

EVOLVING KNOWLEDGE LANDSCAPES:

Reviving from ghost town to ecological campus,
fostering alternative knowledge production in the
City of Tshwane



ABSTRACT

The UNISA Sunnyside Ghost Town is an abandoned teaching college on the outskirts of Pretoria Central in South Africa. Currently, the surrounding area around the UNISA Sunnyside Ghost Town faces significant socio-economic challenges, including limited job and educational opportunities. Responding to the historical, but now defunct educational precinct, and the current socio-economic challenges, the objective of the project is to explore how an 'architectural intervention' can promote the decolonization of knowledge and environmental stewardship in the City of Tshwane (CoT), as a means to contribute to addressing socio-economic challenges. This will be achieved by establishing a landscape-based polytechnic institution on the derelict campus. The landscape design will accommodate both rituals involved in knowledge production as well as educational nature-based interfaces within the landscape. The advancement of ecological education through nature-based learning will manifest as both active engagement with the landscape and passive awareness of landscape systems. *Active engagement* entails hands-on experiences (e.g., tending to gardens and participating in ecological restoration) which fosters practical knowledge about ecosystems. Conversely, *passive awareness* encourages understanding of the environment through observation, interpretation, reflection and nurturing a deeper connection to the natural world. By integrating active and passive approaches, the project offers diverse learning opportunities, catering to a wide range of individuals and communities. The project aims to address the socio-economic issues, especially those facing women, by providing vocational training and supporting small-scale enterprises focused on resources generated from the landscape. This has the potential to empower individuals and communities by enhancing their employability and fostering entrepreneurship. Urban planning principles are employed to create education nodes within a green belt, ensuring an inclusive, safe, and accessible environment for nature based learning. Local communities will be actively involved and empowered, integrating their knowledge and practices into the project. Here, the landscape serves as a canvas for expressing a diversity local and ecological knowledge, and promoting stewardship and engagement. In turn, this approach will lead to the creation of landscape-based classrooms, workspaces, and places for ecological education within the landscape. Traditional ecological and local knowledge are both catalysts for socio-economic and ecological sustainability, which enables innovative approaches to land management by supporting small-scale business initiatives using existing infrastructure as well as a new model for landscapes as part of educational campuses. These initiatives aim to benefit on-site residents and encourage their active participation in the campus.

TABLE OF CONTENT

ABSTRACT	1
TABLE OF CONTENT	2
LIST OF FIGURES	2
1. PROJECT BRIEF	3
1.1. Introduction	3
1.2. Decolonizing knowledge production	4
1.3. Aim of project	5
1.4. City of Tshwane & legislative framework	6
2. DOCUMENTATION OF ITERATIVE DESIGN	7
3. INTEGRATED DESIGN AND TECH INVESTIGATION	8
3.1. Awareness of natural processes	8
3.2. Weaving Design & Ecology	8
3.3. Layering Old & New	8
4. SYSTEMS	10
5. REFLECTION ON PROCESS	11
6. CONCLUSION	12
REFERENCES	14

LIST OF FIGURES

Figure 1; Diagram indicating the greater context and situation of the site (Author 2023).	3
Figure 2; Diagram indicating the meso context and relationship to the city (Author 2023).	3
Figure 3; Diagram of the project's strategies (Author 2023).	4
Figure 4; Diagram indicating the main project objectives of the alternative knowledge campus (Author 2023).	5
Figure 5; Diagram vocational education program developed based on the project's objectives (Author 2023).	5
Figure 6; Interpretive diagram of Tshwane's development framework and urban response (Author 2023).	6
Figure 7: Iterative process from master plan to sketch plan development (Author 2023).	7
Figure 8: Iterative process of sections (Author 2023).	7
Figure 9: Collages demonstrating key theoretical concepts for design and technical response. 1. Awareness of natural processes 2. Weaving design and ecology 3. Layering Old & New (Author 2023).	8
Figure 10: Axo and supporting views of focus area on site (Author 2023).	9
Figure 11: System diagrams indicating conceptual approach to construction, water harvesting and vegetation (Author 2023).	10
Figure 12: Diagram of design enquiry and process followed to reach design- tech response (Author 2023).	11
Figure 13: Longitudinal section through working space and wetland (Author 2023).	12
Figure 14: Sketch plan view of focus area on campus (Author 2023).	13

1. PROJECT BRIEF

1.1. Introduction

Socio-economically vulnerable communities face increased exposure to extreme weather fluctuations and resource shortages as a result of climate change (Thomas et al. 2018). Thomas et al. (2018) emphasize that income and gender play pivotal roles in efforts towards climate adaptation strategies and sustainable and equitable natural resource management. In the City of Tshwane, areas with high rates of youth unemployment, driven by inadequate access to education, are often also areas that have multiple safety concerns. (Visser et al 2016: 8). Black South African women face significant economic vulnerability, with unemployment rates surpassing those of other marginalised groups within the country (Stats SA 2020, 7-8). The UNISA Sunnyside campus is located near the highest concentration of unemployed people in Pretoria Central, showing the need to allocate attention to the development in the area (GCRO 2018). According to Kern (2021), evidence suggests that these issues are further perpetuated by the way in which urban environments are planned and designed. There is a particular focus on vehicular efficiency and non-pedestrian-oriented pragmatic concerns, with a lack of consideration for the comfort and safety of women (Kern 2021).

In the first quarter of the year, project explorations focused on key issues of vulnerability in urban environments. However, the project also examined issues related to high urban degradation, particularly those concerning urban green open spaces (e.g., crime, heat stress, spatial injustice, pedestrian safety) within the central business district of the City of Tshwane. The identification of such vulnerabilities indicated that green infrastructure plays a pivotal role in climate adaptation strategies that have a particular focus on enhancing the quality of life for vulnerable communities through skills development opportunities and increased social cohesion, as highlighted by Anderson et al. (2021).

The project's foundation was built on the idea that spaces should dignify people, be accessible, foster social interactions, and create vibrant living environments, echoing the sentiments of Martins and Tagliari (2023, 135). This inquiry led to an exploration of spaces within the inner city that could dignify both nature and people where the regeneration of nature leads to the increased well-being for city dwellers (Cohen et al. 2017).

The concept of the project revolves around landscapes, with the capacity to heal and rejuvenate over time, concurrently serving as environments that support the reintegration of vulnerable individuals into society as dignified citizens. The project embraced the concept of healing landscapes, with early conceptual explorations that experimented with creating scars within the landscape and allowing them to heal organically over time. This idea draws inspiration from the works of landscape architects like Catherine Mosbach and Michael Desvigne, who view landscapes as dynamic natural systems in which humans play a catalytic role (Raxworthy 2013).

Adjacent to the UNISA site, also known as the UNISA Ghost Town, selected as the eventual focus area for this project, the southern gateway of the city is defined by two of Pretoria's significant ridges, Lukasrand and Freedom Park. These ridges encircle the city and carry significant historical significance (Kistner 2012, 6). The site contains various buildings that have heritage value and a landscape that reflects certain historical activities involved in shaping Pretoria/The City of Tshwane (Pelser 2013). The City of Tshwane is a hub for academic and research activities (Molamo and Weir-Smith 2021, 13). In line with this sentiment, the Ghost Town site serves as a connecting point between the main campus of UNISA, the largest online learning institute in South Africa, and the rest of the city. There is a growing recognition under scholars that because tertiary institutions can be exclusionary and perpetuate inequalities, there is a need for a decolonized system for knowledge production (Jansen 2019, 3-4). This poses an opportunity for the landscape to become a more enticing sensory experience, accessible, and sustainable way to contribute to education.



Figure 1; Diagram indicating the greater context and situation of the site (Author 2023).



Figure 2; Diagram indicating the meso context and relationship to the city (Author 2023).












1.2. Decolonizing knowledge production

Historically, gender biases and racial prejudices have influenced knowledge production in South Africa (Sheehan 2020, 1-2). Diverse methods for knowledge creation are essential in today's education, particularly in polytechnic institutions requiring comprehensive facilities for both practical and theoretical knowledge (Risling Baldy 2023, 45). In design disciplines, it's crucial to consider the physical form and function of spaces fostering knowledge development and transfer. The concept of a living landscape laboratory, proposed by Gomez and Derr (2021, 1), is an interdisciplinary approach enriching traditional university curricula within a campus environment. This integrates various components, facilitating sustainable biophysical environments through research, design, and policy initiatives, including demonstration gardens and landscape features stimulating innovative thinking (Gomez & Derr 2021, 7). Hybrid learning combines traditional and contemporary methods, giving new meaning to abandoned buildings on the site (Figure 3).

Universities successfully integrate Traditional Ecological Knowledge (TEK) into programmes, fostering collaboration between academia and communities for sustainable resource management (Risling et al. 2023, 40-41, Figure 3). Innovative "learning landscapes" enhance programmes in environmental sciences and design, incorporating rain gardens, bioswales, and sustainable technologies for promoting innovation and ecological awareness (Gomez and Derr 2021). Courses now incorporate practical curricula on campus landscapes, underlining the importance of the context in which knowledge production takes place.

A grassroots-oriented approach to vocational education aligns with the UK National Development Plan, aiming to uplift individuals from poverty (Kazier et al. 2022, 287). Micro-enterprises play a crucial role in poverty alleviation but face challenges like inadequate infrastructure and limited raw materials (Ayalu et al. 2022, 20-21). In Tshwane, institutions offer vocational programmes for women, addressing diversity and cultural representation (Yogashen 2022). Microprises following "green entrepreneurship" benefit from sustainably managing ecology as an economic resource (Lambooy & Levashova 2011).

The growing demand for landscape-based solutions promoting ecological, social, and economic development is evident. Land-sharing approaches fostering high biodiversity benefit small-scale economies (Liao et al. 2020, 6). Ecological stewardship restores place identity and benefits communities by engaging with local environments and promoting the healing effects of nature, emphasizing the reciprocal relationship between ecological health and human well-being (Hernández-Blanco 2022, 5028).

