

# NEW ERA CERAMICS

A SOLVENT FOR THE INDUSTRIAL BOUNDARY

Submitted in fulfilment of part of the requirements for the degree of Magister in Architecture (Professional) of the Department of Architecture, Landscape Architecture and Interior Architecture, for the faculty of Engineering, Built Environment and Information Technology

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Study Leader: Dr. Arthur Barker & Ms. Edna Peres  
Course Coordinator: Dr. Arthur Barker

By Carla Christine Taljaard  
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MAMELODI

MAMELODI CEMETARY

EERSTERUS





ST

WATLOO

SILVERTON

ERA BRICKS



*Panoramic View of Eersterust looking South towards Silverton. (Source: unpublished thesis by D.N. Deetjefs, 1993)*

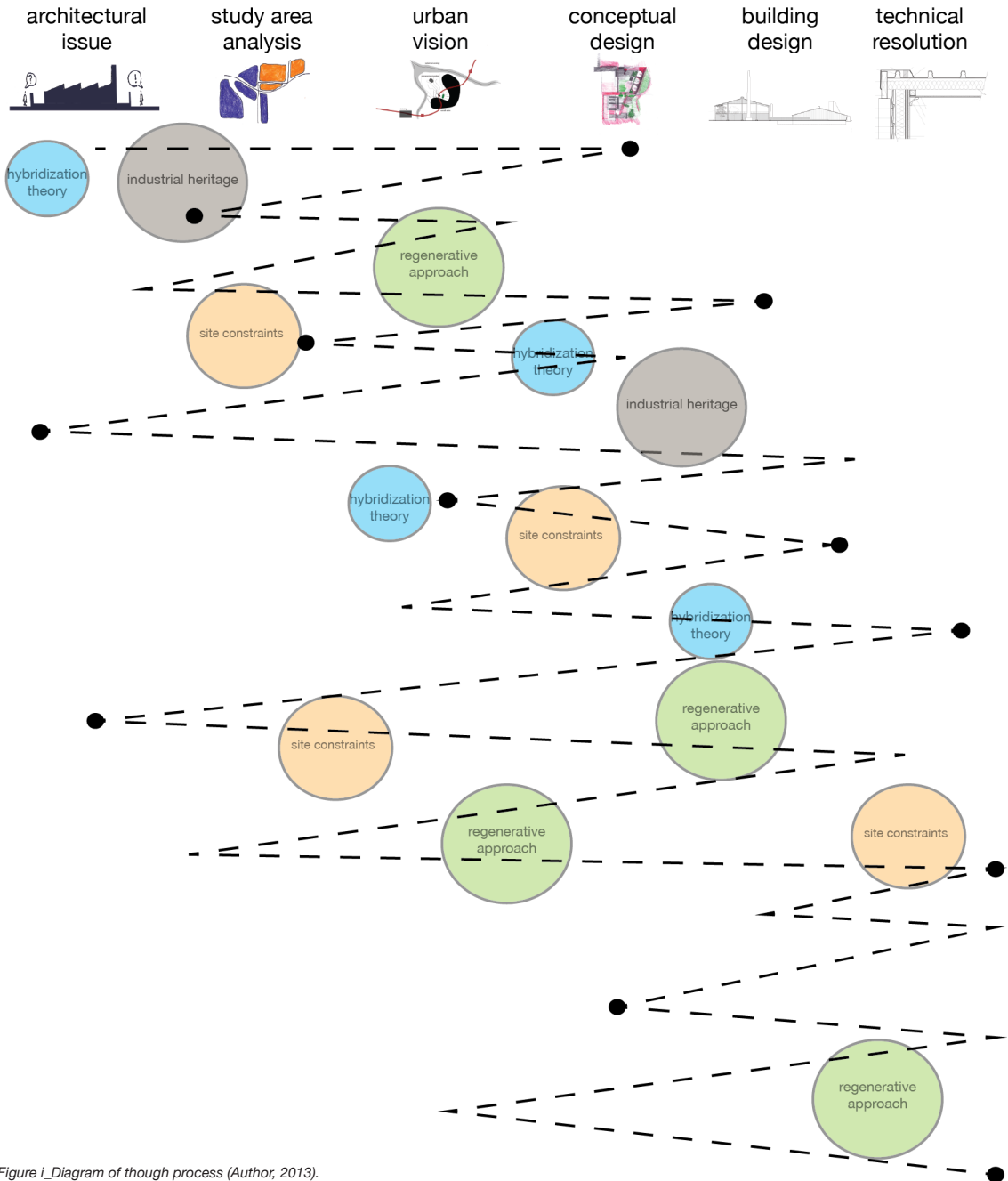


Figure i\_Diagram of thought process (Author, 2013).

## ABSTRACT

The aim of this dissertation is to investigate the legacy of industrial spaces, the effect of this legacy on the surroundings, and how these spaces then become disconnected and isolated after industrial activity is decommissioned. The research forms part of an NRF research scheme that specifically focuses on building the resilience of cities through innovation in the planning, design and construction of the built environment.

The hypothesis on which the dissertation is based states that a process of reintegration of a decommissioned industrial site with the immediate surroundings would enable such a site to become a positive space of transition, and would allow for the reconciliation of society and the ecology that was exploited by the industry. It sees the decommissioning of industrial infrastructure not as a loss or abandonment of obsolete capital, but as the release of energy and potential that can be positively reconstructed.

The mechanistic and reductionist world-view that contributed to an unhealthy relationship between people and their ecological surroundings is theoretically explored through the hybridization theories proposed by Bruno Latour (Latour 1993), and the regenerative methodologies put forth by members of Regenesys (Mang, Reed 2012a).

The potential of obsolete industrial infrastructure to provide powerful leverage points for changing paradigms from mechanistic to ecological is discussed in the light of its history of developing from craft to large-scale production. Craft becomes an important mechanism for the integration of people with the value and purpose of their work, and also of natural materials and the cultural objects they become.

The theories stated above are architecturally applied to an industrial site in Eersterust, Pretoria, which is on the verge of being decommissioned. The site is approached as a constantly evolving and living entity. It is investigated in terms of its patterns and cycles, and these are illustrated as a narrative of all the forces that have impacted on it over millions of years.

The narrative provides clues as to possible programmes and site lifecycles, and enables those phenomena that will nurture the biophysical evolution of the site to be given form. The concept of potential sets arises from this investigation, and informs an architecture that aligns itself with both the ecological and cultural forces on site, and represents the hybridization of the two.

Potential sets distinguish *patterns* of ecological, social and industrial phenomena that occur on site over different time frames. These patterns aid the understanding of the ecological purpose of the site and the alignment of the built intervention with this purpose.

A building is imagined that will create solutions for public, industrial and ecological spaces, with different levels of engagement between the three. The concept of a solvent enforces the notion of hybridity and allows for new relationships between the public, industrial processes and natural cycles to develop.

The dissertation is the result of a process of thought moving between theoretical, pragmatic, abstract and intuitive approaches that assist and influence the proposed intervention. This process is illustrated in Figure i.



## PROJECT SUMMARY

**Programme:** Industrial ceramic production facility

**Site description:** Decommissioned Era Bricks Factory and Quarry

**Site Location:** Derdepoort 326-JR

**Address:** St. Joseph Avenue, Eersterust

**GPS Coordinates:** 25°42'S, 28°18'E

**Research Field:** Heritage and Cultural Landscapes

**Keywords:** Post-Industrial Landscapes, Adaptive reuse, Ceramic production

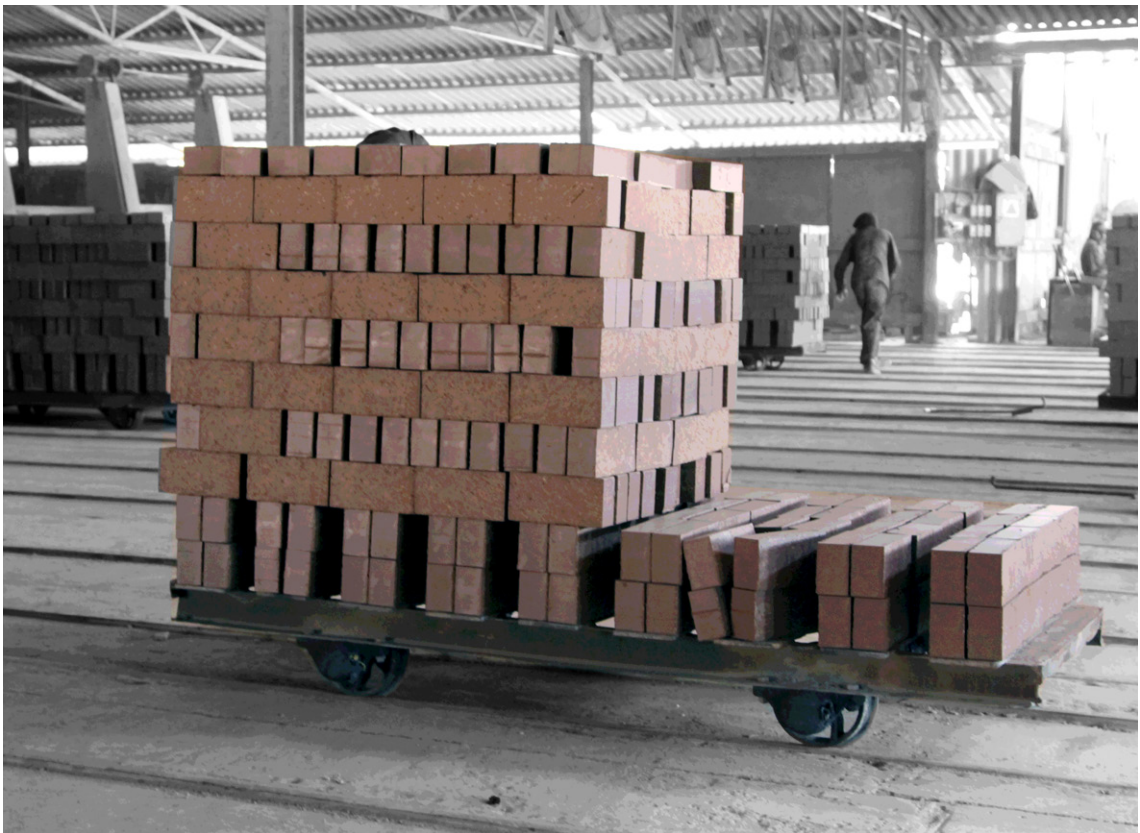
NATURES MAKE CULTURES  
CULTURES MAKE NATURES

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*Bricks on trolley awaiting drying procedure at Era Brick Works (Author, 2013)*

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# INTRODUCTION

## I. BACKGROUND AND PROBLEM STATEMENT

The Industrial Revolution was the cause of the most profound changes in the nature of people's lives for several millennia. Scientific discoveries like the steam engine and Spinning Jenny not only made production faster, more efficient and very profitable, but scientific ideas were also spread much faster with the use of the printing press. The technology and social organization that flowed out of this change in society gave people unprecedented control over natural processes (Dresner, 2002:11).

Control over nature was discussed by writers like Rene Descartes and Francis Bacon who advocated that nature could be fully explained with the use of reason. Through a scientific understanding of nature, one could fully control its processes and functions. Man, who possessed rationality, was completely removed from nature, which possessed no rationality (Dresner 2002:9). Nature was seen as a standing resource at the service of mankind, with no value that could not be attributed to human-centred gain.

*I am come in very truth leading to you Nature with all her children to bind her to your service and to make her your slave – Francis Bacon*

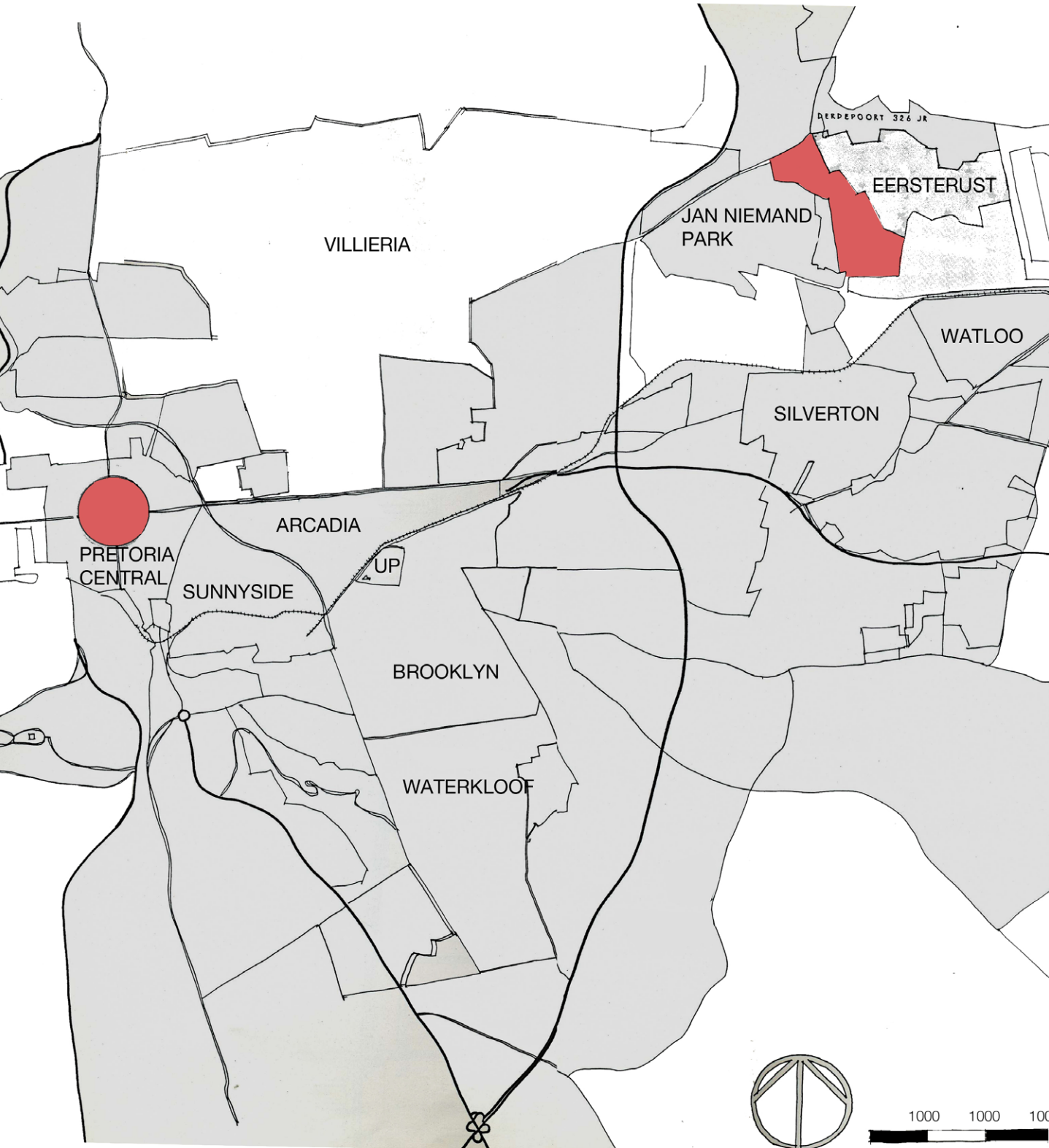
Today, manufacturing industries still rely on the extraction or reconfiguration of natural resources, and are thus dependent on certain ecological services. Ecological services are defined as “the services that humans receive from ecosystems” (Zari, 2012:56). These services range from the provision of food and medicines and regulation services like pollination and climate regulation, to supporting services like soil formation and solar energy as well as cultural inspiration (ibid.).

In reality, however, most industries operate as if natural resources are endless, and the only limiting factors for infinite production are labour and capital (Meadows & Wright 2008:101). Industrial infrastructure is recklessly erected in the landscape, and abandoned as soon as “a resource [is] depleted, the machinery obsolete or the location inconvenient” (Gans, 2004:51 & 52). When these sites are decommissioned, their edges are never properly dissolved, and they become instrumental in the formation of figurative “black holes” in our conception of the surroundings. Their isolation causes many associated stigmas, and they stay “absent from the city's circuit and foreign to urban systems” (Curulli, 2006:26).

The perception that abandoned industrial areas have little value is of concern, as it causes vibrant spaces of production to become fallow pockets in and around the city. Obsolete industrial areas are powerful leverage points for regeneration, as their abandonment releases vast potential to restructure manufacturing systems so that their purposes can become more contributive to the surrounding socio-ecological systems. Industrial wastelands “lend themselves to becoming a strong catalyst for the development of their context” (Curulli, 2006:32).

Industrial spaces of production embody “intangible heritage in the memory and life of workers and their communities” (ICOMOS, 2011:210). They demand of us to remember who we are and how we got here. The urgency of their eminent demise reminds us of our own temporality. Their associations are always emotionally loaded (Curulli, 2006:33). Decommissioned industrial sites provide specific potential in the form of cheap and available land, large open spaces for space-hungry programmes, available skilled labour, and connection to established trade routes and infrastructure. Artefacts and spaces around wasteland sites can be reinterpreted to harness the energies left latent by abandonment.

*Figure 0.1\_Coal heaps used for brick firing at Era Brick factory in Eersterust (Photograph by I. Büchner 2013).*





## II. PROPOSED CONTEXT

The study area is located in the historic core of Silverton, 11km east of Church Square in Pretoria. The area plays host to a diverse range of light and heavy industrial activities, and serves Pretoria with most of its industrial needs. It is well connected to trade routes and infrastructure, and in close proximity to several rivers that flow from south to north.

The surrounding residential communities fall into a middle to lower income bracket and are employed within the industrial belt along Stormvoël Road.

The specific site is a brick factory to the north of Silverton that is situated at the confluence of the Moretele River and the Rietspruit. The quarry on site has been decommissioned and the factory, consisting of two Hoffman kilns and two drying sheds, will be decommissioned within the next ten years. The site has served as an industrial buffer between two previously segregated communities: Jan Niemand Park, a predominantly white neighbourhood to the east, and Eersterust, a predominantly coloured neighbourhood to the west.

Figure 0.2\_Location of site in relation to Church Square (Image by CL Scheffer 1991, edited by author 2013).

Figure 0.3\_The Silverton Industrial Belt in Pretoria-East (Author, 2013).



### III. THE AIMS OF THE PROJECT

The dissertation investigates an industrial site on the verge of being decommissioned. It aims to introduce a new programme into the context that will increase the biodiversity and ecological health of the site, introduce the public to the terrain, and create environments where the intimate interdependency of social structures, industrial activities and ecological evolution are not only well-represented, but encouraged.

This project will contribute to and enrich an understanding of place and history, reintroduce people to the value and purpose of their work, and allow for the reclamation and celebration of ecological capital and human potential.

### IV. RESEARCH METHODOLOGY

The dissertation follows a critical theory research design by investigating the hybridization theories advocated by Bruno Latour and how these correlate with the principles of Regenerative Design as proposed by Pamela Mang, Bill Haggard and other members of the Regenesis Group. Literature reviews are used in order to synthesize and provide links between the theories and ultimately guide the design process.

### V. DELIMITATIONS

The project forms part of the NRF-funded research on regeneration and resilient cities. The financial assistance of the National Research Foundation (NRF) towards this research is hereby acknowledged. Opinions expressed and conclusions arrived at, are those of the author and are not necessarily attributed to the NRF.

The dissertation will focus on the adaptive reuse of industrial landscapes and buildings and not new industrial development. The Ceramic Production Facility will produce mainly two ceramic products, namely olla irrigation pots and ceramic water filters, and no other industrial ceramic products. The dissertation will focus on the production sequence of flocculated water sediment after it has been treated, but not on the specific chemical flocculation process.

This dissertation does not focus on the architecture of industrial production, but on how current spaces of production can be re-imagined after the industrial activity has been terminated.



## VI. ASSUMPTIONS

1. Era Brick Works and quarry will obtain a decommissioning certificate within the next ten years.
2. The existing structures on site are sound and can be altered according to the proposed intervention.
3. The site does not pose any public safety risks, and can be used for public functions.
4. The current Eersterust station and surrounds south of the site will be upgraded according to the Tshwane Regional Spatial Development Framework of 2011.

## VII. DEFINITIONS OF TERMS

### ECOLOGICAL RESILIENCE

Resilience is a neutral term that refers to the ability of a system to absorb shocks and still achieve its system goal. Ecological resilience refers to ecological systems that are able to evolve and adapt to changing conditions and thrive in spite of external forces that impact on it.

### CRAFT

For the purposes of this dissertation, the word craft will not be limited to the specific set of disciplines like metal-works, ceramics and jewelry-making it is usually associated with, but rather, as Glenn Adamson points out in the introduction to *The Craft Reader*, “the application of skill and material-based knowledge to relatively small-scale production” (Adamson 2010, p. 2).

### INDUSTRY

The large-scale process of converting raw materials into goods in a factory.

### REGENERATIVE DESIGN

A specific discipline of multi-disciplinary design concerned with the potential of buildings to contribute to ecological services in a greater manner than what was required for these services to be created and maintained. Regenerative practitioners “emphasize a co-evolutionary, partnered relationship between humans and the natural environment, rather than a managerial one ...” (Cole, 2012:39).

### TECHNOLOGY

The constructional tools available to architects to create space. For the purposes of this dissertation, technology

will be divided into three parts: (1) the earthworks, (2) the framework and roof, and (3) the enclosing membrane.

### ECOLOGICAL WORLD-VIEW

A world-view/paradigm that sees the earth as a “fundamentally interconnected, complex, living and adaptive social-ecological system that is constantly in flux” (Du Plessis, 2012:15). Humans are seen as part of this system and not merely clients that make use of its services.

### BIFURCATION

The division of something into two distinct branches or parts.

### MECHANICAL WORLD-VIEW

The world-view holding that “nature can be seen as a machine that can be understood and managed by reducing it to its parts. Humans are seen as separate and above nature” (Rees, 1999, cited in Du Plessis, 2012:8).

### POTENTIAL SET

A system of elements, artefacts and flows that constantly shift between evolution and resistance to changes in the immediate and broader environment.



Figure 0.4\_Era Brick Site Operation (Photograph by I. Büchner 2013).

*The perfect symmetry between the dismantling of the wall of shame and the end of limitless nature is invincible only to the rich western democracies. The various manifestations of socialism destroyed both their peoples and their ecosystems, whereas the powers of the north and the west have been able to save their peoples and some of their countrysides by destroying the rest of the world and reducing its people to abject poverty. Hence a double tragedy: the former socialist societies think they can solve both their problems by imitating the west; the west thinks it has escaped both problems and believes it has lessons for others even as it leaves the earth and its people to die. The west thinks it is the sole possessor of the clever trick that will allow it to keep on winning indefinitely, whereas it has perhaps already lost everything (Latour, 1993:9).*



Figure 1.1\_Theorist Bruno Latour (source: Scienzainrete 2003)

# CHAPTER 1

## BIFURCATION, HYBRIDIZATION AND DIVERSITY

### SUMMARY

This chapter analyses the circumstances that give rise to the industrial wasteland. It is argued that industrial wastelands are a direct consequence of an imbalance in human–nature relationships, caused by a mechanical world-view that maintains this imbalance as a prerequisite to being “modern”.

The notion of being modern is then further investigated through theorist Bruno Latour’s book *We have never been Modern* (1993). The implications of modern thought for socio-ecological environments, and non-modern societies like indigenous South African cultures, are discussed. The investigation reveals how the world-view held by Modernists contributes to the ecological crisis we face today.

Latour proposes a different way of engaging with current sustainability issues, and his approach is compared to regenerative design theories that argue for ecological resiliency. The overlapping critiques of Latour and proponents of Regenerative Design like the Regensis Group, reveal possible new ways of thinking about the biophysical environment and our human role within it. The chapter concludes with the general paradigm shift necessary for approaching the consequences of the Modernist constitution, of which industrial wastelands are a symptom.

# ARE WE MODERN?

*Modern (noun) characteristic of present and recent time; contemporary; not antiquated or obsolete. (The Oxford English Dictionary, 1989)*

Abandoned industrial wastelands are not a new phenomenon in post-industrial society, but before one can truly engage with the issues inherent in such sites, one must understand the circumstances that gave rise to their existence. In most cases the Industrial Revolution is an easy and reliable scapegoat, and writers like John Ruskin and William Morris have maintained its culpability. The powerful influence of the Industrial Revolution was that it gave humans unprecedented control over natural forces, and treated the landscape as a standing resource, “an open field, unchallenged and without impediment to free colonization” (Gans, 2004:51).

This attitude is a direct consequence of a paradigm that removed people from the biophysical equation, and was promoted by writers like Francis Bacon and Rene Descartes after the Enlightenment. The ontological divide between humankind and its ecological surrounds has resulted in a severe imbalance in the human–nature relationship, and is discussed in the writings of proponents of Regenerative Design as well as theorists like Bruno Latour and Stephen Moore. The maintenance of the imbalance was a fundamental requirement for being “modern”, and is illustrated in colonialists’ view of indigenous peoples, who did not see themselves as separate from nature, as “savage”.

It is the argument of this dissertation that industrial wastelands plainly illustrate the modern imbalance between man and nature and its effects. They serve as painful reminders of what human industriousness is capable of within the modern paradigm. Any intervention on an industrial wasteland should be approached from an understanding of this imbalance, and its adaptation should aim to restore the human–nature relationship.

## 1.1. BIFURCATION

In his book *We have never been modern*, Bruno Latour reflects on the use of the word “modern” to characterize an archaic past by means of a contradiction with the present (Latour 1993:10). Latour describes modern thought as the purification between a scientific world of natural facts, and an unrelated realm of society and culture, “... a partition between a natural world that has always been there, a society with predictable and stable interests and stakes, and a discourse that is independent of both reference and society” (Latour 1993:11). He claims that in order to be modern, one must constantly differentiate and maintain this bifurcation between what is natural (non-human) and what is cultural (human). The rationality and explicitness that accompanied modern thought and its approach to the study of nature can be seen in the writings of many of the philosophers of the Enlightenment.



Francis Bacon's *New Atlantis*, published in 1624, as well as *A Discourse on Method* (1637) by René Descartes presented a reductionist view of rational thought. Both these philosophers expressed the belief that pure intellectual reasoning and investigation of nature could result in absolute knowledge and the ability to command it (Dusek 2006:42). Bacon used the analogy of the relationship between men and women to explain the relationship between the (scientific) enquirer and nature. His use of metaphors of seduction, unveiling and probing to force nature to reveal her secrets has caused much controversy among feminist writers, and contributed to so-called Eco-feminism (Dusek 2006:146).

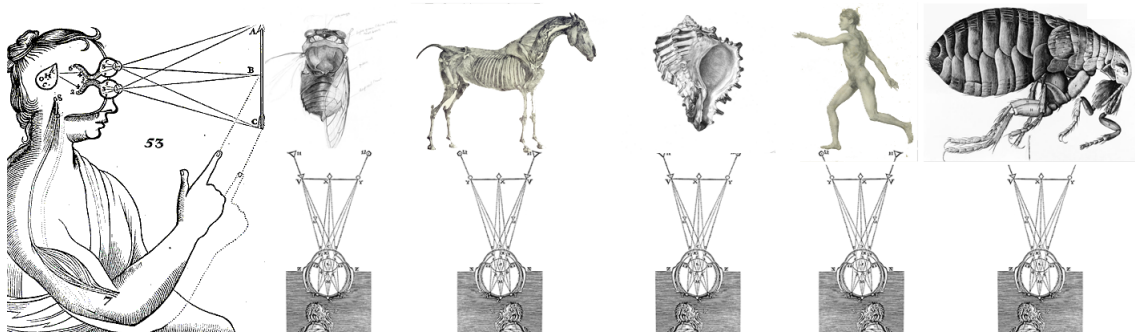
The paradigm of firstly being separate from and superior to nature, and secondly being able to control nature, made it possible for humankind to make decisions that had detrimental or even devastating ecological consequences, without having any immediate societal impact. Politicians and governments came under no real pressure to consider the effects of their policies and decisions on the biosphere, as politics and nature were thought of as entirely unrelated to the ecological world.

The nature–culture bifurcation made it possible to divide natural cycles, patterns, species and all biological life into separate areas of science, while people could imagine themselves completely removed from these in a separate public (cultural) society based on norms and consensus.

The nature–culture bifurcation in the paradigms of policy-makers caused other difficulties as well: scientists could not provide “scientific facts” about environmental degradation to governments before building consensus (a purely societal construct) around these facts. This caused sufficient lag in reaction as well as a disbelief in these facts among many people. The consequences of human interventions for the ecological whole were rarely connected to human well-being before authors like Rachel Carson and Kenneth Boulding started advocating their connection in the publications *Silent Spring* (1962) and *Spaceship Earth* (1966) (Du Plessis, 2006:4).

*... [T]he past decade or more has seen many initiatives developed around sustainable building and construction, [but] the contribution of these to the global sustainability project is neither sufficient in scope and tempo to achieve the transition to a more sustainable world before critical tipping points are reached, nor is it necessarily progress in the right direction .... (Du Plessis, 2006:2).*

Figure 1.2\_Reductionist world-view (collage by author 2013)



## 1.2. HYBRIDIZATION

The argument made by Latour is that the bifurcation between culture (humans) and nature (non-humans) only ever existed in the minds of those purposeful enough to pursue it (Latour, 1993:10). Latour argues that the world is constituted of nothing but mixtures between nature and culture; between society and science; between fact and myth. These are the so-called hybrids. Latour continues to say that it is impossible to separate hybrids. We can only translate and compose hybrids in our understanding of reality (Latour, 1993:10).

*The smallest AIDS virus takes you from sex to the unconscious, then to Africa, tissue cultures, DNA and San Francisco, but the analysts, thinkers, journalists and decision makers will slice the delicate network traced by the virus for you into tidy compartments where you will find only science, only economy, only social phenomena, only local news, only sentiment, only sex (Latour, 1993:2).*

Figure 1.3\_Sarah (print by Slovo Mamphanga 2013)



## 1.3. MODERN THOUGHT IN NON-WESTERN SOCIETIES

The act of classifying things into natural and cultural was a foreign and imposed concept to most non-western societies, including South Africa. Indigenous societies would rarely bifurcate themselves from their ecological surroundings. They saw themselves as a complete part of nature, dependent on the well-being of their ecological surroundings and contributing to its systems. Indigenous cultures were perfectly comfortable with nature–culture hybrids.

In his article “Ubuntu in South Africa: a sociolinguistic perspective to a pan-African concept”, Nkonko Kamwangamal describes the core qualities of the African concept of Ubuntu as *communalism* and *interdependence* (Kamwangamal, 1999). Communalism and interdependence transcend human relations, and apply to humans as well as their social and ecological surrounds. The concept of human survival that is dependent on the well-being of the entire social group as well as the ecological surrounds is one that features strongly in regenerative theory.

Colonialism imposed the bifurcated classification system on the people in colonies, and classified indigenous cultures as natural and not cultural. This led to discrimination based on the nature of a person and a complete disregard for culture, and is evident in the distinction between exhibitions of the indigenous San people at the *Natural History Museum* in Cape Town, and of the VOC and Dutch-East India Company artefacts in the *Cultural History Museum*.

In South Africa, the planning of cities created purposeful divisions in civic spaces and public infrastructure that was deliberately representative of the natural–cultural classification system. Today, this creates difficulties in uniting a society that has been divided on so many social and spatial levels (Nuttall, Mbembe 2007). Just as architecture was used as buffers and dividers up to 1994, the role of architecture in South Africa today should be to facilitate new connections and re-establish old ones, not only between previously racially divided communities, but also between what is seen as *natural* and what is seen as *cultural*. It is necessary to allow for the constant renegotiation of nature–culture hybrids and to represent these hybrids as exactly what they are.



## 1.4. ARCHITECTURAL APPLICATION

Many approaches are available to designers to reinterpret spaces of separation between nature and culture to become spaces of connection. Most of these require a change in perception of the relationship between humans and everything with which humans have a conscious or unconscious relationship (nature, objects, technology, politics), referred to by Latour as non-humans.

Latour proposes a method of understanding nature-culture hybrids in his polemic essay “Pragmatogonies” (1994). A pragmatogony refers to a situation (or socio-technical definition) that pulls together many social, natural, industrial and political humans and non-humans. The essay takes the form of a genealogy that traces the relationships between human and non-human actors. The genealogy starts at the most recent relationship between humans and non-humans and ends at the earliest. Latour argues that the exchanges between non-human and human actors provide the conditions for each other's existence, and the continuous support of them both. They are thus interdependent and support each other very intimately.

A similar interdependency between humans and the natural environment forms a fundamental part of the ecological paradigm advocated by proponents of regenerative design (Cole, 2012:?). The connections between the human species and greater ecological systems are similar to those explained in Latour's “Pragmatogonies”. The reintroduction of people into ecological cycles and as contributors to thriving socio-ecological communities immediately makes them jointly responsible for the well-being of all the systems of which they form a part.

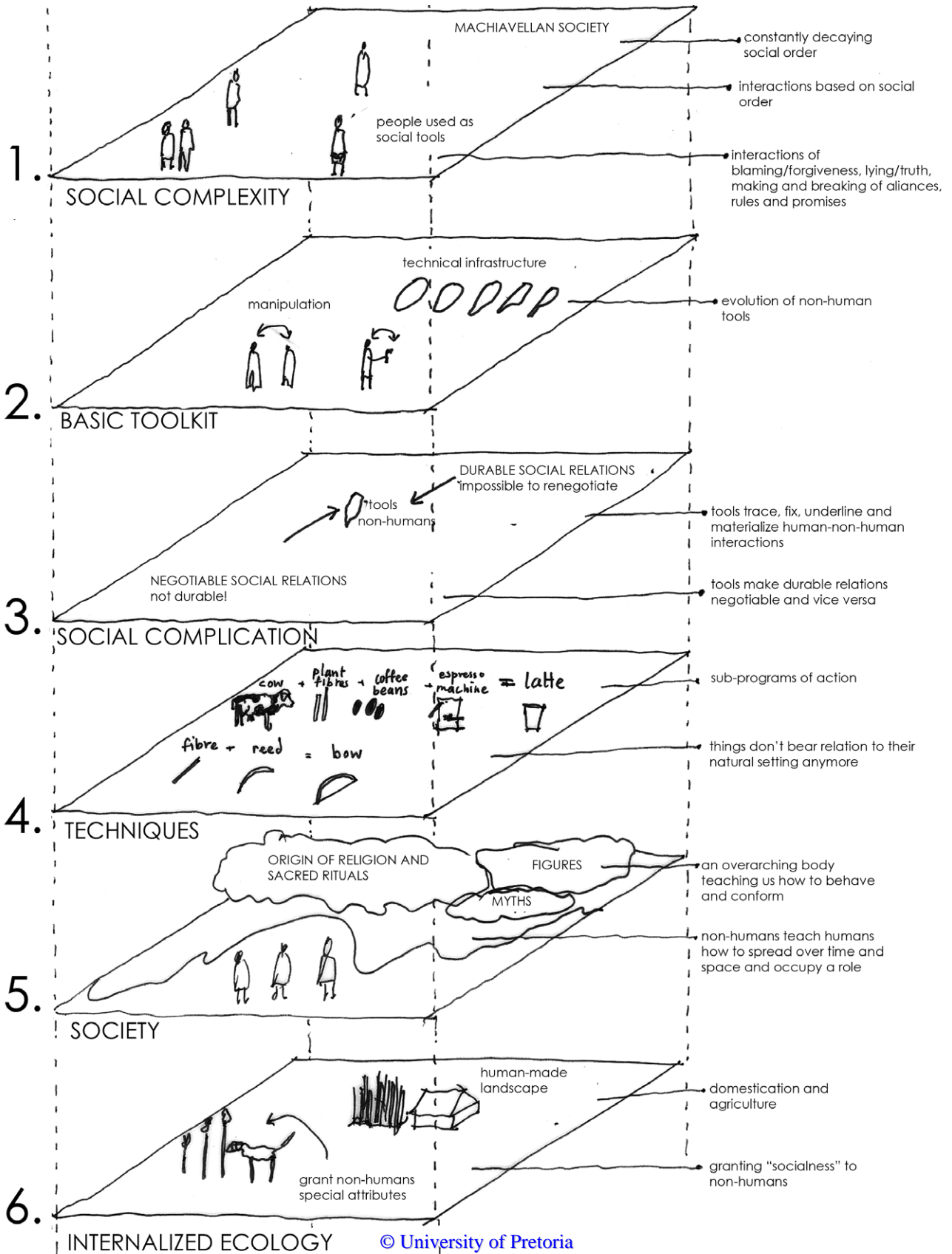
Regenerative practitioners believe that all people can become active participants and role-players in giving back to nature what our endeavours take out, but that this requires a deliberate and conscious change of paradigm from mechanistic to ecological (Mang, Reed 2012b:23). This paradigm shift is especially crucial for people in the built environment, which impacts heavily on natural resources (ibid.).

In their article “Designing from place: a regenerative framework and methodology” (2006), Bill Reed and Pamela Mang of the Regenesi Group reveal a possible

alternative way to approach design decisions based on the qualities of place. The authors advocate that sites have characteristic distinctions like underlying landform as well as climatic, historical and social forces that shape it (Haggard, Reed & Mang 2006:2). Understanding these as interdependent systems that strive towards a specific systemic goal of evolution would enable designers to understand the potential inherent in the site, and how design can harness the aspirations of the site to inform design decisions based on ecological and human potential.

Proponents of regenerative design acknowledge the valuable contribution that the green and sustainability movements have made to design fields, but suggest that designers now move beyond the mechanistic and reductionist views of the environment into a more holistic understanding of the site as a living system, and that people form an interdependent part of that system.

The paradigm shift of regenerative practitioners from mechanistic to ecological can be compared to the paradigm shift from a bifurcated nature and culture to the hybridized nature and culture as proposed by Latour. Both these theories ask of society to see the bigger picture, to understand the relation of society and culture to nature as incredibly intimate, to embrace connections and networks, and to allow for the constant renegotiation of new relationships between humans and non-humans.



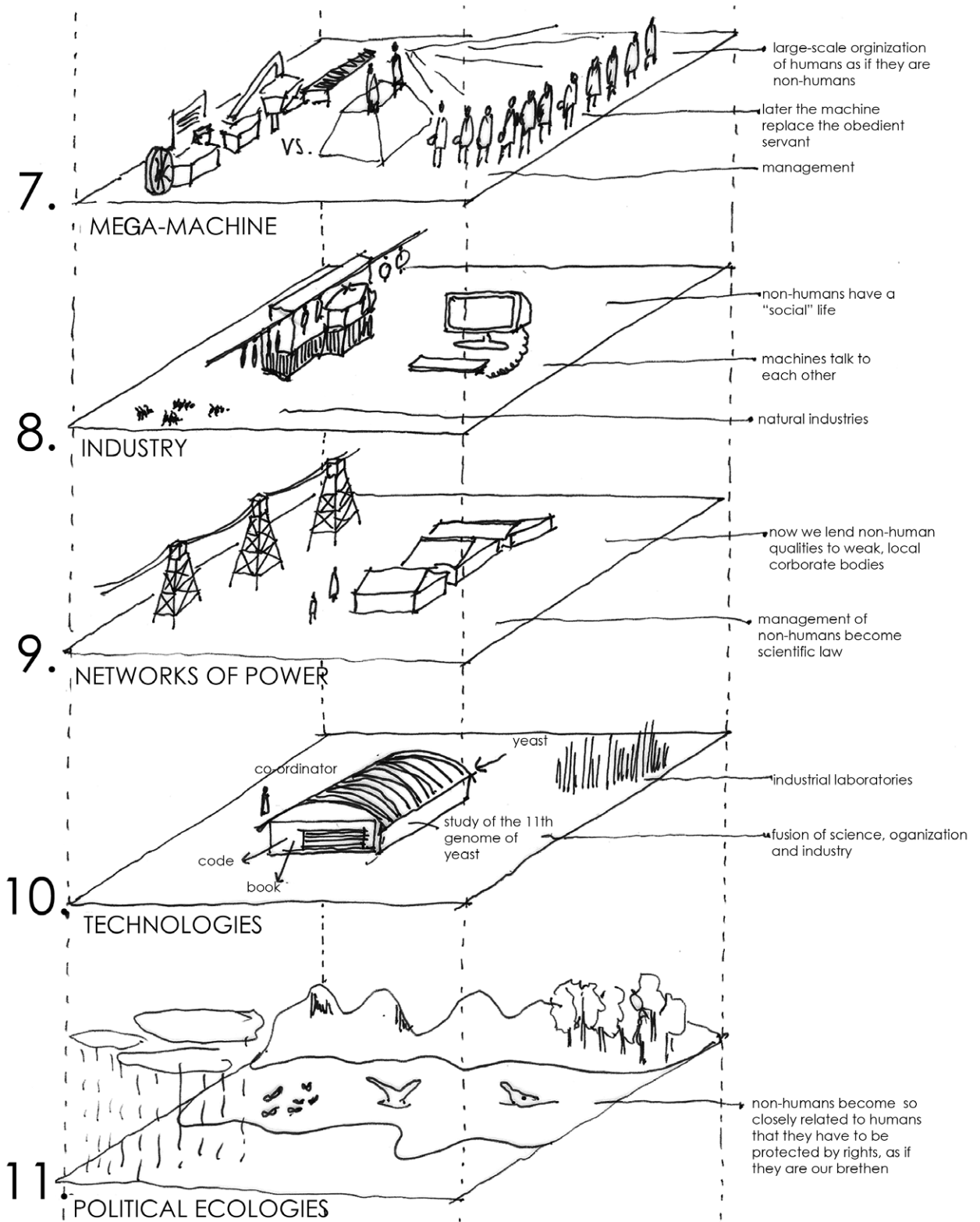
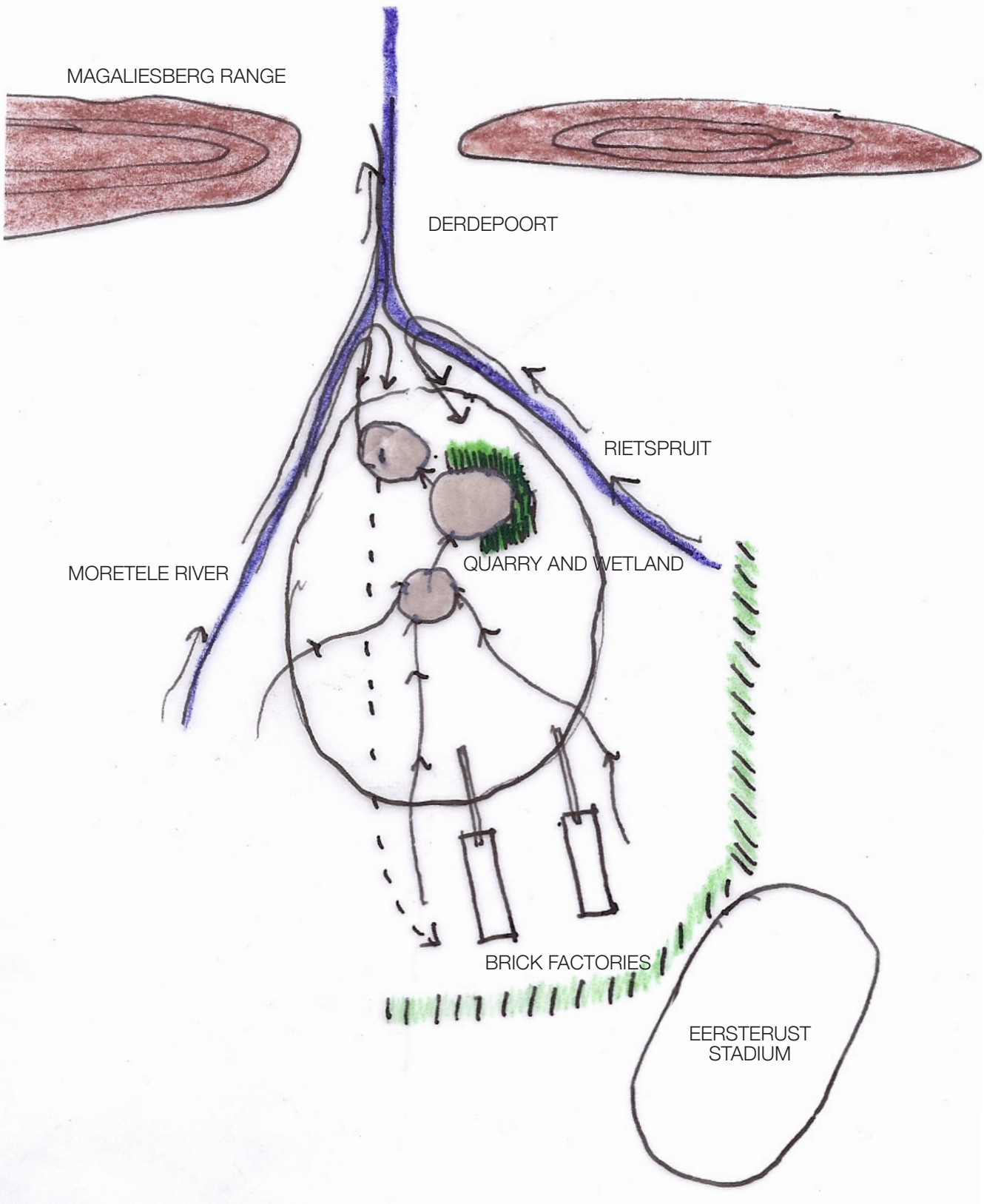


Figure 1.4\_ Illustration of Pragmatogonies (Author, 2013)



# CHAPTER 2

## A MEETING AT THE CONFLUX

### An Alternative Approach To Site And Context

#### SUMMARY

Industrial sites on the verge of decommission represent the consequences of the bifurcated relationship between mankind and ecology in a severe way, but can offer new possibilities to the communities that live around them if approached with an understanding of the bifurcated human–nature relationship. In order to further investigate the latent potential inherent in decommissioned industrial landscapes, and their ability to provide a platform for the formation of renegotiated human-nature relationships, a brick factory to the east of Pretoria was identified as site. The factory will be decommissioned within the next ten years due to the high operational costs of the current production infrastructure.

The site occupies a vast tract of land wedged between the Rietspruit and the Moretele River. It has quarried clay and produced bricks since the late 1940s and carries emotional weight among the people who live and work in the surrounding areas of Eersterust and Silverton. Instead of approaching the site from a conventional analysis perspective, it is holistically understood in terms of the ecological, public and industrial forces that have shaped it. The site investigation takes the form of a narrative of cultural, ecological and industrial actors. An attempt is made to understand the patterns that emerge from this narrative and how these could result in the conception of *potential sets*.

Potential sets contribute to the constant organization and re-organization of industrial, social and ecological actors on the site, and are discussed in terms of their operating time frame and system goals.

The chapter concludes by finding the role of the design project within the bigger purpose of the site and identifies ways to “give form to the phenomena that will direct the site to realize its greatest potential” (Mang, Reed 2012c:28).

Figure 2.1\_Diagrammatic understanding of the forces present on site (Author, 2013).

## 2.1 THE STORY OF THE SITE

The Era Bricks Factory is located south-west of Eersterust, 11km east of Church Square in Pretoria. The site is wedged between the Moretele River to the west and the Rietspruit to the east. It lies directly south of Derdepoort, a fault in the Magaliesberg that caused a break in the mountain range. The Moretele and Rietspruit converge north of the site, and flow further north through the Derdepoort.

In his doctoral thesis entitled “The Rediscovery of Place and our human role within it”, Dr. Nicholas Mang illustrates the value of a narrative or story of place (Mang, 2009). The story of place is proposed as a way to envisage and understand any site as a product of many ecological, social and political forces. By understanding the story of the place one can start to imagine phenomena that would align with the story of the place, and therefore also contribute to it (Mang, 2009 & Mang & Reed, 2012:12).

### Geomorphological forces

The ecological story of the Era Bricks site begins many millions of years ago with the geomorphology of the mountain ranges that line the south and west of the site. The geomorphology created three distinct geological strata

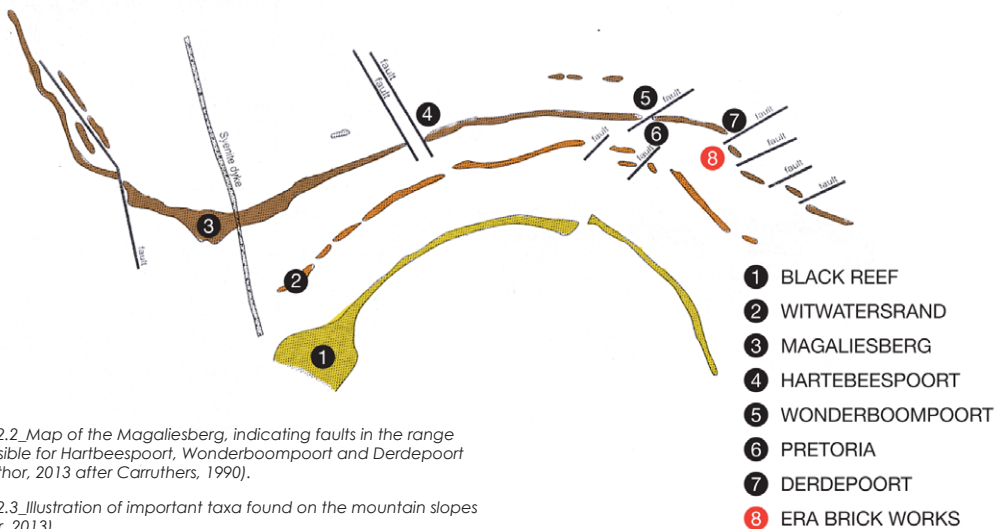
with different soil conditions. These are:

1. Marikana Thornveld on the northern slopes with mafic intrusive rocks and freely drained, deep soils.
2. Norite Koppies Bushveld: large rock boulders with very shallow lithosoils.
3. Gold Reef Mountain bushveld: varied colluvial clay-loam with vertic and melanic clays.

