

2018-2035

BAJO EXTENDED LOCAL AREA PLAN



WANGDUE PHODRANG

DEPARTMENT OF HUMAN SETTLEMENT
MINISTRY OF WORKS AND HUMAN SETTLEMENT

Foreword

Bajo extended is the area between the Bajo Lhakhang and the existing Bajothang Town . It has an area 120.79 acres with present population of 1486 (2015) . The area consists of mostly paddy fields surrounded by built-up on the west, steep and forested area in the east, existing Bajothang Town in the south and Bajo Lhakhang in the north. Along with the existing town, the whole span of area within the Wangphodrang Thromde is prominently visible from Thimphu-Tsirang Highway.

The Wangduephodrang Structure Plan 2015-2035 was approved on 16th NCCHS meeting held on 29th December 2016 and the plan is released to the Dzongkhag Administration for implementation. The local area plan 2(LAP 2) for Bajo Extended area has been developed by translating the overall proposal of the Wangduephodrang Structure Plan. It is a tool to achieve a balance between the Thromde level development needs while respecting the local needs. The plan balances the development with the landscape and its site context and integrates with the existing town. The proposal are provision of agriculture precinct, relocation of school, provision of area for town hall and the vegetable market. Land pooling method has been applied as a tool for provision of the amenities and services.

We would like to thank the support and cooperation received from Dasho Dzongda and officials of the Dzongkhag Administration. We would also like to thank the stakeholders and agencies for thier valuable comments and suggestion during the preparation of the plan.

The Bajo Extended Local Area Plan 2 is prepared in house in the FY 2017-2018 (Completed in June 2018). The Plan is for 20 years and the Dzongkhag Administration has to ensure that the plans and proposal are implemented as per the plan and any changes to the plan should be routed through Ministry concerned/NCCHS. We request the co-operation of the stakeholderes for the implementation of the development plan to realise it's vision.



Director, DHS

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1 Introduction



Wangdue Phodrang is located in central of Bhutan and it is one of the largest districts in the country. It is situated about 72 km from Thimphu and the town lies at the cross-roads of east-west national highway and the north-south corridor, which connects Gelephu to Gasa. Wangdue Phodrang has always been an important seat of governance in the history of Bhutan. The Wangdue Phodrang Dzong was founded by the Zhabdrung in 1638 atop a high ridge between Punatsang chhu and Dang Chhu. Currently, the historic Dzong is undergoing re-construction to its original form after it was completely burnt down by a fire in 24 June, 2012.



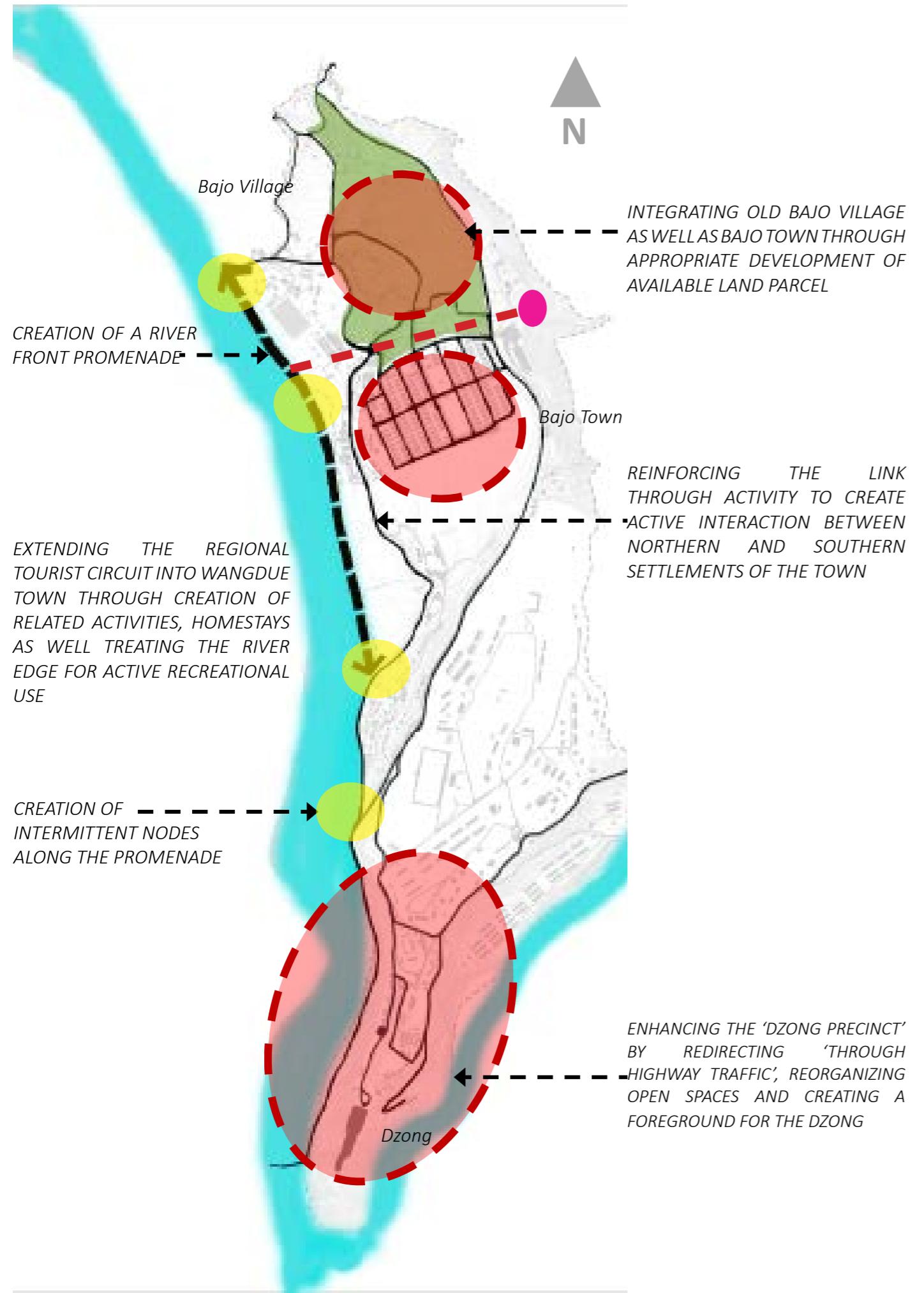
It is believed that the Dzong was first built by masons from Cooch Behar Province, India and in lieu of reward for their excellent work, Zhabdrung gave them land for farming and to dwell on in Rinchengang. This is how settlements in Rinchengang first originated and today, it is among the most prominent sights in the valley owing to its unique architecture, physical layout and setting of traditional Bhutanese timber and mud houses.



Within the Thromde boundary, a large tract of land comes under the military establishment of Royal Bhutan Army, which was relocated from Paro in 1958. Though the campus is considered as a self sufficient unit in itself, it shares a strong and inter-dependent relationship with Wangdue-Bajo town. The military campus includes administrative zone, training institute zone, ceremonial ground, and community and service areas. It houses a military hospital and a primary school in the campus, which serves the civilians as well. On the other hand, the establishment is dependent on the Thromde for its water supply and waste management.



The existing town of Bajothang in Wangdue Phodrang is built on a 15 hectares of relatively flat piece of land, which was selected after an exhaustive analysis through an extended planning exercise. The issue of this existing town dominates any discussion regarding urban planning and development in the country and it is often quoted as an example of erroneous urban development. However, it would be unfair and ill-advised to adopt a preprocessed approach towards Bajothang, while charting the future course of Wangdue Phodrang's development. It is important to analyze the township objectively to arrive at a reasonable conclusion as stated in the Structure Plan.



2 Wangdue Phodrang Structure Plan

2.1 The Concept

It is very important to understand the overall concept of Wangdue Phodrang Structure Plan, which translates to the idea that "Perspective is Contextual". Wangdue Phodrang Thromde has witnessed fast paced development in the past decade. These changes have given rise to a complex array of issues as well as opportunities. Therefore, the development of a concept is guided by the holistic understanding of planning goals in Bhutan, a systematic resolution of the existing issues and capitalization of development opportunities. A simple yet effective set of principles, which guide the concept can be summarized as follows;

- Identify the natural, built and intangible assets of the town—conserve, nurture and harness their potential. For example, the Punatsang Chu Valley, the Wangdue-Phodrang Dzong and the economic potential of the town represent the natural, built and intangible assets respectively.
- Establish a harmonious relationship with its surroundings and facilitate growth and mutual benefit with other entities in its context. For example, creation of a tourism circuit, which includes Punakha town, Wangdue Phodrang, Rinchengang village and other sites along the Valley.
- Develop a cohesive image of the town by means of clearly defined edges and transition spaces, and enhance the image of each precincts. For example, dilution of the visual impact of existing Bajo town by introduction of a new visual axis.
- Creation of new focal points and activity zones to capitalize on design opportunities.

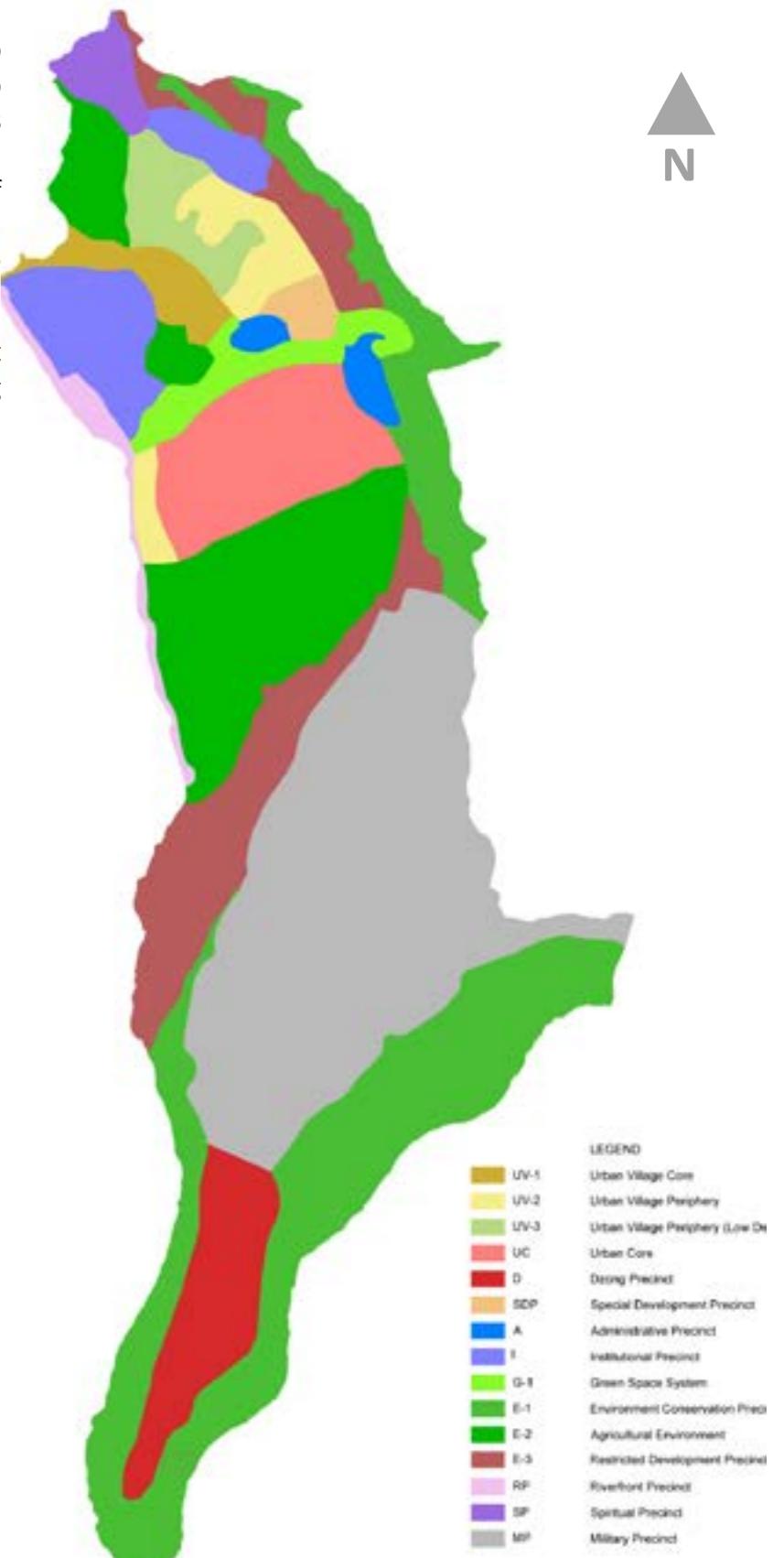




2.2 Precinct Plan (Structure Plan)

A Structure Plan serves as medium to translate the vision of policy-makers into an applicable spatial plan, which responds to the needs and aspirations of citizens. It acts as a blue print for preparation of its constituent local area plans, which in turn lay down definitive and exhaustive guidelines for development.

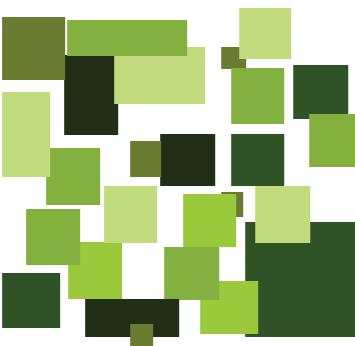
This Structure Plan is built on a precinct based approach as opposed to a zoning based approach as in the conventional planning method.



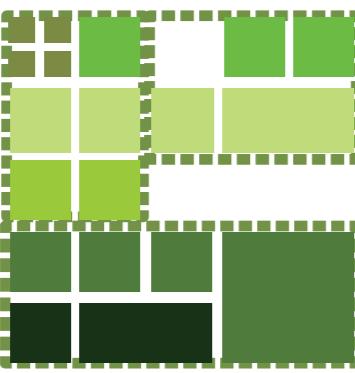
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ORGANICTOWNS



STRUCTURE PLAN



LOCAL AREA PLANS

3 Local Area Plan

3.1 Background

Local Area Plan is a document, which sets out the strategy for accurate planning, and provides a land use planning framework and development controls, for the future development of the area within Wangdue Phodrang Thromde. The objectives contained in this local area plan are relevant to the local area and it is consistent with the visions of Wangdue Phodrang Structure Plan. The local area plan, within frame work of the overall Structure Plan, consists of the details about plot reconfiguration and rationalization in the area in order to achieve a planned and desirable urban growth.

3.2 Objectives

In consistent with the visions laid out in the Wangdue Phodrang Structure Plan, the Local Area Plan essentially aims to facilitate and implement the development plan at the local level. The main objectives of the plan can be broadly classified as follows:

- Effective and efficient implementation of the main objectives formulated in the Structure Pan.
- Prepare and adopt planning principles with consideration to important local factors which are site specific and within the context of the local area.
- Promote planned urban growth by accommodating the suitable percentage of the projected population growth of the area.
- Facilitate the provision of public infrastructures and utilities needed for efficient urban development in a planned and sustainable manner.
- Reconfigure and rationalize land subdivisions to accomodate the proposed urban infrastructures and services through land pooling techniques;
- Ensure development at the local level which respects the unique traditional values of the place and guide the urban growth in a manner that harmonizes with the land features,topography and characteristics of the site;
- Effectively integrate and blend the different urban components of the town into a unified, cohesive and robust urban identity.
- Prescribe building typologies suitable for a coherent urban form and consistent with the proposed precinct plans.

3.3 Planning Boundary

The Local Area Plan 2 (LAP 2) boundary for Bajo Extended area is physically defined by a ridge starting from Bajothang Higher Secondary School to Bajo Lhakhang towards the north, and steep slopes with forest cover towards the east. Punatshang Chhu defines the western edge and the peripheral roads of existing Bajo town delineate the southern edge of the LAP boundary. It has a total area of 120.79 acres. The LAP area lies in a prominent location within the Punatsang Chhu valley, which runs along the north-south axis and contained on either sides of the valley by the mountain range. The area surrounding the Bajo Lhakhang constitutes of a typical agrarian settlement form with plural building typology dispersed over a large tract of farm land. Most of the areas in the LAP remains a private domain with household activities extending to open spaces. In old Bajo village, the built form comprises of both singular building types and plural types, however, singular types are the dominant form. There is a lack of semi-public or shared spaces in the area.



