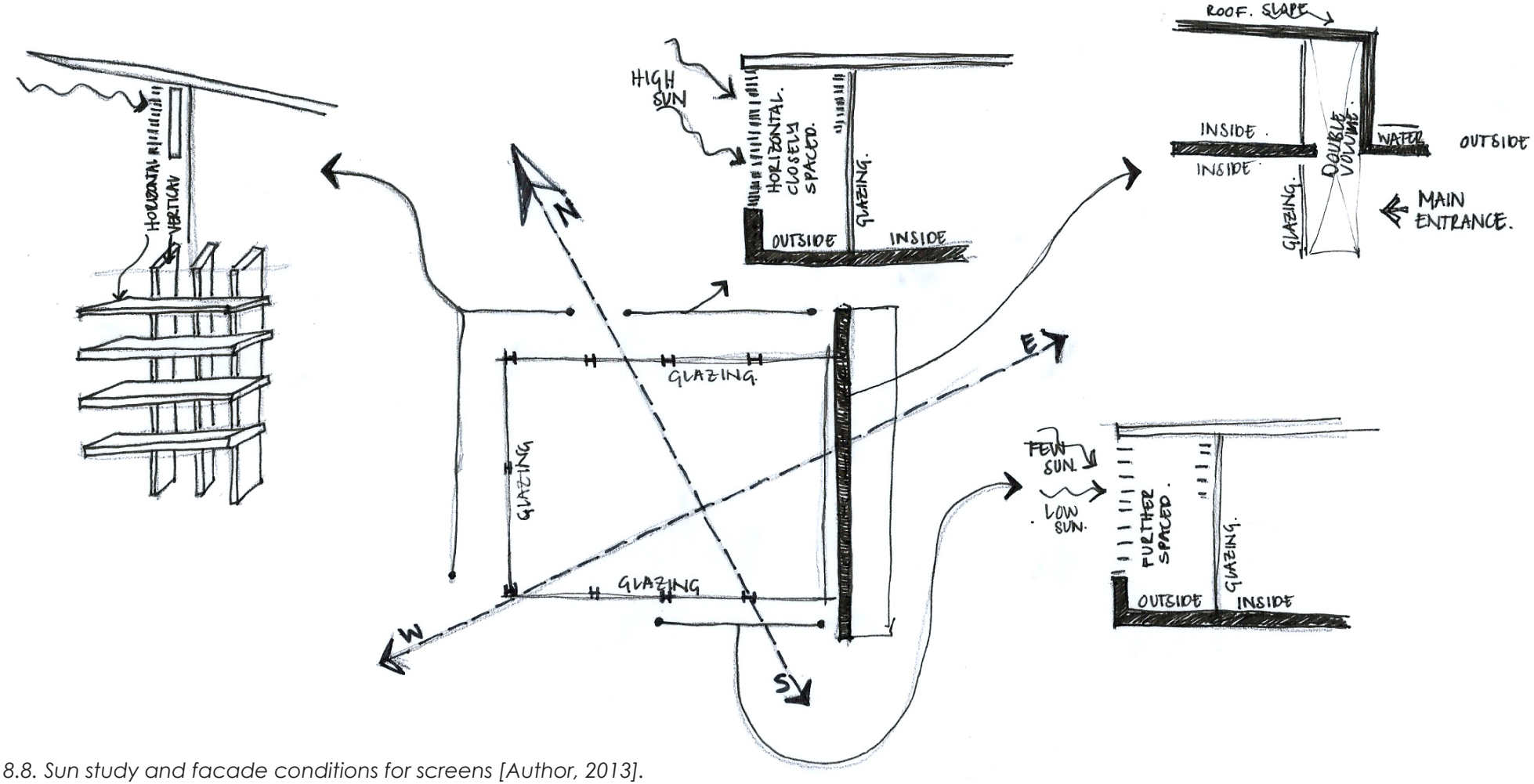

Fig. 8.8. Sun study and facade conditions for screens [Author, 2013].

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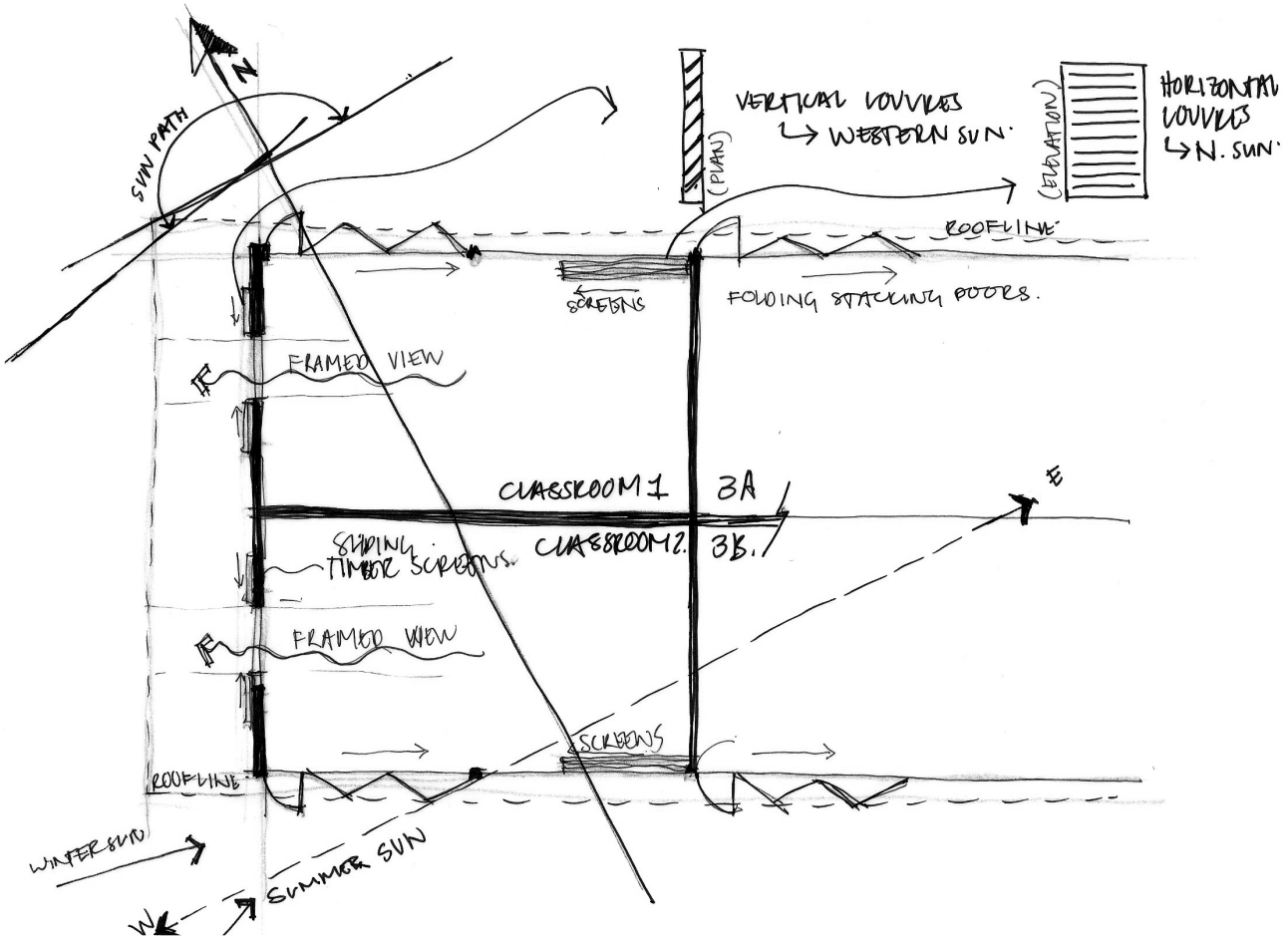

Fig. 8.10. Protection against solar heat gain strategy [Author, 2013].

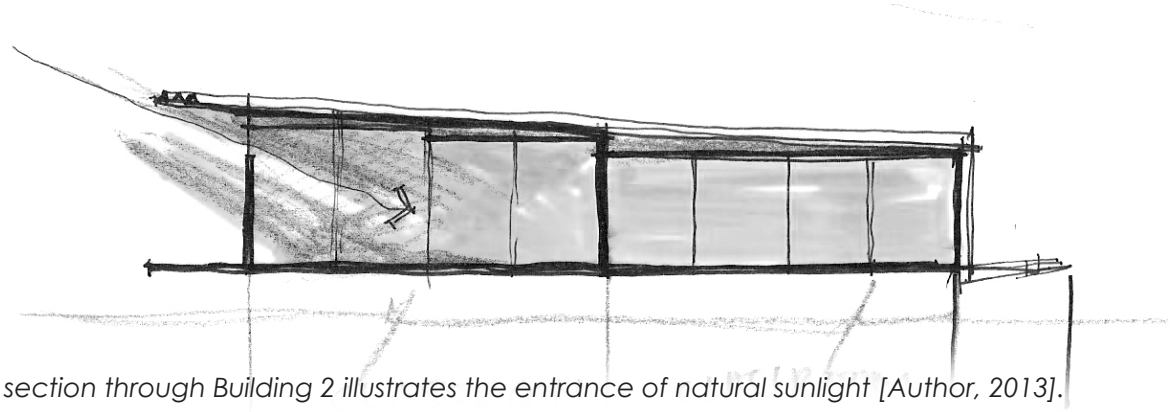

Fig. 8.11. The section through Building 2 illustrates the entrance of natural sunlight [Author, 2013].

8.4.1. PROTECTION AGAINST SOLAR HEAT GAIN

The use of natural sunlight contributes greatly to the design of restorative environments. It is supported by the theoretical approach as a *biophilic element and low-impact technology* [Hartig et al, 2008]. The use of daylighting is therefore not only an energy-saving strategy to increase the sustainability of the building, but is also a representation of nature and its power to restore. The experience of light in the building is a metaphorical stimulation of POPUP's role in the community as a beacon of hope, light and life.

The response to the regeneration of the heritage suggests that the building be orientated along the railway lines and the existing buildings. Additionally, the theoretical approach suggests the use of views and vistas for the regeneration of the human-nature connection. Therefore the building is designed with extensive glazed facades. However, following the above-mentioned considerations, the building needs to be protected against solar heat gain.

To protect the building against solar heat gain, especially against the north-western sun, the use of screens is implemented. Therefore, manual sliding timber screens respond to the problematic north-eastern, north-western and south-western sun, respectively. The selection of timber as the construction material of the screens increase the restorative quality of the environment, since it is a biophilic element and will be operated directly by the users.

