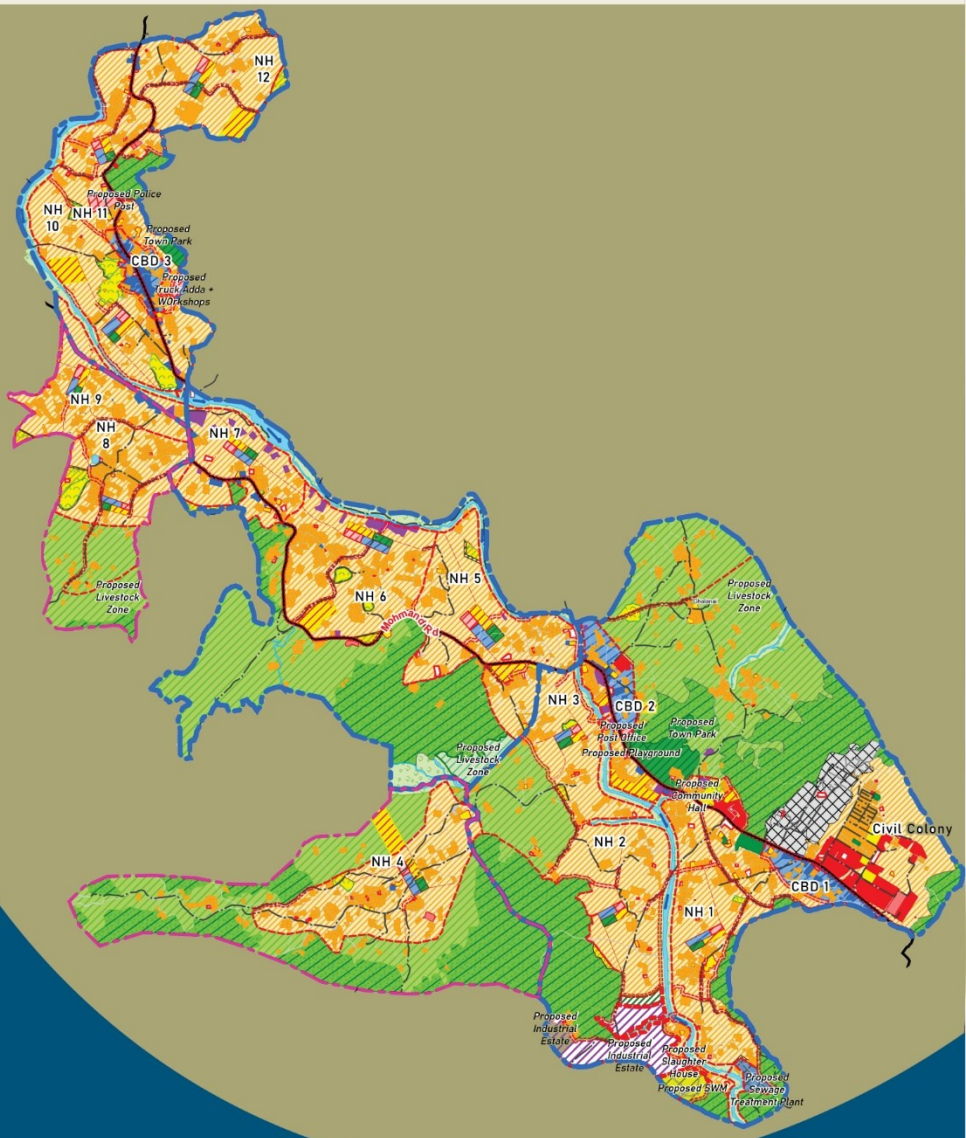
MASTER PLAN OF GHALANAI URBAN CENTER
DISTRICT MOHMAND 2022-42

VOLUME I



Master Plan Project (MPP)
Urban Policy & Planning Unit

June, 2024

URBAN POLICY UNIT
Planning and Development Department
GOVERNMENT OF KHYBERPAKHTUNKHWA

LUBCA
LAND USE & BUILDING CONTROL AUTHORITY
KHYBER PAKHTUNKHWA

MMP
MM Pakistan (Pvt) Ltd.

Cover Photo credit:
* The cover photo is developed by the consultant (MM Pakistan) for the client (Urban Policy and Planning Unit).
* Logos taken from official websites of the relevant departments/organizations.

Disclaimer

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept not responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

URBAN POLICY UNIT
Planning and Development Department
GOVERNMENT OF KHYBERPAKHTUNKHWA

MMP
MM Pakistan (Pvt) Ltd.

MESSAGE FROM THE CHIEF MINISTER, ELECTIONS, AND RURAL DEVELOPMENT DEPARTMENT, GoKP

Khyber Pakhtunkhwa, the third most populated province of Pakistan, is experiencing rapid urbanization due to various push and pull factors. Lack of proper planning has resulted in overcrowding of all major urban centers coupled with traffic congestion, environmental pollution and ribbon development along main roads. Insufficient investment in urban infrastructure, lack of trained human resource and poor management of key infrastructure are the causes of weak coverage and low service quality. A significant proportion of the urban population continues to live in dilapidated environment and urban slums. The current provincial government has introduced a policy shift from "containing urbanization" to "managing urbanization", adopting an integrated approach that capitalizes on the potential of cities and that can convert this constraint into an opportunity and transform the cities to be engines of economic growth.

The provincial government is aware of these challenges for which it has prioritized an innovative planning approach that would bridge the gap between urban and rural development. Through coordinated efforts, district land use plans for districts and master plans for urban centers across the province have been developed. These master plans are designed to address core urban issues such as traffic congestion, provision of affordable housing, traffic & transportation problems, unemployment, lack of education and healthcare facilities and environmental degradation. These plans provide clear and actionable road maps for decision-makers to guide them towards sustainable development ensuring that both urban and rural areas can meet the needs of growing populations while safeguarding natural resources for future generations.

These achievements wouldn't have been possible without the dedicated and untiring efforts of the Master Plan Project, Urban Policy and Planning Unit of the Planning and Development Department, Government of Khyber Pakhtunkhwa. I would like to extend my gratitude to all stakeholders, community members and local government officials whose contributions have been instrumental in shaping these comprehensive plans.

Looking ahead, these master plans stand as a testament to our government's unwavering commitment to fostering sustainable, inclusive and resilient urban development. Together, we will ensure that Khyber Pakhtunkhwa's cities and towns continue to thrive as hubs of economic activity, cultural heritage and community well-being, securing a prosperous future for all generations to come.

Mr. Ali Amin Gandapur

Chief Minister

Government of Khyber Pakhtunkhwa

URBAN POLICY UNIT
Planning and Development Department
GOVERNMENT OF KHYBERPAKHTUNKHWA

LUBCA

MMP
MM Pakistan (Pvt) Ltd.

MESSAGE FROM THE MINISTER LOCAL GOVERNMENT, ELECTIONS, AND RURAL DEVELOPMENT DEPARTMENT, GoKP

The Government of Khyber Pakhtunkhwa is committed to fostering a well-planned, resilient, and sustainable urban future for our cities. Recognizing the rapid pace of urbanization and its associated challenges, we have taken a proactive approach to urban planning and development that aligns with national priorities and international commitments, including the Sustainable Development Goals (SDGs).

Through the Master Plans for Cities, we are laying the foundation for balanced regional development, economic growth, and environmental sustainability. These plans will guide future investments in infrastructure, housing, transportation, and public services to ensure that our cities remain inclusive, competitive, and climate-resilient. Our focus is to bridge the urban-rural divide by ensuring equitable resource allocation and extending modern infrastructure.

The Master Plans represent a vision for progress, prosperity, and sustainability. With strong political will, coordinated action, and community participation, we are determined to transform our cities into hubs of opportunity, innovation, and well-being for all.

The Urban Policy and Planning Unit of the Planning and Development department played a pivotal role in preparing these master plans. These master plans truly reflect the collaborative efforts of a wide range of stakeholders including provincial line departments, district administration, NGOs, local political leadership, and the public at large. I extend my sincere gratitude to UPU and all those who have contributed their expertise and efforts toward creating plans that will not only tackle present challenges but also lay the foundation for a sustainable urban future.

Mr. Arshad Ayub Khan

Minister LGE & RD Department

Government of Khyber Pakhtunkhwa

URBAN POLICY UNIT
Planning and Development Department
GOVERNMENT OF KHYBERPAKHTUNKHWA

MMP
MM Pakistan (Pvt) Ltd.

MESSAGE FROM ADDITIONAL CHIEF SECRETARY, PLANNING & DEVELOPMENT DEPARTMENT, GOVERNMENT OF KHYBER PAKHTUNKHWA

The rapid urbanization across Khyber Pakhtunkhwa has created both opportunities and challenges. On the one hand, urbanization is transforming the socio-economic landscape of the province while on the other, it has caused economic issues such as unplanned expansion, inadequate infrastructure, traffic congestion and increased pressure on public resources. To enhance the economic vitality of urbanization and reduce its negative impacts, there is an urgent need of structured and sustainable urban planning to fully realize the potential of our urban centers.

The formulation of master plans for the towns and cities is a crucial step toward achieving this goal. These plans will provide comprehensive frameworks to guide towards the planning of towns and cities, optimize land use, improving economic productivity and ensuring the equitable distribution of resources. Sustainability remains a key priority in the plans emphasizing environmental protection while aligning resources to meet the growing needs of the urban population. The master plans will serve as structured guidelines for local authorities, district administrations and municipalities to systematically undertake and implement future development initiatives. These plans support the achievements of core urban needs such as housing for all, transportation and public facilities ensuring that cities evolve into resilient, liveable and economically viable centers that can meet the aspirations of residents.

The Urban Policy and Planning Unit (UPU) of the Planning and Development department played a pivotal role in preparing these master plans. The plans truly reflect the collaborative efforts of a wide range of stakeholders including line departments, district administration, NGOs, local political leadership and the community. I extend my sincere gratitude to UPU and all those who have contributed their expertise towards developing master plans that will not only tackle present challenges but would also lay the foundation for a sustainable urban growth.

As we move forward with implementation, I am pleased to announce that the projects identified in these master plans shall be included in the upcoming Annual Development Programmes (ADPs) to ensure their timely execution and alignment with provincial priorities. I am confident that these master plans will serve as benchmarks for urban development. They are testament to the government's commitment to foster well-planned and thriving urban centers that support the prosperity and well-being of citizens for all the times.

Mr. Ikram Ullah Khan

Additional Chief Secretary

Planning and Development Department

Government of Khyber Pakhtunkhwa

MESSAGE FROM THE SECRETARY LOCAL GOVERNMENT,

KHYBER PAKHTUNKHWA

The Ghalanai urban center Master Plan of 2024-2042 represents a significant milestone in our efforts to foster sustainable urban development and shape the future of the city. As Ghalanai expected to grow, there is an increasing need for structured, sustainable and visionary planning to accommodate rising population, promote economic growth and ensure equitable access of all citizens to essential services and resources.

At the Local Government Election & Rural Development (LGE&RD) Department, we are committed to undertake initiatives that contribute to the overall prosperity of Khyber Pakhtunkhwa. The aim is to ensure that each part of the province shall benefit from development strategies. This master plan is a reflection of that vision — offering a comprehensive framework that addresses immediate urban challenges while laying the foundation for a long-term resilient growth.

The Ghalanai Master Plan of 2024-2042 has been designed to maintain an equilibrium between urban expansion and the preservation of valuable cultural heritage and environmental resources including prime agricultural land in the peri urban limits. The plan will create investment and employment opportunities and will generate revenue for further development and enhance the overall quality of life for the people of Mohmand. Moreover, it underscores the importance of collaboration among public institutions, stakeholders and residents in shaping an inclusive, sustainable and prosperous urban centers.

I would like to commend the Urban Policy & Planning Unit (UPPU) of the Planning and Development Department and all stakeholders for their dedication and hard work in developing this master plan. The successful implementation of the plan will not only transform Ghalanai but would also serve as a model for other cities throughout the province.

We resolve our commitment to fostering inclusive growth, ensuring that development opportunities are accessible to all and contributing to a brighter and more prosperous future for the people of Khyber Pakhtunkhwa.

Dr. Amber Ali Khan
Secretary LGE & RD Department
Government of Khyber Pakhtunkhwa

URBAN POLICY UNIT
Planning and Development Department
GOVERNMENT OF KHYBERPAKHTUNKHWA

MMP
MM Pakistan (Pvt) Ltd.

ACKNOWLEDGMENTS

First of all, I am extremely grateful to almighty Allah who enable me and my team to successfully complete this gigantic work of the preparation of Master Plan of Ghalanai Urban center. The preparation of the Ghalanai urban center Master Plan 2024-2042 has been a collaborative and dedicated effort aimed at ensuring the sustainable development of Ghalanai, the vibrant capital of Khyber Pakhtunkhwa. This report reflects the collective commitment of all stakeholders toward a rational, balanced, and systematic use of resources to address the urban center's unique challenges and guide its future growth and development. This Master Plan forms an integral part of the Government of Khyber Pakhtunkhwa broader initiative to promote sustainable urban development across the province. It addresses critical aspects of urban management, including housing, transportation, socio-economic development, and environmental sustainability, providing a comprehensive framework for sustainable growth of Ghalanai Urban center.

I extend my sincere gratitude to the worth Additional Chief Secretary P & DD, Secretary, P & DD, Government of KP for entrusting me and my team with this significant initiative. Special thanks to my existing and former Executive Directors, UPU including Mr. Zubair Asghar Qurashi, Mr. Adeel Shah (current Secretary, P and DD), Mr. Inayatullah Waseem, Mr. Shah Mehmud, Mr. Abdul Basit, Mr. IfthiGhalanai, and Mr. Fazal Khaliq (current ED, UPU) for their insightful leadership and support throughout the planning process. I am also thankful to all my colleagues in UPU and MPP especially Dr. Muhammad whose expertise and efforts during the conceptualization, data collection, analysis, and review phases were instrumental in shaping this detailed master plan. I am deeply thankful to the officials of the District Administration, including Deputy Commissioner Mohmand, and other key officials for their cooperation, guidance, and active involvement during the course plan making. Their local insights, support, and valuable feedback have greatly enriched the plan, ensuring its relevance to the unique context of Ghalanai.

Special recognition is due to MMP Pvt Ltd & Associates for their dedicated efforts in preparing this report. The team’s technical expertise, unwavering commitment, and hard work were instrumental in successful completion of this master plan. I am also thankful to Shabih-ul-Hasan, Dr. Sara Khan, (MMP Ltd) and his team for reviewing various drafts of the Master Plan. Their valuable inputs have greatly enhanced quality of the plan. Finally, I express my appreciation to everyone who contributed to this plan in various capacities. This Plan represents a shared vision for a sustainable, prosperous, and resilient future Ghalanai city.

As this master plan is the first of its kind and will not be free from errors, however, I am fully optimistic about the successful implementation of this plan. In due course of time the plan be reviewed and necessary changes will be made in future revisions. Together, let us work toward building a thriving and sustainable Peshawar for generations to come.

Adnan Salim,

Project Director, Master Plan Project

Urban Policy Unit, P & DD

URBAN POLICY UNIT
Planning and Development Department
GOVERNMENT OF KHYBERPAKHTUNKHWA

MMP
MM Pakistan (Pvt) Ltd.

EXECUTIVE SUMMARY

The Ghalanai Master Plan has been strategically devised to guide the comprehensive and sustainable growth of Ghalanai, an emerging urban center within District Mohmand in the newly merged districts (NMDs) of Khyber Pakhtunkhwa. The plan outlines the future development framework for the urban center up to the year 2040, considering the projected increase in population from 32,422 in 2022 to 63,702 by 2040.

Drawing from the 1998 and 2017 census data, District Mohmand's population has grown from 0.334 million to 0.467 million, with average annual growth rates of 4.3% and 2.8%, respectively. Covering an area of 2,296 square kilometers, the district has a population density of 206 persons per square kilometer as per the 2017 census. The Newly Merged Districts (NMDs) constitute approximately 13% of Khyber Pakhtunkhwa's population, with the province's average annual growth rate standing at 2.89%, higher than the national average of 2.40%. Rapid urbanization in the region, driven by socio-political factors, migration flows, and border security dynamics, has unfortunately led to haphazard and unplanned development patterns due to the lack of focused planning interventions.

Ghalanai Urban Center's present condition reflects the consequences of unregulated growth, with the spontaneous expansion of residential and commercial structures, scattered road networks, and inadequate infrastructure and service delivery. In response, a Preliminary Master Plan has been prepared to provide a structured roadmap for the sustainable development of Ghalanai. A participatory approach was adopted in the planning process, involving extensive field surveys, focused group discussions with local stakeholders, and a comprehensive stakeholder conference with government officials, NGOs, and community representatives. The vision that emerged through this inclusive process states:

"Building Ghalanai the habitat of prosperous community by promoting marble industry, protecting food baskets, providing clean drinking water and hosting its guests."

The Master Plan's formulation was guided by this vision, leading to the preparation of a detailed land use plan and supporting surveys, including a Household Information Survey (HIS), Land Use Survey, and Traffic and Transportation Survey. A dual approach combining primary data collection and secondary data analysis was employed, benchmarking against national standards such as NRM and NEQS, and international best practices across housing, education, health, commerce, industry, environment, recreation, and infrastructure sectors. A detailed situational analysis was conducted to highlight gaps and deficiencies, forming the foundation of the planning recommendations.

According to the 2017 census, the housing situation in Ghalanai Urban Center shows a stock of 2,826 housing units, with a backlog of 1,226 units by 2022. Moreover, 1,021 existing housing units were identified as requiring reconstruction, and 122 buildings were classified as dangerous structures. To accommodate the projected population growth until 2040, an additional 3,911 housing units are estimated to be needed beyond the existing stock. The housing proposals have been designed to serve all income groups, with 75% of residential land allocated for low-income, 20% for middle-income, and 5% for high-income households. Plot sizes range from 5–8 Marla for low-income groups, 10–15 Marla for middle-income, and 20–40 Marla for high-income groups. Strategies for infilling, intensification, and redevelopment are incorporated to promote resource efficiency, revitalization of existing areas, and sustainable urban expansion.

The existing commercial structure of Ghalanai comprises 37 acres, featuring two main commercial hubs: Ghalanai Bazar and Main Mandi Bazar. These serve as vital economic nodes catering to the southern and northern parts of the urban center respectively. The industrial sector, with 23 marble industries, 2 ice factories, and 2 scrap factories spread across 37 acres, plays a significant role in the local economy. To address future industrial needs and enhance service delivery to local industries, an industrial estate of approximately 67 acres is proposed on the south-eastern side of the urban center, selected through a multi-Criteria Analysis considering factors such as accessibility, availability of infrastructure, and compatibility with surrounding land uses.

In terms of educational facilities, Ghalanai hosts 55 educational institutions comprising 43 government and 12 private establishments. The government sector includes 35 primary schools, eight middle schools, three high schools, and two intermediate schools, with a single degree college for women. To ensure educational access at the neighbourhood level, primary and middle schools are proposed in each of the 12 planned neighbourhoods, with an average land allocation of 2.5 acres per school. Additional land allocations of 60.7 acres are planned for three boys' and three girls' high schools, and separate higher secondary schools for boys and girls. The total land reserved for educational facilities is 88.5 acres.

The healthcare infrastructure of Ghalanai covers 5.75 acres, served by 5 Basic Health Units (BHUs), 1 District Headquarters (DHQ) hospital, one private general hospital, and two private medical centers. Current healthcare provision is adequate for the existing population; however, future projections necessitate the expansion of DHQ hospital facilities, including the addition of 9–10 beds, and the recruitment of specialist and technical staff to meet evolving healthcare needs.

Following the Multiple Nuclei theory, the Master Plan proposes the development of two additional Central Business Districts (CBDs) along the main Ghalanai road, complementing the existing central hub. These CBDs will integrate commercial, civic, administrative, and mixed-use developments, strategically positioned to enhance accessibility, reduce travel distances, lower fuel consumption, and improve air quality. The plan also introduces the development of self-sufficient neighborhood units based on Clarence Perry’s concept, integrating existing housing areas and proposing new sustainable neighbourhoods with comprehensive amenities including schools, parks, markets, community centers, dispensaries, libraries, and civic offices—all within walking distance.

Land Suitability Analysis using GIS and Multiple Criteria Analysis techniques informed the selection of suitable areas for major land uses such as residential neighbourhoods, CBDs, and the industrial estate. Twelve self-sustained residential neighbourhoods have been proposed along major road corridors, primarily over existing settlements, to efficiently accommodate the current and future population. Similarly, suitable locations for the proposed CBD-2 and CBD-3 were identified to support mixed-use and commercial growth, fostering accessibility and urban sustainability.

The zoning plan of Ghalanai Urban Center was prepared based on the principles of infill development, sustainable neighbourhood planning, slum improvement, equitable distribution of public facilities, and the hierarchical provision of parks and recreational spaces. The plan ensures that new development integrates existing built-up areas, promotes efficient land use, and supports a balanced urban structure.

The Ghalanai Master Plan reflects best practices in urban planning while respecting the historical, cultural, and environmental context of the Urban Center. Supported by thorough analysis of current conditions and future trends, it outlines action plans across 18 development sectors, specifying detailed proposals, implementation frameworks, responsible institutions, and cost assessments. This

comprehensive and participatory document offers a strategic roadmap for achieving sustainable urban development and enhancing the quality of life for the residents of Ghalanai by 2040.

Content

List of Tables

List of Figures

List of Maps

List of Abbreviations

CBD	Central Business District
DC	Deputy Commissioner
EPA	Environmental Protection Agency
EIA	Environmental Impact Assessment
FGD	Focus Group Discussion
GIS	Geographic Information System
HIS	Household Information Survey
KP	Khyber Pakhtunkhwa
LUBCA	Land Use & Building Control Authority
LSA	Land Suitability Analysis
MCA	Multiple Criteria Analysis
MMP	Mott Macdonald Pakistan
NH	Neighborhood
NC	Neighborhood Council
NEQS	National Environmental Quality Standard
NGO	Non-Government Organization
NDMA	National Disaster Management Authority
NRM	National Reference Manual
OHR	Over Head Reservoirs
PBS	Pakistan Bureau of Statistics
PDMA	Provincial Disaster Management Authority
PSS	Planning Support System
ROW	Right of Way
SDGs	Sustainable Development Goals
SEA	Strategic Environmental Assessment
SWM	Solid Waste Management
TMA	Tehsil Municipal Administration
TMO	Tehsil Municipal Officer
UPPU	Urban Planning & Policy Unit
VC	Village Council
WATSAN	Water and Sanitation
WHO	World Health Organization

1 Introduction

1.1 Project Background

Khyber Pakhtunkhwa (KP) is a province in the northwest region of Pakistan. Despite covering the smallest land area of 74,521 km², it is the third most populous province, with a population of 30.5 million. In 1998, its population was 17.7 million, showing an annual growth rate of 2.89%, which exceeds the national average of 2.40%. Factors such as a high fertility rate and both temporary and permanent internal migration have contributed to this population growth.

To tackle the challenges posed by increasing urbanization and population growth, the Urban Policy & Planning Unit of the Planning and Development Department, Government of KP, has launched the development of Master Plans for 20 cities/urban centers across

On June 01, 2021, the Urban Policy Unity (UPPU), entered into a Contract Agreement between MM Pakistan (Pvt) Ltd for the Preparation of Master Plan for Urban Centers Merged District, Khyber Pakhtunkhwa- Package – 01 Khar, Bajaur & Ghalanai Mohmand. On the 15 June 2021, MM Pakistan (Pvt) Ltd, singed off the contract to begin the services for the project. This report is issued in accordance with the Contract and SC No. 6.2 and 6.3 respectively and Sr. No. 5. Task-E i.e., Final Master Plan Report.

The Government of the Khyber Pakhtunkhwa intends to develop urban areas of the Merged Districts as sustainable, livable, and well managed engines of economic growth. A comprehensive, strategic, regional, and long-term plan is required for all cities and districts of Khyber Pakhtunkhwa.

This master plan was completed under the following TORs:

2.1.1. Land Use Suitability Analysis

a. Mapping of the Historical Growth Trend of The Urban center

To understand the pattern and direction of the spatial growth of Ghalanai urban center the consultants conducted extensive research on the historical urban growth trends and drivers of urban growth over the period of last twenty years. To identify trends and direction of spatial growth the consultant used various sources for mapping the trends over the last 20 years period including municipal records, population census, libraries and archives, Arial photographs satellite images and other published and unpublished data and records. Latest GIS techniques were used for plotting historical growth trends on GIS maps of the urban center-region and articulating the drivers of urbanization and urban spatial growth.

b. Housing trends and needs assessment through projected population growth estimates:

The provision of housing for all is a basic objective of the Ghalanai Urban Center Master Plan, therefore, the growth pattern and projected growth needs over the next 20 years (2044) were properly analyzed and mapped. The conservation of prime agriculture land located around the urban center is another important aspect of the Ghalanai Master Plan. Therefore, to reduce urban sprawl and horizontal development, there is a need to promote mixed-use and compact development. To achieve this objective the Master Plan devised policy guidelines for the establishment of high-density mixed-use development within the existing urban boundaries including the future growth areas. The consultants

carried out an extensive mapping exercise to showing the existing and proposed high-density mixed-use development.

c. *Density* Maps:

To reduce urban sprawl, there is a need to promote high-density mixed-use development. Therefore, the consultants will devise policy guidelines for the establishment of high-density mixed-use development within the existing urban boundaries including the future growth areas. The consultants prepared maps showing the existing and proposed mixed-use development.

d. *Land use Base map:*

For all kind of spatial planning including master plans the preparation of a comprehensive base map is a pre-requisite. Beside other mapping techniques the consultants also used open-source satellite imageries (fresh and archives) to develop an up-to-date map of Ghalanai urban center including its surrounding areas in order to support suitability analysis of existing and proposed land uses for urban development and other ancillary uses. After preparation of land cover map then extensive field surveys were carried out to identify the specific use of each parcel of land. The consultants prepared Base map with the following details:

a) Counter lines drawn at counter interval of 5 meters.
b) Boundaries (District, Tehsil, City, Neighborhood, UC, Ward).
c) All major and minor streets, roads, railway lines and airports (including encroachments).
d) Water supply, sanitation, sewer, SNGPL and telephone networks.
e) Water bodies (spring, streams, river and other water bodies).
f) Residential (planned and un-planned areas, sprawl, building heights – single, double or multi story, density).
g) Commercial and Mixed Areas (heights – single, double or multi story and type retail, wholesale and warehouses).
h) Industrial (all types).
i) Amenities (education, health, religious, banks, police stations, libraries, and community halls etc.).
j) Parks and playgrounds.
k) Brown fields (for re-development).
l) Open spaces (agriculture all types, vacant, and graveyards etc.).

2.1.2. Land Management

e. *Taxation and Revenue Generation*

It is of key importance that urban planning and associated work should be sustainable over long time. To ensure that the entities (Land Use and Building Control Authority, Development Authorities and TMAs etc) responsible for implementation of the Ghalanai Master Plan the consultant conducted a detailed study of the current urban taxation structure and sources including property tax, land tax, capital value tax, stamp duty and proposed suggestions for improvement. Implementation of the MASTER PLAN proposals regarding municipal taxation will increase revenue of LU&BCA and TMAs many folds and will ensure sustainability of these organizations.

a) Land and property valuation for collection of property and other taxes.

b) Identify potential revenue sources and design a municipal taxation structure which is to be utilized at municipal level; through a consultative process.

2.1.3. Governance and Institutions

Good governance and efficient institutions are a key to the successful implementation of polies and plans. To ensure that for implantation of the Ghalanai Master Plan required legal and institutional framework are in placed the consultants objectively analyzed and assessed the existing relevant laws/byelaws and institutional capacity of relevant organization responsible for implementation and monitoring of the Master Plan. The consultant also proposed improvements in the existing laws & byelaws and institutional structure(s) for better implementation of the Master Plan.

2.1.4. Land-use Regulations and Plans

The consultants also studied and analyzed all existing urban planning, development and environment-related national, provincial laws and regulations (byelaws) and proposed a new set of zoning regulations for each land use zone. The consultants provide extensive input in formulation of Building Regulation 2024 and Housing Schemes Regulations 2024.

2.1.5. Environment

To reduce pollution and create healthy living environment for the residents of Ghalanai urban center the consultant studied various sources of air, noise, soil and water pollution. The consultants use state of the art techniques and equipment for identification of the level of air, water and noise pollution at various points of the urban center. The consultant carried out the following surveys:

a) Air quality survey at various points of the city Water quality analysis (drinking water supply and water courses).
b) Soil contamination surveys.
c) Soil and geological survey/data.
d) Analysis of Noise level at various points of the urban center.
e) Identification of environmentally sensitive areas.

2.1.6. Demography, Livelihood and Housing

The successful implementation of the master plan proposals mainly lies on accurate assessment of the urban center's demographic pattern, livelihood sources and housing conditions. For the purpose of analysis the consultants divided the urban center into various zones, calculated its population densities, identified major economic activities and studies housing and related facilities in each zone. Based on these assessments the consultant formulated proposals to revitalize the existing economic base and socioeconomic structure of the urban center. The consultant conducted the following surveys:

a) Housing surveys including house age, height, occupancy and condition surveys.
b) Accessibility surveys for emergencies and other vehicles
c) Household economic conditions/Livelihood surveys,

The consultants also identified areas with lack of municipal services (slums) and formulated proposals for its rehabilitation/up-gradation.

2.1.7. Urban Transportation, Mobility & Accessibility

One of the major issues of Ghalanai urban center is traffic congestion and lack of reliable public transport. To resolve the urban transport, mobility and accessibility issues of the urban center the consultants thoroughly studied the existing traffic and transportation system of the urban center. To have better understanding of the existing situation the consultant conducted various transportation surveys explored the possible constraints and available opportunities and proposed viable solutions for easing traffic and transportation issues within the urban center the consultant conducted the fallowing surveys:

a) Development of a detailed roads and parking inventory
b) Origin, Destination, and Cordon Survey
c) Traffic counts at various roads and junctions to determine roads and junction capacities
d) Public Transport User Interview Survey
e) Household Interview Survey (HIS)
f) Traffic Signage Survey (signage relevant to public transport)
g) Parking Survey as parking lots identifications/developments is an important component of this study
h) Mobility survey and to identify synergy between land-use and transport, etc.
i) Traffic flow volume, trend, axle weightage etc. (data from weighing stations and established traffic count permanent stations or any other means, including survey on the main arteries and by-pass roads)

2.1.8. Historical/Social/Culture Heritage Development

The Mohmand region is renowned for its rich history and cultural heritage, making one of the important heritage and cultural center. Therefore, the thoroughly studied and mapped all existing historical monuments/places, socio-cultural heritage of the urban center and proposed appropriate guidelines for the development of these localities and to capitalize the urban center scape to create social, cultural hubs and identify opportunities within and of the urban center.

2.1.9. Urban Design and Public Realm

Urban Design and Public Realm is an integral part of the Master Plan. Through various surveys and techniques, the consultant analyzed the existing building lines, identified all public spaces, studied in detail vistas, sidewalks, street lighting, monuments, and parks etc. and formulated actionable proposals for improvements. and identified potential areas for new parks, playgrounds and public open spaces. To make the urban center more attractive and beautify the consultants proposed various urban beatification projects.

2.1.10. Quality of Life

Urban Design and Public Realm is an integral part of the final Master Plan. Through various surveys and techniques, the consultant analysed the existing building lines, identified all public spaces, studied in detail vistas, sidewalks, street lighting, monuments, and parks etc. and formulated actionable proposals for improvements. and identified potential areas for new parks, playgrounds and public open spaces. To make the urban center more attractive and beautify the consultants proposed various urban beatification projects.

a) Public spaces (parks, food outlets, libraries, public hall, sports courts/grounds) mapping and state of dilapidation.
b) Heritage sites mapping and their state of preservation as well as trends of encroachment and dilapidation.
c) Civic facilities such as Public Toilets, Street Furniture, Streets Lights, Parking Lots and other amenities exist in the urban center neighborhoods.

2.1.11. Water Supply, Sanitation and Solid Waste Management

The consultants coordinated with the concerned TMA and PHED Department for Water Supply and Sanitation for profiling of all Municipal Services including the identification of new and existing sources of water supply (depletion rates of water and sub-soil aquifer data) & their mapping, sanitation and solid waste management along with existing conditions of (sources of water and their depletion rates as sub-soil aquifer data and surface run off calculation), sewage flows and their mean calculation, solid waste tonnage calculation, methods of collection and disposal (landfills capacity, using and locations) etc. Consultants are required to identify depressed areas in term of services and facilities. Policy directions and action plan is required to generate funds for construction, maintenance and operation of public amenities at feasible locations. The consultants analyzed the existing solid waste management practices and jointly identified land areas for development Sanitary Land Fill Sites and Sewerage Treatment Plants (STP).

2.1.12. Citizens Behavior

BCC is the strategic use of communication approaches to promote changes in knowledge, attitudes, norms, beliefs and behaviours. The provision of physical infrastructure without associated BCC strategies may not be able to achieve the desirable goal of sustainable development. For development of the BCC strategies to ensure that the master plan will be sustainable for a long run the consultants conducted Perception and Behavioural Surveys of local population focusing on issues of urban responsibility using Knowledge, Attitude, and Practice (KAP) methodology based on a valid statistical sample. The purpose of the KAP surveys was to investigate the reasons for and incentives and disincentives of citizens to behave responsibly while utilizing municipal services especially their behavior towards solid waste management, public transport usage, use of public spaces and other social services.

2.1.13. National and International Best Practices

The preparation and implantation of master plans in Pakistan, especially in Khyber Pakhtunkhwa is not common. In the past various types of spatial plans including structure plan and master plans were prepared for major cities but these plans were never implemented. Therefore, to prepare a rational comprehensive master plan for Ghalanai review of the international best practices was included the study Terms of Reference (ToRs). The consultants reviewed planning laws and master plans of various countries having similar socio-economic condition similar to Pakistan including India, Sari Lanka and Malysia and based on the lesson learned developed the MASTER PLAN proposals. Studies for the fringe areas were specifically conducted to discouraged sprawl and ensure conversation of prime agriculture land in the vicinity of Ghalanai city.

2.1.14. Task C – Master Plan Strategic Scenario Development/Mapping

a) Showing suitable land parcels based on multi criteria analysis for various activities through viable projections for housing of all income groups, space required for commercial and industrial activities

and other necessary component of the urban center) Land use pattern both existing and future options;

b) Land use mix potential range of uses (residential, work, leisure, services etc.);
c) Infilling, intensification and redevelopment;
d) Natural systems and environmental resources of the district/city;
e) A detail inventory of existing features including topographical and natural constraints,
f) wetlands, agricultural lands, aggregate resources, groundwater recharge areas, floodplains, fisheries, wildlife etc.;
g) Major transportation, Agricultural, tree plantation, and environmental conservation areas; and
h) Allied infrastructure requirements to support Master Plan proposals.

2.1.15. Task D – Preparation of Master Plan Proposals (Action Plans)

For successful implementation of the Master Plan, the consultant will develop a detailed and comprehensive Master Plan proposal (action plans) for various components of the master plan, including but not limited to:

I. Action Plan for zoning, intensification/densification and land management.
II. Action Plan for future housing of all income groups.
III. Action Plan for slum up gradation/informal settlements.
IV. Action plan for health facilities.
V. Action plan for educational facilities.
VI. Action Plan for Quality of Life.
VII. Action Plan for WATSAN and Solid Waste Management (SWM).
VIII. Action Plan for Transportation and Traffic Management as well as Parking Lots.
IX. Action Plan for Municipal Services.
X. Action Plan for Environmental Management, ii. Disaster Risk Reduction and iii. Emergency Planning.
XI. Action Plan for Rural Urban Fringe and Regional Development.
XII. Action Plan for Tourism Development, Cultural and Heritage Conservation /preservation.
XIII. Action Plan for Economic Development,
- Commercialization,
- Industrialization and
- investment attraction.

XIV. Action Plan for Security Measures of the urban center
XV. Action Plan for Legal/Regulatory and Institutional Framework implementing MASTER PLAN.
XVI. Action Plan for Behavioral Change Communication (BCC)Structure composition of the Report.

The Master Plan report is structured into three volumes along with a separate detailed report:

- **Volume I:** Master Plan – Offers a comprehensive overview of the core strategies, proposals, and planning framework for Ghalanai urban center.
- **Volume II:** Scenario/Sectoral Maps – Presents a collection of maps illustrating zoning, infrastructure networks, environmental factors, and other key spatial elements essential for urban planning.
- **Volume III:** Action Plans – Details implementation strategies, key initiatives, and step-by-step execution plans for proposed developments.

In addition, a separate Detailed Master Plan Report provides in-depth background studies, analyses, methodologies, and insights from Task C, along with relevant information from Task B.

The Ghalanai Urban center Master Plan was developed through the following Five (06) phases:

- Preparatory Planning Phase
- Vision Formulation
- Data Collection & Analysis
- Master Planning/zoning
- Action Plans
- Integration of Action Plan in the Final Master Plan

Therefore, an independent Master Plan prepared for each headquarter city. The plan will cover 20- year period to cater for the development need of the urban center.

1.2 Master Planning Process

Urban centers are increasingly recognized as drivers of economic growth and innovation, playing a pivotal role in addressing the global challenges of rapid urbanization. Investing in urban infrastructure and services has proven essential for accelerating economic development, not only within cities but also across their broader regions. Governments and public agencies, particularly in developing nations, acknowledge that achieving sustainability necessitates timely and strategic urban planning, coupled with fostering resilient urban economies.

In this context, a Master Plan is being developed for Ghalanai Urban Center in District Mohmand. This process began with the formulation of a vision, crafted through extensive stakeholder consultations, which was subsequently translated into clear goals and objectives. Comprehensive field surveys and secondary data collection were conducted to evaluate the current conditions of Ghalanai Urban Center. The data were benchmarked against established standards to identify gaps and deficiencies in critical areas such as housing, public facilities, and utility services. Based on these findings, policies and strategies were developed to address these challenges and guide the holistic development of the urban center.

The overall Master Planning Process is illustrated in the figure below:

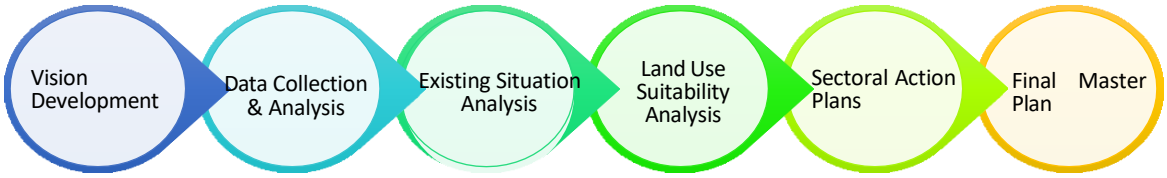


Figure 1-1: Master Planning Process

2.1.16. Vision & Goals of Ghalanai Urban Centre

In the light of discussions and analysis results from participatory exercises carried out through the participation of the Stakeholders of Ghalanai, and also keeping in view the prevailing Town Planning principles, the Vision statement for Ghalanai Master Plan has been developed as follows:

"Building Ghalanai the habitat of prosperous community by promoting marble industry, protecting food baskets, providing clean drinking water and hosting its guests."

The Results derived from analysis of all the FGD Exercises, along with the Consultants' own knowledge gained via numerous field visits and consultation with the general public and prominent local representatives of the area, have enabled us to form a Future Vision for Master Planning of the Ghalanai Town. As per conventional planning techniques, Vision Statement is, normally, a very generalized statement, and it is strategized to convert it into Goals, and then the Goals are converted into Objectives. The following process explains the formulation of Goals from the Vision Statement.

Designing of Goals – Ghalanai-Urban Center Master Plan 2040

Goal 1: Urban Governance Body for Legal components/ Institutional Capacity Building, Legislation & Bylaws for Sustainable Development and Building Control

Goal 2: Planned Housing, Urban Growth & Controlling Urban Sprawl

Goal 3: Transportation & Traffic Management / Road Networking/ Parking Areas Provision

Goal 4: Provision of Urban Amenities and Facilities, including Safe Water Supply, Power Supply, Sewerage, Storm Water Drainage, and SWM in Ghalanai Town

Goal 5: Comprehensive Education Services Provision

Goal 6: Comprehensive Health Services Provision

Goal 7: Identification of Flood prone areas and Flood Protection Measures

Goal 8: Income generation activities/ Revenue Generation Project / Industrial Zone Establishment

Goal 9: Tourism development/ Provision of Recreational Services / Open Space and Sports Facilities Provision/ Urban Forestry Conservation

Goal 10: Efficient Environmental Control Planning

Goal 11: Security and Disaster Management

2.1.17. Mapping, Surveys & Data Collection

This is the second stage of the Ghalanai Urban Centre Master Planning process. The area was mapped using the latest satellite imagery, and a detailed land use survey was conducted to create the existing land use map (shown in Map 2.3) of the Ghalanai Urban Centre. Field surveys, such as the Household Information Survey, Traffic and Transportation Surveys, Commercial Surveys, Public Facility Survey, and Infrastructure Survey, were conducted, and secondary data was collected from various offices to determine the area's existing situation.

Land Use Survey: A GIS-based base map (1:2000 scale) was created by digitizing a raster map from Google's satellite imagery and dividing it into grids. Android-based software was used for the detailed land use survey, conducted by trained local surveyors. The survey documented land uses, administrative boundaries, contour lines (10-meter intervals), road networks, infrastructure, civic amenities, and brownfields. To ensure accuracy, the base map integrated historical maps and remote sensing imagery and was divided into sheets for ground truthing through on-site verification. Each built-up parcel was assessed for land use, building conditions, and stories, with spatial and attribute data processed in GIS labs for analysis.

Transportation Surveys: Various transportation surveys, including the Origin & Destination (O&D) Survey, Traffic Count Survey, Parking Inventory Survey, and Intersection Survey, were conducted across the urban center. The detailed methodology, maps, and questionnaires for each survey are provided in the Background Study and Analysis Report.

Environmental Surveys: Various environmental surveys, including drinking water quality, noise, air, and soil assessments, were conducted at multiple locations across the city with an EPA-approved laboratory. The detailed methodology, maps, and results of each survey are provided in the Background Study and Analysis Report.

Secondary Data Collection: Secondary data was gathered from both published and unpublished government departmental data and reports, Census data, government publications, public records, historical and statistical documents, business reports, journals, and research papers, among others.

2.1.18. Existing Situation Analysis & Problem Identification

The third stage of the Ghalanai Urban Centre Master Planning process was to analyze the current situation and identify problems. Existing data was analyzed using Excel, SPSS and GIS tools to analyze and map the current state of Ghalanai Urban Centre. The Household Information Survey (HIS) data collected during field surveys were analyzed using SPSS, while secondary data on existing facilities like health and education were tabulated. Primary and secondary data were compared with national standards such as NRM and NEQS, as well as international benchmarks, to conduct a gap analysis and identify deficiencies and shortcomings in areas like housing, public facilities, infrastructure, and transportation facilities. Task B, the Background Studies Report, covered these items.

2.1.19. Land Suitability Analysis and Scenario Development

Land Suitability Analysis is a GIS (Geographic Information System)-based method for determining an area's suitability for future proposed land use & zoning, using multi-criteria analysis. In addition, it also enables the relevant governing bodies and institutions to take pragmatic and realistic decisions based on planning proposals. In the fourth stage of the Ghalanai Urban Centre Master Planning process, GIS have been used to conduct a Land Suitability Analysis (LSA). The LSA aimed to identify the most suitable areas for future housing, which would be developed as self-sufficient neighborhoods with facilities like primary schools, parks, open spaces, local retail shopping centers, community centers, mosques, libraries, post offices, police posts, graveyards, and other public facilities. Additionally, the LSA was used to identify the most suitable locations for new central business districts (CBDs) or blue areas (base on future potential areas for commercialization), which would include commercial markets and civic and administrative uses. The LSA was also used to identify the most suitable sites for small industrial estates, sewerage treatment plant, landfill site.

2.1.20. Development of Final Master Plan

The Final Master Plan was formulated based on a land use planning approach that employed land suitability analysis and the development of alternative scenarios, in accordance with the established theories and practices of land use planning, such as the Multiple Nuclei Theory and Linear Dynapolis concept. Our team of experts meticulously scrutinized each scenario and opted for the most suitable one that took into account the local geographical conditions and the prevailing land use distribution. For Ghalanai Urban Centre, the Linear Dynapolis scenario was chosen deemed the most appropriate, as it would likely help to minimize travel costs and traffic congestion in the area. The self-sufficient neighborhoods will be developed in such a way that promotes walkability and mitigates the carbon

footprint of the region. The aforementioned steps in the Master Planning Process have been comprehensively covered in the current Task-C: Development of Final Master Plan.

2.1.21. Action Plans for All Sectors and Final Master Plan

The Action Plan Reports will offer detailed delineations of the eighteen distinct sectors outlined in the Master Plan. These reports will specify proposed development actions for the urban center, identify the responsible actors and agencies, establish the procedural framework for implementation, and provide cost estimates. Together, these Action Plans form Task D of the Master Planning Process for Ghalanai Urban Centre. Task C (Scenario Planning) and Task D (Strategic Development Action Plans) collectively contribute to the Final Master Plan (Task E) now in hand.

2. GENERAL PROFILE OF PROJECT AREA

2.1. Introduction

Mohmand Agency, is a district in the Peshawar Division of Khyber Pakhtunkhwa Province, Pakistan. Prior to 2018, Mohmand Agency was the north-western component of the Federally Administered Tribal Areas (FATA), a semi-autonomous region along the Afghanistan–Pakistan border. In May 2018, FATA was merged into the larger Khyber Pakhtunkhwa Province (KPK) in an attempt to bring stability to the region, redesignating Mohmand Agency to Mohmand District.

2.2. District Demography

District Mohmand has a total population of 474,345 as per the 2017 Census, with an annual growth rate of 2.40%. The district exhibits a high average household size of 9.3, reflecting traditional family structures. The male-to-female ratio stands at 1:0.96, indicating a balanced demographic composition. The literacy rate is 31.28%, with 38% of the population engaged in the workforce, highlighting key socioeconomic characteristics of the district.

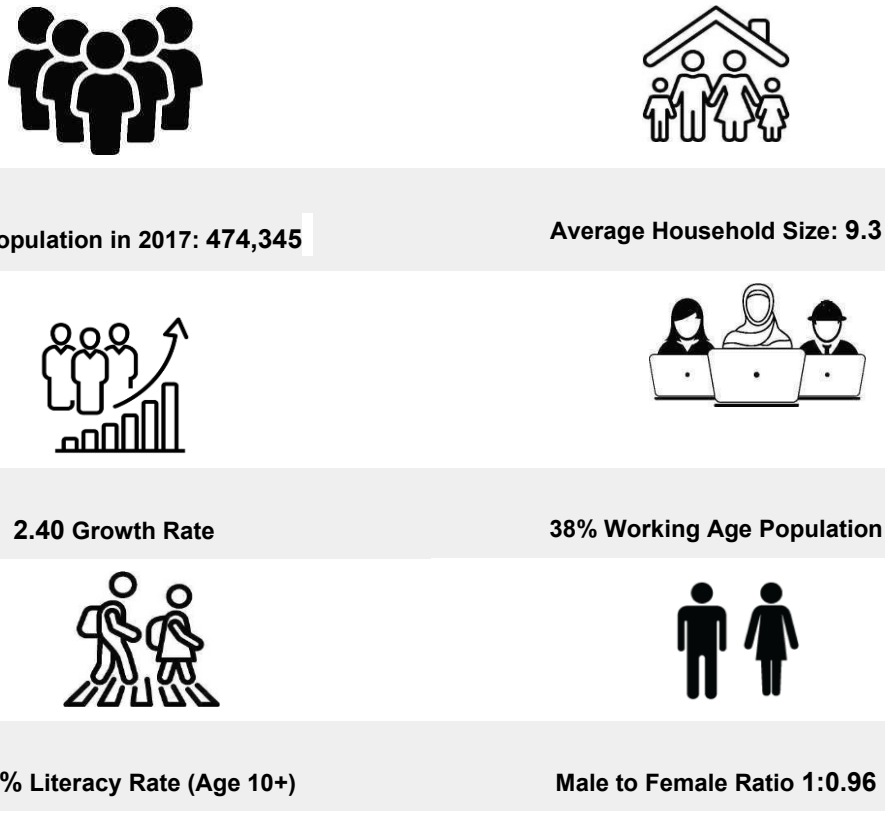


Figure 2-1: District Demographic Overview

2.3. Natural System and Environmental Resources of the District

2.3.1. Geology

The Mohmand District has a rich mineral potential, including gemstones, metallic minerals, and dimension stones. The area primarily comprises igneous and metamorphic rock formations with minor sedimentary sequences. Numerous marble deposits of various shades and colors are estimated to be around 1,150 million tons and are present at Ziarat, Spinkai Tangi, Sar Lara Kandao, Chamarkand, Shin kamar, Jandai, Koh-e-more, Gumbatai, and Sagi areas of the district. Among these, the Ziarat marble deposit is located west of Lakaro, around 8 km from the main Mohmand-Bajaur Road. The marble formation covers a considerable area, with workable marble reserves of more than 100 million tons.

The major concentration of chromite deposits exists in Bucha & Rangmena, Balola, Balogai, Jau, Kawal, and Bazargai in the Prang Ghar area and Tsapari Tangi, Jawar Mena, Gumbatai, and Lakarai areas of Mohmand District. The production of chromite from the Mohmand District is mainly exported to China.

Manganese deposits are located in the eastern part of the Mohmand district. Five manganese bodies have been discovered at Qazi Mula Ziarat, Bamdara, Kamangara, Kandao, and Kharai Dara in Safi & Ambar areas, whereas more than 38 prospects have been identified at 22 locations within a 10 km linear zone covering Nasir Kasai, Maizar Pai Khan and Ziarat/Razam Dherai in Parang Ghar 20 area, Mohmand District. Some of these are quite large (i.e., 115 meters long and 10 meters wide) with 35-66% MnO2 (manganese dioxide) content. Other manganese deposits in the district are being evaluated under an ongoing FATA Development Authority (FDA) scheme called “Investigation & Evaluation of Manganese Prospects in Bajaur & Mohmand Agencies.”

Gem quality emerald has been reported from Tora Tiga in the Mohmand district. Geological studies conducted under the on-going FDA scheme “Exploration & Evaluation of Precious Stones in Bajaur & Mohmand Agencies” resulted in the identification of a number of promising emeralds bearing zones in the aforementioned 22 areas. Previously emerald was mined at these localities using an indiscriminate blasting method which resulted in very little recovery of commercial grade emerald, which led to mine closures.