Basic Health Unit

Delineation of LAP Area

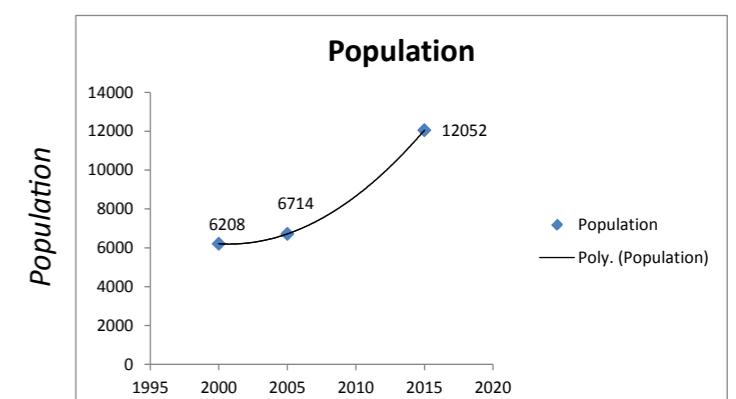


4 Existing Scenario

4.1 Demography

The population of Wangduephodrang Thromde was 6208 in the year 2000, which increased to 6714 in 2005 at the growth rate of 1.6%. The population further increased to 12052 at the rate of 6.02% in the year 2015. It is assumed to increase with a natural growth rate of 1.2% per annum till the year 2019. One of the decisive component in the process of population projection for the town is the year 2019, when the PHPA projects are expected to complete and its employees will be relocated from the existing town to their respective project sites. It is calculated that this would result in a sudden decline of about 1200 persons from the projected population, thereby leaving population of 11593 by the year 2020. Subsequently, the population is assumed to grow at a steady growth rate of 2.5% per year till year 2035 and about 16730 people needs to be accommodated in Thromde by 2035. This implies that an addition of 4738

Year	Population
2015	12052
2019	12641
2020	11593
2025	13116
2030	14840
2035	16730



Population of Wangdue Phodrang town

Projected population carrying capacity of the LAP

SI no	Carrying Capacity	Area in sqm
1	Developable area(21.62 Hectares)	216200
2	Area for town hall	2500
3	Area for roads and amenities (30%)	213700
4	Effective developable area	149590
5	Minimum plot size(13 decimal)	526
6	Total no of plots	284
7	3 floors	50
8	2 floors	234
9	Carrying Capacity	4950

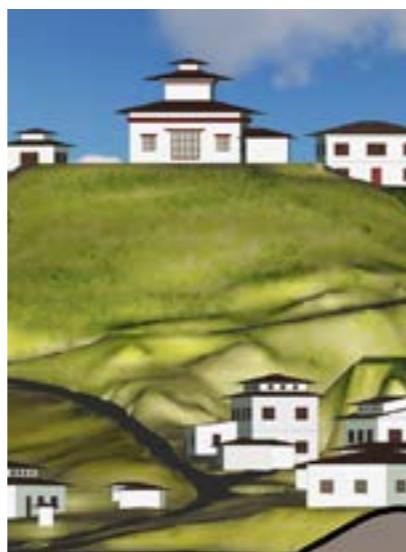
people has to be accommodated within Thromde by 2035.

Assuming the same rate of growth of 2.5% for the Bajo Extended Local Area Plan, the expected growth in population is 2451 in 2035 (1486 in 2015) for the LAP area. Based on the proposed plot reconfiguration, precinct plan, and the development controls provision in the local area plan, the area has a population carrying capacity of 4950 and provides an estimated of 1238 residential dwelling units approximately. This indicates that that population growth of Wangdue Phodrang Thromde can be accommodated within Bajo Extended LAP area easily. The projected population increase and housing units requirement will have to be accommodated in the proposed LAP area as per the calculated population carrying capacity.

4.3 Imageability

The LAP constitute the areas surrounding Bajo Lhakhang and area adjacent to the existing Bajo town. The existing settlements in the area are in the form of organic development and are undergoing transition from a traditional to a relatively modern architectural styles of construction with many buildings partially or wholly modified. Public buildings on a lower grounds along the river forms a distinct zone. The agricultural fields and chuzhing in the area display a distinct character in the form of large tract of terraces and open areas.

The existing Bajo town , which lies adjacent to the LAP area dominates the overall image of the town, with its dense built mass, grid iron layout and a uniform building typology. Overall, the urban fabric comprises of many smaller character districts seperated by unstructured or amorphous transition areas because of which the town is deprived of a unified image.



The Lhakhang and its surrounding settlement form distinct character district in the area.



4.4 View Corridors

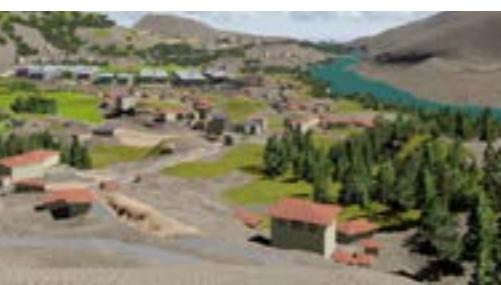
The natural physical setting and the valley of Wangdue Phodrang town offers many views, vistas and view corridors.

The Lhakhang area form a prominent visual landmark defining the northern edge of the town and it offers a kaleidoscopic view of most of the townscape. The Dzong towards the southern edge forms another visual focal point marking the southern end of the valley. These monuments are in turn captured in magnificent vistas at various points as one moves along the primary movement corridors in either direction. Inspite of its close proximity to Punatsang Chhu, terrain limits the view of the river creating a visual disconnect between the river and settlement.

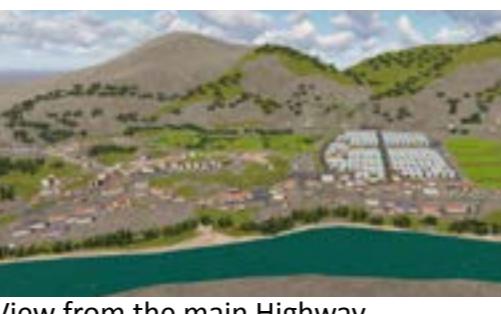
A section of the Thimphu-Tsrang Highway which runs parallel to the Punatsang chhu forms a prominent view corridor as it reveals a spectacular panoramic view of the town.



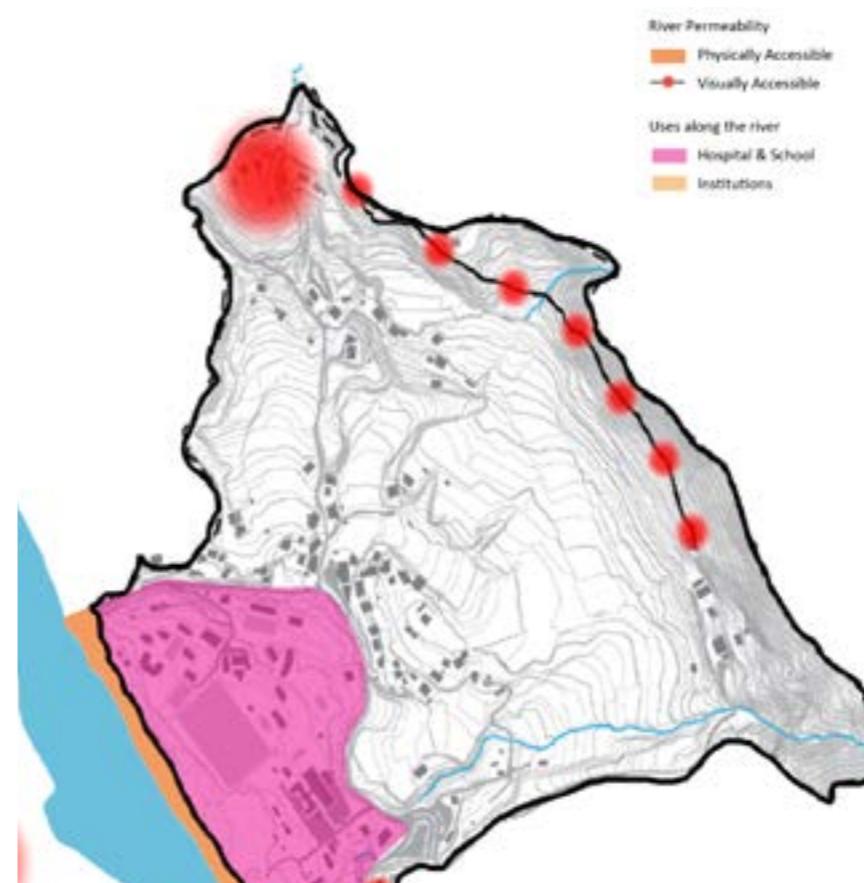
View from the southern side



View from the Lhakhang side



View from the main Highway



The Lhakhang hilltop is an important vantage point with expansive views of the Valley



View of the Punatsang Chhu and the western edge of Wangdue Phodrang from the right banks of the river

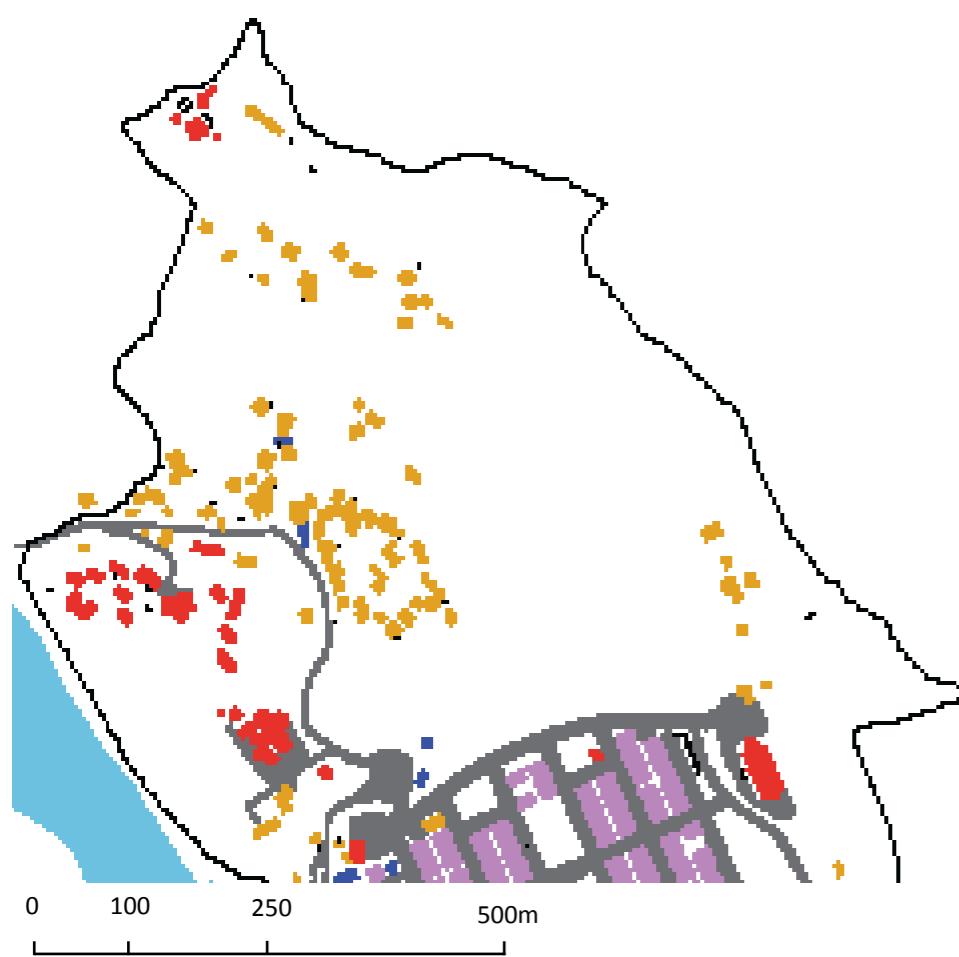
4.5 River Permeability

Punatsang Chhu is an important visual element of Wangdue Phodrang, which also gives the valley its character and identity. The river is distinguished by its wide course, brilliant hues and serenity.

For analysis purposes, a series of vantage points were identified along a visual corridor, which gives a clear view of the river. It was found that the river at present, has very limited visual and physical access. The river is under-utilized as a landscape element and the institutional premises along the river edge, which are physically accessible are not open to the larger public.

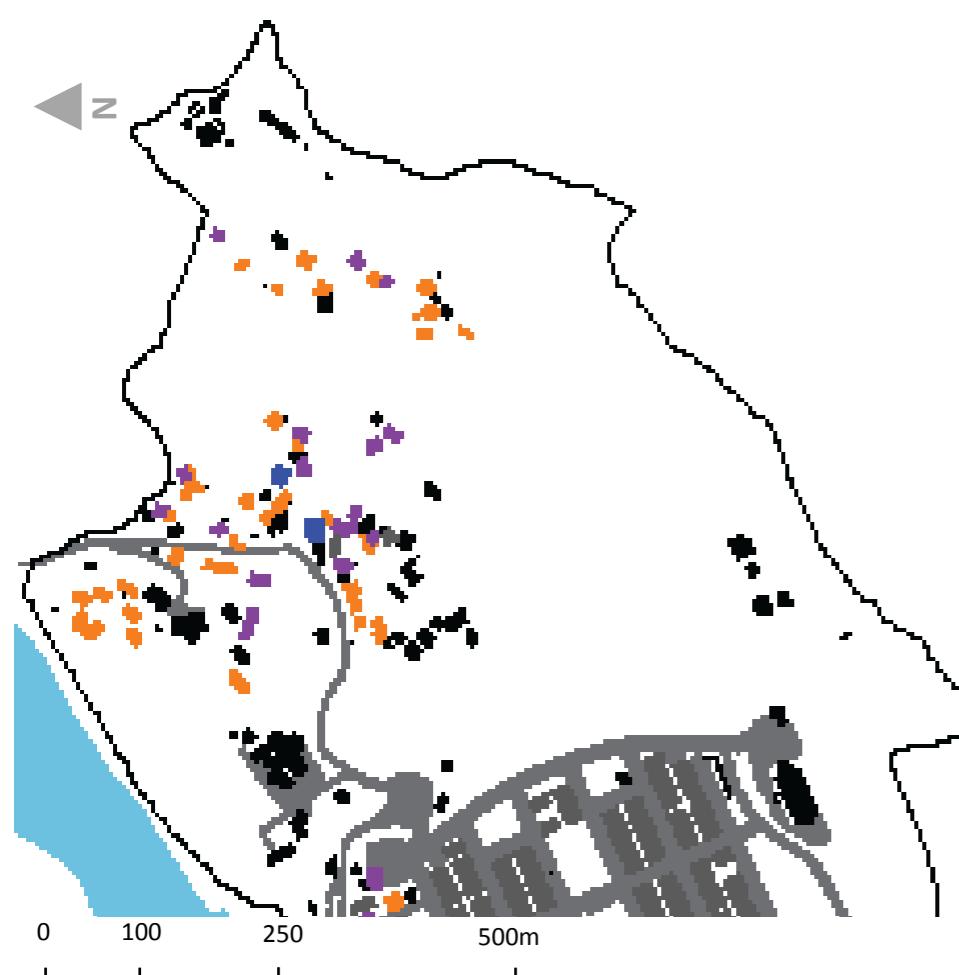
The existing built forms along this section of the river edge does not capitalize on the river view and remains inert and devoid of public activity. A careful planning and treatment along the river edge or promenade would explore its full potential.

5 Settlement Study



Building Use	Nos.	% of total land
Residential	72	69.9
Admn.	26	25.24%
Commercial	5	4.85%

Legend
 — Mixed use
 ■ Residential
 ■ Admin/ PSP
 ■ Commercial



Building Intensity	Nos	% of total Building
G	61	50.8%
G+1	38	31.67%
G+2	17	14.17%
G+3	2	1.67%
G+4	2	1.67%

Legend
 ■ G
 ■ G+1
 ■ G+2
 ■ G+3
 ■ G+4

The existing settlement pattern reveals an uneven urban grain and coarse texture in the valley. The irregular dispersal of the grain show an organic growth in the valley, although few even grain and fine textured patches in the map reveal independent planned developments. Linearly aligned grains throughout the townscape indicate movement corridors to be a guiding factor for the growth of the town. Incidental, unstructured open spaces in the area fail to generate a robust open space network. Mix of varying grains, sporadically laid along the valley fails to construct a harmonious overall urban framework for the area.

5.1 Building Use

The building use study provides an inventory and data for the analysis of existing settlement condition and development pattern that exist in the locality. The study is instrumental in providing insight about the socio-economic status and the pattern of development of different activities. The suitability of the site for each zone is considered in terms of permitted uses and associated development control factors including site attributes, environmental factors, development potential, planning assessment and approval scenarios. Study show that the use is predominantly residential in the area followed by institutional and commercial uses. About 70% of the existing total structures are used for residential use and 26% for institutional use. Only 5% of the total structures are used as commercial and mixed-use.

5.2 Building Intensity

The area consists of uneven grain and coarse texture with varying density across a stretch. The existing development of Bajo has the highest density, which stands out against the entire urban landscape. Slightly, more than half of the existing buildings are one storied. One (G) and two storied (G+1) buildings, which are predominantly residential account for about 60% and 32% of the total buildings respectively. About 14% of the total buildings are three storied (G+2) and as low as 2% constitutes four (G+3) and five (G+4) storied buildings.



Apartment



Independent units

G + 1/2 storey building
with external entriesIndependent units with
separate entries

5.3 Building Typology

Plural

The plural form of the traditional agricultural dwelling unit have multiple building units with interlinked open spaces. Typically, the toilet and kitchen remain separate built forms physically disconnected to the main unit. Other blocks include granary and store rooms. The outdoor spaces enclosed by these multiple blocks contain spillover activities such as a vegetable garden, making it a personal space.

