
Remediator

*Restoring the dichotomous relationship between industry and nature
through an urban eco-textile mill & dyehouse*

- Renée Minnaar -



Remediator

*Restoring the dichotomous relationship between industry and nature
through an urban eco-textile mill & dyehouse*

*by
Renée Minnaar*

*Submitted in fulfilment of part of the requirements for the degree
Master of Architecture (Professional)
in the
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Project Summary

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GPS coordinates

26° 11' 24.6"S, 28° 1' 10.8"E

Programme

Eco-Textile Mill and Dye house

Research field

*Heritage and Cultural Landscapes &
Environmental potential*

Client

Department of Trade and Industry

Theoretical premise

*Using regenerative and transformative resilience theory in conjunction
with philological restoration in an attempt to regenerate living and
socio-economic systems in a post-industrial urban site.*

Architectural approach

*Using ghosts of industries as mediative archetypes in order to restore the dichotomous
relationship between industry and nature resulting from Industrialization.*

Declaration

*In accordance with Regulation 4(c)
of the General Regulations (G.57)
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I declare that this thesis,
which I hereby submit for the degree
Master of Architecture (Professional)
at the University of Pretoria, is my own work
and has not previously been submitted
by me for a degree at this or any other tertiary institution.
I further state that no part of my thesis has already been,
or is currently being, submitted
for any such degree,
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Where reference is made to the works of others,
the extent to which that work has been used
is indicated and fully acknowledged
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.....
Renée Amelia Minnaar

Abstract

Industrialization brought about dramatic changes in many major cities around the world, including Johannesburg. However, rapid technological advancements have resulted in the abandonment of many industrial sites often within the confines of expanding cities as is the case with the old Johannesburg Gasworks.

The repercussions of the hazardous industrial processes of the past are still present on the site in the form of pollution. This, together with South Africa's lack of protection of our industrial heritage, has awoken the fear that these post-industrial artefacts might be in danger of becoming extinct if their value is not recognised.

This dissertation aims to investigate the potential of redundant industrial sites like the old Johannesburg Gasworks to mitigate the environmental and social issues resulting from the past in an attempt to reintegrate the site back into the surrounding urban fabric. Through the understanding and application of environmental and heritage theories, this dissertation hopes to find a means of using architecture as a tool to mediate the dichotomous relationship between industry and nature, resulting from an exploitative world view, and inspire a new archetype for industrial architecture, that is able to inspire mutually beneficial relationships between industry and nature, whilst creating a didactic and dialectical relationship between the existing industrial heritage of the past and the envisioned contemporary architecture of the future.

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Chapter 1

Preface

01 Preface

Setting the scene

Many major cities like Johannesburg, have changed as a result of industrialization and are now left with brownfield sites and various other issues of pollution, resulting from hazardous industrial processes (Kirovová & Sigmundová 2014:433).

Rapid technological advancements have resulted in an increasing number of abandoned industrial sites often within the confines of rapidly expanding cities (Heritage council Victoria 2014:10). Industrial sites that are left abandoned often have a digressive effect on the area surrounding it and large inaccessible sites like the old Johannesburg Gas Works often become ‘*ruptures in the urban fabric*’ (Heritage council Victoria 2014:9) detrimentally effecting urban connectivity.

This dissertation hopes to uncover ways in which architecture can act as mediator between industry and nature and to explore the possibility of using environmental theories in conjunction with heritage theories, in order to create a new archetype for industrial architecture that is able to catalyse regeneration of redundant industrial sites.

The old Johannesburg Gas Works will act as experimental subject in the hope to set a precedent for future industrial typologies.

“Man’s attitude toward nature is today critically important simply because we have now acquired a fateful power to alter and destroy nature.

But man is a part of nature, and his war against nature is inevitably a war against himself?

[We are] challenged as mankind has never been challenged before to prove our maturity and our mastery, not of nature, but of ourselves.”

*- Rachel Carson -
(NRDC 2015)*



Figure 1.1: Left: Ash Plant (Author 2017) Figure 1.2: We are Nature II (Relander 2012, edited by Author)