The rock assemblage in the southern part of the district includes the north-western marginal mass of the Indo-Pakistan plate. The central part represents an abducted ophiolite. In the north, a suite of rocks similar to that of Kohistan Island exists. The general geological sequence is given below:

Table 2-1: Mines and Minerals in Mohmand District

S. No	Alluvium, Gravels, and Terrace Deposits (Rock)	Recent-sub recent Age
1.	Fossiliferous limestone.	Eocene
2.	Ophiolite with layer 1 serpentinized	Cretaceous –
3.	Ultrabasic, layer-2 volcanic, and layer-3 cherts.	Paleocene
4.	Marbleized limestone	Jurassic
5.	Dolomite & silica sand	Siluro-Devonian
6.	Schists phyllites with numerous intrusive	Paleozoici

2.3.2. Soil

The major constituent of soils of Mohmand District is residuum colluvium from schists and state parent materials. The soil is shallow to moderately deep, will to somewhat excessively drained, and slightly to moderately calcareous. Coarse-textured (sand, loamy sand, sandly loam, fine sandly loam to loam) slightly eroded and occurred on lower mountain slopes.

Piedmont alluvium plains and water-reworked loess plains are on nearly level to gently sloping position. These soils are moderately deep, well-drained, moderately calcareous, and slightly eroded. The climate of the area is semi-arid, sub-tropical continental.

The soil of Mohmand District is fertile and is fit for the growth of almost all cereal crops, vegetables and fruits, and even off-season vegetables. Tomato and chilies are also grown in the frost-free pockets of the district. The crops grown are wheat, maize, and oilseeds.

2.3.3. Forest

The data recorded in developmental statistics for the years 2017-18, 2018-19, and 2019-20 was analyzed to get insights of the forest cover in the district. The details of each are as under:

- The total cultivated area in Mohmand District for the years 2017-2018, 2018-2019, and 2019-2020 was approximately 23,500 hectares, 23,600 hectares, and 23,600 hectares, respectively.
- The net sown area, or the total area of land actually sown with crops, was approximately 21,700 hectares, 21,500 hectares, and 21,700 hectares, respectively, for the same three years.
- The current fallow area, or the total area of land left uncultivated during the current year, was approximately 1,800 hectares, 2,050 hectares, and 1,900 hectares, respectively, for the three years.
- The total area sown more than once, or the total area of land sown with crops more than once during the year, was approximately 5,800 hectares, 3,900 hectares, and 3,900 hectares, respectively, for the three years.

Table 2-2: Forest Land Cover/Types in Mohmand District

District Mohmand	Reported Area	Cultivated Area			Cropped Area		Un-Cultivated Area			
	(3+8)	Total	Net Sown	Current Fallow	Total	Area sown more than once	Total	Cultivable Waste	Forest	Not available for cultivation
2017-2018	229,620	23,514	21,714	1,800	27,537	5,823	206,106	7,370	10,006	188,730
2018-2019	229,620	23,604	21,552	2,052	25,467	3,915	206,016	7,280	10,006	188,730
2019-2020	229,620	23,618	21,704	1,914	25,637	3,933	206,002	7,248	10,018	188,736

2.3.4. Agriculture Crops, Fruits, and Vegetables

I. Wheat was the most widely grown crop in Mohmand District for three years, with an area of approximately 6,900 hectares, 7,100 hectares, and 7,100 hectares, respectively. The production of wheat was approximately 9,140 tonnes, 9,366 tonnes, and 8,715 tonnes, respectively, for the three years. The yield of wheat was approximately 1,330 kilograms per

hectare, 1,327 kilograms per hectare, and 1,230 kilograms per hectare, respectively, for the three years.

II. Maize was the second most widely grown crop in Mohmand District for three years, with an area of approximately 115 hectares, 245 hectares, and 251 hectares, respectively. The production of maize was approximately 110 tonnes, 234 tonnes, and 240 tonnes, respectively, for the three years. The yield of maize was approximately 960 kilograms per hectare, 960 kilograms per hectare, and 960 kilograms per hectare, respectively, for the three years.

III. Jowar, barley, and sugarcane were also grown in Mohmand District, with smaller areas and lower production and yields compared to wheat and maize.

IV. Rapeseed and mustard, rabi vegetables, rabi fruits, and kharif fruits were also grown in Mohmand District, but on smaller areas and with lower productions and yields compared to the other crops.

Table 2-3: Agriculture Crops, Fruits and Vegetables

Crops	2017-18			2018-19			2019-20		
	Area (Hectare)	Production (Tonnes)	Yield per Hectare (Kg)	Area (Hectare)	Production (Tonnes)	Yield per Hectare (Kg)	Area (Hectare)	Production (Tonnes)	Yield per Hectare (Kg)
Wheat	6,885	9,140	1,328	7,060	9,366	1,327	7,070	8,715	1,233
Maize	115	110	957	245	234	955	251	240	956
Jowar	88	66	750	110	88	800	115	92	800
Barley	600	387	645	550	370	673	554	374	675
Sugarcane	200	6,531	32,655	150	4,900	32,667	147	4,802	32,667
Rapeseed & Mustard	350	55	157	335	59	176	338	84	249
Rabi Vegetables	273	1,775	6,502	284	1,839	6,475	282	1,798	6,376
Rabi Fruits	225	1,556	6,916	237	1,636	6,903	242	1,615	6,674
Kharif Fruits	194	2,014	10,381	210	2,166	10,314	218	2,268	10,404

2.3.5. Watershed Areas

Mohmand district has phenomenal outflows because of the underutilization of water resources within its boundaries. In this area, 64% of surface water remains untapped and flows out of the district. The surface water available for an average year in its 15 watersheds is 174.6 million m3, of which 36% (63 million m3) is utilized, and 64% (111.6 million m3) is drained. All 15 watersheds of Mohmand District lie within the semi-arid climatic zone and, as such, receive low rainfall resulting in a smaller runoff. In order to trap the available surface water potential, 19 small dams have been recommended for construction. Accordingly, the project will construct five dams, seven weirs where the perennial supply is available, 96 km of lined irrigation channels to irrigate 720 ha of land, and plantation on 757 ha to improve watershed management in the catchment areas of the sub-projects. The table below shows the extent of watershed areas in District Mohmand. However, no watershed areas have been notified in Ghalanai Urban Center.

Table 2-4: Watershed Areas in District Mohmand

S. No	Watershed	Confining Coordinates				Area of Watershed (km2)
		Longitude (E) Degree		Latitude(N) Degree		
		From	To	From	To	
1	Lower Pandiali	71.38	71.51	34.33	34.45	73
2	Lower Prang Ghaar	71.55	71.7	34.35	34.46	99.23

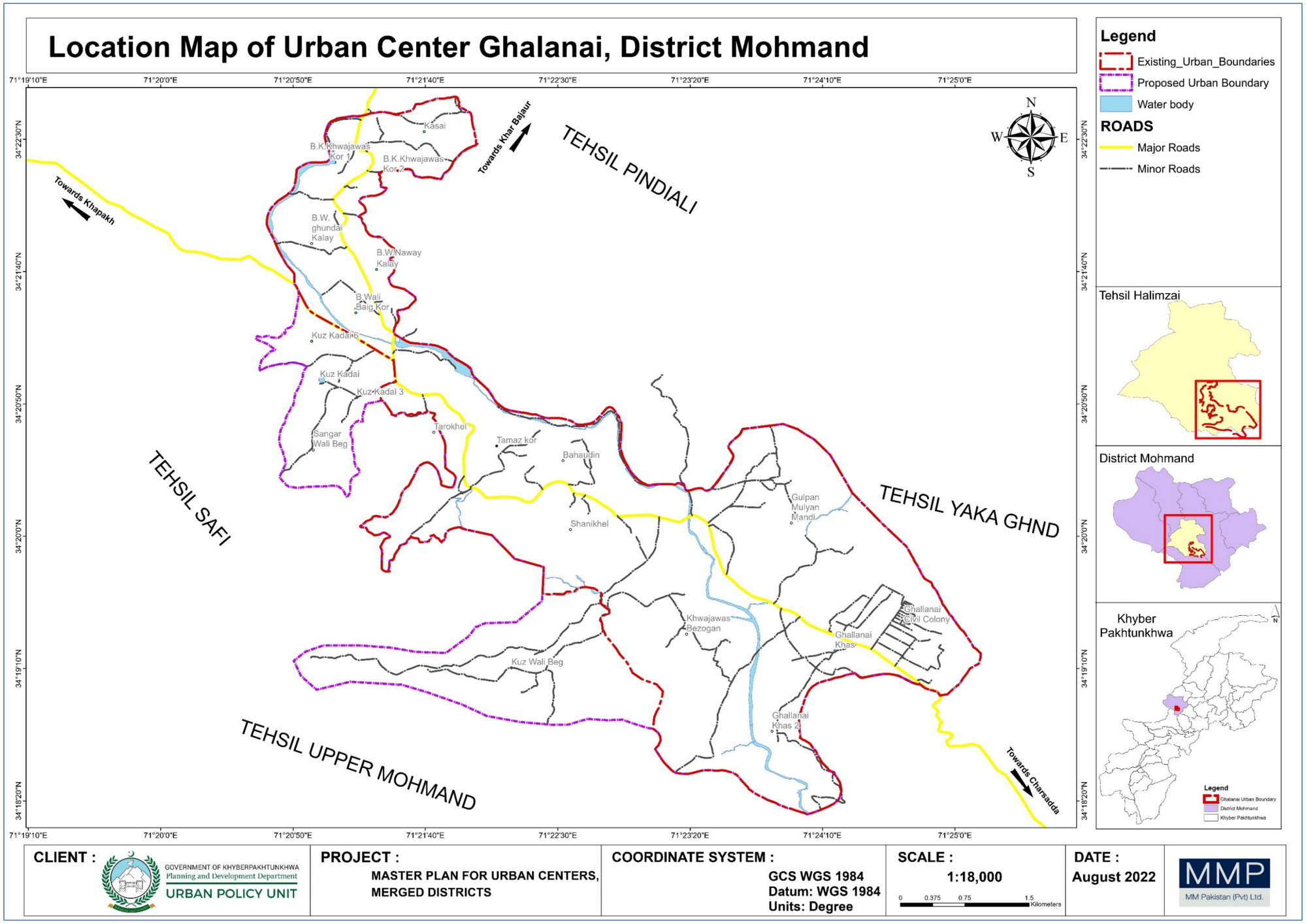
S. No	Watershed	Confining Coordinates				Area of Watershed (km2)
		Longitude (E) Degree		Latitude(N) Degree		
		From	To	From	To	
3	Lower Haleemzai	71.26	71.42	34.31	34.41	97.46
4	Khawazai-Baizai	70.98	71.28	34.35	34.59	390.19
5	Upper Prang Ghaar	71.46	71.66	34.33	34.55	201.29
6	Ekka Ghund-I	71.32	71.56	34.24	34.37	165.14
7	QasimKhel	71.33	71.5	34.17	34.26	82.31
8	EkkaGhund-II	71.07	71.34	34.26	34.42	117.25
9	Upper Pandiali	70.3	71.52	34.43	34.55	130.67
10	Upper Haleemzai	71.25	71.42	34.38	34.47	80.52
11	Ekka Ghund-III	71.29	71.51	34.16	34.28	53.14
12	Safi	71.09	71.33	34.44	34.63	193.38
13	Lakarao	71.09	71.31	34.58	34.73	176.77
14	Shinwari	71.28	71.41	34.53	34.66	108.21
15	Umbar	71.35	71.56	34.51	34.68	219.17

2.4. Project Area of Ghalanai Urban Center

The Urban Center of Ghalanai, located in the Mohmand District at coordinates Lat: 34° 18' and 34° 23' North and Long: 71° 19' and 71° 25' East, selected is the project area for the preparation of the Master Plan. Ghalanai is a rapidly expanding urban community and the administrative hub of the Mohmand District. The urban center of Ghalanai is situated in the southern side of the district, covering an area of 20 square kilometers with a population density of 1412 individuals per square kilometer (as per the 2017 Census). The area comprising Ghalanai NC and Durba Khel NC was designated as urban in 2020 by the local government authorities. The urban center of Ghalanai extends from the southeast of the main Ghalanai and civil colony towards the northwest of Mian Mandi and Shati Khel, encompassing the areas of Babi Khel VC to NC Durba Khel and Chanda Bridge. The district administration is based in the urban center of Ghalanai, which serves as the primary town for the provision of services such as education, health, and business activities. The urban center is surrounded by scattered rural settlements and a hilly and rugged landscape.

In an effort to ensure sustainable urban development, the Urban Policy and Planning Unit (UPPU) of KP has initiated the preparation of a Master Plan for the Ghalanai urban center. The Master Plan aims to regulate and align existing infrastructure and provide a comprehensive and integrated guideline for the future development of the area. The Master Plan covers the period from 2022 to 2040.

The location of the project area for the master plan is shown in map 2-01 below:



Map 2-1: Location map of the Project Area

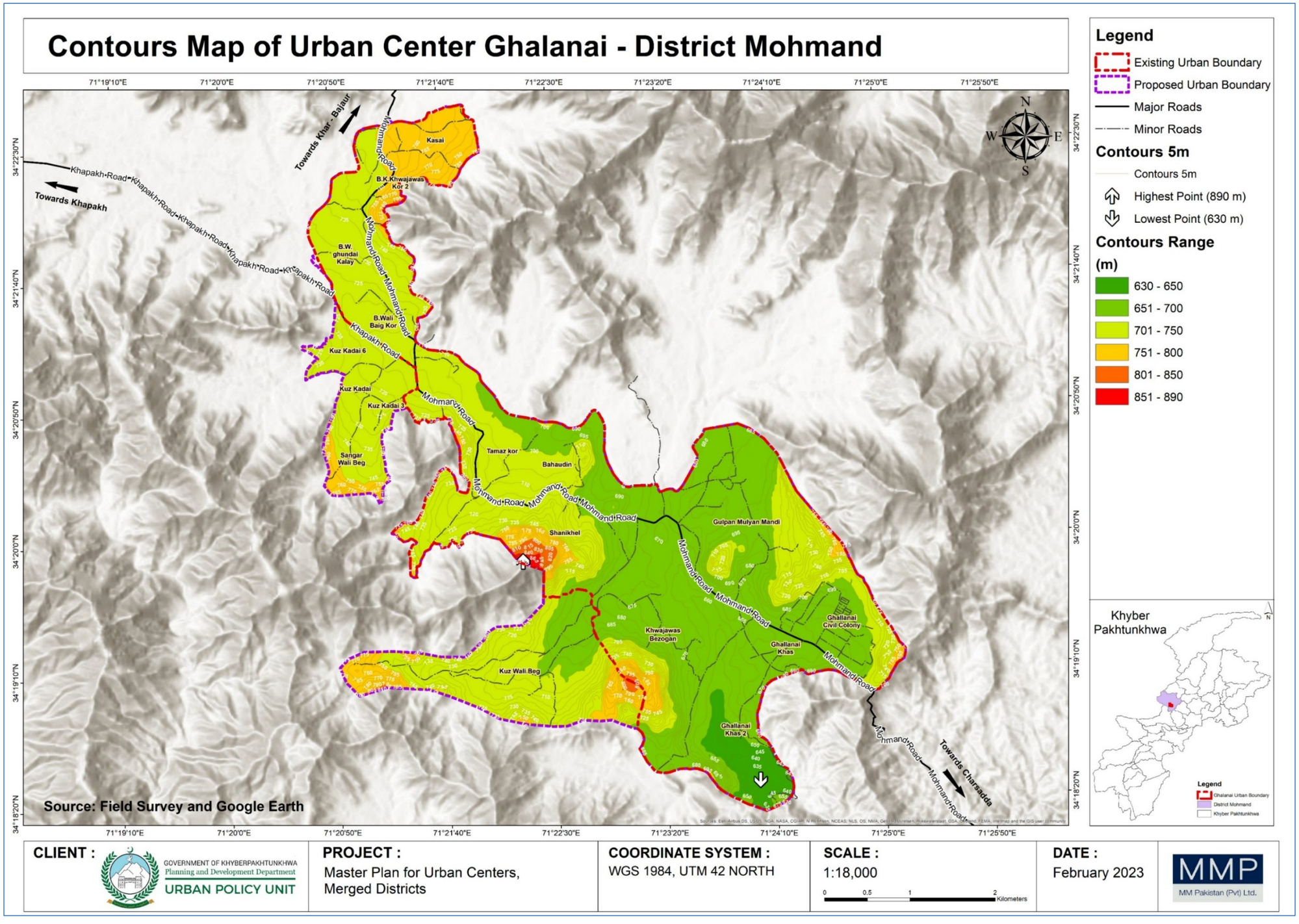
2.4.1. Topography

The Ghalanai Urban Center is situated in a mountainous region characterized by barren slopes and rocky terrain. The area's average height is 750 meters, with the highest elevation point at 890 meters on the northwest side near Kuz Wali Baig and the lowest elevation at 630 meters downstream. Torrential rain is common in the area, resulting in stony and shingle beds in the valleys. Water scarcity is a major challenge, particularly in the valleys, and the region is characterized by long rows of rocky hills, crags, and spurs. Local climate is harsh due to lack of vegetative cover particularly main commercial areas. The map 2-2 below shows the contours and digital elevation model of the Urban Center of Ghalanai.

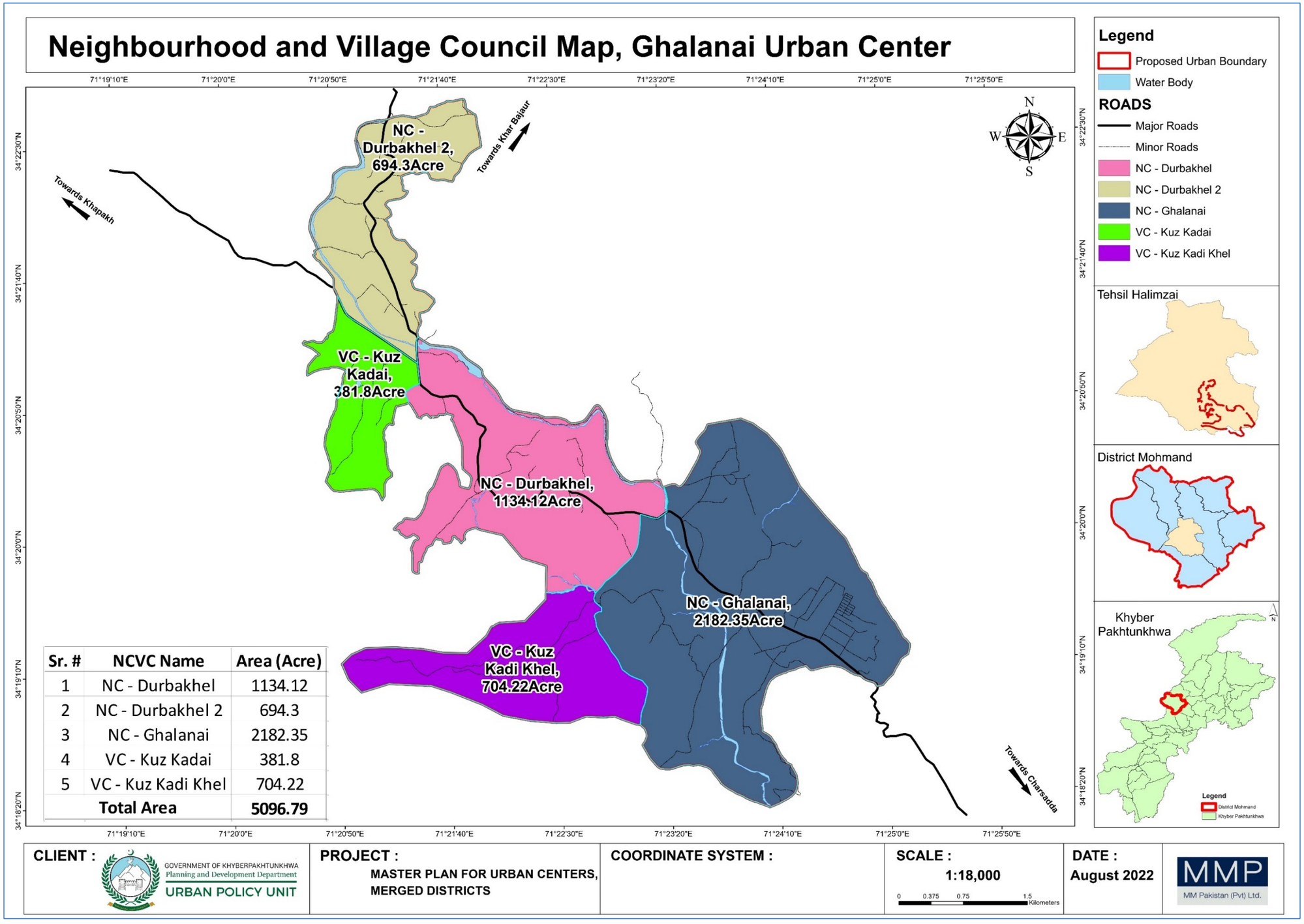
The project area comprised of the following Neighborhood and Village Councils are listed below:

1. NC Ghalanai
2. NC Durba Khel 1
3. NC Durba Khel 2
4. VC Kuz Kadai Khel 1
5. VC Kuz Kadai Khel 2

The project area encompasses three Neighborhood Councils and two Village Councils. Map 2-3 below illustrates the boundaries and jurisdictions of these local government units



Map 2-2: Contour Map of Ghalanai Urban Centre



Sr. #	NCVC Name	Area (Acre)
1	NC - Durbakhel	1134.12
2	NC - Durbakhel 2	694.3
3	NC - Ghalanai	2182.35
4	VC - Kuz Kadai	381.8
5	VC - Kuz Kadi Khel	704.22
	Total Area	**5096.79**

Map 2-3: Administrative areas Boundaries in the Project Area

2.4.2. Wetlands

The Ghalanai Urban center currently does not have any wetlands within its boundaries, it is worth noting that the district of Mohmand, in which the urban center is located, does contain a variety of wetland habitats. These habitats, include marshes, swamps, bogs, and other types of water-saturated environments, are characterized by their water-saturated soils and the presence of water-loving plants. Wetlands support a diverse range of plant and animal life, and they play vital roles in the health and functioning of the surrounding ecosystem. Given the importance of these environments and the potential impacts of development on wetland habitats, it is recommended that the future Master Plan or Land Use Plan for the region include a more in-depth study of these ecosystems.

2.4.3. Agriculture Lands

Agriculture land has been identified as the major land use covering an area of 2219 acres (43.5%) of the total project area. The agricultural land is scattered and located on the fringes of the urban center. Different types of seasonal crops like maize wheat and vegetables such as tomato, onion, cucumber, potato, and other seasonal vegetables are grown here on these parcels of land. Common shrubs found in the project area include sanatha, ak, the small red poppy spera, camel-thorn, and paighambari-gul, as well as drab grass. Among the trees, mesquite, ber, various specimens of acacia, jhands, gurgura Farnaciana, and Kikar are also commonly found. Additionally, numerous herbs, such as polli and chaulai can be found in the area.

2.4.4. Floodplains

While the urban center of Ghalanai has not encountered significant flooding or infrastructure damage in the past, heavy rain and monsoon seasons have resulted in a minimal flow of water along the natural nullah. To mitigate the possibility of flash floods and safeguard public assets and infrastructure, proactive measures such as forestation along water bodies must be taken. This approach could also enhance the urban center's overall resilience against the effects of extreme weather events.

2.4.5. Water Resource

The water resources in the Ghalanai Urban Center are limited, with the Tangi Khwar being the primary river that runs through the project area. Unfortunately, the once pristine waters of the Tangi Khwar have been adversely impacted by the nearby marble industries that have recklessly discharged their waste into the Khwar. As a result, the Khwar's natural flow has been disrupted, and the quality of the water has been severely compromised, posing a significant threat to the ecosystem. The contamination has also resulted in a shortage of fresh water, with the once-abundant Khwar now struggling to provide adequate water to the surrounding communities. Thus, the situation calls for immediate and comprehensive action to mitigate the negative impact on the Khwar and its environs, with the ultimate goal of restoring the Khwar's natural flow and ensuring that the water is safe for human consumption and other uses.

2.4.6. Flora

Common shrubs found in the project area include sanatha, ak, the small red poppy spera, camel-thorn, and paighambari-gul, as well as drab grass. Among the trees, mesquite, ber, various specimens of acacia, jhands, gurgura Farnaciana, and Kikar are also commonly found. Additionally, numerous herbs, such as polli and chaulai can be found in the area.

2.4.7. Fauna

The 1998 census report for the Mohmand district indicates that the local wildlife population is limited, with wild pigs, foxes, jackals, rabbits, and monkeys being the most commonly sighted animals. Some bird species, such as chakore, partridge, see-see partridge, ducks, snipe, quail, wild geese, and sand-grouse also observed.

2.4.8. Population Projection

The population projection for Ghalanai urban center has been calculated using an exponential growth model and taking into account the average growth rate of 2.8% based on the census data from 2017. However, a constant growth rate of 0.2% was subsequently applied for each 5-year interval up to 2040. This means that the population is expected to more than double in the next 20 years, from 28,241 to 63,702, as shown in Figure

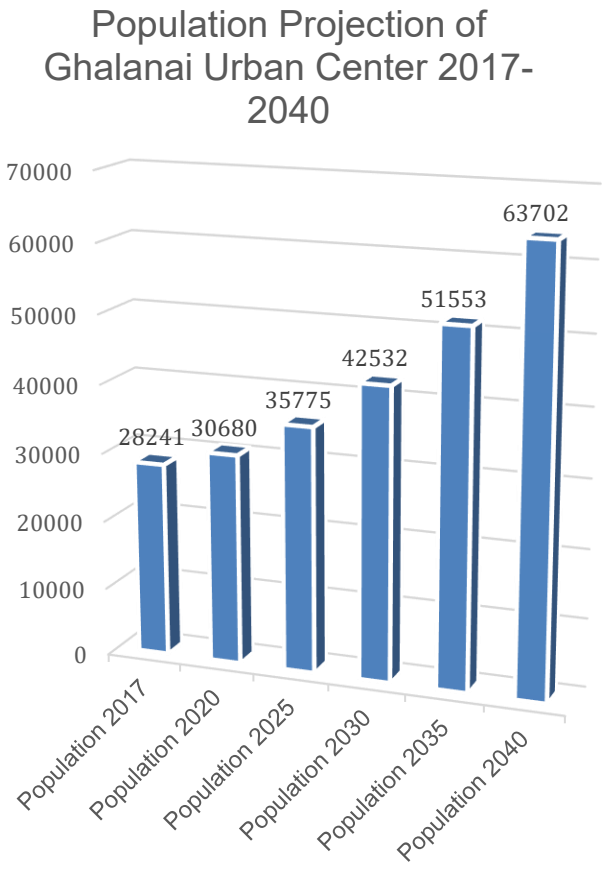


Figure 2-1: Projected Population of Ghalanai Urban Centre

The exponential growth model is a mathematical formula that is used to estimate the future population of a given area based on its current population and growth rate. In this case, the growth rate of 2.8% was used to project the population of Ghalanai up to 2040. This growth rate is considered to be a reasonable estimate of the population increase in the area based on past trends and current conditions. By applying a constant growth rate of 0.2% for each 5-year interval, the projected population of Ghalanai can be estimated with a high degree of accuracy.

- Pn = P0 x (1+r/100) t
- Were,
- Pn =Population of the desired year
- P0 = Population of base year
- r = = Population growth rate
- t = Time

In 2018, the Mohmand district was declared as a separate district and the TMA was established in the Ghalanai urban center for Upper Mohmand on July 1, 2019 after its merger with KP. The TMA jurisdiction consists of 65 councils, including seven neighborhood councils and 58 village councils. Of the neighborhood councils, four lie within the proposed urban boundary of Ghalanai (the project area).

According to discussions with officials from the Local Government and the GIS expert in the Deputy Commissioner's Office, the urban center boundary was determined to include three neighborhoods within the proximity of the Ghalanai urban center. The existing boundary includes 20 settlements with a population of 28,241. The proposed urban boundary of the project area is shown in above map 2-3.

2.4.9. Local Government-NC/VC-wise Population

Ghalanai Urban Center is comprised of into three Neighborhood Councils i.e. NC-Ghalanai NC Durbakhel, and NC Durbakhel 2, and includes Village Councils of Kuz Kadai VC2 and Kuz Kadi Khel VC 1. The table illustrates population distribution across settlements under Neighborhood Councils (NCs) and Village Councils (VCs) in Ghalanai, showing consistent growth from 2017 to 2022. NCs, particularly Durbakhel and Ghalanai, house larger populations compared to VCs, reflecting semi-urban hubs versus rural settlements. Key settlements like Tamaz Kor and Ghallanai Khas 2 exhibit significant populations, whereas smaller settlements like Tarokhel and Kuz Wali Beg show modest numbers. Overall, Ghalanai's population grew by approximately 14.8%, from 28,241 to 32,422, highlighting the need for infrastructure and services tailored to both urbanized and rural communities.

2-5: NC/VC Population Distribution & Growth Trend

S.No	NC/VC	Settlements	Population 2017	Population 2022
1	NC Durbakhel	Bahaudin	2351	2699
2	NC Durbakhel	Shanikhel	2158	2478
3	NC Durbakhel	Tamaz kor	2387	2740
4	NC Durbakhel	Tarokhel	1031	1184
5	NC2 Durbakhel	Kassai	1673	1921
6	NC2 Durbakhel	B.Wali Baig Kor	1282	1472
7	NC2 Durbakhel	B.K.Khwajawas Kor 1	1579	1813
8	NC2 Durbakhel	B.K.Khwajawas Kor 2	854	980
9	NC2 Durbakhel	B.W.Naway Kalay	1375	1579
10	NC2 Durbakhel	B.W. ghundai Kalay	986	1132
11	NC Ghalanai	Gulpan Mulyan Mandi	1739	1996
12	NC Ghalanai	Khwajawas Bezogan	1469	1687
13	NC Ghalanai	Ghallanai Khas	1593	1829
14	NC Ghalanai	Ghallanai Khas 2	2111	2424
15	NC Ghalanai	Ghallanai Civic Colony	1249	1434
16	VC 1 Kuz Kadikhel	Kuz Wali Beg	520	597
17	VC 1 Kuz Kadikhel	Sangar Wali Beg	1142	1311
18	VC 1 Kuz Kadikhel	Kuz Kadai 3	767	881
19	VC 2 Kuz Kadai	Kuz Kadai	757	869
20	VC 2 Kuz Kadai	Kuz Kadai 6	1218	1398
		Ghalanai Total	**28241**	32422

2.4.10. Existing Land Use of the Project Area and comparison with NRM

Table 2-6 below provides a detailed comparison of the proposed urban boundary for the Ghalanai urban center, which spans an area of 20.6 sq. km (or roughly 5097 acres), and the distribution of different land uses. The table also includes a comparison of these land use proportions with the respective National Reference Manual (NRM) for the same size city of 25,000-50,000 Population.

Table 2-6: Existing Land-Use Distribution of Neighborhoods within Ghalanai Urban Centre

Existing Land Uses	Area (Acre)	%	NRM Standards	
Residential	557	11%	Residential	27-43%

Commercial	38	1%	Commercial	1-5%
Industrial	24	0.5%	Industrial	2-20%
Public Buildings	47	2%	Institutional	3-11%
Civic Services	17			
Educational	25			
Health	7			
Restricted Area	68	1%	-	-
Recreational	7	0%	Recreational	1-6%
Graveyard	42	1%	Graveyard	0.5-6%
Transportation	220	4%	Transportation	3-27%
Built Up Area	**1051**	**21%**	-	-
Agriculture	2219	79%	Agriculture	15-25%
Water Bodies	86			
Vacant + Hilly Area	1742			
Non-Built-Up Area	**4047**	**79%**	-	-
Total Area	**5097.6**	**100%**	-	-

Agricultural Land Use: Agriculture land has been identified as the major land use covering an area of 2219 acres (43.5%) of the total project area. The agricultural land is scattered and located on the fringes of the urban center. Different types of seasonal crops like maize wheat and vegetables such as tomato, onion, cucumber, potato, and other seasonal vegetables are grown here on these parcels of land.

Vacant Land & Open Spaces: The next largest land use is the vacant and hilly area, with an area of 1742 acres, or 34% of the total area. Vacant land includes widely varying types of land, ranging from undisturbed open space to abandoned, contaminated brownfields. Vacant land use constitutes the major land use and covers an area of 850 acres. The types of open space are graveyards with an area of 42 acres, 0.82%. As per the TOR (section 7.2.1.d), the graveyard area is included in the category of open spaces. This area spans across a considerable expanse of 42 acres and contributes to nearly 1% of the total land use.

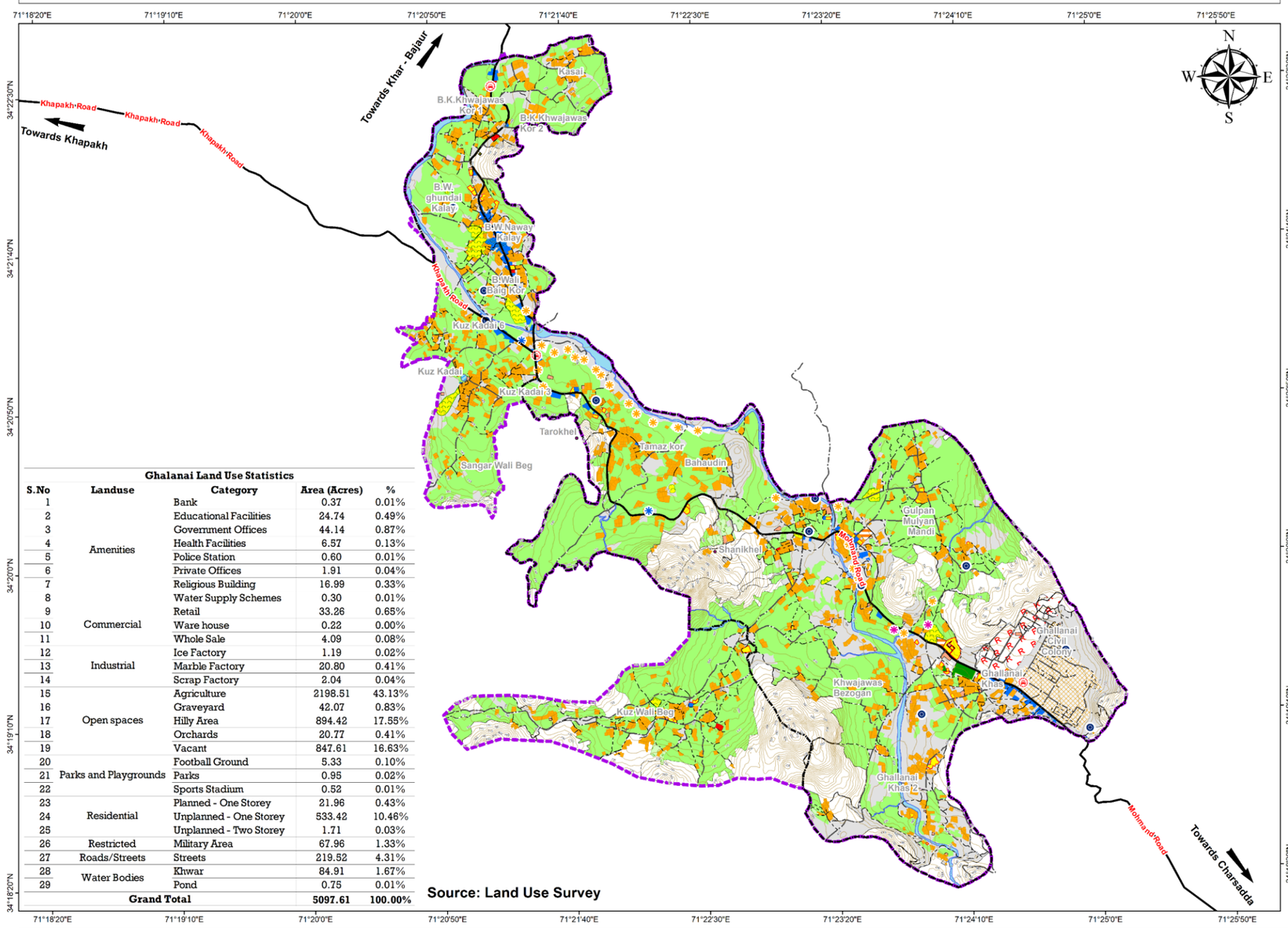
Residential Areas: Residential buildings cover an area of approximately 557 acres within the proposed urban boundary of Ghalanai. Of this area, 22 acres are covered by planned single-story houses, 533 acres are covered by unplanned single-story houses, and 2 acres are covered by unplanned double-story houses. Compared to other regional urban centers, the overall population density of the Ghalanai urban center is relatively low.

Commercial Areas and Industries: The commercial area covers around 38 acres, including retail, warehouses, and wholesale shops. On the other hand, 24 acres of the area is covered by industries and factories such as Ice factories, Scrap, and Marbles factories.

Public Buildings and Amenities: The public buildings covered an area of about 96 acres categorized into civic services, educational, health, police station, other government offices, and religious buildings,

Roads/Streets: The road network in the area is divided into a hierarchy, including major roads, primary roads, and streets. This network covers 4% of the total project area, equivalent to 220 acres. The main route of the road network connects Bajaur and Mohmand, while the Khapakh road is a primary road with a right of way (ROW) of 60 feet. The streets are connected with main road of Bajaur-Mohmand with average width of 20-30 feet.

Land Use Map of Urban Center Ghalanai - District Mohmand



Ghalanai Land Use Statistics

S.No	Landuse	Category	Area (Acres)	%
1	Amenities	Bank	0.37	0.01%
2		Educational Facilities	24.74	0.49%
3		Government Offices	44.14	0.87%
4		Health Facilities	6.57	0.13%
5		Police Station	0.60	0.01%
6		Private Offices	1.91	0.04%
7		Religious Building	16.99	0.33%
8		Water Supply Schemes	0.30	0.01%
9	Commercial	Retail	33.26	0.65%
10		Ware house	0.22	0.00%
11		Whole Sale	4.09	0.08%
12	Industrial	Ice Factory	1.19	0.02%
13		Marble Factory	20.80	0.41%
14		Scrap Factory	2.04	0.04%
15	Open spaces	Agriculture	2198.51	43.13%
16		Graveyard	42.07	0.83%
17		Hilly Area	894.42	17.55%
18		Orchards	20.77	0.41%
19		Vacant	847.61	16.63%
20	Parks and Playgrounds	Football Ground	5.33	0.10%
21		Parks	0.95	0.02%
22		Sports Stadium	0.52	0.01%
23	Residential	Planned - One Storey	21.96	0.43%
24		Unplanned - One Storey	533.42	10.46%
25		Unplanned - Two Storey	1.71	0.03%
26	Restricted	Military Area	67.96	1.33%
27	Roads/Streets	Streets	219.52	4.31%
28	Water Bodies	Khwar	84.91	1.67%
29		Pond	0.75	0.01%
	Grand Total		5097.61	100.00%

Source: Land Use Survey

CLIENT :	PROJECT :	COORDINATE SYSTEM :	SCALE :	
GOVERNMENT OF KHYBERPAKHTUNKHWA Planning and Development Department URBAN POLICY UNIT	Master Plan for Urban Centers, Merged Districts	WGS 1984, UTM 42 NORTH	1:18,000 0 0.5 1 2 Kilometers	**Map Date:** April 2023 **Land Use Survey Date:** May 2022 MMP MM Pakistan (Pvt) Ltd.

Map 2-4: Existing Land Use of Urban Center Ghalanai – District Mohmand

2.4.11. Spatial Pattern of Land Use Distribution in Ghalanai

The spatial pattern of Ghalanai Urban Center is primarily defined by the Bajaur Mohmand Road, which runs through the urban center in a curvilinear pattern. This road acts as the main route of the area, providing connectivity to the Urban Center and the rest of the region towards Bajaur and Malakand Division.

The existing urban fabric of Ghalanai can be described as a mix of land uses and low-density development. The Civil colony is an administrative block in the urban headquarters of Ghalanai, where a number of civil and public offices are located. The Ghalanai Bazar is a commercial strip opposite the civil colony that serves the needs of both the colony and the surrounding localities. The Mian Mandi Bazar located towards north at 7 km from Ghalanai is a commercial hub that has been in operation for several decades, where a variety of commercial activities take place. The Bazar is also known for its history of arms and ammunition production from the Soviet Union era. It is a lively and vibrant area where many people from surrounding villages visit to shop for daily necessities and other products. The Shani Khel area is a mix of different land uses, with a majority of residential, commercial, educational,

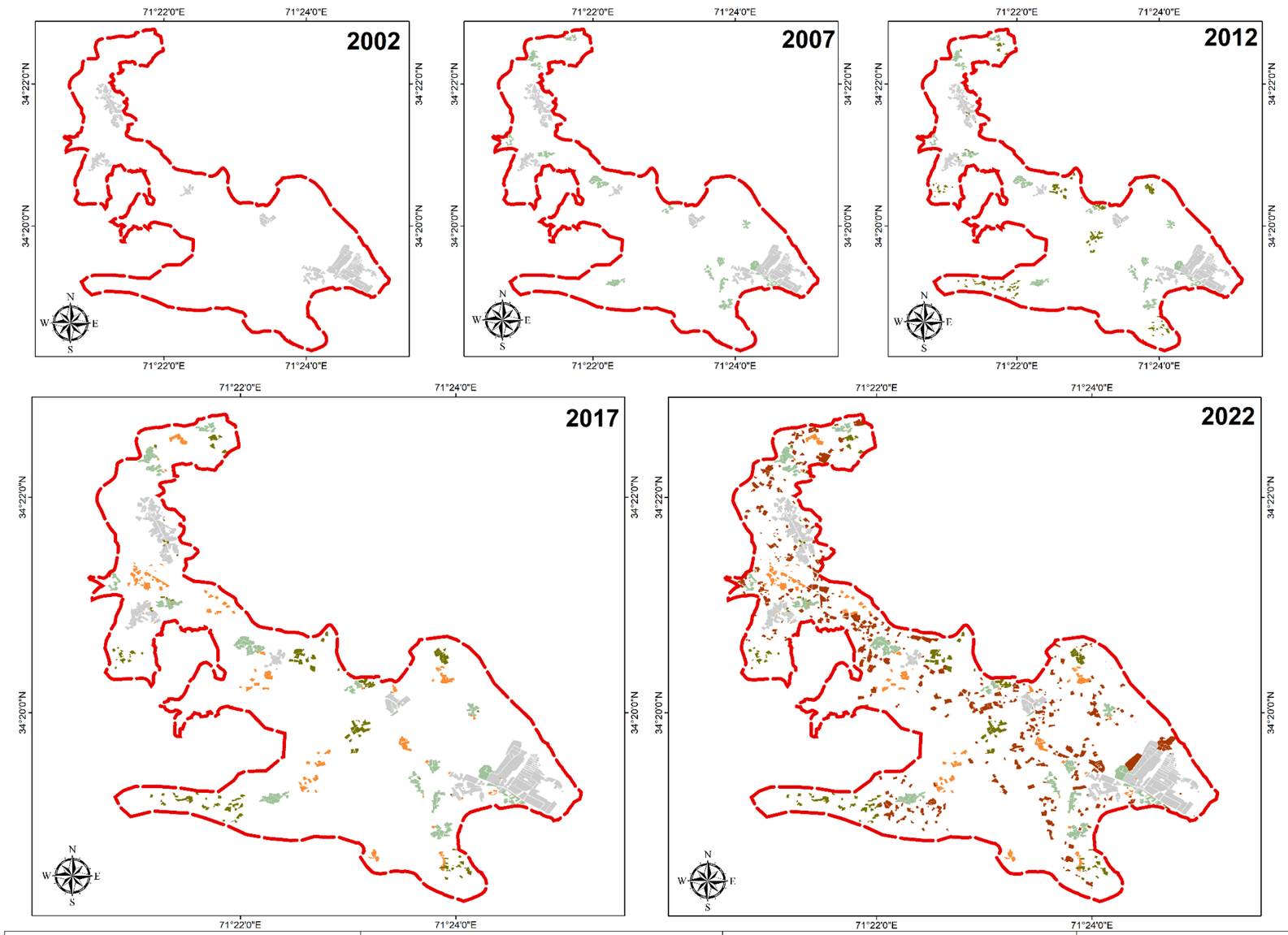
2.4.12. Growth Trend and Spatio-Temporal Analysis

The Ghalanai urban center has undergone substantial growth and expansion over the past 20 years, with the built-up land use area more than tripling from 238 acres in 2002 to 803 acres, 21% in 2022. This growth has been primarily concentrated along roadways and has been observed in scattered patches near the civil colony, Chanda Bridge, and Shani Khel areas between 2002 and 2012, as well as in rapid expansion can be witnessed from 2017 to 2022.

The trend of growth in the Ghalanai urban center can be observed by comparing spatial and temporal imagery from 2002 to 2022. Based on the satellite imageries of 2002, the center had four settlements covering 238 acres in 2002; the civil colony, Ghalanai bazaar, Mian Mandi, and Chanda bridge, while by 2022, the built-up land use area had significantly increased to 803 acres. This growth has been driven by a variety of factors, including the availability of land, infrastructure improvements, and the development of new businesses and industries. The location and accessibility of the urban center, as well as the presence of natural resources, may have also played a role in attracting development and investment to the area.

The physical and economic factors that impact the growth and development trend of the Ghalanai urban center include road infrastructure and the presence of marble industries. The revival of peace in the region also played a decisive role in promoting economic growth in the Urban Center.

Built-Up Growth Trend Map of Urban Center Ghalanai - District Mohmand



Legend

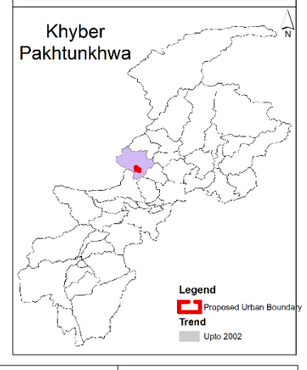
Proposed Urban Boundary

Trend

- Upto 2002
- 2003 - 2007
- 2008 - 2012
- 2013 - 2017
- 2018 - 2022

Trend Change

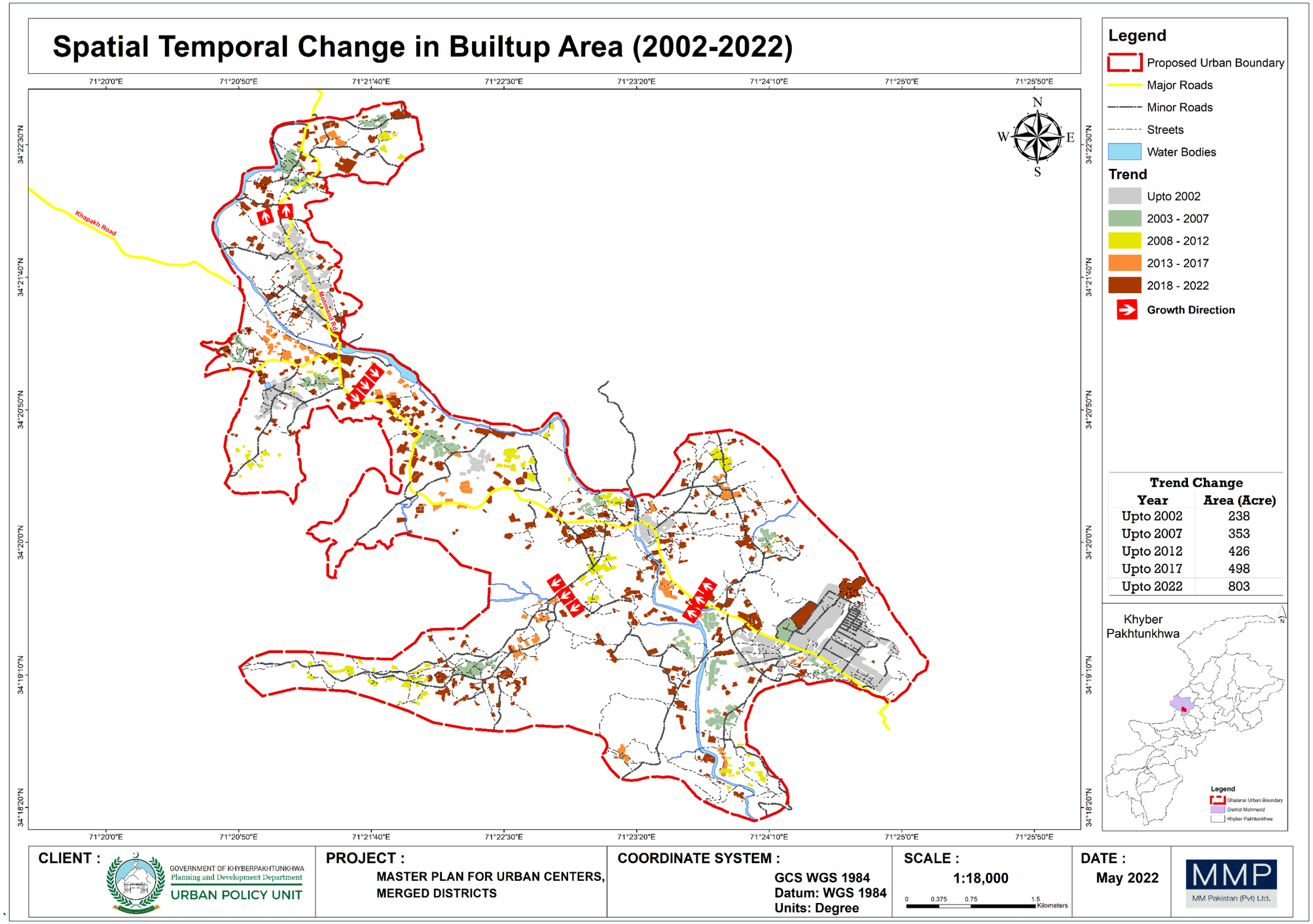
Year	Area (Acre)
Upto 2002	238
Upto 2007	353
Upto 2012	426
Upto 2017	498
Upto 2022	803



CLIENT :	PROJECT :	COORDINATE SYSTEM :	SCALE :	DATE :
GOVERNMENT OF KHYBERPAKHTUNKHWA Planning and Development Department URBAN POLICY UNIT	MASTER PLAN FOR URBAN CENTERS, MERGED DISTRICTS	GCS WGS 1984 Datum: WGS 1984 Units: Degree	1:50,000 0 1 2 4 Kilometers	May 2022

MM Pakistan (Pvt) Ltd.

