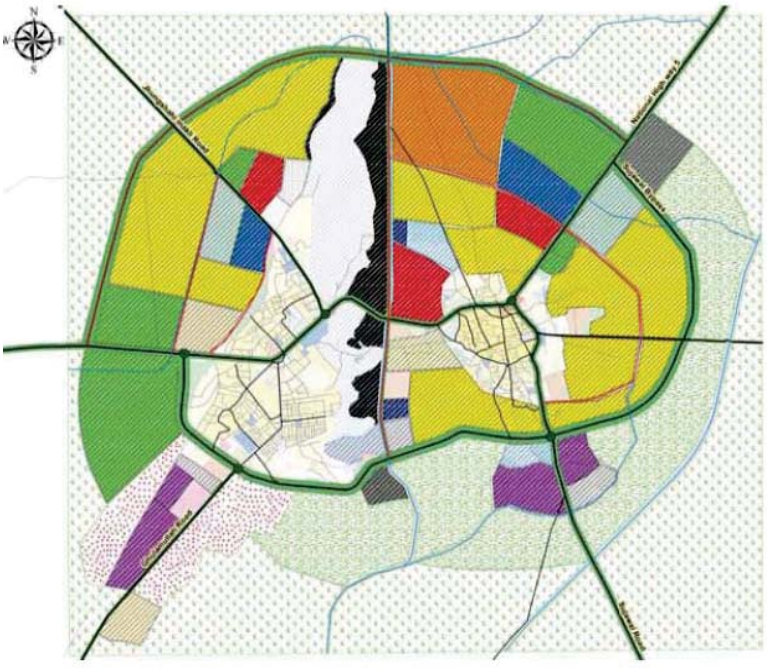
Directorate of Urban Policy Strategic Planning,
P & D Department, Government of Sindh

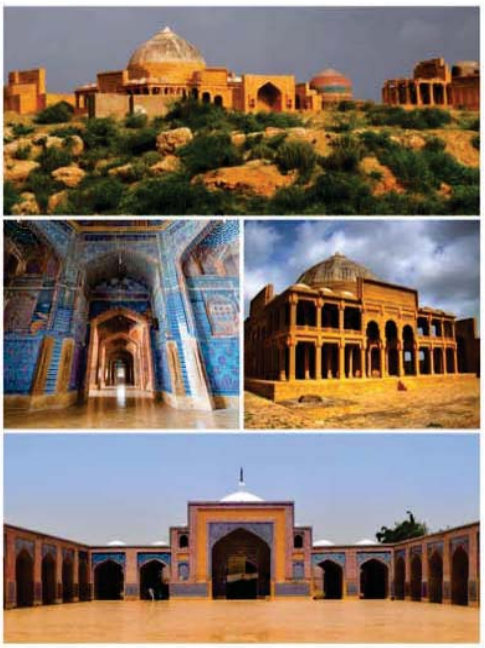
URBAN POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVT OF SINDH

PREPARATION OF DEVELOPMENT MASTER PLANS OF FOURTEEN (14) DISTRICT HEADQUARTER TOWNS OF HYDERABAD, MIRPURKHAS AND SHAHEED BENAZIRABAD DIVISIONS"

STRATEGIC DEVELOPMENT PLAN REPORT

(2017- 37)





Thatta

February, 2021

EA Consulting Pvt Ltd
(Formerly Engineering Associates)
Engineering, Architecture & Project Management
Head Office: AL-9, 15th Lane, Khayaban-e-Hilal,
Phase-VII, D.H.A., Karachi-75500.,
Tel: UAN: 111-117-584, Fax: (021) 3584-1825

In Association with

MMP
MMP Pakistan (Pvt) Ltd.

TRANSMITTAL LETTER

Urbanization in Pakistan is taking place at a substantially high pace most of which is gravitating to the large cities. The secondary cities have not been able to play their role as the "Engine of Economic Growth" due to lack of public funding in the development infrastructure resulting in lop-sided spatial spread. The hinterland has remained poor facing abject poverty due to less economic opportunities, social facilities and institutional support.

Sindh Government took initiative by establishing Directorate of Urban Policy and Strategic Planning (UPSP) within the Planning and Development Department in 2012, to initiate and ensure planned growth of secondary cities of Sindh province through the preparation of Master Development Plans of District Headquarters Towns. In this phase 14 DHQ Towns of Hyderabad, Mirpurkhas and Shaheed Benazirabad Divisions Viz Nawabshah, Sanghar, Naushahro Feroze, Mirpurkhas, Mithi, Umerkot, Tando Muhammad Khan, Tando Allahyar, Mitiari, Badin, Thatta, Sujawal, Dadu, Jamshoro and one SDG compline taluka Islamkot Town.

Directorate of Urban Policy and Strategic Planning initiated Consultant selection process under SPPRA rules. The consortium of three reputable local Consultants led by EA Consulting (Pvt.) Ltd. including MMP (Pvt.) Ltd. and EMC (Pvt.) Ltd was selected due to their high standing in prequalification and lowest financial bid. The Consultants brought together a highly qualified and experienced team to provide the specialized inputs. The data collection was carried out in the field through a sample socio – economic surveys, questionnaires to various government offices and discussions with the stakeholders. The findings and recommendations were submitted to client for review in seven stages and shared with the stakeholders in workshop for each town. This report is the final Deliverable (Strategic Development Plan Report) of the project.

The volume and spatial spread of the project area did present lot of logistics and data availability problems which were resolved with the support of Client who had pursued actively with the various lines departments to assure all available data to Consultants. The Consultant's team is indebted to the Director General UPSP and his team without their support it would not have been possible to complete this project. The consultant would also like to thank all the district officials for making field exercise productive.

ACKNOWLWDGEMENT

The completion of this assignment would not have been possible without the guidance and support of Directorate of Urban Policy & Strategic Planning, Planning & Development Department, Government of Sindh led by Mr. Faisal Ahmed Uqaili (Director General) and team members Mr. Zulfiqar Kumbhar (Deputy Director Housing/P&DC), Ms. Naila Haq (Deputy Director Environment), Ms. Uzaima Nasir Hilaly (Deputy Director Municipal Finance & Governance), Mr. Nabesh Akhtar (Deputy Director Municipal Services), Mr. Dayal Das Rathore (Assistant Director GIS) and Mr. Gulab Ahmed Tanvari (Assistant Director Planning).

The consultant is also thankful to Ex- Director Generals' UP&SP, Mr. Khair Muhammad Kalwar, Mr. Khalid Mehmood Shaikh, Mr. Muhammad Ali Khoso & Mr. Rafique Ahmed Qureshi and Mr. Mumtaz Halepoto Ex- Director Urban Policy & Planning, UP&SP.

EA Consulting Pvt Ltd acknowledges fair & transparent conduct of Financial Contract Management for this assignment carried out by this Directorate of UP&SP under the management and administration of respective Director Generals and Ms. Uzaima Nasir Hilaly Director Admin, Finance & Management.

Moreover, the consultant also appreciates the support of all the District &, line Departments officers/ officials for extending their valuable input and coordination during the preparation of this assignment.

PREPARATION OF DEVELOPMENT MASTER PLANS OF FOURTEEN (14) DISTRICT HEADQUARTER TOWNS OF HYDERABAD, MIRPURKHAS & SHAHEED BENAZIRABAD DIVISIONS

Strategic Development Plan Report – Thatta

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LIST OF ACRONYMS AND ABBREVIATIONS

ADP	Annual Development Plan
AGR	Annual Growth Rate
BC	Brick Construction
BHU	Basic Health Unit
BOD	Biological Oxygen Demand
CBD	Central Business District
CC	Climate Change
DBM	Digital Base Map
DCs	Deputy Commissioners
DHQ(s)	District Headquarters
DMP	Disaster Management Plan
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSPC	Development Strategies & Prevalent Condition
DUP&SP	Directorate Of Urban Policy & Strategic Planning, Government of Sindh
ECP	Emergency Contingency Plan
EDP	Economic Development Plan
EMC	Environmental Management Consultants
EPA	Environmental Protection Act
FWO	Frontier Works Organization
GBHS	Government Boys High School
GBHSS	Government Boys High Secondary School
GBLSS	Government Boys Lower Secondary School
GBPS	Government Boys Primary School
GER	Gross Enrolment Ratio
GGHS	Government Girls High School
GGHSS	Government Girls Secondary School
GGLSS	Government Girls Lower Secondary School
GGPS	Government Girls Primary School
GIS	Geographic Information System
GOP	Government of Pakistan
GOS	Government of Sindh
GPS	Global Positioning System
HESCO	Hyderabad Electricity Supply Corporation
HH	Household
HQ	Head Quarters
KA(s)	Katchi Abadis
KV	Kilo Volt
LPG	Liquid Petroleum Gas
LULC	Land Use/Land Cover
MC	Municipal Committee

MISC	Multiple Indicator Cluster Survey
MW	Mega Watt
NER	Net Enrolment Ratio
NGO	Non-Governmental Organization
NPDMP	National & Provisional Disaster Management Policy
NRM	National Reference Manual
O&M	Operation & Maintenance
OH	Over Head
P&D	Planning & Development Department
PCU(s)	Passenger Car Units
PDAO	Planning & Development Act Ordinance
PDMA	Provincial Disaster Management Authority
PGS	Population Growth Scenarios
PH	Peak Hour
PHED	Public Health Engineering Department
PMTs	Pole Mounted Transformers
PR	Public Representative
PTCL	Pakistan Telecommunication Limited
RAP	Resilience & Adaptability Plan
RCC	Reinforced Cement Concrete
SAR	Situation Analysis Report
SB&TPR	Sindh Building & Town Planning Regulation
SBI	Sindh Board Of Investment
SDI	Spatial Data Information
SECP	Securities & Exchange Connection Of Pakistan
SED	Socio Economic Data
SES	Socio Economic Survey
SEPA	Sindh Environmental Protection Agency
SME(s)	Small Medium Enterprises
SOP	Standard Operation Procedures
SPPRA	Sindh Public Procurement Regulatory Authority
SS	Sample Survey
SSGC	Sui Southern Gas Company
STP	Sewerage Treatment Plant
SWM	Solid Waste Management
SWOT	Strength Weaknesses Opportunities Threat
TAY	Tando Allahyar
TOR	Terms Of References
TSS	Total Suspended Solids
TVC	Traffic Volume Count
TW	Tube Well
UC	Union Council
UG	Under Ground
UG/l	Concentration of Arsenic (10 micro-gm/litre)

W&SD	Work & Services Department
WAPDA	Water and Power Development Authority
WATSAN	Water & Sanitation
WASH	Water, Sanitation & Hygiene
WB	World Bank
WHO	World Health Organization

EXECUTIVE SUMMARY

A. PROJECT AREA BRIEF

The city, formerly commanding the delta of the Indus, was the capital of Lower Sindh from the 14th century. During the ruling period of Soomro Tribe Thatta was the capital of Sindh for 95 years. During 1592-1739, it was governed in the name of the Mughal emperors of Delhi. In 1739 however following the Battle of Karnal the province was ceded to Nadir Shah of Persia, after which Thatta fell into neglect.

Thatta District takes its name from it's headquarter town, one of the oldest towns in this land of ancient civilization. "The word Thatta is derived from Thatti, Thatt or Thatto, a Sindhi word for a small settlement on riverbanks[1].

The district is surrounded on the north and northwest by Jamshoro District, on the east by Hyderabad, Tando Muhammad Khan, Sujawal Districts and the Indus River while Indian Ocean is situated on the south of the District[2].

The district consists of nine talukas and 55 union councils. There are 655 mouzas (revenue villages) in this district, out of which 511 are rural, 10 are urban, 24 are partly urban, 30 are forest mouzas and 80 mouzas are un-populated. The main river of the district is the Indus, which passes through the district and has divided it into two Sub-divisions, namely, Thatta and Shah Bunder[3].

According to Population and Housing census of 2017, population of District Thatta is recorded as 979,817 souls with an average growth rate of 2.62%. Average Household size of Thatta is 5.3 with 184,868 Housing units.

B. VISION 2037

As per the objective of the Provincial Government the planning process was carried out in Consultation with the stakeholders.

A vision formulating workshop was carried out with the main stakeholders on November 8, 2018. The stakeholders were manly local citizens, government officials, businessmen and member of civil society. They were so logged down with the immediate day to day problems that they could not articulate a long term vision. However the collections of opinions expressed produced the following vision:

[1] History of Thatta

[2] District Disaster Management Plan (July 2017 - June 2027)

[3] 1998 District Census Report Of Thatta

"The city full filling all the basic needs, such as housing, water supply and sanitation, in clean and sustainable pollution free environment, with education and health for all, along with growth in local and regional economy with increase in employment, incomes and related skills development to emerge as well planned modern city with peace, security and prosperity like some of the most livable cities in the world."

C. DEMOGRAPHY

It self Thatta is the District Headquarter Town of Thatta District. According to 1998 census, town had a population of 37,515 souls with a growth rate of 3.32% during 1981-1998.

The 2017 census reveals that the population of Thatta Town including Thatta MC & Makli TC has reached to about 101,833 souls with a growth rate of 3.17% during 1998-2017. Projected population of Thatta City works out to be 190,089 souls by 2037.

D. SECTOR WISE ANALYSIS AND PROPOSAL

The Consultants had carried out data collections in three layers:

- Primary source including sample Socio-economic Survey.
- Secondary Source including data from government sources published and unpublished documents
- Discussions with the officials, Consultations with Stakeholders.

The present need analysis and constraints were compiled and submitted in the form of Situation Analysis Report. Consultative Workshops were held in respective DHQ Towns with an objective to validate the accuracy of data and verify the data analysis with the Stakeholders.

Keeping in view the stakeholder's comments and suggestions, the draft strategies were developed to fulfill needs in the most efficient way. The Draft Strategic Development Report submitted by the Consultants was again shared with the Stakeholders and their feedback/comments. Being solicited.

Thereafter, the Final Strategic Report will be submitted. Based on the approved strategies the final action will be the preparation of Long Term/Short Term Plans, Priority Plan and Immediate Action Plan for Core Urban Area.

Based on the evaluation of primary and secondary data, the need assessment has been carried out for a projected population on the basis of 20 years growth projections. The need assessment is based on the Baseline Indicators, Stakeholders Views, Demand vs Need Analysis, NRM with professional judgment and Consultant's own experience and standards used in other developing countries.

1. Housing

Housing in terms of affordable home with basic infrastructure and facilities is the basic human need. According to 2017 census population results, Thatta MC & Makli TC had household size of 5.7 persons and a total housing stock of 17,992. The major issues in the housing sector are scarcity of developed urban land, poor land administration, housing in dilapidated condition, unafforable hosing cost for low income groups unchecked growtrh of squatter settlements, shortage of finance, high cost of building material, high density housing causing congestion and lack of basic utilities.

On basis of projected population for year 2037 the number of households have been estimated around 33,349 on fixed household size of 5.7 persons out of which additional housing requirement will be 15,357.

The strategies for short term plan are; incremental housing schemes, establishment of low-income housing funds and increase number of small size plots. The long term plan includes the development of cost effective approaches, formation of land bank, initiation of an affordable housing programme and formulation of green building bye laws. The priority projects should focus on the land acquisition for low income public housing projects, master planning and infrastructure designing of low income public housing project for additional population. The immediate action plan includes revitalization of core urban area, regularization of land tenure, urban face lifting program, provision of street lights in residential areas, development of green median, rehabilitation of old buildings and demolition of structurally unsafe buildings.

2. Social Amenities

2.1 Education

In District Thatta, there are 1,413 primary schools out of which 1,243 are for male student and 170 are for female students. The enrolments is 57,842 (male 36,083 and female 21,759) with Teaching Staff available is 1,965 out of which 1,594 are male and 371 are Female.[4] Provision of 124 classrooms at different levels is required with the repairing of existing buildings with all basic facilities and training of teaching staff is required.

The schools have shortage of 112 classrooms on the basis of 30 students per classroom. 39,021 students are enrolled in 581 high schools and colleges with 1,168 classrooms. The primary to high schools and colleges have shortage of 132 classrooms on the basis of 30 students per classroom. The issues in education sector involves shortage of classrooms and teachers, low enrolment level with gender disparity, lack of provision of basic and allied facilities and poor condition of schools and colleges.

[4] *Sindh Education Statistics 2015-16.*

The future need is 5,760 classrooms in primary to higher secondary schools and colleges by the end of plan period in 2037 to achieve the target of 100% enrolment with no gender disparity. The education authorities should plan gradually by increasing the classrooms in existing schools in high density areas and new schools in low density areas. The spatial distribution of schools and other educational institutions should be that our schools, specially girls school are within easy walking distance.

The strategies for short term plan includes the provision of medical & engineering colleges, rehabilitation of schools and colleges, eliminate the chances of misuse and encroachments of educational buildings, training programme for teachers, establishment of vocational and skill training centres and rehabilitation/construction of women hostels for teaching staff. The long term plan involves increasing equitable access to quality education, improving the quality of learning outcomes, enhancing the equity of resource allocation, provision of technical education and upgradation of existing universities.

The priority projects need to focus on addition of classrooms with allied facilities and basic utilities, improvement in quality of education, training programme for teachers, establishment of vocational and skill training centres and rehabilitation/construction of women hostels. A skill development organization for women should be established, because for the economic growth of the country women empowerment is necessary. The immediate action plan includes the rehabilitation and upgradation of schools and colleges in core urban area.

2.2 Health

Currently, tertiary level health facilities of Civil Hospital and BHUs are serving the regional population of Sindh at Thatta District. There is one civil hospital having 188 beds, 1 Major Hospitals at District having 40 beds and 6 private Hospitals having 72 beds to serve the district. The other health facilities spread over entire district are 6 RHC (Rural Health Center) having 80 beds, 8 TB Clinics, 22 BHUs (Basic Health Unit) having bed strength of 44, 91Nos of dispensaries having 10 number of beds and 6 M.C.H.C (Mother Child Health Center) having 4 numbers of Beds.

The major issues are insufficient health facilities, lack of diagnostic and other health equipment, difficulty in transferring patients from rural to urban area, vacant posts for doctors and lack of training of paramedical staff. The NRM recommends 2 bed per thousand as the medium term target. On this basis approximately 1,522 beds will be required to be provided gradually. According to WHO standards doctor to population ratio is 1:1000 so taking that as reference point currently the short fall of doctors comes out to be 940. On the basis of NRM recommendation approximately 2,849 beds will be required to be provided gradually until 2037. According to WHO standards the future requirement of doctors comes out to be 1,603. The strategies for short term plan are; improve access to healthcare facilities, access through ambulance network, availability of skilled workforce, improving functionality of equipment and availability of quality medicines and rehabilitation of BHUs and RHCs.

The long term plan includes the extension of Civil Hospital, provision and enhancement of Mobile Health Unit, upgradation of BHUs, RHCs and MCHCs, health awareness programmes, research programmes for

doctors, provision of diagnostic facilities, ambulance, pharmacy in all hospitals, specialized hospitals and accommodation facilities for doctors and paramedics staff.
The priority projects should focus on the extension of Civil Hospital, provision of Mobile Health Unit, provision of quick response ambulance service with all health units, upgradation of BHUs, RHCs and MCHCs, research and development propgramme for doctors and paramedics staff, provision of diagnostic facilities. The immediate action plan involves the rehabilitation and upgradation of DHQ Hospital and Civil Hospital.

2.3 Recreational

District Thatta represents the traditional culture of Sindh. This district has a rich heritage of ancient Sindhi and Arabian culture. Both can be seen in the architect and culture of this district. Thatta town's main Jamia Masjid known as Shah Jahan Masjid is a masterpiece. It was built on the orders of the Mughal Emperor, Shah Jehan, who gifted it to the people of Thatta. Its construction started in 1644 and was completed in 1647.

Makli hills, also known as Makli graveyard, are one of the largest necropolises in the world, with a diameter of approximately 8 kilometers. These hills are supposed to be the burial place of some 125,000 Sufi Saints. The graveyard is located on the outskirts of Thatta city.

The short term plan includes the restoration and maintenance of open spaces, preservation of cultural heritage, and construction/rehabilitation of parks, playgrounds and recreational facilities, construction of auditoriums and upgradation of art councils. The strategies for long term plan are to provide recreational infrastructure, feasibility study for establishment of museum and research centre, youth development programme and promote tourism.

The priority projects includes the Rehabilitation and construction of family parks and playground, Provision of basic facilities like waiting area & cafeteria at Makli Graveyard, Construction of auditoriums and up-gradations of art councils, Provision of beautification plan for Shah Jehan Masjid & Buffer for Makli graveyard, Construction / Rehabilitation of Resorts & Hotels at Keenjhar Lake, Provision of Resort and Guest House & Restaurant at Haleji Lake and feasibility study for establishment of museum, research centre and archeological site.

The immediate action plan includes;

- Rehabilitation of Park adjacent to Shah Jehan Mosque
- Provision of basic facilities like waiting area and cafeteria at Makli Tourist Spots
- Provision of access road to Makli
- Provision of parks, open spaces in Thatta and Makli
- Provision of Buffer Area in Makli
- Landscaping and street furniture along important roads
- Provision of landscaping around the historical buildings should be carried out to improve the environment and to develop the core urban area in a sustainable manner.
- Upgradation of Tourism Facilities near Shah Jahan Mosque

- Preservation of Makli Hills, Shrines and Two Domes Building
- Provision of Community Center
- Rehabilitation of Mosques including Faizan-e-Oleya Masjid and Wali-e-Nemat Masjid
- Provision of Facilitation Centre along Sujawal-Thatta Road and National Highway

3. ECONOMIC DEVELOPMENT

3.1 Irrigation

District Thatta is irrigated, mainly, by Indus River and canals. The following table shows that, among the rural mouzas, 157 (29%) mouzas are irrigated from the river and 104 (19%) are irrigated through canals. However, other modes of land irrigation like river water and tube wells are also used. The supply of sufficient irrigation water for future for agricultural growth is expected to be available.

3.2 Agriculture

The land structure of District Thatta can be divided into four regions. The north western part that comprises of Makli is hilly and barren with no irrigation and agriculture. The south western part, due to the long coastal line of 107 kilometers as well as shortage of river Indus water, is saline and sea-affected. While the southern portion, adjoining the Run of Kachh, on the border of India, is desert like sandy area, the northern part of this district consists of small hills and torrents that are extended till the Kheerthar range of mountains. Though agricultural land is very limited, yet the available cultivable land is very productive in this region.

During 2015-2016 the production of Rice was 229,579 M.tons, Production of Wheat was to 56,719 M.tons, Sugarcane 1,971,167 Bales and cotton 2,633 Bales. During 2013-2014 the production of Rice was 186,219 M.tons, Production of Wheat was to 47,656 M.tons, Sugarcane 2,227,341 Bales and cotton 32,161 Bales. Fields of all crops are low comparing to provincial / national level. To address the property issue / raising of income level waste land available be granted to land less people for utilization.

The total geographical area of District Thatta is 1,735,000 hectares out of this cultivated area is up to 362,000 hectare. Out of cultivable land dividing 2012-2013, actually cultivated to 174,000 hectares leaving 188,000 hectares as fallow. Waste land available to 199,000 hectares, whereas, 827,000 hectares are not available for utilization. The major issues are that the land ownership is much skewed, decrease in land utilization, high price of inputs, absence of farm to market roads, lack of agriculture credit facilities, water logging and salinity, unavailability of water in canals, irrigation and drainage.

The short term plan includes to modernize agriculture, increase supply and quality of agricultural crops and provision of warehouses. The strategies for long term plan includes the agriculture technology development and enhancing crop productivity. The priority projects need to be focused on agriculture credit facilities, regular supply of irrigation water, availability of fertilizers, pesticides and quality seeds,

installation of tube wells, measures to reduce water logging and salinity and construction of farm to market roads. The projects for the economic development plan are included in the priority projects.

3.3 Livestock and Fisheries

Fisheries:

- There are 14,569 fishermen are experiencing their luck, out of which 8,460 are working full time and 6,109 are part time. The number of registered boats in District Thatta are 2,101. The production of fish by annually in District Thatta is approximately 17,204 M. Tons. There are 500 private fish production farms in the District. There is need to develop and implement a broad-based fisheries policy which is required for accelerated development of the fisheries sector.

Livestock:

- The District Thatta is richly populated area having a population of 798,700 of large and small animals. This district is well known with different type of breeds of cattle, Goats and sheep's. Animal population of district is highest number of cattle having 411,000 hands followed by buffaloes 36,700 heads and Goats 351,000.
- Unfortunately, this the sector despite being the second most important sector in the local economy, has not been given due importance in the past. The scattered cattle farms will need to be consolidated away from population outside the town. There are 12 veterinary Hospitals and taluka based veterinary centres. The major issues are limited knowledge and facilities, secondary source of income and insufficient veterinary services. There are 13 sanctioned veterinary doctors out of which 10 are actual, sanctioned posts of paramedics Staff are 32 out of which 25 are actual and technicians are 21.

The strategies need to be focused on the improvement of production performance, establishment of model livestock, dairy and cattle farms and enhancing the veterinary services, lease of fishing rights, local awareness, aquaculture development, and collection of statistical fish data and enforcement of fisheries enactment. The projects for the Economic Development includes the establishment of livestock and dairy farms, development and implementation of a broad-based fisheries policy for the development of the fisheries sector, including Construction of landing areas business halls.

3.4 Industries

Thatta is the 3rd largest industrial area after Karachi & Nooriabad of Sindh province. There are about 30 industrial units established in the district. Apart from the sugar mill, all the larger industrial units are located in Dhabeji and Gharo adjacent to Karachi. Most of the labour in these units are generally non-local and commutes from Karachi. Due to its strategic location near the Industrial city of Karachi, the industrial sector flourishes very well. It is primarily done from the Arabian Sea, Keenjhar Lake and River Indus, small lakes, water channels and fish farms. The main constraint is provision of developed land for industries, lack of incentives including financing and marketing network including direct export channels.

The short term plan includes to modernize the service sector, support industrial development, provision of vocational training and employable skills and micro-financing to small industries. The strategies for long term plan are; sufficient market infrastructure, development of Industrial Estates, heritage saving, shift from industrial agriculture to diversified agro ecological systems and provision of infrastructure for establishment of new industries. The priority projects should focus on revitalization of Industrial Estate and special Industrial Zone, construction of Industrial Estates and increase storage capacities. The projects for economic development plan are; addition in industrial units and full utilization of Industrial Estates to be accelerated.

3.5 Trade and Commerce

There is the presence of strong local retail market in form of Shahi bazaar. Shahi bazar consists of major commercial activities, wholesale market with lots of food shops, commercial banks and government offices, public & private schools and health services etc.

The priority projects includes the provision of slaughter house, provision of parking, upgradation of old bazaar area, establishment of fruit and vegetable market, specialized wholesale market, construction of building for service industry and provision of cold storages and warehouses. The immediate action plan focus on the rehabilitation of Shahi Bazar and Beautification of core area, provision of pedestrian facility in main bazaar area, upgradation of old bazaar area, relocation of Fish, vegetable and meat markets, banned heavy vehicles during peak hours and removal of encroachments. An important step towards economic development will be encouragement for establishment of micro-financial services in Thatta.

4. BASIC UTILITIES

4.1 Water Supply

There are 2 pumping stations & 4 RO. Plants exist viz. Dargah Shah Ibrahim, Christian Colony Thatta, Shaikh Mohallah Thatta and Islampur Mohallah Thatta have been installed, out of which, one RO plant namely Shaikh Mohallah Thatta is non-functional. Since installations of the RO plants in 2013, the membrane, which is used for removing minerals and reducing turbidity volume to some extent, has never been changed. The water, supplied from the RO Plants has never been got tested through any laboratory to determine its drinkability. The present water supply issues like; damaged distribution supply lines, collapsing of old system, contamination of water, high proportion of non-revenue water, inadequate technical capacity and water is supplied without any treatment.

In the entire District Thatta, 51 RO plants have been installed, but only 25 are functional. Huge amounts of money are being spent on the operation and maintenance of these R.O. Plants constructed by Special Initiative Department. At R.O. Plant namely Narejo Village situated on Makli Thatta, TDS volume was checked by PCSIR, at inlet it was 1,416 and at Outlet it was 1,364 which is beyond maximum limit (1000).

It is expected that the town will have a population of about 190,089 persons by 2037 and the daily demand

of the town will be about 5.70mgd. The short term plan includes that the design of water supply pipes should ensure no contamination of water and preference should be given to rehabilitate existing schemes.

The strategies for long term plan are; providing access to safe water, exploration and regulation of groundwater, frame a broad policy framework and feasibility study for identification of new water sources. The priority projects should focus on the improvement of water intake works, procurement of land for water works, construction of RO plants and OH tanks, rehabilitation of existing water supply network, installation of new water supply network and tube wells. The immediate action plan includes the rehabilitation and construction of water supply network in the core town, construction of OH tanks and rehabilitation of filtration plant.

In the long term, piped water supply system for 100% population by 2037 will be the target. The strategy would be to bound private developers to install localized distribution network in the planned housing schemes first and gradually cover the whole population in short term plan.
The overall water demand will be reduced by reuse of treated effluent at least for horticulture and other water conservation measures. It is suggested to introduce Tariff System for water supply through Water Metering (first for water usage above marginal consumption then in long run, for all users).

4.2 Sewerage and Drainage

The major issues identified are damaged lines, over-flowing sewage water on streets, improper maintenance of sewerage facilities, informal settlements, poor condition of sewer system and no waste water treatment plant. Sewerage water flows at 70% of the water supply therefor presently against the water demand of 3.05mgd the sewerage water flows is 2.14mgd. In the next twenty years 3.99mgd sewerage water will be generated against the estimated water supply of 5.70mgd.

The strategies for short term plan are; priority given to un-served areas, need based interventions, use of gravity flow systems, acquire land and provide proper sewage treatment plants leading up to recycling of treated affluent for landscaping, etc. The long term plan includes the provision of improved services, sewage treated before discharging, and construction/rehabilitation of WWTP and land acquisition for stabilization ponds. The priority projects need to focus on the construction/rehabilitation of drains and WWTP, and rehabilitation of waste water disposal stations. The immediate action plan involves the removal of existing waste water collection pond, construction of WWTP, and interconnections of open nallis with underground sewers.

4.3 Solid Waste Management

Some of the major issues are shortage of machineries, lack of properly organized waste collection system, no proper arrangement for the disposal of infectious waste and segregation of organic waste. The current (2017) population of the municipal committee of Thatta as 101,833 the total municipal solid waste load production in the municipality is approx. 24,614 kg or 24.7 tons per day. While in future, there is a need of 19 acres landfill site to accommodate 85.5 tons disposal in four layers over a period of 20 years. Sanitary landfill site is required to be located away from any residential area.

The strategies for short term plan are; develop an, effective and efficient solid waste management and collection system, segregation of bio-medical waste collection system and encourage on-site reuse and recycling. The long term plan includes the community and private sector involvement, public awareness and education and implement waste minimization. The priority projects should focus on the feasibility study for construction of central composting plant and procurement process for landfill site. The immediate action plan includes recycling and segregation of solid waste, separate collection of bio-medical waste and introduction of waste recycling plant.

5. INFRASTRUCTURE

5.1 Energy

There is no power generation facility in Thatta DHQ town vicinity. The power supply is through HESCO-WAPDA transmission system. To meet the requirement of consumers, HESCO purchases the electricity from WAPDA and further distribute at consumer's doorstep. Consultant survey highlight the fact that about 65% of the households in Thatta DHQ town have no alternative power source in addition to HESCO supply, some 31% of the households have solar energy and only 4% household has other sources like generator power.

The strategies for short term plan need to focus on the upgradation of the transmission and distribution process and improvement of streetlight network. The long term plan includes the development of low cost energy production systems, achieving fuel efficiency, adopting new technologies, addition of sub-stations and encourage energy efficient building construction.

The priority projects should focus on the upgradation of grid stations, promotion of energy efficient appliances and feasibility study for alternate energy sources. The immediate action plan focus on the usage of Arial Bundle Cable wires, installation of streetlights, upgradation of existing grid station and promote energy efficient appliances.

5.2 Gas Supply

During survey, out of total 216 houses residents had responded to the questions asked on availability of natural Gas. As given in the Table below, 161 houses had the gas available to them, while the gas was not available to 55 houses. Therefore about 75% households have the gas supply by SSGC and 25% were using alternate source of fuel for their daily household needs.

5.3 Transportation

Thatta city is situated, 98 kilometers east of Karachi, on the national highway (N5). This highway passes through district Thatta for a length of 112 kilometers. Super Highway (M9), which connects Karachi and Hyderabad, also passes through this district for a length of 40 kilometers. District headquarters of Thatta is connected with other talukas through well-built roads. Although these roads are single but are of good quality.

Thatta district is linked with main railway line via Jungshahi railway station, Thatta District of Sindh province, Pakistan. Jungshahi station is among the oldest railway stations in Sindh. This line is the part of first railway line (Karachi-Kotri) for public traffic between Karachi and Lahore. Currently railway traffic is limited due to its operational cost, but long route trains are running on tracks to facilitate the public. Junshahi railway station is approximately 20 Km away from Thatta city.

The strategies for short term plan are; expansion of railway station, improve road design, prevent encroachments, rehabilitation of farm to market roads to reduce traffic congestion. The long term plan includes create Traffic Engineering Bureaus (TEBs), declaring private vehicle free zones, satisfy mobility needs, implementation of Axle Load Management, dualization of main arteries and improving geometry of roads. The priority projects should focus on the rehabilitation of major roads, installation of traffic signals and solar street lighting. The immediate action plan includes the restoration of footpaths and right of way of roads by removing encroachments, improvement of road pavements, and development of tree lined medians, removal of existing unauthorized bus stops and provision of street furniture.

5.4 Communication

As per the survey by the Consultants there are about 97% households using cellular network & internet out of total households surveyed.

6. ENVIRONMENT AND DISASTER RISK MANAGEMENT

6.1 Environment

The land structure of this district can be divided into three parts. The Seismic zoning map of Pakistan (2015) shows that the mostly Districts of Sindh province places in Zone 2A which corresponds to possibility of minor to moderate seismic hazards i.e. probability of earthquakes of intensity (MM Scale) 6 to 7.5.
Accordingly a seismic risk factor of 0.1 needs to be incorporated in the design for constructions and installations in the coastal zone, for operational basis earthquakes (OBE) pertaining to damage due to moderate level earthquakes.
The major issues are water logging and salinity, water contamination, low quality of surface water, seismic risk, aging of surface drainage canal system and polluted air.

The strategies for short term plan proposed to ensure environmental sustainability, enforcement of permit to discharge waste, preserve ecological cycles, increase rangelands production, provide recreational facilities, create environmental awareness, and conserve biodiversity and fostering PPP. The long term plan includes the improvement of drainage, sustainable development while overcoming environmental challenges and multi-pronged approach to fisheries management. The priority projects should focus on the rehabilitation of irrigated plantation, enhance rangeland production, rehabilitation of forest parks and afforestation. The immediate action plan involves enhancing local tress plantation like Neem, Ber Palm trees.

6.2 Disaster Risk Management

Thatta is the historically rich and civilized city of Sindh. It is tail of river Indus, near to delta. As the river Indus has flooded the badly to entire Sindh which has ended at Thatta district, but its end is going so severe and serious. The dykes at Thatta were extremely vulnerable and feeble that they could not bear the increasing flow of water that touched the strength of 950,000 cusecs water. As soon as water touched the dykes of Thatta, water over flew the both banks of Indus River. Floods of 2010/2011 worsened the existing situation of the population and the indicators of food security. The major issues are low level of risk awareness, not "risk conscious" development, insufficient DRR capacity, negligible involvement of private sector, riverine flood and food security problem.

The strategies for short term plan includes to develop coordination mechanism with PMD, develop mechanism for regulation of water discharge, develop monitoring mechanism, provide necessary medical facilities, coordination with DDMA and emergency declaration at all medical points. The long term plan involves the arrangements that allow the system to switch into emergency mode, clarify mutual roles and responsibilities, DSM and PPHI shall be responsible for providing medical cover to the IDPs, National risk assessment would identify highly vulnerable districts and DRR needs to involve local level actors. "Designated Evacuation Shelters" are provided to the people after the disaster. It is a facility where residents who have fled due to the dangers of a natural disaster may stay for as long as is necessary until the dangers of the natural disaster have receded. The purpose of these facilities is to offer temporary shelter for residents who are unable to return home due to the natural disaster. All public buildings like schools, colleges, etc. or elevated areas would be used as shelter in case of any disaster in town. The shelters are designated by the municipal government and awareness about them should be created among the general public. The priority projects should focus on the identification and declaration of "disaster affected" areas, DRM strategies should be based upon clear assessments of disaster risks, vigilance of canals, ensure smooth flow of water, prompt dewatering of stagnant water, HESCO should ensure uninterrupted supply of electricity, arrangement of medical teams, fumigate the area, emergency set up of relief camps and ensure sanitation and cleanliness.

7. IMPLEMENTATION

Presently, different proposals or schemes belonging to their respective sectors are identified by the departments and also incorporated separately in the Annual Development Programme (ADP). This creates a lot of problem as there would not be any harmony in the development of the city, as one scheme may create difficulties and problems for the other. It is necessary that all the public service sectors work together as a package that would result in proper development of the town.

The Government of Sindh would take responsibility of implementing various development proposals by utilizing its maximum resources and by engaging various public offices of government of Sindh, established in town. The concerned agency must ensure that the overall process must go after following themes of implementation process. The overall implementation process to be carried out in coordination with Town

Planning and Urban Development Standards (Frameworks) in which redevelopment will be phased to prioritization.

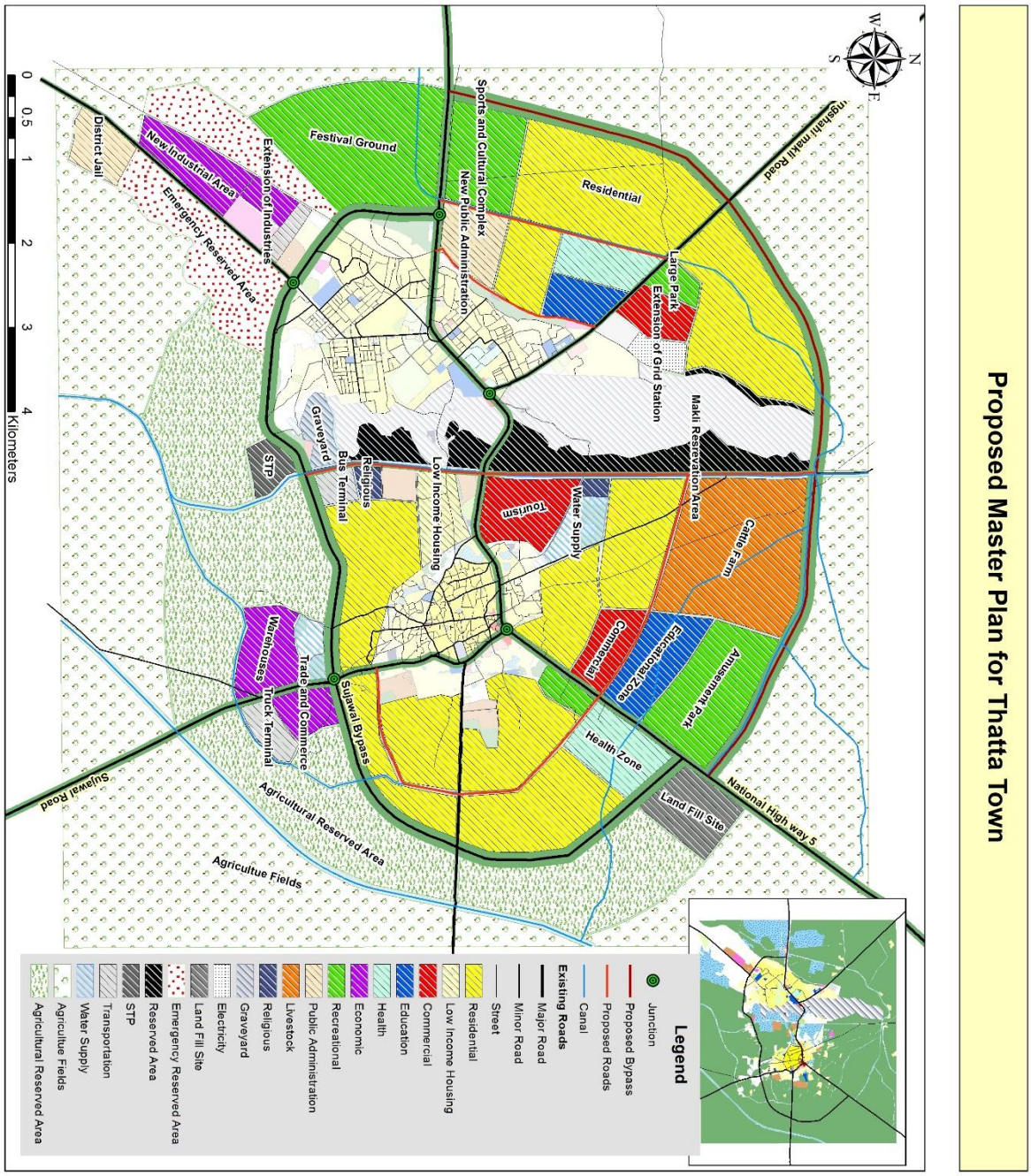
Government may seek technical assistance from all the line department i.e. DUP&SP, Town Planning Department, Municipal Corporation, secretariat of Commissioner and Deputy Commissioner. A committee would be formed as the "Project Management and Implementation Unit" (PMIU) to implement on the Strategic Development Plan. The "Project Management and Implementation Unit" will mainly consist of qualified town and urban planners supported by other technical staff; architects, project managers, engineers, finance officers and any other technical staff expert in their relevant fields.

The "Project Management and Implementation Unit" shall supervise and coordinate respective urban developers involved in development activities, conduct monitory audits, prepare evaluation and impact reports. Planning and development department Government of Sindh shall lead "PMIU" to implement Master Plan.

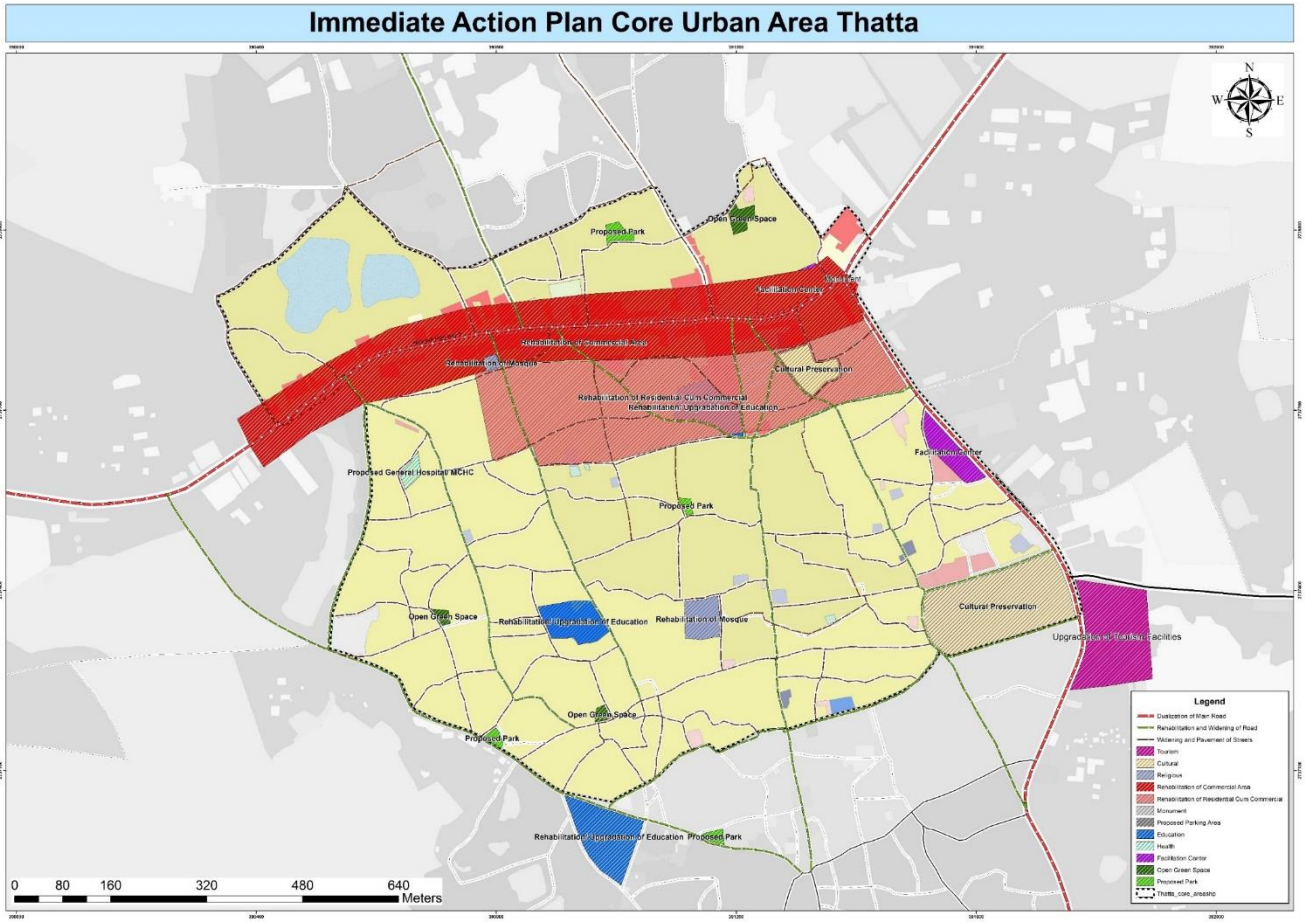
8. STRATEGIES FOR FUTURE DEVELOPMENT

The strategies focus on revitalization of the affordable housing, provision of basic facilities, efficient transportation and communication, energy efficient technology, active service sector, implementation of pro-active governance, develop human resources, facilitate social infrastructure, reinforce the local governance institutions, modernize administration, preservation of heritage, sustainable environment, develop tourism resources, involve community participation and implementing Public-Private Partnership.

9. MASTER PLAN PROPOSALS



10. MMEDIATE ACTION PLAN FOR CORE URBAN AREA



11. SDGS ACCELERATION PLAN:

Under the contract of the Preparation of Development Master Plan of 14 DHQ towns, SDG Acceleration Plan was not part of the approved TORs, however keeping in view the Sindh Government's initiatives to mainstream SDGs targets in provincial planning (taking Islamkot as a model SDG Taluka) the Directorate and Consultant after due consultative process felt the need to include brief SDG Acceleration Plan as part of Development Master Plans. Further in consultation with SDG Unit Sindh, SDG 11 – *Sustainable Cities and Communities* was selected for SDG Acceleration Plan for 14 DHQ towns, since it is pertinent to urban planning and development. Please refer Annexure (A) for brief SDGs Acceleration Plan.

STRATEGIC DEVELOPMENT PLAN REPORT - THATTA

1. SINDH – AN OVERVIEW

Sindh is the most urbanized province in Pakistan. Due to lack of interest in the planning and development of secondary cities District Headquarters towns, the public funding in development infrastructure had been sporadic resulting in un-informed adhoc decisions. Consequently the secondary cities have not been able to play their role as "Engines of Economic growth" and hinterland has remained poor facing abject poverty due to less economic opportunities and social facilities. The poverty head count ratio in the urban-cum-rural areas is almost double than that in the declared urban areas.

Sindh government took initiative by establishing Directorate of Urban Policy and Strategic Planning within the P & D Department initiate and ensure planned growth of Secondary cities through the Preparation of Master Development Plans of District Headquarter Towns in September 2008.

1.1 Project Background

Sindh, Pakistan's second most populated province plays a pivotal role in the national economic and development agenda. The country's largest port city, Karachi, is the financial capital of the country. The Province comprises of 23% of Pakistan's population and 18% of its land area. It has the highest concentration of urban population at 49% as compared to an overall country average of 32.5%, making it the most urbanized province in the country. With 23% of country's population, its contribution to the national GDP is around 33%. Sindh collects 70% of Pakistan's Income Tax and 62% of Sales Tax.

Sindh has 54% of country's textile units, 45% of its sugar mills, 20% of pulp & paper mills and 35% of edible oil processed locally. Sindh accounts for 34% of total industrial capacity in large scale manufacturing and 25% of small scale manufacturing. Moreover the Province produces 70 % of Country's gas, 30% petroleum and 95% of Coal.

Despite global economic slowdown towards the end of 2008 and Pakistan's solidarity with the International cause for peace, playing a key role as the front line state, Sindh's manufacturing sector has been resilient and investments have continued to pour in the economic cycle. MNCs and local enterprises are committed to make investments worth around USD 8.0 billion in the province in coming years.

Sindh's diversified economy also comprises of a well-developed agricultural base supported by an effective irrigation network on the River Indus. Around 14% wheat, 30% rice, 30% sugar cane, 25% cotton and 30% vegetable crops grown in Pakistan are from Sindh. This provides immense opportunity for setting up export based agri-processing industry in the province. (http://www.sbi.gos.pk/sindh-economy.php).

1.2 General Issues

Despite of its significant contribution in National GDP, Sindh has not received the priority in development funding as it deserves. DUP&SP is the medium through which grass root development / strategy is being formulated by professionals for the betterment of people and create de-centralize economical hubs to counter higher migration rate towards developed urban centres resulting better socioeconomic condition

of the people. While going through the available literature so far, several issues have been identified in this regards, such as:

- Non-existence of Sustainable planning policy, apparatus, regulatory framework and its implementation;
- Absence of current housing policy based on sustainable and smart growth mechanism;
- Lack of coordination between institutions responsible for development of a town or Absence of Institutional Framework.
- Previous Master / Development / Structure Plans of Town Planning Department have hardly been implemented due to poor implementation mechanism;
- Local cultural preferences and settlement patterns undermine the role of urbanization in supporting economic growth;
- In most of the District Headquarters Towns, in-effective municipal infrastructure and service delivery is a common cause of failures in water, waste water, SWM, etc.
- Non-existence of spatial and non-spatial database systems;

1.3 Objectives

The objective of the assignment, as mentioned in the TORs is to prepare Development Master Plans of Fourteen (14) District Headquarter Towns of Hyderabad, Mirpurkhas and Shaheed Benazirabad Divisions; for development of spatial planning and zoning system as well as local economic development strategies on the basis on ecological sustainability.

The Consultant is tasked to prepare strategies:

- To plan for social infrastructure at affordable standards for education, health, recreation and cultural needs.
- To upgrade the existing physical infrastructure and enhance the supply of potable water and to propose the required capacity of network for water supply, sewerage, drainage, flood waters till year 2037.
- To provide for modern sanitation, solid waste management and disposal.
- To improve existing road networks, extend links, upgrade intersections, bridges and flyovers; and other means of communication and proposed where needed.
- To provide for safe and efficient public transport.
- To plan for effective traffic management, smooth transit and provide for parking facilities, where required in multi-storey car parks.
- To plan for enhancement and revitalization of economic base by expansion of industrial and commercial base, and for rapid expansion of IT and Telecom sectors, tourism, agricultural activity, etc., in the means of sustainable and smart concept.
- To propose alternate energy sources as country is facing acute shortage especially in summer season.

The Strategic Plan output

The proposed Development Master Plans of selected District Headquarter Towns of Sindh would focus on the following Tasks

- Review of Past Trends, Development Strategies and Prevalent Conditions
- Preparation of Digital Base Maps
- SWOT Analysis
- Carving out a Vision for the Future of these cities
- Preparation of Development Plan comprising of:
    - Long Term Development Plan
    - Growth Scenarios
    - Short Term Action Plans for Priority Infrastructures
    - Immediate Action Plan for the Core Urban Areas
    - Economic Development Plan
    - Disaster Management Plan and
    - Climate Change, Resilience & Adaptability Plans

2. AN OVERVIEW OF THATTA DISTRICT

2.1 History

2.2 Thatta District at Glance

Thatta district takes its name from headquarter town, one of the oldest towns in this land of an ancient civilization. "The word Thatta is derived from Thatti, Thatt or Thatto, a Sindhi word for a small settlement on riverbanks.

According to the 1998 census, the population of District Thatta was 599,492 with 11% urban population and 89% rural population, with an annual average growth rate of 2.42%. District Thatta covered an area of 17,355 sq. kms and the district is surrounded on the north and northwest by Jamshoro district, on the east by Hyderabad, Tando Muhammad Khan, Sujawal districts, and the Indus River while the Indian Ocean is situated on the south of the District.[5]

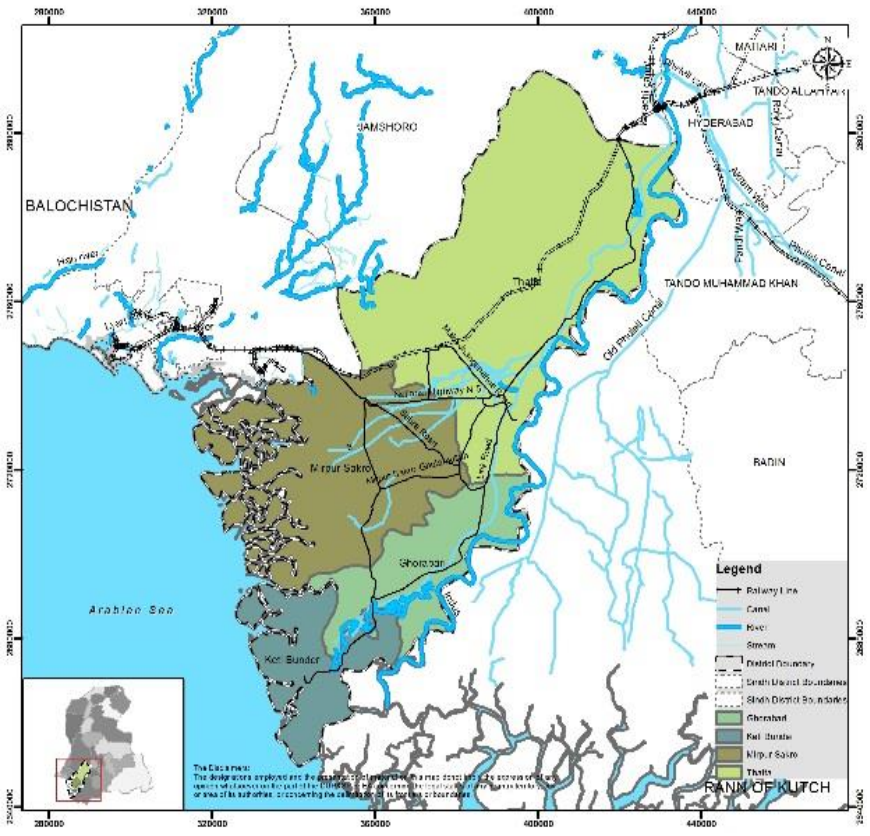


Figure 2-1: Tehsil Map of Thatta

Agriculture, District Thatta is irrigated mainly by Indus River and canals. However, other modes of land irrigation like tube wells are also used. Irrigation is done mostly through canals and tube wells. Though agricultural land is very limited, yet the available cultivable land is very productive in this region. There are two main crop seasons; "Kharif" and "Rabi" in Thatta District. The Kharif season starts from April- May and ends in October-November while the Rabi starts from November-December and ends in April-May. In district Thatta, good breed of buffalos and cows are found in the district. Sheep, goat, camel, horse, ass, and mule are also the main livestock of the district.

[5] District Disaster Management Plan (July 2017 - June 2027)

According to the Population and Housing census of 2017, the population of district Thatta is recorded as 979,817 souls with an average growth rate of 2.61%. Average Household size of Thatta is 5.3 with 184,868 Housing units. According to Population and Housing census of 2017, population of District Thatta is recorded as 979,817 souls with an average growth rate of 2.62%. Average Household size of Thatta is 5.3 with 184,868 Housing units.

2.3 Topography and Geology

Geologically, Thatta is formed of volcanic and sedimentary rocks of quaternary and tertiary and has the same composition as that of the Indus plain and the eastern desert zone of Pakistan containing the deserts of Cholistan, Nara, and Thar. The soils are silt, clayey wet and saline. The natural vegetation found in the district can be divided into two categories-mangroves in the coastal or delta zone, and tropical thorns in the rest of the district. In terms of use, the lands in the district can be divided into five major categories; lands not available or fit for agriculture, those under arable agriculture, forests, rough grazing lands and areas under human settlements.

The soils are silty clayey wet and saline. The natural vegetation found in the district can be divided into two categories-mangroves in the coastal or delta zone, and tropical thorns in the rest of the district. The average height of the Northern part of the district is more than 200 meters while the Southern part of the district where the height is equal to the mean sea level near Keti Bunder is below 20m.[6]

The topography of Thatta is that at the north-western area of the district is a hilly tract, known as Kohistan connecting with the mountainous area of Dadu and Kalat districts, known as the Kirthar Range. The south-western area of the district is sand, “Kallar” (salt incrustation) and sea affected, while the south-eastern portion adjoining the Rann of Cutch on the border of India is also a desert-like sandy area with scattered human habitations. The southern area known as the Kharo tract is the coastal zone of the Arabian Sea.

2.4 Geographical Location and Area

District Thatta is situated at a distance of 98 Kilometers in the east of Karachi on National Highway. It is situated at 230 43' to 250 26' north latitudes and 670 05' to 680 45' east longitudes. The district is surrounded on the north and northwest by Jamshoro district, on the east by Hyderabad, Tando Muhammad Khan, Sujawal districts, and the Indus River while Indi an Ocean is situated on the south of the district. The total area of the district is 8,570sq km. River Indus flows downstream the Kotri Barrage through numerous creeks till its delta in the Arabian Sea near chach deh wali Mohammad at Keti Bunder. The northern part of the district is paramount and known as "Kohistan" connected with a Kheerthar range of mountains.

[6] District Disaster Management Plan (July 2017 - June 2027)

Boundaries:

East: District Badin and Tando Muhammad Khan.
Northwest: District Karachi
North: District Jamshoro.
Northeast: District Hyderabad.
South: Arabian Sea and Rann of Kach.

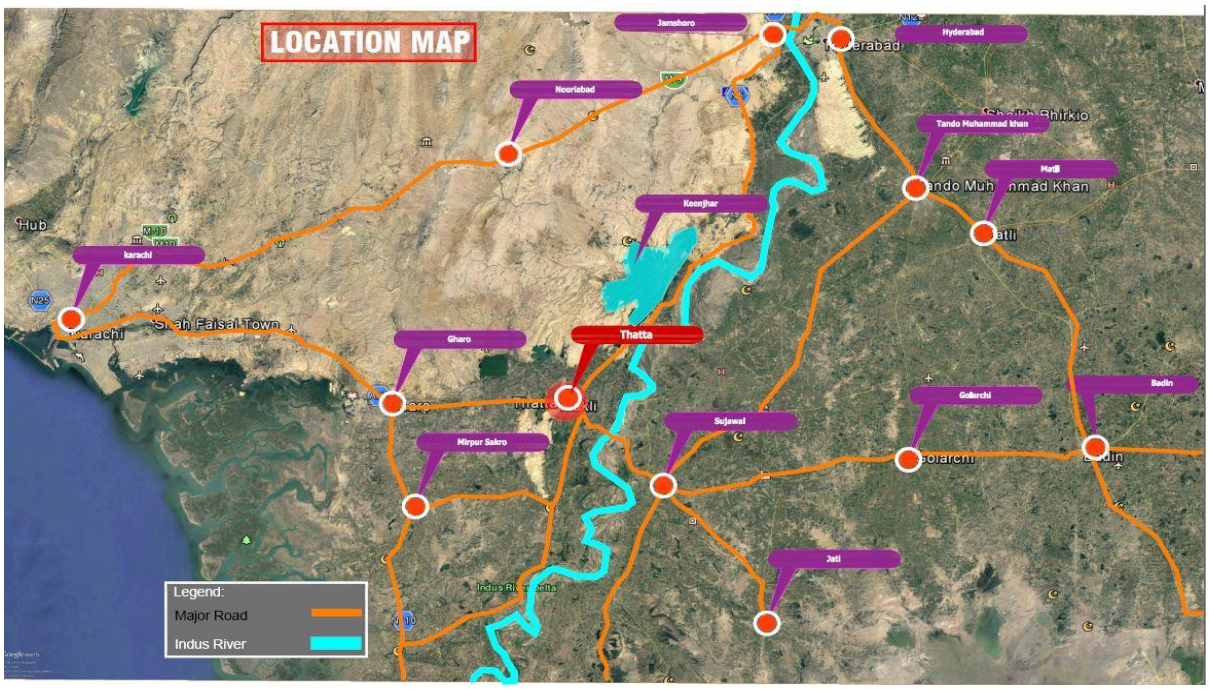


Figure 2-2: Geographical Location of Thatta

2.5 Administrative Set-up

Administratively, the district is divided into four Talukas i.e. Thatta, Mirpur Sakro, Ghorabari, Keti Bunder. There are 39 union councils, 01 Municipal Committee, and 06 Town Committees.

Table 2-1: Administrative Division of District Thatta

S. No.	Name of Four Talukas	No. of Municipal Committees'	No. of Town Committees'	No. of UCs
01	Thatta	01	01	16
02	Mirpur Sakro	00	02	14
03	Keti Bunder	00	00	03
04	Ghorabari	00	03	03
Total		**01**	**06**	**39**

Source: District Disaster Management Plan (July 2017 - June 2027)

2.6 Population

- **Past Growth Trends**

According to the 1998 census, the population of Thatta MC (37,515) + Makli TC (18,742) was 56,257 souls had an annual growth rate of 3.32%. According to the latest census 2017, the population of Thatta MC (54,697) + Makli TC (47,136) is 101,833 with a growth rate of 3.17%. As per the census report of 2017, Thatta MC (9,619) + Makli TC (8,379) have 17,998 households and the average household size is 5.7.

Table 2-2: Present-Past Population Growth Thatta

Project Area	Population		AGR		Average Household Size	
	Census 1998	Census 2017	Census 1998	Census 2017	Census 1998	Census 2017
Thatta MC + Makli TC	56,257	101,833	3.32%	3.17%	6.17	5.7
Thatta Taluka	253748	406,063	2.36%	2.51%	5.6	5.4
Thatta District	599,492	979,817	2.42%	2.61%	5.4	5.3

2.7 Future Projections

In 1998 Population of Thatta Town (Thatta MC + Makli TC) was 56,257 and in 2017 census, the population is jumped to 101,833. Based on the annual growth rate of the 2017 census that is 3.17%, the population of Thatta Town (Thatta MC + Makli TC) is projected as under:

Table 2-3: Future Population Projection

Year	Population Thatta Town (Thatta MC + Makli TC)	
	District	(Municipal + Town Committee)
1998	599,492	56,257
2017	979,817	101,833
2022	1,114,534	119,030
2027	1,267,774	139,131
2032	1,442,083	162,626
2037	1,640,358	190,089

2.8 SWOT Analysis

STRENGTH	WEAKNESSES	OPPORTUNITY	THREATS
DEMOGRAPHY			
1. Different ethnic groups live in harmony 2. Young population proportion is high 3. Sufficient land available for new growth and up-gradation/development	1. High demand for job and employment 2. Shortage of middle age and senior skilled professionals 3. Limited opportunities to hire people to work in public and private sector 4. Impact on public and private sector employment	1. A sustainable society where children future is ensured 2. Supports ideas for life new urbanism 3. Intervention 4. A large number of future professionals in any specific field can be produced 5. Efficient distribution of utility services in urban areas 6. Good labor force is available	1. Intra state migrations of skilled professionals 2. Unemployment (can give birth to social crime) 3. Uncontrolled informal development 4. Infrastructure deterioration

2.9 Urban Morphology

It has been observed that there isn't any particular form of development in the town. But major development is taking place in the Makli area towards Karachi-Thatta road. Thatta was made districts headquarter in 1948 but it has failed to show signs of dynamism its population has been growing at a very slow rate. During 1972-81, it recorded lowest growth rate among the urban district headquarters of Pakistan and Thatta district registered the lowest growth among the districts of Pakistan. Two very large cities, Karachi and Hyderabad have overshadowed Thatta.

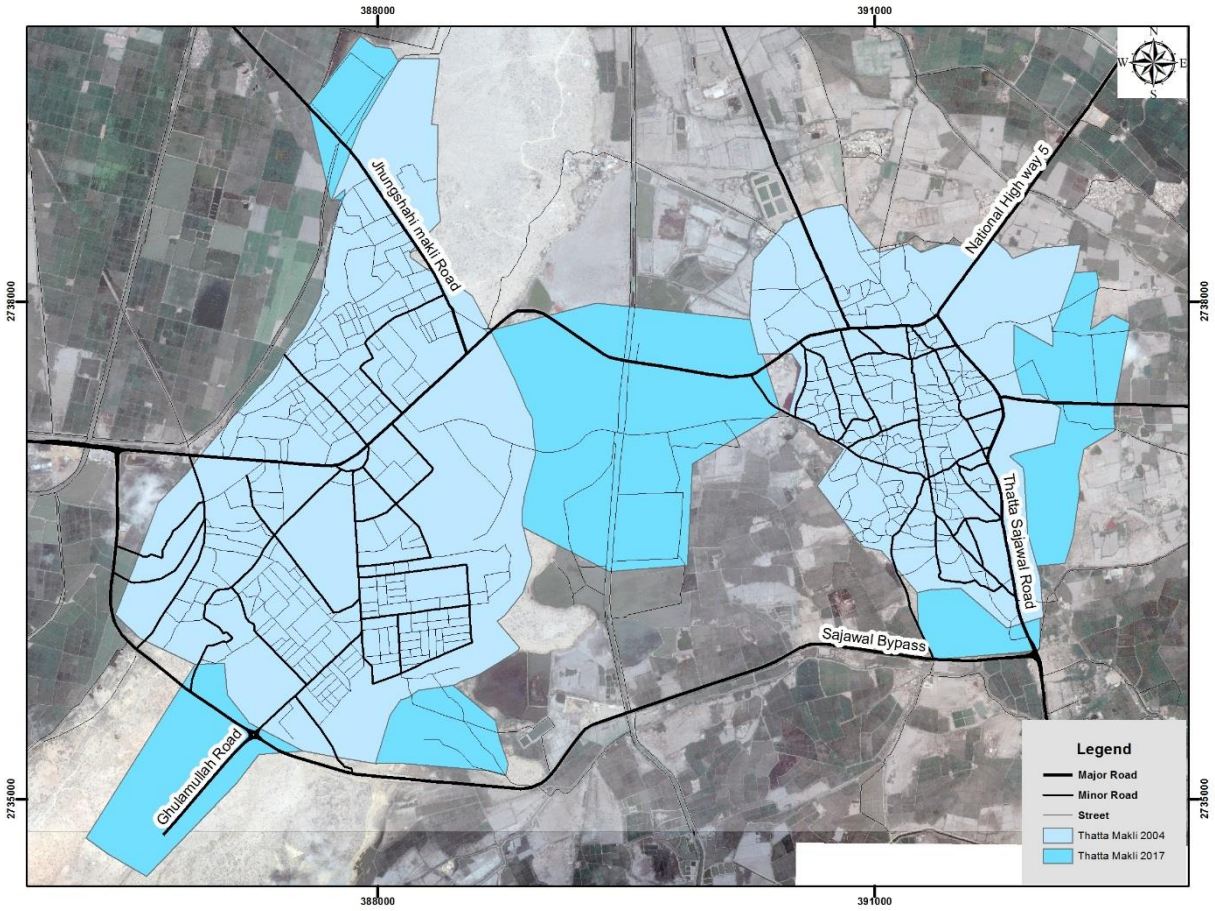


Figure 2-3: Historical Growth of Thatta

2.10 Land Use and Spatial Analysis

The built-up area of Thatta town comprises around 2944.3 acres of land as compared to a consultant's suggested urban boundary is 9720.4 acres. The land use analysis indicates that almost 18.3% of the total urban boundary area is in use of residential purposes only. While 48% of the area is covered by agriculture fields.

