

CHLOE LIANG
THESIS PROGRAMME

*ANTHRACITE
TRACKS*

REVITALISING JERADA: A MINING CITY SANS THE MINE



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*REVITALISING JERADA:
A MINING CITY SANS THE MINE*

THESIS PROGRAMME
ARCHITECTURE & EXTREME ENVIRONMENTS
SPRING SEMESTER 2021/22

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PREFACE

*Descriptions of the programme and an
overview of the project*

ABOUT THE PROGRAMME

Architecture and Extreme Environments is a Master programme that explores the intersection between architecture, technology, culture and environment. Through a site-specific approach, the course aims to respond to present and future global challenges through research by design and direct on-site involvement in the form of active expeditions to remote world locations where prototypes are put to the test and buildings are designed. This year, the programme is based in Morocco.

There is a strong focus on site-specific design, achieving this through direct engagement and fieldwork to environments which are out of balance. These exceptional scenarios, be it flooding, extreme cold or heat, high pollution and health risk zones, to name a few, are used as test beds for an architectural design to be developed.

This methodology allows for a real-scenario, on-site research by designs process that spans from prototypes and building components to large scale building design, in collaboration with local culture, the scientific and technological community and the world of practice and manufacture, both local and global. In this programme students acquire, not only a site-specific design methodology that allows for an architecture fully informed by local conditions, but also knowledge and solutions, which can be applied to many contemporary contexts, both at home and abroad.

WHAT

This programme builds upon my investigation carried out in the previous semester regarding mine waste in Morocco. It proposes a transport and economic hub in the city of Jerada, catering to its unique conditions and needs while reducing and upcycling its massive amounts of mine waste. The project aims to promote and foster economic stability, regional connectivity, and local identity in Jerada.

WHY

Mine waste is a significant problem in Morocco due to the lack of any official disposal plan. Jerada is a key example of this issue within the country, with over 20 million tons of mine tailings deposited adjacent to the city's urban cores despite the coal mine they come from being abandoned since 2001. No official studies have been conducted regarding long-term effects on health and environment from these open deposits, while the population in Jerada is also still reeling from the mine's closure and the subsequent loss of jobs in the region that led to a stagnation of the city's population, economy, and development.

WHERE

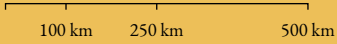
Jerada is a city located in the north-east region of Morocco around 60 kilometres south of Oujda with an arid to sub-arid climate. The proposed intervention is to be located on a plot of land currently housing the city's abandoned coal power plant. The proximity and abundance of the mine waste within the city has potential for upcycling that is still being explored, and the economic instability from the mine's closure lacks a resolution. This unique set of conditions frames Jerada as an intriguing and compelling site for development.

HOW

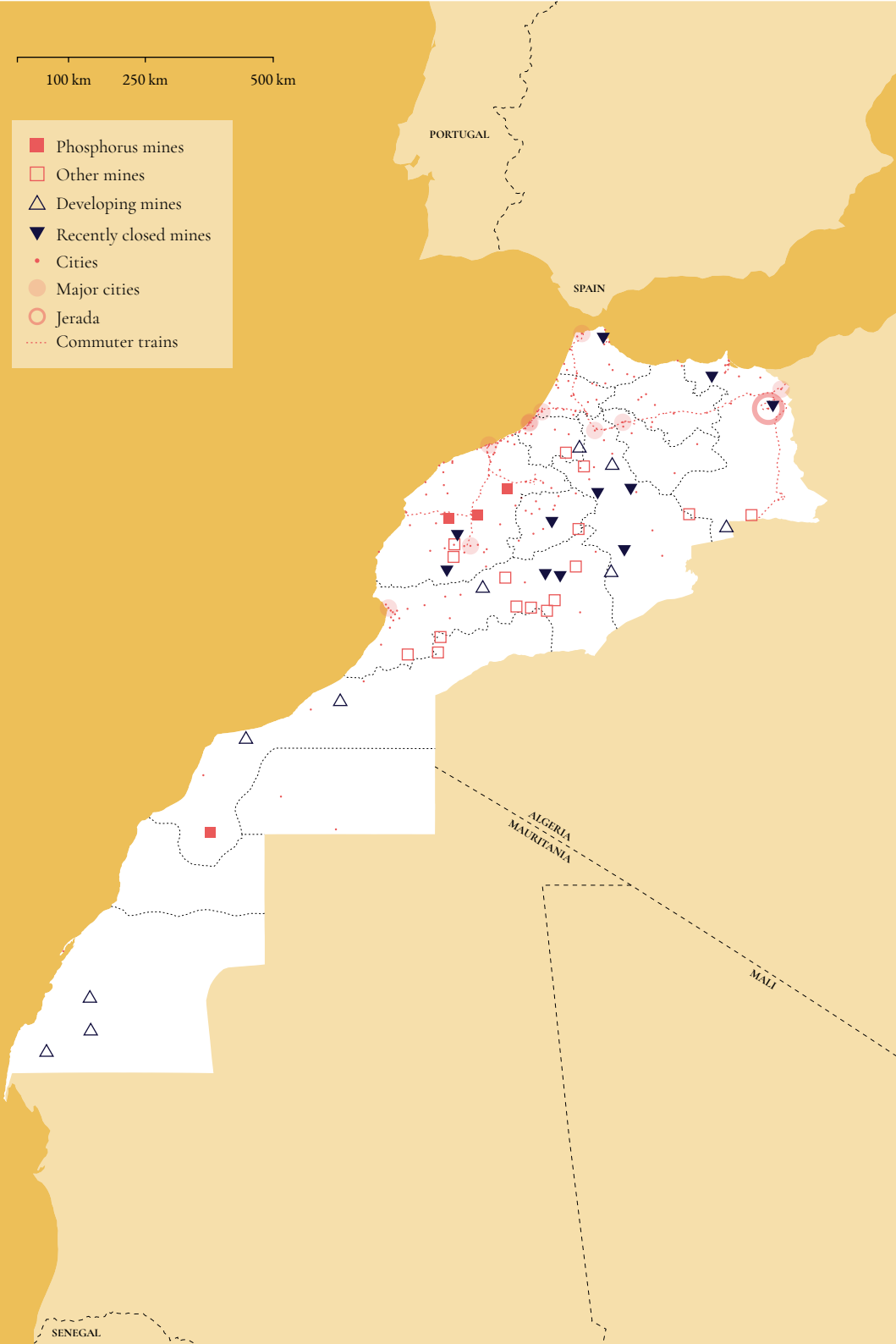
This project envisions a potential rehabilitation of Jerada's economy through the development of public accessibility and local identity. It proposes a community-centred process of upcycling and refining the city's mine waste to create ceramic products and usable coal for sale and local use that is supported by the introduction of a publicly accessible train station.