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8.4.2. CROSS VENTILATION

In essence, *fresh air* is a biophilic element. It is also the essence of natural ventilation that increases the experience of nature in the built environment. The dissertation proposes the use of cross ventilation as a passive design strategy to ventilate the building. As a strategy that combines the use of a biophilic element and a low-impact technology, cross ventilation is a characteristic of restorative environments.

The appropriate scale and width (12m) of the building eliminates the need for mechanical ventilation, thereby assisting to reduce the carbon footprint. The building makes use of windows, screens and louvres to manage the ventilation manually. The manual controlling of the windows, screens and louvres increase the sensitivity of the users toward the natural elements and thus enhance the human-nature connection.

The design furthermore proposes the use of folding stacking doors. This will increase the natural ventilation and the quality thereof. It also improves the adaptability of the spaces and the user's control over the environment. In turn, the *power* of the students over the environment is a figurative expression for the empowerment in their own lives.

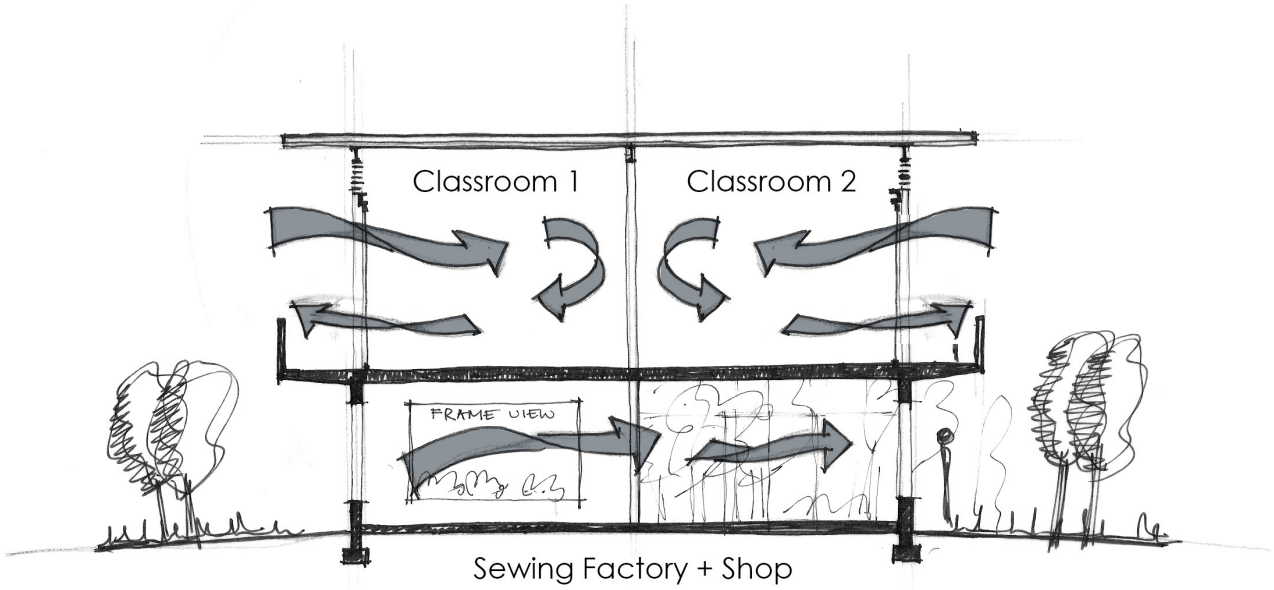

Fig. 8.12. Building 2 section to illustrate the natural ventilation of classrooms 1 and 2 [Author, 2013].

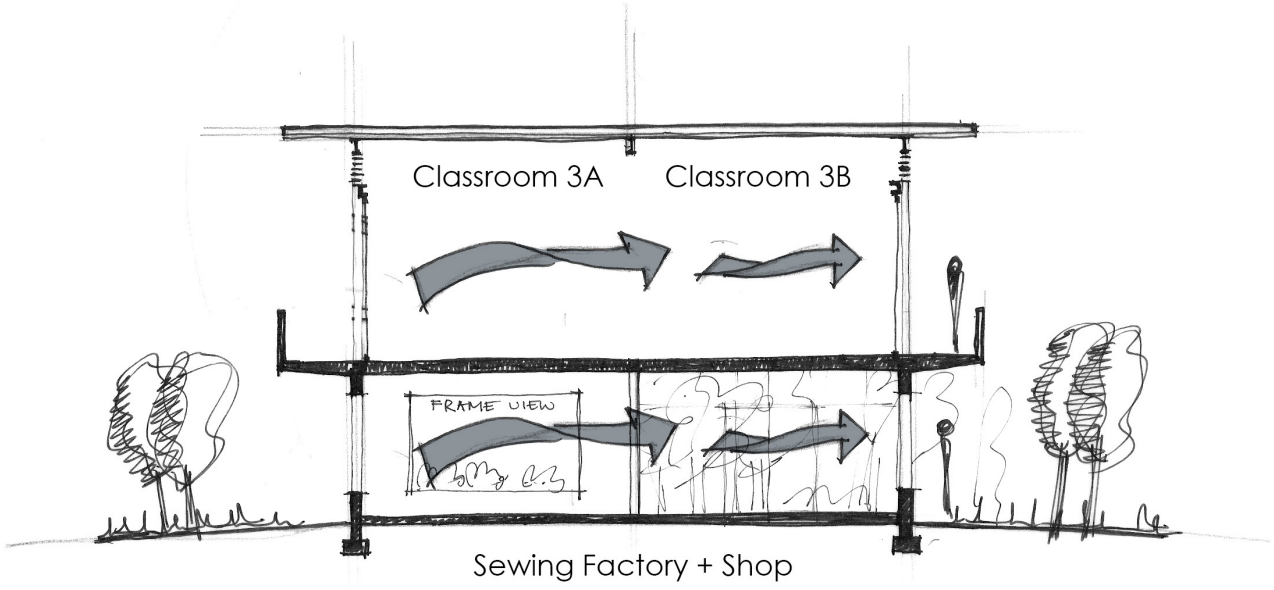

Fig. 8.13. Building 2 section to illustrate the natural ventilation of classrooms 3A and 3B [Author, 2013].

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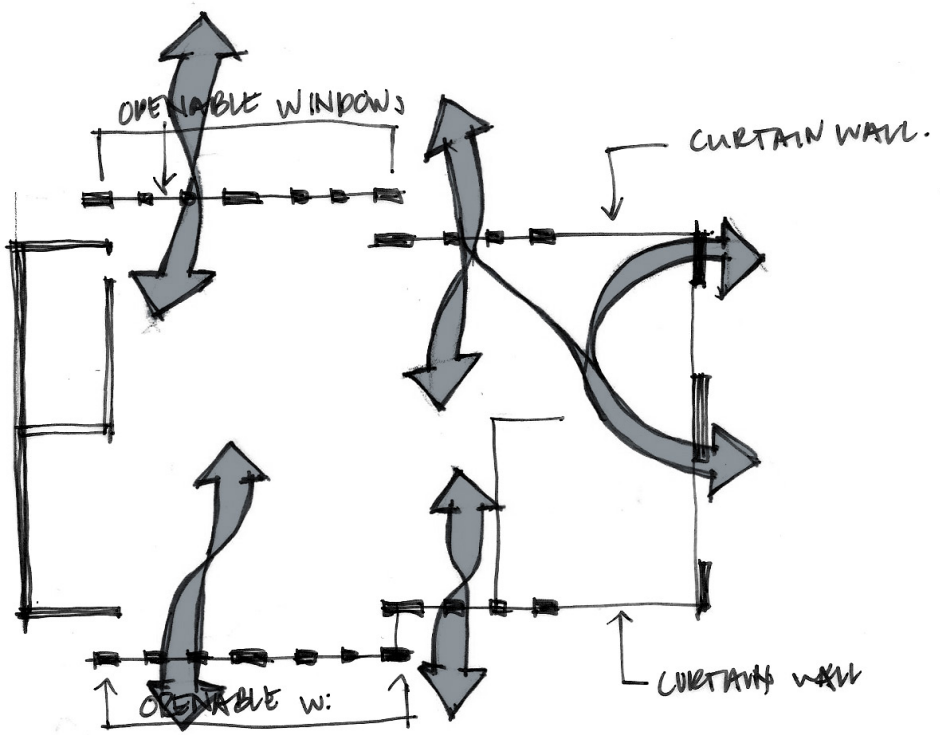

Fig. 8.14. Building 2 ground floor diagram of natural ventilation [Author, 2013].

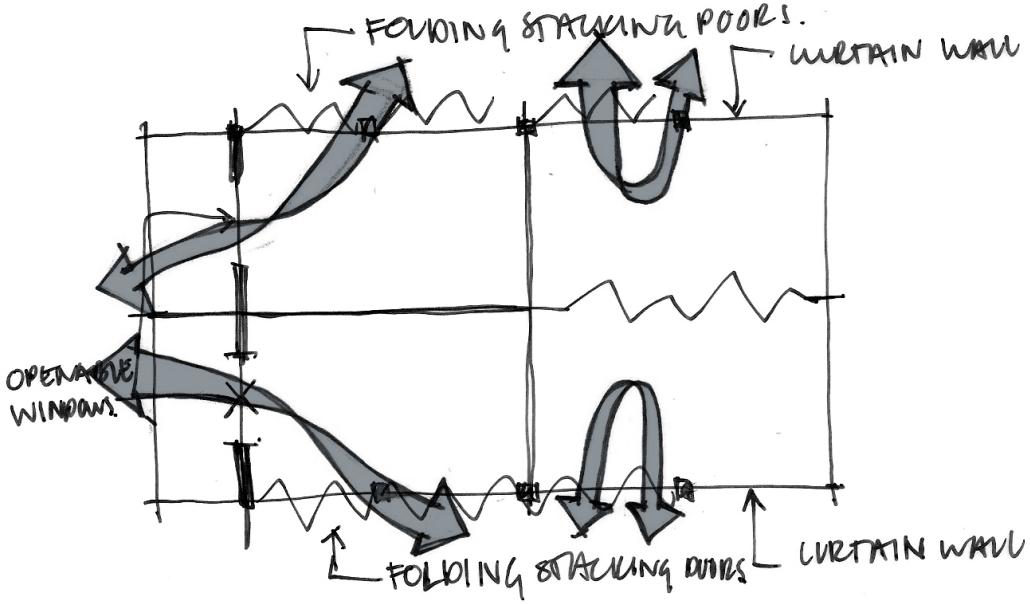

Fig. 8.15. Building 2 first floor diagram of natural ventilation [Author, 2013].