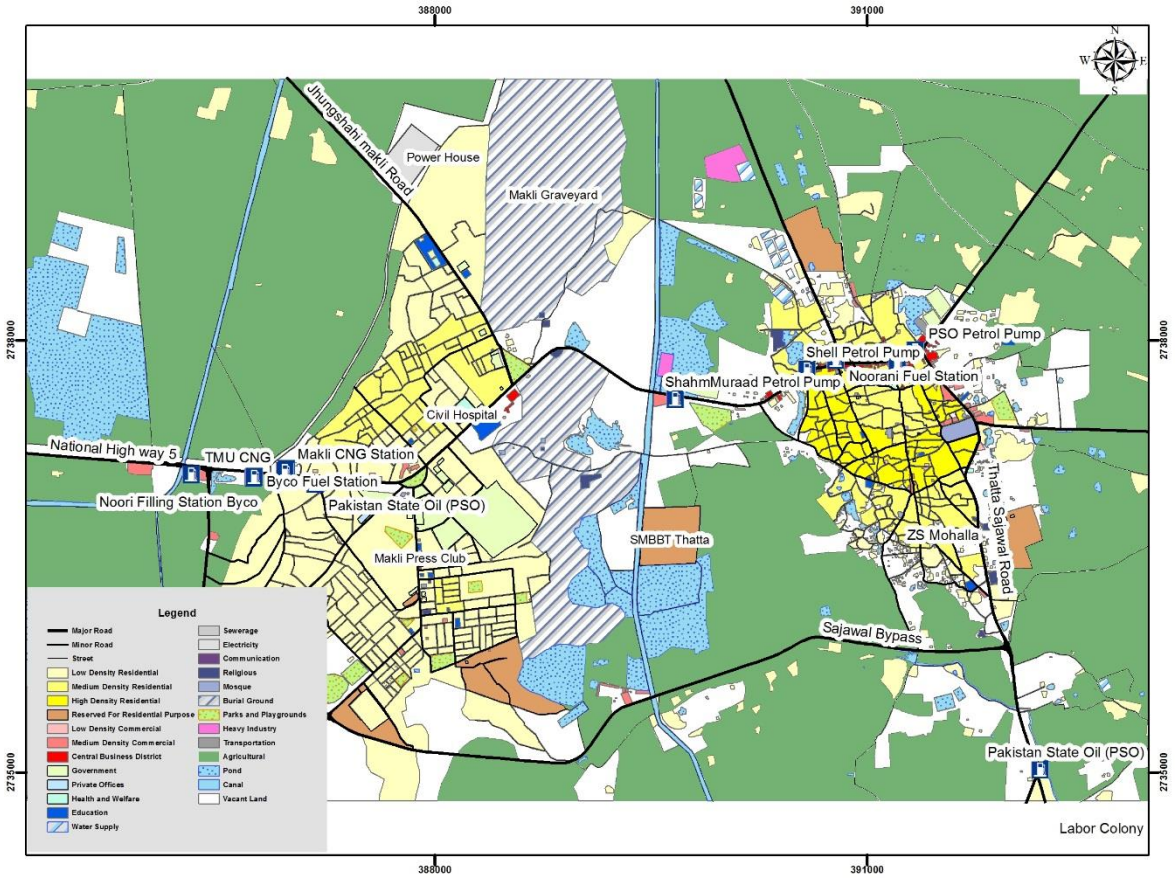


Figure 2-4: Land use Map of Thatta Town

Table 2-4: Land use Classification and Percentages						
THATTA (URBAN BOUNDARY)				9720.4	Acres	NRM
CATEGORIES	LANDUSE CLASSIFICATION			AREA (ACRES)	%	(%)
URBAN	Residential	Residential	Low Density Residential	1110.0	11.4	26 - 48
			Medium Density Residential	336.9	3.5	
			High Density Residential	109.8	1.1	
			Reserved For Residential Purpose	225.5	2.3	
	Sub Total			1782.24	18.3	
	Commercial	Commercial	Low Density Commercial	7.2	0.1	0.5-2
			Medium Density Commercial	23.8	0.2	
			Central Business District	13.4	0.1	
	Sub Total			44.3	0.5	
	Parks and Playground	Parks and Playground	Parks and Playgrounds	43.89	0.5	1-7
	Sub Total			43.9	0.5	
	Amenities	Institutional	Education	18.6	0.2	2-10
			Government	90.3	0.9	
			Health And Welfare	7.2	0.1	
			Private Offices	1.8	0.0	
			Religious	21.7	0.2	
		Utilities And Municipal Service Facilities	Electricity	25.1	0.3	
			Sewerage	0.2	0.0	
			Communication	0.1	0.0	
			Water Supply	17.5	0.2	
		Burial Ground	Burial Ground	583.0	6.0	
	Sub Total			765.5	7.9	
	Industrial	Manufacturing	Small-Scale Manufacturing/ Light Industry	0	0.0	3-8
			Large-Scale Manufacturing/ Heavy Industry	16.6	0.2	
	Sub Total			16.6	0.2	
	Transportation	Transportation	Transportation	291.7	3.0	12-29
	Sub Total			291.7	3.0	
	Sub Total			2944.3	30.3	
NON-URBAN	Agriculture And Forestry		Agricultural	4667.3	48.0	
	Sub Total			4667.3	48.0	
	Water Bodies		Canal	76.2	0.8	
			Pond	576.1	5.9	
	Sub Total			652.3	6.7	
	Vacant Area			1456.5	15.0	3-7
	Total			1456.5	15.0	
TOTAL				9720.4	100.0	

Source: Spatial Analysis done by Consultants

2.11 Existing Zonal Plan:

Zone 1:

This zone comprises of new and scattered developments i.e. low density residential cum commercial, mixed use, commercial strip, water supply scheme, fuel stations, banks and few new housing colonies exists in this zone.

Zone 2:

This zone known as the heart of the Thatta city old town/Shahi Bazar Area, it comprises of main Shahi bazar area and old thickly populated residential cum commercial area with mixed landuse activities.

Zone 3:

This zone comprises of new and scattered developments i.e. low density residential cum commercial, mixed use, commercial strip and few new housing schemes present in this zone.

Zone 4:

Mostly this zone known as the passive recreational area comprises of historical graveyard, shrines of rulers and generals of different dynasty's of Sindh.

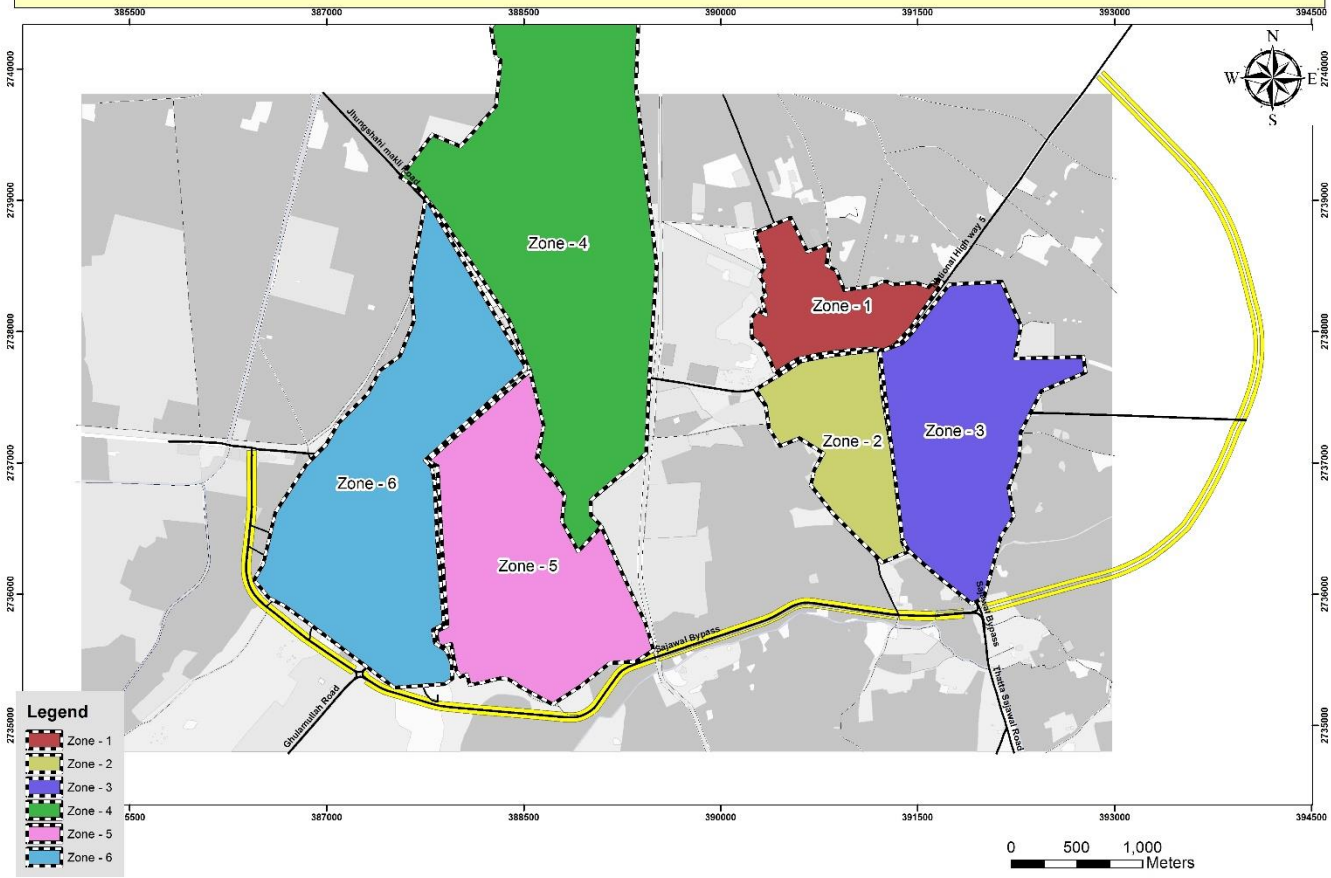
Zone 5:

This zone seems to be a planned area of Public Administration, Recreational, Educational and Health Institutions. It includes major landmarks like DC Office, SSP Office, Civil Hospital, and Session Court, public and private schools and Gymkhana.

Zone 6:

This zone comprises of new and scattered developments i.e. low density residential cum commercial, mixed use area with few commercial activities.

Zonal Plan of Thatta Town



3. VISION FOR STRATEGIC DEVELOPMENT PLAN OF THATTA

Having gone through a detailed process of data collection and evaluation in the previous stages of the study and obtaining citizens input through the Consultative workshops with the stakeholders, the Consultants have identified development issues in the various sectors and provided sector wise strategies to resolve issues in an integrated manner. The issues are running of the development programmes. As funds are never unlimited, it would be utmost necessary to concentrate on projects that being meaningful and quick relief in the life of common man and significantly the quality of life. In the sections of the Report to follow, sector wise development strategies are listed. The focus should be to select projects which have a strong sequential links is the form of a "package" rather than stand-alone project.

3.1 Summation of Vision Formulation

The basic aim of vision formulation exercise is to have pluralistic approach to establish a shared and common vision for the development of Thatta DHQ town in the future, define its role as a leading regional centre in the Sindh province and the socio-economic uplift of the population.

The summations and conclusions are described hereunder:

1) Although the participants generally understood that vision should reflect citizens and stakeholders' aspirations as to where they want to see their town in twenty years from now. However, their focus has remained on the resolution of immediate problems namely; supply of clean drinking water, sewerage and drainage, solid waste disposal, traffic congestion and parking, better health and educational facilities, cleanliness, parks and play areas. It is clear that far flung high sounding vision statements, are meaning less for them if the immediate problems are not urgently solved.

2) The participants showed concern regarding high rate of population growth and migration. Urbanization and uncontrolled land use conversion is eating away lots of urban agricultural land and breaking social fabric of residential communities. Need for land management system has been stressed.

3) The socio- economic uplift of the population has been mentioned by most participants, which include provision of basic needs of housing facilities with sustainable utility services, health, education, parks and playgrounds, employment and income generation.

4) Peace, safety, security and proper governance are envisioned by the participants as the ultimate goal for the twenty year **Thatta's Strategic Development Plan**. Whereas the Vision will remain static, the path to reach the vision may be subject to adjustments to account for ground realities.

3.2 Thatta's Vision Statement

The visioning process stems from the Stakeholders' Vision of the town which have been translated into tangible and concrete targets. The discussions in the Workshop that most people want to see:

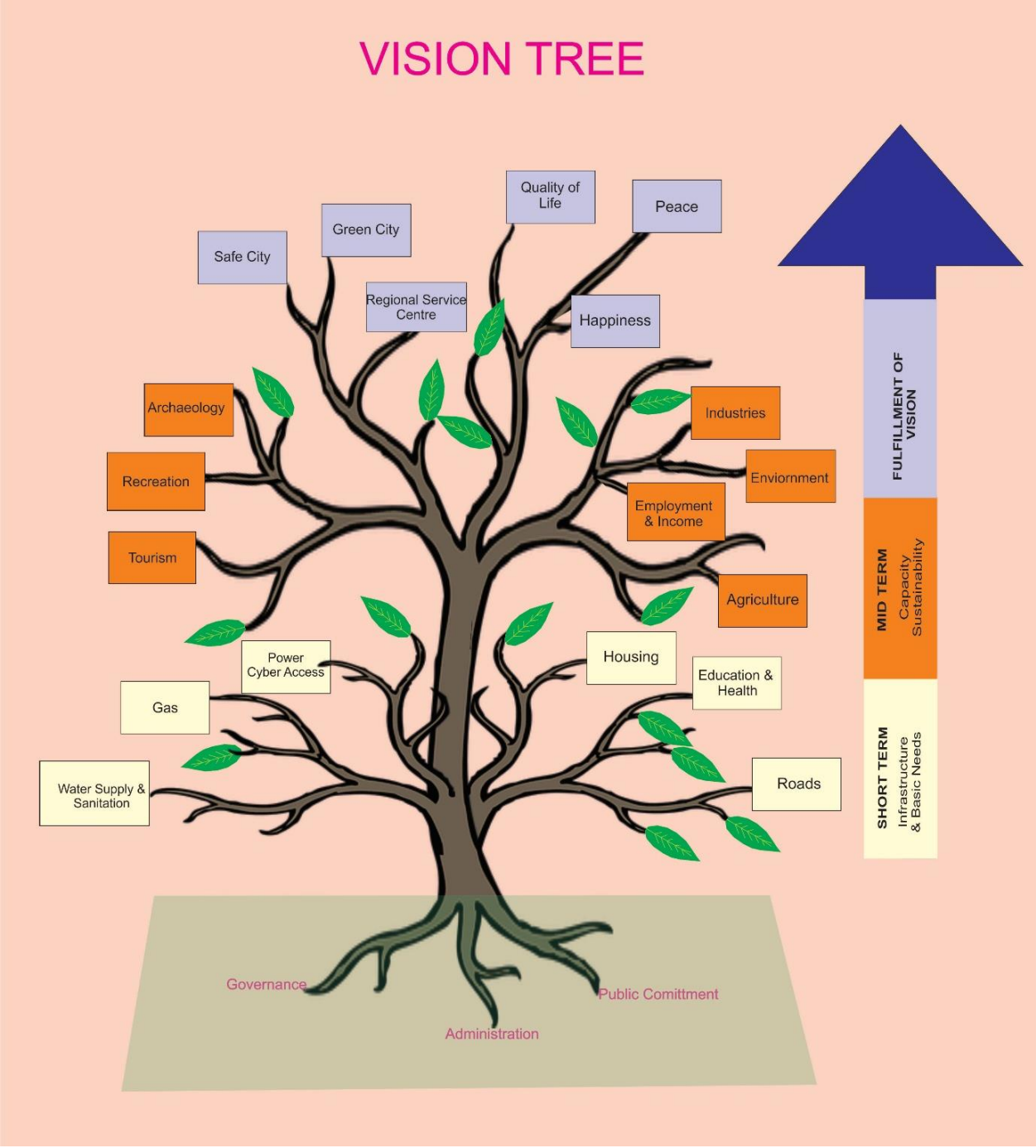
Where a lot of investment is expected to be made;
The priority will first be given to improve the Core Urban Area of DHQ town. And then could go to remaining town and Peri-urban areas.

Existing utilities including water supply, sewerage & drainage as well as facilities are in bad state of repairs due to shortage of funds. The government should make sufficient fund allocations for the repairs and rehabilitation of existing facilities.

THATTA VISION 2037

"The city full filling all the basic needs, such as housing, water supply and sanitation, in clean and sustainable pollution free environment, with education and health for all, along with growth in local and regional economy with increase in employment, incomes and related skills development to emerge as well planned modern city with peace, security and prosperity like some of the best most liveable cities in the world."

3.3 Thatta's Vision Tree



4. PROPOSED MASTER PLAN OF THATTA

4.1 Spatial Pattern

Thatta is the headquarter town of Thatta District. The word Thatta is derived from "Thatti, Thatt or Thatto", a Sindhi word for a small settlement on riverbanks. It is in one of the oldest regions of Indus civilization. It has a rich history as it has been the capital of three dynasties (Summa, Arghuns, Tarkhans) and was later on ruled by the Mughals.

Thatta District is surrounded on the west by Karachi, on the north and northwest by Jamshoro District, on the east by Hyderabad, Tando Muhammad Khan, Sujawal Districts and the Indus River while Indian Ocean is situated on the south. The northern part of the district is paramount and known as Kohistan connected with a Kirthar Range of mountains. The south-western area of the district is sand, Kallar (salt incrustation and sea affected), while the south-eastern portion adjoining the Rann of Kutch on the border of India is also a desert-like sandy area with scattered human habitations. The southern area known as the Kharo tract is the coastal zone of the Arabian Sea.

Thatta is formed of volcanic and sedimentary rocks of quaternary and tertiary and has the same composition as that of the Indus Plain and the eastern desert zone of Pakistan. The soils are silty clay, wet and saline. The natural vegetation found in the district can be divided into two categories mangroves in the coastal or delta zone, and tropical thorns in the rest of the district. The average height of the northern part of the district is more than 200 meters, while the southern part of the district where the height is equal to the mean sea level near Keti Bunder is below 20 meters.

River Indus flows downstream the Kotri Barrage through numerous creeks till its delta in the Arabian Sea at Keti Bunder. Thatta is irrigated mainly by Indus River, mostly through canals and tube wells. Though agricultural land is very limited, yet the available cultivable land is very productive in this region. In Thatta, good breed of buffalos and cows are found. Sheep, goat, camel, horse, ass, and mule are also the main livestock of the district.

Thatta District has progressed considerably in industrial development. There are number of industrial units established in the district. Apart from the sugar mill, all the larger industrial units are located in Dhabeji and Gharo adjacent to Karachi. In addition, stone from the Makli Hills and Kohistan is supplied to the Pakistan Steel Mill and the Thatta Cement Factory.

Thatta District has number of places famous for its heritage, culture and architecture, including; Jamia Masjid Thatta, Jam Tamachi-Ji-Mari, Kalan Kot, Tomb of Sheikh Hail Turab, Bhambore, Makli Hills and Keenjhar Lake (Kalri Lake). Out of these Jamia Masjid and Makli Hills are in Thatta Town.

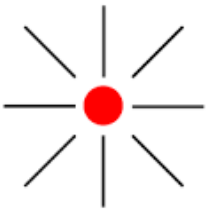
Thatta's Jamia Masjid known as Shah Jahan Mosque is a masterpiece. It was built on the orders of the Mughal Emperor, Shah Jehan, who gifted it to the people of Thatta. The Shah Jahan Mosque is richly embellished with decorative tiles and is considered to have the most elaborate display of tile work in South Asia.

Makli Graveyard is located on the western side of Thatta City at Makli Hills. Makli Hills have a diameter of approximately 8 kilometres. These hills are supposed to be the burial place of some 125,000 Sufi Saints. Makli Necropolis, a UNESCO world heritage site, is the site of one of the world's largest cemeteries and has numerous monumental tombs, designed in a syncretic funerary style characteristic of lower Sindh.

The combination of Thatta MC and Makli TC is forming todays DHQ Town of Thatta, collectively called Thatta Town. Thatta Town is situated on the National Highway (N5) at a distance of 98 kilometres in the east of Karachi. National Highway (N5) length in District Thatta is 112 kilometres and Super Highway (M9) which connects Karachi and Hyderabad, also passes through this district for a length of 40 kilometres. The Thatta district is also linked with the national network of Pakistan Railways through Jungshahi Railway Station. It is among the oldest railway stations and located approximately 20 kilometres away from Thatta City.

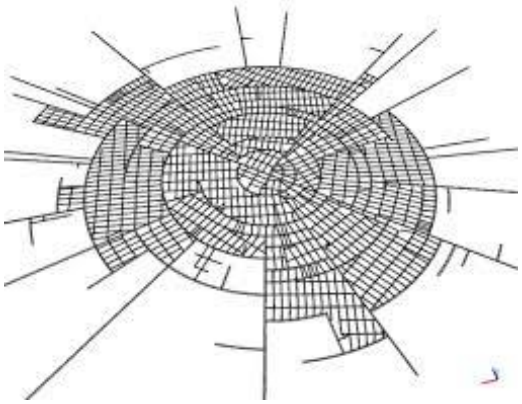
It has been observed that there is not any particular form of development in the town. However, major development is taking place in the Makli area towards Karachi Road. The presence of two very large cities, Karachi and Hyderabad have overshadowed Thatta.

4.2 Basic Urban Form



The existing town is a medium size lively and thriving urban center that fulfils the socio-economic and financial needs of its population and of surrounding towns. Specially those are not along major connectivity corridors are benefited, like Mirpur Sakro, Ghorabari and Keti Bunder Talukas.

It is no surprise then that the population demands the uniqueness and prominence of the existing town to be maintained or enhanced in the future plan. During the stakeholder's conference, the town elders insisted that any future urban development detached from the existing town making the existing town a redundant, will not be acceptable to them. The existing core town would naturally be the physical nucleus of the future town, and the future development will radiate from it in all directions in form of different sectors.



At present there are five major radial roads of Karachi, Hyderabad, Sujawal, Jungshahi and Ghulamullah. Most of these roads are converging to the town center.

However, central canal in vertical direction divides DHQ Town of Thatta into Eastern (Thatta) and Western (Makli) parts. Thus it is named as Central Canal Road of Thatta Town. There is an existing Sujawal Bypass in the south of the town. This bypass termed as Southern Bypass of Thatta Town is providing southern connections with Sujawal and Ghulamullah Roads.

Since this town is not large enough in terms of its spatial spread then its projected future population, thus the alignment of another bypass is made in northern side. This Northern Bypass is a newly proposed bypass, likewise Southern Bypass it starts from Karachi Road (N5) and ends at Hyderabad Road (N5), forming an overlapping curve over the Southern Bypass.

In addition a Central Canal Road is also proposed in the middle of the town, providing vertical link by connecting Northern and Southern Bypasses. In this way, interconnection of the radiating roads with the existing and proposed bypasses around the proposed master plan, will keeps the development compact.

4.3 Proposed Master Plan

The Proposed Master Plan for Thatta has been prepared with the consideration of three phases as follows:

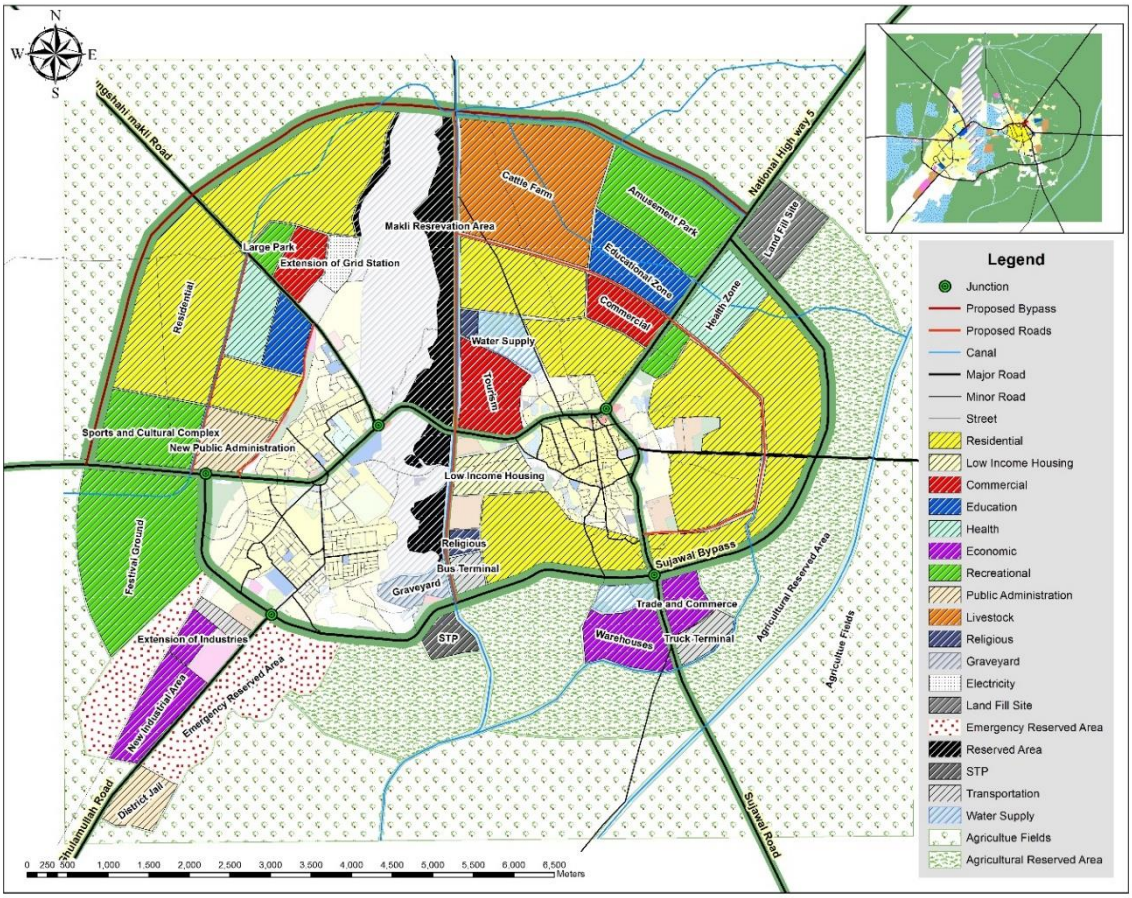
i. Immediate Phase - Immediate Action Plan
ii. Short Term Phase - Priority Projects
iii. Long Term Phase – Strategic Development Plan

The total extent of the area included in the overall proposed Thatta Master Plan is 16,000 acres approx. for a population of 190,100 by 2037. In this way, Thatta Town in next twenty years is expected to have population density of 12 persons per acre and overall eight housing units per acre with an average household size of 5.7.

The hallmark of the plan is that it is **compact without being congested**. As the future expansion of the Thatta Town is expected to be large, thus the complete Proposed Thatta Master Plan is catering for all the needs of a full-fledged metropolis of the future. Thus the plan will afford balanced development containing all required land uses.

The overall structure of the plan is that two distinct curves are rising and falling on a main spine. These curves are Northern and Southern Bypasses around the town, forming connectivity in northeast and west directions through Karachi-Hyderabad National Highway N5. The Central Canal Road is located to provide vertical connectivity to new development areas in between bypasses. In order to amalgamate two towns, a large nucleus of Tourism Area is placed centrally between Makli and Thatta, and their New CBDs are forming bi-nuclei. The other prime activities are placed around the existing town, mostly within two bypasses in curvilinear form. Thus the intersection of radial roads and bypasses will also create main junctions and forming different sectors.

Proposed Master Plan for Thatta Town



Despite taking different aspects in to consideration, the Consultant suggest that the Master Planning should be reviewed every five years to estimate the land use and area requirement according to the growth rate and economic investment.

4.4 Salient Features of Planning

- Considering huge potential of tourism activities, a large Tourism Area is placed in the center along N5 serving both Makli and Thatta. Since a beautiful canal is passing in north-south direction, a Central Canal Road is formed on the left of this area and connecting it with both bypasses.
- In order to cater two towns, bi-nuclei of New CBD Makli and New CBD Thatta are proposed, along Jungshahi Road and Hyderabad Road respectively.
- Due to economic activities and connectivity of Sujawal Road, Warehouses, Trade and Commerce, and Truck Terminal are placed after existing Southern Bypass.

- As the existing Small Industrial Estate is lying along Ghulamullah Road, thus its extension, with truck terminal is proposed there too. Moreover a large area for New Industries is also proposed along the same road.
- Other than two Truck Terminals, a Public Transport Terminal is designated along Southern Bypass also accessible from Central Canal Road in southern direction.
- Although Makli Graveyard is abundant in the vicinity, however to protect heritage it is suggested to designate separate graveyard for further use. Thus, an area for graveyard has been reserved along Central Canal Road and also accessible from Southern Bypass.
- The Cattle Park is proposed in the north direction, accessible from Northern Bypass, and Central Canal Road, to limit the town development further. It will also benefit the population of nearby villages and other settlements.
- With bi-nuclei approach, two sets of Health, Education and Recreation, are placed with New CBDs of Makli and Thatta along Jungshahi and Hyderabad Road respectively.
- In addition there are three major recreational areas are proposed; Sports and Cultural Complex and Festival Grounds near New Public Administration along Karachi Road N5 at Makli side, while Amusement Park along Hyderabad Road N5 near Thatta side.
- Since most of public offices are towards Makli, the New Public Administration area is proposed along Karachi Road N5, to serve and manage this beautiful city of Thatta. Moreover an extension of District Jail is also suggested along Ghulamullah Road.
- Along Northern and Southern Bypasses, the areas have been reserved for agriculture, as these areas are benefitted with the existing irrigation network. This will be helpful in restricting housing development and preserving the agricultural farms from the onslaught of the housing projects by private sectors.

4.5 Northern and Southern Bypasses

Considering the existing Sujawal Bypass in south and a need of northern connectivity; a combination of two bypasses is suggested despite of typical ring road. However, both of these bypasses are joining Karachi-Hyderabad National Highway N5, perpendicularly. The further detail is as follow:

i. Southern Bypass: The existing Sujawal Bypass is recently completed, providing southern connections with Central Canal Road, Ghulamullah Road and Sujawal Road. Thus it is recommended as Southern Bypass of Thatta Town.

ii. Northern Bypass: There is also a need to limit the northern development in proper form, a Northern Bypass is proposed. This newly proposed bypass is connecting from west to Karachi Road (N5) and from northeast to Hyderabad Road (N5). And it also providing connections to Jungshahi Road and Central Canal Road.

The recommendations are to increase the right of way i.e. 200 feet with urban forestation of 200 feet wide on both sides of the bypasses. As the areas on both sides of the bypasses will attract many developers. The

land two hundred feet on both sides of the bypasses should be notified for development control where only planting of local trees should be allowed.

4.6 Radial Roads with Main Spine and Central Link – Regional Connectivity

All proposed radial roads are existing major roads, providing transport connectivity with other urban and rural regional areas. Most of these roads are converging to core urban area, or in other words these roads are originating from the existing town. In this way, the existing town will remain focal point of all development along the roads. However, these roads are also serving as vital radial regional connections.

As a result, there are five proposed radial roads with increased ROW, which will serve as future regional connections. These roads includes; Karachi-Hyderabad (N5), Sujawal, Jungshahi, Ghulamullah and Central Canal Roads. However it is very important to control upfront development along the major roads. Likewise existing and proposed bypasses, on both sides of major roads planting of local trees is also highly recommended.

Other than radial connectivity, in Thatta Town main spine and central link are also formed:

- Main Spine: The Karachi-Hyderabad National Highway N5, it is a main spine of the town. It is also establishing connectivity in between west and east part of Thatta Town.
- Central Link: A Central Canal Road is proposed in the middle of the town, developing vertical link in between Northern and Southern Bypasses.

4.7 Proposed Land Use Zoning

The proposed land use zoning is broadly based on NRM Standards[7]. The NRM has not been revised since decades, thus the Consultant have added new land uses in the prescribed categories, as primary zoning i.e. Level-1. Further, as per the contextual requirement of the local environment of Thatta as DHQ Town, secondary zoning i.e. Level-2, is also categorized accordingly, again in consideration to the NRM Standards[8]. The proposed land use zoning is shown in the table:

[7] Guidelines for Land Allocation to Zones in the Preliminary Design of a New Town, Table 10.3, page no. 305, National Reference Manual on Planning and Infrastructure Standards

[8] Standard Land Use Classification for Urban Jurisdictions in Pakistan, Appendix 10.1, page no. 398, National Reference Manual on Planning and Infrastructure Standards

S.No	NRM STANDARDS		PROPOSED LAND USE CLASSIFICATION		
	Land Use Zoning	Land Uses (%)	Level - 1 Functional Zoning	Areas (acres approx.)	Land Uses (%)
1	Residential	40-45%	Residential	4,780	29.9%
2	Commercial	2-3%	Commercial	442	2.8%
3	Industrial	2-10%	Economic	1,176	7.4%
			Livestock		
			Industrial		
4	Institutional	3-5%	Health and Welfare	1,027	6.4%
			Educational		
			Religious		
			Public Administration		
5	Community Open Spaces	4-6%	Recreational	1,383	8.6%
6	Graveyards	2-3%	Graveyards	1,012	6.3%
7	Arterial Circulation & Terminals	15-20%	Transportation	1,730	10.8%
			Utilities and Services		
8	Protected Reserved	15-25%	Urban Forestation	4,439	27.8%
			Agriculture		
			Water Bodies		
			Vacant / Reserved		
	Total Area of Proposed Master Plan of Thatta Town			15,989	100%

The total area requirement for full fledge metropolis of Thatta will be around 16,000 acres. As shown in the table of proposed land use classification, the percentage of graveyards and protective reserved are higher, in comparison to the NRM standards. Since the town has a Makli Necropolis and due to which protective reserved area will also be required, thus their values are higher in comparison to other towns. Despite this factor, all the other land uses are distributed as per the standard. As the institutional area is still of higher value, as it will also contain residences for employees / staff and some related commercial activities are also associated with institutional areas. In this way, institutional area is sharing the commercial and residential load as well.

S.No	PROPOSED LAND USE CLASSIFICATION FOR THATTA TOWN						
	Level - 1 Functional Zoning	Level - 2 Functional Zoning	Areas (acres approx.)		Land Uses (%)	Areas (acres approx.)	Land Uses (%)
1	Residential	Existing Residential	1,782	4,780	29.9%	4,780	29.9%
		Proposed Residential	2,998				
2	Commercial	Existing Commercial	44	442	2.8%	442	2.8%
		New Central Business District - Makli	95				
		New Central Business District - Thatta	117				
		Tourism	186				
3	Economic	Trade and Commerce	80	243	1.5%	1,176	7.4%
		Warehouses	163				
4	Livestock	Cattle Farms	650	650	4.1%		
5	Industrial	Existing Industries	67	283	1.8%		
		Extension of Small Industrial Area	50				
		New Industrial Area	166				
6	Health and Welfare	Existing Health and Welfare	7	317	2.0%	1,027	6.4%
		Health Area - Makli	130				
		Health Area - Thatta	180				
7	Educational	Existing Educational	19	311	1.9%		
		Educational Area - Makli	93				
		Educational Area - Thatta	199				
8	Religious	Existing Religious	22	66	0.4%		
		Religious 1	26				
		Religious 2	18				
9	Public Administration	Existing Public Administration	90	333	2.1%		
		New Public Administration Area	137				
		District Jail with extension	106				

10	Recreational	Existing Parks and Playground	44	1,383	8.6%	1,383	8.6%
		Sports and Cultural Complex	247				
		Festival Grounds	641				
		Amusement Park	357				
		Large Park - Makli	49				
		Large Park - Thatta	45				
11	Graveyards	Makli Necropolis	943	1,012	6.3%	1,012	6.3%
		New Graveyard	69				
12	Transportation	Existing Transportation	292	1,257	7.9%	1,730	10.8%
		Public Transport Terminal	42				
		Truck Transport Terminal - Sujawal Road	65				
		Truck Transport Terminal - Ghulamullah Road	38				
		Road Network	820				
13	Utilities and Services	Existing Utilities and Services	43	473	3.0%		
		Water Supply	141				
		Sewerage	61				
		Land Fill	175				
		Electricity	53				
14	Urban Forestation	Urban Forestation	490	490	3.1%	4,439	27.8%
15	Agriculture	Agricultural Reserved	2,580	2,580	16.1%		
16	Water Bodies	Canals and Ponds	331	331	2.1%		
17	Vacant	Emergency Reserved - Makli Hills	643	1,038	6.5%		
		Protective Reserved - Makli Necropolis	395				
		Total Area for Future Development of Thatta	15,989	15,989	100%	15,989	100%

4.7.1 Residential Zone

The important features of the proposed master plan are accommodation of all income groups with diverse options for housing. Therefore in total 4,800 acres of residential land use is proposed, which will create eight housing units per acre on average. Thus in overall town more than 38,000 housing units are expected to be in town by 2037.

There are existing vacant land parcels in overall town, specially in between Makli and Thatta, these have a considerable potential of infill development for residential use. This will somehow fulfill the partial need of new migrants coming from other areas in search of better living in the immediate phase. For low income group in short term phase (priority project) land of 120 acres adjacent to SMBBT and accessible from Central Canal Road is proposed for medium to high density development. While for other income groups, mixed density (low, medium and high) residential areas are proposed. Moving ahead, for the long term phase, areas are also being reserved for residential development as per future requirement, which will also include apartment buildings.

The following land use division is for New Residential Schemes according to Sindh Building & Town Planning Regulations of Sindh Building Control Authority:

New Residential Scheme [9]		
S.No.	**Land Use**	**SBCA Standards**
1	Residential	55% max
2	Commercial	5% max
3	Parks	5% min
4	Playgrounds	5% min
5	Public Uses	5% min
6	Educational	3% min
7	Roads	22% min

The Level II secondary zoning of residential land use will be as follow:

- **Houses**

  Taking the existing trend of housing, it is recommended to concentrate more towards houses, as the cultural context favor low to medium density housing development. However, it is preferred to follow the standards and give ample spaces to neighborhood facilities as well.

The following guidelines are for houses zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
- Houses - Neighborhood level facilities like small commercial, parks, playgrounds, schools, religious, parking	- Utilities and services - Road accessibility - Pedestrian friendly streetscape - Mixed-used structures	- Apartments - Large health and educational - Large commercial activities

[9] Land Allocation for New Residential Schemes as per Sindh Building & Town Planning Regulations, Chapter 20.4.1, page no 124.

Houses - Applicable SBCA Bylaws[10]					
Types	**Densities per acre**	**Plot Sizes sq.yds**	**Foot Print FP %**	**Floor Area Ratio – FAR**	**No. of Floors**
Low Density Houses	50 – 100	1,000 or above	40% - 45%	1:1	G+2 (max)
Medium Density Houses	100 - 200	400 to 999	50% - 55%	1:1 - 1:1.5	G+2 (max)
High Density Houses	200 - 300	120 to 399	65% - 75%	1:1.8 - 1:2	G+2 (max)

- **Apartments**

  In Thatta Town, the trend of vertical residential and commercial development is existing but at a very low pace. Secondly, as new migrants are expected from other urban areas as well, thus there is a need to fulfill the modern residential need like apartments. On the other hand, apartments are more effective in accommodating large number of households in less acres of land due to increased density in comparison to houses. It is not necessary to build a concrete jungle, however with better design and new ideas different type of walkable as well as high rise could be made. The main focus should be to provide open and green areas as breathing spaces in between apartment buildings as per the standards.

The following guidelines are for apartment zone development:

Permitted Uses	**Allied Permissible Uses**	**Prohibited Uses**
- Apartments - Designated parking areas - Small commercial - Parks and playgrounds - Prayer areas	- Utilities and services - Road accessibility - Pedestrian friendly streetscape - Mixed-used structures	- Large health and educational institution - Large commercial activities

Apartments - Applicable SBCA Bylaws[11]					
Types	**Densities[12] per acre**	**Apartment Sizes sq.ft**	**Foot Print FP %**	**Floor Area Ratio - FAR**	**No. of Floors**
Low Density Apartments	325	2,500 – 4,000	40%	1:2.75	G+6 (max)
Medium Density Apartments	500	1,500 – 2,500	40%	1:2.75	G+6 (max)
High Density Apartments	650	1,000 - 1,500	40%	1:2.75	G+6 (max)

[10] Houses/Bungalows, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.2, page no 141.
[11] Flat Sites Category, Zoning Regulations /Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.4, page no 144.
[12] Residential Density Standards, as per Sindh Building & Town Planning Regulations, Chapter 20.3, page no 123.

4.7.2 Commercial Zone

This zone is mainly mixed use commercial with state of art buildings. The smart development will be preferred from medium to high density and less foot print, in order to utilize the land efficiently with sufficient open and green spaces.

The Level II secondary zoning of commercial land use will be as follow:

- **Tourism Area**
  Thatta District has a rich heritage of ancient Sindhi and Arabian culture, both can be seen in the architecture and culture of this district. Thatta is famous for the many historical places, thousands of people from all over the country come to visit every year. These places includes; Jamia Masjid Thatta, Jam Tamachi-Ji-Mari, Kalan Kot, Tomb of Sheikh Hail Turab, Bhambore, Makli Hills and Keenjhar Lake (Kalri Lake).

  On the other hand, Thatta is also a transport hub due to regional level economic activities with three major links i.e. Karachi, Hyderabad and Sujawal. The travelling for business purpose is also generating demand for tourism related facilities.

  Considering the potential of tourism, the Tourism Area is placed centrally, connecting Thatta and Makli along N5. In addition, a vertical connectivity is also proposed for Tourism Area i.e. Central Canal Road, to provide access in north-south direction as well. It will accommodate convention center, expo center, hotels, shopping malls, exhibition ground, etc.

- **New CBDs (Commercial Business District) at Makli and Thatta**
  Considering bi-nuclei development of Makli and Thatta, two New CBDs are proposed. One is recommended in Makli along Jungshahi Road, while other is suggested in Thatta along Hyderabad Road (N5).

  The main land uses of the CBDs will be regional corporate headquarters, financial centers, media houses, IT / software, specialized production service and retail shopping outlets with dedicated parking and large open spaces. This will integrate a great deal of financial, business, culture, service institutions and lots of supporting facilities; such as business office buildings, large shopping malls, hotels and apartments, etc. These will be developed with perfect and convenient traffic, communications and other infrastructures, favorable economic development, environment friendly places; which are convenient for commercial activities.

  In continuation to the main CBDs, it is recommended to place sub commercial centers to share the burden of commercial activities. Further small commercials within the residential areas will be formed for retail commercial activities of everyday goods required to fulfill the daily need of the residents.

The following guidelines are for commercial zone development:

Permitted Uses	Allied Permissible Uses
- Corporate head office buildings, towers - Huge markets, malls, outlets - Large public squares and parks - Dedicated parking lots / spaces	- Pedestrian friendly streetscape - Mixed-used buildings - Medium to High Rise Apartments - Fueling stations
Applicable SBCA Bylaws[13][14]	**Prohibited Uses**
- Plot Sizes: 1,000 sq.yds. (min) - FP: 40% - 65% - FAR: 1:2.75 – 1:5.5 - Floors: G+6 & G+8 (max)	- Residential housing schemes - Large health and educational institution

4.7.3 Economic Zone

In view of contextual requirement, the emphasis is given to other economic activities also, instead of only industrial development. The main criteria is to rely on local economic potentials, which mostly related to technical service and upcoming new type of markets.

The Level II secondary zoning of economic land use will be as follow:

- **Trade and Commerce**
  In southeast of the town along Sujawal Road, trade and commerce area is positioned. It is placed in a way that it is also accessible from Southern Bypass. This will provide in and out trading activities of the region specially to other areas of the district. It will includes grains, fruit and vegetable markets, wholesale markets, slaughter house, storage areas etc.

- **Warehouses**
  The warehouses area is proposed on other side of Sujawal Road, opposite to trade and commerce. For all of these trading activities large to small scale warehouses will be required, comprises of general, bulk, liquid, dry and cold storage as well. These should be well equipped with all the required technology of good storage and management like CCTV surveillance, in and out data entry.

  This area will also provide space for technical services like mechanical workshops and spare parts (auto mobile repairing), building construction materials, home depots, furniture market, housewares, food and beverages, computer hardware etc. However with the passage of time, technological advancement and changing needs; new requirement will come up to cater to the job market through new economic opportunities and activities.

[13] Commercial, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.3, page no 143.
[14] Flat Sites Category, Zoning Regulations /Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.4, page no 144.

The following guidelines are for economic zone development:

Permitted Uses	Allied Permissible Uses
- Warehouses and Workshops - Godowns and Cold Storage - Trade and Commerce Areas - Showrooms or Display Centers	- Mixed-used buildings - Residences for workers - Fueling stations
Applicable SBCA Bylaws[15]	**Prohibited Uses**
- Plot Sizes: o Small size: upto 0.5 acres o Medium size: 0.5 to 5 acres o Large size: 5 acres or above - FP: 60% - 70% - FAR: 1:2.5 - 1:1.5 - Floors: G+1 & G+2 (max)	- Private Residential housing schemes - Large health and educational institution

4.7.4 Livestock Zone

Since Thatta is not only an agricultural and industrial town, local inhabitants also rely on livestock for another source of income. In this regard, to promote livestock production, Cattle Park is placed in north direction along Northern Bypass and also accessible from Central Canal Road. The main emphasis is to be given to cattle production and their required facilities and services. In addition poultry is another requirement to fulfil through the livestock zone.

The Level II secondary zoning of livestock land use will be as follow:

- **Veterinary Hospital and College**
  A full-fledged veterinary hospital and college is proposed to cater to livestock health requirements and to produce more vet doctors.

- **Dairy Production**[16]
  Dairy area will be facilitated with mandi / cattle market, artificial insemination center, slaughter house, milk collection unit, chiller storage unit, fodder storage and purchase, bio gas plant etc.

- **Cattle Farms with Pasture and Grazing Lands**
  Cattle area will contain mainly cattle farms that could accommodate buffaloes, cows, sheep, goats, camel, poultry and ostrich; with pasture and grazing lands around the farms.

[15] Industrial Areas, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.6, page no 145.
[16] Dairy Plots, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.8, page no 149.

The following guidelines are for livestock zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
- Cattle Farms - Poultry Farms - Pasture and grazing lands - Slaughter Houses - Dairy production - Veterinary services - Veterinary education and training	- Low rise ancillary structures - Residences of caretakers - Related commercial activities - Fueling stations - Godowns and cold storage - Cattle market	- Other than permitted and permissible

4.7.5 Industrial Zone

In order to increase employment opportunities and production activities; industrial areas need to be developed. It will create more jobs, investment options, open new markets and at the end of the day will boost the economy of the town.

The following land use division is for New Industrial Estate according to Sindh Building & Town Planning Regulations of Sindh Building Control Authority:

New Industrial Estate [17]		
S.No	**Land Use**	**SBCA Standards**
1	Industrial	70% max
2	Commercial	1% max
3	Parks / Playground	3% min
4	Public Uses	6% min
5	Roads	20% min
6	Residential	8% min
No roads shall be less than 40 feet in small industries. No roads shall be less than 50 feet in medium and large industries. Industrial plot of 5 acres or more, residential area for labor and staff is allowed at rear.		

The Level II secondary zoning of economic land use will be as follow:

- **Extension of Small Industrial Estate**
  The Small Industrial Estate of 50 acres area is already present in southwest of Thatta Town along Ghulamullah Road. Its extension is proposed behind existing industries, to promote agro based industries, local production and its associated market. However, it is highly

[17] Land Allocation for New Industrial Estate as per Sindh Building & Town Planning Regulations, Chapter 20.4.2, page no 124.

recommended to first utilize available land parcels within existing industrial area, then move towards its extension for further industrial development. The small scale industries will include flour mills, rice husking mills, ice factories, packaging of fruits and vegetables, feeder crops, handicrafts, souvenirs etc.

- **New Industrial Area**

  Since the potential of other industries also present in Thatta Town, not only agriculture related industries. In this regard, a New Industrial Area is proposed at outskirt of the town, along Ghulamullah Road, next to existing Small Industrial Estate. It is suggested to explore this New Industrial Area according to the economic need of the town. This area is more appropriate to develop new industries, and to avoid development of heavy industries inside the town in order to keep the city environment clean. These industries may include; sugar mills, textile mills, paper mills, salt works, stone works etc.

  It is not suggested to develop whole area at once, instead as per the need. Preferably starting from the road accessible side and keeping further area reserved for future use when firstly developed area utilized.

  The following guidelines are for industrial zone development:

Permitted Uses	**Allied Permissible Uses**
- Small Medium and Large Scale Industries - Processing Units - Manufacturing Activities - Warehouses or Godowns - Workshops	- Showrooms - Mixed-used buildings - Residences for workers - Fueling stations
Applicable SBCA Bylaws[18]	**Prohibited Uses**

- Plot Sizes:
  o Small size: upto 0.5 acres
  o Medium size: 0.5 to 5 acres
  o Large size: 5 acres or above
- FP: 60% - 70%
- FAR: 1:2.5 - 1:1.5
- Floors: G+1 & G+2 (max)
	- Private Residential housing schemes
	- Large health and educational institution

[18] Industrial Areas, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.6, page no 145.

4.7.6 Health and Welfare Zone

This zone is specifically for health and welfare related large scale activities. It will be a specialized area with high tech health facilities, social welfare and supporting services; with advance infrastructure. The aim will be to provide all specialized health solution within the town, and to serve the population beyond city borders, like nearby urban and rural localities.

The Level II secondary zoning of health and welfare land use will be as follow:

- **Health and Welfare Area - Makli**
  Since Civil Hospital in Makli is already occupied and there is a need to establish full fledge public health facility for the residents of town and district as well. Thus, DHQ Hospital is proposed in Makli Nuclei, along Jungshahi Road. In this area DHQ Hospital with Medical and Nursing Colleges, staff residence, hostels, community and allied facilities will be developed to serve the district population. This area could also include; Rehabilitation Centers, Special children, Edhi Homes (orphanage / old age / women) etc.

- **Health and Welfare Area - Thatta**
  Another large health and welfare area is proposed in Thatta Nuclei, along Hyderabad Road. This health area is marked in regards to connectivity, in order to make it accessible for other towns as well and to attract private investment in health and welfare sector. This are will serve the clinical as well as regular hospitalization needs like Maternity, Emergency, Dental, OPDs, Laboratories and Diagnosis, Pharmacies, Blood Banks, Physiotherapy Centers etc.

  It is widely possible that this area will be utilized for distinct health and welfare facilities in long term phase; like specialized hospitals, research and welfare centers etc. It will comprises of the treatment centers, research and development centers.

The following guidelines are for health and welfare zone development:

Permitted Uses	Allied Permissible Uses
- Large Hospitals - Specialized treatment centers - Medical College - Dental College - Pharmaceutical College - Nursing College - Laboratories and Diagnostic Centers - Blood Banks - Health Research Institutes	- Staff Residences (medical and paramedic) - Separate Hostels for Boys and Girls - Auditoriums, seminar halls, workshop spaces - Community facilities (parks, playgrounds, schools, clinic, neighborhood commercial) - Support facilities (gym, health club, bus stops, taxi stand, banks, fueling stations)
Applicable SBCA Bylaws[19]	**Prohibited Uses**

[19] Amenity Plots, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.5, page no 145.

- Plot Sizes: 1.0 acre or above - FP: 50% - FAR: 1:1.5 - Floors: G+2 (max)	- Private residential housing schemes - Large commercial activities

4.7.7 **Educational Zone**

The large scale educational land uses will be development in this zone, focusing towards the global trend of education specially for upcoming generations. The aim is to create a knowledge base hub, to provide quality education in all diversified filed, in order to upgrade the livelihood of the local as well as the regional population.

The Level II secondary zoning of educational land use will be as follow:

- **Educational Area - Makli**

  In Makli Nuclei, northwest of the town along Jungshahi Road, next to Health Area, Makli Educational Area is proposed and suggested mainly for the public sector general university, which is lacking in the town. The idea is to first introduce common educational fields like languages, humanities, applied sciences, arts, commerce, social sciences etc., which could be modified further. Afterwards broad-spectrum of new ranges of education will be added according to the demand of the society, in form of wings, departments and blocks.

  In addition to academic buildings; allied facilities like administration, sports grounds, and health clubs will also be accommodated here. Since it will be the primary level university of the town, thus it will also contain large number of students, faculty and staff. This huge influx will also require residences with community facilities.

  It is also proposed to provide government degree colleges for boys and girls, separately in this area. It is suggested to accommodate all the required facilities and service like; libraries, laboratories, playgrounds, washrooms, etc. The library, data and information centers and scientific research institutes are also recommended in this area to provide all kind of facilities for research and development in different fields.

- **Educational Area - Thatta**

  In Thatta Nuclei, northeast of the town at Hyderabad Road, opposite to Health Area, Thatta Educational Area is suggested. As the society is moving towards global dynamics, diversified fields of education will be prerequisite. These could include upcoming need of the job market like; engineering, business, management, finance, media, IT and software, etc. The purpose behind is to involve regional level youth in the education and research, in order to enhance the educational attainment level.

  The vocational center is also proposed for this area. It will cater need of under privileged youth for better skills and technical knowledge. This will provide space for skill development centers, technical education for the local and surrounding population to accommodate in the current job market. It may

also include; poly technical college for boys and girls, women development center (working women hostels, day care centers), certified computer and IT training centers, research centers, etc.

The following guidelines are for educational zone development:

Permitted Uses	Allied Permissible Uses
- Large scale educational areas - General Education Universities - Scientific Research Institutes - Engineering colleges / universities - Business and management schools - Finance and accountancy Institutes - IT and media Institutes - City level libraries, book banks, data and information centers	- Staff Residences (teaching and non-teaching) - Separate Hostels for Boys and Girls - Auditoriums, seminar halls, workshop spaces - Community facilities (parks, playgrounds, clinics, schools, neighborhood commercial) - Support facilities (gym, health club, bus stops, taxi stand, banks, fueling stations)
Applicable SBCA Bylaws[20]	**Prohibited Uses**
- Plot Sizes: 1.0 acre or above - FP: 50% - FAR: 1:1.5 - Floors: G+2 (max)	- Private residential housing schemes - Large commercial activities

4.7.8 **Religious Zone**

In the proposed master plan two religious sites are allocated in the Thatta Town. Both of the sites are located along Central Canal Road, one in northern part of the town, while other in southern part of the town. These are not necessarily to be developed soon, as presently there are sufficient religious places. These will be grand religious monumental buildings and structures, to enhance aesthetic of the town. Further it is suggested to fulfill the future requirement of different religious groups in sub divisions of other areas.

[20] Ibid

The following guidelines are for religious zone development:

Permitted Uses	Allied Permissible Uses
- Religious buildings like mosques, imam barghahs, mandir, churches, etc. - Religious teaching areas - Religious preaching grounds - Orphanage	- Residences for religious leaders - Accommodation for religious scholars, students - Small parks, playgrounds, clinics, commercial - Support facilities (bus stops, taxi stand, banks, fueling stations)
Applicable SBCA Bylaws[21][22]	**Prohibited Uses**
- Plot Sizes: 1.0 acre or above - FP: 50% - FAR: 1:1.5 - Floors: G+2 (max)	- Private residential housing schemes - Large commercial activities

4.7.9 Public Administration Zone

The public administration offices will includes District Secretariat, Development Authority, Town Committee Offices, Line Departments, Local Government Offices, Town Planning Department, Judiciary Complex, Circuit House etc.

The Level II secondary zoning of public administration land use will be as follow:

- **New Public Administration Area**
  The existing offices of Public Administration are mostly in Makli along Karachi and Ghulamullah Roads. Considering future requirements, the new public administration area is also marked at Karachi Road towards west of the town.
  As Thatta is a district headquarter, in future with the rising activities more space for different public offices and institutions will be required. With this assumption future extension area for public administration need to be reserved.
  The area for public employee housing is also suggested here to cater the need of housing for public employees. This will include houses and walkable apartments for all employees, according to their grade levels and status.

[21] Ibid
[22] Religious Buildings, Plots, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.13, page no 156.

- **District Jail**

  The District Jail is existing along Ghulamullah Road in extreme southwest of the town. Its further extension is proposed adjacent and behind the existing facility. This will serve the purpose of District Jail with all required needs and will also fulfill the residential requirement of the staff of various levels.

  The following guidelines are for public administration zone development:

Permitted Uses	Allied Permissible Uses
- District Secretariat, - Development Authority - Town Committee Complex - Line Departments - Local Government Offices - Town Planning Department - Judiciary Complex - Circuit House	- Employees Residences (for all grades) - Auditoriums, seminar halls, workshop spaces - Community facilities (parks, playgrounds, clinics, schools, neighborhood commercial) - Support facilities (gym, health club, bus stops, taxi stand, banks, fueling stations)
Applicable SBCA Bylaws[23]	**Prohibited Uses**
- Plot Sizes: 1.0 acre or above - FP: 50% - FAR: 1:1.5 - Floors: G+2 (max)	- Private residential housing schemes - Large commercial activities

4.7.10 Recreational Zone

In the existing towns, disappearance of open spaces and non-provision of planned open spaces are seen. Thus, in the proposed master plan, recreational land use has been given a vital importance in order to create a healthy environment. Several types of regional level recreational activities are recommended like sports and cultural complex, amusement and theme parks, festival grounds etc.

The Level II secondary zoning of recreational land use will be as follow:

- **Large Parks – Makli and Thatta**

  In both Makli Nuclei and Thatta Nuclei, Large Parks are proposed with the New CBDs at Jungshahi and Hyderabad Roads, respectively. These will be general public parks, however their sub portions could be reserved for families (ladies and children). Thus these will also contain area for swings, sitting, walking, jogging with allied facilities of washrooms, tuck shops, parking etc.

[23] Ibid

- **Sports and Cultural Complex**
  Next to New Public Administration Area, along Karachi Road at inner side of Northern Bypass, Sports and Cultural Complex is proposed in west of the town. It will include cricket, football, hockey and other ground, cultural center and gymnasium. These type of sports facilities will be as per standards to promote domestic sports.

- **Festival Grounds**
  Along Karachi Road and at outer side of Southern Bypass a huge area is located for the purpose of Festival Grounds. Considering the local tradition and types of festivals, a large space is designated for such events. These grounds will be used for large population events like carnivals, eid festivals.

- **Amusement Park**
  The large site for amusement park is proposed in northeast direction along Hyderabad Road, inside the Northern Bypass. In this area large scale amusement facilities like thrilling rides in a safe and pleasant manner will be provided. Some of its area could be reserved for other recreational activities of theme parks like art park, ice park, floral garden, glow garden etc. could also be introduced as per the demand of the region. Moreover, Thatta is a regional center there is also need to locate botanical and zoological gardens. These gardens will serve not only a metropolis of future but urban and rural areas of Thatta region as well.

The following guidelines are for recreational zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
- City scale parks - Large public squares - Sports facilities - Cultural activities - Amusement area - Special theme parks - Regional level gardens like botanical, zoological	- Ancillary structures - Accommodation for caretakers / workers - Related commercial activities - Fueling stations - Parking - Public washrooms	- Other than permitted and permissible

4.7.11 Graveyards Zone

Presently, the town of Thatta has a large, unique and oldest graveyard, globally known as Makli Necropolis. Since this is world recognized heritage site with an international significance, hence its preservation is highly recommended. However, in order to protect heritage site of Makli Graveyard, a separate graveyard is suggested. This proposed graveyard is along Central Canal Road and also accessible form Southern Bypass. This graveyard can be further divided according to the requirement of practicing religions in the town.

The following guidelines are for graveyard zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
- Graveyard area	- Related commercial activities - Accommodation for caretaker	- Other than permitted and permissible

4.7.12 Transportation Zone

In Thatta Town, the transportation is mainly based on road network of radial roads, bypasses with terminals and intersections. Road network is considered as a vehicle for economic development and social change. Efficient road network not only develops a quick and efficient transportation system but also opens up new areas previously remained closed. It brings about social integration among rural and urban sectors and greatly assists in providing access to basic amenities ssuch as education, health facilities, etc. It brings rural areas in constant touch with urban segment of a society and creates better understanding necessary for social change and economic activities.

The Level II secondary zoning of transportation land use will be as follow:

- **Air Connectivity**
  Regarding air connectivity, Thatta is connected to both Karachi and Hyderabad Airport at a distance of 90 and 110 kilometers respectively via National Highway N5. An airstrip is located in Jungshahi Town, at a distance of 20 kilometers towards northwest via Jungshahi Road. However, it is suggested that residents of Thatta Town should utilize Karachi and Hyderabad Airports, until Jungshahi Airstrip will be upgraded as full fledge airport. Thus a new airport for Thatta Town is not feasible due to nearby airport facilities and with projected population.

- **Railway Connectivity**
  There is no railway station in Thatta, however nearest railway station is Jungshahi Railway at a distance of 20 kilometers. Thus, it is suggested that residents of Thatta Town should utilize this railway facilities.

- **Proposed Road Network**
  The proposed road network is originate from the existing radial roads i.e. Karachi, Hyderabad, Sujawal, Jungshahi and Ghulamullah Roads. And the major regional connectivity is developed through Northern and Southern Bypasses. However, the widening and beatification of Karachi-Hyderabad National Highway N5 is forming the main spine in west and northeast direction; while proposed Central Canal Road is making vertical link between north and south.

  All proposed Major Roads (primary, secondary and tertiary roads) of the master plan will be dual carriageways with green medians in the center; as shown:

S. No.	Major Roads	ROW (ft)	Forestation (ft)
i.	Northern Bypass (new)	200	200
ii.	Southern Bypass (Sujawal Bypass)	200	200
iii.	Karachi Road - N5 (main spine)	150	100
iv.	Hyderabad Road - N5 (main spine)	150	100
v.	Sujawal Road	150	100
vi.	Jungshahi Road	150	100
vii.	Ghulamullah Road	150	100
viii.	Central Canal Road (vertical link)	100	50
ROW – property to property distance Forestation on both side of ROW			

Primary Roads: The proposed Northern and Southern Bypasses running on the periphery of the town are considered as Primary Roads. Its different segments are serving as bypasses without entering in the town. It will have a right of way of 200 feet (min) with initially a four-lane divided road, service road, median, parking, and cycle/pedestrian track and local tree plantation on both sides. In addition to the 200 feet ROW, urban forestation of 200 feet on both side are also proposed, to avoid direct / upfront development along primary roads. All primary roads crossings will be initially roundabouts with enough space for grade separated junctions in the future.

Secondary Roads: The secondary roads, are radial roads connecting the town with other towns and the main spine connecting bypasses. It will have a right of way of 150 feet (min) with three lanes, service road, median, footpaths, parking and cycle/pedestrian tracks. These roads includes; Karachi-Hyderabad N5, Sujawal Road, Jungshahi Road and Ghulamullah Road.

Tertiary Roads: The tertiary roads will have a right of way of 100 feet (min) with at least two lanes, median, footpaths, parking and cycle/pedestrian tracks. It includes newly proposed vertical link i.e. Central Canal Road.

- **Public Transport Terminal**

  The Public Transport Terminal is placed along Central Canal Road in south side of the town, also accessible from Southern Bypass. It is proposed in order to provide better and nearby multi intermodal transport connectivity. Since major regional communication of general public is expected via these major roads; as most of residential, educational and health related traffic will be generated and these will cover most of the town. These will be comprises of the parking for public buses, hiace, wagons, taxis; with allied facilities like ticking booths, sitting / waiting areas, washrooms, shops and required residence for the drivers and staff.

- **Truck Terminals**

  There are two Truck Terminals proposed in the Thatta Town. Considering location of industrial activities, one is placed towards southwest along Ghulamullah Road. Another is located at Sujawal Road near trade and commerce and warehouses. Since from these points all industrial and economic activities are connected, these are found more appropriate locations for heavy traffic and goods transport. The proposed terminals will help in transporting goods from / into the town, which will benefit and boost the economic activities of the town.

  Since Thatta is an economic regional center and it would also require containers facility. It is recommended to mainly comprise of the container yards and related functional spaces. In addition required residence for the drivers and other staff with small offices, rest areas, washrooms, shops etc.

  The following guidelines are for transport zone development:

Permitted Uses	Allied Permissible Uses
- All types of parking areas - Designated ROW - Green belts - Footpaths - Traffic management devices	- Drivers and staff accommodation - Support offices, rest areas, washrooms, shops etc. - Street furniture like lights, trash bins, benches etc.
Applicable SBCA Bylaws[24]	**Prohibited Uses**
- No direct access to major roads will be allowed except through service road - No structure or part of a structure may project beyond building line	- Any kind of encroachment

4.7.13 Utilities and Services Zone

The utilities and services provision is also made in the master plan. This land provision is mainly for large scale utilities and services.

The Level II secondary zoning of utilities and services land use will be as follow:

- **Water Supply**

  The main water supply sources is Indus River, from where water takes off through several canal systems from left side of Kotri Barrage such as KB Feeder, Jam Wah and Thatta Wah. It is suggested to expand the existing water supply works in north of the town. In continuation towards southeast, an additional area along Sujawal Road is proposed for water supply works. This additional area has been reserved to extend the water reservoirs as per the town's water

[24] Highway Major Roads, General Standards, as per Sindh Building & Town Planning Regulations, Chapter 21, page no 126.

demand and related water supply infrastructure. This increase will also cater to water supply filtration plant and other advance purification mechanism.

- **Sewage Treatment Plant**
  The area is designated for STP and its related uses, in south direction accessible from Central Canal Road and Southern Bypass. The site is low in elevation level with respect to nearby main drain, which will helpful to relay mainly on gravity flow. From very first it is not necessary to setup a fully mechanized STP, but it is suggested to start with oxidation ponds then proceed toward advance management of waste water.

- **Landfill Site**
  A landfill site is proposed at outskirts of town area, in northeast side considering wind direction. This landfill site is directly accessible from Hyderabad Road as well as from Southern Bypass. As the whole town will grow according to the master plan it will serve the population for next 20 years or even beyond.

- **Grid Station**
  Grid station in Thatta Town is existing along Jungshahi Road. For immediate need it is possible to extend the facility in the same premises. The extended facility will benefit the residents as per the need of the present consumption of the town. However the Grid Station Extension is proposed for upcoming future load and requirement behind the existing Grid Station.

The following guidelines are for utilities and services zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
- Land use for Utilities and Services like Water Supply, Filtration, Oxidation Ponds, Sewage Treatment, Landfill Sites, Grid Station etc.	- Related land development and building activities - Accommodation for staff, operators and labors. - Specific parking area.	- Other than permitted and permissible

4.7.14 Urban Forestation Zone

Urban forestation along both bypasses and major roads is proposed to avoid rapidly increasing disorganized private development. Instead planned residential areas as per building control rules and regulations which are proposed on both sides of road after urban forestation reserved areas.

In order to protect Northern and Southern Bypasses from uncontrolled development, urban forestation of two hundred feet at both sides of the road should be planted. It is advised to restrict development in this area and implement the rules and regulations to keep the town green. In addition to bypasses urban forestation of 50 to 100 feet on both sides of the Major Roads, Main Spine of N5 and Central Canal Road

are also proposed depending upon their ROW, to avoid direct / upfront development along roads. All major roads crossings will have initially green roundabouts with enough space for grade separated junctions in the future.

It is recommended to plant locally available species for urban forestation. This region is gifted with a large variety of natural vegetation of grasses, shrubs and trees.

The following guidelines are for urban forestation zone development:

Permitted Uses	Allied Permissible Uses
- Land use for horticulture, landscaping, plantation, green belt, forestation.	- Related land use and activities, while no land development or buildings. - Temporary accommodation for labor and security persons. - Specific parking area for any accident and unplanned incident.

4.7.15 Agricultural Zone

In order to limit the town development agricultural reserved areas are proposed mostly along Southern Bypass. In this manner not only town spatial growth will be confined but also essence of agriculture activities will remain close to the town. It will also create a healthy environment and less burden will be on spread of infrastructure network. The existing villages or settlements in the periphery of the town will also be benefited and not removed from their place of livelihood. The recommended crops for production are; rice, sugarcane, wheat, cotton, jowar, maize, bajra, barley, gram, rapeseed, mustard, sesame and oil seeds.

The following guidelines are for agriculture zone development:

Permitted Uses	Allied Permissible Uses
- Land use for proposed agricultural and its necessities.	- Related land activities with respect to its rules and regulations. - Accommodation for farmers and labor in associations with MC.

4.7.16 Water Bodies

In Thatta, the main water source is Indus River from where water takes off through several canal systems from left side of Kotri Barrage such as KB Feeder, Jam Wah and Thatta Wah. Thus the beautification of these canals and Indus River are highly recommended. It includes:

- Protection of its right of way and removal of encroachments
- Control on incompatible development in its surrounding
- Restriction on disposal of waste water

- Restriction on dumping of solid waste
- Provision of roads on both sides of its course
- Native plantation on both sides of its course

The following guidelines are for Water Bodies zone development:

Permitted Uses	Allied Permissible Uses
- Land use for water bodies like rivers, tributaries, canals, water channels, irrigation network, ponds, lakes, water courses.	- Related land use and activities, while no land development or buildings. - Temporary accommodation for labor and security persons.

4.7.17 Vacant Zone

The objective of providing vacant area is to cater the emergency need at time of any disaster. With this respect areas outside the main town will kept reserved for emergency need, which could be utilized for portable homes, mobile health care facilities, camping for vulnerable of calamities, temporary storage of bulk material etc. The proposed vacant area is at outskirts of Thatta Town but being on the peripheral area, would not disturb the town activities in general and it is directly accessible from Ghulamullah Road and Southern Bypass.