INTRODUCTION

This project will attempt to explore the use of the waste product of mine tailings in order to create a resilient community. It is located in the city of Jerada and specifically looks at the architectural, social, and economic implications of utilising the plentiful supply of mine waste that came from the now closed anthracite mine in the city. Beyond upcycling the mine waste, there is also the question of how this finite source can be managed such as to create a resilient community even after it is depleted. An architectural investigation will be carried out throughout the semester that looks into the possibility of an inhabited building that can be continually reconstructed and reshaped through processes driven by the community, while using quantities of the mine waste to tackle these issues.



- Phosphorus mines
- Other mines
- △ Developing mines
- ▼ Recently closed mines
- Cities
- Major cities
- Jerada
- ⋯ Commuter trains



.ii.

MINING IN MOROCCO

*Exploring the history of the mining industry in
Morocco and Jerada*

MOROCCO'S EXTRACTION

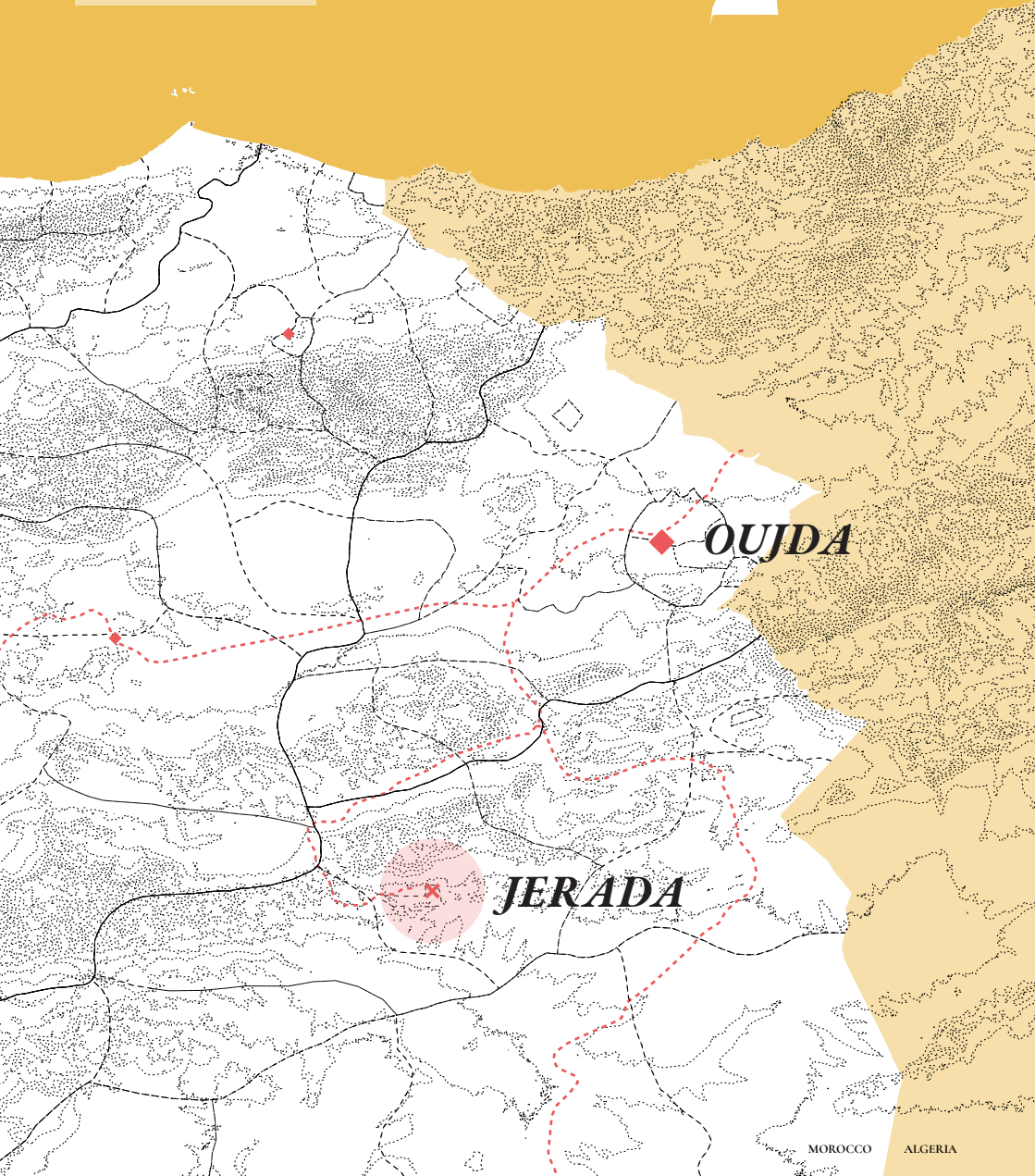
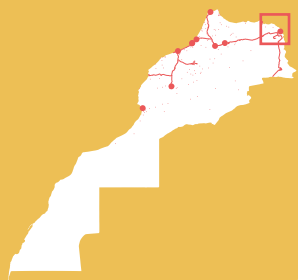
The mining industry represents 22% of the value of Morocco's exports and contributes 2.5 to 6.5% to the country's GDP depending on the prices of the products. The vast phosphate reserves in Morocco make up around 75% of the world's estimated supply, and a wide variety of other minerals including clays, coal, iron, lead, and copper have been or are being extracted in the country. The mining industry contributes to regional development through job creation and the construction of infrastructure, not to mention the indirect benefits in certain key sectors such as transport and mining energy. However, even though the mining industry is a key player in Morocco's economy, there has been little regard for the consequences of the practice. Officially around 240 mines are considered to have been exploited in Morocco, but more than 200 have been abandoned for several years with all the waste produced from the extraction process remaining scattered right at the location of the mine. No effective system has been put in place to manage the abandonment of these old mines as current regulations still do not oblige the operator to rehabilitate a site when operations cease. Since mine waste can be full of concentrated amounts of heavy metals and potentially toxic chemicals, this has resulted in ecological and social damage to the surrounding urban and natural environment. There is also considerable potential for long-term negative impacts on the groundwater, soil health, urban health, and land usability.