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8.4.3. WATER HARVESTING

The investigation of rainwater harvesting and the water budget comprise two strategies. The first strategy is the collection of rainwater on the roof to supply the building of water for sanitation services. The second strategy is the collection of water on the site for irrigation of the agriculture tunnels.

agriculture tunnels

AGRICULTURE AREAS				Usage/Month		
	area	surface	runoff C	summer	winter	spring / autumn
A1	450	agriculture	0,4	0,040	0,020	0,030
A2	1210	lawn	0,2	0,025	0,015	0,020
A3	990	permeable paving	0,6	0	0	0

	AGRICULTURE WATER HARVESTING CALCULATION: A1				
month	rainfall/month	runoff C	catchment area	yield	usage
January	0,135	0,4	450	24,3	18
February	0,076	0,4	450	13,68	18
March	0,079	0,4	450	14,22	13,5
April	0,054	0,4	450	9,72	13,5
May	0,013	0,4	450	2,34	9
June	0,007	0,4	450	1,26	9
July	0,003	0,4	450	0,54	9
August	0,005	0,4	450	0,9	9
September	0,020	0,4	450	3,6	13,5
October	0,007	0,4	450	1,26	13,5
November	0,010	0,4	450	1,8	18
December	0,108	0,4	450	19,44	18

AGRICULTURE WATER HARVESTING CALCULATION: A2					
month	rainfall/month	runoff C	catchment area	yield	usage
January	0,135	0,2	1210	32,67	30,25
February	0,076	0,2	1210	18,392	30,25
March	0,079	0,2	1210	19,118	24,2
April	0,054	0,2	1210	13,068	24,2
May	0,013	0,2	1210	3,146	18,15
June	0,007	0,2	1210	1,694	18,15
July	0,003	0,2	1210	0,726	18,15
August	0,005	0,2	1210	1,21	18,15
September	0,020	0,2	1210	4,84	24,2
October	0,007	0,2	1210	1,694	24,2
November	0,010	0,2	1210	2,42	30,25
December	0,108	0,2	1210	26,136	30,25

AGRICULTURE WATER HARVESTING CALCULATION: A3				
month	rainfall/month	runoff C	catchment area	yield
January	0,135	0,6	990	80,19
February	0,076	0,6	990	45,144
March	0,079	0,6	990	46,926
April	0,054	0,6	990	32,076
May	0,013	0,6	990	7,722
June	0,007	0,6	990	4,158
July	0,003	0,6	990	1,782
August	0,005	0,6	990	2,97
September	0,020	0,6	990	11,88
October	0,007	0,6	990	4,158
November	0,010	0,6	990	5,94
December	0,108	0,6	990	64,152

TOTAL AGRICULTURE WATER HARVESTING AND USAGE			
month	Total Yield	Total Usage	*highest month*
January	137,16	48,25	88,91
February	77,216	48,25	117,876
March	80,264	37,7	160,44
April	54,864	37,7	177,604
May	13,208	27,15	163,662
June	7,112	27,15	143,624
July	3,048	27,15	119,522
August	5,08	27,15	97,452
September	20,32	37,7	80,072
October	7,112	37,7	49,484
November	10,16	48,25	11,3939999999999
December	109,728	48,25	72,872

sanitation services

ROOF AREAS					
	area	surface	runoff C	Usage/Month	Type of Building
B1	564	steel sheeting	0,85	52,8	Place of Instruction (A3 - SANS)
B2	309	steel sheeting	0,85		Place of Instruction (A3 - SANS)
B3	521	steel sheeting	0,85	23,2	Hospitality (H5 - SANS) + Clinic
TOTAL	1394			76	

BUILDING 1 + 2 WATER USAGE					
A3: Places of Instruction (According to SANS)					
Sanitary Fixtures	Males			Females	
population	toilet pans	urinals	whbs	toilet pans	whbs
<120	3	6	5	9	5
Average Usage					
people	litres	days	Total usage/month		
120	20	22	52,8		
Average usage per person					
4 X flush (5L) / person =20 L/person/day					

BUILDING 3 WATER USAGE					
Average Usage					
H5: Hospitality	people	litres	days	Total usage/month	
	20	100	5	10	
Clinic	people	litres	days	Total usage/month	
	120	5	22	13,2	

	ROOF WATER HARVESTING CALCULATION: B1 + B2					
	rainfall/month	runoff C	catchment area	yield	usage	*highest month*
January	0,135	0,85	873	100,17675	52,8	47,37675
February	0,076	0,85	873	56,3958	52,8	50,97255
March	0,079	0,85	873	58,62195	52,8	56,7945
April	0,054	0,85	873	40,0707	52,8	44,0652
May	0,013	0,85	873	9,64665	52,8	0,91185
June	0,007	0,85	873	5,19435	52,8	-46,6938
July	0,003	0,85	873	2,22615	52,8	-97,26765
August	0,005	0,85	873	3,71025	52,8	-146,3574
September	0,020	0,85	873	14,841	52,8	-184,3164
October	0,007	0,85	873	5,19435	52,8	-231,92205
November	0,010	0,85	873	7,4205	52,8	-277,30155
December	0,108	0,85	873	80,1414	52,8	-249,96015

ROOF WATER HARVESTING CALCULATION: B3						
month	rainfall/month	runoff C	catchment area	yield	usage	*highest month*
January	0,135	0,85	521	59,78475	23,2	36,58475
February	0,076	0,85	521	33,6566	23,2	47,04135
March	0,079	0,85	521	34,98515	23,2	58,8265
April	0,054	0,85	521	23,9139	23,2	59,5404
May	0,013	0,85	521	5,75705	23,2	42,09745
June	0,007	0,85	521	3,09995	23,2	21,9974
July	0,003	0,85	521	1,32855	23,2	0,12595
August	0,005	0,85	521	2,21425	23,2	-20,8598
September	0,020	0,85	521	8,857	23,2	-35,2028
October	0,007	0,85	521	3,09995	23,2	-55,30285
November	0,010	0,85	521	4,4285	23,2	-74,07435
December	0,108	0,85	521	47,8278	23,2	-49,44655

TOTAL ROOF WATER HARVESTING AND USAGE			
month	Total Yield	Total Usage	*highest month*
January	159,9615	76	83,9615
February	90,0524	76	98,0139
March	93,6071	76	115,621
April	63,9846	76	103,6056
May	15,4037	76	43,0093
June	8,2943	76	-24,6964
July	3,5547	76	-97,1417
August	5,9245	76	-167,2172
September	23,698	76	-219,5192
October	8,2943	76	-287,2249
November	11,849	76	-351,3759
December	127,9692	76	-299,4067

Fig. 8.16. Rainwater calculations [Author, 2013].

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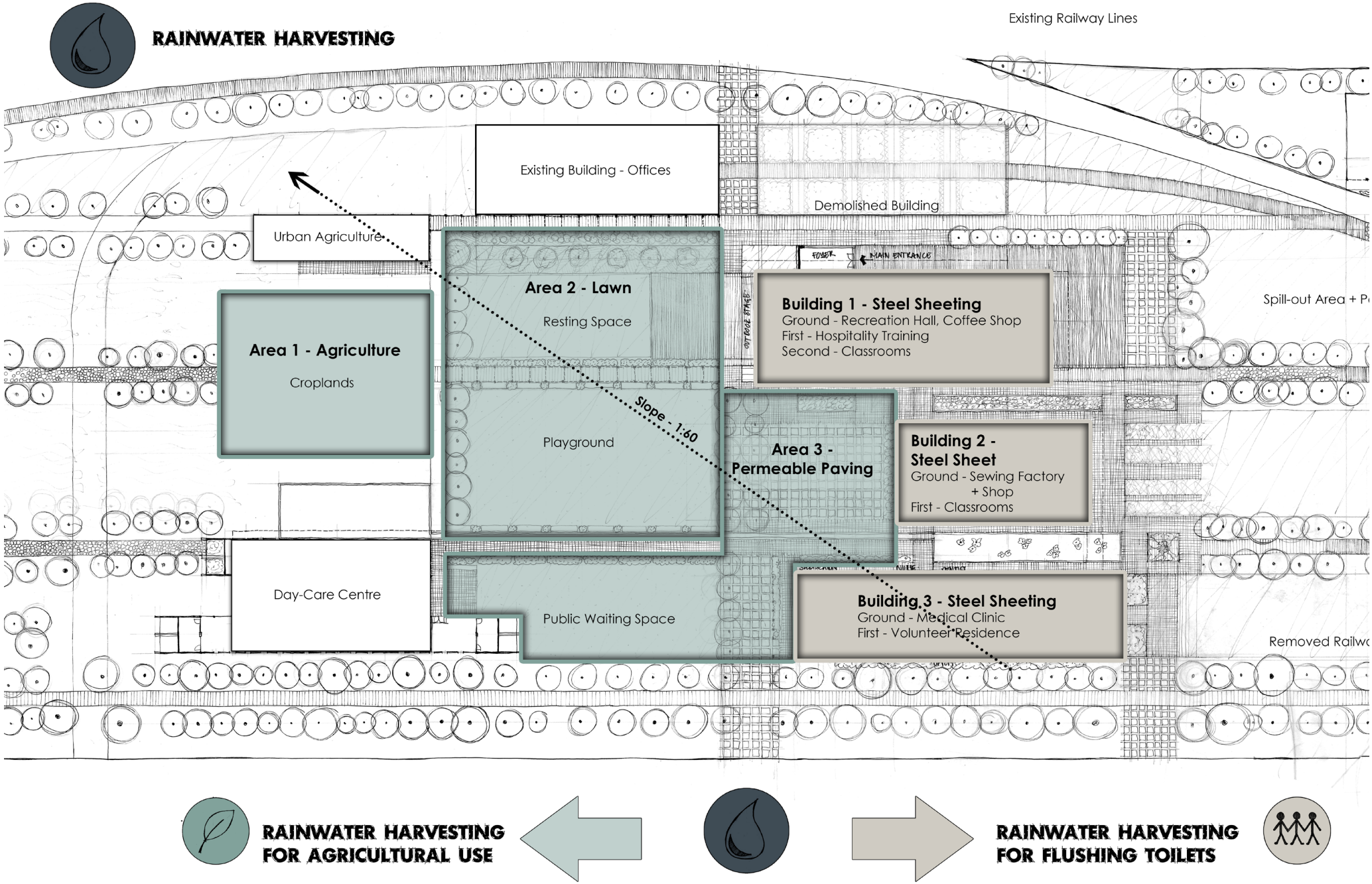

Fig. 8.17. Rainwater harvesting diagram to illustrate strategies [Author, 2013].