ASPECTS	USES
 RESEARCH	 WELLNESS
 TRADITIONAL KNOWLEDGE	 COSMECEUTICALS
 NURSERY CULTIVATION	 JEWELRY
 ENDANGERED	 DYES
	 WEAVING
	 SOAP/ WASHING
	 PERFUME/ FRAGRANCE/ ESSENTIAL OILS

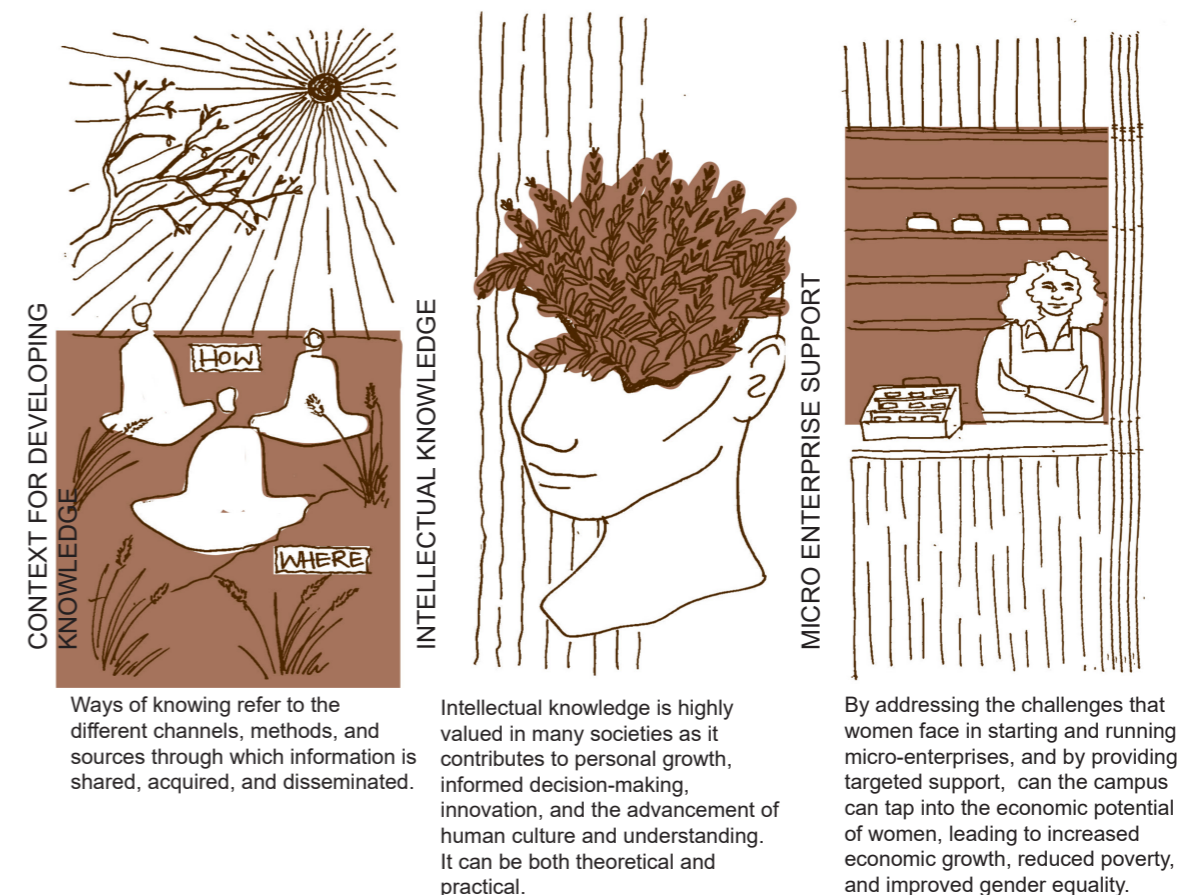
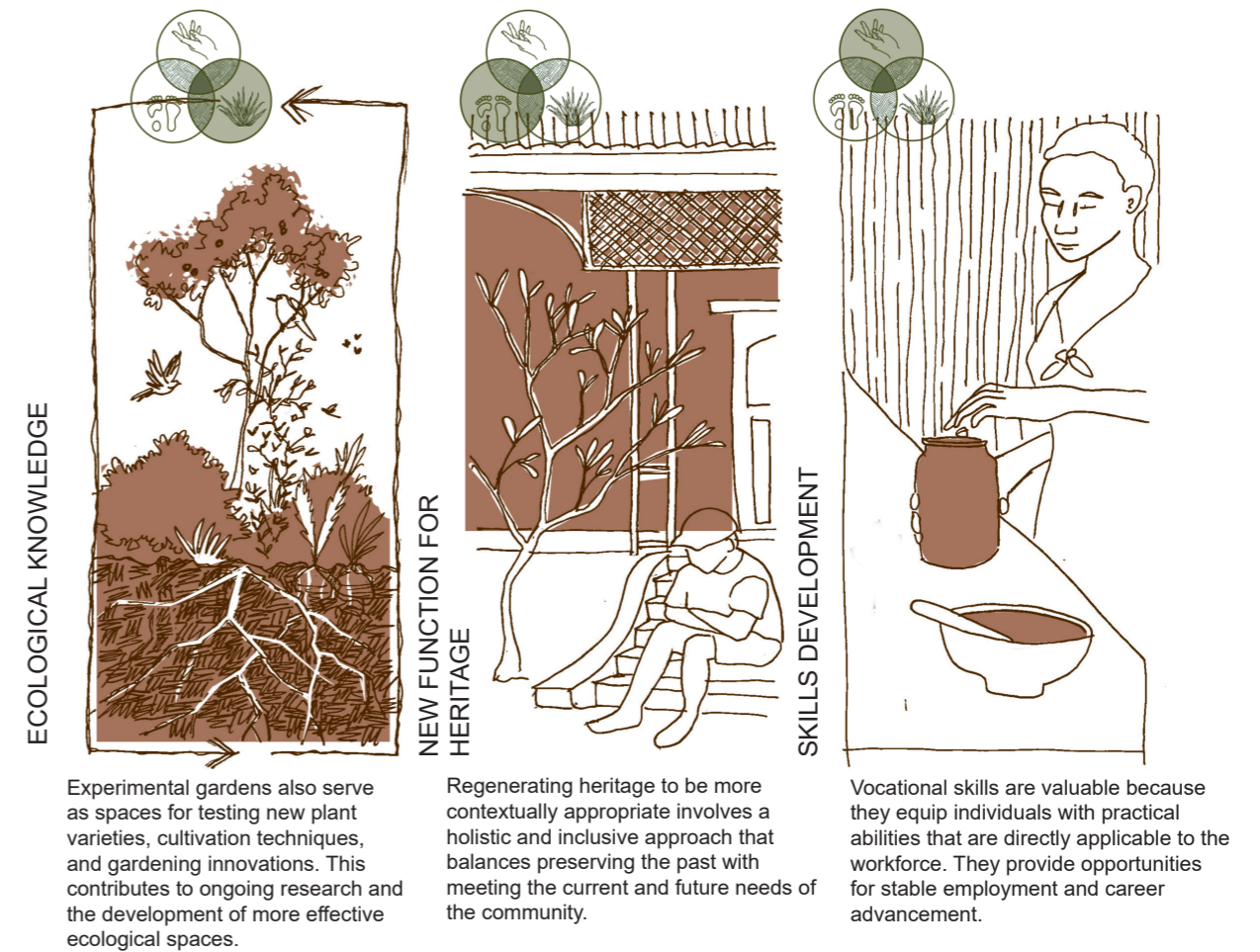


Figure 3; Diagram of the project's strategies (Author 2023).

1.3. Aim of project

A departure from Eurocentric perspectives within South African tertiary institutions is crucial for addressing the specific needs of local African communities (Kaya and Seleti 2013). The project aims to establish a multi-use campus providing vocational training, particularly focusing on the craft of selected vegetation and construction techniques to counteract the erosion of under-recognized knowledge systems (Allais 2012).



Figure 4; Diagram indicating the main project objectives of the alternative knowledge campus (Author 2023).

The project is guided by three fundamental objectives:

Objective 1: The landscape must reflect craftsmanship. This principle highlights the significance of craftsmanship in shaping the landscape, emphasizing that both physical and intellectual labor contribute to its creation (Franco 2022, 109).

Objective 2: The landscape must express alternative knowledge. This principle underscores the need to facilitate and express diverse forms of knowledge within the landscape, aligning with experiential landscape learning articulated by Gomez and Derr (2021). It envisions landscape laboratories actively integrating various forms of knowledge.

Objective 3: Landscape designs must ecologically regenerate the site while uplifting the local community. This principle involves dual regeneration—revitalizing the brownfield site and simultaneously reintegrating and uplifting the local community. Hernandez (2022, 213) gives recognition to the role of knowledge production in community healing.

The objectives can be achieved by establishing a closed-loop, resource-efficient campus that utilizes existing urban infrastructure and natural resources (Nadat & Jacobs 2021). This approach aligns with the triple-bottom-line framework, emphasizing economic, social, and environmental harmony in urban design (DeDeker 2020). The goal is to enhance people’s quality of life by creating job opportunities and fostering network integration facilitated by green infrastructure (Hammer and Pivo 2017).