JOURNEY TO JERADA

There are many such examples of abandoned mines with mine tailings remaining unsupervised and unmanaged on site, but the focus of this project will be on the ex-mining city of Jerada. It is located around 60 kilometres south of Oujda, the capital city of the Oriental region and one of Morocco's major cities with the eighth largest population in the country. Jerada was once the coal-producing powerhouse of Morocco until the mines were shuttered in the 1990s due to high production costs. This led to economic devastation in the city, with over 9000 jobs lost. After the mine was officially closed and abandoned, Jerada was left with five large hills of mine tailings weighing 20 million tonnes. Though not directly toxic, the loose dust not only coats buildings downwind, it has the potential to cause respiratory distress and long-term health problems to nearby residents as well as contaminating the city's groundwater with unwanted chemicals. However, even after the mine's closure, there were no efforts made to clean up the colossal amount of mine waste left over from the excavations until very recently. During my fieldwork in November, my local collaborator Professor Rachid Hakkou introduced me to his business partner, Yassine Elboukili. Yassine works with an engineering firm working on upcycling the mine waste in Jerada. He agreed to drive me to Jerada to meet his colleagues who work there, Anas and Nabil. They kindly brought me around all the five different mine waste dumps in the city and helped to explain how the people who live in Jerada try to co-exist with the massive amounts of mine waste in their proximity.

1 km 10 km 50 km

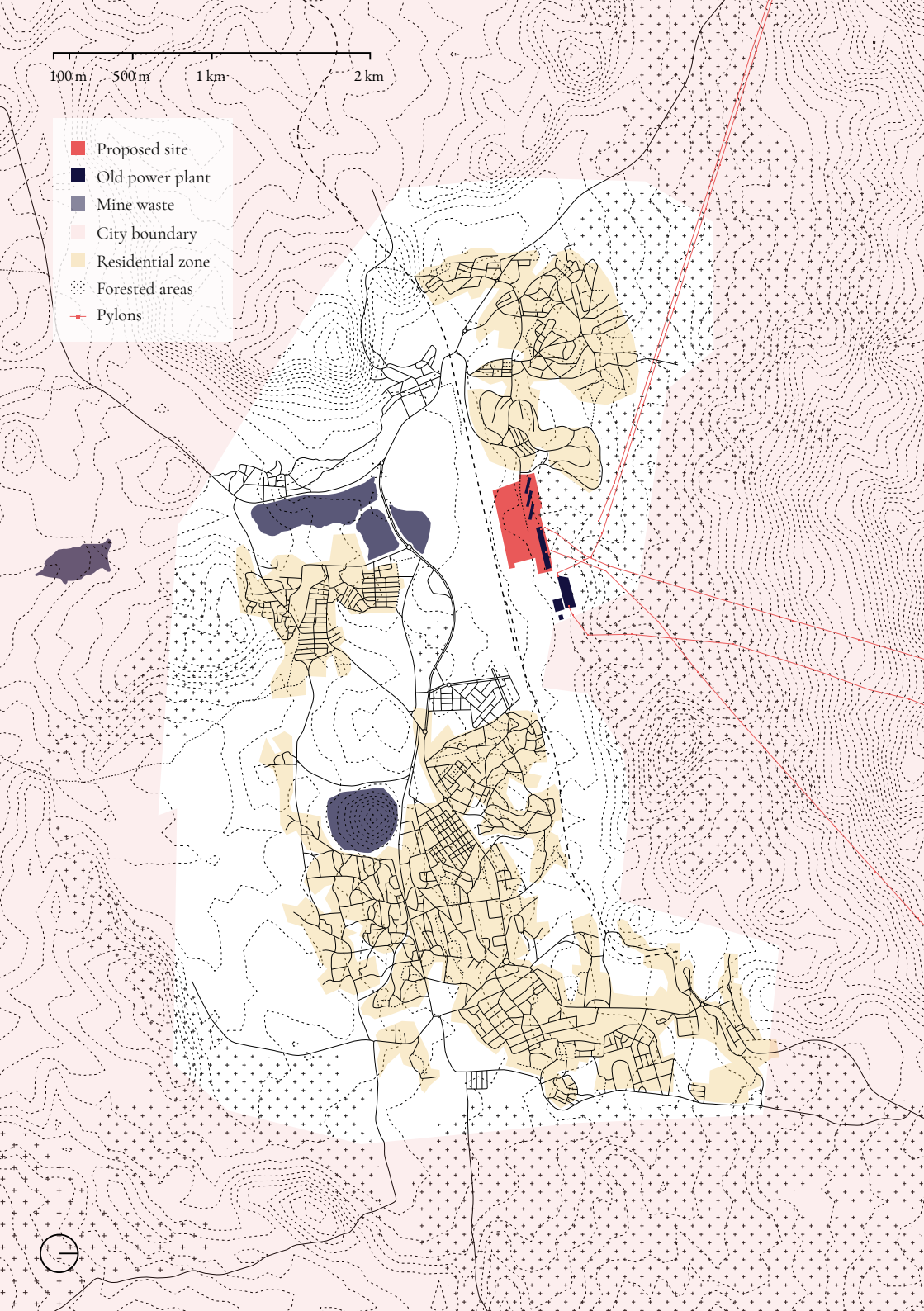
- ◆ Major cities
- ◆ Cities
- ✕ Jerada
- - - Existing train tracks



MOROCCO ALGERIA

100m 500m 1km 2km

- Proposed site
- Old power plant
- Mine waste
- City boundary
- Residential zone
- Forested areas
- Pylons



SIGNIFICANT EVENTS IN JERADA'S HISTORY

- 1927** A coal basin is discovered in the site that would become Jerada
- 1936** Industrial exploitation begins in earnest
- 1967** Coal power plant is established in Jerada, allowing the valorisation of extracted coal
- 1994** The national census places Jerada's population at 59 294
- 2001** Jerada mine is officially closed due to CDM filing for bankruptcy, leaving around 9000 unemployed. Remaining coal reserves are estimated at 10 million tons. The thermal plant still functions with imported coal coming via train and truck from the port at Nador. Hundreds of workers continue to mine for coal under the radar, selling to local distributors for a living
- 2004** The national census places Jerada's population at 43 916, a decrease of more than 25% from 1994
- 2014** The national census places Jerada's population at 43 506, a decrease of 1% from 2004
- 2017** A new thermal plant is built in Jerada as an upgrade/extension to the older one. Demonstrations are held in protest of high water and electricity costs. 2 brothers drown in an illicit underground coal mine, fuelling further furore
- 2018** ~2000 of ~3500 of the illegal mines are closed due to the riots, and upgrading works to various parts of Jerada begin
- 2019** The remaining mines are shuttered



An abandoned mine hoist in Jerada at an old anthracite mining site

2001
THE END OF AN ERA

Charbonnages du Maroc, the company running the mine in Jerada, began facing struggles as early as the 1980s due to rising costs and international competition. The declining prices of coal worldwide and complicated mining procedures made it less profitable to continue commercial anthracite extraction. This led to significant downsizing in workforce from over 8000 to less than 2000 in the 90s, before the mine closed entirely in 2001. Although the mine was shuttered, the adjacent power plant continued providing power to the region, albeit with imported coal transported from the ports of Nador to Jerada via freight trains.