However, the control on vacant land is extremely important, leap-frog development create pressure to utilize for other uses. Thus, there is a need to make sure that no development would take place in these types of reserved areas.

The following guidelines are for vacant zone development:

Permitted Uses	Allied Permissible Uses
- Land use for proposed emergency and imminent necessities	- Related land development and building activities. - Temporary accommodation for operation and maintenance staff in associations with MC.

5. HOUSING

5.1 Existing Situation

Based on 1993-98 estimates 134,648 housing units are required annually in urban Sindh. Only about 25% of the needs are met in the formal housing sector[25].

General housing condition of the surveyed houses was satisfactory. Sample survey of the town reveals that approx. 25% of the houses were constructed in between 6 to 10 years. 76% of the houses were below 120 sq. yards with an average of 6 members in each household.

With this average number of family members, 52% of the houses have only two rooms, as far as the utility services in the houses are concerned, basic services need improvement as the sample survey reveals 48% of the houses have drained (flush system) in their houses while 50% of the houses have un-drained toilets which requires manual cleaning.

Only 60% of the houses have piped supply (House Connection) while 18% of the houses use ground water by manual hand pumps. Conditions of drains are also alarming, 78% of the drains are open and only 7% of the households have covered drains. This section further elaborates the general housing condition of Thatta town.

Table 5-1 Housing Statistics

Administration Unit	Past Census 1998				Current Census 2017			
	Population	AGR	No. of HH	HH Size	Population	AGR	No. of HH	HH Size
Thatta MC + Makli TC	37,515	3.32%	5,684	6.17	101,833	3.17%	17,998	5.7
Thatta District	599,492	2.42%	211,354	5.4	979,817	2.61%	165,503	5.3

General housing condition of surveyed houses was satisfactory although major reasons for the housing backlog are lack of resources, inadequate planning, and wrong land development policies. In Thatta & Makli urban area the problem manifests as unstoppable growth of squatter settlements through encroachment of state and private land. Up gradation of Katchi Abadis and policy /strategic guidelines need to be formulated for stoppage of this practice.

[25] Http://Siteresources.Worldbank.Org/PAKISTANEXTN/Resources/293051-1114424648263/Session-VII-Ghulamkhero.Pdf

Katchi Abadis in Thatta Town[26]

According to data provided by Sindh Kacthi Abadis Authority (SKAA), there are 19 Katchi Abadi in Thatta DHQ Town. These are spread over 69 acres covering 1,621 housing units with 11,498 population approx. Thus, it is estimated that 11% population of Thatta Town resides in katchi abadis. Most of these were notified in 1987 to 1999. However, remaining three are notified recently in 2010 and 2012; namely Ghaya Village, Gul Hassan Solangi Muhallah and Haji Mohammad Siddiq Halo Muhallah. The list of Katchi Abadis present in Thatta Town is as follows:

List of Katchi Abadis in Thatta Town				
S. No.	**Name of Katchi Abadi**	**Total Area (acres)**	**No. of Housing Units**	**Estimated Population**
1.	Alu Shah Agar Mohallah Ward-A	2.80	70	420
2.	Amri Bus Stop Ward-A	3.95	98	592
3.	Bhangi Para Ward-A	0.49	40	240
4.	Bhatwana Mohallah Ward-B	4.44	111	650
5.	Bukhari Mohallah Ward-C	2.15	64	1,530
6.	Gandra Village Ward-B	1.75	45	262
7.	Ghaya Village	5.00	91	564
8.	Gul-Hassan Solangi Muhalla	18.00	200	1,200
9.	Khatan Mohallah Ward-B	6.42	188	610
10.	Khudai Mohallah Ward-A	4.54	113	1,225
11.	Makrani Mohallah Ward-A	0.55	40	240
12.	Mohallah Haji Mohammad Siddiq Halo	4.10	102	714
13.	Sardar Nagar (Christian Colony)	3.12	90	900
14.	Sarwan Palari Mohallah Ward-B	0.35	40	240
15.	Sheedi Mohallah Ward-A	0.58	40	240
16.	Village Khudai	2.00	50	350
17.	Village Massan	4.00	100	600
18.	Waria Mohallah (Part)	1.08	42	252
19.	Waria Mohallah Ward-A	3.91	97	669
Total		**69.23**	**1,621**	**11,498**

[26] Data provided by Sindh Kacthi Abadis Authority, December 2019

5.2 Issues

The following are the major issues in the housing sector:

- Inadequate supply of developed land.
- Poor land administration with inadequate legal and regulatory systems.
- Housing and associated infrastructure is in dilapidated condition requiring improvement / replacement
- Unchecked growth of squatter settlements: Katchi Abadis encroachment on state and vacant land is a direct outcome of the housing shortage.
- Shortage of finance continues to be the major constraint in housing production, maintenance and growth.
- Due to inflationary trends in the economy; the cost of building material have sky rocketed.
- Most of the population of Thatta is living in slums areas and dilapidated houses in the core urban area of Thatta.
- The housing density is quite high in the core urban area comprising Shahi Bazar of Thatta, causing congestion and issues of poor light and ventilation.
- There is a lack of basic utility services such as water supply, sewerage and drainage system and water lodging in the old city of Thatta, but the living conditions in the core urban area of Thatta are very poor due to the lack these services.

5.3 SWOT Analysis

HOUSING			
Strength	**Weakness**	**Opportunity**	**Threats**
1. More than half of the population lives in self-owned houses 2. Almost half of the urban area population has pacca houses. 3. The trend of new housing schemes construction by private development is increasing 4. The trend of rental housing is low just 16% of the population lives in rental housing	1. 26% of the population lives in katcha houses where quality of life is low and utility services are limited 2. High prices of houses in private sector 3. The informal housing sector lacks provision of utility services like gas supply, clean water and drainage facilities	1. Demand for new planned housing schemes 2. Demand for low income housing 3. Demand for public housing projects 4. More housing for local people of town 5. Opportunity for local micro financing for housing 6. Installation of basic utility services through new projects	1. Homelessness 2. High housing prices and rents. 3. Development of informal housing in empty/vacant spaces available within town 4. Increase in urban sprawl 5. Inflation of land 6. Shortage of open spaces in urban areas i. Formation of urban slums Relocation of higher income groups to other towns

5.4 Need Assessment

On basis of projected Population for year 2037 the number of households have been estimated around 33,349 out of which additional Housing Requirement will be 15,351.

Table 5-2: Projected Housing Need 2037 (Thatta MC + Makli TC)		
Housing	**Population**	**No. of HH**
Total need (2037)	190,089	33,349
Present	101,833	17,998
Additional	88,256	15,351

5.5 Policy Guidelines[27]

Housing sector is divided in various sub sectors. Policy guidelines for all sub sectors are given below:

5.5.1 Policy Measures for Land

- Priority Identification of Land for Housing
  As an immediate measure, the provincial, municipal, metropolitan and local authorities under the plan shall identify parcels of state and other lands for housing development in the urban settlements in their respective jurisdictions.

- Land Acquisition
  The procedural and legal bottlenecks in the acquisitions process shall be removed and land acquisition laws shall be suitably amended to make provision for unified, transparent and market value oriented systems

- Land Information System
  Development of a comprehensive land information system using modern technology to record correct and up to date information regarding inventory and land classification, settlement patterns, land values and land availability on all land in urban and rural areas.

- Land Registration and Tenure System
  The informal and customary tenure systems shall be rationalized into a formal and registered social contract.

[27] National Housing Policy 2001

5.5.2 Policy Measures for Housing Finance

- Financial Institutions shall be encouraged to give mortgage loans for housing purposes at market rates.
- Housing finance institutions shall be encouraged to promote savings and provide micro loans for low income group through community organization, NGOs and CBOs.
- Part of the sale proceeds of valuable public land shall be set aside to subsidize low income housing and housing for the poor and needy.
- Subsidized loaning facilities shall be extended for rural housing construction and improvements through micro-financing system and institutions like Khushhali Bank, Zakat funds, etc.

5.5.3 Policy Measures for Katchi Abadis, Squatter Settlements & Slums

- The process of regularization and up-gradation of the pre-1985 Katchi Abadis shall continue as per current policy. However, Katchi Abadis, which are hazardous by virtue of being close to railways tracks or located under high tension power lines, or are on or close to the riverbeds, or on lands needed for operational /security purposes, need to be relocated at appropriate places by LOAs.
- Formation of new Katchi
- Abadis shall not be allowed and shall be discouraged by exercising strict development controls in all urban areas.

5.5.4 Policy Measures for Low Income Housing

- In all government housing schemes, adequate plots for low income people shall be reserved to offer them at affordable prices. In addition private developers will also be encouraged to develop low cost housing schemes.
- City and District Government shall prepare housing plans to cater for the current and future housing needs for low income groups on incremental basis at affordable, cost.
- Building regulations, building by laws, and planning standards shall be revised to permit incremental development and lowering of planning standards to make it cost effective for low income groups.

5.6 Strategic Development Plan

i. Long Term Plan:

- Development of indigenous and cost effective approaches particularly for low income group and mass production.
- Capacity building of institutions involved in housing provision and related sectors, to safeguard against malpractices, inefficiencies, weaknesses and mafia assaults.

- Land bank to be formed to facilitate availability of suitable, affordable, safe and secure land parcels within the town for the development of housing schemes.
- Concepts of small towns should be worked out to minimize the housing requirement in secondary cities.
- An affordable housing program for low income group in different phases up to 2037, through one window operation (including technical guidance, easy loan provisions, legal procedures)
- Formulation of Green Building Byelaws for future housing to address water conservation, low energy consumption, waste recycling etc.
- Agricultural land should be protected from the on- slaught of housing schemes by developers. Further the multi-story housing should be encouraged to conserve the rich farm land.

ii. Short Term Plan:

- Incremental housing schemes on the lines of Orangi, Qasba, and Khuda Ki Basti etc in Karachi should be initiated based on lessons of experience.
- One stop facilitation center should be established to facilitate public, especially for unprivileged and poor households.
- Increase in proportion of small size plots could be made for low income groups in all new housing schemes.
- Low-income Housing Funds would be established to provide sufficient and affordable credit for housing to meet the needs of shelter less poor. Example is Grameen Bank which is a microfinance organization and community development bank founded in Bangladesh. It makes small loans to the impoverished without requiring collateral.

5.7 Priority Projects for Housing

Due to high levels of poverty, houses in Thatta and its costal line are not built in response to climate/weather. There is a diurnal variation of temperature. Thus, housing must be looked into, to prevent illnesses caused by extreme weather. The solution is to reconstruct the existing houses and to construct the new ones for a significant number of households which have low income. These households are unable to acquire their own houses so resolve their housing problem on their own resulting in the expansion of slum areas and encroachments. The living condition in such areas is poor, they face so many problems and mostly don't have utility services. To resolve the problems occurred due to this situation, the public sector in Thatta should launch proactive strategy for urbanization.

i. Development of Housing Site with allied services for Low Income People and Land Acquisition

- **Project Justification**

Significant households in Thatta have low income. These households are unable to acquire their own houses to resolve their housing problem resulting in increase in the number of slums areas and encroachment. The living condition in such areas are poor they face so many problems and mostly don't have utility services.

According to the primary survey conducted in Thatta town, the status of ownership of houses is like 84% families owned and rent free and only 16% of total households are on rent. The category of rental indicates housing gap.

The private sector is usually very active in the development of land and construction of house but the issue is with the affordability for low income groups. The public sector will need to facilitate the private sector.

The site of SMBBT in Thatta (Makli) is located near canal along Sujawal-Thatta Road. The site has been fully developed with 727 plots ready for allotments to poorest of society.

Description	Results
Present Population census 2017	**101,833**
out of total, 16% Population of Thatta Town Living in rental houses with no house ownership	16,293
Households required @ 5.7	2,858
Availability of SMBBT Fully developed plots	727
Additional Plots Required	2,131

At the site of 120 acres, approximately 2,131 number of 120 sq.yd plots will be accommodated. For this tentative cost of ten million per acres including land acquisition and development with all allied facilities and infrastructure is assumed. The development of housing site / scheme will be as per the minimum standards to reduce the cost of the project

The purpose of this project is:

- Provide affordable shelters to the poor people
- Resettlement of the congested part of the towns may be possible
- This process will improve the living standard of the town

- **Project Benefits**

Part of the capital expenditure is expected to be recovered through Sale of commercial plots and buildings. The project is expected to generate direct income. The project will directly give benefit to the low income people. Improve in living conditions are associated with the improvement of social and long term economic benefit.

- **Implementing Authority** – P&D Department Government of Sindh, Thatta MC and HESCO etc.

- **Estimated Cost: 1200 Million Approx**. (Short Term)

Project Name	Long / Short Term	Proposed Area (acre) & Lengths (m)	Preliminary Cost (million/- PKR)	Justification
Land Development for low income housing scheme	Short Term	120 acres	1,200	This will provide more than 2,131 developed plots up to 120 sq.yds for low income group with all amenities and services. For the development of proposed site 10 million per acre development cost is assumed for all internal allied facilities and infrastructure.

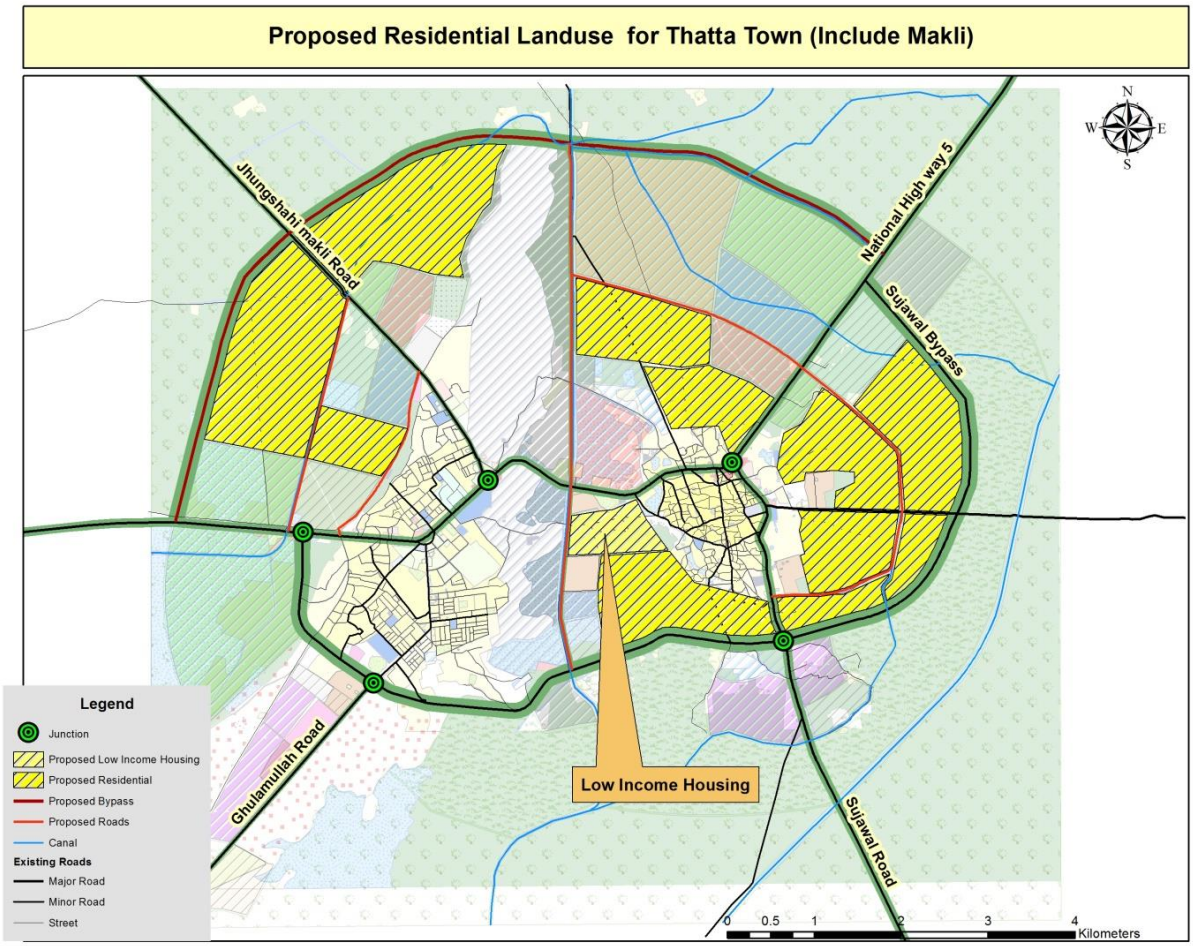


Figure 5-1: Proposal for Site Development for Low income Housing Scheme for Thatta Town

6. SOCIAL INFRASTRUCTURE

6.1 Education

6.1.1 Existing Situation[28]

The reason for the deterioration of education in government schools in Pakistan, especially primary and secondary education, is that the standard of educational expenditure set by the UNESCO is minimum 4% of the GNP, but Pakistan during last 66 years has been spending on an average only 2% of the GNP. The state of education in Sindh is best reflected in its literacy figures and in the serious disparity between rural and urban areas. The Sindh has the largest number of ghost schools in the country and thousands ghost teachers draw government salaries. The education sector in Sindh is facing many challenges; major being very low enrolment level, rural and gender disparity, and low level of quality education. Besides, the alarming fact that there is a large number of out of school children, even those in the systems are not performing and learning outcomes are less than optimal. There are also issues of large number of closed schools and poor infrastructure in functional schools. There is overall poor condition of schools and college due to Lack of repair and maintenance of buildings, lack of playgrounds, libraries, electricity, labs, toilets etc. The tables below show the present statistics of educational institutions in Thatta:

- **Present Taluka level record of Primary, Middle & Secondary level Schools**

  There are 579 schools present in Thatta Taluka. The present enrolment of **Primary, Middle & Secondary School level** in Thatta is about 37,917. The total number of class rooms is 1,152. The average number of students in class rooms is 33. Currently 1,544 teachers are performing their jobs in above category schools. Teacher student ratio for is 1:25

Table 6-1: Present Education Institutions and Enrolment Record

Primary, Middle, and Elementary Schools

S. No	Type	Total Nos.	Class Rooms	Total Teachers	Total Enrollment	Student Capacity Per Room	Teacher Student Ratio
1	**Primary Schools (Co-education)**	362	525	627	20,079	38	32
2	**Govt. Girls Primary Schools (GGPS)**	74	142	197	4,369	31	22
3	**Govt. Boys Primary Schools (GBPS)**	115	180	166	4,493	25	27
4	**Middle School (Co-education)**	5	24	31	506	21	16
5	**Middle School (Girls)**	3	11	13	139	13	11
6	**Middle School (Boys)**	1	-	5	63	0	13
Total		**560**	**882**	**1,039**	**29,649**	**34**	**29**

Source: RSU (Reform Support Unit RSU Education & Literacy Department. Government Of Sindh 2017)

[28] *Sindh Education Statistics 2015-16.*

Table 6-2: Present Education Institutions and Enrolment Record							
	Secondary and High Secondary						
S. No	Type	Total Nos.	Class rooms	Total Teachers	Total Enroll	Student Capacity Per Room	Teacher Student Ratio
1.	Secondary School (Girls)	6	82	136	2,626	32	19
2.	Secondary School (Boys)	5	84	155	2,887	34	19
3.	Secondary School (Mixed)	8	104	214	2,755	26	13
4	High Secondary Schools (Co-education)	1	8	23	714	89	31
5	High Secondary Schools (Boys)	1	8	31	390	49	13
Total		21	286	559	9,372	33	17
Source: RSU (Reform Support Unit RSU Education & Literacy Department. Government Of Sindh 2017)							

- **Present Taluka level record of Primary, Middle & Secondary level Schools**

There are two Higher Secondary boys & Co-education Schools present with total enrolment of 1,104 students and having 16 class rooms. The average number of students in class rooms is 69. Currently 54 teachers are performing their jobs in these schools. Teacher student ratio for is 1:20

- **College and University Education**

a. <u>Sindh University Campus Thatta</u>

The enrolment level in this university is 497. Total numbers of class room in it are 4, having 124 students per room. Teacher student ratio is 1:14.

Table 6-3: Present College and University Education Institutions and Enrolment Record							
S. No.	Education Type	Schools	Enrolment	Class Room	Student Capacity Per Room	No of Teachers	Teacher Student Ratio
1.	Sindh University campus Thatta	1	497	4	124	35	14
Source: District Education Department Thatta							

b. <u>Technical Institutions</u>

The present number of technical institutions in district Thatta are 10 (male: 7, female: 3). 1 male polytechnic institution with a total enrolment of 388 and teaching staff of 19 teachers. There is 1 male Mono-technic Institution with the enrolment of 47 and teaching staff of 5 teachers, 3 male commercial institution with 67 male enrolment and 25 male

teachers and 5 Vocational institutions (male: 2, female 3) with the total enrolment of 111 (male: 42, female: 69) and having teaching staff of 32 (male: 22, female: 10).[29]

Table 6-4: Present Technical Institutions in District Thatta

Name of Institute	Total Nos.	Total Enrolment	Teaching Staff
Polytechnic Institutions	1	388	19
Mono-technic Institutions	1	47	5
Commercial Institutions	3	67	25
Vocational Institutions / Schools	5	111	32
Total	**10**	**613**	**81**
Source: College Education Statistics-2014-15			

c. Private Schools in District Thatta

In District Thatta the total Number of Private Primary schools are 38. Out of which 18 are register and 20 are in renewal process. The total number of enrolment and number of teachers are not available in the respondent department.

6.1.2 **Issues:**

- Shortage of class rooms as per current enrolment
- Low enrolment level with gender disparity
- Shortage of teachers causing low quality of education
- Lack of provision of basic facilities i.e. washrooms, electricity, drinking water etc.
- Poor condition of schools and colleges due to lack of repair and maintenance of buildings
- In addition to classrooms, the rehabilitation of existing educational buildings with all basic and allied facilities are also required. Lack of allied facilities includes furniture, playground, laboratories, libraries etc.
- Lack of boundary walls in several schools
- Low enrolment level
- Shortage of teachers causing low quality of education
- Lack of provision of basic facilities i.e. washrooms, electricity, drinking water etc.
- Poor condition of schools and colleges due to lack of repair and maintenance of buildings
- In addition to classrooms, the rehabilitation of existing educational buildings with all basic and allied facilities are also required. Lack of allied facilities includes furniture, playground, laboratories, libraries etc.

[29] *College Education Statistics-2014-15*

6.1.3 SWOT Analysis

Education & Literacy			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Urban literacy rate is higher than rural. 2. High demand rate for private schooling education system. 3. 11% of urban population is SSC (matriculation) level educated.	1. Illiteracy in rural areas at district level. 2. The trend of losing public institutes and universities. 3. Less highly educated personnel's.	1. More people will move to urban areas for education. 2. More educational institutes are required. 3. More PPP is required for educational sector. 4. Good labour force available for professions like sales and retail marketing.	1. The children of peasants and farmers will not get education. 2. Relocation of educated class to other major towns of province. 3. The trend is barrier to establish higher education institutes offend private sector. 4. Shift of educated professional to other major towns of the country.

6.1.4 Present Need Assessment upto 2017

i. Taluka Thatta (Includes primary to Secondary education institutions)

Currently, there is no gap between demand supply on taluka level. Present number of Boys and Girls students in Schools at Thatta is 39,021. The number of schools is 575 and the number of classrooms is 1,168. Currently there are 1,598 teachers are working in schools of the taluka. Present situation of schools and colleges need are summarized in the table below:

Table 6-5: Present Assessment in Education Sector of Thatta Taluka

S. No	Description	Results
1.	Enrolment	39,021
2.	Class Room	1,168
3.	Student Capacity Per Room	33
4.	No of Teachers	1,598
5.	Teacher Student Ratio	24
6.	Shortage of Class rooms	112

Source: RSU (Reform Support Unit RSU Education & Literacy Department. Government Of Sindh 2017) and Consultant's Estimates 2017

I. Present Assessment in Education Sector (2017)

ii. District Thatta (Includes primary to Higher education institutions)

- As per NRM (National Reference Manual) and NEP (National Education Policy) standards, students per class room occupancy ratio are 30 students per class room for primary, middle and secondary level. Total enrolment and available number of class rooms shows that there is in present no shortage of class rooms.
- The present need can be fulfilled by providing new classrooms in existing school buildings or providing new school buildings with the provision of playgrounds and other facilities.
- Therefore, for the short term plan, Thatta district have no need of extra class rooms.

Table 6-3: Present Assessment in Education Sector of Thatta District

S. No.	Description	Results
1.	Total Enrolments	77,303
2.	Total Number of available Class Rooms	3,132
3.	Student Per Class Room @ NRM Standard (Primary to Secondary)	30
4.	Present Occupancy Load of Students per Class Room	25
5.	Class Rooms Required for present need	2,577
6.	Additional numbers of Class rooms	---

Source: Sindh Education Profile 2016-17 and Consultant's Estimates 2017

6.1.5 **Future Assessment (2037)**

b. District Thatta

i. Primary to Higher Secondary

The long term plan target is to achieve 100% enrolment with 1:1 male female ratio by 2037; therefore 5,545 additional classrooms will be required to accommodate upcoming generation for next twenty years. This need could be fulfilled either by addition in existing buildings or more new schools and colleges will be need to constructed in future to serve additional estimated population of 176,143.

Table 6-4: Future Assessment (2037) at District Level

S. No	Description	Results
Primary to Higher Secondary		
1	Expected total enrolment by 2037 @ 100% enrolment	176,143
2	Total classrooms requirement till 2037	5,871
3	Present Supply (2017)	3,132
4	Additional classrooms requirement till 2037	2,739

c. Taluka Thatta

i. Primary to Secondary

The long term plan target is to achieve 100% enrolment with 1:1 male female ratio by 2037; therefore 3,562 additional classrooms will be required to accommodate upcoming generation for next twenty years. This need could be fulfilled either by addition in existing buildings or more new schools and colleges will be need to constructed in future to serve additional estimated population of 666,090.

Table 6-5: Future Assessment (2037) at Taluka Level

Tuture Assessment at Taluka level (Primary to Secondary)		
1	Expected total enrolment by 2037 @ 100% enrolment	94,946
2	Total classrooms requirement till 2037	3,164
3	Present Supply (2017)	878
4	Additional classrooms requirement till 2037	2,286
Source: *Consultant's estimates based on population projection on 2017 census and 1998 census age pyramid*		

6.1.6 Policy Guidelines[30]

- Development of Teachers and professional substitutes;
- Construct required schools and higher education institutions in all districts. Take stock of operational and staffed schools and eliminate ghost schools.
- Launch a rural education program.
- Ghost Schools and absentee teacher should be identified and removed.
- Maintenance of existing dilapidated schools and buildings should be given top priority.
- For girls literacy and women education, informal system of homeschool may be encouraged.

[30] Sindh Vision 2030

6.1.7 Strategic Development Plan

This Strategic Development Plan aims to strengthen existing schools system to bring socio-economic and sustainable development in the region. The focus of this plan is centered chiefly on improving education standard at primary and secondary levels and providing extra curriculum opportunities to address the needs of youth in rural and remote areas. This will increased the literacy ratio, living standard, employment opportunities of the future population.

i. Long Term Plan

- Increasing equitable access to quality ECE (Early Childhood Education), primary and secondary education
- Improving the quality of learning outcomes through strengthening the teaching/learning process, improving the quality of teachers through merit-based selection and recruitment; improved accountability, and establishing a competency-based constructive system of educational professional development.
- Enhancing the equity of resource allocation and improving the fiscal sustainability and effectiveness of educational expenditure, thereby fostering transparency and accountability in the use of public resources.
- Sindh Technical and Vocational Training authority (STEVTA) is providing the technical education to the people of Sindh for increasing their technical Skills. In Thatta, the peoples are significantly deficit in technical skills. By implementation of this project, people will enhance their technical skills and it also increase the employment status of the district.
- Establishment of Medical & Engineering Colleges & universities.

ii. Short Term Plan

- Rehabilitations of Schools and Colleges with allied infrastructure
- MC to take over all site provided for schools in the new housing schemes to eliminate the chances of misuse and encroachment.
- Training programme for teachers to increase capacity building
- Vocational and skill training centers in alliance with contemporary demand
- Rehabilitation/Construction of Women Hostels for Teaching Staff and Working Women in Thatta

6.1.8 Priority Projects

i. Repair & Rehabilitation of schools with allied infrastructure (Excluding IAP projects)

➢ **Project Scope & Justification**

Education should be the one of major goal of any urban strategy. The sitution of education sector in Thatta is not at the preferred level. Importance must be placed on girls schools

because it was badly disregarded. At present, the condition of exisiting schools in DHQ town needs rehabilation and improvement of the infrastructure and Allied basic facilities like water, electricity, toilet, playgrounds etc. The List of the schools and colleges in this project are given bellow:

S. No.	Name	Area
1	Government Boys High School	1.73
2	G. Girls Degree College, Girls P & H. School	2.44
3	Govt. Girls High School Thatta	0.12
4	Makhdoom Muhammad Hashim Thattvi School	0.10
5	Government Elementary College	0.06
6	Government Boys High School Makli	0.34
7	Govt Boys Degree College Thatta	6.16
8	Govt: Polytechnic Institute Thatta	5.75
9	Government Elementary College of Special Education Thatta	6.60
Total		**23.29**

- **Project Benefit**

  This relate to the basic right of the people and comes under the compulsory social services, By the increasing in the litracy ratio the living standard of the population will improve with in the district. Attempts will be made eleminate the gender gap and attracts more girls in the school.

- **Implementing Authority – District Education Works & Services Department GoS**

- **Estimated Cost: Rs.608.6 Million PKR Approx**.

ii. Capacity Building Training Programs to Enhance Capacities.

- **Project Scope & Justification**
  Sindh Teacher Education Development Authority (STEDA), Provincial Institute of Teacher Education (PITE) is providing the professional development of teachers for increasing their teaching skills. In Thatta, the peoples are significantly deficit in technical skills.

- **Project Benefits**
  By implementation of this project, people will enhance their academic skills and it also strengthens their teaching skills for better results.

- **Implementing Authority - Sindh** Teacher Education Development Authority (STEDA), Provincial Institute of Teacher Education (PITE) Government of Sindh

- **Estimated Cost: Rs.15 Million PKR Approx.**

Project Name	Area Acres	Estimated Cost In Millions	Short Term	Justification
Education				
Rehabilitation of existing school buildings along with allied facilities with basic utilities. Considering 40% Built-up Area	23.29	608.611	Short Term	9.31 acres = 405,741.17 sft, at the rate of 1,500/- PKR per sft construction cost with all infrastructure cost.
Capacity Building Training Programs to Enhance Capacities.	-	15.00	Short Term	Teachers Capacity building programs can also strengthen their teaching skills for better results.

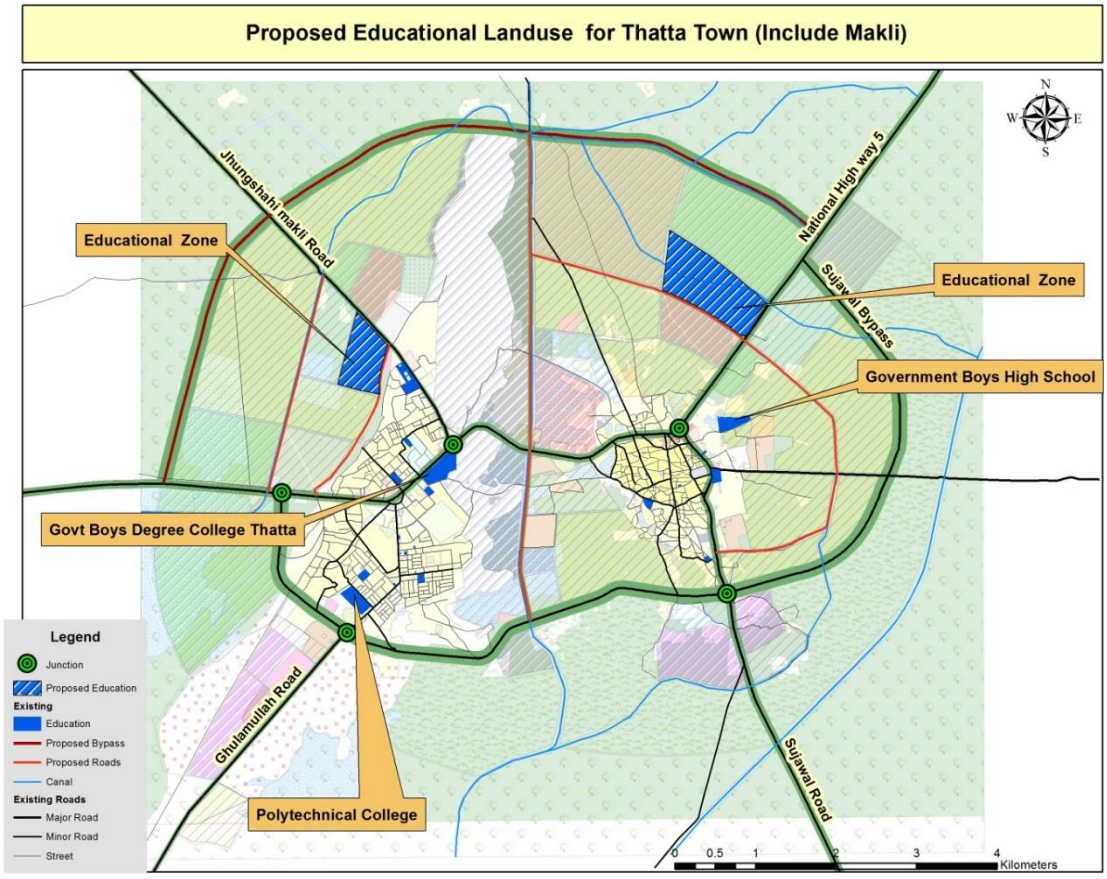


Figure 6-1: Proposal for Extension of Educational Facilities for Thatta Town

6.1.9 Immediate Action Plan for Core Urban Area

i. <u>Rehabilitation and up gradation of Schools</u>

All schools marked in core urban area should be rehabilitate with the structural stability, building repair work, access to utilities, provision of facilities, replacement of old furniture, presence of teaching and non-teaching staff etc.

Immediate plan for Thatta Includes Govt. Boys Primary School, Vocational Training Centre for Girls

All schools marked in core urban area should be rehabilitate with the structural stability, building repair work, access to utilities, provision of facilities, replacement of old furniture, presence of teaching and non-teaching staff etc.

THATTA - CORE TOWN AREA			**REHABILITATION OF EDUCATION FACILITIES**							
S.No	**Education Facility Name**	**Area (acre)**	**Rehabilitation Required - Area wise or job wise cost (PKR)**							
			Street / Road / Parking	**Utility Facilities**					**School Building Repair/ Renovation**	**Security**
				Electricity	**Water Supply**	**Sewerage**	**Gas**	**PTCL**		
1	Government Vocational Training Center (Girls)	0.22	0.22	0.25	0.33	0.33	0.22	0.06	0.11	0.06
2	Govt. Boys Primary School Thatta - Sindhi	0.27	0.27	0.31	0.41	0.41	0.27	0.07	0.14	0.07
Total		0.49	0.49	0.56	0.74	0.74	0.49	0.12	0.25	0.12
Total PKR Rs. Million			**3.50**							

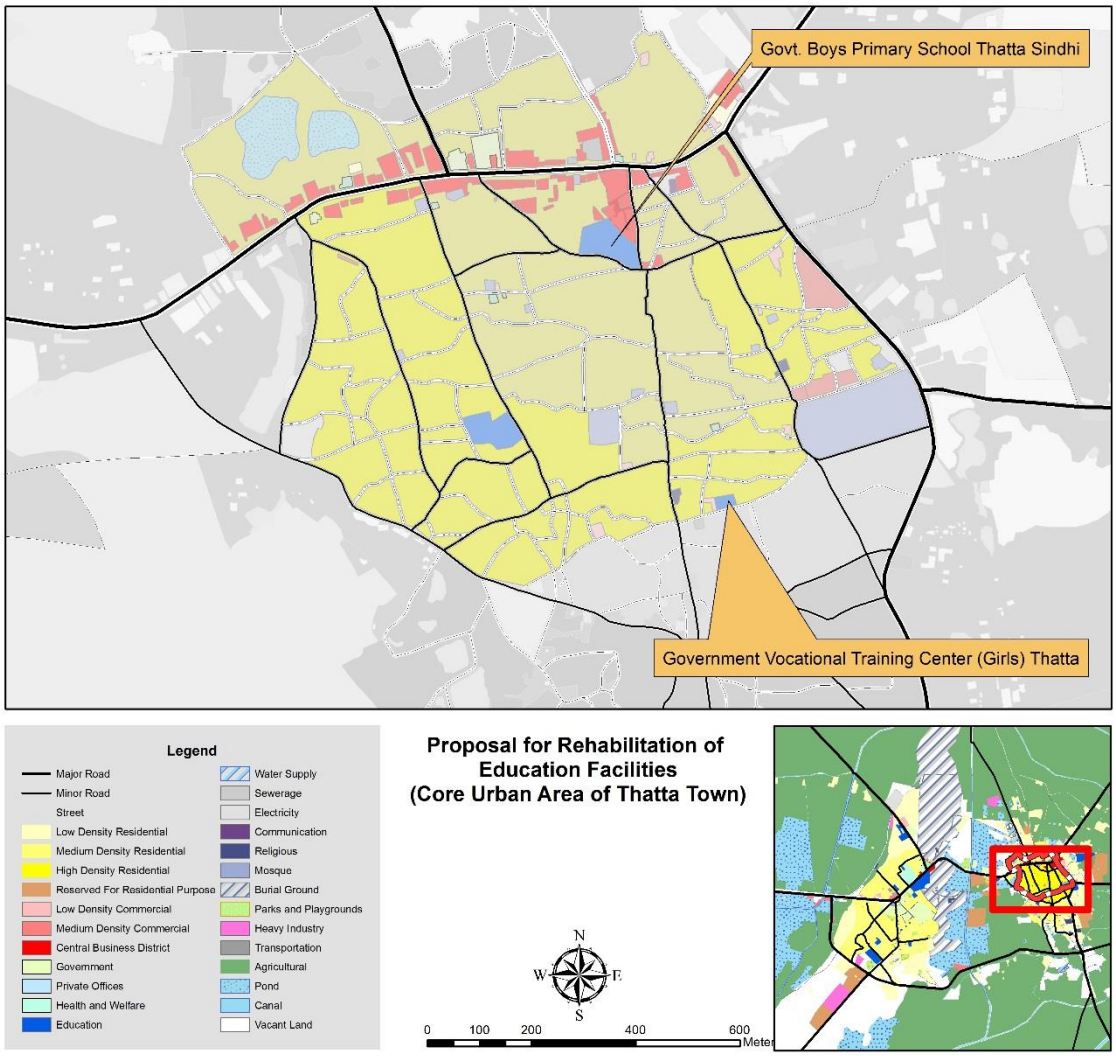


Figure 6-2: Proposal for Rehabilitation of Educational Institutes in Core Urban Area

6.2 Health

6.2.1 Existing Situation

i. Health Sector at District Level

In Sindh maternal health facilities and proper reproductive care is not available at the required scale. Low levels of maternal health and nutrition coupled with high fertility rates lead to high mortality and morbidity among mothers and also children, particularly in the rural areas. The lack of such healthcare endangers the life of the mother and the child. In Sindh the fertility rates average at 6.0 births by women by the age 45-49 and more than 4,000 mothers die every year due to pregnancy related issues. Consequently, poor women's health in Sindh is as much a medical as social problem. Underlying factors here are the lack of awareness of and attention to, women's health needs; women's lower education and social status; and social constraints on women and girls, including the practice of seclusion.

Currently, tertiary level health facilities of Taluka hospital THQ and BHUs are serving the regional population of Sindh at Thatta District. There is one civil hospital having 188 beds, 1 Major Hospitals at District having 40 beds and 6 private Hospitals having 72 beds to serve the district. The other health facilities spread over entire district are 6 RHC (Rural Health Center) having 80 beds, 8 TB Clinics, 22 BHUs (Basic Health Unit) having bed strength of 44, 91Nos of dispensaries having 10 number of beds and 6 M.C.H.C (Mother Child Health Center) having 4 numbers of Beds.

Table 6-1: Government and Private Departmental with bed capacity in District Thatta

Type	No.	Beds
Civil	1	188
Major Hospital	1	40
BHUs	22	44
RHCs	6	80
Private	6	72
Dispensaries	91	10
M.C.H.C	6	4
Total	**133**	**438**

Source: Health Profile of Sindh, 2017

6.2.2 Issues in the health sector

- Lack of Health facilities such as wards, labs and OT facilities
- Lack of diagnostic and other Health equipment
- Deficiency of transferring serious cases from rural areas to hospitals
- Large number of Vacant posts of doctors and medical staffs in health institutes of the district.
- Accessibility to health care facilities in remote rural areas is difficult.

6.2.3 SOWT Analysis

Health			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Availability DHQ hospital in Town	1. Shortage of Beds Shortage of paramedical staff	1. More investment is required through PPP in health sector 2. More job opportunities for doctors and paramedical staff.	1. Less emergency response to health incidents 2. Death rate may increase Difficult to control eradication of epidemic diseases

6.2.4 Need Assessment

i. <u>Present Need Assessment at district level (Population to Bed & Doctor Ratio) 2017</u>

The NRM (National reference Manual) recommends 2 beds per thousand as the medium-term target. On this basis, approximately 1,539 beds will be required to provide gradually. Even though available beds are 438, further 1,960 beds are required to fulfil the present need of the inhabitants for bed capacity. The shortage of doctors and paramedical staff, laboratory equipment, diagnostic services and quality of buildings are an evident problem in small/medium towns and will need to be tackled with an increase in beds.

Table 6-6 : Present Analysis of population to bed ratio and Doctor Ratio at District Level

Present Population 2017	Available Beds	Present need	Required Beds	Available Doctors	Present Need	Required Doctors
979,817	438	1,960	1,522	292	980	688

According to WHO (World Health Organization) standards, doctor to population ratio is 1:1000, so taking that as a reference point, the present need of doctors is 980 while the number of available doctors is 292, and on this basis, the 688 more doctors are required to the health facilities of the public sector.

ii. Future Need Assessment at district level (Population to Bed & Doctor Ratio) 2037

Therefore, the target up to the year 2037 is to provide 2 beds per 1000 projected district population as per standard is given in the National Reference Manual on Planning and Infrastructure Standards (NRM). The required beds for 2037 are 2,843 and doctors are 1,348, the given numbers are excluded from the private hospitals and Clinics. Present Need-Supply of beds and Doctors are given in the below table:

Table 6-7 : Future Need Analysis of population to bed ratio and Doctor Ratio at District Level

Future Population (2037)	Available Beds	Future need	Required Beds	Available Doctors	Future Need	Required Doctors
1,640,358	438	3,281	2,843	292	1,640	1,348

6.2.5 Policy Guidelines[31]

- Enhance basic health care by making it more accessible & affordable, efficient, effective and timely. This will be achieved by diversifying outlets through the involvement and support of other organizations that provide health or health related services.
- Regulate protection from disease and the quality of preventive healthcare across the province.
- Protect people against pollutions of all forms and types, and infectious diseases by promoting public health and by upgrading curative care facilities.
- Enhance and improve existing emergency care facilities and trauma centers, including ambulatory services and paramedic forces.

6.2.6 Health Sector Strategic Development Plan

i. Long Term

- Extension of Civil Hospital
- Provision of Mobile Health Unit for the peripheral area of Town (under supervision of district Hospital)
- Up gradation of BHUs, RHCs and MCHCs.
- Health awareness programme for the deprived population
- Research and development programme for doctors and paramedics staff
- Provision of diagnostic facilities, ambulance, pharmacy in all hospitals
- Tertiary Level Specialized Hospitals for the District
- Enhancement of Mobile Health Unit for far-flung areas of the District
- Accommodation facilities for Doctors and Paramedic Staff

[31] Sindh Vision 2030

ii. **Short Term**

- Improve access to healthcare facilities as due to long journeys to hospitals many patient die on the way.
- We can further improve the access through ambulance network
- Ensure availability of adequate and skilled workforce to fulfill population health needs,
- Improving functionality of equipment and availability of quality medicines.
- Health is the fundamental need of the people. Currently health institutes of District are facing lot of problems due to unavailability of Laboratory facilities. Shortage of specialized doctors, surgical instruments, and lack of machinery are the major issues. The condition of BHUs and RHCs are also very poor, there should need for rehabilitation of these institutes to provide sufficient and high quality health to the people of Thatta District.

6.2.7 Priority Projects

i. Repair and Rehabilitation of DHQ / Civil Hospital Thatta @ Makli

- **Project Justification**

  Health is the fundamental need of the people. Currently, DHQ / THQ hospital of Thatta @ Makli is facing lot of problems due to unavailability of laboratorial facilities, shortage of electricity, surgical instruments, lack of emegency services and lack of equipments are the major issues.

- **Project Benefits**

  This project will provide high quality health facilities and free medicines to the people of District Thatta.

- **Implementing Authority - Government of Sindh - Health Department**

- **Estimated Cost: 341.54 Million PKR Approx. (Short Term)**

S. No.	Project Name	Area (acres)	Estimated Cost In Millions	Short Term	Justification
Health					
1	Repair and Rehabilitation of Civil Hospital Thatta Construction of more Wards within premises of Civil Hospital (Considering 60% Built-up)	7.26	341.54	**Short Term**	4.356 acres = 189747.4 sft, at the rate of 1800/- PKR per sft construction cost with all infrastructure cost.

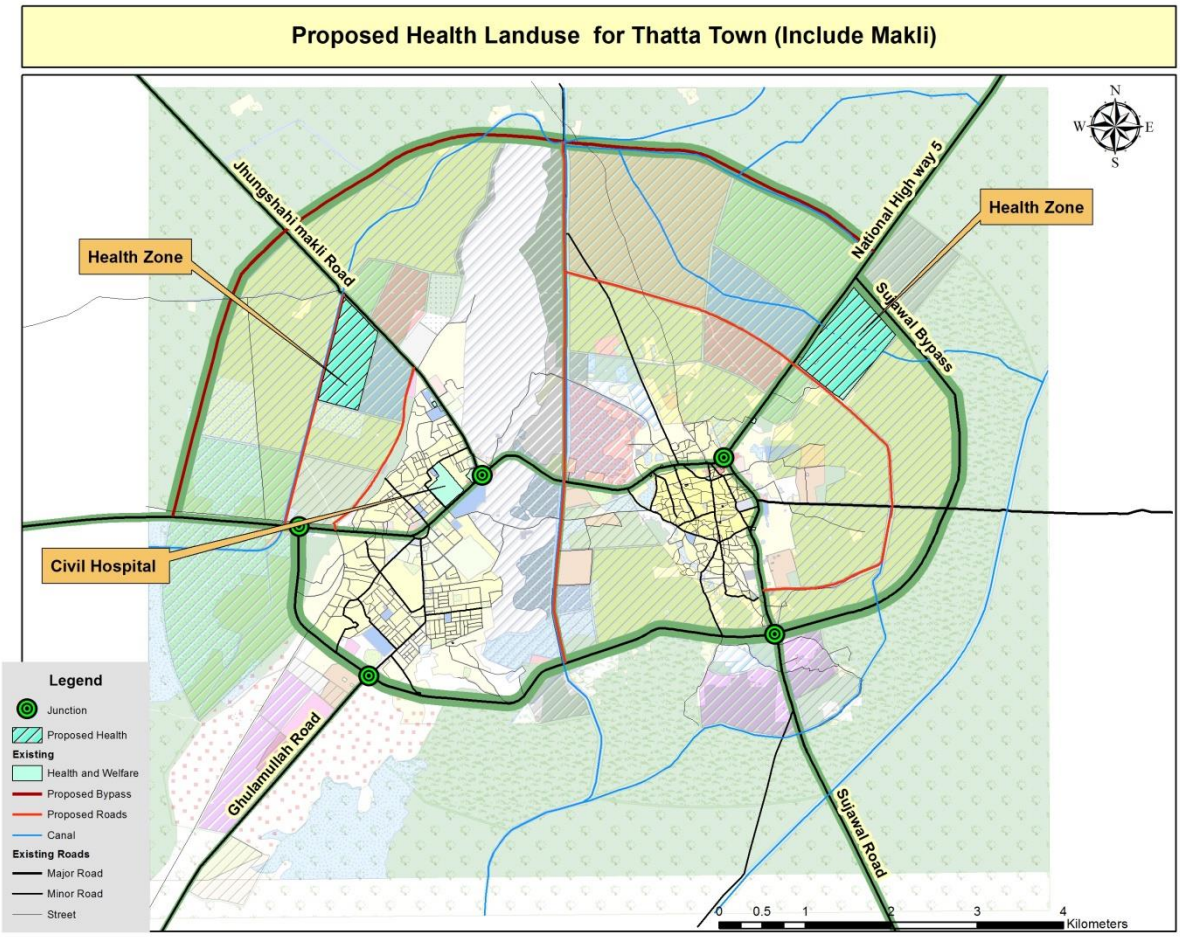


Figure 6-3: Proposal for Extension of Health Facilities for Thatta Town

6.3 Recreational/Tourism/Culture

6.3.1 Existing Situation

Thatta City ostensibly reveals mystic lineages of the unique culture and tradition of Sindh. It is presumed as the Rome of Pakistan. Thatta is outlandish town, about 110 kilometers to the east of Karachi. There are two public parks in Makli and Thatta; and two family parks are in Hashimabad Society of Makli. There is one football ground in Thatta MC and a cricket ground in Makli TC.

6.3.2 Tourism[32]

District Thatta represents the traditional culture of Sindh. This district has a rich heritage of ancient Sindhi and Arabian culture. Both can be seen in the architecture of this district. Thatta is famous for many historical places. Thousands of people from all over the country come to visit every year. Below are few historic and famous places in Thatta District:

- Makli Necropolis
- Shah Jahan Mosque
- Bhambhore
- Keenjhar Lake
- Haleji Lake
- Muqam Qadam Shah, Graveyard Raj Malik
- Soonda Graveyard
- Kalan Kot
- Historical Building of Two Domes
- Nawab Ameer Khani Mosque
- Dabgir Mosque

Out of above mentioned names; Makli Necropolis and Kalan Kot are at Makli Hills, while Shah Jahan Mosque, Historical Building of Two Domes, Nawab Ameer Khani Mosque and Dabgir Mosque are present in Thatta Town and its vicinity.

Makli hills, also known as Makli graveyard, are one of the largest necropolises in the world, with a diameter of approximately eight kilometers. Thatta's Jamia Masjid known as Shah Jahan Masjid is a masterpiece. It was built on the orders of the Mughal Emperor, Shah Jahan, who gifted it to the people of Thatta.

[32] Retrieved from https://www.stdc.gos.pk/index.php/tours/all-locations/itemlist/category/170-thatta

6.3.3 Issues/Problems

- Disappearance of incidental open spaces
- Lack of preservation of recreational spots
- Lack of planned open spaces is a major problem.
- In-active tourist development program
- Tourism marketing is weak.
- Unavailability of basic facilities
- Encroachments
- In core urban area there is only shah Jehan Masjid Park used as recreational space.
- There is no playground available for sports in core urban area

6.3.4 SWOT Analysis

Strengths	Weakness	Opportunity	Threats
Sports & Recreation			
1. Local environment of town supports green urbanism 2. Makli hill station is an attractive recreational spot in Thatta 3. Kenjhar lake other private owned water parks are also good recreational places in Thatta	1. Shortage of water facility to maintain green spaces, green belts and trees plantation 2. Unavailability of sports infrastructure 3. No any proper recreational facility available	1. Good health of local communities 2. Air pollution reduction 3. Healthy environment 4. Protection of natural habitat	1. Give birth to passive recreation 2. Obesity 3. Loss of cultural values
Culture & Tourism			
1. The indigenous cultural activities of various social groups and minorities comprises many events that attract people from its surrounding localities 2. Several annual festivals are celebrated in this district. 3. Strong potential for producing culturally ornamented products used in daily life.	1. Poor Management for organizing cultural events 2. Lack of infrastructure to accommodate visitors into such events 3. Lack of opportunities to commercialize / merchandize cultural goods	1. If organized appropriately could generate handsome amount of revenues with other spin-off effects 2. Arrangement of full security and residential places for the visitors can attract people towards the town	1. Security Threats 2. Demise of cultural values and norms

6.3.5 Policy Guidelines[33]

- Federally-managed lands and waters afford critically needed opportunities for outdoor recreation,
- Diverse recreation opportunities on Federally-managed lands and waters are an important complement to recreation opportunities on state and adjacent lands,
- Providing enhanced and expanded opportunities for outdoor recreation can be done within the provisions of existing, multiple-use;
- Thatta needs infrastructure and programmes for sports activities, sport confections, gymnasium and family parks, and children play area and gardens.
- Preservation and conservation measures for historic places
- Formulation of comprehensive plan for promotion of tourism

6.3.6 Strategic Development Plan

i. Long Term Plan

- Provide Recreational Infrastructure of International Standards at District, Protect and conserve the cultural heritage, promote language, art and culture of District and dissemination of information through media.
- Feasibility study for establishment of museum and research center at historical site Makli graveyard:
- Makli Necropolis is located in the town of Makli, which is located on a plateau approximately 6 kilometers from the city of Thatta, the capital of lower Sindh until the 17th century. It lies approximately 98 km east of Karachi, near the apex of the Indus River Delta in southeastern Sindh. The southernmost point of the site is approximately 5 miles north of the ruins of the medieval Kallankot Fort Youth development programme for sports and recreation
- Proposal of new graveyard on the southern side along sujawal bypass road.
- Establishment of new open spaces as well as establishment of indoor and outdoor game facilities.

ii. Short Term Plan

- Existing open spaces in core urban area should be restored and maintained. New open spaces should be identified and created.
- Development and preservation of cultural heritage sites
- Rehabilitation and construction of family parks and playground near residential areas
- Construction/rehabilitation of recreational facilities' in Thatta & Makli

[33] NOPRA 2005

- Construct more parks and rehabilitate the available parks to facilitate the people of Thatta & Makli.
- Construction of auditoriums and up-gradations for art councils
- Rehabilitation of Shah Jehan Masjid Park
- Preservation of Makli Hill Graveyard
- Provision of basic facilities like waiting area & cafeteria at Makli Graveyard
- Provision of access pavements in graveyard
- Provision of parks and open spaces
- Provision of landscaping and furniture for Shah Jehan Masjid Park
- Makli hill graveyard is decaying and losing its originality, therefore it is prime responsibility of antiquities department to take necessary actions for preservation of graveyard with allied facilities.
- Provision of beautification plan for Shah Jehan Masjid & Makli graveyard to attract tourists.
- Establishment of synthetic grounds, playing turf (for hockey, football) and indoor gym facility.
- Promote tourism through provision of support facilities

6.3.7 Priority Projects

i. Repair and Rehabilitation of Sports Complex (Football Ground) Thatta
ii. Repair & Rehabilitation of Public Park at Makli

- **Project Justification**
  The availability of parks in any city is essential for the safe and healthy environment. Thatta town is significantly deficit in Recreational facilities. there is only one Public park present at makli. Repair and rehabilitation of park is proposed on priority basis. And it is also proposed to repair and rehabilitation of Sports Complex (Football Ground) Thatta on the prirority basis. New parks and sports facilitieas are proposed for thatta and makli in proposed recreational zone of development master plan of Thatta.
- **Project Benefits**: It will boost the local economic potential with significant Benefits from local to national level. It will create unique city landscape and generate number of employment opportunities.
- **Implementing Authority:** Sindh Government, Local Government and private investors
- **Estimated Cost: 343.14 Million PKR Approx.**

Project Name	Long / Short Term	Proposed Area (acre) & Lengths (m)	Preliminary Cost in Million	Justification
Repair and Rehabilitation of Sports Complex (Football Ground) Thatta	Long Term	8.50 acre	**234.24**	**A.** Spectator area 30,000 sft. Repair & Rehab; @ the rate of 2,000/ sft. - Total 60.00 Million for the Construction of Spectator area.

Project Name	Long / Short Term	Proposed Area (acre) & Lengths (m)	Preliminary Cost in Million	Justification
				B. Playground Area 4.0 Acres (174,240 sft, @ the rate of playground @ rate of 1000/ sft. ○ Total 174.24 Million **A+B = 234.24 Millions**
Repair & Rehabilitation of Public Park Makli	Short Term	2.50	**108.9**	Repair and Rehabilitation od Public Park @ Makli 2.50 Acres (108,900 sft, @ of Rs.1000/ sft. ○ **Total 108.9 Million**

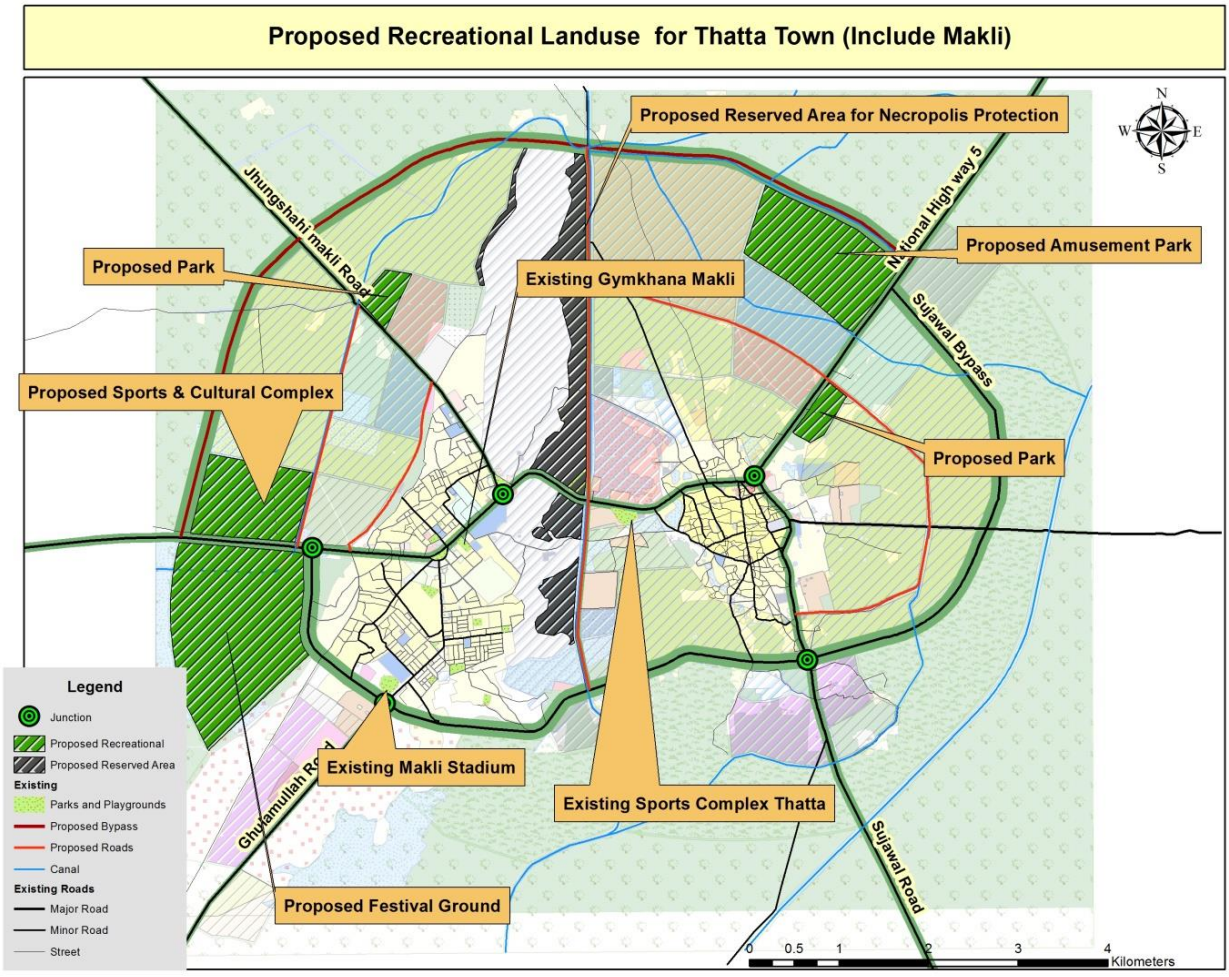


Figure 6-4: Proposal for Future Recreational Landuses for Thatta Town

6.4 Immediate Action Plan for Core Urban Area

- **Provision of Open Spaces, Parks & Playgrounds**

  Availability of recreational facilities can be a vehicle for positive social change for youth and also promoting recreational facilities benefits beyond the traditional aspirations of improved health and wellbeing.

  - **Parks**

    Currently, core urban area of Thatta is suffering due to acute shortage of of compulsory open spaces. There is no any park and open spaces available in core town area. Badshahi Mosque is serving as purposes like recreational and religious. To achieve the short term plan on immediate basis the process of land acquisition should be started to fulfill present gap.

  - **Sports Facilities**

    There is absence of sports facilities in the core urban area of Thatta. The spaces should be identified for the establishment of sports ground and maintained for public use.

- **Conservation of Historical/Heritage and Religious Places**
  - **Shah Jahan Mosque**

    Thatta's Jamia Masjid known as Shah Jahan Masjid is a masterpiece. It was built on the orders of the Mughal Emperor, Shah Jehan, who gifted it to the people of Thatta. Its construction started in 1644 and was completed in 1647.

  - **Historical Building with Two Domes**

    The tomb of sister Fateh Khan is situated to the north east of mausoleum of Mubarak Khan which is in a ruined condition. An Arabic stone inscription is built into the western wall (inside) of the shrine, which points out that the tomb was assigned to the sister (Hamshirah) of Fateh Khan.

    This (resting place is intended for the aspirer to the mercy of Allah; the arrangement for building) this shrine was made one of Nizamuddin shah; may Allah perpetuate his dominion and sovereignty; in the year eight hundred and ninety eight 898 A.H. (1492 A.D.).

- **Immediate Action Plan for Core Urban Area**
  - Repair, Rehabilitation and preservation of Badshahi Mosque
  - Preservation of Two Domes Building

THATTA - CORE TOWN AREA							
RECREATIONAL FACILITIES PRESERVATION							
S. No.	**Recreational Site Rehabilitation Site Name**	**Area / Locality /Address**	**Area (acre)**	**Rehabilitation Required Area wise or job wise cost (PKR)**			
				Street / Road / Parking	**Utility infrastructure**	**Public Facilities**	**Security**
1	Shah Jehan Mosque	**7.60**	6.52	6.52	7.50	8.15	1.63
2	Historical Two Domes Building		1.08	1.08	1.24	1.35	0.27
		Total PKR Rs. Million		**7.60**	**8.74**	**9.50**	**1.90**
		Total PKR Rs. Million		**27.74**			

Note:

1. Rehabilitation of lanes, streets and connection minor and major roads.
2. Utility Infrastructure rehabilitation includes basic services of Water supply, Electricity supply and Gas supply.
3. Public facilities includes rehabilitation and provisioning of public toilets, proper seating arrangements.
4. As per the law and order situation security concerns makes the overall impact to uplift the society life wrt to secured environment.
5. All these basic services in every DHQ town core areas needs to be rehab for quicker revitalization of people's life.

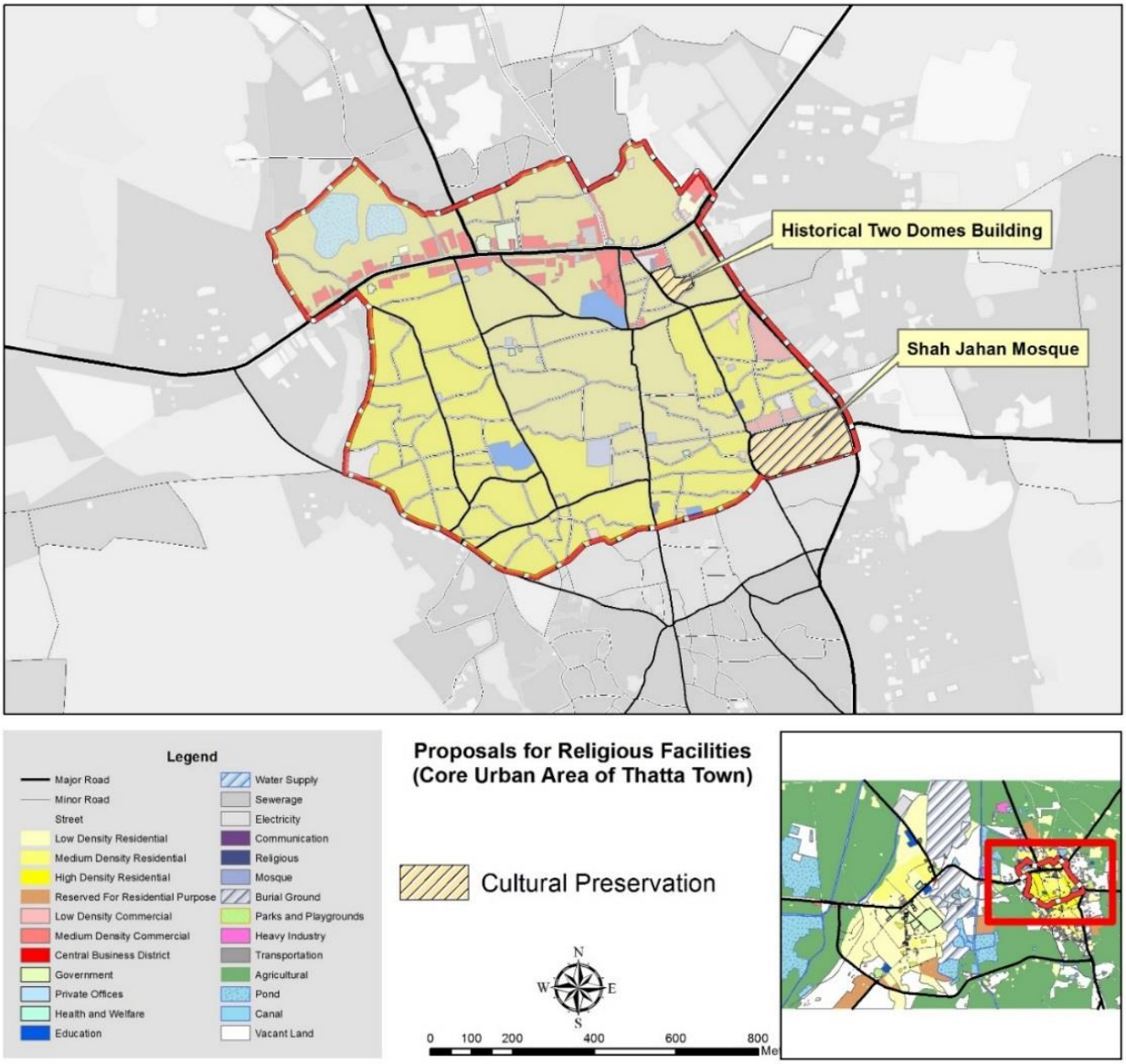


Figure 6-5: Proposal for Cultural Tourism Religious Facilities

7. BASIC UTILITIES

7.1 Water Supply

7.1.1 Source of Water Supply

The Indus River is the main source of potable water that simultaneously off takes through several canal systems from the left side of Kotri barrage such as KB Feeder, Jam Wah, and Thatta Wah which feeds to the Thatta Town and Makli as well. The supplied water by these canals is to be stored into the reservoirs and be utilized accordingly. PHED has installed a slow sand filtration plant which is used as a sedimentation tank and no treatment process is being followed and water is pumped into water mains directly. Moreover, the available groundwater is not suitable for drinking, domestic and agricultural purposes. However, in some areas, potable water is only available where land is parallel to Indus River. The ground water table in the vicinity varies from 20 ft. to 60 ft. The shortage of irrigation water supplies has reduced the water carrying capacity of KB (Kalri Baghar) Feeder requires remodelling of the canal (an off-taking canal from right bank of Indus River at Kotri Barrage).