The Site

Location of the old Johannesburg Gasworks

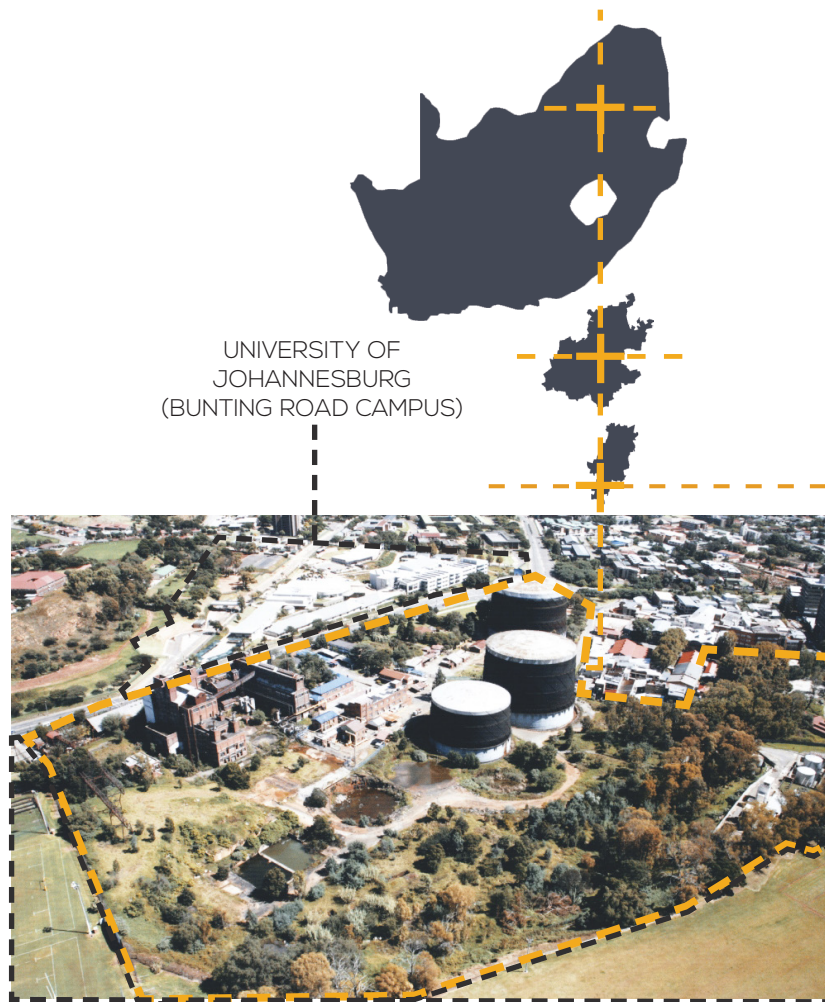


Figure 1.3: Area of focus (Egoli Gas 2009, edited by Author)

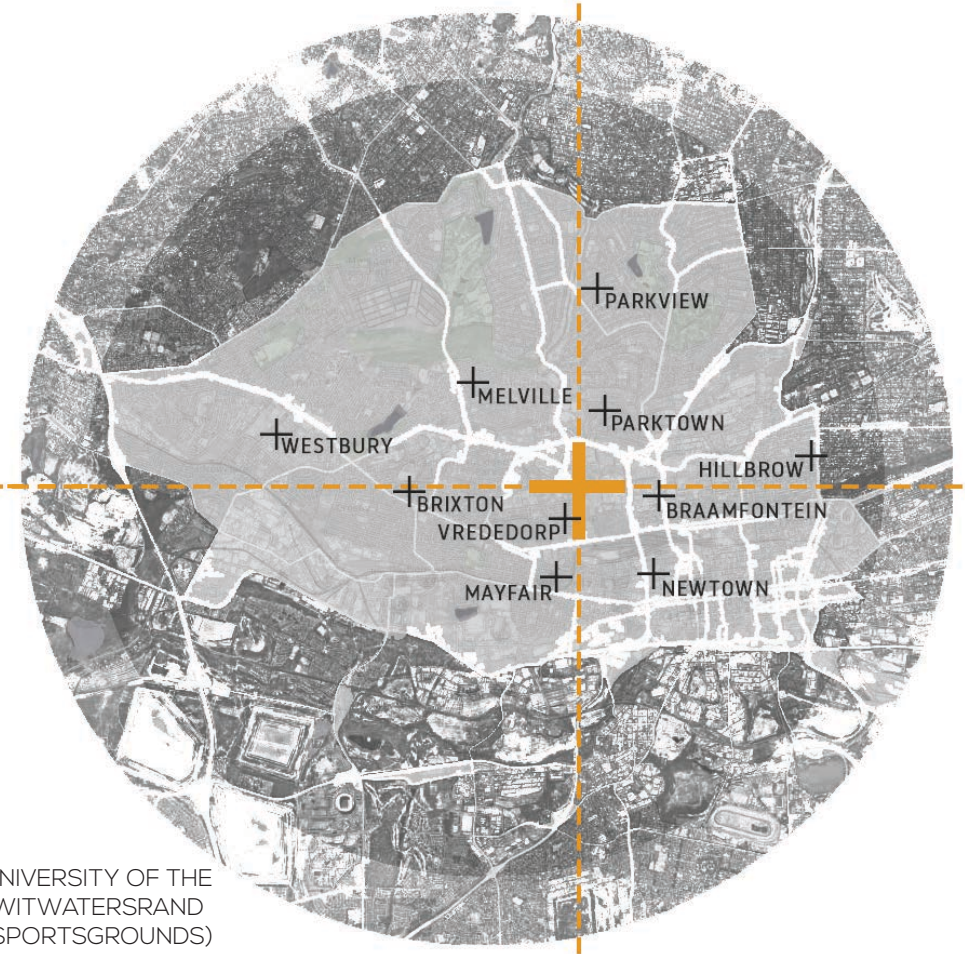


Figure 1.4: Map of Johannesburg (Google Maps, edited by Author 2017)

