



A Strategic Sustainable Implementation on a National level

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Intro

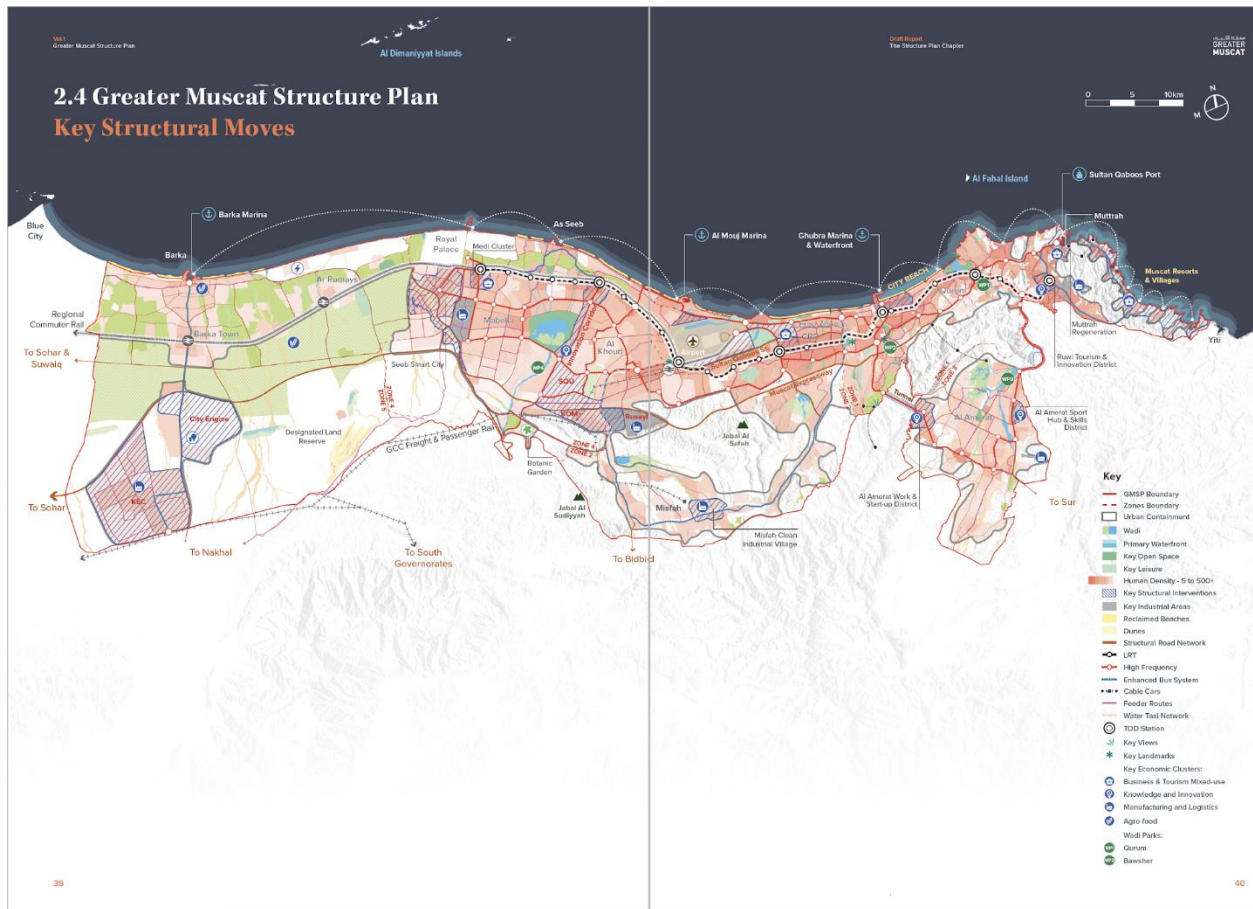
Looking at where I currently stand in Sustainability Leadership, I consider myself very fortunate and excited to talk about my recent experience in the implementation of sustainability in urban design. I was extremely lucky being given the opportunity to lead a team of 5 architects in implementing sustainable solutions on a national level, where we have proposed a concept idea and a business case to officials from the Omani Government in a competition. Not only did the competition change my whole view on sustainable development, but it also helped me understand the plans of the government of Oman on sustainable cities and urban planning and how it is connected to the targets of Oman Vision 2040. I have also changed my look on sustainability where it became a passion that I live up to. Sustainability has also become a way of life where I focus on reading, watching, listening, and giving advice on sustainability related topics. My topic for this essay is about my recent involvement in a competition called Oman Urban Hackathon.

Last February I registered to participate in a competition called Oman Urban Hackathon. The hackathon organizer was an Omani firm called Oman Think Urban (OTU) that specialises in urban planning. One of the partners/co-founders of OTU who led that Hackathon which is Dr Mahmood Al-Wahaibi, he was one of the people that lead the Oman National Spatial Strategy (ONSS), and we learned a lot from him. The hackathon was the third Urban Hackathon that was sponsored by the European Union Delegation where they have done the first in Saudi and the second in Bahrain. There were more than 400 applications to participate which was filtered down to 60. Then there were interviews in March where the number of the actual participants ended up being 30 and I succeeded in being one of them. We were split into 5 teams of 6 people in each group. Each team had professionals and students that were grouped based on the interview responses and the diverse approach on sustainability. The participants are a diverse range of people from many professions such as architects, civil and transportation engineers, digital artists, urban planners, graphic designers, and environmentalists.

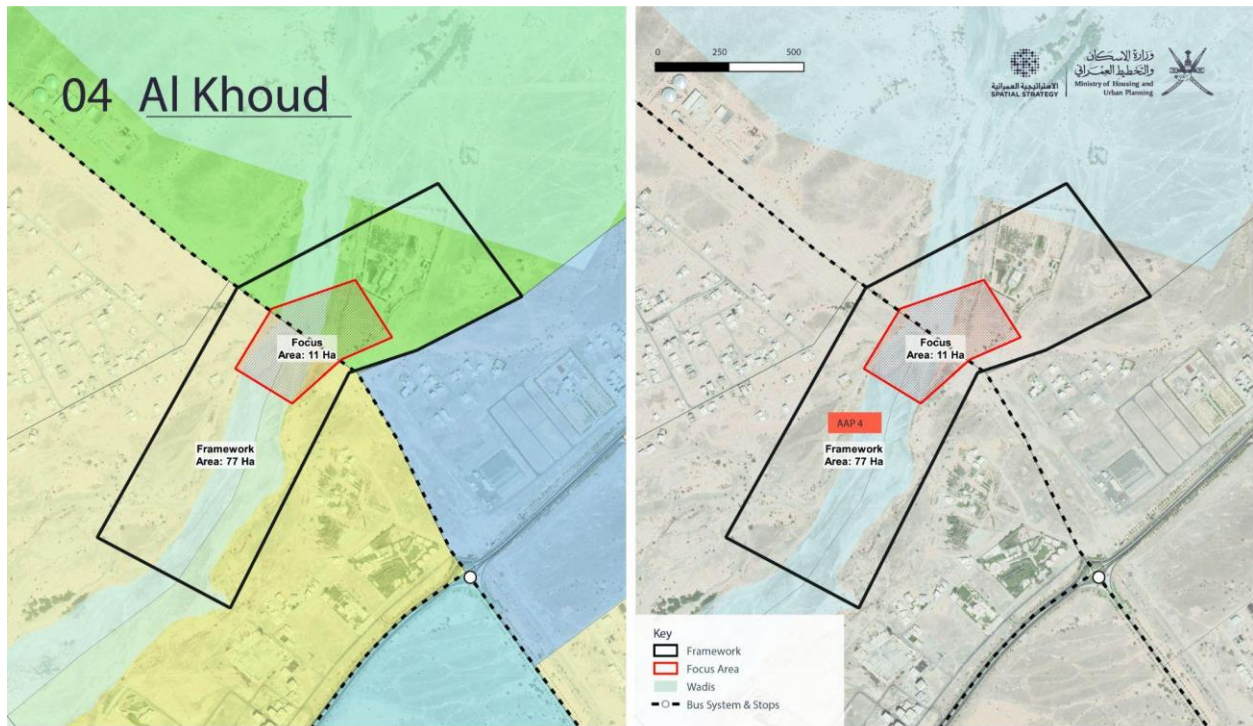
On 25 April we were given an orientation and were split into groups. I was allocated in Group C where my team had 5 talented architects. Two of them were professionals, an academic that teaches architecture at University of Technology and Applied Sciences, and an architect that works online for an American design studio. The other three architects were graduates from 2022. I was the only person in the team who had a different profession where I am a civil engineer and I specialise in engineering designs, technical consultation, and project management. I work for an international American engineering firm called Parsons Corporation and I am also an Operations Manager/partner at an engineering firm called Maqam Engineering Consultancy.

The Hackathon had 7 themes related to sustainability that the groups had to focus on which were Climate Change, Waste Management, Mobility, Energy, Water Management, Community Participation and Public Spaces, Communities and Culture as Urban Dimensions. From these themes the organizers chose a topic from which each team had to make a proposal to deliver as a Concept Design along with a Business Case. Also, if the project needs a Policy Report has to be submitted in case there is a regulation that needs to be revised/proposed to support the proposed solution. There were three deliverables for the competition which were a public presentation at the Youth Centre in front of the Hackathon jury. A detailed report of the proposed solution. And a Project Pro-Forma which was a one-page form that had to be filled that summarises the proposed solution and is used by the Government of Oman to evaluate projects in many aspects such as which targets does the project achieve from the ONSS and the Oman Vision 2040. The form also has a brief description of the nature of the project with a SWOT analysis, timescale and phasing, cost, execution agency, private sector involvement and many more details in just one page that helps the government take a quick judgment whether a project may proceed to the next level or no. Every team was given a specific sub-topic to focus on and my team's topic was Sustainable Development and Planning. The Hackathon jury consisted of experts in the field of urban planning and built environment mainly being academics from local and international educational institutions.

