PROVINCIAL LANDUSE PLAN OF KHYBER PAKHTUNKHWA

DELIVERABLE-04
DRAFT LAND USE PLAN

DISTRICT KARAK

THE URBAN UNIT
Urban Sector Planning & Management Services Unit (Pvt.) Ltd.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF MAPS

LIST OF FIGURES

EXECUTIVE SUMMARY

Effective regulation and management of land are crucial for sustainable development, especially in resource-rich but ecologically vulnerable districts like Karak. Situated in southern Khyber Pakhtunkhwa, District Karak faces mounting pressures from unchecked urban sprawl, fragmented mining practices, deteriorating infrastructure, and water stress. These factors threaten its ecological stability, food security, and ability to meet the Sustainable Development Goals (SDGs). In response, the Provincial Land-Use Plan Project (PLUP), under the Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021, mandated the preparation of district land-use plans across the province, including Karak.

Guided by the vision: **"A district of evolving economy, environmental quality, and opportunities for social interaction,"** the Draft Land-Use Plan for Karak aspires to transform the district into a resilient, inclusive, and economically diversified region. It integrates environmental conservation with strategic infrastructure and spatial development, while aligning with demographic trends and natural resource potential.

The plan's core objectives include: promoting value-added mineral-based industries (coal, gypsum, limestone), regulating oil and gas extraction to ensure long-term sustainability, preserving forests and natural landscapes, and encouraging compact urban growth patterns to reduce sprawl. It also prioritizes institutional reforms by enhancing the capacity of district bodies to enforce zoning bylaws and development regulations. The plan further recommends establishing a mineral research institute and technical training center to skill the local workforce and foster local entrepreneurship.

District Karak benefits from strategic connectivity through national and provincial highways, most notably the Indus Highway, which runs through the district's center and serves as a vital corridor for trade and logistics. This connectivity enhances the district's economic prospects and positions it as a potential hub for industrial and resource-based development.

Key findings highlight Karak's vast reserves of coal, gypsum, limestone, oil, and gas, alongside tourism potential and opportunities for industrial investment. However, the district faces serious challenges, including water scarcity, salinity, fragile law and order, deteriorating infrastructure, and gaps in health, education, and electricity services. These insights underscore the urgent need for a structured land-use framework to harness Karak's potential. Unregulated development and resource exploitation are rising concerns, but with clear policies, public oversight, transparent mineral royalties, and promotion of olive and Ber cultivation, Karak can transition toward sustainable and inclusive growth. The implementation of these strategies is grounded in the Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021, which provides a comprehensive legal and institutional structure for effective planning, enforcement, and coordination through bodies such as the Provincial Council, the Authority, and District Committees.

In Karak, the 2010 and 2022 floods caused major damage due to poor drainage, lack of early warning, and unregulated development. To reduce future risks, the plan proposes improved drainage, elevated roads, reforestation, early warning systems, suitable sites for new small dams and hydraulic structures, and zoning controls for vulnerable areas. At present, due to the absence of rivers or canal systems, 11 reservoirs serve the district, 9 of which collectively store approximately 19,000 acre-feet, while the Chasma Akhora Khel and Makh Banda Dams (with a combined capacity of about 5,000 acre-feet) are nearing completion. However, with over 112 water supply schemes dried up and groundwater under severe stress, the plan emphasizes urgent investment in water conservation and recharge systems.

A comprehensive spatial framework has been proposed for the district's 267,281 hectares, with over 84% of land allocated to ecological and rural economic uses. Rangeland comprises 34.7% of the total area, agriculture 28.2%, and forest zones 21.9%, preserving ecological integrity and supporting the rural economy. Approximately 7.0% is earmarked for formal mining zones to harness the district's rich deposits of oil, gas, salt, limestone, and coal, while ensuring regulation and environmental safeguards.

Urban development is guided by a zoning strategy that allocates land for Central Business Districts, Mixed-Use Zones, Light Manufacturing, Institutional Areas, Urban Forests, and Wastewater Treatment Plants, spanning about 1,850 hectares (0.7% of total land). The built-up area currently covers 7.5%, with a planned, controlled expansion, including 890 hectares for residential development. Additionally, by 2045,

the district is expected to need over 84,000 new housing units—13,681 in urban areas and 70,804 in rural areas.

To guide implementation, the plan proposes a phased strategy with clear zoning regulations, GIS-based monitoring systems, and periodic five-year reviews to adjust to demographic, economic, and climate shifts. Governance reforms include strengthening district land-use committees, improving inter-agency coordination, and instituting transparent mechanisms for mineral royalty management. The plan also supports the development of light-manufacturing zones, industrial estates, agro-processing, eco-tourism, and road network improvements to drive economic diversification.

The plan was shaped through extensive public hearings, focus groups, and inter-departmental consultations, ensuring community ownership and institutional alignment. Following approval by provincial and district authorities, implementation will be phased through Annual Development Plans, with ongoing monitoring and revisions.

By aligning spatial planning with ecological preservation and economic development, the District Karak Draft Land-Use Plan provides a strategic roadmap for sustainable, inclusive, and resilient growth, positioning Karak as a competitive node in the regional economy and a model of sustainable, resource-efficient development.

1. PROLOGUE

1.1 Introduction

1.1.1 Background

Khyber Pakhtunkhwa is undergoing rapid population growth, with an annual rate of 2.89%[1]. If this trend continues, the province's population is projected to double by 2042. This rapid growth will place significant pressure on natural resources, infrastructure, and land, leading to challenges such as unplanned urban sprawl, conversion of fertile agricultural land, water scarcity, deforestation, and environmental degradation.

To address these issues, district-level land use planning has become essential for ensuring the sustainable and efficient use of existing and future resources. Land use planning plays a pivotal role in shaping settlements' social and economic structure by analyzing population trends—its size and distribution—while offering a framework for balanced agricultural, industrial, and urban development.

Acknowledging the situation, the Government of Khyber Pakhtunkhwa has initiated the preparation of District Land Use Plans (DLUPs) for all districts of the province. The Provincial Land Use Plan (PLUP) and the Urban Policy and Planning Unit (UPPU) have awarded a consultancy contract through a competitive bidding process to The Urban Unit (Urban Sector Planning & Management Services Unit Pvt. Ltd., Lahore) for the preparation of land use plans for 22 districts.

One of the critical functions of these plans is to guide government agencies in improving infrastructure and public service delivery by identifying optimal locations for different land use zones. The DLUPs aim to rationalize land development, protect forestland and agricultural land, and promote sustainable practices across sectors by offering a comprehensive and long-term strategy. Importantly, these plans are not just technical documents—they represent participatory and forward-looking frameworks that involve multiple stakeholders, ensuring transparency and accountability in decision-making.

Specifically, the Land Use Plan for District Karak is a data-driven, evidence-based document designed to guide future development in the face of population growth and land pressure, using both primary and secondary data—including household surveys, transport and land use survey, and stakeholder consultations—the plan outlines a zoning strategy to establish compact urban boundaries, promote new planned urban centers, and reduce land use conflicts among residential, commercial, agricultural, and industrial sectors. It places strong emphasis on controlling haphazard development and integrating legal, institutional, and regulatory mechanisms to ensure effective implementation at the district level.

Overall, the Land Use Plan for Karak serve as a vital tool for steering growth in a sustainable direction, enhancing resilience, and preserving valuable resources for future generations.

1.1.1 Objectives

Land use planning in Khyber Pakhtunkhwa focuses on documenting and allocating land for future needs, using evidence-based approaches. It promotes integrated, multi-sectoral development and aims to resolve land conflicts among individuals and institutions. The plan emphasizes efficient land use and the preservation of ecologically and culturally important areas, supporting food security and sustainability.

[1] *6th Population Census & Housing Census 2017, Pakistan Bureau of Statistics, Govt of Pakistan.*

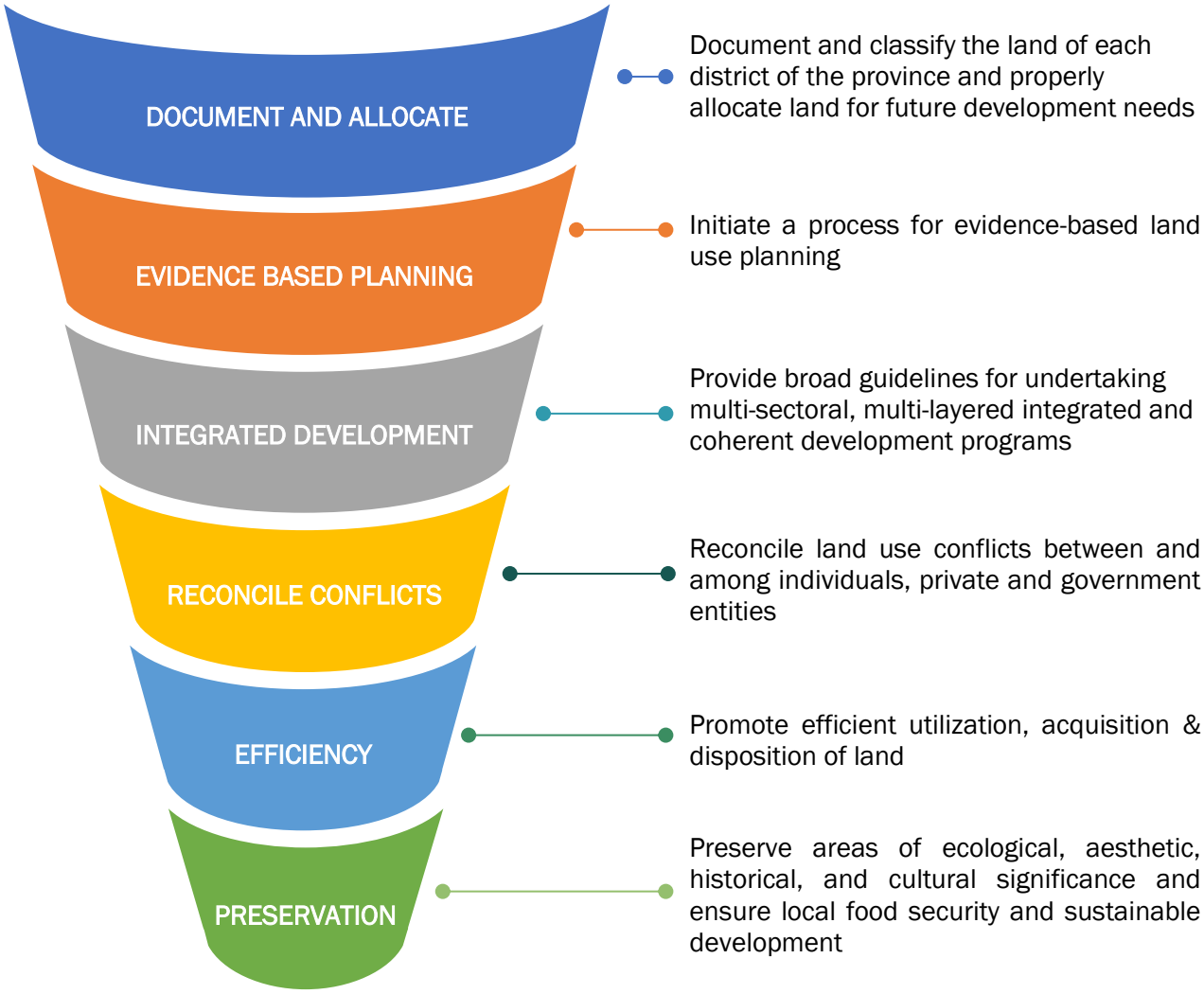


Figure 1-1: Objectives of the Study

1.1.2 Land Use Planning Process

Land use planning is a holistic process based on in-depth analysis of the project area and data, addressing the evolving needs of a growing population. It supports sustainable development by shaping the physical landscape and boosting economic growth. However, achieving a balance between development and environmental protection requires not just technical expertise, but also active participation from government bodies and stakeholders. The District Land Use Plan follows a 9-step process, as outlined in the figure below:

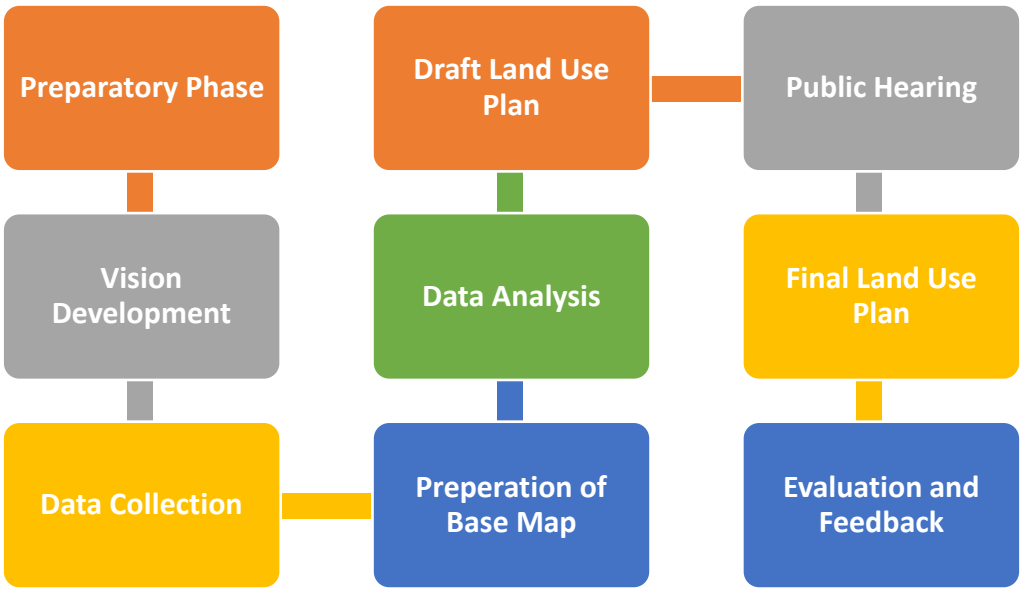


Figure 1-2: Stepwise Project Process

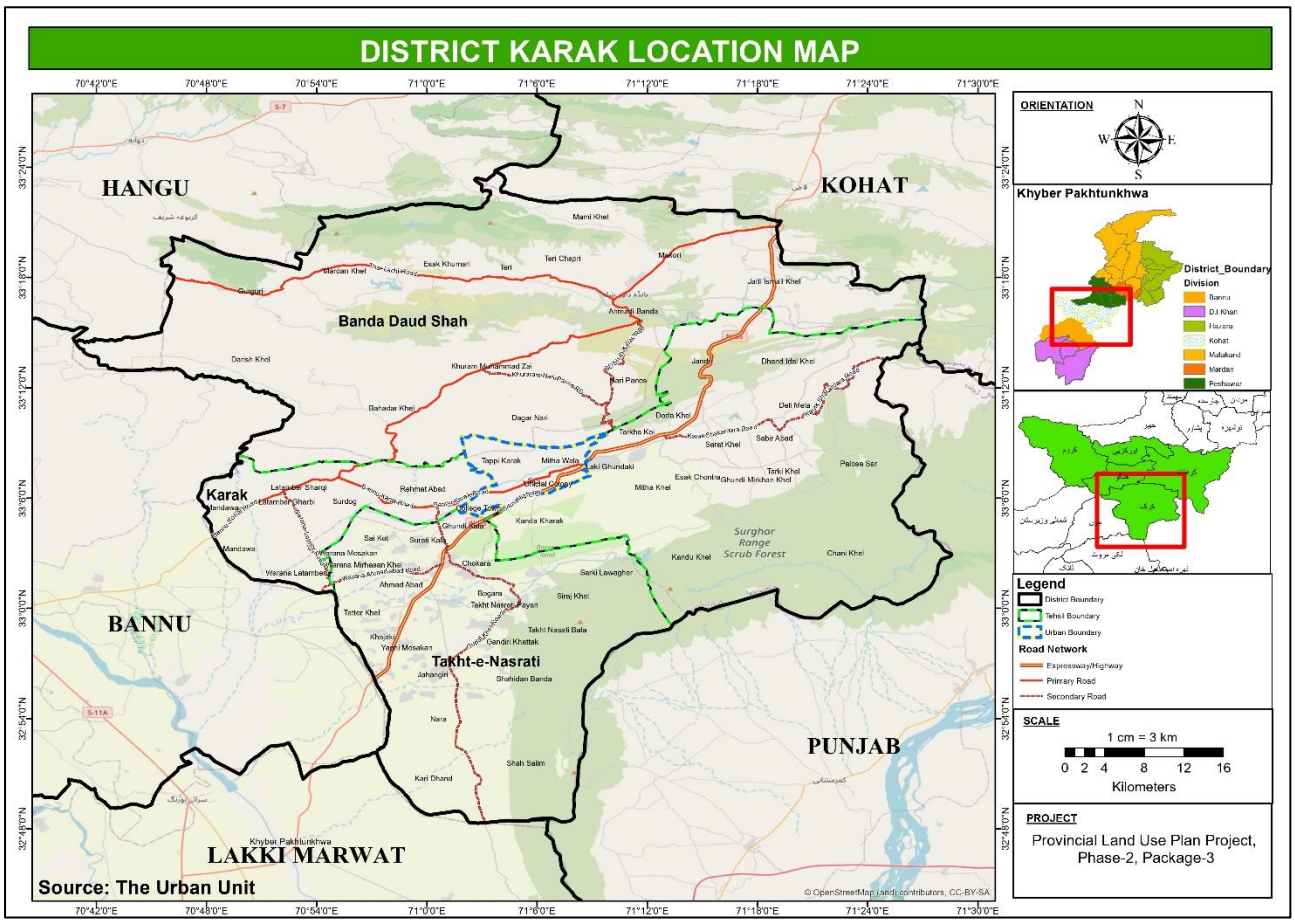
The planning process for the District Land Use Plan follows a structured and phased approach. It begins with the **Preparatory Phase**, where the consultant reviewed the Terms of Reference (TORs), finalized the methodology, and Key stakeholders were identified, and reviewed their involvement at different stages of the project. This was followed by **Vision Development**, in which a collective vision for the district was formulated through focus group discussions (FGDs) and stakeholder workshops. The next step, **Data Collection**, involved gathering both primary and secondary data across multiple sectors, including housing, transport, environment, and Land use survey. Using this data, the team proceeded with the **Preparation of Base Maps** and GIS-based spatial classification to visualize existing land use patterns. These components fed into a comprehensive **Data Analysis** phase, where socio-economic trends, land utilization patterns, and urbanization dynamics were evaluated.

Based on these insights, the **Draft Land Use Plan** was prepared, outlining zoning proposals, infrastructure distribution, and regulatory frameworks. The consultant will conduct a public hearing immediately after the draft land use plan is prepared to solicit feedback from stakeholders and the general public. The input gathered during the hearing will be carefully reviewed and incorporated where necessary to refine the final land use plan. The final land use plan will be approved by the Land Use and Building Control Council and will be handed over to the district administration for implementation and execution.

1.1.3 Project Area

District Karak is situated in the southern part of Khyber Pakhtunkhwa (KP) province, Pakistan, The district spans approximately **2,672** square kilometers. In terms of proximity to other regions, Kohat and Hangu Districts to the Northeast and Northwest respectively, Punjab province borders the district to the East, and Lakki Marwat District to the South, while to the Southwest, it shares a boundary with Bannu District.

The district is divided into three tehsils, which are further subdivided into **4** Neighborhood Councils and **57** Village Councils. The locational map of District Karak and the Southern region is shown in the **Map** below.



Map 1-1: Location Map of District Karak

1.2 Vision Development

Vision development is a crucial step in land use planning, guiding long-term sustainable growth. It gathers feedback from the local community and stakeholders to create a shared vision for the district's physical, social, and environmental future. Based on reconnaissance survey results, the process helps align objectives and promotes efficient land use that balances economic, social, and environmental needs.

1.2.1 Key Findings

The vision development exercise for District Karak reveals that the district holds immense reserves of Coal, Gypsum, Limestone, oil, gas, and other minerals. It also has tourism potential. Besides these, Road Infrastructure has deteriorated, whereas water scarcity and salinity remain the main issues. There is also a lack of health, education, and electricity facilities.

Currently, Karak is going towards haphazard development as the development is not being regulated. The exploitation of natural resources is already significant and is expected to intensify in the future. However, there is hope for sustainable development if effective policies and clear guidelines are established to steer growth in optimal directions. With significant potential, the district's economy can be substantially enhanced by strategically developing its hydrocarbon resources. There is also a dire need to improve health, education, electricity, water management systems, road infrastructure, and public amenities sectors of the district for the citizens to achieve sustainable development while also maintaining the preservation of natural resources.

The Karak district offers potential opportunities for industrial investors, and if these are supported through a suitable environment along with necessary infrastructure for industrial activities, it can become a regional industrial hub. Furthermore, growing more trees of Ber and Olives, best suitable for the district, can help achieve a sustainable environment and a better economy. Above all, transparency should be prioritized in the utilization of royalty funds and the execution of civil works.

1.2.2 Vision Statement

Visions created from focus group discussions with the general public and the consultative workshop with the district administration and stakeholders were blended into a single vision statement for Karak, which is provided below:

"A district of evolving economy, environmental quality and opportunities for social interaction

1.2.2.1 Goals

Based on the Vision's statement, the goals have been derived for the Karak Land Use Plan.

1. *To develop industries in district Karak*
2. *To preserve the environment in Karak*
3. *To discourage haphazard development*

1.2.2.2 Objectives

Based on the goals derived in the above section, the following objectives are formulated.

1. *Develop industries of mining processing and value addition in Karak as using the reserves of Coal, Gypsum, Limestone and other minerals*
2. *Establish research institute for mineral extraction and processing and Technical Training Center to improve the knowledge and skills of locals*
3. *Regulate extraction of oil and gas*
4. *Preserve forests and natural landscape*
5. *Propose well planned, compact development*
6. *Enhance the institutional capacity to enforce building bye laws and regulations*
7. *Framework for implementation of the district land use plan*

1.3 Physical Characteristics of the District

1.3.1 Climate

District Karak, with a humid subtropical climate, is experiencing rising temperatures, declining rainfall, and frequent droughts due to climate change. Covering mostly Piedmont and Valley Plains, it faces extreme heat, water scarcity, and natural hazards like earthquakes and floods. These changes are affecting agriculture, water resources, and local livelihoods.

1.3.2 Range and Monthly Distribution of Climate – Historical Perspective

In Karak, the summers are long, sweltering, humid, and clear, and the winters are short, cold, dry, and mostly clear, resulting in a stark contrast in temperatures between hot summers and milder winters.

1.3.2.1 Temperature

From 1979 to 2024, District Karak shows a consistent semi-arid temperature pattern, peaking in May–June (up to 39 °C) and dipping in December–January (as low as 6 °C). This seasonal trend is key for guiding land use, agriculture, and water management planning. **Figure 1-7** below shows the annual average temperature from 1979-2024.

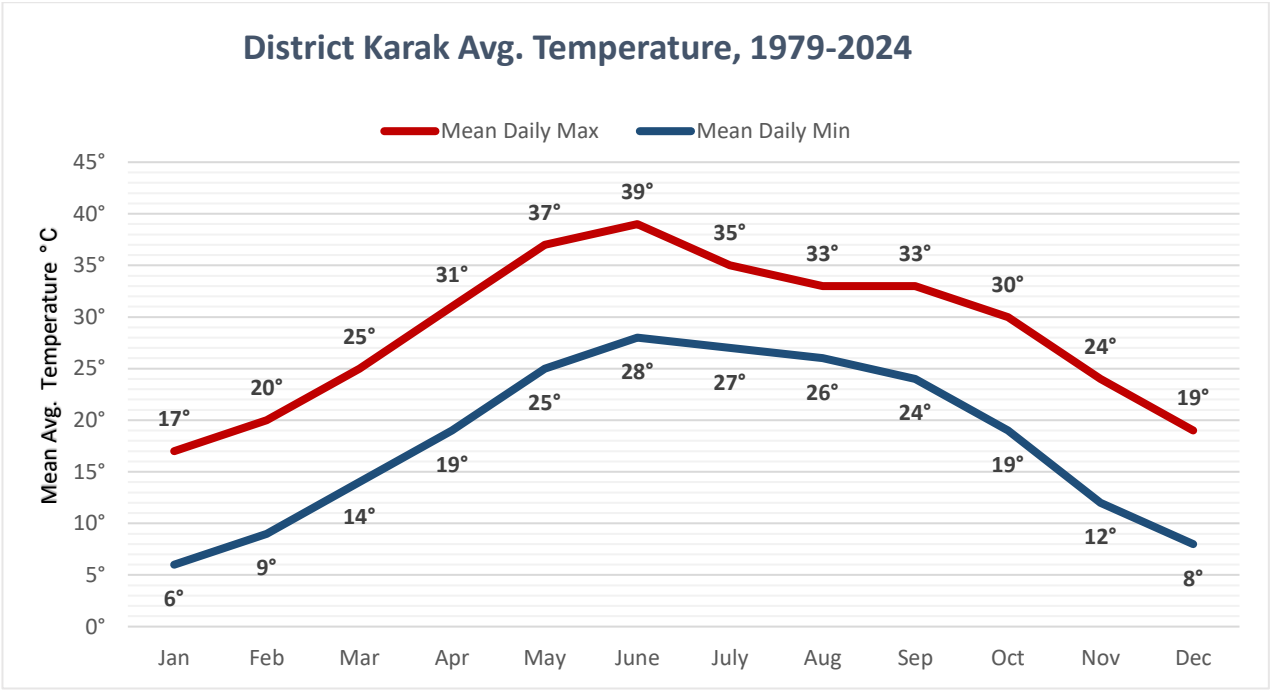


Figure 1-3 Annual Mean Average Temperature[2]

1.3.3 Precipitation

District Karak experiences a highly seasonal rainfall pattern, with most precipitation occurring during July (192 mm) and August (161 mm) due to the South Asian monsoon. Spring months like March (56 mm) and April (43 mm) receive moderate rain, while late autumn and winter (October–December) see minimal rainfall, as low as 12 mm in December. This uneven distribution affects agriculture, water management, and drought resilience.

[2] *https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/karak_pakistan_1174074*

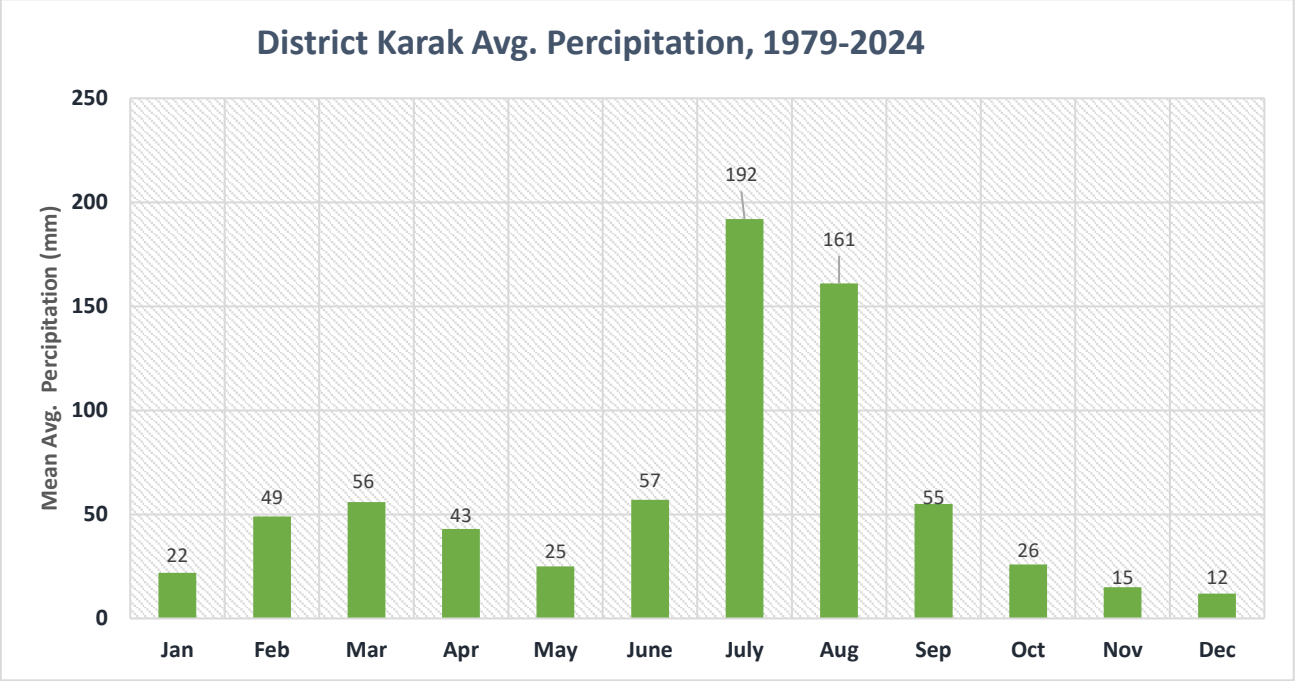


Figure 1-4 District Karak Mean Average Precipitation[3]

1.3.4 Wind Speed

The chart shows monthly wind speeds in District Karak from 1979–2024. Most days have wind speeds between 10–20 km/h, with fewer days in the 5–10 km/h range and rare occurrences in the 20–30 km/h range. May and June see slightly higher 10–20 km/h winds. Unlike Karak, regions like the Tibetan Plateau experience strong winds from December to April due to monsoon patterns.

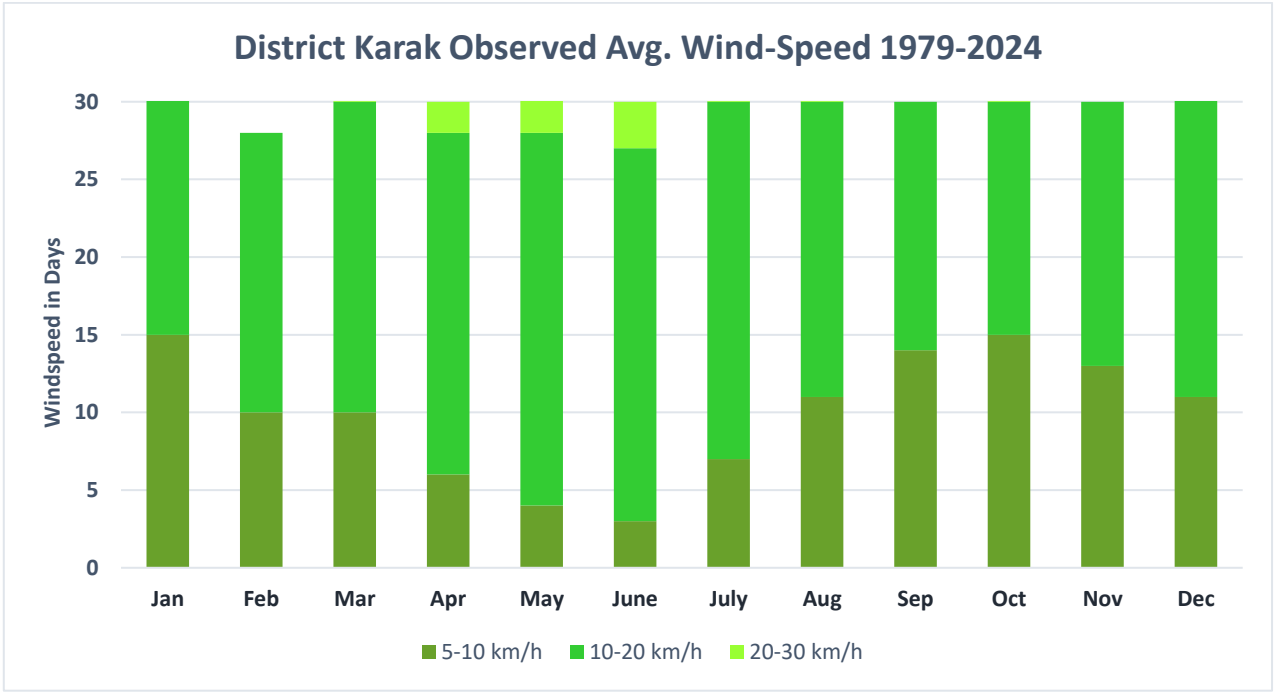


Figure 1.9 District Karak Mean Average Wind Speed[4]

1.3.5 Wind Direction

[3] *https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/karak_pakistan_1174074*
[4] *https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/karak_pakistan_1174074*

In District Karak, prevailing winds blow mainly toward the North, Northeast, and South-Southeast, with weaker winds from the Northeast and West. Wind speeds generally range from 4 to 13 km/h, with highs of 10 to 20 km/h and lows below 2 km/h across directions.

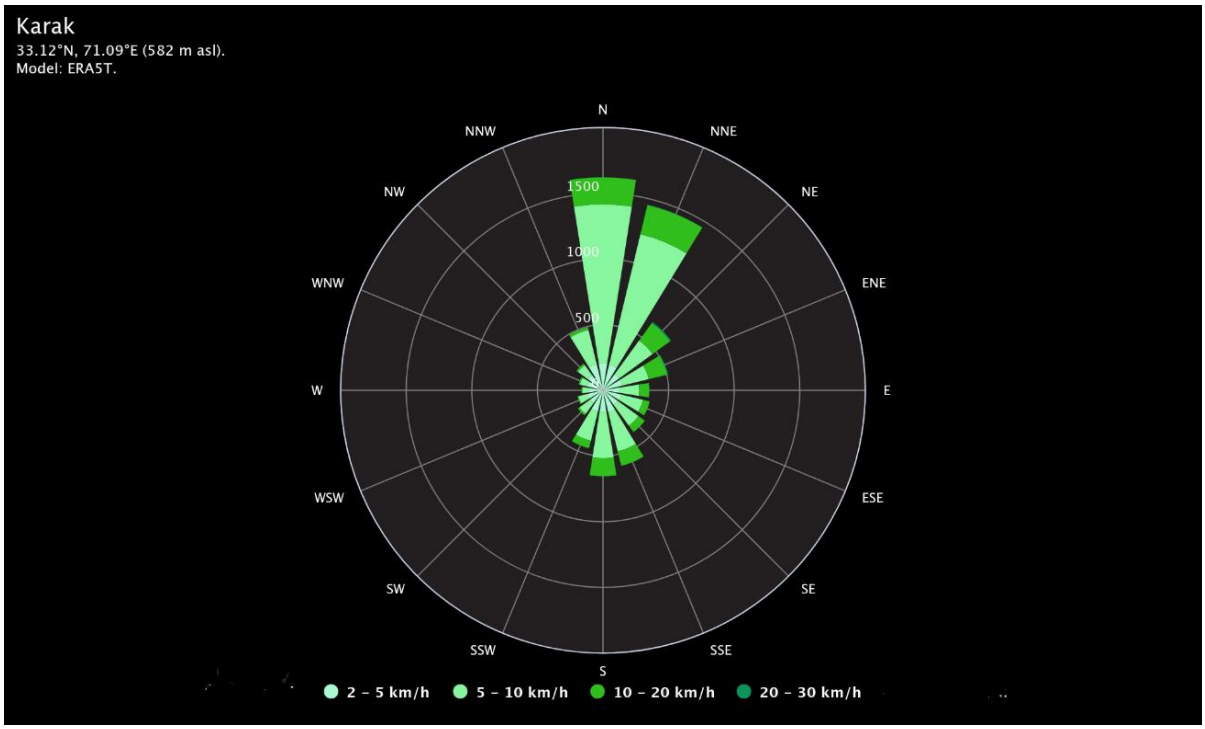


Figure 1.10: Wind Rose Diagram of District Karak[5]

1.3.5.1 Annual Humidity Trend (1981-2024), District Karak

District Karak shows a rising trend in mean annual relative humidity (1981–2024), peaking around 2020. This shift suggests changing microclimates, supporting diverse crops but increasing pest risks, requiring updates in crop zoning, irrigation, and storage planning.

[5] *https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/karak_pakistan_1174074*

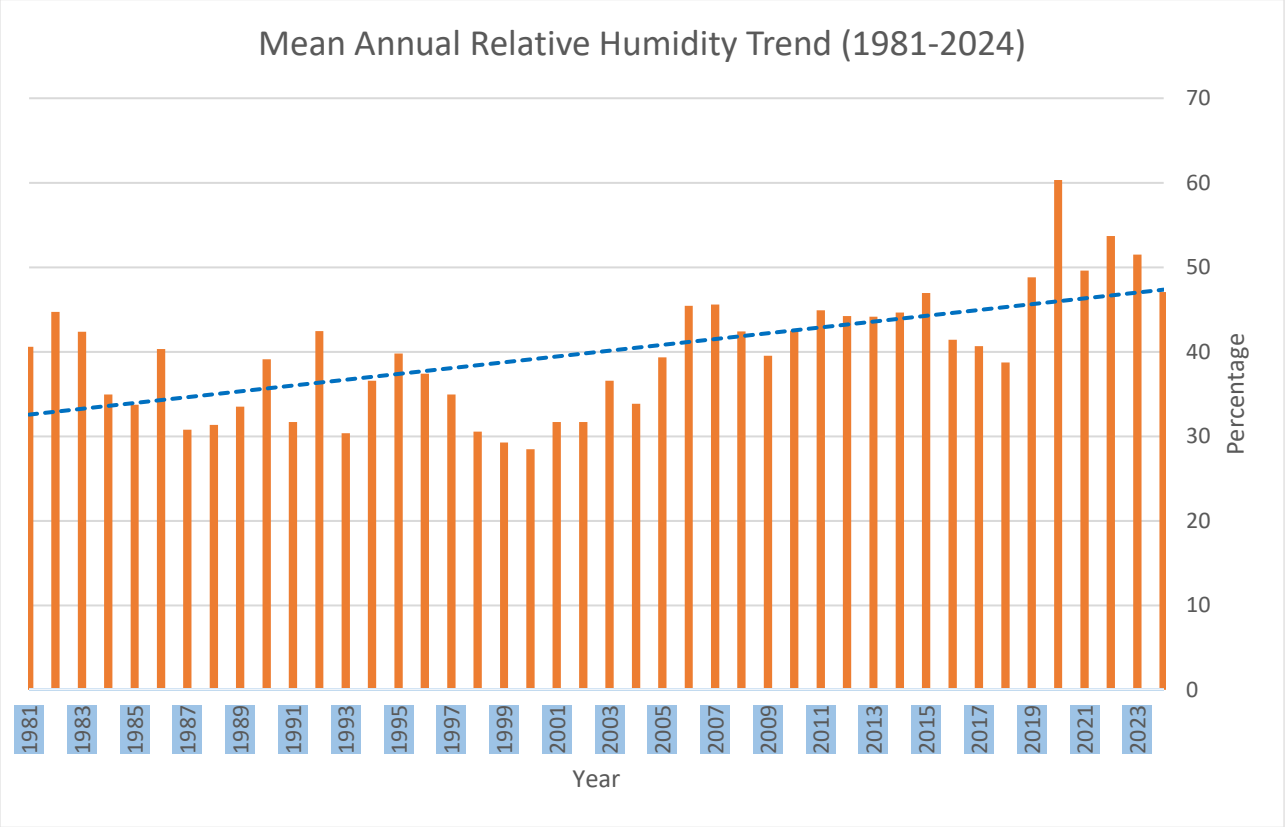


Figure 1-5:Mean Monthly Relative Humidity, District Karak.[6]

1.3.6 Monthly Distribution of Humidity

Karak experiences strong seasonal humidity shifts, peaking above 70% in August and dropping to around 25% in June and December. Heatwaves occur pre- and post-monsoon periods, with the 2023 Winter Contingency Plan noting extreme seasonal conditions.

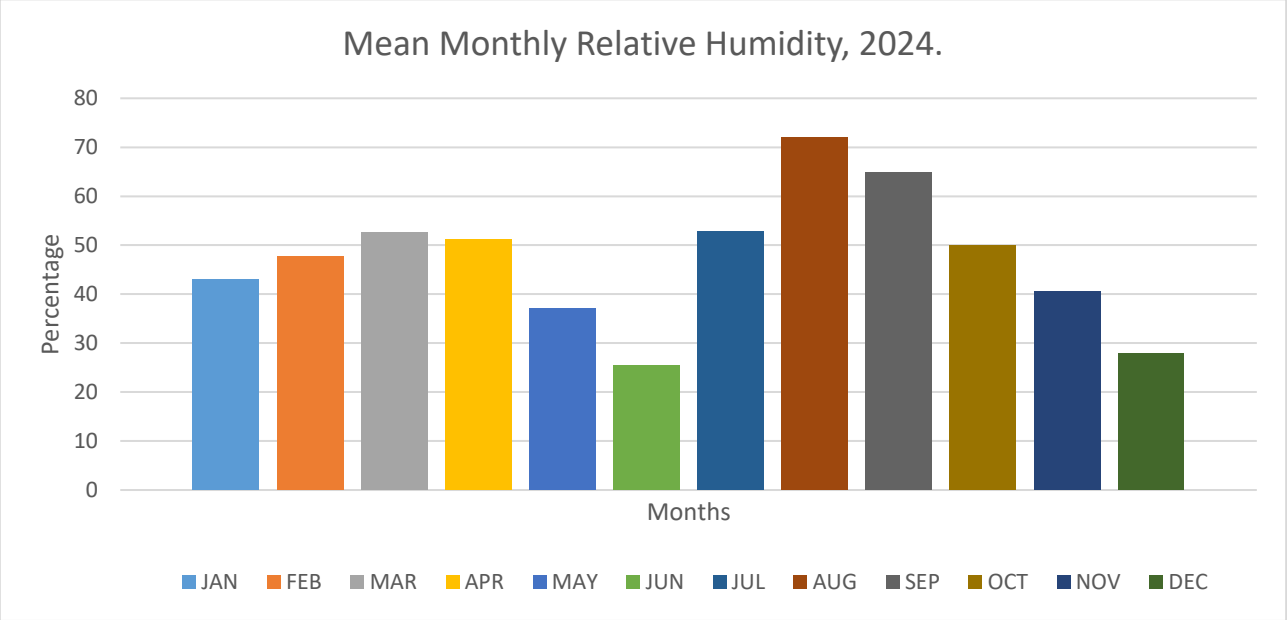


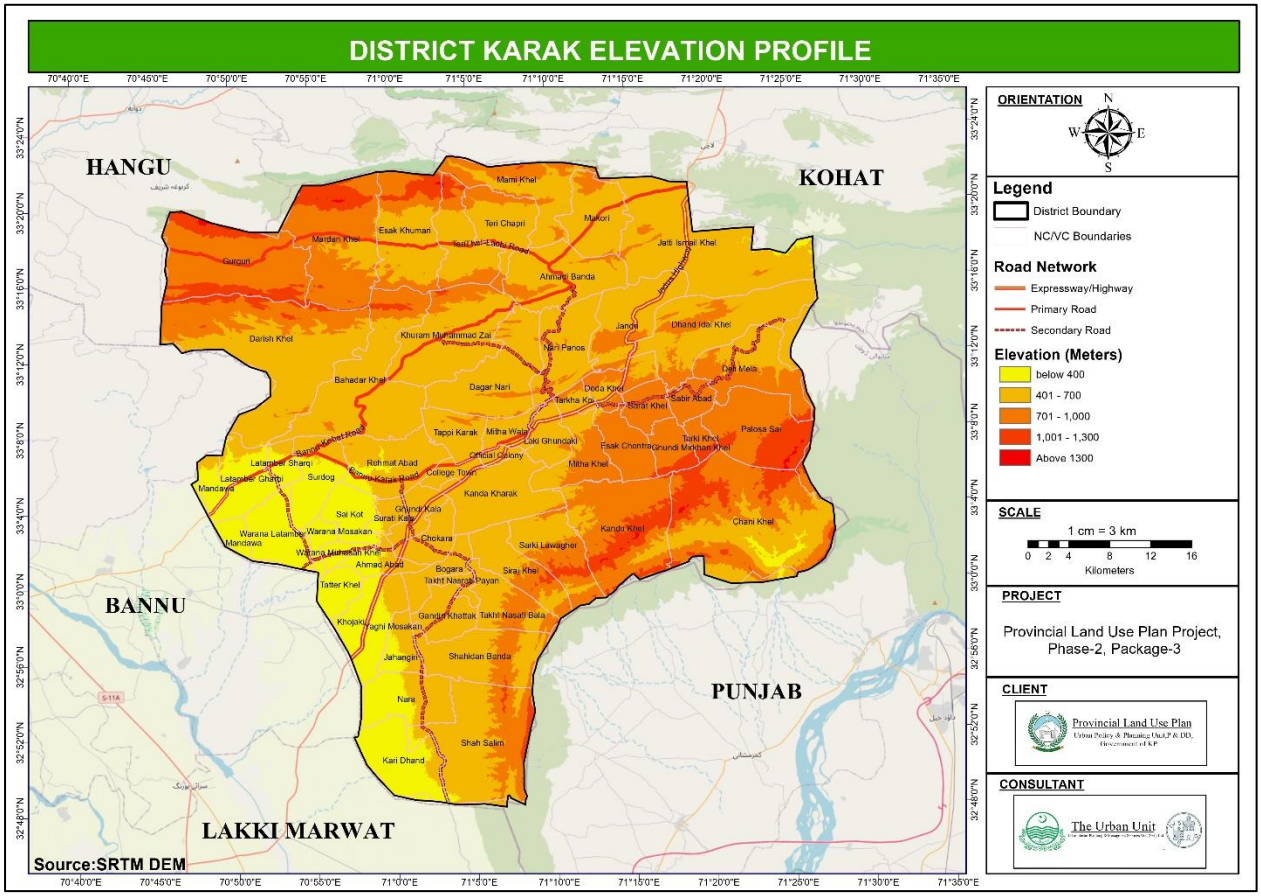
Figure 1-6: Mean Monthly Relative Humidity, District Karak

1.3.7 Elevation

The district lies at the base of the Koh-e-Suleman Range, with elevations ranging from 304 meters in the South to 1416 meters in the Eastern and Northwestern highlands. Central and Southern areas like Takht-

[6] *https://power.larc.nasa.gov/data-access-viewer/*

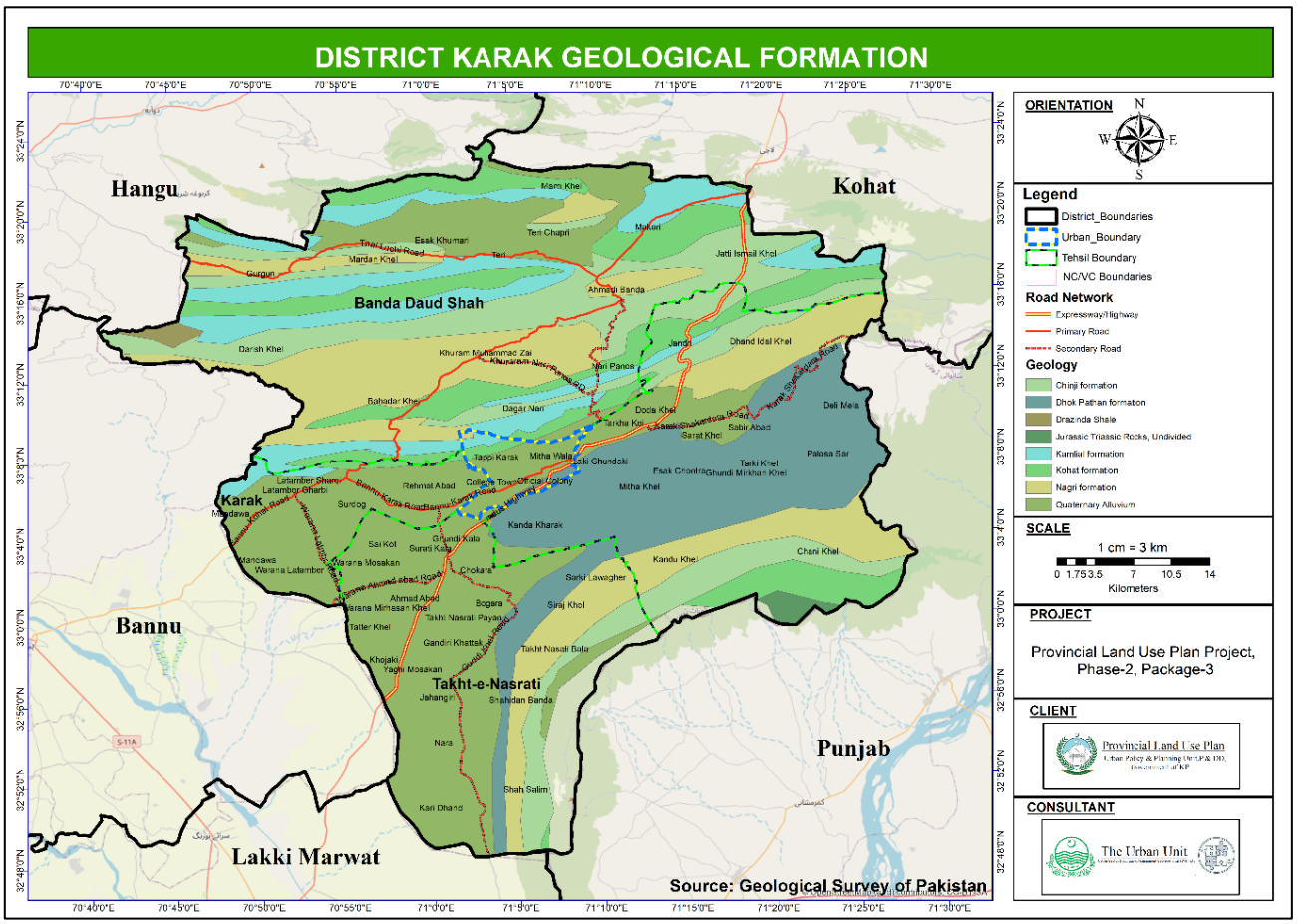
e-Nasrati and Karak tehsil are lower (300–700 meters), suitable for agriculture and development. In contrast, Northern and Eastern regions such as Banda Daud Shah and Sabir Abad feature rugged terrain above 1000 meters, limiting urban growth but offering potential for forestry and eco-tourism.



Map 1-2: District Karak Elevation Profile

1.3.8 Geology

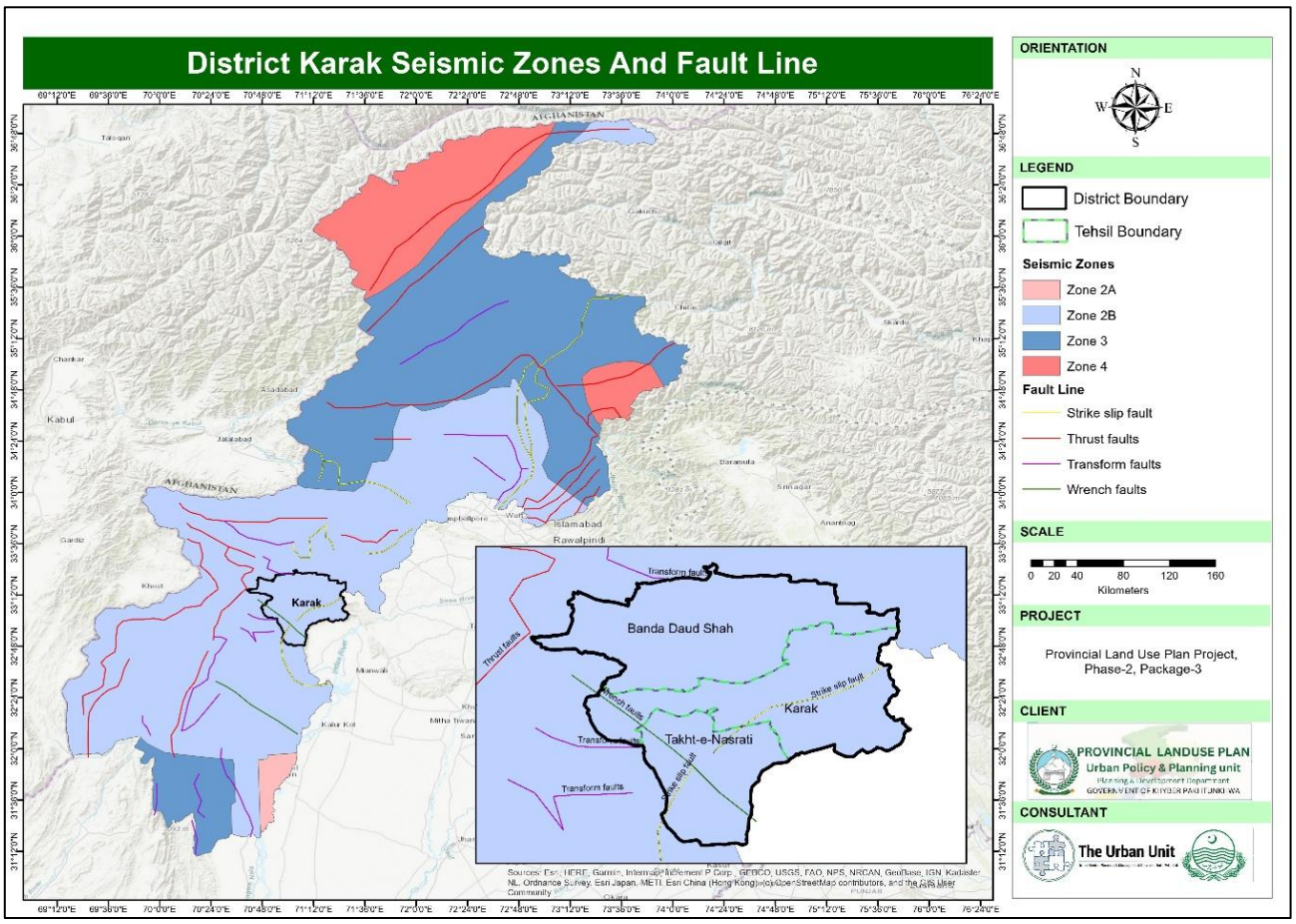
District Karak's central region, especially around Karak city, has alluvial deposits ideal for agriculture, construction, and groundwater use. Southern and central areas (Takht-e-Nasrati) feature Miocene rocks suitable for farming. The North (Banda Daud Shah) has rugged Oligocene and Eocene formations, less favorable for agriculture but promising for mineral exploration. Pleistocene and Pliocene rocks in the Southwest and Southeast offer moderate development potential.



Map 1-3: Geological Formation of District Karak

1.3.9 Seismic Condition

District Karak lies in a seismically active zone near the Indian and Eurasian Plate boundary within the Himalayan collision zone. Classified as Seismic Zone 2B, it faces moderate seismic risk (PHGA 0.16–0.24g), requiring earthquake-resistant construction and disaster preparedness. The district's tectonic features—strike-slip, transform, and wrench faults—must guide zoning and development to enhance resilience.



Map 1-4: Seismic Zones and Fault lines of District Karak

1.3.10 Surface Water Resources

District Karak relies on small dams, khwars, nullahs, and limited canal infrastructure for surface water. With no major rivers, rainwater collected in dams is distributed through natural channels. However, inadequate infrastructure and irregular rainfall pose challenges for effective water distribution, affecting agricultural productivity. Expanding water storage and distribution systems is essential for improving water availability.

1.3.10.1 Canals

Canal irrigation in District Karak is minimal, with only 25[7] hectares irrigated through government canals consistently from 2017–18 to 2021–22. No irrigation is reported via private canals during this period, highlighting the district's limited reliance on canal infrastructure.

1.3.10.2 River

District Karak does not have major rivers like those found in other regions of Pakistan.

1.3.10.3 Khwar and Nullahs

In District Karak, rainwater from dams is distributed through narrow khwars and nullahs, which cannot often meet irrigation needs. Combined with irregular rainfall, this limits the reach of water and leaves much cultivable land barren. Strengthening these natural channels, along with projects like the Makh Banda and Chashma Akhora Khel Dam, is essential to improve water distribution for agriculture.

1.3.10.4 Dams

Due to the absence of rivers or canal systems, District Karak relies on rain-fed small dams for irrigation and water supply. Key completed dams include **Zeibi**, **Ghole Banda**, **Sharqi**, **Sarki Lawaghar**, **Mardan Khel**, **Changhoz**, **Karak**, **Chambai**, and **Latambar**. Among these, **Changhoz Dam** has the largest capacity (11,550

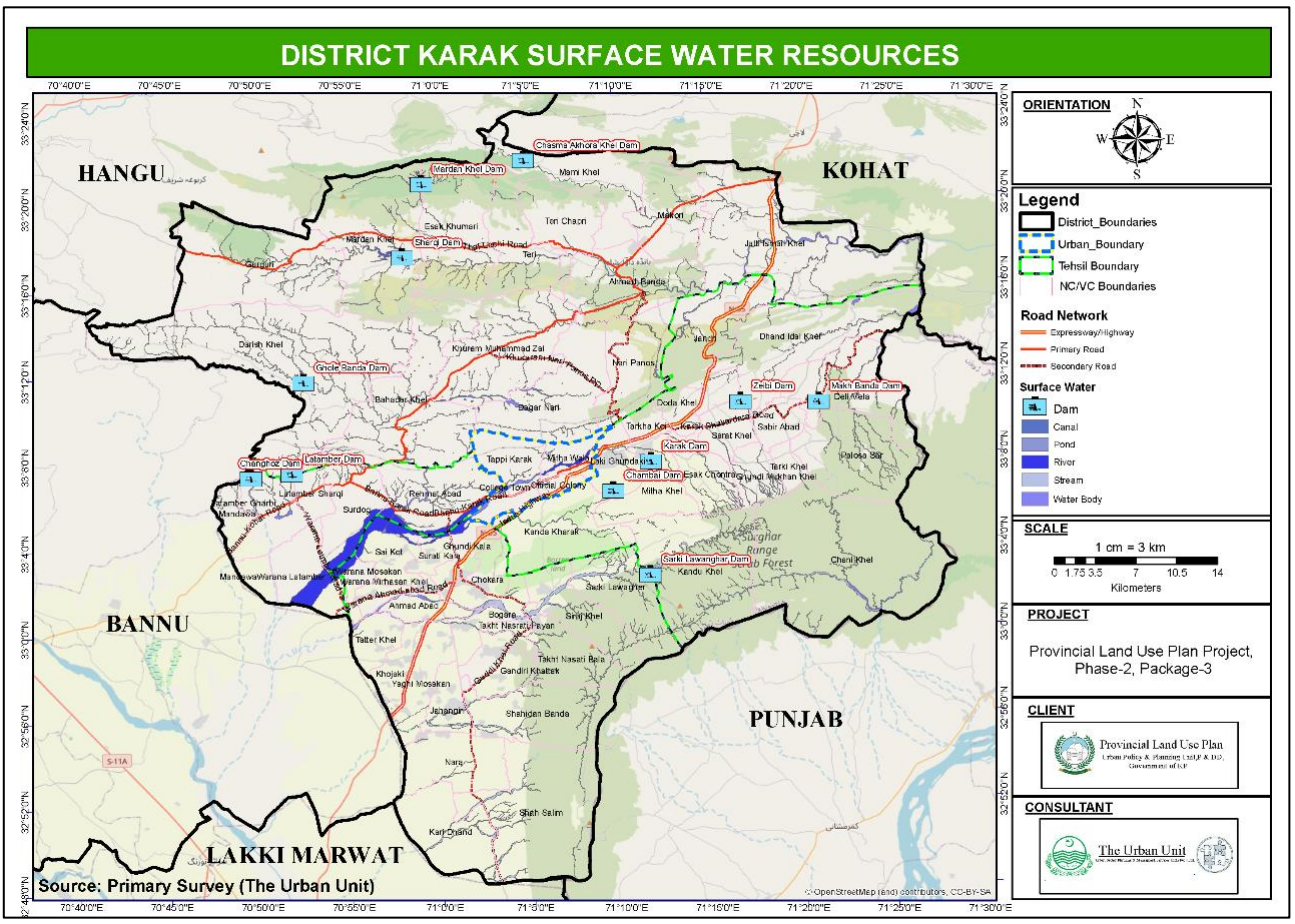
[7] *Development Statistics, 2022, Bureau of Statistics, Govt of Pakistan*

acre-feet), while **Sharqi** and **Ghole Banda** support extensive cultivable command areas. These dams irrigate various regions across the district and also supply drinking water in some cases.

Table 1-1: Surface Water Resource Storages in District Karak[8]

Name of Dam	Coordinates	Cultivable Command Area (acres)	Capacity (Acre-ft.)	Status
Zeibi Dam (drinking purpose)	33°10'38.30"N 71°16'49.88"E	-	1875	Completed
Ghole Banda Dam	33°11'41.03"N 70°53'0.09"E	1500	4531	Completed
Sharqi Dam	33°17'22.98"N, 70°58'32.89"E	9996	3000	Completed
Sarki Lawaghar Dam	33° 2'29.81"N 71°11'36.92"E	3195	1970	Completed
Mardan Khel Dam	33°20'41.98"N 70°59'16.72"E	1300	2383	Completed
Changhoz Dam	33° 7'18.68"N 70°49'40.54"E	11550	3300	Completed
Karak Dam	33° 7'48.97"N 71°11'43.69"E	1549	1175	Completed
Chambai Dam	33° 6'28.57"N 71° 9'40.51"E	1175	2604	Completed
Latambar Dam	33° 7'29.14"N 70°51'58.64"E	800	-	Completed
Chashma Akhora Khel Dam	33°21'54.40"N 71° 5'2.07"E	3100	4150	In-Progress
Makh Banda Dam	33°10'27.31"N 71°21'8.55"E	725	946	In-progress

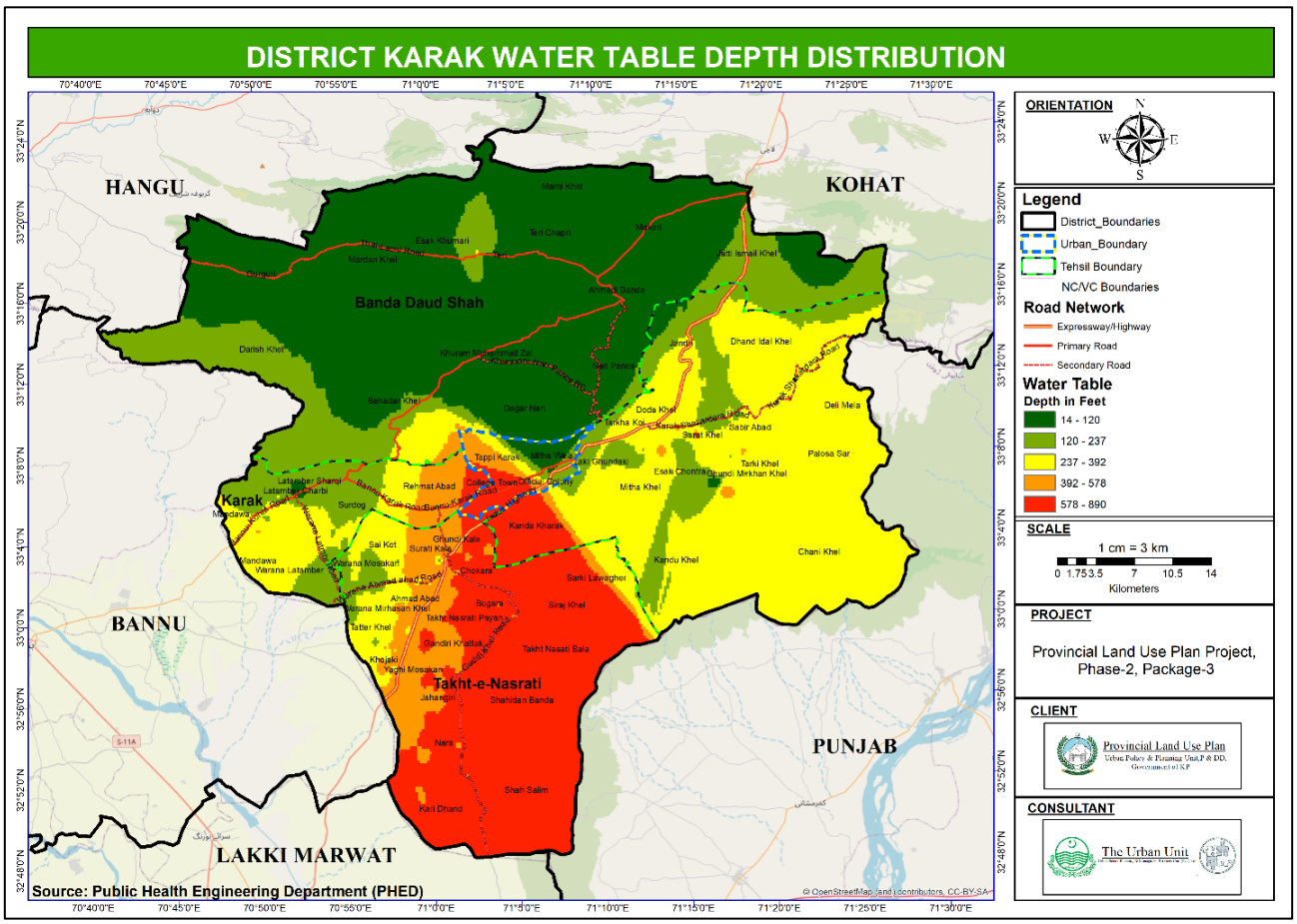
[8] *Directorate General of Small Dams Irrigation Department Khyber Pakhtunkhwa*



Map 1-5: Surface Water Resources in Karak District

1.3.11 Water Table

The water depth in District Karak has been analyzed using secondary data, which provides water table information for each settlement, The map shows water table depth distribution in District Karak. Northern areas, especially Banda Daud Shah, have shallow water tables (14–100 ft). Central parts around Karak city range between 102–297 ft. Southern and southeastern areas, particularly Takht-e-Nasrati, have the deepest water tables, reaching 592–890 ft.



Map 1-6: Water Table Depth Distribution

1.4 Socio-Economic Profile

1.4.1 Historical Population Growth Trend

Population growth in District Karak and Khyber Pakhtunkhwa has fluctuated from 1961 to 2023. Karak, initially part of Kohat, had half the provincial growth rate in 1961 but surpassed it in 1972. Karak's growth then dropped sharply in 1981, rose again in 1998 after gaining district status in 1982, and slightly declined in 2023. In contrast, Khyber Pakhtunkhwa showed a high growth rate in 1961–72, followed by a gradual decline until 1998, with a rise again in 2017 while slightly decrease in 2023.

The growth rate comparison of District Karak and Khyber Pakhtunkhwa is presented in the **Table** and illustrated in the **Figure** below.

Table 1-2: District Karak Population Growth Compared with Khyber Pakhtunkhwa[9]

Census	District Karak		Khyber Pakhtunkhwa	
	Population	Intercensal Average Growth Rate	Population	Intercensal Average Growth Rate
1951	99,908	---	4,556,545	---
1961	121,199	1.02	5,730,991	2.32
1972	191,204	4.23	8,388,551	3.52
1981	249,681	1.41	11,061,328	3.12
1998	430,796	3.26	17,743,645	2.82
2017	705,362	2.62	30,508,920	2.89
2023	815,878	2.46	40,856,097	2.38

[9] *Population Census Organization, Statistics Division, Government of Pakistan (January, 2002). 1951-98 Population of Administrative Units. Table-1: Area and Population of Administrative Units by Rural/Urban: 1951-2017 Censuses*

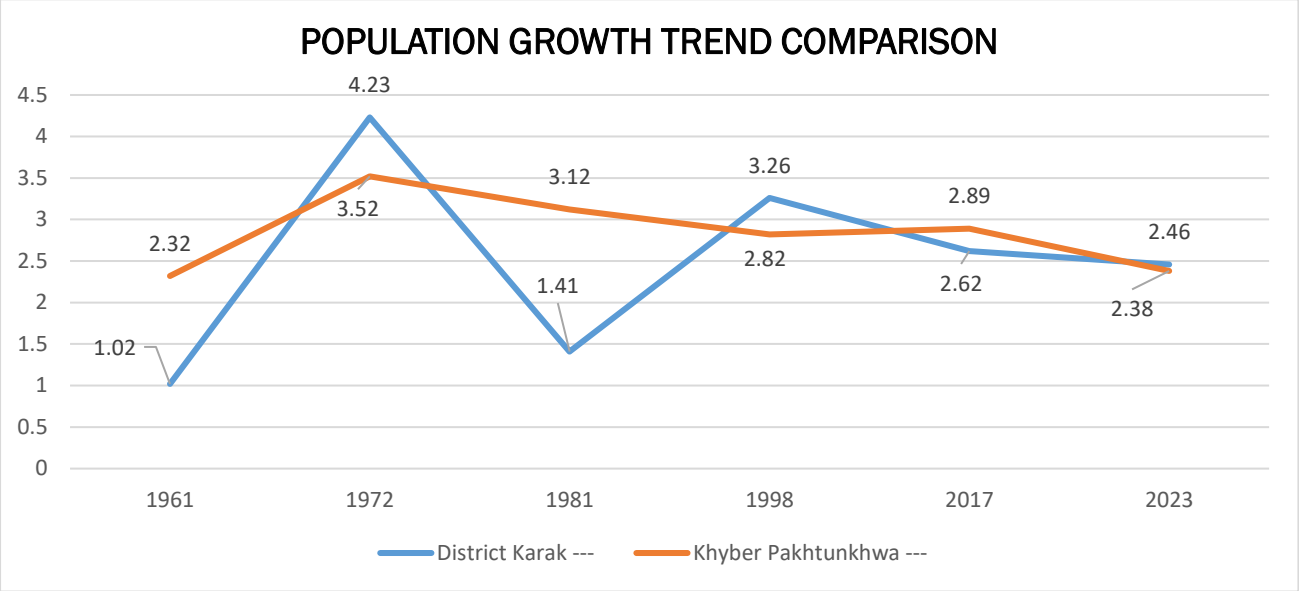


Figure 1-7: District Karak Population Growth Rate Comparison with Province

1.4.2 Population Distribution

According to the 2023 Census, District Karak has a total population of 815,878, comprising 58,065 urban and 757,813 rural residents. The district had no recorded urban population until 1981, when 13,679 individuals were classified as urban out of a total population of 249,681. By 1998, the population increased to 430,796, with 27,893 residing in urban areas and 402,903 in rural areas. In 2017, the population further rose to 705,362, including 51,086 urban and 654,276 rural inhabitants. The population distribution is summarized in **Table** and shown in **Figure** below.

Table 1-3: District Karak Population Distribution[10]

Administrative Area	1951	1961	1972	1981	1998	2017	2023
District Urban	--	--	--	13,679	27,893	51,086	58,065
District Rural	99,908	121,199	191,204	236,002	402,903	654,276	757,813
District Overall	99,098	121,199	191,204	249,681	430,796	705,362	815,878
Urban Areas							
Karak MC	-	-	-	13,679	27,893	51,086	58,065
Rural Areas							
Tehsil Banda Daud Shah	26859	33756	48998	59172	98,626	155,482	177,744
Tehsil Karak	39,216	48,348	72,070	80,513	134,235	241,743	339,983
Tehsil Takhti Nasrati	33833	39095	70136	96317	170,042	257,051	298,151

[10] *Population Census Organization, Statistics Division, Government of Pakistan (January 2002). 1951-98 Population of Administrative Units. Table-1: Area and Population of Administrative Units by Rural/Urban: 1951-1998 Censuses. District Bannu-Final Results of Sixth Population and Housing Census-2017. Table-1: Area, Population by Sex, Sex Ratio, Population Density, Urban Proportion, Household Size and Annual Growth Rate.*

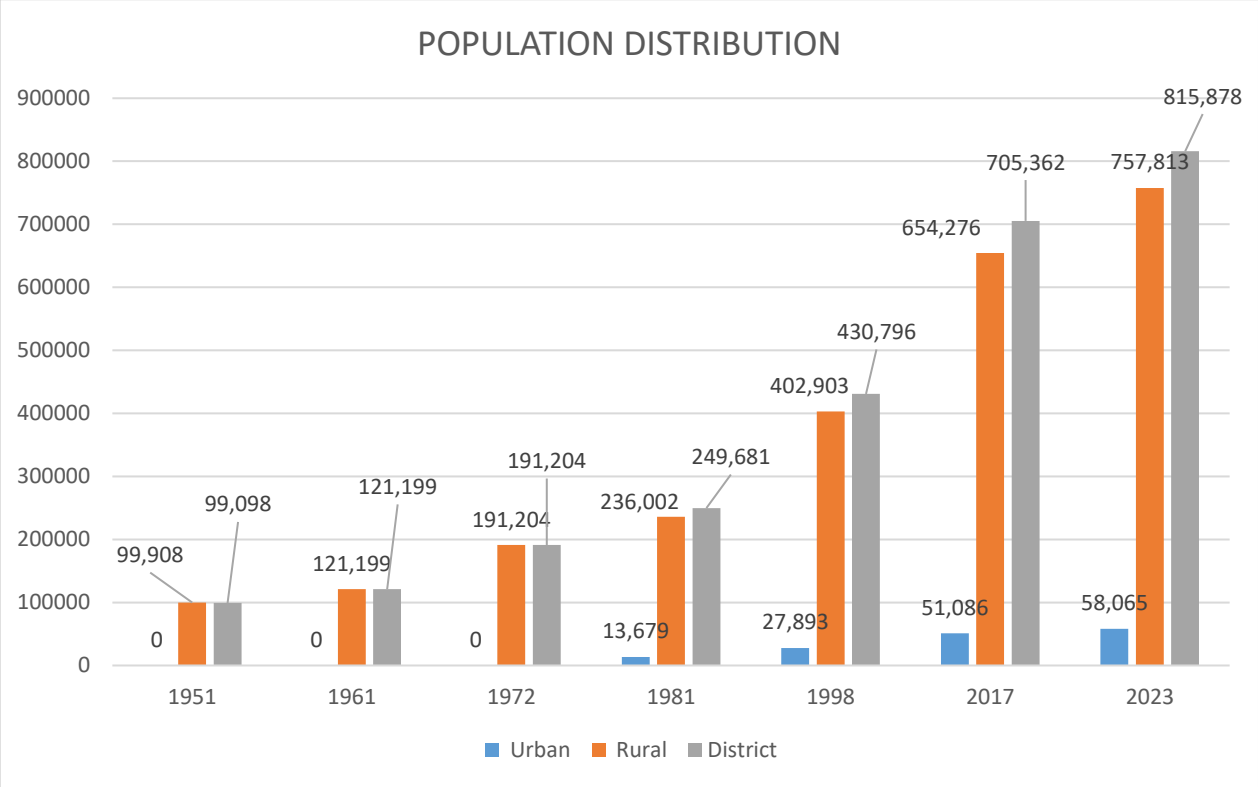


Figure 1-8: Population Distribution in District Karak

1.4.3 Age and Sex Wise Population Distribution

A district where more than 40% of the population is below the age of 15 years is a "youthful population district"[11], with 41.76% of its population under 15 and 60.97% under 25. Among males, 42.43% are below 15 and 61.66% under 25; for females, it's 42.43% and 60.23%, respectively. This growing young population, mostly in rural areas, signals rising future demand for jobs and services, increasing economic dependency pressures.

The details of District Karak's age and sex-wise population distribution are given in the **Table** and graphically represented in **Figure** below.

[11] *Multi-Donor Support Unit (MSU). 2000. District Population Profile: Operationalizing and Interpreting Population Census Data for Planning (NWFP). Islamabad: Government of Pakistan*

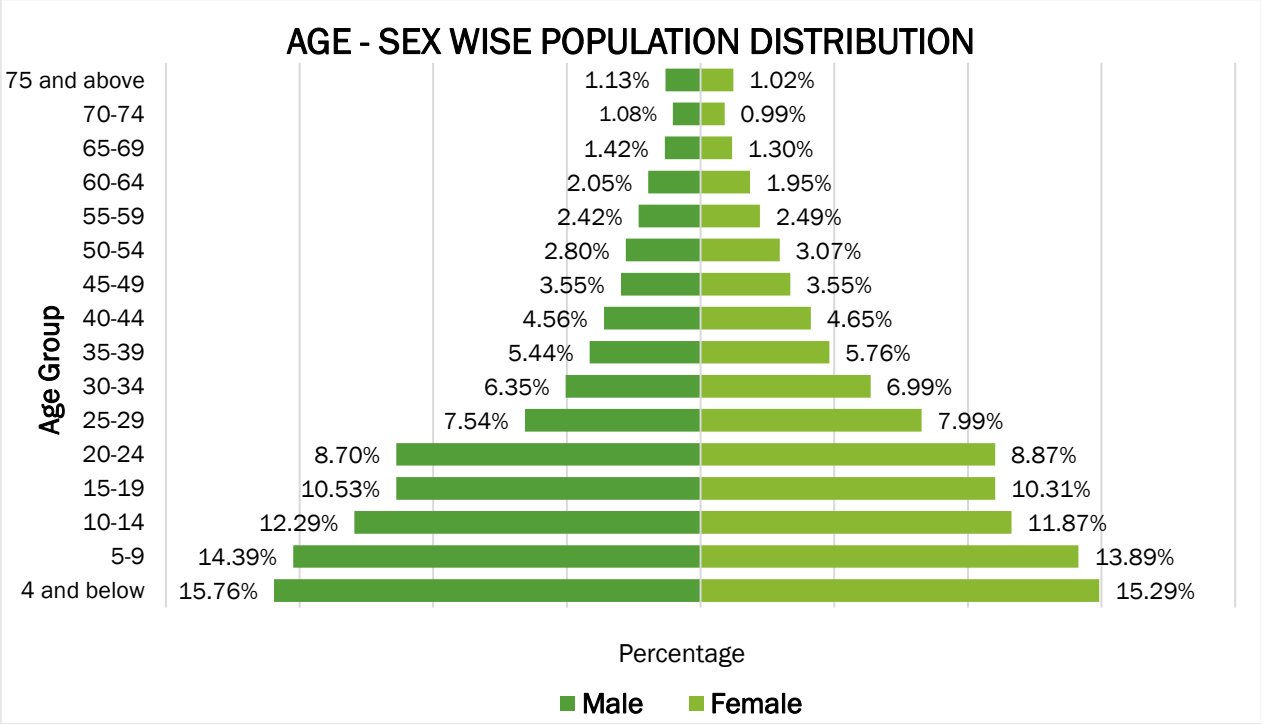


Figure 1-9: District Karak Age and Sex-Wise Population Distribution[12]

1.4.4 Population Density

Population density, the number of people per unit area, is key in urban and land use planning. It guides resource allocation, infrastructure design, and service delivery. High density can lead to congestion and strain public services, making balanced planning essential for sustainable, livable cities.

The consultant has calculated the population density by dividing the total population of an area by its land area. The formula for calculating population density is:

$$\textbf{\textit{Population Density}} = \frac{\textbf{\textit{Total Population}}}{\textbf{\textit{Land Area in sq.km.}}}$$

From 1951 to 2023, population density in District Karak and Khyber Pakhtunkhwa steadily increased. Karak, then part of Kohat till 1982, had a density of 29.64 persons per square kilometers in 1951, rising to 305.26 in 2023. In the same period, Khyber Pakhtunkhwa's density grew from 61.14 to 401.67 persons per square kilometers. Both followed a similar upward trend, Karak saw a sharp increase in density between 2017 and 2023 whereas due to the merger of the erstwhile FATA into Khyber Pakhtunkhwa, land area has increased more as compared to population reflecting a drop in the density. The density comparison of District Karak and Khyber Pakhtunkhwa is given in **Table** and graphically shown in **Figure** below.

Table 1-4: Population Density comparison of District and Province

Census Year	District Karak		Khyber Pakhtunkhwa	
	Population	Density (per sq. km)	Population	Density (per sq. km)
1951	99,908	29.64	4,556,545	61.14
1961	121,199	35.95	5,730,991	76.9
1972	191,204	56.72	8,388,551	112.57
1981	249,681	74.07	11,061,328	148.43
1998	430,796	127.79	17,743,645	238.1
2017	705,362	209.24	30,508,920	409.4
2023	815878	305.26	40,856,097	401.57

[12] *Pakistan Bureau of Statistics. (April, 2021). District Karak-Final Results of Sixth Population and Housing Census-2017. Table-4: Population By Single Year Age, Sex and Rural/Urban*

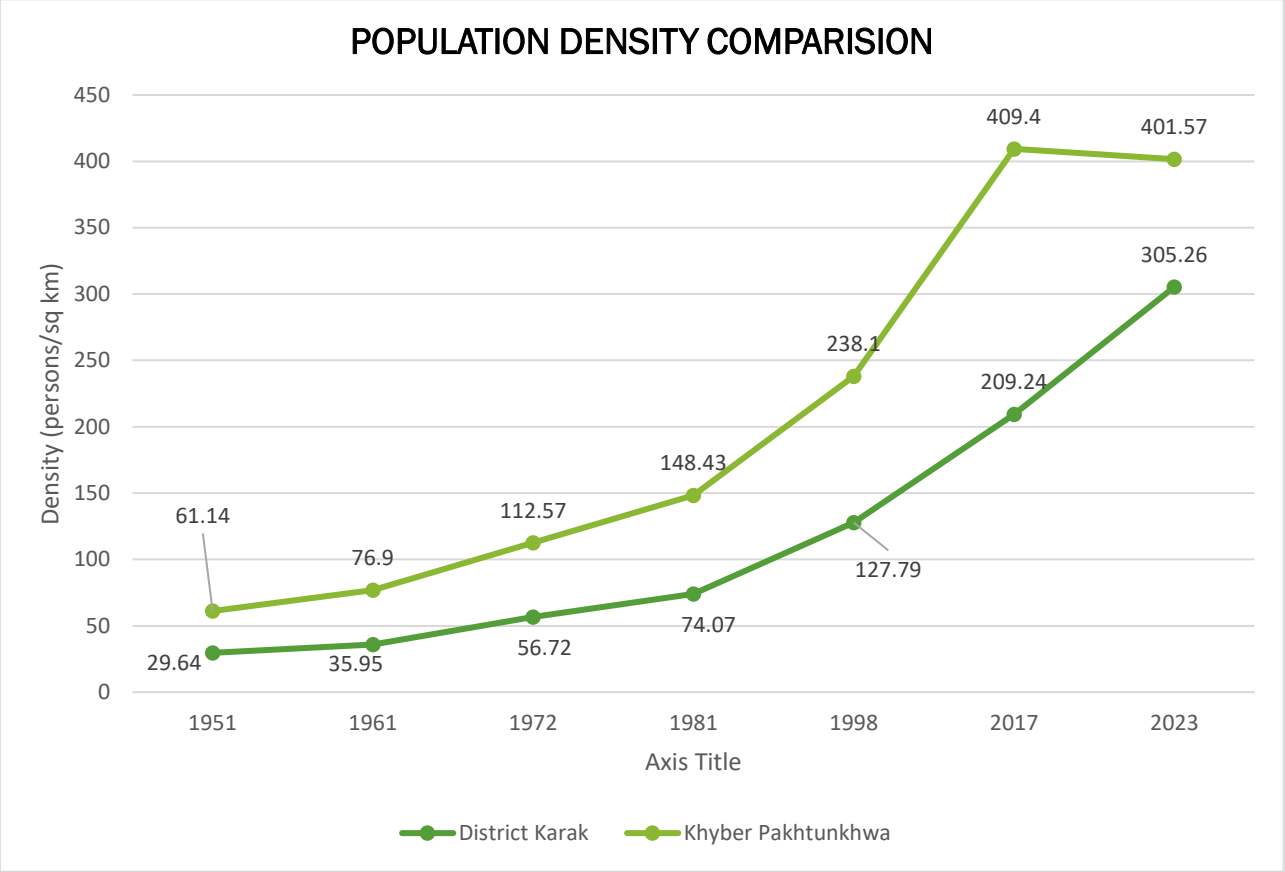


Figure 1-10: Population Density Comparison of District and Province

1.4.5 Migration

The dynamic pattern of migration is mainly influenced by the following driving factors: physical conditions, public service accessibility, economic opportunities, land market, political situation, and plans and policies. The consultant has shown in the sections below the statistics based on the Labor Force Survey (2020-2021) for the migration data in District Karak.

1.4.5.1 In-Migration

According to the Labor Force Survey for 2020–21, a total of **3128** persons were surveyed in District Karak, out of which only **10** persons have moved into District Karak, which is **0.32%** of the total surveyed population.

Out of the total migrated persons into District Karak, **70%** migrated from urban areas and **30%** migrated from rural areas. **50%** of persons have migrated from urban areas of District Bannu whereas **30%** of persons have migrated from the rural areas of District North Waziristan into District Karak.

The in-migration details of District Karak from urban and rural areas are given in **Table** below.

Table 1-5: District Karak In-Migration from Labor Force Survey 2020-2021[13]

District/Country	In Migration		
	Urban	Rural	Total
Islamabad	10.00%	0.00%	10%
North Waziristan	0.00%	30.00%	30%
Bannu	50.00%	0.00%	50%
Karachi South	10.00%	0.00%	10%
Total	**70.00%**	**30.00%**	**100.00%**

Each migrating person had their reason for it, out of the total persons that have migrated from urban areas of other districts to District Karak, **42.9%** have mentioned marriage as a reason, **28.6%** of the persons

[13] *Pakistan Bureau of Statistics. (March, 2022). Pakistan Labor Force Survey 2020-2021. Micro Data*

have migrated to District Karak as they returned to their home while **14.3%** have moved to District Karak because of their job transfers and businesses.

Out of the total persons that have migrated from rural areas of other districts to District Karak, **100%** have mentioned moving due to security/law & order situation. The details of reasons for migrating from various urban and rural areas into District Karak are given in the **Table** below.

Table 1-6: District Karak In-Migration Reasons from Labor Force Survey 2020-2021[14]

Reason	In Migration		
	Urban	Rural	Total
Business	14.3%	0.0%	10.00%
Found a job	14.3%	0.0%	10.00%
Marriage	42.9%	0.0%	30.00%
Returned to their home	28.6%	0.0%	20.00%
Security/Law & Order Situation	0.0%	100.0%	30.00%
Total	**100.00%**	**100.00%**	**100.00%**

1.4.5.2 Out-Migration

According to the 2020–21 Labor Force Survey, 233 people out of District Karak. Of these, 98.31% were from rural areas and 1.69% from urban areas. Key destinations included North Waziristan (24%) and Kohat (20.68%) from rural areas, and Rawalpindi (0.84%) from urban areas.

The out-migration details of District Karak from urban and rural areas are given in the **Table** below.

Table 1-7: District Karak Out-Migration from Labor Force Survey 2020-2021[15]

District/Country	Out Migration		
	Urban	Rural	Total
Chakwal	0.00%	11.39%	11.39%
Charsadda	0.00%	0.42%	0.42%
Hangu	0.00%	0.84%	0.84%
Islamabad	0.00%	4.64%	4.64%
Karachi East	0.00%	0.84%	0.84%
Khanewal	0.00%	0.42%	0.42%
Khushab	0.00%	0.84%	0.84%
Kohat	0.00%	20.68%	20.68%
Kurram	0.42%	7.17%	7.59%
Lahore	0.00%	0.84%	0.84%
Lakki Marwat	0.00%	4.22%	4.22%
Layyah	0.00%	0.42%	0.42%
Mardan	0.00%	0.84%	0.84%
Mianwali	0.00%	6.75%	6.75%
Mohmand	0.00%	2.11%	2.11%
North Waziristan	0.00%	24.05%	24.05%
Peshawar	0.00%	10.13%	10.13%
Rawalpindi	0.84%	1.69%	2.53%
Sheikhupura	0.42%	0.00%	0.42%
Total	**1.69%**	**98.31%**	**100.00%**

Out of the total persons that have migrated out from the urban areas of District Karak, **50%** of the persons have mentioned finding a job as a reason for migrating, while **50%** of the persons have migrated out from District Karak because they married.

[14] *Pakistan Bureau of Statistics. (March, 2022). Pakistan Labour Force Survey 2020-2021. Micro Data*
[15] *Pakistan Bureau of Statistics. (March, 2022). Pakistan Labour Force Survey 2020-2021. Micro Data*

Out of the total persons that have migrated out from other rural areas of District Karak, **26.41%** have mentioned moving with parents as a reason for migrating, **24.24%** of the returned to their home while **12.55%** have described found a job for moving from District Karak.

The details of reasons for migrating out from urban and rural areas of District Karak are given in **Table**.

Table 1-8: District Karak Out-Migration Reasons from Labour Force Survey 2020-2021[16]

Reason	Out Migration		
	Urban	Rural	Total
Found a job	50.00%	12.55%	13.19%
Business	0.00%	0.43%	0.43%
Change of Residence	0.00%	0.43%	0.43%
Education	0.00%	0.43%	0.43%
Health	0.00%	0.43%	0.43%
Job transfer	0.00%	2.60%	2.55%
Marriage	50.00%	10.82%	11.49%
Returned to their home	0.00%	24.24%	23.83%
Searching for better agriculture land	0.00%	1.30%	1.28%
Searching for job	0.00%	3.90%	3.83%
Security/Law & Order Situation	0.00%	3.90%	3.83%
With Parents	0.00%	26.41%	25.96%
Other	0.00%	0.87%	0.85%
With Son	0.00%	0.87%	0.85%
With Spouse	0.00%	10.82%	10.64%
Total	**100.00%**	**100.00%**	**100.00%**

1.4.6 Employment

The employment section in Karak's land use plan aligns land allocation with job trends. Based on LFS 2020, unemployment was high at 56.37%, with most jobs in agriculture (9.40%) and labor (10.22%). HIS 2023 shows improved figures: unemployment dropped to 29.35%, agriculture jobs to 3.68%, and private sector jobs rose to 13.39%. The details of employment in District Karak are given in **Table** and visually represented in **Figure** below.

Table 1-9: District Karak Employment Details

Source	Agriculture-Livestock	Business-Trade	Government Job	Labour	Private Job	Transport	Others	Unemployed
Employment from LFS 2020	9.40%	8.51%	6.28%	10.22%	6.87%	2.35%	0.00%	56.37%
Employment from HIS 2023	3.68%	9.38%	11.72%	19.31%	13.39%	6.47%	6.70%	29.35%

[16] *Pakistan Bureau of Statistics. (March, 2022). Pakistan Labour Force Survey 2020-2021. Micro Data*

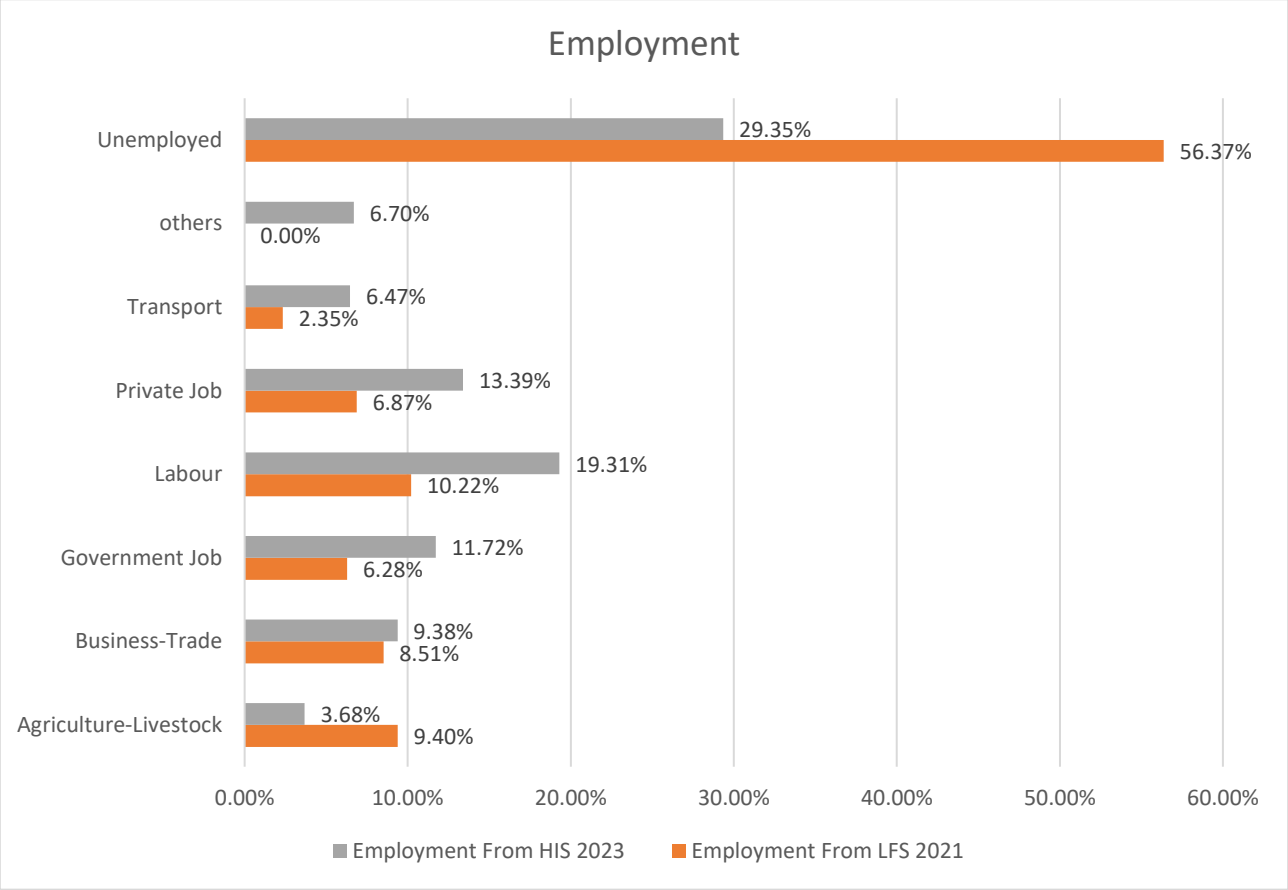


Figure 1-11: District Karak Employment Details

1.4.7 Literacy Ratio

The Pakistan Bureau of Statistics, during its Population and Housing Census, considers a person as literate if they can read a newspaper or a journal of the same standard and can write a simple letter in any language. Literacy is measured as the ratio, in percentages, of the literate population to the corresponding population aged 10 and over.

1.4.7.1 Overall literacy ratios of Census 2023, HIS, and PSLM

The overall literacy rate varies between data sources: 65.36% in the population census and 82.74% in the household survey. According to PSLM, males have consistently higher literacy rates than females across all age groups. The highest literacy is in the 15–24 age group (84% overall – 97% male, 69% female), followed by the 10+ group (72% overall – 91% male, 49% female). The lowest female literacy is in the 15+ group at 44%, with an overall rate of 69%. The details of literacy in District Karak are given in **Table** and shown in the **Figure** below.

Table 1-10: District Karak Literacy Details

Source	Male	Female	Overall
Census 2023	84.12 %	45.60 %	65.36 %
HIS 2023	85.12%	65.29%	82.74%
PSLM 2019	91%	49%	72%

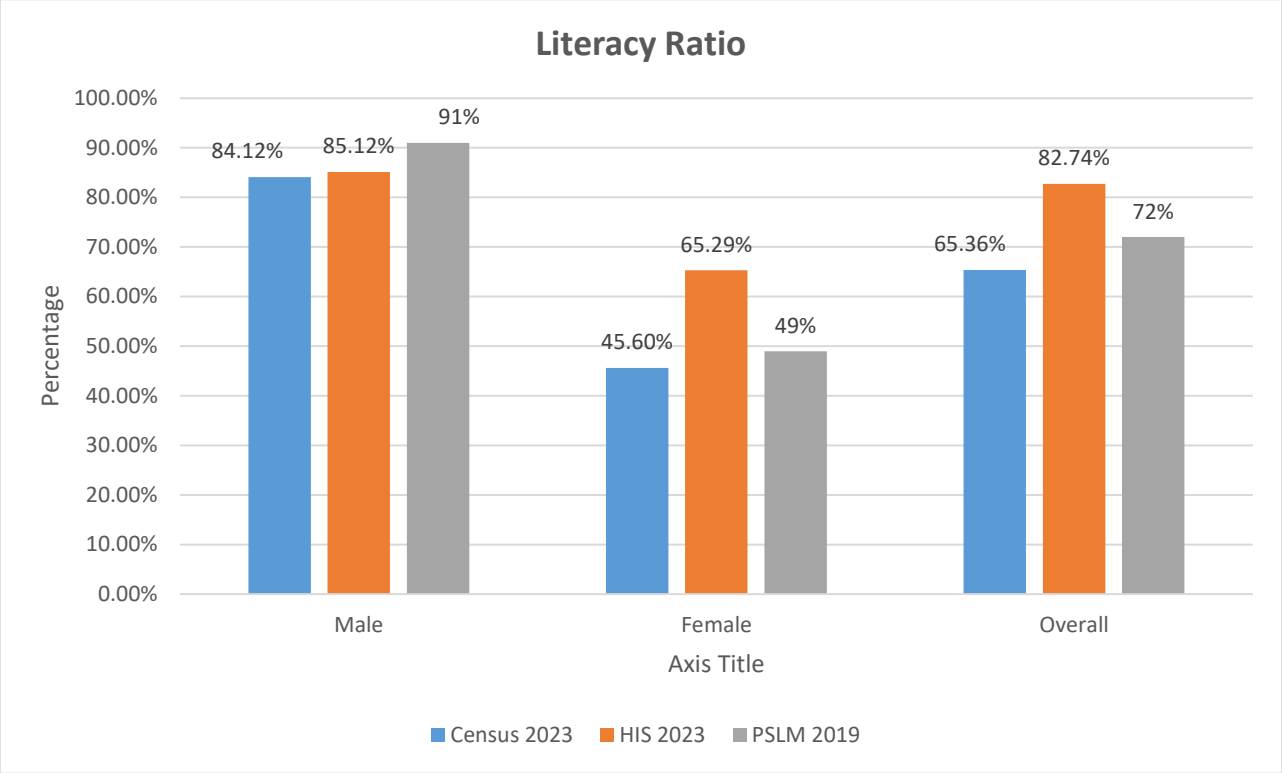


Figure 1-12: District Karak Literacy Ratios of Census and HIS

1.4.8 Education Attainment

Educational attainment in District Karak is largely below matric level, with Census 2023 reporting 36.08%, and PSLM and LFS showing around 29%. Higher education levels remain low (2.30%–9.42%), and technical diploma holders are minimal, indicating a skills gap. HIS 2023 shows the highest overall attainment (82.14%), suggesting gradual improvement, but the focus remains needed on expanding access to higher, vocational, and technical education.

Table 1-11: District Karak Educational Attainment[17]

Education Level	Census 2023	HIS 2023	LFS 2020	PSLM 2019
Below Matric	36.08%	17.86%	29.12%	29.44%
Matric	17.41%	21.65%	13.26%	18.52%
Intermediate	0.60%	29.13%	0.44%	5.27%
Technical Diploma and Other	6.03%	0.87%	4.77%	0.75%
Graduate	3.21%	13.40%	2.07%	3.88%
Master and above	2.30%	9.42%	2.30%	2.07%
Total	**65.62%**	**82.14%**	**51.96%**	**59.94%**

[17] *Calculated from the Household Survey conducted by the Consultant in January, 2023.*

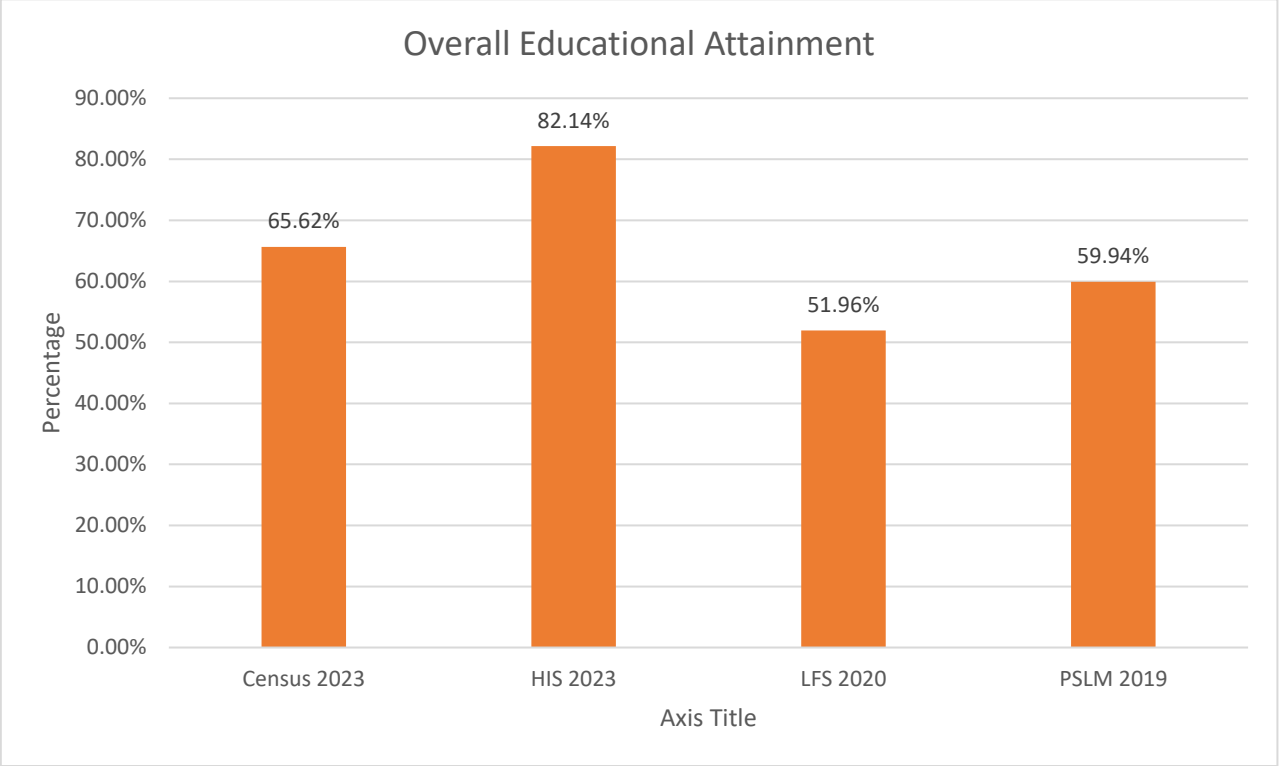


Figure 1-13: District Karak Education Attainment

1.5 Urbanization & Hierarchy of Human Settlements

1.5.1 Urbanization Trend

Urbanization is the shift of population from rural to urban areas, driven by economic growth and industrialization. It leads to city expansion and cultural transformation. While it boosts development and education, it can strain housing, infrastructure, and services, often resulting in slums. Effective urban planning is essential to manage growth and build sustainable, livable communities.

In 2019, the United Nations estimated that more than half the world's population (4.2 billion people) lived in urban areas, and by 2041, this figure will increase to 6 billion people. Pakistan has one of the highest rates of urbanization in South Asia. District Karak remained entirely rural until 1981, when 5.48% of its population was first recorded as urban. Urbanization has since grown slowly, reaching 7.12% in 2023, with over 92% of the population still rural.

Khyber Pakhtunkhwa showed a more consistent urban growth, increasing from 11.08% in 1951 to 18.80% in 2017, before slightly declining to 15.01% in 2023, possibly due to administrative changes.

Nationally, Pakistan has seen a much faster urbanization trend, with the urban population rising from 17.74% in 1951 to 38.88% in 2023, reflecting economic development, migration, and infrastructure expansion.

The **Table** and **Figure** below show the urbanization trend at the Pakistan, Khyber Pakhtunkhwa, and District Karak level based on data obtained from the Population Censuses of Pakistan spanning from 1951 to 2023.

Table 1-12: Urbanization Trend in Historical Perspective

Census Year	District Karak		Khyber Pakhtunkhwa		Pakistan	
	Urban	Rural	Urban	Rural	Urban	Rural
1951	0%	100%	11.08%	88.92%	17.74%	82.26%
1961	0%	100%	13.24%	86.76%	22.52%	77.48%
1972	0%	100%	14.25%	85.75%	25.41%	74.59%
1981	5.48%	94.52%	15.06%	84.94%	28.30%	71.70%
1998	6.47%	93.53%	16.87%	83.13%	32.52%	67.48%

2017	7.24%	92.76%	18.80%	81.20%	36.44%,	63.56%
2023	7.12%	92.88%	15.01%	84.99%	38.88%	61.12%

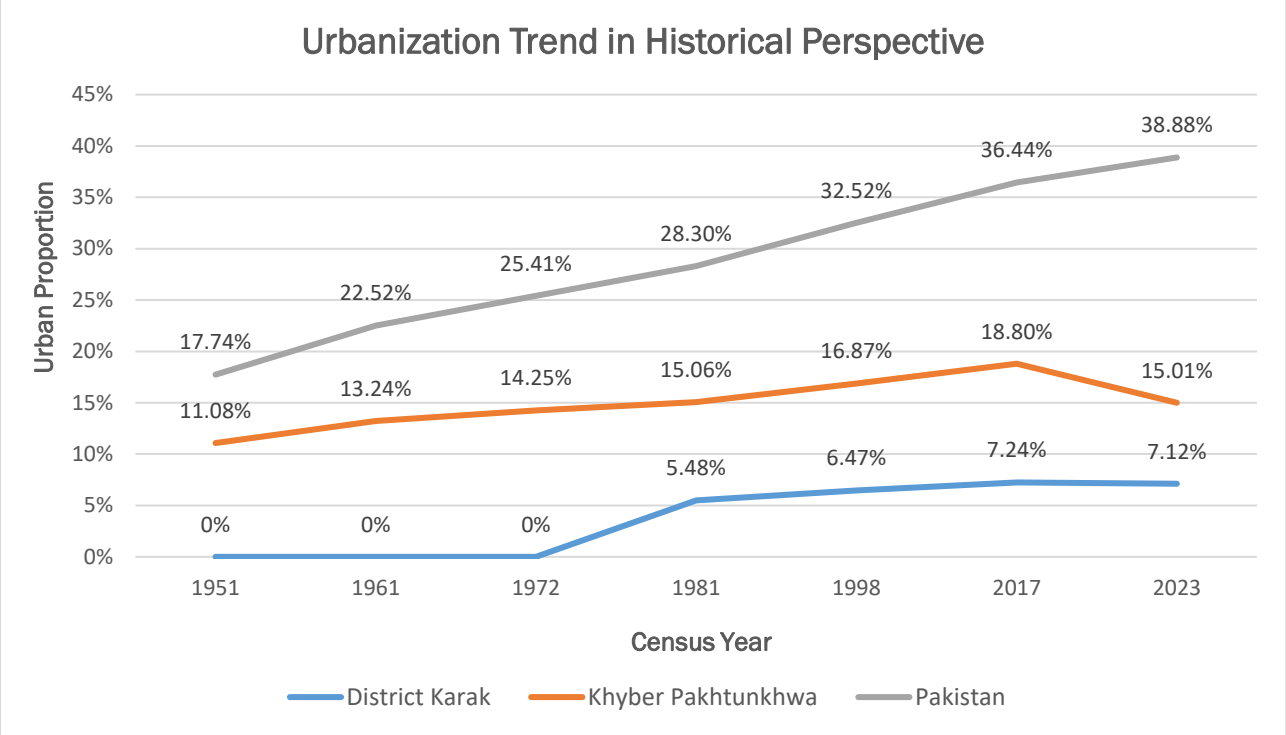


Figure 1-14: Urbanization trend in District Karak

1.5.2 Defining Characteristics and Scores

In addition to demographic analysis, settlement functional analysis and land sprawl analysis have been conducted for effective and feasible strategies for hierarchical distribution. Criteria were then prepared for District Karak, and scoring was applied for each settlement based on the characteristics shown in the Table below. Characteristics include population, density, health and educational facilities, level of services, district links, and other factors. Weight was assigned to each criterion based on data analysis, professional judgment, and the importance of the identified criteria. The criterion is shown in the **Table** below.

Table 1-13: Characteristic Wise Distribution of Score for Hierarchy Development

Characteristics	Scoring Range
Population	• Every 10000 population = 1.0
Population Density	• Every 30 Person per Hectare=1
Administrative Status of Settlement	• District Headquarter = 2.0 • Tehsil Headquarter = 1.5 • Town Committee = 1.0 • Village Council = 0.5 • Cantonment = 0.0
Education Facilities	• No Education Facility = 0.0 • Every 1 High School = 0.5 • Every 1 Higher Secondary School/Inter College = 1.0 • Every 1 Degree College = 1.5 • Every 1 University = 2.0
Health Facility	• No Health Facility = 0.0 • Every 1 Rural Health Center = 1.0 • Every 1 Other Health Center = 1.5 • Every 1 Hospital = 2.0
Access Roads	• Metaled Road = 2.0 • Unmetalled road = 1.0 • Inaccessible = 0.0

Source: The Urban Unit

According to the availability of services and other factors mentioned above, the Karak district's settlement hierarchy is split into five categories: first order, second order, third order, fourth order, and fifth order. The score range of each category has been given in **Table** below.

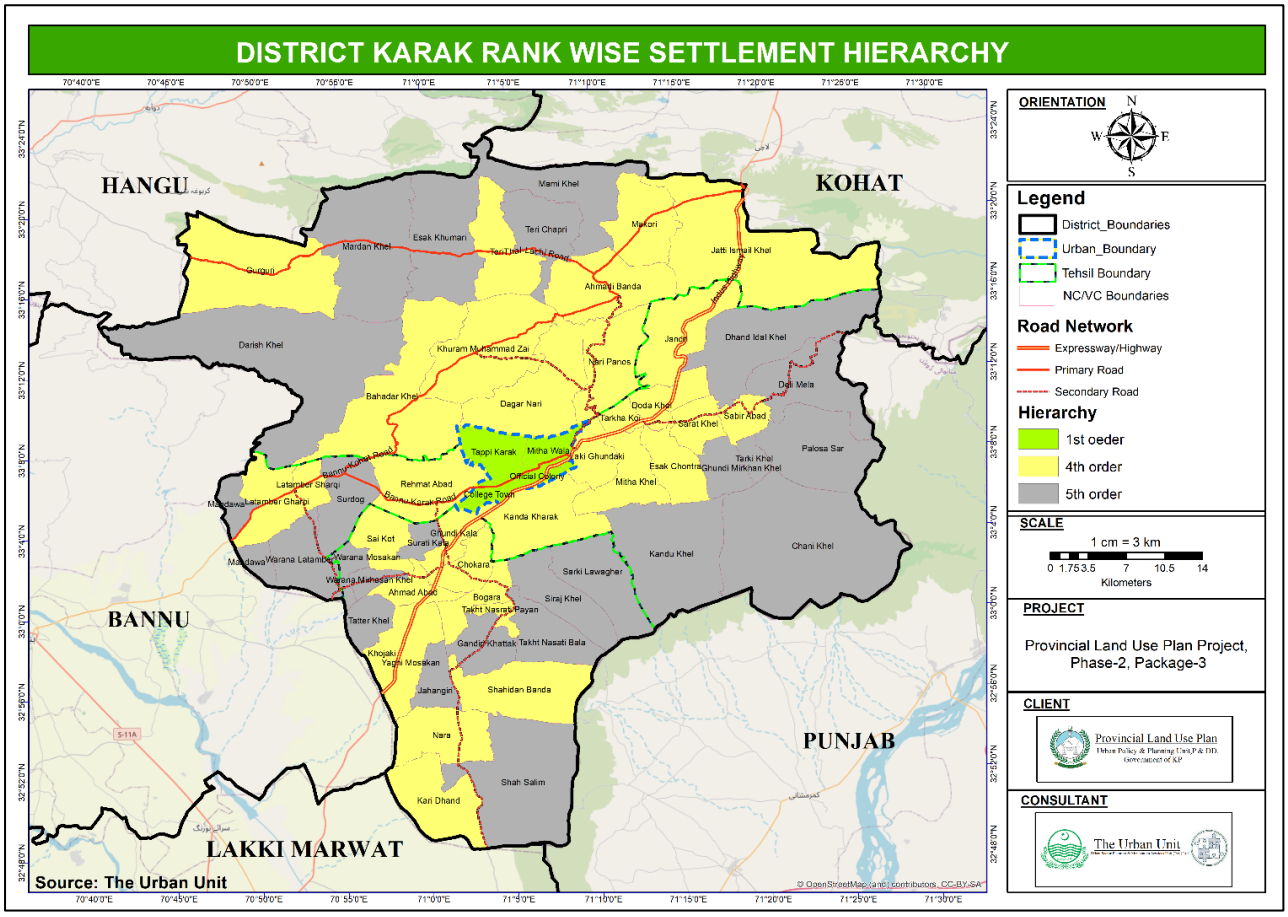
Table 1-14: Hierarchy of Human Settlement Based on Score Range

Hierarchy of Human Settlement	Score Range
1st Order	>20
2nd Order	20-14
3rd Order	14-11
4th Order	10-5
5th Order	<5

Source: The Urban Unit

1.5.3 District Karak Settlement Hierarchy

Functional analysis method helps planners understand settlement patterns based on functions, adequacy, deficiencies, upgrade potential, and threshold values for services. Various methods exist for ranking centers; the simplest is scoring each settlement and analyzing. The functional matrix serves as an inventory. Scores were aggregated to establish the settlement hierarchy in **Task-B Background Studies and Data Analysis** and shown in the **Map** below for district Karak.



Map 1-7: Rank Wise Settlement Hierarchy

The 1st order settlements contain densely populated and built-environment infrastructure which are urbanized places. In District Karak, the Karak Municipal Committee is a 1st order settlement while the 2nd and 3rd order settlements do not prevail in District Karak highlighting a wide range of gap among the settlements.

The 4th and 5th order settlements are those that are the smallest in this hierarchy of human settlements, remote from other areas, and without access to necessities of life like water supply, power, education, and other things. They consist of a very modest number of buildings and are much smaller than cities. There are thirty-two 4th order and twenty-five 5th order settlements in District Karak.

1.5.4 Areas to be Urbanized

For the identification of the areas that would be urbanized in the next 20 years, a detailed evaluation of all the settlements had been conducted through demographic analysis, settlement hierarchy analysis, functional matrix analysis, and change detection analysis.

Based on these, the consultant observed that the settlement of Lakki Ghundaki around the Karak Municipal Committee, Ahmadi Banda, Takht-e- Nasrati, Sabirabad, Latambar are all 4th order settlements but have the potential to get urbanized. Moreover, the functional matrix scores for these settlements are higher compared to other settlements. Similarly, in the demographic analysis, these settlements are more densely populated than the other settlements and infrastructure wise also more developed

1.5.4.1 Settlements to be Urbanized Due to Urban Growth/Expansion

Laki Ghundaki is located around the Karak Municipal Committee, indicating that this is already developed with presence of Karak Township, district administration and DHQ hospital displaying typical characteristics of urban areas. However, they are still classified as rural due to existing boundary restrictions. Despite this classification, these settlements provide services comparable to those found in urban areas, which suggests that they are on the edge of becoming urbanized.

1.5.4.2 Settlements to be Urbanized as Tehsil Headquarter

Ahmadi Banda, located in Tehsil Banda Daud Shah, serves as the administrative center of the Tehsil. Due to its growing population, it is anticipated to undergo significant urbanization in the coming years. This trend is driven by increased service dependency and development, positioning Ahmadi Banda as a key area for future urban planning and infrastructure development.

Takht-e-Nasrati, the administrative center of its tehsil, is a hub of local activities, hosting all major tehsil functions. The presence of two colleges, a vibrant commercial sector, and a growing population contribute to its potential for urbanization in the coming years. This combination of educational institutions, economic activity, and demographic growth positions Takht-e-Nasrati as a focal point for future urban development and planning.