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8.4.4. MATERIALITY

The selection of materials, such as corrugated steel sheeting and sections, face-bricks, exposed concrete, railway sleepers and vegetation, derives from the surrounding context. However, the use of the materials are re-interpreted towards an articulation of the human-nature connection and a manifestation of regeneration on the POPUP site.

EXISTING SITE AND CONTEXT

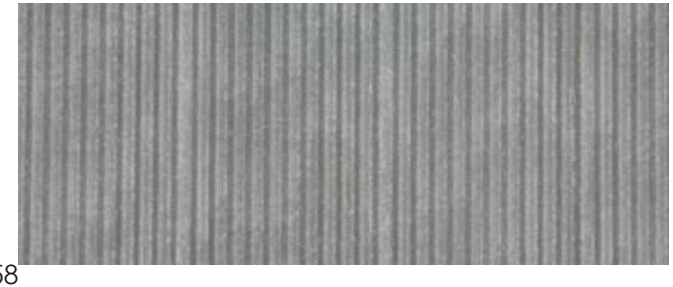
Fig. 8.18. Exposed concrete and face-brick [Author, 2013].

Fig. 8.19. Railway lines and sleeper [Author, 2013].

Fig. 8.20. Corrugated steel sheeting and structure [Bakker, 2002 & Author, 2013].

STEREOTOMIC AND LANDSCAPING

TECTONIC STRUCTURE



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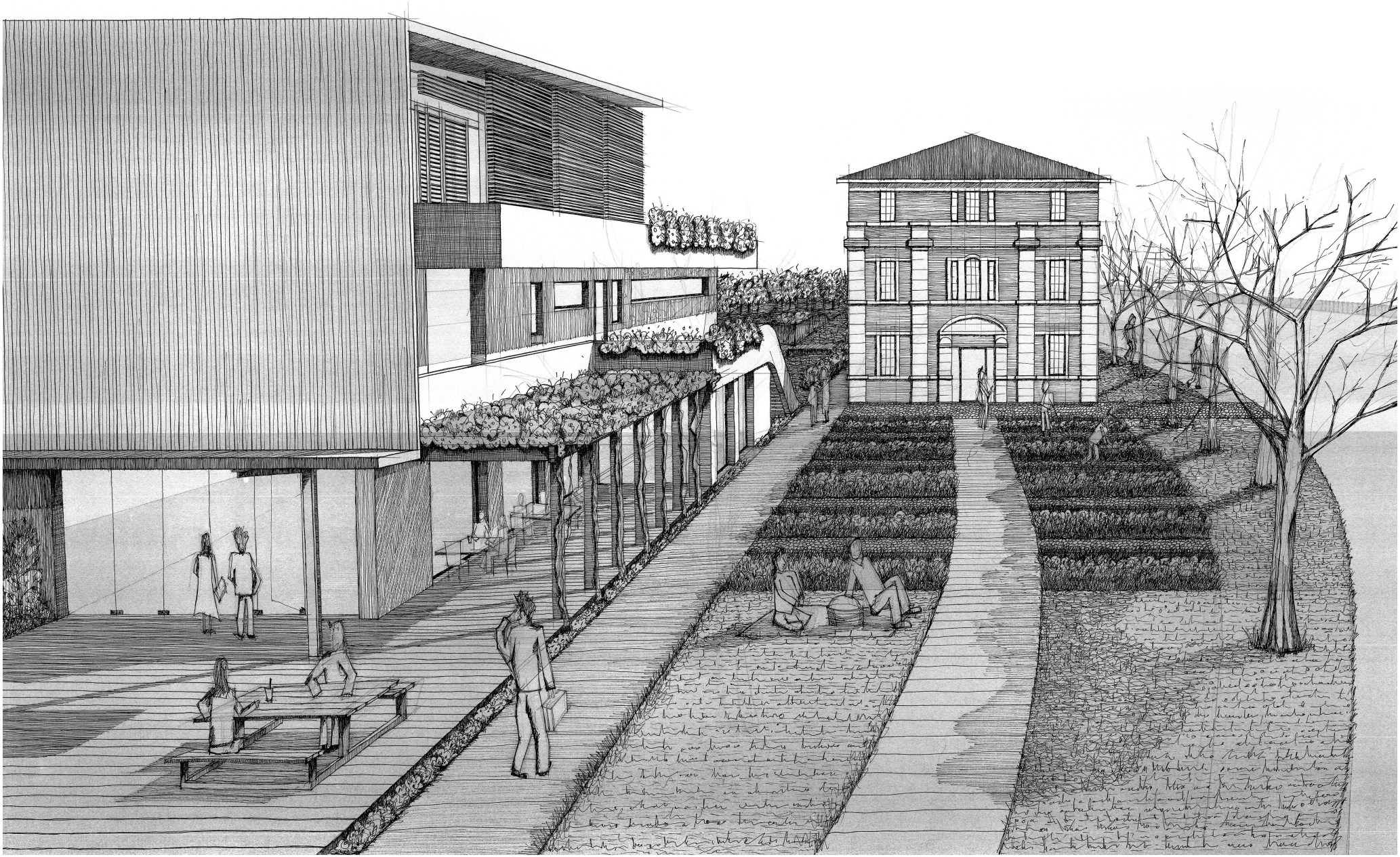

Fig. 8.21. Perspective of main facades [Author, 2013].

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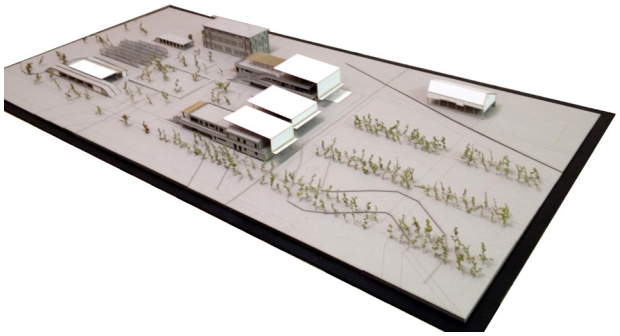
8.5. TECHNOLOGY

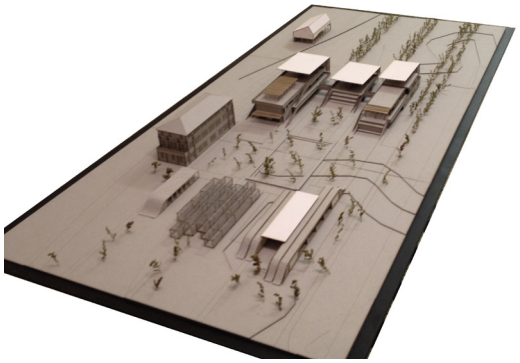
The plans, sections and details illustrate the technological development of the building. The plans and sections illustrate the relationship of the building to its surrounding context. It also represents the regeneration of the human-nature connection, as well as the regeneration of the natural landscape and the heritage.

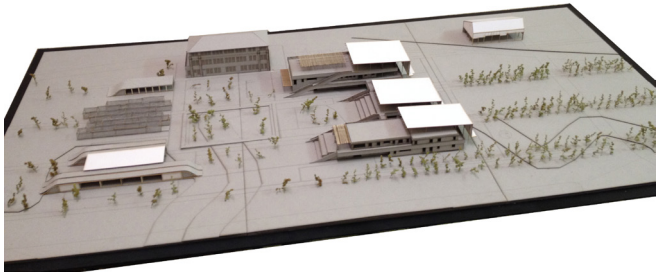
8.5.1. SITE PLAN

The basic services of the building consist of circulation, plumbing and water drainage. The main circulation of the building is informed by the regeneration of the railway lines that serve to reconnect the building to the surrounding context and celebrate the heritage. Therefore, the circulation of and between the buildings is an articulation of the railway lines and direction of movement. The design of the plumbing services is informed by the circulation, the arrangement of public and private spaces, as well as the edge conditions (see Chapter 7). The water drainage and storm water management is designated to the retention pond, situated at the lowest point on the site.

SITE MODEL







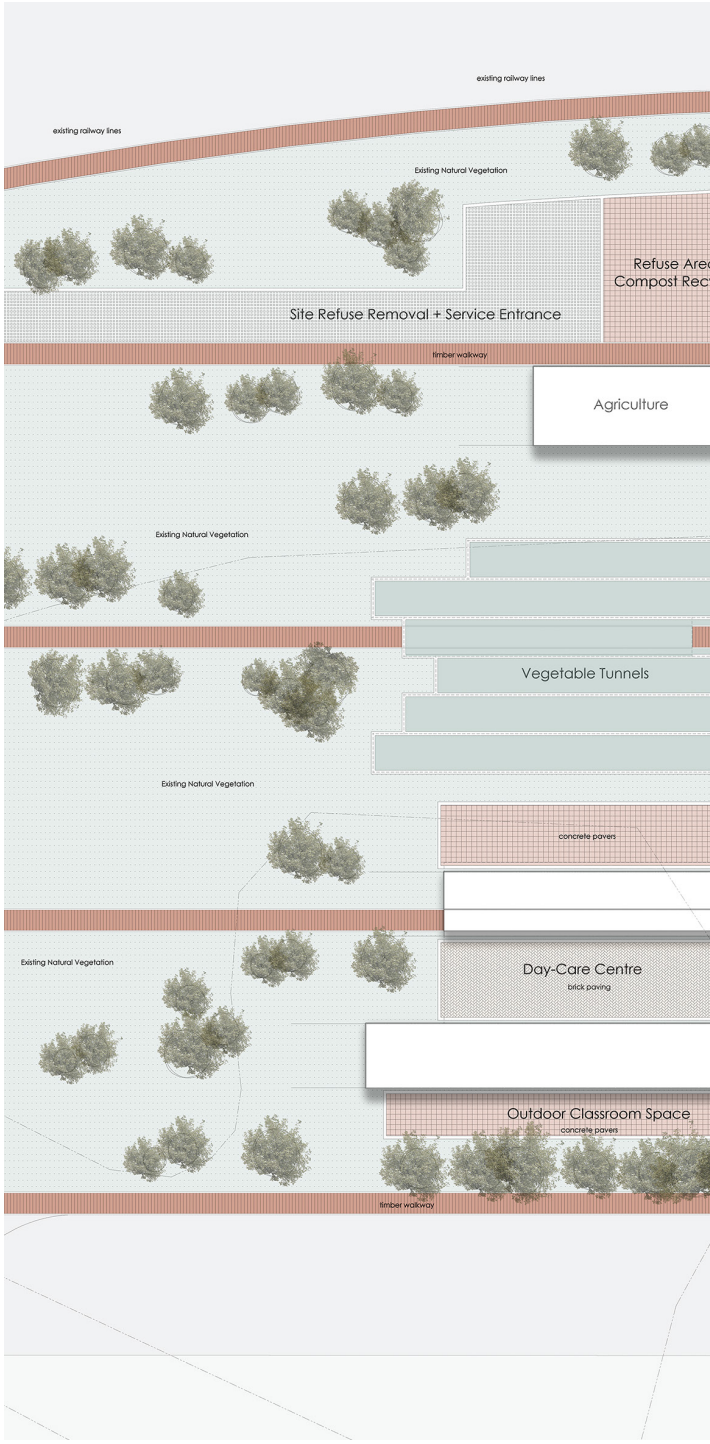


Fig. 8.22. Site plan [Author, 2013].