Map 2-5: Urban Growth Trend analysis of Ghalanai 2002-2022



Map 2-6: Spatial-Temporal Change Analysis

3. Approach and Methodology

3.1. Introduction

A structured and data-driven methodology is essential for effective urban planning to ensure sustainable development and optimal land use allocation. The methodology adopted for the Ghalanai Urban Centre Master Plan is designed to address the region's current and future urban challenges by integrating technological tools, empirical research, and stakeholder engagement. By leveraging Geographic Information Systems (GIS) and a Spatial Decision Support System (SDSS), the planning process ensures that land-use decisions are informed, efficient, and sustainable. This approach not only considers existing conditions but also anticipates future growth patterns, enabling a balanced and resilient urban framework that enhances livability, economic opportunity, and environmental sustainability.

The primary and secondary data collection was carried out. Primary data collection involved extensive field surveys, laboratory analyses, and community engagement activities, while secondary data collection entailed reviewing reports and background documents from government and departmental sources. The methodology adopted is shown in Figure 3 1 below:

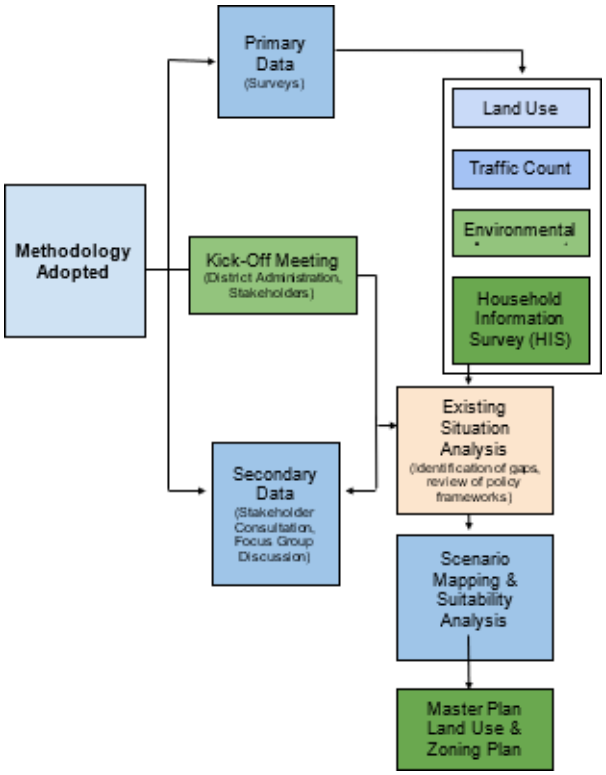


Figure 3-1: Methodology Adopted for Land Use & Zoning

3.2. Primary Data Collection

The project area was mapped using the latest satellite imagery, and a detailed land use survey was conducted to create the existing land use map of the Ghalanai Urban Centre. Field surveys, such as the Household Information Survey, Traffic and Transportation Surveys, Commercial Surveys, Public Facility Survey, and Infrastructure Survey, were conducted, and secondary data was collected from various offices to determine the area's existing situation.

3.3. Secondary Data Collection

Secondary data were obtained from reviewing relevant reports and background documents of the line departments. It is worth informing you that most of these departments have recently been established since the merger of Mohmand in the KP province and are therefore not fully functional. However, the information documented from the secondary sources, especially about the Human Environment, included the district / provincial head offices of the Forest Dept.; TMA office Ghalanai; Public Health Eng. Dept.; Local Government and Rural Development Dept.; Dist. Education Office; DHO; C & W; Highway Authority and the Revenue Department.

3.4. Land Use Suitability Analysis

To determine the suitability of each land parcel for a particular land use, predefined criteria were established for each land use and were categorized into three classes of suitability: most suitable, moderate, and least suitable. Each class was assigned a corresponding score of three, two, and one, respectively, to facilitate the evaluation process.

Next, all the criteria for each land use were intersected, resulting in a score for each land parcel. For instance, if a parcel was located in an area where all criteria were classified as most suitable, its score would be calculated as the product of the number of criteria and their corresponding score. For example, if there were four criteria with a score of three each, the total score for that land parcel would be 12. For further detail please refer to Task-C Report.

This process was repeated for all land parcels across different land uses, allowing for a comprehensive evaluation of land suitability based on multiple criteria. It provides valuable insights into which land parcels are best suited for particular land uses. Furthermore, the resulting scores can be used to develop a suitability map, which provides a visual representation of the suitability of different land parcels for each specific land use.

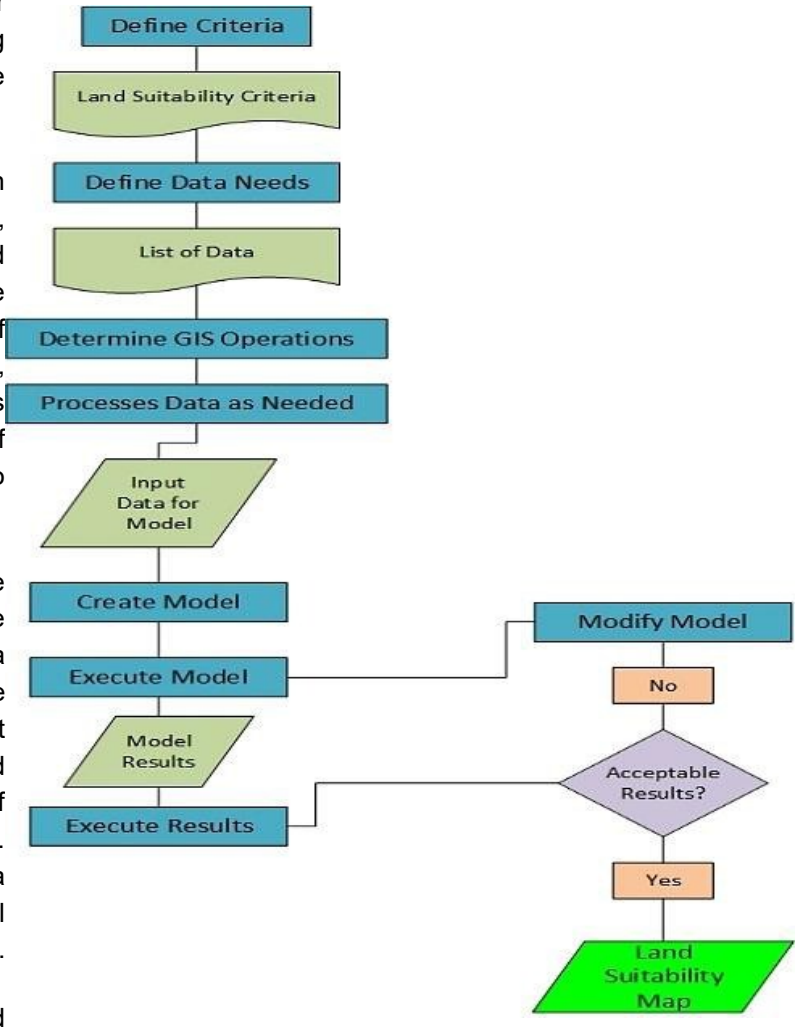
After conducting a comprehensive multi-criteria analysis, the results of the land suitability assessment were generated to inform the future development of residential, CBD, and industrial estates. The suitability map can assist in the decision-making process by identifying the most suitable areas for specific land uses.

The process of land suitability assessment allows for the consideration of various factors that could impact the future use of the land, such as environmental factors, infrastructure, and accessibility. By evaluating these factors, the assessment can aid in identifying potential risks and opportunities for future development.

3.5. Land Use Suitability Through Multi-Criteria Analysis

The Multiple Criteria Analysis (MCA) techniques has been utilized to identify suitable parcels for different land uses, such as residential, commercial, and industrial, by performing a vector-based overlay analysis. This analysis was conducted in two phases, where initially different constraints were erased from the project boundary, resulting in a file containing parcels available for any kind of future development. In the second phase, land use-specific criteria were then applied to the resultant file to find Land use-wise suitability.

The detail methodology adopted for land use suitability analysis using multi-criteria is shown in the figure below:



To determine the suitability of each land parcel for a particular land use, predefined criteria were established for each land use and were categorized into three classes of suitability: most suitable, moderate, and least suitable. Each class was assigned a corresponding score of three, two, and one, respectively, to facilitate the evaluation process.

Next, all the criteria for each land use were intersected, resulting in a score for each land parcel. For instance, if a parcel was located in an area where all criteria were classified as most suitable, its score would be calculated as the product of the number of criteria and their corresponding score. For example, if there were four criteria with a score of three each, the total score for that land parcel would be 12.

This process was repeated for all land parcels across different land uses, allowing for a comprehensive evaluation of land suitability based on multiple criteria. It provides valuable insights into which land parcels are best suited for particular land uses. Furthermore, the resulting scores can be used to develop a suitability map, which provides a visual representation of the suitability of different land parcels for each specific land use.

After conducting a comprehensive multi-criteria analysis, the results of the land suitability assessment were generated to inform the future development of residential, CBD, and industrial estates. The suitability map can assist in the decision-making process by identifying the most suitable areas for specific land uses.

Furthermore, the process of land suitability assessment allows for the consideration of various factors that could impact the future use of the land, such as environmental factors, infrastructure, and accessibility. By evaluating these factors, the assessment can aid in identifying potential risks and opportunities for future development.

Overall, the process of land suitability assessment is a valuable tool for land use planning, providing insights into which areas are most appropriate for different land uses while considering multiple criteria and factors. The resulting suitability map is a useful visual tool that can inform decision-making and resource allocation for future development.

3.6. Land Use Models and Scenario Planning for Ghalanai Urban Center

Scenario planning is a critical component of the master planning process for cities, as it allows planners and decision-makers to anticipate and prepare for a range of potential future developments and challenges. By developing and evaluating different scenarios for the future growth and development of a city, planners can identify the most viable and desirable paths forward and make informed decisions on how to allocate resources and shape the city for future growth.

In the case of Ghalanai, scenario planning is particularly important given the unique challenges and opportunities facing the Urban Center. By considering different approaches / scenarios to urban development, planners can better understand the strengths and weaknesses of each approach and choose the one that is most likely to meet the needs and priorities of the Urban Center and its residents.

Effective scenario planning requires a comprehensive and nuanced understanding of the Urban Center's existing conditions and development patterns, as well as a clear vision for the desired outcomes of the master planning process. It is a crucial step in the master planning process that requires careful consideration and analysis in order to ensure that the Urban Center's future growth and development is well-informed, well-planned, and responsive to the needs and priorities of the community.

The consultant explored two different approaches to urban development and future land use pattern for the urban center of Ghalanai: The Linear Dynapolis model and the Multiple Nuclei model. Both of these models offer unique advantages and challenges for the future growth and development of Ghalanai, and it is important to carefully consider the strengths and weaknesses of each approach in order to determine the most suitable path forward.

These models have been analyzed in relation to the local urban topology of the Ghalanai urban center, taking into account the current growth of the urban center and the distribution and spatial pattern of land use. The development of scenarios for future land use allows for the consideration of various options based on the unique characteristics and topology of the area, facilitating informed decision-making regarding the future development and form of the Urban Center.

3.7. Scenarios Selection Using Decision Support System (DSS) for Ghalanai Urban Centre

The Decision Support System (DSS) was used to develop scenarios for Ghalanai Urban Centre based on the criteria suitable for future planned growth and resource allocation. For this purpose, the two scenarios were developed for future land use and the growth direction of Ghalanai Urban Centre. The scenarios would be based on the data analysis and the decision support system would generate the best possible recommendations for future land use and growth direction of Ghalanai Urban Centre, it would also help in resource allocation and assessing the feasibility of the recommendations. The detailed land use scenarios according to the land use theories and suitability for Ghalanai Urban Centre are given below:

3.7.1. Multiple Nuclei Theory

The multiple-nuclei model is a theory of urban land use that suggests that cities are not simply composed of a single central business district (CBD) but rather multiple centers of activity or "nuclei" that coexist and interact with one another. This model was developed in response to the growth and dispersion of urban areas in the 20th century, which was driven in part by the proliferation of the automobile.

In the traditional urban land use model, the CBD was located at the center of the city and was the primary center of economic and commercial activity. However, the multiple-nuclei model suggests that with the advent of the automobile, people were able to travel more easily within and between cities, leading to the development of multiple centers of activity, such as ports, education, commercial and governmental hubs, that specialized in different types of businesses.

This model aims to provide a more realistic depiction of the complexity of urban regions, as it takes into account the diversity of nuclei and their interactions within the metropolitan area. It also challenges the concept of concentric zones, which posits that cities are organized in a series of rings with the CBD at the center, and suggests that cities are more complex and dynamic than this simple model suggests.

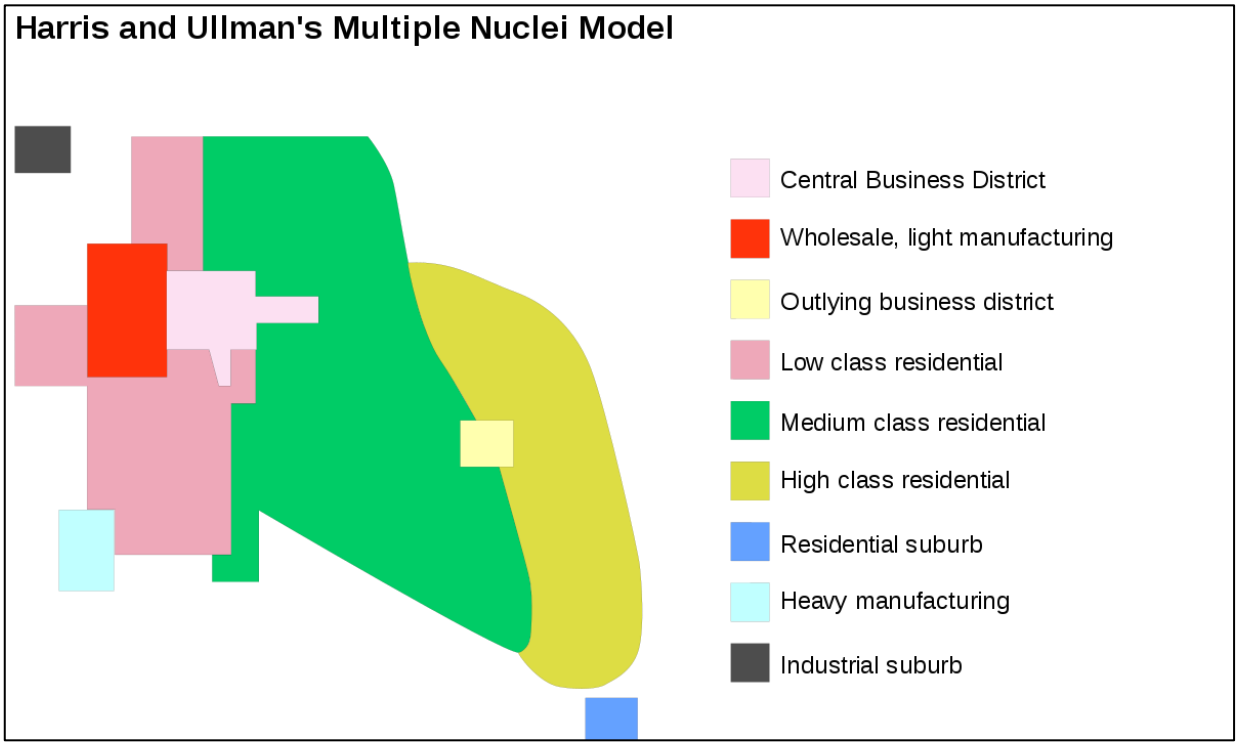
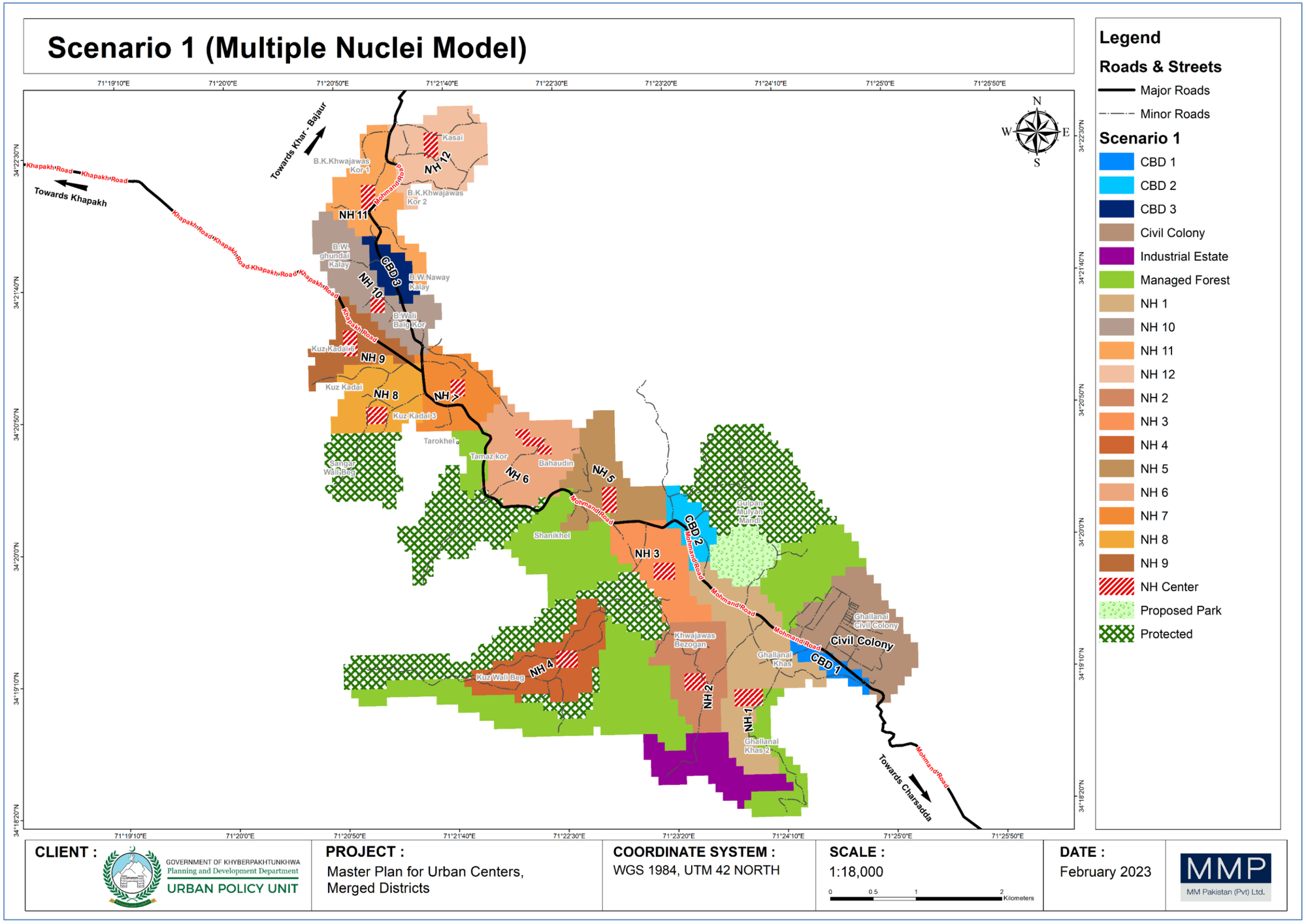


Figure 3-1: Multiple Nuclei Theory



Map 3-1: Scenario Based on Multiple Nuclei Model for Ghalanai Urban Centre

3.7.2. Linear Dynapolis Model

The Dynapolis model is a concept of urban planning that emphasizes the idea of a continuously expanding and evolving city. It seeks to avoid the congestion and monumentality of traditional city centers by promoting the development of a central axis, or spine, along which both commercial and residential districts can grow and expand. This model also advocates for the functional separation of land uses, with industrial areas located on the periphery of the city and residential and commercial areas located closer to the center.

The Dynapolis model envisions a city that is able to adapt and change over time rather than being fixed and static. It suggests that cities should be designed in a way that allows for the growth and establishment of new centers and communities rather than being restricted to a single, preexisting core. This model is characterized by a parabolic settlement pattern, with the central spine serving as the main artery of the city and smaller communities organized in a hierarchy around it.

The Dynapolis model represents an alternative to the traditional model of urban planning, which often emphasizes the centralization of commercial and administrative functions in a single, fixed CBD. It suggests that cities can be more dynamic and flexible in their growth and development and that this can be achieved through careful planning and design.

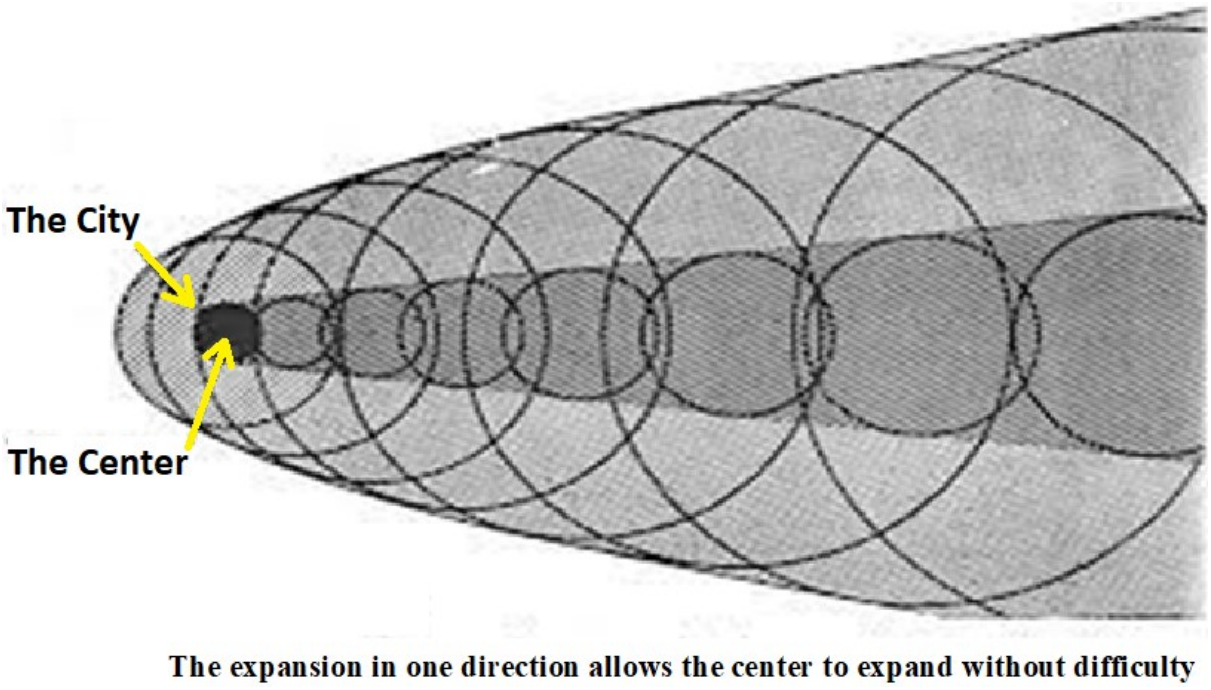
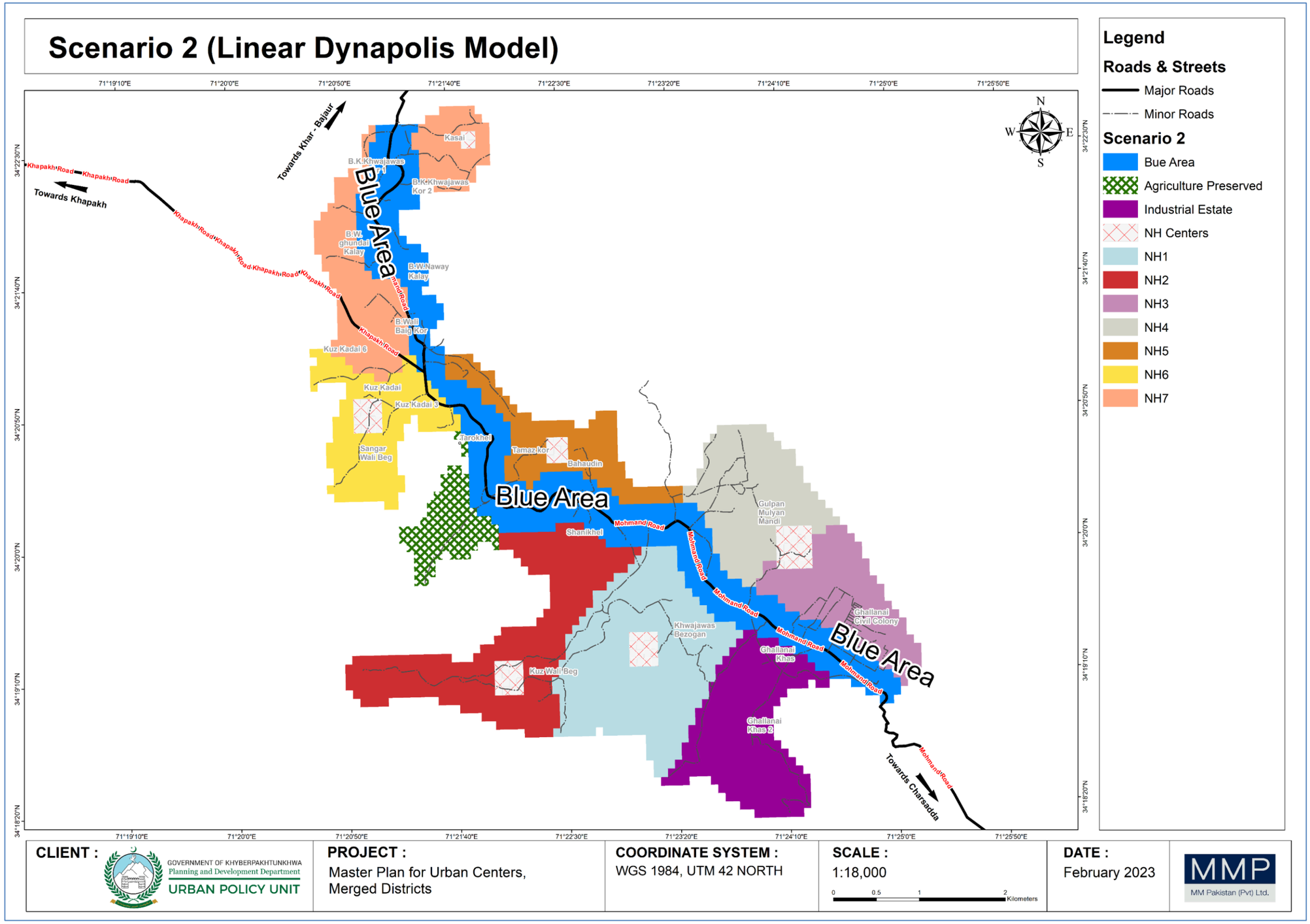


Figure 3-2: Dynapolis city model

Source: Doxiadis, C. A., 1960a. Islamabad program and plan- DOX-PA 88. Volume1.



Map 3-2: Scenario Based on Linear Dynapolis Model for Ghalanai Urban Centre

3.8. Comparison of Scenarios and Development of Master Plan

The evaluation of future land use options for the Ghalanai master plan has taken into consideration the two models of urban land use: multiple nuclei and linear Dynapolis development. These models were analyzed in relation to the local urban topography of Ghalanai and the current growth patterns and distribution of land use within the urban center.

The multiple nuclei model suggests that urban development should occur in a dispersed manner, with multiple centers of growth rather than one centralized hub. This approach takes into account the existing growth patterns within Ghalanai and allows for a more balanced distribution of land use and development.

The Linear Dynapolis model, on the other hand, advocates for a more concentrated development along a single, linear corridor. This model is suitable for areas with a strong transportation infrastructure and a need for efficient movement of goods and people.

Ultimately, the decision on which model to adopt will depend on the specific needs and goals of the Ghalanai urban center. Both models have their own strengths and drawbacks, and it will be important to carefully consider the local context and potential impacts on the community before making a decision. Ultimately, the goal is to create a sustainable and livable urban environment that meets the needs of the community and supports the long-term growth and development of Ghalanai.

Here are a few reasons why the Linear Dynapolis model may not have been the most suitable approach for the future development of Ghalanai:

i) **Size and scale**: The Linear Dynapolis model is typically more suitable for larger, more densely populated cities, as it relies on a single main road or axis to anchor commercial and other urban activities. This model may not be as practical or feasible in a smaller urban center with hilly landscape and narrow valleys such as Ghalanai, where the population and urban activities are more dispersed rather than concentrated.

ii) **Transportation and land use**: The Linear Dynapolis model can also be less efficient in terms of land use and transportation, as it concentrates all commercial and other urban activities along a single main road or axis. This can lead to increased traffic congestion and longer commutes for residents, which may not be desirable in a smaller urban center like Ghalanai.

iii) **Inclusive growth**: Finally, the Linear Dynapolis model may not be as effective at promoting inclusive and equitable growth as the Multiple Nuclei model. By concentrating all economic opportunities and amenities along a single main road or axis, this model can leave certain **areas** of the city underserved or disadvantaged. This may not be as much of a concern in a larger, more established city like Islamabad, but it could be a more significant issue in smaller urban centers similar to Ghalanai.

3.9. Rationale for Selected Scenario

The Multiple Nuclei model is the most suitable approach for the future development of Ghalanai. This model recognizes that urban activities and development in smaller urban centers may not be concentrated along a single main road or in a single business district (CBD) but rather may be dispersed throughout the urban center in the form of multiple centers or nuclei.

The Multiple Nuclei model is deemed a more appropriate fit for Ghalanai based on the following factors. The model allows for more efficient land use and transportation. By decentralizing commercial and other urban activities throughout the city, rather than concentrating them in a single CBD, the Multiple Nuclei model can reduce the need for long commutes and ease traffic congestion. This is particularly relevant in the case of Ghalanai, where the current pattern of commercial development is not predominantly along the main road but rather dispersed in multiple locations throughout the urban center, such as Ghalanai Bazar, Mian Mandi, and Chanda Bazar.

In addition to the practical benefits of decentralized growth, the Multiple Nuclei model also has the potential to promote more equitable and inclusive development in Ghalanai. By allowing for the development of multiple centers or nuclei throughout the city, this model can help to spread economic opportunities and amenities more evenly rather than concentrating them in a single central location. This can help to ensure that all residents of Ghalanai have access to the resources and services they need, regardless of their location within the city.

The proposed scenario will ensure the sustainable growth of the urban center Ghalanai and will contribute to the following factors after implementation:

Decentralized growth and development:

The Multiple Nuclei model is a unique approach that spreads urban development and activities across several centers instead of just one central location. This helps create a more balanced distribution of economic benefits and amenities throughout the city.

Efficient land use and transportation:

The Multiple Nuclei model aims to alleviate traffic and reduce long commutes by dispersing urban activities, including commercial ones, across various centers. This approach is especially useful in a hilly landscape similar to the Ghalanai Urban Center, where having just one central business district may not be possible or feasible due to topographical constraints.

Inclusive and equitable growth:

The dispersal of economic opportunities and amenities across multiple centers instead of just one central location helps ensure that all residents have equal access to resources and services, regardless of where they live. This can help to foster a more diverse and vibrant community, with economic growth and prosperity benefiting all members of society.

Flexibility and adaptability:

The Multiple Nuclei model offers a versatile approach to urban development that prioritizes decentralization and equitable growth. This approach is especially advantageous for the urban center of Ghalanai as it is able to adapt to evolving needs and advance inclusive economic opportunities for all residents.

4. Final Master Plan of Ghalanai Urban Center

The preparation of a comprehensive master plan is critical in guiding and shaping the future growth and development of an Urban Center like Ghalanai. The plan serves as a roadmap for the Urban Center's future, outlining the key goals and objectives for its physical, social, and economic development and providing a clear vision for how it should evolve over time.

The Master Plan is the result of an in-depth analysis of the current and projected needs of the urban center, considering factors such as population growth, land use patterns, economic development, and infrastructure requirements. Its aim is to guide the sustainable and efficient future development of the urban center while meeting the current population's needs and those of future generations.

The plan is based on the principles of smart growth, multiple nuclei theory, and self-sustaining neighborhoods, offering a comprehensive and integrated approach to development in the Ghalanai Urban Center. Finally, a proposed master plan map is presented, illustrating the plan's key components, along with sector-wise proposals for the Urban Center's development.

4.1. Salient Features of Master Plan

The suitability maps results have been used to prepare the zoning plan for Ghalanai Urban Center. It has been ensured that the proposed land uses are allocated in the land parcels which are falling in highly suitable areas for each respective land use. The proposed land use plan of Ghalanai Urban Center has been prepared by keeping in view the following principles:

I. The existing vacant areas inside continuous built-up areas are to be developed first as ‘infill development’.
II. The future residential area will be provided in the form of planned, sustainable, and self-sufficient neighborhoods. The existing houses will be adjusted in the housing areas, which will be a constituent part of the planned neighborhoods.
III. The existing slum areas will be improved through a slum improvement plan involving a package of street pavement, water supply, and sewerage schemes, street alignment, and the provision of missing public facilities and open spaces.
IV. The public facilities such as education, health, and entertainment facilities will be distributed in future areas according to their need as per their catchment areas.
V. Parks and Playgrounds are distributed in the neighborhoods and the whole Urban Center according to their hierarchical distribution order.
VI. Two new Central Business Districts are provided according to the Multiple Nuclei concept of planning. These CBDs are intended to have commercial, administrative, and mix-uses development.
VII. The Neighborhood Centers are provided near the geographical centers of neighborhood units, according to the self-sufficient neighborhood concept of planning so that people do not have to travel long distances to meet their daily necessities and other needs. Thus, travel time to the CBD, petrol consumption and travel cost will be reduced considerably.
VIII. An industrial estate is developed on the leeward side of urban center’s southeastern corner, to provide job opportunities to the local population as well as to promote industrial investment in order to boost up economic development of the Ghalanai Urban Center.

4.2 Sector-wise Proposals

The final master plan for Ghalanai Urban Center has sector-specific proposals that address the unique needs and demands of each sector, including land use and social development. These proposals were created using the National Reference Manual standards and guidelines and relevant policies such as health, housing, transportation, environment, and economic development.

The proposals aim to provide all sectors with the necessary resources and infrastructure to meet their needs while addressing their unique challenges. By incorporating various policies, the master plan ensures comprehensive and holistic development for the community, including access to healthcare, education, transportation, employment, and investment opportunities in the urban center

Table 4-1: List of Sector-Specific Action Plan

Action Plan for Land Management	Action Plan for Future Housing of All Income Group	Slum Identification and Up gradation
Action Plan for Health Facilities	Action Plan for Education Facilities	Action Plan for Quality of Life
Action Plan for WATSAN & Solid Waste Management (SWM)	Action Plan for Transportation, Traffic Management and Parking	Action Plan for Municipal Services
Action Plan for Disaster Risk Reduction	Action Plan for Economic Development	Action Plan for Tourism, Heritage & Conservation Development
Action Plan Environmental of Protection-Ghalanai	Action Plan for Rural- Urban Fringe and Regional Development	Action Plan for Commercialization, Industrialization, and Investment Attraction
Action Plan for Safety & Security-Ghalanai	Action Plan for Institutional Development Framework Implementing Master Plan	Action Plan for Behavior Change & Communication

4.2. Proposed Scenario Development of Ghalanai Urban Center

The Ghalanai Urban Centre comprises five primary settlements—NC Ghalanai, NC Durba Khel 1, NC Durba Khel 2, VC Kuz Kadai Khel 1, and VC Kuz Kadai Khel 2—forming the core of the project area. These zones collectively define the current and future urban footprint of Ghalanai and have been strategically selected for phase-wise urbanization under the Master Plan.

To ensure balanced and sustainable growth, a phased development approach has been adopted through sectoral action plans. Short-term interventions will focus on NC Ghalanai and NC Durba Khel 1, where immediate infrastructure upgrades and service delivery improvements are required. The medium-term phase will prioritize NC Durba Khel 2 and VC Kuz Kadai Khel 1, with plans for residential consolidation and civic facility expansion. Long-term development is proposed for VC Kuz Kadai Khel 2, aligning with future population growth and infrastructure demand.

This phased implementation strategy aims to guide orderly urban expansion, enhance service coverage, and establish Ghalanai as a well-connected, inclusive, and sustainable urban center.

Interventions	Local Government/NV VC
Short Term	NC Ghalanai , Durbakhel 1
Medium Term	NC Durba Khel 2
Long Term	VC Kuz Kadai Khel 1, Kuz Kadai Khel 2,

4.3. Zoning and Land Management

The infilling, intensification, and redevelopment zones are intended to be implemented in the initial stage of the master planning process by following the process of infilling, densification zones (where higher density have been proposed) and reconstruction of dilapidated housing units. Furthermore, the implementation of the proposed master plan will follow the prescribed land use and zoning regulations outlined in the section 4.20 provides a comprehensive set of regulations, specifying permissible, permitted, and prohibited land uses based on different zones. This detailed framework aims to ensure the compatibility and incompatibility.

4.3.1. Housing Need assessment

According to the 2017 census report, the housing backlog in the Ghalanai Urban Center has been calculated by dividing the overall population by an assumed household size of 8. This means that one housing unit is ideally required per household in order to meet future demand for housing. Currently, the Ghalanai Urban Center has a total of 2826 housing units, while a backlog of 1226 units is projected for 2022. Additionally, 1021 of the existing housing units are in need of reconstruction due to their poor condition, and 122 dangerous buildings were identified during the master plan survey. These factors indicate that housing demand is likely to more than double over the next 20 years. In order to accommodate the year-on-year growth in population, an additional 3911 housing units will be required for the plan period 2022 to 2040, beyond the current stock of 2826 residential units.

4-2: Existing Housing Units in Ghalanai Urban Centre, 2022-2040

Year	*Household Size*	*Population*	*Housing Units*
2017	8	28,241	2826
2022	8	32,422	4,053

The total housing demand from 2022 to 2040 incorporates the current housing backlog calculated in the table above, the dilapidated buildings identified in the survey, i.e., 122 dangerous buildings, and the additional units calculated in the plan period by considering the HH size of 8.00. Hence, the total Housing Demand for the Ghalanai Urban Center till plan horizon year 2040 is 5,259 units.

4-3: Future Housing Needs, Ghalanai Urban Centre, 2022-2040

Additional Population (2022-2040)	*Household Size*	*Additional Units Required (2022-2040)*	*Current Housing Backlog (2022)*	*Dilapidated Units (2022)*	*Total Housing Demand (2022-2040)*
31,280	8	3,910	1,227	122	**5,259**

4.3.2. Infilling, Intensification, and Redevelopment

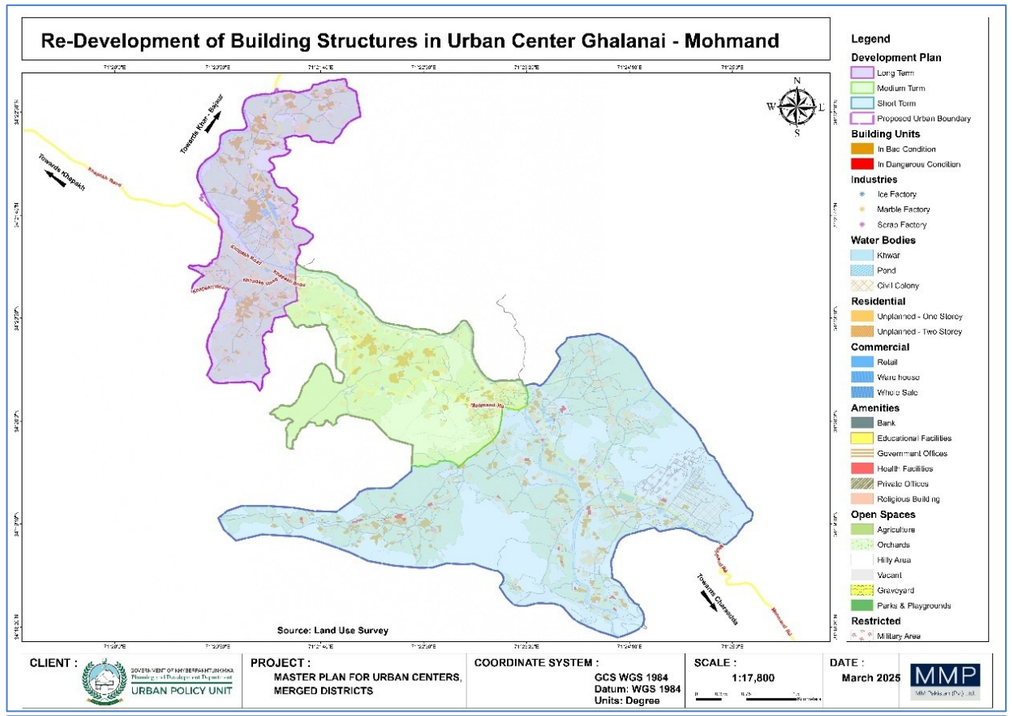
Infilling, intensification, and redevelopment are critical strategies in the implementation of urban master plans as they can revitalize and rejuvenate existing urban areas, increase density and resource efficiency, attract new investment and residents, and promote sustainability and alternative transportation.

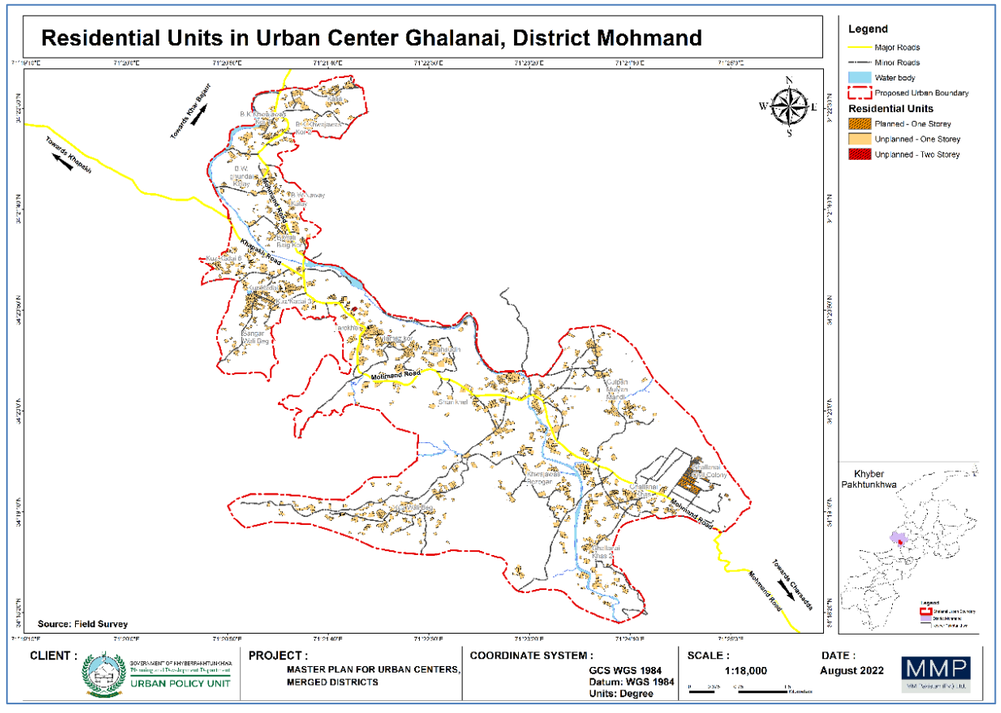
4.3.2.1. Infill Development

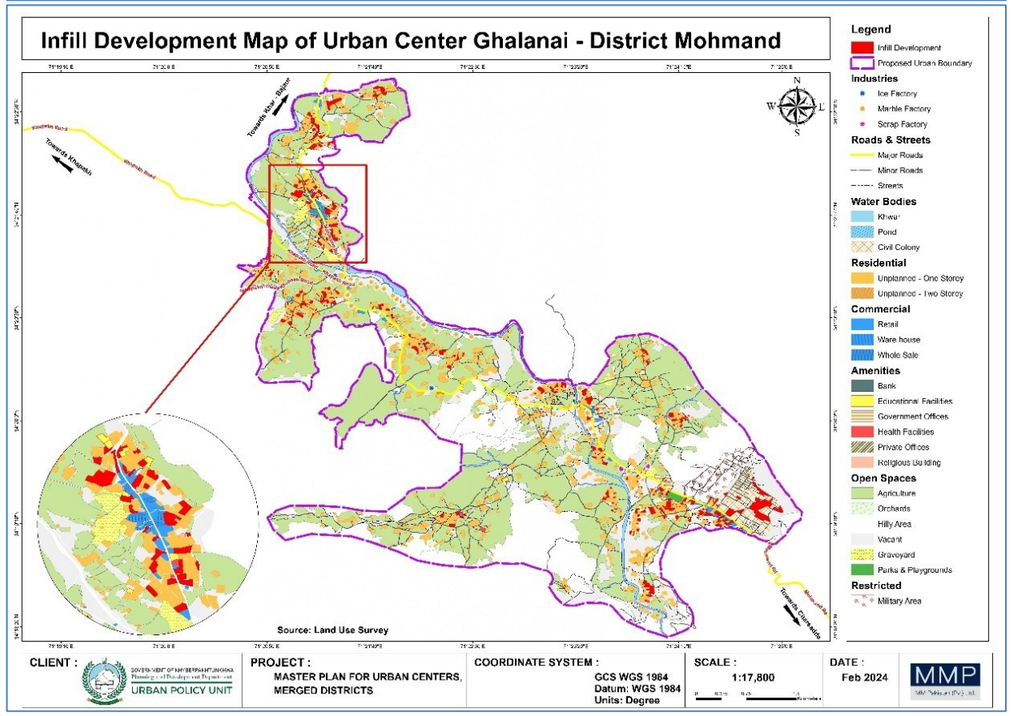
The infill development will be encouraged in the proposed master plan so that compact urban development can be achieved by filling the vacant land parcels on priority bases to encourage service delivery and allied infrastructure in an integrated manner. It is estimated 57 acres of land will be infilled development, which will aim to appeal to the local landscape and adhere to the proposed building codes. This approach to residential development will create a mix of income groups and promote social cohesion. Studies have shown that well-planned infill development can lead to increased property values, improved public health outcomes, and reduced greenhouse gas emissions. For example, one study found that infill development in urban areas can reduce per capita GHG emissions by up to 23% compared to suburban development[1]. Additionally, research has shown that well-designed infill projects can increase nearby property values by as much as 20%.[2]

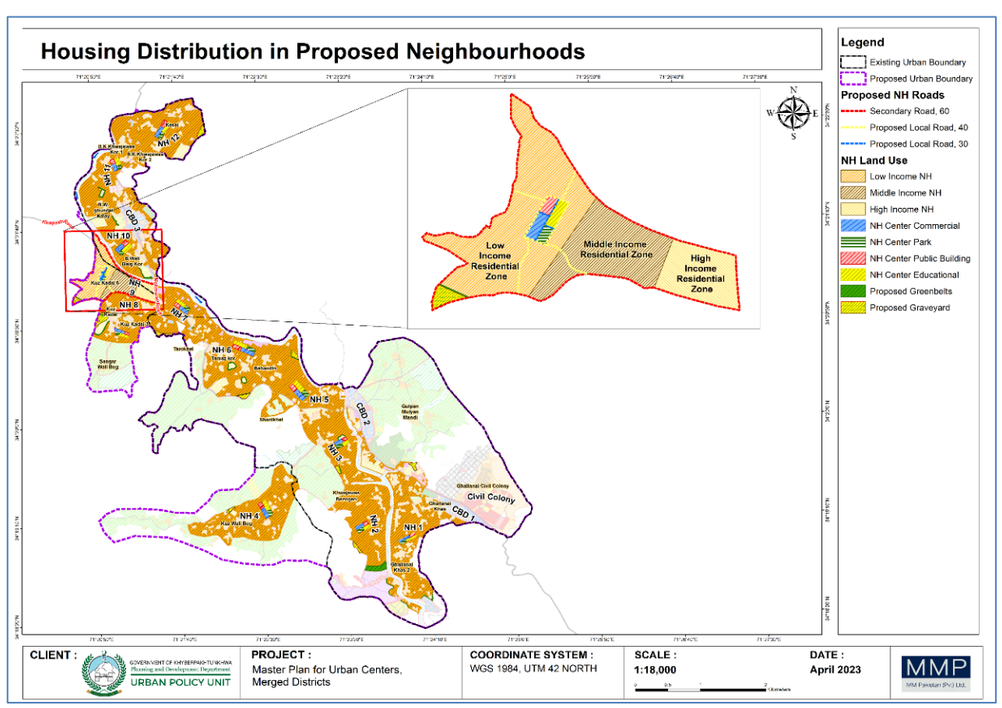
The total area of infill parcels is 57 acres, out of which 46 acres (equivalent to 80.9% of the total area) are allocated for the proposed residential neighborhood, while the proposed Central Business District (CBD) would occupy 10.65 acres, representing 18.7% of the land. Additionally, there are small patches of land, measuring 0.09 acre (0.16%), 0.09 acre (0.16%), and 0.07 acre (0.15%), respectively, which are intended for use in proposed **public** buildings, educational facilities, and managed forest.

[1] The Role of Compact Development in reducing Greenhouse Gas Emissions (EPA)
[2] Infill Development: Increasing Housing Supply and Improving Neighborhoods









Map 4-1: Housing strategies in Ghalanai, District Mohmand

4.3.2.2. Redevelopment/Reconstruction

In particular, the redevelopment of existing dangerous and poorly-conditioned buildings are a priority, as it can improve the safety and livability of the community. In accordance with the master plan's project area, there are 122 dangerous buildings and 1022 buildings in poor condition that can be redeveloped according to the proposed land use at the neighborhood level. The reconstruction of these structures should adhere to the building bylaws of the TMA, and the use of local materials and natural resources should be encouraged to create a balanced and sustainable urban center.

4.3.3. Proposed Residential Development in the form of Neighborhood

According to the projected population of the existing settlements, it became apparent that the required area for housing was 272 acres, with an additional 163 acres for infrastructure. However, in consideration of the whole urban center and its remaining settlements, the consultant has proposed 12 neighborhoods on all the settlements by engulfing the existing residential and proposed housing for different income groups, i.e., low, middle, and high income, covering an area of 1062.40 acres. This proposed residential area of 20.8% of the total area of the urban center and is in accordance with NRM standards for this level of the city.