The Hackathon was focusing on 6 Action Area Plans (AAP) taken from the Greater Muscat Structure Plan (plan below). The AAP locations had many challenges that the government wants to tackle through sustainable solutions that are aligned with the ONSS targets and Oman Vision 2040. We were instructed to either choose one of the 6 AAP locations which were giving to us by organizers, or to choose a location that we believe is an Action Area Plan within Greater Muscat structure Plan that should be prioritised by the government. Hence, our team visited all of the 6 AAP sites and started analysing the challenges in each site in order to finally choose an AAP location.



After a team discussion we made a vote and chose AlKhoud AAP location as the location that we will provide a solution for (see plan below). The location is specifically in Wadi(valley) AlKhoud that is surrounded by empty lands that are owned by Muscat Municipality. We chose it because when we increased the diameter of the surrounding area, we noticed that the Wadi splits AlKhoud from Maabella. Both these cities are situated in Wilayat As Seeb which is considered as one of the highest Wilayats(cities) in Oman that has a very high density of people. The population of Muscat is 1.4 million and the population of As Seeb is very close to 0.5 million (chart below). AlKhoud and Maabella alone make up to 0.4 million people which are two of the fastest growing cities in terms of population and are prone to grow even bigger in the following years. 0.4 million people makes up to 35% of the total population of Muscat which is a very huge percentage.

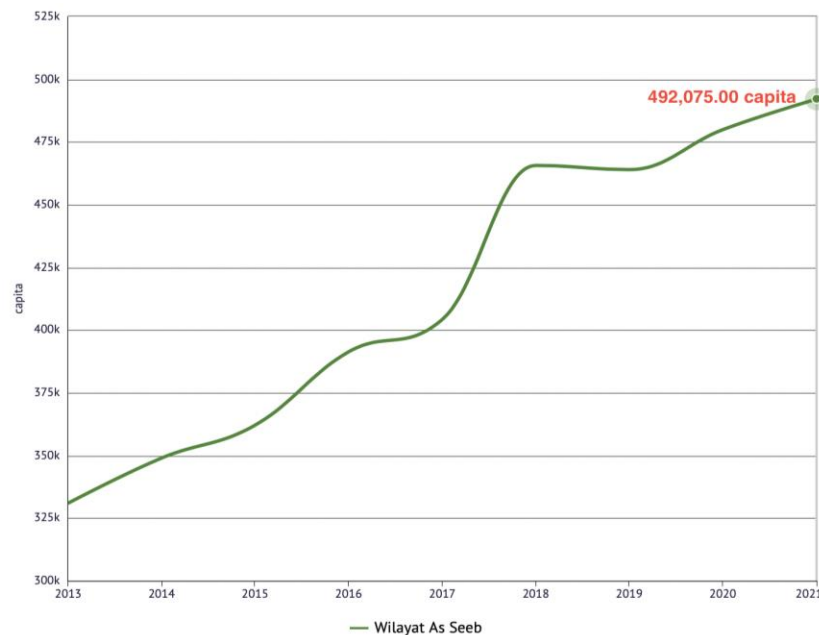


Proposed Framework Land Use Key



KEY ISSUES TO BE CONSIDERED:

- Flood Risk Management
- Access / Severance / Wadi Crossings
- City Park Gateway
- Greenspace Amenities
- Cyclone / Climate Change Effects
- Hydrology & Soils
- Knowledge & Innovation Park integration
- BRT TOD Integration



A general observation is that AlKhoud and Maabella areas grew suddenly faster than other cities in Muscat as time passed by since the early 20's. This goes back to many different reasons, but a major one is because of having Sultan Qaboos University (SQU) and Knowledge Oasis Muscat as well as other similar entities in Wilayat As Seeb resulted

in increasing the demand for employment, which made people in rural areas move to Muscat. Thus, the scattered and unregulated land distribution in the urban fabric started happening, ending up with such wide residential spots that lack well planned infrastructure and basic facilities.

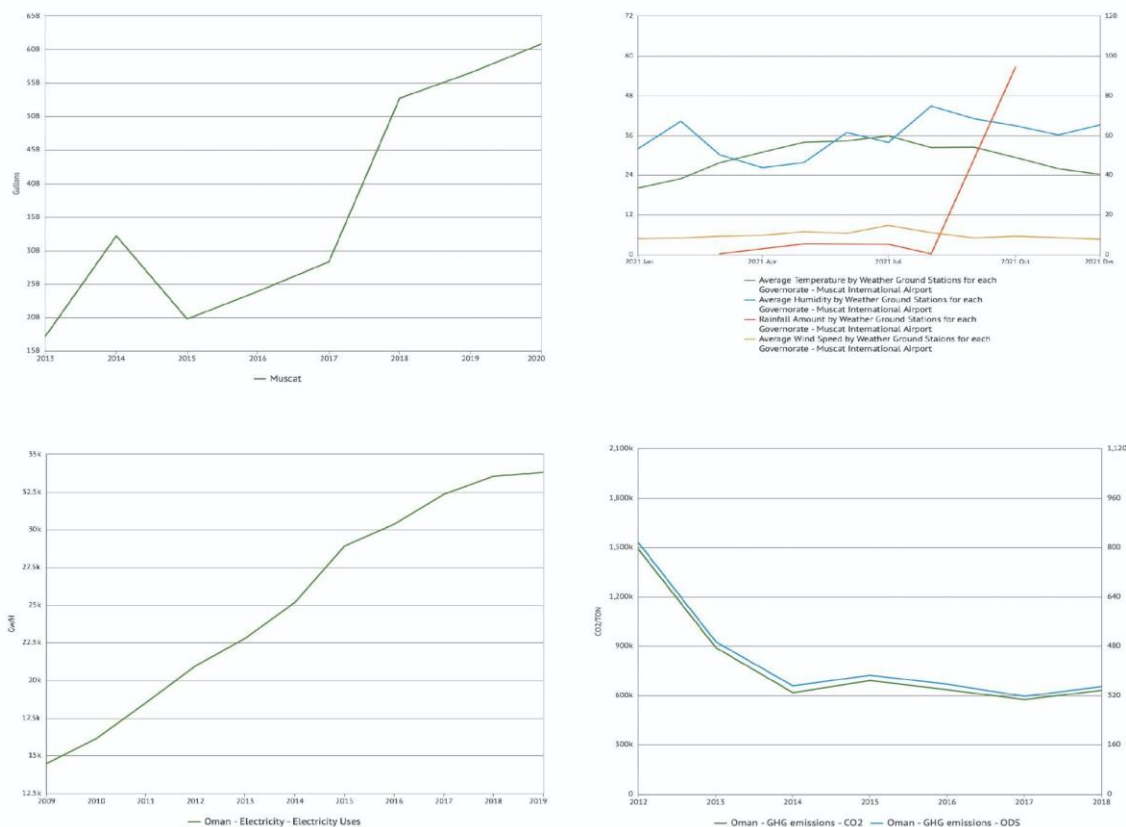
Furthermore, we have done a detailed site analysis for this AAP location and its surroundings, we have come up with Site Observations with pictures from the site, alongside with the desktop site study.

Site Observations:

1. The site is almost an empty land.
2. Manhole chambers located at the center of the wadi.
3. Minor vehicle movement almost 1 vehicle every 5 minutes
4. There is a bus route crossing the wadi as per the ONSS plan provided.
5. Lots of construction waste in the area (block work, concrete, pavers, tiles, gypsum, wood, fabrics, trees)
6. Noticed the AlKhoud side is levelled and easy to construct.
7. The Maabella side is also somewhat flat, but it requires filling in some areas.
8. The road leading to this area from AlKhoud side is not in a good condition.

An additional step regarding the desktop site study was to look for specific statistics in a sustainability wise from the National Center for Statistical Information (NCSI), to help in developing a practical solution for the area while taking in consideration the different sustainability aspects. Unfortunately, we have not found many statistics for As Seeb in particular, but we did find some general ones for Muscat Governorate and Oman as a whole.