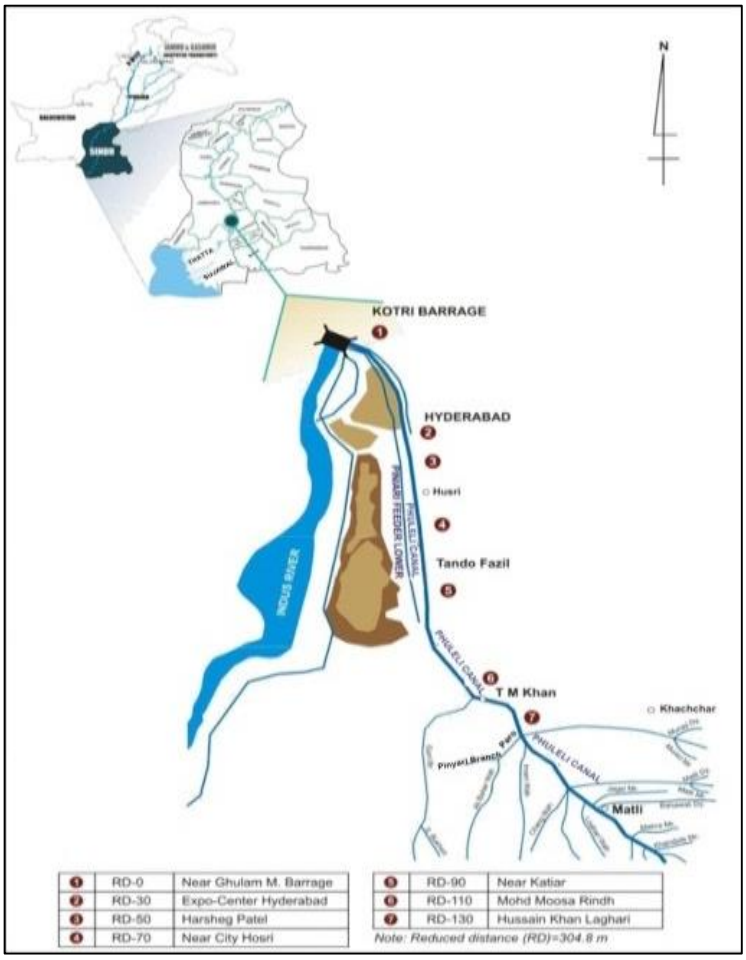


Figure 7-1: Source of Water Supply in Thatta MC

The transmission system of water in Thatta Town is through pumping, there are two pumping stations and nine storage reservoirs in three water works for supply water to Thatta Town. The total capacity of these storage reservoirs is of 16 million gallon approx. The pipes of the water supply have C1, PE, and RCC of various sizes from 12”, 6”, 4”, 3”, and 2” diameter.

The existing system was found partially stuck up and operation and maintenance methods are effected; especially in the absence of regular sampling and testing lab, the quality of water remains doubtful. The sample testing revealed that the water supplied to the residents remains polluted. The Town/Municipal Committee is supplying contaminated water which is not acceptable for drinking purposes. The standard maintenance system is not being followed due to which un-safe water is supplied.

7.1.2 Distribution Network

The distribution network consists of pipe sizes of 16", 8", and 4" diameter pipes. The material of pipes mostly used are C1, AC, and PE pipes. The system is staggered and small pipes are laid on roads and crossing sewerage drains. The intake works are withdrawing 1.83 mgd for distribution to the areas of Thatta Town[34]. The overall supply is 1.83 mgd pumping through two major pumping stations and nine storage reservoirs. Moreover, the distribution network includes AC/PVC/RCC pipes of sizes from 3" to 12" diameter 16"dia AC pipes are used for rising mains. There is no zoning system of distribution and no water meters are installed. Distribution network improvement (DNI) is essentially required for equitable distribution.

The secondary survey illustrates the technical capability for water supply, sewerage, and drainage lie in PHED, while administrative capacity lies with local government. This reveals that O&M of municipal services is the responsibility of local government.

Figure 7-2: Venders transportation

The coverage of the water supply network is variable ranging from the piped supply (house connections) of 60% and hand pumps inside the houses to 18%. The other users have limited access from community stand posts, water tankers and tanker supply. This shows that 40% of town area has no proper water supply network, while current water supply is serving 60% area of Thatta Town.

7.1.3 Water Treatment Plant

There are two pumping stations on storage reservoirs at the treatment works where the only sedimentation is done and no filtration process exists. There was a testing lab that is not being used and no sampling is done on a regular basis. In Thatta Town, four RO. Plants exist viz. Dargah Shah Ibrahim, Christian Colony, Shaikh Mohallah, and Islampur Mohallah have been installed, out of which, one RO plant namely Shaikh Mohallah is non-functional. Since installations of the RO plants in 2013, the membrane, which is used for removing minerals and reducing turbidity volume to some extent, has never been changed. The capacity of RO plant was not shared by concerned Authority.

[34] PHED-Thatta

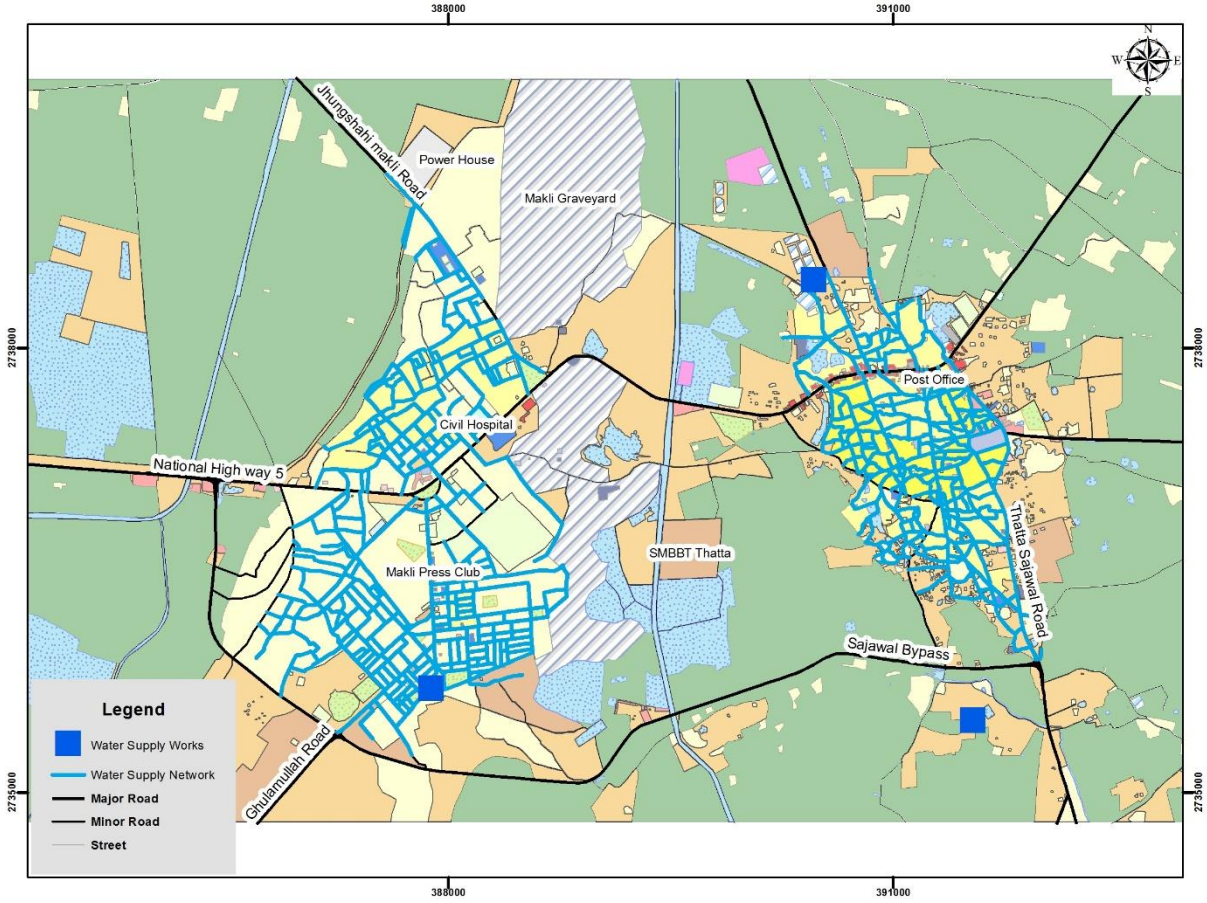


Figure 7-3:Existing Water Supply Map of Thatta Town

7.1.4 Water Quality Assessment

Consultants carried out water sampling of Thatta Town, the test report is attached. Testing parameter results are not within permissible limits WHO/SSDWQ established for drinking water. The city's groundwater source is depleting and contaminated at present but the utility is not in a position to abandon the majority of TWs or alarm the citizens of the critical situation.

Surface Water Quality

The attached sample was collected from the water supply Pumping station (Surface Water). The surface water was found contaminated as per details are given in analytical report show non-compliance of WHO and SEPA standards against following parameters:

- Cadmimum
- Lead and Mercury
- Residual Chlorine
- Barum
- Coliforms (total coliform, Fecal coliform, E-coliforms)

Ground Water Quality

The second sample was taken from a hand pump abstracting groundwater. The testing failed due to the presence of cadmium, lead, Mercury and Barium. The Microbiological analysis confirms the presence of total coliform, total coliform and E-coli.

The Municipal Authorities have failed to supply potable water to the people. There is no shortage of sweet water in Thatta MC, but R.O Plants have been installed on the pretext of providing clean water to the people. But surprisingly there is no system of using existing lab facilities to check the quality of water in the light of physical, chemical and biological parameters set by WHO. However, on maintenance and operation of R.O Plants, millions of rupees are being spent without any verification. Nobody has ever calculated the cost of per gallon of water produced.

7.1.5 General Issues

- Weak institutional arrangements with overlapping of roles and responsibilities.
- Weak coordination mechanisms.
- High proportion of non-revenue water.
- Dysfunctional water supply and sanitation schemes.
- 1" & 2" pipes used which is not a municipal system of water Network.
- Ageing infrastructure (water pipes on road level).
- Poor water quality from polluted and contaminated sources.
- Inadequate water treatment facilities.
- Lack of distribution infrastructure required for water supply to unserved areas
- Distribution Network is faulty which needs overall rehabilitation by DNI for equitable distribution.

7.1.6 SWOT Analysis

Water Supply & Distribution			
Strengths	**Weakness**	**Opportunity**	**Strength**
1. Intake sources available 2. Most of the town is having piped supply of water. 3. Functional water supply overhead tank	1. Absence of systematic water supply system and treatment plant 2. Poor administrative setup for water supply management and distribution	1. Adequate water resources available for water supply system development 2. PPP in service delivery	1. Negative externalities on human and plant health 2. Depletion of water quality due to " "draw down"

7.1.7 Need Assessment

In the long term, piped water supply system for 100% population by 2037 will be the target. The strategy would be to bound private developers to install localized distribution network in the planned housing schemes first and gradually cover the whole population in short term plan. The major source of supply will remain the surface water especially in case of Thatta connections with necessary treatment.

Thus Indus River is the main source of potable water that simultaneously off takes through several canal systems from the left side of Kotri Barrage such as KB Feeder, Jam Wah, and Thatta Wah which feeds to the Thatta MC and Makli TC as well. Water Supply in Thatta Town at present is 1.83 mgd, as per PHED. PHED adopts a 30 gpcd standards for evaluation of present gap and future demand of water. Water demand has been estimated on PHED parameters is as under:

Table 7-1: Water Demand Projected up to Year 2037

Town	Description	2017	2022	2027	2032	2037
Thatta Town (Thatta MC + Makli TC)	Population	101,833	119,030	139,131	162,626	**190,089**
	Water Demand @30 gped)	3.05 mgd	3.57 mgd	4.17 mgd	4.88 mgd	5.70 mgd

Source: Consultant's Estimation

As per secondary data, the existing water supply is 1.83 mgd while the current demand of the town is about 3.05 mgd, so there is gap of 1.2 mgd in present supply. It is expected that the Thatta Town will have a population of about 190,089 persons by 2037 and the daily demand for water for the town will increase up to 5.70 for a whole-day supply.

7.1.8 Sindh Drinking Water Policy[35]

Principles:

- Population should be using an improved drinking water source which is accessible i.e. located on premises, available when needed and safe that is free of faecal and priority chemical contamination.
- Access to safely managed drinking water is a fundamental right of every citizen and that it is the responsibility of the Government to ensure its provision to all citizens.
- Water allocation for drinking purposes shall be given priority over other uses.
- In order to ensure equitable access, special attention shall be given to removing the existing disparities in coverage of safe drinking and for addressing the needs of the poor and the vulnerable.
- A supportive policy framework shall be developed that encourages alternate options through private provision, public-private partnerships, the role of NGOs and community organizations.

[35] Sindh Water and Sanitation Policy 2017

- Low cost technologies in water and sanitation, that are easy and cost-effective to maintain shall be developed and used.

Objectives:

- Develop criteria for installation of new drinking water supply schemes and ensure that all new schemes are safely managed, rationalized and constructed through need based criteria so that all areas and communities are served.
- Develop standardized service delivery models for both urban and rural drinking water Supply schemes to improve efficiency, cost-effectiveness, improve monitoring and Sustainability.
- Develop mechanisms for reuse, recycle and recharge of wastewater for other municipal and productive uses.
- Ensure that all drinking water supply systems are designed and constructed in line with the national drinking water quality standards and all municipal discharges comply with National Environment Quality Standards (NEQS).
- Install water treatment plants at existing drinking water supply schemes where required and incorporate water treatment facilities in all new drinking water supply schemes.
- Ensure development of water safety plans for all drinking water supply systems.
- Institute adaptation measures and disaster risk reduction and mitigation strategies to minimize the impact of climatic events on drinking water supply systems.

7.1.9 Strategic Development Plan

i. Long Term Plan

- Municipality will adopt a demand led approach in providing access to safe water and sanitation to ensure that scarce resources are properly utilized and ownership and sustainability of schemes is ensured over the long-term.
- Frame a broad policy framework at the provincial level which encourages and supports city district to design and implement policy which is in-keeping with the existing capacities and strengths of institutions.
- Feasibility Study for identification of new water sources for town
- Exploration and regulation of fresh groundwater

ii. Short Term Plan

- The design and layout of water supply pipes, storage tanks etc. should ensure that there is no contamination by overflowing sewerage systems, for example by maintaining a minimum distance between the two systems.
- Wherever possible, preference should be given to rehabilitate existing schemes (functioning or not) over the construction of new schemes, unless there are special reasons to justify otherwise.
- Additional UG and OH Tanks required to meet the water demand

7.1.10 Priority projects

i. Improvement of Water Intake Works

- **Project Justification**

  The purpose of the proposed project is a safe water solution for the water intake from present source for Thatta Town. The Indus River is the main source of potable water that simultaneously off takes through several canal systems from the left side of Kotri barrage such as KB Feeder, Jam Wah, and Thatta Wah which feeds to the Thatta Town and Makli as well. The transmission system of water in Thatta Town is through pumping, there are two pumping stations and nine storage reservoirs in three water works for supply water to Thatta Town. The total capacity of these storage reservoirs is of 16 million gallon approx. The pipes of the water supply have C1, PE, and RCC of various sizes from 12", 6", 4", 3", and 2" diameter.

  There is no zoning system of distribution and no water meters are installed. Distribution network improvement (DNI) is essentially required for equitable distribution. Existing water distribution network is old, which need to be improved. Improvements in water intake works cover below components;

  - Construction of intake structure adjacent to Canal which will comprise of screens, pipe, valve chamber
  - Construction of Wet well and pump room
  - Installation of Pumps based on solar power
  - Construction of Reservoir (capacity of 40 million gallons)

- **Project Benefits**

  People of Thatta town are facing shortage of water supply. The project is to improve the collection of raw water supply collection. This project includes increasing the number of pumping stations and up gradation the sizes of pipe lines. After implementation of this project, the source of water intake will be safe. This project shall improve the collection of raw water and increasing the number of pumping stations and up gradation the sizes of pipelines.

- **Implementing Authority:** Thatta MC, Government of Sindh and PHE Department.

- **Estimated Cost: 100.00 Million PKR Approx.**

ii. Repair & Rehabilitation of Water Supply Network 60% Thatta MC (Approx. 1631.44 Acres)

- **Project Identification & Justification**

Almost All the network of Water Supply in Thatta MC and Makli TC is in poor condition and most of it requires repair & rehabilitation. According to the socio economic survey results, 60% of total population has piped water connection. People purchase their potable water through tankers due to the shortage or delays in water supply. This project will help to improve the capacity of supply water schemes already exist in town.

Total Urban Area excluding Agriculture, Vacant and Water Bodies Area	2944.3 Acres
Urban Area excluding Core Town Area 225.23 Acres	2,719.07 Acres
60% Served Area	1631.44 Acres
Proposal for Repair & Rehabilitation of Existing Water supply scheme shall help to supply safe potable water to served 60% population of Thatta MC @ One Million per Acre	1631.44 Million

Repair and rehabilitation of existing water supply network cover below main components such as;

- Excavation
- Pipe cost
- Gate valve/ Washout valve/ Air release valve
- Joints repairs
- Balancing slopes at all network
- Checking of pipe life with rupture checker
- Valves for area wise pressure maintenance

- **Project Benefits**

After implementing of this project, the Potable water will be supplied to rest of area of Thatta MC and Makli TC

- **Implementing Authority -** Government of Sindh- PHE Department Thatta MC and Makli TC

- **Estimated Cost:** 1,631.44Million PKR Approx.

iii. Provision of New water supply network for 40% of Thatta MC (Approx. 1087.63 Acres)

- **Project Justification**

Almost all the network of Water Supply in Thatta is in poor condition and most of it is damaged (especially in the old town area). More than 40% of urban areas have no proper Water Supply Network (excluding Core Town Area). This project will help to supply water in those areas where the network is not available and the existing network is damaged.

Total Urban Area excluding Agriculture, Vacant and Water Bodies Area	2944.3 Acres
Urban Area excluding Core Town Area 225.23 Acres	2,719.07 Acres
40% un-served Area	1087.63 Acres
Installation of New water supply scheme is proposed to cater 40% population of Thatta town @ Rate of 3.0 Million Per Acre	3,262.88 Millions

The objective of the project is to get uninterrupted water supply for treatment to supply potable water to the inhabitants of Thatta town. The project is to provide the raw water supply to unserved areas. This project includes increasing the number of pumping stations and new pipelines.

- **Project Benefits:** As already discussed above that 40% of Thatta MC have not a proper supply of clean Water. So after implementing this project, the Potable water will easily supply to the rest of town.
- **Implementing Authority :** Government of Sindh- PHE Department Thatta MC and Makli TC
- **Estimated Cost:** 3,262.88 Million PKR Approx.

PROPOSED PRIORITY PROJECTS						
S. No.	**Project Name**	**Estimated Cost In Millions**	**ADP**	**Non ADP**	**Status**	
					Short Term	**Long Term**
Water Supply						
1	Improvement In Water Intake Work	100.00	-	Non ADP	Short Term	-
2	Repair & Rehabilitation of existing Water Supply Network 60% (1631.44 acres) except core urban area.	1631.44	-	Non ADP	(Phase Wise)	-
3	Provision of New water supply network for remaining 40% (1087.63 Acres) except core urban area.	3,262.88	-	Non ADP	(Phase Wise)	-

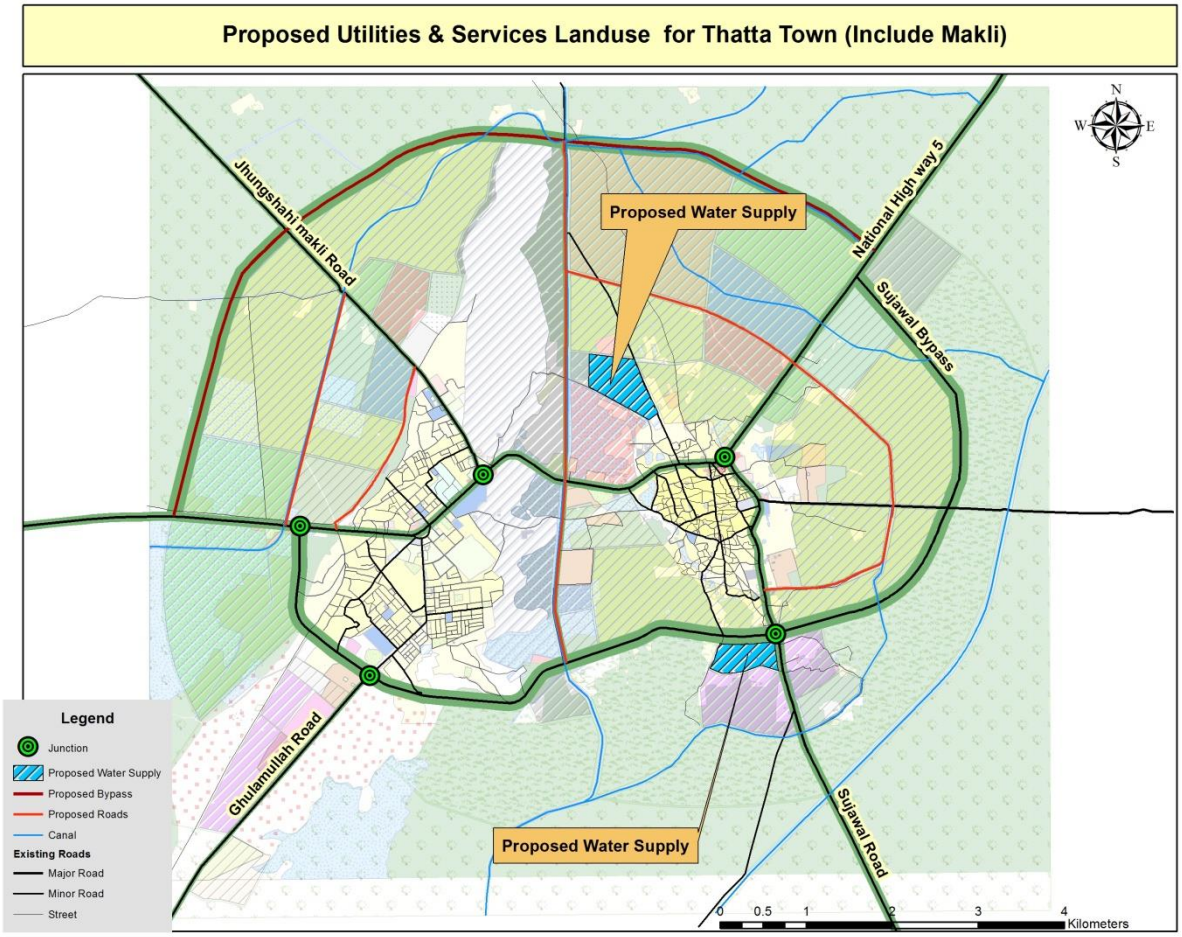


Figure 7-4: Future Landuses for Water Works for Thatta Town

7.1.11 Immediate Action Plan for Core Urban Area

- **Water supply Network Core Town Area**

Existing water supply scheme of core town area has passed ages and became outdated, core area of Thatta is counted as densely populated area of DHQ town, residents of core town area are complaining regarding the quality of water supplied to residents. Mixing of drainage with fresh Water is major issue observed during survey. So therefore it is proposed to repair & rehabilitate existing water supply network of core town area.

i. Rehabilitation of Existing Water Supply Network of Core Urban Area of Thatta

Rehabilitation of Existing Water Supply Network of Core Urban Area Thatta (225.23 Acre)				
S.No	**Name**	**Area (acre)**	**Per acre cost (PKR) million**	**Cost (PKR)**
1	**Water Supply System:** (Water supply system renovation includes supply pipe networks, pumping machinery and equipment's for more efficient and effective supply of water).	225.23	1.0 million Per acre	225.23
			Total Cost (PKR). Million	**225.23**
Note: Water supply system renovation includes supply pipe networks, pumping machinery and equipment's for more efficient and effective supply of water.				

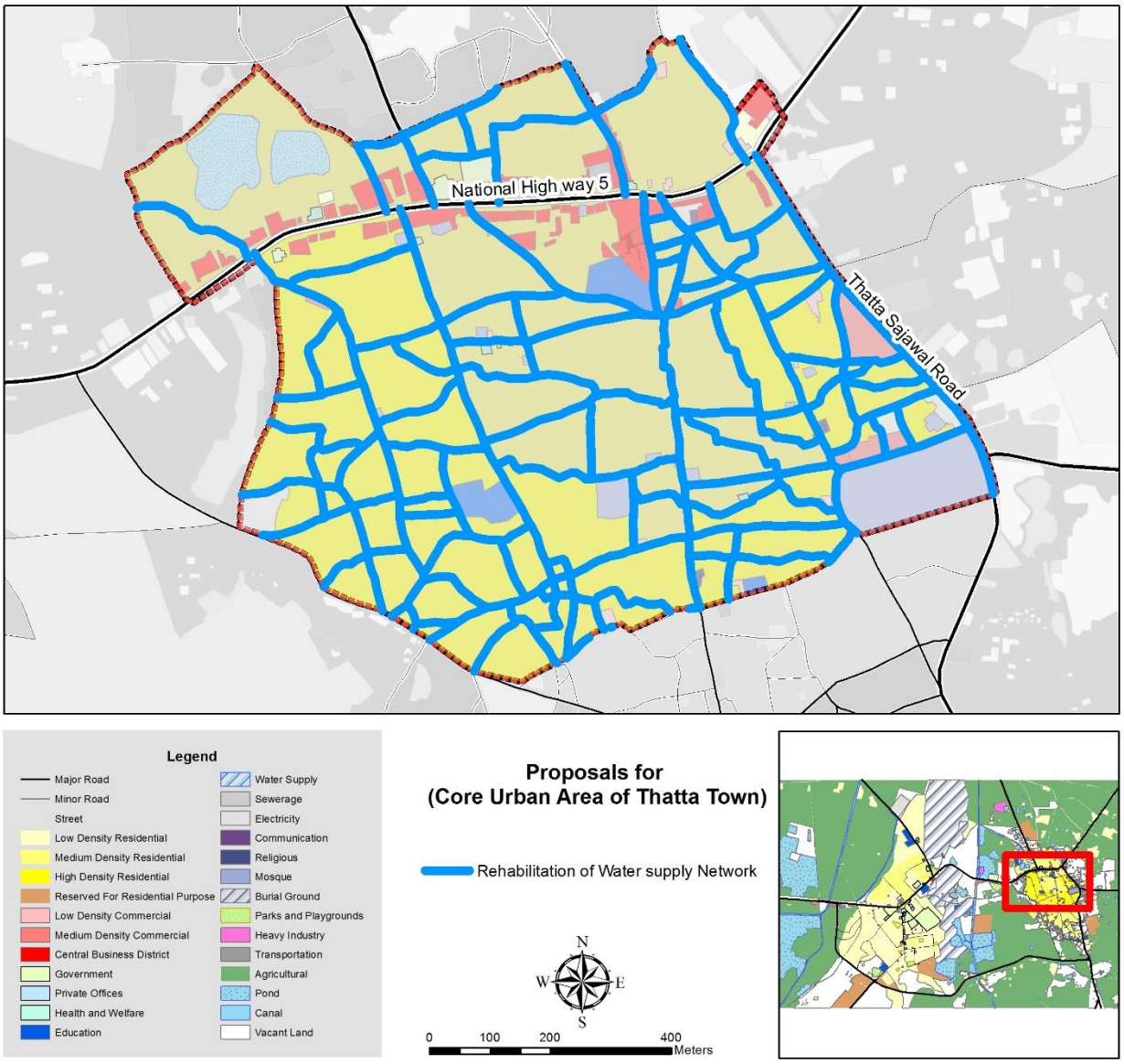


Figure 7-5: Immediate Action Plan for Rehabilitation of Water Supply Network of Thatta Town

7.2 Sewerage and Drainage

7.2.1 Existing Situation

The sewerage and drainage system of Thatta town consists of a combination of underground pipe sewers constructed in various phases. The network consist of the rising main with 16 inches diameter AC pipe and sewer pipe sizes being used are; 6", 4" diameter RCC pipe 12" dia laid underground.

The sewerage and wastewater gravitates to the collector wells (Wet Well) of six disposal pumping stations discharge in open Nala and is pumped through 10 HP pumping units at each pump house discharged into the SCARP drain which is the main carrier of sewerage alternatively it is also discharged into existing Nala.

Figure 7-6: Drainage & Water Lodging Issues in Thatta

Overall drainage system is in poor condition, with open smelly drains and sewers. Drains are blocked by garbage and vegetation. Sewerage is mainly disposed of in roadside drains and nalis. Flooding of properties and approach roads is significant during the rainy season.

7.2.2 Sample Survey Analyses of Existing System

According to the socio-economic survey conducted by the consultants, it is estimated that 75% of existing town area is served with sewerage / drainage network. The coverage by sewerage/drainage network ranges from 47% of the separate disposal systems and 53% of combined surface wastewater disposal system in Thatta and Makli. The majority of socioeconomic survey respondents were dissatisfied with the current sewerage systems. Further, primary and secondary data for sewerage/drainage was collected from Thatta and Makli which reveals that:

In the case of Thatta Town, there is a decline in sewerage coverage in households with no flush system is 50% which is of serious concern causing an increase in diarrhoea cases. Analysis of the recent evidence emerging from flooding affected areas regarding the health, water, and sanitation repercussions are of serious concern.

7.2.3 Waste Water Disposal

There are six disposal stations of sewerage located at Shaikh Fareed, Jungshahi Naka, Babu Shah, Doctor Gali, Edi Center and Mocharo. These pumping stations are discharging into side drains, open spaces, and SCARP drain.

7.2.4 Waste Water Treatment Plant

There is no sewerage treatment as sewage is mainly disposed-off in roadside drains and untreated sewage collects in ponds and swamps. Wastewater is not treated since the treatment plant is not available in Thatta Town. Thus use of raw sewerage for agriculture is also a common practice.

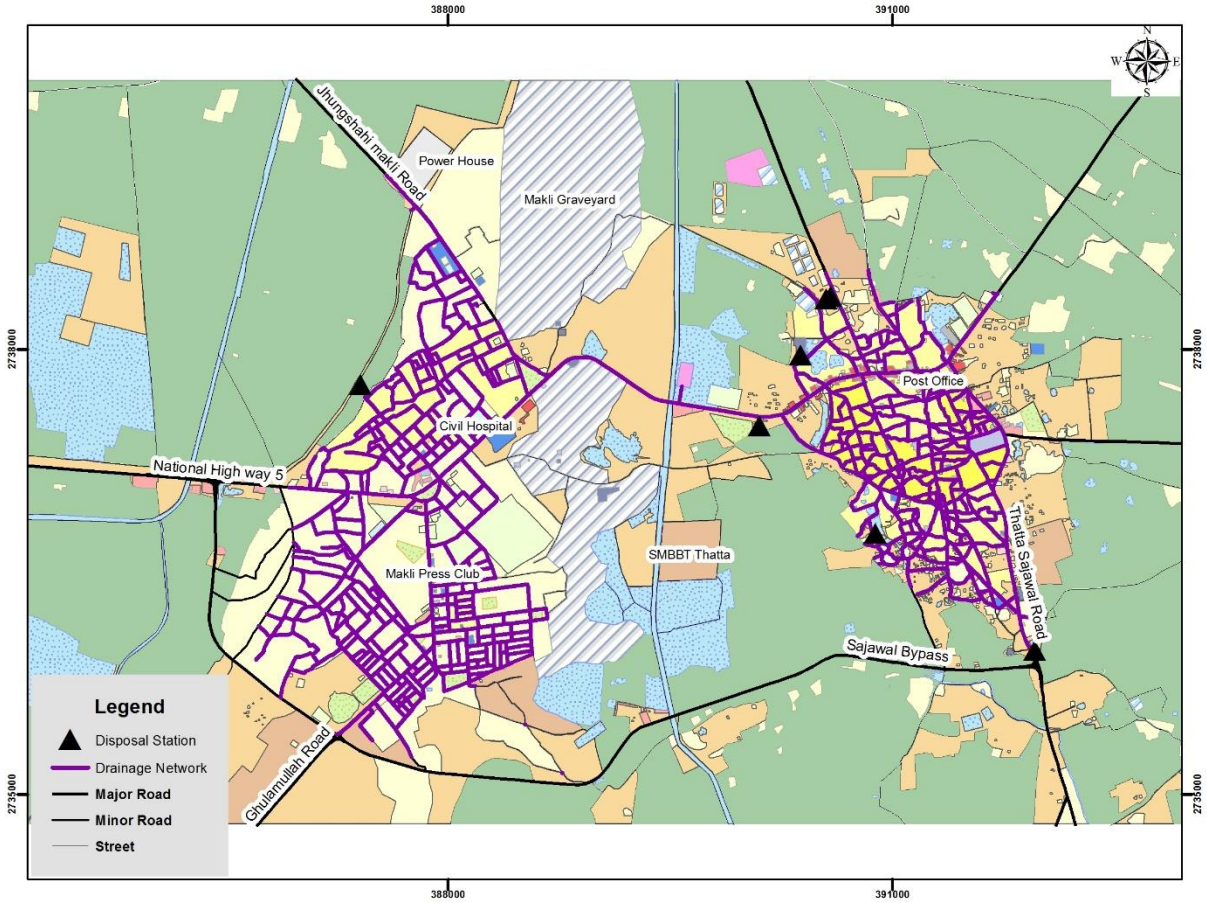


Figure 7-7: Existing Drainage Network Map

7.2.5 Issues:

The major issues identified for Sewerage and drainage are:

- Absence of comprehensive sewerage and drainage plans for cities and towns – there is an urgent need for sewerage improvements and implementation in line with the city planning, to implement sewerage facilities based on it and to revise the plan on regular basis taking social and physical changes into account. No department keeps L-Sections and X-Sections details which cause the problem in extending the system.

- Limited budget allocation for sewerage facilities – since the tariff collected in the water supply and sewerage sector is very limited, the budget allocated for the sewerage sector is limited, too. With the limited budget, it is almost impossible to operate and maintain existing sewerage facilities so as they function as planned and to extend or newly construct sewerage facilities to meet the future requirements.

- Improper operation and maintenance of sewerage facilities–mainly due to the limited budget and personnel allocated for operation and maintenance of sewerage facilities, existing facilities are not operated properly. Improper maintenance might lead to earlier aging of facilities and non-compliance with the effluent quality standard.

- Insufficient sewerage facilities – existing sewerage facilities for sewerage collection and its treatment are far from sufficient in quantity to serve the rapidly increasing population. Sewerage collection systems including branch sewers, trunk sewers, and pumping stations need to be constructed to improve the living environment of the citizens. In the same manner, sewerage treatment plants must be constructed as an urgent needs of the people.

- Insufficient information on facilities – sewers, pumping stations, and sewerage treatment plants consist of civil structures, mechanical and electrical equipment. For efficient and effective operation and maintenance of these facilities, it is necessary to equip their as-built drawings, list, and specifications on site. However, site surveys have usually found that there was little information on these items, especially about sewers and regular sample testing of treated effluent.

- Inefficient record of operation and maintenance works including machinery and equipment available for cleaning drains/sewers – in the same manner, little information in written form is available on the performance of pumping such as flow rates, operation hours, water qualities, facility failures, and repairs and so forth.

- The many informal settlements are located in poorly drained low lying land that can be subject to flooding, resulting in ponds of stagnant water in their midst and providing breeding grounds for mosquitoes and water-borne diseases. There is no standby pumping equipment at disposal stations. There are 4 disposal stations, having no standby diesel pump sets for use during power cuts this causes backup of effluent and overflow on streets.

7.2.6 SWOT Analysis

Sewage Collection & Disposal			
Strength	**Weakness**	**Opportunity**	**Threats**
1. The existing sewerage system facilitates the urban area of the city 2. Combine system (open channel and sewer) serving most of the town area 3. Sufficient land for disposal sites is available	1. Poor maintenance condition; garbage enters into sewers, which requires desisting 2. Drain water is disposed of untreated into canals and drains 3. Open sewers 4. Outdated and disconnected network 5. No policy for re-cycling, and reduction in generation of sewerage 6. Mixing of solid waste disposal into Sewerage 7. Rain/Flood water still standing in town centre areas Drainage and sewerage system of the urban areas are not constructed properly and disaster risk reduction measures are not incorporated while such construction is carried out. Consequently even small amount of rain blocks the drains, which inundates the streets, houses and markets.	1. An appropriate sewerage system plan should be implemented. 2. Improvement of general hygiene/ public health by cleaning sewerage system 3. Canals should be saved from toxic disposals 4. Development of well-designed trunk sewerage network with less number of disposal station. 5. Planning for well-connected gravity based open drainage system covering pounds 6. Job opportunities for skilled staff for proper maintenance 7. Revenue can be generated through charging services for cleaning. 8. PPP in service delivery 9. Reclamation of land (that accommodates water of flood/rain) for public land uses.	1. Public health 2. Storm water flooding/ over flow of sewers 3. Environmental degradation 4. Funding & policies. 5. Removal of encroachment 6. Land grabbers

7.2.7 Need Assessment

The present waste water production is estimated about 2.14 million gallons/day. It is expected that by 2037 sewerage water discharge in the city will reach upto 3.99 million gallons/day approximately. Estimated wastewater generation for the period to 2037 is shown below;

Table 7-2: Estimated Wastewater generation for the period 2037

Town	Description	2017	2022	2027	2032	2037
Thatta MC + Makli TC	Water Supply (mgd)	3.05	3.57	4.17	4.88	5.70
	Sewerage generated @70 % Water supply (mgd)	2.14 mgd	2.50 mgd	2.92 mgd	3.42 mgd	3.99 mgd

Source: Consultant Estimation

7.2.8 Sindh Sanitation Policy 2017[36]

Targets:

Its key targets are:

- Eradicate Open Defecation from Sindh Province by 2025, while 70% villages of 13 high priority districts achieve the status of open defecation free by 2020.
- 100% households in Sindh have access to and use sanitary latrines by 2025, while 70% of rural households in high priority districts will achieve this by 2020.
- Strengthen and implement liquid waste management with sewer lanes and Covered/improved drains with 85% coverage of urban areas and 60% coverage in rural areas.
- Create and develop wastewater treatment mechanisms to cover 75% of urban areas and 40% in rural areas by 2025.
- More than 90% of rural households and 100% of urban households wash hands with soap at critical times by 2025.

Principles:

- The Policy aligns itself with the goals and targets of the SDGs for sanitation, which require sanitation services to be safely managed, have a private improved facility where faecal wastes are safely disposed on site or transported and treated off-site; plus a hand washing facility with soap and water.
- Safely managed sanitation services is a fundamental right for all persons in Sindh province, and should be ensured through enhanced access to marginalized and low resource areas with equitable distribution of resources. Recognition of inequities and rights based programming will be given key emphasis during the planning, execution and monitoring of sanitation programmes.

[36] Sindh Water and Sanitation policy 2017

- The policy seeks to prioritize the areas that pose the greatest risk to human health namely hygiene awareness and excreta disposal, and then address the environmental health risks that are posed by poor drainage and solid waste disposal.
- Increase access to high quality nutrition-sensitive services, including access to water, sanitation facilities, and hygiene.
- The policy shall promote the community led approaches to strengthen the demand for safely managed improved sanitary conditions that emerges from local communities. The multi-stakeholder partnerships and collaborations comprising of citizens, governments, civil society, non-governmental organizations (NGOs), donors, academia, media, etc. be encouraged to maximize the synergies in designing and implementation of interventions.
- Affordable (in terms of designs as well as availability of water) and cost effective technical solutions with necessary modifications and adaptations in technical standards to be consistent with cultural sensitivities of specific communities will be identified and marketed.
- The component sharing model as envisaged in the National Sanitation Policy will be
- Institutionalized gradually in which the community is responsible to construct lane and neighborhood level sewers (internal development) on self-help basis and the government focuses on trunks, disposal and treatment unit (external development).
- The role of women shall be an integral component of behavioral change communication strategies and project planning, implementing and monitoring through capacity development and social mobilization of relevant stakeholders.
- Raw sewerage use for agriculture must be stopped.

7.2.9 Strategic Development Plan

The aim of Strategic Development plan is Provision of adequate Sewerage and Drainage facilities to the DHQ Town through equitable, efficient and sustainable sanitation services. Lanes may continue using concrete drains and to discharge into sewers through screening chamber. Some of the objectives include:

i. Long Term Plan:

- Improving standards of public health through provision of improved services supported up by legal, regulatory and binding framework.
- Wherever existing sewerage systems discharge untreated sewerage in storm water drains or irrigation canals it should be treated before discharging, and may be used for agricultural purposes or converted into lakes and ponds as part of recreational areas.
- Construction / Rehabilitation of Waste Water Treatment Plant:
- In Thatta Town there is no waste water treatment system available to cater the population of DHQ town. At the present, the waste water is disposing at 3 locations. The pumps of disposal stations are not working on their full capacity due to which ponding have been created, rather increasing and affecting people health. The Disposal of Untreated wastewater to canals is unacceptable as the water is used for irrigation purpose as well as

drinking purpose. This project is to protect the health of the people using irrigation canal water and to safeguard the agriculture land in the area.

- Land acquisition of at least 20 acres at this stage for stabilization pond replacing oxidation ditches and swamps.

ii. Short Term Plan:

- Priority for sanitation will be accorded to un-served, under-served areas, and disadvantaged areas.
- An overall sanitation plan will be developed for all urban settlements by city District governments and the TMAs in coordination with all other agencies involved in sanitation.
- Special focus on need based interventions in sanitation sector.
- Gravity flow systems will be used for sewerage schemes so as to avoid pumping and O&M costs.
- Acquire Land & Provide Stabilization ponds for full treatment to produce acceptable quality of effluent for re use.

7.2.10 Priority projects

i. Repair & rehabilitation of primary and secondary drains 50% (1,359.53 Acres) @ of one million per acre) except core urban area

➢ **Project Scope & Justification**

In Thatta MC Sewage is mainly disposed of in roadside drains, and untreated sewage collects in ponds/ swamps. The drainage system and structures are in poor condition with open smelly drains and sewers. Drains are in poor condition almost in all the town and need to be repaied. The drainage and sewerage system in Thatta MC consists of surface drains, and reinforced cement concrete (RCC) pipe sewers in part of the town. The sewerage system lacks proper operation and maintenance due to funding constraints, shortage of technical staff and proper equipment and vehicles.

Rehabilitation of storm water and sewerage works will include the following components.

i. Repair of Walls, bed and Top slab of drains, manholes and chambers
ii. Reconstruction of drains, chambers and manholes where found completely damage
iii. Cleaning of pipes, chambers, drains and inlet gratings
iv. Laying of news pipes after replacement of old damage pipes

- **Project Size**

Project Size	
Landuse of DHQ town excluding Core Urban Area, agriculture, vacant land & water bodies	2,719.07 acres
Out of total 50% of Thatta town served with drainage schemes, which need repair and rehabilitation @ of one million per acres	1,359.53 acres

According to the landuse survey conducted by client, the total Landuse of DHQ town excluding Core area, agriculture, and vacant land & water bodies is about 2,719.07 acres approximately. According to socio economic survey results 50% (1,359.53 Acres) of town area is served with drainage system. Whereas, 70% of respondents from the town are dissatisfied with the current sewerage system. Therefore it is proposed to repair & rehabilitate existing drainage scheme for DHQ town on priority basis covering an area of 1,359.53 acres excluding core town area.

- **Project Benefit**

  After the implementation of the project of surface drainage network with easy disposal to river/canals after the treatment, the risk of urban flooding will be mitigated.

- **Implementing Authority –** PHED Government of Sindh, Thatta MC and Makli TC

- **Estimate Cost:** Rs. 1,359.53 million approx.

ii. Installation of Sewerage and drainage network for 50% (1,359.53 Acres) un-served areas of the Thatta MC and Makli TC @ of three million per acre) except core urban area

- **Project Scope & Justification**

  As per socio-eocnomic survey results, 50% of total area is un-served due to unavailability of drainage network; therefore installation of new network for 50% of area is proposed on priority basis.

  Construction of storm water and sewerage works will include the following components:

  i. Construction of Walls, bed and Top slab of drains, manholes and chambers
  ii. Installation of drains, chambers and manholes where found completely damage
  iii. Laying of pipes, chambers, drains and inlet gratings.

- **Project Size**

Therefore it is proposed to construct new drainage scheme for un-served area of DHQ town on priority basis, covering an area of 1,359.53 acres. The remaining area of the Thatta MC needs to be provided a proper drainage and sewerage network in the town. This project will help the inhabitants of the town for easy disposal of storm water drainage and sewage water in to main drainage system.

Project Size	
Landuse of DHQ town excluding Core Urban Area, agriculture, vacant land & water bodies	2,719.07 acres
Out of total 50% of Thatta town's area is not served with drainage network; therefore installation of new network for 50% of area is proposed on priority basis	1,359.53 acres

- **Project Benefit**

After the implementation of the project, remaining area of the town shall connects with drainage network and the risk of urban flooding will be mitigated.

- **Implementing Authority – PHED Government of Sindh, Thatta MC**

- **Estimate Cost:** Rs.3.00 millions per acre cost – Rs.4, 078.80 million approx.

iii. Construction of Sewage Treatment Plant

- **Project Scope & Justification**

Due to unavailabilty of sewage treatment plant, the preference is given to conventional / natural treatment of waste water through oxidation ponds. Therefore it is proposed to construct Sewage Treatment Plant for DHQ town on priority basis & convert existing oxidation Ponds area into STP.

In order to understand wastewater treatment, it is important to know the various components that challenge out wastewater treatment processes, like total suspended solids, biochemical oxygen demand and contaminants. To treat this water the WWTP consists of following parts/components;

- Preliminary screens.
- Tanks and mixers.
- Chemical dosing skids.
- Sludge pump skids.
- Catwalks & maintenance platforms.
- Controls & instrumentation.
- Sludge dewatering.

- **Project Size**

  Initially, construction of STP having capacity of 2.5 Million Gallon is proposed on priority basis on land of four acres of existing oxidation pond located near Thatta-Sujawal Road.

- **Project Benefit**

  After the implementation of the plan wastewater will be used for landscaping or maybe for other use. This project is expected to improve health conditions considerably. This project has a positive impact over the whole population.

- **Implementing Authority -** Government of Sindh, Thatta MC.

- **Estimate Cost**: Rs.350.00 million approx.

S. No.	Project Name	Estimated Cost In Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Sewage & Drainage						
1	Repair & rehabilitation of primary and secondary drains 50% (1359.53 Acres) @ of one million per acre) except core urban area	1,359.53	-	Non ADP	**Short Term**	-
2	Installation of Sewerage and drainage network for the 50% of un-served areas of the Thatta MC (approx. 1359.53 acres).	4,078.60	-	Non ADP	**Short Term**	-
3	Construction of Sewage Treatment Plant (2.5 Million Gallon)	350.00	-	Non ADP	**Short Term**	-

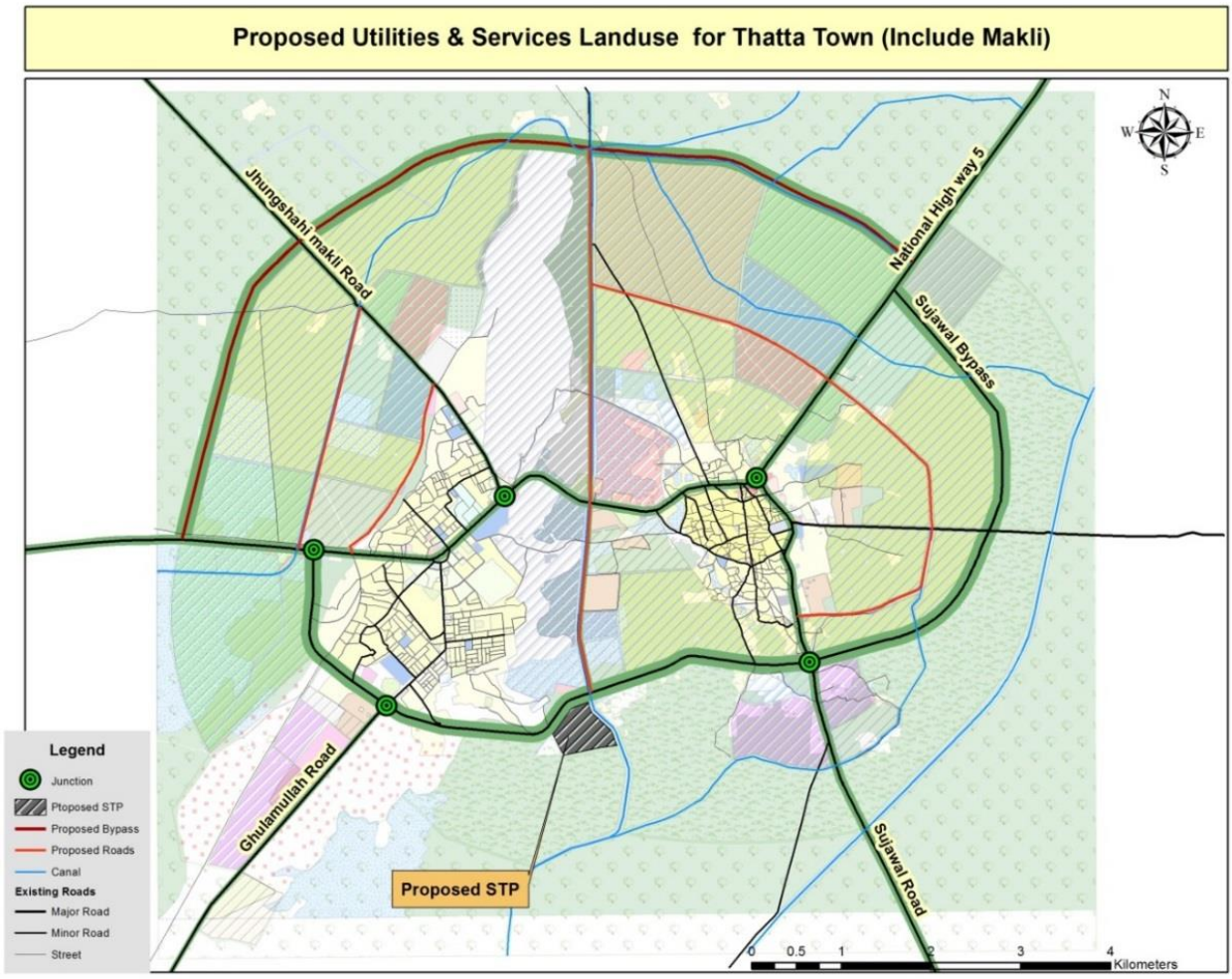


Figure 7-8: Future Landuses Reserved for Proposed Site for STP for Thatta Town

7.2.11 Immediate Action Plan for Core Urban Area

i. Repair & Rehabilitation of Sewerage and Drainage Network Core Town Area

During the survey the residents complained that, the design of existing drainage network is not fulfilling the present demand. And old sewerage line which had burst several times within one year. So therefore it is proposed to repair & rehabilitate existing sewerage & Drainage network of core town area.

S.No	Name	Area (acre)	Per acre cost (PKR) million	Cost (PKR)
Total Core Urban Area : 225.23 Acre				
1	Sewerage System	**225.23**	**1.0 million Per acre**	**225.23**
2	Storm Water Drain System			
			Total Cost (PKR). Million	225.23

Note:

- ✓ Sewerage system includes all urban core area network system with all related machinery and equipments.
- ✓ Storm water drain system includes all the coverage core town area storm drain system through all steeps slopes and peak areas with all linking equipments and machinery.

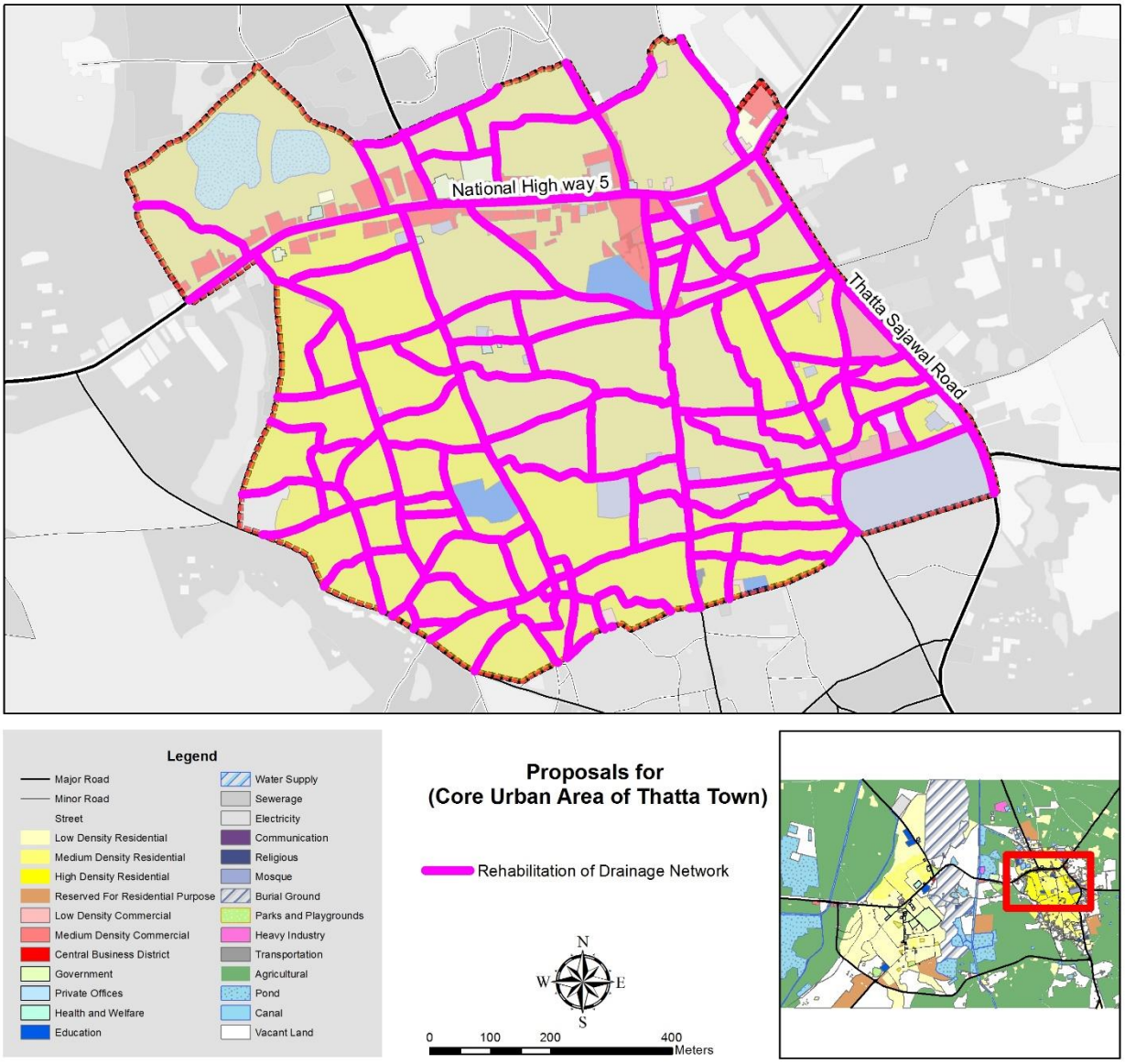


Figure 7-9: Immediate Action Plan for Rehabilitation of Drainage Network of Thatta Town

7.3 Solid Waste Management

7.3.1 Existing Situation

After the passing of the Sindh Solid Waste Management Board Act in 2014, the Sindh Solid Waste Management Board (SSWMB) has been established which has the responsibility to collect and dispose of all kinds of solid waste being generated in Sindh. As indicated, TC/MC is officially responsible for the entire solid waste management of the district under the directives of SSWMB. At present SSWMB has directed the municipal committees for identification of land for Garbage Transfer Stations and Landfills so that garbage collection and transfer and transport operations can be handed over to SSWMB for effective management of solid waste. Meanwhile, feasibility studies of medical hazardous waste of Hyderabad, Mirpurkhas and Shaheed Benazirabad are in progress. Once the municipal committees would be able to allocate proper and adequate land for waste disposal on a long-term basis then SSWMB will come into action for effective SWM at primary and secondary level in these District

7.3.2 Current Practice of Solid waste Collection and Disposal

The collection mechanism that exists in Thatta is still the primary waste management system. The garbage is collected in open containers/community bins placed in streets or empty spaces designated as throw away places. The waste is collected and transferred/transported outside limits of the town to designate/non-designated dumping sites by means of refuse vehicles and tractor trolleys which are usually inadequate in numbers for the handling of MSW by the sanitary/waste collection staff. Total actual numbers of Sweepers and Cleaning staff is 250 in numbers. The employed staff in the municipality is 814 in numbers (including Makli) and the sanctioned employees are also the same.

7.3.3 Identification of Disposal Points

There are a number of recognized/established active primary collection points in the town. These are not permanent structures but rather empty corners or vacant places. Besides regularly served designated collection points, every locality has got throw away sites in the form of depressions, empty areas, cuttings areas, etc. These types of non-designated points if coming in the collection route are often served by the municipality staff or usually avoided due to shortage of time and resources constraints.

Solid Waste collection is done from the designated points by means of vehicles such as; tractor trolleys and refuses vehicles as when necessary to transport the waste to dumping site(s). Due to the lack of data and information available the number of collection points/primary collection (garbage collection points) could not be identified. However, it is presumed that some of these are permanent structures and majority points are empty corners or vacant places. Besides, every locality has got throw away sites in the form of depressions, empty areas, cuttings areas etc. There had been little if any planning in the location of the landfill sites and there has been no planning for the replacement of existing dumping ground(s). Regarding the dumping grounds, the only information available is about their location outside the town limits. These sites are located at some distance from the town, but now susceptible to be enveloped by increasing urbanization. None of the sites had undergone EIA as required by SEPA Review of IEE & EIA Regulations 2014.

Figure 7-11: Condition of Solid Waste in Thatta MC

7.3.4 Hazardous Waste:

There are no special arrangements for the handling, storage and disposal of clinical or hazardous waste except for the breaking of needles and their collection. Hospital waste is internally collected and disposed of by the hospital sweepers No records are kept of where waste is buried as this is at the discretion of the sweeper. As there is no control over the disposal of the waste it is highly likely that some is sold to middle dealers and enters the recycling sector.

There is no data available on the hazardous waste generation and its management in Thatta. Whatsoever the waste generated in healthcare facilities (HCF) such as hospitals and laboratories is mingled with the MSW. The estimated quantities of hazardous waste (risk waste) can be estimated from the bedded healthcare facilities.

Table 7-3: Hazardous waste (Healthcare waste) source and estimation in Thatta

S. No.	Healthcare Facilities (HCF) * Thatta	No. of Beds*	HCW @ 1.1 kg/bed/day[!]
1.	Hospitals Civil/Private	300	330
2.	Rural Health Center	80	88
4.	Basic Health Unit	22	24.2
5.	Mother & Child Health Centre.	04	4.4
6.	Dispensaries	10	11
	Total (90)	**416**	**457.6 kg/day**

Source: Development Statistics of Sindh, 2014, Bureau of Statistics, GoS. & Recent study on HWM, SSWMB unpublished ICEPAK

7.3.5 SWOT Analysis

Strengths	Weakness	Opportunities	Threats
Solid Waste Management			
1. Municipal Corporation is responsible for operating mechanism for solid waste management 2. System in place with improving efficiency, there is a slightly improvement in garbage collection and allocation of landfill site to dispose of toxic waste 3. Recycling by scavengers	1. Poor financial and operational management system. 2. There is no system to identify toxic wastes produced by various activities. 3. Communities' particularly low income groups are not aware with disposal procedures. 4. More than half of the households does not have provision of infrastructure for sanitation purpose.	1. Appropriate measures should be adopted for collection and re-cycling of SWM. 2. SWM recycling will help to generate revenue. 3. More landfill sites should be identified for future disposals. 4. Establishing of a primary collection system would add more revenue resources. 5. Opportunity for recycling and reuse of solid waste, such as RDF, bio-gas etc. 6. PPP in service delivery.	1. Bad sanitation 2. Poor public health 3. Outdated drainage system 4. Threats to plants and animal life Loss of trust building with people in future.

7.3.6 Need Assessment

It is recommended to undertake the field study for the determination of waste generation and characterization for Thatta in order to plan and design the solid waste management system.

- **Waste Generation**

The waste generation rate estimated from the studies conducted earlier in SCIP-3 project suggests to be around 0.4 – 0.45 kg per capita per day[37]. However, it is recommended to undertake the field study for the determination of waste generation and characterization for Thatta in order to plan and design the solid waste management system.

Considering waste generation rate for design purpose as 0.45 kg per capita per day with the current (2017) population of the municipal committee of Thatta as 54,697 the total municipal solid waste load arising in the municipality is approx. 24,614 kg or 24.7 tons per day.

Present Population	**101,833**
Total Generation @ 0.45 kg per capita	45,825 kg (45.8 Tons)
Land fill Site @ 1 Acres per 10,000 Persons	10.2

By assuming solid waste generation at the rate of 0.45 kg per capita per day (as per NRM), it is estimated that at present city generates 45.8 tons solid waste per day, which require 10.2 acres landfill site to accommodate disposal in four layers at present. While in future, there is a need of 19 acres landfill site to accommodate 85.5 tons disposal in four layers over a period of 20 years. Sanitary landfill site is required to be located away from any residential area.

Future Population 2037	**190,089**
Total Generation @ 0.45 kg per capita	85,540 kg (85.5 Tons)
Land fill Site @ 1 Acres per 10,000 Persons	19

It may be concluded that in the medium term, the collection and disposal of solid waste may be outsourced to specialized waste management companies who would collect and recycle waste at a profit. Thus the MC will be relieved of any financial burden on this account.

[37] SCIP-03 Program Management, Project Preparation and Implementation Support for Planning & Development Department, Solid Waste Management Studies of Towns of Central Cluster of Province of Sindh, 2013, Brisbane City Enterprises Pty Ltd, & MMP

7.3.7 Policy Guidelines[38]

Implement integrated solid waste management with 100% coverage in urban areas and 60% in rural areas of Sindh by 2025.

Principle

- Develop integrated solid waste management system.
- Conduct a study on wastewater and solid waste to develop town level profiles (including Infrastructure, equipment and staffing)
- Conduct waste characterization studies.
- Smooth and efficient Solid waste collection and disposal by providing door to door collection services.
- Ensure Effective solid waste management by developing a list of staffing, hardware and equipment for solid waste management.
- Efficient Solid waste disposal and recycling by establishing transfer stations to reduce disposal time.
- Recycle solid waste by systematic separation.
- Sanitary landfill options identify for towns where it is feasible.
- Formalize contracts with companies for waste to energy options.Atleast each mega/intermediate city has a WTE (Waste to energy options) in place.
- Provide each town with a centralized and functional high risk hospital waste disposal facility.
- Update status of all slaughterhouses (recognized and unrecognized) in each district and prioritize those for rehabilitation, solid waste and wastewater management.
- Provide refresher training on slaughterhouse safety and hygiene practice guidelines to 100% slaughterhouse staff in recognized slaughterhouses in safe handling and disposal of carcass, entrails, hides, and wastewater.
- Efficient and effective management of Industrial solid waste by determining the current status of industrial solid waste production and disposal and development of strategies and actions for efficient and effective management of industrial solid waste.
- Develop and use technologies that are affordable, applicable and cost effective to maintain the solid waste management.
- Allocation of proper landfill sites outside of the urban area and Final disposal of waste at least 500m from housing to a contained area chosen and designed according to geological conditions, water table, wind etc.

7.3.8 Strategic Development Plan

The aim of this strategic development plan is to improve the quality of life of the people of DHQ Town and the physical environment and also provide guidelines for the management of solid waste in the town.

[38] Solid Waste Management Policy for Sindh
Sindh Water and Sanitation Policy 2017

i. Long Term

- **Community and Private Sector Involvement in SWM:** The active involvement of local communities and the private sector is essential for an effective waste management system. It would be beneficial to start involving local communities and the private sector in waste management, which has been a slow process. This process needs to be accelerated in a well planned manner.

- **Public Awareness and Education:** It can be brought about in many different ways through the electronic and printed media and street talks, through community organizations such as schools, institutions, and households, using a public-address system, distributing leaflets, for public awareness.

- **Implement Waste minimization:** It is done through pilot and demonstration projects. These pilot and demonstration projects can be used to raise awareness of basic waste-minimization measures.

ii. Short Term

- The collection and disposing of solid waste is the responsibility of the MC. The mechanism for solid waste management is not available, so therefore a detailed feasibility is proposed to develop an efficient solid waste management in Thatta town.
- The collection system needs to be made more effective and efficient.
- Municipal Committee has already initiated some work on biomedical-waste management. It should immediately start segregation practice for biomedical waste collection system.
- Encourage On-site Reuse and Recycling: This method will reduce material consumption and the quantity of hazardous waste generated. As a result, material cost and waste treatment cost will be reduced.
- Techno-economic feasibility and detail study of characterization of waste is proposed on basis of the policy guidelines.
- Develop integrated solid waste management system keeping in mind the method, procedure and design at front end, middle end and back end, based on best possible public health practices and environmental protection laws/rules.
- Industrial waste disposal should be treated seperately and safely.

7.3.9 Priority Project

i. Feasibility Study for Solid Waste Management Mechanism and Mechanism for Primary and Secondary Collection and recycling.

- **Project Scope & Justification**

The collection of the solid waste is the responsibility of Thatta MC. MC has been contributing to keep clean the city by providing the basic municipal services include solid waste management. As street sweeping and collection are by far the most expensive activities in MC's waste-management system, the collection system needs to be made more effective and efficient. A detailed feasibility study is proposed to develop the efficient solid waste management mechanism. There is a practice in Thatta MC that at community level garbage generated from household is placed outside the house that is collected by the sweepers in the morning through door-to-door collection.

Central Composting Plant: In order to handle a large quantity of waste it is essential that organic waste is segregated from the municipal solid waste (with possible recovery of recyclable items) for which a setup of large-scale central composting plant is required. This should be done with private sector participation.

Landfill Site: Landfill is an ultimate safe disposal option for Municipal Solid Waste and is imminently required. Land fill should be in the radius of 2-3 km of the town.

- **Project Benefit**

The project will identify the feasible solution to improve hygienic conditions of the town and a positive impact over the whole population.

- **Implementing Authority -Government of Sindh, Thatta MC**

- **Estimate Cost: Rs.40.00 million approx.**

S. No.	Project Name	Area (Acres)	Estimated Cost In Millions	Short Term	Justification
Solid Waste					
1	Feasibility Study for Solid Waste Management Mechanism and Mechanism for Primary and Secondary Collection and recycling	564.5	20.00	**Short Term**	At the present, the town lacks in the provision of integrated mechanism of municipal solid waste management.
2	Land acquisition for landfill site.	10.0	20.00	**Short Term**	At the rate of 2.0 million per acre

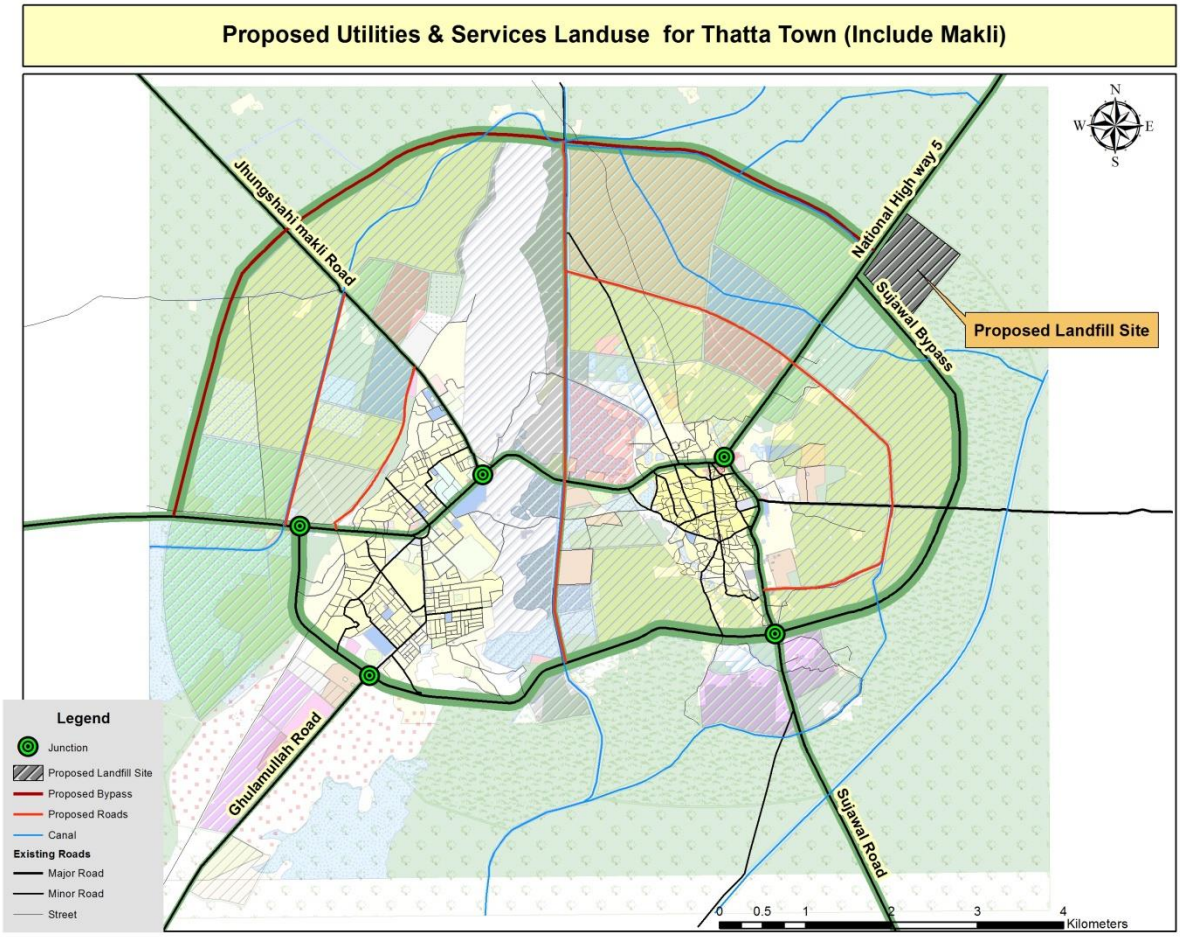


Figure 7-12: Future Landuses Reserved for Proposed Site for Landfill Site for Thatta Town

7.3.10 Immediate Action Plan for Core Urban Area

Heaps of solid waste is evident in the core urban area. It is proposed that primary level collection i.e. door to door collection system should be launched immediately by Municipal Committee. Waste generated by the market of the core urban area should be picked on daily basis.

