The Urban Nomad
A critical look at the institutional architecture of nomadic users

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Design Dissertation report presented as part fulfilment of the degree of Master of Architecture (Professional) in the School of Architecture Planning and Geomatics, University of Cape Town.

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Manzi

Manzi is an isiXhosa word used to describe water however it is also a clan name used to represent the homestead. This tells a story of the material as a vessel. Within it, it holds subsistence (water) and the family (home/village). The materiality of the vessel is a cool porous terracotta.
Ntsomi

Ntsomi is an isiXhosa word used to describe a bedtime story in the form of a parable. The elders tell it to the young as a medium of passing on an oral history. The story stems from lived experiences, but is cloaked in a mythical veil in order to relate a lesson. This speaks to the materiality of African mythological stories.
Abadala, kudala

Abadala, kudala is an isiXhosa phrase referring to the elders both present and past. Xhosa boys paint their bodies in kaolin as a right of passage into manhood, and as an induction into becoming the elders who head the family. It is believed that when one adorns the body in kaolin clay, the material makes one visible to the ancestors, this speaks to the mythical qualities of the material, it become a medium to communicate to the elders who have passed.
Intlambo kaNongqawuse

Intlambo kaNongqawuse is an isiXhosa phrase meaning the Valley of Nongqawuse. uNongqawus ·e was the Xhosa prophetess who told the Xhosa nation that by sacrificing their crop and cattle (which was their source of wealth and food) they would be freed from British colonial rule. This prophecy did not come true but instead lead to a famine which still plagues the South African landscape today. This is the surrealist landscape which has been depicted in the narrative. The material is barren, brittle and dry, it has been drained of water, home, culture, belief, heritage, pride, independence and wealth. Leaving Xhosa people to roam foreign territories in search of subsistence.
Umakhi

Umakhi is an isiXhosa word used to describe someone with an ability to build. To build a home, a village, a city, a nation. In the narrative, it refers to migrant labourers specializing in the trade of brick laying. The fired brick (isitena) becomes a manifestation of the industrialization of the material. Birthed from the dry and brittle surrealist landscape, through fire the land is forged into bricks. Fire which has scorched the land to clear the way for new livelihoods, homes, ntsomi’s, ceremonies, truths, and beliefs. This is the landscape which the urban nomad has to navigate.

The characters appear to be stuck in a moment of tension, uprising, progression and building but they are actually stagnant. What does this mean for the future of the material and its people? This is the question I have explored in the design dissertation, as an extension of this narrative.
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This project would have not been possible without the assistance of the invaluable individuals I have met along this journey of research and discovery. I would like to thank them for sharing their stories with me and assisting me with bringing this project to life.

PROJECT NETWORK

Sibusiso (Naledi Project Ceramic Studio, Langa)
Ceramic craftsman and material consultant. Thanks you for your assistance in the firing process and connecting me with the Craft and Design Institute

David van Staden (Craft and Design Institute, Barrack Street)
Product Support Workshop advisor. Thank you for introducing me to the method of making your own plaster mould using the CNC milling machine.

John Coetzee and Shafeek (UCT School of Architecture)
Workshop advisor. Thank you for allowing me to set up show in the workshop for the semester and for your assistance in the fabrication process from casting plaster, CNCing the mass model, predrilling holes into the procelain greenware, and forging steel for the substructure.

Delise Reich (UCT Michaelis School of Fine Art)
Ceramic craftswoman and material consultant. Thank you for coming in on Saturday to fire up the kiln, and for sharing your own tools and materials in the glazing processes.

SUPERVISORS:
Francis Carter, (Supervisor)
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And to Jane Stuart Clark. who opened up her ceramic studio to me at the age of 12 and without whom I would not have discovered the synergies that lie between my passion for ceramics and my chosen career of architecture.
INTRODUCTION

This design dissertation is critically looking at the architecture of vocational training facilities as an institutional (educational) building typology within Gugulethu. The research focuses on how these buildings facilitate access to resources by urban citizens through their association with public transport hubs, trade and industry. The architectural inquiry into this typology focuses on transient / seasonal users in the built environment operating within changing geographies but with a shared identity, purpose and behaviour.

The research was primarily explored through context dependant fieldwork. This culminated in a vertical studio project working with BAS honours students, theory and technology studies paper and the design dissertation report. Each phase of the research has informed a better understanding of the context. From the vertical studio fieldwork study a better understanding was gained on the context of Gugulethu, which has little built infrastructure but a high density of residents. This has resulted in unplanned use of institutional buildings in informal communities. And an incremental and fragmented architectural language of small scale interventions placed around communal / shared spaces e.g. courtyard, street etc. From the theory and technology study on vocational training facilities in the greater Cape Town metropole, a better understanding was gained on the design and occupation of these spaces and technical characteristic of the materiality of clay. From the design dissertation a better understanding was gained on the architecture of the place and for the people. This was explored through complementary programmatic arrangements and construction processes. The findings for these studies have been distilled into design principles, which have been applied to the design dissertation project.

The paper is divided into 4 sections. The first section explores the theoretical and fieldwork study on the type of users anticipated for the design dissertation project. That being transient users within the theoretical framework of the 'nomadic subject' (Braidotti, 2011). These have been interpreted into three typological users, migrants, students and informal traders. This has been developed into an inhabitation key, which is read in conjunction with the plan drawing. The second section explores the design principles which have emerged from the theoretical and fieldwork study. These include the theoretical works of Balmond and Lefebvre and fieldwork conducted as part of the vertical studio project, theory and technology study and design dissertation report. The third section explores the methods used in the design and technical development as tools for design thinking. These include both digital (AutoCad, SketchUp and CNC milling) and analogue methods (hand drawing, clay study models, slip casting prototypes). The report is concluded with the design project. The design dissertation project uses the medium of clay to explore issues of urban identity and innovation in technical production and contributes to the history of the material and its people as a material culture and heritage which isn’t stagnant.
The title of the design dissertation is the urban nomad. This stems from a theoretical exploration on the Nomadic Theory by Braidotti (Braidotti, 2011). The 'nomadic subject' according to Braidotti is a non unitary subject which references analytical cubism as a mean of representing this subject matter as a layered and diverse entity, representing multiple voices within the urban context. She also classifies the nomadic subject as falling within minority groups (animals, plants, seeds, females, blacks etc) outside of the hegemonic white male which is the dominant subject in current social / spatial construct. She uses the study of the minority as a starting point for creative explorations to re-imagine and re-represent new ideologies in space. This is a methodology or a tool which I have used in my design thinking and development. This methodology has manifested as site specific fieldwork interviews in the design dissertation research. Using minority groups within the context of my site as a creative starting point in the design development. These interviews were done with individuals who fall within the user group classification developed in response to my own interpretation of what a nomadic subject is. And taking on the role of one of these user groups (the student, as a transient user in the built environment) in the technical design development process. Working across multiple vocational training facilities in Cape town (the UCT architecture workshop, CDI and the Naledi Project ceramic studio) to develop prototypes for the building screen. These spaces which I have intersected with in the development of the prototypes have been incorporated in the programmatic narrative of the design dissertation building project.