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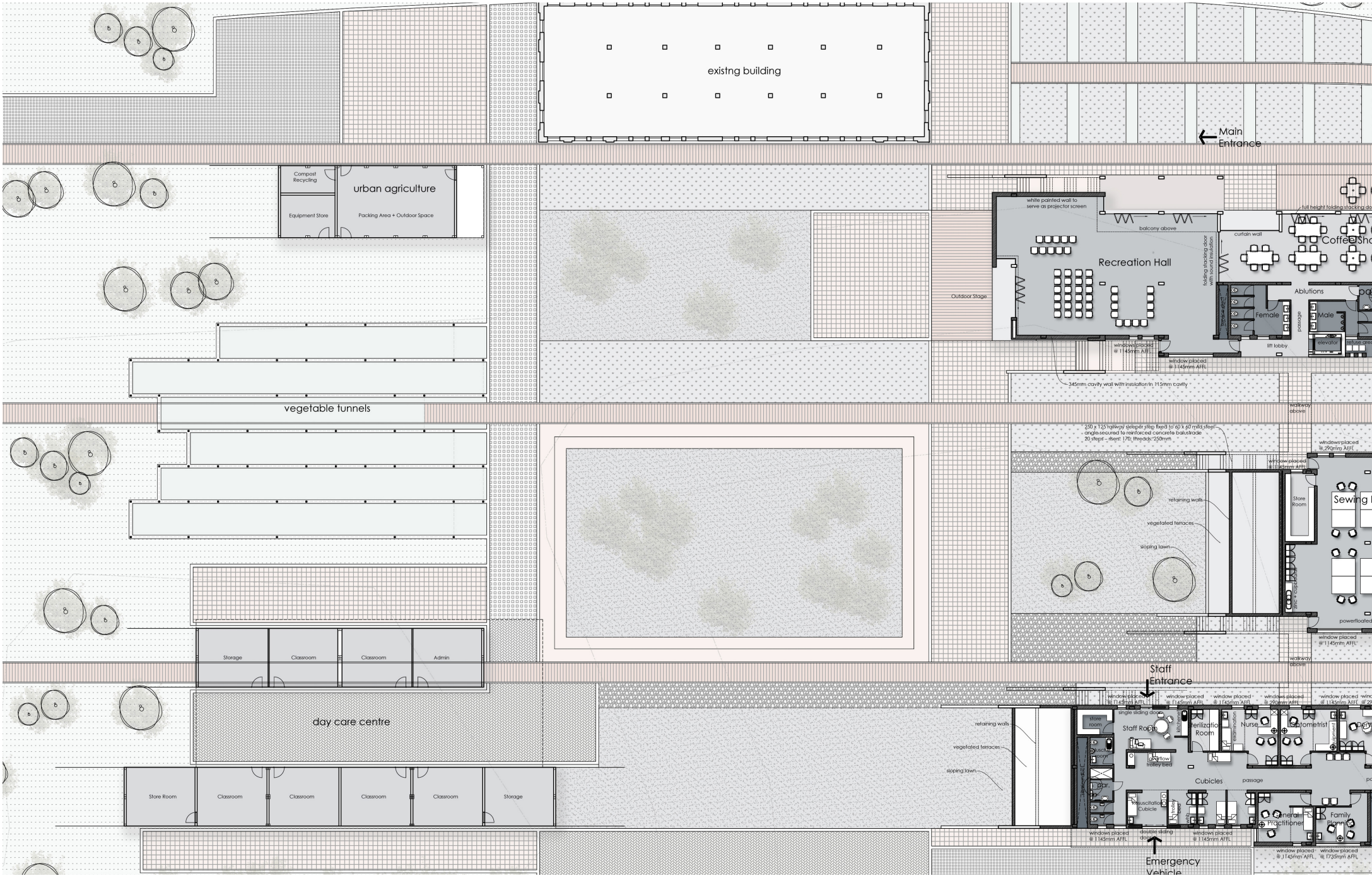

Fig. 8.23. Ground floor plan [Author, 2013].

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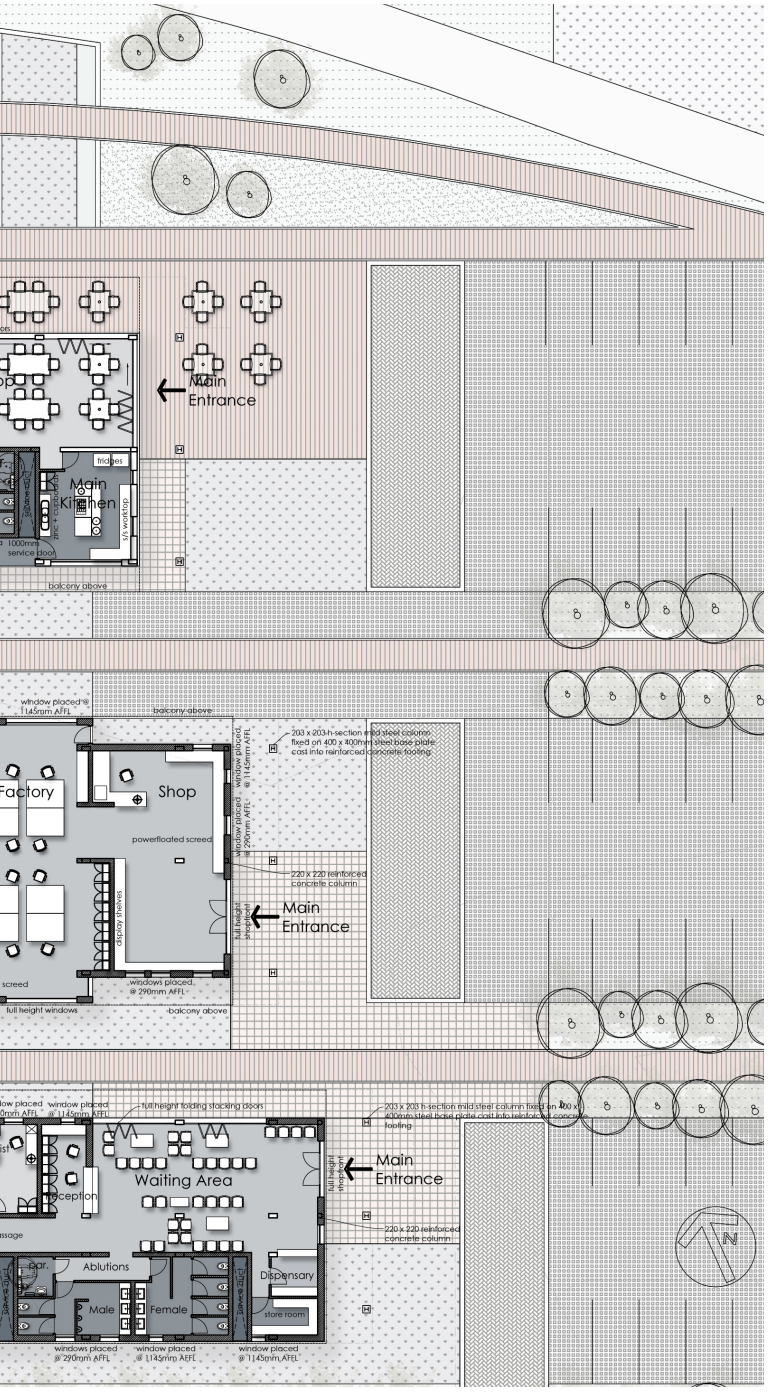
8.5.2. FLOOR PLANS