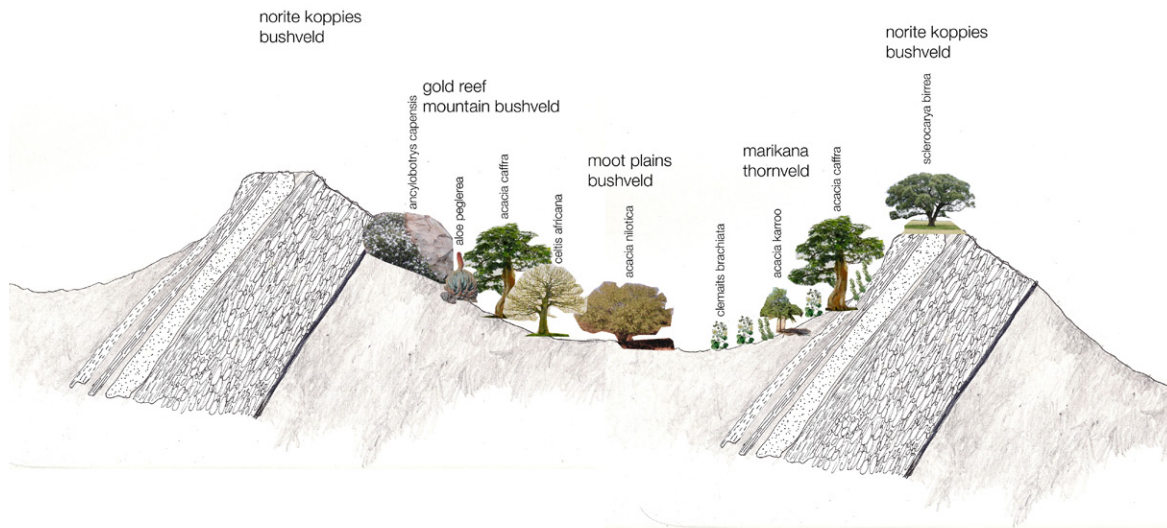
(Mucina & Rutherford, 2006:463-466)

These in turn resulted in very different fauna and flora occupying the slopes, moot (valley) and the ranges (Carruthers 1990).

The Derdepoort is the third geological fault in the Magaliesberg range if counted from its origins in the west. The first fault is called the Hartebeespoort; the second, the Wonderboompoort, is located directly north of Church Square, and the next poort is thus the third, Derdepoort” (Swanepoel, Jansen 2011). Traders would use this poort to get to the Soutpansberg trading route north of the mountain range, as the Wonderboompoort close to town was regularly flooded by the Apies River (ibid.).







## Alluvial forces

The Moretele River and the Rietspruit that join at the Derdepoort form the second layer of forces that impacted on the site. A river confluence shapes the landform, basin, channel morphology and soil composition of any site (Benda, Andras & Bigelow, 2004:1). Rivers deposit silts and soils at confluences and contribute to a rich soil composition and surrounding ecology.

It is thus understandable that, in 1945, the owner of the farm on which the site is located decided to use the clay deposits on site and make clay bricks instead of farm with corn as was done initially (Van Dijkhorst 2013). At this stage, the town of Silverton directly south of the site was already a thriving manufacturing centre around the main tannery core

that was established in 1915. A railway line to Maputo and Nelspruit called the Oosterlyn (Eastern Line) was established and serviced the Silverton tannery south of Eersterust. The tannery required eucalyptus trees for the tanning process, and the remains of several of these tree plantations can still be found on site. The existing trees around the site trapped dust from the brick works and many more were planted around the circumference of the site.

The clay brick factory became very successful, and was sold to Rosema and Klaver Bricks in 1975. This company named the site Era Bricks, built two Hoffman kilns, and quarried clay along the northern edge of the site (Van Dijkhorst, 2013). During 1958, what was left of the original corn farm Derdepoort was subdivided, proclaimed a coloured area,

Figure 2.5\_Location of the Era Brick Works in relation to the Moretele River and the Rietspruit. (Author 2013)







and called Eersterust (Jansen, 2013). The areas south, east and north of the site became populated by coloured people who were displaced from Marabastad in town (ibid.). The area west of the river was proclaimed a white area and called Jan Niemand Park.

The two rivers now served as buffers between racial groups, with the industrial infrastructure forming the core of this buffer. The trees formed a soft visual barrier between Eersterust, Jan Niemand Park, and the industrial infrastructure that now found itself in the midst of a completely residential setting. Clay was quarried on the site only up to a 5m depth, but the source of clay of acceptable quality was depleted 15 years ago. Currently, bricks are manufactured from imported clay delivered from Olifantsfontein and Delmas on a daily basis. Ecological forces started to reclaim areas around the quarries that filled up with clay-rich water. A wetland emerged around one of the deeper excavations, and now offers a new habitat to many bird species and exotic plants.

### Political forces

In 1995, due to political pressure after the National Elections of 1994, a soccer field was constructed on the corner of the site. It was controversially upgraded in 2010 before the Soccer World Cup, but due to construction faults the pitch can currently not be used. The soccer stadium is an example of the political forces that have an impact on the story of the site, especially in its south-eastern corner. The practice soccer field located next to the stadium has however proved to be very popular with the Eersterust community, and currently draws positive energy into the otherwise monotonous industrial terrain.



Figure 2.6\_The Silvertown Tannery in 1915 (source: Natural Cultural History Museum).

Figure 2.7\_The original Era Bricks sign in St. Joseph Ave (Author, 2013).

Figure 2.8\_Eersterust Soccer Stadium built in 1995 (Author 2013).

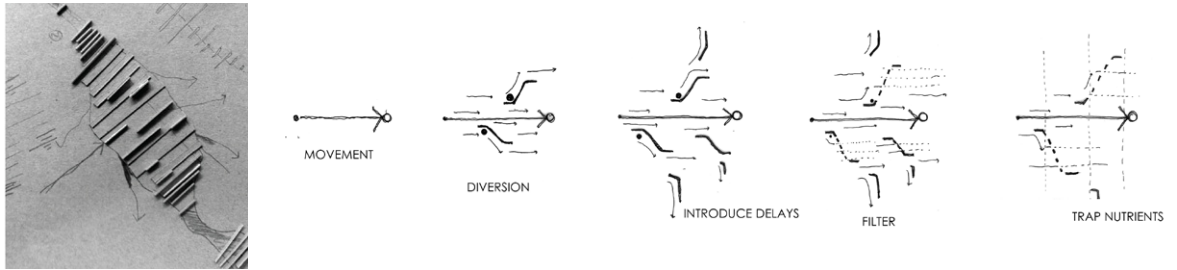


Figure 2.9\_Diagram: ecological analysis of the site's ability to accelerate and decelerate water (Author, 2013).

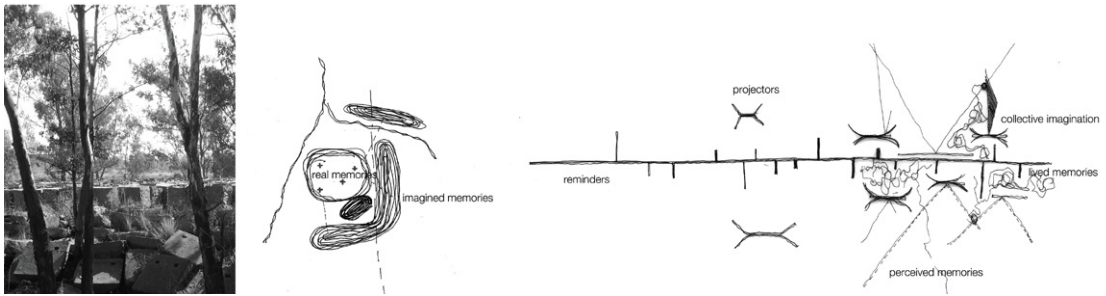


Figure 2.10\_Diagram of the influence that the power and authority of memory has on the understanding of the site (Author, 2013).

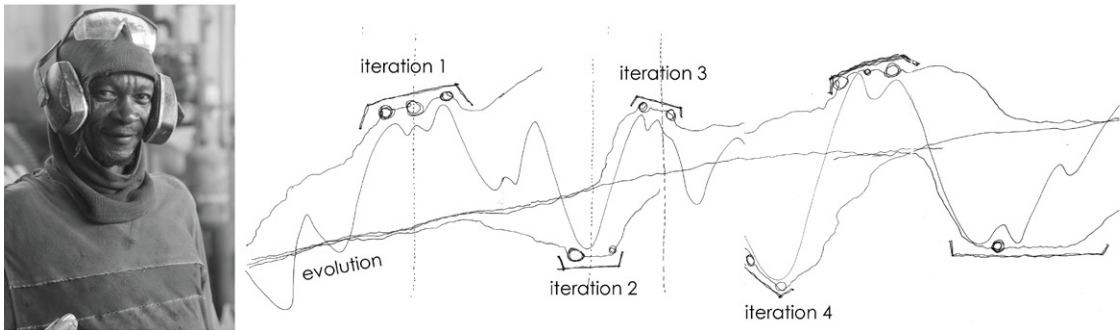


Figure 2.10\_Diagram of small evolutions and revolutions and their consequences (Author, 2013).

## 2.2. POTENTIAL SETS

The concept of potential sets was devised as a mechanism to imagine and analyze the inherent ecological purpose of the flows of the site over time. Broadly defined as a system of elements, artefacts and flows, potential sets constantly shift between evolution and resistance and offer design informants that change as the site evolves.

### Acceleration and deceleration

The first potential set deals with ecological services rendered to the site, and has operated over a time frame of several million years. Informants include the geomorphology landform and river morphology. As the site is relatively flat, it offers the two rivers the space and time to slow down, settle and expand. Proof of this function is apparent in the formation of the wetland around the centre excavation. The role of acceleration and deceleration is to regulate movement, trap nutrients and sediment, create delays and redistribute energies along the width of the plane. A diagrammatic exploration of this potential set is illustrated in Figure 3.2.1.

The above process can be translated into a filtering service that the site renders to the rivers. It provides the circumstances for water and soil sediments to slow down and settle. It also aids the site in the natural production of clay, as the rivers transfer sediment collected upstream to the site. The production of clay is the main ecological purpose of the site.

### Memory and imagination

The public is currently only allowed views of the site through the soft buffer of a eucalyptus grove around the perimeter of the site. By not directly engaging with the site, the public fills this void in their mental map with imagined processes and events (Curulli, 2006:32). Contrary to real memories that are dependent on perceptual information and contextual detail, imagined memories are potent and aura-laden. They rely on prior knowledge and emotions. Imagined memories offer the potential to introduce deliberate mutations and rearrangements of site memories. Curulli describes this type of imagined memory as extremely powerful:

*They demand of us to remember who we are and how we got here. The urgency of their imminent demise reminds us of our own temporality. Their associations are always emotionally loaded. (Curulli, 2006:33)*

The physical industrial infrastructure on the site offers people the power to recollect the real memories of those who worked in the factory, but also their imagined memories that engaged with the site on a removed visual basis. By engaging the emotional imagination of the people who live around the site, and introducing the inherent memory to them, their engagement can be harnessed to create stewardship of and communal responsibility for the well-being of the site.

### Revolution vs. Evolution

This potential set denotes the site's ability to change, adapt and innovate. It operates over a time frame of 20-70 years. Informants include political forces, financial decisions, plant growth and decline and public opinion. It constantly moves through endless iterations, and the evolution of one set will inform the direction of the next. An example of a strand of such an iteration is: excavations were made on site in order to mine clay for the factory. The soil composition was the potential that led to quarries being established on site. After several years of mining, the clay quality was not acceptable for producing face-brick, and the company discontinued their mining activities. After this, the quarry gradually filled with rain- and groundwater which was the next iteration of the potential (if the excavation had not been there, it would not have been possible to retain water). The water-filled quarry established a new habitat for plant and animal growth, while also providing the existing industrial processes with water to cool equipment and to mix with imported clay for their products.

When the factory is decommissioned, it too will provide the same types of potentials ready for the next iteration. These include the existing skilled labour force, flat open spaces, the memories of the supporting community base, and clay found in the quarry water. The challenge is to see these not as obsolete infrastructure or unfortunate social implications, but as a set of potentials left latent by the factory's demise. The design intent situates itself on the cusp between decommissioned industrial infrastructure and a new future. Through understanding the role of the next iteration in the bigger picture of the aspirations of the larger potential set, clues are provided as to what the design intent of the project might be.







## 2.3 THE ROLE OF THE PROJECT IN THE STORY OF THE SITE

A synthesis of the potential sets enables a programme to be chosen for a design intervention that will align itself with the broader purpose of the site. Because the potential sets take account of ecological, social and industrial forces on the site, they enable the bridging of the bifurcation between human aspirations and ecological functions, and offer a hybrid understanding of the site.

A programme that taps into the site's natural filtering and clay-producing capabilities is proposed and stems from potential set 1 (acceleration and deceleration). A production facility for clay products fulfils the ecological purpose of the site and also harnesses the creative capabilities of the existing workforce. It absorbs the inherent knowledge of materials of the current skilled employees of the factory, and aids the evolution of these skills into a more contributive activity (potential set 3: revolution and evolution). The introduction of the public to the functions of the production facility would enable them to confront their own memories of the factory while making new memories as well (potential set 2: memory and imagination).

The water in the quarries is also seen as an evolutive potential (discussed as potential set 3), that can be filtered for sediment. The sediment can be used for the production of ceramic products, with the water being cleaned in the process. The proposed facility will make products that would contribute to the sustained ecological regeneration of the site by producing olla irrigation pots and ceramic water filters. This would create new employment potential for existing skilled workers and establish a new relationship with the clay available on site. If this activity has the potential to facilitate well-defined public interaction, a new relationship between the existing industrial legacy and the public could be established. The new skills, improved relationships and public interaction would become the potential set to be considered in the next iteration.

The ceramic production facility is imagined not as a mere industry, but rather as a craft-based industrious space that allows people, industry and ecology to coexist.

*Figure 2.12\_View of the Era Brick Works entrance from St. Joseph Ave.  
(Author 2013)*







# CHAPTER 3

## INDUSTRY VS. CRAFT

### SUMMARY

The origin and meaning of the words “craft” and “industry” are explored, with reference to the power of craft to mediate the bifurcated nature–culture relationship. Craft represents a valuable connection between natural materials and the cultural objects that are produced through it. African craft serves as an example of how craftsmen were regarded as transformers of natural elements, and needed to understand their connection to nature and dependence on material forces. It is argued that craft has the ability to restore the nature–culture relationship, but that industry also has an important role to play in the creation of ceramics as a hybrid craft–industry.

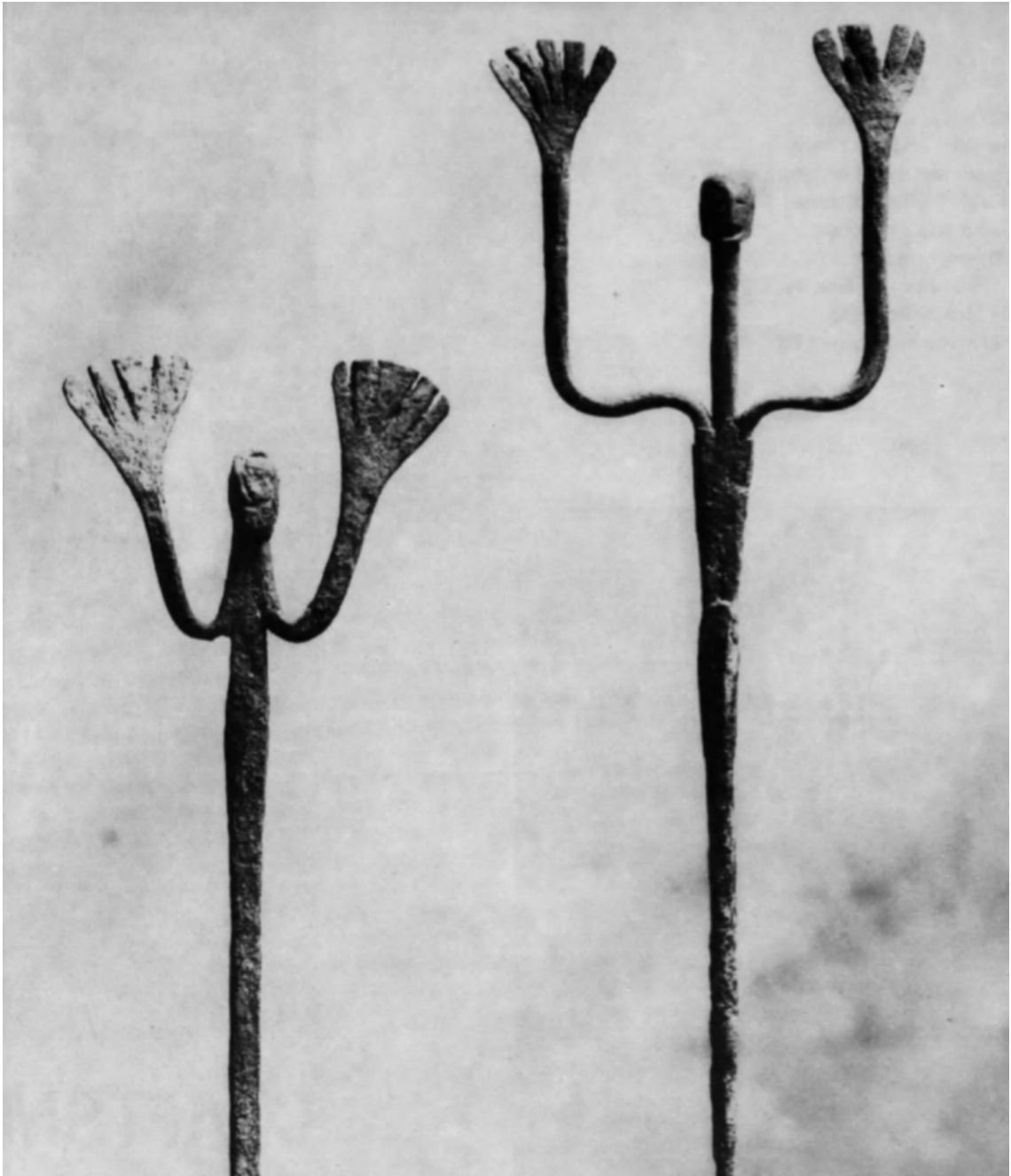
The historic context of the iron-age pottery of Africa, as well as the specific use of brick in the architecture of Pretoria, provides place specific clues as to a ceramic craft that is situated in both culture and nature and acts as a powerful mediator between the two.

The argument is made that an industrial craft-based production facility that incorporates the study of a material’s natural cycles, its relevance to a particular context, with reference to its historical cultural application, would enable a celebration of the hybridity of culture and nature that has always existed.

A future for South African ceramic-based creative industries is imagined, where the study of the material and how it is modified becomes integral in the fostering of a new relationship with the material and therefore also with the bio-physical environment. This future is translated into a possible architecture that encompasses this vision.

The physical requirements of the programme and the spatial translation of these requirements are discussed. Social functions that benefit from the main ceramic production line, or can contribute to it, are added. The production line has specific requirements in the form of space allocation, environmental conditions and public safety. The existing production line currently in place at the factory is used as a starting point for the new programme.

*Figure 3.0\_Aerial photograph of Era Brick Works hanging in reception area of the factory (Author, 2013).*





### 3.1. CRAFT AS A NATURE–CULTURE MEDIATOR IN NON-WESTERN SOCIETIES

The use of the words “craft” and “industry” date back several centuries, but their use and meaning changed considerably in the 19th century (Adamson 2010:322). The American Heritage Dictionary defines the word craft as “an occupation or trade requiring manual dexterity or skilled artistry”. The word dates back to *cræft*, of Germanic origin, which refers to a small trading vessel, requiring an amount of skill (craft) to handle (Oxford online dictionary).

Craft in non-western, “unmodern” societies did not follow the nature–culture bifurcation process brought about in the West by the Enlightenment. The particularities of African craft practice or Japanese furniture creation are exceptional examples of total cultural connection to a natural material and environment. The energy inherent in the material is deeply respected and used as a guiding force for the creation of beauty that reflects the power of the cosmos.

In the article “African art, where the hand has ears”, Amadou Hampatè Bâ asserts that the African craft tradition very rarely regarded any act of creation as separate from the Unity of Life (Bâ, 1976:12). Any craftsman’s trade was a form of expression of primal cosmic unity. Craftsmen were transformers of natural elements and manipulators of forces. Their products were not simply objects, but reflections of the beauty of the cosmos. Craft was a way of participating in the forces of nature and to belong to its invisible and visible worlds (Bâ, 1976:14).

There were many craftsmen’s trades, because there were many possible relationships between man and the cosmos. The craft of the ironsmith is linked to the mysteries of fire and transformation of matter, and weaving is concerned with the mysteries of rhythm (Bâ, 1976:14). Bâ argues that the cultural African tradition of craft can only be understood in an African religious conception of the universe, where “there is a living, dynamic force behind the appearances of all people and objects” (Bâ, 1976:16).

These ideas support Latour’s notion that there is a distinct unity between objects, people and the landscape, as well as the regenerative principles of a specific spirit of place connected to all people.

Colonization has destroyed many of the values of craftsmanship in Africa, and Africans run the risk of forever losing the knowledge still present in the few elderly keepers of traditions (Bâ, 1976:17). As Africans we are in a unique position to rediscover the power that craft yields in aligning people with the spiritual and cosmic energy of their surroundings.

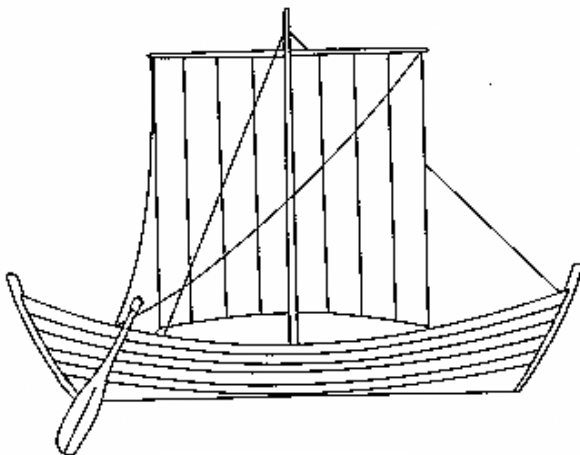
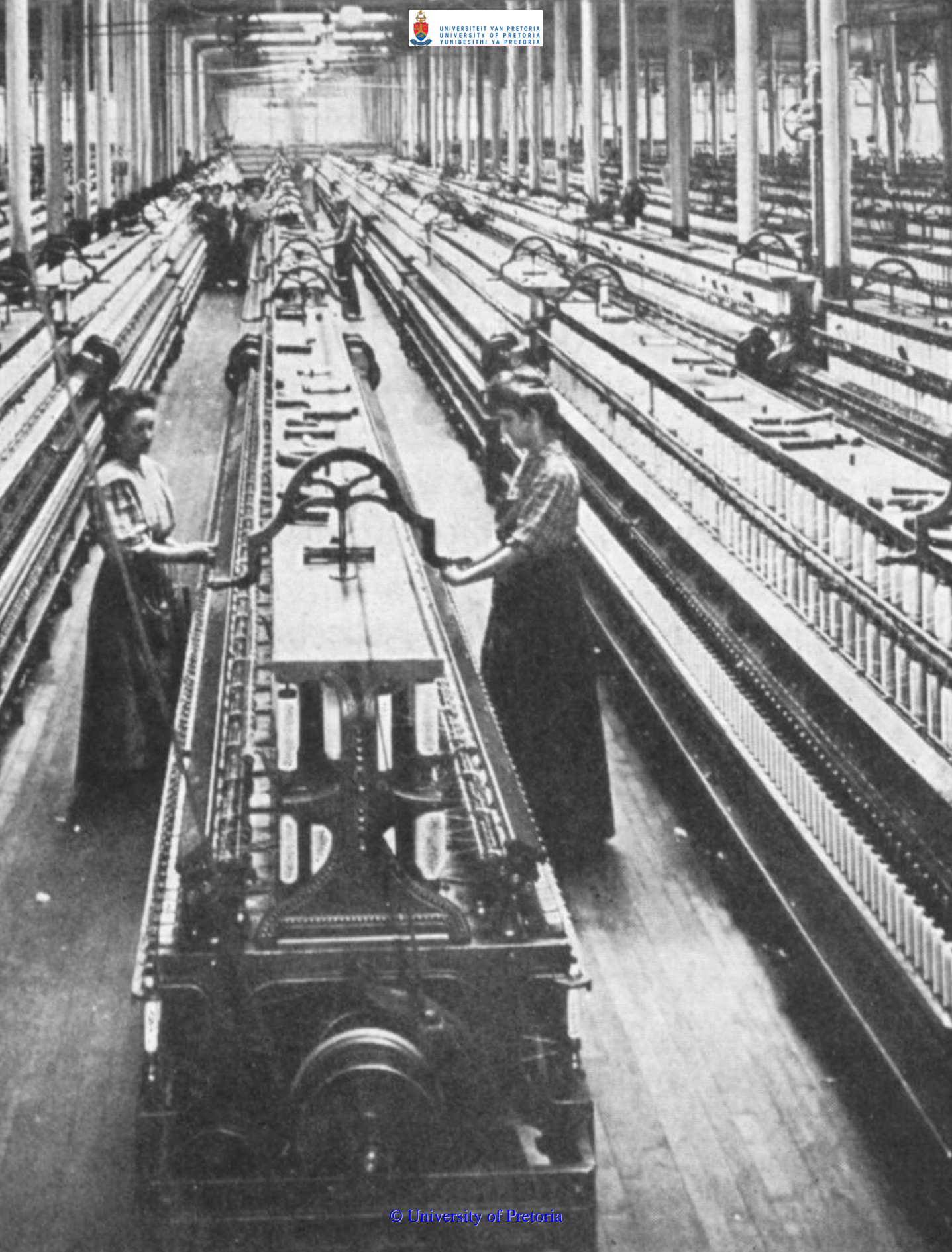


Figure 3.1\_Wrought-iron statues calling down life-giving rain from the sky (source: UNESCO Courier, 1976).

Figure 3.2\_Germanic Trading Vessel (source: Medieval Musings, 2007).



### 3.3 THE IMPACT OF INDUSTRY ON CRAFT

The dichotomy between craft and industry presents a complex relationship between what is produced mainly by hand on a small scale and what machines produce on a bigger scale. The notion that the industrial revolution led to the replacement of craft is contested by Glen Adamson (2010:43). In *The Craft Reader* (2010), Adamson argues that only industries that easily lent themselves to mechanization became mechanized, i.e. cotton spinning and weaving vs. shoe-making and tailoring. It is thus possible to infer that craft and industry coexisted quite well, and that the impact of rapid industrialization on craft was not mechanization, but rather organization and politics, illustrated in the formation of various workers' unions and guilds at the time. The second big impact of mechanization was the deskilling of labour forces and a loss of integration across the production floor.

Not all designers saw the industrial impact as a threat to craftsmanship: in his Manifesto of the Bauhaus in 1919, Walter Gropius described the ability of industry to liberate the creative energies of people in order for them to lead a more balanced life. These sentiments were echoed by Frank Lloyd Wright in his essay "In the cause of architecture: the architect and the machine".

*We must have the technique to put our love of life, in our own way, into the things of our life, using for our tool the Machine, to our own best advantage – or we will have nothing living in it at all – soon.*

(Wright, 1927)

The foundation course at the Bauhaus was focused on man as a balanced whole. Gropius validates this by stating:

*A specialized education becomes full of meaning only if a man of integration is developed along the lines of his biological functions, so that he will achieve a natural balance of his intellectual and emotional power.*

(Gropius, 1919)

Gropius was of the opinion that if the designer worked from his/her biological centre, and immersed him/herself in nature, nature combined with human intuition would be able to produce any imaginable form that would then also be devoid of stylistic human arguments (Adamson, 2010:556). This correlates with the African view that the craftsman is inspired and guided by nature in the articulation of his/her craft.

The application of the Bauhaus curriculum resulted in productive, human, material, industrial, natural and perceptual hybrids that constantly transferred properties and qualities. These bear a similarity to the pragmatogonies described by Latour.

Figure 3.3\_Industrial Spinning Houses in Texas (source: Project Gutenberg).

### 3.4 PROGRAMMATIC INTENTIONS

The notion of the coexistence of craft and industry will be applied in the programmatic intentions of the proposed design intervention on the Era Brick Works site. A production facility is proposed that would produce two distinct ceramic products from the available clay resources on site. The first of these is a ceramic water filter. Ceramic water filters are used where there is limited access to potable drinking water or where the quality of water is unreliable. The clay used to make the filters is impregnated with any available fibrous material that burns away during firing. The burnt-out fibres create pores in the fired clay that allow for the ingress of water. The pots are then treated with a colloidal silver solution for its antibacterial qualities.



The second product is an olla irrigation pot. These pots are a direct irrigation method that is much more effective than conventional drip irrigation. The olla pot is buried in the ground and filled with water. The pores in the olla pot allow the water in the pot to slowly move through the pot and into the surrounding soil. These pots follow the same production principles as water filters, but are formed on a wheel whereas water filters are extruded.



Both the olla pots and water filters will either be sold to the public or used on site, and will make the intervention financially and economically viable.

Clay for the production of the pots will be extracted from both the quarry and the water in the decommissioned quarries. The water from the decommissioned quarry will be flocculated in a facility near the quarry, and the resultant sediment transported to site and mixed with grog, plant fibres and water.

The production line will produce 4000 pots per day, and will require space for the mixing, extruding, forming and firing of these products. The production process requires specific resources like oil, grog and paper pulp in order to function optimally. It also has several by-products like heat, silver nitrate and filtered water that can be used by other supportive industries. These supportive industries, as well as the historic and social potential of the site, inform the arrangement of other programmes in and around the proposed ceramic production line.

Figure 3.4\_Olla Irrigation Pots (source: Dripping Springs, 2012).

Figure 3.5\_Ceramic Water Filters after extrusion (source: RDI Cambodia, 2009).



The supporting programmes include a brick museum, a multifunctional community hall, and a timber workshop, ceramic studio and glazing shop. A health centre is also proposed in order to utilize the health benefits of clay, the heat and steam from the firing kilns, and other products available on the site.

Figure 3.4\_ Stills from the video "The Pot with the Silver Lining" (source: RDI Cambodia, 2008).



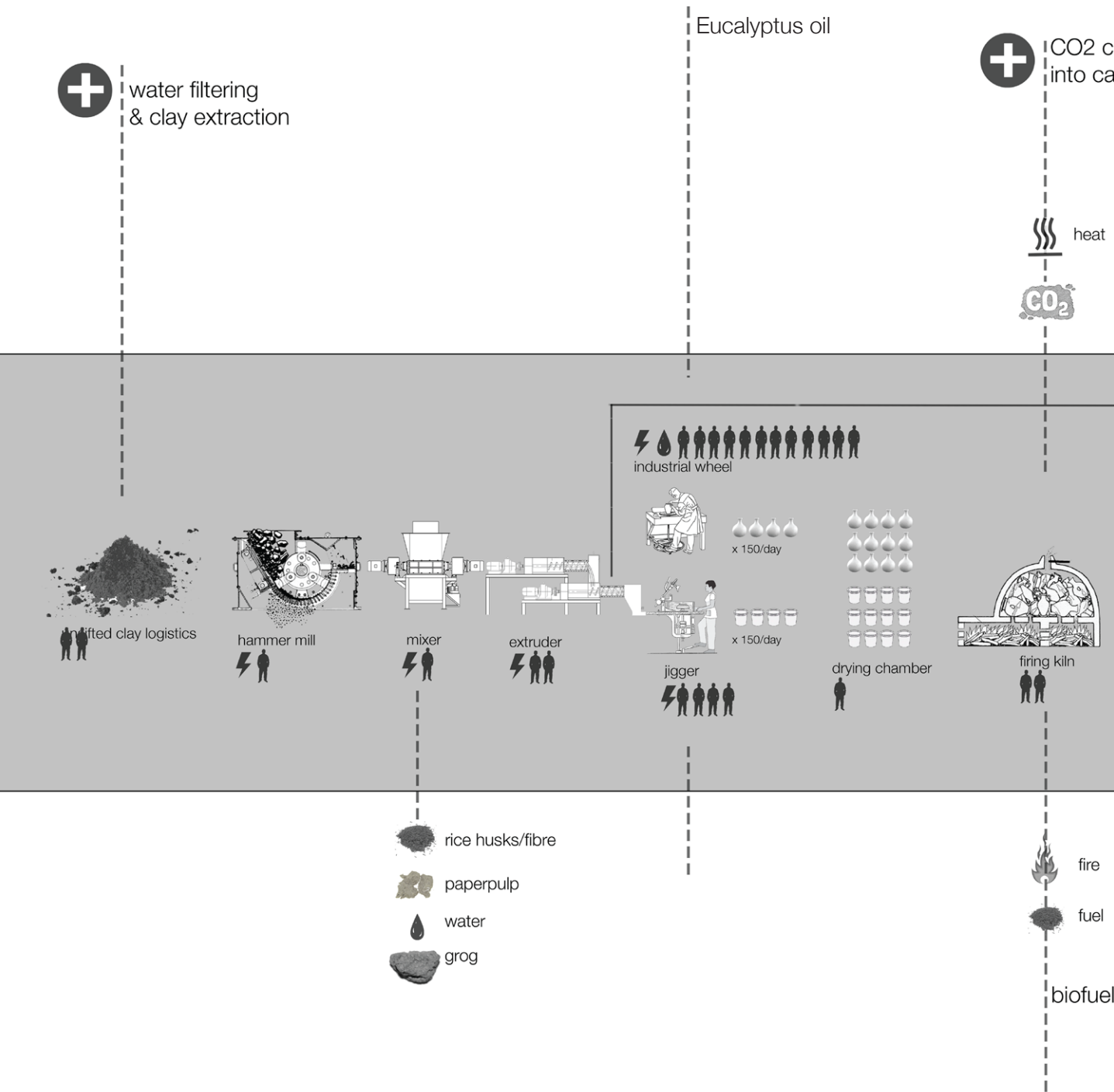
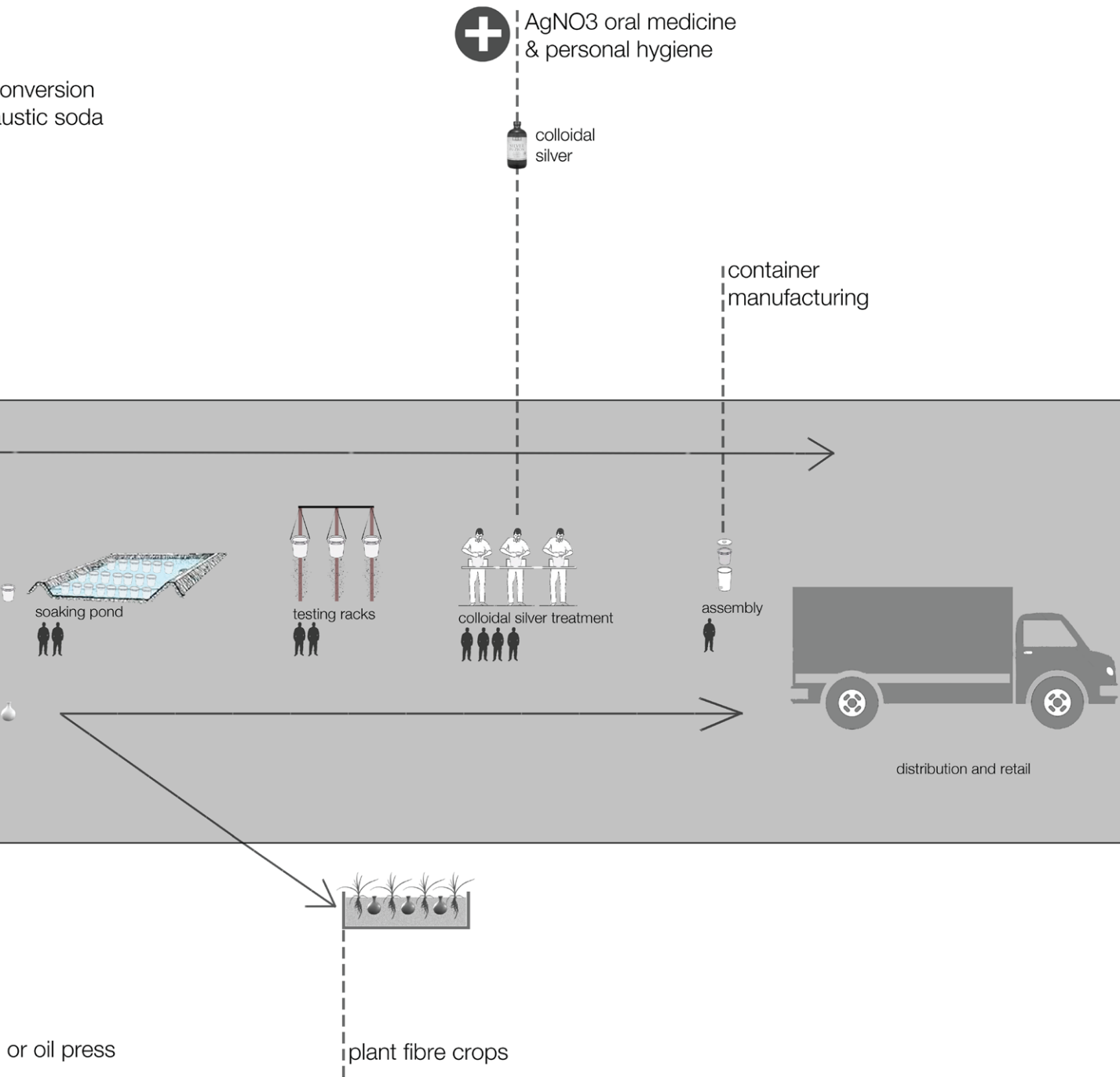
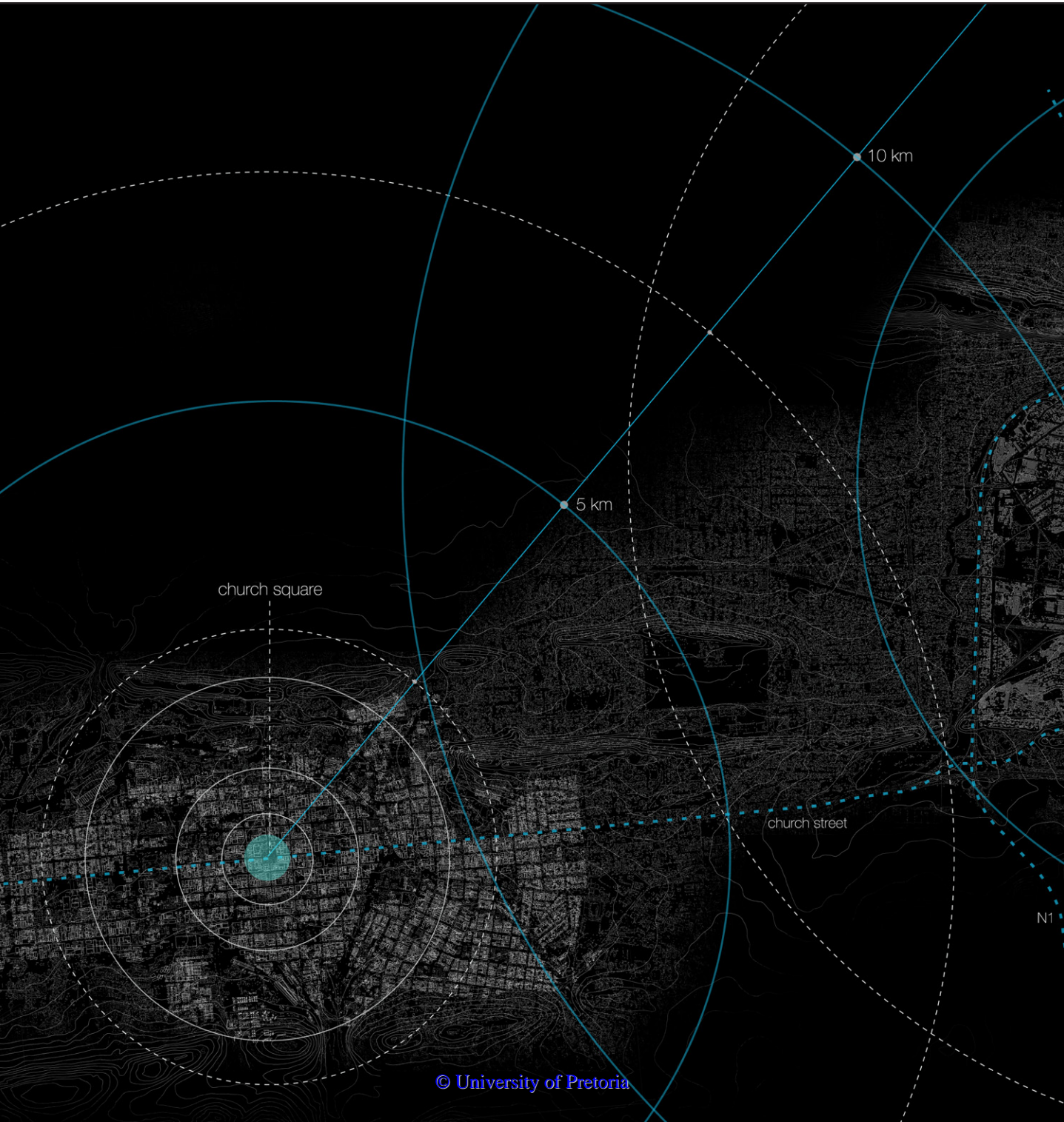


Figure 3.5\_Production sequence with input and outputs (Author, 2013).







# CHAPTER 4

## THE PARK PARADIGM

### SUMMARY

In this chapter the large-scale urban strategy and vision for the Era Brick Works site is presented. The vision stems from an understanding of the potential sets discussed in the previous chapter and how these could inform decisions concerning possible building programmes and the choice of site.

The method of identifying potential sets as a basis for industrial site regeneration projects is tested on two industrial regeneration precedents. These precedents are:

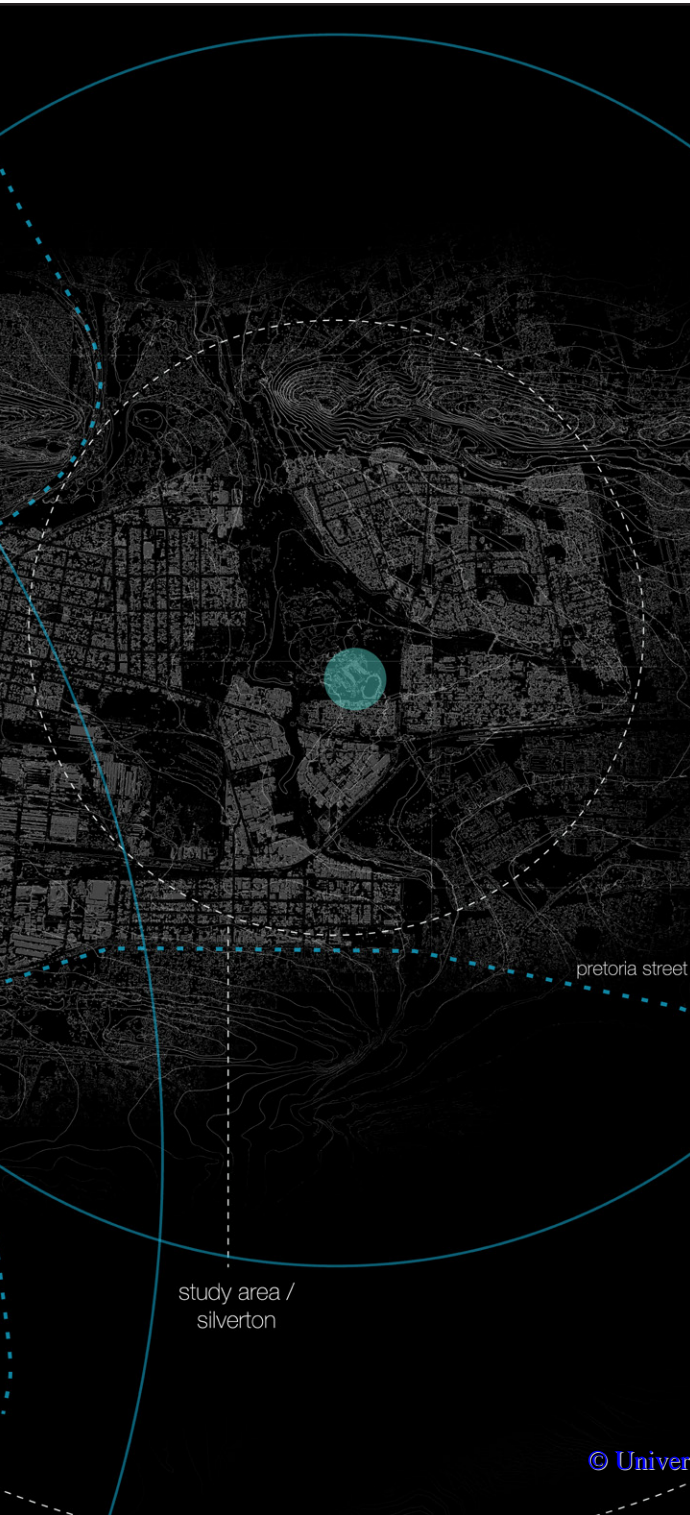
1. The Landscape Park Duisburg-North in Germany
2. The Don Valley brick works in Toronto

The precedents illustrate broad values for the regeneration of industrial sites, but also the pitfalls in the urban approach and long-term vision for such sites. The precedents become formative in the creation of an urban vision and strategy for the Era Brick Works site in Eersterust.

The urban intentions for Era Regional Park are described. The main intentions are to increase the bio-diversity on site and to establish new connections with the surrounding area of Eersterust. By making new social connections between the industrial site and the public, the physical and perceptual boundaries caused by the industrial activity can be dissolved.

The vision for the Era Brick Works site not only aligns itself with the ecological purpose of the site through an understanding of the potential sets, but also finds value in the existing forms and infrastructure brought about by the industrial activity. The vision is reliant on the identified potential sets, and provides the underlying basis for the decision-making process.

Figure 4.0 Locality diagram of site in relation to Church Square  
(Eersterust Urban Vision Group, 2013)











#### 4.1. Landschaftspark Duisburg-Nord, Duisburg, Germany, Peter Latz and others (1991-1999)

The Landschaftspark in Duisburg is a 230-hectare landscape park in the northern Ruhr district of Germany. It forms part of a bigger 10 000-hectare industrial regeneration project by the IBA (International Building Exhibition Emscher) that leaves large tracts of industrial wastelands along the Ruhr River to the “devices of nature” (Kirkwood 2001, Gans 2004).

In Peter Latz’s description of the project in the book *Manufactured Sites*, edited by Niall Kirkwood (2001), he states that the aim of the project was to “engage the community beyond simply reading the past” (Latz, 2001:162). The vision of the multidisciplinary design team was that “park” and “poison” both could contribute to the making of place (Kirkwood, 2001:162).

The park has two symbolic themes that encompass the metamorphosis of industrial structures without destroying them. The first is the theme of “physical nature” and is represented by the erosion of existing iron plates in the “Piazza Metallica” (Latz, 2001:150). The second theme is “utilization” of place and park. The public is invited to playfully and experimentally use the infrastructure in new ways through constant adaptation and imagination.

The powerful and gigantic remnants of the previous industry, such as the blast furnaces and steelworks that served as unhappy memories of misery and bad working conditions, are turned into positive new functions by social re-appropriation: a blast furnace becomes exercise walls for mountaineers and the former dormitory of the miners becomes a new diving training centre (Curulli 2007:38).

Cover Figure\_Foundry of the Landscape Park in Duisburg-North (Author, 2013).



At the Landschaftspark, the existing ecological degradation on site was used as a potential set that would inform the location of specific punctual interventions. “Patterns of ecological disruption provided an underlying ordering structure that determined the shape of a new evolving ecology” (Latz, 2001:163).

The human potential to reimagine industrial artefacts and reappropriate them as socially functioning resources was another potential set that contributed to the success that the park has enjoyed. Bicycle and hiking trails, picnic spots and a wide range of enclosed and open public spaces theoretically make the Landschaftspark a model of industrial reuse, but the scale of the industrial remains and sporadic nature of organized events still cause the park to become eerily silent on many days. A Sunday-morning visit to the park by the author in July 2013 revealed very little activity and public interest in the park.



It could have served the design team of the Landschaftspark well if they considered economic activity as another potential set that would add life to the park, even if it had no visitors. The introduction of offices, studios and education centres could generate daily activity and improve the public vitality of the park.