Shopkeepers can pay a small amount on monthly basis to the sweepers say 250rs/month and domestic consumers availing this facility can pay a small amount on monthly basis say 100rs/month.

Figure 7-2: Sample of Solid Waste Segregation Bins for Core Urban area Thatta

The waste generation rate estimated from the studies conducted earlier in SCIP-3 project suggests being around 0.4 – 0.45 kg per capita per day[39]. However, it is recommended to undertake the field study for the determination of waste generation and characterization for Thatta in order to plan and design the solid waste management system. Considering the waste generation rate for design purposes as 0.45 kg per capita per day with the current (2017) population of the municipal committee of Thatta as 101,833 the total municipal solid waste load arising in the municipality is approx. 45,825 kg or 45.8 tons per day, which require **12** acres landfill site to accommodate disposal in four layers for the present load. While in future, there is a need of 20 acres landfill site to accommodate **85.54** tons disposal in four layers over a period of 20 years. Sanitary landfill site is required to be allocated away from any residential area.

The overall efficiency of the waste management system is less than 55% of the generated solid waste, which is collected and disposed-off through municipality's resources, leaving 45% solid waste unattended / uncollected. At the disposal site, waste is burnt intermittently by municipality staff to reduce its volume. The overall physical composition of municipal solid waste in terms of its constituent components remains the same as with other towns of Sindh i.e. ORGANICS (food waste, bones, green waste), RECYCLABLES (variety of plastics, paper & cardboard, metal pieces, wood pieces, glass, textile pieces & rags, fraction of rubber), INERT (dust and small stones, building waste and ceramics, etc.)

7.3.11 Suitable locations for Disposal Points

There are number of recognized / established active primary collection points in the town.

These are not permanent structures but rather empty or vacant corners. Besides regularly served designated collection points, every locality has got throw away sites in the form of depressions, empty areas, cuttings areas etc. These types of non-designated points if come in the collection route are often served by the municipality staff or usually avoided due to shortage of time and resources constraints.

T H A T T A		**SOLID WASTE MANAGEMENT SYSTEM**		
CORE TOWN AREA		**(Solid Waste Garbage Collection Containers)**		
S.No	**Name**	**Containers No.s**	**Cost / Container**	**Cost (PKR)**
Total Core Urban Area : 517.59 acre				
1	Placing of Garbage Container at different sites/locations in core town area	50	520,000.00	**26,000,000.00**
			Total Cost (PKR). Million	**26.00**

Note:
1. Each site located for garbage container must be strictly followed by MC to collect and manage solid waste from this site for proper management of the core area.
2. Containers must be fully get maintained by MC office.
3. Sindh solid waste management department/authority should kept control on each project for the uplifting of town as per master plans.

[39] SCIP-03 Program Management, Project Preparation and Implementation Support for Planning & Development Department, Solid Waste Management Studies of Towns of Central Cluster of Province of Sindh, 2013, Brisbane City Enterprises Pty Ltd, & MMP

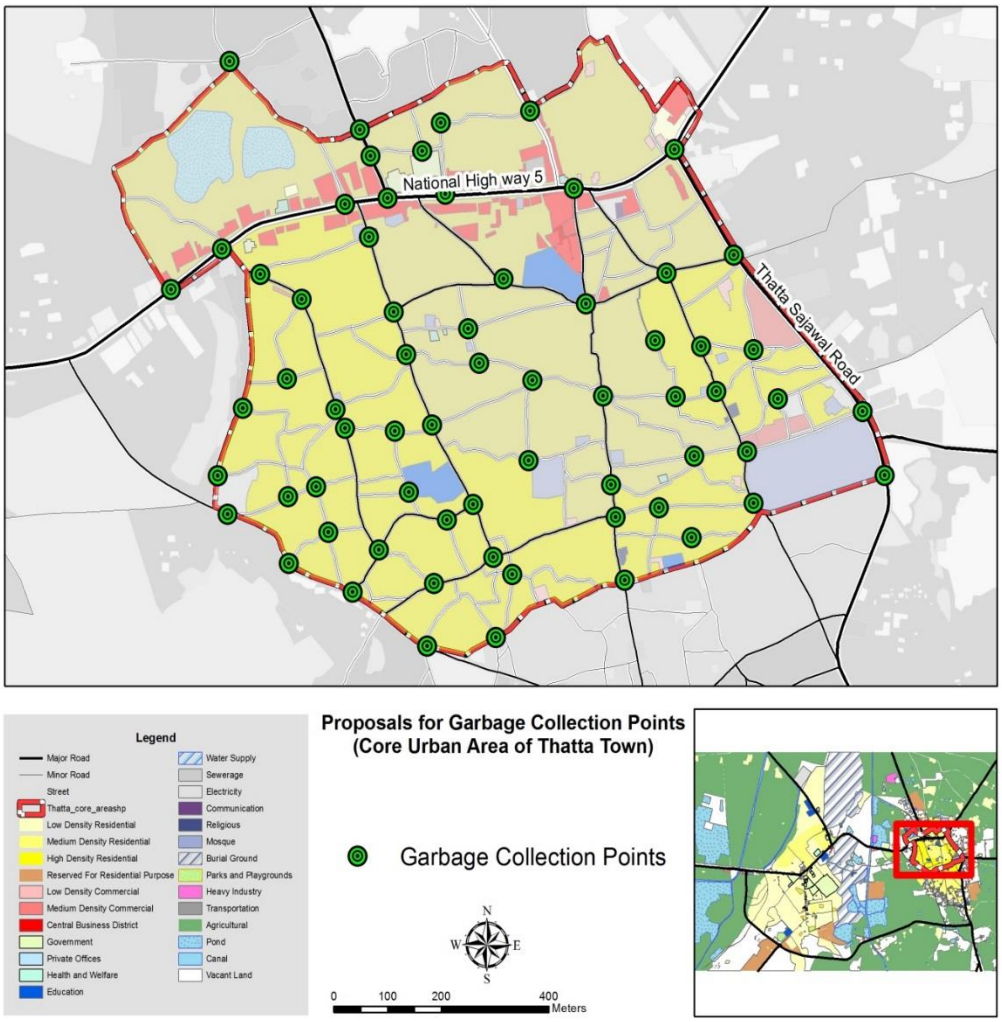


Figure 7-13: Proposed Garbage Collection Points Core Urban Area Thatta

7.4 Firefighting[40]

7.4.1 Existing Situation

Currently there is one fire brigade station situated in Thatta with 18[41] firefighting staff and one functional and one nonfunctional firefighting vehicle. The Municipal committee has no separate budget for firefighting and no vehicle maintenance facility in the station.

7.4.2 Need **assessment**

As the current total population of Thatta MC + Makli TC is 101,833, which will be 190,089 in 2037. As per National reference manual the one fire station is recommended for 0.1 million population and one fire engine is required for 50,000 population. Currently there is one vehicle available with municipal committee. So three more vehicles are needed for DHQ Town.

7.4.3 Strategies

- City committee people would need to be trained about local early warning systems, evacuation, first aid search and rescue, firefighting etc.
- Provision of Sprinkler protection should be ensured in each multi story building for firefighting.
- Assure that all areas of the Town have the highest level of fire protection, at the lowest possible cost, to meet existing and future demand.
- Establishment of fire-stations to accommodate required number of fire vehicles.
- Establish sub-stations at different locations to ensure short response time for the whole city.
- Increase service efficiency through number of vehicles, dedicated staff and financial mechanism.
- To ensure readiness of all vehicles with ample stocks of POL and spares.

[40] Information provided by MC Office Thatta

[41] MC office Thatta

8. INFRASTRUCTURE

8.1 Transportation

8.1.1 Existing Situation

Thatta city is situated, 98 kilometers east of Karachi, on the national highway (N5). This highway passes through district Thatta for a length of 112 kilometers. Super Highway (M9), which connects Karachi and Hyderabad, also passes through this district for a length of 40 kilometers. District headquarters of Thatta is connected with other talukas through well-built roads. Although these roads are single but are of good quality.

Drainage issues on road side and high water level are evident due to which roads are worsening day by day. Absence of street furniture is another issue due to which traffic incidents takes place. Encroachments and unorganized/illegal loading Qinqui and Rickshaw stands are also evident on the road side which causes on street and off street parking issues.

8.1.2 Regional Connectivity (Air, Rail, Road)

- **Airport**

Thatta has direct access to both airports i.e. Hyderabad Domestic Airport via N-5 via Kotri-Hyderabad Road and Jinnah International airport via N5 road. Travel time from Thatta to Hyderabad and Thatta to Karachi Airport is approx. 110 Km which is two and half hours approximately. But due to some technical reasons Hyderabad domestic airport is now closed for commercial traffic as of 2013. An air strip is located in Jung Shahi. Travel time from Thatta to Jung Shahi Airstrip is approx. 20km from Thatta town.

Hyderabad Airport

- **Railway Station**

Jungshahi railway station is located in Jungshahi, Thatta District of Sindh province, Pakistan. Jungshahi station is among the oldest railway stations in Sindh. This line is the part of first railway line (Karachi-Kotri) for public traffic between Karachi and Lahore. Currently railway traffic is limited due to its operational cost, but long route trains are running on tracks to facilitate the public. Junshahi railway station is approximately 20 Km away from Thatta city.

Jung Shahi Station

- **Bus Terminals and Vehicles**

The registered vehicles in Thatta includes; 40 buses, 15 tankers, 150 trucks, 300 taxis, 2,000 rickshaws and 20,000 motorcycles.[42] No information regarding private cars is given and the unregistered qingqi and rickshaws are more in numbers than stated. Presently, it is observed that the majority of traffic is of private vehicles. Buses are very limited and do not operate with regulations or proper stands. Illegal bus and qinqui stands of public transport are evident in Thatta Town. However, there are two major bus stands within the town. The buses route towards the town are given below:

Table 8-1: Routes of Buses

S.No	Route
1.	Sujjawal to Thatta
2.	Hyderabad to Thatta
3.	Karachi to Thatta
4.	Jungshahi to Thatta
5.	Jhumpir to Thatta
6.	Pirpatho to Thatta

8.1.3 Local Road Network

- **Condition of Road**

Figure 8-1: Road Condition

Thatta city is situated, 98 kilometers east of Karachi, on the National Highway (N5). This highway passes through district Thatta for a length of 112 kilometers. Super Highway (M9), which connects Karachi and Hyderabad, also passes through this district for a length of 40 kilometers. The district headquarter of Thatta is connected with other talukas through well-built roads. Most of these roads are of good quality. The existing major roads of Thatta Town includes Sujawal Road, Hyderabad Road (N5), Karachi Road (N5), Jungshahi Road, Ghulamullah Road, Pirpatho Road and Sujawal Bypass.

[42] Information provided by Assistant Engineer Highway Sub-Division Thatta.

Table 8-2: Condition of Existing Roads

S.No	Road Name	Condition	Width (approx.)
1.	Sujawal Road	Good	60 ft
2.	Karachi Road - N5	Good	100 ft
3.	Hyderabad Road - N5	Good	100 ft
4.	Jungshahi Road	Poor	40 ft
5.	Ghulamullah Road	Good	60 ft
6.	Pirpatho Road	Average	40 ft
7.	Sujawal Bypass	Very Good	60 ft

Drainage issues on road side are evident due to which roads are worsening day by day. Absence of street furniture is another issue due to which traffic incidents takes place. Encroachments and unorganized/illegal Qinqui and Rickshaw stands are also evident on the road side which causes on street and off street parking issues. Occasional institutional and religious gatherings (Urs etc.) are also one of the major reasons for traffic congestion.

- **Internal Roads**

  The internal road network of Thatta MC is not satisfactory with deteriorated physical conditions, encroachments on roads, congestion, and roadside parking and drainage issues. Although the road network of Makli TC is much better than Thatta MC. Drainage issues on the road side are evident due to which roads are worsening day by day. The absence of street furniture is another issue due to which traffic incidents take place. Encroachments and unorganized/illegal Qinqui and Rickshaw stands are also evident on the roadside which causes on the street and off-street parking issues.

- **Major Intersections**

  In overall Thatta Town comprising of Thatta MC and Makli TC, there are three major intersections inside the town area namely; Ghulamullah-N5 (DC Office Chowk), Jungshahi-N5 (Makli Chowk) and Sujawal-N5 (Sujawal Chowk). The existence of Sujawal Bypass is forming major outer intersections with Karachi Road - N5, Hyderabad Road - N5, Sujawal Road and Ghulamullah Road.

- **Parking/Street Furniture/Street lightning**

  There are two separates designated parking areas, known as Makli Necropolis Car Parking and Shah Jahan Mosque Car parking, are present in the town. Although there is no specific boundary or demarcation for parking lot, thus people park their vehicles at the entrance of Makli Necropolis and in front of Shah Jahan Mosque. However, generally no separate designated parking is available, thus roadside parking along N5, Shahi Bazar Road, Sujawal

Road is common practice. Similarly, no street furniture is observed, though street lighting is available but needs to be upgraded and maintained where installed and need an extension in other areas as required.

8.1.4 Issues and Problems

- Tertiary and Secondary Roads are in very poor condition
- No formal Bus Terminal
- Traffic Congestion at intersections
- Improper design of roads and intersections
- Unavailability of Traffic signals and street furniture
- Absence of street lightening and non-uniform right of way
- Encroachments and unorganized/illegal loading Qinqui and Rickshaw stands are also evident on the road side which causes on street and off street parking issues.
- Lack of Road Safety measures
- Road side encroachment is evident in the core urban area. Visitors are facing congestion and traffic problems in Shahi Bazar area due to encroachment and lack of parking spaces
- Water lodging & road side Drainage issues are evident due to which roads are worsening day by day.
- There is unplanned street network and absence of public transport also poor maintenance of bus bays.

8.1.5 SWOT Analysis

Strength	Weakness	Opportunity	Threats
LAND USE &TRANSPORTATION			
1. Mixed land uses (residential, commercial, industrial, administration) 2. Good national / regional connectivity through railway , air and road networks 3. Strong network of inter and intra city	1. Unplanned street network 2. Absence of public transport 3. Ribbon type commercial development in residential neighborhoods 4. Poor traffic management 5. Lack of opportunities for integrated transport provisions 6. Lack of coordination between different transport operating agencies 7. No parking space for rest hours for drivers 8. Less provision of street furniture 9. Non-aesthetic streetscape 10. Haphazard on street parking reduces road capacity 11. Poor design of bus bays 12. Poor maintenance of railway station 13. Poor administration and management control 14. Encroachments around bus bays and railway land sites	1. Workability 2. Promotes compact development. 3. Activity centers (support local business) 4. Opportunities in the form of wide roads available for mass transit system development 5. Wider road space can be used to facilitate multiple transport activities by implementing road space design standards 6. Adequate space available for street furniture installation 7. Proper management can promote public transport services 8. After removal of encroachments adequate space available for traffic signs, lane markings and foot paths 9. If properly administrated and space utilized, could promote smooth flow of traffic on nearby corridors 10. A new transport terminal for goods transport will facilitate timely supply of industrial goods	1. Encroachments 2. On street parking (paid/unpaid) 3. Reduced flow of traffic (low speed) 4. Security issues 5. Economic losses due to transporters strikes 6. Inconvenience due to traffic congestion 7. On street parking

8.1.6 Policy Guidelines

- Banned commercial loaded vehicles during peak hours in main CBD area.
- Installation of signals & decrease in traffic delay.
- Decrease/stability in air and noise pollution.
- Involvement of private sector in transportation infrastructure and services projects.
- Efficient operations and effective regulation of transport services.
- Infrastructure development and up-gradation.
- Integration of public transport services and networks.
- Modernize goods transport and freight facilities.

8.1.7 Sindh Empowerment of 'Persons with Disabilities' Act, 2018 [43]

Keeping in view 'Persons with Disabilities' act, 2018 while planning, designing & executing any kind of infrastructure projects i.e. public places, markets, parks, educational institutions, health facilities, Roads Street and pathways centers and etc, it is now mandatory to apply Universal Design and Accessibility criteria for ease of access of differentially abled persons. Also during the planning & designing phase universal guidelines for differently abled friendly construction should adhered for e.g provision of ramps, specialized tiles (Tactile Paving) used for visually impaired personals, signage, street furniture, foot path steps, parking, mechanical access, railings, opening of doors & windows, toilet design, lighting and illumination and etc.

Specifically planning & designing for the transport sector, universal access is the goal of enabling all citizens to reach every destination served by their public streets and pathway system. Universal access is not limited to access by persons using automobiles. Travel by bicycle, walking, or wheelchair to every destination is accommodated in order to achieve transportation equity, maximize independence, and improve community livability. Wherever possible, facilities are designed to allow safe travel by young, old, and disabled persons who may have diminished perceptual or ambulatory abilities. The universal design has following principles;

i. Universal access to destination:
All destinations served by the public road system shall be accessible by pedestrians and by drivers of all vehicles (including bicycles), except that vehicle operation may be restricted for reasons of excessive weight, noise or size, or extraordinary potential for damage to property or person

ii. Equal Right of use:
People's right to use that portion of a street designed for travel is not diminished by less weight, less size, or less average speed associated with their travel mode. Demand actuated tra-c signals

[43] For detail please refer; The Sindh Empowerment of 'Persons with Disabilities' Act, 2018 (https://depd.sindh.gov.pk/sindh-empowerment-of-persons-with-disabilities-act-2018)

must detect and serve a diversity of users including bicycle operators in the roadway and pedestrians using crosswalks.

iii. Accessible surfaces:
To the extent practicable, travel surfaces should accommodate travel on foot with minimal trip hazards and via common assistive devices such as wheelchairs. Roadway surfaces should be as clear as possible of hazards for narrow tires such as bicycle wheels.

iv. Crossable Roadways:
Crossing distances at non-signalized access locations must not exceed the distance that can be covered at walking speed before tra-c may arrive from beyond sight distance, or during reasonable gaps in roadway tra-c. Refuges provided to reduce crossing distances should be large enough to store assistive devices such as wheelchairs and strollers. Tra-c signal timing should provide adequate clearance intervals for safe crossing by pedestrians and slow vehicles.

It is suggested that necessary provision of the above recommendation may be mandated in the laws and regulations of SBEA and other agencies which drafting the buildings and highway regulations

8.1.8 Strategic Development Plan

The aim of strategic development plan is envisions providing equal and equitable sustainable transport system to all groups of society on affordable basis with minimal impacts on environment, also Provision of Citizen-centric, Sustainable and Growth Oriented Modern Transport system and rehabilitation of existing roads.

i. Long Term Plan

- Create Traffic Engineering Bureaus (TEBs) at divisional level to perform functions as specified in Karachi Division (Traffic Engineering) Act 1985.
- Environmental Impact Assessment (EIA) should be mandatory for all transportation projects.
- Declaring private vehicle free zones, especially in peak hours, in CBD areas to reduce noise and air pollutions.
- Satisfy mobility needs via integration of existing and planned routes, services and Infrastructure.
- Implementation of Axle Load Management.
- Dualization of main arteries.
- Improvement of existing roads geometry.

ii. Short Term Plan

- Improve road design to make safer roads.
- Prevent encroachments on footpaths through litigation.
- Rehabilitation of Farm to Market road network.
- Reduce traffic growth and congestion by achieving a mode shift.

8.1.9 **Priority Projects:**

i. Repair and Rehabilitation and Improvement of Major Roads, Minor Roads and Streets (excluding Core Urban Area)

- **Project Justification**

  The condition of secondary and tertiary roads of Thatta is in very poor condition. Due to un-availability of proper drainage network, the sewage water is damaging the roads. All the tertiary roads are also damaged due to sewage water. So it is proposed to improve and rehabilitate the roads of Thatta.

  However, the overall situation indicates narrow street width, poor pavement conditions, encroachments on footpaths and road sides, haphazard and illegal parking, open drains, lack of traffic signals and signs, etc. Space along with major roads is available for provision of missing facilities.

  There is an unplanned & haphazard street network & absence of quality public transportation system in DHQ Town. Major roads & junctions i.e. Thatta –Sujawal Road and Bathoro Road needs repair rehabilitation with allied missing facilities.

- **Project Benefit –** By implementation of the project agricultural, industry sector could be enhanced.

- **Implementing Authority-**Government of Sindh, Thatta MC, Works and Services Department Thatta.

- **Estimated Cost:** 1,061 Million PKR Approx.

ii. Installation of Traffic Signals and new Solar Street Lighting on Main Roads

- **Project Justification**

  Most of the Streets of Thatta Town are without street lights in over all the town and all roads and are devoid of this facility. Street Lighting is essential for safe maneuvering of vehicles at night time and enhance sense of security of pedestrians on roads in dark hours. Given the energy crisis in the country, it is recommended to have solar street lights on streets and major roads.

- **Implementing Authority –** Thatta MC, Government of Sindh

- **Estimated Cost:** 100 Million PKR Approx.

S. No.	Project Name	Estimated Cost In Millions	ADP	Non ADP	Status	
					Short Term	Long Term
Roads and Communication Network						
1	Repair & Rehabilitation of Major & Minor Urban Roads (Excluding Core Urban Area) 20kms with tentative 10 meter right of way @ rate of 4500 per running meter) 900 Million Repair & Rehabilitation of Streets (Excluding Core Urban Area) (Approx. 23,000 meters @ rate of 2,000 per running meter) 161 Million • Pedestrian pathways • Designated Parking Spaces • Provision of Footpaths and Street Furniture	1,061	-	Non ADP	**Short Term**	-
2	Installation of traffic signals and new solar street lights on main roads	100	-	Non ADP	**Short Term**	-

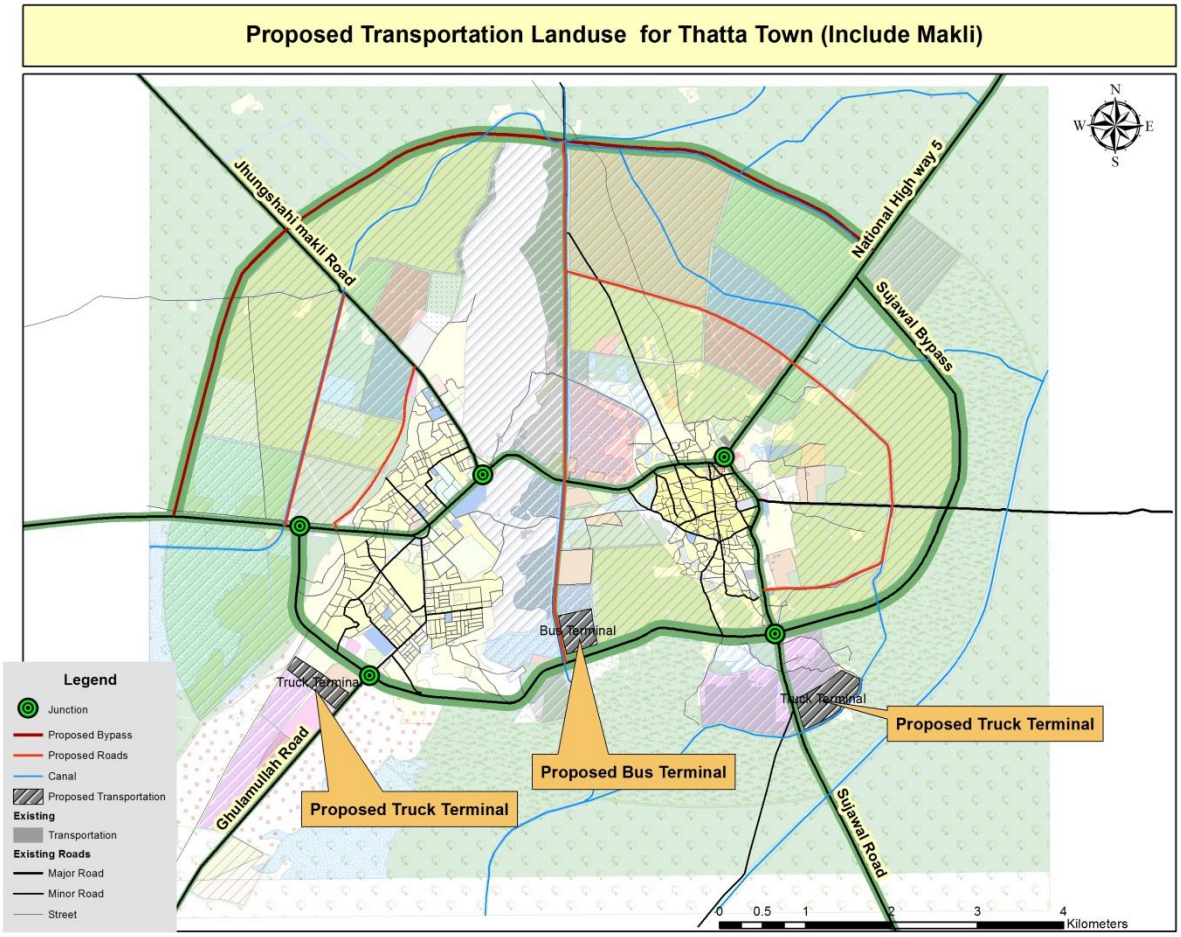
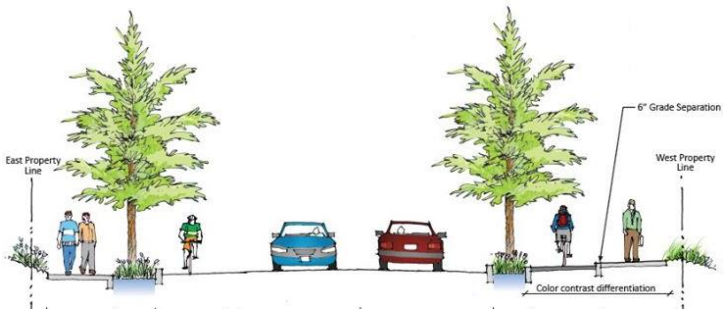


Figure 8-2: Future Proposal for Transportation for Thatta Town

8.1.10 **Immediate Action Plan**

Repair & Rehabilitation of Existing Roads of Core Urban Area

Repair & Rehabilitation of major and minor roads i.e. Thatta-Mirpur Bathoro road, Sujawal Road, Main National Highway N-5 Road, Doctors Street, Fish Market Road, Shahjehan Masjid Road, Khizar Masjid Road and Shahi Bazar Road. The improvement in road pavements with green medians, road markings, signals, pedestrian crossings, will be developed.



The main parameter for rehabilitation of existing roads is to draw a property line, which require very practical approach in such a way that no massive encroachment, destruction will happen. In this regard community participation will be highly needed to take them on board and to make awareness that this realignment is for the betterment of their area. Thus, the community ownership will make the idea workable, other than this forceful action will not work in long run.

Immediate action plan for core urban area in Thatta requires that the right of way of roads should be restored by removing all encroachments along the CBD roads.

The road pavements will be improved and tree lined medians will be developed on all main roads.

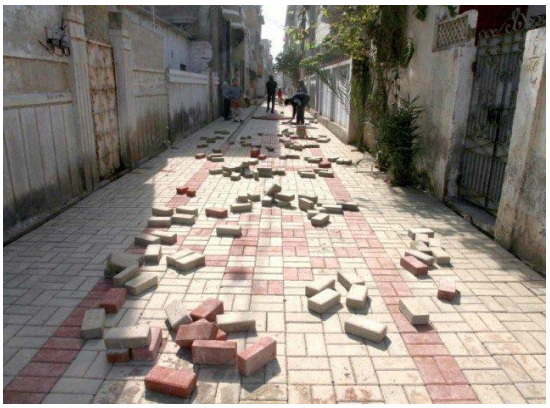
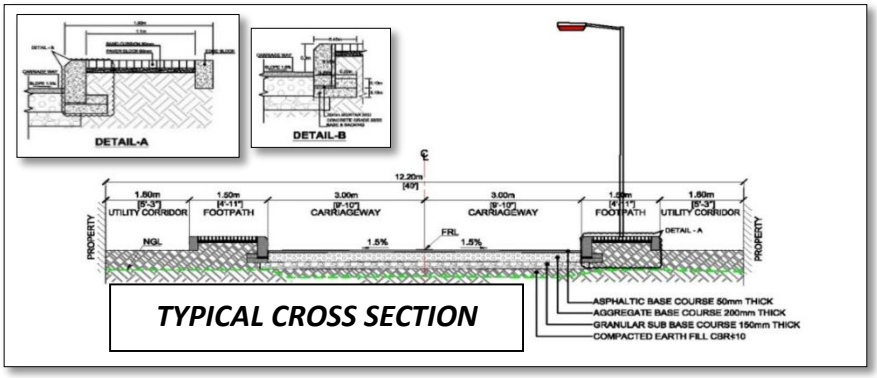
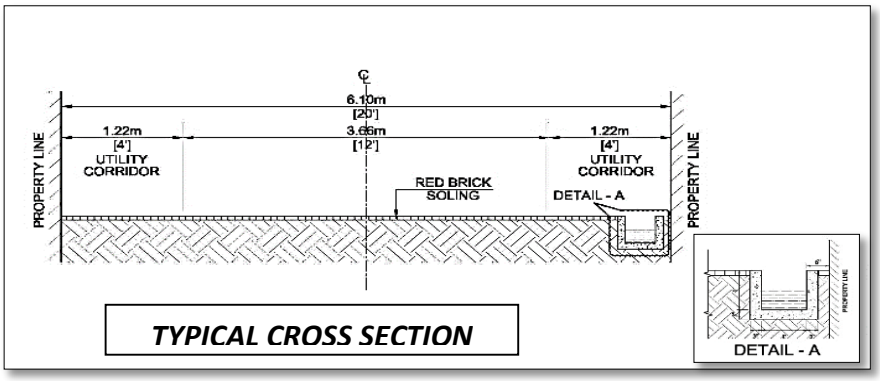


Figure 8-4: Concrete Pavers for Streets

Figure 8-4: Model of Monuments

Typical cross section is given as below;





THATTA - CORE TOWN AREA						REHABILITATION OF ROADS		
S. No	Area / Locality / Address Major Roads	LENGTH (km)	LENGTH (m)	Width (feet)	Width (m)	Area (sq.m)	Per sq.m cost (PKR)	Total Cost Millions (PKR)
1	National High way 5	1.08	1078.50	40.00	12.20	13,152.45	4,500	59.19
2	Shahi Bazaar Road	0.69	691.92	40.00	12.20	8,438.01	4,500	37.97
3	Thatta Sajawal Road	0.13	129.36	40.00	12.20	1,577.51	4,500	7.10
4	Doctor Street	0.01	6.33	40.00	12.20	77.23	4,500	0.35
Total PKR Rs. Million (A).								104.60
5	Nine No.s Minor Roads	4.35	4349.74	40.00	12.20	53,045.65	2,500	132.61
Total PKR Rs. Million (B).								132.61
S. No	Area / Locality / Address Streets Roads	LENGTH (km)	LENGTH (m)	Width (feet)	Width (m)	Area (sq.m)	Per sq.m cost (PKR)	Total Cost Millions (PKR)
1	Upgradation of Streets of Core Town Area	11.77	11774.75	20	6.10	71,797.26	2,000	143.59
Total PKR Rs. Million (C).								143.59
(REHABILITATION OF ROADS) - Total PKR Rs. Million (A+B+C).								380.81

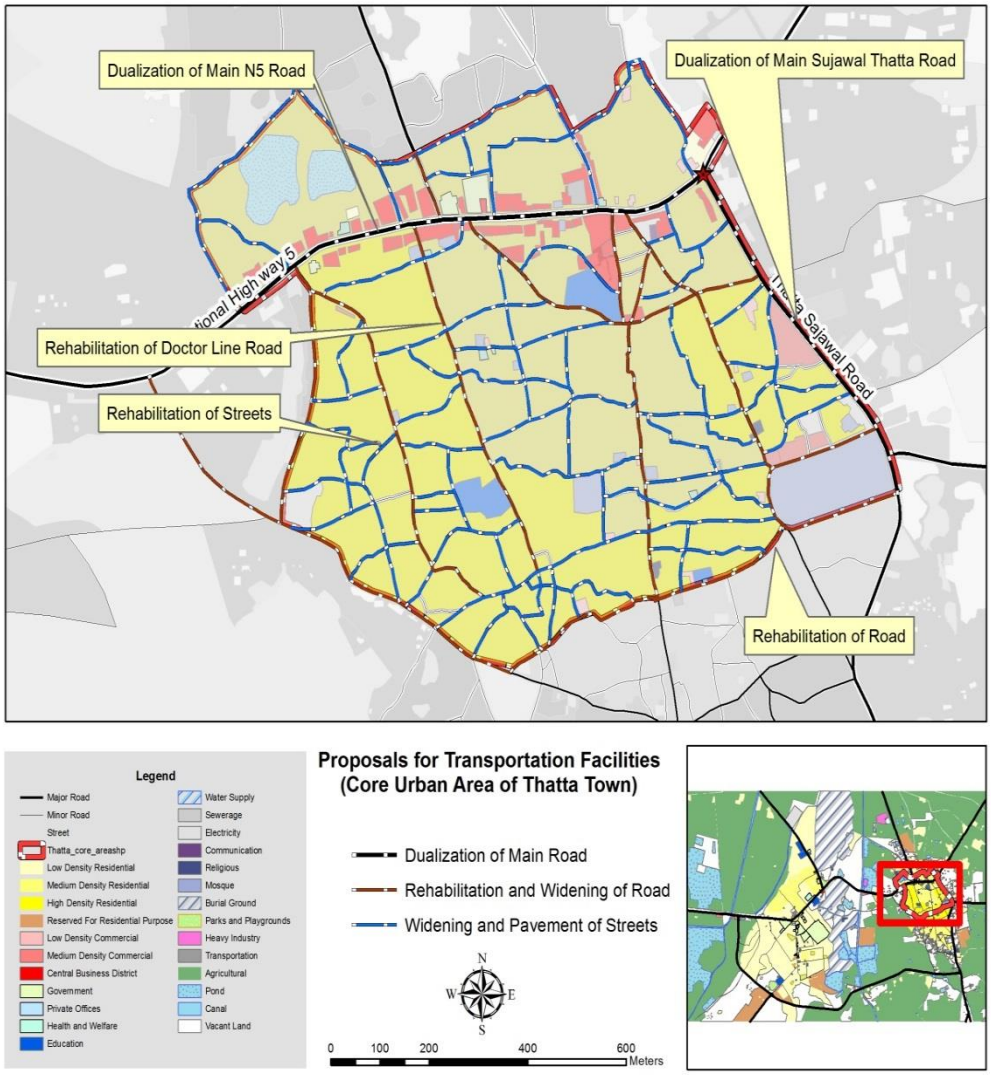


Figure 8-5: Repair & Rehabilitation in existing Transport Facilities of Core Urban Area

Monuments

Repair & Rehabilitation of existing Monuments is proposed on immediate basis monuments include; Sujawal Chowk & Chandni Chowk.

Pedestrian Movement and Street Furniture

Pedestrian movement will be encouraged in core urban area by restoring footpaths on both sides of the roads in the city center. All existing encroachments on the footpaths should be removed to allow walkability in the city canter. Additionally some walkways should be designed in the CBD area by applying the pedestrianization policy there.

Provision of street furniture in the core urban area also needs immediate attention. Street lights, benches, footpaths restoration, traffic signals, zebra crossings and bus stops with shades should be installed on immediate basis.

8.2 Energy

8.2.1 Existing Situation

There is no power generation facility in Thatta DHQ town vicinity. The power supply is through HESCO-WAPDA transmission system. To meet the requirement of consumers, HESCO purchases the electricity from WAPDA and further distribute at consumer's doorstep.

During the socio-economic survey, respondents were also asked about Electric power in their house. Most of the respondents replied to the questions asked about electric power. Analysis of the answers revealed that 84% of households have HESCO electricity and only 16% have no HESCO power supply.

Table 8-3 Source of Alternate Energy

Sr. No.	Source of Alternate Energy	Percentage
1	None	84%
2	Solar Power	61%
	Total	**100%**

Source: Consultant's Survey, July 2017

The Power Supply to Thatta (MC) is through Hyderabad Electric Supply Company (HESCO) WAPDA via 132 KV Grid station feeding district by 11 KV feeders. Electric power supply network exists in the city, but the production is going through a national energy crisis and power supply has become erratic. Thatta MC and Makli TC are categorized as domestic, commercial, industrial, agriculture and other services.

The electricity consumers in the district Thatta are categorized as domestic, commercial, industrial, agriculture and other services. The major portion of electricity is being consumed by industrial sectors, followed by domestic. In the current national energy crisis electricity is facing shortage. Greater emphasis should be laid on alternative energy like solar, wind and biogas. Solar energy should be immediately applied for street lighting and tube wells.

8.2.2 Need Assessment:

The secondary data provided by HESCO indicate the total present supply to Thatta Grid is 114 MW whereas the demand is about 190 MW. This shows that there is shortage of 76 MW of power. This shortage reflects the load shedding in the Thatta, not affecting the domestic consumers only but for business, street lighting, industry and irrigation. The main industrial units are sugar mills, flour mills, and cotton ginning factories, ice factories, and exploration and production companies like OGDCL, PPL, and UEPL & PEL.

8.2.3 SWOT Analysis

Power Supply & Distribution			
STRENGTH	**WEAKNESS**	**OPPORTUNITY**	**THREATS**
1. Electricity supply network for urban area 2. Almost whole urban area gets coverage of electricity 3. Good recovery outcomes as business community in urban area want quality services 4. The industrial sector demands supply of electricity 5. There are good local potential for electricity generation	1. Shortage of electricity & power supply 2. Poor maintenance of electricity supply infrastructure. 3. Power shortage due to non-payments of bills 4. Line losses and power theft. 5. Outdated network in old town areas 6. Existing capacity of electricity supply is short to meet the growing demand of utility 7. No alternate source of electricity is available in the district	1. By increasing the capacity of grid station will minimize electricity shortage & maximize production 2. Opportunities available for alternative energy production through solar energy and wind power 3. Renewal of outdated network to meet existing and future demand	1. Load shedding 2. Threat to agriculture and industrial production and overall economy. 3. Crime rate. 4. Political will and policies at work 5. Licensing and legal issues. 6. Investment protection, law & order. 7. Electricity theft

8.2.4 Issues and Problems:

- Advocacy efforts have not been made to promote efficient fuel use; consequently, there is little public awareness about fuel conservation measures,
- Alternative fuel sources are scarce and expensive. Liquid Petroleum Gas (LPG) and kerosene are available but costly, putting them out of the reach of the rural poor
- Circular Debt
- Transmission and distribution losses are directly connected to Leakage Current Losses, Dielectric Losses, open circuit Losses and theft of electricity.
- Electric theft

8.2.5 Strategic Development Plan

Strategies for Electricity includes:

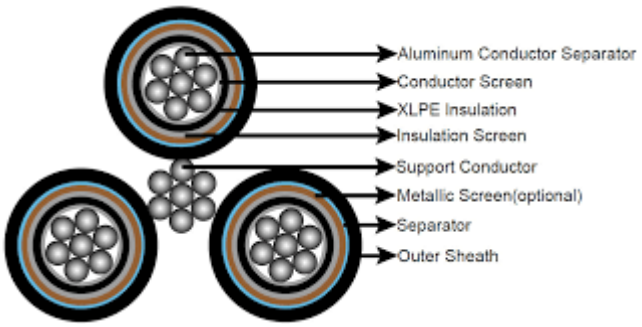
- The effective development of low cost energy production systems can be used
- To offset water scarcity by either deep drilling for freshwater or direct desalinization of brackish water.
- Success in achieving fuel efficiency, adopting new technologies and altering existing fuel-use
- Habits depend largely on women who are the primary users of fuel wood. They must be made aware of the long-term ramifications of adopting these innovations
- Addition of sub stations as per requirement
- Encourage energy efficient building construction

8.2.6 Priority Projects

- Promote energy efficient appliances and devices

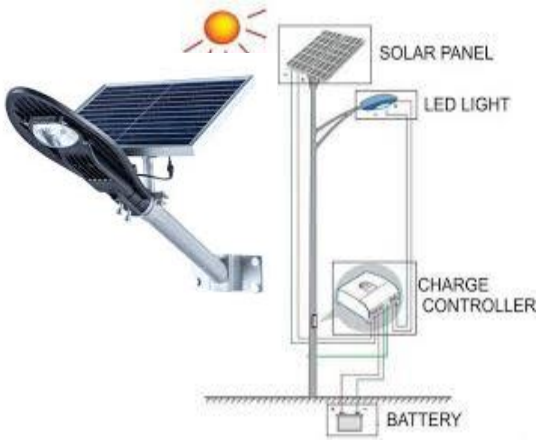
8.2.7 Immediate Action Plan

- **Arial Bundle Cable wires**



In present circumstances it is suggested that Arial Bundle Cable wires should be used to avoid short circuits and thefts issues. This will also increase the aesthetics and beauty of the core urban area.

- **Streetlights**



It is proposed to installed streetlight in all over core urban area. It is suggested to use streetlights with LED panel and solar power battery support. This can save energy and light can be lit even during the load shedding hours, but need regular maintenance. Considering narrow street and road width, it is recommended to use wall mounted poles in narrow streets, while floor mounted poles on other roads.

- Promote energy efficient appliances and devices.

Proposed Wall Mounted Street Lights				
S.No	**Name**	**length (km)**	**length (feet)**	**Cost (PKR)**
1	Proposed Total Length of Street (km) for wall mounted streets lights.	8.00	26,240	6.560,000
			Total Cost (PKR). Million	**6.56**

- Wall mounted street lights approximately should be placed on distance of 15 to 20 feet apart.
- Each wall mounted street light cost (Rs. 5000/-).
- As per total length of Streets for this proposal 1,312 No.s of street lights/wall mounted streets should be placed in core town area.
- Operation and maintenance is the 1st priority to ensure after installation of all equipment's and machinery and kept under strict control of TC office for proper usage of facilities.

8.3 Gas Supply

8.3.1 Presence of Gas

A maximum number of respondents had responded to the questions asked on availability of natural Gas. As given in the Table below, 75% houses had the gas available to them, while the gas was not available to 25% of respondent claimed that they have no any gas facility in their houses. Therefore 25% were using alternate source of fuel for their daily household needs. Households not having Natural Gas provided by SSGC are dependent of alternate sources. Out of total 26% respondents not having gas availability are using following alternate resources.

Table 8-4: Availability of Natural Gas

S. No.	Availability of Natural Gas	Percentage
01	Available	75%
02	Not-available	25%
03	Total	100%

8.3.2 Sufficiency of Gas Pressure

The table below shows the sufficiency of gas pressure as provided by 199 houses. Around 26% of the households suffer from low gas pressure whereas 74% of the households are satisfied with the Gas pressure.

Table 8-5: Sufficiency of Gas Pressure

S. No.	Sufficient Gas Pressure	%
01	**No**	26%
02	**Yes**	74%
03	**Grand Total**	**100%**
Source: Consultant's Survey, July 2017		

8.3.3 Load shedding Hours of Natural Gas

Survey results also reveal that 65% of the households do not have gas load shedding. While only a few of the household's complaints that 5-6 hours gas load shedding is being done in their area on a daily basis. Following table depicts the overall results.

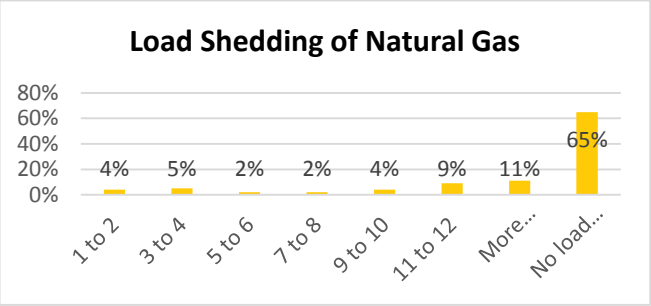


Figure 8-6: load Shedding of Natural Gas

8.3.4 Strategic Development Plan

- Feasibility study for alternate resources available
- Measures to cater Load Shedding of both electricity and gas.
- Measure to appropriately priced the energy resources
- Provision of Sui gas supply for remaining area
- Feasibility study for biogas instead of wooden fuel

8.4 Communication

8.4.1 Telephone, Mobile, Internet

The epicenter of growth in mobile phone services in Thatta is gradually covering to semi-urban, rural areas and small settlements of its surrounding localities. Remote areas have started showing growth, led by the expansion in cellular networks, increasing awareness of the usage of voice and data connections and availability of mobile handsets at affordable prices. The survey result shows that 97% households use mobile/smart phones, whereas only 2% households use both Cellular phone and PTCL landline. The PTCL charges are more and complain rectification is slow. People prefer other service providers in the area.

Communication Tower in Thatta

- **Internet/ Wi-Fi Access**

At present, the internet usage is limited to educated families, and it is by the pace of time increases with the decline of illiteracy rate. As per the survey, only 22% of the respondents are using the internet and the remaining 78% are still without using this new technology, the users are increasing day by day.

S.No	Internet Usage	Percentage
01	Use Internet	22.22 %
02	No Internet	77.77 %
	Total	100 %

Source: Consultant's Survey, July 2017

8.4.2 SWOT Analysis

Strength	Weakness	Opportunity	Threats
Information & Communication Technology			
1. Strong networks available for advanced technologies, e.g. internet, cellular networks, broadcasting,	1. Lack of information sharing regarding agricultural activities, public health, veterinary, disaster forecasting etc.	1. Media can play important role in economic development and prosperity 2. Immediate disaster forecasting through disaster	1. Negative cultural and ethical exposure to young minds (youth), if not regulated properly 2. No check and balance of non-authorized/ non-

Strength	Weakness	Opportunity	Threats
satellite communication 2. All cellular service provider offer facilities and service station 3. Town is covered by PTCL services, station and network	2. The internet usage is limited to educated families 3.	emergency response centre 3. Marketing campaign support of development initiative	biometric SIM's usage

9. ECONOMIC DEVELOPMENT PLAN

The economy of an area or town plays an important role in its sustainability and further growth. An economy can make a town a live town from a dead town. Agriculture and fisheries are the two major sources of employment for the people of district Thatta. In addition to that, there is a substantial number of landless people who own and manage livestock or are engaged in the non-farm sectors. According to a study conducted by the Asian Development Bank, 79% of the population of district Thatta is poor. The incidence of poverty is negatively correlated with land ownership. Landowners are usually not poor.

Most of the farmers have traditionally kept cattle, buffaloes, sheep, camel and goats. A substantial growth on livestock products like; milk, meat, beef, mutton, poultry and eggs have been noticed for many years. The people keep buffaloes, cows, donkeys, sheep, goats, camels and horses. The best breed of buffalo and cow are found in the district. Sheep, goat, camel, horse, ass and mule are also the main livestock of the district. The numbers of large animals exceed the number of smaller animals showing people's preferences for keeping cattle rather than goats or sheep. Livestock in the district suffers in particular from shortage of high quality feed and fodder crops as a result of the overall shortage of water.

i. Policy Guidelines for Overall Economic Development

- Creating a better quality of life for the citizens of the district by encouraging private sector to invest in the district.
- Increase farmer's income.
- Improving infrastructure and key services necessary for economic uplift.
- Providing un-interrupted power supply.

ii. Inclusion of Poverty Reduction Strategy in Economic Development Plan

The poverty reduction strategy (PRS) is aimed to act as medium-term instrument to address the challenge of poverty in Sindh. One of the intervention of PRS has its foundation resting on poverty reduction at the household level, together with the introduction of an urban programme incorporating a model of urban economic clusters for SME-based enterprise development in small cities and towns, and a model of rural growth centres at meso level that would provide a catalytic effect to the PRS. It has the strength to become a keystone for investment planning in the province, while focusing on Economic Development strategies via PRS lens that will boost the employment opportunities as well as enterprise development in the province.

iii. Strategic Plan for Overall Economic Development

- Modernize and revitalize the service sector.
- Implement proactive governance centered on accelerated and balanced economic growth.
- Develop Human resources through capacity building for employment opportunities.
- Reinforce the local governance institutions.
- Modernize local / district / divisional administration.
- Decentralization of governance authorities.
- Involve community participation.
- Exploring and implementing PPP (Public Private Partnership) in all sectors.

9.1 Occupation

The main occupations of the people of District Thatta are industrial based, trade, labour/skilled labour, prominent educationist, agriculturist, professionals like engineers and technical experts especially in the field of related industries are playing their prime role in the development / economical activities of the district. The occupational involvement in industry is also overwhelming. A considerable segment of society adopts government / private service as their occupation. Continuous training to professionals and skilled labour would increase the opportunity for jobs. Occupational data and monthly income pattern of Thatta Town according to socioeconomic survey conducted by the Consultant are summarized as under:

Table 9–1: Occupational Data of Thatta Town

S. No.	Occupational data	Percentage
1	Professionals (Engineers, Doctors, Bankers)	6%
2	Government Servant	16%
3	Teacher	14%
4	Labour	41%
5	Private Employee	21%
Total		**100%**
Source: Consultants Survey, July 2017		

Table 9–2: Monthly Income of Thatta Town

S. No.	Monthly Income	Percentage
1	> 10000	10%
2	10001 to 20000	29%
3	20001 to 30000	21%
4	30001 to 40000	17%
5	< 40001	23%
Total		**100%**
Source: Consultants Survey, July 2017		

The trend of employment and earnings will slightly change due to future economic development plan creating new job opportunities. The number of employees in category of professionals and labour will increase due to construction activities.

9.2 Agriculture

9.2.1 Existing Situation

The agriculture sector in the district is challenged with many issues. Half of the district's land are not available for cultivation and this proportion is increasing steadily over the years. The declining availability of water in Indus has serious repercussions for the Indus Delta and agriculture in the district. A large section of the population that was previously engaged in agriculture has turned to fishing nowadays. Due to sea intrusion, the growers are sprouting betel leaf crops to make ends meet as needs less water and yields more profit. The degradation of Indus delta and grazing lands has also resulted in the decline of livestock population. There are two main crop seasons; "Kharif" and "Rabi" in Thatta District. The Kharif season starts from April-May and ends in October-November while the Rabi starts from November-December and ends in April-May.

After the establishment of a separate district Sujawal in 2013, the geographical area and population of District Thatta have been changed. As in Development Statistics of Sindh 2018, there is no separate data for Thatta and new data is calculated on the basis of Tehsils and new geographical area of the district. Detailed are in Table 9-3: Bifurcation of Area and Population as under:

Table 9-3: Bifurcation of Area and Population

District	Area Hectare		Population 2017	
Thatta	857,000	49.38%	979,817	55.62%
Sujawal	878,500	50.62%	781,967	44.38%
Total	1,735,500	100%	1,761,784	100%

Source: Consultant's estimation

9.2.2 Irrigation Network

The hilly areas of the district are cultivated on monsoon water and wells, while the canals and channels irrigate the other lands. The areas within the protective banks of the Indus used to have fertile patches of land which depended upon the flood and lift water system from barrage channels at various places for irrigation purposes. However, the pattern of irrigation has been transformed in the district due to a lack of water availability.

9.2.3 Land Utilization

After the disintegration of the data, the total geographical area of district Thatta is 856,743 hectares out of this during 2016-17, the cultivated area was up to 166,904 hectares, current fallow was 90,365, and the net area sown was 76,539 but during the 2015-16, the values were minor different, cultivated area of the district was 165,917 hectares, current fallow 90,365, and the net area sown was 75,551. Furthermore, the comparison of land utilization before and after disintegration is given in the tables 7-2 and 7-3.

Table 9-4: Comparison of Land Utilization (Before Disintegration)

Sr. No.	Type of Cultivated area	Land Utilization (Hectares) 2015-16	Land Utilization (Hectares) 2016-17
		Geographical area	Geographical area
1	Cultivated area	336,000	338,000
2	Current Fallow	183,000	183,000
3	Net area sown	153,000	155,000
4	Cultivated Waste	198,000	198,000
5	Not available for cultivated	853,000	852,000
6	**Total geographical area**	**1,735,000**	**1,735,000**
Source: Development Statistics of Sindh 2018			

Table 9-5: Comparison of Land Utilization (After Disintegration)

Sr. No.	Type of Cultivated area	Land Utilization (Hectares) 2015-16	Land Utilization (Hectares) 2016-17
		Geographical area	Geographical area
1	Cultivated area	165,917	166,904
2	Current Fallow	90,365	90,365
3	Net area sown	75,551	76,539
4	Cultivated Waste	97,772	97,772
5	Not available for cultivated	421,211	420,717
Total Geographical area		**856,743**	**856,743**
Source: Development Statistics of Sindh 2018			

9.2.4 Crop Production

Before disintegration during 2016-17 the production of Rice was 542,967 M. Tons, Wheat was to 107,884 M. Tons, Sugarcane 2,535,088 Bales and cotton 89,286 Bales. Whereas, during 2015-16 the production of Rice was 228,579 M. Tons, Production of Wheat was 56,719 M. Tons, Sugarcane 1,971,167 Bales and cotton 27,633 Bales. The crops, production field, and land utilization are given tables as under:

Table 9–6: Comparison of Crop Production (Before Disintegration)

S. No	Major Crops	2013-14		2014-15		2015-16		2016-17	
		Area	Production	Area	Production	Area	Production	Area	Production
1	Rice	70,118	186,219	70,057	185,911	75,374	228,579	140,825	542,967
2	Wheat	16,892	47,656	18,269	51,399	18,159	56,719	37,251	107,884
3	Sugar Cane (Bales)	38,267	2,227,341	38,546	2,019,321	33,237	1,971,167	40,074	2,535,088
4	Cotton (Bales)	5,292	32,161	7,344	41,005	6,682	27,633	19,655	89,286
5	Rapeseed & Mustard	3,415	2,937	3,352	2,883	3,533	3,213	1,230	1,301

Source: Development Statistics of Sindh, 2018

After disintegration during 2016-17 the production of Rice was 115,539 M. Tons, Wheat was to 26,757 M. Tons, Sugarcane 988,767 Bales and cotton 11,658 Bales. Whereas, during 2015-16 the production of Rice was 112,872 M. Tons, Production of Wheat was 28,008 M. Tons, Sugarcane 973,362 Bales and cotton 13,645 Bales. The crops, production field, and land utilization are given tables as under:

Table 9–7: Comparison of Crop Production (After Disintegration)

S. No	Major Crops	2013-14		2014-15		2015-16		2016-17	
		Area	Production	Area	Production	Area	Production	Area	Production
1	Rice	34,624	91,955	34,594	91,803	37,220	112,872	38,902	115,539
2	Wheat	8,341	23,533	9,021	25,381	8,967	28,008	9,023	26,757
3	Sugar Cane (Bales)	18,896	1,099,861	19,034	997,141	16,412	973,362	17,397	988,767
4	Cotton (Bales)	2,613	15,881	3,626	20,248	3,300	13,645	2,908	11,658
5	Rapeseed & Mustard	1,686	1,450	1,655	1,424	1,745	1,587	292	547

Source: Development Statistics of Sindh, 2018

9.2.5 SWOT Analysis

Agriculture			
Strength	**Weakness**	**Opportunity**	**Threats**
1. Agriculture and fisheries are the two major sources of employment for the people of district Thatta 2. Strong network of distribution of agro based products Wheat, rice and sugarcane are major crops of this district. Official statistics about these major crops have shown surprising results i.e. over the last twenty years, area and production of these crops have significantly increased.	3. Shortage of technical and home based industry 4. Low demand of home grown food products 5. Less revenue generation by local government	1. Job opportunity for rural population 2. Healthy population 3. Strong transport system 4. Outside investors show interest in agriculture sector	1. Shortage of educated and skilled professionals 2. Less efficient local markets 3. Shortage of agro based products 4. High land prices 5. Land grabbing by sea water intrusion

9.2.6 Strategic Development Plan

i. Long Term

- Agricultural technology development, dissemination and adoption.
- To address the property issue / raising of income level ,waste land available should be granted to land less
- Enhancing crop productivity through adoption of new technologies.
- Provision of agricultural infrastructure for the welfare and prosperity of local population.

ii. Short Term

- Modernize and revitalize agriculture.
- Use of modern techniques for cultivation by choosing healthy seeds and fertilizers for increasing yield per acre.
- Increase the supply and quality of agricultural crops
- Provision of warehouses for storage of agricultural products
- Enhancement of the storage capacity.
- Provision of warehouses, food gowdowns for storage of agricultural products.
- Construction of covered gowdown.

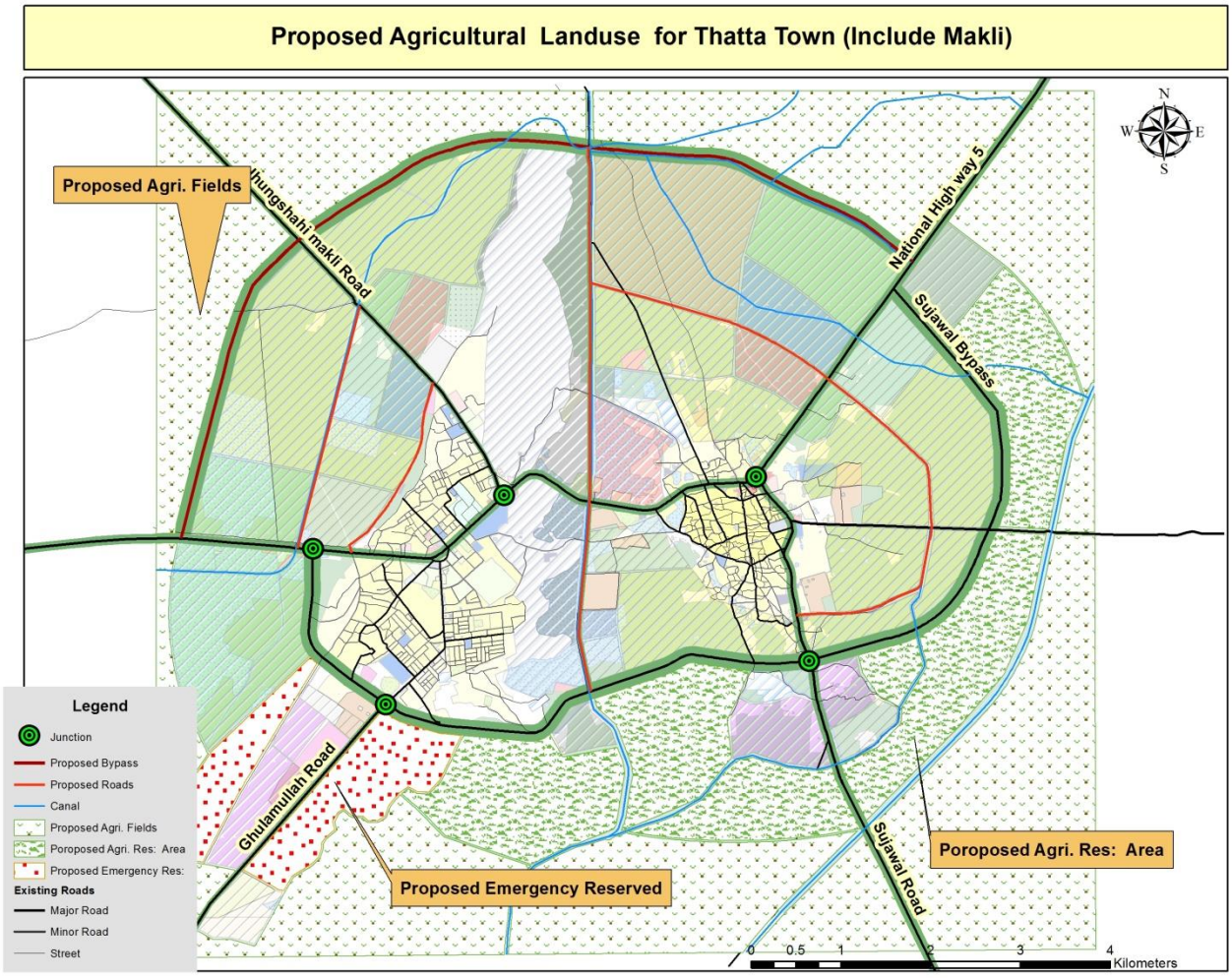


Figure 9-1 : Future Agriculture Reserved Area Proposal Thatta Town

Projects listed in ADP (2018-2019) include:

i. Sindh Agricultural Growth Project (SAGP) World Bank Assisted
ii. Nutrition Sensitive Agriculture Project Phase-I.
iii. Construction of Office Building for On-Farm Water Management staff

9.2.7 Economic Development

Sanghar district is producing Cash Crops like Sugarcane, Wheat, Rice and Cotton. The analysis translates that about 47% and 41% of arable land used for cultivation of cotton and wheat crop only, might be the reason that soil and climate of the region suits to Rice crop, therefore grower and government may focus to reclaim more waste land to convert the same into arable land and priority may be given to Rice and Wheat crops.

In order to improve the crop production improvement and intervention from government departments are need in the following areas:

- Agriculture credit facilities
- Regular Supply of irrigation water
- Availability of Fertilizer, pesticides and quality seed
- Tube well installation facilities
- Decreasing water logging and salinity
- Construction of farm to market roads

9.3 Livestock

9.3.1 Existing Situation

District Thatta is richly populated area having animal's population of large and small animals. This district is well known with different type of breeds of cattle, Goats and sheep's. Animal population of the district are as follows:

Table 9-8 : Number of Livestock

Sr. No.	Category	District Livestock Population	DHQ Town Livestock Population
1	Cattle	202,952	3,500
2	Buffalos	181,225	5,000
3	Sheep	79,996	500
4	Goats	173,324	1,500
5	Camels	5,432	15
6	Asses	9,382	12
7	Poultry	480,467	10

9.3.2 Veterinary Service

The services for veterinary in district Thatta are deficient, as district Thatta is a richly populated area having an animal's population of large and small animals. For this population of animals, the services are not sufficient and not serving the all population of animals.

In total there are 12 veterinary service facilities with poor conditions are providing services in the district. Out of these, in Thatta Town there is a Veterinary Hospital along Main Thatta City Road. There are 10 veterinary doctors (out of 13 sanctioned posts), 25 paramedics staff (out of 32 sanctioned posts) and 21 technicians are working in these veterinary facilities of district.

Table 9-9 Veterinary Service

Veterinary Service		
S. No.	**Items**	**Numbers**
1	Veterinary Hospital	01
2	Veterinary Centers	06
3	Veterinary Dispensaries	05
4	Doctors	10
5	Paramedics Staff	32
6	Technicians	21

Source: Veterinary Department Thatta

The name of veterinary services in the district are as follows:[44]

1. Veterinary Hospital Thatta
2. Veterinary Centre Makli
3. Veterinary Centre Ghorabari
4. Veterinary Centre Jangshahi
5. Veterinary Centre Jhurk
6. Veterinary Centre War
7. Veterinary Centre Haji Siddique Shoro
8. Veterinary Dispensary Mirpur Sakro
9. Veterinary Dispensary Gharo (with mobile unit)
10. Veterinary Dispensary Garho
11. Veterinary Dispensary Jhampir
12. A.I. Sub Centre Gharo

[44] Retrieved from http://www.livestocksindh.gov.pk/thatta.php

9.3.3 Issues and Problems

- Landlessness and small holding prevents the farmer to raise livestock on commercial basis mainly subsistence farming
- Limited knowledge and facilities
- Almost for every farmer, livestock farming is a secondary activity so treated as secondary source.
- Reduced areas for natural grazing and feed production in the face of increasing urbanization and food security requirements
- Veterinary services are not sufficient and not serving all the population of animals.

9.3.4 Need Assessment

The services for veterinary in district Thatta are deficient, as district Thatta is a richly populated area having an animal's population of large and small animals. For this population of animals, the services are not sufficient and not serving the all population of animals.

9.3.5 Strategic Development Plan

- Improving the production performance of livestock in District through manipulation of different minerals and feed supplements.
- Enhancement of Livestock Production and Productivity through strategic deworming and vaccination.
- Establishment of model livestock farms linked with improved supply chain and value addition.
- Establishing new cattle & dairy farms that lead to increase in number of cattle's and quantity of milk.
- Measures to increase Veterinary Services.
- Establishment of Cooperative dairy farming and in-land fisheries
- Large pasture land and labor force available for livestock growth
- Livestock based products can enhance economic activities if produced through appropriate industries.

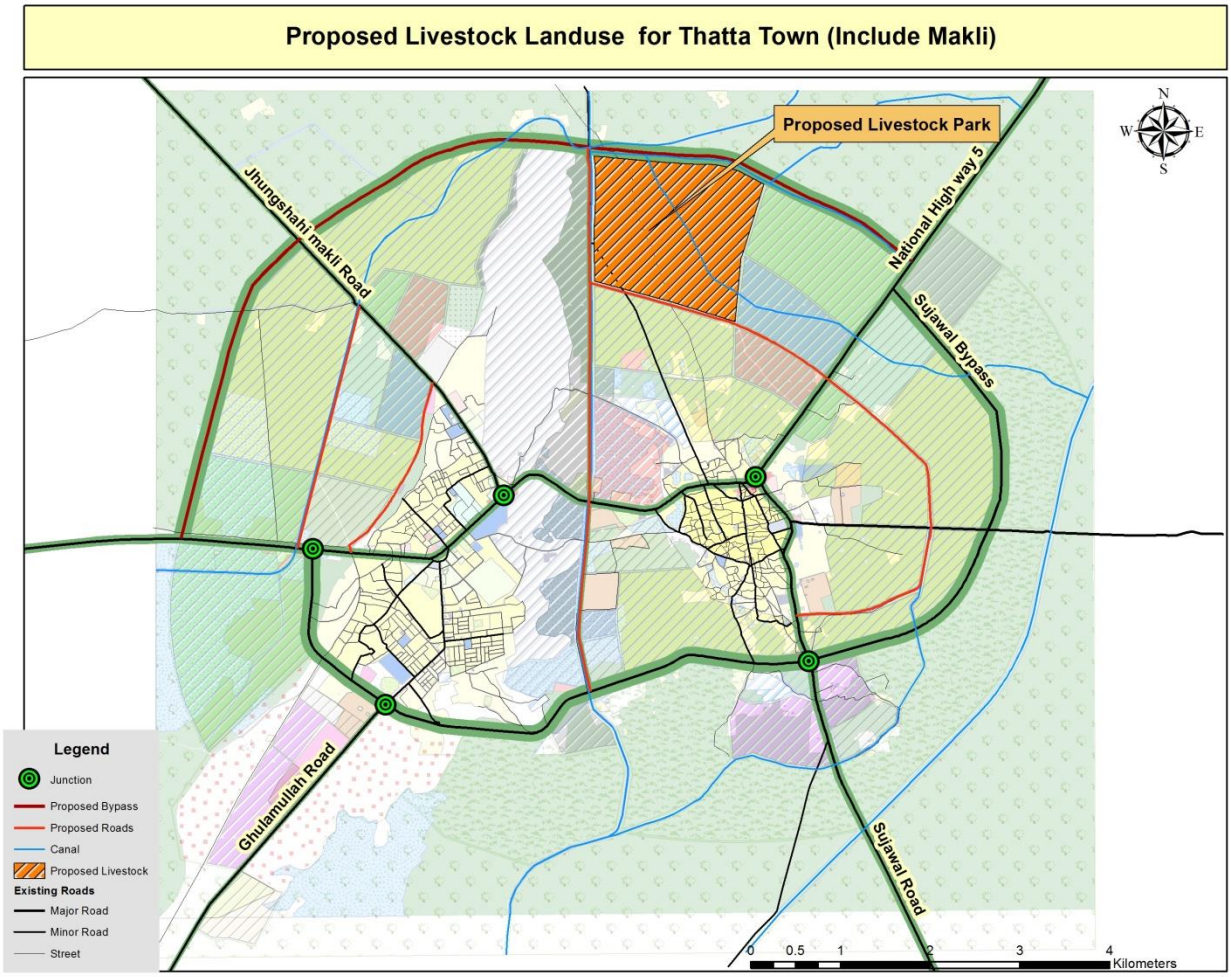


Figure 9-2: Proposed Landuse for Livestock Purpose Thatta Town

9.4 Fisheries

9.4.1 Existing Situation

There are 13,896 fishermen are experiencing their luck, out of which 8,368 are working full time and 5,528 are part-time. The registered boats in district Thatta are 2,101. The annual fish production of the district Thatta is approximately 18,448 M. Tons.[45]

Table 9-10 Annual Fish Production

Fisheries-Water bodies, Fish farms & Production (M.Tons)		
1	Number of Boats	2,101
4	Number of Fishermen	13,896
3	Annual Fish Production	18,448

Source: Development Statistics of Sindh 2018

9.4.2 Issues

- To provide the extension services in private sector.
- Lease of fishing rights, conservation, management and promotion of fisheries.
- Training through open training schools.
- Issuance of district angling licenses.
- Local publicity and awareness.
- Enforcement of fisheries enactment in their respective domain.
- Fish seed stock replenishment in natural water bodies in their respective domain.
- Aquaculture development activities through modern techniques.
- Collection of statistical data of fish and fish resources in their respective domain.