The proposed approach for addressing the housing needs of the Ghalanai Urban Center involves the development of self-sustaining neighborhoods within the existing localities, in line with the scenario selected through MCA analysis. This involved allocation of 12 neighborhoods in the urban center, each of which will be served by a neighborhood center with commercial zones, educational facilities, health centers, parks, and other associative facilities. This will allow residents to access their daily needs within a short distance, enhancing the walkability and livability of the neighborhood centers. The proposed development will provide residents with convenient access to a range of amenities and services, improving the overall quality of life in the Ghalanai Urban Center. The future residential area has been proposed to e developed in the form of 12 self-sufficient neighborhood units.

4.3.3.1. Phase-Wise Interventions of Residential Development

- **Short Term**

The Master Plan proposes 12 Neighborhoods to accommodate Ghalanai’s future urban population. These areas will be developed in phases—short, medium, and long term—guiding stakeholders in planning and land acquisition. Neighborhoods 1, 2, and 3 are prioritized for immediate development, offering low-, medium-, and high-income housing. Strategically located near CBD 1 and CBD 2, they benefit from existing development and major road access.

- **Medium Term**

In medium term, the efforts will be made to develop vacant properties to alleviate immediate housing needs. In this phase, Neighborhoods 5, 6, 7, 10, 11, and 12 will be opened for residential development. These areas fall within the jurisdiction of neighborhood councils, aligning with the plan’s approach to prioritize development within urban limits before expanding to village councils

- **Long Term**

In the long-term housing plan, Neighborhoods 4, 8, and 9—located within village councils—will be opened for residential development. This strategy promotes balanced urban expansion and fosters inclusive, self-sustaining communities. It supports the city's harmonious and sustainable growth.

4.3.3.2. Proposed Neighborhood Land Use

Neighborhoods are proposed for catering to the housing demand as well as creating neighborhood centers to provide infrastructure at the neighborhood level. The proposed residential areas in the form of neighborhoods also contain existing land use of built-up areas. The total neighborhood area spans 2210 acres, of which a cumulative area of 1050.7 acres has been allocated for future residential development, including the provision of streets and allied facilities at the neighborhood level. The detail land use of each neighborhood is as under:

Table 4-4: Existing and Proposed Land Use in Urban Center Ghalanai

Neighbourhoods		Population	Housing Units	Land Use	Area
NH 1	Existing	3658	457	Commercial	0.03
				Educational	4.28
				Graveyard	5.70
				Industrial	1.20
				Public Building	6.00
				Recreational	5.84
				Religious Building	3.11
				Residential	67.18
				Streets/Roads	18.96
	Proposed	4535	566	Proposed Residential	110.84
				Proposed NH Commercial	2.25
				Proposed NH Park	1.07
				Proposed NH Public Buildings	1.11
				Proposed NH School	1.88
				Proposed NH Graveyard	1.94
				Proposed Streets / Roads	48.59
NH 1 Total		**8193**	**1023**		**279.97**
NH 2	Existing	772	97	Educational	0.24
				Religious Building	0.43
				Residential	17.96
				Streets/Roads	6.79
	Proposed	4025	503	Proposed Residential	100.62
				Proposed NH Commercial	1.89
				Proposed NH Park	1.46
				Proposed NH Public Buildings	0.95
				Proposed NH School	1.54
				Proposed NH Graveyard	1.85
				Proposed Streets / Roads	42.12
NH 2 Total		**4797**	**600**		**175.86**
NH 3	Existing	1840	230	Commercial	1.57
				Educational	1.14
				Graveyard	1.81
				Health	0.20
				Industrial	4.17
				Public Building	0.00
				Religious Building	0.83
				Residential	39.14
				Streets/Roads	9.72
	Proposed	3252	407	Proposed Residential	81.30
				Proposed NH Commercial	1.89
				Proposed NH Park	1.87
				Proposed NH Public Buildings	0.95
				Proposed NH School	1.54
				Proposed High + Higher Secondary School	6.79
				Proposed NH Graveyard	1.51
				Proposed Streets / Roads	33.84
NH 3 Total		**5092**	**637**		**188.28**
NH 4	Existing	2454	307	Commercial	0.46
				Educational	2.07

Neighbourhoods		Population	Housing Units	Land Use	Area
				Graveyard	1.60
				Health	0.91
				Religious Building	0.82
				Residential	38.96
				Streets/Roads	14.45
	Proposed	4185	523	Proposed Residential	104.62
				Proposed NH Commercial	2.67
				Proposed NH Park	1.52
				Proposed NH Public Buildings	1.45
				Proposed NH School	2.64
				Proposed NH Graveyard	1.38
				Proposed Streets / Roads	43.84
NH 4 Total		**6639**	**830**		**217.40**
NH 5	Existing	1159	145	Commercial	0.22
				Educational	0.65
				Industrial	0.27
				Public Building	0.04
				Religious Building	2.56
				Residential	24.96
				Streets/Roads	10.40
	Proposed	3680	460	Proposed Residential	83.84
				Proposed NH Commercial	3.88
				Proposed NH Park	3.23
				Proposed NH Public Buildings	2.30
				Proposed NH School	4.16
				Proposed NH Graveyard	2.02
				Proposed Streets / Roads	38.43
NH 5 Total		**4839**	**605**		**176.97**
NH 6	Existing	3067	383	Commercial	0.25
				Graveyard	3.37
				Industrial	7.37
				Religious Building	0.29
				Residential	50.57
				Streets/Roads	8.56
	Proposed	3573	447	Proposed Residential	89.34
				Proposed NH Commercial	3.10
				Proposed NH Park	3.92
				Proposed NH Public Buildings	1.93
				Proposed NH School	2.89
				Proposed High + Higher Secondary School	9.49
				Proposed NH Graveyard	2.37
				Proposed Streets / Roads	37.29
NH 6 Total		**6641**	**830**		**220.72**
NH 7	Existing	897	112	Commercial	3.57
				Educational	1.06
				Graveyard	0.22
				Industrial	7.86
				Public Building	0.14
				Religious Building	1.24
				Residential	17.40
				Streets/Roads	5.41
	Proposed	2462	308	Proposed Residential	61.54
				Proposed NH Commercial	2.12
				Proposed NH Park	1.28
				Proposed NH Public Buildings	1.26
				Proposed NH School	2.05
				Proposed NH Graveyard	3.62
				Proposed Streets / Roads	26.37
NH 7 Total		**3359**	**420**		**135.14**
NH 8	Existing	3272	409	Commercial	0.09
				Educational	0.33
				Graveyard	6.04
				Religious Building	0.36

Neighbourhoods		Population	Housing Units	Land Use	Area
				Proposed Reserved Agriculture	0.00
				Residential	37.60
				Streets/Roads	5.29
				Water Bodies	0.75
	Proposed	2188	274	Proposed Residential	54.70
				Proposed NH Commercial	1.76
				Proposed NH Park	2.21
				Proposed NH Public Buildings	0.69
				Proposed NH School	1.61
				Proposed NH Graveyard	5.12
				Proposed Streets / Roads	23.44
NH 8 Total		**5460**	**683**		**140.00**
NH 9	Existing	1727	216	Commercial	2.77
				Educational	0.25
				Industrial	0.75
				Public Building	0.04
				Religious Building	0.17
				Residential	27.97
				Streets/Roads	6.52
	Proposed	2523	315	Proposed Residential	63.08
				Proposed NH Commercial	1.75
				Proposed NH Park	1.29
				Proposed NH Public Buildings	1.18
				Proposed NH School	1.75
				Proposed NH Graveyard	2.27
				Proposed Streets / Roads	27.04
NH 9 Total		**4250**	**531**		**136.85**
NH 10	Existing	1613	202	Commercial	2.08
				Educational	0.99
				Graveyard	18.85
				Health	0.41
				Industrial	0.57
				Public Building	0.12
				Religious Building	0.21
				Residential	32.27
				Streets/Roads	7.96
	Proposed	3317	415	Proposed Residential	82.92
				Proposed NH Commercial	2.64
				Proposed NH Park	3.16
				Proposed NH Public Buildings	1.38
				Proposed NH School	2.81
				Proposed High + Higher Secondary School	9.75
				Proposed Streets / Roads	35.54
NH 10 Total		**4930**	**616**		**201.65**
NH 11	Existing	1931	241	Commercial	1.13
				Educational	2.86
				Graveyard	0.56
				Health	0.78
				Public Building	0.33
				Religious Building	0.79
				Residential	35.32
				Streets/Roads	10.07
	Proposed	2497	312	Proposed Residential	62.41
				Proposed NH Commercial	1.90
				Proposed NH Park	1.51
				Proposed NH Public Buildings	1.13
				Proposed NH School	1.97
				Proposed NH Graveyard	0.42
				Proposed Streets / Roads	26.75
NH 11 Total		**4428**	**554**		**147.92**
NH 12	Existing	1181	148	Commercial	1.26
				Educational	0.62
				Health	0.15

Neighbourhoods		Population	Housing Units	Land Use	Area
				Religious Building	0.21
				Residential	30.22
				Streets/Roads	9.59
	Proposed	3522	440	Proposed Residential	88.04
				Proposed NH Commercial	2.62
				Proposed NH Park	1.63
				Proposed NH Public Buildings	1.65
				Proposed NH School	2.53
				Proposed High + Higher Secondary School	10.02
				Proposed NH Graveyard	3.55
				Proposed Streets / Roads	37.73
NH 12 Total		**4703**	**588**		**189.83**
Grand Total		**58628**	**7915**		**2210.58**

Source: Consultant Analysis

The proposed housing strategy incorporates specific approaches for the development of new housing areas in the form of neighborhood units, up-gradation, and densification through the redevelopment of existing housing areas including unplanned settlements, and housing in the farm housing areas located in the agricultural areas preserved in the Ghalanai Urban Centre. Looking at the possible distribution of housing types, the future requirement of housing provision will be dominated by small dwelling units. Because of the limited availability of land and increased requirement for housing, large-sized residential development shall be discouraged.

It is proposed to adopt a multi-pronged housing strategy for the provision of housing stock and delivery of serviced land, involving the private sector to a significant extent, government departments, etc. The overall responsibility for the provision of land and facilitation of adequate housing to meet the projected demand lies with the TMA/Local government in collaboration with Housing Department and other government agencies.

This Master Plan has been developed by keeping the following specific strategy for the residential; development.

i. Determination of area requirement;
ii. Identification of suitable areas for housing development based on LSA and scenario development;
iii. Evolving the specific land use pattern and norms for new housing development in the form of neighborhood units;
iv. Provision of integrated neighborhood units to accommodate all income groups using the gradual mixing technique as described below:

Low Income

Low land price (Out skirts of the neighbourhoods)

Near the Middle-class Housing

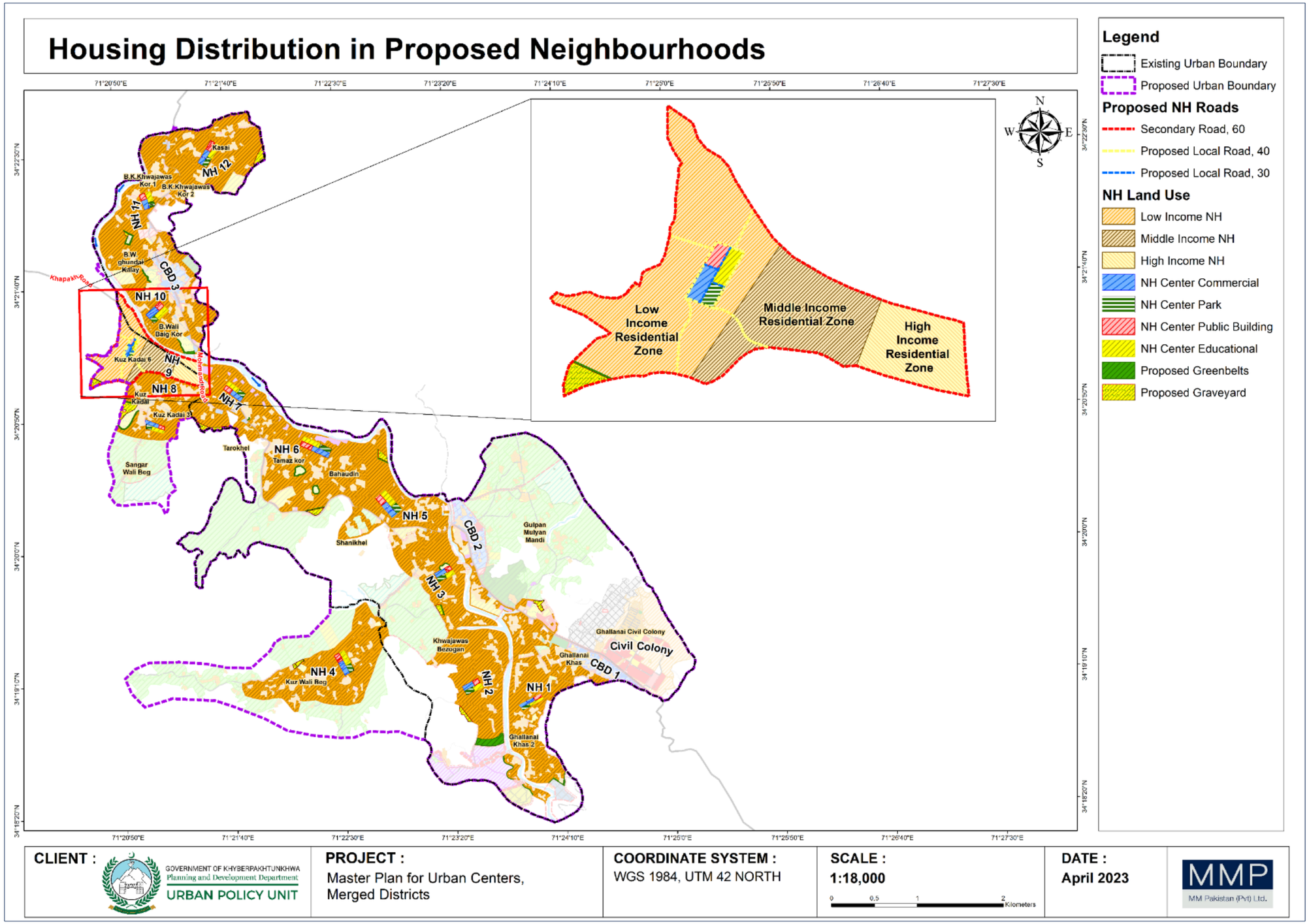
Proximity to Public Transport

Middle Income

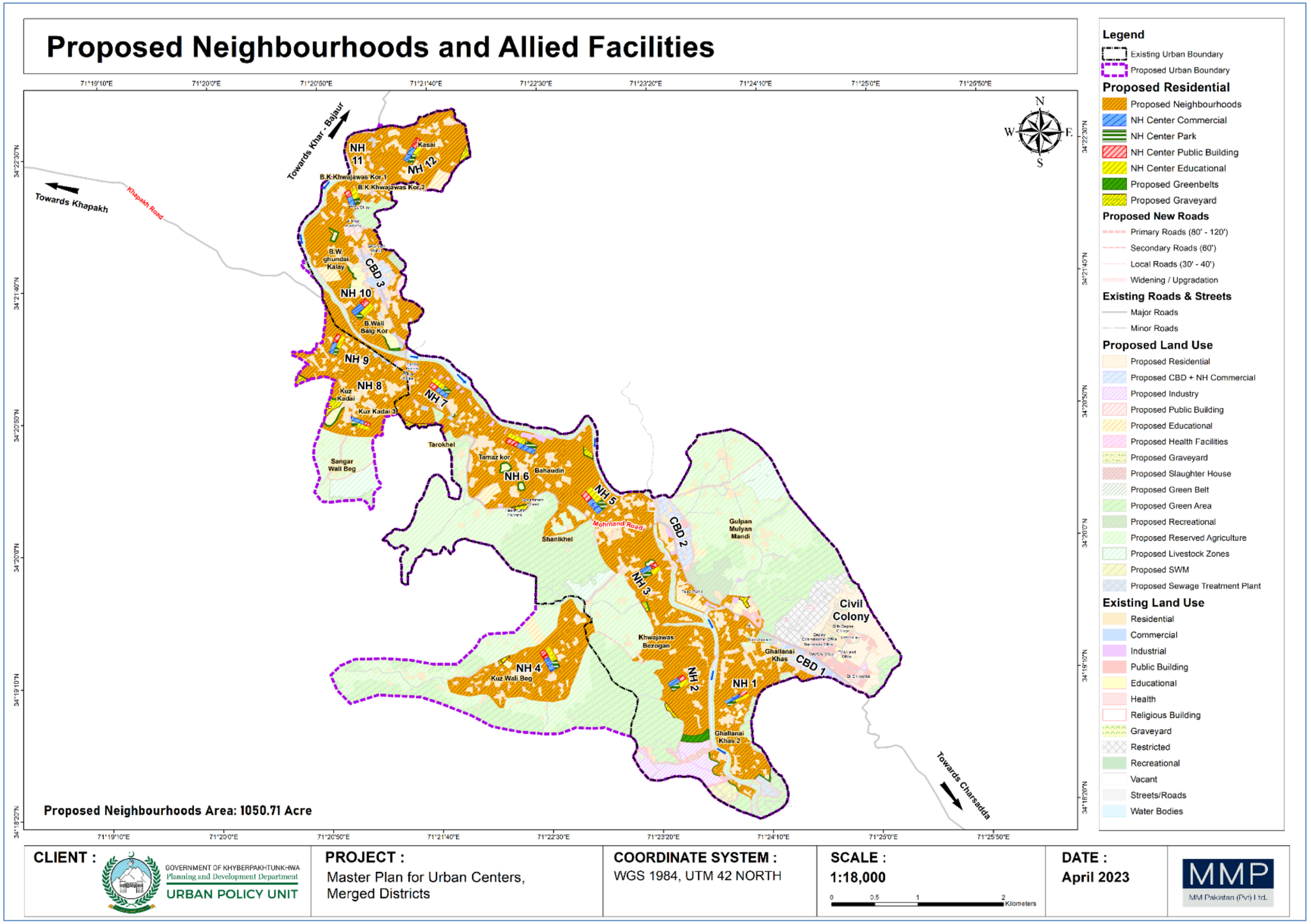
- Moderate land price
- Located in between the high- and low-income class housing
- Proximity to Public Transport

High Income

- Along the main / arterial roads to facilitate high car-ownership rate
- Proximity to community Centers/clubs/parks
- High land price

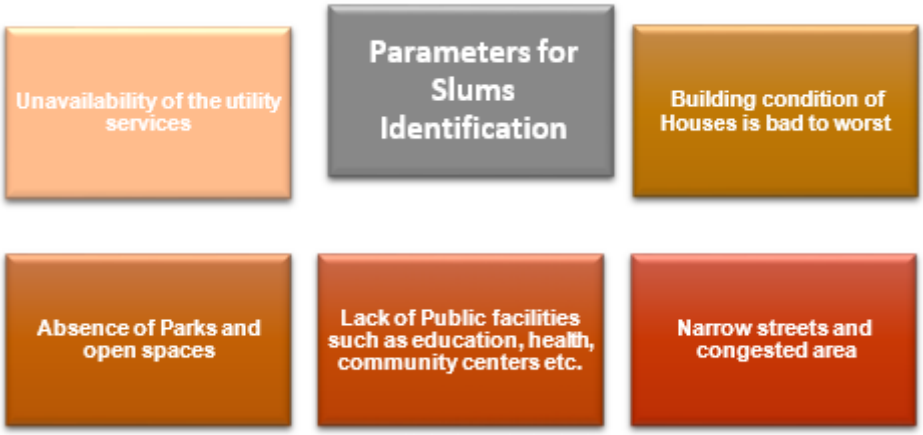


Map 4-2: Housing Distribution in Proposed Neighborhood



Map 4-3: Proposed Neighborhood Centre & Allied Facilities

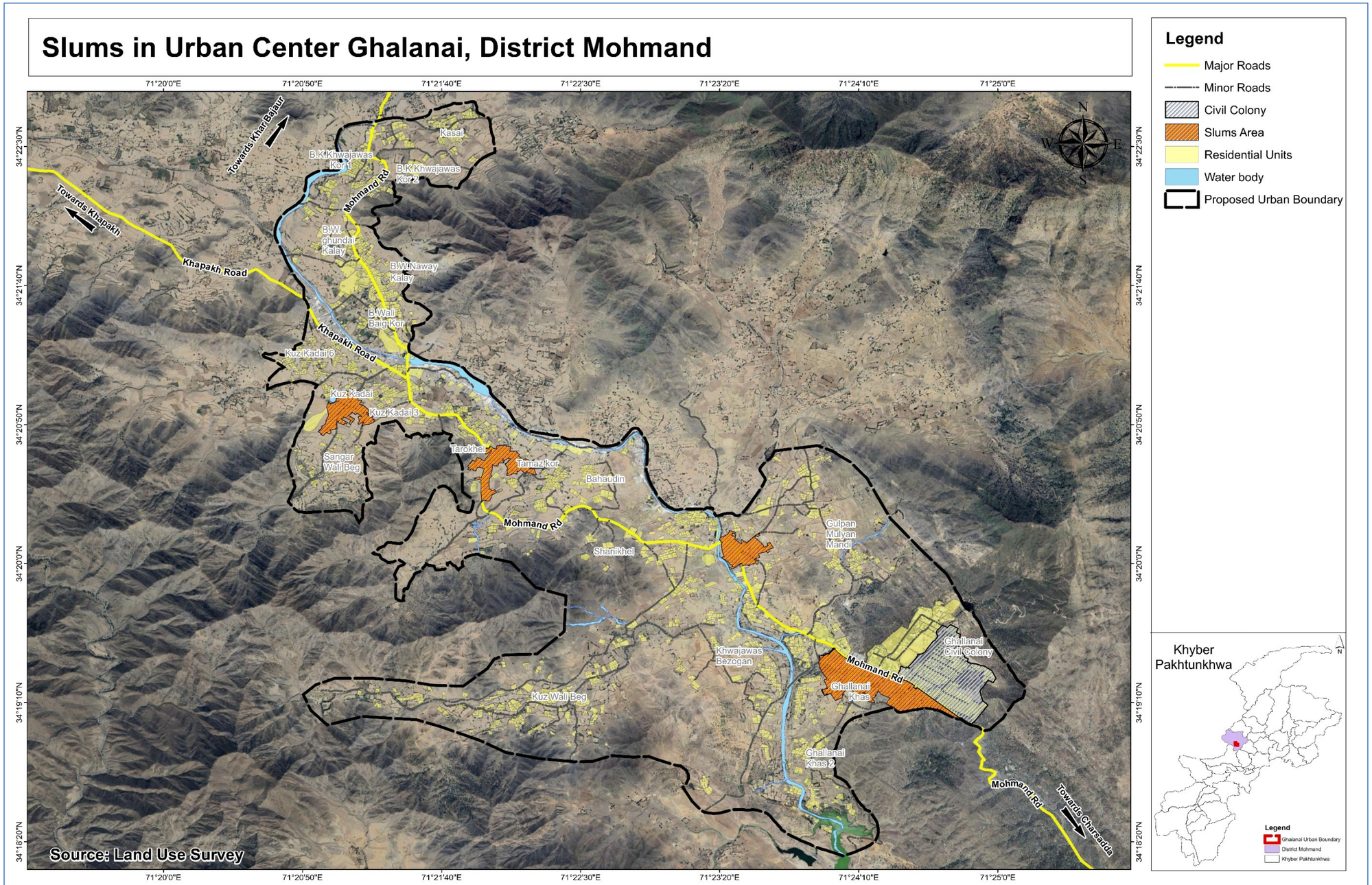
4.3.4. Slum Identification and Upgradation



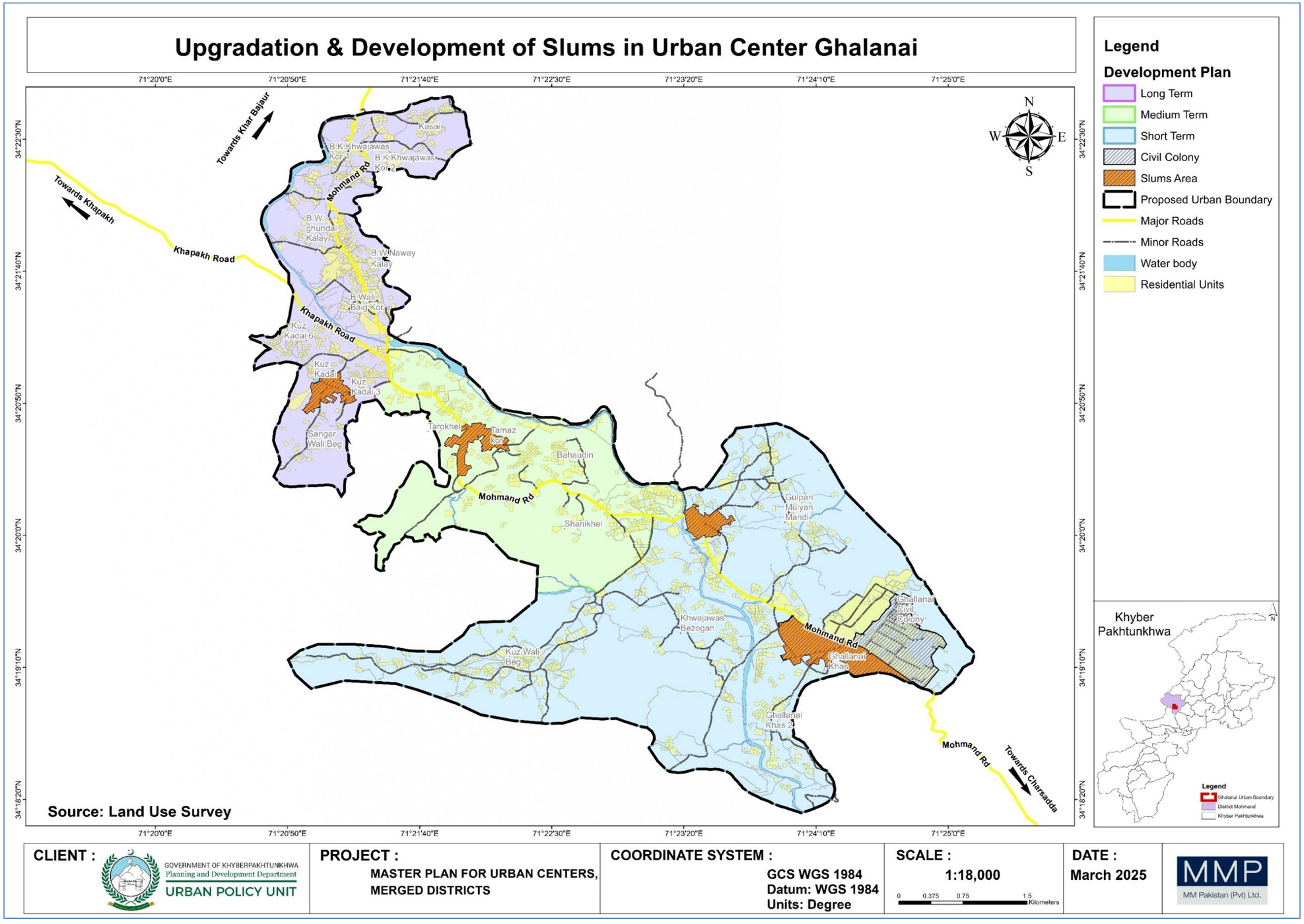
4.3.4.1. Existing Slums Areas in Ghalanai Urban Center

According to these ***parameters***, Ghalanai urban center has inadequate public facilities, and has a number of informal settlements in the city which is sprawling without any developmental plan. These settlements which have been identified in the below figure are usually the abode of the poor people who are living in very small and congested houses having, bad conditions of building and without any modern public utility services such as water supply, sewerage & drainage and solid waste management. The phase- wise interventions are as follows:

Phase-wise Interventions	***Slum Upgradation Plan***
Short-Term	*In the short term, the focus will be on upgrading the NC Ghalanai area and NC Durba Khel 2, which have been identified as high-priority zones. These areas suffer from severely inadequate public facilities and poor living conditions. Immediate actions will include upgrading essential utilities such as water supply, sewerage, and drainage systems, and implementing solid waste management services.*
Medium-Term	*For the medium term, the focus will shift to upgrading the NC Durba Khel 2 and Kuz Kadai 1 areas, which also face significant infrastructural deficiencies and poor living conditions. Similar to the short-term plan, these areas will see enhancements in essential utilities such as water supply, sewerage, and drainage systems, and the implementation of solid waste management services. The construction of permanent parks, open spaces, schools, and healthcare facilities will also be prioritized.*
Long-Term	*In the long term, the focus will be on upgrading the areas of Kuz Kadai. These regions will undergo comprehensive development to ensure sustainable improvement and integration into the urban fabric.*



Map 4-4: Identification of Slums in Urban Center Ghalanai



Map 4-5: Upgradation & Development of Slums in Urban Center Ghalanai

4.4. Proposed Commercial Development

The existing commercial area in the Ghalanai Urban Center covers a total of 37 acres and includes two main commercial areas: Ghalanai Bazar and Main Mandi Bazar. Ghalanai Bazar serves the south side of the urban center, while Main Mandi Bazar serves the north side. Both of these areas are home to retail and wholesale markets and are important centers for commercial activity in the urban center.

4.4.1. Existing Gap Analysis of Commercial Area

The current commercial area gap has been calculated as below:

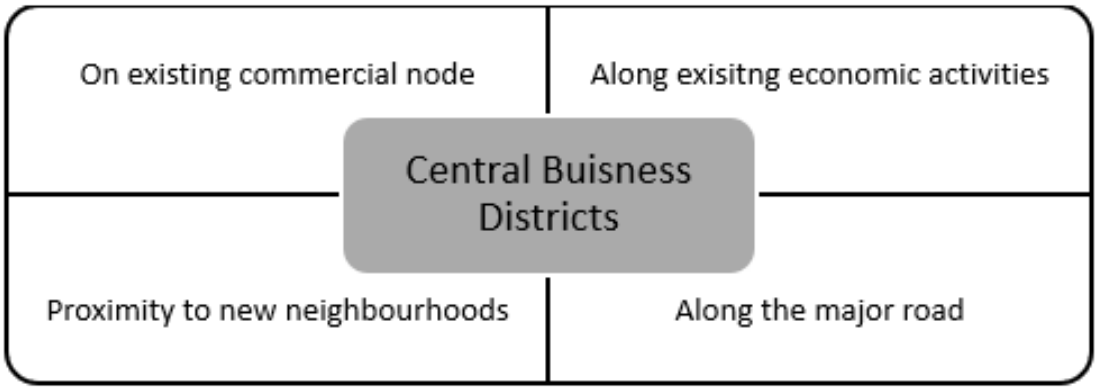
i. Urban Population (2022 projected): 32422
ii. Existing Commercial Area required (@0.5 acres/1000 persons) = 16.2 acres
iii. Current area under commercial land use: 0.15 sq. km = 37 acres
iv. Commercial area required for 2040= 40 Acres (additionally, as the population will be doubled in 2040)

Table 4-5: Commercial Area Required in Ghalanai Urban Centre

Year/Period	*Urban Population*	*Commercial Area Required @0.5 acres/1000 persons)3*
2022	**32422**	**16.2 Acres**
2040	63702	32 Acres
Additional Urban Population 2022-2040	**31280**	• **Acres**

4.4.2. Allocation Criteria for CBD & NH Center

The following four criteria have been devised for the placement of CBDs and NH center level commercial areas:



NH Center Criteria

a) Near the geographic center of the neighborhood

3 *Source: National Reference Manual on Planning and Infrastructure Standards, Page 307, Table 10.4 (adapted).*

b) Availability of Vacant land
c) Preferably at walking distance in each NH

4.4.3. Proposed Central Business Districts

In order to support the economic growth of the Ghalanai Urban Center, three central business districts (CBDs) have been proposed. These districts have been carefully allocated based on a detailed analysis utilizing both the multiple nuclei theory and the results of the MCA analysis. Where CBD 1 covers an area of 37 acres, CBD 2 covers an area of 42 acres, and CBD 3 covers an area of 36 acres. These CBDs are intended to serve as centers for administrative, civic, and commercial activities and will include facilities such as offices for the district administration and major line departments, as well as civic facilities such as museums, libraries, town halls, a grand mosque (Jamia Masjid) and event or gathering halls.

These central business districts (CBDs) will be equipped with a variety of standard commercial facilities such as shopping centers, food courts, indoor gaming areas, multiplex cinemas, and parking facilities. Additionally, there will be civic amenities provided for local residents and tourists alike, including libraries, gyms, open spaces, mosques, wedding halls, and clubs. Finally, administrative facilities will be available such as police stations, government offices, district courts, fire brigades, private offices, and other administrative services to cater to the needs of the local community and visitors.

The proposed CBD for Ghalanai is intended to provide the following additional potential uses:

i. Retail and Commercial: The CBD will feature a variety of retail and commercial establishments, including department stores, supermarkets, banks, and other businesses.
ii. Entertainment and Leisure: The CBD will have several entertainment and leisure facilities, such as movie theaters, restaurants, cafes, and parks, to provide a range of activities and attractions for visitors.
iii. Office and Business: The CBD will house a number of modern office buildings and business centers, providing space for companies of all sizes, as well as other business support services.
iv. Public services: The CBD will have several public services, like city hall, police station, fire station, and public health care centers, which will be convenient for people to access them.
v. Transportation: To ensure that the CBD is well-connected to other parts of the Urban Center, the plan calls for the development of a range of transportation options, including bus and metro stations, bike lanes, and pedestrian walkways.

These facilities will be designed to create a cohesive and integrated environment that supports the needs of the Urban Center's residents and visitors. They will be linked by a network of pedestrian-friendly streets, plazas, and parks, creating a pleasant and inviting atmosphere for all.

In addition to providing necessary services and facilities, the CBD will also act as the economic hub of the Urban Center and promote further development in the region by attracting private sector investment, tourism, and business opportunities. The proposed land use for CBDs is given as under:

Table 4-6: Proposed Land Use for CBD

S. No	Major Use	Land Use	Categories
1	**CBD**	Administrative	Police Station
2			Government Offices
3			

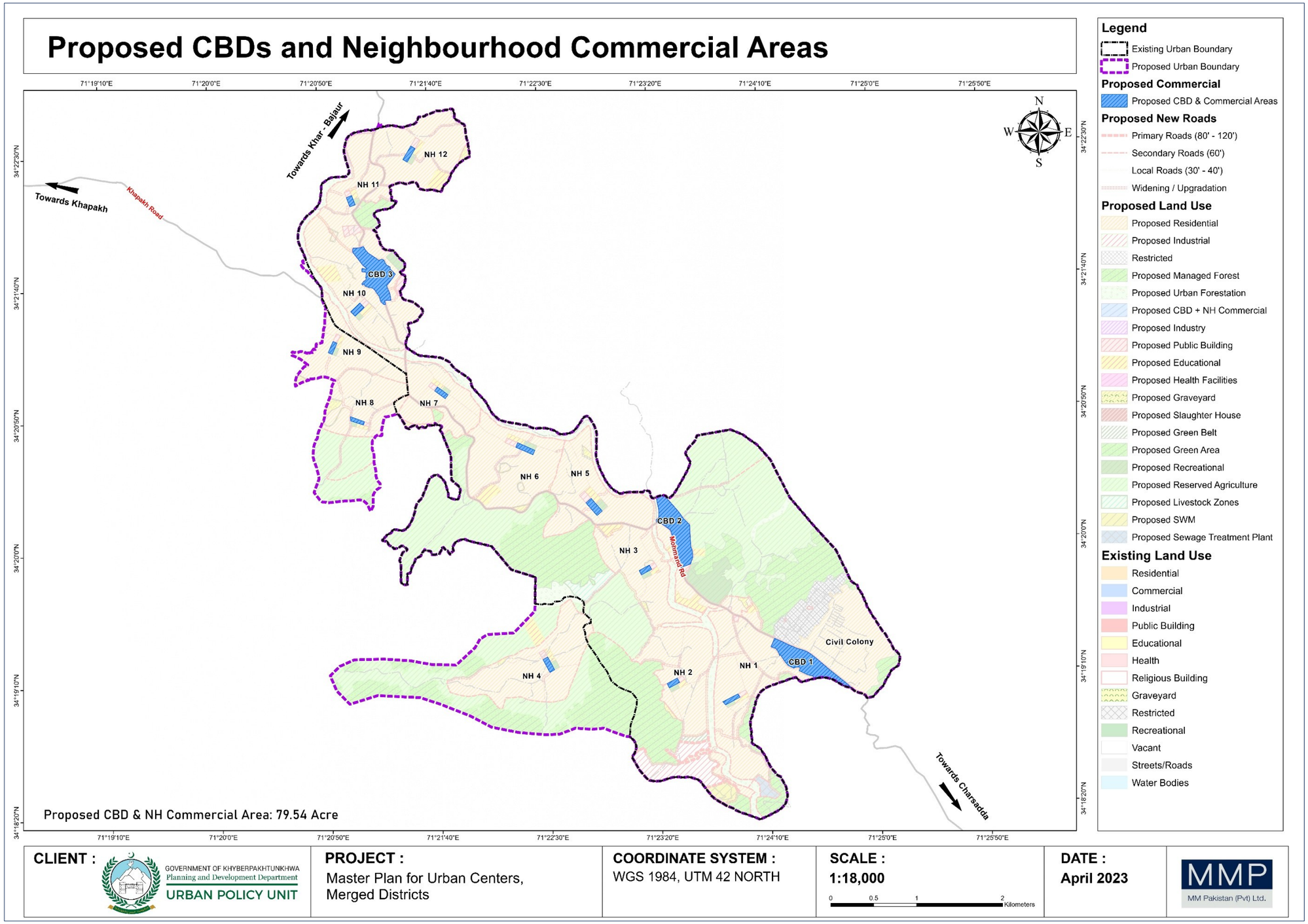
S. No	Major Use	Land Use	Categories
4			District Courts
5			Fire brigade
6			TMA
7			Private Offices
8			Other Administrative Offices
9		Civic	Community Center
10			Library
11			Clubs
12			Gyms
13			Open Space
14			Masjid
15			Wedding Hall
16		Commercial	Wholesale Market
17			Retail Market
18			Hardware Market
19		Mixed Use Residential	Commercial +Offices+ Residential + Parking

Source: Consultants Analysis

In addition to these CBDs, all of the 12 proposed neighborhoods offer a designated area (average of 2.3 acres per neighborhood) in the center of the neighborhood for commercial activities. This Multiple Commercial Zones on a total area of 27.5 acres in the Urban Center will reduce the accessibility issue to a great extent since all the basic necessities will be available in the neighborhood centers. Markets will be reserved for local handicrafts, local fruits, dry fruits, and their value-added products. The proposed designated commercial areas at the neighborhood level will include local shops to ensure the availability of daily used products and services such as grocery stores, general stores, and other uses of daily commodities.

Table 4-7: CBD and Proposed NH Center in Ghalanai Urban Centre

Commercial Area	Area in Acre
CBD 1	37.30
CBD 2	41.99
CBD 3	36.18
NH Center Commercial	28.47
Grand Total	**143.92**



Map 4-6: Proposed CBDs and Neighborhood Commercial Areas

4.5. Industrial Development in Ghalanai Urban Center

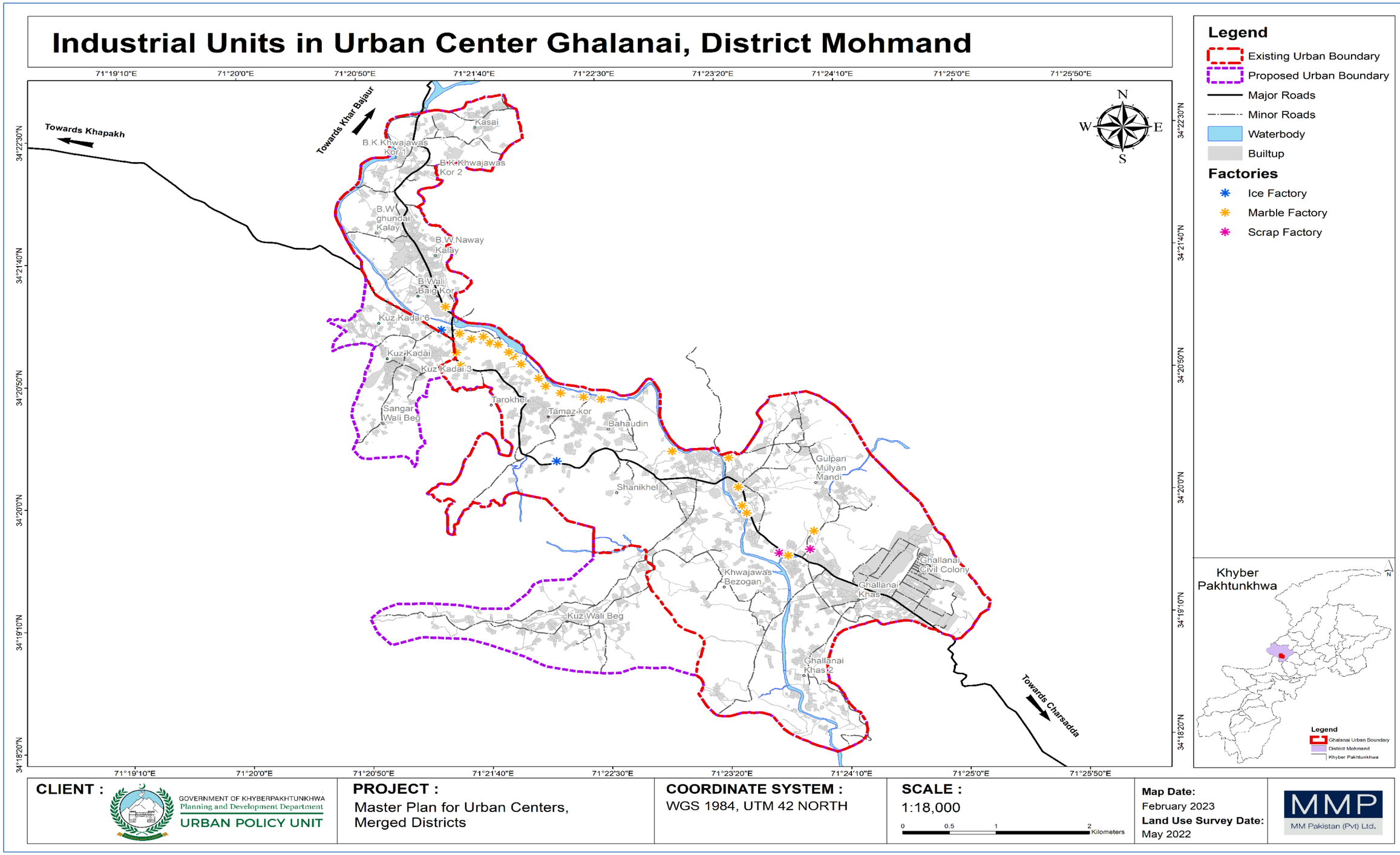
Ghalanai urban center is home containing 23 marble industries, 2 Ice factories, and 2 scrap factories which occupy 37 acres of land and contribute significantly to the local economy by providing livelihood opportunities for the residents. A detailed survey of each industrial unit in the Urban Center has been conducted to assess the types of industries present. Some of the small-scale workshops of woodworking, metal works, and concrete block are also identified in the survey.

These industrial units play a vital role in the development and growth of the Ghalanai urban center and the surrounding region. The marble industry is an important contributor to the local economy in the urban center as well as the District Mohmand, providing employment for a significant number of skilled and unskilled workers in the area. The availability of local raw materials and the production of both raw blocks and final products in the form of marble tiles suggest that the industry has a significant supply chain and may have a wide range of customers in different parts of the province and big cities of the country.

Table 4-8: Existing Industrial Scenario

S. No	Type of Industry	Quantity
1	Marble Industry	23
2	Steel Industry	2
3	Ice Factory	3

Source: Land Use Survey 2022



Map 4-7: Existing Industrial Units in Ghalanai Urban Center

4.5.1. Future Industrial Area Requirements

The calculation of the industrial area requirements for the Ghalanai Urban Center Master Plan was a multifaceted process that took into account multiple factors. In addition to considering the projected population growth for the plan period (2022-2040), the anticipated industrial labor force was also determined based on a variety of factors, including the projected participation rate of the local workforce in the industrial sector and the standard of 50 industrial workers per acre. These calculations were then used to generate a comprehensive table that outlines the industrial area needs of the Urban Center over the entire plan period. The results of this analysis reveal that a total of 40 acres of the industrial area will be required in order to accommodate the anticipated growth and development of the Urban Center's industrial sector. This includes the period from 2022 to 2040 and takes into account the potential shifts in economic conditions and other factors that may impact the demand for industrial space.

Table 4-9: Industrial Land Requirements for Master Plan Period 2022-40

Parameters	Additional Population (2022-2040)
Additional Population	31,280
Industrial labor force [4]	1564
Industrial Area Required [5]	31.28 Acres

4.5.2. **Current** Industrial Area Gap

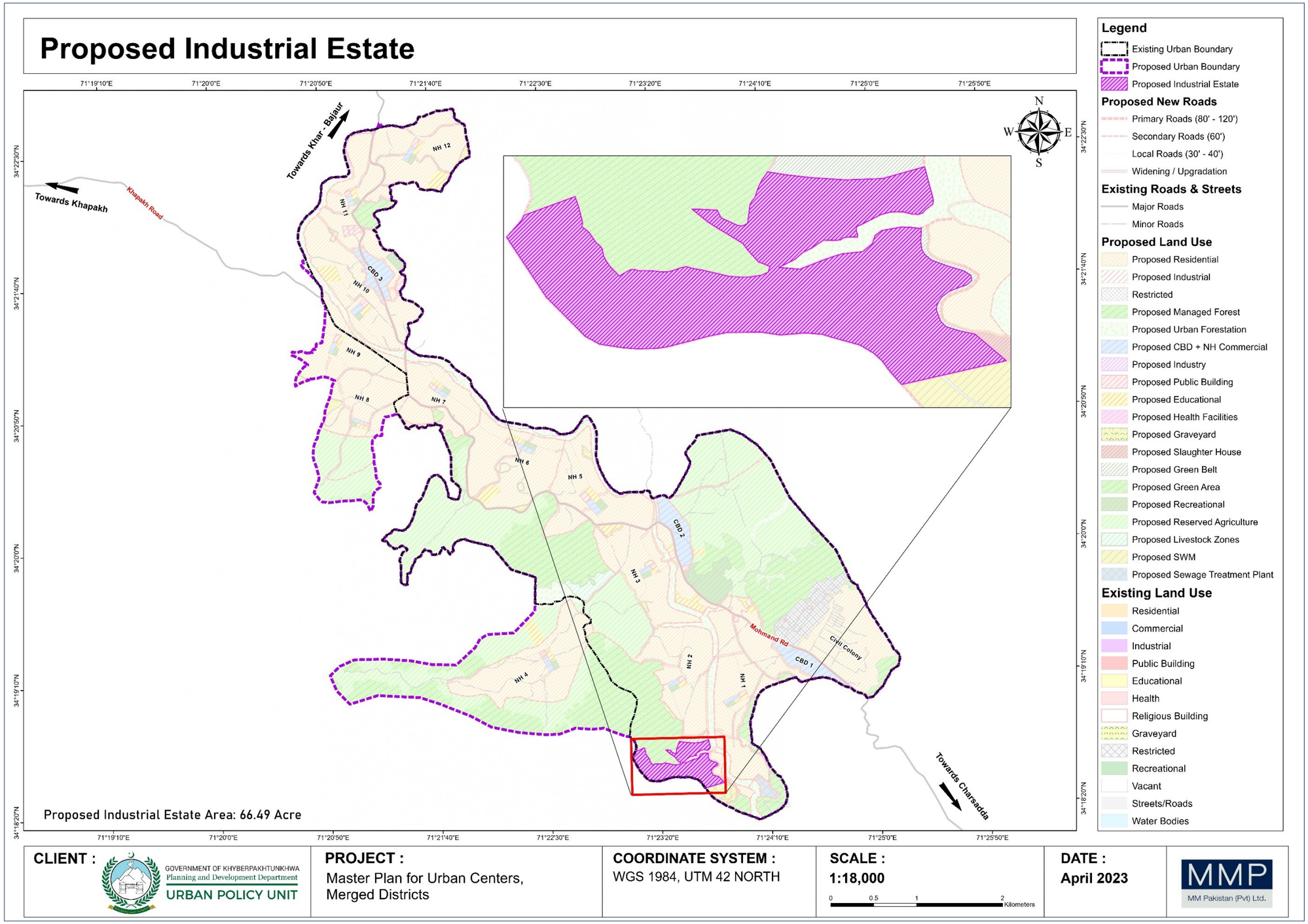
The current industrial area gap has been calculated as below:

i. Urban Center Population (2022): 32422
ii. Industrial labor force (@5% of above): 1621
iii. Industrial area required (@50 workers per acre) = 32.42 Acres
iv. Current Industrial area = 27 Acres
v. Industrial area deficiency: 32.42-27= 5.42 Acres
vi. Future Industrial Area Required till 2040= 36.7 Acre

Based on the comprehensive analysis of the industrial area requirements for the Ghalanai Urban Center Master Plan, it is clear that the total industrial area needs of the Urban Center will consist of both current and future requirements. Specifically, the data indicate that by the end of the plan period, an additional 5.42 acres will be required to address the current deficiency in industrial space, while an additional 31.28 acres will be needed to meet the future requirements of the Urban Center's industrial sector.

