URBAN POLICY AND PLANNING UNIT
PLANNING AND DEVELOPMENT DEPARTMENT
GOVERNMENT OF KHYBER PAKHTUNKHWA

MASTER PLAN OF URBAN CENTER OF KHYBER PAKHTUNKHWA DIVISIONAL AND SELECTED DISTRICT HEAD QUARTER CITIES PACKAGE 4

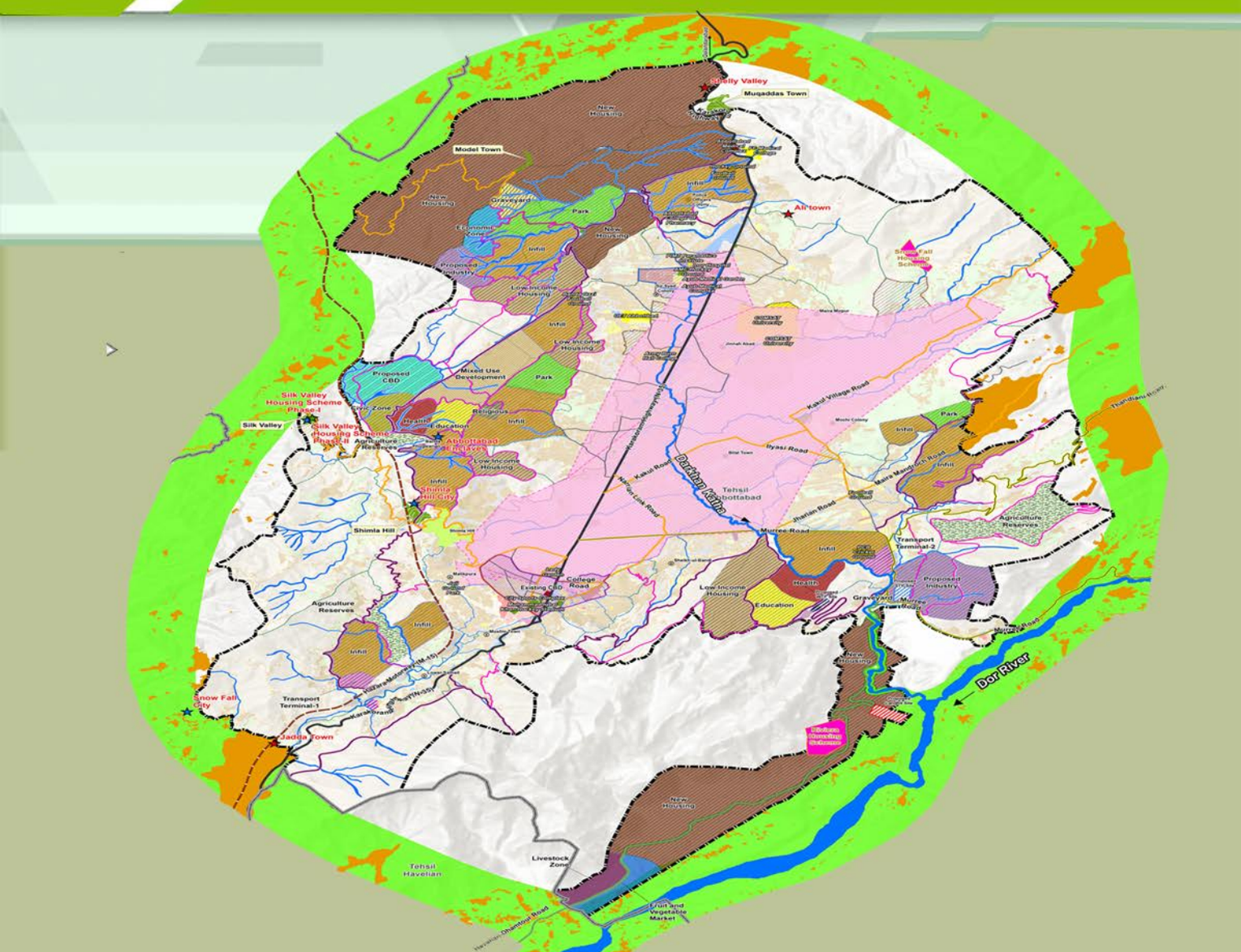
(ABBOTTABAD,HARIPUR)

SUSTAINABLE AND LIVABLE ENVIRONMENT
ABBOTTABAD

TASK- C

REPORT ON MASTER PLAN STRATEGIC SCENARIO DEVELOPMENT/ MAPPING

ABBOTTABAD



JUNE, 2024

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CLEARANCE CODE : 4234/311/M/04(24) DOCUMENT NO:4234-04 REV NO:2

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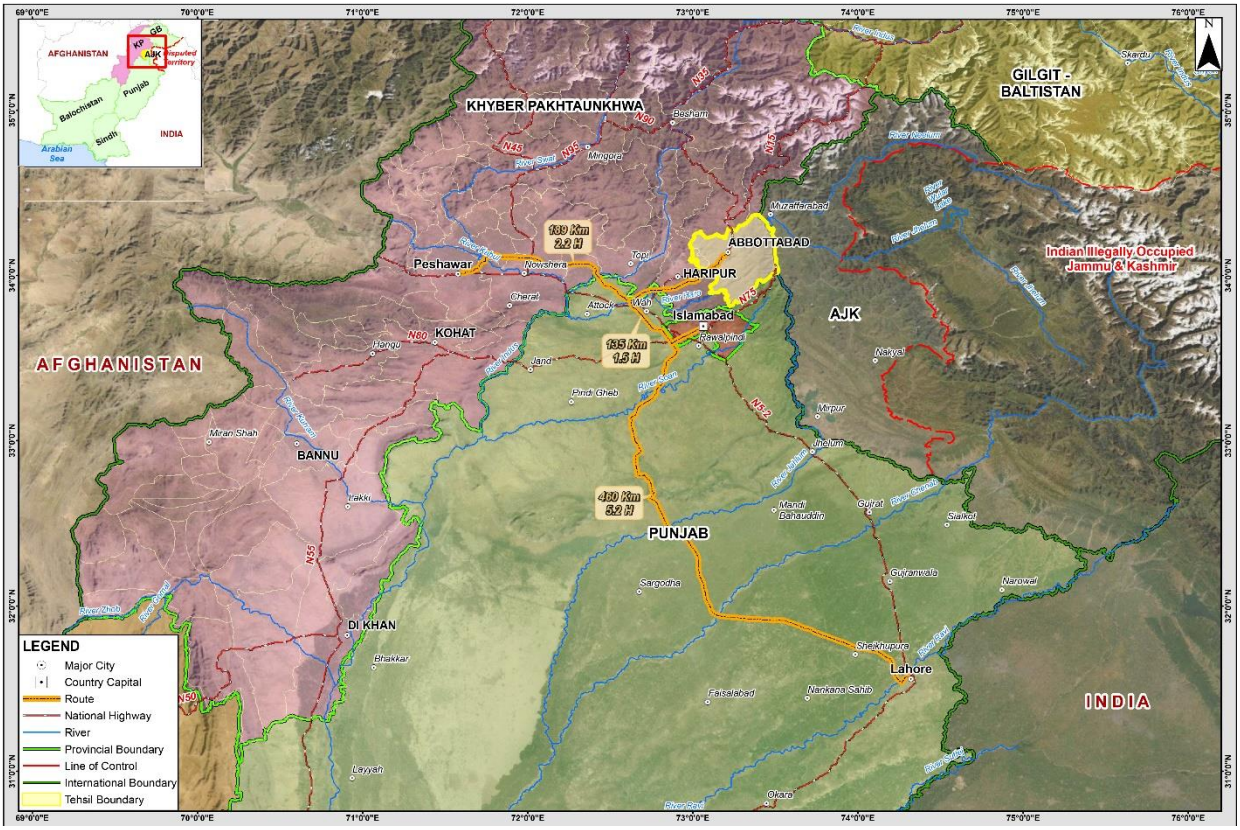
MASTER PLAN STRATEGIC SCENARIO DEVELOPMENT/ MAPPING REPORT

1. EXISTING SPATIAL CONFIGURATION AND URBAN FORM OF ABBOTTABAD

Abbottabad is the capital city of Hazara Division of eastern Khyber Pakhtunkhwa. Abbotabad City is about 135 km north of Islamabad & Rawalpindi, and 189 km east of Peshawar, at an altitude of 1,256 m (4,121 ft). Kashmir lies to the east. Location of **Abbottabad District** is shown in **Map 1.**



Map 1 Location of District Abbottabad

The total area of Abbottabad District is 1,967 kms^2 with a population size of 1,332,912 (2017 censes), which comprises of 53% (approx.) Male, and 47% Female population. Abbottabad district is divided into two tehsils, Abbottabad Tehsil and Havelian Tehsil as well as one urban administration area Nawan shehr.

Table 1-1 Administrative Set-up Abbottabad

Description	Number
Tehsils	02
Neighborhood Councils	14
Village Councils	195
Cantonment	02

1.1 Delineation of Project Boundary

To ensure comprehensive urban planning and development for Abbottabad, the proposed project area is strategically defined to remain within the Abbottabad Tehsil boundary of the city. This demarcation is informed by an analysis of the city's historical growth patterns and spatial trends, which have shaped its current physical footprint. The project area encompasses the existing administrative boundaries of Abbottabad, including the limits of Neighborhood Councils (NCs) and Village Councils (VCs). All Neighborhood Councils of Abbottabad Tehsil are included in the project area to facilitate coordinated urban management.

Additionally, the project incorporates adjoining Village Councils where development has extended in continuity with Abbottabad's urban zones, thereby recognizing the evolving nature of the city's periphery. The administrative boundaries of these Village Councils are considered, particularly at the urban fringe where the transition from rural to urban is evident. Key urban development features, along with planned or anticipated developments, are integral to understanding the city's growth dynamics. Population and development densities in the urban-rural fringe are also crucial factors in shaping the planning process. The proposed project area, covering approximately 101 square kilometers, includes a mix of 11 Neighborhood Councils and 18 Village Councils, addressing both expected infill areas and planned expansions to support sustainable urban growth.

The project area covers 25,035 Acres having population 273,168 person. The Project area along with boundary is shown in the Map-2 below:

Table 1-2 Current Population of the Project Area

Category	GR Used for Projection	Population
NC	2.73	105,917
VC	2.08	167,251
Total Population (2020)		273,168

In the above table, the population data for NCs is derived from Abbottabad urban growth rates. Additionally, the proportionate population of adjacent VCs is taken into account.

Table 1-3 Population Projection 2020-2042

Sr. No.	Year	Population Projected
1.	2020-2023	285,465
2.	2023-2027	318,697
3.	2027-2032	355,819
4.	2032-2037	397,287
5.	2037-2042	443,614

In the above table, the yearly population projection is displayed, utilizing a methodology involving three distinct methods: the Mathematical Method, Arithmetic Method, and Geometric Increase/Progression Method. These techniques are employed to extrapolate future population trends by analyzing historical data and growth patterns. Subsequently, the average population is calculated based on the results obtained from applying these methods for projection.

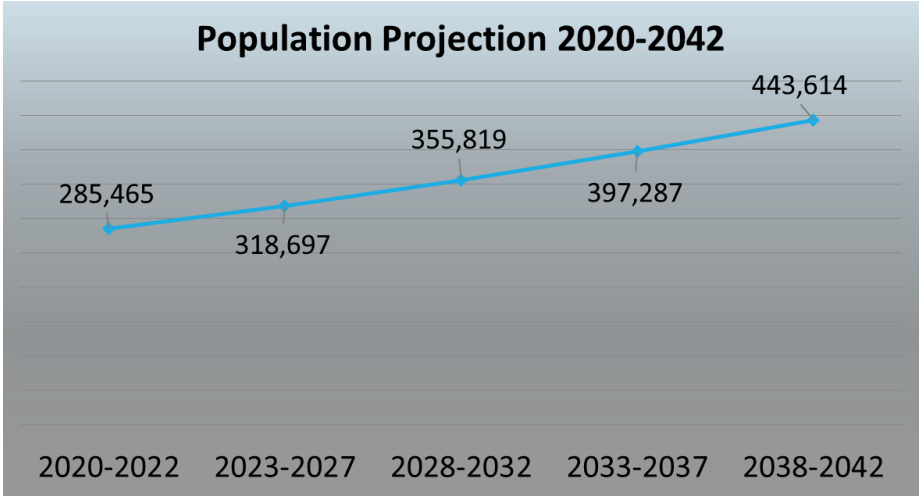
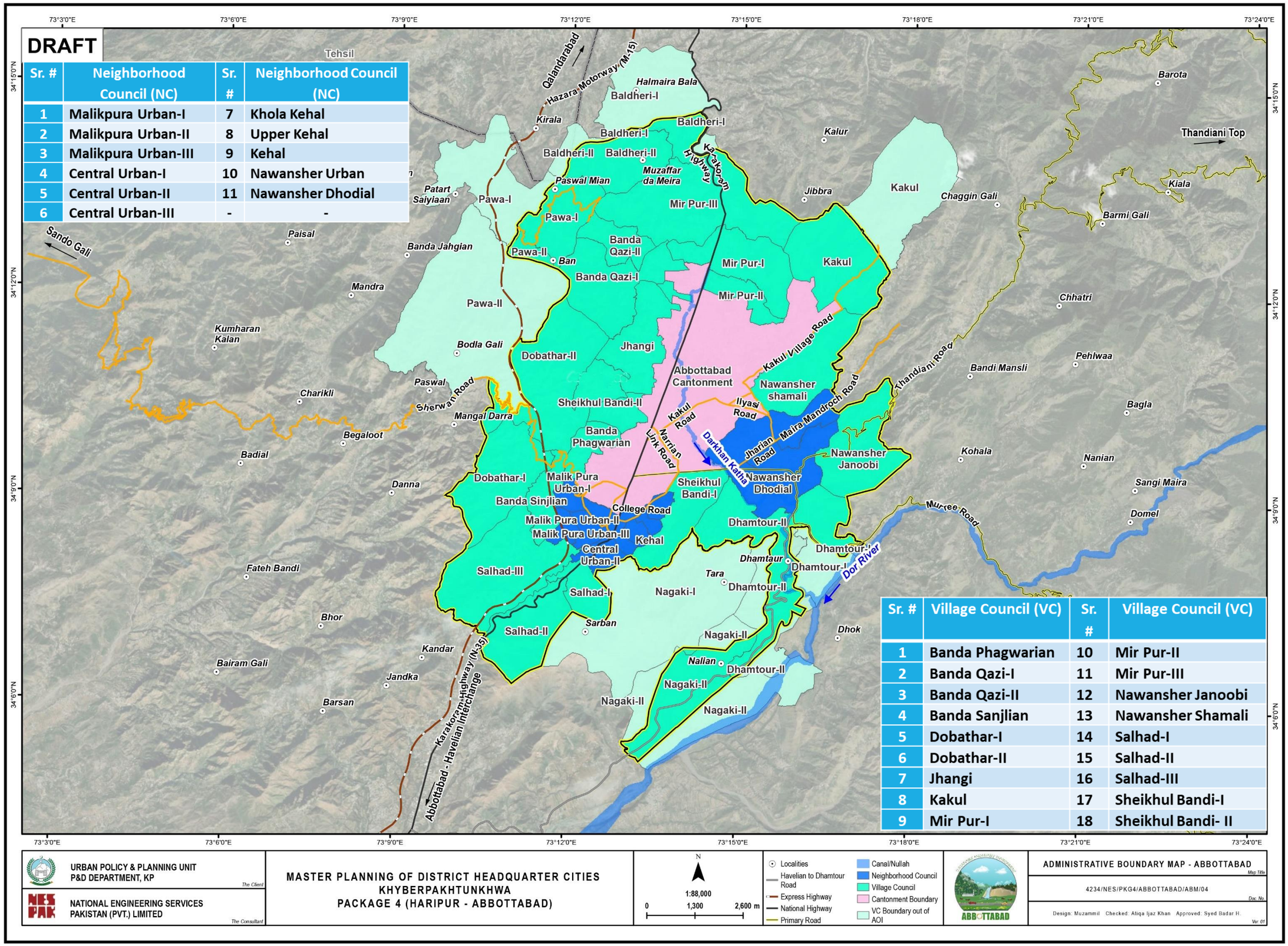


Figure 1-1 Population increase Curve

In addition, the figure visually portrays the curve illustrating the gradual increase in population on a yearly basis.



Sr. #	Neighborhood Council (NC)	Sr. #	Neighborhood Council (NC)
1	Malikpura Urban-I	7	Khola Kehal
2	Malikpura Urban-II	8	Upper Kehal
3	Malikpura Urban-III	9	Kehal
4	Central Urban-I	10	Nawansher Urban
5	Central Urban-II	11	Nawansher Dhodial
6	Central Urban-III	-	-

Sr. #	Village Council (VC)	Sr. #	Village Council (VC)
1	Banda Phagwarian	10	Mir Pur-II
2	Banda Qazi-I	11	Mir Pur-III
3	Banda Qazi-II	12	Nawansher Janoobi
4	Banda Sanjlian	13	Nawansher Shamali
5	Dobathar-I	14	Salhad-I
6	Dobathar-II	15	Salhad-II
7	Jhangi	16	Salhad-III
8	Kakul	17	Sheikhul Bandi-I
9	Mir Pur-I	18	Sheikhul Bandi- II

URBAN POLICY & PLANNING UNIT
P&D DEPARTMENT, KP
The Client

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LIMITED
The Consultant

MASTER PLANNING OF DISTRICT HEADQUARTER CITIES
KHYBERPAKHTUNKHWA
PACKAGE 4 (HARIPUR - ABBOTTABAD)

N
1:88,000
0 1,300 2,600 m

Localities
Havelian to Dhamtour Road
Express Highway
National Highway
Primary Road
Canal/Nullah
Neighborhood Council
Village Council
Cantonment Boundary
VC Boundary out of AOI

ABBOTTABAD

ADMINISTRATIVE BOUNDARY MAP - ABBOTTABAD
Map Title

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Design: Muzammil Checked: Atiqa Ijaz Khan Approved: Syed Badar H.
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Map 2 Boundary of Project Area

In 2003, the urban area of Abbottabad was 29.20 sq km refer Figure 1-2. and in 2010, the Urban area of Abbottabad was 32.68 sq km refer Figure 1-3. Mostly the areas densified with Residential areas and Roads connected with N35 highway. Murree Road is the other major highway that runs through the city. It enters the city at the village of Barrian and joins the Karakorum Highway inside the cantonment. Area was also developed around Ayub Medical complex. But there is less development around Chunkai, Thanda Choa and Kihal areas.

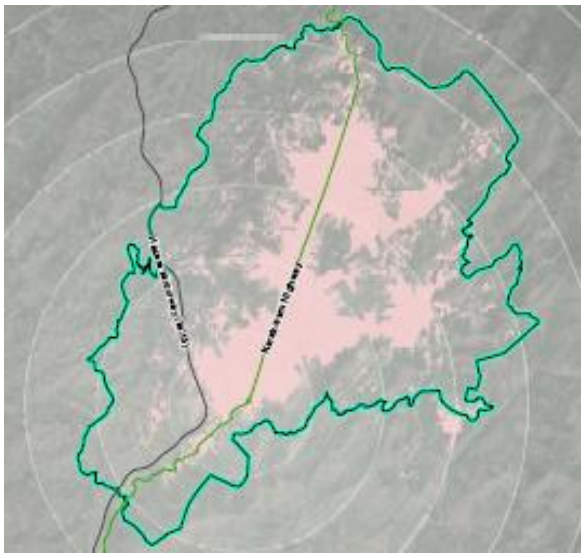


Figure 1-3 Spatial growth Trend in

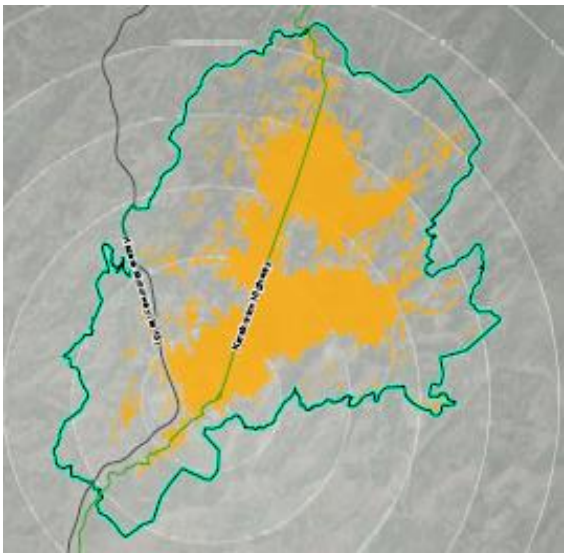


Figure 1-2 Spatial growth Trend in 2010

In 2017, the Urban area of Abbottabad was 38.44 sq km. Mostly the area was densified along N35, Murree Road, Kakul road and Chunkari Road. In 2017, development trend occurs near Abbottabad medical complex, Fawara chowk, M15 near Shimla Pahari Park, Jinnah Road refer Figure 1-4.

In 2022, the urban area was 38.55 sqkm, the area developed along Hazara Motorway. The development growth trend is along Chunkari road near Pakistan military academy refer Figure 1-5.

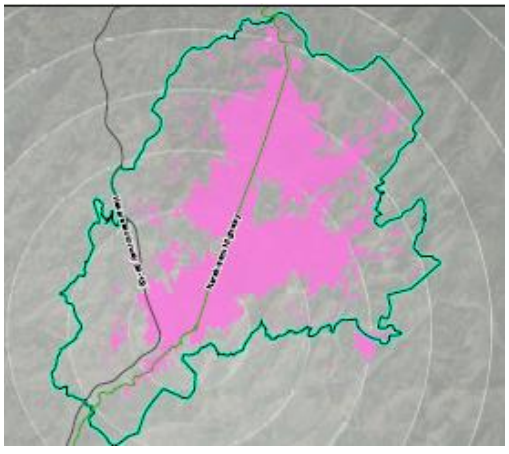


Figure 1-4 Spatial growth Trend in 2017

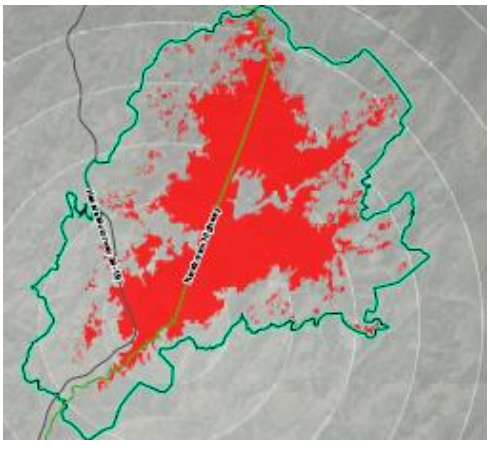
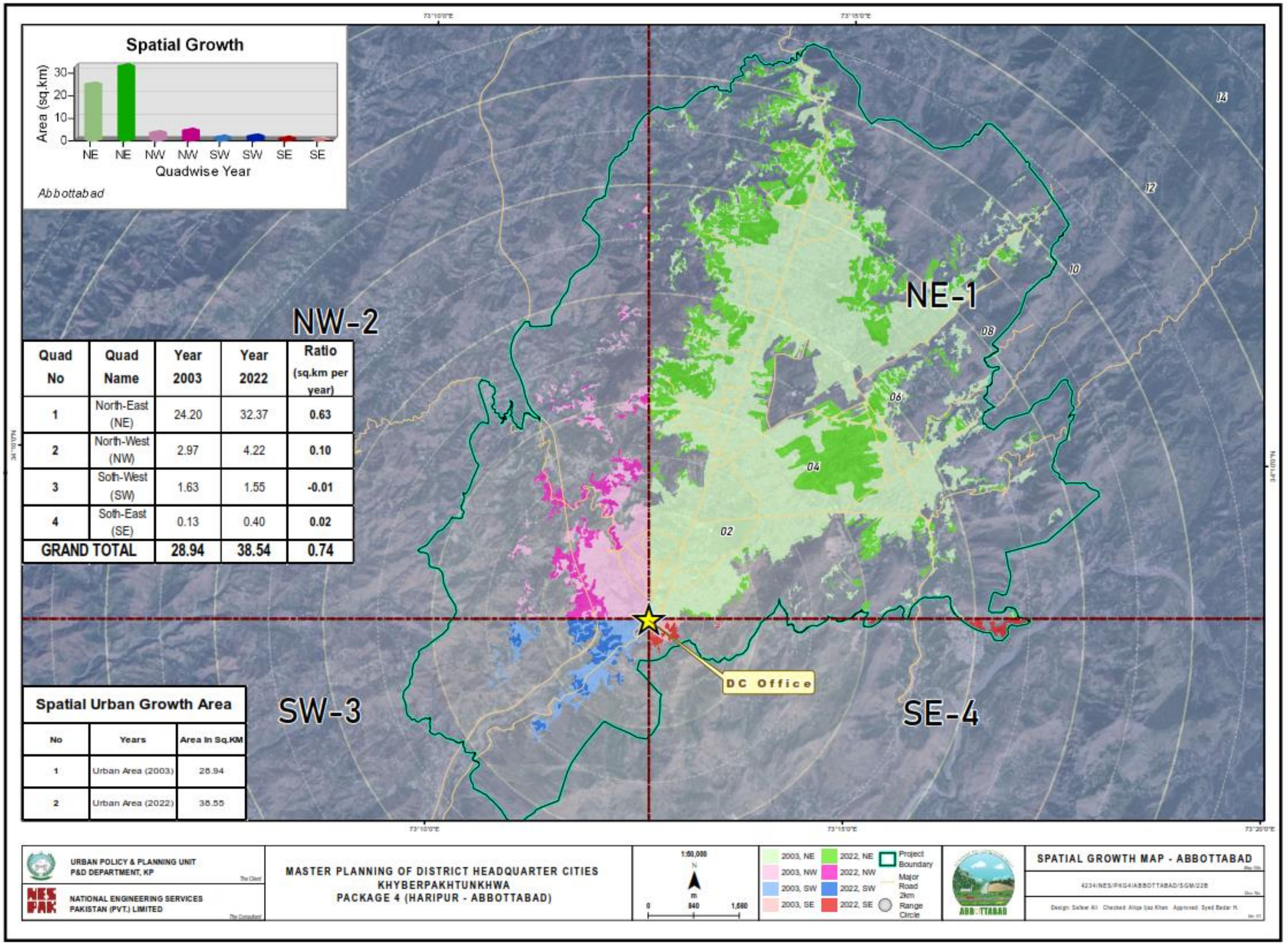


Figure 1-5 Spatial growth Trend in 2022

Table 1-4 Estimated Urban Area for Year 2003, 2010, 2017, & 2022

Sr. No.	Years	Area In Sq.KM	Area in Acres	%
1.	2003	29.2	7215.48	
2.	2010	32.68	8075.40	**11.9%**
3.	2017	38.44	9498.73	**31.6%**
4.	2022	38.55	9525.91	**32.0%**

From 2003 the urban area of Abbottabad City expands by 11% in 2010, 31% in 2017 and in 2022 its area expands up to 32% as shown in Map-3 Below.