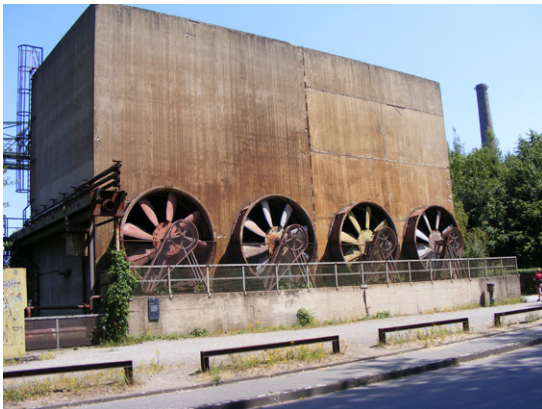


Figure 4.2\_Pioneering planting at the Landschaftspark (Author, 2013)

Figure 4.3\_Public appropriation climbing walls (Author, 2013)

Figure 4.4\_Foundry turned diving centre (Author, 2013)



## 4.2 Evergreen Bricks, Toronto, Ontario, Canada, Du Toit Allsopp Hillier (2010)

Evergreen Bricks is a mixed-use development and ecology centre developed on the previous Don Valley Brickworks site in Toronto. In its prime post-war years, the Don Valley Brickworks produced 43-million bricks per year (Young, 2012:12). In 1985, the brickworks ceased to be operational, and the site became derelict and unsafe (ibid.). The city of Toronto and the Evergreen non-profit organization appointed a multidisciplinary team of architects, landscape architects, ecologists and engineers to transform the site into a mixed-use development that incorporated themes of nature, culture and community.

The team established that the site's lack of connectivity to the surrounding city was symptomatic of a much larger interruption of flow in the greater watershed (Chodikoff, 2007). The team envisaged to "expose the place and allow for more porosity" (ibid.).

The park is divided into ten interpretive areas which correlate with the flows mapped on site. All 16 industrial buildings were reused for public functions, with the addition of one new building, The Centre for Green Cities, which houses offices for Evergreen as well as classrooms and workshops.

The Evergreen Brick Works successfully integrates the site into the surrounding context by aligning the project with the natural flux of the broader watershed, thereby dissolving the boundaries caused by the industrial activities which previously took place there. The introduction of a variety of season-based community projects, as well as offices and infrastructure for specific agencies, brings a broad range of the public to the site on a daily basis.

The Evergreen Bricks development team relied heavily on the potential set of public participation and creativity in order to establish a positive new relationship between the brickworks and the public. This has proved to be very successful, and the various daily social interactions that office workers and agencies provide have served the vitality of the site well.

Another potential set was the synergy of the interdisciplinary team members that were involved in the project. This allowed for many creative and appropriate solutions and interventions on the site.

Figure 4.5 \_ Historic photograph of the Don Valley Brick Works (source: Don River Valley Historical Mapping Project, 2013).

Figure 4.6 \_ Photocollage of the public interior (source: Building Knowledge and Community, 2011).



### 4.3 URBAN APPROACH

Era Brick Works is located to the east of Pretoria on a site wedged between the Moretele River and the Rietspruit. The Tshwane Regional Spatial Development Framework recognizes Eersterust as a local node that forms part of the group of areas that can benefit greatly from new industrial mixed-use areas (Tshwane Development Framework, 2011:51). The framework aims to stimulate new development around the new Eersterust Station that will create employment opportunities for local entrepreneurs while increasing purchasing power in the area.

The strategic location of the New Eersterust station will trigger the effect of agglomeration economies and optimisation of the comparative advantage of the area (Tshwane Municipality, 2011:51).

The vision for the Era Regional Park proposes a north-south bus or tram service that operates between the station and the Eersterust shopping mall with stops at several intervals, including the brick factory. This service will also allow for more commuters to gain access to the stadium fairly easily on foot.

The remainder of the brick factory site is imagined to become a regional park which can either be accessed via the tram or bus line, on foot via two pedestrian entrances, or with a vehicle from both Stormvoël Road to the south and Hans Coverdale Road to the east. The aim of the park is to reintroduce ecological and social value to the industrial heritage site, so that the relationship between people, industry and ecology can be represented. The vision of the design interventions on the site is to make this relationship apparent.

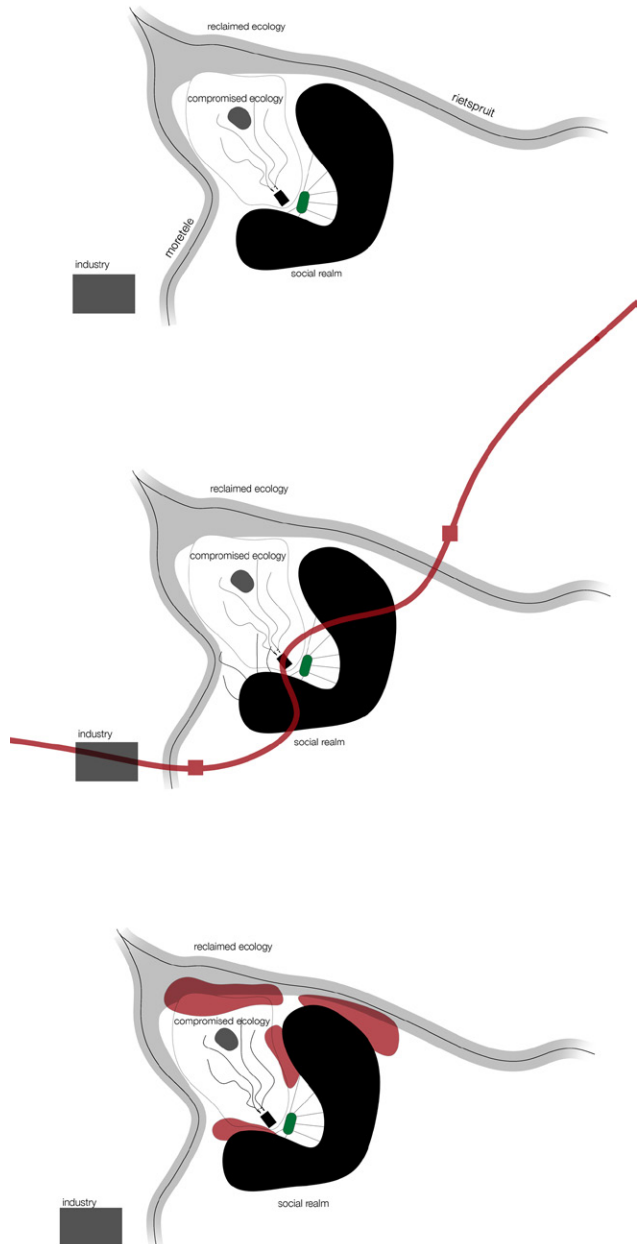
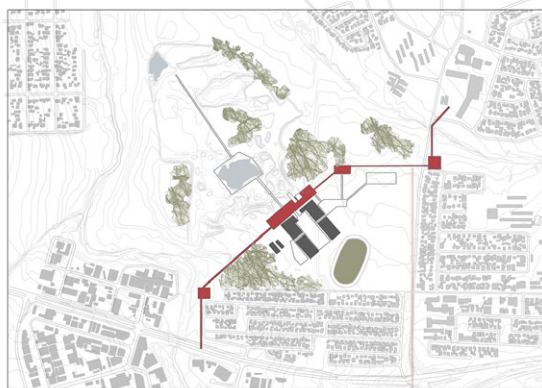


Figure 4.3.1\_Abtract sequence of events at the Era Brick Works (Eersterust Urban Vision Group, 2013).



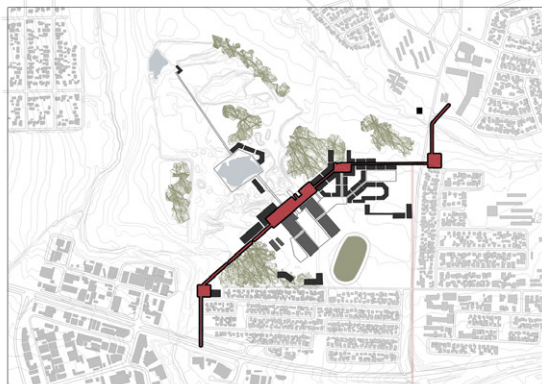
current site plan

The Era Bricks factory site is comprised of a series of existing social, ecological and industrial functions. These include the rivers that form the site boundaries, the soccer stadium to the south-east and four steel sheds. The large space between the southern sheds forms the core of the site, and is proposed to become a new public square. The square would not only serve as spill-out space for the stadium but would act as an independent recreational gathering space. The existing stadium will be upgraded into a sports precinct with practice soccer fields, netball courts, indoor training facilities and a skateboard area. Both the sport precinct and the social square will be accessed via a pedestrian Champion Walk.



anchors reconnect site

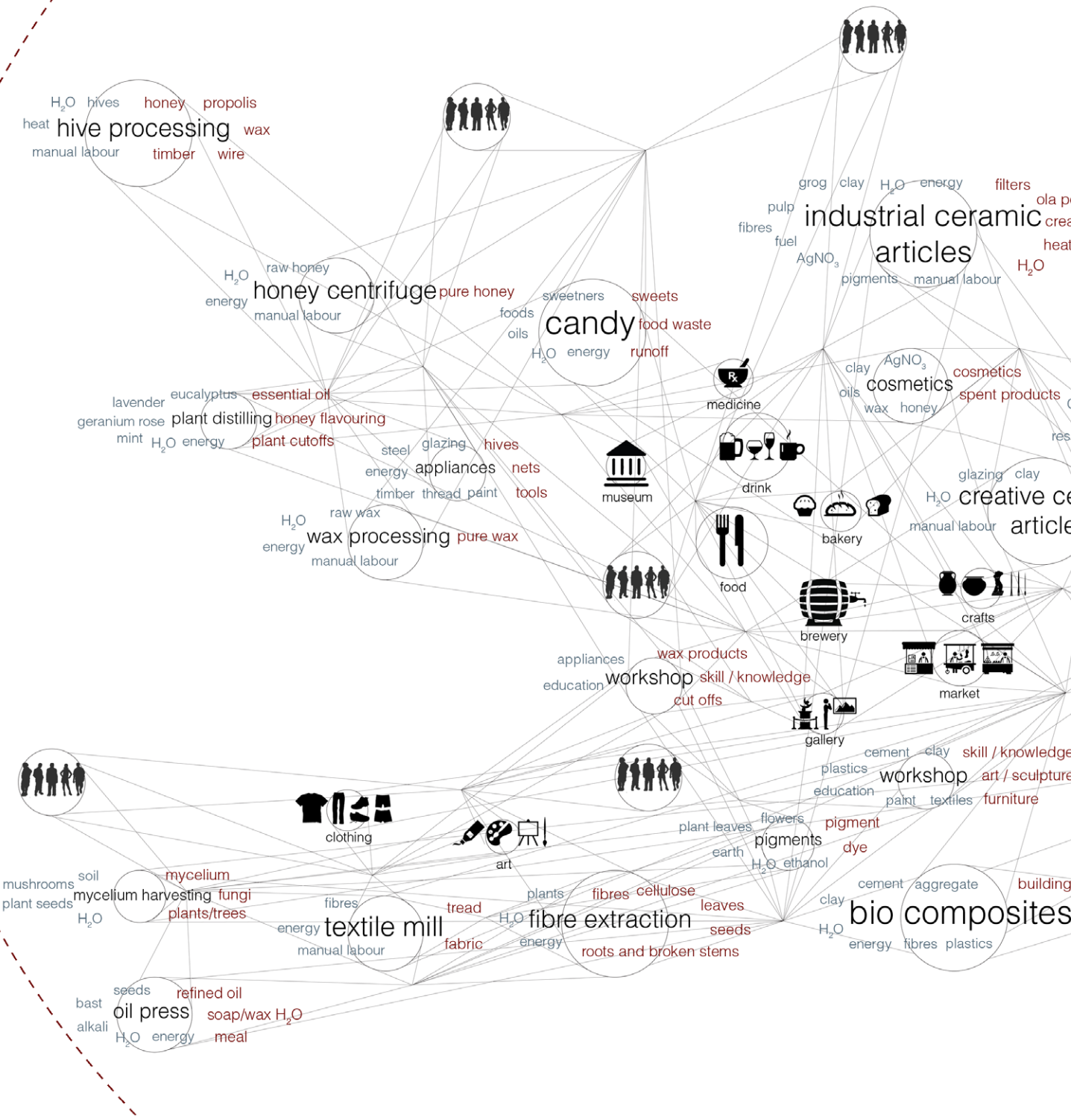
The square is to be further integrated into the surrounding suburban fabric by a new pedestrian and vehicular route, Filander Avenue, the existing entrance service route, will move through all the existing and new site functions and new development will only be allowed south of this route. The entire site north of Filander Avenue will form part of the park landscape. Currently Filander Avenue is a dirt road with brick paving along stretches that carry heavy traffic. The proposal retains the paved areas of Filander Avenue, but changes to tar and dirt depending through which site function it is going.



imagined growth

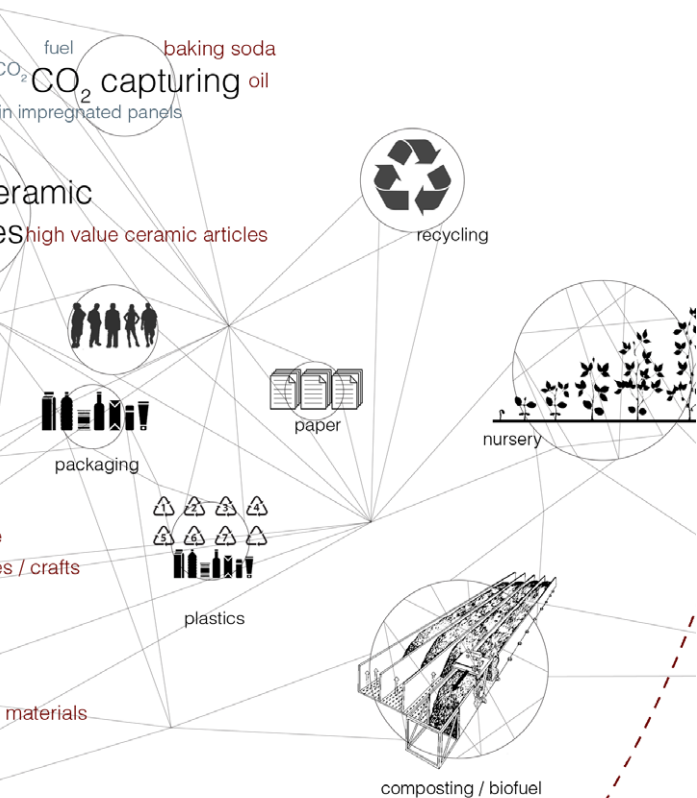
Filander Avenue is proposed to extend to Stormvoël Road to the south and Hans Coverdale West Road to the east, and also serves as a service road to and from the site. Imagined development of the site remains restricted to the southern edge of the meandering route in order to allow for the ecological diversification and regeneration of the landscape to the north of the road. Several bicycle and hiking routes connect the landscape north of the meander to Era Square but provide opportunities for privacy and and to enjoy the natural beauty of the two rivers and the wetland.

Figure 4.3.2\_Imagined development along Filander Avenue (Eersterust Urban vision Group, 2013).





ots  
ative ceramics



## 4.4 INDUSTRIAL ECOLOGY

The programmatic intentions for Era Regional Park stem from the potential sets identified on the site. The potential of the site to act as a filter is broadly interpreted as the filter of not only water, but also people, raw materials and energy. The stadium provides enough pulling capacity for the precinct to become a socially active and interactive filtering space.

The potential set of revolution and evolution can be harnessed by the adaptation of the existing industrial infrastructure to accommodate new social functions that might change and evolve over time. The memory and imagination of the site will enable people who lived alongside the factory to constantly imagine the site in terms of its adaptive potential, while remembering what was there before.

In order to accommodate constant industrial and social evolution on the site, all of the proposed interventions have to form part of a closed industrial ecology that makes use of the existing processes, knowledge systems and latent potential on site. A closed ecology, where the waste of one process could become the input product of another process, was carefully considered. Three main programmes proposed by the Era Regional Park vision support several smaller sub-programmes, which in turn generate resources for each other.

### 4.4.1 Era Fibre And Fabrics

A fibre-processing facility is located in the two western sheds. It provides spaces for the cultivation of plant species native to the area. Its public edges become a nursery and arboretum where people from the area can buy indigenous flora for their gardens. Exotic species are removed from the site and processed into products like paints, oils and fabrics. These products are also available to the public for purchase.

### 4.4.2. Era Apiary

The apiary establishes and promotes the activity of bees in the park. It provides spaces for interaction with the practice of beekeeping. The eucalyptus groves on site form an integral part of this programme, and emphasize the urban aims of retaining the functioning ecological and industrial elements of the site.

Figure 4.4.1 \_Industrial Ecology imagined at Era Regional Park (Eersterust Urban Vision Group, 2013).



### 4.4.3. New Era Ceramics

New Era Ceramics is a production facility where existing clay reserves on site are used to produce specific ceramic products. The facility filters water in the dams on site, mixes the sediment with paper pulp and creates high-value ceramic products from the resultant clay.

The Era Brick Museum forms part of New Era Ceramics and is located in both the eastern sheds.

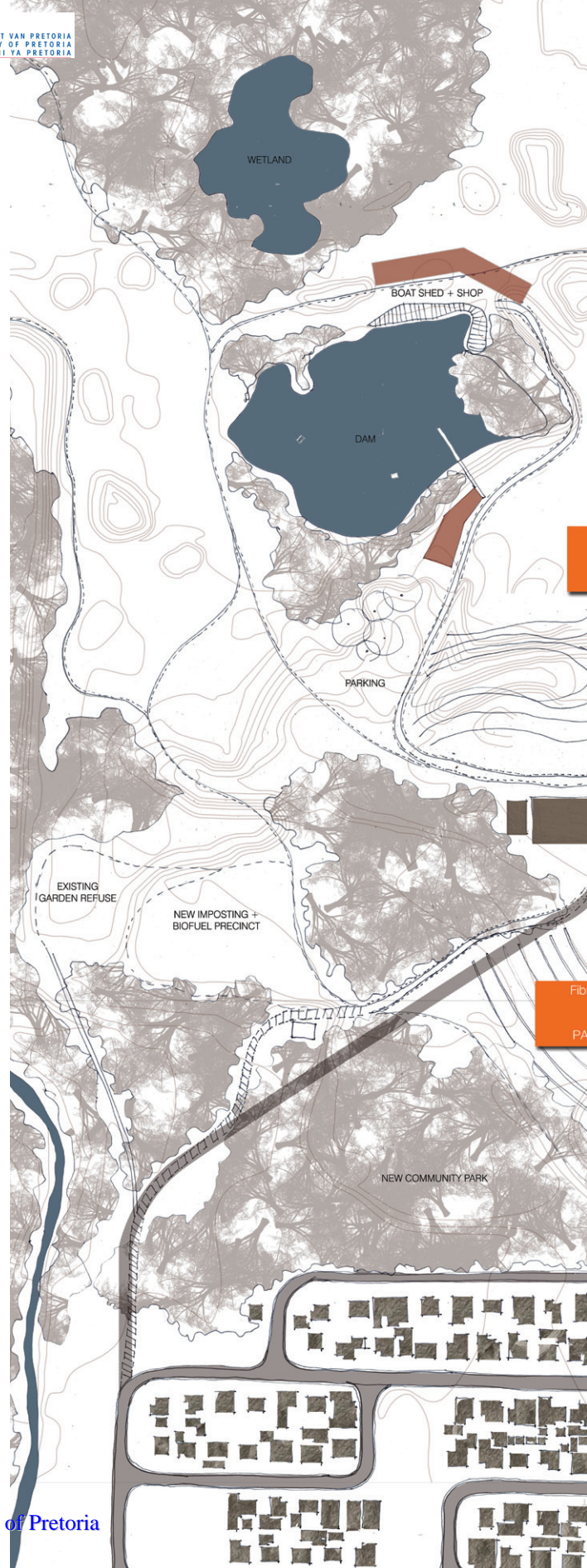
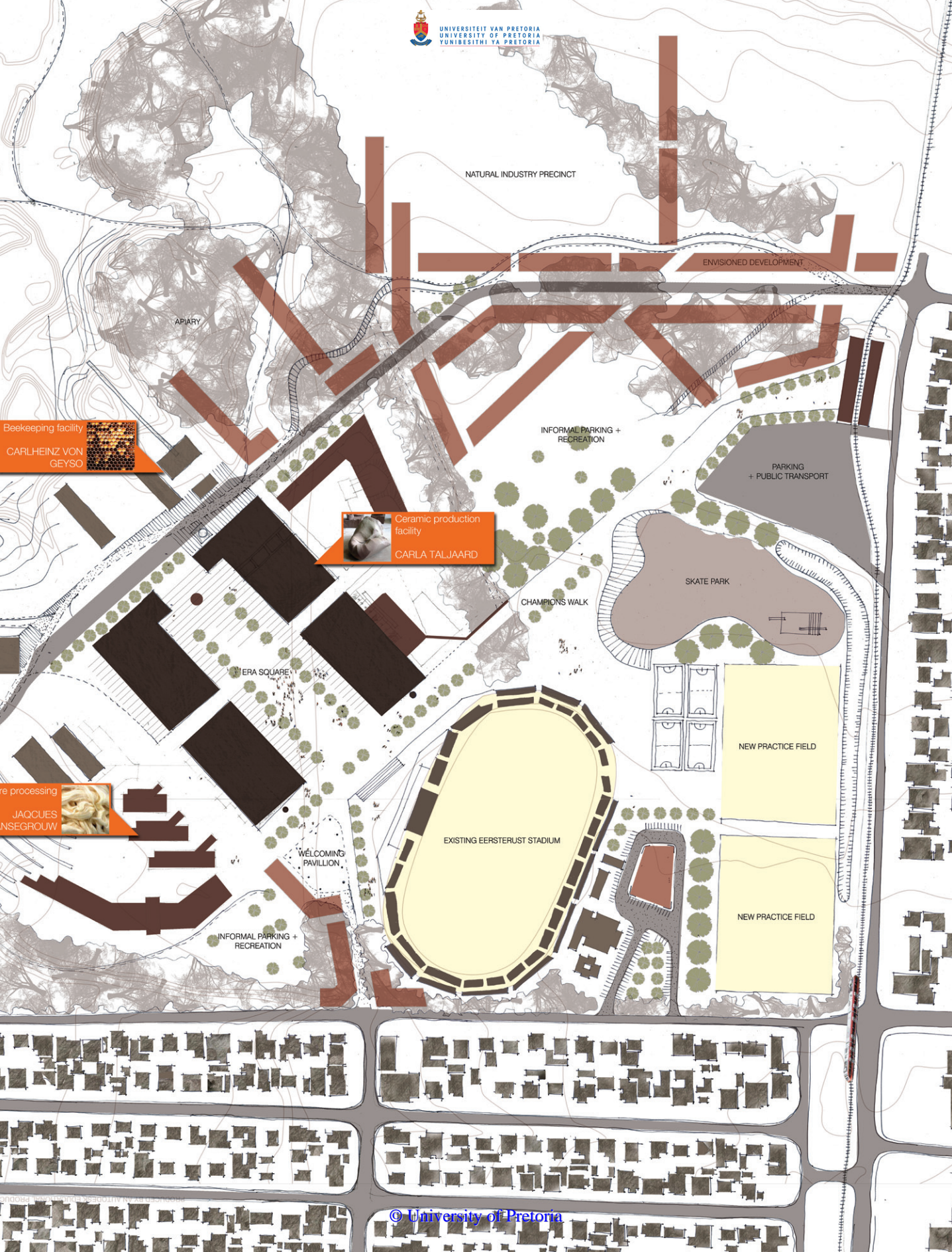


Figure 4.4.2\_Location of proposed industries in relation to existing industrial fabric (Eersterust Urban Vision Group, 2013).





APIARY

NATURAL INDUSTRY PRECINCT

ENVISIONED DEVELOPMENT

Beekeeping facility  
CARLHEINZ VON GEYSO

Ceramic production facility  
CARLA TALJAARD

INFORMAL PARKING + RECREATION

PARKING + PUBLIC TRANSPORT

SKATE PARK

CHAMPIONS WALK

ERA SQUARE

NEW PRACTICE FIELD

Cheese processing  
JACQUES INSENGROUW

EXISTING EERSTERUST STADIUM

NEW PRACTICE FIELD

WELCOMING PAVILLION

INFORMAL PARKING + RECREATION





Figure 4.4.3\_Rendering of proposed Era Square (Eersterust Urban Vision Group, 2013).





# CHAPTER 5

## PROJECT ANALYSIS AND INTENTIONS

### SUMMARY

This chapter describes the intentions of the New Era Ceramics building within the context of the existing landscape, built fabric and proposed urban approach. It analyzes the specific site conditions from the perspective of the Nizhny Tagil Charter for Industrial Heritage (2003) and the TICCIH Principles for the Conservation of Industrial Heritage Sites, Structures, Areas and Landscapes (The Dublin Principles, 2011). These documents assist the understanding of both the heritage value of the extant built form and the qualitative memories of the factory workers and their families.

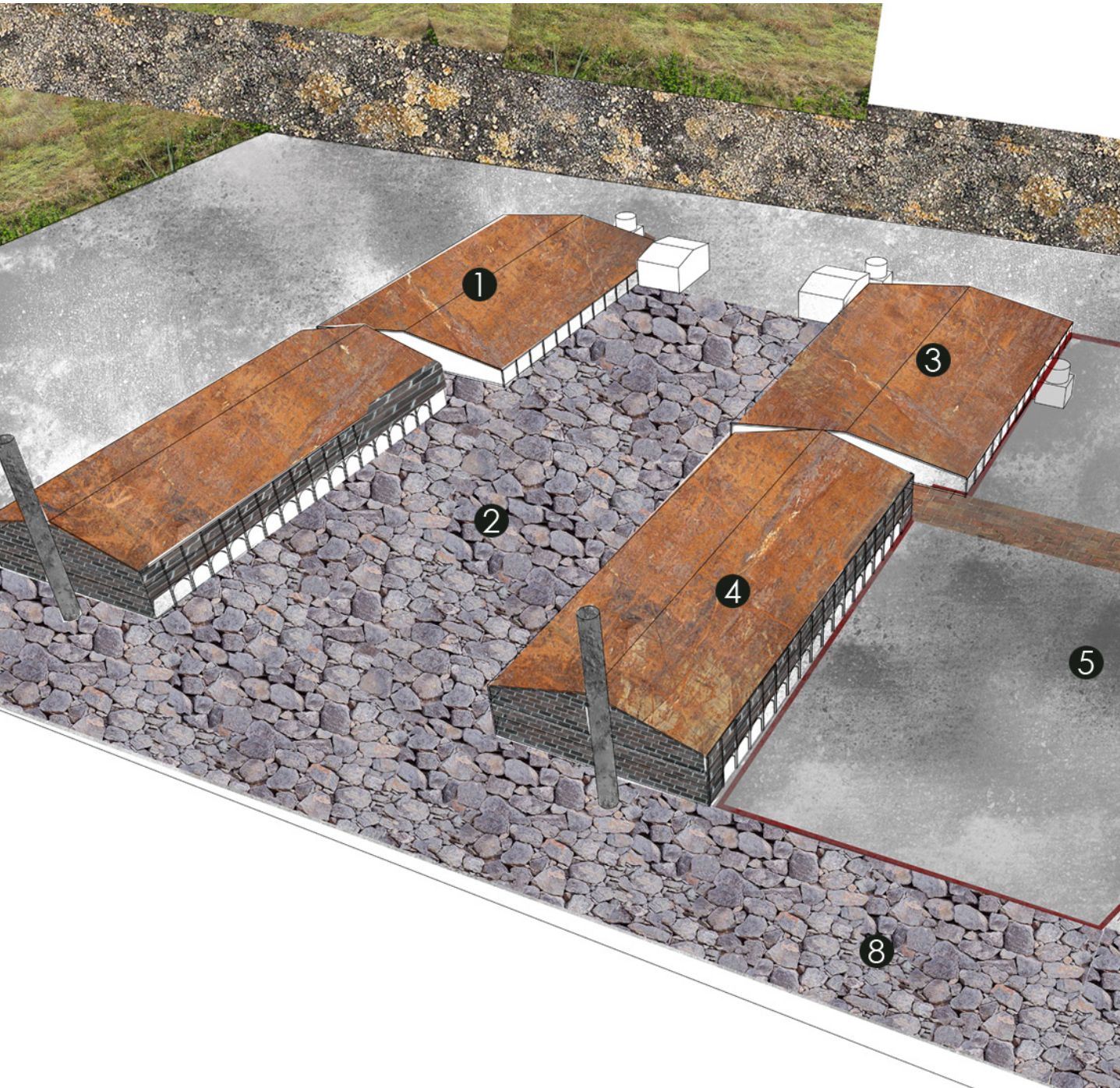
The main design drivers for the project are then introduced within the theoretical and contextual framework discussed in previous chapters, and with specific reference to the identified potential sets on site. The main design drivers are *industrial context and process*, *value of extant fabric* and *spatial intentions*. These are described with the aid of specific precedents that relate to the contextual, programmatic, spatial or heritage conditions that the design project is attempting to address. From these drivers, architectural intentions are formulated and illustrated.

The chapter concludes by synthesizing the project intentions into a conceptual idea. The concept is embedded in the *relationship* between the design drivers and the proposed public functions.

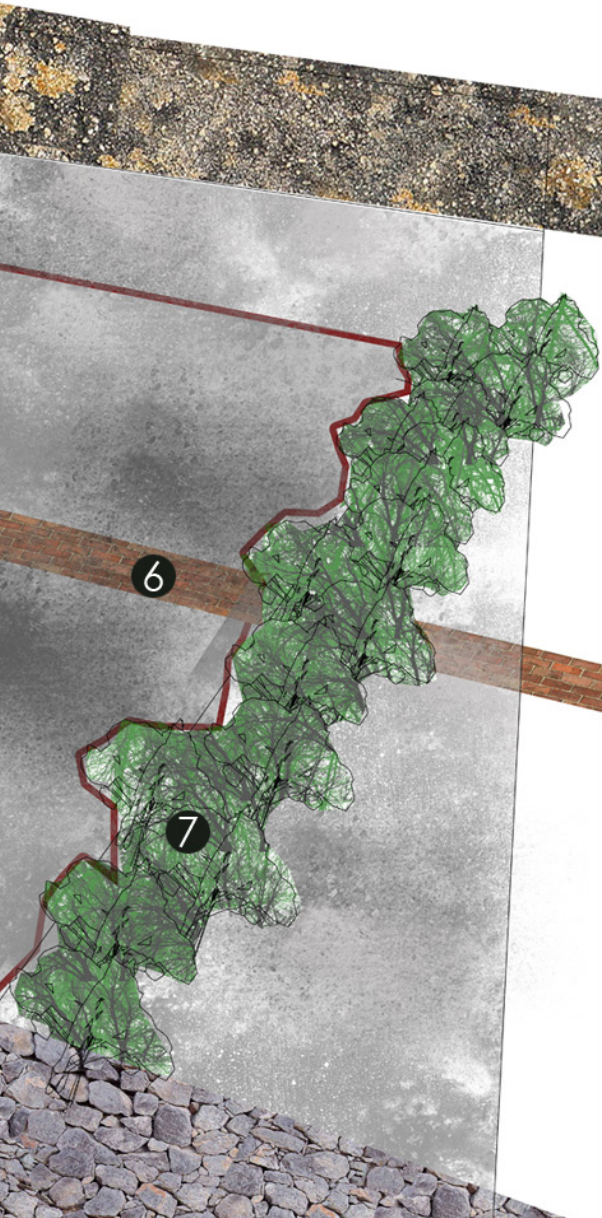
The concept is neither a result of the design drivers nor a precursor for identifying them. It is merely a conclusion drawn from observing the architectural issue within the theoretical and contextual framework.

Figure 5.0 \_ Early conceptual diagram of contextual informants (Author, 2013).









## 5.1 THE LOCATION OF THE PROJECT SITE

The specific site is located to the east of the factory core that is closest to Eersterust and the existing sport stadium. Both the eastern brick drying shed and the eastern firing kiln building border the site to the west, and are situated between the site and the proposed Era Public Square. Although both sheds are relatively low in relation to their footprint, they make up two strong geometric forms. The shed profile has strong visual associations with industrial activity, and is the only part of the factory complex visible from the East.

A grove of eucalyptus trees that were planted in the 1950s obscures this view, edge off the east of the site and form an angled and intentional border towards the north. The northern edge of the site currently borders on the main service road of the factory, where the new Park Meander is proposed. The Park Meander will connect the entire site to Stormvoël Road to the south and Hans Coverdale Road to the east.

A 10m wide service route passes between the two sheds. This will become a pedestrian route that enters the square from the east, as well as the main entrance into and threshold on the square from Eersterust and the proposed sports centre.

The south of the site is bordered by the Champion Walk that starts at the proposed Eersterust bus stop and stretches all along the southern border of the park to the stadium.

- ① FIRST BRICK FACTORY (DECOMMISSIONED)
- ② PROPOSED SOCIAL AND RETAIL SQUARE
- ④ FIRING KILN BUILDING
- ③ DRYING SHED
- ⑤ PROPOSED ERA CERAMICS SITE
- ⑥ PEDESTRIAN ACCESS TO SQUARE
- ⑦ EUCALYPTUS GROVE
- ⑧ PROPOSED CHAMPION WALK

Figure 5.1 \_ Location of site within existing industrial fabric (Author, 2013).

## 5.2 HERITAGE ANALYSIS OF EXISTING BUILDINGS

According to the Nizhny Tagil Charter for Industrial Heritage (2003), industrial heritage denotes the “remains of industrial culture, which are of historical, technological, social, architectural or scientific value” (ICOMOS, 2003:1). The charter maintains that the value of industrial heritage is intrinsic to the site, and that such sites should be available for public exploration (ibid. p.2). The charter recognizes that the sympathetic re-use of structures is an acceptable means of ensuring the sustained survival of significant sites (ibid. p.3).

The four sheds on the New Era Ceramics site represent the formal heritage value of the site, and contain old machinery and technological inventions for the brick-making process. The formal value of the sheds lie in their strong geometry and presence, and the built fabric of their interiors.

The functional value of the sheds lie in their flexible structures and their ability to accommodate a variety of different industrial and social programmes. The structures also have the ability to evoke memories of the previous industrial functions. The heritage analysis focuses on the two sheds that form the Western edge of the New Era Ceramics site.

### Heritage Value Of The Kiln Building

The brick arches of the kiln building are an important part of the brick making process. Their place in the process involves most of the workers on site, and the biggest part

of the planning and activity on site revolves around the movement of bricks into and out of the firing kilns. The kiln building is the only building that can be seen from Hans Coverdale Street in Eersterust, and its chimney forms an important addition to the western skyline of Eersterust.

The kiln building consists of 34 brick firing kilns, 15m deep and 17m to each long edge. The kilns meet a thick brick wall along the middle of the building and function back-to-back, towards the eastern and western exterior (see Figure 5.2.4 below). The firing process is the most controlled and precise of all the brick-making processes and involves the use of fire as a natural element to harden clay into cultural objects. The process thus includes social and natural elements within the industrial process. The repetition of the brick arches is important in terms of material use and contribution to the building façade. The arches create an internal human scale and are therefore retained as proposed shops and restaurants that live out onto the square. The first 3m of every kiln are kept intact so as to enable the eastern and western façades of the kilns to be read as a collective stack. The walls between the columns that support the arches deeper into the kiln are removed to create spatial diversity and to accommodate the new programmes.

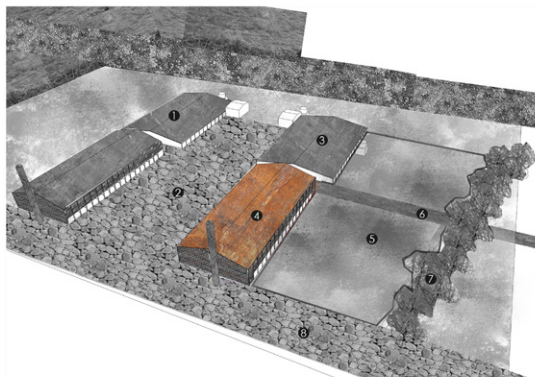
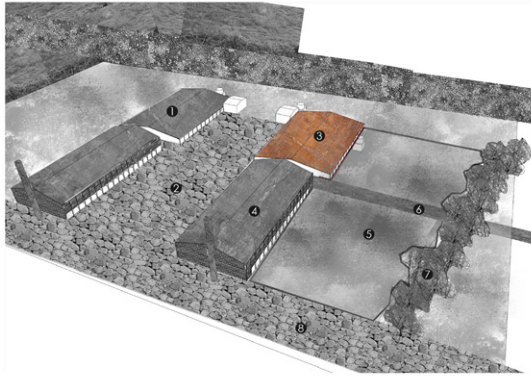


Figure 5.2.1\_ Location of Firing Kiln Building (Author, 2013).

Figure 5.2.2\_ Photograph of kiln stacks that contribute to the façade (Ingmar Büchner, 2013).



## Heritage Value Of The Drying Shed Building



units will fit onto the existing rails and will resemble the brick stacks on rails that used to occupy the space.

Elements of the entire production cycle will be retained and exhibited. The exhibitions are not limited to the museum, but scattered throughout the entire precinct in order to be seen not only by visitors to the museum, but also by members of the public visiting the precinct for other purposes.

The area north of the drying chamber will become a multipurpose function hall where members of the Eersterust community can organize and hold their own private functions or community related events, like the Miss Eersterust pageant that currently takes place in a parking lot.

The drying shed is a lower but broader shed where stacks of bricks were pushed through an air chamber in order to sufficiently dry before the firing process. The floor has steel rails all along the north-south axis of the shed and must be retained. Clay mixing and extruding took place in the northernmost part of the shed, with an addition to the west to elongate the processing space. This northern box is the only part of the shed constructed of brick and not steel, and industrial windows on the northern façade create direct and specific lighting conditions in the interior.

Apart from the tangible heritage aspects inherent in the processes, systems, machinery and buildings on site, intangible heritage is also an important aspect, and is defined by the TICCIH Principles for the Conservation of Industrial Heritage Sites, Structures, Areas and Landscapes as “dimensions embodied in the skills, memories and social life of workers and their communities” (ICOMOS, 2011:1).

The value of the drying shed pertains to these memories of the workforce and the industrial process of making bricks. The skills and knowledge of the Era Bricks worker communities are retained in the form of a brick museum on the southern side of the drying chamber. New exhibition



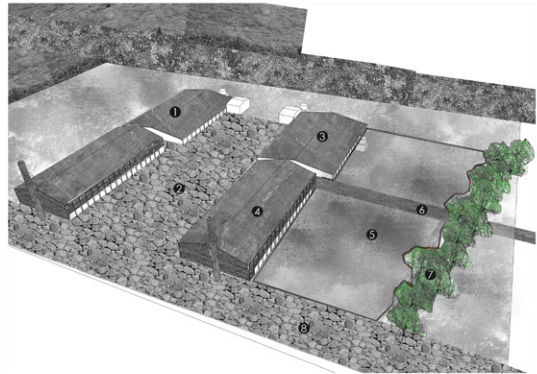
Figure 5.2.3\_ Location of Drying Shed (Author, 2013).

Figure 5.2.4\_ Light quality from northern windows of drying shed (Ingmar Büchner, 2013).





## Heritage Value Of The Eucalyptus Grove



The eucalyptus trees that border the site to the east were planted in the 1950s in order to trap dust and to function as a visual buffer between the site and its surroundings (Van Dijkhorst, 2013). The older trees are more than 60 years old and provide the site with another layer of historic content. Views of the factory from Eersterust have always been through these trees, and the grove has become a “soft” yet important edge. The area under and west of the eucalyptus grove was used for the storage of bricks before dispatch. The changing nature of these loose stereotomic modules of 1.1m x 1.1m are an important part of the formal heritage associated with the eucalyptus grove.



Although the eucalyptus trees are exotic, the grove should be retained as it functions as a habitat for many small animals and significantly contributes to cooler temperatures on site. The trees are effective dust traps, and are preferred by bees for the production of honey at the apiary. The leaves can also be pressed to extract oil for lubricating extrusion machinery during the ceramic process. The continuous reproduction of the trees should be inhibited and saplings removed, but the bigger trees can be retained and their position demarcated with new landscape elements.

Figure 5.2.5\_ Condition under Eucalyptus Grove (Author, 2013).

Figure 5.2.6\_ Eucalyptus Grove as seen from the Eersterust Stadium (Author, 2013).

Figure 5.2.7\_ Eucalyptus Grove with chimney in background (Author, 2013).



Figure 5.2.6\_ Brick-cutter during a break (Ingmar Büchner, 2013).

### Social Value of the two Existing Sheds

The reimagined social value of the current workforce and the industrial value of the two sheds form a substantial part of potential sets 2 (memory and imagination) and 3 (revolution and evolution). The collection of new programmes within and around the two sheds will contribute to the creation of new jobs and allow the current workforce to develop new skills. It would harness the potential in the memory of both the workforce and the public to imagine the sheds and their surrounds as positive and contributive.

## 5.3 CONTEXTUAL HERITAGE INTENTIONS

The design intervention is located within the existing sheds, with a north-eastern addition replacing stacks of bricks that used to stand on site awaiting collection. This addition aims to house larger industrial activities and to create a forecourt to the existing sheds and ultimately a threshold on Era Square.

### The Old Kiln Building

On the eastern side, three extant kilns at either end of the building are left as is to retain the integrity of the shed geometry of the kiln building all along the social access routes. These kilns retain their structural integrity and form, and form part of the new Brick Museum. From the eastern half of the shed, 11 kilns are to be removed and new batch firing kilns inserted into the void. The new kilns will be easily distinguishable from the existing in terms of form.

The restaurant space will wrap around the northern edge of the kiln building, guiding visitors between the two sheds and into Era Square. On the first floor, the existing conditions in the coal-casting chamber with “riki-tik” castors will be retained on the northern edge, above the northern kiln group. This part of the chamber will facilitate public engagement with the historic process in the form of a “riki-tik” exhibition.

### The Drying Shed

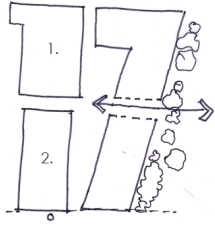
The existing drying chambers divide the space of the drying shed equally. The southern half is proposed to become a brick museum, with visual and physical access at both the eastern and western sides of the shed. New mobile exhibition units that run along the existing rails offer information about the history of the precinct, but can be moved along the rails to change the spatial arrangement of the centre. The northern half of the drying shed becomes a function venue with a private entrance on the north-eastern side. Here, members of the public can host private functions as well as community functions and events. The north box retains its industrial function, and the clay-refining process develops along the edge of the multifunctional and exploration centre in order to allow public and industrial functions to interact, the roof of the old drying shed is lifted up to indicate public entrances and allow for more natural light to enter the building.

### The Proposed Eastern Addition

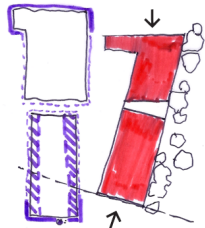
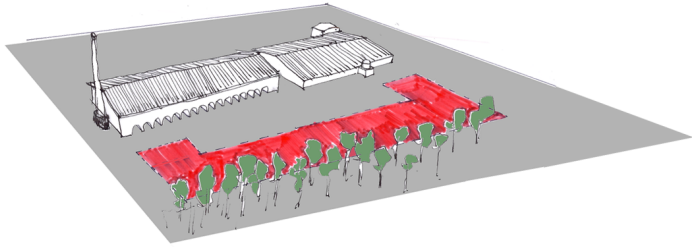
A proposed eastern addition will border the eucalyptus grove and will replace stacks of bricks that stood outside awaiting dispatch. It will provide an opportunity for integration with the softer planted border of the grove and a meeting of natural and industrial functions. The edge of the building will house smaller public functions that relate to the industrial function of the interior courtyard, and will provide public entrances to the east. These functions will include a timber workshop, studio space for ceramic creatives, and the training centre. The units will be sunk into the ground so as to provide a public thoroughfare and views along their edges, but also to buffer the public from the industrial activities taking place inside.

The proposed addition pulls back from the southern block around the chimney, so as to reveal the edge of the building in a new way and to provide a semi-private gathering space around the chimney. The eastern addition is bisected by the public walkway and opens itself up to the public with entrances to a gallery and working museum exhibition on either side. The wing’s programme changes from industrial in the north to social in the south.