Plural with one dominant Structure

These buildings are mostly medium-grained and occasionally small-grained structures. Similar to plural form, there are various disconnected blocks for ancillary activities including store, granary, animal shed etc. These blocks are connected through interlinked open spaces and one dominant block of considerably larger scale, accommodates the main household. The outdoor spaces enclosed by these structures contain spillover activities such as a vegetable or fruit stores and barns.

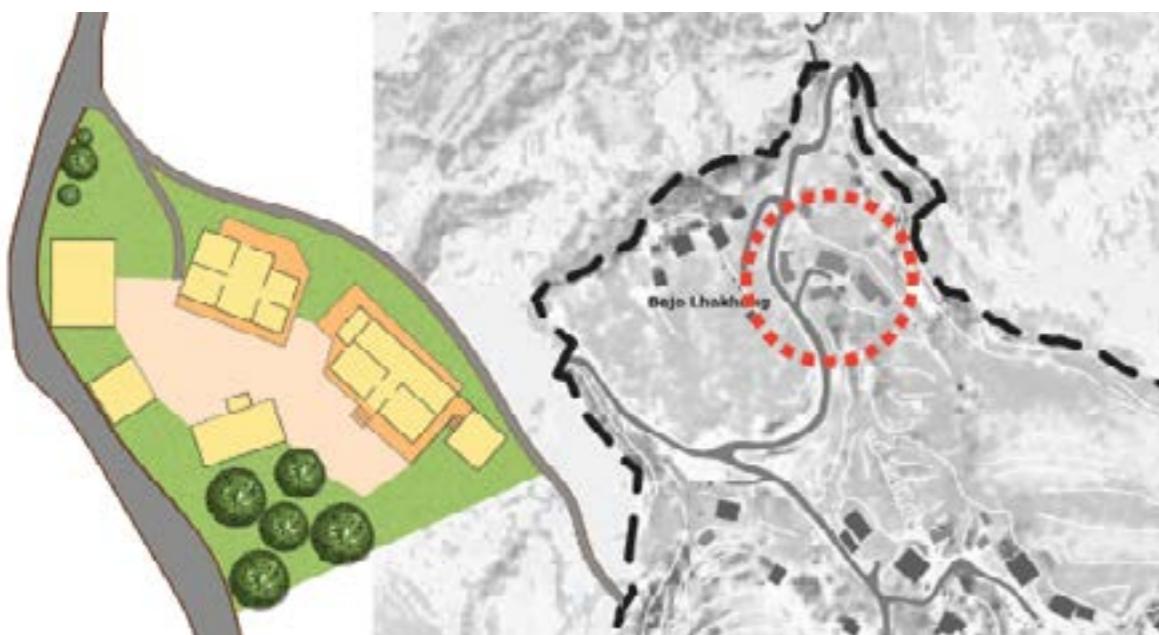
Composite

A deviation from the traditional type, the composite form houses all the activities within one block. This form has one or multiple projections to the main unit with internal connections. This building typology give rise to multiple variations in built form with different styles, placement and number of projections. It has fewer spillover activities in the outdoor open space. With the increasing demand for space, additional spaces are added to the traditional main unit generating a composite form.

Singular

The singular form is usually composed of a simple rectangular plan with an internally partitioned spaces for different activities. These types of buildings are mostly the new constructions, using modern materials and construction techniques, built of multiple units for rental purpose. This type of built forms are the result of the drift from agricultural and farming practices to newer sources of livelihoods of the households.

Lhakhang Cluster



Inferences

- This is a typical old agrarian settlement form that needs to be conserved to keep the character of the settlements intact.
- There is a need to capitalize on rental accommodation without change in form.

Bajo Village Cluster



Inferences

- There is a need for structured common open spaces.
- There is a need for an intermediate buffer space between movement corridor and individual plots.
- There is a need for proper parking spaces.

5.4 Cluster Study

Clusters of varying character together form the existing settlement. The study delineates each clusters, describing its characteristic attributes, physical form, typology as well as activity. The area constitutes of two prominent clusters; the Lhakhang and old Bajo village, which also include patches of amorphous interstitial zones that are unstructured and disconnected. The study of predominant cluster types reflects the lifestyle of people of Wangdue Phodrang and the underlying principles of the town structure.

Lhakhang Cluster



Tucked in a topographical depression, this cluster represents a typical agrarian settlement form with plural building typology dispersed over a fairly large land parcel. Multiple building units, housing different activities are positioned around private open spaces. Uses such as grain storage, kitchen and toilets are segregated from the main block. The outdoor area remains a private domain with household activities extending to open spaces within the plot. The cluster remains introvert in its character as there is no semi-public or public realm within the cluster as the building units belong to a single owner.

Bajo Village Cluster



Situated in old Bajo village, this cluster comprises of both singular (independent) and plural building typologies. Plural forms have multiple units around a dominant building block. The dwellings units are located close to the narrow access road, where the intermediate open area between the road and buildings are used as parking. Many of these building blocks are constructed on smaller leveled plots as per the existing topography and accessible from the main access roads. Although, many of the singular units are built in close proximity to each other, the settlement clusters lack communal open spaces.

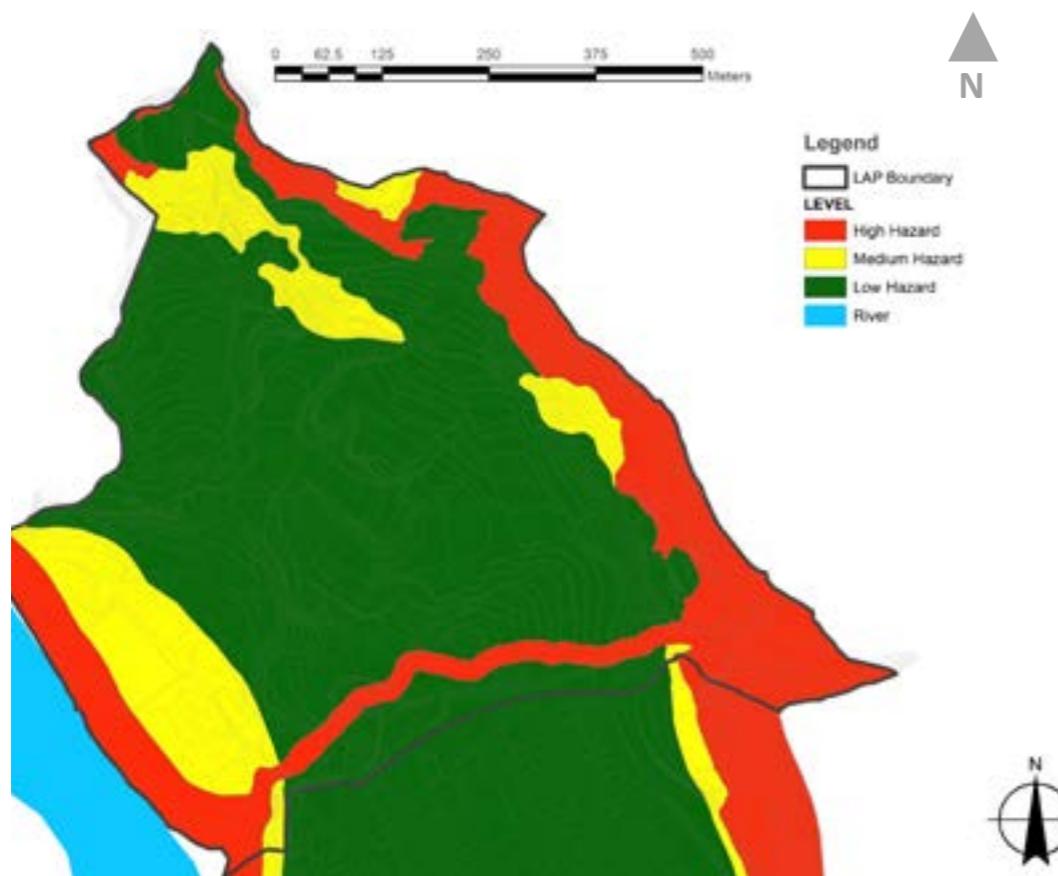
Many of the existing dwellings units, both the plural and singular built form, have their private open spaces extend into the rear sides of the buildings. There is a lack of hierarchy of different spaces within the clusters, and semi public and shared common spaces does not exist. Multiple housing units within the singular apartment building, of medium and large grains built for rental, characterizes the Bajo village cluster.

6 Land Suitability Analysis

The main objective of this analysis is to classify areas within the local area plan boundary into different categories based on their physical characteristics and its suitability for different land use. The analysis is determined on the basis of several important factors such as slope, location of hazard areas, soil and geology information, flood plains and vegetation mapping.

6.1 Hazard Map

The geotechnical study was conducted for Wangdue Phodrang Thromde. The outcome of the study is the hazard map and it designates 3 hazard zones based on the slope angle, material type, geomorphology (including active and passive land slides), land cover type, extent of degradation, susceptibility to erosion and climatic factor. As shown in the map below, majority of the area within the Local Area Plan (LAP) area falls within low hazard zone (green colour). The stretches of area along the Punatshangchhu falls within medium (yellow) and high (red) hazard zones. In all these hazard zones, due care needs to be taken for the drainages to prevent submergence/ inundation, land slides, flooding etc. The low hazard zone is favourable for development whereas only minor constructions or development of infrastructure may be allowed with proper mitigation in place for medium hazard zones. Development is not recommended for high hazard zone. In terms of percentage, about 44% of the total Wangdue Phodrang Thromde

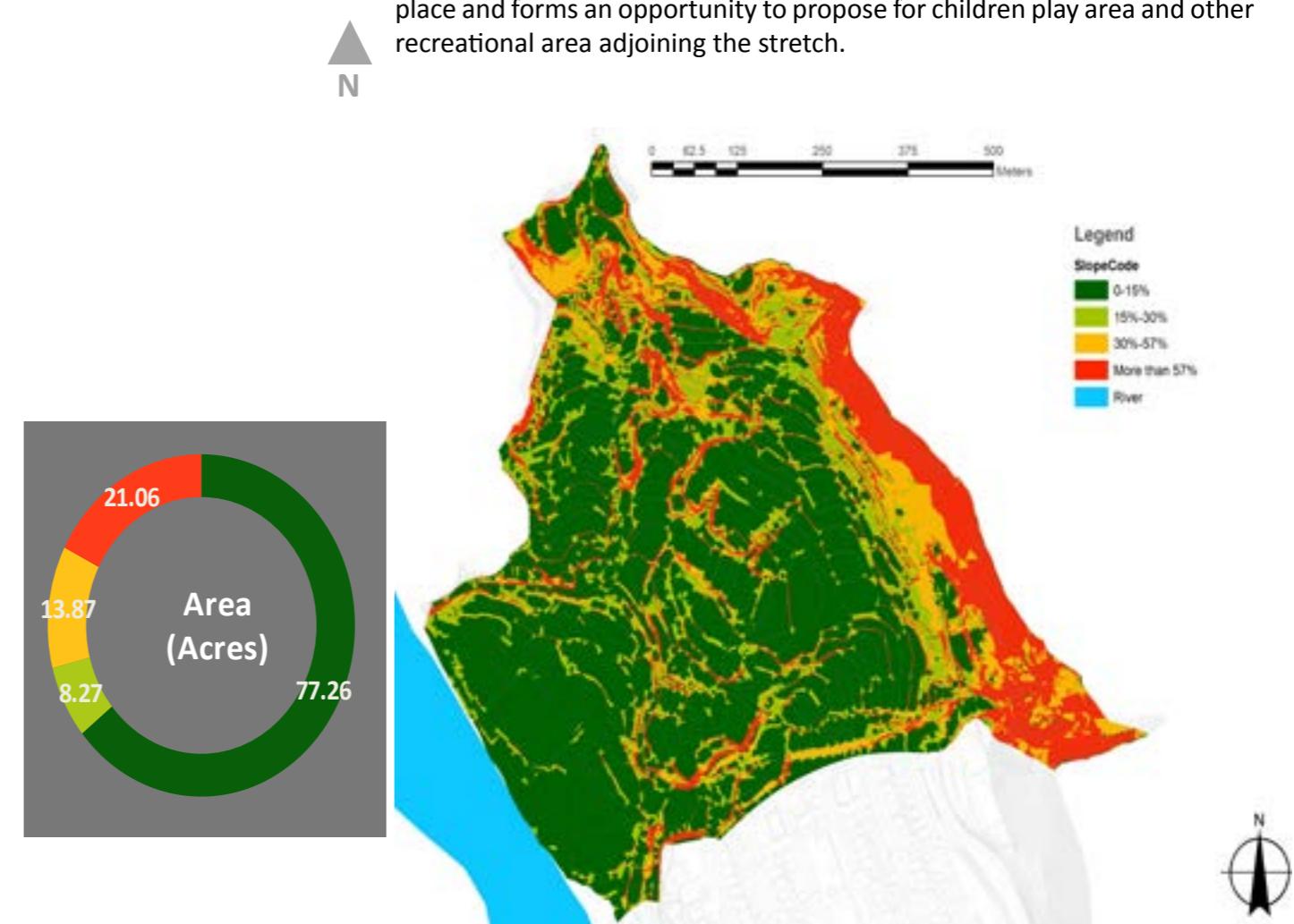


area falls within low hazard zone, about 20 % in the medium hazard and about 36 % in high hazard zone.

It has to be noted that though the hazard mapping through geotechnical studies has taken into consideration slope analysis and Glacial Lake Outburst Flood(GLOF), it has been highlighted separately in the following pages for clarity and understanding.

6.2 Slope Analysis

The LAP area constitutes of a large portion of the area suitable for development. Out of the total area in LAP, 77.26 acres falls under slopes of less than 30% recommended for development and construction; and 13.87 acres fall under moderate slope(30-57%), which is buildable but with mitigation measures. The stretch of land in the eastern and northern edge of the Local area plan falls (area of 21.06 acres) under very steep slope category (more than 57% slope). The slope analysis map and different categories of slope in acreage is shown below. A thin strip of very steep area runs through the developable portion of the area, which in the proposal will be earmarked as the green zone within settlement though the width of area is very less. This green stretch provides a character to the place and forms an opportunity to propose for children play area and other recreational area adjoining the stretch.



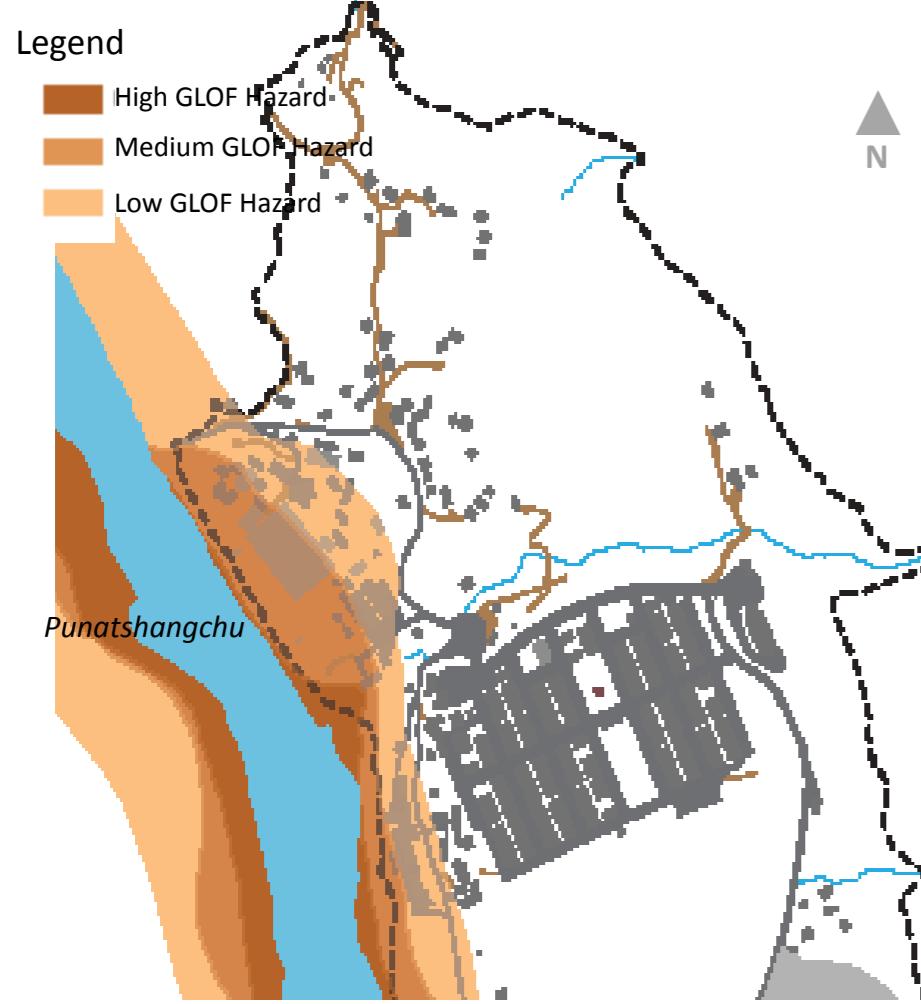
6.3 GLOF Hazard Zone

Punatsang chhu, the country's longest river, is under GLOF threats due to the three glacier lakes; Thorthormi, Raphstreng and Luggye lake. Although major flooding instances had occurred in the past, the 1994 GLOF prompted the establishment of an early warning system (EWS) giving downstream inhabitants time to evacuate.