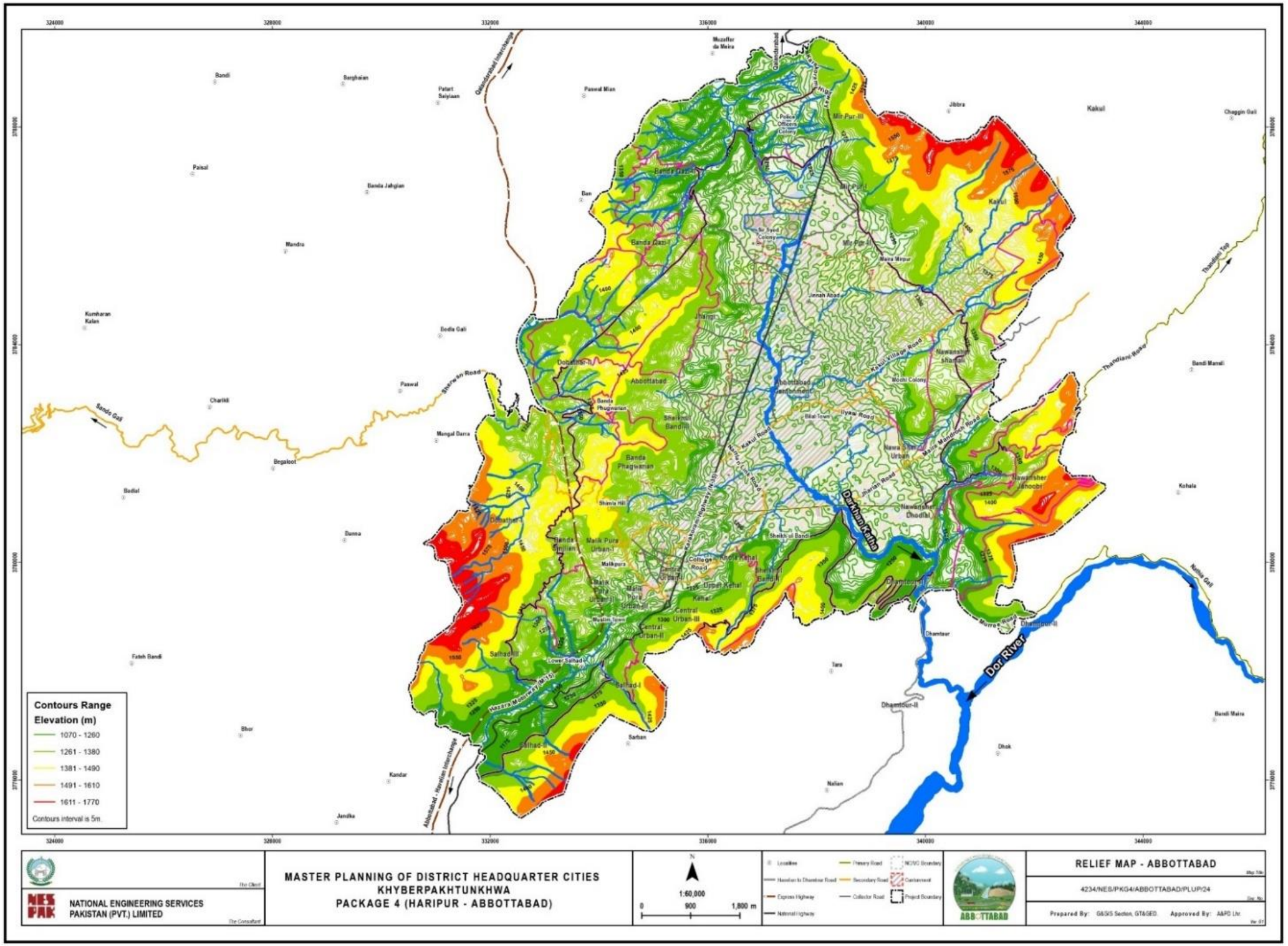
Quad No	Quad Name	Year 2003	Year 2022	Ratio (sq.km per year)
1	North-East (NE)	24.20	32.37	**0.63**
2	North-West (NW)	2.97	4.22	**0.10**
3	Soth-West (SW)	1.63	1.55	**-0.01**
4	Soth-East (SE)	0.13	0.40	**0.02**
GRAND TOTAL		**28.94**	**38.54**	**0.74**

Map 3 Spatial Growth Map of Abbottabad

The existing City has been growing in unplanned manner instead of following any physical development plan or any planning policy resulting in haphazard and uncoordinated development in different sectors

The linear as well as urban expansion in patches shows that the city has the strength to be developed in a sustainable manner along with the fringes and civic communities. Moreover, the proposal of low-class residential zones along industrial zone, fault lines and water bodies would develop a new direction of city's growth towards South and West. The provision of New CBD in West depicts that the city would not have only one center to grow rather it would grow in multiple points and through multiple commercial avenues. The proposed new road along with residential zone will serve the purpose of residential suburb and the proposed Road will help to accommodate heavy traffic flows and enable faster movement of goods and services, as well as people. This road would be designed as major urban Arterial serving as a reliable transport corridor for newly developed zones. The proposed road would also have a significant impact on the local economy by improving accessibility to business districts and industrial zones. This could potentially attract new investments and create employment opportunities, boosting economic growth in the region.

Contour map with contour interval of 5 meters is shown in the Map-4 below which provide detailed information about the terrain, environmental features, and accessibility etc.



Map 4 Contour Map of Abbottabad

The existing Land use classification of Abbottabad City in terms of percentages has been studied in the light of National Reference Manual (NRM). The total area is around 25,035.60 Acres, out of which 60.35% is non-built-up area, while 39.65% is built up. The non-built-up area mainly includes agriculture fields, Canal/ Nullah, which are considered as protected/ reserved in NRM and brown fields/ vacant land. The comparison of existing land use as per NRM[1] Standards is shown in the table below:

Table 1-5 Abbottabad Land Use Classification[2]

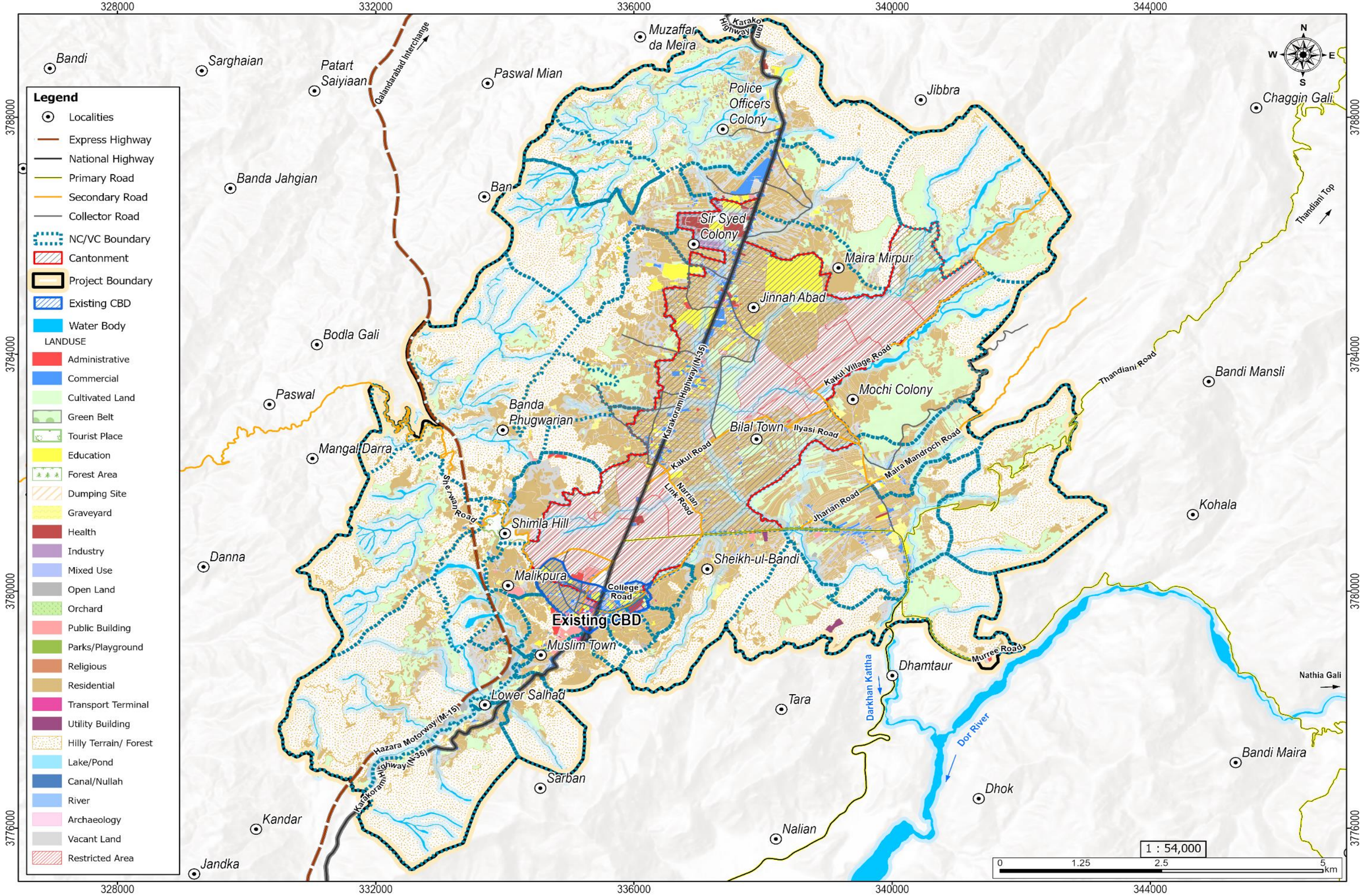
Sr. No.	Existing Land Uses	Areas	Percentages	NRM Standards	
		(acres)	%		
1	Residential	3,814.27	15.24%	Residential	40-45%
2	Commercial	204.77	0.82%	Commercial	2-3%
3	Industry	3.58	0.01%	Industrial	2-10%
4	Mixed Land use	99.33	0.40%		
5	Cantonment	4,495.02	17.95%	-	-
6	Public Buildings	152.03	0.61%	Institutional	3-5%
7	Health Facilities	26.60	0.11%		
8	Educational Facilities	161.79	0.65%		
9	Religious	32.89	0.13%		
10	Parks and Playgrounds	34.90	0.14%	Recreational	4-6%
11	Graveyard	141.01	0.56%	Graveyard	2-3%
12	Roads Network	746.87	2.98%		5-20%

[1] Standard Land Use Classification for Urban Jurisdictions in Pakistan Appendix 10.1, page no. 398, National Reference Manual on Planning and Infrastructure Standards
[2] These areas are calculated from Existing Land use Map of Abbottabad City

Sr. No.	Existing Land Uses	Areas (acres)	Percentages %	NRM Standards	
13	Transportation	7.55	0.03%	Arterial Circulation and Terminals	
14	Utility Services (Dumping site /disposal Station etc.	7.12	0.03%	-	-
Sub-Total: Built Up Area		**9,927.73**	**39.65%**		
15	Agricultural Land	3,072.87	12.27%	Protected Reserved	15-25%
16	Canal/ Nullah	346.48	1.38%	-	-
17	Brown Fields / Vacant Land	868.94	3.47%	-	-
18	Hilly Terrain	10,719.90	42.82%	-	-
19	Open Land	99.68	0.40%	-	-
Sub-Total: Non - Built Up Area		**15,107.87**	**60.35%**		
Total Area		**25,035.60**	**100.00**		

It is observed that the percentages of all built up land uses like; residential, commercial, industrial, institutional, recreational, graveyard and circulation are low, while protected / reserved is high, in comparison to the NRM Standards. Therefore, for future land use proposal, the area deficiency in each land use classification, is balanced from the excess area of protected /reserved and vacant land.

Existing Land use Map of Abbottabad city is shown in the Map-5 below: -



Map 5 Abbottabad Base Map

2. MULTI CRITERIA ANALYSIS FOR SUITABLE LAND PARCELS

Suitability of Land use based on multi-criteria analysis, which categorized into qualitative and quantitative analysis.

2.1 Qualitative multi-criteria Analysis

Qualitative multi-criteria Analysis which includes;

1. Proximity to administrative zones
2. Use of Protected Lands
3. Capability of Land for Agriculture
4. Location and accessibility,
5. Land availability and valuation,
6. Correlation among land uses and provision of basic utilities and amenities

Table 2-1 Land use Criteria Categories with Description (Qualitative)

Land use Categories	Multi Criteria Analysis
Residential Land Use	
Low Income	• Affordable land prices • Near to employment opportunities • Safe and Secure neighborhoods • Access to public transport • Provision of affordable basic utilities and services • Availability of affordable public sector social amenities • Densely Populated Area • Adjacent to industrial Zone • Provision of Opens spaces/Parks
Middle Income	• Provision of basic utilities and services • Affordable land prices • Low/ Medium density housing with Neighborhood scale characteristics • Safe and secure neighborhoods • Access to public transport and quality roads • Access to social amenities • Less environmental issues • Provision of Opens spaces/Parks
High Income	• High land prices • Connectivity to existing high income areas • Low Density • Safe and secure neighborhoods • Green and clean environment • Good quality road infrastructure • Uninterrupted supply of basic utilities and services • Access to quality social amenities

Land use Categories	Multi Criteria Analysis
Commercial Land use	
New (Proposed) CBD	• Adjacent to new development zones • Access from major roads • High Land Prices • Availability of large land parcels • Adjacent to open and green spaces
Mix Use Development	• Approachable from multiple roads • Existing trend of mix use • Availability of land parcels • Provision of parking spaces • Accessible from public transport
Neighborhood Centers	• Centralized with respect to residential development • Pedestrian friendly • Provision to primary level services of daily use • Ample parking space
Industrial and Economic Land Use	
Industrial Area	• Nearby existing industries • Favorable wind direction • Accessible from major roads • Away from city center • Nearby transport terminals • Close to low-income housing • Provision of green areas
Economic Area	• Access from major roads • Adjacent to transport terminals • Nearby existing economic activities • Away from city center
Civic Services	
Civic Centers	• To be located in city center near CBD • Accessible from major roads • Adjacent to existing civic services
Health Services	
Clinics	• In center of residential neighborhood • Preferably within 0.25 km radius to facilitate pedestrian • Adjacent to open / green spaces
Health Centers	• Accessible from secondary roads • Nearby mix use development • Adjacent to green/ open spaces • Ample provision of parking space
Hospitals	• Accessible from major roads • Nearby existing health facilities

Land use Categories	Multi Criteria Analysis
	• Accessible through public transport • Availability of large land parcel • Adjacent to green/ open spaces • Ample provision of parking space
Education Facilities	
Schools	• In center of residential neighborhood • Preferably within 0.25 km radius to facilitate pedestrian • Adjacent to open / green spaces • Away from noisy or busy areas • Away from major roads i.e. (intercity & primary)
Colleges	• Accessible from secondary roads • Nearby mix use development • Adjacent to green/ open spaces • Adjacent to playgrounds • Ample provision of parking space
University	• Accessible from major roads i.e. (intercity & primary) • Accessible through public transport • Availability of large land parcel • Preferably at outskirts of city
Recreational and Sports Facilities	
Neighborhood Park and Playground	• In centre of residential zones / neighborhood • Preferably within 0.25 km radius to facilitate pedestrian • Accessible for the all-income group
Large /City Level Facilities	• Accessible from major roads • Availability of large land parcel • Preferable at outskirts of city or could be near to the city center • Ample parking space • Nearby existing water resource
Graveyard	
Graveyard	• At outskirts of city • Access from major roads • Low land prices
Transport Facilities	
Transport Terminals	• On outskirts of town • Near industries/ economic zones • Adjacent to provincial roads
Intersections	• At crossings of major roads • To avoid traffic congestion • Nearby significant land marks
Major Roads	• Main connectivity • Occurrence of prime activities

Land use Categories	Multi Criteria Analysis
	• Presence of important land uses
Utilities and Services	
Water Reservoir	• Near to water source • At entry point of water course • At outskirts of city • Accessible from major roads • Not close to prime development
Sewerage Treatment Plant	• At exit point of waste water discharge • Low elevation level • At outskirts of city • Accessible from major roads • Not close to prime development
Landfill Site	• At outskirts/ outside of city • Favorable wind direction • Away from water bodies • Low elevation level • Accessible from major roads • Not close to prime development
Agricultural & Livestock	
Agricultural	• Land with agriculture potential • Presence to water/ irrigation network • Accessible from roads • Away from city center • Local market for supplies and trade • Facilities for forming
Livestock	• Near existing livestock/ dairy farms • Adjacent of agriculture land • Veterinary center availability • Away from city center • Local market for supplies and trade

2.2 Quantitative multi-criteria Analysis

The quantitative multi-criteria analysis involves various parameters related to land uses. Quantitative analysis generates a suitability map using Geographic Information Systems (GIS), which helps identify suitable locations and allocate different zones.

Land suitability contributes towards the identification of compatible patch of land for potential development in regard to better land management; mitigation of land degradation; and designing land use pattern that prevents environmental problems through segregation of competing land uses.

The assessment factors are collected from different sources one of them is a land use survey. The assessment factors for land-use suitability for urban development are as follows.

1. The topographic features including Terrain elevation
2. Land-use type
3. Multi-hazed Zones (Urban flooding, earthquake, etc.)
4. Exposure to geological hazards
5. Proximity to the roads network
6. Proximity to built-up urban areas
7. Land Availability
8. The ecological factors

The land suitability analysis for Abbottabad City has been developed using Geographic Information System (GIS) based approach for land use suitability assessment. The criteria and weights for each activity required for each land use has been arranged on a priority basis in order to assist future development by identifying the areas with physical limitations for various land use alternatives are shown in detail in table 2-2 below. The factors if not suitable for development lies under 0-5 weight and if suitable for development lies under 6-10 weight: These weightage criteria help in identifying the suitability of land uses within each zone. By weightage criteria, identify and prioritize the areas that determine the highest suitability for each specific land-use category.

Table 2-2 Multi-Criteria Analysis (Quantitative)

SR.	PARAMETER	OPPORTUNITIES	CONSTRAINTS	WEIGHTING CRITERIA
RESIDENTIAL ZONES				
1	Highly Hazardous Zone (HHZ)		Constraints	0
2	High Multi-hazard Zone (HMZ)		Constraints	02
3	Medium Multi-hazard Zone (MMZ)	Opportunities		06
4	Low Multi-hazard Zone (LMZ)	Opportunities		08
5	Land parcels suitable for agriculture use including cultivation, orchards & forests.		Constraints	0-2
6	Land parcels near landfill/dumping sites & STP (200m)		Constraints	0

SR.	PARAMETER	OPPORTUNITIES	CONSTRAINTS	WEIGHTING CRITERIA
7	Land parcels near protected areas including high tension (HT) Lines, firing range etc.		Constraints	0-2
8	Land available near obnoxious industries		Constraints	0
9	Vacant land parcels within Built-up Areas	Opportunities		07
10	Large land parcels (open/barren land) other than Built-up Areas	Opportunities		10
11	Land parcels accessible to transportation network	Opportunities		08
12	Land availability proximal to community facilities	Opportunities		07
13	Land availability proximal to employment opportunities	Opportunities		08
14	Availability of land parcels over Slope less than 20%	Opportunities		10
15	Availability of land parcels over Slope from 20-30%		Constraints	05
16	Availability of land parcels over Slope above 30%		Constraints	0
COMMERCIAL ZONES				
1	Highly Hazardous Zone (HHZ)		Constraints	0
2	High Multi-hazard Zone (HMZ)		Constraints	02
3	Medium Multi-hazard Zone (MMZ)	Opportunities		06

SR.	PARAMETER	OPPORTUNITIES	CONSTRAINTS	WEIGHTING CRITERIA
4	Low Multi-hazard Zone (LMZ)	Opportunities		08
5	Land parcels suitable for agriculture use including cultivation, orchards & forests.		Constraints	0
6	Land parcels near landfill/dumping sites & STP (200m)		Constraints	0
7	Land parcels near protected areas including high tension (HT) Lines		Constraints	0-2
8	Land available near obnoxious industries		Constraints	0-2
9	Vacant land parcels within Built-up Areas	Opportunities		08
10	Large land parcels other than Built-up Areas	Opportunities		08
11	Land parcels accessible to transport corridors/network	Opportunities		10
12	Lands proximal to existing physical infrastructure services	Opportunities		08
13	Existing trend of mixed Landuse along primary roads of city	Opportunities		10
14	Availability of suitable land parcel on central location with reference to new development	Opportunities		09
15	Availability of land parcels over Slope less than 20%	Opportunities		08

SR.	PARAMETER	OPPORTUNITIES	CONSTRAINTS	WEIGHTING CRITERIA
16	Availability of land parcels over Slope from 20-30%		Constraints	04
17	Availability of land parcels over Slope above 30%		Constraints	0
INDUSTRIAL ZONES				
1	Highly Hazardous Zone (HHZ)		Constraints	0
2	High Multi-hazard Zone (HMZ)		Constraints	02
3	Medium Multi-hazard Zone (MMZ)	Opportunities		06
4	Low Multi-hazard Zone (LMZ)	Opportunities		08
5	Land parcels suitable for agriculture use including cultivation, orchards & forests.		Constraints	0
6	Land parcels near landfill/dumping sites & STP		Constraints	0-2
7	Land parcels near protected areas including high tension (HT) Lines		Constraints	0-2
8	Land parcels along major highways	Opportunities		10
9	Lands proximal to existing main trunk utility lines	Opportunities		07
10	Land parcel availability proximal to exiting industries	Opportunities		06

SR.	PARAMETER	OPPORTUNITIES	CONSTRAINTS	WEIGHTING CRITERIA
11	Availability of large land parcels	Opportunities		08
12	Availability of land parcels over Slope less than 20%	Opportunities		08
13	Availability of land parcels over Slope from 20-30%		Constraints	04
14	Availability of land parcels over Slope above 30%		Constraints	0
CIVIC ZONES (ADMINISTRATION/PUBLIC BUILDING/COMMUNITY FACILITIES) ***(Administration, Education, Health & Religious)***				
1	Highly Hazardous Zone (HHZ)		Constraints	0
2	High Multi-hazard Zone (HMZ)		Constraints	02
3	Medium Multi-hazard Zone (MMZ)	Opportunities		06
4	Low Multi-hazard Zone (LMZ)	Opportunities		08
5	Land parcels suitable for agriculture use including cultivation, orchards & forests.		Constraints	0
6	Land parcels near landfill/dumping sites & STP		Constraints	0
7	Land parcels near protected areas including high tension (HT) Lines		Constraints	0-2
8	Land available near obnoxious industries		Constraints	0-2
9	Vacant land parcels within Built-up Areas	Opportunities		08

SR.	PARAMETER	OPPORTUNITIES	CONSTRAINTS	WEIGHTING CRITERIA
10	Large land parcels other than Built-up Areas	Opportunities		08
11	Land parcels accessible to public transport corridors	Opportunities		10
12	Lands proximal to existing physical infrastructure services	Opportunities		08
13	Availability of suitable land parcel on central location with reference to new development	Opportunities		09
14	Availability of land parcels over Slope less than 20%	Opportunities		08
15	Availability of land parcels over Slope from 20-30%		Constraints	04
16	Availability of land parcels over Slope above 30%		Constraints	0
SPORTS & RECREATIONAL ZONE				
1	Highly Hazardous Zone (HHZ)		Constraints	02
2	High Multi-hazard Zone (HMZ)		Constraints	04
3	Medium Multi-hazard Zone (MMZ)	Opportunities		08
4	Low Multi-hazard Zone (LMZ)	Opportunities		10
5	Land parcels suitable for agriculture use including cultivation, orchards & forests.		Constraints	03-04
6	Land parcels near landfill/dumping sites & STP		Constraints	0

SR.	PARAMETER	OPPORTUNITIES	CONSTRAINTS	WEIGHTING CRITERIA
7	Land parcels near protected areas including high tension (HT) Lines		Constraints	04
8	Land available near obnoxious industries		Constraints	0
9	Vacant land parcels within Built-up Areas	Opportunities		09
10	Large land parcels other than Built-up Areas	Opportunities		08
11	Lands proximal to existing water bodies (lakes, canals & water channels)	Opportunities		10
12	Availability of suitable land parcel on central location with reference to new development	Opportunities		07
13	Availability of land parcels over Slope less than 20%	Opportunities		05-08
14	Availability of land parcels over Slope from 20-30%	Opportunities		05-08
15	Availability of land parcels over Slope above 30%	Opportunities		05-08
AGRICULTURE ZONES (*Cultivation, Orchards, Urban Farms, Forest*)				
1	Land parcels suitable for cultivation outside Established Built-up Area	Opportunities		08
2	Land parcels along/near water irrigation system	Opportunities		08
3	Land proximal to transport services	Opportunities		07

SR.	PARAMETER	OPPORTUNITIES	CONSTRAINTS	WEIGHTING CRITERIA
4	Lands proximal to farm markets	Opportunities		07
5	Lands proximal to existing agricultural activities	Opportunities		08
6	Availability of land parcels over Slope less than 20%	Opportunities		07-10
7	Availability of land parcels over Slope from 20-30%	Opportunities		07-10
8	Availability of land parcels over Slope above 30%	Opportunities		07-10
9	Land available near obnoxious industries		Constraints	0-2
10	Land available near landfill/dumping sites & STP		Constraints	0-2

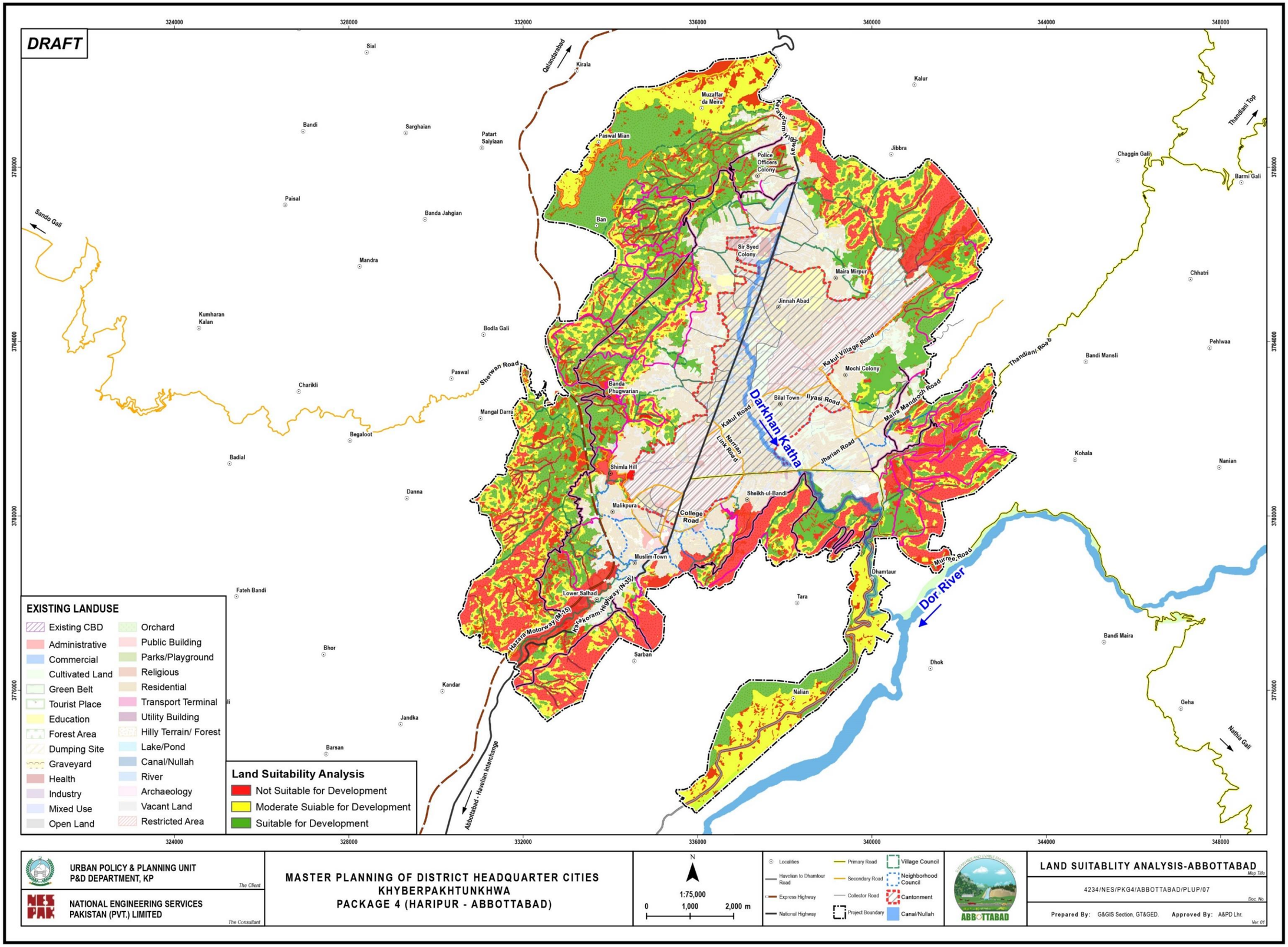
Based on the above stated Multi Criteria Analysis for Suitable Land Parcels Land Suitability Analysis Map is prepared to guide the future development of Abbottabad City and highlights the concentrates. Available land parcels have been divided into three (3) categories as shown in Map – 6 below.

i) Land parcels in green are suitable for development based on following Criteria:
- Low Multi-hazard Zone
  - Seismic ground shaking envisaged during a strong earthquake with very low risk of earthquake induced indirect and localized geo-hazards.
  - Not prone to rock falls, slope failure, bud/debris flows and flood hazard
- Land Parcels with slope less than 20%

ii) Land parcels in yellow are moderate suitable for development based on following Criteria:
- Medium Multi-hazard zone (MMZ)
  - High seismic ground shaking and other indirect earthquake induced localized geo hazard.
  - Prone to minor rock falls, slope failure, mud debris flow, low flood hazards and Bad Lands associated moderate erosion.
- Land Parcels with Slope upto 20%

iii) Land parcels in red are constraints and not suitable for development based on following Criteria:

- Highly Hazardous Zone (HHZ)
    - Extremely high seismic ground shaking envisaged that may be associated with ground rupturing and other indirect earthquake induced localized geo-hazards during earthquake.
    - Prone to massive rockfalls, liquefaction, mud Debris flows differential erosion, bank collapse and high flood hazard.
- High Multi-hazard Zone
    - Very high seismic ground shaking and other indirect earthquake induced localized geo-hazrds
    - Prone to massive rockfalls, slope failure, mud/ debris flows and moderate flood hazard.
- Land Parcels with Slope above 20%



Map 6 Land Suitability Analysis

3. LAND USE PATTERN FUTURE OPTIONS

Land use pattern to be adopted for Abbottabad City Master Plan 2042 three options are considered. In order to arrive at a best option potentials and constraints of all the options are drawn.

3.1 Option 1

The Option-1 brings together housing, commercial, transport, and the choice of location in a tractable way as shown in figure 3-1.

