Approaching a living heritage framework at the overlap of suburban encroachment and iron age ruins in South Africa

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APPROACHING A LIVING HERITAGE FRAMEWORK AT THE OVERLAP OF SUBURBAN ENCROACHMENT AND IRON AGE RUINS IN SOUTH AFRICA

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MArch (Prof)

in the

FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

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UNIVERSITY OF PRETORIA

2021

Summary

Site:
Entrance at 41 Drakensburg street
Bronkhorstspruit dam
Bronkhorstspruit
25°53'11.4"S 28°41'23.2"E

Clients:
Provincial Heritage Resources Authority Gauteng (PHRAG)
South African National Parks (SAN Parks)
Department of Arts and Culture

Keywords: Living heritage, iron age ruins, framework design, landscape, suburban encroachment, programme design, tectonic landscape

Research field: Legacy, Memory and Identity

Abstract

Iron age ruins are often associated with disoccupation and 'safely-dead' cultures, and are disconnected from current urban and cultural development. This perception creates a risk that this part of a South African heritage fabric could be lost to destruction and decay. Questioning this perception in the context of global and local heritage practices exposes this category of heritage site to the potential it has in contributing to social and cultural cohesion. How can the integration of iron age ruin landscapes with developing cityscapes be shaped in a way so as to encourage their sensitive occupation, programmatic longevity and communal value, in turn, extending the cultural significance of such sites into the future? Relying on multiple sources of informants, an understanding of the complexities inherent in ruin sites is established. Conventional investigative tools such as precedent studies, textual analysis and site mapping are paired with qualitative studies such as intuitive experiments, spatial translations and experiential mapping to synthesize a holistic background of informants. By investigating various layers of both tangible and intangible characteristics, this project attempts to establish a framework for creating a living heritage scheme within an iron age landscape in Bronkhorstspruit. The living heritage paradigm is explored through the facilitation of programmes that contribute to heritage production, such as artistic residencies, archaeological laboratories and wayfinding platforms. The resultant morphology of the project aims at framing the ruin landscape between separated buildings in an effort to incorporate the landscape into the metaphysical architectural fabric of the project. This approach looks toward concretising the function of the site so that it may drive development outward, rather than succumb to the encroachment of surrounding development.

Declaration

In accordance with Regulation 4(c) of the General Regulations (G.57) for dissertations and theses, I declare that this dissertation, 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 dissertation has already been, or is currently being, submitted for any such degree, diploma or other qualification.

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

_____   _____

Signed   Date

Ethical clearance letter

Faculty of Engineering, Built Environment and Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie / Lefapha la Boetšenere, Tikologo ya Kago le Theknolotši ya Tshedimošo

9 June 2021

Reference number: EBIT/79/2021

Ms A van Aswegen
Department: Architecture
University of Pretoria
Pretoria
0083

Dear Ms A van Aswegen

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This means that the research project entitled "Masters Professional Mini-Dissertation in Architecture, Landscape Architecture and Interior Architecture (Group / Blanket)" is approved under the strict conditions indicated below. If these conditions are not met, approval is withdrawn automatically.

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This application is approved based on the summaries provided.
Applications from each student (including application forms and all necessary supporting documents such as questionnaire/interview questions, permission letters, informed consent form, etc) will need to be checked internally by the course coordinator/ supervisor. A checklist will need to be signed off after the checking.
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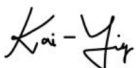Where students want to collect demographic the necessary motivation is in place.

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According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of the EBIT Research Ethics Office.

The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof K.-Y. Chan
Chair: Faculty Committee for Research Ethics and Integrity
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DPD 801+DIT 801+CPD810
2021 M PROF

SUPERVISION

DATE	ACTIVITY AND LENGTH OF INDIVIDUAL MEETING	SUPERVISOR SIGNATURE	STUDENT SIGNATURE
19/03/2021	**Introductory meeting & Proposal discussion**		
29/03/2021	**Introductory meeting with Xander Antonites & site selection information session**		
30/03/2021	**Proposal feedback session with Prof. Barker**		
31/03/2021	**Site selection meeting**		
08/04/2021	**Ethical clearance & Informant's discussion**		
23/04/2021	**Discussing findings on initial informants and investigations. Heritage context analysis, site selection process**		
29/04/2021	**Precedent study discussion and programme generation process**		
11/05/2021	**Q1_essay discussion**		
25/05/2021	**Maquette translation of textual studies**		
03/06/2021	**Initial plan concept discussion**		
10/06/2021	**Q1_essay feedback discussion**		
25/06/2021	**Synthesis and translation of conceptual work into tangible design**		
08/07/2021	**Design iteration discussion**		
26/08/2021	**Technology and material discussion**		
09/09/2021	**Plan iteration workshop**		
16/09/2021	**Technical crit discussion**		
03/11/2021	**Essay compilation discussion, exam format discussion**		
11/11/2021	**Essay compilation discussion, plan iteration workshop, exam format discussion**		

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2. Borden, I. and Rüedi, K. 2006. *The dissertation : an architecture student's handbook*. Amsterdam; Boston : Architectural Press.
3. Hofstee, E. 2006. *Constructing a good dissertation : a practical guide to finishing a Master's, MBA or PhD on schedule*. Sandton, South Africa : EPE.

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Chapter 1

From preservation to living heritage: a critical conceptualisation of conservation practice with application to iron age ruins in the Transvaal region.
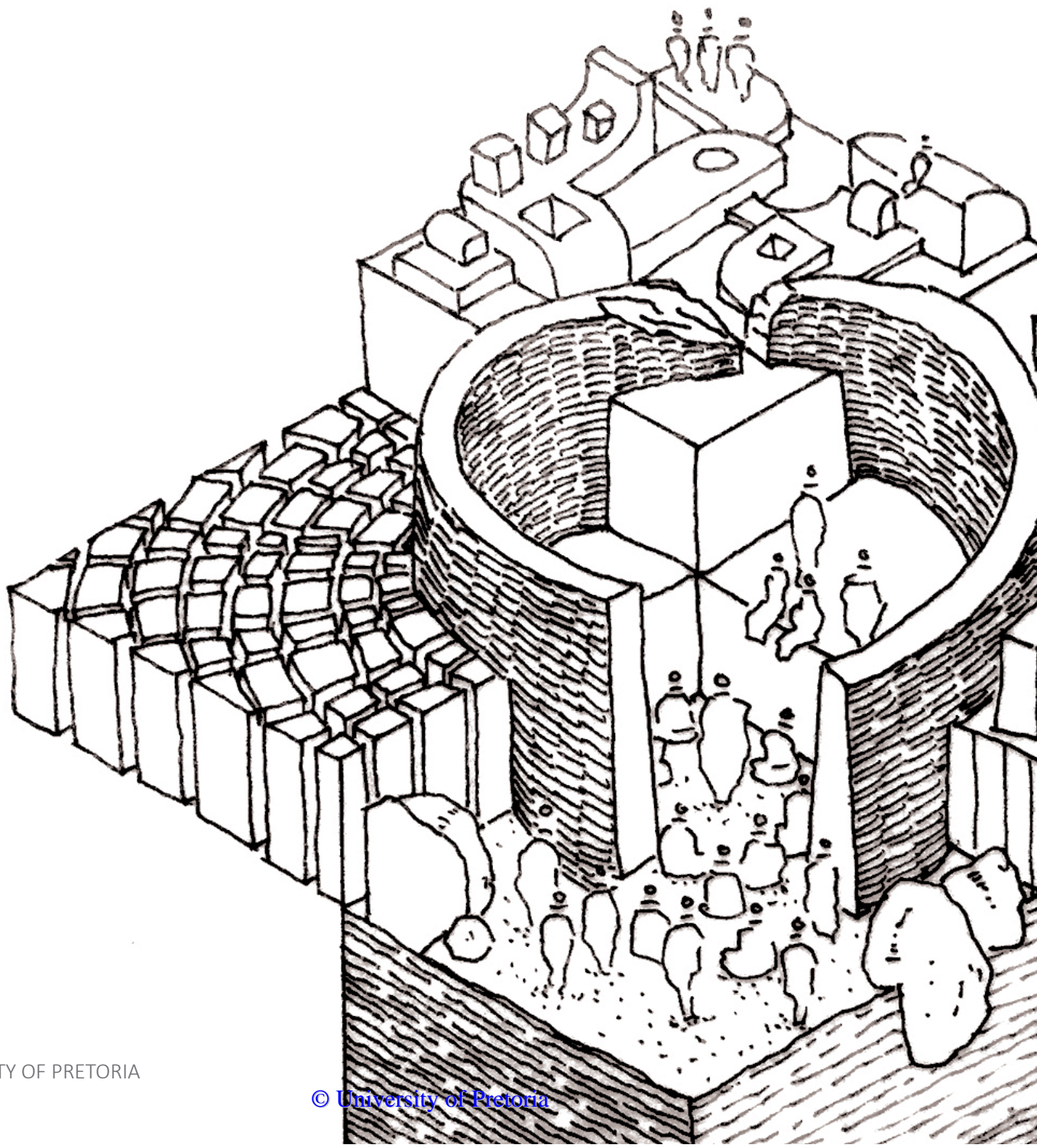
1. Introduction

For the purpose of this chapter as the introductory component of this mini-dissertation, the following research question is proposed: *How can the integration of iron age ruin landscapes with developing cityscapes be shaped in a way so as to encourage their sensitive occupation, programmatic longevity and communal value, in turn, extending the cultural significance of such sites into the future?*
Considering a critical intention, the normative stance of the author in pursuing architectural possibilities throughout the course of this project is aligned according to the following points:

- Critical designer autonomy
- Considered projectivity
- Framework design – situationalism

The first is a means to resist globalisation for the sake of commercial identities through considered architectural exploration. This stance is informed by the writings of Hays on criticality (Hays, 1984), James Curtis' retrospective on the autonomous work of architectural practice RCR arquitectas (Curtis, 2017) and Phillip Plowright's call for practice-theory unification (Plowright, 2009). The second point ideates the consideration of consequences, phasing and programmatic connection beyond the bounds of a singular site, termed by Somol & Whiting in Notes on the doppler effect and other moods of modernism (Somol & Whiting, 2002) and the readings on post-critical projectivity by Robert Cowheard (Cowherd, 2009). The final point describes the resultant process of gathering informants regarding context, which arises from meditating the notions of criticality (designer autonomy) and post-criticality (projectivity). Contained within a site are its cultural and historical narratives, as well as its physical condition. As a means of creating a framework within which a project can be situated and measured according to, these facets of a site restrict, inform and shape the production of an architectural scheme[1].

To lay the foundation of the project framework, a review of globally accepted heritage charters and declarations is conducted. This yields a continuum of practices and offers opportunities for their critique and critical response in the context of this project. From this analysis, shifts in paradigms form a genealogy of conservation mindsets. Framing the response in this project, the review will inform a critical stance, determining applicable heritage tactics for use at the site.

Issues are then identified at four tiers, ranging from the macro to the micro, which guide the project's intention. The change of an artefact's meaning over time is an ongoing event and potentially, a global phenomenon (Young, 1994). On a national scale this results in the consideration and shaping of the relevance of ruin sites (Fontein, 2006), extending into questions of integration on an urban scale and interface on an architectural scale.

A living heritage approach to iron age ruins attempts to consider their potential in the process of urban development. But first, the notion that ruins are spaces of heritage as well as heritage production, needs to be argued. This chapter will inspect the language used to describe ruin sites and attempt to frame iron age ruins (predominantly unoccupied and unprogrammed (van Vuuren, 2010)) as spaces where living heritage can occur. A wide variety of iron age ruin sites are present in South Africa (Anderson, 2009), with the greater Transvaal region bearing no exception. Three potential sites have been identified and an analysis and selection process will be undertaken to determine which is most suitable for the nature of this project.

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[1]This theoretical stance is established in a previous essay titled *The possibility of being both* (Forder, 2018), completed by the author for previous normative stance determination tasks.

2. Global standards & approaches to heritage sites

2.1. Charter review: A genealogy of accepted heritage practices

The project starts with an investigation into the paradigms that have shaped heritage practices. Marking the earliest point of internationally accepted standards for heritage practice is the *International Charter for the Conservation and Restoration of Monuments and Sites*[2] (ICOMOS, 1964). It offers guidelines for the restoration of monuments and sites, which advocates strongly for their maintenance and the prevention of further deterioration (ICOMOS, 1964:1). In cases where enough information is available, restoration may be undertaken by specialised practitioners (ICOMOS, 1964:2). Heritage is classified as a non-renewable resource, which can be used to educate future generations (ICOMOS, 1964:1). A common trend mentioned in all subsequent charters is the inherent characteristic of universal value – heritage is defined as a global asset pertaining to mankind's history as a whole (ICOMOS, 1964). In 1983 the complexity of heritage practice is elaborated upon in the form of the *Appleton Charter for the Protection and Enhancement of the Built Environment* [3] (ICOMOS, 1983). The charter starts to consider alternatives to strict preservation as a means of encouraging the significance of heritage places. It defines terminology associated with the field and suggests a situational approach to conservation (ICOMOS, 1983:2-4). The scope of classification is furthered by the proceeding *Charter for the Protection and Management of the Archaeological Heritage* [4] (ICOMOS, 1990) and *Charter on the Built Vernacular Heritage*[5] (ICOMOS, 1999). The focus on these later charters tends more towards research and documentation for the sake of education and longevity. To build on the paradigm shift from static preservation towards situational upliftment and considered rehabilitation, the concept of living heritage is coined. Created in 2003, the *Living heritage article* (ICCROM, 2003) advocates for the protection of continuous practices and traditions as an aspect of intangible heritage. Leniency is granted in the management of change, and spaces shaped by occupation are considered items of living heritage. Hereafter two supplementary charters, namely the *Charter for Interpretation and Presentation of Cultural Heritage Sites* (ICOMOS, 2008) and the *Burra Charter* (ICOMOS, 2013) are provided, containing detailed descriptions of conservation practices. The intention of these charters considers the nuanced manner in which heritage is communicated (ICOMOS, 2008). A higher-level legislative recommendation is considered in the Burra Charter where local regimes should undergo processes of management-plan construction, to utilise heritage resources effectively (ICOMOS, 2013:12).

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[2]Hereafter referred to as the Venice Charter
[3]Hereafter referred to as the Appleton Charter
[4]Hereafter referred to as the Archaeological Charter
[5]Hereafter referred to as the Built Vernacular Charter
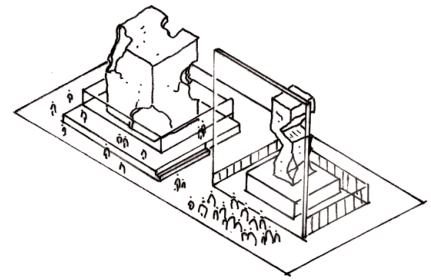
Figure 1: The Venice Charter of 1964 as a diagram (Author, 2021).
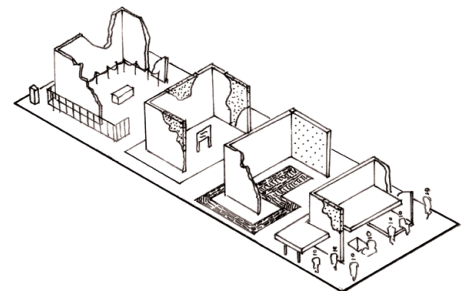
Figure 2: The Appleton Charter of 1983 as a diagram (Author, 2021).
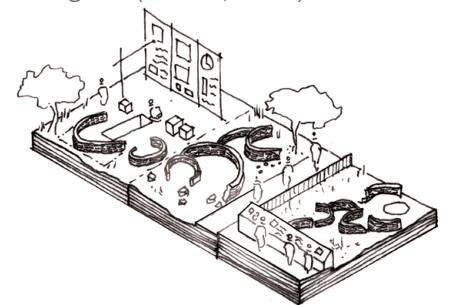
Figure 3: The Archaeological Charter of 1990 as a diagram (Author, 2021).
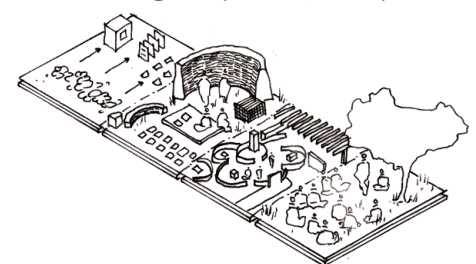
Figure 4: The Built Vernacular Charter of 1999 as a diagram (Author, 2021).
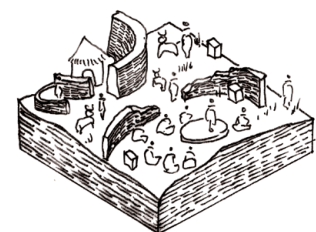
Figure 5: Living heritage article of 2003 as a diagram (Author, 2021).
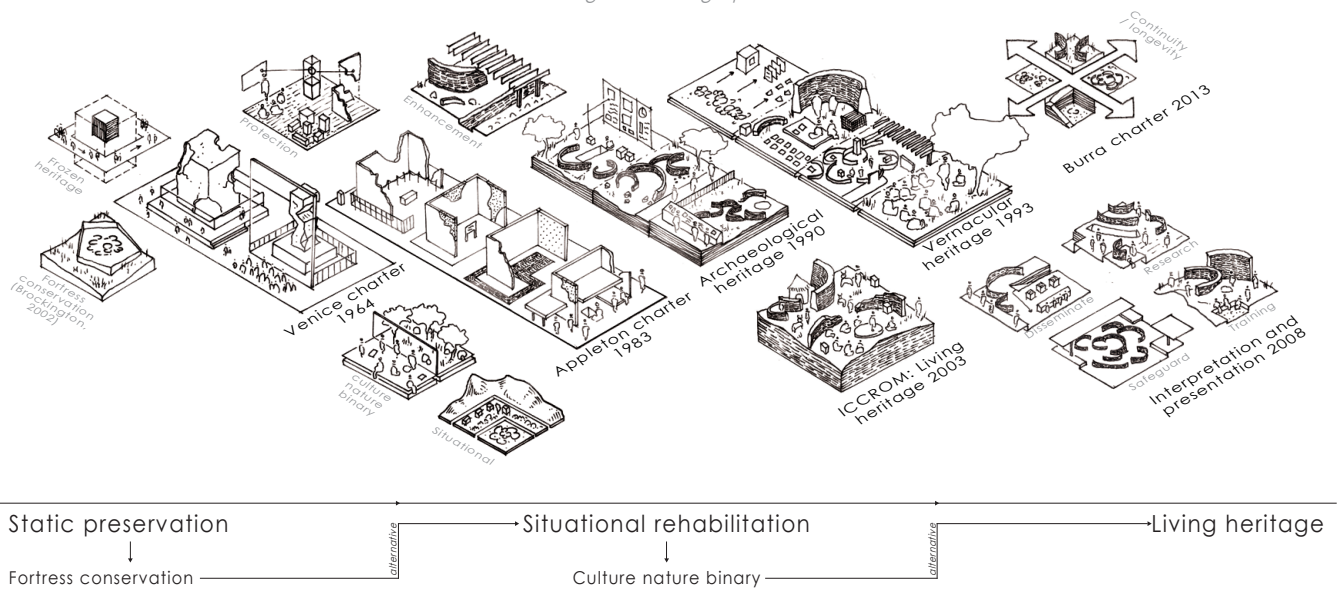
Figure 6: A genealogy graph illustrating the various ideas contained within heritage charters, and the overarching paradigm shift that occurs over time, tending from static preservation to situational rehabilitation, and later, a living heritage approach (Author, 2021). (Refer to appendix A for larger scale).

2.2. Declaration review: Managing change within cultural heritage

After the broader paradigm discussion of charters above, where static preservation tends towards situational rehabilitation and later, towards living heritage consideration, the question of external change as a threat is discussed by additional declarations. The first of these, published by ICOMOS in 1994, is the Nara Document on Authenticity . Associating strongly with the earlier Venice Charter (ICOMOS, 1964), the Nara document describes the processes of documentation, meaning understanding, representation and the reflective process revision and updating. Prevention of further decay is prioritised, but the process of revising established truths is incorporated in cases where conditions change or new data is found.

Nara: Document on authenticity
1994

Quebec: Preservation of spirit of place
2008

Paris: Heritage driving development
2011

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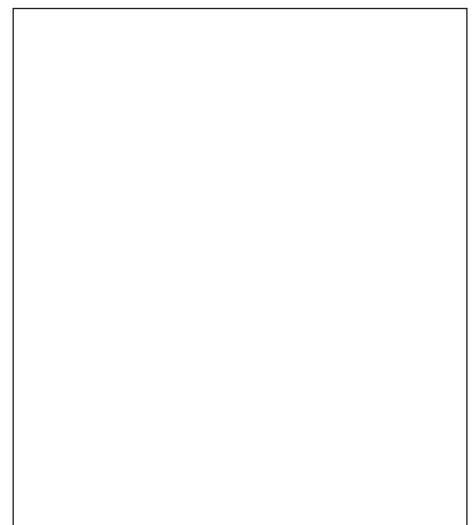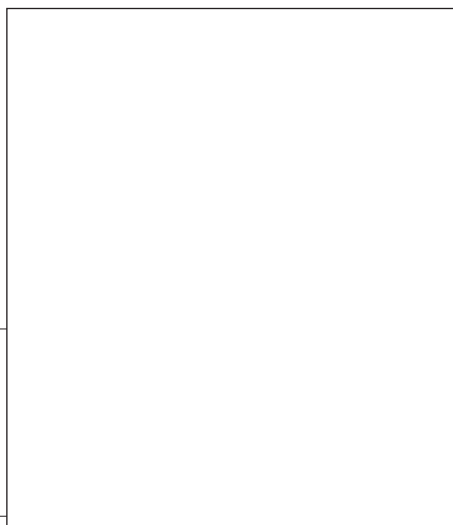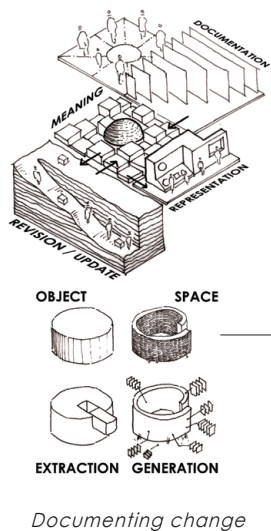
[6]Hereafter referred to as the Nara Document

Thereafter the Quebec Declaration on the Preservation of the Spirit of Place (ICOMOS, 2008) highlights the notion of spirit of place as a classification of heritage. Intangible facets as cultural manifestations on tangible sites are seen as inseparable and combined objects. This shows a tendency towards living heritage preservation and begins to acknowledge change as an inevitable, and important component of heritage sites (Baillie, 2020).
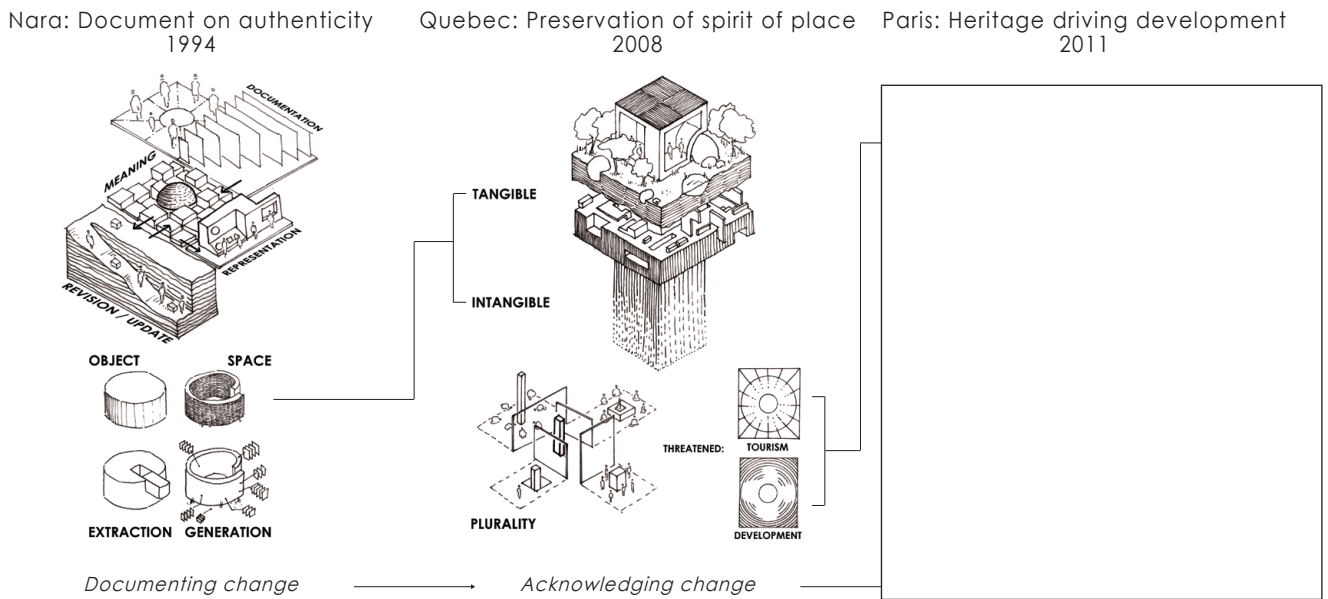
The most recent document on responding to external change within heritage sites is the Paris Declaration on Heritage as a Driver for Development (ICOMOS, 2011). Contained herein is the awareness of internal change due to ongoing practices, but also an awareness of external globalisation and homoginisation. To incorporate the idea of longevity into the management of heritage sites, the notion that these sites can be used to drive change outwardly is considered. The approach towards heritage management grows from documenting change to acknowledging change, and ultimately, guiding change.
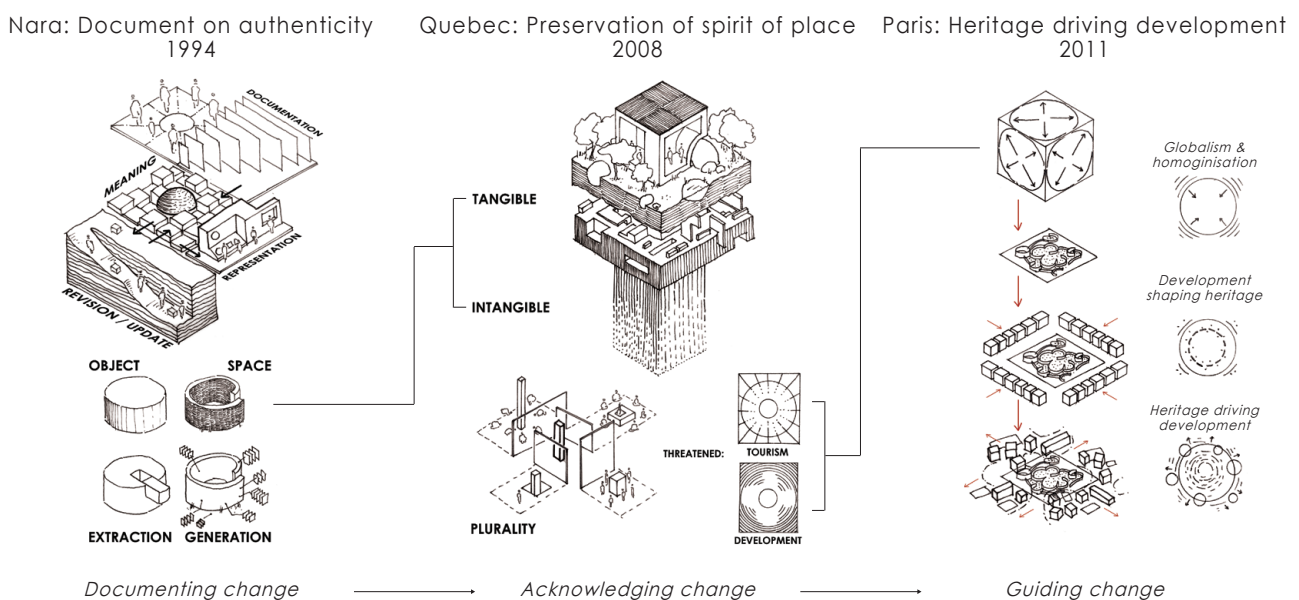
Figure 7: Three declarations illustrated in a continuum where approaches to managing change sit at the core of conservation practice. A shift from heritage as objects for extraction, towards spaces for generation is noted. Tangible significance paired with an active programme, presents a counter to the threat of globalisation and deterioration. Heritage can be protected and change can be guided to drive development outward (Author, 2021). (Refer to appendix B for larger scale).

2.3. Scales of issues at iron age heritage sites

Arising out of these practices are certain issues, additionally, issues can arise from a dearth of enacted practices. Paradigmatic heritage approaches are of global concern, but the means by which conservation is enacted (or not enacted) on a national scale, results in consequences felt closest to home (South African department of arts and culture, 2009:54). Globally, the question of meaning arises, with the aforementioned notion of universal value raising questions about the agency and ownership of iron age ruins (South African department of arts and culture, 2009:15). On a national scale the relevance of iron age heritage is at play (South African department of arts and culture, 2009:42). These sites fall on a spectrum of protected islands without relevant quotidian relations to unprotected sites where irrelevance succeeds deterioration. The urban scale questions how the response employed at these sites can drive the manner in which they are integrated into urban contexts (ICOMOS, 2011). The possibilities include loss due to urban expansion, but also the opportunity for overlap improving contemporary relevance. More intimately still, is the architectural issue of interface. Arising questions of 'what kind of practitioners are involved?' (Latour, 2014), 'how is the public exposed to the site?', 'what role does the site play in the community?', are necessary considerations (ICOMOS, 2008).

Lastly, how can a living heritage mindset, which implies continuity from the past, apply to ruins which have long since been predominantly unprogrammed. For the case of this project (and argued below) living heritage is considered for its critical stance in the heritage continuum, and its possible relevance in an African context (Ballie, 2021).
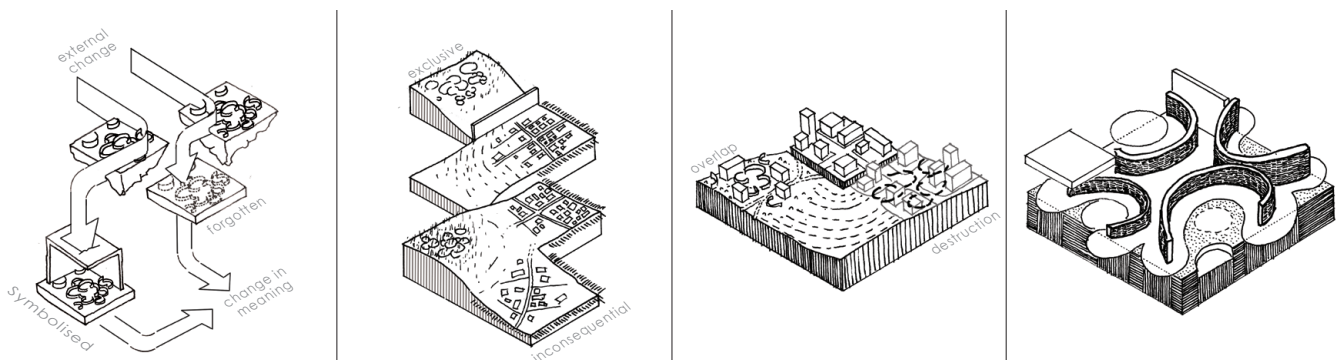
Figure 8: Diagrams describing the four scales of issues identified in this project (Author, 2021).

3. Conceptualising the heritage category of iron age ruins

3.1. Heritage as objects

The Venice Charter (ICOMOS, 1964) defines protection of heritage assets as the ultimate goal. This allows documentation, education and dissemination of heritage meaning. This suggests that material value protection, protects cultural significance as well. For heritage objects (artwork, sculpture, artefacts) this static preservation mindset seems relevant. However, sites, spaces and places that are treated in the same manner (as objects of heritage) fall prey to a fortress conservation flaw (Brockington, 2002). Brockington (2002:4,10) critiques the manner in which natural landscapes are protected in favour of sublime natural beauty. Enforced by the eviction of communities who sustain themselves by means of these landscapes, this mindset can be applied to spaces of heritage. If the significance of the physical place is prioritised over the quotidian practices associated with such spaces, the conservation project will fail its communities.

Ruins fall under heritage classification in line with the Archaeological Charter (ICOMOC, 1990) and the Built Vernacular Charter (ICOMOS, 1999). These documents align with the preceding Venice Charter (1964) and describe heritage as a non-renewable resource, to be documented and maintained by multi-disciplinary teams of expert practitioners. Heritage inclusivity is extended here, to encompass artefactual data (ICOMOS, 1990:3), building and crafting methods, ways of life and traditions (ICOMOS, 1999:2). However, these facets are demarcated as assets for protection and agency over change is in the hands of external parties, rather than the hands of inhabitants (Latour, 1014).
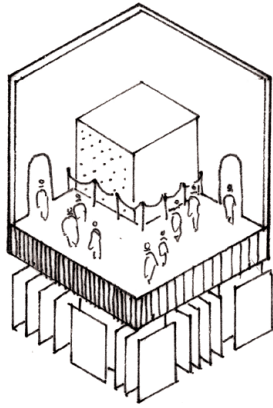
Figure 9: (left) A diagram showing the notion of heritage as a protected resource for the sake of knowledge extraction (Author, 2021).
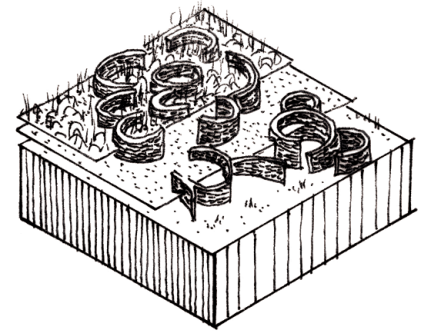
Figure 10: (right) A diagram showing ruins as non-renewable heritage resources with universal value (Author, 2021).

3.2. Heritage as space

The aforementioned Quebec Declaration (2008) in which the concept of spirit of place is first noted, introduces a shift from heritage as an object to heritage as a space. Intangible aspects of a site are tied inextricably to the physicality of cultural landscapes. Programme as an architectural concept is fortified as a spatial instigator in Bernard Tschumi's Spaces and events (Tschumi, 1994). In this article Tschumi (1994:9) describes the variability in perception of form dependent on its associated programme. Tschumi (1994:11-12) describes experiments of superimposition in which the effects of overlaying counterintuitive programmes on top of iconographic typologies results in complex iterations of both programme and architectural form. This is relevant in the context of heritage spaces as a means to apply contemporarily relevant programmes with sites that have significant material value, but little quotidian relevance. In the perspective of both the Built Vernacular Charter (ICOMOS, 1999) and the Living heritage charter (ICCROM, 2003) ruin sites (specifically iron age ruins) are not classified as having living heritage, due to their lack of continuous programme throughout their existence. This can be contested in some cases where certain sites still have traditional meaning and significant memory attached to them, as in the case of Great Zimbabwe (Fontein, 2006) and Mothong traditional medicine village in Mamelodi (Ledwaba, 2018). However, in a majority of the ruins around the Transvaal, the use of these sites is symbolic and often not of the speculative original intention, usually pastoral (Steyn, 2011:108). The paragraph to follow argues that despite lacking continuous programmes, there is still value in viewing and utilising iron age ruins as spaces for contemporary heritage production, rather than simply preserved objects for knowledge extraction.
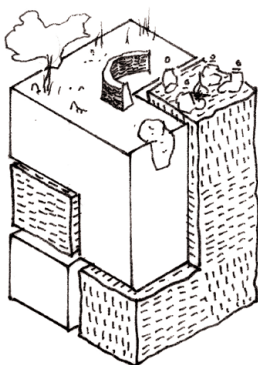
Figure 11: (left) A diagram showing the notion of heritage as a protected resource for the sake of knowledge extraction (Author, 2021).
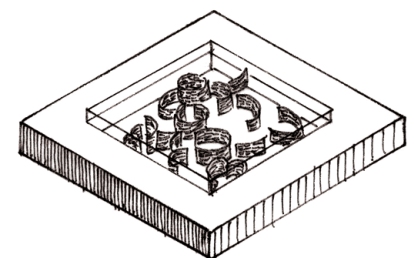
Figure 12: (right) A diagram showing ruins as non-renewable heritage resources with universal value (Author, 2021).

3.3. Ruins as spaces of heritage production

Five texts are used below to argue in favour of the application of a living heritage framework at iron age ruins. Firstly, Viljoen (2011) discusses the dialectic nature of ruins, representing both the past and the future in the present. Tied to the past, ruins hold intrinsic historical value, but the absence of completed form raises questions about possibilities for the future as well (Viljoen, 2011:157-158). Conceptually, Viljoen (2011:160) argues that ruins result from both passivity (abandonment and dereliction) and activity (occupation and destruction) and that the effects of ruination, or the act of destruction does not remove the ideology (in this case, memory) of a place.
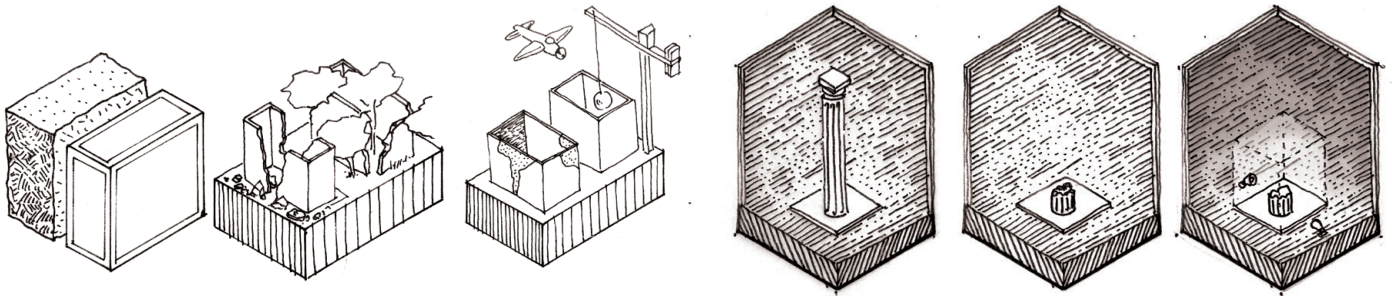
Architectural writer Jonathan Hill (2019:300-301) describes the architecture of ruins as the result of coproduction, a process of spatial production that results from the human creation of culture and its occupational effect on nature. Ruination from coproduction is a continuous process that happens regardless of age or heritage value, but that is specifically prevalent at ruin sites (Hill, 2019:294-295). Consequently, ruins can be considered spaces where a form of programme is inevitable (whether passively or actively conducted) and the effects of programme are most legible. The way in which programme is designed in the case of iron age ruins in South Africa can be shaped by the discussion above, in the form of a living heritage framework.
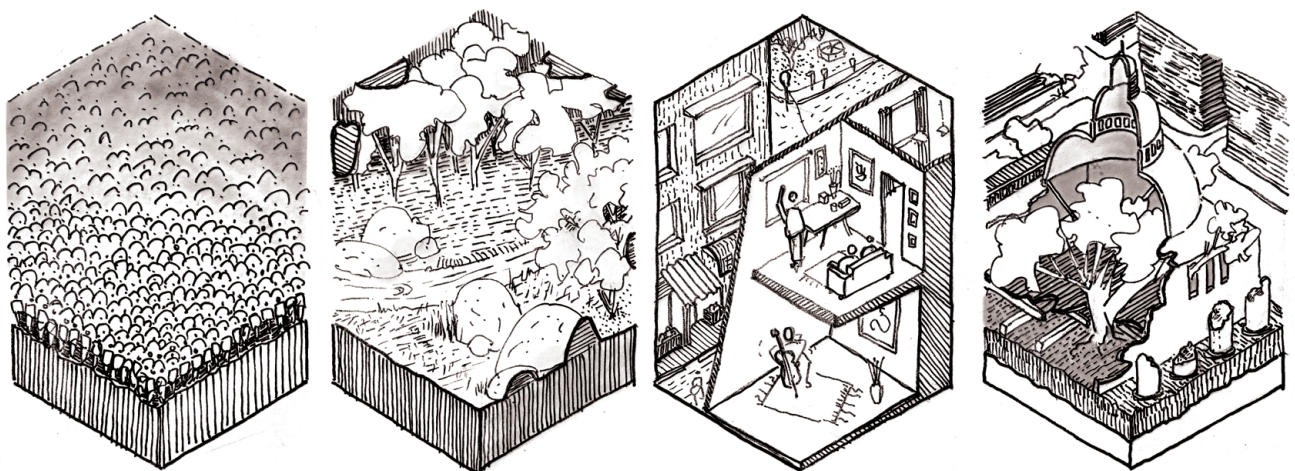
Figure 13: (top) Sketches describing the dialectic nature of the ruin (Viljoen, 2011) and how its nature of absence and presence arises questions regarding the truth of the past and the potential of the future (Author, 2021).
Figure 14: (bottom) Coproduction, as defined by Hill (2019) as a continuous process of ruination brought about by the interaction of man-made culture upon nature- opening the conceptual opportunity for ruins to become spaces of continuous heritage production (Author, 2020).

Related to the aforementioned Tschumi (1994) discussion on the altering effect of events on the perception of form above, James Young (1994) describes ruins and monuments as having variable meaning through time, according to paradigm and situation. This variability seems to be an inescapable fact and should be considered from the genesis of a project.