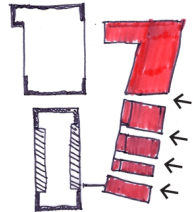
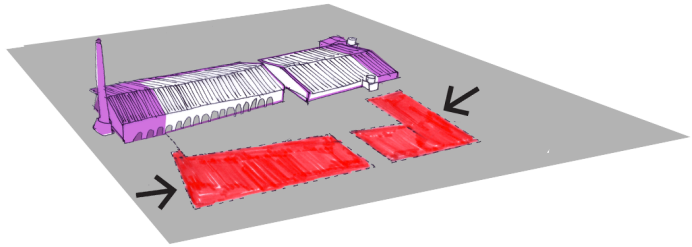
*Figure 5.3.1 \_ Diagrammatical explanation of heritage implications (Author, 2013).*



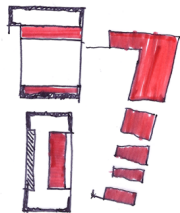
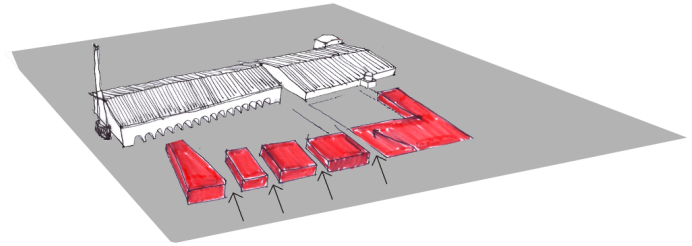
EXTANT FABRIC & PROPOSED BUILDING FOOTPRINT WITH INTERNALIZED INDUSTRIAL COURTYARD



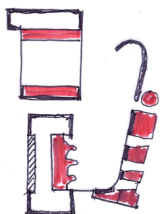
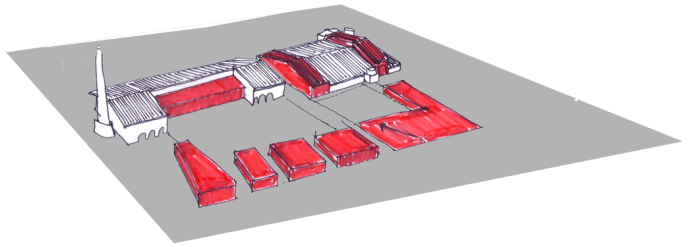
ALLOWING VIEWS OF INDUSTRIAL GEOMETRY



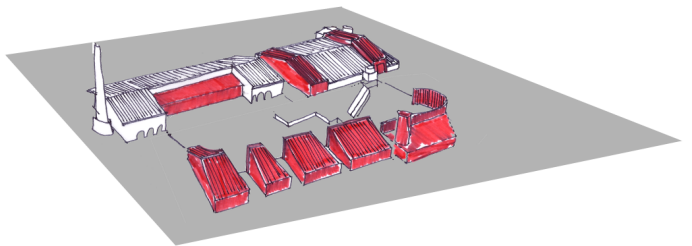
CREATING SPECIFIC VIEWS



CHANGES TO EXTANT FABRIC DO NOT SUBTRACT FROM GEOMETRY

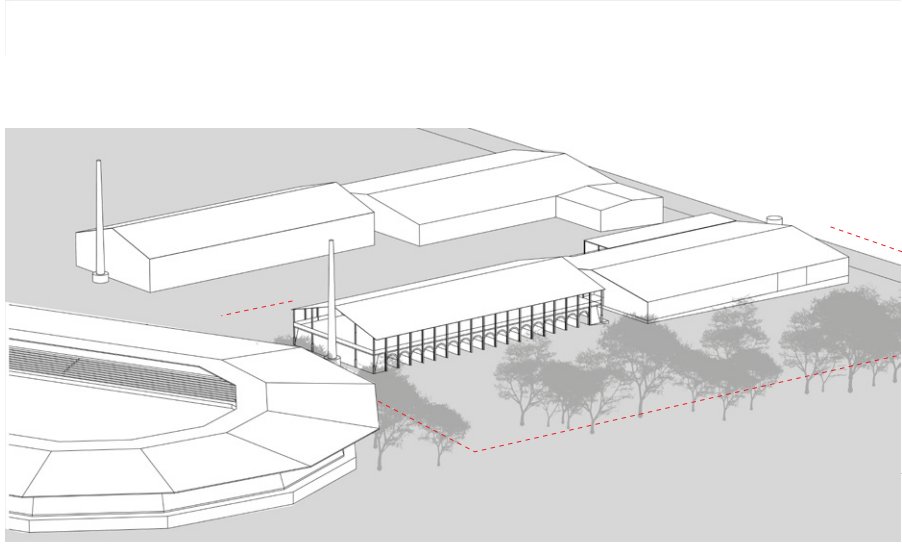
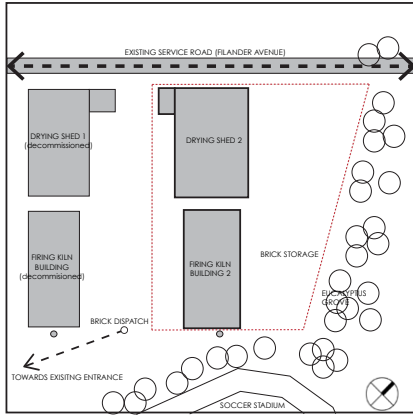


COURTYARD WALL BECOMES A FEATURE

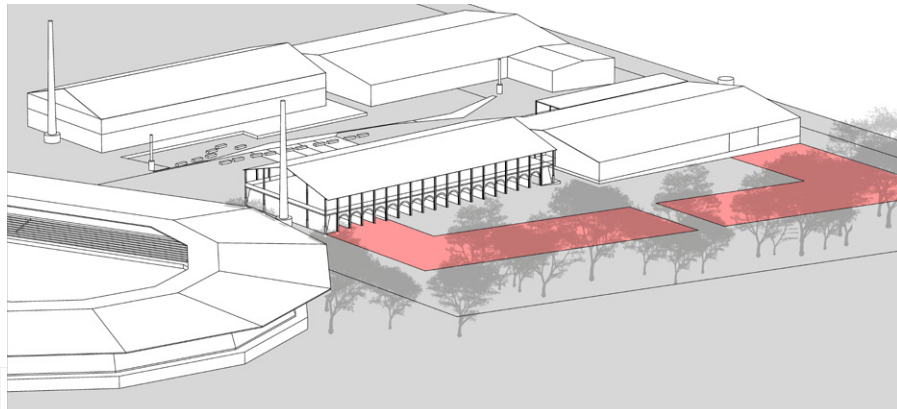
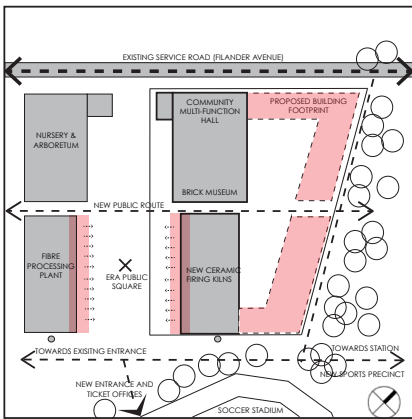




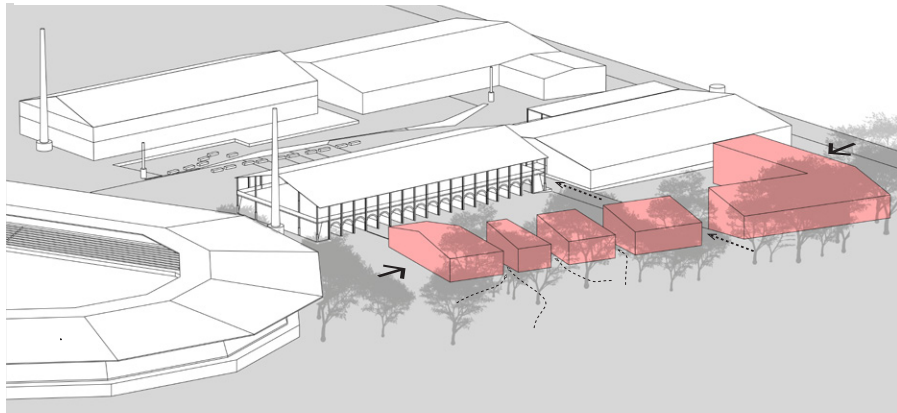
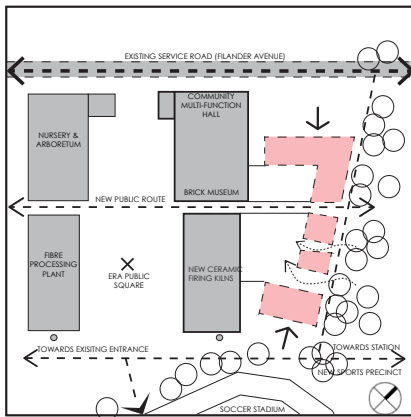
### EXISTING CONDITIONS



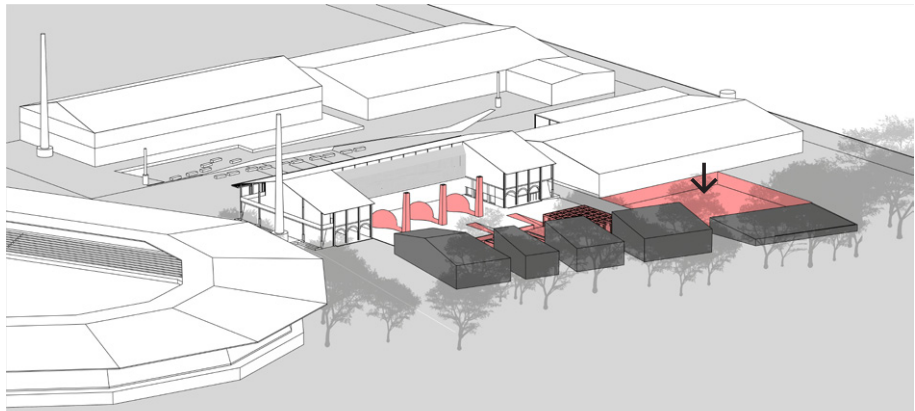
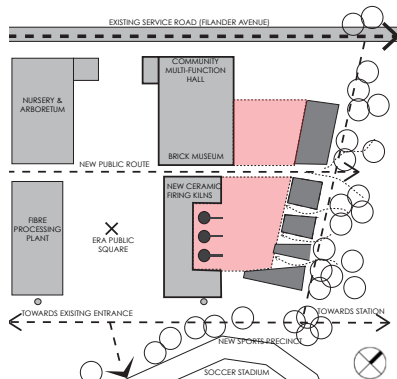
### PROPOSED PROGRAMMES AFTER DECOMMISSION



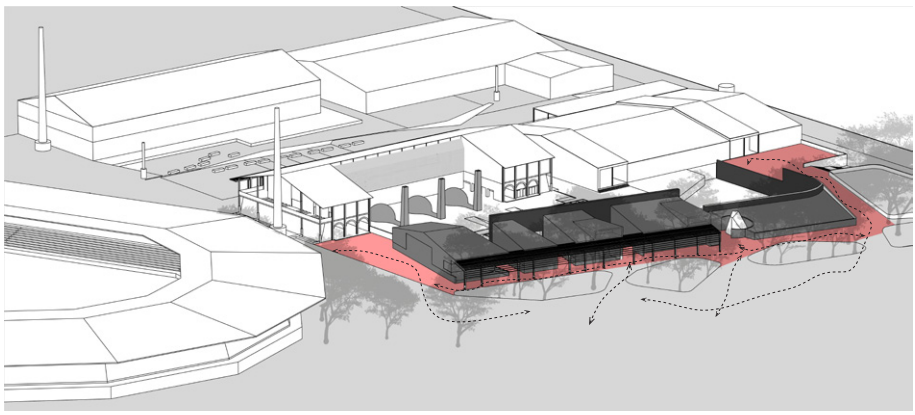
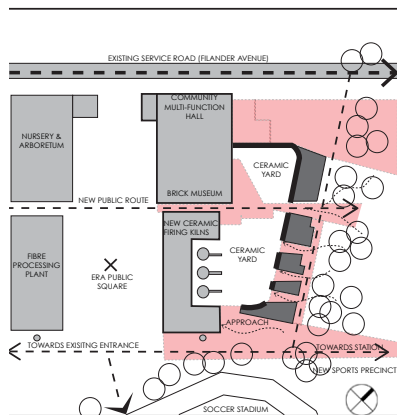
### BUILDING FOOTPRINT DEVELOPMENT



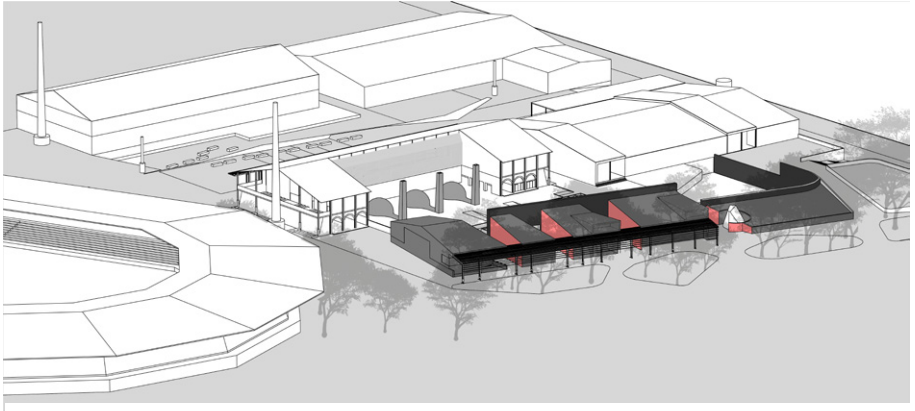
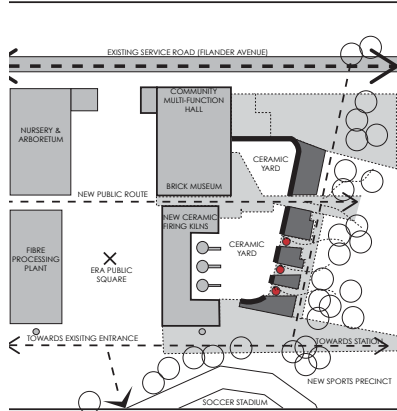
### CCOMODATING INDUSTRIAL CTIVITY



### UBLIC ENGAGEMENT , ACCESS AND SAFETY



### SOCIAL-INDUSTRIAL SPACES OF CO-EXISTENCE



## 5.4 CONTEXTUAL PRECEDENTS

### Enzo Ferrari Museum, Modena, Italy, Future Systems and Shiro Studio (2004-2012)

In 2004 the architecture firm Future Systems, under the guidance of Jan Kaplický, won a competition with its design for an Automotive Museum on the same site as the two-storey house and workshop that Enzo Ferrari's father built in the 1830s ([www.archdaily.com](http://www.archdaily.com)).

The new museum creates a sensitive dialogue with the existing workshop, and immediately reveals its interior content to the existing building. The museum curves around the existing workshop as an appreciative gesture, and creates a new tension with the old. Care was taken to present the ensemble of buildings as a “unified complex made up of several elements” ([www.archdaily.com](http://www.archdaily.com)). The project was chosen as a precedent because it deals with the existing geometry of an industrial building with great sensitivity. The new museum rises only to the same height as the existing building, and although much bigger in footprint, never overpowers the existing.

The existing workshop was completely refurbished and later additions to it were removed. A contemporary exhibition structure now inhabits the previous double-volume workshop.

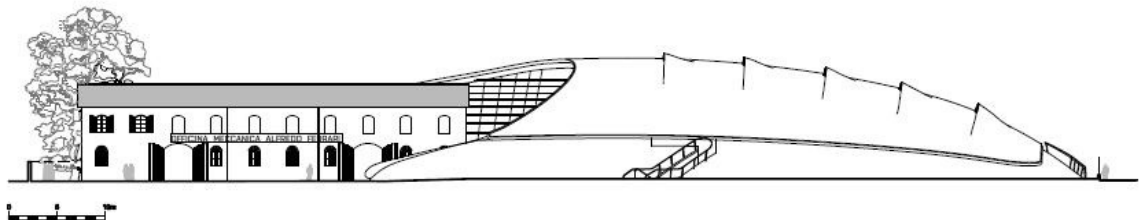
A similar curved element is envisaged for the eastern addition to New Era Ceramics, where the new building will create a positive tension with the two existing sheds, without overpowering them in terms of complexity or materiality. It is important that views of the southern point of the firing kiln remain uninterrupted and, if possible, accentuated.



Figure 5.4.1\_ Aerial photograph of the existing and new buildings (source: [www.archdaily.com](http://www.archdaily.com), 2013).

Figure 5.4.2\_ Ground Floor Plan (source: [www.archdaily.com](http://www.archdaily.com), 2013).

Figure 5.4.3\_ Elevation (source: [www.archdaily.com](http://www.archdaily.com), 2013).







The Cyclops, Twelve Soundbarrier Houses, Diependaal, The Netherlands, VHP s+a+l/ NIO architecten (1997-2001)

The Cyclops is a housing development that makes use of a soundproof embankment along a secondary road forming one of its edges. The houses effectively reduce the noise levels generated by the road and have become catalytic in the development of Diependaal's broader urban design framework (Thiry, 2002:70).

By cantilevering living rooms away from the embankment, light is drawn into the back of the buildings facing the embankment (Architectural Record, 2013). The building effectively makes use of an edge as the main design driver of the project. The 7m cantilevers produce opportunities underneath for activities that do not necessarily require interior spaces. The building is seamlessly integrated into both levels.



Together with the level change, the idea of digging into the ground and excavating parts of it for certain industrial activities is introduced. The eastern addition to New Era Ceramics will also be sunken to provide the necessary height to encourage water movement and to imply the activity of excavating for clay. The addition will need to combine both levels and be activated on both sides.

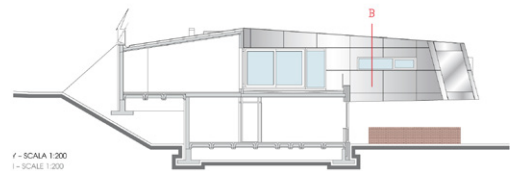


Figure 5.3.4\_ Photograph of The Cyclops towards the motorway (source: www.archdaily.com, 2013).

Figure 5.3.4\_ Internal habitable spaces (source: www.archdaily.com, 2013).

Figure 5.3.4\_ Cross-section (source: www.archdaily.com, 2013).









## 5.5 PROGRAMMATIC INTENTIONS

The programmatic intention of the design project is to facilitate the industrial process of making ceramic products. This process includes the reception of flocculated water from the existing dams and the processing of the resultant sludge into a workable clay mixture. This mixture is then extruded or formed on a wheel, dried, fired, soaked and tested, before being distributed to larger retail environments or to be sold on site.

Social spaces such as the museum, community hall and sports therapy centre are arranged around the production line in order to promote new public–industrial engagements. Where an industrial process and a social programme are situated next to each other, as is the case with the brick museum and clay conveyor belt, specific attention is given to acoustic treatment of the buffer without compromising on the visual linkages between the two programmes. Different views to and from the production line intend to firstly reconnect people with the value and purpose of their work, and secondly to reveal the unapparent relationships that exist between the industrial process and the social and ecological networks that support it. The production line opens up possibilities for new supporting industries to emerge, and attempts to facilitate the evolution of these small industries.

Two main products are to be produced at New Era Ceramics, namely ceramic water filters and olla irrigation pots. Both these products can easily be produced with medium quality clay, and the packaging and treatment of the pots can be subcontracted to community groups within the Eersterust area. The production line for these two products requires similar equipment, but can easily be adapted to the addition of new or alternative products.

*Figure 5.5\_ Surface of ground at Era Brick Works (Photograph by Jacques Pansegrauw, 2013).*



## 5.6 PROGRAMMATIC PRECEDENTS

### Elza van Dijk Pottery Studio, Lynnwood, Pretoria

Elza van Dijk founded her pottery studio in 2002, and has been an independent teacher and practitioner at her Lynnwood studios ever since. The studio produces most forms of baked earthenware and utilizes two gas-fired kilns for firing purposes (Van Dijk, 2013).

The studio consists of a long, narrow space, with the entrance at one narrow end and two firing kilns at the other end. The studio is arranged as a linear procession, from a public retail edge into a storage and display section that becomes the studio with workspaces and big open surfaces. From here one moves to the drying racks and the firing kilns.

The entire studio is well lit with natural light, and openings along the northern and southern ends promote good cross-ventilation. As at the Era Bricks factory, the products that await firing are used as spatial dividers and informants, as can be seen in the drying racks used to demarcate spaces for work, retail and administration in the studio. The firing process at the studio is detached from the main production space, and forms part of the service end of the building and not the communal or public part.

The firing kilns at New Era Ceramics will feature more prominently in the spatial arrangement, but the drying racks for pots can be used as spatial demarcations and guides. This arrangement will contribute to the constant flux of materials and energy evident on sites of production.

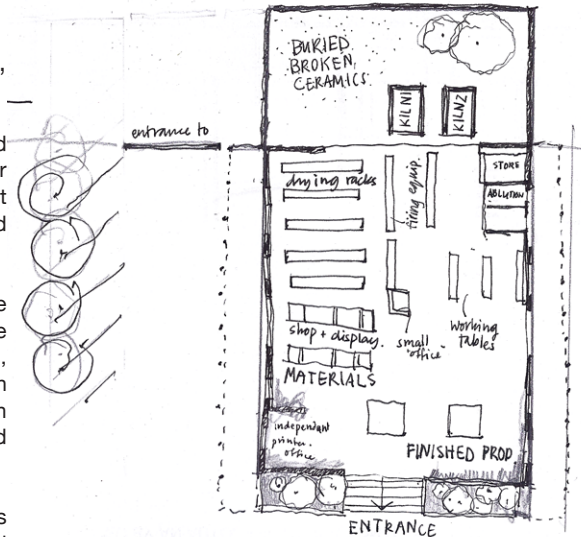


Figure 5.6.1 Interior spatial arrangement of the studio (Author, 2013).

Figure 5.6.2 Drying racks and firing equipment (Author, 2013).

Figure 5.6.3 Storage units used as spatial dividers (Author, 2013).



### Pure Home Water, Taha, Ghana, WaWa Projects (2007)

The Pure Home Water factory in northern Ghana is a small-scale production plant for ceramic water filters. The entire production line takes place in an open shed and its immediate surrounds. Clay is quarried and ground in an area outside the shed. The dry clay is transported into the shed using big plastic buckets. Employees mix the clay with water and grog and knead it into a workable consistency for creating blocks of a specific size in the shed (The WaWa Project, 2011).

The clay blocks are extruded on a jigger and packed on racks to dry out completely before being fired. A batch-firing kiln in the middle of the shed is used to fire the pots. After the firing process, pots are soaked in a concrete soaking pond, and then tested for porosity on steel testing beams.



The shed structure provides ample open space for the production line, with enough room for mounds of clay and movement of employees around it. The building structure consists of concrete blocks up to a level of 1.2m and is left open at the top for ventilation and lighting.

The potential for parts of the production process to form spatial elements will be investigated at New Era Ceramics. More importance will be given to the ritual involved in firing, soaking and testing the products, as these steps in the process make specific use of natural resources and processes.

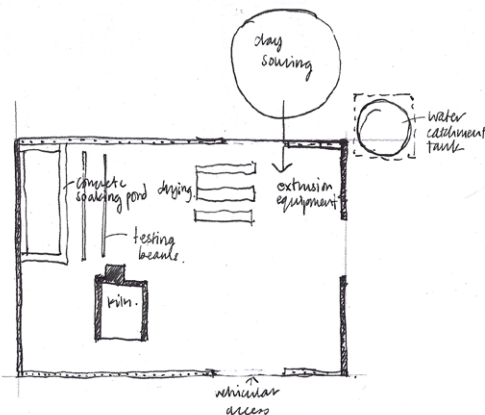


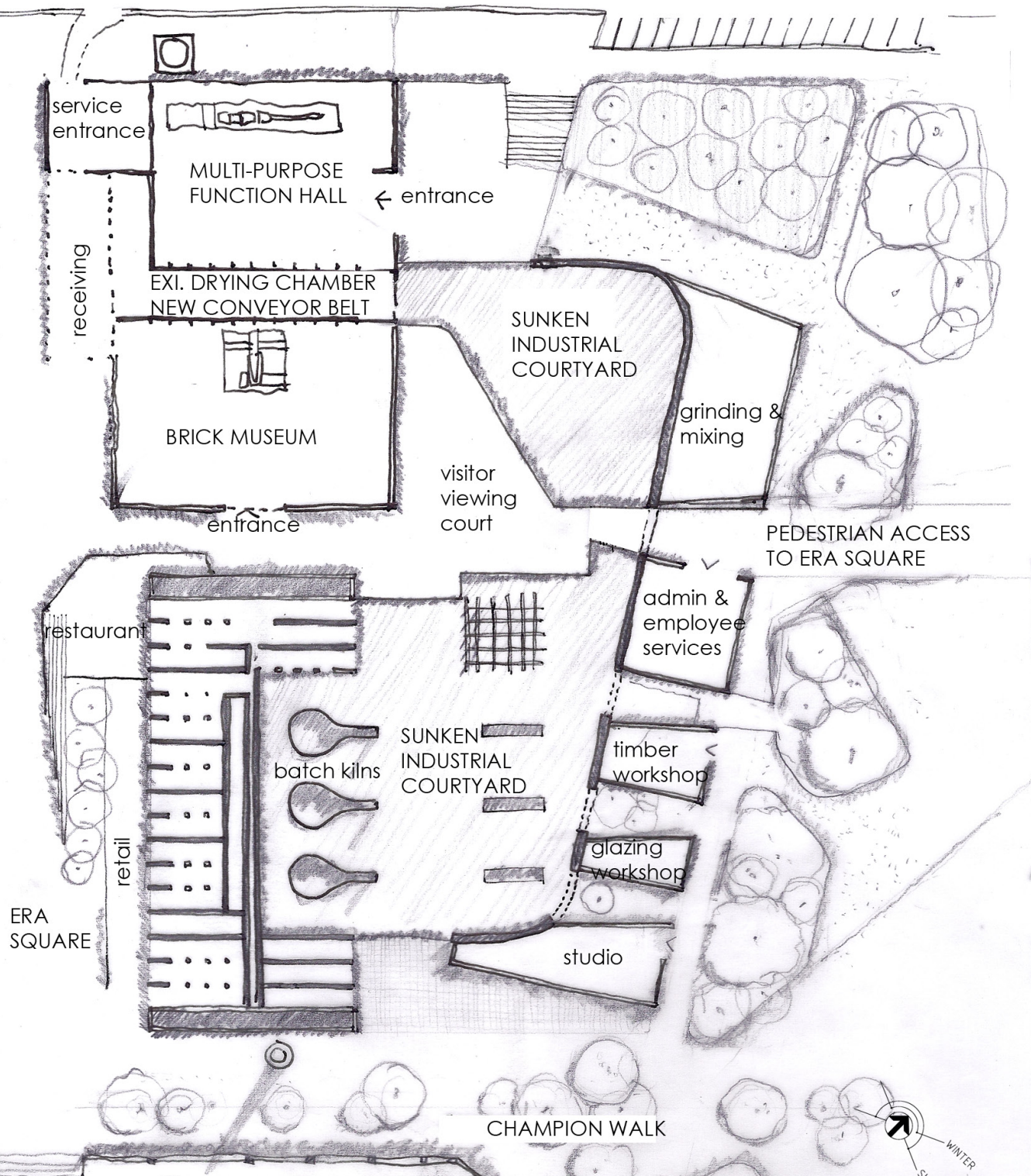
Figure 5.6.4\_ The Pure Home Water factory in context (source: [www.wawaproject.org](http://www.wawaproject.org)).

Figure 5.6.5\_ Interior arrangement of extruding, drying and firing spaces (source: [www.wawaproject.org](http://www.wawaproject.org)).

Figure 5.6.7\_ Plan of interior (Author, 2013).



FILANDER AVENUE



service entrance

MULTI-PURPOSE FUNCTION HALL

entrance

EXI. DRYING CHAMBER  
NEW CONVEYOR BELT

receiving

BRICK MUSEUM

entrance

SUNKEN INDUSTRIAL COURTYARD

visitor viewing court

grinding & mixing

PEDESTRIAN ACCESS TO ERA SQUARE

admin & employee services

restaurant

batch kilns

SUNKEN INDUSTRIAL COURTYARD

timber workshop

glazing workshop

studio

ERA SQUARE

retail

CHAMPION WALK

ERA SOCCER STADIUM





## 5.7 SPATIAL INTENTIONS

The spatial intentions of the design for New Era Ceramics are:

1. to establish a human scale within the two existing industrial sheds;
2. to create comfortable working environments for the employees of New Era Ceramics; and
3. to nurture an understanding of the relationship between industrial heritage and the public.

### Spatial requirements of and strategy for the drying shed

The drying shed will house three diverse programmes: a brick museum, a multi-functional community hall, and the processing conveyor belt for transporting clay to the souring yard. These three programmes can all be accommodated in the low shed, after specific interior alterations.

The reception area for raw products for the industrial process will be located on the north-western side of the drying shed, accessed from within the square. A service road that will allow for small trucks to pass each other will be accommodated, and the entire reception area will be closed off to the public. The conveyor belt will pass between the existing concrete columns that used to house the drying chamber. The conveyor belt will be sealed off on both sides to minimize noise and dust, but visual connections will be made with glazed infill panels between the concrete columns. The area around the conveyor belt will need good ventilation and natural light, with easy access along its entirety.

The proposed multi-purpose function hall will be located to the north of the drying chamber, The kitchen and administration office for the hall will be situated all along the side edges of the shed, to allow natural light and access to the existing water tank. Entry to the hall will be gained from the Park Meander to the north. A new ceiling will be fitted to deal with noise from the conveyor belt. The spatial requirements of the multi-purpose hall are listed in the table below.

The multifunctional hall will be fitted with a new ceiling that can absorb sound and create a more comfortable indoor environment required for social functions. The brick museum will be located to the south of the conveyor belt. Access to the museum will be gained from the

public walkway between the two sheds. A staircase in the museum will connect it to the old kiln building on 1st floor level.

### Spatial requirements of and strategy for firing kiln shed

The firing kiln shed is a two-story shed with existing firing kilns on the ground floor and a coal-casting chamber (Riki-Tik room) on the first floor. On ground floor level, the kilns that face the square will be turned into shops, with the specific spatial qualities of the brick arches kept intact. The kilns facing the east will be removed and converted into new batch-firing kilns. The difference in interior spatial conditions between the existing built fabric and the new intervention should be clearly visible and tangible, displaying different lighting conditions and material choices.

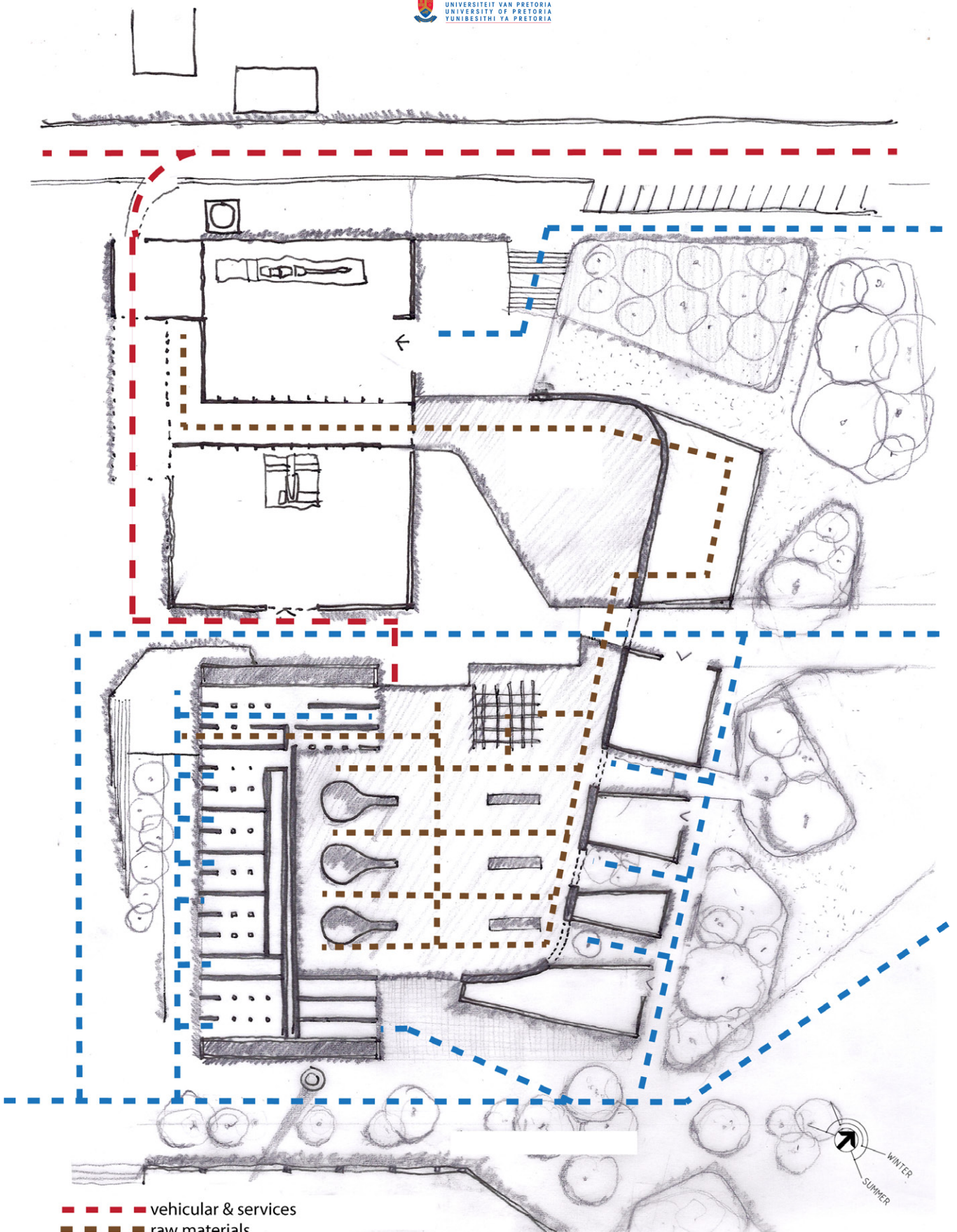
The first floor will become a hydrological sports-treatment facility, with exercising rooms and treatment rooms for sports injuries. The northern part of the kiln building facing the drying shed will become a Riki-Tik demonstration room, where the existing machinery and functions will be kept intact and in working condition for visitors to the museum to explore. The table below lists the spatial requirements of the kiln building.

### Spatial requirements of and strategy for eastern addition

The eastern addition becomes the threshold space between the industrial, ecological and public realms. The aim here is to dissolve the boundaries between these realms and to create visual and direct connections between the Eersterust public edge and the Era Bricks industrial edge.

The eastern addition will house the main industrial production line, from crushing, mixing and extruding up to firing, soaking, testing and distribution. The eastern addition also houses supportive industries like a timber-mould workshop and glazing studio.

The different supportive industries are housed in separate units that are bisected by strips of natural pockets that would allow the public views into the interior courtyard. These industries function independently from the main industrial production line, and can be accessed from both the ceramic yard and the public walkway to the east.



- vehicular & services
- raw materials
- public (pedestrian)

## 5.8. CIRCULATION

Circulation in the New Era Ceramics building exists on three different levels:

1. Public circulation is mainly pedestrian with specific entrances to public functions. The circulation routes allow for views of the industrial process throughout.
2. The private circulation refers to the employee circulation and moves along the eastern addition building.
3. Movement of raw material from receiving to crushing, formed, firing and finally dispatch.

The three circulation routes sometimes overlap and coincide in order to establish solutive spaces for the interaction between the public and the industrial process. The public circulation is not intended to be prescriptive, but to rather enable the safe exploration of the site in its historic and present condition. The public is allowed specific views from viewing balconies that sometimes offer direct access to the industrial processes.

Raw clay and sediment is received on the Eastern side of the old Drying Shed, sorted and sent to the clay souring yard in the ceramic courtyard. It is then crushed, mixed extruded and formed in the clay workshop, before being transported to the drying platforms. On the drying platform, it is tested before and after the firing process.

One of the public access paths to Era Square goes through this process via the yard bridge. From the yard bridge, the public has views of all the processes in the courtyard from a safe distance.

## 5.9 CONCLUSION

A synthesis of the intentions of the project leads to the conceptual development of the intervention.

If the building is to provide the spaces of hybrid public–industrial–ecological engagement envisioned in the intentions, the conceptual development must embody this vision.

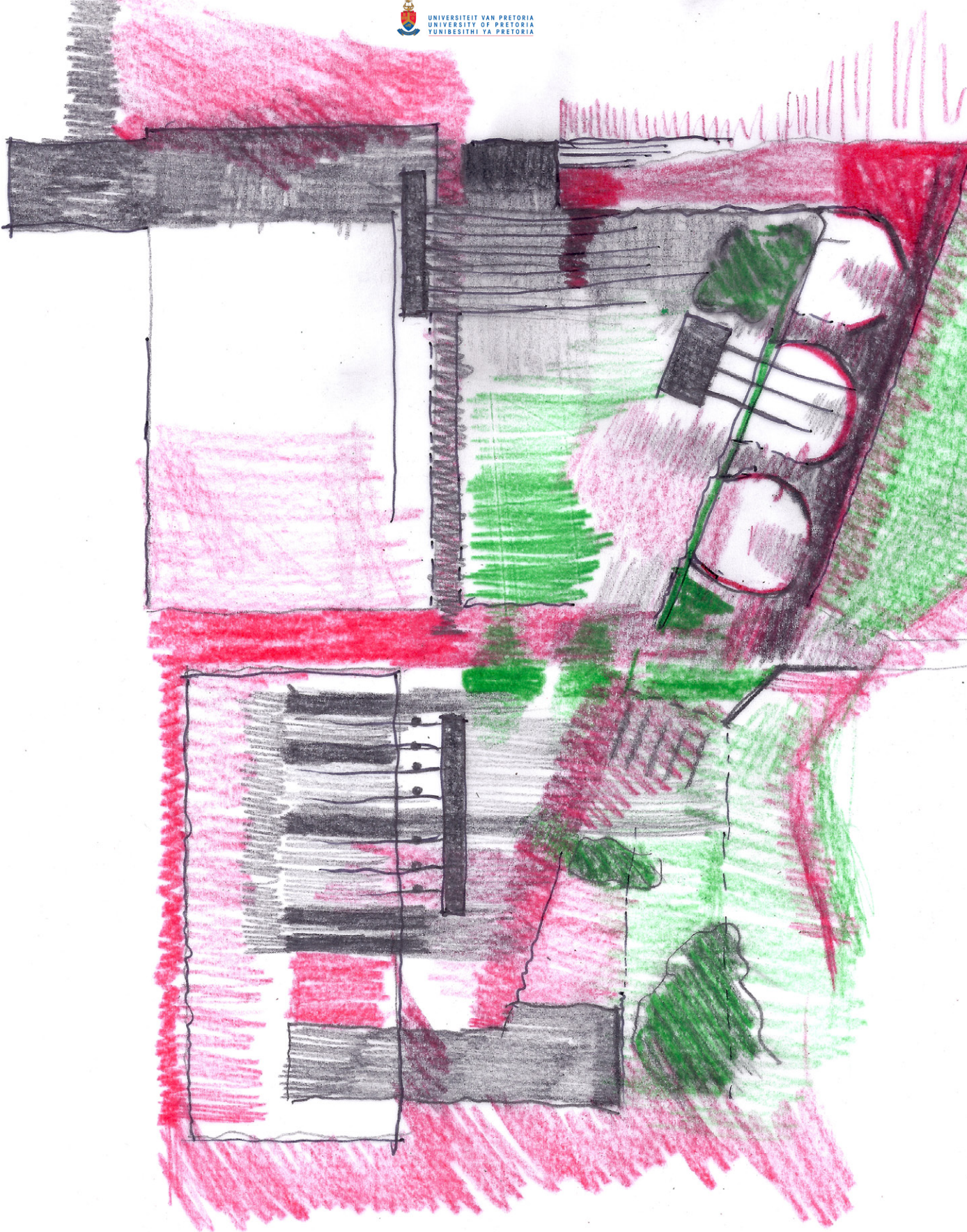
If the building acts as a solvent for industrial, public and ecological services, it will be able to filter people and products in the same way that the wetland on site filters the water that moves through it.

The concept of the building as a solvent, and how this concept is developed into a building, will be discussed in the next chapter.

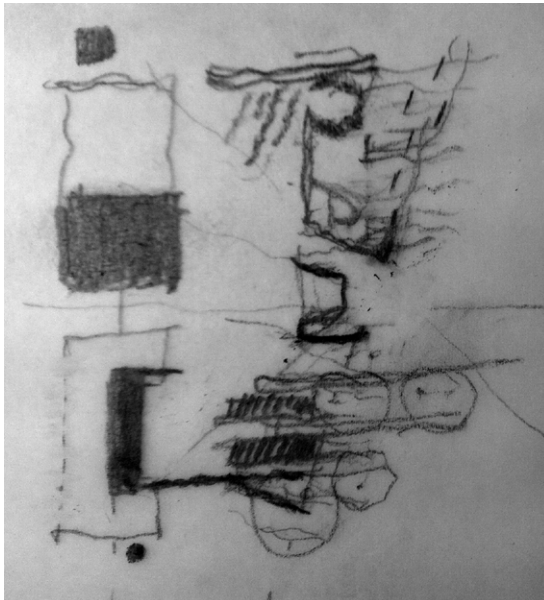
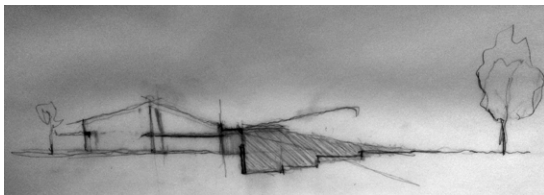
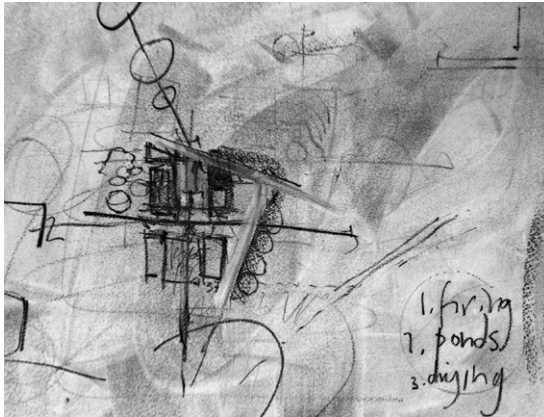
*Figure 5.7.1 (previous page)\_ Plan indication spatial intentions (not to scale) (Author, 2013).*

*Figure 5.7.2\_ Plan indication circulation networks (not to scale) (Author, 2013).*









# CHAPTER 6

## DEVELOPMENT

### SUMMARY

This chapter illustrates the conceptual thought processes involved in the design of New Era Ceramics. The concept is then further developed into a building that addresses the architectural issue of bifurcation within the constraints of the site and programme.

The aim of the concept is to dissolve the boundaries that the industrial infrastructure has created, whether these are physical or perceptual, and to integrate the site into surrounding Eersterust.

Sketches clarify the intentions of the project and aim to illustrate an understanding of the proposed building within its context. The new building dissolves the boundaries created by the industrial activities which previously took place there, and absorbs the extant fabric into new purposes.

The aim of the design is not to disregard any of the previous layers that have been added to the site, but to selectively reuse them to become accessible to future generations.

Figures 6.0.1-6.0.4\_ Development of concept (Author, 2013).



INDUSTRIAL INFRASTRUCTURE  
IS DOWN CYCLED

PARK AND POISON BOTH CONTRIBUTE  
TO THE MAKING OF PLACE

INDUSTRIAL SITES CONVERTED TO LANDSCAPE  
WITH MUSEUMIFIED INDUSTRIAL OBJECTS



## 6.1. THE BUILDING AS A SOLVENT

The word “solvent” stems from the Latin word *solvere*, meaning to “loosen, release, unbind and untie” (Babylon Online Dictionary, 2013). Solvents have the ability to solve a solute, and to create a solution. The word also refers to the act of “weakening or dispelling particular attitudes or situations” (Concise Oxford English Dictionary, 2012).

The concept for the renewal of the Era Bricks site revolves around the capacity of a building to act as a solvent. A solvent-building creates the spatial conditions for specific relationships between different programmes to exist.

In the case of New Era Ceramics, the spatial conditions must allow for public activities, natural cycles and industrial processes to take place in relative proximity to each other. These exchanges between programmes must be mediated by the building within the constraints of public safety and the spatial nature of the extant industrial sheds.

An architectural language that can keep the public safe but still mediate levels of engagement was developed. The engagement levels and their architectural translation are discussed in 6.2.

The point of departure for the development of the building stems from the understanding that the eastern addition will become the main mediating element of the design, while the two existing sheds will serve as either public spaces related to Era Square, or industrial pockets situated within the public sphere.

*Figure 6.1.1\_ Ecological, industrial and social solution (Author, 2013).*

### 6.1.1. ITERATION A

Figure 6.1.1 Sketch design iteration A.

The first design iteration concentrated the industrial activity at the eastern edge of the site, and kept the drying shed available solely for the public programmes.

1. Industrial activity was concentrated to the north of the site, and took place in a series of circular spaces. These spaces could be viewed from a public ramp that ran along the north-eastern part of the site.
2. Social activities were arranged in the southern half of the eastern addition that sat flush with the existing firing kiln shed.
3. Main access to the industrial functions of the building was along the eastern walkway and public functions were accessed from the north.

In this iteration the eastern addition still did not satisfactorily relate to the eucalyptus grove to the east, and disregarded the opportunity to attract public interest along the centre walkway into Era Square. There was insufficient hierarchy in terms of building entrances and thresholds for the public to understand the building and know where to enter.

The iteration also did not engage with the existing sheds in terms of materiality, form or programme, and connections to the existing sheds were weak.

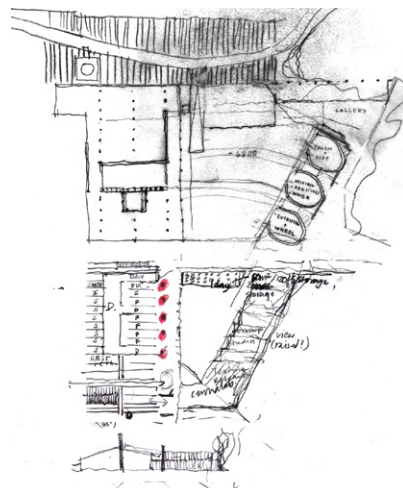
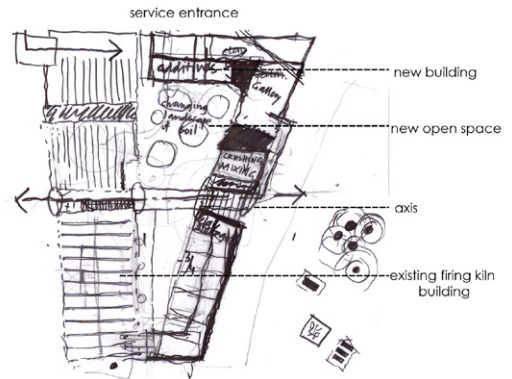
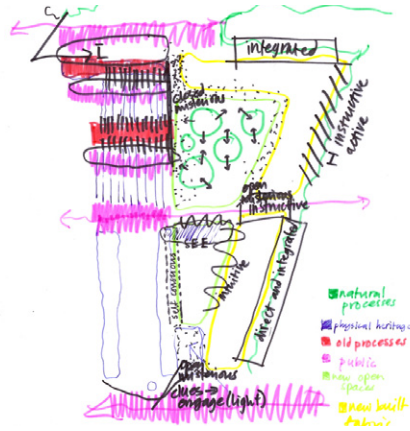


Figure 6.1.1.1\_ Site relationship analysis (Author, 2013).

Figure 6.1.1.2\_ Initial spatial arrangement (Author, 2013).

Figure 6.1.1.3\_ Spatial arrangement development (Author, 2013).

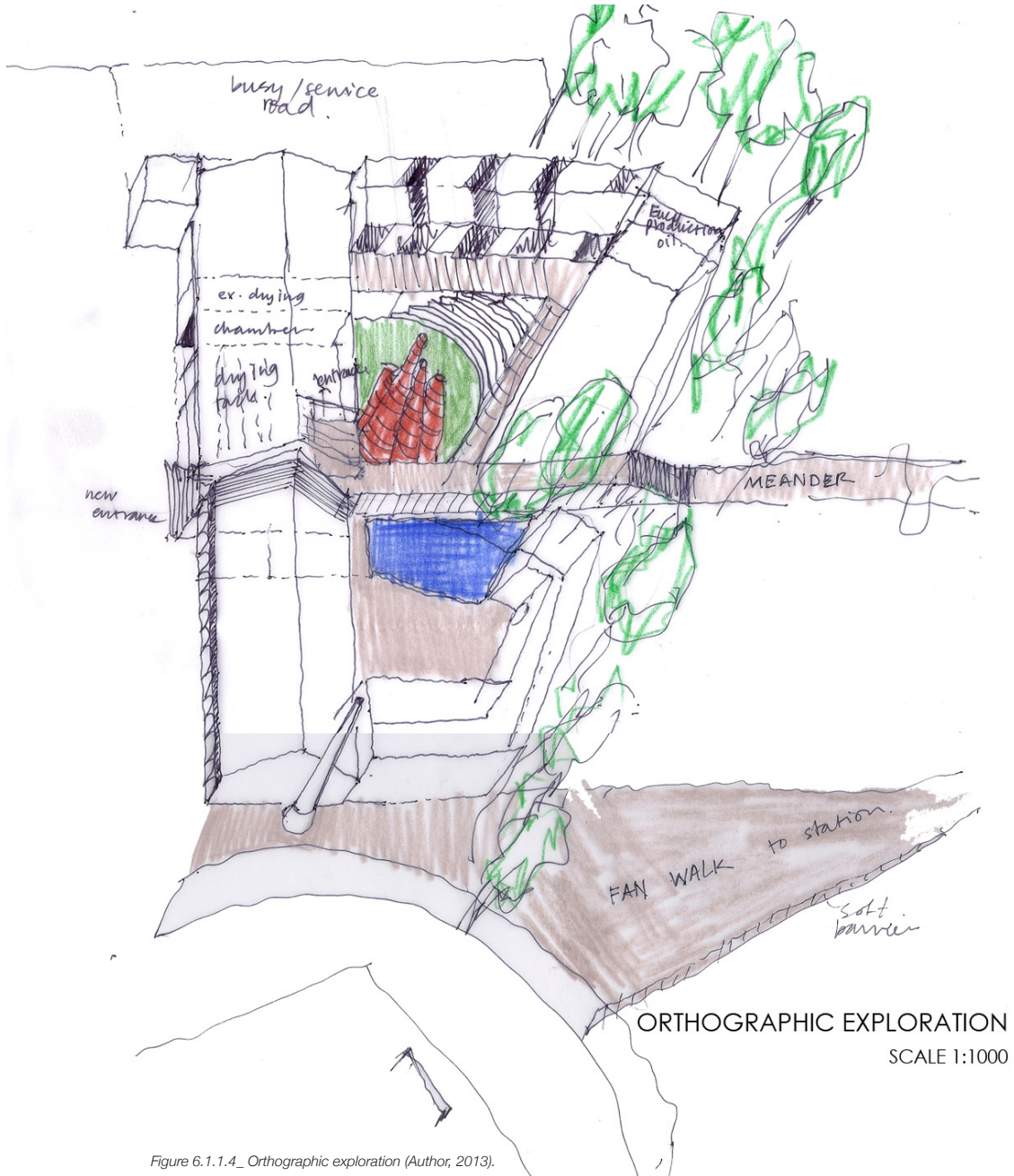


Figure 6.1.1.4\_ Orthographic exploration (Author, 2013).



## 6.1.2. ITERATION B

Figure 6.1.2 Sketch design iteration B.

1. Industrial activity was still concentrated to the northern part of the eastern addition, but the southern part dissolved into the landscape, with only small studio units being scattered in the area along the eucalyptus grove.
2. The central access way to Era Square was broadened, and the southern half of the drying shed's roof was removed to open up an exterior exhibition space.
3. A single circular element remained to the north to become the souring yard for clay.
4. Only specific parts of the ground were lowered to provide public viewing but limit access.

This iteration accommodated the production line of the ceramic products very well, but only engaged the public in activities like grinding and extruding that would not be as visually interesting as the making, firing and testing of the products. The iteration did not form a legible whole in terms of materiality or form.

There were missed opportunities in terms of the resolution of building edges that could engage with more public functions. Unhindered access to the firing kilns created public safety risks.

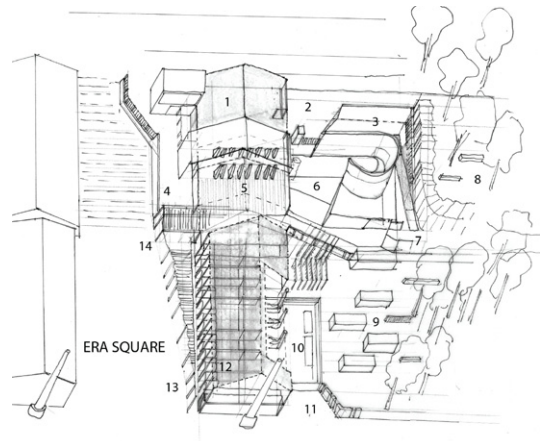
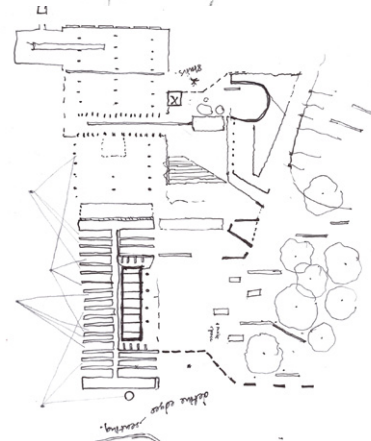
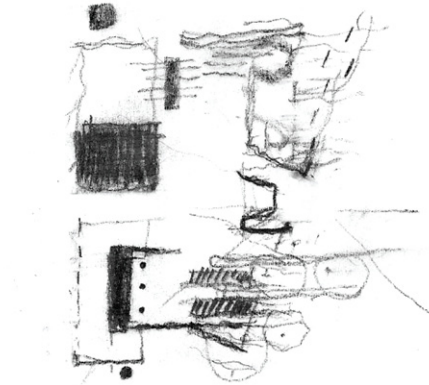


Figure 6.1.2.1\_ Conceptual diagram of building dissolving (Author, 2013).

Figure 6.1.2.2\_ Diagrammatic development (Author, 2013).

Figure 6.1.2.3\_Bird's Eye spatial investigation (Author, 2013).