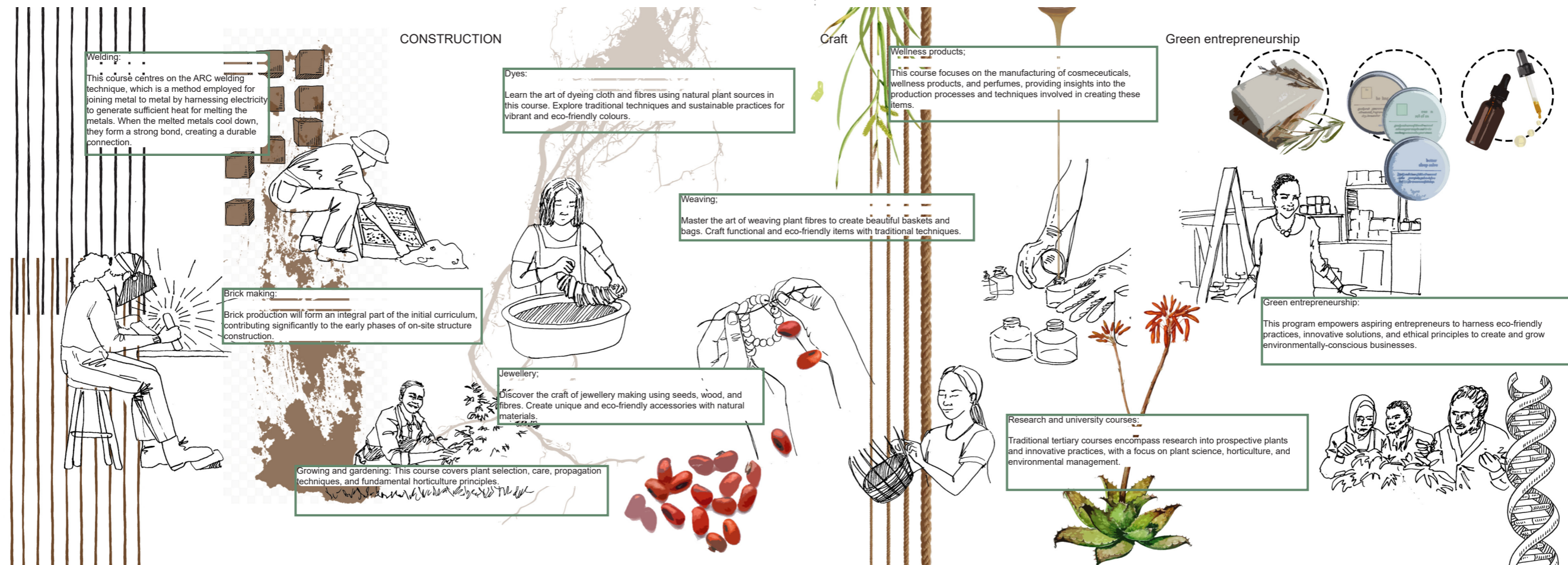


Figure 5; Diagram vocational education program developed based on the project’s objectives (Author 2023).

1.4. City of Tshwane & legislative framework

The National Development Plan of South Africa (NDP) aims to address societal inequalities and foster economic upliftment by creating environments and infrastructure that enable improved living standards. However, a gap exists between the NDP and the City of Tshwane's Integrated Development Plan, particularly within the current poor economic conditions (Kazier et al. 2022, 287-288).

The City of Tshwane plans to utilize a specific site as an entry point to the city, promoting its green initiatives. There is potential inclusion of the adjacent Ghost Town as part of this city gateway. The urban development response, as seen in Figure 6, is to integrate the campus into the urban fabric with blue-green infrastructure networks and principles promoting a more walk-able city (Pretoria Inner City Integrated Spatial Development Framework n.d., 44).

If a development like this takes place it must adhere to NEMA (National Environmental Management Act), necessitating applications and additional measures for environmental well-being (NEMA 2022). A water use license is required for on-site water use (Department of Water Affairs, 1998).. NRHA (National Resource Heritage Agency) and SAHRA (South African Heritage Resources Agency) require a Heritage Management Plan for heritage resources (Department of Arts and Culture 1999, 21).

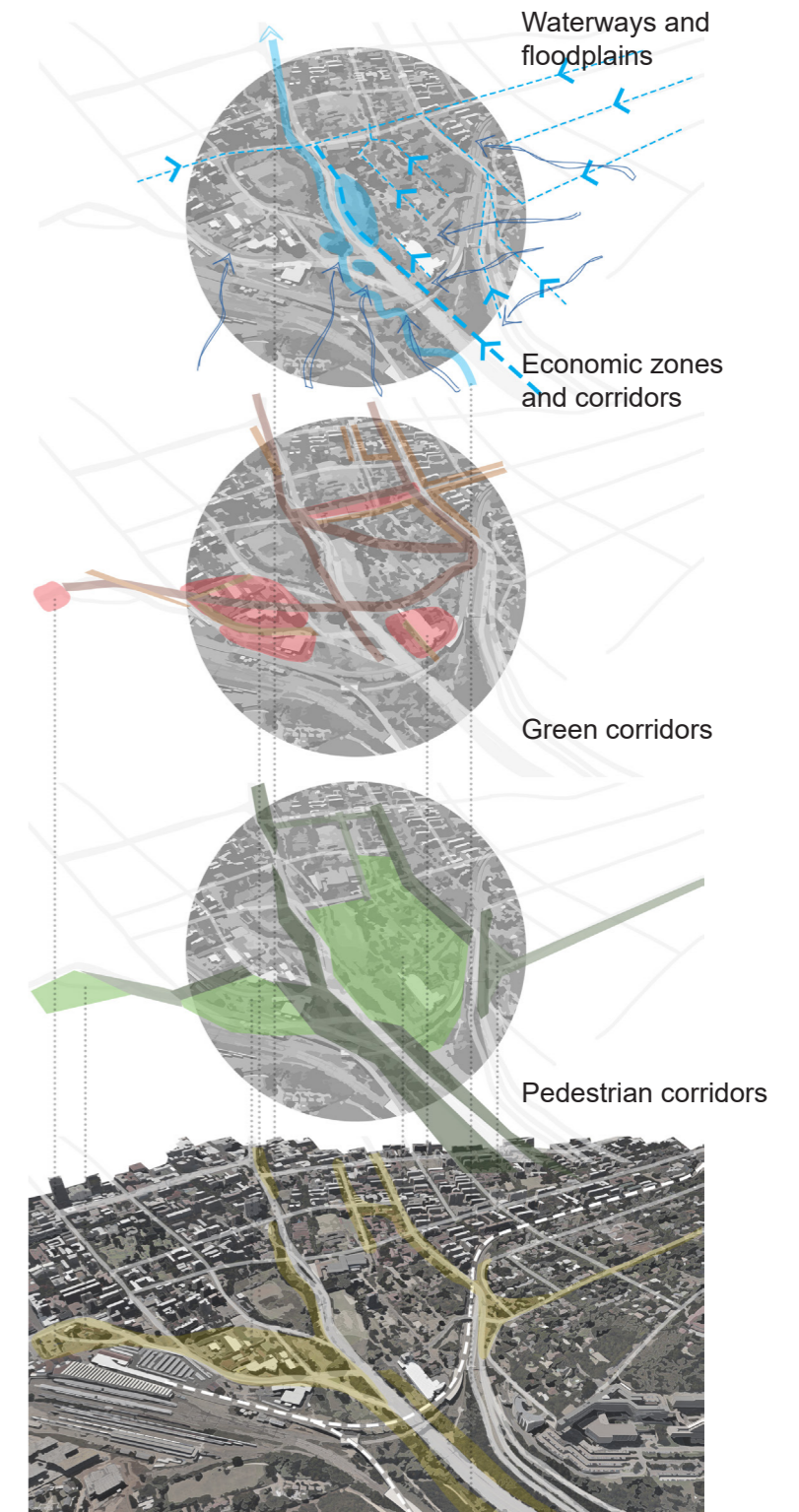


Figure 6; Interpretive diagram of Tshwane's development framework and urban response (Author 2023).

2. DOCUMENTATION OF ITERATIVE DESIGN

The iterative process begins with an examination of the urban scale to gain insight into how the project integrates with the broader urban environment. This examination is informed by mapping exercises that identified key nodes where the site interfaces with public transportation networks, such as bus routes and a train platform. At the campus level, three primary considerations come to the fore. The most important consideration is the establishment of connectivity. Following this, attention is given to the strategic placement of educational facilities within the landscape. A division of spaces into public, semi-public, and private domains fulfil a dual role by preserving the dignity of on-site residents while also facilitating public interaction. The area selected for the sketch plan was determined based on its alignment with the three core project objectives: urban regeneration, skills development, and the enhancement of alternative knowledge systems. The focus area for the sketch plan was found to best encapsulate these key considerations.

Urban planners place a strong emphasis on the preservation of green spaces to counter urban sprawl and promote urban density, as highlighted by Li et al. (2019). The campus project is designed with the objective of achieving a central concentration of urban density while also incorporating a green belt that aligns with the recommendations made by Li et al. (2019) for the incorporation of vital green infrastructure in the area. This green belt serves as the foundation for an educational nature walk along the campus's perimeter. This not only promotes health and well-being but also connects various nodes along the path, encouraging passive engagement with nature, as suggested by Cohen et al. (2017). The spatial organization of semi-public, public, and private spaces within the campus is guided by principles of hierarchy, the seamless transition between spaces, and accessibility, as suggested by Thwaites (2001).