Interviews with human subjects have been conducted as part of the fieldwork for the design dissertation. The Faculty of EBE Ethics in Research Committee has granted ethical clearance for the fieldwork. The scope of the fieldwork entails engaging with users / staff of key training and trade facilities in Gugulethu and surrounding networks. The aim of the interviews is to understand the broader networks that exist at a neighbourhood scale; urban scale and provincial scale and how these nomadic networks stem from these pivotal spaces within the community. The findings from these interviews is discussed in the summary on the key users (inhabitation key).
The first user classified is the migrant. This stems from my own subjective history and background. My family migrated to Cape Town from rural Eastern Cape in search of employment opportunities and a better life. This is the same story for 7.67% other South Africans (Stats SA, 2011). From the creative exploration of the cultural, material and economic heritage of the internally displaced migrant labourer in South Africa, I began to identify urban thresholds in Cape Town in relation to Gugulethu, to understand the nature of arrival spaces in the urban domain. This became the urban strategy adopted for the design dissertation project. Whereby urban threshold spaces in the form of public transport hubs became the sites of interests for a vocation training / hotel building project. This led to the selection of the site, which is the market four storey to the Nyanga Junction train station / taxi rank in Gugulethu. This is shown in the image below. Like many transportation hubs, these spaces in the city are defined by high volumes of pedestrian / vehicular movement and informal trade.

Table from Stats SA Census 2011 document showing the major migration flows in South Africa between provincial administrations:
1. Limpopo to Gauteng (12.06% of all inter-provincial migratory moves);
2. KwaZulu-Natal to Gauteng (8.27%);
3. Eastern Cape to Western Cape (7.67%);
4. Eastern Cape to Gauteng (6.04%);
5. Mpumalanga to Gauteng (4.71%);
6. North West to Gauteng (4.23%);
7. Eastern Cape to KwaZulu-Natal (3.87%);
8. Gauteng to North West (3.69%);
9. Gauteng to Western Cape (3.42%); and
10. Free State to Gauteng (3.37%).

The research will be focusing on the Eastern Cape to Western Cape migration corridor as it relates to migrants in the context of the design dissertation which is based in the Western Cape. According to the data, 10% of the migrants who formed part of the census had a qualification above matric (this is a lower literacy level in comparison to other provinces). And 29% of these migrants stay in the informal settlements of Cape Town showing a higher influx of migrant into informal settlements than in any other province. Therefore to meet the needs of these users, formal temporary accommodation in informal settlements is needed and education / training would be required to access economic opportunity.

FIGURE 7:

LEFT: literacy level of migrants EC-WC
RIGHT- dwelling typology of migrants EC-WC
(Stats SA, 2011)
This user typology critically looks at the urban nomad as an internally displaced persons / migrant urban citizen. To be displaced is to flee or be forcibly removed from your home or place of belonging as a result of violence, environmental disaster, economic distress or development projects within the territory of your urban or rural place of dwelling. Although migrants may typically struggle to access a secure, formal urban livelihood, it is important to recognise that informal livelihood opportunities in urban areas exceed employment opportunities in rural areas in South Africa (Cornwell & Inder 2004) (South African Cities Network, 2014). This extract from Migration, Mobility and Urban Vulnerabilities, a report compiled by the South African Cities Network highlights the primary reason for internal migration in the context of South Africa as economic distress (for the sake of livelihood / economic opportunity); historically the cause was forced removals and recently private development projects. These account for the internal migration and physical insecurities experienced by the urban citizen.

It is difficult to seek international aid for displaced people because technical if they are within their home country they should be receiving aid from their own government, but in many instances that is not the case. "...officials continue to view migration as an ailment and migrants as a burden and an 'illegitimate drain on public resources, such perceptions place migrants outside of local government constituency' (Landau et al., 2011, 8), leading to further exclusion, marginalisation and non-recognition of their rights as citizens." (South African Cities Network, 2014). As a result, these communities are forced to generate their own means of support (political, economic, shelter, etc.). Based on the interdependence required to survive, strong social relations are forged within the community. "...due to the lack of support from local government, migrants are dependant on informal networks, NGO's and religious organisations for support." (South African Cities Network, 2014). This extract highlights key social structures and institutions found within migrant communities that support the integration and transition of migrant into urban life independent of the state. These organisations, and the facilities which support the work that they do, become pivotal spaces within the community.

FIGURE 9: arrival stair platform to Nyanga Junction train station, overlooking Amandla Edufootball, Nyanga Junction taxi rank and informal market (Njobe, 2017)
FIGURE 10: Map drawing of major transportation hubs in Cape Town; Cape Town station, Nyanga Junction station (site) and airport as arrival / threshold spaces in the city. (Njobe, 2017)
The design dissertation project is based on the vocational training facility as a model for an institutional building that can function as a pivotal space within self-governing migrant communities. A building which can plug into a network of existing campuses both in Gugulethu and the greater Cape Town metropole to provide access to resources across the city. The building project has been designed to support the existing entrepreneurial program on the site which has developed organically over time and independent of the state. A non-profit organisation by the name of CDI has been identified as the client for the digital craft centre/hotel. The reason for migration has been identified as economic opportunity however due to the literacy levels of most migrants coming into the Western Cape, these users have very limited employment prospects. The building projects aims to support, train and upskilling these users so that they have access to better employment prospects within their industry/trade.