Driving change from within and shaping development around ruins is a concept advocated for in the Paris declaration (ICOMOS, 2011) as well. Conceptually reinforced by academic scholars; Coppolino (n.d.) who describes ruins as narrative instigators, and Jordaan (2014) who tends towards the fantastical and metaphysical role ruins can play in inspiration and ideating new possibilities.
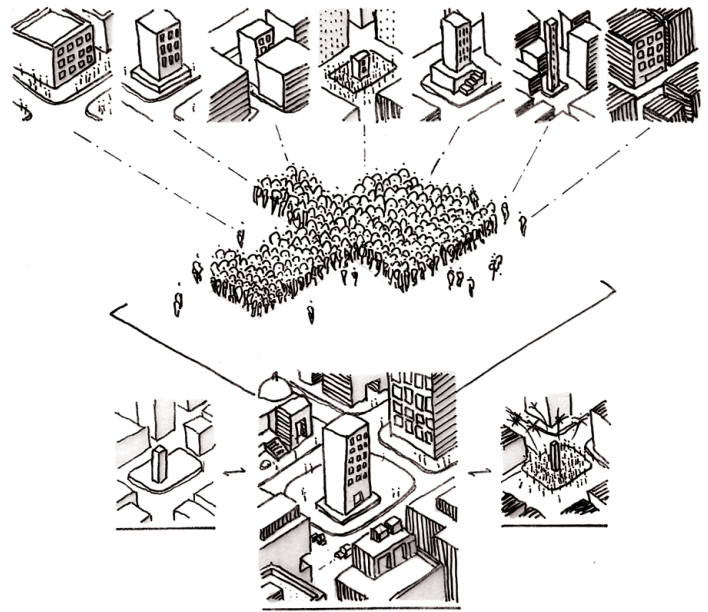
Lastly, architectural writer Gevork Hartoonian (2012) describes Alvar Aalto's idea of tectonic landscapes in architecture being landscapes inspired by heterotopias[7], or conceptual other worlds. In this case, ruins are tied to the past in their inception. They present a contemporary interactable surface that results from the heterotopic past penetrating time and existing in the present. Ruins become contact points with which humans of today can exist in space enriched by history, simultaneously working towards creating the future on top of it. From these texts, it is argued that there exists potential for ruins to be read as spaces of continual living heritage, and consequently, spaces of heritage production.
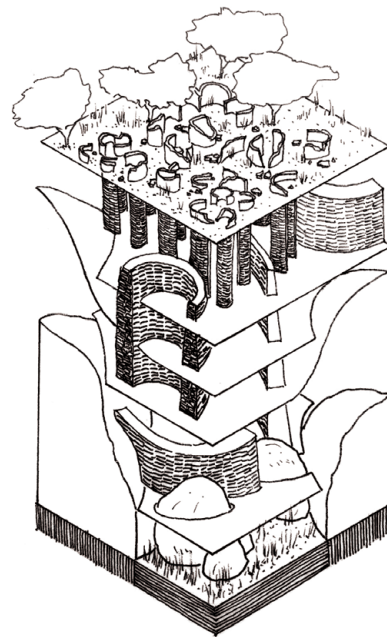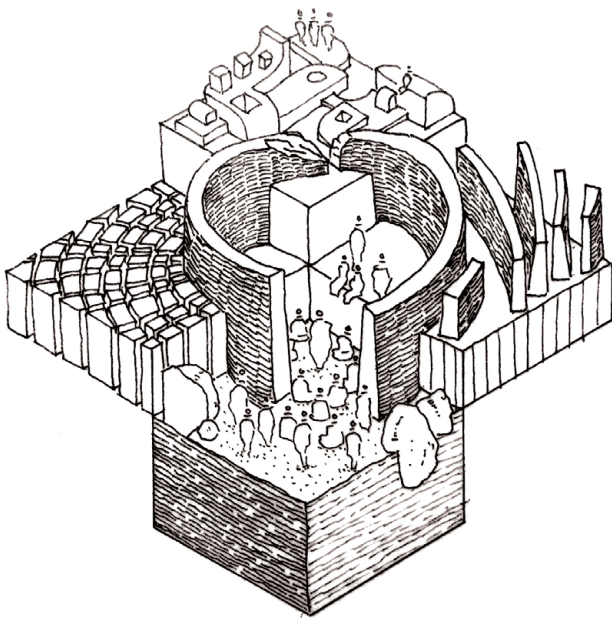
Figure 15: (top) A set of diagrams describing Young's (1994) description of memory dynamism over time, dependent on periodic context and the resultant potential of plural interpretations as sites for future development.

Figure 16: (bottom row, left) Thereafter, the ruin as a narrative instigator (Coppolino n.d. & Jordaan, 2014), showcasing the potential of driving development outward from within (Author, 2020).

Figure 17: (bottom row, right) Lastly, the notion of the tectonic landscape (Hartoonian, 2012) as a site where historical remnants permeate into the present and allow for the attachment of the future onto the past (Author, 2021).

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[7]Physical characteristics that make up the stable condition of conceptual spaces that are 'other' to the present (Jordaan, et. al. 2014)

4. Considering sites for ruin heritage projects

4.1. Introducing potential sites

Three potential iron age ruin landscapes are considered as stages for this project. Surrounding the town of Emgwenya there are various clusters of ruins. The town sits amidst the ancient landscape and is home to a tourism scheme called the Stone Circle Museum. Their call to service is the dissemination of a pseudo-scientific truth regarding the construction of these sites (Stone Circle Tours, 2021). This truth threatens the meaning of these sites, but yields the benefit of elevated significance and interest in the conversation regarding these sites within a more public domain. Thereafter, the northern ridge of the Bronkhorstspruit dam contains two clusters of ruins that abut the upper-class residences. Confronted from the south by potential suburban encroachment and from the north by sand mining industry, these sites are at risk of destruction, but retain potential for valuable urban integration. Lastly, a remote site containing a large and coalesced group of ruins is situated to the west of Rustenburg on what is today private property. The bucolic context offers the beneficence of minimal active destruction. However, long term inactivity will result in the loss of the site's memory. Its contemporary value is underutilised and the heritage potential of the site could drive valuable and complex developments.
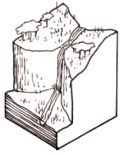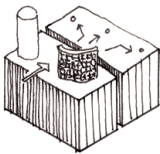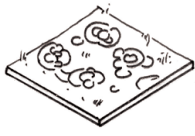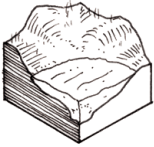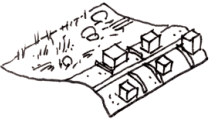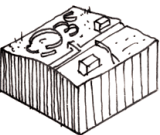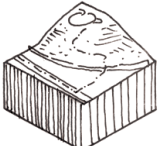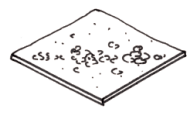
	Topography	Setting	Access	Condition	External threats
Emgwenya Sotoho/Tswana ruins	Cliffs and hills	Town, agricultural	Museum tour	Semi-protected	Esoteric truth, urban development
Bronkhorstspruit dam Ndebele ruins	Hills and dam	Sloping suburb, open land	roadside / suburb	Unprotected	Urban development, mining
Molokwane Bakwane ruins	Hills and veld	bucolic / agricultural	road, hike, private land	Semi-unprotected	Loss and deterioration

Figure 18: Tables discussing various characteristics of the potential sites, as a means of creating an identifiable caricature of each site (Author, 2021).

4.2. Site selection

The Bronkhorstspruit site is selected based on factors concerning its contextual threats, namely mining and urban expansion. Situated in close proximity to an existing suburban area offers an attachment point for quotidian programmes, but also necessitates a response to possible developmental encroachment in the future. Upon inspection of aerial photographs, the ruins present in good condition with plans of various enclosures legible, and pathways well marked. Lastly, there is a depth of research available on the cultural history of the site and Ndebele culture from which it emerges, completed by prominent South African archaeologist and academic, Chris van Vuuren, which will offer essential insight when considering possible programmes. Van Vuuren's research often relates archaeological data and cultural concepts with architectural and spatial principles- improving the interoperability of the research in the context of this project. For practical reasons, it is possible to access the Bronkhorstspruit site in person, unlike the Molokwane site which is situated on private property. The omittance of the Emgwenya site is due to its overall composition of smaller sites scattered between agricultural land and distanced from larger settlements in sections of remote land. The vastness and detachment from nearby contemporary settlements shift the nature of such a project away from urban integration, in contrast to the intention of this project.

4.3. Issues and potentials of the Bronkhorstspruit site

In his 2008 article, van Vuuren discusses the issue of tangible and intangible heritage distinction (van Vuuren 2008). Taking note of the global academic discourse surrounding heritage practice, van Vuuren (2008:1-2) highlights the publishment of the Living heritage article (ICOMOS, 2003) and the condition it creates as a document proceeding the earlier Venice Charter (ICOMOS, 1994). Acknowledgement of the value of intangible heritage represents a crucial change in mindset for heritage practice, but van Vuuren argues that it dichotomises intangible aspects from tangible aspects (which he argues are inextricably connected). His advocation for their mutual consideration and understanding tends more towards the thinking of the Quebec Declaration (2008) which unifies the concepts under the term spirit of place (ICOMOS, 2008). Anthropologist Bruno Latour (2014) further discusses this un-dichotomisation of heritage facets in his article *Another way to compose the common world*. Here, Latour (2014:305) suggests a bridging in the analysis of subject and object and insists on their unsegregated consideration – often requiring altered practices enacted by alternative practitioners. Beyond this need for nuanced consideration of culture and nature, object and subject, as integrated components of place, the site offers the opportunity for urban integration and advocation for heritage protection in the face of confrontational external change. A framework that guides the way in which development occurs around the iron age ruins into the future, and development driven from within the ruins outwards, becomes the crucial outcome for consideration in this project.

5. Conclusion

As a means of creating a critical framework that can shape, inform and restrict the project, a broader context of heritage practice has been analysed. The resultant paradigm of living heritage as a means of conservation, and simultaneously, heritage production for future longevity is established. As a tectonic landscape, the selected site is read as a heritage site with inherent material value, but also valuable associated meaning and potential that can drive development outwards. Upon the selected site in Bronkhorstspruit, this approach will endeavor to address the potential threats of suburban encroachment and sand mining. Iron age ruins in South Africa present a unique spatial condition, more specifically, the nuances of Ndebele oral history and cultural building practices pertaining to the history of the selected site will be explored. The subsequent parts of this project will also investigate potential programmes as heritage devices and possible architecture that could be created to house such programmes.

Chapter 2

Conceptualising a living heritage programme within the tangible and intangible context of iron age ruins in Bronkhorstspruit.
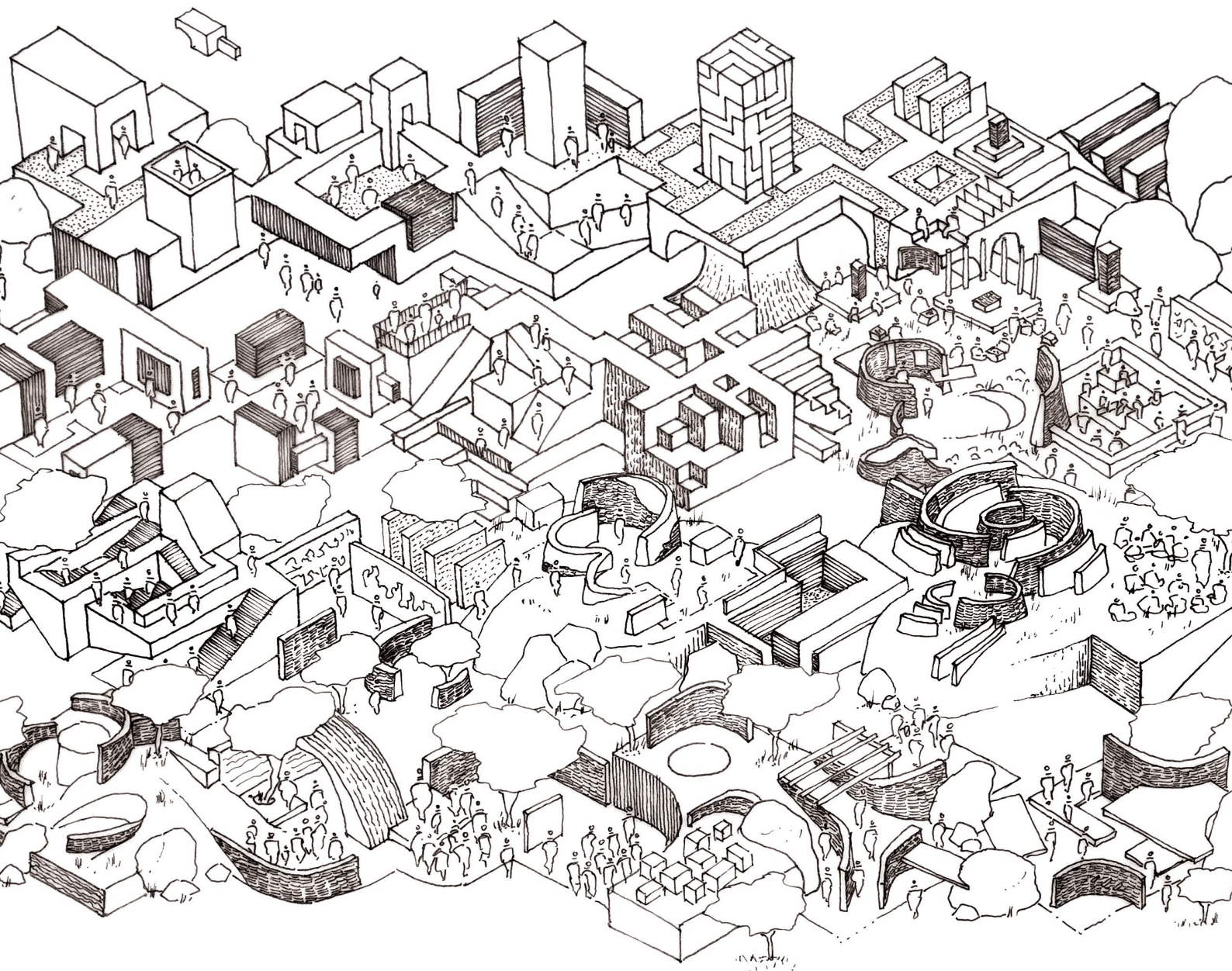
6. Introduction

This chapter builds on the position and situation discussed in the previous chapter by exploring further aspects of design research. A broad review of global heritage charters and paradigms informed a living heritage approach to iron age ruins in South Africa. The paradigm of living heritage as a response to ruins (usually abandoned) requires the conceptualisation of programme. The goal of this chapter is to generate programmes that facilitate a continuous production of heritage and then propose initial concepts for their architectural manifestation. Programmes will be generated, reviewed and iterated through the layering of diverse sets of informants.

Firstly, precedent studies are conducted and used in experiments to generate conceptual programmes. These are imagined within various scales of proximity to the ruins on site. Reflection upon these programmes occurs thereafter through the critique of contemporary architectural heritage typologies. The critiques will highlight important lessons and ensure the programmes build on the continuum of heritage practices. The role and involvement of various collaborators and participants is investigated under the categories of landowners, associated cultural groups, the public and relevant boards and councils. Viewed in conjunction with issues present on site, these groups shape the programmes according to particular needs and points of concern. The conceptual programmes are then offered specificity through the examination of readings regarding the culture currently understood to be associated with the history of the site. Various anthropological essays written by Chris van Vuuren (from 1993-2011) regarding the oral history of the Ndebele & Ndundza language groups form the subject of this study.

The physical context is discussed in terms of complexities in the mapping process, and the resultant plural lenses of observation that are required. Lessons gained from visiting the site are also taken note of as a means of extracting organisational tactics from the ruins to inform the production of architectural interfaces. Concepts that take the form of programmatic diagrams are presented as the culmination of the research. This product is extended by the use of the plan diagram as a conceptual mechanism to imagine the initial architectural manifestation of the programmes.

7. Conceptualising a living heritage programme

7.1. Precedent studies: Reviewing heritage responses

To gain perspectives on the built world of architectural heritage projects, and define a new programmatic response that aligns with a living heritage point of view, various local and international precedents will be discussed. Sketches that interpret each project are presented as visually accessible caricatures, which are later used in an experiment to generate a conceptual programme. The precedents are chosen for their response to heritage of a ruined and anthropological nature.

a) Maropeng centre

The Maropeng centre, design by MMA Design studio, in 2005, is an educational and research focused interpretation centre (MMA design studio, n.d.). It aims to disseminate information regarding paleontological history to the public and offer resources for scientists to conduct said anthropology. From an educational point of view the site functions fruitfully. Its relation to living heritage lies in the research it generates.

Programme	Heritage response	Heritage type	Setting
Visitors and Research centre	Document and display research	Archaeological and anthropological	Protected landscape
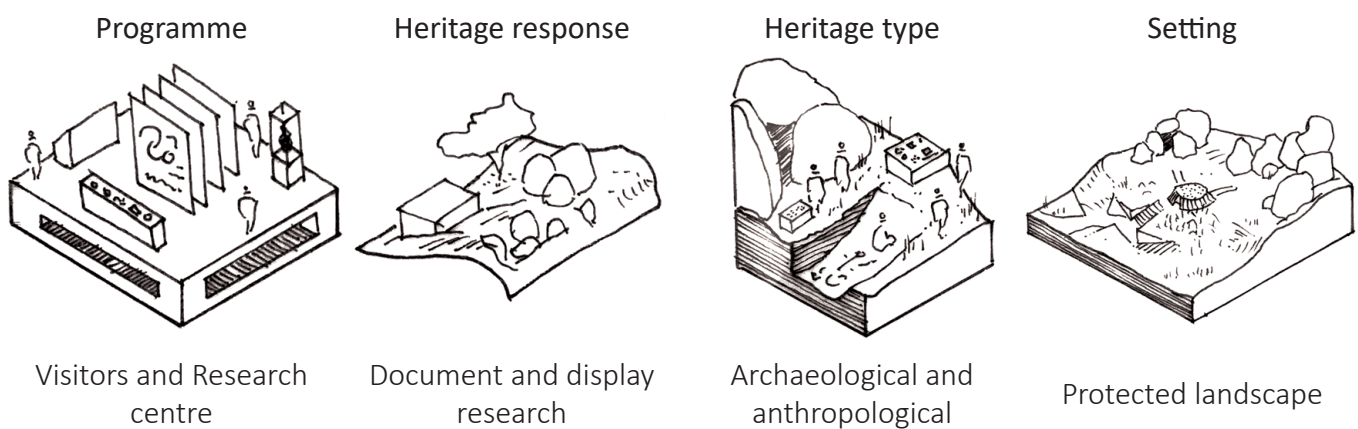
Figure 19: Diagrams showing the characteristics of the Maropeng centre (Author, 2021).

b) Mapungubwe interpretation centre

Peter Rich, architect of the Mapungubwe interpretation centre (completed in 2009) incorporated local craftsmanship into the production of the building (Fagan, 2010). Local woman, residing closely to the site, were employed in the manufacturing of sunbaked earthen bricks, used to construct the well-known vaults (Fagan, 2010). Designed with an African architectural identity in mind, this project succeeds in bringing relevance to both South African architecture and iron age culture. Peter Rich (2020) claims that skills taught during construction are still used by the craftspeople to build their settlements, and in that way the project continues to drive heritage production. However, the interpretation centre typology lacks a means of programmatic continuity beyond sparse tourist visits.

Programme	Heritage response	Heritage type	Setting
Interpretation centre	Express culture and inform visitors	Iron age stone ruins archaeological	Bucolic landscape
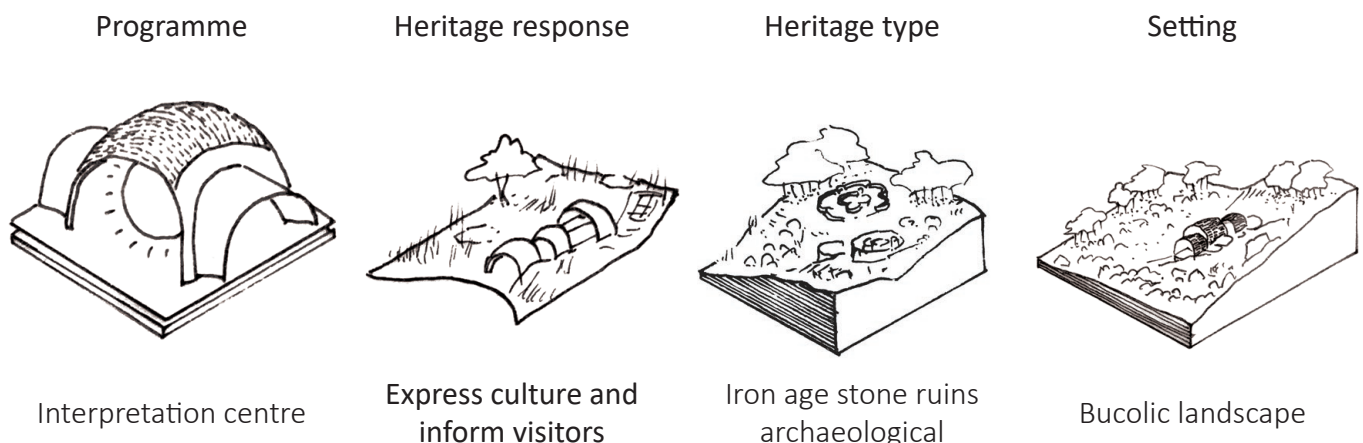
Figure 20: Diagrams showing the characteristics of the Mapungubwe interpretation centre (Author, 2021).

c) Stone circle museum

This programme is associated with the ruins around the Emgwenya region. The stone circle museum offers guided tours of the ruins, bringing them into public consciousness (Stone circle tours, 2021). The programme is living in the sense that the ruins inspire various tours, however, the museum presents truths based in pseudo-scientific practices. The ruins are mythologised and determined to be of Anunnaki origin (Stone circle tours, 2021), rather than African iron age origin. As a result, the ruins are experienced as apart from South African history and heritage, and do not contribute to the continuous production of South African heritage, contrary to the intention of a living heritage scheme (SADAC, 2009).

Programme	Heritage response	Heritage type	Setting
Meeting node	Guided tours and theory dissemination	Iron age stone ruins archaeological	Town surrounded by ruins
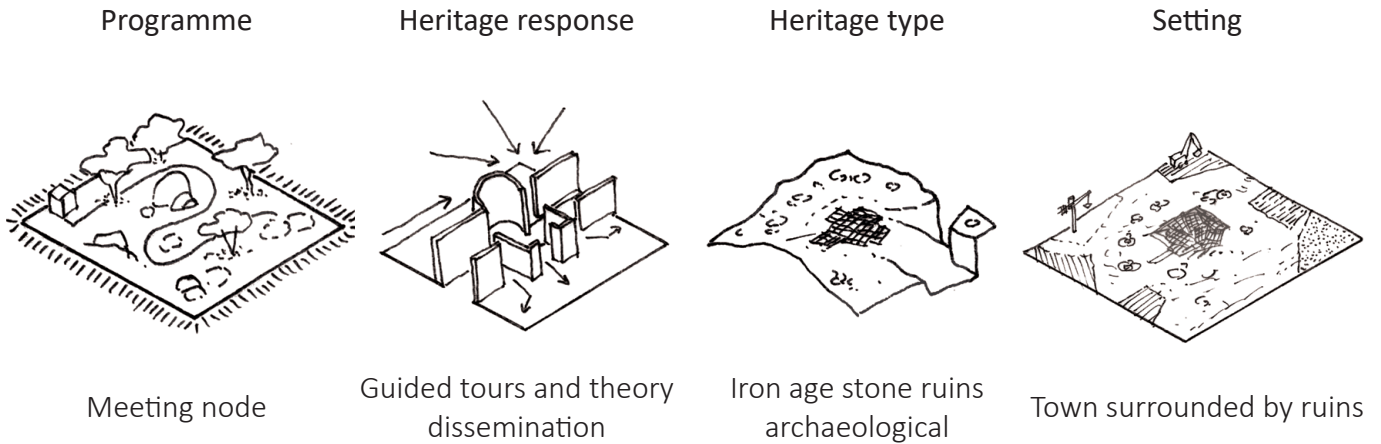
Figure 21: Diagrams showing the characteristics of Stone circle museum (Author, 2021).

d) Neues museum Berlin

On an international scale, the Neues museum by David Chipperfield, completed in 1994, relies on the notion of patina to express and emphasise historic change (Balfour, 2009). The site was damaged by war and stood in ruins for a long period of time (Moore, 2009). In the design for the project's renovation, the effects of war are not reversed, but highlighted. The skin of the structure becomes a condensed representation of time and its consequences. When considering a living heritage paradigm, the project remains a static museum displaying history as a frozen object. The notion that changes over time can be documented and represented, as well as allowed to occur as the product of inhabitation, would align more with a response focused on living heritage (ICOMOS, 2003).

Programme	Heritage response	Heritage type	Setting
Museum	Rehabilitate for new use	Building ruins of war	Urban museum island
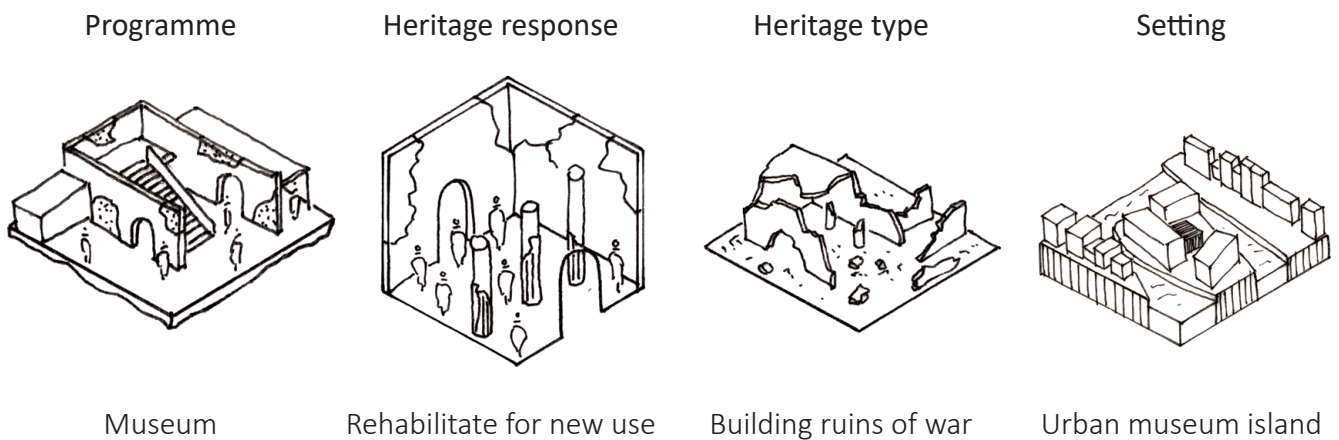
Figure 22: Diagrams showing the characteristics of the Neues museum in Berlin (Author, 2021).

e) Temple to Mithras museum

This site, located in a dense urban area, underneath a large skyscraper, was designed by Foster & partners, in 2017. The ruin, previously unearthed and relocated, was converted into an interface through which a sensory and experiential walk-through is generated (Melvin, 2018). The focus is on communicating a recreated sensational experience of the period in which the temple would have existed. While no actors are involved, and all the stimuli are artificially created, this project can still be classified as a cultural village response due to its sensationalised and anachronistic nature. Valuable in its own right, this project accommodates heritage within (albeit, underneath) an area alive with quotidian activity. It is protected and promoted, but possibly overlooked.

Programme	Heritage response	Heritage type	Setting
Experiential museum	Display archaeology and inform visitors	Relocated ruins	Underground high density commercial zoning
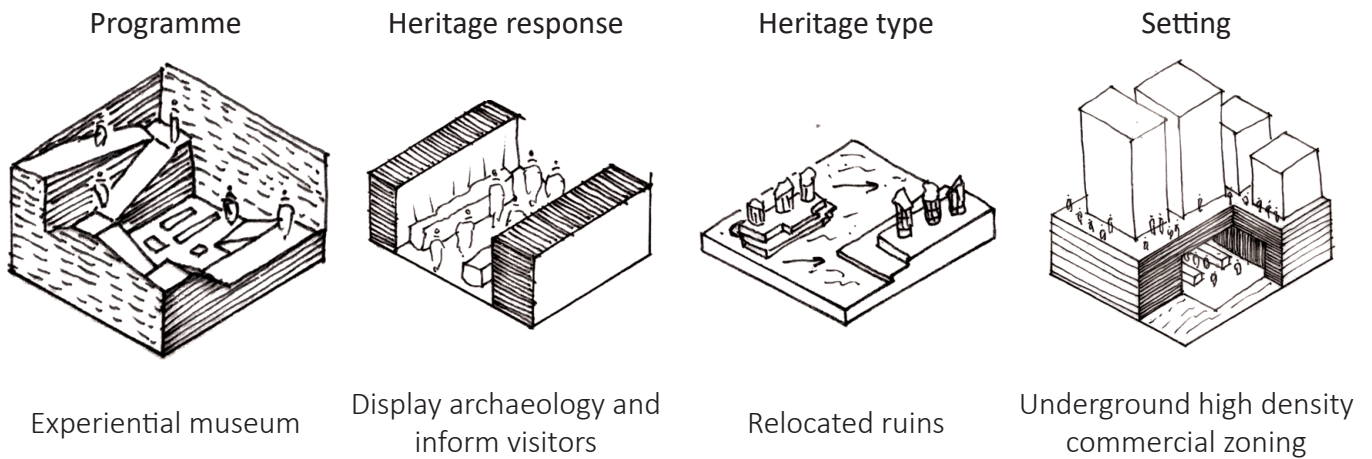
Figure 23: Diagrams showing the characteristics of the Temple to Mithras museum (Author, 2021).

The precedents above present a variety of heritage responses to historically distant ruined and anthropological heritage. To generate a new programme that could form the basis of the response to this project's site, an experiment will be conducted below, considering a living heritage approach.
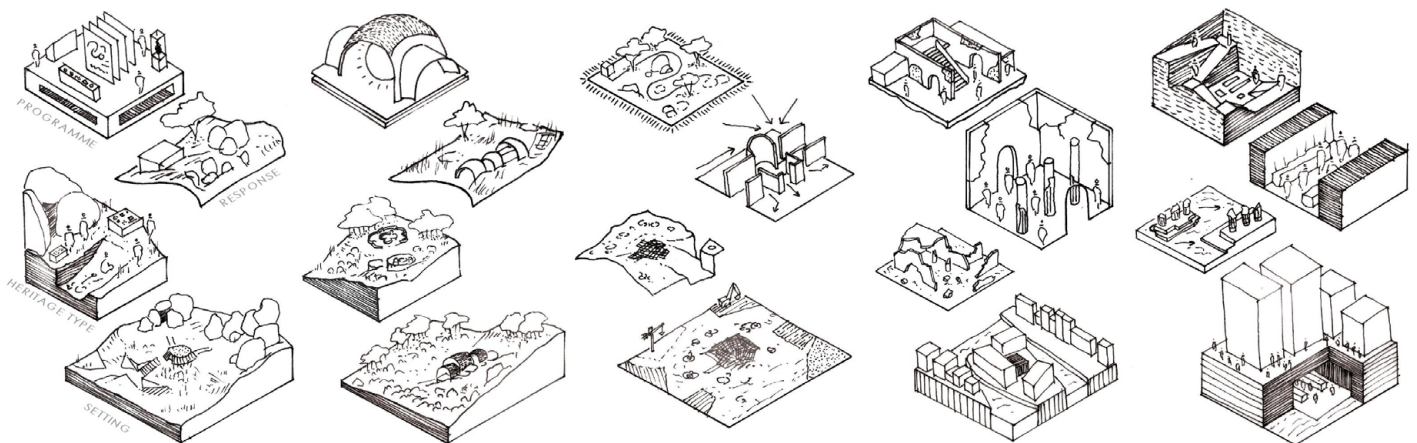
Figure 24: A table containing the summarised precedent studies (Author, 2021).

7.2. Generating conceptual programmes

Through a means of abstraction, each precedent above has been given specific characteristics according to architectural categories. These form the concept pieces that will be stitched together to form new programme concepts.

The table below describes each precedent according to notions of heritage response, user experience and the role of the practitioner. The concepts that drive the architectural language and the means by which the projects are created are also identified.

	Maropeng centre	Mapungubwe centre	Stone Circle museum	Neues museum	Temple to mithras museum
Architectural language	Maropeng centre	Extrapolated vernacular	Nodes / satelites	Infill / Juxtapose	Projected recreation
Medium 'built around the idea of'	Research data	Community engagement	Mystery	Patina	Sensation
Heritage response	Display / inform	House identity	Reveal single truth	Express change	Relocation / reveal
Role of practitioner	Research / articulate	Protect / evaluate identity	Tour guide	Restorationist	Narrator
Experience of users'	Education	Observe character	Voyeur	Temporal	Sensory experience

Figure 25: Characteristics of the precedent studies according to selected categories (Author, 2021).

The four constructed programmes are described hereafter and summarised into parti-diagrams.
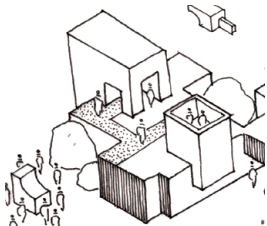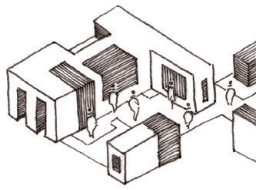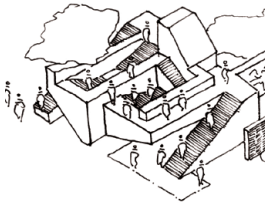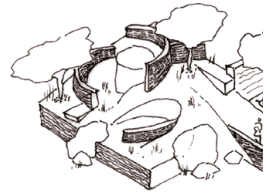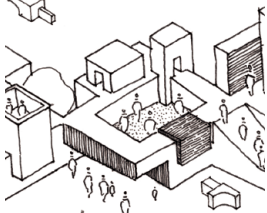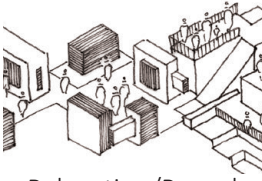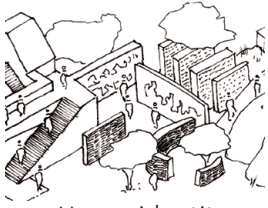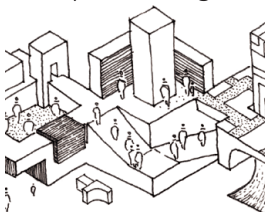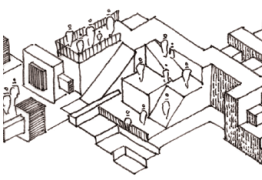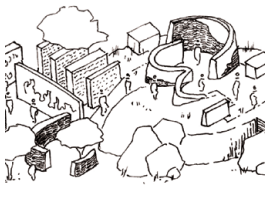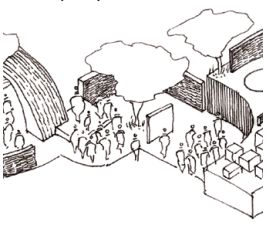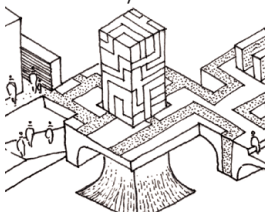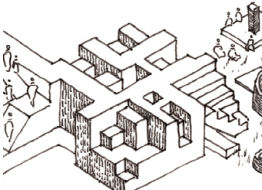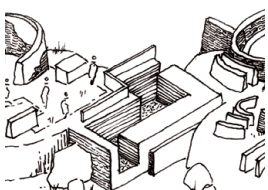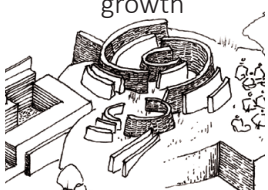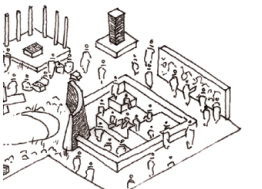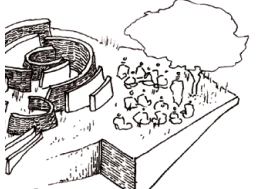
	A	B	C	D
Architectural language	Nodes / satelites	Infill/Juxtapose	Prescribed navigation	Extrapolated vernacular
Heritage response	Express change	Relocation/Reveal	House identity	Display and inform
Role of practitioner	Research / articulate	Narrator	Restorationist	Tour guide
Response to site issues	Information protection priority	Designing with change in mind	Resist change, facilitate growth	Extend influence beyond site
Medium 'built around idea of'	Research data	Community engagement	Patina	Sensation
Experience of users	Sensory experience	Voyeur	Education	Temporal experience
	Integration through resource expenditure and **research**	Integration through **distribution**	Integration through **ritual** and tradition	Integration through **experiential tourism**

Figure 26: A table showing overlapped characteristics resulting in the generation of new conceptual programmes (Author, 2021).

The sketches below show the overlap of selected characteristics in the process of constructing new conceptual programmes.
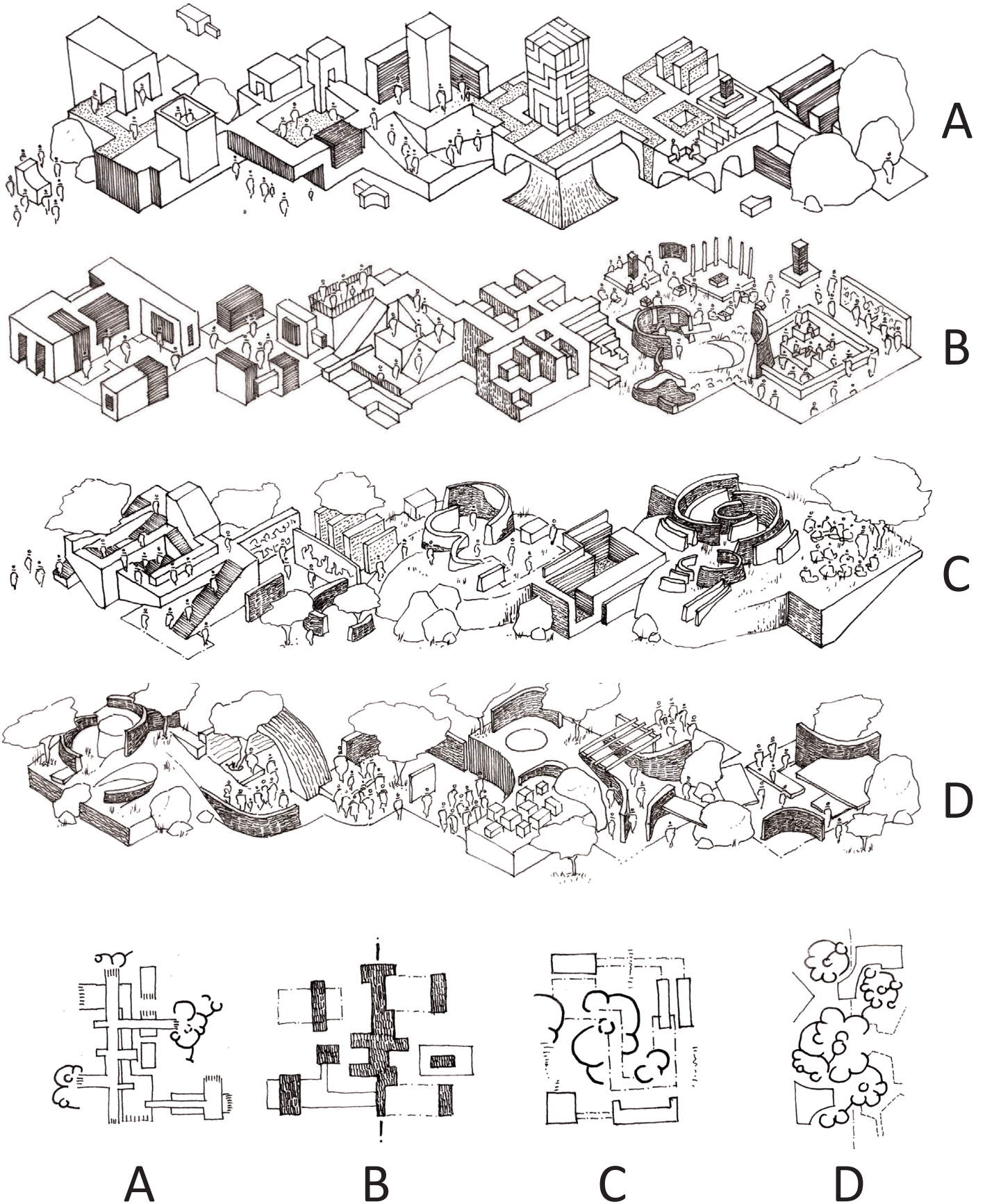
Figure 27: The new conceptual programmes imagined as parti diagrams (Author, 2021).

Reflecting upon these conceptual programmes, a further level of abstraction can be extracted. Each concept can be interpreted according to the proximity within which it suggests activity in relation to the ruins of the site. Namely;

- Research that occurs adjacent to the ruins
- Traditions that take place periodically within the ruins
- Experiences facilitated around the ruins
- Rituals enacted regularly between the ruins
- Attachment nodes fulfill threshold requirements and become anchoring points in a removed proximity to the ruins.
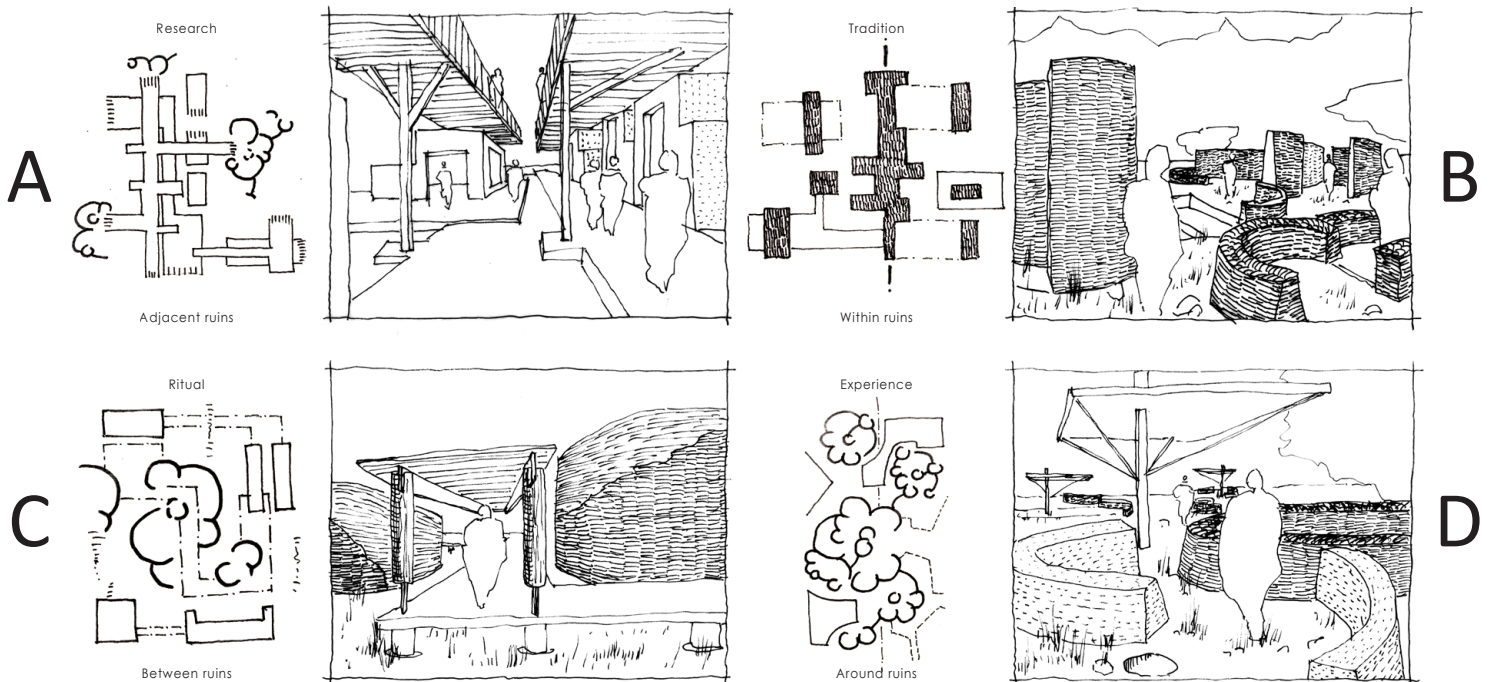
Figure 28: Parti-diagrams extracted from the conceptual programme experiment, imagined in vignettes as spatial elements in the landscape (Author, 2021).