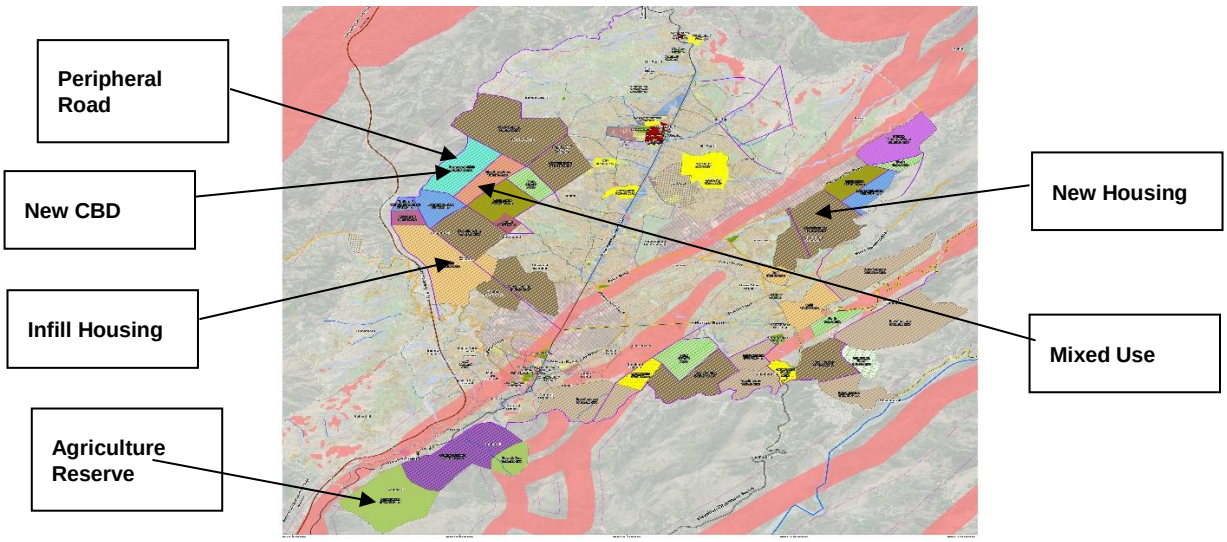


Figure 3-1 Option-1

Main features of Option-1 are given below:

- Peripheral road parallel to Hazara Motorway
- New CBD away from existing Development along the peripheral road
- Infill residential development is along proposed peripheral road and new housing is on both east and west sides close to existing residential development
- All the proposed development in east side of Hazara Motorway
- Mixed use development close to proposed CBD
- Agriculture reserved in south direction

3.2 Option 2

Option 2 follows existing growth pattern, in order to utilize present development through creating multiple growth centers refer figure 3-2.

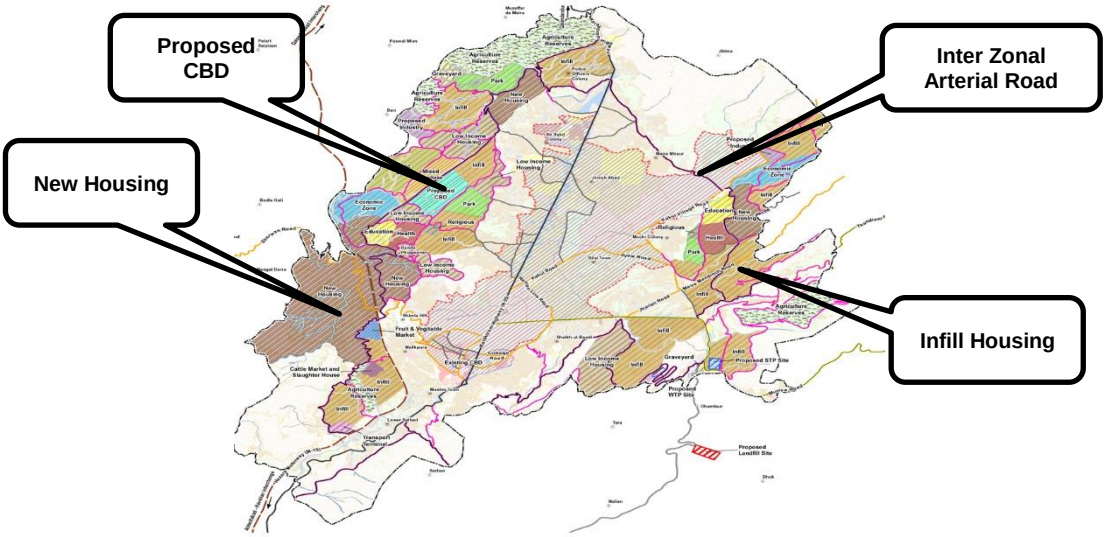


Figure 3-2 Option-2

The key features of Option-2 are given below:

- Proposed inter-zonal Arterial Road providing access to all parts of project area connecting new proposed zones as well as existing development.
- Proposed CBD at central location of proposed zones
- Infill residential development is on both east and west direction complimenting existing residential development and new housing is proposed on both sides of Hazara Motorway.
- Mixed use development is surrounded by Civic Zone, Low-income housing, Economic Zone and Proposed CBD.
- Agricultural reserves are proposed on north direction for restricting development beyond project boundary.

3.3 Option 3

The key features of Option-3 are given below:

- Two Satellite Towns are proposed in accordance with the provision of approved District Land use Plan of Abbottabad District.
- Green Belt around the project area and Dor River is proposed in accordance with the provision of approved District Land use Plan of Abbottabad District for restricting development beyond project boundary.
- Proposed inter-zonal Arterial Road providing access to all parts of project area connecting new proposed zones as well as existing development.
- Infill Housing Development is proposed on south east and south west
- Proposed Industry is sited in south east direction.

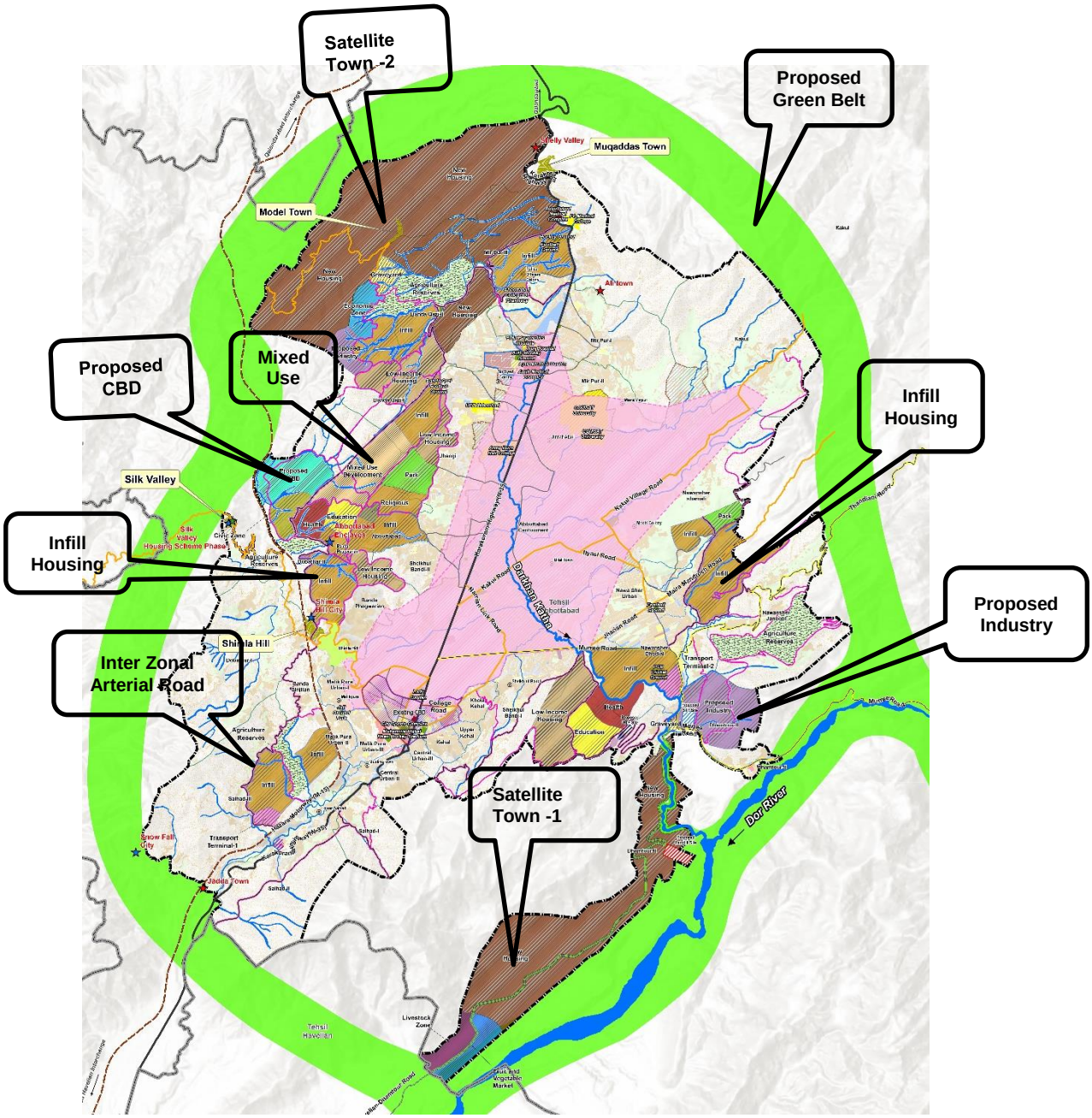


Figure 3-3 Option-3

Above explained options of Land use pattern have pros and cons however option - 3 is preferred option as Proposed Inter-zonal arterial Road and Proposed Inter – zonal collector road alignment follows the natural topography of the project area. Proposed zones for different land uses are evenly distributed in considerations of existing development of the city and two satellite towns are proposed to fulfill the future requirements of housing in north and south direction and a green belt is proposed to restrict leap frog development of city therefore option-3 is suggested for Abbottabad City Master Plan 2042.

4. LAND USE MIX POTENTIAL RANGE OF USES

Land use mix potential range refers to the degree to which those different types of land uses (e.g., residential, work, leisure, services etc.) are physically and functionally integrated.

In master plan of Abbottabad City, the area designated for Mixed Land use is at a central location surrounded by Civic, Proposed CBD, infill development and Low-Income housing zones refer figure 4-1 below:

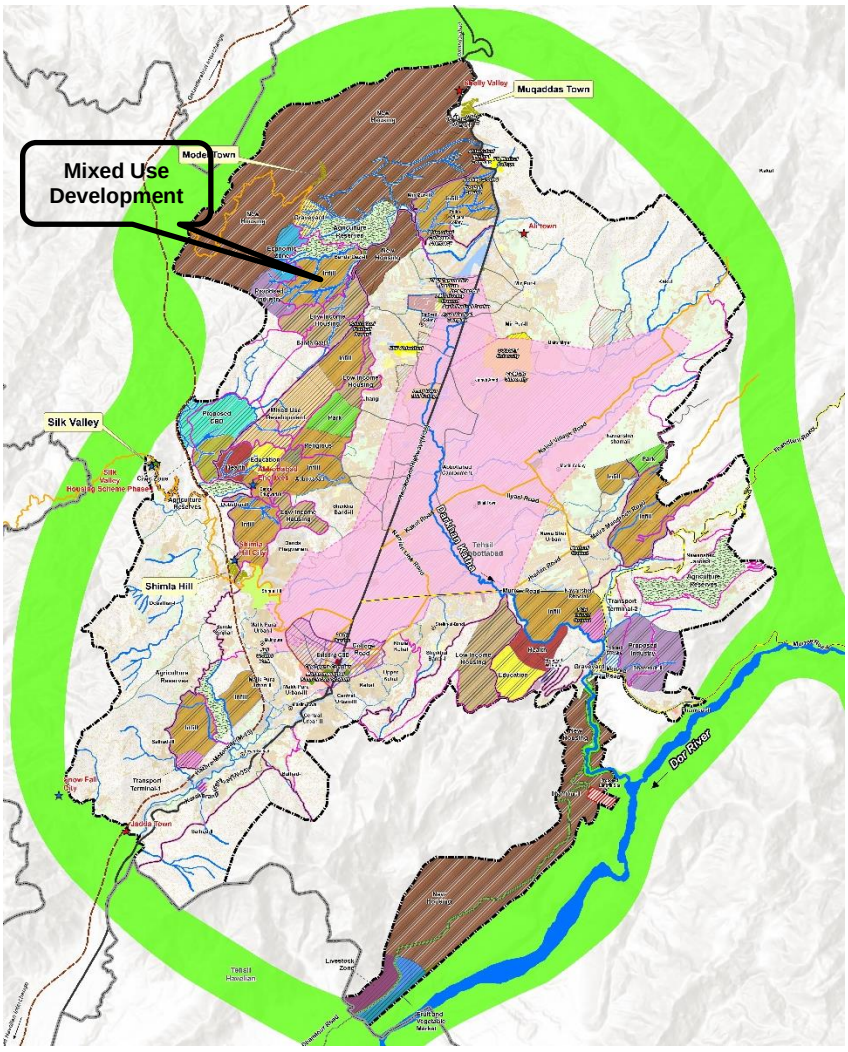


Figure 4-1 Mix Land Use Potential Range of Uses

Land use Mix Potential Range of uses (residential, work, leisure, services etc.) shall provide a base for transit-oriented development. It would promote walking, biking and use of transit within neighborhoods. Travel distances would be reduced, enable “linked trips” where one trip provides for many activities, and allow drivers to park once and then get around easily on foot. It shall provide a mix of public spaces to cater to a range of users (children through to older adults) and encourage social interaction as people fulfil more of their needs in their local area and enhance an area’s unique identity and development potential.

Mix Land Use potential range shall provide the 3Ds—population density, land use diversity, and pedestrian friendly design.

5. PROPOSED PHASE WISE DEVELOPMENT

The Proposed Master Plan for Abbottabad has been prepared with the consideration of four phases of development generated through GIS.

It is recommended to focus on Phase-1 for up gradation and restoration in existing town, for infill development in Phase-2, new and future development in Phase-3 and Phase-4 plan respectively.

Table 5-1 Phase Wise Scenario Development

Sr. No.	Phase Name	Year / Duration	Development	Plan
1.	Phase -1	5 years (2022-2027)	Up gradation / Restoration	Action Plans
2.	Phase-2	10 years (2022-2032)	Infill Development / Intensification	Priority Projects
3.	Phase-3	15 years (2022-2037)	New Development	Strategic Development Plan
4.	Phase-4	20 years (2022-2042)	Future Development	Strategic Development Plan

In light of Task-B findings and Land Use Base Map of Abbottabad City, NCs and VCs are suggested to be developed according to phase wise development of Abbottabad City. The mentioned names of NCs and VCs are not exactly in line of proposed development, as existing development is not following any specific pattern and results in leapfrog development.

5.1 Phase-1 Up gradation and Restoration

This phase would emphasize on up gradation and restoration of existing NCs and VCs which are old and almost have no space for new development. It will be preferred if any land parcel still available would be utilized as open space and the existing development will be taken care of through restoration and preservation. In addition, more focus would be towards beautification of old town, managing traffic congestions, repairing of utilities, widening of roads and upgradation of public spaces.

The NCs (Central Urban-I, Central Urban-II, Central Urban-III, Kehal, Khola Kehal, Malik Pura Urban-I, Malik Pura Urban-II, Malik Pura Urban-III, Nawa Sher Urban, Nawansher Dhodial and Upper Kehal) and VCs (Mir Pur-II, Sheikhul and Bandi-I) where no new development is feasible, instead, rehabilitation work is required.

5.2 Phase-2 Infilling Intensification and Redevelopment

Infill development is the process of developing vacant or under-utilized land parcels within existing urban areas that are already developed. This will be considered as a means of sustainable land development close to existing inner city area. Thus, in infill development new buildings can be constructed on vacant or underused property or in between existing buildings the infill development is somewhat possible in VC's (Jhangi, Mir Pur-I, Sheikhul Bandi-II).

5.3 Phase-3 New Development

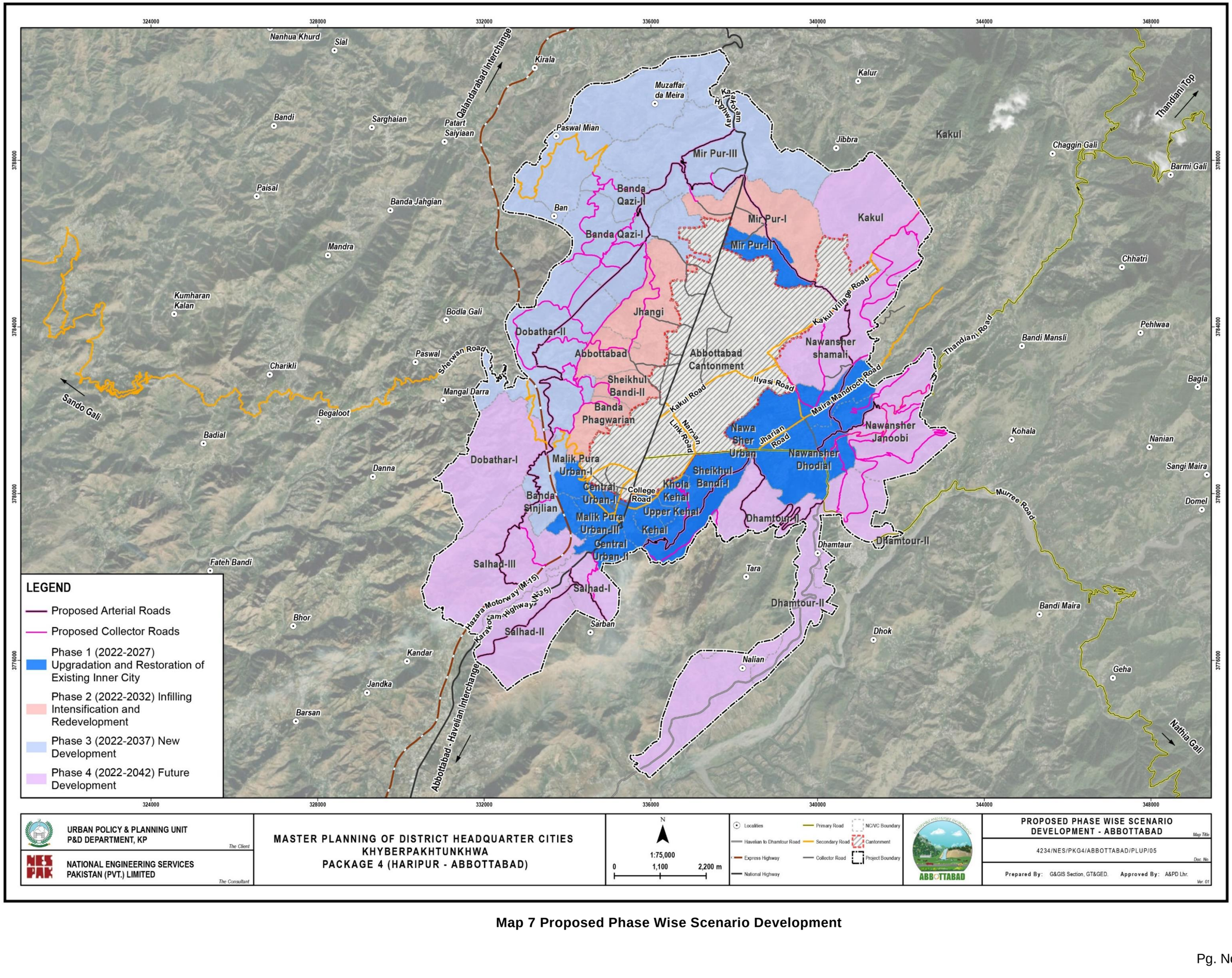
This will include state of art new development, giant infrastructure, iconic buildings, well planned schemes and large landscapes in VCs (Banda Qazi-I Qazi-II, Banda Sinjlian, Dobathar-II and Mir Pur-III) have potential for new development in near future.

5.4 Phase-4 Future Development

This would include future development for long term activities in VCs (Dhamtour-II, Kakul, Nawansher Janoobi, Salhad-I, Salhad-II, Salhad-III and Nawansher shamali) have potential for new development in far future.

Refer proposed Phase Wise Scenario Development Map 7.

In the Master Plan of Abbottabad City 2042, it is suggested that by the year 2042 the Village Councils fall in the Project Area shall be given status of Neighborhood Councils.



Map 7 Proposed Phase Wise Scenario Development

6. PROPOSED MASTER PLAN OF ABBOTTABAD CITY

After observing trend of development on major transport corridors i.e. Hazara Motorway M-15 and Karakoram Highway N-35 the area between these two connections towards western side are highly recommended to be reserved for very long-term future development or protected for agricultural production. The total extent of the proposed area is 28,601.23 acres approx. for a population of 443,614 by 2042. In this way, Abbottabad in next twenty years is expected to have population density of 15.5 persons per acre and an average household size of 6.

At present residential and commercial buildings have densities up to three stories and five stories respectively. For proposed master plan of Abbottabad City, it is recommended to follow Khyber Pakhtunkhwa Model Building Bye-laws 2017. As per this document residential density of houses would be suggested to two stories (ground plus first floor), for walkable apartments four stories (ground plus three floors) and commercial buildings maximum height would be restricted to seven stories (ground plus six floors) maximum.

As the future expansion of Abbottabad is expected to be large, thus the Proposed Abbottabad Master Plan provides all the necessities of a full-fledged metropolis of the future. Thus, the plan will afford balanced development containing all required land uses.

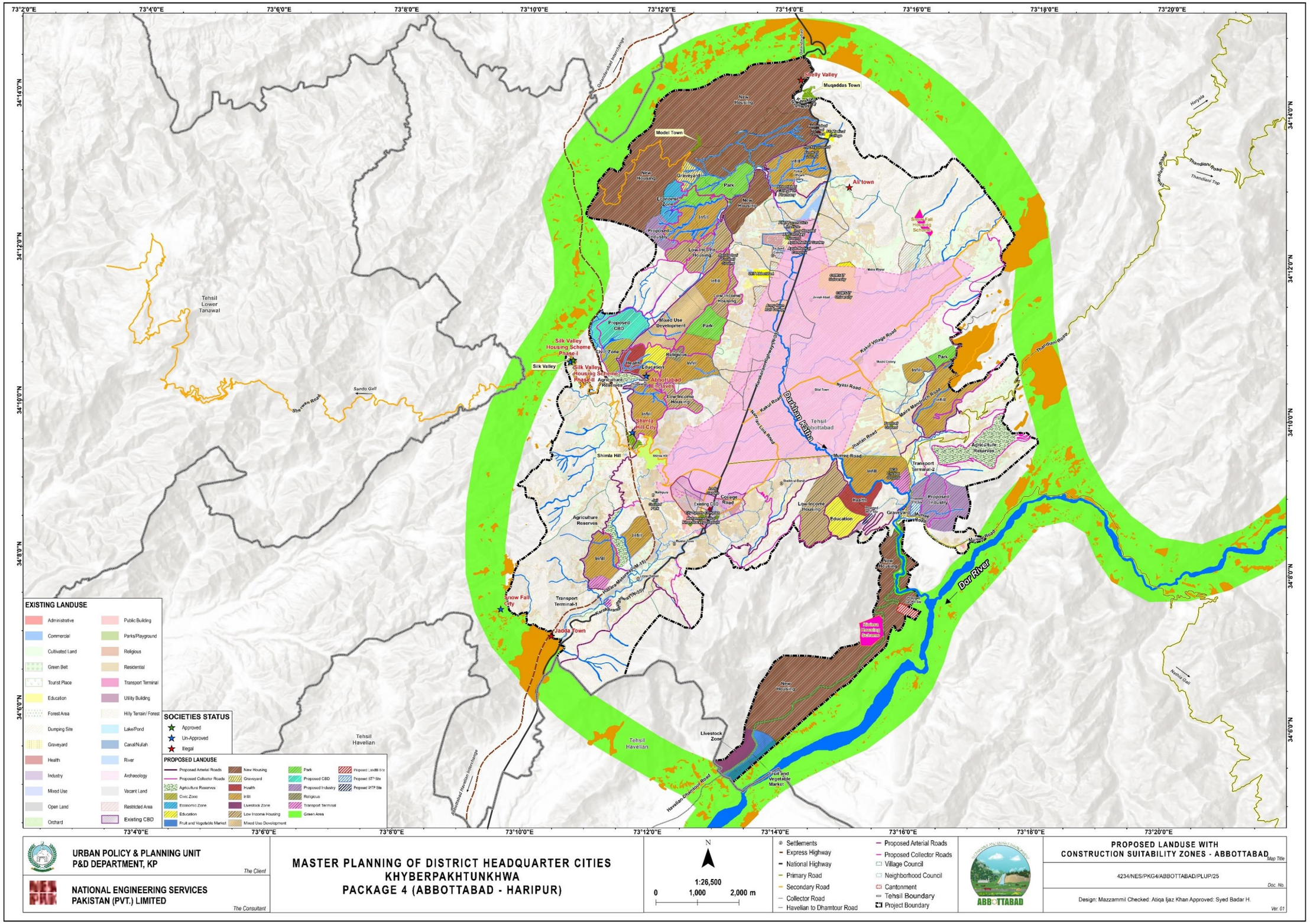
Despite taking different aspects in to consideration, it is suggested that the Master Planning should be reviewed every five years to estimate the land use and area requirement according to the growth rate and economic investment.

The proposed Abbottabad City is based on the multi-growth pattern of the city refer Map-8 Abbottabad Proposed Master Plan.

6.1 Salient Planning Features (Abbottabad Master Plan)

- Areas for mixed-use development are identified in west direction. This zone is bounded by proposed inter zonal arterial road i.e. 100 feet road to reduce the burden on its surrounding area.
- The industrial zone especially for small scale and cottage industries is proposed in the North West direction of the city next to proposed economic zone. For medium industry the location is proposed in south east direction on proposed inter zonal arterial road.
- The economic zone is located towards west side, along proposed inter zonal arterial road.
- The transport terminals are provided on south direction along the proposed inter zonal arterial road and M-15 and in south west direction along Murree Road.
- The main health and educational zones are identified in south and west directions of the city along the proposed inter zonal arterial road and it will accessible to everyone equally in the proposed zones.
- The major recreational zone i.e. city level parks are placed in western side, eastern and north including amusement park, zoological and botanical gardens.
- The areas for graveyards have also been reserved in the northern direction. The extension of existing grave yard in south east direction is also proposed.
- The infill housing development is proposed with neighborhood centers, to avoid leapfrog housing development. New housing is proposed in north direction along the N-35 and along Havalian Dhamtour Bypass Road in south direction.

- The livestock zone is proposed in the south west along Havalian Dhamtour Bypass road due to existing trend of dairy and poultry farming and to limit the town development further. It will also benefit the population of other settlements
- The major agricultural zones are identified as garden towns with agri-centers in east and west direction.
- Sewerage treatment plant is proposed in downstream area towards south east near Murree Road.
- Landfill Site is also suggested in south east direction assessable from Havelian Dhamtour Road
- The Reserved Areas for agriculture, graveyards, recreational, infrastructure and utilities will be helpful in restricting housing development and preserving the agricultural farms from the onslaught of the housing projects by private sectors.