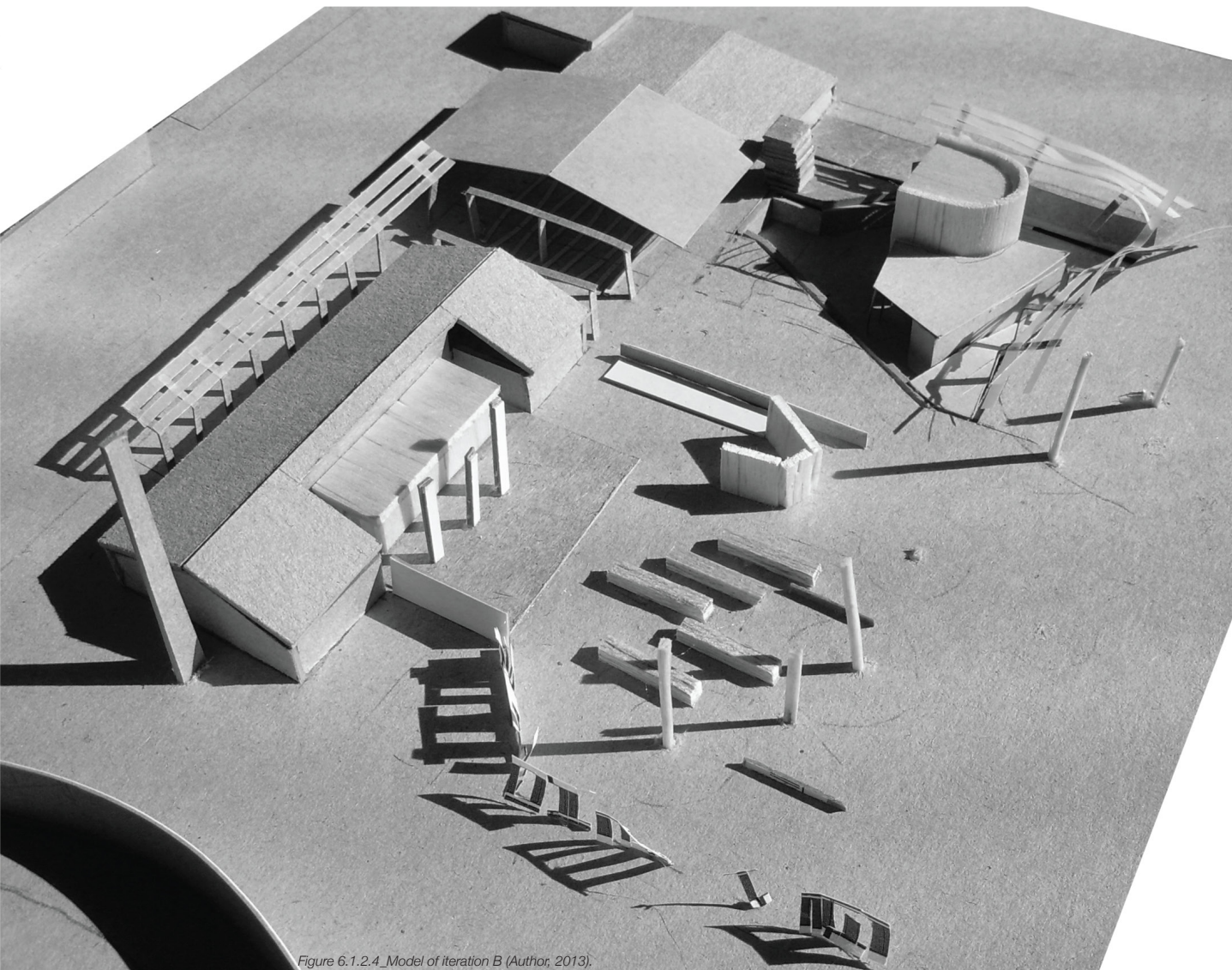


Figure 6.1.2.4\_Model of iteration B (Author, 2013).

### 6.1.3. ITERATION C

1. This iteration developed the curve of the singular round element of the souring yard into a powerful datum along the entire interior industrial courtyard.
2. The datum wall is thick enough to be inhabited by people, industrial activities and small animals. It also provides stacks that passively ventilate the basement buildings below.
3. The northern and southern edges of the eastern addition are pulled back from the existing sheds to provide views of the shed edges.
4. The entire interior industrial courtyard is lowered into the ground with a bridge providing the public with views of the processes as well as access to Era Square.
5. The datum wall together with the change in level provides the necessary buffer between the public and industrial activities.
6. The eastern addition breaks up and away from the datum wall as it moves north, completely disappearing after the access walkway.
7. The datum wall becomes a landscape element to the north, providing light and ventilation to the basement levels beneath it.

This iteration accommodates both the industrial activity and the public's engagement with it. Opportunities for new ecological habitats to form in and around the eastern addition engages with the hybrid functions inherent in the building.

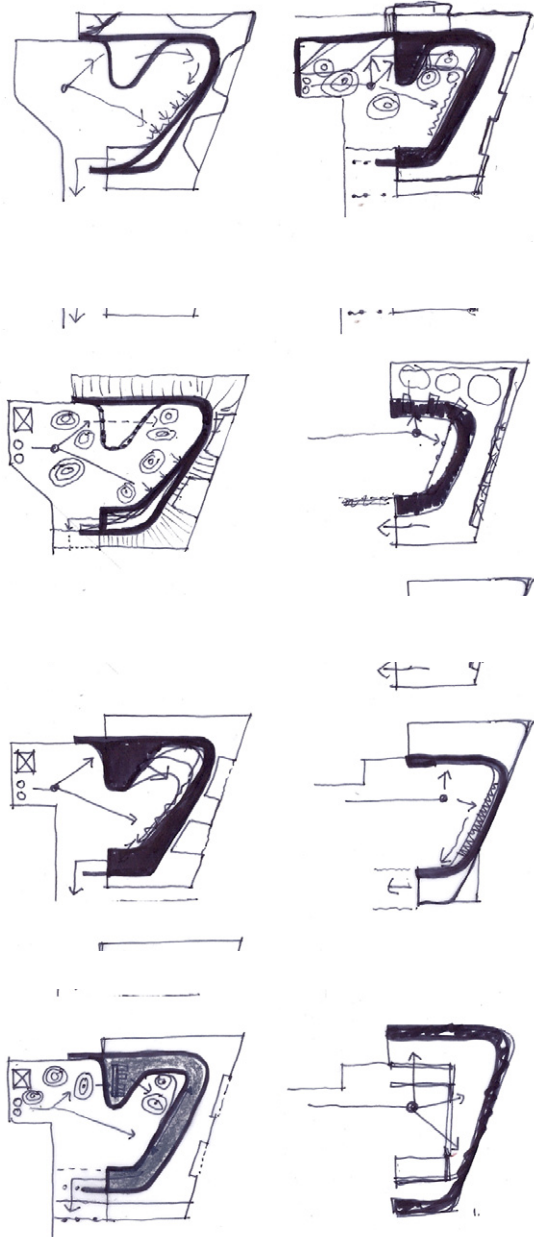
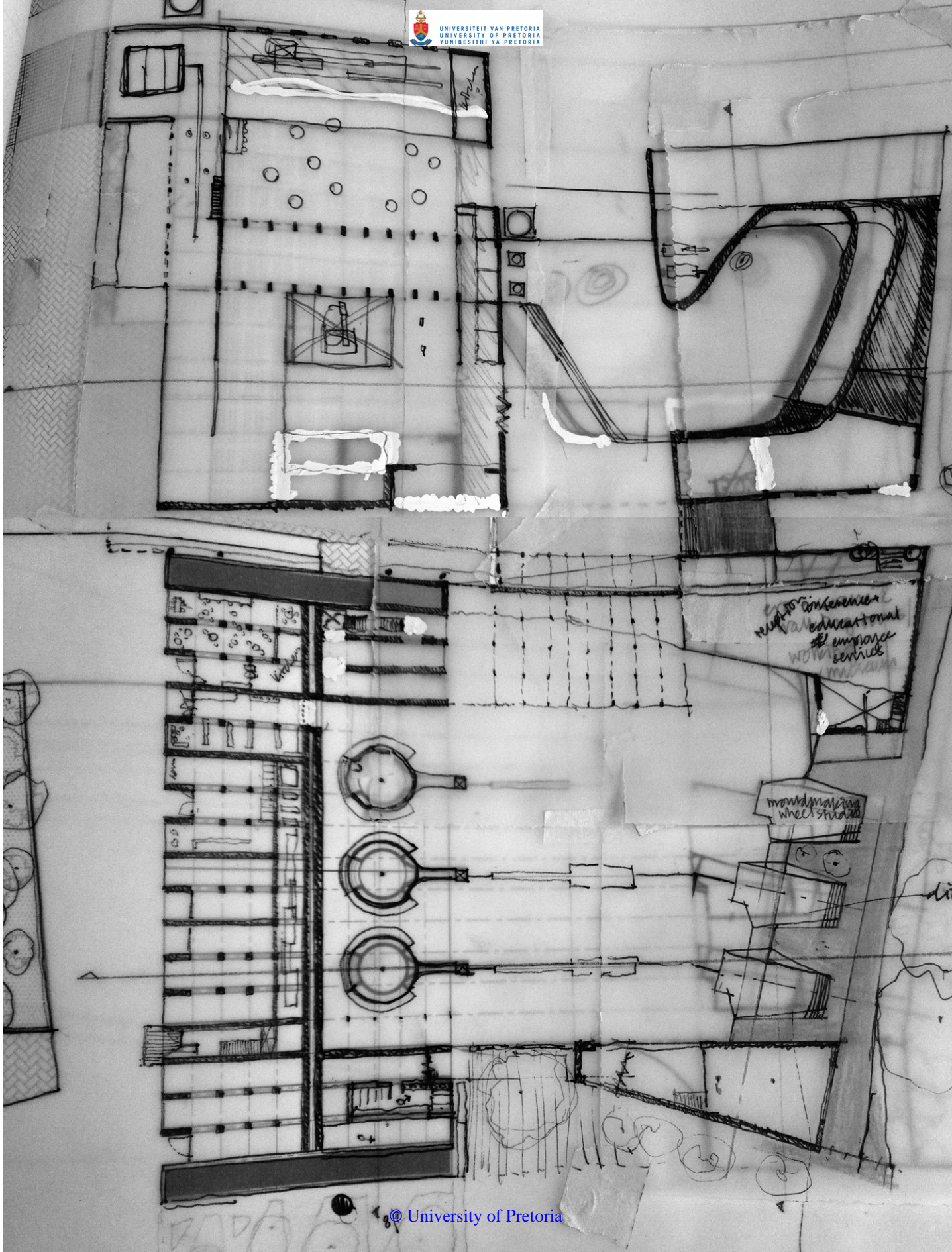


Figure 6.1.3.1\_Plan development (Author, 2013).

Figure 6.1.3.2\_Sketch plan of iteration C (Author, 2013).





night conference  
educational  
with  
services

mountain  
wheel



FILANDER AVENUE

NEW ARBORETUM AND NURSERY

NEW MULTI-PURPOSE COMMUNITY HALL

NEW BRICK MUSEUM

CLAY SOURING YARD

MIXING BASEMENT

PEDESTRIAN ACCESS TO ERA SQUARE

NEW FIBRE PROCESSING FACILITY

NEW RETAIL AND CERAMIC PRODUCTION

ADMINISTRATION

EMBER WORKSHOP

GLAZING STUDIO

PUBLIC CREATIVE STUDIO

PROPOSED ERA SQUARE

CHAMPION WALK BETWEEN STADIUM AND STATION

NEW OPEN-AIR WELCOMING PAVILION

PROPOSED TICKET OFFICE

EXISTING EERSTERUST SOCCER STADIUM

HISTORIC FACTORY ENTRANCE, PROPOSED PEDESTRIAN ENTRANCE

ST. JOSEPH AVENUE

NEW SPORTS CENTRE

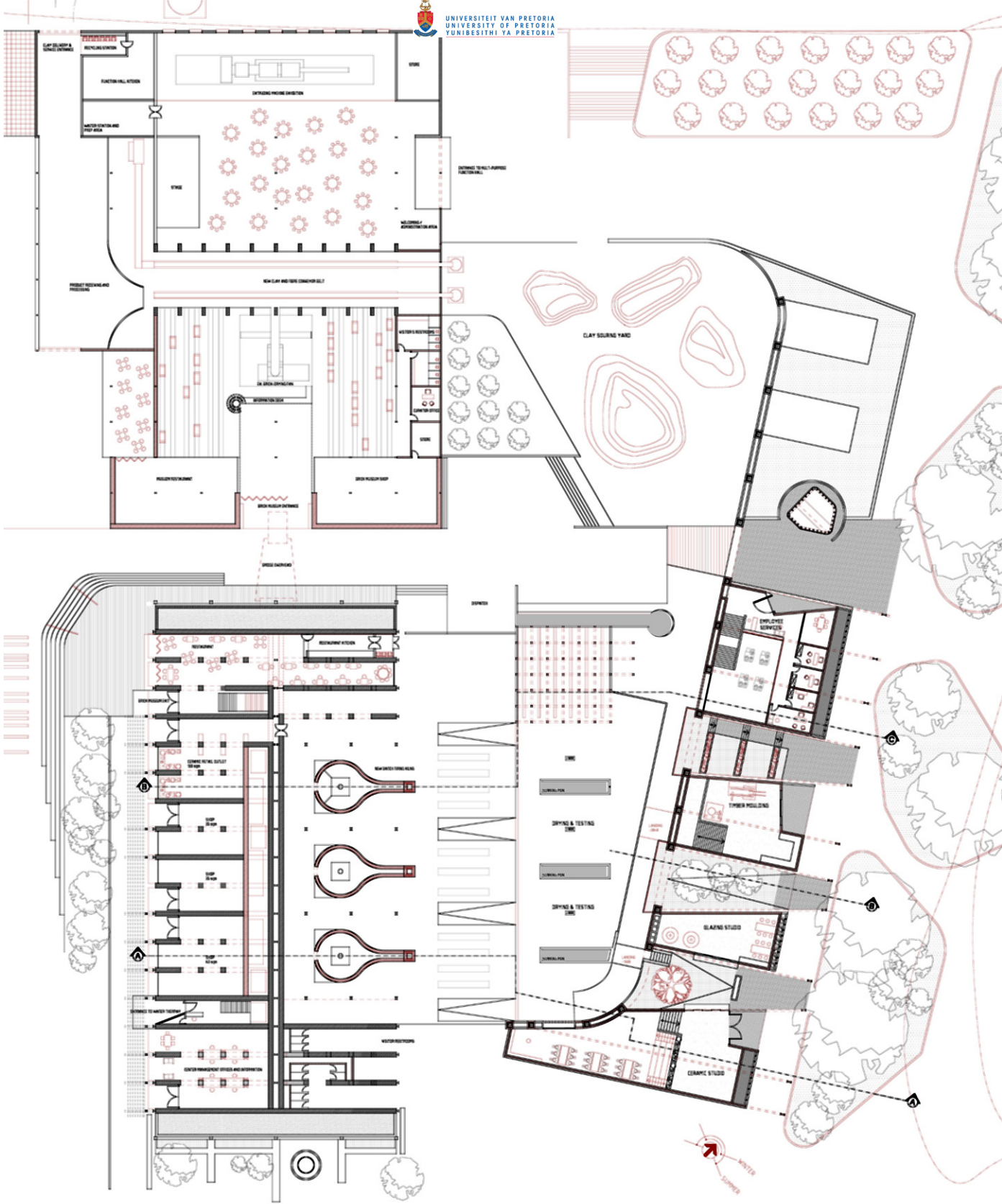
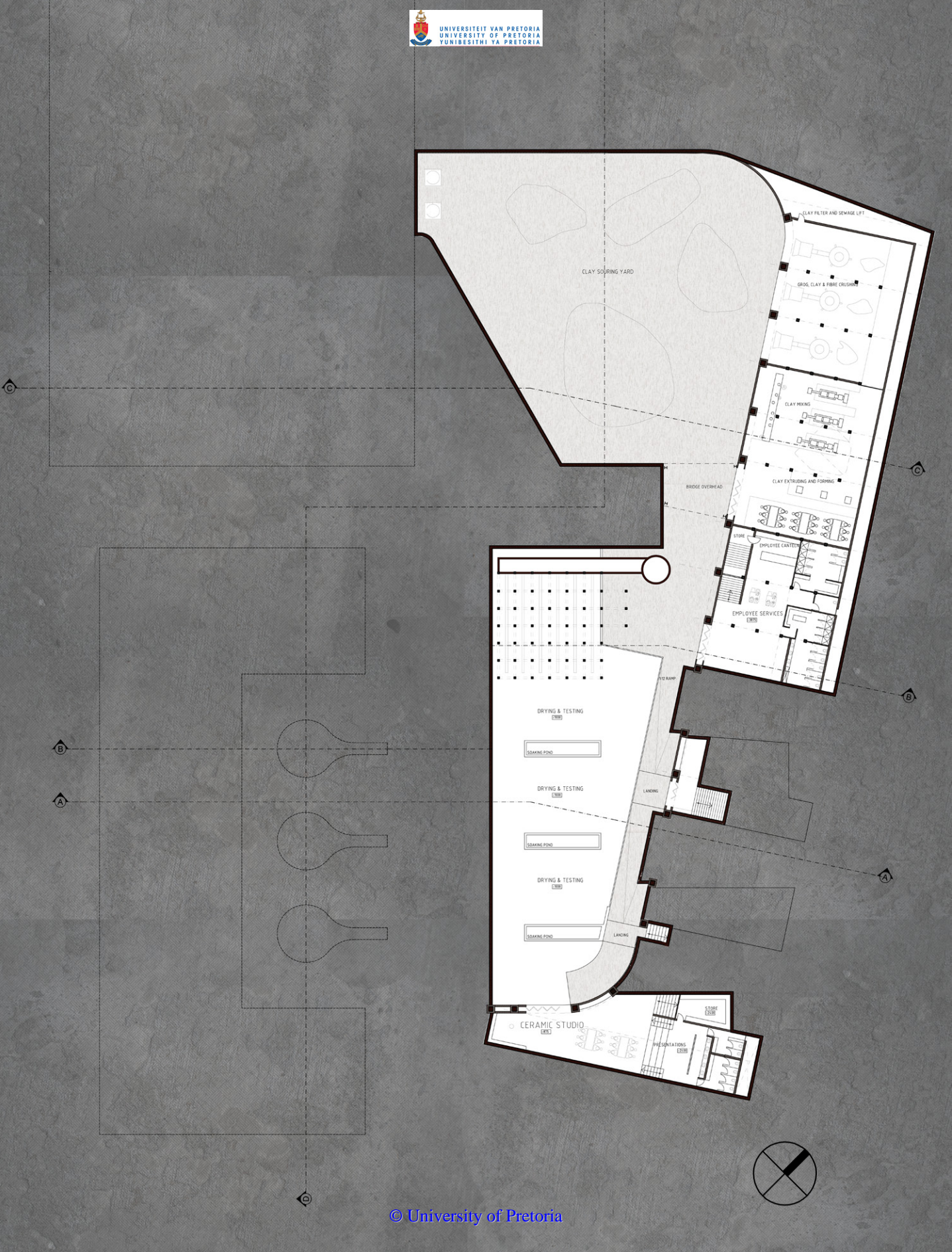


Figure 6.1.3.3\_ Site Plan (Author, 2013).

Figure 6.1.3.4\_ Plan development (Author, 2013).







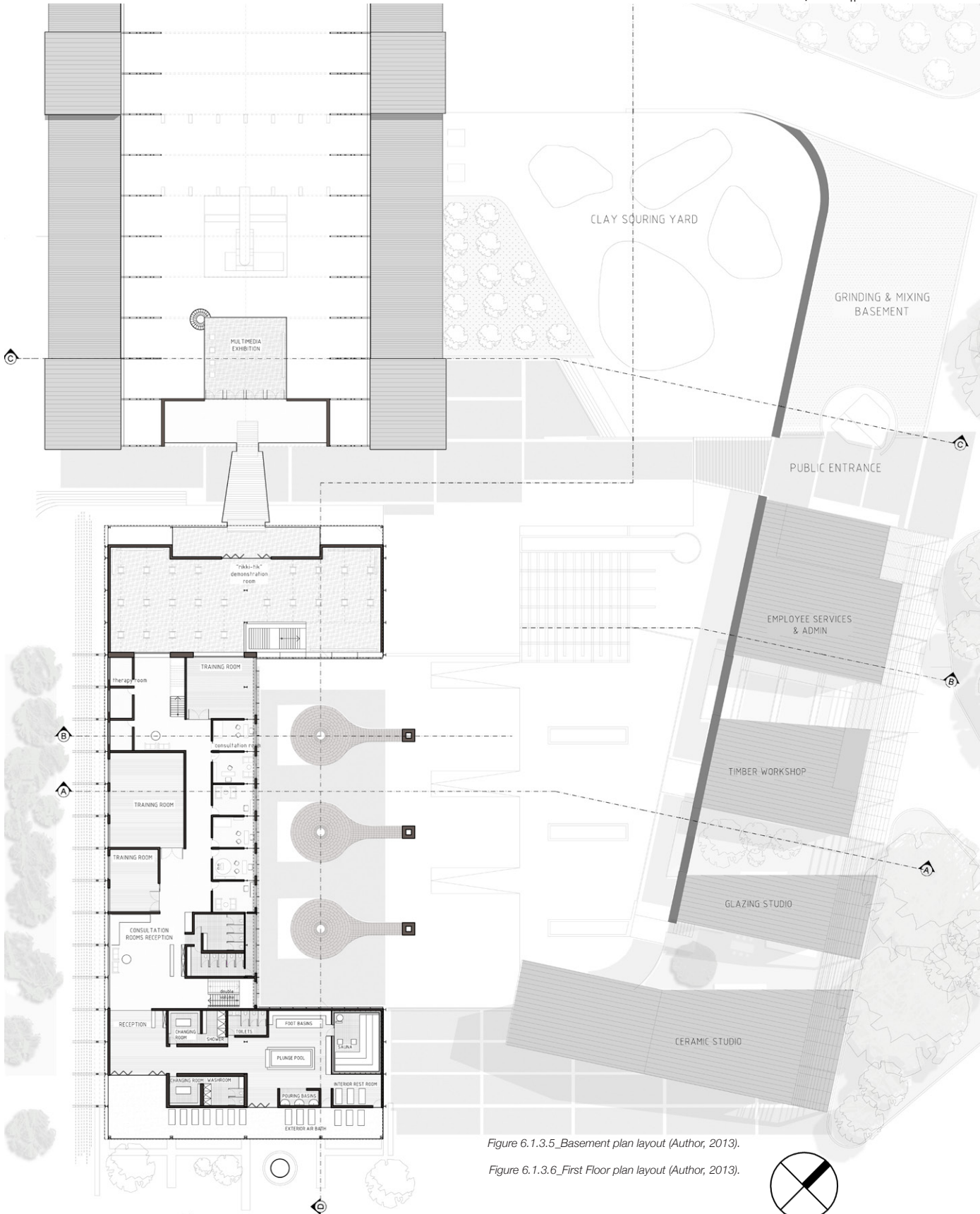


Figure 6.1.3.5\_Basement plan layout (Author, 2013).

Figure 6.1.3.6\_First Floor plan layout (Author, 2013).

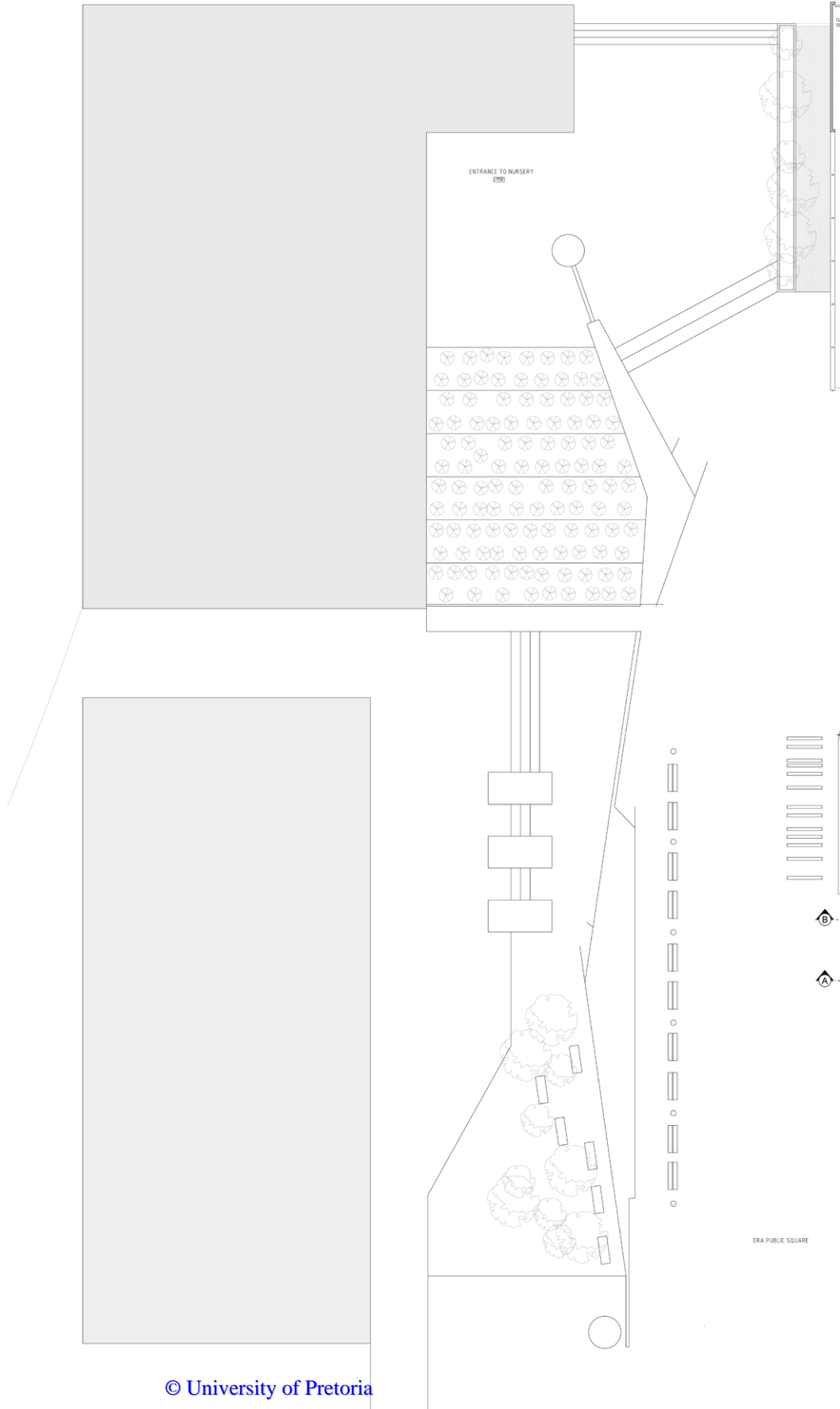
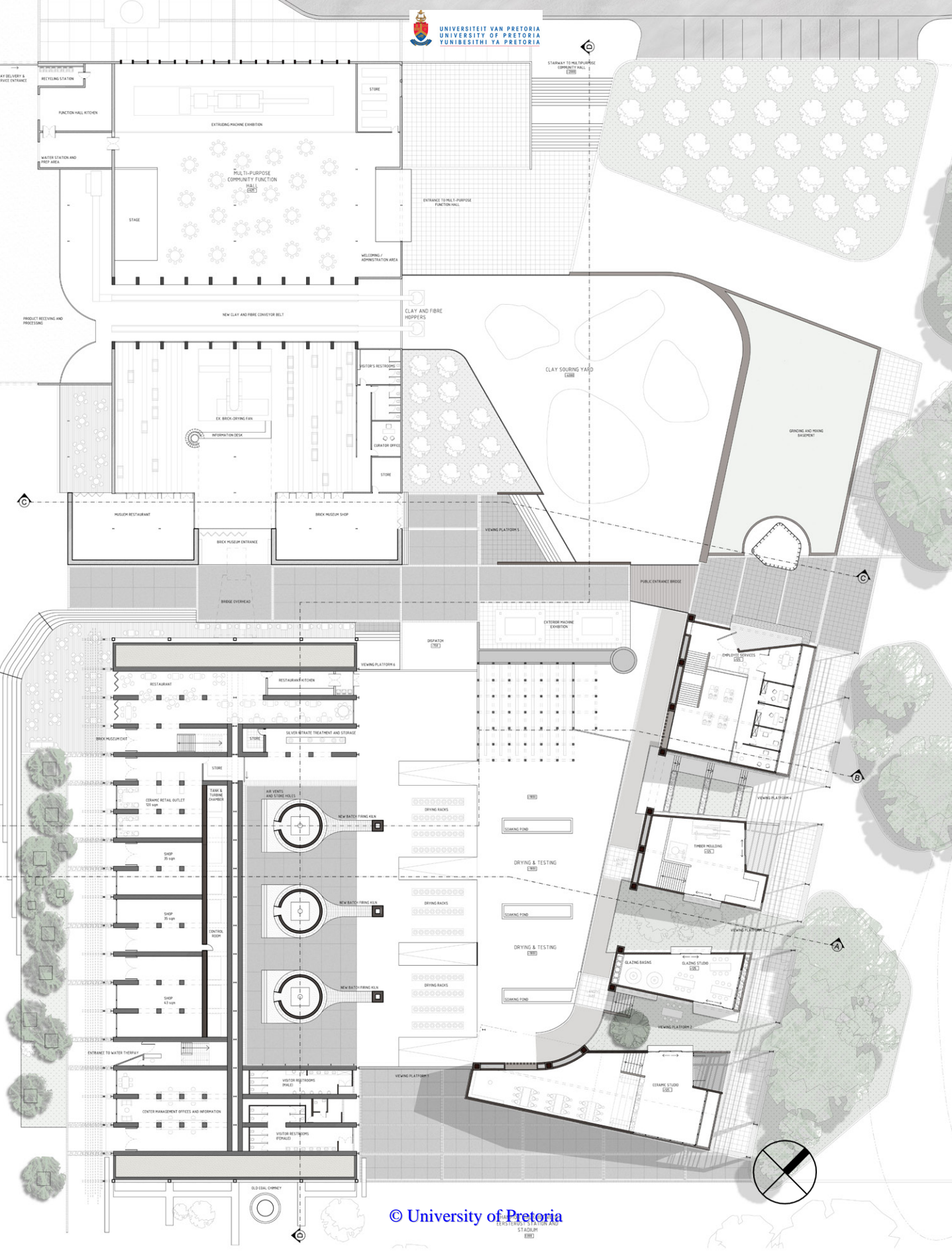


Figure 6.1.3.7\_Ground Floor Layc





WATER STATION AND RECYCLING STATION  
FUNCTION HALL KITCHEN  
STAGE  
MULTI-PURPOSE COMMUNITY FUNCTION HALL (E8)

STORE  
ENTRANCE TO MULTI-PURPOSE FUNCTION HALL  
WELCOMING ADMINISTRATION AREA

STAIRWAY TO THE VOUCHER COMPETITION MALL (E8)

PRODUCT RECEIVING AND PROCESSING

NEW CLAY AND FIBRE CONVEYOR BELT  
CLAY AND FIBRE HOPPERS  
EX BACK-DRYING FAN  
INFORMATION DESK  
VISITOR'S RESTROOMS  
ELEVATOR OFFICE  
STORE

CLAY SORING YARD (E8)

GRASSING AND PAVING BASEMENT

MUSEUM RESTAURANT  
BACK MUSEUM ENTRANCE

BACK MUSEUM SHOP

VIEWING PLATFORMS

BRIDGE OVERHEAD

PUBLIC ENTRANCE BRIDGE

RESTAURANT  
RESTAURANT KITCHEN  
DISPATCH (E8)

EXTERIOR MACHINE EXHIBITION

EMPLOYEE SERVICES (E8)

BACK MUSEUM SHOP

STORE

SILVER PLATE TREATMENT AND STORAGE

VIEWING PLATFORMS

CERAMIC METAL OUTLET (E7) (E8)

SEAM & LUBRICANT STORES

AIR VENTS AND STORE HOLES  
NEW BATCH-FIRING KILN

DRYING RACKS

CLEANING FINDER

SHOP 25 sqm

SHOP 26 sqm

SHOP 43 sqm

CONTROL ROOM

NEW BATCH-FIRING KILN

DRYING RACKS

CLEANING FINDER

NEW BATCH-FIRING KILN

DRYING RACKS

CLEANING FINDER

DRYING & TESTING (E8)

DRYING & TESTING (E8)

DRYING & TESTING (E8)

DRYING & TESTING (E8)

DRYING & TESTING (E8)

DRYING & TESTING (E8)

DRYING & TESTING (E8)

DRYING & TESTING (E8)

DRYING & TESTING (E8)

DRYING & TESTING (E8)

DRYING & TESTING (E8)

DRYING & TESTING (E8)

ENTRANCE TO WATER TREATERY

CENTER MANAGEMENT OFFICES AND INFORMATION

VISITOR RESTROOMS (MALE)

VISITOR RESTROOMS (FEMALE)

VIEWING PLATFORMS

GLAZING BASINS  
GLAZING STUDIO (E8)

GLAZING BASINS  
GLAZING STUDIO (E8)

GLAZING BASINS  
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GLAZING BASINS  
GLAZING STUDIO (E8)

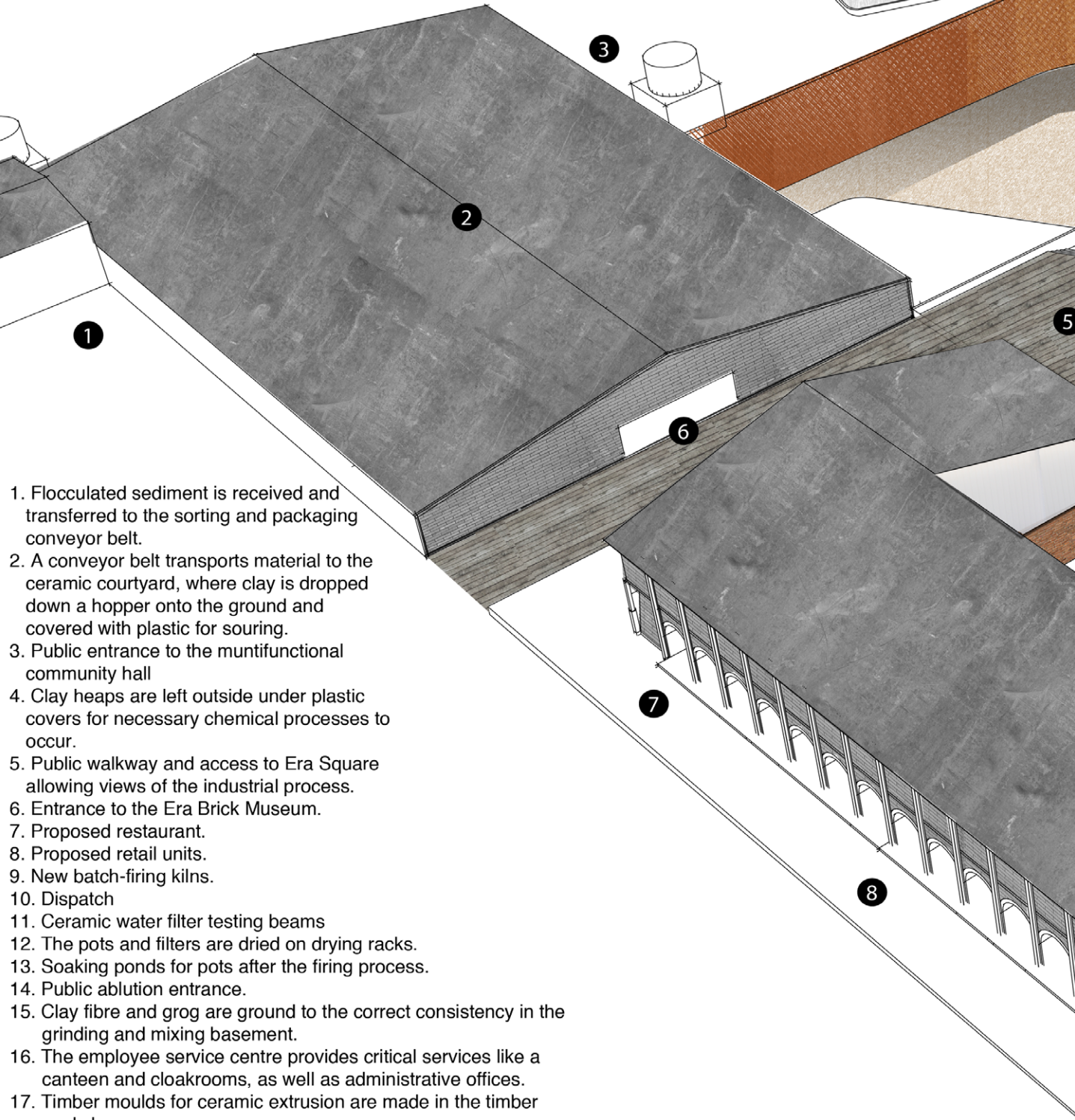
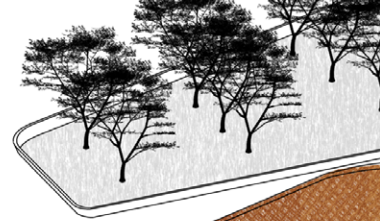
GLAZING BASINS  
GLAZING STUDIO (E8)

GLAZING BASINS  
GLAZING STUDIO (E8)

GLAZING BASINS  
GLAZING STUDIO (E8)

GLAZING BASINS  
GLAZING STUDIO (E8)

OLD COAL CHIMNEY



1. Flocculated sediment is received and transferred to the sorting and packaging conveyor belt.
2. A conveyor belt transports material to the ceramic courtyard, where clay is dropped down a hopper onto the ground and covered with plastic for souring.
3. Public entrance to the multifunctional community hall
4. Clay heaps are left outside under plastic covers for necessary chemical processes to occur.
5. Public walkway and access to Era Square allowing views of the industrial process.
6. Entrance to the Era Brick Museum.
7. Proposed restaurant.
8. Proposed retail units.
9. New batch-firing kilns.
10. Dispatch
11. Ceramic water filter testing beams
12. The pots and filters are dried on drying racks.
13. Soaking ponds for pots after the firing process.
14. Public ablution entrance.
15. Clay fibre and grog are ground to the correct consistency in the grinding and mixing basement.
16. The employee service centre provides critical services like a canteen and cloakrooms, as well as administrative offices.
17. Timber moulds for ceramic extrusion are made in the timber workshop.
18. Ceramic products are glazed if required.
19. The studio provides training and educational facilities.
20. The Champion Walk moves past both buildings.



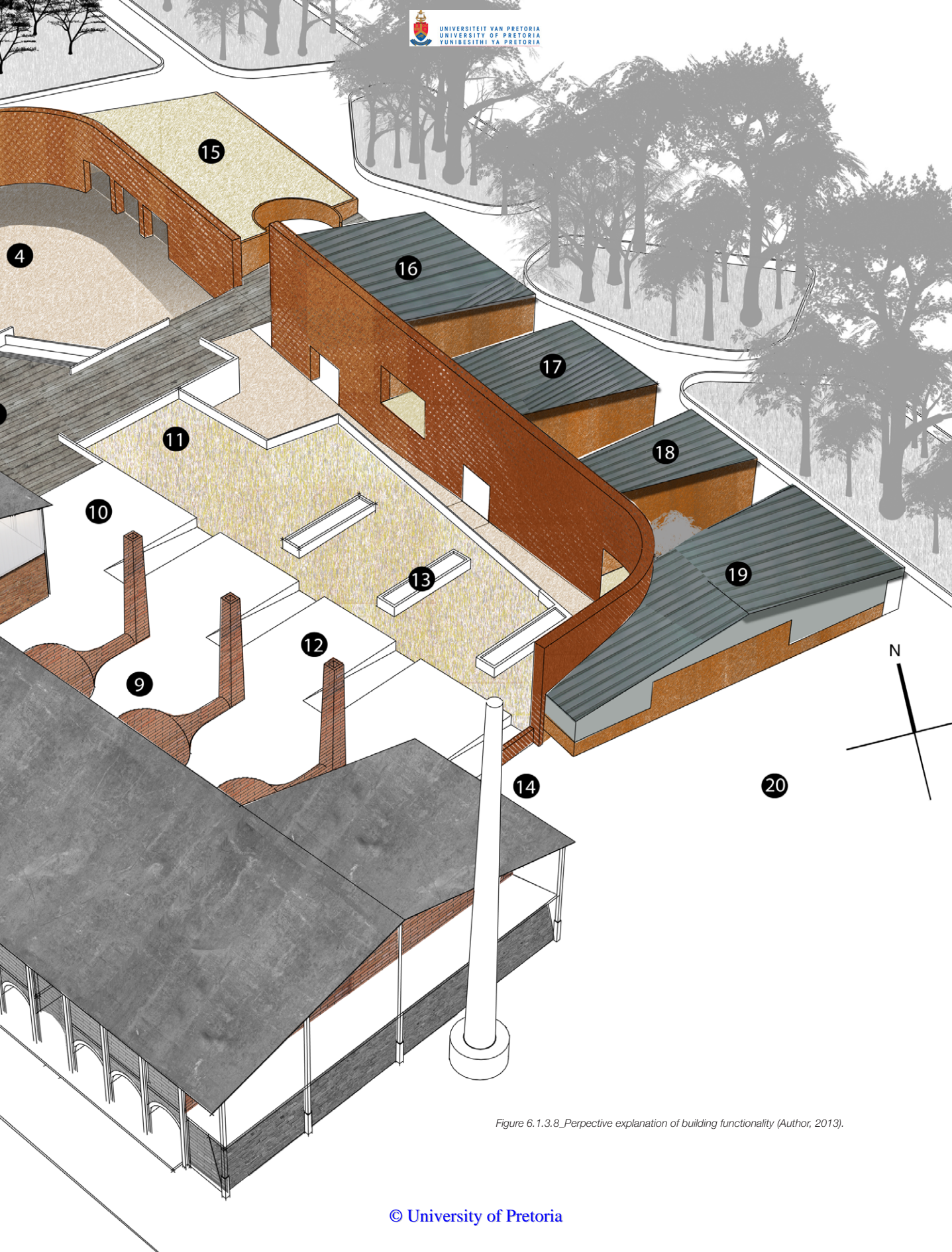


Figure 6.1.3.8\_Perspective explanation of building functionality (Author, 2013).



## SECTIONAL DEVELOPMENT

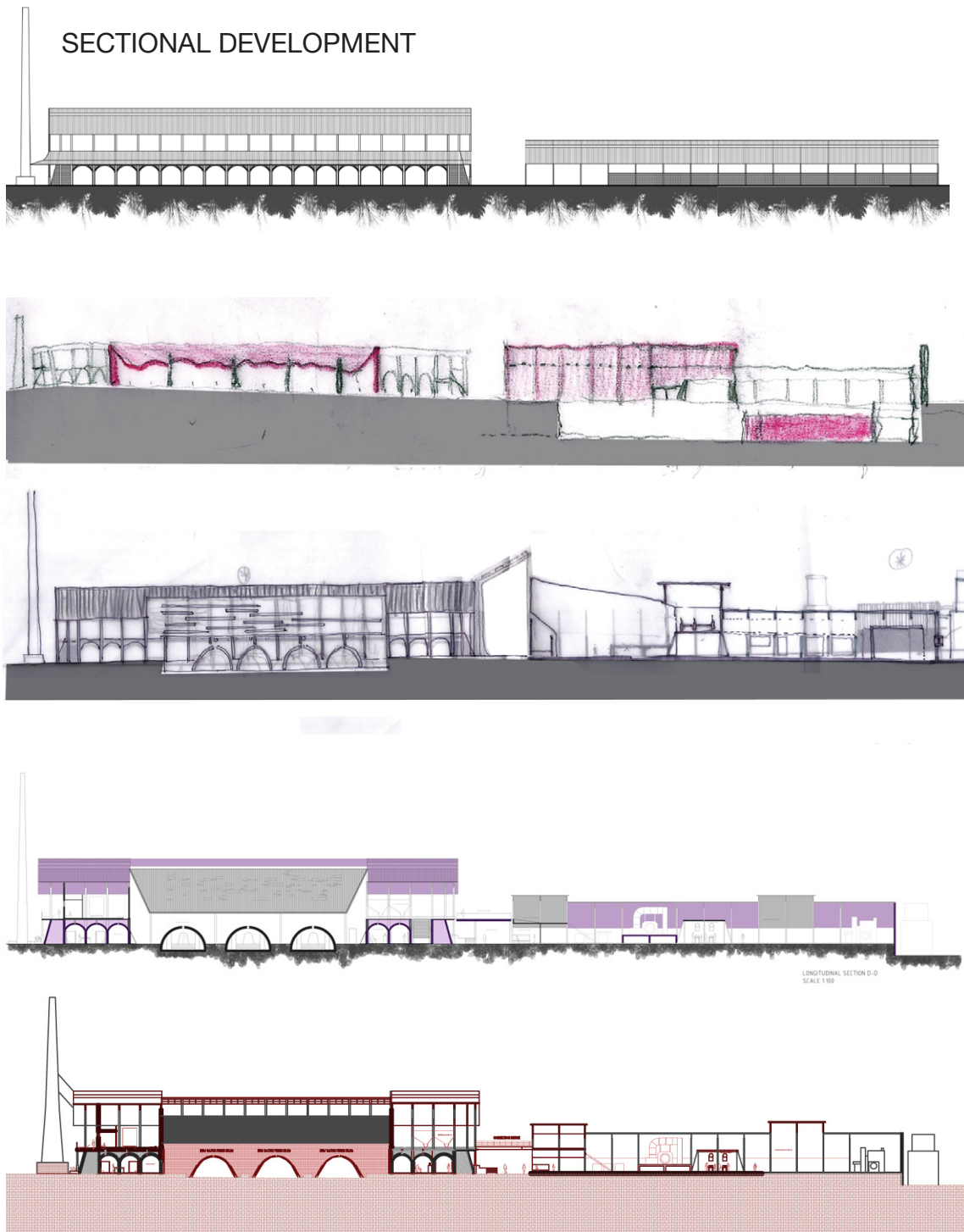


Figure 6.1.3.9\_Longitudinal Section Development (Author, 2013).

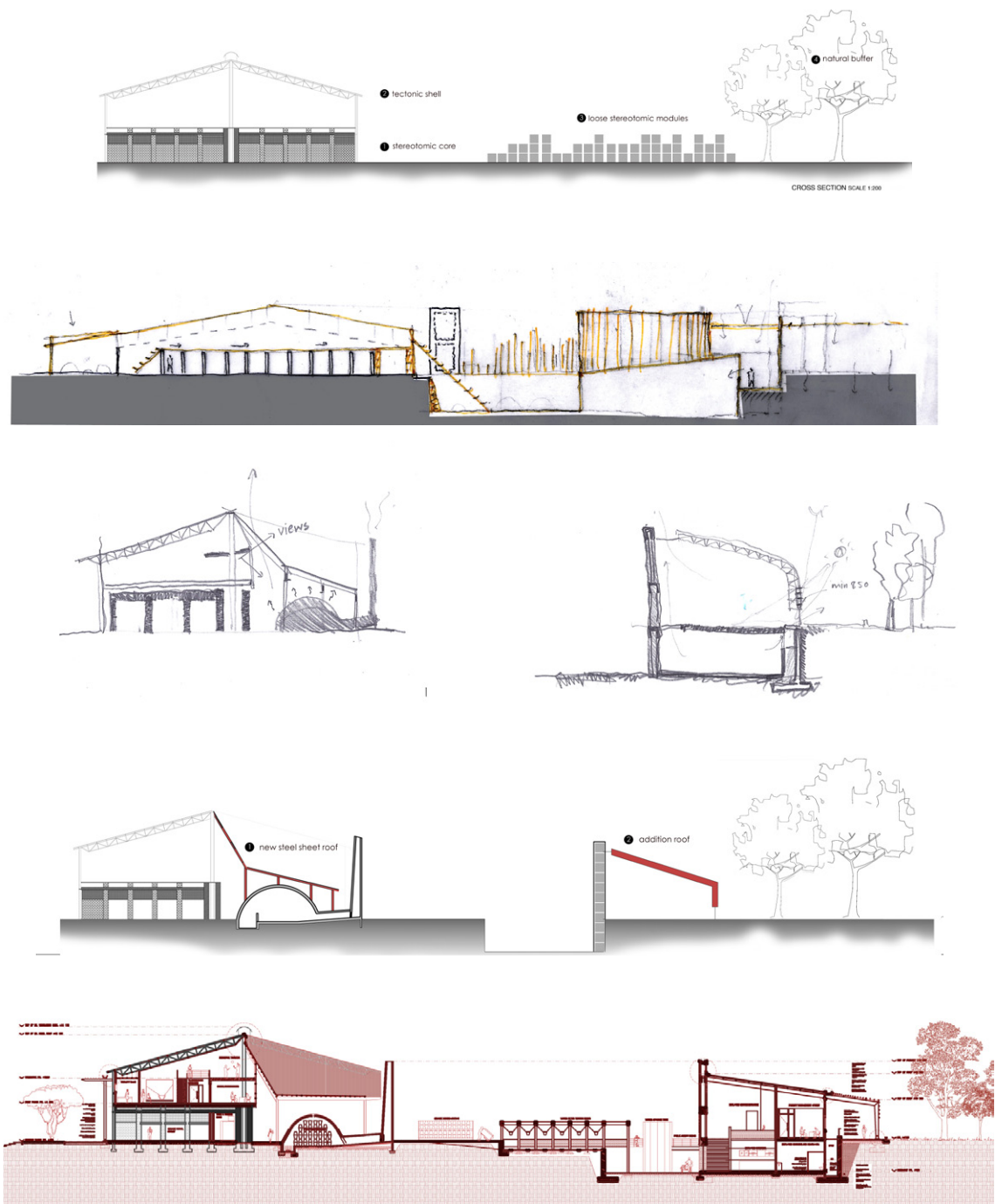


Figure 6.1.3.10\_Cross Section Development (Author, 2013).