This experiment, based on intuition, attempts to create new living heritage concepts out of built heritage precedents. In reflection categories of proximal association are generated. Hereafter, specificity from cultural idiosyncrasies and site particularities will shape the programme into a more contextual response. A critique of existing heritage response typologies will provide restriction and inform the programme from a critical lens as well.

7.3. Reviewing heritage architecture typologies

The precedents above can be described under various heritage responses. These responses, in the South African context and considering a living heritage approach, have certain critiques. A frame of reference based on the failure of existing heritage programmes could help to critically guide the development of programme going forward.

a) Museum

The legacy of the museum typology can be related to the Venic charter (ICOMOS, 1964). This charter and its paradigm enforce a strict preservation mindset. Under this premise, heritage artefacts have universal value and require the necessary protection for the education of future generations (ICOMOS, 1964). However, Baillie (2020) argues that this results in the removal of tangible heritage from intangible cultural narratives. This is contrary to the living heritage mindset and enforces a Eurocentric approach to African heritage projects. Latour (2014) further sees the legacy of museums tied to the exoticised ontology employed by external practitioners upon a culture, resulting in construed interpretations. The national policy on living heritage (SADAC, 2009) critiques this exoticised ontology in a South African context when discussing missionaries of the early colonial period. When interpreting African cultures, African ways of life, knowledge systems and rituals, were seen as different to the western Christian ideology of the missionaries and settlers (SADAC, 2009). During the apartheid period, African art, culture and practices were intentionally shunned in favour of promoting Eurocentric counterparts (SADAC, 2009). The museum typology can be challenged for these notions, the dichotomisation of tangible and intangible heritage components and the condescending interpretation of cultures by external practitioners. Both constitute a contrary approach to living heritage projects and can be addressed through consideration of agency, ownership and ontology.
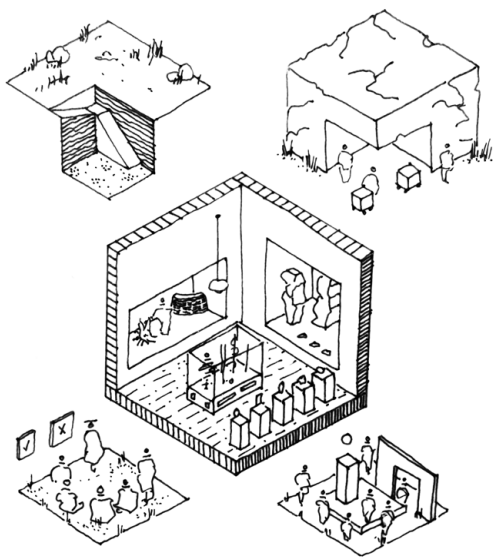
Figure 29: The museum depicted as an ideogram. Removed and frozen artefacts put on display as separate tangible heritage, rather than items interlinked with cultural practices (Author, 2021).
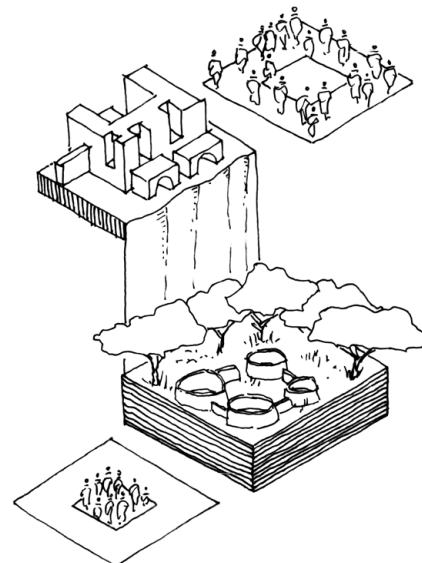
Figure 30: The cultural village depicted as an ideogram. Contemporary recreations of isolated historical programmes presented to voyeuristic tourists.

b) Cultural village

The cultural village, as seen in the Shona village at Great Zimbabwe, attempts to create a living heritage project (Baillie & Sørensen, 2021). However, there is a large critique offered to the power inequality it creates between the actors and the viewers. The educational facet is relevant, but the question of exposure at the cost of dignity arises (Baillie & Sørensen, 2021). Apart from the critique on dignity, this typology does not connect to other living facets of the culture portrayed. It still exists as an isolated display, frozen in time- only repeated every day. No production of heritage or continuation of narrative is facilitated (Baillie & Sørensen, 2021).

c) Interpretation centre

The interpretation centre (prominent in the Mapungubwe interpretation precedent described above) achieves a lot in terms of contributing to the creation of an African architectural identity. Rich exploration into materiality and adapted architectural principles make these pavilions valuable in continuing the production of heritage. However, there is doubt cast onto the longevity and exclusivity of interpretation centres. In some cases (such as Freedom Park) interpretation centres can still be isolated islands that lack interaction with their immediate and intangible contexts. The programme of such sites also needs to be reconsidered for its usefulness over time. Rather than just the display of information and narratives as a means to educate, there could be a consideration for the production of new heritage at such sites.
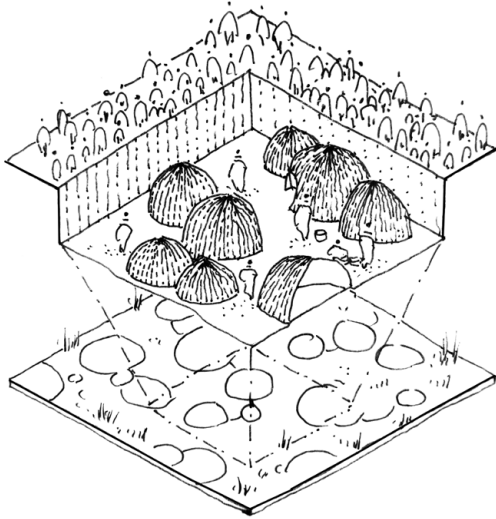
Figure 31: The interpretation centre depicted as an ideogram. The promotion of heritage through architecture, successfully drawing attention, but failing to ensure community engagement over time and programmatic longevity (Author, 2021).

By measuring the new programme according to a critical review of heritage response typologies insists that the new programme learns from past practices. The parties involved in the project will also play a significant role in understanding programme implementation and longevity.

7.4. Understanding party involvement

Before cultural nuances are explored and contextual issues are identified, an understanding of party involvement is required. Four tiers of stakeholders can be identified- landowners, language group members, boards and councils, and the public.

a) Landowners

Initiating a project such as this will require mediation with the landowner (SADAC, 2009), upon whose land the ruins are situated. For the case of this project, a mediatory centre will be established where a compromise can be determined between heritage boards, the city and the landowner. The public and cultural use of the region surrounding the ruins will be the goal of the mediation. The mediation centre at this site will serve as a precedent for the process of determining shared usage rights, one that can be emulated at other sites across South Africa (with other landowners).
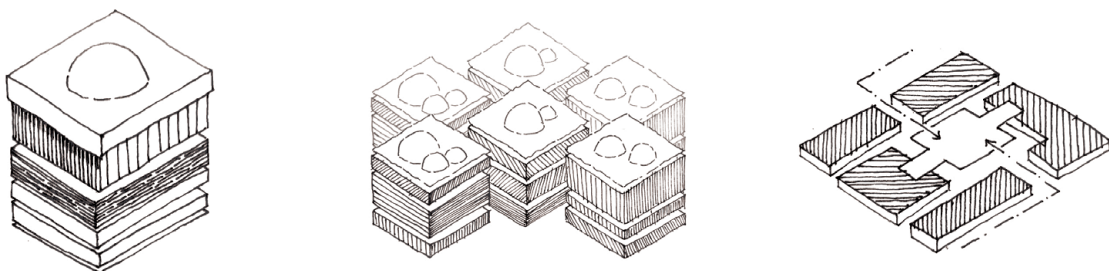
Figure 32: Diagrams depicting the contemporary land ownership of the current landowner, landowners at other sites and neighbours as a layer upon a continuum of culture-land association (Author, 2021).

b) Ndebele language group members

Members of the site's associated language group will play a vital role in the generation and longevity of the scheme. The processes of building creation, reuse/destruction and documentation of change over time will be managed by appointed custodians. Places of artefact creation, oral history documentation, skill development and performance will be considered as heritage production spaces. The handover of knowledge, both historical and newly generated, to future generations will be accommodated through on-site engagement. The role of tour-leading will be shaped through walk abouts and told through indigenous knowledge system understandings of the landscape.

Rituals enacted with specific cultural intent (indigenous knowledge systems) will be facilitated. Reintroducing the site as a place of importance in the culture will depend on the relevance it holds in the perspective of the language group members. However, the occurrence of such rituals will be facilitated and not shunned. The question of sacredness and secrecy (van Vuuren, 2001) and its interaction of the public will require careful attention. Resultant heritage will need to be dignified through choices of ownership and agency. The heritage produced should be protected, and the choice of sacredness should be respected.
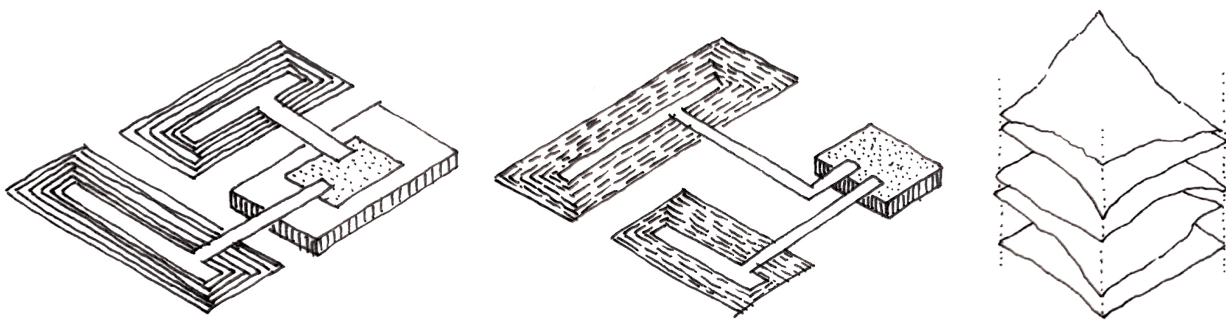
Figure 33: Diagrams depicting daily practitioners in close proximity to the site, event/ritual practitioners travelling larger distances to reach the site and descents of the language group as a category of practitioners (Author, 2021).

c) Councils and boards

The Tshwane municipality will be consulted with to determine changes in urban planning that can accommodate a new zoning allowance for such sites. The heritage board will be involved in protecting and hosting the public communication facet of the project. Consultation with community leaders will allow representatives of the heritage boards to communicate about what can be shared and what needs to be protected.
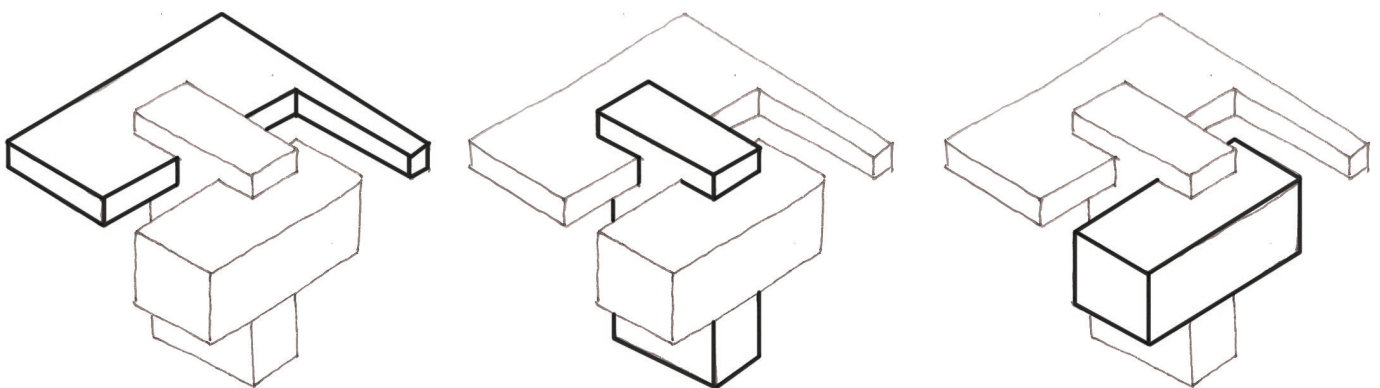
Figure 34: Diagrams depicting SAN parks, Tshwane metropolitan and PHRAG as boards and councils shaping the organisational framework behind a heritage project (Author, 2021).

d) The public

Public engagement will take the form of educational experiences. This project holds intentions of allowing the production of dignified heritage that can be protected and allowed to change over time. The experience of the user is placed in a secondary priority to the production of heritage on the landscape, and will be shaped by architectural interfaces that mediate privacy and exposure.

Throughout the consideration of party involvement, various needs and roles from each tier are highlighted. These will be consolidated later into programme sets after the information regarding cultural and site specificity are analysed.
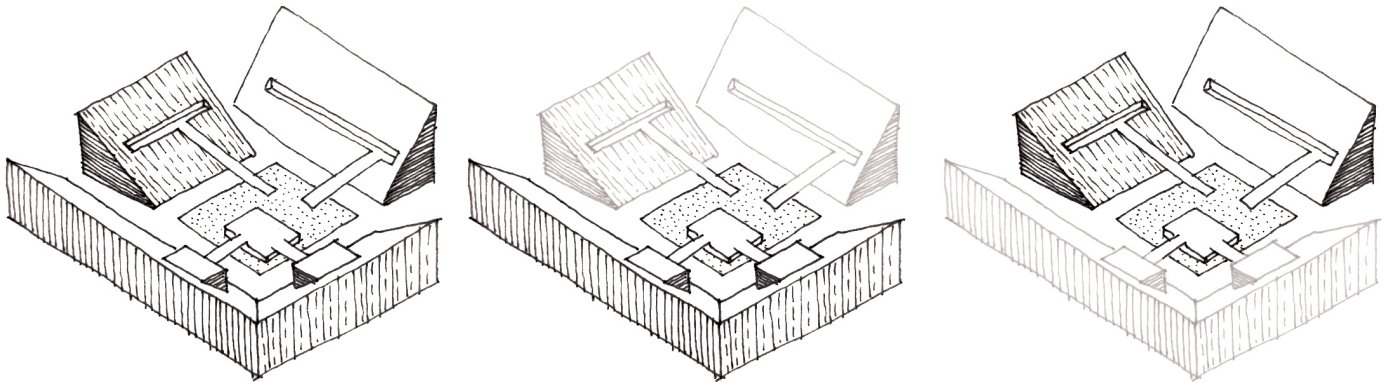
Figure 35: Diagrams depicting external parties interacting with the site. The general public as a larger category containing scholars and visitors (Author, 2021).

8. Informing a living heritage programme

8.1. Textural study: Oral history of the Ndebele & Ndundza

It is believed that the iron age ruins along the Bronkhorstspruit ridge were constructed by members of the Ndebele language group (communication from Antonites, 2021). The discussion about understanding the relevance of oral history as a valid source of anthropological data that van Vuuren (1993) explores over many years offers a rich insight into the Ndebele culture. van Vuuren (2011) has a keen interest in multi-disciplinary research practices as well and often draws focus to the architectural and spatial implications of culture, as enacted upon the landscape.

a) 1993: oral tradition and settlement reconstruction

In this essay, van Vuuren (1993) advocates for the value of oral traditions as a viable source of data and history keeping. The role of internal practitioners in understanding history and driving authenticity is crucial. A consideration of who the enactors of documentation are is relevant to this project.
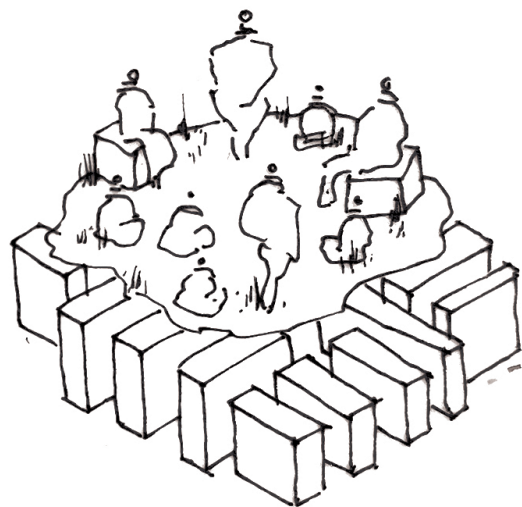
Figure 36: The concept of oral tradition constructing history as a layer part of the physical landscape (Author, 2021).

b) 2001: Exhibiting the Ndebele 50

This text discusses the role that a European gaze has in the commodification of Ndebele culture (van Vuuren, 2001). Sacredness and secrecy are important cultural facets that need to be respected in terms of protecting iconography and cultural identity from the process of commercial beneficence. The advertisement of cultural artefacts as products available for purchase, decontextualises them. In the context of an integrated tangible and intangible heritage, this decontextualisation objectifies the identities of the craftspeople that made them. Considering this critique, unobtainable objects with oral history attachments that resemble biographies, enforce a two-sided understanding of both the meaning of the object and the culture from which it comes.
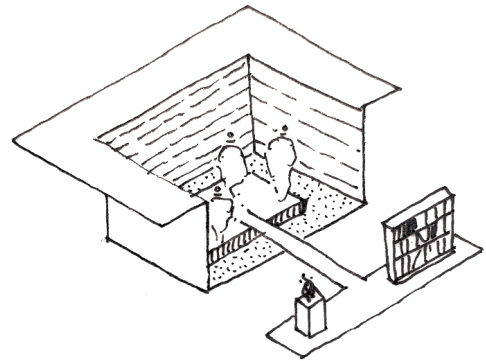
Figure 37: The effect of cultural commodification depicted as the decontextualisation of symbols and meanings (Author, 2021).

c) 2008: Intricacy of intangible cultural heritage

As seen in the Quebec declaration on spirit of place (ICOMOS, 2008), and reinforced by van Vuuren herein (van Vuuren, 2008) intangible and tangible heritage are inseparable when understanding a culture. Culture is said to arise out of a slow process, through ongoing cultural practices. Translated into architectural principles, place is a permanent facet, whereas space and built form are temporal (van Vuuren 2008). The human body, and its relation to the landscape, serve as the orientation point and scale bar for the implementation of built form. Culture, as rituals and traditions enacted by people over time, results in the simultaneous production and change of space on the landscape.
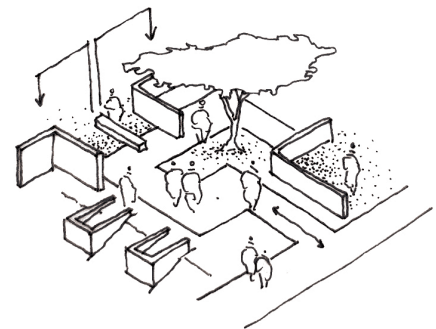
Figure 38: The integration of activity and place as two parts of one whole culture (Author, 2021).

d) 2010: Memory, landscape and event

This analysis of the historical condition of Ndebele settlements considers the role of the landscape as a memory refresher (van Vuuren, 2010). Oral history is tied to memory and its interaction with the landscape, resonating with Aalto's description of the tectonic landscape (Hartoonian, 2012). The concept of the past as a heterotropic layer can be interacted with through architecture. Architecture can rely on its relation to ruin landscapes to reclaim the past and facilitate the continuous production of heritage.
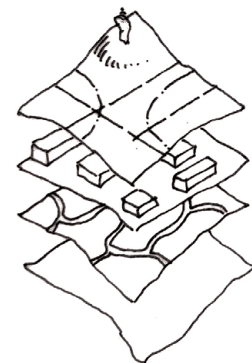
Figure 39: The landscape understood as a palimpsest of events tied to history (Author, 2021).

e) 2011: Lifetime in ruins

van Vuuren (2011) discusses the mnemotechnic nature of the landscape as a sensory experience extending from the body. This haptic understanding of space reveals a greater understanding of the layers of physical qualities associated with memory. Juhani Pallasmaa (2009) describes this hapticity as a crucial function in creating meaning within architecture. The landscape is both a repository of memories, as well as an area for cultivation and change (van Vuuren, 2011). Standing in direct opposition to the culture-nature binary which insists on the strict preservation of natural sublimity over the protection of inhabiting peoples.
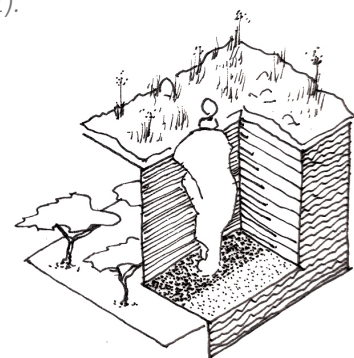
Figure 40: Prioritised sensory experience of the landscape in which haptic sensations fuel memory and inspiration (Author, 2021).

To give specificity to both the nature of this project's programme, but also the character of the architecture itself, the readings above are understood both for the content, but also for their possible translations into form.

8.2. Textual studies imagined as space

By exploring the spatial possibilities of the intangible characteristics and debates described in the texts above, architectural form can be sculpted out of the theory. While reading and note-taking, various intuitive sketches are made. These are translated to parti-concepts and those turned into maquettes which start to conceptualise an architectural approach.
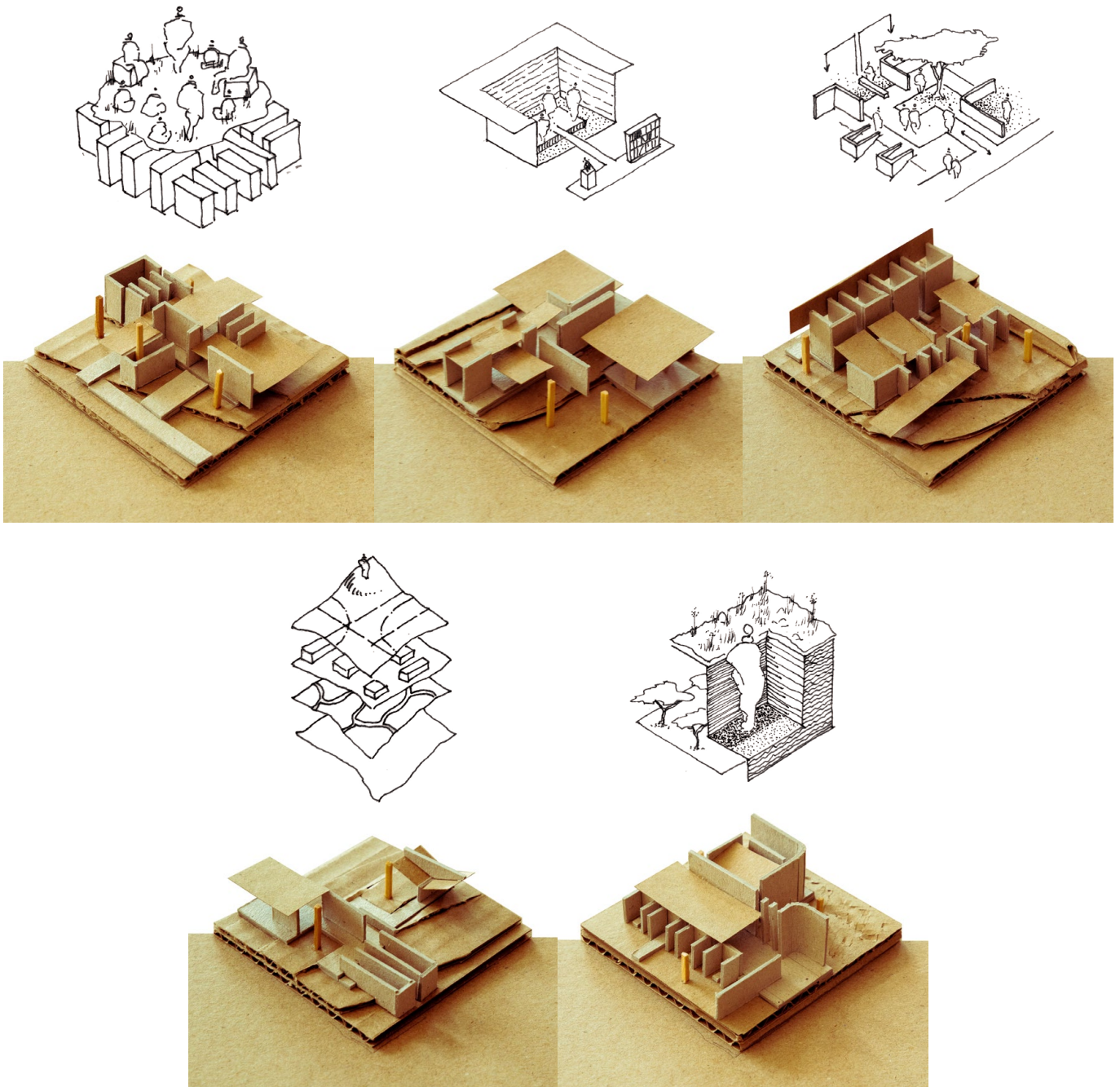
Figure 41: The photos above are of models generated based on each textual study that was analysed (Author, 2021).

8.3. Understanding programmes as relationships

Based on the perceived means by which someone would experience the site, the following five sets of programmes are established. These relationships attempt to incorporate the overlapped conceptual programmes as proximity determiners, the influences that stakeholders would play and the notions extracted from the textual study.

The arrival as a relationship between the suburbs and the ruins, at a removed proximity from the ruins. An initial attachment point for the programme to the surrounding context.

A mediation node facilitating the relationship between the landowner and members of the associated language group (Ndebele), adjacent to the ruins and focused on research and conversation.

The production core which facilitates the continuous production of heritage in a tangible (artefacts, artwork, ritual devices and built spaces) and intangible sense (traditions, temporal considerations, documentation, dissemination). The relationship between the secrecy/privacy of this tradition within the ruins, and the public as viewers is considered here.

Spaces of transition mark thresholds between built form and historical and physical landscape. The experience around the ruins can also highlight the relationship between old and new structures and spaces.

A database between the ruins will serve as a collection hub for the information regarding the ruins of this site, as well as a repository for information generated at other ruin sites. A relationship between the in-situ ruins and ruins around the country will facilitate the promotion of this era of heritage and allow conversation about the protection of ruins through their integration with surrounding contexts. This function will serve to protect the tradition of documenting change over time, that occurs as the result of inhabitation.

Figure 42: A diagram showing the aspects of surrounding suburbs and surrounding ruins (Author, 2021).

Figure 43: A diagram showing the aspects of landowner and members of the associated language group (Author, 2021).

Figure 44: A diagram showing the aspects of public access and secrecy/privacy (Author, 2021).

Figure 45: A diagram showing the aspects of built form and landscape, possibly, the new and the old as well. (Author, 2021).

Figure 46: A diagram showing the aspects of the Bronkhorstspruit ruins suburbs and other ruins across the country (Author, 2021).

9. A visit to the Bronkhorstspruit iron age ruins

9.1. Contextualising the site issues

a) Sand mining

The site visit was guided by Xander Antonites, an anthropologist at the University of Pretoria. Upon our arrival at the site the first prominent issues became visible. Many of the land owners around the ruins conduct sand mining excavations. This threatens the anthropological material in the surrounding region of the ruins, and if continued threatens the ruins themselves. A mechanism of protecting the ruins is required.

Figure 47: Photographs of removed earth matter (left) and the scars of large machinery (right), the damage caused by careless sand mining (Author, 2021).

b) Suburban expansion

Abutting the southern edge of the ridge is a suburban development that faces the Bronkhorstspruit dam. There are plans to construct new suburban districts to the east of the ruins. Expansion of the suburban fabric is a threat to the ruins, but also holds potential for integration. The means by which residential development can interact with a living heritage site is presents an opportunity to set a precedent for future such scenarios.

Figure 48: A photograph showing the juxtaposition of suburban development and the ruin landscape (Author, 2021).

9.2. Lessons from mapping through aerial photos

An aerial view of the site depicts the intricate plans of the ruins clearly. Various ruin complexes present the imprint of walls that have been demolished or 'robbed', a characteristic that is difficult to discern in person. Differences between entrances and collapsed segments of walls are indistinguishable in aerial photographs. A duality is then created, a legible morphological understanding is gained from this method, however an alternative is required to understand the grain of the ruins. Methods such as sketches made on site, photographs taken of particular moments and information conveyed orally through the guide, present intangible layers that enrich an understanding of the character of the site. Other than concerns of practical representation, viewing the ruins from above, yields a risky romanticisation of the plan that could inspire a formalistic response based in mimicry. This approach can be challenged as it prioritises visual and symbolic representation, over spatial interpretation[8].
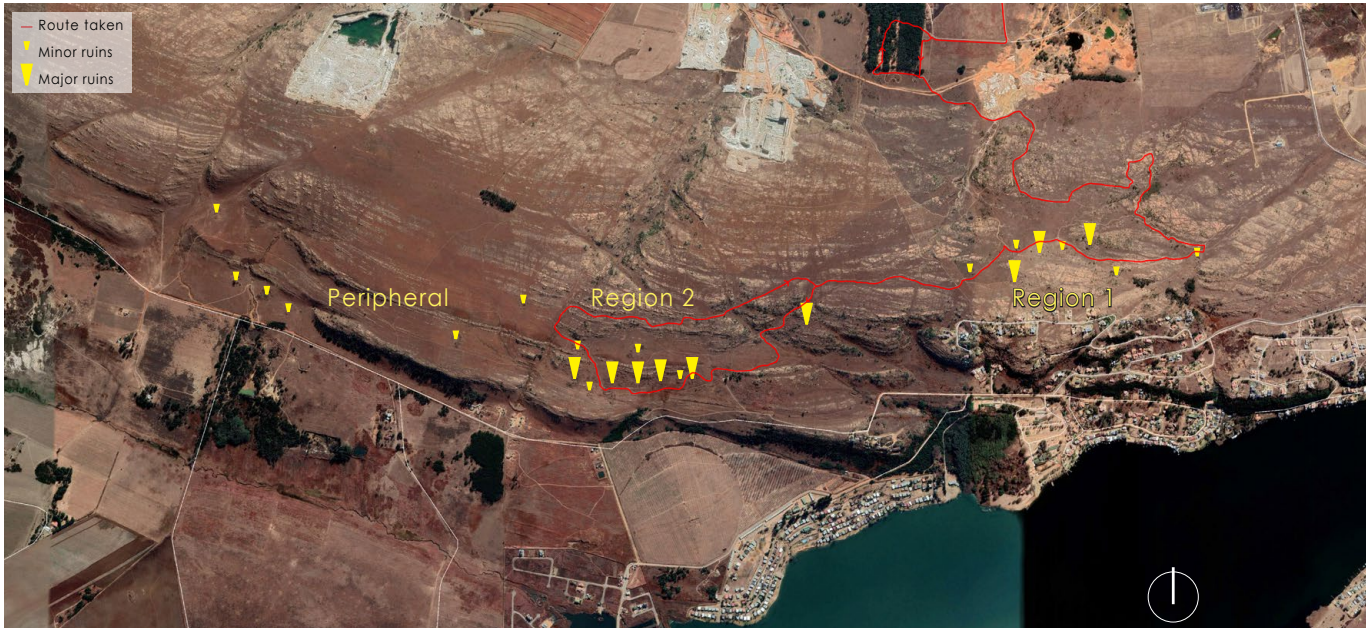
Figure 49: (Top) An aerial photograph depicting the extent of the ruin landscape with major and minor ruin indicators. (Bottom) Detailed mapping of Region one from a first person experiential perspective. This serves as the setting for this project (Author, 2021).

_____

[8]A group task title Architectural representation vs. Activity driven architecture completed for the masters mini conference challenges this idea of symbolic representation in architecture (refer to appendix C).

4.3. Analysis through photos and sketches (59)

The tour of the site produced information that filled in blanks and corrected misinterpretations that were previously present. From a first-person perspective, a sensory understanding is gained, which relates to van Vuuren's (2011) description of the importance of sensory understandings of the landscape in Ndebele culture. Supplementary information regarding the ruins was provided by Xander Anotnites on the walkabout.

a) Permanence scale

The ruins represent only a portion of the original structure. Based on archeological and anthropological investigations it is believed that upon the stone walls that still exists, a temporal skin of woven reeds was placed. Furthermore, clay foundations upon which huts would have been built are also no longer present. The reeds, floors and dwelling walls deteriorate naturally over time leaving the stone walls bare. Another observation is the presence of larger trees and bushes growing from within the walls and not in the surrounding veld. Protection provided by the walls shields saplings from veld fires and ensure their successful growth. This dynamism in temporality sparks interest in the possibility for implementing temporary features in conjunction with permanent structures. As mentioned before, there is also evidence of stone walls that have been demolished or robbed throughout history. The notion that even permanent features can change due to cultural influences over time informs the use of materials of permanence and impermanence later on.

b) Privacy hierarchy

The complexes arise organically as the product of social hierarchy (On site communication with Antonites). Those who are able to rally members to their cause can afford to spend labour on higher and wider stone footings. Therefore, there tends to be a steady decline of stone wall prominence the further from the origin point walls are added. As more families join a leader, the wider the complexes stretch. Boundaries are also believed to have been created for physical separation more than visual. Inner dwellings would have been the most private, and their construction would not allow visual or physical interaction by the general public. But the outer stone walls were shaped to guide the flow of movement around and towards activity, with little fear of visual seclusion.
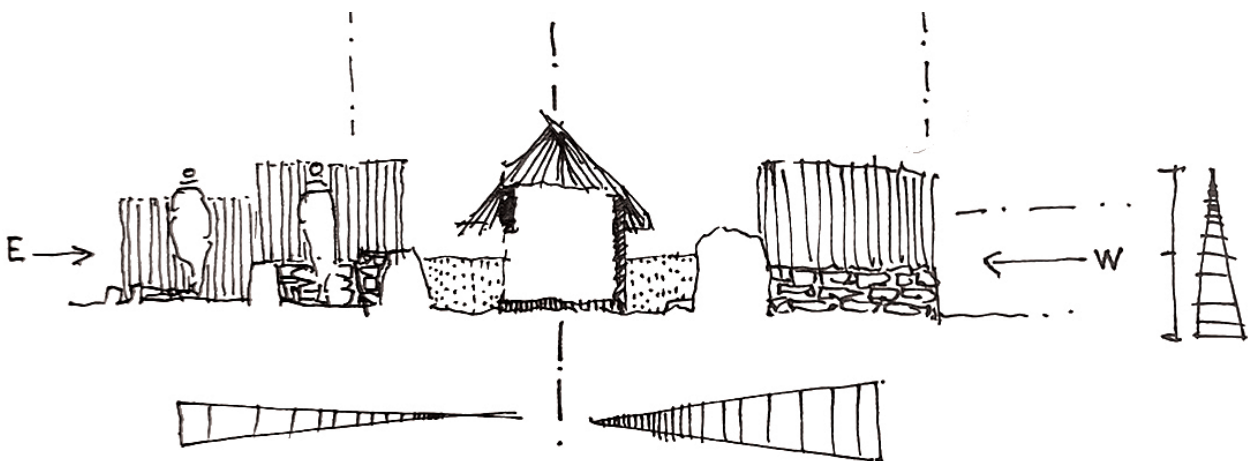
Figure 50: Socially emergent form depicted in a projective sketch. Stone walls surround interior enclosures and timber screens enclose exterior enclosures. A scale of physical privacy is understood (Author, 2021).

c) Terrain levels

On site, various complexes appeared to have terraced lobes. Two explanations are currently postulated for this occurrence. The first is evident of cattle paddocks. In these areas where cattle were stored, dung would be removed and reused as a fuel source and a building material. This resulted in a slow carving out of these sections that appear to be sunken below the other areas. Secondly, terraces can be seen in areas higher in elevation on the sloping ground. Fluvial runoff accumulates against the stone walls during heavy rains and causes the separate lobes to have stepped levels. This is not thought to be an initial design consideration.
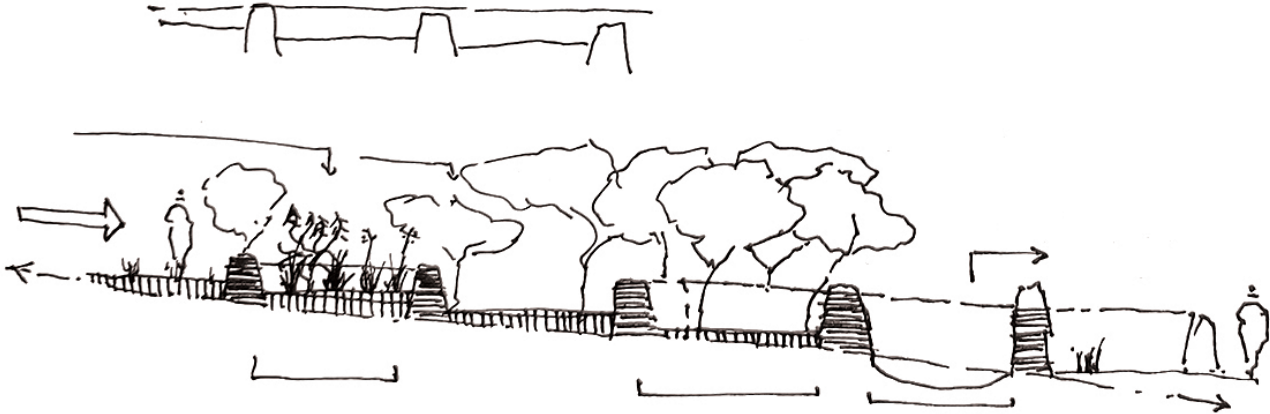
Figure 51: Temporally emergent form shaped as terraces. Cattle kraals are sunken from years of dung removal, and adjacent lobes are raised from years of fluvial runoff (Author, 2021).

d) Spatial anchoring points

The complexes seem to be placed without specific relationships to other ruins. However, there appears to be consistency in the orientation of public entrances and the more private entrances. Approaching from the west, the public entrances are wider and usually located in close proximity to larger kraals. The eastern rims of the ruins appear to have small guided entrances that lead into private courtyard spaces. Other than that, the complexes are anchored more so by their relation to available building materials (Rocky outcroppings) and open areas of land, possibly for grazing. The idea of landscape features that serve as anchoring concepts and attachment points for activity is a useful principle to further employ when organising a new architectural project.

| Platform and niche | Socially imbedded material | Landscape attachment | Guided movement | Volume and boundary |
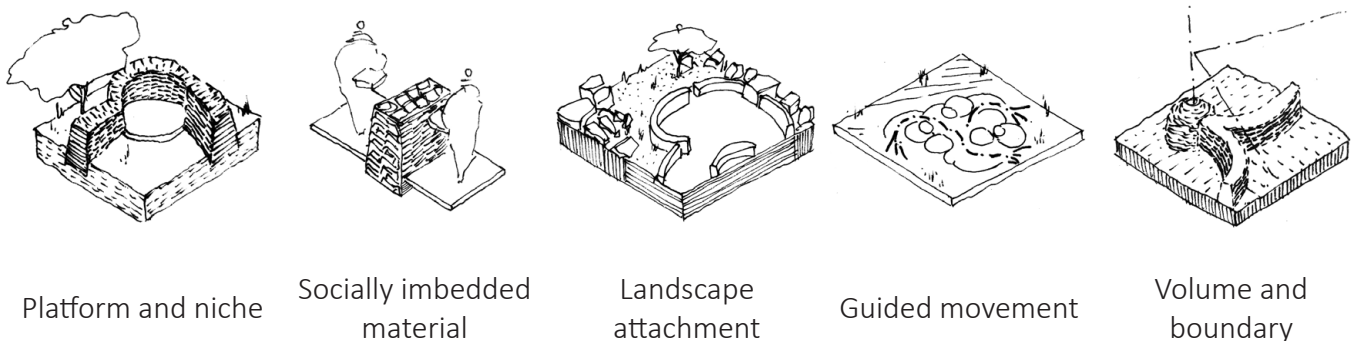
Figure 52: (Left to right) Organisational principles extracted from on-site mapping. Programmed niches built into walls, fabricated materials are imbedded with social meaing, landscape elements offering attachment points for spaces, guided movement through sequentially attached spaces and structural mounds serving as markers between which walls are built (Author, 2021).

10. Programmes as initial design concepts

As the product of this design research chapter, the informantion taken from the above explorations and studies are used to synthesize conceptual plans that act as conceptual designs. These are generated to accommodate the conceptual programmes above and begin to concretise the theoretical exploration. The author's normative position of hybridised designer autonomy and post-critical projectivity is visible here. Autonomous design concepts based on critical contextual informants are generated. To follow, these concepts are projected on site and corporealised in the next chapter. Brief descriptions of each building are given below.