In the years following the official closure, despite lacking sufficient protective gear, countless local miners persisted in entering the mines to scavenge what little anthracite they could find. They sold the small quantities of coal, just a few pounds at a time, to local brokers just to make a living. Without any more maintenance, the mines also grew progressively more dangerous as time went by, claiming multiple lives over the years that passed.

The source of the majority of the jobs in the city disappeared within a decade and as a result, Jerada's employment rates dipped to one of the lowest in the country while experiencing a population decline of over 25% during that time span. It also left a tremendous amount of mine waste that, while not growing, remained as a memory of the city's heyday.

2017
SEEKING REPARATIONS

Now, the massive stacks of mine waste are a reminder of the injustice that was done to the population - their main economic source, the Jerada coal mine being shuttered in 2001, leaving over 9000 people without a source of income. The mine waste in Jerada is not as reactive as some others, but the sheer quantity of the waste means that dust and debris are constantly blowing around the city, where the loose small particles may pose a health and environmental risk to the 50 000 inhabitants of Jerada.

In 2017, persistent government neglect of the city's infrastructure and rising prices of water and electricity led to a slew of riots breaking out in Jerada. Discontent and outrage were further fuelled by the tragic deaths of two brothers illicitly mining for coal in the abandoned mine. These protests, termed *Hirak* in Arabic, had three core demands: an economic alternative for the city's workforce, prosecution for the parties involved in creating this situation in Jerada, and a reduction of the price of electricity and water. After more than a year in detention, leaders of the *Hirak* received prison sentences of up to 20 years in 2018. Though the government promised several acts of compensation including new health services, agricultural projects, social aid, and new mining licenses, the people remained skeptical.

As of 2018, several improvement projects have been implemented by the government. A new community recreation centre was built and a plan to close all the illegal mine entrances was put into motion.



*Top: Newly built community centre in Jerada
Bottom: One of the many scavengers looking for coal in the mine tailings*



A deposit of mine waste adjacent to one of Jerada's main streets

.iii.

REVITALISING JERADA

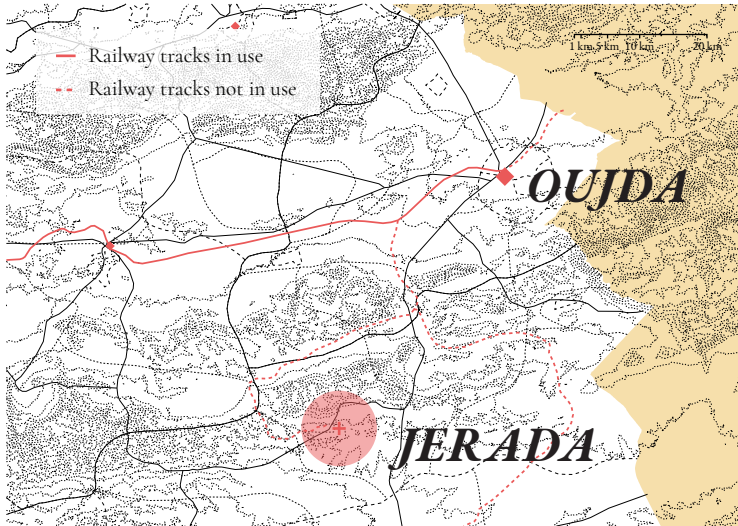
Investigating the driving factors of the project

REINVIGORATING THE SOCIAL AND ECONOMIC ENVIRONMENT IN JERADA

The idea behind this project stems from a conversation I had with my local collaborator, Professor Rachid Hakkou, who is a researcher at Cadi Ayyad University in Marrakech with a specialty in upcycling mine waste. He said that although the mine waste in Jerada was not the most toxic or dangerous in the country, the site itself was the most problematic in Morocco. The urban population of Jerada's relationship with the millions of tons of mine tailings is notable both in scale and proximity. Coupled with the tense social, political, and economic situation within the city, it presents a unique backdrop that has rich potential for exploring an architectural investigation and proposal.

A few of the complexities in Jerada that I want to look into include the lack of connectivity between the city and its surrounding urban communities, the stagnant workforce that arose from the coal mine closure in 2001, and the possibility of a local identity that is tied with the mountains of mine waste within Jerada's urban cores. The overall goal of the project will be to propose an architectural programme that has the possibility of reinvigorating the social and economic environment in Jerada through the lens of the aforementioned factors.

HOW CAN AN ISOLATED COMMUNITY BE MADE ACCESSIBLE?



Main roads, train tracks, and contours of the region between Oujda and Jerada

When planning a visit to Jerada, I noticed that they were fairly removed from other cities. They had a single bus stop that had minimal routes, and no functioning train station despite the presence of some derelict tracks that were now out of use. It seemed that the main mode of transport to this city was via the single highway connecting it to the rest of the country by using taxis or private vehicles. A local collaborator, Yassine, kindly offered to drive me there from Oujda, one of the largest cities in Morocco. He mentioned that Jerada was one of the more obscure cities in Morocco and that it was extremely unexpected that I expressed an interest in travelling there, because hardly anyone who doesn't live there would want to visit. Jerada's unique backstory and their proximity to Oujda indicated a strong possibility for easier accessibility. A preliminary question I asked myself as a result of this experience was how, if possible, could Jerada's disconnect from the rest of the country be remedied to benefit the social and economic environment in Jerada?

HOW DOES A DISCARDED WORKFORCE GET REJUVENATED?



An abandoned mining building on the largest hill of mine tailings

Once anthracite was discovered in the region, Jerada as a city grew and prospered alongside the mine that sprung up to extract the coal. At its productive peak the mine hired over 8000 local workers, essentially supporting the economy and community of Jerada. As a result of this dependence, the closure of the mine led to significant job shortages in the city. In 2014, Jerada had an unemployment rate of 37% compared to a national average of 19%. Only six other Moroccan cities had a higher rate of unemployment. Along with disproportionately high unemployment statistics, Jerada also lost a quarter of its population between 1994 and 2004. The population count has now remained static since, pointing towards a stagnation in growth. Thus, a question arises of how the population in Jerada who used to be employed in the mine can be utilised to encourage economic and population growth for while preventing overdependency on a single company from occurring such that history will not repeat itself.

HOW CAN A LOCAL IDENTITY BE FORGED?



One of the hills of mine tailings next to a mosque in Jerada

In conversations with my local contacts Professor Hakkou, Anas, and Yassine, I brought up a discussion about the relationship between the residents of Jerada and the distinctive piles of mine waste within the city. A common anecdote they shared was that the people living in Jerada identified with the overwhelming presence of the mine waste, as it was a phenomenon unique to Jerada. Over the years, the largest hill of mine tailings in the centre of the city had turned into an icon of sorts. Not only that, despite the lack of jobs, they had enough pride in their city to stay regardless of the challenges. Professor Hakkou mentioned that only those who lived in close proximity to the tailings had negative feelings due to the particles of mine waste persistently clinging to surfaces and interiors of their houses. This brings up an interesting duality that can be explored: how can the imagery and emotions tied to the piles of mine waste be utilised architecturally to further build a spirit of community?