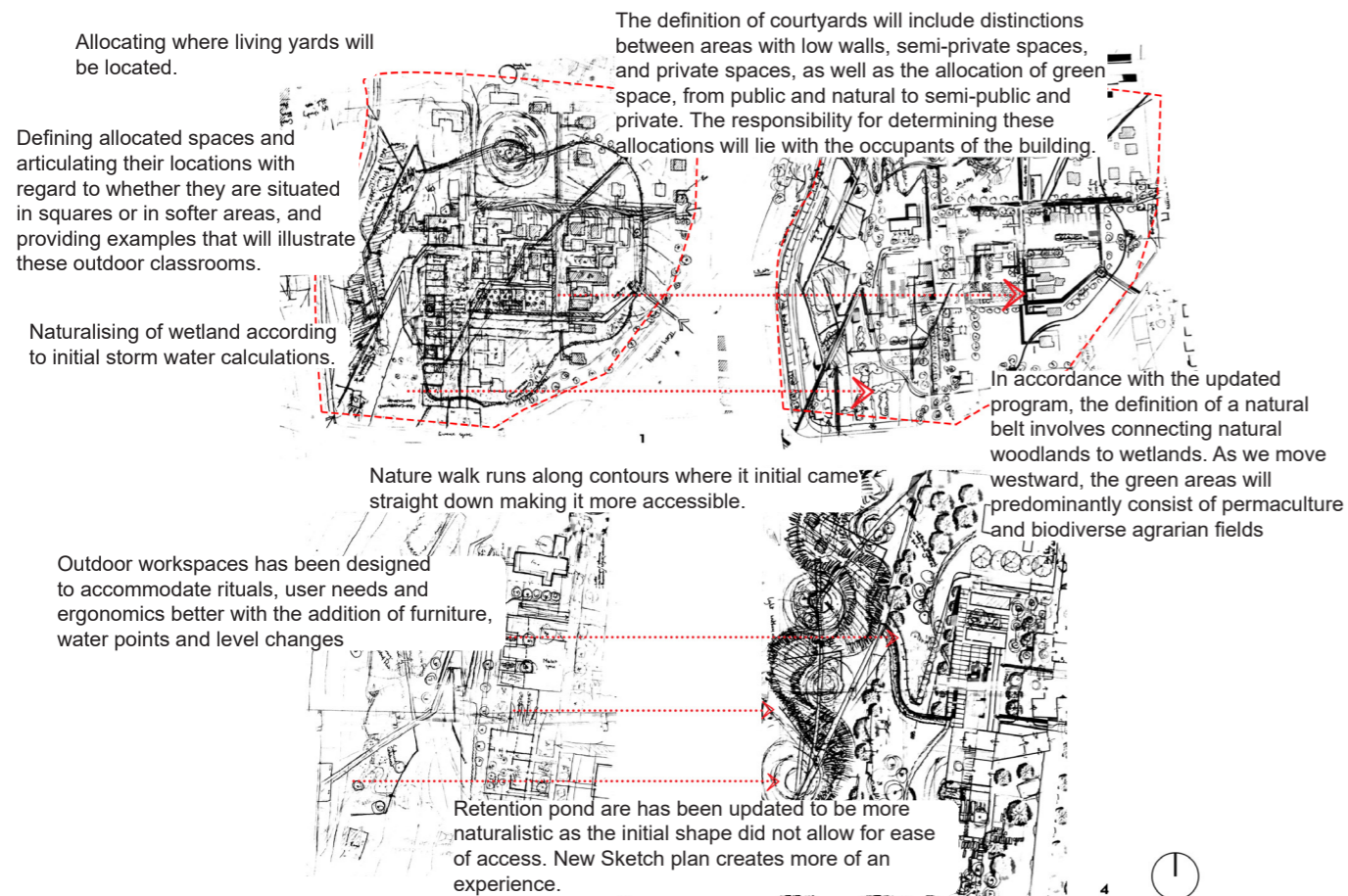


Figure 7: Iterative process from master plan to sketch plan development (Author 2023).

The campus features three distinct courtyards: The Eastern Courtyard, located to the east, which contains institutional buildings like innovation labs and resource centres that are accessible to residents. It further includes a laboratory greenhouse and spaces for recreation and outdoor study - enhancing indoor-outdoor educational experiences. The Central Courtyard serves both as a residential and semi-public zone, offering nature-based experiences for residents, particularly those with children. Facilities within this courtyard include a demonstration greenhouse, residential buildings, a nursery, a clinic, a second-hand bookshop, a community kitchen, and a farm-to-table pantry. The Western Courtyard serves is intended as the primary public space, hosting various commercial activities, including workshop galleries, maker spaces, shops, and associated offices available for seasonal galleries and public demonstrations. Versatile Multi-use spill-out spaces support market activities, outdoor workshops, and teaching areas, creating a dynamic hub for creators and the public.

Nodes strategically placed within the landscape serve a twofold purpose: to facilitate both intellectual knowledge production and craft practices that align with the curriculum and to encourage engagement with nature. In this context, green infrastructure plays a dual role by establishing functional systems that support on-site activities for sustainable resource management, while also promoting ecological knowledge and fostering awareness of natural systems.

The campus landscape encompasses several key components, including the development of native wetlands, ecological restoration efforts, and the implementation of regenerative campus designs. These initiatives are integral to the landscape laboratory approach, offering not only valuable research opportunities but also enriching nature-based experiences for students (Gomez and Derr 2021).

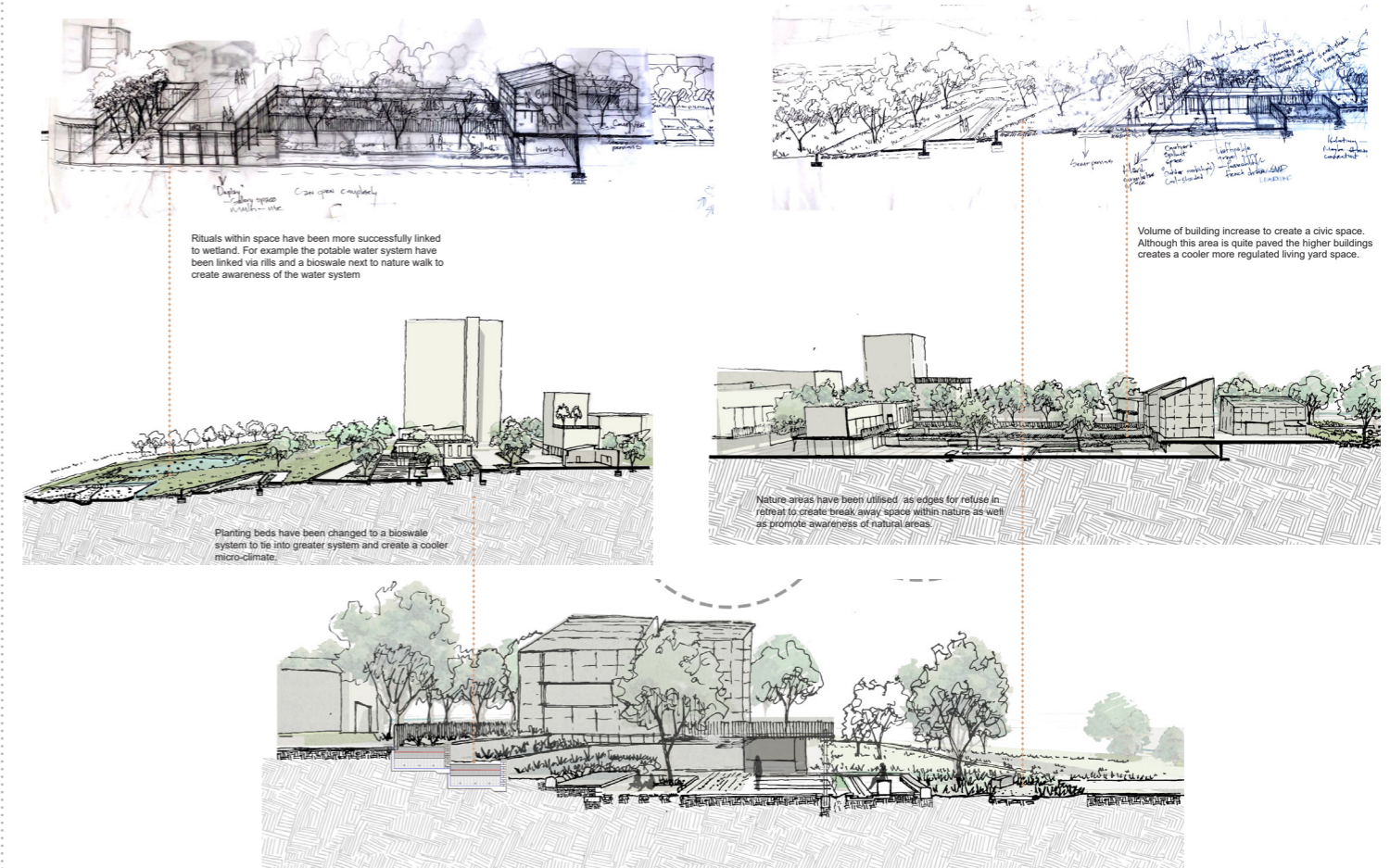


Figure 8: Iterative process of sections (Author 2023).

3. INTEGRATED DESIGN AND TECH INVESTIGATION

The site incorporates three key theoretical concepts that contribute to the creation of environments conducive to nature-based learning and knowledge production within the landscape, as outlined in Figure 9. Firstly, a focus on transforming the landscape and its systems to foster awareness which achieved through both direct and passive engagement with the landscape and its materiality. Secondly, a balance is sought between the site's current overgrown, natural aesthetic and its original intent of control, influencing design and construction decisions and challenging interpretation of the existing. Lastly, the site's heritage is addressed by incorporating a layering approach that juxtaposes the old with the new, creating a contemporary palimpsest that contributes to a contemporary narrative for the site.