10.1. Arrival pavilion
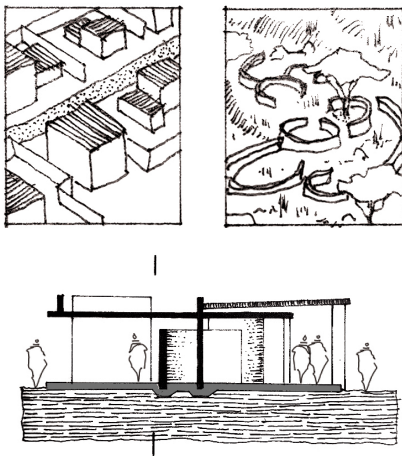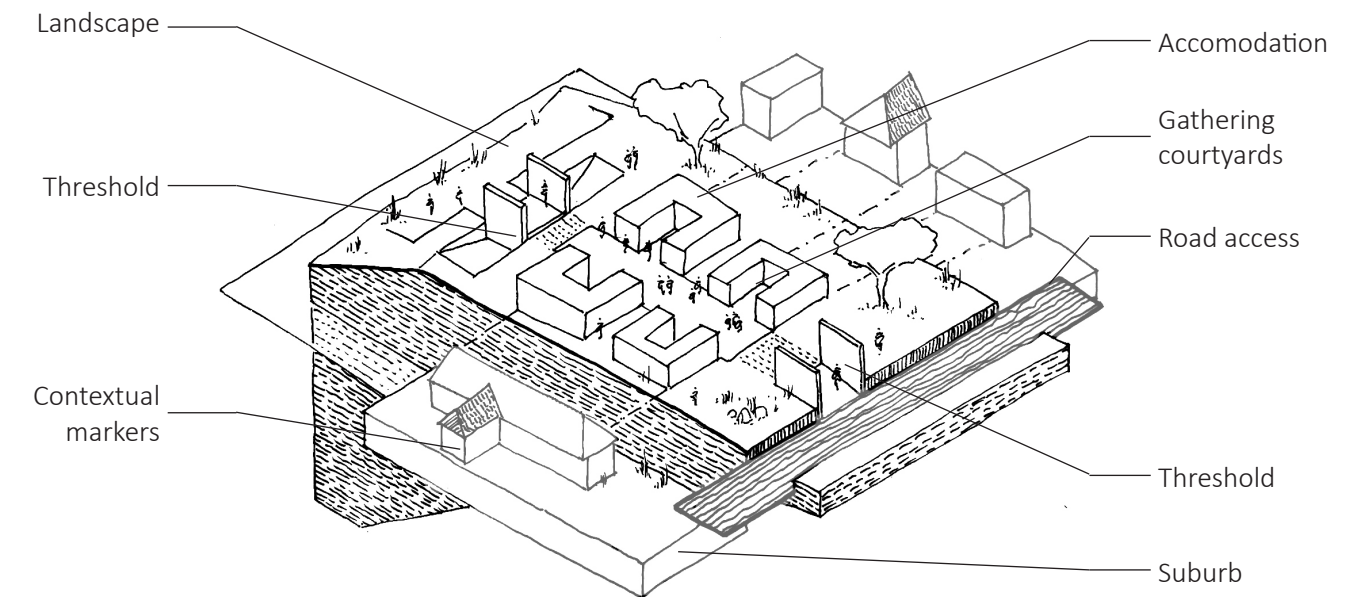
Figure 53: (top) Diagram of indicating the components of the arrival pavilion programme (Author, 2021).

Figure 54: (above & right) Plan and section as concept diagrams showing an initial organisation of the programme components for the arrival pavilion programme threshold (Author, 2021).

10.2. Mediation node

Perforated boundary

Discussion hall

Landscape vista

Landscape vista

Supplementary offices

Landowner landscape
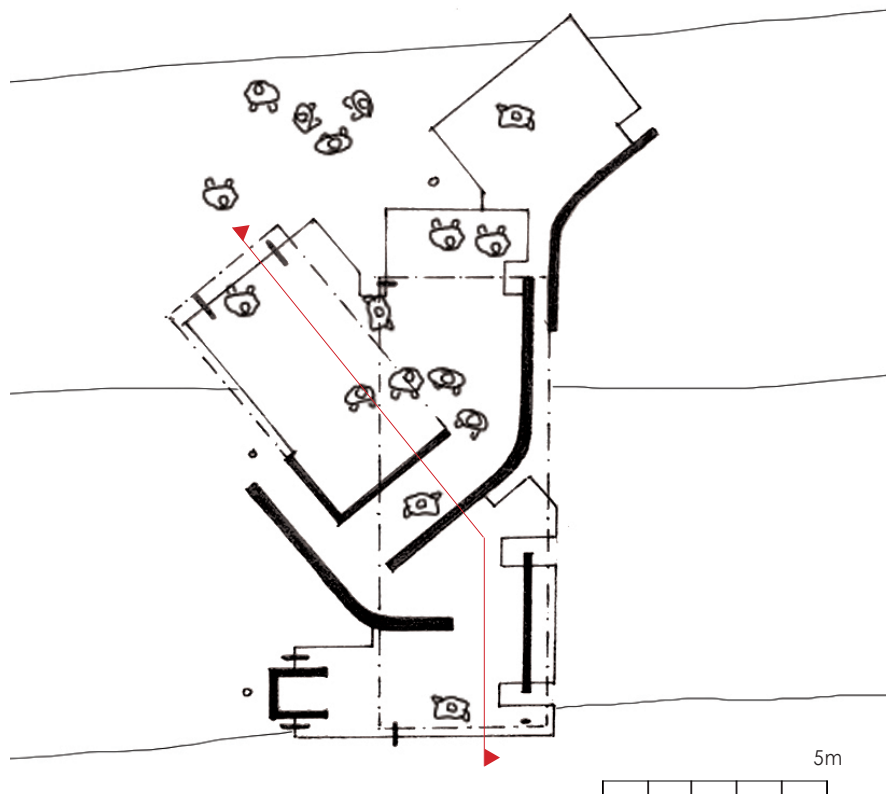
Ruin landscape
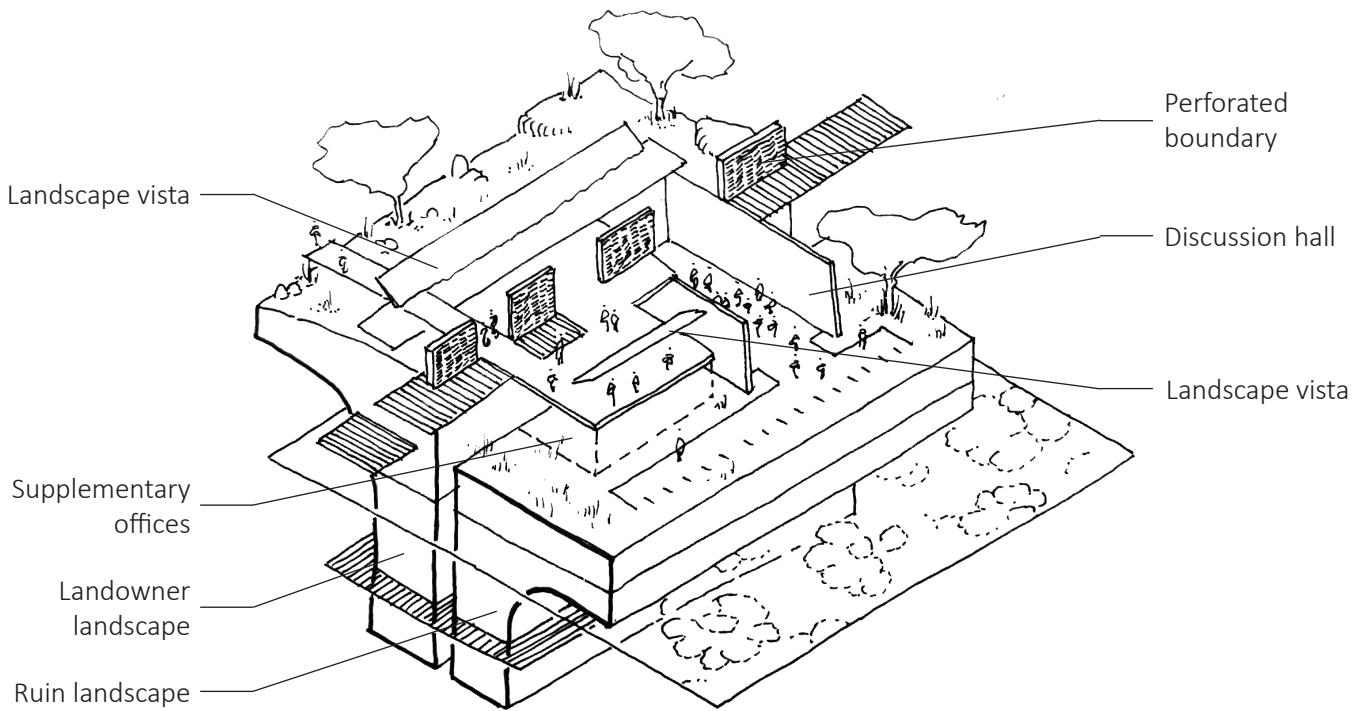
Figure 55 (top): Diagram of indicating the components of the mediation node programme (Author, 2021).

Figure 56 (right & bottom): Plan and section as concept diagrams showing an initial organisation of the programme components for the mediation node programme (Author, 2021).

offices

services

courtroom

approach

5m
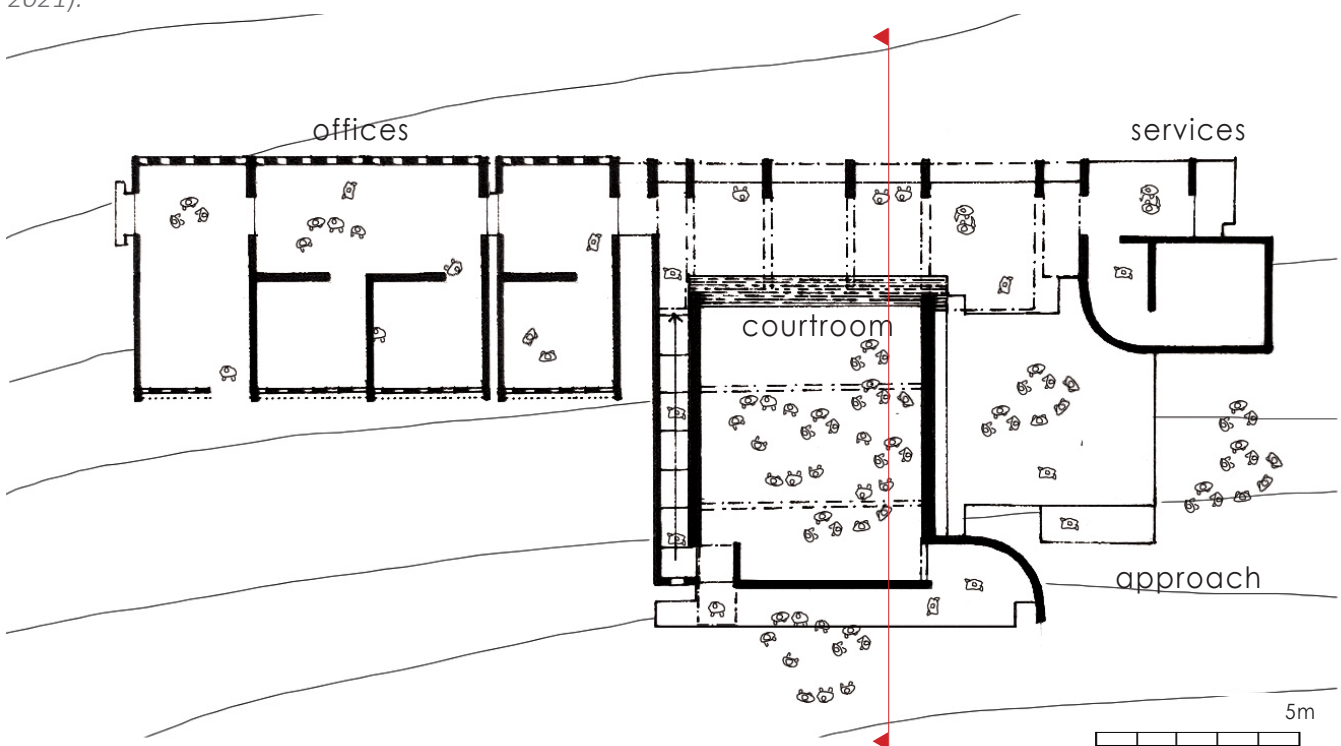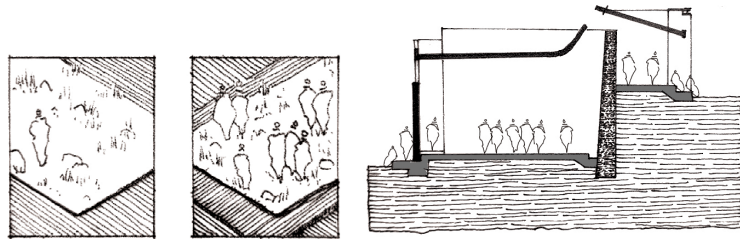
10.3. Heritage gallery
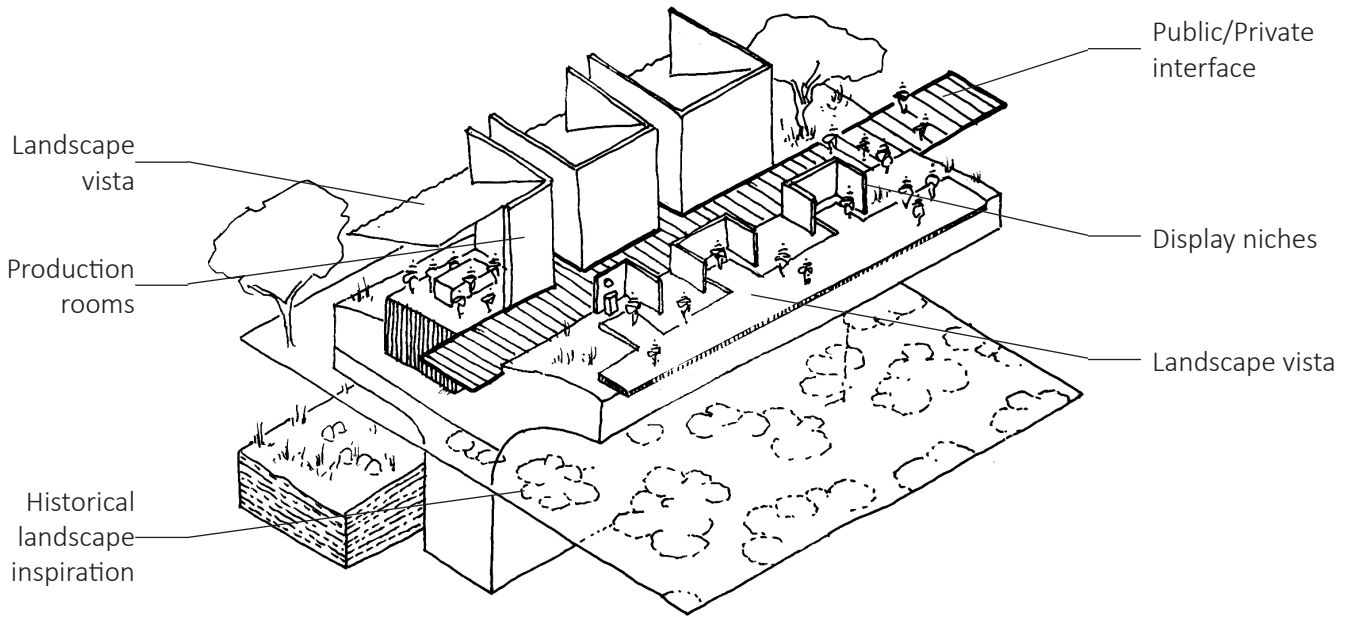
Figure 57 (top): Diagram of indicating the components of the heritage gallery programme (Author, 2021).

Figure 58 (right & bottom): Plan and section as concept diagrams showing an initial organisation of the programme components for the heritage gallery programme (Author, 2021).

10.4. Navigation platforms

Future foot path network

Contemporary routes

Iron age ruins

Landscape

Visible navigation markers

Directional indicators

Tectonic landscape

Historical heterotopia
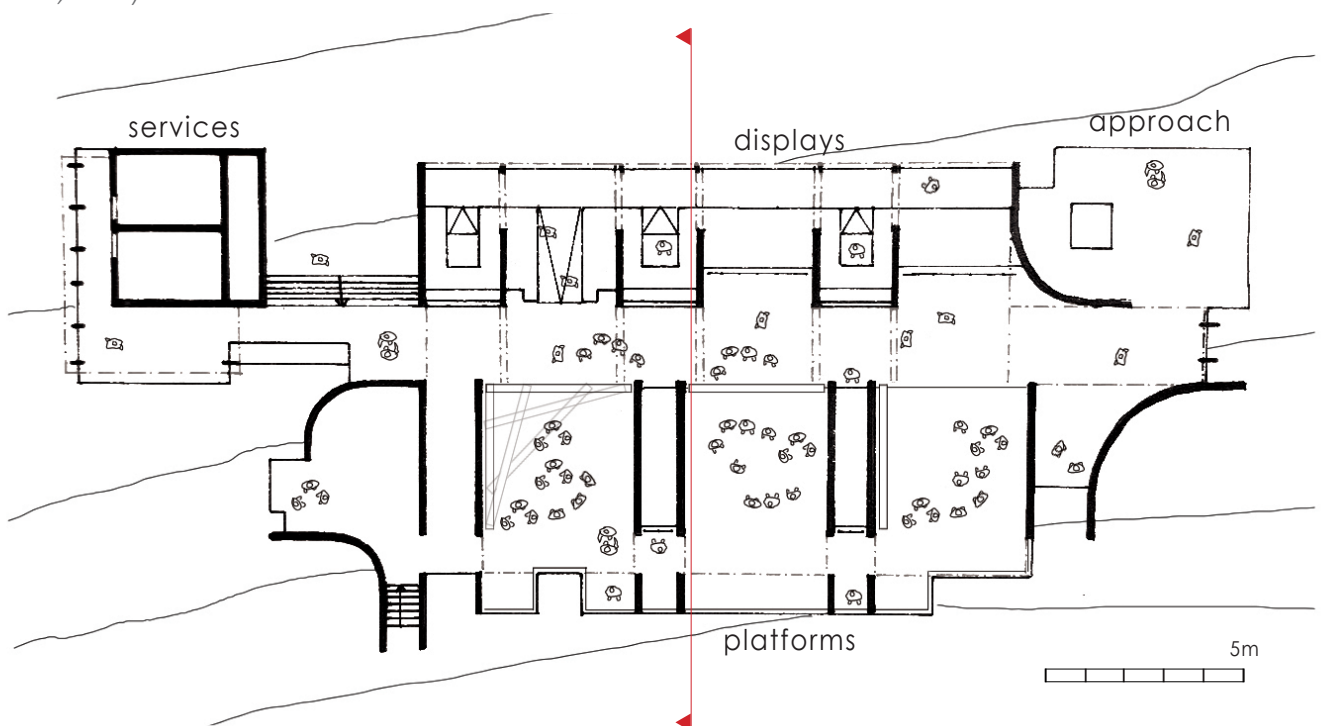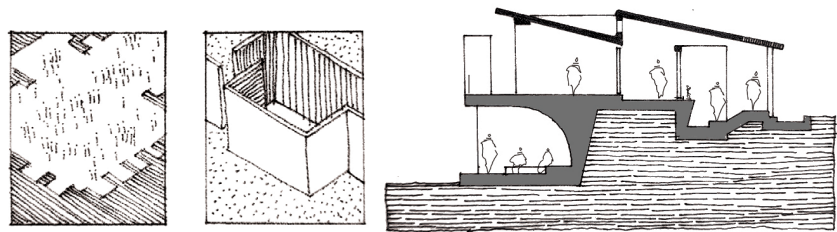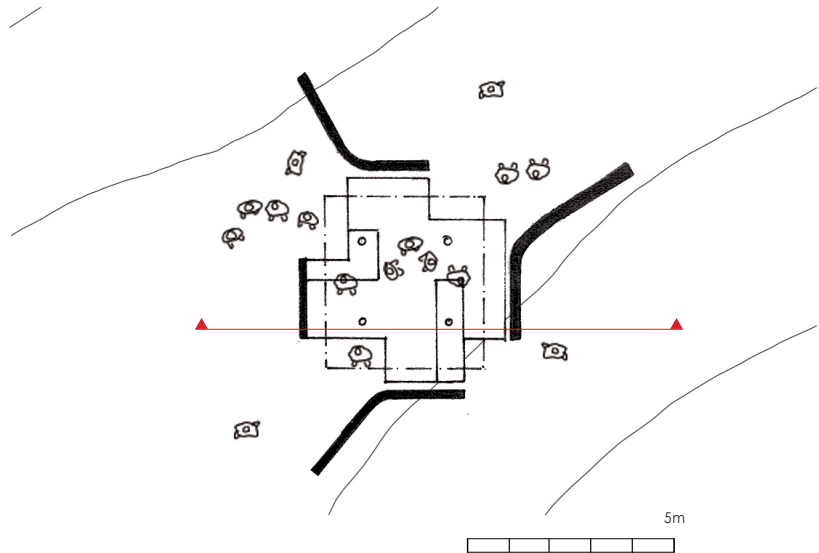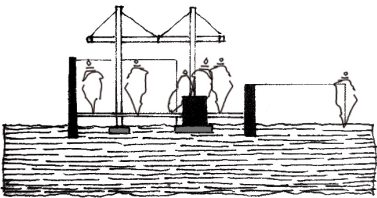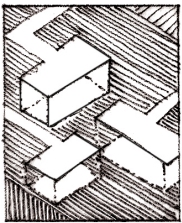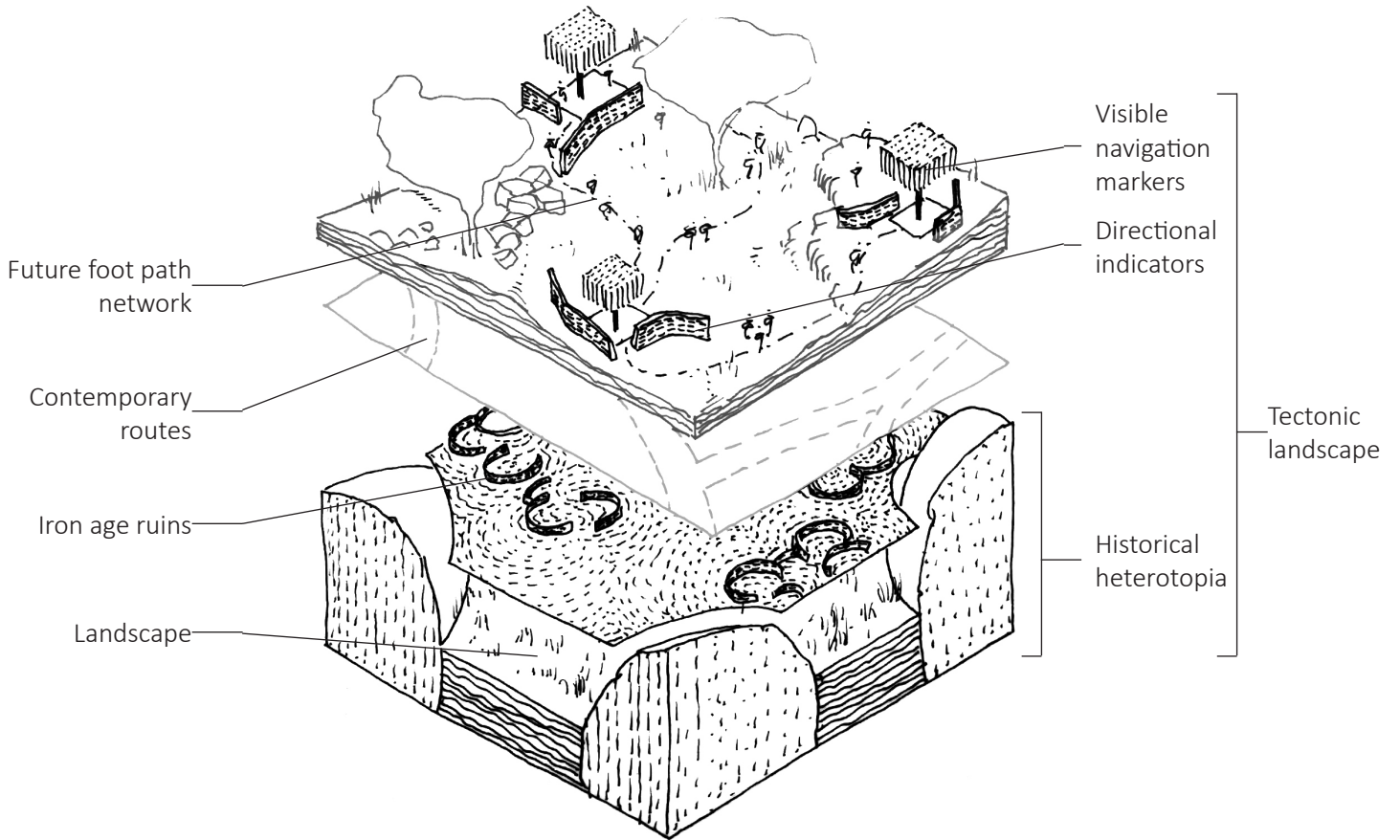
Figure 59 (top): Diagram of indicating the components of the navigation platform programme (Author, 2021).

Figure 60 (bottom): Plan and section as concept diagrams showing an initial organisation of the programme components for the navigation platform programme (Author, 2021).

10.5. Research repository
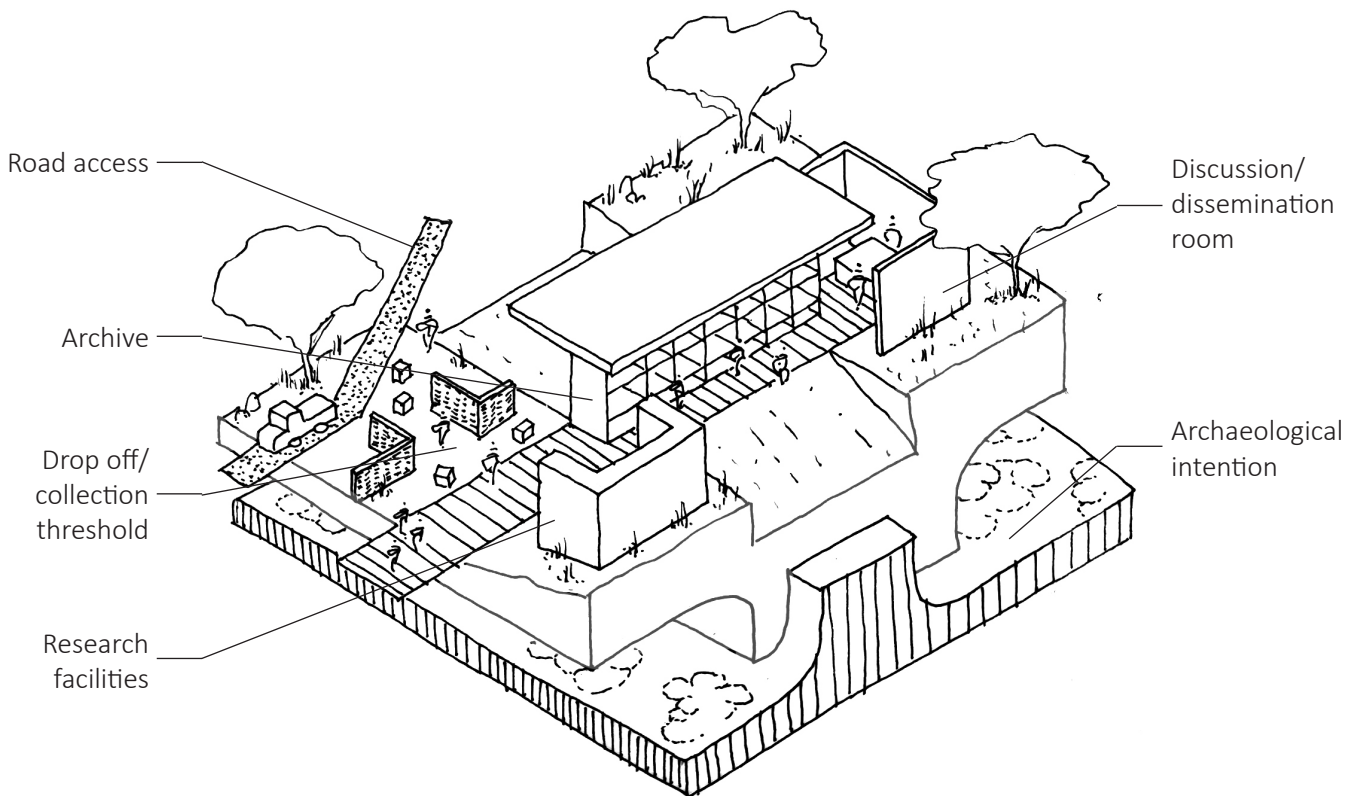
Figure 61 (top): Diagram of indicating the components of the research repository programme (Author, 2021).

Figure 62 (right & bottom): Plan and section as concept diagrams showing an initial organisation of the programme components for the research repository programme (Author, 2021).
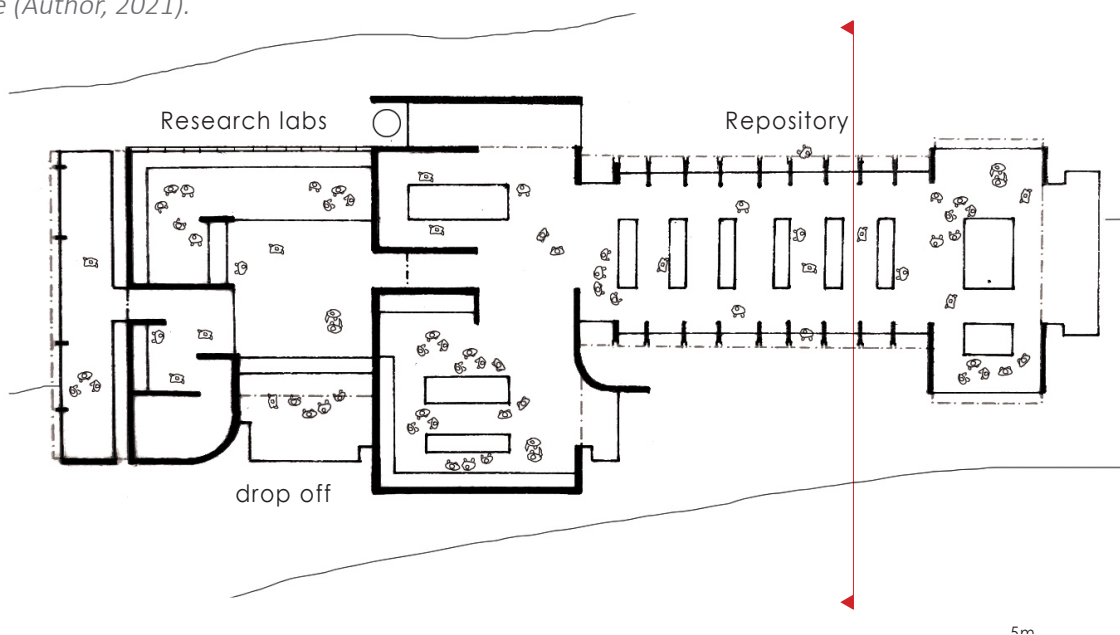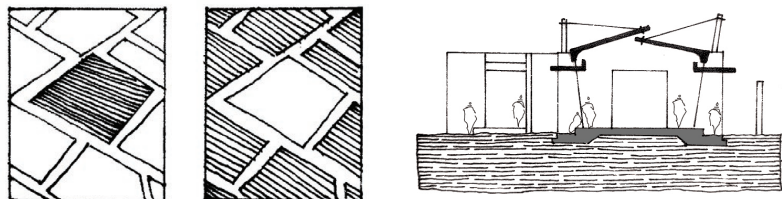
11. Conclusion

This chapter shows the design research that sits behind the consequent design concepts. An experimental exercise in which intuitive programmes were generated from precedent studies offered a starting point for conceptual ideation. Paired with a critical review of existing heritage programme typologies and a role analysis of the parties involved, more detailed programmes were generated. Thereafter, the cultural and physical contexts were examined through textual studies and experiential mapping respectively. The first chapter described a review of a broader heritage context and serves as the background for the context of this site. Together, the conceptual programme generation process and the contextual analysis created a framework within which initial design concepts could be generated. Going forth, these design concepts need to be further contextualised through their placement on site. This will add a layer of specificity regarding orientation, topographical relationship and climate adaptation.
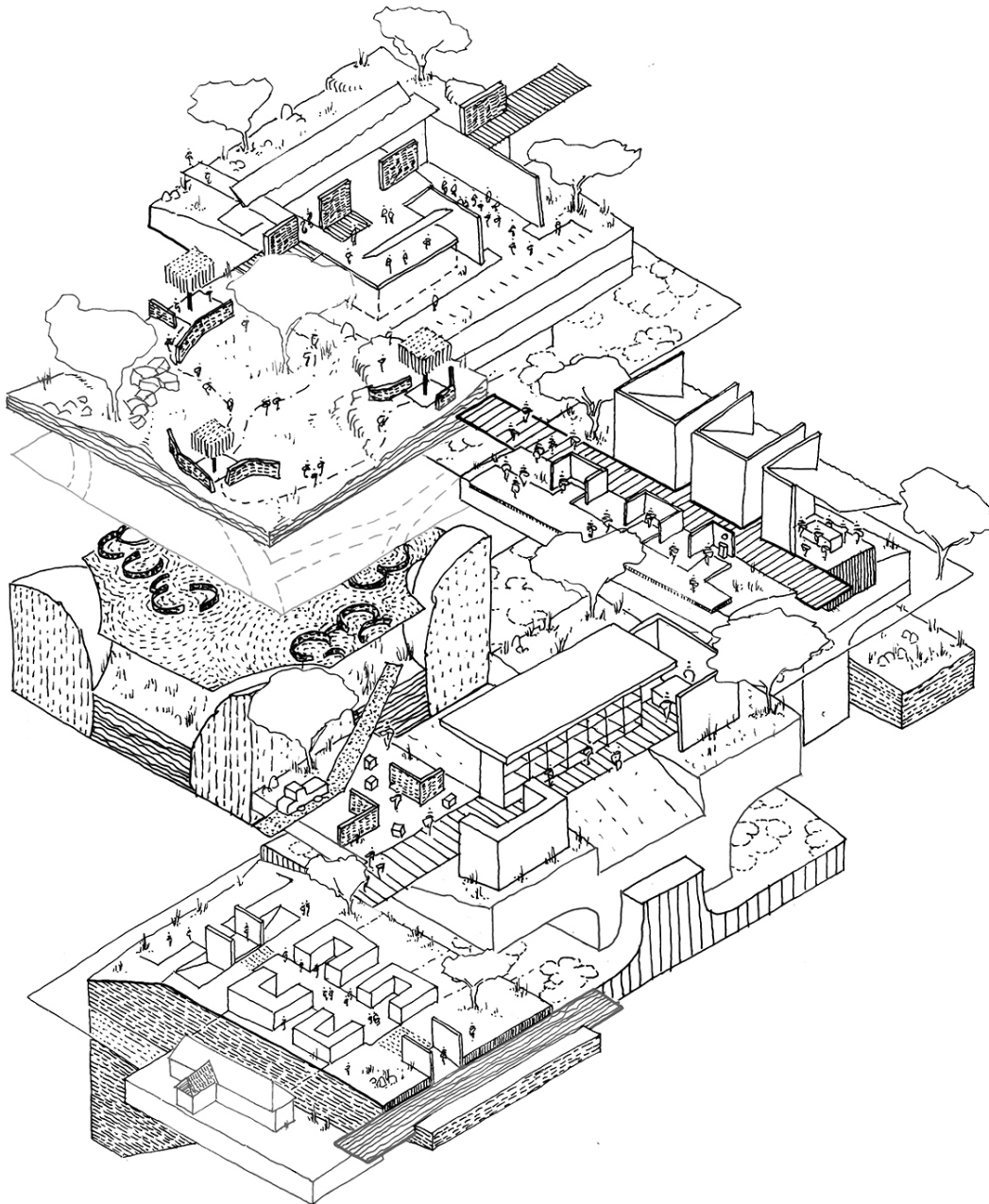
Figure 63: An amalgamation of the programme diagrams into one diagram that shows a conceptual understanding of the programme framework to be employed at the site (Author, 2021). Refer to Appendix K for a reflective collage of the programme framework concept.

Chapter 3

Translating living heritage concepts into architectural form at the iron age ruins in Bronkhorstspruit
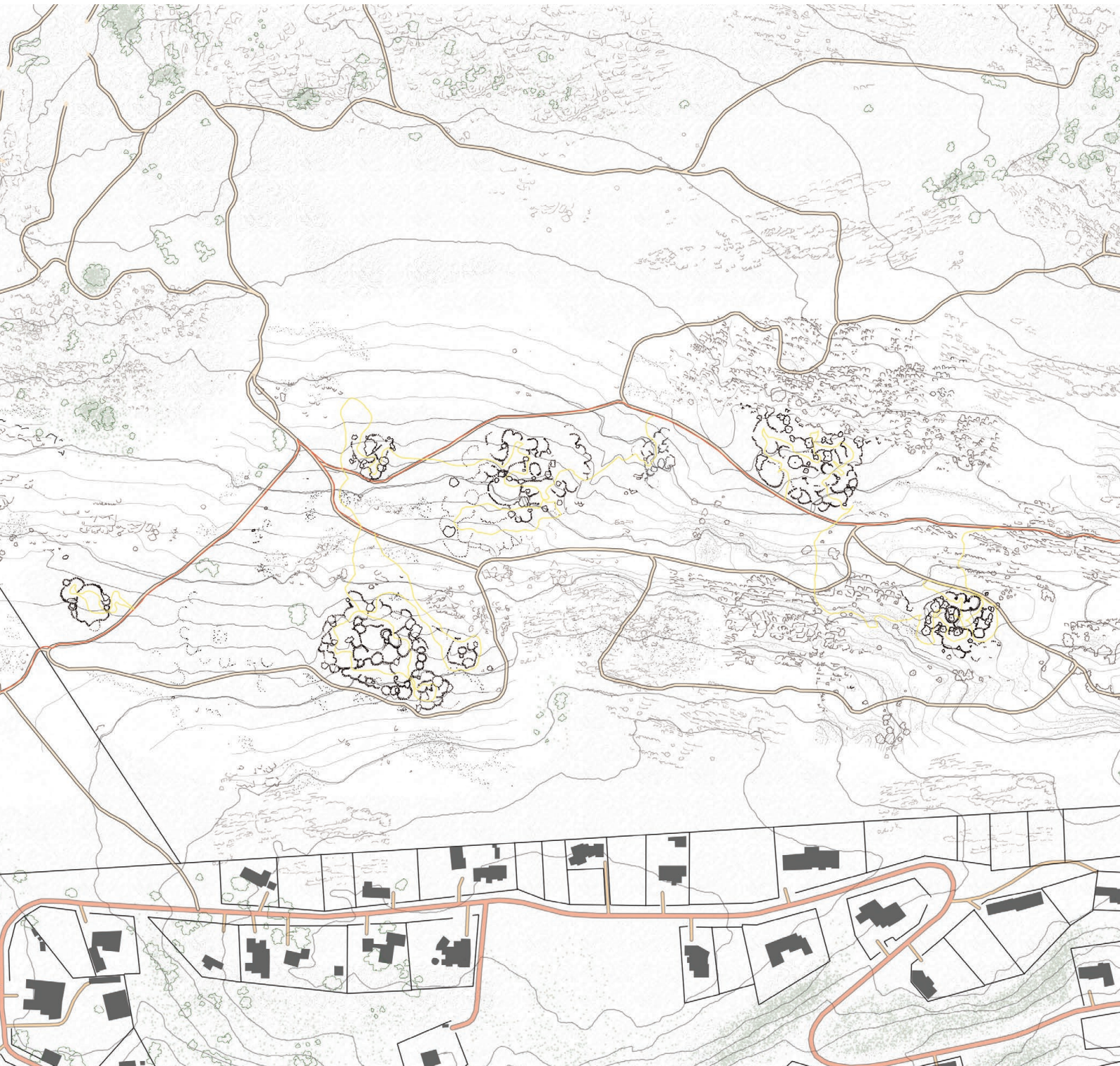
12. Introduction

This chapter describes the corporealisation of the previously determined conceptual plans by focusing on creating an informed architectural language and applying it in context. Positioned within global and local heritage paradigms, the project is fueled by a living heritage approach. The preceding chapter investigated various informants to generate a series of programmes that could achieve a living heritage response to the site and its imbedded cultural history and heritage value.

Herein, contextualisation will be explored through the delimitation of certain design tactics, the positioning of the plan concepts on site, and their acclimatisation to the site's conditions, both topographical and climatic. To achieve this, and the double purpose of unifying the architectural language of all five buildings, typical spatial details will be designed first. Each programme has unique components but can be abstracted to highlight common functional requirements. The spatial details will be informed by these requirements, designed for climate appropriateness, and used in combination to articulate each building. These details also serve as baseline components that can yield derivations which share conceptual and spatial intent but facilitate a unique variety of activities. Forming a lexicon, they are then used to translate the earlier plan concepts into detailed buildings with unified architectural intention.

The physical characteristics of the site will guide the manner in which the initial plan concepts need to be adjusted so that each suit the terrain and climatic factors of its position. Their morphological organisation needs to be iterated to accommodate supplementary programmes and services. Thereafter, the distanced interaction of each pavilion with the other and the users experience throughout the site must be explored. Finally, a description of each pavilion's design and programme is offered with the intention of communicating their genesis in the critiqued theory, their intention within the tangible and intangible context of the site and their resultant morphology.