General issue

The disconnection between natural and built environments



Figure 1.5: Industrial revolution (Author 2017)

According to Pearlmutter (2007:752), there has always been a strong connection of mutual influence between climate and architecture. Architecture's role has been to alter the immediate climate in a very intentional manner in order to provide shelter. Traditionally, architecture was birthed from a comprehensive understanding of the opportunities and stresses of the specific climate it was to insert itself into. However, rapid technological advancement and the abundant availability of fossil fuel have allowed architects to create architecture that is completely isolated from its regional climate. These types of buildings have shaped our current cities and have inadvertently led to a change in local and global climates.

Due to the disconnection between natural and built environments, the physical function of cities and the well-being of

their citizens are at risk. According to Hes and Du Plessis (2015:12) scientists have warned that if we continue on our current path, natural ecosystems will no longer be able to sustain future generations due to the immense stresses placed on their natural functions.

The reality is that the protection of these services is no longer an optional extra, it is critical (Hes & Du Plessis 2015:12). This solidifies the need for the intricate interactions between nature and the built environment to be understood, in order to reclaim the balance that once existed between these two fields (Pearlmutter 2007:752). According to Fox (2000:3), the way in which we build and live in these environments becomes important, not only for the human race to prosper, but also for the preservation and prosperity of the entire '*non-human*' portion of nature.

Urban issues





The Danger

South Africa, like many other developing countries, has failed to recognize the value of our industrial heritage and this has led to an absence in the protection of heritage with the necessary measures (Läuferts Le Roux & Mavunganidze 2009:533). This has awoken the fear that industrial buildings might be in danger of extinction if attention and awareness of their value are not brought to the table. Industrial heritage buildings, no longer in use, are often left abandoned leading to deterioration and frequently resulting in the demolition of these structures, leaving only ‘ruins of the past’ (Läuferts Le Roux & Mavunganidze 2009:533).

The Disconnect

The old Johannesburg Gaswork site currently has no connection to the vibrant socio-economic systems of areas such as 44 Stanley Avenue, the universities or the schools that surround it. The site’s isolation is as a result of a very strong natural boundary formed by the topography on the eastern edge, fences to the north, west and south of the site, the hazardous pollution left by the industrial processes as well as the danger resulting from neglect to maintain the structures on site.

Boundary map legend

-  Strong natural boundary
-  Man-made boundary - fence
-  Semi-permeable
-  Built fabric

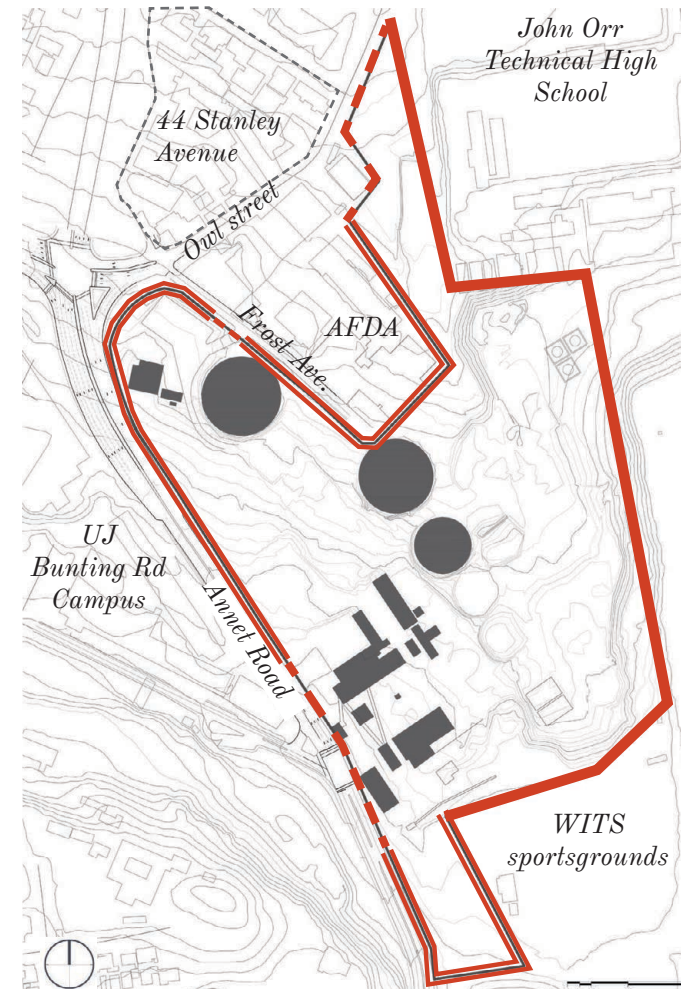


Figure 1.6: Analysis of site boundaries (Author 2017)

Architectural issue

The dichotomy between industry and nature

It is impossible to isolate the built environment from natural systems. However, for many years the world view in which nature, humans and their habitats are seen as separate from one another and the idea that nature exists only to serve humanity, has been embraced (Peres, Barker & Du Plessis 2015:1). This has led to the exploitation of natural systems without considering the long-term effects on the vitality of these systems or the well-being of humanity.