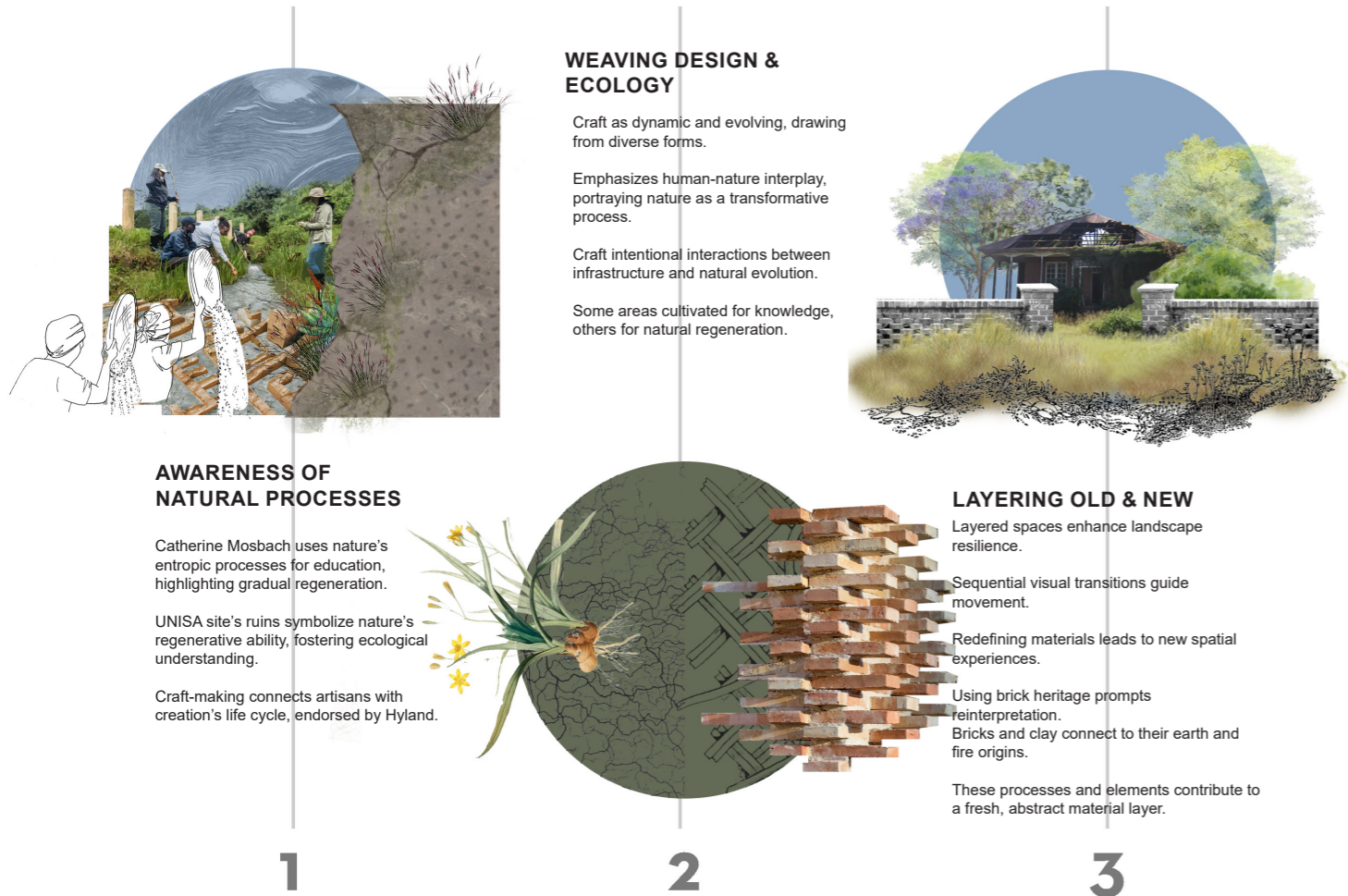


Figure 9: Collages demonstrating key theoretical concepts for design and technical response. 1. Awareness of natural processes 2. Weaving design and ecology 3. Layering Old & New (Author 2023).

3.1. Awareness of natural processes

Prominent strategies for conveying knowledge about ecology to individuals include engaging multiple senses through richer sensory experiences, providing opportunities for involvement in plant cultivation, and facilitating direct encounters with natural ecosystems (Gilbertson 2022). Landscape architect Catherine Mosbach's work serves as a notable example of how allowing nature's inherent entropic processes to influence the landscape can serve as an educational tool that promotes awareness of gradual regeneration processes over time (Raxworthy 2013). The ruins on the UNISA site stand as a poignant symbol of nature's intrinsic ability to follow its course and ultimately regenerate itself. Understanding these natural processes can cultivate a deep appreciation for ecological phenomena (Pallasmaa 2000, pp. 78-84).

The craft-making process, as elucidated by Teerds (2018), involves the artisan engaging within the initiation and end of creation. There exists a connection between the artisan's body, mind, and the surrounding environment as underscored by Hyland (2017). Therefore, it becomes imperative to consider the origins and life cycles of materials integrated into the Vocational Education Program. Local materials such as clay and excavated rock, as highlighted by Mateus, Fernandes, and Teixeira (2019), possess an advantageous profile characterized by lower embodied energy and a cradle-to-cradle life cycle. While the site's resources may be mostly limited to excavated rocks and remnants of old structures, it is worth noting that the re-purposing of building rubble can be regarded as an integral component of continuing the existing material language of the site.

3.2. Weaving Design & Ecology

According to Teerds (2018), the concept of integrating ecological perspectives into craft is articulated as a profound understanding of craft as a dynamic entity, akin to nature itself, perpetually evolving and deriving its potency from its diverse manifestations. Beyond its traditional association with the production process, craft encompasses a broader context, often entailing cultivation and a significant interplay with materials (Teerds 2018).

Michael Desvignes's body of work frequently engenders a dynamic interplay between human intervention and natural progression, emphasizing nature as an ongoing process of transformation (Olivetti 2022). In this context, the designer's role is to intentionally craft the interplay between elements retained as foundational infrastructure aligned with the original intent and those left to evolve naturally (Lou & Havic 2020, 11-13).

According to Lou & Havic (2020) the dynamic interplay between nature and human intervention is constantly in flux. On the cultivated side of the site design, the landscape serves as an open canvas, facilitating knowledge production. Conversely, on the southern edge, the design promotes natural regeneration. This naturalistic border is designated as a space where nature is allowed to flourish without extensive human intervention, in contrast to the more actively managed productive landscapes.

3.3. Layering Old & New

The layering of spaces enables the interplay between the uncontrolled nature and the spaces that require more control. As landscapes change over time, the overlap and diversity within the landscape increase the resilience of the landscape (Olivetti 2022). This fundamentally shapes the interpretation of spaces. Visual shifts within a sequential experience guide the flow of movement and direct one's focus (Lou & Havic 2020, 19).

The small houses on the site hearken back to historical periods of inequity. However, by redefining the significance of materials through diverse applications, the potential for novel spatial experiences emerges. The site's historical use of exposed bricks can be preserved as a material for new purposes. This approach not only allows us to maintain a connection to the era in which it was originally constructed but also creates opportunities for new interpretations of the site. The very language of bricks or clay evokes thoughts of their creation from earth and fire, as discussed by Pallasmaa (2000, 78-84). These fundamental processes and elements, once integral to the act of crafting, now contribute to a contemporary layer to a simple material.

Spillover space from galleries and workshops

Water garden

Grassland gets wilder near attenuation pond

Plant species used in soaps, balms, creams and haircare

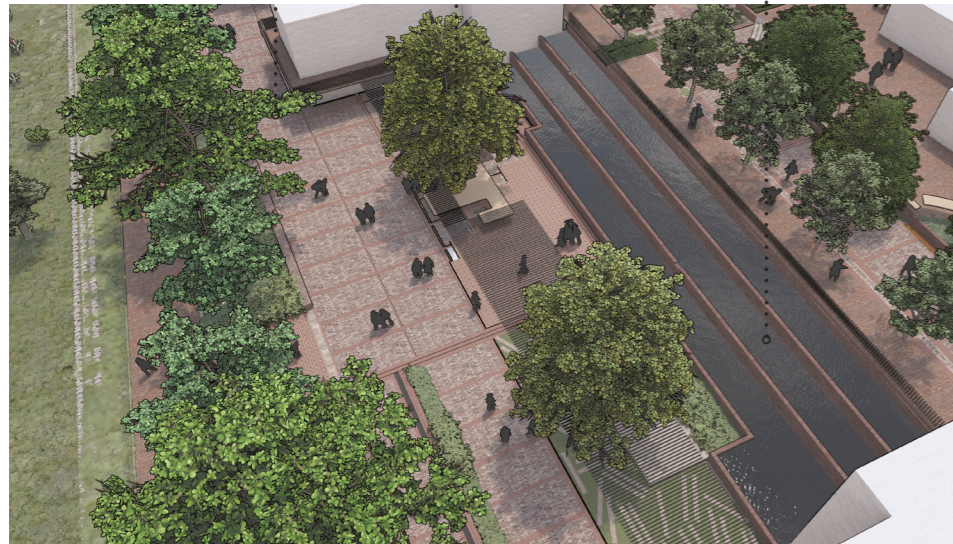
Walkway with various nodes and experiences of attenuation pond system

Work benches of various levels

Berms with rockery at one edge

Mounds supporting walkways and celtis mix

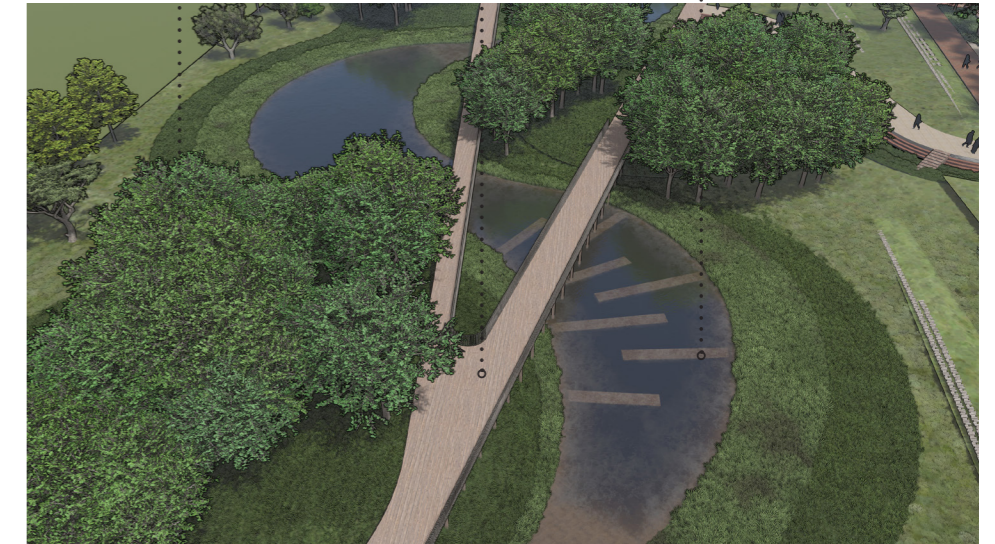
Gabion baffle wall to slow down water and extend purification time



View a: Water garden allows for micro-climate management and creates sound as it falls from one terrace to the next.



View b: Forraige garden makes use of urbanite stepping stones and crevice gardens to create a naturalistic landscape and mimics foraging in nature.



View c: Wetland walk creates various nodes within the landscape to experience natural systems from. The spatial experience creates the feeling of being within nature.