ASPECTS OF EXPLORATION



Public transport systems^a

This presents a possibility to create multiple nodes of access to Jerada, drawing the city out from relative seclusion



Local markets^b

Beyond the economic benefits of a marketplace, local specialities could contain goods specific to Jerada's resources such as mine waste



Community collaboration^c

By encouraging community input and interaction with goods and services offered, a distinct local identity may begin to form

PURSUING SUSTAINABLE DEVELOPMENT GOALS

08 *Decent work and economic growth*

Perhaps the most pressing of the difficulties Jerada faces is the lack of sufficient jobs in the city. This has led to economic stagnation and soaring unemployment rates. My project intends to formulate an opportunity that would allow for consistent employment and sustained growth.

09 *Industry, innovation and infrastructure*

In 2017 and 2018, the riots in Jerada signalled a strong discontent with the city's neglect at the hands of the government. This was substantiated by underdeveloped infrastructure city-wide. My project will explore the possibilities of integrating public infrastructure within an architectural project that encourages local innovation.

11 *Sustainable cities and communities*

The persistent stagnation of Jerada's population has forecast a questionable future of a city in decline. If this trend were to continue, the community of residents would likely require considerable aid to survive as a city. My project aims to utilise their mine waste in a sustainable manner that strengthens Jerada through the process of encouraging resilient growth and expansion.

12 *Responsible consumption and production*

My project proposes the possibility of creating an industry rooted in mine waste, which though plentiful, is ultimately a limited resource. The ideal outcome of my architectural investigation would result in a pattern of production that would be able to continue even after the mine waste has been fully utilised.

8 DECENT WORK AND ECONOMIC GROWTH



Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all^d

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation^e

11 SUSTAINABLE CITIES AND COMMUNITIES



Make cities and human settlements inclusive, safe, resilient and sustainable^f

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Ensure sustainable consumption and production patterns^g



*Foreground: A local worker, Anas, and I walking on a hills of mine tailings
Background: A machine sorting imported coal to use in the power plant*

.iv.

METHODOLOGIES

*Pursuing the possibilities of the architectural
investigation*

AREAS OF INVESTIGATION



The largest and oldest deposit of mine waste in Jerada

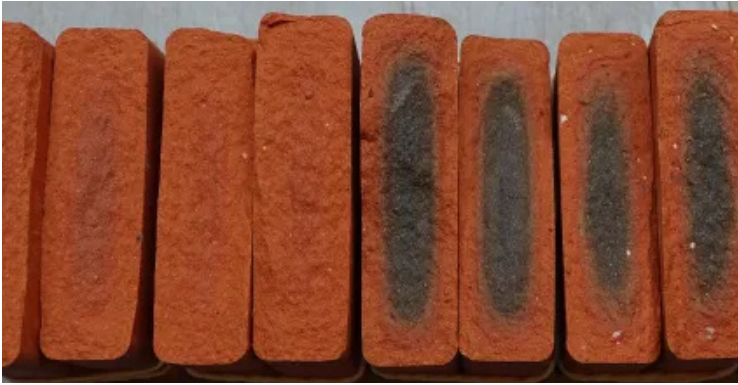
How can the mine waste be utilised to create a resilient community even after it has been exhausted?

How would a building that can be continually reconstructed and reshaped while inhabited look like?

How can the community be a driving factor for a building's function and design?

STATE-OF-THE-ART
BUILDING WITH MINE WASTE

There are several precedents when it comes to utilising mine waste to create building components and materials. Along with the tests I conducted during my fieldwork in Morocco, the experimentation performed by these researchers can allow me to understand the potential of using the mine waste in Jerada while planning for and designing my project. In particular, Taha's success in forming bricks using the mine tailings in Jerada bode well for my intentions of implementing the concept beyond just bricks, but also other ceramic materials such as tiles, flooring, and ornamental craftwork.



Top: Yassine Taha holding a brick made using coal mine waste from Jerada by Taha et al. ^h
Middle: Roof tiles using sulphuric mine waste by Veiga Simão et al. ⁱ
Bottom: Soil-lime brick using granite sawing waste by Menezes et al. ^j

STATE-OF-THE-ART
ENGENDERING IDENTITY

Looking at architecture and art that involves and revolves around the idea of identity, I am inspired by an approach that goes beyond simple participatory design into a realm of ritual and festivities. The projects shown on the right are all examples of projects that involve culture, tradition, and community in various unique ways that show how powerful and distinct the respective social climate surrounding the project is and how it has consequently shaped the project. I intend to look beyond mine waste as a practical material and attempt to find a communal spirit and identity through its use.



Top: A shared pool in Alto Comedero, a community in Argentina built and run by Tupac Amaru ^k
Middle: A shelter by Luis Aldrete along the Pilgrim Route, curated by Tatiana Bilbao ^l
Bottom: A still from Francis Alÿs' film *When Faith Moves Mountains* ^m

FIELDWORK IN MOROCCO

As established in previous sections of this programme, no effective system has been put in place to manage the abandonment of old mines and control their possible long-term negative impacts on the environment. As such, my fieldwork conducted in Morocco in the fall semester dealt with the potential mine waste has to be upcycled into useable ceramic tiles. I looked into the abandoned mines at Kettara and Jerada, where both have unique issues posed by the presence of mine waste.

The mine waste in Kettara is highly reactive. When exposed to rainfall or water vapour in the air, it undergoes a chemical reaction to become Acid Mine Drainage (AMD), which seeps into the ground and contaminates the soil and groundwater of the area, contaminating the groundwater of the village nearby.

Jerada was left with five large hills of mine tailings weighing 20 million tonnes after their coal mine was closed. Though not directly toxic, the loose dust not only coats buildings downwind, it has the potential to cause respiratory distress to nearby residents as well as contaminating the city's groundwater with unwanted chemicals.

My project aimed to create façade tiles using clay, mine waste, and natural additives, and evaluate the aesthetic, functional, and chemical properties of the tiles.