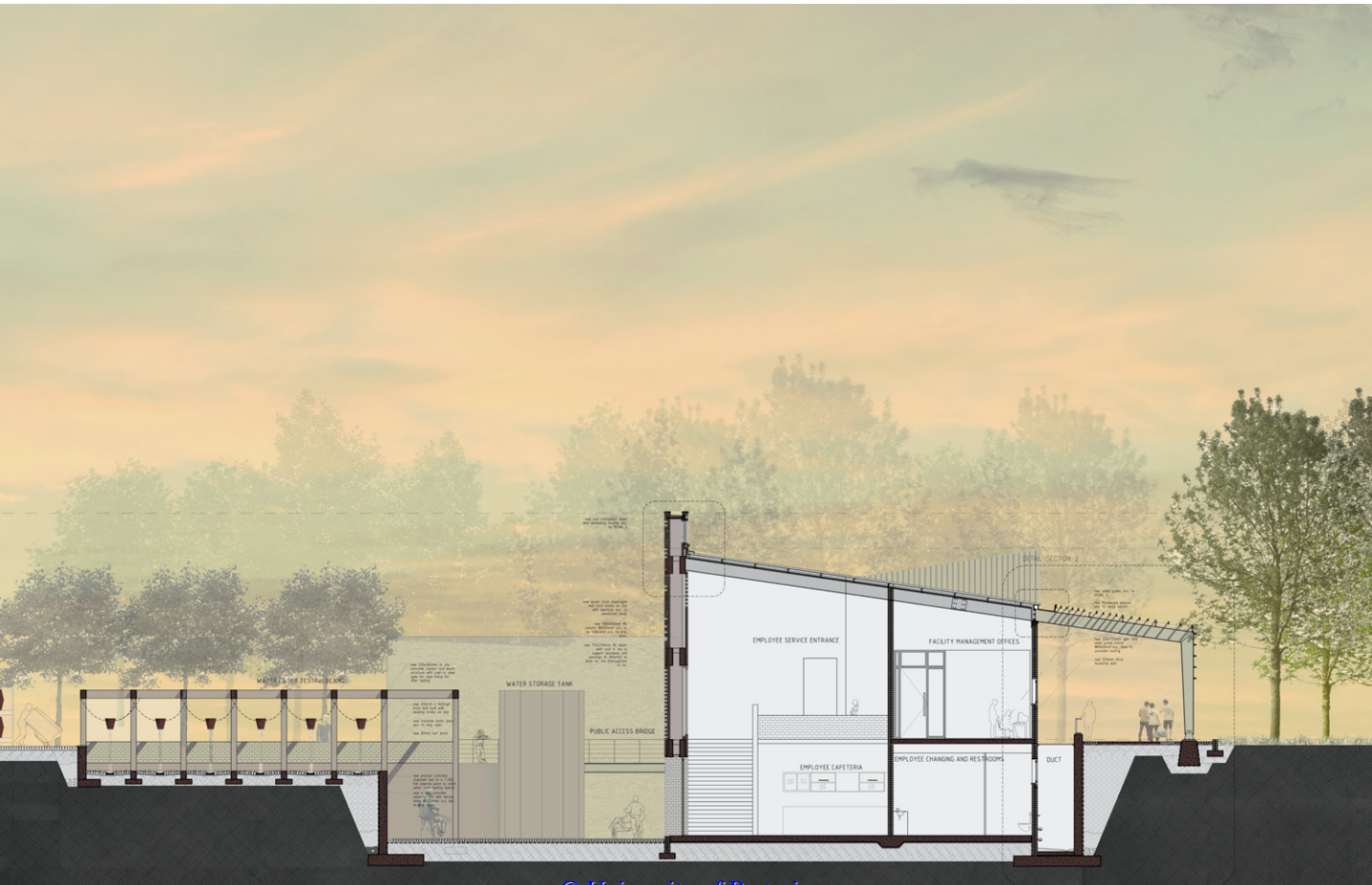




Figure 6.1.2.11\_Longitudinal Section C-C, NTS (Author, 2013).





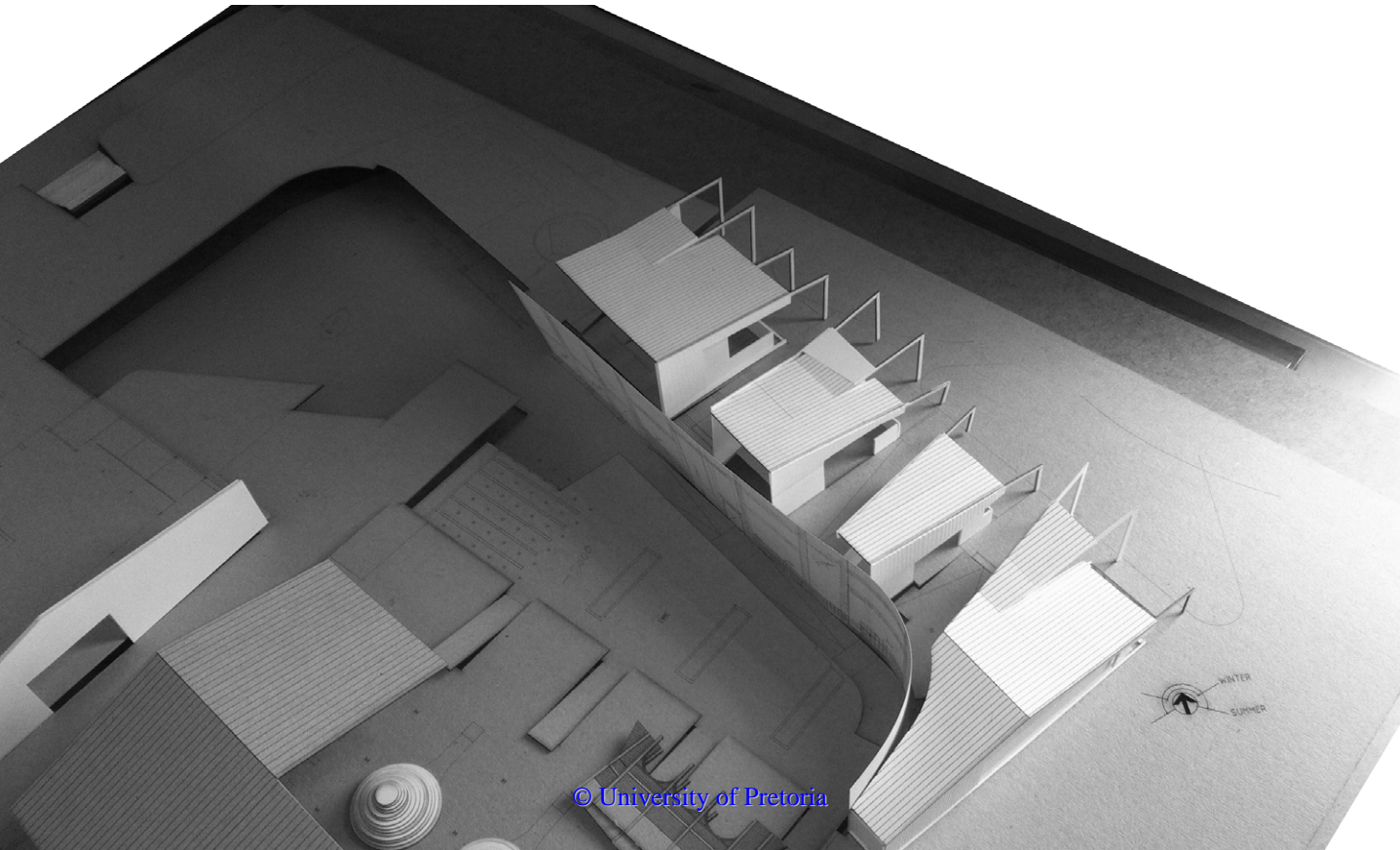
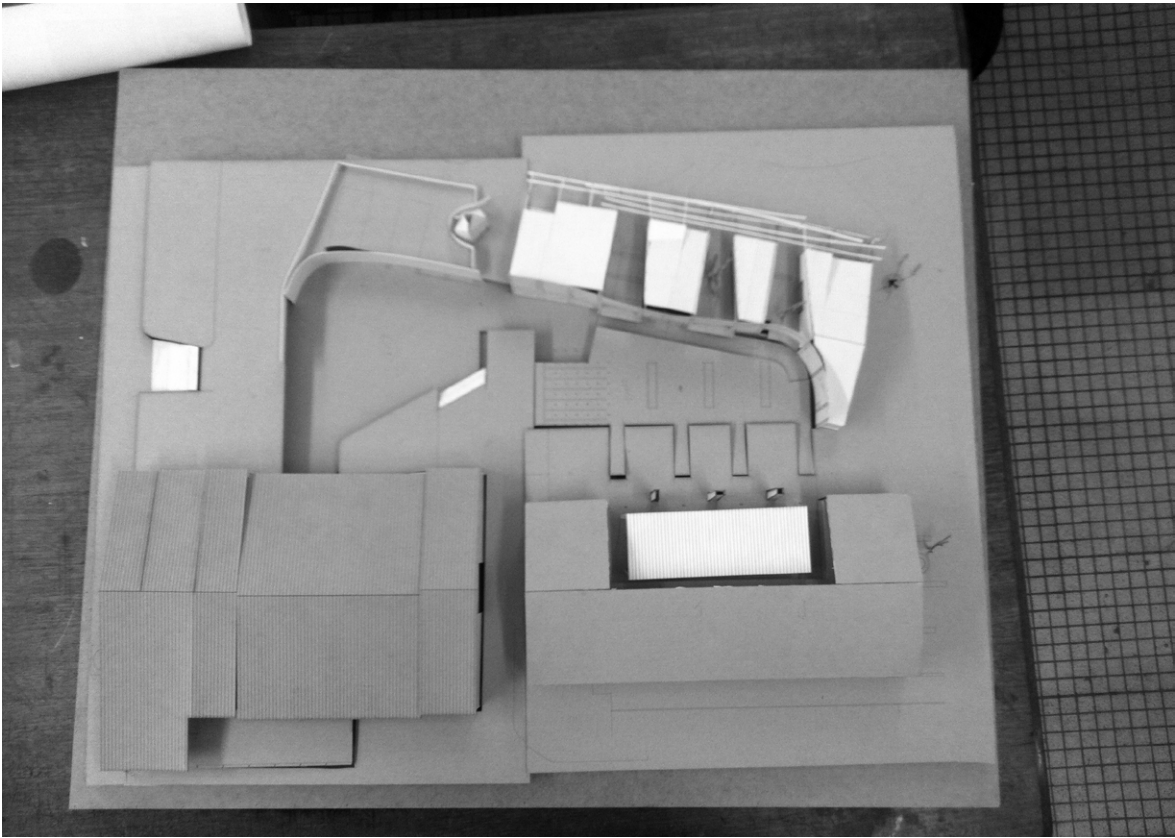
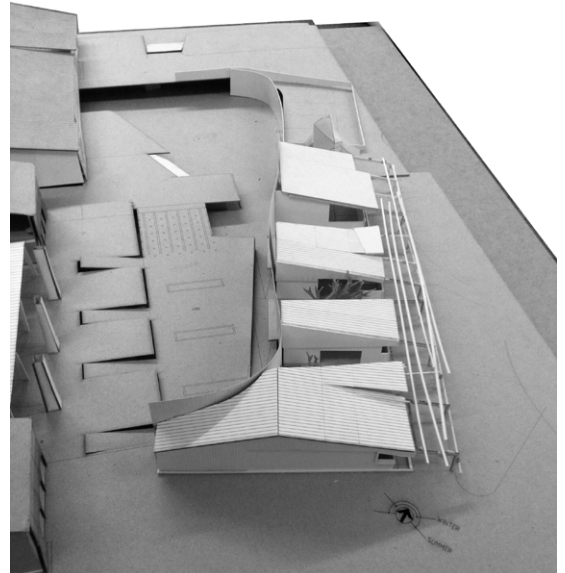
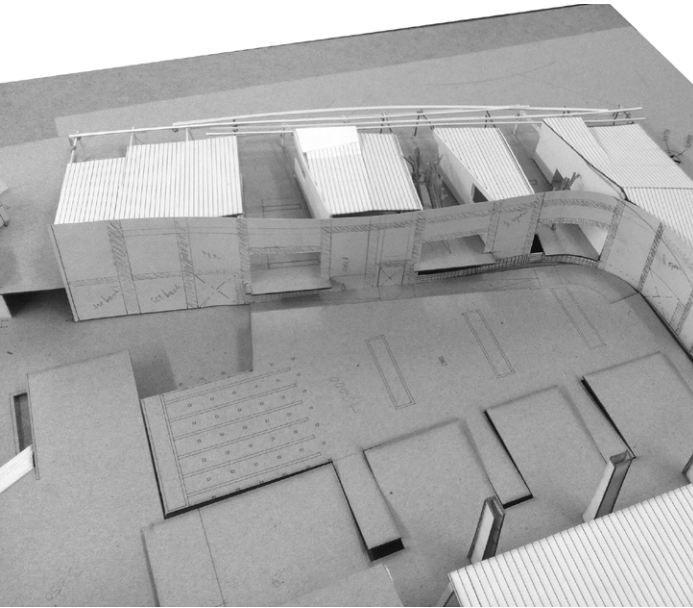


Figure 6.1.3.12-6.1.3.16\_Three-dimensional development (Author, 2013).



## 6.2. THE LEVELS OF PUBLIC-INDUSTRIAL ENGAGEMENT

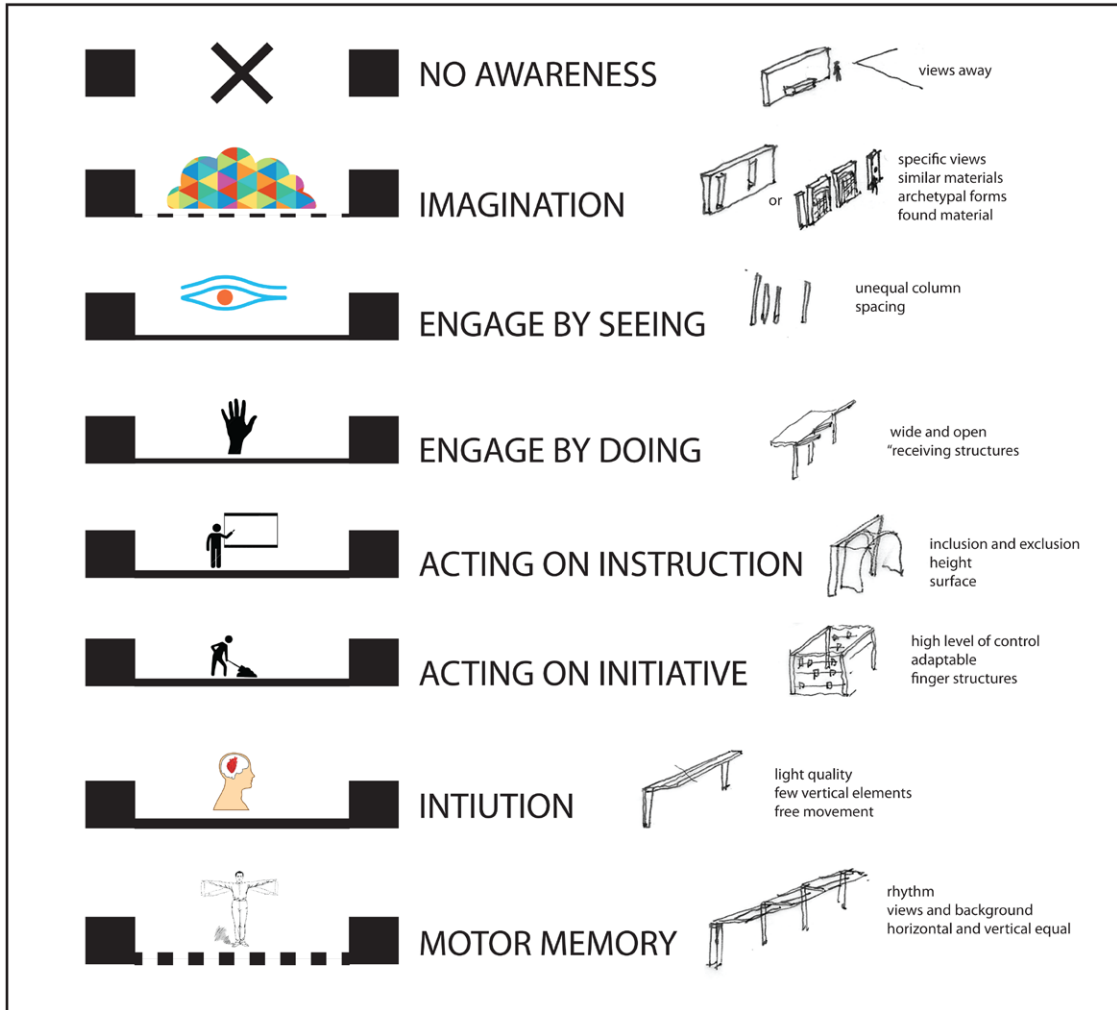
To provide a framework for the design of the solvent-building, the type of engagement between the public and the industrial activities needs to be defined. These engagements structure public interaction with industrial activities across seven levels. Different senses are utilized for different engagements, and an architectural language was developed in order to make the engagements legible. The seven levels are further illustrated in Figure 6.2.1.

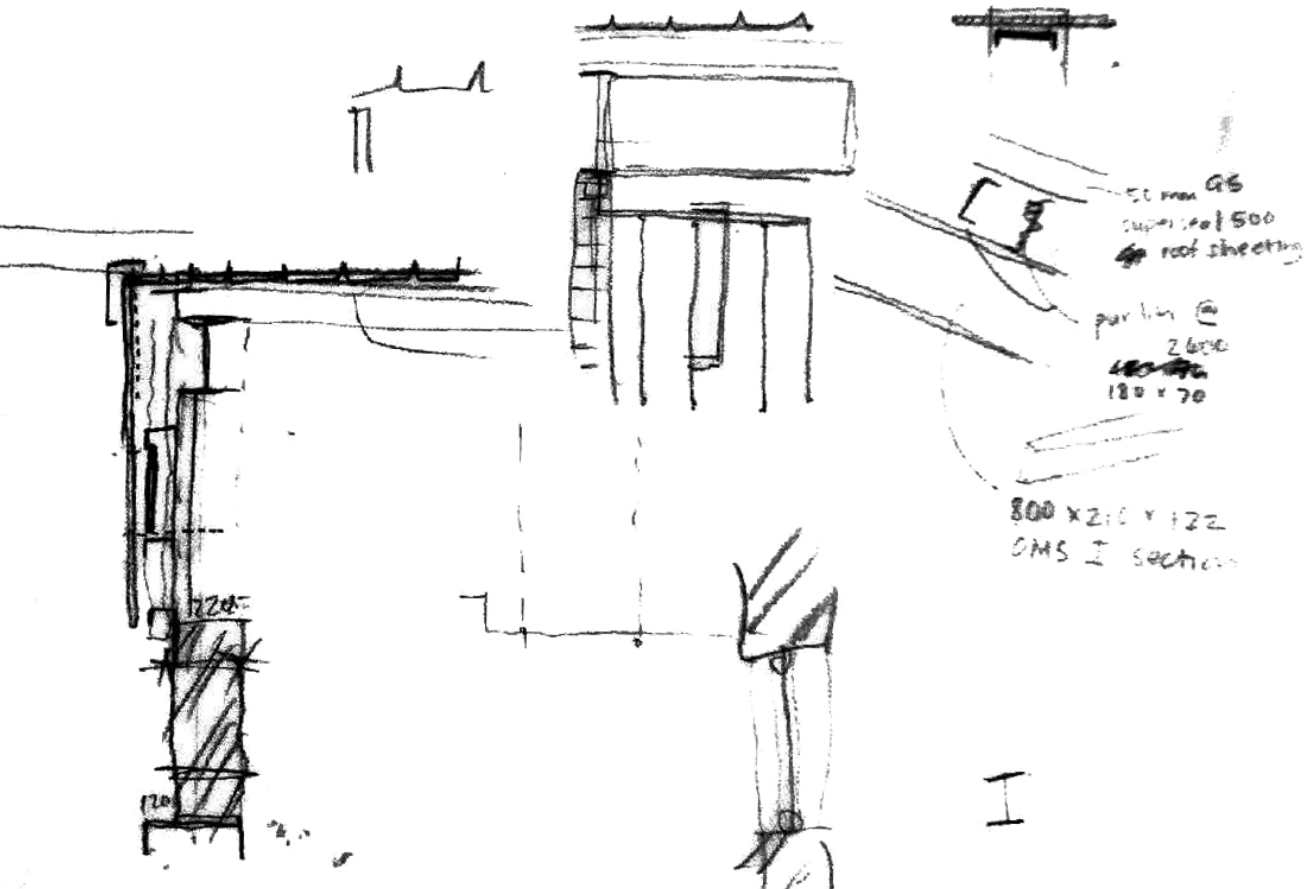
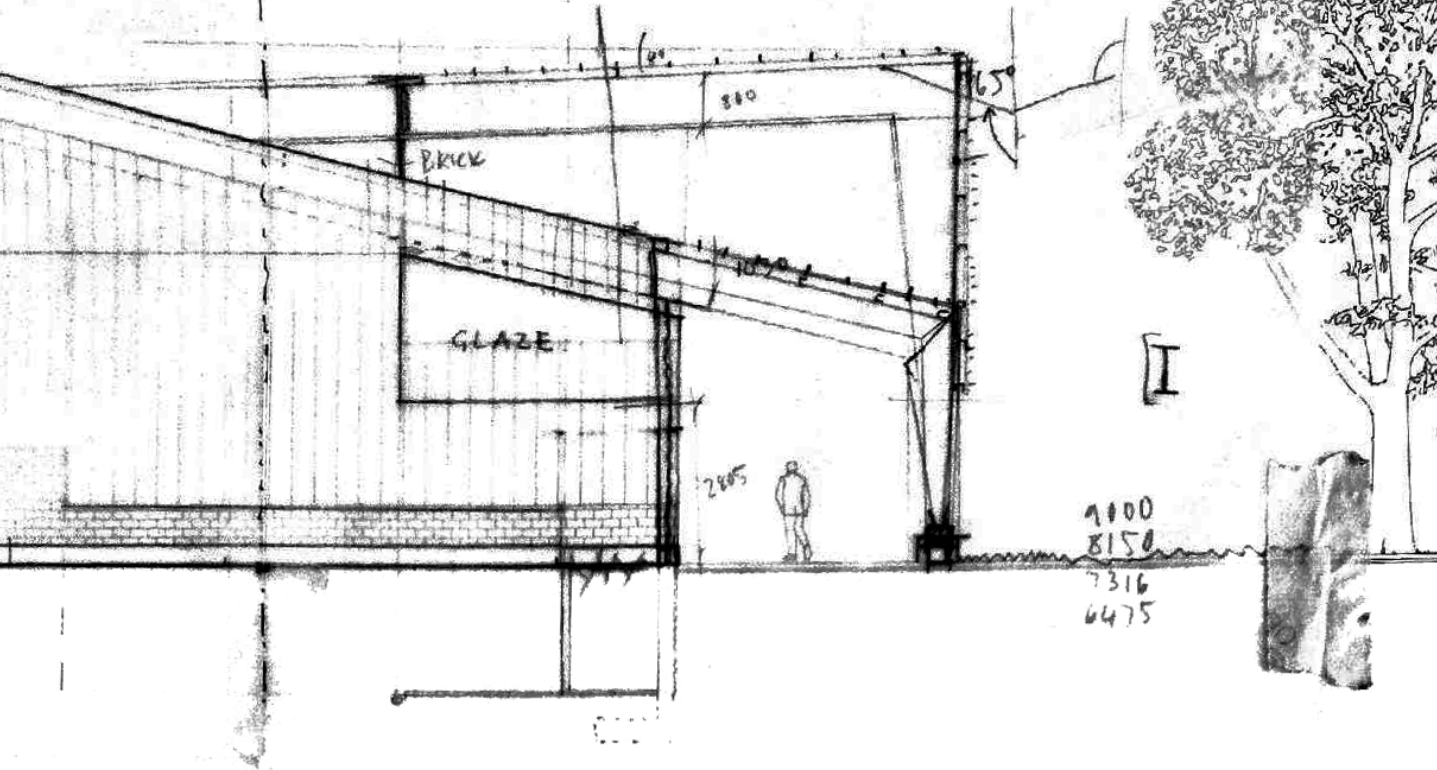
1. **No awareness**  
The public is not aware of any industrial activity. The industrial activities are completely hidden (underground).
2. **Imagination**  
Industrial activities are heard and smelled but only very specific glimpses are indirectly provided. Similar materials are used and reference is made to archetypal forms (i.e. brick arches).
3. **Visual engagement**  
Members of the public can visually engage by seeing industrial processes and by varying proximities to the process. The angle of view and light quality is used to achieve the engagement.
4. **Tactile engagement**  
Direct tactile engagement is realized through the specific inclusion and exclusion of different aspects of the industrial process. This means that certain elements in the industrial process are isolated and can be touched although they are still in use. Elements like height and surface heighten the experience.
5. **Acting on instruction**  
This engagement is achieved by means of examples and precedents as well as a low level of experimentation and control. Physical contact is important, and this level of engagement can also incorporate forms of teaching.
6. **Acting on intuition**  
This level of exchange is open and adaptable, and entails a high level of experimentation and control. A certain level of give-and-take is required and safety becomes an important factor.
7. **Muscle memory**  
Patterns and repetitions form the basis of this level, and exterior views become the backdrop of the activity.

The engagements are mapped onto plans and sections of the building to aid the decision-making process concerning materiality and form.

Figure 6.2.1\_Illustration of Levels of Engagement (Author, 2013).







# CHAPTER 7

## TECHNOLOGY

### SUMMARY:

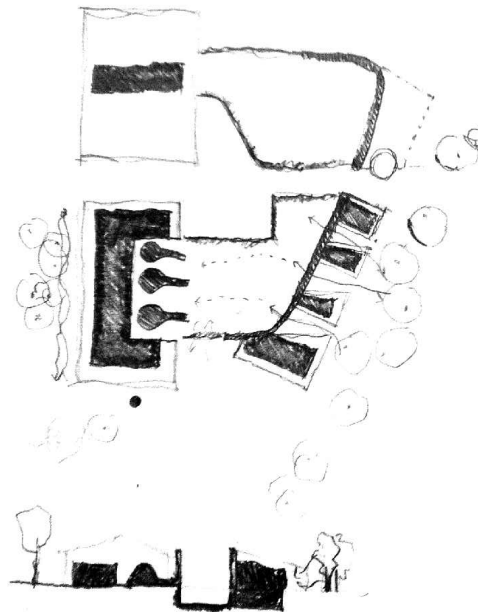
The notion of architecture as a constructional craft is discussed in relation to Kenneth Frampton's view on tectonics, illustrated in his book "Studies in Tectonic Culture" MIT Press 1996. The relationship between place, culture and tectonics advocated in the book is used as the basis for the tectonic concept of New Era Ceramics. By taking the composition of existing fabric as the starting point for making technological decisions, the intent is not to contrast the old and the new, but to work with the existing technology on site, and to provide for an exchange between the absorption of the old built fabric into the new (solution), or the strengthening of existing technology and specific new use of it (expression).

Heavy and stable elements become the language associated with industrial activity and related spaces, and frame the interior industrial courtyard between the existing firing kiln building and new eastern addition. Lightweight, floating elements are associated with social functions, and sit over the stereotomic core. Lastly the ecological functions wrap around and through the social functions and are articulated by soft and tensile tectonic materials like timber. The different technological languages make the different building functions legible.

Bricks produced on the site were the only tactile connection between the public and the site, and are tectonically applied as a new mediating element between the public and the industrial production line by a datum diaphragm wall. The ability of brick to be both a structural element as well as a weaving element is harnessed as a conceptual driver of hybridity.

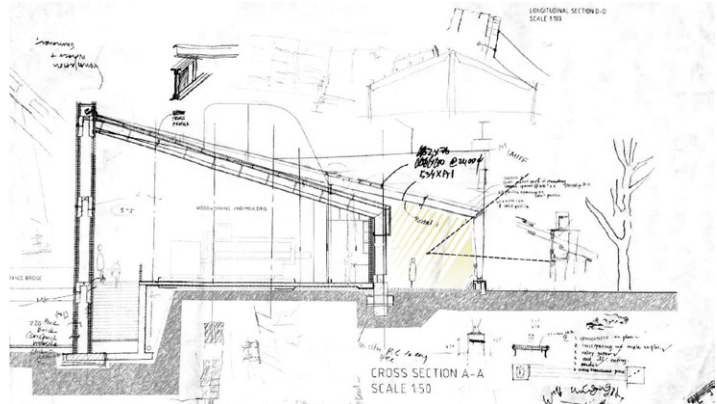
The tectonic intentions are not dependent on the concept of a solvent-building, rather, they have an inherent relationship with it. The technical resolution of the building articulates the conceptual decisions and aims to render them recognizable (Vittorio Gregotti, 1983, cited in Nesbitt, 1996:496).

Figure 7.0\_ Technological intentions: Hard interiors with light shells (Author, 2013).

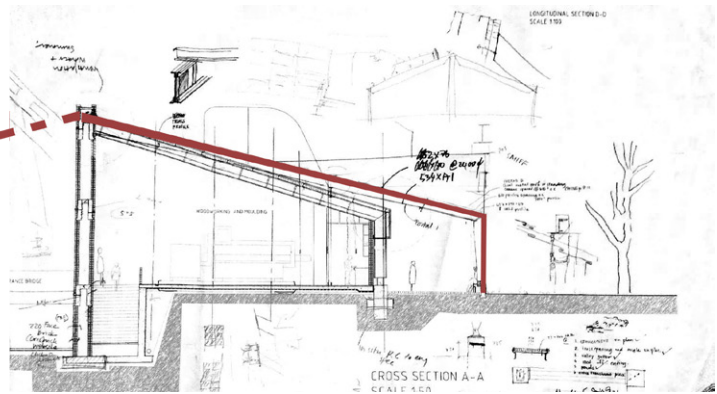




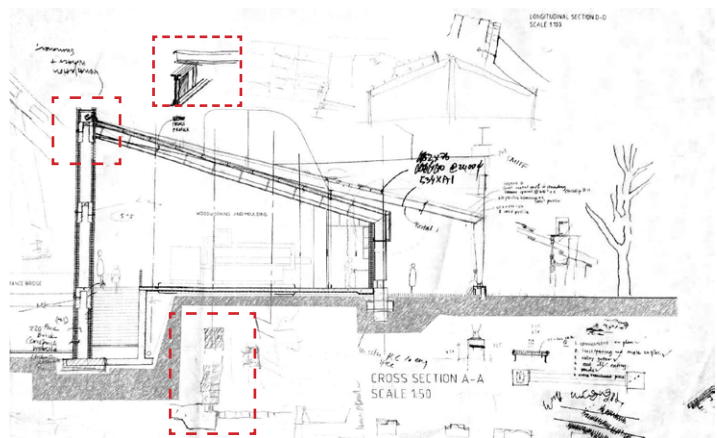
architecture as place



architecture as norms



architecture as technology



## 7.1. ARCHITECTURE AS A CONSTRUCTIONAL CRAFT

In the book “Studies in Tectonic Culture” Kenneth Frampton advocates the cultivation of a tectonic tradition that will enrich the priority given to architecture as spacemaking by reconsidering the constructional elements used to create it (1996:2). He challenges the prestige attached to figurative signification and abstract reference in architecture and favours the importance of the body in understanding the meaning of space (1996: 10,11).

Frampton is in opposition to a building technique that derives its form from discourses such as figurative arts. He validates this statement by referring to Giorgio Grassi’s 1980 essay “Avant Garde and Continuity” (1996:2)

*It is actually pathetic to see the architects of that “heroic” period, and the best among them, trying with difficulty to accommodate themselves to these “isms” [Cubism, Suprematism, Neo-plasticism]; experimenting in a perplexed manner because of their fascination with the new doctrines [...] only later to realize their ineffectuality.*

At the same time, Frampton recognizes the risk of allowing technology to become an autonomous force that guides the making of place. He refers to Heidegger’s fears of the rootlessness of the modern world in “Building, Dwelling, Thinking” 1954.

*Technology was disturbing to Heidegger inasmuch as he saw it as being devoid of any respect for the intrinsic nature of things. He considered that neither nature, nor history, nor man himself would be able to withstand the unworldliness of technology if it were released on a planetary scale (1996: 24).*

The immense impact of changing technologies on the built environment, especially those technologies associated with “green building” and the various rating tools available today has not gone without criticism. The readiness with which green technologies and rating tools allow themselves to become design generators and cause generic buildings devoid of any contextual connection are criticized by regenerative practitioners (du Plessis, 2012; Cole, 2012). This is not to say that technology has no place in the making of architecture, only that it should not be the driving force of tectonic articulation.

These writers, including Frampton argue for a third and important vector in the design process, namely place. Place and the history of place, or “*story of place*” as it is referred to by Mang (2009) provides the contextual clues necessary to create the small niches of particularity that differentiates culture from civilization, (Nesbitt 1996:469) and incorporates the ecological purpose of any site.

It is therefore necessary to consider an approach to construction that finds itself at the convergence of contextual constraints, cultural practices and technological advances. These three vectors will be referred to as place, norms and technology, and provide basis for the tectonic resolution of the New Era Ceramics building. This will allow for the technological articulation of the building to relate to the tactile, corporeal experience of place and to cultivate an appreciation of context within the constraints of physical material properties in a poetic way.

Figure 7.1.1\_ Architecture as place, norms and technology (Author, 2013).

## 7.2 EXISTING TECTONIC CONDITIONS

The existing conditions of place, norms and tectonics in the Era Bricks Site are used as a starting point for tectonic investigation. Existing materiality informs the choice of new materials and their place in the new context. The geometry and language of the existing sheds also provide physical clues to approach the tectonic of the Eastern addition.

These qualities inform not only the choice of materials but also their finish and methods of fixing. The investigation of these qualities result in two tectonic concepts, one deals with existing fabric and the other with the materiality of the new Eastern addition building.

### Stereotomic Core

The existing firing kilns consist of 34 brick barrel vaults made of dense refractory bricks with a high aluminium oxide content. The bricks are loosely packed and supported on either side by the next vault. A layer of river sand on top of the vaults supports the structure from above. The brick vaults are a dense and stereotomic element associated with the industrial activity. It is therefore continued in the construction of the new batch firing kilns. These are made using the bricks of the 11 vaults that are to be removed on the eastern side of the building. These kilns are structurally independent from the rest of the shed.

### Lightweight Shell

Lightweight steel shell over firing kilns

A steel structure covers the firing kilns and rests on 300x300mm steel H-sections standing outside of the kilns. The columns support a 800mm deep custom welded T-section truss that in turn support a s-profile corrugated iron sheet metal roof. The lightweight steel structure covers the kilns and protects the “Riki-Tik” machines on the first floor.

### Loose Stereotomic Modules

Brick Modules awaiting dispatch

The area east of the firing kiln building is currently filled with a collection of brick pallets awaiting dispatch. These heavy elements in the landscape are ever-changing and will be replaced by the new eastern addition. The memory of the bricks awaiting dispatch are retained in the materiality of the new datum wall, that retains the thickness of the pallets, but rearranges them to form a new wall. The materiality of the

wall is envisioned to be diverse and dynamic in character, made with a variety of the bricks produced on site and shifting between permeable and dense varieties at specific intervals along its length.

### Natural Screen

The eucalyptus grove forms a soft natural edge to the site and provides shade and habitat for small animals. The grove traps dust and obscures the view of the factory from Eersterust. This edge is reinterpreted as a protective timber element around both the eastern addition and the old firing kiln building, and extends around the building into the viewing platforms. This element frames an important mediating condition of public industrial and social actors, and is made of of steel and timber.

### New Interior Finishes

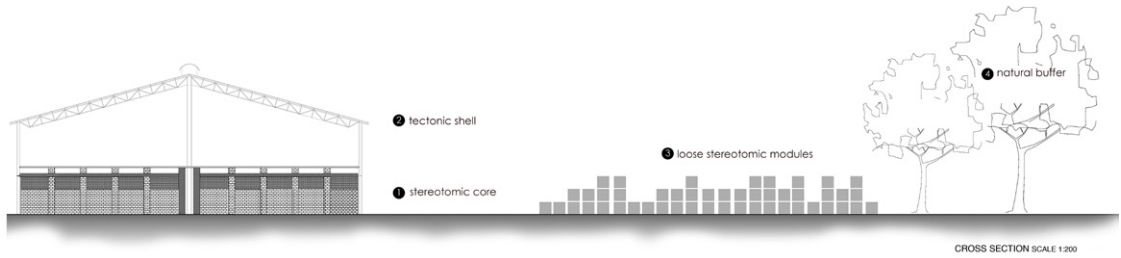
Most of the existing built fabric is left unfinished and expresses its true nature. The new addition will continue this aesthetic with facebrick and unpainted steel and concrete. The interior of the studio, workshops and employee services building however needs to be finished in order to create a comfortable interior environment. Material decisions for the interior are based on their lifecycle and carbon footprint, and insulation properties.

Nonstructural internal walls will be made of 110mm thick brickwork that is bagged and painted. The ceiling is made of 20mm plywood boards that sit on top of purlins so that the roof structure can be exposed, and floors will receive a 40mm thick screed.

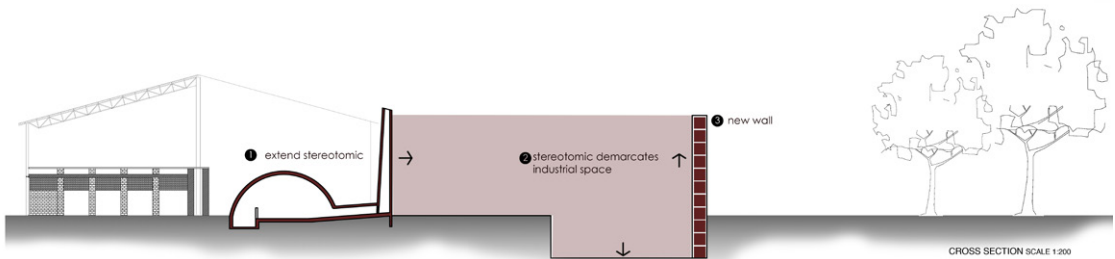




## EXISTING TECTONIC CONDITIONS



## STEREOTOMIC INTENTIONS

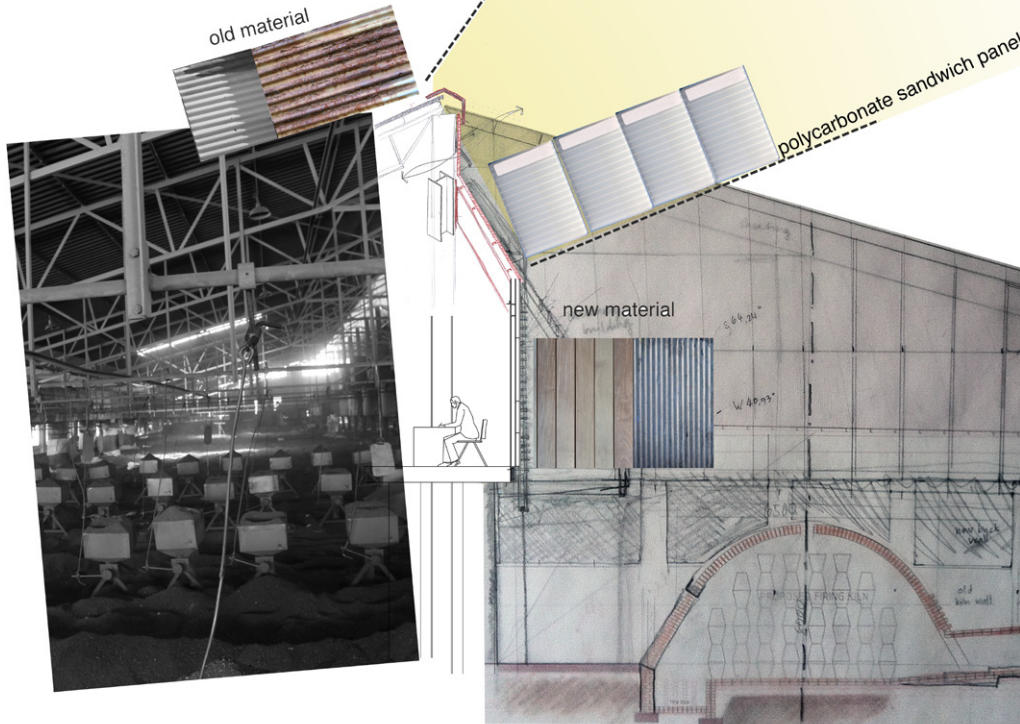
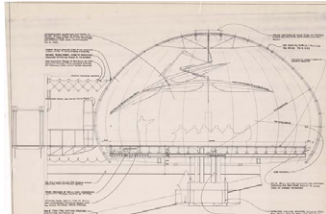


## TECTONIC INTENTIONS

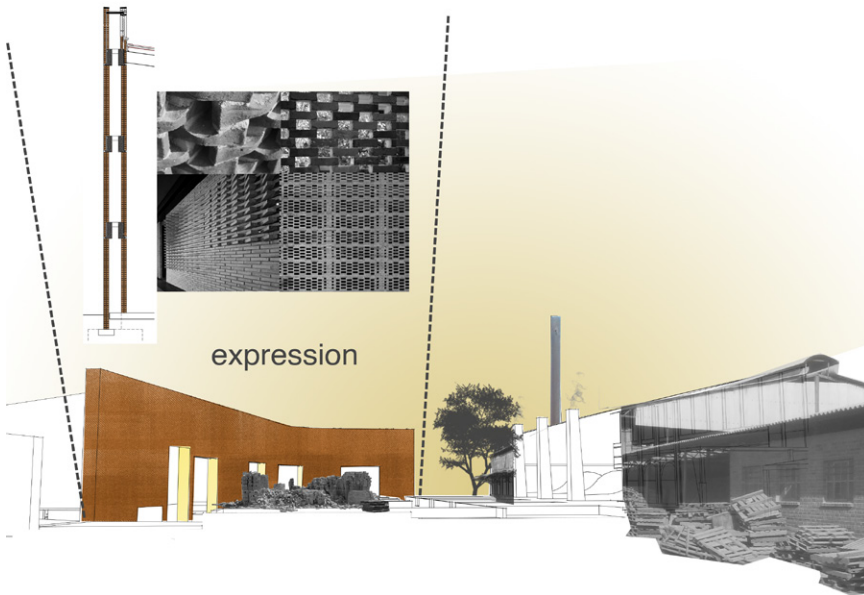


Figure 7.2.1\_ Palette of existing conditions (Author, 2013).

Figure 7.2.2\_ Cross-sectional relationship between existing conditions (Author, 2013).



solution between old and new



### 7.3. MAIN TECTONIC CONCEPTS:

#### The Expression And Solution Of The Existing And New

The main tectonic concept for the New Era Ceramics building differentiates between the addition to the existing shed and the new eastern addition as an extension and progression of the existing. However, the main tectonic condition of stereotomic core, lightweight roof and ecological screen is maintained.

#### Solutive Technological Approach – Connections Between Old And New

Solutive connections refer to connections between existing and new that incorporates both old and new into a mediatory condition. It introduces a solute element that either covers or supports both old and new elements, and enables the retention of the integrity of both.

The solution between existing and new can be seen in the Lingotto Factory Conversion in Torino, Italy, from 1983 to 2003 by the Renzo Piano Building Workshop.

The Lingotto Factory was built between 1917 and 1920 as a Fiat manufacturing plant, and praised by Le Corbusier in his book *Vers une Architecture* (1923) as “a guideline for town-planning”. The factory was decommissioned in 1982, and in 1985 the Renzo Piano workshop was commissioned to convert the factory into a multi-purpose facility in order to knot the factory back into the city, and reclaim the million square metres it occupies (Lelyveld, 2004:15). These included a helipad and dome-shaped boardroom on the factory roof, as well as a new concert hall in the basement underneath the courtyard.

The Leitmotif for the different interventions was various types of technology, but the fundamental characteristics of the factory were to remain intact (Jodido, 2002:33). Instead of using contrasting materials to distinguish between old and new, the existing structure and connections were used and built upon.

A similar approach is intended for the batch-firing kiln insertion of the New Era Ceramics building. The existing steel column structure is used to support a new roof. This insertion attaches itself to the existing in such a way that the connections frame the solutive space.

#### Expressive Technological Approach- The Making Of New

The second technological approach aims to make specific new use of existing materials and technologies on site, and to exhibit these in an adapted format. This approach includes the use of new material that can be stereotomic or tectonic forming the supporting structure and basis for the expressive use of material used in the existing building.

The Ningbo History Museum by Wang Shu and Amateur Studio in Ningbo, China, offers some expressive technological clues: The Museum’s exterior is composed using an ancient Chinese building technique called *wa pan*, used by farmers in the area to quickly assemble walls with debris collected from destruction sites. The fragments are made up of different materials and sizes and express a certain vulnerability of built form absent in most of the neighbouring buildings.

The New Era Ceramics site also has a variety of brick debris that can be utilized in the same fashion. A similar approach is intended for the datum wall that provides the industrial edge to the east. A concrete frame is built that provides stability for new and old bricks to be woven and expressed along its length.

*Figure 7.3.1\_ Lingotto Factory Conversion in context (R&D Valterza, 2010).*

*Figure 7.3.2\_ Detail of new boardroom exterior (<http://www.rpbw.com/en/home/>).*

*Figure 7.3.3\_ Solutive detailing approach (Author, 2013).*

*Figure 7.3.4\_ Expressive detailing approach at the datum wall (Author, 2013).*

*Figure 7.3.5\_ South Façade of the Ningbo Museum showing wa pan construction (Iwan Baan, 2012).*

*Figure 7.3.6\_ Interior Courtyard spaces (Iwan Baan, 2012).*



## 7.4 BRICK AS A TECHNOLOGICAL MEDIATOR BETWEEN STEREOTOMIC AND TECTONIC

Frampton illustrates clay brick's ability to become both a stereotomic element or tectonic element in the introduction to his book "Studies in Tectonic Culture" MIT Press 1996.

Figure 7.3.1 Detail of brick weaving.

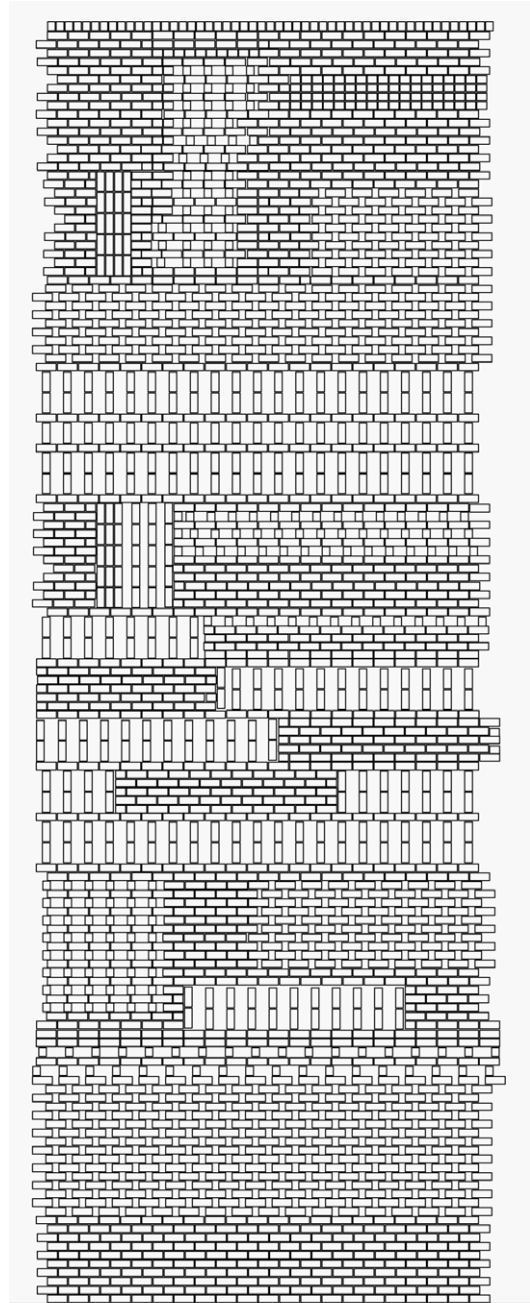
In this regard we need to note that masonry, when it does not assume the form of a conglomerate as in pisé construction, that is to say when it is bonded into coursework, is also a form of weaving, to which all the various traditional masonry bonds bear testimony. (1996:6)

Brickwork thus has the ability to become a solutive material with both a stereotomic as well as tectonic capability. This quality of bricks has a direct history within the wider context of Pretoria with architects like Norman Eaton making use of woven brickwork to become shading elements or screen walls (Fisher, 2002).

In the New Era Ceramic scheme, brick is used as a woven element between the industrial courtyard and the social functions around it, and manifests itself most expressively in the datum wall. This is the main connecting element between social and industrial functions, and is made from a concrete framed structure and filled in with facebrick produced on site. The double skin of the brick wall as well as its thickness of one meter make the habitation of the wall possible. The datum wall also acts as a ventilation device in the timber moulding workshop where there is excessive dust and heat. Here the internal skin allows for the release of hot air that is extracted through the cavity between the skins.