13. Translating a living heritage concept into architectural intention

Jonathan Hill (2019) discusses coproduction as a reciprocal process of ruination in which people create a culture that is enacted upon the landscape yielding ruins in the long term upon which the process repeats. Ruins, while presenting with material and immaterial absence (Hill, 2019), offer a stage for speculation about future possibilities that can take place within their voids. The idea that ruination does not imply an endpoint, but rather a point for continuation, enforces a living heritage approach to ruins. Hartoonian (2012) discusses Alvar Aalto's notion of the tectonic landscape as a contemporary plane interrupted with markers of heterotopias. An instance of ruins offers a connection to a heterotopic past that can inform and drive ideation and architectural intent going forward. Ruins can be treated as the subject matter that is framed by programmes of heritage production in architecture that can facilitate it.

Certain limitations on form and technology need to be identified. Considering the ground condition, a minimally invasive approach is taken. Buildings are placed in association with the ruins, but for their preservation- buildings do not touch the ruins. Programme serves as the mediator between ruin and building and while ruins are included in the fabric of the heritage project, they are protected as well by the programmed buildings that frame them on the landscape. Where pertinent or poignant, excavation will be dealt with in a manner tantamount to archaeological practices. Instances where ground disturbance can occur include essential structure necessitated by spaces in close dialogue with the landscape or necessary services. Removed earth will be considered heritage material until it can be analysed to determine its value. Thereafter, such material can be reintegrated into the building fabric as bricks made in-situ. An opportunity for agency and authorship is offered in the analytical process and the production process of the building material. Material choices are markers of cultural interaction with the landscape. Other elements of stone and timber can bear their genesis in the landscape as well, and lend their characteristics to the buildings. Then, considering services, the remote nature of the buildings and a contemporary need for sustainable design reinforces the use of photovoltaic panels for electricity generation. Water access can be supplemented by rainwater harvesting and integrated water waste reduction systems can be used.

Considering this stance, the architecture of a living heritage project at a ruin site begins to address earlier issues of meaning, relevance, significance and interface. The significance of the heritage material can be promoted (in line with the South African policy on living heritage's goals (2009)) and used to drive development outwards (ICOMOS, 2011). A scheme like this could set a precedent for similar conservation schemes at other sites in South Africa enforcing a paradigm of iron age relevance and developments informed by their idiosyncratic meaning.

The following points sum up the translations of a living heritage concept into an architectural intention:

- The spaces should facilitate living heritage production in their flexibility and service access.
- The architectural language should highlight the interaction of culture with the landscape in its expression of materials made from the landscape.
- Technology should be suited to the site's sensitivity and environment.
- The buildings should, wherever possible, passively manage thermal comfort in an act of dialogue with the environment.
- The architecture should be precedential, inciting inspiration for the creation of such schemes elsewhere.

14. Layering informants onto architectural intention

Before further iteration of the plan concepts takes place, a need for an architectural language to contextualise, unify and define buildings arises. These details will be informed by the previous studies, further invesitgations into the characteristics of the site and common threads in functional needs of each building.

14.1. Responding to the landscape's environmental characteristics

a) Creating thermal comfort

The iron age site within which this project has its footing, shapes not only the programme and plan concepts, but also the physical manifestation of the architecture. Situating the concepts on site and matching them to the environmental conditions will aid in creating a scheme that's integrated with the landscape. An architecture that has thermal comfort, technical efficiency and terrain suitability requires a consideration of the climatic condition and the topography of the site. The Bronkhorstspruit region has hot summers with flash storms and shorter cooler winters with minimal rainfall (Weather Spark, 2021), very similar to the climate of Pretoria (Climate-data.org, 2021). The tables below compare the average high and low annual temperatures of Pretoria and Bronkhorstspruit, showing their similarity.
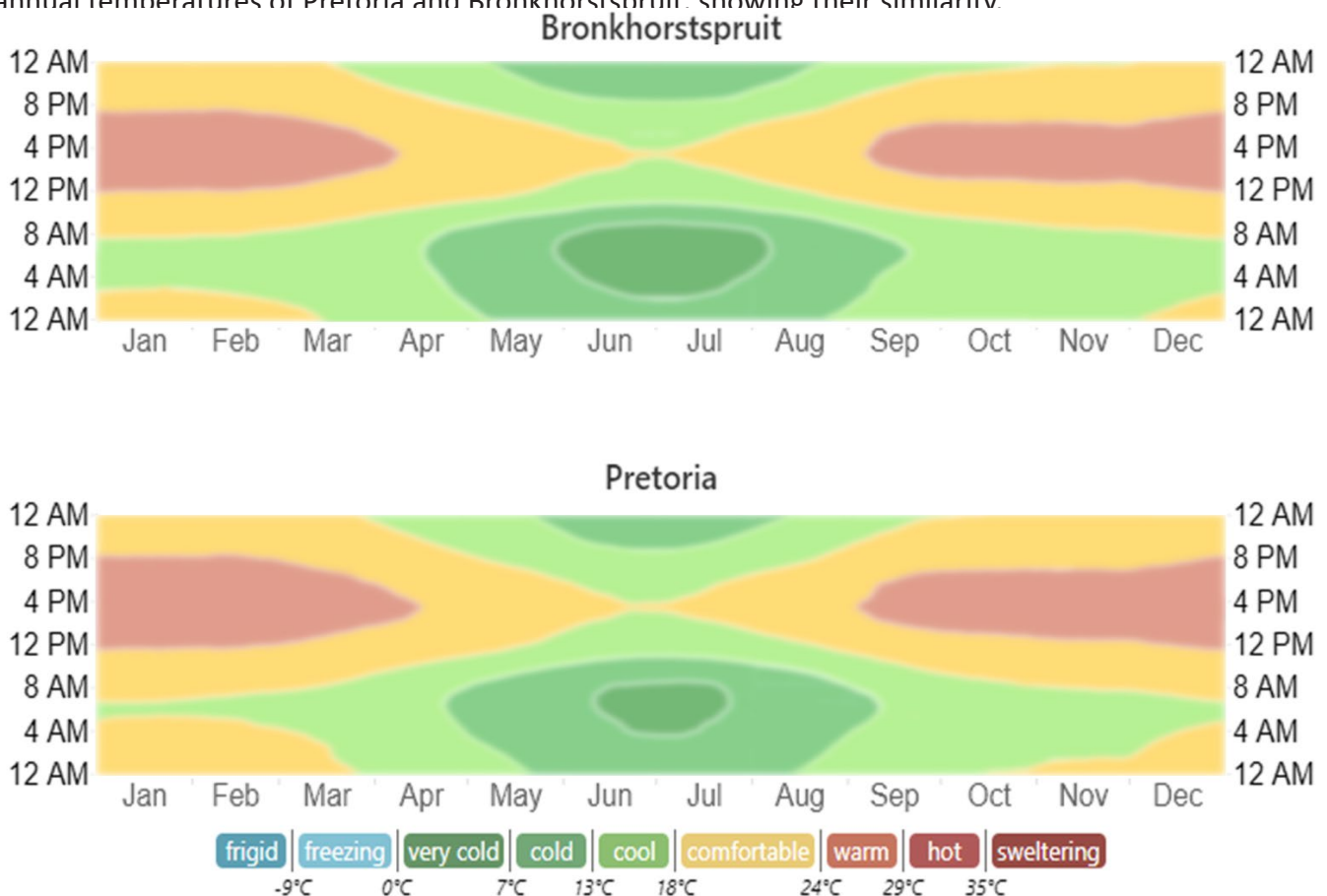
Figure 64: The table above compares the perceived comfort level of the ambient temperature of Pretoria and Bronkhorstspruit. Their similarity implies that climatic controls that suit conditions in Pretoria will be suitable in Bronkhorstspruit as well. The period from November to March require afternoon cooling strategies and the period from May to August require warming strategies to create thermal comfort (Data from Weather Spark, 2021).

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	20.7 °C	20.7 °C	19.4 °C	16.6 °C	13.7 °C	11 °C	10.7 °C	14 °C	17.7 °C	19.4 °C	19.8 °C	20.6 °C
	(69.3) °F	(69.2) °F	(66.9) °F	(61.9) °F	(56.7) °F	(51.7) °F	(51.3) °F	(57.2) °F	(63.9) °F	(66.9) °F	(67.6) °F	(69) °F
Min. Temperature °C (°F)	15.7 °C	15.6 °C	14.2 °C	11.2 °C	7.4 °C	4.4 °C	3.8 °C	6.6 °C	10 °C	12.6 °C	13.9 °C	15.4 °C
	(60.3) °F	(60) °F	(57.5) °F	(52.1) °F	(45.3) °F	(39.9) °F	(38.8) °F	(43.9) °F	(50.1) °F	(54.6) °F	(57.1) °F	(59.7) °F
Max. Temperature °C	26 °C	26.1 °C	25 °C	22.5 °C	20.6 °C	18.3 °C	18.3 °C	21.8 °C	25.4 °C	26.5 °C	25.8 °C	26 °C
(°F)	(78.8) °F	(79) °F	(77) °F	(72.5) °F	(69.1) °F	(64.9) °F	(65) °F	(71.2) °F	(77.8) °F	(79.6) °F	(78.5) °F	(78.8) °F
Humidity(%)	67%	64%	63%	62%	52%	50%	44%	38%	36%	47%	58%	65%
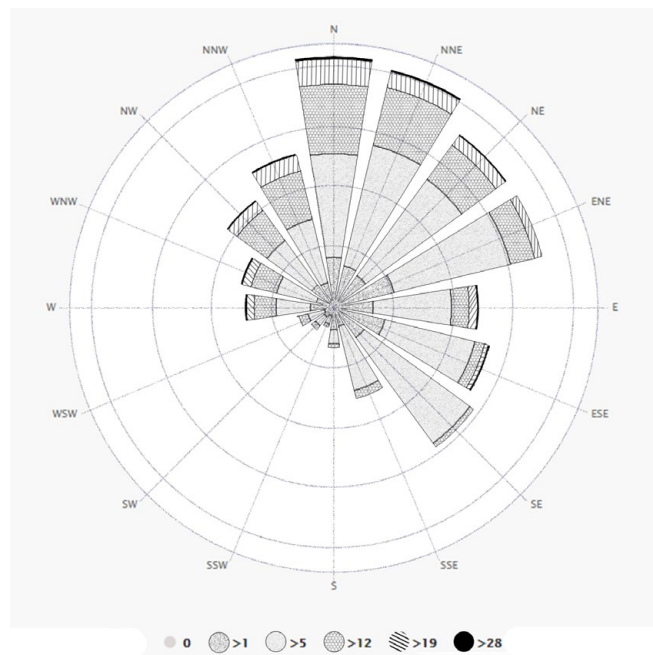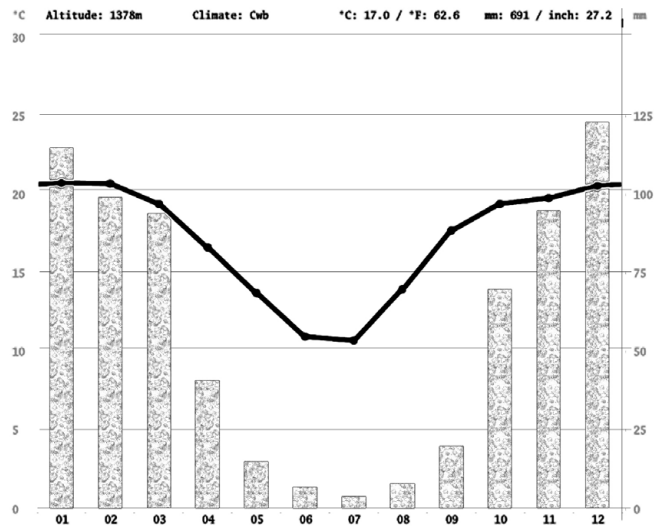
Figure 65: (top) A table summarising the monthly average temperature conditions of Bronkhorstspruit. The data depcits warm humid summers, and cold dry winters (Data from Climate-data.org, 2021).

Figure 66: (middle) This graph shows the correlation between seasonal temperature and rainfall, reinforcing the character of warm humid summers, and cold dry winters (Data from Climate-data.org, 2021).

Figure 67: (bottom) A wind rose diagram that shows a predominant yearly wind direction from the north and north east, with minimal south-western forces. This will facilitate buildings that face north with proper cross ventilation in summer (Data from Meteoblue.com, 2021).
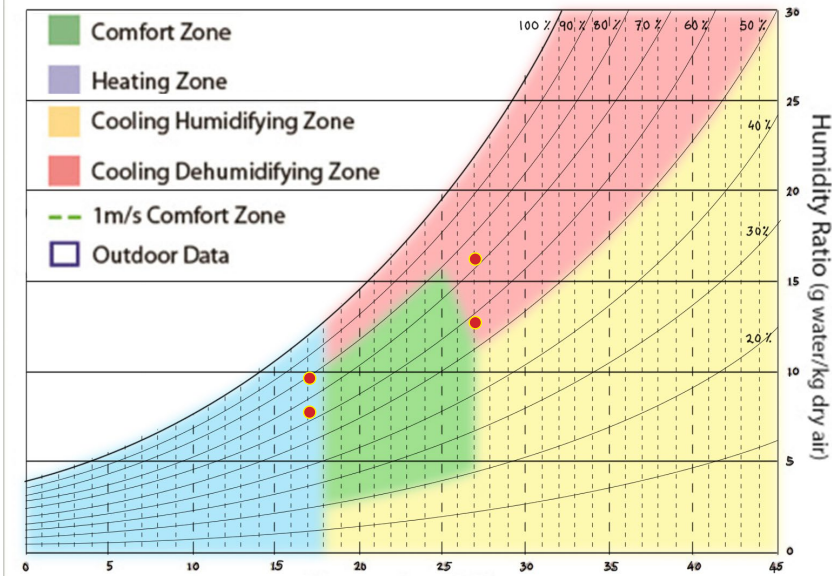
Figure 68: Bioclimatic psychometric graph indicating the range of summer weather conditions in Bronkhorstspruit in comparison with the range of perceived thermal comfort. (Bioclimatic chart from Roshan, et al., 2017 based on Milne and Givoni, 1979)

Summer period: October to March according to figure 64

Temperature: 17-27 °C
Humidty: high 50-67%
Daylight: 8.8-9.8 hrs/day

Strategy: Ventilation removes hot and moist air (Holm, 1996).
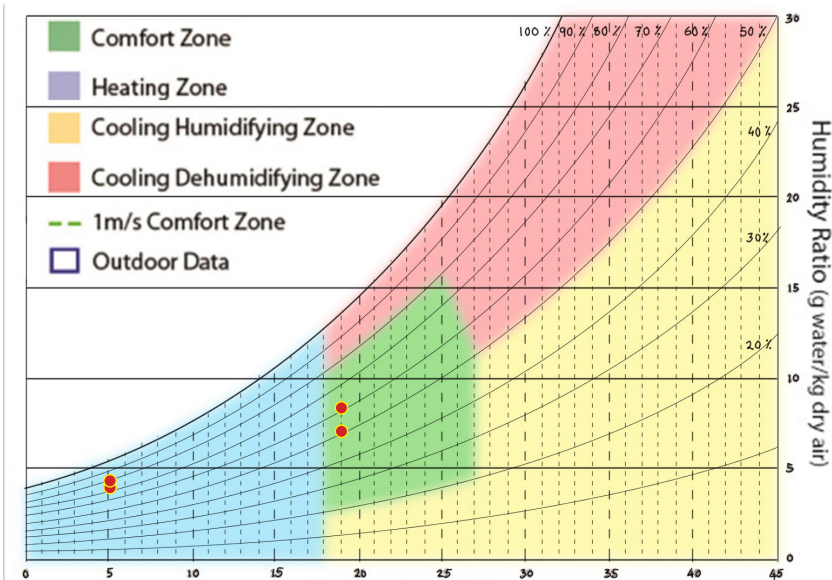
Figure 69: Bioclimatic psychometric graph indicating the range of winter weather conditions in Bronkhorstspruit in comparison with the range of perceived thermal comfort. (Bioclimatic chart from Roshan, et al., 2017 based on Milne and Givoni, 1979)

Winter period: April to August according to figure 64

Temperature: low 5-19 °C
Humidty: low 38-52%
Daylight: 8.3-9.5

Strategy: Thermal mass elements with solar heat gain and insulated rooves (Holm, 1996).

These conditions necessitate cooling technologies and lower solar heat gain in summer. Where possible the buildings will be orientated facing north, with shorter elevations in the east and west, limiting harsh morning and afternoon heat (Holm, 1996), while still offering the opportunity to maximise interior daylight and take advantage of solar power. Shading on northern elevations (Holm, 1996:71) will be used to prevent excess interior solar heat gain in summer, with the benefit of solar heat gain in winter. Passive ventilation facilitated by smaller building widths (Holm, 1996:71). The role of a building skin with thermal mass, is in creating and maintaining cooler interiors to combat the harsh heat in the summer (Holm, 1996:30). In winter, thermal mass will aid in warming spaces up and the insulation will ensure maintenance of that heat. Importantly, the mechanisms used need to be adjustable. This implies the ability to close off ventilation and stop additional cooling during colder periods and rely on passive heating. This idea of adjustability will be explored further in the next section.

b) Sourcing water and electricity

Water catchment (when periodically available in summer months (Weather Spark, 2021)) can be used for irrigation and WC filling. However, there is not enough rainfall available year round for the buildings to be reliant on rainwater harvesting alone (Weather Spark, 2021). Water will have to be piped to the buildings from municipal connections, and rain water harvesting will supplement the overall water need and limit municipal reliance. The arrival pavilion can rely on its proximity to the suburbs for water and sewage connections. The heritage pavilion will have a boardwalk that leads from the arrival pavilion and along with it, bring water. This is similar to the research repository which will have a separate boardwalk connection in the east. The mediation node is further away from the ruin landscape and abuts the landowner's border, this allows for its source to be found in the northern municipal connections. Photovoltaic panels can be implemented in the buildings that require electricity and de-centralised septic tank systems can be used at ablution facilities to mitigate the need for large scale sewer line excavations. Once the resolved design plans are introduced later on, each building will be analysed according to its rainwater yield and solar-energy production based on the data provided in the tables below.

Precipitation / Rainfall mm (in)	115 (4.5)	99 (3.9)	94 (3.7)	41 (1.6)	15 (0.6)	7 (0.3)	4 (0.2)	8 (0.3)	20 (0.8)	70 (2.8)	95 (3.7)	123 (4.8)
Humidity(%)	67%	64%	63%	62%	52%	50%	44%	38%	36%	47%	58%	65%
Rainy days (d)	11	9	8	5	2	1	1	1	2	7	10	12
avg. Sun hours (hours)	9.2	9.2	8.8	8.3	8.9	8.8	9.0	9.5	9.8	9.8	9.6	9.6

Average Monthly Rainfall

Rainfall	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bronkhorstspruit	95.8mm	78.1mm	63.3mm	28.9mm	10.0mm	5.1mm	1.9mm	5.2mm	16.7mm	56.0mm	86.8mm	95.1mm
Pretoria	97.1mm	80.9mm	64.4mm	30.5mm	10.8mm	5.1mm	1.8mm	4.7mm	15.7mm	51.1mm	79.4mm	90.6mm

Average Daily Incident Shortwave Solar Energy
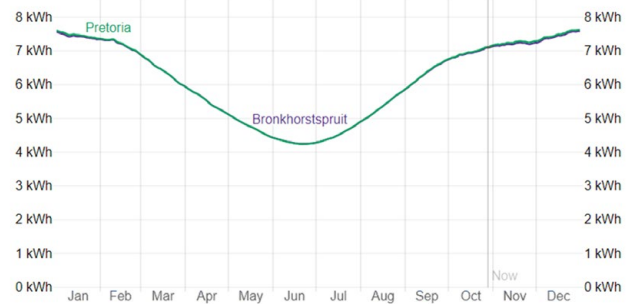
The average daily shortwave solar energy reaching the ground per square meter.

Solar Energy (kWh)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bronkhorstspruit	7.4	7.2	6.4	5.5	4.7	4.3	4.6	5.4	6.4	7.0	7.2	7.5
Pretoria	7.5	7.2	6.4	5.5	4.7	4.3	4.6	5.4	6.4	7.0	7.3	7.5

Figure 70: (top) A table summarising the monthly average rainfall and daylight quantities for use in calculating solar power and water catchment capacity (Data from Climate-data.org, 2021).

Figure 71: (bottom left) A graph showing the monthly average rainfall amounts in Bronkhorspruit for use in calculating water catchment capacity (Data from Weather Spark, 2021).

Figure 72: (bottom right) A graph showing the average daily incident shortwave solar energy in Bronkhorspruit for use in calculating solar power generation capacity (Data from Weather Spark, 2021).

c) Conditions for ground interference

The terrain varies between each site, where some are dappled with rocky outcrops, others are sparse and open. A micro-pile foundation system paired with decking necessitated by a desire for minimal ground disturbance, will be used and adjusted to suit each building's condition. Where rocks are in the way, a chemically bonded footing can stand in place of the pile. Suspended structures on pad footings will be used to create large areas of cover while minimising the need for many vertical support members. Where communion with the landscape is prioritised, raft foundations will be used in line with the sensitive excavation mentality described previously to create larger and more important spaces.
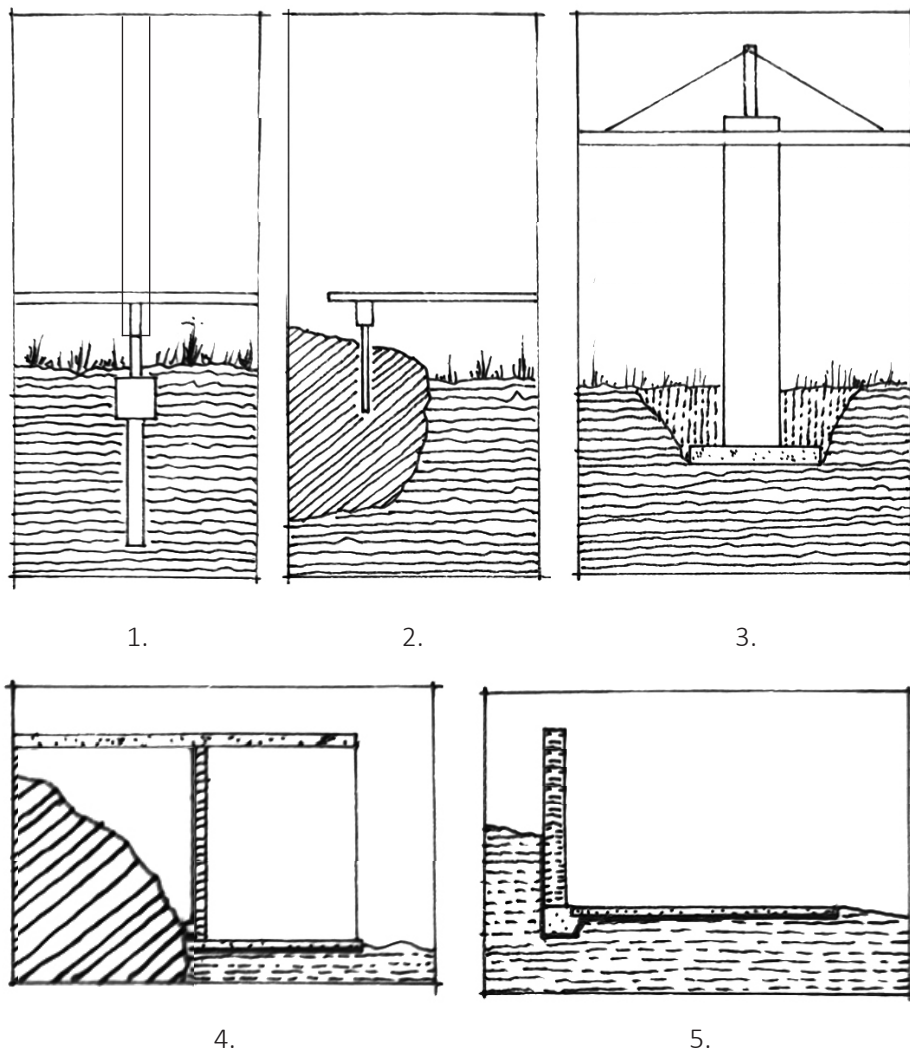
Figure 73: Diagrams showing the scale of ground disturbance used to create a hierarchy of sacredness. (1.) Micro-pile foundation (2.) Chemically bonded pin footings (3.) Pad footing (4.) Structural niches (5.) Raft foundations (Author, 2021).

14.2. Conceptualising and informing typical spatial details

The architectural language that will be used to realize each building in this project is informed not only by the living heritage programmes and physical features of the site, but by the experience of these layers as well. The experience of the living heritage process is understood from two perspectives- the practitioner and the observer (informed by van Vuuren's (2001) critique of the roles involved in commodified culture). These categories consider the general role of all involved groups and offer a lens with which to define typical architectural details. The experience of the culture, the landscape, and their interaction as a heritage site can be summed up into processes of production, observation, and transition. To follow, the conceptualisation of each spatial detail is described and thereafter, the technical design of each is defined.

- Production is about the activities within culture manifesting as tangible works. It requires enclosure to protect sacredness, imply introspection and facilitate ideation based on memory inherent in the notion of ruins. These spaces can be occupied by various practitioners depending on the programme it is used in. Practitioners can include artists, archaeologists and scholars.
- Observation maintains practitioner agency but offers the chance for engagement with tangible work by observers. A bifurcated enclosure with open niches implies a hybridisation of introspection and extrospection. The physical aspects of heritage extraction and production displayed within the backdrop of the landscape.
- Transitions stitch together the experience of practitioner and maker, between programmes and the landscape. Minimum enclosure is used, implying a landscape and wayfinding priority. Cases of internal transitions can make allowance for the attachment of programmed spaces.
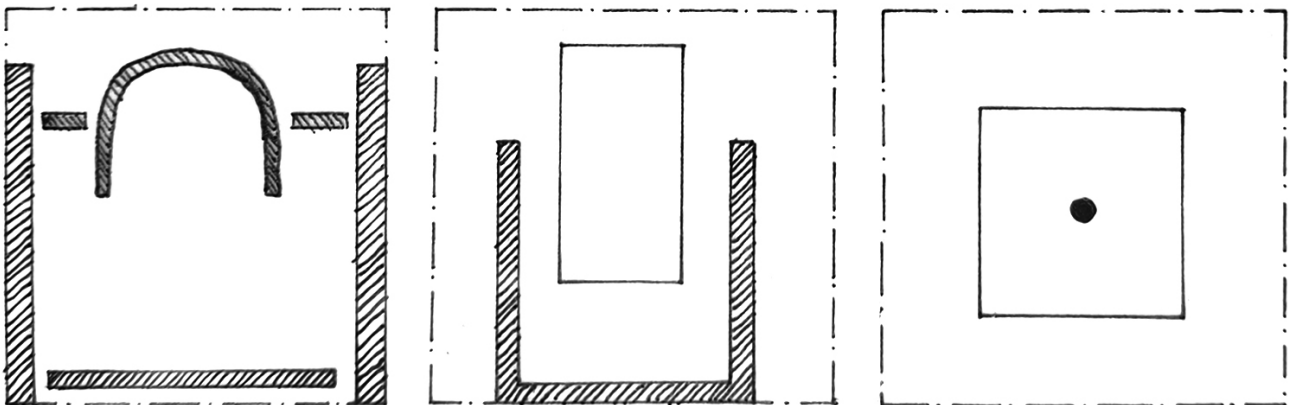
Figure 74: (left to right) Parti diagrams representing three levels of enclosure to accommodate common spatial details. Enclosed spaces for production type programmes, hybridised enclosure for observation type programmes, and minimal enclosure for transition type programmes (Author, 2021).

The architectural language of each typical detail considers all the aforementioned layers of informants and attempts to sum them up into a lexicon of usable parts for the consistent articulation of spaces at each building. Each is described according to its primary, secondary and tertiary structural components in the sections to follow. Thereafter these typical components are applied to the plan concepts, where in each case the programme creates the layout, the landscape drives morphology and the details drive resolution. A reminder of the programmes generated in chapter two is given below.

- • Arrival pavilion
- • Mediation node
- • Heritage gallery
- • Navigation platforms
- • Research repository

a) Production

The production detail is a platform for discussions and for meetings, and a studio for creating and generating works. A light well creates interior daylighting without unnecessary solar heat gain and imitates the private exterior typology observed in the ruins (seen in figure 50 Chapter 2). Household courtyards and built-in niches were used for daily activities, in turn, contributing to the cultural fabric of the iron age society. The light well doubles as a heat stack- facilitating the escape of rising heat. When necessary, the building can be opened and the short width can allow air to move through the building (Holm, 1996). A large sliding door can move open to accommodate the transport of furniture, tools and artefacts as well as facilitate the aforementioned cross ventilation. Deeper northern facades, achieved with extended overhangs, ensure minimal heat gain in the warmer months. Thermal massing on the eastern and western sides can aid in maintaining a constant interior temperature through colder months as well. The intention is to create a building skin that can be adapted to changing exterior conditions and achieve internal thermal comfort regardless. In colder months, the spaces can be closed up and allowed to gain heat from solar heat gain, in warmer months, passive ventilation can get rid of warmer air.
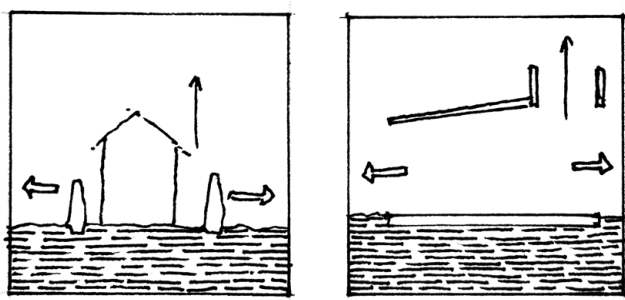
Figure 75: Diagrams comparing historical spatial units and their translation into new form, where visual access focuses on the horizontal plane with a skyward openess (Author, 2021).
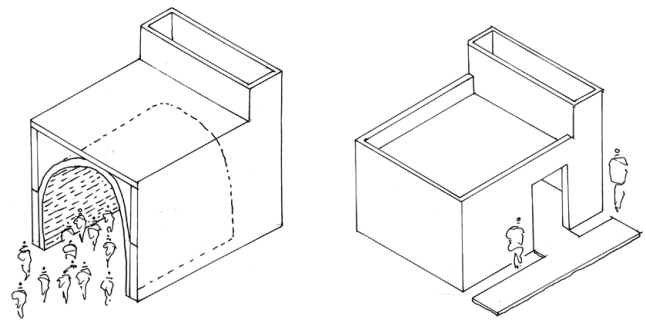
Figure 76: Diagrams showing potential derivations of the production spatial detail as social and research based spaces (Author, 2021).
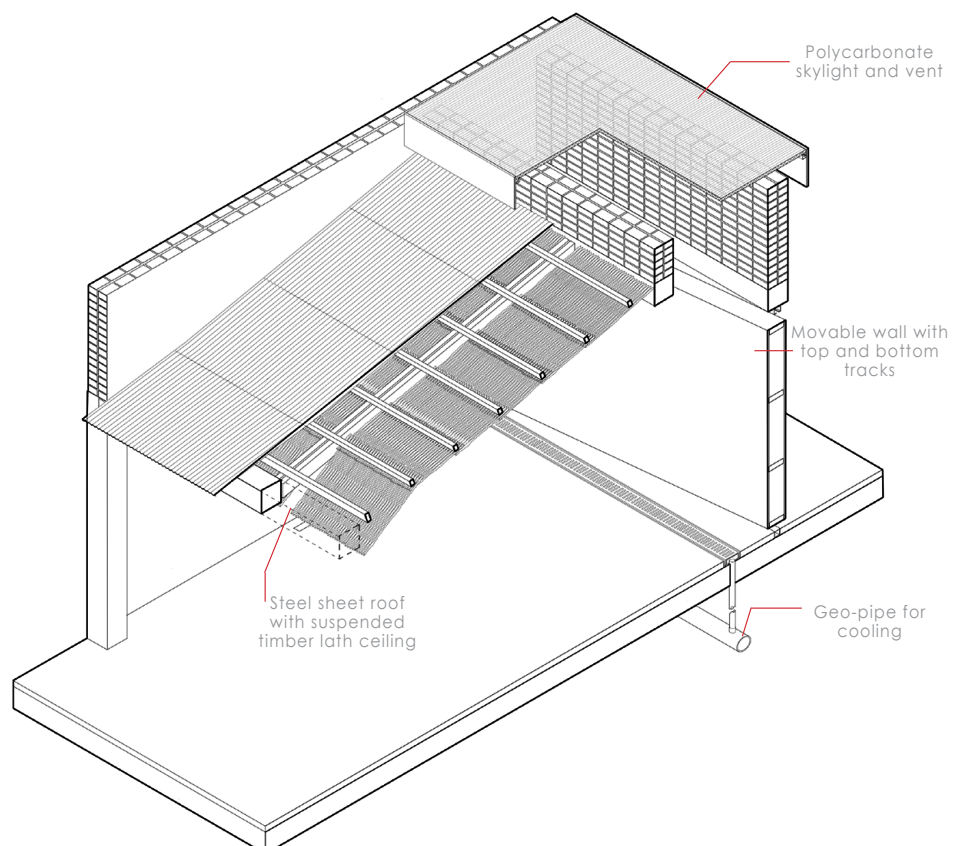
Figure 77: Axonometric section of the production detail indicating its materiality (Author, 2021).

Polycarbonate skylight and vent

Movable wall with top and bottom tracks

Steel sheet roof with suspended timber lath ceiling

Geo-pipe for cooling

b) Observation

The observation detail intends on creating spaces for observing the landscape and the works created within it. Displays can be filled with works of archaeological and contemporary origin. Earlier, the notion of reused and sensitively examined excavation material was described. In this detail, the ground material is to be converted into earthen bricks and used as roof tiles. The translucent roof sheeting allows daylight to fall through earthen tiles and create an interior experience crafted out of the terrain below. This imbeds the structure with social value through craftsmanship, but also highlights the need to treat any earth matter removed from the site with care and consideration. The roof sheet is separated from the tiles to allow space between the elements for ventilation and, the top of the tiles will be painted with a reflective paint to reduce excess heat absorption and transfer as well. The detail can accommodate passive ventilation to combat any further heat gain. Observing the cultural facets of the site in association with the landscape asks for an open typology, this necessitates raised enclosures as artefact storage that provides protection from the elements. The vertical supports are on pad foundations, but the remainder of the floor surface can be achieved with decking, simultaneously diverting any stray water away.
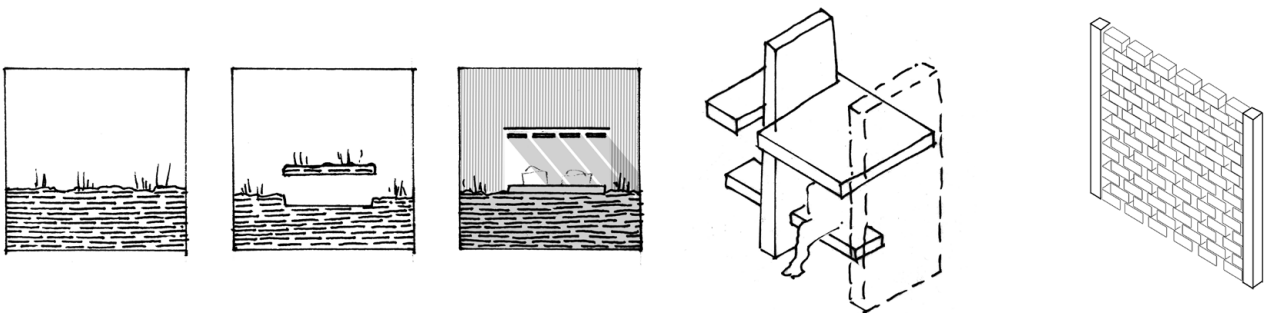
Figure 78: A sequence of diagrams showing the reuse of excavated earth matter as roof tiles that cast patterned light into the space below (Author, 2021).

Figure 79: Diagrams showing potential derivations of the observation spatial detail as a extrospective and introspective building skin (Author, 2021).
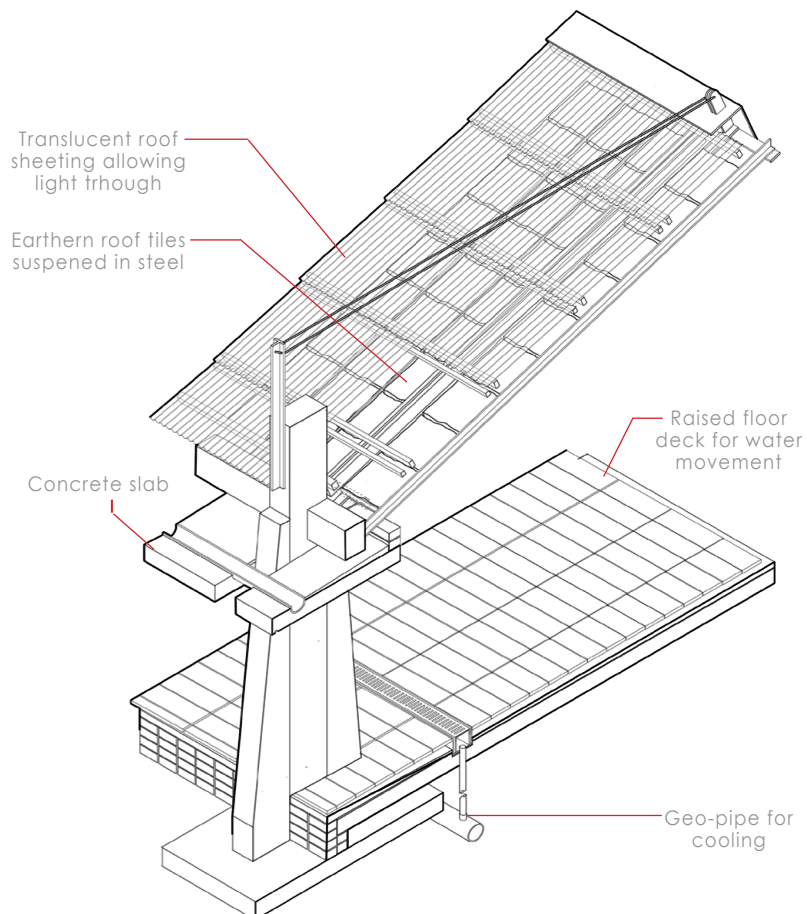
Figure 80: Axonometric section of the observation detail indicating its materiality (Author, 2021).

Translucent roof sheeting allowing light trhough

Earthern roof tiles suspened in steel

Concrete slab

Raised floor deck for water movement

Geo-pipe for cooling

c) Transition

The transition detail intends on creating a unique shading device made of the landscape that can be used to shape spaces of movement. Predominantly used at the navigation platforms, it can also be used to articulate passages and walkways. The suspended timber lath shading device can be shaped to create spatial variation below. It speaks of the materials on the landscape and finds inspiration in the physical barriers suggested to have been on top of the stone walls before their ruination. These would not have been visual barriers, but physical, and in the context of this detail they are visual markers that shape wayfinding. The elements are allowed to pass through the detail in a translated way, sunlight is filtered and rain is dissipated. Underneath, decking is used to minimise ground disturbance. Decking can also serve in cases where services need to be transported over larger stretches of landscape, which would alternatively be imbedded in the ground.
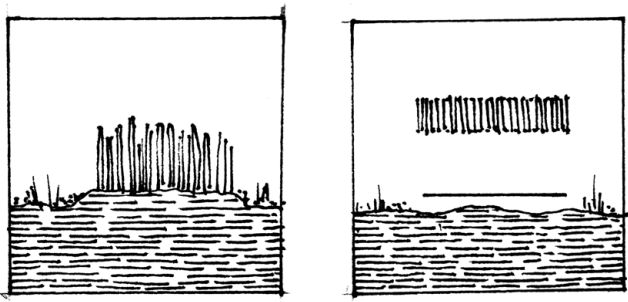
Figure 81: Diagrams showing the use of on-site materials to create heightened experiences of the landscape (Author, 2021).
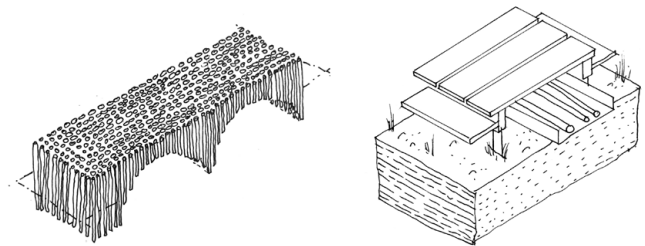
Figure 82: Diagrams showing potential derivations of the transition spatial detail as a hierarchical ceiling device and service delivery boardwalk (Author, 2021).