FIELDWORK

The example which has been used for the migrant user typology is a man by the name of Sibusiso. Initially he was interviewed as part of the research conducted for the theory and technology studies papers, but has since formed a part of the prototyping process for the design dissertation project. Sibusiso migrated from the Eastern Cape in search of employment. He was interested in art, and familiar with the medium of clay from his rural upbringing. So he reached out to the Guga'Sthebe Cultural centre in Langa to get the necessary training as a ceramicist. He now currently works there as a ceramic artist and teacher.

From the fieldwork conducted with Sibusiso, I gained a better understanding of the design of a ceramic studio space. A better understanding of the slip casting process. And a technical understand of the material. I also observed how the Naledi project uses indoor/outdoor space. The south/east facing amphitheater space is used as a studio in the morning when the ambient temperature of the studio is still high from kiln firing from the night before. Clay pieces are air dried in the sunny west facing parking lot before firing which happens in the evening. The parking lot is also used as a spill over space when there are high volumes of production. In the interview process, Sibusiso mapped out where to source materials for slip casting in Cape Town. He was also the one who referred me to the CDI, where the plaster mould was CNC for slip casting the prototypes. Once I had made the prototypes, I returned once again to the Naledi Project studio where Sibusiso consulted on what strategy to adopt for the firing process and where I was able to share the prototyping process I had gone through with him.

FIGURE 11: own pictures take at the Naledi Project ceramic studio in Langa showing flexible event in the west facing parking lot. Work tables have been arrange in the afternoon sun for high production slip casting and air drying. This is done by Sibusiso while the mama's paint in the cool shade of the studio inside. There isn't enough space for all stages of production, this is a measure which has been adopted to address that.
The second interpretation of the 'nomadic subject' (Braidotti, 2011) looks at transient users in the built environment, primarily students in secondary and tertiary education. This stems from the fieldwork study that was done which consisted of interviewing and visiting sites where vocational training takes place. The sites which were identified include Gugulethu Comprehensive School and the College of Cape Town within the context of my site (Gugulethu). Corobrik bricklaying training centre, UCT architecture school workshop, UCT michaelis school of fine art ceramic studio, Craft and Design Institute (CDI) and the Naledi Project ceramic studio have been used as precedent from the theory and technology research done in the first semester as examples of vocational training facilities in the greater Cape Town metropole.

Both the Gugulethu Comprehensive school and the College od Cape Town form part of a nomadic network of campuses that students can access. The specialisation of higher educational campuses emerged as a post apartheid strategy. Institutions of higher education were previously racially segregated causing redundancies in infrastructure. This was consolidated through creating specialised campuses, in order to maximise built form for maximum programmatic function. This then became the precinct strategy adopted for the design dissertation project. By proposing the building project as an extension of these existing facilities (primarily managed by the CDI), the building program is able to function at a much smaller building footprint, as a specialised ceramic prototyping facility but maximising on function across the different sites and number of users by tapping into these networks.

The prototyping process has also been an opportunity to emerge myself within the role of the student as an imagine user of the proposed building project. Going through that process i now understand the spaces required for a digital ceramic prototyping centre and how these spaces are placed in relation to each other based on the workflow, and different stages of production. In order to create ceramic prototypes for the technical development of the design dissertation building project i was required to work across these vocational facilities, as there wasn't one specific facility that offered the necessary equipment and spaces for ceramic prototyping. Through the study i have proved the need for a centralised facility specialising in ceramic prototyping. The difficulties i faced working between these sites was transporting the material and artefacts as clay is a brittle material and ceramic can easily break on transportation if not handled correctly. However, working across these sites opened up the opportunity to reconnect with the people i had been in contact with, earlier in the research, for example the Naledi Project ceramic studio and the Craft and Design Institute. Creating a network or 'team' around the prototyping process.

FIGURE 12: own photographs of prototyping process done across vocational campuses in Cape Town
FIGURE 13: Map showing vocational schools network in Gugulethu. (Njabe, 2017)
The College of Cape Town campuses are located all over Cape Town, originally built within group areas. Students are now able to access these campuses across the city. This starts to break historic spatial boundaries. The key findings from the interview conducted at this site are the importance of trade and industry to the education pedagogy of vocational training. This is a principle which I have applied in the design proposal through the integration of the existing traders in Nyanga Junction as facilitators and users of the building. This creates a cross pollination between public and private users, whereby trainees can learn from the entrepreneurial experience of the traders and traders can build on their skill set through the training offered by the centre. The interview extract below begins to highlight the need for a space where practical learning can play out as an essential part of the programs course work.

Q: "with business training, do you offer entrepreneurship?" (Njobe, 2017)
A: "Yes but we don't have incubators... they do a year program in entrepreneurship which is very theoretical and I don't think that the vast majority of them understand why they are doing that. Especially the profile that we are dealing with in Gugulethu, they want to go get a job. They want to work for government. So that is an issue. but on a post matric level in the Business Management program we offer it as a major subject for N4 (Basic Entrepreneurship), N5 and N6 (National Entrepreneurship)." (Anonymous, 2017)

The Gugulethu College of Cape Town facility focus on business training however, they lack an industry partner for practical business training. The informal traders in Nyanga Junction become a key component in bridging this gap. Other entrepreneurs in the private sector will also be invited to the centre for presentations, talks and to also provide training.
GUGULETHU COMPREHENSIVE SECONDARY SCHOOL

A: "We are phasing out the business side. I.D Mkhize is focusing on the business. These learners who want to focus on commerce, they go to I.D. Mkhize and those who want to become doctors, they go to Fezeka. Fezeka is an academic school now, we are the technical." (Anonymous, 2017)

From this interview extract the principle of the Gugulethu Comprehensive Secondary school (who chose not to have his name disclosed in the report) states that the school specialises in vocational training. This school exists as part of a network of specialised secondary schools in Gugulethu. The digital craft prototyping centre has been strategically designed as part of this network of schools and other vocational training facilities both in Gugulethu and the surrounding metropole. Therefore the proximity of the Gugulethu comprehensive school to the site (opposite) offers an opportunity for students to use the centre and if there is an overflow of users at the centre, there is also an opportunity to access the workshops spaces at the school. Ceramic facilities arent offered at any of these schools. This is the unique value proposition of the design dissertation project to the existing schools network.