4 *Pakistan Bureau of Statistics, Govt. of Pakistan, Labor Force Statistics 2020-2021.www.pbs.gov.pk).*

5 *Source: Environment and Urban Affairs Division, Govt. of Pakistan, National Reference Manual on Planning and Infrastructure Standards, Section 5.3.1.2, Page 89 (adapted @50 industrial workers per acre).*



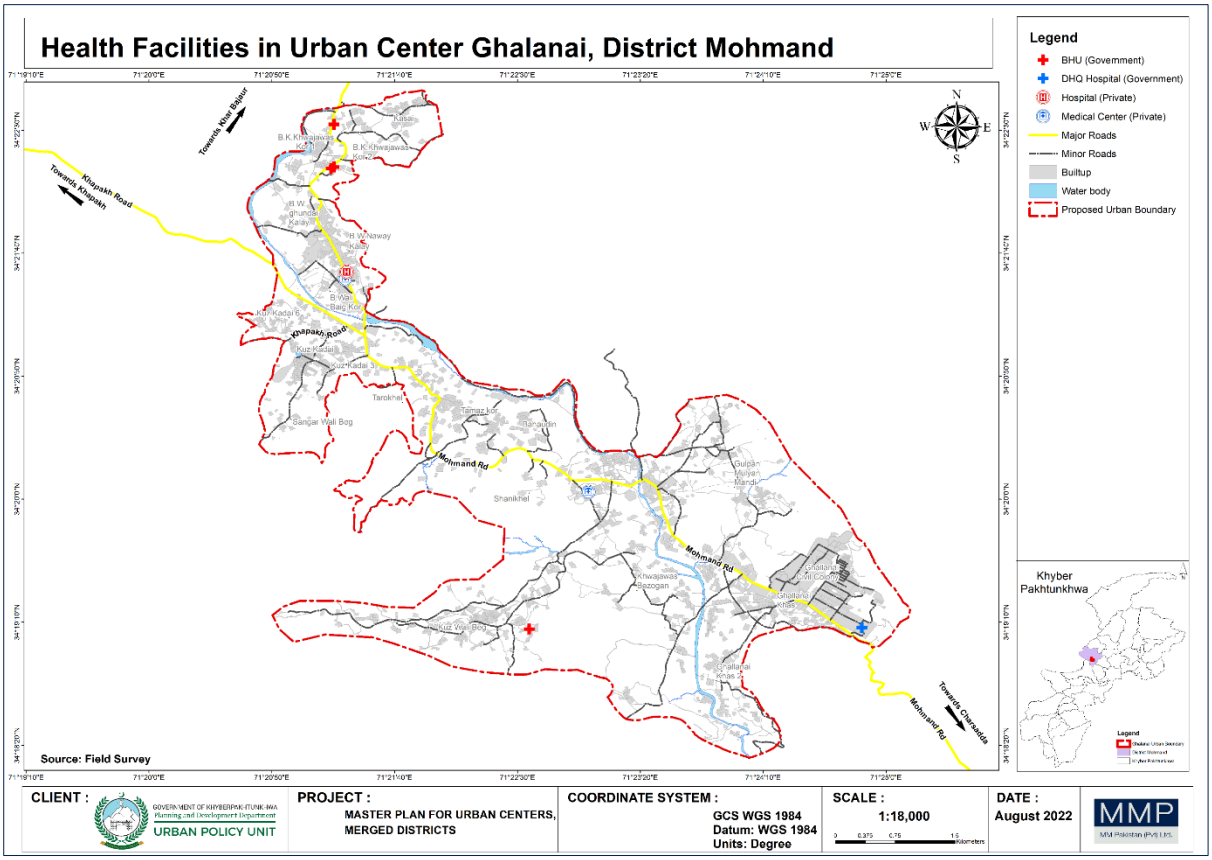
Map 4-8: Proposed Industrial Estate

4.6. Proposed Health Facilities

In Ghalanai, the medical facilities cover a total of 5.75 acres (0.11 %), which constitutes a relatively insignificant part of the overall land area of 5097 acres. The urban area, as well as the surrounding outskirts of Ghalanai, are served by the 5 Basic Health Units (BHU), 1 District Headquarter Hospital (DHQ), one private General Hospital, and two private Medical Centers (Amaan General and Al-Adil medical center and maternity home).

Sr. No	Health facilities	Total number
1	Government Hospital (DHQ)	1
2	BHU	4
3	Private Hospital	1
4	Private Medical Centre	2

Source: Land Use survey 2022



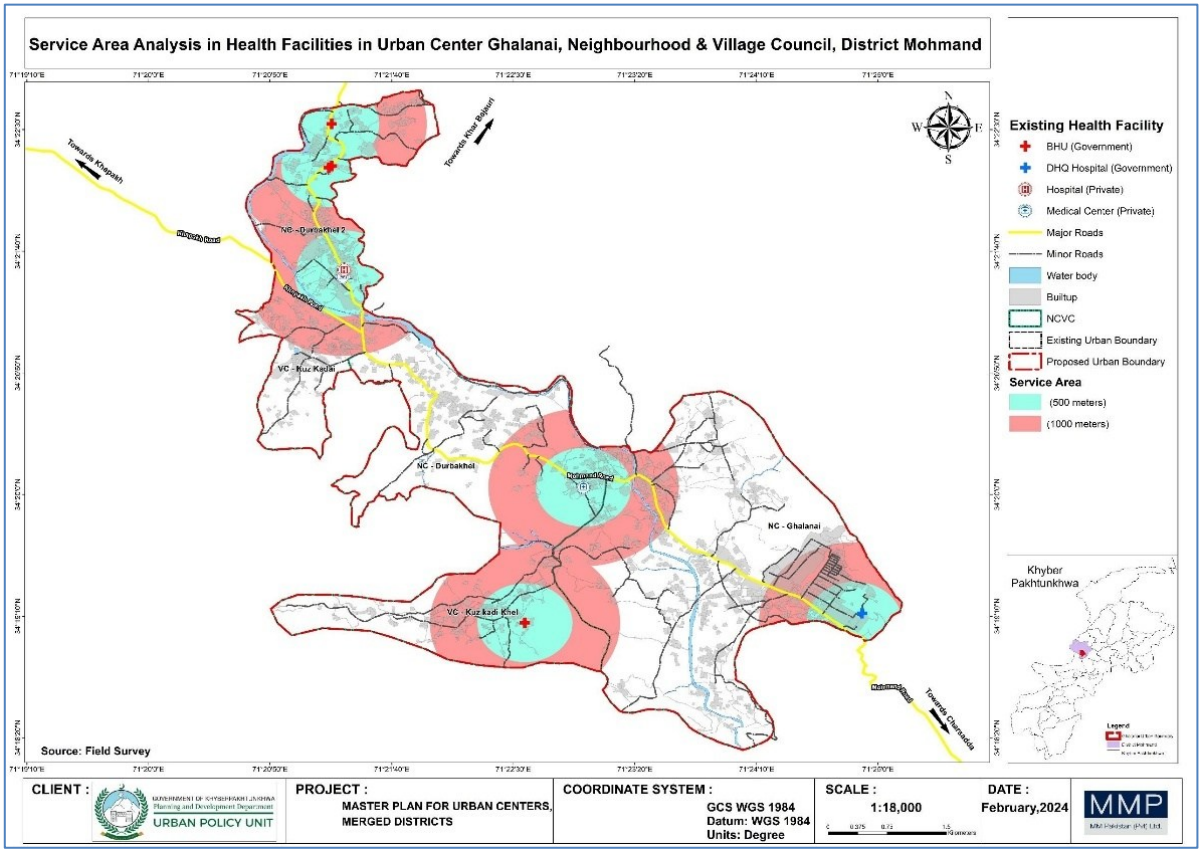
Map 4-9: Existing Health Facilities

The provision of adequate health facilities is essential for ensuring the well-being of a population. In Khyber Pakhtunkhwa, the government has made significant efforts to improve the healthcare system and increase access to health services. According to the KP Health Policy, there should be at least one basic health unit (BHU) for every 5,000 people in urban areas and every 3,000 people in rural areas. Similarly, there should be at least one Rural Health Centre (RHC) for every 25,000 people, and at least one Tehsil Headquarter Hospital (THQ) for every 500,000 people.

4.6.1. Demand Analysis of health facility

The existing health facilities in the Urban Center are sufficient to meet the needs of the resident population. The District Headquarters (DHQ) hospital, located in the urban center, provides comprehensive healthcare services to the community. According to the NRM, an estimated 9-10 beds will be needed in 2040 to meet the demand during the plan period of this Master Plan. In order to accommodate this projected growth, an extension of the DHQ hospital is proposed. Additionally, the recruitment of new specialist doctors, as well as laboratory and technical staff, is also proposed to ensure that the facility is equipped to meet both current and future health needs. This will not only ensure the availability of doctors at the center but also make the urban center more self-sufficient in the provision of healthcare services.

A GIS-based analysis of the area shows that the current facilities are located at three different locations. The first cluster is located in NC Durba Khel 2 on the northwest side, the second cluster lies centrally and thirdly with the District Headquarters (DHQ) Hospital situated in NC Ghalanai, on the southeastern edge of the city. These BHUs and several private healthcare centers provide comprehensive coverage; however, significant gaps exist between these two zones, particularly in NC Durba Khel, Durba Khel 2, and VC Kuz Kadai Khel. Overall, the areas between NC Durba Khel and NC Ghalanai remain underserved in terms of basic health infrastructure. The illustration in the form of a map is attached to the map below.



Map 4-10: Health Service Area in Ghalanai Urban Centre

The Proposed health facilities are divided into immediate-, short-, medium- and long-term action plans.

A phased strategy has been adopted under the Ghalanai Master Plan to enhance healthcare coverage and accessibility across the urban center. The proposed health infrastructure has been categorized into

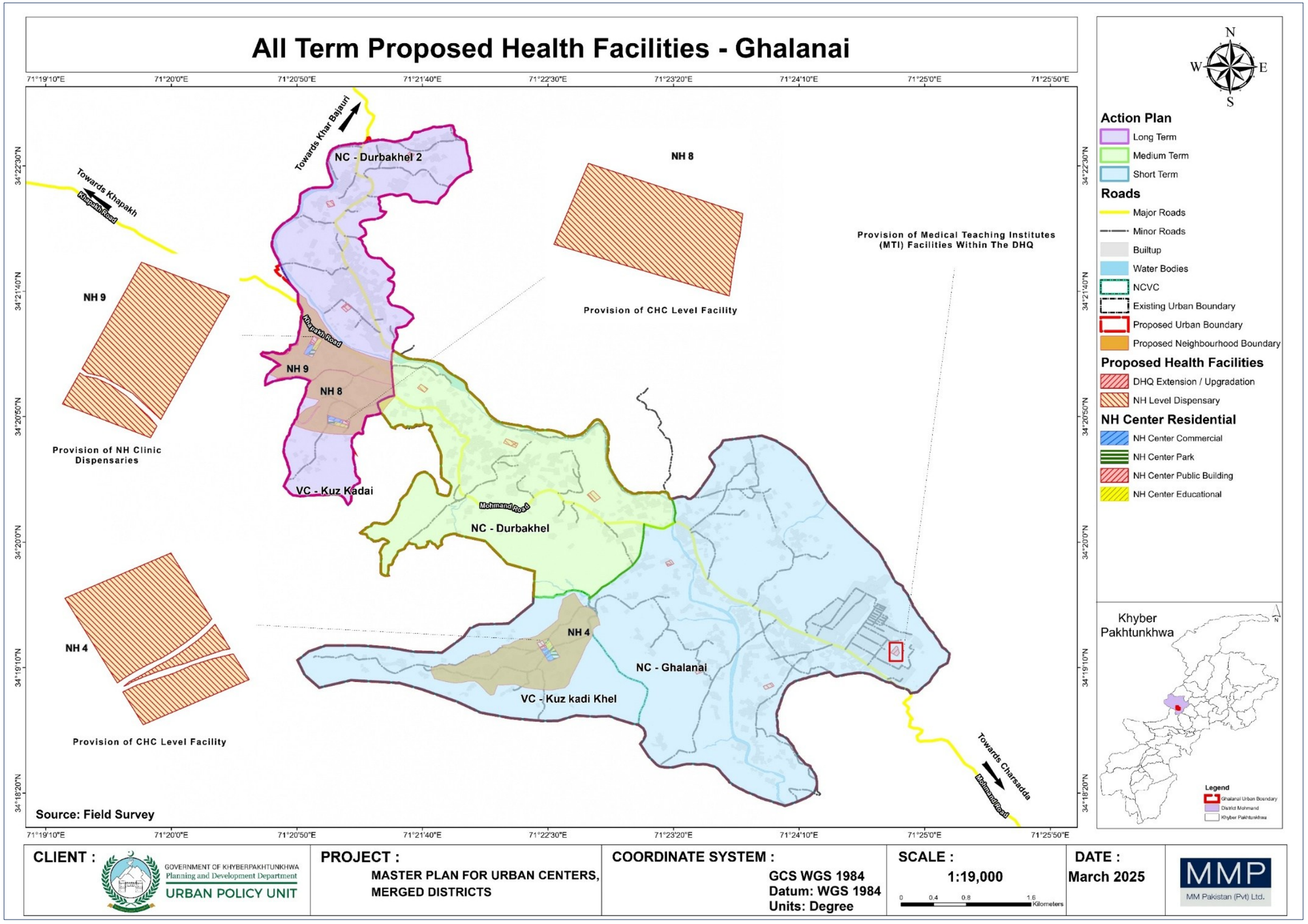
short-, medium-, and long-term interventions, addressing existing service gaps and catering to future population growth.

In the short term (2023–2027), priority is given to filling critical service voids in the northern and central parts of the urban area. Key interventions include the provision of NH-level dispensaries in underserved neighborhoods, extension and upgradation of the DHQ hospital, and the operation of the medical waste incinerator. The focus remains on NC Ghalanai, NC Durba Khel, and VC Kuz Kadai Khel, where population clusters are currently underserved.

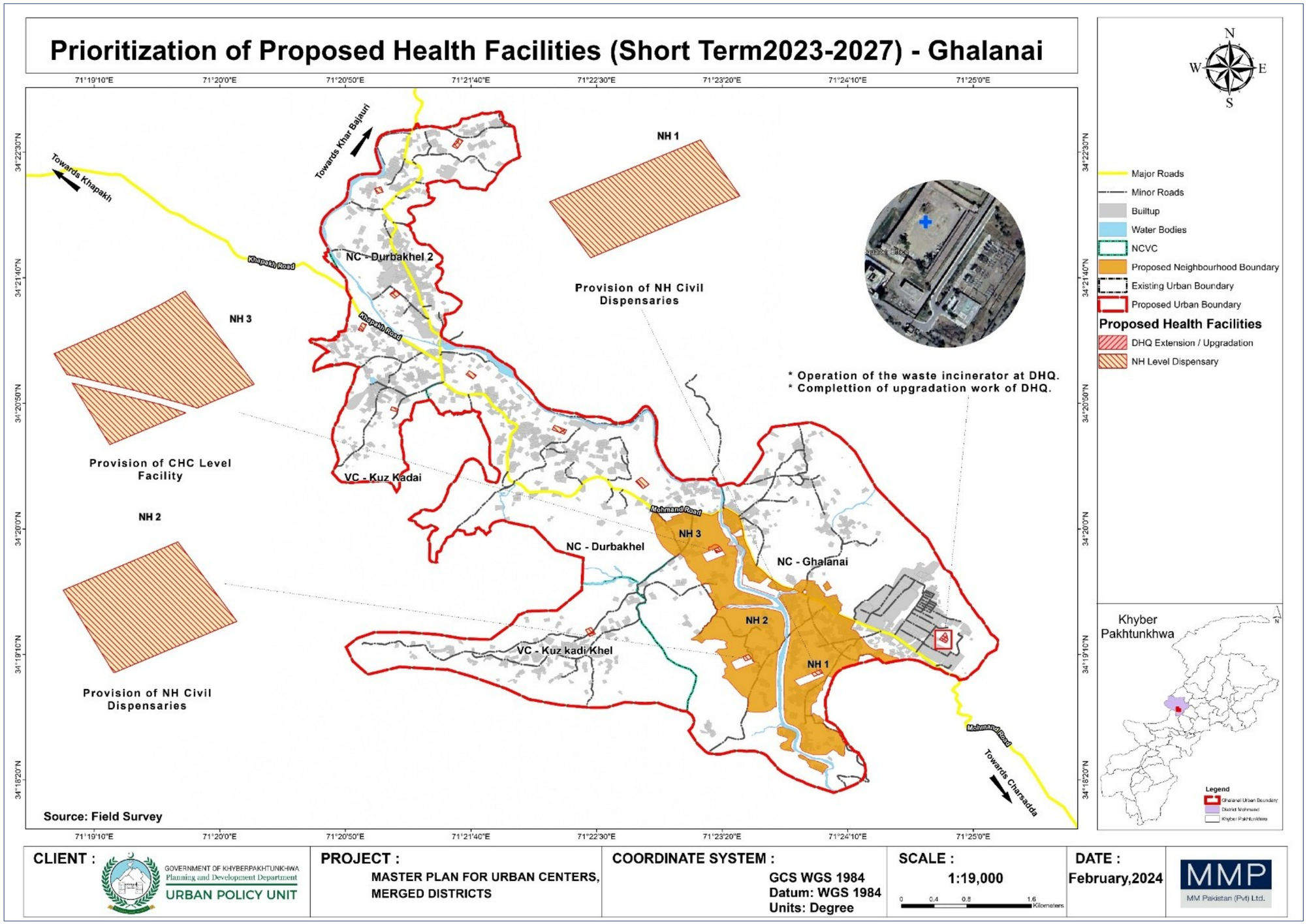
During the medium-term phase (2027–2032), the plan extends services deeper into the expanding urban footprint, especially within emerging neighborhoods. This includes the establishment of CHC-level facilities, maternal and child health units, and new NH dispensaries in NH 6, NH 7, and NH 12. In addition, enhancements are planned for diagnostic services at the DHQ hospital, including testing laboratories and advanced imaging equipment such as X-ray, ultrasound, and CT scan units.

The long-term phase (2032–2040) focuses on strategic expansion to accommodate long-term growth and future healthcare demand. Proposals include the provision of CHC-level facilities in NH 4 and NH 8, NH clinic dispensaries in NH 9, and most notably, the introduction of Medical Teaching Institutes (MTIs) within the DHQ hospital campus. These additions are aimed at developing Ghalanai into a more self-sufficient health service hub, capable of addressing complex healthcare needs and reducing referral loads to larger cities.

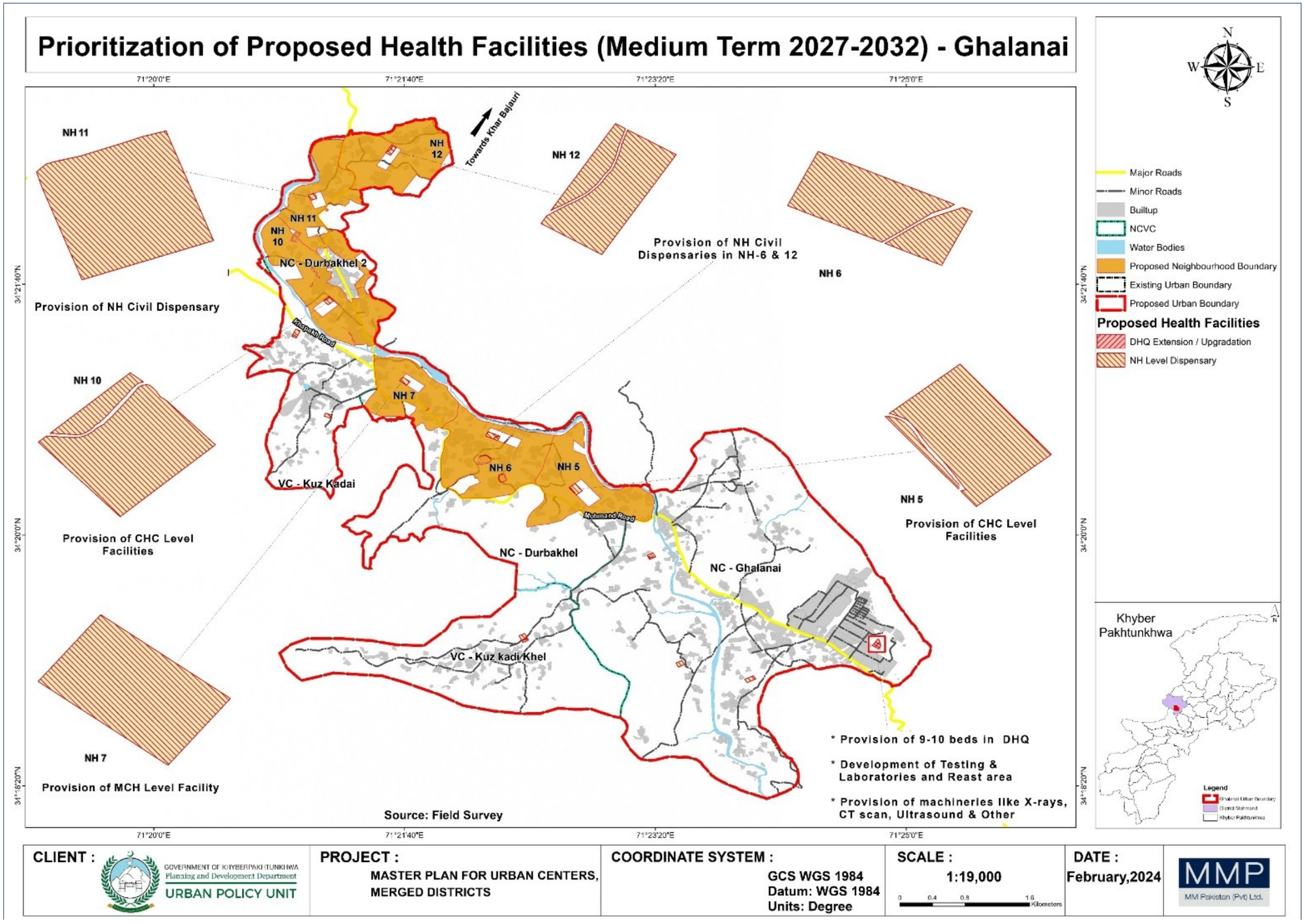
This phased development approach is based on spatial analysis, population projections, and service gap assessments, ensuring the progressive realization of universal healthcare access across Ghalanai Urban Centre.



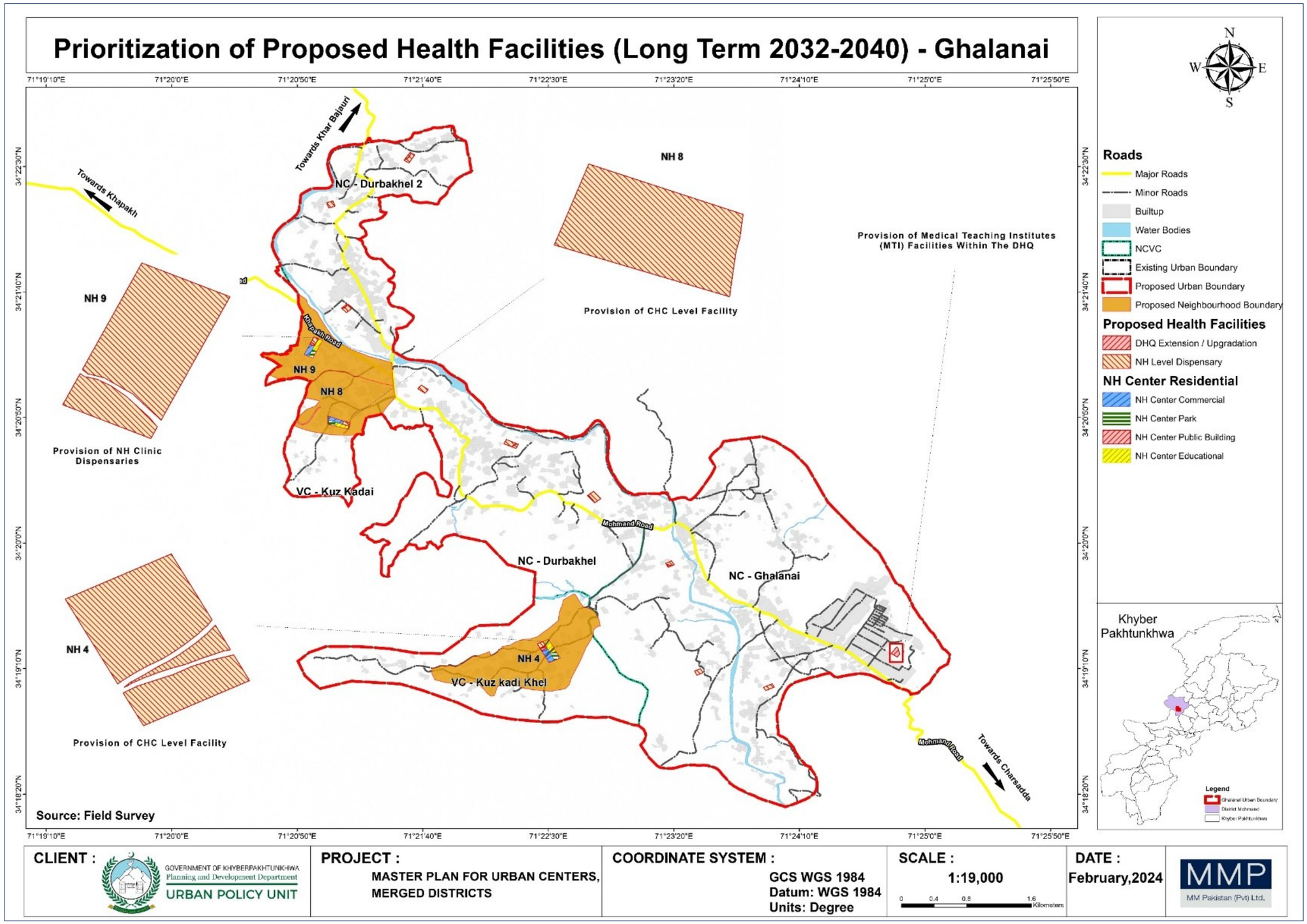
Map 4-11: Proposed Health Facilities in Ghalanai Urban Centre



Map 4-12: Proposed Health Facilities in Ghalanai Urban Centre



Map 4-13: Medium Term Health Facilities in Ghalanai Urban Centre



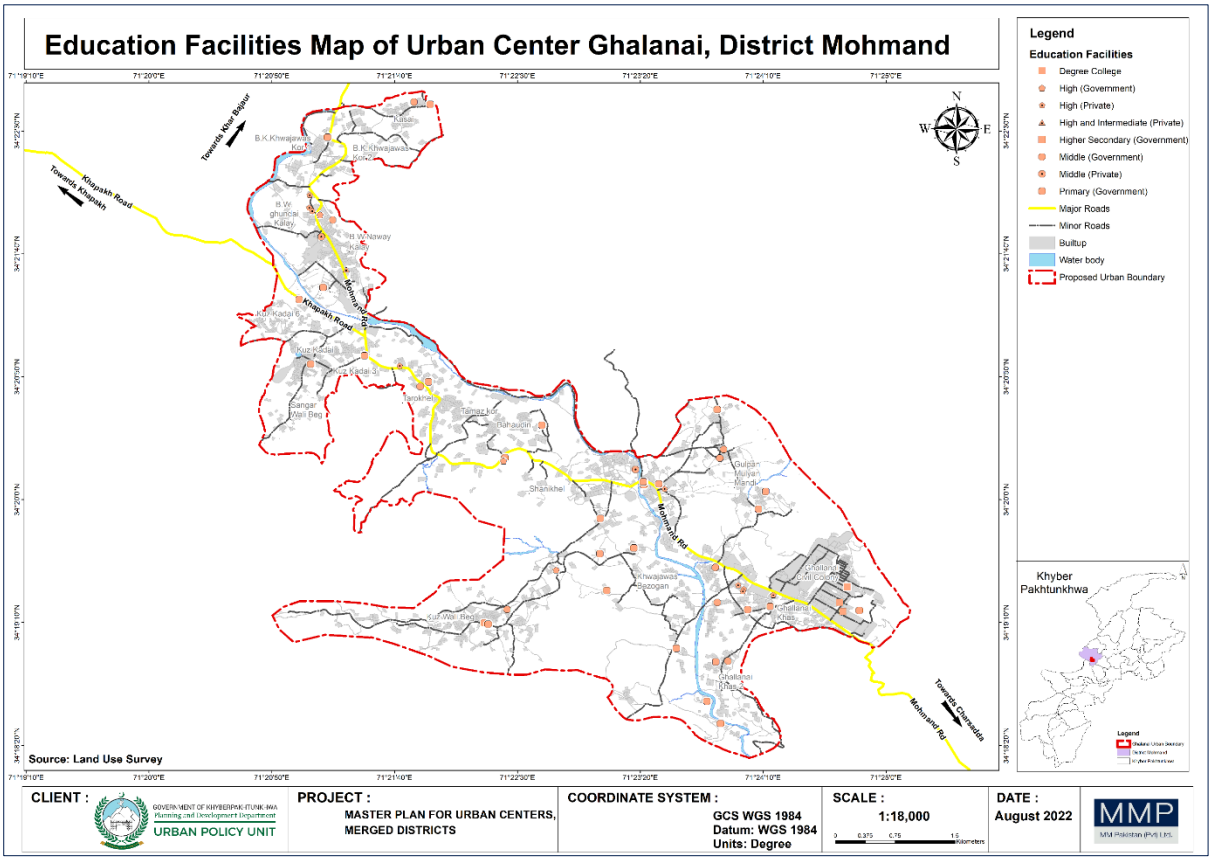
Map 4-14: Long Term Health Facilities in Ghalanai Urban Centre

4.7. Proposed Education facilities

According to the land use analysis the following is the summary of Education sector.

Table 4-10: Education facilities in Ghalanai Urban Centre, 2022

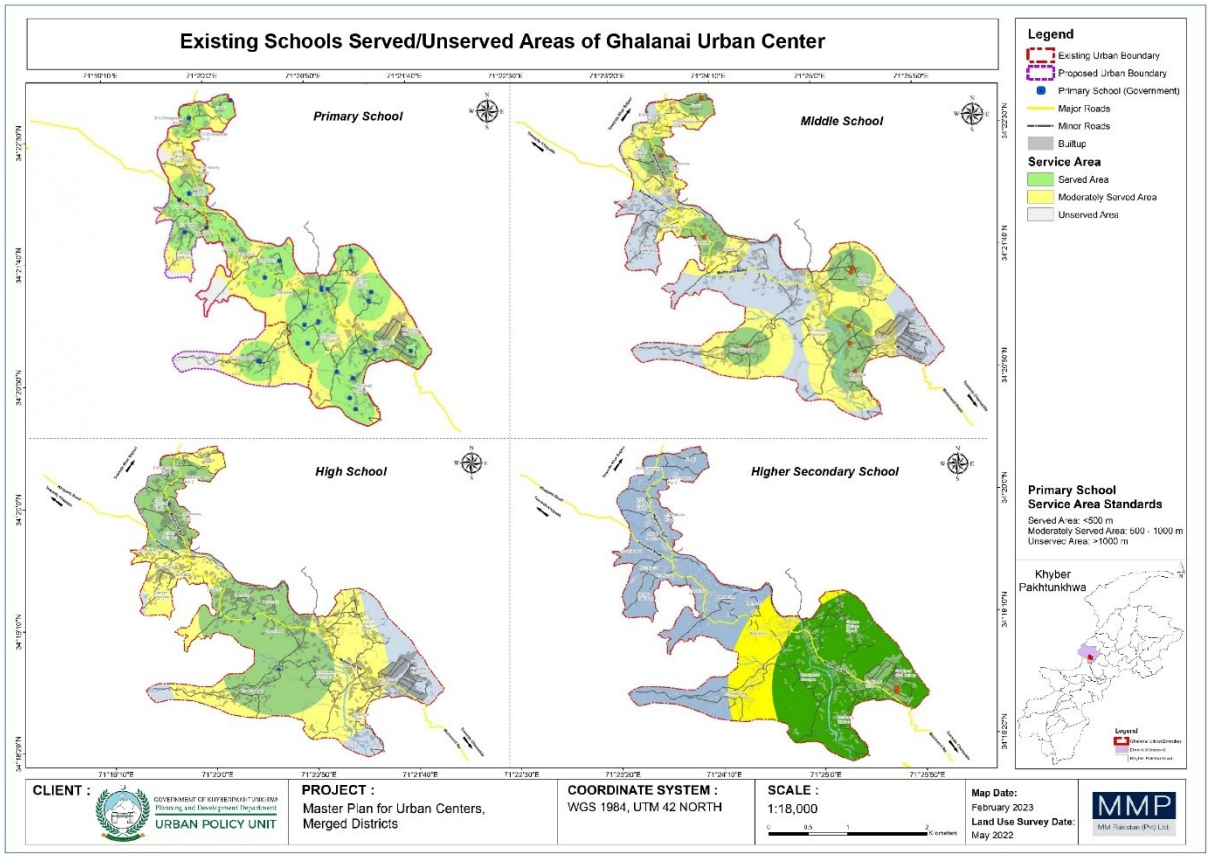
S. No	Institutes (Government)	Boys	Girls	Total
1	Primary School	13	15	**28**
2	Middle School	5	4	**9**
3	High School	2	1	**3**
4	Higher Secondary School	1	1	**2**
5	Degree College	0	1	**1**
Total		**21**	**22**	**43**



Map 4-15: Existing Education Facilities in Ghalanai Urban Centre

As per the Khyber Pakhtunkhwa education policy, the government is working to ensure that every child has access to a school within a reasonable distance from their home. The government aims to achieve this by increasing the number of schools in underserved areas and improving the quality of education in existing schools. The government is also working to provide adequate facilities in schools, including classrooms, libraries, laboratories, and playgrounds

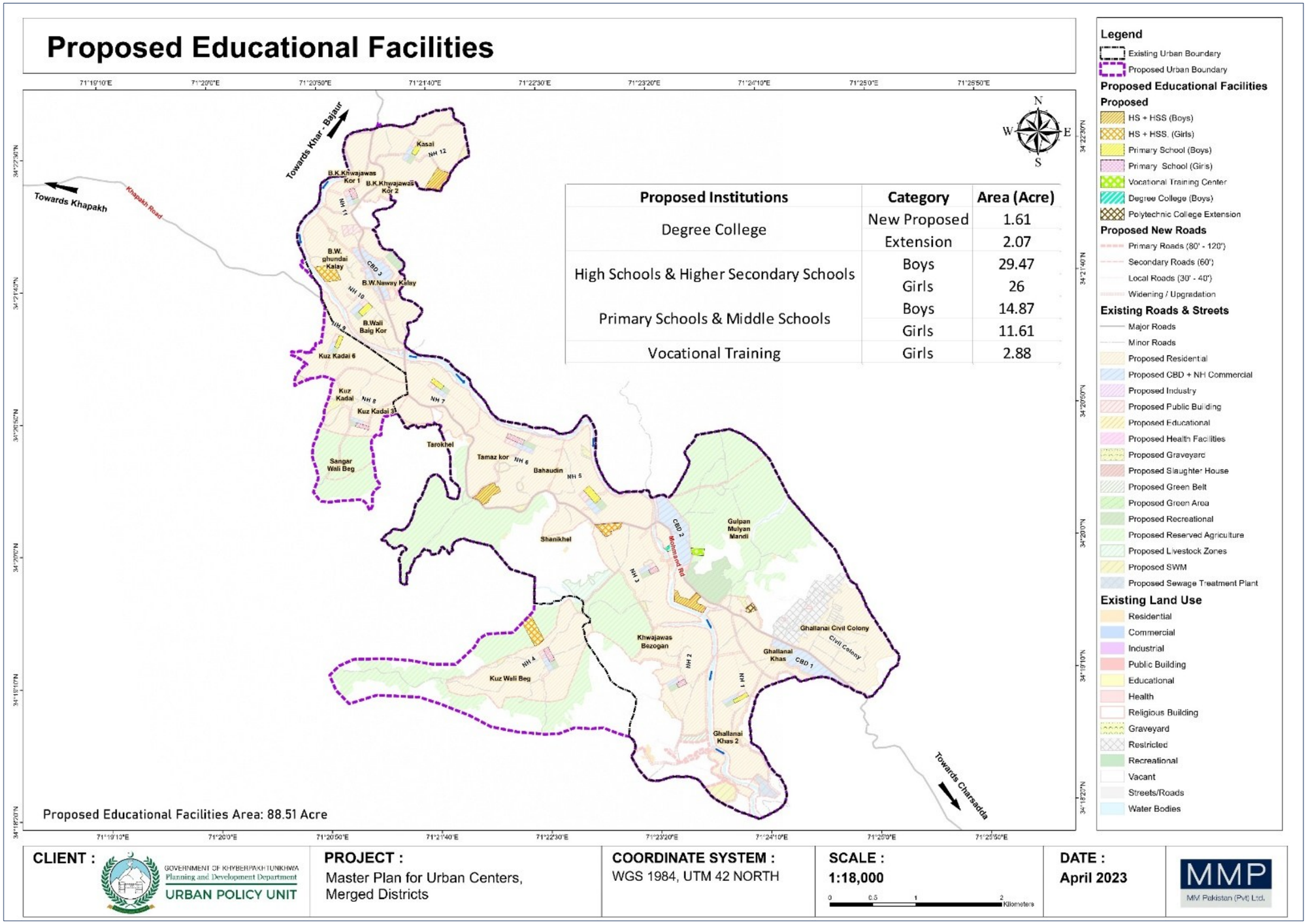
According to the population projection and the standards outlined in the National Reference Manual (NRM) for the provision of education institutions, it has been revealed that the existing institutes in Ghalanai Urban Centre are not meeting the required standards



Map 4-16: Existing Served/Unserved Areas of Educational Facilities

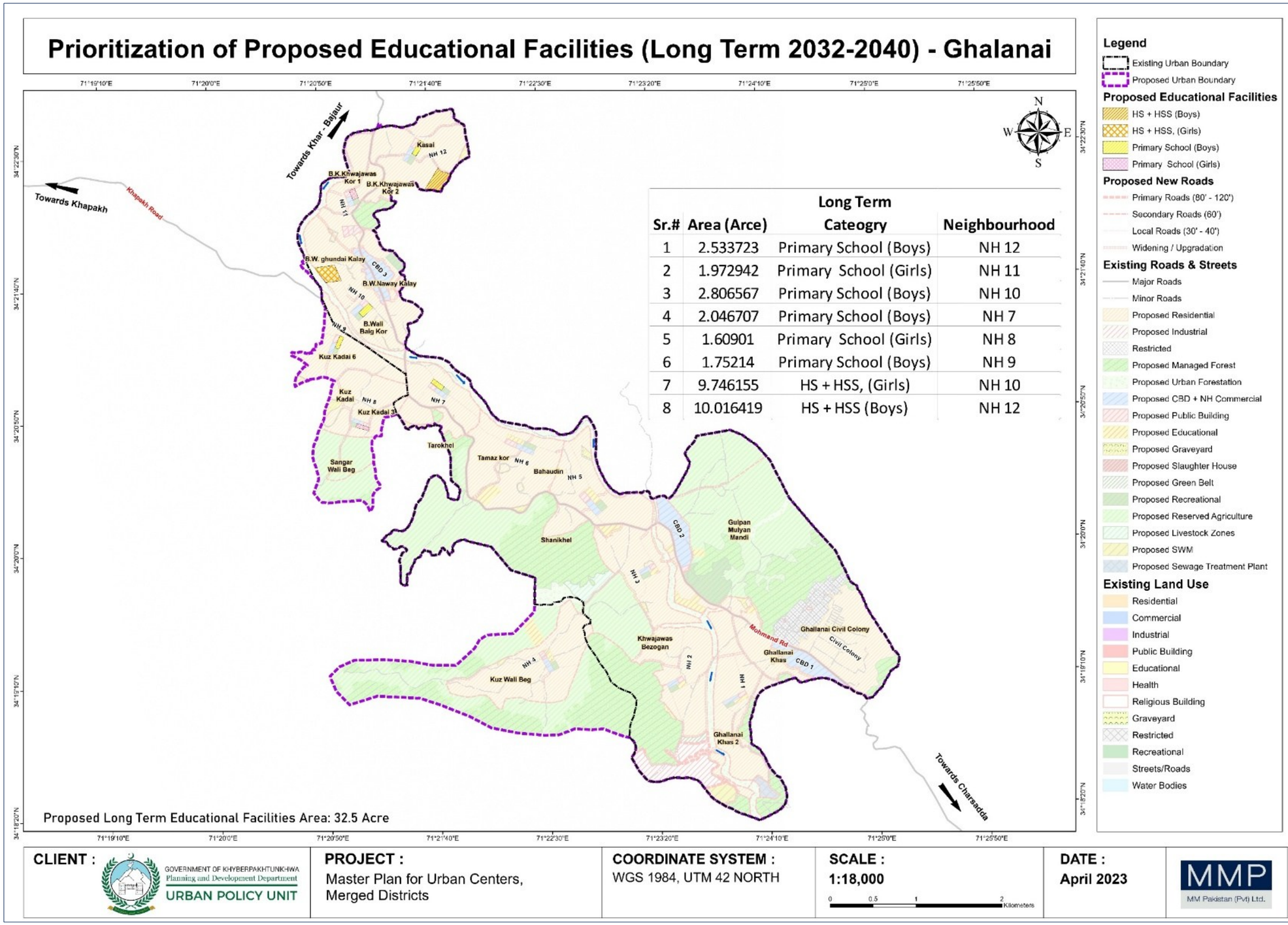
4.7.1. Proposed Educational Facilities

In an effort to provide educational facilities at the neighborhood level, a proposal has been made to establish a primary and middle school in each of the 12 neighborhoods in the urban center of Ghalanai. The average allocation of land for each school is 2.5 acres, totaling 27.8 acres for all the neighborhoods. This will allow children in the area to have easy access to educational facilities within walking distance. In addition to the primary schools, high and higher secondary schools, separately for boys and girls, have been proposed on a total area of 60.7 acres. This includes three boys' high schools, three girls' high schools, and separate higher secondary schools for boys and girls. The total land allocation for education facilities is 88.5 acres.



Proposed Institutions	Category	Area (Acre)
Degree College	New Proposed	1.61
	Extension	2.07
High Schools & Higher Secondary Schools	Boys	29.47
	Girls	26
Primary Schools & Middle Schools	Boys	14.87
	Girls	11.61
Vocational Training	Girls	2.88

Map 4-17: Proposed Education Facilities, Urban Center Ghalanai



Map 4-18: Prioritization of Proposed Education Facilities

4.8. Quality of Life

The World Health Organization (WHO) defines Quality of Life (QOL) as ‘‘an individual perception of their position in life in the context of the culture and value systems in which they live and concerning their goals, expectations, standard and concern’’. The standard indicators of the quality of life include wealth, employment, the environment, physical and mental health, education, recreation and leisure time, social belonging, safety, security, and freedom.

Sustainable development is also about dealing with equity. Frequently, poor society and marginal groups are most exposed to environmental hazards, live in fragile environment and low excess to adequate general infrastructure. According to United Nations Universal Declaration of Human Rights: ‘all people have the right to a standard of living adequate for the health and well-being of themselves and their family, including food, clothing, housing health care and the necessary social services’.

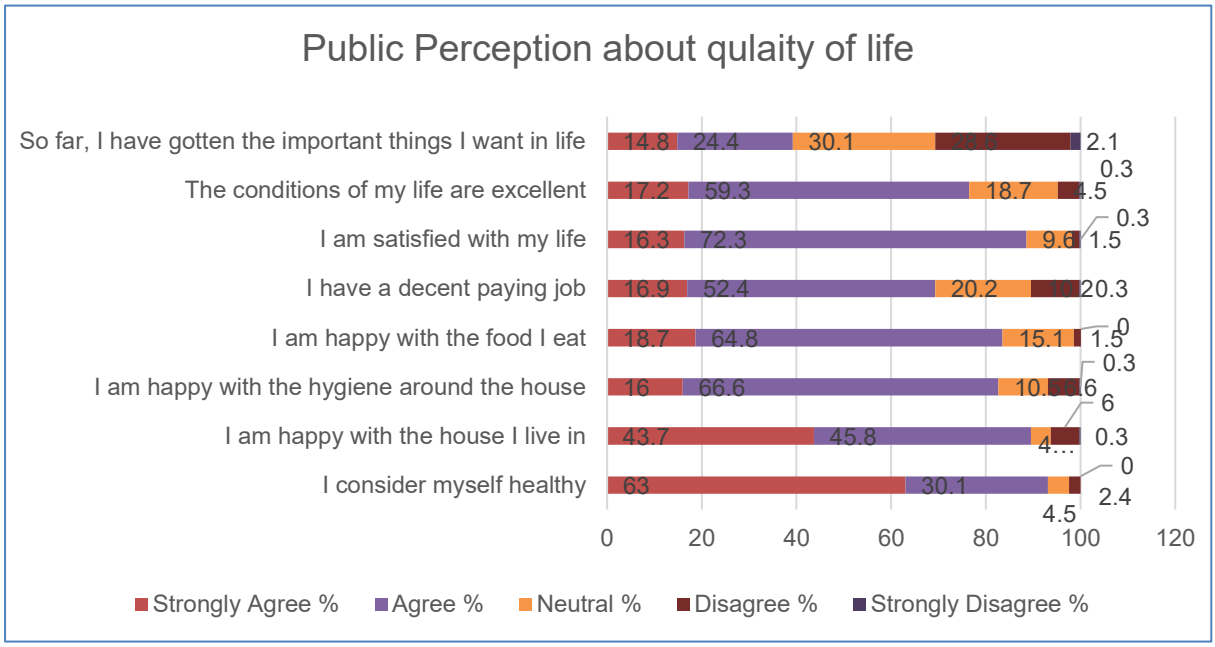
4.8.1. Quality of Life Indicators

To determine the existing quality of life, a field survey was undertaken to determine the quality of life in Ghalanai Urban Center. A city's quality of life is determined by the services and facilities available to its residents. Multiple quality-of-life indicators were measured in order to assess the satisfaction of residents of Ghalanai urban center. These indicators were based happiness index, public perception about key factors in determining quality of life, neighborhood and city level basic facilities availability and satisfaction from the services.

4.8.2. Happiness Index to Measures Quality of Life

Using a household survey of 332 samples, the happiness index is determined in Ghalanai urban center. This survey aims to measure the level of satisfaction of city residents. The survey measured satisfaction and dissatisfaction based on eight parameters. Parameters include purpose of life, excellence of life condition, satisfaction with life, a decent job and salary, the quality of food they consume, sanitation and hygiene in the environment, housing conditions, and general health and well-being. The public perception regarding each parameter is shown in the figure 7-3 below. Responses to these questions are recorded as a level of affirmation to the statements.

Figure 4-1: Public Perception About Quality Of Life



4.8.3. Quality of Life Improvement

When we set goals for our lives and seek to make meaningful improvements in how we live, what we're really striving for is a higher quality of life. Improving quality of life leads to better outcomes in happiness, health, relationships and overall life satisfaction. To improve the quality of life in Ghalanai, it is essential to address fundamental urban challenges, including the enhancement of civic facilities, resolving inadequate housing, and improving public transport. Specifically, ensuring accessible and quality education and health facilities for all residents must be a focal point. Strategic investments should be made to position educational institutions and healthcare centers within convenient proximity to the community. Simultaneously, the implementation of sustainable transportation systems, like bike lanes and efficient public transit, not only alleviates traffic issues but also contributes to creatin an environment where education and healthcare services are easily reachable, ultimately enhancing the overall well-being of the residents. Additionally, the development of green spaces and parks can help to mitigate the negative effects of urbanization and provide residents with a sense of community and connection to nature.

Another important aspect of improving quality of life in Ghalanai is ensuring access to affordable housing. This can be done by implementing policies that encourage the development of low-cost housing units, as well as by supporting programs that provide assistance to those in need. In addition, cities can work to address the social and cultural needs of residents by promoting diversity and inclusiveness, and by supporting the arts and cultural events.

In addition to addressing physical needs, sustainable urban planning in Ghalanai must also address social and cultural needs. This can be done by promoting diversity and inclusiveness, and by supporting the arts and cultural events. Cities can also work to foster a sense of community by creating green spaces and parks, which provide residents of Ghalanai with a connection to nature and an opportunity to socialize

The quality of life can be improved in Ghalanai by taking the following measures during the design and planning of the cities.

- Improving the Accessibility of Education and Health Facilities
- Walking, Cycling and Public Transport as Main Mobility
- Provision of Green, Common and Recreational Spaces
- Provision of Libraries and Public Halls
- Improvement/Provision of Civic Facilities
- Preservation of Social, Cultural, and Heritage Sites
- Implementation of Waste Reduction Strategies and Green Energy Initiatives.

Table 4-11: Periodic Interventions for Quality-of-Life Improvement

Sector	Action Plan	Implementing and Executing Agencies	Target Group	Time Period
	➢ Rapid assessment of current accessibility features, identify immediate barriers and prioritize areas with the most urgent need of improvement.	Local Government /Municipal Authorities	Local Students and General Public	2022-2025

Accessibility to Education and Health Facilities	➢ Expansion of the DHQ Hospital with 116 more beds and improvement in the accessibility of the neighborhood. ➢ Development of new educational and health facilities in NH 12 and 13.	Local Government /Municipal Authorities	Local Students and General Public	2022-2030
	➢ Development of new educational and health facilities in NH 1, 2, 3, 10, and 11. ➢ Planning of the new routes that are accessible and have the appropriate width for ambulance transportation in an emergency. ➢ Development of contingency plans for immediate response to unexpected barriers to Accessibility.	Local Government /Municipal Authorities	Local Students and General Public	2022-2035
	➢ Development of new educational and health facilities in NH 4, 5, 6, 7, 8, and 9.	Local Government /Municipal Authorities	Local Students and General Public	2022-2040
Roads and Urban Mobility	➢ Provision of bicycle parking at the different intersections and in the parking lots. ➢ Provision of bus stops for the local transport on the main roads.	Local Government /Municipal Authorities	General Public and Visitors	2022-2025
	➢ Pavement of the priority roads and streets. ➢ Provision of footpath alongside the main roads and streets with addition of sitting spaces.	Local Government /Municipal Authorities	General Public, Visitors and Transporters	2022-2030
	➢ Widening of roads for the cycle tracks and central landscaping throughout the main roads and corridors. ➢ Provision of parallel parking to cater to the irregular parking along the roads in the widening process.	Local Government /Municipal Authorities	General Public, Visitors and Transporters	2022-2035
	➢ Development of major bus stands and bus stops with the development of local transport systems at the government level. ➢ Construction of new roads with the provision of green belts, footpaths, and street furniture. ➢ Provision of dedicated lanes for bicycles along with footpaths.	Local Government /Municipal Authorities	General Public, Visitors and Transporters	2022-2040

4.9. Proposed Public Buildings

The Master Plan for Ghalanai incorporates key public infrastructure to uplift community well-being and ensure a safe, healthy, and culturally enriched urban environment.

Slaughterhouse: A modern facility is proposed on 1.2 acres near the industrial estate to ensure hygienic meat processing with veterinary inspection, waste rendering, and compliance with livestock safety standards.