The major statistics that were taken into consideration:





Empty and neglected land



Topographic leveling



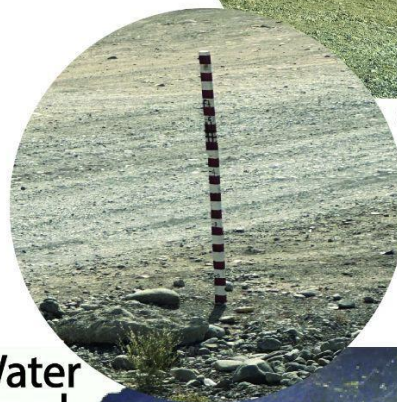
Unpaved way to the site



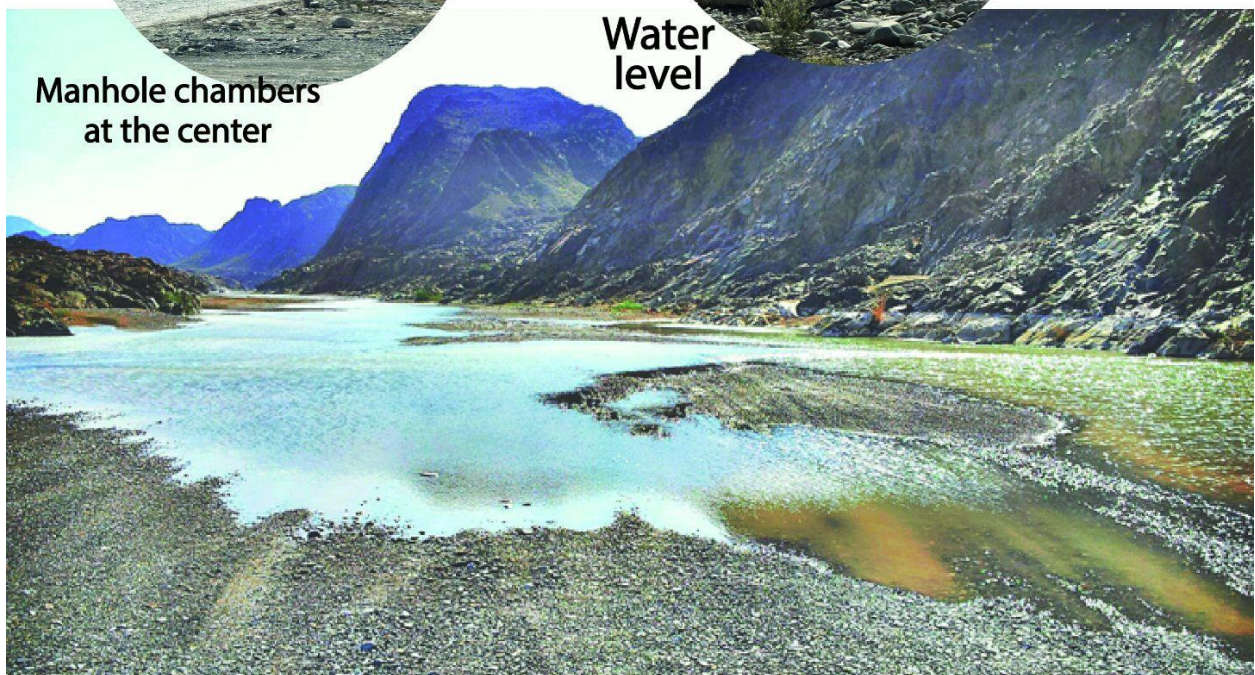
Construction debris

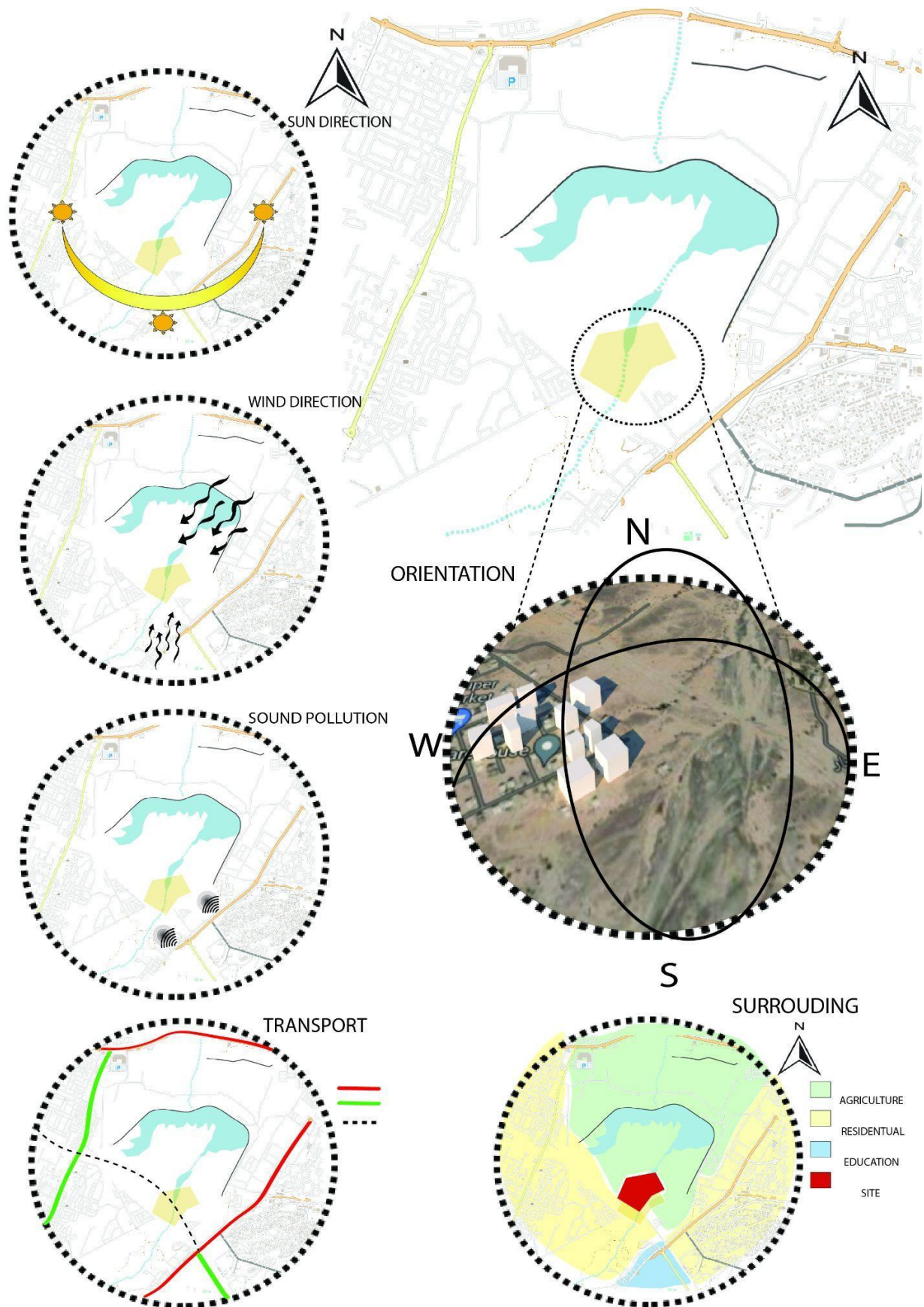


Manhole chambers at the center



Water level





Environmentally wise, The wadi is defined as a valley that has a river that is usually dry except when it has rained, so it naturally occurs throughout the time, forming some type of a natural habitat in the area. Another observation in this regard is that Wadi AlKhoud is known for the different species that live by it, besides the original natural state of the whole Wadi area, with all of the existing plants and geographic features it has. Hence, keeping the Wadi state as it is, or even enhancing it, is a major point which we have to keep in mind when proposing a solution for the existing problems surrounding the site.

To conclude, we addressed all the existing problems in the site by referring to the AAP as well as our own personal analysis, in the following:

1. Flood Risk Management
2. Cyclone/Climate Change Effects
3. Access /Severance /Wadi Crossings
4. Hydrology & Soils
5. City Park Gateway
6. Knowledge Oasis Muscat integration
7. Greenspace Amenities
8. Transit Oriented Development (TOD) Integration
9. Traffic Jam occurring from Sultan Qaboos University Street
10. Lack of Outdoor Recreational Areas
11. Lack of Green Bodies between the neighbourhoods
12. Wadi Segregating AlKhoud from Maabella
13. Intensive use of nearby Parking lots of the apartment buildings by the general public which creates a huge problem for apartment residents.

Survey & Findings

We have done a survey targeting people living in AlKhoud and Maabella areas, alongside those who work, study, or regularly visit the two areas. We asked mainly about whether the two areas have any open spaces as recreational areas, whether they visit Wadi AlKhoud or not and the reasons behind that, and many other related questions.

Findings of the Survey:

- A total of 56 people answered the survey.
- All responses came from Omanis, about 51% were Males, and 49% of Females.

Some of the responses are below:

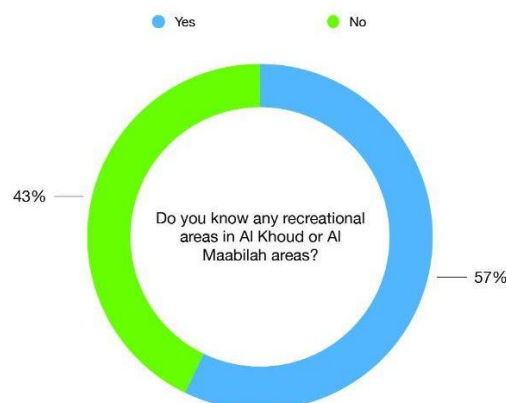


Table 1-6

Table 1-6	
Yes	32
No	24

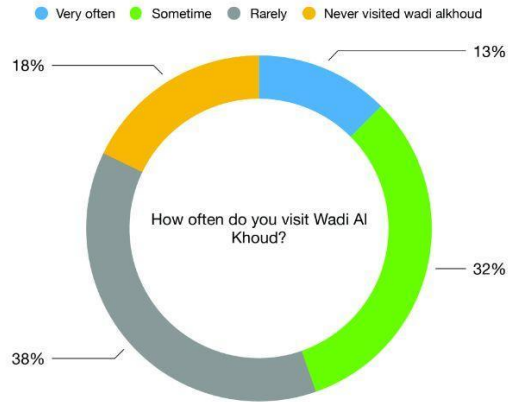


Table 1-7

Very often	7
Sometime	18
Rarely	21
Never visited wadi alkhoud	10

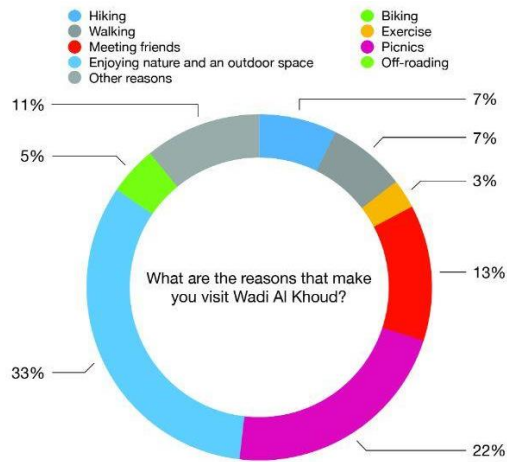


Table 1-3

Hiking	8
Biking	0
Walking	8
Exercise	3
Meeting friends	14
Picnics	24
Enjoying nature and an outdoor space	36
Off-roading	5
Other reasons	12