Map 8 Proposed Master Plan of Abbottabad

6.2 Abbottabad District Land Use Plan (DLUP)

District Land use Plan of Abbottabad 2018-2038 has been evaluated in detail to avoid any contradiction in the Master Plan of Abbottabad City. The spectrum of District Land use Plan is very vast and proposals for various land uses are for the whole District and scale of Master Plan is limited to Abbottabad City. The proposals of Abbottabad District Land Use Plan have been considered at broader level. City specific proposals of DLUP have been transformed in the Master Plan to create compatibility in DLUP and Master Plan as given in table below:

Table 6-1 Comparative Analysis of DLUP and Master Plan Abbottabad

Sr. No.	Proposals	DLUP	Master Plan
1	Havelian to Dhamtour By Pass Road	Conceptual Alignment	Finalized Alignment
2	Green Belt	Green Belt 2 Km around the City	Green Belt 1 Km around the Project Boundary
3	Industrial Area	Proposed Industrial Estate Site at South-East Direction along Murree Road	Industrial Estate Site in the South-East Direction along Murree and Bypass road.
4	Satellite Town	Proposed Satellite Town at Banda Baazdar Town and Balder Town	New Housing is proposed in North direction as Satellite Town-1 and in South direction Satellite Town-2

7. INTEGRATED DEVELOPMENT PROPOSALS FOR KEY SECTORS

7.1 Major Transportation

7.1.1. Proposed Inter-Zonal Arterial Roads (100' R.O.W)

For this purpose, ROW of all new proposed arterial roads within the zones is set as 100 feet. This ROW will cater future demand of traffic that will generate due to growth of existing population as well as new development. It is recommended to phase-wise develop these roads as and when development of adjacent zones takes place. These proposed arterial roads are shown on Figure 7-1 below:

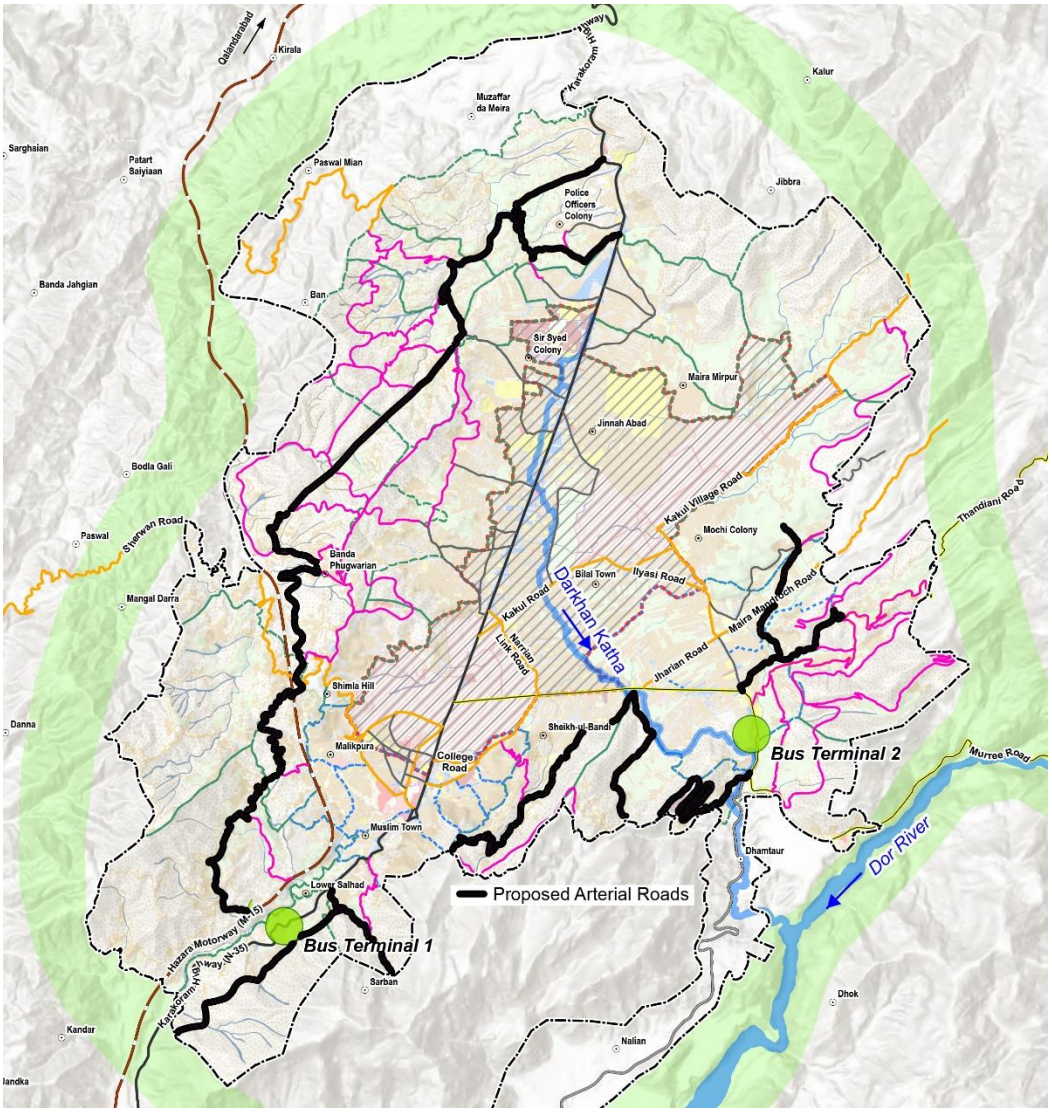


Figure 7-1 Proposed Inter-zonal Arterial Road

Most of these roads are identified by linking existing isolated minor roads/tracks in such a way as to provide not just the connectivity to new zones but also to act as new arteries to add up in the existing road network of the city. This will also help to ease traffic congestion in existing areas by diverting traffic to alternative routes. Final alignment of these proposed roads will depend on the engineering studies for these roads in future. Proposed typical cross section for arterial road is illustrated in Figure 7-2 below:

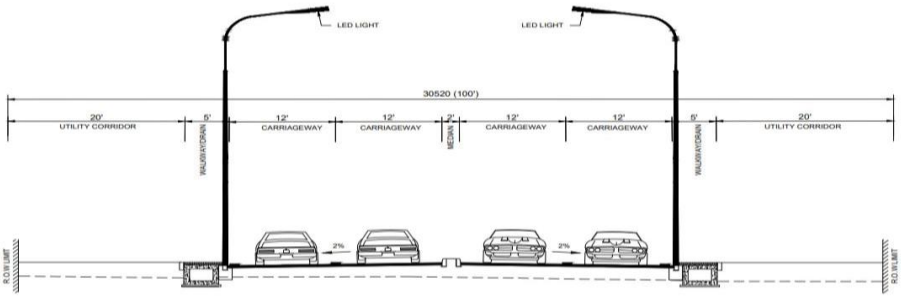


Figure 7-2 Typical Cross Section (100') for arterial roads

7.1.2. Proposed Inter-Zonal Collector Roads (60' R.O.W.)

The proposed collector roads within the proposed zones are planned with a right-of-way (ROW) width of 60 feet. This ROW is intended to accommodate the anticipated increase in traffic demand resulting from both the growth of existing developments and the introduction of new ones. It is advisable to implement these roads gradually, aligning with the progress of development in adjacent zones. These proposed collector roads are shown on Figure 7-3.

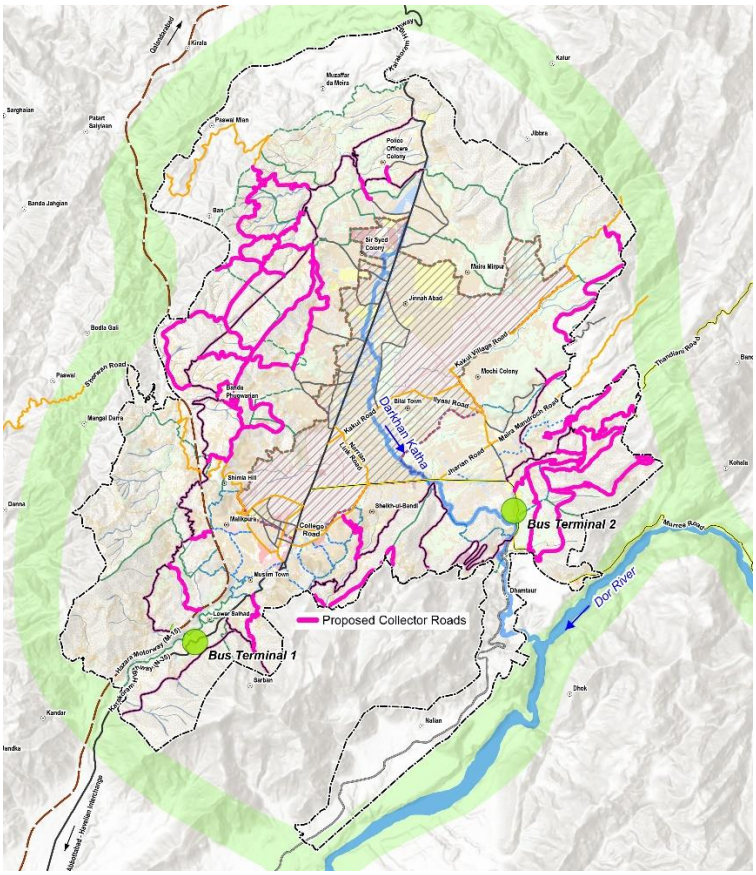


Figure 7-3 Proposed Inter-zonal Collector Road

Many of these roads are selected by strategically connecting existing isolated minor roads and pathways. This approach not only establishes connectivity to the new zones but also integrates them into the existing urban road network, effectively transforming them into new main arteries. Furthermore, this initiative aims to alleviate traffic congestion in existing areas by diverting traffic onto alternative routes. Final alignment of these proposed roads will depend on the engineering studies for these roads in future. Proposed typical cross section for collector road is illustrated in Figure 7-4 below:

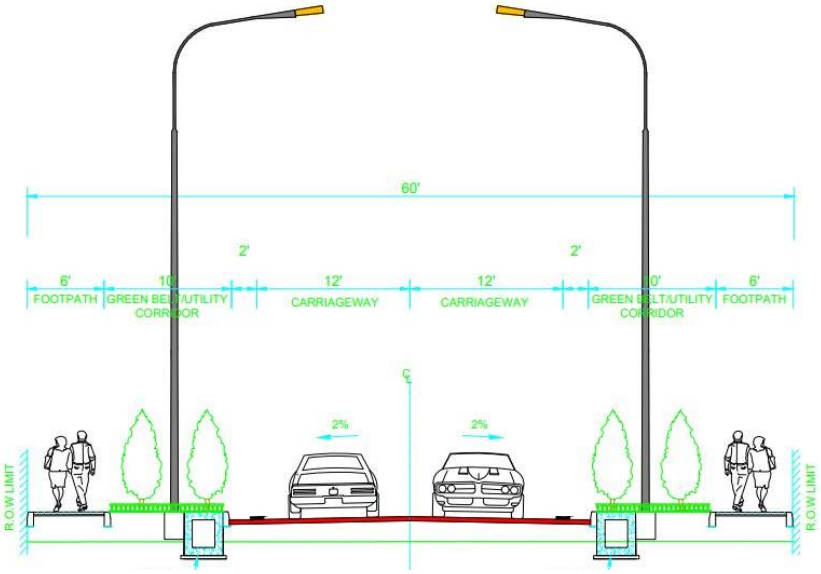


Figure 7-4 Typical Cross Section (60') for collector roads

7.1.3. Improvement of Existing Roads

- **Improvement of KKH (Within Abbottabad)**

The N-35 (KKH) is the major arterial road in Abbottabad. KKH is highly congested there are various educational and medical institutions, as well as commercial areas situated alongside the KKH. This leads to an influx of people from different parts of the city and inter-city. N-35 from Fawara Chowk to Murree Road Intersection needs to be improved and rehabilitated for future growth of traffic (Reference to Existing Situational Analysis Report for Abbottabad). Unfortunately, there are no parking facilities available along the road which leads to on-road parking. One lane of KKH is occupied by on road parked vehicles. Traffic from intercity roads like Murree Road also merge onto the KKH, leading to congestion near the Fawara Chowk, Piffer Chowk and Muree Road Intersection. Congestion at different points due to its attraction for trips and intercity traffic. Moreover, there are some bus terminals situated along KKH, especially at Fawara Chowk, without proper entry and exit points aggravating congestion and ultimately blockage along KKH.

Capacity enhancement and geometric improvement of KKH is required immediately in 5.0 km stretch from Fawara Chowk to Fareed Ullah fish point. Provision of pedestrian sidewalks throughout this stretch is necessary along with proper Bus bays to accommodate proper local transport i.e Suzuki Pickups. All intercity buses/wagon terminals located along KKH should be shifted outside the main CBD area to appropriate location. In addition, provision of an efficient public transport service is mandatory in order to handle the increased demand of traffic volume and ensure sustainability of the city. Service road is not present along KKH. Service Road ensures that vehicles entering or leaving from adjacent trips attraction areas do not obstruct the flow of traffic on the main arterial road. Service roads also separate slower-moving local traffic (accessing properties) from faster-moving through traffic on the main arterial road. This separation reduces congestion and the risk of collisions, as turning vehicles either entering or exiting have their own gap and for these purpose service roads are mandatory for KKH.

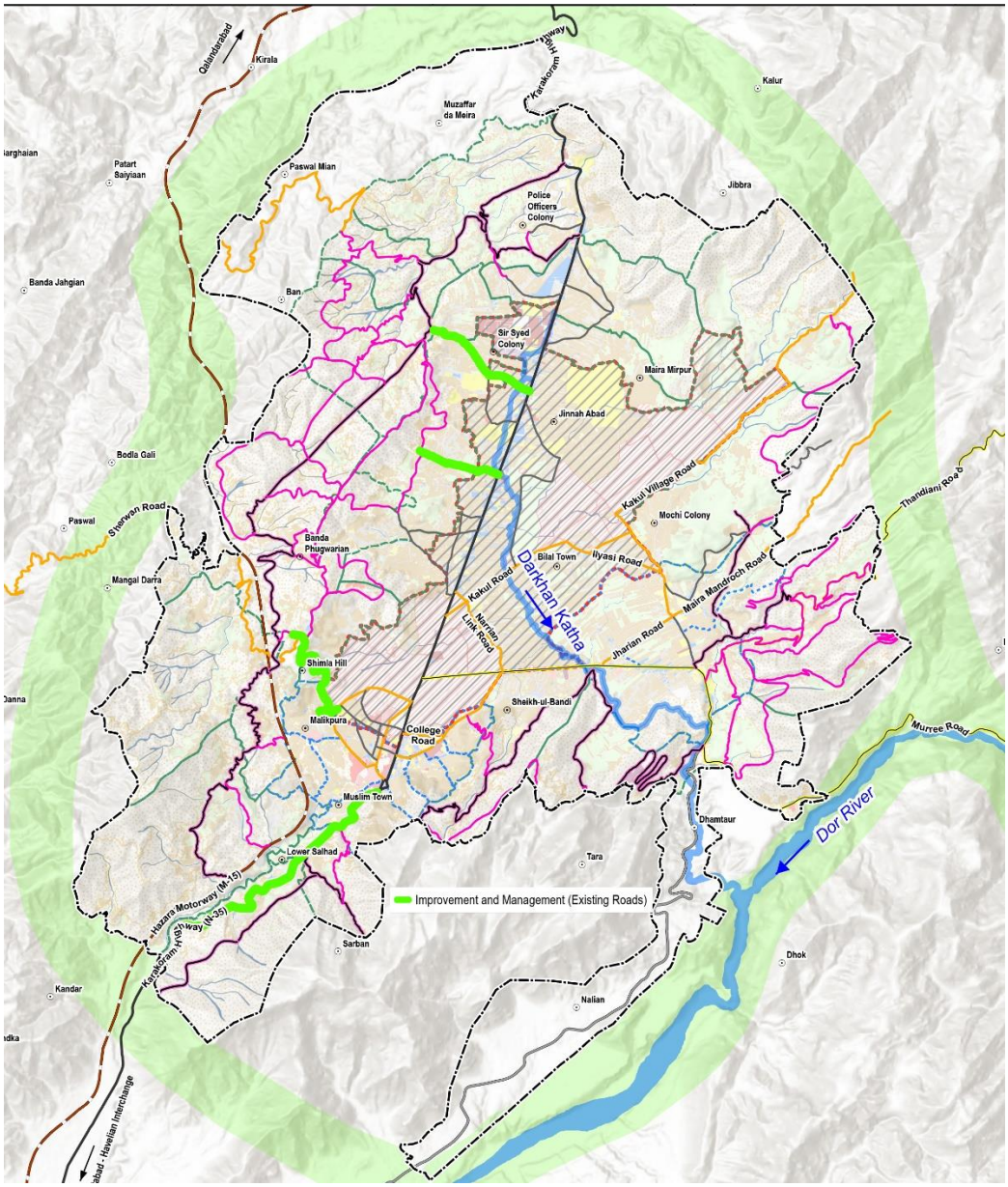


Figure 7-5 Improvement of Existing roads

- **Improvement/ Traffic Management on Other Important Roads**

Shimla Hill, Jhangi Syedan & Shah Kot Road required improvement to cater for the future traffic movement from KKH to proposed development These roads alignment pertains to planning phase, which may vary on account of detail design. Similarly, Circular Road is one of the most congested roads due to its location within main CBD of Abbottabad. Its improvement is also needed very much. Since widening is not feasible, some alternate solutions can be taken up for following roads in CBD area:

1. Circular road
2. Abbottabad Bazar Road
3. Murree Road

To reduce traffic congestion on these urban roads during peak hours, access restrictions or channelization can be imposed on certain areas. This measure can limit the entry of specific types of vehicles, such as delivery trucks and heavy vehicles, during certain times of the day especially on KKH. To improve traffic management in market areas, parking plazas should be provided and vehicle entry into market streets should be restricted with barricades and warning signs. Park and ride services could be introduced to further mitigate car entry and to facilitate customers. Commercial and delivery vehicles should also face entry constraints; such as only being allowed at certain time period for product deliveries. Allowing traffic movement in one-way direction where ROW is less. Sometimes, it can be an effective way to avoid conflicts and reduce traffic congestion if a proper traffic circulation is possible.

More congested areas near Sabzi Mandi and Main Abbottabad Markets should be converted into car free areas with only pedestrians allowed. This can be achieved systematically after provision of proper car parking areas at strategic locations.

Havelian-Dhamtor Bypass project is 24' wide single carriageway road of 17.5 km. This bypass allow direct access towards Galiyat and Murree from Dhamtor without entering Abbottabad City. This bypass serve as important link between new zones and relieve congestion.

7.2 Agriculture Areas

Agriculture areas to be developed by adoption of advance agriculture technology and use of modern techniques for cultivation, selection of best seeds, fertilizers and pesticides. Improving irrigation system by utilization of modern techniques. Enhancing crop productivity through adoption of new technologies.

Warehouse facilities to be established for storage of agriculture products and construction of farm to market roads.

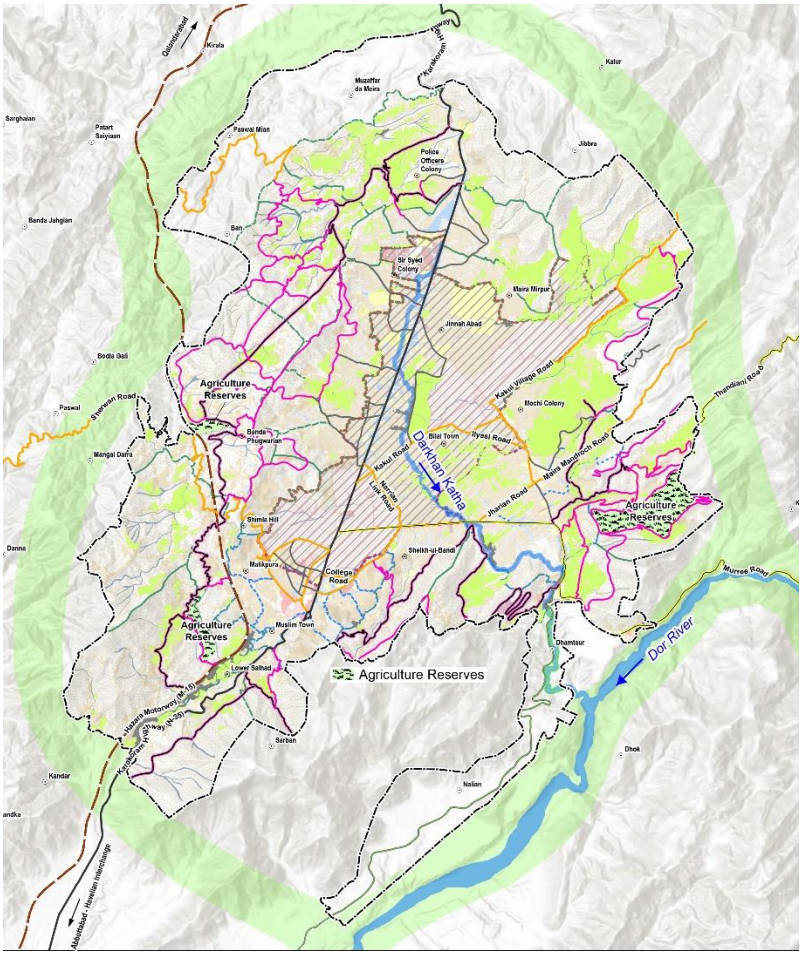


Figure 7-6 Agriculture area

7.3 Urban Forestation (Tree Plantation)

Tree plantation in the master plan is proposed along the Inter-zonal Arterial Road, along Dor River, Darkhan Katha Nullah and other water channels/ streams subject to availability of land and also inside city area where appropriate land is available for tree plantations. In accordance with the approved District Land Use Plan of Abbottabad 1Km wide Green Belt is proposed along the boundary of project area as shown in Figure 7-7 Tree Plantation.

Native trees of Abbottabad City to be preferred to add beauty in the urban area and better environment.

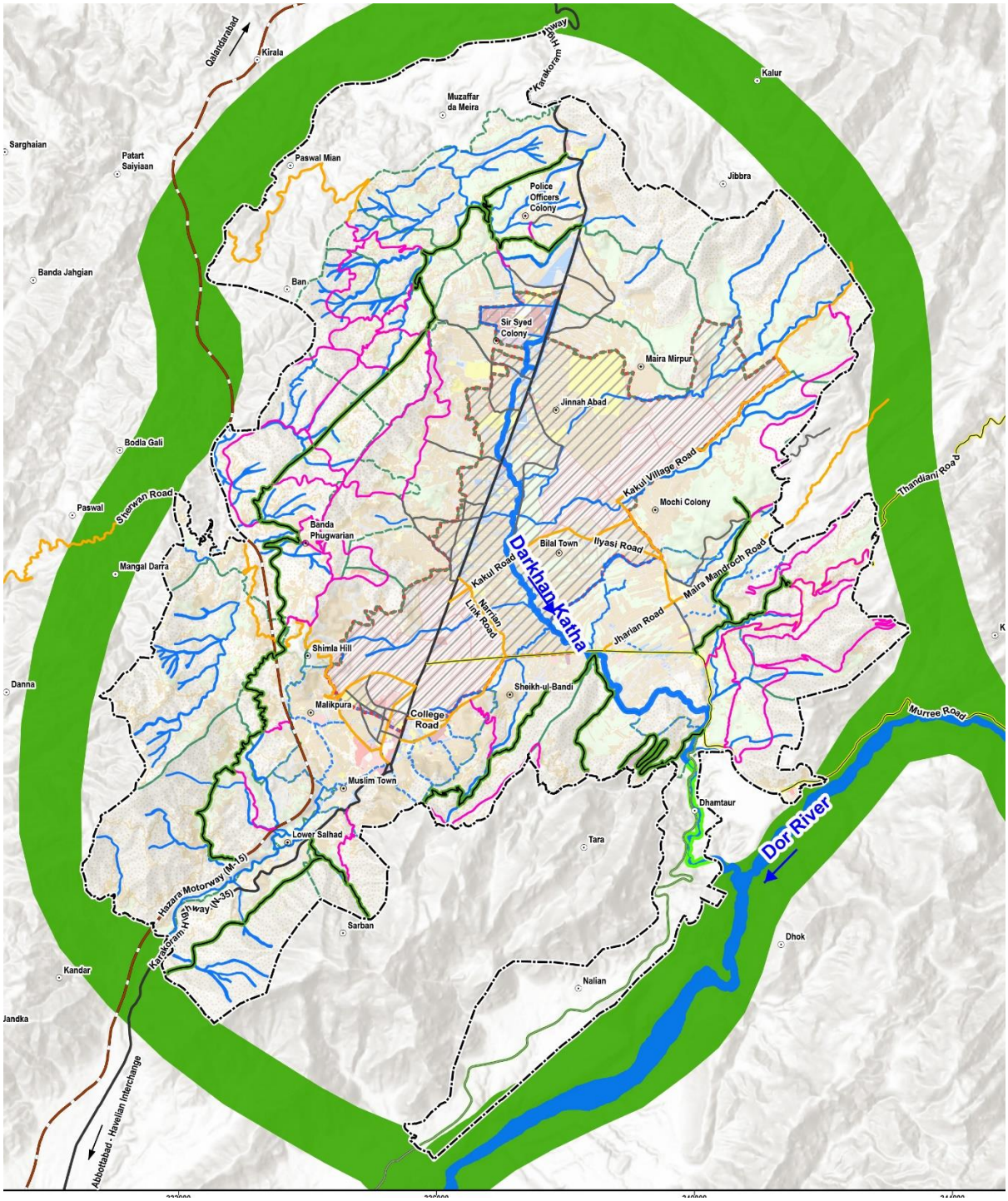


Figure 7-7 Tree Plantation

7.4 Environmental Conservation Areas

The environment conservation is proposed along Dor River and Darkhan Katha Nullah to protect adjoining area prone to urban flooding to overcome environmental challenges such as land degradation, water sheds, deforestation, waste management, pollution control and climate change.

Plantation of trees is proposed to reduce the impact of emissions to make viable local climate to achieve safe and healthy environment. Environment sustainability is ensured by restricting

to discharge waste and pollutants in water bodies without treatment. Environment awareness shall be created to preserve ecological cycles and to reduce risks of urban flooding, pressure on land along water bodies and conserve biodiversity.

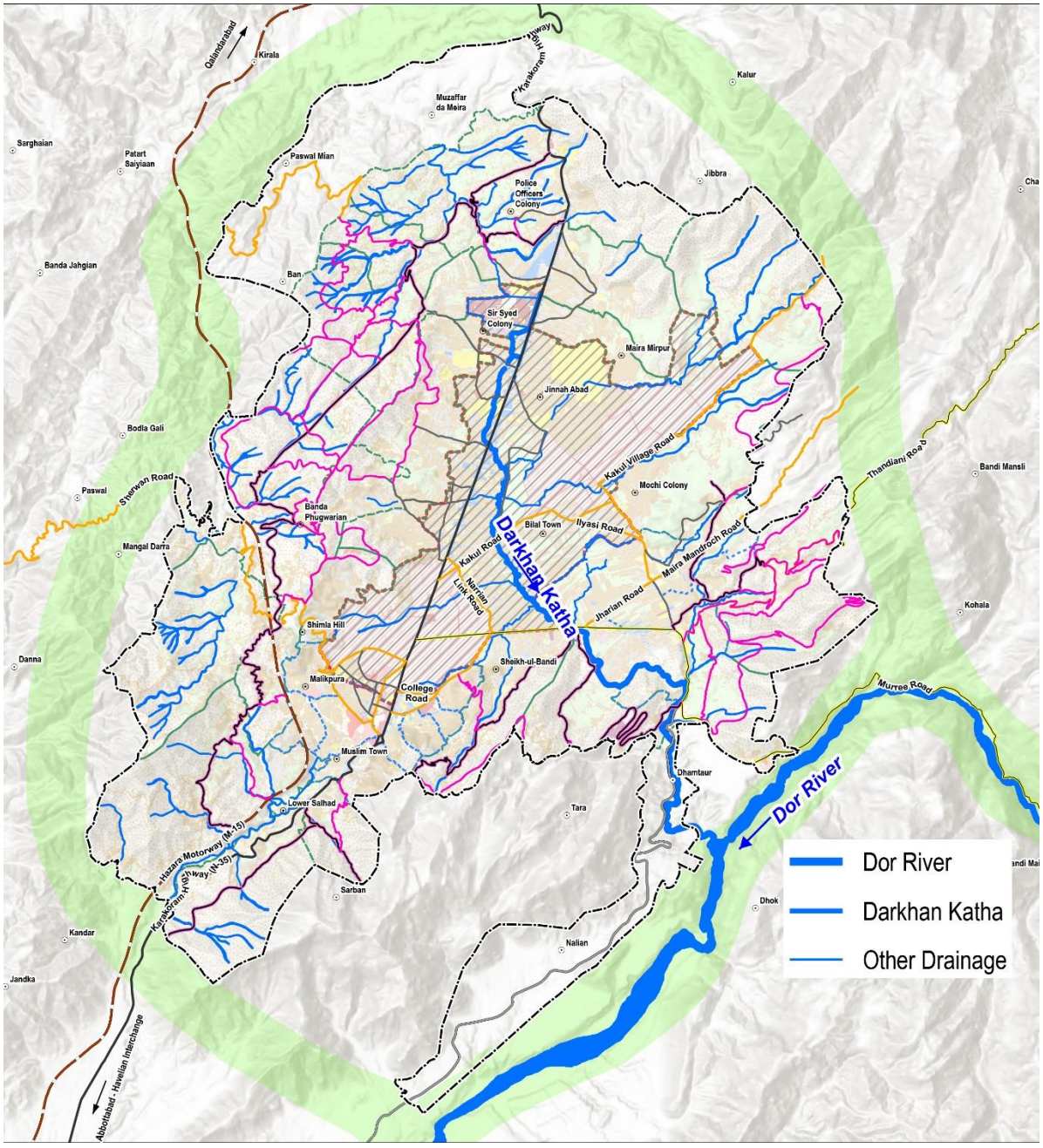


Figure 7-8 Environment Conservation

8. PROPOSED LAND USE ZONING

The proposed land use zoning is broadly based on NRM Guidelines. The NRM has not been revised since decades, thus Consultant have added new land uses in the prescribed categories, as per the contextual requirement of the indigenous environment of Abbottabad as DHQ city, and in consideration of the NRM Standards. The proposed land use zoning is shown in the table below:

Table 8-1 Proposed Land Uses Abbottabad

Sr.No.	Proposed Land Uses	Areas (acres)	Percentages %	NRM Standards	
1	Residential	7,709.27	26.95%	Residential	40-45%
2	Commercial	450.10	1.57%	Commercial	2-3%
3	Mixed Use	344.66	1.21%		
4	Industrial	468.71	1.64%	Industrial	2-10%
5	Cantonment	4,495.02	15.72%	Institutional	3-5%
6	Civic Zone	224.19	0.78%		
7	Health Facilities	192.13	0.67%		
8	Educational Facilities	351.83	1.23%		
9	Religious	51.89	0.18%		
10	Utility Services (Dumping site / Disposal Station etc.	59.20	0.21%		
11	Graveyard	292.34	1.02%	Graveyard	2-3%
12	Parks and Playgrounds	456.93	1.60%	Recreational	4-6%
13	Roads Network	1,781.54	6.23%	Arterial Circulation and Terminals	5-20%
14	Transportation	74.41	0.26%		
Sub-Total: Built Up Area		**16,952.22**	59.27%		
14	Agricultural Land	1,402.04	4.90%		15-25%

Sr.No.	Proposed Land Uses	Areas (acres)	Percentages %	NRM Standards	
15	Canal/ Nullah	346.48	1.21%	Protected Reserved	
16	Brown Fields / Vacant Land	632.09	2.21%		
17	Hilly Terrain	9,181.36	32.10%		
18	Open Land	87.04	0.30%		
Sub-Total: Non - Built Up Area		**11,649.01**	**40.73%**		
Total Area		**28,601.23**	**100.00%**		

8.1 Residential Zone

Keeping in view the current population the total housing demand is calculated for the additional population i.e. 158,149 by 2042 income class wise area required along with total demand for housing is shown in the table 8-2 below.