A: "we do have learners that will need to do the entrepreneurship after their grade 12 because they won't be able to go to varsity because they are doing technical maths and technical science, they are not doing pure physics and pure maths. which means those ones can only go to vocational schools, one of them is by the police station (indicating to College of Cape Town)" (Anonymous, 2017)

The interview extract also shows an opportunity for collaboration between the students of this school and the entrepreneurs or traders of the Nyanga Junction market within the space of the proposed building project.
The third interpretation of the 'nomadic subject' is the informal trader. This stems from site explorations. The market four court to the Nyanga Junction train station is programmed for informal trade. Primarily second hand clothing, but also food vendors, hair salons / barber shops, shoe and cellphone repairs etc. These businesses are defined by mobility in terms of the strategic position of their businesses along high volume pedestrian routes and the temporary occupation of the structures from which they operate (whether its trading from an allotment on the paved surface of the fourcourt, on an elevated table, in a container or in a shared building). One of the traders interviewed as part of the fieldwork told her story of how she had moved from a formal structure but after the passing of her husband and traveling between Cape Town and the Eastern Cape she lost her trading post. From there she moved to an old shipping container but was later evicted by local authorities. She now trades from the pavement allotment allocated to informal traders in the Nyanga Junction train station market. Her family owns a container where they store second hand clothing to sell at the market. She also sells food/snacks from her trading bay. Her journey illustrates the transient nature of traders on site, the clothing trade ecosystem, and the difficulties that informal traders face in their business with local authorities due to the tensions between formality and informality.
TRADING TYPOLOGIES

CLOTHING
TAIIORING • DRESSMAKING • CLOTHES RETAIL • SHOE REPAIR

Clothing is a major market of trade in this area. There are numerous second-hand clothes traders, some of whom source their products from other cities. Shoe repair and dressmaking/tailoring are another significant trade.

BEAUTY
COSMETICS • HAIR SALONS

Hair salons saturate the street edges as well as in trade spaces off the active streets and operate competitive business in close proximity to each other. Various traders also sell myriad cosmetics and beauty products in pop-up stalls on the pavement.

FOOD
FRUIT • VEGETABLES • TAKE AWAYS • FRESH MEAT

Street food culture is prevalent throughout; whilst major cutlets exist in the train station, at street level there are individual fast food options offering both local cuisine and dishes from across the continent, making this a true reflection of the diversity in this area. Fresh produce and meat also retail for far lower prices than at major chain supermarkets.

SERVICES & HEALTHCARE
DENTIST • FUNERAL SERVICES • HERBALIST MEDICINAL HEALER

There is a strong influence on traditional medicine, with “doctors” offering traditional healing services and who also sell medicinal herbs on the pavement. A dentist operates a bustling practice from a container-converted-surgery. A funeral service also offers comprehensive service including 24-hour availability.

MIXED-TRADE
MIXED TRADE • CLOTHES, FOOD • COSMETICS

Whilst most trade is focussed on specific categories, some traders diversify their product with a general mixture of clothing, cosmetics and in some cases, food or fresh produce.

ELECTRONICS & HARDWARE
CDs • CELLPHONE REPAIRS • PUBLIC PHONES • ELECTRICAL APPLIANCES • HARDWARE

Many traders sell hardware parts and home accessories including door handles, PVC piping, plugs, and electrical components. Pirated CDs are a niche but focussed market. Major cellular operators such as Vodacom license public phone facilities from a container, and there is a strong market for mobile phone repairs and accessories.

FIGURE 19: trading typologies identified in the Nyanga Junction precinct as part of the fieldwork conducted for VPUU in 2016. (Dowlath et al., 2016)

FIGURE 20: own photographic collage of trading typologies along NY3 in the Nyanga Junction station precinct. (Njobe, 2017)
FIGURE 21: Map showing Nyanga Junction station precinct, chosen site for the design dissertation highlighted in red. (Njobe, 2017)
SITE CONDITIONS

FIGURE 22: Panoramic of existing site, showing traders operating from old shipping container. One is locked, the other two are a shoe repair and cellphone repair shop. Both will be relocated into the design dissertation building project. (Njobe, 2017)

FIGURE 23: Panoramic of existing site, showing traders operating from old shipping containers and paved surface of the Nyanga Junction market. 2 containers are programmed for 2nd hand clothing storage and the third is a barber shop, all of which will be reconfigured in the design dissertation building project. (Njobe, 2017)

FIGURE 24: Panoramic of clothing ecology working between 3 sites; the Nyanga Junction market, the pedestrian walkway on the opposite side of the street and the vacant plot opposite the Gugulethu Comprehensive school. The sites cater for both local and international trade of second hand clothing. (Njobe, 2017)
FIGURE 25: sectional inhabitation drawing (Njobe, 2017)

FIGURE 26: plan inhabitation drawing (Njobe, 2017)
INFORMAL GRID

A string loops and folds and is compressed so that one loop touches another. The contact points merge or fuse – the curving lines 'straighten' out to produce the familiar configuration of truss.

If the loops compress further and the contacts harden, other configurations arise.

The different rates of compaction of a travelling wave produce a variety of networks.

The arrested movements at any moment are structures, ordered by chance and carrying a memory of the shaping, but hidden, force field.

