



SONAMTHANG ACTION AREA PLAN

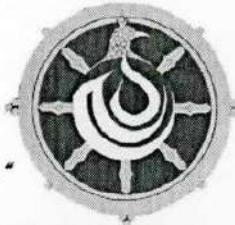
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ROYAL GOVERNMENT OF BHUTAN
MINISTRY OF WORKS AND HUMAN SETTLEMENT



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MINISTER

FOREWORD

Sonamthang village, under the Panbang Dungkhag and Zhemgang Dzongkhag in the south-eastern part of Bhutan, is an agro-based settlement located along the Nganglam-Panbang highway. The Sonamthang Action Area Plan has been prepared through a collaborative process by the Department of Human Settlement, Zhemgang Dzongkhag Administration and Panbang Dungkhag Administration. The Plan has been finalized after several consultations with the land owners and relevant stakeholders, and approved during the 33rd Policy and Planning Committee of the Ministry (PPCM) meeting on April 2, 2021. Therefore, I sincerely appreciate your coordination and cooperation in the preparation of Sonamthang Action Area Plan.

The Sonamthang Action Area Plan has been prepared to establish a long-term, integrated planning vision for Sonamthang to guide the future growth across the planning area, with an emphasis on implementation. It has been prepared in cognizance of its existing conditions. The primary vision of the Plan is to develop Sonamthang as an agriculture, nature and craft based settlement in harmony with its surroundings. It focuses on the five main elements of sustainability, accessibility, open spaces, compatibility and integration.

The Plan critically assesses the sites within the planning boundary where there might be legitimate development opportunities through the analysis. Besides the proposals pertaining to road connectivity, open spaces, infrastructure, services and amenities, the Plan renders a clear direction for land uses, height and scale of development in order to strike a balance between the need to intensify or to protect the character of the settlement. Uniquely, the Plan is underpinned by the guided land development modality for its implementation. This has been recognized as the most appropriate land mobilization scheme given the nature of the settlement.

The long-term sustainability of Sonamthang would depend on how development respects the provisions of the approved action area plan. Therefore, I sincerely urge that the Zhemgang Dzongkhag Administration, Panbang Dungkhag Administration and Ngangla Gewog Administration to take full ownership of the plan and ensure that the developments take place as per the provisions. If there is a requirement to change the provisions of the plan, it should be possible as the action area plan is a living document and is subject to periodic review. But changes have to be done following the due planning procedure.

I would also like to request all the stakeholders involved to extend their wholehearted cooperation and support to facilitate smooth implementation and materialization of the plan to witness Sonamthang develop into a sustainable agro-, nature- and craft-based settlement. I would like to wish the local governments and the people of Sonamthang all the best in building a place of your own. I also urge you to seek technical assistance of the MoWHS whenever necessary.