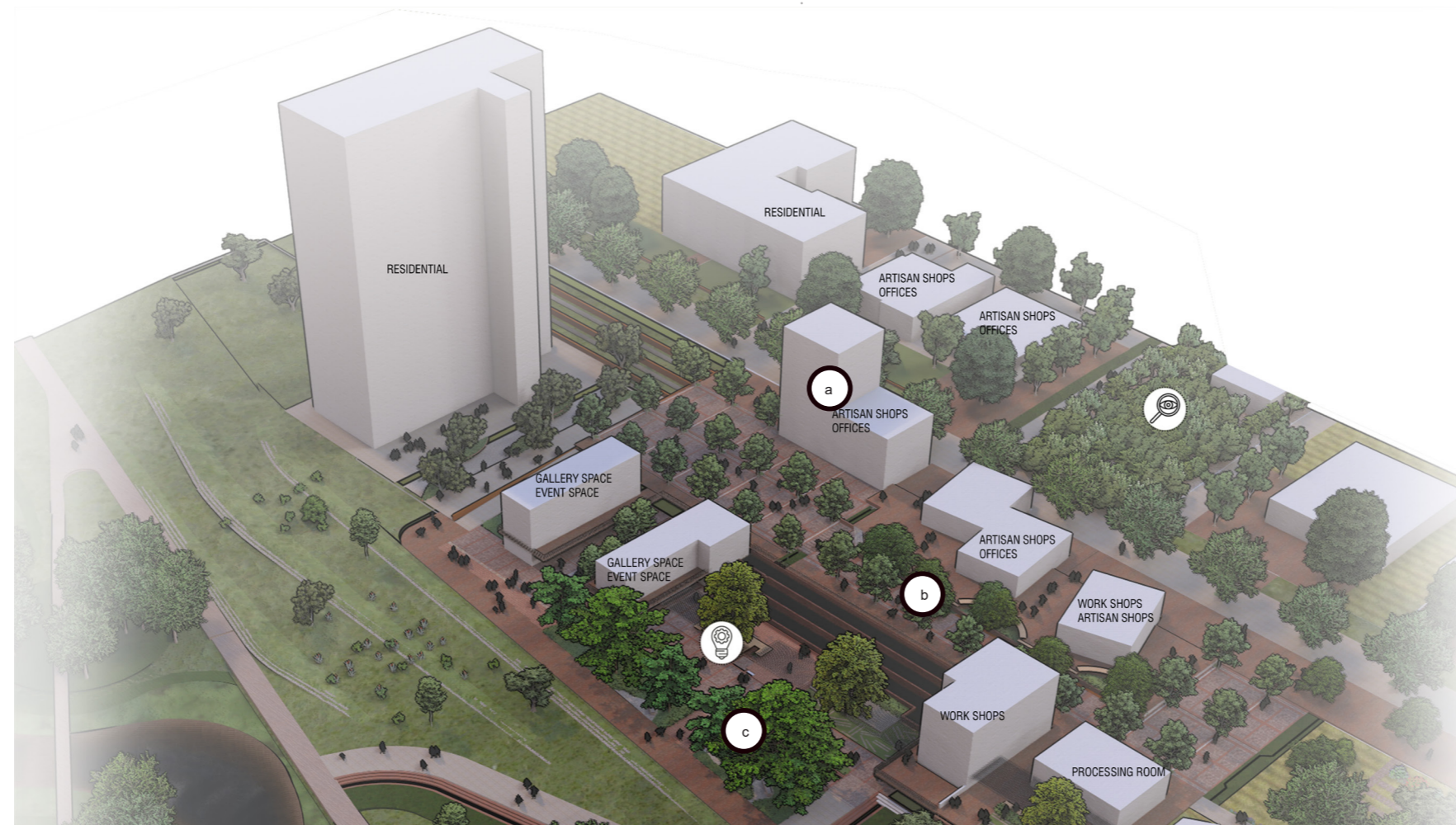


Figure 10: Axo and supporting views of focus area on site (Author 2023).

4. SYSTEMS

Construction plays a significant role in the process of knowledge transfer where it is evident through the integration of vegetation and water systems, serving educational and practical purposes. These elements play a crucial role in enhancing curricula and craftsmanship while also promoting environmental awareness.

The act of construction, when executed with higher-quality craftsmanship in mind, demonstrates the embodiment of knowledge transfer through the utilization of up cycled and on-site manufactured materials. These materials are combined with water and vegetated systems, effectively fusing the natural environment with the materials themselves. This harmonious coexistence of nature and construction materials becomes a vehicle for the dissemination of knowledge and the acquisition of practical skills. Constructed elements play a supporting role in this synergy, reinforcing the link between craftsmanship and environmental consciousness.

Water bodies play a pivotal role in knowledge transfer in two key ways. Firstly, they provide platforms for engaging with nature on multiple levels, fostering a deeper connection with the environment. As an illustration, the wetland offers multiple avenues for engagement, including lookout points and walkways, which afford diverse experiences and perspectives of the natural ecosystem. Moreover, bioswales transcend their utilitarian role as mere water conduits - they assume an interactive and playful dimension within the landscape, beckoning users to immerse themselves and draw nearer to the natural environment. Secondly, water is an integral part of the craft process itself, being used for rituals like washing or as a vital resource in craft techniques, as water is a fundamental component in many processes of making. In this manner, water transforms into a functional as well as captivating component.

The choice of plant species in the educational setting is informed by the plants' capacity of yielding functional by-products. These plants are evaluated not solely for their relevance in climate adaptation but also for their potential to generate a range of commodities, such as creams, balms, perfumes, weaving materials, jewellery, dyes, and phytomedicine. Additionally, there is a need for collaborative areas and processing facilities to facilitate the production process. In this context, the landscaped elements designed for crafting purposes offer both production space and opportunities for knowledge dissemination, aligning with the Polytech curriculum.

Craftsmanship and the transmission of knowledge play a pivotal role in community revitalization. By providing access to nature and fostering engagement with the natural world, this role indirectly imparts a deeper understanding of natural systems to the students on campus. Consequently, it allows for the adoption of sustainable craft practices in the future. As such, this holistic integration of both natural and man-made systems yields more immersive platforms and opportunities for fostering ecological awareness.

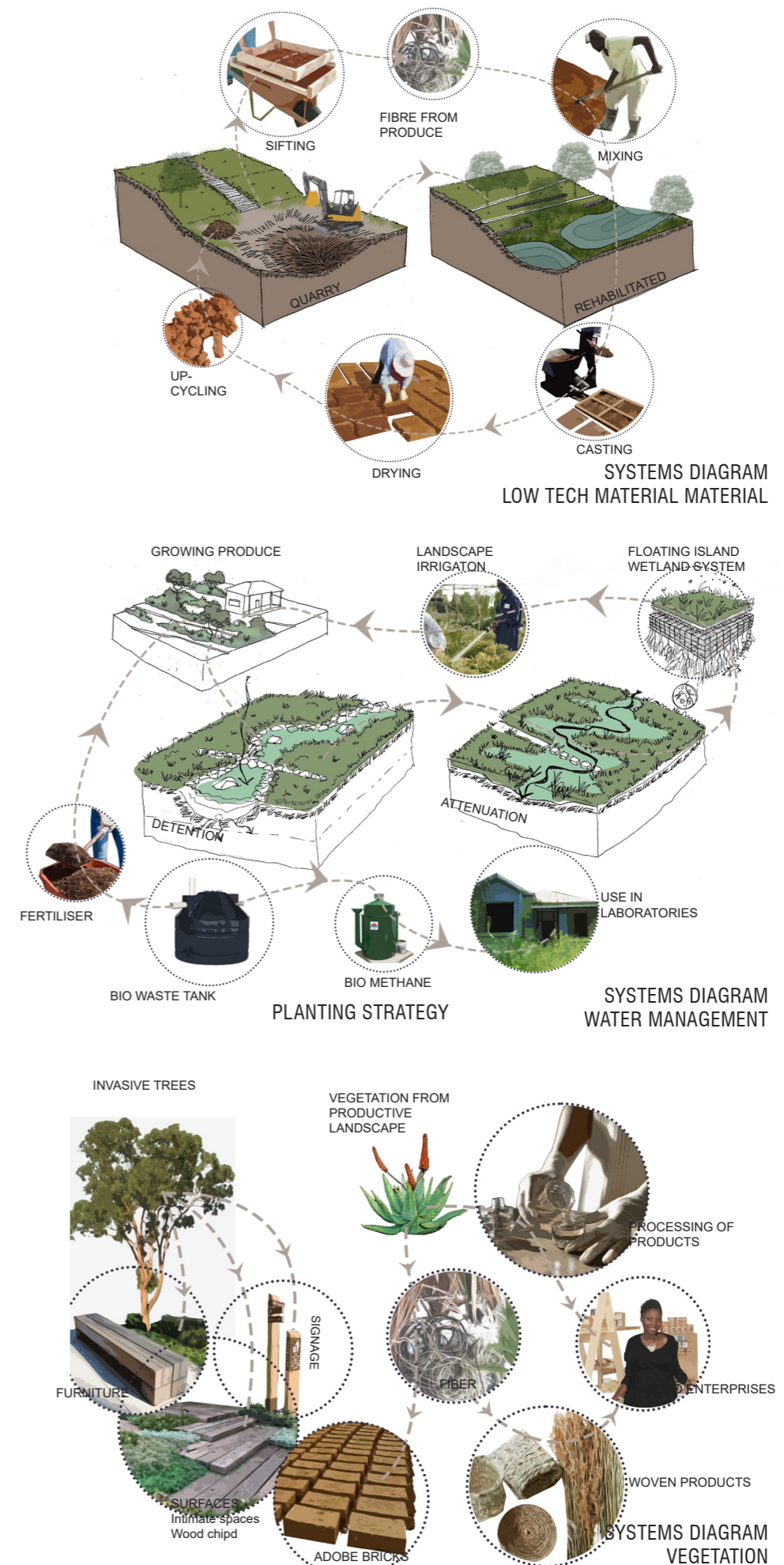


Figure 11: System diagrams indicating conceptual approach to construction, water harvesting as well as vegetation (Author 2023).

5. REFLECTION ON PROCESS

The recognition of the marginalization of nature and women in Pretoria Central played a crucial role in shaping the criteria for selecting the project site. This selection process aimed at identifying areas in the city with the most pressing needs for economic upliftment, empowerment, and ecological restoration. The UNISA Sunnyside campus emerged as the most promising site to address these imperatives due to its proximity to concentrated economic vulnerability in the City of Tshwane. Despite its historical role as a teaching campus, the Sunnyside site has lost its relevance in the contemporary urban context, leading to its current state of dereliction.

This led to the realization that South Africa's education systems have traditionally favored a Western narrative, neglecting the integration of local and ecological knowledge into curricula and practical experiences. This recognition serves as the primary conceptual driver for the project, emphasizing the importance of incorporating relevant knowledge bodies within the given context. The reliance of urban residents on such knowledge systems in their daily lives underscores the imperative to decolonize knowledge systems and align them with local contexts. Vocational training provides an avenue for cultivating craftsmanship within the landscape.