The gentle slope along the upper half of the western edge of the existing town is less vulnerable to deeper ingress of flood water as opposed to the steeper lower half of the edge. Small stretches of the western edge, which includes the mouth of the stream that drains old Bajo village and parts of Agriculture Research and Development Center(ARDC) campus towards the south fall under high hazard. The medium hazard zone, which primarily comprises of gentle slope, includes the part of the school campus. The part of the old Bajo village is demarcated as low hazard zone.

The Punatsang chhu valley comprises of numerous emerging developments such as major hydropower projects, farmland and public infrastructure, which makes it imperative to conduct an analysis to identify GLOF hazard zones along the river valley and accordingly prepare mitigation measures.

GOLF	Area (Acres)	% of total land
High Hazard	34.92	28.9%
Medium Hazard	15.87	13.14



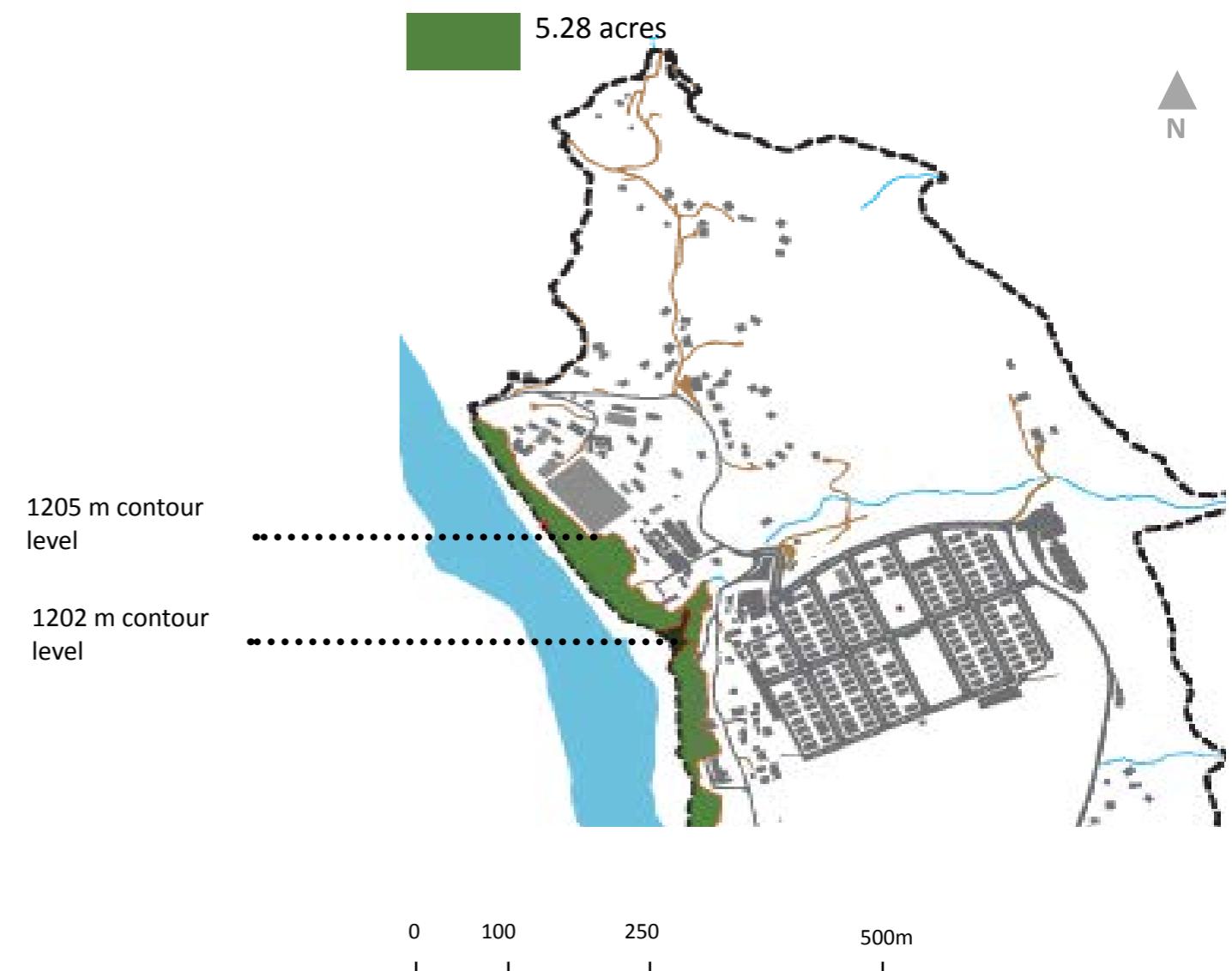
6.4 PHPA Hazard Zone

Under PHPA I and II, the construction of concrete dam across the width of Punatsang chhu located few kilometers downstream of existing town is in progress. Once completed, it is anticipated that the maximum submergence level at Punatsang chhu near the existing town would be at contour level 1202 meters. In addition to this, a buffer height of 3 meters has also been recommended up to 1205 meters to be identified as partial submergence level.

A PHPA hazard zone has thus been demarcated that defines the area under the anticipated submergence level ,which lies within the western edge of the Bajo Extended LAP area. This affected area measuring about 5 acres constitute mainly the premises of Bajo Higher Secondary School and the Basic Health Unit. The PHPA hazard has sizable overlap with GLOF high and medium hazard zones.

Given, the serious impact due to the rise in submergence levels on the people and environment, there is a need for planning and hazard mitigation measures accordingly.

Total area under submergence



6.5 City Greens

The existing city greens are the combination of the natural, organized and unorganized green areas, which include steep slopes with thick vegetation, agricultural land, chuzhing (paddy fields) and few planned open green spaces. The sustainability of any development (built-environment) depend on the degree to which it exist in harmony and balance with the natural environment. Currently, the area lacks organized and defined system of green network and open spaces. There is no hierarchy of green network and the green areas are incidental, disjointed and rather loosely organized within the urban fabric.

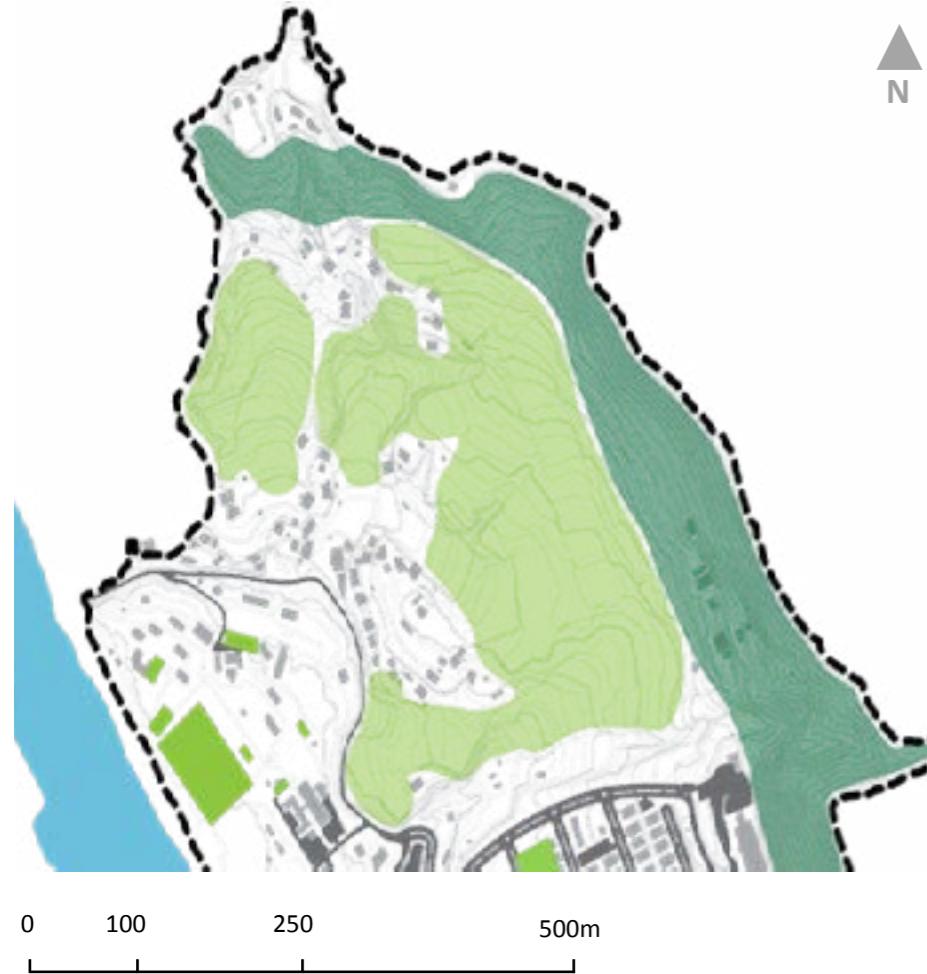
The long strip of steep slopes with heavy vegetation towards the eastern edge, which runs through the length of the town, gives a prominent character to the structure of the town. A large tract of land in the centre occupies about 10% of the Thromde area, which is under the ownership of private landholdings and currently, being used for agricultural and farming purposes. A large play ground can be seen inside the school premises and very few small recreation areas are randomly dispersed in different locations. A planned green buffer along the river bank would enhance the quality of riverfront and the interface between the river and the development.



Agriculture land



Steep slopes in north west



Bajo Extended LAP area as seen from Bajo Lhakhang

Developable area in Bajo extended	
S.No	Area (in acre)
1 LAP area	120.79
2 High Hazard	36.5
3 Bajo HS School	15.79
4 BHU Area	5.86
5 Lhakhang Area	3.08
6 Area for Green zone within settlement	4.71
7 Agriculture Precinct	6.11
8 Deep gorge after Bajo town	5.79
9 Developable area	53.44
	21.62 hectares

6.6 Composite Land Suitability

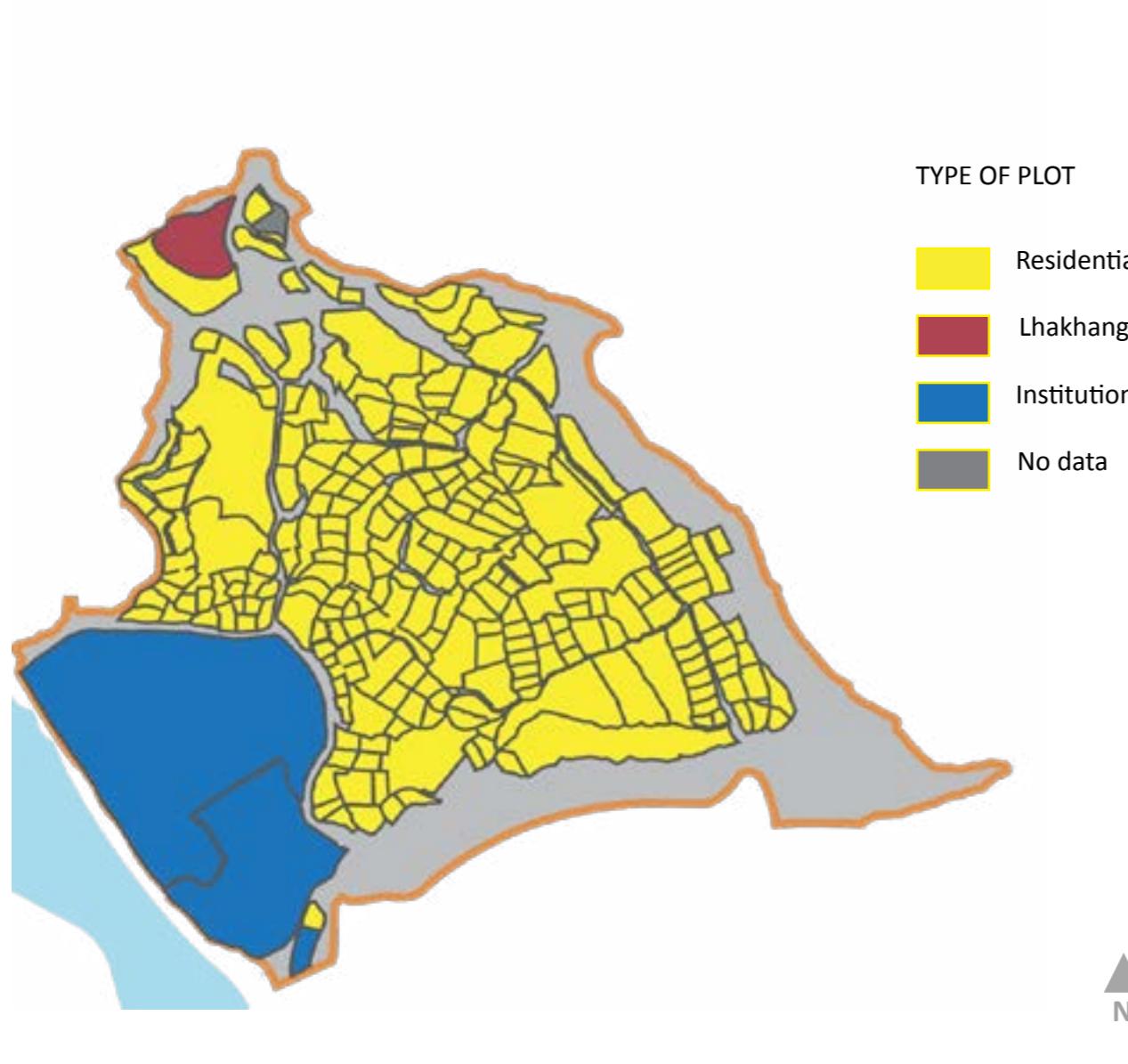
The composite land suitability analysis map illustrates the different areas under GLOF, slope and PHPA hazard zones. About 32.31 acres of the total LAP(120.79 acres) area falls under different hazard zones and these areas are not feasible for development. As a result, the total developable area is 53.44 acres excluding Bajo HS School, Basic Health Unit, Bajo Lhakhang and designated agriculture precinct. Only about 44 % of the Local Area Plan is suitable for development. The proposed development would require judicious use of resources while maintaining the balance between the built-up and open areas.



6.7 Existing Land Use and Ownership

The map and table below illustrate the existing land ownership pattern and land uses of the LAP area. As per the cadastral data record received from the National Land Commission Secretariat, the existing land use in the area is predominantly residential. However, on the ground, large tract of these private land is being currently used for agricultural (paddy cultivation) and other farming purposes.

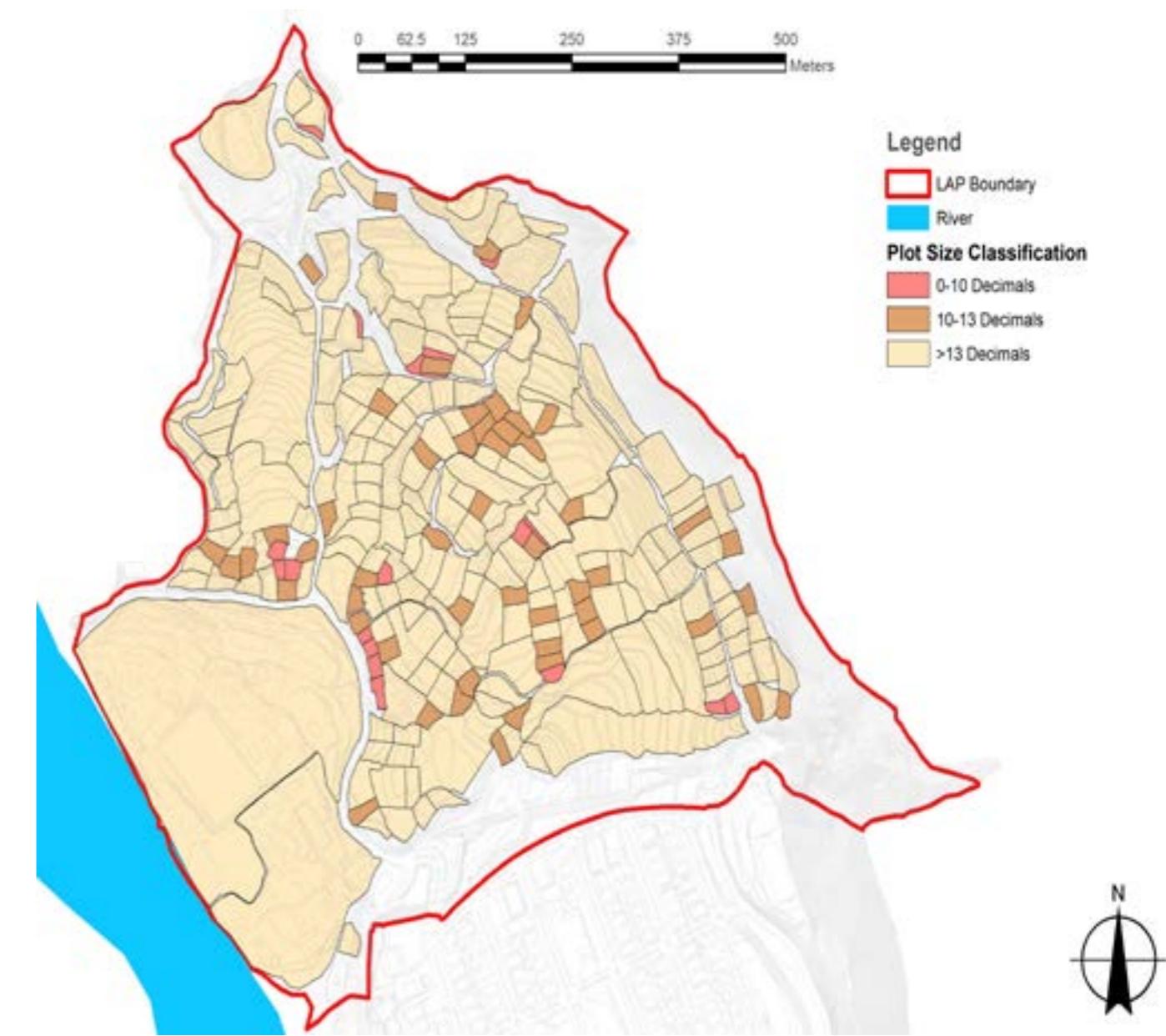
Type of Plot (Land use)	Number	Area (Sqm)
Institutional	03	85860
Residential	246	265700.3
No data	01	1000.5
Lhakhang	01	5394.6



6.8 Plot Size Classification

The existing landholding pattern in the area is primarily dominated by private individuals registered under residential land use according to the land/ thram record. Most of the residential plots are not built and at present, farming and agriculture related uses are being practised on the ground. A large portion of the area is designated under institutional use that comprises of Bajo HS School and Basic Health Unit . As per the Local Government Act, it is stated that the 'Minimum plot size in potential growth areas of Thromde shall be 13 decimals (before pooling) whereas in areas where local area plans exist, minimum plot size shall be as per the size specified in the approved local area plans'.