Tashi Delek

Dorji Tshering
Zhabtob Lyonpo

Sonamthang Action Area Plan

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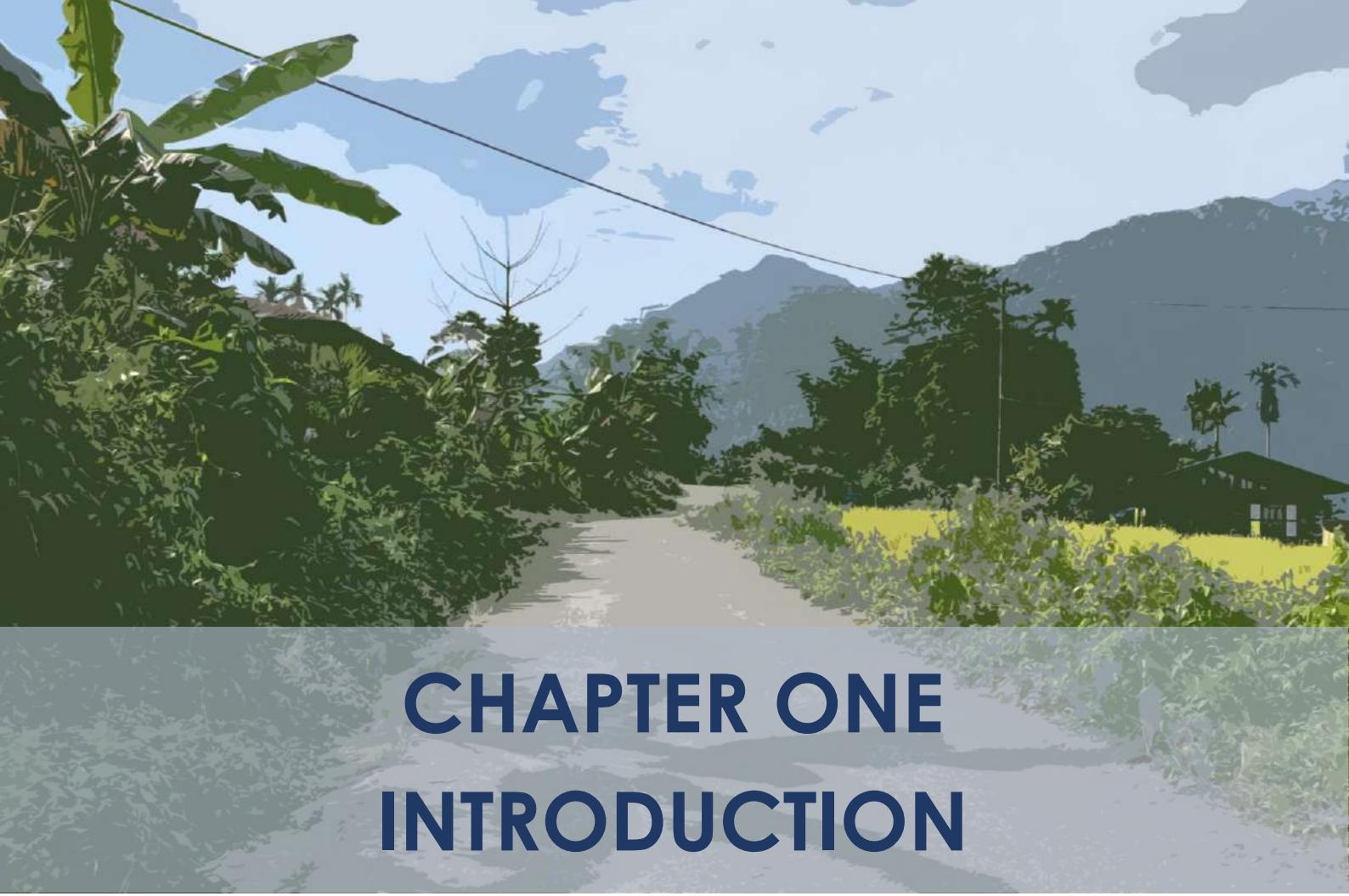
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CHAPTER ONE

INTRODUCTION

1. INTRODUCTION

1.1 Background

Sonamthang is a small rural settlement, which falls under Ngangla Gewog in Panbang Dungkhag Administration (PDA), Zhemgang Dzongkhag, Bhutan. Sonamthang's close proximity to Panbang, a yenlag throm, and its location along the Panbang-Nganglam Primary National Highway led to increase in development pressure in terms of constructions of houses, especially along the highway. These development pressure and unplanned developments were concerning, especially to the cultural and natural landscape of Sonamthang. Moreover, given its viability of potential future growth, the Department of Human Settlement (DHS) under the Ministry of Works & Human Settlement (MoWHS) was requested by Zhemgang Dzongkhag Administration vide letter no. ZhemDzong/Tshogdu(2)2017/3870 dated March 21, 2017, to prepare a proper development plan.

Following the request, DHS carried out a detailed topographical survey of the area earmarked for Sonamthang in September, 2018, as illustrated in Figure 1.1. The first visit by the planning team of DHS was made in December, 2018 to familiarize with the site and to gather information regarding the strengths, opportunities and issues of the area. The first stakeholder consultation meeting was also conducted on December 4, 2018 in Zhemgang Dzongkhag Administration to inform the local governments and the relevant stakeholders about the preparation of the

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Sonamthang Action Area Plan (SAAP); and to request for the necessary data, which are required for the plan preparation.