Table 8-2 Housing Demand & Area Required for Additional Population in Abbottabad City

Land Requirement in Residential Sector	Low Income Housing (45%)	Middle Income Housing (45%)	High Income Housing (10%)	Total
Projected Population (2022-2042)	443,614			
Population Distribution as Per Income Class	199,626	199,626	44,361	443,614
Additional Population	71,167	71,167	15,815	158,149
HH Size	6			
Housing Requirement	11,861	11,861	2,636	26,358
Existing Housing Stock of Abbottabad City	37,887			
Replacement Demand @15% of existing Stock (Source PBS)	2,557	2,557	568	5,683
Housing Stock of Abbottabad City by 2042	32,204			
Additional Replacement Demand @15% of existing Stock	2,174	2,174	483	4,831
Existing Backlog as per PBS	1,018	1,018	226	2,262
Total Demand of Housing Stock	17,610	17,610	3,913	39,134
Land Required (Kanals)	**5 Marla & Apptt**	**10 Marla**	**1 Kanal**	
	3,642	7,284	3,237	14,163
Addition of Amenities 120% (Kanals)	4,370	8,740	3,885	16,995

Land Requirement in Residential Sector	Low Income Housing (45%)	Middle Income Housing (45%)	High Income Housing (10%)	Total
Land Requirement Total (Kanals)	8,012	16,024	7,122	31,158
Land Requirement Total (Acres)	1,002	2,003	890	3,895

In reference to Task-B following is summary of the residential sector:

Sr. No.	Categories Names	Values
1.	Existing area (in acres)	3814.27
2.	Existing area (in %)	15.24
3.	Existing household size	6
4.	Existing number of houses	37,887
5.	NRM Standards	40-45%
6.	Proposed area (in acres)	7,709.27
7.	Proposed area (in %)	26.95
8.	Proposed household size	6
9.	Required Housing by (2042) for additional Population	39,134

One of the important features of the proposed master plan is accommodation of all income groups with specific options for housing particularly suitable for respective income groups. Therefore, in total approximately 7,709.27 acres of residential land use is proposed, which will mean having 10 housing units per acre on average. Thus, it is expected that by around 2042 the total housing stock in the town would be about 39,134 units to accommodate the additional population. Refer Map-9.

The central part of Abbottabad occupies most of the residential use with other mix uses. With growing population there is shift from center to outskirts in the south direction of the city to avoid congestion and pollution thus new residential schemes have emerged. There are existing vacant land parcels in overall town for housing development. It is suggested to utilize available land within inner city in short term plan for infill development. To fulfill housing need of population for next decade till 2030, Infill Housing Development within adjoining VCs is proposed with Neighborhood Centers, to avoid leapfrog housing development.

Moving ahead, for medium to long term phase, areas are also being proposed for new residential development as per future requirement, which might also include apartment buildings. To fulfill housing need of population till 2042, areas are also designated for New Housing Development. For Low Income Housing area towards south is found more feasible for medium to high density development; while for middle and high-income groups, mixed density (low, medium and high) residential areas are suggested to be proposed in new housing development. Following land use division is for New Residential Schemes according to KP Local Government Private Housing Schemes Management and Regulations, Rules 2020:

Table 8-3 Planning Standards for Private Housing Schemes

Sr. No.	Land Use	Category-D (upto 50 kanal)	Category-C (50-100 kanal)	Category-B (100-200 kanal)	Category-A (200-500 kanal)	Mega Housing Scheme (above 500 kanal)
1.	**Open Spaces**	-	Min 05%	Min 07%	Min 07%	07% or above
2.	**Graveyard**	-	-	Min 02%	Min 02%	Min 02%
3.	**Commercial**	-	Max 01%	Max 05%	Max 05%	Max 10%
4.	**Public Buildings**	-	Min 02%	02% to 10%	03% to 10%	04% to 10%
5.	**Size of Residential Plot**	Max 01 kanal	Max 02 kanal	Max 02 kanal	Max 02 kanal	Max 02 kanal
6.	**Internal Roads**	Min 25 ft	Min 25 ft	Min 30 ft	Min 30 ft	Min 30 ft
7.	**Site for Solid Waste**	-	Min 05 marla	Min 10 marla	Min 01 kanal for 200 kanal and 10 marla for each additional 100 kanal upto 500 kanal	Min 04 kanal for 500 kanal and 02 kanal for each additional 500 kanal
8.	**Grid Station Exclusive of Public Buildings**	-	-	As per Requirements of concerned deptt. / Agency	As per requirements of concerned deptt. / Agency	As per requirements of concerned deptt. / Agency
9.	**Major Roads**	Min 40 ft	Min 40 ft	Min 60 ft	Min 100 ft	Min 150 ft
10.	**Service Area / Scheme Office**		Min 05 marla	Min 10 marla	Min 10 marla	Min 01 kanal

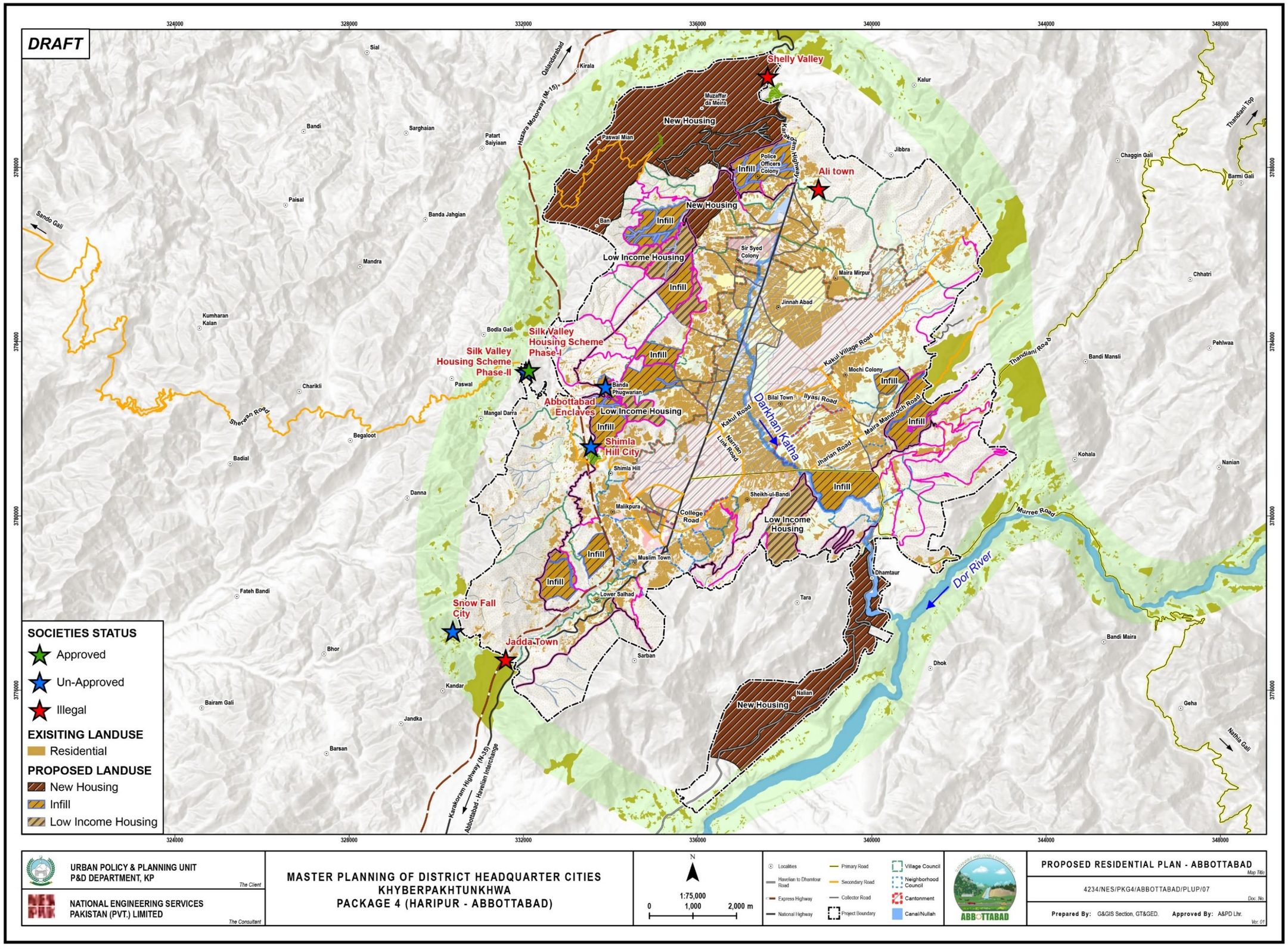
The Category D is suggested to be removed and the minimum size of housing schemes should not be less than 50 Kanal, since small chunks of housing schemes are not sustainable solutions. In Category C and Category B, it is recommended to limit the size of residential plot to one Kanal, in order to increase number of plots to serve more population. The internal roads should not be less than 30 feet in any category, for better accessibility and parking provision.

The Guidelines for Residential Zone Development

The Residential Zone will encompass houses and apartments, emphasizing low to medium-density housing development in alignment with cultural preferences. It is recommended to adhere to standards and allocate ample space for neighborhood facilities. According to the Khyber Pakhtunkhwa (KP) Land Use and Building Control Act, 2021, there is a crucial need to define the terms 'permitted' and 'permissible' land use. While the act acknowledges this necessity, the detailed development guidelines remain unspecified. To address this gap, the consultant has reviewed the Punjab Land Use (Classification, Reclassification, and Redevelopment) Rules 2009 (Amended, 2020), specifically relevant to the study area. It is essential to note that these development guidelines will be rendered void if the Building Control Authority introduces any Land Use Classification Rules applicable in KP.

The guidelines for Residential Zone development are as follows:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
(i) detached house; **(ii) semi- detached house;** **(iii) town house;** **(iv) residential apartment;** **(v) neighborhood level park and playground;** **(vi) place of worship or prayer;** **(vii) place of burial or cremation; and** **(viii) horticultural nursery:**	**(i) daycare centre or preschool;** **(ii) primary school;** **(iii) secondary school;** **(iv) dispensary with no bed and laboratory facilities;** **(v) library;** **(vi) guest house having not more than ten rooms;** **(vii) small size corner shop at the ground floor; and** **(viii) office of a professional not exceeding twenty five percent of the floor area, as office associated with resident professional; this facility shall be available to a resident holding both a professional degree, diploma or certificate and a registration with a statutory body established under a law for the time being in force:**	**The District Land-Use Planning and Management Committee/KP Land-Use and Building Control Authority/TMA shall not allow a person to use a property in a residential area for a purpose which is neither permitted nor permissible.**



Map 9 Proposed Residential Zone

8.2 Commercial Zone

In reference to Task-B following is summary of the commercial sector:

Sr. No.	Categories Names	Values
1.	Existing area (in acres)	204.77
2.	Existing area (in %)	0.82%
3.	NRM Standards	2-3%
4.	Proposed area (in acres)	794.76
5.	Proposed area (in %)	3.21%

This zone is mainly mixed-use commercial with state-of-the-art buildings. The smart development will be preferred from medium to high density with less foot print in order to utilize the land efficiently with sufficient open and green spaces. Refer Map-10 Abbottabad Proposed Commercial Land Use. The commercial land use will include the following:

8.2.1 NEW CBD (CENTRAL BUSINESS DISTRICT)

The placement criteria of New CBD are based on existing commercial areas, prevailing growth trends and inter and intra-regional connectivity. It is proposed in west side efficiently accessible through Proposed 100 feet Arterial road.

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

8.2.2 MIXED-USE DEVELOPMENT[3]

Mixed-use development involves urban planning that combines various functions, such as residential, commercial, cultural, institutional, or entertainment, within a single space. These functions are integrated to some extent both physically and functionally, with pedestrian connections provided. This approach can be applied to a single building, a block or neighborhood, or even an entire city or administrative unit. Mixed-use developments may include new construction, the reuse of existing buildings, or the redevelopment of brownfield sites.

A common characteristic of mixed-use developments is the provision of a range of services and amenities within walking distance, promoting a pedestrian-friendly environment. This approach is often seen as a way to enhance the overall quality of life, encourage sustainability, and contribute to the economic viability of an area.

[3] https://www.planetizen.com/definition/mixed-use-development

In continuation to the main CBD, it is recommended to place sub commercial areas at other major intersection to share the burden of retail commercial activities and will also benefit the inhabitants with nearby commercial facilities. Thus, a mixed-use development is suggested on the Proposed Inter zonal Arterial Road adjacent to New CBD.

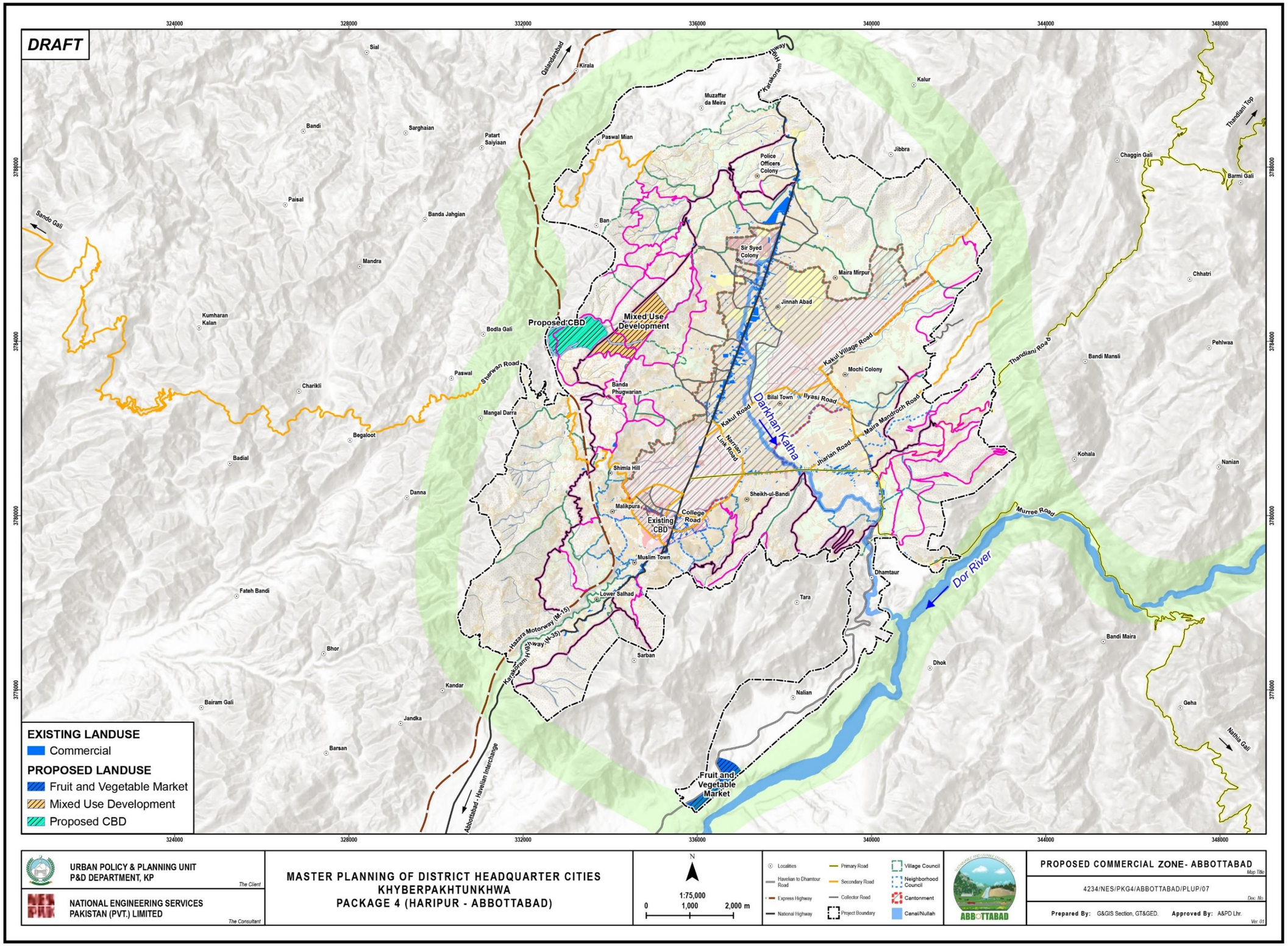
8.2.3 NEIGHBORHOOD CENTERS

In order to facilitate residents at micro level Neighborhood, Centers are proposed in partially developed areas. It would include facilities like; daily use commercial markets, weekly bachat bazaar, primary school, small mosque, play area / parks, clinics, common parking.

The following guidelines are for commercial zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
(i) residential apartment; · **(ii) multi storey building;** **(iii) condominium complex;** **(iv) commercial plaza;** **(v) market, shopping mall, departmental store;** **(vi) business facility;** **(vii) private office;** **(viii) government or semi-government office;** **(ix) court or tribunal;** **(x) financial institution;** **(xi) cultural institution such as park, memorial and monument;** **(xii) hotel up to three star;** **(xiii) motel having not more than twenty rooms;** **(xiv) showroom and shop;** **(xv) boutique;** **(xvi) restaurant;** **(xvii) social welfare institution such as community centre, art gallery & museum;** **(xviii) parking plaza;** **(xix) taxi stand and bus halt;**	**(i) educational institution;** **(ii) research institution** **(iii) marriage or banquet hall with a minimum plot size of four Kanal;** **(iv) cinema;** **(v)theater, auditorium, concert hall or exhibition hall with a minimum plot size of four Kanal;** **(vi) seasonal commercial fare site;** **(vii) stadium or play land;** **(viii)Shops dealing in hazardous or dangerous substances** **(ix)petrol pump or gas or LPG or LNG station;** **(x)bus or truck terminal;** **(xi)loading and unloading requirements of all uses;** **(xii) weighbridge;** **(xiii) private hospital;** **(xiv) hotel four star or above;** **(xv) television or other studio;** **(xvi) auto workshop;** **(xvii) whole sale storage place;**	**The District Land-Use Planning and Management Committee/KP Land-Use and Building Control Authority/TMA shall not allow a person to use a property in a commercial area for a purpose which is neither permitted nor permissible.**

(xx) police station, post office, fire station; and **(xxi) place of worship or prayer:**	**(xviii) printing press;** **(xix)Coal, wood or timber yard;** **(xx)athletic club, gymnasium, fitness centre or indoor sport facility; and** **(xxi) base trans receiver station or communication tower:** **(xxii)renewable energy installations or projects.**	



Map 10 Proposed Commercial Zone

8.3 Industrial and Economic Zone

In reference to Task-B following is summary of the industrial and economic sector:

Sr. No.	Categories Names	Values
1.	Existing area (in acres)	3.58
2.	Existing area (in %)	0.01%
3.	NRM Standards	2-10%
4.	Proposed area (in acres)	468.71
5.	Proposed area (in %)	1.64

In order to increase employment opportunities and production activities; industrial and economic areas need to be developed. It will create more jobs, investment options, open new markets and at the end of the day will boost the economy of the town. Refer Map-11 Abbottabad Proposed Industrial and Economic Land Use.

8.3.1 INDUSTRIAL ZONE

The current landscape features a predominant concentration of small-scale industries along N-35. To further bolster industrial development, new areas in the North West and South East are recommended for the establishment of Small and Medium Industrial Estates, conveniently accessible via the proposed road network. Promotion of cottage and small-scale industries, encompassing flour mills, ice factories, packaging of fruits and vegetables, feeder crops, and cottage industries specializing in handicrafts and souvenirs, is a key focus.

In response to contextual requirements, our approach extends beyond exclusive industrial development. The primary criteria involve harnessing indigenous economic potentials, primarily associated with technical services and emerging market trends.

8.3.2 ECONOMIC ZONE

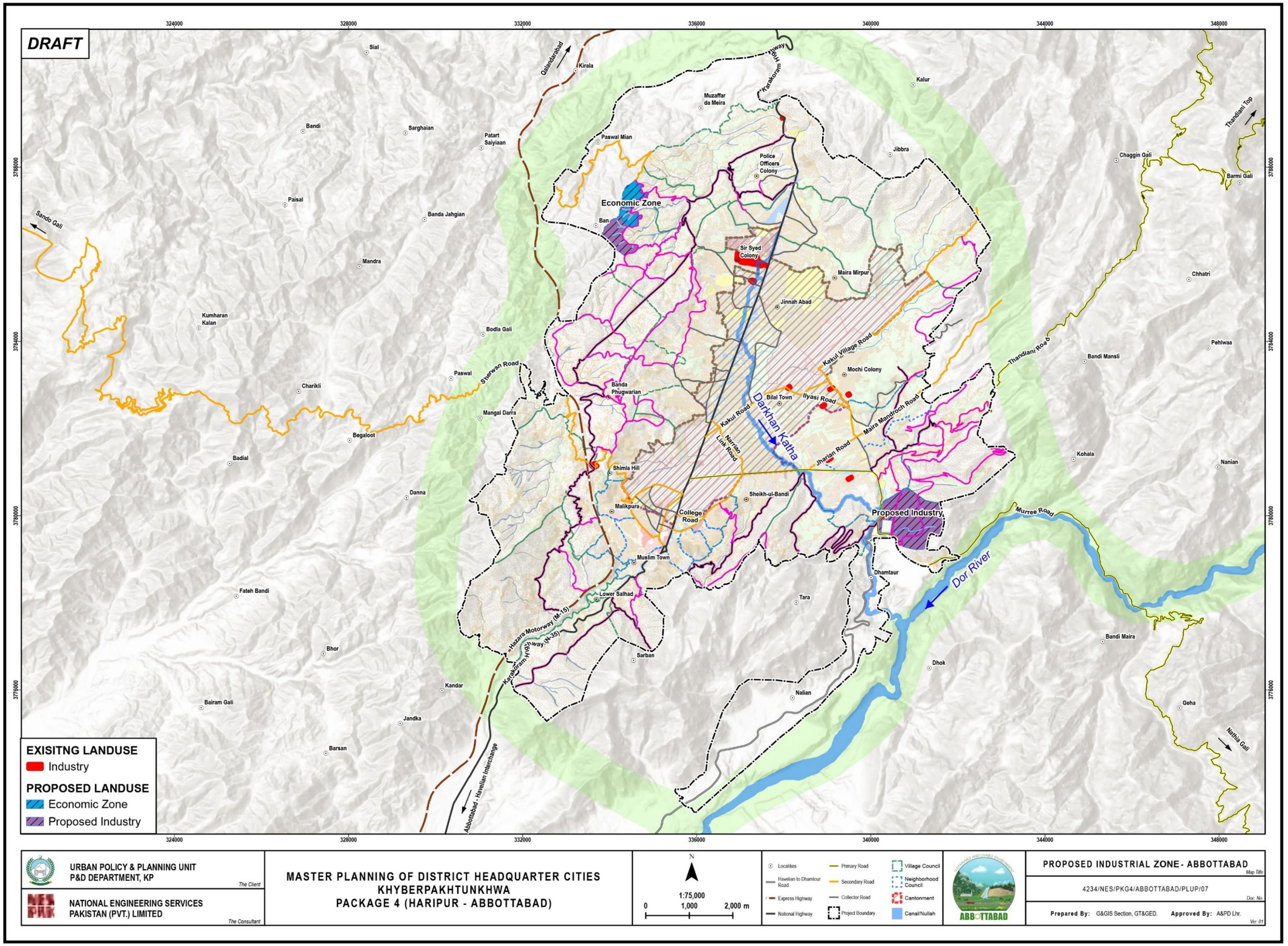
Complementing the industrial endeavors, an economic zone is proposed in the west direction, adjacent to the planned industrial area. This economic zone will feature a diverse array of technical services, including mechanical workshops and spare parts for automobile repair, alongside offerings such as building construction materials, home depots, furniture, housewares, food and beverages, and computer hardware. By integrating these components, the Industrial and Economic Zone aims to catalyze sustainable and diversified economic growth within the region.

The following guidelines[4] are for industrial development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
(i) cottage or light industry; (ii)Vertical green industry (iii) construction equipment; (iv)warehouse, storage or distribution centre; (v) building material store; (vi) fire station; (vii)restaurant (viii) loading and unloading place: (ix)weighbridge (x)industrial units except for which special permission is required under any law, rules or policy (xi)industrial products display center, fair price shop and showroom; and (xii)renewable energy installation or projects: (xiii)ancillary office or place for industry (xiv)auto workshop, service garage and service station; (xv)essential residential, commercial or educational facility for laborers or employees; (xvi)police station, post office or fire station; (xvii)base trans-receiver station or communication tower; (xviii)construction equipments; (xix) parking lot; (xx) water purification plant;	(i) storing, packing, pursing, cleaning, preparing, and manufacturing of blasting powder, ammunition, fireworks, gun powder, sulphur, mercury, gases, phosphorous, dynamite; nitro-compounds, (ii) storing explosives, petrol, oil, lubricants, and other inflammable materials including coal, chemicals, liquids or otherwise cleaning dying, preparing and manufacturing of cloth or yarn in indigo or other colour; (iii) storing, processing, cleaning, crushing, melting, preparing or manufacturing and dealing in bombs, tallow, offal, fat blood, soap, raw or dry hide or skin, washing or dying wool or hair; (iv) casting of heavy metals, electro plating, welding, marble cutting and polishing, manufacturing of cement or pipes, burning or grinding of lime stone, metal or use of any other obnoxious or hazardous material; (v) petrol pump or gas station or LPG or LNG storage and filling station; (vi) grid station;	The District Land-Use Planning and Management Committee/KP Land-Use and Building Control Authority/TMA shall not allow a person to use a property in an Industrial area for a purpose which is neither permitted nor permissible.

[4] https://lgcd.punjab.gov.pk/system/files/The_PLG_LAND_USE_PLAN_RULES_2020_0.pdf

Permitted Uses	Allied Permissible Uses	Prohibited Uses
(xxi) green or forest area; **(xxii) warehouse, storage or distribution center;** **(xxiii)vocational and technical training institute;** **(xxiv) building material store; and** **(xxv) medium or heavy industry including manufacturing, production, processing**	**(vii) power plant;** **(viii) hospital;** **(ix) effluent treatment or recycling plant;** **(x) industrial units for which special permission is required under any law, rules or policy;** **(xi) oil depot;** **(xii) incineration plant;** **(xiii)essential residential, commercial, health and educational facility for workers or employees; and** **(xiv) place of worship.**	



Map 11 Proposed Industrial Zone

8.4 Civic Services Zone

The summary of the civic services sector is given in the Table below:

Sr. No.	Categories Names	Values
1.	Proposed area (in acres)	224.19
2.	Proposed area (in %)	0.78

As Abbottabad is the district of Hazara division with the city of Abbottabad being the principal town therefore in future with the rising activities more space for different public offices and institutions will be required. With this assumption a new Civic Services Zone is proposed near Hazara Motor ways M-15 and proposed 100 feet arterial road next to proposed CBD and mixed-use development. This will include Town Committee Offices, District Secretariat Offices Development Authority, Line Departments, Local Government Offices, Town Planning Department, Circuit House, Judiciary Complex etc. refer attached Map-12 Abbottabad Proposed Civic Services Zone.

The following guidelines are for civic services zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
• District Secretariat, • Development Authority • Town Committee Complex • Line Departments • Local Government Offices • Town Planning Department • Judiciary Complex • Circuit House •Government offices and administrative buildings. •Public service centers. •Municipal facilities and town halls. •Police stations and law enforcement offices. •Fire stations and emergency response facilities. •Public transportation hubs. •Educational institutions focused on civic education.	• Employees Residences (for all grades) • Auditoriums, seminar halls, workshop spaces • Community facilities (parks, playgrounds, clinics, schools, neighborhood commercial) • Support facilities (gym, health club, bus stops, taxi stand, banks, fuel stations) •Commercial establishments providing essential services. •Public libraries and cultural institutions. •Public parks and recreational areas. •Non-profit organizations promoting civic engagement. •Educational institutions not directly related to civic education.	•Heavy industrial activities. •Residential developments not in line with civic purposes. •Commercial activities unrelated to civic services. •Activities with potential environmental hazards. •Any uses incompatible with the public service nature of the zone.

Permitted Uses	Allied Permissible Uses	Prohibited Uses
•Community centers for public gatherings and events.	•Small-scale commercial ventures supporting civic functions.	

8.4.1 HEALTH ZONE

In reference to Task-B following is summary of the health sector:

Sr. No.	Categories Names	Values
1.	Existing area (in acres)	26.60
2.	Existing area (in %)	0.11
3.	Proposed area (in acres)	192.13
4.	Proposed area (in %)	0.67

This zone is specifically for health and welfare related large scale activities. It will be a specialized area with high tech health facilities, social welfare and supporting services; with advance infrastructure.

It is suggested to have extension of existing DHQ Hospital with medical and nursing colleges as well. Since it will become tertiary level center for health facilities, thus staff residence, hostels, community and allied facilities will also be accommodated here. It could also include; Rehabilitation Centers, Special children, Welfare Homes (orphanage / old age / women) etc. It is widely possible that this area will be utilized for distinct health and welfare facilities in long term phase; like specialized hospitals, research and welfare centers etc. It will comprise the specialized units like oncology, urology, infertility centers, organ transplantation, and specialized treatment centers, research and development centers.