[45] Development Statistics of Sindh 2018

9.4.3 SWOT Analysis:

Livestock & Fisheries			
STRENGTH	**WEAKNESSES**	**OPPORTUNITY**	**THREATS**
1. Different breed of goats, sheep and cattle are found in the district 2. Sheep, goat, camel, horse, ass and mule are also the main livestock 3. Mechanism for milk collection available 4. Favorable environment is available for livestock growth (Pasture) and poultry farming in surroundings of city 5. A fishery industry is well established which provide fish to different parts of the Province	1. Large scale breading has not developed 2. Livestock in the district suffers in particular from shortage of high quality feed and fodder crops 3. Lack of facilities to industrialize livestock based products 4. Drought and destruction of breeding grounds and estuaries has caused significant reduction in fishing 5. Deficient veterinary services	1. Cooperative dairy farming and in-land fisheries has sufficient scope 2. Large pasture land and labor force available for livestock growth 3. Livestock based products can enhance economic activities if produced through appropriate industries.	1. Theft and security issues 2. Losses due to Disasters (floods and epidemics)

9.4.4 Need Assessment

There is need to develop and implement a broad-based fisheries policy which is required for accelerated development of the fisheries sector. Government of Sindh has to take measures to modernize the fisheries sector including establishment of farms on district level to promote fish farming.

9.4.5 Strategic Development Plan

- Need for extension services in private sector
- Lease of fishing rights, conservation, management and promotion of fisheries
- Local publicity and awareness
- Enforcement of fisheries enactment in their respective domain
- Fish seed stock replenishment in natural water bodies in their respective domain
- Aquaculture development activities through modern techniques
- Collection of statistical data of fish and fish resources in their respective domain

9.4.6 Economic Development

i. Establishment of new Cattle and Fish farms

It is expected that sustainable growth of livestock will be maintained as per objectives of Livestock & Fisheries Department with the participation of private sector. Hence there is possibility for increasing number of livestock and dairy farms to meet the requirement of meat and milk. Similarly new fish farms and poultry farms in the districts need to be established to generate production and income of the people engaged in this business. For this there is proposed the Cattle Farm along the proposed Bypass Road in the north of Makli Town, while Fish farms need to be identified by concerned authority to attract the private investment, where water is available.

There is need to develop and implement a broad-based fisheries policy which is required for accelerated development of the fisheries sector. Government of Sindh has to take measures to modernize the fisheries sector including establishment of farms on district level to promote fish farming.

9.5 Industries

From the industrial point of view, Thatta district has progressed considerably. There are number of industrial units established in the district. Apart from the sugar mill and cement factory, most of the larger industrial units are located in Dhabeji and Gharo adjacent to Karachi. Most of the employees in these units are generally non-local and commutes from Karachi and Hyderabad. Due to its strategic location near the Industrial city of Karachi, the industrial sector flourishes very well.

9.5.1 Industrial Estates / Zones

The Small Industrial Estate of 50 acres area is already present in southwest of Thatta Town along Ghulamullah Road. It was established under Small Industries Corporation in 1986-87 with 98 industrial plots. This need to be further developed and extended to meet the additional requirements of the district. The objective is to establish planned industrial areas where industrialists could have all the facilities such as land, road, railway, water supply, electricity, gas, telephone, godowns, sanitation, drainage, labour colonies and other necessary public amenities. Recently, Special Economic Zone at Dhabeji in Thatta, under CPEC (China Special Economic Zone) has been identified, at more than 1,500 acres of land, which is expected to bring the boom of industrialization in Sindh.

9.5.2 Types of Industrial Units

Most of the industries in Thatta District are pertaining to the textile, sugar and agriculture fields. Famous among these include sugar mills, textile mills, paper mills, flour mill, salt works, ice factory, rice husking mills etc. In addition, stone from the Makli Hills and Kohistan is supplied to the Pakistan Steel Mill and the Thatta Cement Factory. Most of the industries present in Thatta District are listed here:

List of Industries in Thatta District [46]		
Flour Mills	**Rice Mills**	**Sugar Mills**
People Floor Mills	Madina Rice Mill	Thatta Sugar Mill (non-functional)
Sheikh Altaf Hussain Floor Mill	Brohi Rice Mill	Abdullah Shah Ghazi Sugar Mill
Thatta Floor Mill	Jani, Rice Mill	Al-Abbas Sugar Mill
Salt Works	Memon, Rice Mill	**Steel Industries**
Dhabeli Salt Work	Raja, Rice Mill	Amreli Steel Plant
Harjena Salt Work	Nooriani , Rice Mill	Shahi Steel Pipe Work
Qurashi Salt Work	Jai, Rice Mill	**Oil Industries**
Saif Salt Works	Muhammadi, Rice Mill	O.K Oil Mill
Textile Mills	Insaf, Rice Mill	Al-Hamim Oil Industries
Anwar Textile Mill	Al-Jillani, Rice Mill	Tahir Omer Industries
Indus Jute Mill Dhebeli	Garib Sons, Rice Mill	**Others**
Akhtar Garments	**Food Processing**	Thatta Cement Factory
Azmatullah Textile Mill	Pioneer Food Pvt Ltd	Tapal Wood Works
Annoor Textile Mill	Seven Star International	National Colloid Industry
Ice Factories	Halal Nutrition Pvt. Ltd.	Agriculture Engineering
Sindh Ice Factory	Maza Pakistan	Hassan Feed and Allied Products
Malik Ice Factory	Meskey and Femtee Pvt Ltd.	

9.5.3 Wind Mill Power Project

Thatta District is in advatageous position to have wind blowing environment for operating Wind Mill Power Plants. The major contribution is of Wind Power Plants generating about 1000 MW electricity with additional units to produce additional 1500 MW electricity, as shown below:

Table 9–11: List of Wind Mill Power Plants

Plant Name	Location	Capacity (MW)	Status
Operational			
Jhimpir Wind Power Plant	Jhimpir, Sindh	56.4	Operational since 2009.
Jhimpir Wind Energy Project	Jhimpir, Sindh	49.6	Operational since Dec 2012.
Three Gorges First Wind Farm Pakistan Ltd-I	Jhimpir, Sindh	149.5	Operational since Dec 2014.
Foundation Wind Energy–I & II Pvt Ltd	Gharo, Sindh	100	Operational since Jan 2015.
Sapphire Wind Power Pvt Ltd	Gharo, Sindh	52.8	Operational since Nov 2015.
Yunus Energy Ltd	Jhimpir, Sindh	50	Operational since Sep 2016.
Metro Wind Power Co Ltd	Jhimpir, Sindh	50	Operational since Sep 2016.
Tenaga Generai Ltd	Gharo, Sindh	49.5	Operational since Oct 2016.
Gul Ahmed Wind Power Ltd	Jhimpir, Sindh	50	Operational since Oct 2016.
Master Wind Energy Ltd	Jhimpir, Sindh	52.8	Operational since Oct 2016.

[46] Retrieved from http://skillingpakistan.org/ and http://epasindh.gov.pk/NON%20COMPLIANCE%20INDUSTRY%20HYDERABAD.htm

Plant Name	Location	Capacity (MW)	Status
FFC Energy Ltd	Jhimpir, Sindh	50	Operational since Oct 2016.
Zorlu Enerji Pakistan	Jhimpir, Sindh	56.4	Operational since Oct 2016.
Tapal Wind Energy Ltd	Jhimpir, Sindh	30	Operational since Oct 2016.
HydroChina Dawood Power Ltd	Gharo, Sindh	49.5	Operational since Apr 2017.
Sachal Engineering Works Pvt Ltd	Jhimpir, Sindh	49.5	Operational since Apr 2017.
United Energy Ltd	Jhimpir, Sindh	100	Operational since Jun 2017.
Total		**996**	
Under Construction			
Thatta Power Plant	Jhimpir, Sindh	50	Under construction
Harappa Solar Pvt Ltd	Jhimpir, Sindh	18	Under construction
AJ Power Pvt Ltd	Jhimpir, Sindh	12	Under construction
Hawa Energy Ltd	Jhimpir, Sindh	50	Under construction
Jhampir Wind Power Ltd	Jhimpir, Sindh	50	Under construction
Access Electric Pvt Ltd	Jhimpir, Sindh	21.5	Under construction
BukhshSolar Pvt Ltd	Jhimpir, Sindh	10	Under construction
Safe Solar Power Pvt Ltd	Jhimpir, Sindh	10	Under construction
Blue Star Hydel Pvt Ltd	Jhimpir, Sindh	1	Under construction.
Tricon Boston Corporation	Jhimpir, Sindh	150	Under construction.
Zephyr Power Ltd	Gharo, Sindh	50	Under construction.
Three Gorges Second Wind Farm Pakistan Ltd-II	Jhimpir, Sindh	50	Under construction.
Three Gorges Second Wind Farm Pakistan Ltd-III	Jhimpir, Sindh	50	Under construction.
Hartford/Artistic Alternate Energy Pvt Ltd	Jhimpir, Sindh	50	Under construction.
Western Energy Pvt Ltd	Jhimpir, Sindh	50	Under construction.
Shaheen Foundation	Jhimpir, Sindh	50	Under construction.
Norinco International Thatta Power Pvt. Ltd.	Jhimpir, Sindh	50	Under construction.
Trans-Atlantic Energy Pvt Ltd	Jhimpir, Sindh	50	Under construction.
Act 2 Wind Ltd	Jhimpir, Sindh	50	Under construction.
Harvey Wind Power Project	Jhimpir, Sindh	50	Under construction.
Zulikha Energy Ltd	Jhimpir, Sindh	50	Under construction.
Gul Ahmed Electric Ltd	Jhimpir, Sindh	50	Under construction.
Metro Wind Power Ltd	Jhimpir, Sindh	60	Under construction.
Din Energy Ltd	Jhimpir, Sindh	50	Under construction.
Din Energy Ltd	Jhimpir, Sindh	50	Under construction.
Burj Wind Energy Pvt Ltd	Jhimpir, Sindh	14	Under construction.
Iran-Pak Wind Power Pvt Ltd	Jhimpir, Sindh	50	Under construction.
Titan Energy Pakistan (Pvt) Ltd	Jhimpir, Sindh	50	Under construction.
Dawood Power Pvt Ltd	Gharo, Sindh	50	Under construction.
Bhambore Wind Project	Gharo, Sindh	50	Under construction.
MBM Engineering Company	Karachi, Sindh	1	Under construction.
Gharo Wind Power Plant	Gharo, Sindh	50	Under construction.
Finerji (Pvt) Ltd	Jhimpir, Sindh	50	Under construction.
Trident Energy (Pvt) Ltd	Jhimpir, Sindh	50	Under construction.
Wind Eagle (Pvt) Ltd	Jhimpir, Sindh	50	Under construction.
Total		**1547.5**	

9.5.4 Marble City in Thatta District

The best quality marble deposits of Sindh are commercially known as Golden and Coral marbles. While the large deposits of Golden Marble occur at Sonda (Daduri area) near Kinjer Lake in Thatta District, GoS has planned for establishment of Sonda Marble City in District Thatta, with an estimated cost of Rs.892.842 million, over an area of 200 acres of land. Mining and processing plant can help its use domestically and for export purpose.

9.5.5 SWOT Analysis

Industrial			
Strengths	**Weakness**	**Opportunities**	**Threats**
1. There are about 30 industrial units established in the district including sugar mills (5), textile mills (9), paper mills (2), flour mill (3) salt works, ice factory (2), etc. 2. In addition, crushed stones from the Makli Hills and Kohistan are supplied to the Pakistan Steel Mill and the Thatta Cement Factory 3. There are also large raw coal deposits in Thatta 4. Recent addition to the industrial units is the car manufacturing plant near Budho Talpur, belonging to the Deevan Group, adjacent to the Deewan Sugar Mills	1. Less job opportunities for other sectors 2. Less job employment in agriculture sector	1. More international trade. 2. Job employment 3. Based on the success story of present industries, more industries can be installed in future 4. If products produced by these industries are in good quality then this will enhance the industrial profile of the district at regional level as well as at national level	1. Isolated economy 2. Uneducated social group 3. More emphasis of crop producers on sugar cane production 4. Air pollution 5. Water contamination to river Indus resources

9.5.6 Strategic Development Plan

i. Long Term Plan

- Sufficient market infrastructure to ensure optimal value addition
- Development of planned Industrial Estates / Special Economic Zone in District
- Heritage saving through empowerment of artisans for development of handicrafts
- Paradigm shift from industrial agriculture to diversified agro ecological Systems
- Provision of infrastructure for establishment of new industries.

ii. Short Term Plan

- Support industrial development.
- Modernize and revitalize the service sector.
- Enhancement of colonization in SIEs through provision of missing facilities
- Provision of vocational training and employable skills to the unemployed youth of the district
- Customized lending and micro financing to small industries

9.5.7 Priority Projects

i. Revitalization of Industrial Estate of Thatta (Ghulamullah Road, Makli)

➢ **Project Scope & Justification**

At present, Thatta @ Makli is providing sufficient employment through its industrial estate. Approximately, 50 acres of land is designated for industrial estate. There are about 98 industrial plots designated for to establish industrial units in the district. District Thatta have almost all type of industries ranging from heavy, medium and cottage industries.

Most of the industries in Thatta are pertaining to the Textile, Sugar and agriculture Field. Famous among These include sugar mills (2), textile mills (9), paper mills (2), flour mill (3) salt works, ice factory (2), etc. In addition, stone from the Makli Hills and Kohistan is supplied to the Pakistan Steel Mill and the Thatta Cement Factory

While revitalizing the Industrial Estate of Thatta, the industrial zone must be bifurcated through green belts as buffer zone to limit the adverse impacts of industrial pollution on adjoining residential areas.

➢ **Project Benefits**

Increase industrial activity with significant employment generation and overall assistances to the city's economy.

- **Implementing Authority** – BoR, Sindh Small Industrial Development Board. Thatta Chamber of Commerce and Industries.

- **Estimated Cost**: 500.00 Million Approx.

Project Name	Sector	Short Term	Area in Acres	Preliminary Cost in million	Justification
Revitalization of Industrial Estate of Thatta (Ghulamullah Road, Makli)	Sindh Small Industrial Development Board.	Short Term	50 Acre	500.00	Per acre cost @ 10 Million / per Acre

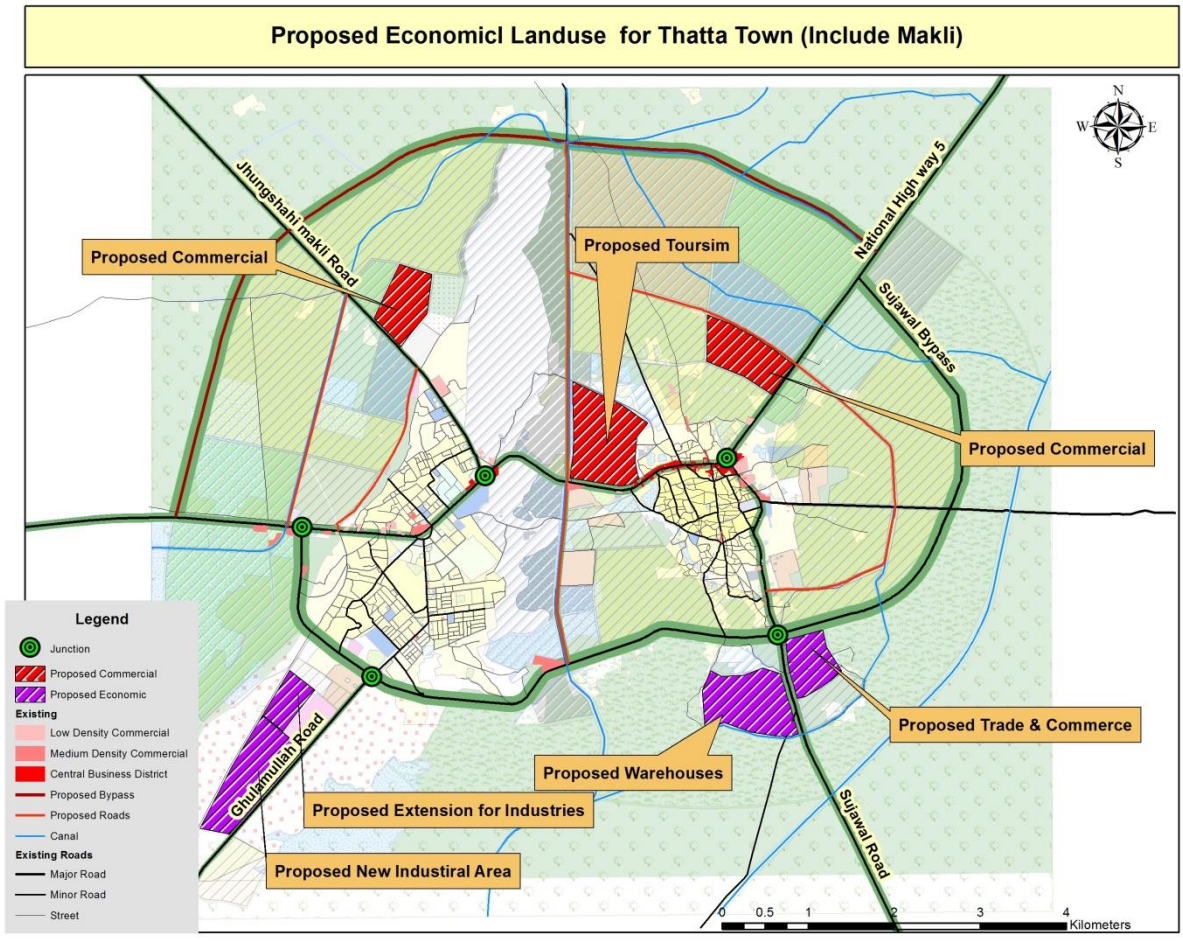


Figure 9-3: Proposed Economic Landuse for Thatta Town

9.6 Trade and Commerce

There is the presence of strong local retail market in form of Shahi bazaar. Shahi bazar is in poor condition, located in old commercial area of DHQ Town. Shahi bazar consists of major commercial activities, wholesale market with lots of food shops, commercial banks and government offices, public and private schools and health services etc. However, there are certain issues pertaining to trade and commerce activities:

- The failure of PPP (Public Private Partnership) trouble for locals and government.
- Demise of local agriculture market.
- Un-planned local business activities.

9.6.1 SWOT Analysis

Trade & Commerce			
Strengths	**Weakness**	**Opportunities**	**Threats**
1. Availability of financial institutes 2. The district as a whole is well-known due to its characteristic of industrial engine which serves all over Sindh by using market of Hyderabad, the regional trading Hub 3. Large number of local skilled artisans available 4. Strong local retail	1. The failure of PPP trouble for locals and government 2. Demise of local agriculture market 3. Un-planned local business activities	1. More opportunities for public private partnership 2. Support to local economy 3. Home grown handicrafts can be promoted through proper exposure to export market 4. Large number of business interest groups	1. Security issues (which lead a large number of agriculturists and business persons to migrating from the city). 2. Inflation. 3. Low subsidies provided by local and provincial government.

9.6.2 Issues

- The failure of PPP (Public Private Partnership) trouble for locals and government.
- Demise of local agriculture market.
- Un-planned local business activities.

9.6.3 Priority Projects

i. Establishment of Fruit and Vegetable Market at Thatta

- **Project Scope & Justification**

  At present there is no site designated for fruit and vegetable market. Ordinary retail shops for vegetables and fruits are located on the main roads and causes traffic congestion and garbage issues. Provision of new fruits and vegetables market shall resolve issues i.e. congestions and road side waste generation etc.

  As towns expand, the relocation of wholesale markets to the fringes becomes imperative. In order for this major operation to be successful, it is necessary to provide good level of access and infrastructure for the project area. Close linkages with bus and truck stands must be ensured. This planned market shall provide an easy access and the existing commercial area shall not face traffic congestion and other related problems. Fruit and vegetable market area is considered to be part of trade and commerce zone for future up-gradation of Thatta DHQ town with respect to its use in future and giving ease to the present user of existing market.

  Establishment of Fruit and Vegetable Market at Thatta with allied facilities shall attract entrepreneur to expand their investment and will also improve the urban environment. In the Proposed Master Plan approximately 243 acres of land along Sujawal Road is proposed for Economic Zone; including 80 acres for Trade & Commerce and 163 acres for Warehouses.

  Out of total trade and commerce area, Consultant has suggested ten acres of land for development of trade and commerce activities on priority bases. This will be comprises of fruit and vegetable market, whole sale market, slaughter house and godowns. This planned market shall provide an easy access and the existing commercial area shall not face traffic congestion and other related problems. It will also include general shopping area and offices will be reserved for fruit and vegetable market on priority basis. The remaining area of trade & commerce is reserved for future need to expand facilitates and to add new market requirements. Whereas, warehouse area will be developed in future for specialized type of warehouse storage facilities as per upcoming demand of market.

- **Project Benefits**

  It will give ease to the local population to earn their living through it and will increase the revenue generation and employment. It will also reduce the traffic congestion which is the major issue of town due to existing markets in the main core city area.

- **Implementing Authority** – BoR, Thatta Municipality.

- **Estimated Cost**: 435.6 Million Approx.

Project Name	Sector	Short Term	Area (acres)	Preliminary Cost (million)	Justification
Establishment of Fruit and Vegetable Market at Thatta (Considering 50% Built-up Area)	Economic Development (Trade & Commerce)	Short Term	10 acres	435.6	50% of proposed land is 5 acres = 217,800 sq.ft , at the rate of 2,000/- PKR per sq.ft construction cost with all infrastructure

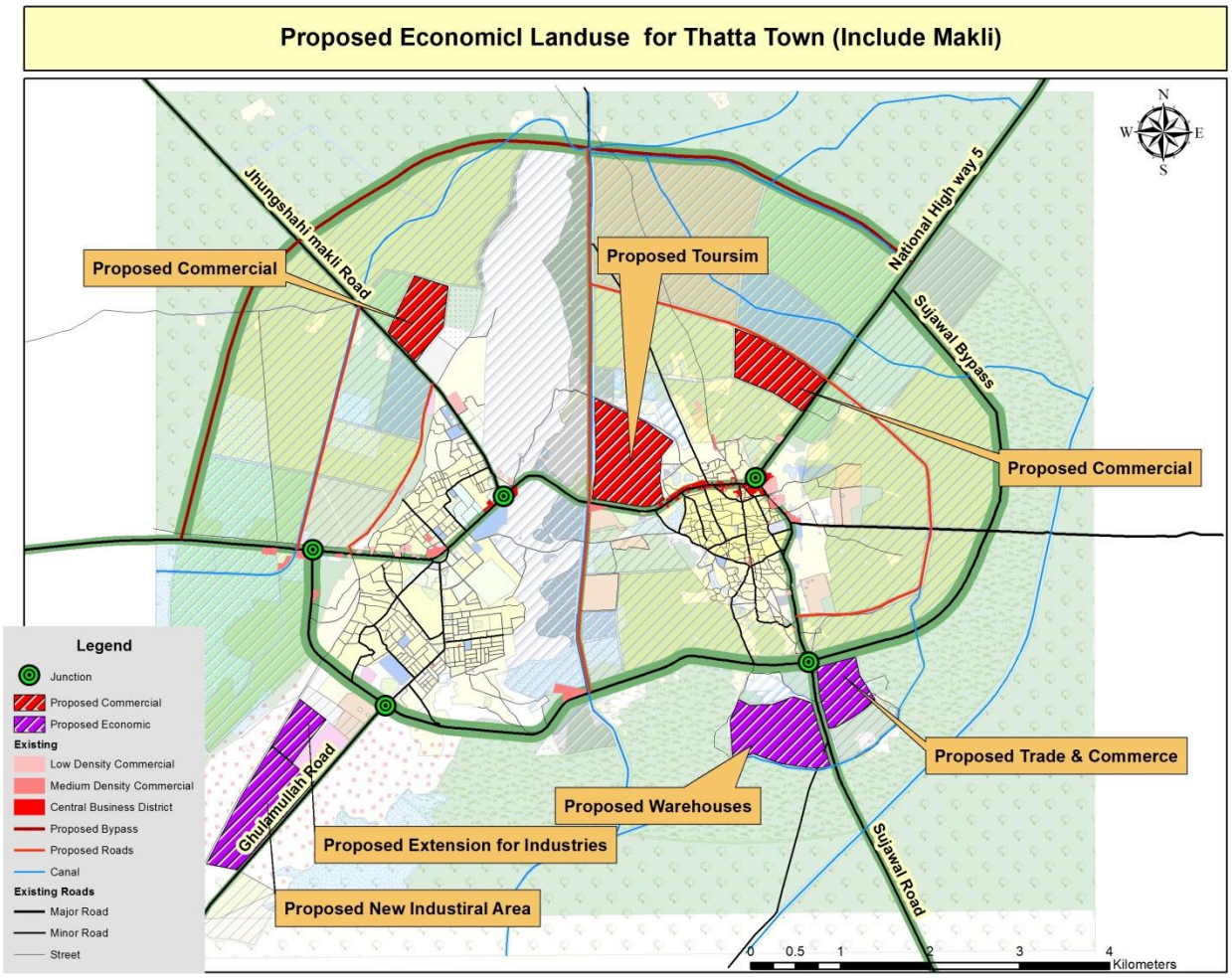


Figure 9-4: Future Economic landuse for Thatta DHQ Town

9.6.4 Immediate Action Plan for Core Urban Area

The core town area is the oldest and the most congested part of the Thatta town, and facing lot of problems i.e. unavailability of footpaths, outdated sewerage & drainage system, encroachments, illegal Wagon & qingqi stands etc. Main CBD is thriving trade and popular retail businesses in narrow streets and high density low rise buildings occupied by population belonging to various income groups.

The proposed projects for core urban area of Thatta consists on; Removal of encroachments from town center and bazaars, created by the shopkeepers and hawkers; Rehabilitation of Main Commercial (CBD) Area, Rehabilitation & Beautification of main Bazar area i.e. Shahi Bazaar, Commercial area along National Highway N-5 road and Thatta Sujawal Road etc.

- **Modernization of Commercial Activity in the Core Urban Area**

  Thatta has major commercial hub like; Shahi Bazar, Commercial area along National Highway N-5 road and Thatta Sujawal Road etc. CBD includes traders, wholesale markets, and traditional embroidery shops, Auto Shops, restaurants, schools, clinics and general stores etc. Shahi bazar is located in old commercial area of DHQ town & in poor condition.

  - Up gradation of Shahi bazar area.
  - Provision of pedestrian facility in the Bazaar area.
  - Banned heavy vehicles during peak hours.
  - Removal of encroachments (road side bus & wagon stands etc.)
  -

THATTA - CORE TOWN AREA						
REHABILITATION OF COMMERCIAL AREAS Rehabilitation Required Area wise or job wise cost (PKR)						
S.No	Area / Locality / Address	Area (acre)	Cost in PKR million.			
			Street / Road / Parking	Utility infrastructure	Public Facilities	Security
1	Rehabilitation of Commercial Areas	49.10	12.28	1.47	18.41	12.28
	Total PKR Rs. Million		**44.44**			

Note :
1. Commercial areas should be enlisted in Govt. Agency for all services of Trade, Retail, Marketing, Sale etc.
2. All commercial areas security services are associated with combine effort of commercial trade union and local Govt.
3. Commercial areas accessibility for daily users and marketers is well define with ease.

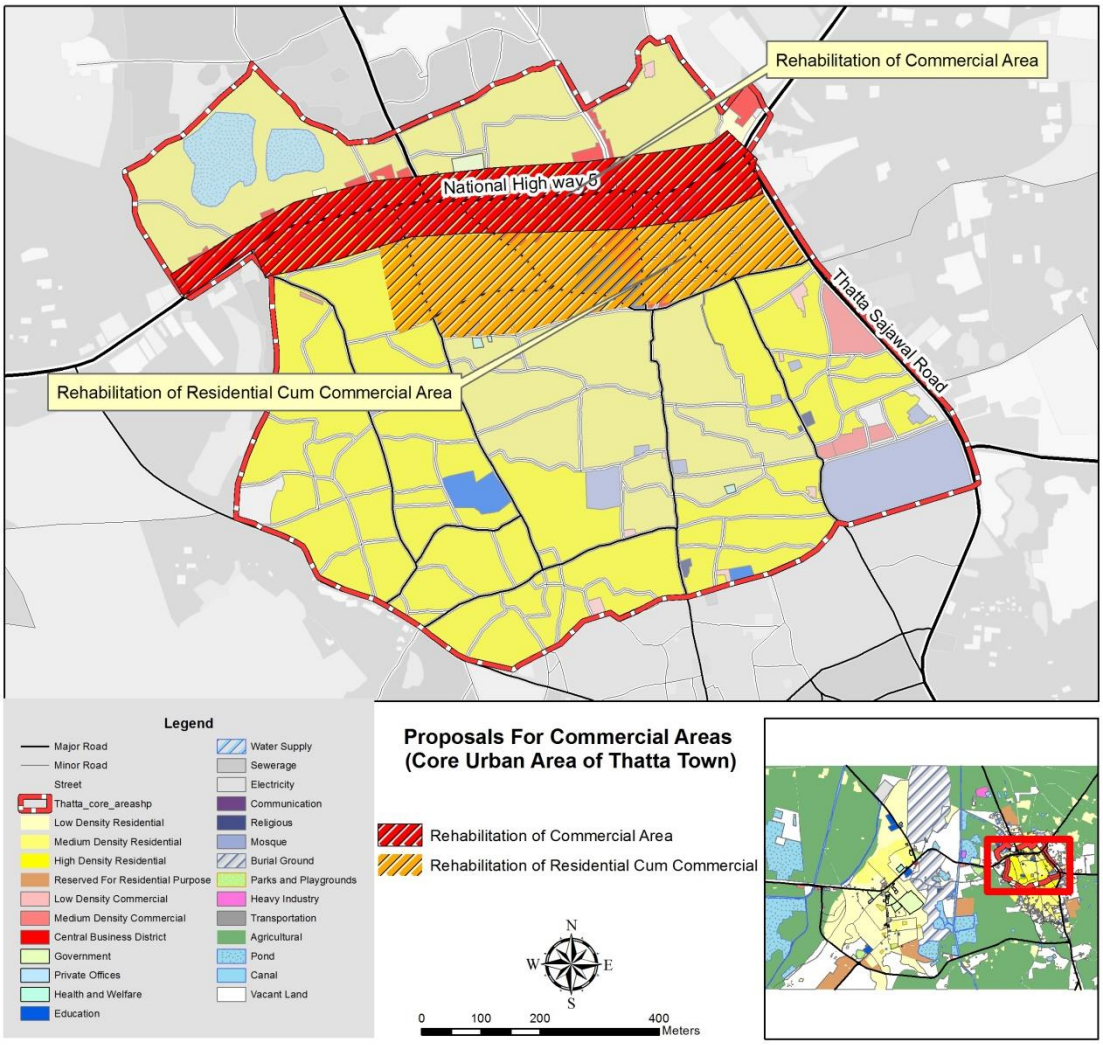


Figure 9-5 Proposal for Rehabilitation of Commercial Area

9.7 Economic Development Plan of Headquarter Town with Poverty Reduction Strategy (PRS)

Poverty Reduction Strategy (PRS)

Sindh province is leading the way in being the first province to have taken the bold step of formulating a specific Poverty Reduction Strategy (PRS) for the entire province, which has been approved by the Sindh cabinet on 16th October, 2018. The PRS developed is aimed to act as medium-term instrument to address the challenge of poverty in Sindh and to have a specific focus on Community Driven Local Development (CDLD). This is a logical approach for Sindh, given the GoS initiatives over the last decade in CDLD, through the Union Council Based Poverty Reduction Programme (UCBPRP).

i. A Vision for Poverty Reduction in Sindh

The poverty reduction strategy is aimed to act as medium-term instrument to address the challenge of poverty in Sindh. As such, the long-term intentions and aspirations of the GoS in reducing poverty should be clear, with a definable 'vision' for poverty reduction and associated goals and targets to be achieved over the specified duration of the Strategy.

ii. Poverty Reduction Strategy (PRS) Approaches

The PRS illustrates three dimensional approaches to reduce poverty at Rural and Urban Level

I. This includes continuation of People Poverty Reduction Program to carry out interventions of financial support and capacity building at grass root level
II. The second proposal entails a model of Rural Growth Centers which will serve as a business hub by clustering the geographically connected and demographically viable village
III. The third approach envisages reducing urban poverty by adding urban economic clusters and creating linkages between rural and urban poverty reduction activities

iii. Poverty Reduction Strategies

The three key strategies of the PRS, and their core components, are:

STRATEGY I Community Driven Local Development (CDLD) – the Foundation

The CDLD Policy is incorporated within and is a component of the PRS continuation of a CDLD approach consists of:

- Building on and expanding the UCBPRP programme
- Mainstreaming a CDLD approach, and integration of this approach with line department activities.

STRATEGY II Addressing Urban Poverty

- The direction of the strategy to address urban poverty is on emphasizing ' urban within rural' – focusing on the small towns within rural areas of Sindh

- The strategy focuses on targeting employment opportunities and enterprise development
- A key approach within this is utilizing urban economic clusters as a means to facilitate cooperatives in enterprise development.

Urban Income Enhancement Program and Economic Cluster

In order to address the issues of human development and poverty in districts, the policies and programs are to be developed both for rural and urban areas. These issues for the development of city have been tackled by linking with "Urban Income Enhancement Program" which emphasizes in establishment of "Urban Economic Cluster" focusing on:

- Small Enterprise Development,
- Vocational training and
- Encouraging Women Force for establishing handicrafts and cottage industry

This would lead to creating the opportunities for income generation and employment.

STRATEGY III Rural Growth Centers, or 'Service Hubs'

- This strategy consists of a new approach in the way forward to address rural poverty and development. This involves identification of locational focal points or villages that can serve as a center for improved facilities and provision of services to the surrounding clusters of villages
- The intention is to consolidate services and facilities in these hubs, to provide growth and development opportunities.

Rural Growth Centre

It include the following components but not limited to

- Housing and village up-gradation (internal roads, drains, parks, Masjid)
- Commercial facilities to support local agri-based businesses and services - for example, storage facilities including refrigerated facilities for storage of agricultural inputs and outputs), distribution centers, sale outlets, bank, milk chilling plant, veterinary clinic
- High school for students from villages in the cluster
- Rural Health Centre
- Vocational center and other community facilities, such as RSP center
- Drinking water plants.

Honorable Chief Minister, Sindh approved five districts namely Badin, Thatta, Tharparkar, Sujawal and Larkana for establishment of Rural Growth Centers (RGCs) as a pilot district.

iv. Mainstreaming the Poverty & Policy & Program

In order to initiate the development of a stronger economy of towns, its policies need to be embedded in sector strategies of the following departments along with Municipal Town Committee and Katchi Abadi regulators.

- Industries & Commerce Department
- Local Govt. Department
- Works & Services Department
- Transport Department
- Planning & Development Department

- Reinforce the local governance institutions.
- Modernize local / district / divisional administration.
- Decentralization of governance authorities.
- Involve community participation.
- Exploring and implementing PPP (Public Private Partnership) in all sectors.

iv. Access to Micro-Finance

Access to demand-driven microfinance provided by sustainable microfinance institutions (MFIs) has proven to be a powerful tool for poverty reduction by improving the ability of poor people to increase incomes, build assets, and reduce their vulnerability during periods of economic hardships.

10. ENVIRONMENT

10.1 Existing Situation

Thatta district is lying between 23°43' to 25°26' north latitude and 67°05' to 68°45' east longitude. Thatta is one of the southern and border districts of Pakistan. It is bounded by District Jamshoro in North, Karachi in North West, Hyderabad, and Tando Muhammad Khan in North East, Sujawal in East, Arabian Sea in the South and Rann of Kutch in South East.

District Thatta spreads over a vast area of 17,355 square kilometers and is the second largest district of the Sindh province following District Tharparkar. It covers 12.3% area of the province and 2.18% of Pakistan. Thatta district is covered by its four talukas namely Thatta, Mirpur Sakro, Keti Bander & Ghorabari. Termed as mini Sindh, it carries all the environmental features of the province. It has semi desert hills/gravel rocks, rangeland s, water bodies, delta, tidal flats, creeks, lakes, and mangrove and riverine forests, irrigated agricultural lands.

Thatta is also rich in bio diversity and an abode of some of the most important environmental resources of Pakistan. Out of the six RAMSAR wetland sites in Sindh, 3 lies in Thatta, out of 34 protected areas of the province, 16 are in Thatta, and of 13 game reserves of Sindh, 3 are in this district. 17% area of the district is under forest cover. The famous lakes Keenjhar and Haleji are situated here as well as the UNESCO listed Makli necropolis.

10.1.1 **Seismicity**

The Seismic zoning map of Pakistan (2015) shows that the mostly Districts of Sindh province places in Zone 2A which corresponds to possibility of minor to moderate seismic hazards i.e. probability of earthquakes of intensity (MM Scale) 6 to 7.5. Accordingly a seismic risk factor of 0.1 needs to be incorporated in the design for constructions and installations in the coastal zone, for operational basis earthquakes (OBE) pertaining to damage due to moderate level earthquakes.

10.1.2 **Surface Hydrology**

DHQ Thatta is situated on the right bank of River Indus at a distance of about 10 km. The lands along the river are formed of silt and sandy loam. Being in the Indus basin, the plane lands of the area are very fertile and productive. Surface water source is the Keenjhar & Haleji Lake and their link canal emerging from main Keenjhar Lake & KB Feeder. It is a perennial canal that supplies water for irrigation and domestic purposes. Most of the canals, branch canals and water courses are unlined and require periodic maintenance.

10.1.3 **Sub Surface Hydrology**

Generally, the left bank is underlain with saline groundwater unsuitable for agriculture and domestic and potable use. The fresh groundwater is mostly restricted to the narrow corridor along the Indus River, and occasional lenses and perched water. In the freshwater zone, freshwater is mostly pumped

by the private tub wells to supplement the canal supplies. In the saline groundwater zones the public sector tube wells drain out groundwater to dispose that into canals or in to the drainage network

As per the consultant analysis of groundwater quality, it is observed that the groundwater is not fit for human consumption and is contaminated with heavy metals like Antimony, Cadmium, Mercury, Barium and Boron. Also the water is bacteriologically contaminated.

10.1.4 **Ecologically Sensitive Areas**

The central part of the district is dominated by agricultural fields and human habitations. A well-developed irrigation system is present to supplement the agriculture activities in the area. The North-North western part is hilly known as Kohistan which is dry arid region of district with sparse vegetation. And on contrary, the South-South Western part of the district is deltaic region where Mangrove forest is situated.

Flora

The flora of the area is governed by the type of soil and the amount of moisture available. The Thatta District has a wide range of soil types due to its diverse land forms which include sandy, deltaic, alluvial, gravel, coastal and mountainous. In the Kohistan region the dominant trees and shrubs are hubul (acacia arabica), kaneli (prosopis spicegra) Pi (salvadora olioides), Karil (capparis aphylla), rhazya stricta, daemia extensa and many others. The dominant trees, shrubs and under shrubs of sand dunes are represented by ak (calotropis procerra), lai (tamerix diocia) besides babul, kandi and karil, etc. The plants found cultivated or wild near villages in the alluvial tracts are neem (azadirachta indica), ber (zizyphus jujube), serrel (albizzia lebbeck) etc.

Forest resource:

Area of riverine forest in the Thatta district calculated in 1990 is 45,128 hectares while the area obtained in 2010 is 36,432 hectares and in 2014 the area further decreased to 25,888.

a. Riverine Forest

The riverine forest was deeply affected due to anthropogenic activities. A large portion of riverine forests was converted into agricultural land. Depletion in forest area with the increase of agricultural land is a major loss of natural ecosystem. Every year extensive area of forests land is turned into waste land or agricultural land due to natural causes or human activities.

b. Mangrove Forest

Outcome of classified maps shows the depletion in area of both the dense and sparse mangroves from 1990s to 2014. Dense mangroves were about 15,227 ha in 1990s, 12,513 ha in 2010 and only about 8872 ha left in 2014. Similarly loss in the area of sparse mangroves was about 92,407 ha to 80,316 ha then 67463 ha. Mangroves forests are also badly affected during these two

decades. This decrease was due to the increase in the settlements in the coastal region and several other reasons such as camel grazing and illegal cuttings may also be the cause of this depletion.

c. Agricultural Land

Agricultural land observed from 1990s to 2014 is increased. Rate of increase of agricultural Lands from 1990s to 2014 is about 7.3 to 21%. Total area in 1990 was 131,589 hectares which has been increased to 174,201 hectares in 2010 and in 2014 value increased to 186,349. Reason for this increase is obviously linked with an increase in the population.

Fauna

Wildlife

As a result of shift in land use from a previously uncultivated land to presently extensively cultivated area, the wildlife has noticeably reduced. Due to human intervention, most of the endemic wildlife has either left or become locally extinct. The animals that are now found are common species that are highly adaptable and able to coexist with people. Cape hare, fox, Asiatic jackal and porcupine constitute the dominant wildlife species in the district. Cape hare is also sighted during the day which indicates that predators are not common in the area. The number and frequency of visits by other animals into the area is reported by the locals to have substantially reduced in recent period.

The wildlife in the area has been affected by colonization of the area and many wild life species have either diminished or vanished. At present hyenas and wolves are hardly ever seen. Jackals are fairly common and foxes are seen in the rapidly contracting area of dry waste. Hog deer which were once seen along the bank of River Indus are uncommon and pigs though diminished are still found in small numbers. Hare and deer are fairly common.

Below are the main wildlife sanctuary's present in Thatta;

- Bijoro Chach, Thatta Wildlife Sanctuary
  - Bijoro Chach, Thatta Wildlife Sanctuary is at an area of 121 hectors, located in the district Thatta. This is a wetland in Sindh.
- Illegal trade of Endangered Green Turtles
  - The wildlife department carried out this raid on the appeal of WWF Pakistan, which was getting quite a few complaints from inhabitants about the illegitimate
- Kinjhar (Kalri) Lake Wildlife Sanctuary
  - Kinjhar Lake is lying in Thatta District, Sind Province about 113km by road east-north-east of Karachi.
- Haleji Wildlife Sanctuary
  - Lake Haleji, in Thatta, Sindh, Pakistan is a refuge in winters and home of thousands of birds and known as one of the most important
- Hadero Lake Wildlife Sanctuary

- Geographical Location Situated in Sind Province about 85km east of Karachi, Hadero is an accessible via the Makli Hills-Thatta - Jungshahi metalled road.

Birds

The most common birds found in the district are sparrows, robins and doves. Characteristic bird species that have adapted to the environment and are still found in the area include the Indian grey partridge (francolinus pondicertanis), chest-nut-bellied sand grouse (pterocles exustus), rock dove (Columbia livia), Indian little button quail (turnix sylvatica) and Eurasian roller (coracias garrulous). Kites and vultures, the high flying birds are also spotted. Other birds reported in the area include the Houbara Bustard (Clamydotis undulata), Houbara Bustard (Tetrax tetrax) Tiloor, which are in IUCN Red List as low risk, near threatened); Grey Parttridge (Francolinus pondiceranus); Indian Sand grouse (Pterocles exustes); Painted Sand grouse (Pterocles indicus); Saker Falcon (Falco biarmicus cherrug) (Extremely rare); Indian Griffon Vulture (Gyps fulvus fulvescens); Partridge (Ammoperdix griseogularis) Teetar/Sissi Tittar; Common Quail (Coturnix coturnix) Butair/Bhuntrio; Eurasian Wryneck (Jynx torquilla) Gandam Muroor/Nando Kath-Kulho; Sindh Woodpecker (Dendrocopos assimilis) Sindhi Khat-Khat/Kath Kutho; Common Hoopoe (Upupa epops) Hud Hud; Indian Roller (Coracias benghalensis) Neel Kanth/Sat Rango; Asian Koel (Eudynamys scolopacea) Koel/Koel; Rose-ringed Parakeet (Psittacula krameri) Tota, Gulabi Kanth Tota/Mitthu, Chattu; Spotted Owlet (Athene brama) Chittidar Ullu/Nandho Chibhro; Rock Pigeon (Columba livia) Jhungi Kabutar; Indian Collared Dove (Streptopelia decaocto) Bari Fakhta Gero; Common Crane (Grus grus) Koonj; Tawny Eagle (Aquila rapax) Gandoori Okab, Rigger/Par Mar, Common Myna (Acridotheres tristis) Myna Ghursal/Kabbri, Myna; Pale Crag-martin (Hirundo obsoleta) Peeli Chatani Ababeel/Jabal wari Ababeel also as pithee; House Sparrow (Passer domesticus) Gorrea, Gharelu Chiriya/Jhirki.

The Kinjhar, Haleji and Hadero lakes are locate on the international flying routes of the ducks. Among birds both grey and black partridges are very common in the forest plantation. Most of the common kind of wild duck and water fowl are seen in the cold season. Geese are also found penetrating the fields of gram and wheat. Kunj are also regular winter visitors. Sand grouse of various kinds visit the district in the cold weather, but the expansion of the cultivated area has driven them away. This also applies to the houbara which was quite common in former times. Quails are common. The other birds found in the district are Indian cursor, small Indian swallow plover, asian open bill stork, black and glossy ibris, sirkeer malikoha or cuckoo, Indian scoops owl, dusky horned owl, etc. Black or Eurasian coot is also found in the district. The Talukas of Sujawal, Shah Bander, Thatta, Mirpur Sakhro were known for the shikar of deer, ducks and partridges. The water fowl census revealed the biggest concentration in the whole of Pakistan on Keenjhar Lake.

Flora and fauna are very important for human existence. The flora releases oxygen which is taken by the fauna for respiratory purposes. In return, the fauna releases carbon dioxide required by the flora for photosynthesis. Human beings are benefitted a lot from flora and fauna through food, medicines, and water. The above mentioned detail of flora and fauna in Thatta District shows the presence of diversity of life in all its forms, species of genetic variations, habitats connectivity and ecosystems. The variety of flora and fauna in Thatta District brings more beauty to nature and this could increase the tourism. Hence it is necessary to protect and increase the native plants, this will help to preserve the natural habitat of nearby animals to improve the biodiversity.

10.1.5 **Ambient Air and Noise Quality**

Consultants has conducted real-time ambient air quality and noise monitoring for 24 hours on 11 August, 2017 near National Bank in Thatta Town. The selected location is situated on a busy road where number of commercial activities are happening and vehicular movement is also high with bus and taxi stands. Since it is more congested, busy area causing emissions and noise due to heavy vehicular movement and traffic generation; thus this location has been selected for air quality and noise testing.

The results depicted that the air quality parameters SO_2, NO_2, NO, CO, SPM and $PM_{2.5}$ are well within the prescribed SEQS except PM_{10} which exceeds the limits indicating dirt content in the air due to dirt roads at the sampling location. High level of SO_2 is related to vehicular emission due to busy road thus deteriorating air quality. Similarly, the noise level at few point of time exceeded the prescribed limits of SEQS for commercial area i.e. 65dBA which also portrays the heavy vehicular movement on site.

10.2 Issues and Problems

The following are the key issues for Thatta District related to soil loss and degradation:

- **Water erosion**
  Sedimentation of canal irrigation system decreases water and land use efficiency. Some 40 million tons of soils are brought into the Indus basin each year, which shortens the life span of major reservoirs and reduces their efficiency. The upstream riverside infrastructure is destroyed and top soil is washed away declining productivity of the area. In downstream, the sedimentation reduces the efficiency of hydropower generation and irrigation systems.
- **Loss of Biodiversity**
  Due to the ever-increasing human and livestock population there is enormous pressure on natural vegetation in almost every agro-ecological region of the country. Aridity and prolonged drought in arid lands have affected the vegetation cover in these areas. All these factors have contributed towards the loss of biodiversity in various regions of the country. As a result of natural habitat degradation and illegal hunting, 31 species of mammals, 20 species of birds and 5 species of reptiles are listed as endangered species in the country.

- **Water logging and Salinity**

  The major factor contributing to water logging in cultivated areas is excessive percolation from the canal system, which builds up the ground water level. Human activities can also aggravate water logging problems through actions which include the following:

  - Cultivation of high delta crops on highly or moderately permeable soils
  - Obstruction of natural drainage channels through construction of buildings and roads
  - Improper alignment and poor maintenance of artificial open drainage system
  - Inefficient disposal of excess rain water, etc.

  Total waterlogged area with water table depth of 5-10 feet in Pakistan is about 11 million hectares. Salinity and sodicity are associated with irrigation but these also occur as a consequence of soil formation process over the centuries.

- **Drought and Flooding**

  The effects and impacts of drought in fragile eco-systems assume serious proportions of land due to misuse of marginal areas, unwise land use practices and overexploitation of natural resources. Adverse effects of drought on human activity usually last for many years.

- **Soil Nutrient Degradation**

  A significant portion of cultivated soils are low in retained important plant nutrients. This nutrient deficiency, mainly of nitrogen, phosphorus, potassium, sulphur, zinc, copper, iron and manganese, has been indicated by various fertilizer experiments conducted on soils in different parts of the country. The problem is particularly severe in the case of irrigated sandy soils, moderate in the case of irrigated loamy soils of old river terraces, and of a minor degree in other soils.

10.3 SWOT Analysis

Strengths	Weakness	Opportunity	Threats
ENVIRONMENT			
Urban Area & Areas Suitable For Urban Development			
1. Land available for future development within town urban boundary. 2. The land use analysis indicates that almost 18.3% of total urban boundary area is in use of residential	1. Loss of agricultural land through land development for housing purpose 2. Water logging 3. Unplanned growth inside town. 4. Lack of utility services	1. Mixed land uses may create activity centres. 2. High density will overcome housing shortages.	1. Land grabbing 2. Slums 3. Unplanned growth 4. Threat to agricultural land 5. Private sector may increase the cost of services.

Strengths	Weakness	Opportunity	Threats
purpose only where as 48% of the area is covered by agriculture fields.			
Land			
1. The land structure of district Thatta can be divided into four regions. Among which 3 regions are barren and fourth one, area along Indus is fertile and suitable for agriculture. 2. So land of Thatta is suitable for development. 3. Rural rich fertile agriculture land that produces quality crops.	1. Unplanned land uses 2. Limited availability of govt. land for future spatial growth 3. Incomplete development of agricultural land parcels (scattered agricultural growth) 4. Poor administration by agencies monitoring urban growth of the city.	1. If treated through appropriate urban design principals & standards, can be transmitted into mixed land uses and strong activity centres. 2. May increase productivity if cultivated at full strength.	1. Land shortage for new development. 2. Slum formation 3. Contamination of land in un-irrigated areas.
Climate			
1. The climate of the district is moderate 2. Suitable for producing crops. 3. The sea breeze blows for eight months of the year, from March to October, making the weather comparatively cooler. 4. January is the coldest month.	1. Rainfall shortages affect the efficiency of canal system. 2. Hot winds blow from May to August from south to north which disturbs the inhabitant's life very badly.	1. Agricultural practices can be changed in accordance with weather condition for maximum production.	1. Droughts 1. Heavy rains Climate change affects agricultural production

Strengths	Weakness	Opportunity	Threats
5. The annual average rainfall of the district is about 200 mm. 6. The mean maximum and minimum temperature recorded are about 40°C and 25°C respectively.			
AIR			
1. Air quality in the rich agricultural belt is good for human health, and also keeps ecological balance in atmosphere. 2. Most of the area is air pollution free.	1. Inner city air is polluted by high volume of traffic 2.	1. Development planned with respect to air circulation can provide relief to inner city's polluted environment. 2. In future the town can be planned as Green City.	1. Air pollution 2. Respiratory diseases
Fresh Water Bodies			
1. Huge irrigation canal based network available 2. District Thatta is irrigated, mainly, by Indus River and canals 3. Inland of fisheries water ponds exists. 4. There are 462 fish production farms in Thatta district.	1. Water contamination due to waste disposal 2. Contamination of standing water bodies created by rain and flood water at open lots is an invitation to malaria and dengue.	1. Temporary water bodies can be used for fish farming. 2. To provide the extension services in private sector 3. To acquire land for fish production in District 4. Lease of fishing rights, conservation, management and promotion of fisheries.	1. Contaminated water is a serious threat for human health. 2. Standing water gives birth to diseases 3. Threat to agricultural land 4. Affect agricultural production 5. Water logging.

10.4 Policy Guidelines[47]

- Enhancing role of local governments in sustainable management of natural resources
- Conservation of biological diversity, protection and sustainable use of indigenous flora and fauna
- Sustainable Management in Reserved, Protected, Flora and Fauna
- Management of irrigated and linear plantations
- Promotion of indigenous species
- Increase the efficiency of surface drainage.

10.5 Strategic Development

i. Long Term Plan

- Drainage can be improved on many sites and is the first thing to consider once a waterlogging problem has been identified. Options might vary from shallow surface drains (ie. Spoon- and 'W'-drains) to more intensive drainage using wide-spaced furrows, to the intensive drainage form of raised beds
- Achieving sustainable development, while overcoming environmental challenges such as land degradation, watersheds and marine fisheries, deforestation, waste management and pollution control, and climate change
- Multi-pronged approach to fisheries management should be adopted that takes account of economic, environmental, and social performance

ii. Short Term Plan

- Ensuring environmental sustainability
- Need of Permits to discharge waste and pollutants into the environment;
- Restoration and maintenance to preserve ecological cycles, functions and services of environment
- Increase the productivity of rangelands
- Provide recreational facilities for public by improving forest parks, wild life sanctuary
- Rehabilitate degraded ecosystems and create environmental awareness
- Develop and implement policies that integrate the objectives of conservation and development to reduce pressure and protect environmental values and conserve biodiversity
- Fostering public-private partnerships

[47] National Forest Policy 2010

10.6 Priority Projects

- Rehabilitation of Irrigated plantation
- Enhance Rangeland production and planting fodder trees for farmer community
- Improvement and Rehabilitation of Forests Parks
- Afforestation of Blank Reaches along Important Highways
- Afforestation along riverine belt
- Measures to reduce waterlogging and salinity
- Measures against drought and flooding hazards
- Due to the ever-increasing human and livestock population there is enormous pressure on natural vegetation in almost every agro-ecological region of the country. Measures should be taken to reduce biodiversity.

11. DISASTER RISK MANAGEMENT

11.1 Existing Situation

District Thatta is situated at a distance of 98 Kilometers in east of Karachi on National Highway. It is situated at 23° 43' to 25° 26' north latitudes and 67° 05' to 68° 45' east longitudes. The district is surrounded on the north and northwest by Jamshoro district, on the east by Hyderabad, Tando Muhammad Khan, Sujawal districts and the Indus River while Indian Ocean is situated on the south of the district. The total area of the district is 8,570sq km. River Indus flows downstream the Kotri Barrage through numerous creeks till its delta in the Arabian Sea near chachdehwali Mohammad at Keti Bunder. The northern part of the district is paramount and known as "Kohistan" connected with a Kheerthar range of mountains. Below table shows the previous history of disasters. District Thatta is vulnerable to various natural and human induced hazards including floods, cyclones, droughts, sea Intrusions, deforestation of mangroves, water logging and salinities and earthquakes as natural hazards, while fires, civil unrests, road accidents and health epidemics are prominent human induced hazards. Besides, poor communication infrastructure, lack of health facilities, low literacy ratio and poverty especially in the remote coastal villages makes the area very vulnerable to various hazards.

Table 11-1 : Hazards Matrix of Thatta[48]

Hazard	Frequency	Severity / Force	Year
Riverine floods	Monsoon	Medium	1973, 1976, 1992 & 2010
Heavy Rainfall	Monsoon	Medium	2011, 2013
Epidemics	Seasonal	Medium	Every Year
Droughts	Frequent	High	1999-2002
Earthquakes	Rare	Very Low	2013
Transport Accidents / fire	Frequent	Low	Throughout
Fire	Rare	Low	Every Year

The district Thatta in the lower Sindh prone to riverine based flooding includes Dadu, Jamshoro and Thatta on the right bank of River Indus and Tando Allahyar, Matiari and Hyderabad on left bank of river.

As established previously, district Thatta is a food insecure district of Pakistan. District Thatta is an agro-based district with majority of the households engaged in agriculture farming, livestock rearing and non-

[48] Disaster Risk Management Plan District Thatta

agriculture activities/casual labour. Among these three types of the households, empirical studies have shown that poverty has been relatively higher in the non-agriculture households, followed by livestock households and small farmers.[49]

As stated in the previous section, many families of this flood affected district lost their homes (15,693 houses were damaged), their crops (108,303 crop area affected) and heads of livestock (65 livestock died). Due to the lack of industrial base, the sources of income of households, situated in this severely affected district, are less diversified. All the social indicators including large household size, poor literacy level, higher mortality rate and inadequate infrastructure with poor access to education and health facilities show a higher level of poverty and deprivation in this district.

Through the destruction of roads, transport and market infrastructure, the floods had a significant
The losses to crops and livestock along with the poor functioning capacity of the market significantly reduced the expected income of the population of this district. Thus the floods and rains affected people of district Thatta had to face a number of key challenges to recover their livelihood; directly affecting the food security situation.

Through the destruction of roads, transport and market infrastructure, the floods had a significant negative impact on commodity market. As a result, the functioning capacity of markets (transporters, processors, wholesalers and retailers) decreased with upward movement of transaction costs and shortage of food commodities. This phenomenon hindered the socio-economic access to food in the district.

I. Health

In 2010 floods, 32 BHUs, 13 Dispensaries, 4 RHCs and 2 SHCs were damaged. During 2011 floods, out of the 47 BHUs, 13 BHUs were reportedly damaged. Out of the 8 RHCs 2 were reported damaged[50].

II. Education

Due to the 2010 floods, 696 schools (Boys: 406, Girls: 66, Mixed: 224) were affected.51 During 2011's heavy rains 172(Boys': 138, Girls': 34) schools were affected, of which 44 (Boys': 32, Girls': 12) were completely destroyed and 128 (Boys': 106, Girls': 22) were partially damaged.[52]

As per data collected after flood 2011, the flood affected health facilities in district had marginally adequate stocks of medicines, equipment and other consumables for one to two weeks.

[49] Arif, et al (2010), "The 2010 Flood and Poverty in Pakistan: A Preliminary District-level Analysis", Pakistan Institute of Development Economics Islamabad,
Background Paper for Conference on the " The Environments of the Poor", 24-26 Nov. 2010, New Delhi
[50] WHO, G. N. (8th to 12th September, 2011). Health Initial Rapid Assessment, 22 flood affected districts in Sindh. Islamabad
[51] Flood Report, 2010-11, RSU, Sindh
[52] District Profile Thatta April 2012, UNOCHA

III. livestock

Beside loss to natural resources, crops, agricultural lands and human life and activities, livestock's life is always endangered by droughts. Thus, alternate arrangements for emergency response facilities like nutritious fodder, vaccines and livestock sanctuaries must be established to prevent the migration or demise of livestock during droughts. The responsibility to implement such measures falls upon the Livestock Department.

As the fodder depletes, livestock are fed on dry grass, leading to a host of digestive problems such as diarrhea, toxemia and metabolic disorders; compromising their immune systems and affecting milk production. This adds to the woes of livestock owners, whose total income generation dependency.

11.1.1 Public Safety

Public safety is the priorities principal of any governance whether it is Federal, Provincial, Divisional or District.

To spread terror in residents, terrorists mainly focused / target crowded places e.g. educational institutions, stadium, shopping centres, malls, religious centres, institutional setups like press club etc., which are less protected in Sindh especially. Terrorist activities can be performed in any shape but mainly on crowded places.

- **Crowded Places**

  Crowded places will remain an attractive target for terrorists, who have demonstrated that they are likely to target places which are easily accessible, regularly available and which offer the prospect for an impact beyond the loss of life alone (for example serious disruption, or a particular economic/political impact).

- **Responsibilities of National / Provincial / Local Government**

  Police and Local Administration Government have the primary responsibility for preventing, preparing for, responding to, and recovering from terrorist attacks in their jurisdiction.

  The protection and resilience of crowded places—particularly those at an elevated security risk—is a key focus of National / Provincial Police / Local Government Administration. While the owners and operators of crowded places remain responsible for implementing protective security measures, National / Provincial Police / Local Government Administration acknowledge that responsibility for building and sustaining resilience to terrorism is shared between government, owners and operators, and communities.

  National / Provincial Police / Local Government Administration are responsible for providing threat information to owners and operators of crowded places. This includes material developed by National / Provincial Police / Local Government Administration, Law Enforcement Agencies (LEA) etc. Police provide specific information on the local threat context to help owners and operators develop protective security measures.

Police are also responsible for running and administering Crowded Places Forums. These Forums are the primary means of collective engagement between police and local owners and operators of crowded places, including businesses and local councils. Members of the Crowded Places Forum can share information, guidance, and lessons learned relevant to their local circumstances.

- **Responsibilities of Stakeholders**

  Implementation of protective security measures and reducing the vulnerability of crowded places to terrorist attack was not just a job for the Government (Federal / Provincial / Division / District) and the police alone. To be most effective, this work requires engagement from a range of local partners, including local authorities and businesses, in order to identify vulnerable sites and prioritize work to reduce those vulnerabilities.

- **Identification of Land uses for Potential Terrorists Attack**

  Consultant identified different land uses in Thatta which are potential crowd pulling places.

  Concerned authorities have not come up with any plan for terrorist's activities / attack to reduce potential threats, incident management, crisis management, business / life continuity and recovery phases.

Table 11-2: Potential Terrorists Threat

S. No	Landuse	Terrorist Threat
1	**Education**	Secondary Schools/College/ University
2	**Health**	BHU/Hospitals/Medical Collages
3	**Commercial**	CBD/Mandi/Shopping Mall
4	**Religious**	Eid Gah / Shrines/Minority Religious Places/Imam Barghas
5	**Government Offices**	District Court/DC Office/SSP Office/District Jail/Police Head Quarter/LEA
6	**Recreational**	Tourism Places
7	**Transportation**	Bus Stop/Railway Station/Airport

➢ **Possible Terrorist Intensity Places of DHQ Town Thatta**

Consultants identified some possible terrorist Intensity places of DHQ Town Thatta on the basis of Crowd and most visiting places by the residents of DHQ Town Thatta, the places are classified according to the given the above table

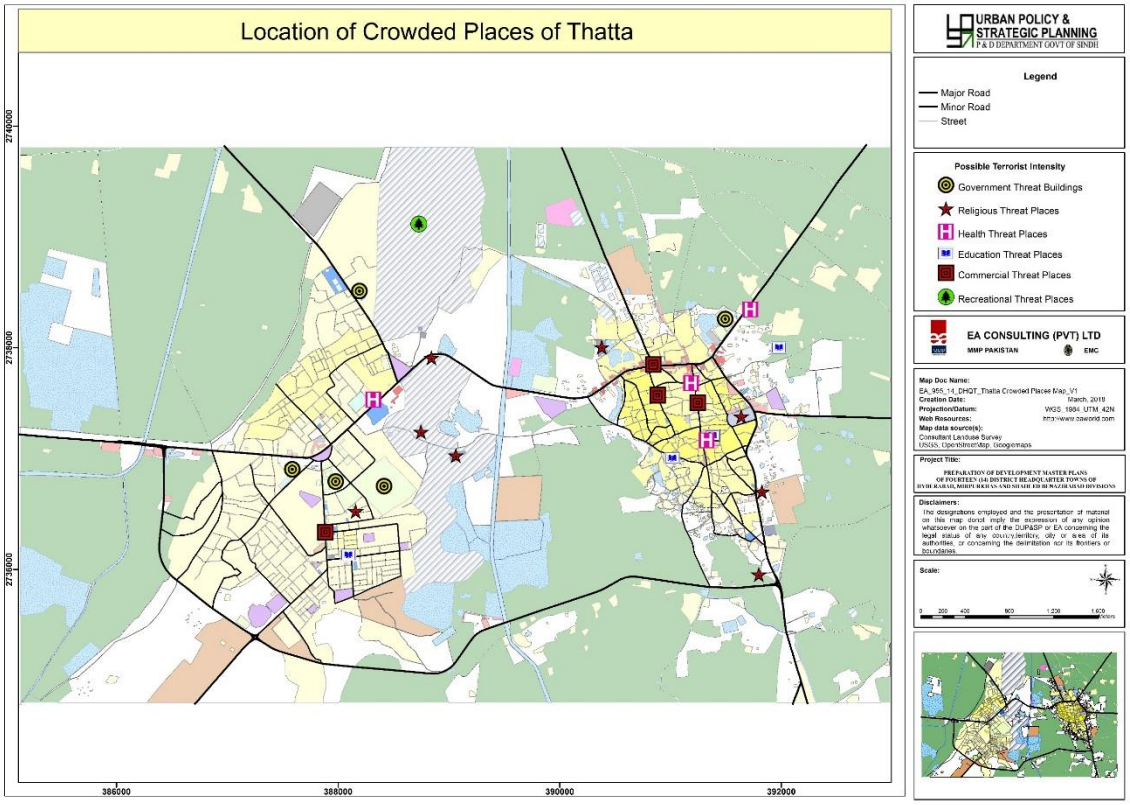


Figure 11-1: Crowded Places of DHQ Town Thatta

- **Proposed Strategy to Counter Potential Threat Measures**

Proposed Strategy for Protecting Crowded places from Terrorism is based on strong, trusted partnerships between all levels of government and those responsible for crowded places. It aims to make crowded places as resilient as possible to terrorist attacks while preserving our use and enjoyment of these places. A nationally consistent approach will help achieve this objective in an effective and efficient manner.

The Strategy involves four core elements which provide a structure for building a consistent national approach to protecting crowded places that can be applied flexibly.

- **Building Stronger Partnerships**
- **Enabling Better Information Sharing and Guidance**
- **Implementing Effective Protection Security**
- **Increasing Resilience**
- **Building Stronger Partnerships**

Protecting crowded places from terrorism is not just a job for governments, it is a responsibility shared by the private sector and the community. The success of this Strategy rests on sustainable and strong partnerships between all governments and owners and operators of crowded places, including businesses and local governments.

Trusted relationships between governments and owners and operators of crowded places are fundamental to the effective implementation of this Strategy. The Crowded Places Partnership sets out a range of mechanisms to support this engagement, but none of these replace the ability for all police and intelligence agencies to engage directly with owners and operators when required.

- **Enabling Better Information Sharing and Guidance**

  Protecting crowded places from terrorism in an evolving threat environment requires trusted and routine information sharing and guidance between all governments, industry sectors, business, and communities.

  It is a key responsibility of government to ensure those who own and operate crowded places have access to high quality threat information.

  The flow of information between governments and those responsible for crowded places is not one-way. Owners and operators should be willing to share information, advice, and lessons they have learned with governments and their peers. Building a strong and inclusive security culture is a responsibility shared by all.

- **Implementing Effective Protection Security**

  Implementing protective security measures can be a complex process which, if done incorrectly, can be costly and ineffective. Owners and operators have a responsibility to undertake a risk assessment and/or vulnerability analysis of their crowded place, implement the appropriate mitigations, monitor them for effectiveness (including through audits), and review them at appropriate junctures.

- **Guidance**

  Before owners and operators make decisions about protective security measures they must first understand how attractive their location may be for a terrorist to attack.
  Crowded places encompass a significant range of different locations, venues and businesses. They differ substantially in size and have different levels of risk to manage.