Accordingly, the different plot sizes within the LAP is broadly classified under three main categories as shown below. There are a total of 254 plots out of which 184 plots are above 13 decimal, 52 plots are between 10 to 13 decimal and only 18 plots less than 10 decimal.



6.9 Existing Infrastructure

The primary road within the Bajo Extended LAP boundary is 1.26 kms in length and has an average width of 4 meters. The main road which connects Wangdue Phodrang and Punakha passes through this area and just above the Bajo HS School and Basic Health Unit(BHU). The area lacks proper footpath and storm water drainage systems.

The existing water supply network in the area is under the Rural Water Supply Scheme (RWSS), except for the Basic Health Unit and Bajothang Higher Secondary School premises, which are supplied through the Municipal Water Supply Scheme (MWSS). The surface water from the stream Baychhu ,which is located towards the eastern end is the main source for both the RWSS and MWSS schemes. The RWSS has a 24 hours water supply with no provision of any treatment facility. The existing Bajothang town and its adjoining areas are sufficiently supplied with treated water through the MWSS. The existing water treatment plant has the capacity of 2.4 MLD, which is sufficient to cater to the needs of the residents till the year 2025, beyond which augmentation would be necessary.

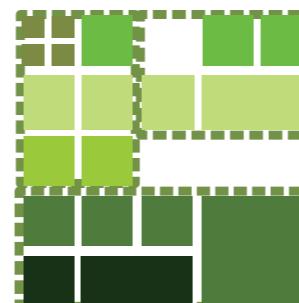
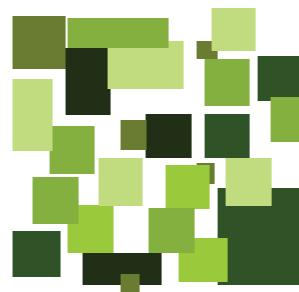
Except for the existing Bajo town, majority of the households in the area depend on sanitation facilities such as individual septic tank and soak pit. Regarding solid waste management, the town does not have systematic door to door collection methods. The municipality have three waste collection bins placed along the main routes leading to the BHU and Lhakhang area.

There are no street lightings within LAP area except for the existing Bajo town. The school campus and BHU have fire hydrant network in use.



7 Proposal

7.1 Plot Reconfiguration



The local area plan preparation process involves analytical rationalization and development of land parcels for unified servicing and planned growth. It ensures that land parcels are put to their optimum and efficient use through the adoption of land pooling technique as the most viable planning tool. Land pooling, as the common and most preferred tool, enables the mobilization of the land for development.

The scheme requires the consolidation of the individual land parcels from which a certain percentage of the total land is deducted for the provisions of public utilities such as roads, footpaths, recreation, drainage, utility services and amenities. The remaining land parcels are reconfigured to efficient shape and sizes and re-allotted to their original owners.

In consistent with the objectives of the Wangdue Phodrang Structure Plan, one of the major planning intervention proposed is the relocation of Gangthangka Primary School, which is currently near the Dzong area, to the Local Area Plan (LAP).

The important aspect of the Local Area Plan is the designation of agriculture precinct one below the Lhakhang and other to the entrance to the LAP area from the existing Bajo Town. The National Human Settlement Strategy 2017 for Wangduephodrang strategises the potential for development of agriculture as an alternate employment after the hydropower projects and tourism.

Differential land pooling percentages are adopted based on the precinct designation, which is the basis for different number of floors and the uses. The highest land pooling percentage is 30 % for urban village 1(UV-1), 27 % for UV-2, 24% for UV-3, 20% for Restricted Development Precinct and no land pooling contribution from designated agricultural land use precinct. The average land pooling percentage is 27 % as shown in the Land pooling contribution table and the services/amenities provided are town hall, children play areas,vegetable market ,off-street pedestrian paths and roads.

The table in the following page illustrates the details of the land pooling contribution as per the development proposals in this local area plan.

Land Pooling Contribution for Bajo extended Local Area Plan

Sl. No		Area (sq.m)	Area (Acres)	Remarks
1	Local Area Plan Project Area	488821.29	120.79	
Exclusions				
2	High Hazard Area(Steep slopes, GLOF, deep gorge after town) as per geotech	140323.48	34.67	
3	Bajo HS School and BHU Area	63890.58	15.79	
4	Bajo Lhakhang Area	12443.92	3.07	
5	Agriculture Precinct	25204.50	6.23	
6	Existing road above school and below Lhakhang	9936.24	2.46	Already existing road
7	Total Area Under Land Pooling	237022.57	58.57	
Proposals (through Land Pooling)				
8	Road widening of road above BHSS and below Lhakhang	10122.56	2.50	
9	Other Roads	26928.88	6.65	
10	Offstreet pedestrian paths	2918.32	0.72	
11	Children Play area and open spaces	6310.10	1.56	
12	Proposed Town Hall	2500.0182	0.62	
13	Parking lots	1006.94	0.25	
14	Plot falling within green	7148.14	1.77	
15	Weekly market	3321.6494	0.82	
16	Service Plots	3441.736	0.85	
	Total area of proposed infrastructure and amenities	63698.34	15.74	
	Land pooling contribution(Approx 27%)	26.87 (- 27%)		

7.2 Local Area Plan Principles

The concepts and planning principles proposed in this local area plan is consistent with the overall visions and objectives of Wangdue Phodrang Structure Plan, and it is primarily an extension of the concepts and principles formulated in the Structure Plan.

The principle is essentially guided by the vision that the proposed new urban form blends with the Bhutanese cultural landscape, and in harmony with the traditional architectural style. The proposed developments give due consideration to the existing local environment and physical landform.

The proposal ensures the development of a cohesive image of the town through well defined edges and new transition spaces. The introduction of new visual axis and the gradual reduction in the intensity of built form as we move from existing Bajo town towards the Lhakhang would minimize the visual impact of the existing built form of Bajo town.

It aims to create a robust movement network by strengthening internal secondary connections, reinforcing existing and new pedestrian linkages. This will enable a smooth and efficient inter-operability of activities between different neighborhoods of the town.

The plan intends to build a walkable neighbourhood through streets and pedestrian linkages, with the objective to ease movement as comfortably and conveniently as possible. The proposed river front promenade and public open spaces shall be carefully linked to the development in the LAP

The whole of Thromde is prominently visible from Thimphu-Tsirang Highway. To integrate the existing Bajo town development with the Bajo extended, valley of flower have been proposed to integrate as well as shift the visual focus from existing town to Valley of flowers.

Provision of stretch of green within the settlement to preserve the topographical character of the place and also to prevent development in steep stretch





Designation of agricultural land use at two areas - one at the entrance to the LAP from the existing Bajo Town and other below the Bajo Lhakhang. The agricultural fields will provide visual relief between the dense development of existing Bajo and the Bajo extended development urban hub.

Provision of primary roads that connect to existing Bajo Town road and loops around the urban hub of the Bajo extended LAP. The provision is made to divert heavy traffic towards the western part of the area and around the urban hub of the LAP.



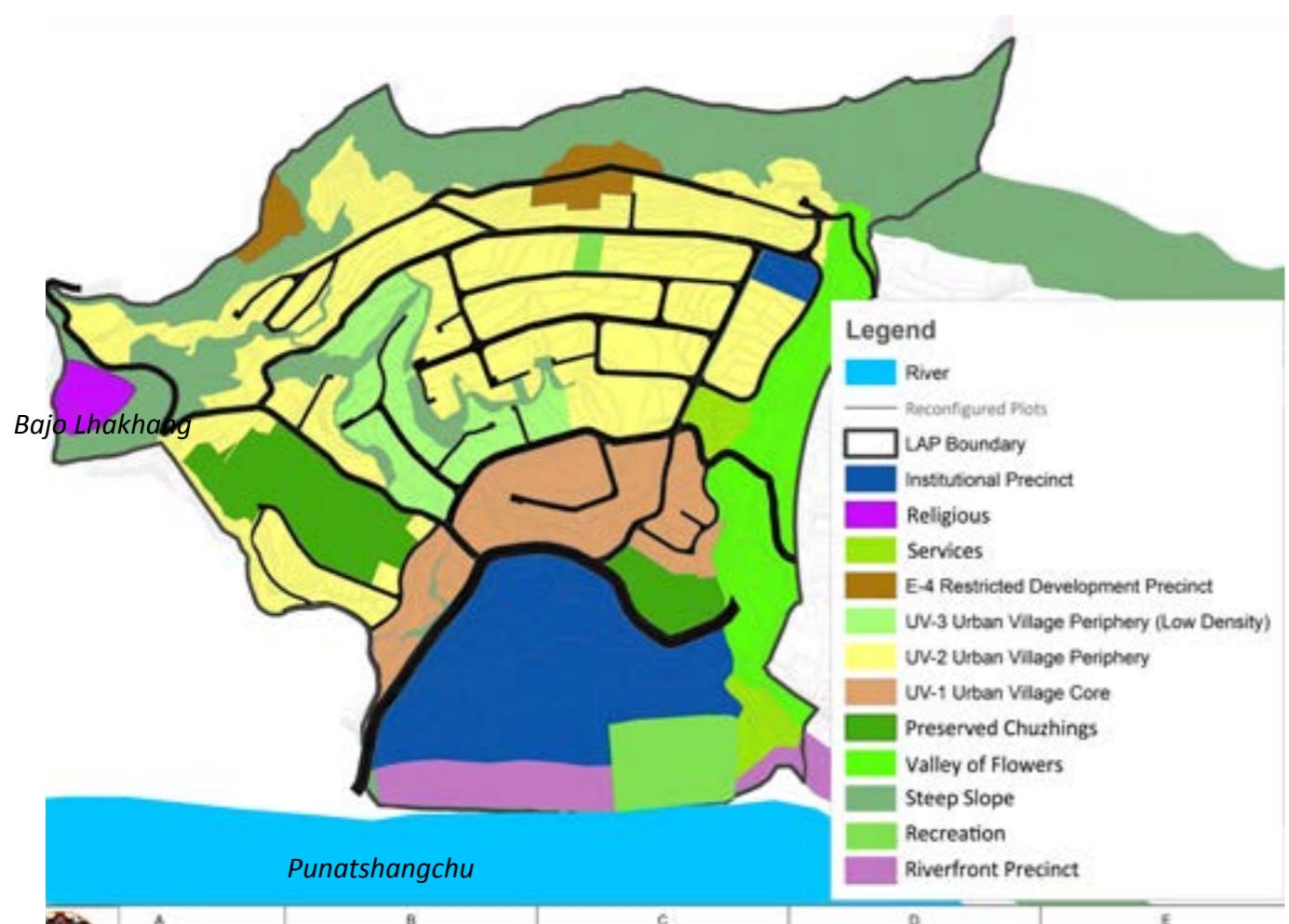
The eastern edge of the LAP area and western stretch (banks of Punatshang chhu) is high hazard area restricted for any constructions. The banks of Punastang chhu is proposed for river front development

7.3 Precinct Plan

The different precincts proposed in the local area plan are primarily guided by the Wangduephodrang Structure Plan, and it is an integral part of the overall precinct plan formulated in the Structure Plan.

The concept of precinct-based approach acknowledges the diversity of activity and multitude of building use. It brings compatible activities together in a manner which enriches the life of the city. It gives more flexibility as opposed to a conventional land-use plan. However, it needs be understood that every precinct has a dominant activity and any other activities in the same precinct is complementary to it. The supporting activities are governed by the main activity thus, a limited number of other activities may be permissible depending on their compatibility with the main activity.

The proposal consists of various precincts with different land uses, which are consistent with the overall precinct plan of the Structure Plan. The map below illustrates the different precinct categories;



Green Space System

The proposal include a network of green open spaces and the valley of flowers which will revamp the existing image of the town through the shift in the visual focus of the town from the concentrated built masses of existing Bajo town to the beautifully landscaped new areas. Furthermore, the valley of flowers will act as a place of both visual and physical interface between the existing bajo town and the new development. The luxurious green open space with its interactive social spaces and landscaped areas, would act as a breathing space for the inhabitants of the town while maintaining a balance of built mass on either sides.

Agricultural Environment

A large portion of agriculture land including chuzhing was used for the development of the existing Bajo town. There has been an increasing awareness about similar trends wherein new development has lead to abrupt land-use conversion and the encroachment of agricultural land. In light of this issue, the government has emphasized on the need to protect chuzhing in the country with outmost priority and this is of particular importance in Wangdue Phodrang after very little that is left for conservation. The proposal includes the conservation of chuzhing and agricultural land through the designation.

Institutional Precinct

The Bajo Higher Secondary School, proposed location of Gangthangkha Primary School and Town Hall are designated under institutional precinct, and their functional character are kept intact as it maintains the flow of activities and amenities.

Spiritual Precinct

Religion and spirituality percolate deep into the political, socio-cultural, and personal facets of life in Bhutan. The Structure Plan aims to preserve the sanctity of the religious premises through preservation of open areas, controlling the scale and expanse of built form surrounding the premises, and facilitating tourism with certain limitation on commercial activity.

Residential Precincts (UV-1,UV-2 and UV-3)

The residential precincts have been zoned between the existing Bajo town and the Lhakhang. The proposed residential areas are grouped under three main category, based on the landform, views of the townscape and the existing residential clusters; 'High Density Development Mixed Use' (UV-1 Urban Village Core), 'Medium Density Development' (UV-2 Urban Village Periphery) and 'Low Density Development' (UV-3 Urban Village Periphery). The High Density residential precinct comprises of the existing densely built up area, which is proposed to be restructured while retaining the existing built forms. The medium and low density precincts shall have new proposed interventions for residential development. The design approach shall be cluster based, emphasizing creation of smaller residential clusters with common shared open spaces in order to retain the traditional community character.