The stereotomic brick structure of the new firing kilns and the datum wall designate and enclose the industrial activity. They become elements that is associated with ceramic production and thus aid in public engagement with industrial processes.

Figure 7.4.1\_ Elevation of brick weaving composition (Author, 2013).



## 7.5 STRUCTURAL SYSTEMS

### Interior Industrial Core As Substructure

The space between the new batch firing kilns and the eastern addition forms the ceramic courtyard. This courtyard is excavated to four meters below the existing ground level and metaphorically refers to extraction of clay. The level difference also creates a boundary between the visitor and the industrial ceramic processes in the courtyard. The core is articulated by stereotomic concrete retaining walls and is articulated on the western edge by the batch firing kilns and the datum wall on the east. This demarcates the industrial space and becomes the new stereotomic core. The eastern addition reinterprets the stereotomic core of the firing kilns as face brick blocks that are situated independently under an overarching roof.

### Lightweight Shell As Roof

The lightweight steel structure of the existing firing kiln building is repeated in the roofing structure of the eastern addition. The slope of the roof is kept the same as the existing shed in order to form a geometrical composition, but the material differs in order to understand the addition as new. A 500 Superseal steel roof sheet was chosen over a 534mm deep steel portal frame. The sheeting is left unfinished to mimic existing roof finishes. The portal frame extends and covers a public walkway and becomes the mediating element between the interior industrial functions of the eastern addition and the predominantly public edge. Here the roofing material changes to a timber pergola that is supported by steel T sections bolted to the portal?.

Figure 7.4.1 Detail of the interior core of the Eastern addition

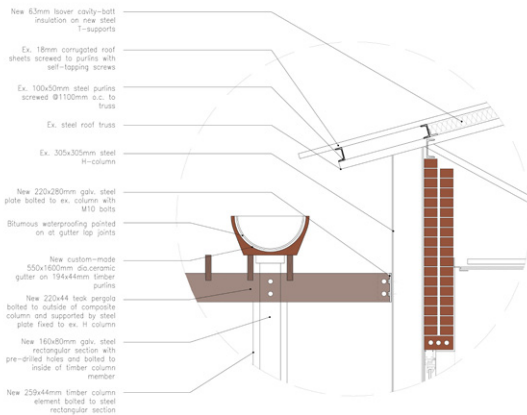
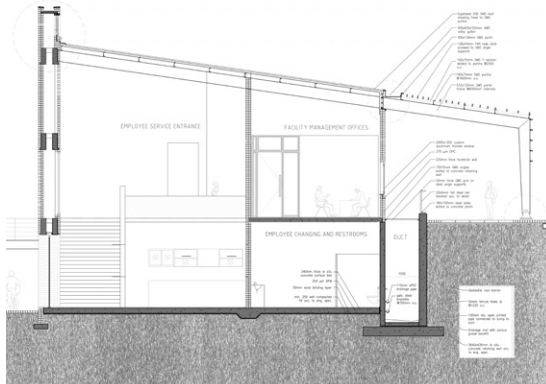
### Natural Screen

The natural screen provided by the eucalyptus grove is reinterpreted as a shading and sheltering pergola that surrounds both buildings with punctures into the eastern addition to reach the industrial core. The natural screen becomes a mediating element and is thus made of a combination of materials from timber to ceramics. The pergola also functions as a water catchment element with a custom made extruded ceramic gutter.

Figure 7.5.1\_Industrial core as substructure (Author, 2012).

Figure 7.5.2\_ Gutter detail, NTS indicating existing steel roof (Author, 2012).

Figure 7.5.3\_Perspective of pergola structure expressing the natural screen (Author, 2012).



## 7.6 APPROACH TO SERVICES

The New Era Ceramics Buildings comprise of three zones with different service requirements. These are:

1. The Old Firing kilns that now house offices and retail spaces to the west, and new batch firing kilns to the east
2. The Basement grinding and mixing workshops
3. The Studio, workshops and employee services building.

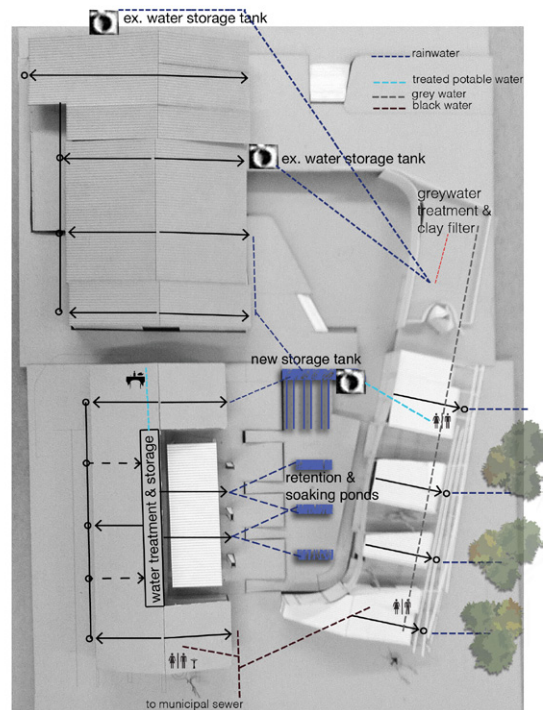
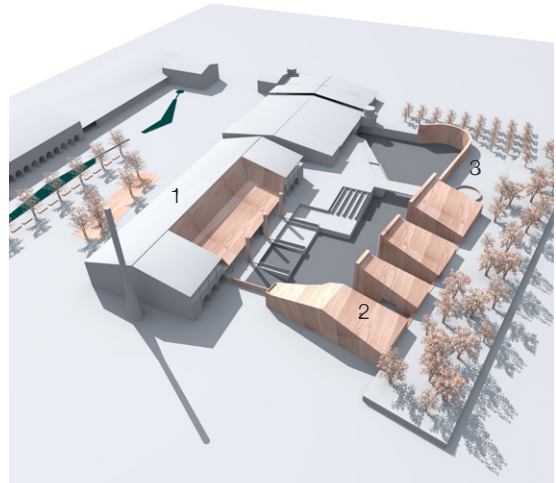
Services like water reticulation and energy are holistically approached to deal with all the buildings' water requirements, while ventilation, heating, cooling and lighting strategies pertain to the specific spatial and functional requirements of each zone.

### Water Reticulation

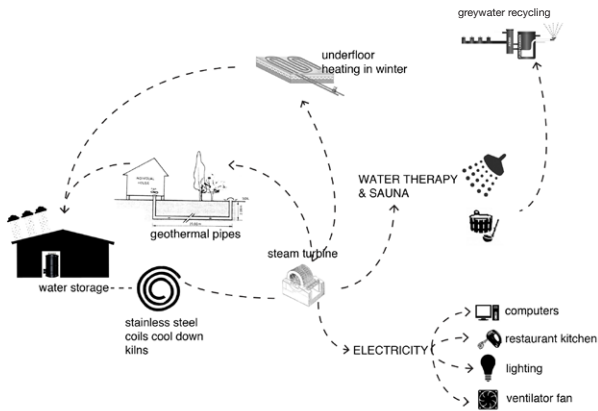
Ceramic production is a water-intensive activity: Approximately 3 350l of water is consumed for each tonne of ceramic product that is made, of which 2 800l can be reused after filtering as greywater. (European Commission 2007:130). The New Era Ceramic production facility will aim to produce between 4 and 4,5 tonnes of ceramic products per day, and will thus require roughly 15 kilolitres of water daily. Water for use in the production of clay products does not need to be potable, but must be free from oil. Rainwater is harvested from both the Old Drying Shed roof for this purpose. The harvested rainwater from the drying shed building is stored in existing water tanks on site, and relies on gravity and the 4m height difference between tank and mixing basement to be transported.

Rainwater is also harvested from the Firing Kiln building and Eastern addition. Rainwater from the firing kiln building is stored in a service core in the middle of the building as well as underground tanks under the square. This water is used for the restaurant, offices and public ablutions located in the building.

The ceramic water filters need to be tested for the correct porosity and strength, but function as an indirect filtering process. The water from this part of the process can thus be used for showers, sinks and flushing in the employee services building.







## Harvest Of Energy

Water also forms part of the energy strategy of the building by making use of the heat gain in the firing process: Energy from the batch-firing kilns can be captured and harvested for use in the firing kiln building. The batch-firing kilns must be sufficiently cooled down before they can be reloaded. Stainless steel pipes are coiled through the kiln structure, and water pumped through the pipes after firing. The high temperature (600-800°C) of the kiln structure turns the water into steam. The pipes lead into steam turbines that lower the temperature of the water and generate power. Each of the three batch kilns are equipped with a turbine and a water storage tank. After cooling down from 800°C to under 100°C, the water is then pumped through pipes in the new first floor slab in winter for space heating purposes, or under the ground in summer to be sufficiently cooled down before entering the kilns again. Energy from the steam turbine will be sufficient to power pumps, lights, computers, fans and other equipment in the firing kiln building.

## Ventilation

The Eastern addition buildings are sufficiently cross-ventilated. Openable windows and stacking doors allow occupants to control the amount of air intake, and air is sufficiently cooled down by the water bodies and movement of water in the ceramic courtyard. The datum wall offers thermal mass to protect the interior the Eastern addition against the western sun. Basement toilets are ventilated by means of high level windows in the basement wall that open up to the North.

Higher numbers of airchanges per hour are required in the mixing basement and timber moulding workshop. Here, the slope of the roof is used to collect warm air that ventilates through cavities in the brick datum wall and out of the building through a mechanical fan.

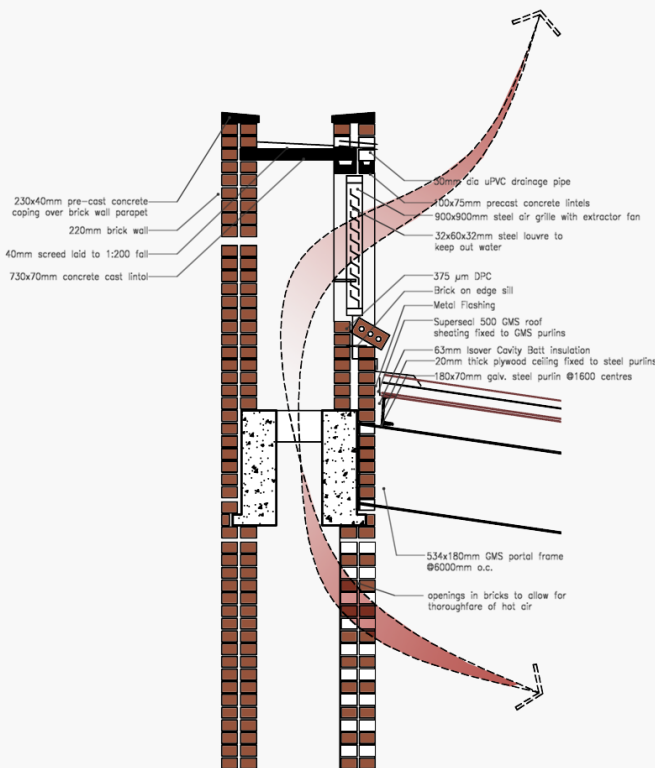


Figure 7.6.1\_ Different service zones (Author, 2010).

Figure 7.6.2\_ Water reticulation strategy (Author, 2013).

Figure 7.6.3\_ Energy harvesting system summary (Author, 2013).

Figure 7.6.4\_ Ventilation through datum wall (Author, 2013).

Figure 7.6.5 (next page)\_ Service strategy and execution (Author, 2013).

ROOF AREA = 1180m<sup>2</sup>  
MONTHLY YIELD (m<sup>3</sup>)

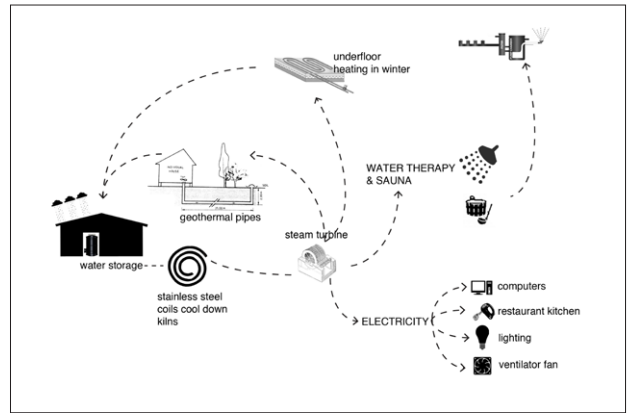
JANUARY	144 750
FEBRUARY	79 800
MARCH	87 200
APRIL	54 278
MAY	13 830
JUNE	7 450
JULY	3 200
AUGUST	6 385
SEPTEMBER	23 400
OCTOBER	75 500
NOVEMBER	104 300
DECEMBER	117 000

PROPOSED USE (m<sup>3</sup>/MONTH)

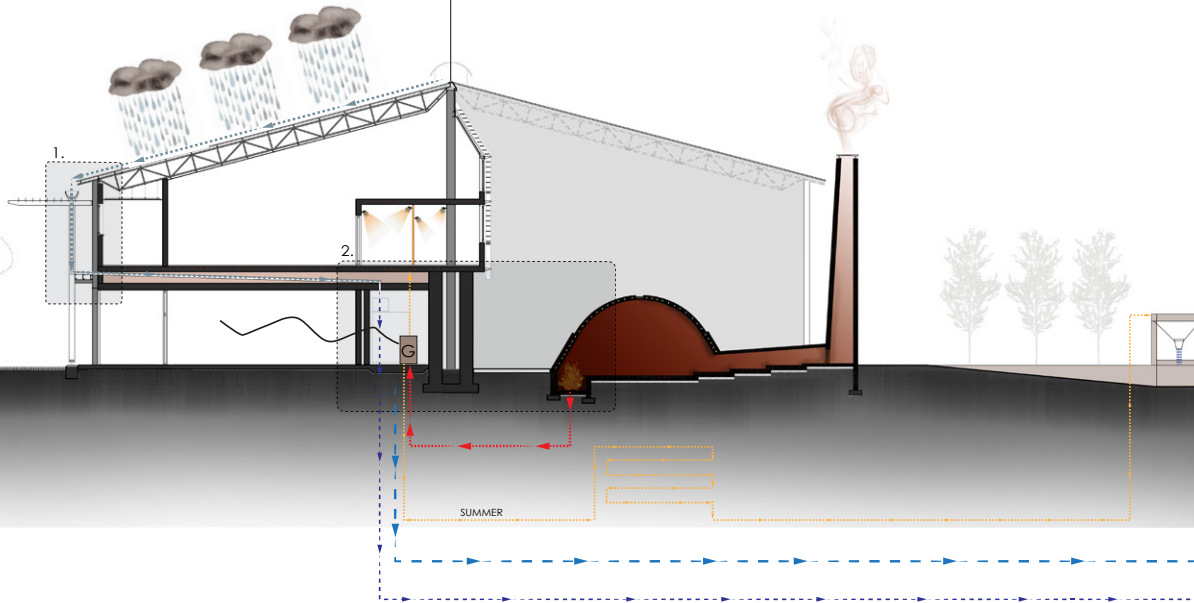
ABLUTION	289
WATER THERAPY	750
RESTAURANT	40,7
CLEANING	23
<b>TOTAL WATER OUT</b>	<b>1102,7</b>

=110 200 LITRES

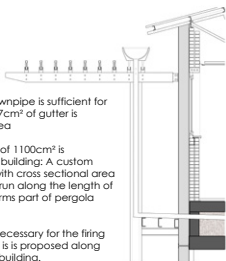
138 600 litres are stored for monthly use  
this is 34% of the total yield in JULY  
the remaining water is stored in the soaking  
ponds



SERVICE SUMMARY



RAINWATER CAPTURED FROM EXISTING KILN BUILDING ROOF AND DIVERTED TO THE FILTER AND STORAGE ROOM



It is assumed that 1cm<sup>2</sup> downpipe is sufficient for 1m<sup>2</sup> of roof area and that 7cm<sup>2</sup> of gutter is sufficient for 5m<sup>2</sup> of roof area

A gutter with cross section of 1100cm<sup>2</sup> is necessary for the firing kiln building. A custom extruded ceramic gutter with cross sectional area of 1150cm<sup>2</sup> is proposed to run along the length of the easter addition and forms part of pergola structure.

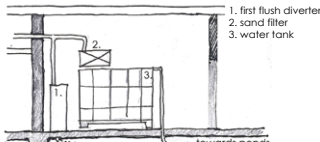
Downpipes of 1800cm<sup>2</sup> is necessary for the firing kiln building. 10 x 150mm ø is proposed along the length of the firing kiln building.

1.

RAINWATER STORAGE AND TREATMENT

3 x steel Braithwaite tanks of 2000mm x 6000mm x 4000mm are installed in a new water treatment room in the old firing kiln shed. The modular nature of these tanks make them ideal for installation in an existing building. A sand filter removes dust and any debris that might not have been removed by the gutter grating.

Water in the tanks are used to cool the kilns after firing by pushing the it through coiled stainless steel pipes built into the kiln structure. The water in the pipes are then fed into a steam turbine to generate electricity.



2.

SOAKING PONDS ACT AS OVERFLOW



Ceramic tiles need to be soaked in ponds for three hours after firing. Water for soaking does not have to be potable.

Water from the first flush converter and overflow from the storage tanks are directed in to three soaking ponds that collectively have the storage capacity of 39m<sup>3</sup> or for 39 000 litres of water.

The soaking ponds can deal with big volumes of water in the case of a storm, and collects surface runoff from the surrounding area.

3.

ROOF AREA = 843m<sup>2</sup>  
MONTHLY YIELD (m<sup>3</sup>)

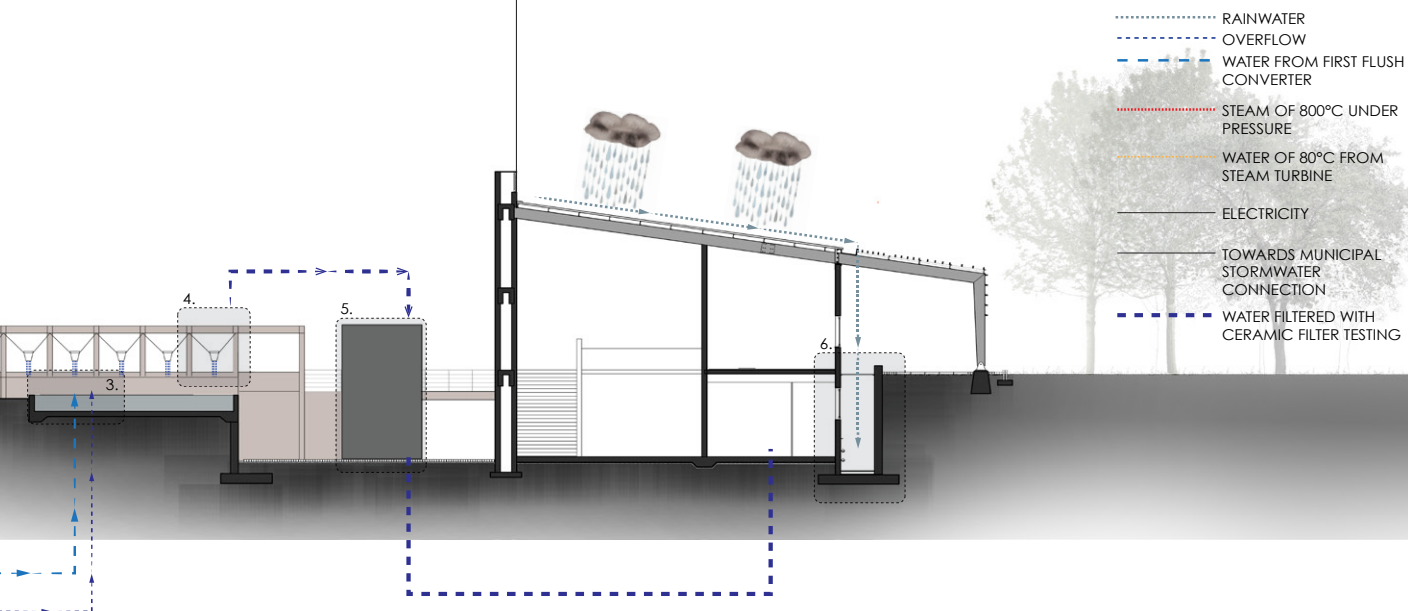
JANUARY	103 200
FEBRUARY	56 900
MARCH	62 200
APRIL	38 700
MAY	9 800
JUNE	5 300
JULY	3 200
AUGUST	4 500
SEPTEMBER	16 700
OCTOBER	53 900
NOVEMBER	74 350
DECEMBER	83 500

PROPOSED USE (m<sup>3</sup>/MONTH)

CLAY MIXING	450
EXTRUDING AND WHEEL	30
<b>TOTAL WATER OUT</b>	<b>480</b>

=480 000 LITRES

500 000 litres are stored for monthly use in existing water storage tanks this is 0,15% of the total yield in JULY the remaining water is used for irrigation of the surrounding soft landscape or directed towards the municipal stormwater connection

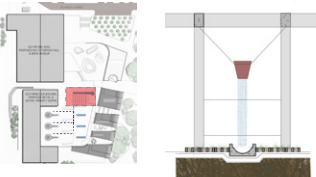


WATER FROM THE FIRING KILNS BECOME POTABLE AFTER USED AT FILTER TESTING BEAMS



Testing of the ceramic filters produces potable water as a byproduct of the process. The porosity of filters are tested by hanging them from beams, filling them with water and letting the water naturally filter through.

Water from the filters are captured and stored in a in a tank in the ceramic yard.



STORAGE TANK FOR POTABLE WATER FOR USE IN EMPLOYEE SERVICE CENTRE



Water captured from the ceramic testing beams are stored in a in-situ cast concrete water tank. The tank has the capacity to store 48 kl of water, which is replenished daily.

The water is used in the Eastern Addition building to flush toilets, in showers as well as for cooking in the canteen.

The total monthly water use of the Eastern Addition building is 1240 kl per month or 60kl per day.



RAINWATER FROM THE EASTERN ADDITION ROOF IS CAPTURED AND DIRECTED TOWARDS THE MIXING BASEMENT TO BE USED IN THE INDUSTRIAL PROCESS



Ceramic production is a water-intensive activity: Approximately 3 350l of water is consumed for every tonne of ceramic product that is made of which 2 800l can be reused after filtering as greywater.

The New Era Ceramic production facility will aim to produce between 4 and 4.5 tonnes of ceramic products per day, and will thus require 15 kilolitres of water daily. Water for use in the production of clay products does not need to be potable, but must be free from oil. Rainwater is harvested from the Eastern Addition's roof and gravity fed to the mixing basement in a service duct.

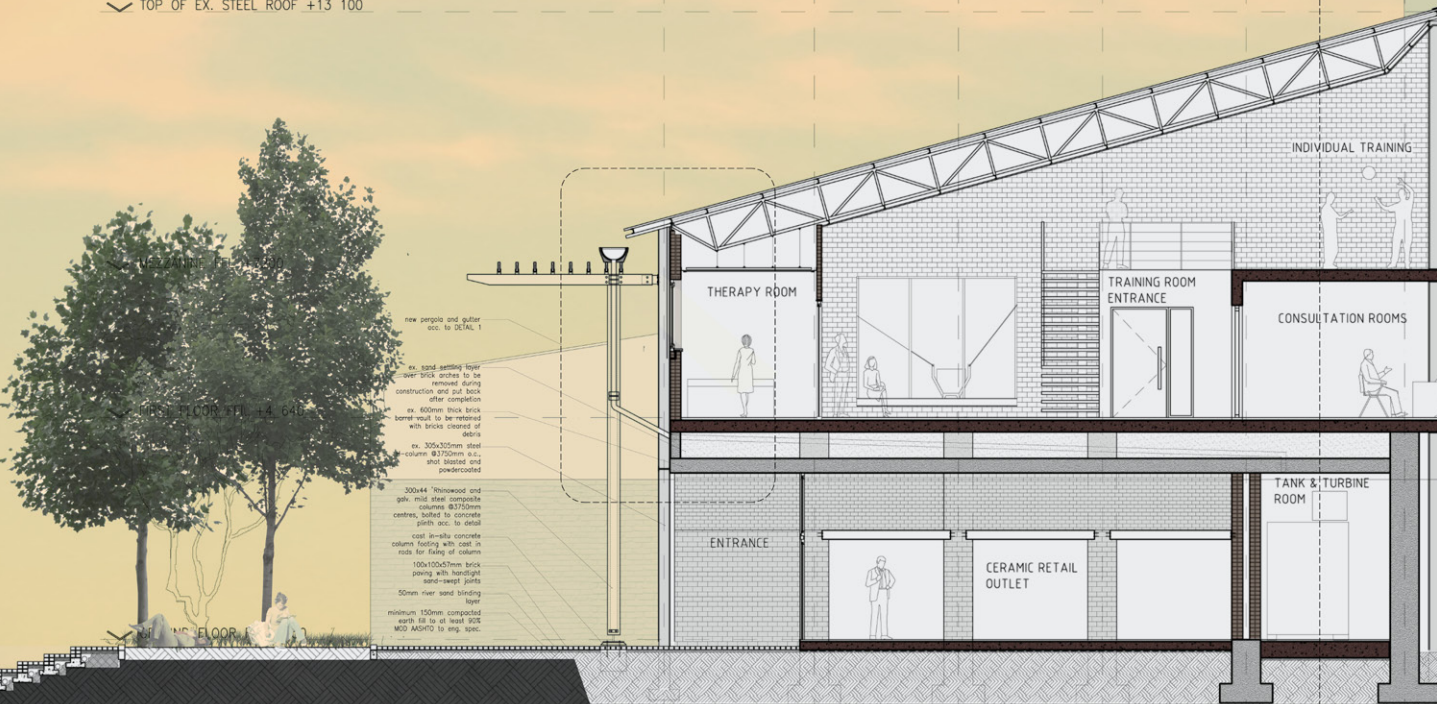


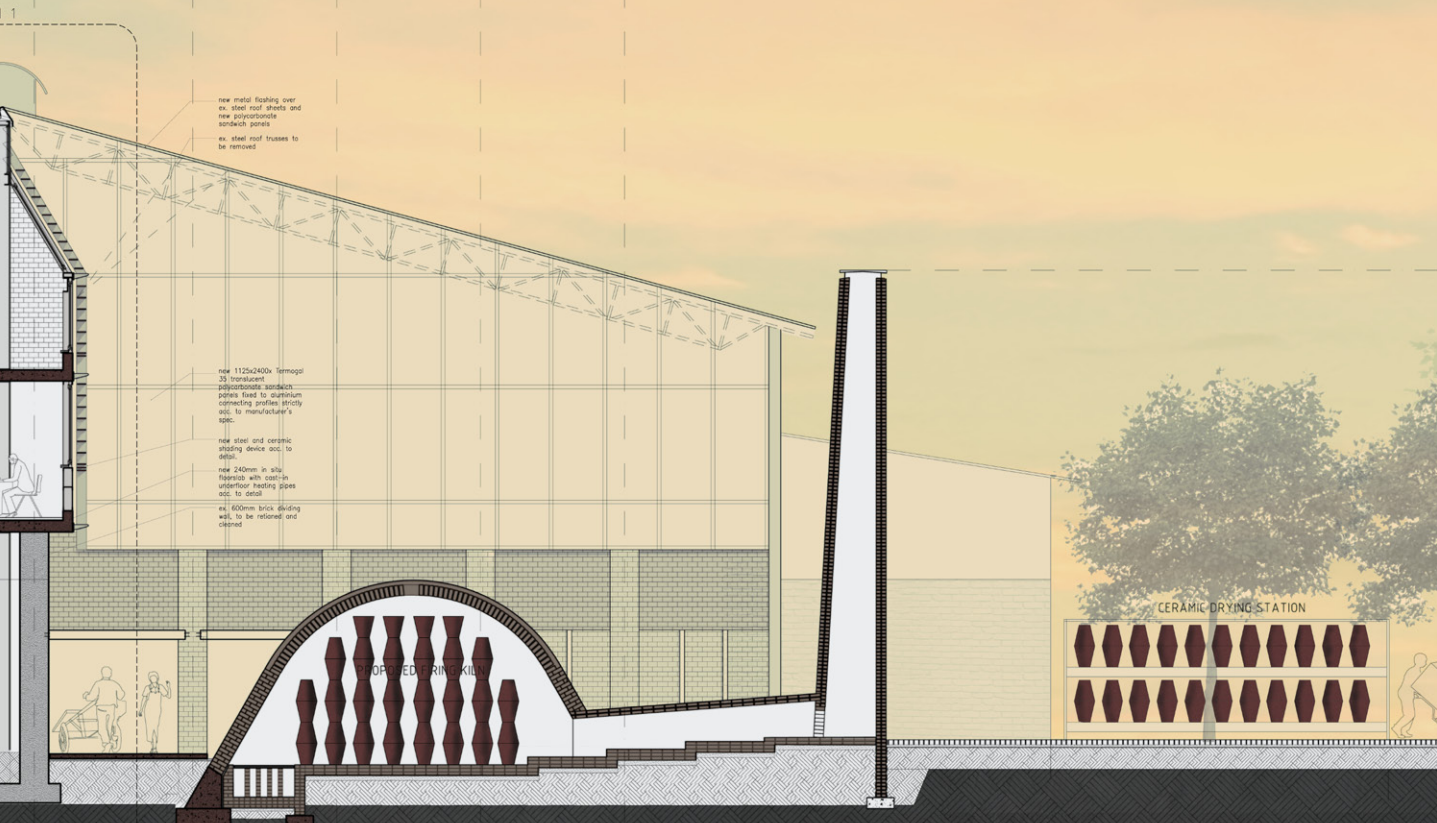


TOP OF EX. VENTILATION COWL +14 110

TOP OF EX. STEEL ROOF +13 100

DETAIL SECTION





new metal flashing over  
ex. steel roof sheets and  
new polystyrene  
sandwich panels  
ex. steel roof trusses to  
be removed

new 1125x2400mm Temagol  
33 translucent  
polycarbonate sandwich  
panels fixed to aluminium  
connecting profiles strictly  
acc. to manufacturer's  
spec.

new steel and ceramic  
sliding device acc. to  
detail

new 240mm in situ  
finishes with cast-in  
underfloor heating pipes  
acc. to detail

ex. 600mm brick glazing  
wall to be retained and  
cleaned

IMPROVED DRINK KILN

CERAMIC DRYING STATION





Figure 7.7.2 Section through new Eastern Addition, NTS (Author, 2013).

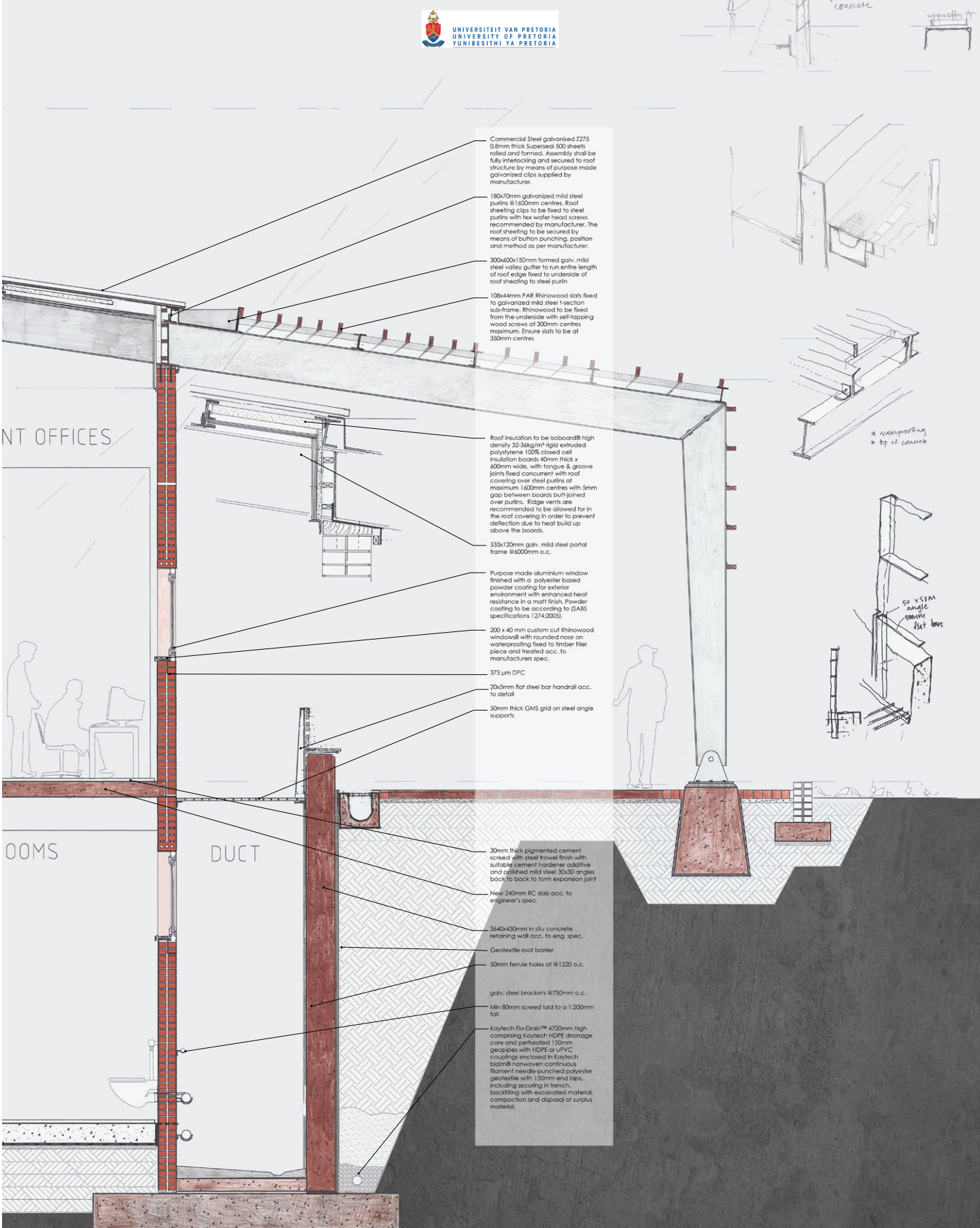




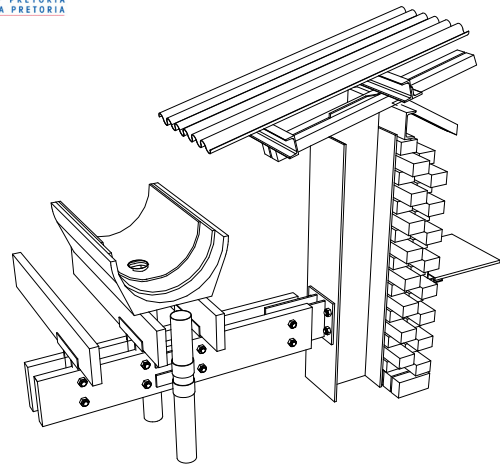
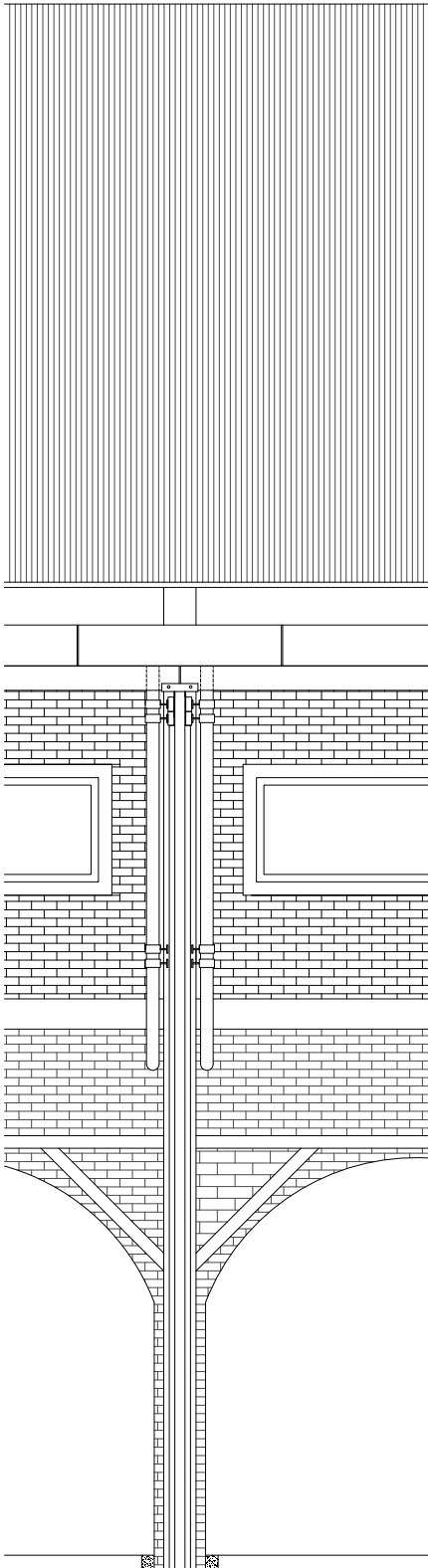




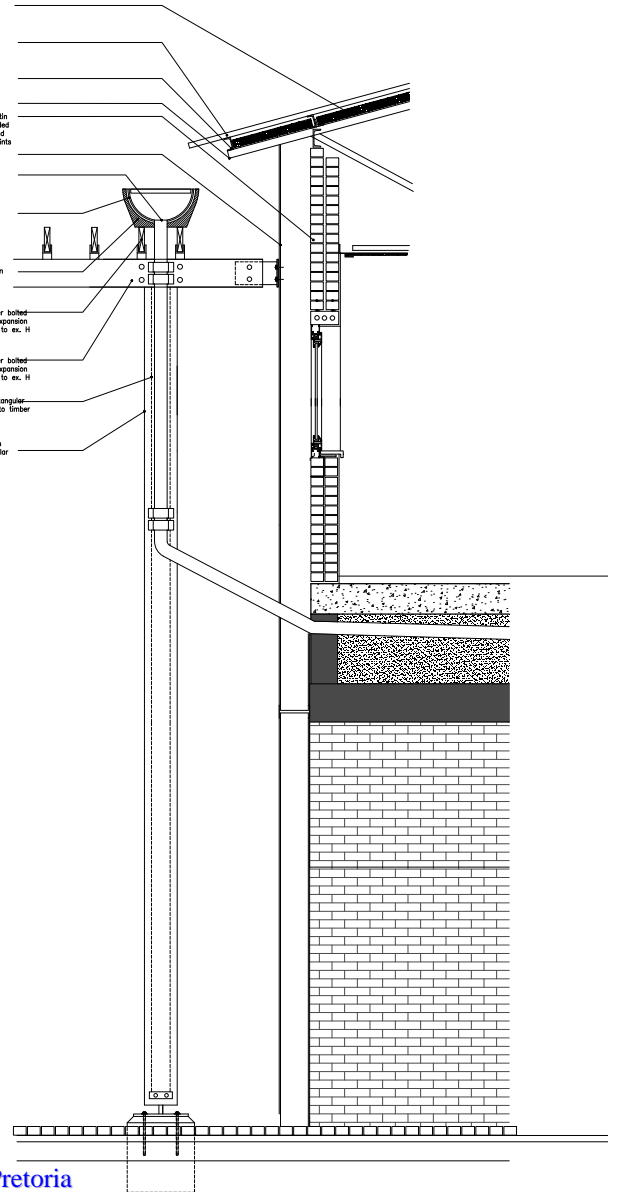








- New 63mm laser cavity-bolt insulation fixed and secured on top of ceiling
- Ex. 18mm corrugated roof sheets screwed to purlins with self-lapping screws
- Ex. 100x50mm steel purlins Ø1100mm o.c. fixed to truss
- Ex. steel roof truss
- 222 x 106 x 73 ZNco Dryx Gullie Imperial FBX clay roof bricks, bedded and jointed in class I mortar and pointed with recessed horizontal joints
- Ex. 300x300mm steel H-column
- New 100mm Ø steel downspipe x2 Ø11mm fixed to timber column with galvanneal steel brackets
- Bitumous waterproofing pointed on all gutter top joints
- New custom-made 550x1600mm ceramic gutter supported on 134x44mm timber purlins
- New 225x48 Rhinewood pergola member bolted to outside of composite column with expansion bolt and supported by steel plate fixed to ex. H column
- New 225x48 Rhinewood pergola member bolted to outside of composite column with expansion bolt and supported by steel plate fixed to ex. H column
- New 160x80mm galv. mtl steel rectangular section with pre-drilled holes, bolted to timber column member
- New 250x44mm timber column element bolted to steel rectangular section



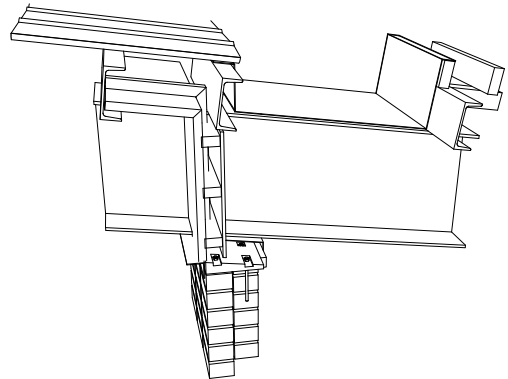
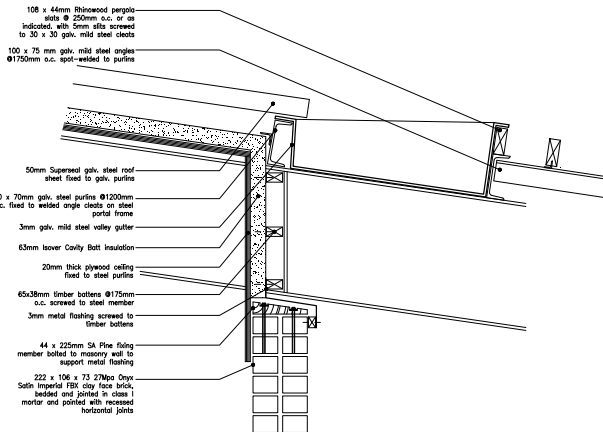
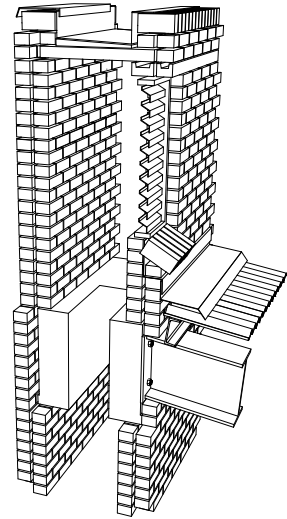
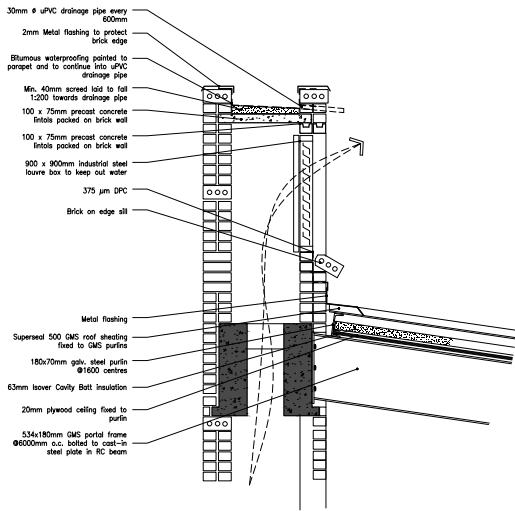
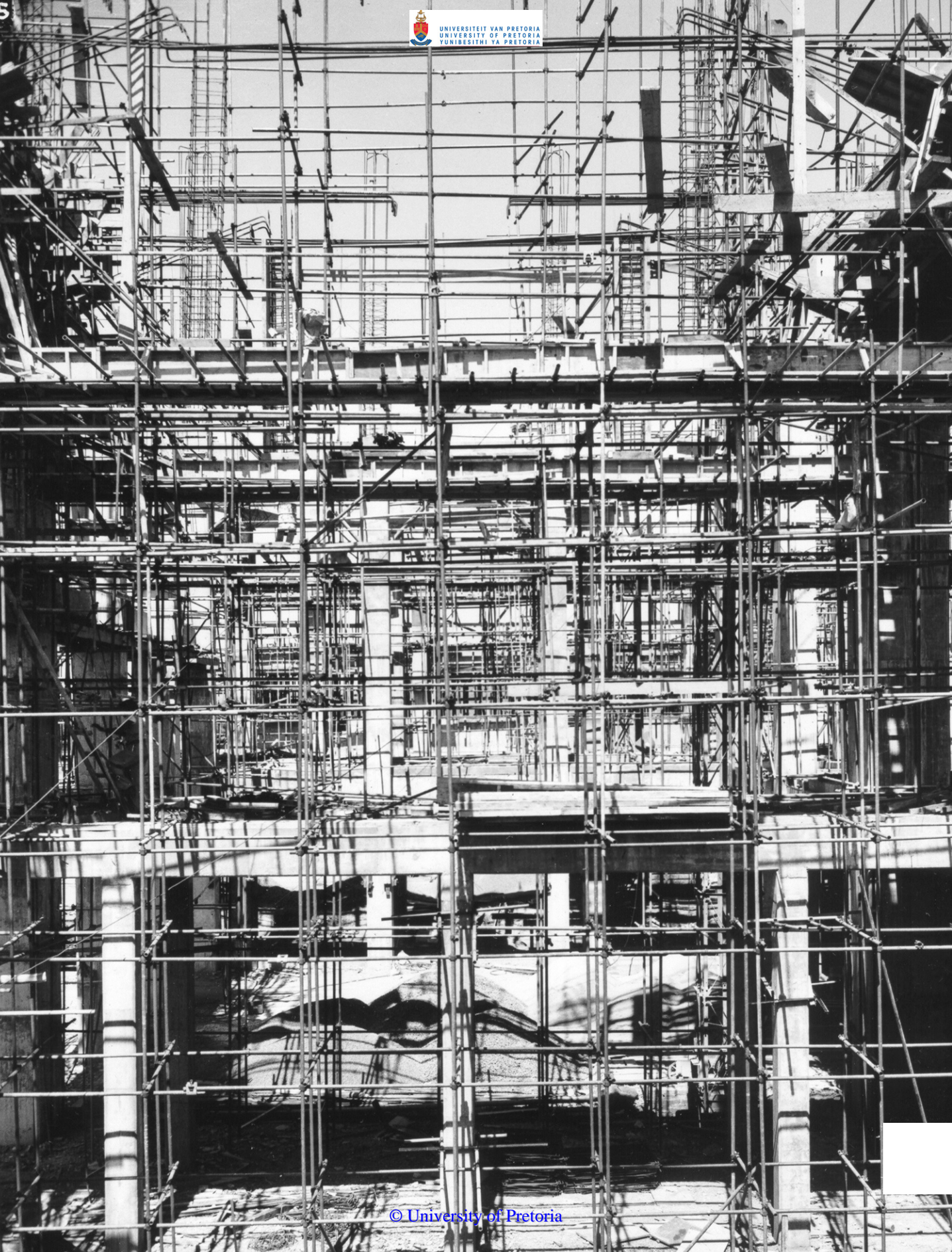


Figure 7.7.5 (previous page)\_ Pergola and walkway detail, NTS (Author, 2013).

Figure 7.7.6 (top)\_ Diaphragm wall ventilation detail, NTS (Author, 2013).

Figure 7.7.7 (bottom)\_ Eastern addition gutter detail, NTS (Author, 2013).





# CHAPTER 8

## CONCLUSION

This dissertation set out to investigate the phenomena of an industrial site during and after it is decommissioned. It approached the issue from the standpoint that abandoned industrial sites are a symptom of an unbalanced nature-culture relationship brought about by the bifurcation between man and nature in modern western thought.

The investigation revealed that a general paradigm shift, in the way an abandoned industrial site is approached, reveals many qualitative and latent potentials that can be harnessed to regenerate it. This makes abandoned industrial sites powerful leverage points in the development of their surroundings. By creating a building that allows opportunities for these latent potentials to evolve and thrive, the previously impassive site becomes a positive site of transition.

The concept of potential sets was formulated to aid in an understanding of the site beyond its apparent strengths and weaknesses. Three potential sets provided strong clues of the ecological purpose of the site as a natural filter and clay producer. These purposes were programmatically translated into a ceramic production facility and conceptually translated into the building as a solvent. The solvent-building also provided the opportunity for hybrid natural-cultural spaces that can address the bifurcation of the two and make engagement possible and evident.

The New Era Ceramics Building allows for the reclamation and celebration of obsolete industrial capital as well as ecological and human potential. It contributes to an understanding of place and history and represents the

intimate relationship between people, industry and ecology. The building acts as a space of co-existence that allows for the active engagement between the public and industry, within the greater ecological site. It offers an approach with which decommissioned industrial sites can become positively regenerated and aligned to its ecological purpose as advocated Mang & Reed (2012).

The ecological purpose of the site is to produce clay and this is programmatically employed to establish the economic viability of the scheme. The production line allows for the existence of many other sub-industries that are accommodated to form a supportive industrial ecology. The program is also situated within the larger framework of the site and other proposed interventions on site to form a closed loop production relationship with other building programs.

Passive environmental strategies such as rainwater harvesting and ventilation are employed to promote indoor comfort levels for employees without losing a connection to industrial spatiality or the exterior. This is achieved by three open viewing platforms situated between the industrial functions, and provide ample light and fresh air into the building.