The project's core design-tech strategy is to instill on-site craftsmanship, influencing both site construction and the curriculum. This dual focus fosters opportunities for societal reintegration and ecological regeneration by seamlessly integrating the built environment with educational goals. The design's technical response aligns with these objectives by creating a landscape conducive to the expression of craftsmanship within the technical development. The planting strategy further integrates craftsmanship, using plants specifically intended to be crafted into final products. The skills development program accompanying this approach aims to support and economically uplift marginalized members of the Sunnyside community, fostering ecologically conscientious entrepreneurs for the future.

Lastly, the project seeks not only to uplift individuals and reintegrate them into society but also to contribute to the ecological regeneration of the site and promote hands-on learning and experience with natural systems through the incorporation of ecological knowledge into the campus design. The campus landscape, in essence, functions as an experimental ground for ecological initiatives, prioritizing spaces conducive to learning and engagement. Consequently, it transforms into a canvas that articulates innovation and ideas, actively encouraging users to interact with the environment either through hands-on engagement or to cultivate an awareness and appreciation of natural systems.

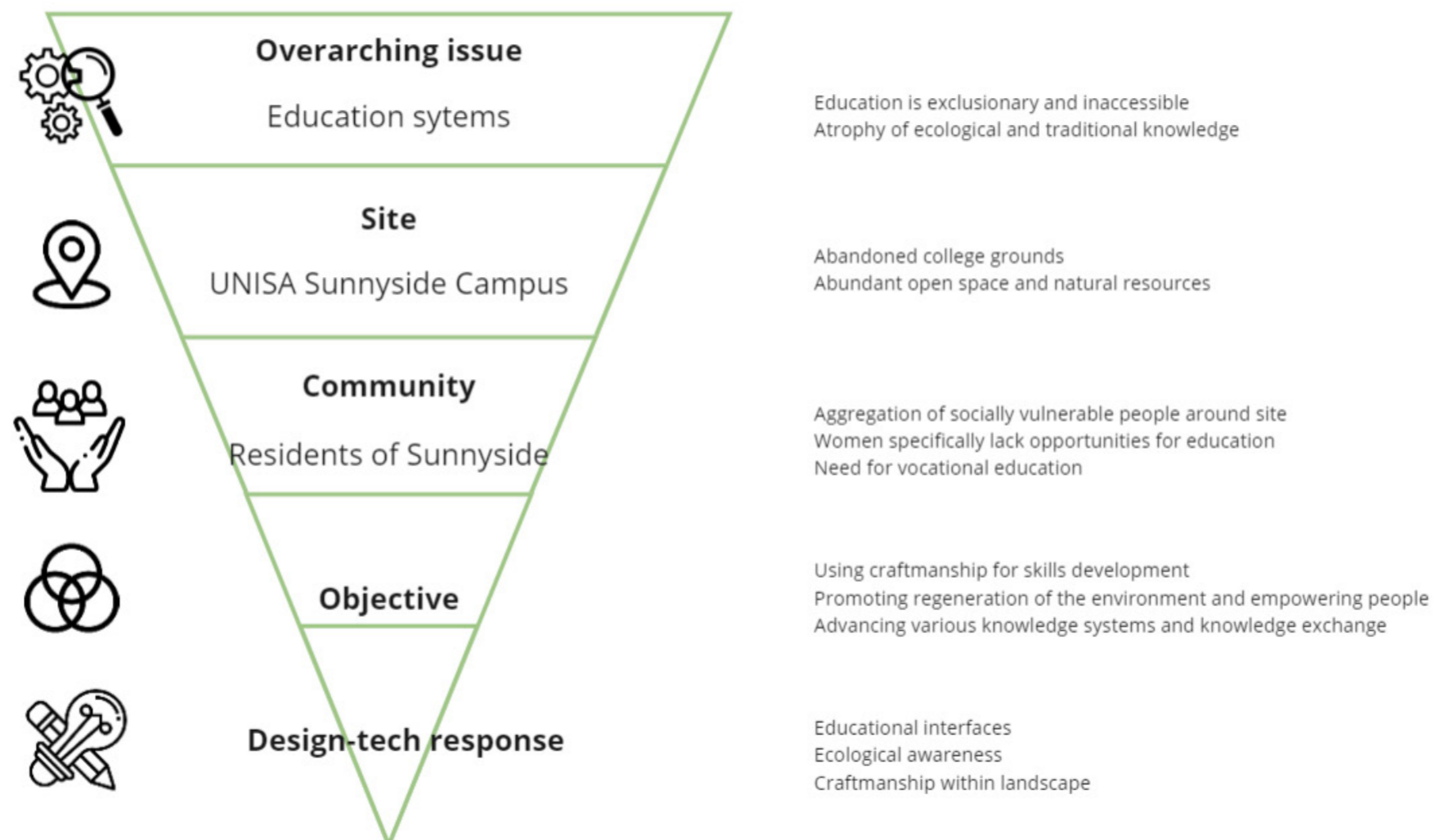


Figure 12: Diagram of design enquiry and process followed to reach design- tech response (Author 2023).

6. CONCLUSION

The project recognizes the imperative need to shift away from Eurocentric perspectives embedded in South African higher education institutions. Its focal point is addressing the specific needs of local communities through the creation of a dynamic, multi-use campus. This campus aims to counteract the erosion of under-recognized knowledge systems by providing vocational training in various fields. Guided by fundamental principles of craftsmanship in landscape, expression of alternative knowledge, and regeneration, the project emphasizes the transformative power of these principles in shaping the environment. Craftsmanship underscores the significance of meticulous landscape design, expressing alternative forms of knowledge within the physical space. Simultaneously, the concept of regeneration is pivotal, influencing both the revitalization of the site and its integration into the broader community.

An integral facet of the project is its commitment to meeting the needs of vulnerable groups, particularly women from low-income backgrounds. It envisions establishing a secure and ecologically sound campus environment by maximizing the utilization of the prevailing derelict urban infrastructure and natural resources. The campus's multifunctional character aligns seamlessly with the triple-bottom-line approach, prioritizing economic, social, and environmental considerations in urban design. This comprehensive strategy fosters nature-based education in a sustainable manner, promoting a harmonious balance between economic, social, and environmental aspects. Central to the project is the decolonization of knowledge production, emphasizing the necessity for diverse methods in knowledge creation. Polytechnic institutions, in particular, demand comprehensive facilities for both practical and theoretical knowledge generation.

The project introduces the concept of a living landscape laboratory, integrating various components of a comprehensive educational institution. This concept enriches traditional curricula and promotes sustainable biophysical environments through research, design, and policy initiatives. A noteworthy emphasis is placed on the integration of Traditional Ecological Knowledge (TEK) directly onto the campus, enhancing ecological awareness and fostering community engagement. Blue-green infrastructure emerges as a pivotal tool for knowledge transfer, serving not only as platforms for engaging with nature but also as contributors to economic value through the production of goods. In conclusion, this project exemplifies a holistic approach to education, community development, and ecological awareness, promising a more inclusive and sustainable future for the surrounding communities. The simultaneous upliftment of ecology and marginalized communities becomes achievable by challenging the norms of traditional knowledge exchange forums, as demonstrated by this project.

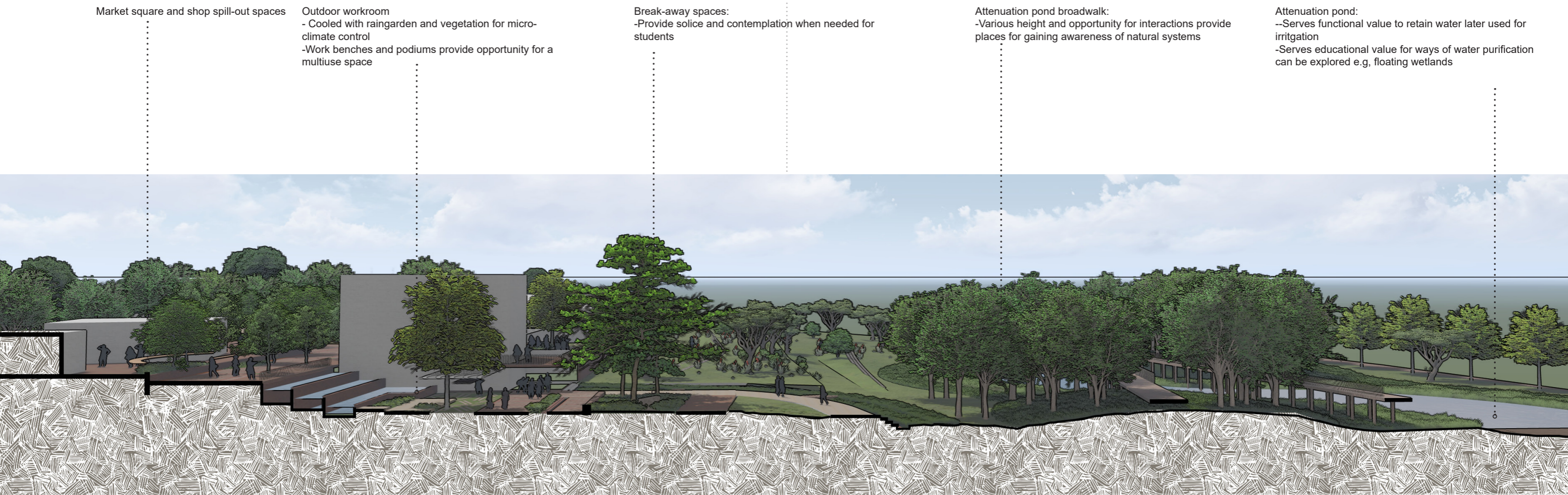


Figure 13: Longitudinal section through working space and wetland (Author 2023).