- **Layered Security**

  The goal of layered security is to reduce the likelihood of a successful terrorist attack on a crowded place by building multiple layers of redundancy into a site's security architecture.

  Layered security describes the practice of securing a site by applying multiple layers of complementary protective security measures.

The following represents some examples of protective security measures that can be used within each layer. Some security measure can strengthen multiple layers. For example, the effective use of security officers can help to delay, detect, deter, respond to, and recover from an attack.

Deterring a potential terrorist attack can involve the presence of obvious physical and electronic target hardening measures, including:

- Fencing indicating demarcation;
- Perimeter security lighting;
- Warning signs and notices;
- High visibility security patrols;
- CCTV cameras;
- Perimeter vehicle security barriers.

Detecting a potential terrorist attack can occur through visual detection and alert systems, including:

- CCTV cameras;
- Electronic intruder detection systems;
- Reporting of suspicious behaviour by security officers, staff, or members of the public;
- Vehicle screening and searching;
- Canine explosive trace detection;
- Screening—x-ray machines, metal detectors, explosive trace detection, and bag inspections.

Delaying a potential terrorist attack can occur through physical counter-measures and other approaches including:

- Security fences;
- Environmental barriers including water features, natural topography, and vegetation;
- Vehicle security barriers and measures to slow the speed of vehicles;
- Pedestrian and vehicle access control points;
- Trained staff interventions;
- Rapid security officer response.

Responding to a potential terrorist attack requires a timely and coordinated security response throughout a crowded place's area of control. Important elements of response include:

- Security staff who can respond quickly and possess the requisite training, competence and equipment to deal with or limit the impact of threats to the location;
- Reliable emergency communication systems throughout the location;
- Comprehensive security plans that are understood by all staff and security personnel, regularly exercised, and compatible with local emergency services plans.

Cost and Proportionality

Security measures can be resource intensive, costly and, if not correctly managed and communicated, can alienate staff and the public and significantly disrupt the day-to-day operations of a crowded place. This is why expert specialist advice is essential and why careful consideration and planning is required before implementing any protective security measures. The following principles should underpin all decision-making:

- It is not possible to protect everything, so owners and operators must **prioritise** the highest risk areas of a crowded place;
- All protective security measures should be **proportionate** to the level and type of threat;

- Security is more **cost effective** when incorporated into the design phase of a crowded place.

Reputation

The success of governments and businesses rests on building and maintaining a good professional reputation. Reputation is prone to serious and permanent damage if owners and operators of crowded places give a less than robust, responsible professional priority to protecting people against attack. Being security minded and better prepared could not only deter an attack, it reassures customers and staff that those responsible for crowded places are taking security issues seriously.

Recovery

Recovery from a terrorist attack is the process of rebuilding, restoring and rehabilitating affected individuals, communities, and physical assets. This process usually begins once an incident has been resolved, continues until disruptions have been rectified, demands on services have returned to normal levels, and the needs of those affected have been met.

- **Increasing Resilience**

  Even the most the most robust and thorough protective security plan may not stop a terrorist attack on a crowded place from occurring or succeeding. But what well-considered and tested protective security does is reduce both the likelihood of a terrorist attack occurring and the consequences of such an attack.

  Resilient crowded places can do more to prevent a terrorist attack, can reduce the damage caused by an attack, and can recover more quickly after an attack has occurred. Building a strong security culture is central to developing resilience to terrorism and other types of criminal activity.

Other elements of building an effective security culture can include:

- Ensuring that security is a permanent feature of executive decision making and agendas;
- Requiring senior management to demonstrate personal commitment to and compliance with security values and standards;
- Understanding commercial, reputational and legal risk that could result from inadequate protective security measures being in place to prevent or mitigate a terrorist attack;
- Providing staff with clear, succinct and jargon-free guidance about security standards and procedures;
- Promoting good security practice to both staff and visitors by making use of internal communication systems, posters, message boards and newsletters;
- Adopting effective and lawful staff screening processes during recruitment;
- Providing staff training in security practices;
- Exercising all staff in security scenarios;
- Self-initiated security penetration and breach testing;
- Sharing information with staff about security breaches;

Encouraging and rewarding staff for identifying and reporting security vulnerabilities.

11.2 Issues and Problems

- Low levels of risk awareness and knowledge.
- Development not "risk conscious" and DRR not yet effectively integrated.
- Insufficient DRR capacity at all levels of society.
- The involvement of the private sector in DRR is as of yet negligible.
- Riverine Flood
- Food Security Problem

11.3 Policy Guidelines[53]

- Provide training and awareness courses to district, municipal and local authority personals dealing with management of hazard prone areas
- Develop public awareness materials (e.g. posters, brochures, booklets, videos).
- Update media about its role in disaster risk management process and how awareness through media can be broadcasted to local community
- Arrange and conduct need assessments of damages / losses.
- Ensure application of proper mechanism for evacuation and relocation of affected community to safer places.
- Establish Relief Camps with necessary arrangements.
- Initiate relief and rescue activities in their respective areas with the help of all stakeholders which also include provision of shelter, food, medicines etc. to the affected communities as well as to IDPs who are settled in makeshift Relief camps
- Arrange coordination meetings with health units.
- Mobilize entire health network functioning in the district for situation analysis and need assessments.
- Arrange mobile teams / Mobile Medicine Units for pre-medication of affected communities in all near and remote areas.
- Delegate responsibilities for regular inspection and maintenance of irrigation channels and drains.
- Coordinate and communicate with DDMA.
- Identify and strengthen the vulnerable points in the banks of all canals and drains running through the district.
- DRM plans and initiatives need to be based upon assessments that identify the nature and degree of vulnerability or risk (including the identification of particularly vulnerable groups), that allow prioritizing problems or geographical areas on a rational basis and that inform the design of appropriate and technically sound DRM interventions.
- DRM initiatives need to build upon existing community organizations and relevant coping mechanisms to be sustainable.

[53] National Disaster Risk Reduction Policy 2013

- Clearly defined division of roles and responsibilities between different layers of government.

11.4 Strategic Development

The aim of the policy is to advocate an approach to disaster management that focuses on reducing risks – the probability of losing one's life or health, assets and livelihoods.

Some of the objectives in this aspect includes:

- Develop coordination mechanism with PMD for ascertaining flood discharge.
- Develop mechanism for regulation of water discharge into canals, distributaries and drains before onset of monsoon season.
- Develop monitoring mechanism for inspection of embankments, weak parts of drains, IPs (inspection parts) and NIPs (Non-Inspection Parts) of all irrigation channels.
- Provide necessary medical facilities at relief camps.
- Close coordination and communication with DDMA.
- Depending on the calamity, the D.H.O will declare emergency at all medical points/health facilities.
- Detail of medical/paramedical staff at all points requiring medical health cover during any disaster.

11.5 Priority Projects

- There is a need to set criteria for the identification and declaration of "disaster affected" areas. Disaster declarations may temporarily restrict individual rights (such as property rights or mobility).
- DRM strategies and initiatives need to be based upon clear assessments of disaster risks i.e. a quantitative and qualitative understanding of the underlying causes and vulnerabilities, geographical distribution of vulnerability and hazards , the probability of hazard occurrence and predicted losses.
- Vigilance of canals / drains round the clock.
- Closure of canals at the heads as soon as possible in case of any breach or heavy downpour, etc.
- Ensure smooth flow of water, plugging up of breaches, if any, in the shortest possible time.
- Prompt dewatering of stagnant water from affected and low lying areas of the district.
- The Executive Engineers, HESCO Division shall ensure uninterrupted supply of electricity particularly to municipal services such as pumping stations for draining out rain water from the low lying and slum areas. Shall make arrangements for immediate removal/repair of fallen live wires to avoid any untoward incident of electrocution

- Arrange and provide adequate stock of medicines and medical supplies including Anti-Snake Venoms (ASVs) and Anti-Rabbi Venoms (ARVs), blood plasma, Saline Water, and other medical fluids for victims.
- Arrange medical teams for providing medical cover to the IDPs settled in any relief camp.
- Fumigate the affected areas and areas at risks of spread of any of epidemic disease.
- Ensure that all ambulances are in working order and road worthy conditions.
- Ensure vacant possession of all schools buildings at the time of emergency for setting up relief camps.
- Ensure sanitation and cleanliness as well as clean drinking water facilities wherever possible at all school buildings declared as relief camps through by binding down their concerned Headmasters.

11.6 Long Term Plan

- There is a need to have clear arrangements that allow the system to switch into emergency mode and mobilize necessary resources in a timely and effective manner.
- There is need to clarify mutual roles and responsibilities (horizontal and vertical) and coordination arrangements in an updated, multi-hazard national response plan that is based upon current legislation.
- The DSM, PPHI shall also be responsible for providing medical cover to the IDPs in the catchment area of BHUs assigned to them particularly, and will perform their due role in supplementing the overall medical cover provided by the District Health Department.
- National risk assessment would identify highly vulnerable districts and be complemented by higher resolution work at local level to diagnose the underlying causes of risk, explore concrete risk reduction options and inform development planning and prioritization exercises and/ or disaster preparedness planning.
- DRR needs to address and involve local level actors in high-risk communities to be effective and produce sustainable results.
- There is need to clarify mutual roles and responsibilities (horizontal and vertical) and coordination arrangements in an updated, multi-hazard national response plan that is based upon current legislation.

12. CLIMATE CHANGE EMERGENCY CONTINGENCY PLAN

- **District Level Plan**

Thatta is the historically rich and civilized city of Sindh. It is tail of river Indus, near to delta. As the river Indus has flooded the badly to entire Sindh which has ended at Thatta district, but its end is going so severe and serious. The dykes at Thatta were extremely vulnerable and feeble that they could not bear the increasing flow of water that touched the strength of 950,000 cusecs water. As soon as water touched the dykes of Thatta, water over flew the both banks of Indus River.

- **Broad Contours of the Plan**
  - Early warning of approaching weather system will be provided by Pakistan Meteorological Department (PMD) and communicated to the District Disaster Management Authority (DDMA). DDMA is expected to translate weather forecast and flood warnings into usable early warning for vulnerable communities and ensure its timely dissemination to all concerned.
  - In case, there is continuous rise in major canal water level the people residing near major canals will be evacuated to safer places.
  - Threatened population will be evacuated by DDMA.
  - DDMA would be responsible for provision of search and rescue, medical and emergency responses.
  - Camps will be established at pre-selected sites by DDMA.
  - DDMA would be responsible for effective and transparent relief distribution including relief provided by Provincial Disaster Management Authority (PDMA), National Disaster Management Authority (NDMA) and other Humanitarian Agencies.
  - All stakeholders would take necessary actions to facilitate early recovery and rehabilitation of affected population.
  - In case the district falls short of meeting the humanitarian needs, PDMA will assist by making available the required stocks. In case when disaster exceeds capacities of the provincial government, NDMA will be requested to make available the additional stocks from national reserves, prepositioned across the country.
  - When required, Armed Forces may be requested for assistance by PDMA Sindh at any stage, particularly for rescue, evacuation and emergency relief phases. Thus, the DDMA will have to submit the request to PDMA for assistance of armed forces in aid of civil administration.
  - Special requirements of Aviation / Naval support by any agency will be coordinated by PDMA.
  - Resources of Government Departments and Agencies such as, Pakistan Red Crescent Society and domestic philanthropy may be requisitioned, if the intensity of the situation so entails for an effective response.

- **Early Warning**

12.1 Pakistan Meteorological Department

- Pakistan Meteorological Department (PMD) has a broad mandate of supporting agro-based economic activities, air and maritime traffic safety, disaster mitigation efforts and disseminating weather forecast to numerous end users. PMD will ensure the following during monsoon season:
- Inform public on the weather forecast and issue warning in case of potential threat like Rainfall.
- Collect rain data on a regular basis, consolidate and share it with all concerned.
- Disseminate flood information to the NDMA/PDMA on a daily basis during flood season.
- Share weather forecasts and early warning information with NDMA, F/G/S PDMAs, and the media on a regular basis in the monsoon period.
- Coordinate with FFC, WAPDA, PCIW, FFD, and SUPARCO in the Monsoon period to generate flood warning where wanted.

I. Flood Forecasting Division (FFD)

- FFD is an affiliated organization of PMD. It disseminates flood early warning and river flow updates to relevant National, Provincial and District Governments and National Response Agencies, especially in the context of Monsoon Season.

II. Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)

- SUPARCO deploys its satellite imagery capacities for disaster impact mitigation and for early warning of disaster occurrence and trends monitoring. SUPARCO will play the following role during monsoon season:
- Provide remote sensing and satellite maps before and during disasters in order to show their impact.
- Provide remote sensing and satellite maps for hazard risk zones to enable relevant agencies to take measures for minimizing damage to population and property.
- Assist post-disaster damage assessment.

III. District Disaster Management Authority (DDMA) Response

- DDMAs shall activate District Emergency Operation Centers (DEOCs)
- In the event of a disaster, organize emergency response through the District Emergency Operation Center (DEOC)
- Setup early warning mechanisms and dissemination of proper information to public, prepare district level response, plans and guidelines, establish stockpiles of relief and rescue material; provide information to PDMA on different aspects of Disaster Management.
- Inform/update PDMA regarding the overall situation.
- Organize evacuation on priority basis.

- Conduct initial and subsequent assessment of disaster affected areas and determine the extent of loss and damage.
- Collect information on damage status and promptly plan for the resources requirement for relief operation and share it with the PDMA.
- Provide food, drinking water, medical supplies and NFIs to the affected population
- Preferably, set up tent cities / relief camps on open land and provide relief to the affectees in camps.
- Coordinate with PDMAs to deploy resources for emergency response.
- Mobilize community volunteer groups and civil defense for emergency operations.
- Forward timely situation reports (SITREP) on daily basis to PDMA for its timely dissemination to concerned quarters.
- Ensure registration of all relocated population in the camps and overall affected population on gender-segregated basis.
- Prioritize vulnerable segments of society in their relief operations.
- Facilitate early return of relocated population and help in restoring their livelihoods.

12.2 Health Department

I. Pre-Disaster

- Provide specific information required regarding precautions for epidemics
- Establish a health mobile team in district & town headquarter hospital
- Setup an Information Center to collect and share information amongst relevant stakeholders.
- Collaboration with relevant organizations/partner NGOs.
- Stocking of life saving drugs and vaccines.

II. During Disaster

- Providing emergency treatment to the affected
- Provision of First-aid & water testing kits, chloramines and anti-snake venom serum & other emergency support
- Deployment of mobile medical teams & health staff
- Collaboration with all relevant stakeholders

III. Post Disaster

- Establishment of medical camps, vaccination, ensuring safe food & water in camps
- Conduct impact assessment on health, intervene to stop outbreak of diseases
- Rehabilitation of health infrastructure

12.3 Education Department

I. Pre-Disaster

- Providing the necessary information, training to teachers & students regarding disasters with tips to save their families & themselves during disaster.
- In collaboration with Civil Defense and Boy Scouts / Girl Guides Association and gear up the volunteer's force.
- Educate students about Healthcare Precautions

II. During Disaster

- Mobilize the human resources for intervention during disaster
- Arrangement for evacuees to setup relief & temporary shelter camps
- Deployment of volunteers for camp management & emergency support

III. Post-Disaster

- Assessment of damages & needs of affected educational institutes
- Rehabilitation of affected educational institutes
- Continuing education of children at camps and helping them to recover from shock by providing toys etc.

12.4 Agriculture Department

I. Pre-Disaster

- Assessment of high risk prone areas and estimation of possible damage
- Create community Seed Bank at UC level
- Regular surveillance of Irrigation water supplies
- Close coordination with Meteorological Department & other stakeholders for weather information.
- Testing, functioning and pre-positioning the available machinery.

II. During Disaster

- Immediate mass awareness and update of situation
- Arrangements for relief & temporary shelter camps in canal rest houses
- Vigilance for protection of agriculture crops.
- Immediate activation of machinery and equipment.

III. Post-Disaster

- Assessment of damages & needs of affected crop area and submit to DDMA
- Assistance in repair & rehabilitation of Irrigation Systems.
- Timely compensation to affected farmers
- Mass awareness campaigns regarding epidemics & diseases to crops
- Inform the affected population regarding the land use and crop management on damaged/devastated areas.

12.5 Livestock And Fisheries Department

I. Pre-Disaster

- Estimation of possible damage
- Mass awareness regarding precautions
- Close coordination with agriculture, irrigation, meteorological department and other stakeholders.
- Vaccination of livestock.
- Stocking of fodder and vaccines.

II. During Disaster

- Update local communities of ongoing situation.
- Provide livestock vaccination
- Arrangements for relief and transportation of livestock.
- Provision of fodder for livestock in affected area.

III. Post-Disaster

- Assessment and submission of damages and need of affected livestock to DDMA
- Timely compensation to affected livestock owners
- Mass awareness campaign regarding epidemics & diseases to livestock

12.6 Planning and Development Department

I. Pre-Disaster

- Gathering statistical data regarding possible damages and recovery needs from all relevant departments
- Plan and identify potential resources
- Facilitation to other department in planning

II. Post-Disaster

- Gathering statistical data regarding actual damaged and recovery needs from all relevant departments
- Plan and Identify potential resources
- Facilitate other departments in planning and execution of rehabilitation in cost effective manner
- Coordinate with all line departments

12.7 Revenue Department

I. Pre-Disaster

- Assessment of high risk prone areas and estimation of possible damage and needs for recovery.
- Arrangement of financial resources.
- Identification of high grounds for establishment of tent cities.

II. During Disaster

- Establish relief distribution centers/camps and accept relief donation/relief support
- Timely release of funds to DDMA.

III. Post-Disaster

- Assessment of damages to industrial/business, crops and livestock and settlement of applicable taxes accordingly.
- Support DDMA in conduct of authentic damage assessment and compensation need.

12.8 Police Department

I. Pre-Disaster

- Information dissemination through "15 helpline service" to local residents
- Deploying and giving security cover to government agencies, which are working/preparing for the monsoon season in areas where law and order is not good.

II. During Disaster

- Providing easy access and security to rescue and relief teams.
- Maintain law and order and divert traffic on alternative safe routes as and when necessary.
- Maintaining law and order and provide security to relief stockpiles and camps.

III. Post-Disaster

- Ensure security to workers of NGOs/INGOs
- Provide security in unsafe areas
- Facilitating institutions/NGOs/INGOs, which focus on rehabilitation activities

12.9 Civil Defense

I. Pre-Disaster

- Information sharing regarding technical and personnel expertise with DDMA.
- Conduct training for volunteers in first aid & other activities
- Effectively train & mobilize volunteers and initiate mass awareness regarding necessary first aid rescue activities

II. During Disaster

- Deployment of volunteers at the disposal of DDMA for Rescue, Evacuation and initiated basic first aid.
- Communicate to DEOC any additional resources required for performing rescue and evacuation activities
- Taking precautionary measures to stop fire incidents in camps and perform firefighting in emergency.
- Management of relief camps where required.

III. Post-Disaster

- Identify gaps and make plan to overcome weaknesses
- Assisting District Administration and other Line Departments in Rehabilitation works

12.10 Civil Society And Private Sector Response[54]

The response of civil society organizations and the private sector to floods should be rapid and extensive. Local NGOs, will work extensively with the Government to provide emergency relief support provisions which include ration packs, water purification kits and tablets, shelter items (including tents, blankets and mosquito nets), sanitation kits and hygiene supplies, doctors and medical supplies, mobile and basic health care units especially for women and children. A particular focus will be placed on healthcare services to avoid the spread of water- borne infections and other disease and to provide basic health care services. Media on their part will cover the event extensively and play a significant role in raising awareness and mobilizing local and international resources fzor the disaster. Individuals and organizations from the private sector, both from Pakistan and the global community will contribute significantly to the flood relief effort alongside the government and donor community.

[54] Government of Sindh Rehabilitation Department Provincial Disaster Management Authority, 2012. Sindh Provincial Monsoon/Floods Contingency Plan, Karachi: Government of Sindh

12.11 Scouts

I. Pre-Disaster

- Nominate the scouts, which can be trained to handle flood emergencies
- Training will be imparted in the scouts regarding boat handling and first response to the affected during the emergency.

II. During Disaster

- Trained scouts will be deployed/placed at the disposal of Deputy Commissioner
- The scouts will perform the duties as per training and will report to respective Deputy Commissioner

III. Post-Disaster

- The trained scouts would continue to impart the training in other scouts and volunteers in the district.

12.12 Standard Operating Procedures (Sops)

- The Deputy Commissioner shall keep close liaison with all departments like Local Government, Health, Agriculture, Civil Defense, Irrigation, Works & Services, Education & Literacy, Police & other Law Enforcement Agencies. Meetings in this regard are to be held on regular basis with concerned departments and minutes are to be shared with DDMA.
- If there is likelihood of heavy rains, flood emergency would be declared in the District and all government functionaries and NGO's would be kept on high alert.
- Control rooms would be established at District and Taluka level in the offices of the Deputy Commissioner, Assistant Commissioner, Qanoongo (Revenue) and all other line departments during the emergency. These control rooms shall function round the clock.
- The Executive Engineer Irrigation will establish round the clock control room in his/her office for making liaison with all concerned & activate contingency plan of the department. They shall identify the vulnerable points of the irrigation canals and intimate DDMA. Executive Engineer will be in touch with DDMA and the Meteorological Department and inform the concerned agencies about any development emergency. He/She will make special arrangements for watching and patrolling of vulnerable points.
- Immediate arrangements for necessary machinery, sand bags and other material to be used for strengthening of embankments of canals and plugging breach shall be ensured and availability of communication network must be made at all vulnerable points.
- The Executive Engineer Irrigation shall ensure regular, timely and proper de-silting of all canals, distributaries, drains, sub-drains and submit a certificate to his/her higher authorities with an information copy to DDMA.

- The Deputy Commissioner shall ensure activation of Central District Control Room and already established control rooms at each Qanoongo (Revenue) Offices round the clock, under the supervision of Assistant Commissioner concerned. They shall also ensure preparedness at proposed relief camps and ensure immediate evacuation of people residing in low-lying areas to safer place / relief camps, if required. He/She shall also make immediate arrangements for the availability of sufficient quantity of relief material like food, blankets, tents, plastic sheets etc.
- The Deputy Commissioner shall constitute Supervisory Committee for relief works at district level.
- The Deputy Commissioner must further ensure that special attention is given to disabled people, women and children and extra ordinary measures are taken for such purpose.
- The Deputy Commissioner shall nominate the Assistant Commissioner as focal person to coordinate with the Taluka and Town level local council for drainage of accumulated rainwater.
- The Assistant Commissioner shall be focal person in Taluka for the entire operations of rescue and relief. He/She must ensure the respective arrangements for tractor trolleys and labor in coordination with Civil Defence, Boy Scouts Association and Police Department if needed and mobilize the village staff in the pre-and-post emergency work. He/She shall also ensure proper distribution of relief material among the actual needy persons.
- The Executive Engineer Irrigation Department shall ensure availability of bulldozers, excavators and earthmoving machines in sufficient quantity and in proper working condition in case of emergency.
- The Director Agriculture shall arrange for protection of standing crops from damages and diseases that may be caused from the stagnant rainwater in the fields. He/She shall manage required machinery from mechanical wing and must have the inventory of such machinery and equipment.
- The Deputy District Officer Livestock and his/her staff shall ensure safety of livestock from flood diseases and losses and Veterinary Officer shall ensure regular and timely vaccination of cattle in the district. They shall make all necessary arrangements for fodder for the livestock to be shifted from marooned areas.
- The Deputy Controller, Civil Defense should ensure the enrolment of volunteers as early as possible in order to avoid any chaotic situation during emergency. He/She will continuously remain updated of weather forecast reports and with meteorological departments and will arrange for warnings in emergency through sirens, loudspeakers and media at Taluka and town level. He/She shall ensure presence of the volunteers and scouts for rain relief and rescue activities in case of any emergency.
- The Deputy Director Food shall ensure availability of sufficient stock of wheat and other grains and shall coordinate with Deputy Commissioner for supply of food grains from local food grain dealers in case of need. He/She will also ensure that no stocks of government wheat, placed at depots, are damaged due to water accumulation, fire or rioting.

- The Divisional Engineer Telephone should ensure full function ability of telephones all over the district and provide assistance to all departments on demand at the time of need.
- Continuous supply of gas and proper safety of gas lines in the district must be ensured. Immediate repair work should be performed in case of any damage to the gas lines.
- The Deputy Commissioner shall ensure mobilization of the NGO's and business community in the rescue and relief activities in case of emergency and shall depute volunteers on different emergency tasks.
- The Regional Director Information shall keep close liaison with all control rooms of the district to provide correct and exact information to media regarding emergency. He/She shall also arrange briefings about the latest situation in case of emergency.
- The Red Crescent Society and other welfare associations and NGO's of the district shall provide food packets and other required material to the affected persons in relief camps in case of emergency.
- Proper arrangement for lifting of trees fallen due to heavy rain and gusty winds from the main roads shall be made by the Executive Engineer Provincial Highways department.
- The in charge Utility Store Corporation shall ensure the availability of sufficient stock of edible items in case of need.
- The Revenue Department shall also conduct the survey of any loss of life, houses, cattle, standing crops and other infrastructure after the disaster. In the event of the highest degree of emergency, Pakistan Army may be requested to help the district administration in rescue and relief operations.

12.13 Implementation and Monitoring

12.13.1 Indicators

I. Quantitative Indicators

OECD (2002) defines an indicator as a ''quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor.'' Quantitative indicators are numerical representations of complex phenomenon. Quantitative indicators can be useful in determining the level of achievement at all stages of a resilience project and can even be used to measure the strength of resilience characteristics, though this is better attained by using qualitative indicators[55].

[55] Brown, C., Shaker, R. R. & Das, R., 2018. A review of approaches for monitoring and evaluation of urban climate resilience initiatives. Environment, Development and Sustainability, 20(1), pp. 23-40

II. Qualitative Indicators

Qualitative indicators evaluate the quality of a plan using subjective data (relying on people instead of instruments). Many qualitative indicators use a 1-5 scoring system, however, this is not the only way; Sovacool (2012) points out that indicators could ''rely on a simple scoring technique of 'positive,' 'negative,' or 'neutral,' as in a given metric can worsen, improve, or stay the same over time.'

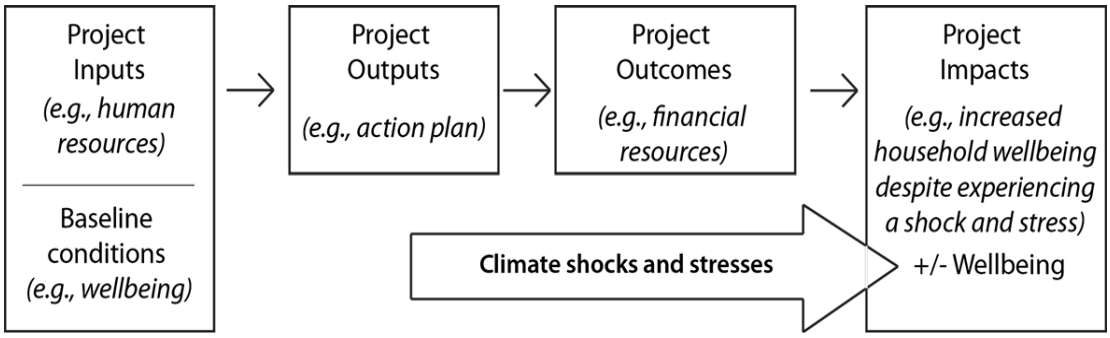


Figure 12-1 : Four phases of a resilience initiative, and the timing of baseline and post-shock measurements of wellbeing (Brown, et al., 2018)

These qualitative values can be used to create baselines and/or to indicate that a particular resilience impact/outcome has been achieved. The challenge with a qualitative indicator that uses a scale from 1-5 is that the scale should be created based on criteria that is fair and well informed.

III. Process Indicators

There are many processes that underlie resilience planning and action, and process indicators outline the extent to which these processes have been undertaken. Moser and Boykoff (2013) write that given the challenges (e.g., attribution) in adaptation and resilience measurement, ''tracking and evaluating the adaptation process—with all of its individual components (e.g., assessment, planning, stakeholder engagement, decision-making, implementation, institutionalization, monitoring, and social learning)—becomes at least as important as the questions of success in outcomes''.

An example of a process indicator is the level of participatory involvement in resilience decision making. If one's definition of resilience encompasses participatory involvement, then the extent to which this has been applied can be used as a process indicator. This can be assessed qualitatively (on a scale of 1-5) or quantitatively (number of stakeholder types represented).

IV. Impact Indicators

Determining the impact of resilience initiatives is a bit difficult, as these impacts are often difficult to interpret or understand and can often not be measured until after a disaster, or at least until the slower

onset effects of climate change have started to occur (e.g. sea level rise). One approach could be to assess the process and outcome indicators and inferring from the results that climate change resilience has been reasonably ensured.

Wellbeing and financial losses after a disaster are the two most important climate resilience indicators that can help to assess the success of climate change resilience initiatives. By evaluating these indicators, evaluators can gain an insight to the effect of climate change resilience initiatives on the community. By assessing these two indicators, a city can determine whether it has the adaptive capacity to remain resilient in the face of shocks and stresses resulting from climate change.

V. Identified Indicators[56]

Collection of Data to Perform Vulnerability Assessments to Floods

- Number of exposure and socio-economic datasets on current exposure to floods at district level.
- Geographic coverage of all datasets (% of all exposed areas).
- Number of reports detailing data collection and summarizing information.
- Number of policy and technical documents based on datasets and modeling scenarios.

Building Technical Capacity to Generate Vulnerability Assessments to Floods

- Number of technical staff trained to acquire competence in computer modelling techniques and able to perform Vulnerability Analysis (VA).
- Average staff performance on end-of-training comprehension tests.
- Proportion of ministries using datasets to generate vulnerability analysis or proportion of sectors covered by analysis at district level.
- Number of policy and technical documents incorporating results from VA's.
- Proportion of government investment/program documents using results from VA's as a priority-setting or screening tool.

Institutional Framework and Mechanisms to Support Adaptation and Adaptive Capacity

- Number of laws and regulations created or amended to clarify land and carbon property rights.
- Existence of a dispute resolution mechanism.
- Number of materials (presentations, briefs, papers) developed for legal literacy programs.
- Number of people participating in legal literacy programs.
- Number of individuals and community groups participating in Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of

[56] McCarthy, N., Winters, P., Linares, A. M. & Essam, T., 2012. Indicators to Assess the Effectiveness of Climate Change Projects, Washington DC: The Inter-American Development Bank

forests and enhancement of forest carbon stocks in developing countries (REDD+) financed projects.

- Average number of days and money spent in REDD+ project preparation.
- Total value of REDD+ projects and value per participant.
- Percentage reduction in production variability from forest-based activities and/or farm production at the forest margins.
- Number of early warning and health hazards dissemination outlets, by type of outlet (e.g. radio, newspaper, and website), geographic coverage, and level of disaggregation of system information (e.g. district-specific).
- Percentage languages used in dissemination materials of total number of languages spoken in district.
- Number of extension materials containing climate change-relevant materials.
- Percentage change in government budget allocations towards climate change information dissemination.
- Percentage reduction in property damage.
- Percentage reduction in mortality and in disease prevalence for diseases related to weather patterns (e.g. malaria, dengue).

Investment in Projects that Directly Support Adaptation and Improve Adaptive Capacity

- Percentage increase in the number of seed varieties developed, documented and made available in the market.
- Documentation of seed varieties and their characteristics.
- Documentation of procedures and partnerships created to transfer seeds either directly to farmers or to market traders.
- Percentage increase in number of seed varieties available in rural markets.
- Number of climate resistant seed varieties available in the market and percentage increase in use of climate resilient seed varieties.
- Percentage crop yield improvement in years of climate extremes.
- Percentage greater performance in average crop yields.
- Percentage decrease in proportion of rural and urban populations malnourished.
- Number of energy facilities built or retrofitted to withstand greater range of climate shocks.
- Percentage of total capacity built or retrofitted by type of facility and by “threat” level identified in vulnerability analysis.
- Percentage decrease in monetary damages to energy facilities due to climate extremes (adjusted for degree, or extent, of climate shock).

- Percentage decrease in customers losing access to energy due to climate shock-induced power failures.

12.13.2 **Responsibility of Plan Implementation**

Table 12-1: Authorities Responsible for Implementation

S#	Department	Designation
1	**Administration**	District Commissioner
		Assistant District Commissioner-I
		Assistant District Commissioner-II
2	**Irrigation**	District Irrigation Officer
3	**Agriculture**	District Agriculture Officer
4	**Health**	District Health Officer
5	**Education**	District Education Officer
6	**Social Welfare**	District Officer
7	**Livestock**	District Officer

Monitoring and Evaluation[57]

There are three ways to monitor and evaluate climate change adaptation and resilience:

- Measuring against project objectives
- Measuring against baselines
- Measuring against emerging understanding of good adaptation measures

a) Measuring against Baselines

Baseline comparisons can be used to monitor and evaluate the effectiveness of climate resilience initiatives. During this process, an initial measurement is taken (e.g., number of civic organization per 10,000 people). This measurement is then taken at different stages of the project to measure the effectiveness of strategies used to improve that particular indicator. This approach could be applied to resilience characteristics (e.g. flexibility). In order to do this, a more qualitative assessment (subjective scoring from 1 to 5) could be employed to create a baseline value.

b) Measuring against Definitions

[57] Brown, C., Shaker, R. R. & Das, R., 2018. A review of approaches for monitoring and evaluation of urban climate resilience initiatives. Environment, Development and Sustainability, 20(1), pp. 23-40

Relatively straightforward definitions exist for climate adaptation, but in the context of resilience – with its emphasis on system level interaction and inherent qualities – this approach can prove to be much more difficult. How you define resilience is a key determinant in how the monitoring and evaluation approach will be adopted. For example, if resilience is defined as a decrease in post-disaster recovery time, specific indicators will be evaluated which would not be useful when concerned with the resilience characteristics with cities.

c) Measuring against Project Objectives

As mentioned above, the objectives of a resilience program differ depending on the way resilience is defined and also at which phase of the project the assessment is being made. Alexander et al. (2016) define process as the ‘‘inputs, throughput and outputs of the decision-making process,’’ outcomes as ‘‘the implementation of the outputs from the decision-making process’’ and impact as ‘‘the resulting effect of the decision-making process and outcome’’. Similarly, Spearman and McGray (2011) use the following sequence: inputs, initiatives, outputs, outcomes, and impacts. Monitoring and evaluation can take place at each of these temporal locations (i.e., process, outcome, impact). Many people also advocate that monitoring and evaluation be carried out throughout the duration of the project rather than just at the beginning and the end of the project.

d) Key Principles of Monitoring, Evaluation and Reporting System[58]

i. Use of Mixed Methods

The monitoring and reporting system combines quantitative and qualitative methods to collect and analyze data, and generate knowledge and lessons in implementing the plan.

ii. Ownership

District focal points for each sector (mentioned in the table above) are responsible for collecting, aggregating and submitting their reports annually to the District Administrative Unit.

iii. Stakeholder Engagement

Empowering stakeholders and ensuring their active contribution to the monitoring and reporting process is a key feature of the monitoring and evaluation system. The monitoring and reporting system is rooted in the desire to maintain a programmatic approach in the implementation of the investment plans through projects and programs. It aims to engage the stakeholder groups, including government institutions at national, sub-national and local levels, as well as civil society, local communities and the private sector, in discussing progress with the implementation of the monitoring plan. The monitoring and reporting process will also be used to share lessons learned and discuss the challenges encountered with a view to identify feasible solutions.

iv. Learning by Doing

Monitoring and reporting is an iterative learning process. It is expected that the quality of monitoring will improve over time as the authorities gain experience.

[58] Williams, A., 2016. Options for Results Monitoring and Evaluation for Resilience-Building Operations, Washington DC: World Bank Group

13. URBAN LAND MANAGEMENT

13.1 Introduction

Urban areas throughout the developing world are experiencing a problem in the supply of adequate and affordable serviced land to meet the housing needs of their rapidly expanding urban populations. As a result, low income groups who are mostly denied access to land due to shortfall in supply are forced to either seek for residential land through illegal means or to crowd into existing low income settlements, creating slum conditions. In Sindh, the shortfall in land supply arises not from the lack of virgin land but partly from the lack of resources, capacity to service the lands and land ownership by landlords and make them ripe for development and also partly from the use of ineffective and inappropriate land and land use policies and practices.

"Land management" is defined as an activity on the ground, using appropriate technologies in the respective land use systems. It is known by different names in different parts of the world; basically all are land management tools. In Pakistan land management is not being practiced till yet because of non-absence of policies / framework. Strong land owner opposition to forcible land acquisition, combined with extremely limited fiscal capacity has left the urban local bodies (ULBs) with very few options to develop well-planned and serviced urban land. Land pooling and reconstitution (LPR) is a tool that addresses both these issues by allowing the land owners to share the gain in the land value post provision of infrastructure and services. In lieu, the land owners pay betterment charges and contribute a part of their land to fund the infrastructure and services.

13.2 Goals

As most of towns in Sindh strive to become centers of global production, trade and development, they are increasingly concerned with improving their attractiveness for foreign direct investment and employment generation. For example, towns must have efficient spatial structures, adequate infrastructure and urban services, affordable housing and healthy environments. Effective urban land management is required to promote urban regeneration and development of new industrial and commercial districts, investments to upgrade and expand critical infrastructure systems, programs to enhance and protect the environment, and initiatives to upgrade social overhead capital (housing, education, healthcare).

13.3 Objectives

To implement these initiatives for Thatta, there is a need to develop urban land management strategies to provide land for industrial and commercial development, to facilitate the formation of public-private partnerships, and to finance the provision of infrastructure and social overhead

capital investments. Unfortunately, in many cities around the world such strategies do not exist and foreign investment is either stifled or, if it does take place, causes significant adverse side effects.

Cities and towns are crucial to the economic well-being of Sindh. For this, it is imperative that its cities and towns are transformed and pressures of new growth are dealt with so that they are more livable, efficient, and environmentally sustainable. Only then will the rapid pace of economic growth that Sindh is undergoing be sustained and the targets of environmental sustainability achieved. To manage the transformation of Sindh's cities and towns and effectively manage new growth requires effective urban planning protocols, processes, and institutions underpinned by effective legislation. To effectively manage the new growth implies that the agricultural land at the periphery of the cities and towns or smaller settlements that are not yet "urban" is transformed to be made suitable for urban or non-agricultural uses. This essentially means that the irregular landholdings and plots will have to be given regular shapes; they must be ordered; each plot must be given access; infrastructure services such as water supply and drainage must be provided; land must be appropriated for providing roads, parks, social amenities, and low-income housing, development controls must be prescribed to result in a good quality-built form and levy development or betterment charges to offset the cost of developing the physical and social infrastructure. But most importantly, all of this must happen in a timely and such manner that it is acceptable to the "landowners" to avoid conflict in the growth management process.

13.4 Urban Land Management in Thatta

Due to absence of provincial policy / framework for utilizing Urban Land especially in District headquarter towns, planners / development authorities have not carefully assessed the land use and transportation impacts of foreign investment. Due to non-existence / less effectiveness of Development authority mechanism, schemes / projects in private sector faces low exposure due to non-availability of basic facilities and monitoring mechanism by approval authority. As a result traffic congestion and infrastructure problems with the water supply and sewerage treatment are mounting.

Getting access to land for factories and commercial facilities is problematic, particularly in agricultural rich fertile land. Decades of inefficient allocation of land for industrial uses have literally blighted / dis-courage agricultural activities in the region. Unfortunately, a lack of clarity over land rights, corruption and bureaucratic inertia are impeding redevelopment. To compound matters, land use plans in many transition economy towns have not been planner to reflect the new land use requirements necessary to support post-industrial development.

To effectively exploit the benefits of inward investment flows and to ensure that social and environmental goals are met, the public sector needs to take the lead in planning and formulating urban land management strategies to promote sustainable urban economic development.

13.5 Land Pooling and Reconstitution

Simply put, in LPR, a number of small holdings are pooled together, a part of land is taken from each plot for provision of infrastructure and public facilities and the rest returned to the original land owners. It is basically a land management tool and is used all over the world under different names with slight modifications in their working.

Land Management Techniques

The strategies available for access to urban land could be through Guided land development for large areas; Land pooling and reconstitution; Land reconstitution / redevelopment; Acquisition for public purpose under the Land Acquisition Act, 1894; Joint Sector Model of land assembly and development; Transferable Development Rights (for built up areas); Saleable FAR and mixed use concept (for regeneration of inner city); Land Pooling and Redistribution Scheme.

A. Land Acquisition Act, 1984

In Pakistan, the Land Acquisition Act, 1894 gives the right for Government authorities to acquire parcels of land for the implementation of development projects. The origin of the practice of land acquisition by public entities in Subcontinent goes back to 1824, when the British Government of India instituted regulations to facilitate urban land public acquisition from private owners. In fact, the obligation for owners to give up their land had to find a legitimate justification. The initial reason advanced to acquiring the land against their will was the need for constructing public buildings in Bengal provinces. These regulations enabled the British government to take possession of the land for the construction of roads and canals. From 1850 on, the scope of these laws was extended to other provinces in order to facilitate the operation of further infrastructure projects such as railways.

The Land Acquisition Act was edited in 1894. It harmonized and consolidated previous regulations into one single act, applicable within the whole British India. After Pakistan's independence in 1947, the Pakistan Government started using this act as a tool to purchase land at a lower price than that on the regular market, as it was meant to be used in the public interest. Several amendments have been made on this act, but its procedures have not changed.

B. Land readjustment / pooling

Land readjustment / pooling Land re-adjustment is a process whereby a public authority assembles numerous small parcels of raw land without paying compensation to the owners. The authority then sub-divides such assembled lands for urban use returning most of the building sites to the original owners in proportion to the value of their land contribution and permitting them the right of alienating such sites. The authority retains a portion of the assembled lands, applying them partly to provide civic amenities such as roads, parks and gardens or schools, and the remainder land for public sale to recover the cost of development. Thus, land re-adjustment acts as tool to achieve unified control over large areas of land and as an instrument of financing public service installations in the process of planned urban growth.

C. Guided Urban Development

The concept of Guided Urban Development (GUD) emerged in response to ad hoc, uncontrolled urban development with no regard to infrastructure services. It also aims to secure a limited availability of urban land for economically weaker sections. GUD has been practicing in India and developing world. The objectives of the scheme are as follows:

- Ensure provision of serviced plots for low income families at affordable prices (approximately 75% of total plots to be reserved for EWS / LIG); and
- Provide incentives to the land owner / private developer to participate in the provision of low income shelter by guaranteeing fair return on investments (profit of 20-30%).

13.6 City Survey

City survey is very important to manage land records for city. City survey will help to resolve present hassle in property transactions besides impeding planning & development. It will also help to resolve several issues i.e. Verification of ownership & Land grabbing issues respectively. Therefore it is suggested to conduct city survey & deal as separate project for Thatta.

13.7 SWOT Analysis and Need Assessment

Strength	Weakness	Weakness	Threats
GOVERNANCE			
Planning Actors			
1. Politicians 2. Existence of Local government 3. Public Health Engineering Department	1. Lack of co-ordination among departments. 2. Weak technical support of government departments. 3. Weak financial base of departments. 4. Absence of development authority. 5. Shortage of technical staff, town planners, urban designer and policy makers at SMC, Regional Office of SBCA) 6. Overlapping of administrative functions 7. Need based ad-hoc planning system (day-to-day basis)	1. Strengthen the institutions, responsible for planning and execution 2. Immediate preparation of overall urban development strategy 3. Detailed land use zoning plan 4. Sectoral development plans 5. Detailed subject plans to regulate with density development. 6. Enhancing the role of local government on sustainable basis.	1. Inaccurate funding in development projects. 2. Wastage of local resources 3. Infrastructure development of poor quality, non-standard infrastructure. 4. Failure to provide technical support on issues required innovation. 5. May give birth to unwilling political interference and hidden interests based on nepotism and discrimination.
Coordination of Public Agencies / Department			
1. Town Committee / Taluka Municipal Administration 2. Politicians in charge 3. Participation of Sindh Building Control Authority (SBCA)	1. Weak co-ordination mechanism. 2. Lack of information sharing between line departments.	1. Preparation of local co-ordination standard procedures through policy frameworks. 2. Organizing events to make strong coordination between different departments.	1. Week coordination may give birth to poor governance. 2. Political interference

Strength	Weakness	Weakness	Threats
Local Council			
1. Availability of Town Committee.	1. Not actively pursuing the stated objectives.	1. With awareness and training of councilors the local councils can be more effective. 2. Workshops and meetings can enhance the coordination as well as clear the vision about development perspectives.	1. Confusion and chaos in the local development affairs at present until local bodies are established.
Financial Resources			
1. Institution and system are in place. 2. Regular provincial grants available for development project. 3. Programme based medium-term donors funding.	1. The council does not affectively generate funds. 2. Less efforts offer by local councils for revenue generation through available local resources. 3. High dependency on provincial grant. 4. Lacking capacity in collection and financial management. 5. Very low capacity for capital investment in development projects.	1. Self-sustainable financial system needs to be effectively introduced. 2. Development of self-reliance and suitable financial model. 3. Resource generation through PPP. 4. Exploitation of local potentials for resource generation. 5. To curb mismanagement and corruption.	1. Poor maintenance of infrastructure relating utility services. 2. Political pressure and financial leakages. 3. Lacking M&E and implementation of strict accountability measures during audits.

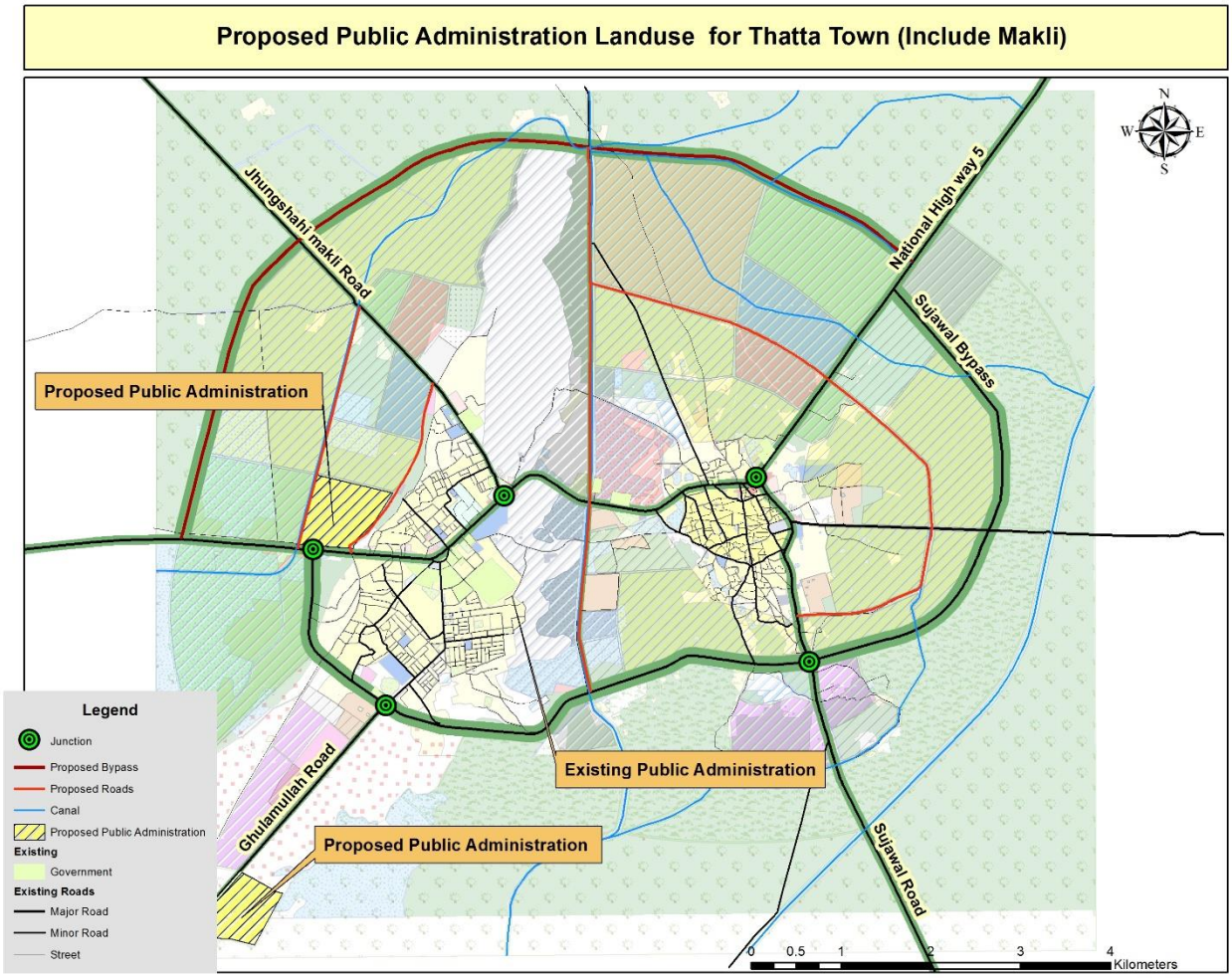


Figure 14-1 Future Administration Proposal of Thatta

14. IMPLEMENTATION STRATEGY

This part of the report aims to provide an implementation framework for various development proposals recommended in 'Strategic Development Plan' to drive future growth of Thatta DHQ town up to 2037, under the present governance framework of Government of Sindh.

14.1 Process of Implementation

The implementation of development plan is basically the process of prioritizing, phasing, coordinating, budgeting, scheduling, monitoring and making adjustments. There are number of management systems and charting procedures available to help a city manager to control this process. Issues that must be addressed in this regard are:

- Determine priorities within and among the sub plans
- Determine the phasing or sequence of activities among the sub plans.
- Address timeframes and budget availability
- Creating master schedule of activities with a progressive cost table so that the program can be appropriately expanded or contracted to meet implementation contingencies and budget fluctuations.
- Assign the various activities to be undertaken by qualified managers.
- Establish a timely monitoring and report system to keep the city officials and the public informed of progress and activities.

14.2 Implementation Agency

The office of the Deputy Commissioner and in case of Local Bodies/Local Government, the Chairman of district council and Mayor of metropolitan city will be the key implementation agency to execute Strategic Development Plan Thatta 2037.

The Government of Sindh would take responsibility of implementing various development proposals by utilizing its maximum resources and by engaging various public offices of government of Sindh, established in Thatta. The concerned agency must ensure that the overall process must go after following themes of implementation process.

a) ***The overreaching theme of the implementation of Strategic Development Plan Thatta is:***

- Consultation with stakeholders during implementation at all levels.
- Decentralize decision making to the greatest extent possible.
- Promote transparency and accountability of decision making and implementation enforcement.
- Rationalize impacts where necessary;
- Ensure compensation to affected communities

- Enhance the quality of infrastructure provisions, promote utility services opportunities, and focus facilitating poor segments of society.

b) ***The principals that implementation process will follow:***

- The overall implementation process to be carried out in coordination with Town Planning and Urban Development Standards (Frameworks) in which redevelopment will be phased to prioritization;
- The implementation process will be based on updated planning codes and regulations;
- Special consideration will be paid to implement planning standards relating to disaster (Drought) preparedness in all development proposals/projects;
- Facilitate communities, government machinery, and other organizations of community to participate in overall implementation process;
- Educate stakeholders for technical assistance;
- Be comprehensive, coherent, and coordinate to avoid errors through continuous monitoring and evaluation
- Arrange supple of financial resources

14.3 Legal Frameworks

Local governance agencies dealing with any development proposal must ensure that all development related activities and their approval consent should be carried out in accordance with urban planning statutory frameworks of government of Pakistan operational at all government level levels. This includes all legal frameworks substantiated through the relevant articles of constitution of Pakistan and the primary act (LAA 1984) governing land acquisition and compensation.

a) ***National Level Policy Frameworks***

The constitution of the Islamic Republic of Pakistan passed on the 10th April 1973 and as modified thereafter, is the supreme law of Pakistan Government. This constitution provides legal cover to all laws and acts, particularly those embedded in chapter-3 pertaining with land acquisition, development and compensation.

b) ***State level Statutory Frameworks pertaining to planning and development Control***

On 14th Feb 2011, the government of Sindh notified the extension of the jurisdiction of Karachi Building Control Authority to the whole of Sindh. The five Regions of Sindh Building Control Authority notified by the Government of Sindh are: **Karachi, Hyderabad, Mirpurkhas, Sukkur & Larkana,** having the Head Quarter **Karachi. Thus, any development activity within juridical boundary of these districts must be carried out in accordance with the primary planning instrument ' *Sindh Town Planning and Building Control Regulation*'.**

c) ***Local Planning Instruments***

There is variety of regulations dealing with municipal services offences and penalties (Fines) in case of violation have been constituted in Schedule-VI (Section 139) 'Offences under the Act' Part-1 of Local Government Act-2013 (Third Amendment 2016) of Sindh Government.

In this regulation, various well defined public activity management and control regulations dealing with Public Health Safety, Land use Planning, Development Control, Encroachments, preparedness of safety measures from Natural & manmade disaster, quality of Drinking water, Solid Waste & Waste Water generating though multiple activities, Preservation of Heritage Sites, Open Space management and associated penalties, in case of violation, have been defined in detail.

d) ***Other relevant planning and design standard instruments***

There are varieties of other documents that support assessment of development proposals prior to implementation. e.g. 'National Reference Manual' - Ministry of Housing and works, Environment and Public Affair Division, etc.

If regularization requirements of any of development proposal is beyond the capacity of regularity frameworks mentioned above, the concerned agency dealing with development/implementation process in Thatta may develop their own regulatory frameworks/ building codec's to regularize the status of development with consent of local/provincial government authorities, if necessary.

14.4 Institutional Enhancement

While implementing the Strategic Development Plan "SDP', the respective Provincial and District Government may seek technical assistance from all the line department i.e. DUP&SP, Local Development Authority, Municipal Corporation, secretariat of Commissioner and Deputy Commissioner.

The ' *Project Management and Implementation Unit* "will mainly consist of urban planners supported by other technical staff; architects, project managers, engineers, finance officers and any other technical staff expert in their relevant fields.

The "*Project Management and Implementation Unit* "shall supervise and coordinate respective urban developers involved in development activities, conduct monitory audits, preparer evaluation and impact reports and will report to the head of respective governance agency.

Development authorities will be responsible for implementing new approved town planning and building codes with the assistance of office of head of respective governance agency. The office of secretariat of Commissioner and Deputy Commissioner will be responsible for the overall coordination and monitoring and will provide support for development/redevelopment activity from federal to district level.

The district Urban Management Unit would also facilitate the office of District Deputy Commission for all development/ implementation related (a) needs identification (b) revision of annual plans (c) coordination (d) financial management and (e) monitoring of all development activities assigned to developers or government departments.

14.5 Implementation Schedule

Strategy:	**Programs/ Policies**
Balanced Urban Growth	**1. <u>Land Use Zoning</u>** Except of Makli, Thatta town is not in particular form due to absence of development authority. The infrastructure in town is continuously under pressure due to un-planned development. Mainly major development is being taking place in Makli area towards Karachi-Thatta Road. Thatta was made districts headquarter in 1948 but it has failed to show signs of dynamism, and its population has been growing at a very slow rate. During 1972-81 it recorded lowest growth rate among the urban district headquarters of Pakistan and Thatta District registered the lowest growth among the districts of Pakistan. Two very large cities, Karachi and Hyderabad have over shadowed Thatta. **2. <u>Development Control</u>** High prices of houses and developed land The informal housing sector lacks provision of utility services like gas supply, clean water and drainage facilities. Required Amendment in Zoning Bye laws Restrict the provision of utility services for approved planned areas Thatta development isn't in particular form due to absence of development authority. The infrastructure in town is continuously under pressure due to un-planned development. **3. <u>Transportation</u>** The district is well-connected with other districts through good quality roads Contribution in positive regional and local economic development

	Roads **14.6 Need Dualization & Rehabilitation of Existing Roads.**
Responsibilities to Plan: Detailed Urban Design Strategy Development Assessment Impact of property Assessment Environmental Impact Study (EIA,IEE)	**Implementation Responsibilities:** Public Sector/ Private developers
Concerned Agencies: P & D Department Government of Sindh/ District Government/ Line Departments of local Government /Private Developers	**Time of Implementation:** Short Term (1 year to 5 Years) Long Term (5 years to 20 Years)

Strategy: **Future Transport Sector Development & Improvement**	**Programs/ Policies** **(A)Traffic Management Program** • Parking restrictions / Charged parking system • Control traffic movement specially cargo Qingqis and Pick-ups • Manage unidirectional traffic flow. • Enforcement of traffic rules • Improved road infrastructure and street furniture • Implementation of traffic bylaws **(C) Congestion Reduction in Core Urban /CBD Area** • Designated stands for qingqi / rickshaws • Specified spaces for charged parking system • Alternate route for loading and unloading vehicles • Unidirectional traffic flow pattern • Removal of encroachments from major distributors • Development of infrastructure for pedestrian movement in old precinct.
Responsibilities to Plan • Enforcement of encroachment and road space improvement byelaws • Traffic corridors detailed study	**Implementation Responsibilities** International Development and Fund Supporting Agencies/Public Sector/ Private developers

• Encroachment Removal & Relocation Study • On Street & Off Street Parking Feasibility Study • Beautification plan	
Concerned Agencies Provincial Works & Services Department Government of Sindh./ District Highways Department/ Local Municipal Government/District Government/ Private Developers Line Departments of local Government.	**Time of Implementation** Short Term (1 year to 5 Years) Long Term (5 years to 20 Years)
Strategy: **Water Supply System Improvement**	**Programs/ Policies** • In the long term, piped water supply system for 100% population by 2037 • Installation of localize network in the planned housing schemes first and gradually cover the whole population in five year plans. • Reuse of treated effluent • Implementation of Tariff System for utilities through Water Metering (first for water usage above marginal consumption then in long run for all users). • Construction / Rehabilitation Of Water Supply Network • Improvement of Water Intake Works
Responsibilities to Plan • Need Assessment/Demand & Supply Study • Separate Master Plan for water supply and infrastructure development plan	**Implementation Responsibilities** Public Sector/ Private developers
Concerned Agencies Provincial / Local Government/ Public Health Engineering Department	**Time of Implementation** Short Term (1 year to 5 Years) Long Term (above 5 years)

Strategy: **Drainage & Sewerage System Improvement**	**Programs/ Policies** • Improvement and reconstruction of existing Combined system of sewerage and drainage (Phase-wise approach of replacing open drains with covered sewers of PE pipes). • Provision of wastewater treatment plant.
Responsibilities to Plan • Need Assessment/Demand & Supply Study • New Master Plan for Drainage & Sewerage services improvement.	**Implementation Responsibilities** Public sector / Private developers
Concerned Agencies Provincial / Local Government/ Public Health Engineering Department Municipality (MC)	**Time of Implementation** Short Term (1 year to 5 Years)

Strategy: **Solid Waste Disposal System Improvement**	**Programs/ Policies** • Immediate designation of walled Landfill Site with special attention for hospital waste disposal. • Collection and disposal of solid waste through specialized waste management companies.
Responsibilities to Plan • Disposal Generation Assessment Study • New Master Plan for Solid Waste Disposal System improvement.	**Implementation Responsibilities** Public / Private Sector
Concerned Agencies Provincial / Local Government/ Public Health Engineering Department Municipality (MC)/ Sindh Solid Waste Management Company SSWMB	**Time of Implementation** Short Term (1 year to 5 Years)

Strategy:	**Programs/ Policies**
Improving Efficiency of Municipal Committee's (MC) • Municipal Committee	• Acquire the required additional sanitary workers as per requirement. • Make Municipal Committee self sufficient • Strengthening Municipal Committee's Financial Capacity • In long term introduce 4R Solid Waste Management System (reduce-reuse-recycle-reject)
Responsibilities to Plan • Municipal Committee's Progress Assessment Study	**Implementation Responsibilities** Public / Private Sector
Concerned Agencies Provincial / Local Government/ Public Health Engineering Department Municipal Committee (MC)	**Time of Implementation** Short Term (1 year to 5 Years)

Strategy:	**Programs/ Policies**
Improving Fire Fighting Capacity	• Establishment of fire-stations to accommodate required number of fire vehicles. • Establish sub-stations at different locations to ensure short response time for the whole city. • Increase service efficiency through number of vehicles, dedicated staff and financial mechanism. • To ensure readiness of all vehicles with ample stocks of POL and spares.
Responsibilities to Plan Assessment on Municipality's firefighting potential	**Implementation Responsibilities** Public Sector
Concerned Agencies Thatta Municipal Committee.	**Time of Implementation** Short Term (1 year to 5 Years)
Strategy:	**Programs/ Policies**

Energy (Gas, Electric Power, Energy Generation through Alternate Resources)	• Development of alternative energy resources such as wind, solar and bio-gas etc. • To Improve existing infrastructure of WAPDA • Solar street lights project • Energy generation through solar panel system for residential and commercial purpose. • Installation of Gas Network for entire DHQ Town.
Responsibilities to Plan • Demand and Assessment of various energy resources. • Feasibility study for solar Park • Rehabilitation of solarized street lights.	**Implementation Responsibilities** Public/ Public Private Partnerships
Concerned Agencies • SSGC-Sui Southern Gas Company • WAPDA • Developers	**Time of Implementation** Short Term (1 year to 5 Years)

Strategy: **Health Sector** Improve access to healthcare facilities & minimize the long journeys to access basic medical facilities	**Programs/ Policies** • Check and balance to accomplished existing health care projects. • Addition of 2,843 beds to achieve the target of 2 beds per 1,000 district population • Hiring of 1,348 doctors and paramedical staff to cater future population. • Installation of incinerators.
Responsibilities to Plan • Health reforms	**Implementation Responsibilities** Public Sector and Welfare Agencies
Concerned Agencies	**Time of Implementation**

State Government/District Health Department. Provincial and District Health Department	Short Term (1 year to 5 Years) Long Term (above 5 year)

Strategy: **Education Sector Strategy**	**Programs/ Policies** • Short term plan provision of 106 classrooms at school and college level. • Repairing of school existing buildings with furniture • Training of teaching staff • 2,286 additional classrooms (school and colleges) by 2037
Responsibilities to Plan • Education Infrastructure Improvement Mater Plan	**Implementation Responsibilities** Public Sector
Concerned Agencies Provincial Government/District Education Department.	**Time of Implementation** Short Term (1 year to 5 Years) Long Term (more than 5 years)

Strategy: **Improving Recreation Sector**	**Programs/ Policies** • Repairing of existing recreational facilities and completion of under construction work. • Introduce financial mechanism i.e. facility use charges, to generate revenue to make them self-sustaining. • Special arrangement for security, parking and alternate route during religious and cultural activities in the city. • Rehabilitation and construction of family parks and playground near residential areas

	• Construction / Rehabilitation of Recreational facilities' in Thatta & Makli • Construct more parks and rehabilitate the available parks to facilitate the people of Thatta & Makli. • Construction of auditoriums and up-gradations for art councils • Rehabilitation of Shah Jehan Masjid Park • Provision of basic facilities like waiting area & cafeteria at Makli Graveyard • Provision of access pavements in graveyard • Provision of parks and open spaces • Provision of landscaping and furniture for Shah Jehan Masjid Park • Makli hill graveyard is decaying and losing its originality, therefore it is prime responsibility of antiquities department to take necessary actions for preservation of graveyard with allied facilities. • Provision of beautification plan for Shah Jehan Masjid & Makli graveyard to attract tourists.
Responsibilities to Plan • Provisions of New Recreation sites	**Implementation Responsibilities** Public Sector
Concerned Agencies Provincial Government / Culture, Tourism & Antiquities Department/ Government of Sindh/ District / Local Government / TMA	**Time of Implementation** Short Term (1 year to 2 Years) Long Term (More than 5 years)

Strategy:	**Programs/ Policies**

Disaster Risk Management	• Engage all stakeholders of entire district in overall disaster rehabilitation process. • Recognize the commitment of stakeholders and the need for collaboration across all levels of government, community, industry, commerce, and government owned corporations, private and volunteer organizations and local communities within all aspects of disaster management. • Aligned job responsibilities of key stakeholders with job descriptions mentioned in principal guidelines proposed in *Pakistan National Disaster Risk Management Act 2010*, *National Disaster Risk Management Guidelines* and *Disaster Risk Management Plan, Sindh.* • Ensure establishment of straight relationships, trust, teamwork, consultative decision-making and shared responsibilities among stakeholders. • Develop disaster risk assessment system through statistical information, risk maps, emerging hazards information and their affects. • Adopt measures of sustainability of local communities by utilizing local resources available to avoid post disaster cataclysms (dearth, theft, spread of epidemic diseases, etc.) • Promote economic sustainability after disasters.
Responsibilities to Plan • Identification of Disaster Prone Areas and Early warning and shelter homes • Development of Community Training and Drill Organization Manual and SOP. • Development Local stakeholders Roles and Responsibility SOP.	**Implementation Responsibilities** Public Sector and National /International Welfare agencies

Concerned Agencies NDMA/PDMA/ P & D department Gos. /SUPARCO/ Provincial Irrigation Department Gos./ Line departments of local government / District Disaster Management Authority.	**Time of Implementation** Short Term (1 year to 5 Years)

Strategy **Economic Development Plan**	**Programs/ Policies** • Rehabilitation of Infrastructure in existing Small Industrial Estate (roads, street lights, parking for loading/unloading goods vehicles, etc.) • Increase strategic storage through construction of cold storage / Godowns for agro products to cater drought situation. • Provide good incentives near peripheries for shifting / re-location of whole sale markets from the inner city to reduce congestion. • Encourage Local Private Investors by giving them subsidies. • Consider changing trends of crop production through periodically revise Economic Policy Framework (feasible studies for economic potentials) • Ensure measures for security / risk recovery plan for economic zone. • Market and logistics should also be added to enhance trade and commerce. • Livestock and dairy sector needs to encourage and facilitated. • Centralize wholesale markets to create connectivity with regional markets. • Drought measures
Responsibilities to Plan Feasible studies for economic potentials	**Implementation Responsibilities** Public /private developers
Concerned Agencies Provincial Government / District Government / Local Government / Chamber of Commerce and Industries	**Time of Implementation** Short Term (1 year to 5 Years) Long Term (5 years to 20 Years)

Annexure – A

Sustainable Development Goals Acceleration Plan

Annexure – B

Atlas

Sustainable Development Goals (SDGs) Acceleration Plan
Thatta DHQ Town

Sustainable Development Goals:

The Agenda 2030 comprises of Sustainable Development Goals (SDGs) which are a call for action by all countries – poor, rich and middle-income – to promote prosperity while protecting the planet. They recognize that ending poverty must go hand-in-hand with strategies that build economic growth and address a range of social needs including education, health, social protection, housing and job opportunities, while tackling climate change and environmental protection.

The 17 goals of SDGs provide a direction for targeting human prosperity and have a global scope – applying on both developed and developing countries. SDGs have come into action since the beginning of 2016 and will continue as the leading global development agenda until 2030. The SDGs targets are defined as aspirational, with each government setting its own national/subnational targets while considering its circumstances and priorities. In consultation with stakeholders, governments are also to decide how to incorporate SDGs in its planning processes, policies and strategies, and to recognize the link between sustainable development and other relevant ongoing processes in the economic, social and environmental fields[1].

Pakistan signed the international agreement on the 2030 agenda in September 2015 during the United Nations General Assembly (UNGA) Session for sustainable development, committing to achieve the 17 SDGs between 2016 and 2030. In February 2016, under a unanimous resolution, the National Assembly of Pakistan endorsed SDGs as Pakistan's national development agenda. The country has thereafter made rapid progress in adopting and formally launching the 17 SDGs.

SDGs in Sindh:

In line with the National Initiative on SDGs, Government of Sindh (GoS) has also made focused efforts to support the mainstreaming, localization, and implementation of the 2030 Agenda through a support project for SDGs implementation in Sindh, jointly-funded by the GoS and United Nations Development Programme (UNDP), with the aim to address socio-economic challenges in the province and steer it in a progressive direction towards achievement of the SDGs. Under the project, the SDGs Support Unit Sindh has been established in Planning & Development Department, Government of Sindh with effect from May 2017. The Unit contributes towards accelerating progress on SDGs in the province by working through following four approaches:

[1]United Nations Development Group, Reference Guide to UN Country Teams -Mainstreaming the 2030 Agenda for Sustainable Development, March 2017 Update

Policies and Plans Mainstreaming SDGs in local development plans and strategies clearly delineating the resource requirements.	Data Reporting Strengthening coordination, reporting and monitoring mechanisms for SDGs	Financing Financing flows increasingly aligned with 2030 Agenda	Innovation Supporting integrated and innovative approaches to accelerate progress on SDGs on priority areas.