FIGURE 27: showing variation of unconventional grid systems from Balmions book Informal (Balmond, 2007)

PLAN GEOMETRY

SCREEN GEOMETRY

FIGURE 28: plan diagram drawing showing the use of a circular geometry in the initial design. (Njobe,2017)

FIGURE 29: elevation diagram drawing showing the use of a triangular geometry in multiple assembly patterns. (Njobe,2017)

DESIGN PRINCIPLES

This section of the paper explores the theoretical references which have informed the architectural language of the design dissertation project. These include the ideas of Lefebvre in his book Rhythmanalysis (Lefebvre,2013). Lefebvre’s principles have been translated in the design dissertation project as the ‘rhythms’ created through form and void and event and memory. Balmond’s concept of the ‘local’, ‘hybrid’ and the ‘informal’ have been used as a reference from his book Informal (Balmond,2007), through exploring local moments as generative studies to creating new systems of order and the overlapping of multiple ordering systems within a single space / place. Foucault’s theory on heterotopias has also been used as a reference through the use of overlapping of multiple programmatic events within a single space / place. Hillier’s proposal to merge local knowledge with historical precedence through participatory design in her book Stretching Beyond the Horizon (Hillier, 2007), has been referenced in the extensive consideration of users in the programmatic design and screen fabrication process. These theoretical references have influenced the fluid and fragmented architecture that has emerged as part of the design proposal.

The plan geometry works off a circular geometry and the screen a triangular geometry. Both breaking away from the traditional rectilinear Cartesian grid.
Perspective elevations start to show how the use of a circular geometry in the plan has informed how the form for the building was generated.

**FIGURE 30: east elevation perspective of digital pod. (Njobe, 2007)**

Curvilinear walls at threshold spaces lead pedestrian into the building and create opportunities for chance encounters between diverse users.

**FIGURE 31: north elevation perspective (Njobe, 2007)**

**FIGURE 32: south elevation perspective (Njobe, 2007)**
FORM AND VOID

FIGURE 33: Extract from Balmond’s book
Informal (Balmond, 2007)

Juxtaposition: Two actions, side by side, clashing and
influencing each other to give a new entity by virtue of adjacency. The
close relation of one event to another. Agitation by proximity. The circle
next to a cross – two column sections next to each other or
one prime number next to another.

Different adjacencies give different speeds. Time is an essential
component in juxtaposition, not sequential as we know it, but
a seccentric space-time of arrested moments.

FIGURE 34:
LEFT: Muntu house drawing showing
composition of informal dwelling compound on
Steve Biko street, Gugulethu, done as part of
the vertical studio project. (Mativenga et al.,
2016)

Hybrid: One action overlapping the other, a co-sharing
of separate natures. Two or more local natures bound
within each other, the cross within the circle, the same grid
uplicated and rotated, or the direct overlap of similar
atures. (Balmond, 2007)

FIGURE 35:
RIGHT: plan drawing of the Guga’Shebe
Cultural Centre in Langa, showing similar
language to the informal dwelling compound.
(CS Studio, 2010)

LEFEVRE, RHYTHMANALYSIS

The concept of form and void is explored spatially in the sequential arrangement of fragmented spaces, or
what has developed into programmatic pods. These pods work as building interventions on their own.
Cross pollination occurs between these pods when users begin to work across disciplines. Void spaces act
as a multipurpose space for unplanned activity to occur. These have manifest spatially as a workshop
courtyard, gallery roof garden, and a double volume space for community gatherings. Programmatically
this occurs in the temporary and cyclical occupation of space. This stems from a theoretical exploration of
the ‘nomadic subject’ (Bradotti, 2011) which has informed an architecture for transient users (e.g training
space for students and unemployed urban citizens, incubator space for entrepreneurs, innovation space for
professionals and hobbyist etc. working within a collective space).

FIGURE 36: sectional nolly showing form and void spaces (Njobe, 2017).

FIGURE 37
The fragmented nature of the buildings create opportunities for light and ventilation to penetrate spaces. This has led to the development of the functionality of the façade as a daylighting screen on the east, west and north façade using high fired porcelain which is vitreous making it water tight and voids have been used in the screen assembly allowing diffused light into the spaces. The initial design intention for the screen was to use porous terracotta for evaporative cooling but due to the Cape Town climate, stagnant water in the clay posed a health and safety risk. The roofs have also been designed to drainage into the courtyard spaces and out onto the west end of the building as the municipal connections are located on the station edge of the site.
ROOF DRAINAGE

The courtyard that have formed between the programmatic pods of the building and the fragmented nature of the building has been used as a strategy to drain water from the roofs. All the roofs are pitched towards the courtyard spaces. This water is then diverted to the east edge of the building where the municipal connections are located. The drawing on the left has been used to illustrate this.

FIGURE 39: Roof plan diagram showing drainage
STUDIES FINDINGS

PRODUCTION SPACE – The case studies done for this part of the technical study were focused on ceramic production (a factory and a studio). The interview at the Corobrik factory highlighted key characteristics of clay as a sustainable building material (with reference to the research being conducted by the Clay Brick Association), the use of this material will be adopted in the design proposal as a key sustainability strategy. The study findings also propose the use of the ambient temperature emitted by the kilns and working with their natural convection systems of heat movement and heat transfer in the passive design strategy for the design proposal. The key finding in terms of spatial layout was that certain stages of production require their own space as overlaps cause workflow clashes, therefore spaces in the design proposal have been divided programmatically according to this principle.

PROTOTYPING SPACE – The case studies done for this part of the technical study were found in spaces of higher education. What emerged from the interviewee narratives was the importance of critical/scarce skills that vocational/craft/design training provide especially within prototyping spaces which provide the means to experiment and innovate. This is an attractive quality in terms of employability. And this was seen to be the main social impact of these spaces, providing employability skills to nomadic users. The workflow and spatial composition within these spaces didn’t have a fixed spatial narrative as the spaces have multiple workflow patterns depending on how each individual makes use of the space, this allows for the design of fragmented spaces in the design proposal going forward which mimic the informal and incremental architectural language of the site in Gugulethu.