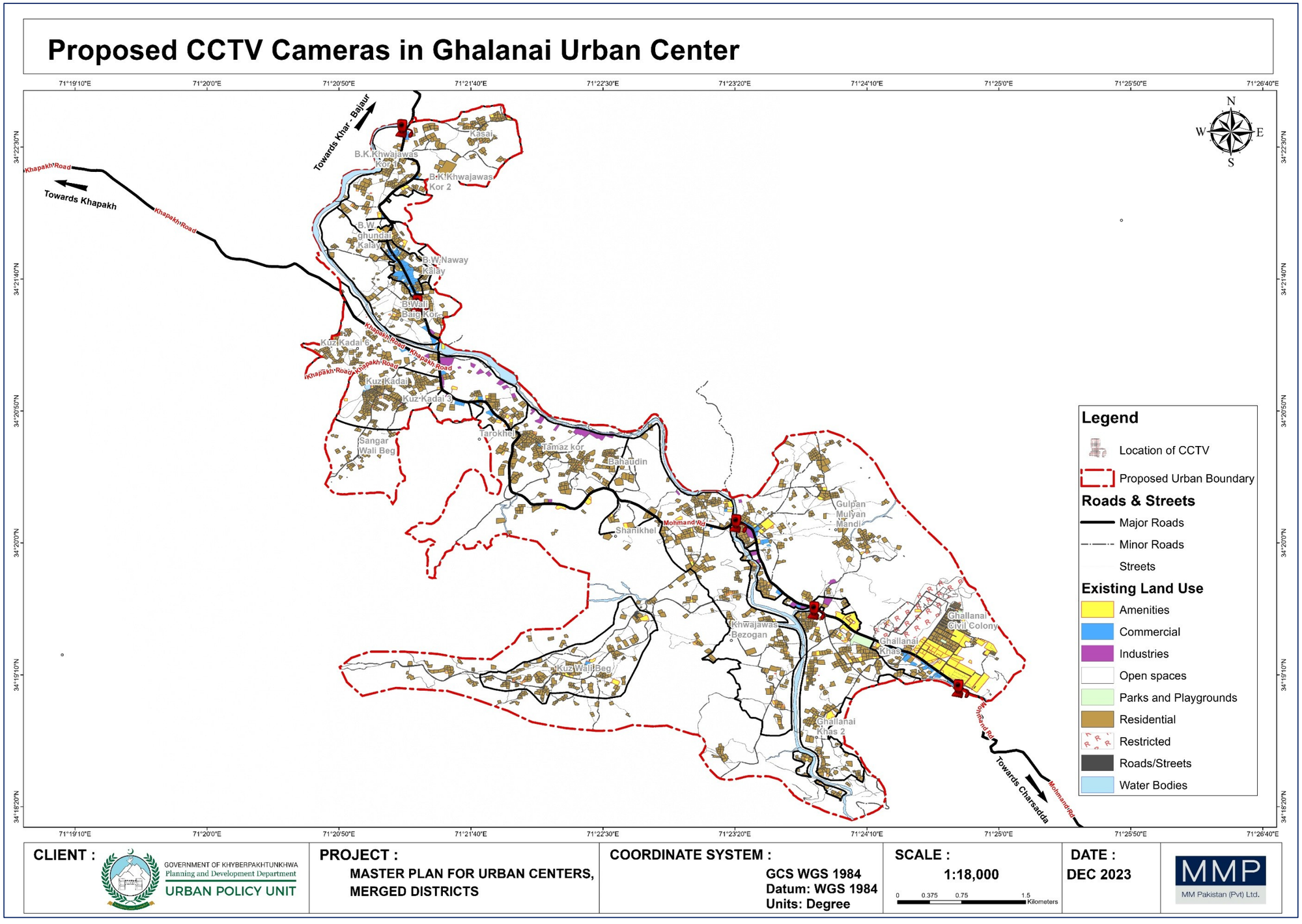
Post Mall: To meet future postal needs, a Post Mall is planned on 0.2 acres near CBD-2. It will offer postal, courier, and bill services with state-of-the-art automation. Letterboxes will also be installed in each neighborhood center.

Security: While the current police infrastructure suffices per NRM standards, 12 new neighborhood-level police chowkis are proposed to ensure localized safety and rapid response.

Fire Protection: Addressing the lack of fire safety measures, the plan mandates the installation of hydrants, extinguishers, and trained fire response units across commercial and residential areas.

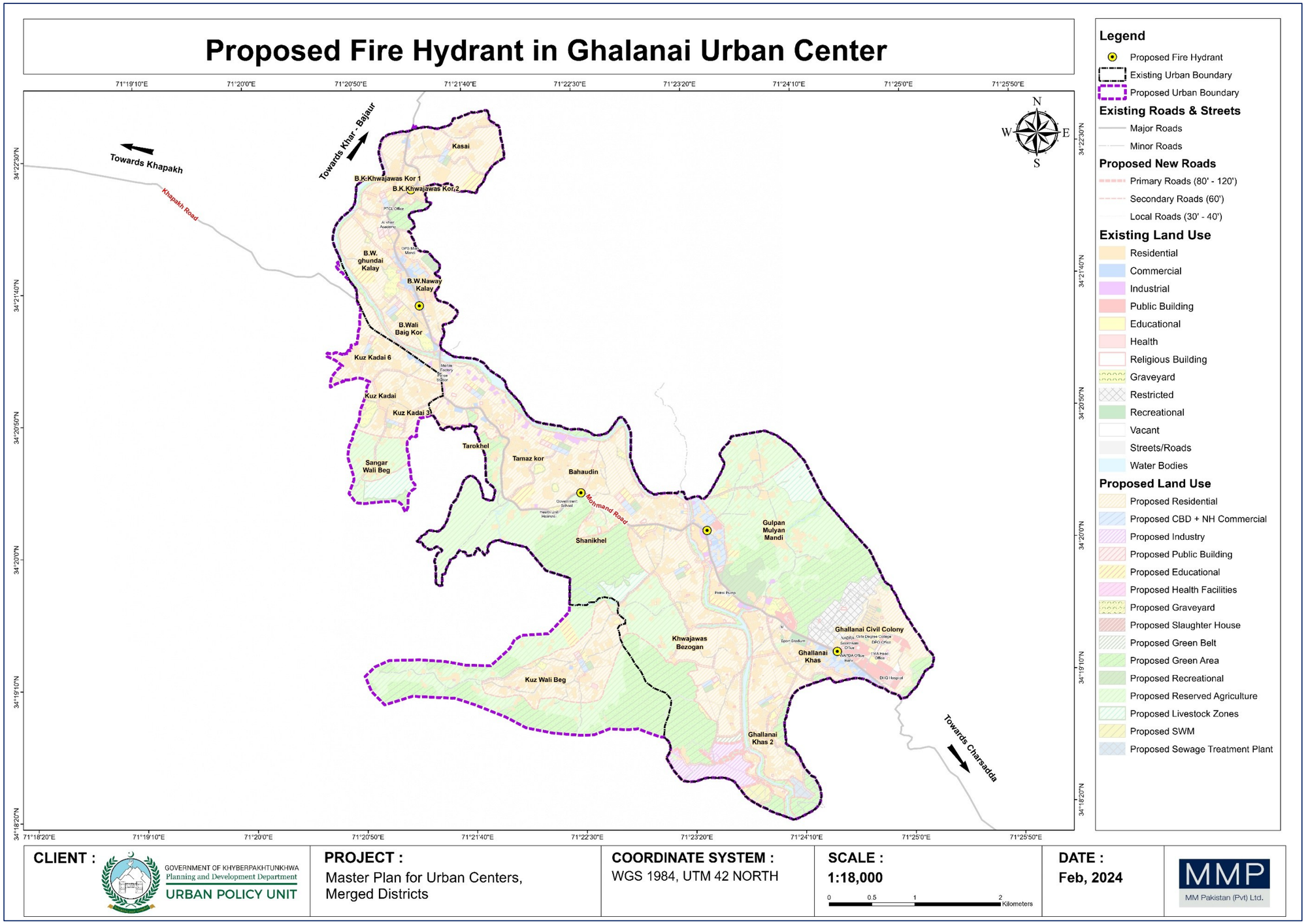
Cultural Heritage & Archaeology: The plan emphasizes conservation of significant archaeological sites representing diverse civilizations (Islamic, Indo-Greek, Kushan, etc.), with coordination ongoing with the Department of Archaeology for documentation and protection.

Proposed Museum: A 1.04-acre museum near CBD-1 will preserve and present regional history, crafts, and culture, supporting tourism, education, and local economic development.



Map 4-19: Proposed CCTV Cameras in Ghalanai Urban Center

Proposed Fire Hydrant in Ghalanai Urban Center



Legend

- Proposed Fire Hydrant
- Existing Urban Boundary
- Proposed Urban Boundary

Existing Roads & Streets

- Major Roads
- Minor Roads

Proposed New Roads

- Primary Roads (80' - 120')
- Secondary Roads (60')
- Local Roads (30' - 40')

Existing Land Use

- Residential
- Commercial
- Industrial
- Public Building
- Educational
- Health
- Religious Building
- Graveyard
- Restricted
- Recreational
- Vacant
- Streets/Roads
- Water Bodies

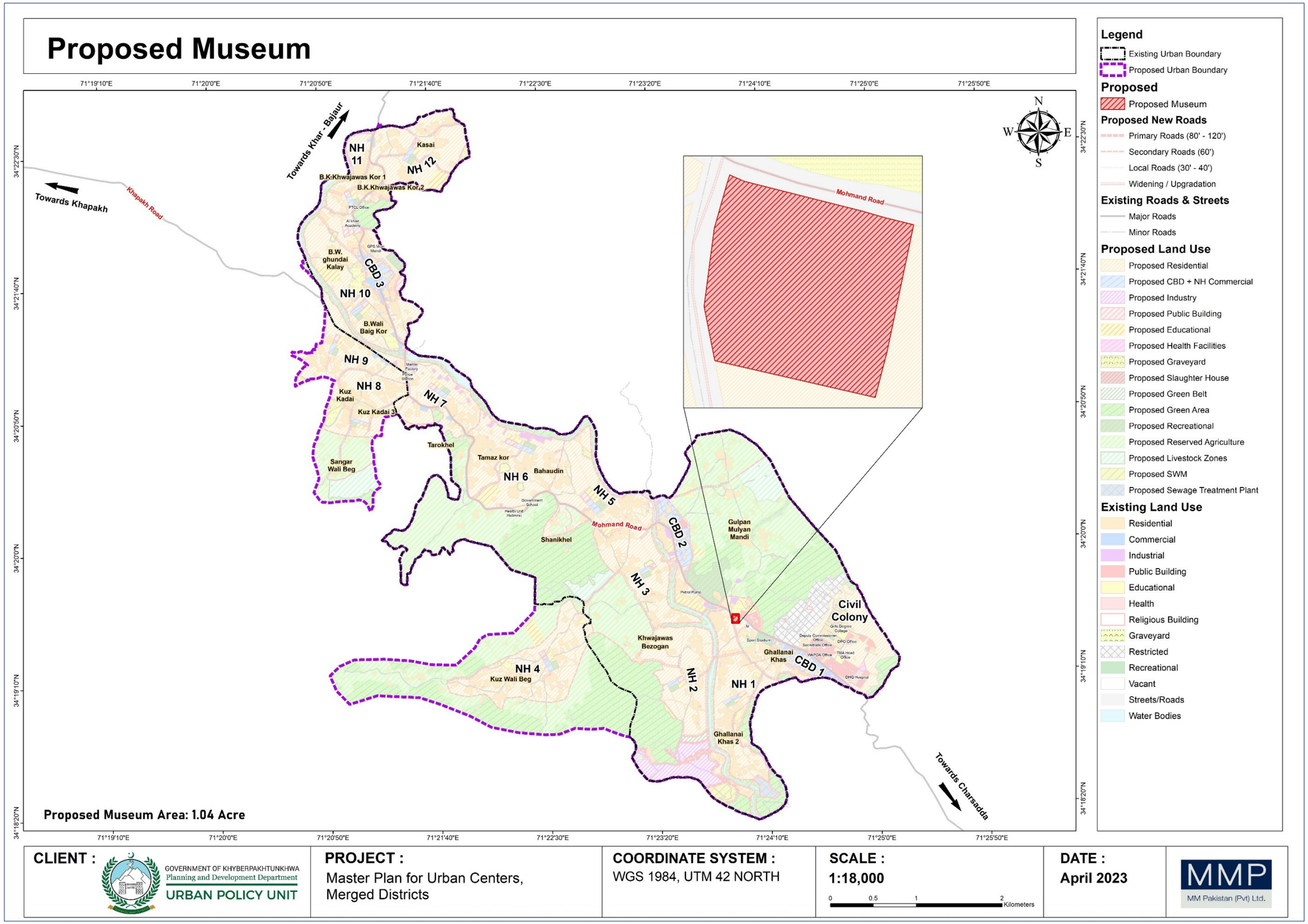
Proposed Land Use

- Proposed Residential
- Proposed CBD + NH Commercial
- Proposed Industry
- Proposed Public Building
- Proposed Educational
- Proposed Health Facilities
- Proposed Graveyard
- Proposed Slaughter House
- Proposed Green Belt
- Proposed Green Area
- Proposed Recreational
- Proposed Reserved Agriculture
- Proposed Livestock Zones
- Proposed SWM
- Proposed Sewage Treatment Plant

CLIENT :	PROJECT :	COORDINATE SYSTEM :	SCALE :	DATE :
GOVERNMENT OF KHYBERPAKHTUNKHWA Planning and Development Department URBAN POLICY UNIT	Master Plan for Urban Centers, Merged Districts	WGS 1984, UTM 42 NORTH	1:18,000 (0, 0.5, 1, 2 Kilometers)	Feb, 2024

MMP MM Pakistan (Pvt) Ltd.

Map 4-20: Proposed Fire Hydrants in Ghalanai Urban Center



Map 4-21: Proposed Museum Site in Ghalanai Urban Center

4.10. Existing WATSAN Profile and Proposed Interventions

4.10.1. Existing Water Supply System

The source of current Water Supply Scheme for Ghalanai Urban Center is 9 tube wells at Charsadda (at a distance of 10 kilometers from Ghalanai Town) wherefrom the water is extracted and taken to Ghalanai. Then this water is uplifted to an overhead water tank and supplied to the citizens of Ghalanai. This water supply scheme was completed in August, 2022 to serve the present population of Ghalanai. The total water extracted from each tube well for 5 to 6 hours per day is 30,000 gallons. However, two tube wells have been closed due to ground water depletion and now the total water supply from remaining 7 tube wells is 210,000 gallons per day. This water supply arrangement is expected to work for around 7 years for the existing and growing population of Ghalanai Urban. This water supply cannot be extended to the Mian Mandi area and it cannot serve the future where a separate water supply system is a dire need for future to serve the Mian Mandi town and surrounding areas.

The development work on the Gandao small dam in Ghalanai had been suspended after a militants' attack on the site in 2014 and could not be resumed so far. The dam was planned to be completed with an estimated cost of Rs490 million. Once completed the water reservoir would supply drinking water to the 24,000 population in Ghalanai town and surrounding areas. However, the work resumed in 2018 on the scheme to provide water supply to Ghalanai Town and has potential to serve 22,000 people. The scheme currently had in pipeline to complete however, lack of funds and security situation in the area create hurdles in execution of the project. There is need for different stakeholders' engagement and public representatives to utilize the existing line department potential in the provision of basic need of drinking water.

4.10.1.1. Water demand

Water consumption recorded in the developed world is more than 50 gallons/person/day, whereas the UN suggests that each person needs 50 to 100 liters of water a day to ensure their basic needs for drinking, cooking, and cleaning. The water demand of urban center for 2022 has been estimated using 30 gallons per capita per day.

Population-based water demand is determined to know about the current as well as future demand of water in Ghalanai urban center. Either according to Khyber Pakhtunkhwa Drinking Water Policy 2015, access to at least 45 liters per capita of potable water is available within a household, or the round trip of fetching potable water does not exceed 30 minutes. The 30 gallons per capita demand is considered for water to include allied uses such as car washing, clothes, gardening, etc. As the same demand for the plan period (2040).

The TMA has made significant efforts to establish a reliable water supply network throughout the urban center. However, despite these efforts, residents are still facing a shortage of water for basic needs such as drinking and cooking.

4.10.1.2. Existing Gap in Water Supply

The current water supply capacity of the 7 tube wells stands at approximately 210,000 gallons, while the projected demand for 2022 exceeds 3,600,000 gallons, resulting in a significant gap of approximately 3,400,000 gallons. It is imperative to address this disparity promptly, while also considering future demand. According to population projections, the figure is expected to double, with the number of people in the project area growing from 32,422 to 63,702. Presently, households primarily

rely on water tankers for their water requirements, with only a limited number accessing spring water and fresh surface water sources.

4.10.1.3. Water Supply Future Options

In light of the projected population of 63,702 individuals in Ghalanai by 2040, it is recommended to implement the following four water supply sources to adequately meet the future requirements of the area and ensure sustainability for the plan period 2040.:

Gandao Dam/Abdul Shakoor Tube well Scheme: Gandao Dam, officially Abdul Shakoor Dam since December 2019, is a gravity dam built near town of Ghalanai in Mohmand District. These tube wells will help meet the growing demand for water in Ghalanai.

Jays Dam Water Supply Scheme: The implementation of the Jays Dam Water Supply Scheme is crucial to cater to the increasing water needs of the population. By harnessing the water storage capacity of Jays Dam, this scheme will provide a reliable and sustainable source of water supply to Ghalanai.

Danish Pool Water Supply Scheme from Springs: The Danish Pool Water Supply Scheme involves harnessing the water resources from the springs and establishing a dedicated water supply system. By utilizing this natural source, the scheme will ensure a consistent and clean water supply to meet the demands of Ghalanai.

Utilization of Water from Kabul River: Considering the availability of water resources, it is proposed to tap into the water of Kabul River to fulfill the water requirements of Ghalanai. By exploring the potential of this river as a water source, additional supply channels can be established to cater to the increasing population's needs.

These four proposed water supply schemes will contribute to the sustainable development and long-term water security of Ghalanai, ensuring that the projected population growth and beyond are adequately provided for.

4.10.1.4. Allocation-Criteria for Drinking Water

The criteria have been devised to ensure water availability at the neighborhood level for allocating tube wells and water filtration plant for Ghalanai urban center:

- At the Center of each neighborhood (1 OHT per Neighborhood)

4.10.1.5. Proposed Water Supply System

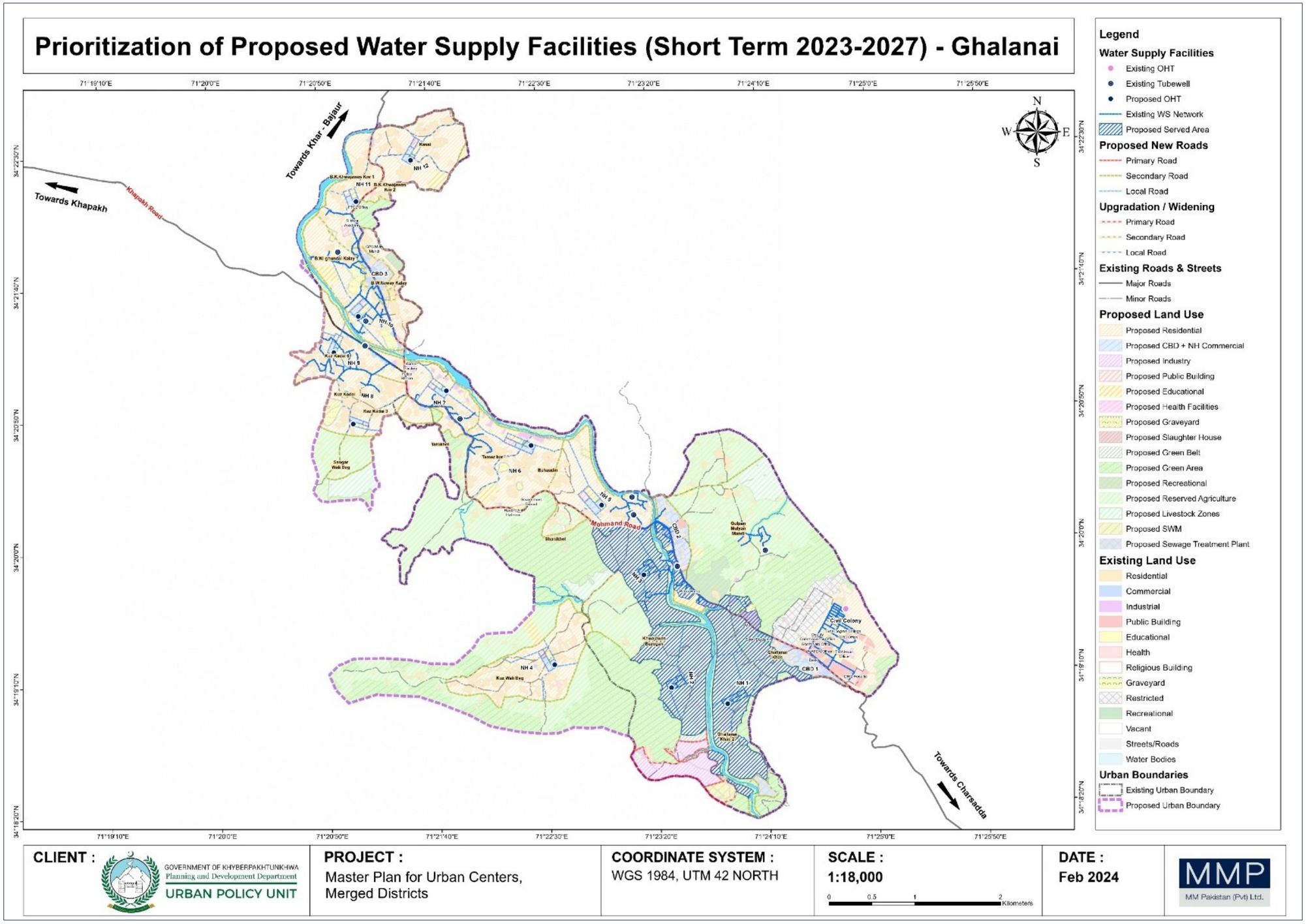
The issue of water supply in the Ghalanai Urban Center is a pressing concern that requires immediate attention. In order to address this issue, a comprehensive plan has been proposed to ensure the consistent and adequate provision of water to the community.

The proposed system includes the development of tube wells and overhead water tanks (OHT) at the neighborhood level. These local reservoirs will have the capacity to meet the water needs of the proposed population within each neighborhood. In addition to these decentralized water sources, it is also proposed that a central water supply system be established in the central business district (CBD) to provide water to commercial, public, and private buildings. This central system will supplement the

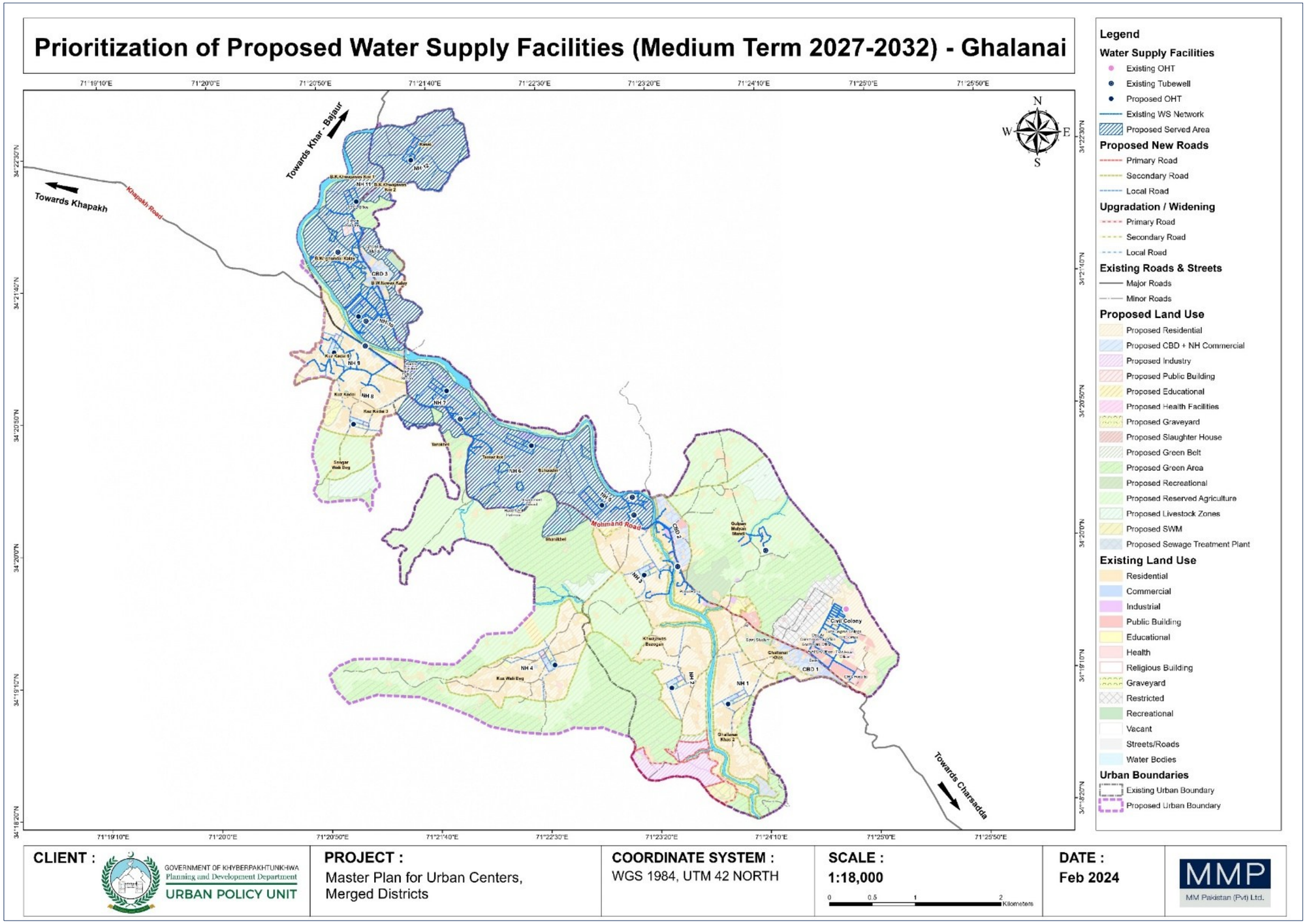
neighborhood-level reservoirs and ensure that a stable and reliable water supply is available for all members of the community.

Overall, the proposed plan for addressing the issue of water supply in the Ghalanai Urban Center seeks to balance the need for decentralized, local water sources with the benefits of a central water supply system. By implementing these measures, it is hoped that a sustainable and efficient water supply can be secured for the long-term benefit of the community.

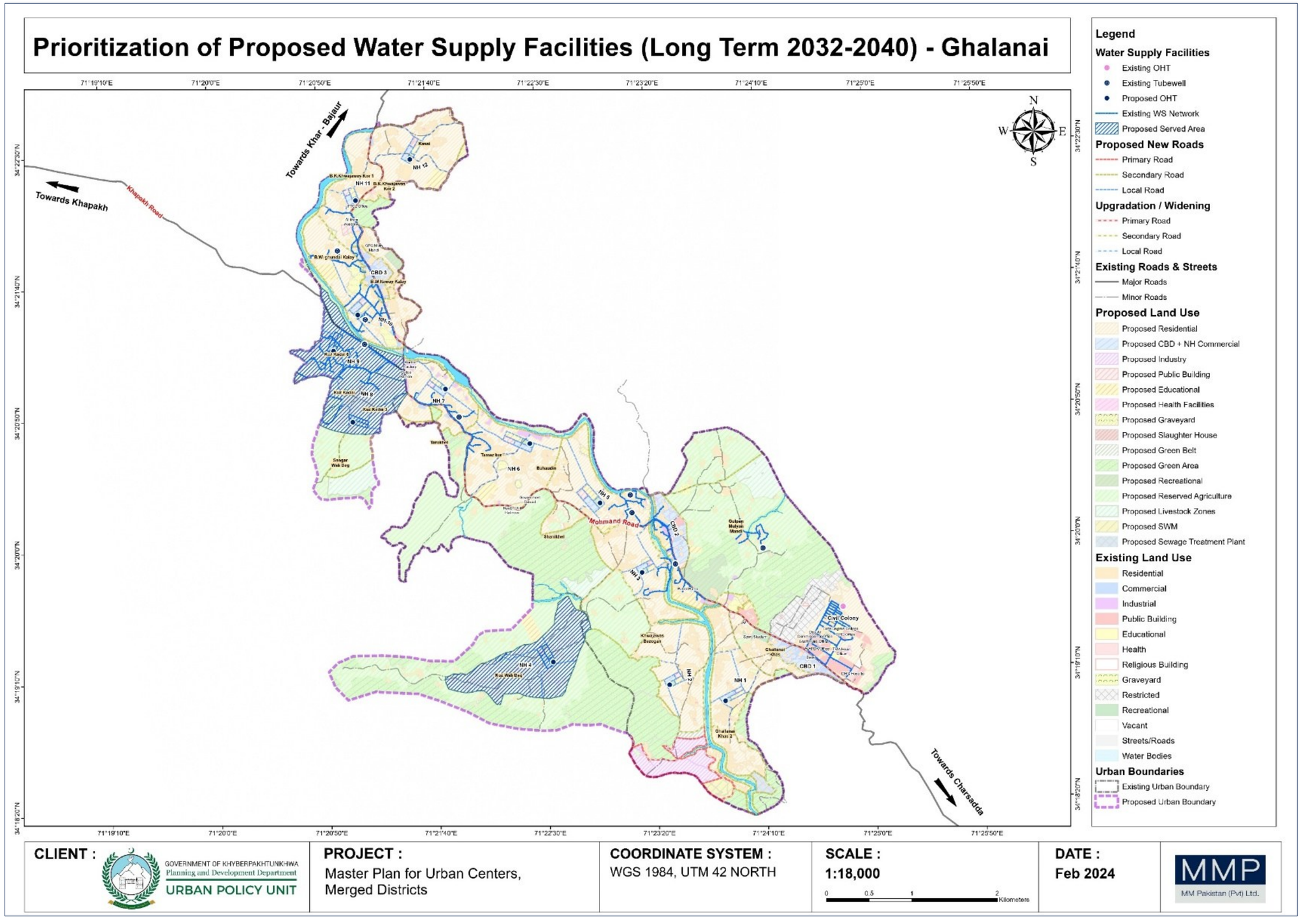
The following maps shows phase-wise interventions for water supply in Ghalanai urban center.



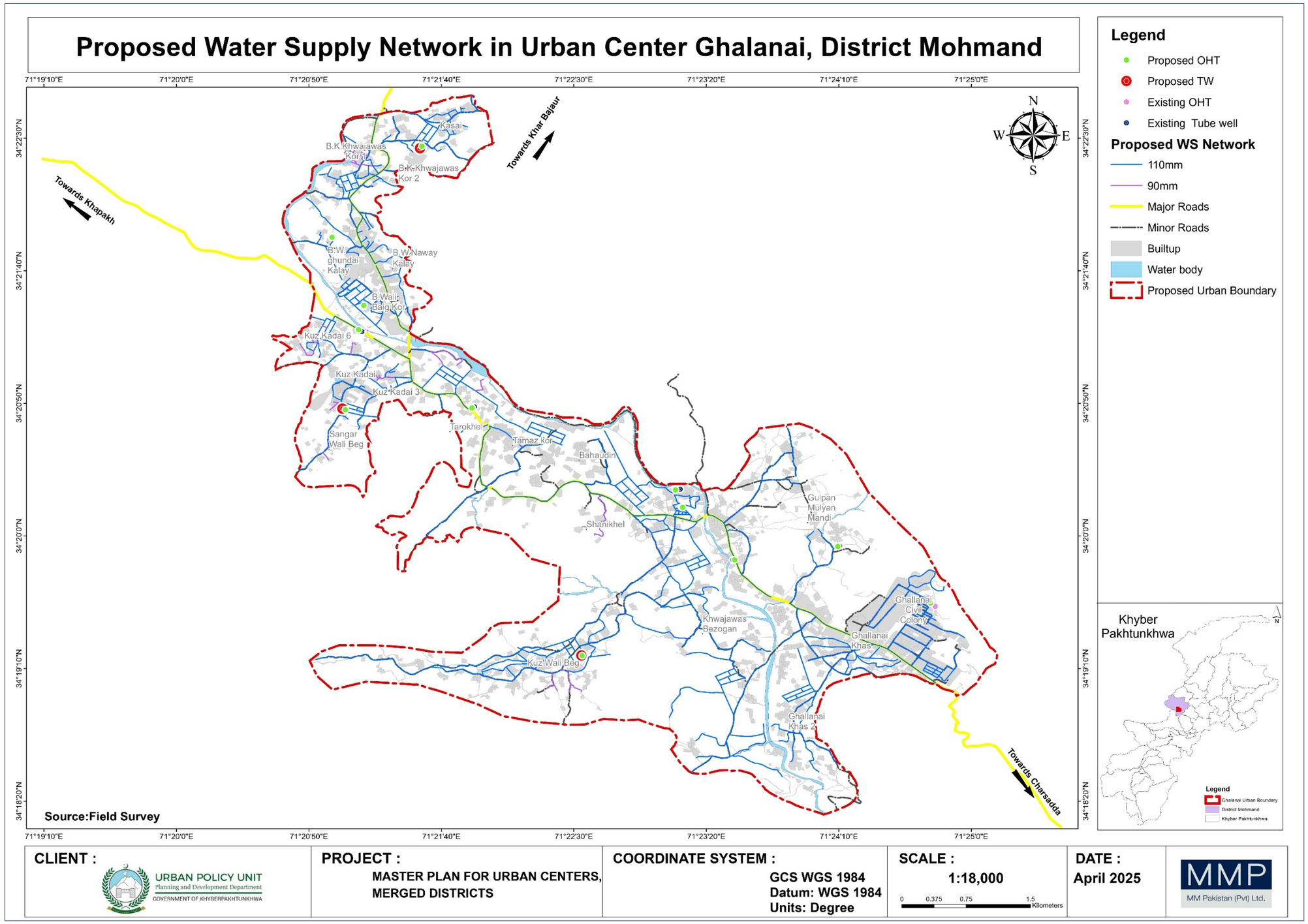
Map 4-22: Short Term- Proposed Water Supply Services Map Network Plan



Map 4-23: Medium Term- Proposed Water Supply Services Map Network Plan



Map 4-24: Long Term- Proposed Water Supply Services Map Network Plan



Map 4-25: Proposed Water Supply Network Map

4.10.2. Sewerage Profile and Phase-wise Interventions

It is clear that the current sewage and drainage system in Ghalanai is insufficient and poorly maintained. The reliance on open drains, which are not properly sloped or maintained, has resulted in residents improperly disposing of sewage and drainage water in the streets or temporary or open drains. This lack of a proper system is a major concern for residents, as indicated by a field survey conducted in 2022, which found that the lack of a proper sewerage system was identified as the most significant issue affecting the daily lives of people in the community. The inadequate sewage and drainage system not only affects the quality of life for Ghalanai residents but also has the potential to cause significant public health and environmental issues. It is essential that a more effective system for the proper disposal of sewage and drainage water be put in place to address these issues.

4.10.2.1. Allocation-Criteria Analysis for Sewage Treatment Plant

The following criteria have been devised for the allocation of a sewage treatment plant for the Ghalanai urban center:

i. At the exit point of wastewater discharge
ii. Low elevation level
iii. Outskirts of the city
iv. Away from the residential area
v. Proximity to the proposed industrial estate

4.10.2.2. Proposed Sanitation system

The proposed sanitation system for Ghalanai is designed to ensure that the Urban Center has a reliable and effective system for collecting, treating, and disposing of sewage and other waste materials. At the heart of this system is a proposed Sewage Treatment Plant, which will be located on a 9-acre site on the outskirts of the Urban Center, at the downstream of the urban center, near the proposed Industrial Estate. The proposed site was selected based multi-criteria analysis that determined it to be the most suitable location. Local sewer lines should be constructed and connected to the proposed sewerage system so that water pollution is avoided and residents of the urban center may benefit from the proposed sewerage system.

The Sewage Treatment Plant will be equipped with state-of-the-art technology and processes for treating and purifying sewage in order to ensure that it meets all relevant environmental and public health standards. The treated sewage will be safely discharged into the surrounding environment or reused for irrigation or other purposes as appropriate.

In addition to the Sewage Treatment Plant, the proposed sanitation system for Ghalanai will also include a network of sewage collection and transport systems, as well as a range of amenities and infrastructure to support the collection and disposal of other types of waste, such as solid waste and hazardous materials.

Overall, the proposed sanitation system for Ghalanai is an essential component of the Urban Center's master plan and will help to ensure that the Urban Center is able to sustainably manage its waste and sewage in a manner that protects the environment and the health and well-being of its residents.

4.10.2.3. Proposed Phase-wise Interventions

In the pursuit of advancing alternative strategies for Water, Sanitation, and Solid Waste Management (WATSAN), an extensive development plan has been created to cater the diverse service aspects within the confines of Ghalanai urban center. This comprehensive action plan describes across distinct timelines, encompassing short-term goals (2023-2025), medium-term aspirations (2025-2030), and long-term visions (2030-2040). The primary objective is to integrate alternative strategies, emphasizing a holistic approach for the effective delivery of WATSAN and Solid Waste management services in the urban center.

Short-Term Action Plan (2023-2025)

The immediate focus of the development plan revolves around achieving short-term objectives. During this phase, our priority is to enhance the existing infrastructure for water supply, sanitation, and solid waste management. This includes upgrading water treatment facilities, expanding sewage systems, and implementing efficient waste collection and disposal methods. Public awareness campaigns will be launched to encourage responsible waste disposal practices and promote water conservation.

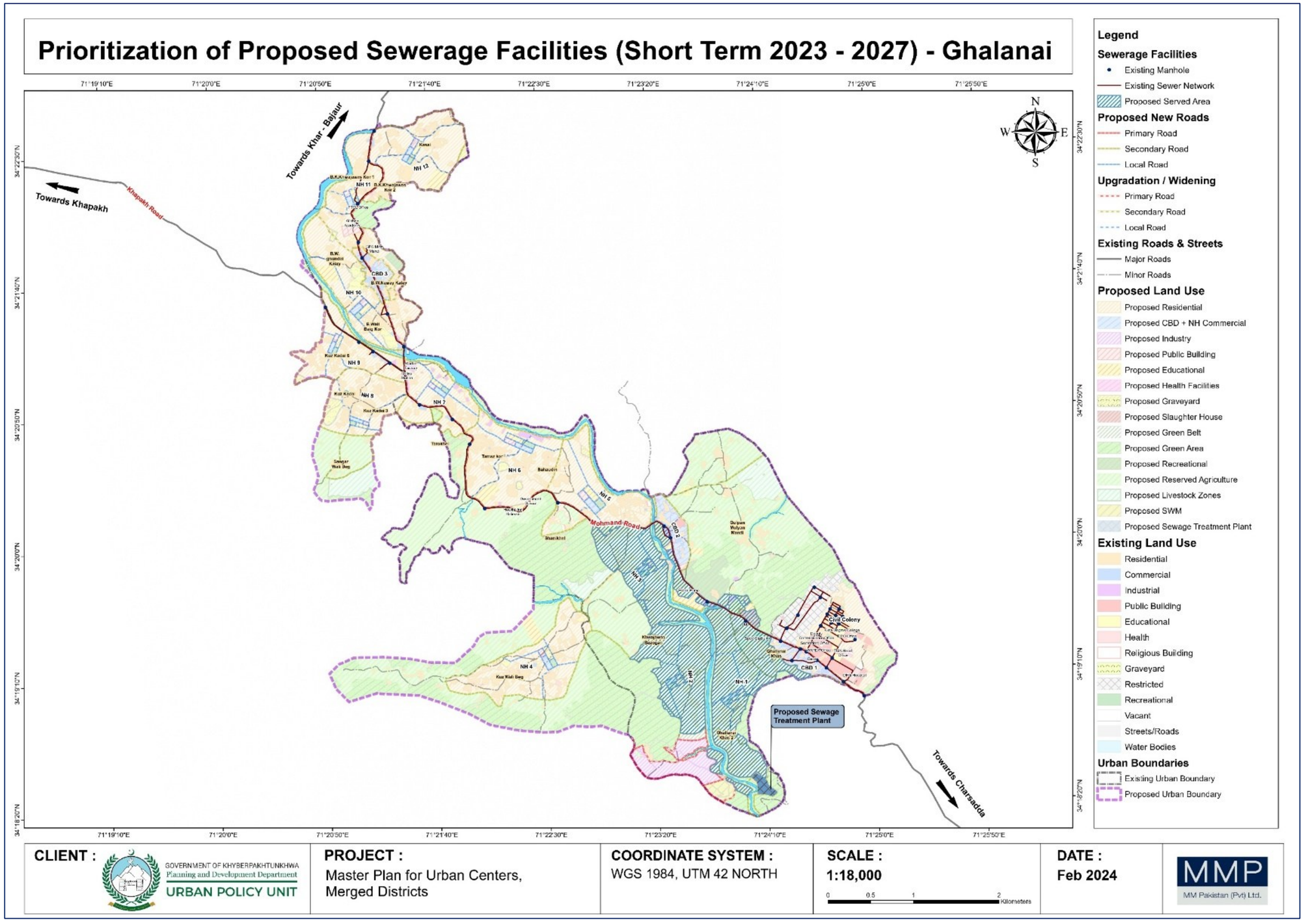
Medium-Term Actions Plans (2025-2030)

Moving into the medium-term horizon, the plan aims to implement sustainable solutions and innovative technologies. Investments will be made in renewable energy sources to power water treatment plants, and smart technologies will be integrated into waste management systems for better efficiency. Community involvement programs will be initiated to foster a sense of ownership and responsibility among residents for the maintenance of communal facilities.

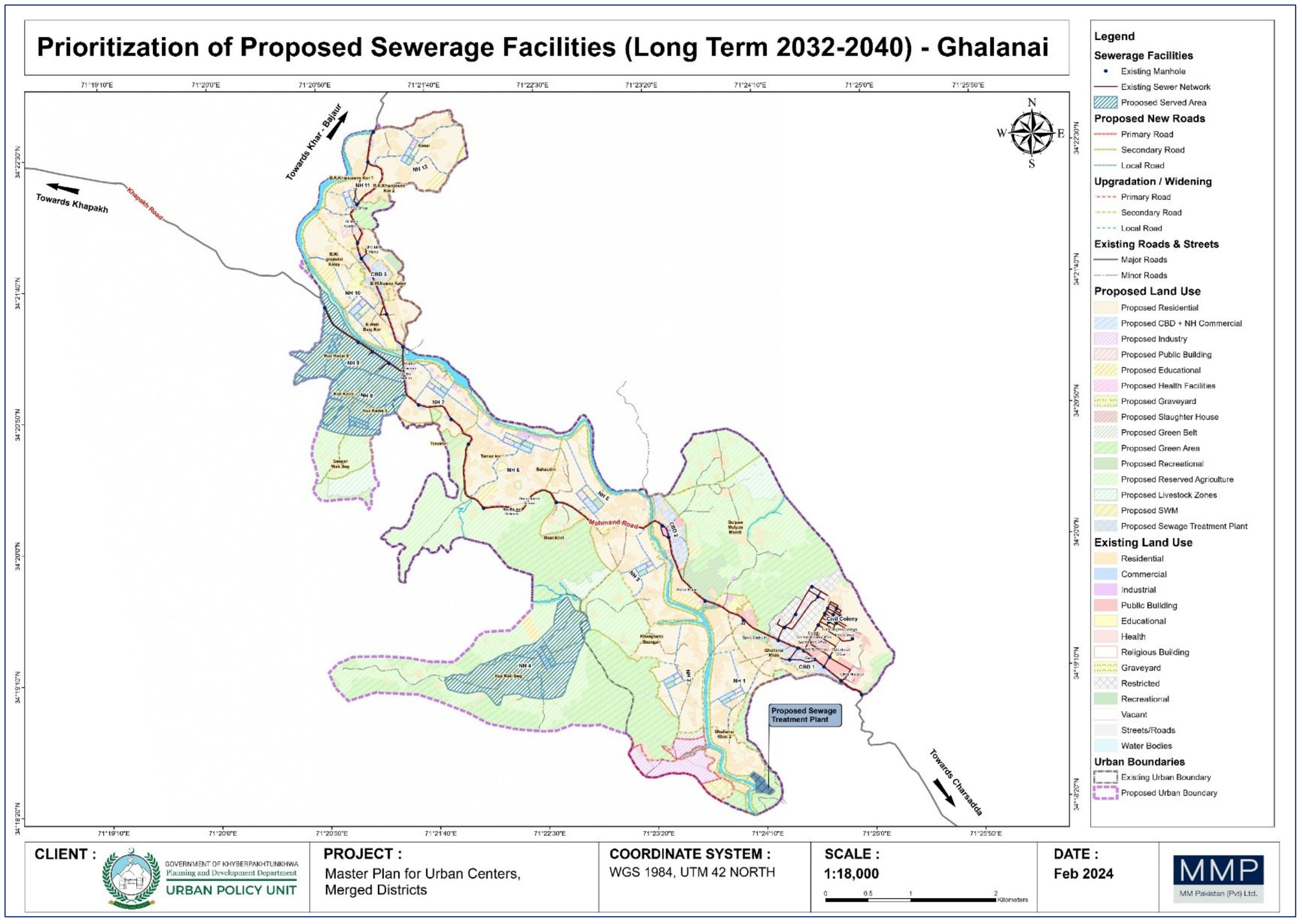
Long-Term Action Plans (2030-2040)

Looking ahead to the long-term, the development plan envisions a transformed urban center with resilient and eco-friendly infrastructure. Green spaces and water conservation initiatives will be integrated into urban planning, ensuring a balance between development and environmental sustainability. The focus will extend beyond infrastructure to include education and capacity-building programs, creating a skilled workforce capable of sustaining these systems independently.

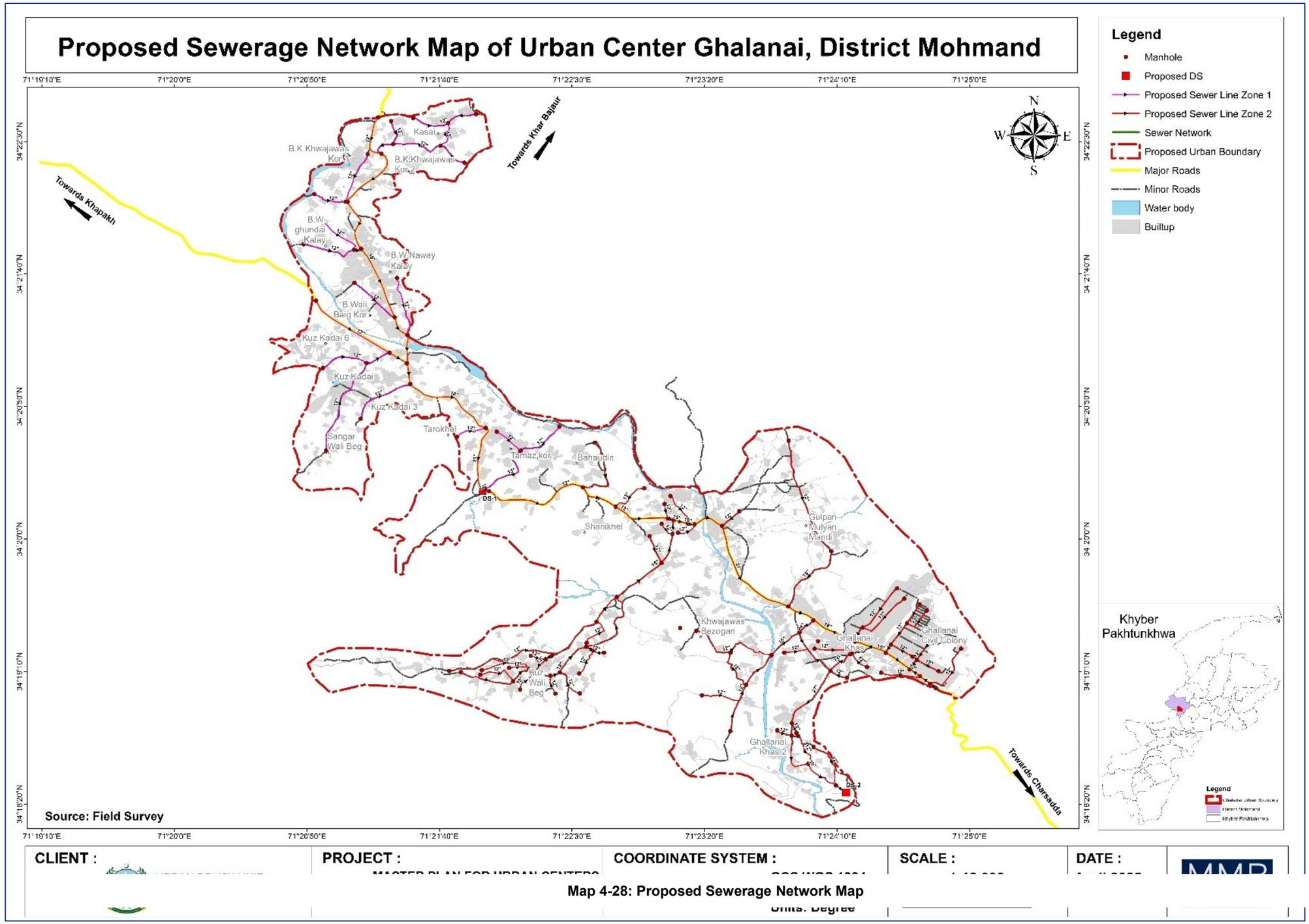
Phase-wise intervention plans are illustrated in the maps below, including detailed layouts of the proposed sewerage network.



Map 4-26: Short Term- Proposed Sewerage Interventions



Map 4-27: Long Term- Proposed Sewerage Interventions



Map 4-28: Proposed Sewerage Network Map

4.10.2.4. Proposed Solid Waste Management Interventions

In Pakistan, solid Waste Generation (per capita/year) ranges between 0.283 to 0.612 kg/capita/day, and its growth rate is 2 % per year. By considering the average minimum and maximum per capita waste generation, the existing and future solid waste generation is calculated for Ghalanai urban center. The average solid waste of 0.26 kg/capita/day is generated.

Table 4-12: Solid Waste Generation in Ghalanai Urban Center

Year	Projected Population	Solid Waste/Kg/day	Tonnes/day
2022	32422	8430	8.43
2040	63702	16,563	16.5

By comparing the solid waste generation and collection, it is determined that only 15 percent of the Urban Center's solid waste is collected by TMA, while the rest of 85 percent is dumped in open spaces, in natural drains, and on streets.

The TMA Ghalanai is responsible for managing the collection, transportation, and disposal of solid waste in the Urban Center. Currently, the TMA handles the collection of waste in Ghalanai Bazar and the surrounding area. However, the TMA is facing challenges in meeting the demand for waste management due to a shortage of skilled personnel, essential equipment, and financial resources. As a result, the current infrastructure is unable to effectively handle the waste management needs of the Urban Center.