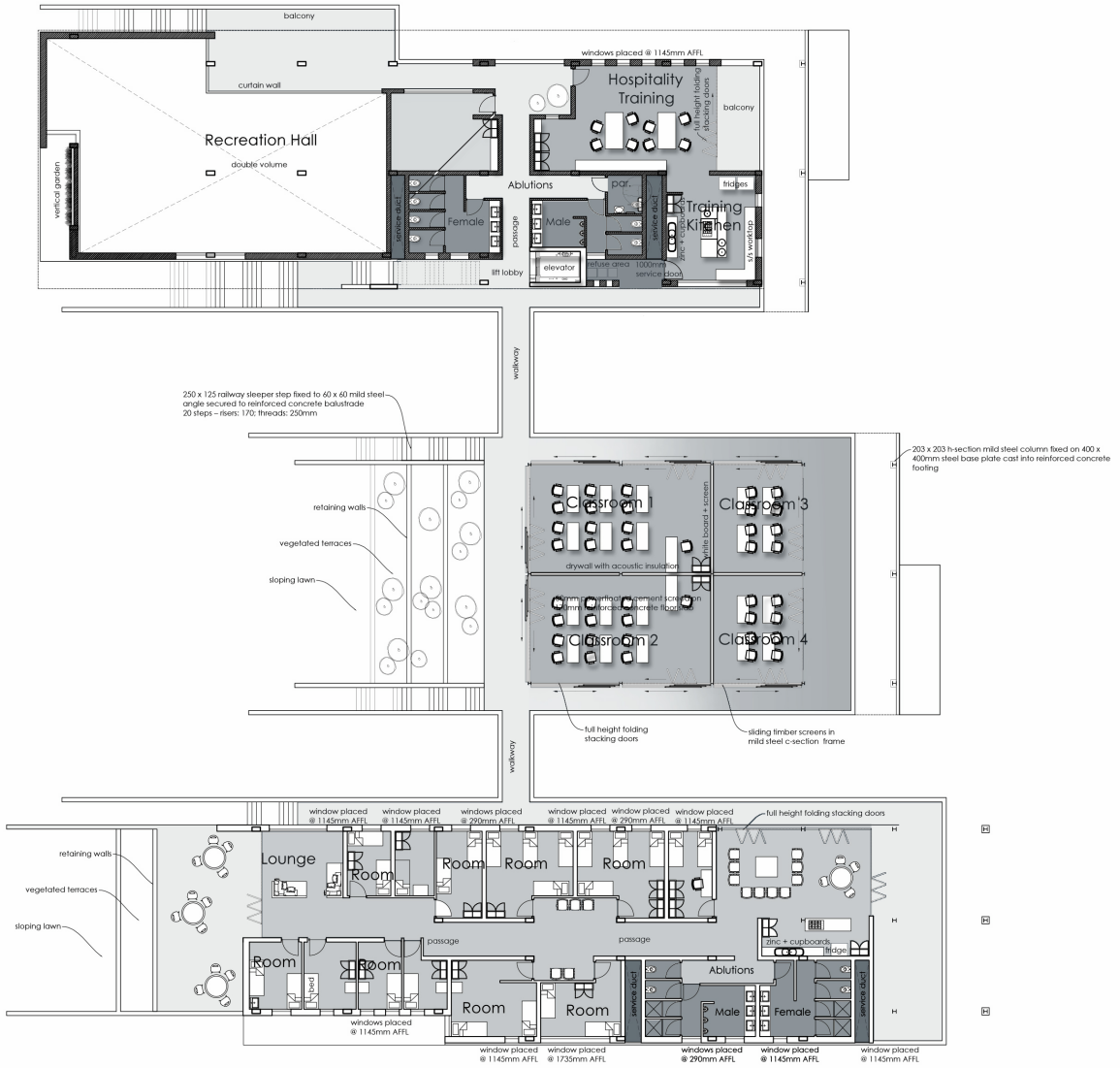


Fig. 8.24. First floor plan [Author, 2013].

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8.5.3. SECTIONS

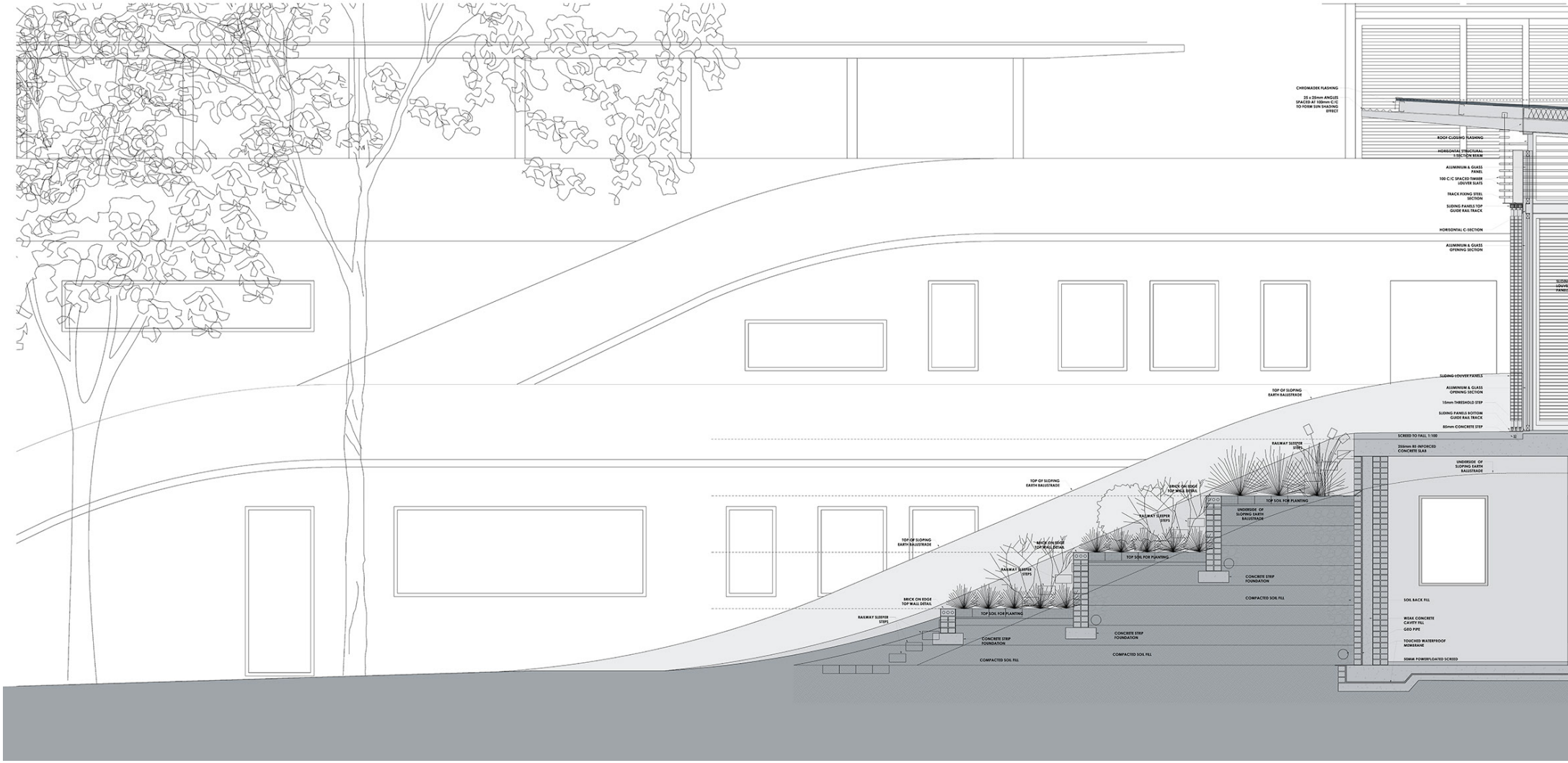

Fig. 8.25. Building 2 section illustrating technological investigation [Author, 2013].

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8.5.4. DETAILS

The technological development of the building is illustrated in three details. The first detail illustrates the development of the stereotomic structure; the stepped terraces covered with vegetation and the stairways consisting of railway sleeper steps and a concrete balustrade that rises from the ground to merge the building with the natural landscape. The second detail shows the development of the tectonic structure and the connection of the sliding timber screens. The third detail displays the curtain wall facade; the connecting element between the stereotomic and tectonic.

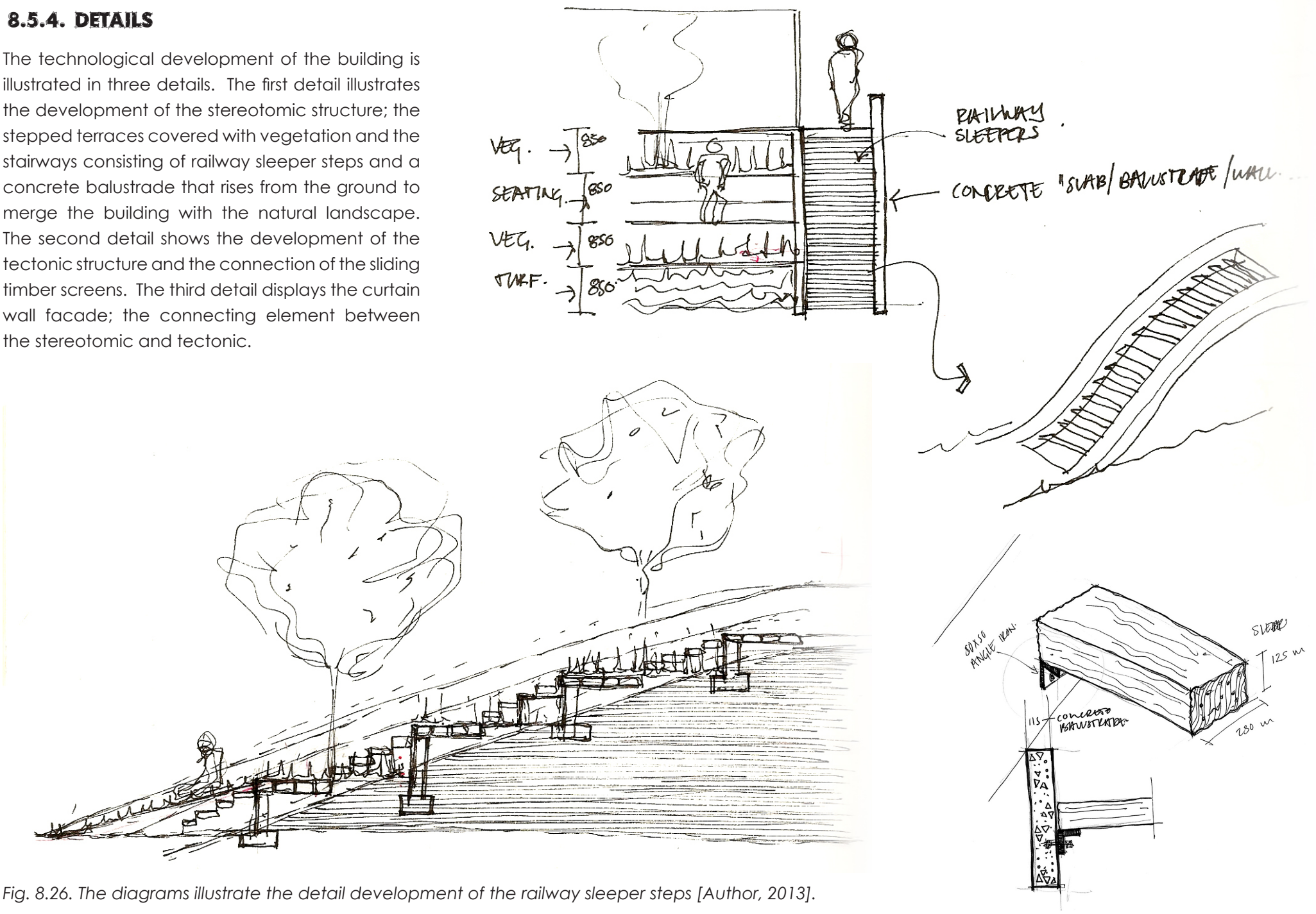

Fig. 8.26. The diagrams illustrate the detail development of the railway sleeper steps [Author, 2013].