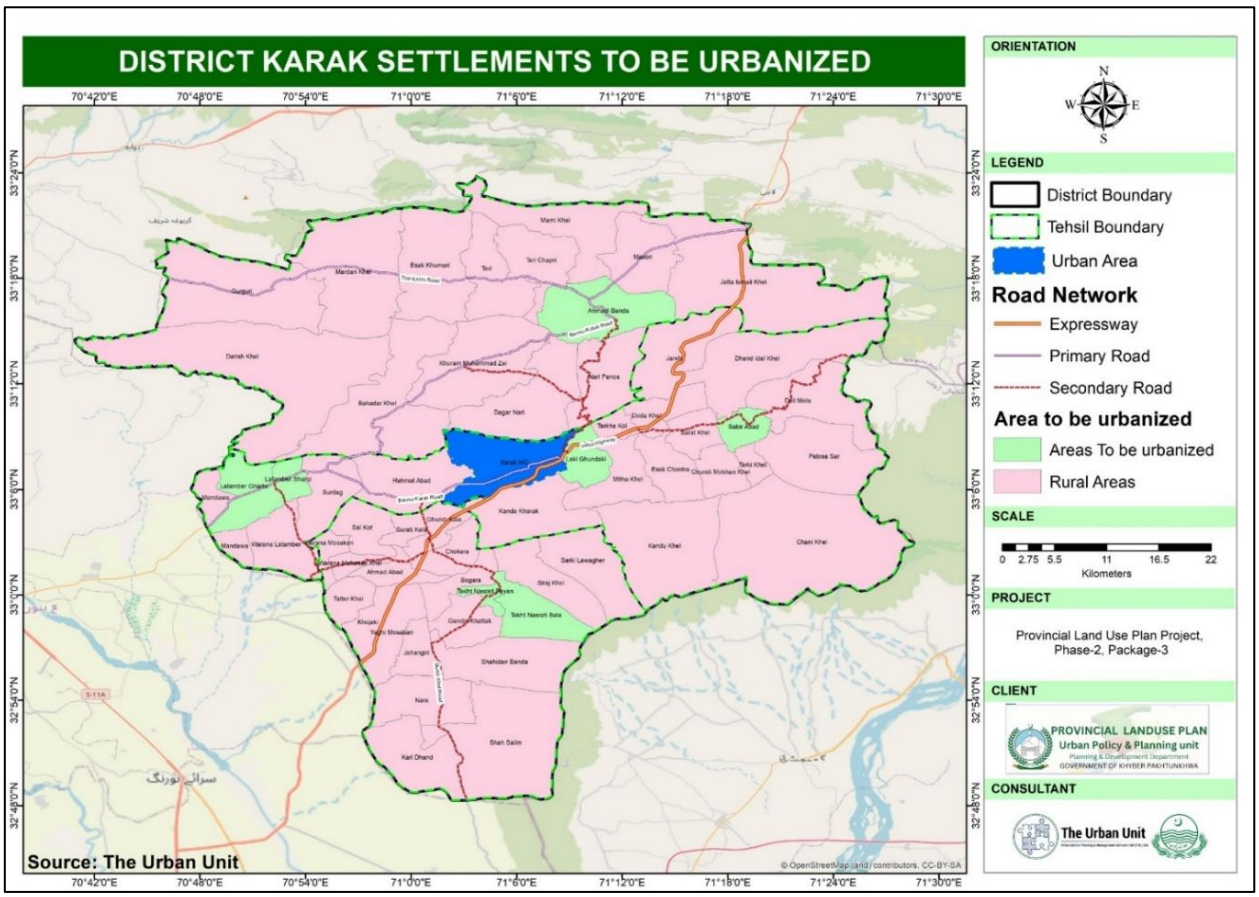
1.5.4.3 Rural Growth Centers in District Karak

Sabirabad, located on the eastern side of District Karak, is currently underdeveloped due to a lack of facilities. Urbanizing Sabirabad, will address the disparity. This development aims to provide essential services and amenities to the local population, fostering balanced regional growth among the district and improving the quality of life for residents in the east of District Karak.

Latambar, originally a single expansive settlement divided into two village councils i.e. Latambar Sharqi and Latambar Gharbi to improve administrative efficiency and manage its large population more effectively. As key areas within District Karak, Latambar exhibit significant potential for urbanization within the upcoming development plan. The strategic division allows for targeted infrastructure improvements and service delivery, addressing the unique needs of each area. This urbanization initiative aims to enhance economic opportunities, improve living standards, and promote sustainable growth, making Latambar a pivotal region in the district's future development landscape. The above-described settlements to be urbanized are **Tabulated** and visually shown in **Map** below.

Table 1-15: Settlements to be urbanized

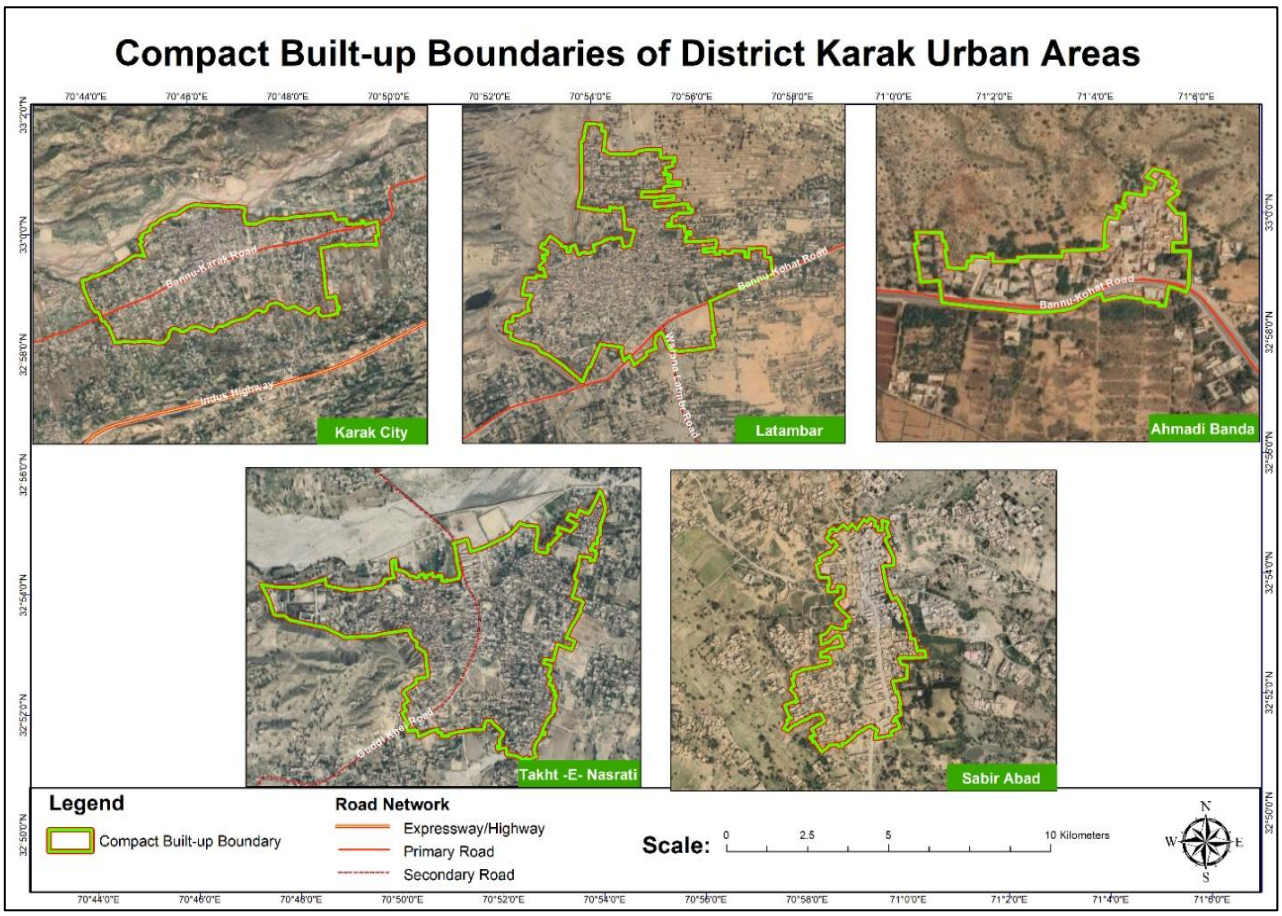
Tehsil	Settlement to be Urbanized
Banda Daud Shah	Ahmadi Banda
Takhti Nasrati	Takhti Nasrati Payan, Takhti Nasrati Bala
Karak	Laki Ghundaki
Karak	Sabir Abad
Karak	Latambar Sharqi, Latambar Gharbi



Map 1-8: District Karak settlements to be urbanized

1.5.5 Compact Built-up Boundaries

The first step in land use planning is the demarcation of compact built-up boundaries (CBB), identifying continuous urban areas to manage sprawl and promote sustainable development. CBBs support efficient infrastructure planning by reducing costs and improving services. Boundaries were drawn using existing land use maps, enclosing dense, mixed-use development and following natural or man-made features like roads and water bodies. In district Karak, five CBBs have been marked for: Karak City, Ahmadi Banda, Takhti Nasrati, Sabir Abad, and Latambar, as shown in the **Map** below.

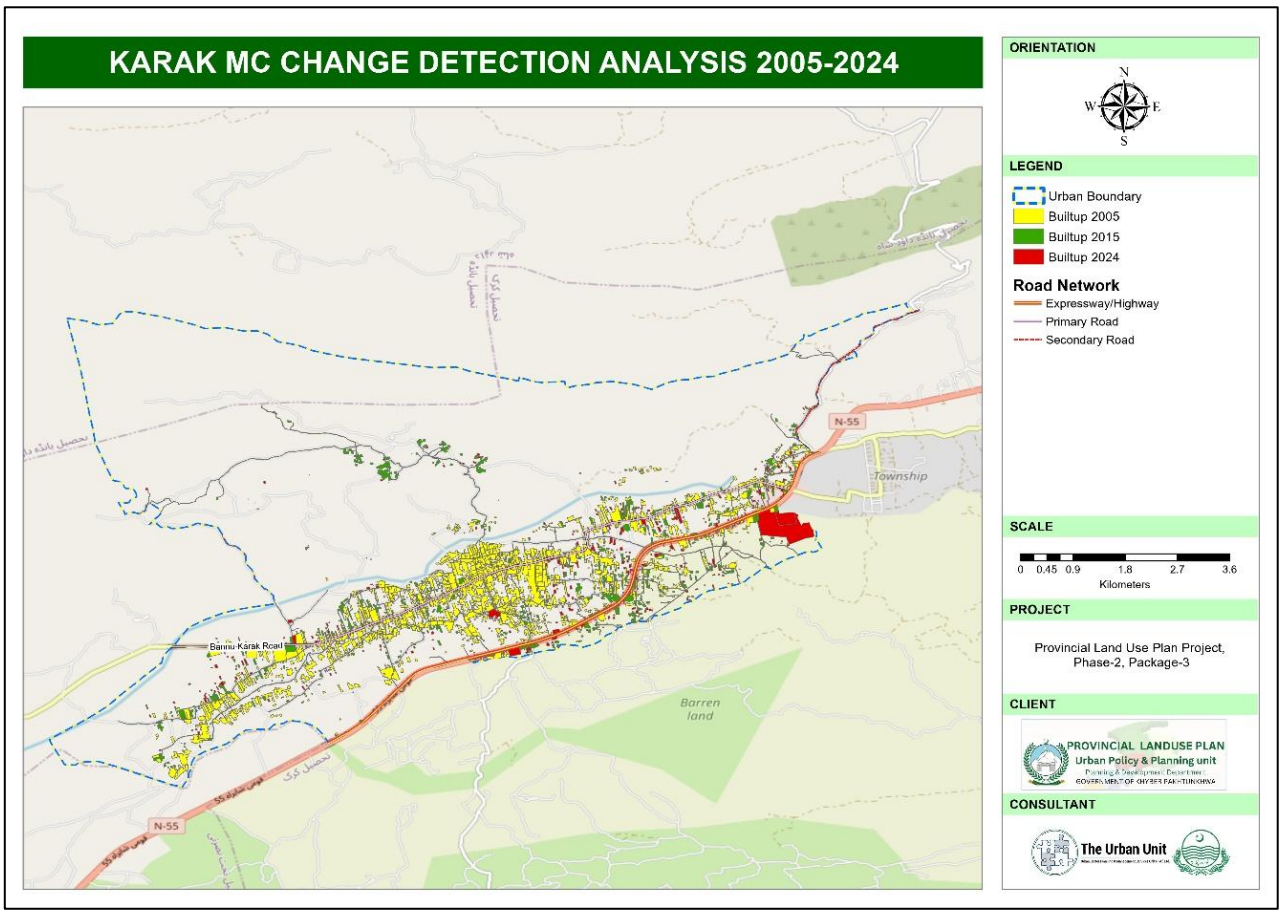


Map 1-9: Compact Built-up of district Karak Urban Centers

1.5.6 Growth Directions

1.5.6.1 Karak City

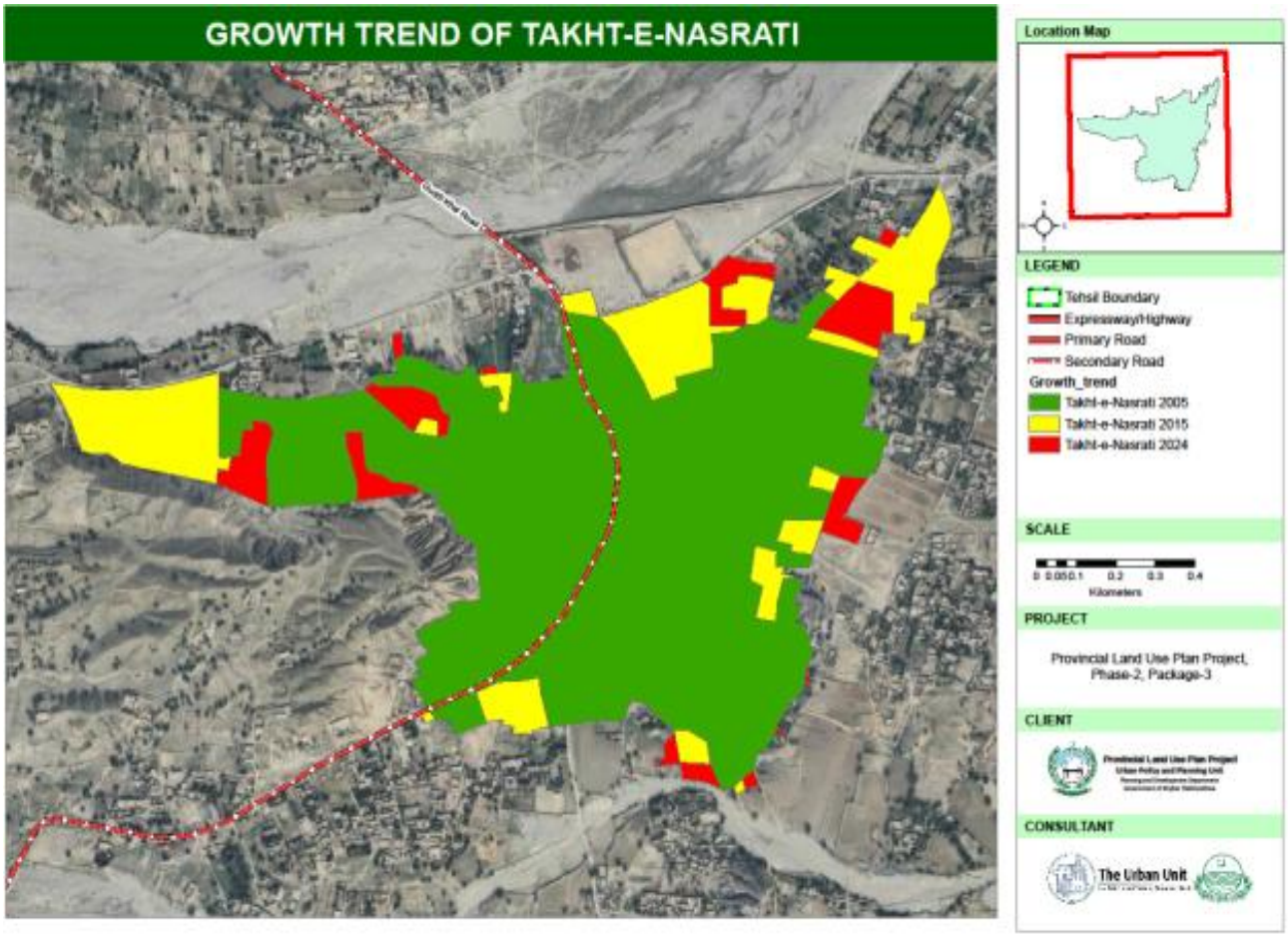
Growth trend analysis of Karak city shows major expansion toward the east, driven by institutions like Khushal Khan Khattak University, the Judiciary Complex, and Karak Development Authority approved housing scheme. The built-up area grew from 1,060.81 acres in 2005 to 1,396.47 acres in 2024, with **45%** of the growth in the eastern sector. The west is mostly agricultural land, while the north is limited by hilly terrain. Future zoning will prioritize eastern expansion in line with existing trends and infrastructure. The **Map** below shows land use changes over time.



Map 1-10: Karak MC Change Detection Analysis

1.5.6.2 Takht-e Nasrati

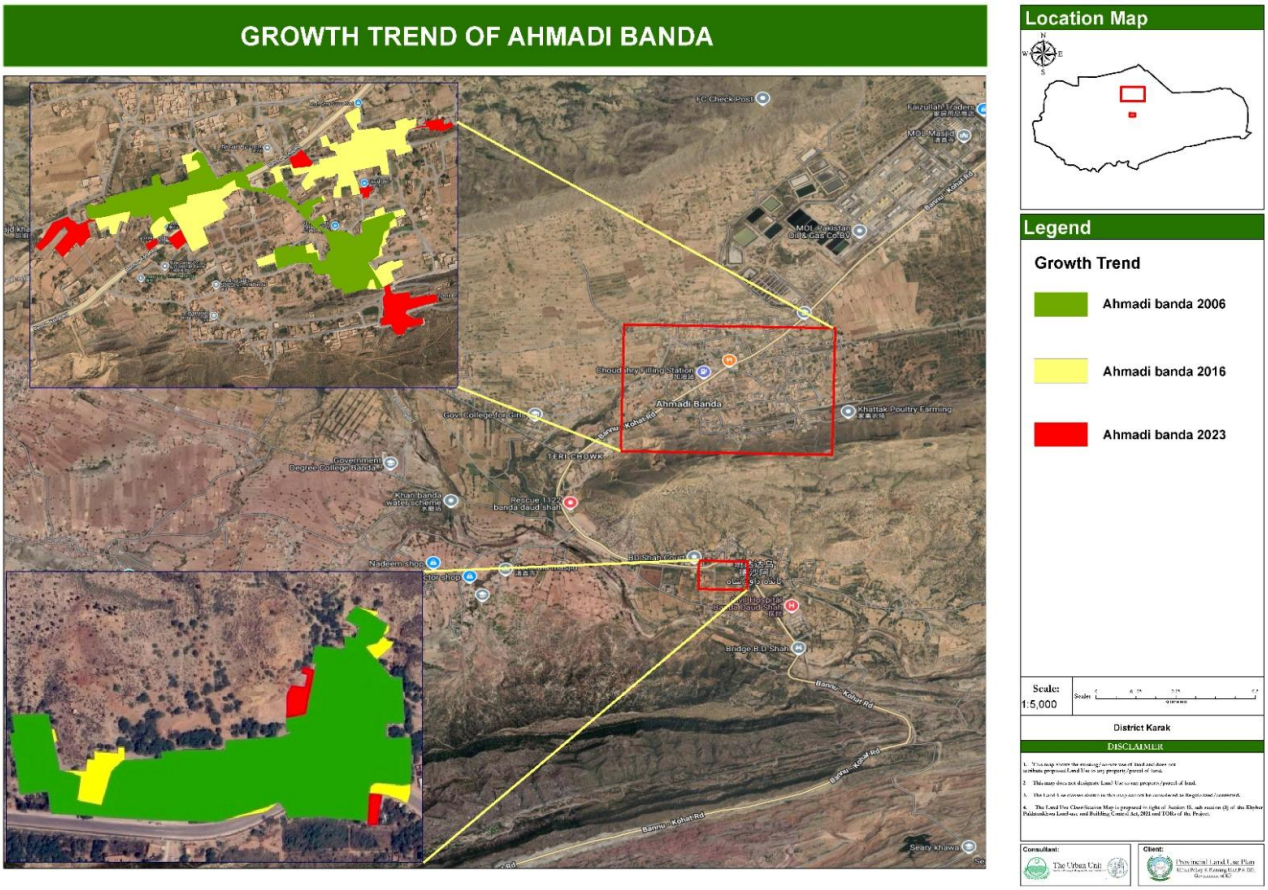
The growth trends of Takht-e-Nasrati indicate a clear expansion towards the east and northeast, driven by the availability of key amenities such as bus terminals and public parks, while the westward growth is influenced by healthcare facilities. Statistical data shows that the built-up area increased from 201.72 acres in 2005 to 251.74 acres in 2015, representing a growth rate of **24.79%**. Currently, the built-up area is approximately 272.14 acres, reflecting an 8.10% increase from 2015 to 2024. Notably, over 50% of the total growth from 2005 to 2024 has occurred in the northeast sector. Below **Map** shows the growth trend analysis of Takht e Nasrati settlement.



Map 1-11: Takht e Nasrati growth trend through the years

1.5.6.3 Ahmadi Banda

Ahmadi Banda has experienced moderate growth toward the east and west over the past two decades. Key public facilities, such as the judicial complex, the TMO Office, and the SDEO office, are located within the compact built-up area of Ahmadi Banda. The expansion of this built-up area has been gradual. In 2006, it covered 11.85 acres, increasing to 12.71 acres by 2016, and currently stands at approximately 13.13 acres. This reflects a growth of about 7.30% between 2006 and 2016, and a further 3.19% from 2016 to 2024. Ahmadi Banda is bordered by hilly terrain in the North crossing which has also got built up which is growing rapidly due to availability of land for growth clearly indicating the growth direction towards the North of the hills.

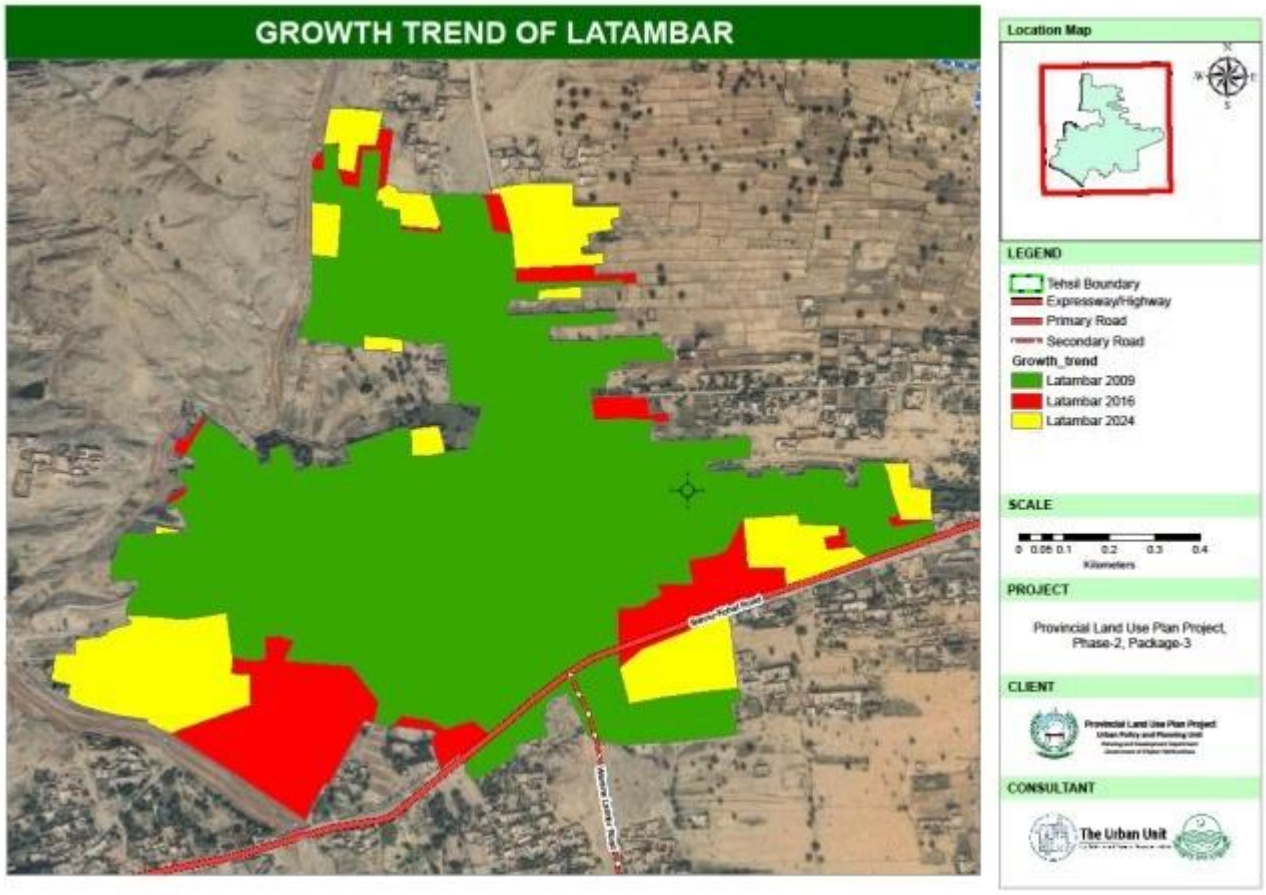


Map 1-12: Ahmadi Banda growth trend through the years

1.5.6.4 Latambar

An analysis of the past 20 years reveals that Latambar growth has primarily expanded toward the southeast and southwest parts of its boundary with mountains to the North restricting expansion. In 2009, the compact built-up area of Latambar covered approximately 193.30 acres, increasing to about 228.98 acres by 2016, and currently reaching around 247 acres. This reflects an 18.46% growth from 2009 to 2016 and a further 19.66% increase from 2016 to 2024.

Roughly half of this growth has occurred in the southwest; however, due to a natural barrier (a water body), further expansion in this direction is no longer feasible. Therefore, it is recommended that future development zones be directed toward the south and southeast, as these areas have the capacity to accommodate the projected population growth until the end of the planning period.

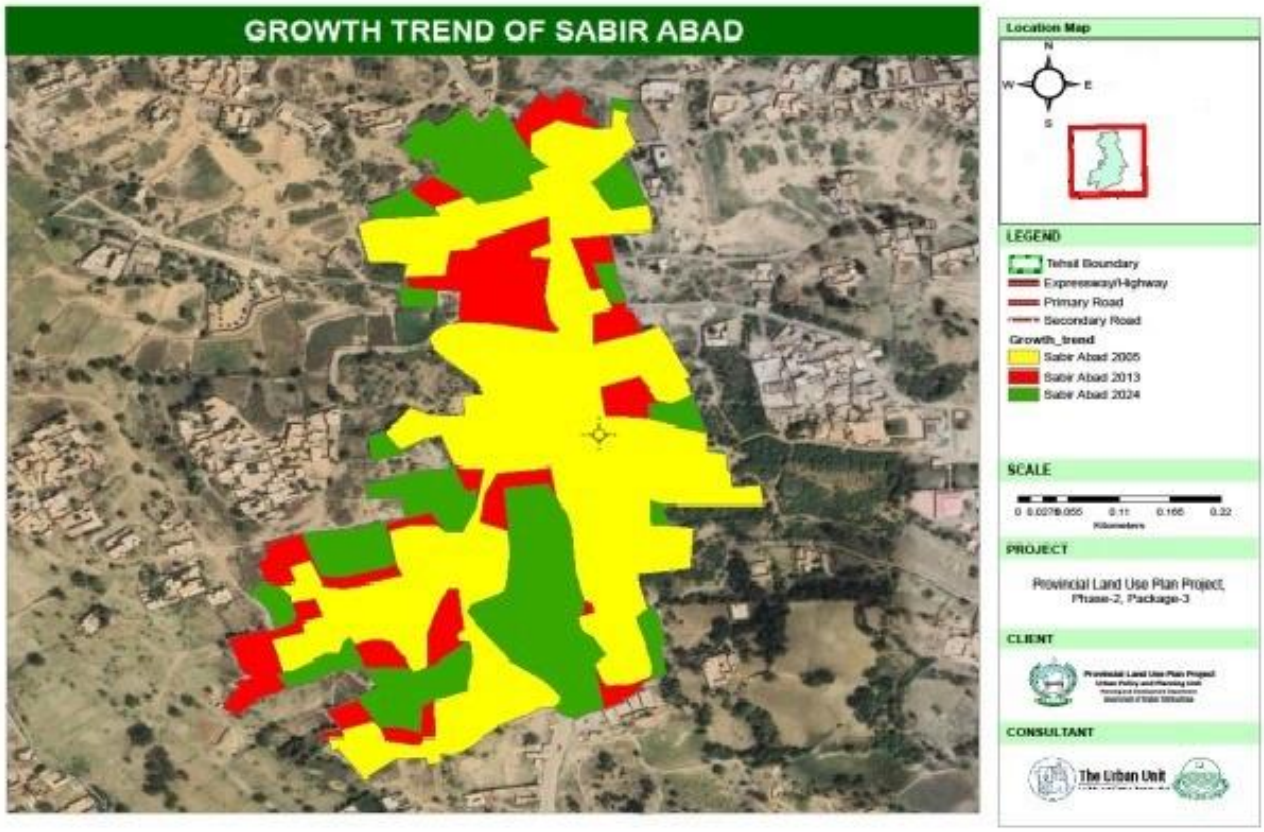


Map 1-13: Latambar growth trend through the years

1.5.6.5 Sabir Abad

In reviewing the past twenty years to assess the growth trajectory of Sabir Abad, it is evident that the town has experienced linear expansion around its compact built-up area. In 2005, the compact built-up area spanned 26.74 acres, increasing to 34.96 acres by 2016. As of now, the built-up boundary has expanded to approximately 47.71 acres. The growth between 2005 and 2016 reflects a **30.71%** increase, while the period between 2016 and 2024 saw an even larger rise of **36.47%**. This significant growth highlights the need for proper zoning and strategic planning moving forward.

Given the available land and existing infrastructure including roads, educational, and health facilities it is recommended to prioritize future development toward the northeast. This would allow for the preservation of agricultural land in the southwest, ensuring that food production for the area remains sustainable to some extent.



Map 1-14: Sabir Abad growth trend through the years

1.5.7 Proposed Planning Boundaries of Urban Centers

Delineating urban boundaries is essential for sustainable land use and growth management. Clear boundaries support compact, high-density development, optimize infrastructure use, control unplanned expansion, and protect rural land. They also guide zoning, resource allocation, and future development, reducing costs and environmental impact. The figure below outlines the consultant's process for defining proposed urban boundaries.

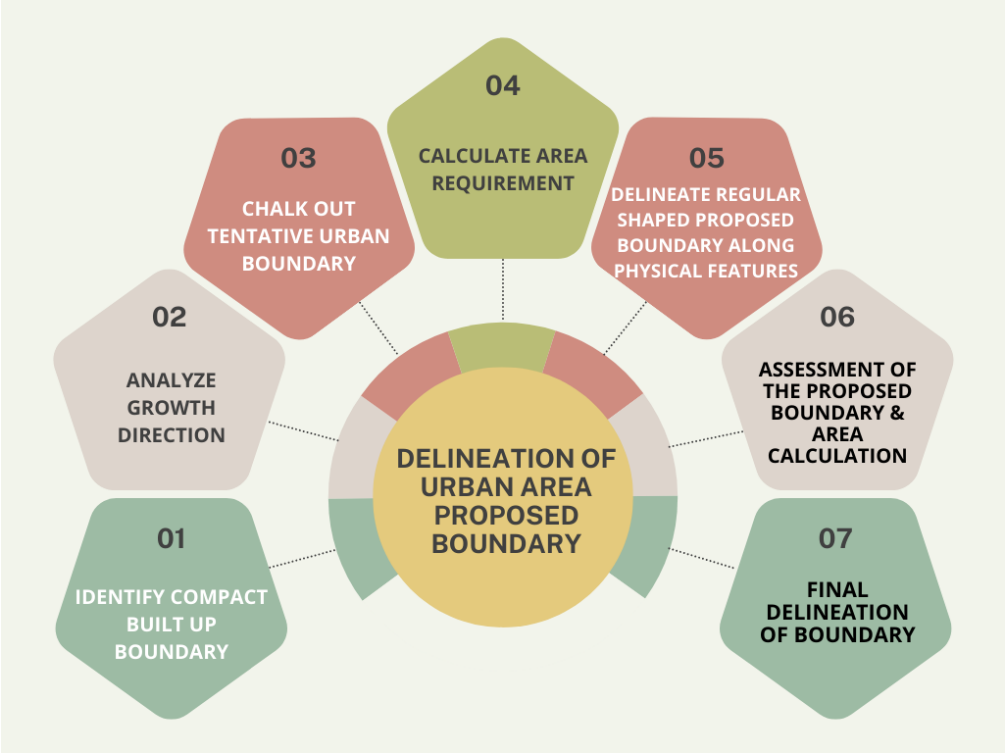


Figure 1-15: Urban Area Proposed Boundary Delineation Process

The process of delineating the proposed urban boundary began with the already identified compact built-up boundary. A tentative boundary was drawn in the direction of physical growth to include recent developments and planned projects such as community centers, colleges, and universities that contribute to the socio-economic fabric of the urban area.

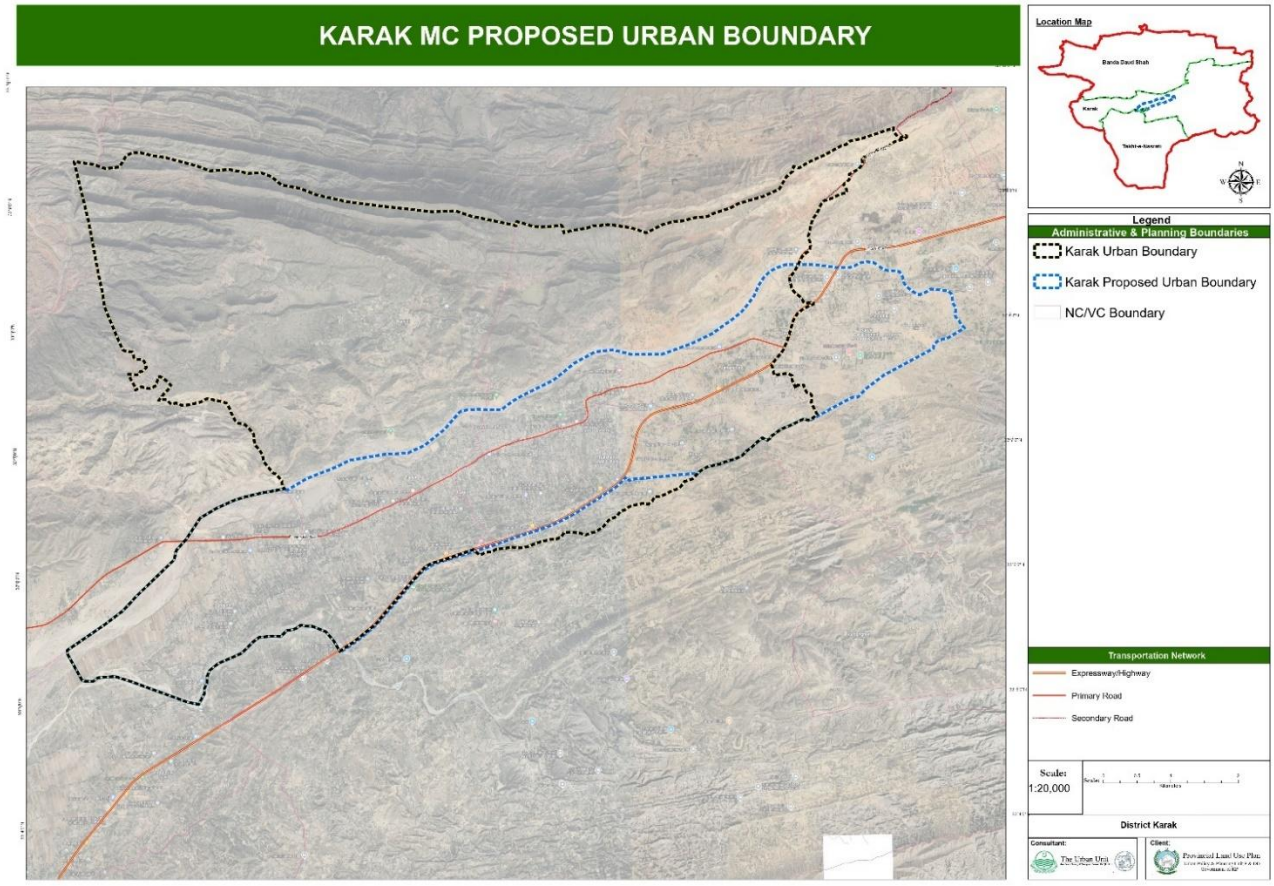
For existing urban areas undergoing boundary expansion, neighboring rural areas (Village Councils) were included based on the proportion of rural area and population to be added to the existing Neighborhood Council (NC). This helped in calculating the total area required during the plan period.

For rural areas transitioning to urban (comprising more than one Village Council), the population of each VC was proportionally calculated to determine the area requirement for each new urban settlement. This ensured that boundaries matched the population-based land requirement and avoided over- or underestimation.

The proposed boundary was drawn considering both natural and man-made physical features, maintaining a regular shape to avoid jurisdictional confusion. These boundaries aim to support sustainable growth, minimize environmental conflicts, and optimize land use for residential, commercial, and public service needs. Once delineated, the proposed urban boundaries were assessed against area requirements to ensure proper space utilization for future development thus finalizing the urban area boundary delineation.

1.5.7.1 Karak City

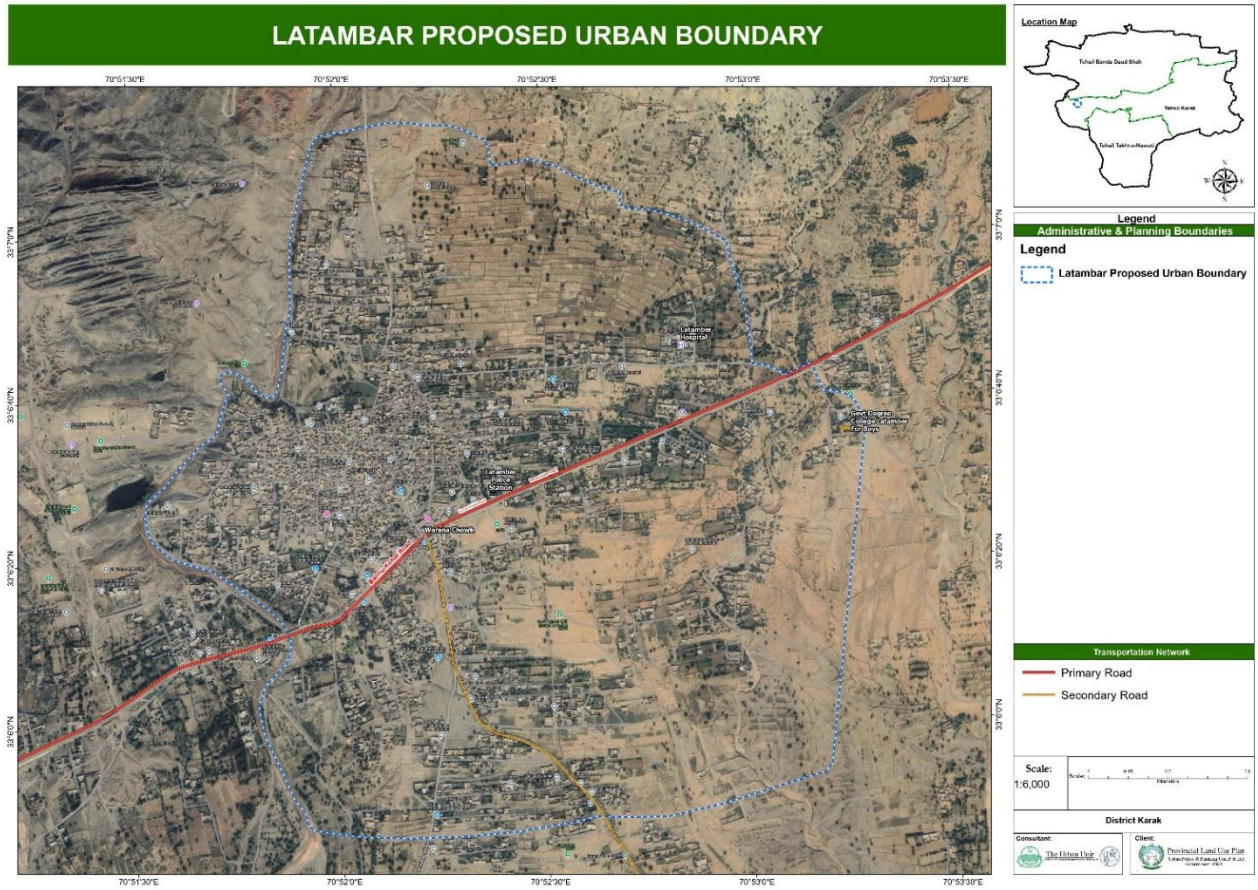
The delineation of the proposed urban boundary of Karak has been carried out with careful consideration of the area's demographic profile, natural features, and physical infrastructure. The boundary has been meticulously defined to ensure the optimal provision of services and facilities to the urban population, accounting for both current needs and future growth. The urban boundary is defined along the Southeastern edge, following the natural course of the water body, and extends Westward. From this point, the boundary traces the path of the tributary flowing from the West to the South, maintaining alignment with this watercourse until it intersects with the main N-55 highway. Continuing along the Southwestern sector, the boundary follows the N-55 highway eastward for approximately 200 meters beyond the Election Commission Office in Karak. At this juncture, the boundary makes a strategic deviation, cutting to the right, and proceeds through the Kharay area, moving Eastward. The boundary line then skirts the Southern edge of the Karak Development Authority (KDA) Township, continuing Eastward until it reaches the water body. The boundary then follows this watercourse in a Northeasterly direction, ultimately returning to the starting point of the proposed urban boundary. This method of delineation ensured a cohesive urban boundary that accounts for natural or manmade features, provides access to critical infrastructure, and allows for the planned expansion of services and facilities in alignment with the anticipated growth of Karak. Below **Map** shows the proposed urban boundary of Karak city.



Map 1-15: Karak City Proposed Boundary

1.5.7.2 Latambar

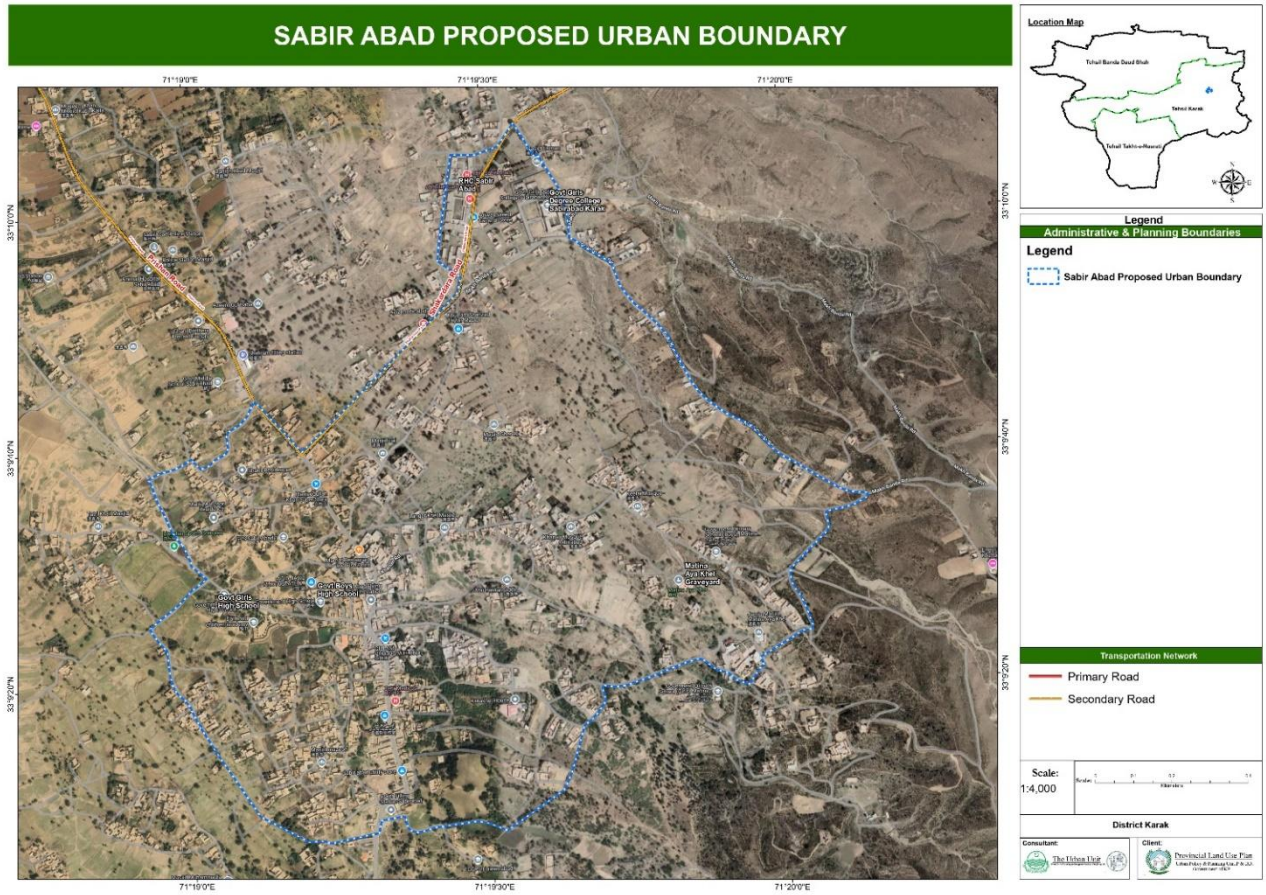
The delineation of the proposed urban boundary for Latambar commenced at the Latambar Eidgah, located in the Western part of the area, adjacent to a water body that earmarks the starting point. From this point, the boundary follows the water continuing toward the Southwest direction. The boundary crosses Bannu Road and extends along the water body for approximately 750 meters. The boundary line then diverts and proceeds Eastward, intersecting the water body in the encompassing the graveyard in the South crossing Warana road. The boundary then follows the to the East for about 1 km after which it moves up in the North direction until main Bannu-Kohat road along Government Degree College for Boys. From this point, the boundary shifts a little to the left, engulfing Latambar hospital and agriculture fields in the North. Crossing the local road leading to Latambar dam, the boundary then goes Westward following the water body from Latambar dam till it reaches the starting point of Latambar Eidgah thus completing the delineation loop.



Map 1-16: Latambar Urban Area Proposed Boundary

1.5.7.3 Sabir Abad

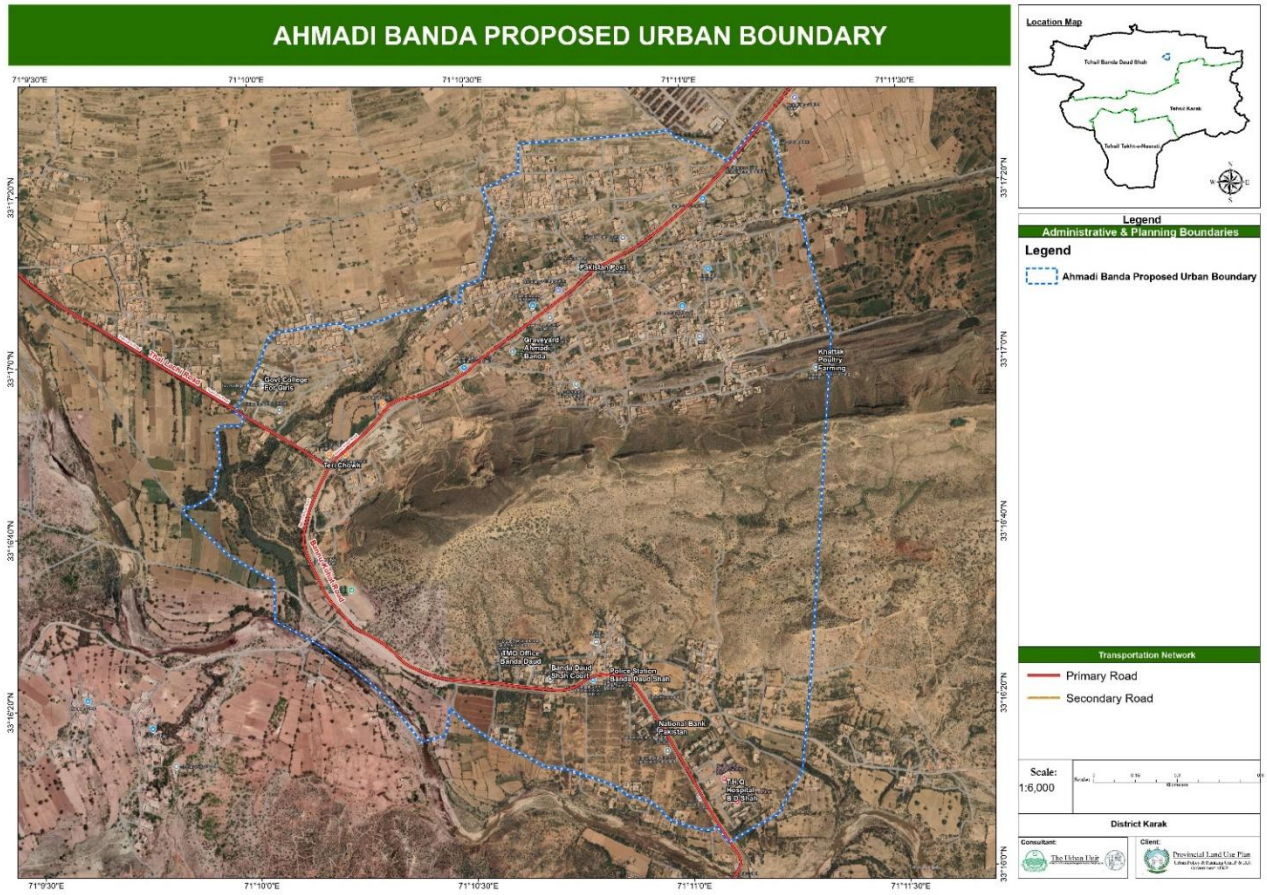
The delineation of the proposed urban boundary for Sabir Abad commenced at the Upper Chowk, located near the Government Girls Degree College in the Northern part of the boundary. From this point, the boundary follows both roads emanating from the chowk. The route proceeds Southwest along Shakardara Road, and Southeast along Makh Banda Road, marking the Southwestern edge of the boundary. Continuing Southwest, the boundary intersects with Pareshan Khattak Road, joining it approximately 190 meters above Azeem Chowk. From this junction, the boundary follows a local road until it reaches the next paved road. At this point, the boundary shifts left for about 190 meters, before turning right and following a local unpaved (katcha) road toward the southwest. The boundary continues along this road, reaching a chowk located next to Masjid Muhammadia Al Hadees. From here, the boundary shifts left, heading toward the main road in the Southern part of the proposed urban area. The boundary then turns right, heading Eastward, and connects to a local road in the area. Following this local road, the boundary continues until it reaches a chowk, at which point the boundary line completes the loop, returning to its starting point, thus finalizing the delineation of the proposed urban boundary for Sabir Abad.



Map 1-17: Sabir Abad Proposed Urban Boundary

1.5.7.4 Ahmadi Banda

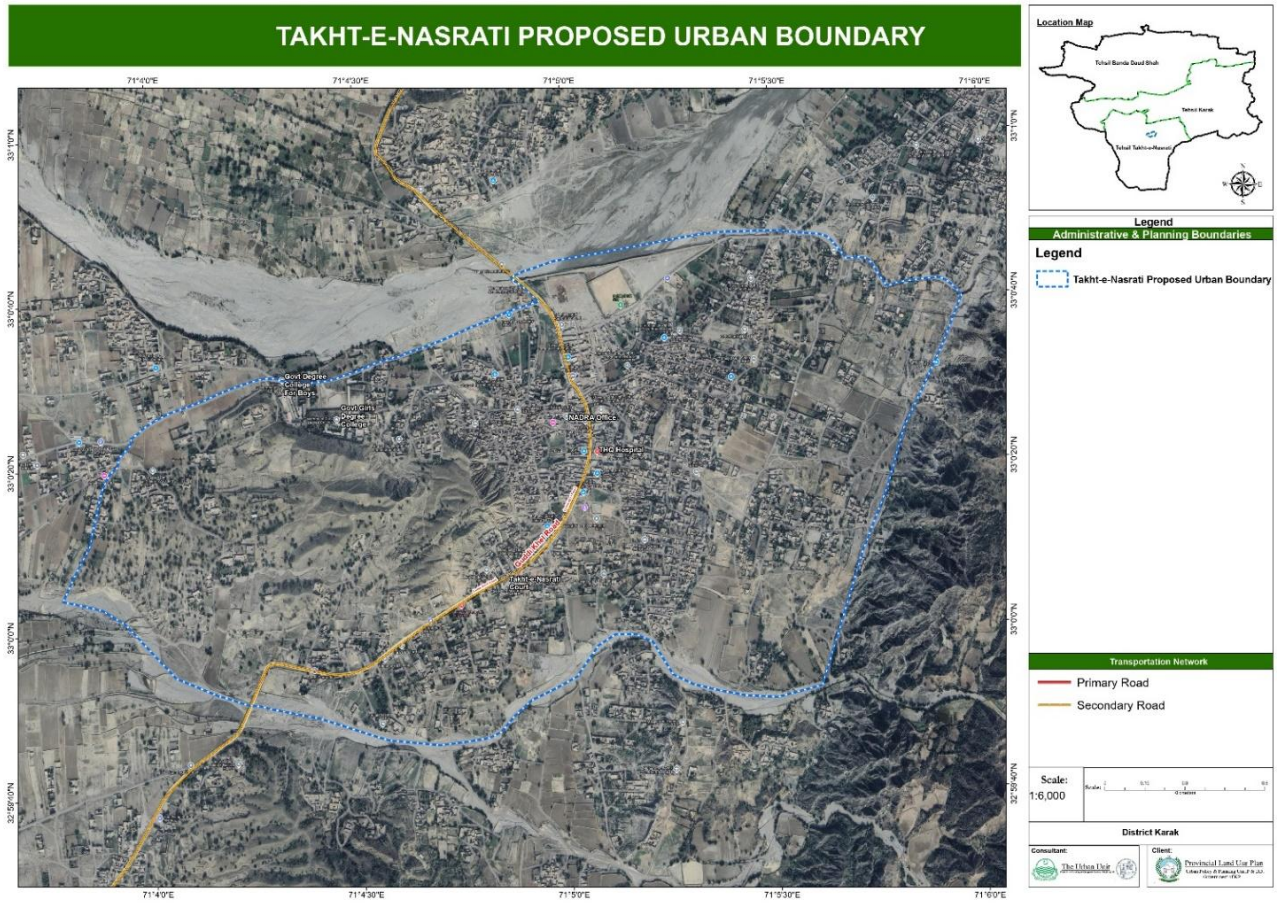
The delineation of the proposed urban boundary for Ahmadi Banda has been undertaken with careful consideration of key landmarks and infrastructural elements. The process begins at the Civil Hospital in Banda Daud Shah, located in the Southeast. From this point, the boundary extends Eastward, connecting to a local road situated behind the Khattak Poultry Farm in the Northeastern region of the boundary. From the Northeastern boundary, the line proceeds to intersect with Bannu-Kohat Road, situated in the Northeast sector of the proposed boundary. It then continues along the perimeter of the boundary wall of the MOL Pakistan Oil and Gas Company, following this wall for approximately 250 meters, before diverting Westward to encompass the populated settlements in the area. In the Northwest section of the boundary, the delineation follows a local road, progressing toward Thall-Lachi Road. From this intersection, the boundary continues Westward, where it connects to another local road in the Western part of the proposed urban area. The boundary then follows this road Southward until it reaches a water body in the Southwestern sector of the boundary. At this point, the boundary line meets yet another local road, which further links to a final local road that leads directly to the Civil Hospital in Banda Daud Shah, thereby completing the delineation loop and returning to the original starting point.



Map 1-18: Ahmadi Banda Proposed Urban Boundary

1.5.7.5 Takhti Nasrati

To accommodate future development, considering the natural barriers of water bodies that define the urban area's Northern and Southern limits. This strategic focus aims to optimize land use while promoting sustainable urban growth in Takht-e-Nasrati. The proposed urban boundary for Takht-e-Nasrati has been delineated with great precision, considering both the natural landscape and the existing infrastructure to facilitate the effective provision of services and facilities. The boundary has been defined with careful attention to the area's topography and urban growth requirements. The delineation begins at the Takht-e-Nasrati Road, following the water body in a North-to-West direction. The boundary continues along the road, passing near the Government Degree College for Boys. As it progresses Westward, the boundary makes a cut at the curve of the road near the local graveyard, before extending directly towards the Kurram River tributary. The boundary then follows the course of the tributary Eastwardly. From the Eastern side of the area, the boundary line leads towards the hill located in the Southeastern portion of Takht-e-Nasrati. From here, the boundary extends in a Northeast direction, reaching a local road that connects to the tributary, completing the delineation of the proposed urban boundary.



Map 1-19: Takhti Nasrati Proposed Urban Boundary

1.5.8 Rural to Urban Population Transformation

To calculate the population within the proposed urban area, firstly, two sets of data were extracted from the Geographic Information System (GIS) landuse dataset which are following:

- Residential land use area of the relevant administrative units such as Neighborhood Council (NC) or Village Council (VC)
- Residential land use area within the proposed urban boundary

Subsequently, the residential land use area within the proposed urban boundary was divided by the overall residential land use area of the respective NC or VC to obtain the ratio. This ratio was then multiplied by the total population of that NC or VC, allowing to estimate the current population residing within the proposed urban boundary in present year i.e. 2025. This population of 2025 was then projected exponentially using the tehsil wise population growth rate between 1998-2017 census to obtain the population residing within the urban boundary in 2045. The equation below shows the formula to obtain the current population 2025 residing within the urban boundary:

$$\text{Current Urban Population} = \frac{\text{Residential area within urban boundary}}{\text{Total Residential area of NC/VC}} \times \text{Projected Population of NC/VC}$$

Table 1-16: Population of Transitioning areas to be urbanized

Urban Center	Projected Population of NC/VC (2025)	Total NC/VC Area (hectares)	Total NC/VC Residential Area (hectares)	Proposed Urban Area (hectares)	Residential Area within Proposed Urban Boundary (hectares)	Population living in proposed urban area (2025)	Population Growth Rate of respective Tehsil	Projected Urban Population in 2045
Takht Nasrati	24974	4014.27	184.38	420	93.79	12704	2.64	21393
Ahmadi Banda	11477	5722.89	108.16	397	45.07	4782	2.42	7715
Latambar	24598	4479.51	234.62	520	128.52	13474	2.62	22602

Sabir Abad	14257	1503.50	101.65	182	32.26	4525	2.62	7590
Laki Ghundaki	9139	2005.82	101.84	379	47.20	4236	2.62	7105
Karak MC (existing)	71188	5285.00	324.07	2175	299.63	65819	3.23	124300
Karak City (including MC & Laki Ghundaki)	80327	7290.82	425.91	2554	346.83	70055	-	131405

1.5.9 Population Projection

As per study requirement, population of District Karak has been projected for 20 years using the exponential population growth model, which is a robust technique for population forecasting. The formula of the exponential growth model, as well as the population projected, are given as under:

$$Pn = P0\,x\,(1 + r/100)\text{^}\,t$$

Where;

P_n =Population of desired year

P_0 = Population of base year

r = Population growth rate

t = Number of years

Based on the 2017 census growth rates, District Karak's overall population is projected to reach 1,463,480 by 2045. The urban population is expected to be 190,705, and the rural population 1,272,775. At the tehsil level, rural populations for 2045 are projected as follows: Banda Daud Shah – 296,307; Karak – 464,489; and Takhti Nasrati – 511,979.

The details of five-year interval projected population of District Karak are given below in **Table** and graphically shown in **Figure**.

Table 1-17: Population Projection of District Karak

Administrative Area	Growth Rate 1998-2017	2017	2025	2030	2035	2040	2045
District Urban	3.23	55,203	105,540	122,324	141,808	164,431	190,705
District Rural	2.58	651,096	763,935	867,888	986,008	1,120,236	1,272,775
District Overall	2.62	706,299	869,475	990,212	112,7816	1,284,667	1,463,480
Urban Areas							
Karak City	3.23	55,203	70,055	81,979	95,937	112,276	131,405
Latambar	2.62	-	13,474	15,334	17,451	19,860	22,602
Sabir Abad	2.62	-	4,525	5,149	5,860	6,669	7,590
Ahmadi Banda	2.42	-	4,782	5,390	6,074	6,846	7,715
Takhti Nasrati	2.64	-	12,704	14,472	16,485	18,779	21,393
Rural Areas							
Tehsil Banda Daud Shah	2.42	155,642	183,670	206,996	233,287	262,912	296,307
Tehsil Karak	2.62	238,317	276,232	314,551	358,186	407,886	464,489
Tehsil Takhti Nasrati	2.64	257,137	304,033	346,341	394,535	449,438	511,979

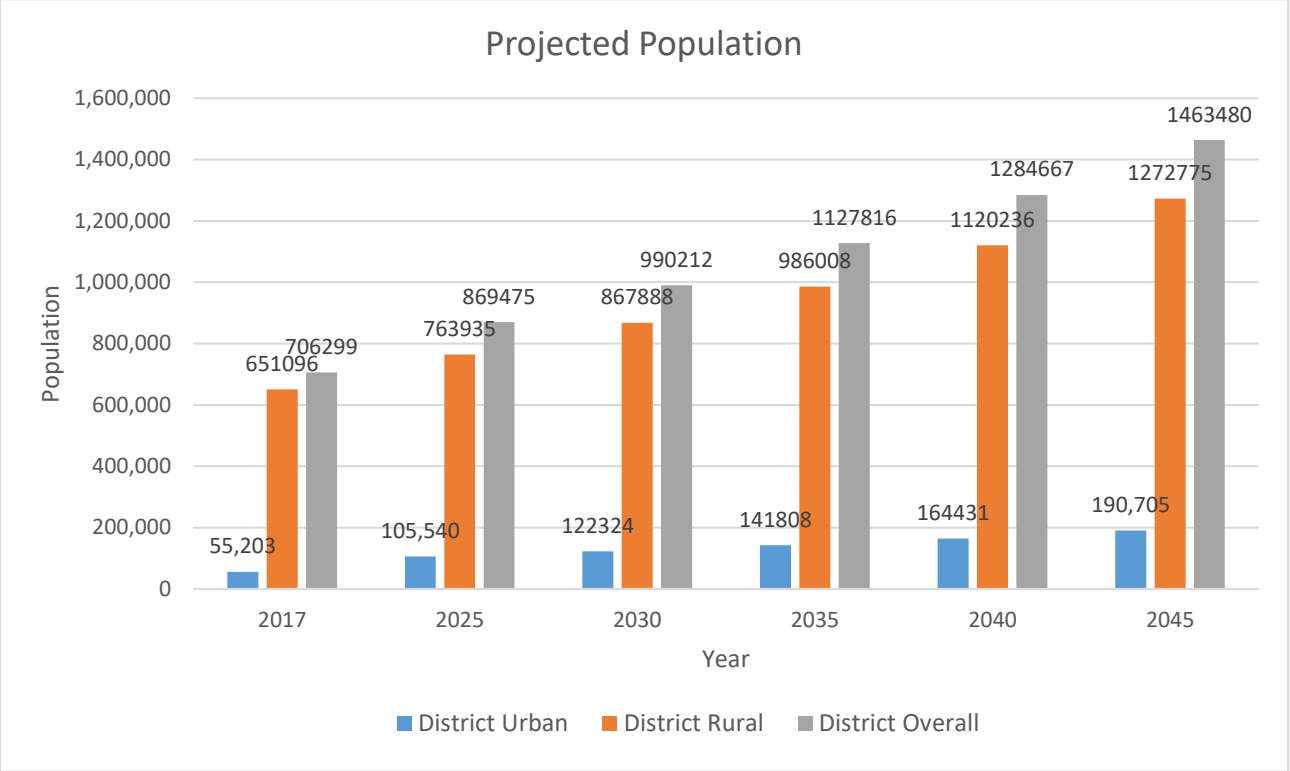


Figure 1-16: Population Projection for the plan period

2. EXISTING LAND USE DISTRIBUTION

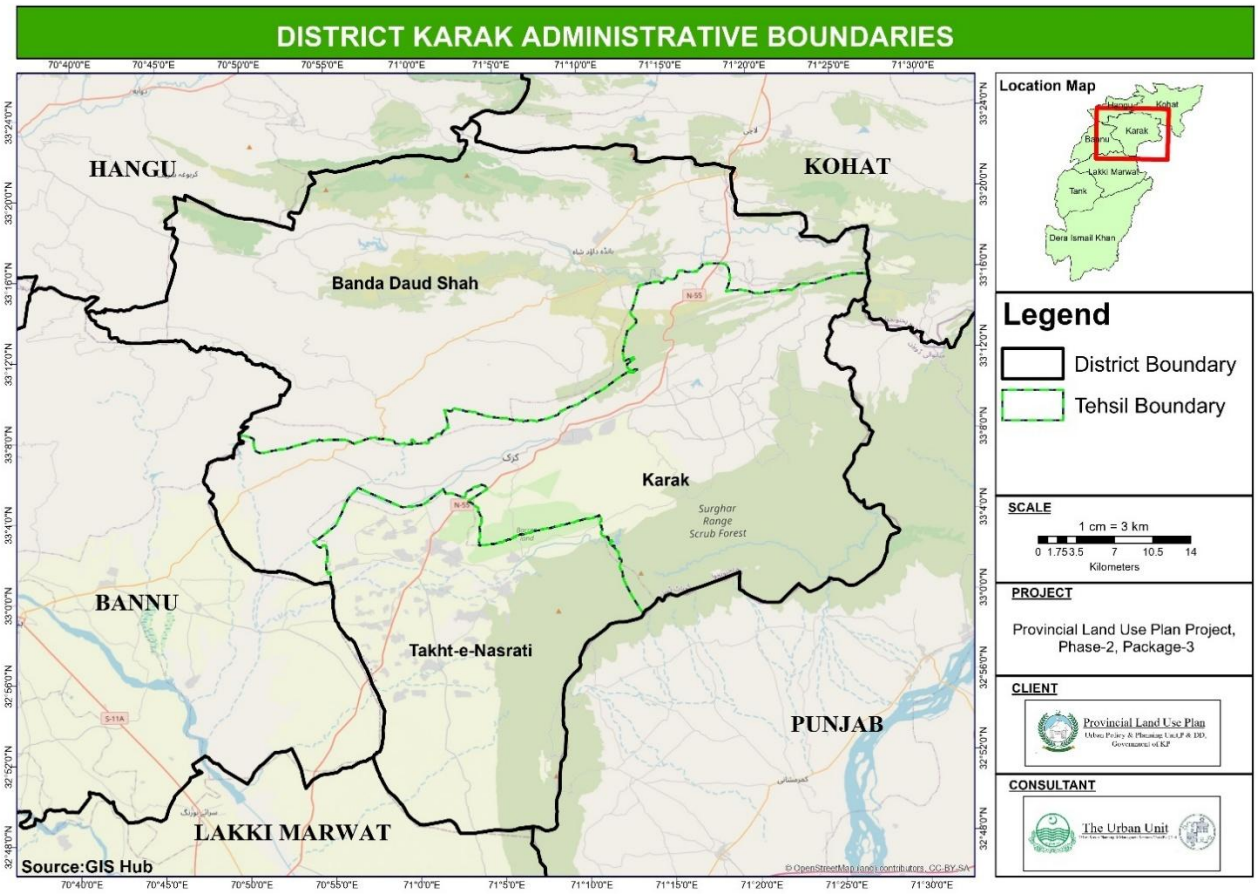
Land, a fundamental resource integral to human sustenance and progress, has witnessed centuries of exploitation and transformation. In the context of District Karak, land emerges as a fundamental resource essential for the well-being and progress of its communities. Over centuries, humanity has honed its understanding of land resources, navigating the delicate balance between finite resources and ever-growing human needs. This equilibrium is notably strained, evident in the challenges faced by the district's land. The pressing demands on land manifest in various ways, from diminishing crop yields to the depletion of both the quality and quantity of available land.

2.1 Administrative Setup

Nestled in the northwestern region of Pakistan, District Karak has been divided into three tehsils, each contributing uniquely to the district's dynamics. Tehsil Karak covers the East and West part of the district, spanning **963.79** sq. Km (36%) of the district's total area. Tehsil Banda Daud Shah being the area wise largest tehsil is situated towards the North-West of the district and spans across **1110.04** sq. Km (41.5%). Smallest of all three tehsils, Takht-e-Nasrati encompasses the South-West part with **598.91** sq. Km (22.4%) of the district's geographical composition. Collectively, these tehsils carve out a district-wide territory covering **2672.75** sq. Km area, creating a tapestry that reflects the geographical diversity of the region. Below **Table** shows the details of the tehsil-wise area of District Karak and visually in **Map**.

Table 2-1: Tehsil Setup of District Karak

Tehsil	Area (Sq. Km)	Percentage
Karak	963.79	36.1%
Banda Daud Shah	1110.04	41.5%
Takht-e-Nasrati	598.91	22.4%
District Karak	**2672.75**	**100%**



Map 2-1: Tehsils of District Karak

2.2 Urban Centres

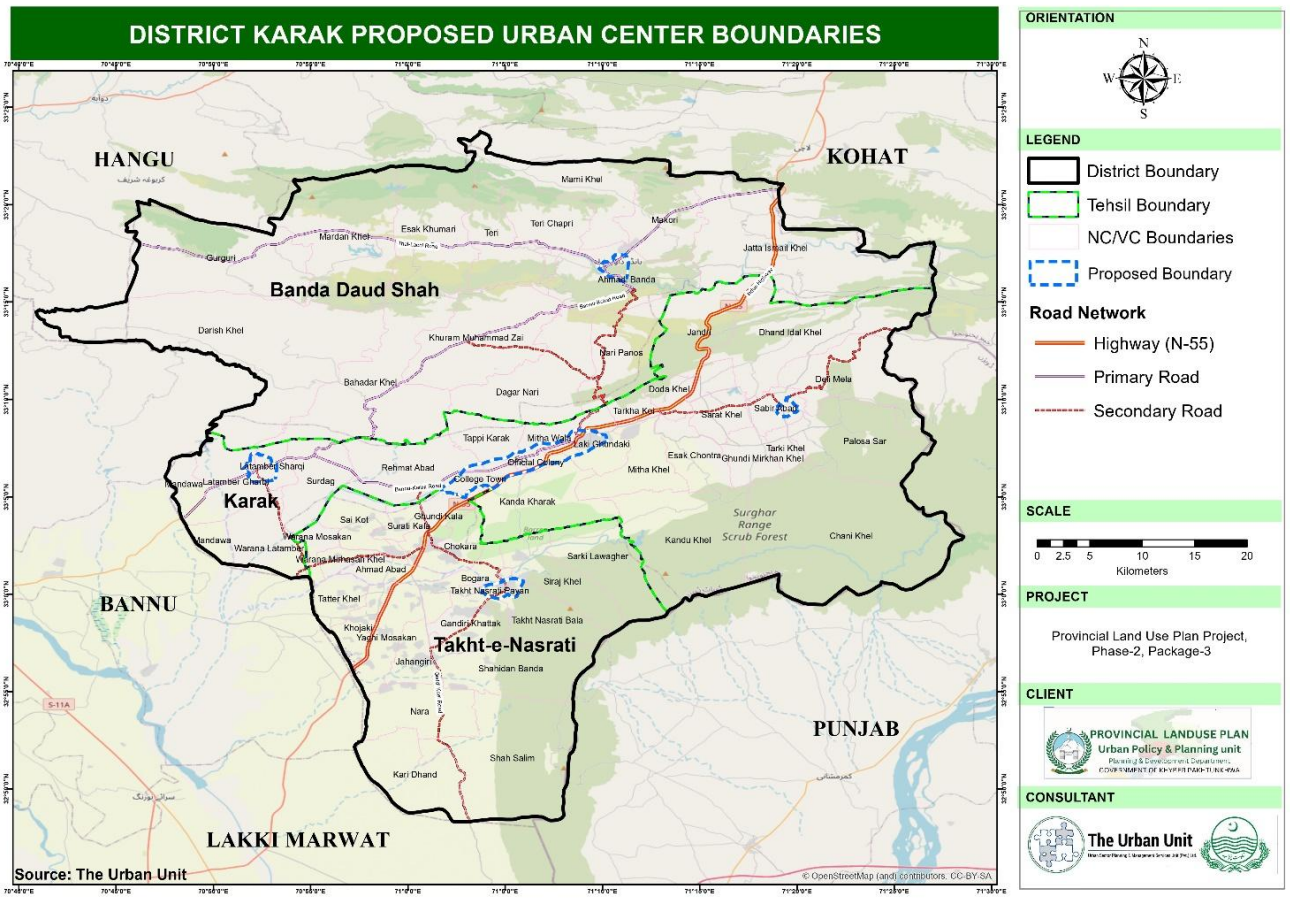
District Karak has five urban centers, of which four were proposed by the consultant based on background studies and data analysis (Task-B) carried out during the plan period while the existing municipal entity—currently functioning as the District Headquarters (DHQ)—holds a central role in the district's governance and urban dynamics. The Karak Municipal Committee in Tehsil Karak alongside the proposed urban centers of Latambar and Sabir Abad, represent key nodes in the district's spatial development strategy. Additionally, the remaining tehsils also include significant proposed urban centers both of which are Tehsil Headquarters: Ahmadi Banda in Tehsil Banda Daud Shah and Takht-e-Nasrati in Tehsil Takht-e-Nasrati.

These urban centers, both existing and proposed, are integral to the district's urban framework, playing a critical role in shaping its land-use patterns, fostering economic activity, and promoting balanced regional growth. The strategic development of these centers is expected to enhance the district's connectivity, service delivery, and overall urban functionality, thereby driving the sustainable urbanization and long-term prosperity of Karak.

In line with modern town planning principles, these proposed urban centers are designed to address the evolving socio-economic needs of the district, providing a balanced distribution of services and infrastructure, while mitigating congestion in the existing municipal areas. Together, these centers will significantly contribute to the spatial planning objectives, enhancing the liveability and resilience of Karak's urban landscape. The Karak City urban center covers **2554** hectares while the area of Latambar and Sabir Abad urban centers are **520** and **182** hectares. The Ahmadi Banda urban center spans **397** hectares while the Takht-e-Nasrati urban center covers an area of about **420** hectares. Recognizing the unique dynamics of urban center is paramount for the formulation of a comprehensive and effective land-use strategy tailored to the distinct characteristics of District Karak. Below **Table** shows the details of the areas of the urban centers of District Karak and Map show their location.

Table 2-2: District Karak Urban Centers

Sr. No	Tehsil	Urban Center	Area (hectares)
1	Karak	Karak City	2554
2		Latambar	520
3		Sabir Abad	182
4	Banda Daud Shah	Ahmadi Banda	397
5	Takht-e-Nasrati	Takht-e-Nasrati	420



Map 2-2: District Karak Proposed Urban Centers

2.3 District Land Use Distribution

The district Karak spans of about 2672.75 sq.km in which we observed that most of the land is classified as Rangeland accounting to 1558.21 sq. km of land. The second most occurring landuse is of agriculture measuring a total area of 720.54 sq.km. This is indicative of agriculture being one of the main sources of income in the district. There is 131.42 sq.km of area covered by Barren land which is considered as not usable for production purposes. Categorical description of landuse statistics in District Karak is given below:

Residential and Commercial

The residential fabric covers an area of 76.46 square kilometers, constituting 2.86% of the total district land. This includes various housing and living spaces catering to the population's diverse needs; mixed-use zones offer a blend of residential and commercial accounting to only 0.04 sq. Km (0.001%) of landuse, contributing to a vibrant urban environment. The commercial landscape, spanning 1.69 square kilometers, forms 0.06% of the district.

Concentrated Public Sector

Covering 2.90 square kilometers of education zones plays a crucial role in fostering intellectual growth and development within the district. Health facilities, occupying 0.35 square kilometers, provide essential services to the community, ensuring the well-being of residents. Public Buildings and Civic Amenities encompassing 0.60 square kilometers serve as hubs for civic engagement and public services, enhancing the overall quality of life. With an area of 0.30 square kilometers, religious buildings contribute to the cultural and spiritual landscape of the district. The Parks, totaling 0.89 square kilometers, offer recreational opportunities and contribute to the district's environmental sustainability.

Industrial

Scattered industries distributed across 0.43 square kilometers to complement the industrial landscape, promoting economic diversity along with small industrial estate accounting to 0.01 sq. km of landuse in district Karak.

Physical Landscape

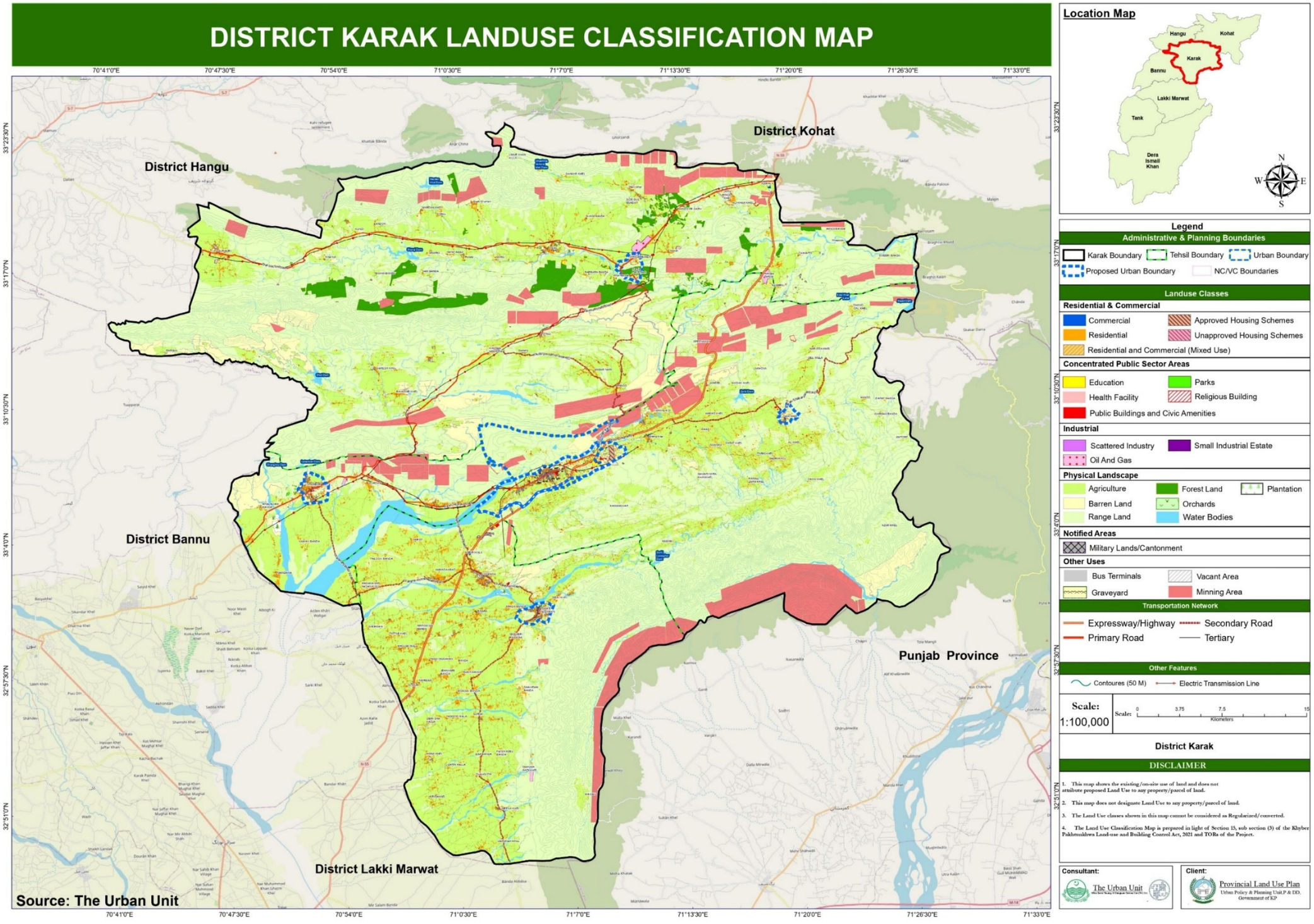
Extending over a vast area of 720.34 square kilometers, agriculture remains a pivotal component of the District Karak landscape, contributing significantly to the local economy and sustenance. The expansive range land covering 1558.21 square kilometers defines a substantial portion of the district, characterized by natural vegetation and serving various ecological functions. Encompassing 50.18 square kilometers, the forested areas contribute to biodiversity conservation, supporting a rich ecosystem within the district. The barren land, spanning 131.42 square kilometers, represents areas with limited vegetation, presenting both challenges and opportunities for sustainable land use planning. District Karak is adorned with water bodies covering 96.39 square kilometers, enhancing scenic beauty and providing essential resources. Orchards, occupying 0.12 square kilometers, contribute little to the district's agricultural diversity, providing fruit and economic opportunities.

Other Land Uses

Transportation takes up 18.50 sq. km with bus terminals only occupying 0.004 sq. km of land. Graveyards, covering 1.26 square kilometers, serve as solemn spaces for final resting, integrated into the district's cultural and social fabric. Spanning 7.62 sq. km, vacant areas represent potential spaces for future development, requiring careful consideration in land use planning. Mining accounts to 0.45 sq. km of landuse occupation in District Karak. Below Table shows the statistics of district Karak existing landuse distribution.

Table 2-3: District Karak Existing Landuse Distribution

Sr. No	Land use	Some of Area in sq.km	Percentage
1	Agriculture	720.34	26.95
2	Barren Land	131.42	4.92
3	Bus Terminals	0.00	0.00
4	Commercial	1.69	0.06
5	Education	2.90	0.11
6	Forest Land	50.18	1.88
7	Graveyard	1.26	0.05
8	Health Facility	0.35	0.01
9	Minning Area	0.45	0.02
10	Oil And gas	2.98	0.11
11	Orchards	0.12	0.00
12	Parks	0.89	0.03
13	Plantation	1.58	0.06
14	Public Buildings and Civic Amenities	0.60	0.02
15	Range Land	1558.21	58.30
16	Religious Building	0.30	0.01
17	Residential	76.46	2.86
18	Residential and Commercial (Mixed Use)	0.04	0.00
19	Restricted	0.03	0.00
20	Scattered Industry	0.43	0.02
21	Small Industrial Estate	0.01	0.00
22	Transportation	18.50	0.69
23	Vacant Area	7.62	0.29
24	Water Bodies	96.39	3.61
	Grand Total	**2672.75**	**100.00**



Map 2-3: District Karak Existing Landuse Classification

2.4 Tehsil Land Use Distribution

District Karak is subdivided into three administrative tehsils: Tehsil Karak, Tehsil Banda Daud Shah, and Tehsil Takht-e-Nasrati. Tehsil Karak accounts for approximately 36% of the district's total land area, making it a significant portion of the district's spatial distribution. Tehsil Banda Daud Shah occupies around 41.53%, representing the largest share of the district's geographical footprint. Meanwhile, Tehsil Takht-e-Nasrati spans approximately 22.41% of the total area, completing the district's spatial configuration. This distribution of land across the tehsils influences both resource management and infrastructural planning at the district level, highlighting the importance of tailored urban policies for each tehsil based on its respective land area and regional needs.

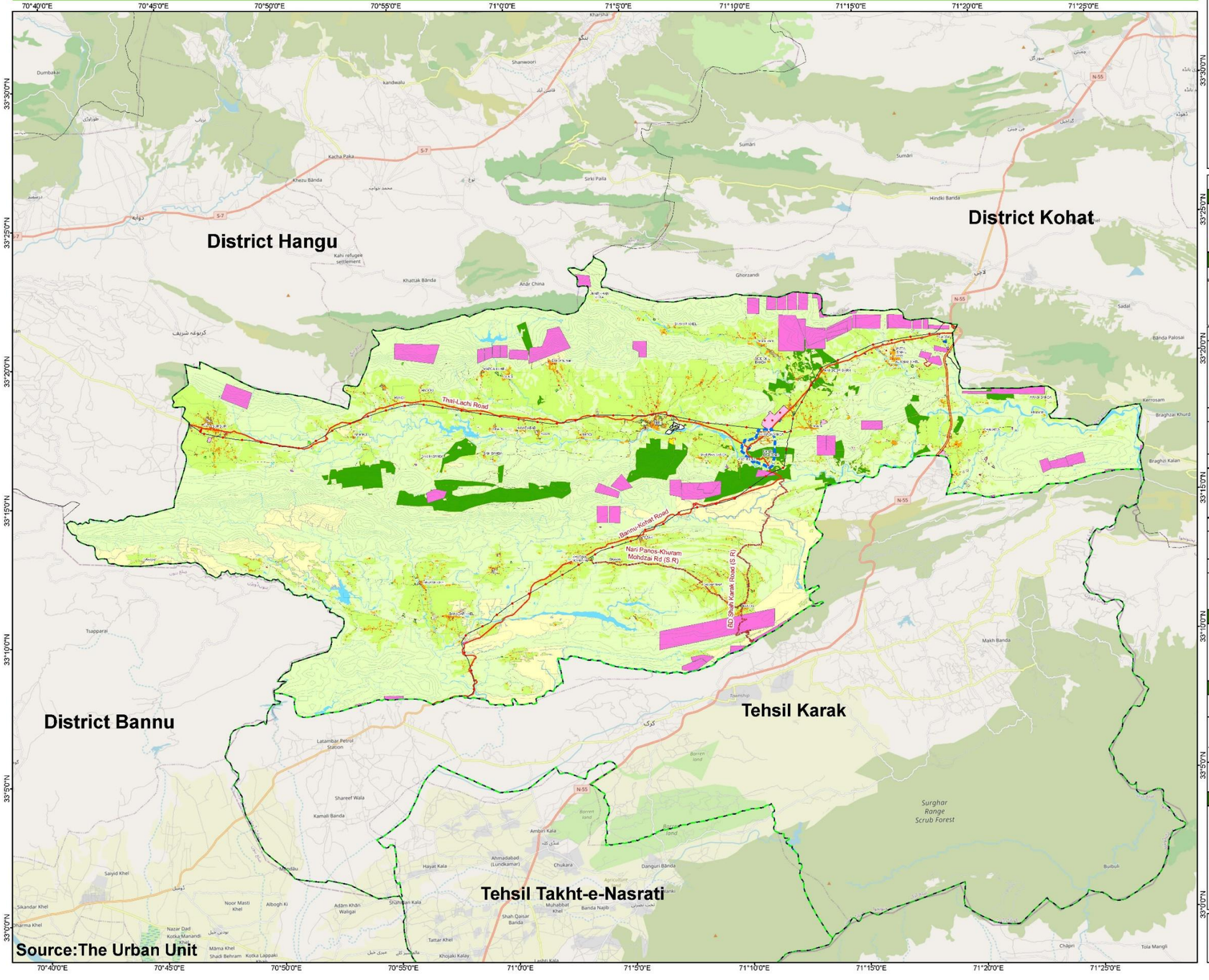
2.4.1 Tehsil Banda Daud Shah

Tehsil Banda Daud Shah encompasses a total land area of 1,110.04 square kilometers, with a predominant presence of rangeland, which constitutes 62.56% of the total area, or approximately 694.47 square kilometers. Agricultural land use covers 231.36 square kilometers, accounting for 20.84% of the tehsil's overall area. Residential land use occupies 17.3 square kilometers (1.56%), while commercial land use is relatively minimal at 0.40 square kilometers, or 0.04%. Other notable land uses include a designated mining area (0.23 square kilometers or 0.02%), Oil and Gas facilities (1.83 square kilometers or 0.17%), and forest land (50.1 square kilometers or 4.51%). The land use statistics presented in the accompanying **Table** and **Map** provide a comprehensive view of the spatial distribution and functional zoning within Tehsil Banda Daud Shah.

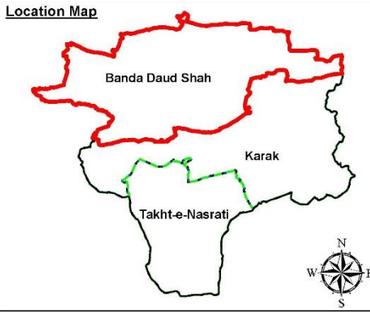
Table 2-4: Tehsil Banda Daud Shah Landuse Classification Statistics

Sr. No	Landuse	Area (sq. km)	Percentage
1	Agriculture	231.36	20.84
2	Barren Land	79.71	7.18
3	Commercial	0.40	0.04
4	Education	0.59	0.05
5	Forest Land	50.10	4.51
6	Graveyard	0.55	0.05
7	Health Facility	0.11	0.01
8	Mining Area	0.23	0.02
9	Oil and Gas	1.83	0.17
10	Orchards	0.02	0.00
11	Parks	0.28	0.03
12	Plantation	0.35	0.03
13	Public Buildings and Civic Amenities	0.06	0.01
14	Range Land	694.47	62.56
15	Religious Building	0.07	0.01
16	Residential	17.30	1.56
17	Residential and Commercial (Mixed Use)	0.001	0.0001
18	Scattered Industry	0.21	0.02
19	Transportation	6.18	0.56
20	Vacant Area	1.87	0.17
21	Water Bodies	24.35	2.19
	Grand Total	**1110.04**	**100**

TEHSIL BANDA DUAD SHAH LANDUSE CLASSIFICATION MAP



Location Map



Legend

Administrative & Planning Boundaries

- District Boundary
- Tehsil Boundary
- NC/VC Boundaries
- Proposed Urban Boundary

Landuse Classes

RESIDENTIAL & COMMERCIAL

- Residential
- Commercial
- Residential and Commercial (Mixed Use)

CONCENTRATED PUBLIC SECTOR AREAS

- Education
- Parks
- Health Facility
- Religious Building
- Public Buildings and Civic Amenities

INDUSTRIES

- Scattered Industry
- Oil And Gas

PHYSICAL LANDSCAPE

- Argiculture
- Forest Land
- Water Bodies
- Barren Land
- Orchards
- Range Land
- Plantation

Notified Areas

Other

- Minning Area
- Vacant Area
- Graveyard

Transportation Network

- Expressway/Highway
- Secondary Road
- Primary Road
- Tertiary

Other Features

- Contours (50 M)
- Electric Transmission Line

Scale: 1:100,000

Scale: 0 3.25 6.5 Kilometers

District Karak

DISCLAIMER

1. This map shows the existing/on-site use of land and does not attribute proposed Land Use to any property/parcel of land.
2. This map does not designate Land Use to any property/parcel of land.
3. The Land Use classes shown in this map cannot be considered as Regularized/converted.
4. The Land Use Classification Map is prepared in light of Section 15, sub section (3) of the Khyber Pakhtunkhwa Land-use and Building Control Act, 2021 and TORs of the Project.

Consultant: The Urban Unit

Client: Provincial Land Use Plan, Urban Policy & Planning Unit,P & DD, Government of KP

Map 2-4: Tehsil Banda Daud Shah Landuse Classification

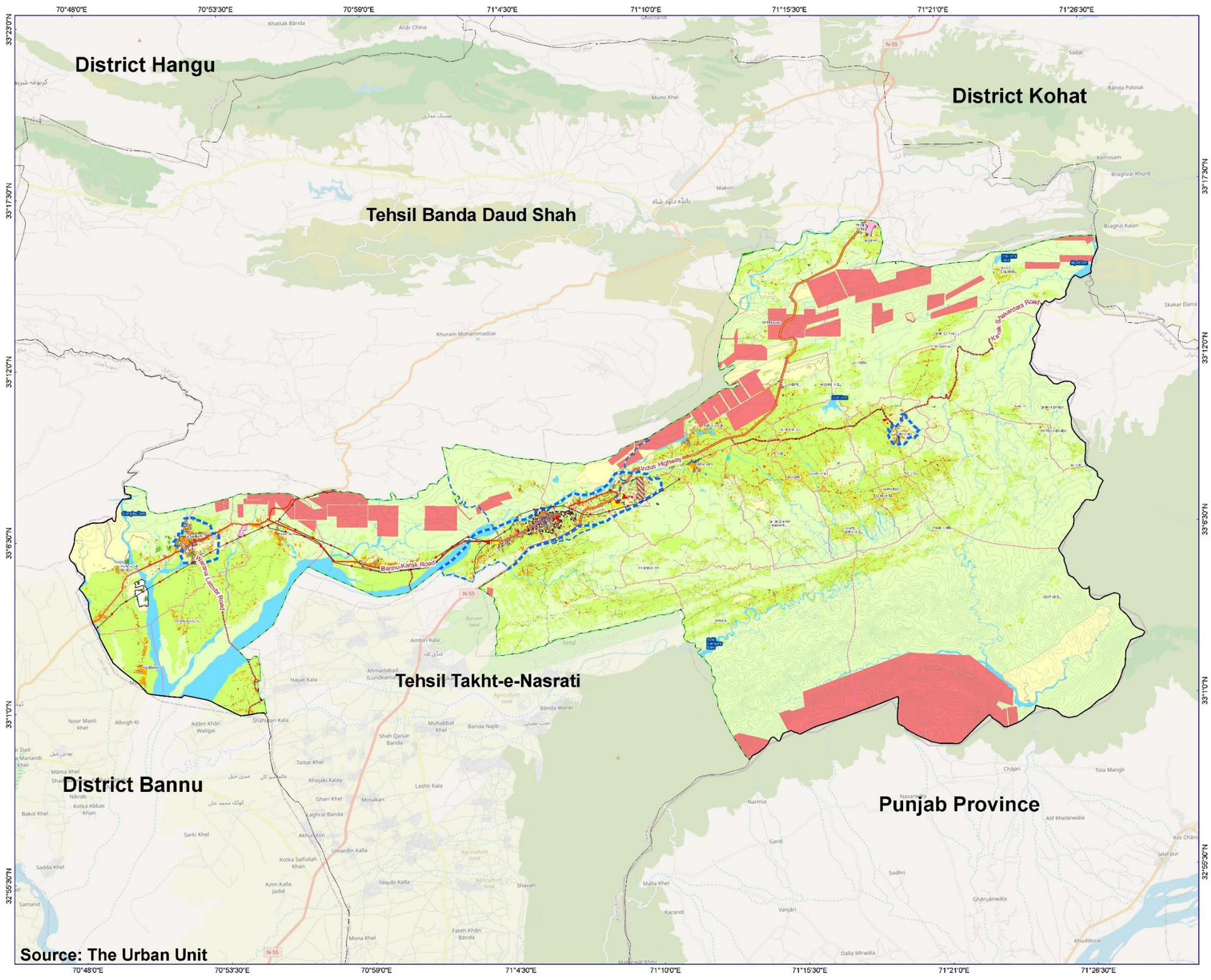
2.4.2 Tehsil Karak

Tehsil Karak encompasses a total area of 963.79 square kilometers. The largest individual land use category within this tehsil is Range Land, which occupies 607.94 square kilometers or 63.08% of the total area. Agricultural land also holds a substantial share of 22.94%, covering 221.07 square kilometers. Residential and Commercial areas combined occupy 26.91 square kilometers, constituting 2.79% of the total area. Water bodies occupy an area of 45.57 sq.km (4.73%). Moreover, some other land uses in tehsil Karak is Mining area, Oil and Gas, Scattered Industries and small industrial estate whose details are given in **Table** below whereas accompanying **Map** offers a detailed view of land use distribution within Tehsil Karak.

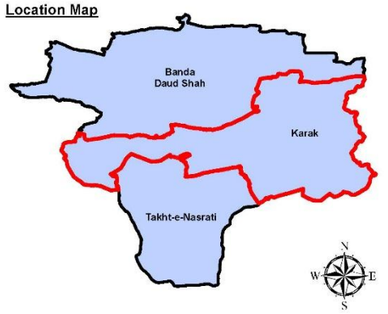
Table 2-5: Tehsil Karak Landuse Classification Statistics

Sr. No	Landuse	Area (Sq.km)	Percentage
1	Agriculture	221.07	22.94
2	Barren Land	47.37	4.92
3	Commercial	0.77	0.08
4	Education	1.29	0.13
5	Forest Land	0.08	0.01
6	Graveyard	0.51	0.05
7	Health Facility	0.17	0.02
8	Minning Area	0.22	0.02
9	Oil And Gas	0.81	0.08
10	Orchards	0.01	0.001
11	Parks	0.48	0.05
12	Plantation	0.99	0.10
13	Public Buildings and Civic Amenities	0.35	0.04
14	Range Land	607.94	63.08
15	Religious Building	0.16	0.02
16	Residential	26.14	2.71
17	Residential and Commercial (Mixed Use)	0.04	0.004
18	Restricted	0.03	0.003
19	Scattered Industry	0.15	0.02
20	Small Industrial Estate	0.01	0.001
21	Transportation	6.18	0.64
22	Vacant Area	3.45	0.36
23	Water Bodies	45.57	4.73
	Grand Total	**963.79**	**100**

TEHSIL KARAK LANDUSE CLASSIFICATION MAP



Location Map



Legend

Administrative & Planning Boundaries

- District Boundary
- Tehsil Boundary
- Urban Boundary
- NC/VC Boundaries
- Proposed Urban Boundary

Landuse Classes

Residential & Commercial

- Commercial
- Residential
- Residential and Commercial (Mixed Use)
- Approved Housing Schemes
- Unapproved Housing Scheme

Concentrated Public Sector Areas

- Education
- Health Facility
- Public Buildings and Civic Amenities
- Parks
- Religious Building

Industrial

- Scattered Industry
- Oil And Gas

Physical Landscape

- Argiculture
- Barren Land
- Range Land
- Forest Land
- Orchards
- Plantation
- Water Bodies

Notified Areas

- Military Lands/Cantonment

Other Uses

- Bus Terminals
- Graveyard
- Vacant Area
- Minning Area

Transportation Network

- Expressway/Highway
- Primary Road
- Secondary Road
- Tertiary

Other Features

- Contoures (50 M)
- Electric Transmission Line

Scale: 1:100,000

Scale: 0 2.75 5.5 11 Kilometers

District Karak

DISCLAIMER

1. This map shows the existing/on-site use of land and does not attribute proposed Land Use to any property/parcel of land.
2. This map does not designate Land Use to any property/parcel of land.
3. The Land Use classes shown in this map cannot be considered as Regularized/converted.
4. The Land Use Classification Map is prepared in light of Section 15, sub section (3) of the Khyber Pakhtunkhwa Land-use and Building Control Act, 2021 and TORs of the Project.

Consultant: The Urban Unit

Client: Provincial Land Use Plan, Urban Policy & Planning Unit, P & D D, Government of KP

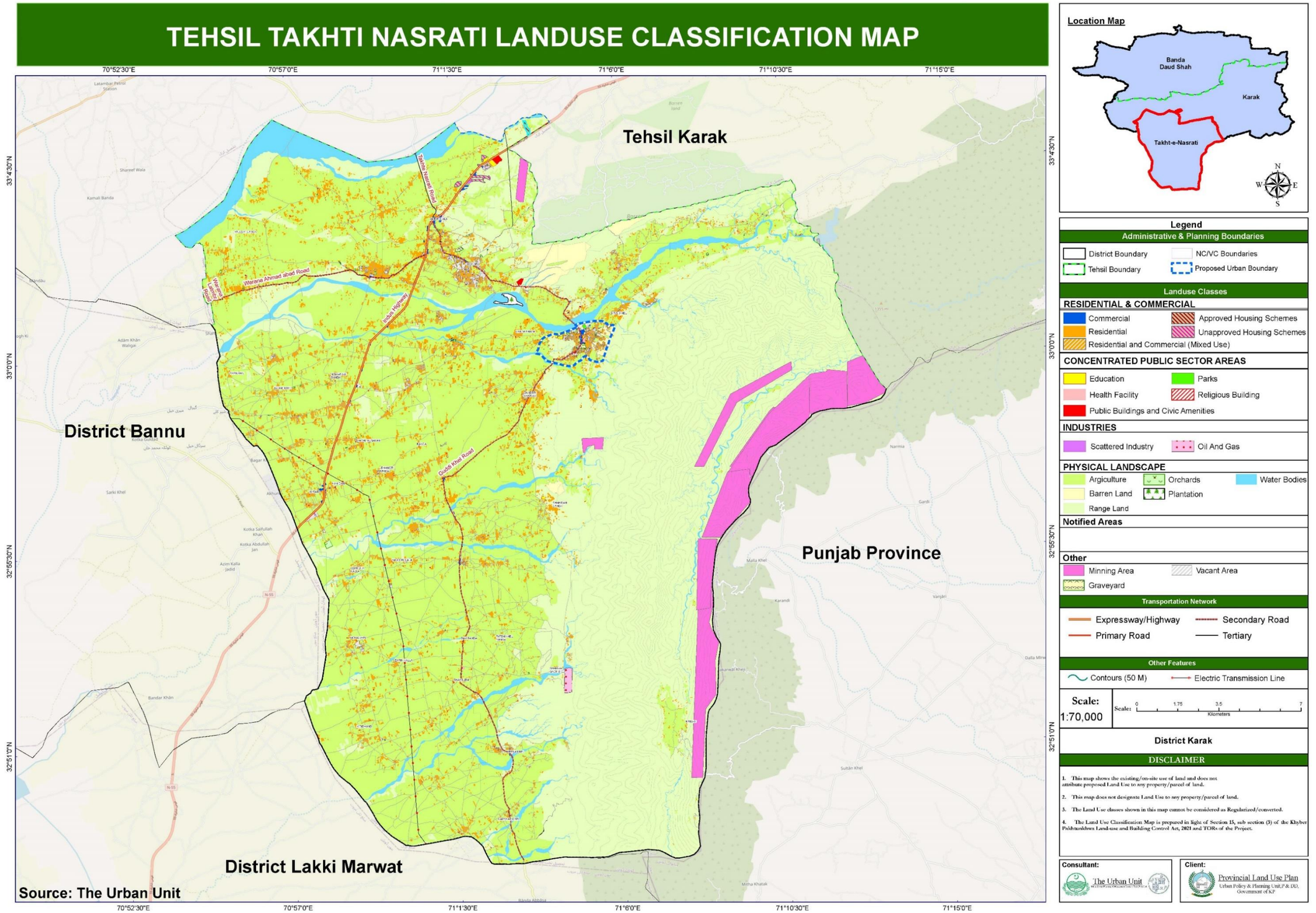
Map 2-5: Tehsil Karak Landuse Classification

2.4.3 Tehsil Takhti Nasrati

Tehsil Takht-e-Nasrati covers a total area of 598.91 square kilometers. This tehsil's primary land use is Agriculture land, accounting for 44.73% of the total area (267.91 square kilometers). Range land covers 255.81 square kilometers, representing 42.71% of the tehsil's area. Residential has an area of 33.03 or 5.5% while commercial is relatively small, making up only 0.52 square kilometers or 0.086%. Water bodies share a substantial land area with 26.47 sq. km (4.42%) presence in Takhti Nasrati. The **Table** below presents comprehensive land use statistics for the tehsil while the **Map** illustrates the existing land use in Takht-e-Nasrati.

Table 2-6: Tehsil Takht-i-Nasrati Landuse Classification Statistics

Sr. No	Landuse	Area (Sq.km)	Percentage
1	Agriculture	267.91	44.733
2	Barren Land	4.34	0.725
3	Bus Terminals	0.004	0.001
4	Commercial	0.52	0.086
5	Education	1.02	0.170
6	Graveyard	0.20	0.033
7	Health Facility	0.07	0.012
8	Oil And Gas	0.34	0.057
9	Orchards	0.09	0.014
10	Parks	0.12	0.020
11	Plantation	0.24	0.040
12	Public Buildings and Civic Amenities	0.18	0.030
13	Range Land	255.81	42.712
14	Religious Building	0.06	0.011
15	Residential	33.03	5.514
16	Residential and Commercial (Mixed Use)	0.001	0.0002
17	Scattered Industry	0.07	0.011
18	Transportation	6.14	1.025
19	Vacant Area	2.31	0.386
20	Water Bodies	26.47	4.419
	Grand Total	**598.91**	**100**



Map 2-6: Tehsil Takhti Nasrati Landuse Classification

2.5 Urban Land Use Distribution

District Karak unfolds its unique urban land use distribution across various key areas. The urban fabric within the district is a dynamic amalgamation of residential, commercial, industrial, and recreational spaces, each contributing to the vibrancy and functionality of the urban environment. District Karak comprises five urban centers, one of which is an officially designated urban center, while the other four are proposed for future urban development. The already designated urban center, located within Tehsil Karak, serves as the district headquarters, acting as the administrative and economic hub of the region. Among the four proposed urban centers, two are also situated within Tehsil Karak, reflecting its centrality in the district's urban framework. The third proposed urban center is located in Tehsil Banda Daud Shah, and the fourth in Tehsil Takht-e-Nasrati, each playing a crucial role in the decentralization of urban services and fostering balanced regional development.

This strategic distribution of both existing and proposed urban centers highlights the district's forward-looking approach to urbanization, aimed at addressing the growing demand for infrastructure, housing, and public services. The identified urban centers are critical for guiding future land use planning, improving connectivity, and promoting sustainable development throughout District Karak. By expanding and formalizing these proposed centers, the district aims to enhance economic activity, provide better access to services, and support the overall growth of the region in a structured and organized manner.

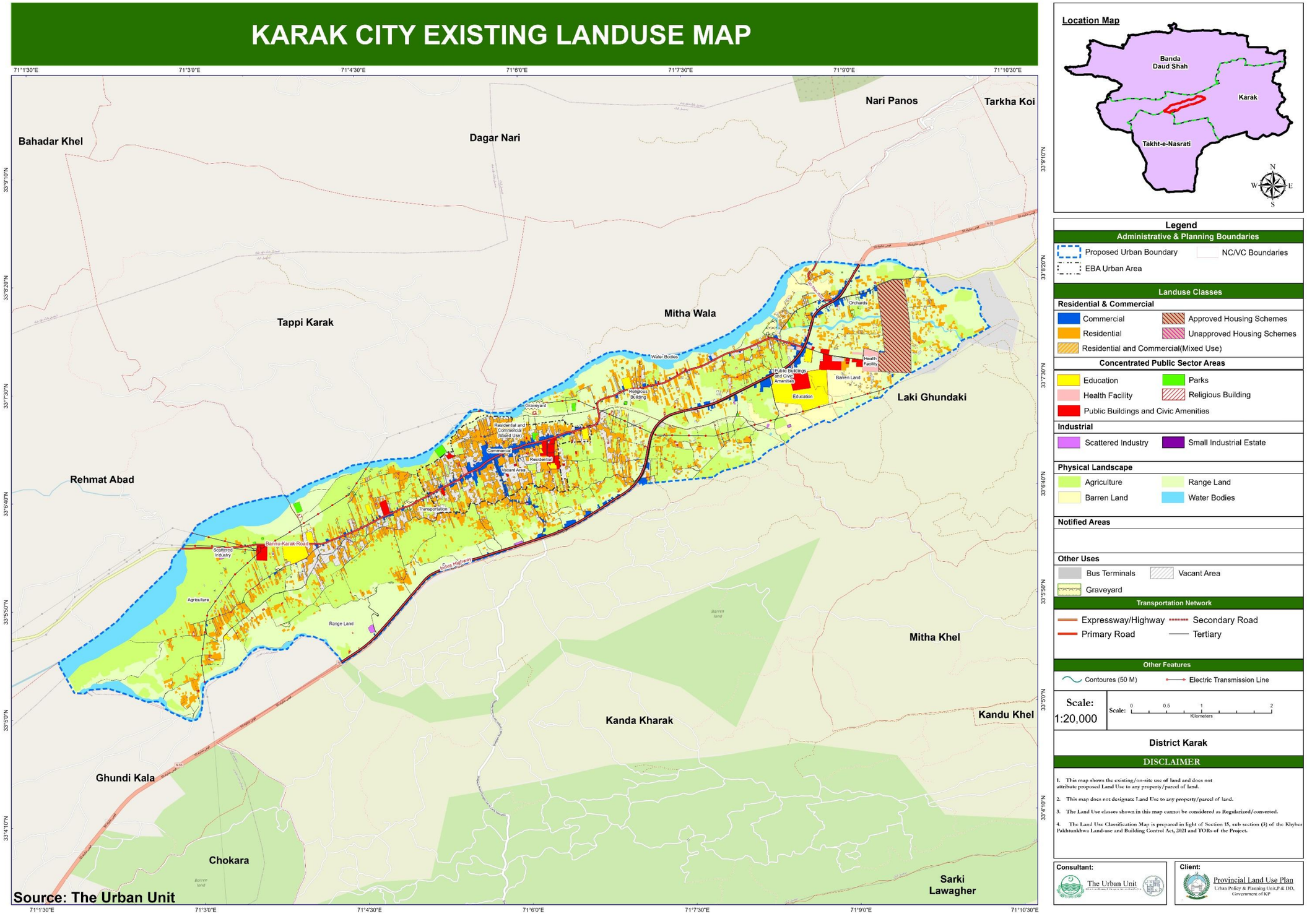
2.5.1 Karak City Urban Center

The land use distribution indicates that most of the 2,554.26 hectares within the planning boundary lies outside the compact built-up area. Agriculture 760.66 hectares, range land 670.76 hectares, and water bodies 246.27 hectares are the dominant land uses, reflecting the rural nature of the area. Agricultural land which is the most prominent, suggests strong potential for farming and productive land use. Residential land occupies 343.46 hectares, with 74.33 hectares within the compact built-up area, indicating a significant urban and peri-urban housing presence. Key services—such as commercial 45.19 hectares, educational 60.57 hectares, health 9.02 hectares, and civic amenities 28.67 hectares —are more concentrated outside the compact zone, reflecting a dispersed infrastructure pattern.

Vacant land 166.78 hectares and barren land 82.56 hectares present valuable opportunities for future development. Infrastructure, including transportation 100.54 hectares and public amenities, reflects increasing investment in accessibility and governance. Moderate allocations to parks, religious buildings, and scattered industry support essential urban functions. With only **206** hectares currently developed as compact built-up area, the data underscores the need for phased and strategic planning to manage future urban growth effectively. The detailed land use statistics presented in the accompanying **Table**, along with the **Map**, offer a comprehensive overview of land use patterns, which are essential for guiding future urban planning and ensuring sustainable development in the area.

Table 2-7: Karak City Urban Center Existing Landuse Statistics (Hectares)

Landuse	Compact Built-up	Outside Compact Built-up	Total
Agriculture	19.74	740.92	760.66
Barren Land	0.48	82.08	82.56
Commercial	21.15	23.87	45.19
Education	5.46	55.11	60.57
Graveyard	0.05	13.83	13.87
Health Facility	1.17	7.85	9.02
Orchards	-	0.92	0.92
Parks	0.59	10.19	10.78
Public Buildings and Civic Amenities	7.30	21.37	28.67
Range Land	4.90	665.86	670.76
Religious Building	1.03	5.47	6.50
Residential	74.33	269.12	343.46
Residential and Commercial (Mixed Use)	2.90	0.53	3.43
Scattered Industry	-	4.26	4.26
Transportation	15.26	85.28	100.54
Vacant Area	51.65	115.3	166.78
Water Bodies	-	246.27	246.27
Grand Total	**206.01**	**2348.24**	**2554.26**



Legend

Administrative & Planning Boundaries
- Proposed Urban Boundary
- NC/VC Boundaries
- EBA Urban Area

Landuse Classes

Residential & Commercial
- Commercial
- Approved Housing Schemes
- Residential
- Unapproved Housing Schemes
- Residential and Commercial(Mixed Use)

Concentrated Public Sector Areas
- Education
- Parks
- Health Facility
- Religious Building
- Public Buildings and Civic Amenities

Industrial
- Scattered Industry
- Small Industrial Estate

Physical Landscape
- Agriculture
- Range Land
- Barren Land
- Water Bodies

Notified Areas

Other Uses
- Bus Terminals
- Vacant Area
- Graveyard

Transportation Network
- Expressway/Highway
- Secondary Road
- Primary Road
- Tertiary

Other Features
- Contoures (50 M)
- Electric Transmission Line

Scale: 1:20,000

Scale: 0 0.5 1 2 Kilometers

District Karak

DISCLAIMER

1. This map shows the existing/on-site use of land and does not attribute proposed Land Use to any property/parcel of land.
2. This map does not designate Land Use to any property/parcel of land.
3. The Land Use classes shown in this map cannot be considered as Regularized/converted.
4. The Land Use Classification Map is prepared in light of Section 15, sub section (3) of the Khyber Pakhtunkhwa Land-use and Building Control Act, 2021 and TORs of the Project.

Consultant: The Urban Unit

Client: Provincial Land Use Plan, Urban Policy & Planning Unit,P & DD, Government of KP

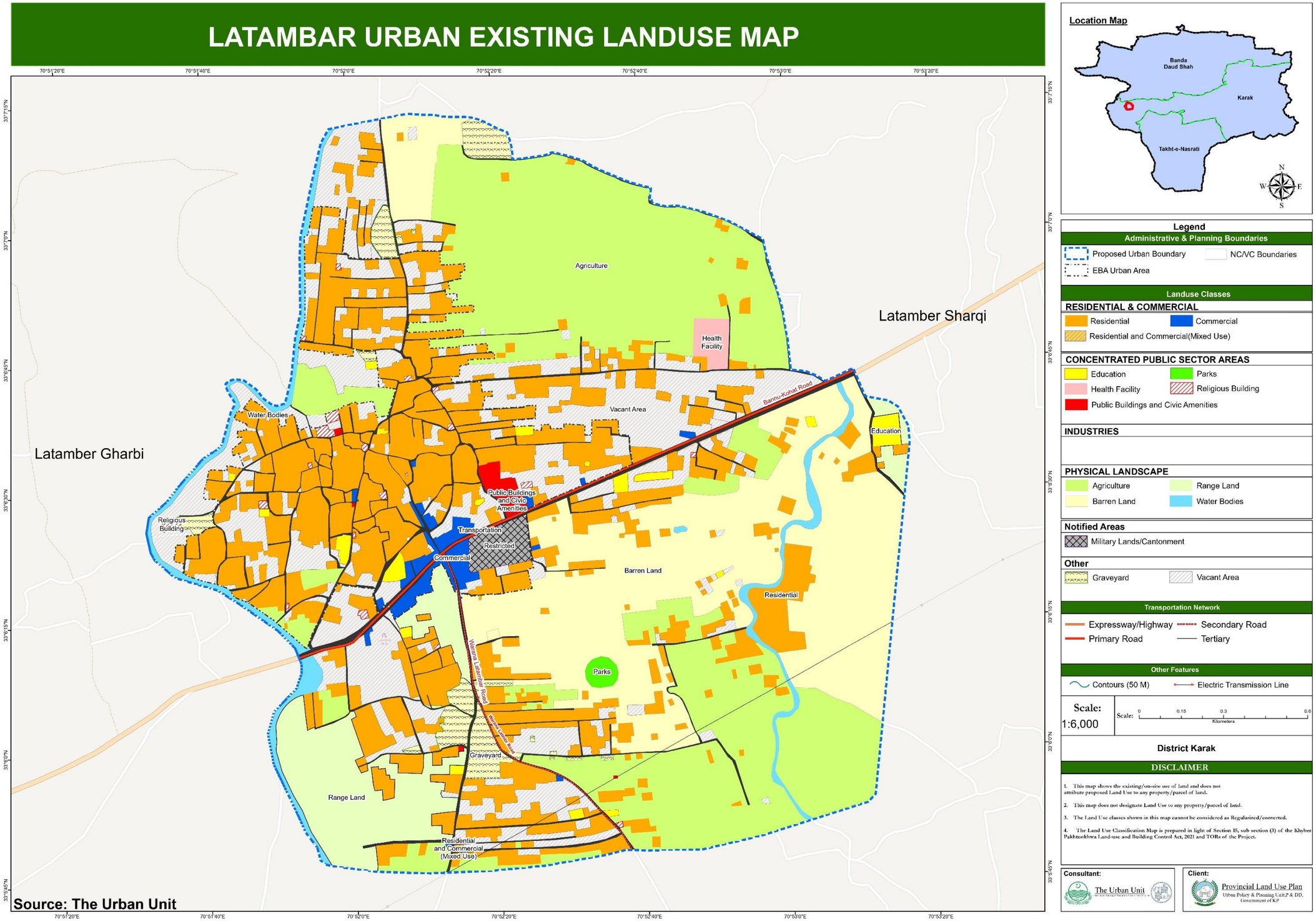
Map 2-7: Karak City Urban Center Existing Landuse

2.5.2 Latambar Urban Center

In Latambar Urban Center, agriculture 132.73 hectares and residential use 128.86 hectares dominate the landscape, reflecting both productive land use and a significant population presence. Vacant 77.85 hectares and barren land 92.85 hectares represent key opportunities for future development. Range land 26.64 hectares indicates the area's semi-rural nature and future growth potential. The transportation network covers 22.02 hectares, supporting mobility and access. Commercial 4.90 hectares, education 4.24 hectares, and health facilities 2.05 hectares provide essential services. The land use statistics presented in the accompanying **Table**, along with the **Map**, offer a comprehensive overview of land use patterns, which are essential for guiding future urban planning and ensuring sustainable development in the area.