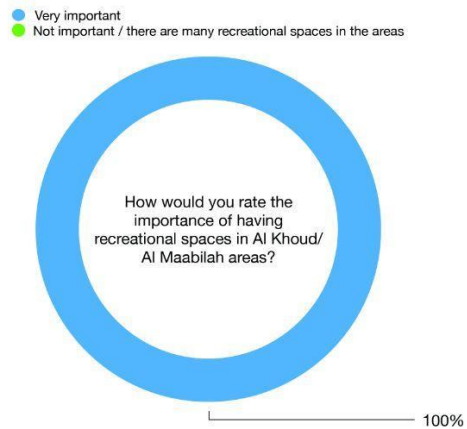


Table 1-4

Very important	56
Not important / there are many recreational spaces in the areas	0

Relating to the ONSS - Technical Volume

Referring to the Technical Volume of the ONSS, we have found two main relevant Policies that will serve our project and achieve the Spatial Development Policy Framework, which are presented here:

Core Theme and Policy Identification	SD7.1
Project Number	SD7.1.1-1
Project Name	Development of Social Infrastructure Facilities
Project Linkages - Enables	None
Project Linkages – Dependent on the completion of	SD2.1.1-1, SD2.1.1-2, SD2.1.1-3, SD4.1.1-1
Project Description	
This project aims at provision of the community facilities in Muscat Governorate. These facilities comprise healthcare facilities; institutional and government services; social, cultural and recreational facilities; parks and open spaces. The demand for Muscat Governorate 2040 has been estimated using the ONSS Planning Standards. Muscat Governorate needs to have 5 district hospitals, 20 district police stations, 5 sports centres and 820ha of parks and open space to cater to the need of 1 million population in urban areas by 2040. The project will be implemented in phases spread over 20 years. Further details are given below.	

Core Theme and Policy Identification	SD12.2
Project Number	SD12.2.1-1
Project Name	Development of Wadi Parks
Project Linkages - Enables	None
Project Linkages – Dependent on the completion of	WR4.1.2-2
Project Description	
The project aims to implement urban enhancement interventions across the governorate, introducing well-connected pedestrian and cycling infrastructure in existing neighbourhoods to support the use of active transportation for short and medium distance trips. Establishment of Wadi Parks considering the vegetation and buildings to provide shade coverage during peak sun exposure will be an important consideration to ensure these spaces are attractive and comfortable. The project design will be done for 2 years, during these two years detailing the changes to road design, to facilitate safer vehicle speeds and turning movements in urban areas. The infrastructure will predominantly be focused at the neighbourhood level, ensuring that discretionary trips are accessible and convenient for pedestrians. It will also include investments in multi-use trails and larger active transportation corridors that can be used for commuting or recreational purposes. The project would develop visitor facilities and park facilities across the 7 wadi parks conceived.	

Relating to the ONSS - Standards

Parks and Open Space Typologies:

Wadi Parks: Wadis within urban expansion zones will have an important role to play in delivering accessible open space. These threads of desert can extend into the urban fabric and can create a connected network of multi-functional open space which supports the hydrological processes, enhances biodiversity, and provides a recreational resource for future residents. Degraded wadi corridors in existing urban areas can also be transformed into linear parks.

Development Guidelines for Urban Districts

Wadi Parks: Several major wadis cross through the Muscat city area, originating in the Al Hajar Mountains range and terminating in the Sea of Oman. Wadis are unique assets that can help further the resilience of the city with respect

to climate change and flooding events. It is recommended that detailed project reports be carried out for each wadi park with respect to the following aspects:

- Retain the hydrological “sponge” capacity of wadis to help manage flooding and general drainage.
- Connect wadis with their surrounding neighbourhoods and the city’s system of public spaces with improved accessibility through Non Motorised Transportation (NMT) and public transport.
- Remove or reorient high volume roads that restrict connectivity between neighbourhoods and wadis parks.
- Remove any encroachments in wadis, which restrict their hydrological capacity.

Relating to the Muscat Regional Spatial Strategy (RSS)

Sustainable Development

Sustainable development is an overarching element of both the ONSS and RSS that forms the structural basis for the vision for the Sultanate and the specific policies of each governorate. The spatial framework contained within the ONSS/RSS aims to achieve sustainable development by balancing the social, economic, and environmental implications of growth in a manner that is mutually reinforcing, recognizing that each element is intrinsically linked.

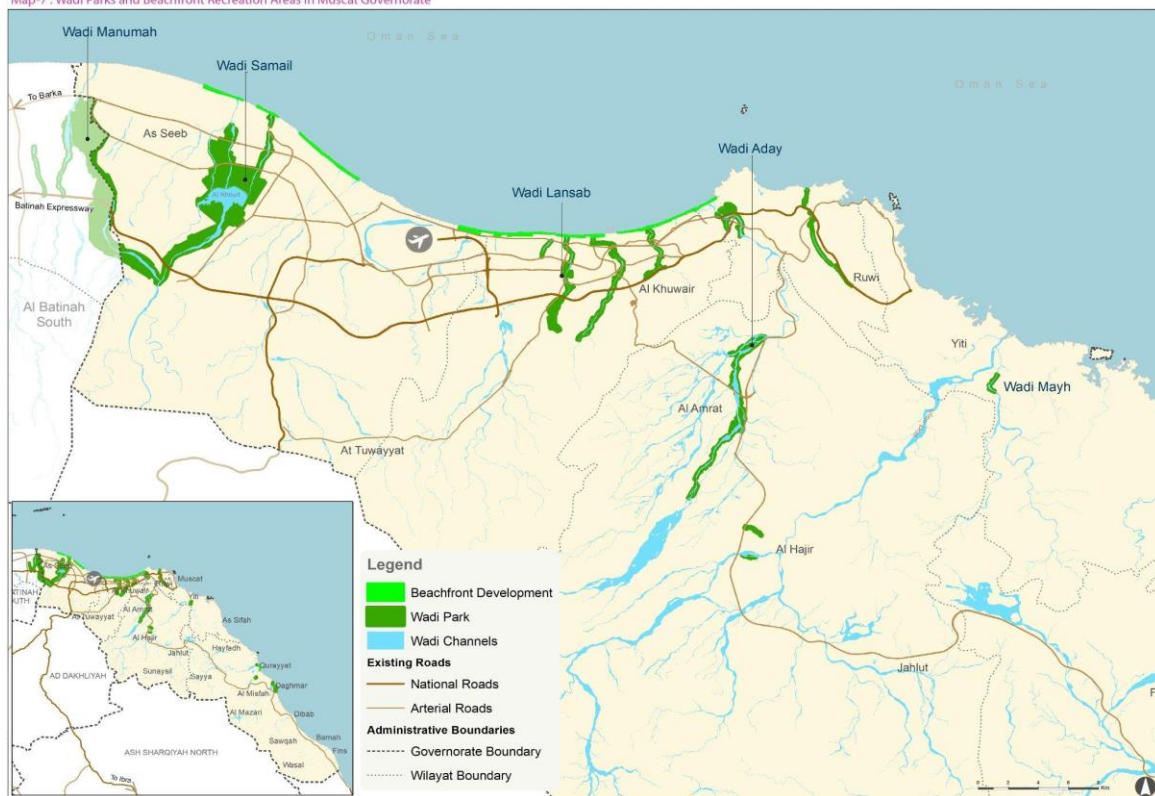
SD7.1 Improving the Quality of Oman’s Urban and Rural Environments – Providing Community Facilities to Build Strong and Inclusive Communities

The establishment of a regional settlement hierarchy will enable the appropriate allocation of community facilities based on each settlement’s role and catchment area in the Muscat Governorate. Service standards have been identified for a variety of facility types and catchment areas (regional, district, neighbourhood, and local).

SD12.2 Improving the Quality of Oman’s Urban and Rural Environments – Creating Urban Wadi Parks and Beachfront Recreation Areas

The Government will create a cohesive network of linear wadi parks and beachfront recreation areas in the Muscat Governorate which provide climate protected pathways for walking and cycling, linking key cultural heritage sites, oasis settlements, and urban neighbourhoods from the Al Hajar Mountains to the Sea of Oman.