WORKSHOP SPACE – these study spaces were primarily located on the ground floor, this allowed for the ease of access between indoor and outdoor spaces in theoretical and practical training respectively and allocating programmatic function to solid form and void spaces within the design proposal. The equipment used in the spaces is heavy, therefore construction above ground level would add to the structural load and cost of the building. The study spaces are open plan to allow for clear lines of sight (internal rooms within the workshop space use glazing as partitions). This was observed at the CDI and it is to ensure that proper health and safety protocol is followed, as users are aware that they can be observed by staff. Light and ventilation were the key design concerns. These were addressed through designing shallow spaces (less than 10m deep) for sufficient light penetration, and installing roof mounted mist sprays, extractors and strategic orientation of spaces for sufficient cross ventilation. As these spaces are located on the ground floor, safety was a concern, as workshop spaces house expensive equipment. This was resolved by having high level so that pedestrians can’t see into the space at eye level, this curbs temptation for theft. The high level windows are openable so that the spaces can breathe. These high walls on the ground floor also provide a surface which informal traders can trade.
DIGITAL CRAFT CENTRE

FIGURE 41:
Explode axo of digital craft centre showing programmatic arrangement and circulation (Njobe, 2017)

HOTEL

FIGURE 40:
Explode axo of hotel building showing programmatic arrangement and circulation (Njobe, 2017)
STUDIO POD

FIGURE 42:
Axo of studio pod in digital craft centre
(Njobe, 2017)

FIGURE 43:
Exploded axo of studio pod in digital craft centre, showing programmatic function
(Njobe, 2017)
ADMIN POD

FIGURE 44:
Axo of admin pod in digital craft centre
(Njobe, 2017)

FIGURE 45:
Exploded axo of admin pod in digital craft centre, showing programmatic function
(Njobe, 2017)
DIGITAL POD

FIGURE 46:
Axo of digital pod in digital craft centre
(Njobe, 2017)

FIGURE 47:
Exploded axo of digital pod in digital craft centre, showing programmatic function
(Njobe, 2017)
DESIGN DEVELOPMENT

This section of the paper focuses on the design development of the design dissertation project; looking at the initial concept sketches / models, and focusing on the development of the form and screen of both buildings. Precidence has also included to give context to what has informed the development.

DESIGN METHODS

The representation strategy that has been employed in the design dissertation building project is working across scale in the design development through drawings and study models:

- Massing model (1:250)
  Exploring concept of form and void; the volume of space, the relationship between the volume of these spaces and the adjacent building (Nyanga Junction train station).

- Prototype (1:50 / 1:5)
  Exploring materiality and structural assembly

- Hand drawing (pen, copic markers, watercolour pencils). Hand drawing allows for creative exploration.

- Autocad (digital). Used to scale imported SketchUp and hand drawings and to work out specific datum’s and geometries. AutoCad brings a certain precision to the design development process.

- SketchUp 3D modeling (digital). SketchUp allows one to visualize the design in 3D and get an understanding of the building form, circulation, and imagining how the space can be occupied. The screen component used in the building façade was also initially modelled in SketchUp and exported for CNC milling to make a plaster mould. The SketchUp model was also used to simulate the daylighting conditions of the void spaces in the building, which has informed the narrative of how these spaces are occupied. However, the digital models does come with constraints. A lot of the richness in the model and the information it provides is lost in the translation of the model from a 3D digital representation of the design to a 2D analogue representation of the design. Therefore it is useful to generate an analogue study model of the 3D SketchUp model so that the audience can engage with the design holistically.

- Clay study models (terracotta). Quick clay study / massing models were also generated as an accessible means of exploring certain design concepts (arrangement of volumetric spaces and assembly of ceramic components). Working with the actual finish material (even though this exploration may not have been at scale 1:1) has given insight into the materials inherent characteristic, this has informed the specified finishes to the building and the joinery / structural system applied to the materials system.

- Prototypes (plaster of paris, high firing porcelain)
FIGURE 49: Own sketch showing existing site conditions which have informed the design dissertation project.
FIGURE 50: First design iteration with sizes of spaces (schedule of accommodation generated from fieldwork studies at the College of Cape Town and the Gugulethu Comprehensive Secondary School (Njoe, 2017))

FIGURE 51: Second iteration, moving from rectilinear to circular geometry (Njoe, 2017)

FIGURE 52: Third iteration, starting to explore connective routes between spaces (Njoe, 2017)
FIGURE 53: Fourth iteration developing the nature of spatial enclosure in response to the environmental conditions of the site. (Njobe, 2017)
FIGURE 54:
3 dimensional development of spatial enclosure.
(Njobe, 2017)
FIGURE 55:
Fifth iteration of the design development, where a full set of plans was generated for the mid year review. Initially the design had just started off as a hotel catering to incoming migrants, based on this review, the scheme expanded to accommodate the digital craft centre on the Nyanag Junction market site. This developed from the findings and concluding the technology study at the end of the first semester which was focused on vocational facilities. (Njobe, 2017)
FIGURE 56: The 6th and 7th iteration of the design dissertation project begin to explore the form of the digital craft centre on the second site. The two buildings are separated by a service road.
(Njobe, 2017)
FIGURE 57:
The 6th and 7th iteration of the design dissertation project perspective drawing
(Njoebe, 2017)
FIGURE 58:
The 8th and 9th iteration of the design dissertation project showing the development of spatial enclosure, adding of circulation routes / fire escapes, deconstructing the facade and development of the elevation (Njobe, 2017)
FIGURE 59:
The 8th and 9th iteration of the design dissertation project showing the development of spatial enclosure, adding of circulation routes / fire escapes, deconstructing the facade and development of the elevation (Njobe, 2017)
FIGURE 60: The 10th iteration of the design dissertation project begins to develop the spatial inhabitation of the plan drawing. From this point the plan was consolidated in terms of efficiency in circulation spaces and compliance with fire escapes. A second floor was also added to the digital craft centre to accommodate open plan offices, a gallery and a roof garden. (Njøbe, 2017)
FIGURE 61:
The 11th iteration to the design was focused on developing the roof structures for the buildings.
The first pod uses a monolithic pitch roof which drains into the first courtyard.
The second pod uses a double pitch roof which drains into the first and second courtyard and also captures north light into the open plan office space.
The third pod uses a butterfly roof, supported by a central truss that pitches into the second courtyard. This particular roof has been treated special as this pod sits at the junction between the two buildings, making it a special moment in how the two builds are read together.
All three pods use steel in the roof structure and metal sheet cladding. The hotel roof is a concrete roof. The roof is cast to fall along the central axis and down towards the third courtyard (refer to sectional nolly diagram on page 27, where the different courtyards have been indicated).
(Njobe, 2017)
FIGURE 62: Concept sketches of screen development looking at the initial strategy of making an evaporative cooling screen using porous terracotta clay and the different iterations in terms of the form of the ceramic component and how it could be assembled into a wall. These designs emerged in response to the site climatic conditions - rain, wind and sun direction and the volumetric capacity of the ceramic hollow blocks. (Njobe, 2017)
FIGURE 63:
The Bioskin of the Sony Research and Development Office was used as precedence for an evaporative cooling skin. This image was taken from the book Ceramic Material Systems (Kane, King and Bechtold, 2015).