Table 2-8: Latambar Urban Centre Existing Land Use Statistics (Hectares)

Landuse	Compact Built-up	Outside Compact Built-up	Total
Agriculture	1.88	130.85	132.73
Barren Land	-	92.85	92.85
Commercial	4.51	0.39	4.90
Education	1.56	2.68	4.24
Graveyard	-	9.59	9.59
Health Facility	-	2.05	2.05
Parks	-	1.05	1.05
Public Buildings and Civic Amenities	1.81	0.05	1.86
Range Land	-	26.64	26.64
Religious Building	0.99	0.53	1.52
Residential	67.49	61.37	128.86
Residential and Commercial (Mixed Use)	-	0.07	0.07
Restricted	3.13	-	3.13
Transportation	8.93	13.09	22.02
Vacant Area	20.59	57.26	77.85
Water Bodies	-	10.72	10.72
Grand Total	**110.89**	**409.20**	**520.09**



Map 2-8: Latambar Urban Center Existing Landuse

2.5.3 Sabir Abad Urban Center

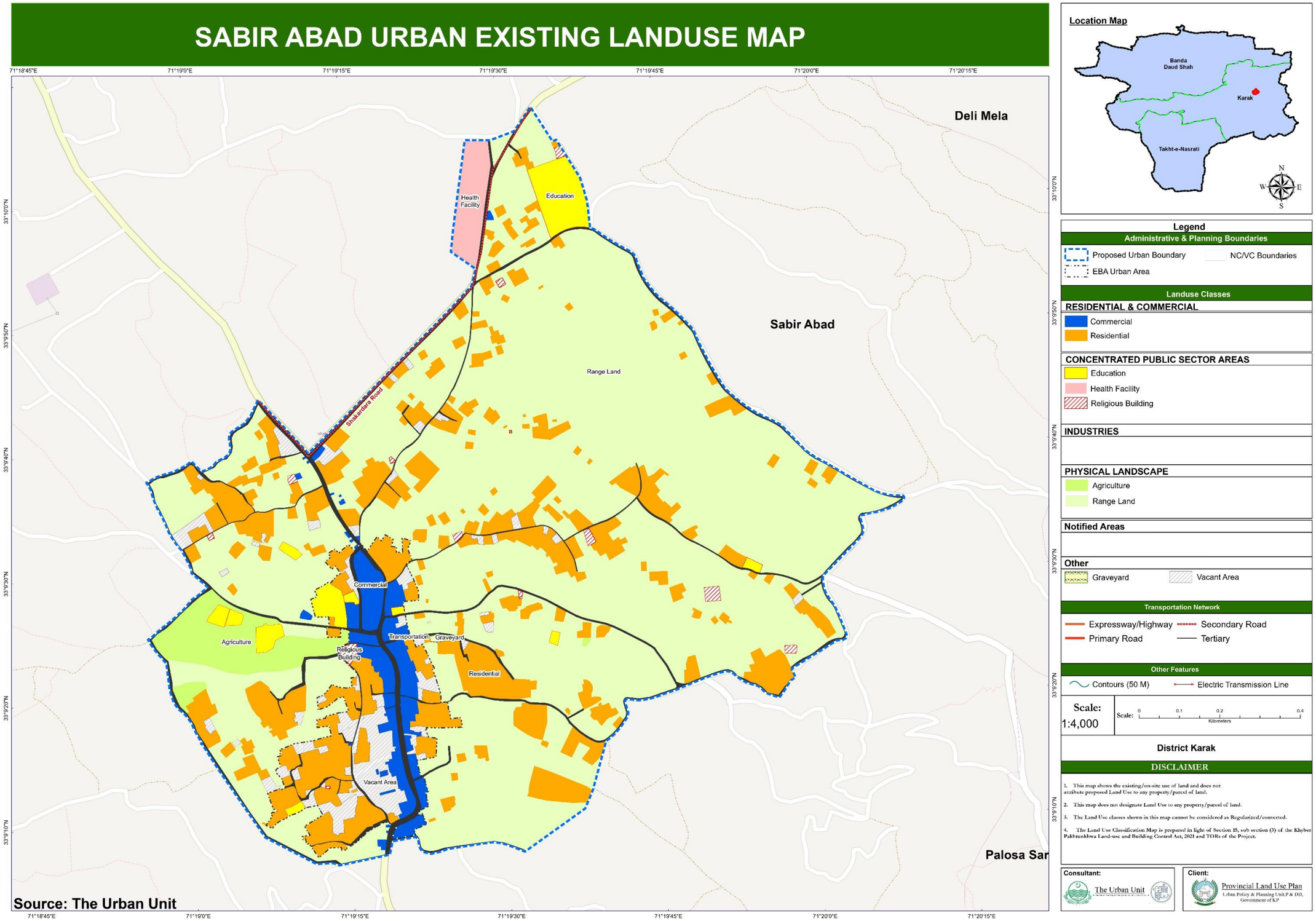
Sabir Abad, designated as a rural growth center for future urbanization, holds significant potential for planned development. The current land use is primarily range land 119.38 hectares, underscoring its rural character while offering ample scope for future urban conversion. Residential land 32.26 hectares reflects an existing settlement base that can support expansion.

The presence of commercial activity 5.18 hectares, along with education 3.89 hectares and health facilities 2.08 hectares, indicates basic public services already established. Additionally, the vacant land 5.70 hectares and transportation network 7.99 hectares provide a foundation for internal connectivity and will play a key role in guiding future urban growth.

These significant existing land uses form the core structure for guiding Sabir Abad's transition into an organized urban center under the upcoming development plan. The land use statistics presented in the accompanying **Table**, along with the **Map**, offer a comprehensive overview of land use patterns, which are essential for guiding future urban planning and ensuring sustainable development in the area.

Table 2-9: Sabir Abad Urban Center Existing Land Use Statistics (Hectares)

Landuse	Compact Built-up	Outside Compact Built-up	Total
Agriculture	-	5.00	5.00
Commercial	4.91	0.28	5.18
Education	0.89	3.00	3.89
Graveyard	-	0.09	0.09
Health Facility	-	2.08	2.08
Range Land	-	119.38	119.38
Religious Building	0.17	0.51	0.68
Residential	7.88	24.38	32.26
Transportation	1.79	6.20	7.99
Vacant Area	3.93	1.77	5.70
Grand Total	**19.56**	**162.67**	**182.24**



Map 2-9: Sabir Abad Urban Center Existing Landuse

2.5.4 Ahmadi Banda Urban Center

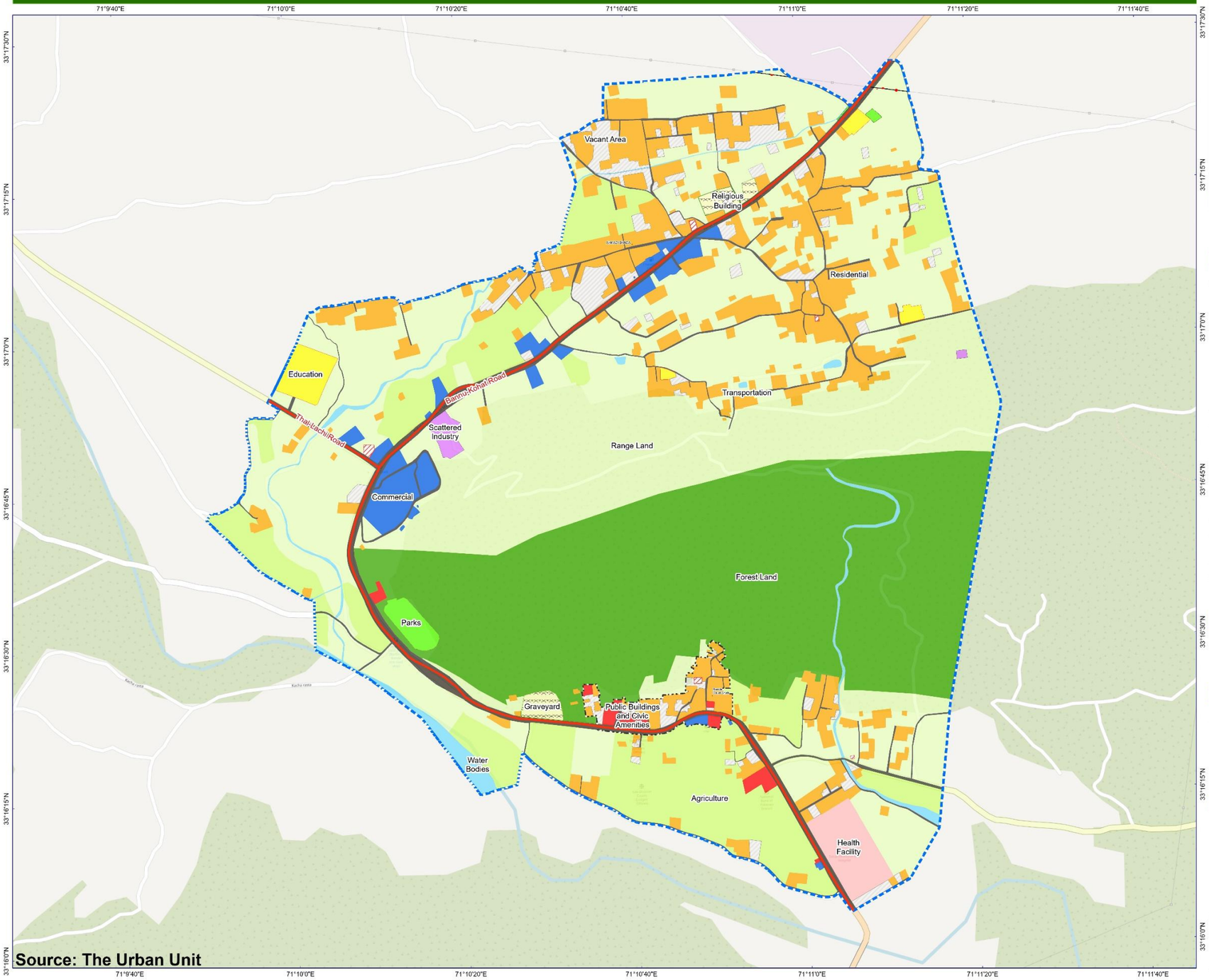
Ahmadi Banda urban center, the administrative center of Tehsil Banda Daud Shah, the existing land use is heavily dominated by range land 156.89 hectares, reflecting its rural nature and offering major potential for future urban development. Residential land 45.07 hectares and agriculture 43.54 hectares form the core of the settled and livelihood-based land uses, indicating both current population presence and economic reliance on farming.

Commercial use 6.56 hectares shows signs of local trade activity, while health facilities 4.12 hectares and education 2.95 hectares represent essential public services already established. The transportation network, occupying 16.83 hectares, is also a significant existing feature, providing critical connectivity within the area. These key land uses highlight the foundational structure of Ahmadi Banda and guide its potential transition into a well-planned urban center. The land use statistics presented in the accompanying Table, along with the Map, offer a comprehensive overview of land use patterns, which are essential for guiding future urban planning and ensuring sustainable development in the area.

Table 2-10: Ahmadi Banda Urban Center Existing Land Use Statistics (Hectares)

Landuse	Compact Built-Up	Outside Compact Buit-up	Total
Agriculture	-	43.54	43.54
Commercial	0.16	6.39	6.56
Education	-	2.95	2.95
Forest Land	-	99.53	99.53
Graveyard	-	1.80	1.80
Health Facility	-	4.12	4.12
Parks	-	1.58	1.58
Public Buildings and Civic Amenities	0.96	0.69	1.65
Range Land	-	156.90	156.89
Religious Building	0.05	0.30	0.35
Residential	2.82	42.25	45.07
Scattered Industry	-	0.99	0.98
Transportation	0.94	15.88	16.83
Vacant Area	0.85	9.29	10.14
Water Bodies	-	5.03	5.03
Grand Total	**5.79**	**391.24**	**397.02**

AHMADI BANDA URBAN EXISTING LANDUSE MAP



Location Map

Legend

Administrative & Planning Boundaries

- Proposed Urban Boundary
- EBA Urban Area

Landuse Classes

RESIDENTIAL & COMMERCIAL

- Commercial
- Residential

CONCENTRATED PUBLIC SECTOR AREAS

- Education
- Parks
- Health Facility
- Religious Building
- Public Buildings and Civic Amenities

INDUSTRIES

- Scattered Industry

PHYSICAL LANDSCAPE

- Agriculture
- Forest Land
- Range Land
- Water Bodies

Notified Areas

Other

- Graveyard
- Vacant Area

Transportation Network

- Expressway/Highway
- Secondary Road
- Primary Road
- Tertiary

Other Features

- Contours (50 M)
- Electric Transmission Line

Scale: 1:6,000

Scale: 0 0.15 0.3 0.6 Kilometers

District Karak

DISCLAIMER

1. This map shows the existing/on-site use of land and does not attribute proposed Land Use to any property/parcel of land.
2. This map does not designate Land Use to any property/parcel of land.
3. The Land Use classes shown in this map cannot be considered as Regularized/converted.
4. The Land Use Classification Map is prepared in light of Section 15, sub section (3) of the Khyber Pakhtunkhwa Land-use and Building Control Act, 2021 and TORs of the Project.

Consultant: The Urban Unit

Client: Provincial Land Use Plan, Urban Policy & Planning Unit, P & DD, Government of KP

Map 2-10: Ahmadi Banda Urban Center Existing Landuse

2.5.5 Takht-e-Nasrati Urban Center

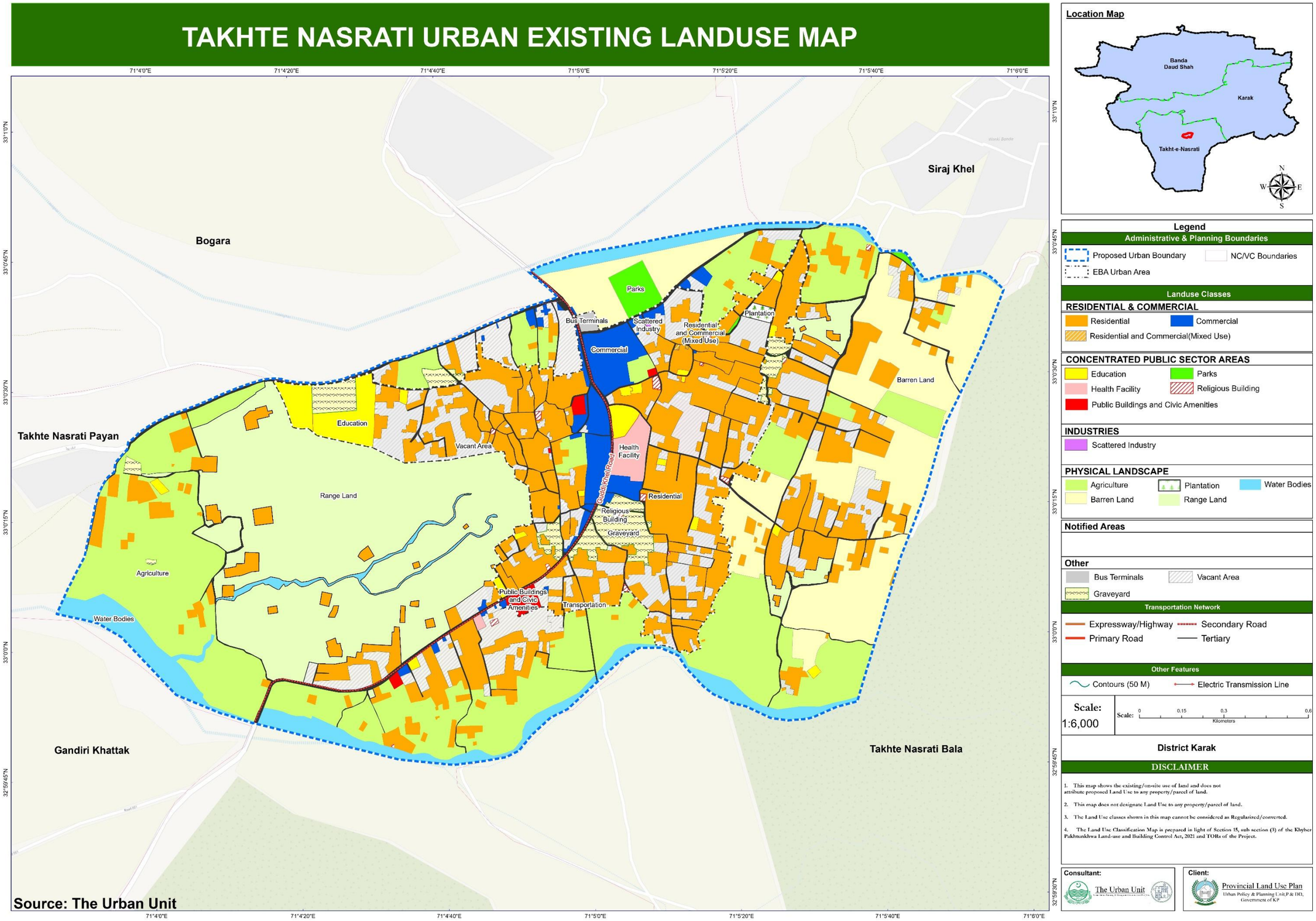
Takht-e-Nasrati, the Tehsil headquarters, spans approximately 420.09 hectares. The dominant land use is range land 77.64 hectares, reflecting the town's rural character and potential for environmental conservation or managed use. Agriculture remains significant at 88.39 hectares, supporting local livelihoods.

Residential land occupies 93.64 hectares, highlighting growing housing needs, while commercial 9.68 hectares, education 7.31 hectares, and health facilities 2.32 hectares provide essential urban services. The transportation network covers 15.97 ha, ensuring local connectivity.

Vacant land 43.70 hectares presents opportunities for future development, and water bodies 19.71 hectares enhance the area's ecological and planning value. The land use statistics presented in the accompanying Table, along with the Map, offer a comprehensive overview of land use patterns, which are essential for guiding future urban planning and ensuring sustainable development in the area.

Table 2-11: Takht-e-Nasrati Urban Center Existing Land Use Statistics (Hectares)

Landuse	Compact Built-Up	Outside Compact Built-Up	Total
Agriculture	1.62	86.77	88.39
Barren Land	-	47.59	47.59
Bus Terminals	0.43	-	0.43
Commercial	8.57	1.11	9.68
Education	6.78	0.53	7.31
Graveyard	6.23	2.18	8.42
Health Facility	2.17	0.15	2.32
Parks	0.05	2.37	2.42
Plantation	0.52	-	0.52
Public Buildings and Civic Amenities	1.23	0.18	1.41
Range Land	-	77.64	77.64
Religious Building	0.65	0.13	0.78
Residential	51.89	41.75	93.64
Residential and Commercial (Mixed Use)	0.14	-	0.14
Scattered Industry	0.04	-	0.04
Transportation	6.97	8.99	15.97
Vacant Area	22.84	20.86	43.70
Water Bodies	-	19.71	19.71
Grand Total	**110.13**	**309.96**	**420.09**



Legend

Administrative & Planning Boundaries
- Proposed Urban Boundary
- NC/VC Boundaries
- EBA Urban Area

Landuse Classes

RESIDENTIAL & COMMERCIAL
- Residential
- Commercial
- Residential and Commercial(Mixed Use)

CONCENTRATED PUBLIC SECTOR AREAS
- Education
- Parks
- Health Facility
- Religious Building
- Public Buildings and Civic Amenities

INDUSTRIES
- Scattered Industry

PHYSICAL LANDSCAPE
- Agriculture
- Plantation
- Water Bodies
- Barren Land
- Range Land

Notified Areas

Other
- Bus Terminals
- Vacant Area
- Graveyard

Transportation Network
- Expressway/Highway
- Secondary Road
- Primary Road
- Tertiary

Other Features
- Contours (50 M)
- Electric Transmission Line

Scale: 1:6,000

Scale: 0 0.15 0.3 0.6 Kilometers

District Karak

DISCLAIMER

1. This map shows the existing/on-site use of land and does not attribute proposed Land Use to any property/parcel of land.
2. This map does not designate Land Use to any property/parcel of land.
3. The Land Use classes shown in this map cannot be considered as Regularized/converted.
4. The Land Use Classification Map is prepared in light of Section 15, sub section (3) of the Khyber Pakhtunkhwa Land-use and Building Control Act, 2021 and TORs of the Project.

Consultant: The Urban Unit

Client: Provincial Land Use Plan — Urban Policy & Planning Unit,P & DD, Government of KP

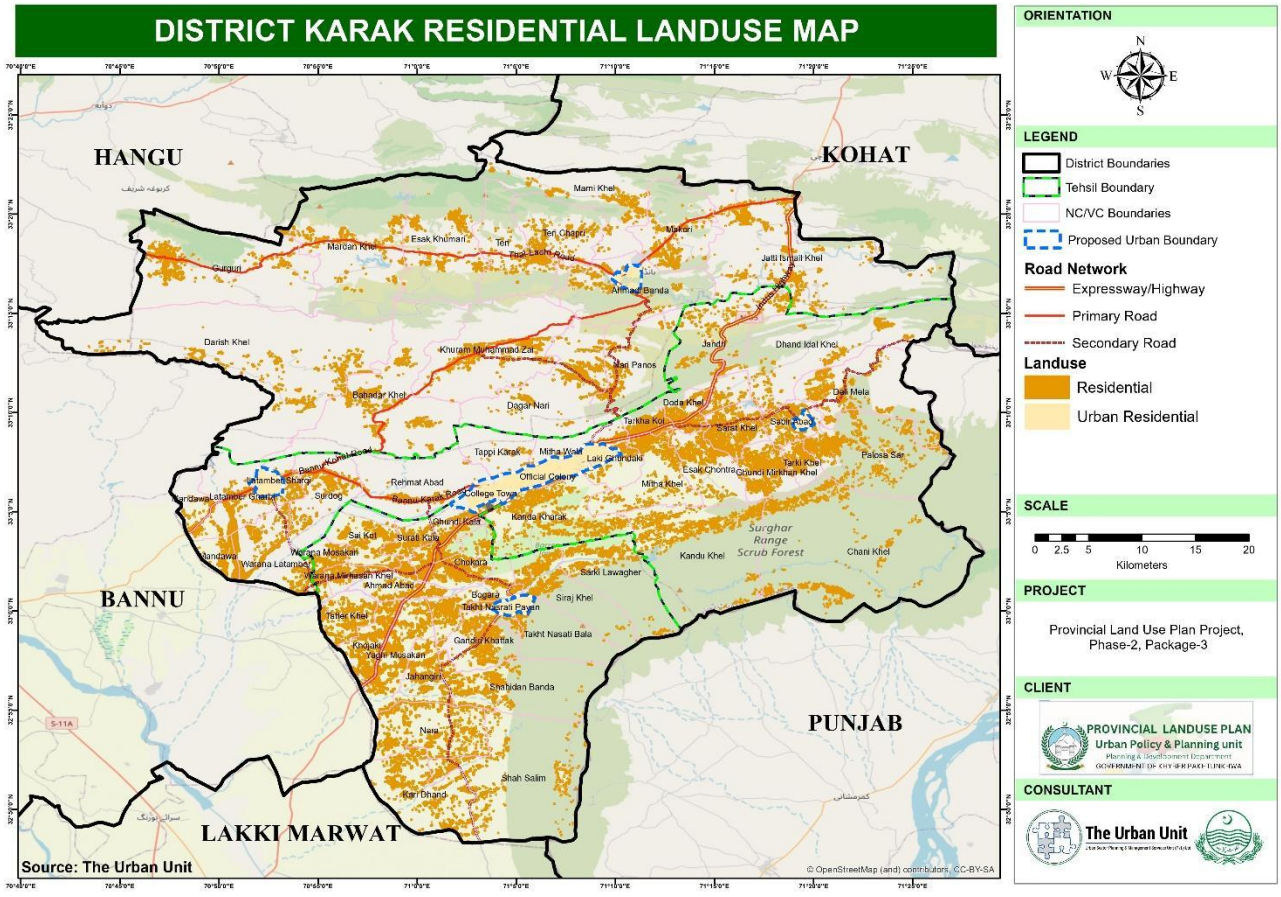
Map 2-11: Takhti Nasrati Urban Center Existing Landuse

3. SECTORAL STUDIES

3.1 Housing

Housing is needed for everyone irrespective of their living in urban and rural areas, which is further dominantly connected to other land uses. Therefore, the housing sector is diversified and encompasses all activities related to work, education, and recreation. To fulfill the required need for housing, other land uses are needed as well while a massive amount of land is required for residential purposes, and with it, other activities are facilitated accordingly. As housing is the most important area to focus on, it is crucial to study its existing characteristics and spatial dynamics to prepare future Land Use Plans. Both qualitative and quantitative aspects of housing sectors should be considered to analyze land suitability, limitations, and constraints.

The characteristics of the existing housing in District Karak are studied using various data sources including secondary data from the census as well as primary data from the Household Information Survey. The characteristics of the housing include the growth pattern, average household size, existing stock, density, and the existing housing backlog and future housing demand along with area required for residential purpose in District Karak for the plan period.



Map 3-1: Existing Residential Landuse

3.1.1 Housing Stock

3.1.1.1 Housing Growth Pattern

The housing growth pattern has been studied from the past three census years of 1998, 2017 and 2023 published by the Pakistan Bureau of Statistics. Overall district and rural areas of Karak showcased an increase of **67%** from 1998 to 2017 whereas urban area recorded more than the rural at **69%**. Between 2017 and 2023, overall housing increased by **33%** which is more as compared to the growth between 1998 and 2017 with again urban area recording **40%** of growth during the same period. Details of housing growth pattern are summarized below in **Table**.

Table 3-1: Housing Growth Pattern

Administrative Area	Housing Units 1998	Housing Units 2017	Housing Growth 1998-2017 (%age)	Housing Units 2023	Housing Growth 2017-2023 (%age)
District Urban	3002	5287	76%	7936	50%
District Rural	40168	66920	67%	88061	32%
District Overall	43170	72207	67%	95997	33%
Urban Areas					
Karak MC	3002	5287	76%	7936	50%
Rural Areas					
Tehsil Banda Daud Shah	10961	16624	52%	22259	34%
Tehsil Karak	13829	25693	86%	31994	25%
Tehsil Takhti Nasrati	15378	24603	60%	33808	37%

3.1.1.2 Housing Stock by Type

In Karak District, the total housing stock increased from 72,207 units in 2017 to 95,997 units in 2023. In 2017, rural areas dominated with 63,570 units, while Pacca houses made up the majority across the district. However, a significant number of Katcha units indicated the need for housing improvements. By 2023, all housing types saw growth especially Pacca and Semi Pacca houses, which rose to 58,249 and 18,335 respectively reflecting improved construction standards.

The **Table** shows a clear increase in housing stock across all categories from 2017 to 2023 in Karak District. Pacca houses saw the highest growth, indicating an improvement in housing quality. Semi-Pacca and Katcha units also increased, reflecting ongoing demand and population growth. Rural areas remained dominant in housing numbers, but Karak City, showed significant expansion. Overall, the data highlights both progress in construction standards and the continued need for housing development and planning.

Table 3-2: District Karak Previous Housing Stock[18]

Administrative Area	2017				2023			
	Pacca	Semi Pacca	Katcha	Total	Pacca	Semi Pacca	Katcha	Total
District Urban	4,637	453	197	**5,287**	6,666	1,050	220	**7936**
District Rural	43,705	9,477	13,738	**66,920**	51,583	17,285	19,193	**88,061**
District Overall	48,342	9,930	13,935	**72,207**	58,249	18,335	19,413	**95,997**
Urban Areas								
Karak MC	4,637	453	197	**5,287**	6,666	1,050	220	**7,936**
Rural Areas								
Tehsil Banda Daud Shah	11,214	2,231	3,179	**16,624**	11,849	5,163	5,247	**22,259**
Tehsil Karak	17,193	3,684	4,816	**25,693**	19,486	6,812	5,696	**31,994**
Tehsil Takhti Nasrati	15,298	3,562	5743	**24,603**	20,248	5,310	8,250	**33,808**

3.1.1.3 Housing Occupancy

In Karak District, housing occupancy is predominantly owner-based. In 2023, 98% of households across the district lived in owned homes, with only 2% living in rented units. Urban areas reported slightly more rental occupancy (5%) compared to rural areas, which had just 1%. Government or rent-free housing was negligible, indicating a low reliance on public or subsidized housing.

Within urban areas, Karak City had the highest rental occupancy at 10%, while other urban settlements like Latambar, Sabir Abad, Ahmadi Banda, and Takhti Nasrati had full owner occupancy. In rural tehsils,

[18] *Pakistan Bureau of Statistics. (April, 2021). District Karak-Final Results of Sixth Population and Housing Census-2017. Table-24 and 26 Selected Housing Characteristics of Urban and Rural Localities.*

ownership rates remained consistently high at 99%, with very minimal rental or rent-free housing, and no significant presence of government housing reported.

The data reflects a strong culture of homeownership in Karak District, especially in rural areas. High ownership rates indicate housing stability but also suggest limited availability of rental options, which may restrict mobility and housing access for new or temporary residents. For land use planning, this highlights the need to diversify housing options, particularly in growing urban areas, to support a wider range of household needs.

Table below shows the details of the Housing occupancy in District Karak as per the HIS.

Table 3-3: District Karak Housing Occupancy[19]

Administrative Area	Owned	Rented	Rent Free	Government
District Urban	95%	5%	0%	0%
District Rural	99%	1%	0%	0.0%
District Overall	98%	2%	0%	0%
Urban Areas				
Karak City	90%	10%	0%	0%
Latambar	100%	0%	0%	0%
Sabir Abad	100%	0%	0%	0%
Ahmadi Banda	100%	0%	0%	0%
Takhti Nasrati	100%	0%	0%	0%
Rural Areas				
Tehsil Banda Daud Shah	99%	1%	0%	0.0%
Tehsil Karak	99%	1%	0%	0%
Tehsil Takhti Nasrati	99%	1%	1%	0%

3.1.1.4 House Sizes in Karak

The distribution of housing sizes in District Karak reflects a combination of compact urban development and spacious rural housing patterns, shaped by population density, cultural norms, and land availability. **Table** below presents a consolidated view of housing sizes across urban and rural areas of District Karak as per the Housing Information Survey (HIS).

Table 3-4: District Karak Housing Sizes (Marla's)[20]

Administrative Area	Less Than 5	5 - 10	11 - 20	Above 20
District Urban	10%	39%	25%	26%
District Rural	10%	30%	41%	19%
District Overall	10%	32%	38%	21%
Urban Areas				
Karak City	11%	43%	21%	25%
Latambar	0%	36%	45%	18%
Sabir Abad	71%	14%	14%	0%
Ahmadi Banda	0%	67%	33%	0%
Takhti Nasrati	0%	14%	7%	79%
Rural Areas				
Tehsil Banda Daud Shah	20%	38%	34%	8%
Tehsil Karak	8%	29%	46%	17%
Tehsil Takhti Nasrati	4%	26%	41%	29%

In Karak District, housing sizes are mostly concentrated in the 11–20 marla range (38%), followed by 5–10 marlas (32%). Urban areas have a higher share of 5–10 marla houses (39%), while 26% exceed 20 marlas. In rural areas, larger homes are more common, with 41% falling in the 11–20 marla range and

[19] *Household Information Survey*
[20] *Household Information Survey*

19% above 20 marlas. Some areas show extremes—Sabir Abad has 71% of homes under 5 marlas, while Takhti Nasrati has 79% above 20 marlas, reflecting diverse settlement patterns.

The data highlights that rural areas in Karak tend to have larger plot sizes compared to urban zones, reflecting the availability of land and traditional settlement patterns. Urban areas, while still showing a fair percentage of large homes, are more compact due to space constraints and growing density. This distribution is crucial for land use planning, as it guides zoning, infrastructure development, and housing policy to meet the needs of both dense urban centers and low-density rural communities.

3.1.2. Projection of Future Housing Need

3.1.2.1. Average Household Size

The average size of a household is a key factor in housing projections as it directly impacts the demand for housing units. This value helps in determining the number of housing units required to accommodate a specific population. Smaller household sizes usually lead to a higher demand for housing units, while larger household sizes can reduce the number of units needed. Urban areas may have different average household sizes compared to rural areas due to factors such as housing costs, availability, and cultural preferences.

The average household size in District Karak has varied from the 1998 population census to the 2017 and 2023 population censuses. In 1998, the average household size of the overall district was **10**. In 2017, the district overall decreased to **9.38** and further decreased to **8.4** in 2023. For current year 2025 and plan period 2045, the household sizes have been projected using exponential growth method using the growth rate of household size of 2017 and 2023 censuses.

Table below shows the details of average household sizes in newly proposed urban areas of District Karak as well as the rural areas.

Table 3-5: Average Household Size

Administrative Unit	1998 Census	2017 Census	2023 Census	2025 Projected	2045 Projected
District Overall	10	9.38	8.4	8.1	5.6
Urban Areas					
Karak City	9.2	9.31	7.3	6.76	3.03
Latambar	10.2	8.91	9	9.03	9.34
Sabir Abad	9.1	9.05	8.5	8.32	6.75
Ahmadi Banda	7.8	7.56	7	6.82	5.28
Takhti Nasrati	10.5	9.7	8.5	8.13	5.24
Rural Areas					
Tehsil Banda Daud Shah	9	9.03	7.9	7.56	5.13
Tehsil Karak	9.7	9.14	8.8	8.69	7.66
Tehsil Takhti Nasrati	11	9.87	8.8	8.47	5.78

3.1.2.2. Projected Housing Stock 2025

Housing units in rural and urban areas of district Karak has been calculated using the projected population as calculated in Section **1.5.9** of the report and projected household size of 2025 calculated above in **Table 3-5**. Below **Table** summarizes the projected housing stock 2025 in district Karak.

Table 3-6: Projected Housing Stock 2025[21]

Administrative Unit	Projected Population 2025	Projected HH Size 2025	Projected Housing Units 2025
District Urban	105540	7.2	**14663**
District Rural	763935	8.31	**91977**
Overall District	869475	8.15	**106640**
Urban Areas			
Karak City	70055	6.76	**10363**

[21] *Projected Household size 2025 for district Urban & Rural are calculated by dividing respective projected population 2025 by projected housing units 2025.*

Administrative Unit	Projected Population 2025	Projected HH Size 2025	Projected Housing Units 2025
Latambar	13474	9.03	**1492**
Sabir Abad	4525	8.32	**544**
Ahmadi Banda	4782	6.82	**701**
Takhti Nasrati	12704	8.13	**1563**
Rural Areas			
Tehsil Banda Daud Shah	183670	7.56	**24295**
Tehsil Karak	276232	8.69	**31787**
Tehsil Takhti Nasrati	304033	8.47	**35895**

3.1.2.3. Housing Density

The existing housing density 2025 in District Karak has been calculated using the residential area from the land use classification statistics and the projected housing stock 2025 calculated above in **Table 3-6**. According to the land use statistics, the total residential area in District Karak is **7,650** hectares in which **646.86** hectares is in occupied by the urban area of Karak and **7,003.14** hectares is in rural area. The rural area comprising of three tehsils of Banda Daud Shah, Karak and Takhti Nasrati have **1684.8**, **2110** and **3209.1** hectares of residential landuse respectively.

By dividing the number of housing units by the respective areas, the residential density in urban areas is found to be **23** housing units per hectare, while in rural areas, it is **13** units per hectare. The overall housing density for the district is **14** units per hectare. **Table** below shows the housing density for both urban and rural areas of District Karak.

Table 3-7: Current Housing Density

Administrative Unit	Projected Housing Units 2025	Current Residential Area (hectares)	Current Housing Density
District Urban	14663	646.86	**23**
District Rural	91977	7003.14	**13**
Overall District	106640	7650	**14**
Urban Areas			
Karak City	10363	346.89	**30**
Latambar	1492	128.86	**12**
Sabir Abad	544	32.26	**17**
Ahmadi Banda	701	45.07	**16**
Takhti Nasrati	1563	93.78	**17**
Rural Areas			
Tehsil Banda Daud Shah	24295	1684.8	**14**
Tehsil Karak	31787	2110	**15**
Tehsil Takhti Nasrati	35895	3209.1	**11**

3.1.2.4. Housing Backlog

A housing backlog refers to the gap between the demand for housing and the supply of available housing units. This backlog can have significant social and economic implications, affecting affordability, homelessness, and overall quality of life.

For calculating the current housing backlog, the projected average household size of 2025 was adjusted by proposing a more realistic household size. This was done viewing the past three census data regarding household size where the trend was normalized. The latest census of 2023 shown quite a drastic decrease in within six years from the previous census of 2017 for the household size across district Karak. The current housing backlog of District Karak has been calculated by dividing the projected population of 2025 by the proposed household size which results in number of total households in District Karak. Thus, by subtracting the housing units required from the projected housing units 2025 calculated above in **Table 3-6**, it gives us the current backlog as the result.

Table 3-8: Current Housing Backlog

Administrative Unit	Projected Population 2025 (A)	Proposed HH Size 2025 (B)	Housing Units Required (C = A/B)	Projected Housing Units 2025 (D)	Current Housing Backlog (E= C-D)
District Urban	105540	7.31	14430	14663	140
District Rural	763935	8.04	94991	91977	3014
Overall District	869475	7.95	109421	106640	3154
Urban Areas					
Karak City	70055	7	10008	10363	-355
Latambar	13474	8.5	1585	1492	93
Sabir Abad	4525	8	566	544	22
Ahmadi Banda	4782	7	683	701	-18
Takhti Nasrati	12704	8	1588	1563	25
Rural Areas					
Tehsil Banda Daud Shah	183670	7.5	24489	24295	194
Tehsil Karak	276232	8.5	32498	31787	711
Tehsil Takhti Nasrati	304033	8	38004	35895	2109

3.1.2.5. Future Demand

The future housing demand for 2025-2045 has been calculated by dividing the additional population between 2025 and 2045 by the average household size which was proposed for 20 years projection period. This additional housing demand along with current housing backlog (column E) calculated in **Table 3-8** above gives us the total housing demand for plan period. The housing demand in District Karak is given in **Table** below.

Table 3-9: Total Housing Requirement by 2045

Administrative Unit	Additional Population between 2025 & 2045 (A)	Proposed HH Size 2045 (B)	Housing Demand 2045 (C=A/B)	Current Housing Backlog (D)	Total Housing Requirement 2045 (E= C+D)
District Urban	84680	6.25	13540	140	13680
District Rural	509325	7.56	67410	3014	70424
Overall District	594005	7.34	80950	3154	84104
Urban Areas					
Karak City	61350	6	10225	-	10225
Latambar	9128	7.5	1217	93	1310
Sabir Abad	2580	7	369	22	391
Ahmadi Banda	2933	6	489	-	489
Takhti Nasrati	8689	7	1241	25	1266
Rural Areas					
Tehsil Banda Daud Shah	112637	7	16091	194	16285
Tehsil Karak	188742	8	23593	711	24304
Tehsil Takhti Nasrati	207946	7.5	27726	2109	29835

3.1.3. Area Requirement

For long term plan period area requirement, the consultant has proposed increase in the housing density in both urban and rural areas. Total area required for Housing units of District Karak is **5159.8** hectares.

In urban area, **465** hectares area is required while rural area requirement is **4694.9** hectares for housing. details for area required for housing in 2025-2045 for District Karak is shown below in **Table**.

Table 3-10: Area Required for Proposed Residential Use (Hectares)

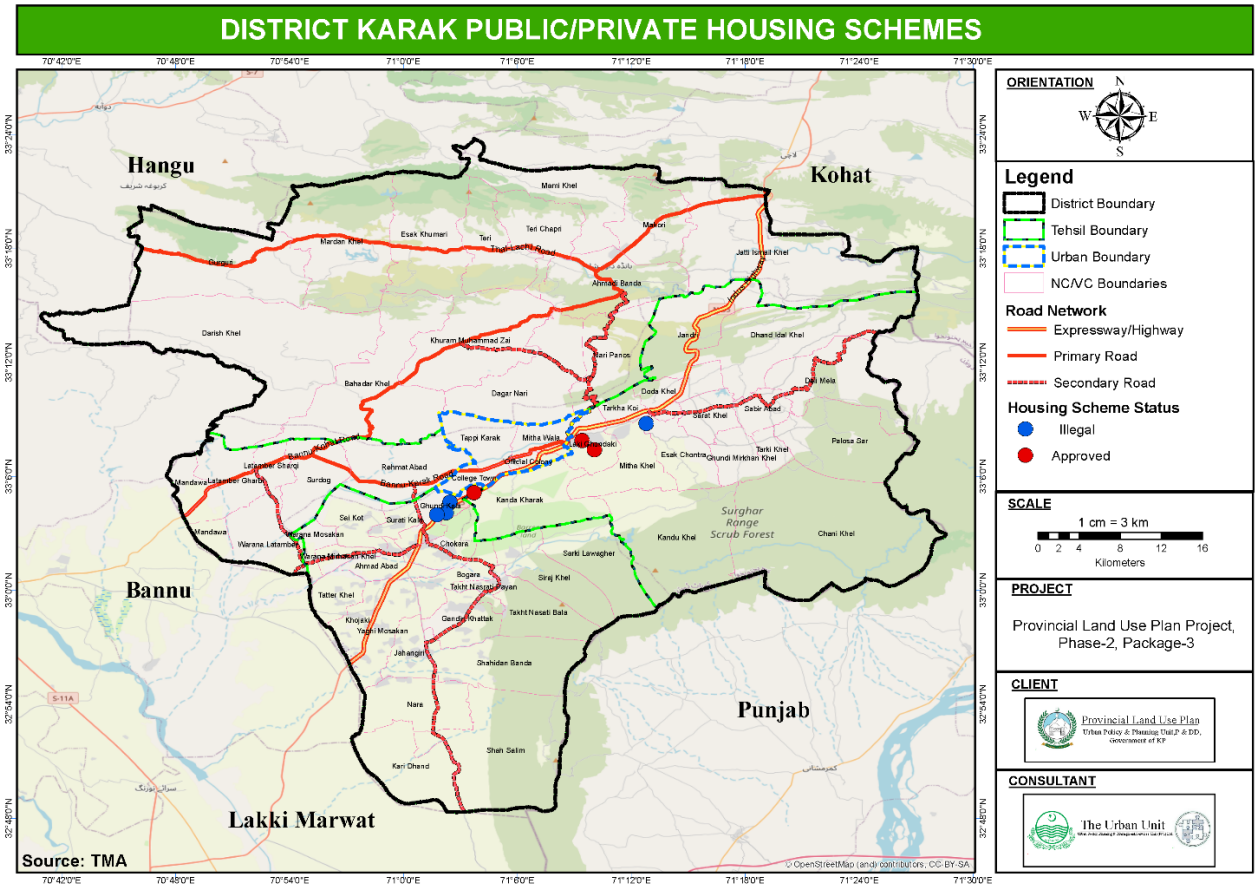
Administrative Unit	Required Housing Units by 2045	Proposed Housing Density	Area Required (Hectares)
District Urban	**13680**	29	**464.9**
District Rural	**70424**	20	**4694.9**
Overall District	**84104**	21	**5159.8**
Urban Areas			
Karak City	**10225**	35	**292.1**
Latambar	**1310**	20	**65.5**
Sabir Abad	**390**	20	**19.5**
Ahmadi Banda	**489**	20	**24.5**
Takhti Nasrati	**1266**	20	**63.3**
Rural Areas			
Tehsil Banda Daud Shah	**16285**	15	**1085.7**
Tehsil Karak	**24304**	15	**1620.3**
Tehsil Takhti Nasrati	**29835**	15	**1989**

3.1.4. Review of Existing Towns in Public and Private Sector

According to field data and stake holder consultation meeting, there are a total of 8 housing schemes in Karak. Among them, only one—Karak Township—is a government scheme, while the remaining seven are privately developed. Out of these, two housing schemes are approved by the Tehsil Authorities: Faisal Town and Khyber Colony, both of which are located in Karak Tehsil. The remaining five housing schemes are unapproved: four are situated in Takht-e-Nasrati, and one is in Karak Tehsil. The existing town in public and private sector district Karak has been given in the **Table** and **Map** below.

Table 3-11: Existing Towns in Public and Private Sector

Sr. No	Name	Approval Status	Layout Plan Status	Area (Kanals)	Tehsil
1	Faisal Town	Approved	Yes	164	Karak
2	Madina Colony	Illegal	No	150	Takht-e-Nasrati
3	Amber Town	Illegal	No	250	Takht-e-Nasrati
4	Karak Township	Approved	Yes	1012	Karak
5	Khyber Colony	Approved	Yes	260	Karak
6	Wahab Colony	Illegal	No	300	Takht-e-Nasrati
7	Khattak Colony	Illegal	No	80	Takht-e-Nasrati
8	Ashrafia Colony no 2	Illegal	No	100	Karak



Map 3-2: Karak Public/Private Housing Schemes

3.1.4.1. Spatial Analysis of Housing Schemes

A total of eight housing schemes have been identified in District Karak, of which only three are approved while the remaining five are unauthorized/Illegal. Among the approved schemes, only one is a public sector initiative — Karak Township, which falls under the jurisdiction of the Karak Development Authority. All the housing schemes are situated within the tehsils of Karak and Takht-e-Nasrati. The identification and boundary demarcation of these schemes were carried out using Google Earth in the presence of relevant TMA's during Consultation session held on 25th March 2025 at DC office Karak. The spatial analysis was then carried out for infrastructure development and constructed houses in each of the housing scheme.

A spatial analysis of the Karak Development Authority (KDA) Housing Scheme, located in Tehsil Karak, revealed that the main road and the majority of internal streets are paved. Approximately 40-50% of the houses have been constructed and are currently inhabited. However, the boundary wall and main entrance gate have not been developed. The scheme also includes a functional District Headquarters (DHQ) Hospital, and public parks have been established within the area.

Faisal Town, a privately approved housing scheme situated in Tehsil Karak, was also assessed through spatial analysis. The main entrance gate has been constructed, and the boundary wall is only partially developed. The scheme displays infill development, with portions of the main road and some internal streets paved, while the remaining areas remain largely undeveloped.

Khyber Colony, another privately approved housing scheme in Tehsil Karak, remains entirely undeveloped. The area consists of agricultural land with no visible infrastructure development. Only a boundary wall has been constructed, and there is no main gate.

Madina Colony, a private housing scheme located in tehsil Takht-e-Nasrati, is partially developed. Only a few houses have been constructed, and the main road and internal streets are unpaved. Although the boundary wall and main gate have been built, the scheme overall remains largely undeveloped and exhibits infill development.

Ambeer Colony is a privately illegal township located in Tehsil Takht-e-Nasrati. A spatial analysis conducted through Google Earth revealed that only a few houses and one private college is present while the entire scheme is infill land. No significant infrastructure development was observed—there is no main gate, and

the boundary wall is incomplete and irregularly built. Additionally, the housing scheme lacks a main road, and the internal streets are unpaved.

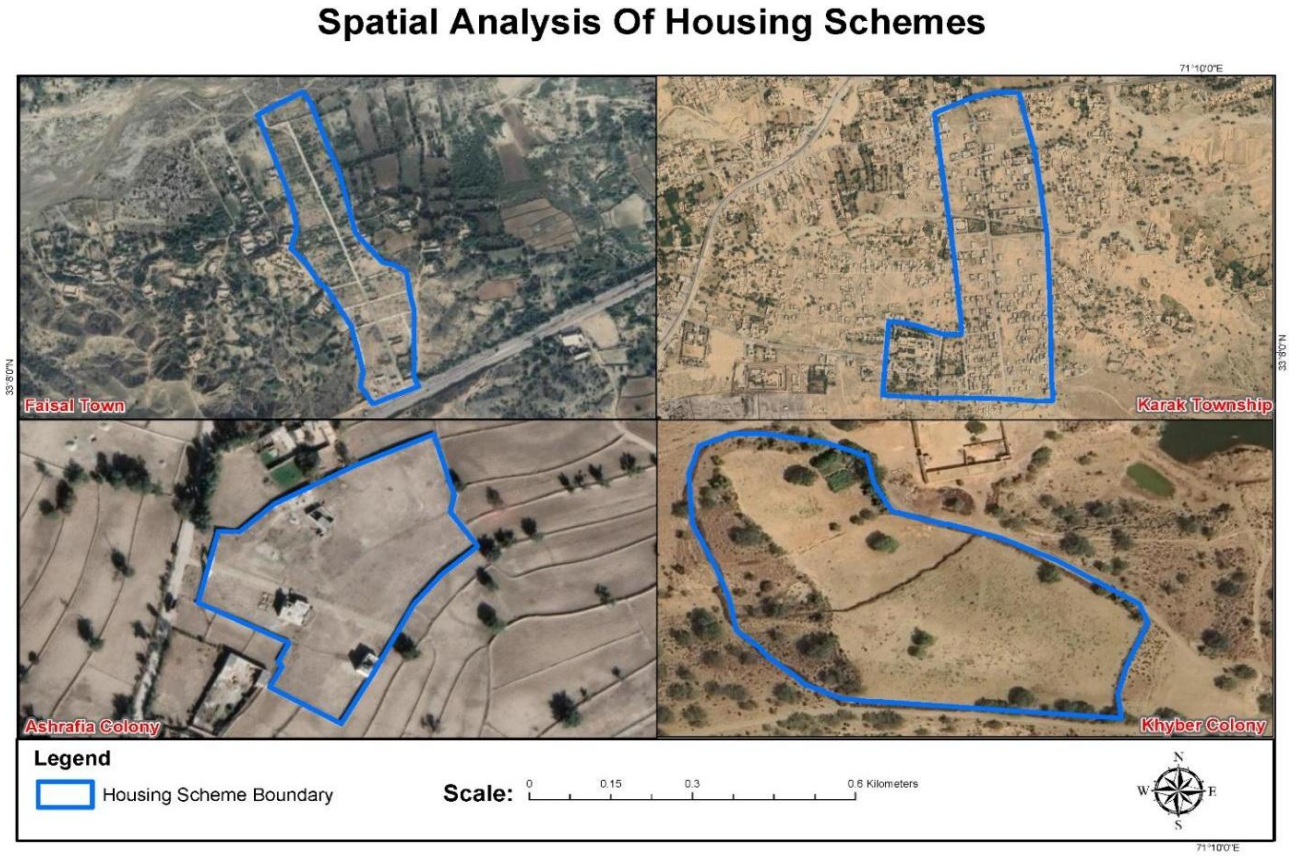
Wahab Colony is an unapproved private housing scheme located in Tehsil Takht-e-Nasrati. There is no visible infrastructural development — no main gate, boundary wall, main road, or internal streets have been constructed. A few houses exist, but they lack access to basic facilities. The rest of the area consists of infill development.

Khattak Colony, also an illegal private housing scheme in Tehsil Takht-e-Nasrati, shows minimal development. Only a few houses have been constructed, with no sign of a main gate or boundary wall. There is also no development of the main road or internal streets, and the remaining land remains as infill.

Ashrafia Colony 2 is another unauthorized housing scheme, situated in Tehsil Karak. On the ground, only three houses, a boundary wall, and a main gate have been built. No other infrastructure — including the main road or street network — has been developed. The details of the existing housing schemes in public and private sector district Karak have been given in the **Table** and depicted in **Maps** below.

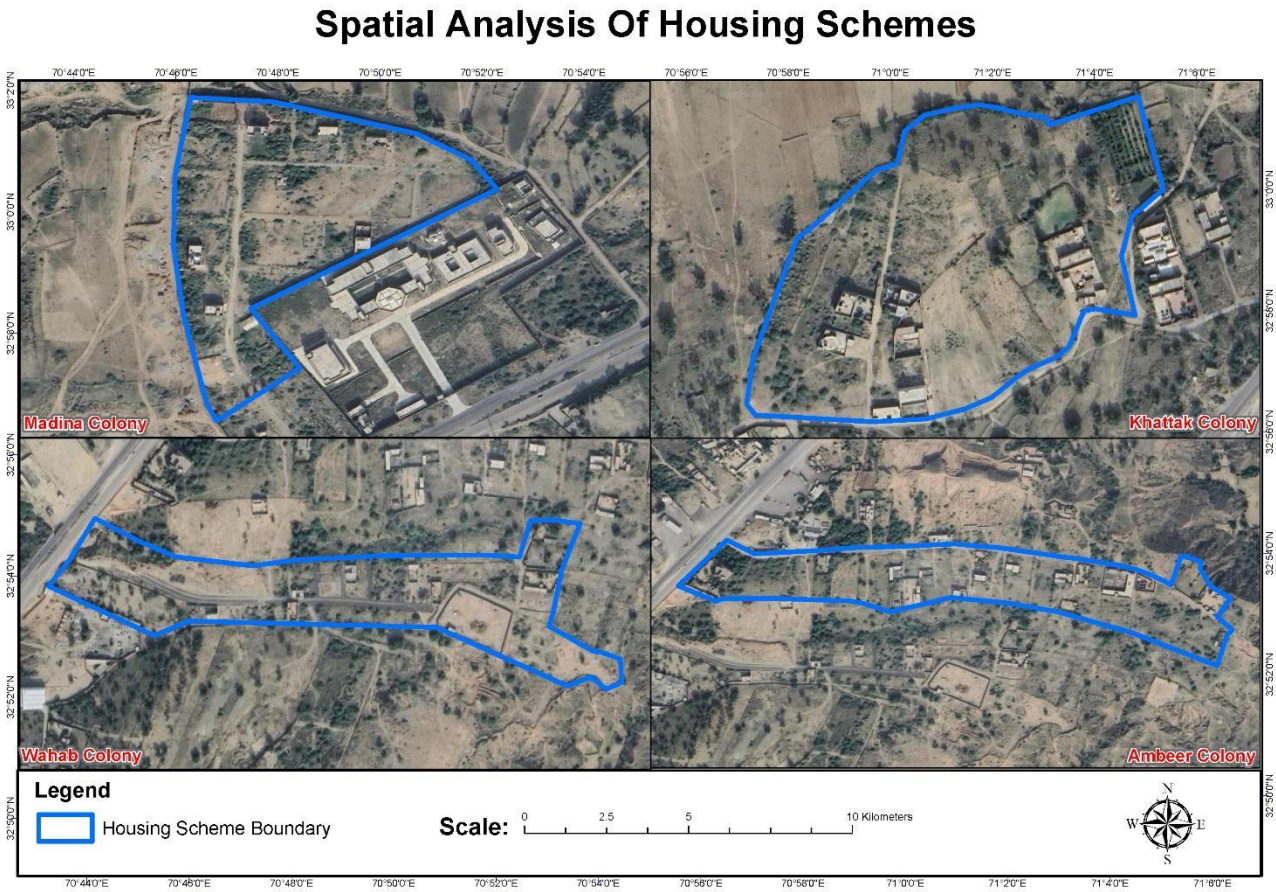
Table 3-12: Existing Housing Schemes[22]

Sr #	Name	Approval Status	Area (Kanals)	Tehsil	Infrastructural development in %	Built Houses in %
1	Faisal Town	Approved	164	Karak	30 to 40%	1 to 5%
2	Madina Colony	Illegal	150	Takht-e-Nasrati	30 to 40%	5 to 10%
3	Ambeer Colony	Illegal	250	Takht-e-Nasrati	0	20 to 30%
4	Karak Township	Govt	1012	Karak	50 to 60%	40 to 50%
5	Khyber colony	Approved	260	Karak	0	0
6	Wahab Colony	Illegal	300	Takht-e-Nasrati	0	5 to 10%
7	Khattak Colony	Illegal	80	Takht-e-Nasrati	0	1 to 5%
8	Ashrafia Colony no 2	Illegal	100	Karak	10 to 20%	1 to 3%



Map 3-3: Spatial Analysis of Housing Schemes

[22] *Spatial analysis from Google earth and Data Collected from TMA during consultation session held at DC Office Karak 25 March 2025.*



Map 3-4: Spatial Analysis of Housing Schemes

3.1.5. Affordability Inputs Relative to Local Income Level

Housing is one of the basic human needs; the World Health Organization defined it as a "residential environment which includes, in addition to the physical structure that man uses for shelter, all necessary services, facilities, equipment and devices needed or desired for the physical and mental health and social well-being of the family. Globally, housing is defined as affordable if a basic housing unit, which provides a minimum amount of personal space (anywhere from 250 to 500 square feet) and amenities, is accessible at 20% to 40% of gross monthly household income for either rent or mortgage.[23]

Apart from the economic perspective, affordable also means physically adequate and fit for human habitation: in simple words, a house cannot be considered affordable if it is overcrowded and unhealthy. To evaluate the real cost of housing then, housing-related expenditures (housing, water, electricity, gas, etc.) should be kept into consideration as well, since those are what make a house healthy and appropriate for living. Starting from this point, affordable housing can be described in many ways, depending on the quantitative or qualitative perspective we decide to analyse.[24]

According to the HIS carried out by the Consultant, only 1.6% of the households live in a rented house in the entire District Karak with monthly rent varying from Rs 3000 to Rs 20000 with an average rent of Rs 9000 per month for a household. The average household income in District Karak is Rs 35000 per month. On average about 25% of the household income is paid in rent which according to international definition stated above, falls in the affordable housing.

According to **Table 3-3,** 98% of the houses in the entire district Karak were owned by people which clearly put aside financial affordability defined above internationally. So, in the project area, affordability was studied with respect to adequacy through the following physical aspects keeping the average household size to 9 for the complete district:

- Structure of house
- Average covered area

[23] *A framework for affordable housing in Pakistan, International Growth Center, 2019.*
[24] *What is affordable Housing? Habitat for Humanity.*

- Rooms per house
- Bathrooms per house
- Persons per room
- Period of construction

The below **Table** below demonstrates the analysis performed on the above physical criteria for affordable housing in District Karak.

Table 3-13: Physical Criteria for Affordable Housing[25]

Structure of House (Pacca)	Avg Covered Area (Marla)	Avg Rooms per house	Avg Bathrooms per house	Avg Persons per room	Period of Construction (11-50 years)
36%	10	4	2	3	52%

In the light of the above shown table, it can be analysed that more than half of the housing units in district Karak have Pacca structure with an average of 4 rooms per house. Although the average size of house as calculated from Household Integrated Survey above in the chapter above came out to be 34 marlas, the average covered area of each house was assumed to be 10 Marla. Dividing average household size of 9 by average covered area of 10 Marla which is 2720 sq. ft of area gives 302 sq. ft lying between the internationally accepted minimum range of 250-500 sq. ft of personal space for affordable housing. Studying the congestion, in district Karak, there are 3 people sharing a room which is internationally a standard for healthy living.

The period of construction has been broadly categorized as per the Pakistan Bureau of Statistics among which the most repeated category of 11-50 years was selected as more than half (52%) of all the houses in district Karak fell in this category. This according to the Department of Housing and Urban Development (US) is below the average lifespan of a house which is about 70 years. In addition to the above, the housing adequacy was also studied according to the facilities available such as:

- Potable Water
- Electricity
- Gas
- Sanitation

The below **Table** summarizes the facilities available to the housing units in District Karak.

Table 3-14: Availability of basic facilities[26]

Potable Water	Electricity	Gas	Sanitation
40%	90%	13%	50%

Analyzing the above table, it is evident that more than half of the households have no access to potable water. Around 90% of the population have access to electricity whereas only about 13% of the households have access to gas (natural or LPG) for their daily use. Wastewater and solid waste disposal collectively termed as sanitation for analysis turned out to be available for only half of the population indicating that one person out of two dispose their household solid waste and wastewater into open drains or spaces.

According to the Household Information Survey 2023 carried out by the Consultant, source of drinking water as per the SDG Target 6.1 was found "improved" for more than 90% of the district but the water source was not accessible as more than 61% of these water sources were located outside premises.[27]

Similarly, the percentage of electricity shown above in Table 3-9 only indicates the presence of electricity and does not consider the number of hours electricity is available for the households to use. 78% of the households in response to the question of electricity loadshedding in the HIS survey responded that there is more than 12 hours of outages.[28]

Table 3-15: Housing Affordability & Adequacy within District Karak

Category	Indicator	Findings (Karak)	Assessment
Economic Affordability	% of Households in Rented Units	1.6%	Very low reliance on rental market
	Average Monthly Rent	PKR 9,000	25% of average income (PKR 35,000) – Affordable

[25] *Calculated from the Household Survey conducted by the Consultant in January, 2023.*
[26] *Calculated from the Household Survey conducted by the Consultant in January, 2023.*
[27] *Calculated from the Household Survey conducted by the Consultant in January, 2023.*
[28] *Calculated from the Household Survey conducted by the Consultant in January, 2023.*

Category	Indicator	Findings (Karak)	Assessment
	International Benchmark (Rent-to-Income)	20–40%	Within affordable threshold
Physical Adequacy	Avg. Covered Area	10 marla (≈ 2,720 sq. ft.)	Meets space standards
	Avg. Persons per Room	3 persons	Acceptable standard (≤3 persons/room)
	Avg. Rooms per House	4	Adequate
	Avg. Bathrooms per House	2	Adequate
	Structure Type	36% Pacca houses	Below desirable standard
	Construction Age	52% houses built 11–50 years ago	Within structural lifespan
	Personal Space per Person	≈ 302 sq. ft./person	Within international norms (250–500)
Service Adequacy	Access to Potable Water	40% within premises	Low
	SDG Indicator 6.1.1 (Improved Water Source)	>90% (but 61% outside premises)	Physically improved but not accessible
	Electricity Access	90% households	High access, but quality is poor
	Electricity Load Shedding	78% experience >12 hours/day	Severely impacts usability
	Access to Gas (Natural/LPG)	13%	Very low
	Access to Sanitation (Waste & Wastewater Disposal)	50%	Inadequate

In a nutshell, the housing was affordable if only the economic and physical aspects are studied but the inputs from the public and secondary data clearly indicates that the housing sector seems to be non-affordable as the lack of essential amenities such as drinking water, electricity, natural gas, and sanitation are below standards which exacerbates the challenges faced by the residents of district Karak. These fundamental services are critical to maintaining health and a decent standard of living. Provision of reliable access to clean water, energy, and proper sanitation with prioritizing the equitable distribution of essential amenities is indispensable for creating healthier, more resilient communities and promoting social equity among the people of District Karak.

3.2. Communication

Communications are an integral component of an administered area's socio-economic functions, directly and indirectly impacting quality of life, agriculture, tourism, commerce, industry, and security. The movement of people and goods within and throughout District Karak is therefore highly influential to the quality of life, economy, and safety of its residents; thus, making transportation a critical component of any spatial intervention, particularly the Land Use Plan.

Communication infrastructure, such as highways, terminals, and bridges, consumes substantial amounts of land. In urban settings, roads alone comprise 20%-30% of land space. Therefore, optimizing the quantity of land reserved for communications infrastructure is necessary to satisfy long-term transportation needs while leaving ample space for other land uses.

The communications plan has been prepared for the Karak District to enhance the following in the district:

- Road Infrastructure
- Public and Goods Transport
- Rail Network
- Air Transport Facilities
- Postal services and
- Telecommunication Services

3.2.2. Baseline Data

This report utilized the primary and secondary data to develop the communication context plan for District Karak.

3.2.2.1. Primary Data

Two-way traffic counts and Origin-Destination (OD) Interviews surveys were conducted in the district. Further, Bus terminals, truck stands, telecommunication, postal services, and cellular towers were marked in the land-use survey.

3.2.2.1.1. Traffic Counts

Traffic counts survey results were used to observe daily traffic volumes along the major critical roads of District Karak and identify existing roadway constraints and nominated roads for geometric improvements, i.e., widening or dualization.

The surveyed roads and their count locations were selected based on the following criteria in consultation with the Client:

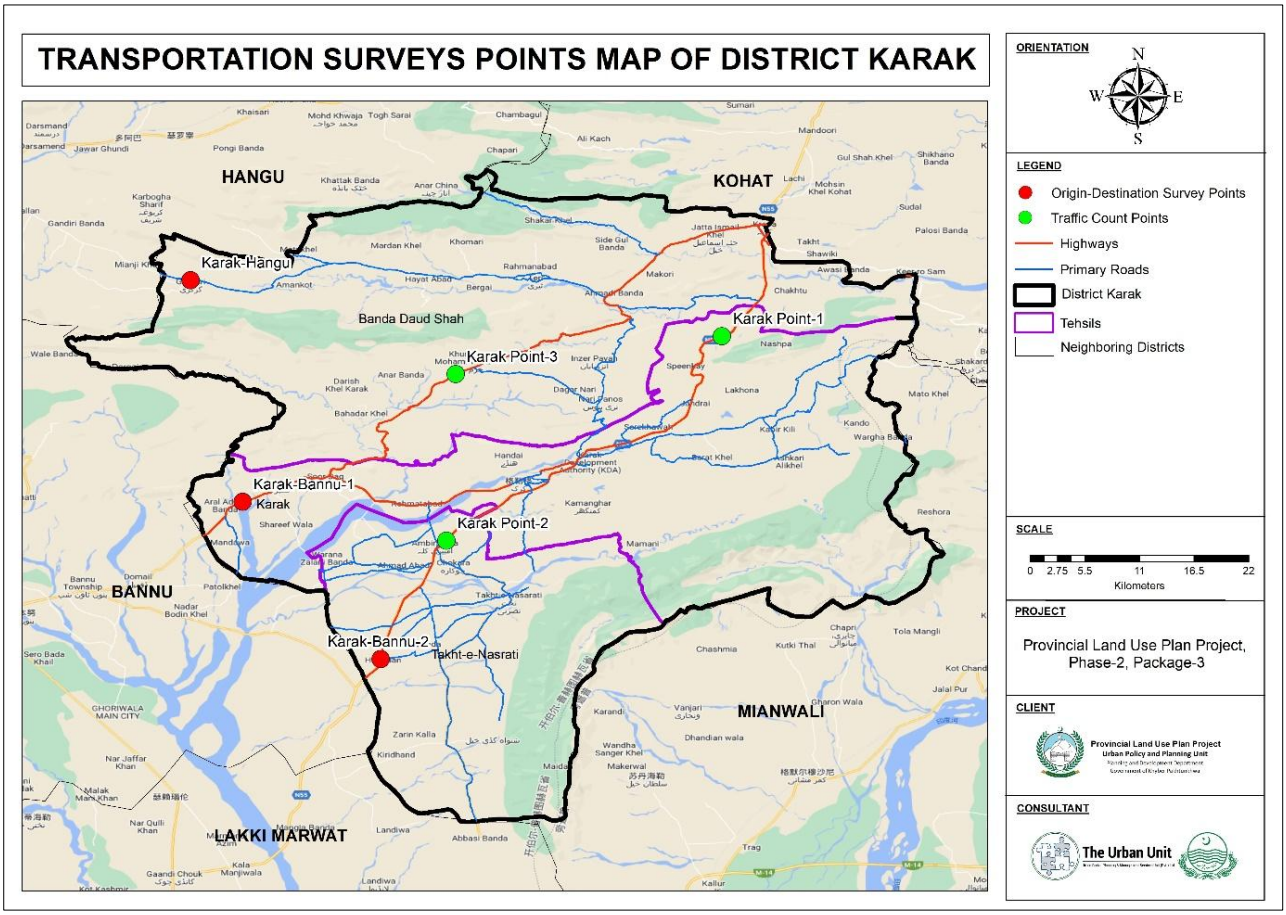
- The subject road is a major Provincial Transportation Corridor, i.e., a primary road or provincial highway;
- The road is not a National Highway, as traffic data can be obtained from the National Highway Authority.
- The road provides inter-district connectivity and
- The road provides access to major settlements.

Nine (9) hours of Traffic count surveys were conducted over 6 days at 30-minute Intervals from 8 am to 5 pm.

3.2.2.1.2. Origin-Destination Interviews

Roadside interviews were conducted near Karak's inter-district boundaries to determine the status of popular origins and destinations of travelers passing in and out of District Karak.

The locations for the traffic count and Origin-Destination surveys are shown in the map below. These locations were finalized by the Client before the initiation of the survey activities.



Map 3-5: Transportation Survey points of District Karak

3.2.2.2. Secondary Data

In addition to the primary traffic and infrastructure data collected from the traffic counts and land use survey, the following secondary data sources were consulted to develop the communications context of District Karak and subsequently, the secondary data sources were used to develop the maps in the following sections for determining the spatial coverage of the various communications services.

i. Existing Road inventory and ongoing and future development plans from the respective departments:
   a. Communication & Works
   b. National Highway Authority
   c. Pakhtunkhwa Highway Authority
ii. Published Annual Development Program from the *KP Planning & Development Website*
iii. Bus and Truck Stand data, along with route permits and goods forwarding agency information from:
   a. District Regional Transport Authority;
   b. Provincial Transport Authority;
iv. Airport Facilities Layouts from Satellite Imagery;
v. Airport Operational Data from Civil Aviation Authority;
vi. Post Office Locations from Pakistan Postmaster General;
vii. Ongoing and Future Development Plans for Railway Infrastructure from Pakistan Railways (Divisional Office Peshawar);
viii. Existing Telephone Exchanges and Network Data from Pakistan Telecommunication Company Limited (PTCL);

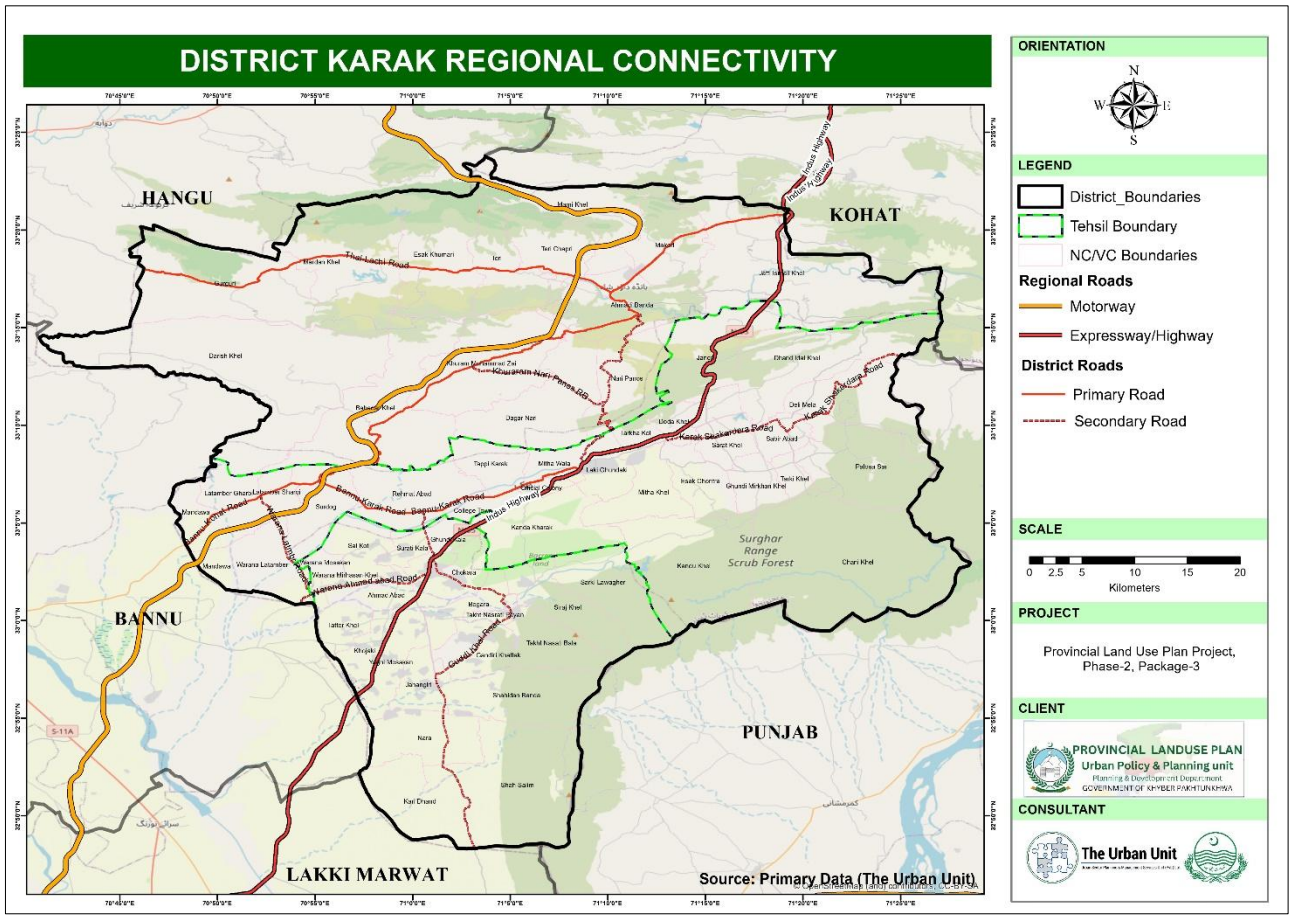
3.2.3. Transportation Network

District Karak spans over 3372 square kilometers (KPBOIT, 2017). It includes three tehsils: Karak, Banda Daud Shah, and Takht e Nasrati. The local economy depends primarily on three sectors: Mineral Processing and Value Addition (Coal, Gypsum, Limestone, Rock salt, Shale Clay and Silica Sand. Gypsum and

Limestone), Hydrocarbon Extraction (at Jatta, Dharangi, Lakoni Algad, Kutal, Malla Khel, and Mitha Khattak), and Oil and Gas Support Industry (Drilling Services and Oil & Gas Industries). Given the arid nature of the district, there is some potential in agriculture as well (wheat, maize, barley, ground nuts, pulses, gram, etc.). Apart from these industries, residential areas and some tourist attractions, including Sarki Lawaghar Dam and Zaibi Dam, can potentially affect transport demand.

The road geometry has been evaluated by comparing existing widths with recommended standards based on traffic volume, whereas Connectivity has been assessed by overlaying the road network on land use data to identify missing links between regions, routes, and land uses.

The KP Annual Development Program was used to identify ongoing road projects in District Karak, shown on the road network map to support land use planning. Proposed projects are also included to reflect current and future connectivity in the draft land use plan. The key map showing District Karak, its major roadways, and neighboring districts is provided in the Map below.



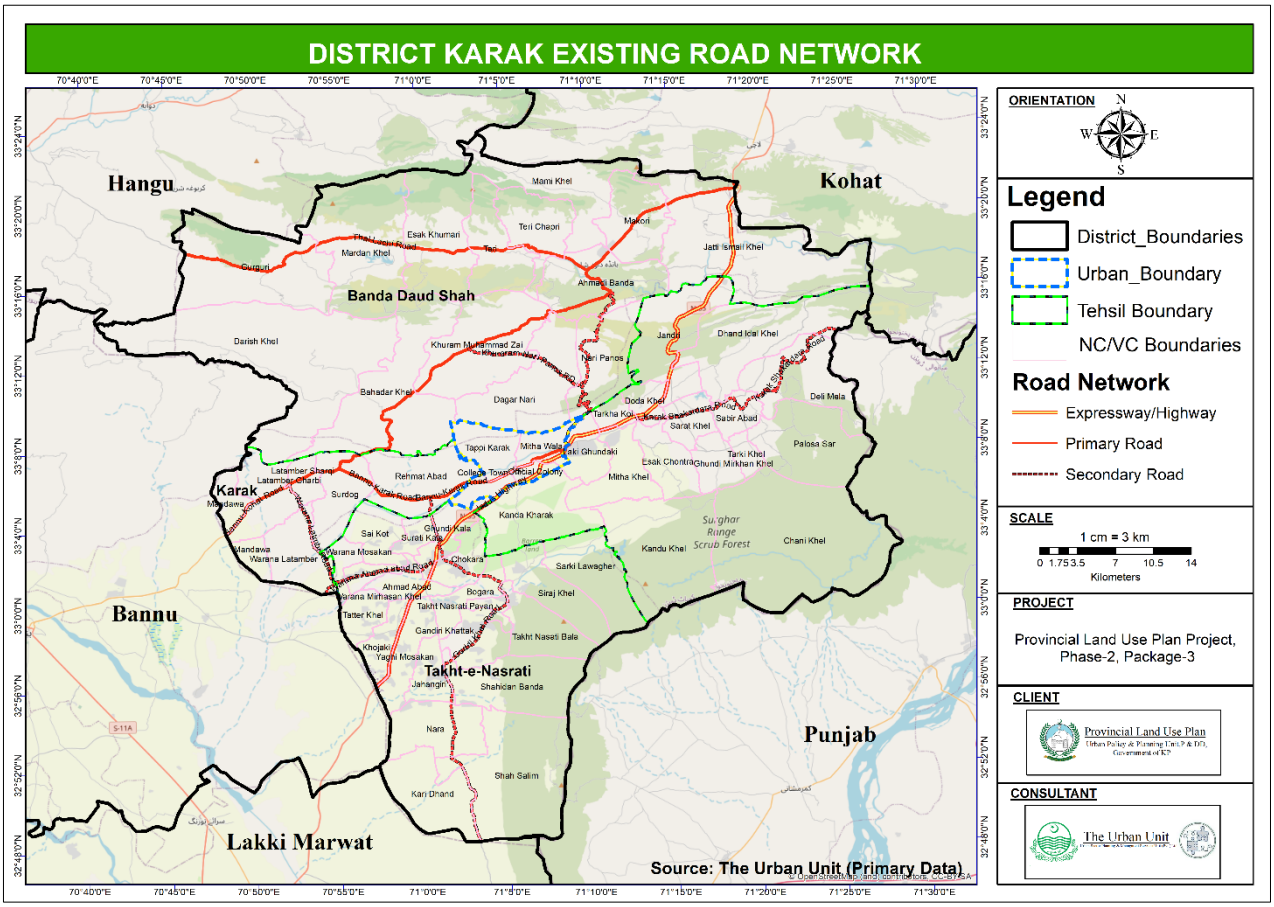
Map 3-6: District Karak Regional connectivity

The district of Karak is served through several major National and Provincial highways. The Indus Highway (N-55), spanning 64 km (The Urban Unit, 2020), runs through the district, linking the Tehsil Takht-e-Nasrati at Ambiri Kala, whereas the Karak Tehsil also lies centrally along it, accessible via Bannu Road too. The provincial highways passing through Karak span over 92 km, including Bannu-Kohat Road (linking Banda Daud Shah Tehsil), Bannu Karak Road, and Takht Nasrati Road as single-carriageways. Key highways serving the district include:

- Indus Highway (N-55)
- Bannu-Kohat Road
- Karak-Bannu Road (merging with Bannu-Kohat Road at Surdag)
- Takht-e-Nasrati Road (connecting to Lakki Marwat via N-55)

3.2.3.1. Existing Road Network

District Karak has a functional road network comprising highways, primary, secondary, and local roads that connect key areas within the district and link it to Bannu, Hangu, Kohat, and Punjab. The existing road network of Karak spans over 1010 kilometers. The Indus Highway (N-55) serves as the main route, supported by secondary and local roads maintained by federal, provincial, and local authorities. Moreover, preliminary land use data revealed that the existing road density of Karak is 38 kilometers per 100 Square Kilometers of Land. This network supports regional connectivity and informs future land use planning.



Map 3-7: District Karak Existing Road Network

A breakdown of District Karak's road network is provided in **Table** below.

Table 3-16: District Karak Road Inventory

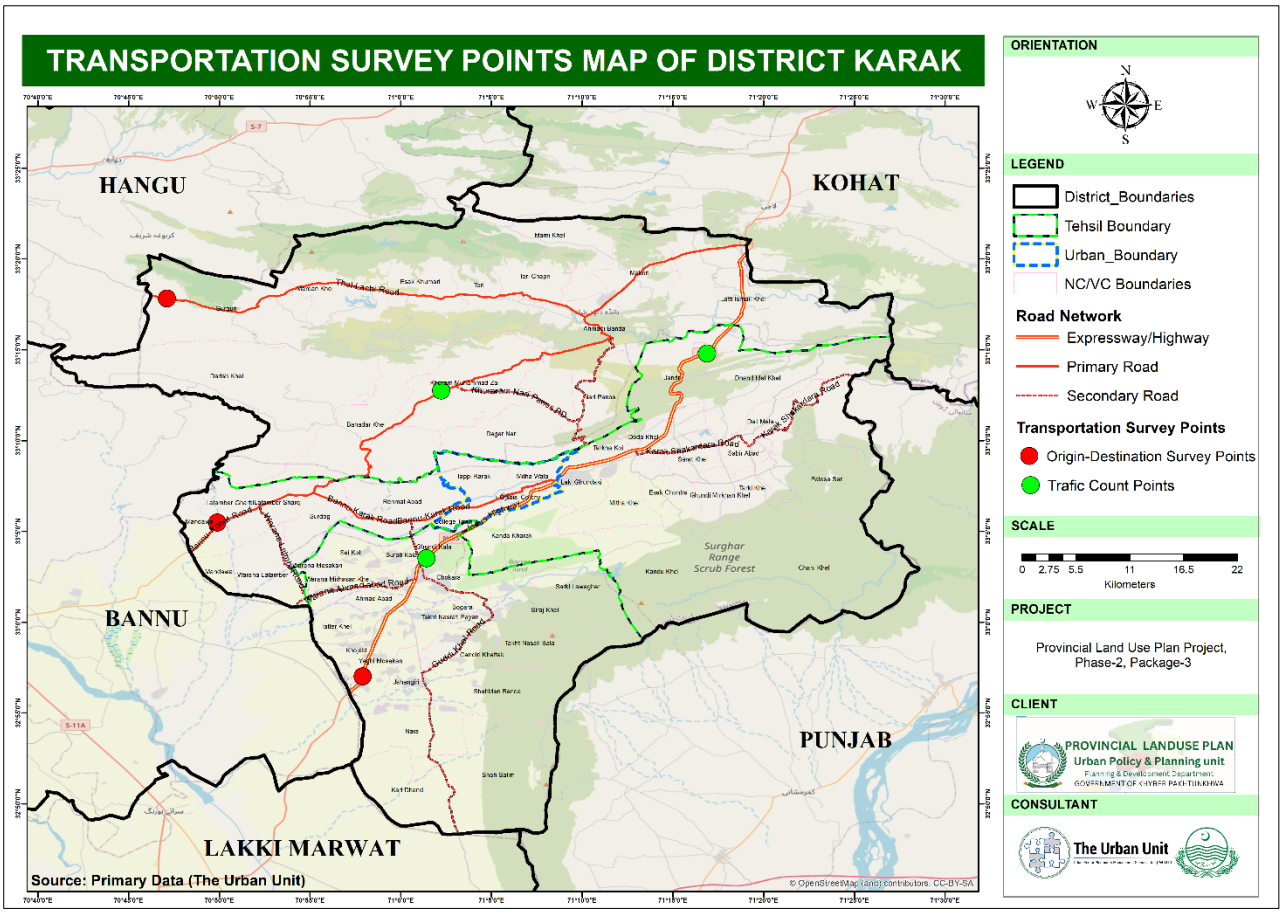
Road Type	Length (Km)
National Highways	64
Provincial Highways	92
Primary Roads	2
Secondary Roads	355
Local Roads	497
Unpaved Tracks / Shingle Roads	No Data Available
Total	1010

3.2.3.2. Observed Traffic Patterns

The results of the traffic count survey, and Origin-Destination survey have been discussed and summarized in this section.

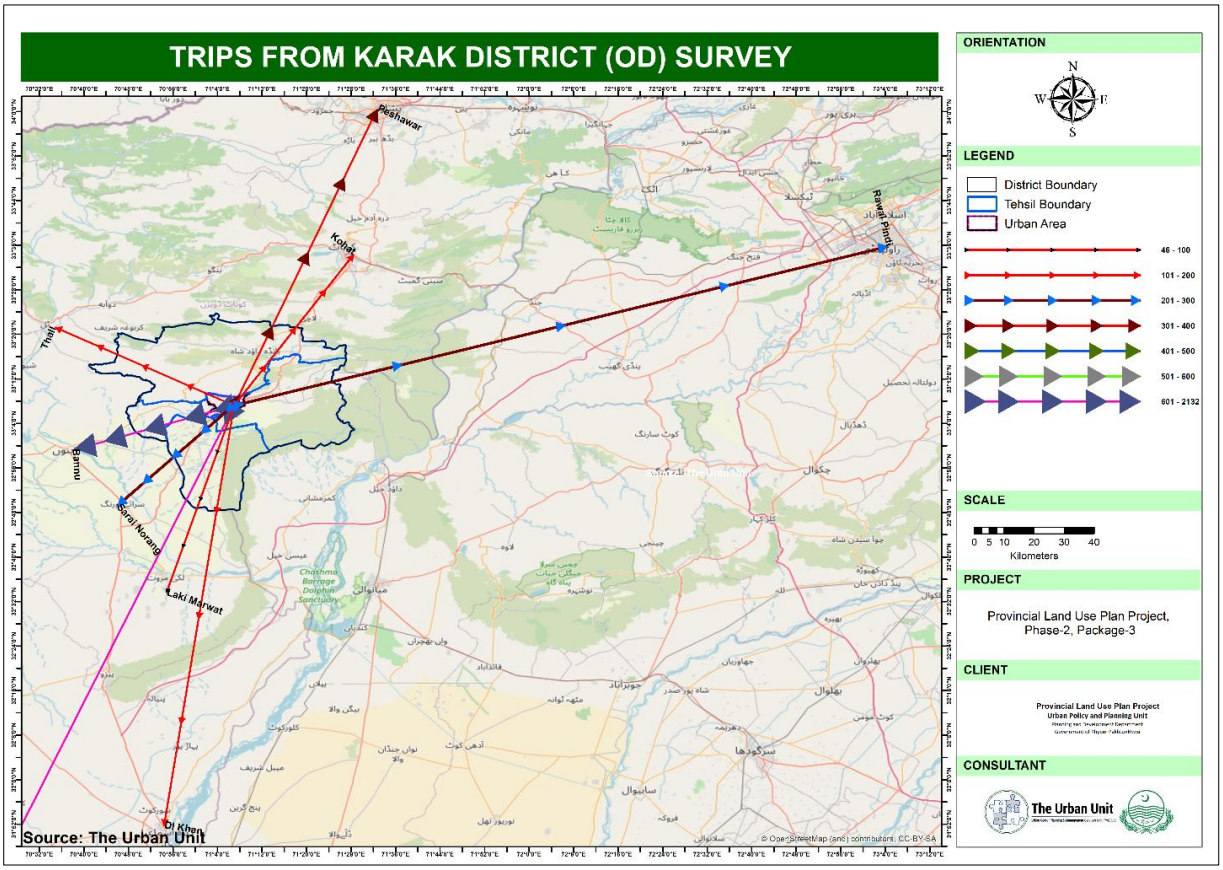
3.2.3.3. Major Origins and Destinations

The Origin-Destination survey helped identify the major trip generators and attractors for District Karak, along with trip purpose. Naturally, areas with higher populations would have more trips than smaller areas. However, the trip's purpose is indicative of whether these areas possess commercial or tourism-oriented attractions that would require improved road infrastructure.

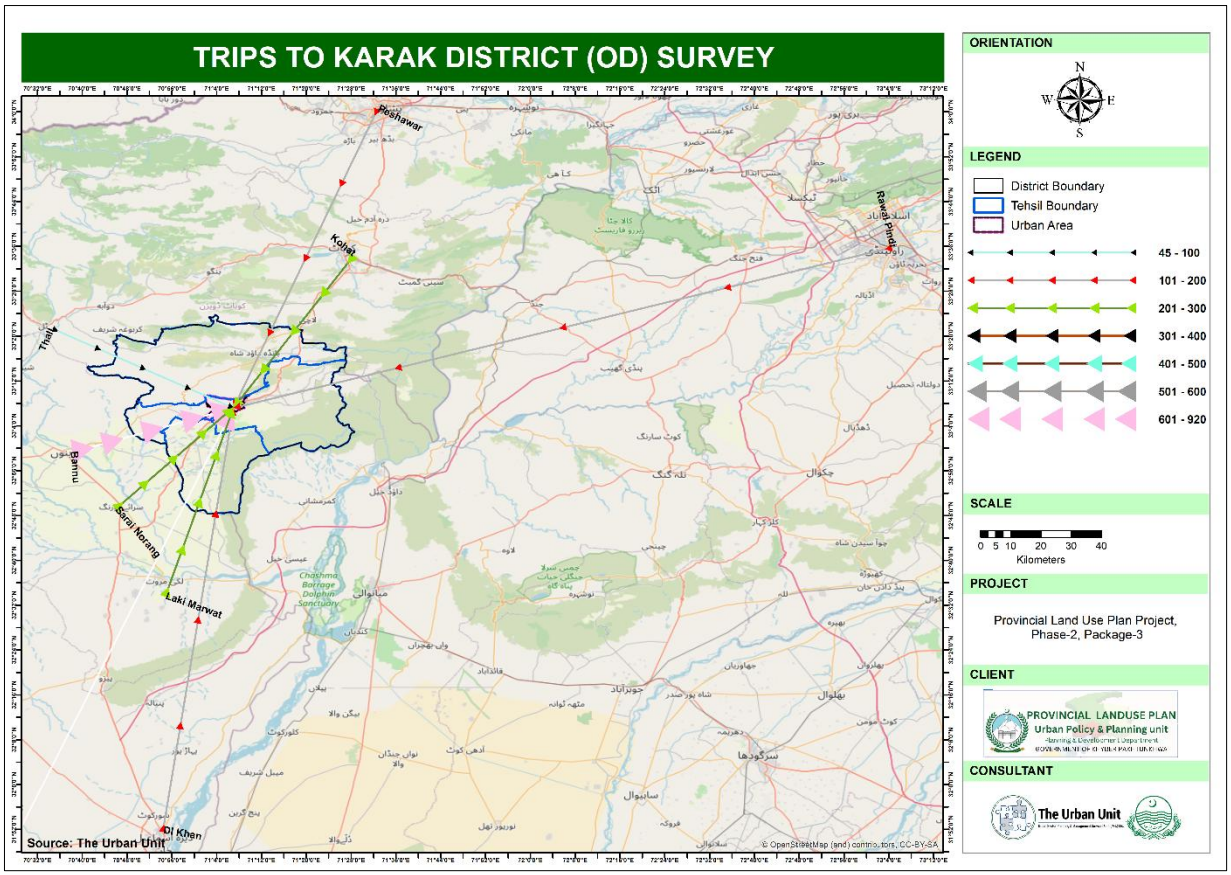


Map 3-8: Transportation survey points in District Karak

The Maps below show locations exhibiting a larger number of trips from other districts to Karak, through thicker lines.



Map 3-9: Origin-Destination Trips from District Karak



Map 3-10: Origin-Destination Trips to District Karak

Trip purpose is used to determine the factors that influence travel in and out of a given district and help identify whether the provision and improvement of a local facility within the district could reduce the need

for people to make external trips. More than 3500 Origin-Destination records were used to produce the pie charts shown in **Figure** below.

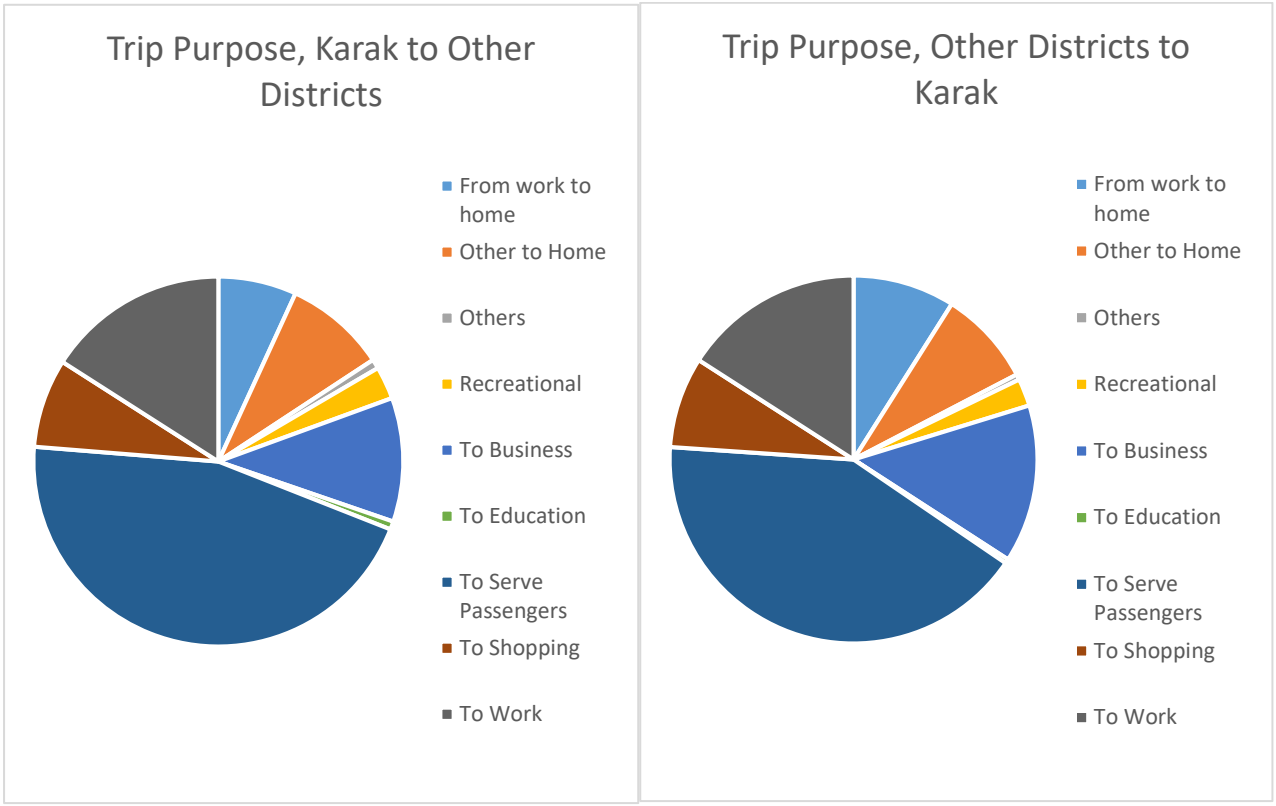


Figure 3-1: Trip Purpose Analysis

Trip purpose analysis for District Karak shows that the most common reason for people to travel to and from Karak is work or business. The trip purpose patterns for people travelling to Karak from other districts or from other districts to Karak are relatively the same.

3.2.3.3.1. Traffic Volumes

Traffic volume data from December 2022 at three key points in Karak District—two on the N-55 and one on Old Bannu Road—shows the N-55 as the primary transport corridor. Point 2 recorded the highest traffic (4,290 vehicles), while Old Bannu Road saw minimal movement (499 vehicles), indicating its local use. Light vehicles and motorcycles dominated, reflecting short-distance and semi-urban travel, while heavy vehicles comprised 8% and 4% on N-55 points, underscoring their freight role. A brief overview of traffic volume is provided in **Table** below.

Table 3-6: Summary of traffic volumes

Point No	Day	Peak Hour Volume	Peak Hour	Total Volume	
				Vehicles	PCU
Point 1	Friday 23/12/22	1001	15:00 - 16:00	4346	6389
Point 2	Wednesday 21/12/22	1253	15:30 - 16:30	7741	8919
Point 3	Tuesday 20/12/22	111	12:00 - 13:00	946	731

Notably, the maximum traffic volume was observed on Wednesday. The dominance of light and two-wheeler traffic also points to the need for improved public transport options. These patterns suggest prioritizing infrastructure upgrades along the N-55, maintaining Old Bannu Road as a secondary route, and enhancing public and non-motorized transport options. Mode-wise highest directional traffic volume on the five traffic count points in District Karak has been summarized in **Table**. The passenger car Unit (PCU) was calculated for various modes of traffic.

Table 3-17: Mode-Wise Daily Traffic Volume

Sr No	Vehicle Class	Point 1 (N-55)		Point 2 (N-55)		Point 3 (Old Bannu Road)	
		23/12/22	Friday	21/12/22	Wednesday	20/12/22	Tuesday
		Karak	Kohat	Lakki Marwat	Karak	Kohat	Attock
1	Motorcycle/ Scooter	286	237	1387	1640	340	300
2	Rickshaw/Qingqi	2	3	59	82	0	0
3	Car/Jeep/Taxi	1045	911	920	1193	62	63
4	Suzuki/Bolan	46	65	119	144	10	10
5	Pick Up/ Hi-Ace	530	444	433	632	57	42
6	Bus/Coaster	45	48	44	41	0	1
7	Loader/Suzuki	31	17	83	90	16	14
8	Pick up/Shezore	61	49	108	134	5	11
9	Tractor Trolley/Truck	281	245	298	334	9	6
Total Volume (veh)		2327	2019	3451	4290	499	447
Total Volume (PCU)		3412	2977	3998	4921	387	344
Heavy Vehicle (%)		8%	7%	4%	4%	1%	1%

Growth projections based on a linear growth rate of 8% per annum have been employed to determine which roads will require further widening or dualization over the next 20 years to accommodate traffic due to future growth patterns of District Karak.

It is recommended that roads requiring widening be widened up to 60ft while maintaining a single carriageway cross-section. While roads shall maintain the standard cross sections as designed by their owning authorities, the portions of dualized roads passing through urban areas shall have a cross section similar to that shown in **Figure**.

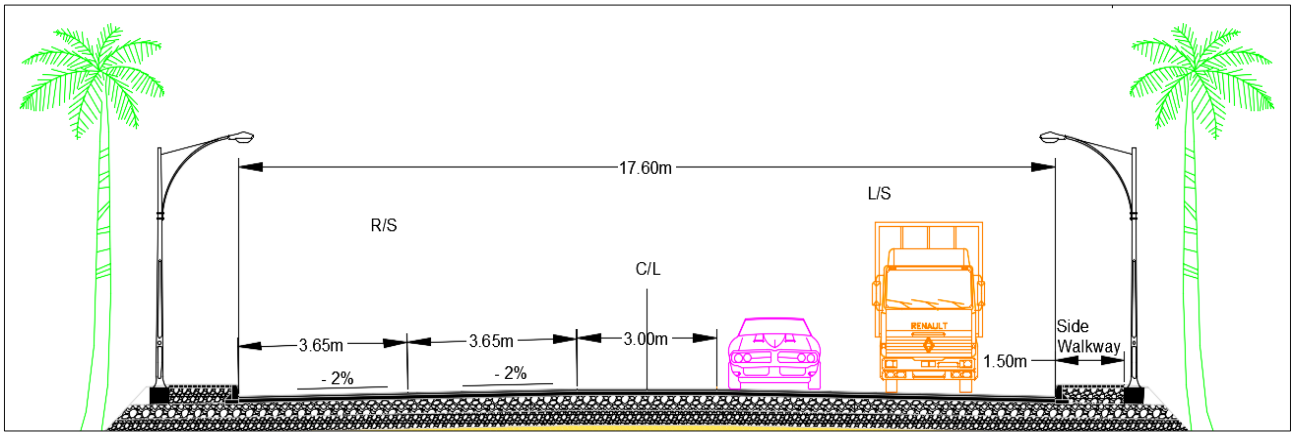


Figure 3-2: Typical Cross Section of Urban Dual Carriageway

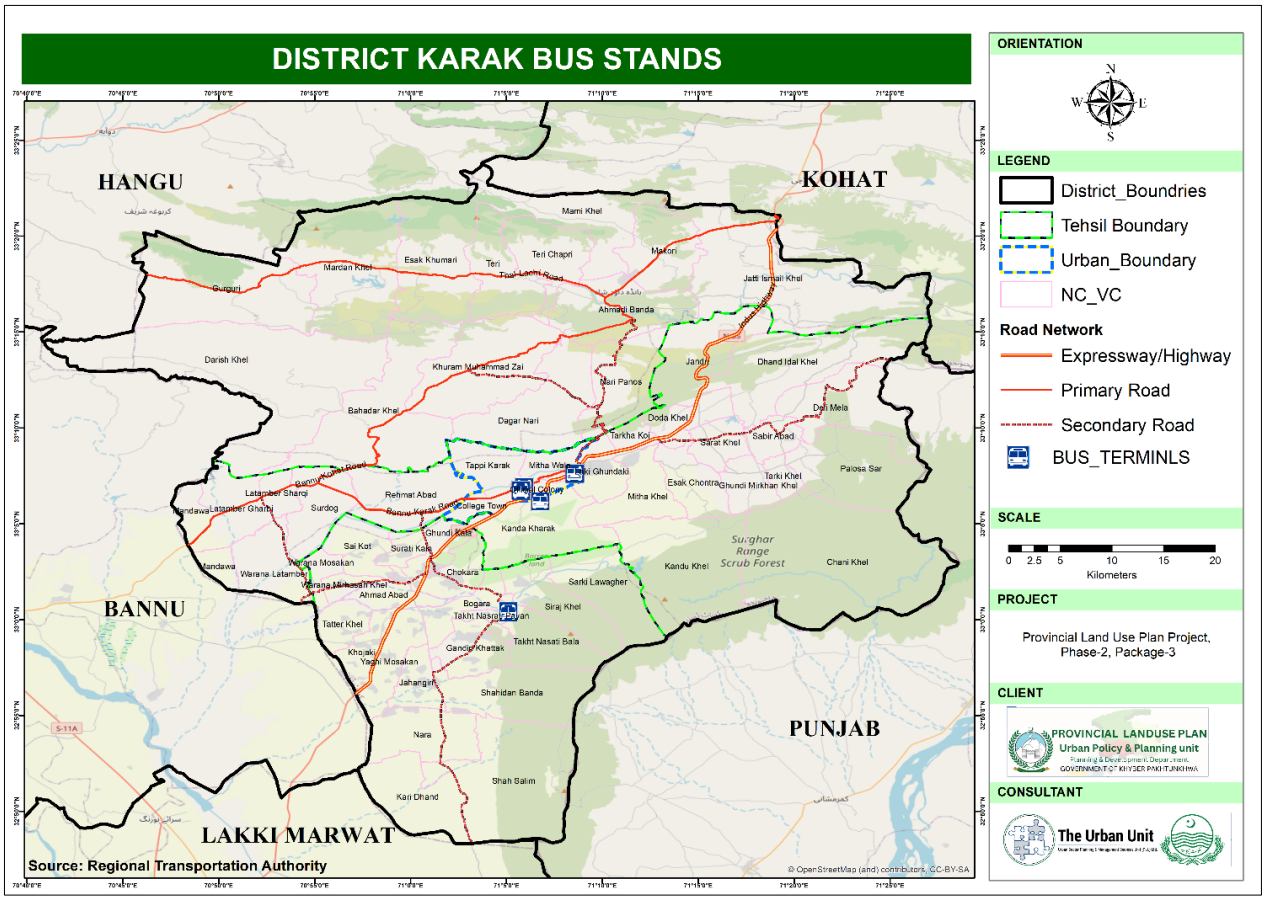
Depending on the road classification and ownership, the following rights-of-way **Table** shall be reserved for each type of cross section.

Table 3-18: Right-of-Way for Road Classes

Owner Class	Cross-section Type	Right-of-Way
Provincial Roads	Single Carriageway (24 ft)	Variable
	Dual Carriageway (60 ft)	110 ft or 55 ft from the Centerline
National Highway	Single Carriageway	Variable
	Dual Carriageway (60 ft)	220 ft from the Centerline

3.2.3.4. Bus Terminals

The existing bus terminals are evaluated for coverage in terms of the cities or settlements that can access them. Those settlements that do not have any terminals in their drivable vicinity were identified based on spatial analytics.



Map 3-11: District Karak Bus Stands

The terminal data shown in **Map** below is supplemented by the bus data provided by the *Kohat Regional Transport Authority (RTA)*. The information provided by the Kohat DRTA is summarized in **Table** below. The secondary data provided by the RTA is enclosed in **Appendix C**.

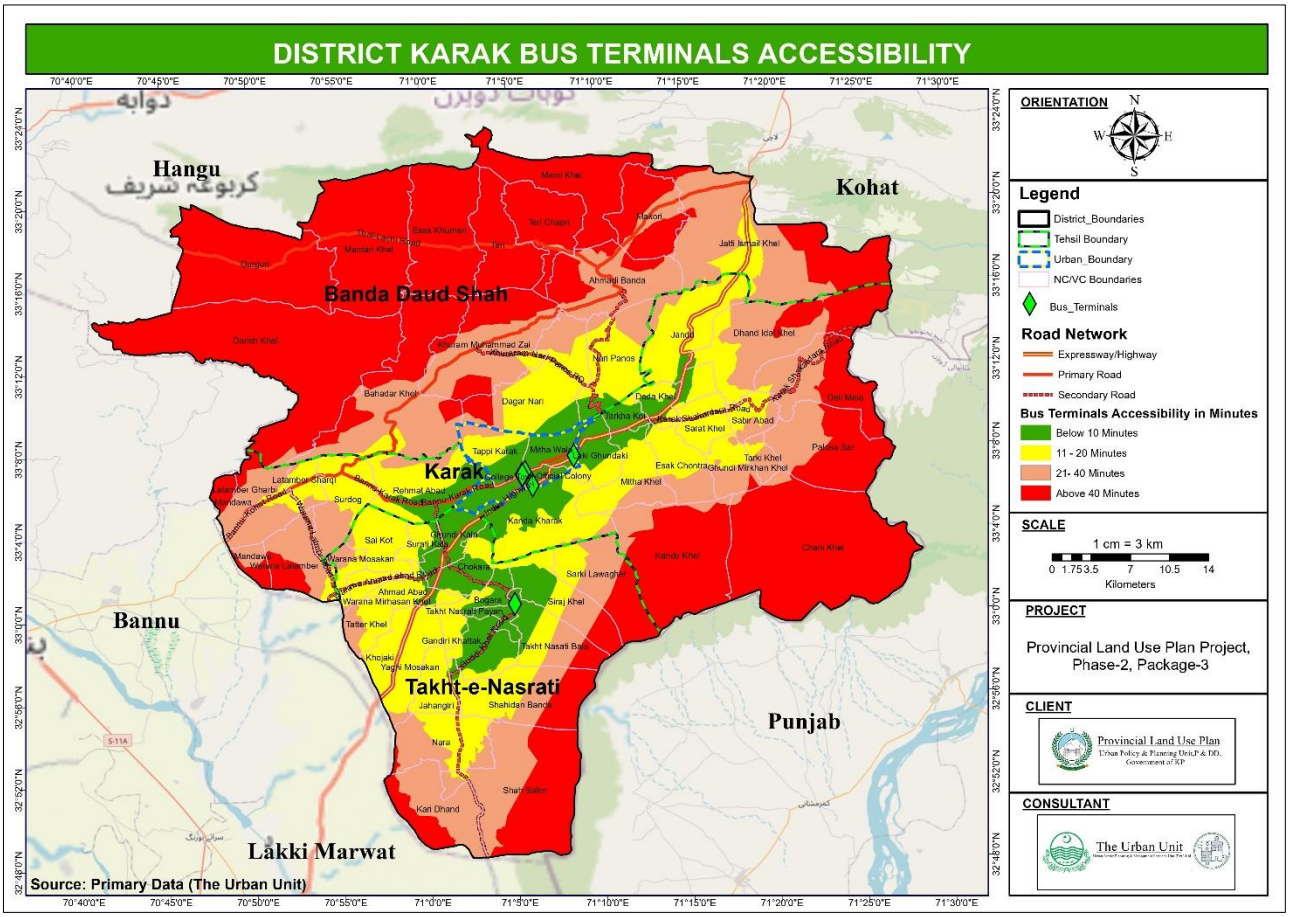
Table 3-19: Bus and Truck Stand Data Provided by the RTA

Number of Route Permits	Bus Stands	Number of Goods Forwarding Agencies	Parking Places	Route Classes
1478	Class D: 08 Class C: 02	10	2	A Class: 04 B Class: 08 C Class: 09

**Class-C terminals are Government-owned, while Class-D terminals are privately owned*

3.2.3.5. Bus Service Accessibility

Each neighborhood in District Karak has been analyzed for bus terminal accessibility in terms of drive time to the nearest terminal. Those areas having a bus terminal within a 0-10-minute drive, 11-20-minute drive, 21-40-minute drive and above 40-minute drive have been highlighted in **Map** below. Areas lying within the above 40-minute regions are deemed to be underserviced and may be candidate localities for new terminals.



Map 3-12: District Karak Bus Terminals Accessibility

3.2.3.6. Truck Terminal

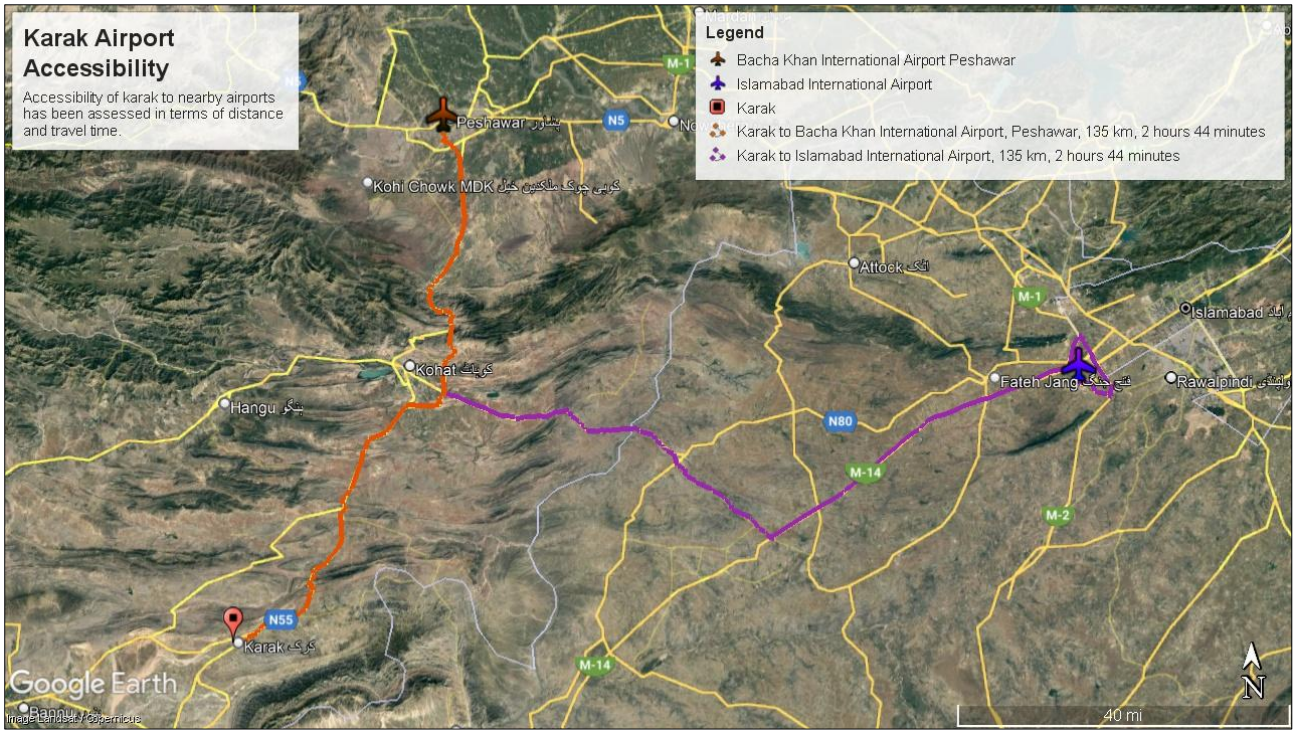
Due to the unavailability of reliable truck stand data, truck stand accessibility for the District has not been conducted.

3.2.3.7. Rail Transportation

Karak does not have rail infrastructure. The nearest operational railway station is Kohat. Historically, Karak was never connected to railways. Even the old Attock-Thall Railway line, now abandoned, bypassed Karak.

3.2.3.8. Air Transportation

At present there is no civilian Airport in District karak. The nearest operational airports to Karak are the Bacha Khan Airport in Peshawar and the Islamabad International Airport in Fateh Jang. **Figure** below illustrates the distance and travel time between Kohat and the aforementioned airport.



Map 3-13: Distance and Travel Time between Karak and Airports

3.2.4. Ongoing Projects

The ongoing road network and transportation-related initiatives in the study area have been extracted from the Annual Development Program of Khyber Pakhtunkhwa for the year 2022-2023. **Table** presents a summary of ongoing development schemes in District Karak.

Table 3-20: Ongoing Transportation Schemes

Sr.	ADP Number	Scheme Name	Approval Date	Expected Completion
ADP Schemes				
1	1360/ 150859	Construction and Black Topping of road from Sarki Lawagher to Alam Sheri, District Karak. (12Km)	29-11-2018	-
2	1397/ 170567	Construction of Black Topped Road from Teri to Kot Banda at Tehsil Banda Daud Shah, District Karak	15-09-2017	-
3	1413/ 190144	Construction of road at Ghar Kalay (Shuhada Road), Mitha Khel, District Karak	29-06-2020	-
4	1458/ 190581	Construction / Rehabilitation of BT road in Tehsil Karak, Takht-e-Nasrati, and Banda Daud Shah, Karak	08-03-2022	-
5	1473/ 200006	Repair and Rehabilitation of the road between Banda Daud Shaha (Teri Chowk) to Gurguri, District Karak (38-Km)	29-06-2020	-
6	1515/ 220758	Construction of BT road from Warana to link road and Warana to Musakan, District Karak - 30 KM (B) / PDWP	Not specified	-
NHA schemes				
7	-	Dualization of Indus Highway (N-55) from Sarai Gambila to Kohat Section	Not specified	-
8	-	Dualization & Improvement of Old Bannu Road	Not specified	-

3.2.5. Key Findings

District Karak's transportation network faces challenges but also presents opportunities through ongoing infrastructure upgrades. The Indus Highway section between Karapa and Hamidan experiences heavy

traffic, with daily volumes of 4,346 vehicles at Ambiri Kala and 7,741 at Speenkay, expected to exceed 8,000 by 2025. Dualization of this section is in progress to improve capacity.

Bannu Road, west of Karak City, transitions from a dual to a single carriageway near Tappi (Tehsil Road), carrying around 6,043 vehicles daily. Upgrading the Tappi–Surdag stretch to a dual carriageway is recommended to ease congestion and improve safety.

A proposed east-west Karak Bypass would link the N-55 to Old Bannu Road, diverting traffic from Karak City and offering an alternative route during blockages. Planned as a dual carriageway with a 220-foot right-of-way, its feasibility will be assessed through cost and environmental studies between 2022 and 2042.

Current bus terminals, particularly in Tehsil Karak, offer limited coverage. Establishing new terminals in the underserved urban areas of Banda Daud Shah, Karak, and Takhti Nasrati tehsils would reduce travel time and improve accessibility.

There is also no reliable data or infrastructure for truck terminals, creating logistical inefficiencies. Developing dedicated truck terminals would enhance freight movement and support regional economic growth.

Karak lacks railway connectivity, with the nearest station in Kohat and no plans for expansion. The district also lacks an operational airport; the closest are in Peshawar and Islamabad, with a non-operational one in Bannu.

3.2.6. Proposals: Transportation and Communication Network

3.2.6.1. Dualization of Roads

To enhance regional connectivity, mobility, and accessibility in District Karak, the following road dualization projects have been proposed.

Dualization of Indus Highway (N-55) from Karak District Boundary towards Kohat: This proposed project involves the dualization of the Indus Highway segment remaining section falls the Karak District boundary extending towards District Kohat. The Indus Highway (N-55) is a vital north-south transport corridor that plays a significant role in regional and inter-provincial connectivity. The dualization will help in accommodating increasing traffic volumes, reducing congestion, and enhancing travel safety and efficiency between Karak and Kohat. It will also support commercial transportation and stimulate local economic activities.

Dualization of Bannu–Kohat Road: The dualization of the Bannu–Kohat Road is another strategic road which will be improved east-west mobility in the region. This road is essential for connecting the southern parts of Khyber Pakhtunkhwa, and its expansion will ensure a smoother, safer, and faster route for passenger and goods transport. The project is expected to benefit multiple districts, including Karak, by strengthening trade links and improving access to essential services and markets.

Dualization of Karak–Bannu Road from District Court Karak to Surdag:

This proposed dualization project focuses on upgrading the section of the Karak–Bannu Road (N-80) from the District Court Karak to Surdag. This route is a critical local and regional link, and its dualization will greatly improve connectivity between Karak and Bannu. The improved roadways will facilitate safer and more efficient transport, reduce travel time, and support the movement of people and goods, thus contributing to the socio-economic uplift of the area.

3.2.6.2. Upgradation/Improvement of Roads Network

The following road projects have been proposed for upgradation and improvement in District Karak to enhance internal connectivity, reduce travel time, and provide.

- **Upgradation/Improvement of Indus Highway Link Road** (*From N-55 to Abbas Banda via Thall Model Public School).*
- **Upgradation/Improvement of Shakardara Road** (*From Kabir Killi to District Boundary)*
- **Upgradation/Improvement of Parishan Khattak Road** (*From Chungi No.2 to Kabir Killi).*
- **Upgradation/Improvement of Thal–Lachi Road** (*From Teri Chowk to District Boundary)*
- **Upgradation/Improvement of Latambar–N-55 Link Road** (*Via Warana)*

Upgrading these roads will not only improve local accessibility and ensure safer travel for residents but will also provide better access and mobility to the proposed urban areas identified in the district's land use

plan, strengthening the integration between transportation infrastructure and planned urban development.

3.2.6.3. Urban Road Proposals

The urban road links network in proposed urban areas are planned to provide connectivity and accessibility to major land uses. These road links will provide easy access to commercial areas such as the CBD, fruit and vegetable market, and weekly bazar. The roads will also connect to recreational spaces like playgrounds, public parks, and the sports complex. Important institutional areas, including schools, hospitals, and public offices, will also be linked through these roads. In addition, the network will support access to agricultural zones, light manufacturing areas, plantation zones, residential areas, and riparian plantations, helping ensure smooth movement across all major land use types.

Construction of Bypass Road from N-55 to Bannu Road: A bypass road has been proposed in the urban area of Karak, connecting N-55 to Bannu Road with a Right of Way (R.O.W) of 60 to 90 feet. This road aims to divert heavy and through traffic away from the city center, reducing congestion, improving road safety, and enhancing overall traffic flow within the urban area. It will also support future urban growth and provide better connectivity between major regional routes.

3.2.6.4. Upgradation and Construction of Bus Terminals

The existing bus terminals in District Karak, particularly in Tehsil Karak, do not provide adequate coverage, leaving several areas underserved and increasing travel times. Establishing new bus terminals at the tehsil level in urban areas of Tehsil Banda Daud Shah, Tehsil Karak, and Tehsil Takhti Nasrati would significantly enhance accessibility and improve passenger transport services.