On December 6, 2018, a Memorandum of Understanding (MoU) was signed between the Zhemgang Dzongkhag Administration and DHS to outline the roles and responsibilities of the local governments and DHS in the preparation of Sonamthang Action Area Plan. MoU will facilitate efficient coordination, cooperation and collaboration. In addition, it would also ensure that there is no duplication of activities and facilitate timely actions. However, in case issues ensue which is outside the outline of MoU, it will be dealt in proper coordination between the two.

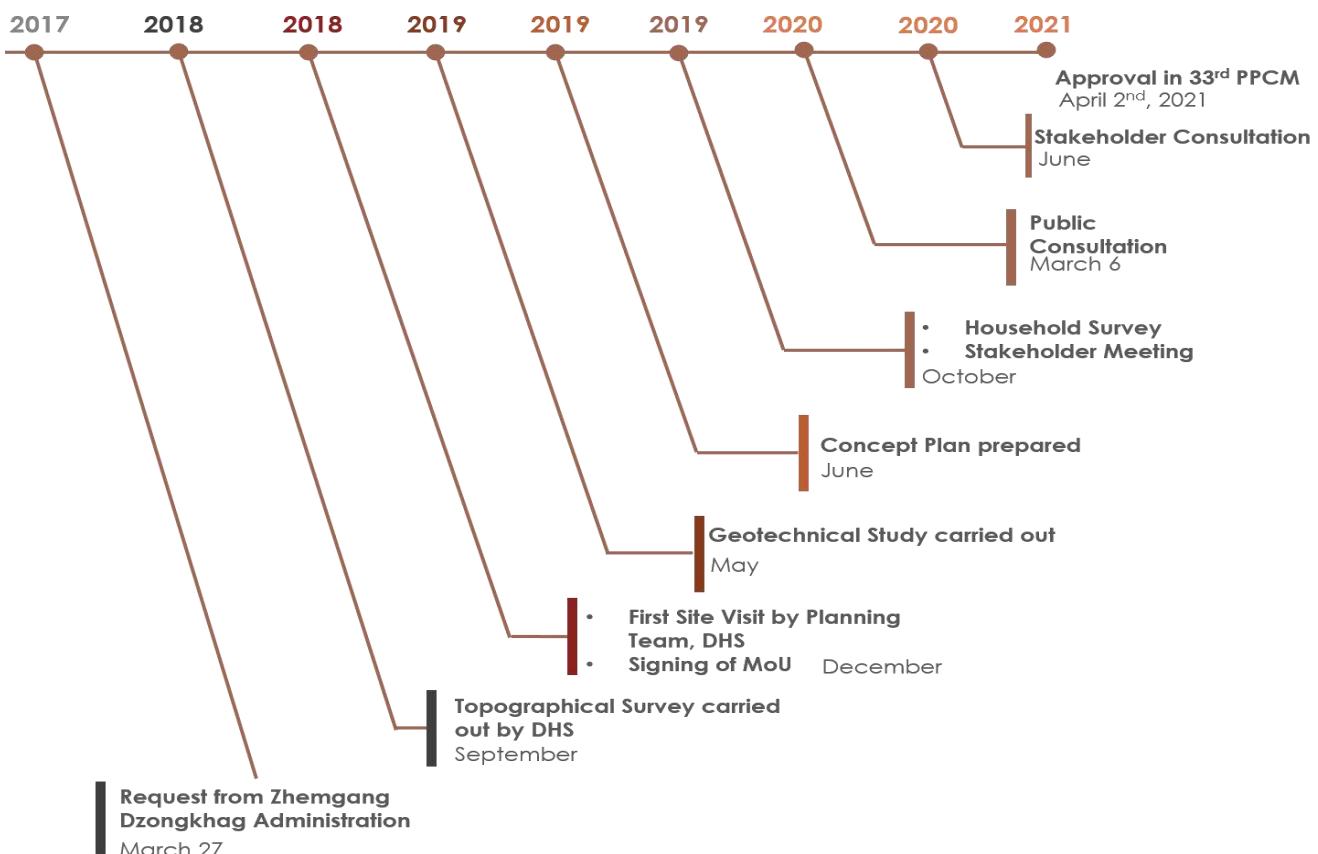


Figure 1.1 Chronology of Events

Subsequently, Alpha Geotech and Company completed the Geotechnical study for Sonamthang in May, 2019. Geotechnical investigation is intended to provide critical information about the suitability of the project site; and is a pre-requisite for spatial planning. Based on the initial availability of information, a conceptual plan was prepared by the planning team in the 2018-2019 fiscal year. The concept plan aims to provide a clear direction for development of Sonamthang as an agriculture, nature and craft-based village in harmony with its surrounding.

The second stakeholder consultation meeting was held on October 22, 2019, which was attended by some landowners of Sonamthang. It was conducted in Ngangla Gewog Administration hall. During the meeting, the Department of Human Settlement informed the local government to strictly impose moratorium until the plan is finalized for implementation. Simultaneously, a thorough household and socio-economic survey was also carried out by the

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planning team of DHS, with support from the Ngangla Gewog Administration (NGA), PDA and the local people of Sonamthang.