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DETAIL 1: RAILWAY SLEEPER STEPS

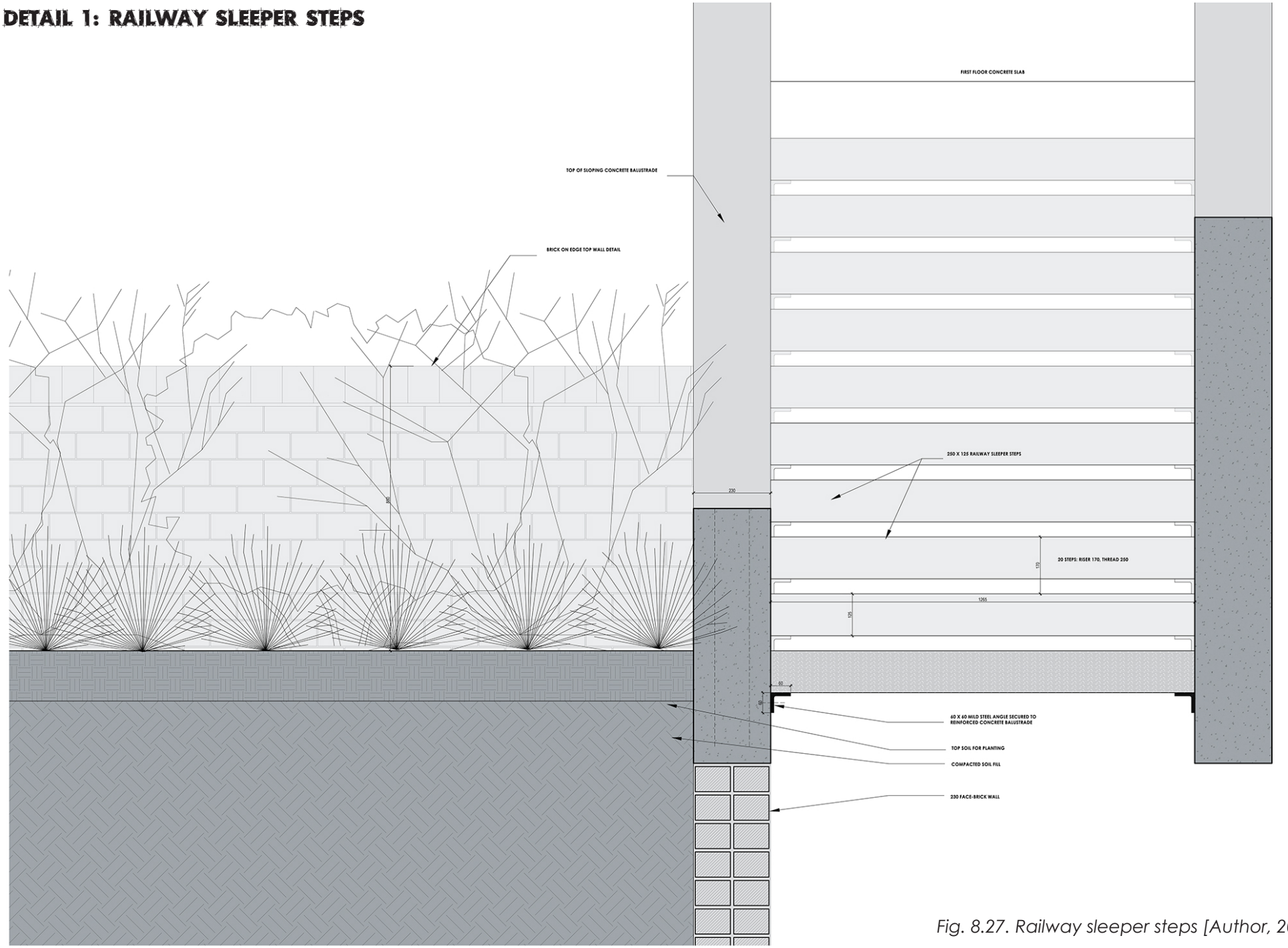

Fig. 8.27. Railway sleeper steps [Author, 2013].

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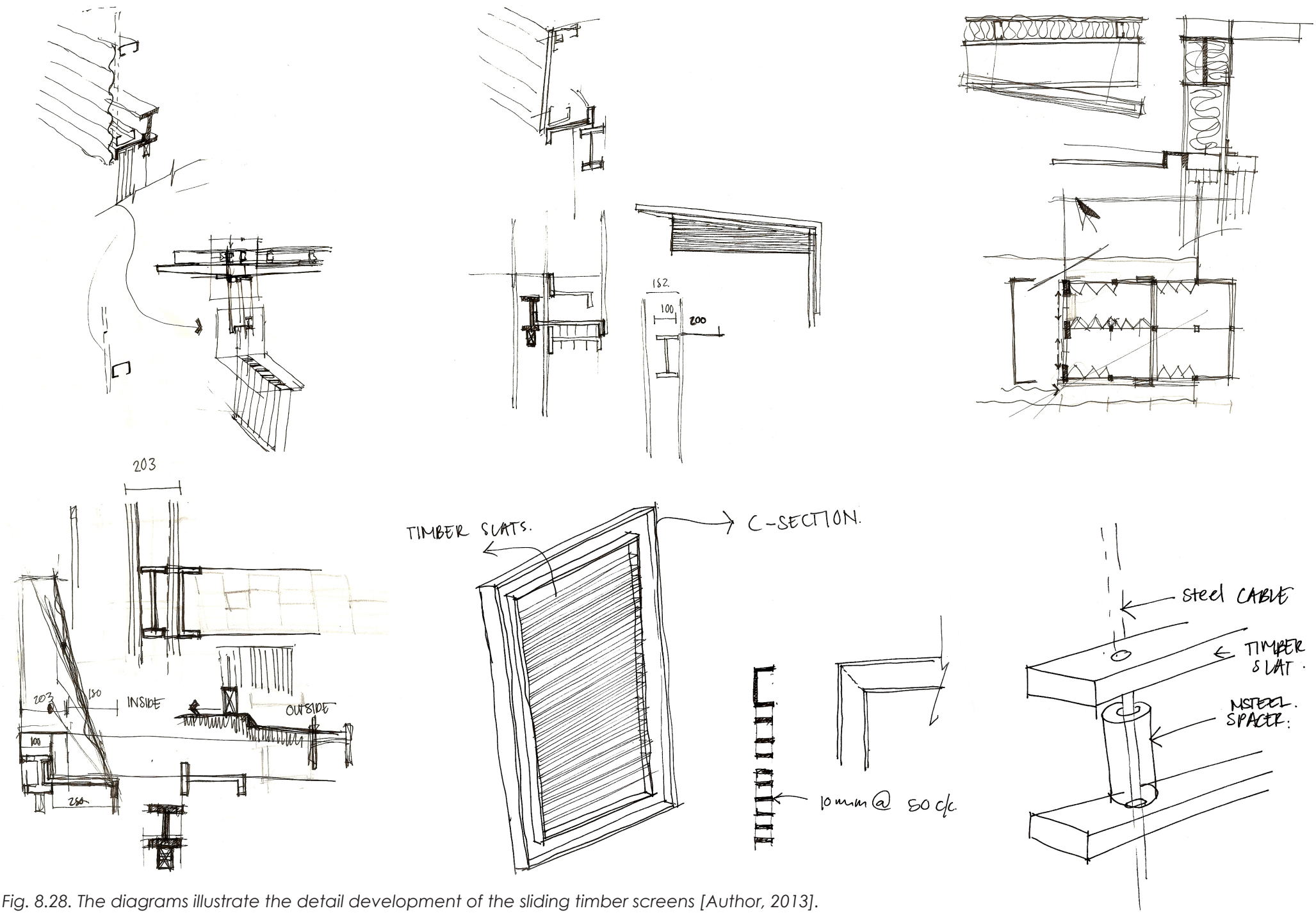

Fig. 8.28. The diagrams illustrate the detail development of the sliding timber screens [Author, 2013].

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DETAIL 2: TIMBER SCREENS

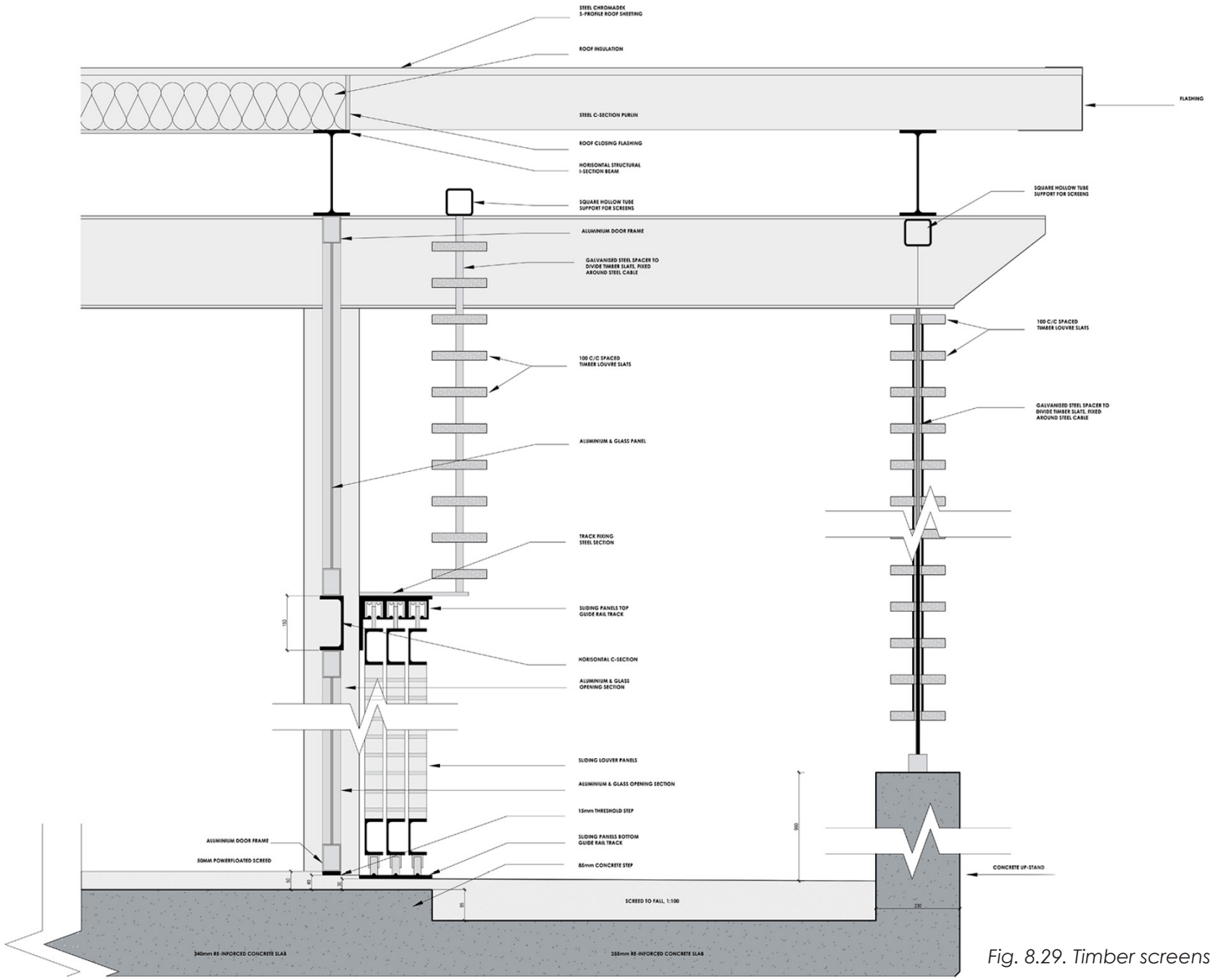

Fig. 8.29. Timber screens [Author, 2013].