3.2.6.5. Construction of Truck Terminal

The absence of designated truck terminals in District Karak hinders efficient freight movement. Without proper truck stands, logistical inefficiencies arise. Developing strategically located truck terminals would improve freight management, reduce roadside congestion, and support regional economic growth.

3.2.6.6. Railways Networks

District Karak lacks a railway network, with the nearest operational railway station in Kohat. Pakistan Railways has no immediate plans for expansion to Karak, leaving road transport as the sole mode of passenger and freight movement.

3.2.6.7. Air Transportation

Similarly, the district lacks a civilian airport, with the nearest non-operational airport in District Bannu. The closest operational airports are in Peshawar and Islamabad, requiring residents to travel long distances for air connectivity. Future assessments should consider regional air transport solutions to enhance mobility and business opportunities.

Table 3-21: Proposed Transportation Network Projects for District Karak

Road Projects				
Sr. No	**Project**	**Km**	**Year**	**Right of Way to be Reserved**
1	Dualization of Single portion of Indus Highways from Karak District Boundary towards Kohat (In Progress)	47	2025-30	60 -90 ft (Variable as per available land)
2	Dualization of Bannu Kohat (In Progress)	-	2025-30	60 -90 ft (Variable as per available land)
3	Dualization of Karak-Bannu Road from District Court to Surdag (N-80)	16.3	2025-30	60 -90 ft (Variable as per available land)
4	Upgradation/Improvement of Indus Highway Link Road From N-55 to Abbas Banda via Thall Model Public School to Abbas Banda	41	2030-35	60 -90 ft (Variable as per available land)
5	Upgradation/Improvement of Shakardara Road from Kabir Killi to District Boundary	11	2030-35	60 -90 ft (Variable as per available land)

6	Upgradation/Improvement of Parishan Khattak Road from Chungi No.2 to Kabir Killi	19	2030-35	60 -90 ft (Variable as per available land)
7	Upgradation/Improvement of Thal-Lachi Road from Teri Chowk to District Boundary	38	2030-35	60 -90 ft (Variable as per available land)
8	Upgradation/Improvement of Latambar-N55 link road via Warana	20.3	2025-2030	60 -90 ft (Variable as per available land)

Proposed Urban Roads

Sr. No,	Proposed Urban Road	Km	Year	Right of Way to be Reserved
9	Ahmadi Bandi-Urban Road 1	0.80	2025-45	40-60 ft (Variable as per available land)
10	Ahmadi Bandi-Urban Road 2	0.50	2025-45	40-60 ft (Variable as per available land)
11	Ahmadi Bandi-Urban Road 3	0.50	2025-45	40-60 ft (Variable as per available land)
12	Ahmadi Bandi-Urban Road 4	1.00	2025-45	40-60 ft (Variable as per available land)
13	Ahmadi Bandi-Urban Road 5	0.70	2025-45	40-60 ft (Variable as per available land)
14	Ahmadi Bandi-Urban Road 6	0.40	2025-45	40-60 ft (Variable as per available land)
15	Ahmadi Bandi-Urban Road 7	0.55	2025-45	40-60 ft (Variable as per available land)
16	Karak -Urban Road 1	1.55	2025-45	40-60 ft (Variable as per available land)
17	Karak -Urban Road 2	0.35	2025-45	40-60 ft (Variable as per available land)
18	Karak -Urban Road 3	0.65	2025-45	40-60 ft (Variable as per available land)
19	Karak -Urban Road 4	0.55	2025-45	40-60 ft (Variable as per available land)
20	Karak -Urban Road 5	1.29	2025-45	40-60 ft (Variable as per available land)
21	Construction of Bypass Road from N-55 to Bannu-Karak Road	2.96	2025-45	60-90 ft (Variable as per available land)
22	Latambar-Urban Road 1	0.40	2025-45	40-60 ft (Variable as per available land)
23	Latambar-Urban Road 2	2.17	2025-45	40-60 ft (Variable as per available land)
24	Latambar-Urban Road 3	0.60	2025-45	40-60 ft (Variable as per available land)
25	Latambar-Urban Road 4	0.51	2025-45	40-60 ft (Variable as per available land)
26	Sabir Abad-Urban Road 1	0.53	2025-45	40-60 ft (Variable as per available land)
27	Sabir Abad-Urban Road 2	0.40	2025-45	40-60 ft (Variable as per available land)
29	Sabir Abad-Urban Road 3	0.82	2025-45	40-60 ft (Variable as per available land)
29	Sabir Abad-Urban Road 4	0.50	2025-45	40-60 ft (Variable as per available land)

30	Sabir Abad-Urban Road 5	1.51	2025-45	40-60 ft (Variable as per available land)
31	Takhti Nasrati-Urban Road 1	1.13	2025-45	40-60 ft (Variable as per available land)
32	Takhti Nasrati-Urban Road 2	1.11	2025-45	40-60 ft (Variable as per available land)
33	Takhti Nasrati-Urban Road 3	1.76	2025-45	40-60 ft (Variable as per available land)
34	Ahmadi Bandi-Urban Road 1	0.80	2025-45	40-60 ft (Variable as per available land)
35	Ahmadi Bandi-Urban Road 2	0.50	2025-45	40-60 ft (Variable as per available land)
36	Ahmadi Bandi-Urban Road 3	0.50	2025-45	40-60 ft (Variable as per available land)
37	Ahmadi Bandi-Urban Road 4	1.00	2025-45	40-60 ft (Variable as per available land)
38	Ahmadi Bandi-Urban Road 5	0.70	2025-45	40-60 ft (Variable as per available land)

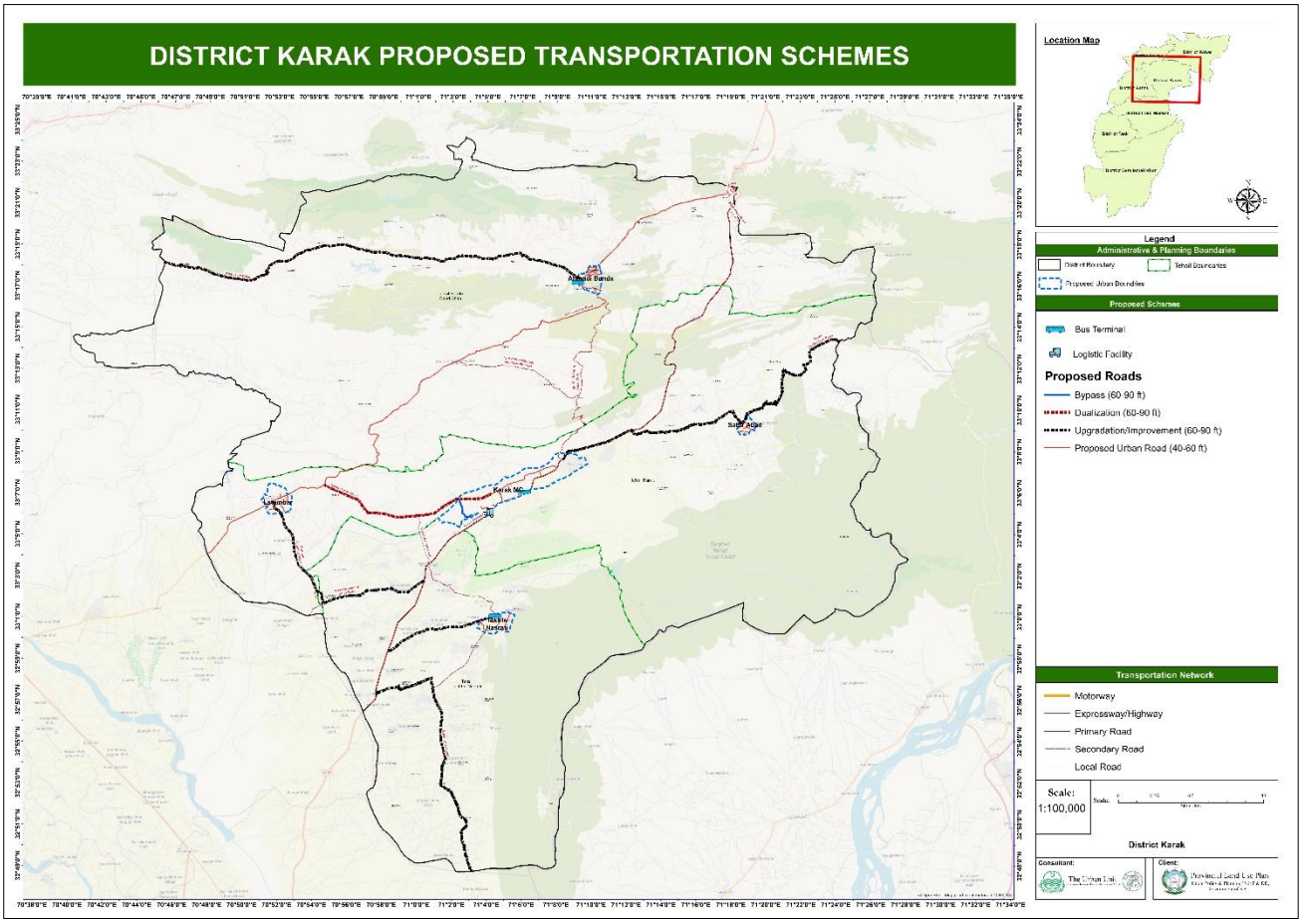
Bus Terminal

Sr.	Project	Year	Land Required	Concerned Departments
39	Upgradation of Class-C Bus Terminal in District Karak (Urban Area)	2025-30	As Per Motor Vehicles Ordnance 1965 and Motor Vehicles Rules 1969	Transport Department / Provincial/ District Regional Transportation Authority
40	Construction of Class-C Bus Terminal in Tehsil Banda Daud Shah (Urban Area)	2025-30		
41	Construction of Class-C Bus Terminal in Tehsil Takhti Nasrati (Urban Area)	2025-30		

Truck Terminal

Sr.	Project	Year	Land Required	Concerned Departments
42	Construction of a Truck Terminal/Logistics Facility in District Karak (Urban Area)	2025-30	As Per Motor Vehicles Ordnance 1965 and Motor Vehicles Rules 1969	Transport Department / Provincial/ District Regional Transportation Authority

Below **Map** shows the proposed transportation schemes in district Karak.



Map 3-14: Proposed Transportation Schemes

3.2.6.8. Postal Network Coverage

The existing postal services have been mapped using the Pakistan Postal Code Directory available on the Pakistan Post Website and overlaid on maps of settlements obtained from the Land Use survey. All post offices within the district boundary are **Tabulated** below.

Table 3-22: List of Post Offices in District Karak

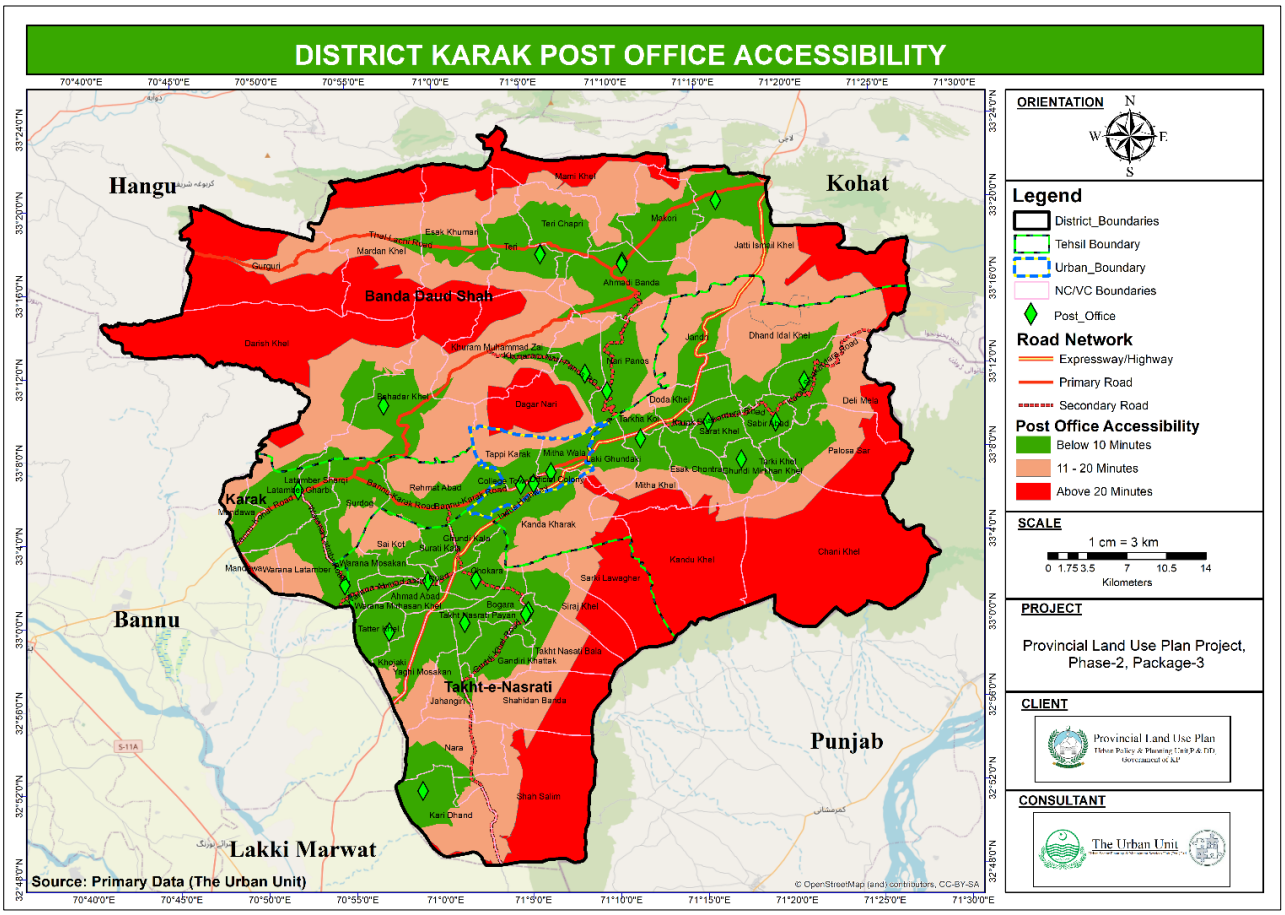
Name of District	Name of Tehsil	Name of Union Council	Name of Post Office	Status of Post Office/ Booking Office / Delivery Office
Karak	Karak	Latamber	Latamber	S.O
Karak	Karak	Latamber	Warana	S.O
Karak	Karak	Esak Chontra	Ghundi Mir Khan Khel	S.O
Karak	Karak	Esak Chontra	Dab Begu Khel	S.O
Karak	Karak	Karak South	Distt: Court Karak	S.O
Karak	Karak	Karak South	Karak City	S.O
Karak	Karak	Karak South	Karak City NPO	NPO
Karak	Karak	Karak South	Khattak Digital Franchise Post Office	DFPO
Karak	Karak	Mitha Khel	Mitha Khel	S.O
Karak	Karak	Sabirabad	Sabirabad	S.O
Karak	Karak	Sabirabad	Kurd Sharif	EDBO
Karak	Takhti Nasrati	Takhti Nasrati	Takhti Nasrati	S.O
Karak	Takhti Nasrati	Takhti Nasrati	Alhafiz Photostate studio	DFPO
Karak	Takhti Nasrati	Takhti Nasrati	Bogara	EDBO
Karak	Takhti Nasrati	Chowkara	Chowkara	S.O

Name of District	Name of Tehsil	Name of Union Council	Name of Post Office	Status of Post Office/ Booking Office / Delivery Office
Karak	Takhti Nasrati	Ahmad Abad	Ahmad Abad	S.O
Karak	Takhti Nasrati	Ahmad Abad	Mohabati Killa	S.O
Karak	Takhti Nasrati	Takhti Nasrati	Kiri Dhand	EDBO
Karak	Banda Daud Shah	Banda Daud Shah	Banda Daud Shah	S.O
Karak	Banda Daud Shah	Bahader Khel	Bahader Khel	S.O
Karak	Banda Daud Shah	Teri	Teri	S.O
Karak	Banda Daud Shah	Teri	Ahmadi Banda	S.O
Karak	Banda Daud Shah	Teri	Pakistan Post	DFPO
Karak	Banda Daud Shah	Nari Panoos	Nari Panoos	S.O
Karak	Banda Daud Shah	Nari Panoos	Dager Nari	S.O
Karak	Banda Daud Shah	Jatta Ismail Khel	Jata Ismail Khel	EDBO
Karak	Karak	Karak South	Karak GPO	GPO

3.2.6.9. Post Office Accessibility Analysis

To understand District Karak's postal services, all post offices within the district boundary have been marked in GIS format as shown in the map below.

It should be noted that postmen typically deliver to neighborhoods rather than recipients coming to post offices. This accessibility analysis is therefore from the perspective of the post offices rather than of the neighborhoods. Areas lying beyond above 20-minute drive from the nearest post office shall become candidate localities for a new post office. Candidate localities were also assessed for whether they meet the necessary population thresholds stipulated by Pakistan's National Reference Manual.



Map 3-15: District Karak Post Office Accessibility Analysis

3.2.6.10. Landline Coverage

The Telecommunication services data, as obtained from the Pakistan Telecommunication Company Limited (PTCL), includes information on the existing telephone Exchanges for District Karak.

Table below lists the existing telephone exchanges in District Karak as provided by PTCL. The same telephone exchanges are mapped as shown below, using the Main Feeding Area information for reference.

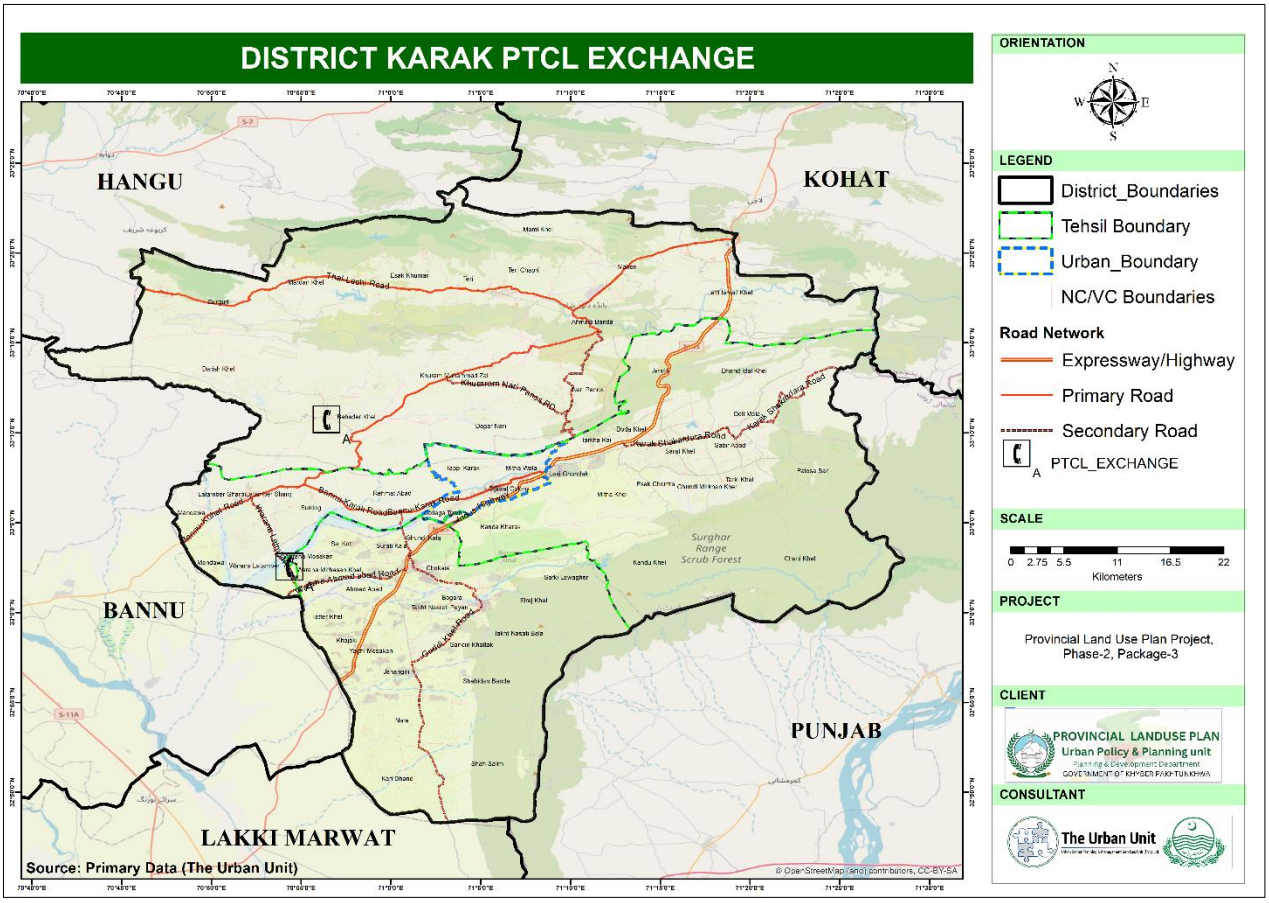
Table 3-23: List of Telephone Exchanges in District Karak

Region	Exchange Name	Type (Exchange/ MSAG)	Address	Main Feeding Area	PSTN	BB
NTR-II	AHMAD ABAD	DSLAM	AHMAD ABAD	Ahmed Abad Village	66	54
NTR-II	BAHADUR KHEL	DSLAM	BAHADUR KHEL	Bahadar Khel Village	31	23
NTR-II	BANDA DAUD SHAH	DSLAM	Banda Daud shah	Banda daud shah	109	98
NTR-II	CHOWKARA	DSLAM	CHOWKARA	Chowkara Village	60	39
NTR-II	GURGURI	DSLAM	GURGURI	Gurguri village and bazar	47	51
NTR-II	JEHANGIRI BANDA	DSLAM	JEHANGIRI BANDA	Data Banda Village	81	49
NTR-II	KHURRAM	DSLAM	khurram	khurram	37	22
NTR-II	LATAMBER	DSLAM	Latamber	Latamber	122	76
NTR-II	MITTA KHEL	DSLAM	MITTA KHEL	Data Khel Village	96	82
NTR-II	NARAI PANOOS	DSLAM	NARAI PANOOS	Data Panoos Village	50	27
NTR-II	PALOSA SAR	DSLAM	PALOSA SAR	Data Sar Village	2	0
NTR-II	REHMAT ABAD	DSLAM	REHMAT ABAD	Data Abad Village	32	19
NTR-II	SABIR ABAD	DSLAM	EWSD-SABIR ABAD-T	EWSD-SABIR ABAD-T	44	23
NTR-II	TITTER KHEL KTK	DSLAM	TITTER KHEL KTK		64	25
NTR-II	WARANA	DSLAM	EWSD-WARANA-T	EWSD-WARANA-T	81	48
NTR-II	KARAK	MSAN	Karak	Karak city	396	351
NTR-II	TAKHT NASRATI	DSLAM	TAKHT NUSRATI	TAKHT NUSRATI	113	94

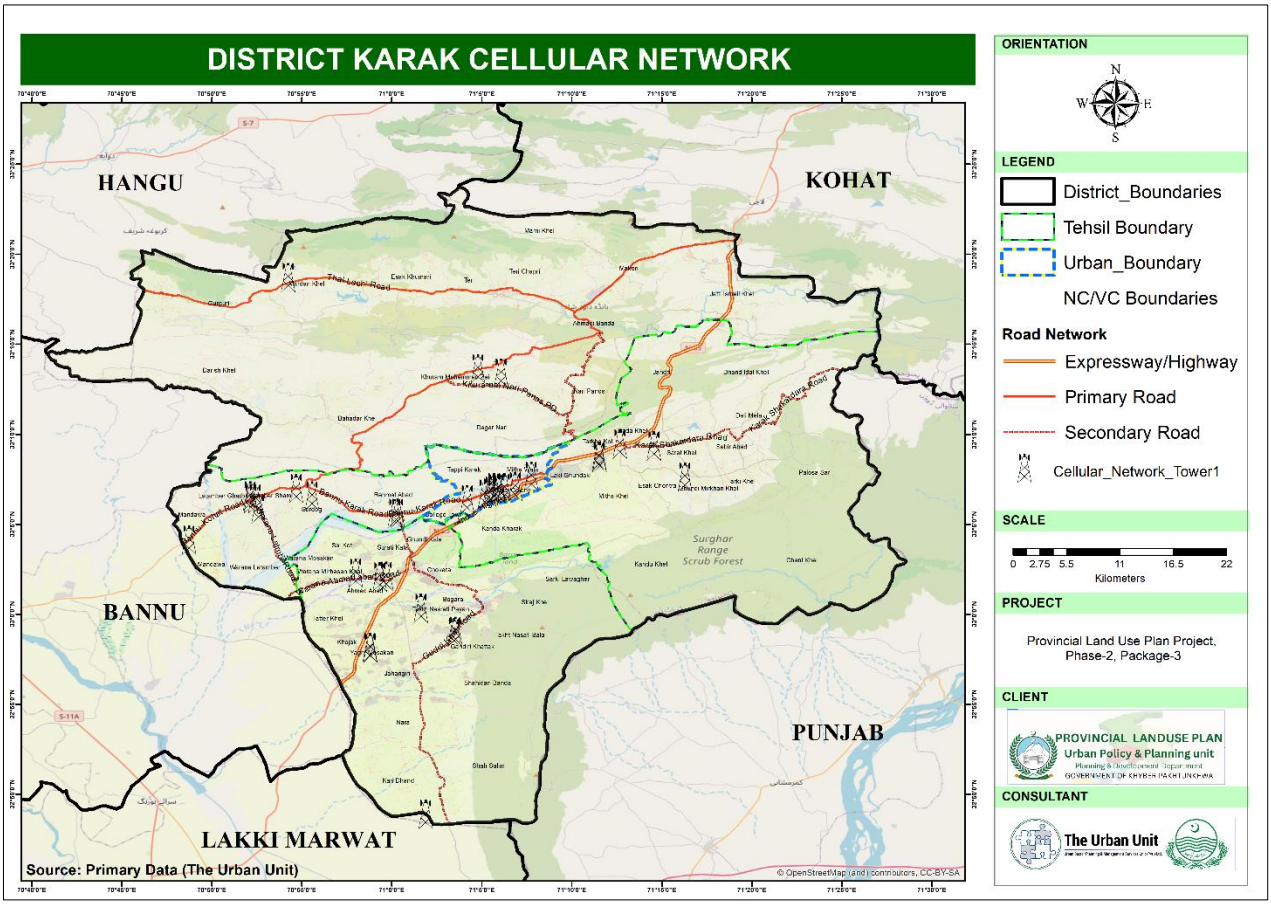
3.2.7. Existing Landline and Cell Phone Tower Infrastructure

The locations of the existing cellphone towers in District Karak were obtained during the land use survey. The respective service provider for each tower has not been identified in this study, as the Pakistan Telecommunication Authority and Private Cellular Operators have not furnished any data regarding their assets. However, for land inventory purposes, the obtained locations of existing Cellular Towers have been mapped.

Maps below illustrate the location of District Karak's telecommunication infrastructure, including telephone exchanges and Cellular towers.



Map 3-16: Existing PTCL Infrastructure



Map 3-10: Existing Cellular Tower Infrastructure

3.2.7.1. Key Findings

District Karak has a network of 26 post offices, including sub-offices, EDBOs, and DFPOs. Accessibility analysis reveals that many rural settlements, especially in Banda Daud Shah, Takht-e-Nasrati, and southern Karak, are more than 20 minutes from the nearest post office. Landline infrastructure is moderately developed with 17 PTCL exchanges, though areas like Palosa Sar and Rehmat Abad have minimal coverage. Cellular towers are present mainly along major roads and urban areas; however, service gaps likely exist in peripheral and mountainous regions. Lack of detailed data from private operators limits a complete assessment.

The assessment of telecommunication facilities in District Karak did not reveal any significant concerns. Background studies and vision data confirmed that there is no need for upgrades or recommendations that have been proposed in the Land Use Plan.

3.2.7.2. Proposals: Telecommunication and Postal Services

New post offices need to be established in underserved areas beyond the 20-minute threshold, focusing on remote parts of Banda Daud Shah and Takht-e-Nasrati. Broadband coverage should be extended in low-connectivity areas, and existing exchanges should be upgraded for better internet services. Cellular tower expansion is recommended in telecom blackspots, with land reserved for future installations. Coordination with PTA and private operators is essential for updated infrastructure planning, and public-private partnerships should be encouraged to improve overall service delivery.

The establishment and upgrading of Sub Post Offices are proposed at Tehsil Headquarters, smaller towns, and time-scale post offices in neighborhoods that currently fall outside the service range and may experience postal delays. These initiatives, planned from 2025 to 2045, aim to bridge service gaps in underserved areas and improve accessibility by introducing new post offices. These locations will be selected based on population requirements, land required for each new post office, and the concerned department is mentioned in **Table** as per the National Reference Manual.

No proposals have been made regarding landline communication and Cellular Tower communication coverage. The documentation of the existing telecommunication infrastructure in this chapter serves as an inventory resource for the district.

Table 3-24: Summary provision Sub-Post Offices, Land Required and Stakeholder

Provision of Sub Post Offices as Per National Reference Manual				
Sr.	**Project**	**Year**	**Land Required**	**Concerned Departments**
16	Sub Post Offices, Tehsils HQ (Higher Selection Grade)	2025-30	As per the National Reference Manual	Pakistan Post
17	Sub Post Offices, Smaller Towns of Tehsils HQ (Lower Selection Grade)	2025-30		
18	Provision of Time-scale-Post offices in Smaller Towns /Large Villages /Neighborhoods (Having Population around 50,000)	2030-40		

3.3. Social Infrastructure

3.3.1. Education

Education is vital to human development. It reduces poverty and inequality, promotes employment, and improves health, economic stability, and living standards. Therefore, prioritising education is crucial for any development plan.

According to the Annual Statistical Report of Government Schools 2021-2022, Khyber Pakhtunkhwa (KP) has 34,183 government schools, with 33,405 functional and 778 non-functional. Additionally, there are 9,021 private schools, including 600 boys' schools, 173 girls' schools, and 8,248 co-education schools. These schools include 1,848 primary, 3,144 middle, 2,803 high, and 1,226 higher secondary institutions.

Government school enrolment in KP totals 5.974 million, with 67.22% in primary and 32.77% in secondary schools. The province has 174,278 government teachers (111,260 male and 63,018 female) distributed across boys' and girls' schools. In private schools, 126,475 teachers work at various levels, including 12,965 in primary, 32,522 in middle, 51,637 in high, and 29,351 in higher secondary schools.

3.3.1.1. Existing Educational Institutes in District Karak

District Karak provides education through universities, colleges, and schools. However, the growing population has strained government resources, limiting access to free and affordable education. To bridge this gap, private schools, owned by individuals or groups, play a vital role by offering education on a fee-based model. Strengthening both public and private education systems is essential for improving overall educational outcomes in the district.

The education system in District Karak is functional but faces key challenges, particularly in gender disparity and overcrowding at the primary level. Boys have significantly higher enrollment than girls, with female participation declining sharply at higher education levels. While the district has a well-established network of schools, limited infrastructure and a shortage of teachers at the primary level affect learning quality. Middle and high schools have better teacher-student ratios, but access to higher education remains a concern, especially for girls.

3.3.1.2. Government Education

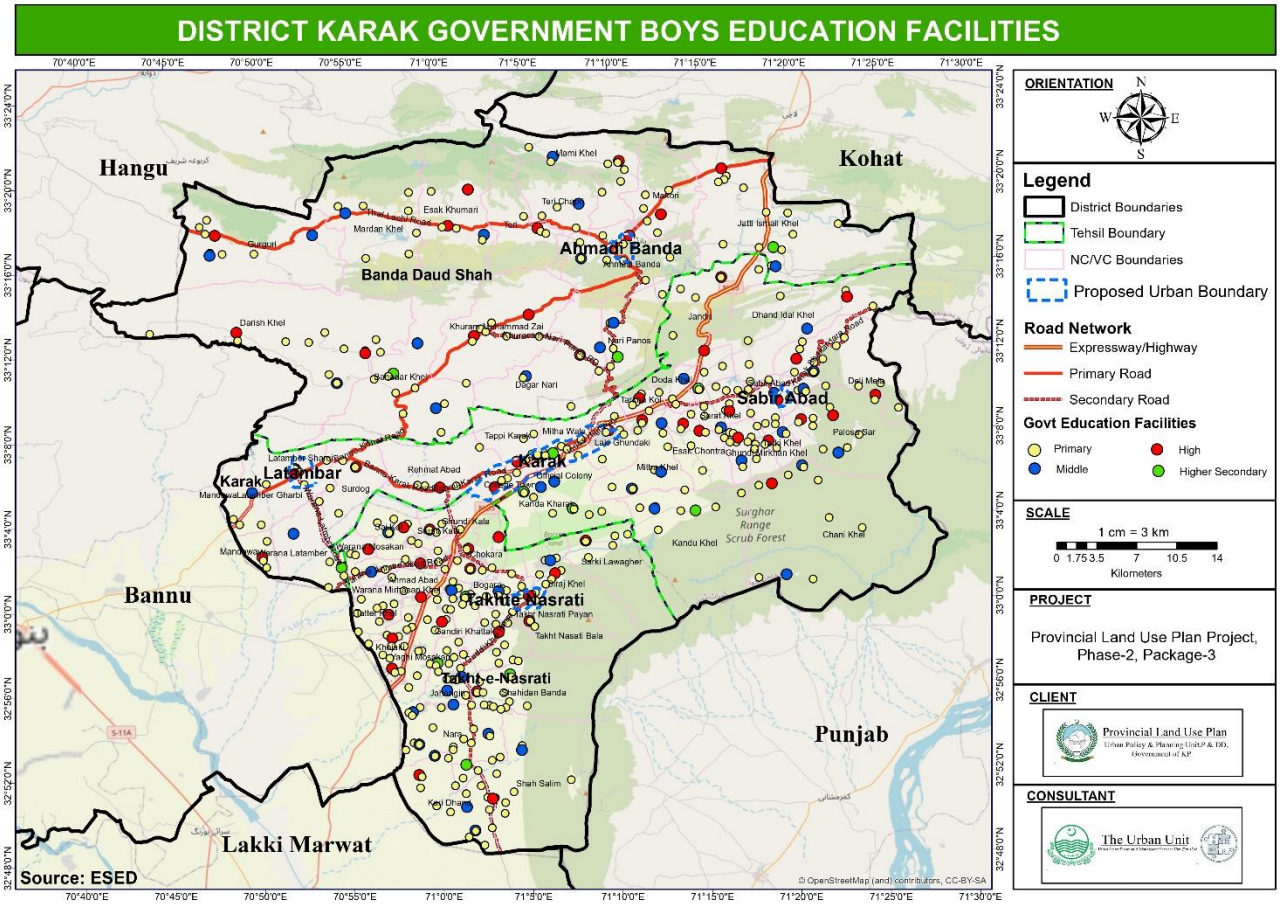
District Karak has 788 primary, 87 middle, 85 high, 18 higher secondary schools, 11 degree colleges, 1 university, and 2 technical institutes with the university located in urban area of Karak. 2 technical colleges are located each in Karak urban area and Tehsil Takhti Nasrati. The details of government education institutes are shown in the below **Table.**

Table 3-25: Government Educational Institutes[29]

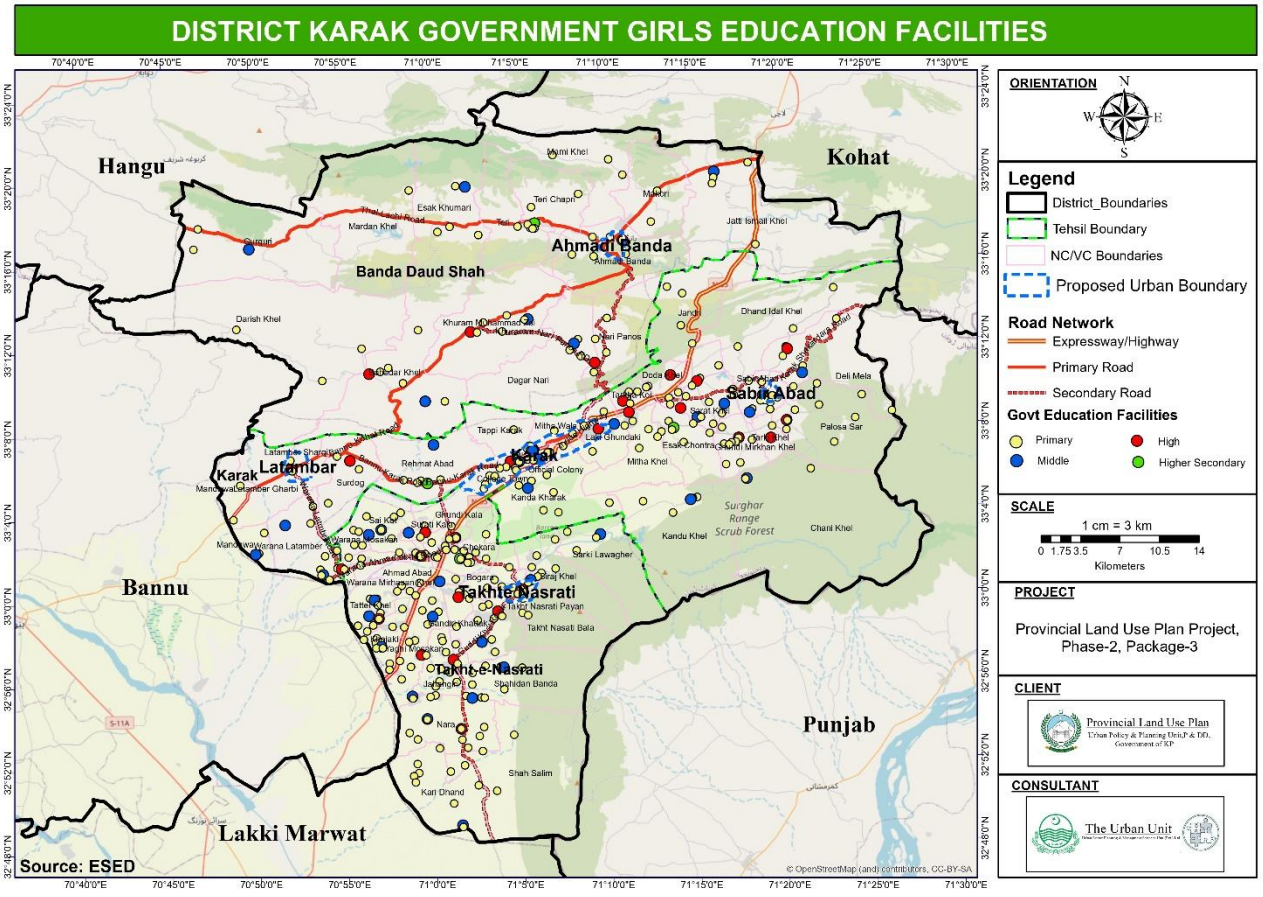
Administrative Area		Primary Schools	Middle Schools	High Schools	Higher Secondary Schools	Degree Colleges	Universities	Technical Institutes
Urban	Boys	28	2	7	1	2	1	1
	Girls	40	3	6	1	4		
Rural	Boys	408	48	49	12	5		1
	Girls	312	34	23	4			
District	Boys	436	50	56	13	7	1	2
	Girls	352	37	29	5	4		
	Total	788	87	85	18	11		2
Urban Areas								
Karak City	Boys	14	1	3	1	1	1	1
	Girls	25	3	2	1	1		

[29] *Secondary data was collected from the Khyber Pakhtunkhwa Education Monitoring Authority (KPEMA); Directorate of Higher Education; Directorate of Social Welfare, Special Education, and Women Empowerment; and Khyber Pakhtunkhwa Technical Education and Vocational Training Authority.*

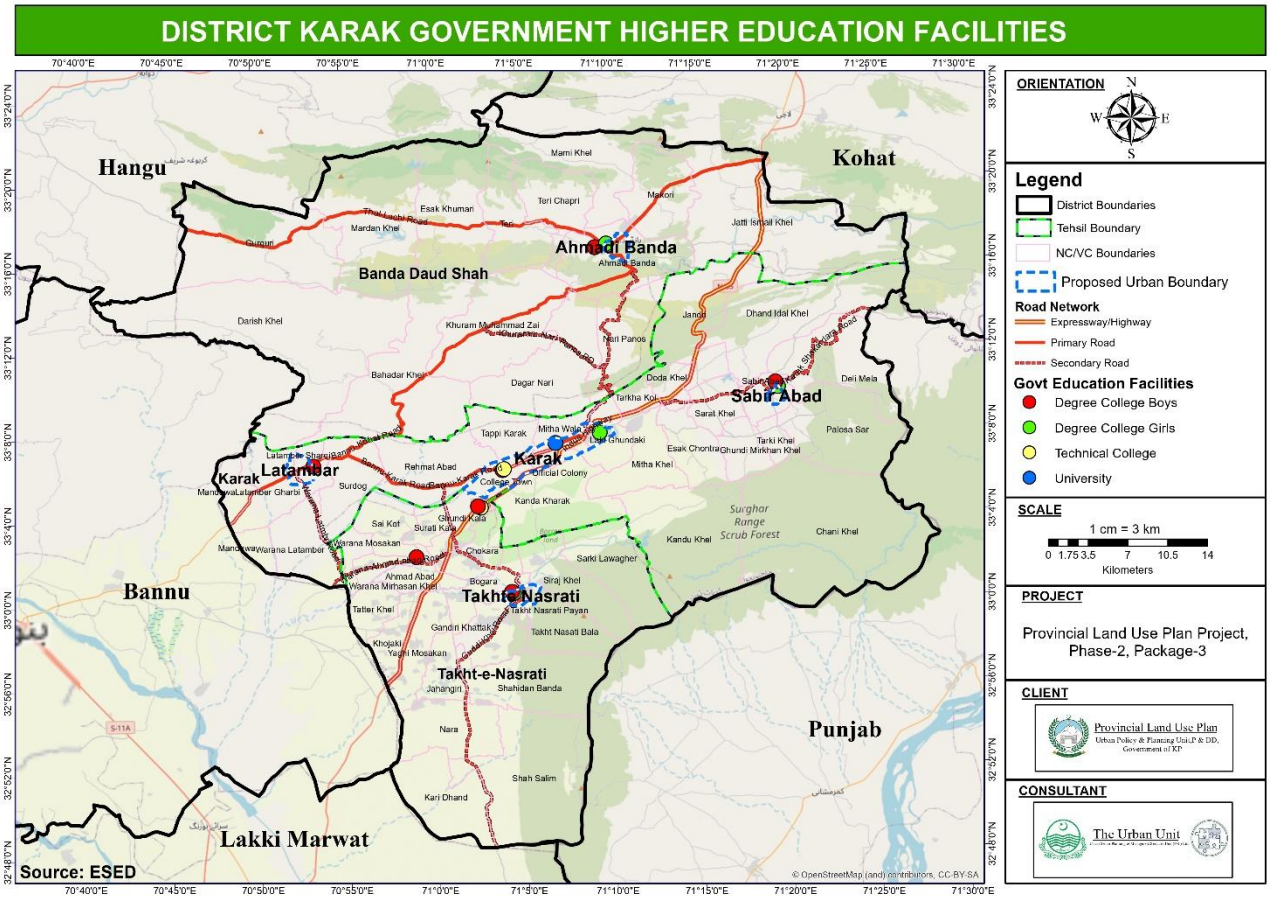
Ahmadi Banda	Boys	1		1				
	Girls	1		1		1		
Sabirabad	Boys	3		1				
	Girls	5		1		1		
Takht-e-Nasrati	Boys	6		1		1		
	Girls	5		1		1		
Latambar	Boys	4	1	1				
	Girls	4		1				
Rural Areas								
Karak Tehsil	Boys	145	19	18	5	2		
	Girls	113	12	10	2			
Takht-e-Nasrati Tehsil	Boys	169	15	19	4	2		1
	Girls	149	16	10	1			
Banda Daud Shah Tehsil	Boys	94	14	12	3	1		
	Girls	50	6	3	1			



Map 3-17 District Karak Government Boys Education Facilities



Map 3-18 District Karak Government Girls Education Facilities



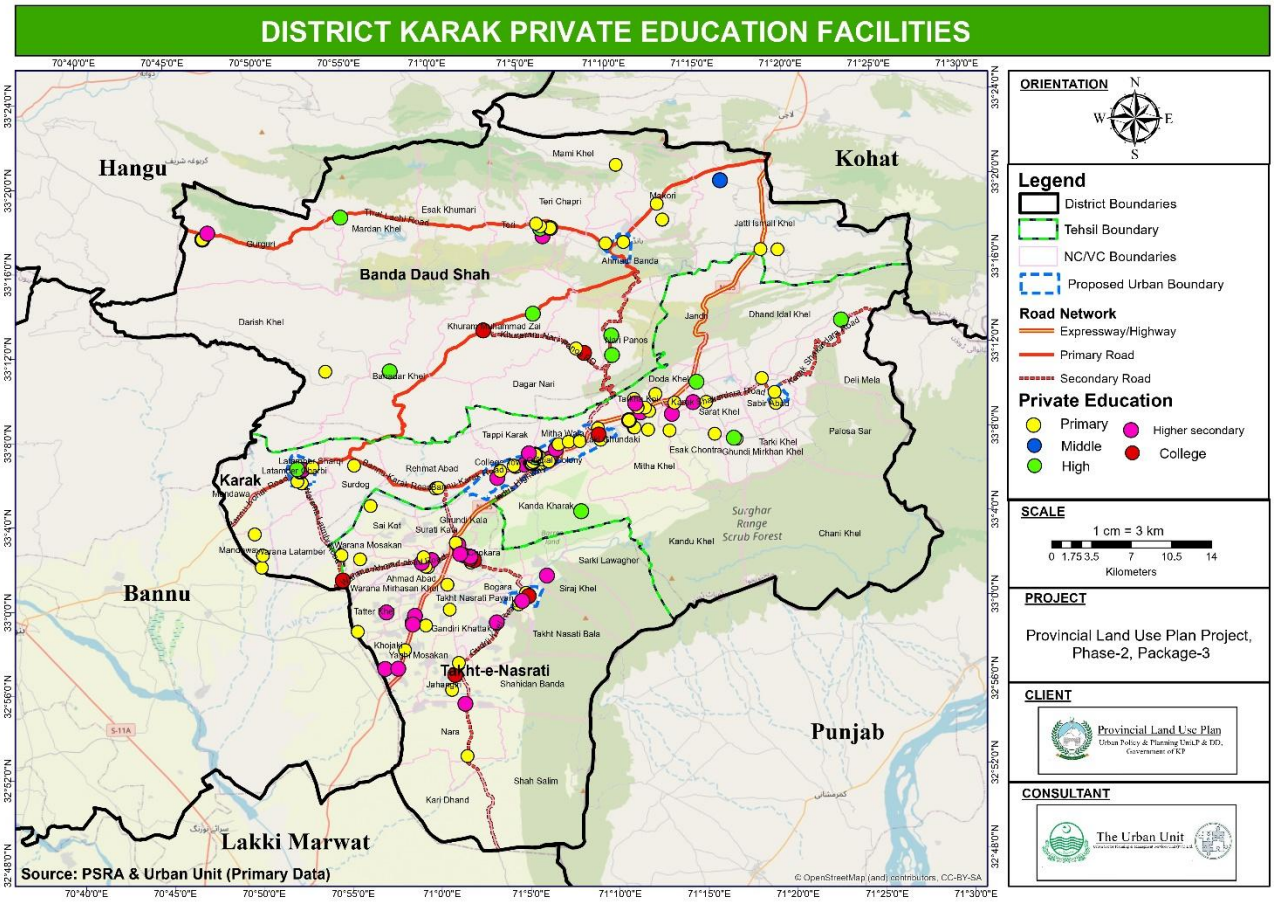
Map 3-19 District Karak Government Higher Education Facilities

3.3.1.2.1. Private Institutes

In District Karak, private educational institutions play a limited yet significant role in the education sector. The district has 83 private primary schools, 3 middle schools, 16 high schools, 32 higher secondary schools, and 9 private colleges, contributing to the overall educational landscape. However, no private university in the district indicates a gap in higher education opportunities within the private sector. The details of private institutes are shown in the below **Table**.

Table 3-26: Private Education Institutes[30]

Administrative Area	Primary Schools	Middle Schools	High Schools	Higher Secondary Schools	Colleges
Urban	28		3	11	3
Rural	55	3	12	21	6
District	83	3	16	32	9
Urban Areas					
Karak City	18		2	8	1
Ahmadi Banda	1				
Sabirabad	1				
Takht-e-Nasrati	2			1	1
Latambar	6		1	2	1
Rural Areas					
Karak Tehsil	24	2	4	5	1
Takht-e-Nasrati Tehsil	16			14	3
Banda Daud Shah tehsil	15	1	8	2	2



Map 3-20 District Karak Private Education Facilities

[30] *Secondary data was collected from the Khyber Pakhtunkhwa Private School Regulatory Authority (PSRA), and Higher Education Regulatory Authority (HERA).*

3.3.1.3. Teacher-Student Ratio

In primary schools, Karak (1:38) closely matches the provincial ratio (1:39), both indicating overcrowded classrooms. At the middle (1:11 vs. 1:13) and high school (1:18 vs. 1:21) levels, Karak performs slightly better than the provincial average. However, at the higher secondary level, Karak (1:15) has a better ratio compared to KPK (1:23), suggesting better teacher availability. In universities (1:26) and technical institutes (1:15), Karak aligns with provincial trends, while degree colleges in Karak (1:12) show better student-teacher interaction than the provincial average.

The table below shows the total enrollment, working teachers, and the teacher-student ratio of government and private institutes in District Karak.

Table 3-27: Teacher-Student Ratio of Government Education Institutes[31]

Type of Institute		Primary Schools	Middle Schools	High Schools	Higher Secondary Schools	Degree Colleges	Universities	Technical Colleges
Enrolled Students	Boys Institutes	59959	4629	16935	6261	2,791	1577	307
	Girls Institutes	20523	2616	9915	2869	1,155		0
Working Teachers	Boys Institutes	1355	405	988	443	178	59	20
	Girls Institutes	744	247	470	140	128		0
Teacher-Student Ratio	Boys Institutes	1:44	1:11	1:17	1:14	1:15	1:26	1:15
	Girls Institutes	1:27	1:10	1:21	1:20	1:09		0
	Overall	**1:38**	**1:11**	**1:18**	**1:15**	**1:12**	**1:26**	**1:15**

On the other hand, In District Karak private institutions, the student-teacher ratio varies by level: primary schools (1:24), middle schools (1:20), high schools (1:21), and higher secondary schools (1:35). The below **Table** shows the total enrollment, working, and teachers-student ratio of private institutes in District Karak.

Table 3-28: Teacher-Student Ratio of Private Education Institutes[32]

Type of Institute	Primary Schools	Middle Schools	High Schools	Higher Secondary Schools
Enrolled Students	33313	395	6047	27844
Working Teachers	1364	19	287	775
Teacher-Student Ratio	**1:24**	**1:20**	**1:21**	**1:35**

3.3.1.4. Need for New Education Institutes (Current backlog and Future projection)

3.3.1.4.1. Primary Schools

The need for new primary schools was determined using NRM standards: one boys' school per 7,500 people and one girls' school per 8,200. The backlog was calculated by dividing each settlement's population by these thresholds and then subtracting existing schools to find the shortfall. Since the projected population includes both males and females, an average of the NRM standards for boys' and girls' schools is used to estimate the total number of schools required in the future. This total is then distributed between boys' and girls' schools based on the existing ratio of male to female schools in the area.

Future School Requirement:

[31] *Khyber Pakhtunkhwa Education Monitoring Authority (KPEMA). (2023).* Annual Statistical Report of Government Schools 2021-2022. *Enrollment in Government Schools and Teaching Staff in Government Schools.*
Bureau of Statistics, Planning & Development Department, Government of Khyber Pakhtunkhwa. Development Statistics of Khyber Pakhtunkhwa 2023. *Table No. 79, 80, 81, 83, 84, 85, and 86*
[32] *Secondary data was collected from the Khyber Pakhtunkhwa Private School Regulatory Authority (PSRA).*

- Step 1: Since the future population projections don't distinguish by gender, an average of the NRM standards is used: (boys+girls)/2
- (7,500+8,200)/2=7,850 people per school (approx.)
- Step 2: Future projected population is divided by this average (7,850) to calculate the total number of schools needed.
- Step 3: This total is then distributed into boys' and girls' schools based on the current ratio of male to female schools in the area, to maintain consistency with the existing educational infrastructure distribution.

In District Karak, the primary school system is generally functioning well. Karak City, with a projected population of 131,405, requires 17 new schools (10 for boys, 7 for girls), having a backlog of 3 schools. Other areas like Ahmadi Banda and Sabirabad show minimal needs, requiring only one additional school each. Takht-e-Nasrati and Latambar require three schools each, with distribution based on existing gender-wise school ratios. The overall demand across these centers totals 17 new schools by 2045, comprising 10 boys' and 7 girls' schools. This planning helps identify and bridge current and future gaps in educational infrastructure, ensuring balanced access to education across genders and localities as the population grows.. The detailed backlog projections up to the year 2045 are provided in the **Table** below.

Table 3-29: District Karak Primary Schools Backlog

Urban Center	Projected Population 2045	BOYS	GIRLS	Requirement	Backlog	Backlog	BOYS	GIRLS
		Existing	Existing		Boys	Girls	2045	2045
Karak City	131405	14	25	17	3	0	10	7
Ahmadi Banda	7715	1	1	1	0	0	0	1
Sabirabad	7105	3	4	1	0	0	1	0
Takht-e-Nasrati	21393	6	5	3	0	0	1	2
Latambar	22602	4	4	3	0	0	2	1
Overall	**190220**	**28**	**39**	**25**	**3**	**0**	**14**	**11**

Tehsil	Village Councils	Projected Population 2045	Boys	Girls	Requirement	Backlog	Backlog	BOYS	GIRLS
			Existing			Boys	Girls	2045	2045
KARAK	Chani Khel	24983	9	2	3	0	1	1	2
	Deli Mela	17876	12	6	2	0	0	1	1
	Dhand Idal Khel	11623	8	4	1	0	0	0	1
	Doda Khel	19477	4	5	2	0	0	1	1
	Esak Chontra	30949	5	5	4	0	0	2	2
	Ghundi Mirkhan Khel	28843	13	9	4	0	0	1	3
	Jandri	24453	8	6	3	0	0	1	2
	Kanda Kharak	35875	8	8	5	0	0	2	3
	Kandu Khel	27621	7	4	4	0	0	1	3
	Laki Ghundaki (excluding urban)	8225	4	4	1	0	0	1	0
	Latamber Gharbi (excluding urban)	5808	3	1	1	0	0	0	1
	Latamber Sharqi (excluding urban)	12852	2	0	2	0	0	0	2
	Mandawa	17445	5	3	2	0	0	0	2
	Mitha Khel	30274	8	5	4	0	0	3	1
	Mitha Wala (excluding urban)	1105	0	1	0	0	0	0	0
	Palosa Sar	16863	9	8	2	0	0	1	1
	Rehmat Abad	15652	5	5	2	0	0	1	1
	Sabir Abad (excluding urban)	16324	6	6	2	0	0	1	1
	Sarat Khel	31027	11	12	4	0	0	2	2

Tehsil	Village Councils	Projected Population 2045	Boys	Girls	Requirement	Backlog	Backlog	BOYS	GIRLS
			Existing			Boys	Girls	2045	2045
	Surdag	17901	3	4	2	0	0	1	1
	Tappi Karak (excluding urban)	5185	2	1	1	0	0	0	1
	Tarkha Koi	19856	4	5	3	0	0	2	1
	Tarki Khel	22367	4	2	3	0	1	1	2
	Warana Latamber	18055	5	9	2	0	0	2	0
Takht-e-Nasrati	Takht Nasati Bala (excluding urban)	10475	1	2	1	0	0	1	0
	Takht Nasrati Payan (exlcuding urban)	10186	5	1	1	0	0	0	1
	Bogara	20589	9	8	3	0	0	2	1
	Ahmad Abad	24445	7	6	3	0	0	2	1
	Chokara	31199	5	10	4	0	0	3	1
	Gandiri Khattak	26314	10	7	3	0	0	1	2
	Ghundi Kala	29094	5	8	4	0	0	3	1
	Jahangiri	27476	11	11	4	0	0	2	2
	Kari Dhand	37661	15	8	5	0	0	2	3
	Khojaki	31741	12	13	4	0	0	2	2
	Nara	33761	15	12	4	0	0	2	2
	Sai Kot	23997	5	7	3	0	0	1	2
	Sarki Lawagher	15391	5	3	2	0	0	1	1
	Shah Salim	25310	11	5	3	0	0	1	2
	Shahidan Banda	27565	13	10	4	0	0	2	2
	Siraj Khel	29809	6	6	4	0	0	2	2
	Surati Kala	19056	5	3	2	0	0	1	1
	Tatter Khel	25922	9	10	3	0	0	2	1
	Warana Mirhasan Khel	16557	2	2	2	0	0	1	1
	Warana Mosakan	16447	4	7	2	0	0	2	0
	Yaghi Mosakan	28984	13	10	4	0	0	2	2
Banda Daud Shah	Bahadar Khel	19311	8	6	2	0	0	1	1
	Darish Khel	21278	11	3	3	0	0	1	2
	Khuram Muhammad Zai	20432	8	6	3	0	0	2	1

Tehsil	Village Councils	Projected Population 2045	Boys	Girls	Requirement	Backlog	Backlog	BOYS	GIRLS
			Existing			Boys	Girls	2045	2045
	Dagar Nari	24272	4	3	3	0	0	1	2
	Nari Panos	24797	5	4	3	0	0	2	1
	Jatti Ismail Khel	30060	13	4	4	0	0	1	3
	Makori	31025	5	2	4	0	0	2	2
	Mami Khel	23538	7	3	3	0	0	1	2
	Teri Chapri	20258	4	2	3	0	1	1	2
	Teri	18957	3	5	2	0	0	2	0
	Ahmadi Banda (excluding urban)	10801	7	5	1	0	0	0	1
	Esak Khumari	15961	5	4	2	0	0	1	1
	Mardan Khel	18441	7	1	2	0	0	0	2
	Gurguri	17176	7	2	2	0	0	0	2
	Overall	**1268925**	**407**	**314**	162	0	3	76	86

3.3.1.4.2. High Schools

The table outlines the projected need for secondary schools in various urban centers of Karak District by 2045, based on a population threshold of one school per 27,000 people. It compares the existing number of boys' and girls' schools with the required number, and calculates the resulting backlog.

Karak City, with a projected population of 131,405, needs five secondary schools. Currently, it has three boys' and two girls' schools, resulting in a backlog of two boys' and three girls' schools. Smaller areas like Ahmadi Banda and Sabirabad, with populations under 8,000, meet the requirement with their existing schools, thus showing no backlog. Takht-e-Nasrati and Latambar each require one school and already have one of each, but minor gender-specific gaps remain.

Overall, the district needs a total of seven schools to meet the 2045 requirement. However, due to mismatches in gender-wise distribution, there is a backlog of two boys' and three girls' schools, emphasizing the need for balanced planning in future school constructionDespite this, addressing the shortfall in rural areas, for both genders it is essential for ensuring equitable access to high school education with detailed data provided in the table below.

Table 3-30: District Karak High School Backlog

Urban Center	Projected Population 2045	BOYS	GIRLS	Requirement	Backlog	Backlog	BOYS	GIRLS
		Existing			Boys	Girls	2045	2045
Karak City	131405	3	2	5	2	3	2	3
Ahmadi Banda	7715	1	1	0	0	0	0	0
Sabirabad	7105	1	1	0	0	0	0	0
Takht-e-Nasrati	21393	1	1	1	0	0	1	0
Latambar	22602	1	1	1	0	0	0	1
Overall	**190220**	**7**	**6**	**7**	**2**	**3**	**3**	**4**

Tehsil	Village Council	Projected Population 2045	Boys	Girls	Requirement	Backlog	Backlog	BOYS	GIRLS
			Existing	Existing		Boys	Girls	2045	2045
KARAK	Chani Khel	24983	1	0	1	0	0	0	1
	Deli Mela	17876	1	1	1	0	0	1	0
	Dhand Idal Khel	11623	2	0	0	0	0	0	0
	Doda Khel	19477	0	1	1	0	0	1	0
	Esak Chontra	30949	2	1	1	0	0	1	0
	Ghundi Mirkhan Khel	28843	2	1	1	0	0	0	1
	Jandri	24453	1	0	1	0	0	0	1
	Kanda Kharak	35875	0	0	1	0	0	1	0
	Kandu Khel	27621	0	0	1	0	0	1	0
	Laki Ghundaki (excluding urban)	8225	0	0	0	0	0	0	0
	Latamber Gharbi (excluding urban)	5808	0	0	0	0	0	0	0
	Latamber Sharqi (excluding urban)	12852	0	0	0	0	0	0	0
	Mandawa	17445	1	0	1	0	0	0	1
	Mitha Khel	30274	1	1	1	0	0	1	0
	Mitha Wala (excluding urban)	1105	0	0	0	0	0	0	0
	Palosa Sar	16863	3	1	1	0	0	0	1
	Rehmat Abad	15652	1	0	1	0	0	0	1
	Sabir Abad (excluding urban)	16324	0	0	1	0	0	1	0

Tehsil	Village Council	Projected Population 2045	Boys	Girls	Requirement	Backlog	Backlog	BOYS	GIRLS
			Existing	Existing		Boys	Girls	2045	2045
	Sarat Khel	31027	1	1	1	0	0	1	0
	Surdag	17901	1	1	1	0	0	0	1
	Tappi Karak (excluding urban)	5185	0	0	0	0	0	0	0
	Tarkha Koi	19856	1	1	1	0	0	1	0
	Tarki Khel	22367	0	1	1	0	0	1	0
	Warana Latamber	18055	0	0	1	0	0	1	0
Takht-e-Nasrati	Takht Nasati Bala (excluding urban)	10475	0	0	0	0	0	0	0
	Takht Nasrati Payan (exlcuding urban)	10186	1	0	0	0	0	0	0
	Bogara	20589	0	1	1	0	0	1	0
	Ahmad Abad	24445	1	1	1	0	0	1	0
	Chokara	31199	2	0	1	0	0	1	0
	Gandiri Khattak	26314	1	1	1	0	0	1	0
	Ghundi Kala	29094	1	1	1	0	0	1	0
	Jahangiri	27476	0	1	1	0	0	1	0
	Kari Dhand	37661	2	0	1	0	0	1	0
	Khojaki	31741	3	0	1	0	0	1	0
	Nara	33761	0	1	1	0	0	1	0
	Sai Kot	23997	1	0	1	0	0	1	0
	Sarki Lawagher	15391	1	0	1	0	0	1	0
	Shah Salim	25310	0	0	1	0	0	1	0
	Shahidan Banda	27565	1	0	1	0	0	1	0
	Siraj Khel	29809	1	0	1	0	0	1	0
	Surati Kala	19056	1	1	1	0	0	1	0
	Tatter Khel	25922	1	1	1	0	0	1	0
	Warana Mirhasan Khel	16557	0	0	1	0	0	1	0
	Warana Mosakan	16447	1	1	1	0	0	1	0
	Yaghi Mosakan	28984	1	1	1	0	0	1	0
Banda Daud Shah	Bahadar Khel	19311	0	1	1	0	0	1	0
	Darish Khel	21278	2	0	1	0	0	1	0
	Khuram Muhammad Zai	20432	2	1	1	0	0	1	0

Tehsil	Village Council	Projected Population 2045	Boys	Girls	Requirement	Backlog	Backlog	BOYS	GIRLS
			Existing	Existing		Boys	Girls	2045	2045
	Dagar Nari	24272	1	0	1	0	0	1	0
	Nari Panos	24797	0	1	1	0	0	1	0
	Jatti Ismail Khel	30060	1	0	1	0	0	1	0
	Makori	31025	1	0	1	0	0	1	0
	Mami Khel	23538	1	0	1	0	0	1	0
	Teri Chapri	20258	0	0	1	0	0	1	0
	Teri	18957	1	0	1	0	0	1	0
	Ahmadi Banda (excluding urban)	10801	0	0	0	0	0	0	0
	Esak Khumari	15961	2	0	1	0	0	0	1
	Mardan Khel	18441	0	0	1	0	0	0	1
	Gurguri	17176	1	0	1	0	0	0	1
Overall		**1268925**	**49**	**23**	50	0	0	40	10

3.3.1.4.3. Higher Secondary Schools

The table presents the projected requirement for higher secondary schools in urban centers of Karak District by 2045, using a standard of one school per 60,000 population. It compares the existing number of boys' and girls' higher secondary schools with the calculated need based on future population. Karak City, with a projected population of 131,405, requires two higher secondary schools—one for boys and one for girls. Since one school of each type already exists, there is a backlog of one boys' and one girls' school. Smaller areas like Ahmadi Banda and Sabirabad, due to their relatively low populations, do not require separate higher secondary schools and thus show no backlog.

Takht-e-Nasrati and Latambar, though not meeting the 60,000 threshold individually, are planned to receive one higher secondary school each—Takht-e-Nasrati for boys and Latambar for girls—likely due to geographic needs or gender-based service gaps. Overall, the district needs two additional schools, with a backlog of one boys' and one girls' school to meet future educational demands.

Table 3-31: District Karak Higher Secondary Schools Backlog

Urban Center	Projected Population 2045	BOYS	GIRLS	Requirement	Backlog		BOYS	GIRLS
		Existing			Boys	Girls	2045	2045
Karak City	131405	**1**	**1**	2	1	1	1	1
Ahmadi Banda	7715	0	0	0	0	0	0	0
Sabirabad	7105	0	0	0	0	0	0	0
Takht-e-Nasrati	21393	0	0	0	0	0	1	0
Latambar	22602	0	0	0	0	0	0	1
Overall	**190220**	**1**	**1**	**2**	**1**	**1**	**1**	**1**

Village Council	Projected Population 2045	Combined Population	Boys	Girls	Requirement	Backlog		BOYS	GIRLS
			Existing			Boys	Girls	2045	2045
Chani Khel	24,983	103,814	1	0	2				
Ghundi Mirkhan Khel	28,843					1	0	1	1
Kandu Khel	27,621								
Tarki Khel	22,367								
Palosa Sar	16,863	62,686	0	0	1				
Sabir Abad (excluding urban)	16,324					0	0	1	0
Deli Mela	17,876								
Dhand Idal Khel	11,623								
Jandri	24,453	74,957	1	0	1				
Sarat Khel	31,027					0	0	0	1
Doda Khel	19,477								
Esak Chontra	30,949	81,079	0	1	1				
Tarkha Koi	19,856					0	0	0	1
Mitha Khel	30,274								
Laki Ghundaki (excluding urban)	8,225	66,042	2	1	1				
Kanda Kharak	35,875								
Mitha Wala (excluding urban)	1,105					0	0	1	0
Tappi Karak (excluding urban)	5,185								
Rehmat Abad	15,652								
Latamber Gharbi (excluding urban)	5,808	72,061	0	0	1				
Latamber Sharqi (excluding urban)	12,852								

Village Council	Projected Population 2045	Combined Population	Boys	Girls	Requirement	Backlog		BOYS	GIRLS
			Existing			Boys	Girls	2045	2045
Mandawa	17,445					0	0	1	0
Surdag	17,901								
Warana Latamber	18,055								
Tehsil Karak		**460,639**	**4**	**2**	**7**	**1**	**0**	**4**	**3**
Takht Nasati Bala (excluding urban)	10,475								
Sarki Lawagher	15,391	55,675	0	0	1	0	0	1	0
Siraj Khel	29,809								
Takht Nasrati Payan (exlcuding urban)	10,186								
Bogara	20,589	57,089	1	0	1	0	0	1	0
Gandiri Khattak	26,314								
Ahmad Abad	24,445								
Khojaki	31,741	82,108	0	0	1	0	0	1	0
Tatter Khel	25,922								
Jahangiri	27,476								
Shahidan Banda	27,565	84,025	2	0	1	0	0	0	1
Yaghi Mosakan	28,984								
Chokara	31,199	60,293	0	1	1	0	0	1	0
Ghundi Kala	29,094								
Kari Dhand	37,661								
Nara	33,761	96,732	1	0	2	1	0	1	1
Shah Salim	25,310								
Sai Kot	23,997								
Surati Kala	19,056	76,057	1	0	1	0	0	0	1
Warana Mirhasan Khel	16,557								
Warana Mosakan	16,447								
Tehsil Takhti Nasrati		**511,979**	**5**	**1**	**8**	**1**	**0**	**5**	**3**
Bahadar Khel	19,311								
Darish Khel	21,278								
Khuram Muhammad Zai	20,432	110,090	2	0	2	0	0	1	1
Dagar Nari	24,272								
Nari Panos	24,797								

Village Council	Projected Population 2045	Combined Population	Boys	Girls	Requirement	Backlog		BOYS	GIRLS
			Existing			Boys	Girls	2045	2045
Jatta Ismail Khel	30,060	95,424	1	0	2				
Makori	31,025					1	0	1	1
Mami Khel	23,538								
Ahmadi Banda (excluding urban)	10,801								
Teri Chapri	20,258	90,793	0	1	2				
Teri	18,957								
Esak Khumari	15,961					0	1	1	1
Mardan Khel	18,441								
Gurguri	17,176								
Tehsil Banda Daud Shah		**296,307**	**3**	**1**	**6**	**1**	**1**	**3**	**3**
Overall		**1,268,925**	**12**	**4**	**21**	**3**	**1**	**12**	**9**

3.3.1.4.4. Degree Colleges

The need for new degree colleges was assessed using the NRM standard: one boys' college per 400,000 people and one girls' college per 750,000. The backlog was calculated at the tehsil level by dividing the population by these thresholds, then subtracting existing colleges from the required number.

Within the District Karak, there is no deficiency of degree colleges, the existing degree colleges for boys and girls are sufficient for the current population. The details are given in below **Table.**

Table 3-32: District Karak Colleges Backlog

Administrative Area		Existing Colleges	Required Colleges 2045	Backlog
Karak Tehsil	Boys	3	2	-1
	Girls	2	1	-1
Takht-e-Nasrati Tehsil	Boys	3	1	-2
	Girls	1	0	-1
Banda Daud Shah Tehsil	Boys	1	0	-1
	Girls	1	0	-1

3.3.1.5. Constraints

- Urban areas have a severe shortage of middle and high schools, particularly for boys.
- Rural areas have fewer higher secondary schools, limiting access to advanced education. Girls' education is particularly constrained, with fewer higher secondary schools.
- High student-teacher ratios, especially in boys' primary schools (1:44) and girls' high schools (1:21), affect education quality. Girls' enrollment is significantly lower than boys' across all levels.
- Limited institutes for technical education with zero reported for females.
- The district has only two technical institutes, both for boys, with none available for girls.
- A significant gender disparity exists, with girls having fewer schools than boys at almost every level.
- Degree colleges are not proportionally distributed considering the larger rural population.
- The overall number of educational institutes is insufficient to meet future population growth and access demands.

3.3.1.6. Recommendations

- **Establish more middle and high schools in urban areas**, especially for boys, to address current shortages and ensure equitable access.
- **Upgrade existing schools or construct new higher secondary schools in rural areas**, with a focus on increasing facilities for girls to improve gender parity in advanced education.
- **Expand Higher Secondary Education** – Propose the establishment of 21 new higher secondary schools (12 for boys and 9 for girls) in rural areas to address the current backlog and projected demand. Additionally, upgrade existing high schools where feasible to higher secondary level to ensure adequate coverage and accessibility for the plan period up to 2045.
- **Recruit more qualified teachers and reduce student-teacher ratios**, particularly in overcrowded boys' primary and girls' high schools, to enhance learning outcomes.
- **Establish a Women's Technical Institute** – Develop a dedicated vocational training center to enhance technical skills and employment opportunities for females.
- **Improve Educational Infrastructure** – Expand schools and colleges in Ahmadi Banda, Sabirabad, Takht-e-Nasrati, and Latambar.
- **Address School Shortages** – Build high schools in Urban areas, additionally, 50 new high schools need to be established especially for rural areas
- **Enhance Enrollment & Retention** – Provide financial aid, free learning materials, and community awareness programs.

- **Ensure equitable distribution of degree colleges** by establishing additional institutions in underserved rural areas to match population needs and improve higher education accessibility.
- **Plan and construct additional educational institutions at all levels** to align with projected population growth and ensure adequate access to quality education across the district.

3.3.2. Health

Health is a crucial aspect of land use planning and is directly linked to sustainability. The design, layout, and function of communities significantly impact public health, yet this connection is often overlooked. Land use decisions shape not only physical spaces but also influence health outcomes, including obesity, diabetes, heart disease, and respiratory illnesses. Poor planning can discourage physical activity, limit access to healthy food, and expose communities to environmental hazards.

To address these challenges, broad policies and strategies are needed to promote healthier community design, improve building practices, and mitigate environmental risks. Raising awareness among policymakers, the media, and the public while fostering collaboration between public health and urban planning professionals is essential for reversing negative health trends.

3.3.2.1. Existing Health Facilities

A health facility is defined as an institution that provides health services, both curative and preventive, to all specific classes of the public, including both outdoor/indoor patients. Before the partition of the Subcontinent, Pakistan's healthcare system was based on the British model. Over time, it has evolved into a network of public and private sectors providing primary, secondary, and tertiary care. Rural and peri-urban areas access healthcare through dispensaries, basic health units (BHUs), sub-health centers, maternity and child health centers, and rural health centers. The public and private sectors operate tertiary care facilities in urban areas, forming an integrated healthcare system. The health facilities in District Karak are divided into government and private facilities.

3.3.2.1.1. Government Healthcare

District Karak has 6 hospitals with 530 beds across urban and rural areas. All these hospitals are located in the urban areas of District Karak while the rural areas have 6 RHC's with 76 beds. Additionally, 18 functional Basic Health Units (BHUs), 3 dispensaries, and 2 Mother and Child Health Centers (MCHCs).

Urban Healthcare Facilities

- Karak City has 2 hospitals with 274 beds and 1 Sub-Health Center (SHC).
- Sabirabad and Latambar each have 1 hospital with 66 and 40 beds, respectively.
- Ahmadi Banda and Takht-e-Nasrati each have 1 hospital with 40 and 110 beds, respectively.

Rural Healthcare Facilities

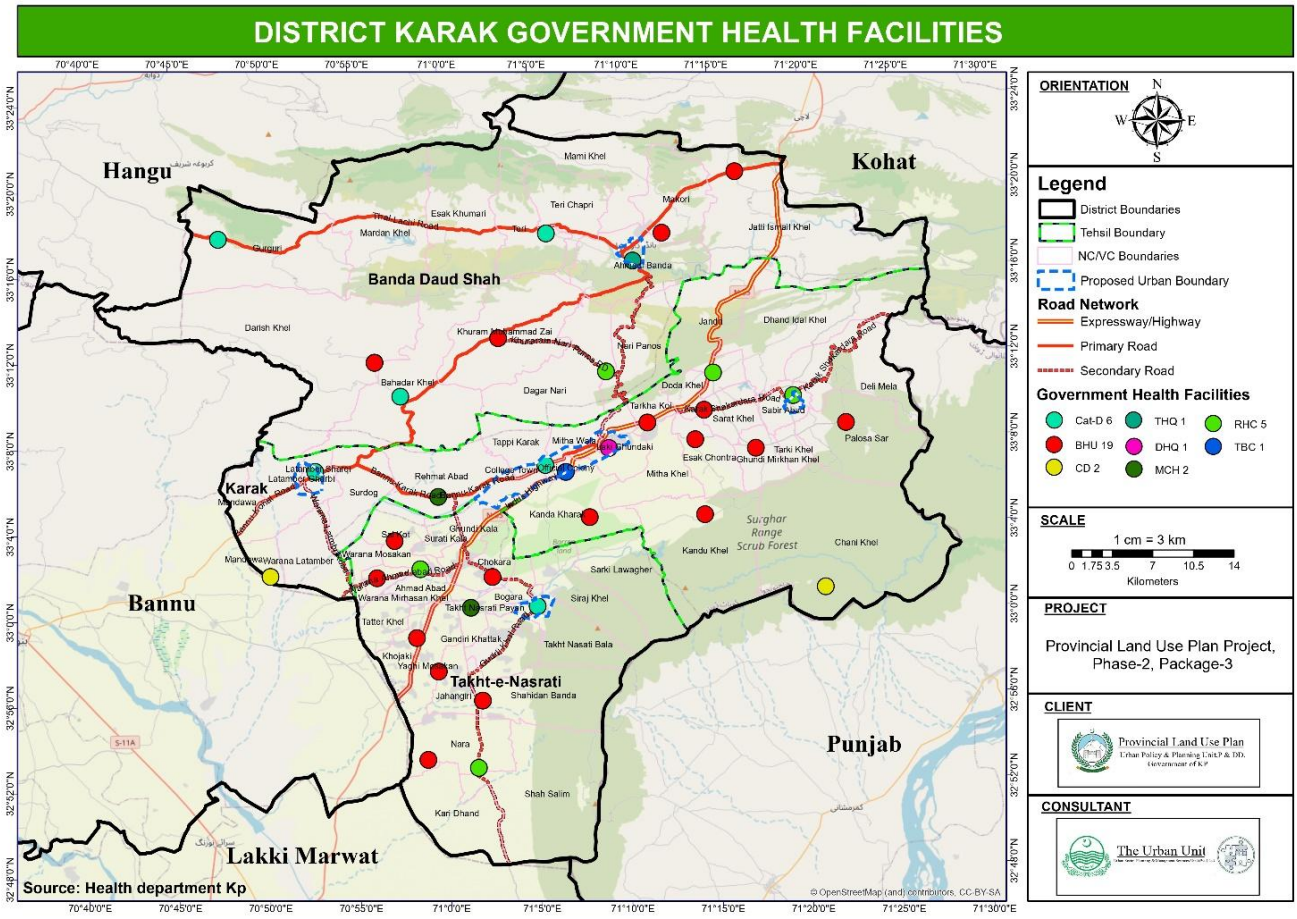
- Karak Tehsil has 1 RHC with 8 beds, 7 BHUs, 3 dispensaries, and 1 MCHC.
- Takht-e-Nasrati Tehsil has 2 RHCs with 16 beds, 7 BHUs, and 1 MCHC.
- Banda Daud Shah Tehsil has 3 RHCs with 52 beds and 5 BHUs.

Table 3-33: District Karak Public Health Institutes[33]

Administrative Area	Hospitals		Rural Health Centers		Basic Health Units	Dispensaries	TB Clinics	Mother Child Health Centers
	Number	Beds	Number	Beds				
District Urban	6	530	-	-	-	-	1	-
District Rural	-	-	7	84	18	3	-	2
District Overall	**6**	**530**	**7**	**84**	**18**	**3**	**-**	**2**

[33] *Secondary data were collected from the Independent Monitoring Unit, Health Department, Khyber Pakhtunkhwa, and Directorate General Health Services, Khyber Pakhtunkhwa.*

Administrative Area	Hospitals		Rural Health Centers		Basic Health Units	Dispensaries	TB Clinics	Mother Child Health Centers
	Number	Beds	Number	Beds				
Urban Areas								
Karak City	2	274	-	-	-	-	1	-
Ahmadi Banda	1	66	-	-	-	-	-	-
Sabirabad	1	40	-	-	-	-	-	-
Takht-e-Nasrati	1	110	-	-	-	-	-	-
Latambar	1	40	-	-	-	-	-	-
Rural Areas								
Karak Tehsil	-	-	1	8	7	3		1
Takht-e-Nasrati Tehsil	-	-	2	16	7	-	-	1
Banda Daud Shah Tehsil	-	-	4	60	4	-	-	-



Map 3-21 District Karak Government Health Facilities

3.3.2.1.2. Private institutes

District Karak has 4 hospitals, 42 clinics, 9 medical centers, 6 homeopathic clinics, 5 Unani clinics, and 13 laboratories, with more clinics and labs in rural areas.

Urban Areas

- Karak City: Largest hub with 3 hospitals, 19 clinics, 3 medical centers, 3 homeopathic clinics, and 5 labs.
- Takht-e-Nasrati: 9 clinics, 1 medical center, 4 labs.

- Ahmadi Banda: 1 medical center, 1 homeopathic clinic.
- Latambar: 1 homeopathic, 1 lab.
- Sabirabad: No listed private facilities.

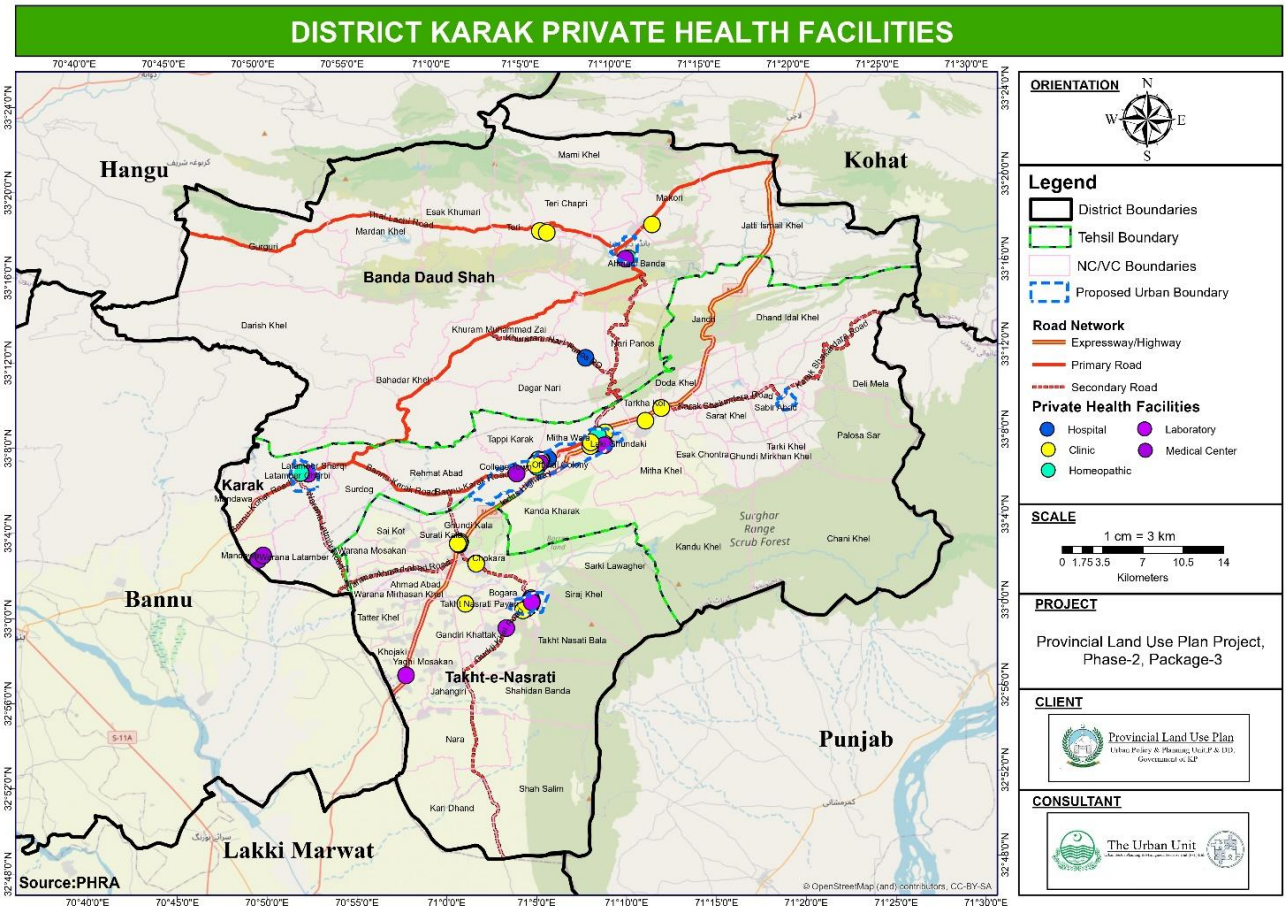
Rural Areas

- Karak Tehsil: 2 clinics, 2 medical centers.
- Takht-e-Nasrati Tehsil: 9 clinics, 1 medical center, 3 labs.
- Banda Daud Shah Tehsil: 1 hospital, 3 clinics, 1 medical center, 1 homeopathic.

Table 3-34: District Karak Private Health Facilities[34]

Administrative Area	Hospitals	Clinics	Medical Center	Homeopathic Clinic	Laboratories
District Urban	3	28	5	5	10
District Rural	1	14	4	1	3
District Overall	4	42	9	6	13
Urban Areas					
Karak City	3	19	3	3	5
Ahmadi Banda			1	1	
Sabirabad					
Takht-e-Nasrati		9	1		4
Latambar				1	1
Rural Areas					
Karak Tehsil		2	2		
Takht-e-Nasrati Tehsil		9	1		3
Banda Daud Shah Tehsil	1	3	1	1	

[34] *Secondary data was collected from the Health Care Commission, Khyber Pakhtunkhwa.*



Map 3-22 District Karak Private Health Facilities

3.3.2.2. Doctor-to-Population Ratio

The doctor-to-population ratio, also known as physician density, is a key metric used to assess healthcare accessibility and the distribution of healthcare providers within a population. It is typically expressed as the number of physicians per 1,000 or 10,000 inhabitants. The ideal doctor-to-population ratio varies depending on factors such as the healthcare needs of the population, the distribution of healthcare resources, the prevalence of diseases, and the level of healthcare infrastructure and services available. Human resources are crucial for quality healthcare, with a minimum threshold of 4.45 health workers per 1,000 people to achieve UHC/SDG-3. This includes 1.11 doctors and 3.34 nurses, LHVs, and midwives per 1,000.

In District Karak, 299 doctors serve a projected population in 2025 of 869,476, resulting in a doctor-to-population ratio of 0.34:1,000. The district also has 173 nurses, 50 LHVs, and 66 midwives, with a combined ratio of 0.33:1,000. Overall, the essential health workforce ratio is just 0.67:1,000—significantly below the UHC standard.

3.3.2.3. Need for New Health Facilities

3.3.2.3.1. Primary Healthcare

Dispensaries/Community Health Centers

In Karak, urban areas are underprivileged in terms of primary healthcare, lacking existing primary health facilities. Therefore, per the Health Department's "STANDARDIZATION OF HEALTH FACILITIES IN NWFP", the draft land-use Plan of District Karak identifies and recommends the provision of 8 new dispensaries/community health centers (without a medical officer), to cater to the basic health needs like common illnesses, minor injuries, and vaccinations, etc., at community levels. The details are given in the table below.

Table 3-35: Need for New Dispensaries/CHCs

Administrative Area	Population 2045 (A)	Required Dispensaries 2045 @20000 (B = A/20000)	Existing Dispensary (C)	Backlog 2045 (B-C)
Karak City	131405	6	0	6
Ahmadi Banda	7715	0	0	0
Latambar	22602	1	0	1
Sabirabad	7105	0	0	0
Takht-e-Nasrati	21393	1	0	1
District Urban	**190220**	**8**	0	**8**

Basic Health Units (BHU's)

The need for new Basic Health Units (BHUs) has also been assessed according to Health Department standards, which specify one BHU for every 20,000 people in urban areas and one BHU for every 15,000 people in rural areas, up to a defined maximum threshold[35]. To determine the required number of BHUs, the total population of each urban and rural area was divided by its respective population standards. The number of existing BHUs was then subtracted from the required number in each area to calculate the backlog of BHUs.

Keeping in view the existing health infrastructure condition, the backlog has been derived through truncation or floor rounding, i.e., 1.9=1, 0.99=0, and 2.45=2. In Karak, most of the existing facilities have poor functioning and have good potential for upgradation, and many of the backlog areas are surrounded by neighboring health facilities within a 5 km range, thereby allowing minimal provisions for new facilities.

Therefore, in district Karak, with a projected total population of 1,463,480 by 2045, the district's rural area will require a total of 61 new BHUs, but only 19 currently exist, including 1 non-functional. The backlog calculated is 42 BHUs, while 25 new BHUs are proposed across the district's underserved rural areas, including the upgradation of lower-tier facilities (Civil Dispensaries) to BHUs.

Following this, in Tehsil Karak, a total of 9 BHU's have been proposed, wherein the Chani Khel and Mandawa VC's existing civil dispensaries in Kurd Sharif and Mandawa, respectively, have been upgraded to BHU's, while the Deli Mela and Dand Idal Khel VCs have been collectively provided with a single BHU, as both are having Category D hospitals in proximity. Subsequently, the Tarkha Koi and Rehmat Abad VCs, each have been proposed with a BHU due to the proximity of DHQ and Category C/D hospitals, respectively, while the Sarat Khel, Surdag, Tarki Khel, and Warana Latamber VCs, each have also been proposed with a BHU due to their proximity to Category D hospitals.

Similarly, in the Tehsil Takht-e-Nasrati, a total of 10 BHUs have been proposed, wherein Bagara, Gandiri Khattak, Ghundi Kala, Kari Dand, Sarki Lawagher, Shah Salim, Siraj Khel, Surati Kala, Tatter Khel, and Warana Musa Khan VCs, each have been allocated with a single BHU due to RHC/Category C hospitals in proximity.

Lastly, in the Banda Daud Shah Tehsil, a total of 6 BHUs have been proposed, wherein Jatta Ismail Khel, Mami khel, Teri Chapri VCs, each have been allocated with a single BHU due to the proximity of RHC/Category C hospitals, and Esak Kumari and Mardan Khel VCs, each have also been allocated with a single BHU due to the proximity of RHC/Category D hospitals.

[35] *Secondary data provided by Directorate General Health Services government of KP*

Table 3-36: Need for new BHUs

Tehsil	Village Council	Population 2045	2045 including urban	Criterion @15000	Requirement	Existing	Backlog	Proposed	Existing Health Facility within proximity
KARAK	Chani Khel	24983	24983	1.7	1	0	1	Upgrade to BHU (from existing CD)	CD Kurd Sharif
	Deli Mela	17876	17876	1.2	1	0	1	1	Cat D Sabirabad
	Dhand Idal Khel	11623	11623	0.8	0	0	0		RHC/Cat D
	Doda Khel	19477	19477	1.3	1	1	0	0	RHC/Cat D
	Esak Chontra	30949	30949	2.1	2	1	1	0	RHC/Cat D
	Ghundi Mirkhan Khel	28843	28843	1.9	1	1	0	0	RHC/Cat D
	Jandri	24453	24453	1.6	1	0	1	0	RHC
	Kanda Kharak	35875	35875	2.4	2	1	1	0	DHQ
	Kandu Khel	27621	27621	1.8	1	1	0	0	CD
	Laki Ghundaki (excluding urban)	8225	15330	0.5	0	0	0	0	DHQ
	Latamber Gharbi (excluding urban)	5808	22330	0.4	0	0	0	0	Cat D
	Latamber Sharqi (excluding urban)	12852	18932	0.9	0	0	0	0	Cat D
	Mandawa	17445	17445	1.2	1	0	1	Upgrade to BHU	CD Mandawa
	Mitha Khel	30274	30274	2.0	2	1	1	0	DHQ/Cat D
	Palosa Sar	16863	16863	1.1	1	1	0	0	Cat D
	Rehmat Abad	15652	15652	1.0	1	0	1	1	Cat C/Cat D
	Sabir Abad (excluding urban)	16324	23914	1.1	1	0	1	0	Cat D
	Sarat Khel	31027	31027	2.1	2	0	2	1	Cat D
	Surdag	17901	17901	1.2	1	0	1	1	Cat D
	Tarkha Koi	19856	19856	1.3	1	0	1	1	DHQ
	Tarki Khel	22367	22367	1.5	1	0	1	1	Cat D
	Warana Latamber	18055	18055	1.2	1	0	1	1	Cat D
	Overall		**491646**		**22**	**7**	**15**	**9**	
Takht-e-Nasrati	Takht Nasati Bala (excluding urban)	10475	23014	0.7	0	0	0	0	Cat C
	Takht Nasrati Payan (exlcuding urban)	10186	19040	0.7	0	0	0	0	Cat C
	Bogara	20589	20589	1.4	1	0	1	1	Cat C
	Ahmad Abad	24445	24445	1.6	1	0	1	0	RHC
	Chokara	31199	31199	2.1	2	1	1	0	RHC
	Gandiri Khattak	26314	26314	1.8	1	0	1	1	Cat C
	Ghundi Kala	29094	29094	1.9	1	0	1	1	RHC/Cat C
	Jahangiri	27476	27476	1.8	1	1	0	0	RHC/Cat C
	Kari Dhand	37661	37661	2.5	2	0	2	1	RHC

Tehsil	Village Council	Population 2045	2045 including urban	Criterion @15000	Requirement	Existing	Backlog	Proposed	Existing Health Facility within proximity
	Khojaki	31741	31741	2.1	2	1	1	0	RHC/Cat C
	Nara	33761	33761	2.3	2	1	1	0	RHC
	Sai Kot	23997	23997	1.6	1	1	0	0	RHC
	Sarki Lawagher	15391	15391	1.0	1	0	1	1	Cat C
	Shah Salim	25310	25310	1.7	1	0	1	1	RHC
	Shahidan Banda	27565	27565	1.8	1	1	0	0	RHC/Cat C
	Siraj Khel	29809	29809	2.0	2	0	2	1	RHC
	Surati Kala	19056	19056	1.3	1	0	1	1	RHC
	Tatter Khel	25922	25922	1.7	1	0	1	1	RHC
	Warana Mirhasan Khel	16557	16557	1.1	1	1	0	0	RHC
	Warana Mosakan	16447	16447	1.1	1	0	1	1	RHC
	Yaghi Mosakan	28984	28984	1.9	1	0	1	0	RHC/Cat C
	Overall		**533372**		**24**	**7**	**17**	**10**	
Banda Daud Shah	Bahadar Khel	19311	19311	1.3	1	0	0	0	RHC
	Darish Khel	21278	21278	1.4	1	1	0	0	RHC
	Khuram Muhammad Zai	20432	20432	1.4	1	1	0	0	RHC/Cat C
	Dagar Nari	24272	24272	1.6	1	0	1	0	RHC
	Nari Panos	24797	24797	1.7	1	0	1	0	
	Jatti Ismail Khel	30060	30060	2.0	2	1	1	1	Cat C
	Makori	31025	31025	2.1	2	1	1	0	Cat C
	Mami Khel	23538	23538	1.6	1	0	1	1	RHC/Cat C
	Teri Chapri	20258	20258	1.4	1	0	1	1	RHC/Cat C
	Teri	18957	18957	1.3	1	0	1	0	RHC/Cat C
	Ahmadi Banda (excluding urban)	10801	18516	0.7	0	0	0	0	Existing Cat C
	Esak Khumari	15961	15961	1.1	1	0	1	1	RHC/Cat D
	Mardan Khel	18441	18441	1.2	1	0	1	1	RHC/Cat D
	Gurguri	17176	17176	1.1	1	0	1	0	RHC
Overall			**304022**		**15**	**4**	**10**	**6**	

3.3.2.3.2. Secondary and Tertiary Health Facilities

As per the Health department standards, the secondary and tertiary health facilities (RHCs and Hospitals) have been categorized by the number of beds, the details of which are provided in the **Table** below.

Table 3-13: Health Department Standards for Establishing New Health Facilities

Type of Health Facility	Population	No of Beds	Land Requirement (Kanals)
BHU	15000-20000 (Urban) 10000-15000 (Rural)	N/A	10.75
RHC	45000-60000	20	10.75
Cat-D	105000	42	20-30
Cat-C	275000	110	40-50
Cat-B	525000	210	60
Cat-A	875000	350	70

In the Tehsil Karak (excluding DHQ), existing health facilities include 1 Category C, 2 Category D, and 1 RHC, all of which possess a total of 152 beds. The required number of beds by 2045 is 250 beds, so 98 additional beds are needed to cater to the backlog. The proposed number of beds is 78, resulting in an overall bed capacity of 230 beds by 2045. The proposed interventions include an increase in the number of beds in Cat C (Women & Children) Hospital from 64 to 110, upgradation of BHU Kandu Khel to RHC with an increase of 20 beds, and an increase in the number of beds from 8 to 20 in RHC Jandri.

Likewise, in Tehsil Banda Daud Shah, the existing health facilities include 1 category C hospital and 4 RHCs, which have 126 beds, are sufficient for the Tehsil's healthcare, and there is no need for interventions.

The existing health facilities in the Tehsil Takht-e-Nasrati include 1 category C and 2 RHCs, also having a total of 126 beds. The required number of beds for the Tehsil by 2045 is 213 beds, so 87 additional beds are needed to cater to the backlog. The plan proposes 100 beds for the Tehsil, resulting in an overall bed capacity of 226 beds by the plan period. The proposed intervention is the upgradation of a category C to a category B hospital.

Table 3-14: Need for the Establishment and Upgradation of Secondary and Tertiary Health Facilities

	Tehsil Karak (excluding DHQ)	Tehsil Banda Daud Shah	Tehsil Takhti Nasrati	District
2045	626086	304022	533372	**1463480**
Required No of Beds in 2045 @1 bed for 2500	250	122	213	**585**
Available Beds	152	126	126	**210**
Additional Beds Required	98	-4	87	**189**
Existing Facility	01 Cat C, 02 Cat D, 01 RHC	01 Cat C, 04 RHC	01 Cat C, 02 RHC	**01 DHQ Hospital**
Proposed Interventions	1. Increase no of beds in Cat C W&C Hospital from 64 to 110 2. Upgradation of BHU Kandu Khel to RHC with 20 beds 3. Increase in no of beds from 08 to 20 in RHC Jandri	-	Upgrade from Cat C to Cat B	**Cat B to Cat A**
Proposed Increase in No of Beds	78	-	100	**140**

Bed Capacity after Proposed Intervention	230	126	226	350

3.3.2.4. Constraints

- Urban areas offer a wider range of private hospital options compared to rural areas. Limited access to private healthcare in rural areas results in longer travel times for medical care and increased dependence on public health facilities, further straining existing resources.
- The doctor-to-population ratio stands at 0.34:1,000, significantly lower than the ideal ratio of 1.11:1,000.
- There is a considerable backlog of BHUs across all tehsils as well as urban areas.
- The urban areas are having a backlog of 8 Civil Dispensaries by 2045.
- The district has an overall backlog of 61 BHUs, 15 in Tehsil Karak, 17 in Tehsil Takht-e-Nasrati, and 10 in Banda Daud Shah.
- Similarly, a total of 189 beds are required for the district, wherein 98 in Tehsil Karak, 87 in Tehsil Takht-e-Nasrati.

3.3.2.5. Recommendations

Establishment of New Dispensaries/Community Health Centers:

The Urban areas have been proposed with **06** new Civil Dispensaries (CDs) to further enhance healthcare accessibility.

Expansion of Basic Health Units (BHUs)

- Address the current backlog of **61** BHUs by constructing **25** new units in underserved areas of the district.
- Ensure equitable distribution of BHUs across all tehsils to improve healthcare accessibility.

Enhancement of Rural Health Centers (RHCs)

- Upgradation of BHU Kandu Khel to RHC with 20 beds and an increase in the number of beds from 8 to 20 in RHC Jandri at Tehsil Karak.
- Upgrade facilities with modern equipment and staff to provide quality healthcare services.

Improvement in Doctor-to-Population Ratio

- Increase recruitment of medical professionals to move closer to the ideal ratio of 1.11:1,000.
- Provide incentives for doctors to serve in rural areas to reduce healthcare disparities.

Upgradation of Hospitals

- Upgradation of the DHQ Hospital from Category B to Category A.
- Increase in the number of beds in category C (W&C) Hospital from 64 to 110 in Tehsil Karak.
- Upgradation of Category C Hospital to Category B in Tehsil Takht-e-Nasrati.

In District Karak, the overall proposed number of beds in Tehsil Karak (excluding DHQ) is 78, in Tehsil Takht-e-Nasrati is 100, and an increase of 140 beds is proposed at the DHQ Hospital

3.3.3. Recreational Facilities

Recreational facilities are an essential part of human life and take many different forms, shaped naturally by individual interests and the surrounding environment. Recreational activities include sports, parks, open spaces, and playgrounds.

3.3.3.1. Existing Sports Facilities

Sports facilities in Karak District, particularly on cricket and football grounds, form a crucial part of community engagement and recreation. At the same time, these grounds are popular for various sporting activities. The sports facilities in District Karak are identified from the data collected from the sports and youth affairs department and the district land use classification map.

3.3.3.1.1. Government Sports Facilities

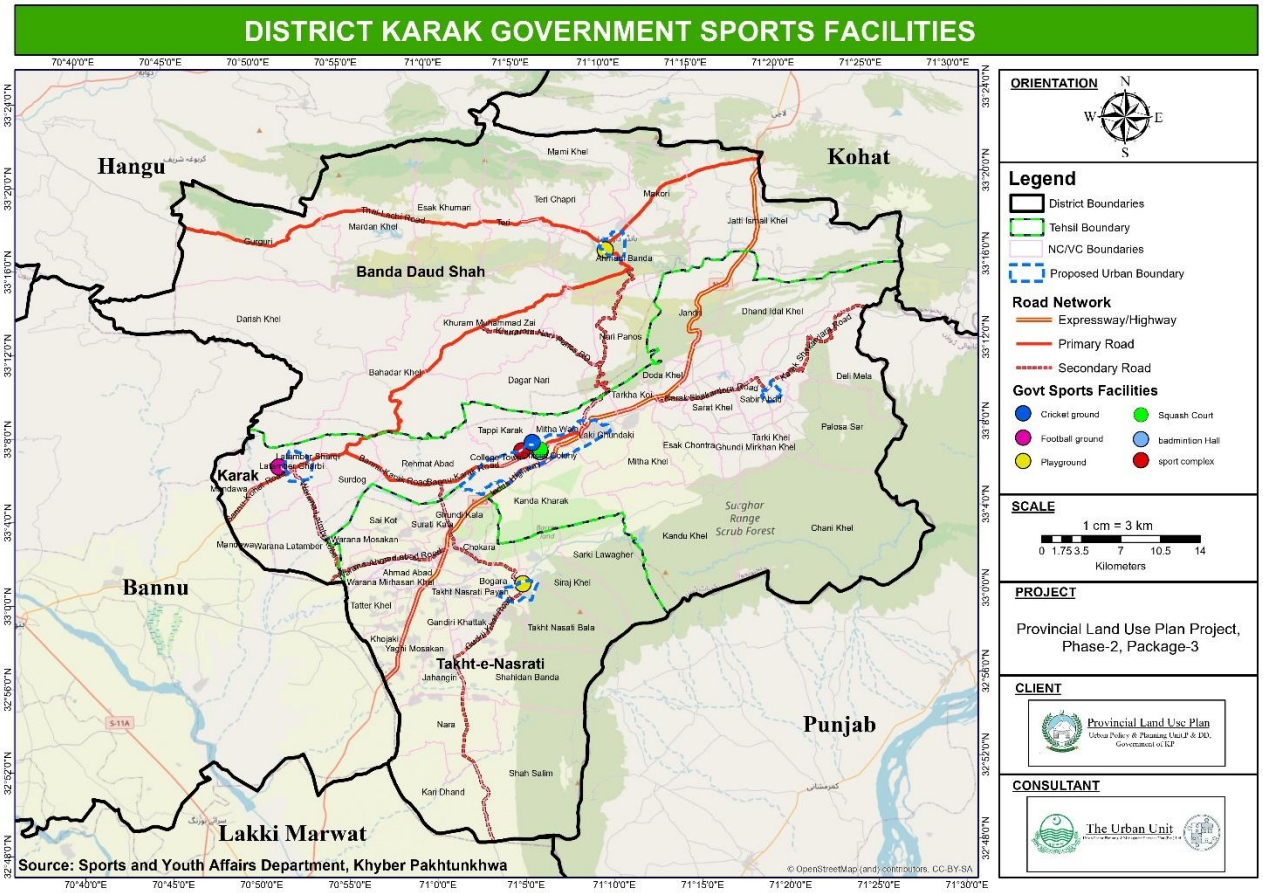
In District Karak, there are 7 government sports facilities, which include 1 sports complex, 2 playgrounds, 1 cricket ground, 1 football ground, 1 badminton court, and 1 squash court.

In urban areas, Karak city has more sports facilities as compared to other urban areas in the district. However, in rural areas, Tehsil Karak has more sports facilities, while the remaining tehsils have no government sports facilities. District Karak sports facilities have been **Tabulated** below.

Table 3-37: District Karak Government Sports Facilities[36]

Administrative Area	Sports Complex	Playgrounds	Cricket Grounds	Football Grounds	Badminton	Squash Court
District Urban	1	2			1	1
District Rural	-	-	1	1		-
District Overall	**1**	**2**	**1**	**1**	**1**	**1**
Urban						
Karak City	1	-	-	-	1	1
Ahmadi Banda	-	1	-	-	-	-
Latambar	-	-	-	-	-	-
Sabirabad	-	-	-	-	-	-
Takht-e-Nasrati	-	1	-	-	-	-
Rural						
Karak Tehsil	-	-	1	1	-	-
Takht-e-Nasrati Tehsil	-	-	-	-	-	-
Banda Daud Shah Tehsil	-	-	-	-	-	-

[36] *Secondary data collected from sports and youth affair department*



Map 3-23 District Karak Government Sports Facilities

3.3.3.1.2. Private Sports Facilities

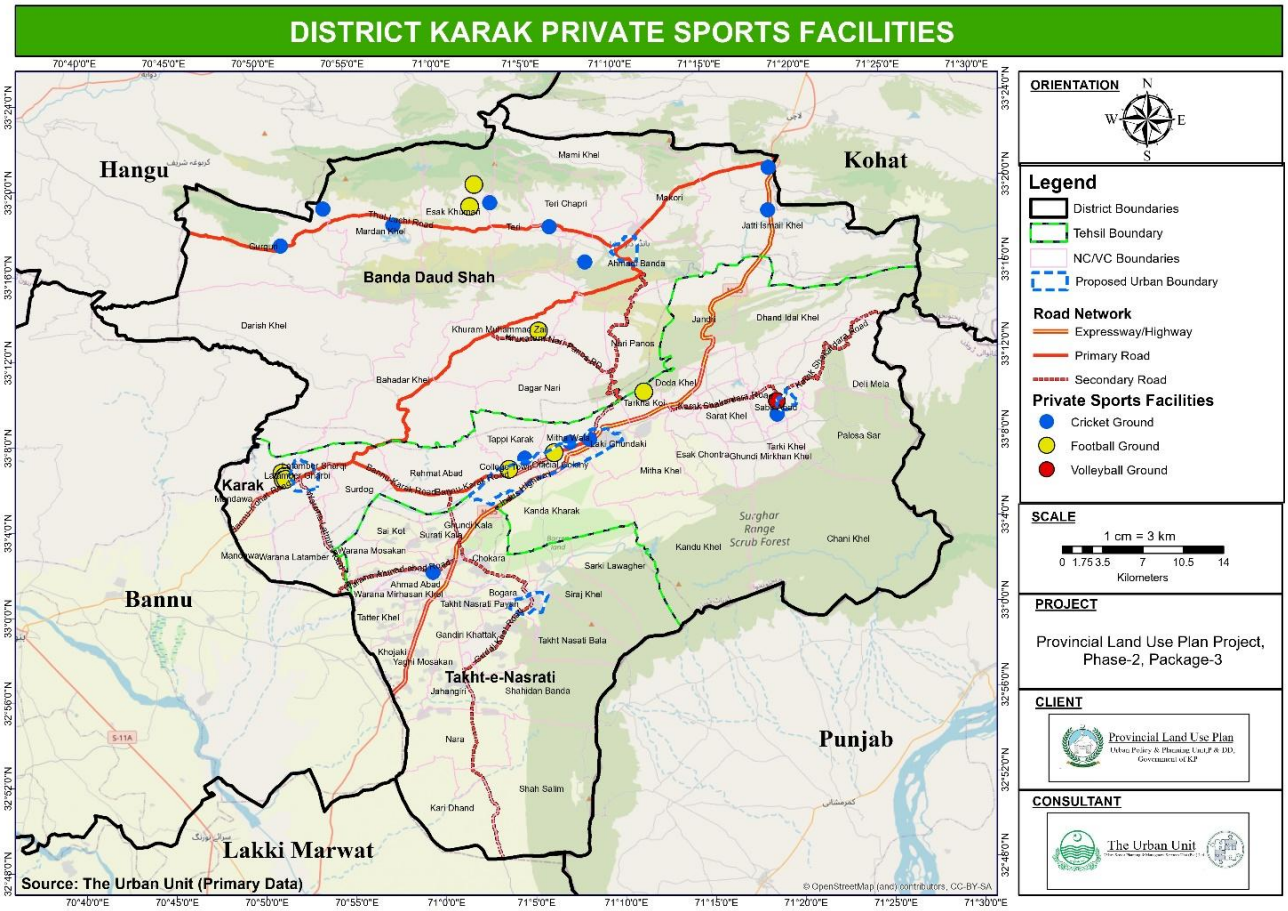
In district Karak, there are 28 total private sports facilities which include 17 cricket grounds, 10 football grounds and 1 volleyball ground.

In urban areas karak city, there are only 3 sports facilities with 1 cricket ground and 2 football grounds, and the rest of the urban areas lack such facilities. While in rural areas, there are 25 sports facilities, tehsil Karak has 6 cricket grounds, 5 football grounds and 1 volleyball ground. Tehsil Banda Daud Shah has 9 cricket grounds 3 football grounds and tehsil Takht-e-Nasrati has only 1 cricket ground. The data has shown in the **Table** below.

Table 3-38: District Karak Private Sports Facilities

Administrative Area	Sports Complex	Playgrounds	Cricket Grounds	Football Grounds	Badminton	Volleyball
District Urban	0	0	1	2	0	0
District Rural	0	0	16	8	0	1
District Overall	**0**	**0**	**17**	**10**	**0**	**1**
Urban						
Karak City			1	2		
Ahmadi Banda						
Latambar						
Sabirabad						
Takht-e-Nasrati						
Rural						
Karak Tehsil			6	5		1

Takht-e-Nasrati Tehsil			1			
Banda Daud Shah Tehsil			9	3		



Map 3-24 District Karak Government Sports Facilities

3.3.3.2. Future requirement of Sports Facilities

In District Karak, the consultant has consolidated both public and private recreational facilities, including parks, playgrounds, and sports complexes. The assessment focuses on the district's urban areas and the analysis considered the existing recreational facilities along with their land area (in hectares), and the proposed recreational area was then divided by the existing urban footprint to calculate the percentage allocation for future recreational space, the observed land use of recreational data was obtained from National Reference Manual (NRM)[37].

Karak City currently has the highest number of recreational facilities 6 and the largest proposed recreational area of 43.18 hectares; however, it reflects the lowest recreational land percentage 2% relative to its urban boundary. In contrast, Ahmadi Banda and Takht-e-Nasrati, with fewer existing facilities, show higher proposed recreational percentages of 5% and 4%, respectively. Latambar and Sabirabad notably lack any existing recreational facilities, despite proposed areas of 20.89 and 7.4 hectares, indicating a gap in current recreational infrastructure. This data highlights the need for equitable distribution and development of recreational spaces, particularly in underserved areas like Latambar and Sabirabad. The detail data has shown in below **Table**.

Table 3-39: Proposed recreational facilities in urban centers

[37] National Reference Manual of Planning and Infrastructure Standards (NRM). Table 10.2: observed range of land use proportions at city/town scale (%)

Administrative Area	Existing recreational facilities combined	Existing Area in Hectares (ha)	Proposed recreational area	Existing urban boundary	Proposed % of recreational
Karak City	6	10.78	40.68	2554	2%
Ahmadi Banda	1	1.58	18.64	397	5%
Latambar	2	2.6	20.87	520	4.5%
Sabirabad	-	0	7.4	182	4%
Takht-e-Nasrati	1	2.42	16.48	420	4.5%

3.3.3.3. Recommendations

- Ensure adequate funding is secured and allocated to enhance sports facilities, prioritizing accessibility and environmentally sustainable practices.
- The government should equitably provide sports facilities like complexes, parks, and playgrounds in both urban and rural areas as part of the district's future plan.
- Latambar and Sabirabad currently lack existing recreational facilities, despite having proposed areas of 20.89 hectares and 7.4 hectares respectively. Therefore, it is essential to initiate recreational development projects in these areas, with a focus on land acquisition and infrastructure development as a priority.
- Given Karak City's high number of existing facilities and substantial proposed area but the lowest recreational percentage (2%), it is recommended to revisit urban boundary zoning to enhance park and recreational space allocation.
- Create community outreach programs to promote and maintain sports facilities, encouraging active participation and local support.

Add greenspaces and landscaping around sports facilities to enhance their appeal and create a welcoming environment.

3.3.4. Social Security

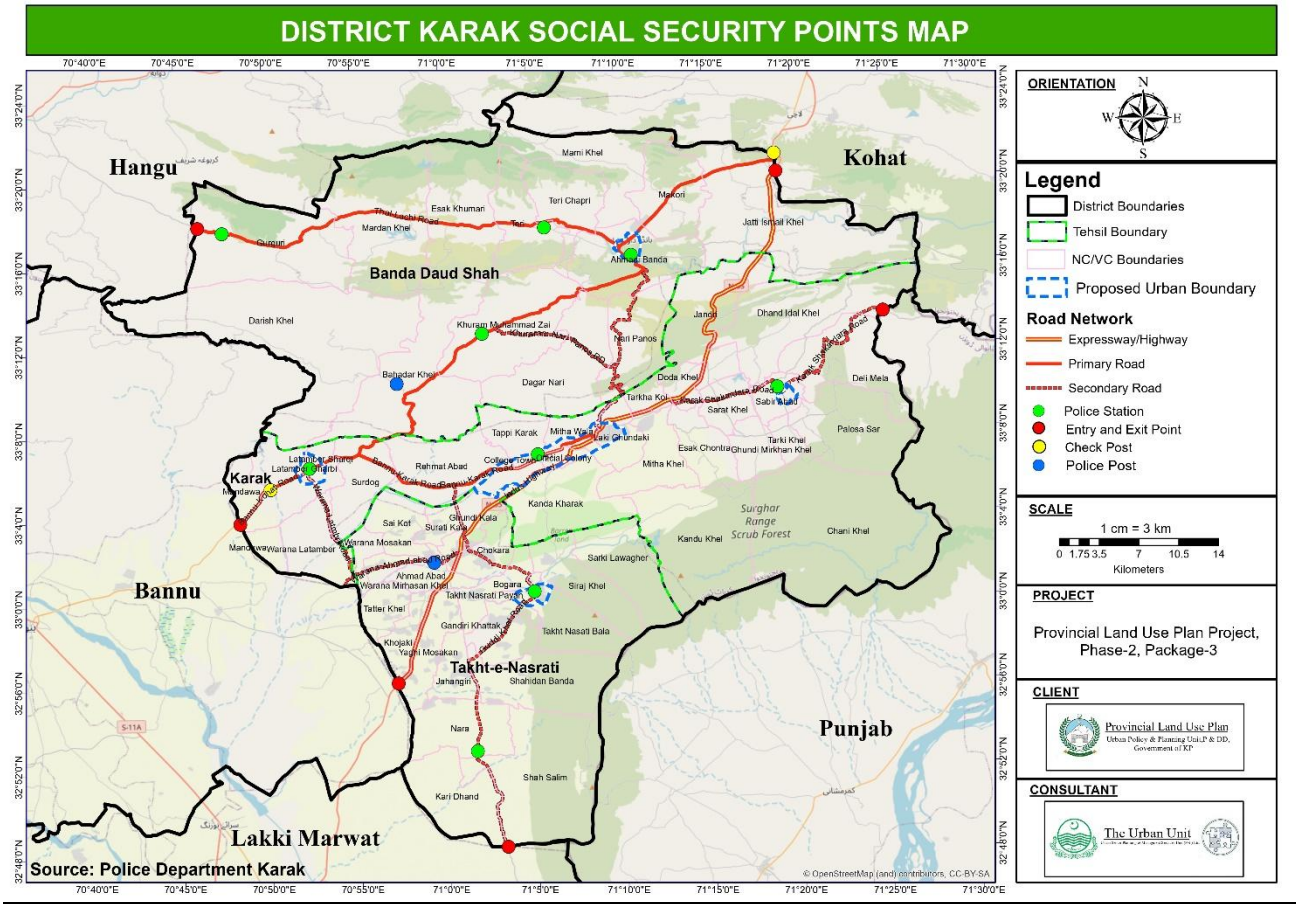
Security plays a significant role in various aspects of social, economic, and political progress. It creates an environment of safety and stability, which are fundamental prerequisites for development. Effective police security helps prevent crime, corruption, and violence, fostering an environment where individuals and businesses can thrive. The rule of law, upheld by police enforcement, provides certainty and predictability for economic activities, attracting investment and promoting entrepreneurship. Overall, police security is integral to sustainable development, creating an enabling environment where individuals can live in safety, exercise their rights, and participate in social, economic, and political activities.

3.3.4.1. Entry and Exit Points

District entry and exit points typically refer to the designated locations where individuals can enter or exit a particular administrative district, such as a city, county, or other geopolitical subdivision. These points serve various purposes, including monitoring traffic, controlling access, and ensuring security.