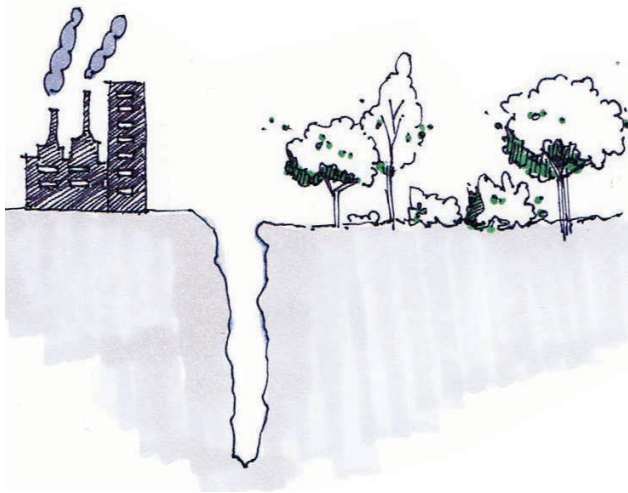
The development of the fragmented relationship between industry and nature can be observed through a series of paintings depicted in Figures 1.8-1.10, clearly showing the change in relationship through a progression of time.

Precisionism was a style first practiced by artist Charles Sheeler and Edward Hopper, after the First World War. The term Precisionism was coined in the

1920s and was strongly influenced by Futurism and Cubism with themes like the modernization and industrialization of American landscapes. The focus of the style was to depict real people in real situations. The artists' depictions often expressed a sense of admiration for the industrial era, instead of commenting on the social consequences of industrial development (The Art History Archive [sa]).

The paintings by Charles Sheeler (see Fig. 1.12-1.14) form the pinnacle of the severed relationship between industry and nature, as nature and man are completely absent from his representations of the American landscape.

In order to provide possible solutions to the severed relationship between industry and nature, historic industrial structures and their contribution to this dichotomy need to be understood.



*Figure 1.7: Dichotomy between industry & nature
(Author 2017)*

The Evolution of Industry vs. the Devolution of Nature depicted through Art



Figure 1.8: The opening of the Stockton & Darlington Railway (John Dobbin 1825)

Coexistence of Industry and Nature

In this painting, dating back to 1825, it is clear that the artist looked favourably upon the Industrial Revolution. With the train positioned in the far background, humans and nature form the main focus of the painting. The lack of dirt and the portrayal of smoke in the scene speak of a time when industry was still seen as a part of nature's cleanliness and purity (Caron, Lindfield & Vandehey 1996).



Figure 1.9: Gare Saint-Lazare: Arrival of a Train (Claude Monet 1877)

Transition to importance of Industry

In Claude Monet's 1877 painting *Gare Saint-Lazare*, industry is romanticised through the beautiful depiction of the smoke stack floating in the air, 'like a natural organism creating clouds on earth' (Caron, Lindfield & Vandehey 1996). Monet's use of white, grey and blue paint creates the idea of the smoke being one with a cloud-filled sky instead of being hazardous or dirty.

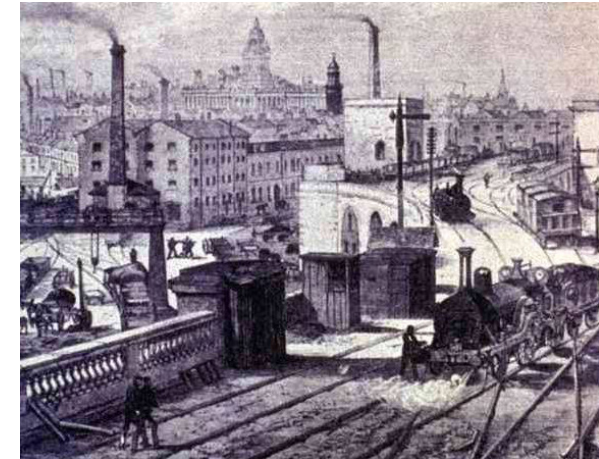


Figure 1.10: Disappearance of Nature (Unknown artist [sa])

Disappearance of Nature

This painting is cluttered with structures. What makes this scene different from the other two paintings is the lack of focus on the trains, instead the train forms part of numerous other man-made products of the Industrial Revolution. The people depicted in this image are small, dark and faceless, perhaps commenting on the lack of impression on their surroundings and their only focus being on their daily routine (Caron, Lindfield & Vandehey 1996).