*Foreground: Hamza, who defended his doctorate on Kettara's mine waste, gathering tailings
Background: An expanse of mine waste from the closed mine at Kettara*



Samples of the tiles that were made with mine waste and clay from Morocco in an ogee shape and a kite shape

MATERIALITY AND AESTHETICS

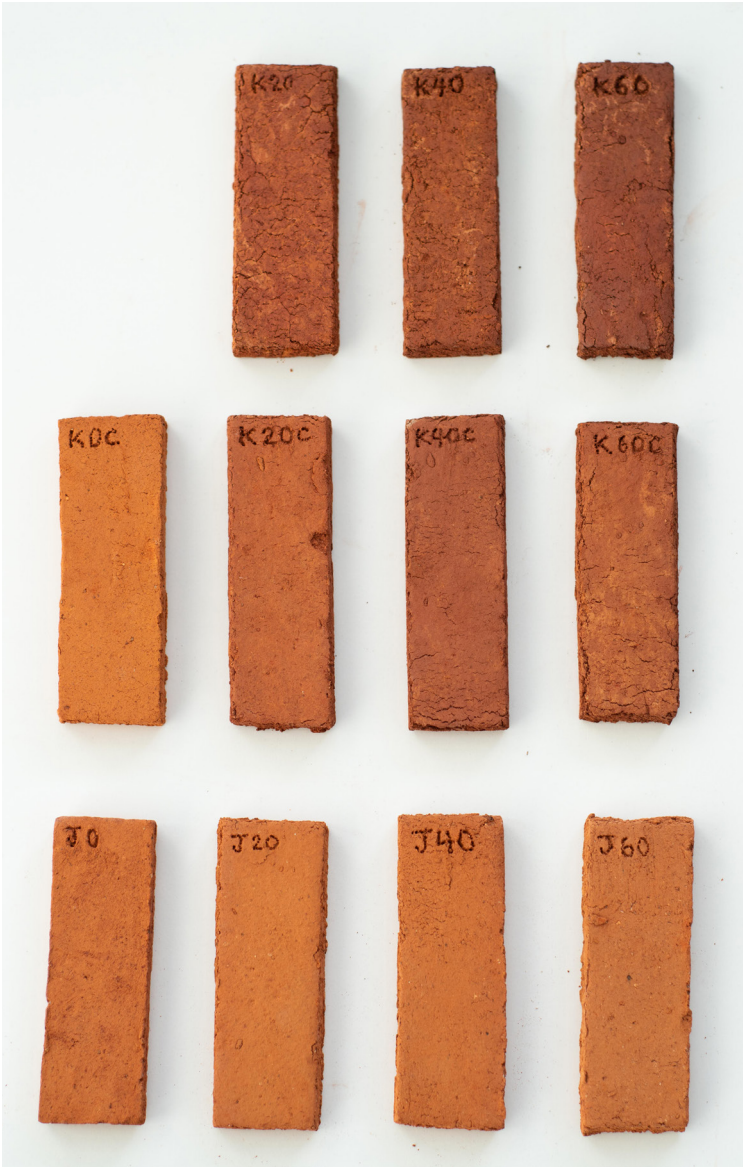
The mottled and varying hues of the unfired tiles stand out to me as an unexpected but beautiful aspect that I had initially not foreseen while designing them. I am interested in utilising these forms and textures in the design of my project to create something functional, but also aesthetically captivating. Although once fired the tiles lose most of the different colours, there is still a gradient of redness that is very evident through the use of different amounts of mine waste and additives. Utilising both fired and unfired tiles could be a way to incorporate all these features into various aspects of architectural design. Simultaneously, the textures of the tiles could be integrated into functional components of the project. In the fieldwork, I designed the tiles to have undulating ridges that ran down the tiles to potentially direct the flow of water that comes into contact with them. Likewise, the façade can make use of this feature to redirect any rainwater into collection bins to save resources.

FUNCTIONALITY AND PERFORMANCE

For scientific experimentation during my fieldwork, ceramic tablets of smaller sizes were prepared and used for efficiency and ease of practice. The waste material was gathered and sifted to remove the larger rocks and to allow better cohesion with the clay. After the clay was combined with the mine waste and other additives, it was formed into small tablets and left to sun-dry for 2-3 days. The tablets were then fired in a kiln at 950 °C. After they were fired, they were then placed in individual baths of distilled water to determine if any further contamination of the water would occur. As can be seen on the image on the left, there are slight colour variations across the tablets, though majority of the colour differences were burnt off during the kiln firing process.

Though the results for TDS and conductivity require further testing before conclusions can be drawn, the pH values of the mine waste from Kettara show a marked decrease after being combined with clay and fired into a ceramic tile. The Jerada waste was also successfully formed into tiles with a slight decrease in acidity. Thus, a conclusion can be made that manufacturing ceramic tiles made from Kettara and Jerada mine waste is a feasible way to valorise unwanted mine waste into a useful product.

I intend on integrating these mine waste tiles with my project, both in terms of a building material and a locally sourced commercial venture for the people of Jerada.



Samples of ceramic tiles made from mine waste and clay from Morocco and fired in a kiln