In regions where districts or jurisdictions are separated by borders, there may be official checkpoints staffed by law enforcement or border control authorities. These checkpoints monitor the movement of people and goods between districts, enforcing regulations and screening for illegal activities. Toll booths on highways often serve as entry or exit points for districts, where motorists pay fees for using the road infrastructure. Highway exits also serve as entry or exit points for specific districts or municipalities, providing access to local roads and communities.

There are 6 entry and exit points in District Karak, 1 point is toward District Kohat, 1 point towards District Hangu, 2 points towards District Bannu, 1 point toward District Lakki Marwat, and 1 point towards District Mianwali. Out of these 6 points, 2 are the main points as they lie on the major highways, these are Karak-Kohat Point on N-55 Highway and Karak-Bannu Point on N-80 Highway.



Map 3-25: District Karak Social Security Points Map

3.3.4.2. Institutional Capacity of District Police

The institutional capacity of the District Police refers to the overall ability, resources, and infrastructure that are available to the police force at the district level to effectively carry out its duties and responsibilities. This capacity comprises various elements, such as personnel, infrastructure, collaborations, and partnerships, as well as training and professional development.

Personnel is a crucial aspect of the District Police, which includes the number of police officers employed, their training, expertise, and specialization in different areas such as investigations, community policing, traffic management, and more. Infrastructure is also vital for the District Police, as it involves the physical resources available, such as police stations, police posts, check posts, vehicles, communication equipment, forensic labs, holding facilities, and other necessary infrastructure. Collaborating and partnering with other law enforcement agencies, government departments, community organizations, and the public is vital for addressing complex issues such as crime prevention, counterterrorism, and maintaining public order. Training and professional development programs are essential for keeping police officers updated with the latest techniques, laws, and best practices in law enforcement.

The Central Police Office (CPO) in Peshawar is the headquarters of the Police, headed by the Provincial Police Officer. It comprises various branches, such as Establishment, Administration, Operation, Investigation, Finance & Procurement, Internal Accountability, Welfare, Legal, Public Relations, Information Technology, Infrastructure Development, and Training Branches.

The Provincial Police Officer (PPO/IGP) is the Head of the Khyber Pakhtunkhwa Police, is assisted by the Additional Inspectors General of Police, Deputy Inspectors General of Police, and other senior ranking police officers at CPO, units, and regional levels, in the effective administration and performance of his duties.

The Khyber Pakhtunkhwa Police is divided into seven regions, namely Peshawar, Malakand, Mardan, Hazara, Bannu, Kohat, and Dera Ismail Khan. Each region is headed by a Regional Police Officer (RPO),

and the Capital City, Peshawar, is headed by the Capital City Police Officer (CCPO). The thirty-five districts of Khyber Pakhtunkhwa, including Newly Merged Districts, are divided among these seven regions concerning their administration and criminal jurisdiction. Likewise, each district is headed by a District Police Officer (DPO).

3.3.4.3. Population to Police Personal Ratio

The population-to-police personnel ratio is a measure used to assess the level of security resources available to protect a given population. It is calculated by dividing the total population of an area by the number of police personnel or law enforcement officers available to maintain public safety and provide security within that area. This ratio can vary significantly depending on various factors such as the size and demographics of the population, the level of crime or threat perception, the efficiency of law enforcement agencies, and government policies regarding security provisions.

A lower population-to-police personnel ratio generally indicates a higher level of security provision and potentially a safer environment. Conversely, a higher ratio may suggest stretched resources and potentially greater security risks. It's important to note that while this ratio can provide some insight into the security situation of an area, it's just one of many factors to consider when evaluating overall safety and security. Other factors such as crime rates, police effectiveness, community engagement, and socioeconomic conditions also play crucial roles in determining the security and well-being of a population.

The United Nations recommends on average one police officer for every 450 citizens, 2.2 police personnel for every 1,000 persons. However, a number of caveats related to context need to be taken into consideration in deciding on the ratio, including the country's geography and road network; the country's policing model; police mobility and communications capacity; the resilience/contribution of informal policing mechanisms; the country's crime rate; and the fiscal space to recruit and sustain a professional police service.

There is a total of **1040** police personnel in District Karak police personnel, this includes **1040** personnel working in operational and investigation units of the police in District Karak Police. These **1040** security personnel are serving a population of **869,475** according to the projected population of 2025. The police personnel-to-population ratio in District Karak is **1.19:1,000**, meaning that there are **1.19** police persons for every 1,000 persons, which is below the United Nations recommended standard of **2.2** police officers per 1,000 persons.

3.3.4.4. Need for New Police Stations

To determine the number of new police stations needed to meet current demand, a detailed assessment of existing facilities was conducted. According to the National Reference Manual for Infrastructure and Planning, one police station is recommended for every 50,000 people. This evaluation is based on demographic data from the 2025 population census of District Karak, with projections extending to the year 2045.

The assessment of new police stations is conducted based on the tehsils. In District Karak, there are currently 9 existing police stations, while the total required is 17, resulting in a backlog of 8 police stations.

- Tehsil Karak currently has 3 police stations, while 7 are required, resulting in a backlog of 4 police stations.
- Tehsil Takht-e-Nasrati has 2 existing police stations, with a requirement of 6, leaving a backlog of 4 station.

This indicates a clear need for the development of additional police stations to meet the demands of the current population. The projected future (2045) requirements for police stations are also presented in the **Table** below.

Table 3-40: District Karak need for new police stations

Administrative Area	Existing Police Stations	Projected Population (2045)	Required Police Stations (2045)	Police Stations Backlog
Tehsil Karak	3	626086	13	10

Tehsil Takht-e-Nasrati	2	533372	11	9
Tehsil Banda Daud Shah	4	304022	6	2

3.3.4.5. Recommendations

- Address the significant shortage of security personnel by increasing manpower, enhancing logistical support, and providing training in modern policing to combat crime and terrorism effectively.
- Enforce standard duty hours with a maximum of eight-hour shifts, especially at key entry and exit points, to support the health, alertness, and effectiveness of police officers.
- Redesign training programs for functional specialization and ongoing professional development to equip officers for challenges like terrorism, organized crime, and public safety.
- Establish 10 new police stations across tehsil Karak to ensure a safe environment and meet the needs of the growing population.
- Establish 9 new police stations across tehsil Takht-e-Nasrati to ensure a safe environment and meet the needs of the growing population.
- Establish 2 new police stations across tehsil Banda Daud Shah to ensure a safe environment and meet the needs of the growing population.
- Police infrastructure requires improvement, as many police stations and post buildings are in poor condition and in need of renovation.

3.3.5. Graveyards

Graveyards, also known as cemeteries, are specific areas designated for the burial of deceased individuals. These spaces are treated with respect and reverence in many cultures and societies around the world and serve as final resting places. Graveyards hold significant cultural, religious, and historical importance, and they can be places of remembrance and reflection that connect the living with their ancestors and heritage.

Different cultures have varied burial practices, including methods of interment (burial or cremation), burial rituals, and grave markers. Graveyards often feature unique architectural elements, such as mausoleums, monuments, tombstones, and gardens. The design and layout of graveyards may reflect cultural and religious beliefs, as well as aesthetic considerations.

Graveyards require ongoing maintenance to ensure they remain respectful and dignified spaces. This includes grounds keeping, restoration of aging monuments, and sometimes conservation efforts to protect historical gravesites. While graveyards are primarily places for the deceased, they also serve as places for the living to visit and pay respects to loved ones. Many people find solace and peace in visiting graveyards, especially during times of mourning or remembrance.

There are often legal regulations governing the establishment and maintenance of graveyards, including zoning laws, environmental regulations, and cemetery management guidelines. With changing societal norms and technological advancements, the concept of graveyards is evolving. Alternative burial practices, such as green burials and virtual memorials, are gaining popularity in some communities.

3.3.5.1. Existing Graveyards

Graveyards have a deep historical connection to the local community. They bring residents closer to an understanding of the past and help to provide insights into how people within the area used to live. The data collected regarding the availability of graveyards within District Karak reveals that there are a total of 205 graveyards spread across both urban and rural areas, covering an area of 298.82 acres. A significant portion of these graveyards, numbering 121, is located in rural areas, occupying 207.6 acres. Conversely, urban areas host fewer graveyards, with a count of 84 covering 91.22 acres.

However, the majority of graveyards are concentrated in rural areas. Tehsil Karak leads in rural graveyard count, with approximately 49 graveyards covering 69.91 acres. While Tehsil Banda Daud Shah follows closely with 47 graveyards covering an area of 109.72 acres. Conversely, Tehsil Takht-e-Nasrati has the fewest graveyards, numbering 25 and occupying an area of 27.97 acres. Some notable graveyards are as following:

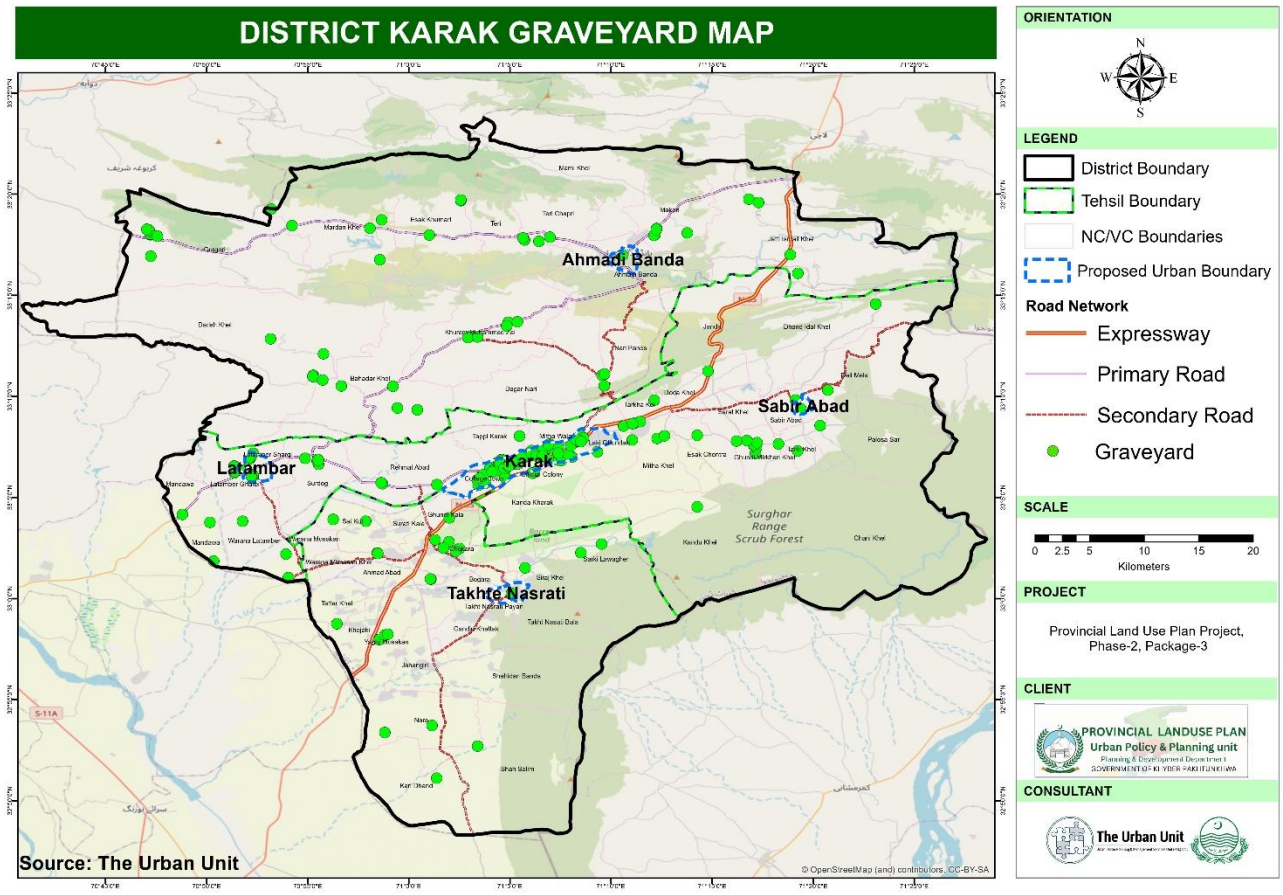
Sardar Nika Graveyard, Tappi Graveyard, Saleri Graveyard, Mashal Khel Graveyard, Mechar Graveyard, Jatta Ismail Khel Graveyard, Jatta Old Graveyard, Yousaf Khel Graveyard, Awazi Banda Graveyard, Emaar Graveyard, Ahmad Abad Graveyard, Pathakhel Graveyard, Mosolgad Graveyard, Zangi Graveyard,

The tehsil-wise number of graveyards and their total area is given in **Table** below.

Table 3-41: District Karak Existing Graveyards

Administrative Area	Number of Graveyards	Area of Graveyards (Acres)
District Urban	84	91.22
District Rural	121	207.6
District Overall	205	298.82
Urban Areas		
Karak City	71	64.56
Latambar	8	16.14
Sabir Abad	1	0.20
Ahmadi Banda	2	2.67
Takhti Nasrati	2	7.65
Rural Areas		
Tehsil Karak	49	69.91
Tehsil Banda Daud Shah	47	109.72
Tehsil Takht-e-Nasrati	25	27.97

In Karak, the distribution and layout of graveyards share a common pattern. Most of these resting places are situated along the main Karak-Bannu Road, serving as accessible and central locations for the larger population. However, in smaller localities adjacent to these main roads, smaller graveyards can also be found, catering specifically to the needs of the communities residing in those areas. This arrangement ensures that residents from both the town itself and its peripheral neighborhoods have convenient access to burial grounds, reflecting a thoughtful and inclusive approach to the provision of these essential services in the district. The graveyards in District Karak are shown in the **Map** below.



Map 3-26: District Karak Existing Graveyards

3.4. Agriculture

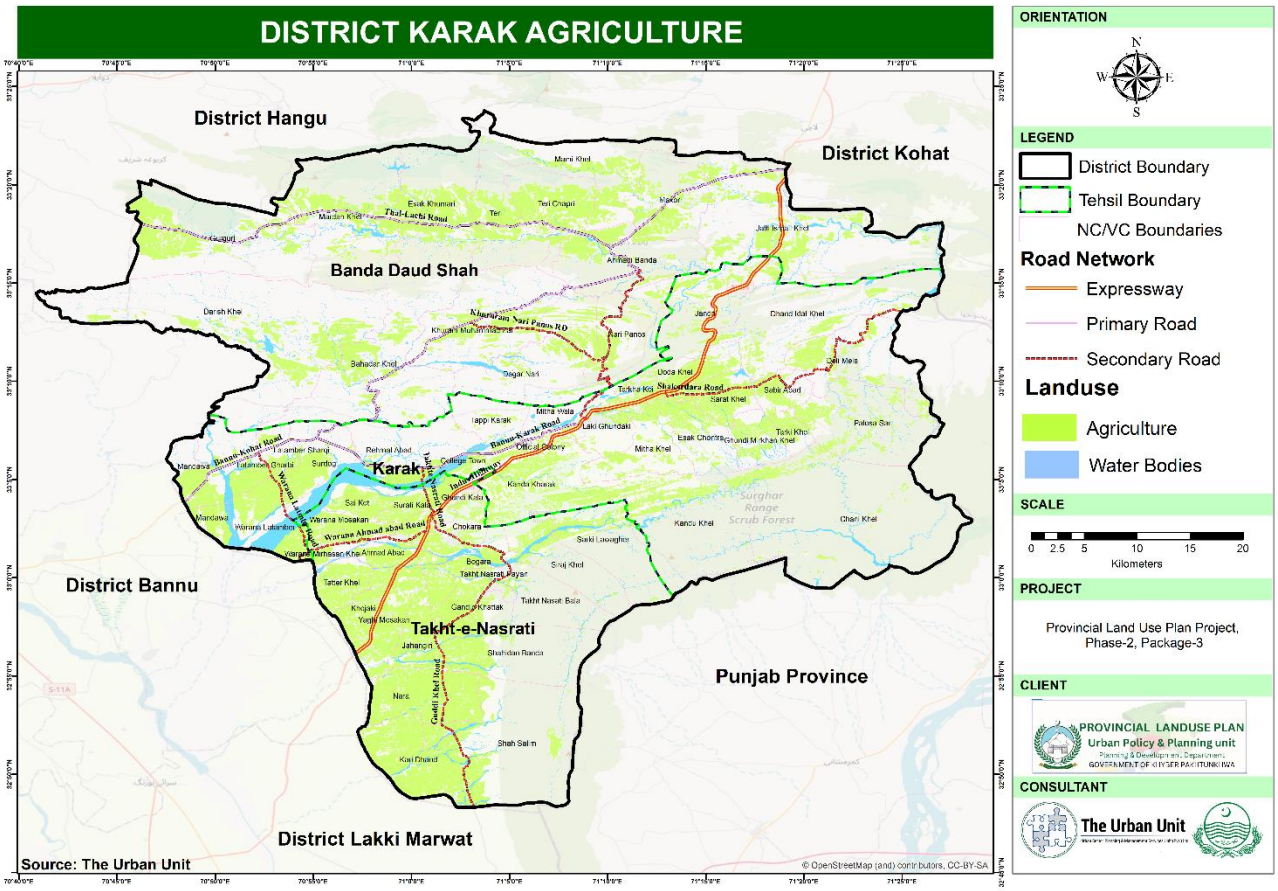
3.4.1. Agriculture Profile

Agriculture is the principal occupation of the district Karak. As per District assessment the agriculture covers an area of 742.57 sq.km in available area of 2672.53 sq.km. Besides agriculture, several manufacturing and mining industries have absorbed a large number of skilled and unskilled laborers. District Karak primarily relies on rainfall for agriculture, with only about 1% of the land being irrigated through government canals. The main crops of the district are wheat, maize, barley, sugarcane, jawar, and bajra. The major of the above crops is wheat in “Rabi’ and maize in “Kharif”.

3.4.2. Agriculture Land Utilization

According to the Crop Statistics Khyber Pakhtunkhwa, the total reported area of district Karak is 265,201 hectares, out of which according to the year 2021-22 the total cultivated area is 75,642 hectares containing the sum of “net area sown” and “current fallow” i.e. 29% of the total reported area. District karak major population (92.75 %)[38] lives in rural areas, this surplus of population has directly affected the agriculture sector of District Karak.

[38] *Khyber Pakhtunkhwa District wise population census 2017, Bureau of Statistics*



Map 3-27: District Karak Agriculture Landuse

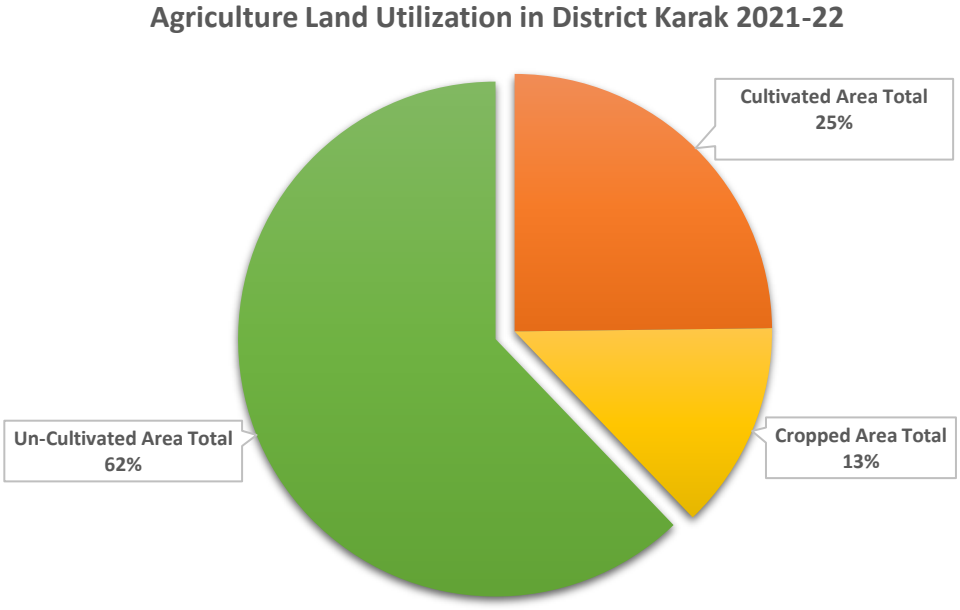


Figure-3-3: Agriculture Land in District Karak

The total agriculture-reported area of District Karak has been found which covers an area of 265,201 hectares. The total cultivated area is 75,642 hectares, but a fluctuating change in the "Net sown" examined for the year 2020-21 which shows an increase of 8%, results in the growth of 32,123 hectares area in 2020-21 and slightly decrease to 25,632 hectares in the next year 2021-22. The uncultivated area in District Karak remains remarkably stable from 2017-18 to 2021-22, consistently encompassing approximately 189,560 hectares. The amount of area that has been deducted for Culturable waste encompasses 16669 hectares, These areas include abandoned farmland, fallow land, and land that is

currently underutilized due to various factors such as lack of irrigation, poor soil fertility, and inadequate access to inputs and markets while an area of 167,178 hectares was identified which is not available for cultivation and an uncultivated farmland that is covered in trees is known as a forest region, a 5712 hectares of uncultivated farm land in Karak district under forest. The forest area as a percentage of the reported area comes out to be 2.15%. Details are **Tabulated** below.

Table 3-42: Distribution of Area by Crops in District Karak (Hectare)[39]

Year		2017-18	2018-19	2019-20	2020-21	2021-22
Total Reported Area (ha)		265202	265202	265202	265201	265201
Cultivated Area	**Total**	**75642**	**75642**	**75642**	**75641**	**75642**
	Net Sown	29527	26858	27684	32123	25632
	Current Fallow	46115	48784	47958	43518	50010
Cropped Area	**Total**	**30856**	**28074**	**28831**	**50931**	**39782**
	Area Sown More than Once	1329	1216	1147	18808	14150
Un-Cultivated Area	**Total**	**189560**	**189560**	**189560**	**189560**	**189559**
	Culturable waste	16669	16669	16669	16669	16669
	Forest	5712	5712	5712	5712	5712
	Non-Available for cultivation	167179	167179	167179	167179	167178

3.4.3. Production Profile

In District Karak these mainly two type of Crops are cultivated in both season. Crops which cultivated before winter and harvested in early summer are termed "Rabi crops," comprising wheat, barley, grams, oil seeds, and pulses. Conversely, crops grown in early summer and harvested in early winter are referred to as "Kharif crops," which may include rice, sugarcane, millets, and maize. The district grows major crops like wheat, gram, barley (Rabi), maize, rice, bajra, and sugarcane (Kharif). Based on the data provided by Crop Reporting Service, the production profile of Rabi and Kharif crops in the Karak district can be analyzed as follows.

Crops: Seven Major crops are yielded in District Karak i.e. Maize, Jowar, and Bajra in the Kharif season. While wheat, gram, Barley, Rapeseed, and Mustard are in the Rabi season. Major differences have been recorded for the Kharif season crops between the year 2017-18 and 2021-22. In the year 2021-22, there was a significant decrease shows in the area and production of most crops in District Karak compared to 2017-18. For Rabi crops, wheat cultivation saw a decline in the cultivated area from 15,966 hectares in 2017-18 to 6,071 hectares in 2021-22, with production dropping from 4,022 tons to 2,697 tons showing 32.9% drop in the production of the wheat. Similarly, gram cultivation experienced a notable reduction in area, falling from 5,808 hectares to 1,744 hectares, while production decreased from 1,384 tons to 518 tons. Barley showed a marginal decrease in the cultivated area from 82 hectares to 77 hectares, accompanied by a slight reduction in production from 28 tons to 33 tons. For rapeseed and mustard, the cultivated area declined from 150 hectares in 2017-18 to 99 hectares in 2021-22, with production increase from 20 tons to 35 tons. Among the Kharif crops, maize cultivation shows a drop-in terms of area, with decrease from 115 hectares in 2017-18 to 33 hectares in 2021-22, though production reduced from 123 tons to 34 tons. Jowar saw its cultivated area decline from 423 hectares to 243 hectares, with production decreasing marginally from 147 tons to 114 tons. Lastly, bajra do experienced a decrease in cultivated area from 1398 to 688 with decrease in the production by 35%, the detailed statistics are given the following **Table**.

Table 3-43: Distribution of Area by Crops in District Karak (Hectare)[40]

Year	Indicator	Rabi Crops				Kharif Crops		
		Wheat	Gram	Barley	Rapeseed and Mustard	Maize	Jowar	Bajra
2021-22	Area (ha)	6071	1744	77	99	33	243	688
	Production (Ton)	2697	518	33	35	34	114	344
	Yield per Hectare in Kg	444	297	429	354	1030	469	500

[39] *District wise landuse utilization in KP, Development Statistics of KP-2022*
[40] *Development Statistics-2022*

Year	Indicators	Vegetable			Fruits		
		Rabi	Kharif	Total	Rabi	Kharif	Total
2021-22	Area (ha)	12	7	19	-	-	-
	Production (Ton)	8	21	29	-	-	-
	Yield per Hectare in Kg	-	3000	3000	-	-	-
2020-21	Area (ha)	-	4	4	-	-	-
	Production (Ton)	-	13	13	-	-	-
	Yield per Hectare in Kg	-	3250	3250	-	-	-
2019-20	Area (ha)	-	5	5	-	-	-
	Production (Ton)	-	19	19	-	-	-
	Yield per Hectare in Kg	-	3800	3800	-	-	-
2018-19	Area (ha)	-	8	8	-	-	-
	Production (Ton)	-	28	28	-	-	-
	Yield per Hectare in Kg	-	3500	3500	-	-	-
2017-18	Area (ha)	8	11	19	-	-	-
	Production (Ton)	20	38	58	-	-	-
	Yield per Hectare in Kg	2500	3455	5955	-	-	-

2020-21	Area (ha)	6933	1804	50	122	38	134	612
	Production (Ton)	3731	610	23	44	38	55	274
	Yield per Hectare in Kg	538	338	460	361	1000	410	448
2019-20	Area (ha)	15393	6208	127	181	42	251	1323
	Production (Ton)	4800	2071	52	51	43	99	586
	Yield per Hectare in Kg	312	334	409	282	1024	394	443
2018-19	Area (ha)	15308	5335	166	174	65	449	1487
	Production (Ton)	4404	1874	65	46	60	179	660
	Yield per Hectare in Kg	288	351	392	264	923	399	444
2017-18	Area (ha)	15966	5808	82	150	115	423	1398
	Production (Ton)	4022	1384	28	20	123	147	530
	Yield per Hectare in Kg	252	238	341	133	1070	348	379

Vegetables: Vegetables are used for their fresh edible portions. Vegetables are also grown due to persistent demand from nearby towns. These include spinach, cauliflower, potato, turnip, carrot, radish, tomato, pumpkin, bitter guard, potato, ladyfinger, eggplant, etc. During 2017-18 vegetables cultivated in the Rabi season occupied 8 hectares and 20 tons of vegetables were produced, while in the Kharif season, 38 tons of vegetables were cultivated on an area of 11 hectares. The area for vegetables in the Rabi season in 2021-22 has increased to 12 hectares while its production has decreased to 8 tons from 20 tons. The Kharif season vegetable area decreased in 2021-22 compared to the previous year's 2017-18 to 7 hectares from 11 hectares and its production from 38 tons to 21 tons, as described in the **Table** below.

Table 3-44: Distribution of Area by Crops (Vegetables and Fruits) in District Karak

3.4.4. Water Management, Irrigation System and Type of Irrigation

According to the United Nations "UN World Water Development Report", the total actual renewable water resources decreased from 2,961 m^3 per capita in 2000 to 1,420 m^3 per capita in 2005. A more recent study indicates an available supply of water of little more than 1,000 m^3 per person, which puts Pakistan in the category of a high-stress country. Using data from the Pakistani federal government's Planning and Development Division, the overall water availability has decreased from 1,299 m^3 per capita in 1996-97 to 1,101 m^3 per capita in 2004-05. In view of the growing population, urbanization, and increased industrialization, the situation is likely to get worse. Nevertheless, excessive mining of groundwater goes on. Despite a lowering water table, the annual growth rate of electric tube wells has been indicated to be 6.7% and for diesel tube wells to be about 7.4%. In addition, increasing pollution and saltwater intrusion threaten the country's water resources. About 36% of the groundwater is classified as highly saline.

3.4.4.1. Irrigation system

The Karak District, located in the Khyber Pakhtunkhwa province, is characterized as a semi-arid region with a predominantly Barani-cultivated area. Notably, the absence of a river or canal traversing the district necessitates the reliance on small dams for irrigation purposes. A substantial portion of District Karak relies on a network of dams to provide essential water resources for both agricultural and drinking purposes. These dams such as Zaibi Dam with a capacity of 1,670 acre-ft. Other significant dams include Ghole Banda Dam (4,531 acre-ft, 1,500 hectares CCA), Sharqi Dam (9,996 acre-ft, 3,000 hectares CCA), Changhoz Dam (11,550 acre-ft, 3,300 hectares CCA), and Chasma Akhora Khel Dam (4,900 acre-ft, 5,600 hectares CCA), these dams primarily collect and store rainwater, which is then distributed through a series of small nullahs. However, these nullahs are often too narrow to handle the full volume of water needed, leading to insufficient distribution across the district.

3.4.4.2. Type of Irrigation

In 2021-22, the total irrigated area for agriculture in District Karak was recorded at 2,002 hectares. Of this, only 25 hectares (1%) were irrigated by government canals, while no land was irrigated through private canals, wells, or tanks. The majority of the area, approximately 70%, was irrigated using tube wells, with the remaining 29% relying on other sources such as lift pumps. This highlights the region's dependence on farmer-managed irrigation systems and alternative water resources, reflecting the absence of more traditional sources like private canals or wells. The data underscores the need for enhanced irrigation infrastructure and sustainable water resource management to support the district's agricultural productivity.[41]

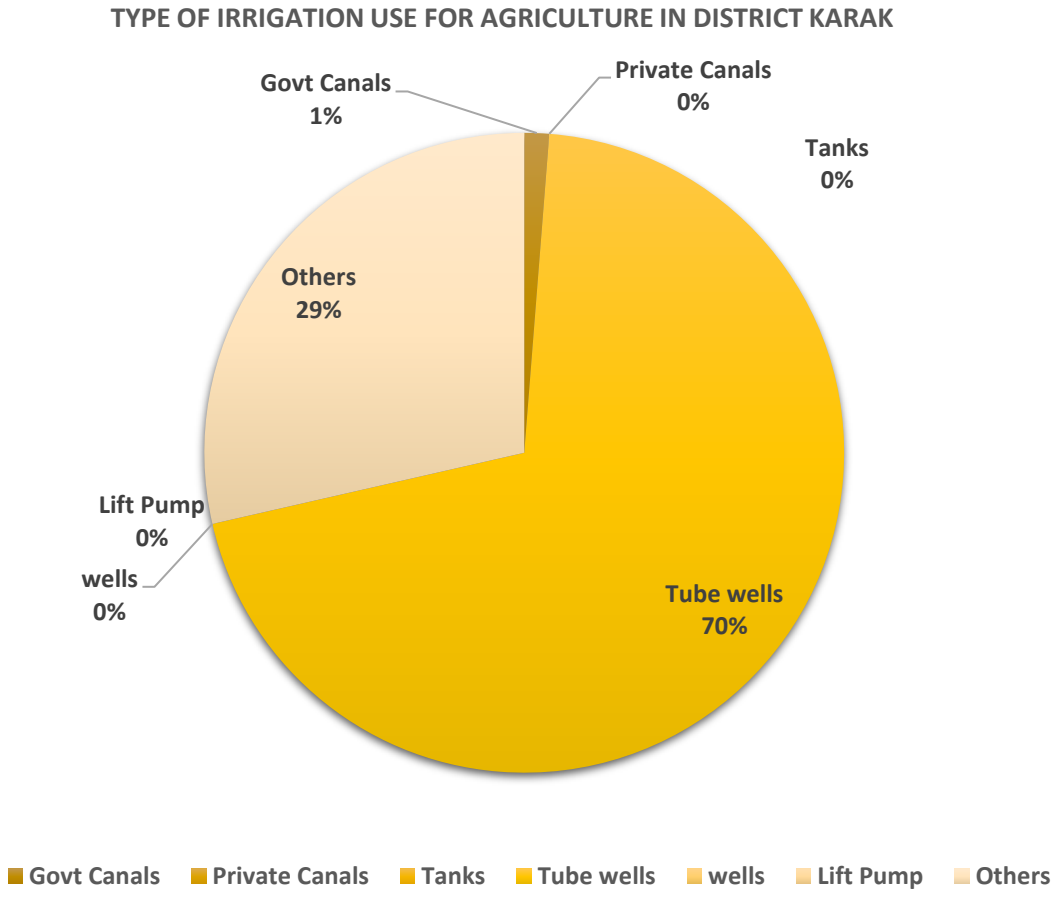


Figure 3-4: Type of Irrigation for Agriculture Use

3.4.5. Irrigated Area by Dams in District Karak

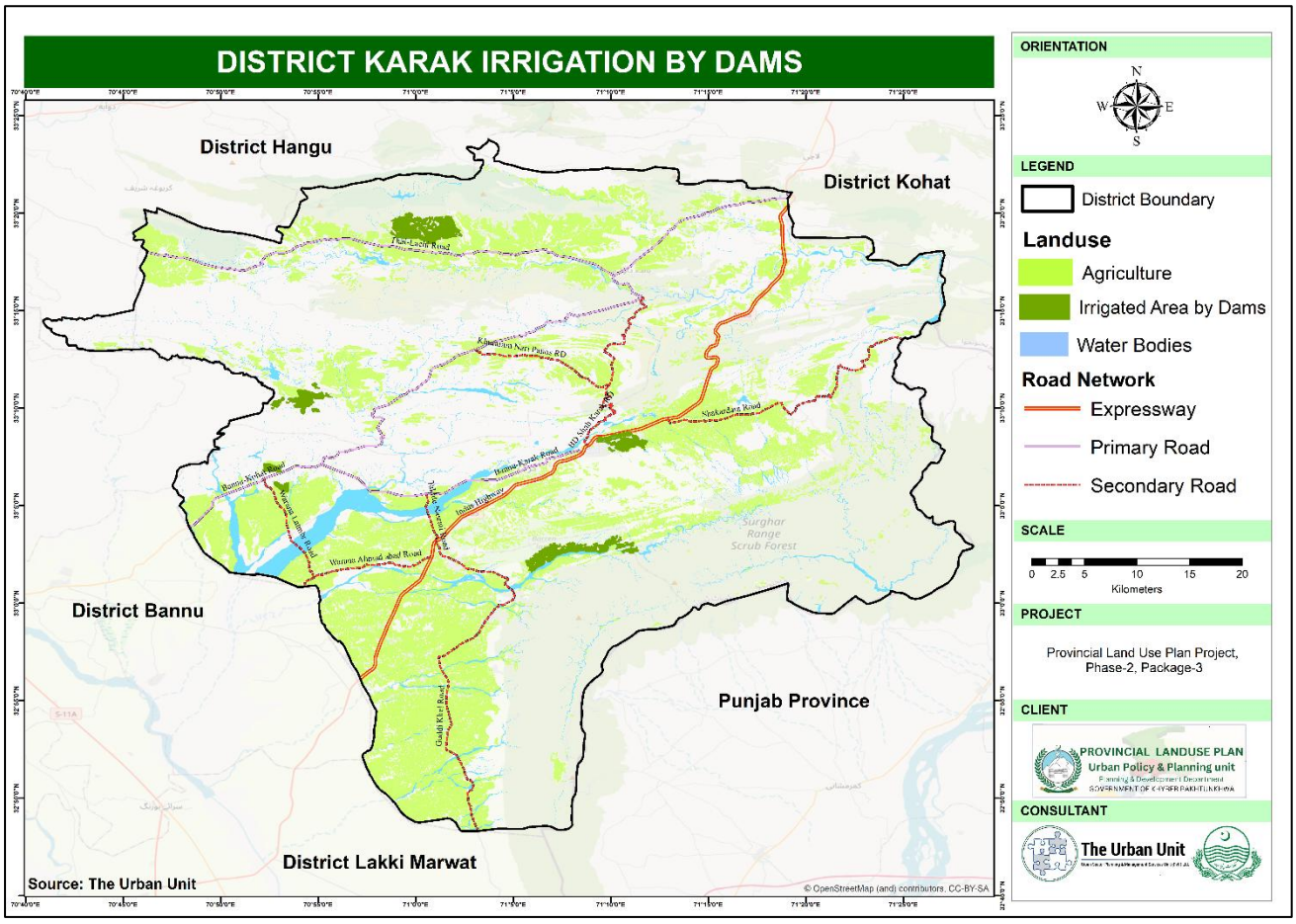
Data regarding the areas irrigated by small dams was obtained from the concerned focal person during a stakeholder consultation meeting conducted at the DC office of District Karak. The focal person also provided images of the dams, which were georeferenced using GIS. Based on these images, the consultant delineated the dam boundaries through GIS. These boundaries were then compared and aligned with the

[41] *Development Statistics-2022*

existing agricultural land. It is important to note that most of these dams were constructed between 2008 and 2011; therefore, much of the land within the cultivable command areas of these dams has since been converted into built-up areas leading to the command areas of these dams based on the existing land use. In total, District Karak has 11 constructed dams, but data was only available for 5 dams. The Cultivated Command Area (CCA) of these dams is presented below in the **Table** accompanied by the **Map**.

Table 3-45: CCA of Small Dams

Name of Dam	Year of Construction	Coordinates	Cultivable Command Area CCA (Hectares)	Status
Ghole Banda Dam	2010	33°11'41.03"N 70°53'0.09"E	1500	Completed
Sarki Loughar Dam	2009	33° 2'29.81"N 71°11'36.92"E	1970	Completed
Mardan Khel Dam	2011	33°20'41.98"N 70°59'16.72"E	1300	Completed
Karak Dam	2008	33° 7'48.97"N 71°11'43.69"E	1175	Completed
Latamber Dam	2023	33° 7'29.14"N 70°51'58.64"E	930	Completed



Map 3-28: Irrigated agriculture area by small dams

3.4.5.1. Agriculture Employment

The agriculture sector employs a significant proportion of the district's workforce, with 21.9% of the total workforce being employed in agriculture in 2020-21. This indicates the importance of the agriculture sector to the local economy. In rural areas, the proportion of people employed in agriculture is 22.8% of the rural

workforce being employed in agriculture while in urban 1.6% of workforce is engaged in the agriculture sector. This highlights the significant role of agriculture in rural livelihoods and the local economy.

In terms of gender, there is a slight difference in the proportion of males and females employed in the agriculture sector, with 13.1% of males and 58.9% of females being employed in district rural area agriculture where proportion of female in urban area of the district contribute 0% and only 1.7% of the male is engaged in agriculture sector[42]. This suggests that both genders are involved in agricultural activities to a similar extent. This indicates the shift towards non-agricultural employment opportunities in urban areas.

Table 3-46: Employment by Sector in the Karak District (Percentage)[43]

Indicators		Total	Male	Female
Employment by Sector (%)	Agriculture	21.9	12.5	57.9
	Rural	22.8	13.1	58.9
	Urban	1.6	1.7	0

3.4.5.2. Influence of Urbanization on Agriculture

Table above gives the total cultivable area in District Karak in the years 1997-98 and 2018-19. Cultivable area is the farm area which was sown at least once during the census year. It is the sum of Net Sown and Current Follow areas. The total cultivable area during 1997-98 was 77,476 hectares, which decrease to 75,642 hectares in 2021-22. Comparing cultivable area in 1997-98 with that in 2021-2022, the decrease of cultivated area over the period of 24 years has been 1,834 hectares (4,532 acres). With in-flow of rural migrants to urban areas of District karak, there have been significant changes in land utilization, cropping pattern and sources of irrigation. However, change in cultivated area Net Sown from 1997/98 – 2021/22 noted as 40,126 hectares while current fallow increases up to 35,292 hectares. Though District karak is dependent on rain-feed water and due to this the recorded value of net sown and current fallow between two periods vary. Other than that, as already stated, urbanization is often considered to have negative impacts on agriculture; for instance, from the loss of agricultural land to urban expansion and an urban bias in public funding for infrastructure, services and subsidies. However, this has not been the case in District karak, because agricultural producers and rural consumers also rely on urban-based enterprises for a wide range of goods and services, including access to markets.

Table 3-47: Change in Cultivation Area 1997-1998 and 2021-2022

Year	Cultivable Area In (hectares)		
	Total	Net Sown	Current fallow
1997-1998[44]	77,476	62,758	14,718
2021-2022[45]	75,642	25,632	50,010

3.4.6. Constraints

- A large proportion of the agriculture farmers are illiterate and does not have technical skills to understand the modern scientific methods of agriculture and often remain ignorant to increase their yields and control various diseases of crops, which effect their agriculture productivity.
- Optimum portion of the district face irrigation water shortage which affects the cropping pattern of the district.
- The District farmers are under large number of debts and live in hand to mouth condition. So, due to lack of burden debt, they cannot afford to purchase modern machineries and fertilizers to improve seeds, etc.
- Most of the farmers of the locality are still stuck to the old traditions of their forefathers. Because of small holdings of land and poverty they are unable to acquire and use modern technology.
- As some parts of the district are facing water logging and salinity problems which can adversely affect the crop productivity

[42] *Labour Force Survey report, KP 2021*
[43] *Labour Force Survey report, KP 2021*
[44] *Census Report of District Karak-1998, pg.no 12, Table Land Utilization*
[45] *District wise landuse utilization in KP, Development Statistics of KP-2022*

- Due to division of lands in family's generation by generation the lands are not enough to even fulfill the family needs. These small farmers do not get credit facilities to purchase seeds, pesticides, fertilizers, etc.
- Absence of road network and poor infrastructure often generate problems to farmers to make approach to the markets and make hardship to sell their products.
- The average yield of the district is much lower than the required yield, as there is a huge gap between the productive yield and wanted yield.
- Water wastage is very high in the locality. The archaic method of flood irrigation is still in practice in whole of the district.

3.4.7. Recommendations

Major crops grown in District Karak include maize, jowar, and bajra during the Kharif season, while wheat, gram, barley, rapeseed, and mustard are cultivated in the Rabi season. To enhance productivity and strengthen the agricultural value chain for these crops, targeted interventions are needed.

- For maize, promoting high-yield and drought-tolerant hybrids, improving on-farm storage, and linking farmers to feed mills and small-scale processing units can significantly boost returns.
- In the case of jowar and bajra, introducing climate-resilient varieties, supporting mechanized harvesting, and encouraging local value-added production such as flour and livestock feed can strengthen market access.
- For wheat and barley, access to certified seeds, adoption of precision farming, improved grain storage, and cooperative marketing will improve profitability and reduce post-harvest losses. Gram production can benefit from disease-resistant varieties, better pest management, and post-harvest value addition through cleaning, grading, and packaging, with linkages to processors and exporters.
- For rapeseed and mustard, ensuring quality seed availability, nutrient management, and establishing village-level oil extraction units will enhance income through localized value addition.

Beyond crop-specific interventions, broader systemic improvements are critical. Regular workshops and training sessions should be organized to educate farmers on modern agricultural techniques and best practices.

- Establishing model farms can demonstrate the tangible benefits of adopting modern farming methods.
- Financial support is crucial; therefore, microfinance and low-interest loan schemes tailored for small farmers should be introduced, along with subsidies on fertilizers, seeds, and farming equipment to reduce their financial burden.
- Soil health management programs are essential to tackle issues like waterlogging and salinity, alongside investments in drainage systems and soil amendment techniques.
- Investment in irrigation infrastructure is vital to ensure a reliable water supply, with an emphasis on efficient methods like drip and sprinkler systems for water conservation.
- Integrated pest management programs should be implemented to educate farmers on effective pest and disease control, while ensuring access to affordable and effective crop protection solutions.
- Furthermore, transportation infrastructure needs to be improved to link rural areas with markets, enabling easier movement of agricultural goods.

Finally, programs aimed at enhancing crop yields through improved seed varieties, better farming practices, and soil health improvement should be introduced, alongside initiatives that promote water conservation technologies to reduce wastage and ensure sustainable farming.

3.4.8. Future Plan

The district belongs to the Northern Dry Mountains Agro-Ecological Zone of Pakistan. Agriculture of the district is mostly subsistence level and depends on rainfall and spate/rod kohi irrigation. Due to lack of water for irrigation, fruits and vegetables are not grown in enough quantities. Vegetables are also grown in very minor quantities. To enhance the agriculture productivity in the future some initiatives must be introduced in the future to increase the agriculture production and reduce culturable waste. Here are some future plans to be proposed into district karak, in-order to obtain a sustainable agriculture farming and increase the potential of the soil to reduce food security issues.

Table 3-48: Future Plan for improvement of Agriculture Sector

What	How	Why
Irrigation Dams	Construction of new small dams Rehabilitation of existing dams;	Mitigate and improve water flow;
	Construction of Check dams, Contour trenches	Conserve water: reduce soil erosion: and recharge ground water
Modern Farming Technique	Awareness campaign on soil diversification: subsidize technology, Incentive loans	To improve agriculture yield: enhance crop output: tackle climate challenges: ensure continuous production
Reviving groundwater	Establish Percolation tanks	Capture and Store rainwater runoff: recharge water depth: Enhance biodiversity: increase community resilience
Revitalizing soil Vitality	Seed Broadcasting and Planting Native species	Cost effective technique, Forest conservation, Habitat Restoration and Environmental Improvement
Advance Irrigation system	Installation of Sprinkle/Drip Irrigation system	Improving crops yield: reducing weed growth: allowing efficient fertilization: reduce labor costs: prevent soil diseases and energy efficiency
Enhance Technical Capacities	Training Programs – Environmental Protection, Climate Resilience, Forestry and Biodiversity Conservation	Increased knowledge on the technical aspects will lead to better planning and implementation.

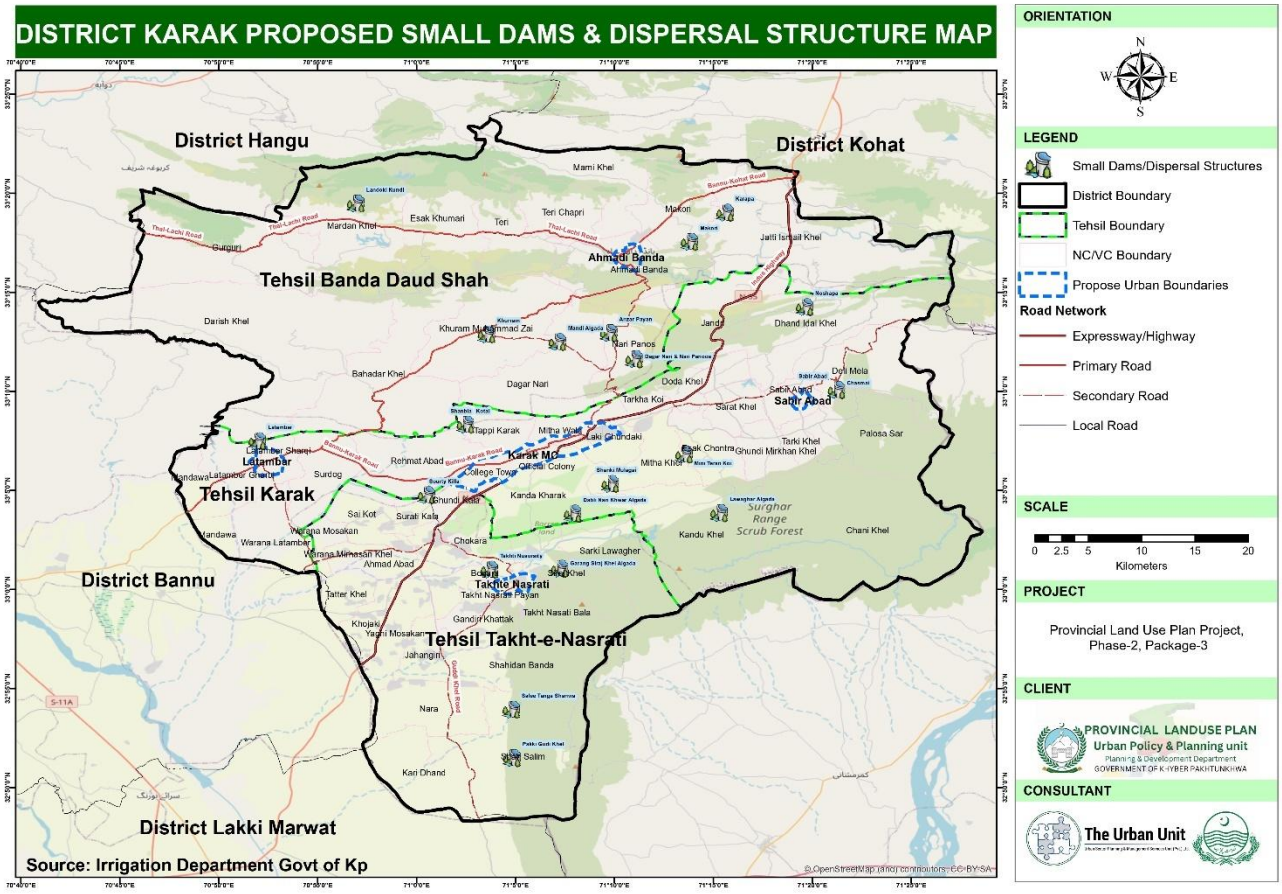
3.4.8.1. Potential New Small Dams

For the draft landuse plan of district Karak, stakeholder consultation sessions held on 24th and 25th March 2025 at DC Office Karak, representative from Irrigation Department shared his valuable insight on the potential of new small dams and other water structures in district Karak. Secondary data provided was then used by the consultant to highlight the new water structure locations in district Karak. Below Table and Map shows the identified locations.

Table 3-49: Feasible sites for Small dams and Hydraulic structures

S. No.	Name of Scheme	Latitude	Longitude	Location
1	Anzar Payan	33°12'56.71"N	71° 9'41.57"E	Banda Daud Shah
2	Chasmai	33°10'3.99" N	71°21'11.67" E	Karak
3	Dabli Nari Khwar Algada	33° 3'49.35"N	71° 7'52.00"E	Karak
4	Dagar Nari & Nari Panoos	33°11'37.56"N	71°10'58.54"E	Banda Daud Shah
5	Garang Siraj Khel Algada	33° 1'2.58"N	71° 7'12.53"E	Takht-e-Nasrati
6	Karapa	33°19'0.94"N	71°15'33.97"E	Takht-e-Nasrati
7	Khurram	33°12'52.31"N	71° 3'31.28"E	Banda Daud Shah
8	Kotal	33° 8'18.95"N	71° 2'27.24"E	Karak
9	Landoki Kundi	33°19'28.38"N	70°56'54.16"E	Banda Daud Shah
10	Latamber	33° 07'29.31"N	70°51'55.80"E	Karak
11	Lawaghar Algada	33°03'51.00" N	71°15'16.00" E	Takht-e-Nasrati
12	Makori	33°17'32.64"N	71°13'46.40"E	Banda Daud Shah
13	Mandi Algada	33°12'29.36"N	71° 7'5.92"E	Banda Daud Shah
14	Mini Teran Koi	33° 6' 48.14" N	71°13' 29.38" E	Karak
15	Noshapa	33°14'15.17"N	71°19'35.61"E	Karak
16	Pakki Gudi Khel	32°51'29.57"N	71°4'47.85"E	Takht-e-Nasrati

17	Sabir Abad	33°10'3.99" N	71°21'11.67" E	Karak
18	Salee Tanga Shanwa	32°53'55.93"N	71° 4'45.81"E	Takht-e-Nasrati
19	Shanbia	33° 8'18.95"N	71° 2'27.24"E	Karak
20	Shanki Mulagai	33° 5'19.65"N	71° 9'46.09"E	Karak
21	Surati Killa	33° 4'45.56"N	71° 0'28.75"E	Karak
22	Takhti Nasrati	33º 0' 59.75" N	71º 3' 39.73" E	Takht-e-Nasrati
23	Toyaki Near Kamangar	33° 5'19.65"N	71° 9'46.09"E	Karak
24	Urbashi	33°16'32.64"N	70°49'45.84"E	Banda Daud Shah
25	Zarki Nasrati	32° 58'48.00"N	71° 5'41.00"E	Takht-e-Nasrati
26	Zeri	33° 7'49.44"N	71°11'43.96"E	Karak



Map 3-29: Proposed small dams and dispersal structure

3.5. Livestock Profile

Livestock products such as meat, milk, bones, fat, hides, and skin yield substantial profits for investors, especially with the growing demand in the international halal food market, which presents significant export opportunities for the livestock industry. The livestock sector accounts for 11.53% of the Gross Domestic Product (GDP) at constant basic prices (2005-06) in Pakistan.

The district of Karak has enormous potential that can be harnessed through appropriate livestock policies. The livelihoods of farmers in the karak district are directly impacted by the livestock sector, which provides food, wool, fuel, and farming resources. This sector offers consistent daily financial support, employment opportunities, and a stable food source. Additionally, it serves as a safeguard against the risks associated with crop failure or other unforeseen events.

3.5.1.1. Availability of livestock population in District Karak

The **Table** below displays the livestock population in District Karak for the years 2006 and 2021. There has been considerable growth in all categories of livestock over this period. The cattle population increased

from 212,496 in 2006 to around 342,191 in 2021. Buffalo numbers grew from about 2,054 to 5,374. The sheep population saw a significant rise from around 33,546 to over 100,347. Goats more than doubled, increasing from 291,325 to about 595,679. The camel population saw a modest increase from 2,901 to 3,102. Horses and mules also saw notable growth, with horses increasing from 60 to 278 and mules from 58 to 876 and poultry also increase from 652734 to 784745. Overall, there has been substantial growth of 35% in the livestock population in District Karak over the 15-year period.

Table 3-50: Livestock Population in Karak

S. No	Livestock	2006[46]	2021[47]
1	CATTLE	212496	342191
2	BUFFALOES	2054	5374
3	SHEEP	33546	100347
4	GOATS	291325	594679
5	CAMELS	2901	3102
6	HORSES	60	278
7	MULES	58	876
8	Donkey	18450	14205
9	Others	0	19219
	Total	**560890**	**1080271**

3.5.1.2. Assessment of Poultry Population

The poultry population in Khyber Pakhtunkhwa (KP) has shown a substantial increase from 27,695,116 in 2006 to 40,996,000 in 2021. This significant growth reflects the expanding poultry industry in the province, driven by increasing demand for poultry products such as meat and eggs. The growth trend indicates advancements in poultry farming practices, enhanced veterinary care, and possibly increased investment in the sector, which collectively contribute to the rising poultry numbers. In contrast to the provincial trend, the poultry population in District karak has increased sharply from 652,734 in 2006 to 784,745 in 2021.[48] This increase is much lower during this period, indicating several underlying issues affecting the poultry sector in Karak. Notably, there are 46 poultry farms in the district, but the population data from these farms is not available. This lack of comprehensive data likely contributes to the reported decrease in poultry numbers, as the actual population might be higher than documented. The decrease could also be attributed to other factors such as inadequate veterinary services, disease outbreaks, or economic challenges faced by poultry farmers

[46] *Livestock Census 2006*
[47] *Khyber Pakhtunkhwa livestock report 2021*
[48] *Development Statistics-2023*

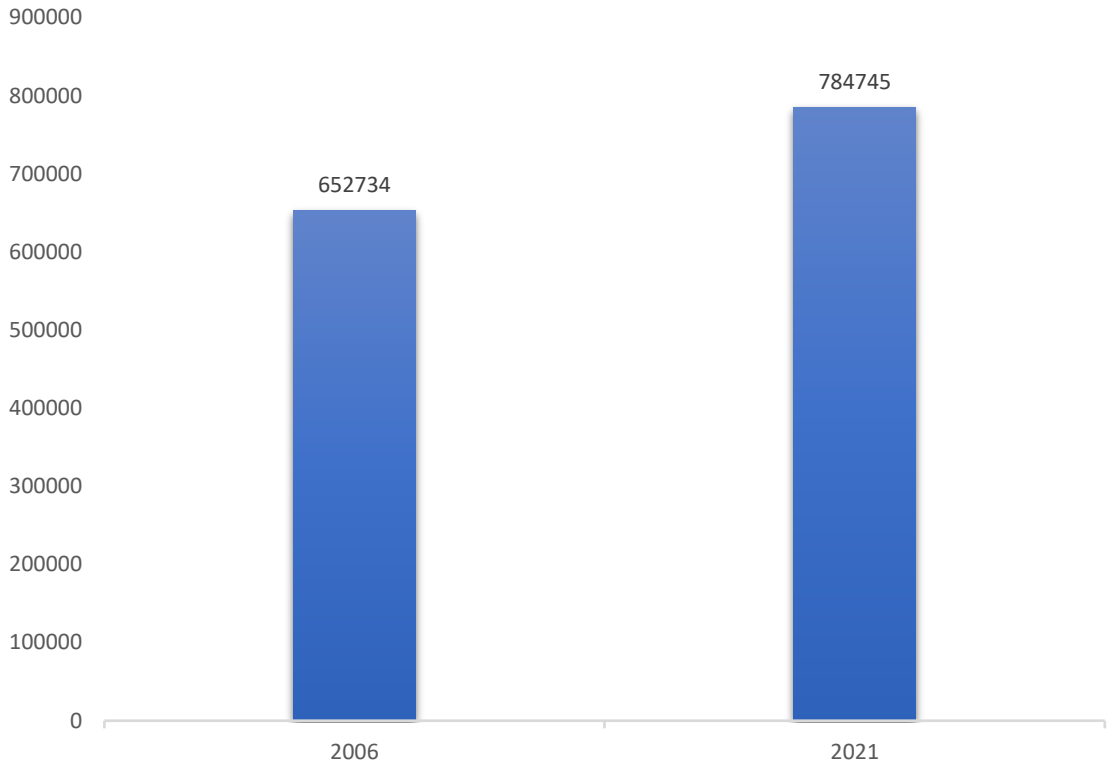


Figure 3-5: Comparative Trend of Poultry Production in District Karak

3.5.1.3. Livestock Facilities

The total count of veterinary facilities in the Karak district has increased from 38 in 2018-19 to 41 presently. In detail, the number of hospitals has remained the same at 4, dispensaries from 21 to 23, and centers from 13 to 14. The **Table** below provides a comprehensive overview of the veterinary institutes in District Karak.

Table 3-51: Veterinary Institutes in Karak[49]

Year	Total	Hospitals	Dispensaries	Centers
2018-19	38	4	21	13
2019-20	38	4	21	13
2020-21	42	4	23	15
2021-22	40	4	21	15
Current	41	4	23	14

The effectiveness of District Karak veterinary facilities can be assessed by analyzing the quantity of animals and birds receiving treatment and protection. In the fiscal year 2020-21, a total of 103 animals were treated, while 94 animals were protected, along with 286 birds were protected. This shows an improvement in the services of veterinary facilities as compared to past years. Details are given in **Table** below.

Table 3-52: Veterinary Institutes in Karak[50]

Year	No. of Animals Treated	No. of Animals Protected	No. of Birds Protected
2018-19	84	93	341
2019-20	93	84	316
2020-21	70	30	283
2021-22	103	94	286
Current	0	0	0

[49] *Development Statistics-2022*
[50] *Development Statistics-2022*

3.5.1.4. Institutional Structure of Livestock sector in Khyber Pakhtunkhwa

The organizational structure of the Directorate General (Research) for Livestock & Dairy Development in Khyber Pakhtunkhwa, Pakistan. It is divided into three main divisions: the Veterinary Research Institute, Planning & Development Cell, and Livestock Research & Development. The Veterinary Research Institute oversees various centers, including the Center of Microbiology & Biotechnology, Center of Biological Production, and Foot & Mouth Disease Vaccine Research Center, as well as Veterinary Research & Disease Investigation Centers. The Livestock Research & Development division encompasses several facilities, such as Livestock Research & Development Stations. It also includes the Center of Animal Nutrition, Poultry Research Institute, Arid Zone Small Ruminants Research Institute, and the Goat Production Research. The Planning & Development Cell is positioned between these two divisions, likely responsible for coordinating and strategizing their activities.

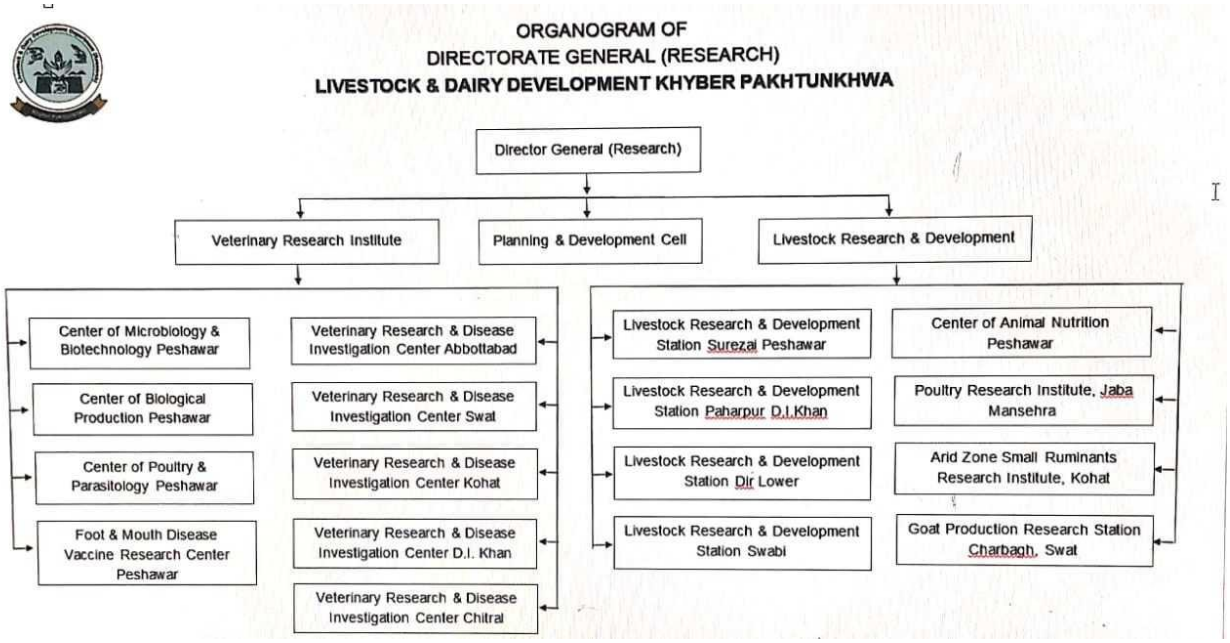


Figure 3-6 Institutional Structure of Livestock sector in KP[51]

3.5.2. Constraints

- There has been a decrease in the number of veterinary institutes from 158 in 2018-19 to 78 currently, leading to a reduction in veterinary hospitals, dispensaries, and centers. This reduction is affecting the quality of animal health services, with a low number of animals and birds being treated and protected in these facilities, indicating inefficiencies in service delivery.
- Efficient water utilization strategies for livestock are needed, including the development of water sources and conservation methods.
- There is inadequate identification and management of suitable grazing lands and pastures. Additionally, there is a lack of continuous supply of quality feed for livestock, which impacts productivity.
- Livestock are facing a high prevalence of diseases, with insufficient vaccination programs and veterinary services. There is also a low emphasis on disease surveillance, diagnosis, and control.
- Women play a significant yet undervalued role in livestock raising and production, with a lack of recognition and support for their contributions to the livestock sector.
- The existing regulatory framework requires improvement to address challenges related to nutrition, breeding, diseases, and marketing. More effective policies are needed to support sustainable livestock practices

3.5.3. Recommendation

- Increase the number of veterinary institutes, hospitals, and dispensaries to enhance animal health services. Consider establishing mobile veterinary units to reach remote areas.

[51] *Directorate of Livestock and Dairy Development Khyber Pakhtunkhwa*

- Invest in training for veterinary professionals and upgrade facilities to improve service delivery and treatment outcomes.
- Implement water conservation methods and improve water storage systems. Encourage the use of rainwater harvesting and efficient irrigation techniques for livestock.
- Invest in the development of new water sources and infrastructure to ensure a reliable water supply for livestock.
- Identify and manage suitable grazing lands and implement rotational grazing practices to maintain land health and productivity.
- Develop systems to provide a continuous supply of high-quality feed, including growing fodder crops and improving feed storage and distribution.
- Increase efforts in disease surveillance and implement comprehensive vaccination programs to control and prevent livestock diseases.
- Improve the availability and quality of veterinary services, including diagnostics and treatment options, to better manage animal health.
- Acknowledge the role of women in livestock raising and production through recognition programs and support initiatives.
- Offer training and resources specifically tailored for women in the livestock sector to enhance their skills and productivity.
- Update the regulatory framework to address issues related to nutrition, breeding, diseases, and marketing more effectively.
- Develop and enforce policies that support sustainable livestock practices, including incentives for best practices and support for smallholder farmers.

3.5.3.1. Future Plan

3.5.3.1.1. Establishment of Disease-free zone

The livestock sector has been previously identified as playing an extremely important role in the rural economy, with improved production having the potential to alleviate poverty and contributing to household food security. Livestock diseases are a major source of production loss in Pakistan, with FMD having been identified as a major contributor through impacts on milk production, fertility, and animals being sold at a reduced value. In the same period, Pakistan most region is also endemic for a common disease known as foot and mouth disease (FMD). Creating disease-free zones is crucial for controlling zoonotic diseases and ensuring livestock health. Over the past 15 years, District Karak's livestock population has grown by 48%, accompanied by notable improvements in veterinary facilities, highlighting the region's potential for livestock development. Disease-free zones play a vital role by reducing disease prevalence, lowering veterinary costs, and minimizing production losses. They also improve market access, enhance food security, and reduce the risk of zoonotic disease transmission. Additionally, these zones promote sustainable farming practices by curbing the overuse of antibiotics and chemicals, ensuring long-term productivity and environmental health. This approach strengthens the livestock sector while supporting farmers and the local economy.

3.5.3.1.2. Improving Barren land management

The District major land is compressed of barren land due to insufficient water for irrigation purposes. This issue produces a shortage of food for the available and future livestock population. Thus, tackling problems for such large portion of landuse require a sustainable specific approach include rainwater harvesting techniques such as constructing contour trenches, and water ponds; growing drought-resistant fodder crops like berseem, sorghum, and barley. Implementing Silvopasture systems with native tree like Acacia nilotica, prosopis cineria; rotational grazing to prevent overgrazing. Together these measure can transform the barren land into valuable resources for a thriving livestock sector in District karak.

3.5.3.1.3. Improving Livestock feeding resources

The grazing areas in District Karak are steadily declining due to population growth and insufficient water availability for cash crops. Simultaneously, the rising cost of feed ingredients, such as grains and protein sources, has made it increasingly challenging for small-scale livestock farmers to afford quality feed. To address these issues, it is essential to develop feed processing units, storage facilities, and quality control services within the district. This will ensure the availability of affordable, high-quality feed in the market. Additionally, awareness campaigns and knowledge-sharing programs should be implemented to educate

livestock farmers about proper feeding requirements and efficient feed management practices, fostering sustainability and growth in the livestock sector.

3.5.3.1.4. Market access for livestock farmers

Animals in karak are purchased and sold in traditional weekly rural markets according to phenotypic characteristics. Usually, animals are bought by middlemen, who only estimate the weight of animals from its appearance. The livestock market is fragmented, with no centralized marketing system dominated by middlemen and brokers, leading to low prices for farmers and high prices for consumers Secondly, the lack of infrastructure, including roads, storage facilities, and slaughterhouses, hinders the livestock sector development. Thirdly there is no standardized grading and labeling systems. Fourthly, the supply chain for livestock and its products is inefficient. Developing livestock markets will minimize the centralizing system and offer a wide opportunity to local farmers to grip into wholesale market for their products.

3.5.3.1.5. Rural Infrastructure Development

The district major rural regions have not strong infrastructure for livestock farmers to run their business in their own way. The sector needs more government support for its different functions. Major challenges in district karak are lack of proper infrastructure and farmers often have to travel long distances to get their animals treated. Another challenge is farmers does not have access to credit facilities and no subsidy on high quality animal feed and veterinary medicines. These issues must be addressed to support the sector's long term growth in the future.

3.6. Fuel, Minerals and Energy

District Karak, situated in Khyber Pakhtunkhwa province, south of Kohat District and on the north side of Bannu and Lakki Marwat districts on the main Indus Highway between Peshawar and Karachi, is a significant contributor to the country's energy sector, particularly known for its oil and gas production. Karak has one of the largest uranium mines in Pakistan under supervision of Pakistan Atomic Energy Commission. Gas has been recently discovered in Shakardara, Gurguri and Makori areas. The district has emerged as a key hub for energy development, with substantial oil reserves that play a vital role in meeting Pakistan's energy needs. In addition to oil, Karak is rich in natural gas, making it a dual source of energy production. The district also boasts valuable mineral resources, including gypsum, limestone, and salt, which are essential for industrial applications. These natural resources not only support the local economy but also contribute significantly to the national energy and construction sectors. However, sustainable extraction and equitable resource management remain critical to ensuring long-term prosperity for the region and its people.

3.6.1.1. Existing Minerals Resources

District Karak is rich in natural resources, including substantial reserves of minerals. Major minerals such as coal, gypsum, laterite, limestone, rock salt, and silica sand are extracted on a large scale. According to data from the Mineral Development Department, KP (2017-2022), the district's mineral production has exhibited significant variation over the five-year period. Gypsum and rock salt have remained the leading contributors, with gypsum playing a vital role in the district's economy. However, gypsum production has declined notably, dropping from 601,165 units in 2017 to 421,134 units in 2022. In contrast, rock salt extraction has increased substantially, rising from 73,727 units in 2017 to 207,563 units in 2022, reflecting the discovery of new mines.

Other minerals have shown fluctuating trends, with coal production varying between 49,111 and 81,413 units during the same period. Limestone and silica sand have recorded steady growth, signaling a positive trend in overall mineral production, except for gypsum. These production patterns are influenced by several factors, including the discovery of new reserves and mines, heightened private and government interest, advancements in exploration technologies, improved infrastructure, and increased private sector collaboration. This dynamic landscape highlights the evolving potential of District Karak's mineral sector and its importance to the regional economy

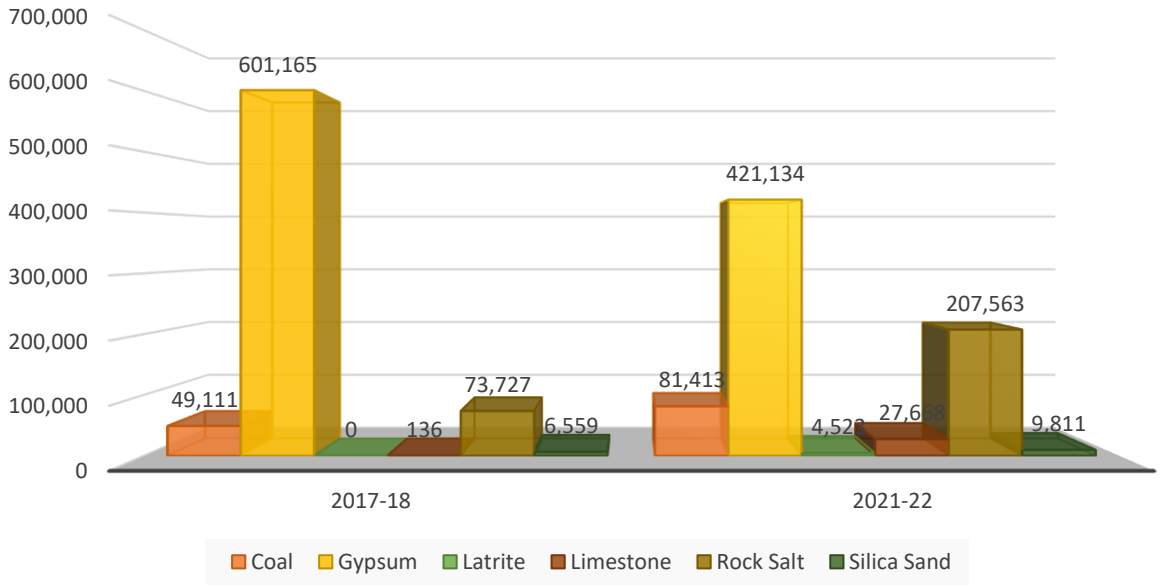


Figure 3-7: Yearly Mineral Production Trend (2017-22) District Karak

3.6.1.2. Existing Fuel Resources

District Karak is home to several significant oil and crude fuel fields operated by MOL Pakistan Oil & Gas Company, including Makori Deep, Makori East, Mami Khel, Manzalai, Mardan Khel, and Nashpa oil fields. According to the Development Statistics for 2021-22, the total crude oil production from these fields was recorded at 9,025,314 barrels. The Nashpa oil field emerged as the largest contributor, accounting for 50% of the total production, making it the highest-producing field in the district.

Makori East field ranked second, contributing 36% of the total crude oil production, while the Mardan Khel field accounted for 10%. The remaining production was distributed among Makori Deep, Mami Khel, and Manzalai fields, which collectively contributed 3% and 1% of the total crude oil output, respectively. These figures highlight the critical role of the district's oil fields in Pakistan's energy sector and the prominence of the Nashpa and Makori East fields in overall production.

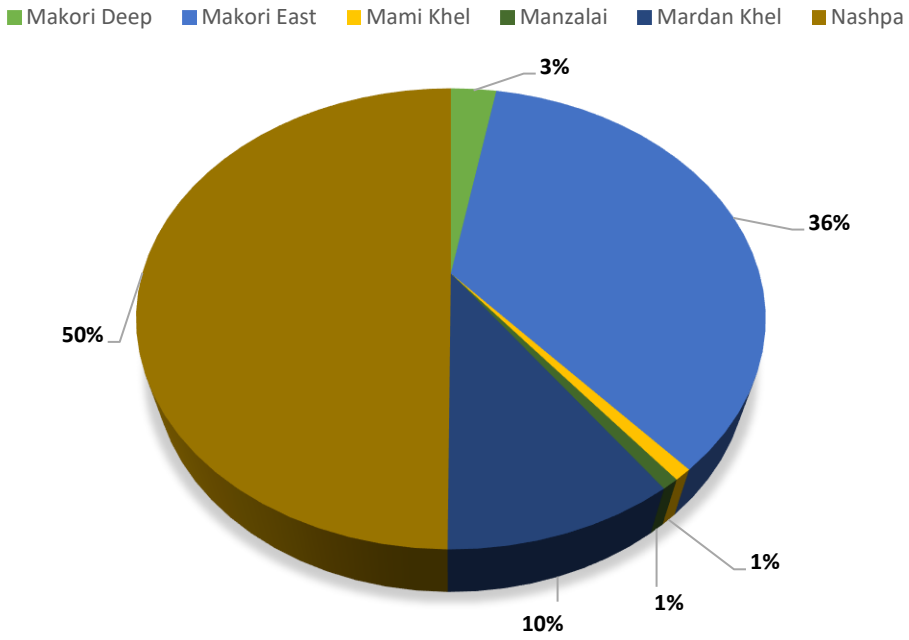


Figure 3-8 District Karak Crude Oil Production Statistic of year 2021-22

3.6.1.3. Existing Practices of Minerals Extraction

Karak district is rich in various minerals, including Coal, Gypsum, Laterite, Limestone, Rock salt, and Silica Sand each with its own distinct mining practices and applications. Limestone mining, for instance, involves quarrying large blocks of sedimentary rock, which are then crushed and processed for use in construction

materials like concrete and asphalt. Likewise, the extraction of Gypsum mining has its process, mostly it's distributed in sedimentary rocks near the surface. In the beginning, the Geologists use various exploration techniques such as geophysical surveys, drilling, and geological mapping, to identify the location of gypsum deposits. The extraction is done via surface mining, using open-pit or strip-mining techniques, or underground mining, involving tunnels. Once extracted, gypsum is crushed and ground into a fine powder, then heated in a kiln to remove moisture, creating plaster of Paris. This material is used for casting molds, ornamental sculptures, and wall and ceiling repairs. Gypsum is also essential in cement production, where it regulates setting time and enhances strength, and in fertilizer production, where it improves soil structure and reduces water runoff. Additionally, gypsum's versatility makes it a valuable resource in various industries Surface mining involves the use of open-pit or strip-mining techniques to extract the gypsum from the ground.

The coal mining is randomly extracted from the surface and near surface very shallow depths through hit and trial mining methods in all along more than 150 Km strike length mostly from a coal bed/s lying within the sandstone member. Coal is primarily used for electricity generation, steel production, and cement manufacturing. Additionally, it plays a crucial role in various industrial processes and can be converted into liquid fuels, highlighting its versatility and importance

3.6.1.4. Existing Energy Sources

District Karak, with its high levels of solar irradiance, particularly during the intense summer months when temperatures soar to 46.4°C, offers substantial potential for harnessing solar energy. The district's geographical orientation and predominantly clear skies during these periods make solar energy a reliable and sustainable option. Solar energy is particularly well-suited for rural electrification, irrigation systems, and household energy needs. Both government and private sectors could explore the establishment of solar farms or provide incentives for households to install photovoltaic systems.

Wind energy also presents a viable resource in District Karak, driven by the district's wind patterns and speeds. Wind speeds in Karak peak in the months of April to June, with average speeds around 3.7 m/s and reaching up to 4.3 m/s in May. Wind turbines could be installed in these high-wind areas to generate electricity, which could either be fed into the local grid or used for community-specific projects, such as water pumping or powering small industries.

Karak's hydrological resources, although limited compared to other regions, include seasonal streams that could be harnessed for small-scale hydropower projects. While the district does not have large rivers, the existing water bodies, particularly during the monsoon season, could provide sufficient flow for micro-hydropower generation. These small hydropower plants could contribute to the local energy supply, especially in rural areas where grid connectivity is less reliable

3.6.1.5. Existing Situation in District

The district has a total of 49,302 electricity connections serving domestic and commercial users. Over the years, the number of electricity connections has steadily increased, with 49,302 connections in 2021, up from 47,289 in 2019, 46,466 in 2018, and 45,388 in 2017. This growth underscores the rising demand for electricity among households and businesses across the district.

The district is served by a total of four 132 KV grid stations, two of which are functional while the other two are non-functional. In Karak Tehsil, there are two grid stations—one functional and one non-functional. Banda Daud Shah has one functional grid station, while Takht-e-Nasrati has one non-functional grid station. The term "non-functional" indicates that while the land for the grid station has been acquired and the transmission lines have been laid out across the area, the station is not yet connected to the grid.

In terms of rural electrification, 488 villages in District Karak were electrified in 2019, bringing modern energy access to previously underserved areas. This expansion is crucial to improving living standards and promoting economic development in the district's rural communities. However, despite these positive developments, serious concerns are still raised about the financial aspects of electricity distribution in District Karak. The district faced a substantial financial loss of 4.0 billion rupees, with a collection of only 1 Billion rupees. This loss represents a 78% loss rate, which is alarmingly high and suggests significant inefficiencies in the distribution and billing systems.[52]

[52] *Ministry of Energy (Power Development). (August 2024). Power Sector Theft. https://power.gov.pk/PowerTheft.pdf*

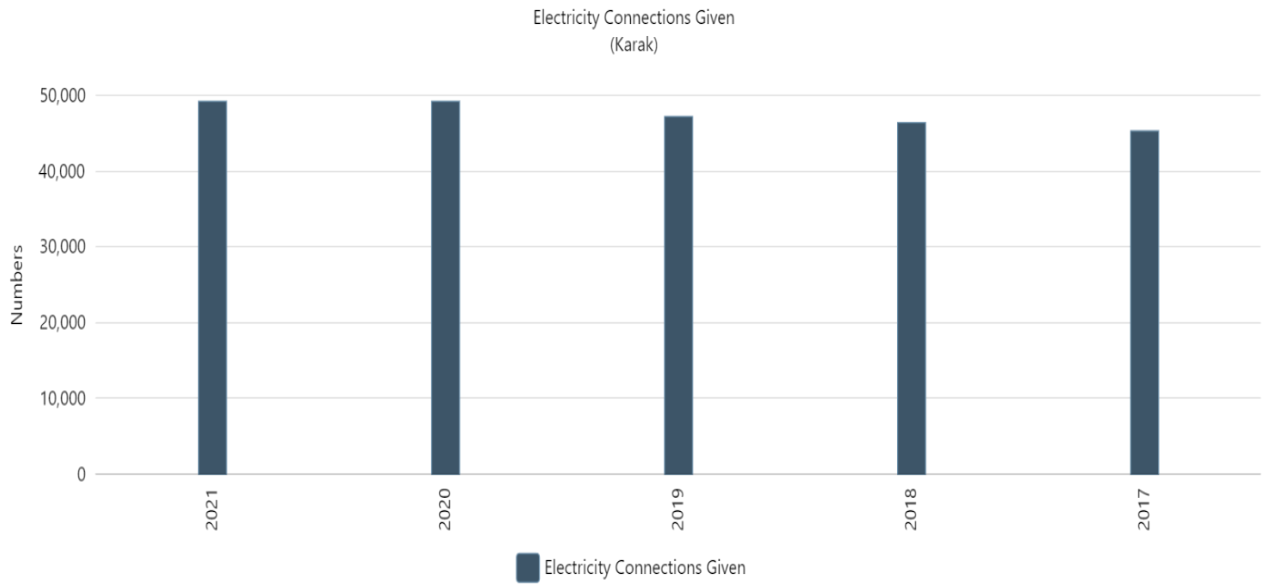
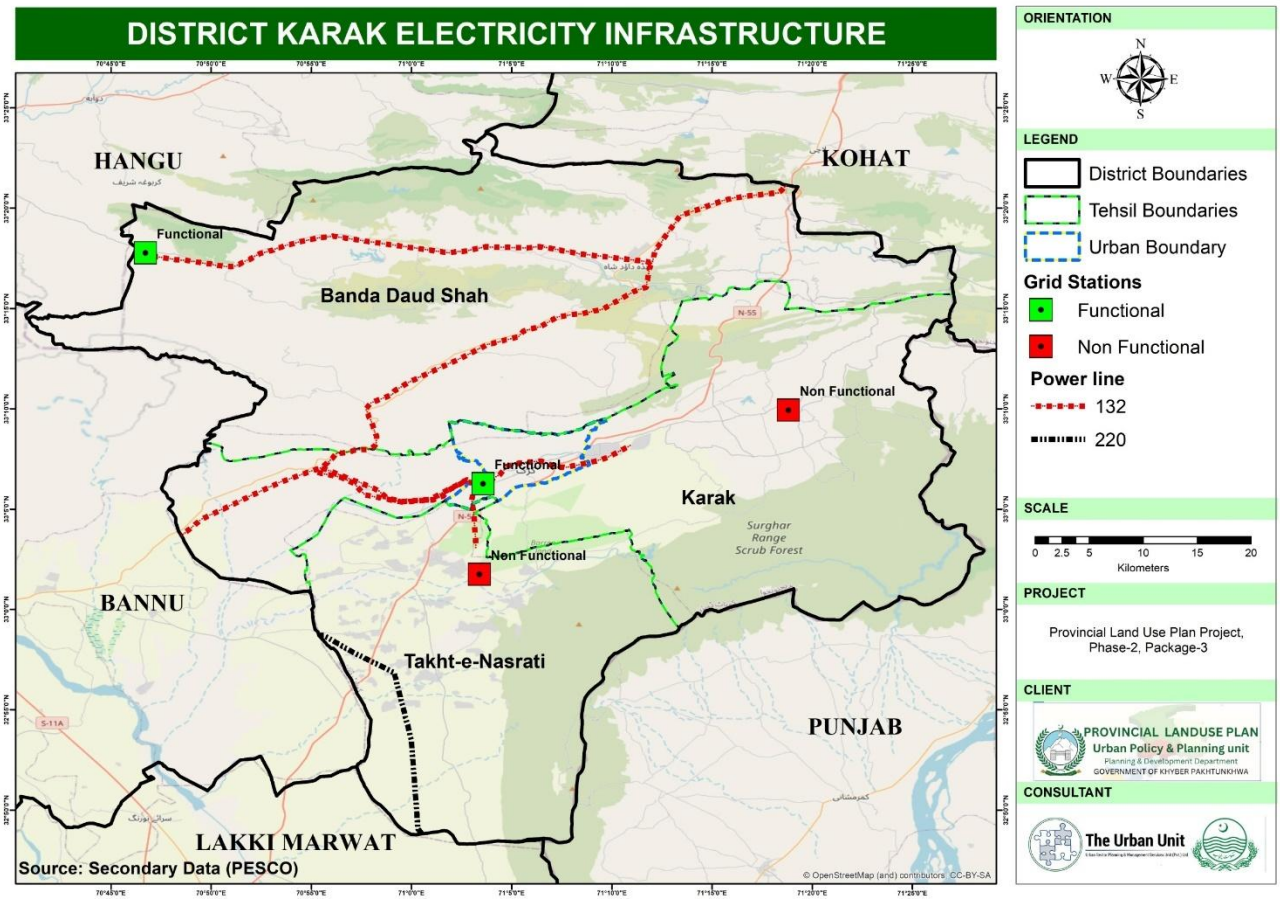


Figure 3-9: Existing Electricity Connections in District Karak



Map 3-30: Electricity Infrastructure in District Karak

3.6.1.6. Constraints

- Mining operations in Karak have resulted in subsidence, erosion of the soil, and the pollution of water as well as air. The absence of proper mining technology and outcry of well-designed prevention methods compounds these challenges affecting local fauna and flora.
- Mining staff are exposed to the dangers of occupational accidents because the labor safety and health standards are not fully complied with. Most employees naturally use their protective equipment like helmets, gloves, industrial boots, scramblers, which are the most widely used

vehicles in mines, and appropriate uniforms. This leads to the frequency of accidents being overwhelmingly high.

- Mining tasks in the local community have negative impacts such as habitat loss, noise pollution, and water source interruption. Not enough community consultation and interaction are the sparks in case of conflicts among the parties.
- The absence of new mining and processing technologies limits the environmental management and efficiency of mining activities. Furthermore, the implementation of autonomous mining systems in Karak is a subject that still needs a lot of work.
- The required skilled workforce for a sector that has a brighter future is not being employed due to the fact that there are no vocational training institutes in the district and the outlying areas.
- There are regular power cuts during working hours which in turn lead to a loss of efficiency in the minerals processing. The poor condition of mine access roads causes access to be blocked. Moreover, the operations of crush plants in mining areas are not possible, as there is no electricity and water.
- The local economy's dependence on mining is a major cause of economic instability, as well as a factor that restricts the potential for diversification.
- There is an absence of a participatory decision-making mechanism for the stakeholders or a regulatory body, which is one of the major reasons why the mining sector cannot develop well.
- Karak has the potential to operate as the "Gypsum" and "Rock Salt" in the area, but its potential is impaired by various infrastructural and regulatory challenges
- Although Karak has potential for solar and wind energy development, the district currently lacks sufficient infrastructure and investment in these renewable energy sources. The existing energy infrastructure is underutilized, with inadequate integration of renewable energy into the local grid.
- Despite efforts to electrify rural areas, the expansion of electricity access remains slow, particularly in remote and underserved communities.

3.6.1.7. Recommendation

- Enforce stricter environmental and occupational health and safety regulations to ensure sustainable mining practices.
- Invest in advanced technologies for dust control, water treatment, soil conservation, and waste management.
- Provide mandatory training and certification programs for workers on safety practices and equipment use.
- Increase community engagement and consultation to address concerns and mitigate impacts.
- Develop efficient waste management strategies, including recycling, safe disposal, and regular audits to monitor waste practices
- To reduce the financial losses in electricity distribution, it is essential to implement accurate metering systems, strengthen billing processes, and introduce anti-theft measures.
- It is crucial to operationalize the existing non-functional grid stations in Takht-e-Nasrati and Karak Tehsil. By making these grid stations functional, the district can significantly improve its electricity distribution network.

3.6.1.8. Future Plan

3.6.1.8.1. Reduce Local Market dependencies in Mineral Sectors

The District karak is home to minerals resources, producing variety of minerals but known for its Gypsum and fine Salt production. The district has produces 0.4 tons of gypsum in the year 2021-22. A significant amount is exported to neighbor countries at the low rates through local dealers and this demand is dependable on such market which can be affected with regional uncertainty. However, this heavy reliance on an unstable regional market makes the sector vulnerable to economic uncertainties. Development of export oriented focused marketing strategy for the mineral and Domestic promotion, facilitation of investors to participate in international exhibitions is necessary to approach international market, strengthen regional economy, enhance business connectivity, reduce local broker’s dominancy and offer opportunity to trade eye to eye. Investing in such Initiatives in the future will not only boost Karak’s mineral

sector but also drive technological advancements, creating long-term economic opportunities for the district.

3.6.1.8.2. Strengthening Human Resources

The district future economy lies on extraction of mine and minerals, and workforce engagement within mineral sectors. The level of workforce in this sector can be gauged with availing technical institutes, providing quality training in the mineral sector. Currently, 33% of the workforce proportion is engaged within industry sector. However, the district has more potential in future to capture skill force and produce employment in various sectors. Therefore, Initiatives such as training programs and technical institute are crucial to take place like offering On-the-job training on mining processing, Safety protocol and modern extraction, also Degree and Certification program in mining technology, geology and metallurgy programs and private & public collaboration is needed to be launched for furthering employment.

3.6.1.8.3. Technology Up-gradation

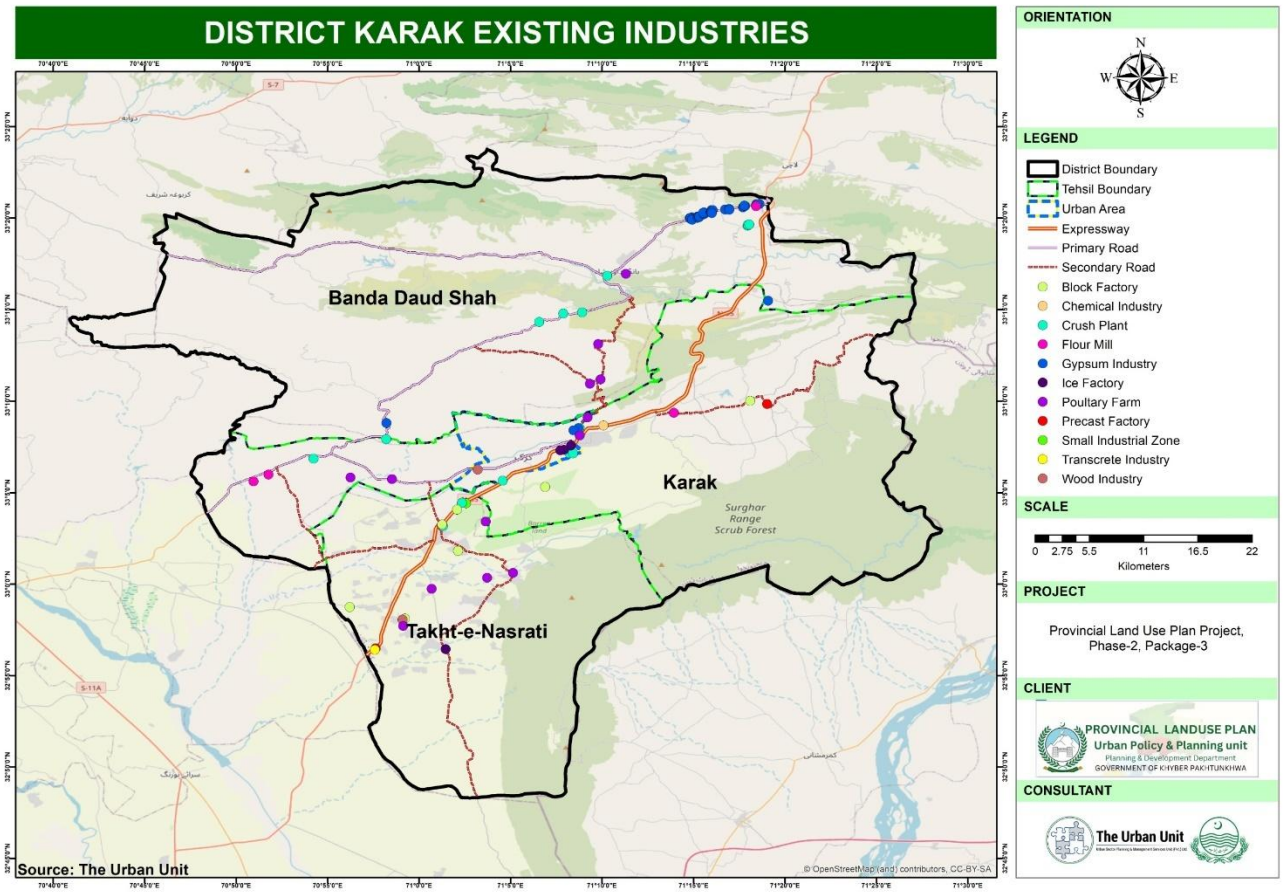
- Technology is as vital as the sector itself for increasing competitiveness and tapping international markets. Some of the key action points to reduce the industrial wastage and increase its production demand, in this regard are;
- Establishment of Machinery Pools (at least 01 at each cluster) at major mining areas of the country.
- Establishment of Common Facility & Training Centers (at least 01 at each cluster) in major mineral processing hubs.
- Modern Stock Yards/Warehouses (export facilitation).
- Technology endowment fund for up gradation of the existing processing units/mines

3.7. Industry

Industry refers to the sector of an economy that is involved in the production of goods and services. It encompasses a wide range of activities, including manufacturing, processing, and construction, and is essential for economic development and employment generation. District Karak is famed for its several natural resources including salt mines, gypsums, coals, and as well as for fuels such as Gas and oil. The District boasts a diverse range of industries, encompassing sectors such as mining, agriculture, and manufacturing. District Karak is known for its gypsum industries, particularly used in cement, plaster, paper production, paint, fuel and gas desulfurization, etc.

3.7.1.1. Existing Industrial Distribution

In addition to traditional mine and minerals industries, Karak is home to several small to medium-sized enterprises (SMEs) under small Industrial Estate and Industrial Economic Zone, compressed of Crush plants, Poultry farms, construction materials, and light engineering Industries. The Poultry farms industry, in particular, has seen growth due to insufficient agricultural land for livestock and it acquire less area and can thrive on seeds-based feed, which is readily available. Additionally, the high local demands and the region's suitable climate further encourage this sector. The crush plants industry also benefits local raw materials productions like rock salt, limestone, gypsums, and silica clay, supporting both local needs and regional market growth. Additionally, Karak hosts various scattered industries, including ice factories, crushing plants, block factories, mineral water plants, Wood factories, grinding/crushing units, furnace factory, Water bottles, chemical industries, and flour mills. Below Map shows the spatial distribution of the existing industries in district Karak.



Map 3-31: Existing Industries Distribution

3.7.1.1.1. Small Industrial Estates (SIE)

Karak is home to one small industrial estate, managed by the Small Industries Development Board (SIDB). Established by an act of the NWFP Parliament in 1972, SIDB aims to promote small-scale industries. Since its inception, SIDB has developed nine Small Industrial Estates across the province. In Karak, the Small Industrial Development Board (SIDB) has successfully established a small industrial estate located on Indus Highway. The estate covers an area of 31.5 acres, currently hosting 17 operational units out of the total 127, with the remaining units still under construction. These industries include food processing, steelworks, agro-based industries, and furniture manufacturing.

Table 3-53: SIDB Ongoing project in Karak[53]

Small Industrial Estate (SIE) Name	Address	Location with Grid Reference	Status of Activation	Capacity of Site* (Units)	Area of Industrial Site in Acres
SIE Karak	Indus Highway Road, Opp. Govt. College of Management Sciences, Karak	33º 04′ 24″ N 71º 02′ 34″ E	Activate	127	31.5

3.7.1.1.2. Salt & Gypsum City Karak Economic Zone

Karak Salt and Gypsum Economic Zone is an initiative of Khyber Pakhtunkhwa Economic Zones Development and Management Company (KPEZDMC). KPEZDMC has been established, as a non-profit organization, within the meaning of section 42 of the repealed Companies Ordinance, 1984(now the Companies Act 2017) and is wholly owned by government of Khyber Pakhtunkhwa. Salt and Gypsum City Karak (SGCK) covers an area of 310 acres. The zone is expected to attract an investment of approximately Rs 3 billion and generate about 25,000 jobs, It is geographically located in the Karak District; SGCK has a

[53] *Small Industries Development Board Khyber Pakhtunkhwa*

high potential to benefit the nearby areas and become a factor of improvement in their economic landscape. Salt and Gypsum City karak Economic Zone has easy access to KP, Baluchistan, and Punjab provinces. Moreover, it is along the Bannu-Kohat link Road, which lies in Tehsil Banda Daud Shah, which is a gateway to other Districts within Khyber Pakhtunkhwa. Karak District has a literacy rate of 64%, which will facilitate local industries by making skilled and educated laborers accessible. Salt and Gypsum City Karak (SGCK) has the potential to attract large amounts of investment due to the availability of copious natural resources and its strategic location.

3.7.1.1.3. Regional Distribution of Industry

The District Karak is primarily known for its natural resources and construction industries. These industries are distributed across various districts, and their presence is overseen by the Directorate of General Industries and Commerce. The officially recognized industries in the region include crush plants, ice factories, gypsum production, mineral water plants, poultry farms, and bottled mineral water facilities, chemical industries, grinding and crushing operations, furnaces, and flour mills.

Table 3-54: Established industries[54]

S.no	Industrial Type	Industrial Units
1	Stone Crushers / Crush Plants	24
2	Ice Factory	10
3	Gypsum Industry	39
4	Mineral Water Plant	2
5	Poultry Farm	46
6	Bottles Mineral Water	2
7	Chemical Industry	1
8	Grinding/Crushing	1
9	Furnace	1
11	Flour Mills	4
	Total	**130**

To further verify the presence of industries on the ground, we employed spatial technology analysis to cross-check the actual industries with the official list provided by the Trade and Commerce Department. This analysis revealed additional industries not included in the official list, such as block factories, precast factories, wood and Transcrete factories.

Table 3-55: Spatially Identified Industries

S. No	Industrial Type	Industrial Units
1	Block Factory	7
2	Precast Factory	2
3	Wood Factory	2
4	Transcrete Factory	1
	Total	**12**

The overall industrial landscape in District Karak includes several additional industries not listed in the official records, such as block factories, precast factories, wood factories, and Transcrete factories. These were identified through spatial analysis. Additionally, the average working in industries in the District Karak is 5 persons, here, poultry farms represent the largest sector with 46 units, followed by gypsum industries as the second largest with a significant presence. The district also hosts 24 crush plants, 10 ice factories, and 7 block factories.

[54] *Directorate General of Industries & Commerce Khyber Pakhtunkhwa*

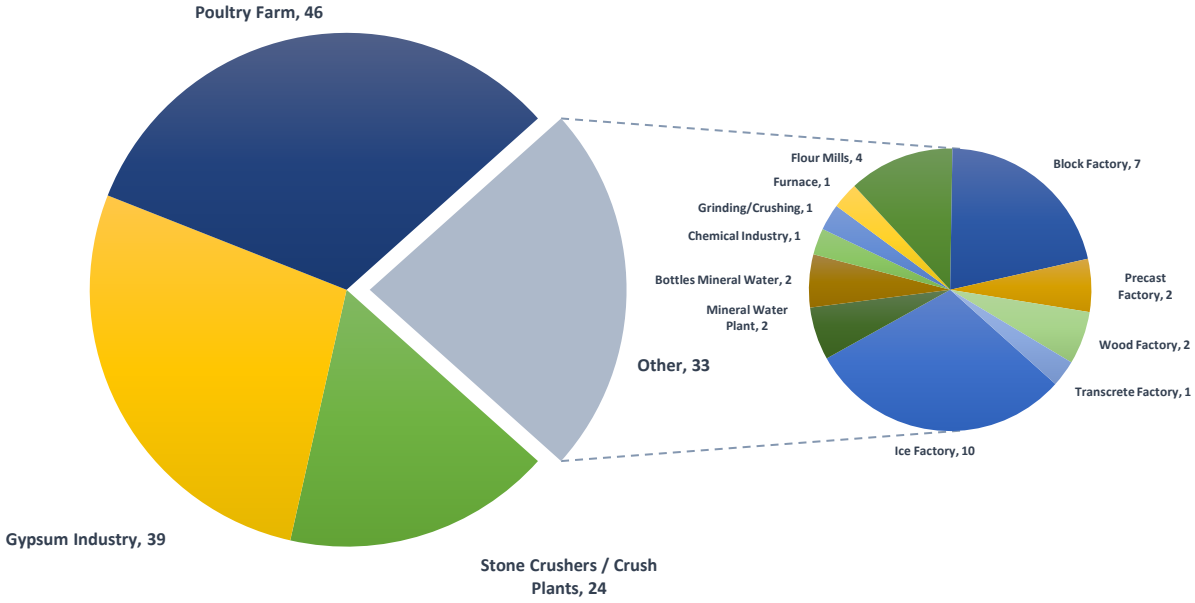


Figure 3-10: District Karak Industries Pattern

3.7.1.2. Industrial Growth Pattern

Karak District has a diverse industrial sector encompassing medium and small manufacturing units. This section provides an in-depth analysis of the industrial landscape in karak, focusing on historical trends, recent developments, and sectorial composition. Through an examination of data from Development Statistics, KP 2023, and other sources, this analysis sheds light on the growth trajectory, challenges, and opportunities within the industrial sector.

Analyzing the data from Development Statistics regarding industrial establishments, it's evident that the overall number of industrial units in Karak District has gradually increased over five years. It noted that there were 5 industry units in 2017-18 and increased to 11 units in 2018-19. While in the next year 2020-21, the number of industrial units' surplus to 119 units in the year 2021-22, and it jumps to 120 units in the year 2021-22. In the year 2017-18, the running units were 5, and the closed units were none, the running units peaked at 76 in 2020-21 while it again declined to 66 in 2021-22.

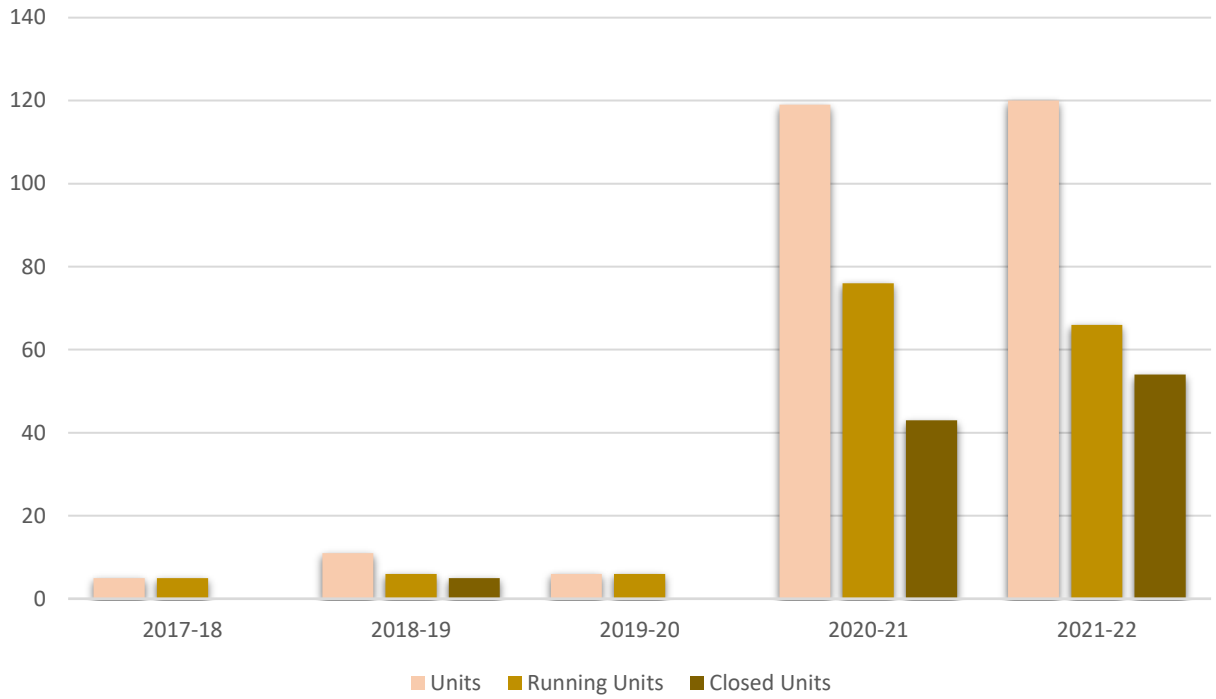
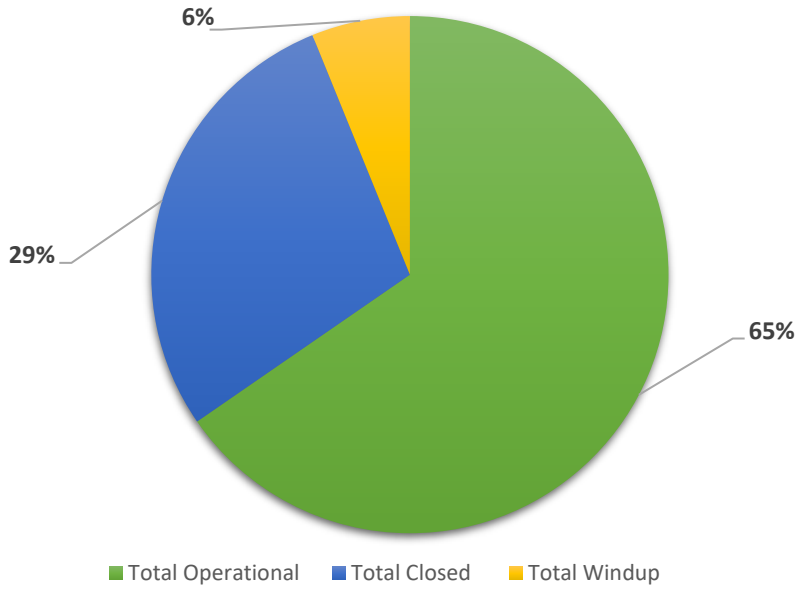


Figure 3-11: Historical Overview of Industrial Sector Karak

3.7.1.3. Industrial Units Status in Karak District

According to the Directorate General of Industries and Commerce, District karak hosts a total of 130 industries out of these, 85 are operational, 37 are closed and 8 have wind-up. Sector-wise. The statistic shows an overall industrial status stated, 65% of the industries in District Karak are functional, while 6% have wind-up and 29% remain closed. This distribution highlights the district's industrial capacity and areas needing attention for full economic revitalization.



3.7.1.4. Industrial Employment

Diverse soil types and rich natural resources in District karak underpin its economic activities. This region not only offers minerals and mines but also presents ample opportunities across its robust industrial and services sectors. The harmonious blend of these sectors not only supports local livelihoods but also fosters a dynamic economic landscape poised for growth and development. Services lead in employment share, engaging 45.10% of the workforce, highlighting a robust service sector encompassing retail, healthcare, education, hospitality, and finance.

Table 3-56: Sectorial Employment, District Karak[55]

Sector	Employment
Total labor force	226700
Agriculture	21.90%
Industry	33%
Services	45.10%

3.7.1.5. Constraints

- Poor road networks hinder the movement of goods and raw materials, impacting operational efficiency.
- Inconsistent electricity supply disrupts production schedules and increases operational costs.
- Water scarcity limits industrial operations, particularly in sectors dependent on water-intensive processes like agriculture and food processing.
- Industries like the gypsum industry and stone-crushing plants contribute to environmental pollution, affecting air and water quality in the region.
- Lack of clustering and zoning for industries like the gypsum industry, block factories, and crushing plants leads to inefficiencies in infrastructure use and environmental management.
- The industrial workforce may lack the necessary skills for modern manufacturing and technology, impacting productivity and competitiveness.
- Rural-urban employment gaps highlight unequal distribution of economic opportunities, especially in the service sector.
- Industries may face challenges in complying with environmental regulations and safety standards, affecting operational continuity.
- Inconsistent government policies and a lack of incentives for industrial growth hinder investment and expansion.

3.7.1.6. Recommendation

- Support the upgradation of road networks with funds to facilitate the movement of goods and raw materials.
- Upgrade and put in new power supply infrastructure, with wind and solar power as the main resources to achieve a stable and environmentally friendly power supply.
- Introduce water-saving technologies and practice smart and sustainable water management which is the recycling and efficient usage in the industrial process.
- Strict mandatory environmental regulations should be imposed plus the provision of incentives to the industries to use cleaner production technologies.
- Implement pollution monitoring measures to ensure compliance with the law, as well as to punish the rule-breakers in the industries like gypsum, and stone-crushing plants.
- Set up industrial parks and zoning areas to attract industries like gypsum, paving brick factories, and stone-crushing plants.
- Users should be able to use and evolve infrastructure respectfully, properly manage resources such as water, and facilitate relationships between the industries in these special zones.
- Offer quality vocational training, seminars, and creative-curriculum skill development programs that correctly reflect and answer the actual demands of the manufacturing and technology fields.
- Work side by side with academic institutions and industry players to ensure the labor potential receives appropriate and latest training.
- Regarding the creation of employment opportunities through the setup of industries in rural areas and the bridging of rural-urban employment, the local labor force must be motivated.
- Offering tax breaks and grants, among others, to businesses that set up their facilities and operations in the countryside will increase local GDP and employment.
- Create and introduce stable government policies that boost the industrial sector by placing clear rules, systems, and support for investment and expansion.

[55] *Labor Force Survey, 2020-21*

- Introduce a regulatory environment that acknowledges the co-existence of industry with environmental and safety standards and provides resources and ensures enforcement.

3.7.1.7. Future Plan

The Industrial future plan recognizes the industrial area requirement for district. The given **Table** below highlights the overview of population projections and industrial area requirements for urban centers in District Karak by 2045. The population for each urban center is projected, and 10% of this future population is used as participation rate in the industrial sector to calculate the required area for future industrial development. This sample of the population is divided by a standard factor of 50[56] (representing the population per acre for industrial areas) to determine the area required in acres which is then divided by 2.47 to get the required area in Hectares.

Table 3-57: Future Industrial Requirement for Urban Centers of District Karak

Urban Center	Projected Population (2045)	Proposed Urban Area Boundary (Ha)	Area Req. 2045 in Hectares (@10% participation rate)
Karak City	131405	2554	106.40
Ahmadi Banda	7715	397	6.25
Latambar	22602	520	18.30
Sabirabad	7105	182	5.75
Takhti Nasrati	21393	420	17.32

3.8. Trade and Commerce

The services sector plays a significant role in the economy of Khyber Pakhtunkhwa, accounting for 55.65% of its total economic activity within the services sector, Wholesale and Retail Trade (WRT) stands out as the largest subsector. WRT, along with Hotels and Restaurants (HR), collectively contributes 40.37% to the services sector and 22.47% to KP's overall GDP. Furthermore, this sector holds a noteworthy position nationally, representing 13% of the Wholesale and Retail Trade and Hotels and Restaurants sector across the country. Karak, located in the Khyber Pakhtunkhwa province of Pakistan, is a city with significant historical, cultural, and economic importance. Its strategic position, the district is situated among the districts of Kohat, Bannu, and Lakki Marwat, on its east the district meets with the river Indus, which is the longest river of Pakistan that separates the district from the province of Punjab making the district into a pivotal hub for trade and commerce in the region. The city's economy is run by it's primarily mine & minerals resources and also up to some extent, its agriculture and industry sectors push the district into a commercial center for surrounding areas. The Indus Highway Road passes through the center of District Karak which provides a gateway for the neighboring districts to export and import their goods.

3.8.1. Distribution of Commerce and Trade Centers

3.8.1.1. International Commerce and Trade Centers

Karak serves as a crucial trade hub with significant international ties. Located on the Indus Highway (N-55), a vital trade route connecting Karachi in the south to Peshawar in the north, the city plays a vital role in promoting trade. This highway also serves as a critical link to the China-Pakistan Economic Corridor (CPEC), enhancing trade connections between Pakistan and China, and extending to the Central Asian Republics (CARs). The corridor's crucial role in transporting goods from Xinjiang in China to Karachi and further into Central Asia significantly enhances Karak's position in regional trade. Notably, Karak's exports, such as top-quality Honeybees, Mazari products, and valuable minerals, are widely recognized internationally for their quality and superior craftsmanship.

3.8.1.2. National Commerce and Trade Centers

The Indus Highway is a crucial route for transporting goods across Pakistan. It is well-maintained and plays a vital role in facilitating efficient logistics. Karak is nationally recognized for producing and distributing

[56] *Ministry of Housing and Works, Environment & Urban Affairs Division, Govt. of Pakistan, National Reference Manual on Planning and Infrastructure Standards, Section 5.3.1.2, Page 89. The Manual `recommends 50 industrial workers per acre.*

various commodities. The city is a significant supplier of oil, gas, salt rock, honey, vinegar, and dry fruits such as Karak groundnuts. The agriculture sector makes a significant contribution, with major crops including wheat, bajra, rice, and rapeseed/mustard. Karak is also known for its crush and gypsum production, supplying materials to major construction hubs. Additionally, the city has a strong presence in the poultry industry, with its farms supplying various parts of the country.

3.8.1.3. Regional Commerce and Trade Centers

Karak is a vital commercial and trading hub in Khyber Pakhtunkhwa, playing a key role in the region. Strategically located, it serves not only the surrounding areas but also the District Mianwali of Punjab province. The city's markets offer a diverse range of vibrant products. Locally, Karak is known for its abundant agricultural produce, including wheat, rice, Bajra, Gram, rapeseed & mustard, maize, Dates, ground nut, and Zizyphus tree (Ber). Moreover, Karak is a hub for manufacturing Blocks and construction aggregates like Karak Crush, widely distributed in the region. The city is also reputed for its high-demand Gypsum used in construction materials. The bustling Karak Bazaar, a pivotal commercial center, meets the locals' basic needs and serves as a hub for trading ground-producing nuts and mustard oil, attracting traders from neighboring regions. Additionally, the city's famous beef pulao draws food enthusiasts from surrounding areas. Karak's well-maintained trade routes and strategic location affirm its crucial role in regional development and economic interactions, enhancing its significance in the regional trade network.

3.8.1.4. District Commerce and Trade Centers

Karak, a district known for its vibrant commercial scene, hosts several local markets and trade centers that cater to the diverse needs of its population. The Karak Bazaar, the most prominent market, is a bustling hub where agricultural products, Food products, and Handicrafts. This bazaar not only supports the local economy but also plays a significant role in the social and cultural life of the district. Additionally, the weekly Sunday Mela Bazaar is a notable event featuring a wide array of goods, from fresh produce to artisanal crafts.

Karak’s local economy benefits from various traditional goods and industries. The city's salt mines are renowned for producing high-quality salt used to be exported at the national level due to its fine quality and also its gypsum which is used as a mixture for producing construction chemicals. Small-scale industries in Karak include furniture making, spice grinding, and Steel production. The district's strategic location and robust transportation network, including integration into the CPEC and connectivity via the Indus Highway, further enhance its role as a commercial hub.

Local markets such as Teri Bazar, Dabbi Bazar, and Tatti Bazar serve as key commercial centers within their respective tehsils, facilitating both local and regional trade. Smaller markets in Takht-e-Nasrati and Banda Daud Shah Tehsils also contribute significantly to the local economy by providing essential goods and fostering economic activity within their communities.

3.8.2. Major Commercial Activities in the District

3.8.2.1. Retail Trade

The district of Karak boasts a vibrant commercial landscape with a wide array of retail shops and markets that cater to the diverse needs of its residents. The Karak City Market stands as the central commercial hub of the city, offering a rich variety of products ranging from textiles and clothing to food items and household goods. This bustling market is integral to the district's economy, serving as a key destination for both daily essentials and specialty items. In the Takht-e-Nasrati Tehsil, Tati Bazar emerges as the focal point of market activity, known for its lively atmosphere and extensive range of products that support the local economy. Similarly, Teri Bazar in Banda Daud Shah Tehsil serves as another crucial commercial center, facilitating trade and commerce not only within the region but also extending to neighboring areas. These markets are essential for providing necessary goods and services to their communities, thereby fostering economic activity, and supporting the livelihoods of local residents. Collectively, these commercial activities highlight the district's dynamic market environment, where traditional bazaars and modern retail operations coexist and contribute to the overall economic vitality of Karak.

3.8.2.2. Agricultural Products

Karak is renowned for its rich agricultural output, which plays a significant role in the district's economy. The area is famous for specific dry fruit including ground nuts (Peanuts). These fruits are cultivated in the district’s favorable climatic conditions and are traded extensively both locally, regionally, and internationally. In addition, Karak produces rapeseed & mustard, and major grain products include wheat,

Bajra, and Jowar. The district also grows pulse. These agricultural products are essential to the local economy, with businesses engaged in their trading, processing, and packaging, contributing significantly to the livelihoods of the residents.

3.8.2.3. Industrial Operations

District Karak has a diverse industrial sector, ranging from traditional cottage industries to modern enterprises, contributing significantly to the local and provincial economy. Key industries include gypsum extraction and processing, which supports construction and cement production, as well as food processing, which benefits from the district's strong agricultural base. Flour mills, crush plants, and poultry farms further enhance economic activity by processing essential goods and supporting local food security.