GoS has also taken the crucial step towards mainstreaming and localizing SDGs in the province by approving prioritization of SDGs in the immediate, medium and long-term for the province. The prioritization has been done by considering severity of development issues and challenges, resource availability, and Sindh's economic and social endowments, value for money, and magnitude of impacts, in line with Sindh 2025 vision and other policies and strategies.

Sindh's SDGs Priorities

Ranking of Priorities	Goal #	Sustainable Development Goals (SDGs)	Immediate Priorities	Intermediate Priorities (Up-to 2025)	Long-term Priorities (Up-to 2030)
1	Goal 4:	Quality Education			
2	Goal 3:	Good Health and Well Being			
3	Goal 6:	Clean water and Sanitation			
4	Goal 7:	Affordable and Clean Energy			
5	Goal 2:	No Hunger			
6	Goal 8:	Decent work and Economic Growth			
7	Goal 9:	Industry, Innovation and Infrastructure			
8	Goal 16:	Peace and Justice			
9	Goal 11:	Sustainable cities and communities			
10	Goal 1:	No Poverty			
11	Goal 12:	Sustainable Consumption and Production			
12	Goal 10:	Reduce Inequalities			
13	Goal 5:	Gender Equality			
14	Goal 17:	Partnership development			
15	Goal 13:	Climate Change			
16	Goal 14:	Life Below Water			
17	Goal 15:	Life on Land			

The above table indicates that the SDG Goal # 4, 3, 6,7,2 and 8 are on the Immediate priority, whereas Goal # 1,9,16,11,12 and 10 are on Intermediate priority i.e. upto year 2025. The remaining goals which are Goal # 5, 17, 13, 14, and 15 will be on the Long term priority i.e upto year (2030).

Urban Development Planning and the SDGs:

Today's common urban development challenges like affordable housing, provision of basic services, municipal functions, controlling crime, poverty, disease and the exhaustion of natural resources do not respect regional borders or limits between the built and the non-built domains. Therefore, the scope of urbanization should always include the livable environment while also considering the regional dimension. In this connection, the rigorous consultation and analysis being done by GoS to prepare Development Master Plan of 14 DHQ Towns of Sindh, it is being realized with even more significance that sustainable development cannot be achieved without significantly transforming the way we plan, build and manage our urban spaces. The rapid growth of cities resulting in rising population and increasing migration that has led to a boom in urban areaats and slums, is becoming a more significant challenge for urban areas.

Under the contract of the preparation of development Master Plan of 14 DHQ towns, SDG Acceleration plan was not part of the approved TORs but keeping in view the Sindh government's initiatives to mainstream SDGs targets in provincial planning (taking Islamkot as a model SDG Taluka) the Directorate and Consultant after due consultative process felt the need to include brief SDG Acceleration Plan as part of Development Master Plans. Accordingly in consultation with SDG unit Sindh, SDG 11 was selected for SDG Acceleration Plan for 14 DHQ towns since is pertinent to urban planning and development.

SDG 11 – *Sustainable Cities and Communities* sets the basis for urban-planning techniques and policies for the future. For a tangible acceleration towards achievement of SDG 11, simultaneous interventions will need to be executed directly through urban-planning interventions. While this involves investments in public transport, housing, creating green public spaces and improved urban planning and management in participatory and inclusive ways, an in-depth review of SDG 11 targets reveals a much stronger interlinkage with other SDGs such as poverty, health, education, clean energy, provision of basic services (social services as well as urban municipal services), etc. thereby generating a holistic societal impact, which is of prime importance in the context of Agenda 2030.

Using the key mechanism for periodic updating of the Development Master Plan after every five years, the SDGs Acceleration Plan also proposes embedding SDGs agenda targets against projects and schemes designed at local level and assesses the available and potential financing flows in context of future opportunities. Therefore, the targets and indicators of

SDG 11 – Sustainable Cities & Communities is being reviewed against the Master Plan, along with identification of supportive plans, policies and interventions.

The SDGs Acceleration Plan table below explicitly underlays the outline for how the Master plan of the town addresses the targets and indicators under SDG 11 – Sustainable Cities & Communities. The plan also takes note of the local social and economic data to identify services provision gaps at the local level, as well as key challenges at district level.

SDG Acceleration Action Plan - Thatta DHQ Town

SDG Goal 11 : Make Cities and Human Settlements Inclusive, Safe, Resilient and Sustainable

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable				
	11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing	[2]11% of the urban town population lives in katcha houses	- Increase in proportion of small size plots (Plot size will be depend on land value) could be made for low income groups in all new housing schemes. - Affordable housing program for low income group in different phases up to 2037, through one window operation (including technical guidance, easy loan provisions, legal procedures)	Sindh Katchi Abadis, Squatter Settlements & Slums Policy - The process of regularization and up-gradation of the pre-1985 katchi abadis shall continue as per current policy. However, katchi abadis, which are hazardous by virtue of being close to railways tracks or located under high tension power lines, or are on or close to the riverbeds, or on lands needed for operational /security purposes, need to be relocated at appropriate places by LOAs. - Formation of new katchi abadis shall not be allowed and shall be discouraged by exercising strict development controls in all urban areas. - Formation of Resettlement Plans - Resettlement plans shall be prepared by the concerned Land Owning Agencies (LOAs) in consultation with

[2] Data provided by Sindh Katchi Abadis Authority, December 2019. Katchi abadi is defined as by Katchi abadi authority

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
					affected communities for shifting of katchi abadis dwellers who fall within hazardous or security/operational zones. These plans shall primarily be on a self-financing basis. - The internal infrastructure and services shall be provided on incremental basis depending on the needs and priorities of the residents to make them affordable and cost effective. Trunk infrastructure and services shall be provided by public sector organizations and the cost shall be met from Government exchequer
	11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in	11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities	70% people have access to public transport.[3]	- Improve road design to make safer roads. - Prevent encroachments on footpaths through litigation. - Environmental Impact Assessment (EIA) should be mandatory for all transportation projects. - Declaring private vehicle free zones, especially in peak hours, in CBD areas to reduce noise and air pollutions.	Sindh empowerment of Persons with Disabilities' Act, 2018[4] i. Universal access to destination: All destinations served by the public road system shall be accessible by pedestrians and by drivers of all vehicles (including bicycles), except that vehicle operation may be restricted for reasons of excessive weight, noise or size, or extraordinary potential for damage to property or person ii. Equal Right of use: People's right to use that portion of a street designed for travel is not diminished by less weight, less size, or less average speed associated with their travel mode. Demand actuated tra-c signals must detect and serve a

[3] Socio Economic Survey 2017
[4] https://depd.sindh.gov.pk/sindh-empowerment-of-persons-with-disabilities-act-2018

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	vulnerable situations, women, children, persons with disabilities and older persons			- Reduce traffic growth and congestion by achieving a mode shift. - Enhance institutional efficiency to improve service delivery. - Dualization of main arteries - Improve road design to make safer roads. - Prevent encroachments on footpaths through litigation. It is suggested that necessary provision of the above recommendation may be mandated in the laws and regulations of SBEA and other agencies which drafting the buildings and highway regulation	diversity of users including bicycle operators in the roadway and pedestrians using crosswalks. iii. Accessible surfaces: To the extent practicable, travel surfaces should accommodate travel on foot with minimal trip hazards and via common assistive devices such as wheelchairs. Roadway surfaces should be as clear as possible of hazards for narrow tires such as bicycle wheels. iv. Crossable Roadways: Crossing distances at non-signalized access locations must not exceed the distance that can be covered at walking speed before tra-c may arrive from beyond sight distance, or during reasonable gaps in roadway tra-c. Refuges provided to reduce crossing distances should be large enough to store assistive devices such as wheelchairs and strollers. Tra-c signal timing should provide adequate clearance intervals for safe crossing by pedestrians and slow vehicles.

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	11.3.1 Ratio of land consumption rate to population growth rate 11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically	Baseline will be established at the start of implementation of Master plan. Vision formulation exercise through multiple consultative workshops were conducted to establish a shared and common vision for the development of Thatta DHQ town in the future.	o The total extent of the area included in the overall proposed Thatta Master Plan is 16,000 acres approx. for a population of 190,100 by 2037	Sindh Colonization of Government Lands Act 1912 and Disposal of Government Lands Rules, 2005.[5] National Housing Policy 2001[6]
	11.4 Strengthen efforts to protect and safeguard the world's	11.4.1 Total expenditure (public and private) per capita spent on the	Baseline will be established at the start of	• Protection of historical places and cultural heritage	Heritage act for policies 2012[7]

[5] http://sindhlaws.gov.pk/setup/publications_SindhCode/PUB-16-000113.pdf
[6] http://mohw.gov.pk/mohw/userfiles1/file/National%20Housing%20Policy.pdf
[7] https://antiquities.sindhculture.gov.pk/index.php/about-us/acts/343-heritage-act-1994

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	cultural and natural heritage	preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)	implementation of Master Plan. • Makli Necropolis • Shah Jahan Mosque • Bhambhore • Keenjhar Lake • Haleji Lake • Muqam Qadam Shah, Graveyard Raj Malik • Soonda Graveyard • Kalan Kot • Historical Building of Two Domes • Nawab Ameer Khani Mosque • Dabgir Mosque		(2) An agreement under this section may provide for the following matters or 'for such of them as it may be found expedient to include in the agreement--- (a) the maintenance and custody of the protected heritage and the duties of any person who may be employed to watch it; (b) the restriction of the owner's right to destroy, remove, alter or deface the protected heritage; (c) the facilities of access to the public or to any portion of the public and to persons deputed by the Committee to inspect or maintain the protected heritage; (d) the notice to be given to Government in case the land on which the protected heritage is situated is offered for sale by the owner, and the right to reserve by Government to purchase such heritage, or any specified portion of such heritage, at its market value; (e) the payment of any expenses incurred by the owner or Government in connection with the preservation of the protected heritage; and (f) any matter connected with the preservation of the protected heritage which is a subject of agreement between the owner and Government.

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	11.5.1 Number of deaths, missing persons and persons affected by disaster per 100,000 population	Sindh Data [8] No of deaths (1988-2013) = 241 No of People effected (1988-2013) =24,096,173 Deaths per 100,000 population = 0.2491 Affected people per 100,000 population = 241	• The DSM, PPHI shall also be responsible for providing medical cover to the IDPs in the catchment area of BHUs assigned to them particularly, and will perform their due role in supplementing the overall medical cover provided by the District Health Department. • National risk assessment would identify highly vulnerable districts and be complemented by higher resolution work at local level to diagnose the underlying causes of risk, explore concrete risk reduction options and inform development planning and prioritization exercises and/ or disaster preparedness planning. • Arrange medical teams for providing medical cover to the IDPs settled in any relief camp. • Fumigate the affected areas and areas at risks of spread of any of epidemic disease.	National Disaster Risk Reduction Policy 2013[9]

[8] PDMA (2017)
[9] http://www.pdma.gos.pk/new/resources/Sindhidrr-policy.pdf

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
				• Ensure that all ambulances are in working order and road worthy conditions. • Ensure vacant possession of all schools buildings at the time of emergency for setting up relief camps. • Ensure sanitation and cleanliness as well as clean drinking water facilities wherever possible at all school buildings declared as relief camps through by binding down their concerned Headmasters. • The creation of an integrated multi-hazard damage loss data-base is therefore a prerequisite for systematic vulnerability and risk monitoring	
	11.6 By 2030, reduce the adverse per capita environmental impact of cities,	11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of	[10]Present Total solid waste generation in Thatta DHQ town is 24 tons per day. Regular collection	- The collection and disposing of solid waste is the responsibility of the TC. - The collection system needs to be made more effective and efficient. - Town Municipal Committees has already initiated some work on	THE SINDH SOLID WASTE MANAGEMENT BOARD ACT, 2014 [11]

[10] Municipal Committee Thatta
[11] http://www.pas.gov.pk/uploads/acts/Sindh%20Act%20No.IV%20of%202014.pdf

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	including by paying special attention to air quality and municipal and other waste management	total urban solid waste generated, by cities	by municipal is about 50-60%	biomedical-waste management. It should immediately start segregation practice for biomedical waste collection system. - Techno-economic feasibility and detail study of characterization of waste is proposed on basis of the policy guidelines. - Develop integrated solid waste management system keeping in mind the method, procedure and design at front end, middle end and back end, based on best possible public health practices and environmental protection laws/rules. - Industrial waste disposal should be treated seperately and safely	
	11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and	Only 1.4% (43 acres) out of total 2,944 (11.9 Sq KM[12])acres park area is available in Thatta	• Existing open spaces in core urban area should be restored and maintained. New open spaces should be identified and created. • Development and preservation of cultural heritage	Adopt-a-park policy 2019 (PPP unit, Finance dept. GoS) is still in progress

[12] Based on Landuse Calculations

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	particular for women and children, older persons and persons with disabilities	persons with disabilities		• Cater the problem of Shortage of water facility to maintain green spaces, green belts and trees plantation. • Availability of sports infrastructure. • Provision of infrastructure to accommodate visitors into cultural events	
	11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	11.a.1 Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city	Through inclusive and participatory development of SDP and collaborative implementation, the target for development plan integration is achieved	• Build a local / district / regional transportation system. • Rehabilitation of existing roads should be scratched from its compaction level and reconstruct as per specification of design perimeters. • Discourage direct link roads with bypass • The Consultant suggest that the Master Planning should be reviewed every five years to estimate the land use and area requirement according to the growth rate and economic investment	• Preparation of Development master plans of DHQ towns by Govt of Sindh • Poverty Reduction Strategy for Sindh approved by cabinet 2018 The key conceptual underpinnings of this strategy are:[13] • The policy is focused on creation/facilitation of rural hubs: • Using principles of agglomeration to support and drive growth • Focusing on those interventions that will have a catalytic effect • Consolidation of services, for improved service deliver and better impact.

[13] Poverty Reduction Strategy for Sindh

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
					The combined effect aims to provide improved facilities, services and opportunities for households in the surrounding cluster of villages served by the hub
	11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and	11.b.1 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030a 11.b.2 Number of countries with national and local disaster risk	Provincial policies and strategies in placed	National risk assessment would identify highly vulnerable districts and be complemented by higher resolution work at local level to diagnose the underlying causes of risk, explore concrete risk reduction options and inform development planning and prioritization exercises and/ or disaster preparedness planning. • Arrange medical teams for providing medical cover to the IDPs settled in any relief camp. • Fumigate the affected areas and areas at risks of spread of any of epidemic disease. • Ensure that all ambulances are in working order and road worthy conditions.	National Disaster Risk Reduction Policy 2013[14]

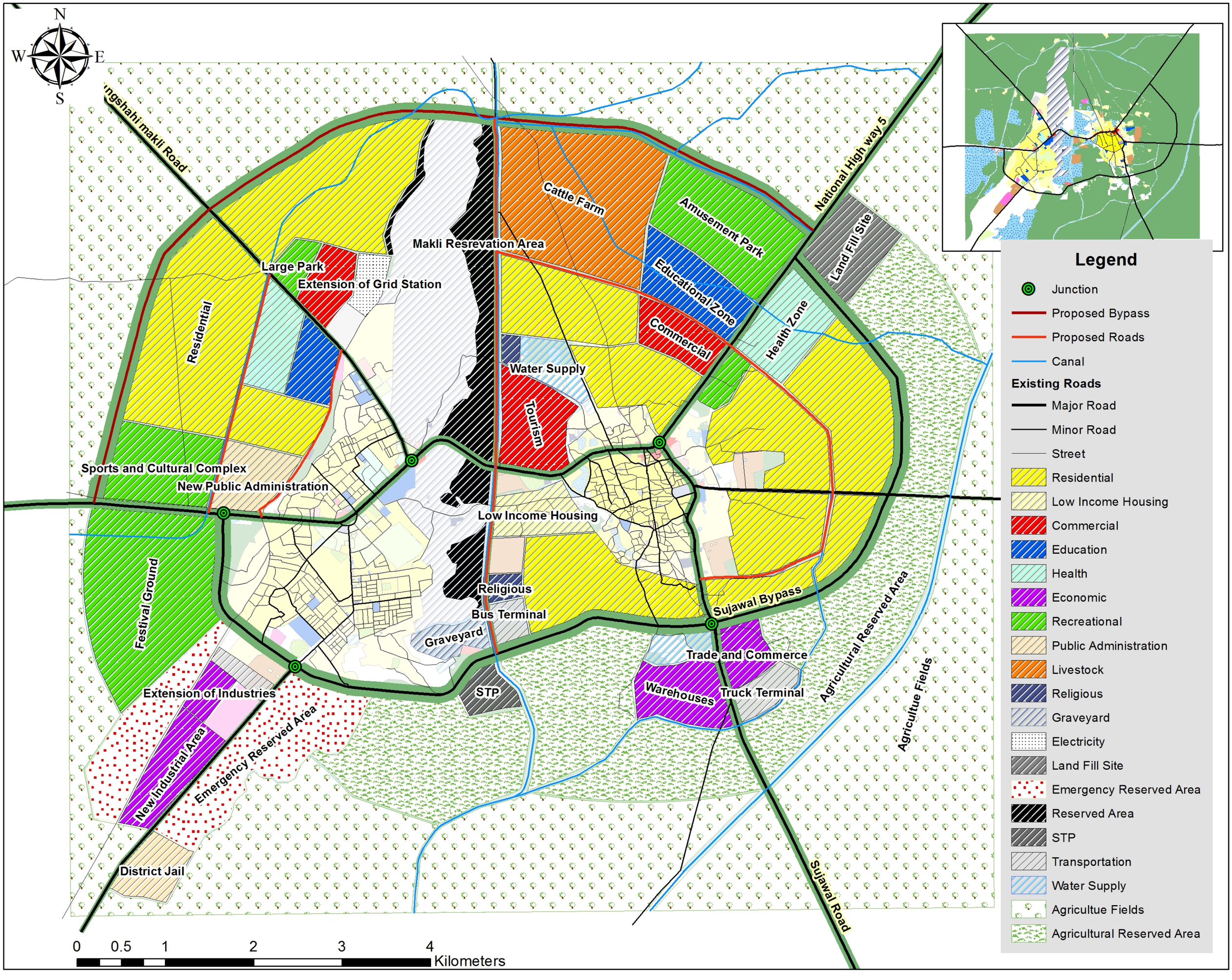
[14] http://www.pdma.gos.pk/new/resources/Sindhidrr-policy.pdf

SN	SDG Target	Indicators	Baseline Survey	Supportive Strategies given in SDP	Policies
	develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels	reduction strategies		• Ensure vacant possession of all schools buildings at the time of emergency for setting up relief camps.	

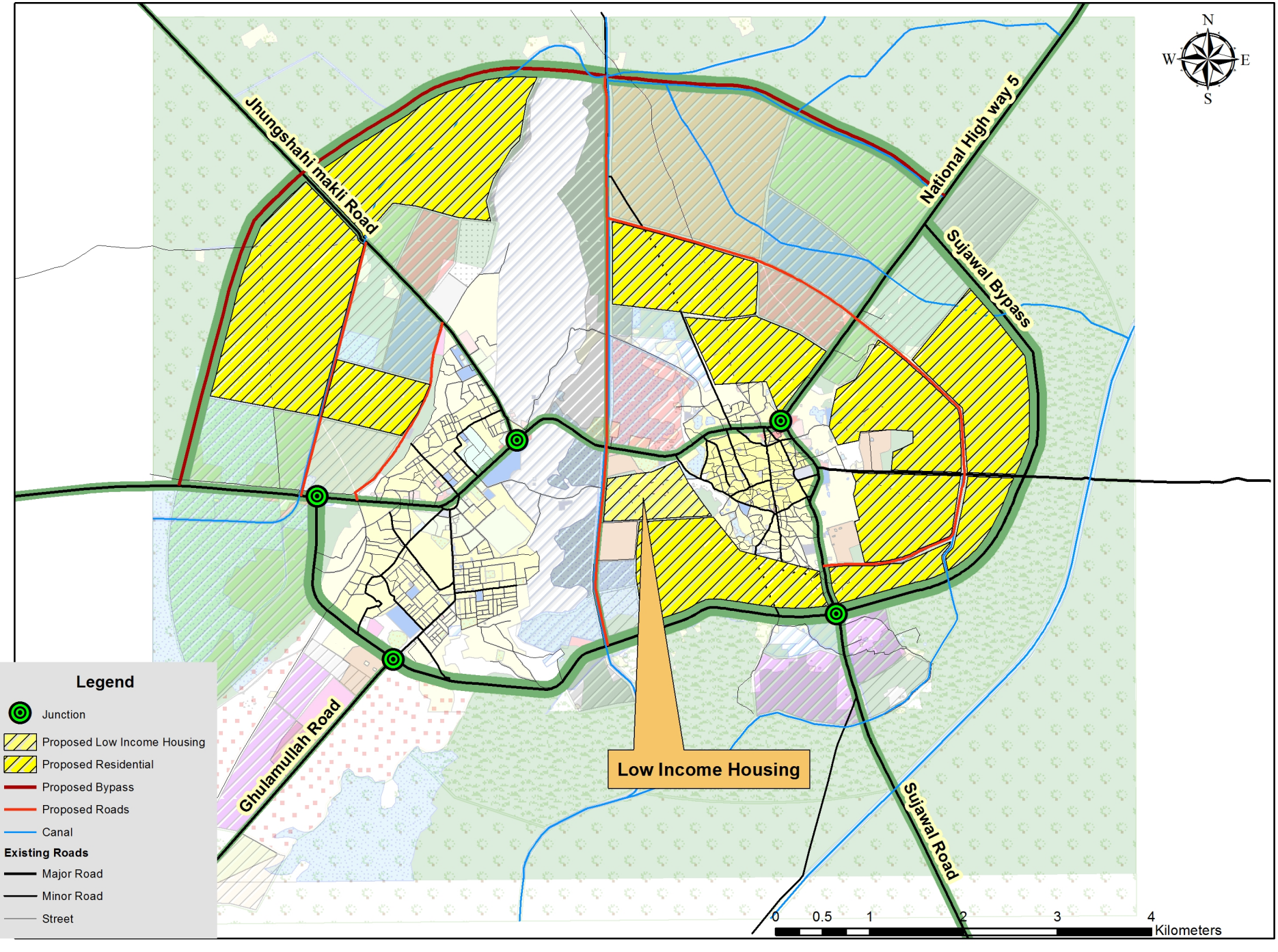
Annexure – B

Atlas

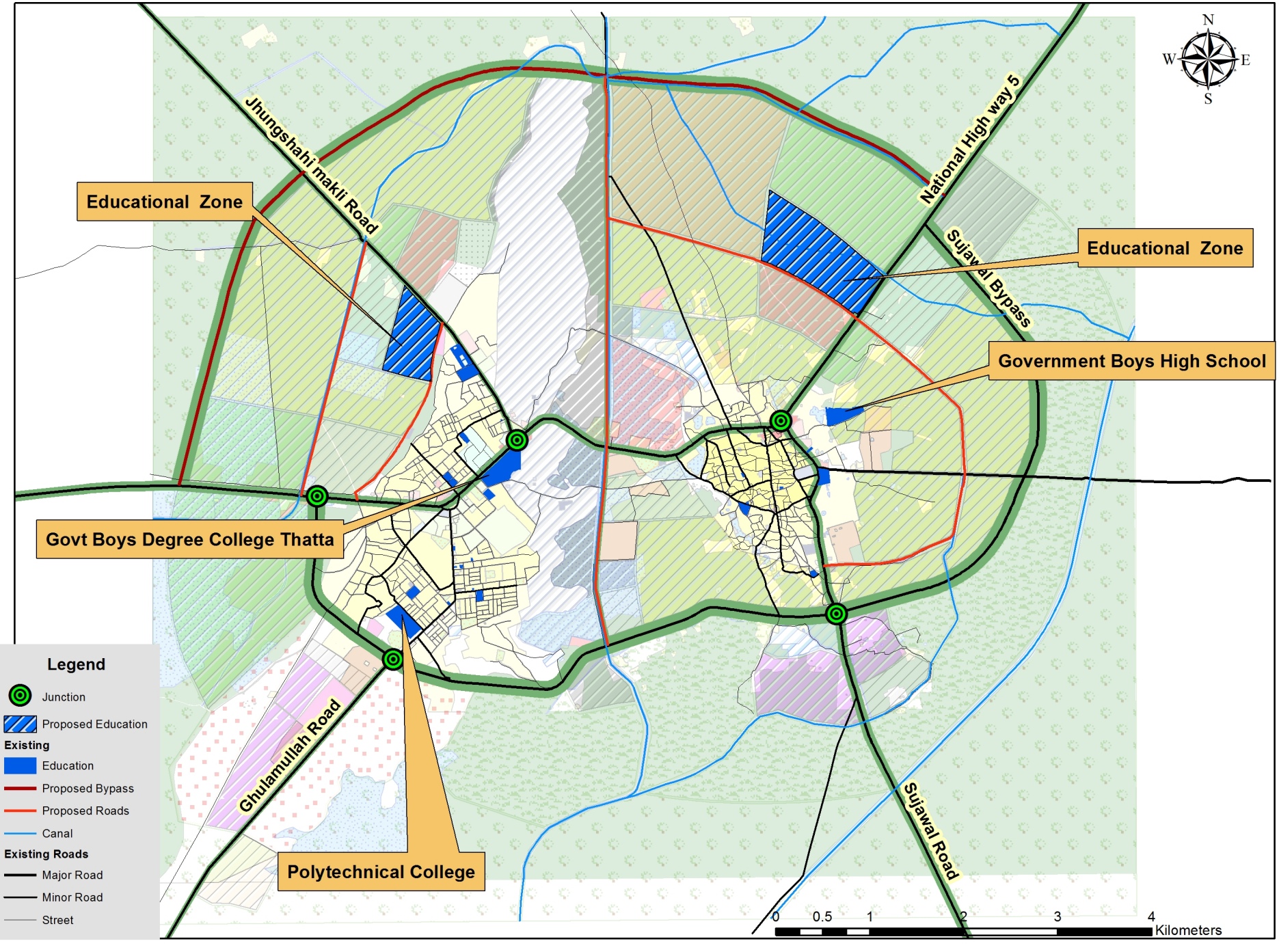
Proposed Master Plan for Thatta Town



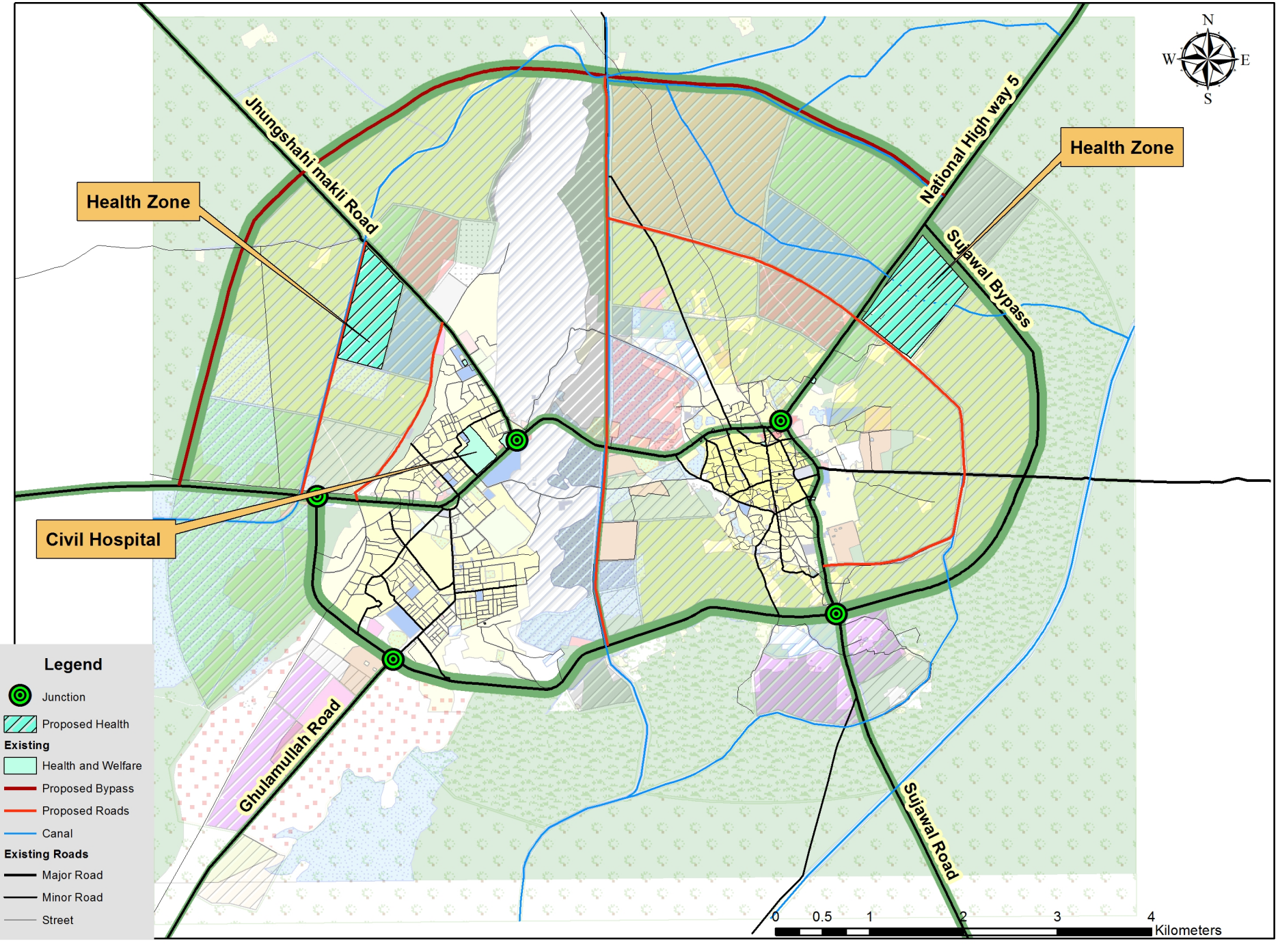
Proposed Residential Landuse for Thatta Town (Include Makli)



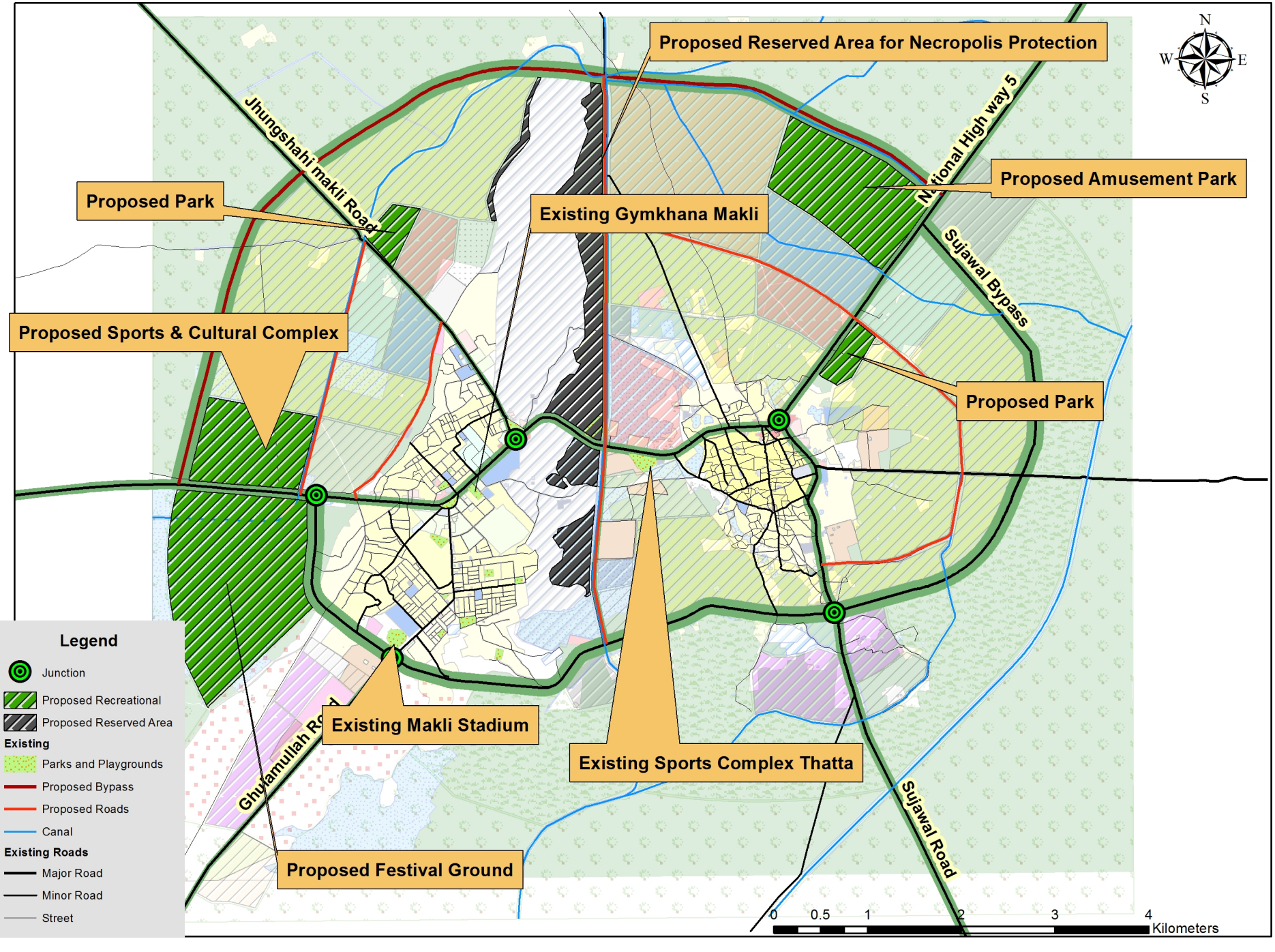
Proposed Educational Landuse for Thatta Town (Include Makli)



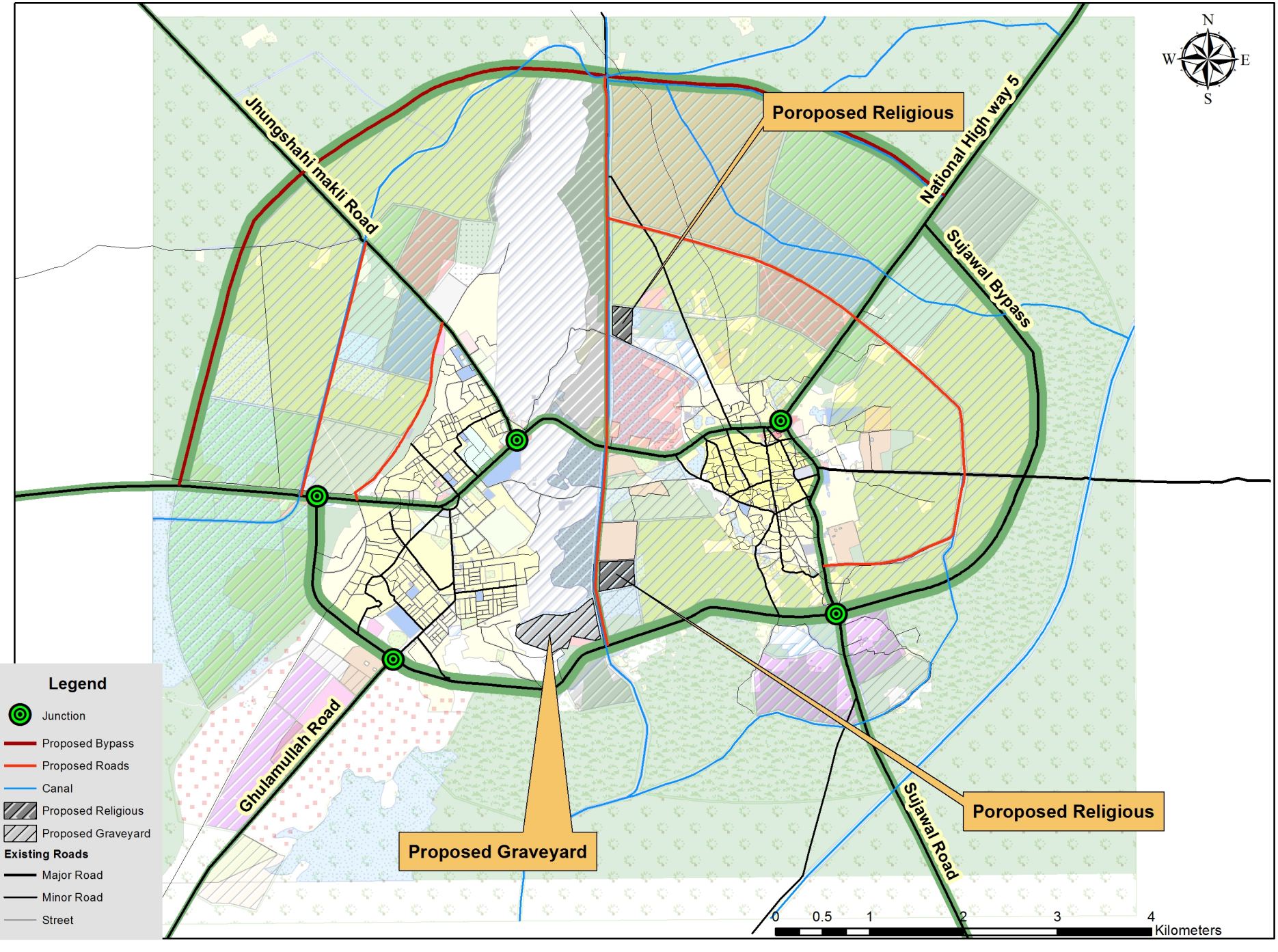
Proposed Health Landuse for Thatta Town (Include Makli)



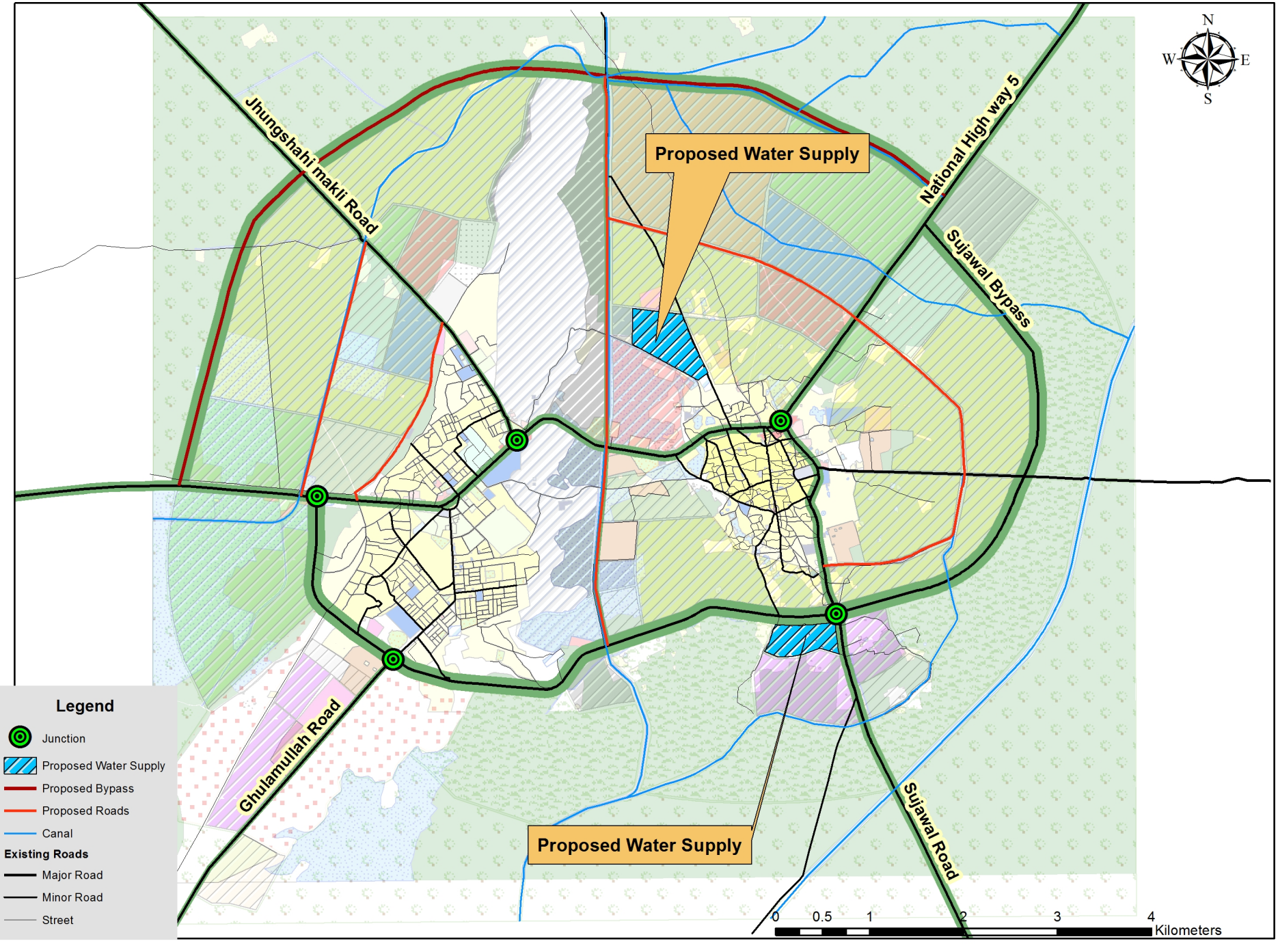
Proposed Recreational Landuse for Thatta Town (Include Makli)



Proposed Religious & Graveyard Landuse for Thatta Town (Include Makli)



Proposed Utilities & Services Landuse for Thatta Town (Include Makli)



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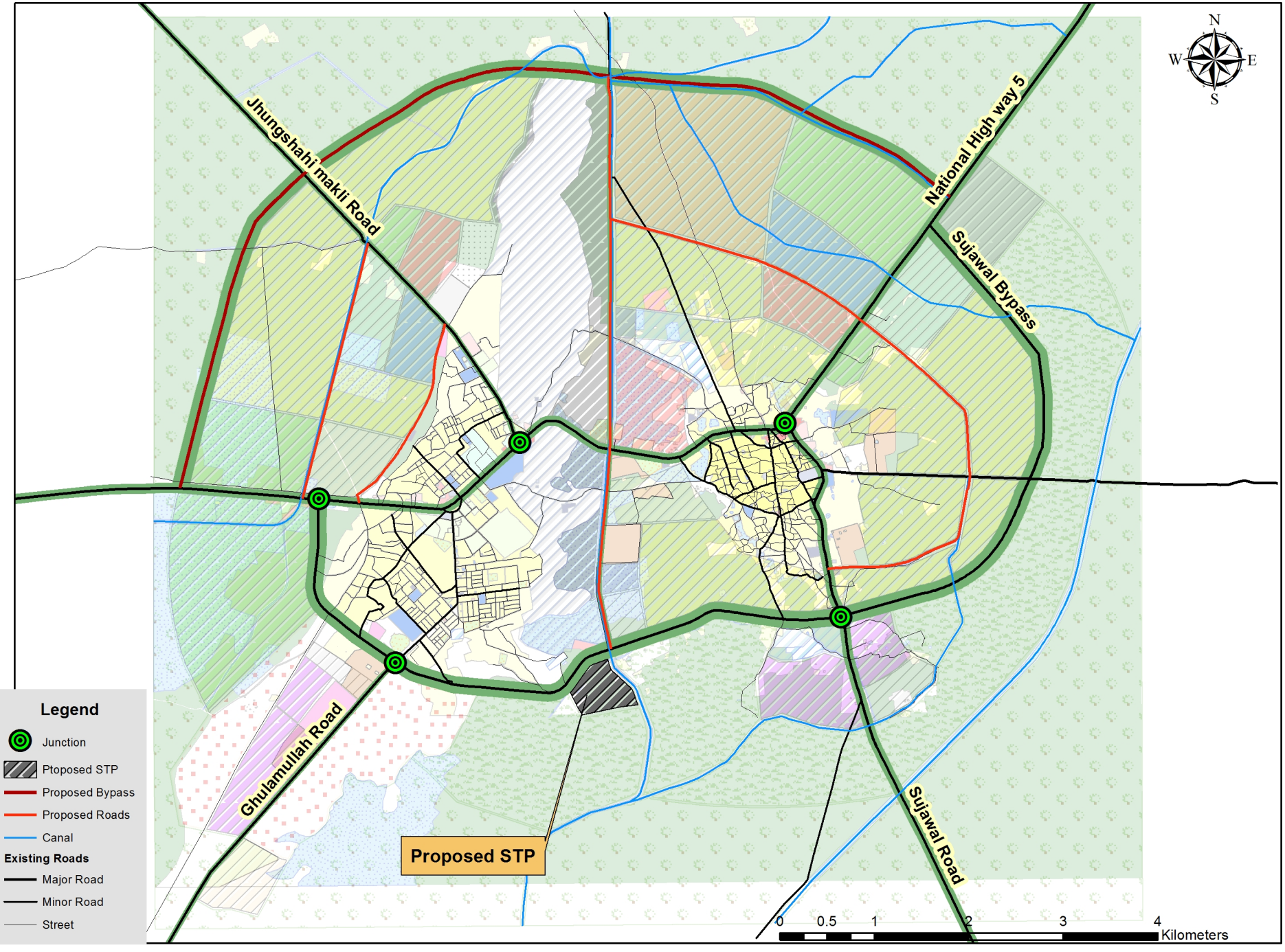

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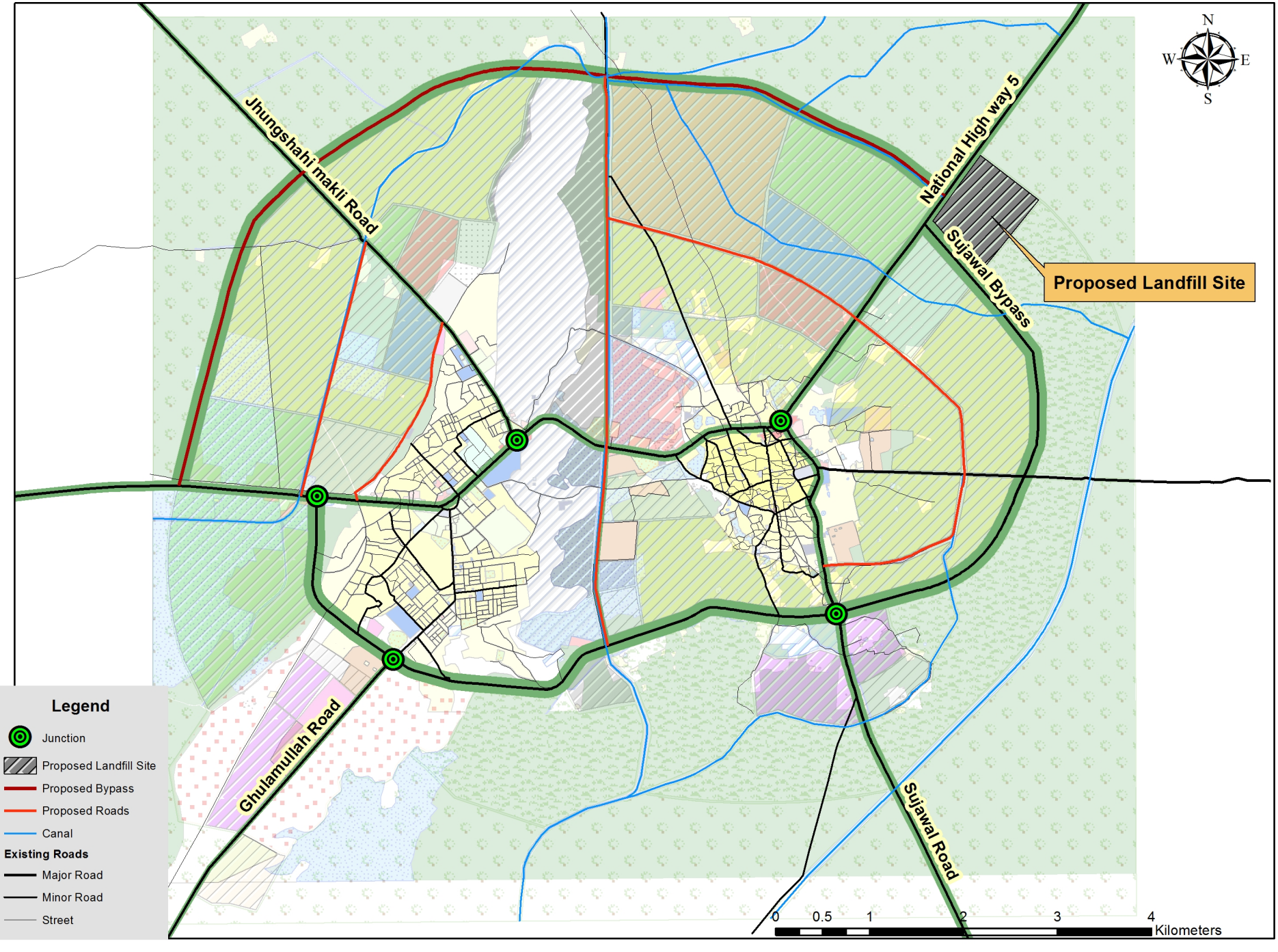
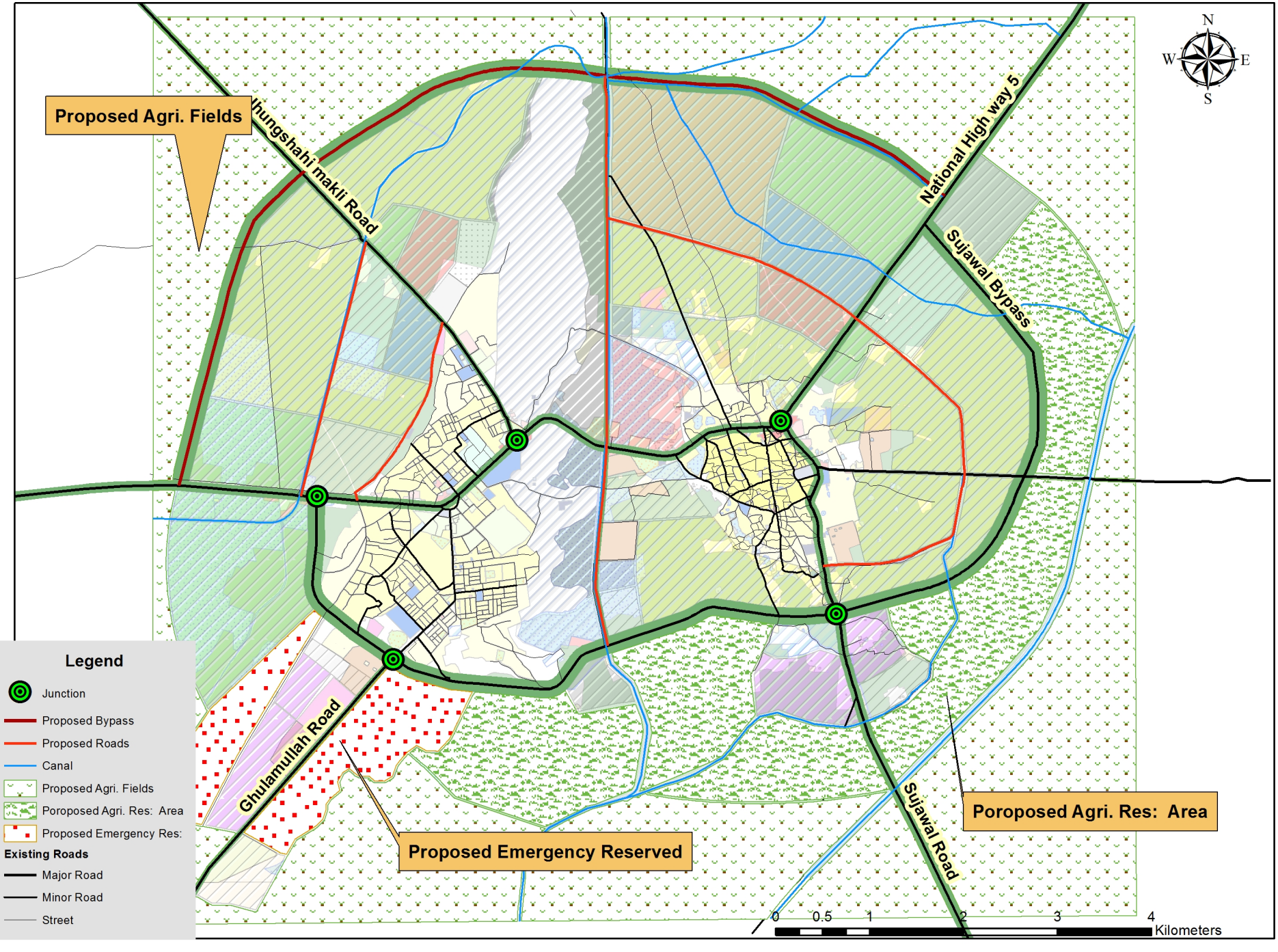


Proposed Agricultural Landuse for Thatta Town (Include Makli)



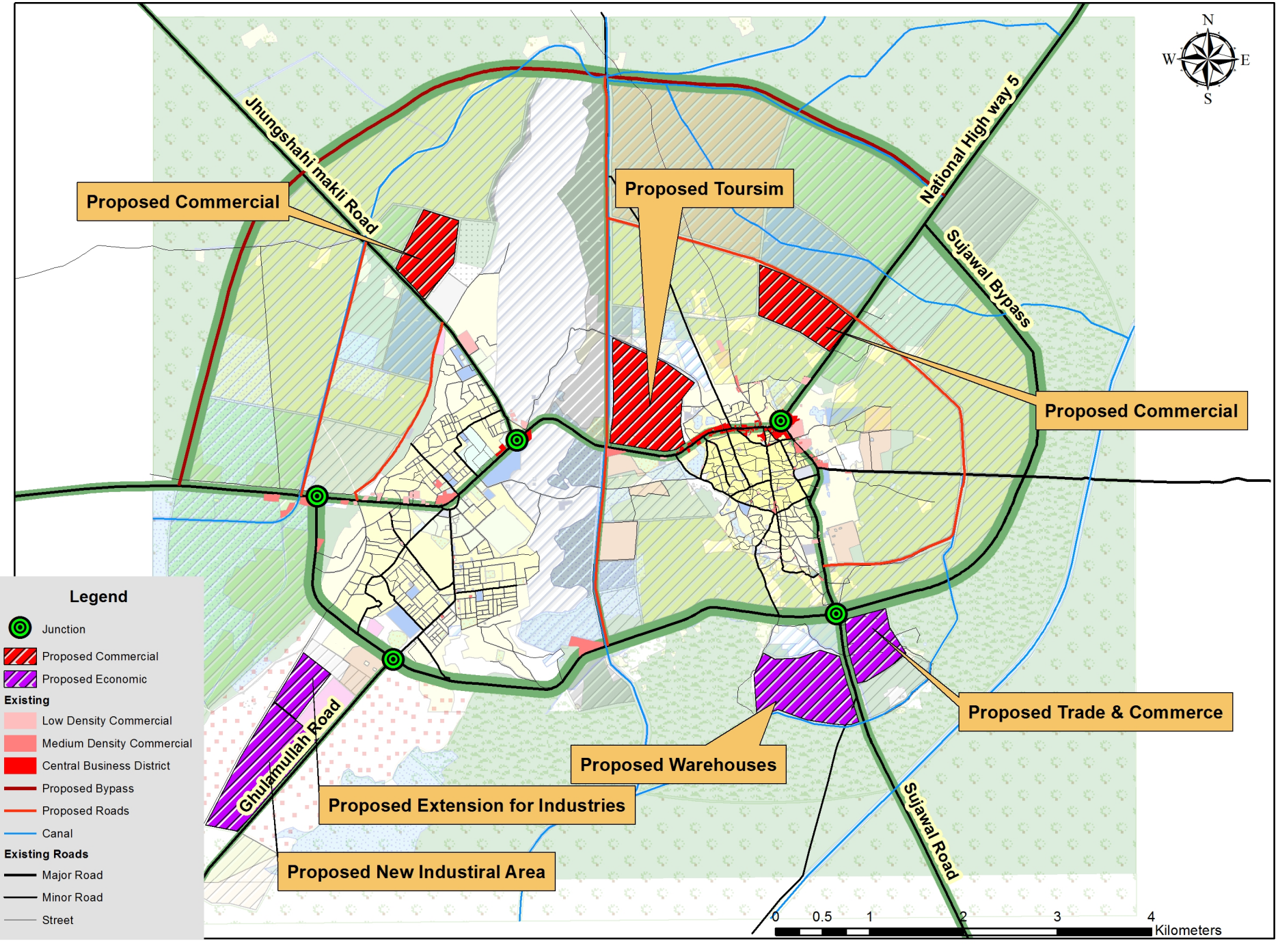
Legend

- Junction
- Proposed Bypass
- Proposed Roads
- Canal
- Proposed Agri. Fields
- Poroposed Agri. Res: Area
- Proposed Emergency Res:

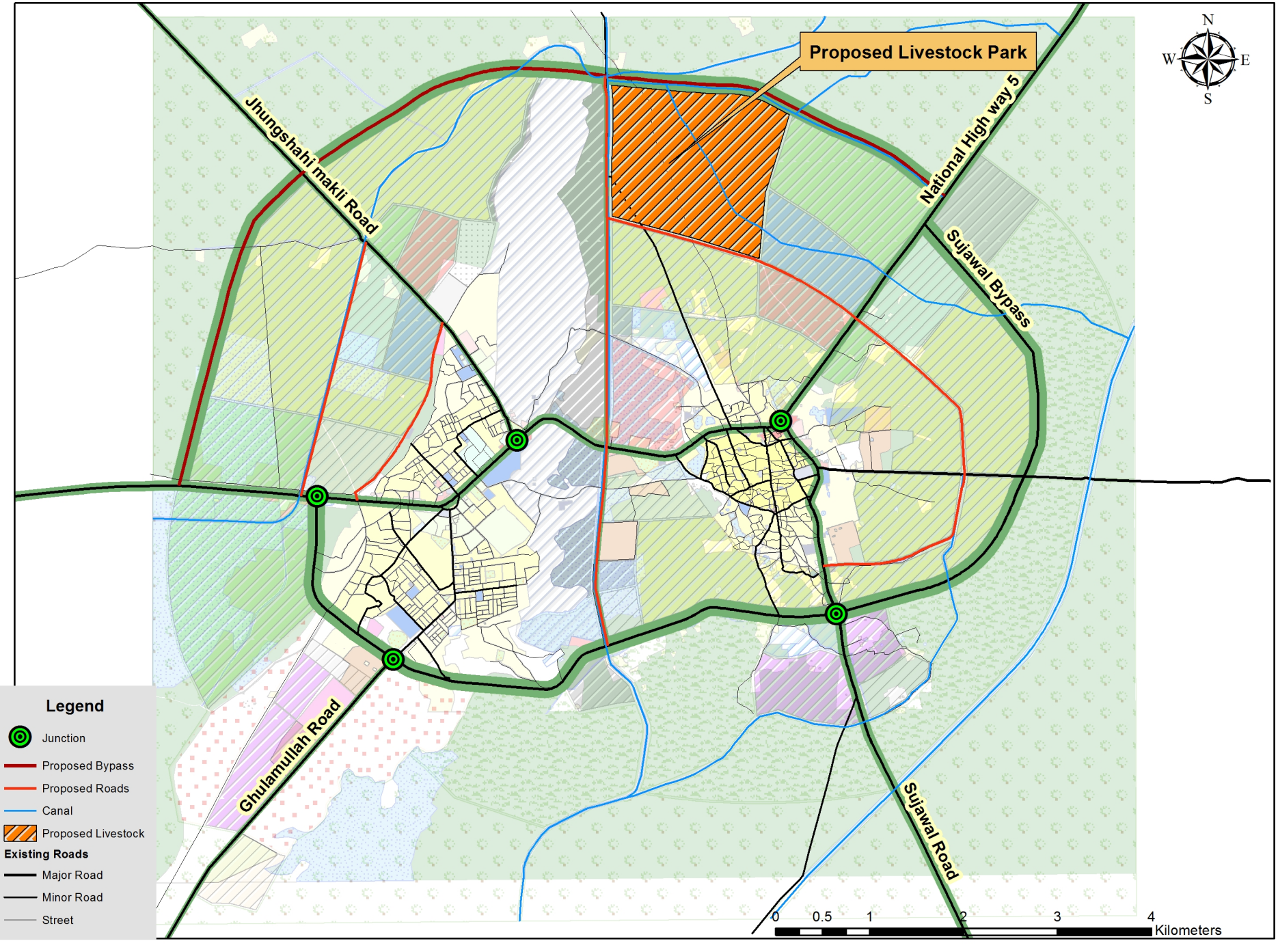
Existing Roads

- Major Road
- Minor Road
- Street

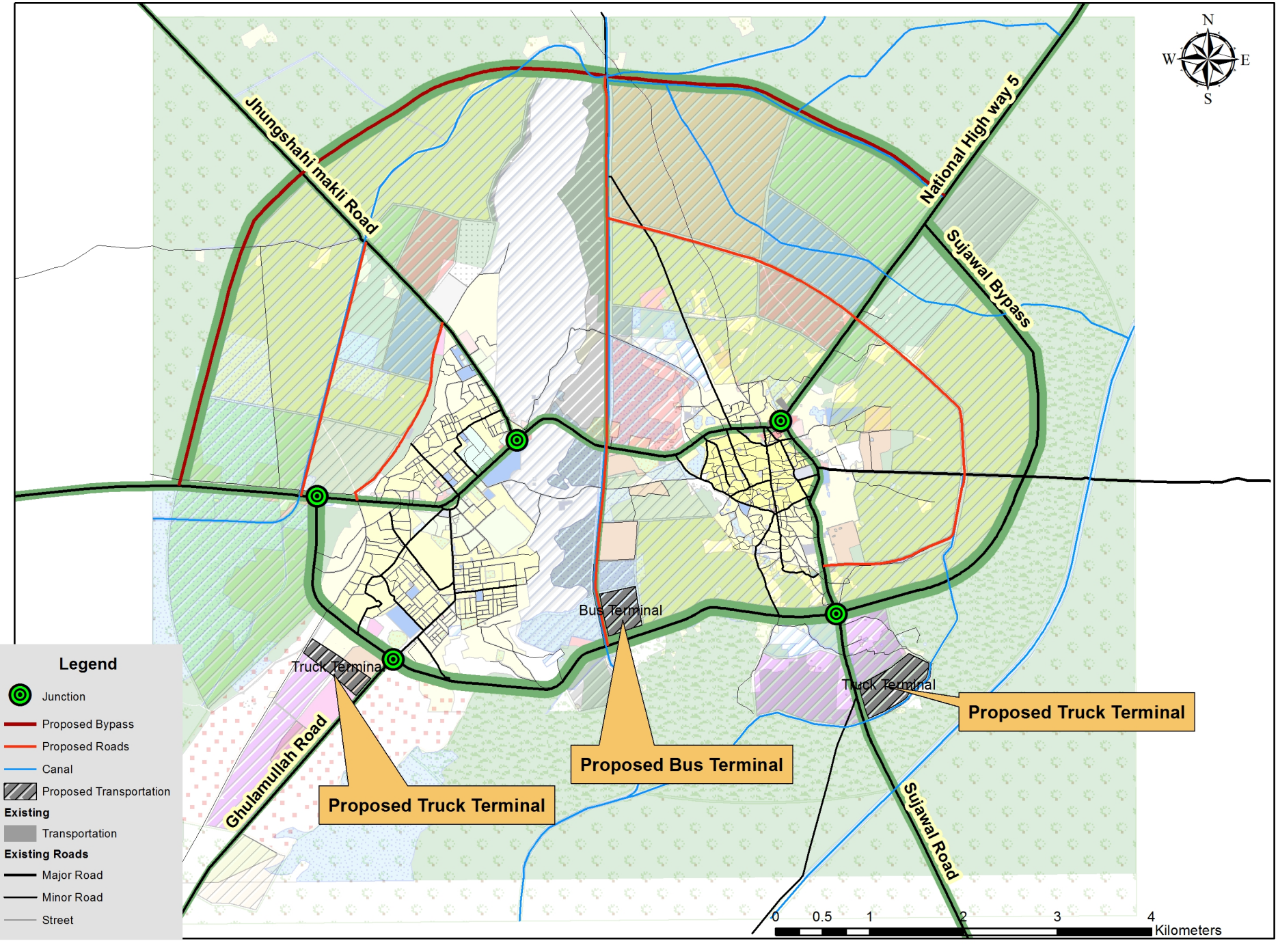
Proposed Economicl Landuse for Thatta Town (Include Makli)



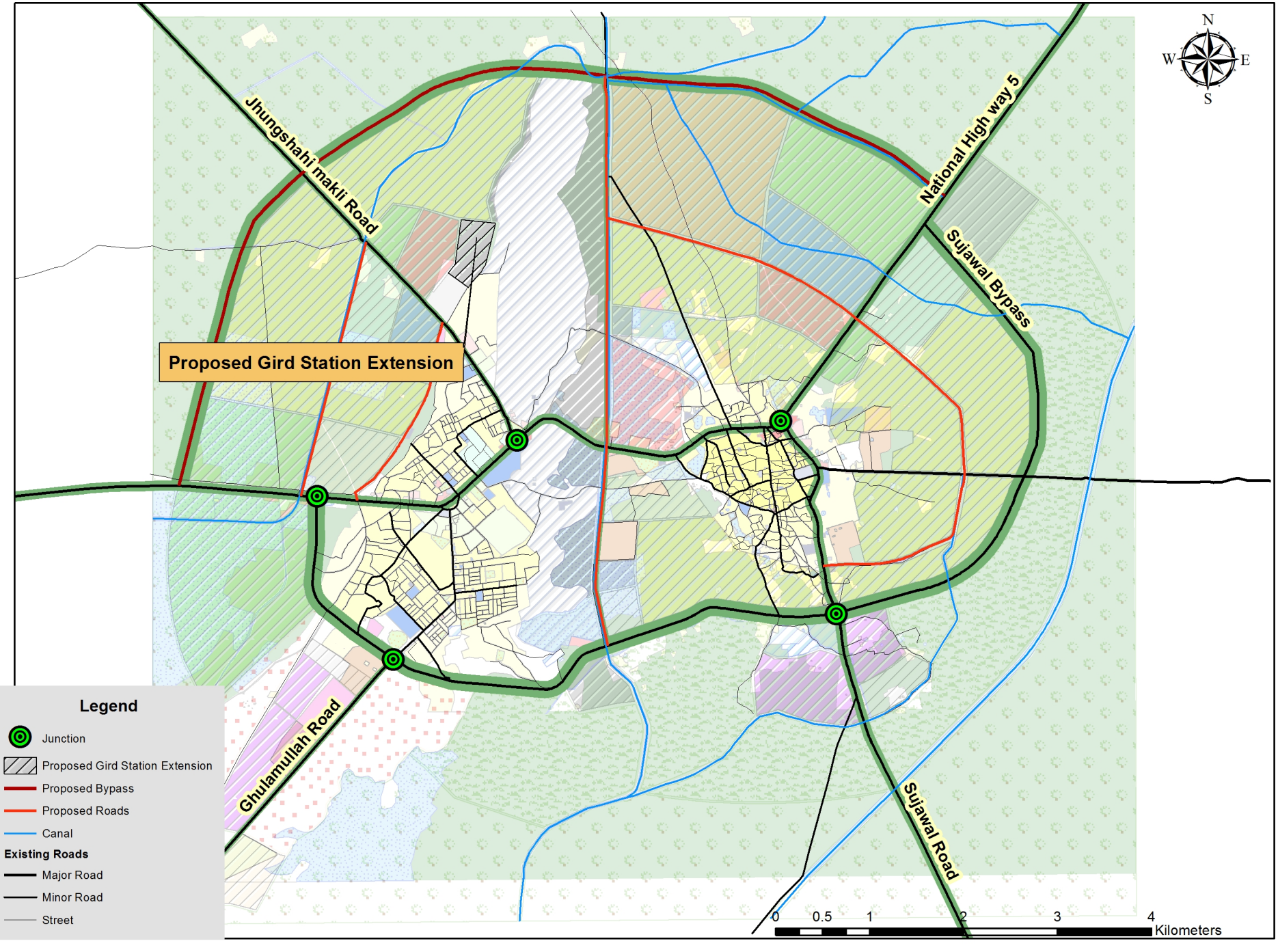
Proposed Livestock Landuse for Thatta Town (Include Makli)



Proposed Transportation Landuse for Thatta Town (Include Makli)



Proposed Utilities & Services Landuse for Thatta Town (Include Makli)



Proposed Public Administration Landuse for Thatta Town (Include Makli)