Suspended timber lath mattress as shading device

Timber deck

Micro-pile foundation
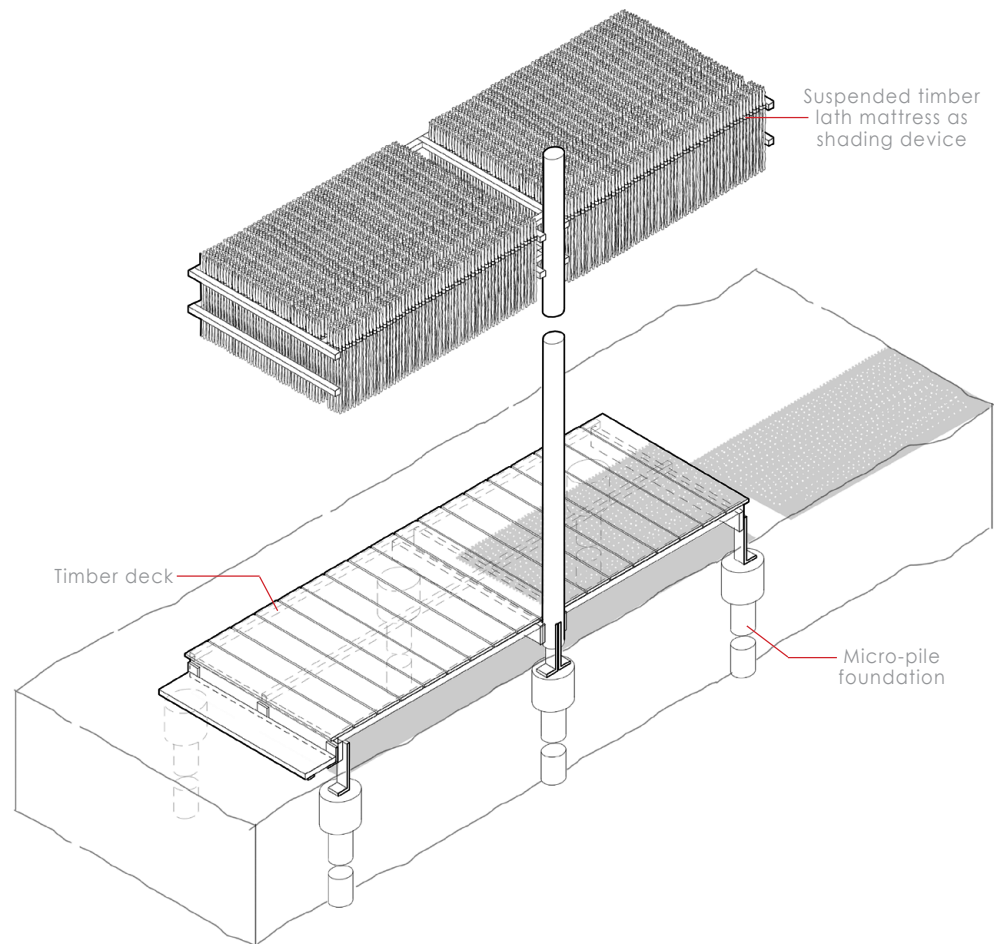
Figure 83: Axonometric section of the transition detail indicating its materiality (Author, 2021).

15. Informing the placement of the plan concepts

The above spatial details will serve as components that can be assembled to articulate each plan concept. Before the plan concepts can be appropriately designed, they need to be given physical sites. Their position will give each programme's plan an idiosyncratic situation to respond to. The following informants are kept in mind when determining placement;

- Each plan is placed in proximity to the entities they represent the relationship for. For example, the mediation node programme, which represents the relationship between current landowners and the heritage landscapes they own, will be positioned between the two entities- marking a symbolic mediated boundary.
- The positioning is also limited by a need to prevent unnecessary destruction to the ruins. Framing the ruins, the plans will not directly interfere with the ruins and rather facilitate a programmatic interaction with the ruins.
- On a practical scale, placement is also informed by ease of access to water and existing dirt roads. Terrain will also shape placement. Where rocky outcrops and trees exist, the plan will have to be adjusted to fit between, within and upon such features. Wind direction and northern solar exposure also guide orientation and inform design strategies.

The maps to follow depict the placement logic of each conceptual plan and indicate an overall arrangement of the programmes they facilitate in a framework around the ruins.
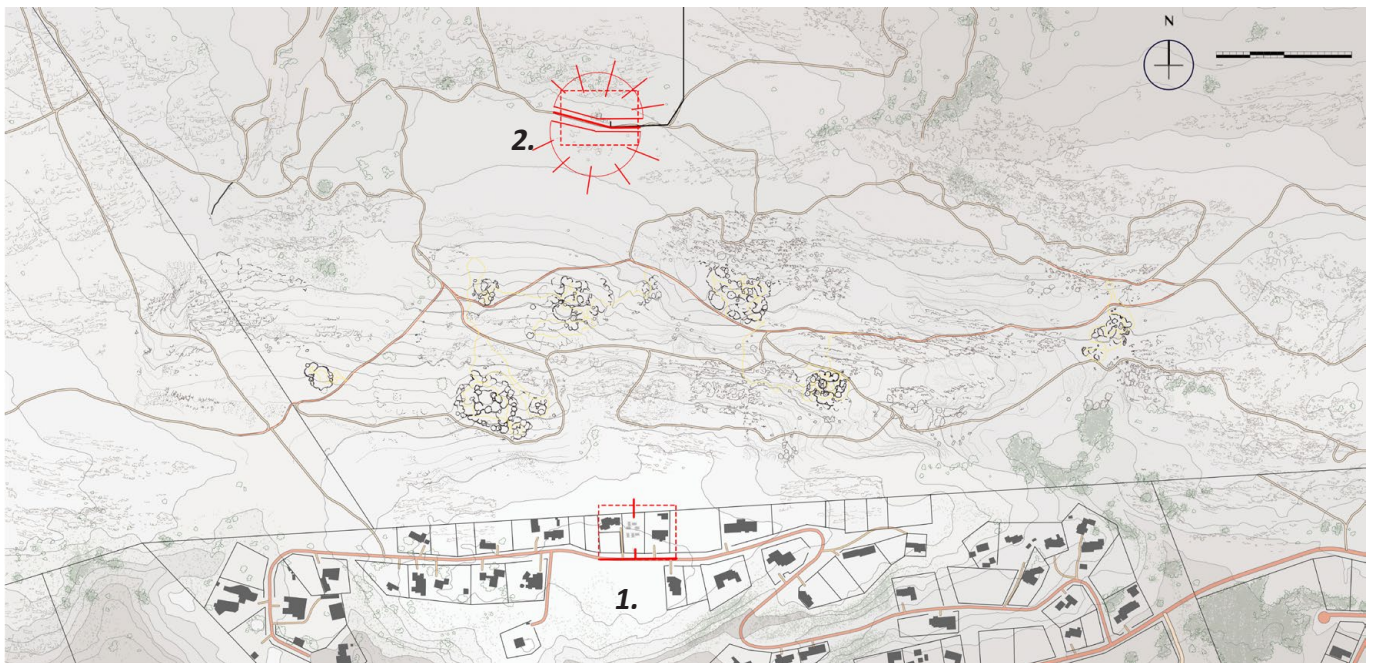
Figure 84: A site map indicating the placement of the arrival pavilion (1.) on an open plot of land within the suburbs to serve as a main access point to the site, and the placement of the mediation node (2.) on the northern boundary of the site abutting the landowner's property and the newly negotiated protected heritage landscape. Both have access to main roads and services and act as thresholds between contrasting conditions (Author, 2021).
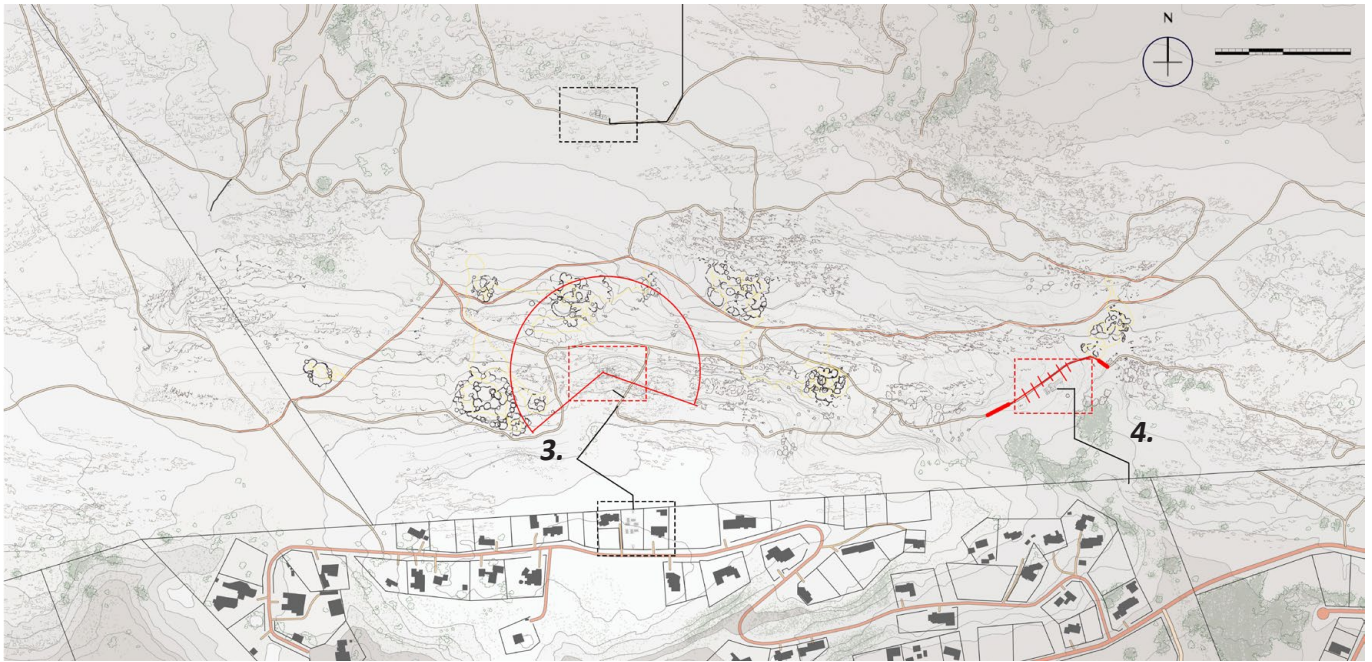
Figure 85: A site map indicating the placement of the heritage gallery (3.) on a central hill with vistas facing the surrounding ruins. It is close to an existing dirt road and can be reached via a boardwalk from the arrival pavilion that carries water with it as well. The research repository (4.) is placed to the east, adjacent to the main set of ruins and before the easternmost one with a dual boardwalk and service access path as well. It is attached to an existing dirt road for ease of transport to and from archaeological sites (Author, 2021).
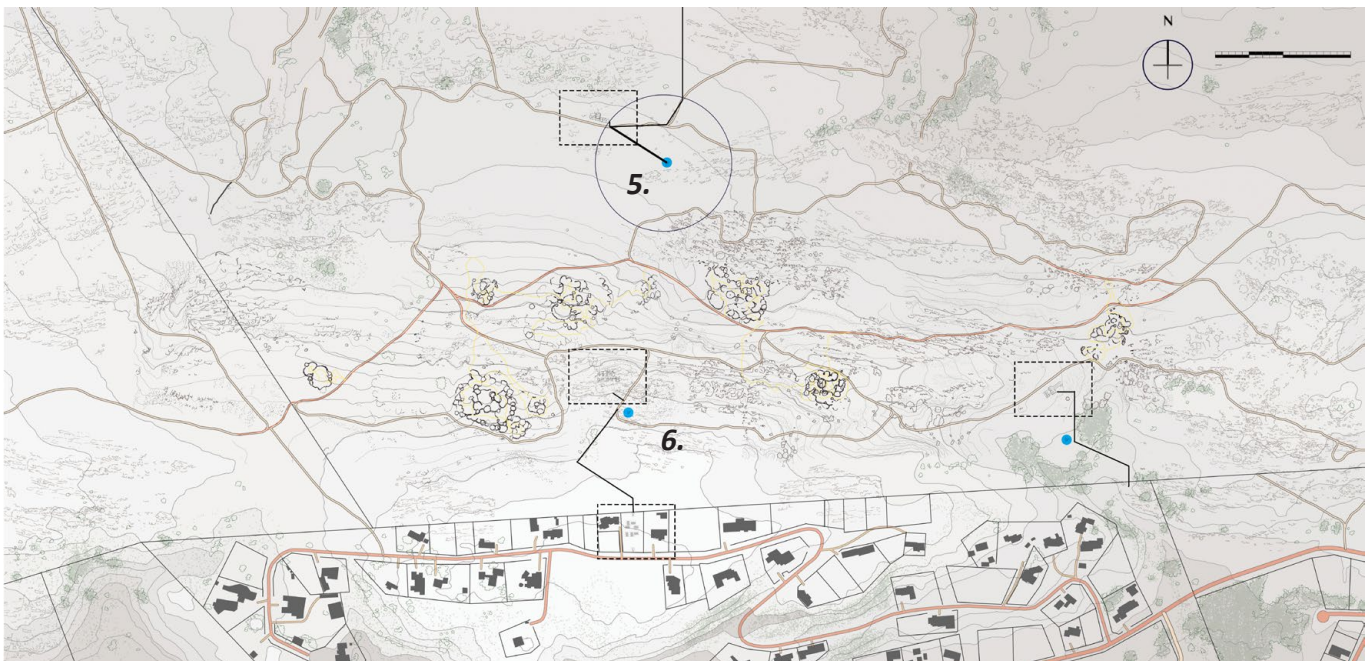
Figure 86: A site map indicating the placement of initial navigation platforms. The northern platform (5.) is placed amidst a rocky outcropping 100m away from the mediation node. The southern platform (6.) is placed at the intersection of an existing road and the boardwalk. Both extend the access of the initial buildings and offer a transition towards the other navigation platforms placed around the site (Author, 2021).
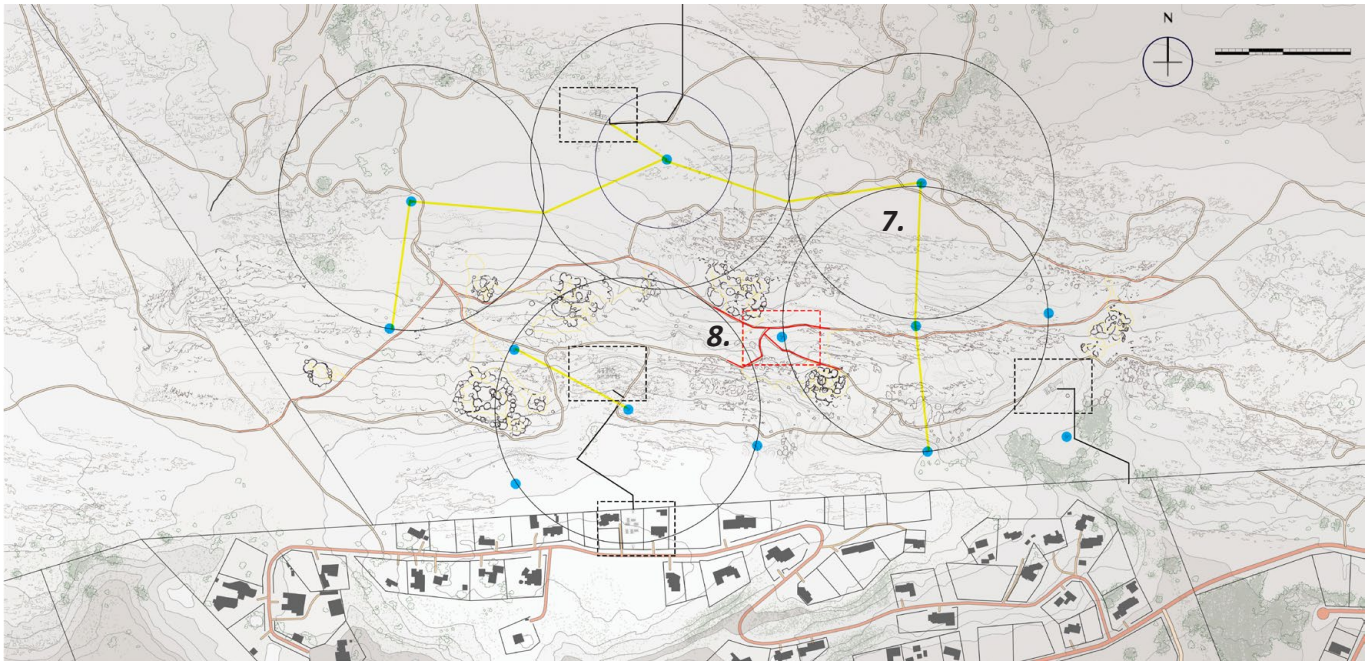
Figure 87: A site map indicating the placement of the remaining navigation platforms at the intersection of a 200m walking radius and existing dirt roads. These offer vistas and facilitate wayfinding between and around the ruins (Author, 2021).
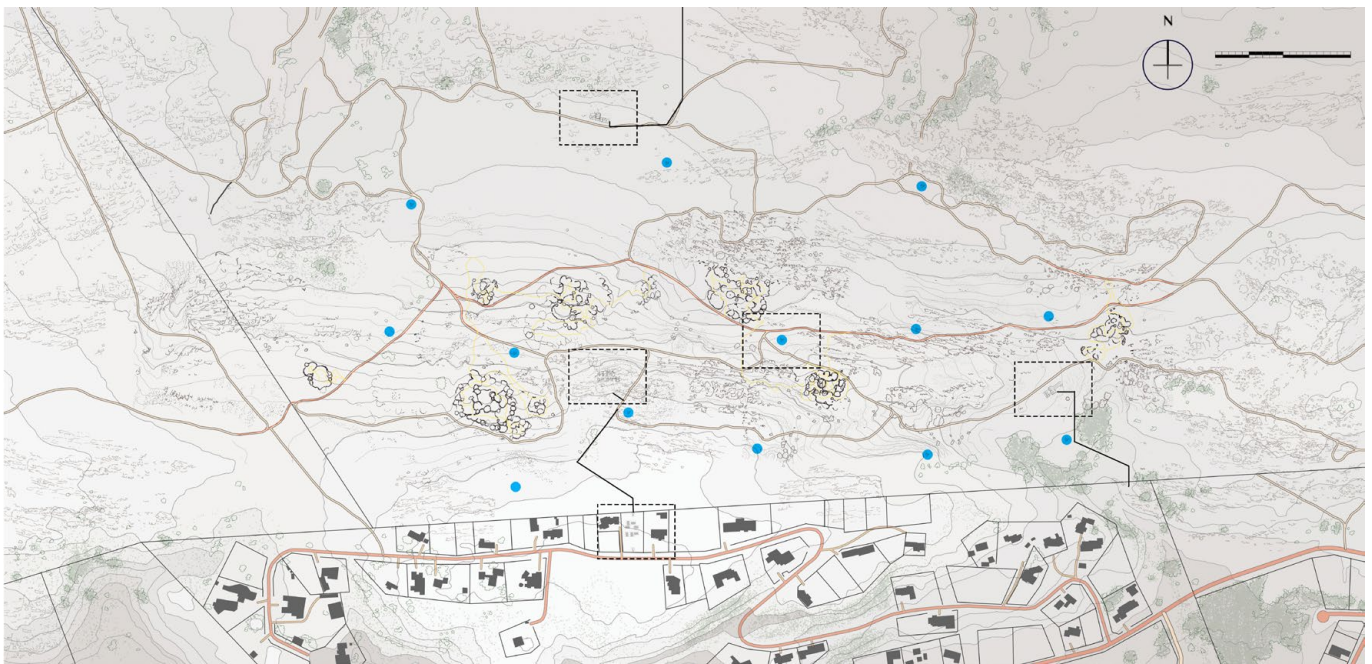
Figure 88: A site map indicating the five sites of building placement (Author, 2021).

While each building's separation allows the ruins to be framed within the overall programme, the architectural language employed requires consistency for the sake of architectural coherence. Arising from similar functional requirements at each building, this coherence can be achieved through designs of typical spatial details that can be adjusted and assembled according to the requirements of each building. The next section explores the physical parameters that guide the design of the spatial details, whereafter, they will be applied to the conceptual plans.
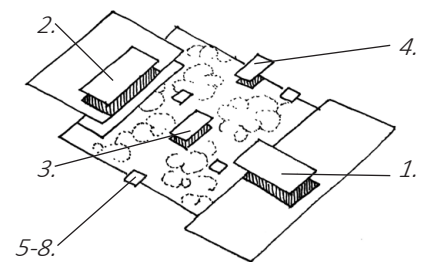
Figure 89: An abstract expression of the relationship between the five programmes (Author, 2021).
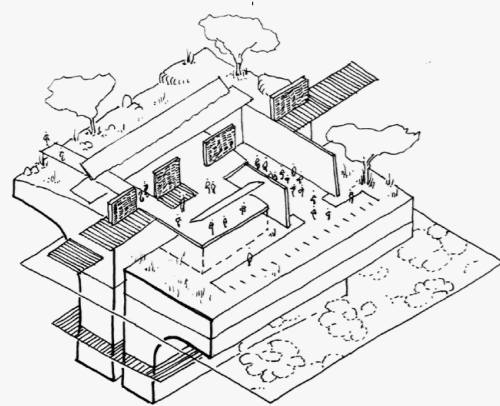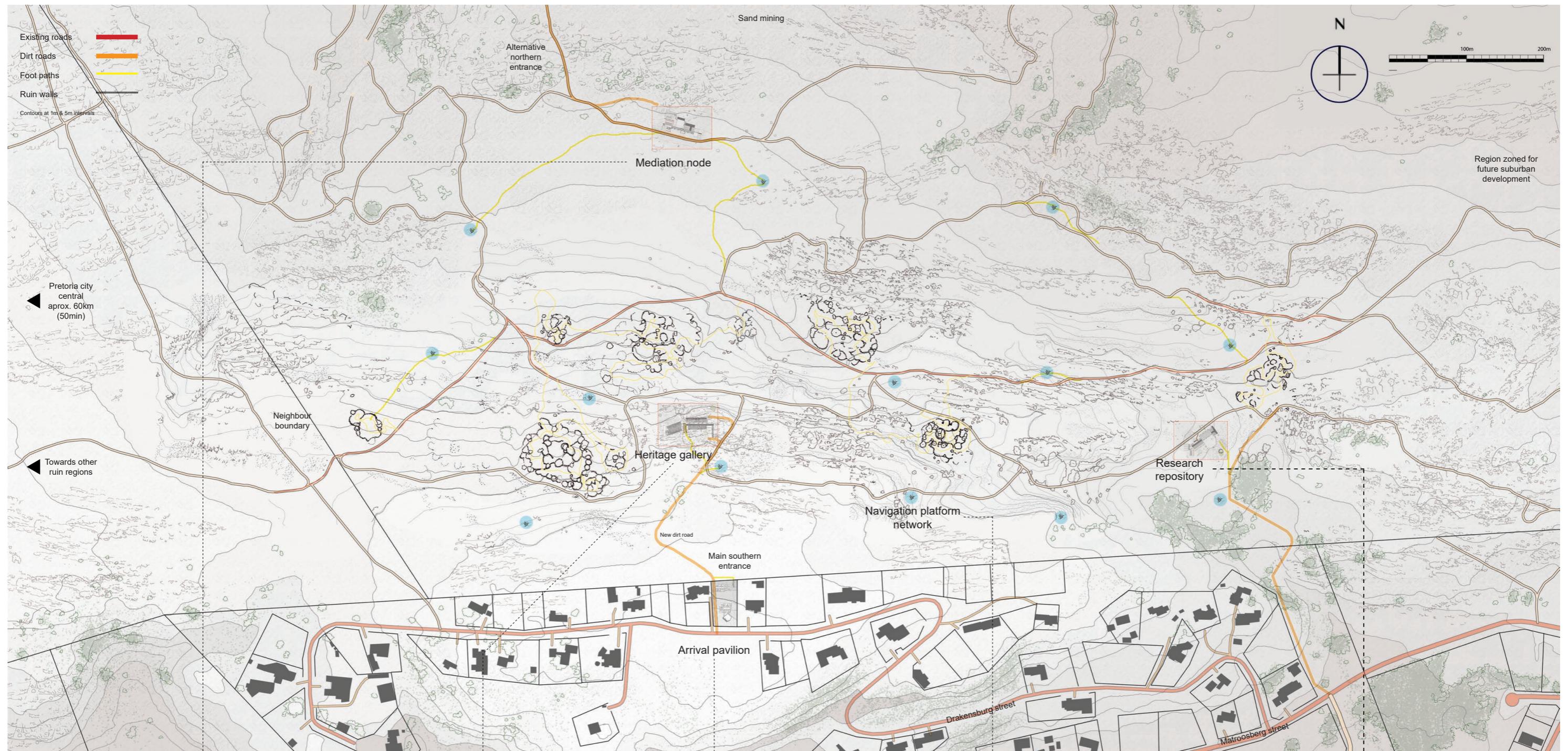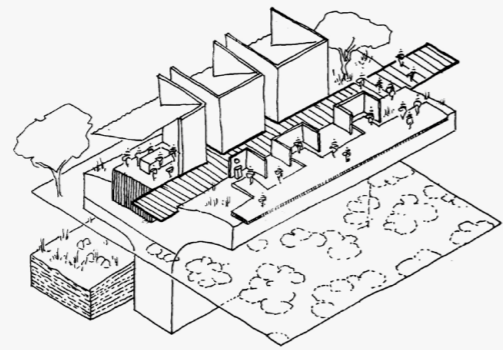
Figure 90: Site map indicating the developments across the ruin landscape (Author, 2021).
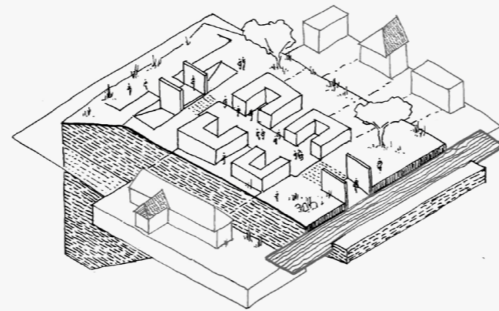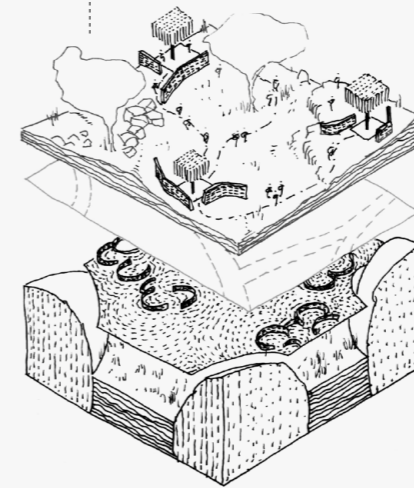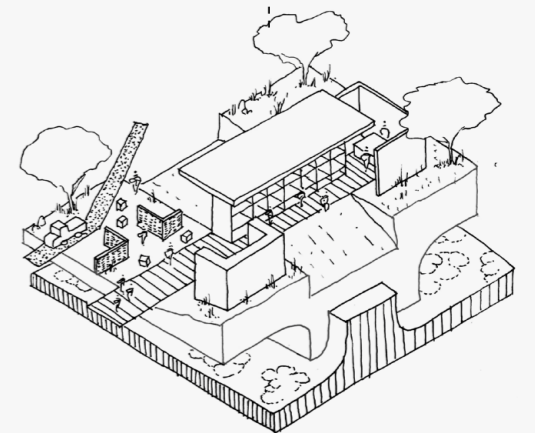
16. Bringing architectural intention and plan concepts together

The following section serves to describe the designs of each building contained within this scheme's framework. Each building is described according to the following points:

• Its genesis in the programme generation experiment and development through each subsequent layer of design informants- in the form of a genealogy diagram.
• Its articulation through the combination of the typical spatial details described previously and acclimatisation to its specific site conditions- in the form of sequential spatial section diagrams.
• Its resultant morphology as the product of the overlap and synthesis of all the preceding informants- in the form of plan drawings in context.

Lastly, each building is given an SBAT rating (Sustainable building assessment tool) and analysed for its rain-water harvesting capacity and solar power generation capacity.

16.1. Arrival pavilion

The arrival pavilion is the general gate to the site and offers a threshold from the suburban context into the heritage context of the iron age ruin landscape. It bears morphological markers in position and scale to the adjacent sites, but relies on the typological language of the project to find its architectural form. Orientated on a north-south axis parallel with the site, longer east and west facing elevations arise. Unnecessary interior heat gain can be mitigated on these exposed elevations with shading devices and thermal massing. Daylight can be brought into interior spaces using the production typology and its light wells.

The arrival pavilion serves to introduce outsiders to the site and create an experience of transition. Furthermore, accommodation units are included here as a means of housing travelling visitors, practitioners part of the residency and special guests. Small units consisting of ablutions, a bedroom and a kitchenette are organised around courtyards to facilitate social interaction.

Positioned within the suburbs, the heritage sensitivity of this site is reduced. Therefore, the accommodation units are treated with continuous concrete foundations, rather than raised floors. Decking is used to guide movement between spaces, and dirt roads are used on the periphery to connect vehicular access to the existing roadways on the site. Niches throughout the plan create moments of pseudo-enclosure for refuge and extrospection.

The transition detail is used to guide movement from one spatial condition to the another. At the accommodation units the typologies come together at a smaller scale. The production detail serves as a light well rather than a heat stack and cooling is achieved through passive ventilation facilitated with a thinner building depth. Thermal massing and shading further contribute to thermal comfort.

Water catchment is accounted for at the accommodation units and photovoltaic panels account for energy loads. Passive ventilation aims to cool the spaces and thermal massing aims to stabilise the interior temperature year-round. This site benefits from its proximity to infrastructure and can therefore rely on the municipal sewer connection for sewage removal.
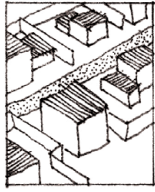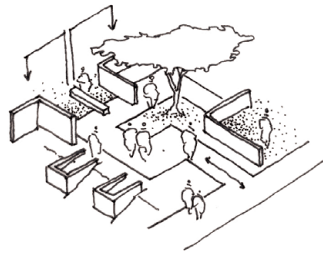
Programme as relationship   Textual study   Model translation

Lessons from site

Consolidated programme concept   Plan as concept
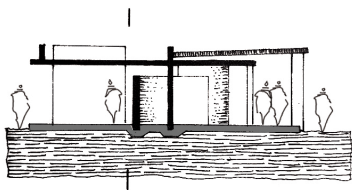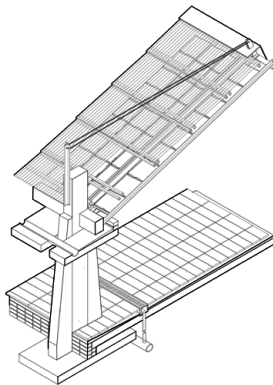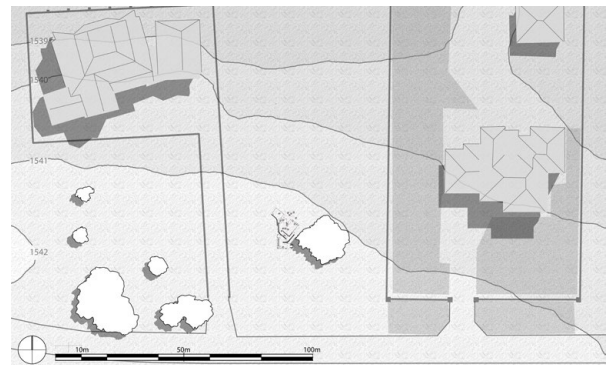
Section as concept   Design iteration   Site placement ▶ Plan resolution

Figure 91: The figures above combine to form a genealogy of the arrival pavilion, showing its development (Author, 2021).

Figure 92: Site plan of the arrival pavilion depicting thresholds and accommodation units. A service delivery road on the western side links to existing dirt roads on the site. As a threshold between the suburbs and ruin landscape, the various components are placed in relation to the geometry of the surroundings as a means of connecting the two entities (Author, 2021).
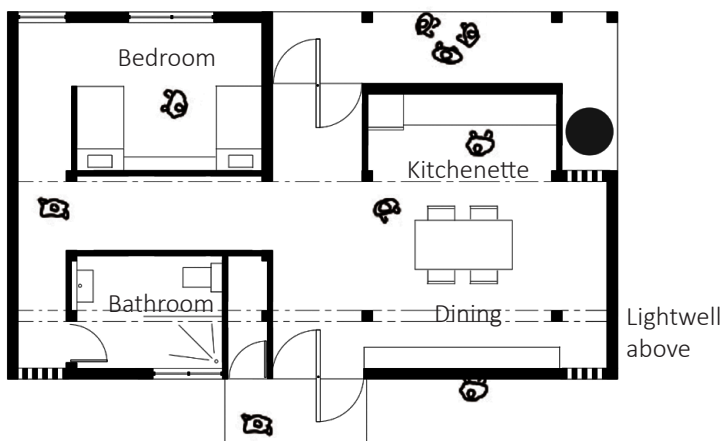
Figure 93: A plan of the basic accommodation unit, with a bedroom, bathroom and kitchenette (Author, 2021).
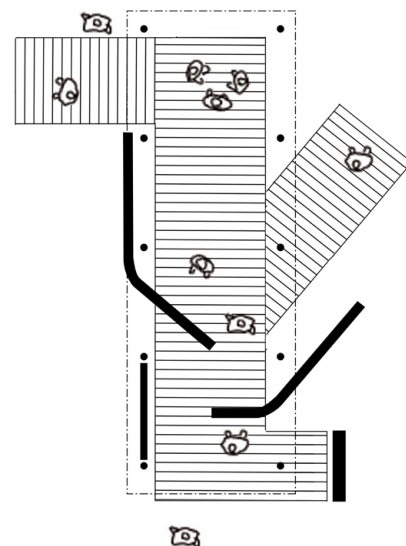
Figure 94: The initial threshold guides movement between walls with space for the display of information and images (Author, 2021).

16.2. Mediation node

The main axis of the building is a wall in line with an existing road and tilted to the east by 15° to ensure efficient daylighting and prevent excess solar heat gain. The wall has been perforated with programme to indicate shared use of the land. It may be approached from the northern landowner's side and the southern suburban which looks up at the ruins.

The mediation node serves as a stage for discussion between current landowners and the new heritage priority of this site. Agreements must be reached and terms of use determined. This building will serve as both precedent and meeting hall for this kind of discussion, with the hope that such a programme can occur throughout South Africa. Overtime, its use can be adapted to host events and cater for community gatherings.

The site slopes down slightly to the north with the gathering hall imbedded into the earth. This space sets the stage for cooperation going forth and has its founding in the meaningfulness of the landscape. It is therefore treated as part of the landscape with the adjacent structures sticking to the raised floor notion.

The southern elevation of the building is lined with the observation detail in the form of a passage with vistas to direct focus towards the ruin landscape beyond. Along the observation detail, instances of the production typology are placed as offices, ablutions and storage, all with light wells for adequate daylighting.

Photovoltaic panels provide the energy needed for the programmes to function and a water connection can be taken from the northern municipal line to suppliment harvested rain water.
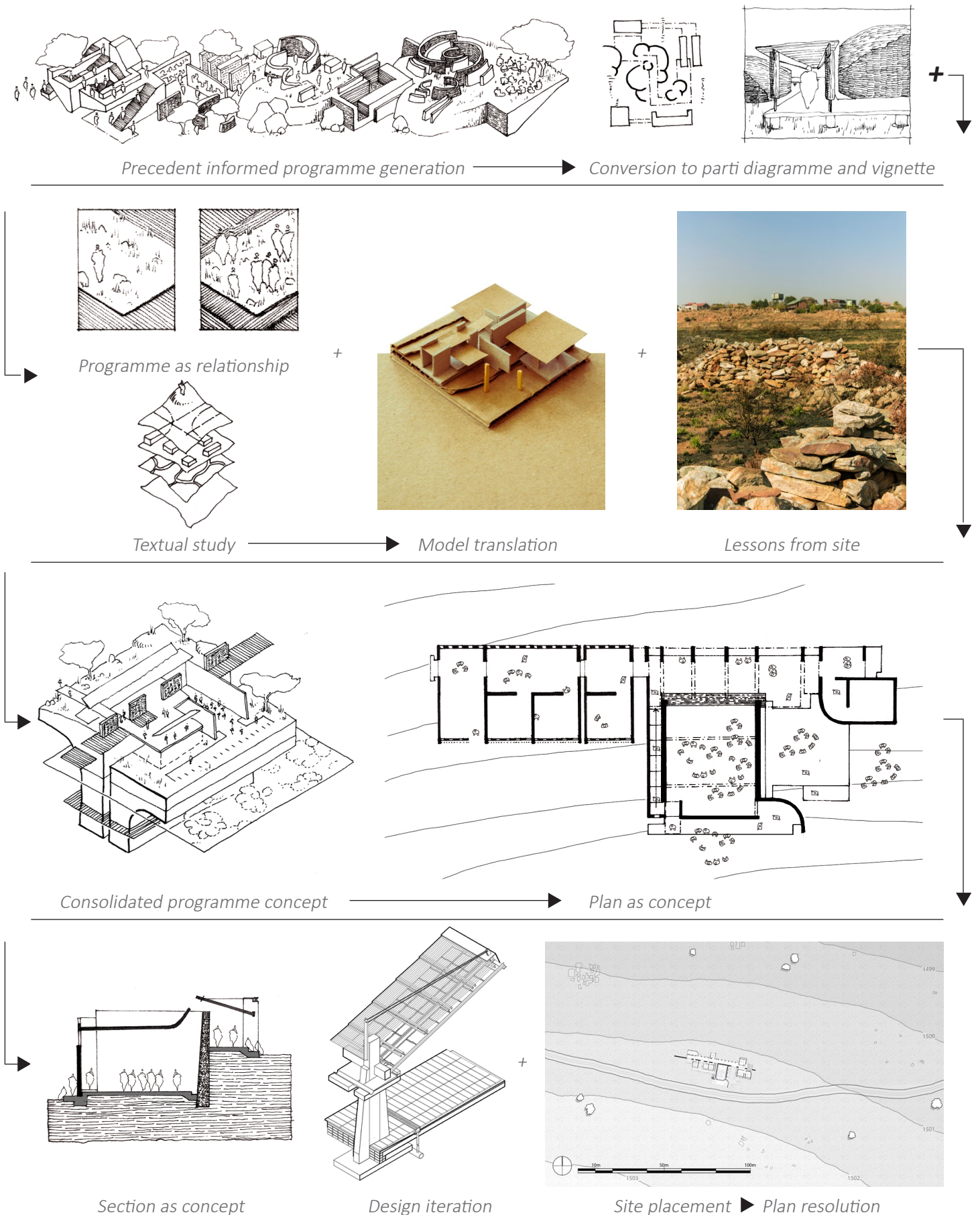
Figure 95: The figures above combine to form a genealogy of the mediation node, showing its development (Author, 2021).
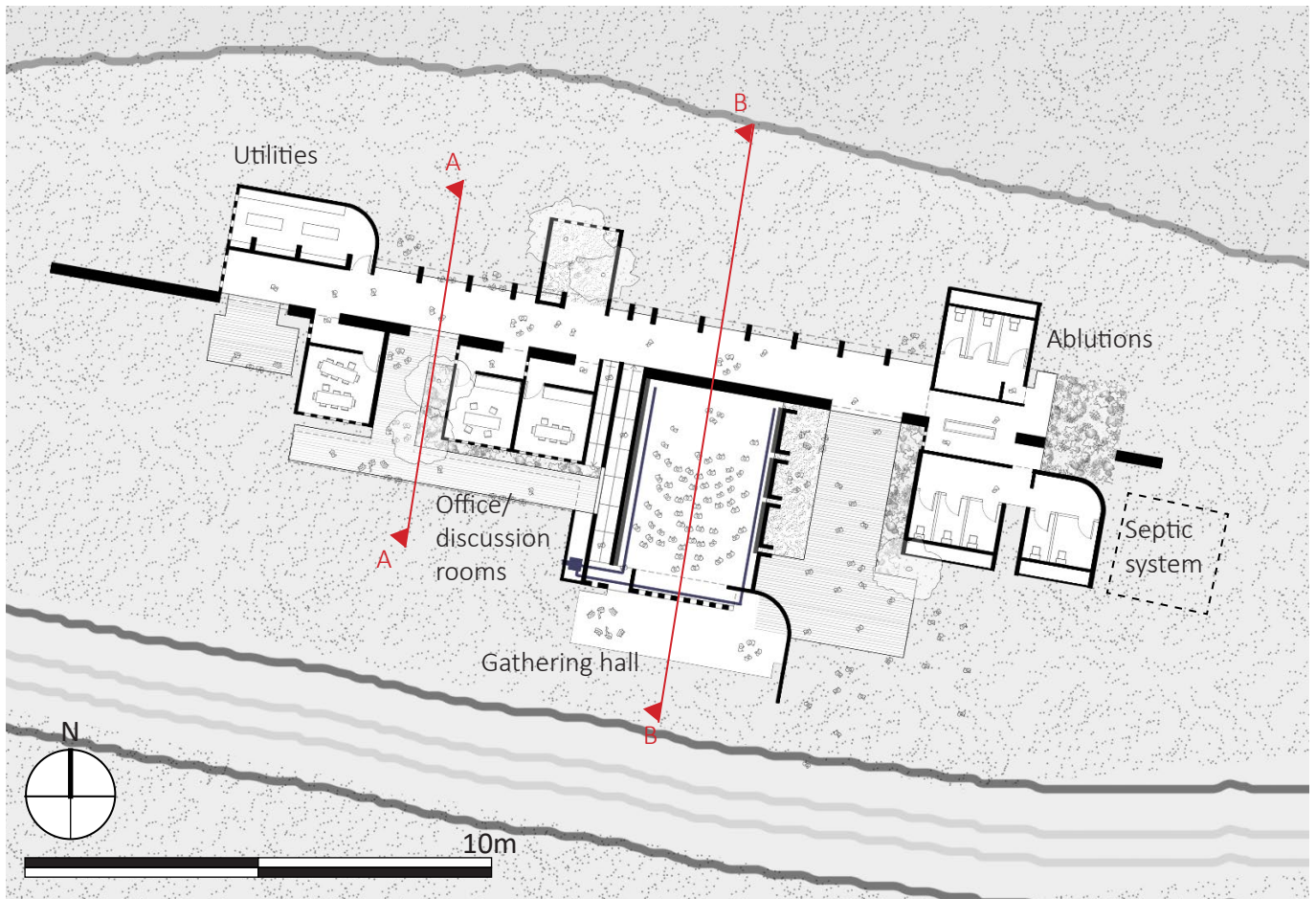
Figure 96: Initial plan drawing of the mediation node (Author, 2021).

Figure 97: Section through the gathering space that leads out to a view of the landscape. A space for lingering during mediation processes and discussions (Author, 2021).

Figure 98: Section through the main hall where community discussions happen and the topic of land use is decided upon by the landowner and heritage practitioners (Author, 2021).

Parking

To northern
landowner

1501

Outdoor
lingering
space

1502

Spill out
space

Female WC

Entrance

Vista deck

1503

Main
meeting hall

Service
parking

Male WC

Discussion
room

Discussion
room

FHR

Discussion
room

Recreational
deck

Main axis

Courtyard

Kitchenette

Utilities
room

1504

Ex. dirt road

Service
parking

10m

Stone
Concrete
Brick

Heritage gallery

To ruin landscape

Arrival pavilion

Research repository

Figure 99: Spatial plan drawing of the mediation node (Author, 2021).