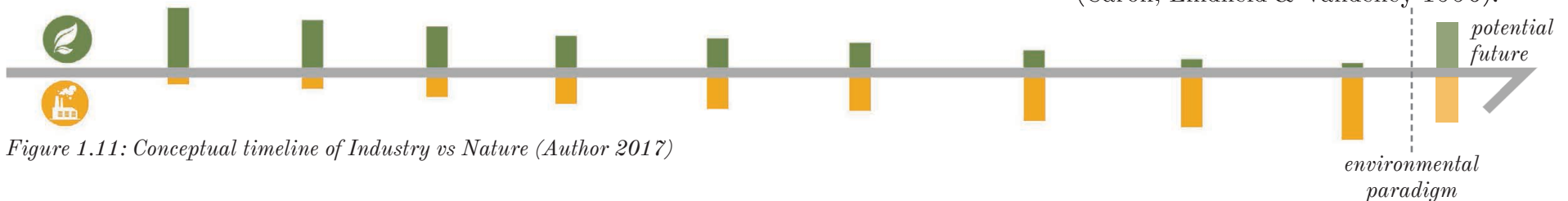


Figure 1.11: Conceptual timeline of Industry vs Nature (Author 2017)

Precisionism - the pinnacle of the severed relationship between industry & nature



Figure 1.12: American Landscape (Charles Sheeler 1930)



Figure 1.13: Classic Landscape (Charles Sheeler 1931)



Figure 1.14: Upper Deck (Charles Sheeler 1929)

Retort house 2



*Figure 1.15: Retort house 2
(Author 2017)*

Retort house 1



*Figure 1.16: Retort house 1
(Author 2017)*

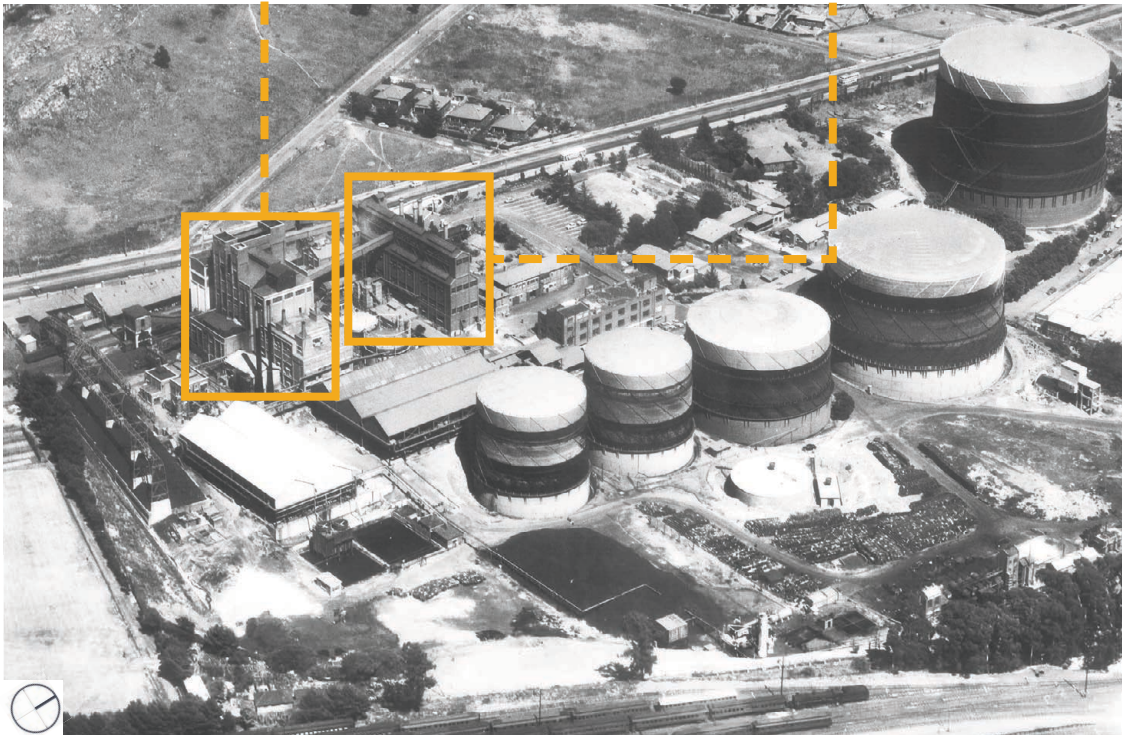


Figure 1.17: Aerial photo of Gas Works in 1960 (City of Johannesburg Gas Department 1960, edited by Author)