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8.6. CONCLUSION

The chapter has served to illustrate and discuss the technical resolution of the dissertation. The structural systems, services and aesthetics were discussed. The design responded with investigations of water harvesting, protection against solar heat gain, cross ventilation, endemic vegetation and local materials, that were illustrated in the chapter. The technical resolution was illustrated in design drawings consisting of plans, sections and detail drawings.

Fig. 8.30. Perspective from courtyard [Author, 2013].

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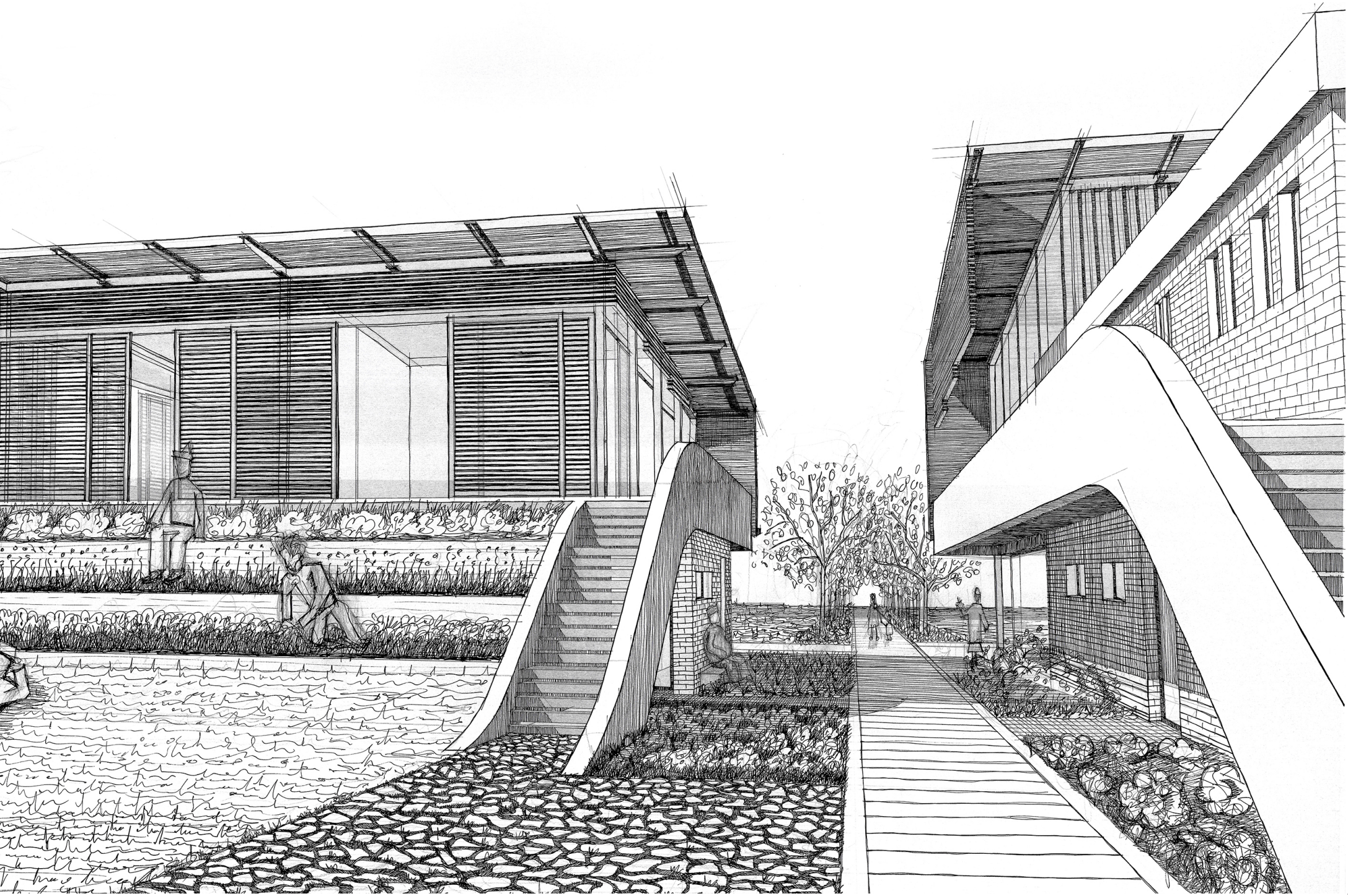

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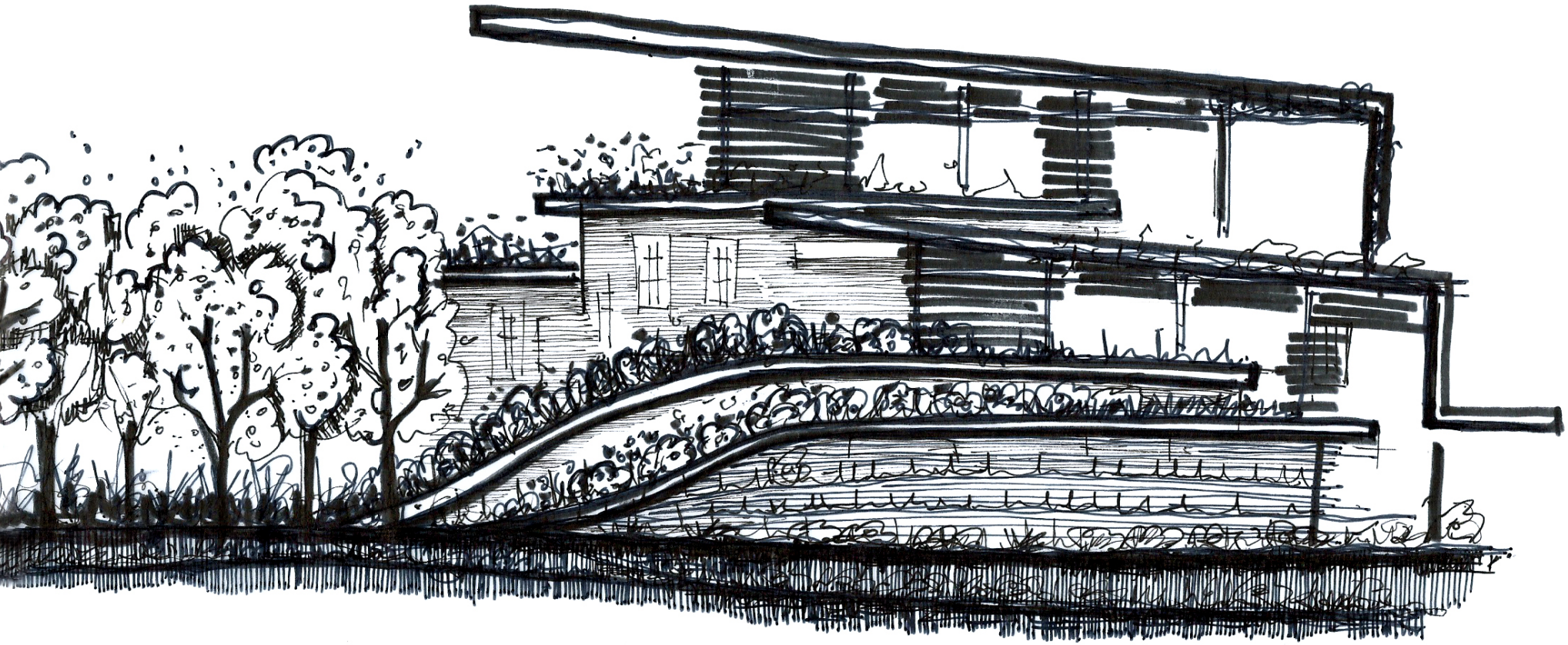
9. CONCLUSION



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9.1. CONCLUSION

The dissertation served to ask the question of how non-profit organisations (NPOs) can operate more efficiently when they share resources and services. The design responded with the *strategy of service integration* by transforming the facilities of POPUP, a single NPO, into a shared services hub for multiple NPOs.

The theoretical platform for the dissertation consisted of the combined theoretical approaches of *regenerative design, biophilic design and restorative environmental design*. The aim of the theoretical approach was to create restorative environments, as required by the client and the programmatic response. Furthermore, the aim of the theoretical approach was to regenerate the human-nature connection, a manifestation of the connection between the current natural landscape and the urban condition.

The conceptual approach is derived from the theoretical approach of regeneration, the history of social welfare, as well as a contextual response. The design informants: *the regeneration of natural landscape; the regeneration of heritage; the regeneration of programme; the monastery concept, and the response to context*, were the main informants for the design development. The structural concept was derived from the contextual response and aimed to articulate the *human-nature connection*, as well as manifest *regeneration* on the POPUP site.

In conclusion, the dissertation demonstrates how NPOs can operate more efficiently by sharing facilities, resources and service delivery areas. With regard to the client, the dissertation proposed to create restorative environments that exhibit POPUP's approach of holistic healing and the cultivation of self-sustainable lifestyles. The dissertation illustrates the possibility to regenerate the heritage significance of the context and the POPUP site by enhancing its current value and emphasising its contemporary meaning.

Ultimately, the dissertation illustrates through *the regeneration of natural landscape, the regeneration of heritage and the regeneration of programme*, i.e. that architectural intervention can serve to enable the regeneration of people.

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