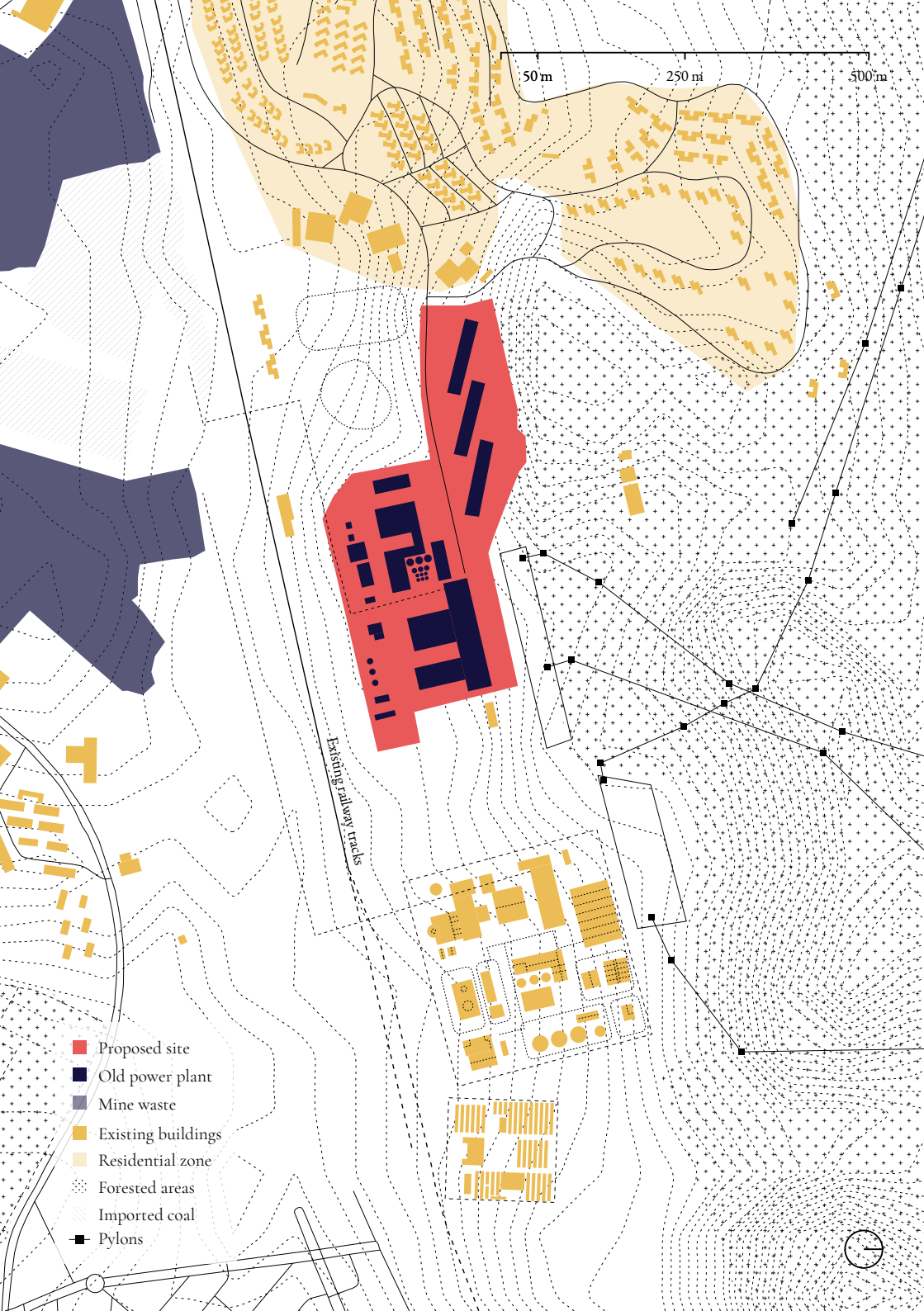


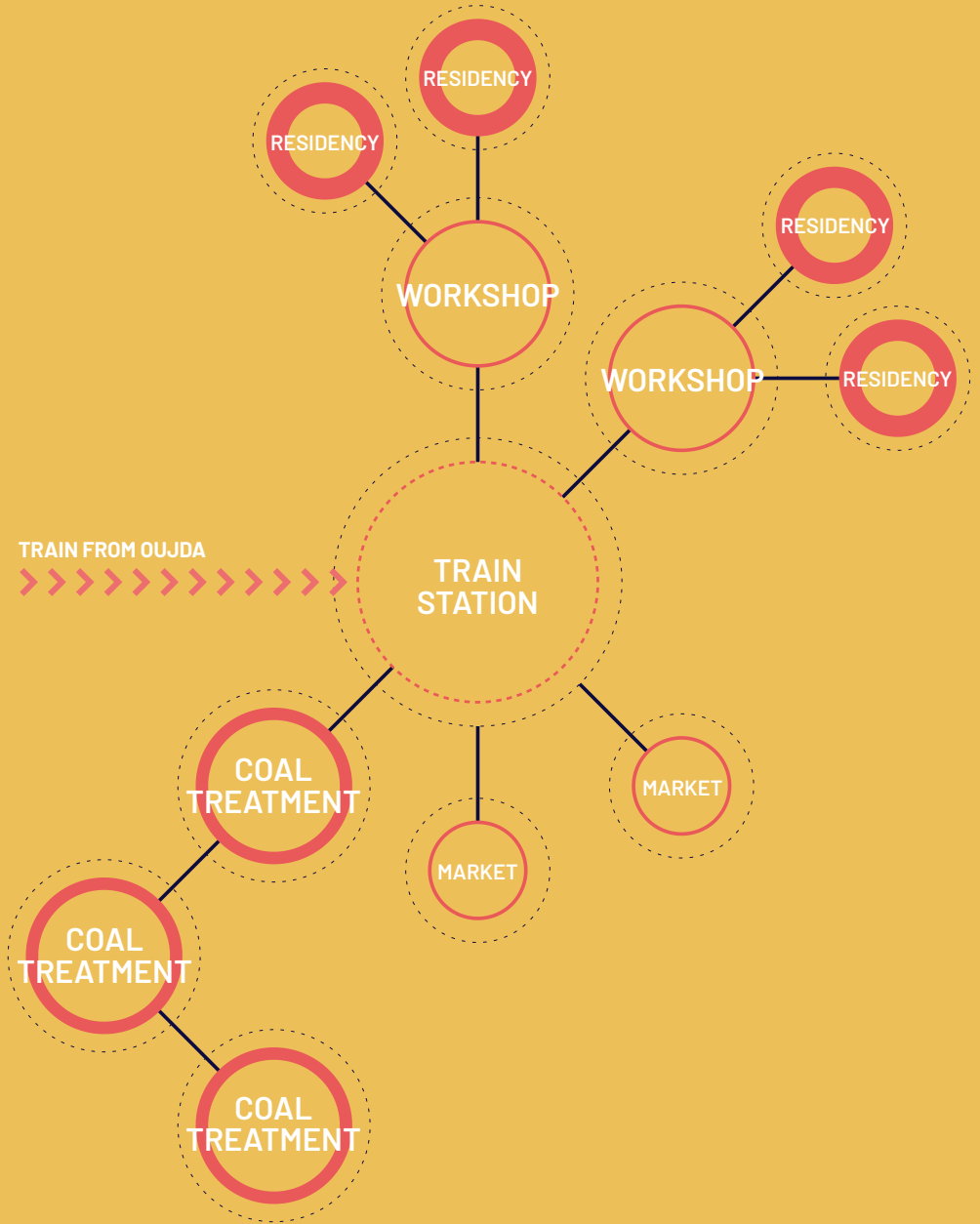
A tile made mine waste and clay from Morocco in an arrow shape

.v.

FUNCTIONS

*Proposed programmatic and user distribution
with the project*





PERMEABILITY/PRIVACY
 PHYSICAL/SPATIAL CONNECTION

TRAIN STATION

Currently, Jerada is lacking a train station, with only car and bus access to the city. A train station would not only encourage out-of-town visitors, but it would also facilitate economic movement to and from the city through cargo transport. It would also help to modernise the province and link it up to nearby important cities like Oujda, Nador, and Fes.

COAL TREATMENT

It is unrealistic to expect immediate cessation of illicit mining activities, especially when it is a major source of income for residents. Thus, introducing modern coal treatments such as washing the coal would greatly decrease carbon emissions for a cheap price. This would tide the job market over while slowly switching over to renewable sources such as solar and wind energy. Not only could this coal come from remnants within the deposits of mine waste, it could also signal a change in policy that improves mining conditions and safety for independent miners in Jerada.