Artistic impression of the proposed development as viewed from the existing Bajo town



Three dimensional panoramic view from the Thimphu-Tsirang national highway

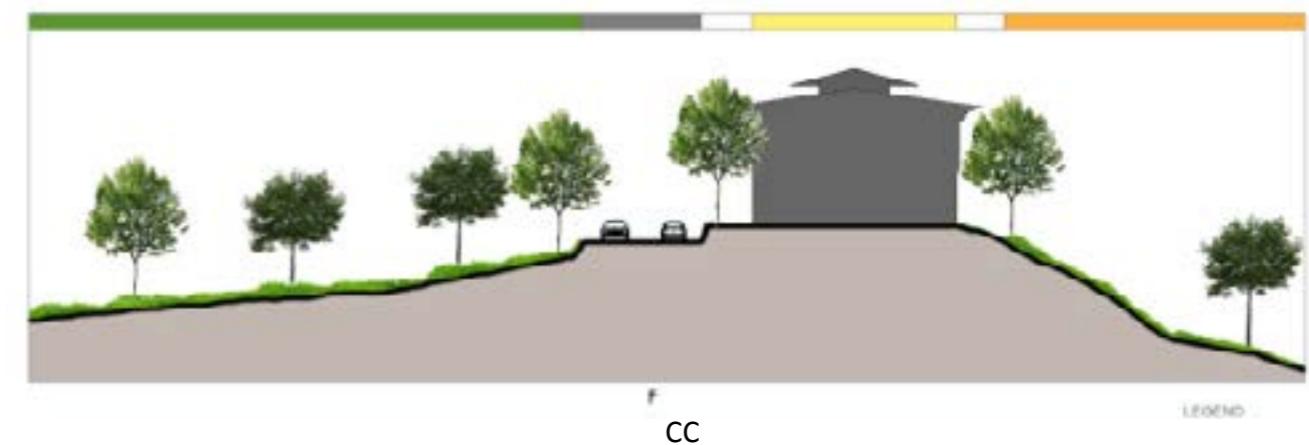
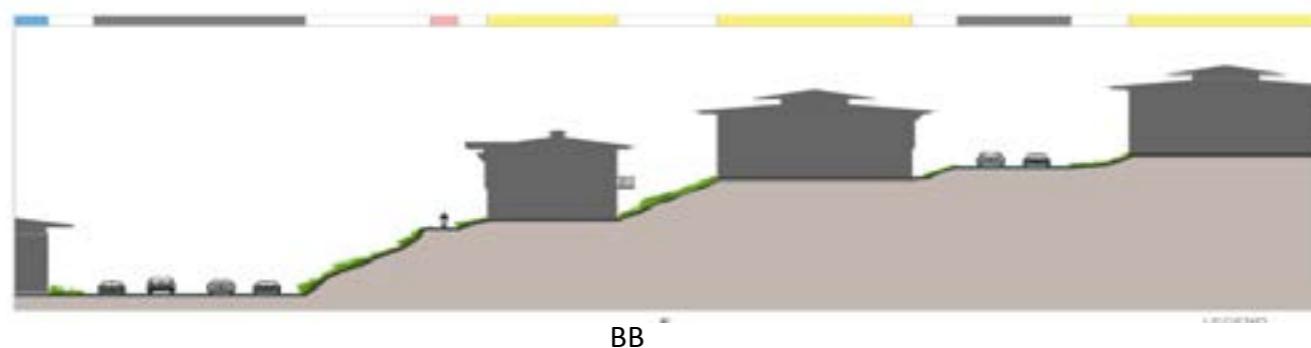
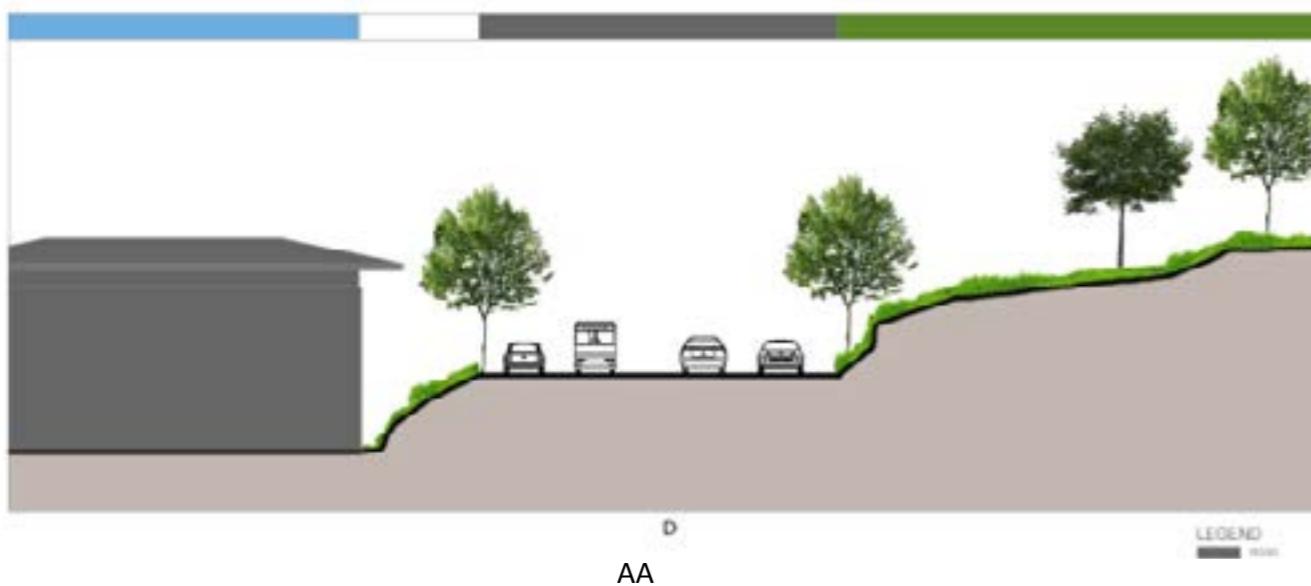


Proposed plot reconfiguration



Aerial view of the proposal

Typical Site Sections





River embankment for the protection and prevention of soil erosion of the river banks.

Linear riverfront development shall act as an important linking element bringing together different and isolated land parcels along the river edge.

Transition zones designed as a promenade will become a vibrant public realm with hard and soft paved surfaces, and landscaped areas.

Social space along the riverfront with small scale commercial activities such as food court, ice cream parlour, boutique, outdoor sitting arrangement, etc.



7.4 Riverfront Precinct

Punatsangchhu is one of the most distinct natural features within the urban landscape of Wangdue Phodrang, however, its edge and transition zone remains untreated and inaccessible. The riverfront can prove to be dangerous in the event of sudden rise in water level resulting in the submergence of the immediate low-lying areas. The ongoing PHPA-I project is assumed to create one such situation once it starts to operate. It will cause river banks to submerge and deplete especially where the slopes are gentle.

To deal with this situation, a riverfront development is proposed along the major part of the stretch. To protect low lying developments from flood, and to prevent erosion of the river banks, retaining walls would have to be built along the edge of the river. The project will reclaim some land from the river bed and transform the stretch into a vibrant and thriving public domain. The transition zone is planned as an accessible linear promenade with landscape elements both soft and hard paved areas, outdoor sitting arrangements and food courts.

This linear development along the river side would also act as a linking element bringing together various land parcels within the town. The dam shall be of earth/masonry to allow drainage of sub-soil water and maintain hydro geological equilibrium. A detailed study of the existing soil condition and the structural design of the river embankment and river training work needs to be carried out in the later implementation stages.





The development leads to the creation of vintage points and visual landmarks. The area can be a vibrant public space for the local residents and tourists alike. The computer rendered images of the proposed valley with beautifully landscaped areas which forms a strong visual axis.



Pedestrian pathways make the area accessible, facilitating public interface.



7.5 G-1 Open Space System (Valley of flowers and play areas)

The proposal is aimed at redefining a new image for the whole town. It would enable to shift the attention and visual axis from the existing Bajo town's dense urban form to this beautifully landscaped valley, enhancing the image of the whole town.

The intervention also has a functional component to it along with the visual aspects. The new development is largely proposed on the other side of this valley, making it a place of visual as well as physical interface between Bajo town and this new development. The luxurious green open space with its interactive social spaces and landscaped areas, would act as a breathing space for the inhabitants of the town while maintaining a balance of built mass on either sides.

The illustrations are only indicative. The principle requirement is of a focal point or a visual landmark which can be seen from a distance (from the highway across the Punatsang Chhu). The land mark shall be designed in consultation with the competent authorities .



Valley of flowers as viewed from the Thimphu-Tsirang National Highway.

7.6 E-1 Environment Conservation Precinct

The natural environment protection policy is to preserve the invaluable environmental assets for the future generation. The town has gradual, gentle slopes along the river edge, followed by moderately sloped terraces and then very steep slopes forming an edge towards the far east. This belt of steep slopes with heavy forest, further extends diagonally to west and then form the southern periphery of the town. There is also a thin stretch of steep slopes starting from Bajo Lhakhang area and stretching half way through the LAP 2 area.

Steep slopes are associated with environmental features such as sensitive landforms, rock outcrops, bedrock fractures, and groundwater seeps. On the other hand, they can be described as valuable resources that create micro-climates where a diversity of organisms can thrive. Evidently, the protection of steep slopes is a matter of necessity and their effective protection and preservation is required wherever possible. This scale of environmental sensitivity makes steep slopes high hazard zone where the possibility of any kind of building activity is ruled out.

The plan, thus, reserves and proposes enhancement for all forest and ecofragile areas of the town and aims to preserve them for posterity.



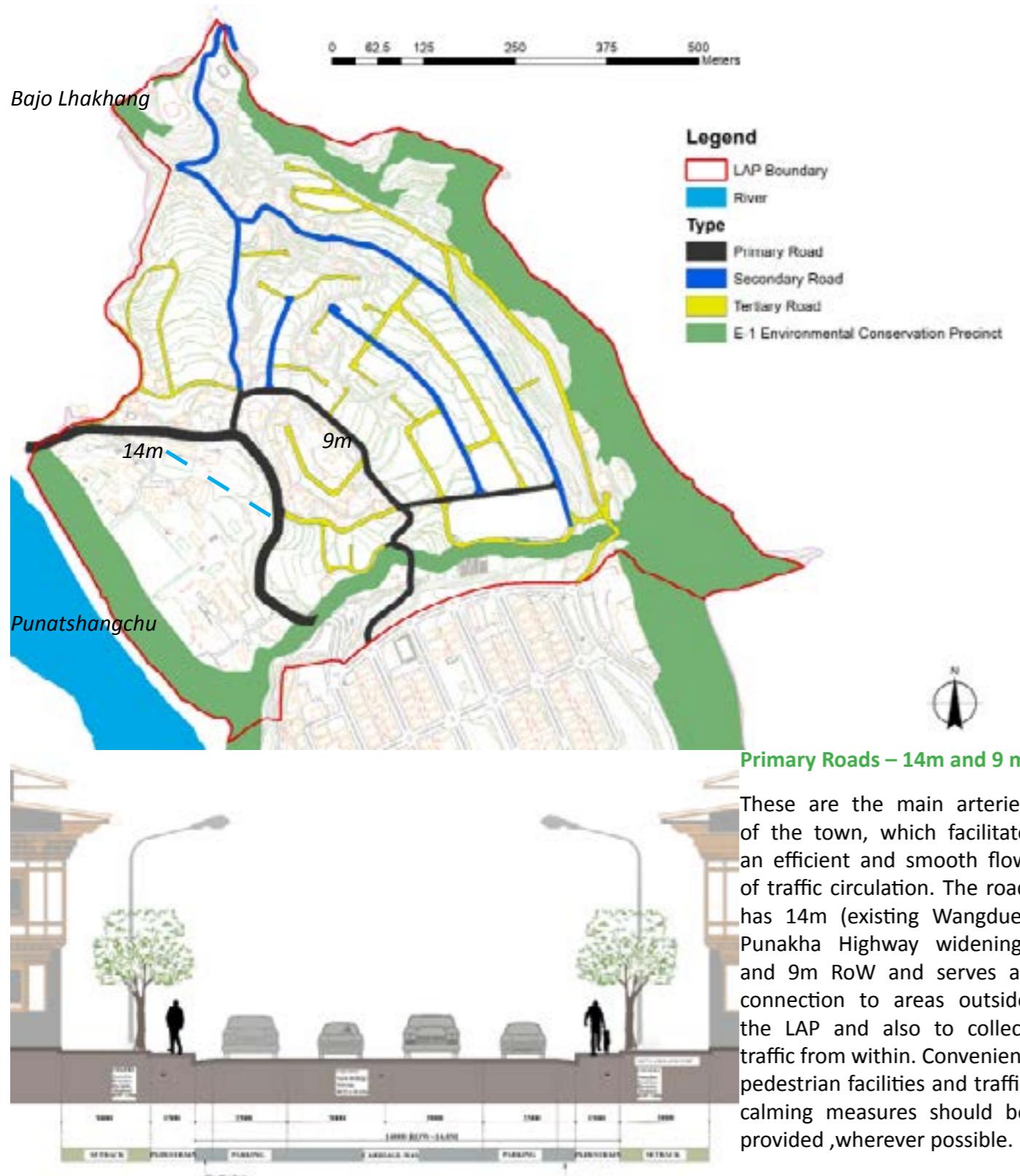
7.7 E-2 Agricultural Environment

In recent years, urban agriculture has gained tremendous popularity as a means to counter climate change, and also from the view point of food security. After losing out a large area of chuzhing(paddy land) for the development of existing Bajo town, it has now become very important to preserve the remaining chuzhing. The protection of chuzhing is of national significance and therefore, it becomes particularly important in Wangdue Phodrang. As part of the proposal in plan, it includes the conservation of the agriculture precinct specifically the chuzhing, while opening up optimum dryland for development that commensurate with the housing demand for the future. Two major land parcels in the LAP area have been identified for this purpose.



7.8 Circulation System and Road Network

An efficient road network across the town consists of roads of different hierarchies. Based on its location and connectivity characteristics, each road acts as a primary, secondary and tertiary roads. All the classes of roads are essential components of the town level road network, providing access to the residential quarters in the urban villages and to different activity centres. The number of lanes and the direction of traffic flow also affects the carriageway width. The following street sections illustrates the different types of road and street networks proposed in this local area plan.



Secondary Road - 7.5 meters

Secondary roads are the ones that connect the primary roads with the various parts of the medium density residential precincts. Secondary roads are intended to carry moderate levels of local traffic originating within the residential settlements to the primary roads, and therefore, their design and alignment should balance efficient vehicular travel with the safety and livability of the residential neighborhoods. The road has a Right of Way of 7.5m ,which include two lanes with pedestrian paths on one side.



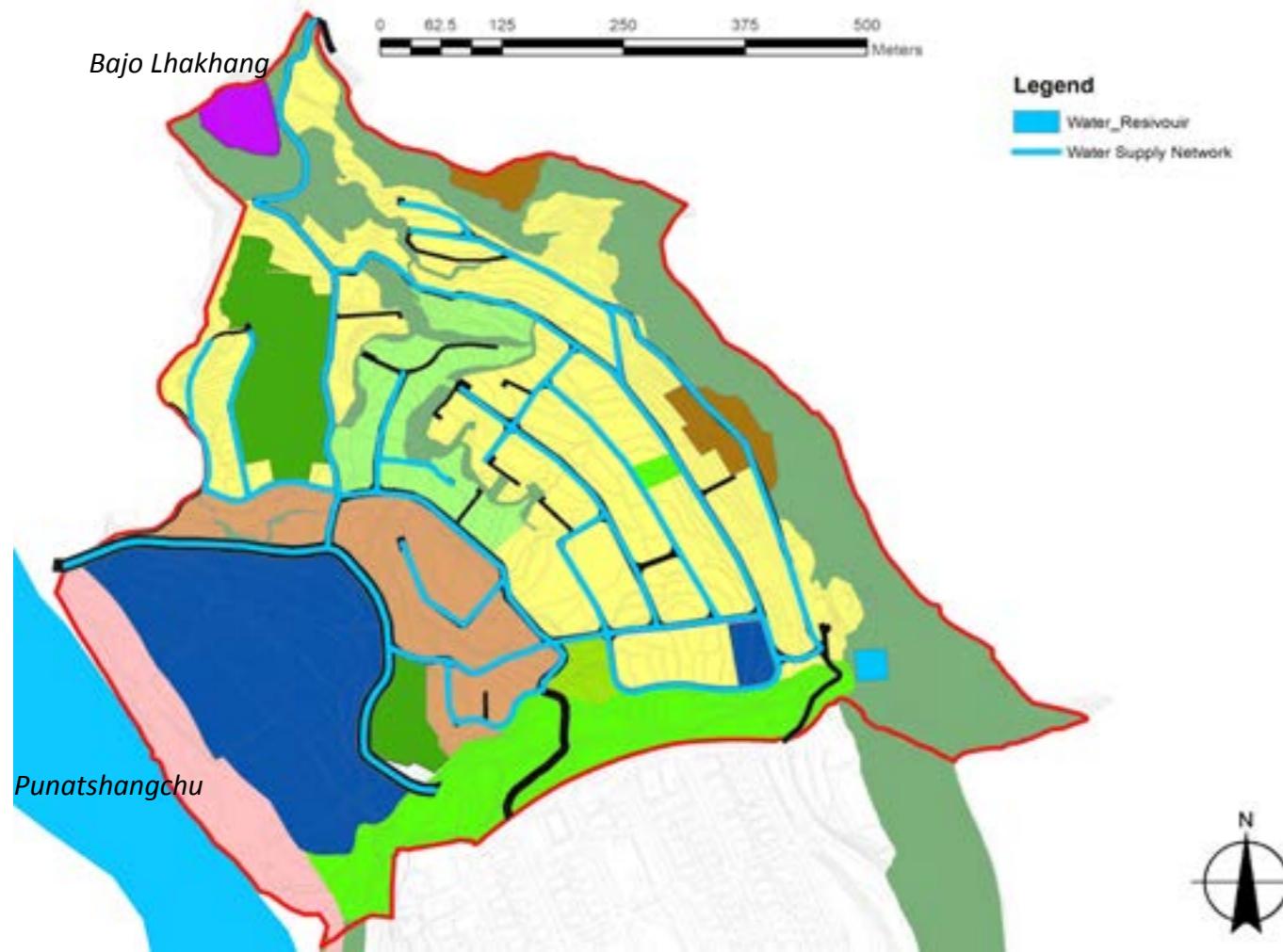
Tertiary/Access Road - 6m

Access roads are designed to serve low volumes of traffic through a pedestrian friendly environment. The carriageway is wide enough to allow two vehicles to slowly pass through. The emergency and service vehicles may use both the lanes in times of emergency. The bicycles may be encouraged to share the streets along with the motorists.