As per the planning procedure, a minimum of two public consultations are required to be carried out. In line with the procedure, the first public consultation was conducted on March 6, 2020, whereby the proposals were presented and the land mobilization modalities were discussed. After several discussions with the department and with the local government and public, it was decided that Guided Land Development was the most appropriate land mobilization modality for Sonamthang.

The Final Report for SAAP was then completed in May, 2020. Due to the covid-19 crisis, the second public consultation was not held. Nonetheless, the third stakeholder consultation meeting was held on June 12, 2020 in Zhemgang Dzongkhag Administration (ZDA) to present the final SAAP proposals including the land mobilization modality. The meeting concluded that the local governments will conduct small public meetings at Sonamthang to consult the landowners pertaining to the Guided Land Development (GLD) method. Along this line,



Figure 1.2 Snapshots taken from the visits to Sonamthang

Ngangla Gewog initiated phase wise public consultations on June 13, 2020 by taking necessary measures in purview of the covid-19 situation.

The Plan was then presented and approved during the 33rd PPCM (Policy and Planning Coordination Meeting) at MoWHS on Friday 2nd April 2021.

1.2 Need for Planning Intervention

Zhemgang Dzongkhag, popularly known as Khenrig-Nam -Sum, is divided into three agro-ecological zones – Upper Kheng covering Bardo and Shingkhar, Middle Kheng covering Nangkhor and Trong; and Lower Kheng constituting Phangkhar, Goshing, Ngangla and Bjoka.