The dissertation provides arguments for the specific re-imagination of industrial sites before they are decommissioned in order to make use of the energy that is released by their abandonment.



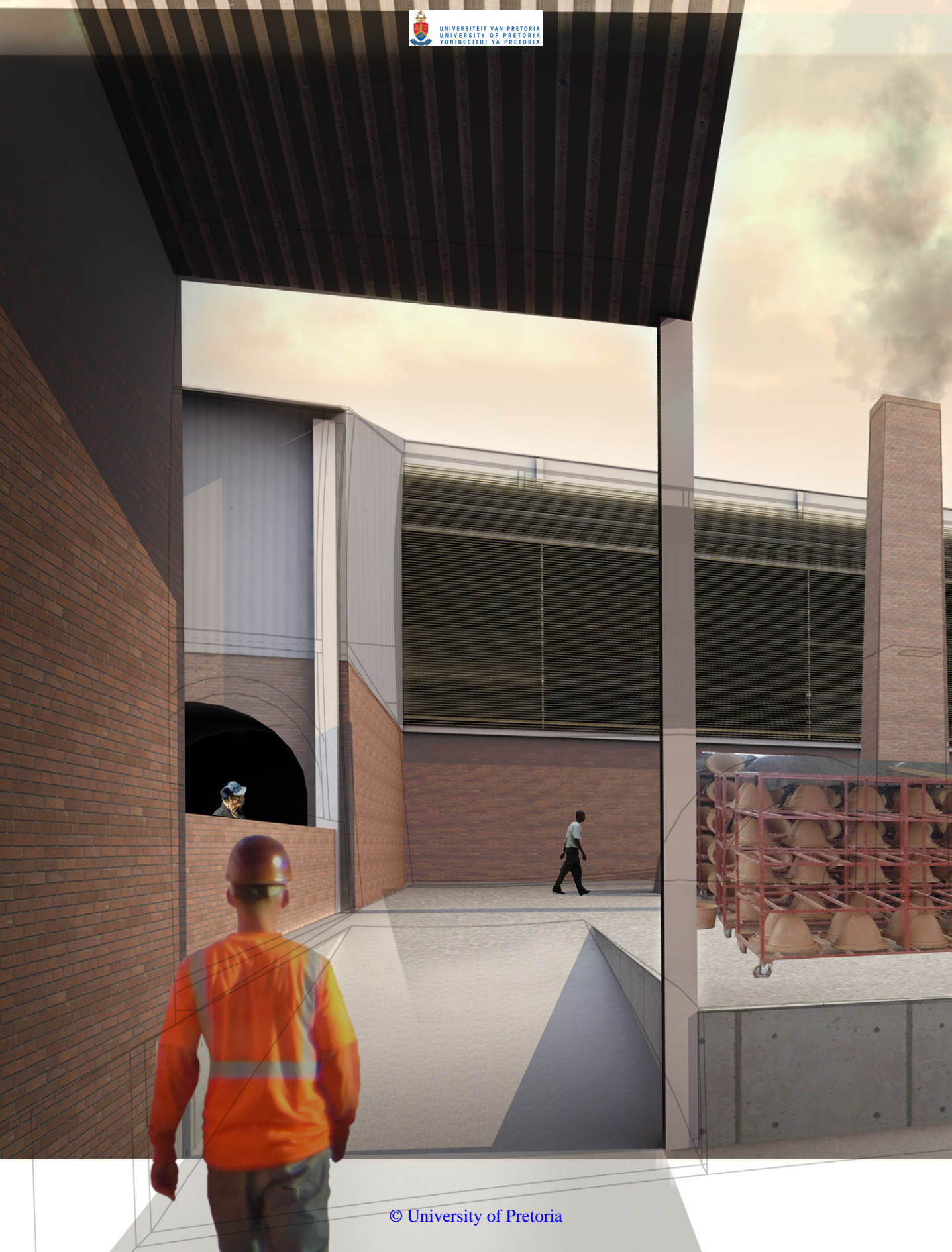


# CHAPTER 9

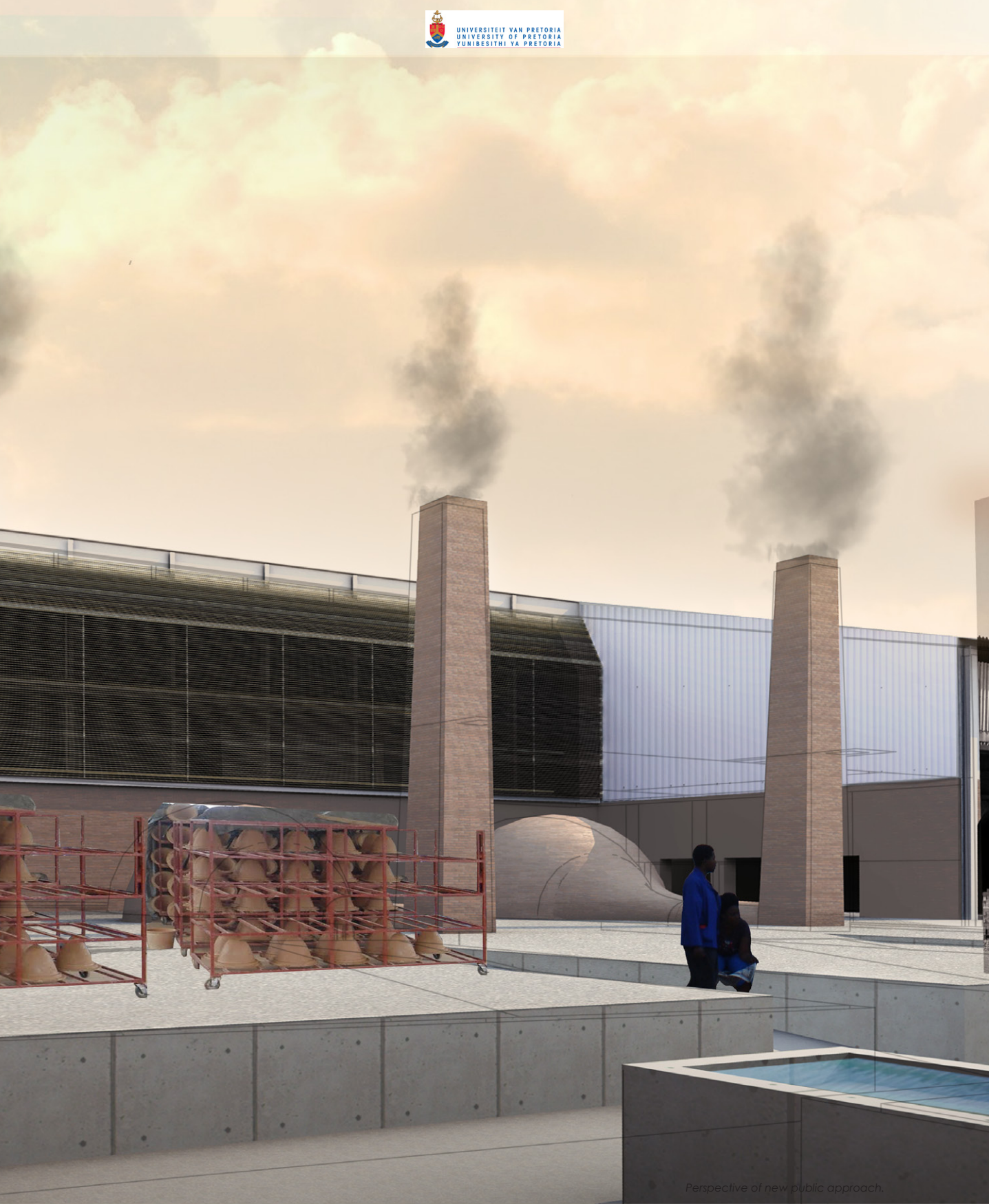
## APPENDICES











*Perspective of new public approach.*



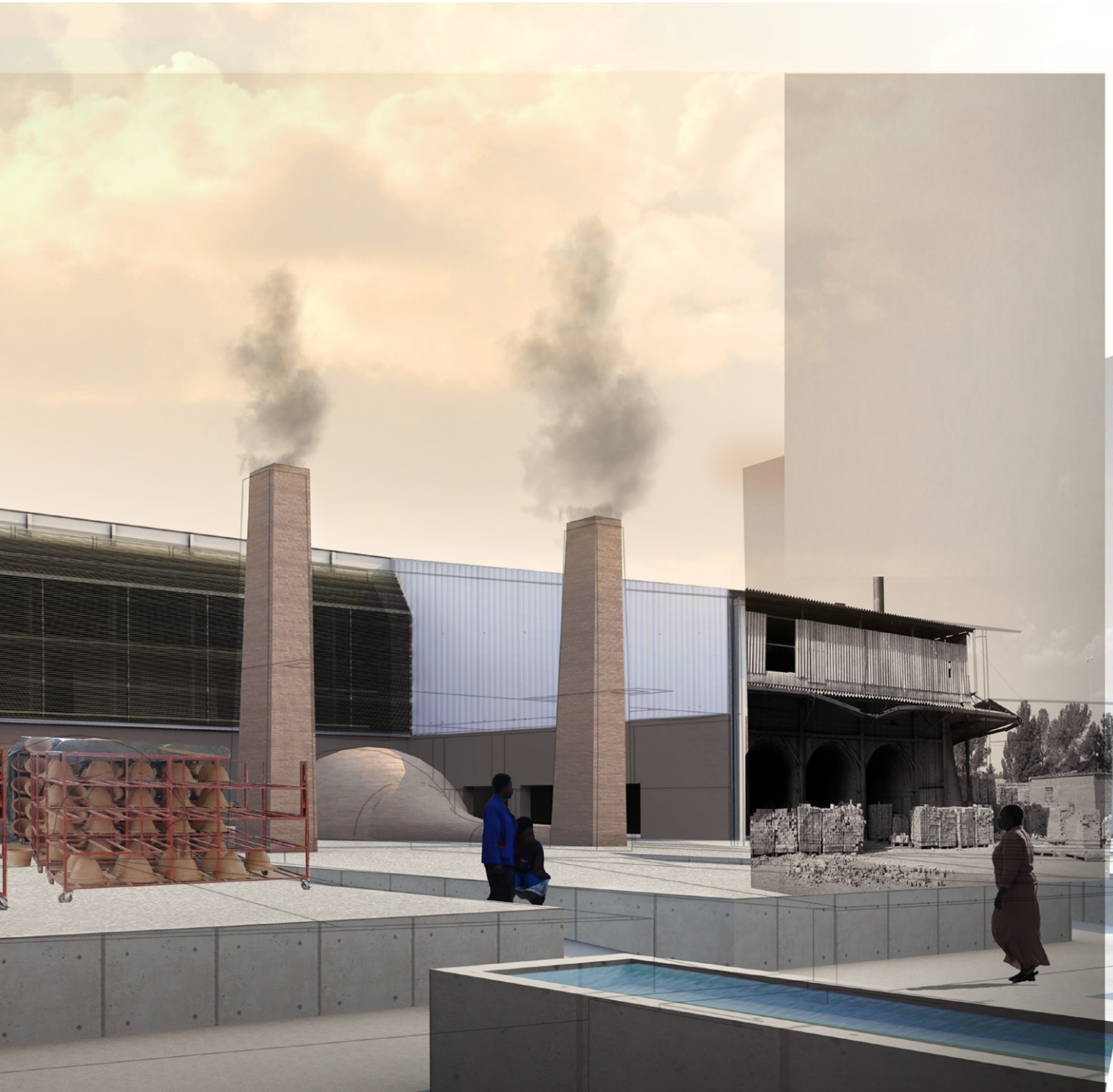
Era Square Perspective.





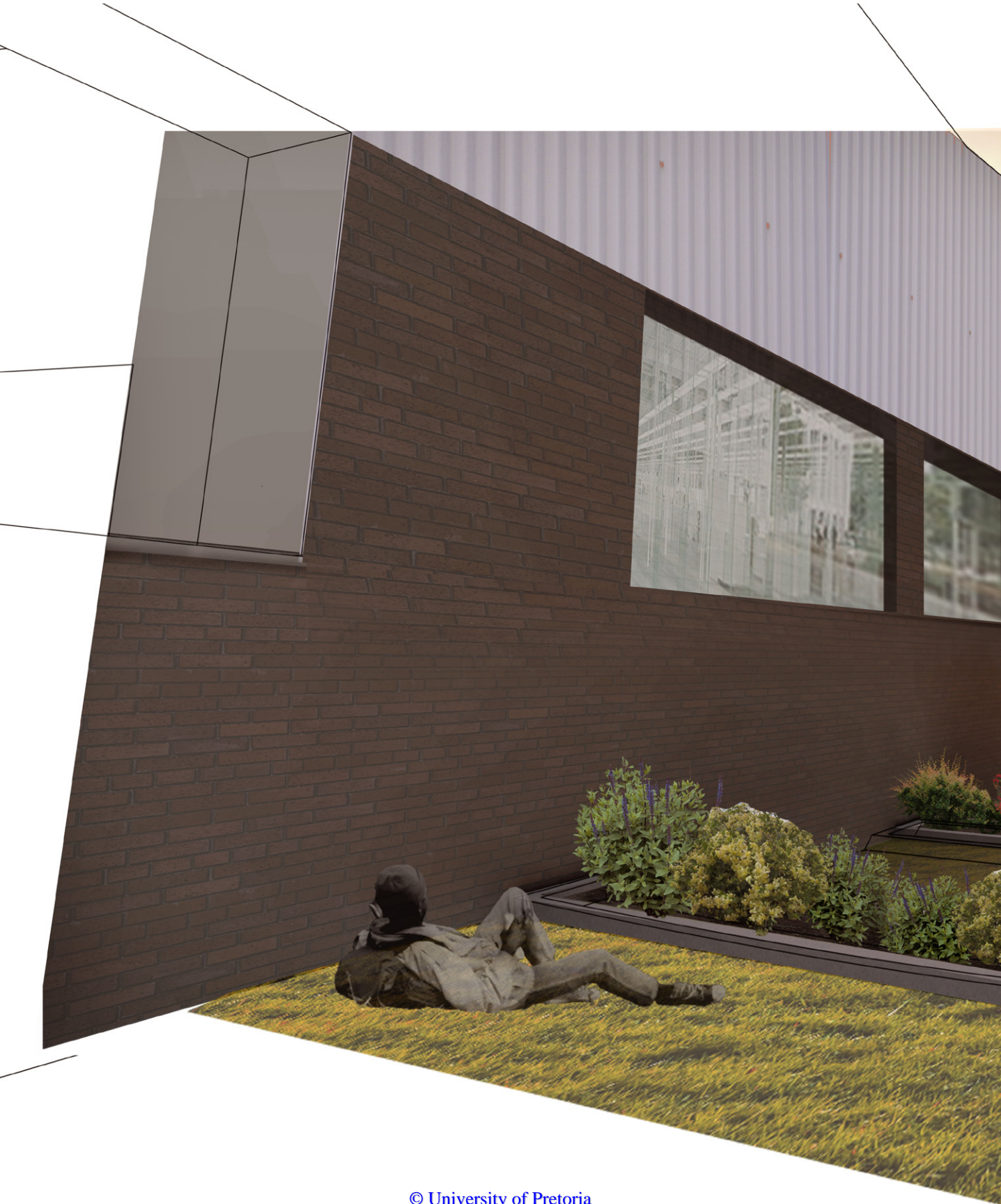






*Firing kilns and industrial ceramic yard.*



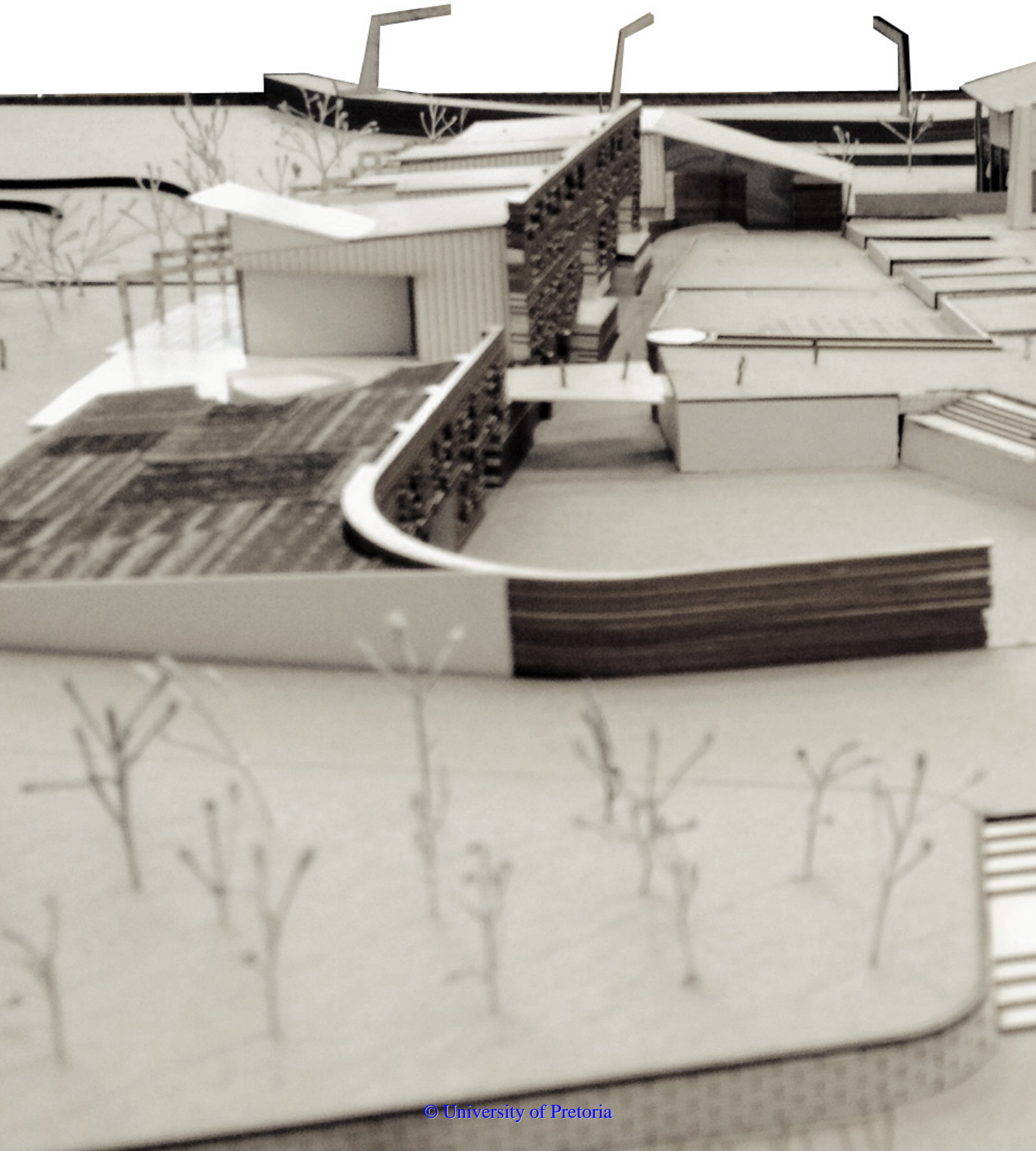




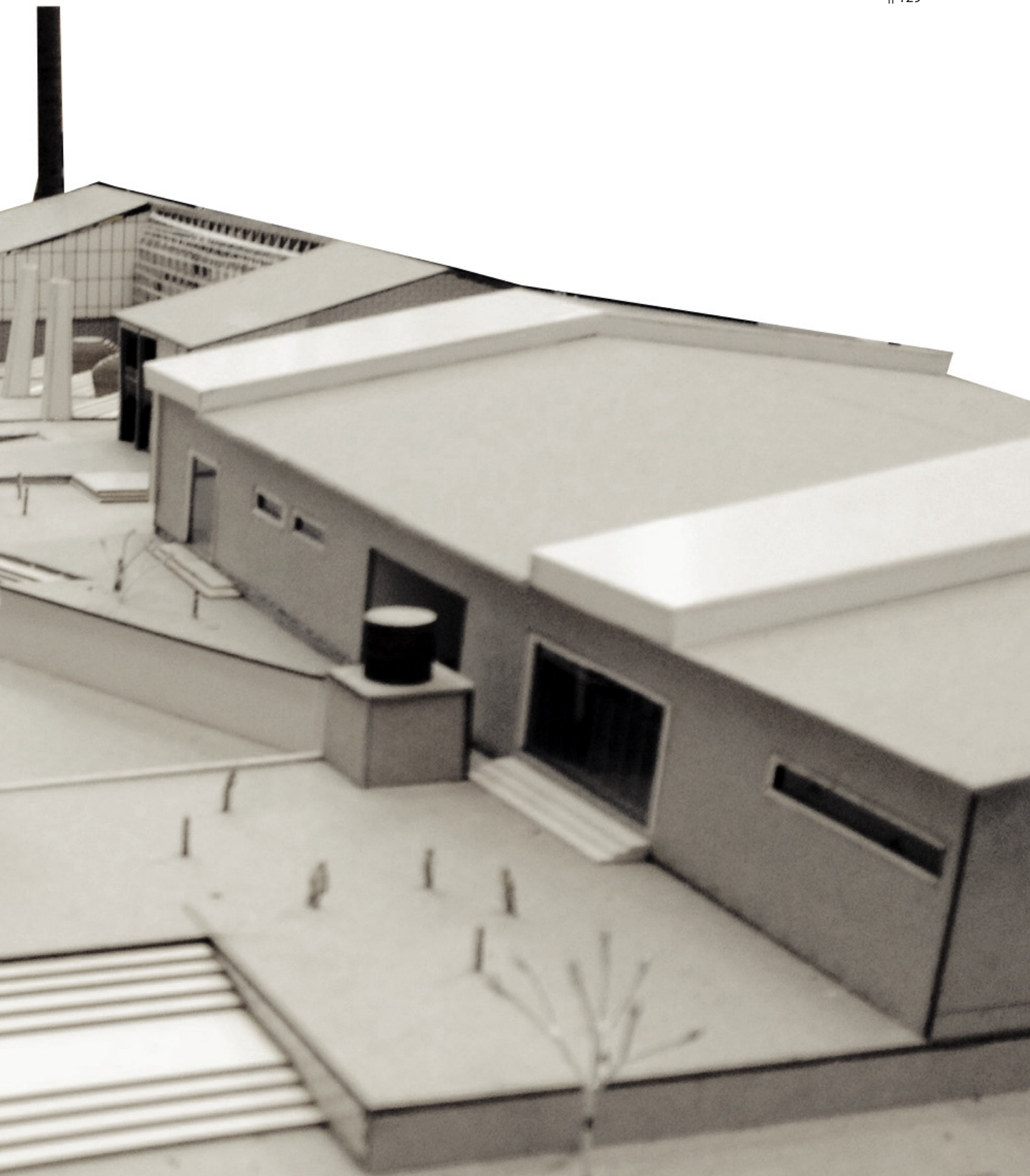


*Pockets of co-existence between Eastern Addition buildings*









*Detail model of New Era Ceramics, view towards the South, facing the Stadium*

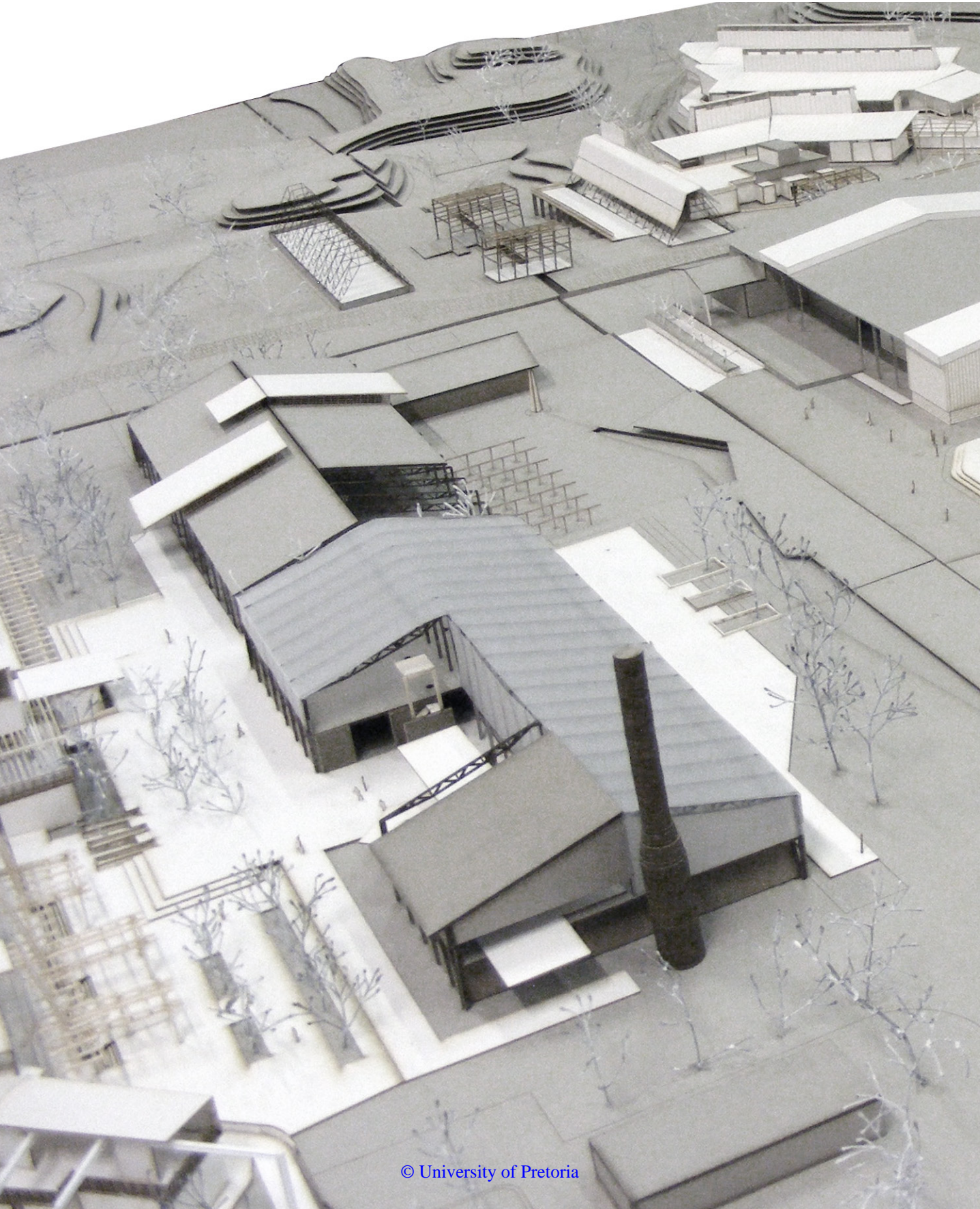






Detail model of New Era Ceramics, view of new batch-firing kilns



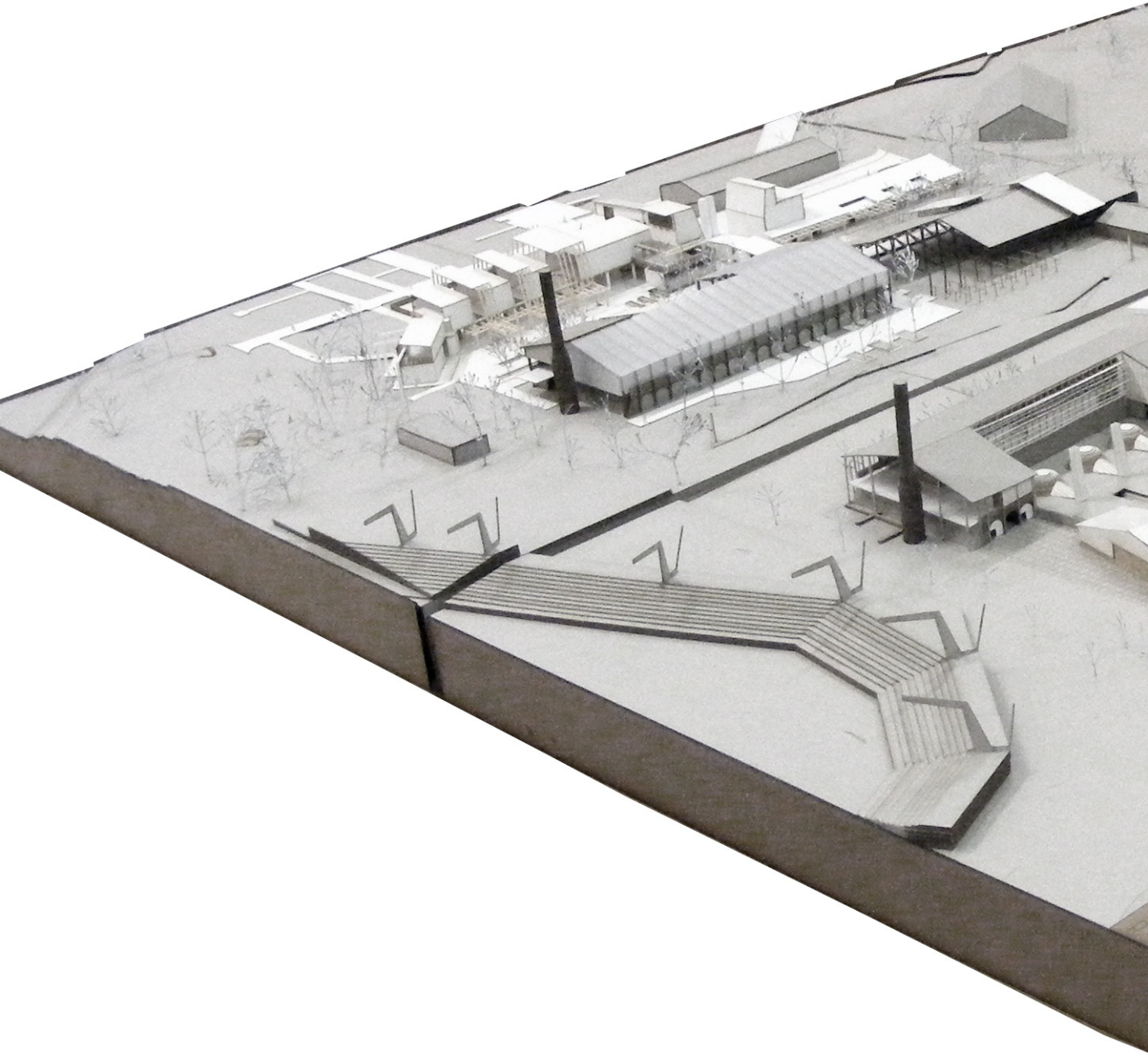




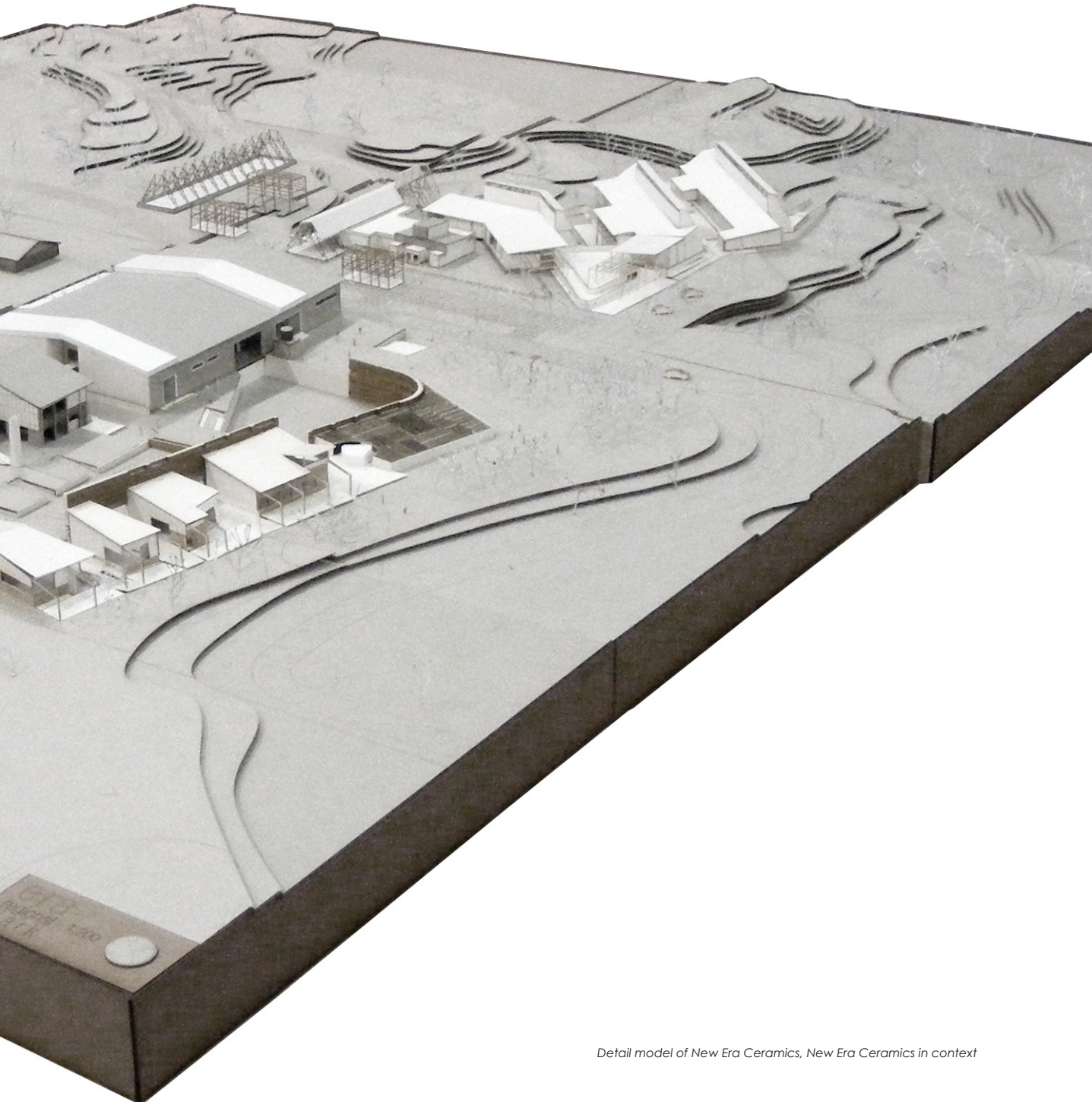


*Detail model of New Era Ceramics, bird's eye view of Era Square*









*Detail model of New Era Ceramics, New Era Ceramics in context*

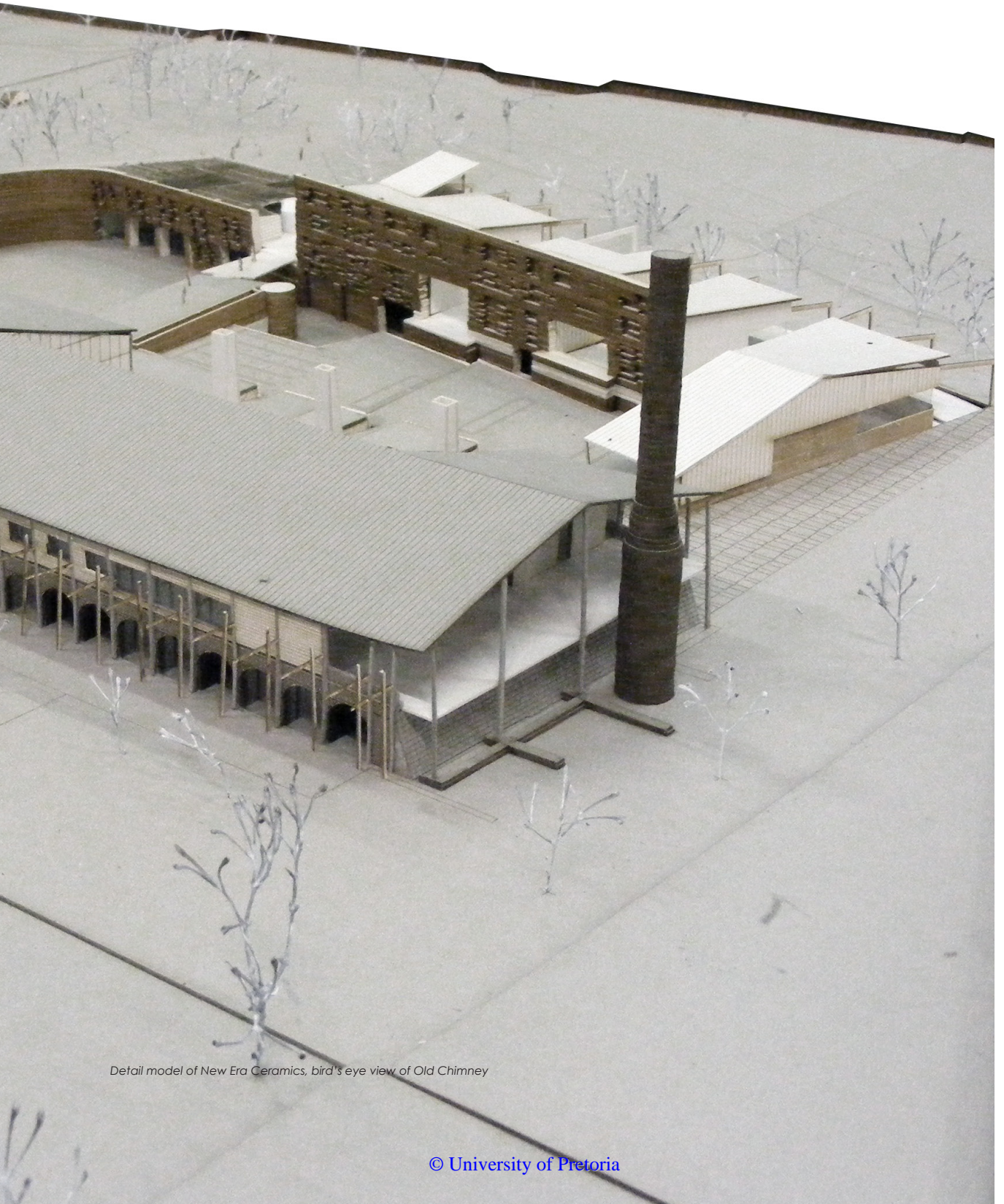






*Detail model of New Era Ceramics, view towards Eersterust Stadium*





*Detail model of New Era Ceramics, bird's eye view of Old Chimney*





*Detail model of New Era Ceramics, New Eastern Addition*





*Detail model of New Era Ceramics, view of approach towards Eerste-  
rust Stadium from the Champion Walk*





Detail model of New Era Ceramics, entrance to multi-purpose community hall

## 9.1 QUANTITATIVE SPATIAL REQUIREMENTS

### Multi-Function Community Hall

Program	Occupancy	Accommodation requirements	Sanitary requirements	Heating and cooling	Ventilation	Lighting	Fire
Multi-purpose function hall	A1	<ul style="list-style-type: none"> <li>1 kitchen and bar</li> <li>waiter's station</li> <li>1 admin office</li> <li>open hall</li> </ul>	<ul style="list-style-type: none"> <li>Male: 1 toilet, 2 urinals &amp; 1 whb</li> <li>Female: 3 toilets &amp; 2 whb</li> <li>1 disabled toilet with whb</li> <li>1 kitchen with cold store</li> <li>1 bar with whb</li> </ul>	Heating required during winter evenings  Cooling required in summer	2-10 AC/hr openings of at least 10% of floor area	Natural and electrical lighting for 100 LUX	External walls to be 30min fire proof

### Brick Museum

Program	Occupancy	Accommodation requirements	Sanitary requirements	Heating and cooling	Ventilation	Lighting	Fire
Brick Museum	C2	<ul style="list-style-type: none"> <li>1 curator's office</li> <li>1 shop with store</li> <li>1 reception</li> <li>exhibition space</li> <li>1 kitchenette</li> </ul>	<ul style="list-style-type: none"> <li>Male: 1 toilet, 1 urinal &amp; 1 whb</li> <li>Female: 2 toilets &amp; 1 whb</li> <li>Staff: 2 toilets &amp; 1 whb</li> <li>1 disabled toilet with whb</li> </ul>	Cooling required in summer	2 AC/hr openings of at least 10% of floor area	Natural and electrical lighting for 150 LUX	External walls to be 30min fire proof

### Old Kiln Building-West

Program	Occupancy	Accommodation requirements	Sanitary requirements	Heating and cooling	Ventilation	Lighting	Fire
Kiln shops	A1	<ul style="list-style-type: none"> <li>1 centre management office</li> <li>4 shops with kitchenette</li> <li>1 restaurant with kitchen</li> <li>public restrooms</li> </ul>	<ul style="list-style-type: none"> <li>Male: 3 toilets, 7 urinals &amp; 3 whb</li> <li>Female: 12 toilets &amp; 6 whb</li> <li>Disabled: 2 toilets with whb</li> </ul>	Cooling required in summer  Heating required in winter	2 AC/hr openings of at least 10% of floor area for kiln shops 10 AC/hr for restaurant	Natural and electrical lighting for 500 LUX	External walls to be 30min fire proof
1 <sup>st</sup> Floor therapy centre	A1	<ul style="list-style-type: none"> <li>1 ground floor access</li> <li>locker room</li> <li>1 reception</li> <li>1 wet therapy area with sauna and steam rooms</li> <li>3 large training rooms</li> <li>individual training area</li> <li>6 therapy rooms</li> <li>6 consultation rooms</li> </ul>	<ul style="list-style-type: none"> <li>Male: two facilities with 1 toilet, 1 urinal, 1 whb and 2 showers</li> <li>Female: two facilities with 2 toilets, 1 whb and two showers</li> </ul>	Cooling required in summer  Heating required in winter	20 AC/hr	Natural and electric lighting for 150 LUX	External walls to be 30min fire proof
Riki-Tik demonstration	C2	<ul style="list-style-type: none"> <li>exhibition space</li> <li>1 staircase</li> </ul>	n/a	n/a outdoor area	n/a	n/a	n/a

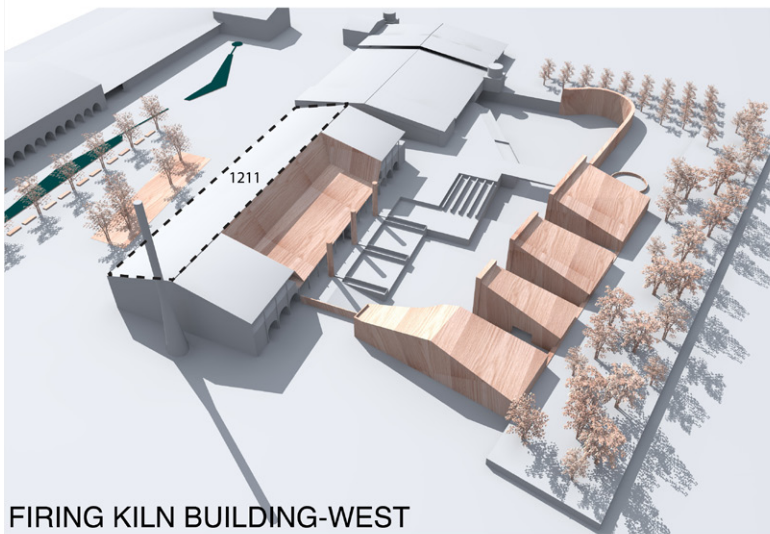


## New Eastern Addition

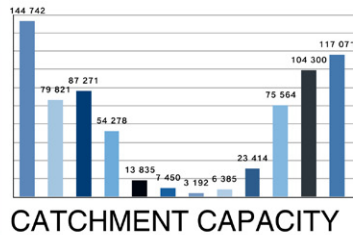
Program	Occupancy	Accommodation requirements	Sanitary requirements	Heating and cooling	Ventilation	Lighting	Fire
Grinding basement	D2	<ul style="list-style-type: none"> <li>1 storeroom</li> <li>3 x 14sqm grinding units</li> <li>3 x 8sqm mixing units</li> <li>3 x 9sqm extruders</li> <li>18 ceramic wheels</li> <li>wide walkway for raw material circulation</li> </ul>	n/a	Cooling required in summer	20 AC/hr + extraction of dust	Natural and electrical lighting for 750 LUX	External walls to be 30min fire proof
Employee service centre	A1	<ul style="list-style-type: none"> <li>3 x 12sqm offices</li> <li>1 boardroom</li> <li>1 reception</li> <li>washing and storage facilities</li> <li>canteen with small kitchen</li> <li>recreational space</li> </ul>	<ul style="list-style-type: none"> <li>Male: 1 toilet, 3 urinals, 3 whb and 4 showers</li> <li>Female: 5 toilets, 3 whb and 4 showers</li> </ul>	Cooling required in summer  Heating required in winter	Offices: 2 AC/hr Meeting: 10 AC/hr Other: 10 AC/hr Kitchen 10 AC/hr	Natural and electric lighting for 250 LUX	External walls to be 30min fire proof
Timber-mould workshop	D2	<ul style="list-style-type: none"> <li>30sqm of work surface</li> <li>70sqm for machinery</li> </ul>	n/a	Cooling required in summer	10 AC/hr with extraction of sawdust	Natural and electric lighting for 750 LUX	External walls to be 30min fire proof
Glazing workshop	B3	<ul style="list-style-type: none"> <li>40sqm of work surface</li> <li>20sqm for glazing units</li> <li>15sqm storage space</li> </ul>	n/a	Cooling required in summer	10 AC/hr	Natural and electric lighting for 250 LUX	External walls to be 30min fire proof
Studio and	A3	<ul style="list-style-type: none"> <li>reception with</li> </ul>	<ul style="list-style-type: none"> <li>Male: 1 toilet,</li> </ul>	Cooling required	2 AC/hr	Natural and	External

## 9.1 WATER HARVESTING CALCULATIONS

### Old Firing Kiln Building -West



Month	Precipitation (mm)	Area	Runoff Coefficient	Yield (P x A x C) m3
January	136	1182.54	0.9	144 742.9
February	75	1182.54	0.9	79 821,45
March	82	1182.54	0.9	87 271,45
April	51	1182.54	0.9	54 278,59
May	13	1182.54	0.9	13 835,72
June	7	1182.54	0.9	7 450
July	3	1182.54	0.9	3 192,8
August	6	1182.54	0.9	6 385,72
Sept	22	1182.54	0.9	23 414, 3
Oct	71	1182.54	0.9	75 564,31
Nov	98	1182.54	0.9	104 300
Dec	110	1182.54	0.9	117 071.5



### Old Firing Kiln Building -East



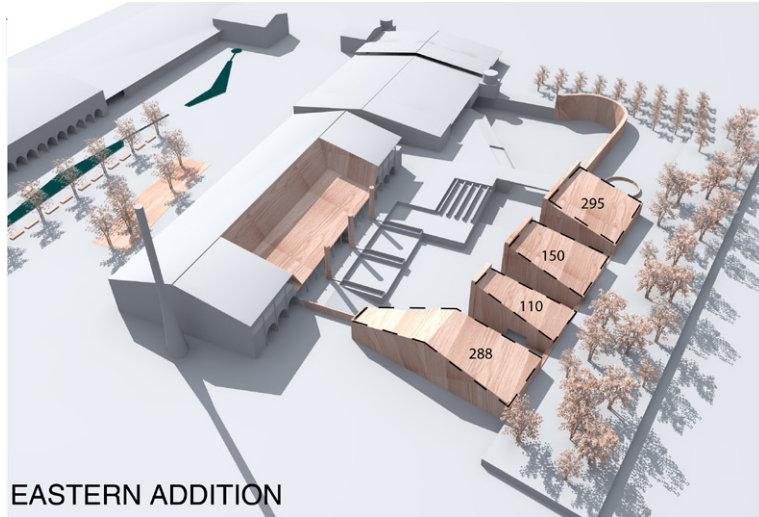
Month	Precipitation (mm)	Area	Runoff Coefficient	Yield (P x A x C) m3
January	136	526	0.9	64 382.40
February	75	526	0.9	35 505.00
March	82	526	0.9	38 818.80
April	51	526	0.9	24 143.40
May	13	526	0.9	6 154.20
June	7	526	0.9	3 313.80
July	3	526	0.9	1 420.20
August	6	526	0.9	2 840.40
Sept	22	526	0.9	10 414.80
Oct	71	526	0.9	33 611.40
Nov	98	526	0.9	48 393.20
Dec	110	526	0.9	52 074.00

Month	Precipitation (mm)	Area	Runoff Coefficient	Yield (P x A x C) m3
January	136	599	0.9	73 317.60
February	75	599	0.9	40 432.50
March	82	599	0.9	44 206.20
April	51	599	0.9	27 494.10
May	13	599	0.9	7 008.30
June	7	599	0.9	3 773.70
July	3	599	0.9	1 617.30
August	6	599	0.9	3 234.60
Sept	22	599	0.9	11 860.20
Oct	71	599	0.9	38 276.10
Nov	98	599	0.9	52 831.80
Dec	110	599	0.9	59 301.00

**CATCHMENT CAPACITY**



New Eastern Addition



EASTERN ADDITION

Month	Precipitation (mm)	Area	Runoff Coefficient	Yield (P x A x C) m <sup>3</sup>
January	136	843	0,9	103 183,20
February	75	843	0,9	56 902,50
March	82	843	0,9	62 213,40
April	51	843	0,9	38 693,70
May	13	843	0,9	9 863,10
June	7	843	0,9	5 310,90
July	3	843	0,9	2 276,10
August	6	843	0,9	4 552,20
Sept	22	843	0,9	16 691,40
Oct	71	843	0,9	53 867,70
Nov	98	843	0,9	74 352,60
Dec	110	843	0,9	83 457,00

CATCHMENT CAPACITY

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

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Carla Taljaard  
October 2013