Figure 100: Technical plan drawing of the mediation node (Author, 2021).

Figure 101: Roof plan drawing of the mediation node (Author, 2021).

Photovoltaic panels

Figure 102: Spatial section drawing of the mediation node (Author, 2021).

Transluscent polycarbonate s-rib roof sheeting nailed to timber purlins at 300 c/c with roofing nails over nylon washers

200 x 100 galvanised steel T-section bolted to threaded steel rods cast into concrete column

220 x 1000 reinforced concrete column on concrete pad footing to eng. specification

50 x 76 planed SA pine purlin mounted at 600 c/c mounted to timber rafter

50 x 228 planed SA pine rafter mounted at 600 c/c and bolted to steel bracket

Galvanised steel trough folded on site and mounted to timber purlin laid to fall 1:250

220 brick parapet with stretcher bond and recessed joints steel brickforce every 2 brick courses

220 x 220 off-shutter reinforced concrete beam cast in-situ with cast in drip ridge

150 x 150 steel bracket galvanised as a whole and bolted to concrete beam

500 x 60 earthen tiles fabricated from excavated ground material suspended on steel angles bolted to timber rafters

25 x 100 Treated timber decking nailed to 50 x 76 SA pine battens at 300c/c fixed to joists

50 x 228 planed SA pine floor joists at 300 mounted to galvanised steel brackets

Galvanised steel bracket bolted to threaded steel rods cast into concrete micro-pile footing

220 dia. concrete micro-pile footing to engineer spec

500 packed and mortered stone wall with brick force every 3 stone courses

300 reinforced concrete retaining wall to engineer specification

2 polyolefin DPM

20 medium density fibreboard barrier

Compacted no-fines loose gravel in layers of 100 on geotextile

150 dia. High density polyethylene geopipe laid to fall 1:100

Compacted earth in layers of 100

170 reinforced concrete raft foundation to engineer spec

10 dia. stainless steel wire rope fastened between steel T-seciton anchor and roof plate bracket, fitted with galvanised steel turnbuckle

400 x 20 painted steel plate capping bolted to timber rafter with welded steel brackets

20 multicellular polycarbonate sheeting on aluminium frame

220 brick parapet with stretcher bond and recessed joints steel brickforce every 2 brick courses plastered and painted on interior

100 x 200 dry packed paving laid in stretcher bond

80 compacted sand binding layer

Bituminous waterproofing membrane on screed

75 screed layer cast to fall 1:100 with 30 screed fillet all round

170 reinforced concrete roof slab cast in situ with 350 cast downstand beams

80 glass wool insulation layer on 12 gypsum ceiling board mounted on top of timber battens

>10 dia. timber dowels varnished with linseed oil and suspended from timber battens

10-15 dia. natural timber dowels suspended in wire mesh with 20 dia. steel crimps

20 x 20 steel wire mesh welded to steel hollow section frame and galvanised as a whole

50 x 75 welded steel hollow section frame pre-tapped and galvanised as a whole to be bolted between brick wall and timber post

220 x 220 off-shutter reinforced concrete beam cast in-situ

150-170 dia. treated timber gumpole mounted to steel footing and capped with galvanised steel nail plate

220 dia. concrete micro-pile footing to engineer spec

400 Galvanised steel cable tray suspended from timber floor battens

Heritage gallery
Ruins
Main axis
FFL
NGL
Rooftop vista
Main meeting hall
Spill out space
FFL
NGL
Landowner
N

Figure 103: Technical section drawing of the mediation node (Author, 2021).

10-15 dia. natural timber dowels suspended in wire mesh and hung with 20 dia. steel crimps

50 x 75 welded steel hollow section frame pre-tapped and galvanised as a whole to be bolted between brick wall and timber post

20 x 20 steel wire mesh welded to steel hollow section frame and galvanised as a whole

m20 galvanised steel crimps fixed to timber dowels

150-170 dia. treated timber gumpole mounted to steel footing and capped with galvanised steel nail plate

25 x 100 treated timber decking nailed to timber battens at 300c/c

25 x 100 treated timber decking nailed to timber battens at 300c/c

50 x 76 planed SA pine floor battens at 300 c/c

50 x 228 planed SA pine floor joists at 300 c/c mounted to galvanised steel brackets

Pre-tapped and galvanised steel bracket bolted to threaded steel rods cast into concrete micro-pile footing

220 dia. concrete micro-pile footing to eng. spec.

220 x 220 polished reinforced concrete slab cast in-situ

2 polyolefin DPM wrapped up into brick wall with overlap of 600

Compacted earth in layers of 100

220 brick foundation wall on concrete strip foundation

600 x 200 reinforced concrete strip foundation to eng. spec.

Figure 104: Timber lath matress shading structure detail at the mediation node (Author, 2021).

16.3. Heritage gallery

The building is situated on a slight clearing amidst a rocky area in a centralised proximity to the surrounding ruins. The orientation is bent to offer visual panoramas of the ruins form this high vantage point. Deep northern facades and overhangs prevent excess solar heat gain on the northern facing elevation. The western section relies more heavily on passive ventilation strategies to provide coolth during the harsh heat of dusk.

The heritage gallery will serve as a space for artefact creation, discussion and event planning. Where support functions act as mounds between which the main programme is strung. Here, significant members of the community can discuss the manner in which artefactual data is presented to the public. Contemporary artists can join a residency type programme with a focus on producing art within this field. The public is not exposed to the production process which is deemed private and belonging to the makers.

Studios can be shaped to accommodate multiple activities- allowing diverse artistic expressions. Individual display niches highlight the importance of works and offer space for information display- prioritising a read understanding of heritage.

The section reveals the manner in which the typical details are combined. These indicate spaces of production facing north, observation facing south and transition in the centre connecting the two. The walls either side of the central passage open to allow ease of curation between the production spaces and display spaces.

Warmer air generated in the productive spaces rises and escapes out of heat stacks, while cool air, created using a wetted mesh, falls and cools the spaces. Photovoltaic panels can be accommodated on the roof of production spaces at each building to provide electricity. Passive ventilation plays a minor role along with shading and thermal massing to create a cooler ambient condition in the building.

Precedent informed programme generation ➤ *Conversion to parti diagramme and vignette*

Programme as relationship +

Textual study ➤ *Model translation* + *Lessons from site*

Consolidated programme concept ➤ *Plan as concept*

Section as concept   *Design iteration*   *Site placement* ➤ *Plan resolution*
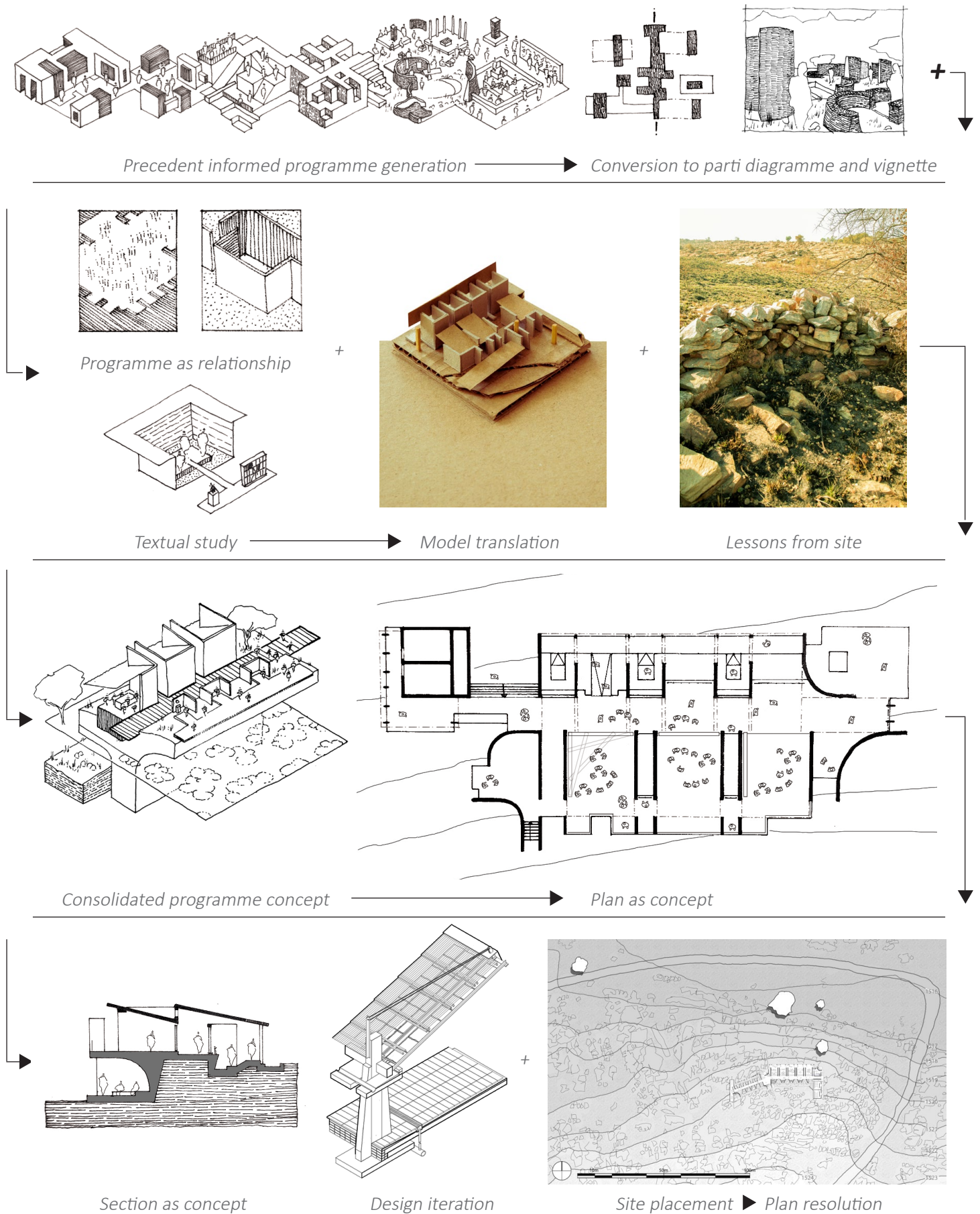
Figure 105: The figures above combine to form a genealogy of the heritage gallery, showing its development (Author, 2021).
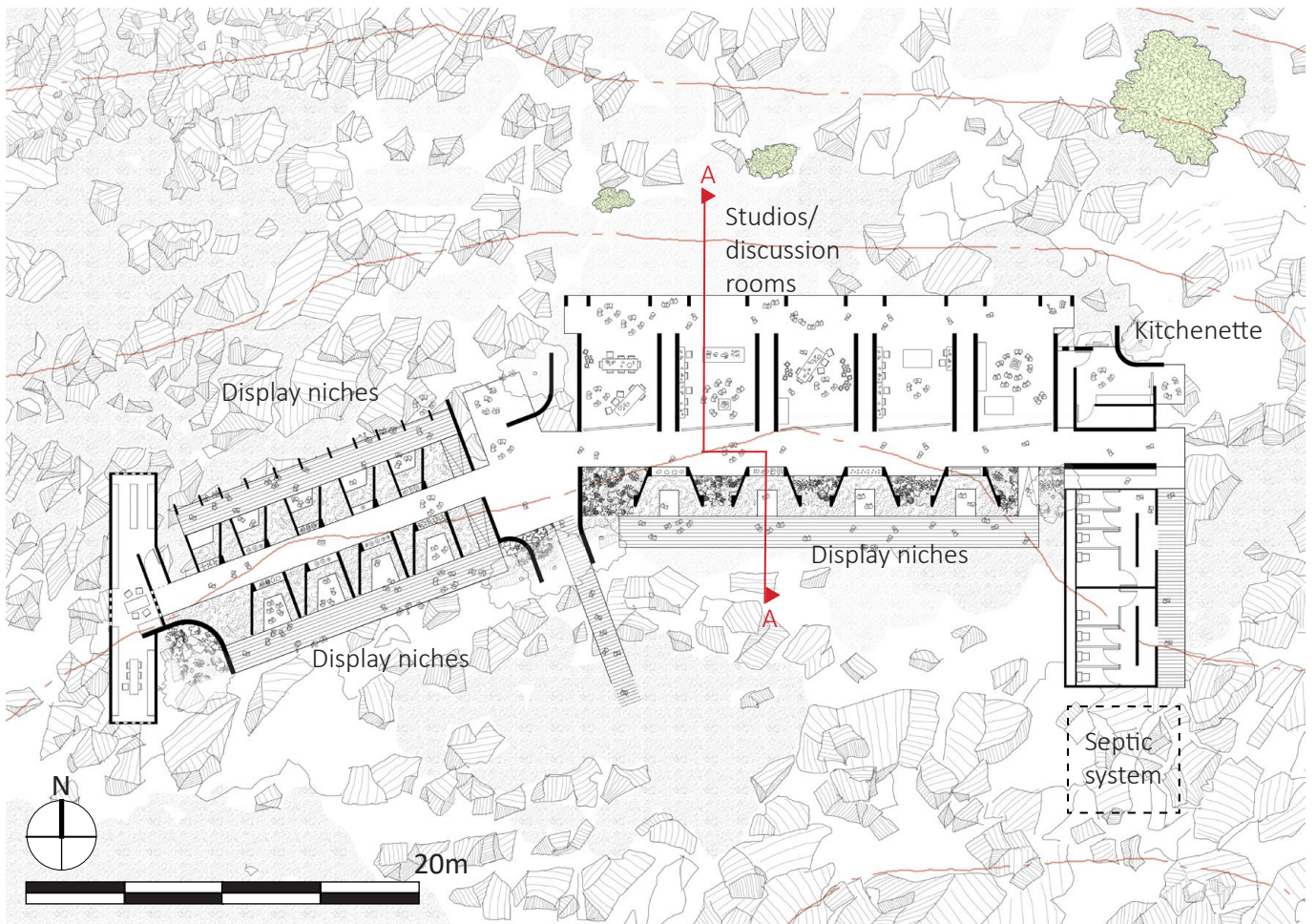
Figure 106: Initial plan drawing of the heritage gallery (Author, 2021).
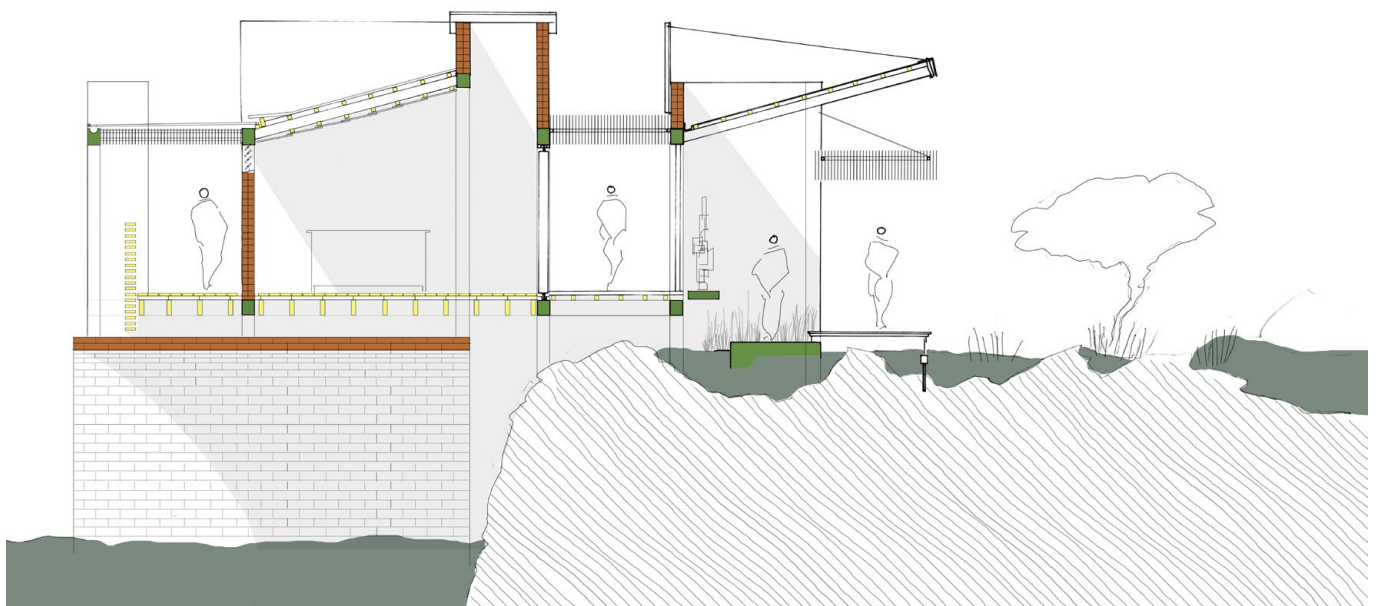
Figure 107: Section through the heritage gallery showing the split relationship between a more sacred production process in the studios on the left and the publicly accessible display niches on the right. This separation protects the authorship of the practitioners involved and offers agency to members of the Ndebele language group when deciding what aspects of their material culture pertaining to the site can be displayed to the public. Additional exhibition spaces sit in close communion with the landscape on the lower level. Large-scale installations can take place in these niches (Author, 2021).

Mediation node

Ruins

Ruins

Ruins

1520

1521

1522

1523

1524

1525

Function: Multi-purpose niches
Surface: Natural ground

Function: Multi-purpose niches
Surface: Natural ground

Function: Multi-purpose niches
Surface: Natural ground

Function: Multi-purpose niches
Surface: Natural ground

Function: Multi-purpose niches
Surface: Natural ground

Function: Kitchenette
Surface: Polished concrete

Service parking

Ruins

10m

Stone
Concrete
Brick

Figure 108: Lower plan drawing of the Heritage gallery (Author, 2021).

Figure 109: Spatial plan drawing of the Heritage gallery (Author, 2021).

Figure 110: Technical plan drawing of the Heritage gallery (Author, 2021).

Photovoltaic panels

Figure 111: Roof plan drawing of the Heritage gallery (Author, 2021).

Figure 112: Spatial section drawing of the Heritage gallery (Author, 2021).

Translucent polycarbonate s-rib roof sheeting nailed to timber purlins at 300 c/c with roofing nails over nylon washers

Galvanised steel s-rib roof sheeting nailed to timber purlins at 300 c/c with roofing nails over nylon washers

38 x 152 planed SA pine purlin mounted at 600 c/c mounted to timber rafter

80 glass wool insulation layer on 12 gypsum ceiling board mounted on top of timber battens

38 x 50 planed and varnished timber brandering at 600 c/c nailed to rafter

50 x 228 planed SA pine rafter mounted at 600 c/c and bolted to steel bracket

>10 dia. timber dowels varnished with linseed oil and suspended from timber rafter

150 x 150 steel bracket galvanised as a whole and bolted to concrete beam

220 x 220 off-shutter reinforced concrete beam cast in-situ

220 brick parapet with stretcher bond and recessed joints steel brickforce every 2 brick courses

Bituminous waterproofing membrane on screed

50 screed cast to fall 1:50

170 x 1000 reinforced concrete slab cast in situ with cast in drip ridge

152 x 38 planed and varnished timber balustrade with internal steel rod reinforcment

25 x 100 Treated timber decking nailed to 50 x 76 SA pine battons at 300c/c fixed to joists

50 x 228 planed SA pine floor joists at 300 c/c mounted to galvanised steel brackets

220 x 220 off-shutter reinforced concrete column cast in-situ

220 x 220 off-shutter reinforced concrete column cast in-situ

170 reinforced brick vault

20 multicellular polycarbonate sheeting on aluminium frame to fall 1:100

50 x 75 welded steel hollow section frame pre-tapped and galvanised as a whole to be bolted between brick walls

20 x 20 steel wire mesh welded to steel hollow section frame and galvanised as a whole

10-15 dia. natural timber dowels suspended in wire mesh with 20 dia. steel crimps

Galvanised steel trough folded on site and mounted to timber purlin laid to fall 1:250

220 x 1000 reinforced concrete column on concrete pad footing to eng. specification

10 dia. stainless steel wire rope fastened between steel galvanised steel anchor imbedded into concrete column and roof plate bracket, fitted with galvanised steel turnbuckle

Translucent polycarbonate s-rib roof sheeting nailed to timber purlins at 300 c/c with roofing nails over nylon washers

50 x 76 planed SA pine purlin mounted at 600 c/c mounted to timber rafter

50 x 228 planed SA pine rafter mounted at 600 c/c and bolted to steel bracket

Galvanised steel flashing fixed to timber purlin over roof sheet with roofing nails

400 x 20 painted steel plate capping bolted to timber rafter with welded steel brackets

150-170 dia. treated timber gumpole mounted to steel footing and capped with galvanised steel nail plate

Steel plate light fixture mounted to concrete column with cast in PVC conduit

Galvanised steel bracket bolted to threaded steel rods cast into concrete micro-pile footing

220 dia. concrete micro-pile footing to engineer spec

170 reinforced concrete raft slab cast in situ with

400 Galvanised steel cable tray suspended from timber floor battens

Vista deck

Studio space

Main axis

Display niche

Arrival pavilion

FFL

NGL

Multipurpose niche

Mediation node

Ruins

NGL 1524

N

10 M

Figure 113: Technical section drawing of the Heritage gallery (Author, 2021).

20 multicellular polycarbonate sheeting on aluminium frame to fall 1:100

50 aluminium sheeting mount screwed to steel plate over polyurethane expansion layer

20 painted cement and sand plaster over single brick parapet wall on inte

220 brick parapet with stretcher bond and recessed joints steel brickforce every 2 brick courses plastered on interior

4 x 600 steel plate skylight frame with 40 flanges welded on and galvanised as a whole mounted to brick parapet on threaded steel rods

110 brick on edge for one course

m30 galvanised bolt on threaded steel rod over steel and nylon washers through brick frogs and on both sides of brick parapet tightened

m40 steel washer over nylon washer

m30 galvanised bolt on threaded steel rod through steel skylight frame tightened to fix plate in place

Figure 114: Skylight detail drawing at the Heritage gallery (Author, 2021).

16.4. Navigation platforms

These platforms are positioned throughout the site to create a network of visually accessible wayfinding markers. Each instance has its own plan, where stone walls are used to direct movement towards the location of the nearest ruins. These are exterior structures and offer repose in the form of shade from the sun, but do not require further protection to the same extent as interior spaces.

Over time, the goal is that intuitive pathways will form on the landscape between these platforms and the other buildings on the site. Together, the ruins, landscape and contemporary living heritage programmes will be stitched together by the product of activity. Such pathways that develop over time negate the need for initial invasive stretches of long boardwalk.

The transition typology, both the timber lath mattress shading device and decking detail, is used to create minimally penetrative platforms with shade shaped by materials bearing the semblance of the landscape.
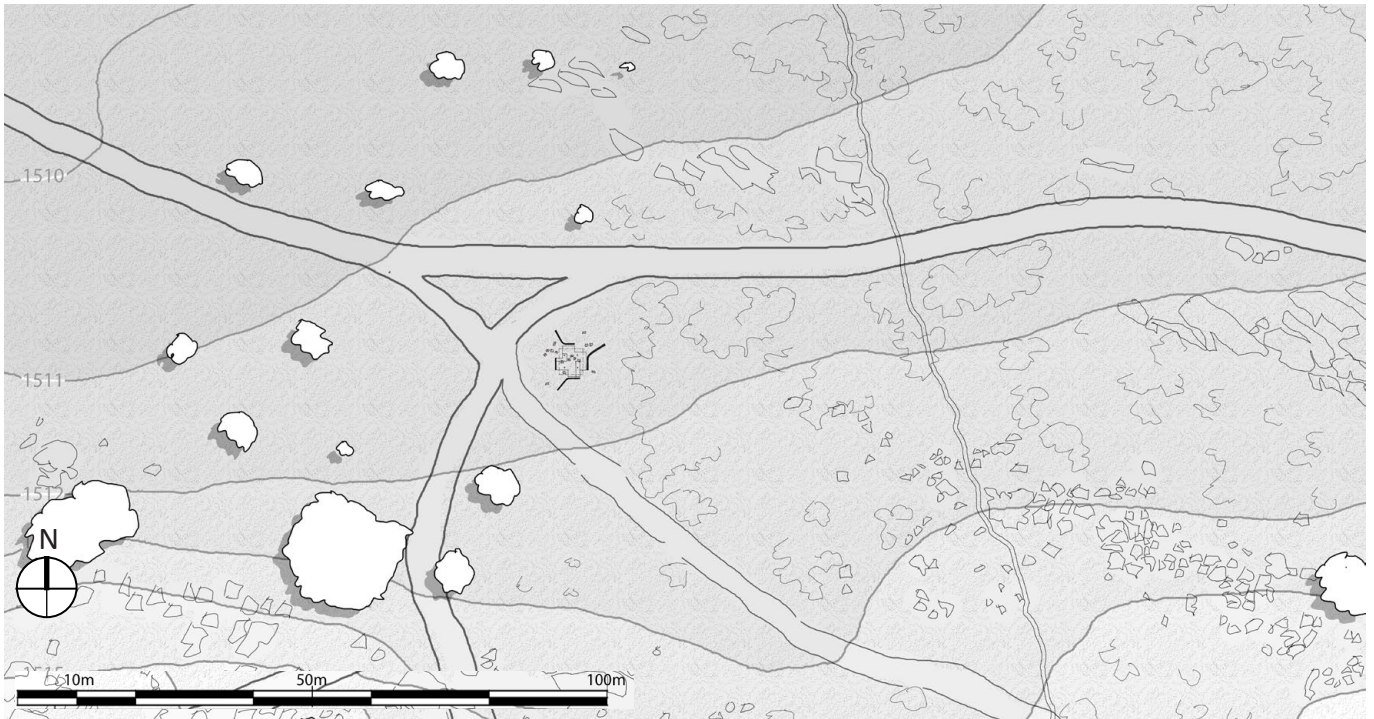
Figure 115: Plan drawing of a navigation platform. This one sits in a large network that extends visual accessibility across the site. Wayfinding is prioritised and new foot paths will form over time (Author, 2021).
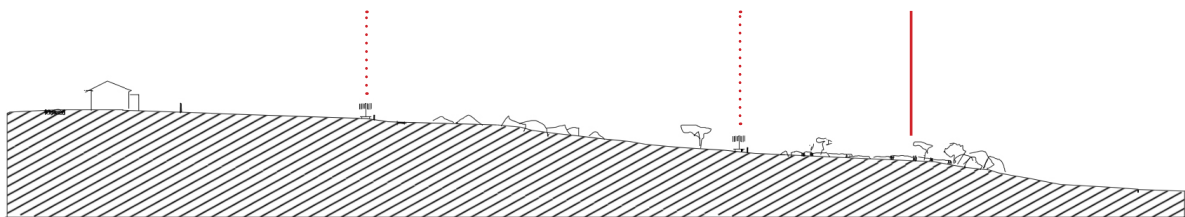
Figure 116: Landscape section diagram showing the scale of the navigation platforms in relation to the ruins and suburbs.
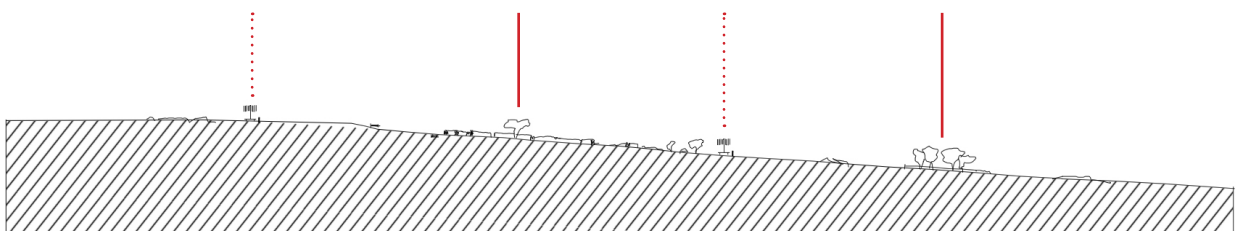
Figure 117: Landscape section diagram showing the navigation platforms as wayfinding devices to aid in ruin visualisation.

Navigation platforms genealogy
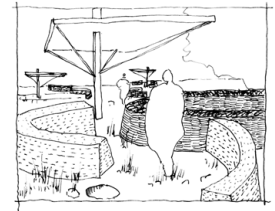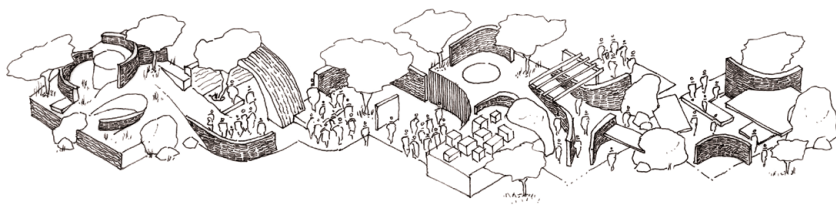
Precedent informed programme generation ——————▶ *Conversion to parti diagramme and vignette*
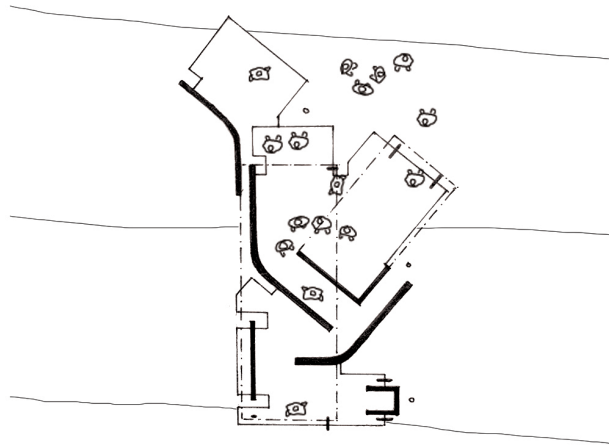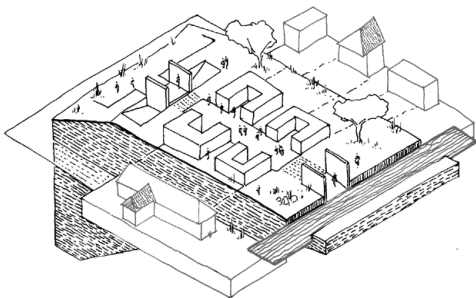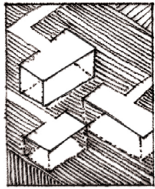
Programme as relationship
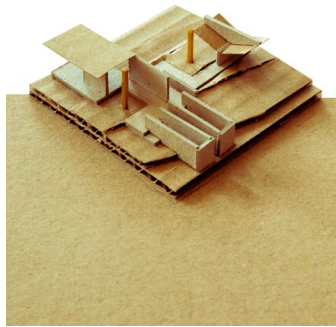
*Textual study* ——————▶ *Model translation*   *Lessons from site*
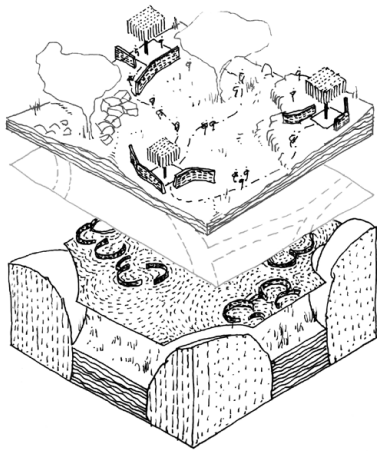
*Consolidated programme concept* ——————▶ *Plan as concept*
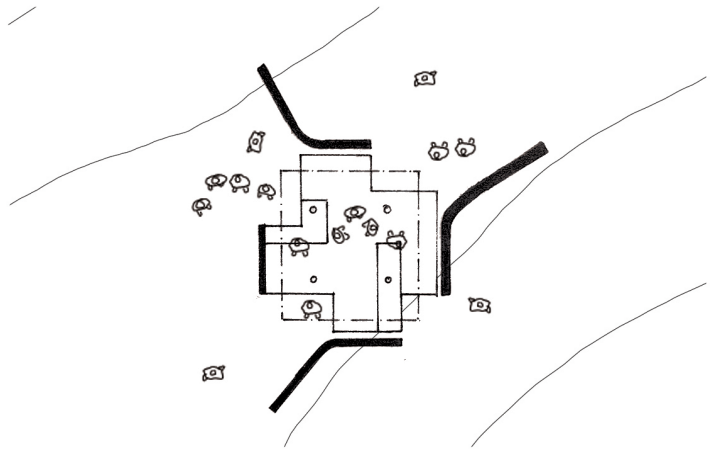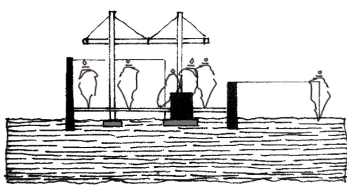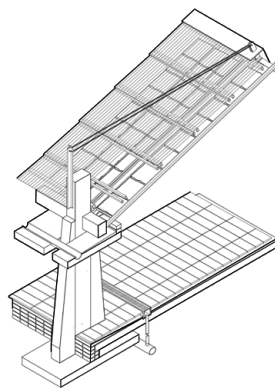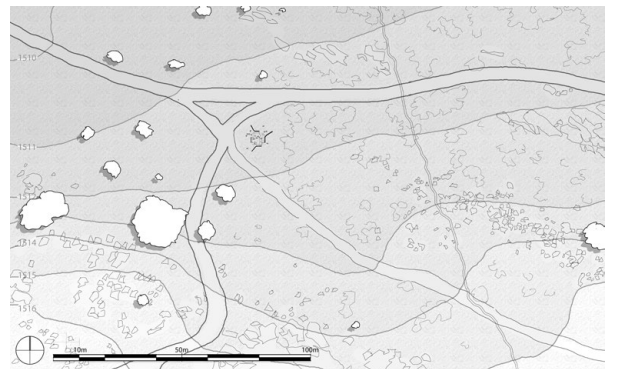
Section as concept   *Design iteration*   *Site placement* ▶ *Plan resolution*

Figure 118: The figures above combine to form a genealogy of the navigation platform, showing its development (Author, 2021).

16.5. Research repository

The research repository sits closer to the eastern periphery of the ruins with only the eastern most ruins beyond it. To imply a sense of procedural documentation, this position provides easy access to the first set of ruins to be documented, and then ease of access to the rest via an existing dirt road. Its orientation is parallel to the existing road, creating a challenge with harsh western solar heat gain. This is combatted with a bend in the plan that offers shade on the western elevation, and also with north-western trees and enclosures.

The repository intends on providing research and documentation facilities for the site, where ground material can be examined, artefacts can be documented and knowledge can be generated. Such a programme can also be a hub for similar satellite programmes at other ruin sites in the region. Universities and heritage boards can be involved in creating and disseminating this knowledge. Visitors and practitioners are offered a chance for empirical education regarding the physical composition of the site's heritage material, while also experiencing a more intangible aspect of it elsewhere on the site.

The plan is broken into two mounds of enclosed research spaces and discussion rooms with an archive in the middle. A courtyard serves as the drop-off area for excavated material that can be distributed throughout the building.

The observation detail is used in to create a semi-open-air space around the archive. The storage units contained underneath will be sealed to protect the material, while a lateral connection to the landscape is prioritised. Interior decking, while serving to minimise ground interference, also drives any stray water away. Light wells from the production detail are used to bring daylight into the research and discussion rooms.

Due to the heavy energy load of the equipment, a municipal electrical and water connection will be required. The equipment also necessitates careful temperature control; therefore, mechanical cooling will be used and the energy load will be supplemented with photovoltaic panels.

Research repository genealogy

Precedent informed programme generation ⟶ Conversion to parti diagramme and vignette