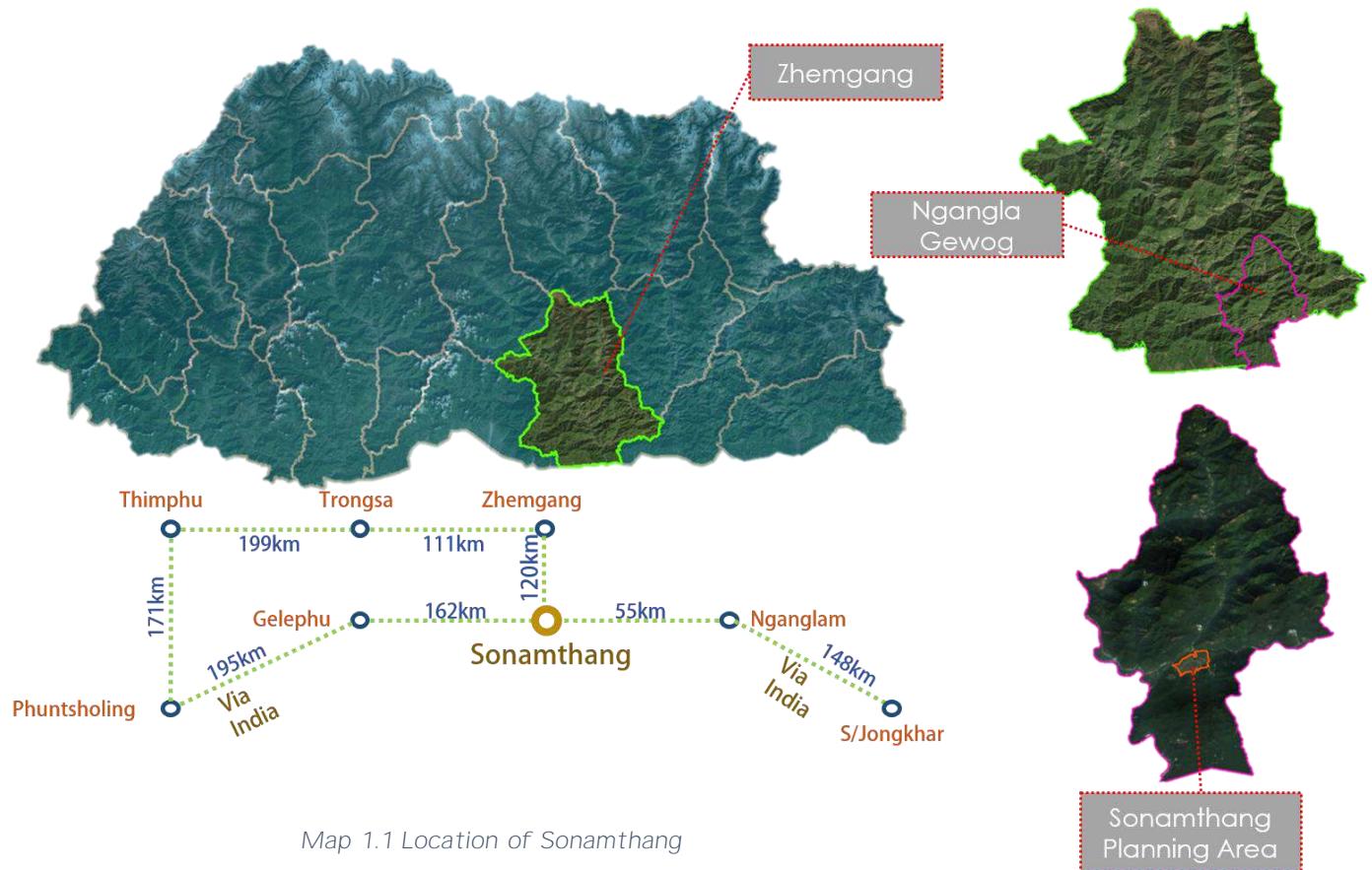


It is blessed with rich biodiversity and the development of eco-tourism is identified as one of the key focus areas for the Dzongkhag to achieve self-reliance and inclusive socio-economic development. However, it remains one of the most inaccessible and remote regions in the country.