Additionally, Karak hosts industries such as block factories, ice factories, and wood workshops, alongside Small Industrial Estate-1, located on Indus Highway. These industrial operations generate employment, foster entrepreneurship, and support regional infrastructure development, making Karak a vital hub for trade and commerce.

3.8.2.4. Construction and real estate

In construction and real estate, Karak is actively engaged in both residential and commercial projects. The district is experiencing ongoing developments in housing, commercial spaces, and infrastructure, reflecting a growing demand for real estate. This sector plays a crucial role in accommodating the expanding population and supporting local and regional economic activities.

3.8.2.5. Transport and logistics

The transport and logistics sector are vital for facilitating the movement of goods and people within and beyond the district. Businesses in this area manage the transportation of various products and provide essential services for local trade and commerce. This sector supports economic growth by ensuring efficient connectivity and accessibility for both commercial and personal travel.

3.8.2.6. Financial services

Financial services in Karak are provided by banks and financial institutions that cater to the needs of individuals and businesses. These institutions offer a range of services, including banking, loans, and financial management, which are essential for supporting local economic activities and personal financial needs.

3.8.2.7. Hospitality and tourism

In the realm of hospitality and tourism, Karak features a variety of hotels, guesthouses, and other accommodations. Although this sector is not highly developed compared to other regions, it still plays a role in supporting local and regional tourism. The hospitality industry provides essential services for travelers and tourists, contributing to the district's overall economic development by attracting visitors and supporting local businesses. Overall, Karak's commercial sector is characterized by a mix of traditional practices and modern business operations, reflecting the district's economic diversity and growth potential.

3.8.3. Main Bazars in Karak

i. Porana Bazar

Porana Bazar, meaning "Old Market," is one of the oldest commercial areas in District Karak. This bazaar holds historical importance, as it has been a trading hub for decades, serving generations of locals. The market is known for its traditional Pashtun handicrafts, including handwoven carpets, embroidered textiles, and wooden furniture. Many shops here sell antique items and vintage goods, attracting collectors and history enthusiasts. Additionally, Porana Bazar is famous for its spice merchants, offering locally sourced red chilies, turmeric, and coriander. The narrow, bustling lanes of this bazaar retain an old-world charm, with tea stalls and small eateries serving Karak's signature dishes, such as Dumba Karahi and Chapli Kebabs.

ii. Haleem Market

Haleem Market is a specialized bazaar named after its most famous offering—Haleem, a slow-cooked wheat and meat dish popular during Ramadan and festive seasons. This market becomes especially lively in the evenings, with numerous food stalls serving freshly prepared Haleem, Nihari, and other traditional dishes. Besides food, the market also has shops selling sweets, dry fruits, and spices, making it a favorite spot for shoppers preparing for weddings and religious celebrations. The aroma of simmering meat and

freshly baked roti (bread) fills the air, drawing crowds from nearby towns. Haleem Market is not just a food bazaar but also a social gathering spot where people meet after work to enjoy a hearty meal.

iii. Sabzi Mandi

Sabzi Mandi is Karak's primary wholesale and retail vegetable market, where farmers from surrounding villages bring their fresh produce. The market is bustling in the early morning as traders and shopkeepers purchase tomatoes, onions, potatoes, leafy greens, and seasonal fruits. The prices here are relatively lower than in smaller local markets, making it a preferred destination for bulk buyers. Additionally, Sabzi Mandi has a section dedicated to herbs and medicinal plants, used in traditional remedies. The market plays a crucial role in Karak's agrarian economy, supporting local farmers and ensuring fresh produce reaches households and restaurants across the district.

iv. Teri Bazar

Teri Bazar is a key commercial stop for travelers moving between Karak, Kohat, and Bannu. The market is known for its roadside dhabas (eateries) serving quick meals like Chana Chaat, Samosas, and Doodh Pati Chai (milky tea). Many shops sell auto parts, tires, and mechanical repair services, catering to truck drivers and commuters passing through the region. Teri Bazar also has a small livestock section, where goats and sheep are traded. The market's strategic location makes it a vital economic hub for the town, providing essential goods and services to both locals and travelers.

v. Masjid Bazar

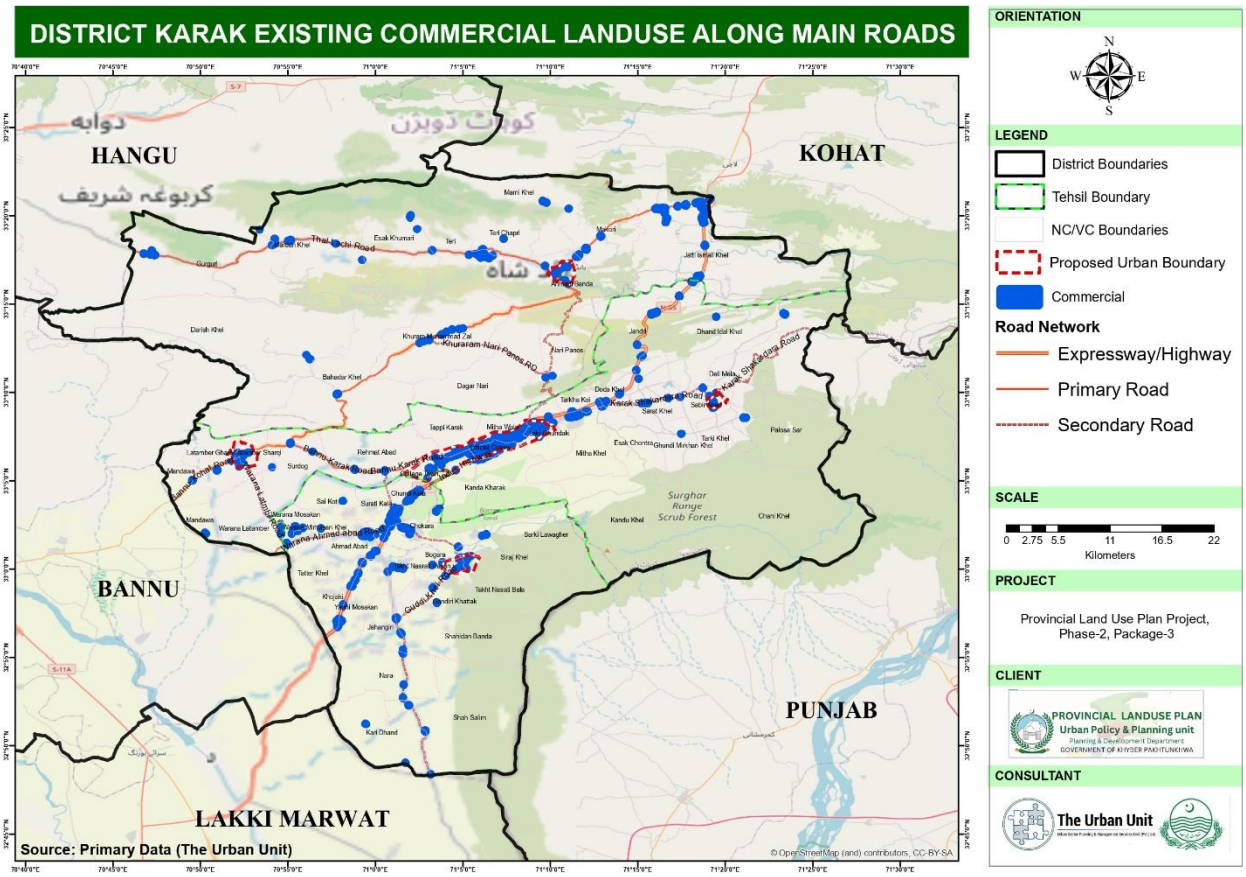
Masjid Bazar gets its name from its proximity to prominent mosques, making it a busy spot, especially before and after prayers. The market specializes in Islamic books, prayer mats, attar (perfumes), and dates popular items for religious occasions. Many shops sell traditional Pashtun clothing, including Shalwar Kameez and turbans, often purchased for Eid and weddings. Street vendors offer fresh juices and snacks, creating a lively atmosphere. The bazaar also has tailors and embroidery shops that customize traditional dresses, adding to its cultural significance.

vi. Subehdar Market

Subehdar Market is a well-organized commercial area known for its electronics, mobile accessories, and home appliances. Many shops here deal in second-hand smartphones, refurbished gadgets, and repair services, making it a budget-friendly shopping spot. Additionally, the market has stationery stores, photocopy centers, and bookshops, frequented by students and professionals. A section of Subehdar Market is dedicated to footwear, with vendors selling both local Peshawari Chappals and branded shoes. The market's clean layout and variety of goods make it a preferred shopping destination for middle-class families.

vii. Qutab Din Market

Qutab Din Market is named after a prominent local figure and serves as a general-purpose bazaar catering to daily needs. It has a mix of grocery stores, cloth merchants, and hardware shops. One of its unique features is a small gold market, where jewelers sell traditional Pashtun jewelry, including bracelets, necklaces, and earrings. The market also has several carpet shops offering handwoven rugs, a specialty of the region. Qutab Din Market is less crowded than the main bazaars but remains essential for residents seeking quality goods at reasonable prices.



Map 3-32: Karak Existing Commercial Land Use

3.8.4. Commercialization along Main Roads of Urban Centers

1. Karak City

In Karak City, commercial activity is extensively distributed along major road corridors, especially the Karak-Bannu Road (N-55/Indus Highway) and the Karak–Gurguri Road. There is a dense linear development along both sides of these primary and expressway roads.

The commercial clusters are extending from Chountra and Jandri in the east to Surati Kala and Ghundi Kalla in the west. Key urban neighborhoods such as College Town, Rehmat Abad, Urban Colony, and Lakki Adda show higher concentrations of commercial activities, forming a vibrant commercial spine through the city.

2. Ahmadi Banda

In Ahmadi Banda, commercial development is primarily concentrated along main roads, particularly the Indus Highway and the Link Road connecting to Banda Daud Shah. The commercial clusters, highlighted are largely positioned along the expressway and primary road network, exhibiting a linear (ribbon) development pattern. The majority of the commercial activity falls within the proposed urban boundary aligning with the accessibility and visibility of main transportation corridors.

The pattern reflects a growing tendency for roadside commercialization, especially near intersections and junctions, suggesting that Ahmadi Banda is evolving into a road-dependent commercial node with emerging marketplaces and business services closely linked to vehicular movement.

3. Latamber

In Latambar, commercial activity is primarily concentrated along the main transportation corridors, particularly the Bannu-Kohat Road (an expressway) and the Latamber-Maidan Road. There is a linear commercial pattern, especially near the central intersection of Latamber Gharbi and Latamber Sharqi.

4. Sabir Abad

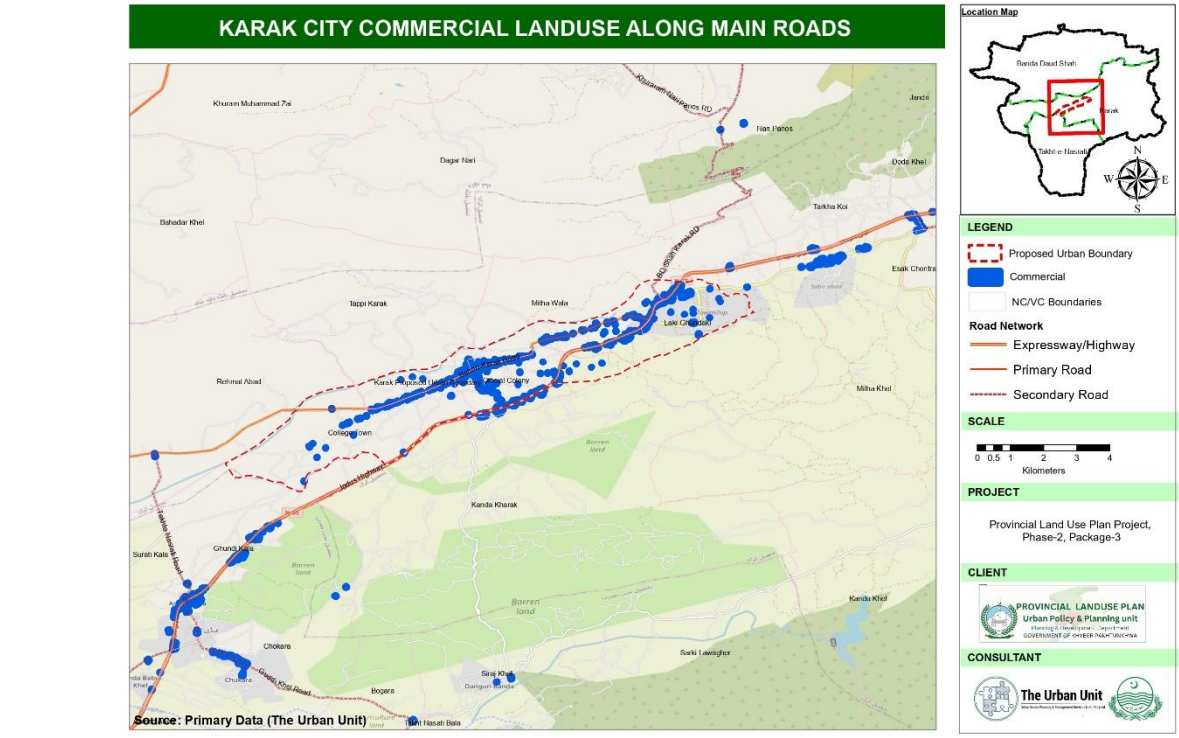
Commercial activity is predominantly concentrated along the main north-south primary road that runs through the center of the town. There is a dense and continuous commercial strip particularly along the

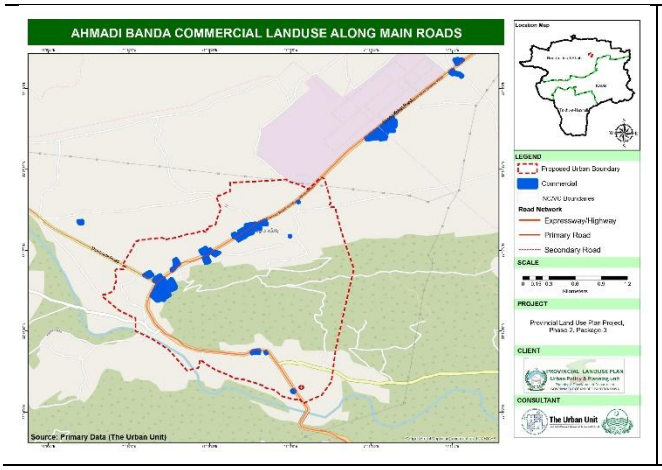
Sabir Abad–Palosa Sar Road. Commercial clusters are most prominent in the central built-up area of Sabir Abad and gradually extend toward the junction connecting to the Karak–Shaheedan Road in the north. Smaller pockets of commercial land use are also visible along secondary link roads, including near the Sabir Abad Girls College and adjacent junctions.

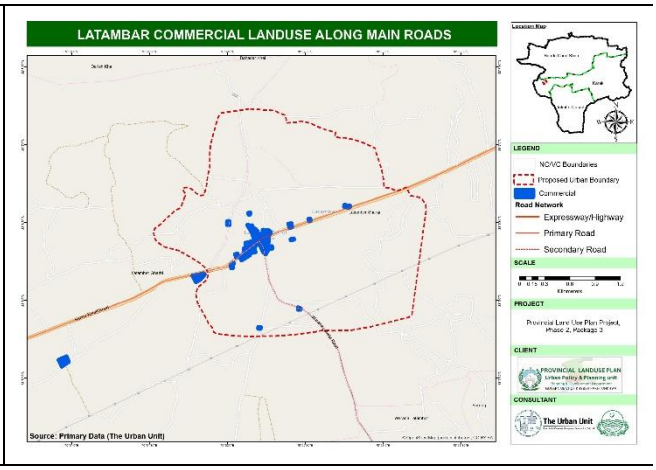
5. Takht-e-Nasrati

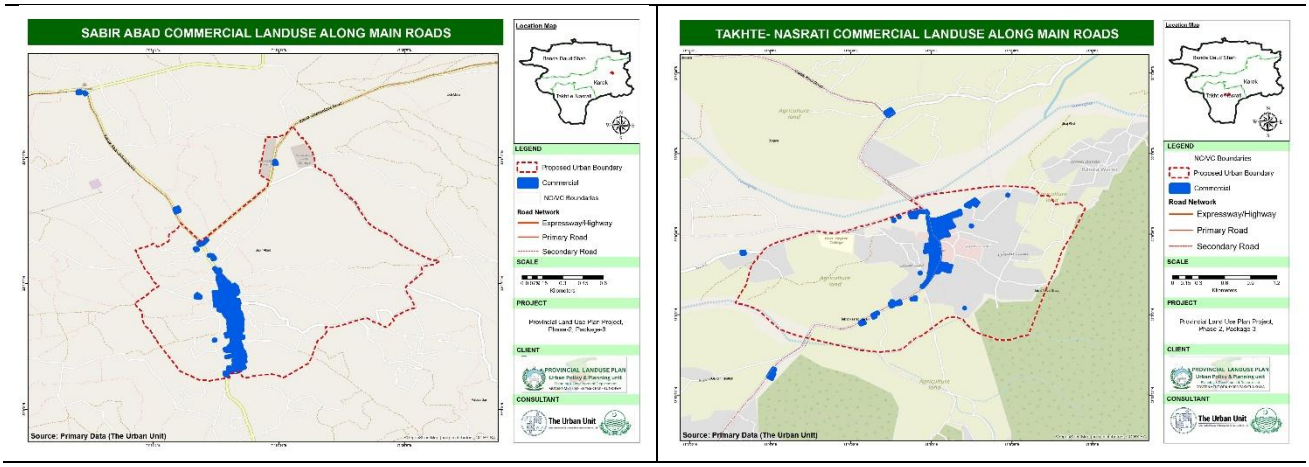
Commercial land use is predominantly concentrated along the Takht Nasrati Road and the Gulshan Abad Road, forming a dense linear commercial corridor through the heart of the settlement. The highest concentration of commercial establishments is located around the central urban core, near the intersection of key roads and close to landmarks such as the Government Degree College. Commercial sprawl is also observed extending northward toward Gulshan Abad Road and eastward toward Banda Wanki, with smaller clusters scattered along peripheral secondary roads.

Commercialization along main roads in Karak Urban Centers









Map 3-33: Commercialization along Main Roads Karak Urban Areas

3.8.4.1. Constraints

The Karak District is poised to become a vital center for agricultural, industrial, and mineral development in the region. Its strategic position along the Indus Highway and involvement in the China-Pakistan Economic Corridor (CPEC) bolster trade connectivity and economic potential. The district is renowned for high-quality natural resources such as Oil & Gas, Gypsum, Rock salt, and Coal, providing ample opportunities for industrial growth and economic diversification. Furthermore, its agricultural and artisanal products such as Honeybee and Ground nuts items can offer local investors access to international markets in the Middle East, Central Asia, China, and Eastern Europe through initiatives like CPEEC. However, the district faces significant challenges:

The shortage of skilled labor leads to inefficiencies in industrial and agricultural sectors, compounded by the absence of vocational training opportunities in relevant fields.
Poor telecommunications services in Karak and surrounding areas deter investor interest.
Limited access to financing facilities hinders local business owners, particularly in the industrial and agricultural sectors.
Low competitiveness results from inadequate infrastructure, including frequent power outages that disrupt economic activities, especially in the industrial sector.
The absence of forward linkages for the agriculture sector, such as access to markets and agro-processing facilities, limits growth.
Inadequate IT infrastructure impedes the ease of doing business and the attraction of buyers.
A lack of compliance with international standards and certifications within existing value chains results in diminished investor interest.
Urban planning issues, including encroachment, and inadequate parking spaces, create challenges.
Narrow roads, a lack of traffic management, and high volumes of both vehicular and pedestrian traffic exacerbate traffic congestion in commercial areas.

3.8.4.2. Recommendation

Some initiatives that can improve the comparative advantage of Karak are:

- Boosting the Chamber of Commerce and Industry's resources is crucial for fostering regional industrial and commercial growth. Allocating a portion of tax revenue from the southern districts can support this endeavor.
- Provision of a business incubation center to offer specialized support and resources to aspiring young entrepreneurs and women. Through mentorship, training, and access to resources, these centers aim to nurture innovation and empower these demographics economically. By fostering a conducive environment for business growth, the project aims to catalyze entrepreneurship among youth and women, driving socioeconomic progress and inclusive prosperity.
- Establishing a dedicated marketplace to support local artisans. This includes building a work shed with essential tools, equipment, and electrification, as well as collaborating with artisan communities to design market stalls. The initiative provides a platform for artisans to showcase and sell handmade products, preserving cultural heritage. Marketing strategies will attract

tourists and engage museum visitors, creating economic opportunities for artisans and enriching the region's cultural landscape.

- Providing gas connections to local industries at CNG rates under Article 158 is essential to ensure their success and uphold the legal rights of the area's residents.
- Establishing of new wholesale market and shifting traditional export patterns to new markets like Japan, and the USA. This would enhance regional trade and decrease the congestion of the city.
- Forming a committee chaired by the Karak Chamber of Commerce, comprising representatives from key institutions such as the Small and Medium Enterprises Development Authority (SMEDA), and agricultural and industrial departments, is imperative. Regular meetings should be held to address and resolve issues facing the business community.
- Providing awareness of legal requirements, amnesty schemes, and investment opportunities to traders, industrialists, and investors is crucial. Recommendations based on local realities should be submitted to policymakers for informed decision-making.
- Setting up processing units near quarries and adopting modern mining techniques to reduce transportation costs, increase productivity, and protect the environment. Improving network routes between districts and integrating renewable energy into the industrial sector with solar panels to enhance productivity, reduce congestion, and promote sustainability.
- Introducing government-initiated financing programs through the macro banking system to uplift the agriculture sector. Promoting skill development programs and enhancing telecommunications infrastructure to address the shortage of skilled labor, increase efficiency, and attract investor interest.
- Developing comprehensive urban planning strategies to address encroachment, parking inadequacies, and waste management inconsistencies, and implementing traffic management solutions such as widening roads and optimizing traffic flow to alleviate congestion in commercial areas.

3.8.4.3. Future Plan

3.8.4.3.1. Central Business District (CBD)

The District Karak is a city with significant historical, cultural, and economic importance. It's connected with Indus Highway passes through central of the city and linked with Karachi on south and Peshawar on the north. Karak is notably famous for its multi-products such as fuels, & gas in term of mines and gypsum, salt, limestone, etc. in term of minerals. Aside this, It produce the world top quality Honeybees and Handicrafts that are widely recognized internationally for their quality and superior craftsmanship. Similarly, the district major commercial zones lie along karak-link road and Indus-highway following ribbon development. The future development growth follow pattern towards Indus-highway due to its strategic location and connection with adjoined areas until Karachi. Therefore, a Central Business Districts were supposed for the future commercial zone and are identified based on sub-criteria that used for identification of suitable land for CBD.

- Proximity to Road Network

The proximity to the road network has been considered a critical factor in the selection process for commercial development in karak. The location closest to primary roads such as Indus Highway, is considered the most favorable for commercial purposes. Meanwhile, this criterion is essential in ensuring that commercial sites remain accessible to customers, clients, and essential services, promoting business growth and success.

- Land Use Type

The utilization of available land resources has been prioritized by classifying the land use into three categories - vacant or barren land, seasonal agriculture, and orchards - for commercial development. In particular, vacant or barren land, particularly those situated in infill areas, is deemed the most suitable for commercial development due to its prime location and accessibility. While seasonal agriculture is considered moderately suitable. On the other hand, hilly areas are considered the least favorable for future commercial zones.

- Proximity to Existing Commercial Areas

The proximity to existing commercial areas has been deemed a critical factor for future commercial development as it promotes compact urban growth, facilitating the provision of essential services and utilities. A proximity to other nearby commercial zone and public building is prefer suitable for commercial zone.

3.8.4.4. Standards for Commercial Buildings (from KP Model Building Bye-Laws 2020)[57]

1. Maximum Building Height

- The maximum height of commercial buildings shall not exceed 82 feet (24.99 meters) or 7 storeys, including the mezzanine floor whichever is less.
- Total height including stair tower/machine room may be up to 90 feet from the center of the adjacent road level.

2. Floor Heights

- Ground Floor: Minimum 9.5 ft
- First & Second Floors: 9.5 ft each (if applicable)
- Mezzanine Floor: Max height 7 ft; only allowed where clear height of room is ≥16 ft
- Basement Height: Clear height minimum 9 ft
- Arcade Height: Max height from adjacent road level 10 ft 6 in.

3. Setbacks (Commercial & Mixed Use)

Table 3- 3-58: Setbacks (Commercial&Mixed Use)

Plot Size (sq. yd)	Arcade	Rear Setback	Side Setback
Up to 151 (5 Marla)	None	3 ft	None
152–250 (5.1–8.3 Marla)	None	5 ft	None
251–400 (8.3–13.2 Marla)	None	7.5 ft	None
401–600 (13.2–20 Marla)	8 ft	7.5 ft	5 ft
601–999 (20–33 Marla)	8 ft	8 ft	5 ft
1000–1999 (33–66 Marla)	8 ft	10 ft	7.5 ft

4. Footprint & Floor Area Ratio (FAR)

Table 3-59: Floor Area Ratio

Plot Size (sq. yd)	Ground Floor Coverage	Upper Floor Coverage	FAR
Up to 80	100%	–	1:6
81–250	95%	–	1:6
251–400	90%	–	1:6
401–600	85%	75%	1:6
601–999	80%	70%	1:6
1000–1999	70%	65%	1:6

3.8.4.5. Managing Existing Commercial Activities

The management of the existing commercial Activities is of greater importance in order to curtail and discourage it's haphazard and uncontrolled growth. As Karak land use plan designates the zoning and regulatory measures for future commercial needs of the city, existing commercial activities can be managed through these strategies:

a. Phased Regularization

- The existing commercial activities will be allowed to continue if they meet basic safety and zoning standards (e.g., structural integrity, fire safety).
- Require non-compliant structures (e.g., those violating setbacks or height limits) to be regularized within a set timeframe (e.g., 2–3 years) through retrofitting or partial demolition.
- Incentives like tax breaks or low-interest loans should be provided for businesses to comply with regularization.

Implementation:

[57] *https://www.lgkp.gov.pk/wp-content/uploads/2020/11/Public-Notice-of-draft-of-Model-Building-Bye-Laws-2020.pdf*

- Conduct a survey of existing commercial structures along roads to identify non-compliant ones.
- Issue notices with clear regularization guidelines and timelines, enforced by a local building control authority.

b. Relocation of Non-Conforming Uses

- Identification of commercial activities that are incompatible with zoning plans (e.g., heavy industries in retail zones) and planning their relocation to designated industrial zones.
- Providing relocation incentives, such as subsidized land or infrastructure support, funded through public-private partnerships (PPPs) or ADB/AIIB grants.

Implementation:

- Mapping non-conforming commercial activities.
- Develop a relocation plan with timelines, funding sources, and stakeholder consultations.

c. Selective Freezing

- Freezing further expansion of non-compliant commercial structures (e.g., no additional floors or extensions) until they meet zoning and building standards.
- Allowing compliant structures to continue operating without restrictions.
- Enforcing freezing through strict monitoring by a local building control authority.

Implementation:

- The building control authority under the KP Land-Use and Building Control Act 2021 to monitor and enforce freezing.
- Usage of land digitization (as recommended in KP Urban Policy 2030) to track compliance and prevent illegal expansions.

3.8.4.5.1. Proposals for Containment, Regulation, and Upgradation

The following policy interventions are proposed to address existing and future ribbon development in Karak:

Framework	Relevant Provisions	Application
KP Land Use & Building Control Act, 2021	*Sec. 21, 22, 31*	Legal basis for DCLs, development permissions, and urban improvement plans
KP Urban Policy 2022–2030	*Para 32, 37, 38*	Mandates compact growth, discourages ribbon development, promotes GIS monitoring
KP Building Regulations, 2023	*Setbacks, access rules*	Technical standards for roadside development (e.g., minimum building lines, access control)
KP Local Government Act, 2013	*Tehsil and neighborhood council authority*	Legal support for local monitoring, by-laws enforcement, and development control

1. Establishment of Development Control Lines (DCLs)

- Define clear development boundaries along major corridors to prohibit new unplanned construction beyond designated limits.
- Enforced through the KP Land Use and Building Control Act, 2021 (Sections 21 & 22) which mandates permission-based land use conversion and construction within notified plans.

2. Regularization and Retrofit of Existing Ribbon Areas

- Existing residential and commercial units will not be demolished but instead retrofitted with:
- Service lanes or rear access where feasible
- Enforced setbacks and uniform building lines
- Basic infrastructure (water, sewerage, drainage, streetlights)
- This complies with **Section 31 of the KP Land Use and Building Control Act, 2021**, which allows urban design improvement plans for existing structures.

3. Restriction of Future Ribbon Development

- No new commercial conversion or subdivision shall be permitted outside of designated zones.
- Controlled through zoning provisions under the KP Urban Policy 2022–2030, which mandates contiguous and compact development (Para 32) and discourages linear growth.

4. Planned Commercial Clustering

- Identify and promote planned commercial hubs within the city core and future growth nodes to absorb new commercial demand, reducing pressure on linear roadside strips.

5. Community-Based Monitoring and Enforcement

- Empower Tehsil-level councils and neighborhood units under the KP Local Government Act, 2013 to monitor encroachments and regulate roadside activity.

This supports decentralized enforcement and stakeholder participation in curbing unregulated construction

3.9. Solid Waste Management

The Solid Waste Management (SWM) system in Karak District faces critical challenges due to inadequate infrastructure, financial constraints, and a lack of human resources. Urban areas have limited waste collection, often leading to uncontrolled dumping, while rural regions lack any structured disposal system, exacerbating environmental and health risks. The absence of designated landfill sites, inefficient machinery, and poor inter-departmental coordination further hinders effective waste management. With waste generation projected to increase significantly, an urgent, integrated approach is needed to address these issues.

This proposal recommends establishing a controlled landfill site, procuring modern waste management equipment, and recruiting additional sanitary workers. Additionally, capacity-building programs for municipal staff will enhance technical expertise and operational efficiency. A district-wide 3R (Reduce, Reuse, Recycle) awareness campaign will engage communities in responsible waste disposal. By implementing these measures, Karak District can improve its SWM system, ensuring its residents a cleaner and healthier environment.

This report outlines a comprehensive Solid Waste Management (SWM) system for the Karak District to improve waste collection, transportation, and disposal processes. The proposed framework addresses the distinct needs of both urban and rural areas, bridging resource gaps and incorporating modern techniques to optimize waste management services.

As of 2025, the population of Karak District is estimated at 0.87 million. The rapid population growth in urban areas has significantly increased waste generation, making it imperative to implement effective measures to safeguard public health and enhance the quality of life in this vital district of Khyber Pakhtunkhwa (KPK).

The proposed SWM system has been meticulously designed following an in-depth evaluation of existing infrastructure. The plan includes a strategic 20-year roadmap (2025–2045) to modernize waste collection, transportation, and environmentally sustainable disposal systems.

3.9.1. Objective

- Proposed model for implementing an integrated Waste Management system in Karak District (Urban & Rural areas).
- To upgrade human resources (HR) and machinery for efficient waste collection and management.
- Implementation of better disposal methods in the district, including the development of a controlled dumpsite.
- Introduce the 3R (Reduce, Reuse, Recycle) concept in the community through local bodies to control waste generation and minimize its environmental impact.
- To build capacity for SWM staff, ensuring effective operations.

3.9.2. Design Approach

The approach to developing a suitable and practical SWM plan for Karak is based on the following principles:

- Develop a waste management system tailored to the needs of both urban and rural areas in Karak District, ensuring efficient waste collection, transportation, and environmentally sustainable disposal practices.
- Strengthen the workforce by recruiting and training additional personnel to bridge labor gaps and enhance overall efficiency. Invest in advanced machinery such as compactors, dump trucks, mechanical sweepers, and skip loaders, while ensuring regular maintenance to sustain operational reliability.
- Upgrade existing dumpsites into controlled facilities equipped with leachate management systems, gas recovery mechanisms, and structured waste layering to minimize environmental hazards.
- Promote the 3R (Reduce, Reuse, Recycle) approach within the community through local government initiatives, raising awareness to reduce waste generation and mitigate environmental impacts effectively.
- Organize capacity-building workshops and continuous training programs for SWM staff to improve technical and operational capabilities. Foster collaboration with industry experts for knowledge-sharing initiatives and establish standardized operational protocols to optimize efficiency.

3.9.3. Design Methodology

To ensure the successful implementation of the proposed Solid Waste Management system in Karak District, the following methodology will be adopted:

- **Waste Collection and Segregation**: Implement a structured collection system, including door-to-door waste collection and designated waste bins or hand carts for mixed municipal solid waste, including recyclable, organic, and non-recyclable waste. Encourage community participation in source segregation to facilitate recycling and composting in later stages of the solid waste management system development, as per the willingness of the service provider.
- **Infrastructure Development:** Establish controlled landfill sites with leachate treatment systems, methane gas recovery, and proper waste compaction techniques. Develop transfer stations to streamline waste transportation from rural areas to main disposal sites.
- **Capacity Building and Training:** Conduct specialized training programs for SWM personnel on modern waste collection, recycling techniques, and landfill management. Strengthen the institutional framework by integrating IT-based monitoring systems to improve operational efficiency.
- **Machinery and Equipment Upgrade**: Procure and maintain essential waste management machinery, including compactors, dump trucks, mechanical sweepers, and recycling equipment. Establish maintenance workshops to ensure the longevity and efficiency of these assets.
- **Public Awareness Campaigns:** Launch community engagement programs to educate residents on the benefits of the 3R approach. Collaborate with local schools, businesses, and organizations to promote waste reduction, responsible waste disposal, and sustainable recycling practices.
- **Regulatory and Institutional Strengthening:** Develop and enforce local regulations to promote compliance with waste management guidelines. Strengthen coordination between municipal authorities, environmental agencies, and private waste management firms to enhance service delivery.

- **Monitoring and Evaluation**: Establish a comprehensive monitoring and evaluation framework to track progress, address challenges, and improve waste management strategies. Utilize GIS mapping and data analytics to optimize waste collection routes and landfill operations.

By implementing this structured approach, Karak District will achieve a more efficient and sustainable waste management system, reducing environmental hazards and improving overall quality of life for its residents.

3.9.4. Existing Solid Waste Management Infrastructure

The Solid Waste Management (SWM) system in Karak District faces critical challenges due to inadequate infrastructure, financial constraints, and a lack of human resources. Urban areas have limited waste collection, often leading to uncontrolled dumping, while rural regions lack any structured disposal system, exacerbating environmental and health risks. The absence of designated landfill sites and inefficient machinery further hinders effective waste management. Waste generation is projected to increase significantly.

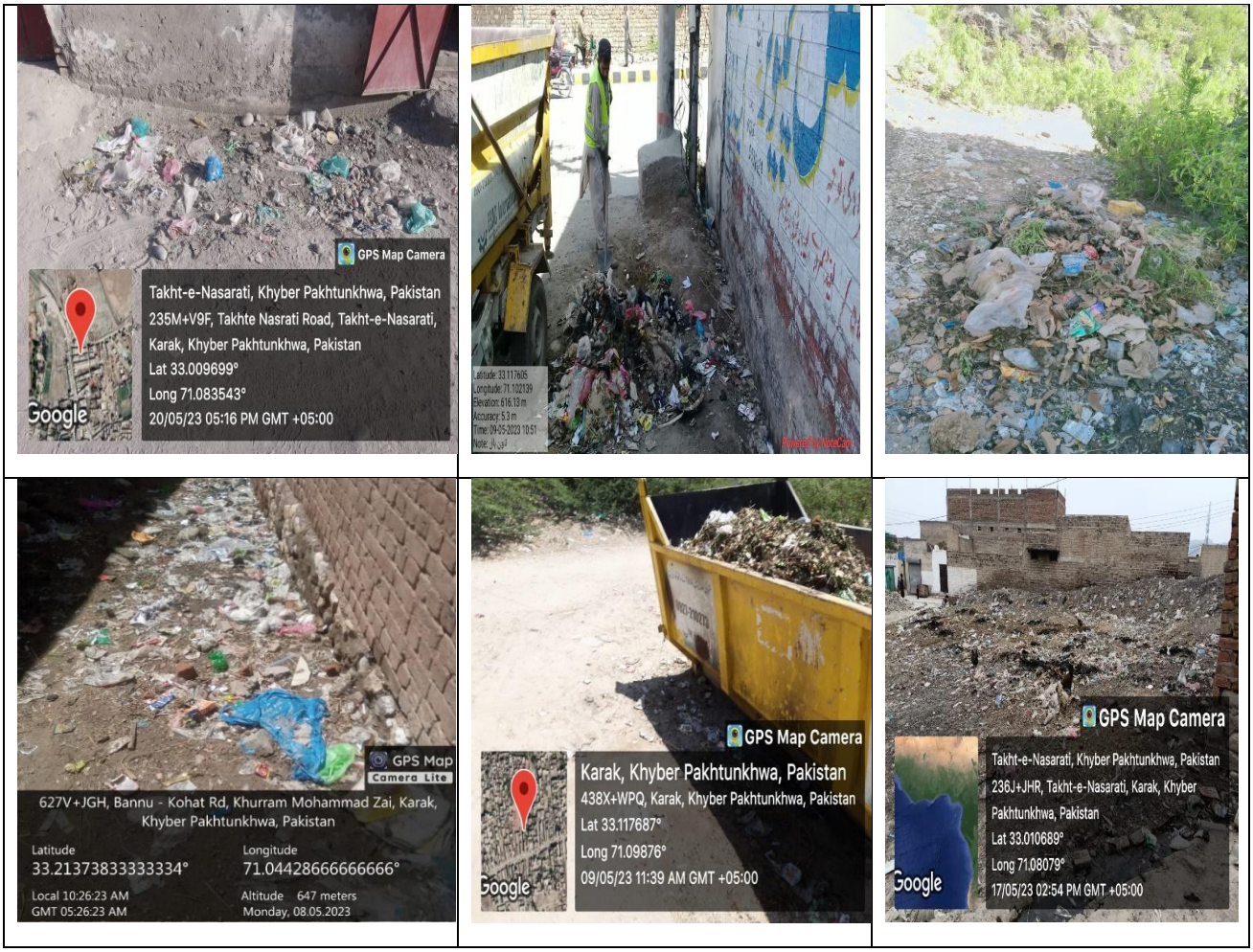


Figure 3-12: Current SWM situation in the district Karak

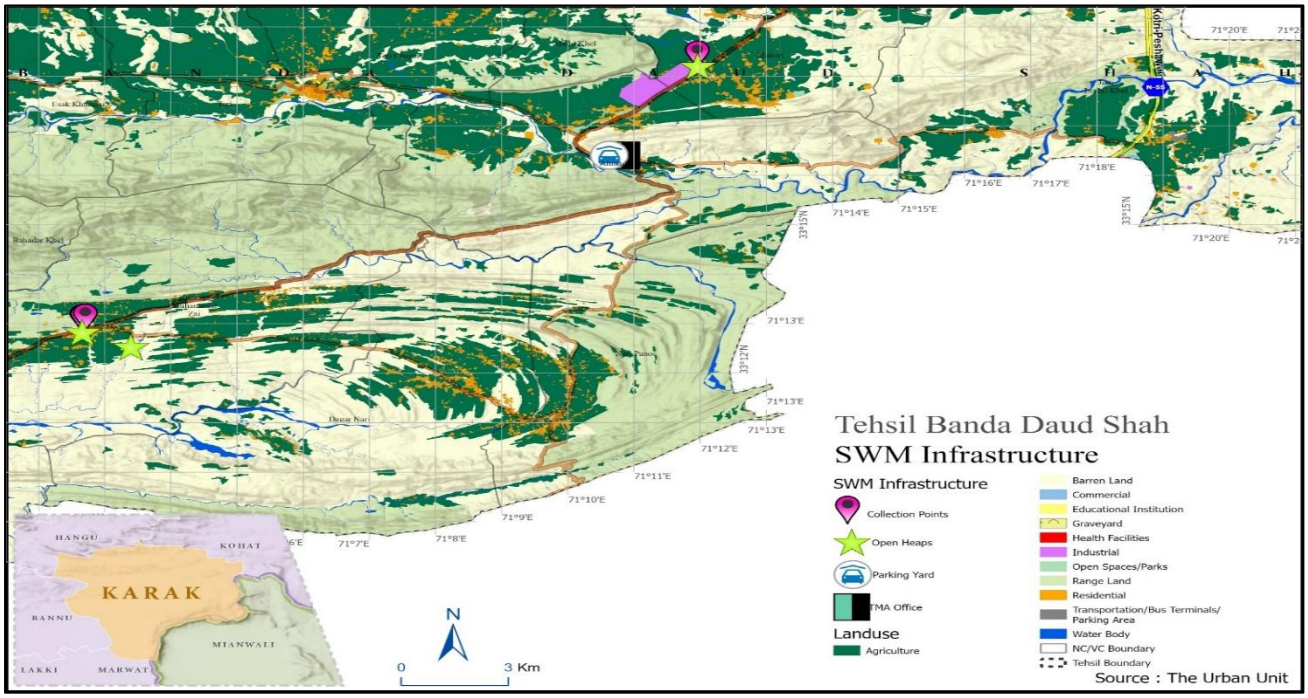
3.9.4.1. Existing Resources

In the Karak district, the existing resources for solid waste management are notably insufficient to effectively address the waste management needs of the local population. The growing demand for waste collection, transportation, and disposal services, coupled with the expanding urban and rural areas, necessitates a substantial increase in resources to meet these challenges.

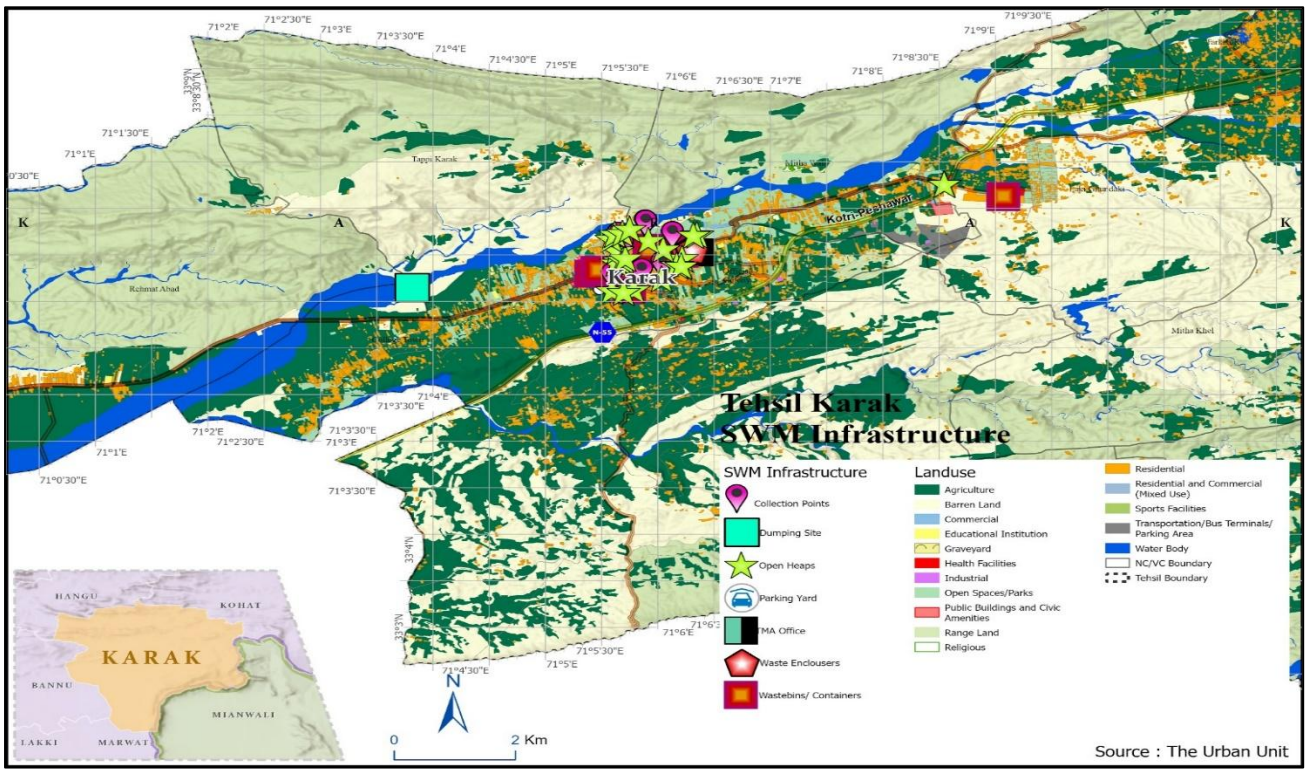
To ensure a cleaner and more sustainable environment in the Karak district, it is imperative to urgently allocate additional resources to improve and expand the existing solid waste management infrastructure. This includes investing in more waste containers, vehicles, recycling facilities, and critically, enhancing the workforce to manage waste efficiently. The table below represents the existing resources of Karak district.

Table 3-60: Resources of TMAs of district Karak

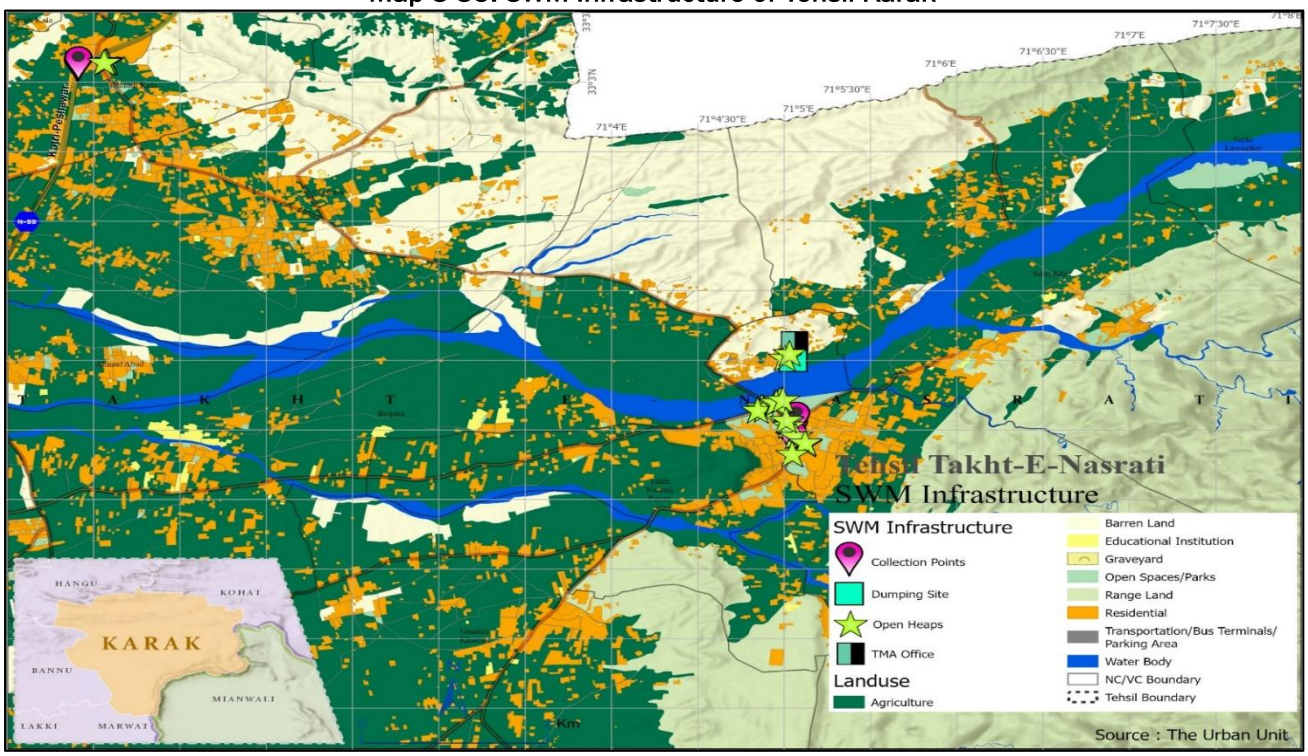
TMA Karak		TMA Takht-e-Nasrati		TMA Banda Daud Shah	
Name	Qty.	Name	Qty.	Name	Qty.
Tractor trolleys	01	Tractor trolleys	01	Tractor trolleys	01
Hand Carts	08	Hand Carts	04	Hand Carts	02
10 m^3 Containers	06	Mini Tipper	01	0.2 m^3 Waste Bins	15
.2m^3 Waste Bins	32			Mini Tipper	01
Waste Enclosures	01				
Mini Tipper	02				
Arm Roll	01				
Driver	04	Driver	01	Driver	02
Sanatory Worker	31	Sanatory Worker	16	Sanatory Worker	04



Map 3-34: SWM Infrastructure of Tehsil Banda Daud Shah



Map 3-35: SWM Infrastructure of Tehsil Karak



Map 3-36: SWM Infrastructure of Tehsil Takht-e-Nasrati

3.9.5. Waste Generation

Karak District generates approximately 291 tons of waste per day, a cumulative of 1,06,215 tons annually, with urban areas contributing 17,155 tons per year. The per capita waste generation rate is 0.45 kg per day for urban area. Waste generation is broadly divided into municipal solid waste (MSW, 87% of the total generated waste) and bulk waste (13% of the total generated solid waste)[58]. In Karak (Urban areas), MSW comprises 30 tons per day from residential sources, 4 tons per day from commercial activities, and 6

[58] *https://www.adb.org/sites/default/files/publication/784421/solid-waste-management-pakistan-road-map.pdf*

tons/day from institutes, health & public buildings. Bulk waste constitutes 13% of the total waste, including construction and demolition debris, sludge, dung, and desilted materials. Further emphasizing the evolving challenges of waste management in both urban and rural parts of the district. Urban area comprises Karak City, Takhti Nasrati, Ahmadi Banda, Latambar, and Sabirabad; therefore, solid waste management design for the urban area is limited based on urban land use.

- Total waste generation of District Karak = 291 tons/day
- Total waste generation (District) = 1,06,215 tons/year while
- Total Waste generation of Urban Area of Karak District = 47 tons/day (87% MSW=40.4 tons/day, 13% Bulk Waste=6.5 tons/day)
- Total waste generation (Urban)= 17,155 tons/Year

The waste projection has been done to analyze the situation of waste generation for the next 20 years in Karak District for a proper solid waste management system. Urban and rural wise waste generation details are provided below in Tables and graphically depicted in Figures along.

Table 3-61: Population vs Waste Generation Trend (Urban Areas)

Urban Areas	Year	Population	W.G (tons/day)	W.G (tons/year)
Karak City	2025	70055	32	11,507
	2045	131405	59	21,583
Ahmadi Banda	2025	4782	2	785
	2045	7715	3	1,267
Latambar	2025	13474	6	2,213
	2045	22602	10	3,712
Sabirabad	2025	4525	2	743
	2045	7105	3	1,167
Takhti Nasrati	2025	12704	6	2,087
	2045	21393	10	3,514

Table 3-62: MSW generation as per Land use (Urban Areas)

Land-use	MSW Generation (t/d)
Commercial	4
Institutes (Edu., Health & Pub. Buildings)	6
Residential & Mixed	30
Total	**40**

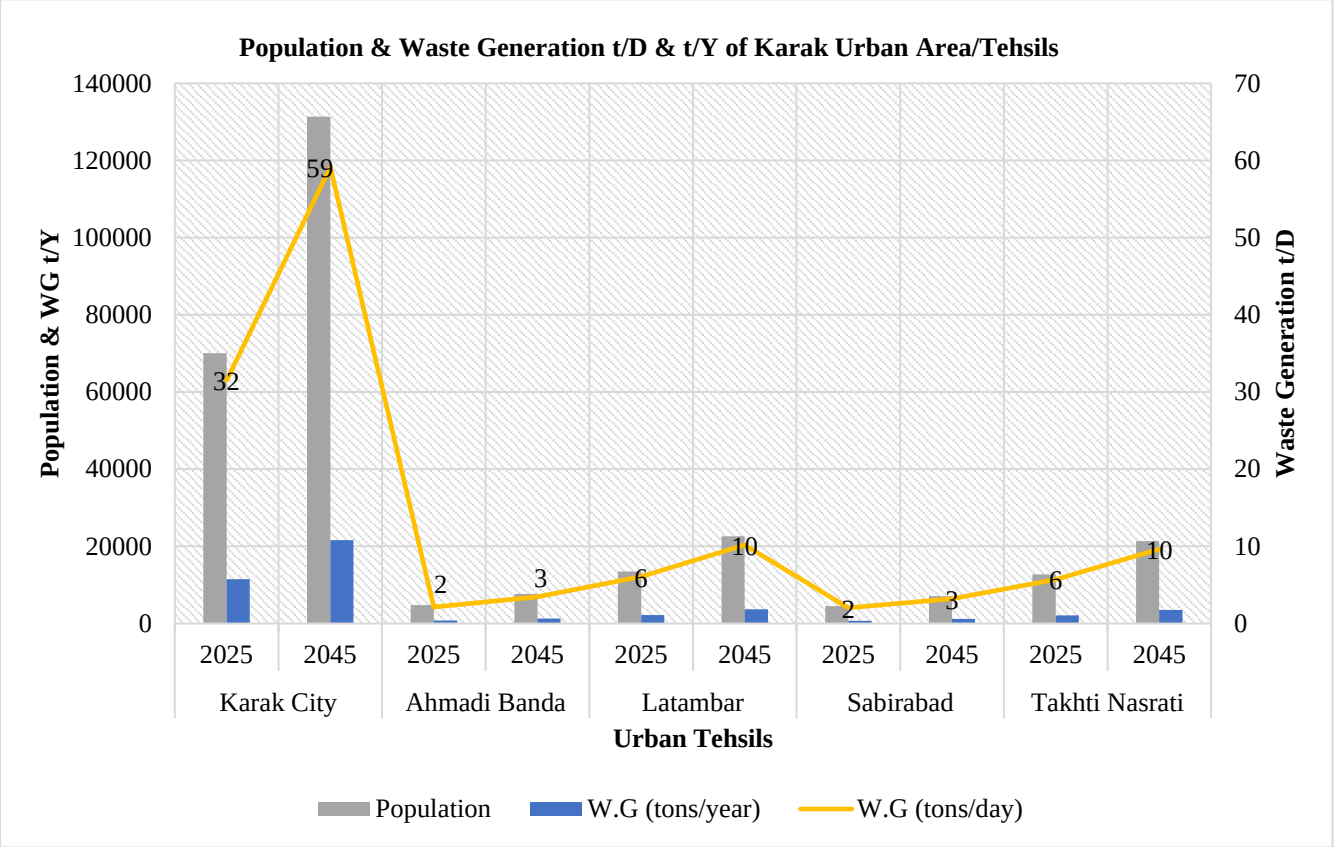


Figure 3-13: Population Vs Waste Generation t/y of District Karak Urban Areas

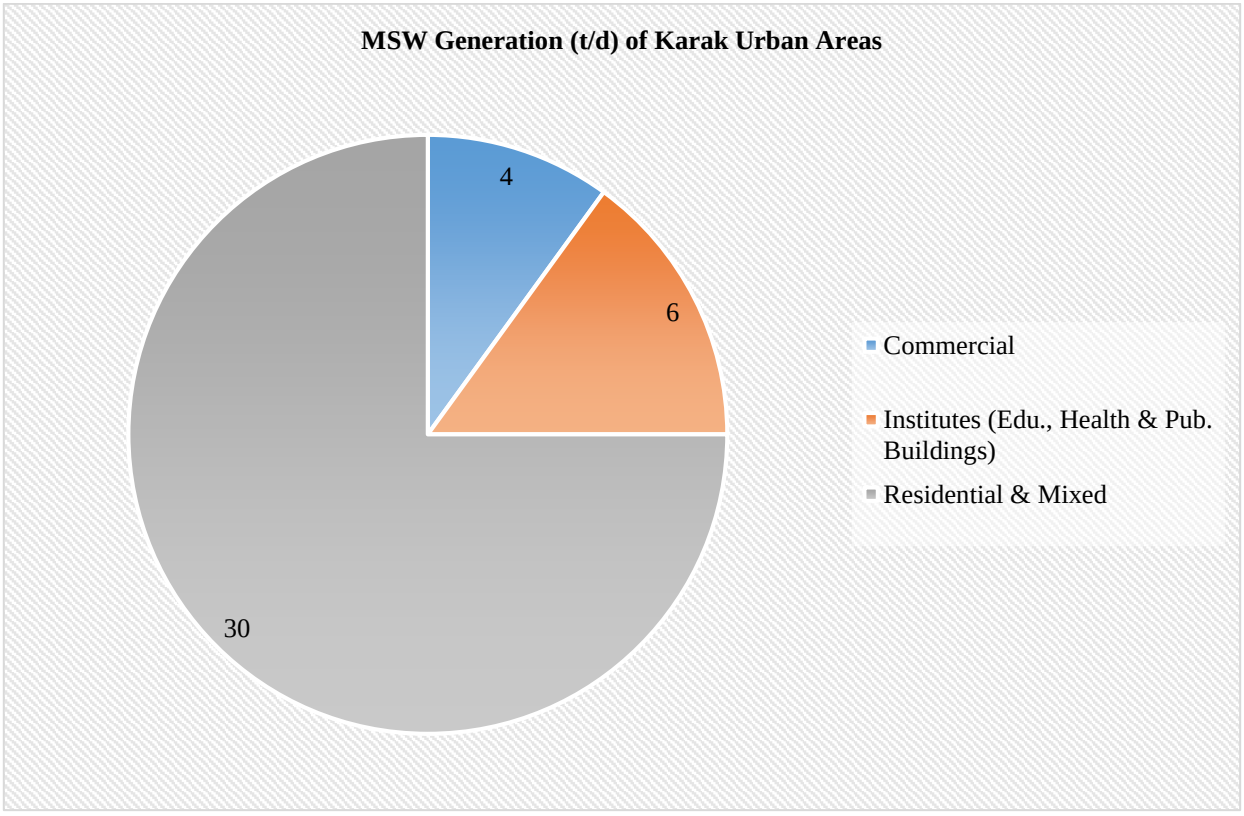


Figure 3-14: MSW Generation (t/d) Based on Land Use (Urban Areas)

Waste generation in the rural areas of Karak is projected to increase significantly due to population growth at an annual rate of 1.5%. In 2025, with a population of 7,63,935, the daily waste generation is 244 tons, totaling 89,228 tons annually. By 2045, the rural population is expected to reach 14,63,480, generating 407 tons per day and 1,48,555 tons annually. This steady increase underscores the growing need for

efficient waste management systems in rural areas to address the escalating waste volumes over the next two decades.

Table 3-63: Population vs Waste Generation Trends in Rural Areas

Rural Areas	Year	Population	W.G (tons/Day)	W.G (tons/year)
Karak	2025	276232	88	32,264
	2045	464974	149	54,309
Banda Daud Shah	2025	183670	59	21,453
	2045	296307	95	34,609
Takhti Nasrati	2025	304033	97	35,511
	2045	511979	164	59,799

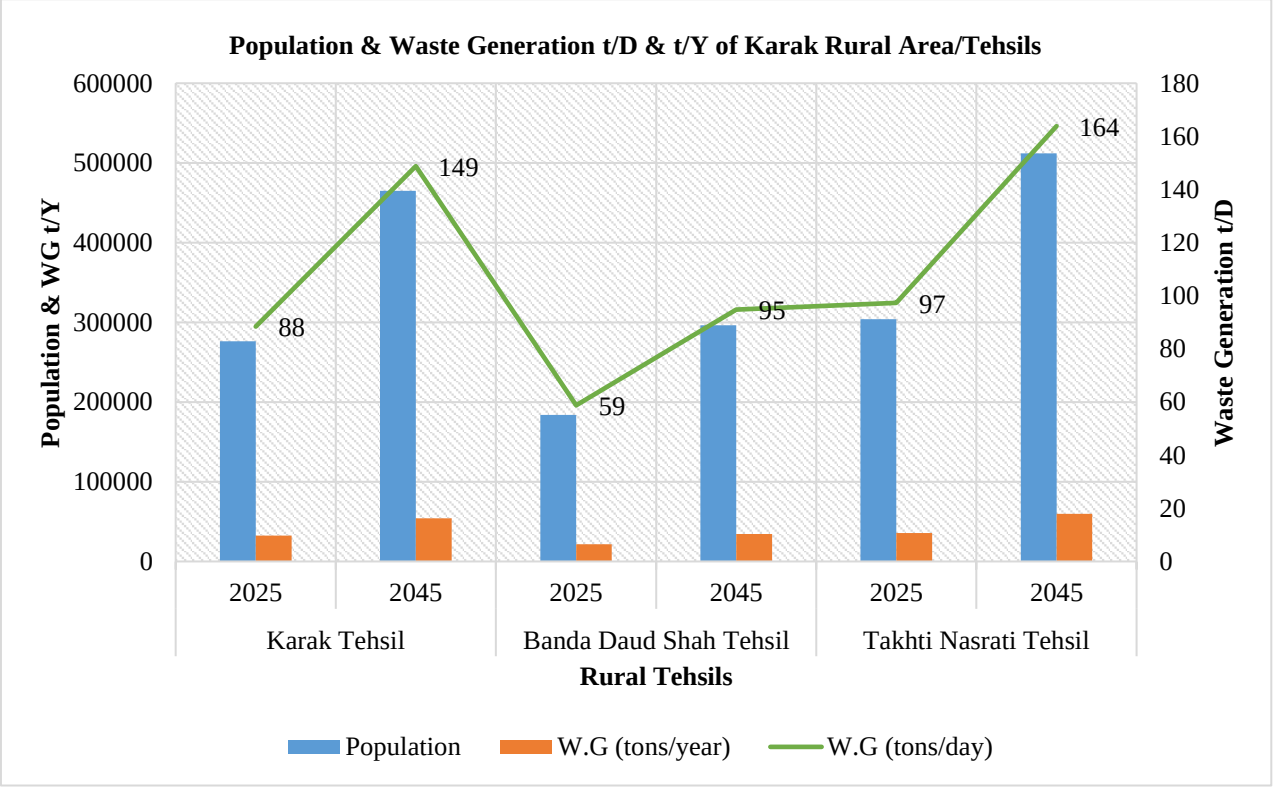


Figure 3-15: Population Vs Waste Generation t/D (Rural)

3.9.6. Proposed Solid Waste Management Plan

A comprehensive Solid Waste Management (SWM) system is essential for addressing waste management challenges in Karak urban areas. The plan, designed from 2025 to 2045, aims to transform current waste management practices into a more efficient and advanced system. This long-term strategy focuses on waste collection from households, commercial establishments, institutions, offices, public spaces, and parks, ensuring proper storage in containers and environmentally safe transportation to controlled dumpsites, unlike the existing practice of open dumping.

The proposed SWM system for Karak urban areas will consist of four major components:

- Primary & Secondary collection system
- Waste Transportation
- Final Disposal

This system will identify the necessary resources and infrastructure required to manage solid waste in Karak urban areas for the next 20 years, aiming to modernize the operations and enhance the efficiency of SWM practices.

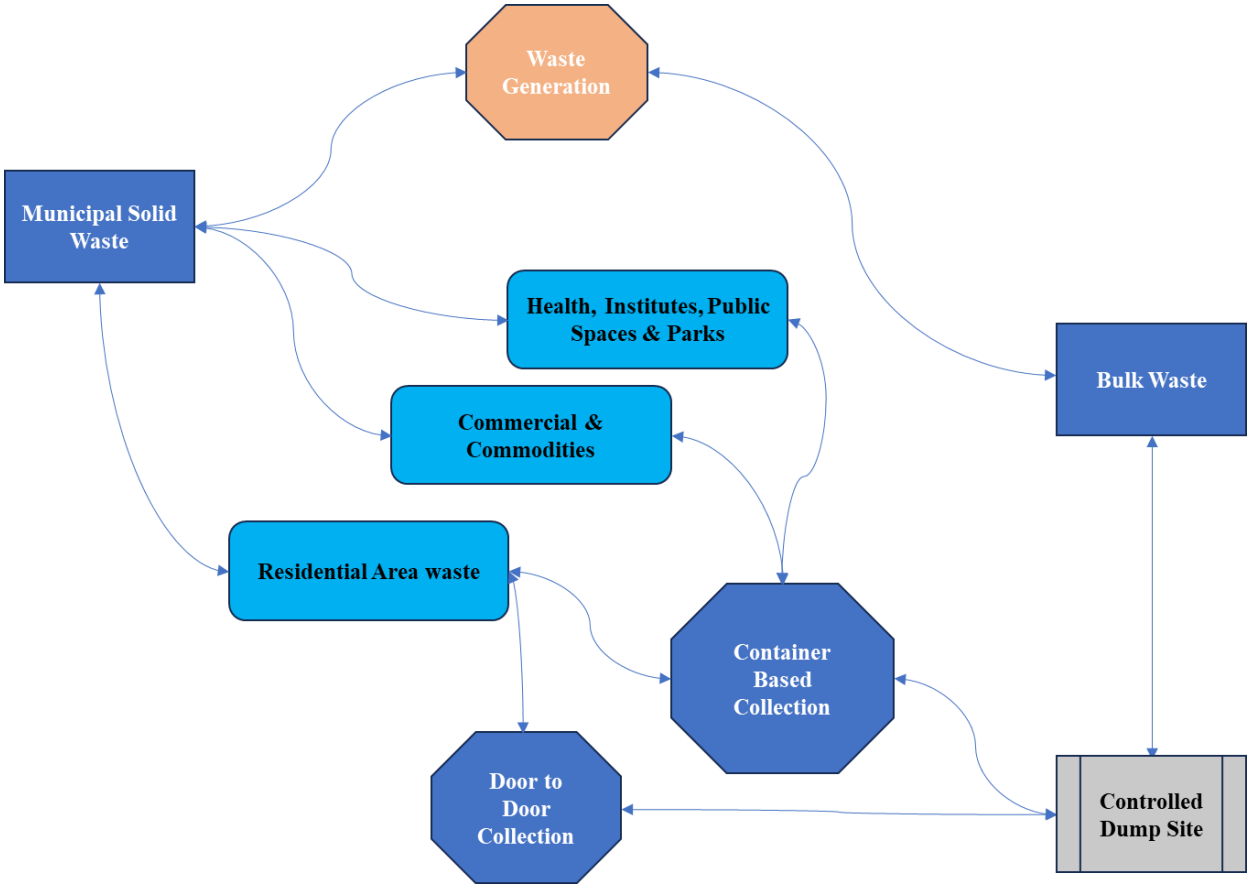


Figure 3-16: Proposed Waste Management Model for Karak (Urban Areas)

3.9.6.1. Design Standards and Criteria

Service level benchmarks have been established based on key performance indicators (KPIs). These KPIs encompass service delivery, operational efficiency, institutional strength, and financial sustainability. The present study identifies specific indicators to assess Solid Waste Management (SWM) services, along with their current status and targeted improvements. The objectives of SWM services improvement have also been outlined to ensure better performance over time.

Table 3-64: Service Delivery Indicators

Service Delivery Indicators	Current Status (Baseline)	Target (2026)	Target (2030)	Target (2035)	Target (2045)
Household-level waste collection (door-to-door service)	10% covered under door-to-door collection through Hand carts	30% coverage in planned areas	50% coverage in planned areas	70% coverage in planned areas	90% coverage in planned areas
Collection Efficiency (Percentage of waste transported to the final disposal site)	30% collection efficiency	50% efficiency	60% efficiency	85% efficiency	90% efficiency
Mechanical Sweeping Coverage	5km	15 km	Expansion as per infrastructure improvements	Expansion as per infrastructure improvements	Expansion as per infrastructure improvements

To effectively plan a Solid Waste Management (SWM) system for any area, it is crucial to analyze its existing infrastructure, socio-economic conditions, available development resources, and topographical characteristics. The Urban Unit team conducted field visits across Karak (urban Tehsils) to evaluate the specific needs and requirements for the proposed SWM system.

Table 3-65: System Indicators

System Parameter	Existing System	Proposed System
Street Sweeping	Conducted irregularly without a fixed schedule	Daily sweeping, litter clearance, and organized waste collection from households and shops
Waste Containment	Waste is dumped in open heaps and transferred to collection points, causing health and environmental hazards.	Introduction of **hand carts/ covered wheelie bins**. Urban/rural areas will have **0.8m³ waste containers.**
Waste Transportation	Waste is transported in open vehicles, leading to pollution and health risks	**Covered garbage compactors** of various capacities according to requirement will be used in urban areas to ensure safer and more hygienic waste transportation. While in Urban areas waste will be collected and transported by using tractor trolley, dumpers, mini dumpers with hydraulic lifting and loader models will be proposed.
Hospital Waste	Infectious waste is mixed with general waste	A **separate system** for handling and disposing of **infectious medical waste** is proposed which is the jurisdiction of health department and should not be mix or dump at municipal waste disposal site.

For Karak, various parameters have been gathered from secondary data sources, validated through field surveys, and analyzed using statistical models to project future requirements. The proposed Solid Waste Management (SWM) system has been designed considering the following key factors:

- Projected population growth to estimate future waste management needs.
- Waste generation trends across different zones of the city.
- Area classification based on demographics and land use characteristics.

3.9.6.2. Operational Design Modules:

The operational design for Karak (urban) integrates various waste streams into the main waste collection system. Key modules are outlined below:

Table 3-66: Operational Design Modules for Karak (Urban Areas)

Modules	Description	Methodology
Design Module I	Door-to-Door (D.t.D) Waste Collection	Collection using Handcarts with waste emptied into mini dumpers or in containers placed at main roads /streets
Design Module II	Container-Based Collection	Waste is collected from containers (0.8 m³) using compactors.
Design Module III	Commercial Waste Collection	Containers 0.8m³ in commercial areas were emptied using Mini tippers modified with a hydraulic jack. This design was modified by considering local circumstances and the small amount of waste generated from scattered commercial areas.

Design Module IV	Waste from Institutions, Societies, and Public Places	Waste from industries, institutions, bus stands, sports facilities, and healthcare units is collected using compactors for (0.8m³) containers.
Design Module V	Manual Sweeping	Workers deployed based on population ratio (1 worker per 900 population for urban areas, 1 worker per 1400 population for rural areas).
Design Module VI	Bulk Waste Collection (Green Waste, Debris, Desilted Waste)	Collection using Tractor loader and Dumper 5m³.
Design Module VII	Mechanical Sweeping and Washing	Main roads were cleaned using mechanical sweepers (4m³ capacity) for urban area as per requirement.

3.9.6.3. Basic Principles and Standards Used:

The Solid Waste Management (SWM) system in Karak (urban) Tehsils has been designed to focus on economic feasibility, social impact, environmental sustainability, and equitable service delivery. The key design standards for SWM operations are outlined below:

Table 3-67: Design Standards

Sr. No.	Activity	Standards
1	Waste Storage Containers	• 0.8m³ containers compatible with garbage compactors.
2	Door-to-Door Waste Collection	• Handcarts and Mini Tipper/Dumber (1m³) for household waste collection, preventing littering, collecting waste bags from streets, and lifting sludge. • Garbage compactors (7m³) for planned areas.
3	Mechanical Sweeping	Mechanical sweepers will cover 10-15 km of road length daily.
4	Waste Transportation	• Three trips per day to the landfill by 7m³ compactors. • Two trips per day by Dumper 5m³ and also used Tractor Loader.
5	Manual Sweeping Standard.	Each sanitary worker will cover 800 meters per day
6	Sanitation Workforce	One worker will be allocated per 900 residents

3.9.6.4. Proposed Waste Handling Design/ Scheme

Based on a thorough assessment of sanitation operations, administrative jurisdiction of Karak Municipal Corporation, and existing waste management infrastructure—including transfer stations (Waste transfer station is not proposed for urban area due to small amount of generated waste but for rural areas it is proposed in case of transfer distance exceed 15km from city center and landfill sites—the following recommendations are proposed for improving MSW handling in Karak:

- The MSW generated from residential, commercial, and institutional sectors has been analyzed based on tonnage estimates
- Waste collection varies by area: mini dumpers (1 m³) & compactors (7 m³) will be utilized for waste collection from residential and commercial centers, 0.8m³ containers support waste storage. Final disposal will be done by the machinery at the controlled dumpsite/Landfill site.
- A new controlled dumpsite/landfill site is proposed for the Karak as it will serve as a cost-effective solution. The site area is calculated in this report, which will accommodate waste disposal for the next 20 years.

Figure 3-17: Solid Waste Management System for Karak (urban Tehsils)

Karak District's rural areas, with a population exceeding 0.7 million, generate approximately 250 tons of waste daily, requiring a well-structured waste management system suited to its geographical and infrastructural conditions. Rural settlements often face challenges such as limited road access, scattered households, and lack of formal waste disposal systems, making an adaptive and community-driven approach essential.

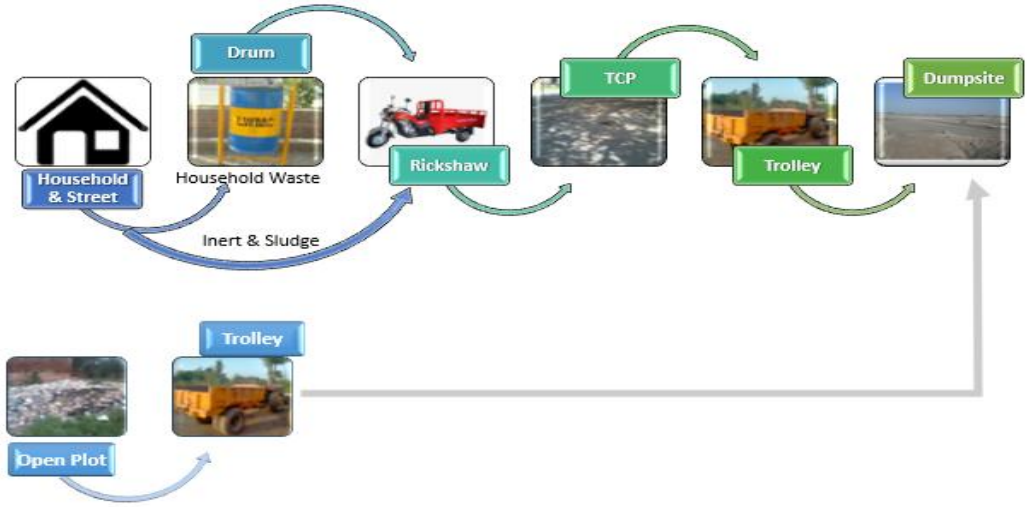


Figure 3-18: Solid Waste Management System for Rural Area of District Karak

- **Hand carts and loader rickshaws** will be used for door-to-door waste collection twice a week, especially in villages where narrow streets make large vehicle access difficult.
- **Trolleys and drums** will be placed in central locations of each village, serving as temporary waste collection points to ensure easy waste disposal for rural households.
- **Small-scale dumpers (10m³) and loaders** will collect waste from these designated points and transport it to transfer stations located at accessible spots in each tehsil.
- **Front-end loaders** will facilitate bulk waste movement, ensuring efficient transportation to final disposal sites without overburdening smaller collection vehicles.
- A **centralized landfill site** near Karak City will be developed, where waste from all rural areas will be safely disposed of, reducing open dumping and environmental pollution.

The above mentioned rural-focused waste management strategy ensures cleaner villages, reduced health risks, and sustainable waste disposal across Karak, Takhti Nasrati, and Banda Daud Shah Tehsils, improving the overall living conditions in the district.

3.9.6.5. Modes of Solid Waste Collection, Haulage, and Way Forward

3.9.6.5.1. Primary Waste Collection:

In **Karak Tehsils (Urban)**, waste management falls under the Municipal Committee (MC) of Karak, where primary waste collection is carried out using handcarts (HC) and minidumpers (MD). Residential waste is collected door-to-door by sanitary workers using hand carts, while commercial areas, institutions, and societies rely on a Container-Based Collection (CBC) system, also with a mini dumper (1m^3). Bulk waste from open plots and public spaces is handled by front-end Loaders and loader Tractors, which transport the waste to designated collection points or transfer stations/controlled dumpsites. To enhance efficiency, the city aims to transition to 100% handcart-based collection for residential areas and CBC with mini dumpers for commercial zones, reducing inefficiencies and improving overall cleanliness. The key to success lies in procuring new machinery, enhancing infrastructure, and ensuring 100% waste collection coverage to minimize environmental and public health hazards.

Table 3-68: Proposed Modes for Primary Waste Collection

KARAK URBAN AREAS	RESIDENTIAL WASTE (TON/DAY) (D.T.D WASTE COLLECTION)	RESIDENTIAL WASTE (TON/DAY) (C.B.C WASTE COLLECTION)	PROPOSED WASTE COLLECTION MODE	COMMERCIAL WASTE (TON/DAY) (C.B.C WASTE COLLECTION)	PROPOSED WASTE COLLECTION MODE	WAY FORWARD
Karak	1.54	13.86	Container-based and hand carts are provided to pick up waste from households & Transfer to the Dumpsite by mini dumpers (1 m3) and Compactor (7m^3)	2.2	CBC with Mini Dumper with hydraulic lifting (1m^3)	Procurement of new machinery
Takht e Nasrati	0	3		1		
Ahmadi Banda	0	1		0		
Latamber	0	4		1		
Sabirabad	0	1		0		
Total	1.54	22.86	24	4.2	90%	
	10%	90%	100%	100%	90%	

In contrast, the rural tehsils of Karak—including Banda Daud Sha, and Takhte Nasrati—lack formalized waste collection systems, requiring a transfer station-based approach. Waste will be collected using handcarts and mini dumpers 2.5m^3 from villages and transferred to designated transfer stations within each tehsil. From there, large vehicles such as Tractor Loaders, dumpers 10m^3, and Tractor Trollies will transport waste to a Controlled landfill site, ensuring environmentally sustainable waste disposal. Additionally, a special sanitary team in each tehsil will focus on cleaning public spaces, parks, and graveyards, promoting a cleaner and healthier environment across the district.

Table 3-69: Proposed Modes for Primary Waste Collection in Rural Tehsil

ITEMS	KARAK TEHSIL	TAKHTI NASRATI TEHSIL	BANDA DAUD SHAH TEHSIL	TOTAL
Hand Carts	35	36	22	**93**

Mini Dumper 2.5 m^3	5	6	3	**14**
Trolleys	1	1	1	**3**

3.9.6.5.2. Secondary Waste Collection

Currently, Karak lacks a transfer station, and waste is illegally dumped in open plots, along roadsides, or in unmanaged heaps or kurgans, posing serious environmental and health risks. The absence of a structured secondary waste collection system leads to inefficient disposal practices. Given the Karak's urban area/tehsils relatively lower population, we propose direct waste transportation from collection points to the landfill site, eliminating the need for a transfer station. Additionally, bulk, debris, and construction & demolition (C&D) waste will be repurposed for road infrastructure at disposal sites. To enhance efficiency, MC Karak will procure modern machinery, improving waste haulage operations, minimizing pollution, and ensuring a cleaner, more sustainable urban environment.

Table 3-70: Proposed Modes for Secondary Waste Collection in Karak Urban tehsils

Intermediate Facilities	Way forward
Collection Points/Containers	By MC/TMA Karak
Waste from Containers	Containers to Landfill site
Bulk/ Debris/ C&D Waste	Utilization for road infrastructure at disposal facility or open plots
Resources for Secondary Waste Collection & Haulage at Disposal Facility	Procurement of Machinery by MC/TMA Karak

3.9.6.5.3. Bulk Waste Collection and Handling

Separate handling of the bulk waste, including Debris/ C&D waste collection and garden waste collection, is proposed for Karak Urban tehsils. The quantity of the C&D/ debris waste is estimated at 5 t/d, and its collection and haulage are proposed with a specific fleet based on urban infrastructure. Storage and further utilization of C&D waste are proposed at the Existing disposal site or landfill site.

Table 3-71: Proposed Bulk Waste Collection Modes in Karak Urban Tehsils

Waste Category	Resources/ Machinery	Karak City	Ahmadi Banda	Latamber	Sabirabad	Takhte Nasrati	Total Fleet
Bulk Waste	Dumper 5cum	1	0	0	0	0	1
	T Loader (4*4)	1	0	0	0	0	2
	Trolleys	0	0	1	0	1	2
	Frond End Loader	0	0	1	0	1	2
	Drivers	2	0	2	0	2	6
	Helpers	1	0	0	0	0	1

The rural tehsils of Karak require dedicated resources for the efficient management of Municipal Solid Waste (MSW) and bulk waste. Karak rural Tehsil, generating 82 t/d of MSW and 12 t/d of bulk waste, requires a substantial fleet and workforce to handle collection and transportation. Banda Daud Shah Tehsil produces 51t/d of MSW and 8 t/d of bulk waste, necessitating adequate collection points and haulage capacity, and Takhte Nasrati Tehsil, 84 t/d of MSW & 13 t/d of Bulk waste generation, still require essential machinery and manpower to prevent accumulation and ensure proper disposal.

Table 3-72: Bulk and MSW in Rural Areas of Karak Tehsil

Tehsil	MSW Portion-t/d	Bulk Waste t/d
KARAK	82	12

TAKHTI NASRATI	84	13
BANDA DAUD SHAH	51	8

The proposed resources include sanitary workers, loaders, dumpers, trolleys, and compactors to manage waste effectively. Bulk waste, including C&D debris and garden waste, requires separate handling, with designated vehicles for collection and transportation to disposal or repurposing sites. The allocation of appropriate equipment and workforce is essential for maintaining cleanliness and preventing environmental hazards in rural Karak. The graphical representation of rural area waste is categorized into bulk waste and Municipal solid waste;

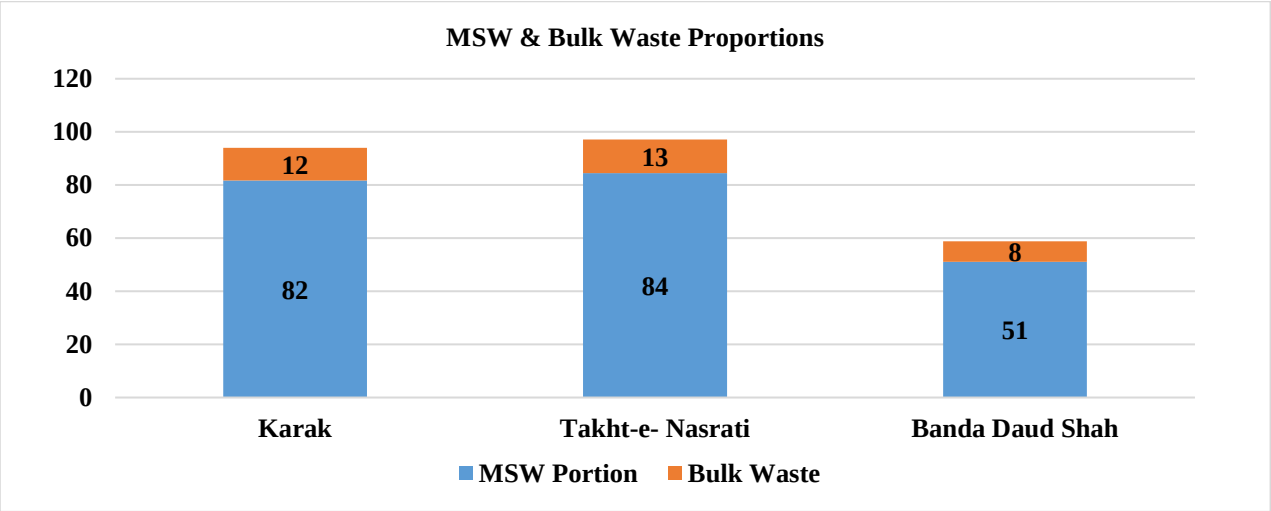


Figure 3-19: Graphical Representation of Bulk and MS Waste

3.9.6.6. Machinery/ Fleet Required for Waste Handling

The summary of the total resources required to perform waste collection from the city is calculated and explained in the Table below.

Table 3-73: Summary of total proposed resources for Karak Urban Areas[59]

Sr. No.	Resources	Karak City	Ahmadi Banda	Latambar	Sabirabad	Takhti Nasrati	Total Fleet
1	Compactor 7cum	1	0	0	0	0	1
2	Mini Tipper 1cum	3	1	2	0	2	8
3	Dumper 5cum	1	0	0	0	0	1
4	T Loader (4*4)	1	0	0	0	0	1
5	Container 0.8cum	83	9	27	9	23	151
6	Container 5cum	0	0	0	0	0	0
7	Trolleys	0	0	1	0	1	2
8	Handcarts	29	3	8	3	7	49
9	Frond End Loader	0	0	1	0	1	2
10	Drivers	7	2	6	1	6	22
11	Helpers	10	4	8	2	8	32
12	Workers	58	5	16	5	15	99

The bifurcation of resources to handle the waste as per proposed waste collection streams is explained below. The rural areas and tehsils of Karak require adequate staffing, human resources, and machinery to ensure efficient waste management. The proposed requirements are outlined in the tables below.

[59] *Final-9april,2025\Karak Design Sheets\HMAFH Model SWM for Karak (1).xlsx*

Table 3-74: Summary of total proposed HR Resources for Karak Tehsils (Rural Area)[60]

Tehsil	Helpers DTD	Workers Manual Sweeping	Drain Cleaner	Supervisors	Drivers
Karak	5	70	1	3	27
Takht-e- Nasrati	6	72	1	3	28
Banda Daud Shah	3	44	1	2	17
Total	**14**	**186**	**3**	**8**	**72**

Table 3-75: Tehsil Wise Resources (Proposed) for Rural Area

Tehsil Wise Rural Resources (Proposed)				
Items	Karak	Takht-e- Nasrati	Banda Daud Shah	Total
HAND CARTS	35	36	22	**93**
MINI DUMPERS (2.5 m^3)	5	6	3	**14**
TROLLEYS	1	1	1	**3**
DUMPERS (10CM)	4	4	2	**10**
LOADERS	2	2	1	**5**
DUMPERS (25CM)	2	2	1	**5**
FRONT END LOADER	1	1	1	**3**
DRUMS	196	202	122	**520**

3.9.6.7. Container-Based Collection (CBC):

The container-based Collection (CBC) system is more convenient for municipalities due to the deployment of communal storage bins/Containers, which are accessible for citizens to dump waste. Proposed Resources for CBC to handle 23 t/d from five (urban)areas of waste are tabulated below.

Table 3-76: Container-Based Collection in Karak Urban Tehsils

Waste Category	Resources	Karak City	Ahmadi Banda	Latambar	Sabirabad	Takhti Nasrati	Total Fleet
CBC	Compactor 7cum	1	0	0	0	0	1
	Mini Tipper 1cum	0	1	2	1	2	6
	Chain Arm Roll 5cum	0	0	0	0	0	0
	T Loader (4*4)	0	0	0	0	0	0
	Container 0.8cum	62	5	17	6	14	104
	Container 5cum	0	0	0	0	0	0
	Handcarts	29	3	8	3	7	49
	Drivers	1	1	2	1	2	7
	Helpers	2	2	4	2	4	14
	Workers	58	5	16	5	15	99

[60] *Final-9april,2025\R-Design sheet karak district.xlsx*

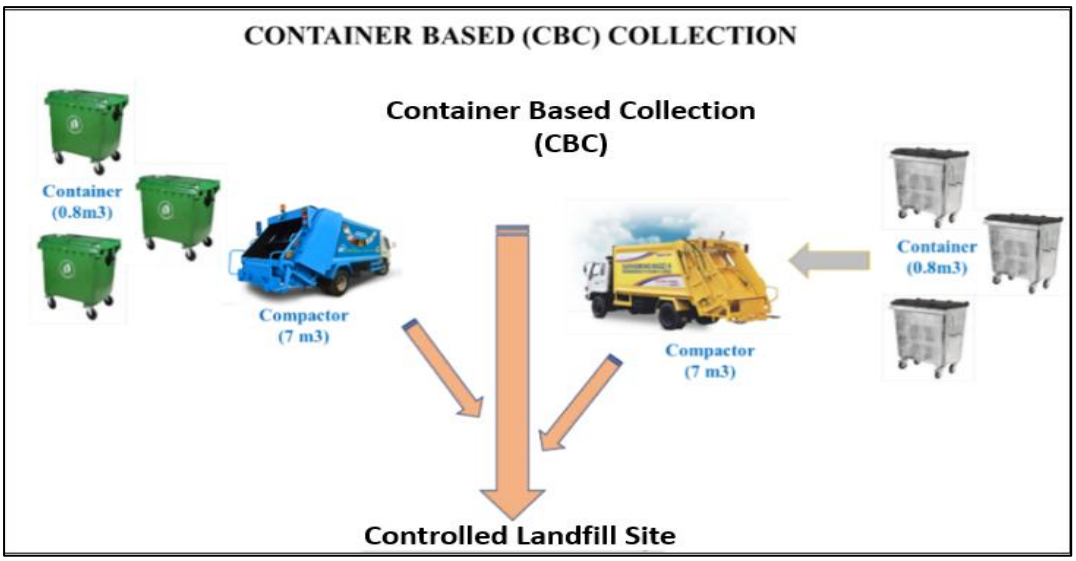


Figure 3-20: Container-Based Collection in Karak Urban Areas/Tehsils

3.9.6.8. Door-to-Door with Mini Dumpers

A Container-Based Collection (CBC) system using hand carts is proposed to collect 2 tons/day of waste from densely populated residential areas of Karak. Considering the city's road infrastructure, socio-economic conditions, and mountainous, congested urban pockets, this initiative is designed. The plan includes deploying 29 handcarts with a workforce of 58 sanitary workers for efficient waste collection. Given the scattered nature of residential areas, waste will be collected door-to-door using handcarts and transported to 0.8m³ containers, ensuring a structured and effective waste management system.

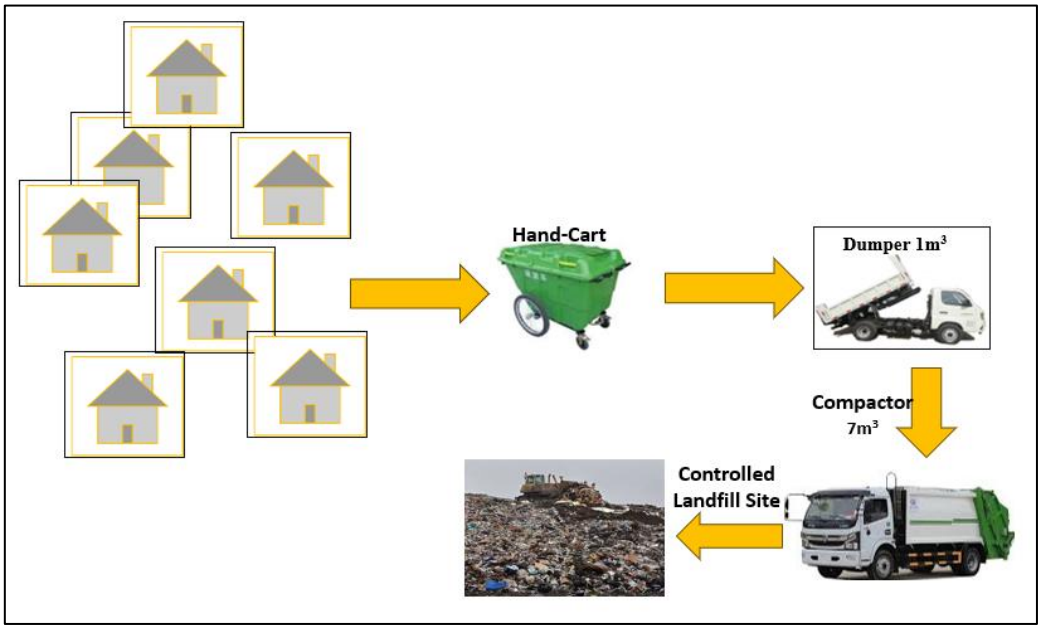


Figure 3-21: Door-to-Door Collection Modes in Karak Urban Tehsils

3.9.6.9. Commercial Waste Collection

Karak's urban tehsils commercial areas generate significant waste, necessitating an efficient collection and disposal system. A CBC model using Mini Tippers with hydraulic lifting is proposed to address this, covering 100% of commercial areas and markets. This system, adapted to local conditions from global best practices, involves 0.8m³ containers emptied by 1m³ mini dumpers with container lifter arms, ensuring improved waste management and environmental sustainability. The initiative will enhance city aesthetics, reduce informal scavenging, and maximize recyclable material recovery. Additionally, as the population grows, 5m³ containers will be introduced for high-waste zones, including vegetable and fruit

markets, to be lifted by chain arm roll vehicles, ensuring a scalable and long-term waste management solution. The proposed resources for Commercial Waste Collection are mentioned in the Table below.

Table 3-77: Modes for Commercial Waste Collection of Karak's urban tehsils

Waste Category	Resources	Karak City	Ahmadi Banda	Latam bar	Sabira bad	Takhtie Nasrati	Total Fleet
COMMERCIAL & COMMODITY	Mini Tipper Cum Compactor 1m³	1	0	1	0	1	3
	Compactor 7cum	0	0	0	0	0	0
	Container 0.8cum	10	2	4	1	3	19
	Container 5cum	0	0	0	0	0	0
	Drivers	1	0	1	0	1	3
	Helpers	2	0	2	0	2	6

Figure 3-22: Proposed Resources for commercial Area waste collection mode

3.9.6.10. Institutions, Societies, and Industries:

Municipal Solid Waste (MSW) generation in Karak urban tehsils from institutions, industries, and societies consists of a diverse mix, including food waste, packaging materials, plastic bags, bottles, paper, and general litter. There is no waste produced from societies due to their absence. These sources collectively produce approximately 6 tons of waste per day, significantly burdening the city's overall waste load. Institutional buildings, such as offices, educational institutions, healthcare facilities, and government buildings, are key contributors to this waste stream.

A structured collection and disposal system is proposed to efficiently manage this waste, utilizing a 1m³ mini dumper cum compactor, 27 containers of 0.8m³ capacity, one driver, and two helpers for each urban area. This arrangement ensures effective waste handling and transportation, minimizing environmental impact and promoting a cleaner **and more sustainable urban tehsils**. The proposed infrastructure will streamline waste collection, reduce littering, and enhance overall urban sanitation in Karak. Waste Generation from these sources is calculated and the resources proposed are tabulated below:

Table 3-78: Proposed waste collection mode for Institutional & Industrial Areas

Waste Category	Resources	Karak City	Ahmadi Banda	Latambar	Sabirabad	Takhtie Nasrati	Total Fleet

HEALTH, EDU, INDUSTRY & CIVIC AMENITIES	Mini tipper Cum Compactor 1m³	1	1	1	0	1	4
	Container 0.8cum	11	2	6	2	6	27
	Drivers	1	1	1	-	1	4
	Helpers	2	2	2	-	2	8

3.9.6.11. Bulk Waste Collection:

To improve solid waste management (SWM) in Karak, a dedicated system for debris and bulk waste collection is proposed. This approach ensures that construction and demolition (C&D) waste is managed separately, preventing its mixing with municipal solid waste. Since C&D waste generation is linked to urban development and economic growth, and Karak is experiencing moderate urban expansion, integrating bulk waste handling into the overall SWM framework is essential.

Figure 3-23: Modes for Bulk Waste Collection

For effective collection, a 5m³ dumper truck and a 4x4 tractor loader will be deployed at renovation and development sites. This specialized fleet will enhance waste removal efficiency, ensuring cleaner urban surroundings and supporting the city's sustainable development. The proposed resources for bulk waste collection include one dumper, one tractor loader, two drivers, and one helper, forming a structured system for handling large waste volumes.

Table 3-79: Proposed resources for bulk waste collection mode

Waste Category	Resources	Karak City	Ahmadi Banda	Latambar	Sabirabad	Takhe Nasrati	Total Fleet
Bulk	Dumper 5cum	1	0	0	0	0	1
	T Loader (4*4)	1	0	0	0	0	1
	Trolleys	0	0	1	0	1	2
	Frond End Loader	0	0	1	0	1	2
	Drivers	2	0	2	0	2	6
	Helpers	1	0	0	0	0	1

3.9.6.12. Mechanical Sweeping & Washing

Advancements in technology have led to the development of highly efficient sweeping machines that are quieter, more cost-effective, and environmentally compliant. The adoption of such equipment in Karak will reduce the need for general labor while allowing for the employment of specialized personnel, such as drivers and trained street sweepers.

Mechanical sweeping and road washing are crucial for maintaining cleanliness in urban areas by effectively removing dust particles and litter, thereby enhancing the city's aesthetics and reducing airborne pollutants. Additionally, this approach will help mitigate health risks and potential injuries associated with manual sweeping. However, due to operational limitations, such as obstructions from parked vehicles and the need for thorough cleaning, mechanical sweeping must be complemented by manual sweeping for maximum efficiency.

Table 3-80: Proposed resources for bulk waste collection mode

Waste Category	Resources	Karak City	Ahmadi Banda	Latambar	Sabirabad	Takhti Nasrati	Total Fleet
Mechanical Sweeping & Washing	Mech Sweeper 4m3	1	0	0	0	0	1
	Drivers	1	0	0	0	0	1
	Helpers	1	0	0	0	0	1

Considering Karak climatic conditions, mechanical sweeping is proposed for major roads on alternate days, while city furniture, monuments, marketplaces, and footpaths will undergo weekly washing if recommended. This integrated approach will significantly improve sanitation standards and urban hygiene in the city.

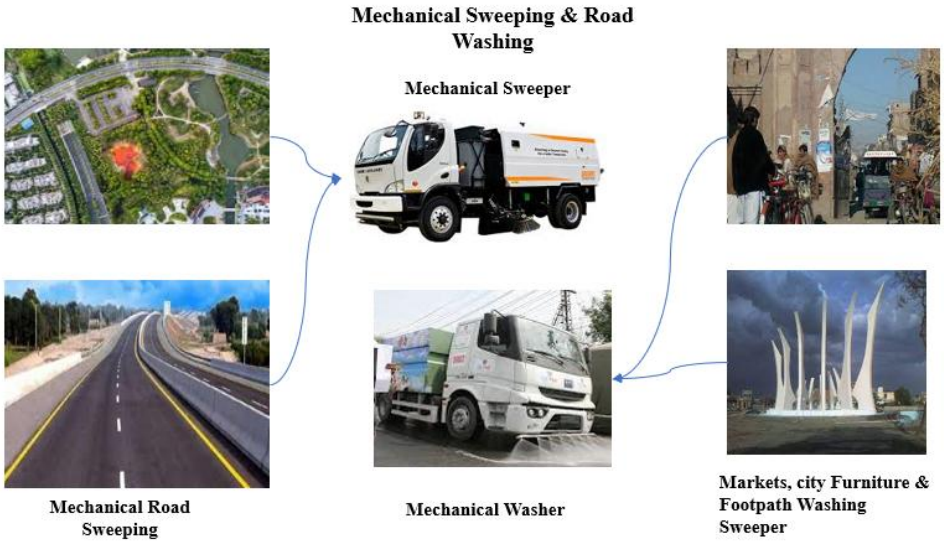


Figure 3-24: Mechanical Sweeping and Road Washing in Karak

3.9.6.13. Water Sprinkling

A structured street cleaning program will be implemented in Karak to enhance cleanliness and environmental sustainability. This initiative will focus on reducing dust pollution and improving urban hygiene through activities like

3.9.6.14. Scheduled water sprinkling in high-traffic areas

Identified critical locations will receive water sprinkling, using a mechanical sweeper/water bowsers with an integrated system to maintain cleanliness and minimize environmental hazards. This program will contribute to a cleaner, healthier urban environment by reducing airborne particulates and supporting waste management sustainability.

3.9.6.15. Manpower & Manual Sweeping Operation

In Karak urban and its rural tehsils, solid waste management relies heavily on manual labor, with workers involved in waste collection, transfer, and disposal. However, a lack of proper training on equipment use, maintenance, and health risks poses challenges. Inefficiencies arise due to limited coordination among local authorities, affecting waste management operations. The required number of sanitary workers is based on a standard ratio of one worker per 500 residents. Given Karak's developing status, manual

sweeping with basic tools like brooms, shovels, and handcarts remains essential, particularly in residential areas. However, improper waste disposal by residents, due to weak enforcement and cultural habits, contributes to unclean streets. Daily manual sweeping is necessary to maintain cleanliness, but resource limitations hinder effective implementation. The resources offered for manual sweeping mode in Karak Urban tehsils are given here in Table below;

Table 3-81: HR & Machinery Proposed for Karak

Operational Mode	Resources	Qty.
Manual Sweeping	Handcarts	29
	Workers	58

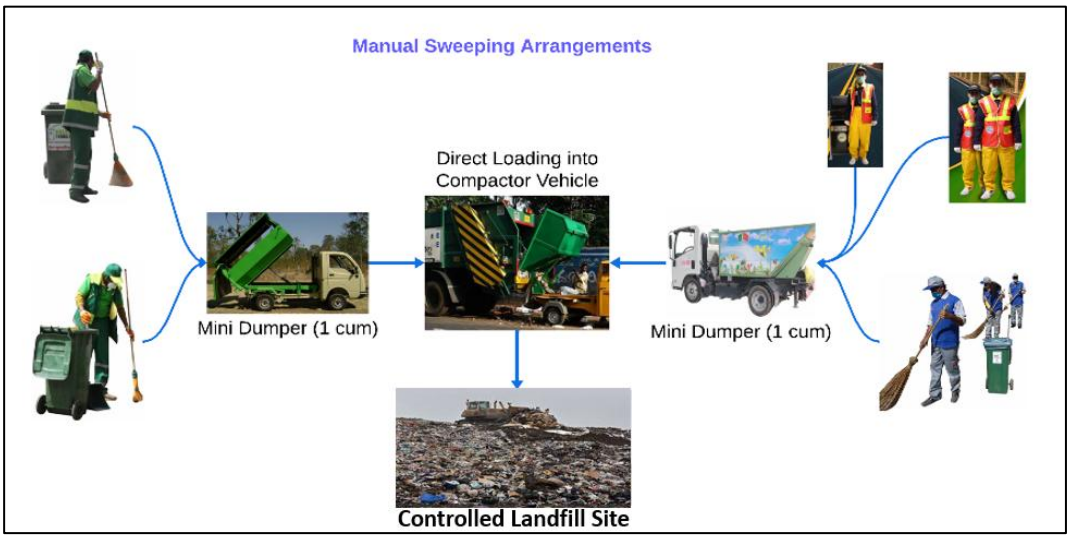


Figure 3-25: Pictorial Representation of manual sweeping mode

3.9.6.16. Working Hours

Government offices typically operate for 8 hours per day, and the Karak Municipal Corporation and TMA follows the same schedule. In the proposed system, these working hours will remain unchanged; however, various task teams may operate in two shifts. For instance, street sweeping may be conducted early in the morning, while mechanical washing occurs during the night shift.

3.9.6.17. Digital Monitoring of the Operations

It is proposed that Karak Municipal Corporation install tracking devices and Radio Frequency Identification (RFID) cards on all compactors, mini dumpers, dumpers, mechanical sweepers, and washer vehicles. This initiative aims to enable real-time online monitoring of the fleet in the field and track the number of trips to the dumping site. The monitoring system will enhance transparency in waste collection by comparing the collected tonnage with the fuel issued for operations. Additionally, the attendance of field staff is proposed to be recorded through an Android application to ensure accountability and efficiency. The cost of the IT-based monitoring system is included in the cost estimate section.

If the Government of Khyber Pakhtunkhwa expresses interest in digitizing the Solid Waste Management (SWM) system, The Urban Unit, Lahore, will facilitate Karak Municipal Corporation in developing the IT-based tracking system for fleet monitoring and the Android application for workers' and drivers' attendance.

3.9.6.18. Drain Cleaning

Karak Municipal Corporation is responsible for cleaning drains and sewers. Currently, the removed sludge is often left along roadsides for extended periods. Within the city's limit, numerous smaller drains fall under the corporation's maintenance, along with multiple open drains.

It is proposed that a dedicated drain cleaning team be deployed in urban areas, with manpower allocated based on population density and drain length. The team should follow a structured, year-round desilting schedule, ensuring each drain is cleaned at least once per quarter. The Lahore Waste Management

Company (LWMC) has implemented a similar strategy, deploying 621 workers to clean 398 km of drains, showing the effectiveness of population-based staffing and scheduled operations[61].

3.9.6.19. Transfer Station and Controlled Dump Site/Landfill Site

The farther the final disposal site is from the waste collection area, the greater the cost savings that can be achieved by using a transfer station (TS). For Karak urban areas/tehsils, a Controlled dumpsite is essential for efficient solid waste management, overseen by the MC/TMA Karak. Given the city's waste generation a centralized controlled dump site is proposed because the urban waste is of approximately 40 tons per day (14,600 tons per year) and a projected total waste accumulation of 365,000 tons over 20 years, proper disposal is crucial. The proposed landfill site spans 8 acres, with a height of 15 meters and a total volume capacity of 486,667 cubic meters.

A transfer station (TS) is generally recommended for rural areas or tehsils of Karak District, where waste collection points are far from disposal sites, helping to reduce transportation costs. However, Karak urban tehsils, with its relatively smaller area and population, does not require a transfer station. Instead, a controlled landfill site is needed to ensure proper waste containment, minimize environmental hazards, and improve waste disposal efficiency. The designated landfill should be designed with appropriate waste compaction and coverage measures to prevent pollution and public health risks.

Figure 3-26: Karak transportation of Waste from the Container to Landfill Site

The economic feasibility of a transfer station in rural areas depends on local economic conditions. However, most experts agree that a disposal site must be at least 20 to 25 kilometers from the waste generation area for a transfer station to be justified. In some cases, transfer stations are used for shorter distances to facilitate waste sorting or to enable transportation to more distant landfills.

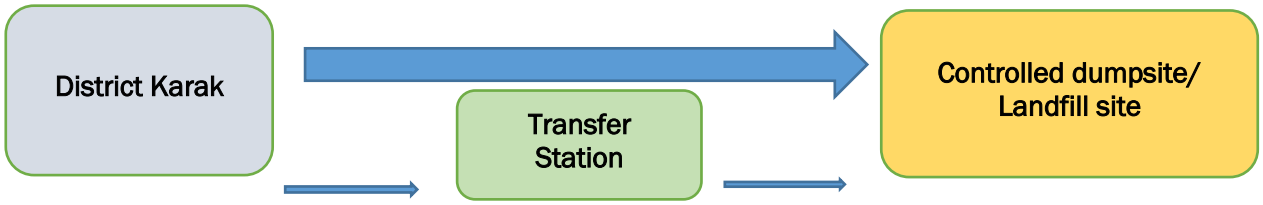


Figure 3-27: Karak Rural Areas Transportation of Waste to Landfill Site

Currently, However, as suggested by the Solid Waste Management (SWM) team of The Urban Unit, proper transfer stations should be established where the distance to the disposal site is greater than 15km in tehsils to reduce fleet costs and minimize health hazards.

Furthermore, Karak lacks a proper landfill site, and the existing disposal site is poorly managed, leading to environmentally harmful waste disposal practices. The current site is causing significant nuisance to nearby residents. The required area is calculated for the disposal site in Karak Urban tehsils for which the details are provided in the table below.

Table 3-82: Area Calculation for Proposed Landfill

Karak Urban Areas	
Waste Generation per day (Tons)	47
Waste Generation per year (Tons)	17155
Waste Generation (20 years)	4,28,875
Bulk Density	0.75
Volume	571,833

[61] *https://pakobserver.net/lwmc-deploys-621-workers-for-desilting-drains-prior-to-monsoon*

Height (m)	15
Area	38,122
Area in Acres	**10**

3.9.6.20. Proposed Capacity Building for Sustainable SWM in Karak District

To ensure sustainable solid waste management in Karak District, a comprehensive capacity-building plan is needed. This includes:

- **Machinery & Equipment:** Procurement of modern waste collection vehicles, mechanical sweepers, and landfill management tools to enhance efficiency.
- **Financial Management:** Allocating adequate funds for SWM operations, exploring public-private partnerships, and implementing revenue-generation strategies like waste collection fees.
- **Human Resource Development:** Hiring skilled staff, training MC personnel in waste management techniques, and conducting capacity-building programs with expert support.

Strengthening these areas will improve waste collection, disposal, and overall environmental sustainability in Karak District.

3.9.6.21. Future Direction

The Solid Waste Management (SWM) department faces significant challenges due to outdated equipment and limited resources. To enhance waste management, the department should focus on the following key areas:

- **Immediate Procurement:** Documenting the urgent procurement of equipment and services to implement the proposed SWM system, establishing a baseline for future planning.
- **Data Management:** Currently, there is no system to track waste generation, collection rates, or daily disposal quantities. Adequate staff must be appointed to manage and maintain accurate waste data.
- **Private Sector Involvement:** The concept of service delivery through private contracting does not exist. Given the lack of technical and managerial expertise, involving the private sector in waste disposal and treatment should be explored.
- **Capacity Building:** Institutional capacity must be strengthened through training programs on SWM, with assistance from the Urban Unit to support Karak MC/TMA.
- **Sustainable Waste Management:** WSSCB should establish agreements for proper waste treatment and management to ensure long-term environmental sustainability.

3.9.6.22. Early Actions Required

To efficiently execute the project and avoid unnecessary delays, the SWM department must undertake key preparatory activities before launching the project and mobilizing contractors:

- **Procurement & Monitoring:** Acquiring a new fleet, hiring additional human resources, and installing a weighbridge at the dumping site to track waste collection and transfer.
- **Landfill Site Selection:** The existing dumpsite poses environmental and health risks, making it necessary to identify and evaluate potential new Controlled landfill or dump sites for the city and tehsils.
- **Site Infrastructure:** Basic infrastructure at the dumpsite must be established for waste arriving during night shifts, allowing operations to commence before private partners are mobilized.
- **Urban Infrastructure Improvement:** Enhancing infrastructure in the city and tehsils to support operations such as mechanical sweeping and efficient waste collection

3.10. Water Supply, Sewerage & Drainage

Water is one of the most significant natural resources available at the disposal of humans. It is facing increasing global demands and challenges thus, a considerable decline in its availability is observed due to mismanagement/misuse, which has culminated in an intricate scenario in terms of water availability to various regions. The Land Use Plan Report for Water and Sanitation (WATSAN) establishes a structured framework for the efficient utilization and management of land to support sustainable water and sanitation services in district Karak. The objectives and scope of the report are discussed in the section below.

3.10.1. Purpose & Objectives of Land Use Plan

The primary purpose of the Land Use Plan for Water and Sanitation (WATSAN) is to establish a structured framework for the efficient utilization and management of land to support sustainable water and sanitation services in Karak. This plan seeks to address the challenges posed by rapid urbanization, population growth, and environmental degradation, ensuring the availability and accessibility of water resources while maintaining adequate sanitation facilities. It aims to optimize the allocation of land for essential municipal services, including water supply systems, wastewater treatment plants, and drainage networks, while safeguarding natural water bodies and promoting environmental conservation.

The objectives of this section of Land Use Plan includes integrating water and sanitation considerations into urban and rural planning, identifying suitable zones for WATSAN infrastructure development, and reducing the risk of environmental contamination. The plan emphasizes equitable access to safe drinking water and sanitation services, particularly for underserved communities. It also seeks to enhance the resilience of water and sanitation systems to climate change impacts and promote efficient land-use patterns that align with sustainable development goals.

3.10.2. Scope of the Report

The Draft Land Use Plan Report builds upon the findings of the Baseline and Analysis Report for District Karak, leveraging its detailed insights into the existing infrastructure pertaining to water and sanitation in the district. It begins by presenting a comprehensive review of the existing WATSAN infrastructure as outlined in the Baseline Land Use Plan, including key assets such as water supply networks, wastewater treatment facilities, and drainage systems. The report then transitions to identifying gaps, challenges, and opportunities for improvement, paving the way for strategic interventions. Finally, it outlines proposed extensions and enhancements in the Future Land Use Plan, ensuring alignment with sustainability goals and the evolving needs of the district's population and economy.

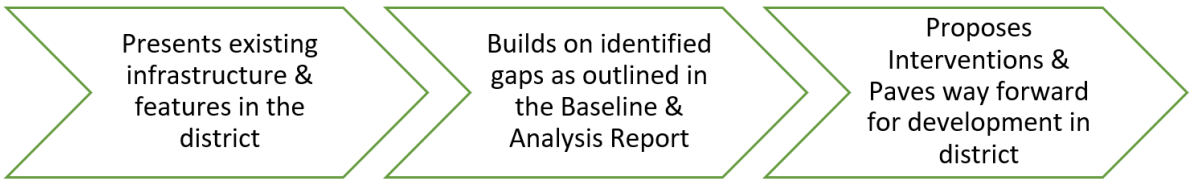


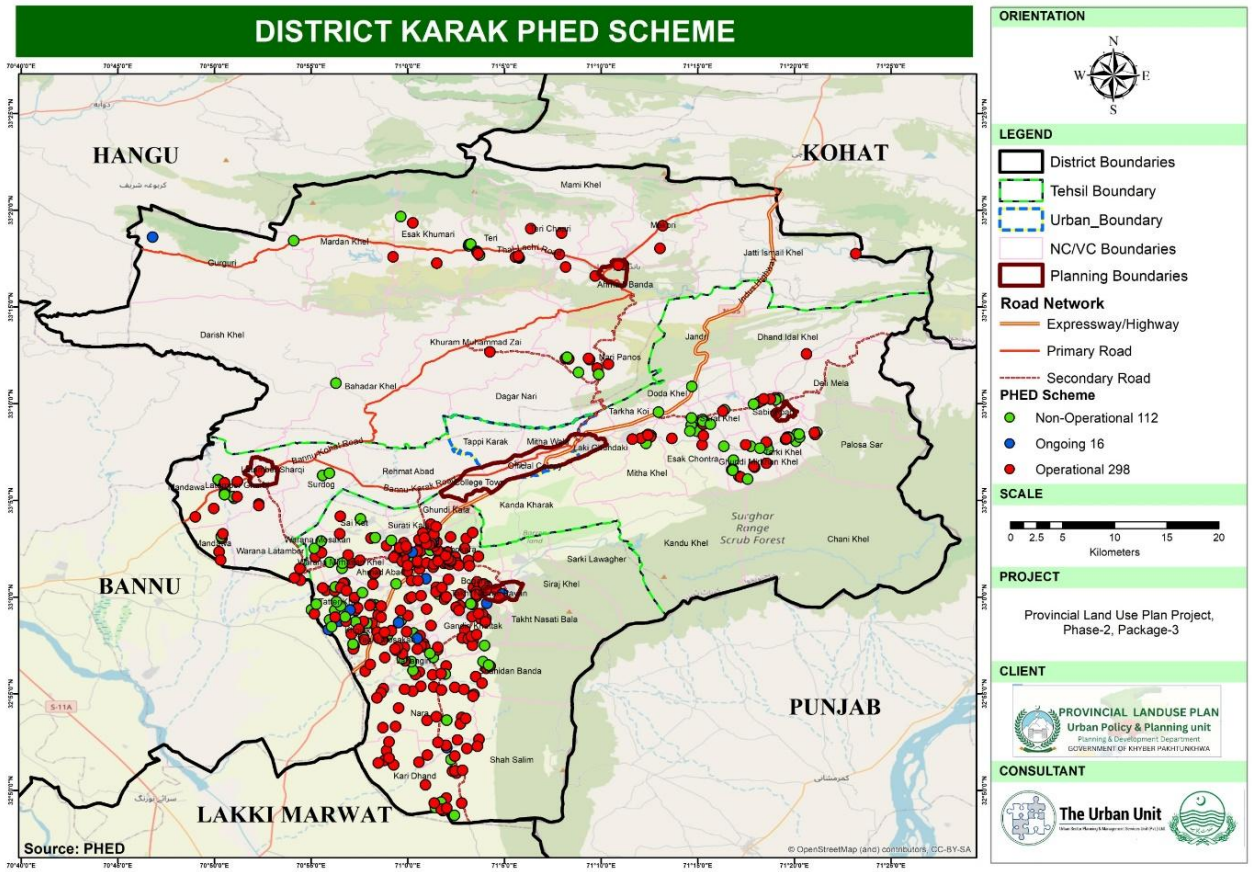
Figure 3-28: WATSAN report methodology

3.10.3. Overview of Existing Land Use Plan

The surface water sources of District Karak primarily comprise ten surface water storage reservoirs constructed across the region. The major reservoir is Chasma Akhora Khel Dam, with a storage capacity of 4,900 acre-feet. Other significant reservoirs include Zeibi Dam, Ghol Dam, Sharqi Dam, Sarki Lawaghar Dam, Mardan Khel Dam, Changhoz Dam, Karak Dam, Chambai Dam, and Latambar Dam, contributing to a total planned storage capacity of 24,198 acre-feet. These reservoirs serve both irrigation and water supply functions for surrounding areas. In addition to these storages, the district has ephemeral streams that contribute surface runoff to these reservoirs during rainfall events.

The groundwater resources of District Karak are primarily utilized for drinking water through tube well-based small schemes. These schemes are predominantly managed by the Public Health Engineering Department (PHED), with installations completed in multiple phases across rural areas. The discharge capacity of tube wells varies with the local groundwater potential, which remains poor in settlements such as Sur Dag, Narre Khawar, and Takht-e-Nasrati. Notably, over 112 water supply schemes have dried up,

16 ongoing and 298 operational schemes raising serious concerns for future drinking water availability. The depletion of groundwater is driven by limited recharge sources, declining rainfall, and increasing temperatures.