The abandoned coal power plant currently on my intended site

CERAMICS MARKET

Removing and upcycling the mine waste that looms in the backdrop of Jerada would have the potential to improve the long-term respiratory health of the residents while simultaneously contributing to economic gain. This mine waste can be incorporated into ceramic materials by the locals, creating a product unique to Jerada. The grey hue might even become a hallmark of the region and transform into a visual identity for Jerada, much like how Marrakech is the “Red City” and Chefchaouen is the “Blue City”.

WORKSHOP AND RESIDENCY

Alongside the ceramics market, I intend for there to be workshop spaces for local artisans to produce and practice their craft. These have the potential to be flexible spaces with varying degrees of separation depending on the needs of the craftsmen, and they may also include living spaces where artists-in-residence can stay for periods of time.

TRAIN STATION⁶



Tourists⁹

A train station provides convenient access to and from Jerada, potentially attracting all kinds of visitors eager to see the unique sights in the region



Commuters⁷

Now no longer restricted by the need for private cars, workers can come to Jerada from other regions to participate in a revitalised economy

COAL TREATMENT⁸



Ex-miners⁸

As an alternative to extracting coal, people can be allocated to processing it to be cleaner and more efficient, opening up new jobs in Jerada



Commuters

With a new sector of processing opening up in Jerada, new people would be interested in finding work and starting businesses related to it

CERAMICS MARKET^p



Families^r

A new option for a fun day out or an opportunity to create a family business, a ceramics market would provide options for freelancers and businesses to participate



Tourists

A ceramics market selling products unique to Jerada would be a strong attraction for tourists looking to explore unique regions of Morocco

WORKSHOP AND RESIDENCY



Craftsmen^u

By proving the incentive of housing and workshop space, Jerada can attract and train artisans that can develop Jerada's ceramics market further



Families

Not only can the craftsmen have a dedicated space for working, their families are able together and participate in the community

EXPECTED DELIVERABLES

Drawings

Urban scale - connecting the site and project to the urban cores of Jerada and the surrounding mine tailings

Site scale - relationship to the functioning power plant, train tracks, and residential quarters

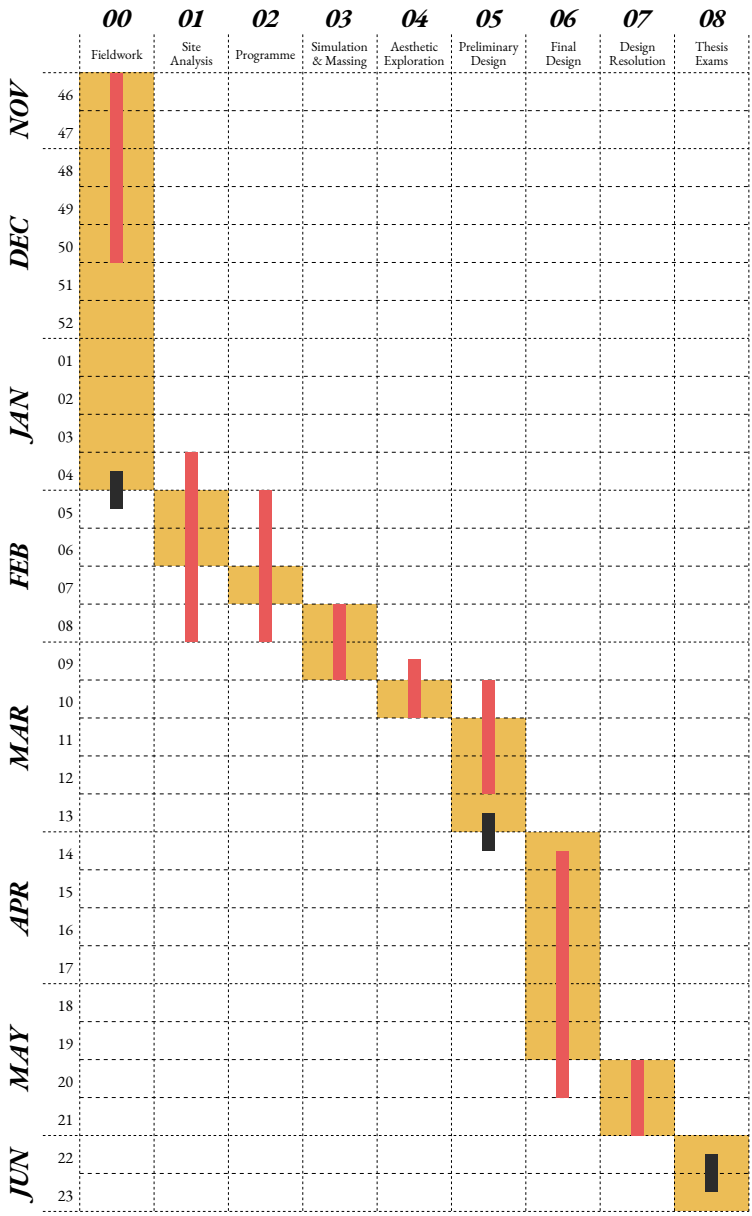
Programmatic scale - depicting specific moments within the architecture

Plans, sections, and elevations - various scales for different levels of detail showing the programmatic functions and layouts

Models

Topographical model of Jerada and the footprint of my intervention

Examples of tilework that would be used in the project



Official schedule
 Personal schedule
 Exams



Mine waste from the oldest and largest tailings deposit in Jerada

.vi.

REFERENCES

*Projects, papers, articles, and figures used for
the project and programme*



Villa Verde Housing by Elemental °

A classic example in the field of participatory design, Elemental's Villa Verde Housing shows the potential of leaving an aspect of the architectural design up to the residents themselves, forming a partnership and collaboration between architect and user. The residents can add spaces to a half-built frame when finances and living situations demand it, allowing the basic built project to remain low-cost and thus affordable.



Alto Comedero by the Tupac Amaru neighbourhood association ³⁰

Run and built by a controversial figure, Alto Comedero nonetheless is a fascinating look into the boundless promise that a community-run neighbourhood can offer. Amenities that would ordinarily be seen as unnecessary luxury are built and maintained for the residents here, despite their economic status, showing a clear understanding of how their presence can change and improve morale, community spirit, and comfort of those living here.



*Pilgrim Route Refuge by Luis Aldrete **

The natural earthiness inherent in the form and quality of this building allows it to lie low to the ground, unobtrusive but yet compelling. As a rest house for pilgrims, it serves its purpose simply and beautifully without the need for unnecessary ornamentation. The latticework of the bricks demonstrate a sensitivity to light, shadow, and atmosphere throughout the structure.



Palma Intermodal Station Entrance by Joan Miquel Seguí^y

The delicate latticework present along the façade of the structure is constructed out of ceramics, lending a very light and fragile spirit to an otherwise heavy and traditional material. The simplicity of the form allows the intricacy of the ceramic formwork to shine, giving an elegance and distinctiveness to a ubiquitous and common material.

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