7.9 Water Supply Network

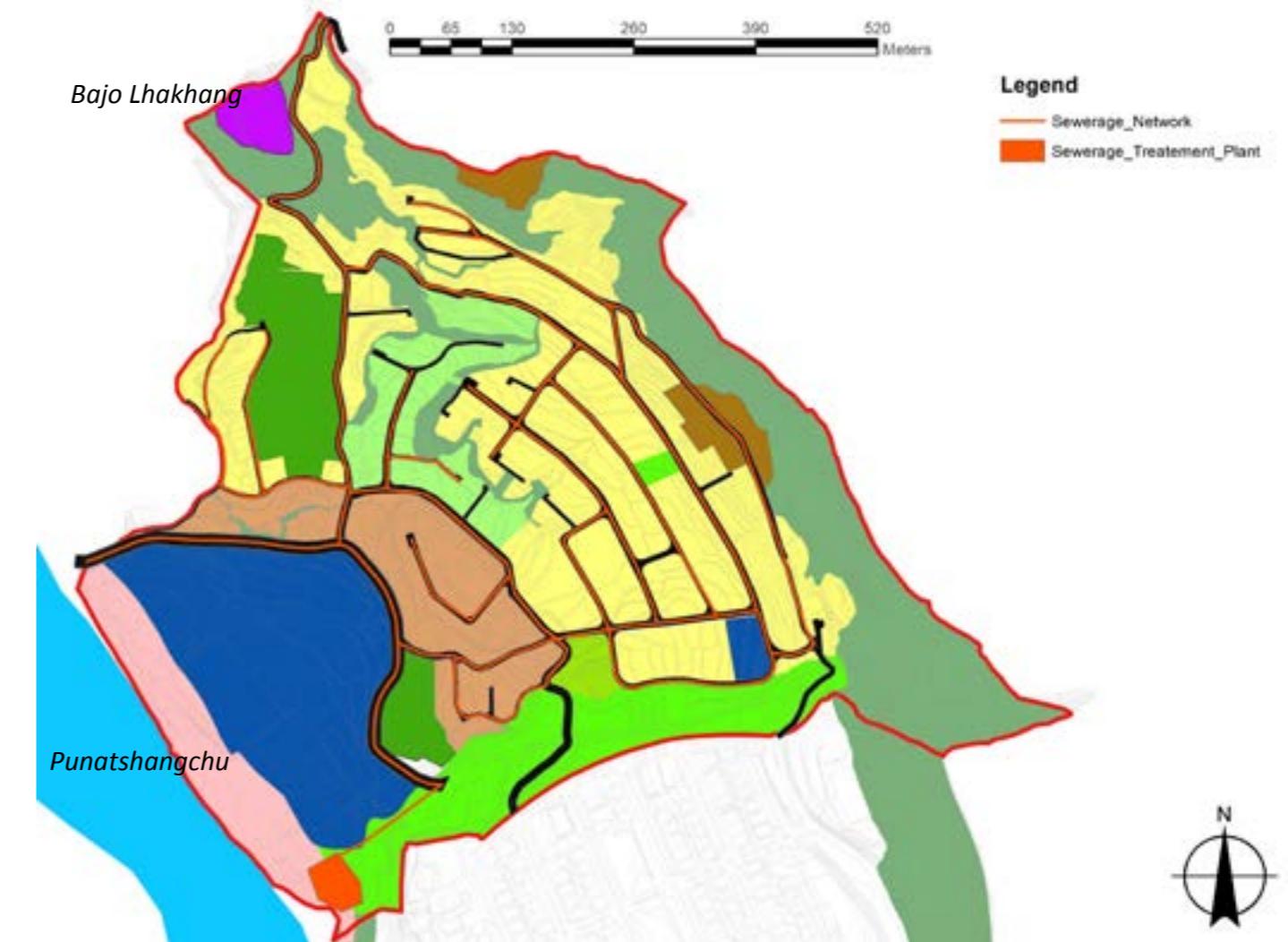
Water demand for any area depends on the land use pattern and the type of living standards of the population residing in the area. The main water reservoir is located towards the eastern edge, above the existing RBA campus. Service reservoirs located along the different areas are connected to the main reservoir, which then supply water to all the households in the town through a proper distribution network. Currently, the area gets its water from the rural water supply scheme, except for the school and BHU. The proposal also includes plans to augment the existing capacity of the WTP, since the quantity of water from the source is sufficient to cater the whole Thromde population. It is proposed that the storage reservoirs are well connected to a pressurized network of water supply to enable the setting up of on-street fire hydrants within the Thromde area.



7.10 Sewerage and Sanitation Network

Normally, sewerage projects may be designed to meet the requirements for a span of thirty years time period. Sewage flow for the design of sewers will include peak factors. As per planning standards, 80% of the water supply is expected to reach the sewers. However, the sewers should be planned for a minimum waste water flow of 100 liters per capita per day. The minimum size (diameter) of sewers lines in urban areas should be 200 mm.

At present, except for the existing town, the area surrounding old Bajo village does not have any organized sewage collection or treatment system. Population relies on individual septic tanks and soak pits. The sewage treatment plant (STP) located on the eastern bank of Punatshang chhu treats sewerage coming from the existing township only. A common septic tank is proposed for the Bajo Extended Local Area Plan near the Basic Health Unit Area. This area is the lowest area in the Bajo extended, which is suitable for the collection of sewerage.



7.11 Fire Safety

The water reservoirs proposed in the LAP area shall also cater to the fire safety requirements of the town. It is proposed that a network of water supply is established to enable the setting up of on-street 'fire-hydrants', especially in the urban village core(UV-1) and other important public areas.

It is proposed that fire hydrant system be installed in all three residential precincts. The system shall be installed along the roads through a dedicated 6 inch primary pipeline for water supply. This main fire safety water line will be connected to a storage reservoir and water will be discharged at a constant pressure with the help of a jockey pump of 10 HP, 10.8 cum at 70 m head, main electrical pump of 137 cu m at 70 m head and a backup diesel pump of 137 cu m at 70 m head. The source of water for storage reservoir will be the main water supply reservoir.

A 3 inch pipe hydrant valve and a hose box shall be installed at a variable distance of 60 to 120 meters depending on the settlement pattern. Given the mountainous topography and the issues of accessibility in some areas, it is advisable to employ 'Firefighting Bikes'. These fire fighting bikes are increasingly becoming popular in many countries in the region and they are found to be efficient for various reasons during fire hazard and emergency situations. Fire fighting bikes can carry wide range of equipment from simple fire extinguishers to jet guns with hose rigs. They are prompt and reduces the emergency response time, and also ensure service delivery to the most remote locations of the town.

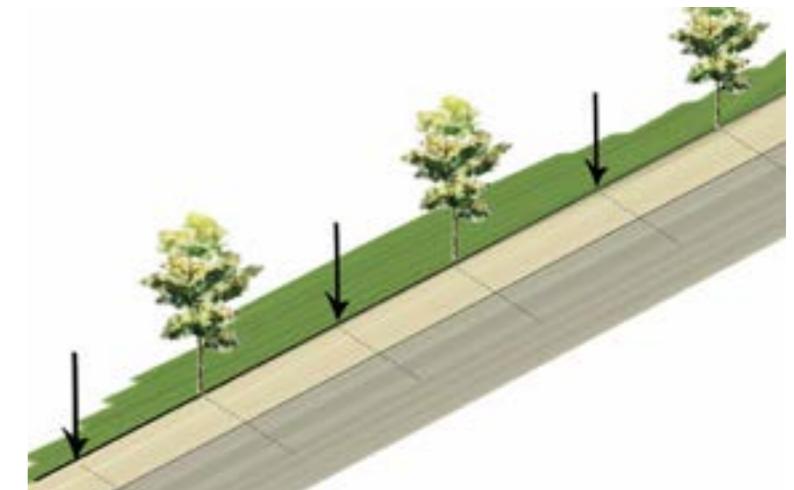


Source:

'Wheels of Change in Firefighter Fleet', The Telegraph 2013.

7.12 Street Lighting

Lighting needs of pedestrians are different from those of vehicular traffic and therefore need to be designed and integrated within the overall lighting strategy for the street. This would help the safety of pedestrians on the pavements after dark.



High Mast Lighting (30 m tall) – are inefficient as too much light is dispersed into the night sky (causing light pollution) and not much light reaches the ground level.

Mid-Mast Lighting (10-12 m tall) – are appropriate for most arterial and subarterial streets. For wide streets with high pedestrian or commercial activity, Mid-Mast lighting may be combined with Pedestrian Scale lighting to create additional security and comfort.

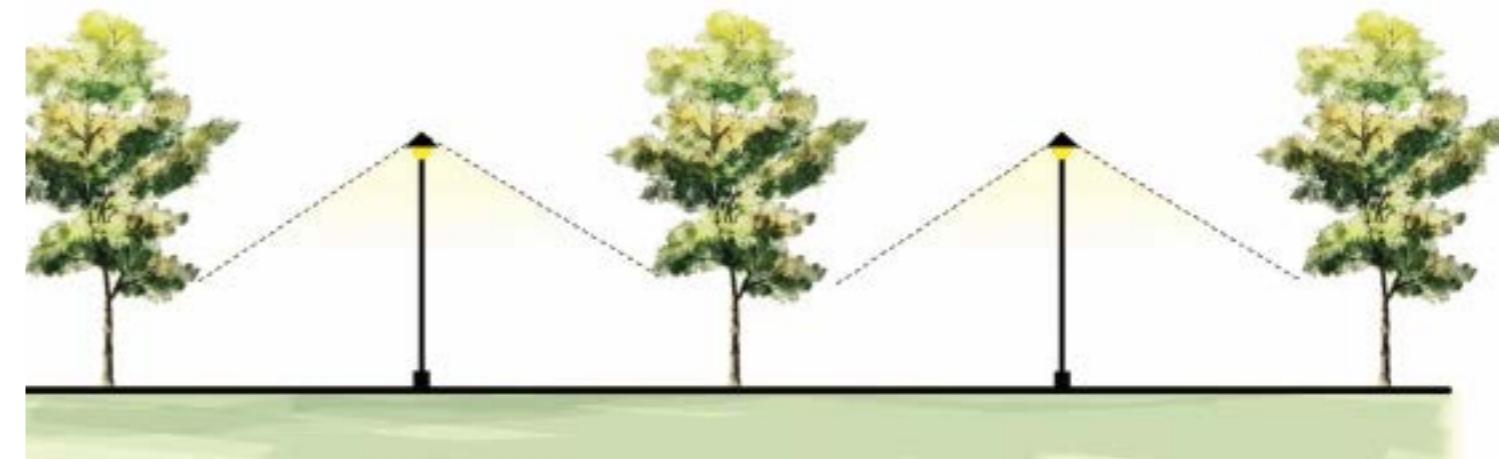
Low-Mast or Pedestrian Scale Lighting (3-5 m tall) – illuminate pedestrian walkways and provide supplemental light for the sidewalk.

Approx. 30 lux level is suitable for non-shopping areas and 20-25 lux level for shopping areas.

Street Lighting must not pollute the environment, i.e. no night sky light pollution.

Energy efficient fixtures should be used that are durable, efficient and inexpensive.

During the installation and placement of the street lights, adequate gaps and spacing from the tree canopies should be maintained to ensure that performance of lighting is not compromised.

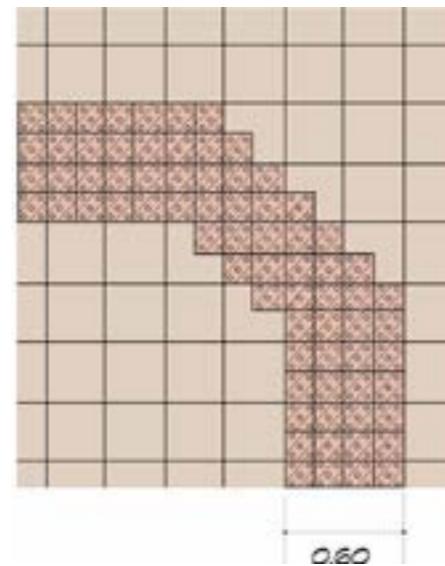


7.13 Guidelines for Streetscapes

It is important that the built-environment is designed barrier-free and adapt to fulfill the needs of all people equally. An inclusive design would imply planning for people with varying abilities and disabilities. It aims to provide better infrastructure and street furniture to all kinds of users and make streets barrier-free and accessible to all.

Street furniture

Street furniture (bus stops, benches, mail boxes, lampposts, telephone booths, public toilets, etc.) should be located which allow the free movement of people without any obstruction. Textural changes in the footpath surface help visually impaired people to identify the location of public amenities.

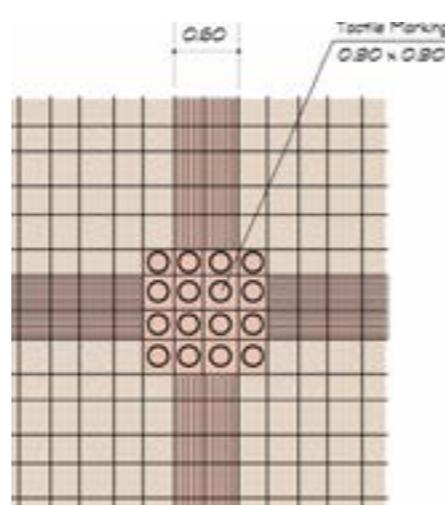


Resting Facilities

Level rest areas with seats are helpful for all pedestrians, especially for those with mobility problems. Resting spaces with benches should allow a minimum of 1.20 m of adjoining space for a wheelchair.

Signs

All types of signages should be visible, clear, and well lit at night. Signage on the pedestrian path are obstructions and needs to be detectable. Tactile warning markings should be provided on the ground around the obstruction to overcome them. The warning markings should extend over a width of at least 0.60 m outside the projected area at the base of the object. The color of signs should contrast with the surrounding surface so as to be clearly distinguishable.

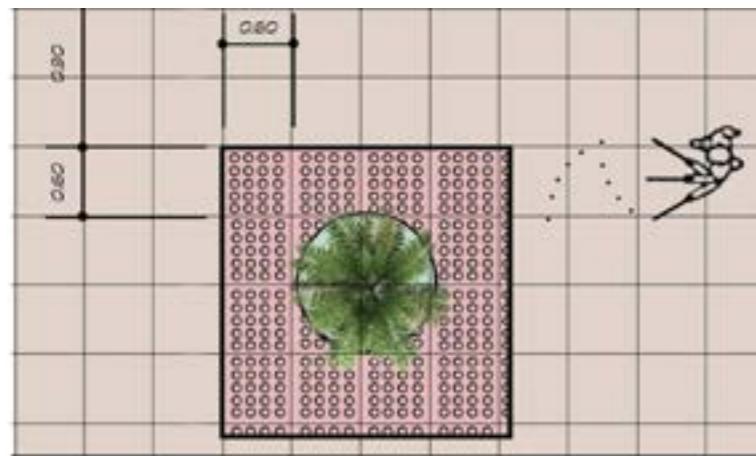


Guide Strips

A guide strip is a line constructed on the road surface to facilitate and guide the pedestrians with visual impairments on the streets. Guide strips should be laid in simple and logical manner, and should not be located close to manholes or drains in order to avoid confusion.

Tactile Marking

Tactile markings on the pedestrian route should be placed on guide strips where alternative routes exist or at a junction of guide strips and other major pedestrian crossings. They are also used to inform pedestrian about the obstructions on their paths.



7.14 Way Finding System

Wayfinding system help inform people of their surroundings in the (unfamiliar) built environment and it is important that it shows clear information at strategic points that will guide people into the right directions. Complex structures in the built environment are interpreted and stored by the human memory. Distances, locations and time may be remembered differently than as they appear to be in reality.



An effective wayfinding system is based on human behavior and consists of the following characteristics:

- Do not make them think- Create a comprehensive, clear and consistent visual communication system with concise message.
- Show only what is required- Show information which is relevant to the space, location and / or navigation path.
- Remove excessive information - Remove unnecessary elements to create a clear visual environment ahead.



Following the typical Bhutanese architectural elements, wayfinding signage could be designed and can be used at different locations as per their requirement.

Celebratory Gateway Banners - These would be used for advertising cultural events and also function as gateway to the location where the events are held.

Sinage - These are basic sinages which help locate ammenities such as restroom, parking, access, etc. to the users.

Information Kiosks - These would provide information to the visitors regarding historical and cultural significance of certain places in the area.

Bike and Pedestrain Direction Marker - These would provide information such as distance to destination and locate the availability of ammenities to bikers and pedestreians.