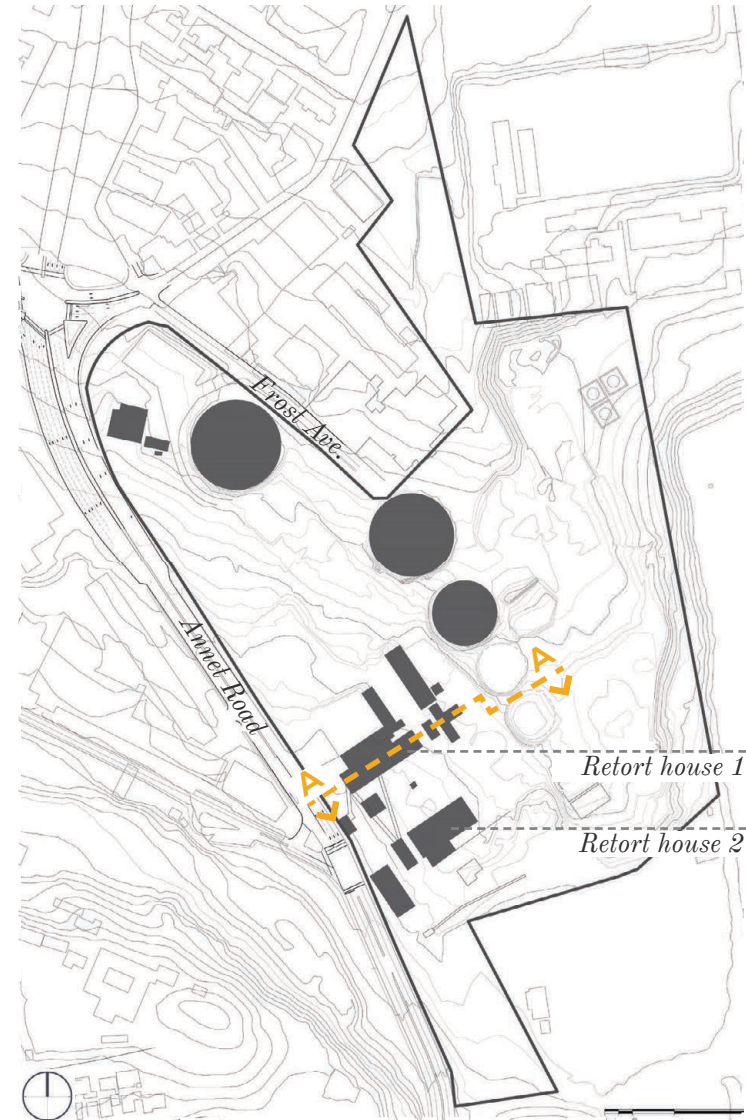


Figure 1.18: Site map showing retort house and site section position (Author 2017)

What function follows form?

The form of the retort house was dictated by the building's function (see Fig. 1.19-1.20), however the function for which the gasworks was originally built is no longer relevant. The current stagnant character and lack of purpose of the industrial heritage on site has resulted in the buildings becoming a void in the landscape and the site becoming a void in the city. This lack of function to these once functioning buildings beckons the question; what does a building become after it loses the purpose it was originally designed for?

The re-appropriation of the industrial heritage without tarnishing its architectural significance does become important for the preservation of this part of South Africa's heritage for future generations.

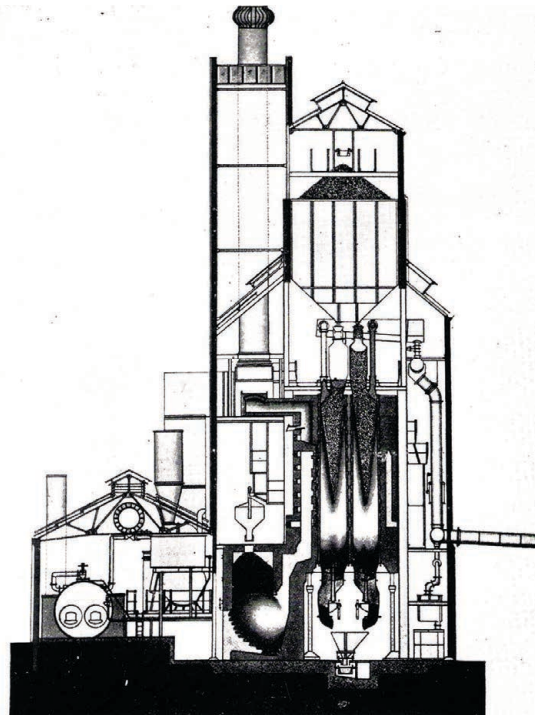


Figure 1.19: Cross section through Retort 1 (City of Johannesburg Gas Department 1940s, edited by Author)