Map-7: Wadi Parks and Beachfront Recreation Areas in Muscat Governorate



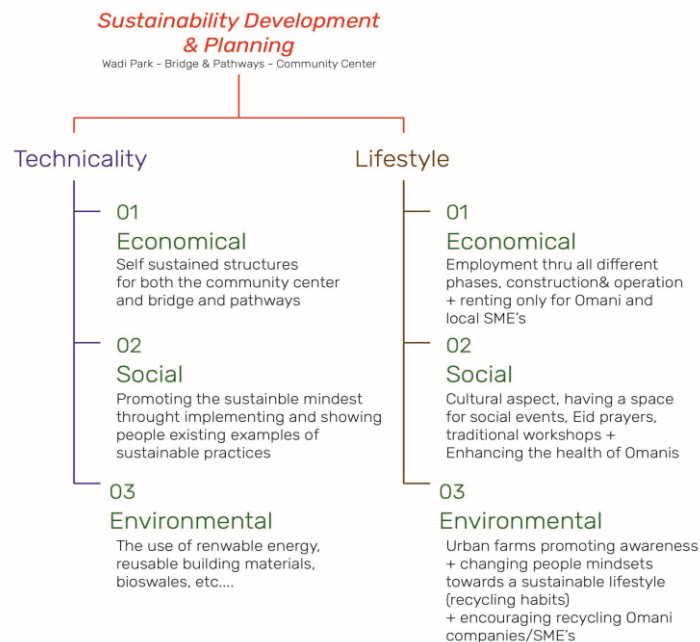
After all of the information listed above, the following solution is proposed:

The **Wadi Park** aspect addresses the problem of that we have such a huge natural empty space that is not used and cannot be used because it lacks the infrastructure it needs to reach that area and satisfies all types of people. While the **Social Infrastructure** part addresses the fact that there is a lack of social amenities and facilities and recreational spaces in AlKhoud and Maabella regions as well.

So, we are proposing **Three Main Components** to the whole project, **The First Component** is the **Wadi Park** which was already proposed in the ONSS projects, thus leaving the natural habitat with basic enhancements to the site regarding the green spaces. **The Second Component** is the **Bridge and Pathways** that will connect the middle centers of both AlKhoud and Al Maabella areas to the center of our proposed site, as well as a Bridge that connects the two edges of Wadi AlKhoud. **The Third Component** is the **Community Center** which will be placed right beside the edges of the Bridge, acting as a recreational area for visitors of the Wadi as well as an attraction spot. Each component is solving a main issue in the site. For instance, the wadi park is going to solve the issue of having such a huge space that is not utilized, turning it into a better green area while maintaining the natural habitat. The bridge and pathways will solve the connectivity part between AlKhoud and Maabella since they are separated by the Wadi and will allow ease of access for these two cities residents to reach the Wadi through the pathways. The last component is directing the need for a recreational space in the area, since 100% of the people voted in the survey of the importance to have a recreational space in the chosen APP location as very important, and if we are to zoom out to see AlKhoud and Maabella neighbourhoods, we will actually notice the lack of a centric node that would act as a recreational amenity, or even a green body, thus the community center will solve all of this.



To include sustainability in the project, we have thought of introducing two main categories that will apply all three sustainability aspects in them. The First Category is the Technical one, which will cover the technical implementation and construction of the bridge, pathways, and community center. The Second Category is the lifestyle, which will cover the human aspect in the project, and how we promote and encourage healthy habits in general.



Achieving Oman Vision 2040

We have identified the main objectives from the 12 National Priorities that are related and will be achieved throughout the project's implementation and operation:

Vision Pillars:

- **A Society of Creative Individuals**
- **An Environment with Sustainable Components**
- **A Competitive Economy**
- Responsible State Agencies

Objectives:

(Health)

- A healthy society free of health risks and hazards, where “health is the responsibility of all” through encouraging people to live a healthier life by doing sports.

(Citizenship, Identity and National Heritage and Culture)

- A knowledge-based society that is conscious and mindful of its identity, having skills and capabilities, and keeping abreast of development and technological changes.
- A sustainable investment in heritage, culture, and arts to contribute to national economic development.
- A society of responsible members who are aware of their rights and committed to their duties.

(Well-being and Social Protection)

- A cohesive and vigilant society that is socially and economically empowered, especially women, children, the youth, the persons with disabilities and the most vulnerable groups.
- Advanced social services and programs that cater to the needs of society.
- An empowered civil society that participates effectively in sustainable development

(Economic Diversification and Fiscal Sustainability)

- A competitive, diversified, and integrated economy based on foresight, innovation, and entrepreneurship.

(Labour Market and Employment)

- Labour Market and Employment

(Development of Governorates and Sustainable Cities)

- Empowered communities capable of setting their socio-economic and environmental priorities and operating within a framework of administrative and economic decentralization.
- An efficient settlement hierarchy to guide sustainable urban development, accommodate the growing population and provide the necessary public services and utilities.
- Smart, sustainable, and vibrant cities and a vital countryside with a viable architecture that ensures high quality of life, work, and leisure.
- Diversified and easily accessible means of transport, integrated with sound and targeted urban planning and sustainable world-class infrastructure.

(Environment and Natural Resources)

- An environment that ensures balance between environmental, economic, and social requirements, according to sustainable development guidelines.
- Environmental ecosystems that are of high quality and free from pollution
- Food and water security achieved through renewable resources, advanced technologies and optimal exploitation of the Sultanate's strategic location and biodiversity.
- Sustainable use of and investment in natural resources and wealth to deliver high added value.
- Renewable energy, diversified sources of energy, and rationalized consumption to achieve energy security.
- A green and circular economy that addresses national needs and moves consistently with the global trends.

The Concept proposal

The concept is to build a sustainable urban mixed-use hub, an efficient building that provides the healthiest environment to its users and has a lower impact on the natural environment and resources. The masterplan will be equipped with walkability and wide green spaces in mind, allowing residents, workers, and visitors to live, work and play within a fully integrated and sustainable community. Encouraging environmental commitment from all stakeholders. Promising them to earn marketability for this building, with possible incentives from the government.

Social, Environmental and Economic Benefits of the project:

Social Benefits

Better indoor environmental quality, healthier environment, no extra burdens on local infrastructure.

Environmental Benefits

Protect wildlife, no air or water pollution, no extra waste production, prevent natural resources depletion.

Economic Benefits

Lower operating and maintenance costs, higher property value, higher employee productivity, lower life cycle costs.

A Regenerative project will be Net Zero Energy, use no more electricity than it generates onsite:

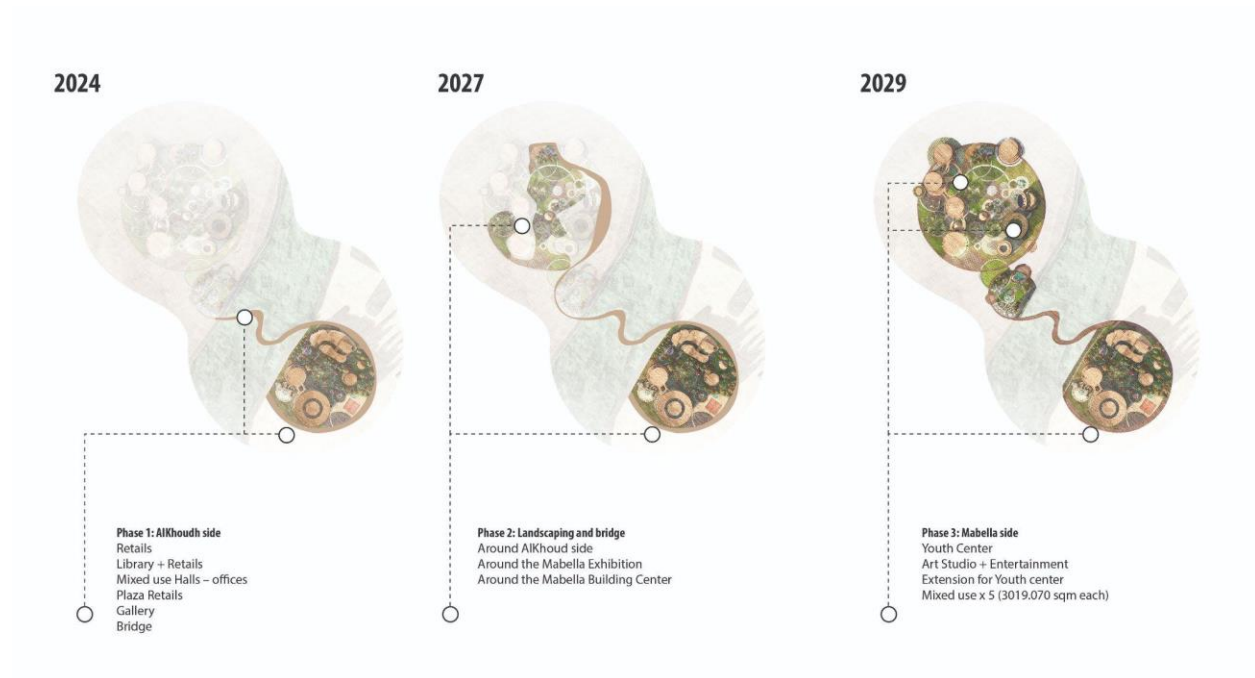
- Net Zero Carbon Footprint
- Net Zero Carbon Emissions
- Water Balance
- Uses only water received by Precipitation.
- Zero Waste
- Reuse, Recycle, or Compost all waste.