Map - These would help visitors to locate themselves and find directions to their destination.



2018-2035 DEVELOPMENT CONTROL REGULATIONS



WANGDUE PHODRANG

DEPARTMENT OF HUMAN SETTLEMENT
MINISTRY OF WORKS AND HUMAN SETTLEMENT

8 Development Control Regulation

The Bajo Extended (Local Area Plan 2) Development Control Regulations prescribed herein shall be read in conjunction with the provisions of **Wangduephodrang Development Control Regulations, 2016 (WDCR-2016)** of Wangduephodrang Structure Plan 2015-2035. The Bajo Extended DCRs contains provisions on the planning and built form regulations only ; and for other provisions such as administration, application procedures,penalty etc., has to be referred in WDCR 2016.

The general guidelines for development which apply to all the precincts within the local area plan are listed as follows:

- The maximum permissible plot coverage shall be within the set back rules as prescribed in this regulations, and balconies (not enclosed/ roofed) projecting up to 1.2 m from the ground floor external wall face shall be permitted. Such projections/structures shall not cover the septic tanks.
- No permanent construction shall be permissible on areas designated as high hazard. In plots where high hazard zone overruns the allotment, any modification of slope may be allowed only after due considerations of soil stability and site drainage conditions. However, the area may be utilized for non-building activity like vegetable farming or gardening.
- Existing buildings situated in the high hazard zone should be employed with hazard mitigation techniques, wherever feasible.
- All buildings must be designed and built according to the principle and technique prescribed by the Bhutanese Architecture Guidelines to preserve and promote the traditional architectural character of the buildings and towns.
- The orientation of a building must preferably be such that its longitudinal axis is perpendicular to the gradient of the contours.
- The color of buildings and roofing sheets are important consideration from the viewpoint of the Bhutanese Architectural identity. The bright coloured buildings and reflective roofing sheets should be highly discouraged. It is recommended that the roofing sheets are painted or coated in pastel green or brick red. The exterior walls must be painted in white, mud color, or cream color as prescribed by the Building Color Code of Bhutan 2014.

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8.1 River Front Development Precinct

SALIENT FEATURES

Increasing river permeability by creation of a pedestrian trail along the river with activity nodes at certain intervals.

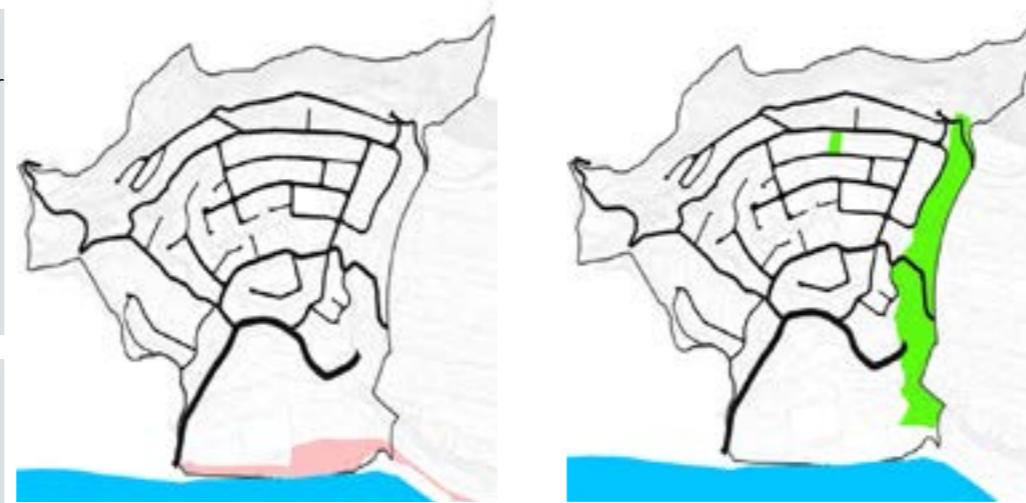
- Designed streetscape which visually interacts with the river.
- Creation of a city level public recreational space.
- A large city level park annexed to the promenade.



PROPOSED GUIDELINES

The promenade shall be paved with interspersed landscaped greens

- Edge of promenade towards river shall be visually permeable.
- Sitting spaces shall be created at regular intervals.
- No permanent structure shall be allowed. All kiosks as well as activity nodes shall have temporary structures.
- Proper traditional signage should be designed.
- The promenade shall be well lit through proper landscape/street lighting.



PERMISSIBLE BUILDING USE

- Small scale commercial eateries such as food courts, ice cream parlours, kiosks shall be allowed.
- Multipurpose ground.
- Landscape areas.

SPECIAL CONDITION

Special attention should be given to public safety, especially through the provision of adequate lighting, elimination of blind spots, safe infrastructure design, and universal accessibility to public amenities.

8.2 G-1 Open Space System (Valley of flowers and play areas)

SALIENT FEATURES

- Creation of a landscaped open space along the stream which forms a physical and visual break between the compact development.
- A visual axis leading to a proposed visual focal point.
- Colourful landscaped area forming a visual amenity within the town.

PROPOSED GUIDELINES

- No built structure shall be proposed
- It must be ensured that the visual axis of the focal element is not disrupted by landscape elements.
- Seasonal flowers shall be planted to maintain the character of the valley throughout the year.
- The channel of stream shall not be disrupted with any intervention.
- Interspersed sitting areas as well as landscaped greens shall be proposed.
- Design elements such as lighting, street furniture as well as signage shall be designed in accordance with Bhutanese Architecture Guidelines.

PERMISSIBLE BUILDING USE

- No building construction is allowed



8.3 E-2 Agricultural Precinct

SALIENT FEATURES

- Conserving the precinct as a cultivable zone.

PROPOSED GUIDELINES

- Ensure access to each farm.
- Design intersections of canals and pedestrian pathways to ensure unobstructed passage of water and hassle-free movement for pedestrians.
- Erection of fences or other boundaries based on the recommendations of Ministry of Agriculture.

PERMISSIBLE BUILDING USE

- Paddy cultivation on chuzhing.
- All agriculture related activity.
- Temporary structures dedicated to farming such as cattle sheds, barns, etc

8.4 Environment Conservation Precinct

SALIENT FEATURES

- Preserve all forest and eco-fragile areas of the town.
- A visual link binding different areas of the town together.

PROPOSED GUIDELINES

- The proposed precinct is composed of forest and steep slopes
- Existing greens along hill slopes.
- Area demarcated as “no construction” zone.
- Reinforcement of green fingers to establish a robust green structure

PERMISSIBLE BUILDING USE

- Plantation.
- Lawns.
- Farming.



8.6 Institutional Precinct

SALIENT FEATURES

- Creation of an architecturally and visually impactful precinct.
- Development of a precinct that is easily approachable and accessible from various areas.
- Development of site in response to the topography of the site.

PROPOSED GUIDELINES

- The architecture of new buildings must adhere to the prescribed traditional Bhutanese architectural style for public buildings.
- The hierarchy of open spaces must ensure that each building has ample foreground to allow visitors to identify and visually register the buildings in the order of their importance. The access to individual buildings must be clearly defined to make approach easy and intuitive for users including differently-abled users.
- It must have provision for adequate public amenities such as parking areas, toilets etc.
- Orientation of the buildings should be such that it maximizes intake of sunlight.
- Boundaries should be visually permeable to allow continuity of landscape while making sure that they provide adequate safety for the premises.
- It should have an efficient way finding system in place — signage and markers for all users including differently-abled users.



8.5 Spiritual Precinct

SALIENT FEATURES

- The precinct consists of sacred and spiritual part of the city, which is the Bajo Lhakhang
- The plan aims to preserve the sanctity of the religious premise.

PROPOSED GUIDELINES

- Preserve the Lhakhang and upgrade its surrounding greens through natural landscape elements.
- Any new interventions within the precinct shall be compatible with the spiritual and cultural character of the Lhakhang.
- The buildings shall be designed in response to the site topography, and with sensitivity to the religious sanctity of the area.
- Any new proposals shall not obstruct the important sightlines of the Lhakhang.



PERMISSIBLE BUILDING USE

The new building use proposals in the precinct shall be compatible with the religious activity of the Lhakhang such as monastery, lodging for pilgrims, chorten, etc.

PERMISSIBLE BUILDING USE

- Educational, Training, Cultural and Government Institutions
- Public Libraries, Town Halls, Art galleries

SPECIAL CONDITION

Residential and other activities incidental to the main institutional use, provided only 20% of the site should be used for such activities.

PROPOSED BUILT-FORM

Ground Coverage	35%
Setback (Min.)	6m on all the sides
Building height (Max.)	4 (Four floors)
Building Typology	Singular

8.7 UV-1 Urban Village Core

SALIENT FEATURES

- This precinct is envisioned to obtain a relatively high built-to-open-space ratio and consequently a high net density of approximately 300 pph.
- Owing to its natural landform, the proposed built-form in this precinct will balance the heavy built-mass of Bajo town, diluting its visual impact when seen from the Thimphu-Tsirang Highway.
- The precinct already has existing residential buildings with large footprints and building heights ranging from G+2 to G+3. The proposed built-form is intended to replicate the existing building density.
- The precinct layout is designed to structure the interstitial open spaces and organize new units as clusters with shared open areas.
- The proposed urban form shall be compact, forming a legible image of the precinct.
- Comprising of a mix of residential typologies and small commercial nodes, the precinct is designed to offer variety and heterogeneity, making it lively.



PROPOSED GUIDELINES

- Traditional Bhutanese architectural style and use of locally available building materials must be encouraged to achieve sustainability goals.
- The facades of buildings should define streets to enhance the streetscape.
- The maximum built-up on ground floor for a single building must not exceed 650 sq m.
- Building line for adjacent plots along a given road must be uniform, i.e. equal to the prescribed minimum front setback. Special permission must be sought for deviation from the building line in the case of corner plots or plots with steep slope towards or away from the front edge.
- Orientation of buildings must be sympathetic to the site slope i.e. the major axis of the building should either be along or perpendicular to the average slope line of the site.
- Non-residential uses listed as under, shall be permissible only on ground floor.

PERMISSIBLE BUILDING USE

- Residential uses, apartments and group housing with less than or equal to 8 units.
- Ubiquitous local level retail shops and services, household economic activity, cottage industries not involving use of, or installation of, any machinery driven by more than 10 KW power and which do not create noise, vibrations, fumes and dust provided that such home occupations and cottage industries shall not be permissible in the tenement dwellings or flats.
- Professional services, commercial permissible only on ground floor
- Play fields, gardens, gymnasium etc.
- Small restaurant, pre- primary and primary school, dispensary, clinic.
- Public facilities and utilities.
- Uses Permissible on Appeal to Competent Authority under Special Conditions
- Min. Plot size – 1,000 sq m, All permissible non-residential uses in residential area may be permitted in a residential dwelling only on the ground floor or any other floor with separate means of access/staircase from within the building or outside the building, but not within the prescribed marginal open space. Such development shall only be permitted beyond 150 m from the boundary of the building unit of existing school, or heritage place.

PROPOSED BUILT-FORM

Plot Area (Min.) for future subdivision	370 Sqm.
Ground coverage for plot sizes	45%
Setback (Min.)	1.5 m Front; 2 m sides and 3m rear
Building height (Max.)	4 (Four floors)
Building Typology	Singular, Plural, Composite

8.8 UV-2 Urban Village Periphery

SALIENT FEATURES

- The precinct is proposed to achieve moderate net density of approx. 185 pph with substantial open space associated with each residential building.
- The built and open shall be harmoniously balanced by forming clusters of 6-7 units with shared open areas.
- The precinct shall form a visual continuum between the dense existing Bajo Town and the Urban Village Core (UV-1), when seen from the Highway
- The proposed precinct shall comprise of residential buildings with medium grain, resulting in a moderately compact built form.
- A hierarchy of private and shared open spaces shall be established within the precinct.



PROPOSED GUIDELINES

- Traditional Bhutanese architectural style and use of locally available building materials must be encouraged to achieve sustainability goals.
- The facades of buildings should define streets to enhance the streetscape.
- The maximum built-up on ground floor for a single building must not exceed 650 sq m.
- Building line for adjacent plots along a given road must be uniform, i.e. equal to the prescribed minimum front setback. Special permission must be sought for deviation from the building line in the case of corner plots or plots with steep slope towards or away from the front edge.
- Orientation of buildings must be sympathetic to the site slope i.e. the major axis of the building should either be along or perpendicular to the average slope line of the site.

PERMISSIBLE BUILDING USE

- Residential uses, Apartments with less than or equal to 6 units.
- Household economic activity, Cottage industries not involving use of, or installation of, any machinery driven by more than 1KW power and which do not create noise, vibrations, fumes and dust provided that such home occupations and cottage industries shall not be permissible in the tenement dwellings or flats.
- Uses Permissible on Appeal to Competent Authority under Special Conditions-Minimum Plot size 1000 sqm- Child care centres,resorts

PROPOSED BUILT-FORM

Plot Area (Min.)	385 Sqm.
Ground coverage for plot sizes	45%
Setback (Min.)	3 m Front; 2 m Sides and 3m Rear
Building height (Max.)	3 (Three floors)
Building Typology	Singular, Plural

8.9 UV-3 Urban Village Periphery

SALIENT FEATURES

- As this precinct is situated in a linear low lying stretch of land, the developable parcels shall be aligned linearly with regulated front and back edge conditions.
- Low building density shall be maintained in the stretch with large parcels and smaller building footprints.
- As the precinct is surrounded by green slopes, the built mass shall be interspersed with greens, blending with the surroundings.
- The urban form shall remain sparse with dominant open spaces within the precinct.
- The precinct is proposed be an introvert residential development with private green spaces.



PROPOSED GUIDELINES

- Traditional Bhutanese architectural style and use of locally available building materials must be encouraged to achieve sustainability goals.
- The facades of buildings should define streets to enhance the streetscape.
- The maximum built-up on ground floor for a single building must not exceed 650 sq m.
- Building line for adjacent plots along a given road must be uniform, i.e. equal to the prescribed minimum front setback. Special permission must be sought for deviation from the building line in the case of corner plots or plots with steep slope towards or away from the front edge.
- Orientation of buildings must be sympathetic to the site slope i.e. the major axis of the building should either be along or perpendicular to the average slope line of the site.

PERMISSIBLE BUILDING USE

- Residential uses, Apartments and group housing with less than or equal to 6 units.
- Household economic activity, cottage industries not involving use of, or installation of, any machinery driven by more than 10 KW power and which do not create noise, vibrations, fumes and dust provided that such home occupations and cottage industries shall not be permissible in the tenement dwellings or flats.
- Uses Permissible on Appeal to Competent Authority under Special Conditions- Minimum Plot size 1000 sqm- Child care centres,resorts

PROPOSED BUILT-FORM

Plot Area (Min.) for future subdivision	400 Sqm.
Ground coverage for plot sizes	30%
Setback (Min.)	3 m Front; 2 m Sides and 3 Rear
Building height (Max.)	3 (Three floors)
Building Typology	Singular, Plural

8.10 E-3 Restricted Development Precinct**SALIENT FEATURES**

- The precinct is relatively steeper and minor constructions/development may be allowed. The slope range for this precinct is 30%-58% slope.

PROPOSED GUIDELINES

- No new plots shall be proposed in this precinct and sub- division of existing shall not be allowed.
- Any relevant plots within slope of 30 to 58% may be allowed to construct on with a limited ground coverage of 20% and a height restriction of two storey(2 floors)

PERMISSIBLE BUILDING USE (for existing structures)

- Tourist Home Stays
- Residential
- Offices

**8.11 S-1 Service Precinct****SALIENT FEATURES**

- Precincts characterised by public utility/public facility, sewage treatment plant and other services.
- The allocated areas in this Local Area Plan is for weekly market and the lowest area near the Punatshangchhu is the existing Eco-line treatment plant.

PROPOSED GUIDELINES

- Traditional Bhutanese architectural style and use of locally available building materials must be encouraged to achieve sustainability goals(weekly market)
- Plot subdivision shall not be allowed for the precinct
- Parking provision for weekly market shall be within the plot (1 car parking space per 50 sqm of Gross Floor Area)

PROPOSED BUILT-FORM

Setback (Min.)	3 m on all sides
Building height (Max.)	2 (Two floors)
Building Typology	Singular, Plural

Notes:

- Plot Coverage:** The maximum permissible plot coverage shall be within the set back rules as prescribed in this regulations,
- Cantilevered balconies** (not enclosed) projecting up to 1.2 m in the setback area from the ground floor level external wall face shall be permitted. Projections beyond 1.2 m may be permitted provided they do not extend into the set back areas and they are structurally safe. Such projections/structures shall not cover the septic tanks. In case of commercial buildings cantilevered balconies shall be allowed only at the rear.
- Setback:** Shall be measured from the outermost wall/window projection.
- Habitable attics** shall not be permitted. Provision of basement or split floor level shall be included within the maximum number of floors allowed as per the regulations.
- Compound wall:** Construction of compound walls shall not be permitted in Urban core precincts. In residential precincts of compound walls with a height of not more than 1.0 m shall be permitted.



DHS, MoWHS