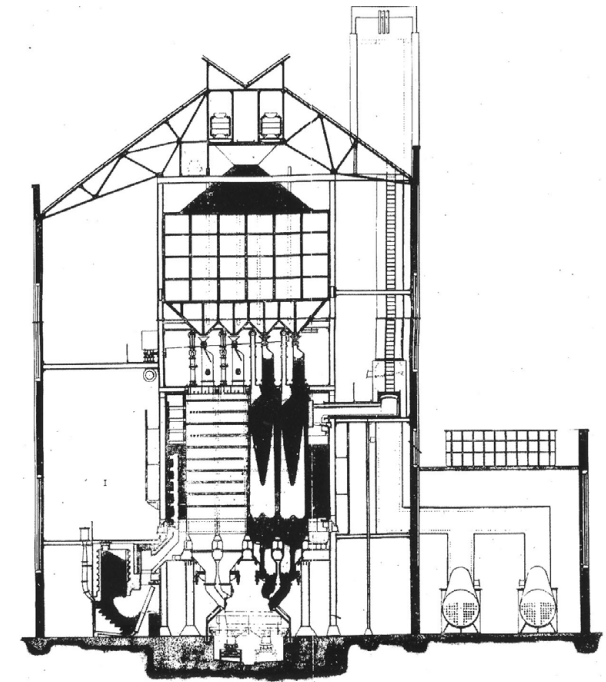


Figure 1.20: Cross section through Retort 2 (City of Johannesburg Gas Department 1950, edited by Author)

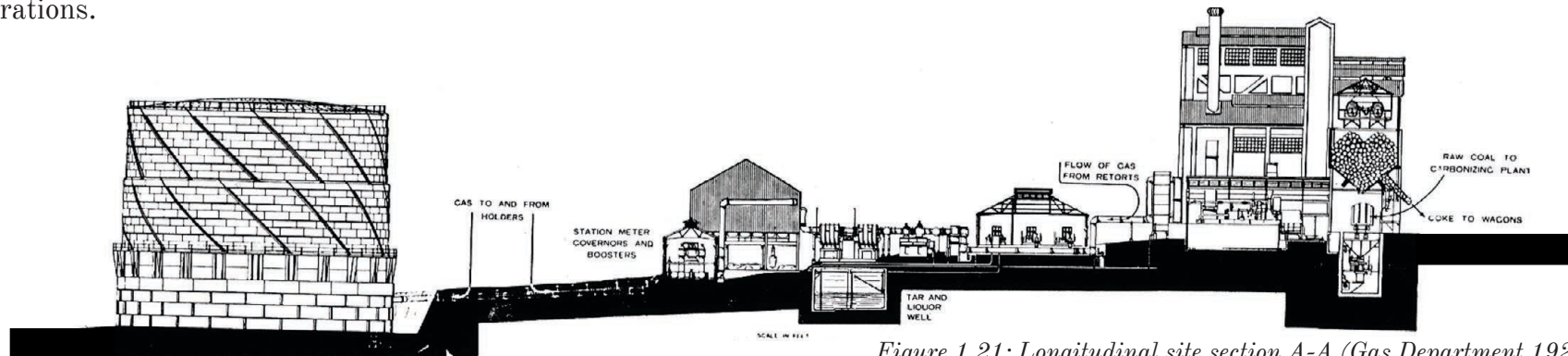


Figure 1.21: Longitudinal site section A-A (Gas Department 1929)

Research questions

Main questions

How can architecture act as remediator in order to restore the dichotomous relationship between industry and nature?

How can architecture be used to mediate past and present identities in such a way that it creates a meaningful architectural dialogue?

How can industrial heritage be reappropriated in order to catalyze regeneration of socio-economic systems?

Sub-questions

How can architecture be used to catalyze regeneration of living systems?

Is philological restoration an appropriate approach to create meaningful and appropriate connections between contemporary and historical buildings?

Does architecture have the ability to resurrect the latent productive potential of a stagnant industrial heritage site through the re-appropriation of unused heritage buildings?

How can architecture be used to re-invent and re-imagine a degraded urban site?

Does a regenerative architectural intervention have the ability to catalyze urban rejuvenation in a city like Johannesburg?

Research methodology

Introduction

The preceding investigation has highlighted the general issue of the disconnection between industry and nature and the repercussions of this dichotomous relationship on the environment. This dichotomy has contributed to a severed connection between the old Johannesburg Gasworks' site and the rest of the urban fabric. The idle, function-driven buildings left on this abandoned industrial site are in danger of extinction, if drastic measures are not implemented to save them. Finding an appropriate strategy for the re-appropriation of industrial heritage buildings has become vital. Parallel to this issue, is the investigation into ways in which architecture can mediate the dichotomous relationship between industry and nature, while identifying the possibility of new means to create industrial architecture that is conducive to the regeneration of living as well as socio-economic systems. The following research methodologies will be applied in order to find possible solutions to the issues raised by this dissertation.