In plan other sub zones of health are also proposed, which are accessible from proposed 100 feet arterial road, and other proposed collector roads. The purpose of health areas is to make these accessible for other towns as well as attract private investment in health and welfare sector. The aim will be to provide all specialized health solutions within the town, and to serve the population beyond city boundary, like nearby urban and rural localities.

The following guidelines are for health and welfare zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
• Hospitals and healthcare facilities. • Medical clinics and diagnostic centers. • Rehabilitation centers and nursing homes. • Educational institutions related to health sciences. • Community welfare centers. • Recreational facilities promoting well-being. • Green spaces for relaxation and exercise. • Social service agencies and counseling centers.	• Educational institutions not directly related to health sciences. •Non-profit organizations focused on community development. • Research institutions with a health and welfare focus. •Supportive housing for vulnerable populations. • Ancillary services such as pharmacies and health-related retail.	• Heavy industrial activities. •Commercial activities unrelated to health and welfare. •Residential developments not specifically designed for health-related purposes. •Activities with environmental hazards detrimental to health. •Any uses incompatible with the well-being and safety of the community.

8.4.2 EDUCATIONAL ZONE

In reference to Task-B following is summary of the educational sector:

Sr. No.	Categories Names	Values
1.	Existing area (in acres)	161.79
2.	Existing area (in %)	0.65
3.	Proposed area (in acres)	351.83
4.	Proposed area (in %)	1.23

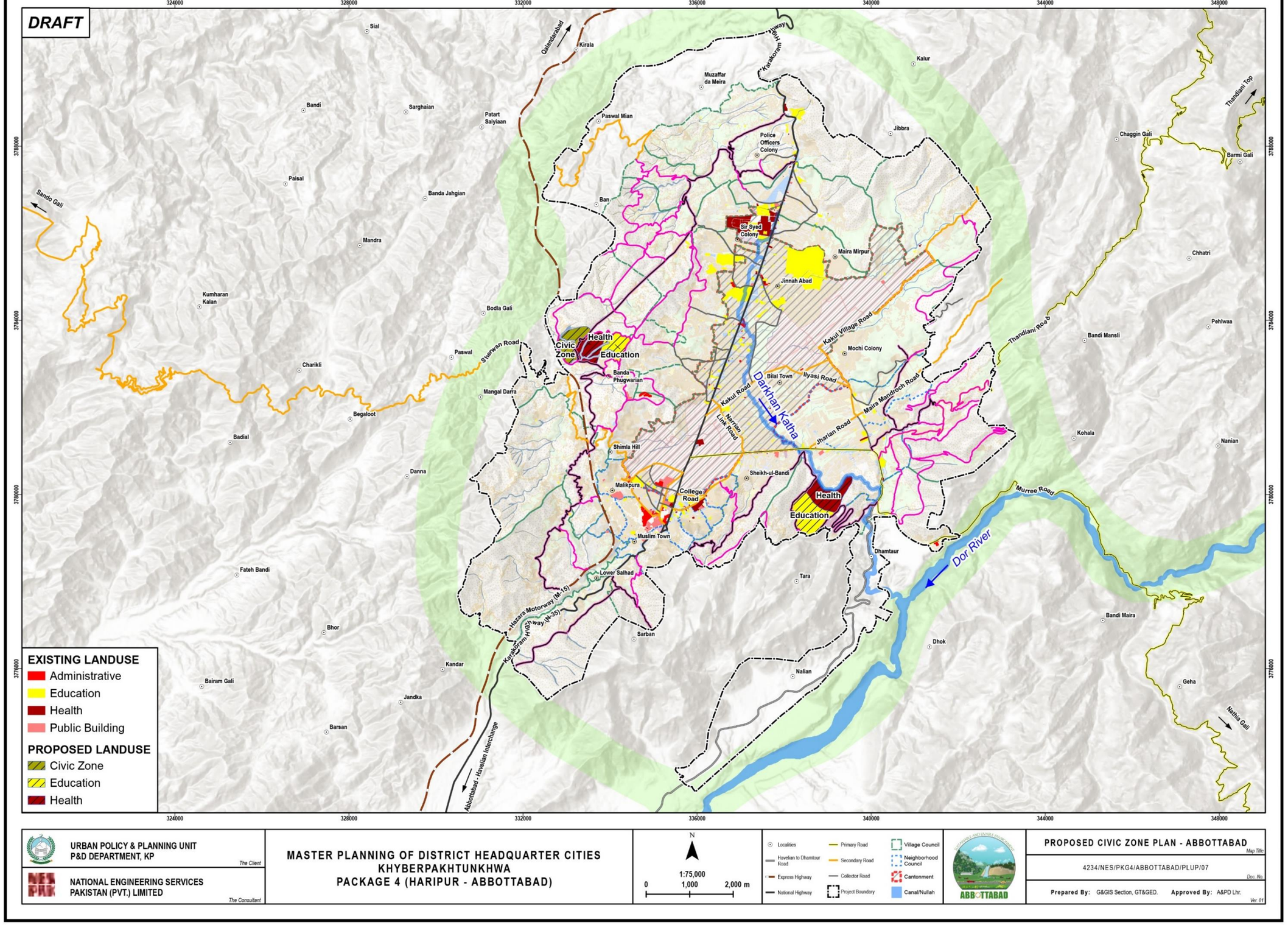
The large-scale educational land uses will be developed in this zone, focusing towards the global trend of education especially for future generations. The aim is to create a base of knowledge hub, to provide quality education in all diversified fields, in order to upgrade the livelihood of the indigenous as well as the regional population. The Educational Zone is mainly

proposed for new universities and campuses of well-known national educational institutes, which is lacking in the town. As the society is moving towards global dynamics, diversified fields of education will be a prerequisite. It could include upcoming need of the job market like; engineering, business, management, finance, media, IT and software, artificial intelligence, robotics etc.

The vocational training centre is also suggested to be placed in this zone to cater need of under privileged youth for better skills and technical knowledge. This will provide space for skill development centres, technical education for the indigenous and surrounding population to accommodate in the current job market. The library, data and information centres and scientific research institutes are also recommended in this zone to provide all kind of facilities for research and development in different fields. The purpose behind is to involve regional level youth in the education and research, in order to enhance the educational attainment level.

The following guidelines are for educational zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
•Schools and educational institutions at all levels. •Colleges and universities. •Research and development institutions. •Libraries and educational resource centers. •Student housing and dormitories. •Auditoriums and lecture halls. •Sports facilities and recreational areas for educational purposes. •Administrative offices for educational institutions.	•Educational support services such as tutoring centers. •Bookstores and educational supply stores. •Cafeterias and dining facilities for students. •Non-profit organizations focused on education and research.	•Heavy industrial activities. •Residential developments not associated with educational purposes. •Commercial activities unrelated to education. •Activities with potential environmental hazards. •Any uses incompatible with the educational nature of the zone



Map 12 Proposed Civic Zone

8.5 Recreational Zone

In reference to Task-B following is summary of the recreational sector:

Sr. No.	Categories Names	Values
1.	Existing area (in acres)	34.90
2.	Existing area (in %)	0.14
3.	NRM Standards	4-6%
4.	Proposed area (in acres)	456.93
5.	Proposed area (in %)	1.60

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

In the heart of city a **Central Park** and **Sports and Cultural Complex** are proposed. A central park would contain area for swings, sitting, walking, jogging with allied facilities of washrooms, tuck shops, parking etc. It would also have sub portions reserved for families (ladies and children). And sports and cultural complex would include cricket, football, hockey and other grounds, cultural centre and gymnasium.

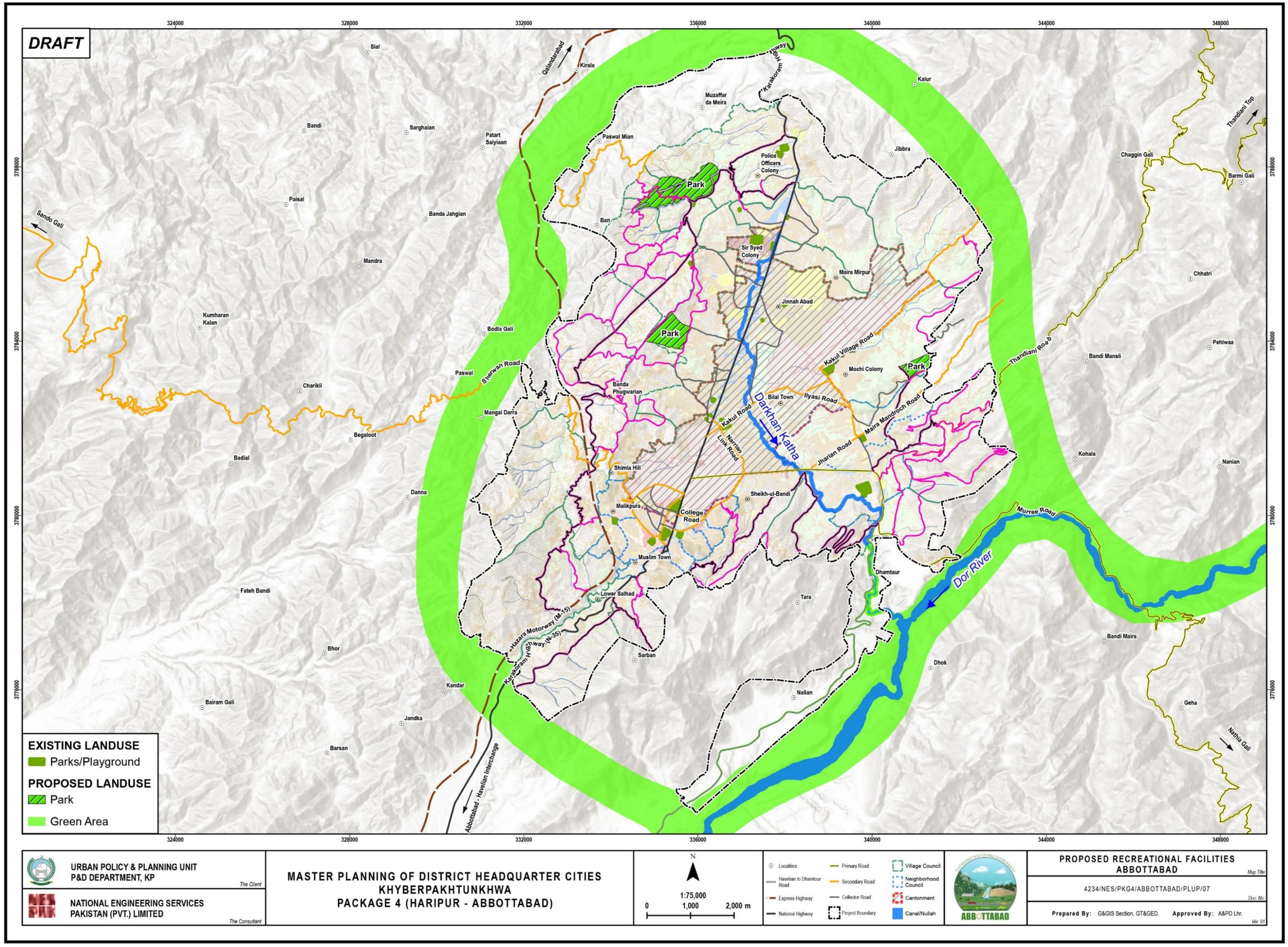
The recreational area specifically for **Amusement and Theme Parks** is designated in west side accessible from proposed arterial road and collector roads. In this area large scale amusement facilities like thrilling rides in a safe and pleasant manner will be provided. Moreover, theme parks like Art Park, floral garden, glow garden etc. could also be introduced as per the demand of the region.

In addition, Abbottabad is famous for its natural beauty and is a popular destination for tourists due to its beauty for tourism including Scenic Beauty of Thandiani, Ayubia National Park and Pine Hills. Abbottabad is increasingly promoting eco-tourism initiatives, emphasizing the conservation of natural resources and biodiversity while catering to tourists. This includes efforts to preserve forests, wildlife, and promote sustainable tourism practices.

Due to pleasant climate and the variety of outdoor activities it offers make it a popular destination for both local and international tourist, there is also a need of **Botanical and Zoological Gardens** in this region. These gardens will serve not only a metropolis of future but urban and rural areas of Abbottabad region as well. It is recommended to develop these gardens towards south. Considering indigenous tradition and types of festivals, spaces are proposed for such events. These recreational spaces will be used for large population events like carnivals, Eid festivals, etc. Refer Map-13 Abbottabad Proposed Recreational Land Use.

The following guidelines are for recreational zone development:

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



Map 13 Recreational Zone

8.6 Graveyards

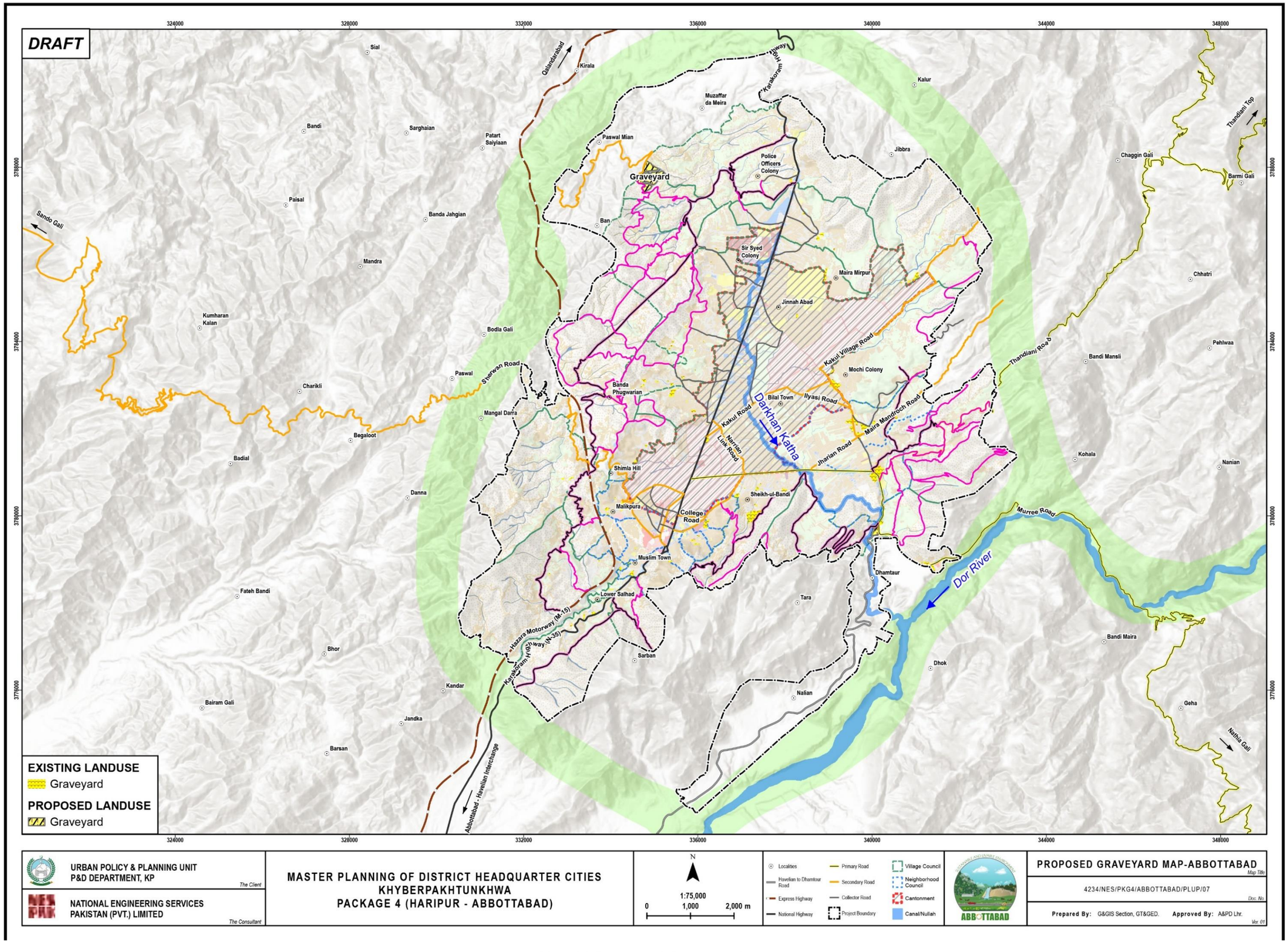
In Reference to the Task B the Proposed summary of the graveyard sector is given in the table below:

Sr. No.	Categories Names	Values
1.	Existing area (in acres)	141.01
2.	Existing area (in %)	0.56
3.	NRM Standards	2-3%
4.	Proposed area (in acres)	292.34
5.	Proposed area (in %)	1.02%

Considering accessibility two areas for graveyards are designated at appropriate locations. Thus, these sites will be accessible whenever required and will also remain in the periphery of the town. These graveyards can be further divided according to the requirement of practiced religions in the town. Refer Map 14 Proposed Graveyard.

The following guidelines are for graveyard zone development:

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



Map 14 Proposed Graveyards

8.7 Transportation Zone

In reference to Task-B following is summary of the transportation sector:

Sr. No.	Categories Names	Values
1.	Existing area (in acres)	754.42
2.	Existing area (in %)	3.01%
3.	NRM Standards	5-20%
4.	Proposed area (in acres)	1,855.95
5.	Proposed area (in %)	6.49

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

Major intersections in Abbottabad are without any proper traffic control devices this results traffic flow congestion and compromise the safety of pedestrians. Some intersections are manually controlled by Traffic Police during peak hours to ease the flow of traffic. It is required to regulate the traffic movements at intersections by deploying geometric improvements and proper traffic signaling system with proper phasing and timing at critical time of the day.

Fawara Chowk, Piffer Chowk and Muree Road Intersection are the main congested intersection of KKH that required geometric improvement as these intersections are failing to fulfil the demand and capacity. Sarban Chowk & Tank Chowk needs improvement to facilitate future traffic volume as well. The KKH requires geometric improvements at U-turns and segregation of traffic directions at intersections are also required. Median openings along KKH cause major fatalities. These median openings should be blocked and proper U-turn should be modeled along KKH for safe & efficient movement of traffic flow. Below is the list of key solutions to congestion problems at intersections.

- Geometric remodeling of critical intersections along with provision of dedicated left slip and right turn lanes.
- Removal of Illegal parking of public transport and private vehicles near intersections.
- Installation of proper advanced traffic signals at the intersections.
- Provision of proper pedestrian facilities for crossing of pedestrian at signalized and unsignalized intersections
- Provision of proper traffic signage, safety devices, lane marking and road furniture.

To ensure the smooth traffic operation at congested intersections, adaptive traffic signals should be installed on selective intersections where delay is observed in peak hours. Adaptive traffic signals can automatically adjust signal timings in real-time based on traffic flow throughout the day. They can also respond to changes in traffic patterns or emergencies more

quickly than fixed time signals or manual traffic control. Adaptive traffic signals offer more flexibility and responsiveness than fixed time signals or manual traffic control, resulting in improved traffic flow, reduced congestion, and enhanced safety.

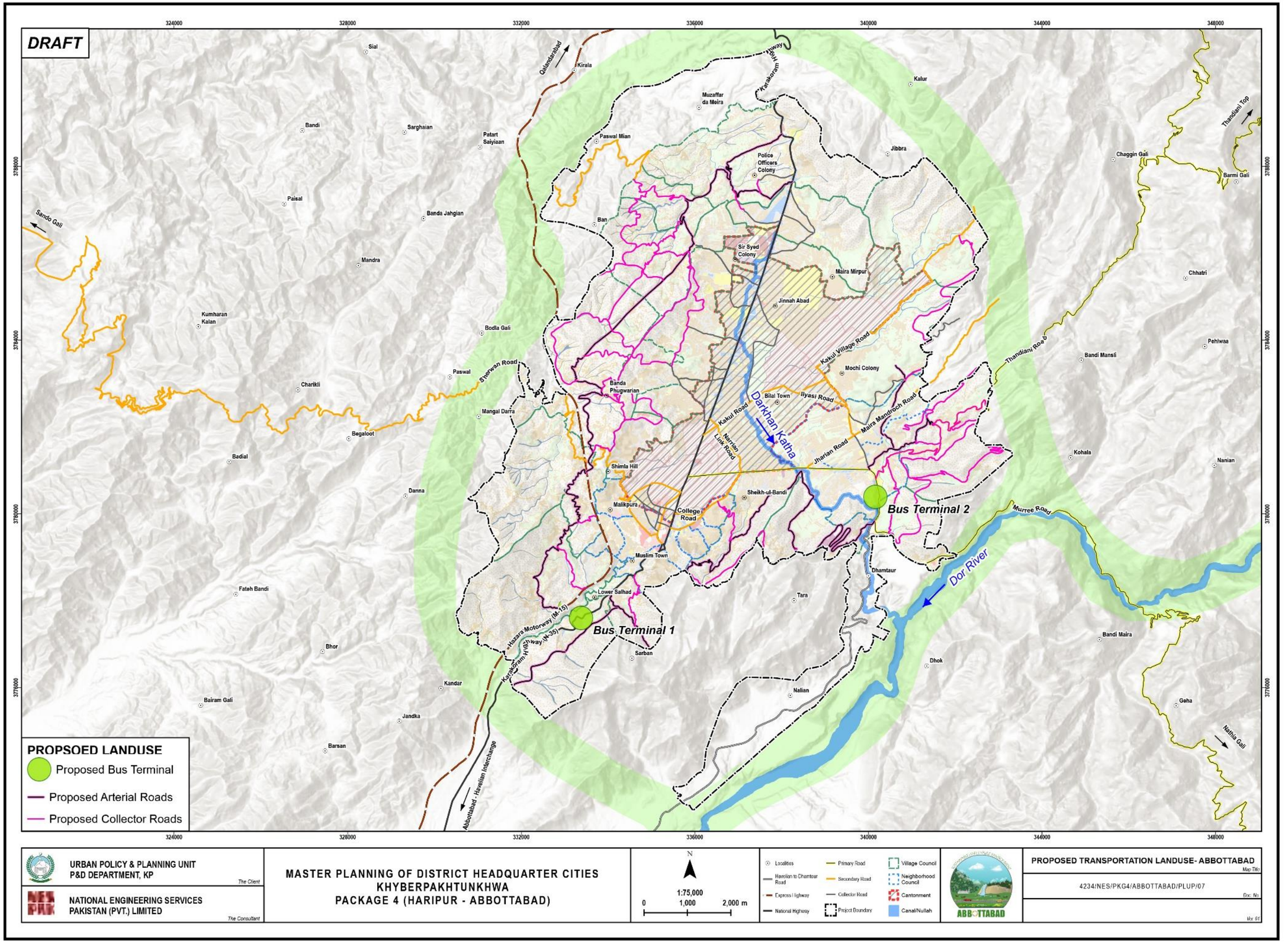
Additionally, establishment of integrated security surveillance is mandatory requirement and traffic monitoring system similar to those in place in Lahore and Islamabad is recommended for Abbottabad City. This system can smartly handle intelligent traffic management on the basis of real-time data by controlling traffic signals. These systems are also very effective for emergency response.

Proper regulatory, informatory and warning signs are required at each arterial and collector road. It is crucial to convey the significance of road signage to the general public and foster awareness about the importance of these signs in ensuring road safety and effective traffic management. Lane marking should be provided to ensure smooth traffic flow, organization and discipline of vehicles. Traffic regulations should be imposed for smooth and safe traffic operation. Public awareness campaigns and signage highlighting the consequences of illegal parking can aid the efforts of traffic police in curbing this issue on main arterial roads.

The development of new zones in Abbottabad requires careful planning and consideration of the city's future transportation needs. As a result, the master plan for Abbottabad proposes the construction of new arterial roads to support these new zones. These roads will provide essential transportation links between different parts of the city and enable easier access to the new areas. Overall, the inclusion of new arterial roads in the master plan for Abbottabad demonstrates a commitment to sustainable urban development and a focus on providing efficient and effective transportation infrastructure to support the city's growth. These roads alignment pertains to planning phase, which may vary on account of detail design. The proposed Inter-zonal Arterial Roads and proposed Inter-zonal Collector Roads are originating from the existing roads and these become major connecting corridors for Abbottabad City through widening and beautification. These would have dual carriageways with green medians in the center, footpaths, parking and urban forestations on both sides. However, it is very important to control upfront development along the major roads, thus upto 100 feet plantation of indigenous trees is suggested on both sides of major roads. Refer map – 15 Abbottabad Proposed Transportation Land Use.

The following guidelines are for Transport zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
• Parking Areas • Right of Ways of Designated Roads • Green Belts • Walkways • Traffic Management Devices	• Street Furniture • Accommodation for drivers and staff • Service Area, Support Offices, washrooms shops etc.	• Other than permitted and permissible



Map 15 Proposed Transportation Land use

8.8 Utilities and Services Zone

8.8.1 WATER SUPPLY SYSTEM

Urbanization has indeed a significant impact on water resources, both in terms of quantity and quality. As more people concentrate in urban areas, the natural landscape undergoes changes that lead to water-related problems affecting daily life. Large cities require huge amount of water to satisfy both domestic and industrial needs.

Currently, both groundwater and surface water are used as water supply source in the Abbottabad city. Most of the piped water supply system in the project area is fed by tube wells with overhead /surface reservoirs constructed at various locations in the city or directly water pump into the system. The water supply distribution network in project area is very old with rusted pipes which results in mixing of sewage in water supply lines and significant amount of drinking water is wasted due to leakages.

As per groundwater study report, depth to water table in the city varies from 10 to 240 feet below ground level. The average depletion rate of aquifer is 1.2 feet per year and specifically in western Abbottabad, depletion rate is more than in central plain areas where underlying aquifers are more or less stable and recorded less than 1 foot decline per year. Considering the depletion rate less than 1 foot per year in certain areas new groundwater developments can be planned. However, the areas have more than 1 foot depletion rate been not encouraged for further tubewells.

The excessive demand of Abbottabad city in future may be fulfilled through different surface water sources near the Project area. Prominent surface water sources for water supply to the city are springs and partially from Dor River. Utilizing these surface water sources can provide an alternative or supplementary water supply to meet the increasing demands of the urban population. However, it is important to consider the sustainability and environmental impact of extracting water from these sources to ensure long-term water availability and ecosystem preservation.

8.8.2 WATER DEMAND

Sufficient potable water is required to fulfill the requirement of domestic and various non-domestic consumptions. Importance of water demand estimation cannot be overstated for the planning and design of water supply systems.

Calculation of water demand of project area is fundamentally based on the value of average per capita water demand and the number of persons to be served in a project area.

Existing population (year 2022)	= 285,465 Persons
Per Capita Water demand	= 35 gpcd
Total domestic average demand	= 9,991,275 Gallons/day = 9.99 MGD
Projected Population (year 2042)	= 443,614 Persons
Per Capita Water demand	= 35 gpcd
Total domestic average demand	= 15,526,490 Gallons/day = 15.53 MGD
Total maximum day demand	= 23,289,735 Gallons/day = 23.29 MGD

The source will be designed on maximum day demand either tube well or surface water treatment plant. Overhead storage based on 1/10th of diurnal water demand will be provided

for balancing reservoir. Location of water reservoir and treatment plant is shown in the Map 16.

8.8.3 SEWERAGE AND DRAINAGE SYSTEM

The description of the existing wastewater collection system in Abbottabad city highlights the use of a partially combined system which involves a combination of sewer pipes, open and covered drains to collect both wastewater and storm water in the developed area. Presently, there is no lift/disposal station for the disposal of wastewater in the whole project area. The existing sewerage system in Abbottabad city lacks any arrangement for the treatment of raw sewage. All sewage is being disposed of into nearby irrigation channels or nullahs by gravity. As a result, all sewage generated in the city is discharged untreated into the receiving water bodies, leading to environmental pollution.

Proper sewerage system shall be proposed for Abbottabad city. Total catchment area shall be divided into different zones depending upon the topography of the area and trunk and secondary sewers shall be proposed to collect and transport the sewage from the project area and carried to Sewage disposal station (if any) by gravity, situated at the downstream of the project area. The sewage from disposal station will be pumped through force main pipe to Sewage Treatment Plant (STP) for its treatment. The sewage after treatment from STP will be disposed-off into water body passing in the vicinity of the project area or stored for reuse. Storm water allowance will be taken in proposed sewer lines.

Proposed sewerage system will consist of the following components:

- Primary trunk sewer
- Secondary sewers
- Disposal stations (if any)
- Sewage Treatment Plant (STP)

8.8.4 SEWAGE GENERATION

Calculation of sewage flow generated in project area is fundamentally based on the value of average per capita water demand and the number of persons to be served in a project area.

Projected Population (year 2042) = 443,614 Persons

Per Capita Sewage generation = 85% of water consumption (35 gpcd)

Total average Sewage Generation = 13,197,517 Gallons/day

= 13.2 MGD

8.8.5 SEWAGE TREATMENT PLANT (STP)

Sewage treatment is a crucial process that aims to remove contaminants from wastewater, making it suitable for discharge into the environment or for reuse. In the case of Abbottabad City, the implementation of a sewage treatment plant (STP) is recommended to treat the wastewater effectively. The sewage treatment plant will be designed on average flow. The area requirement for sewage treatment plant will depends on sewage treatment technology and number of treatment plant to be installed. The location of STP will be provided in later stage.

STP site location with a low elevation level shall be chosen. This will allow gravity flow, where wastewater can flow naturally without the need for excessive pumping. Gravity flow can be more energy-efficient and cost-effective compared to relying solely on pumping systems. However, other factors such as proximity to water sources, environmental considerations, and land availability also need to be taken into account when selecting the site for the STP.