The table presents a comprehensive overview of TMA's waste collection capacity, encompassing a range of equipment and operational procedures. The equipment inventory includes 9 large-sized containers with a 4-ton capacity, 15 small-sized containers with a 40 kg capacity, 6 facilitation vehicles, 1 compactor, and 4-wheel barrow. Operational procedures involve the manual collection of solid waste, conducted twice in a week at 7 am. Key issues identified pertain to staffing deficiencies, particularly related to daily wages, technical shortcomings, and inadequacies in the available vehicles for services. Additionally, the land for the dumping site is yet to be purchased by the TMA.

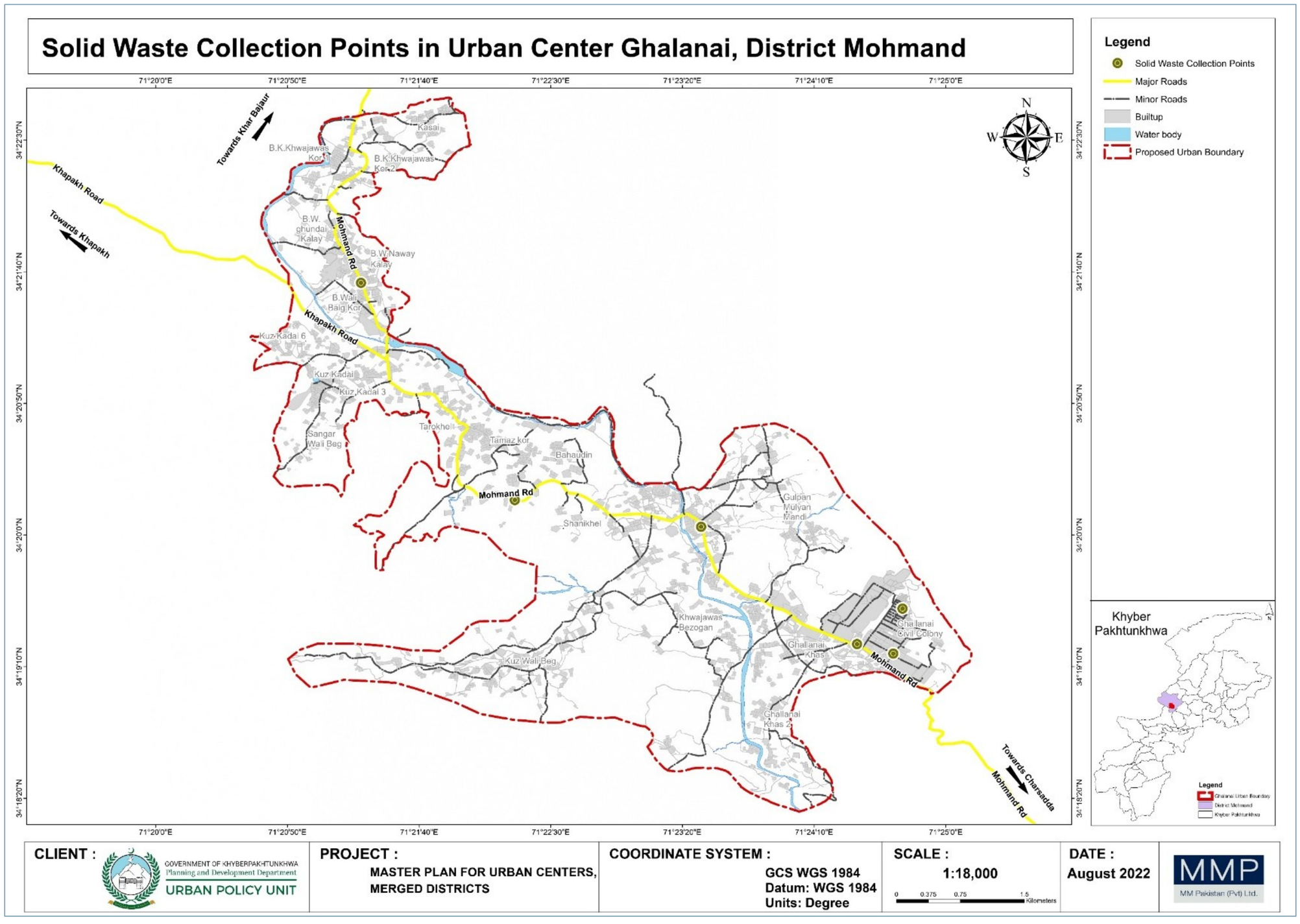
Table 4-13: TMA waste collection Capacity

Existing Service	Equipment	Procedure	Key Issues	Future Programs
Solid Waste	- 9 large sizes, 4- Ton capacity containers. - 15 small size, 40 kg capacity containers - Facilitation Vehicles 6 in number - 1 Loader - 1 Compactor - 4 Wheel Barrow - Manual Spray Pump	- Manual collection of solid waste - Solid waste collection at 7 am twice a week	-Staff issues/deficiencies mostly are daily wages -Technical deficiency -Vehicles deficiencies for services	- Land yet to be purchased for the dumping site

4.10.2.5. Issues in Waste Collection

During the field survey, the solid waste collection system has been studied and the details of waste management discussed with the TMA officials with the identification of major issues:

- Staffing deficiencies, primarily related to daily wages, pose a challenge
- Technical shortcomings indicate potential inadequacies in waste collection methods
- Inadequacies in available vehicles for services suggest logistical limitations
- Limited transportation capacity may impact the overall effectiveness of waste management
- Addressing these issues is crucial for a more efficient and sustainable waste collection process by the TMA
- Lack of maintenance of drains
- Awareness creation among people to avoid throwing waste in open drains and streams to protect natural resources is necessary



Map 4-29: Solid Waste Collection points

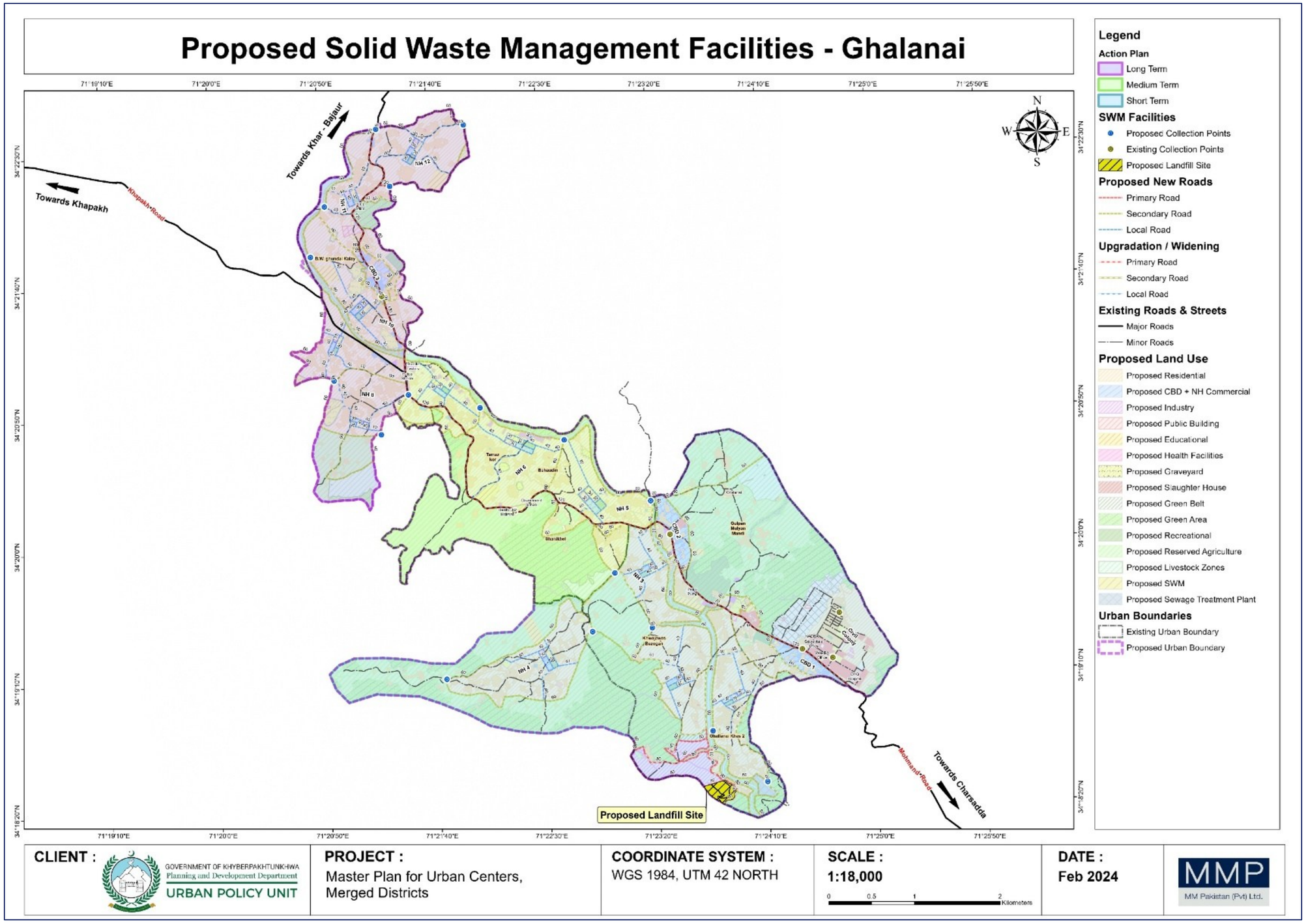
4.10.2.6. Allocation-Criteria for Sanitary Landfill Site

The following criteria have been devised for the selection of the sanitary landfill site for the Ghalanai urban center: Sanitary Landfill Site:

i. At the exit point of wastewater discharge
ii. Connectivity with major roads
iii. Preferably on Barren Land
iv. Away from the residential area
v. Proximity to the proposed industrial estate

4.10.2.7. Proposed Sanitary Landfill Site

In order to effectively address the issues of solid waste management (SWM) in the Ghalanai Urban Center, a comprehensive strategy has been proposed that involves the establishment of both major and minor solid waste collection points at the neighborhood and central business district (CBD) levels. These collection points will ensure that waste is efficiently collected and managed within the Urban Center, improving overall environmental health and quality of life for residents. In addition to these collection points, a 15-acre sanitary landfill site has been proposed downstream of the urban center, near the industrial estate, where industrial waste can also be disposed of. The proposed site was allocated through a multi-criteria analysis, which determined it to be the most optimal site. In order to promote sustainable waste management practices and reduce the overall volume of waste, it is recommended that a recycling plant be installed at the landfill site to reuse waste and minimize the amount of material sent to the landfill. A separate section for the collection of organic waste is also suggested, which can be decomposed in the future to further reduce the overall volume of waste. By implementing these measures, the Ghalanai Urban Center can effectively address its SWM issues and promote sustainable waste management practices for the benefit of its residents and the environment.



Map 4-30: Proposed Solid Waste Management Facilities

4.11. Transportation Facilities and Proposed Interventions

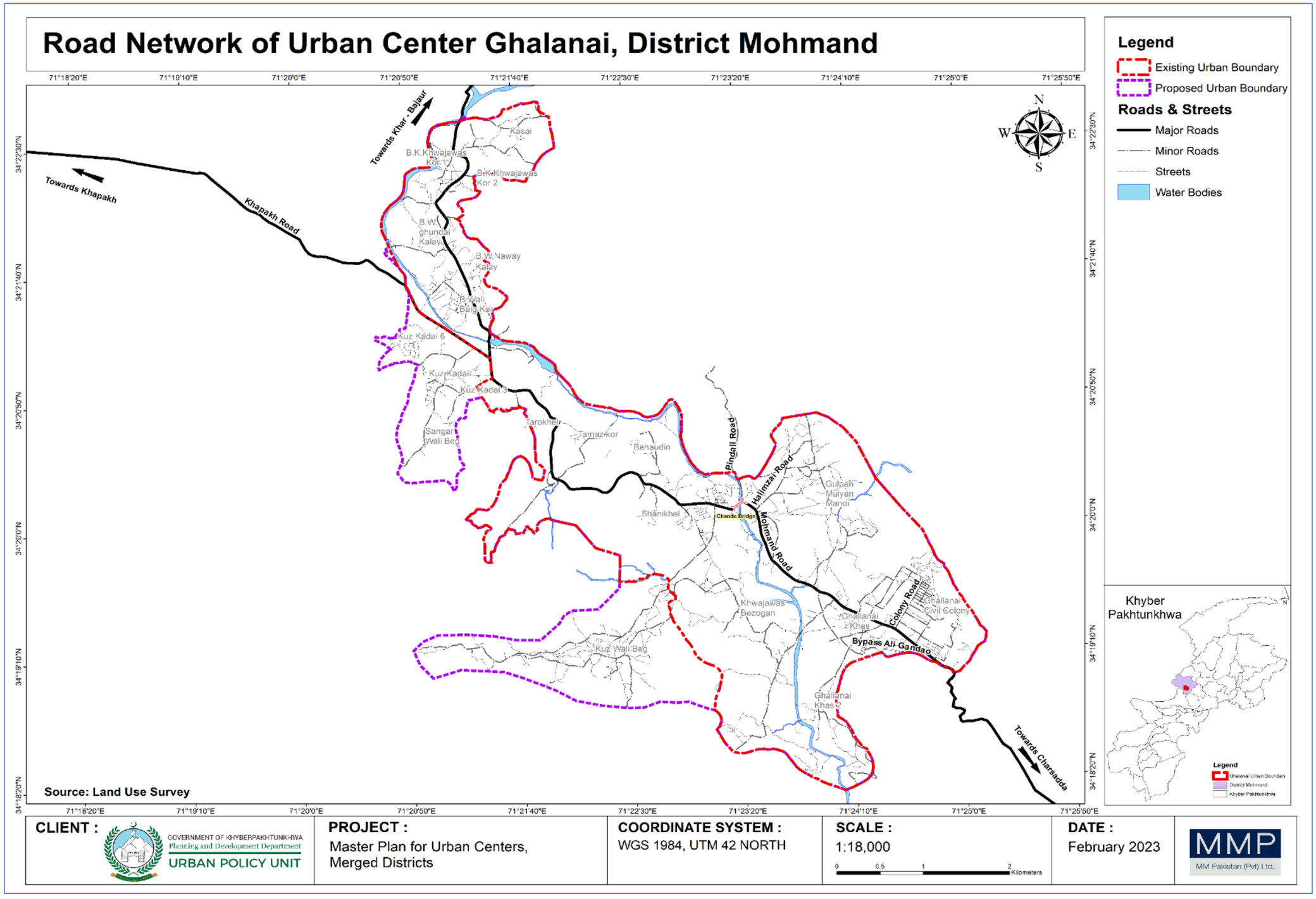
4.11.1. Existing Road Network

According to the established hierarchy, the main transit route (known as the Trunk Road) in Mohmand district is the road constructed by the Federal Works Organization (FWO). This road connects Ghalanai to Peshawar and Shabqadar in the south, and to Nawagai, Bajaur, and Taimergara in the north. Private transportation companies, including bus, coach, and coaster services, offer transport services between Ghalanai and other major urban cities, as well as intercity travel. Apart from the mentioned roads, there is only one bridge located near the Chanda Bazar Road that links the northern and southern parts of the city. This bridge is a reinforced concrete structure that spans 85 meters in length. It has two lanes and is wide enough for two trucks to pass each other simultaneously in opposite directions.

Total length of all roads including in the proposed project area are 75.3 km based on GIS map as calculated in table 4-14 below which contributes 3.99% of the total land use. Major roads contribute 11.5 km, minor roads are 32 km while the streets are 28.8 km in length, these roads are not wide enough with limited rights of way varying between 20 feet to 60 feet and in some cases lesser than this resulting in traffic congestions and jam at various points during the peak hours of traffic.

Table 4-14: Road Network Hierarchy

Type	Name of Road	Total Length (KM)	Carriage Way Width (Feet)
Major Roads	Main Road Ghalanai	11.5	26
	Khapakh Road	3	24
Minor Roads	Total Number of Roads = 45	32	12-24
Streets	Total Number of Streets = 63	28.8	12-24
Total		**75**	



Map 4-31: Existing Road Network of Ghalanai

4.11.2. Proposed Road Network & Transportation Facilities

As per the standard for urban road established by HLURB (The Housing and Land Use Regulatory Board, i.e., 2.4 km per 1,000 population and 1.0 km per square km, adequacy of Total Road Length against population served in the proposed scenario is found as 105.18 km (Future Road Requirements) in 2040, whereas, this requirement covers overall urban network including minor access road within residential areas. Considering these standards for traffic demand and adequacy of road length against population, Primary and Secondary roads have been proposed as summarized. The proposed road development plans for the Ghalanai Urban Center will involve the construction of various roads with different widths and lengths. The Ghalanai Main Road, for example, will be 120 feet wide and extend for a total distance of 11.3 kilometers. The Industrial Estate Road is proposed to be 80 feet wide with 5.5 kilometers in length. The Neighborhood Road will be 60 feet wide and span a total of 59 kilometers, while the NH Center Road will have widths of 40 and 30 feet and extend for 24.80 and 4.4 kilometers individually, providing a connection of arterial roads to each neighborhood which further joins secondary and primary roads of the urban center. Overall, these proposed road development plans will result in the construction of a network of roads with varying widths and lengths that will help to improve connectivity and accessibility within the Urban Center.

4.11.3. Proposed Roads Pattern for Future Development

The road pattern in the urban center has been designed with the goal of aligning with the local topography and improving connectivity. Specifically, the road network has been proposed to include three levels of hierarchy: neighborhood roads, intra-neighborhood roads, and secondary roads. The widths of these roads are proposed to be 30', 40', 60', and 120', respectively. This hierarchy of road sizes and widths is intended to provide a balanced distribution of traffic and support the needs of the local community. The main Mohmand-Bajaur Road is likely a key component of this road network, serving as a major artery for the area and connecting the various neighborhoods and secondary roads.

The proposed road network includes a major upgrade to the existing main road, which was previously 60' wide. The upgrade involved widening the road to 120' in order to accommodate the increasing traffic volume and improve safety for all road users.

According to the traffic volume survey study, as explained in the background study, the existing 60' road was operating at or near capacity during peak hours. The study found that the peak hourly volume (PHV) exceeded the capacity of the existing road, making an upgrade necessary to handle the expected traffic in the future.

The upgrade to a 120' road will not only increase the capacity for vehicles but will also add additional lanes in each direction, improving traffic flow and reducing congestion. This will result in a reduction in travel time for commuters and also improve mobility for commercial vehicles.

The wider road will also provide more space for non-motorized transportation, such as pedestrian and bicycle lanes. Ultimately this will help to improve connectivity and accessibility for all road users and also promote sustainable transportation options.

4.11.4. Proposed Road by Category

The main Mohmand and Bajaur roads are the primary arteries that pass through the urban center and serve as important transportation corridors for the region. To meet the expected increase in demand and accommodate the necessary utilities, such as electricity, water, drainage, and service roads, the

widening of these roads has been proposed to 120 feet. This will allow for more efficient and safe travel along these routes and support the growth of the urban center.

In addition to the main roads, the industrial estate roads have been proposed to have a width of 80 feet to facilitate the transport of raw and finished materials to the industries and warehouses located within the estate. This will improve the efficiency of these operations and help to support the local economy.

To ensure that the traffic flow within neighborhoods is smooth and efficient and to accommodate basic infrastructure, neighborhood roads have been proposed to have a minimum width of 60 feet. The width of internal roads within neighborhoods may vary depending on the topography and local context, ranging from 30-40 feet.

The proposed road development plans for the Ghalanai Urban Center will involve the construction of various roads with different widths and lengths. The Ghalanai Main Road, for example, will be 120 feet wide and extend for a total distance of 11.3 kilometers. The Industrial Estate Road is proposed to be 80 feet wide with 5.5 kilometers in length. The Neighborhood Road will be 60 feet wide and span a total of 59 kilometers, while the NH Center Road will have widths of 40 and 30 feet and extend for 24.80 and 4.4 kilometers individually, providing a connection of arterial roads to each neighborhood which further joins secondary and primary roads of the urban center. Overall, these proposed road development plans will result in the construction of a network of roads with varying widths and lengths that will help to improve connectivity and accessibility within the Urban Center. The table 4-15 below shows proposed roads by category.

Table 4-15: Proposed Road by Category

S. No	Road Category	Width (ft.)	Length (km)
1	Primary Road	120	11.28
2		80	5.46
3	Secondary Road	60	59.18
4	Proposed Local Road	40	24.80
5		30	4.46
Grand Total			105.18

4.11.5. Proposed New Road and Widening/Upgradation

The proposed Master Plan for the Ghalanai Urban Center aims to create a comprehensive and efficient network of roads that can support the growth and development of the Urban Center. As part of these plans, a total of 105.1 kilometers of roads have been proposed for construction or upgradation, covering an estimated area of 455.31 acres in order to improve connectivity and accessibility within the Urban Center. Specifically, 65.34 kilometers of these roads will be newly proposed routes that will be constructed in order to address gaps in the existing road network and support the expansion of various sectors and communities. In addition to these new roads, 39.84 kilometers of existing roads will also be upgraded in order to increase their capacity and improve their safety. These upgrades will help to ensure that the Urban Center's Road network is able to accommodate the needs of its growing population and support the overall development of the Ghalanai Urban Center. The detail of the new roads and the widening of the existing road are given as under:

Table 4-16: Proposed New Road and Widening/Upgradation

S. No	Road Type	Length (KM)
1	Proposed Roads	65.34
2	Upgradation / Widening	39.84
Grand Total		**105.18**

Source: Land Use survey 2022

The proposed plan to construct new roads and upgrade existing ones is aimed at improving the overall interconnectivity between different parts of the urban center. These developments are expected to create a more vibrant environment in the city, both in the present and in the future, up until the plan period of 2040.

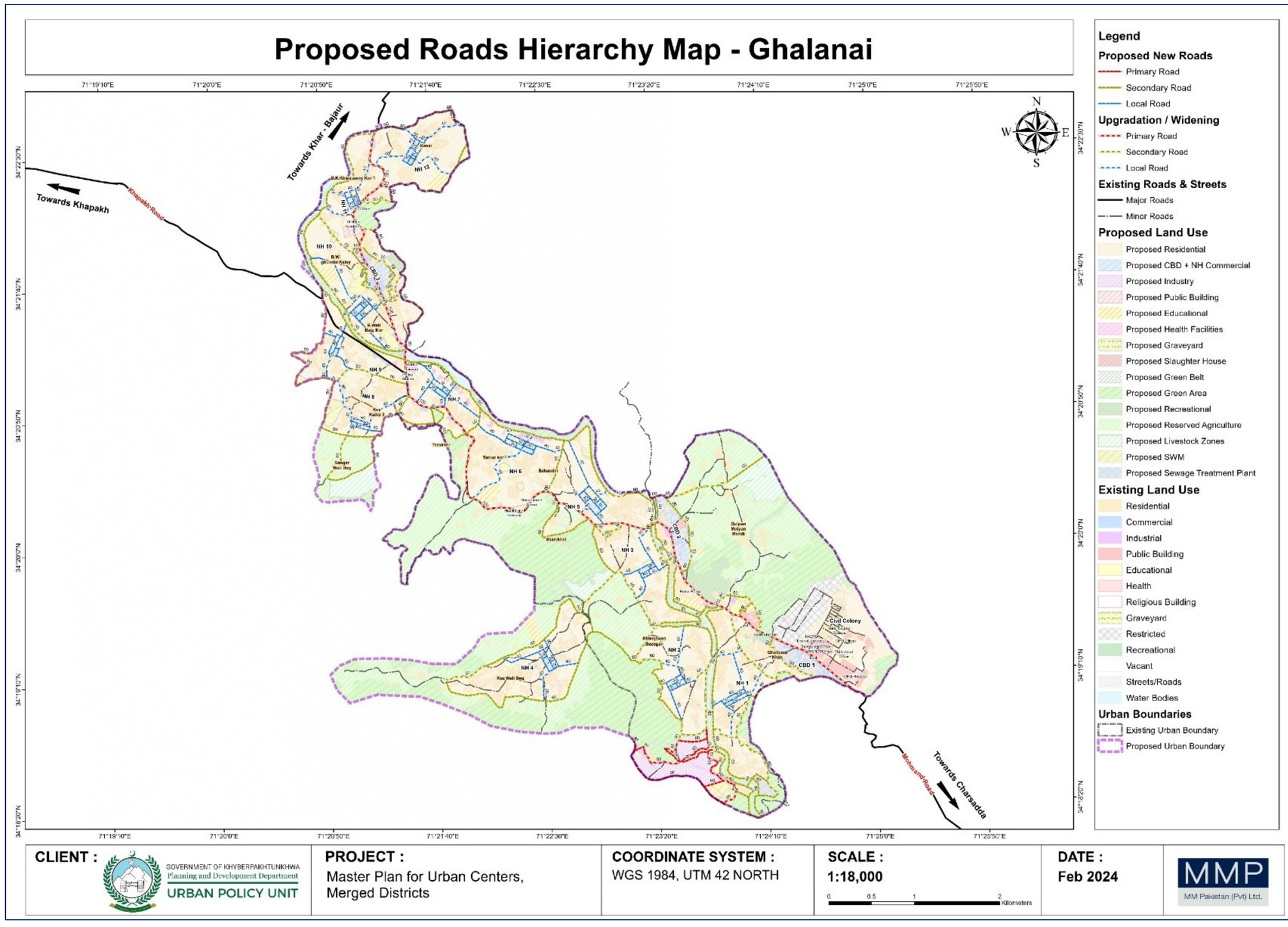
By building new roads, the city can expand its reach and access to previously isolated areas. This will lead to better accessibility for commuters and improved connectivity for businesses. Upgrading existing roads will also help in easing traffic congestion, improving road safety, and reducing travel times for residents.

In addition to providing physical connectivity, the new roads and upgrades will facilitate the growth of the city by creating an environment that fosters economic and social development. The development of these roads will help in connecting different parts of the city, and consequently, people from diverse income and social backgrounds, enabling cultural exchanges and bringing communities closer together.

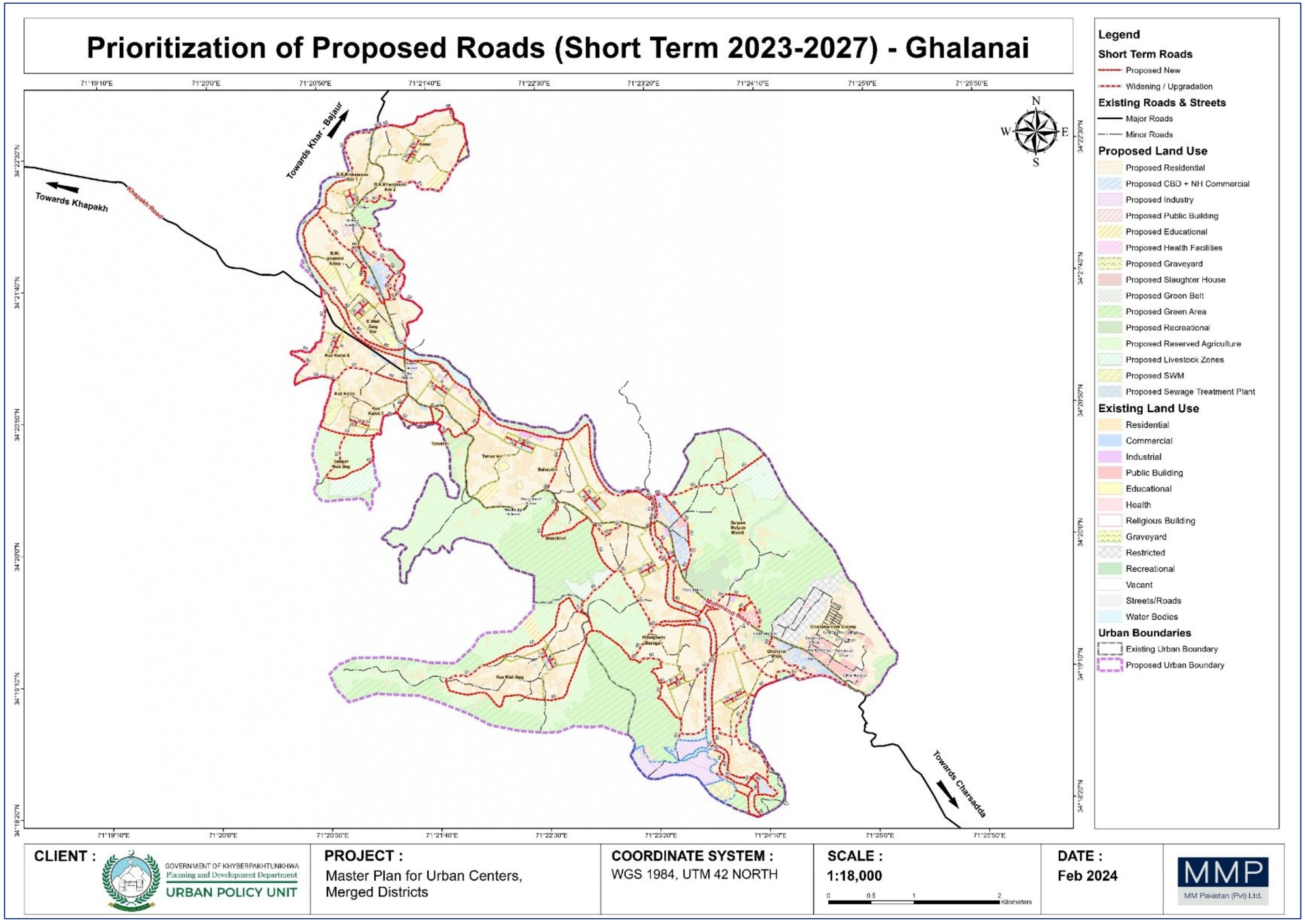
New road construction and upgrades will improve connectivity and create a vibrant urban environment until 2040. These developments will also create vibrancy and promote social development urban center.

The proposed new roads and upgradations well ensure the overall inter-connectivity between the existing as well as the future development and will help in creating vibrancy in the Urban Center for the plan period of 2040. The proposed road hierarchy is shown in the map 23 below.

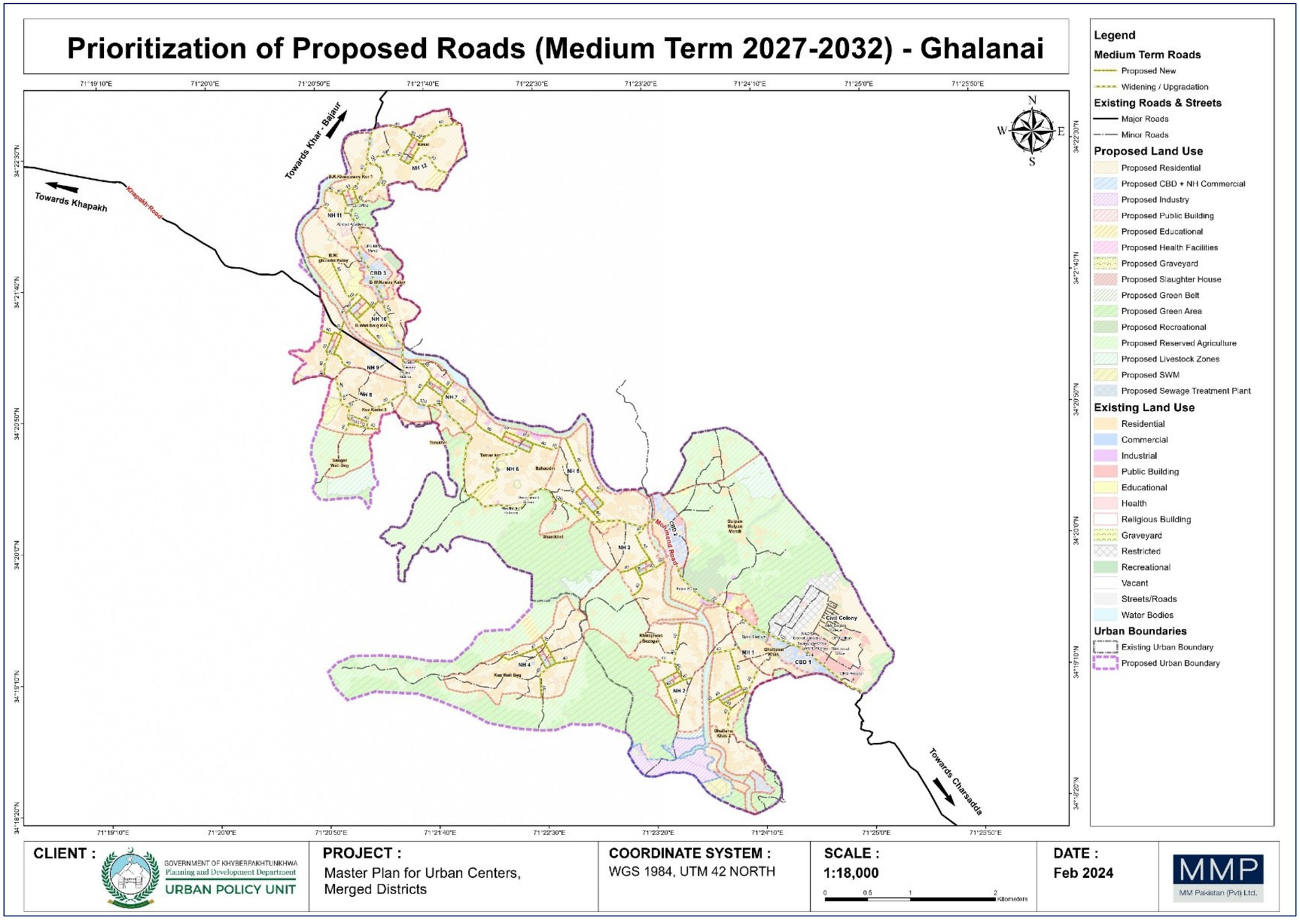
4.11.6. Proposed Phase-wise Interventions



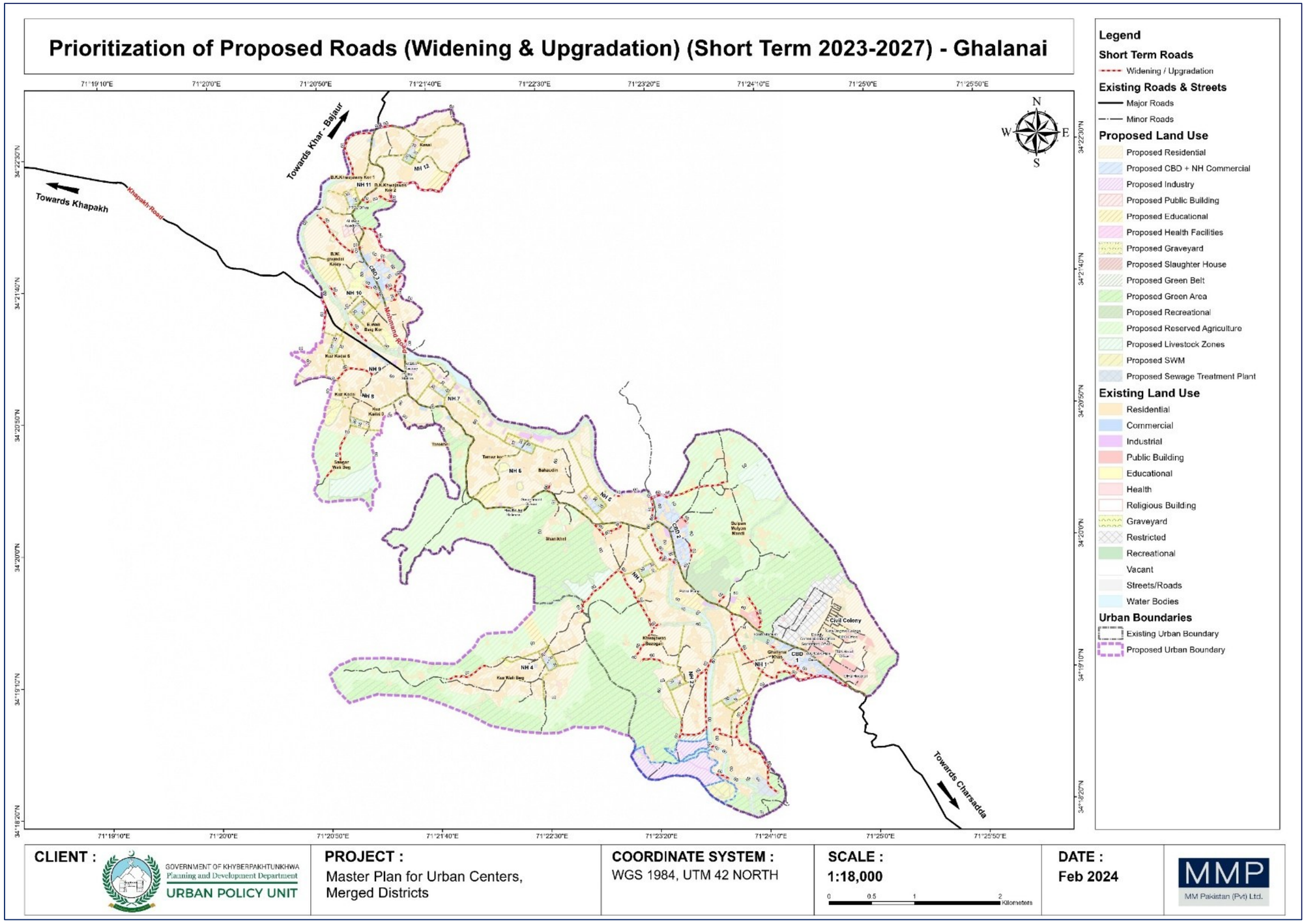
Map 4-32:Proposed Road Hierarchy Maps



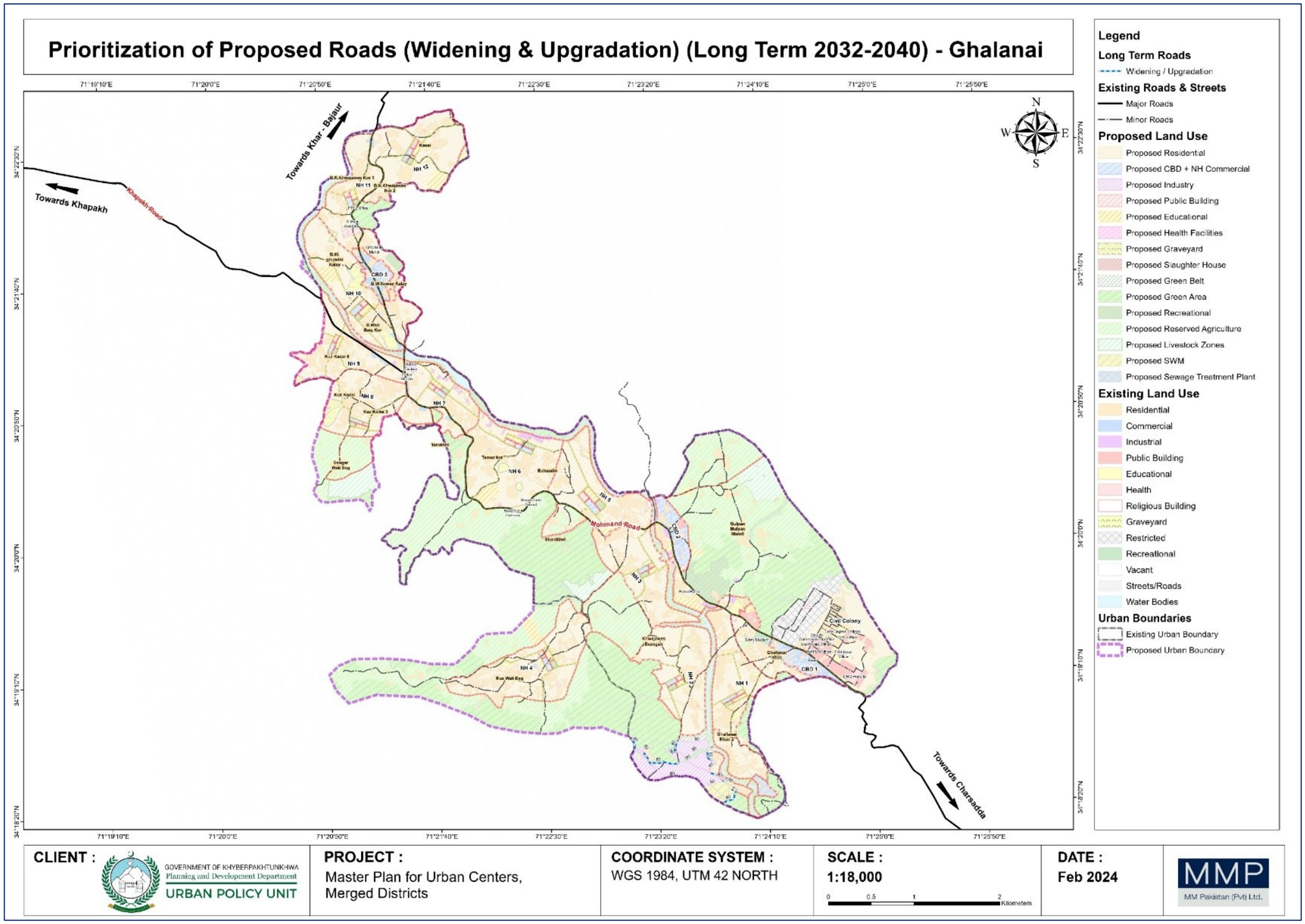
Map 4-33:Short Term- Proposed Roads Intervention



Map 4-34: Medium Term- Proposed Roads Intervention



Map 4-35: Short Term- Widening and Upgradation of Roads Intervention



Map 4-36: Long Term- Widening and Upgradation of Roads Intervention

4.12. Proposed Diaster Risk Reduction and Enviormental Interventions

4.12.1. Existing Situation

According to the Contingency plan 2022, the District Mohmand falls in moderately vulnerable to natural disasters. The recent inventory conducted by the Emergency Operation Center showed that natural disasters had caused damage to housing units, schools, and other public and private buildings in the district. These hazards have occurred in rural areas outside the urban area of Ghalanai. However, in the future, there is the possibility of urban flooding in case of heavy rains and cloud outbursts. Since the urban area of Ghalanai is located on higher ground, there is no possibility of khwar flooding in the urban area of Ghalanai.

4.12.2. Natural Hazards

Earthquake: As discussed above, the district Mohmand lies in Zone-3; therefore, there is always a high risk to structures and buildings which may cause causalities of both the human beings and animals. Further, it is revealed from the data obtained from the field about the housing units most of the units lack structural stability and are vulnerable to seismic activity. For devising Disaster Risk Reduction (DRR), the structural strength of all buildings and infrastructures should be ensured in new plans.

Landslides / avalanches: The urban center of Ghalanai does not have steep slopes. Therefore, there is no landslides/avalanche disaster risk.

Flash Floods: Damages due to floods in 2022 have occurred in district Mohmand; however, the project area has not experienced any flood-related devastations.

4.12.3. Manmade Hazards

Wastewater: The industries discharge their wastewater into the adjacent nullahs without prior treatment, which, as per laboratory analysis of the samples, the COD and BOD exceed the NEQS.

Mining and Quarrying: The mining and quarrying in the district lead to land sliding and rock falling, which pose a threat to public property as well as human loss.

4.12.4. Proposed Guidelines

Ghalanai Urban Center is vulnerable to various natural and human-made disasters that have the potential to cause significant loss of life, property damage, and disruptions to economic and social activities. Thus, it is crucial to implement effective disaster risk reduction (DRR) measures that aim to mitigate the impact of such disasters on the Urban Center's inhabitants and infrastructure. These DRR measures will be further detailed in the DRR action plans, which will outline specific strategies and actions to be taken to reduce the risks and enhance the resilience of the Urban Center against disasters.

4.13. Environmental Protection & Sustainability

Summary of Environmental Quality Results:

Environmental testing samples of air water, and soil conducted in Ghalanai Urban Center yielded the following results:

4.13.1. Air Quality:

- The levels of Nitrogen Oxides (NO, NO2, and NOx) were well within the National Environmental Quality Standards (NEQS).
- Sulfur Dioxide (SO2) was also compliant with NEQS limits.
- Carbon Monoxide (CO) levels across all monitoring sites were within permissible limits.
- Particulate Matter (PM10, PM2.5, and SPM) at all sites complied with NEQS standards.
- Lead Airborne Particles and Ozone levels were also well below NEQS limits.

4.13.2. Noise Levels:

Hourly noise monitoring at ten locations showed that all sites complied with commercial noise standards during both day and night.

This indicates that, overall, Ghalanai's air and noise quality meet national standards, showcasing positive environmental conditions but also highlighting the need for continuous monitoring to ensure sustainability.

4.13.3. Drinking Water and Waste Water Sample

A total of eight samples were collected where six samples collected for drinking water and two sample were collected for waste water. The drinking water samples were collected from tube well and ground water, three each from the project area. Drinking water samples were collected from the main drinking water sources of the worksite while the wastewater sample was collected from the final discharge point of the campsite.

As discussed in the methodology in background study, High density sterilized methods are used for the sampling and prevention of drinking and wastewater. The following standard methods were used for analysis:

- American water works association (AWWA)
- American public health association

Water quality data as generated after laboratory testing of drinking water and surface / wastewater sample revealed that except for the COD and BOD, all other parameters tested, are in compliance with the National Environmental Quality Standards (NEQS) for liquid effluents and drinking water respectively.

The COD in Khwajas Kor is 290 mg/l and near Akhun Zadgan Masjid the COD value is 250 mg/l while the NEQS value is 150 mg/l for COD. Similarly, the BOD for the above sites are 142.5 mg/l and 122.5 mg/l respectively while the NEQS value of BOD is 80 mg/l

4.14. Proposals for Environmental Protection and Sustainability

Based on these findings, the following proposals have been made to enhance sustainability and protect Ghalanai's environment:

4.14.1. Sustainable Urban Development:

The city will adopt the Linear Dynapolis model, which promotes walkability and reduces dependence on vehicles, helping to minimize carbon emissions and traffic congestion.

4.14.2. Efficient Land Use:

The Master Plan allocates 30.6% of land for agriculture and reserves space for livestock and poultry farming, ensuring food security and preserving green spaces while balancing urbanization.

4.14.3. 3. Compact and Accessible Neighborhoods:

Self-sufficient neighborhoods will be developed to enhance the quality of life. Essential services like schools, healthcare, parks, and transportation will be accessible within walking distance, reducing the need for long commutes and lowering environmental impact.

4.14.4. 4. Monitoring Population Growth and Resource Use:

The Master Plan will align infrastructure development with projected population growth, ensuring responsible resource use and preventing environmental degradation due to overburdening.

4.14.5. 5. Proposed Green Zones and Neighborhood Parks:

The Master Plan includes designated green zones and 13 neighborhood parks, enhancing biodiversity, air quality, and providing recreational spaces for residents.

The Master Plan for Ghalanai Urban Center prioritizes environmental sustainability by promoting walkable neighborhoods that reduce reliance on vehicles, thus cutting down carbon emissions and traffic congestion. It also emphasizes efficient water and sanitation systems, improving public health and reducing environmental contamination. Disaster Risk Reduction (DRR) measures are integrated to enhance resilience against natural hazards, ensuring community safety. The plan also focuses on safety and security, with well-designed infrastructure and emergency response systems. By reserving protected agricultural zones, the plan supports food security and the preservation of green spaces, while recreational areas like parks contribute to the quality of life. These initiatives collectively foster a sustainable, resilient, and livable urban environment, balancing development with environmental protection.

4.14.6. Contribution to Sustainable Development Goals

The proposals for Ghalanai's Master Plan contribute to several United Nations Sustainable Development Goals (SDGs):

4.14.7. Sustainable Urban Development:

SDG 11 (Sustainable Cities and Communities): Promotes walkability, reduces vehicle dependence, cuts emissions, improves air quality, and decreases traffic congestion.

4.14.8. Efficient Land Use:

SDG 2 (Zero Hunger): Zones reserved for agriculture and livestock farming to support food security and a resilient food supply.

SDG 15 (Life on Land): Preserved green spaces and balances urban development to protect terrestrial ecosystems.

4.14.9. Compact and Accessible Neighborhoods:

- **SDG 11 (Sustainable Cities and Communities):** self-sufficient neighborhoods with easy access to services, promoting equitable urban living.
- **SDG 3 (Good Health and Well-Being):** Accessible healthcare and recreational facilities improve public health and encourage physical activity.

4.14.10. Monitoring Population Growth and Resource Use:

- **SDG 12 (Responsible Consumption and Production):** Aligns infrastructure with population growth to promote responsible resource use and prevent over-exploitation.
- **SDG 13 (Climate Action):** Ensures sustainable development by avoiding environmental overburdening.

4.14.11. Green Zones and Neighborhood Parks:

- **SDG 13 (Climate Action):** Contributes to climate resilience through carbon sequestration and enhanced biodiversity.
- **SDG 15 (Life on Land):** Supports biodiversity and ecosystem services.
- **SDG 11 (Sustainable Cities and Communities):** Improves livability and fosters a sense of community.

4.14.12. Additional contributions:

- **SDG 6 (Clean Water and Sanitation):** Efficient water and sanitation systems improve public health and reduce environmental contamination.
- **SDG 11 (Sustainable Cities and Communities):** Disaster Risk Reduction measures enhance resilience and safety against natural hazards.

These proposals collectively foster sustainability, resilience, and a high quality of life in Ghalanai

4.15. Tourism and Heritage Development

Tourism Development and Sustainable Tourism

This section addresses tourism development in general and cultural heritage-based tourism in particular. In this context, it is important to examine it through the internationally accepted concepts developed by the relevant international bodies of which Pakistan is a member state and endorses their definitions. Although, at the moment the scale of tourism in the study areas do not seem to threaten the local cultural heritage or environment, but the concepts of responsible and sustainable tourism should be taken into account from the beginning in formulating any policies or activities concerning tourism development with the long-term goals and future in view.

UNESCO, ICCROM, ICOMOS, IUCN, and WTO are all such organizations that work to promote sustainable development and the preservation of cultural and natural heritage. Here is how each of them defines sustainable tourism:

UNESCO: UNESCO defines sustainable tourism as “tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities.”

ICCROM: ICCROM (International Centre for the Study of the Preservation and Restoration of Cultural Property) defines sustainable tourism as “tourism that maximizes its economic, social, and environmental benefits while minimizing its negative impacts (particularly on cultural heritage).”