Map 3-37: Existing Water Supply Network of District Karak

3.10.4. Current and Future Water Demands

The current and future water demands, as calculated for the district's urban and rural settlements have been discussed in detail in the Baseline and Analysis Report for District Karak. The section below discusses the observed trend and projected water needs for the residents of Karak.

3.10.5. Water Demand Estimation

Water demands have been calculated for the urban and rural areas of District Karak, keeping in view the population augmentation and the minimum per capita water demand of 30 GPCD for urban areas and 15 GPCD for rural areas of the district.

3.10.5.1. Water Demands for Urban Areas

The current and future water demands have been calculated for the urban settlements of Karak District. Notable urban settlements proposed as per the land use plan includes Karak, Ahmadi Banda, Latambar, Sabirabad and Takht-e-Nasrati. The current water demand for the urban area of Karak district is collectively approximately 4.12 MGD, which is expected to reach 7.42 MGD by the end of 2045. Based on the aforementioned population forecasts and water demand factors, the relative demands of urban areas for various planning horizons will be as follows:

Table 3-83: Average Daily Water Demands for Urban Settlements of Karak District

Urban Settlements	Average Daily Demand (MGD) 2025	Average Daily Demand (MGD) 2045
Karak	2.73	5.12
Ahmadi Banda	0.19	0.30

Urban Settlements	Average Daily Demand (MGD) 2025	Average Daily Demand (MGD) 2045
Latambar	0.53	0.88
Sabirabad	0.18	0.28
Takht-e-Nasrati	0.50	0.83

The trend of water demand increase over the project's planning period has been pictorially represented in the graph below.

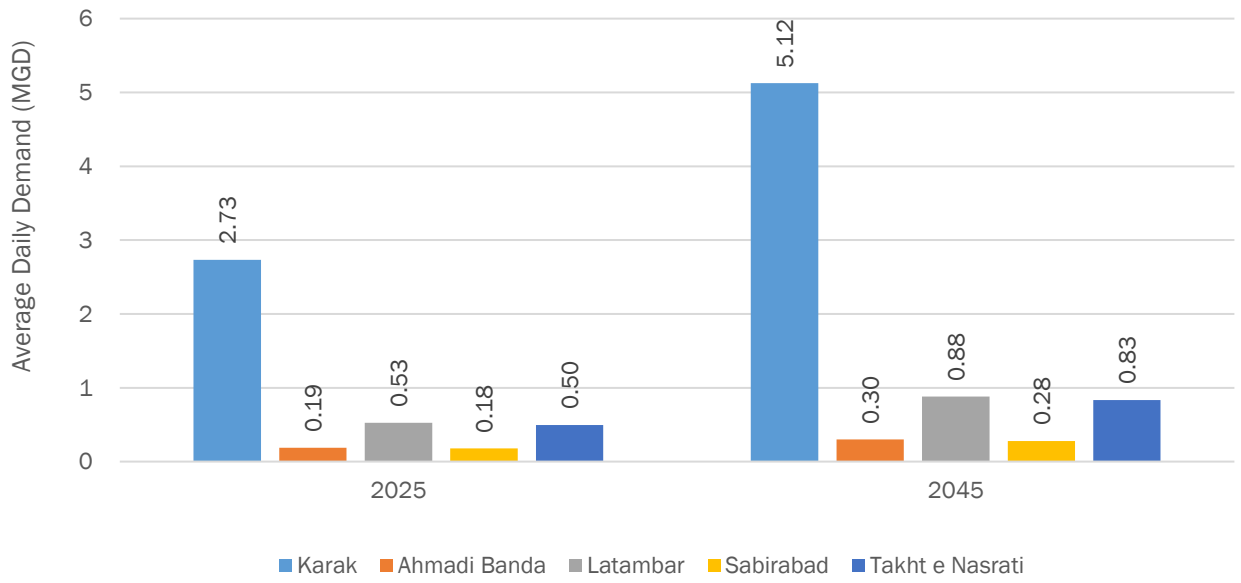


Figure 3-29: Average Daily Demands of Urban Settlements of Karak District

3.10.5.2. Water Demands for Rural Areas

The rural areas of Karak District consist of the rural populations of the Karak, Takht-e-Nasrati and Banda Daud Shah Tehsils. The current water demand for rural areas of Karak is approximately 14.90 MGD and is expected to reach 24.83 MGD by the end of 2045. The current and future water demands have been calculated for the rural settlements in these Tehsils based on the population forecast and the relative water demand factors, as tabulated below.

Table 3-84: Average Daily Demands for Rural Settlements of Karak District

Rural Settlements	Average Daily Demand (MGD) 2025	Average Daily Demand (MGD) 2045
Karak Tehsil	3.58	5.78
Banda Daud Shah Tehsil	5.39	9.07
Takht-e-Nasrati Tehsil	5.93	9.98

The trend of water demand increase over the project's planning period has been pictorially represented in the graph below.

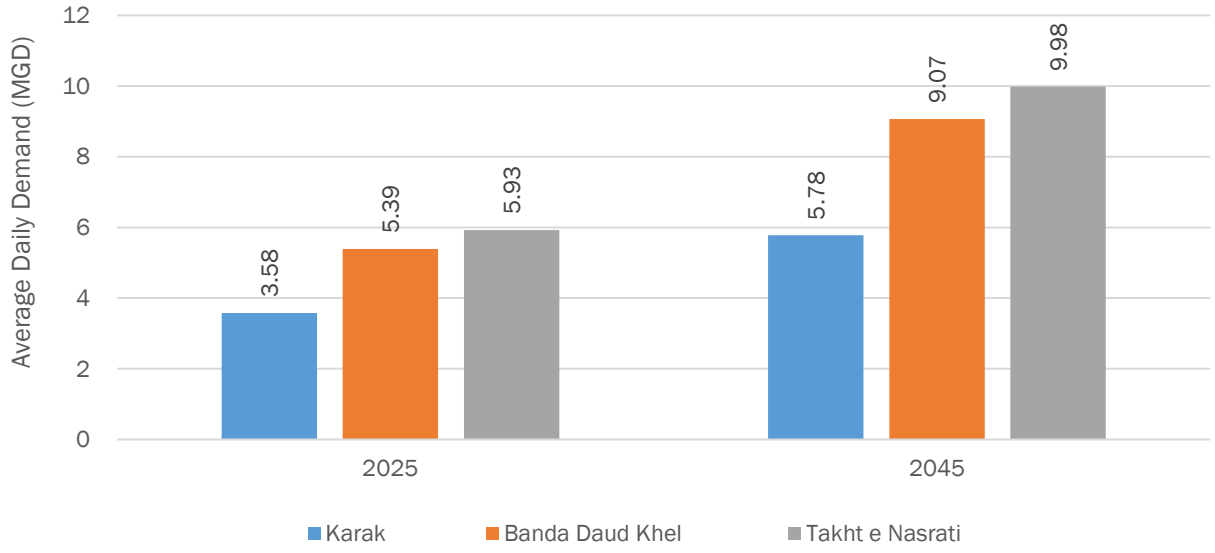


Figure 3-30: Average Daily Demand for Rural Settlements of Karak District

3.10.6. Wastewater Generation

Sewerage Flow is calculated using 30 GPCD as Average Water Demand, including Non-Revenue Water or Losses. In addition, 10% of Commercial, 10% of Institutional and 10% of Industrial water demand is also calculated and added. The provision of stormwater has also been added as 50% of the peak sewage flow to cater for the rainwater run-off into the sewerage system.

The wastewater flows from Karak District collectively for urban and rural areas is estimated to be around 61.52 MGD at the end of 2045. The urban areas contribute to 23% of this wastewater, whereas the rural communities generate the remaining 77%. The details of sewage flow for urban and rural areas have been provided below.

3.10.6.1. Waste Water Flows for Urban Areas

The wastewater generated by the urban settlements, including only Karak Tehsil of the District, has been forecasted and tabulated below.

Table 3-85: Wastewater Flows for Urban Settlements of Karak District

Urban Settlements	Sewage Flow (MGD) 2025	Sewage Flow (MGD) 2045
Karak	5.21	9.78
Ahmad Banda	0.36	0.57
Latambar	1.00	1.68
Sabirabad	0.34	0.53
Takht-e-Nasrati	0.95	1.59

It is evident from the table that the total sewage flow of the urban areas of Karak district is expected to reach 14.15 MGD by the end of 2045. The trend of wastewater generation over the project's planning period has been pictorially represented in the graph below.

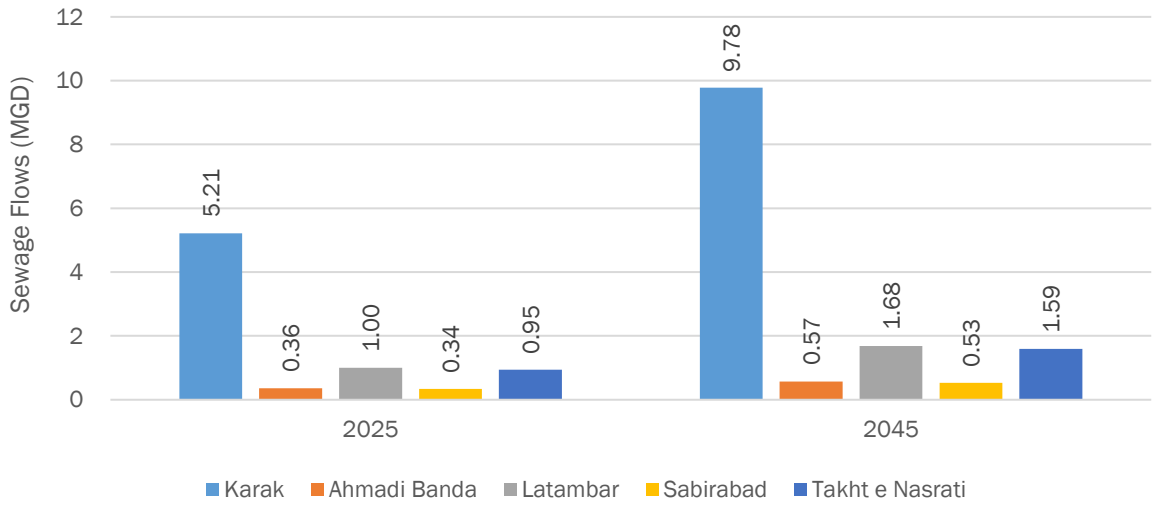


Figure 3-31: Wastewater Generation for Urban Settlements of Karak District

3.10.6.2. Waste Water Flows for Rural Areas

The wastewater generated by the rural settlements of Karak District has been forecasted and tabulated below.

Table 3-86: Wastewater Flows for Rural Areas of Karak

Rural Settlements	Sewage Flow (MGD) 2025	Sewage Flow (MGD) 2045
Karak	6.83	11.02
Banda Daud Shah	10.28	17.30
Takht-e-Nasrati	11.31	19.05

It is evident from the table above that the rural settlements of Takht-e-Nasrati Tehsil are the major contributors to the sewage flow generation from the rural areas of Karak District. The total sewage flow of all the rural areas of the district is expected to reach 47.37 MGD by the end of 2045.

The trend of wastewater generation over the project's planning period has been pictorially represented in the graph below.

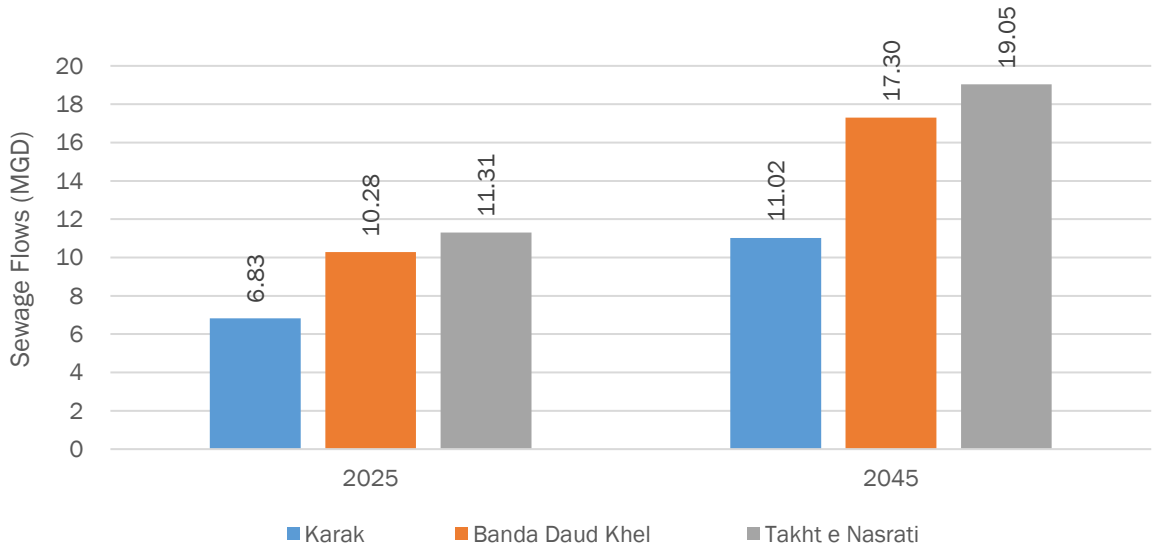


Figure 3-32: Wastewater Generation for Rural Settlements of Karak District

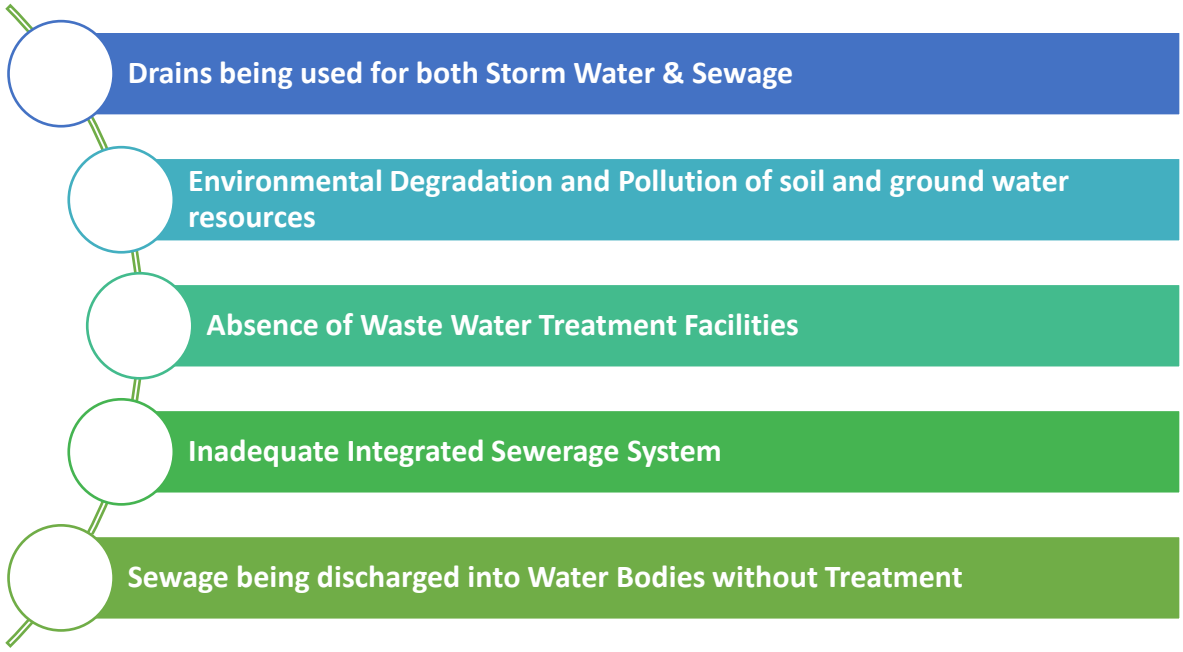
3.10.7. Comparative Analysis & Implications

The projected water consumption and wastewater generation patterns for Karak District reveal a markedly rural-dominant distribution, with rural areas consistently accounting for a substantially higher share. By 2045, rural settlements will consume approximately 77% (24.83 MGD) of the total water demand, while urban areas will account for 23% (7.42 MGD). Wastewater generation trends mirror this pattern, with rural areas contributing around 77% (47.37 MGD) of the total projected wastewater flows and urban areas generating 23% (14.15 MGD). This indicates a persistent rural demand dominance despite gradual urban growth.

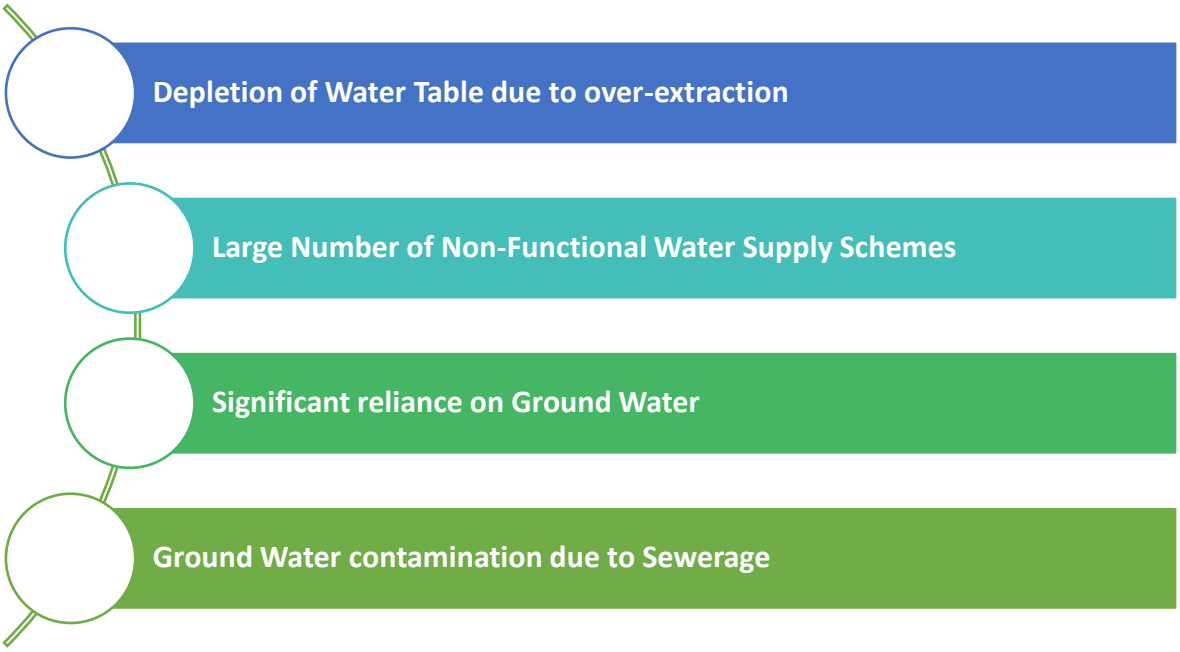
This pronounced disparity necessitates focused infrastructure development in rural water supply schemes, decentralized wastewater management, and environmental safeguards, while simultaneously upgrading urban water supply networks, sewerage systems, and treatment capacities. Recognizing these distinct sectoral demands is vital for developing balanced, sustainable water resource management strategies and mitigating future water security and sanitation challenges across both settlement types

3.10.8. Constraints & Recommendations

Major constraints pertaining to the sewerage and drainage systems of the district Karak have been identified through analysis of the existing situation. Some of the key constraints identified are as follows.



Major constraints pertaining to the water supply system of district Karak have also been identified through analysis of existing surveys and field visits. Some of the key constraints identified are as follows.



3.10.9. Future Plan & Strategic Intent

The high-level future plans in terms of strategic directions to answer what, where and how questions have been proposed as per the existing situation and projected growth trends in the district. However, it should be noted that these plans are representative of only an abstract of the solution and are subject to detailed design and master planning. The focus is on Short, Medium and Long-Term phases.

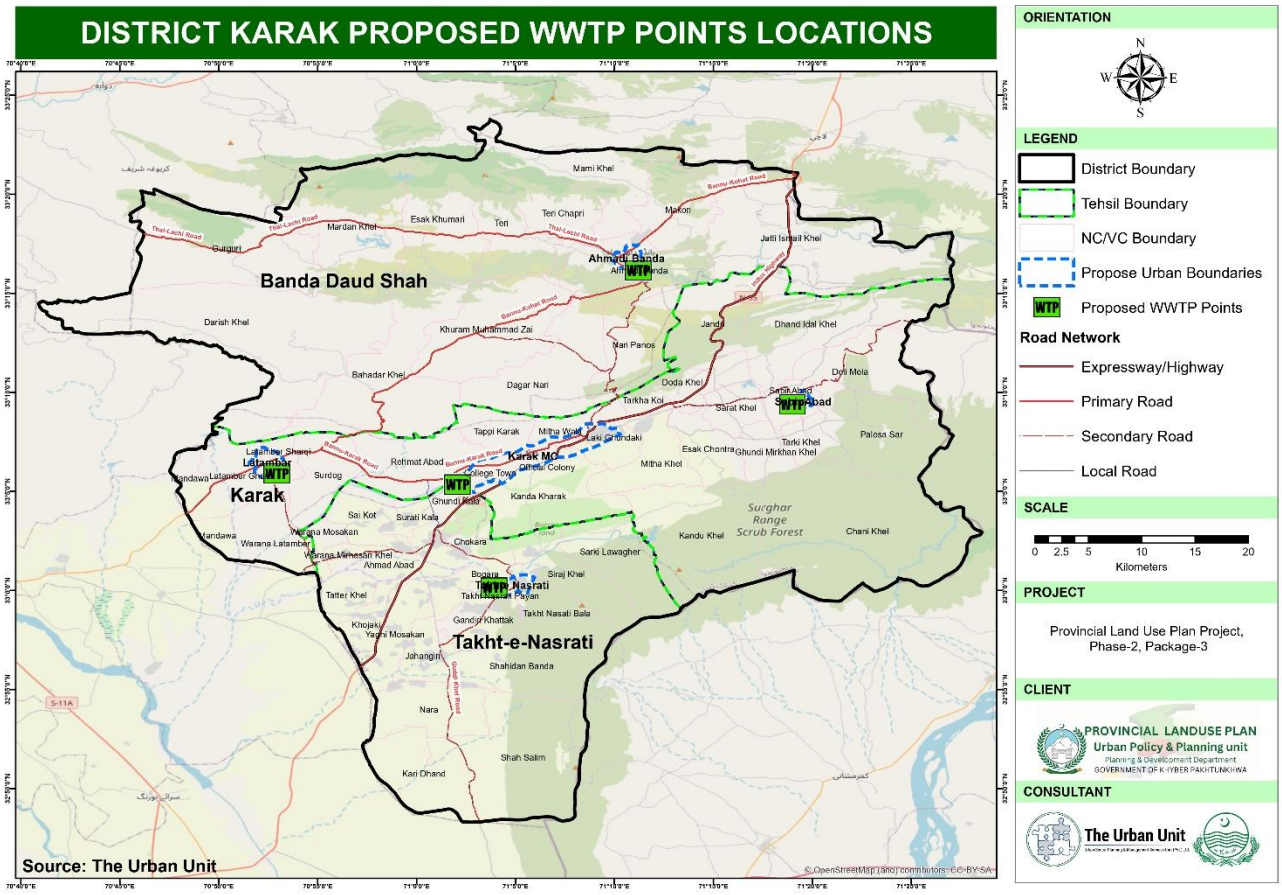
Table 3-87: Proposed Interventions during plan period

Sr.	Period	Area	Project	Scope	Stakeholder
1	Short	Karak, Takht-e-Nasrati, and Banda Daud Shah Tehsils	Rehabilitation of existing water supply infrastructure in rural areas of Karak, Takht-e-Nasrati and Banda Daud Shah	Rehabilitation of Tubewell including repair of Pumping Machinery, Electrical Panels, Civil Structure of Pump House along with replacement of distribution network (as per requirement) of existing non-operational water supply schemes	PHED Karak District
2	Short	Karak and Banda Daud Shah (Urban & Rural)	Extension of Sewerage System to Unserved Areas of Karak District in Tehsils of Karak and Banda Daud Shah (Phase-I)	Design & Execution of integrated sewerage system complete with trunk & lateral sewer lines, pumping stations, manholes and other related works with solar and integration of SCADA	Local Govt. in Karak and Banda Daud Shah
3	Short	Karak District (Rural)	Provision of Filtration Plants in brackish zones of VCs Jandri, Ahmadi Banda and Warana Mirhasan Khel	Installation of RO-based filtration plants with complete structure, machinery, boring and other appurtenances.	Local Govt. & Public Stakeholders in Karak, Takht-e-Nasrati and Banda Daud Shah
4	Medium	Karak	Provision of new Water Supply		PHED Karak District

Sr.	Period	Area	Project	Scope	Stakeholder
		and Banda Daud Shah (Rural)	Schemes for rural areas of Karak District in Tehsils of Karak and Banda Daud Shah (Phase-I)	Provision of surface water or ground water-based schemes complete with machinery, pump-house, well bores, valves, bulk meters, chlorinators and other related works.	
5	Medium	Karak, Ahmadi Banda, Latambar, Sabirabad and Takht-e-Nasrati	Rehabilitation of existing & provision of new Water Supply Schemes for urban areas of Local Govt. in Karak, Ahmadi Banda, Latambar, Sabirabad and Takht e Nasrati	Provision of water supply schemes (surface water or groundwater based) complete with machinery, pump-house, valves & meters, chlorinators and other related works, including rehabilitation of existing water supply infrastructure (as per requirement)	Local Govt. in Karak, Ahmadi Banda, Latambar, Sabirabad and Takht e Nasrati
6	Medium	Takht-e-Nasrati, Ahmadi Banda, Latambar, Sabirabad (Urban and Rural)	Extension of Sewerage System to Unserved Areas of Karak District in Takht-e-Nasrati, Ahmadi Banda, Latambar, Sabirabad (Phase-II)	Design & Execution of integrated sewerage system complete with trunk & lateral sewer lines, pumping stations, manholes and other related works with solar and integration of SCADA	Local Govt. in Takht-e-Nasrati, Ahmadi Banda, Latambar, Sabirabad
7	Medium	Karak District (Urban & Rural)	Provision of solar energy systems for tube wells for filtration plants of Karak district	Provision and conversion of existing infrastructure to solar system complete with solar panels, electrical works, battery back-up system, SCADA control and other related works.	Local Governments & Public Stakeholders in Karak, Takht-e-Nasrati, Latambar, Sabirabad, Banda Daud Shah, Ahmadi Banda,
8	Medium	Karak District (Urban & Rural)	Provision of Filtration Plants in Karak district	Installation of filtration plants (RO or UV as per requirements) with complete structure, machinery, boring and other appurtenances.	Local Governments & Public Stakeholders in Karak, Takht-e-Nasrati, Latambar, Sabirabad, Banda Daud Shah, Ahmadi Banda,
9	Long	Takht-e-Nasrati (Rural)	Provision of new Water Supply Schemes for rural areas of Karak District in Tehsil of	Provision of surface water or ground water-based schemes complete with machinery, pump-house, well bores, valves, bulk	PHED Karak District

Sr.	Period	Area	Project	Scope	Stakeholder
			Takht-e-Nasrati (Phase-II)	meters, chlorinators and other related works.	
10	Long	Karak District	Rehabilitation of the existing Sewerage and drainage system of Karak	Rehabilitation of existing sewerage & drainage infrastructure in Karak, including repairs, cleaning, de-silting, possible extension and other associated works.	Local Governments in Karak, Takht-e-Nasrati and Banda Daud Shah
11	Long	Karak, Takht-e-Nasrati, Latambar, Sabirabad, Banda Daud Shah, Ahmadi Banda	Provision of Wastewater Treatment Plants for Karak	Design and Construction of Wastewater Treatment Plant (STP) of Anaerobic and Facultative Type with auxiliary facilities and an estimated area of 50 , 10, 5 acres and capacity of 11 MGD-I, complete with land acquisition, civil works, machinery, Sullage carriers, disposal works and other related works.	Local Government in Karak, Takht-e-Nasrati, Latambar, Sabirabad, Ahmadi Banda
12	Long	Karak District (Urban)	Construction of WWTPs for Urban Areas of Karak district	Construction of WWTPs of type WSP completed with construction of ponds, civil works, and other auxiliary infrastructure works as required	Local Government in Karak, Thakht-e-Nasrati, Latambar, Sabirabad, Banda Daud Shah, Ahmadi Banda
13	Long	Karak District (Rural)	Construction of decentralized WWTPs for Rural Areas of Karak district	Construction of low-cost wastewater treatment solutions such as Anaerobic Baffled Reactors, Aerated Lagoons, and Oxidation Ditches complete in all aspects including mechanical works, civil works and land acquisition as per settlement requirements.	District Council Karak / Local Governing Bodies for Rural Areas of Karak District

Proposed wastewater treatment plants in urban areas of district areas area shown in **Map** below.



Map 3-38: Proposed Wastewater treatment plants in district Karak

3.11. Environment

The District Land Use Plan for Karak envisions a sustainable future where environmental preservation and forestry management play pivotal roles in fostering ecological balance and socio-economic development in the province. The unique environmental profile of district Karak is further characterized by its arid climate and diverse natural resources. The district's mineral-rich terrain, including salt, gypsum, and oil deposits, offers economic potential but also adds pressure on fragile ecosystems if not managed sustainably. Large-scale degradation of rangelands and deforestation for fuelwood and grazing continue to threaten biodiversity and the survival of native species in the region. A balanced land use strategy should prioritize afforestation, watershed management, and the protection of ecologically sensitive zones.

The extensive Range Land zone, which covers about **59.5%** of the total land area, primarily used for grazing and pastoral activities is under threat due to overgrazing, land degradation, and climate change. These challenges, compounded by the region's reliance on traditional practices and inadequate resource management, highlight the urgent need for integrated strategies that align with modern environmental principles.

This chapter underscores the findings from comprehensive background studies and proposes actionable interventions to enhance environmental conservation, promote sustainable forestry practices, and build resilience against climate vulnerabilities while supporting the livelihoods of local communities.

3.11.1. Issues and Constraints

The following key environmental and climate challenges have been identified in District Karak, based on background studies, field surveys, analysis of legal gaps, and consultations with government departments and local communities:

- Karak district has potential habitat and variety of biodiversity with vast range of flora and fauna. However, the changes in habitat and ecosystem due to anthropogenic activities have impacted local biodiversity. Uncontrolled deforestation, illegal hunting and poaching, and overgrazing are the critical vulnerabilities of the district. Moreover, the reduction in forage production intensifies the pressure of livestock and wildlife on the range areas, ultimately driving out important wildlife species from the area.
- Karak Forest department is also facing multiple communal and sectoral constraints relevant to forest sector. For instance, in designated forested areas, local community has conflicts on land ownership and land use that are a strong barrier to forest management and conservation objectives of the forest department. Local Communities in rural areas of Karak district involve in hunting, harvesting non-timber forest products, and fuelwood consumption that directly a leading conflict between department and community. Similar is the case with over grazing that affects conservation efforts negatively. The excessive use of agricultural harbors like herbicide and pesticide may have adversative effects on growing forests which leads to reduction of wild floral composition and impose environmental impact.
- Spanning **2672.52** square kilometers, Karak's landscape comprises residential, commercial, industrial, and public sectors. Despite this diversity, recreational spaces like parks are alarmingly scarce, occupying just **0.93** square kilometers. The small area dedicated to parks and recreational zones, coupled with their poor condition in most of the cases, indicates inadequate green cover, impacting urban cooling, air quality, and public health.
- The district has approximately **19** sq.km of forest land, and the existing tree cover is insufficient to fulfill the environmental needs of the city, such as mitigating urban heat and pollution.
- Although air pollution in Karak is not currently a critical concern, the district's air quality shows signs of vulnerability, likely influenced by localized pollution sources like mining and stone crushing, traffic and limited green cover. Without proactive measures, these factors could lead to significant air quality deterioration in the near future, despite any mitigating effects from geographical or meteorological conditions.

- Limited urban space and increasing development pressures may lead to encroachment on forests, rangelands, and barren lands, threatening ecological balance and native habitats.
- The district's capacity for climate change adaptation and mitigation needs substantial improvement to minimize the impacts of climatic extremes, such as irregular rainfall, temperature fluctuations, and extreme weather events.
- Unsustainable mining practices in Karak have led to soil erosion, water and air pollution, habitat loss, and frequent occupational accidents due to poor safety compliance and outdated technology. Limited community engagement, lack of vocational training, unreliable electricity, and inadequate infrastructure further hinder environmental management and sectoral efficiency, making the local economy vulnerable due to overdependence on mining.
- The absence of baseline environmental data and resource statistics at the district and tehsil levels hinders effective decision-making and limits understanding of the current state of the environment.
- There is a need to mainstream climate change adaptation and mitigation measures at the district and tehsil levels. This includes integrating climate considerations into local development plans and policies.
- The environment and climate change sector lacks institutionalization at lower levels of government. Clear roles and responsibilities need to be defined and implemented for effective action at the district and tehsil levels.
- Weak enforcement and monitoring and limited resources (HR, funds, equipment) are restraining the efforts to implement environmental standards in the district.

3.11.2. Future Plan of Action

The following **Table** summarizes the future plan of action in district Karak for environment preservation.

Table 3-88: Future Plan of Action

What	How	When	Who	Where	Why
Green Spaces	Rehabilitation of existing parks;	ADP 2025-Onward	Local Government; Urban Development Sector; Karak Development Authority (BDA)	All Public Parks	Enhances green spaces, improves community well-being, boosts biodiversity, and revitalizes degraded urban areas.
	Establishment of new parks	ADP 2025-Onward		Karak District	Expands recreational opportunities, promotes environmental sustainability, mitigates urban heat, improves air quality, and foster social cohesion
	Greening of Cities	ADP 2025-Onward	Local Government; Forestry, Environment &Wildlife Department; BDA	Open spaces, public buildings and institutions; newly constructed buildings; green belts; road site plantations; landscape development	Reduce Urban Heat Island effect; Act as permeable surface to hold heavy precipitation; improve environmental quality; Increase aesthetics and land market value
Sustainable Mining Practices	Introduce eco-friendly mining practices and increase capacities of the	ADP 2025-Onward	Mines Dept; EPA; Forest Dept		To reduce soil erosion, air & water pollution, and protect surrounding ecosystems and to

	mining sector ensure environmental sustainability				ensure sustainable practices and mitigate ongoing environmental degradation
	Develop and Implement post-mining land rehabilitation plans	ADP 2025-Onward	Mines Dept; EPA; Forest Dept	Abandoned/closed mining sites	To restore degraded land, improve biodiversity, and prevent long-term ecological damage
Air Quality Monitoring	Installation of AQ Monitors/ Sensors	ADP 2025-Onward	EPA KP	Mining Sites; Industrial Sites; Crushing Units; Residential/Built up areas and main roads (Congestion Points)	To improve environmental quality and reduce air attributed disease burden
Multi-Hazard Vulnerability and Risk Assessment (MHVRA)	Carry out district-level climate inclusive Multi-Hazard Vulnerability and Risk Assessment (MHVRA) study	ADP 2025-Onward	Relief, Rehabilitation & Settlement Department, PMD, EPA, Forest Dept.	Karak District	Identify, assess, and mitigate local hazards, ensuring improved disaster preparedness and climate compatible development
Reforestation/ Urban Afforestation	Seed Broadcasting and Planting Native Species	Spring 2025-Onward	Forest & Wildlife Department, KP	Rakh Sarkar, Karak Pheasantry, Land Along Lora Nullah, Private Plantation initiative through PPP	Habitat Restoration, Forest Conservation and Environmental Improvement
Community Involvement and Academia Engagement	Awareness and Community Based Organization	Throughout the year	Forest & Wildlife Department; KP EPA; LG; Health Department; Non-profit sector, local community	Karak district	Conservation of threatened Species; greening of the area, environmental improvement initiatives
Enhance Technical Capacities	Training Programs – Environmental Protection, Climate Resilience, Forestry and Biodiversity Conservation	As per Training Plan	EPA; Forest Department and other Relevant Departments	District and NC/VC	Increased knowledge on the technical aspects will lead to better planning and implementation.

The following section provides a detailed explanation of some of the proposed interventions discussed above;

3.11.3. Greening of District

To meet the city's environmental needs, Karak district require an extensive urban greening initiative.

3.11.3.1. Policy and Regulatory Measures

The following measures needs to be taken for Karak to enhance the environmental sustainability and resilience of the district.

- Strict enforcement of existing laws and action plans enacted to provincial scale like KP Environmental Protection Act, 2014 and the KP Wildlife and Biodiversity (Protection, Preservation, Conservation and Management) Act, 2015, KP Climate Action Plan 2022, KP Land-Use and Building Control Act, 2021, the KP Urban Areas Development Authorities Act, 2020, and other related instruments to ensure environmental sustainability at district scale.
- Introduce heavy fines for illegal felling of trees to deter deforestation and encourage responsible construction practices in Karak district.
- Ensure that only indigenous tree species should be planted in public spaces, parks, and along roads for ecological compatibility and preserve local biodiversity. This would also help maintain Karak's natural habitat and enhance the beauty of urban areas.
- Develop urban green corridors to improve the environmental values and beautification of Karak urban centers. These urban corridors are linear parks and green belts that can connect existing green spaces. The green corridor may also develop along railway lines, roads, canals, and nullahs in the district. The linear plantation can also be done through extensive ornamental plantation. Such green corridors not only cool urban areas and improve air quality by creating cool air paths but also provide significant benefits for urban biodiversity.
- Promote plantation of indigenous, deep-rooted species which are well-adapted to low rainfall, provide fodder, and enhance soil fertility.
- Encourage private property owners to convert rooftops of 100 m^2 or larger into green roofs, which can help in managing stormwater, improving air quality, and creating green urban spaces. Green roofs would also provide significant insulation and reduce the urban heat island effect.
- Ensure that a minimum of 9 m^2 of accessible, urban green space per inhabitant is provided. This includes parks, gardens, and tree-lined streets. This would improve public health, reduce pollution, and provide recreational spaces for Karak's growing urban population.
- In all large development and construction projects, including housing societies, the removal of trees should be prohibited unless absolutely necessary. If the removal is required, it should be mandated that new trees are planted according to the area’s ecological needs.

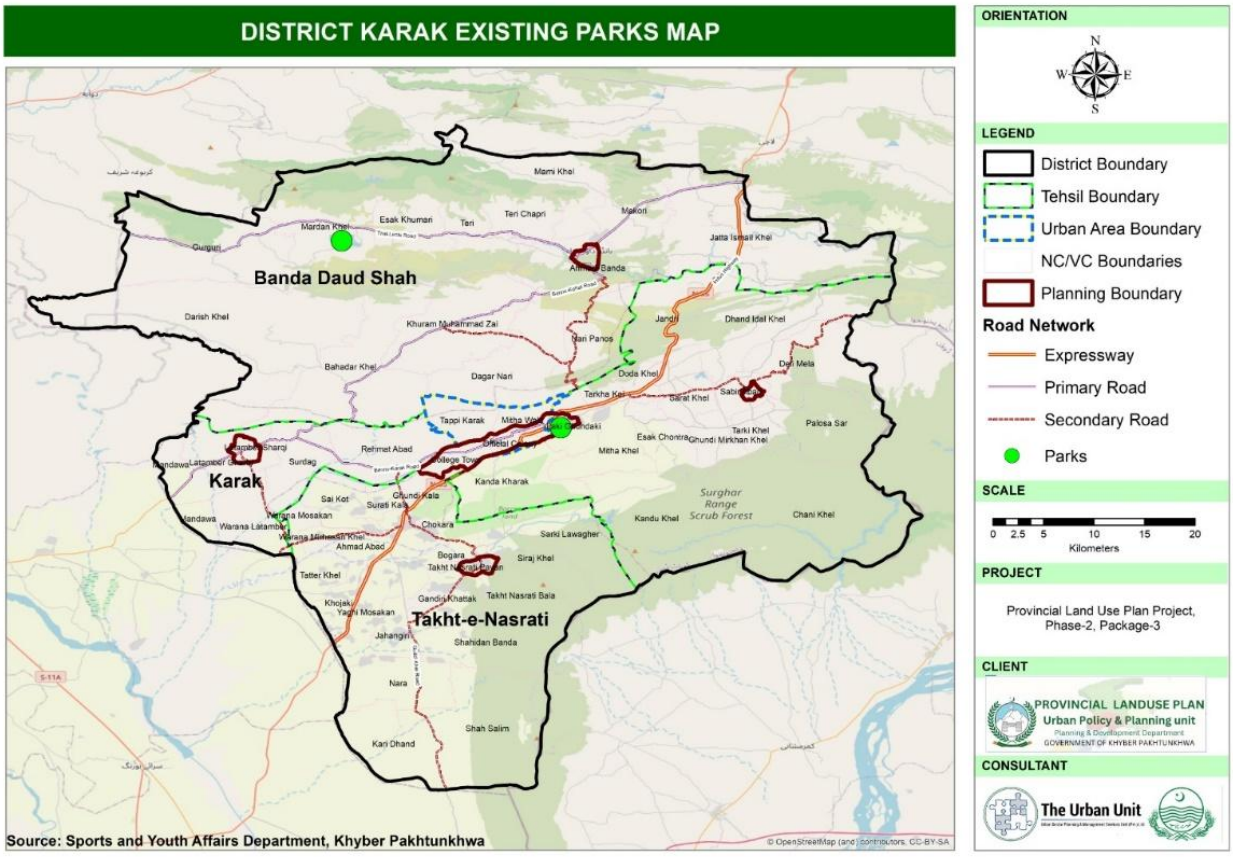
3.11.3.2. Urban Greening Monitoring Framework

- Establish a monitoring framework to track the progress of greening efforts in the district, particularly tree plantation, park development, and green roof initiatives.
- Implement a community-based geotagging system that allows residents to crowdsource data on tree locations and share pictures of them. This system would not only engage citizens in conservation efforts but also help create a real-time database of urban trees, which can be used for planning and maintenance purposes.
- Regular assessments should be made to ensure that greening of district goals are being met, and corrective measures should be implemented when necessary.

3.11.3.3. Rehabilitation of Existing Parks

Parks are essential for striking green spaces, promoting sustainability and improved the visual appeal of urban areas. At present, Karak is facing unplanned urban expansion and land use, coupled with few parks for whole district.

The availability of developed parks is crucial for a liveable city, serving as a key indicator of a sustainable urban ecosystem and quality of life. The World Health Organization recommends a minimum benchmark of 9 sq. meters of green space per person (UN-Habitat, 2013). This standard offers valuable guidance for sustainable land use planning to mitigate green spaces challenges. All existing Parks, shown in the below Map.



Map 3-39: Existing Parks in District Karak

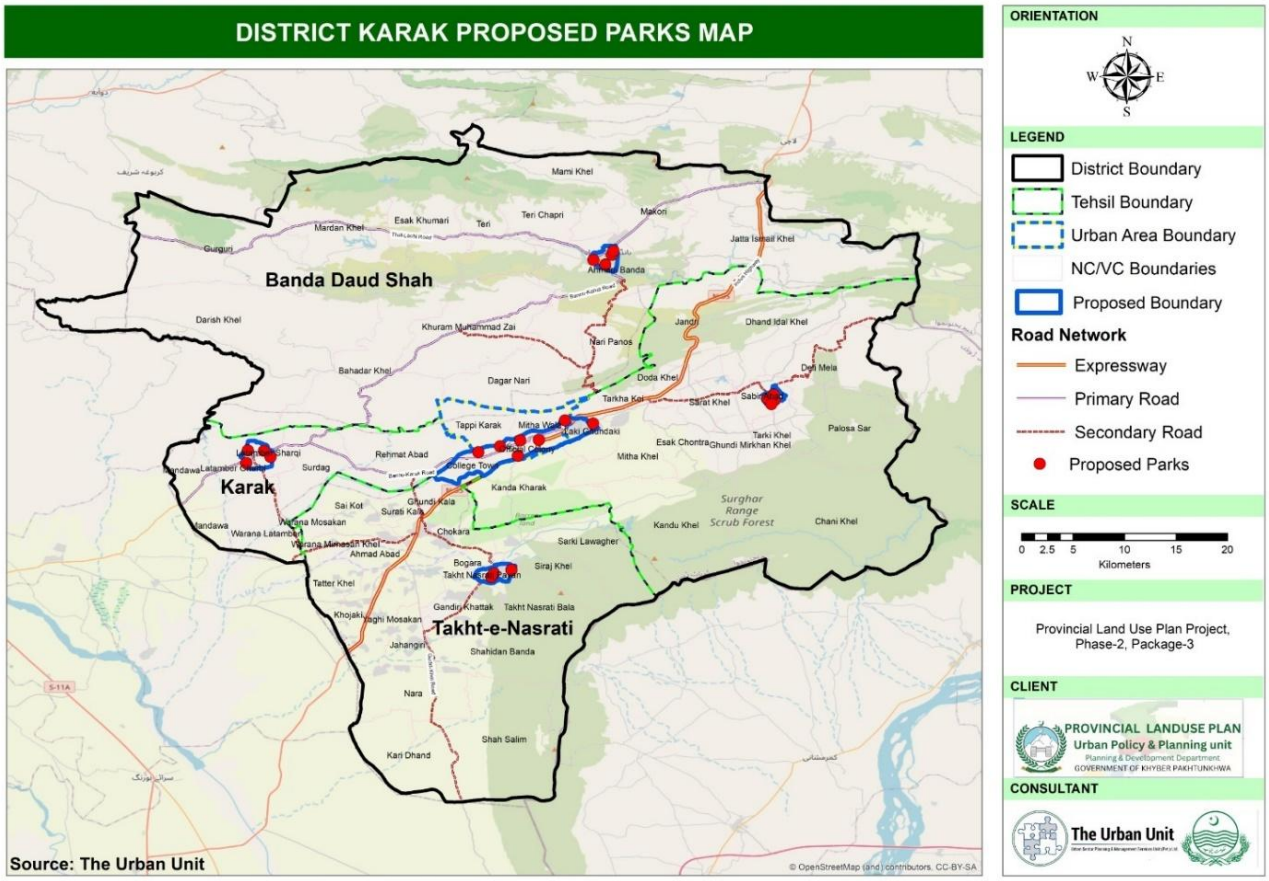
3.11.3.4. Conceptual Design

The proposed conceptual design for provision of parks in Karak district strives to create an inclusive, sustainable, and vibrant green space that caters to the diverse needs of the local community, with particular attention to gender aspects. The following elements are recommended for rehabilitation of existing parks and development of new parks.

- Provision of softscape including grassy lawns, a rose garden, and scattered plantation to enhance aesthetic appeal, promote biodiversity, and provide a peaceful environment for all visitors.
- Proposed plantation of indigenous, ornamental, medicinal, flowering, and fruiting plants, which will support faunal diversity, especially attracting regional birdlife and contributing to the ecological balance.
- Hardscaping components such as a parking area, toilet block, jogging track, recreational facilities like swings, playland, and a cycling track to encourage physical activity and provide entertainment options for the entire community.
- Women's-only spaces within the park, such as dedicated walking tracks, sitting areas, and outdoor exercise zones, to create a comfortable and secure environment for women.
- Seating areas designed with a focus on comfort and safety, encouraging social interaction, relaxation, and inclusive participation from all genders.
- Child-friendly zones with designated play areas and safe, shaded seating to cater to families, with special consideration for mothers and caregivers.
- Water features such as small ponds or fountains that contribute to a serene ambiance while creating spaces for quiet reflection and social interaction.
- Lighting designed to ensure safe evening use, with a particular focus on well-lit pathways and areas frequented by women and children.
- Gender-sensitive public restrooms, with separate facilities for women and men, ensuring privacy and security.
- Accessibility features, such as ramps and wide pathways, to accommodate people with disabilities, ensuring that the park is inclusive for all members of society.

- Waste management facilities like bins and recycling stations that promote cleanliness and environmental consciousness while ensuring convenience and accessibility for all visitors.

Below **Map** shows the parks proposed in District Karak.



Map 3-40: Proposed Parks in District Karak

3.11.3.5. Afforestation

To propose future interventions, a comprehensive primary and secondary data analysis was done of protected /environmentally sensitive areas of district Karak.

For Restoration and Forest Management, a criterion was developed for field assessments to identify the needs for restoration activities and to plan future interventions. The criteria and the assessment results of the selected sites are tabulated below.

Table 3-89: Site Suitability Assessment

Name	Forested Land	Blank Area	Soil Suitability	Plantable Area	Category*
Payala, Ahmad Abad	●	●	●	●	A
Darish Khel	●	●	●	●	A
Jatta Ismail Khel	●	●	●	●	B
Dand idal khel	●	●	●	●	C
Dowroo algad	●	●	●	●	C
Surdag	●	●	●	●	C
Lak Kanai	●	●	●	●	C
Chakhtu	●	●	●	●	B

***Classification**

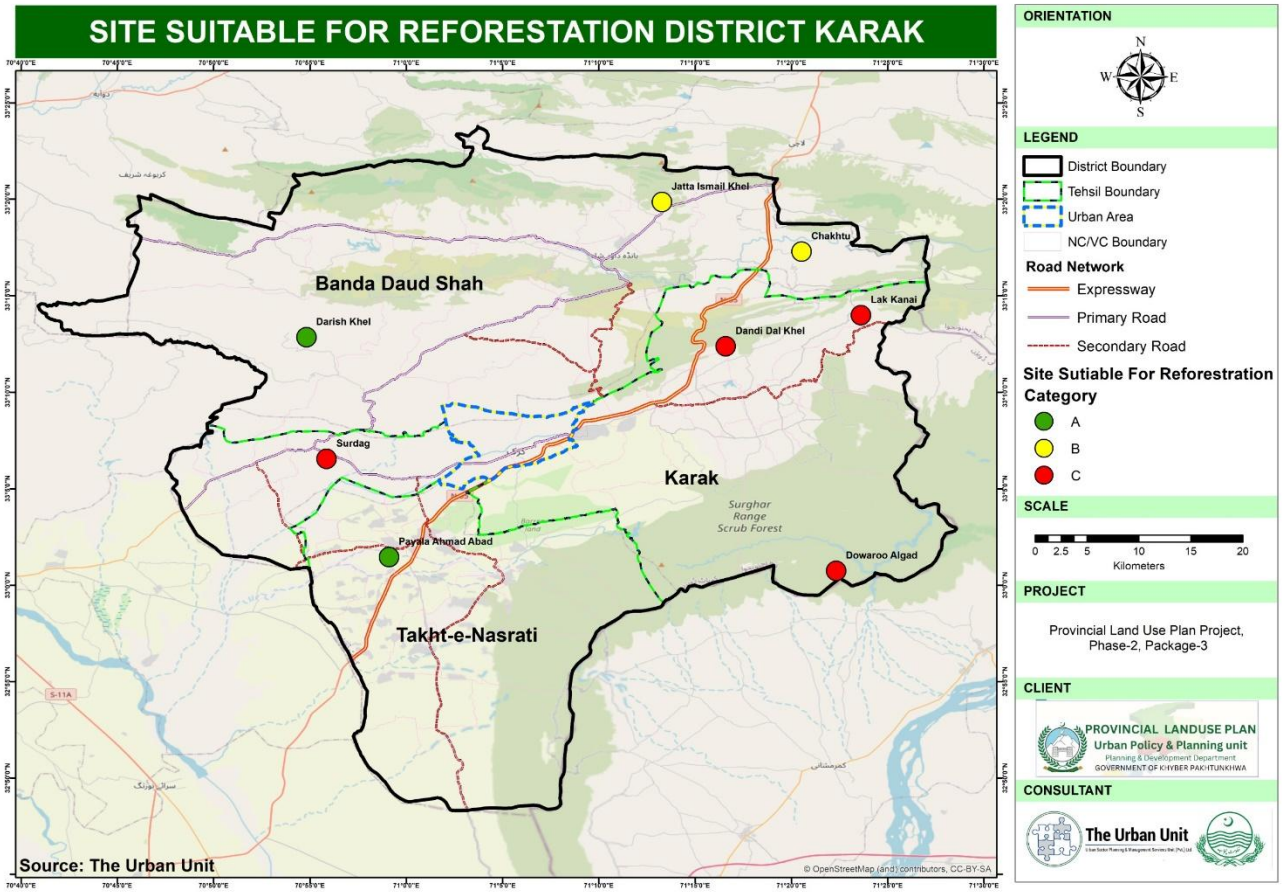
A: More Suitable for Reforestation and Forest Management

B: Moderate Suitable for Reforestation and Forest Management
C: Less Suitable for reforestation and Forest Management

The forest plantation initiative in Karak aims to significantly expand tree cover by planting native species on barren, degraded, and ecologically suitable lands. This effort focuses on selecting tree species that are well-adapted to the local climate, soil, and ecological conditions, thereby boosting biodiversity and creating valuable wildlife habitats. With only less than **1%** currently under forest cover, there is an urgent need for large-scale plantation activities. By introducing a diverse range of tree species, this initiative will help restore habitat connectivity, combat deforestation, and address land degradation and water scarcity. Furthermore, integrating land use planning and fostering community participation in forest land management will ensure sustainable and effective stewardship of these resources for future generations.

3.11.3.6. Conceptual Design

- The forest plantation design should be based on mix plantation or polyculture design to attract and conserve the wild diversity of the region.
- The gradual thinning of forested land for better growth of plantation and removal of weed like *Prosipis julifora* which is the very common weed in forestry.
- The spacing of line and trees are 10 x 10 feet for the well managed and better growth of plant.
- The species selection based on indigenous plant species which are native to the division includes:
    - *Acacia modesta* (Phulai)
    - *Acacia nilotica* (Kikar)
    - *Albizia lebbeck* (Siris)
    - *Acacia modesta* (Phulai)
    - *Dalbergia sissoo* (Shisham)
    - *Morus alba* (Shehtoot)
    - *Ziziphus nummularia* (Beri)



Map 3-41: Suitable sites for reforestation

3.11.4. Enhance Air Quality

Karak district is facing moderate air quality issues that are mainly associated with industries (including brick kilns) and transport sector. To maintain the air quality below the national ambient quality standards, it is important that sound policy and physical measures are included in the future plan to attain the desire results.

3.11.4.1. Policy and Regulatory Measures

- Provide eco-friendly transportation infrastructure to ease commuting, reducing traffic jams, better connectivity and reduce environmental pollution.
- Stringent enforcement of environmental quality standards in the pollution hotspot areas and industries.
- Encourage the existing industries to focus on renewable energy sources, such as solar or wind, to reduce reliance on fossil fuels.
- Monitor and impose a fine on stubble or waste burning.
- Increase in tree cover through tree plantation campaigns along roadsides, in public parks, and around industrial zones to act as natural air filters and accord environmental approval of all development projects as per KEPA 2014.
- Implement stricter regulations on mining operations, particularly concerning dust control and emissions.
- Promote the use of non-motorized vehicles, such as bicycles, as a means to reduce pollution from mobile sources.
- Improvement of road infrastructure to avoid dust and noise with a provision of dedicated bike paths, pedestrian zones, and repair & maintenance work.
- Ensure submission of comprehensive Environmental Management Plans (EMPs) as a mandatory requirement with all mining lease applications, as outlined in the KP Mines and Minerals Act, 2017.
- Ensure strict enforcement of land reclamation and ecological restoration measures before mine closure to mitigate long-term environmental damage.
- Safeguard regular environmental audits and monitoring of mining sites through third-party evaluations to track compliance with environmental safeguards.
- Impose a ban on mining activities in ecologically sensitive zones such as protected forests, watersheds, and biodiversity hotspots unless special environmental clearances are obtained.
- Ensure mandatory waste management protocols for all mining operations to prevent contamination of air, water, and soil, in line with the KP Mines Safety and Regulation Act, 2019.
- Promote the use of cleaner, energy-efficient, and water-conserving technologies in both extraction and processing phases.
- Promote environmental training and certification for mine workers and managers to build capacity on pollution control and ecosystem protection.
- Introduce public disclosure requirements for mining companies to report key environmental indicators and engage transparently with local communities and regulators.
- Greening of all industries located in Karak district and ensure installation of emission control system.
- Introduce dust suppression technologies such as water spraying systems on mining sites and roads used by mining trucks.

3.11.4.2. Air Quality Monitoring

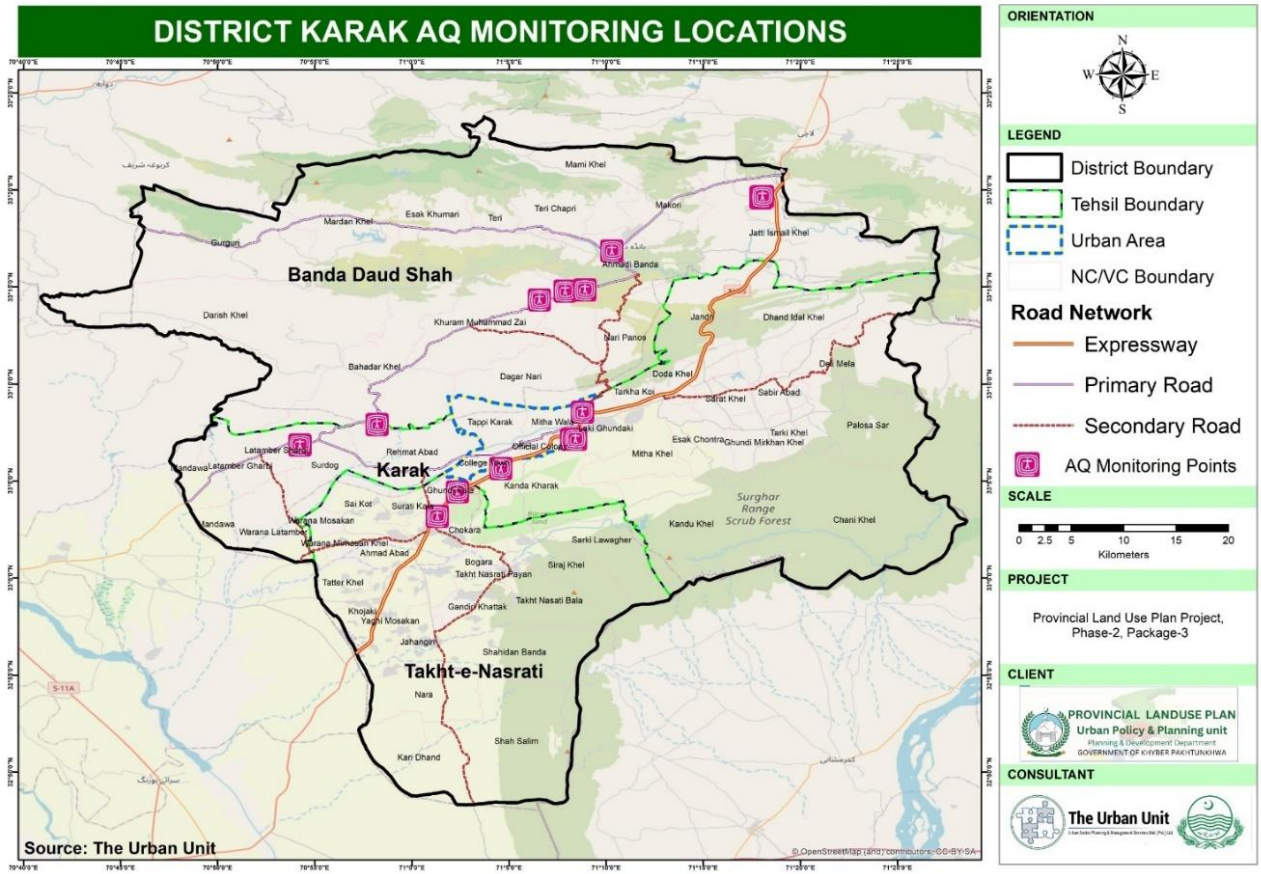
- Installation of air quality monitoring station for continuous monitoring of ambient air in Karak district.

3.11.4.3. Scope

This project aims to record particulate matter concentrations (PM2.5 and PM10) in the hotspot areas of Karak district for continuous monitoring and informed decision making. A district level air quality monitoring dashboard for disclosure of information and issuance of health advisory is recommended.

3.11.4.4. Activities

Installation of air quality monitoring equipment /stations and a network of low-cost sensors in hotspot areas of District Karak.



Map 3-42: AQ Monitoring Locations

3.12. Natural Hazards

District Karak in Khyber Pakhtunkhwa is exposed to multiple natural hazards, including earthquakes, floods, heatwaves, and potential landslides, all of which pose serious threats to socio-economic stability. Situated in Seismic Zone 2B, Karak faces moderate earthquake risk, as evidenced by the 2015 tremors that underscored the urgent need for earthquake-resistant infrastructure and better community preparedness. The district also suffered significant damage during the 2010 and 2022 floods, largely due to inadequate drainage systems, lack of early warning mechanisms, and unregulated development. While large-scale landslides have not been recorded, the risk may increase due to heavy rainfall and poor land management practices. Additionally, intensifying heatwaves—with temperatures surpassing 45°C—pose severe health risks, especially for vulnerable populations, highlighting the need for climate-adaptive urban planning, improved water infrastructure, and public awareness initiatives.

3.12.1. Seismic Risk Profile of Karak

3.12.1.1. Seismic Zone

According to Pakistan Building Code 2007, Pakistan is divided into 5 zones which are mentioned in the table 1. These zones have been identified for Karak district as shown in figure 1.

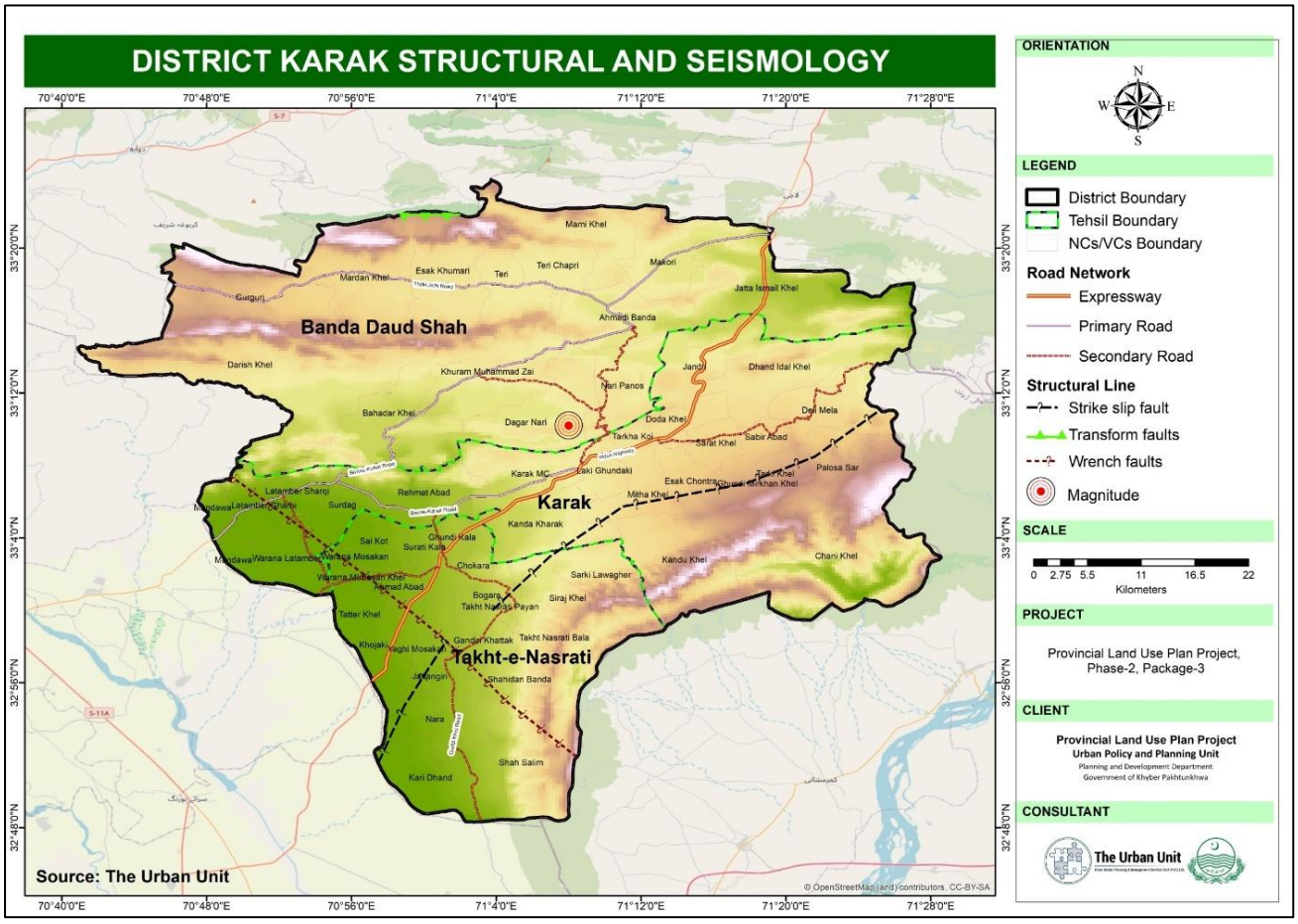
Table 3-90: Seismic zone distribution indicating hazard level and PGA

Zone	Seismic Hazard Level	Peak Ground Acceleration (PGA)
Zone 1	Low	0.05 to 0.08g

Zone 2A	Moderate-Low	0.08 to 0.16g
Zone 2B	Moderate-High	0.16 to 0.24g
Zone 3	High	0.24 to 0.32g
Zone 4	Very High	>0.32g

*Where ‘g’ is the acceleration due to gravity

Karak falls under Seismic Zone 2B, indicating moderate to high seismic risk, similar to other southern KP districts. The region lies near the Main Frontal Thrust (MFT) zone, making it vulnerable to tectonic movements caused by the collision of the Indian and Eurasian plates. Past tremors of magnitude 4–5 have been felt in the region, but the infrastructure remains largely unprepared for a major seismic event.



Map 3-43: Seismology Zones of District Karak

3.12.1.2. Zone 2B (Moderate-High Risk)

- **Structure:** Reinforced Concrete (RC) frame structures with shear walls or braced frames mandatory.
- **Foundation:** Deepened or pile foundations may be recommended based on soil conditions.
- **Design Requirements:**
  - Seismic design must follow Zone 2B requirements in BCP-2007 (use seismic coefficient Z = 0.24).
  - Importance Factor (I): 1.0 for residential, 1.25–1.5 for critical facilities (schools, hospitals).
- **Retrofit Need:** Retrofitting of all unreinforced masonry or adobe structures in urban areas.

The summarized requirements regarding infrastructure development and land use planning are mentioned in the **Table**.

Table 3-91: Summary of development strategies by seismic zones

Seismic Zone	Land Use Planning	Infrastructure Development
Zone 2A	Permit moderate density; avoid soft soils.	Require basic seismic detailing.
Zone 2B	Controlled densification; restrict hillside or slope cuts.	Use RC frames, tie beams, and confined masonry. Mandatory code checks.
Zone 3	Limit high-rise development. Focus on horizontal expansion.	Reinforced shear walls; ductile detailing; critical facility retrofitting.
Zone 4	Avoid construction on slopes and soft deposits.	Only permit development with isolation techniques or deep foundations.

3.12.2. Earthquake Resistant Structural Design and Construction Practices in Karak

3.12.2.1. Confined Masonry Construction:

- Widely used in residential buildings and schools, especially in Karak's rural and semi-urban areas.
- Brick or stone walls are confined with reinforced concrete (RC) bands at plinth, lintel, and roof levels.
- Promoted by ERRA and PDMA following post-2005 awareness campaigns.

3.12.2.2. RC Frame Structures with Brick Infill:

- Used in health facilities, schools, and government buildings built after 2010.
- Reinforced concrete columns and beams provide seismic resistance, while brick acts as infill material.

3.12.2.3. Low-Rise Construction:

- Karak's built environment consists mainly of single- and double-storey buildings, which is favorable for seismic safety if properly reinforced.

3.12.2.4. Compliance with Pakistan Building Code 2007 (Seismic Provisions)

Pakistan's seismic design requirements are laid out in the Building Code of Pakistan – Seismic Provisions 2007, which is enforced for new constructions, especially for public buildings. In KP, and specifically in Karak:

The code classifies Karak as Seismic Zone 2B (moderate risk).

It mandates minimum structural safety features such as:

- Use of reinforced concrete frames.
- Provision of shear walls.
- Anchored and tied-down roofs.
- Foundation reinforcements suitable for regional soil types.

Note: In Karak, actual enforcement is often weak in private constructions due to lack of regulatory oversight, but public sector projects (schools, hospitals) increasingly follow the code.

3.12.2.5. Retrofitting Practices in Existing Buildings

- **Steel Bracing and Jacketing**:
  - Retrofit older school buildings and health units by adding steel braces or jackets to beams and columns.
  - Common in ERRA-funded post-2005 earthquake programs, extended into KP districts.
- **Shear Wall Addition**:

  - Existing structures in KP cities (including Karak) are sometimes retrofitted with external or internal shear walls, especially in public schools.
- **FRP Wrapping**:
  - Fiber Reinforced Polymer (FRP) sheets are used to strengthen columns and beams in critical public buildings.
  - Though relatively expensive, this method has been piloted in urban KP (e.g., Peshawar) and may be extended to district centers like Karak through donor projects.

3.12.2.6. Common Materials and Techniques in Karak Region

- **Locally Available Brick and Stone**: Combined with cement mortar and reinforced with rebar cages.
- **Use of Tori (ring beams)**: A traditional method of placing horizontal RCC bands at plinth, lintel, and roof levels in rural homes.
- **Steel Reinforcement from Local Markets**: Mild steel bars and mesh are widely used in both confined masonry and RC frame structures.
- **Plinth-Level Reinforcement**: Local masons often raise the plinth and include horizontal ties to prevent differential settlement and improve seismic performance.

3.12.3. Land-use Planning of Karak District

Most of Karak's agriculture is **rain-fed**, with limited irrigated farming supported by small-scale water storage projects.

The district has a few small dams constructed to support irrigation and domestic water use:

- **Zaibi Dam**
- **Sharki Dam**
- **Changhoz Dam**

Urban planning within the main urban area—Karak Township—is overseen by the Karak Development Authority (KDA). Its functions include:

- Infrastructure development (roads, drainage, water supply)
- Solid waste management
- Provision of parks and green spaces
- Street lighting and sanitation improvement

The KDA works under the directives of the Local Government and Rural Development Department of KP.

3.12.3.1. KP Urban Policy 2022–2030

The Urban Policy Unit (UPU) under the Planning & Development Department has set a framework that applies to all KP districts, including Karak. The policy mandates:

- Preparation of spatial plans and land use zoning for tehsils
- Regulating markets, housing, roads, and infrastructure development
- Preventing unplanned urban sprawl
- Promoting integrated land use tied to hazard mitigation (e.g., in floodplains or seismic zones)

3.12.3.2. Khyber Pakhtunkhwa Rivers Protection Ordinance, 2002:

This ordinance guides land use in river catchment areas, including:

- Restricting construction near rivers to prevent pollution and ecological damage
- Protecting aquatic ecosystems and ensuring buffer zones

3.12.4. Early Warning Systems

In Pakistan, earthquake early warning systems (EWS) are at a foundational stage. While there is not fully operational public EWS, several institutional measures exist:

- The Pakistan Meteorological Department (PMD) operates the National Seismic Monitoring Centre (NSMC), with over 30 seismic stations across Pakistan, including in KP.
- These stations collect real-time seismic data, which is analyzed at PMD. Alerts are relayed to the Provincial Disaster Management Authorities (PDMA).
- In KP, PDMA KP collaborates with district administrations (including Karak) to issue warnings via SMS, media, and administrative channels.
- While automated citizen alerts (e.g., apps, sirens) are not fully implemented, Pakistan is engaged in partnerships (e.g., with Japan and UNDP) to develop such systems.
- Community Awareness and Training
- The Earthquake Reconstruction and Rehabilitation Authority (ERRA) and NDMA have created earthquake safety training materials distributed through schools and local government structures.
- In KP, school safety drills are periodically conducted in collaboration with PDMA KP and the Education Department.
- Awareness campaigns have been conducted in districts like Karak to train community volunteers, teachers, and health staff on safe evacuation and emergency protocols.

3.12.4.1. Risk Assessment

- NDMA and UNDP have carried out Multi-Hazard Vulnerability Risk Assessments (MHVRA) across KP, identifying seismic risks at district and tehsil levels.
- PDMA KP has developed a Hazard Risk Profile Atlas that includes earthquake risk zones. Karak is classified as a Zone 2B (moderate risk).
- These assessments guide decisions on zoning, building approvals, and public infrastructure planning.

3.12.4.2. Policy and Regulation

- The Building Code of Pakistan – Seismic Provisions 2007 (BCP-2007) is enforced in public and institutional buildings, requiring compliance with earthquake-resistant design.
- The KP Land Use and Building Control Act 2021 empowers authorities to regulate construction based on seismic hazard zoning.
- Tehsil Municipal Administrations (TMAs) in KP are legally responsible for ensuring that private development complies with seismic safety standards.

3.12.4.3. Preparedness Planning

- District Disaster Management Plans (DDMPs) have been prepared by PDMA KP in collaboration with local governments, covering emergency evacuation, shelter management, and communications during earthquakes.
- Regular mock drills and simulations are conducted in public institutions in coordination with the Health and Education departments.
- Karak District has participated in such planning efforts through its local disaster management committees.

3.12.4.4. Insurance and Financial Planning

- Earthquake insurance coverage is still limited but promoted under State Bank of Pakistan's micro-insurance frameworks.
- Some donor-funded initiatives (e.g., through NDRMF) have supported pilot disaster risk financing for vulnerable communities in KP.

3.12.4.5. Stakeholder Collaboration

- After the 2005 earthquake, ERRA, NDMA, and various NGOs collaborated to develop earthquake-resistant designs now used in KP.
- PDMA KP works with organizations such as UNICEF, UNDP, and GIZ to improve infrastructure safety and institutional capacity.
- Universities in KP, including UET Peshawar, contribute through research, seismic vulnerability studies, and training of engineers and planners.

3.12.4.6. Recommendations

1. All buildings must follow PBC 2007 – Seismic Provisions, particularly Chapters 3–6.
2. Residential and public buildings must:
   - Use Reinforced Concrete (RC) frames with proper seismic detailing.
   - Include horizontal reinforcement bands at plinth, lintel, and roof levels.
   - Maintain minimum ductility and strength requirements (as per PBC Table 5.1 & 5.2).
3. Confined masonry is allowed for low-rise homes but must include:
   - RC tie-columns and ring beams (minimum 150 mm width).
   - Proper anchorage of roof slab with ring beams.
4. Max height for residential buildings in Karak city: Ground + 2 floors, unless engineered with special structural support.
5. Maintain minimum side setbacks of 3 ft and rear setbacks of 5 ft for ventilation, fire safety, and light.
6. Buildings in seismic zones must avoid torsional irregularities and asymmetrical layouts (PBC 2007, Clause 6.4.4).

3.12.5. Flood Resistant Plans

Floods are one of the most frequent and destructive hazards in Khyber Pakhtunkhwa (KP), with districts like Karak being particularly vulnerable to riverine and flash floods. A comprehensive flood resistance plan tailored to the region's needs can significantly reduce the impacts of future flood events.

3.12.5.1. Expansion and Maintenance of Urban Drainage:

In response to urban flooding, particularly in Karak city, the Tehsil Municipal Administration (TMA) Karak has undertaken projects to expand and maintain drainage channels. These efforts aim to manage increased stormwater runoff during heavy rainfall events.

3.12.5.2. Road Infrastructure Enhancements

3.12.5.2.1. Elevation of Flood-Prone Road Sections:

The Khyber Pakhtunkhwa Highways Authority (KPHA) has identified and elevated sections of roads in low-lying areas susceptible to flooding. This measure ensures uninterrupted connectivity during heavy rains.

3.12.5.2.2. Improved Culvert and Bridge Designs:

New culverts and small bridges are being constructed with enhanced capacity to allow for better water flow, reducing the risk of water accumulation and roadway damage.

3.12.5.3. Community-Level Water Management

3.12.5.3.1. Construction of Check Dams and Retention Basins:

In collaboration with local communities, small-scale check dams and water retention basins have been constructed in upstream areas to capture and slowly release rainwater, mitigating sudden downstream flooding.

3.12.5.4. Reforestation and Soil Conservation

3.12.5.4.1. Afforestation Initiatives on Hill Slopes:

The Forest Department, along with local NGOs, has initiated tree plantation drives on vulnerable hill slopes to reduce surface runoff and enhance soil absorption capacity, thereby decreasing flood risks.

3.12.5.4.2. Terracing and Contour Plowing:

Farmers are encouraged to adopt terracing and contour plowing techniques to prevent soil erosion and promote water infiltration, reducing the speed and volume of surface runoff.

3.12.5.5. Early Warning Systems and Community Preparedness

3.12.5.5.1. Installation of Rain Gauges and Alert Systems:

The Provincial Disaster Management Authority (PDMA) KP has installed rain gauges in strategic locations to monitor precipitation levels. Data from these instruments feed into an early warning system, enabling timely alerts to communities via SMS and local media.

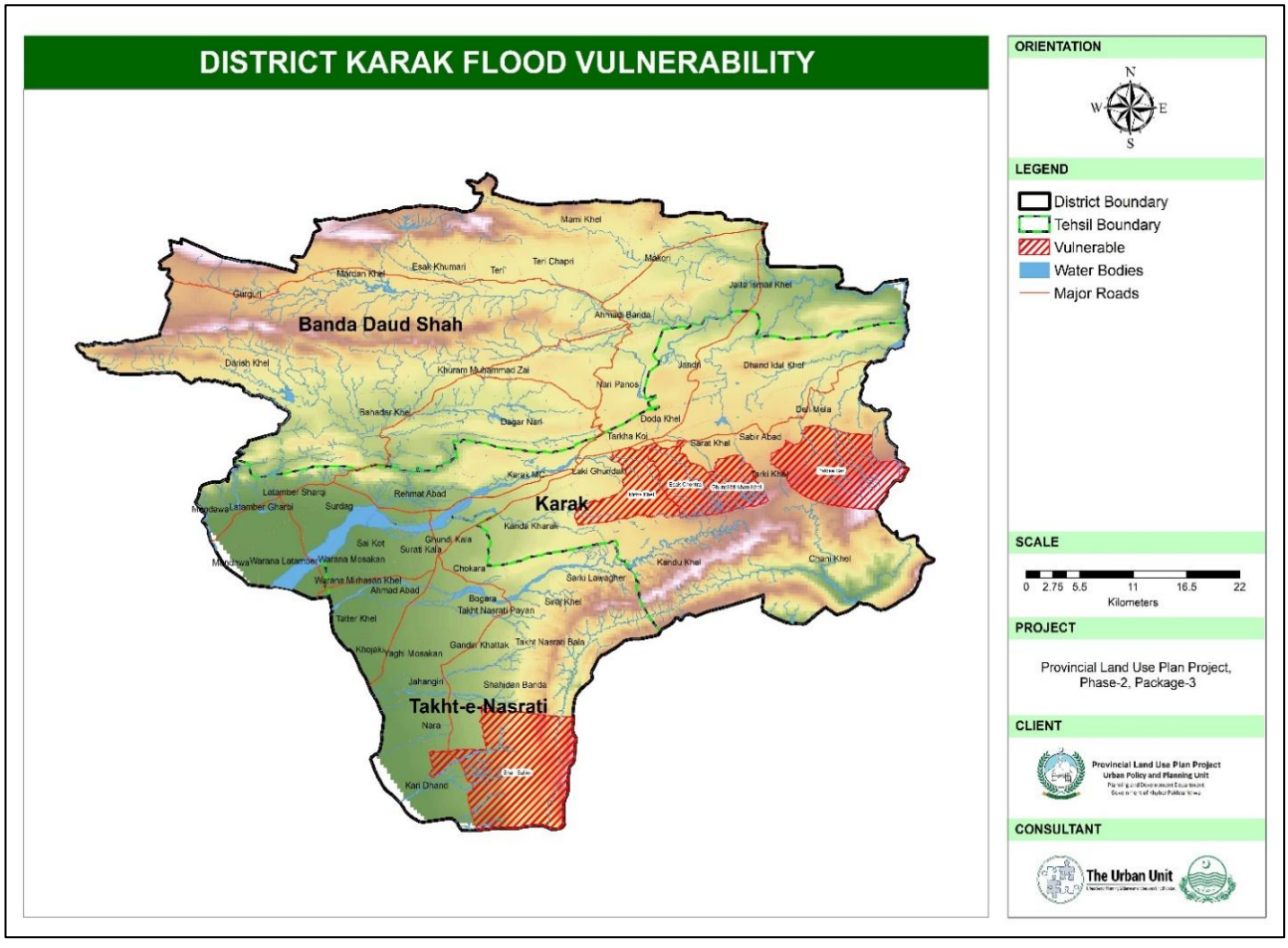
3.12.5.5.2. Community-Based Disaster Risk Management (CBDRM) Programs:

Local authorities, in partnership with NGOs, have conducted CBDRM training sessions, equipping community members with the knowledge and skills to respond effectively to flood warnings and emergencies.

3.12.5.6. Land Use and Zoning Practices

3.12.5.6.1. Floodplain Mapping and Construction Control:

KP's Urban Policy Unit and PDMA integrate floodplain maps into district land use planning to restrict development in hazard zones.



Map 3-44: Flood Vulnerability Map of District Karak

3.12.5.6.2. Relocation of At-Risk Settlements:

After major flood events (e.g., 2010), some informal settlements near riverbanks were relocated under provincial programs.

3.12.5.6.3. Use of Green Buffer Zones:

Areas adjacent to rivers are reserved for parks, agriculture, or natural drainage, not housing.

3.12.5.7. Nature-Based Mitigation

3.12.5.7.1. Reforestation and Riverbank Vegetation:

Tree plantation and bioengineering using vetiver grass are promoted to stabilize banks and reduce erosion.

3.12.5.7.2. Restoration of Natural Drainage Paths:

Blocked nullahs and seasonal streams are being cleared and desilted by local governments before monsoon season.

3.12.5.8. Community Preparedness

3.12.5.8.1. Evacuation Plans and Route Mapping:

District Disaster Management Units (DDMUs) prepare community-level evacuation routes and safe shelters in flood-prone Union Councils.

3.12.5.8.2. Household-Level Training:

Red Crescent and NGOs run training on how to prepare emergency kits and protect documents and valuables from flood damage.

3.12.5.9. Recommendations

1. Avoid development in:
   - Flood-prone areas, dry riverbeds, and steep slopes.
   - Areas with known history of subsidence or soil erosion.
2. Conduct site-specific soil investigations for all public or multistory buildings (as per PBC 2007, Chapter 4).
3. Use reinforced strip or raft foundations in low-rise structures and pile foundations for soft or weak soils.
4. Foundations in low-lying zones must be raised at least 2.5–3 ft above the highest known flood level.
5. Drainage outlets must be integrated with covered drains or culverts, particularly in Karak town.
6. Sump pits and soakage wells should be built in large buildings to manage stormwater.
7. Roofs must be designed with proper slope and water disposal spouts.

3.12.6. Landslide Resistant Plans

3.12.6.1. Excavation of Rock

3.12.6.1.1. Methods of Excavation

In Pakistan, rock excavation is primarily carried out using conventional and mechanized methods. The common practices include:

- **Drilling and Blasting:**

This is the most widely used technique, where explosives are placed in drilled holes to break rock. The fragmented rock is then removed by mechanical loaders or trucks.

- **Mechanical Excavation:**

Machines such as excavators, bulldozers, and road headers are employed for softer rock formations to reduce reliance on blasting.

- **Manual Excavation:**

In areas with limited access to heavy machinery, manual labor is used for small-scale projects, involving hand tools for breaking rock and removing debris.

- **Ground Support Installation:**

After excavation, rock bolting and mesh are installed to stabilize tunnel or shaft walls and prevent collapses.

3.12.6.2. Excavation Practices

- **Slope Height Reduction**:

  In KP, especially in highway and road construction by the C&W Department, cutting the slope height is used to reduce the weight and driving force of soil on unstable slopes. This technique is commonly employed on road sections through hilly or dissected terrain.

- **Benching of Slopes**:

  In road and irrigation projects, benching (terracing the slope into horizontal steps) is practiced reducing runoff speed and soil erosion. It's commonly used in rural areas of southern KP to stabilize road cuts and canal banks.

- **Controlled Excavation and Cutting**:

  The National Highway Authority (NHA) and KP Communication & Works (C&W) departments follow excavation protocols to minimize undercutting of steep slopes. Excavation is avoided in landslide-prone areas unless supported by slope studies.

- **Backfilling with Local Material**:

  In some areas, especially along rural roads and canals, lighter backfill materials such as gravel and sand are used in combination with proper compaction to reduce sliding forces.

3.12.6.3. Strengthening Slopes

In Pakistan, especially in regions like Karak and other parts of Khyber Pakhtunkhwa (KP), local slope stabilization practices include the following:

3.12.6.4. Gabion Retaining Walls:

Constructed using galvanized steel wire mesh boxes filled with locally sourced stone boulders. These are commonly used along roadways, riverbanks, and embankments. Gabions are particularly effective in flash flood-prone areas as they allow water to pass through while holding soil in place.

3.12.6.5. Dry Stone Pitching:

A traditional method where stones are manually arranged in sloped layers without mortar. Often used along irrigation channels and roadside embankments in KP, this technique stabilizes the surface and reduces erosion effectively.

3.12.6.6. Vegetative Turfing:

Native grasses such as Vetiver and Bermuda grass are planted on slopes to control erosion. Sometimes coir mats or jute netting are used to support early-stage growth. This method is cost-effective and supports biodiversity.

3.12.6.7. Terracing:

Terraces are flat steps created on slopes to control runoff and prevent erosion. This method is used in agriculture and slope stabilization across hilly areas of KP and is suitable for integration with farming.
These methods are low-cost, labor-intensive, and suitable for the socio-economic context of KP, making them practical for local governments and communities in Karak.

3.12.6.8. Drainage Techniques

In Khyber Pakhtunkhwa (KP), especially in districts like Karak, effective slope drainage is crucial for landslide and erosion control. Local practices focus on low-cost, practical techniques suitable for the regional terrain and community resources:

3.12.6.9. Surface Drainage Channels:

Open unlined or brick-lined channels are constructed along road embankments and hillsides to divert rainwater. These are commonly seen in Karak's rural areas and are maintained seasonally to prevent blockages.

3.12.6.10. Cross-Drainage Structures:

Culverts and causeways are installed across roads and streams to allow proper water flow. KP Highway and Irrigation Departments frequently use these in flood-prone or erosion-sensitive areas.

3.12.6.11. Earthen Berms and Contour Trenches:

These are built to intercept runoff on slopes, slowing water flow and increasing infiltration. NGOs and community development programs often implement these in agricultural and peri-urban settings.

3.12.6.12. Subsurface PVC Drainpipes:

Installed in areas with recurrent slope failures, these horizontal drains reduce groundwater pressure. Used selectively due to higher costs, often supported by donor-funded or provincial hazard mitigation programs.

These drainage strategies are context-appropriate and enhance slope stability, especially during monsoon seasons common to southern KP.

3.12.6.13. Rock Slope Stabilization/Mitigation Techniques

In Pakistan, rockfall and slope instability are addressed through cost-effective engineering practices adapted to local terrain and resource constraints, especially in hilly and semi-arid regions like Karak and Kohat. Common techniques include:

3.12.6.14. Wire Mesh and Netting:

Double-twisted galvanized wire mesh is draped over rocky slopes to contain loose rock. Used widely along highways in KP, including Karakoram Highway and Kohat Tunnel approaches.

3.12.6.15. Rock Bolting and Anchoring:

Steel anchors and bolts are installed into unstable rock faces to prevent detachment. Frequently used in infrastructure projects under the National Highway Authority (NHA) in northern KP and tribal areas.

3.12.6.16. Shotcrete Application:

Concrete sprayed over exposed rock surfaces provides stabilization and prevents weathering. Deployed in tunnel portals and vertical road cuts, particularly in government and donor-funded projects.

3.12.6.17. Catch Ditches and Stone Barriers:

Excavated ditches or stacked stone walls are placed at the base of rocky slopes to catch falling debris. Common in rural Karak and Kohat for basic protection where budgets are limited.

3.12.6.18. Bench Cutting:

Slopes are stepped or benched to reduce slope angle and limit rockfall velocity. Applied in new road construction or widening projects by KP Communication & Works Department.

These localized methods are implemented based on site-specific risk, geology, and resource availability, often involving local contractors and manual labor to ensure cost-effectiveness.

3.12.6.19. Recommendations

According to Pakistan Building Code 2007, following are the recommendations regarding land use mapping of Karak District;

1. Before deciding about placing a building on or adjacent to sloping ground in mountainous terrain, an examination of the hill slope stability conditions shall be made. The stability of sloping ground shall be evaluated and improvements if required shall be designed through an established analytical method. On or adjacent to a sloping ground, the location of all buildings shall meet the requirements shown on Figure 3.1, unless special slope stability measures are taken.
2. The site selection for an important engineered building on potentially liquefiable soils shall be preceded by evaluation of liquefaction potential of the sub-surface through detailed geotechnical

investigations and established analytical techniques. Necessary mitigation measures shall be taken to minimize the potential risk.

3. The selection of site for a building on such soils shall be made on the basis of the detailed geotechnical investigations and adopting necessary mitigating measures in the structure and/or bearing ground.

3.12.7. Heat Wave Resistant Plans

3.12.7.1. Heatwave Warnings and SMS Alerts:

During peak summer months (May–July), PDMA KP disseminates heatwave alerts via SMS in southern KP districts, including Karak, through coordination with District Administration and Health Departments.

3.12.7.2. Community Health Awareness Campaigns:

The District Health Office (DHO) Karak, in collaboration with Lady Health Workers (LHWs), conducts heatstroke awareness drives, especially in schools and rural communities. Posters, community meetings, and mosque announcements are used to spread preventive information.

3.12.7.3. Heat-Ready Public Health Facilities:

Karak's public hospitals and Basic Health Units (BHUs) have been directed by Health Department KP to ensure:

- **Availability of ORS (oral rehydration salts)**,
- **Emergency beds for heatstroke patients**, and
- **Backup electricity supply (generators or solar)** to run fans and coolers during outages.

3.12.7.4. Shaded Rest Areas for Workers:

During recent summers, temporary shade structures have been installed at bus terminals, bazaar entry points, and traffic police checkpoints to protect field workers and the public.

3.12.7.5. Water Access Measures

3.12.7.6. Public Water Points in Urban Karak:

During heatwaves, Tehsil Municipal Administration (TMA) Karak establishes temporary water distribution points, especially in crowded commercial areas like Railway Bazaar and Mandan Road.

3.12.7.7. Water Tanker Services to Peri-Urban Areas:

Tankers are dispatched to underserved neighborhoods experiencing water shortages, particularly in peri-urban union councils like Ghoriwala and Domel.

Heatwaves have become increasingly severe in KP, particularly in southern districts like Karak, Lakki Marwat, and Dera Ismail Khan. Rising temperatures, often exceeding 45°C, pose serious risks to health, infrastructure, and agriculture. A targeted heatwave resistance plan can help mitigate these impacts effectively.

3.12.7.8. Recommendations

1. Use reflective roof coatings, light-colored paint, and ventilated roofing systems to minimize indoor heat gain.
2. Encourage courtyard and passive ventilation designs in residential buildings.
3. Green buffers, tree-lined streets, and rooftop gardens should be included in urban master planning.

3.12.8. General Recommendations

1. Enforce KP Land Use & Building Control Act 2021 to:
2. Restrict construction in seismic and flood hazard zones.
3. Establish a District Land Use Committee for plan approval and monitoring.
4. Mandatory registration of architects and engineers involved in any structural design with PEC.
5. Create a Building Control Cell within Karak's TMA to review plans, inspect sites, and issue compliance certificates.

3.13. District Economy

Karak district, located in the southern part of Khyber Pakhtunkhwa, is a strategically positioned and economically diverse region. It boasts a resource-rich landscape, a strong agricultural foundation, and expanding industrial activities that together form the backbone of its economy. The district's key economic drivers include agriculture, petroleum, and mineral extraction, complemented by a growing services sector, trade hubs, small-scale industries, and government employment.

Agriculture is a basis of Karak's economy, contributing 22.7% to the region's GDP and employing 21.9% of the labor force in the district. Notably, 12.5% of working males and 57.9% of working females are engaged in agriculture in this district. With ongoing improvements in infrastructure, market access, and processing facilities, agricultural employment is expected to rise by 10–12% in the next five years. Livestock plays a vital role in Karak's economy, significantly contributing to rural livelihoods, food security, and economic resilience.

Petroleum and mining are key economic drivers in Karak, with oil fields like Nashpa, Makori, and Mardan Khel contributing significantly to revenue and jobs. The industrial sector employs 33% of the labor force, and employment in petroleum, mining, and industry is expected to grow by 10–15% over five years, supported by projects like the refinery in nearby Kohat. Mining of coal, gypsum, limestone, and rock salt is expanding, with the Salt and Gypsum City projected to create 25,000 jobs and establish Karak as a regional mineral processing hub. Urbanization is boosting the services sector, which employs 45% of the labor force, mainly in wholesale and retail trade. This sector's employment is projected to rise by 15–20% over five years, driven by increased demand for services, housing, education, and health facilities.

Trade and connectivity are central to Karak's economic advancement. The district's strategic location along the Indus Highway and integration into the China-Pakistan Economic Corridor (CPEC) offer significant trade advantages. Key commercial centers such as Porana Bazar and Haleem Market function as vital hubs for goods exchange. Roads like Karak–Bannu Road and Karak–Shakardara Road enhance regional connectivity, enabling efficient transport of agricultural and mineral products.

Regional employment in sectors like manufacturing, mining, and small industries is expected to grow by 8–12% over the next five years, driven by infrastructure and industrial expansion. Karak's high literacy rate and youthful population provide a strong foundation for workforce development. Technical education and vocational training, supported by the Khyber Pakhtunkhwa Board of Technical and Commerce Education Act, 2021, and the Technical Education and Vocational Training Authority Act, 2015, aim to equip youth with skills needed in mining, petroleum, agriculture, and manufacturing.

Government policies such as the KP Industrial Policy 2020–2030, the Small Industries Development Board Act, 1972, and the Investment Facilitation Agency Ordinance, 2002, promote investor confidence and industrial growth by offering tax incentives, subsidies, and streamlined regulations. Environmental and worker safety are ensured through the Boilers and Pressure Vessels Act, 2016, and the Khyber Pakhtunkhwa Power Crushers Act, 2020, supporting sustainable and responsible industrialization in the district. The details of key growth sectors of the districts given below:

3.13.1. Agriculture

Agriculture is the principal occupation in District Karak, where 92.18% of the population lives in rural areas. The district covers a total reported area of approximately 265,201 hectares, with around 75,642 hectares under cultivation as of 2021-22. The cultivated area has fluctuated over recent years, with "net sown" land decreasing by 20.21% to 25,632 hectares in 2021-22, while "current fallow" land increased by 7.79% to 50,010 hectares. Uncultivated areas, including barren land, forests, and mountainous terrain, cover about 189,560 hectares, with 5,712 hectares classified as forest (2.15% of total area).

Karak produces both Kharif and Rabi crops. Major Kharif crops include maize, jowar, and bajra, all of which have seen substantial declines in cultivated area and production from 2017-18 to 2021-22. For instance, maize area decreased by 71% (from 115 to 33 hectares) with production dropping 72% (from 123 to 34 tons). Similarly, jowar area fell by 43%, and bajra by 51%, with corresponding decreases in production. Rabi crops such as wheat, gram, barley, and rapeseed/mustard have also declined in area—wheat by 62% and gram by 70%. Production followed a similar trend, with wheat dropping 33% and gram 63%, though barley and rapeseed/mustard showed production increases of 18% and 75%, respectively.

Vegetable cultivation remains small but consistent, with Rabi season vegetable area increasing from 8 to 12 hectares but production decreasing from 20 to 8 tons between 2017-18 and 2021-22. Kharif season vegetable cultivation declined in both area (from 11 to 7 hectares) and production (from 38 to 21 tons) during the same period.

3.13.1.1. Strategies for Local Economic Resilience

To build economic resilience in Karak's agriculture, key strategies include improving market access and value chain development of potential crops to ensure better prices and reduce losses. Investing in irrigation, storage, and processing infrastructure boosts productivity and connects farmers to markets. Training in climate-smart practices helps farmers adapt and diversify. Access to affordable credit and insurance supports investment and risk management. Promoting mixed farming and strengthening cooperatives enhances income stability and market reach.

3.13.1.2. Constraints

Agriculture in Karak faces several structural challenges that hinder productivity. A major issue is the lack of education and technical knowledge among farmers, which limits their ability to adopt modern farming practices. Most are bound by traditional methods and lack access to quality inputs due to limited capital and mounting debts. Uneconomical landholding sizes—caused by generational land division—further reduce efficiency, as smallholders struggle to invest in seeds, fertilizers, or modern implements. Water scarcity is another critical concern, with much of the district experiencing inadequate irrigation that disrupts cropping patterns.

Other significant constraints include poor transportation infrastructure, which restricts farmers' access to markets, and a high incidence of pest and crop diseases due to limited awareness and preventive measures. Water wastage remains high as outdated flood irrigation methods dominate. In parts of the district, waterlogging and salinity affect soil health and crop productivity. These combined factors result in low per-acre yields for crops, fruits, and vegetables, weakening the overall agricultural output of the region.

3.13.1.3. Recommendations

To enhance agricultural productivity and address the prevailing constraints in the region, several key recommendations are proposed. First, regular workshops and training sessions should be organized to educate farmers on modern agricultural techniques, supported by agricultural extension services and model farms that demonstrate best practices. These initiatives will create jobs in extension services, training facilitation, and model farm operations. Financial support mechanisms such as microfinance, low-interest loan schemes, and subsidies on seeds, fertilizers, and equipment should be introduced to ease the burden on small farmers and help them manage existing debts. Promoting local agro-based businesses through easier access to credit and subsidies can stimulate rural entrepreneurship and job creation. Promoting the advantages of modern technology through community engagement and providing incentives like grants for adopting new tools can further encourage innovation in farming.

Addressing soil health is essential; therefore, programs should focus on mitigating waterlogging and salinity through improved drainage systems and soil treatments. Land consolidation through cooperatives or land pooling can create economically viable holdings, while ensuring small farmers have access to credit for essential inputs. Investment in irrigation infrastructure is also critical—modern systems like drip or sprinkler irrigation should be promoted for water conservation. Public-private partnerships (PPPs) can be leveraged to develop and manage irrigation systems, storage facilities, and rural infrastructure. Integrated pest management programs must be introduced to help farmers manage crop diseases and pest infestations with affordable solutions. Improving transportation infrastructure by building rural roads can facilitate better market access. This also supports the growth of local logistics and agribusiness services, contributing to rural employment. Lastly, improving crop yields through better seed varieties, fertilizers, and water-saving irrigation practices will support sustainable agricultural development. Encouraging value addition through agro-processing units and packaging facilities can further boost income, create rural employment opportunities, and strengthen local agribusiness ecosystems.

3.1.1 Livestock

The livestock sector is a key component of District Karak's rural economy, providing food, income, employment, and resilience against crop failure. It also offers significant export potential, particularly in the growing halal food market.

From 2006 to 2021, Karak saw a 35% overall growth in livestock. Cattle rose from 212,496 to 342,191, buffalo from 2,054 to 5,374, sheep from 33,546 to 100,347, and goats from 291,325 to 595,679. Camels increased from 2,901 to 3,102, horses from 60 to 278, and mules from 58 to 876. Poultry grew from 652,734 to 784,745.

However, the poultry sector's growth remains below the provincial average—KP's total poultry increased from 27.7 million to 41 million during the same period. In Karak, the lower growth may be due to inadequate veterinary services, disease outbreaks, economic constraints, and missing data from 46 undocumented poultry farms.

3.13.1.4. Constraints

The livestock sector in District Karak faces several critical constraints. The number of veterinary institutes has declined sharply from 158 in 2018–19 to just 78, resulting in fewer hospitals, dispensaries, and centers, which has weakened animal health service delivery. This has led to a low number of treated and protected animals, highlighting inefficiencies in veterinary care. Efficient water utilization strategies are lacking, with a need to develop water sources and adopt conservation practices. There is also inadequate identification and management of grazing lands and pastures, and a shortage of quality feed supply, both of which affect livestock productivity. Disease prevalence remains high among livestock due to insufficient vaccination coverage, poor veterinary services, and limited focus on disease surveillance, diagnosis, and control. Additionally, women play a vital but underrecognized role in livestock rearing, yet their contributions receive little institutional support. Lastly, the regulatory framework governing nutrition, breeding, disease management, and marketing remains weak and needs reform to promote sustainable livestock development.

3.13.1.5. Recommendations

To enhance the livestock sector and stimulate local economic growth in District Karak, increasing the number of veterinary institutes and mobile units will not only improve animal health services but also create new employment opportunities in veterinary care and allied services. Investments in veterinary training and infrastructure will generate skilled jobs while boosting service quality. To build economic resilience in Karak's livestock sector, key strategies include improving market access and developing the value chain for poultry and small ruminants to ensure better prices, reduce post-production losses, and enhance income opportunities for farmers. Promoting water conservation infrastructure and fodder production can support value addition and agribusinesses, including feed processing units and water-efficient livestock farming models. Encouraging local businesses through incentives to engage in livestock-based value chains—such as dairy processing, meat packaging, and organic feed production—will strengthen rural enterprise development. Recognizing and empowering women's role through tailored training and microenterprise support can expand income-generating activities. Importantly, updating the regulatory framework and offering incentives for sustainable practices will attract private investment. Public-private partnerships (PPPs) should be promoted to develop veterinary services, disease surveillance systems, and livestock markets, ensuring sustainable service delivery and innovation in the sector.

3.13.2. Mining and Mineral Resources

The district is "famed for its several natural resources including salt mines, gypsums, coals, and as well as for fuels such as Gas and oil." It specifically mentions the significance of gypsum industries, "particularly used in cement, plaster, paper production, paint, fuel and gas desulfurization, etc." This indicates strong potential for growth in extraction and initial processing of these minerals.

3.13.3. Industrial Development (SMEs and Economic Zones)

Karak's economic potential is driven by several expanding sectors including **SMEs in industrial development**, particularly through the establishment of the **Small Industrial Estate (SIE)** in Takht-e-Nasrati and the **Salt and Gypsum City Economic Zone (SGCK)** the latter expected to create around **25,000 jobs**. High-growth industries include the **poultry sector**, which benefits from limited land requirements,

availability of seed-based feed, strong local demand, and a favorable climate, as well as the **crush plants industry**, which leverages abundant local resources such as rock salt, limestone, gypsum, and silica clay to meet both local and regional construction material needs.

3.13.4. Trade and Services

Wholesale and retail trade sector accounts for 14.46% of the labor employment in the province.

3.13.5. Rural-Urban Linkages

- **Industrial Distribution:** The spatial distribution of industries across the tehsils of Karak, Banda Daud Shah, and Takht-e-Nasrati highlights how industrial activities are dispersed yet interconnected within the district. The concentration of gypsum industries along the Bannu-Kohat Road and the presence of crush plants and food processing units in Karak city and along the Indus Highway indicate the advantage of established transport linkages.
- **Agricultural-Industrial Connection:** The growth of poultry farms is directly linked to "insufficient agricultural land for livestock" and the availability of "seeds-based feed," indicating a connection between agricultural practices (even if limited land for traditional livestock) and industrial growth. Similarly, crush plants utilize "local raw materials productions like rock salt, limestone, gypsums, and silica clay," demonstrating how rural resource extraction feeds urban-oriented industries.
- **Labor Force Distribution:** The sectoral share of the rural and urban workforce shows that industry employs 33% of both rural and urban workers. Meanwhile, the services sector accounts for a significant 65.50% of urban employment, indicating that urban centers function as service hubs supporting the broader district, including industrial and rural economic activities.

3.13.6. Economic Resilience Strategies

Several forward-looking initiatives that contribute to economic resilience of district Karak are included:

- Diversification through Natural Resources: The emphasis on the abundant natural resources (gypsum, coal, oil, gas, salt) provides a strong base for long-term economic activity, mitigating over-reliance on a single sector. The development of the Salt and Gypsum City Karak Economic Zone specifically targets leveraging these resources for industrial growth.
- Development of Industrial Estates: The establishment of the Small Industrial Estate and the Salt and Gypsum City Karak Economic Zone are strategic efforts to create organized industrial hubs, fostering a conducive environment for industrial growth and stability.

3.13.7. Job Creation and Value Addition

- Direct Job Creation through Economic Zones: The Salt and Gypsum City Karak Economic Zone is explicitly projected to "generate about 25,000 jobs," providing a clear strategy for large-scale employment.
- Industrial Employment Contribution: Industrial employment already contributes significantly to the Labor force, engaging "33% of rural workers and 33.0% of urban workers."
- Value Addition in Agro-based Industries: Food processing units scattered across the district add value to agricultural produce, contributing to rural development and poverty alleviation. While specific expansion strategies are not outlined, the presence of these value-adding activities highlights their role in strengthening the local economy.

3.13.8. Public-Private Partnerships and Local Business Support

- Public-Private Partnership Framework: The Khyber Pakhtunkhwa Economic Zones Development and Management Company (KPEZDMC), which oversees the Salt and Gypsum City Karak Economic Zone, is described as a "non-profit organization… wholly owned by government of Khyber Pakhtunkhwa," with the aim to "develop and manage world-class industrial estates." This structure inherently represents a form of public-private collaboration for industrial development.
- Small Industries Development Board (SIDB) Support: The SIDB is identified as managing the Small Industrial Estate in Karak, aiming "to promote small-scale industries." SIDB also has a history of

setting up "training and manufacturing centers specializing in woodworking, automotive, carpet weaving, knitting, weaving, stitching, and leather goods," directly providing local business support through skill development and infrastructure.

4. PROPOSED LANDUSE ZONING

Land use planning is a cornerstone of sustainable urban development, guiding the spatial organization of land to accommodate diverse functions such as residential, commercial, institutional, industrial, recreational, and ecological uses. It establishes the groundwork for zoning regulations, ensuring that land is developed in a rational, efficient, and context-sensitive manner. Effective land use planning not only mitigates land-use conflicts by separating incompatible functions but also promotes optimal resource utilization, minimizes environmental degradation, enhances community well-being, and supports the integration of infrastructure, transportation systems, and economic activities.

Zoning is a pivotal regulatory tool in urban and regional planning, used to manage land development in a way that promotes orderly growth and protects public interests. Through the division of land into well-defined zones, each with specific regulations regarding use, intensity, and built form, zoning ensures that spatial development aligns with broader policy objectives such as public health and safety, environmental sustainability, economic efficiency, and social equity.

The proposed land use plan has been conceptualized to address the projected demographic and spatial growth trajectories over the next two decades. It aims to serve the evolving needs of both urban and rural populations while safeguarding ecologically fragile zones. The strategy adopts a balanced and inclusive spatial approach—facilitating urban expansion where necessary, while preserving vital rural and environmental assets—to ensure long-term sustainability and resilience.

The detailed proposed zoning structure for the district, including all urban centers, is given below.

4.3. Land Use Zoning in Urban Areas

The proposed zoning framework encompasses a broad spectrum of land use categories to accommodate anticipated spatial needs and promote balanced regional development. While zoning offers the legal and regulatory mechanism for implementation, land use planning delivers the strategic vision—integrating spatial, socio-economic, and environmental considerations into a cohesive framework. Together, they form the backbone of sound urban governance, ensuring that future growth is not only feasible, but also desirable in terms of livability, functionality, and resilience. These designated zones include Residential, Mixed Use, Commercial, Institutional including Educational, Health and Public Buildings/Amenities, Agricultural, Industrial and Recreational. This typology provides the institutional structure for integrated and controlled land development, enabling the district to evolve in a sustainable, inclusive, and economically dynamic manner. The methodology for each land use zone in urban areas is given below:

4.3.1. Residential

With the current estimated population living in proposed urban centers now available (section **1.5.8** of this report), the consultant analyzed household size trends from the earlier available census to propose a realistic household size for 2025 so as to obtain the approximate number of housing units available within the urban boundary. These housing units were then divided by the residential area within proposed urban boundary to get the current housing density.

Now for the plan period requirement, the additional population between 2025 and 2045 was divided by the proposed household size of 2045 to calculate the housing units needed to accommodate the additional population. The additional housing units required till 2045 were then divided by proposed housing density 2045 to get the area required for residential purposes. The housing density proposed for 2045 by the consultant was increased then that of 2025 with the objective to densify the urban growth and optimize land usage.

In the last step to ensure that the proposed residential area is equipped with adequate infrastructure and services, the consultant proposed same amount (100%) of land for utilities/amenities including but not only limited to basic level private education and health facilities, Mohalla level recreational spaces, water supply network, road infrastructure, community places such as religious buildings, libraries, sewerage and solid waste infrastructure etc. as estimated of the residential zone.

The allocation of residential zones across various urban centers of District Karak is based on criteria, including accessibility, land availability, existing land use, proximity to employment centers, and access to basic utilities, amenities, and public services. Each proposed zone has been identified through careful

analysis of urban growth trends, current development patterns, and future infrastructural expansion with maximum effort to preserve agricultural land wherever possible.

4.3.2. Mixed Use Zone

In proposing the mixed-use zone within the designated urban area, the consultant has identified the existing Established Built-up Area (EBA) for treating it as an existing mixed-use zone. This recommendation is grounded in an extensive analysis of global precedents, incorporating urban planning practices from both developed and developing countries.[62],[63]. The consultant has also examined the percentages of population distribution within mixed-use zones across various international contexts which is about **10-40%** of an area are living in the mixed-use zone, providing valuable insights into the functionality and efficiency of such zones in diverse urban settings.[64],[65].

Drawing from these international examples, the consultant has strategically adapted best practices to the specific characteristics of the project area. This adaptation process has been carried out with careful consideration of local policies, regulatory frameworks[66], and the unique needs of the community, ensuring compliance with established urban planning standards.

Additionally, the proposed population density for the mixed-use zone has been formulated in alignment with KP Urban Policy 2030 and also considered the percentages of living population in developed and developing countries, to maintain a balance between residential, commercial, and institutional uses. This approach adheres to both regional regulatory guidelines and international urban planning standards, aiming to create a sustainable, integrated, and well-balanced urban environment. Through this methodical and data-driven approach, the proposal seeks to foster a dynamic and efficient urban space that supports long-term growth, connectivity, and livability.

The allocation of mixed land use zones across District Karak is based on key criteria, including accessibility from major roads, an existing mixed use pattern in the vicinity and the availability of suitable land especially non-agricultural.

4.3.3. Commercial

In proposing the establishment of a commercial zone within both the existing and proposed urban areas, the consultant has conducted a thorough review of national standards, specifically the National Reference Manual of Planning and Infrastructure Standards. The analysis revealed that the existing commercial areas are currently adequate, with a surplus capacity that is expected to meet the demands up to the planning horizon of 2045. This conclusion is based on the standard of 1 acre commercial space per 1,000 people, as outlined in the referenced manual.

Subsequently, the consultant explored alternative strategies for future commercial development, examining the best international practices for proportional allocation of commercial areas. These practices involve scaling commercial zones in alignment with the existing commercial infrastructure, ensuring that future growth is both balanced and responsive to the evolving needs of the projected urban population. This approach considers long-term sustainability and efficiency, aligning commercial area expansion with population growth and demand patterns. By applying such internationally recognized strategies, the proposal aims to optimize the allocation of commercial space in a manner that ensures both accessibility and economic viability for the proposed urban areas.[67],[68]

Furthermore, the consultant has incorporated the provisions of the local policy framework, specifically the KP Urban Policy 2030, into the proposal. In line with this policy, a designated portion of the proposed commercial area has been allocated within the mixed-use zone to support integrated development that aligns with the broader urban planning objectives. The remaining portion of the proposed commercial area has been designated for flexible, need-based commercial development, allowing scattered commercial growth in response to emerging demand and localized requirements within the proposed residential zones.

---

[62] *Mixed-use Development: Theory and Practice in Amsterdam's Eastern Docklands*
[63] *https://dda.gov.in/dda-master-plan-delhi-2041*
[64] *Evaluating the challenges and impacts of mixed-use neighborhoods on urban planning: an empirical study of a megacity, Karachi, Pakistan*
[65] *Evaluative structure of perceived residential environment quality in high-density and mixed-use urban settings: An exploratory study on Taipei City*
[66] *KP Urban Policy 2030*
[67] Characterizing growth types and analyzing growth density distribution in response to urban growth patterns in peri-urban areas of Lianyungang City
[68] *Past—Present—Future: Urban Spatial Succession and Transition of Rail Transit Station Zones in Japan*

This approach ensures that commercial expansion is both adaptable and in harmony with the strategic goals outlined in the local urban policy, fostering a balanced and responsive urban environment. For urban centers where mix use zones have not been proposed, the Central Business Districts (CBD) are proposed allowing compact commercial growth in proximity to existing commercial and guided by key criteria such as accessibility from major roads, central positioning within the city and the availability of suitable land parcels.

4.3.4. Industrial

The proposed industrial zones have been developed based on insights derived from the Labor Force Survey (LFS) 2020 of Pakistan, which indicates that 9.81% of the district's workforce in Karak is currently engaged in industrial activities. Given the district's mineral-rich resources and its potential for future industrial expansion, the consultant has proposed an increase in industrial employment capacity. In alignment with this potential, the consultant proposes that up to 10% of the additional population by 2045 will be accommodated within the industrial sector.

To meet this anticipated demand, the consultant has recommended the allocation of 1 acre of land per 50 people for industrial activities as per the NRM[69]. This land allocation ratio is designed to ensure sufficient capacity for the growing industrial workforce, supporting both the district economic development and its ability to attract new population and businesses. This approach takes into account the district industrial growth potential, as well as the need to create a sustainable and thriving industrial environment that aligns with the region's long-term economic objectives.

The allocation of industrial zones across District Karak is guided by key criteria, including accessibility from major roads, proximity to existing industrial areas, and the availability of suitable land keeping in view the wind direction of district Karak.

4.3.5. Institutional Zone

The institutional zone is further sub divided into 3 zones, i.e. public buildings, health facilities and educational institutes, all the zones are discussed below in detail.

4.3.5.1. Health

After conducting a comprehensive analysis of future demand for healthcare facilities, the consultant has proposed the establishment of dedicated health zones, drawing on a range of international studies and precedents. These health zones will be strategically located adjacent to existing healthcare facilities[70],[71], ensuring that the proposed areas are well-positioned to accommodate large-scale healthcare infrastructure, including hospitals and extensive private healthcare facilities.

In addition, smaller-scale/basic healthcare facilities will be integrated into the proposed residential zones, utilizing available land to support local, community-based healthcare services. This approach ensures equitable access to healthcare services for the growing population while promoting a decentralized healthcare system that allows for both specialized and primary care within residential areas. By incorporating these provisions, the proposal aims to create a well-balanced healthcare infrastructure that meets both immediate and future healthcare needs in a sustainable and accessible manner.

The criteria for selecting a location for the health zone include accessibility from the road, proximity to existing health facilities, availability of suitable land parcels, adjacency to open or green spaces, and a nearby residential area.

4.3.5.2. Education

After thoroughly analyzing the future demand for educational facilities, the consultant has proposed the creation of a dedicated educational zone, informed by various international studies and precedents. This educational zone will be strategically located adjacent to existing educational institutions[72],[73] ensuring a seamless expansion of educational infrastructure that is specifically designed to accommodate higher-

[69] *Ministry of Housing and Works, Environment & Urban Affairs Division, Govt. of Pakistan, National Reference Manual on Planning and Infrastructure Standards, Section 5.3.1.2, Page 89. The Manual `recommends 50 industrial workers per acre.*
[70] *TOWARD THE HEALTHY CITY People, Places, and the Politics of Urban Planning by Jason Corburn*
[71] *Public Health Matters Zoning, Equity, and Public Health by Juliana Maantay, PhD, MUP*
[72] *School-Oriented Development: A New Paradigm for Neighborhood Planning by Carolyn Reid*
[73] *Ibrahim, B. (2020). AUB 2030 Masterplan: Educational Institutions as Urban Anchors*

level educational facilities, such as those offering post-matriculation programs, as well as large-scale private educational facilities.

Additionally, primary to matriculation-level educational facilities will be integrated within the proposed residential zones, utilizing additional specified land to ensure convenient access to schooling for the local population. This approach promotes the development of a comprehensive and decentralized educational system, which caters to the needs of all age groups and education levels, while fostering accessibility and equity in education for the growing urban community. By strategically placing these educational facilities, the proposal aims to support the region's long-term educational growth, providing a well-rounded infrastructure that aligns with both current and future needs.

The allocation of education zone is based on several key criteria: proximity to residential developments, adjacency to existing educational institutions or green/open spaces, accessibility to road networks, and availability of suitable land parcels.