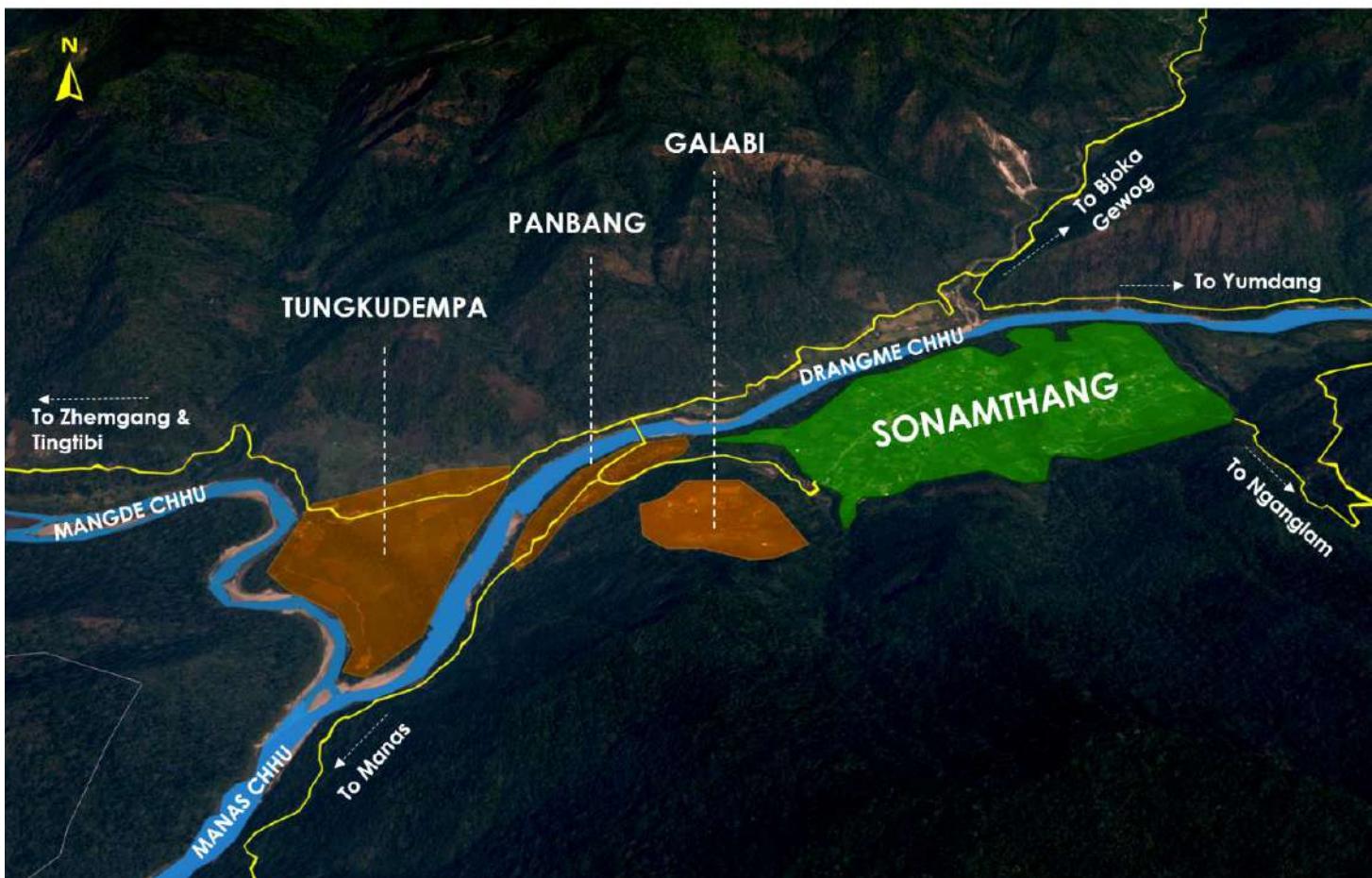
The construction of Nganglam-Panbang highway, which was completed in December, 2015 has provided convenience to the people of Zhemgang. Small settlements like Sonamthang and Thinleygang are experiencing new and unplanned development pattern along the highway. Sonamthang, a rural settlement is known for its rich agricultural landscape and Sonamthang's most immediate local role is as a home, a meeting place and a setting for day to day life for the local population. The unplanned development is however, concerning as it would lead to deterioration of the natural landscape and its identity. Although, provided with certain level of services and infrastructure, Sonamthang lacks housing and quality infrastructure. These are some of the reasons for the requirement of planning intervention in Sonamthang.

1.3 Location and Connectivity

Zhemgang Dzongkhag lies in the southern-central region of the country and is bordered by the districts of Bumthang and Trongsa in the North, Mongar in the East, Sarpang in the West and the Indian State of Assam in the South. The Dzongkhag is a part of the biological corridor constituting the famous Royal Manas National Park, the Jigme Singye Wangchuck National Park, and the Thrumshingla National Park.



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Map 1.2 Site Orientation of Sonamthang

Sonamthang lies in the heart of sub-tropical biodiversity richness, adjacent to Royal Manas National Park (RMNP). From the regional perspective, Sonamthang lies in the Lower Kheng region in Zhemgang Dzongkhag. Besides being bounded by significant wildlife richness, it is also home to Bhutan's largest river basins, the Mangde Chhu and Drangme Chhu basins. As illustrated in Map 1.2. Sonamthang is located almost at the exact confluence of Mangde Chhu and Drangme Chhu, which then flows south as Manas Chhu.