Micro Goals

1. To bring vitality and innovation to the context. As the area is left without benefit to the community specially the residents of Maabella and AlKhoud. The lack of such urban mixed-use centers. A multi-level urban living, a meeting point providing various important facilities for neighbourhoods. Mitigate the cars mobility use as well.
2. To minimize the consumption of resources restoration of the adjacent wadi and wetlands.
3. Public squares with water features irrigated by recovered and recycled water.
4. Canopies and cantilevers sustain a microclimate at ground level restoring native ecosystems, the creation of activated green areas within the urban fabric and the introduction of stormwater management systems.
5. Incorporate active and passive measures to lower the demand for indoor cooling.
6. Synergy of landscape, leisure, commerce, and cultural spaces as a master plan that serves the neighbourhood.
7. Continuous route bridge acting as shading devices and helping to cross the wadi.
8. Bus terminal, a conference center, and an entrepreneurship center among other mixed-use facilities.
9. Recycled concrete, pottery cladding, recycling waste, waste management by providing containers to collect the recyclables. Looking at the financial return of the project and its benefits in terms of profits in the short and long term.
10. Shaded terraces with planting beds and water bodies to reduce temperature, whereas large overhangs cut direct sunlight and create shaded spaces.
11. Pedestrian friendly outdoors, green lawns even on the rooftops, giving visitors access to the landscape.
12. Grassy hills, palm tree-filled plazas, reflective pools, and activity zones for outdoor games.

Business Case

Project Phasing



As per the figure above, we have split the project into Three Phases where we thought about the community priority in connecting both AlKhoudh and Maabella and also focusing on the buildings that will generate income back to the project. So, we have focused on building Phase 1 which is in AlKhoudh side and has retails/offices and a total built up area of **19,555.095 sqm** and the pedestrian bridge.

We calculated the prices only focusing on building these buildings as “Shell and Core” meaning no fitouts, where the tenants will execute their fitouts as per their needs and that is how commercial plots are usually constructed. We have looked into the retail rent price of similar places which are close to the project that are SQUare and Murooj Square and found that the price per sqm is around 10 OMR. From there we have calculated the income back from renting the commercial spaces with a 70% occupancy. We got as income **1,642,620 OMR** annually. Now if we are to deduct the operation and maintenance costs which was estimated as 140,000 OMR annually, the net profit annually of Phase 1 only will be **1,502,620 OMR** where the costs of building phase 1 will be covered in 5.2 years including the bridge which costs **4,000,000 OMR**. See the tables below that explain the project phases and the costs per building. Note that the costs and areas below are estimates based on the concept design and the advice of a local international grade contractor.

Phase 1: AlKhoudh side (considering 150 OMR per sqm for Shell and Core only without fit outs) Project start date from Q3 2024, end date Q4 201

Building description	Area (sqm)	Cost (OMR)
Retails	1385.442	207,816.300

Library + Retails	8824.734	1,323,710.100
Mixed use Halls – offices	3216.991	482,548.650
Plaza Retails	6127.928	919,189.200
Gallery	96.500	19,300.000
Bridge	413m	4,000,0000
Total area	19,555.095	7,930,319.000

Phase 2: Landscaping and bridge (considering 22 OMR per sqm) Project start date from Q2 2027, end date Q4 2028

Building description	Area (sqm)	Cost (OMR)
Around AlKhoud side	80,664.504	1,774,619.090
Around the Maabella Exhibition	17,249.700	379,493.400
Around the Maabella Building Center	105,495.410	2,320,899.02
Total area	203,313.114	4,475,011.510

Phase 3: Maabella side (considering 150 OMR per sqm for Shell and Core only without fit outs) Project start date from Q2 2029, end date Q4 2031

Building description	Area (sqm)	Cost (OMR)
Youth Center	3644.200	546,630.000

Art Studio + Entertainment	3043.570	456,535.500
Extension for Youth center	1521.770	228,265.500
Mixed use x 5 (3019.070 sqm each)	15,095.350	2,264,302.500
Total area	23.304.890	3,495,733.00

Total investments, costs and returns expected of all Phases of the project when they are completed:

Total built up area of all of the buildings in all Three Phases: **43,618.075 sqm.**

Total external areas: **203,313.114 SQM**

Total construction costs of all phases: **15,901,063 OMR**

Total Income when all of the development is completed:

24,255 x 10 OMR for 70% occupancy = 242,550 monthly, 2,910,600 annually

Total annual income from all phases: 2,910,600 + 1,642,620 = 4,553,220 OMR

Approximated Operation and Maintenance costs 200,000 annually for phase 2 + 3

Estimated Total Operation and Maintenance costs **300,000 OMR.**

Estimated Net profit for the whole development **4,253,220 OMR annually.**

Total construction costs of all phases: 15,901,063 OMR

Total Operation & Maintenance costs 300,000 OMR annually

Net profit for the whole development 4,253,220 OMR annually if there is 70% occupancy.

15,901,063 /4,253,220 = 3.7 years to cover the total project costs

Funding Agency

The project is planned in a way where it might not need any Governmental involvement in the investment part. Where we are proposing to raise funds for the proposed Community Center through Corporate Social Responsibility (CSR). We are proposing a potential target to invest in this project which is Petroleum Development Oman (PDO), and this is through their Social Investment program which aims to fund similar projects that enhance the sustainable lifestyle.

Renewable Energy provision:

We thought about adding future provisions for Renewable Energy through solar power and calculated it as per the data below (note that the prices are as per International for Renewable Energy IREC):

On Grid Per KW = 500 to 600 OMR

Off Grid Per KW = 1800 OMR

Every KW requires 9sqm of roof space.

Flat roof space available 18,068.530 sqm / 9sqm per KW = **2007 KW or 2 MW** but realistically solar power is 15 to 21.5% efficient so **15% x 2MW = 300KW** of green energy

As per Eskom.co.za 1000 KW can supply 650 homes.

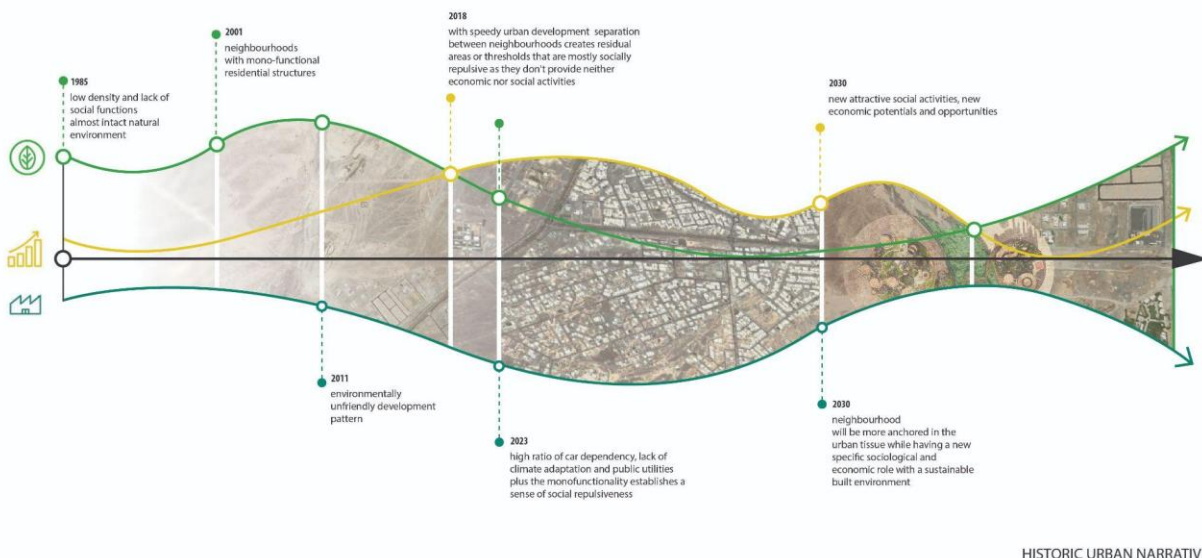
Total cost for lowest price 500 OMR per KW x 2007 KW = **1,003,500 OMR to generate 300KW**

Model of the Business Case: Commercial areas to rent that consist of retail, office spaces and mixed-use halls for events and open markets. The business model was selected based on the survey results, and the existing examples of open malls (plazas) such as SQUare & Murooj Square which are very close to the proposed location. Also, because this business model is very profitable and is self-sustaining with an excellent return on investment.

Project Funding proposal: Since the project concept is mostly based on a social approach towards sustainability that will set a benchmark for other centers which will be replicated in the rest of the cities, we started searching for companies that have a Corporate Social Responsibility (CSR) program. We found that many companies provide that in Oman and chose the biggest one which is Petroleum Development Oman (PDO) that have a Social Investment program where they fund such projects in order to contribute to a sustainable society.

Design Concept

How was this Design Shape Decided/Achieved?