4.3.5.3. Public Buildings

The designated public building zones, as stipulated by the National Reference Manual (NRM)[74], are strategically proposed in proximity to existing public infrastructure. This deliberate spatial arrangement aims to enhance accessibility and efficiency by clustering essential public services in areas with established demand and supporting infrastructure. By locating these zones near existing public buildings, the proposal seeks to optimize land use, minimize travel distances for users, and foster collaborations between various public services. This approach aligns with the principles of sustainable urban development, ensuring that key community amenities are well-integrated into the broader urban fabric while promoting equitable access for all residents.

The allocation of public buildings zone is based on several key criteria: adjacency to existing public buildings/institutions accessibility to road networks, and availability of suitable land parcels.

4.3.6. Recreational Zone

In proposing the recreational zones, the consultant has conducted an initial assessment of the current recreational land use, including parks, playgrounds, and sports complexes, through Geographic Information System (GIS) analysis. This data has been used to calculate the existing recreational area's percentage relative to the total land area. The consultant then compared this existing provision with the projected population for the plan period, ensuring that the future demand for recreational spaces is appropriately met.

By examining the discrepancy between the current recreational land use and the expected population increase, the consultant identified deficiencies in the existing recreational infrastructure, such as Parks, playgrounds or sports complexes to meet the needs of the growing community.

In response to these identified deficiencies, the consultant has proposed additional recreational facilities, both active and passive, in alignment with the recommended percentage ranges outlined by the National Reference Manual (NRM). This proposal not only addresses the recreational needs of the expanding population but also ensures that the distribution and types of facilities correspond to the specific demands and preferences of the area, contributing to a well-balanced and sustainable urban environment.

The allocation of recreational zones across various urban centers in District Karak is guided by several key criteria: accessibility for nearby residents, connectivity through road networks, availability of suitable land parcels, central or peripheral positioning.

4.3.7. Agriculture Zone

Urban and rural agricultural zones are essential components of sustainable development, each playing distinct yet complementary roles in food security, environmental sustainability, and economic stability. Urban agricultural zones, found in urban, suburban, and peri-urban areas, integrate farming into the city fabric, such as seen in places like Mexico City, where agriculture has adapted to urban pressures by utilizing city-generated waste and catering to recreational and tourism needs. These zones not only provide fresh produce but also contribute to green space preservation and waste recycling. In contrast, rural agricultural zones, with their expansive farmlands and natural resources, support large-scale crop and livestock production using both traditional and mechanized techniques. They sustain rural livelihoods,

[74] *Ministry of Housing and Works, Environment & Urban Affairs Division, Govt. of Pakistan, National Reference Manual on Planning and Infrastructure Standards, Table 10.2.*

protect local ecosystems, and supply food to both rural and urban populations. However, both types of zones face challenges—urban agriculture contends with space limitations and urban expansion, while rural zones are threatened by land degradation and unplanned development. To ensure their long-term viability, deliberate planning, infrastructure investment, climate-resilient practices, and biodiversity conservation are necessary, underscoring the importance of agricultural zones in building resilient, inclusive, and balanced communities.

In District Karak, a significant portion of the land is already covered by built-up areas reflecting the growing urbanization in the region. As pressure mounts to accommodate further expansion, there is a critical need to adopt a sustainable land use strategy that safeguards the district's valuable agricultural resources. The primary objective is to preserve existing agricultural land by redirecting development towards less other non-built-up areas such as vacant, barren and rangeland. Therefore, the proposed zoning plan emphasizes the prioritized use of barren land, rangeland, and other vacant parcels for future growth and infrastructure development. Agricultural land was only considered for development if no other alternatives are available or have been already utilized. This approach aims to balance urban expansion with the long-term sustainability of local food production, environmental conservation, and livelihoods, ensuring that development needs do not come at the cost of essential agricultural assets.

4.3.8. Urban Forestation Zone

Urban forestation refers to the strategic planning, management, and conservation of trees and green spaces within urban environments. This practice encompasses a variety of green elements, including street trees, parks, gardens, and green corridors, all contributing to the urban forest ecosystem. Urban forests play a crucial role in enhancing the quality of urban life by offering numerous environmental, social, and economic benefits. They improve air quality by filtering pollutants, mitigate urban heat islands through shade and evapotranspiration, and manage stormwater by intercepting rainfall, thereby reducing runoff and the risk of flooding. Additionally, these green spaces provide habitats for urban wildlife, promote biodiversity, and offer residents recreational areas that contribute to physical and mental well-being. The presence of trees and greenery in cities has been linked to reduced stress levels, lower rates of depression, and increased opportunities for community engagement. Economically, urban forests can enhance property values and reduce energy costs by providing natural cooling. As urban areas continue to expand, integrating and maintaining urban forests becomes essential for sustainable city development and resilience against climate change.

In District Karak, a spatial analysis of the digitized rangeland class of land use was utilized to identify suitable areas for urban forestation. This assessment aims to propose the optimal utilization of underused or degraded rangeland by converting it into urban forestation. By targeting dilated and unproductive portions of rangeland, the initiative seeks to enhance environmental sustainability, improve local microclimates, and contribute to the ecological balance within urban and peri-urban settings. The proposed urban forestation will not only restore degraded land but also support biodiversity, reduce soil erosion, and offer long-term benefits for the residents of District Karak.

4.4. Recommended Landuse Zoning Plan for Urban Areas

The proposed urban boundaries have been strategically divided into multiple zones, each designated for a specific land use purpose. These zones have been carefully delineated to ensure that future development within the urban area adhering to the planning regulations and guidelines established for each category. The zoning framework aims to promote orderly and sustainable growth while addressing the long-term needs of the city. This zoning approach also integrated key urban design principles, such as ensuring access to green spaces, facilitating economic activities, and providing essential public services in a way that promotes liveability, environmental sustainability, and long-term resilience. The rules and guidelines for each zone will help manage land use efficiently, fostering an urban environment that balances growth with the preservation of community values and public welfare.

In the zoning process, all existing built-up areas have been excluded from the proposed zones to prevent conflict with current land uses. The remaining available land has been systematically allocated to the most suitable zones, ensuring that the development needs of the population are met through the planning horizon of 2045. This allocation process took into consideration projected population growth, infrastructure requirements, and the demand for public amenities, providing a comprehensive framework for urban expansion.

4.4.1. Karak City Urban Center

Karak City, located within Karak Tehsil of District Karak, serves as the administrative and functional district headquarters. It plays a central role in the socio-economic development of the entire district by acting as the primary hub for the provision of essential services, infrastructure, and facilities. As the district headquarters, Karak City not only supports the local population but also extends its influence across neighboring tehsils, facilitating regional growth and enhancing economic activities.

Spanning approximately 2554 hectares, Karak City's strategic importance lies in its role as a center for governance, commerce, and service delivery. The city's capacity to host administrative functions, healthcare, education, and public utilities makes it an essential node in the district's urban planning framework. This centralization of services allows for efficient resource allocation and better coordination of development efforts within District Karak, reinforcing its position as a key driver of economic and social progress.

The city's pivotal role must be considered in regional connectivity and the need for sustained investment in infrastructure to accommodate future growth. As Karak City continues to develop, maintaining its balance between expanding urban functions and preserving essential land for future development is crucial for ensuring sustainable urbanization in the region.

The Karak city urban center is the administrative and economic core of Karak District, providing essential services to both the city and surrounding rural communities. It hosts key healthcare facilities, educational institutions from primary schools to universities, and central government offices, including the DC Complex and judicial facilities. The city plays a crucial role in commercial exchange, serving as a marketplace for the entire district's population.

Future development plans include two housing schemes to the East and Southwest, alongside educational institutions like Khushal Khan Khattak University and vocational colleges. Healthcare services are centralized, with a designated health zone supporting district-wide needs. The strategic location of government infrastructure underscores Karak's role as a key service hub. Given the concentration of services and the expected population growth, strategic urban planning is essential to ensure that infrastructure, housing, and public services evolve to meet future demands and foster regional development.

4.4.1.1. Proposed Landuse Zoning

The Karak urban area has been classified into several functional zones, including Residential, Mix Use, Commercial, Health, Light Manufacturing, Agriculture, Urban Forestation, Recreation and Public Buildings zones. Additionally, specialized areas have been set aside for essential services and amenities such as a weekly bazaar and fruit vegetable market. Each zone has been allocated a distinct role in supporting the overall urban infrastructure and community needs details for which are following:

- Residential Zone

As per the calculations carried out in **Table 3-10** of the report, **292** hectare of area is required to meet the requirements of Karak city by 2045. As discussed in **Section 4.1.1** of this report, 100% additional land has been added to the housing need so as to cater for the public amenities accompanied by populace. Below **Table** shows the residential zone area requirement.

Table 4-1: Proposed Residential Zone Area

Description	*Statistics (area in Hectares)*
Housing Requirement by Plan Period	10225
Proposed Housing Density	35
Additional Residential Area Required	292.14
Additional Area for Utilities (100%)	292.14
Total Residential Area Required	584.29
Proposed Residential Zone	**539.91**

- Mix Use Zone

The mix use zone proposed in Karak city comprises of three sub zones i.e. residential (50%) economic (40%), public amenities (10%) which have been carried out as per the KP Urban Policy 2030 guidelines. The calculation for proposed mix use zone has been given below in **Table**.

Table 4-2: Proposed Mix Use Zone Area

Description	Statistics (Area in Hectares
Percentage of population currently living in assumed mix use zone	22%
Proposed percentage of population to live in proposed mix use zone	30%
Current assumed mixed use zone density (pph)	121
Desired mixed use zone density (pph)	201
Additional population between 2025-2045	61350
People out of additional population between 2025-2045 to be accommodated by mixed use zone (30%)	18405
Area required for mixed use zone (hectares)	91.6
Proposed Mixed Use Zone	**90.6**

The 90.6 hectares of area required for the mixed use zone has then been divided into the ratio as mentioned above i.e. with **45.3** hectares designated for residential (50%), **36.24** for economic activities (whereas 40%) **9** hectares (10%) for public amenities.

- Commercial Zone

The consultant has not proposed any specified commercial zone as the major portion of the commerce has already been zoned in the mix use. Apart from this, Fruit & Vegetable market and a weekly bazar has been proposed. The commercial zone break up has been given in the **Table** below.

Table 4-3: Proposed Commercial Zone Area

Population 2025	Current Commercial Area (hectares)	Projected Population 2045	Projected Commercial Area Requirement (hectares)	Additional Area Required (hectares)	Mix Use Commercial	Fruit & Veg Market	Weekly Bazar
70055	45	131405	84.41	39.41	36.24	1.45	1.1

- Industrial Zone

According to Labor Force Survey of Pakistan 2020, **9.81%** of the population in district Karak is linked with industries. Keeping the baseline in mind, the consultant has proposed **10%** industrial employment in the coming 20 years. Although the district has industrial potential with mineral resources available, the consultant has proposed a light manufacturing zone along with an already small industrial estate of approximately **13** hectares on the main Indus Highway to the South of the urban boundary. This has been done so as to keep the industrial land occupation as realistic as possible. The proposed industrial zone has been aligned with the observed range of landuse proportions at city/town level[75]. Details of industrial area requirement for plan period are given in the **Table** below.

Table 4-4: Proposed Industrial Zone Area

Population 2045	10% Participation Rate	50 persons/acre	Area required in Hectare	Proposed Zone Area (Ha)
131405	13141	262.81	106.4	39.38

- Institutional Zone

Public buildings, education institutes and health facilities have been combined to form an institutional zone. 6.6 hectare have been proposed in a separate public building zone. Education and Health zones of 27.46 and 5.53 hectares respectively have been proposed. Combinedly, the institutional zone details have been given below in the **Table**.

[75] *Ministry of Housing and Works, Environment & Urban Affairs Division, Govt. of Pakistan, National Reference Manual on Planning and Infrastructure Standards, Table 10.2*

Table 4-5: Proposed Institutional Zone Area

Public Buildings	Education	Health	Proposed Zone Area (Ha)
6.6	27.46	5.53	39.59

- Recreation Zone

For the recreation zone, the consultant proposed several parks and playgrounds covering both active and passive recreation throughout the residential zones so as to avoid congestion and locality wise access to green spaces. Details of the proposed recreational zone break up are provided below in **Table**.

Table 4-6: Proposed Recreation Zone Area

Public Parks	Playgrounds	Sports Complex	Total Proposed Area (hectares)
19.57	20.7	0.37	40.64

- Urban Forestation Zone

Urban forestation was proposed in all those existing rangeland areas where the ground was not level and there was less chance to reclaim it for agriculture purposes. This was done to increase the green cover along with enhancing the air quality of the urban area. Apart from urban forestation, throughout the length of the water bodies in the proposed urban boundary were separated from the nearest landuse by riparian plantation. In the urban forestation zone, indigenous plantation is proposed as discussed in environment chapter of the report. Below **Table** provides the details.

Table 4-7: Proposed Urban Forestation Zone Area

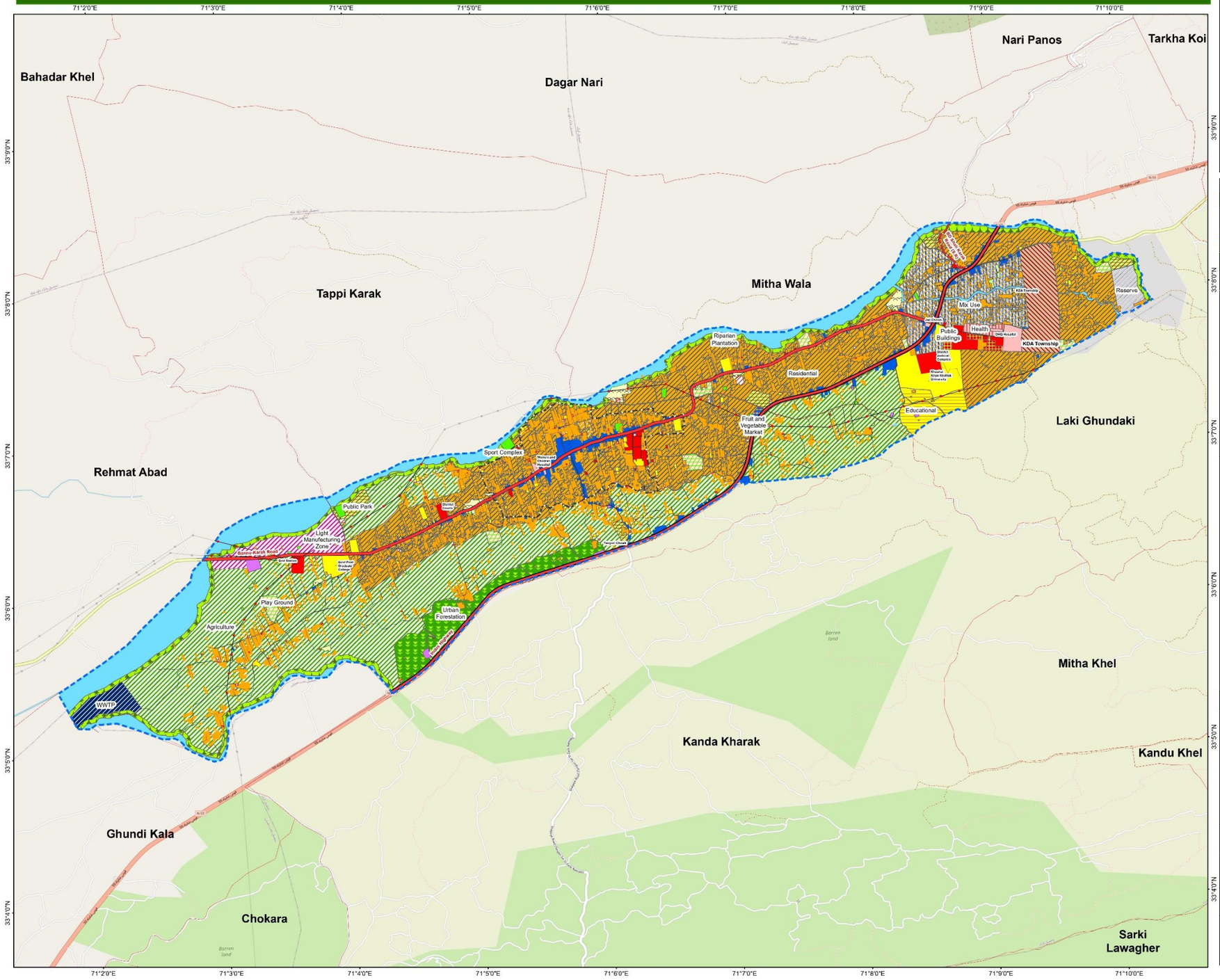
Urban Forestation	Riparian Plantation	Total Area (hectares)
71.82	103.57	175.39

The summarized landuse statistics of both existing and proposed have been combined and compared with the observed landuse percentages out of the total proposed urban area provided in the National Reference Manual of Govt of Pakistan and presented below in **Table** accompanied by a **Map** visualizing the proposed zones.

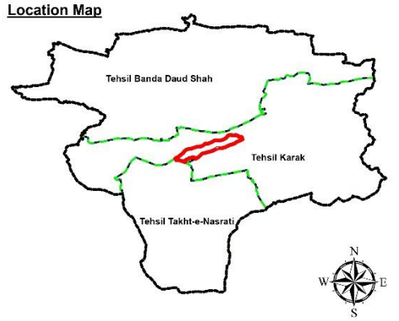
Table 4-8: Karak City Urban Center Proposed Zones Master Table

Landuse Class	Existing	Area (hectares)	Proposed	Area (hectares)	Sum of existing and proposed	Landuse Percentages	NRM Percentages
Residential	Residential	343.37	Residential	539.91	883.28	**36%**	**24 - 50%**
	Residential and Commercial (Mixed Use)	3.43	Mix Use (Residential)	45.28	48.71		
	Total	**346.80**	**Total**	**585.19**	**931.99**		
Commercial	Commercial	45.19	Fruit and Vegetable Market	1.45	**83.97**	**3%**	**0.5 - 5%**
			Mix Use (Commercial)	36.22			
			Weekly Bazar	1.09			
	Total	**45.19**	**Total**	**38.77**			
Institutional	Education	60.57	Educational	27.50	**144.45**	**6%**	**2-21%**
	Health Facility	9.02	Health	5.54			
	Public Buildings and Civic Amenities	28.67	Public Buildings	6.64			
	Religious Building	6.50					
	Total	**104.76**	**Total**	**39.68**			
Industrial	Scattered Industry	4.26	Light Manufacturing Zone	39.56	**43.82**	**2%**	**2-20%**
	Total	**4.26**	**Total**	**39.56**			
Recreational/ Open Space	Playgrounds/Parks/Open Spaces	10.78	Playground	20.70	**51.41**	**2%**	**0.5-7 %**
			Public Park	19.57			
			Sport Complex	0.37			
	Total	**10.78**	**Total**	**40.64**			
Arterial Circulation/Terminals	Transportation	100.62	-	-	**100.62**	**4%**	**2-29%**
	Total	**100.62**					
Other Uses	Agriculture	760.66	Agriculture	716.66	**1196.06**	**47%**	**-**
	Barren Land	82.56	Mix Use (Public Amenities)	9.06			
	Graveyard	13.87	Urban Forestation	71.82			
	Orchards	0.92	Reserve	15.97			
	Range Land	670.76	Riparian Plantation	103.57			
	Vacant Area	166.78	WWTP	20.13			
	Water Bodies	246.27					
	Total	**1941.83**	**Total**	**934.99**			
	Grand Total	**2554**	**Grand Total**	**1681**	**2554**	**100%**	

KARAK CITY PROPOSED URBAN ZONES



Location Map



Legend

Administrative & Planning Boundaries

- EBA Urban Areas
- NC/VC Boundary
- Karak Proposed Urban Boundary

Landuse Classes

Existing Landuse

- Approved Housing Scheme
- Unapproved Housing Scheme
- Commercial
- Education
- Health Facility
- Public Buildings and Civic Amenities
- Residential
- Residential and Commercial (Mixed Use)
- Orchards
- Parks
- Religious Building
- Graveyard
- Scattered Industry
- Transportation
- Water Bodies

Proposed Landuse

Commercial
- Fruit and Vegetable Market
- Mix Use
- Weekly Bazar

Recreational
- Play Ground
- Public Park
- Sport Complex

Institutional
- Educational
- Health
- Public Buildings

Others
- Agriculture
- Light Manufacturing Zone
- Reserve
- Residential
- Riparian Plantation
- Urban Forestation
- WWTP

Transportation Network

- Motorway
- Expressway/Highway
- Primary Road
- Secondary Road
- Local Road

Scale: 1:20,000

Scale: 0 0.5 1 2 Kilometers

District Karak

Consultant: The Urban Unit

Client: Provincial Land Use Plan, Urban Policy & Planning Unit.P & DD. Government of KP

Map 4-1: Karak City Urban Center Proposed Zoning

4.4.2. Latambar Urban Center

Latambar strategically positioned within Tehsil Karak, is recognized as a vital rural growth center, integral to the overall spatial and socio-economic development of the tehsil. Covering an expansive 520 hectares, it serves as a focal point for the delivery of key services, infrastructure, and amenities, bridging the gap between urban and rural populations. As a designated growth center, Latambar development is central to the balanced distribution of resources, promoting equitable access to education, healthcare, utilities, and transport services across the tehsil.

According to development forecasts, Latambar will accommodate up to 4% of the total tehsil population by the end of the plan period underscoring its capacity to manage urban expansion and rural service delivery. This will anticipate future infrastructure demands, including housing, public utilities, and social services, while safeguarding environmental sustainability. The strategic vision for Latambar is to enhance its function as urban center by improving connectivity, fostering local economic opportunities, and promoting sustainable land use, thereby strengthening its role as a key driver of regional development within Tehsil Karak.

In terms of healthcare, Latambar is equipped with a Category D hospital located within the urban area. This medical facility provides essential healthcare services to the residents, ensuring access to quality medical care and contributing to the overall health and well-being of the community.

The commercial hub surrounding Warana Chowk is a key focal point for the local economy. This area provides residents with access to essential goods and services, including food, groceries, wheat, and meals. The presence of this commercial center ensures that the daily needs of the community are met, fostering economic activity and enhancing the quality of life for local inhabitants.

Careful consideration to balance growth pressures with the need to preserve agricultural and rural land, ensuring that Latambar evolves into a resilient, well-integrated community that meets the long-term needs of its population while contributing meaningfully to the broader development goals of the tehsil.

4.4.2.1. Proposed Landuse Zoning

Latambar urban area has been classified into several functional zones, including Residential, CBD, Health, Light Manufacturing, Agriculture, Recreation and Public Buildings zones. Additionally, specialized areas have been set aside for essential services and amenities such as a weekly bazaar and fruit vegetable market. Each zone has been allocated a distinct role in supporting the overall urban infrastructure and community needs details for which are following:

- **Residential**

As per the calculations carried out in **Table 3-10** of the report, **65.5** hectares of area is required to meet the requirements of Latambar urban center by 2045. As discussed in **Section 4.1.1** of this report, 100% additional land has been added to the housing need so as to cater for the public amenities accompanied by populace. Below **Table** shows the residential zone area requirement.

Table 4-9: Proposed Residential Zone Area

Description	*Statistics (area in Hectares)*
Housing Requirement by Plan Period	1310
Proposed Housing Density	20
Additional Residential Area Required	65.5
Additional Area for Utilities (100%)	65.5
Total Residential Area Required	131
Proposed Residential Zone	**131.05**

- **Commercial**

The commercial needs of the population have been addressed by proposing a central business district along with a separate fruit vegetable market and a weekly bazar have been proposed. Below **Table** shows the details of area.

Table 4-10: Proposed Commercial Zone Areas

Population 2025	Current Commercial Area (hectares)	Projected Population 2045	Projected Commercial Area Requirement (hectares)	Additional Area Required (hectares)	CBD	Fruit & Veg Market	Weekly Bazar
13474	4.86	22602	8.15	3.29	2.44	1.40	2

- Industrial

According to Labor Force Survey of Pakistan 2020, **9.81%** of the population in district Karak is linked with industries. Keeping the baseline in mind, the consultant has proposed **10%** industrial employment in the coming 20 years due to the mineral resources and industrial potential of the district. Details of industrial area requirement for plan period are given in the **Table** below.

Table 4-11: Proposed Industrial Zone Area

Population 2045	10% Participation Rate	50 persons/acre	Area required in Hectare	Proposed Zone Area (Ha)
22602	2260	45.2	18.3	15.32

- Institutional

Public buildings, education institutes and health facilities have been combined to form an institutional zone. Below **Table** gives us the details of area proposed for each individual sub zone.

Table 4-12: Proposed Institutional Zone Area

Public Buildings	Education	Health	Proposed Zone Area (Ha)
2.64	1.87	1.30	5.82

- Recreational

For the recreation zone, the consultant proposed several parks and playgrounds covering both active and passive recreation throughout the residential zones so as to avoid congestion and locality wise access to green spaces. Details of the proposed recreational zone break up is provided below in **Table**.

Table 4-13: Proposed Recreational Zone Area

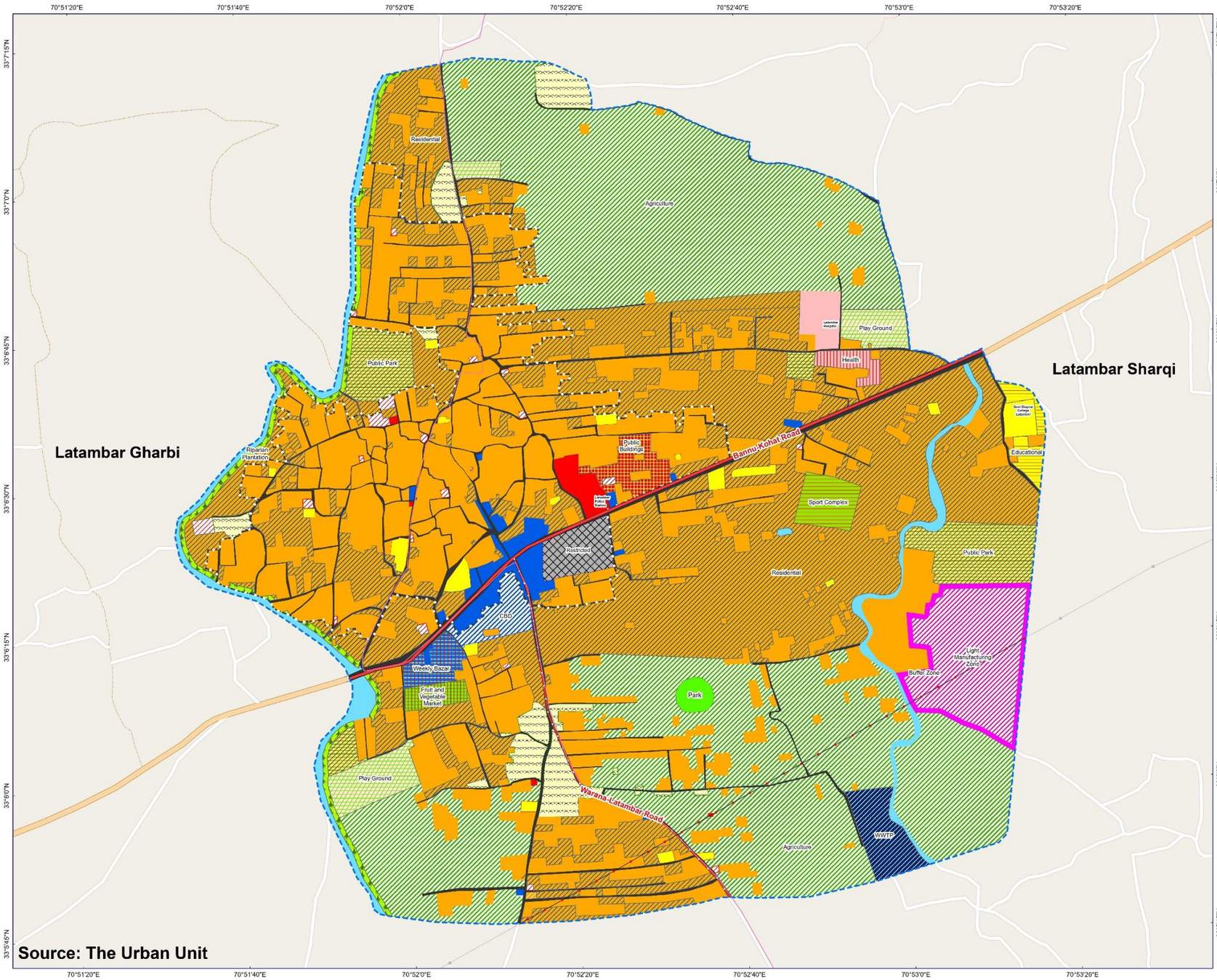
Public Parks	Playgrounds	Sports Complex	Total Proposed Area (hectares)
12.23	6.69	2.75	21.68

The summarized landuse statistics of both existing and proposed have been combined and compared with the observed landuse percentages out of the total proposed urban area provided in the National Reference Manual of Govt of Pakistan and presented below in **Table**. The master tabulated data below is then accompanied by a Map visualizing the zones.

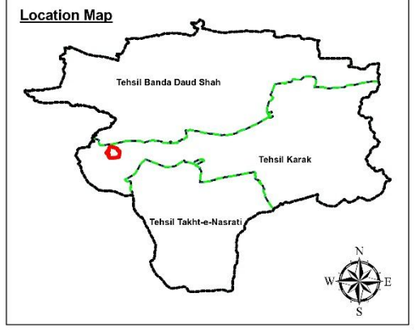
Table 4-14: Latambar Urban Center Proposed Zones Master Table

Landuse Class	Existing	Area (hectares)	Proposed	Area (hectares)	Sum of Existing & Proposed	Landuse Percentages	NRM Percentages for Reference
Residential	Residential	128.86	Residential	131.05	259.91	**50%**	**24 - 50%**
	Residential and Commercial (Mixed Use)	0.07			0.07		
	Total	**128.94**	**Total**	**131.05**	**259.99**		
Commercial	Commercial	4.90	Fruit and Vegetable Market	1.40	**10.75**	**2%**	**0.5 - 5%**
			CBD	2.44			
			Weekly Bazar	2.01			
	Total	**4.90**	**Total**	**5.85**			
Institutional	Education	4.24	Educational	1.87	**15.49**	**3%**	**2-21%**
	Health Facility	2.05	Health	1.30			
	Public Buildings and Civic Amenities	1.86	Public Buildings	2.64			
	Religious Building	1.52					
	Total	**9.67**	**Total**	**5.82**			
Industrial	-	-	Light Manufacturing Zone	12.69	**15.33**	**3%**	**2-20%**
			Buffer zone	2.64			
			Total	**15.33**			
Recreational/ Open Space	Playgrounds/Parks/Open Spaces	1.05	Playgrounds	6.69	**22.72**	**4%**	**0.5-7 %**
			Public Park	12.23			
			Sport Complex	2.76			
	Total	**1.05**	**Total**	**21.68**			
Arterial Circulation/Terminals	Transportation	22.02			**22.02**	**4%**	**2-29%**
	Total	**22.02**	**Total**	**22.02**			
Other Uses	Agriculture	132.73	Agriculture	141.98	**173.95**	**33%**	-
	Barren Land	92.85	Riparian Plantation	4.69			
	Graveyard	9.59	WWTP	3.84			
	Range Land	26.64					
	Vacant Area	77.84					
	Restricted	3.14					
	Water Bodies	10.72					
	Total	**353.51**	**Total**	**150.51**			
	Grand Total	**520**	**Grand Total**	**330**	**520**	**100%**	

LATAMBAR PROPOSED URBAN ZONES



Location Map



Legend

Administrative & Planning Boundaries

- Proposed Urban Boundary
- EBA Urban Area
- NC/VC Boundary

Landuse Classes

Existing Landuse

- Commercial
- Education
- Graveyard
- Health Facility
- Residential
- Mixed Use
- Public Buildings and Civic Amenities
- Religious Building
- Parks
- Scattered Industry
- Transportation
- Restricted
- Water Bodies

Proposed Landuse

Commercial
- CBD
- Fruit and Vegetable Market
- Weekly Bazar

Recreational
- Play Ground
- Public Park
- Sport Complex

Institutional
- Educational
- Health
- Public Buildings

Others
- Agriculture
- Light Manufacturing Zone
- Buffer Zone
- Residential
- Riparian Plantation
- WWTP

Transportation Network

- Motorway
- Expressway/Highway
- Primary Road
- Secondary Road
- Local Road

Scale: 1:6,000

Scale: 0 0.15 0.3 0.6 Kilometers

District Karak

Consultant: The Urban Unit

Client: Provincial Land Use Plan, Urban Policy & Planning Unit,P & DD, Government of KP

Map 4-2: Latambar Urban Center Proposed Zoning

4.4.3. Sabir Abad Urban Center

Sabir Abad, an emerging growth center within Tehsil Karak, spans approximately 182 acres of land and currently accommodates a population of around 5000 residents. This urban area is strategically positioned to meet the growing demands of its community through a well-developed infrastructure that supports education, healthcare, sports, and commerce.

Sabir Abad acts as a service hub facilitating the delivery of essential infrastructure and services, not only to its immediate population but also extending to the wider rural catchment of eastern side of the district. The settlement is strategically positioned to absorb a portion of the projected population growth which according to development forecasts will accommodate up to 2% of the total tehsil population by the end of the plan period. This capacity underscores Sabir Abad role in the balanced rural-urban integration and sustainable development of the region.

The area contribution to the tehsil is multifaceted from providing access to basic amenities to serving as a node in the provision of public services thus ensuring equitable resource distribution in line with broader regional planning objectives. Its designation as a growth center aligns with long-term land use planning strategies aimed at managing urban expansion and supporting rural economic vitality.

The Government Girls Degree College Sabir Abad, located in the northern part of the proposed urban boundary, plays a pivotal role in addressing the educational needs of the surrounding areas. This institution provides quality higher education to female students and contributes to the region's academic development. Additionally, a Boys and Girls High School, situated centrally-west within the urban area, further complements the educational facilities, meeting the needs of secondary-level students and ensuring comprehensive access to education for the local population. Sabir Abad is also well-equipped to meet the healthcare needs of its residents. A Category D hospital located on the Northern border of the proposed boundary works together to provide essential health services. These medical facilities ensure that residents have access to primary healthcare and emergency services, enhancing the overall well-being of the community.

The southwest part of Sabir Abad is home to a burgeoning commercial zone, with about 1 kilometer of commercial activity along Parishan Khattak Road. This area hosts a variety of businesses and local markets, providing residents with easy access to essential goods and services. The commercial activities play an important role in supporting the economic vitality of Sabir Abad, contributing to its growth and development.

In conclusion, Sabir Abad is rapidly evolving into a well-rounded urban center, offering essential services in education, healthcare, recreation, and commerce. Its strategic location and infrastructure make it a vital area within Tehsil Karak, providing a sustainable and thriving environment for its residents.

4.4.3.1. Proposed Landuse Zoning

Sabir Abad urban area has been classified into several functional zones, including Residential, CBD, Health, Light Manufacturing, Agriculture, Recreation, Public Buildings and Urban Forestation zones. Additionally, specialized areas have been set aside for essential services and amenities such as a weekly bazaar and fruit vegetable market. Each zone has been allocated a distinct role in supporting the overall urban infrastructure and community needs details for which are following:

- **Residential**

As per the calculations carried out in **Table 3-10** of the report, **19.5** hectares of area is required to meet the requirements of Sabir Abad urban area by 2045. As discussed in **Section 4.1.1** of this report, 100% additional land has been added to the housing need so as to cater for the public amenities accompanied by populace. Below **Table** shows the residential zone area requirement.

Table 4-15: Proposed Residential Zone Area

Description	*Statistics (area in Hectares)*
Housing Requirement by Plan Period	390
Proposed Housing Density	20
Additional Residential Area Required	19.5
Additional Area for Utilities (100%)	19.5
Total Residential Area Required	39

Proposed Residential Zone	38.98

- **Commercial**

The commercial needs of the population have been addressed by proposing a central business district while a separate fruit vegetable market and a weekly bazar have been proposed. Below **Table** shows the details of area.

Table 4-16: Proposed Commercial Zone Area

Population 2025	Current Commercial Area (hectares)	Projected Population 2045	Projected Commercial Area Requirement (hectares)	Additional Area Required (hectares)	CBD	Fruit & Veg Market	Weekly Bazar
4525	5.28	7105	8.29	3.01	1.04	0.5	0.46

- **Industrial**

According to Labor Force Survey of Pakistan 2020, **9.81%** of the population in district Karak is linked with industries. Keeping the baseline in mind, the consultant has proposed **10%** industrial employment in the coming 20 years due to the mineral resources and industrial potential of the district. Details of industrial area requirement for plan period are given in the **Table** below.

Table 4-17: Proposed Industrial Zone Area

Population 2045	10% Participation Rate	50 persons/acre	Area required in Hectare	Proposed Zone (Ha)
7105	711	14.21	5.75	5.64

- **Institutional**

Public buildings, education institutes and health facilities have been combined to form an institutional zone. Below **Table** gives us the details of area proposed for each individual sub zone.

Table 4-18: Proposed Institutional Zone Area

Public Buildings	Education	Health	Proposed Zone Area (Ha)
2.59	0.84	1.42	4.85

- **Recreation**

For the recreation zone, the consultant proposed several parks and playgrounds covering both active and passive recreation throughout the residential zones so as to avoid congestion and locality wise access to green spaces. Details of the proposed recreational zone break up is provided below in **Table**.

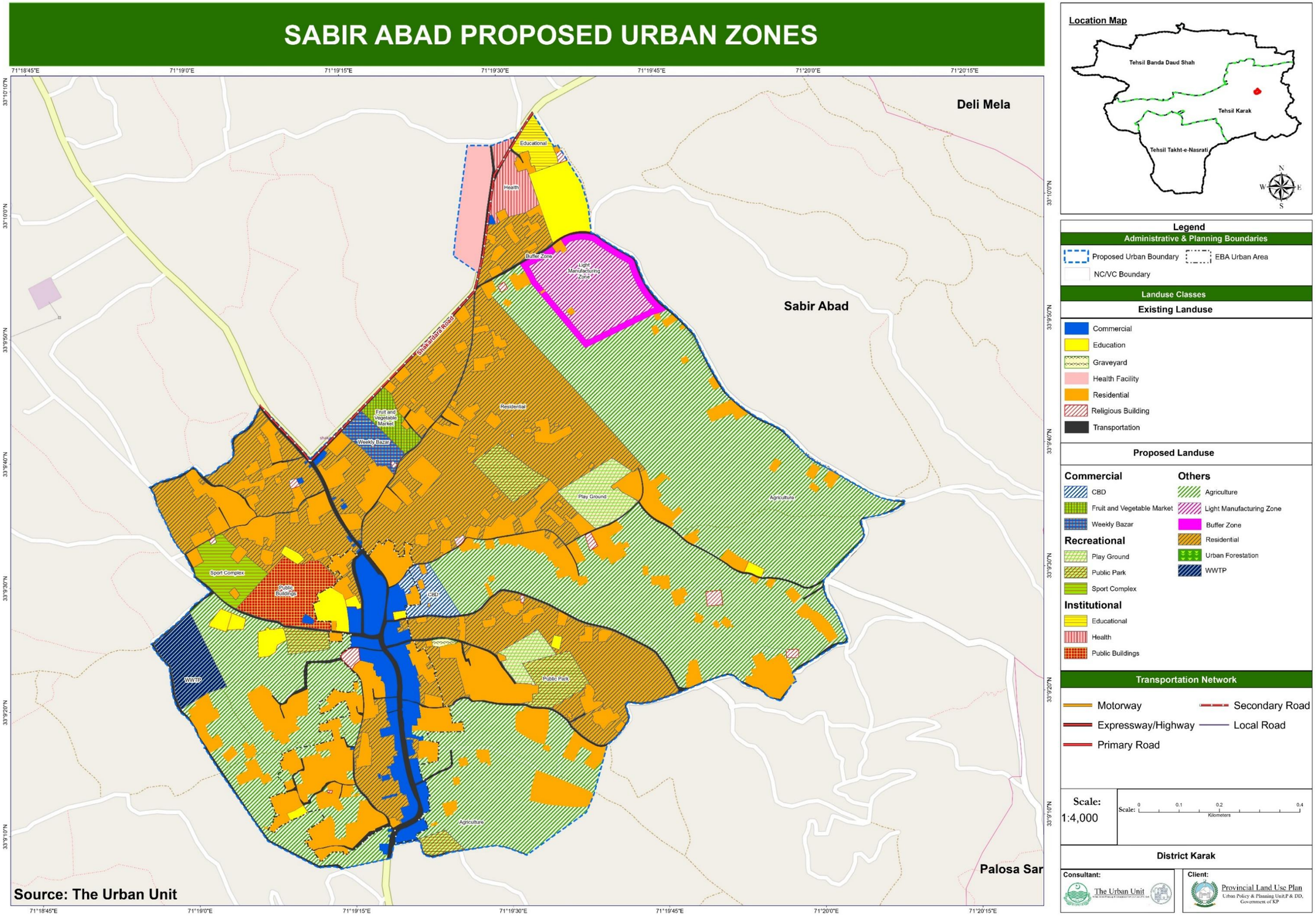
Table 4-19: Proposed Recreation Zone Area

Public Parks	Playgrounds	Sports Complex	Total Proposed Area (Ha)
3.73	2.74	1.73	8.2

The summarized landuse statistics of both existing and proposed have been combined and compared with the observed landuse percentages out of the total proposed urban area provided in the National Reference Manual of Govt of Pakistan and presented below in **Table** accompanied by a **Map** visualizing the zones.

Table 4-20: Sabir Abad Urban Area Zoning Master Table

Landuse Class	Existing	Area (hectares)	Proposed	Area (hectares)	Sum of Existing & Proposed	Landuse Percentages	NRM Percentages for Reference
Residential	Residential	32.26	Residential	38.98	**71.24**	**39%**	**24 - 50%**
	Total	**32.26**	**Total**	**38.98**			
Commercial	Commercial	5.18	Fruit and Vegetable Market	0.98	**8.21**	**4.5%**	**0.5 - 5%**
			CBD	1.04			
			Weekly Bazar	1.01			
	Total	**5.18**	**Total**	**3.03**			
Institutional	Education	3.89	Educational	0.84	**11.50**	**6%**	**2-21%**
	Health Facility	2.08	Health	1.42			
	Religious Building	0.68	Public Buildings	2.59			
	Total	**6.64**	**Total**	**4.85**			
Industrial	-	-	Light Manufacturing Zone	4.32	**5.64**	**3%**	**2-20%**
			Buffer Zone	1.32			
			Total	**5.64**			
Recreational/ Open Space	-	-	Playgrounds	2.74	**8.20**	**5%**	**0.5-7 %**
			Public Park	3.73			
			Sport Complex	1.73			
			Total	**8.20**			
Arterial Circulation/Terminals	Transportation	7.99	-	-	**7.99**	**4%**	**2-29%**
	Total	**7.99**					
Other Uses	Agriculture	5.00	Agriculture	67.21	**69.44**	**38%**	-
	Graveyard	0.09	WWTP	2.14			
	Range Land	119.38					
	Vacant Area	5.70					
	Total	**130.16**	**Total**	**69.35**			
	Grand Total	**182**	**Grand Total**	**130**	**182**	**100%**	



Map 4-3: Sabir Abad Urban Area Proposed Zones

4.4.4. Ahmadi Banda Urban Center

Ahmadi Banda, a critical settlement within Tehsil Banda Daud Shah, serves as the administrative and functional hub of the entire tehsil. As the official tehsil headquarters, it holds administrative significance and acts as the central point for governance, service delivery, and infrastructural development. Spanning across approximately 397 hectares, Ahmadi Banda's strategic location and size make it a focal point in the tehsil's urban development plan.

The area not only supports its current population but is also equipped to handle projected demographic growth through to 2045. According to development forecasts, Ahmadi Banda will accommodate up to 2% of the total tehsil population by the end of the plan period. This increase in population is significant, necessitating careful urban planning to ensure the sustainable expansion of infrastructure, housing, and essential services.

Ahmadi Banda will continue to evolve in terms of public utilities, transportation networks, health, and educational facilities. Its capacity to serve as a hub for economic activity, social services, and governance will be critical in ensuring the orderly development of the wider region. In addition, its role as a service provider extends to surrounding rural and peri-urban areas. it will integrate regional connectivity, access to resources, and environmental sustainability into the broader planning framework.

To accommodate this growth and evolving role, the future development of Ahmadi Banda will likely focus on land use optimization, zoning regulations, and infrastructure upgrades that align with the region's long-term development goals. The area's ability to integrate modern urban management practices while preserving its administrative efficiency will be pivotal in shaping the future of the entire tehsil.

The Government College for Girls, which plays a crucial role in fulfilling the educational needs of female students in the region, providing them with access to quality education and empowering the local community.

To the southwest, the Stadium Banda Daud Shah serves as a multi-purpose recreational facility. This sports complex is not only a hub for athletic activities but also a venue for social interactions, contributing significantly to community engagement within the Tehsil of Banda Daud Shah and beyond. It plays a vital role in fostering social cohesion and promoting healthy lifestyles among the residents.

In the southeast of the area, the Category-C hospital stands as a key healthcare facility, designed to serve the medical needs of the residents of Banda Daud Shah Tehsil. Its proximity ensures that quality healthcare is accessible to the local population, contributing to the overall well-being of the community.

Ahmadi Banda is also home to a well-established institutional zone that includes critical services such as the Tehsil Municipal Administration (TMA), the Judiciary Complex, National Bank, and a Police Station. These institutions provide essential administrative, legal, financial, and law enforcement services, ensuring the efficient functioning of the area and enhancing the quality of life for its residents.

In summary, Ahmadi Banda's infrastructure supports the educational, healthcare, recreational, and institutional needs of its community, creating a well-rounded and sustainable urban environment within Tehsil Banda Daud Shah.

4.4.4.1. Proposed Landuse Zoning

Ahmadi Banda urban area has been classified into several functional zones, including Residential, CBD, Health, Light Manufacturing, Agriculture, Recreation, Public Buildings and Urban Forestation zones. Additionally, specialized areas have been set aside for essential services and amenities such as a weekly bazaar and fruit vegetable market. Each zone has been allocated a distinct role in supporting the overall urban infrastructure and community needs details for which are following:

- **Residential**

As per the calculations carried out in **Table 3-10** of the report, **24.45** hectares of area was required to meet the requirements of Ahmadi Banda urban area by 2045. As discussed in **Section 4.1.1** of this report, 100% additional land has been added to the housing needs so as to cater for the public amenities accompanied by populace. Below **Table** shows the residential zone area requirement.

Table 4-21: Proposed Residential Zone Area

Description	*Statistics (area in Hectares)*
Housing Requirement by Plan Period	489

Proposed Housing Density	20
Additional Residential Area Required	24.45
Additional Area for Utilities (100%)	24.45
Total Residential Area Required	48.9
Proposed Residential Zone	**49.07**

- **Commercial**

The commercial needs of the population have been addressed by proposing a central business district while a separate fruit vegetable market and a weekly bazar have been proposed. Below **Table** shows the details of area.

Table 4-22: Proposed Commercial Zone Area Calculation

Population 2025	Current Commercial Area (hectares)	Projected Population 2045	Projected Commercial Area Requirement (hectares)	Additional Area Required (hectares)	CBD	Fruit & Veg Market	Weekly Bazar
4782	6.56	7715	10.58	4.02	2.07	1.64	0.89

- **Industrial**

According to Labor Force Survey of Pakistan 2020, **9.81%** of the population in district Karak is linked with industries**.** Keeping the baseline in mind, the consultant has proposed **10%** industrial employment in the coming 20 years due to the mineral resources and industrial potential of the district. The proposed zone for industrial area in Ahmadi Banda has been kept double of the required area due to presence of huge Gypsum reserves in neighboring areas. Details of industrial area requirement for plan period are given in the **Table** below.

Table 4-23: Proposed Industrial Zone Area

Population 2045	10% Participation Rate	50 persons/acre	Area required in Hectare	Proposed Zone (Ha)
7715	772	15.43	6.25	12.31

- **Institutional**

Public buildings, education institutes and health facilities have been combined to form an institutional zone. Below **Table** gives us the details of area proposed for each individual sub zone.

Table 4-24: Proposed Institutional Zone Area

Public Buildings	Education	Health	Proposed Zone (Ha)
3.75	2.05	1.87	7.67

- **Recreational**

For the recreation zone, the consultant proposed several parks and playgrounds covering both active and passive recreation throughout the residential zones so as to avoid congestion and locality wise access to green spaces. Details of the proposed recreational zone break up is provided below in **Table.**

Table 4-25: Proposed Recreational Zone Area

Public Parks	Playgrounds	Sports Complex	Total Proposed Area (Ha)
7.04	1.65	2.32	11.01

- Urban Forestation

Urban forestation was proposed on all forest land in the center of the urban center where the terrain in hilly. This was done to increase the green cover along with enhancing the air quality of the urban area. Apart from urban forestation, throughout the length of the water bodies in the proposed urban boundary were separated from the nearest landuse by riparian plantation. In the urban forestation zone, indigenous plantation is proposed as discussed in environment chapter of the report. Below **Table** provides the details.

Table 4-26: Proposed Urban Forestation Area

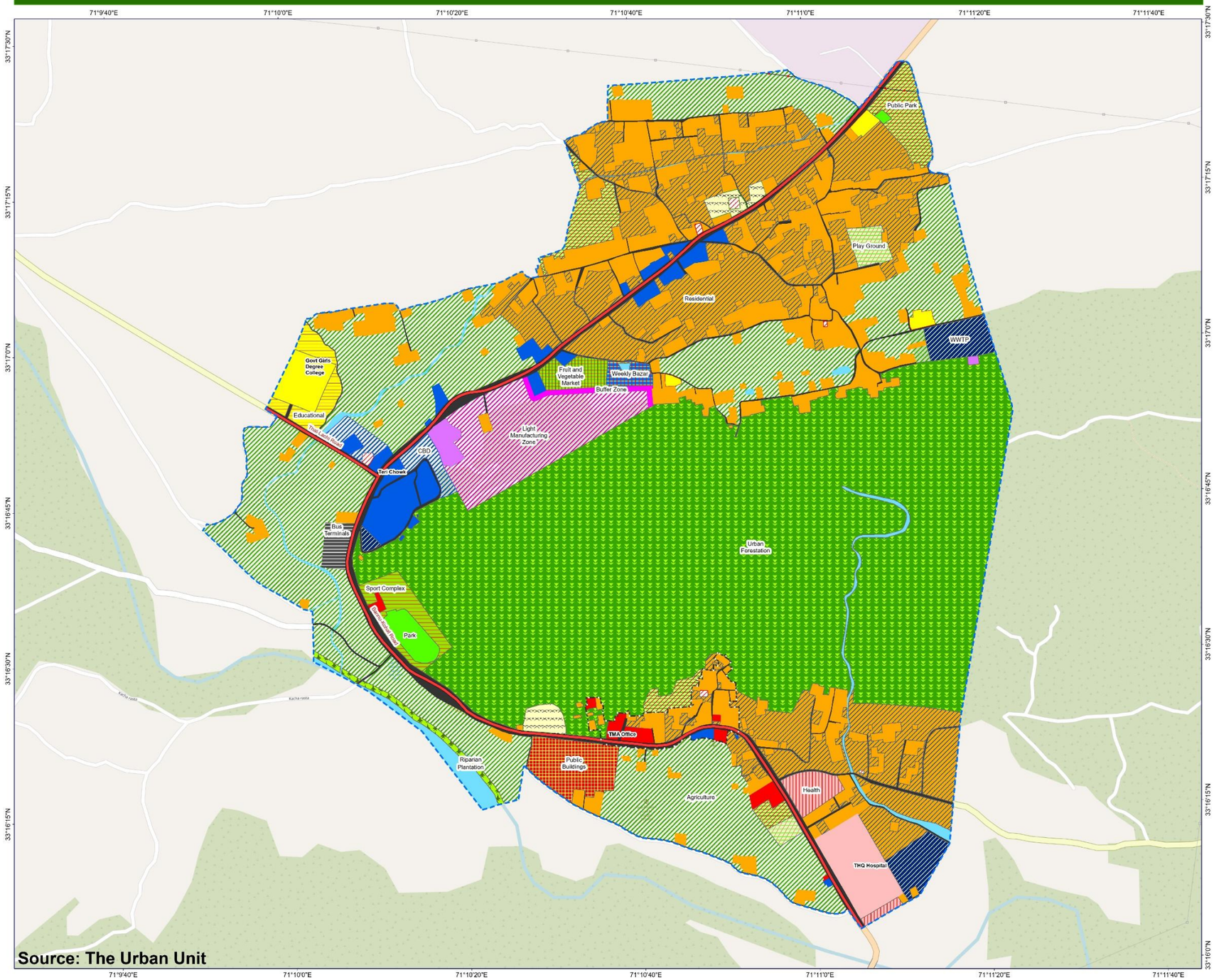
Urban Forestation	*Riparian Plantation*	*Total Area (hectares)*
141.91	1.1	143

The summarized landuse statistics of both existing and proposed have been combined and compared with the observed landuse percentages out of the total proposed urban area provided in the National Reference Manual of Govt of Pakistan and presented below in **Table** accompanied by a **Map** visualizing the zones.

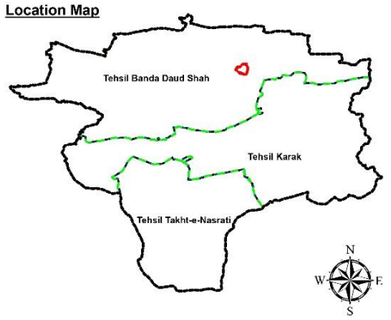
Table 4-27: Ahmadi Banda Urban Area Zoning Master Table

Landuse Class	Existing	Area (hectares)	Proposed	Area (hectares)	Sum of Existing & Proposed	Landuse Percentages	NRM Percentages for Reference
Residential	Residential	45.07	Residential	49.07	**94.14**	**24%**	**24 - 50%**
	Total	**45.07**	**Total**	**49.07**			
Commercial	Commercial	6.56	Fruit and Vegetable Market	1.64	**11.15**	**3%**	**0.5 - 5%**
			CBD	2.07			
			Weekly Bazar	0.89			
	Total	**6.56**	**Total**	**4.59**			
Institutional	Education	2.95	Educational	2.05	**16.74**	**4%**	**2-21%**
	Health Facility	4.12	Health	1.87			
	Public Buildings and Civic Amenities	1.65	Public Buildings	3.75			
	Religious Building	0.35					
	Total	**9.07**	**Total**	**7.67**			
Industrial	Scattered Industry	0.99	Light Manufacturing Zone	11.59	**13.30**	**3%**	**2-20%**
			Buffer Zone	0.72			
	Total	**0.99**	**Total**	**12.31**			
Recreational/ Open Space	Playgrounds/Parks/Open Spaces	1.58	Playgrounds	1.65	**12.59**	**3%**	**0.5-7 %**
			Public Park	7.04			
			Sport Complex	2.32			
	Total	**1.58**	**Total**	**11.01**			
Arterial Circulation/Terminals	Transportation	16.83	Bus terminal	1.02	**17.85**	**4%**	**2-29%**
	Total	**16.83**	**Total**	**1.02**			
Other Uses	Agriculture	43.54	Agriculture	77.21	**231.37**	**58%**	**-**
	Graveyard	1.80	Riparian Plantation	1.10			
	Range Land	156.92	WWTP	4.30			
	Vacant Area	10.14	Urban Forestation	141.91			
	Water Bodies	5.05					
	Forest Land	99.53					
	Total	**316.98**	**Total**	**225.01**			
	Grand Total	**397**	**Grand Total**	**310**	**397**	**100%**	

AHMADI BANDA PROPOSED URBAN ZONES



Location Map



Legend

Administrative & Planning Boundaries

- Proposed Urban Boundary
- EBA Urban Area

Landuse Classes

Existing Landuse

- Commercial
- Residential
- Education
- Scattered Industry
- Graveyard
- Transportation
- Health Facility
- Water Bodies
- Parks
- Public Buildings and Civic Amenities
- Religious Building

Proposed Landuse

Commercial
- CBD
- Fruit and Vegetable Market
- Weekly Bazar

Recreational
- Play Ground
- Public Park
- Sport Complex

Institutional
- Educational
- Health
- Public Buildings

Others
- Agriculture
- Light Manufacturing Zone
- Buffer Zone
- Residential
- Riparian Plantation
- Urban Forestation
- WWTP
- Bus Terminals

Transportation Network

- Motorway
- Secondary Road
- Expressway/Highway
- Local Road
- Primary Road

Scale: 1:5,000

Scale: 0 0.125 0.25 0.5 Kilometers

District Karak

Consultant: The Urban Unit

Client: Provincial Land Use Plan, Urban Policy & Planning Unit, P & DD, Government of KP

Map 4-4: Ahmadi Banda Urban Area Proposed Zones

4.4.5. Takhti Nasrati Urban Center

Takht-e-Nasrati is a strategically important urban center within its namesake tehsil, functioning as the administrative headquarters. It plays a vital role in the governance, management, and coordination of public services across the entire tehsil. Spanning approximately 420 hectares, Takht-e-Nasrati acts as a central hub for a variety of administrative functions, ensuring the smooth operation of governmental activities and facilitating the provision of essential services to the surrounding population.

As the focal point of service delivery, it is responsible for ensuring access to crucial amenities such as health facilities, education facilities, water supply, sanitation, and transportation infrastructure. These services not only support the local residents but also extend to the wider communities within the tehsil. The administrative center is key to planning and executing development initiatives, fostering a more balanced distribution of resources and enhancing the overall quality of life for the people.

In terms of urban planning, the area must accommodate a growing population and its evolving needs, with strategic focus on land use, infrastructure development, and zoning regulations. Takht-e-Nasrati role extends to guiding sustainable development, ensuring efficient land utilization, and supporting economic and social development objectives within the tehsil. The urban framework must, therefore, be adaptable, promoting expansion while maintaining essential services and facilities, creating a resilient and sustainable administrative and service hub.

Takht-e-Nasrati functions as a key administrative hub for the tehsil, facilitating the efficient delivery of services and infrastructure. Its strategic position enhances service provision both locally and at the district level. The town is well equipped with educational facilities, including two colleges (for boys and girls) and a centrally located high school, which together meet the educational needs of the region. Healthcare services are provided by the Tehsil Headquarters Hospital, ensuring accessible medical care for the local population and surrounding areas. In the northern part of the town, a public park and a bus stand offer recreational space and enhance connectivity within the tehsil. The town's commercial center, located in the north-central area, serves as the primary economic hub, supporting local trade and providing essential goods and services to the surrounding communities, including Karak. Judicial services and security are ensured through a centrally located judiciary complex and a police station in the northern section, respectively. Natural boundaries, such as water bodies, help define the town's geographic limits, aiding in planning and development.

Overall, Takht-e-Nasrati strategic layout, infrastructure, and facilities offer significant opportunities for sustainable growth and efficient service delivery across the region.

4.4.5.1. Proposed Landuse Zoning

Takhti Nasrati urban area has been classified into several functional zones, including Residential, CBD, Health, Light Manufacturing, Agriculture, Recreation, Public Buildings and Urban Forestation zones. Additionally, specialized areas have been set aside for essential services and amenities such as a weekly bazaar and fruit vegetable market. Each zone has been allocated a distinct role in supporting the overall urban infrastructure and community needs details for which are following:

- **Residential**

As per the calculations carried out in **Table 3-10** of the report, **63.3** hectares of area were required to meet the requirement of Takhti Nasrati urban area by 2045. As discussed in **Section 4.1.1** of this report, 100% additional land has been added to the housing needs so as to cater for the public amenities accompanied by populace. Below **Table** shows the residential zone area requirement.

Table 4-28: Residential Area Calculation

Description	*Statistics (area in Hectares)*
Housing Requirement by Plan Period	1266
Proposed Housing Density	20
Additional Residential Area Required	63.3
Additional Area for Utilities (100%)	63.3
Total Residential Area Required	126.6
Proposed Residential Zone	**126.74**

- **Commercial**

The commercial needs of the population have been addressed by proposing a central business district while a separate fruit vegetable market and a weekly bazar have been proposed. Below **Table** shows the details of area.

Table 4-29: Proposed Commercial Zone Areas

Population 2025	Current Commercial Area (hectares)	Projected Population 2045	Projected Commercial Area Requirement (hectares)	Additional Area Required (hectares)	CBD	Fruit & Veg Market	Weekly Bazar
12704	9.69	21393	16.32	6.63	3.29	1.91	1.54

- **Industrial**

According to Labor Force Survey of Pakistan 2020, **9.81%** of the population in district Karak is linked with industries. Keeping the baseline in mind, the consultant has proposed **10%** industrial employment in the coming 20 years due to the mineral resources and industrial potential of the district. Details of industrial area requirement for plan period are given in the **Table** below.

Table 4-30: Proposed Industrial Zone Area

Population 2045	10% Participation Rate	50 persons/acre	Area required in Hectare	Proposed Zone Area (Ha)
21393	2139	42.79	17.32	12.95

- **Institutional**

Public buildings, education institutes and health facilities have been combined to form an institutional zone. Below **Table** gives us the details of area proposed for each individual sub zone.

Table 4-31: Institutional Zone Proposed Area

Public Buildings	Education	Health	Proposed Zone Area (Ha)
4.66	2.39	2.33	9.38

- **Recreation**

For the recreation zone, the consultant proposed several parks and playgrounds covering both active and passive recreation throughout the residential zones so as to avoid congestion and locality wise access to green spaces. Details of the proposed recreational zone break up is provided below in **Table**.

Table 4-32: Recreation Zone Proposed Area

Public Parks	Playgrounds	Sports Complex	Proposed Zone Area (Ha)
9.67	4.08	2.87	16.61

- **Urban Forestation**

Urban forestation was proposed in all those existing rangeland area where the ground was not level and there was less chance to reclaim it for agriculture purposes. This was done to increase the green cover along with enhancing the air quality of the urban area. Apart from urban forestation, throughout the length of the water bodies in the proposed urban boundary were separated from the nearest landuse by riparian plantation. In the urban forestation zone, indigenous plantation is proposed as discussed in environment chapter of the report. Below **Table** provides the details.

Table 4-33: Urban Forestation Zone Proposed Area

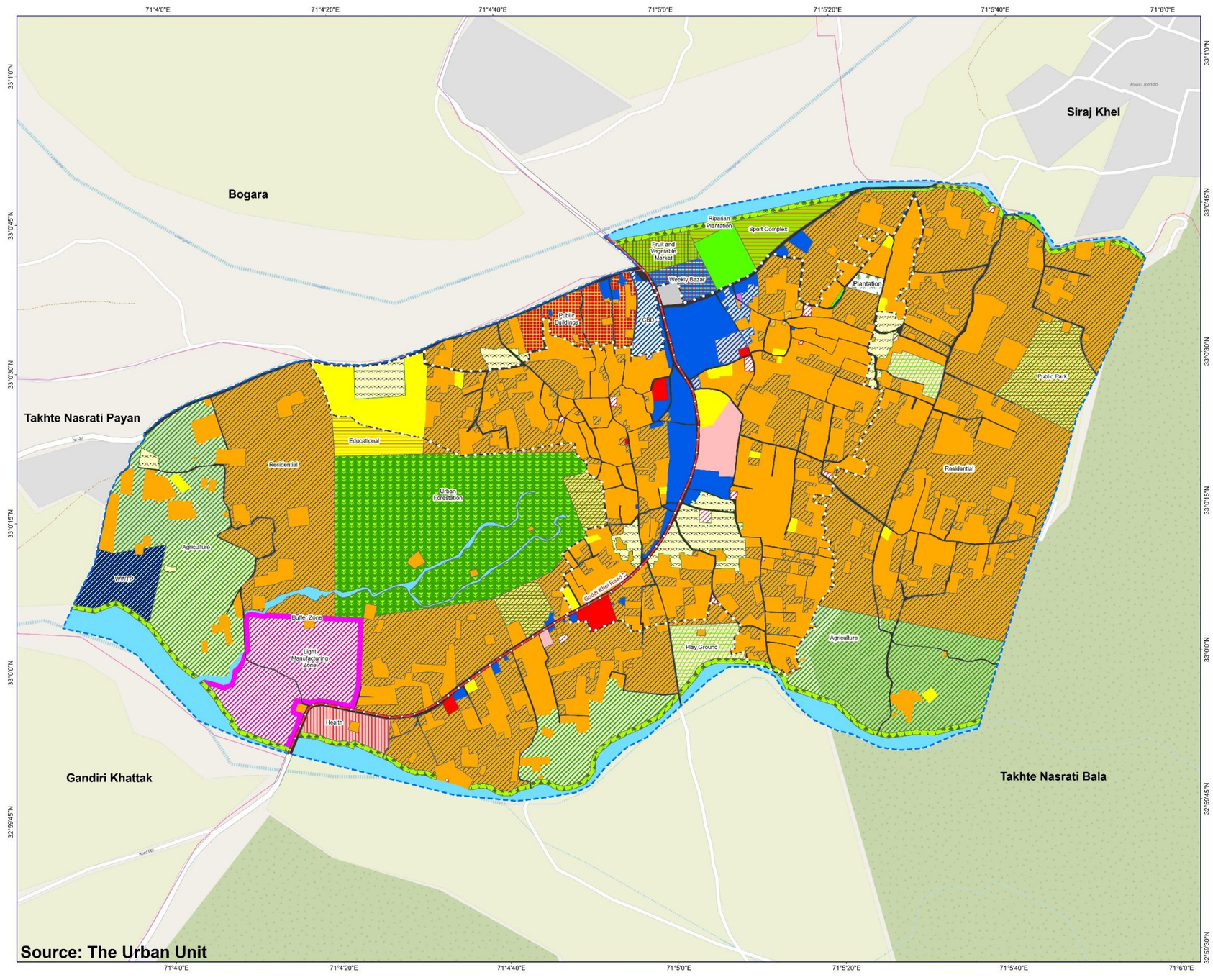
Urban Forestation	Riparian Plantation	Total Area (Ha)
32.15	6.91	39.06

The summarized landuse statistics of both existing and proposed have been combined and compared with the observed landuse percentages out of the total proposed urban area provided in the National Reference Manual of Govt of Pakistan and presented below in **Table** accompanied by a **Map** visualizing the zones.

Table 4-34: Takhti Nasrati Urban Area Zoning Master Table

Landuse Class	Existing	Area (hectares)	Proposed	Area (hectares)	Sum of Existing & Proposed	Landuse Percentages	NRM Percentages for Reference
Residential	Residential	93.64	Residential	126.74	220.38	**52%**	**24 - 50%**
	Residential and Commercial (Mixed Use)	0.14			0.14		
	Total	**93.79**	**Total**	**126.74**	**220.53**		
Commercial	Commercial	9.68	Fruit and Vegetable Market	1.91	**16.42**	**4%**	**0.5 - 5%**
			CBD	3.29			
			Weekly Bazar	1.54			
	Total	**9.68**	**Total**	**6.74**			
Institutional	Education	7.31	Educational	2.39	**21.28**	**5%**	**2-21%**
	Health Facility	2.42	Health	2.33			
	Public Buildings and Civic Amenities	1.41	Public Buildings	4.66			
	Religious Building	0.78					
	Total	**11.90**	**Total**	**9.38**			
Industrial	Scattered Industry	0.04	Light Manufacturing Zone	11.01	**12.99**	**3%**	**2-20%**
			Buffer Zone	1.94			
	Total	**0.04**	**Total**	**12.95**			
Recreational/ Open Space	Playgrounds/Parks/Open Spaces	0.52	Playgrounds	4.08	**17.13**	**4%**	**0.5-7 %**
			Public Park	9.67			
			Sport Complex	2.87			
	Total	**0.52**	**Total**	**16.61**			
Arterial Circulation/Terminals	Transportation	15.97	-	-	**16.39**	**4%**	**2-29%**
	Bus Terminals	0.43					
	Total	**16.39**	**Total**	**16.39**			
Other Uses	Agriculture	88.39	Agriculture	42.01	**115.58**	**28%**	-
	Barren Land	47.59	Riparian Plantation	6.91			
	Graveyard	2.32	WWTP	4.07			
	Range Land	77.64	Urban Forestation	32.15			
	Vacant Area	43.70					
	Water Bodies	19.71					
	Plantation	8.42					
	Total	**287.76**	**Total**	**85.14**			
	Grand Total	**420**	**Grand Total**	**257**	**420**	**100%**	

TAKHTE NASRATI PROPOSED URBAN ZONES



Location Map

Legend

Administrative & Planning Boundaries

- Proposed Urban Boundary
- EBA Urban Area
- NC/VC Boundary

Landuse Classes

Existing Landuse

- Commercial
- Education
- Graveyard
- Health Facility
- Residential
- Mixed Use
- Public Buildings and Civic Amenities
- Parks
- Religious Building
- Plantation
- Scattered Industry
- Bus Terminals
- Transportation
- Water Bodies

Proposed Landuse

Commercial
- CBD
- Fruit and Vegetable Market
- Weekly Bazar

Recreational
- Play Ground
- Public Park
- Sport Complex

Institutional
- Educational
- Health
- Public Buildings

Other
- Agriculture
- Light Manufacturing Zone
- Buffer Zone
- Residential
- Riparian Plantation
- Urban Forestation
- WWTP

Transportation Network

- Motorway
- Expressway/Highway
- Primary Road
- Secondary Road
- Local Road

Scale: 1:6,000

Scale: 0 0.15 0.3 0.6 Kilometers

District Karak

Consultant: The Urban Unit

Client: Provincial Land Use Plan, Urban Policy & Planning Unit, P & DD, Government of KP

Map 4-5: Takhti Nasrati Urban Area Proposed Zones

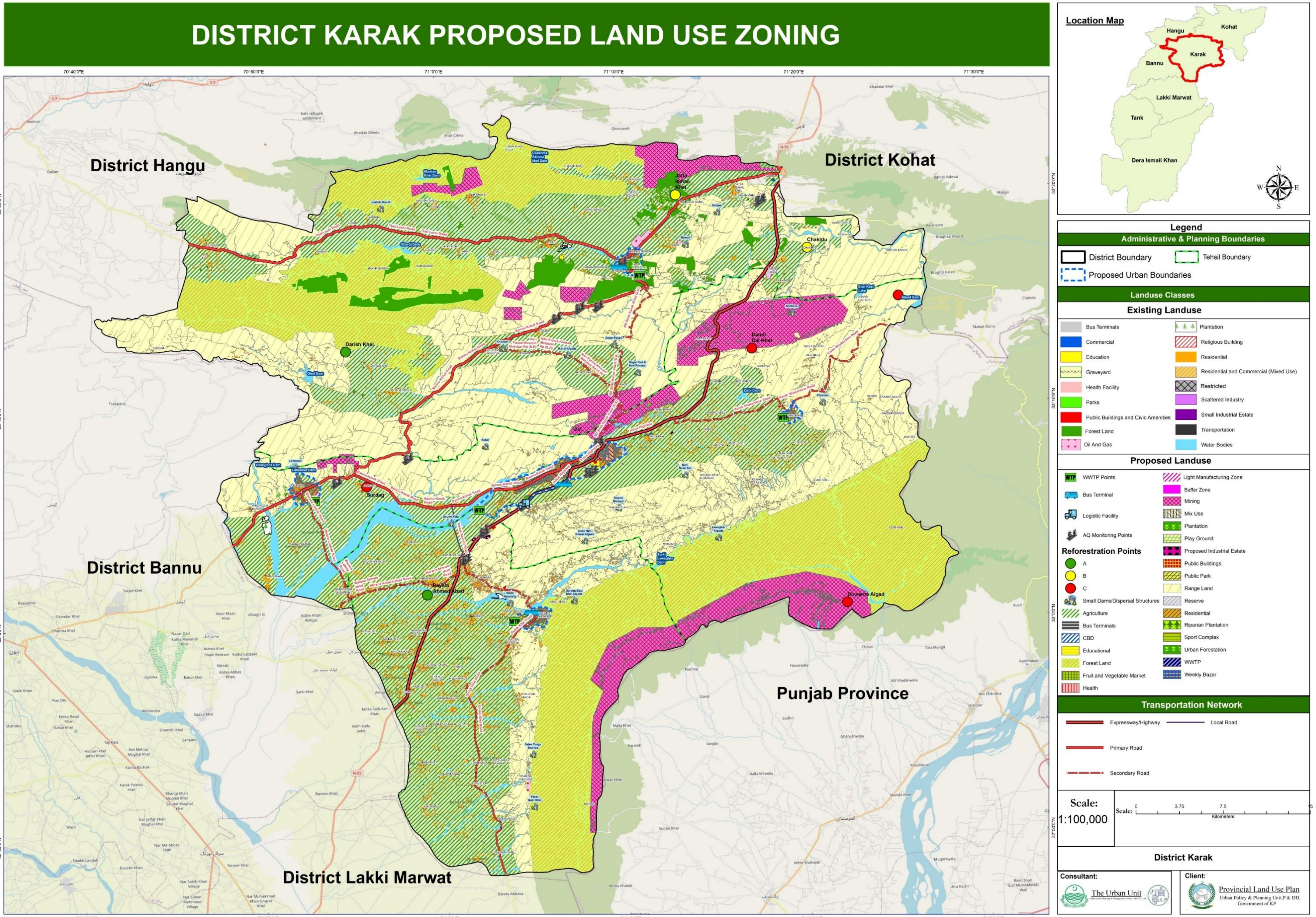
4.5. Recommended Landuse Zoning Plan for District

Areas beyond the urban boundaries categorized as rural areas were zoned on a broader scale. Those zones whose data was provided by respective departments such as Forest and Mining were mapped initially. From the data provided by the forest department, shrubs and bushes class was merged into Rangeland zone in the landuse plan. In the next stage, the predominant land use extracted from existing landuse map was marked as an independent Zone with keeping a look at potential areas that could be included in the zone. Following this, rural settlements were classified as Residential zones and lastly, current industrial zones or proposed industrial sites were marked as Industrial zones.

The combination of limited industrial development, significant agricultural activity, and natural resource extraction points to a district that will balance urbanization with its rich natural resources. However, the challenges posed by the semi-arid climate, limited water resources and lack of economic opportunities highlight the need for sustainable land use practices and careful planning to ensure that Karak can continue to thrive economically while preserving its environment and natural resources for future generations. The **Table** below shows the proposed zoning statistics of the district accompanied by a **Map** visualizing the proposed zoning.

Table 4-35: District Karak Proposed Landuse Zoning Statistics

Landuse	Area (sq. km)	Percentage
Agriculture	745.05	27.88%
Buffer Zone	0.07	0.002%
Bus Terminals	0.01	0.0004%
CBD	0.09	0.004%
Educational	0.35	0.01%
Forest	563.62	21.09%
Fruit and Vegetable Market	0.074	0.003%
Health	0.12	0.005%
Light Manufacturing Zone	0.79	0.03%
Mining	183.10	6.85%
Mix Use	0.91	0.03%
Plantation	0.00001	0.00%
Playground	0.36	0.01%
Proposed Industrial Estate	1.03	0.04%
Public Buildings	0.20	0.01%
Public Park	0.53	0.02%
Range	908.90	34.01%
Reserve	0.16	0.01%
Residential	9.04	0.34%
Riparian Plantation	1.16	0.04%
Sport Complex	0.10	0.00%
Urban Forestation	2.46	0.09%
Weekly Bazar	0.07	0.002%
WWTP	0.34	0.01%
Proposed Zones Total	2418.54	90.49%
Existing Built up	254.21	9.51%
Grand Total	**2672.75**	**100%**



Map 4-6: District Karak Proposed Landuse Zoning

4.5.1. Agriculture Zone

For the delineation of the agriculture zone, the consultant conducted a thorough assessment of existing agricultural land use patterns across District Karak. This involved detailed field surveys, land use mapping, and consultations with local stakeholders to identify areas where agriculture and farming are the predominant activities. Based on this comprehensive analysis, the agriculture zone was strategically proposed to encompass lands that demonstrate significant agricultural productivity and potential. The designation aims to protect these vital lands from non-agricultural encroachment, promote sustainable farming practices, and ensure the long-term viability of the district's agricultural sector. By aligning the zone boundaries with actual land use and agronomic suitability, the plan supports targeted interventions to enhance crop and livestock production, optimize resource use, and strengthen rural livelihoods.

The proposed agriculture zone in District Karak covers 745.05 sq. km (approximately 27.88% of the total land area), plays a crucial role in the district's economy and sustenance. Agriculture in Karak is predominantly concentrated in the eastern and southern regions of the district, where the land is more suitable for crop cultivation and livestock grazing. These areas benefit from irrigation systems that utilize groundwater resources from tube wells, particularly in valleys and lower-lying areas where water availability is more consistent.

Effective land use zoning and planning are essential to optimize the use of this agricultural land while balancing economic development, environmental sustainability, and social needs. The delineation of an agriculture zone reflects a strategic approach to preserve prime farmland, protect soil quality, and maintain the rural character of the district.

The district's agricultural activities primarily include the cultivation of wheat, maize, barley, and pulses such as chickpeas and lentils. These crops are essential for local food production and contribute significantly to the economy. Wheat is the most grown crop, followed by maize, which is harvested mainly in the warmer months, while wheat is sown in cooler seasons. In addition to crops, livestock farming is a significant agricultural activity, especially in the hilly and rugged terrains of the northern and western parts of the district. Goats, sheep, and cattle are raised for meat, wool, and milk, with goat and sheep farming being the most prominent due to the suitable grazing conditions in the semi-arid climate.

However, the agricultural sector in Karak faces several challenges, primarily due to the district's semi-arid climate and limited rainfall. This results in a reliance on irrigation, with farmers depending heavily on groundwater extracted through tube wells. While these systems support crop cultivation, over-reliance on groundwater has raised concerns about water table depletion. Soil fertility in some areas is also a limiting factor, as soil erosion and nutrient depletion are common in the absence of regular rainfall and adequate irrigation infrastructure. Furthermore, the district's vulnerability to climate variability, including droughts and irregular rainfall patterns, impacts crop yields and the health of livestock, posing risks to food security and economic stability.

In land use planning, integrating environmental conservation measures within the agriculture zone is critical to mitigate these risks. Establishing buffer zones along watercourses and steep slopes can help reduce soil erosion and prevent contamination of water sources. Additionally, planning policies should regulate land fragmentation and discourage conversion of agricultural land into non-agricultural uses such as urban expansion or industrial development, which threaten the viability of farming in the district.

To address these challenges, there is an urgent need to adopt sustainable agricultural practices in the district. Improving irrigation efficiency through methods such as drip irrigation and utilizing solar-powered pumps could conserve water and increase crop productivity. Additionally, implementing soil conservation techniques like contour farming and agroforestry can help preserve soil fertility and reduce the impact of erosion. The introduction of climate-resilient crop varieties that can withstand heat and drought would also contribute to long-term agricultural sustainability.

Land use planning should also promote diversification of agricultural activities and support infrastructure development such as rural roads, storage facilities, and market access to strengthen the agricultural value chain. Engaging local communities and stakeholders in participatory planning processes ensures that agricultural zoning reflects local knowledge and addresses farmers' needs, thus improving compliance and effectiveness.

Despite these challenges, the agriculture zone in Karak remains a vital part of the district's economy, supporting the livelihoods of many rural households and providing essential resources for the local community. Proper zoning and planning combined with sustainable practices will enhance the resilience and productivity of agriculture in the district for future generations.

4.5.2. Mining Zone

The consultant proposed the mining zones based on a comprehensive review of existing mining areas provided by the Mines and Minerals Department, including sites where extraction leases have been officially granted. This approach ensures that the delineated zones accurately reflect the current extent of mining operations within the district. The proposed mining zones are closely aligned with ongoing mining activities and are designed to facilitate better land use management. Alongside the zoning proposal, the consultant has recommended a set of rules and regulations aimed at guiding residents and operators within these zones to promote sustainable mining practices, ensure environmental protection, and safeguard community health and safety. These regulatory measures are critical to mitigate the adverse impacts of mining, such as land degradation, water contamination, and ecosystem disruption, thereby supporting the long-term viability of the district's mineral resources.

The proposed mining zone in District Karak covers approximately 183.1 sq. km, representing about 6.85% of the district's total land area. This zone is primarily concentrated in the eastern and southern parts of the district, regions renowned for their rich mineral resources, particularly salt is one of Karak's key natural assets. Karak has historically been a major center for salt mining, hosting some of the largest salt mines in Pakistan, these mining operations serve as an important economic driver, with extensive large-scale salt extraction alongside smaller-scale mining of other minerals such as limestone and gypsum.

The northern parts of Karak, especially the mountainous areas, contain significant salt deposits that are actively mined and processed for both local consumption and commercial distribution. Beyond salt, mining in Karak also includes gypsum, limestone, and coal extraction, which support various industrial sectors including construction, cement manufacturing, and chemical production. The western region near the Bannu district also holds deposits of valuable minerals, though mining activity there is on a smaller scale compared to the eastern and northern areas.

The mining industry in Karak significantly contributes to the local economy by providing employment opportunities and supporting the livelihoods of many families. However, mining activities also present challenges related to environmental sustainability and land degradation. Unregulated mineral extraction has the potential to cause deforestation, soil erosion, and contamination of water resources, which negatively impact local ecosystems. Therefore, there is a critical need to implement regulated and sustainable mining practices that mitigate environmental harm while maintaining the sector's economic benefits. Although mining activities are geographically concentrated and occupy a relatively small proportion of the district's total land area, the sector holds considerable potential for growth due to the richness of mineral deposits.

In conclusion, the mining zone in District Karak, which accounts for approximately 7% of the total land area, plays a vital role in the district's economic landscape particularly in the northern and western regions. The abundant mineral resources, especially salt, continue to underpin mining activities that are expected to remain a significant source of income and development for the district. To ensure the long-term sustainability of this industry, it is essential to enforce sustainable mining practices that protect the district's natural environment and resources.

4.5.3. Forest Zone

For the proposal of the forest zone, the consultant conducted a preliminary assessment of both designated and observed forested areas within the land use preparation. The proposed forest zone encompasses these areas and their immediate surroundings to ensure the preservation of environmental integrity and ecological resources in District Karak. This approach reflects a commitment to protecting the district's natural habitats and biodiversity, which are essential for maintaining soil stability, regulating water cycles, and supporting local wildlife. By incorporating both officially recognized forest lands and additional adjoining areas, the zoning plan aims to create a comprehensive conservation buffer that mitigates the impacts of human activities such as deforestation, grazing, and mining. This strategic zoning will facilitate sustainable forest management, promote reforestation efforts, and support community-based conservation initiatives to safeguard these vital ecosystems for present and future generations.

The forest zone in District Karak spans approximately 563.62 sq. km, constituting about 21.1% of the district's total land area. This zone is predominantly concentrated in the north-western and south-eastern regions, were mountainous terrain limits intensive agricultural and industrial development. The forested landscape primarily comprises scrubland and woodland patches, with the surrounding Mountains serving as a natural boundary. While the district lacks dense tropical forests, these areas are crucial for maintaining ecological balance by supporting biodiversity, conserving soil, and regulating water resources.

The northern part of Karak, characterized by higher elevations and rugged topography, hosts some of the most extensive forested tracts. Although not densely forested, these areas are vital in sustaining biodiversity and mitigating soil erosion, particularly in zones vulnerable to seasonal flooding and drought. Smaller, more fragmented forest patches are found in the western part of the district, interspersed with agricultural and grazing lands.

Despite their ecological significance, these forested areas face ongoing threats from deforestation, land conversion for agriculture and grazing, illegal logging, and mining activities, especially near the mountainous regions. These pressures jeopardize the forest zone's ability to sustain local wildlife, including various bird species and small mammals, and undermine its role in soil conservation and water cycle regulation.

The fact that nearly 22% of Karak's land area is designated as forest underscores the importance of these natural resources to the district's environment and economy. To ensure their sustainable management, it is imperative to implement conservation measures such as reforestation programs, sustainable timber harvesting, and the establishment of protected areas to preserve existing forest cover. Furthermore, promoting alternative livelihoods for communities dependent on forest resources can help alleviate human pressure on these ecosystems.

In conclusion, the forest zone in District Karak, primarily located in the northern and western regions, plays a critical role in maintaining the district's ecological balance. Effective and sustainable management practices are essential to protect and enhance these forested areas for the benefit of current and future generations.

4.5.4. Industry/Manufacturing Zone

For the proposal of the industrial zone, the consultant conducted a detailed review of the current industrial employment and the future employment potential, considering the mineral-rich nature of District Karak. The district's abundant natural resources, including salt, gypsum, limestone, and other minerals, provide a strong foundation for industrial development. Based on this assessment, light manufacturing zones have been proposed within each Proposed Urban Area (PUA) to foster localized industrial growth and economic diversification. Additionally, KPEZDMC has proposed the establishment of a dedicated salt and gypsum industrial city of 102.5 hectares in the north-western part of the district. This industrial city is expected to serve as a catalyst for employment generation and fulfill the growing industrial demands of Karak and surrounding regions.

The Light Manufacturing Zones in District Karak spans approximately 79 hectares and are strategically situated across all proposed urban areas. These zones serve as a nucleus for small-scale industries, primarily focused on wood and steel production, which are critical to supporting local construction, infrastructure projects, and the manufacturing sector. The zone's proximity to the urban center ensures efficient access to transportation networks, markets, and skilled labor, thus facilitating the smooth operation and distribution of manufactured goods both within and outside the district.

Wood-based industries within these zones specialize in carpentry, furniture manufacturing, and other woodworking crafts that cater to both residential and commercial sectors. Steel industries focus on small-scale metal fabrication, including the production of tools, machinery components, and construction materials. These industries not only provide essential inputs for Karak's ongoing infrastructure development but also create vital employment opportunities for local residents, thereby contributing to poverty alleviation and economic stability in the district.

Despite its relatively modest size, the light manufacturing zone plays a pivotal role in Karak's urbans growth and economic diversification. However, challenges remain, including the need to modernize equipment and production methods, implement effective waste management practices, and encourage sustainable resource use to reduce environmental impacts. Addressing these challenges will require coordinated efforts from local government, industry stakeholders, and development partners. With targeted investments in infrastructure, technology, and workforce development, the light manufacturing zone has significant potential to enhance industrial productivity, stimulate economic growth, and improve the quality of life for Karak's residents.

Furthermore, the proposed salt and gypsum industrial city by KPEZDMC leverages Karak's mineral wealth to establish a specialized industrial cluster. This initiative is expected to attract investment, foster technological innovation, and strengthen the district's position as a key player in Pakistan's mineral-based industries. The development of this industrial city will not only expand employment opportunities but also

encourage value addition and export-oriented growth, aligning with broader regional and national economic goals.

4.5.5. Rangeland Zone

The Range Land zone in District Karak covers a substantial 908.9 hectares, accounting for 34% of the total land area. This extensive land area is primarily used for grazing and pastoral activities, supporting the livelihoods of many families in the rural parts of Karak. Range land is typically characterized by open, uncultivated land, often with sparse vegetation, which provides ideal grazing grounds for livestock such as goats, sheep, and cattle.

The Range Land in Karak is concentrated in the central and western parts of the district, where the topography consists of semi-arid to arid landscapes, including hills and plateaus. These areas are not suited for intensive agricultural development due to limited water resources and arid conditions but are well-suited for grazing, which remains a primary economic activity in these regions. The semi-arid climate, combined with the natural vegetation, supports the raising of livestock, particularly in areas where the terrain is less accessible for farming or other land uses.

These rangelands are vital for the district's pastoral economy, with livestock farming being a cornerstone of many households' livelihoods. Goats, sheep, and cattle are the most raised animals in these areas, as they are well adapted to the harsh conditions. In addition to providing meat, wool, and milk, livestock farming in Karak also supports local trade and markets, contributing significantly to the region's economy.

However, Range Land faces several challenges, primarily related to overgrazing, which can lead to land degradation, soil erosion, and the loss of vegetation. As the demand for grazing land increases, due to population growth and livestock expansion, the risk of further environmental degradation becomes more pronounced. Additionally, climate change is another significant concern, as it affects the availability of forage and water, making the land less suitable for livestock farming during periods of drought.

To ensure the long-term sustainability of the Range Land, it is crucial to implement sustainable grazing practices and range management strategies. These may include rotational grazing, which allows grasslands to recover, as well as the development of water harvesting systems and fodder production to reduce dependence on natural grazing. Furthermore, community-based conservation programs can help raise awareness about the importance of protecting these valuable ecosystems.

In conclusion, the Range Land in District Karak plays a critical role in the district's agricultural and economic landscape, covering over 33% of the district's total land area. Its extensive use for livestock farming supports the livelihoods of many rural communities, but careful management is needed to prevent environmental degradation and ensure the sustainability of this essential resource.

4.6. Landuse Regulations & Guidelines

Land use regulations constitute the legal and procedural backbone of spatial governance, enabling the orderly transformation of land while safeguarding public interest, environmental assets, and urban form. As part of the zoning framework, these regulations establish the functional character of each land parcel by defining what activities are allowable, conditionally approvable, or strictly restricted within designated zones.

Central to this framework are three key categories:

- **Permitted Uses** refer to those land use activities that are inherently aligned with the primary intent and planning objectives of a specific zone. These uses are allowed by-right and do not require discretionary approval, provided they comply with applicable building codes, design guidelines, floor area ratios (FAR), setbacks, and height restrictions. Permitted uses facilitate predictable development outcomes and ensure efficient processing of building permits and planning approvals.
- **Permissible Uses** represent a secondary tier of land use activities that may be allowed within a zone subject to certain conditions. These uses are not automatically permitted but may be approved through a special review process—often involving impact assessment, stakeholder consultation, and compliance with supplementary criteria. The intent is to provide flexibility while maintaining compatibility with surrounding uses and minimizing potential land use conflicts.
- **Prohibited Uses** encompass activities that are fundamentally incompatible with the intended function of a zone due to their adverse environmental impacts, socio-spatial externalities, or

infrastructure demands. These uses are categorically disallowed to preserve the integrity of zoning objectives, protect public health and safety, and maintain functional coherence in urban and rural areas.

These regulatory distinctions are essential to preserving urban form, promoting functional integration, managing growth, and facilitating context-sensitive development. They also empower local planning authorities to enforce zoning compliance, monitor land use change, and guide investment in alignment with strategic spatial frameworks.

The zoning regulations apply uniformly across the district and are tailored to the land use character and development intensity of each zone. The regulatory structure covers the following major land use categories:

- **Residential Zones**
- **Commercial Zone (CBD)**
- **Industrial Zones**
- **Agricultural Zones**
- **Mining Zones**
- **Forest Zones**
- **Institutional Zones (including Education, Health, and Governmental uses)**
- **Mixed Land Use Zones**
- **Recreation Zone**

Each of these zones is governed by a specific matrix of permitted, permissible, and prohibited uses, as detailed in the following subsections. This structured approach ensures the development of an inclusive, sustainable, and resilient urban-rural fabric while balancing socio-economic development with environmental stewardship.

4.6.1. Residential Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Detached/semi-detached dwellings, • place of worship or prayer, • Social/cultural institutions, • Parks and playgrounds, • Apartment buildings, • Graveyard or place of burial, horticultural nursery, • Urban farm, • Old age home or orphanage, • Urban forest,	• Commercial offices and service, • Shops of local character, • Raising of poultry for non-commercial purposes, • Private community centre or club • Day-care centre or Pre-schools, • primary school; • secondary school; • Rehabilitation centres, • Petrol pump, • Gas filling station, • Taxi/rickshaw stand. • Guest houses offices of TMAs/other tiers of local Govt. • Offices of professionals with adequate parking facilities, • Local shopping areas/retail shops,	• Heavy, large and extensive industries: noxious, obnoxious and hazardous industries, • Warehousing, storage go-downs of perishables, hazardous, inflammable goods, • Workshops for buses, • Slaughter-housing, • wholesale mandis, • Sewage treatment plant/disposal work, • Water treatment plant, • Solid waste dumping yards, • Outdoor games stadium, • Indoor games stadium, shooting range, • Zoological garden, botanical garden, • Bird sanctuary, • Picnic hut,

	• Clinics/dispensaries	• International conference centre, • Sports training centre, reformatory and all uses not specifically permitted or permissible • Any other land uses which is neither permitted nor permissible

4.6.2. Commercial Zone (CBD)

Permitted Uses	Permissible Uses	Prohibited Uses
• Commercial buildings, • Markets, shopping mall departmental stores and Outlets, • Shops except dealing in hazardous dangerous substances • Taxi/rickshaw stand. • Public Squares and Parks • Bakery or confectionary, • Clinic or polyclinic, • place of worship or prayer, • Courier service or logistics office, • Private telephone exchange or cable operation or mobile franchise offices, • Memorial and monument, • Hotel or motel, • Hostel • Car showroom, • Police station, post office and fire station, • Boutique or garment outlets or beauty parlour, • Restaurant, • Social welfare institutions such as community centre, art gallery and museum, • Parking plaza or Parking site.	• Pedestrian friendly streetscape, • Mixed- use buildings, • Technical and vocational institution, • Seasonal commercial fare site, • Stadium; amusement park / play land, • Bus terminal, • Fuel Stations, • Wholesale market, • Second hand goods market, • Coal, wood or Timber yard. • Education institution • Marriage or banquet hall, concert hall • petrol pump or gas or LPG or LNG station; • bus or truck terminal; • private hospital; • auto workshop; • athletic club, gymnasium, fitness centre or • indoor sport facility;	• Dwellings except those of service apartment, essential operational, watch and ward personnel, • Heavy, extensive, noxious, obnoxious, hazardous and extractive industrial units, • Hospitals/research laboratories treating contagious diseases, • Poultry farms/dairy farms, • Slaughter-houses, • Sewage treatment/disposal sites, • Agricultural uses, • Storage of perishable and inflammable commodities, • Quarrying of gravel, sand, clay and stone, • Zoological garden, botanical garden, • Bird sanctuary, • Forensic science laboratory and all other activities which may cause nuisance and are noxious and obnoxious in nature. • A local government shall not allow person to use land or building commercial area for any purpose which is neither permitted nor permissible.

4.6.3. Industrial Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Small and Medium Scale Industries • vertical green industry;	• Showrooms • Mixed- used buildings	• Private residential housing schemes

• construction equipment, building material store; • Processing Units • Manufacturing Activities • Warehouses storage or Go-down; • Workshops • Cold storage and Ice factory • Petro chemicals, petroleum and gas products • Loading and unloading space; • Parking lot • Industrial park or estate • Police station, fire station and post office; • restaurant; • green area, park or forest • bank or automated teller machine (ATM); • Industrial research institute; • Treatment or recycling plant; • Grid station; • Vocational training institute	• Residence for workers • Fuel stations and Oil depot; • Restaurant; • Hospital; • Power plant • Grid Station • Place of Worship • Essential residential, • commercial, health and educational facility for workers or employees • Auto workshop, service garage and service station;	• Large health, recreational commercial and educational institutions • The land use for storing, packing, pursing, cleaning, preparing, and manufacturing of blushing power, ammunition, fireworks, gun powder, Sutphin, mercury, gases, nitro-compounds, phosphorous, 'dynamite, explosives, bombs or any other obnoxious hazardous material shall not be permissible In a declared industrial area. • A local government shall not allow person to use land or property in an industrial area for any purpose which is neither permitted nor permissible.

4.6.4. Agriculture Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Crop, • Orchard, • Pastureland • livestock such as dairy or poultry farm • Forest, • Nursery or a green house, horticulture, • Tube well, • Existing rural settlement or village, • place of worship or prayer. • Agro-based industry • Public slaughterhouse • Storage activities of agricultural goods which are non-hazardous in nature.	• Milk Chilling and Pasteurization • Animal husbandry clinic, veterinary dispensary or hospital. • Agricultural machinery workshop • Basic health unit • clinic or hospital; • Country club, • Zoological garden, • Farmhouse • Slaughterhouses, • Dairy production, • Botanical garden, • recreational club or resort or country club; • Bird sanctuary, • Zoo or wildlife park, • Grain market • Cattle farm • Poultry Farm,	Other than permitted and permissible

	• Cattle market • Fruit and vegetable market, • Agriculture, Livestock research institute • Park, monument, playground, gymnasium or sports complex • public or private recreational or theme park; • Vegetable, fruit and grain market • water filtration plant; • wastewater treatment plant; • Power plant • petrol pump or gas station or LPG or LNG storage and filling station. • Base trans-receiver station • Or communication tower. • shooting range; • swimming pool; • library; • Detached/semi-detached dwellings.	

4.6.5. Mining Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Extraction of minerals (e.g., coal, sand, gravel, stone), quarrying, and other resource mining activities.	• Housing or colony for workers (including schools and corner shops, health facility) • Processing plants for mined materials, • storage facilities for mined goods, • Industrial parks related to mining activities (Processing plants, Storage facilities • Workshops and manufacturing units, Logistics infrastructure), Transportation infrastructure. • Utilities for mining operations (water treatment plants, power plants for mining operations),	• Residential developments, • Commercial buildings, • Agricultural uses (crop farming, livestock farming), • Any land use that interferes with mining operations or is incompatible with mining activities. • Any non-essential developments such as recreational areas, large-scale residential, or commercial zones within mining areas

	• Vocational training centers for workers in the mining sector.	

4.6.6. Forest Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Forestry activities such as timber extraction (sustainable logging), reforestation, agroforestry, controlled ecotourism (e.g., hiking, camping), conservation efforts. • Wildlife conservation and habitat restoration, national parks, nature reserves.	• Forestry research institutes, sustainable wood processing industries (e.g., paper mills), eco-tourism facilities (lodges, visitor centers), and community-based forest management activities. • Educational and training centers focused on environmental conservation and sustainable forestry practices	• Urban development (residential, commercial, industrial), large-scale agriculture (e.g., crop farming), mining activities, infrastructure projects (e.g., roads, buildings), land clearing for non-forest related uses. • Any activities that lead to deforestation, illegal logging, or degradation of forest ecosystems.

4.6.7. Institutional Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Large Scale education zone • General education universities • Scientific research institutes • IT and Media institutes • City Level libraries, book banks, data and information centers • Large Scale Health Institutions; Hospitals, • Scientific research institutes, • Clinics, • Clinical Laboratory, • BHUs and RHCs, • Maternity Care Centres • Government or semi-government offices (District Secretariat, Town Hall etc. • Social welfare institution such as community	• Staff residences (teaching and non-teaching, health workers, employees) • Separate hostels for Boys and Girls • Auditoriums, seminar halls, workshop spaces, • Community facilities (Parks, Playgrounds, neighbourhood commercial) • Athletic club, gymnasium, Sports facilities, fitness center or indoor sport facility, • Banks or Automated Teller • Machine (ATM), • Departmental Store, • Taxi or bus stand. • Hotel or Motel, • Guest house,	Other than permitted and permissible

center, art gallery, museum and auditorium • Local and zonal municipal office • Police station, fire station or post office • Shelter home, • Pannahgahh, • Convention Centre		

4.6.8. Mixed Land Use Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Detached/semi-detached homes • Residential apartments • Social institutions (schools, places of worship) • Retail shops, cafes, local businesses, offices for professionals (doctors, lawyers) • Schools, • Clinics, • Community centers, • Public parks, • Transportation hubs (bus stations and public transport terminals) • Small workshops, • Artisan businesses, • Local food production, local manufacturing units • Libraries, post offices,	• Additional housing developments, Housing Schemes, housing societies and residential apartments • Hotels, motels, restaurants, specialized retail outlets. • Day-care centers, health centers, cultural centers. • Cottage industries, home-based businesses, small-scale production units. • Public sports complexes, recreation centers.	• Large-scale housing projects incompatible with zoning. • Hazardous goods stores, large malls, or heavy industry shops. • Large hospitals, forensic labs, military facilities. • Large factories producing hazardous materials, heavy industrial operations. • Sewage plants, waste disposal sites, power plants.

4.6.9. Recreation Zone

Permitted Uses	Permissible (Conditional) Uses	Prohibited Uses
• Public parks, playgrounds, green spaces • Sports facilities (fields, courts, pools) • Community/recreation centers • Nature preserves	• Commercial amenities (e.g., cafés) • Event venues (festivals, concerts) • Campgrounds/RV parks • Private recreational facilities (marinas)	• Industrial activities (factories) • Heavy commercial (malls) • Residential housing (high density)

• Accessory uses (parking, restrooms) • Educational facilities (nature centers)	• Small-scale lodging (eco-lodges) • Temporary uses (farmers' markets)	• High-impact infrastructure (highways) • Polluting uses (landfills) • Intensive agriculture (livestock farming) • Waste disposal facilities • Transport depots/terminals

5. LEGAL & INSTITUTIONAL FRAMEWORK

5.3. Legal Framework for Implementation of District Land Use Plans

Under the Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021, the implementation of District Land-Use Plans involves a structured process. Initially, the Planning Control Authority or designated unit formulates the plan, which is then reviewed and approved by the Provincial Land-Use and Building Control Council. Once approved, the plan is officially notified, and public consultations may be conducted to raise awareness. The plan is integrated with broader urban and infrastructure plans to ensure alignment with development goals and service provision. Landowners and developers must ensure their activities comply with the plan, with the Planning Control Authority monitoring compliance and enforcing regulations through inspections and notices. Applications for land-use and development permissions must align with the plan. The plan is subject to periodic reviews and updates, with significant changes leading to amendments. The Planning Control Authority monitors implementation, prepares regular reports, and resolves disputes through the Appellate Tribunal, ensuring effective and organized land development across Khyber Pakhtunkhwa.

5.3.1. Constitution and Functions of the Council

The Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021 establishes the Provincial Land-Use and Building Control Council, a key body responsible for overseeing land-use and building regulations. The Council is chaired by the Chief Minister of Khyber Pakhtunkhwa, with the Minister for Local Government, Elections, and Rural Development serving as the Vice Chairperson. The Council's membership includes various provincial ministers—such as those for Agriculture, Industries, and Environment—as well as senior officials from the Planning and Development Department, the Board of Revenue, and other government departments. Additionally, the Council features five experts, with at least three from the private sector, who are nominated by the Chairperson. The Director General of the Authority acts as the Member-cum-Secretary. While co-opted members with specific expertise may be invited for discussions, they do not possess voting rights. Members are expected to attend all meetings and may receive honoraria, particularly those from the private sector. Terms for members from clause (q) are three years, renewable, and vacant seats must be filled within one month.

The Council’s functions are multifaceted. It is responsible for approving policies and guidelines related to the Authority’s operations, reviewing and endorsing urban policies, physical planning standards, and land-use regulations proposed by the Authority. The Council oversees the creation and modification of strategic and master plans, including district land-use plans, and approves the Authority’s annual budgets. Additionally, the Council manages financial provisions for private sector expert members and oversees the preparation and implementation of various plans, providing directives as needed.

Meetings of the Council are chaired by the Chief Minister or, in their absence, by the Vice Chairperson. The Council is required to meet at least bi-annually, though additional meetings may be convened at the Chairperson’s discretion. A quorum for meetings is two-thirds of the total members, and the Council determines its own procedural rules.

5.3.2. Provincial Land-Use and Building Control Authority

The Act also establishes the Provincial Land-Use and Building Control Authority as a corporate entity with perpetual succession, capable of managing property, entering into agreements, and engaging in legal actions. The Council serves as the Board of Directors for the Authority, which is headquartered in Peshawar with the option to open sub-offices across the province. The Authority's actions are authenticated by the Director General, who is supported by the Urban Planning Policy Unit of the Planning and Development Department.

The Director General leads the Directorate General, overseeing the Authority’s operational aspects. Responsibilities include proposing and recommending planning standards, land-use guidance, and regulatory amendments to the Council, and supervising the development and implementation of master plans, strategic development plans, and district land-use plans. The Director General conducts research, publishes reports, and advises the Council on land conservation, classification, and development, and supervises the District Land-Use Planning and Management Committees. The Director General may be appointed from a panel of recommended candidates or through direct recruitment. This role involves administrative and financial management of the Authority, preparation of meeting agendas,

implementation of Council decisions, progress monitoring, and compliance management, including recommending inquiries into non-performance.

This comprehensive framework under the Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021, aims to ensure organized development and regulatory compliance across the province, fostering effective land-use planning and building control.

5.3.3. District Local Enforcement Unit

The planning regulation outlines the establishment of a Local Planning and Enforcement Unit in each district to ensure effective land-use management. This Unit comprises a Chief Planning Control Officer, Planning Control Officers, Inspectors, and additional staff appointed by the government in consultation with the relevant authority. The Chief Planning Control Officer is responsible for the administration and operational functions of the Unit and reports directly to the District Land-Use Planning and Management Committee. Moreover, the Chief Officer is required to maintain coordination with local governance bodies, including the Chairperson of the Tehsil Council, City Mayor, Tehsil Municipal Officer, Director of the Urban Area Development Authority, as well as Deputy and Assistant Commissioners. This inter-agency coordination ensures transparency and accountability, particularly in identifying and reporting deviations from approved land-use and master plans.

The Unit's primary responsibilities include supporting the District Land-Use Planning and Management Committee in conducting surveys and preparing district land-use and master plans. It is also tasked with ensuring the implementation of relevant legislative provisions within its jurisdiction. Furthermore, the regulation empowers the government to appoint Planning Control Officers and Inspectors as required, and to authorize other agencies or designated officials to perform these roles during the enforcement period of the Act. Overall, this chapter emphasizes a structured, collaborative, and compliance-driven approach to land-use governance at the district level.

5.3.4. District Land-Use Planning and Management Committee

The District Land-Use Planning and Management Committees are constituted as institutional mechanisms to oversee and guide land-use governance at the district level in accordance with statutory provisions. Each committee is chaired by the Deputy Commissioner and comprises key departmental heads and representatives from local councils, with the Additional Deputy Commissioner (Finance and Planning) serving as both a member and the Secretary. The committees are mandated to convene on a monthly basis or as required, with a two-thirds quorum necessary for proceedings. Their core functions include the facilitation and supervision of land-use surveys, zoning activities, strategic and master planning, and coordination with local government bodies. They are also responsible for reviewing no-objection certificates (NOCs), development permissions, and recommending land-use plans to the relevant Authority for approval. Additionally, the committees are empowered to take enforcement action against unauthorized developments and violations of approved land-use plans. The inclusion of co-opted members with technical expertise further strengthens the committee’s capacity for informed decision-making. These provisions collectively promote a structured, accountable, and efficient approach to district-level land-use planning and management.

5.3.5. Planning Control Permissions

Under the Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021, certain permissions are required for land and building developments. These include both land-use and development permissions. Land-use permission is necessary for any land or building unless specifically exempted by the Act, while development permission is required for any land development or building construction. It is important to note that land-use permissions granted before the commencement of this Act will still be subject to its provisions.

5.3.6. Land Use Permission

To obtain land-use or master planning permissions, applications must be submitted to the Planning Control Officers. These applications need to be in the prescribed format and include all necessary documents, along with any additional documentation that the Planning Control Officer may request. Only the landowner or their authorized representative is eligible to apply for land-use permission.

When a land or building use does not comply with the district land-use plan, the owner must submit a land-use conversion plan within three months of the notification of the plan. If the owner fails to submit a plan, the Planning Control Officer will issue a notice requiring submission within 30 days. Should the plan still

not be provided, the Planning Control Officer will create and issue a conversion plan on behalf of the owner. Owners must align their land or building use with the issued conversion plan.

5.3.7. Development Permissions

The Act defines three types of development permissions: land development permissions, road remodeling permissions, and building permissions. Applications for these permissions must be accompanied by the prescribed fee.

Applications for development permissions should be submitted to the Planning Control Officer, following the prescribed format and including all necessary documents. Additional documentation may be requested by the Planning Control Officer. Land development and building permissions can only be requested by the property owner or their authorized representative, whereas road remodeling permissions can be requested by relevant authorities or entities.

Certain exemptions apply to building permissions. Specifically, no building permission is required for constructions based on standard designs notified by the Authority. Similarly, repairs, rehabilitation, or renovation of historic buildings, provided they have the approval of the relevant authority, are exempt from building permission requirements.

Owners of buildings that do not comply with the district land-use plan must submit a building conversion plan within three months of the notification of the plan. If no plan is submitted, the Planning Control Officer will issue a notice requiring submission within 30 days. Should the plan still be lacking after this notice, the Planning Control Officer will create and issue a conversion plan. Compliance with the issued conversion plan is mandatory for all building owners.

This framework provides clear procedures for obtaining and managing planning and development permissions, ensuring adherence to land-use and building regulations, while also allowing for necessary modifications and exemptions.

5.3.8. Certificates and Renewal of Building Stock

Under the Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021, a compliance certificate is mandatory for anyone who has obtained development permission. This certificate must be submitted within the time specified in the development permission and must confirm that the development has been executed in accordance with the granted permissions and applicable regulations. The compliance certificate should adhere to the form and include the documents specified by the Authority or any additional documents requested by the Planning Control Officer. If the Planning Control Officer determines that the development aligns with the permissions and regulations, they will issue the compliance certificate.

Buildings may be subject to renewal regulations, and owners are required to renew their buildings in accordance with these regulations.

5.3.9. Improvement of Urban Design

Improvement proposals are necessary if an area's urban design is deemed poor or if directed by the Government. These proposals must include a land use change plan (if required), a redevelopment plan, a building stock renewal program (if necessary), cost estimates for the redevelopment and renewal programs, any required changes in development and ownership, and steps to ensure a smooth transition to the planned development. Land use change plans will follow the procedures outlined in Section 18 of the Act.

When land use changes occur, an infrastructure change proposal must be formulated within 60 days. This proposal will include directives for utilities and agencies to plan for the municipal services required to support the new land use.

The Unit has the authority to prepare and execute schemes, direct government agencies, standardize building plans, acquire land, enter into public-private partnerships, reallocate land and building rights with Government approval, and support the establishment of Real Estate Investment Trusts (REITs).

A betterment fee may be charged to cover the costs of improvement or infrastructure proposals, with prior Government approval. This fee is based on the ownership of physical assets and may be recovered as arrears of land revenue. It can cover all or part of the costs associated with improvements.

If the full cost of improvements is not covered by the betterment fee, a development charge may be imposed on the owners of physical assets who have benefited from the development. This charge is

payable upon the sale or lease of the asset exceeding 11 months. It correlates with the development costs and may be recovered as arrears of land revenue, subject to Government approval.

5.3.10. Enforcement and Penalties

Planning Control Officers are responsible for assessing and evaluating planning permissions, while Planning Control Inspectors handle unauthorized land use and development and prepare contravention reports.

Authorized officers have the power to seal buildings or structures for violations of the Act, rules, or regulations. They may also attach areas or open spaces for such violations.

Penalties for offenses are specified in the First Schedule of the Act. These offenses are cognizable and non-bailable. No court can take cognizance of these offenses except on a complaint by an authorized officer or the District Land-Use Planning and Management Committee. The Code of Criminal Procedure, 1898 applies to offenses under this Act.

The Government will establish an Appellate Tribunal to hear appeals against decisions or orders issued by the Authority or its officers. The Tribunal will consist of a chairperson and two expert members. Appeals must be filed within 15 days of receiving the decision. The Tribunal's decisions are final, and its members will serve a three-year term. Directors and officers of corporate bodies are responsible for offenses under this Act unless they can prove otherwise.

5.3.11. Inspection

The Government may establish an external Land Use Inspectorate to monitor enforcement of the Act. This Inspectorate will include a Chief Inspector and Deputy Chief Inspectors and will be funded by the Government.

The Chief Inspector and Deputy Chief Inspectors have the authority to inspect records, enter premises, and obtain court records related to the enforcement of the Act.

Inspections will follow an annual schedule prepared in consultation with the Authority. Unannounced inspections may only occur on the Department's directions. Draft findings from inspections will be shared with enforcement officials for feedback, and final reports will be provided to the relevant authorities.

5.3.12. Inclusion of Technical Experts in District Planning framework

In order to ensure a robust and effective decision-making in district land-use planning, the framework requires the active participation of technical experts, a provision made possible through the co-option of members in the District Land-Use Planning and Management Committee, in collaboration with the newly established Local Planning and Enforcement Unit. Some strong alternatives include:

- Inclusion of local enforcement unit in District Land-Use Planning
- Engagement of Urban Planners, GIS Experts for District-Level Planning
- Integration of specialized workforce for effective Land-Use Planning
- Integration of Sectoral Expertise in District Committees
- Appointment of Technical Consultants for Planning Oversight
- Expert Advisory Mechanism for District Planning Committees
- Involving Technical Experts in District Land-Use Planning

5.4. Institutional Gaps and Implementation Strategy

Despite the presence of a legislative and administrative framework for land use planning at the provincial and district levels, effective implementation remains hindered by several institutional shortcomings. Key challenges include limited technical and human resource capacity, poor inter-agency coordination, weak monitoring and enforcement mechanisms, and minimal stakeholder engagement. Local planning units often operate without qualified professionals such as urban planners and GIS experts, leading to delays in plan preparation, poor compliance, and ineffective development control. Fragmented mandates, cumbersome regulatory processes, and lack of data-sharing protocols further exacerbate inefficiencies and duplication of efforts.

5.4.1. Institutional Gap Analysis and Actionable Mechanisms

To address these issues, a set of targeted, actionable mechanisms has been developed to strengthen institutional performance and bridge the gap between planning and implementation. These include establishing formal coordination bodies, implementing training programs, introducing GIS-based monitoring tools, reforming regulatory procedures, and creating participatory platforms for community engagement. The following table outlines the key institutional gaps and corresponding strategies designed to enhance accountability, coordination, and responsiveness in the planning system.

Table 5-1: Gap Analysis and Actionable Mechanisms

Identified Gap	Detailed Description	Proposed Mechanism / Action Plan	Responsible Institutions
Fragmented Inter-Agency Coordination	Agencies at provincial, district, and tehsil levels often operate in silos with unclear communication and reporting lines. This leads to duplication of work and conflicting decisions in planning and enforcement.	• Establish formal coordination committees at each level. • Conduct quarterly inter-departmental coordination meetings. • Develop shared digital dashboards for real-time data sharing.	District Planning Committees
Inadequate Institutional Capacity	District and tehsil-level units often lack adequately trained urban planners, GIS experts, data analysts, and enforcement officers, limiting the quality and timeliness of plan implementation.	• Launch mandatory training & certification programs for planning staff. • Hire technical staff through P&D-led recruitment. • Allocate dedicated funds for technical equipment and planning software.	Planning Control Authority, P&D Department
Weak Monitoring and Enforcement System	Lack of real-time monitoring tools and irregular site inspections lead to unauthorized developments going unchecked.	• Integrate GIS-based monitoring systems. • Schedule routine and surprise inspections. • Publish quarterly compliance and enforcement reports. • Establish citizen complaint response mechanisms.	Inspectorate Wing, District Enforcement Units, Planning Control Officers
Obsolete Land Use Data and Delayed Updates	Land use plans are often based on outdated or incomplete data, and there is no structured timeline for their periodic review.	• Make five-year plan revision mandatory by regulation. • Institutionalize data collection using satellite imagery and public surveys. • Create a rolling update mechanism at the district level.	DG of Authority, District Committees, Urban Planning Policy Unit
Limited Community Engagement and Public Awareness	Citizens remain unaware of land-use regulations, their responsibilities, or the grievance redressal mechanisms available to them.	• Launch public education campaigns (radio, TV, social media, town halls). • Establish digital portals for plan access and feedback. • Form citizen advisory groups for plan reviews.	District Committees, LG Department, Communication & Outreach Unit
Ambiguous Regulatory Roles and Overlaps	Institutional mandates are sometimes overlapping or undefined, resulting in confusion over responsibilities (e.g., plan approval vs enforcement).	• Revise and harmonize regulations to clearly demarcate roles. • Issue standard operating procedures (SOPs) for plan	Provincial Council, Law Department, DG LU&BCC Authority

Identified Gap	Detailed Description	Proposed Mechanism / Action Plan	Responsible Institutions
		review, approval, and monitoring. • Set up grievance handling protocols for inter-agency disputes.	
Lack of Specialized Technical Input in Decision-Making	Strategic decisions are often made without input from subject experts, resulting in plans that may lack technical depth.	• Form Expert Advisory Panels with GIS, climate, transport, and housing experts. • Involve academia and research institutes in plan review stages. • Institutionalize co-opting of experts in District Committees.	Planning Control Authority, District LU Committees, P&D Experts Pool
Insufficient Funding for Implementation	Planning and enforcement units face budgetary constraints that affect staffing, technology adoption, and project execution.	• Introduce dedicated development and enforcement budget lines. • Mobilize funding through betterment charges and public-private partnerships (PPPs). • Explore federal and donor funding for capacity building.	Finance Dept., LU&BCC Authority, District Governments
Weak Legal Enforcement and Appeal Mechanisms	Legal processes for penalizing violations or resolving appeals are often slow and cumbersome, reducing the credibility of enforcement.	• Strengthen the Appellate Tribunal with adequate staffing and infrastructure. • Simplify and digitize appeal filing processes. • Publicly disclose tribunal decisions to ensure transparency.	Appellate Tribunal, Law Department, DG LU&BCC Authority
Disconnected Infrastructure Planning	Land-use decisions are not always aligned with utility and transport infrastructure planning, creating long-term inefficiencies.	• Mandate joint planning between land-use and infrastructure agencies. • Require infrastructure feasibility reports with all major land-use changes. • Create integrated spatial development models.	LG & Public Health Engineering, Transport Department