Implementing a sewage treatment plant in Abbottabad city will significantly improve the quality of water discharged into the environment, helping to prevent water pollution and protect the surrounding ecosystems.

8.8.6 SOLID WASTE MANAGEMENT SYSTEM

Solid waste is being produced since the inception of human history. Solid waste production has increased over time due to population growth, expanding human activities, and increased resource utilization. Solid waste management poses a significant challenge, especially for developing countries that often face resource shortages and have inadequate institutional setups to handle waste effectively.

In the case of Abbottabad city, there is currently no permanent dumping or sanitary landfill site available. As a temporary solution, the Water and Sanitation Services Company (WSSC) is dumping all the garbage and municipal solid waste of Abbottabad city at Salhad. Unfortunately, residents of the nearby areas have to face health problems as a result of continuous exposure to chemicals, inhalation of toxic fumes and dust from the landfill site.

To address this issue, it is essential for Abbottabad city to establish a permanent sanitary landfill site. The total production of solid waste upto year 2042 will be 1,468,057 Ton by assuming generation rate 0.5-0.6 kg/c/d. The total land requirement for landfill site is estimated to be around 30 acres. This landfill site should be carefully planned and designed to ensure proper waste disposal, minimize environmental impact and mitigate health risks for the surrounding communities.

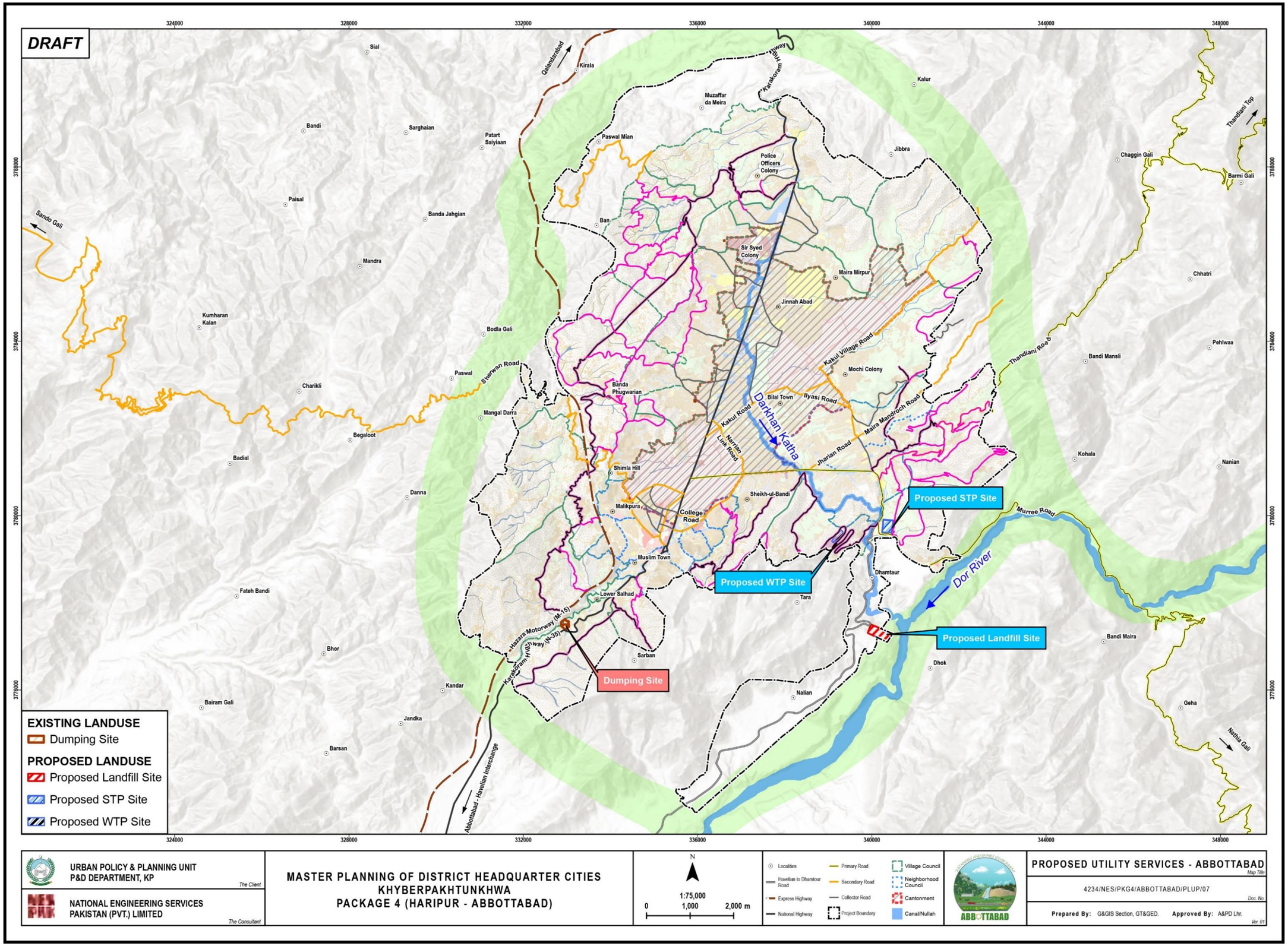
When selecting a location for the sanitary landfill site, factors such as distance from residential areas, hydrogeological considerations, and environmental regulations need to be taken into account. Additionally, proper waste management practices including waste segregation, recycling and composting should be implemented to minimize the volume of waste going to the landfill and promote sustainable waste management practices.

Establishing a permanent sanitary landfill site in Abbottabad city will provide a long-term solution for managing solid waste effectively, protecting public health and minimizing environmental pollution caused by improper waste disposal.

The following guidelines are for utilities and services zone development:

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

The proposed Utility Services in Abbottabad City are shown in the Map 16.



Map 16 Proposed Utility Services

8.9 Agricultural Zone

In Reference to the Task B summary of the agricultural sector is given in the Table below:

Sr. No.	Categories Names	Values
1.	Existing area (in acres)	3,072.87
2.	Existing area (in %)	13.59
3.	Proposed area (in acres)	1662.04
4.	Proposed area (in %)	8.09

In order to limit the town development prevailing trend of agricultural production is endorsed at outskirts of city area. Considering inter and intra-regional connectivity among farm roads and rich agricultural potential areas as per existing base map, **Agricultural Reserved** are proposed with **Agri-Centers**. These will emphasize on agro production of indigenous crops and all facilities and services will be provided in Agri-Centers to boost agricultural production within city limits. Refer Map 17 Proposed Agricultural Land Use.

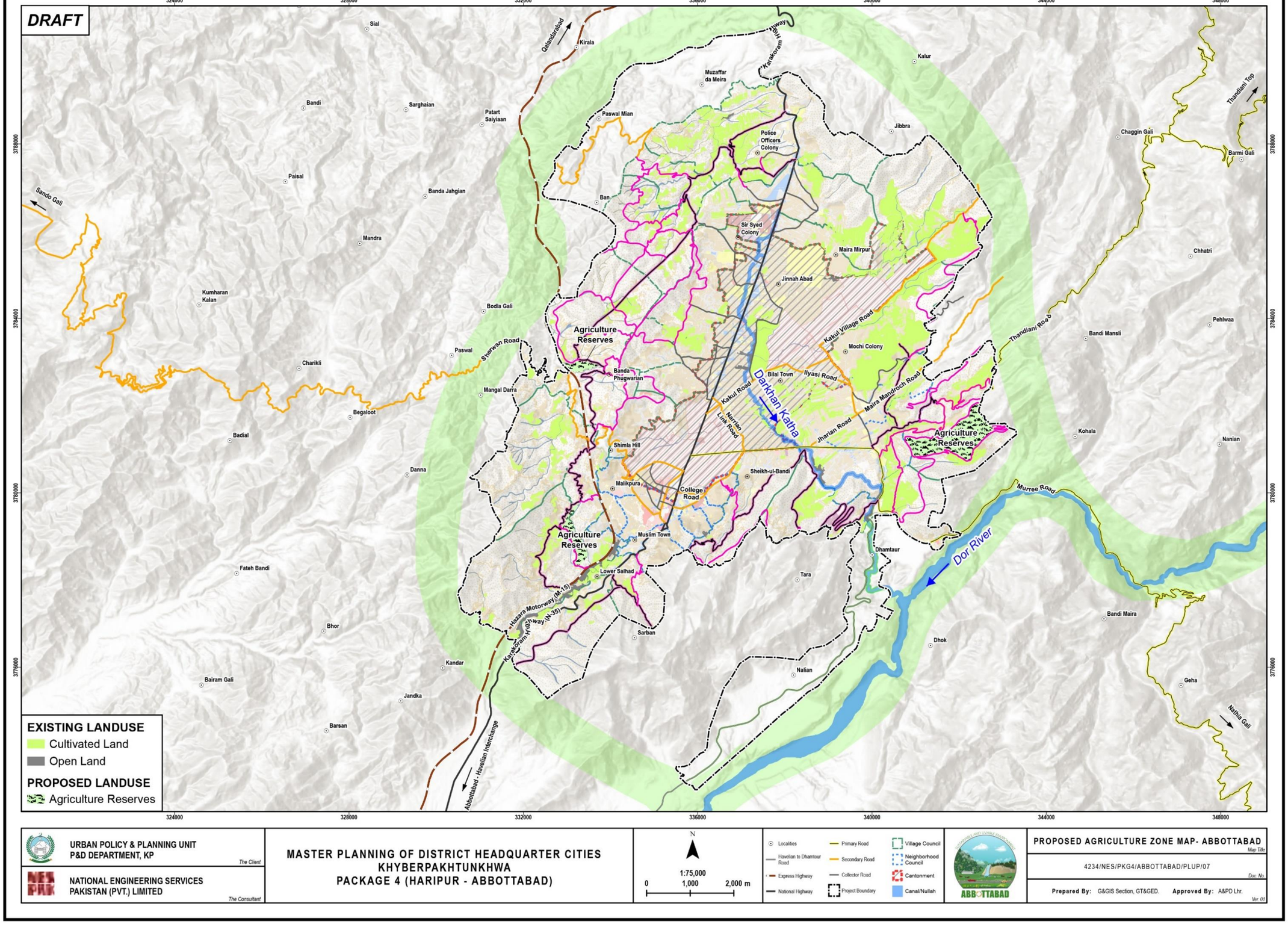
In this way, not only spatial growth of the city will be confined but also essence of agriculture activities will remain close to the city. It will also create a healthy environment and result in containing the spread of infrastructure network. The existing villages or settlements in the periphery of the town will also be benefited and not removed from their place of livelihood.

The following guidelines[5] are for agriculture zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
(i)crop; **(ii) orchard;** **(iii) pasture land;** **(iv) livestock rearing such as dairy, poultry or fish farm;** **(v) forest;** **(vi) nursery or a greenhouse;** **(vii) tube well;** **(viii) agricultural godown;**	**(i) agricultural machinery workshop;** **(ii) brick kiln;** **(iii) basic health unit;** **(iv) clinic or hospital;** **(v) veterinary dispensary or hospital;** **(vi) recreational club or resort or country club;** **(vii) shooting range;** **(viii) swimming pool;** **(ix) library;** **(x) cold storage;**	**• Other than permitted and permissible**

[5] https://lgcd.punjab.gov.pk/system/files/The_PLG_LAND_USE_PLAN_RULES_2020_0.pdf

Permitted Uses	Allied Permissible Uses	Prohibited Uses
(ix) residential dera or farm hut or farm house or house; (x) place of worship or prayer; (xi) place of burial or cremation; (xii) corner shop; (xiii) agro-based industry; (xiv) cottage industry; (xv) public slaughter house; (xvi) gawala colony; and (xvii)bus or truck terminal and ancillary activities	(xi) agricultural or livestock research institute; (xii) park, monument, playground, gymnasium or sports complex; (xiii) vegetable, fruit and grain market; (xiv) cattle market of a local government; (xv) public toilets; (xvi) public or private recreational or theme park; (xvii) oil depot; (xviii) power plant: (xix)water filtration plant; (xx)waste water treatment plant; (xxi) landfill site or dumping site or waste segregation site or plant; (xxii) Incineration plant; (xxiii)birds/ wildlife sanctuary; (xxiv) botanical or zoological garden; (xxv)factory outlet or products marketing center; (xxvi) zoo; (xxvii) base trans-receiver communication tower; and station or (xxviii) petrol pump or gas station or LPG or LNG storage and filling station.	



Map 17 Proposed Agriculture Zone

8.10 Livestock Zone

The Proposed summary of the Livestock Zone is given in the Table below:

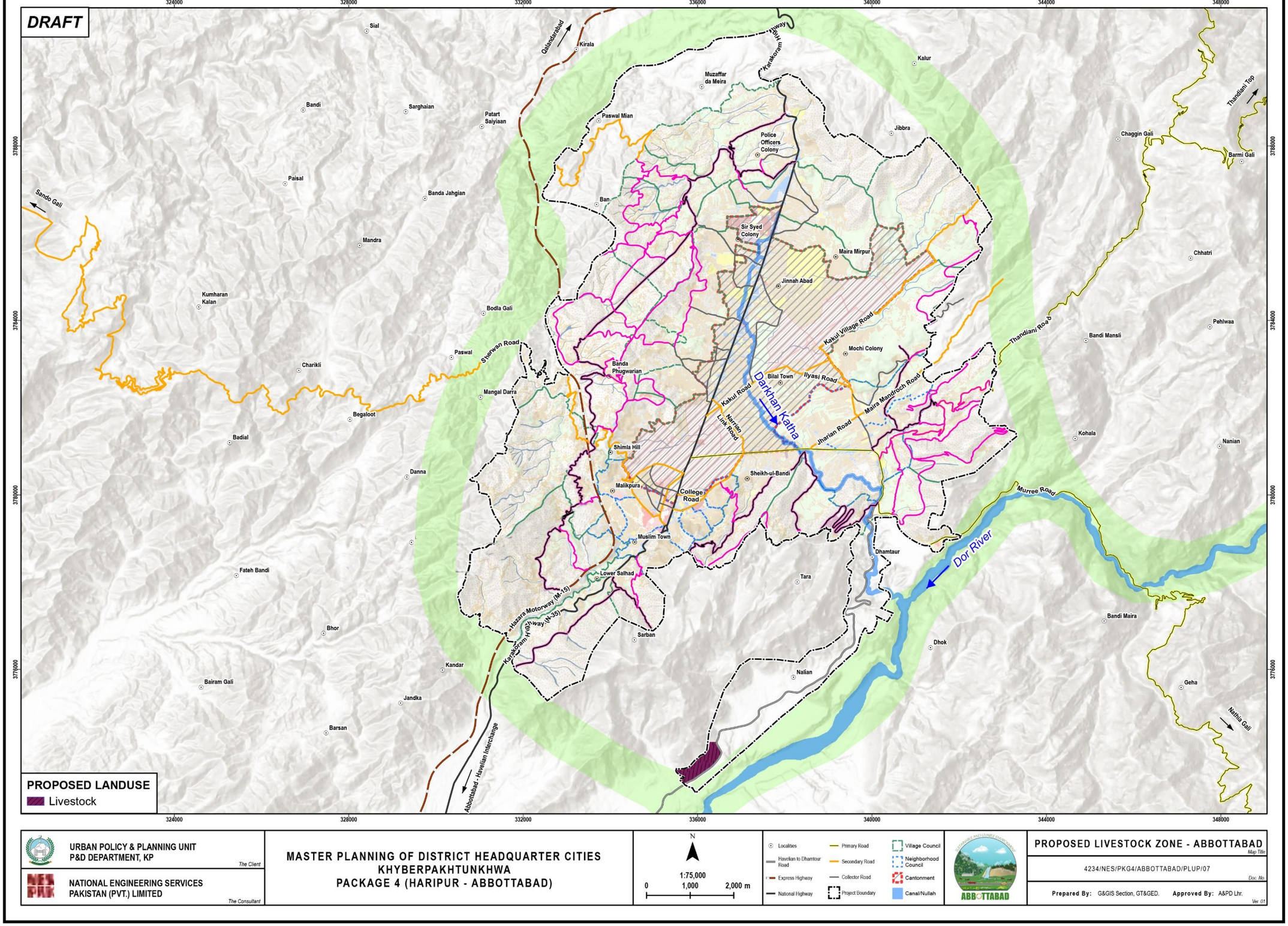
Sr. No.	Categories Names	Values
1.	Proposed area (in acres)	72.16
2.	Proposed area (in %)	0.25

Livestock Zone is placed in south direction connected with proposed Havalian Dhamtour Bypass road, to promote livestock production. Main emphasis is to be given to cattle production and their required facilities and services. In addition, poultry is another requirement to fulfil through the livestock zone. Thus, the cattle area will contain mainly cattle farms that could accommodate cattle, buffaloes, sheep, goats, etc. with pasture and grazing lands around the farms. Refer attached Map 18 Proposed Livestock Land Use.

This zone can also accommodate a new full-fledged veterinary hospital to cater to livestock health requirements. Dairy area will be facilitated with mandi / cattle market, artificial insemination center, slaughter house, milk collection unit, chiller storage unit, fodder storage and purchase, bio gas plant etc.

The following guidelines are for livestock zone development:

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



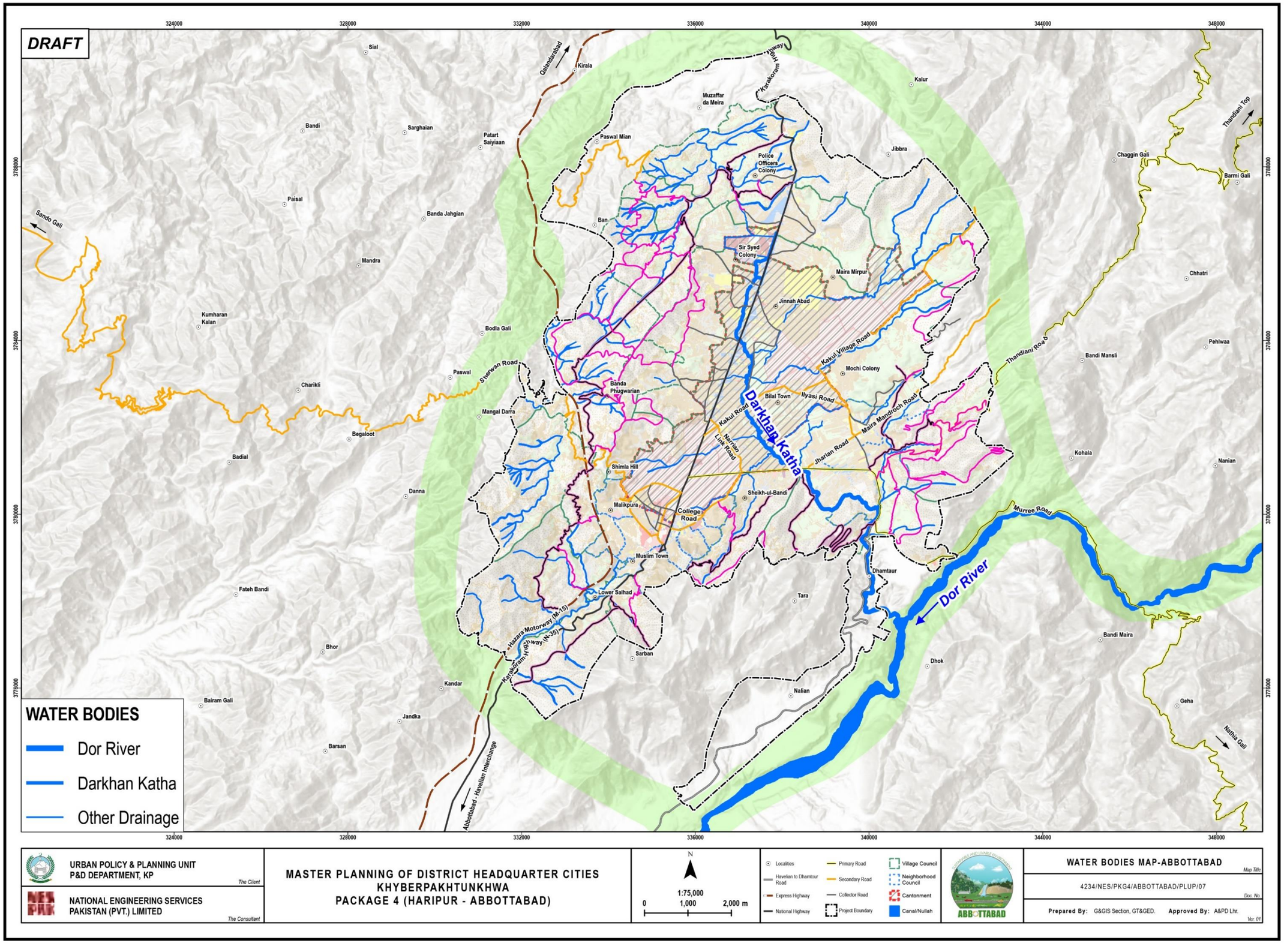
Map 18 Proposed Livestock Zone

8.11 Water Bodies

In Reference to the Task B summary of the water bodies is given in the Table below:

Sr. No.	Categories Names	Values
1.	Existing area (in acres)	346.48
2.	Existing area (in %)	1.56
3.	Proposed area (in acres)	346.48
4.	Proposed area (in %)	1.56

It is suggested to protect all water bodies in and around city area refer Water Bodies Map-19



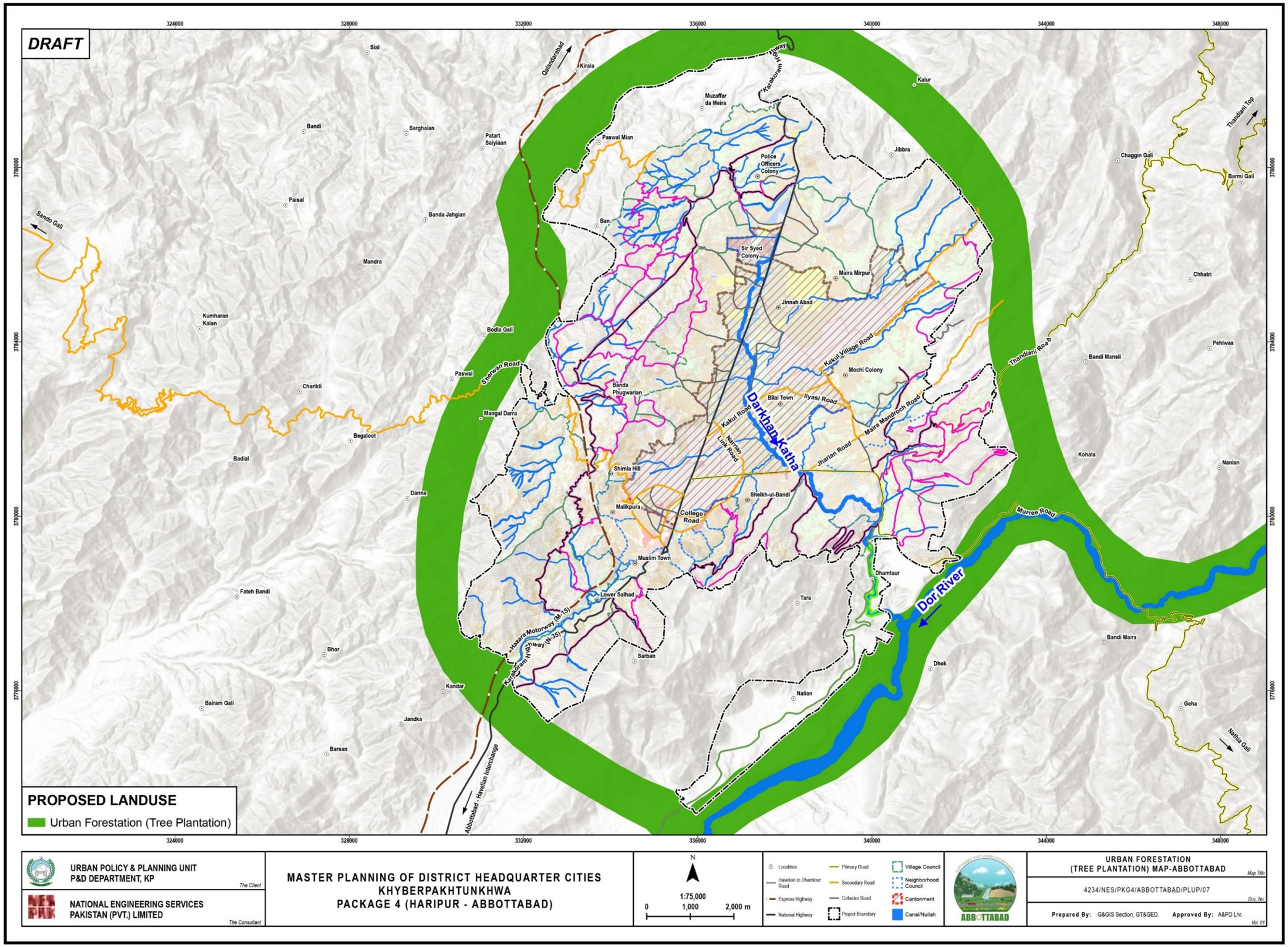
Map 19 Water Bodies

8.12 Urban Forestation (Tree Plantation) Zone

Urban forestation on both sides of proposed Inter- Zonal Arterial Road, around Dor River and Darkhan Khata is proposed subject to availability of land. Green belt 1 Km wide is proposed around the boundary of project area. Other than linear form of tree plantation it is recommended to encourage plantation of indigenous trees at suitable vacant land parcels within existing city and also urban forestation to be included in proposed parks, play grounds and open spaces subject to land availability and process of land acquisition of the area refer Urban Forestation (Tree Plantation) Map-20.

The following guidelines are for Water Bodies zone development:

Permitted Uses	Allied Permissible Uses	Prohibited Uses
• Sustainable forestry practices for the cultivation of native trees and plants. •Nature trails and walking paths for recreational use. •Educational facilities for environmental awareness and conservation. •Bird watching areas and wildlife observation zones. •Conservation and research centers for flora and fauna. •Eco-friendly structures for environmental education. •Picnic areas with minimal impact on the natural surroundings. •Passive recreation spaces such as meditation or yoga areas.	• Outdoor classrooms and workshops focused on environmental education. •Sustainable agriculture practices that complement the urban forest. •Small-scale nature-inspired art installations. •Eco-friendly cafes or refreshment stands with sustainable practices. •Visitor centers providing information on local biodiversity.	•Heavy industrial activities. •Residential developments not aligned with conservation goals. •Commercial activities unrelated to environmental preservation. •Activities with potential harm to the ecosystem. •Any uses incompatible with the urban forestation nature of the zone.



Map 20 Urban Forestation (Tree Plantation)

9. TOURISM POTENTIAL IN ABBOTTABAD

Abbottabad, nestled amidst the Himalayas, boasts breathtaking natural beauty, a rich history, and cultural sites. This section explores the current tourism potential of Abbottabad and proposes strategies for its development within the Master Plan.

9.1 Current Tourism Landscape

Natural Beauty: Highlight Abbottabad's scenic mountains, lush valleys, serene lakes like Harnoi Lake, and the Harnoi River offering opportunities for boating and fishing.

Historical Significance: Mention colonial-era buildings like the Old Lockhart House (potentially incorporating a museum) and religious sites like Ilyasi Masjid.

Scenic Viewpoints: Include Shimla Hill and potentially develop viewpoints for panoramic vistas.

Adventure Activities: Include trekking, hiking trails like Pipeline Track, and exploring options for paragliding or mountain biking.

9.2 Strategies for Development

- **Infrastructure Development:**

Upgrading existing tourist spots like **Lady Garden** and **Shimla Pahari** Park.

Building well-maintained hiking trails and viewpoints, incorporating accessibility features where possible.

Investing in a variety of eco-friendly accommodation options, from campsites to boutique hotels.

- **Cultural and Heritage Tourism:**

Preserving historical buildings like the **Old Lockhart House** and **Ilyasi Masjid**, promoting their cultural significance through guided tours and information boards.

Organizing cultural festivals showcasing local crafts, music, and food, potentially in collaboration with nearby villages like **Dhamtor Village.**

- **Adventure Tourism:**

  Develop designated areas for activities like rock climbing, paragliding, and mountain biking (following proper feasibility studies and safety measures).
  Promote responsible tourism practices like respecting the environment and local communities.