FIGURE 64:
Own illustrations showing biomimetic references to evaporative cooling skins. For example using the human skin as a reference (which is illustrated on the far left) (Njeb, 2017).
FIGURE 65:
The Mangado’s Spanish Pavilion was used as precedent in terms of how the fabrication narrative was compiled. This image was taken from the book Ceramic Material Systems (Kane, King and Bechtold, 2015)
SCREEN DEVELOPMENT

The Mangado's Spanish Pavilion was used as precedence in terms of how the fabrication narrative was compiled. This image was taken from the book *Ceramic Material Systems* (Kane, King and Bechthold, 2015)
FIGURE 67: First stab at generating my own form for the design of the ceramic component. (Njoe, 2017)
SCREEN DEVELOPMENT

FIGURE 68: Clay (terracotta) study models of the first ceramic component iteration, working across digital and analogue models and hand drawing for the design (Njoe, 2017)
FIGURE 69: Second iteration of ceramic component, working across digital and analogue models and hand drawing for the design. (Njobe, 2017).
SCREEN DEVELOPMENT

FIGURE 70: Illustrations showing development of material palette for the design dissertation project, and methods of assembly of the ceramic components for the screen. (Njoe, 2017).
FIGURE 71: Elevation diagram which begins to deconstruct the elevation programmatically. This is what set up the development of different wall typologies for the screen; on how it would function along different edges of the building. (Njoebe, 2017).
INTRODUCTION TO DESIGN DISSERTATION BUILDING PROJECT

The architectural project for the design dissertation is a digital craft centre focused on ceramic prototyping and a hotel, which offers temporary residential accommodation. These two buildings sit in the Nyanga Junction train station market four court. The proposed client is CDI (Craft and Design Institute) as an extension to their current programmatic offering. A gap has been observed that they do not offer ceramic prototyping equipment as part of their facility even though their mandate builds on the historic culture of craft and vocation in South Africa, to promote this trade from subsistence based to marketable products that can compete within the global design market.

The buildings acts as a threshold space to the city, locating itself at a transit hub as an economically dense and arrival space for incoming urban citizens. The building program provides skills training to equip users with the necessary skills to create their own employment and calcify an urban identity. It explores local moments as generative studies working with the existing trade activity at the Nyanga Junction train station and providing additional support space to these traders. The programmatic focus has been narrowed down to prototyping space as this will cater to a larger, diverse and transient user group (who would form part of a membership database) as opposed to production spaces which have permanent users. Prototyping spaces in the technical study were found to be in spaces of higher education, therefore precedence will be taken from vocational educational facilities in Gugulethu and Cape Town (e.g. College of Cape Town, Gugulethu comprehensive school, Corobrick bricklaying training centre, Naledi Project, CDI etc.).

A key element in vocational training is theoretical and practical learning as they play out in indoor and outdoor learning spaces respectively and the relationship that vocational training has to industry and trade whereby the pedagogy is shaped by the needs identifies in the industry.
FINDINGS

The major constraints I faced while casting the plaster blocks was temperature and ratios between water and plaster. The temperature of the water and the space which your working in will either increase or decrease curing time. The ideal temperature has to be cool as this slows down the curing reaction giving you enough time to mix and pour the plaster. A higher plaster to water ratio will increase the strength of the plaster but will make a mixture that will harden quite quickly. This is the mistake I made the first time I casted, as I wanted a high strength plaster as I was afraid that it would not withstand the milling process. This created a lumpy, inconsistent pour.

The second time around I added more water to the mixture to create a more smoother pour. The formwork also had a laminated finish making the plaster smooth once removed from the mould. This whole process I found to be reminiscent of casting concrete, and I feel the lessons learnt from it can be transferred in the design of concrete.
The major constraints of the mould making process were firstly the drying time required before one can mill the plaster blocks, that being 2-3 weeks before it becomes bone dry. I only discovered a faster way of drying when I was making my massing model (which was a CNCed plaster block), that being slow drying it in the kiln at 80°C for 8 hours. Leaving the plaster block outside in the sun also dramatically decreases drying time.

The second constrain was the milling machine, in terms of the size of the machine and the size of the drill bit. When working with forms with perpendicular edges, you are limited by the depth of the drill bit, but if the form is curvilinear, the drill bit is able to go to greater depths. The time it takes to mill depends on the volume of void space that needs to be cut out, therefore minimising the amount of void space will decrease milling time.

* All pictures taken in the fabrication process are that of the authors
FINDINGS

The initial experiment was to cast hollow ceramic blocks with the thinnest possible walls in order to achieve translucency in the high firing porcelain, as the clay would become translucent once fired above 1200C with that nominal thickness. However, what resulted was that the slip had to be left in the mould for at least 10 min for the walls to be strong enough to hold themselves up, once the volume of the liquid slip had been decanted. The variation in the amount time one left the slip in the mould was found to only affect the density (weight) of the hollow ceramic block and not necessarily the wall thickness, which stayed fairly consistent at 3mm. This is because the plaster absorbs the liquid from the slip, this is what causes a wall to form along the perimeter wall of the plaster void, therefore the longer one leaves the slip in the mould, more water is absorbed from the slip making the vessel denser.

As a result the design of the facade was changed from trying to create a building which would allow diffused light into the interior spaces, and emit diffused light at night into a facade that had solid blocks and void spaces to allow light in. The focus then became about what finishes to apply to the ceramic block once bisque fired.

The slip casting process was found to be quiet time consuming and labour intensive as allowance had to be made for drying inbetween pouring, decanting and removing the hollow block from the mould so that the walls of the hollow block didn't collapse. This would work well in a building project in terms of community participation as this construction process could run along side the more formal (structural) construction of the building.