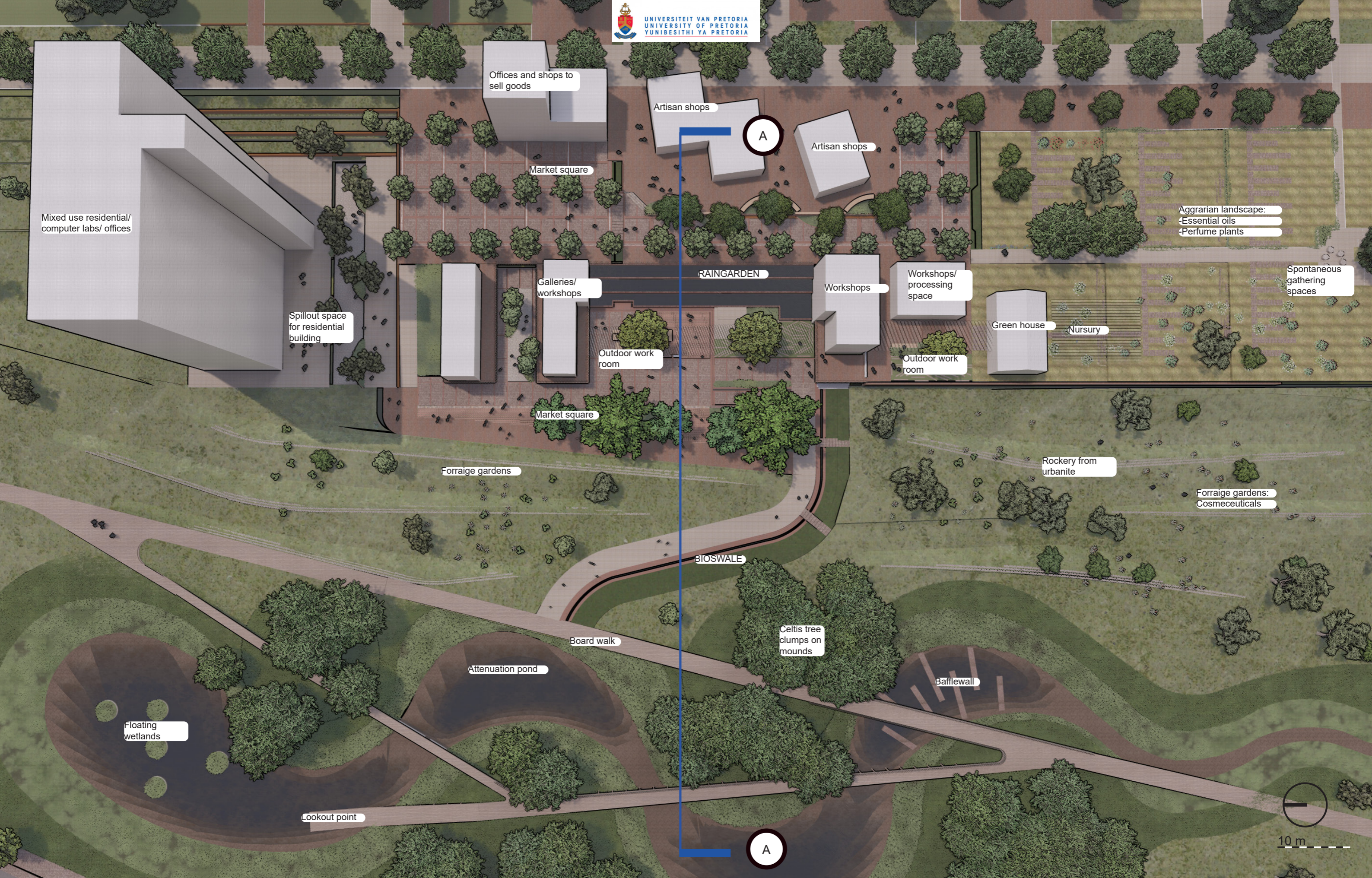


Figure 14: Sketch plan view of focus area on campus (Author 2023).

REFERENCES

- Abrahams, N., Jewkes, R., & Mathews, S. (2010). Guns and gender-based violence in South Africa. *SAMJ: South African Medical Journal*, 100(9), 586-588.
- Allais, S. (2012). Will skills save us? Rethinking the relationships between vocational education, skills development policies, and social policy in South Africa. *International Journal of Educational Development*, 32(5), 632-642.
- Anderson, V., Gough, W. A., & Agic, B. (2021). Nature-based equity: an assessment of the public health impacts of green infrastructure in Ontario Canada. *International journal of environmental research and public health*, 18(11), 5763.
- Ayalu, G., Abbay, A. G., & Azadi, H. (2022). The role of micro-and small-scale enterprises in enhancing sustainable community livelihood: Tigray, Ethiopia. *Environment, Development and Sustainability*, 1-24.
- Brom, P., Engemann, K., Breed, C., Pasgaard, M., Onalapo, T., & Svenning, J.-C. (2023). A Decision Support Tool for Green Infrastructure Planning in the Face of Rapid Urbanization. *Land*, 12(2), 415.
- Cohen, D. A., Han, B., Evenson, K. R., Nagel, C., McKenzie, T. L., Marsh, T., . . . Harnik, P. (2017). The prevalence and use of walking loops in neighborhood parks: A national study. *Environmental health perspectives*, 125(2), 170-174.
- DeDeker, D. J. (2020). A Data-Driven Triple-Bottom-Line Sustainable Balanced-Reporting Framework for Small Municipalities: University of Wisconsin-Stevens Point.
- Gilbertson, K., Ewert, A., Siklander, P., & Bates, T. (2022). Outdoor education: Methods and strategies: *Human Kinetics*.
- Gomez, T., & Derr, V. (2021). Landscapes as living laboratories for sustainable campus planning and stewardship: A scoping review of approaches and practices. *Landscape and Urban Planning*, 216, 104259.
- Hammer, J., & Pivo, G. (2017). The triple bottom line and sustainable economic development theory and practice. *Economic Development Quarterly*, 31(1), 25-36.
- Hernández-Blanco, M., Costanza, R., Chen, H., DeGroot, D., Jarvis, D., Kubiszewski, I., . . . Turner, K. (2022). Ecosystem health, ecosystem services, and the well-being of humans and the rest of nature. *Global change biology*, 28(17), 5027-5040.
- Hyland, T. (2017). Craft working and the “hard problem” of vocational education and training. *Open Journal of Social Sciences*, 5(09), 304.
- Jansen, J. (2019). *Decolonisation in universities: The politics of knowledge*: Wits University Press.
- Kaizer, R. M., Ntshangase, B. A., & Msosa, S. K. (2022). Development planning peculiarities in the city of Tshwane, South Africa: A case study. *Entrepreneurship and Sustainability Issues*, 10(1), 282.
- Kaya, H. O., & Seleti, Y. N. (2013). African indigenous knowledge systems and relevance of higher education in South Africa. *International Education Journal: Comparative Perspectives*, 12(1).
- Kern, L. (2021). *Feminist city: Claiming space in a man-made world*: Verso Books.
- Kistner, U. (2012). Vryheidspark and other government monuments - walking and working through Pretoria : editorial. *Image & Text : a Journal for Design*, 2012(19), 6-13.
- Lambooy, T., & Levashova, Y. (2011). Opportunities and challenges for private sector entrepreneurship and investment in biodiversity, ecosystem services and nature conservation. *International Journal of Biodiversity Science, Ecosystem Services & Management*, 7(4), 301-318.
- Li, F., Zheng, W., Wang, Y., Liang, J., Xie, S., Guo, S., . . . Yu, C. (2019). Urban green space fragmentation and urbanization: A spatiotemporal perspective. *Forests*, 10(4), 333.
- Liao, C., Qiu, J., Chen, B., Chen, D., Fu, B., Georgescu, M., . . . Li, X. (2020). Advancing landscape sustainability science: theoretical foundation and synergies with innovations in methodology, design, and application. In (Vol. 35, pp. 1-9): Springer.
- Littlelyke, M. (2008). Science education for environmental awareness: approaches to integrating cognitive and affective domains. *Environmental education research*, 14(1), 1-17.
- Luo, S., & Havik, K. (2020). Gardens of Interstitial Wildness: Cultivating Indeterminacy in the Metropolitan Landscape. *Spool. Journal of Architecture and the Built Environment*, 7(1# 6), 9-22.
- Marques, B., Freeman, C., Carter, L., & Pedersen Zari, M. (2021). Conceptualising therapeutic environments through culture, indigenous knowledge and landscape for health and well-being. *Sustainability*, 13(16), 9125.
- Martins, L. B., & Tagliari, A. (2023). Fábio Moura Penteado in São Paulo. *Drawings for a Modern, Urban, and Democratic Architecture. diségno*(12), 133-146.
- Molamo, M., & Weir-Smith, G. (2021). The geography of opportunity: Exploratory spatial data analysis in the City of Tshwane.
- Molnár, Z., & Babai, D. (2021). Inviting ecologists to delve deeper into traditional ecological knowledge. *Trends in Ecology & Evolution*, 36(8), 679-690.
- Nadat, Y., & Jacobs, S. (2021). Elements that contribute to resilience in young women from a high-risk community. *Social Work*, 57(1), 87-100.
- National Water Act 1998, (1998).
- Olivetti, M. L. (2022). Landscape architecture and the green deal dare: Five successful experiences in urban open spaces. *Sustainability*, 14(14), 8751.
- Pallasmaa, J. (2000). Hapticity and time. *Architectural Review*, 207(1), 78-84.
- Pillay, Y. (2022). #WomenMonth: IFP awards three women cosmetology learnerships. Retrieved from <https://www.iol.co.za/mercury/news/womenmonth-ifp-awards-three-women-cosmetology-learnerships-b78fa9a0-d820-448f-8298-416da77e436f>
- Raxworthy, J. (2013). *Novelty in the Entropic Landscape: Landscape architecture, gardening and change*. Doctoral Dissertation.
- Risling Baldy, C., Reed, K. P., & Begay, K. (2023). Polytech to PolyTEK: Traditional Ecological Knowledge, Indigenous Science, and the Future Forward Polytechnic University. *Humboldt Journal of Social Relations*, 1(45), 34-51.
- Teerds, H. (2018). *Vita Architectura. Architecture, Craftsmanship and the Public World*. In *Dialectic VI, The Art of Making Architecture* (Vol. 6, pp. 3-9): ORO Editions.
- Thwaites, K. (2001). *Experiential Landscape Place: an exploration of space and experience in neighbourhood landscape architecture*. *Landscape Research*, 26(3), 245-255.
- Visser, T., Chodokufa, K., Amadi-Echendu, A., & Phillips, M. (2016). An analysis of small business skills in the city of Tshwane, Gauteng province. *African Journal of Business and Economic Research*, 11(1), 93-115.