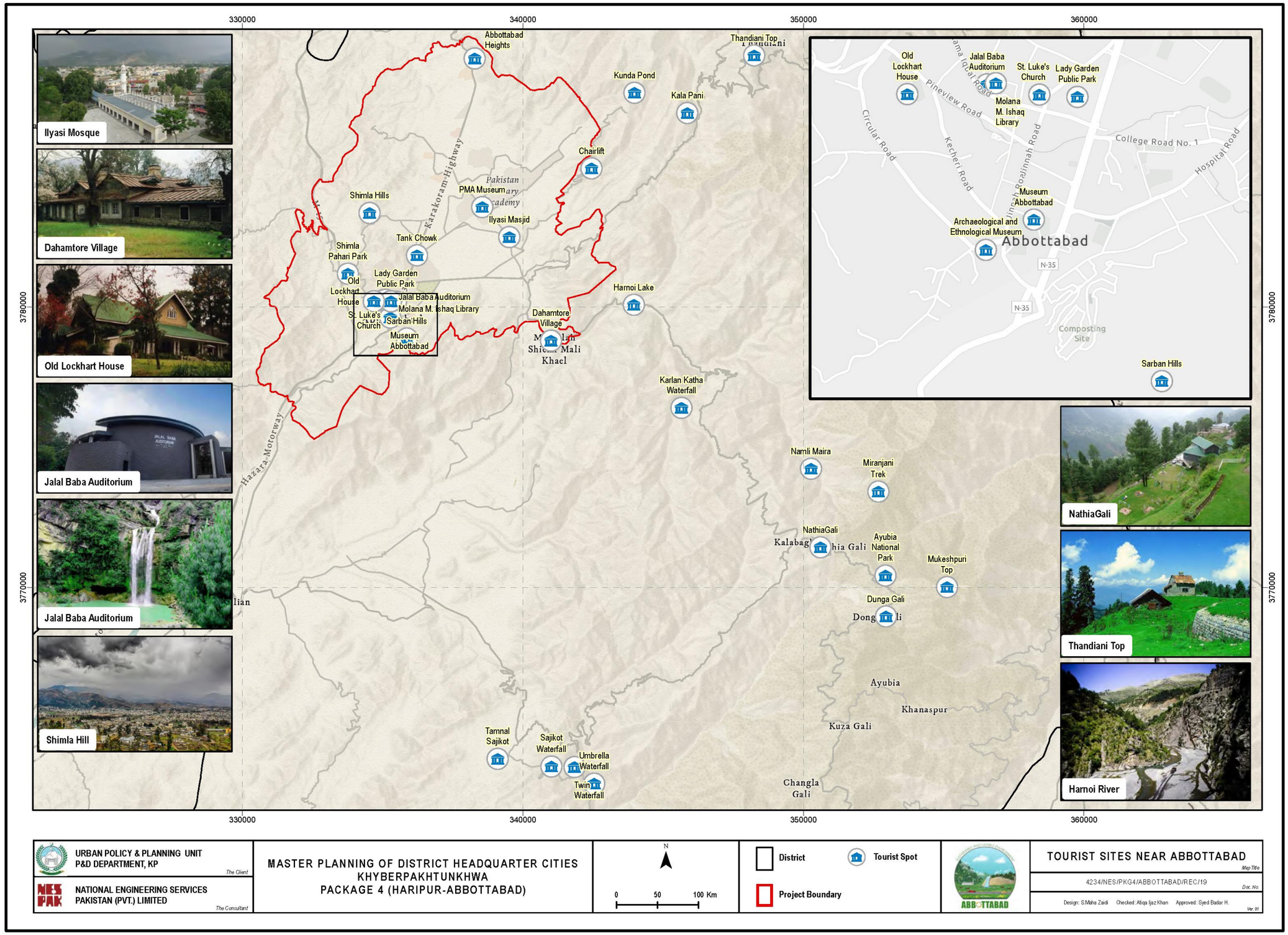
- **Marketing and Promotion:**

Create a dedicated tourism website and social media presence for Abbottabad, showcasing its natural beauty, historical sites, and cultural experiences.

Collaborate with travel agencies to promote Abbottabad as a tourist destination.

Consider nearby tourist destinations like **Nathiagali** and **Thandiani Top** in promotional materials for a broader regional perspective.

Map 21 provides a comprehensive overview of the existing tourism sites in Abbottabad. It highlights various key attractions, including natural landmarks, historical sites, and recreational areas that draw visitors to the region. The map serves as a valuable resource for understanding the spatial distribution of these tourism assets and how they are integrated into the broader landscape of Abbottabad. It also helps in identifying potential areas for tourism development and planning, thereby supporting efforts to enhance the city's appeal as a travel destination.



Map 21 Existing Tourism Sites in Abbottabad

10. CULTURAL HERITAGE AND ARCHEOLOGICAL SITES

The cultural heritage of a region plays a pivotal role in reinforcing the cultural identity of its people. It nurtures collective memory and a deep sense of belonging, adding both tangible and intangible dimensions to the living environment.

Abbottabad, renowned for its natural beauty, is equally rich in cultural heritage and archaeological sites. These historical remnants narrate the stories of past civilizations, providing insights into the lives and legacies of those who lived here long ago. Preserving and promoting these invaluable treasures is essential not only for understanding the city's history but also for sustaining and enhancing its cultural identity for future generations.

Below is a comprehensive list of the significant cultural and archaeological sites in Abbottabad, detailing their access points and historical periods. This compilation serves as a testament to the city's rich and diverse heritage:

Table 10-1 Comprehensive List of Heritage and Archeological Sites in Abbottabad

Sr. No.	Name of Explored Site	Access	Probable Date
1	Abbottabad Mound 1	Khan Colony Road	Kushan
2	Abbottabad Mound 2	Khan Colony Road	Kushan
3	St. Luke Church	Jinnah Road	British
4	Old Tehsil City	Main City	British
5	Frontier House	Main City	British
6	Abbottabad Police Station	Main City	British
7	Abbott House	Jinnah Road	British
8	DCO Office & Residence	Main City	British
9	Sikh Temple	Link Road, Gordwara Gali Road	British
10	Town Hall (Abbottabad Museum)	Company Bagh	British
11	Senior Civil Judge Court	Kutchery Area	British
12	MS House	Jail Road	British
13	City Girls Primary School	Mohalla Noordin Main City	British
14	Vicarage House	Jinnah Road	British
15	Panj pir Ziyarat	Jail Road	British
16	Government Guest House	Main City	British
17	DFO Forest Compound/Support Office	Jail Road	British
18	Old Bungalow Inside Forest Compound	Jail Road	British
19	Guard Room	Kutchery Area	British
20	Church Quarter	Jinnah Road	British
21	FG Boys School	School Building, Shimla Road	British
22	City Mosque Entrance	Sarafa Bazar	British
23	Govt Guest House	Shimla Road	British
24	Session Court Building	Fowara Chowk	British
25	Front Entrance and Boundary Wall of Dist. Jail	Jail Road	British
26	Police Line Buildings	Shaheen Chowk	British
27	Cantt. Board Office	Main City	British

28	Govt. Islamia Boys School #2 (Govt. Centennial School)	Main City	British
29	Hostel of Govt. (Victoria) Boys School	City	British
30	Govt. Gobind Girls High School	Band Kho, Main City	British
31	Orish Public School	Nawanshehr, Rush Mohalla	British
32	Nawanshehr Bazar Shops	Nawanshehr	British
33	Sikh Temple	Nawanshehr	British
34	Nawanshehr Site I (Ilyasi Masjid)	Nawanshehr	Kushan
35	Ghazi Baba Ziarat	Galiyat Road	18th Century AD
36	Bagnotar Police Station	Galiyat Road	British
37	Kala Pani Bungalow	Thandiani Road	British
38	Kalapani Quarter	Thandiani Road	British
39	Thandiani Church	Thandiani Road	British
40	Church Bungalow	Thandiani Road	British
41	Forest Rest House Dungagali	Murree Road	British
42	Forest Rest House Dagri	Nathiagali, Governor Cottage Road	British
43	STC Cottage Nathiagali	Galiyat Road	British
44	Nathiagali Church	Nathiagali, Governor Cottage Road	British
45	Dunga Gali Church	Murree Road	British
46	Yousaf Mandi	Havelian Bazar	British
47	Havelian Railway Station	Havelian Bazar	British
48	Post Office Road Building	Havelian Bazar	British
49	Sikh Temple Havelian	Havelian Bazar	Sikh
50	Rajoia Temple I	Havelian, Rojoia Road	Sikh
51	Rajoia Temple II	Havelian, Rojoia Road	Sikh

10.1 Recommendations for Cultural Heritage & Archaeological Sites in Abbottabad

To preserve Abbottabad's rich cultural and archaeological heritage, following is recommended:

Documentation: Conduct detailed surveys and research to capture the historical significance of each site.

Conservation: Implement robust conservation and restoration plans respecting the original integrity of the sites.

Public Awareness: Promote these sites through educational programs and sustainable tourism to foster local and visitor appreciation.

Accessibility: Improve infrastructure and signage to enhance site accessibility.

Legal Protection: Strengthen laws to protect sites from encroachment and inappropriate development.

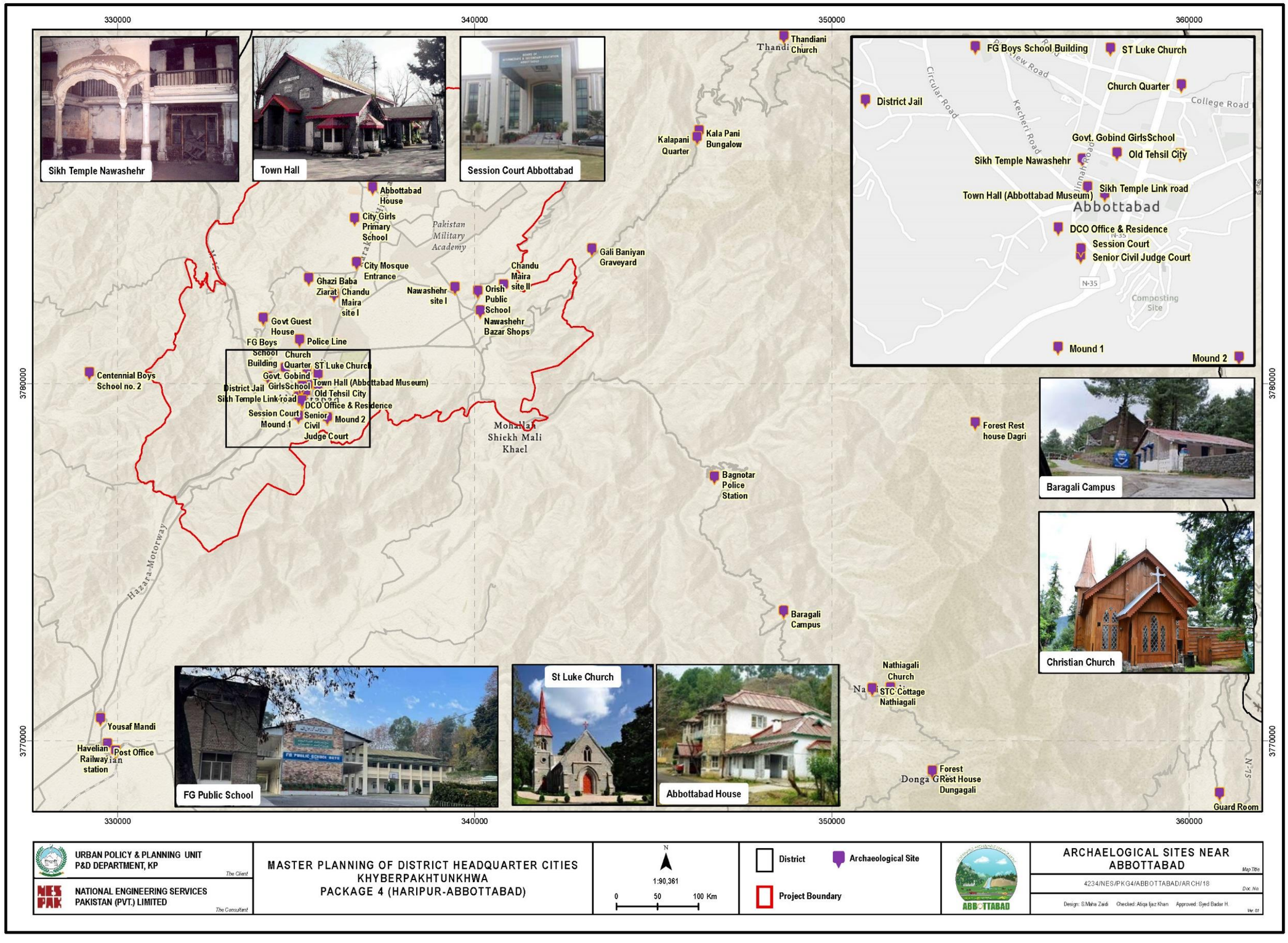
Community Involvement: Engage and empower local communities in preservation efforts.

Sustainable Practices: Promote practices that balance heritage conservation with urban development.

Partnerships: Collaborate with governmental and non-governmental organizations for resources and expertise.

Heritage Education: Integrate heritage topics into school curricula and organize cultural events.

Monitoring: Regularly evaluate site conditions and conservation efforts to adapt and improve strategies.



Map 22 Archaeological Sites, Abbottabad

11. GUIDELINES FOR SAFER LAND USE PLANNING AND SUSTAINABLE DEVELOPMENT OF ABBOTTABAD CITY

a) Abbottabad City is located in Seismic Zone-3, as per Building Code of Pakistan, Seismic Provision-2007. The major threat to the urban population living in the Abbottabad City is from earthquakes that may create a havoc keeping in view the potential of Seismic intensity, existing land use and prevailing construction practices. For practical purpose, Highly Hazardous Zone (HHZ-Comprising of a geologic fault with 100-300 meters buffer zone) should not be used for any new development involving buildings with human occupancy and critical infrastructure in compliance to Sub-clause 3.2, BCP-SP-2007.

b) Site specific Geotechnical investigation should be considered mandatory for any new important construction.

c) In general, energy efficient, environment friendly and innovative construction technologies should be promoted owing to good seismic competence, cost effectiveness and easy eractibility, for all types of construction and in all areas of High, Medium and Low Seismic Hazard Zones.

d) However, more importantly, innovative construction technologies need to be promoted in High Seismic Hazard Zones (HSZ).

e) Modified Traditional Construction Technologies need to be accorded due consideration in perspective of their good seismic performance and valued advantages of cost effectiveness, energy conservation procurement of construction material and local availability of skilled workforce.

f) Construction of multistory (Ground story + one or more) buildings / communication towers and any other high rising structures should be strictly avoided in localities identified under Highly Hazardous Seismic Zone (HHZ) for geologic faults with 100/150m buffer or 200/300 m corridor with the geologic faults at the center of the corridor. Any buildings meant for emergency response services and all types of community buildings involving large number of human occupancy should not be constructed in these localities.

g) Conventional / prevailing non-engineered construction practices using stone and / or concrete blocks / brick masonry with cement / sand or mud mortars with or without RCC slab roofs should be abandoned and replaced with Masonry Infilled Concrete Framed-MICF structure designed by a competent structural engineer in compliance to the BCP recommended Seismic Design Parameters.

h) Other potential natural phenomenon that may create a state of emergence is hill torrent/flash floods accompanied by flood hazard.

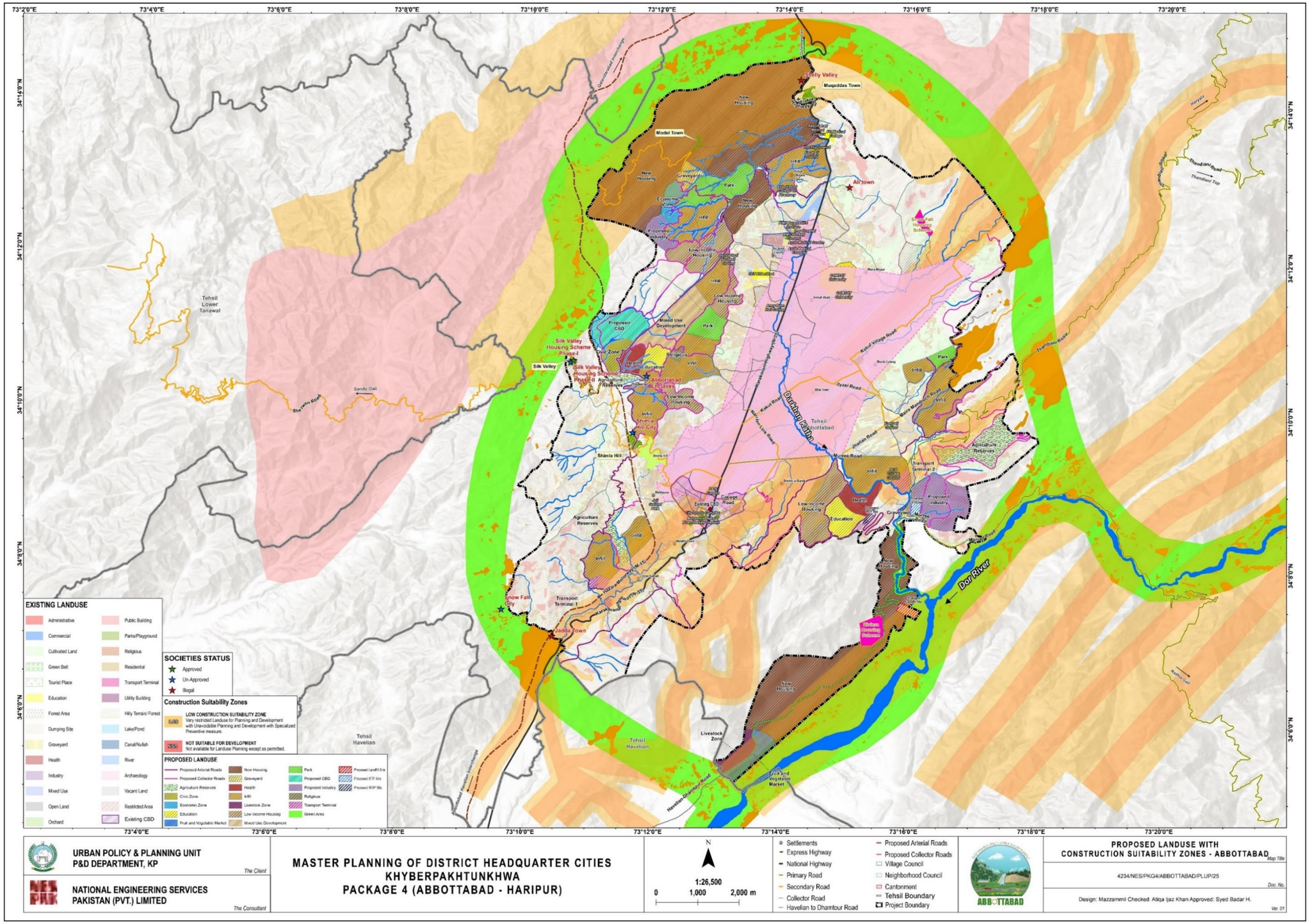
i) Lessons learned from previous disasters indicate that wide spread damage to lifeline and property was attributed to three natural phenomena which in the order of increasing severity are Earthquakes, Flood hazard and Landslides. Other natural phenomenon and manmade activities that may lead to immense loses include:

- Land degradation/Erosion
- Severe Seismic ground shaking
- Potential surface rupturing in areas having close proximity to geologic faults
- Potential threats from extensive / massive slope failures during major earthquakes.
- Alluvial Amplification in areas covered by huge thickness of Quaternary deposits.

j) Lesson learned from previous disasters are also indicative of those critical factors that may result in partial or complete collapse of buildings, houses and infrastructure. These factors include:

- Inappropriate geometry and configurations of buildings
- Inadequate structural design of buildings
- Non-engineered RCC construction
- Buildings on weak foundation such as loose soils, un-compacted debris and terrace deposits occurring on hill slopes.
- Abandoning of indigenous construction techniques
- Poor construction practices, materials and workmanship.

k) Safer Urban Land use Plans Identifying Safe Havens for any new development should be prepared and implemented in perspective of the guidelines of Construction Suitability Map of Abbottabad City (Refer Map-6 & Map 23).



Map 23 Proposed Master Plan of Abbottabad with Construction Suitability Zones

ANNEXURE-I

ANNEXURE-1

COMPLIANCE TO COMMENTS ON TASK-C- SSD/ MAPPING REPORT DRAFT MASTER PLAN ABBOTTABAD

S. No	Points	COMMENTS	COMPLIANCE
1	**Report format and sectoral maps**	The report must include detailed information on the district, tehsil, project area, and NC/VC, along with comprehensive demographic data. Additionally, the report will feature essential maps that support the proposal, such as existing and proposed residential, commercial, industrial, and economic areas, slum and informal settlement, planned and unplanned area, public sector facilities, security services, health and educational institutions, recreational areas, tourism and archeological sites, parks and playground, graveyards, urban forests, water bodies, livestock and agriculture areas, utilities and services, and civic services. Moreover, the sectoral maps for each land use shall be prepared and included in reports which shall become part of action plans later.	The revised report includes detailed information on the district, tehsil, project area, and NC/VC, along with comprehensive demographic data, such as the projected population refer to Section 1, Tables 1-1, 1-2, 1-3 Map 1 and Map 2 For essential maps regarding stated zones, refer Map 9, Map 10, Map 11, Map 12, Map 13 and Map 14.
2	**Environment Section**	Representative of EPA shared that further detail of the proposed industrial zone shall be required so as to identify that which type of industrial activity shall be allowed and which should be restricted/ prohibited. The consultant responded that the detail of the industrial activities within the proposed industrial zone along with its regulations shall be provided in its separate action plan. Moreover, the findings of the environment surveys (noise, air, and water), along with remedial measures/ strategies for catering the issues (if any) shall be included in reports.	Refer to Section 7.4 of revised report and Figure 7-8.

ANNEXURE-1

COMPLIANCE TO COMMENTS ON TASK-C- SSD/ MAPPING REPORT DRAFT MASTER PLAN ABBOTTABAD

S. No	Points	COMMENTS	COMPLIANCE
3	**Other Ongoing and Proposed Projects**	Representative of Abbottabad district administration shared that there is a JICA proposal in WATSAN which may also be considered in the master plan exercise. The consultant agreed and requested for the detail of the said project. The chair added that all the current and on-going projects shall be incorporated in the master plan, for which the concerned line departments shall be consulted accordingly.	All current projects, including those by TMAs, have been incorporated. Detailed section-wise proposals will be provided in a separate document titled "Action Plan for WATSAN and Solid Waste Management (SWM)" as per Task-D of the TOR.
4	**District Land Use Plan Abbottabad and Master Plan of Abbottabad City.**	One of the participants suggested that the proposals of the master plan and land use plan Abbottabad shall not be in conflict with each other. Therefore, comparative analysis shall be done to avoid conflict in proposals of the both plans. The consultant replied that the District Land Use Plan Abbottabad is thoroughly reviewed and comparatively analysis is done. The proposals are in line with the land use plan. Furthermore, the proposals of the master plan are more rational as they are finalized considering the seismic studies and fault lines particularly in Abbottabad. Similarly, the proposals are based on a latest authentic data particularly, the housing data (public and private housing schemes) where the concerned deputy commissioners and local TMAs were requested to share the updated data. The data so received was readily incorporated in the master plans. Moreover, the proposed satellite towns in DLUP Abbottabad are also considered in the master plan.	Refer to Section 6.2 titled "Abbottabad District Land Use Plan (DLUP)" and Table 6-1 for the "Comparative Analysis of DLUP and Master Plan Abbottabad."

ANNEXURE-1

COMPLIANCE TO COMMENTS ON TASK-C- SSD/ MAPPING REPORT DRAFT MASTER PLAN ABBOTTABAD

S. No	Points	COMMENTS	COMPLIANCE
5	**The WATSAN and Solid Waste Management Section**	The WATSAN and solid waste management section shall be revisited and the detail of existing/current waste collection/ disposal/ management practices, availability/ adequacy of landfill/dumping sites, categorization of different types of wastes including domestic, hospital and industrial waste, WWTP sites (existing and proposed), issues in existing system and proposals for catering the current need and requirements till the plan period shall be included. Similarly, detail about drinking water sources, per capita water demand, available resources, backlog, and the new proposals considering the current need and requirements of the plan period shall also be the part of reports. The serviceability maps (maps showing the served, poorly served and un-served areas in terms of these facilities and amenities) shall also be prepared and included in reports. The consultant agreed with the recommendation and ensured that the section shall be updated accordingly.	Refer to Section 8.8 titled "Utilities and Services Zone" for detailed information on the following sub-sections: 8.8.1 Water Supply System 8.8.2 Water Demand 8.8.3 Sewerage and Drainage System 8.8.4 Sewage Generation 8.8.5 Sewage Treatment Plant (STP) 8.8.6 Solid Waste Management System Additionally, refer Map 16 for the Proposed Utility Services Land use.
6	**Tourism Section**	One of the participants shared that special emphasis must be given to tourism section as both of the cities are rich in tourism attraction and potential sites for recreation. In this regard, all the existing tourism spots, archaeological and historical sites/monuments, detailed inventory of hotels/ motels/ restaurants/ guest houses etc. shall be explored and documented. The consultant may identify new potential tourism spots and incorporate in the master plans considering the transportation system enhancement and ensuring for accessibility and mobility.	Refer Section 9 and Map 21 for *Tourism Sites in Abbottabad* and section 10 and Map 22 for *Archaeological Sites of Abbottabad.*

ANNEXURE-1

COMPLIANCE TO COMMENTS ON TASK-C- SSD/ MAPPING REPORT DRAFT MASTER PLAN ABBOTTABAD

S. No	Points	COMMENTS	COMPLIANCE
7	**Transportation Section**	A representative from the TMA emphasized that the consultant must maintain close coordination with the district administration and consider all completed, ongoing, and proposed transportation projects in their plan. Additionally, a detailed road inventory with verified Right of Ways (ROWs) from relevant departments (NHA. PKHA. C&W, Transport and Mass Transit Department, etc.), issues in the existing transportation system, rationalized road widening proposals, new road proposals considering existing and proposed land uses. and measures to promote public transportation modes should be included in the reports. The consultant shall also make inventory and classify all the roads, determine their existing ROWs, identify congested intersections, map all on/off-road and dedicated parking areas, pinpoint hotspots during peak hours, and document various encroached points in the city. Furthermore, land use should be integrated with the designed/planned road network to reduce encroachments on road capacity and prevent the deterioration of the transportation system. He also mentioned that all current and future transportation proposals from each department should be analyzed and incorporated into the master plan. Current parking practices and issues in cities. particularly in CBDs, along with feasible parking proposals, should also be part of the reports.	Refer to the following sections and figures for detailed information on major transportation and existing road improvements: Section 7.1: Major Transportation Figure 7-Figure 7-2, Figure 7-3, Figure 7-4, Figure 7-5. Additionally, refer to Map 15: Proposed Transportation Land Use for an overview of the existing & proposed transportation land use.

ANNEXURE-1

COMPLIANCE TO COMMENTS ON TASK-C- SSD/ MAPPING REPORT DRAFT MASTER PLAN ABBOTTABAD

S. No	Points	COMMENTS	COMPLIANCE
8	**Education and health sector**	As for the education and health sector, the consultant has to map all existing health and education and proposed facilities both public and private. the proposals must be based on prevailing standards and health and education policies of the government. The standards for locating the educational institutes must be followed. Considering the current and projected need the upgradation of existing institutes or proposals of new institutes shall be given accordingly. In this regard, the serviceability maps (maps showing the served, poorly served and un-served areas in terms of these facilities and amenities) shall also be prepared.	Refer Map 12: *Existing and Proposed Civic Zone*, which includes health and educational institutes.
9	**Balanced distribution of recreational sites facilities**	The consultant shall ensure that all the neighborhoods are equipped with the parks and recreational sites in addition to city level facilities. In this regard, parks (though smaller in size) shall be provided per NCVC level with special consideration for female and kids.	Refer Map 13: *Existing and Proposed Recreational Zone*, which outlines the current recreational facilities. Additionally, recreational facilities at the NC/VC level, including parks and other amenities, will be provided as part of infill development and new housing.
10	**Infill Land Parcel**	The consultant must define and rationalize the size of infill land parcels and shall be made in line with the new housing regulations of KP. Appropriate use of the infill land parcels must be identified.	Refer to the section 5.2 and map-7 for detailed information on the infill land parcels
11	**Compliance of Land Use and Building Control Act, 2021**	All the land use categories must be made in line with the Land Use and Building Control Act, 2021. The regulations for every land use/zone must be drafted in detail. The draft master plans reports must contain maps of both existing and newly proposed situation scenario along with statistical details.	Refer Table 1-5 for the "Abbottabad Land Use Classification," which details the categories and designated purposes of land within the city and refer Table 8-1 describes proposed land uses categories.

ANNEXURE-1

COMPLIANCE TO COMMENTS ON TASK-C- SSD/ MAPPING REPORT DRAFT MASTER PLAN ABBOTTABAD

S. No	Points	COMMENTS	COMPLIANCE
12	**land suitability analysis**	In MCA or land suitability analysis, the constraint map must be prepared first, in which all the constraints (for instance, water bodies, agriculture land, high slopy terrain, build up area etc.) get eliminated. The area left for development shall be utilized in different proposals. Similarly land suitability maps (showing highly, moderately and least suitable land parcels) for each land use (like residential, commercial, industrial etc.) shall be prepared separately. The proposals shall be adjusted in highly suitable land parcels first, followed by moderately suitable land on need basis. The rationalized selection of a particular land parcel out of all the suitable land parcels gives the different scenarios.	Refer to the following sections, tables, and map for detailed information on the multi-criteria analysis used to identify suitable land parcels in Abbottabad: 2.1 Qualitative Multi-Criteria Analysis Table 2-1: Land Use Criteria Categories with Description (Qualitative) This table outlines the qualitative criteria used to evaluate and categorize land parcels, providing descriptions for each category to assess their suitability for different types of land use. 2.2 Quantitative Multi-Criteria Analysis Table 2-2: Multi-Criteria Analysis (Quantitative) This table presents the quantitative criteria and their respective weights used in the multi-criteria analysis, offering a numerical assessment of land parcels based on various factors influencing land use suitability. Map 6: Land Suitability Analysis This map visually represents the results of the land suitability analysis, showing **(highly, moderately and least suitable land parcels)** for various types of development based on the multi-criteria evaluation.