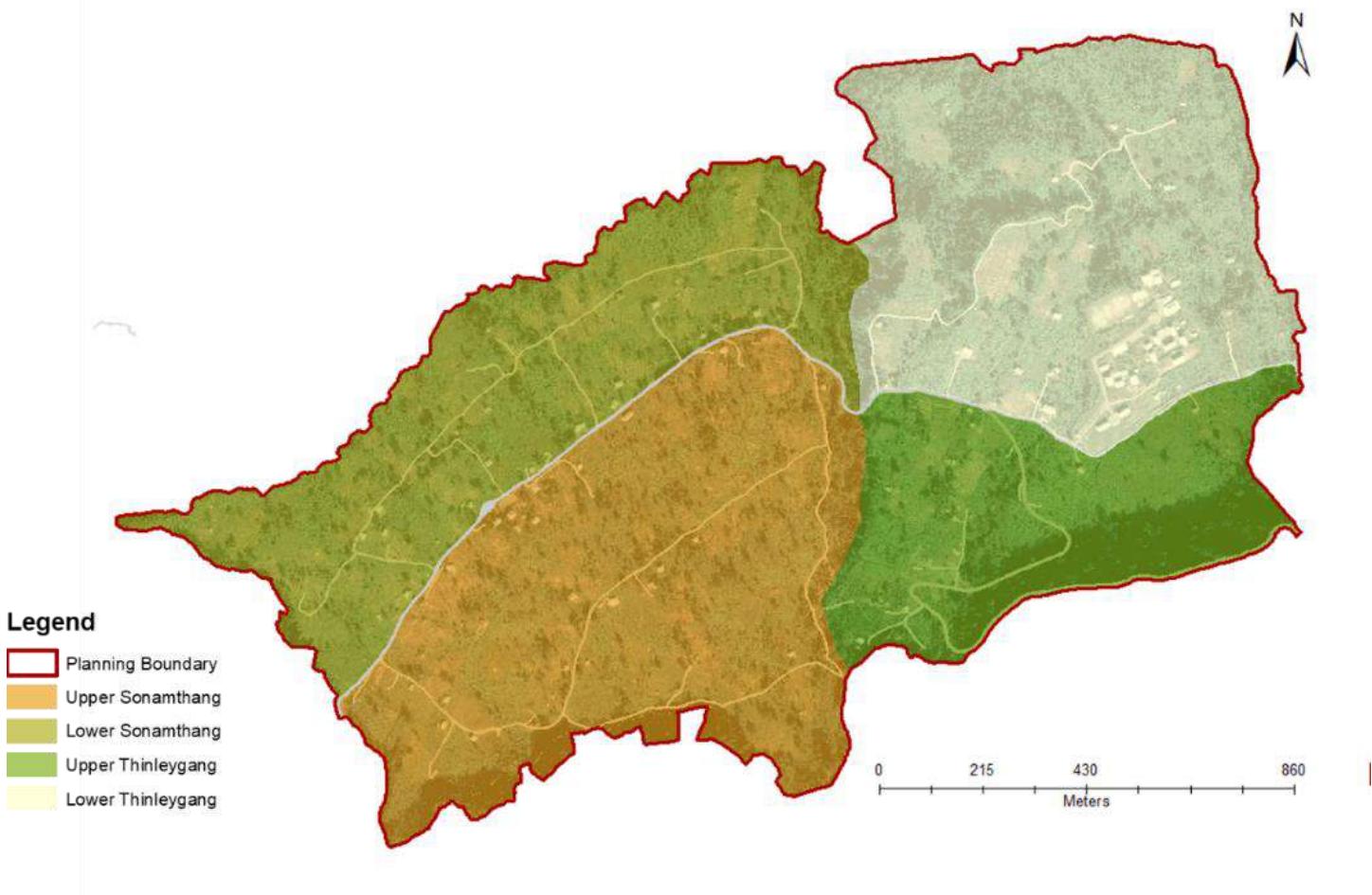
In terms of connectivity, Sonamthang is accessible by road transport. It is connected by Panbang-Zhemgang national highway in the east with about 120km distance from Zhemgang town. To the west, it is connected by Panbang-Nganglam highway with 55km distance from Nganglam. Sonamthang is 231km away from Trongsa and 203km far from Samdrupjongkhar, which is only accessible by road through India. The distance between Sonamthang and Gelephu is 162km.