ICOMOS: ICOMOS (International Council on Monuments and Sites) defines sustainable tourism as “tourism that respects the cultural and natural heritage of the host communities, while providing economic and social benefits to local populations.”

IUCN: The International Union for Conservation of Nature (IUCN) defines sustainable tourism as "tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities." It aims to balance the economic benefits of tourism with its negative impacts and to promote long-term conservation and development in the destinations where it takes place.

All these organizations emphasize the importance of balancing economic, social, and environmental factors to create a sustainable tourism industry that benefits all stakeholders, including tourists, local communities, and the environment.

WTO: The World Tourism Organization (WTO) defines sustainable tourism as "tourism that meets the needs of present tourists and host regions while protecting and enhancing opportunity for the future. It is envisaged as leading to management of all resources in such a way that economic, social, and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems." The WTO's definition emphasizes the importance of intergenerational equity, resource conservation, and cultural preservation in sustainable tourism.

Table 4-17: Proposed Phase-Wise Development of Tangible, Intangible Heritage, and Tourism

Sr. No.	Proposed Actions	Proposed Actors	Time Period	Tentative Cost (in million PKRs)
1	Documentation and Inventorying Heritage in KPK: tangible, intangible, natural, living, and documentary in Mohmand District	• Directorate of Archaeology and Museums Government of Khyber Pakhtunkhwa	5 years	10-50

2	Establishing a monitoring and enforcement system	• Directorate of Archaeology and Museums Government of Khyber Pakhtunkhwa • District Administration	Continuous	2-8/year
3	Developing and Promoting Heritage Tourism Renovation of Eidgah Masjid	• Tourism Corporation of Khyber Pakhtunkhwa • Directorate of Archaeology and Museums Government of Khyber Pakhtunkhwa • District Administration	5 Years	10-50
4	Developing a Small-Scale History and Heritage Museum	• Directorate of Archaeology and Museums Government of Khyber Pakhtunkhwa • Local Communities	5-10 Years	50-100
5	Mohmand Heritage Festival	• District Administration • Local Communities • Private Partners (CSR)	Annual	10-25/Year

4.16. Commercialization, Investment Attraction and Economic Development

The economic development and investment attraction strategy for Ghalanai Urban Centre, as outlined in the Master Plan, focuses on creating a balanced and sustainable growth environment. Key proposals include the establishment of an industrial estate to foster local business growth, alongside a designated central blue area aimed at commercial expansion. The plan also emphasizes the promotion of agriculture and livestock through targeted action plans, encouraging regional prosperity. Furthermore, tourism and regional development initiatives are integral, with suggestions for mining, livestock farming, and the improvement of connectivity through new road infrastructure. These comprehensive proposals aim to stimulate both local and regional economic growth, positioning Ghalanai Urban Centre as a hub for diverse sectors.

Figure 4-2: Economic Development Strategies

4.17. Rural Urban Fringe and Regional Development

The fringe exists in the agricultural hinterland, where land use is changing, and is characterized in relation to the metropolis. The Rural-Urban Fringe and Regional Development action plan aim to boost the development of the Ghalanai urban center, taking into account settlement distribution in the district and broader regional context. The goal of this action plan is to demonstrate how integrating landscape and environmental resources into the planning system can generate economic, social, and environmental benefits.

The following key interventions have been proposed for rural-urban fringe & regional development.

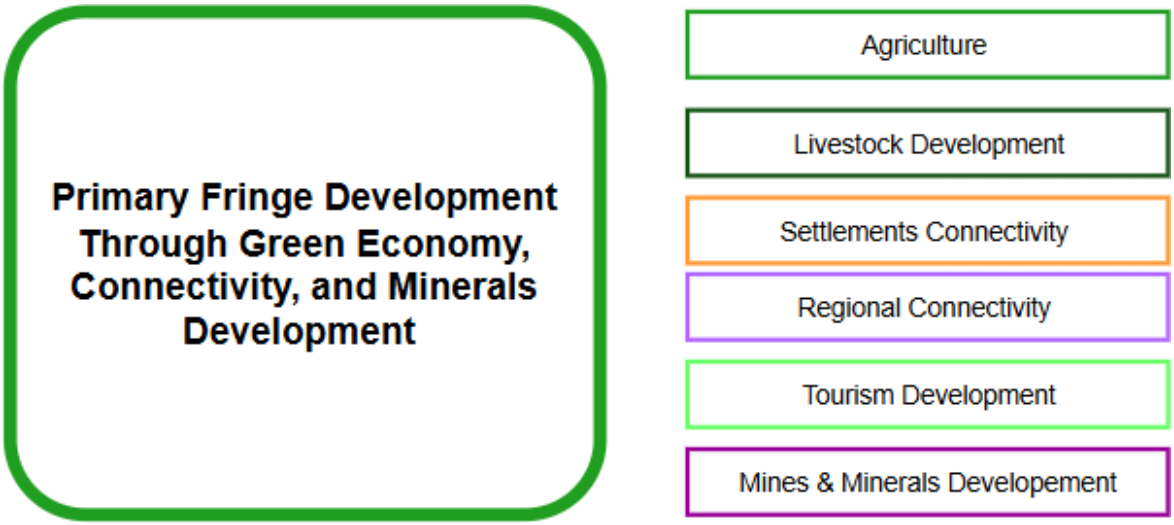
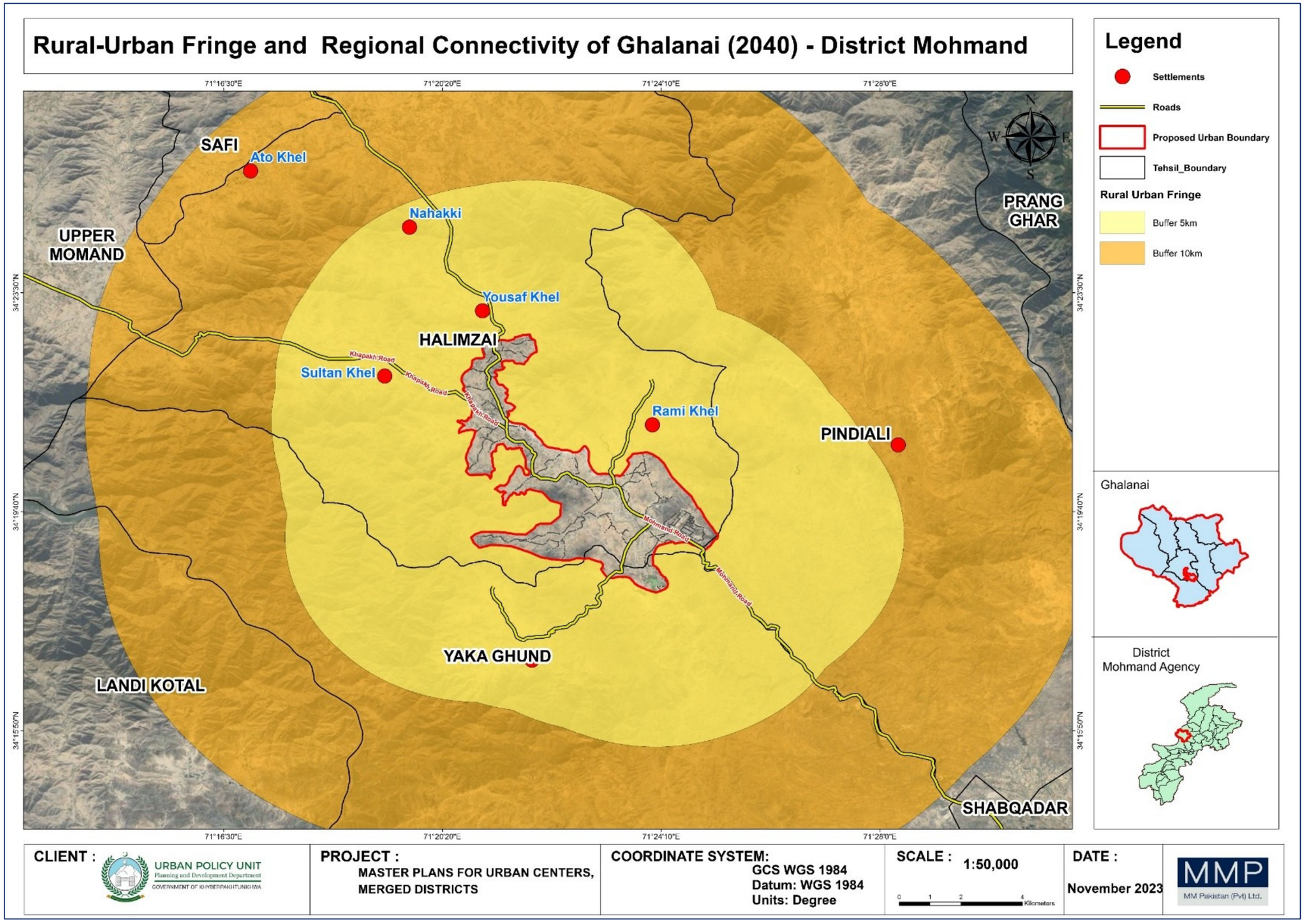


Figure 4-3: Fringe Development through Green Economy & Sustainable Approaches

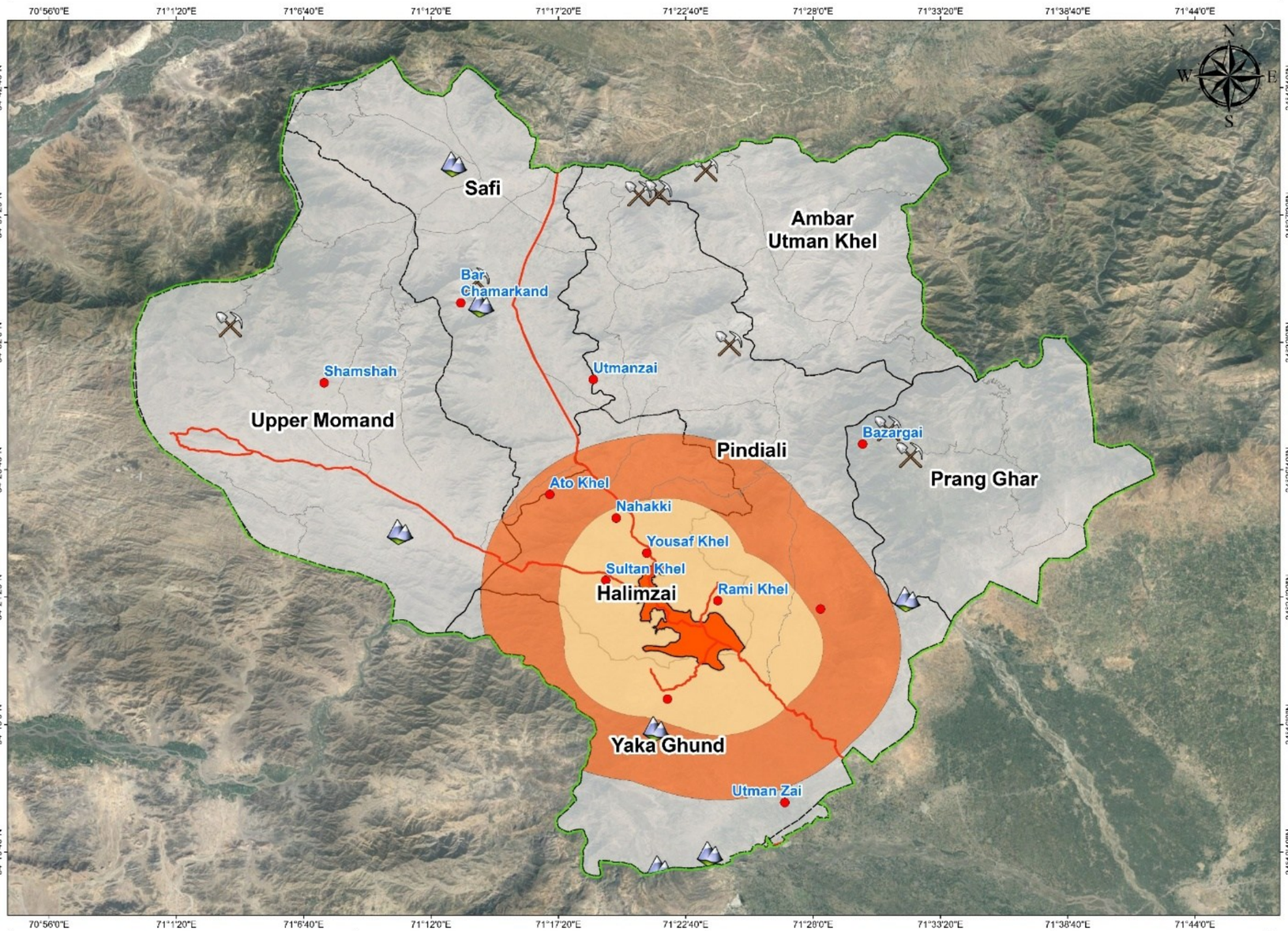
Ghalanai Urban Centre serves as the administrative headquarter of Mohmand District. Ghalanai Urban Centre is situated in a semi-arid region. Ghalanai Urban Centre has a diverse economy with potential in several sectors such as mining, agriculture, and tourism. The city is divided into three distinct neighborhoods, namely Ghalanai, Durba Khel 1, and Durba Khel 2. Additionally, two neighboring Village Councils, Kuz Kadai Khel 1, Kuz Kadai Kher 2i, exists as indicated in below:

The following key factors have been considered to improve rural-urban fringe development in plan period 2022-2040.



Map 4-37: Proposed Fringes Development & Regional Connectivity

Regional Development of Ghalanai - District Mohmand



Legend

- Settlements

Economic Nodes

- Tourist Spot
- Mines and Minerals

Regional Connectivity

- Main Roads
- Minor Roads

Rural Urban Fringe

- Buffer 5km
- Buffer 10km

Administrative Boundaries

- Proposed Urban Boundary
- Tehsil Boundary
- District Mohmand Agency

District Mohmand Agency

Khyber Pakhtunkhwa

CLIENT :	PROJECT :	COORDINATE SYSTEM:	SCALE :	DATE :
GOVERNMENT OF KHYBERPAKHTUNKHWA Planning and Development Department URBAN POLICY UNIT	MASTER PLANS FOR URBAN CENTERS, MERGED DISTRICTS	GCS WGS 1984 Datum: WGS 1984 Units: Degree	1:145,000 0 3 6 12 Kilometers	November 2023

MMP
MM Pakistan (Pvt) Ltd.

4.18. Master Plan Implementation Framework

The implementation framework for the Ghalanai Master Plan is a strategic blueprint translating visionary aspirations into actionable reality. In the short term (2023-2025), the focus is on establishing decentralized governance and initiating networked urban projects. Local leaders and municipalities play pivotal roles, adapting to new structures while engaging communities through awareness campaigns. The medium term (2025-2030) sees a scaling-up phase, refining governance frameworks, expanding projects, and embedding community involvement in decision-making. Technological integration becomes more pronounced, enhancing communication and project coordination. The long term (2030-2040) envisions fully integrated decentralized governance, institutionalized networked urban initiatives, and advanced technological adoption. Community empowerment becomes sustainable, with excellence recognized through awards. The synthesis of strategies ensures that decentralized governance, collaborative partnerships, technological integration, and community involvement form an interconnected fabric, driving Ghalanai towards a resilient, inclusive, and tech-driven urban future. This isn't just a procedural guideline; it's a commitment to forging a city that reflects the dreams and needs of its residents, one intentional step at a time.

The implementation framework for the Ghalanai Master Plan aligns seamlessly with the legal underpinnings of the Khyber Pakhtunkhwa (KP) Urban Policy and the Land Use & Building Control Act of 2021. These documents serve as the backbone, providing the legal framework for the proposed organogram that will govern the plan's execution. The organogram, intricately designed, reflects the mandates laid out in the KP Urban Policy and the Act, ensuring a harmonious integration of legal guidelines into the implementation structure. As we embark on this transformative journey, the proposed organogram stands as a testament to our commitment to compliance, governance, and the lawful realization of Ghalanai's urban aspirations. This marriage of visionary planning and legal diligence ensures that every step we take is not just progressive but firmly anchored within the legal parameters set forth by the regional authorities.

4.18.1. Legal Backing of the Master Plan

The preparation of the master plan document will provide a guideline for future development of Ghalanai urban center up to 2040. This document will work as a blueprint for shaping the urban development of the center. The approval of the plan from the public and line department this will be notified by the KP cabinet and it should be legally adopted by the TMA Ghalanai. This will become legal document and anyone violating the plan may be get penalties under the KP Land Use & Building Control Act 2021. The implementation of Master Plan should be made mandatory for all local planning authorities such as Municipal Committee, Ghalanai and the local administration.

4.18.2. Building & Development Control

Detailed building control and development scheme approval byelaws has been prepared in the Land Use & Building Control Act which can be used as a regulatory framework for the building and development control. The TMA should appoint qualified town planners and architects it building and development control section which should receive and applications regarding the development and approve panning permissions according to byelaws and land use and building control act in the proposed master plans. One window operation should be implemented for the ex-FATA urban headquarters like the same also has been practice for the rest of the urban areas and districts. All the approved building plans and development approved documents should be digitally recorded and available for the general public along with the proposed master plan maps for respective urban areas.

The private housing schemes should also be approved with compliance with district land use plan and master plan. The Provincial Land Use & Building Control Authority (PLU & BCA) came under the Land use & Building Control Act 2021 should established Local Enforcement Unit (LEU) at district level for such approvals and a source of revenue generation for the efficient functioning of the authority.

4.18.3. 5.18.3 Public Participation and Community Empowerment

A community organization should be initiated by TMA of Ghalanai to encourage self-help and matching-grants projects through it. Self-help and participatory projects should be introduced to improve the existing areas and to develop new low-income housing schemes. The organization of communities to develop self-help projects will empower them and thus they will be able to get their problems and issues resolved in future. Community based organizations (CBOs) may take up the form of Citizen Community Boards (as proposed in the Devolution Plan for various provinces of Pakistan). Some NGO's may also take up the task of organizing communities and developing self-help housing projects, micro-credit schemes, ladies shopping centers (Meena Bazars), women vocational centers, ladies sewing and embroidery centers and handicrafts center. These projects will empower women and go a long way in empowering women and eradicating poverty in the urban center.

4.18.4. Financing of the Plan Provision

New innovative ways of financing projects such as BOT should be tried in the building of roads, bridges and multistory flats. Private sector may be encouraged to participate in the development of educational and health institutions. Financing arrangements suggested for all proposals in the Master Plan should be followed in letter and spirit. Self-financing projects should be encouraged and incremental development housing projects (such as Khuda-ki-Basti projects) to make the low-income housing projects affordable for the target groups.

4.18.5. 5.18.5 Coordination among Line Departments

Proper liaison and coordination should be maintained by the Technical Staff such as Engineers, District Town Planner & District Architect in the Municipal Committee of Ghalanai with various line departments and horizontal and vertical linkages should be established to implement the Master Plan in a coordinated manner. Copies of approved Master Plans should be available with all concerned departments and they should be mandated to follow the Master Plan for all future development projects.

4.18.6. Monitoring and Evaluation of the Plan

There should be a provision of interim evaluation of the Master Plans after every phase. A system of monitoring of the plans should be developed to note down the progress of the implementation of the Master Plan. An evaluation and research cell should be created in the Municipal Committee of Ghalanai to monitor and evaluate the Master Plan regularly.

4.18.7. Continuity in the Planning Process

The Master Planning should be envisaged as a continuous process. It means that a new Master Plan should be prepared after the expiry of the planning period i.e. 20 years and the Master Plan should be revised after every 5 years. The preparation of local plans and area development schemes should continue on a regular basis according to a phase wise Programme. A GIS cell should be established to monitor the activities and plans with proposed master plan and maintain the database. A dashboard can also be created to make sure all the line departments have access to these data and get help from

the GIS cell wherever necessary. An already GIS cell has been created in every DC office at district level which can also be utilized for such purpose.

4.18.8. Phasing and Programming of the Master Plan

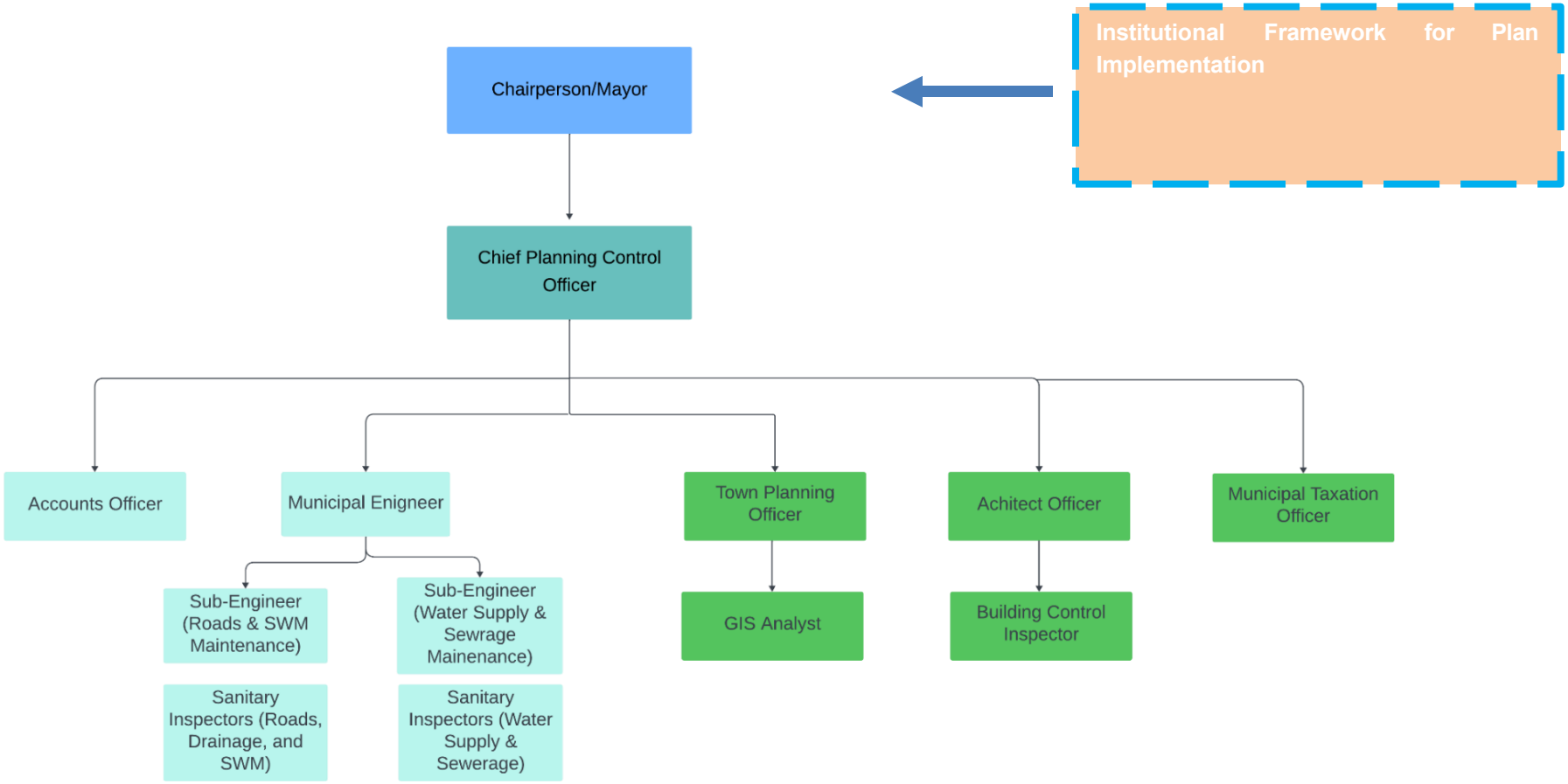
The Master Plan for Ghalanai will provide guidelines for the future development of the town during the next 20 years i.e., up to 2040. The proposed development projects will be spread over the following three phases of five year each:

4.19. Phase I (Short-Term) Phase II (Medium Term) Phase III (Long-Term)

4.19.1. Institutional Framework for Implementation of the Plan

The existing Tehsil Municipal Committee (TMA) in Ghalanai has a very scanty technical staff. There is no Town Planner or Architect working in the municipality. At present the Municipal Committee of Ghalanai is headed by an Administrator under whom there is a Tehsil Officer Regulations, Tehsil Office Infrastructure (TOI) while Tehsil Municipal Officer (TMO) has an additional charge and currently dealing with Ghalanai and Ghalanai urban center. An Accountant and some supporting staff such as clerks, personal assistants also work in the municipality office. The current functions of the Municipal Committee include approval of building plans, maintenance of land record, street lighting, solid waste management, street upgrading, and maintenance of drainage system in the town. However, the building approval and such activities are not enforced till now but TMA has plan to create awareness amongst the pubic regarding building plan approval. A small portion of the city has a sewerage system particularly in civil colony There is a need to create a establish Local Enforcement Unit in the District which should be made responsible for the development of detailed local plans and enforce the building bye-laws in future development.

As the Ghalanai is a small urban center and a limited number of technical staff can manage and enforce the prior building and development control in the future. For the building and development control and maintenance of the planned areas. Qualified Town Planners, Architects and Engineers should be employed to prepare and implement the provisions of the Master Plan. The following implementation framework in the figure 4 below has been proposed for the Municipal Committee Ghalanai:


Institutional Framework for Plan Implementation
Chairperson/Mayor
Chief Planning Control Officer
Accounts Officer
Municipal Enigneer
Town Planning Officer
Achitect Officer
Municipal Taxation Officer
Sub-Engineer (Roads & SWM Maintenance)
Sub-Engineer (Water Supply & Sewrage Mainenance)
GIS Analyst
Building Control Inspector
Sanitary Inspectors (Roads, Drainage, and SWM)
Sanitary Inspectors (Water Supply & Sewerage)

4.20. Zoning Plan and Regulation

The Zoning Plan and Regulations for Ghalanai Urban Center establish a robust framework for guiding the city's planned growth and sustainable development. These regulations are essential for promoting the efficient use of land, ensuring equitable access to resources, and fostering an organized and harmonious urban environment. By defining permissible land uses and specifying development controls for each zone, the plan provides a clear roadmap for managing urban expansion and integrating it with the city's strategic objectives. This approach not only addresses the current needs of the community but also anticipates future demands, creating a resilient urban center capable of adapting to social, economic, and environmental changes.

The zoning plan divides the urban center into distinct zones, such as residential, commercial, industrial, institutional, and recreational, each designed to serve specific purposes while minimizing land-use conflicts. Each zone has tailored regulations that define allowable activities, building densities, setback requirements, and infrastructure needs, ensuring that development is functional, efficient, and sustainable. For instance, residential zones focus on providing safe, accessible, and affordable housing options for diverse income groups, while commercial zones are strategically located to enhance economic activity and provide investment opportunities. Similarly, industrial zones are planned to promote economic growth while mitigating environmental impacts, and recreational zones prioritize green spaces and public amenities to enhance the quality of life.

The regulations also integrate sector-specific guidelines and standards derived from the National Reference Manual and relevant policies in areas such as health, housing, transportation, environmental management, and economic development. These guidelines ensure that urban development aligns with broader policy objectives, such as reducing urban sprawl, enhancing connectivity, protecting natural resources, and fostering social inclusion. For example, transportation guidelines focus on developing a well-connected network of roads, public transit, and pedestrian pathways, while environmental regulations prioritize the preservation of natural habitats, waste management, and the use of renewable energy.

Moreover, the zoning plan emphasizes public welfare by ensuring compliance with safety standards and building codes while fostering equitable access to critical resources like healthcare, education, and employment opportunities. By incorporating public-private partnerships and encouraging local investments, the plan facilitates the development of self-sustaining neighborhoods and economic hubs that contribute to the city's long-term resilience and growth.

In conclusion, the Zoning Plan and Regulations for Ghalanai Urban Center serve as a vital instrument for shaping the city's future. By balancing the demands of urbanization with sustainability and inclusivity, the plan aims to create a well-organized, livable, and economically vibrant urban center. It provides a comprehensive vision for a city that supports the needs of its residents today while laying the foundation for future generations to thrive.

4.20.1.1. Land Use & Zoning Regulations

- "Accessory building" means a building which is subordinate to the principal building, and is incidental to the use of the principal building on the same lot.

- "Actual land use" means the existing land use both in the planned areas and non-planned areas

within the local area of a local government.

- "Agricultural area" means the land, outside the peri-urban area, which is predominantly used for the cultivation of crops and includes cropland, pastureland, orchards, nurseries, poultry farms, fish farms and dairy farms and the areas earmarked in the district land use plan or master plan;

- "Agro-based industry" means an industry for pickles, spices, honey, rice mill, flour mill, sugar mill, citrus processing and polishing unit, fruits or vegetable pulping and juicing units, cotton and ginning mill, distillery unit, jute mill, dairy, poultry, meat, bamboo and timber products manufacturing units, fodder or poultry feed manufacturing unit;

- “Appellate Tribunal” means the appellate forum, to be established under sub-section (1) of section 41 of this Act;

- "Approved scheme" means a scheme approved by the Government, a local government or any other public authority;

- “Authority” means the Provincial Land-Use and Building Control Authority, established under section 6 of the Khyber Pakhtunkhwa Act no.XXXII of 2021;

- "Betterment fee" means the fee levied by a local government under the Act.

- "building" means any structure for a shop, house, hut, out-house, shed, stable or enclosure built of any material and used for any purpose, and also includes a well, wall, verandah, platform, plinth, ramp, staircase and steps.

- "Building byelaws" mean the building byelaws of a local government.

- "Building line" means the line under or beyond which the outer face of a building may not be projected in the direction of an existing or proposed road except the compound wall.

- "Built up area" means an area established in a non-planned area.

- “Chairperson” means the Chairperson of the Council;

- "Commercial area" means an area designated for commercial use as per approved scheme or master plan or is being used as such in the non-planned area.

- "Commercial corridor" means a road or a segment of a road, with not less than sixty feet right of way and specified depth of area, which has been designated as commercial by a competent authority.

- "Commercial uses" means the use of land or buildings for the purpose of retail merchandising, provision of services and small-scale processing;

- "Competent authority" means the concerned local government to approve land use plan, classification, reclassification, development and redevelopment in a local area.

- " Condominium complex " means a multi-storey mixed-use building having residential apartments with maximum 20% floor area for commercial use, offices, recreational area, place of worship, gym and play area;

- “convener” means the convener of the District Land-Use Planning and Management Committee;

- "conversion" means the change of existing land use to any other land use as per classification under the rules;

- “Cottage industry" means an industry which is carried on wholly or primarily with the help of the members of the family as a whole time or part time occupation.

- “Council” means the Provincial Land-Use and Building Control Council, constituted under section 3 of the Khyber Pakhtunkhwa Act no. XXXII of 2021;

- "department" means the Local Government and Community Development Department;

- "Educational institution" includes a school, college, university, research or training center, academy or Information Technology center, library or a madrassa recognized as such by any law for the time being in force;

- "Environmentally sensitive area" means an area that has been designated as such under Regulation 22 of the Pakistan Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations 2000;

- "Existing planned areas" means areas developed under approved land use classifications in an approved scheme;

- "Form" means the forms appended to the rules;

- "Government" - means ' the Government of the Khyber Pakhtunkhwa;

- "Hazardous use means a use that poses threat to public health or the environment and is more explicitly stated to include substances that are explosive, flammable, toxic, infectious, and other such uses as deemed fit by the Authority;

- "Healthcare institution includes a hospital, health center, dispensary,' clinic, polyclinic, clinical laboratory, medical training -center, nursing home, dental center, homeopathic or acupuncture center, recognized as such by any Law for the time being in force;

- "Historically significant area" means an area designated under any law for the time being in force as historically, architecturally • or archeologically significant area;

- “Institutional use" means land use which is predominantly connected with education, health, public or private office, hotel, theatre or auditorium, including public assembly institutions in terms of building and zoning bye-laws of the local government;

- "Intercity service area" means an area designated by the competent authority as service area along the main connecting roads.

- "Land use plan" means a plan for optimum use of land, in any region, to serve as a guide in zoning to meet the needs of the community and approved by the competent forum;

- "Local government" means a Galiyat Development Authority constituted under the Act:

- “Master plan" means the traditional method for presenting a set of land usage, allocation and control measures in the form of a map or in graphical form and is supported by written statement of goals and objectives, strategy, financial implications and policies for planning and development for an area and includes a structure plan, an outline development plan, a spatial plan, peri-urban structure plan and a metropolitan plan approved by the competent forum;

- “member” means a member of the Council;

- "non-conforming use" means the land use that does not conform to the permitted or permissible land use but it is existing at site;

- “non-hazardous use" means all other uses except hazardous uses;

- "non-planned area" means an area of the local government other than the planned area;

- "Notified area" means an area in which special restrictions regarding its development or redevelopment have been imposed under any law for the time being in force;

- "Open space" includes park, golf course and theme park;

- "Other restricted area" means an area in which the Federal Government, the Government, a local government or any other public body has imposed certain building or area development restrictions;

- “Peri urban area” means an area that spans the landscape between contiguous urban development and rural countryside with low population density and is predominantly being used for agricultural activity and is likely to be urbanized in the next twenty years as demarcated in district land use plan or master plan;

- "Planned area" means an area of the local government with defined land uses as per approved schemes or master plan or Outline Development Plan;

- "Planning Officer" means head of planning wing of the local government;

- “prescribed” means prescribed by rules and regulations;

- "Project area" means an area selected by the competent authority to prepare a land use reclassification scheme;

- "Proposed land use" means the land use other than the land use explicitly indicated in the land use plan for future development of the local area;

- “province” means the Province of Khyber Pakhtunkhwa;

- "Public sector institutional area" means an area reserved for the Federal Government, the Government, a local government or any other public body;

- "redevelopment" means renewal, reconstruction or upgradation of infrastructure and buildings in an area;

- “regulation” means regulations made under this Act;

- "Residential area" means an area which is designated for residential use in accordance with an approved scheme or master plan or is being used as residential in non-planned areas;

- "Residential use" means land use which is predominantly connected with housing;

- "Restricted area" means an area in which the Federal Government, the Government, a local government or any other public body has imposed certain building or area development restrictions;

- "Ribbon development" means existing unplanned and horizontal development along the roads of a local area of the local government;

- "Right of way (ROW)" means the width of road or street between two opposite properties;

- “rules” mean rules made under the Khyber Pakhtunkhwa Act no. XXXII of 2021;

- "Set back area" means an area to be surrendered for road widening;

- "Site development zone" means an area within the planned or non-planned area of a local government with proposed land uses and notified by the competent authority for the future development of the local area;

- “sub-type” means a sub-type, as laid down in land use regulations made under section 52 of the Khyber Pakhtunkhwa Act no. XXXII of 2021;

- “Unauthorized land use” means land use otherwise than in accordance with a land use permission or without a land use permission where required;

- “Urban design” means the relationship between different buildings, buildings and streets, squares, parks and waterways and other spaces, which make up the public domain, the nature and quality of the public domain itself, the relationship of one part of a village, town or city with other parts and the patterns of movement and activity which are thereby established in short, the complex relationships between all the elements of built and un built space; and

- “Valuation table" means a valuation table notified under the Stamp Act 1899 (II of 1899).

A word or term, used but not defined in the rules, shall have the same meaning as assigned to it in the Act.

4.20.1.2. Land use classes:

A local government shall, within six months from the commencement of the rules, classify its local area into the following land use classes indicating actual land use in both planned area and non-planned area:

A. Residential Area

B. Commercial Area (Institutional Area)

C. Industrial Area

D. Agricultural Area

E. Notified Area (Including Forest Area)

The land use in each land use class shall be as under:

- Permitted use: The land use, which is allowed in each land use class under the rules.
- Permissible use: The planning and design committee subject to the payment of the fee may allow the land use that are not permitted.
- Prohibited use: The land use, which is neither permitted nor permissible.

4.20.1.3. Zoning and Land Use Regulations

Land use	Permitted use	Permissible use	Prohibited use
Residential Area (Neighborhood)	• Detached house • Semi-detached house • Town house; • Residential apartment building; • neighborhood level park and playground; • ,place of worship or prayer • Old age home or orphanage • Place of burial or graveyard • Horticultural nursery • Urban farm • Urban forest; and • Non-commercial renewable energy installation.	• Place of worship or prayer or mosque; • Daycare center or preschool; • Primary and junior school; • Secondary school and higher secondary school; • Dispensary with two bed which may include indoor pharmacy; • Hospital; • Library; • Indoor sports facilities; • Community center • Post office, fire station, rescue and emergency services office; • hostel; • Guest house having not more than ten rooms;	• Land uses that are neither permitted nor permissible.
Commercial Area (Blue Area)	• Residential apartment; • Multi storey building; • Condominium complex; • Commercial plaza; • Shopping mall, departmental store; • Business facility; • Private office; • Government or semi-	• Technical and vocational institution • Theater, auditorium, concert hall or exhibition hall or cultural institution • Seasonal commercial fare site • Stadium, amusement park & play land • Petrol pump or gas or LPG or LNG station	• Land uses that are neither permitted nor permissible.

	government office; ● Court or tribunal; ● Mixed use building; ● Shops and group of shops; ● Coaching center or academy for educational purpose and extra- curricular activities such martial-arts, school or health club; ● Cultural institution such as park, memorial and monument; ● Hotel or Motel; ● Car showroom; ● Boutique or garment outlets or beauty parlor;	● Loading and unloading requirements of all uses; ● Weighbridge; ● Service industry without nuisance; ● Second hand goods market ● Private hospital; ● Television or other studio; ● Auto workshop, service garage and service station; ● Wholesale market; ● Storage place, cold storage and warehouse; ● Printing press; ● Coal, wood or timber yard;	
Industrial Area	● Cottage, light and medium industry, heavy or large industry; ● Vertical green industry; ● Construction equipment; ● Warehouse, storage or distribution center; ● Building material store; ● Cold storage and ice factory; ● Petrochemicals, petroleum and gas products storage or gowdown; ● Industrial Park or estate; ● Police station, Fire station and post office ● Automatic Teller Machine (ATM); ● Industrial research institute; ● Treatment or recycling plant ● Grid station ● Power plant; ● Loading and unloading place ● Weighbridge ● Industrial units except for which special permission is required under any law, rules or policy ● Industrial -products display center, fair price shop and showroom; and ● Renewable energy installations or projects	● Petrol pump, gas station, LPG or LNG storage or filling station ● Essential residential, commercial, health and educational facility for workers or employees ● Oil Depot ● Restaurant ● Hospital ● Auto workshop, service garage and service station ● Incineration plant ● Storing, packing, pursing, cleaning, preparing, and manufacturing of blasting powder, ammunition, fireworks, gun powder, Sulphur, mercury, gases, nitro-compounds, phosphorous, dynamite ● Storing explosives, petrol, oil, lubricants, and other inflammable materials including coal, chemicals, liquids or otherwise cleaning dying, preparing and manufacturing of cloth or yarn in indigo or other color ● Storing, processing, cleaning, crushing, melting, preparing or manufacturing and dealing in bombs, tallow, offal, fat blood, soap, raw or dry hide or skin, washing or dying wool or hair ● Casting of heavy metals, electro plating, welding, marble cutting and polishing, manufacturing of	● Land uses that are neither permitted nor permissible.

	• Ancillary office or place for industry • Auto workshop, service garage and service station • Essential residential, commercial or educational facility for laborers or employees • Base trans-receiver station or communication tower	cement or pipes, burning or grinding of lime stone, metal or use of any other obnoxious or hazardous material • Effluent treatment or recycling plant;	
	• Old-age home or orphanage; and • Urban forest area.		
Open Space and Recreation al Zone	• Bird sanctuary; • botanical garden; • Park, memorial, monument or play ground; • Forest; • Orchard; • Picnic hut; • Plant nursery; • Place of worship; • Joy land or play land; • Farm; • Recreational club or resort; • Shooting range; • Swimming pool; • Library; and • Zoological garden.	-	-
Agricultura l & Livestock Zone	• Crop; • Orchard; • Pasture land; • Livestock rearing such as dairy, poultry or fish farm; • Forest; • Nursery or a green house, horticulture; • Tube well; • Existing rural settlement or village; • House within and contiguous to rural settlement; • Farm house within the boundaries of farm • Place of worship or prayer; • Place of burial or cremation • Agricultural machinery	• Agricultural machinery workshop • Brick kiln, milk chilling and Pasteurization; • Animal husbandry clinic; • Country club; • Community facility or public utility • Bus terminal or truck stand • Fruit and vegetation market • Grain market; • Cattle market; • Rice mills and flour mills; • Recreational club or resort or country club; • Shooting range; • Swimming pool; • Library; • Cold storage; • Zoological garden	• Land uses that are neither permitted nor permissible.

	workshop ● Basic health unit; ● Public or private recreational park ● Corner shop ● Warehouse	● Agricultural or livestock research institute; ● Park, memorial, monument, playground, gymnasium or sports complex; ● Picnic Hut ● Oil depot; ● Power plant; ● Water filtration plant;

4.20.1.4. Land Use of Notified Area

A local government may declare a historically significant area, environmentally sensitive area (Forest Area), public sector institutional area, other restricted area or an intercity service area as notified area after clearance from District Planning and Design Committee.

A local government shall ensure that the following land use provisions under permitted, permissible and prohibited uses are strictly followed as per land use plan in following notified area.

1. **Historically Significant Area**

   a. **Permitted use**: A local government shall ensure that land use permitted in a historically significant area is in accordance with any special or general law and the conditions provided in the notification governing the historically significant area.

   b. **Permissible use:** A local government, subject to rule, may grant any of the permissible uses in a historically significant area which is in accordance with any special or general law and the conditions provided in the notification governing the historically significant area.

   c. **Prohibited use:** A local government shall not allow a person to use a property in a historically significant area for a purpose which is neither permitted nor permissible.

2. **Environmentally sensitive area**

   a. **Permitted use:** A local government shall ensure that permitted land use in an environmentally sensitive area is in accordance with special or general law and any special conditions applicable in the environmentally sensitive area.

   b. **Permissible use:** A local government may, subject to rule, grant any of the permissible use in an environmentally sensitive area subject to any special or general law.

   c. **Prohibited use:** A local government shall ensure that no person is allowed to use a property in an environmentally sensitive area for a purpose which is neither permitted nor permissible.

3. **Public Sector Institutional Area**

   a. **Permitted use:** A competent authority shall ensure that permitted land use in a public sector institutional area is in accordance with any special general law.

b. **Permissible use:** a competent authority may grant permission for any of the following uses:

   i. Public office including a Federal Government, Government, local government office or an office of any other public body
   ii. Official residence;
   iii. Public sector educational institution;
   iv. Public sector religious institution or place of worship;
   v. Public sector mess or club;
   vi. Public sector healthcare institution;
   vii. Diplomatic premises;
   viii. Jail or prison;
   ix. Public sector television station or studio and
   x. Any ancillary use

c. **Prohibited use:** A local government shall not allow a person to use a property in a public sector institutional area for a purpose which is neither permitted nor permissible.

4. Other Restricted Area:

a. **Permitted use:** local government shall ensure that land use permitted in any other restricted area is in accordance with any special or general law and the conditions provided in the notification governing the restricted area.

b. **Permissible use:** A local government, subject to rule 11, may grant any of the permissible uses in any other restricted area is in accordance with any special or general law and the conditions provided in the notification governing the restricted area.

c. **Prohibited use:** A local government shall not allow a person to use a property in any other restricted area for a purpose which is neither permitted nor permissible.

5. Intercity service area:

a. **Permitted use:** The competent authority may grant permission for any of the following uses;

   i. Commercial Use
   ii. Residential Use and
   iii. Ancillary Use

b. **Permissible Use:** The competent authority may grant permission for any of the following uses;

   i. petrol pump or gas station or LPG or LNG storage and filling station
   ii. train, bus or truck terminal;
   iii. and unloading place;
   iv. service station or workshop; and

v. weighbridge

C. **Prohibited use:** The competent authority shall not allow a person to use a property in an intercity service area for a purpose which is neither permitted nor permissible.

4.21. Conclusion

The Ghalanai Urban Center master plan is a comprehensive document that outlines a vision for the city's future development by 2040. The plan is based on a thorough analysis of the city's strengths, weaknesses, opportunities, and threats, with the aim of promoting economic growth, improving quality of life, and protecting the environment.

A central goal of the Ghalanai master plan is to facilitate the expansion of commercial and residential areas to meet the needs of its growing population and support economic development. The plan proposes the establishment of 13 self-sufficient neighborhoods and adopts a Multiple Nuclei Model for commercial development, which allows for a more decentralized approach to urban growth. This model supports diverse economic activities across multiple centers, enhancing accessibility and reducing congestion.

Additionally, the plan emphasizes the expansion of green infrastructure, focusing on the preservation of natural resources and environmental sustainability. Key initiatives include expanding managed forest areas, planting trees and vegetation in urban spaces, and preserving agricultural land. These efforts will protect the natural environment, improve air quality, reduce greenhouse gas emissions, and promote water conservation.

To support the growth of commercial, industrial, and residential areas, the Ghalanai master plan also calls for upgrading and expanding existing infrastructure and amenities, including roads, public transportation, schools, hospitals, and other essential facilities. This includes initiatives designed to enhance the quality of life for residents, such as the creation of new parks and recreational areas, improving public spaces, and developing cultural and community centers. Details of these public spaces and facilities outlined in the Action Plans prepared as Task-D of the Master Plan to enhance and ensure effective implementation.

For the Ghalanai master plan to achieve its goals, a robust implementation strategy involving all relevant stakeholders is essential. This may include establishing a dedicated planning authority or coordinating body, developing partnerships with private sector organizations and community groups, and actively engaging the local community in the planning and decision-making process. By adopting a proactive and collaborative approach, it is hoped that the Ghalanai master plan will effectively address the challenges and opportunities facing the city and contribute to its long-term prosperity and success.

Proposed Master Plan of Ghalanai Urban Center - District Mohmand (2024-42)

SCALE : 1:18,000
COORDINATE SYSTEM : WGS 1984, UTM 42 NORTH
0 0.425 0.85 1.7 Kilometers

71°19'10"E 71°20'0"E 71°20'50"E 71°21'40"E 71°22'30"E 71°23'20"E 71°24'10"E 71°25'0"E 71°25'50"E
34°22'30"N 34°21'40"N 34°20'50"N 34°19'10"N 34°18'20"N

Towards Khar - Bajaur
Towards Khapakh
KhapaKh Road
NC - Durbakhel 2
Area = 2691.81 Acres
VC - Kuz Kadai
Area = 381.8 Acres
NC - Durbakhel
Area = 1134.12 Acres
NC - Ghalanai
Area = 21.82.35 Acres
VC - Kuz Kadi Khel
Area = 704.22 Acres
Towards Charsadda
Mohmand Road

NH 12, NH 11, NH 10, NH 9, NH 8, NH 7, NH 6, NH 5, NH 4, NH 3, NH 2, NH 1
CBD 3, CBD 2, CBD 1
Proposed Police Post
Proposed Town Park
Proposed Truck Adda + Workshops
Proposed Livestock Zone
Proposed Post Office
Proposed Playground
Proposed Community Hall
Director, Planning (LU & BCA)
Civil Colony
Proposed Industrial Estate
Proposed Slaughter House
Proposed SWM
Proposed Sewage Treatment Plant

Tehsil Halimzai
Halimzai

District Mohmand
Safi
Ambar Utman Khel
Upper Momand
Pindiali
Prang Ghar
Halimzai
Yaka Ghund

N W E S

NH= Neighborhood (Proposed)
NC= Neighborhood Council (Local Govt Urban)
VC= Village Council (Local Govt Rural)

Sr. No		Existing & Proposed Landuses of Master Plan	Area (Acre)	Area (%)
1	Proposed Land Use	Proposed Residential	1050.71	26.53%
2		Proposed Commercial + Mixed use	79.54	2.01%
3		Proposed Industry	66.49	1.68%
4		Proposed Public Building	27.83	0.70%
5		Proposed Educational	88.51	2.24%
6		Proposed Health Facilities	1.41	0.04%
7		Proposed Graveyard	25.06	0.63%
8		Proposed Slaughter House	0.96	0.02%
9		Proposed Green Belt	16.38	0.41%
10		Proposed Green Area	1032.29	26.07%
11		Proposed Recreational	62.29	1.57%
12		Proposed Reserved Agriculture	936.13	23.64%
13		Proposed Livestock Zone	99.87	2.52%
14		Proposed SWM	13.99	0.35%
15		Proposed Sewage Treatment Plant	8.46	0.21%
16		Proposed Roads / Streets	450.31	11.37%
Total Proposed Land Uses			**3960**	100.00%
1	Existing Land Use	Residential	557.09	10.93%
2		Commercial	37.57	0.74%
3		Industrial	24.02	0.47%
4		Public Building	47.33	0.93%
5		Educational	24.74	0.49%
6		Health	6.59	0.13%
7		Religious Building	16.99	0.33%
8		Graveyard	42.07	0.83%
9		Recreational	6.79	0.13%
10		Streets/Roads	219.51	4.31%
11		Restricted	68.57	1.35%
12		Water Bodies	85.66	1.68%
Total Existing Land Use Total Area			**1137**	22.31%
Grand Total			**5097**	100.00%

Legend

NC Boundary
VC Boundary
Existing Urban Boundary
Proposed Urban Boundary

Proposed New Roads
Primary Roads (80' - 120')
Secondary Roads (60')
Local Roads (30' - 40')
Widening / Upgradation

Existing Roads & Streets
Major Roads
Minor Roads

Existing Land Use
Residential
Commercial
Industrial
Public Building
Educational
Health
Religious Building
Graveyard
Restricted
Recreational
Streets/Roads
Water Bodies

Proposed Land Use
Proposed Residential
Proposed Industrial
Restricted
Proposed Managed Forest
Proposed Urban Forestation
Proposed CBD + NH Commercial
Proposed Industry
Proposed Public Building
Proposed Educational
Proposed Health Facilities
Proposed Graveyard
Proposed Slaughter House
Proposed Green Belt
Proposed Green Area
Proposed Recreational
Proposed Reserved Agriculture
Proposed Livestock Zones
Proposed SWM
Proposed Sewage Treatment Plant

Client :	Consultant:	Name and Signature of the Team Leader		Director, Planning (LU & BCA)	Approved By:
GOVERNMENT OF KHYBERPAKHTUNKHWA Planning and Development Department URBAN POLICY UNIT	MMP MM Pakistan (Pvt) Ltd.	NAME : DR. SHABIH UL HASSAN ZAIDI	SIGNATURE:		Landuse & Building Control Council, KPK Dated: June 03, 2024

Map 4-39: Proposed Master Plan of Ghalanai Urban Center