Tools for the accumulation, interpretation and application of research

Historical Research

This will be used to gain comprehensive understanding of the architectural heritage and the importance thereof in order to develop an appropriate approach toward the site and its built fabric as well as to understand the relationship between nature and the architecture that resulted from industry.

Mapping

A thorough analysis of the site and its surrounding context will be needed in order to fully understand the urban and architectural issues as well as the opportunities for an appropriate architectural intervention.

The existing heritage fabric on site, vegetation and circulation will all be mapped through a combination of observation, historic data analysis and computer based research and presented in the form of various maps.

Literature Reviews

This will have to be done in order to gain insight into the architectural theories addressed in this dissertation. A comprehensive understanding of philological restoration, regenerative and transformative resilience theory and the application thereof is needed to validate the work that will be produced.

Qualitative research

Will be conducted in the form of photography and observation in order to gain a comprehensive understanding of the current conditions on site and the current state of each building.

Evaluative Research

The National Heritage Resources Act no. 25 of 1999 of South Africa and the Nizhny Tagil Charter for the protection of industrial heritage, will be consulted to critically evaluate the current built structures on site in order to determine which buildings carry architectural value and which buildings can potentially be altered or demolished.

Collaborative design

As the precinct will be shared by four architects and a landscape architect, collaborative design will play an important part in the development of this dissertation. Collaboration with Tsica Heritage Consultants on the development and the value of the built fabric of the site will also form part of the research methodology.

Case studies / Precedents

Theoretical precedents will be studied in order to gain an understanding of how theory can be applied to design in order to initiate urban regeneration. Local precedents will be studied in order to identify strategies for the re-appropriation of industrial heritage in the South African context. Finally, formal precedents will be studied to gain insight into strategies for achieving the architectural intentions of this dissertation and ways in which architecture can be molded to create sensory experiences.

Limitations & Delimitations

Assumptions

It will be assumed that:

The gas cylinders on site will no longer be used.

Egoli Gas will relocate to another area in Johannesburg. Although the land is owned by Egoli Gas, there is the opportunity for the city of Johannesburg to possibly give them incentives due to the site's position in the Empire-Perth corridor strategy.

Some of the buildings may be demolished according to a heritage assessment conducted by Tsica heritage consultants. According to an assessment made by a structural engineer the heritage buildings are structurally sound (Tsica Heritage Consultants 2011:3). We will therefore assume that the buildings have the ability to be re-appropriated.

Limitations

Site visits will be limited as the site is quite dangerous and only authorized and guided visits are allowed by Egoli Gas. Plans and sections are however available for the existing buildings on site and the group will therefore not be restricted in terms of drawing up the existing buildings or modelling the site.

Delimitations

Due to the time constraints and vastness of the site only four architectural interventions and one landscape intervention will be developed into well resolved architectural projects. The rest of the site will merely be programmed and zoned according to the proposed urban vision, but will not be developed in detail.

Project intentions

The project intends to adopt the 2040 Spatial Development Framework for Johannesburg by transforming the old Johannesburg Gasworks into a future regional node for the Empire-Perth corridor. The project also intends to catalyze urban regeneration through the reactivation and regeneration of the Johannesburg Gasworks with the help of an architectural intervention.

Through the application of theory this project hopes to challenge the ideas of conservation and attempts to create a strong dialogue between the existing industrial heritage of the past and the envisioned contemporary architecture of the future.

Terminology

A guide for understanding

Dichotomy:

“A division or contrast between two things that are or are represented as being opposed or entirely different.”
(English Oxford Living Dictionary 2017).

Regenerative Design:

Regenerative design as defined by Pamela Mang & Bill Reed in *‘Regenerative Development and Design’*.

“Regenerative Design: a system of technologies and strategies, based on an understanding of the inner working of ecosystems that generates designs to regenerate rather than deplete underlying life support systems and resources within socio-ecological wholes”
(Mang & Reed n.d:2).

Remediator:

“A person who or thing which remediates something; an agent or provider of remediation” (English Oxford Living Dictionary 2017).

Retort:

A retort can be defined as a vessel which decomposes substances with the help of heat (Ardictionary 2010).

Industrial Ecology:

Industrial ecology strives to create sustainable and well integrated relationships between industry and nature through a comprehensive understanding of natural systems thinking (Brent, Oelofste & Godfrey 2008:9).

Transformative Resilience:

A theory that is aimed at recovering a system’s health through the use of regenerative design (Peres 2016:188).

One-way throughput:

Lyle (1994:5) refers to the ‘one-way throughput’ as a linear degenerative process in stark contrast to nature’s cyclical flows.

TICCIH:

The International Committee for the Conservation of the Industrial Heritage

Philological restoration:

A term originating from the Latin classification of a monument as a document or inscription.

Mordants:

“a chemical that fixes a dye in or on a substance by combining with the dye to form an insoluble compound”
(Merriam-Webster 2017)