Programme as relationship   +   +

Textual study ⟶ Model translation   Lessons from site

Consolidated programme concept ⟶ Plan as concept

Section as concept   Design iteration   Site placement ▶ Plan resolution
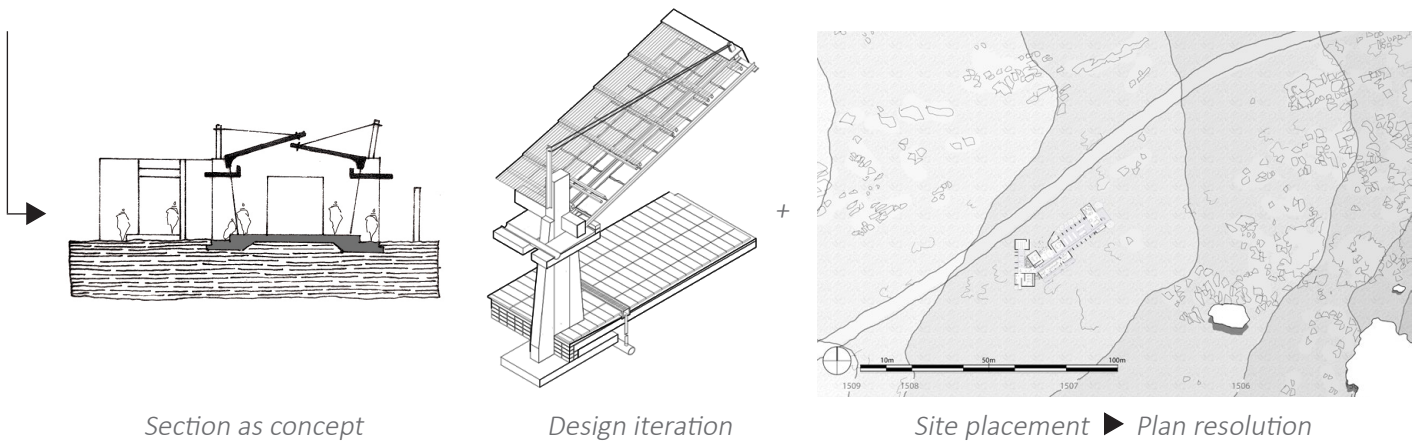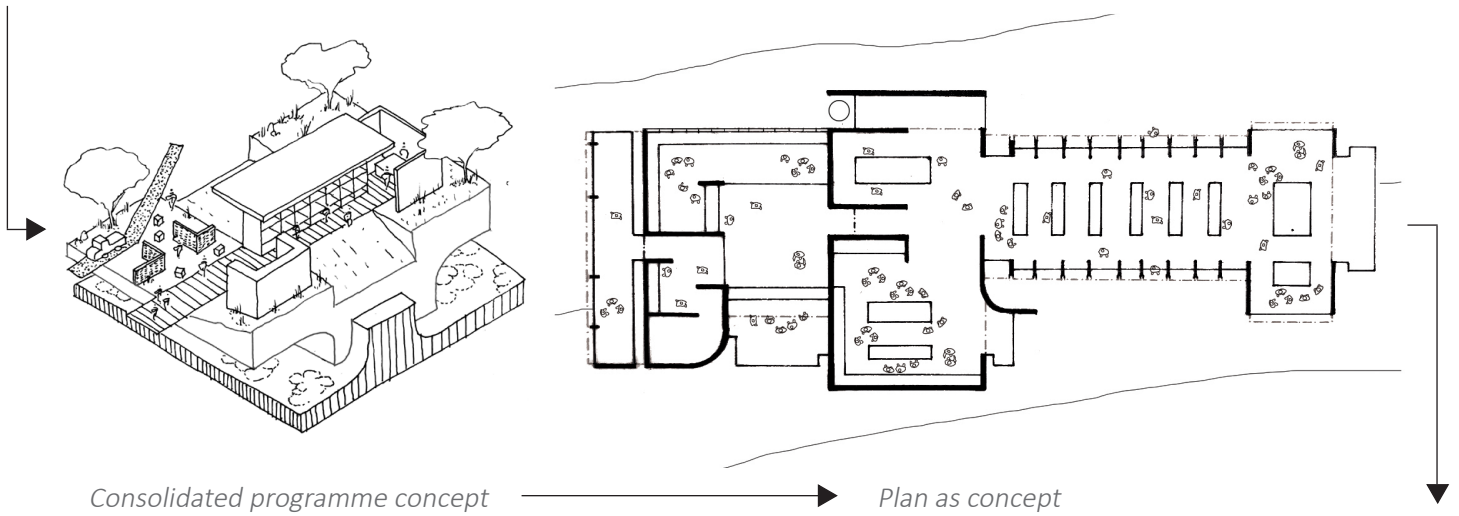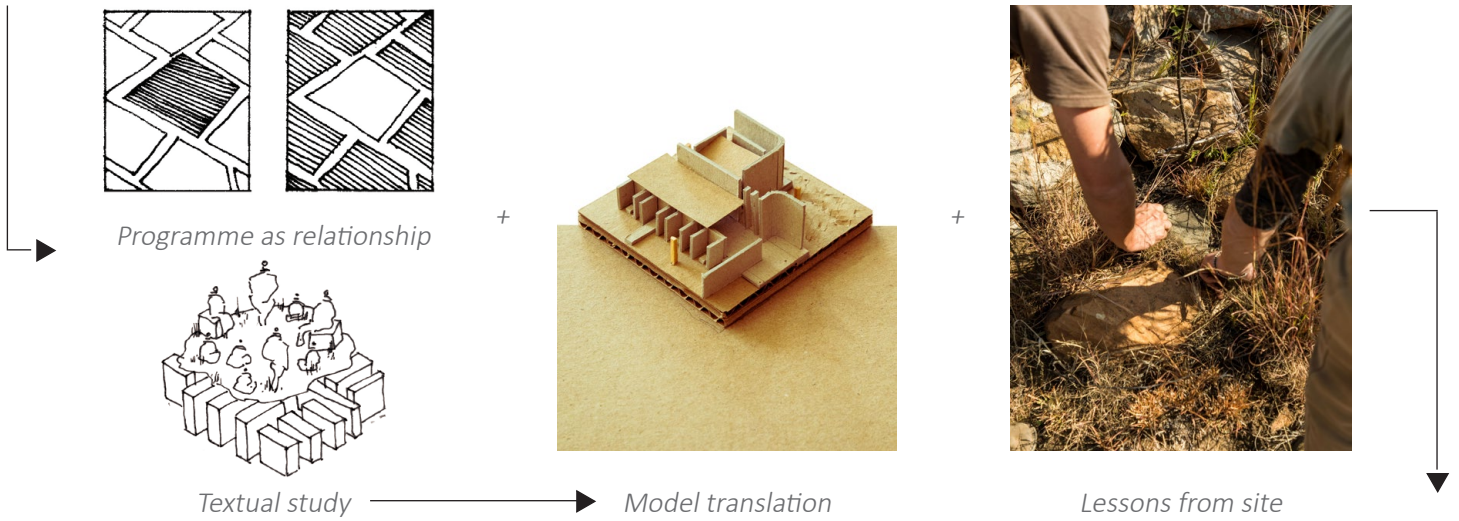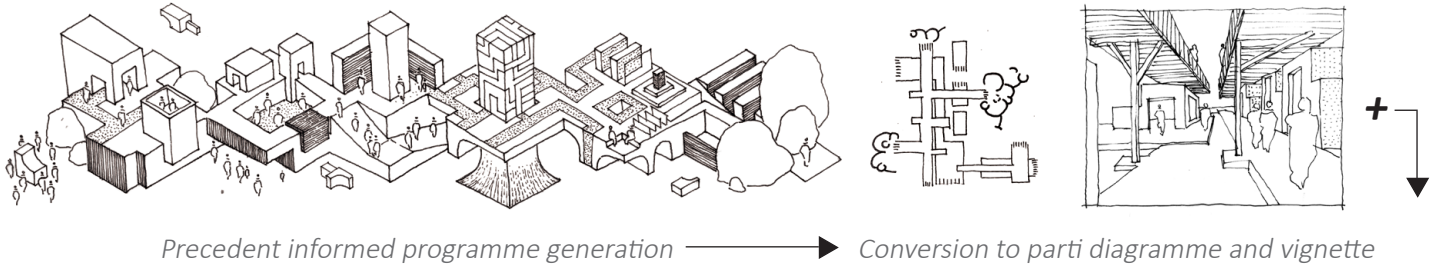
Figure 119: The figures above combine to form a genealogy of the research repository, showing its development (Author, 2021).
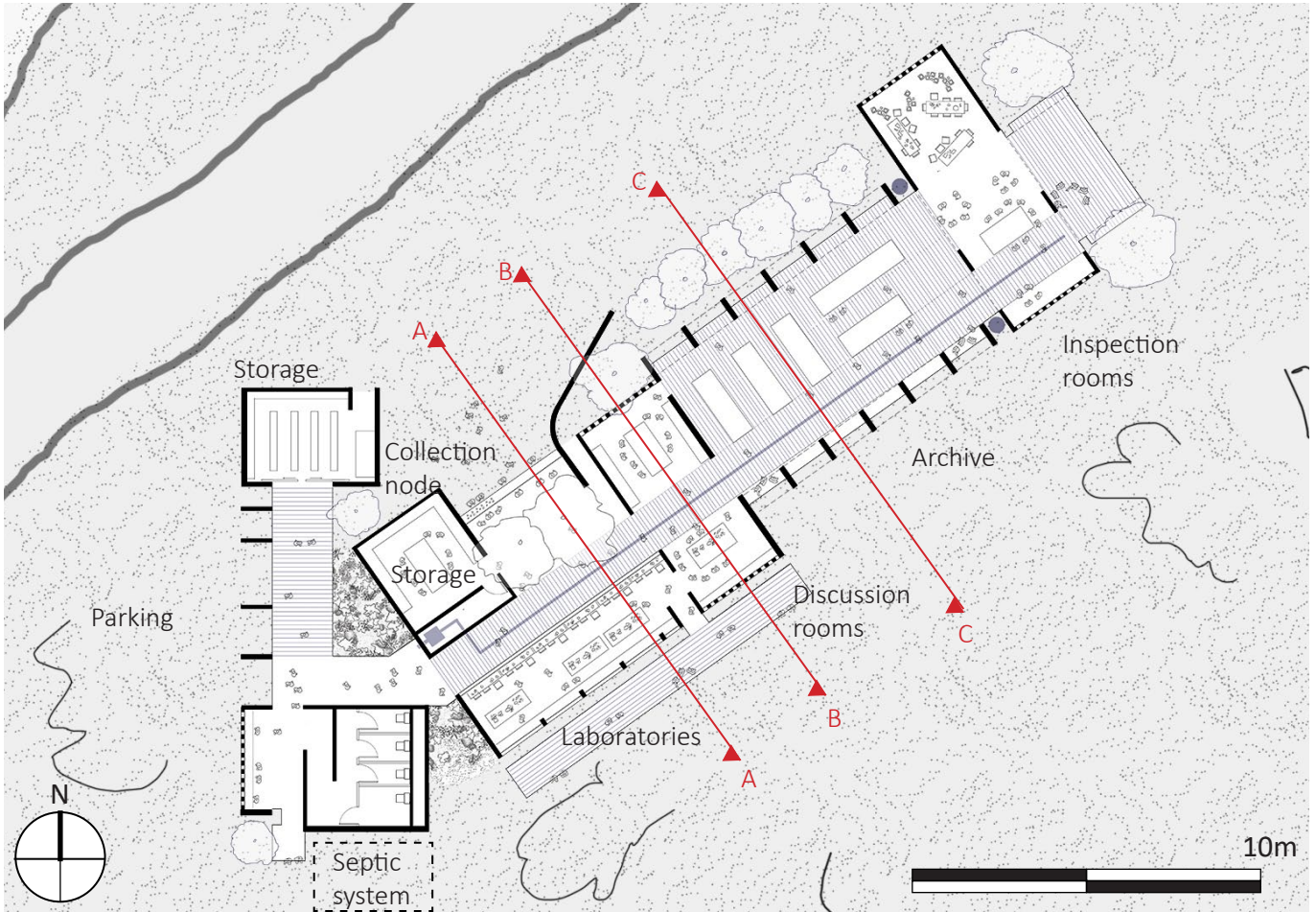
Figure 120: Initial plan drawing of the research repository (Author, 2021).
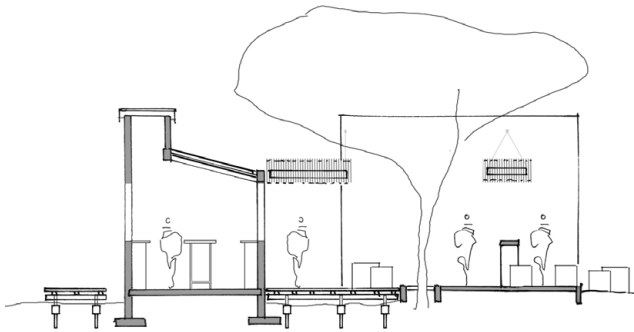
Figure 121: Section A-A as diagram through the collection where excavated heritage material is dropped off for analysis at the lab to the left (Author, 2021).

Figure 122: Section B-B as diagram through the discussion rooms where material can be analysed, debated and defined (Author, 2021).

Figure 123: Section C-C as diagram through the archive showing the combined observation detail that ties the knowledge contained inside to the landscape outside (Author, 2021).

Figure 124: Spatial plan drawing of the Research repository (Author, 2021).

Figure 125: Technical plan drawing of the Research repository (Author, 2021).

Figure 126: Roof plan drawing of the Research repository (Author, 2021).

Figure 127: Spatial section drawing of the Research repository (Author, 2021).

Figure 128: Technical section drawing of the Research repository (Author, 2021).

80 x 200 dual steel channel and planed SA pine composite rafter mounted at 2000 c/c and welded to steel bracket bolted to concrete beam

100 x 200 steel I-beam and planed SA pine composite rafter mounted at 2000 c/c and welded to steel bracket and bolted to concrete beam

50 x 75 mild steel cold rolled lipped channel purlin at 600 c/c nailed to composite rafter

400 x 20 painted steel plate capping bolted to composite rafter with welded steel brackets

200 x 100 mild steel I-beam section cut into 100 x 100 T sections and welded to steel channel and steel plate bolted to concrete beam

80 x 220 mild steel channel bolted to composite rafter

220 x 1000 reinforced concrete column cast in-situ on concrete pad footing to eng. specification

50 x 75 mild steel cold rolled lipped channel purlin at 600 c/c nailed to composite rafter

Galvanised steel flashing fixed to concrete column

150 x 500 void cast into concrete column

500 x 60 earthen tiles fabricated from excavated ground material suspended on steel angles of timber rafters

220 brick parapet with stretcher bond and recessed joints steel brickforce every 2 brick courses

Transluscent polycarbonate s-rib roof sheeting nailed to steel purlins at 300 c/c with roofing nails over nylon washers

150 x 150 pre-tapped galvanised steel bracket bolted to concrete beam

220 x 330 off-shutter reinforced concrete beam cast in-situ with cast in drip ridge

170 x 1000 reinforced concrete slab cast in-situ with 120 upstand beam and cast in drip ridge

Galvanised steel trough folded on site and mounted to steel channel purlin laid to fall 1:250

Timber decking in background

Concrete column structure   **Steel frame structure**   **Earthen roof tiles**   **Adjacent steel frame structure**   **Adjacent earthen roof tiles**   **Steel channel purlins**   **Transluscent roof sheeting**

Figure 129: Suspended earthen roof tile detail at the Research repository (Author, 2021).

17. Sustainability analysis

This project achieves a Sustainable buildings assessment tool (SBAT) rating of 3.8. Unfortunately, the remote nature of the site makes certain criteria difficult to achieve. Various products and services are only available outside the recommended area, accessibility is limited due to the heritage sensitivity of the site and public transport systems do not link with this region. Potential improvements can be achieved through the attachment of public transport networks to the site. Furthermore, future developments that contain commercial, educational and health programmes in the area could increase the project's score by improving general access to such services.

SB4 Environmental, Social and Economic Performance	Score
Environmental	3.8
Economic	3.7
Social	3.9
SBAT Rating	3.8

SB5 EF and HDI Factors	Score
EF Factor	3.3
HDI Factor	4.0

SB6 Targets	Percentage
Environmental	76
Economic	74
Social	77

Figure 130: A graph showing the ratings achieved by the project according to the Sustainable Building Assessment Tool (SBAT).

18. Conclusion

This chapter dealt with the translation of conceptual intention into architectural form. Consequently, the result of applying a living heritage framework upon an iron age ruin site is a series of buildings within a network upon the site. Both climatic responsivity and topographical adaptation were adjustments made to the initial concepts in order to ground them in a real setting. From an architectural theory point of view, a series of autonomous ideas was generated in an abstracted intangible context, and then layered upon a physical site to create a situated architecture. This network of programmes aims at framing the larger landscape between built form and programme and the site as a whole is incorporated into the heritage production process. Potential development that occurs in this region in the future could be shaped to support this programme and be informed by it. The landscape upon which this project sits will be protected by this living heritage programme. Hereafter, a reflection on the process and product of this project will be conducted in order to understand what improvements can be made for future schemes with similar themes. The influence this project will have on the author's future as a candidate architect will also be examined.

Chapter 4

Reflection and conclusion
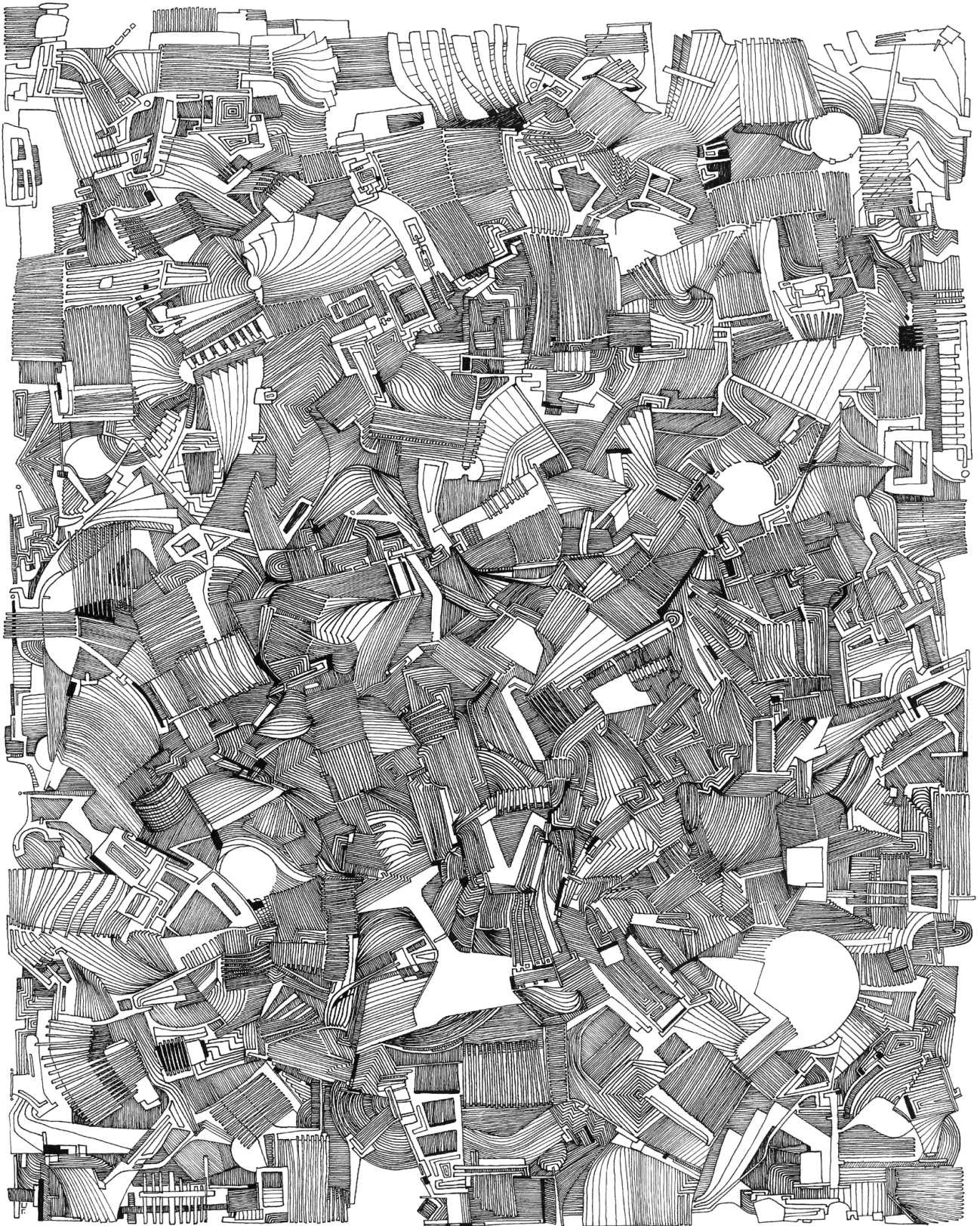
19. Reviewing initial intention

The initial intention of the project was to secure the significance of an iron age ruin site and protect it from sand mining and suburban encroachment, as described in the research question:

How can the integration of iron age ruin landscapes with developing cityscapes be shaped in a way so as to encourage their sensitive occupation, programmatic longevity and communal value, in turn, extending the cultural significance of such sites into the future?

Issues at four scales brought to the fore questions about the meaning and relevance of iron age ruin in South Africa. How can these perceptions of significance be used to supplement a cohesive South African cultural identity (South African department of arts and culture, 2009) through their integration into suburban and urban built fabric? The concept of a living heritage framework within which a heritage conservation project in Africa (Baillie, 2020) could be generated was proposed. This paradigm set the stage for the creation of a heritage project with longevity and cultural agency. More traditional heritage programmes such as the museum, interpretation centre and the archaic cultural village, were critiqued and used to inspire and inform a new programme for the site. The resultant programmes addressed ideas of heritage production, in a context where heritage extraction is the go-to process. Ruins were given the role of tectonic landscapes (Hartoonian, 2012) with connections to the past and inspirers of the future ((Coppolino, n.d.) & (Jordaan & Raman, 2014)) shaped the programmatic and architectural intention of this heritage scheme. This project attempts to counteract previous mindsets established by international heritage boards, in favour of exploring African possibilities for heritage conservation. Strict preservation seems to be an outdated approach and more value can be generated if heritage resources are imbedded into ongoing contemporary practices.

20. Measuring the product against the intention

On a technical scale, the question of interface was raised. This project focused on creating a haptic experience with the landscape and the intangible effects of culture upon it. After an investigation into both the intangible contexts of broader heritage paradigms and cultures associated with the site, initial concept programmes were given form. Concept found footing in the acclimatisation of the plan concepts to suit the physical conditions of the site. The resultant buildings aim to facilitate various heritage production programmes around and within the ruin landscape as a means of framing the heritage fabric and giving it a chance for continued significance.

As stated in the opening introduction to this project, the author's normative stance relies on an autonomous conception of architecture that is projected onto site and adapted to find a sense of situationism. A risk in this approach is the reliance on projectivity to assume certain consequences of programme and architecture. The programmes selected for the heritage framework at the site were done so from a critical perspective, yet there may be the potential for alternative programmes that could either replace or supplement the proposed set. Another possibility that might be to the detriment of this project when considering the reality of practice is financial incentive. This project exists in the theoretical realm (as is the nature of a scheme intended for academic purposes) and while it tries to rely on concrete information and rational design to argue for its success, it is an ambitious scheme. A reduction in scale and complexity might be necessary were such a project practically suggested. Reality and academia should reliably work hand-in-hand (Plowright, 2009) but compromise is the only way to overcome financial and political confrontations. Such a scale reduction could be considered in conjunction with alternate sites for such a scheme. Further research and exploration could look into translating this project framework to urban block-type sites, or possibly city-wide sites that stretch to multiple blocks. Other research that could be pursued after this project includes deeper investigation into the processes of material cultivation and production and their associated programmes.

21. Considering what this project means for the author's future

Part of this reflective section is a consideration of the author's future. I believe that this project, founded on my own interest in heritage as an informant to architecture as well as a connected part of it, has yielded a better understanding of the required sensitivity heritage projects require. It is my hope that once I enter practice, I will be able to use the understanding context to help me root architectural concepts in their situation- both physically and culturally. I stand strong in the idea that heritage can drive innovation even while it is protected from decay. Further affirmed by this project as well is my belief that change does not automatically imply loss or destruction, but continuation. A memorial that is taken down, repositioned or altered does not imply a loss of history or a destruction of memory, it implies that the perception of it has shifted to match what is contemporarily relevant (Young, 1994). Just so, the future will yield alternatives that may contradict any contemporary paradigm. Rather than resist, a process of critical collaboration seems pertinent. I believe this applies to any piece of the built environment. If a critical approach to heritage integration can be conceptualised and (crucially) combined with a respect for context and consequence then a conservation scheme that is continuously reflective and pertinent can be installed.

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23. Appendix

Appendix A:
A genealogy graph illustrating the various ideas contained within heritage charters, and the overarching paradigm shift that occurs over time, tending from static preservation to situational rehabilitation, and later, a living heritage approach (Author, 2021).

Appendix B:
Three declarations illustrated in a continuum where approaches to managing change sit at the core of conservation practice. A shift from heritage as objects for extraction, towards spaces for generation is noted. Tangible significance paired with an active programme, presents a counter to the threat of globalisation and deterioration. Heritage can be protected and change can be guided to drive development outward (Author, 2021).

Appendix C:
Posters created for the masters mini-conference comparing approaches in representative architecture and activity driven architecture. This study informs the programme driven approach taken in this project rather than visual mimicry of the ruin morphology (Author, et. al., 2021).

Appendix D:
Accommodation schedule for the arrival pavilion showing room functions, estimated energy loads and water requirements.

Appendix E:
Accommodation schedule for the mediation node showing room functions, estimated energy loads and water requirements.

Appendix F:
Accommodation schedule for the heritage gallery showing room functions, estimated energy loads and water requirements.

Appendix G:
Accommodation schedule for the research repository showing room functions, estimated energy loads and water requirements.

Appendix H:
Various tables showing the required photovoltaic panel quantities for each building to meet energy loads.

Appendix I:
Various tables showing the potential rainwater harvesting capacity of each building. Municpal water connections will be required to compensate for water needs during the dryer months. Harvested rainwater will be used in WC and irrigation.

Appendix J:
The full graph showing the scores achieved by the project according to the Sustainable Building Assessment Tool (SBAT).

Appendix K:
A retrospective and conclusionary collaged landscape diagram showing the conceptual programmes developed within this project in conjunction with the conceptual programmes generated in the previous year of studies. This collage shows a living heritage intention that has grown over the course of two years' worth of conceptual exploration into the theme of living heritage frameworks at ruin landscapes (Author, 2020-2021).

ICOMOS Charter review

a lineage of heritage practice

Static preservation → **Situational rehabilitation** → **Living heritage**

Fortress conservation ——————— Culture nature binary ———————

A genealogy graph illustrating the various ideas contained within heritage charters, and the overarching paradigm shift that occurs over time, tending from static preservation to situational rehabilitation, and later, a living heritage approach (Author, 2021).

ICOMOS Declaration review

managing change within cultural heritage

Nara: Document on authenticity
1994

Quebec: Preservation of spirit of place
2008

Paris: Heritage driving development
2011

Documenting change ⟶ *Acknowledging change* ⟶ *Guiding change*

Three declarations illustrated in a continuum where approaches to managing change sit at the core of conservation practice. A shift from heritage as objects for extraction, towards spaces for generation is noted. Tangible significance paired with an active programme, presents a counter to the threat of globalisation and deterioration. Heritage can be protected and change can be guided to drive development outward (Author, 2021).

Representative architecture

Activity driven architecture
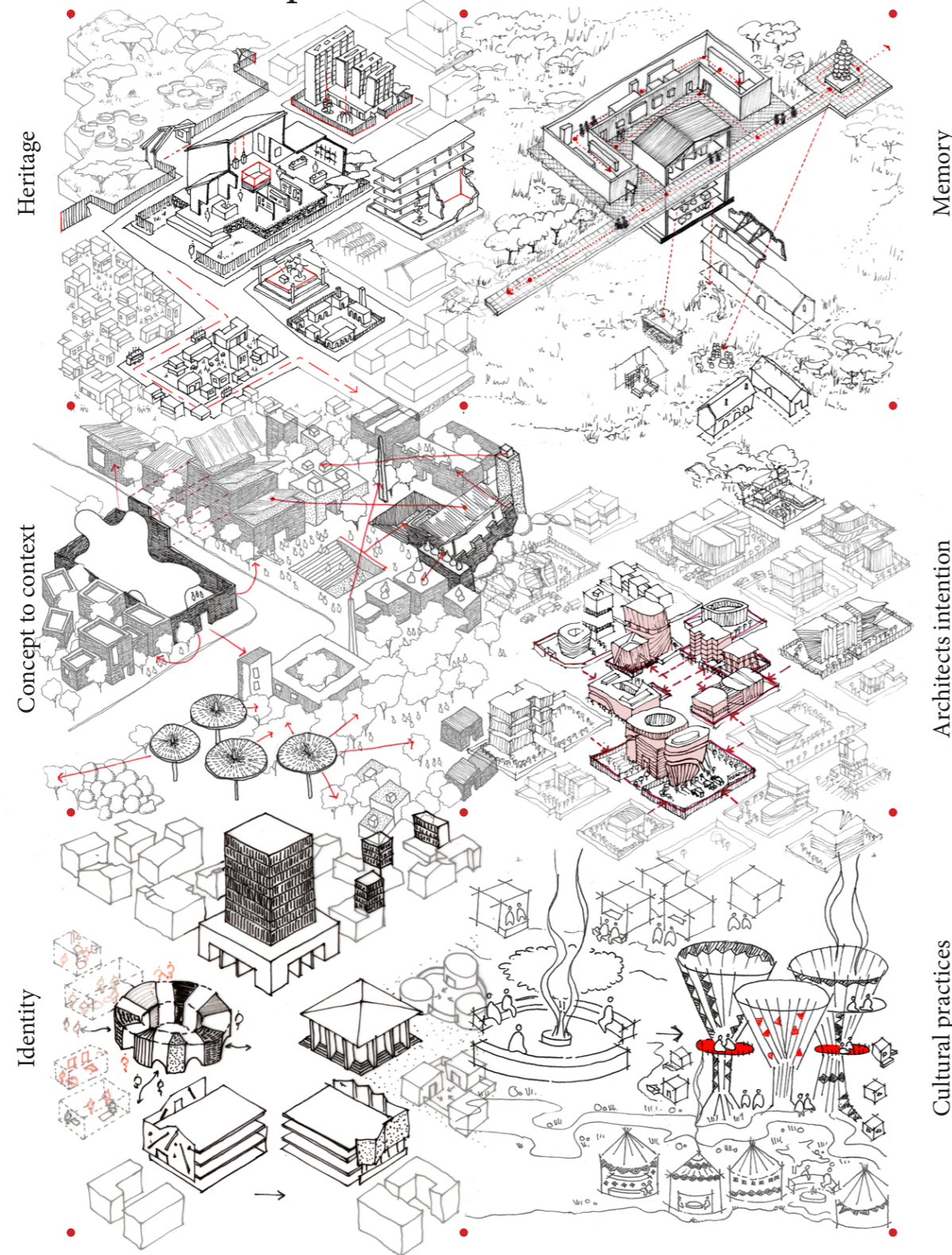
Translation of meaning found in the cultural, physical or temporal context into abstract, symbolic or ocularcentric architectural form.

The extraction of meaning- from context- into architectural form requires the architect to understand the factors that contribute to the occurrence of particular rituals or practices, rather than simply recreating the morphology of the referenced situation.

Cameron / Laura / Hano / Heike / Wian / Jade

University of Pretoria / 2021 / Masters mini conference

Posters created for the masters mini-conference comparing approaches in representative architecture and activity driven architecture. This study informs the programme driven approach taken in this project rather than visual mimicry of the ruin morphology (Author, et al., 2021).

Arrival pavilion

Room type	Room function	no.	Total area m2	Occupants	Device type	Total estimated monthly energy load (kWh)	Device type	no.	Total estimated monthly water requirement (ltr)	water type
Accomodation unit	Short and long term accomodation units with ablutions and kitchenettes for residency pratitioners and visitors	14	1312.5	Residency practitioners, visitors, community members and leaders	Microwave*	1.8	Sink	1	47250	Potable
					130ltr dual fridge freezer	31.2	WHB*	1	6720	Potable
					Computer	44.0	WC**	1	224	Non-potable
					Short-term interior night lighting	945.0	Shower***	1	33600	Potable
					Computer	168.0	Clothes washing machine****	1	3360	
	Veranda		147		Night-time outdoor lighting	66.2				
Threshold	Transition pavilions between suburbs and ruins	2	158	All	Night-time outdoor lighting	71.1				
Storage room	Shelving for tools, equipment and materials required for operation and maintanence.	1	6	Tradesman, repairman, custodians	Short-term interior lighting	2.2				
Utilities	Solar energy storage and solar heated water distrubution and storage.	1	6	Tradesman, repairman, custodians	Short-term interior lighting	2.2	Irrigation (4ltr/m2)		2400	Non-potable
TOTAL			1629.5			1331.6			93554	

*Assuming 3min/day average use at 1200W

Gas stove and kettle and solar water heater limit energy load

*Assuming 4ltr per person, twice daily (2 occupants average)

**Assuming 4ltr flush per person, twice daily (2 occupants/unit average)

***Assuming 4ltr/min in 10min showers per person, (2 occupants/unit average)

****Assuming 60ltr/wash in 4 washes per month

Non-potable need

Potable need

Accommodation schedule for the arrival pavilion showing room functions, estimated energy loads and water requirements.

Appendix E

Mediation node											

Room type	Room function	no.	Total area m2	Occupants	Device type	Total estimated monthly energy load (kWh)	Device type	no.	Total estimated monthly water requirement (ltr)	water type
Meeting hall	A large space for community discussion and engagement.	1	54	Community leaders, landowners, municipal representatives, municipal and heritage board members, arbitrators	Overhead projector*	12.0				
					Short-term interior lighting	19.4				
					Computer**	8.8				
Offices/ discussion rooms	Rooms to for discussion and documentation of community decisions.	3	36	Community leaders, landowners, municipal representatives, board members	Computer	44.0				
					Short-term interior lighting	13.0				
Utilities room	Storage for tools and equipment required for operation and maintanence, includes a kitchenette.	1	15	Tradesman, repairman, custodians, office workers	Short-term interior lighting	5.4	Sink	1	540	Potable
					Kettle***	15.0				
					Microwave****	3.6				
					130ltr dual fridge freezer	31.2				
Veranda	A large gathering/rest space with a vista of the landscape	1	60	All	Night-time outdoor lighting	27.0				
Ablutions		1	66.5	All	Short-term interior Lighting	23.9	WC*	8	3600	Non-potable
							WHB**	4	3600	Potable
							Urinal***	3	3600	Non-potable
Utilities	Solar energy and solar heated water storage and distrubution	1	3	Tradesman, repairman, custodians	Short-term interior Lighting	1.1				
Other	Outside decking and pathways	n/a	115.5	All	Night-time outdoor lighting	52.0	Irrigation (4ltr/m2)		2400	Non-potable
TOTAL			350			256.4			13740	

*Assuming 8hr/week average use at 300W

**Assuming 6hr/day average use at 50W

***Assuming 25min/day average use at 1500W

****Assuming 6min/day average use at 1200W

*Assuming 4ltr flush per person, thrice daily (10 occupants average)

**Assuming 4ltr per person, thrice daily (10 occupants average)

***Assuming 4ltr flush per person, thrice daily (10 occupants average)

Accommodation schedule for the mediation node showing room functions, estimated energy loads and water requirements.

Appendix F

Heritage gallery

Room type	Room function	no.	Total area m2	Occupants	Device type	Total estimated monthly energy load (kWh)	Device type	no.	Total estimated monthly water requirement (ltr)	water type
Studios	Makers-spaces for residency practitioners and community engagement. Platforms for the creation of landscape-inspired artworks and ideas about the future of heritage and heritage production.	5	100	Residency practitioners, community members and leaders	Outlets for various equipments					
					Night-time interior lighting	2.3				
Niches	Small open spaces for the display of artefacts and information for public access	13	73	Visitors from the public, scholars, artisits, members of the press	Night-time lighting	26.3				
Storage room	Shelving for artworks and objects produced here during their display rotation	1	45.5	Residency practitioners, scholars	Short-term interior lighting	16.4				
Foyer	Gathering space at the entrance of the buildng with vistas to the landscape	1	24	All	Night-time outdoor lighting	10.8				
Kitchenette	Small kitchen for use by practitioners	1	11.25	Residency practitioners	Short-term interior lighting	4.1	Sink	1	396	Potable
					Microwave*	5.4				
					130ltr dual fridge freezer	31.2				
Ablutions		1	88	All	Short-term interior lighting	31.7	WC*	8	7200	Non-potable
							WHB**	6	7200	Potable
Utilities	Solar energy storage and solar heated water distrubution and storage.	1	3.5	Tradesman, repairman, custodians	Short-term interior lighting	1.3				
Other	Outside decking and pathways.	n/a	119.75	All	Night-time outdoor lighting	53.9	Irrigation (4ltr/m2)		2400	Non-potable
TOTAL			465			183.2			17196	
					*Assuming 10min/day average use at 1200W		*Assuming 4ltr flush per person, twice daily (30 occupants average) **Assuming 4ltr per person, twice daily (30 occupants average)			

Accommodation schedule for the heritage gallery showing room functions, estimated energy loads and water requirements.

Research repository									
Room type	Room function	no.	Total area m2	Occupants	Device type	Total estimated monthly energy load (kWh)	Device type	no.	Total estimated monthly water requirement (ltr)	water type
Archive	Short and long term storage of excavated material and artefacts during processing and analysis.	1	84	Archivists, archaeologists, students, scientists, board representatives	Short-term interior lighting	30.2				
Discussion room	Host spaces for discussion and dissemination of knowledge generated about extracted heritage material.	2	78	Scholars, archaeologists, visitors, residency practitioners	Short-term interior lighting	28.1				
					Computer					
Storage room	Shelving for tools, equipment and materials required for archaeological excavations	2	32	Archaeologists, custodians	Short-term interior lighting	11.5				
Kitchenette	Small kitchen for use by practitioners	1	11.25	Residency practitioners	Microwave*	5.4	Sink	1	396	Potable
					130ltr dual fridge freezer	31.2				
Collection zone	Drop-off space for excavated materials	1	27.5	Archaeologists, scientists	Night-time outdoor lighting	12.4				
Laboratory	Laboratory for analysis of excavated material and artefacts.	1	30	Archaeologists, scientists	Long-term interior lighting	21.6				
					Specialised laboratory equipment**	440.0				
					Computer					
Ablutions		1	26	All	Short-term interior lighting	9.4	WC*	8	7200	Non-potable
							WHB**	4	7200	Potable
Utilities	Solar energy storage and solar heated water distrubution and storage.	1	4	Tradesman, repairman, custodians	Short-term interior lighting	1.4				
Other	Outside decking and pathways.	n/a	61	All	Night-time outdoor lighting	27.5	Irrigation (4ltr/m2)		2400	Non-potable
TOTAL			353.75			618.7			51192	
					*Assuming 10min/day average use at 1200W **Assuming an estimated average daily load of 20kWh		*Assuming 4ltr flush per person, twice daily (20 occupants average) **Assuming 4ltr per person, twice daily (20 occupants average)			

Accommodation schedule for the research repository showing room functions, estimated energy loads and water requirements.

	Average daily hours of shortwave radiation (Climate-data.org, 2021)	Average maximum potential energy generation capacity of one 540W panel /day (kWh)
January	9.2	4.97
February	9.2	4.97
March	8.8	4.75
April	8.3	4.48
May	8.9	4.81
June	8.8	4.75
July	9	4.86
August	9.5	5.13
September	9.8	5.29
October	9.8	5.29
November	9.6	5.18
December	9.6	5.18

Potential energy generation capacity /month of each building (kWh)

Building:	Arrival pavillion	Meidation node	Heritage gallery	Research repository
Energy load required (kWh)	1332	256	183	619
no. of panels required	10	2	2	5
January	1490.4	298.1	298.1	745.2
February	1490.4	298.1	298.1	745.2
March	1425.6	285.1	285.1	712.8
April	1344.6	268.9	268.9	672.3
May	1441.8	288.4	288.4	720.9
June	1425.6	285.1	285.1	712.8
July	1458.0	291.6	291.6	729.0
August	1539.0	307.8	307.8	769.5
September	1587.6	317.5	317.5	793.8
October	1587.6	317.5	317.5	793.8
November	1555.2	311.0	311.0	777.6
December	1555.2	311.0	311.0	777.6

	average estimated building load /month (kWh)	number of 540W panel photovoltaic panels required (1.1m x 2.3m)
Arrival pavillion	1332	10
Meidation node	256	2
Heritage gallery	183	2
Research repository	619	5

	Lighting requirement (Lumens/m2)	LED fixture requirement (W/m2)	Usage period	Average usage/24hrs (hrs)	Average energy load/day (kWh/m2)	Average energy load/month (kWh/m2)		
Short-term interior lighting	400	6	Periodic use when occupied*	2	0.012	0.36	0.006	kW/m2
Short-term interior night lighting	400	6	Night time use**	4	0.024	0.72	0.006	kW/m2
Long-term interior lighting	400	6	Extended day and night time use	10	0.06	1.8	0.006	kW/m2
Night-time outdoor lighting	100	1.5	Night time use when occupied***	10	0.015	0.45	0.0015	kW/m2
			*Rely on daylighting					
			*After hour use from 18:00-22:00					
			***Lighting set to seasonal timer from 18:00-04:00					

Various tables showing the required photovoltaic panel quantities for each building to meet energy loads.

Appendix I

Arrival pavilion	Roof surface area (m2):	1176	
Month	Monthly rainfall (mm)	Rain water roof catchment potential (ltr/month)	Water available/day
January	95.8	112660.8	3755.4
February	78.1	91845.6	3061.5
March	63.3	74440.8	2481.4
April	28.9	33986.4	1132.9
May	10	11760	392.0
June	5.1	5997.6	199.9
July	1.9	2234.4	74.5
August	5.2	6115.2	203.8
September	16.7	19639.2	654.6
October	56	65856	2195.2
November	86.8	102076.8	3402.6
December	95.1	111837.6	3727.9
Water requirement		93554	3118

Heritage gallery	Roof surface area (m2):	166	
Month	Monthly rainfall (mm)	Rain water roof catchment potential (ltr/month)	Water available/day
January	95.8	15902.8	530.1
February	78.1	12964.6	432.2
March	63.3	10507.8	350.3
April	28.9	4797.4	159.9
May	10	1660	55.3
June	5.1	846.6	28.2
July	1.9	315.4	10.5
August	5.2	863.2	28.8
September	16.7	2772.2	92.4
October	56	9296	309.9
November	86.8	14408.8	480.3
December	95.1	15786.6	526.2
Water requirement		17196	573

Mediation node	Roof surface area (m2):	501	
Month	Monthly rainfall (mm)	Rain water roof catchment potential (ltr/month)	Water available/day
January	95.8	47995.8	1599.9
February	78.1	39128.1	1304.3
March	63.3	31713.3	1057.1
April	28.9	14478.9	482.6
May	10	5010	167.0
June	5.1	2555.1	85.2
July	1.9	951.9	31.7
August	5.2	2605.2	86.8
September	16.7	8366.7	278.9
October	56	28056	935.2
November	86.8	43486.8	1449.6
December	95.1	47645.1	1588.2
Water requirement		13740	458

Research repository	Roof surface area (m2):	240.5	
Month	Monthly rainfall (mm)	Rain water roof catchment potential (ltr/month)	Water available/day
January	95.8	23039.9	768.0
February	78.1	18783.05	626.1
March	63.3	15223.65	507.5
April	28.9	6950.45	231.7
May	10	2405	80.2
June	5.1	1226.55	40.9
July	1.9	456.95	15.2
August	5.2	1250.6	41.7
September	16.7	4016.35	133.9
October	56	13468	448.9
November	86.8	20875.4	695.8
December	95.1	22871.55	762.4
Water requirement		51192	1706

Various tables showing the potential rainwater harvesting capacity of each building. Municipal water connections will be required to compensate for water needs during the dryer months. Harvested rainwater will be used in WC and irrigation.

Appendix J

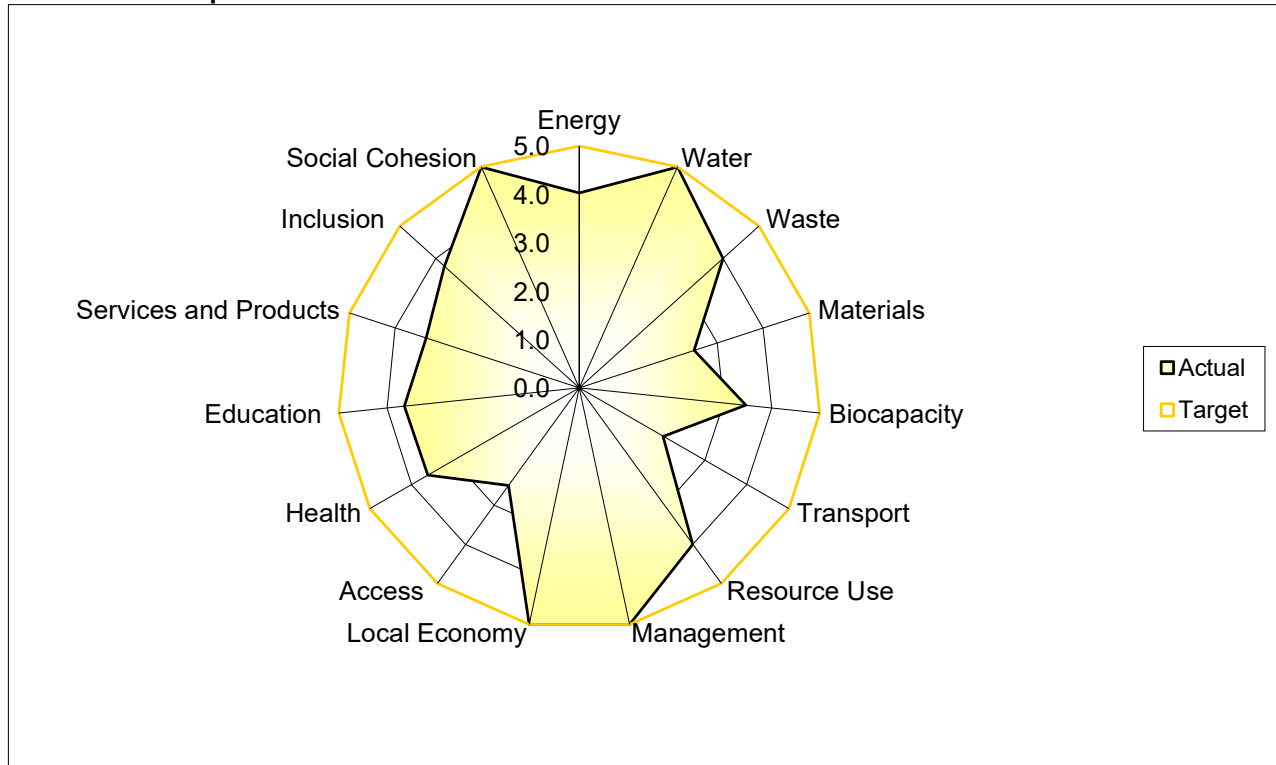## SUSTAINABLE BUILDING ASSESSMENT TOOL RESIDENTIAL

1.04

	Achieved
SB SBAT REPORT	**3.8**

SB1   Project

Living heritage at the Bronkhorstspruit iron age ruins

SB2   Address

Entrance at 41 Drakensburg street, Bronkhorstspruit dam

SB3   SBAT Graph

SB4   Environmental, Social and Economic Performance

	Score
Environmental	3.8
Economic	3.7
Social	3.9
SBAT Rating	3.8

SB5   EF and HDI Factors

	Score
EF Factor	3.3
HDI Factor	4.0

SB6   Targets

	Percentage
Environmental	76
Economic	74
Social	77

The full graph showing the scores achieved by the project according to the Sustainable Building Assessment Tool (SBAT).

Appendix K

A retrospective and conclusionary collaged landscape diagram showing the conceptual programmes developed within this project in conjunction with the conceptual programmes generated in the previous year of studies. This collage shows a living heritage intention that has grown over the course of two years' worth of conceptual exploration into the theme of living heritage frameworks at ruin landscapes (Author, 2020-2021).