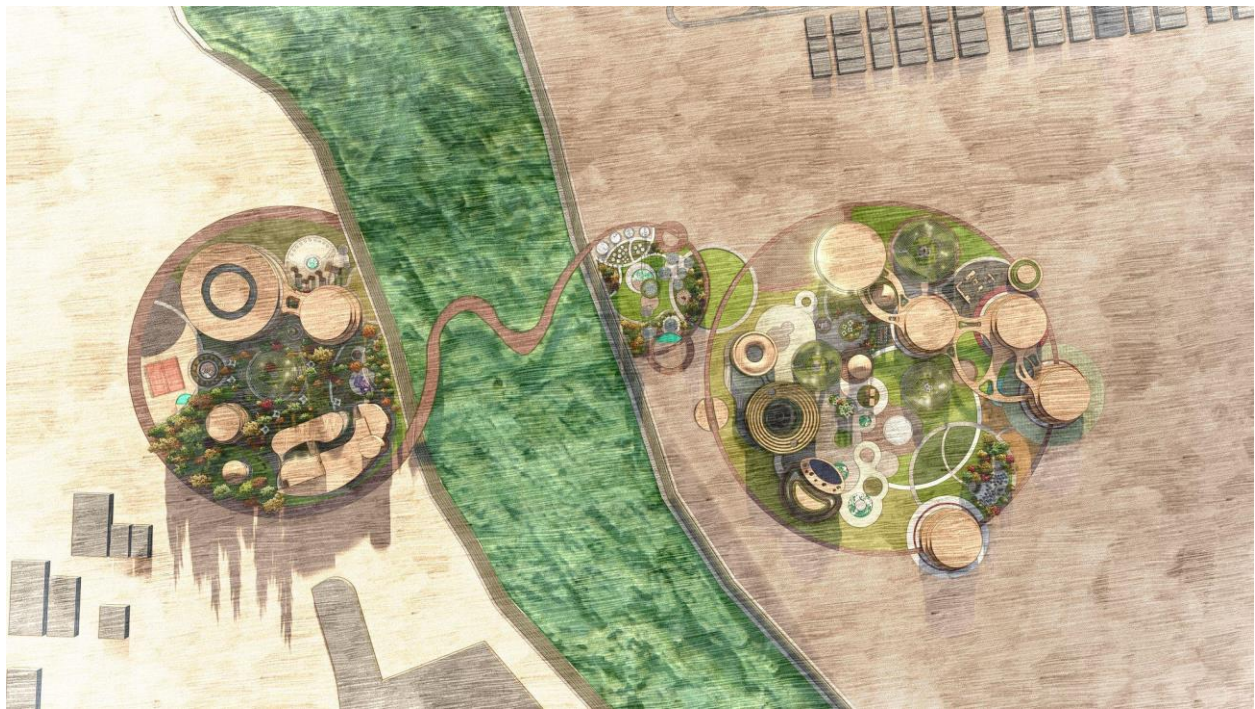


The design concept of this Community Center started by considering the master site plan of the area proposed (Wadi AlKhoud) and how it is acting as a central space for the nearby neighbourhoods. The AAP is linked to 3 different districts: AlKhoud 6, Maabella and AlKhoud (Mazoon Area), which allowed the AAP to be the potential central node of all those districts connecting them together as a network.

With this knowledge, alongside with all other findings and observations, as well as the references and the policies of the ONSS, the idea of creating an actual link between two different neighbourhoods that were separated by the Wadi route came to life.

This link is a design concept of providing a living bridge that will allow this connection to be emphasized and serves its purpose of bringing together two different areas together and showcase the natural existing Wadi in the zone.

With this bridge it is important to create an attraction that will interest the nearby residents to actually visit and use this bridge. And that is when the idea of promoting Wadi Parks and recreational spaces on both ends of the bridge came into light. In simple words, these spaces will encourage residents from both ends to cross the bridge in order to enjoy the open spaces and the recreational areas on both ends. With this development the area will attract people towards it acting as a community center. The concept started to show its potential, alongside the assessment done in which its results were mainly about providing a recreational space for the community.



The Study of the Connection Paths and the network towards the site are shown in this figure based on 3 different ways: Walking, Biking, Bus Terminals.



The Design Concept: Components AlKhoud Side

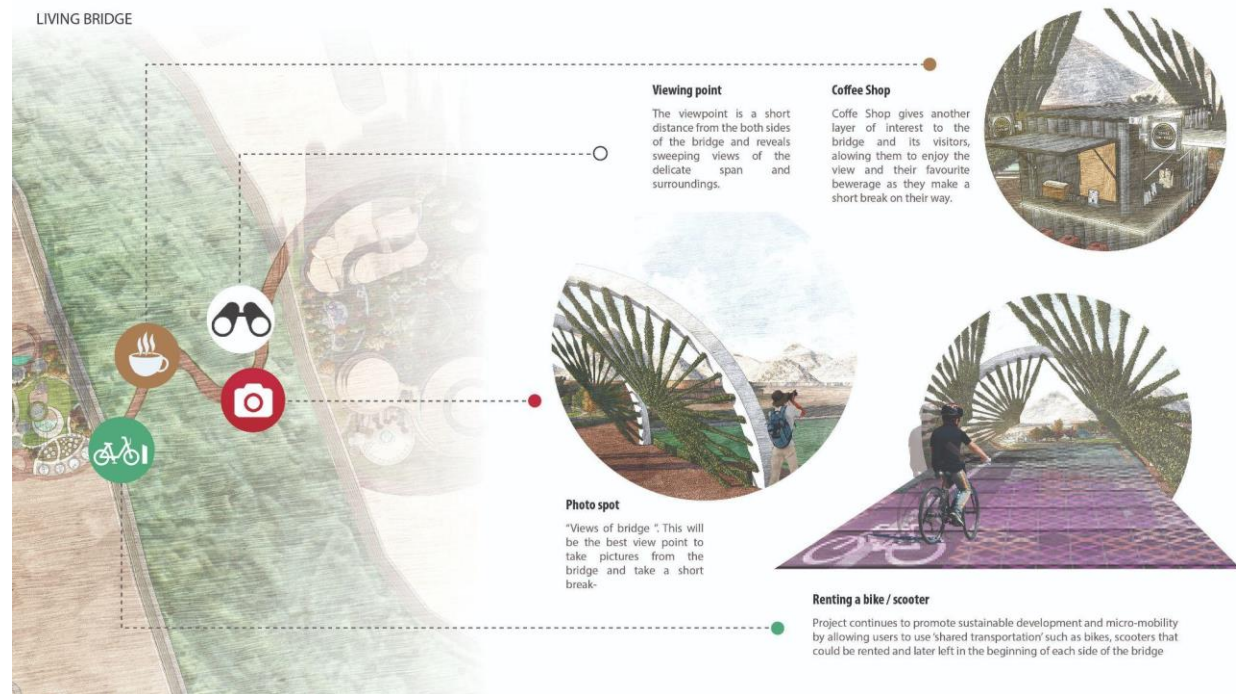


The design components in AlKhoud side along with the bridge are all in Phase 1 of the project. They will act as a source of income as explained in the business case. These different components are mainly for the education, co-working spaces, as well as retail (mini mall plaza). These components are as follows:

1. Retail (Mini Mall Plaza) Building
2. Library and Retail Building
3. Mixed used Halls + Offices Building
4. Retail Shops
5. Gallery Building
6. Bridge

Passive Design was considered as the main designing principle for the project. The circular shapes enhance the wind flow and integrate as a passive cooling system for the structure. The cantilevered roofs providing shades for the walkways in the lower floor as well as the landscaping paths. The pathway at the edges is utilized as a running track. When it comes to the construction materials, we have proposed recycled materials to a certain percentage if not fully such as fly ash and blast furnace slag in concrete and also terracotta for cladding.

The Bridge



The bridge acts as a living bridge, where it is utilized not only for crossing over, but also by providing recreational and interesting spaces on it. There are coffee shops with seatings as a break, plantations, bike lanes...etc. The bridge is also designed with a tensile support arch that basically has a mesh for green plants that purify and cool down the air for the pedestrians walking underneath. The bridge will also provide rental bikes on both ends that users can use to move between AlKhoud and Maabella using the Bridge to cross over. Wetlands are used to collect and filter rainwater. Benches were placed along the wadi to mitigate the possible floods and protect the Community center.

PERMEABLE PAVEMENT



The components are as follows:

1. The Bridge
2. Bike Rentals
3. Bike Lanes
4. Seating Areas
5. Green Arch mesh

Maabella Side



In Maabella side, there are 2 Different areas, the Recreational and Entertainment area, and the Exhibition area which is the smaller circle at the edge of the wadi.

Recreational and Entertainment area

This area provides the community the possibility of hosting different social and recreational activities, and it is also taking care of the Youth specifically by providing them those spaces that not only entertain them but also enhance and develop their Creativity and further the careers. The components are as follows:

1. Youth & Business Center.
2. Mixed-Use Halls
3. Art Studio
4. Galleries

The Entertainment and Sports Components:

1. Outdoor Cinema
2. Pavilions for Performances (Music, Theatre ...etc)
3. Skate Park
4. Book Club Reading Pavilion
5. Running Track
6. Food Courts and outdoor Cafes + Restaurants.
7. Outdoor Gym