* ALL PICTURES TAKEN IN THE FABRICATION PROCESS ARE THAT OF THE AUTHORS
FINDINGS

The slip cast elements have to be dry before they can be fired therefore I air dried them first, then they were slow dried at 80°C in the kiln for 8 hours before they were bisque fired. The kilns at the UCT Hiddingh campus do not do a vitriss fire which is above 1200°C (this would make the porcelain water tight without applying any glazing); these vessels were fired at 1200°C therefore a transparent glaze was applied to make the ceramic components water tight as they would be exposed to the outdoor climate as a cladding system. The use of transparent glazes also added to the aesthetic value of the components because when they are exposed to daylighting, it creates a tonal variation in the facade system which is pleasing to look at. Two coats of high fire porcelain transparent glaze was applied to the components as a final touch to the design before they were glaze fired.
*ALL PICTURES TAKEN IN THE FABRICATION PROCESS ARE THAT OF THE AUTHORS*
What I discovered from the fabrication of the steel substructure was the incredible malleability of steel. It took multiple heating and re-heating of the steel flat bar to bend them to the desired shape. The process started by creating a wooden jig that would be used as a datum for the form I wanted to bend the steel into. The rectangular hollow vertical supports were cut to size and smoothed. The steel brackets pop riveted onto the main vertical supports and horizontal flat bar. The main concerns in this part of the process was safety, it was very important to wear safety glasses and gloves while working with the steel.

*All pictures taken in the fabrication process are that of the authors*
PERSPECTIVE DRAWINGS

SOUTH ELEVATION PERSPECTIVE

VIEW FROM SECOND FLOOR WALKWAY

VIEW FROM UNDER FIRST FLOOR WALKWAY
WHERE CLOTHING TRADERS OPERATE
PERSPECTIVE DRAWINGS

PERSPECTIVE SECTION THROUGH ADMIN POD
(refer to page 33 for programmatic breakdown)

PERSPECTIVE SECTION THROUGH COURTYARD002
(refer to page 27, sectional nolly showing courtyard spaces)
PERSPECTIVE DRAWINGS

PERSPECTIVE SECTION BOTH BUILDINGS
(refer to page 31 for programmatic breakdown of the overall project)

PERSPECTIVE SECTION THROUGH DIGITAL POD
(refer to page 34, for programmatic breakdown of digital pod)
MODELS
1. top: cnc plaster massing model
2. bottom: ceramic screen 1:5 prototype
CONCLUSION

The design dissertation project emerged as a material exploration of clay and understanding the narratives of nomadic users and their relationship to the material. This exploration evolved to inform the programmatic function and structural assembly of the design dissertation project which culminated in the ceramic screen prototype fabrication. This process of model making has managed to merge both the social and technical ideologies of the project. It makes the inhabitation narratives of the nomadic users tangible and give a tactile quality to space making, that the audience can engage with. The project also has a distinct language of representation (model making, photography and illustration), which is accessible in terms of relaying construction information to an audience who might not have the training to read formal architectural drawings. This style of representation is a strategy which could be used in terms of encouraging community participation in the construction of the design dissertation project.

The architecture which has emerged, which was informed by both theoretical explorations and context dependant fieldwork has managed to address the existing site conditions. This was done through having a minimum built footprint on the ground floor, which makes room for the density and flow of existing informal traders but also supporting that activity with formal services which traders can access from the building project. And providing shading to traders on the ground floor through cantilevers, by moving the formal building programs to the floors above. This relationship between formal and informal on site is what has added to the richness in user engagement, as it encourages chance encounters between diverse sets of users which is what nomadic users require in order to form their own urban social networks.

The ceramic screen is used on the first and second floor, where as the ground floor has more hard wearing finishes (rough cast plaster). This takes into consideration building maintenance, and an understand of the site conditions as ceramic is a fragile material, that can break when it isn't handled with care. Also the fabrication of the screen can be done on site (as it is part of the building program) therefore making it easy to replace elements of the screen should they break. By embedding the skill and knowledge of a contemporary method of ceramic fabrication within the community of Gugulethu, it makes it possible to build something beautiful within this community without the usual fear of mainteance that disadvantaged communities like Gugulethu struggle with.
REFERENCES:


INTERVIEWS

Amanda Sidimba (08 June 2017) Interview Transcript
Anonymous, (04 July 2017) Interview Recording
Anonymous, (29 June 2017) Interview Recording
Sibusiso (10 June 2017) Interview Transcript

IMAGE CREDITS

Njobe, S. (2017) [drawings and photographs]

PREFACE (image credits for images used in the preface artwork)

LIST OF FIGURES:

FIGURE 1-5 / Page 3-7 / Source: refer to preface image credits)
FIGURE 34 / Page 27 / Source: Mativenga et al. (2016)
FIGURE 64 / Page 48 / Source: Njube, S. (2017)

*ALL PHOTOGRAPHS AND DRAWINGS IN SECTION 05 BELONG TO THE AUTHOR
## APPLICATION FORM

**Please Note:**
Any person planning to undertake research in the Faculty of Engineering and the Built Environment (EBE) at the University of Cape Town is required to complete this form before collecting or analysing data. The objective of submitting this application prior to embarking on research is to ensure that the highest ethical standards in research, conducted under the auspices of the EBE Faculty, are met. Please ensure that you have read, and understood the EBE Ethics in Research Handbook (available from the UCT EBE, Research Ethics website) prior to completing this application form: [http://www.ebe.uct.ac.za/usr/ebe/research/ethics.pdf](http://www.ebe.uct.ac.za/usr/ebe/research/ethics.pdf)

### APPLICANT'S DETAILS

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<th>Sanelisiwe Njobe</th>
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<td>If this is a research contract, indicate the source of funding/sponsorship</td>
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<tr>
<td>Project Title</td>
<td>The Urban Nomad</td>
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I hereby undertake to carry out my research in such a way that:
- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

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<td>Sanelisiwe Njobe</td>
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### APPLICATION APPROVED BY

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<th>Full name</th>
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<tr>
<td>Francis Carter</td>
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For applicants other than undergraduate students who have answered YES to any of the above questions.