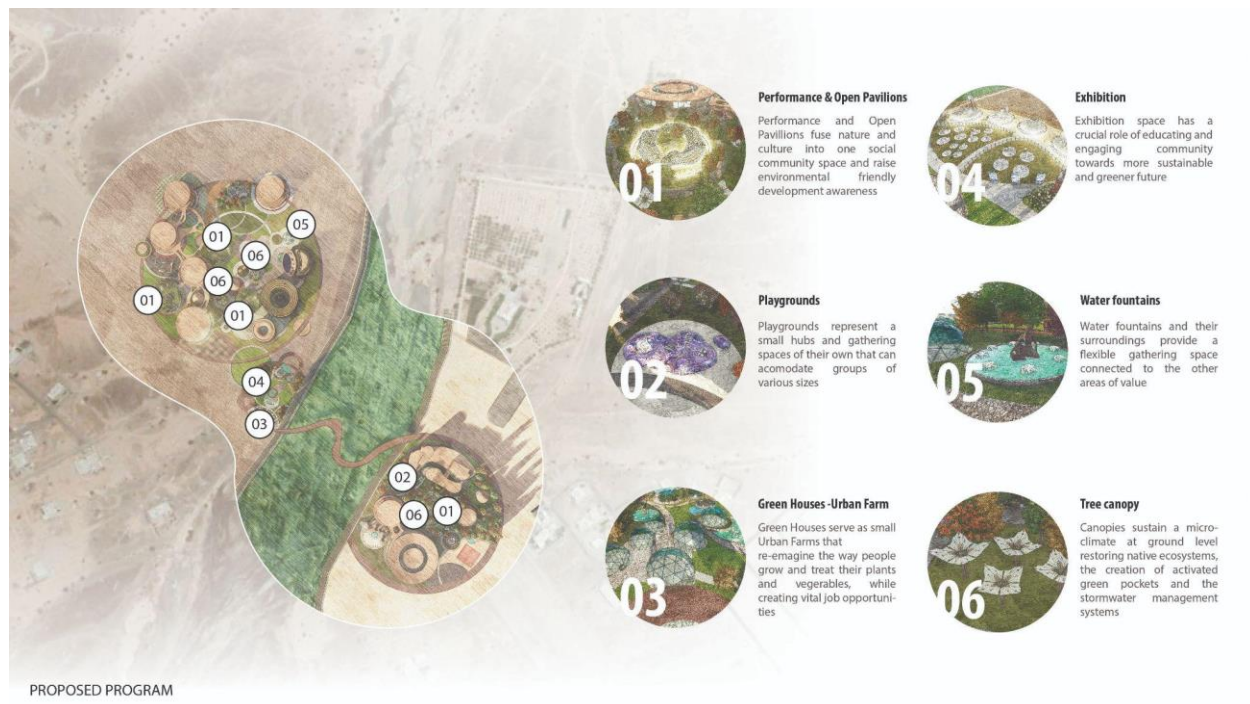
Exhibition Zone



This Zone is all about promoting a **Sustainable Lifestyle** which is one of the main goals of this community center. It includes an Urban Farm that can provide food for the local market as well as possibilities of employment. Green houses are also used for educating the users and showcasing the possibilities and the types of plants within the project.

An outdoor exhibition is also provided for the public where it showcases methods used for water treatment, water purification, grey water, ...etc. The exhibition will also promote the visitors to recycle and will educate them in the recycling methods and the local companies that provides these services such as Tadweer, Wakud, Be'ah ...etc. The project will also have different recycling spots where the community can bring different recycling materials paper, metals, electronic wastes and get collected by the recycling companies. In general, the exhibition center will raise awareness and promote having a **Sustainable Lifestyle**. It fuses nature and culture into one social community space and raises awareness on climate change and the 17 SDG's by doing simple things such as processing food waste and turning it into compost for instances. The components of this area are as follows:

1. Urban Farm
2. Green Houses
3. Water Features
4. Outdoor Exhibition (For Water Treatment Methods)
5. Recycling Exhibition
6. Green Renewable Energy Exhibition
7. Waste Management Exhibition



Project Pro-Forma

Below is the project Pro-Forma that we had to submit which is used by the Government to evaluate projects.



Project Pro-Forma



Project Name		
Project Linkage – Urban theme		Sustainable Development and Planning
Project Linkage – ONSS Targets		Policies SD12.2 & SD7.1 ONSS pillars
Project Linkage – Vision2040 Objectives		Meets 20 objectives, some are A healthy society, Encouraging people to live a healthier life by doing sports A sustainable investment in heritage, culture, and arts to contribute to national economic development Advanced social services and programs that cater to the needs of society
Project Linkage – Government plans		Social infrastructure & Wadi Park
Project Description		
A pedestrian bridge that connects AlKhoudh with Mabella in wadi AlKhoud. Along with a Community Center and a Wadi park that is adjacent to Wadi AlKhoud. The project is aimed to achieve Sustainability from a holistic approach where it promoting the indicators through the technical aspects of the buildings design and the construction methods used. It also promotes healthy lifestyle habits such as Non-Motorized Transportation, recycling and cultural Omani traditional activities. The project is setting a benchmark of community centers to be replicated elsewhere.		
Project Key Targets (KPIs)		
Target /KPI	Measure	Quantity
Access to community facilities	% of people	40% of the population of AlKhoud and Mabella, 13% of Muscat (180,000 people)
AlKhoud and Mabella residents Employment	Number of people employed	200 direct employments
Socio-Spatial Impact		
Promoting a sustainable lifestyle		
SWOT Analysis		
Strengths Community Participation, Empty plot, existing natural habitat which is integrated to the project. Close to SQU and Knowledge Oasis.		Weaknesses the furthest neighborhood is 5.8km away from the project in AlKhoud 6. Random land distribution around the project area.
Opportunities Commercial, mixed-use hub that serves the community, promote better lifestyle and increase the value of the lands around it.		Threats People not willing to change their lifestyle. Special weather conditions.
Project Timescale, Phasing and Alignment to the ONSS		
Start Date (mm/dd/yyyy)	06/01/2024	
End Date (mm/dd/yyyy)	12/31/2026	
Phase	Phase 1: Community center in AlKhoud side & bridge	
Oman National Spatial Strategy (ONSS)	1- Development of Social Infrastructure Facilities SD 7.1 2- Development of Wadi Parks SD12.2	
Preliminary Project Investment and Operating Costs		
Parameter (Example / sm*2 – km – feet)	Unit Cost (OMR)	Total Cost (OMR)
Phase 1: Community Center & pedestrian bridge	-	7.9M
Total Investment Cost		15.9M
Annual Estimated Operating and Maintenance Cost (OMR per annum)		300,000
Potential for Private Sector Involvement		
Potential for Private Sector Involvement	Petroleum Development Oman	



Proportion of Private Sector Investment (%)	75% through Corporate Social Responsibility (CSR)
Proportion of Public Sector Investment (%)	25%
Public Private Partnership Target	Muscat Municipality, Petroleum Development Oman
External Funding Eligibility (FDI)	Invest Oman, Diamond Developers
External Funding Agency Target (specify)	Green Climate Fund
Key Stakeholders in the Implementation and Management	
Petroleum Development Oman, Occidental, Muscat Municipality, Ministry of Housing & Urban Planning, Ministry of Culture Sports and Youth, Beah, Tadweer, Namaa,	
Executing Agency	
Petroleum Development Oman	
Overall Priority	
Medium according to the Regional Spatial Strategy.	



Conclusion

The hackathon was an experience of a lifetime for everyone who participated. We had the opportunity to implement sustainable solutions on a national level and our proposals are being evaluated by the government in order to consider executing them. I have personally gained a lot of knowledge in understanding the governmental targets on the Sustainable Development and how urban planning and the built environment industry plays a major role in affecting the mindset of the people to have a sustainable lifestyle. I have learnt the process of the current governmental process of evaluating projects proposals and I would definitely propose more projects in the future.

We have actually made 3rd place in the competition, and I would like to thank my teammates Hiba, Hamsa, Milena, Shahad and Juhaina for their amazing work and the accomplishment we achieved together. We went through a 48-hour Hackathon from 21-23 May, and it was a hectic period for us but we ended up coming up with all of the work above. (photo below of my group at the award ceremony at the Dutch Ambassador of Oman Residence along with the EU Ambassador and the Omani Deputy Minister of Youth, Culture and Sports I am the third from the left).

There are a lot of approaches being used by the government of Oman towards getting ideas and concepts on sustainable cities, urban planning, and proposals. Some are through Hackathons similar to this one. The government is also focusing on a lot of sustainable urban planning aligning with the ONSS and the Oman Vision 2040 which are both derived from the 17 SDG's. There are futuristic cities that are targeted to set benchmarks for future cities in Oman such as The Sustainable City – Yiti which is under construction and the recently launched Sultan Haitham City. Our proposal was also targeted to set a benchmark for community center that will be duplicated across the country promoting sustainable lifestyle for the people.



A photo of myself explaining our team's idea at the beginning of the 48-hour Hackathon

References

- *Oman Urban Planning Hackathon Launched to Address Challenges to Sustainable Development* (no date) *Oman News Agency*. Available at: <https://omannews.gov.om/topics/en/79/show/112880/> (Accessed: 06 June 2023).
- *Oman Think Urban* (no date) *#OmanThinkUrban*. Available at: <https://www.otu.community/> (Accessed: 06 June 2023).
- Oman Observer (2023) *Muscat city gears up for Urban Hackathon*, *Oman Observer*. Available at: <https://www.omanobserver.om/article/1134393/business/economy/muscat-city-gears-up-for-urban-hackathon> (Accessed: 06 June 2023).
- *National Center for Statistics and Information* (no date) *Home - NCSI PORTAL*. Available at: <https://www.ncsi.gov.om/Pages/NCSI.aspx> (Accessed: 06 June 2023).
- Ministry of Housing and Urban Planning (no date) *Features of the Urban Strategy 040, Sultanate of Oman | Ministry of Housing and Urban Planning*. Available at: https://www.housing.gov.om/cmsapi/files/content/information_center/Features%20of%20the%20Urban%20Strategy%202040%20.pdf (Accessed: 06 June 2023).
- RSS-D15: Final Regional Spatial Strategy, Muscat Governorate Volume 1 – Regional Vision, Strategy, and Policy Framework, November 2020
- RSS-D15: Final Regional Spatial Strategy, Muscat Governorate Volume 2 – Implementing the Regional Spatial Strategy, November 2020
- RSS-D15: Final Regional Spatial Strategy, Muscat Governorate, Volume 3 – Technical Background to the Strategy, November 2020
- Vision Document (no date). *Oman Vision 2040*. Available at: https://www.mof.gov.om/pdf/Vision_Documents_En.pdf (Accessed: 06 June 2023).
- *Social Investment*. Available at: <https://www.pdo.co.om/en/community/social-investment/Pages/default.aspx> (Accessed: 06 June 2023).