At the local level, Sonamthang village is located right next to Panbang town. Galabi where the Panbang Dungkhag Office, Dungkhag Court and the helipad is located, is west of Sonamthang. It is also in close proximity to Tungkudempa town. As shown in Map 1.3, Sonamthang has four parts, the upper and lower Sonamthang; and the upper and lower Thinleygang.

As for the planning boundary of Sonamthang, initially it consisted of an area of 2.16 sq.km or 533.446 acres, which was based on the topographical survey boundary. However, after the inclusion of the plots along the periphery, the planning area was fixed at 2.19 sq km or 540.021 acres. Sonamthang sits at an elevation of 150 to 330 metres above the mean sea level.

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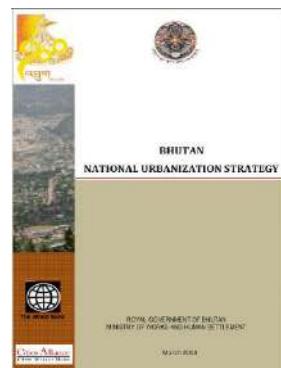
Map 1.3 Planning Boundary of Sonamthang

1.4 Planning Considerations

Sonamthang does not have a higher level spatial plan, however, there are few plan documents outlining vision and strategies for Zhemgang, which will have direct or indirect influence on Sonamthang. Following are some of the overarching plans:

a) Bhutan National Urbanization Strategy 2018

Bhutan National Urbanization Strategy 2018 (BNUS) is a document that provides a strategic direction to balance rapid urbanization and at the same time, preserve our country's fragile ecology. It aims to address the growing demands of urbanization, with respect to the limited availability of serviced land. BNUS 2018 highlighted that diverse economic development activities and basic infrastructure were missing or lacking in Zhemgang.



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b) 12th Five Year Plan



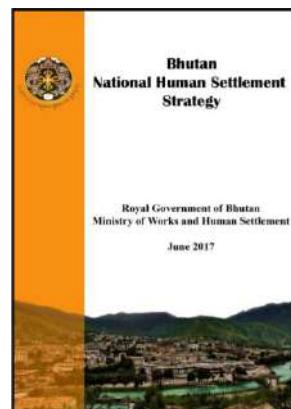
The 12th Five Year Plan aims to promote just, harmonious and sustainable society through enhanced decentralization. The strategies framed for Zhemgang are:

- Ø Develop and improve critical and quality infrastructures.
- Ø Identify inclusive and climate resilient strategies.
- Ø Provide effective, efficient and user-friendly public services and amenities.
- Ø Promote and strengthen entrepreneurship, enterprises and industries of all types.

c) National Human Settlement Strategy 2017

National Human Settlement Strategy 2017 (NHSS) was adopted by MoWHS to identify potential urban centers with an objective to promote a regionally balanced development. The strategies identified for Zhemgang based on its comparative advantages are:

- Ø Development of bird watching treks.
- Ø Production of bamboo based handicrafts.
- Ø Development of centre for training and workshops especially in terms of agriculture and tourism.
- Ø Construction of Chamkarchhu hydroelectric project to facilitate supply of agricultural and livestock products.



d) Zhemgang Urban Development Plan 2003

Zhemgang Urban Development Plan 2003 envisions Zhemgang to be developed as 'Service Centre in terms of agriculture and education' and as a 'Tourist base'.

e) Comprehensive National Development Plan for Bhutan 2030 (CNDP 2030)

CNDP 2030 is a national spatial document with an objective to promote regional balanced development. According to CNDP 2030, Bhutan has been categorized based on the four vertical regions and three horizontal regions based on different climatic, social, cultural and other conditions. This national spatial plan proposes for linked urban centres with linked urban functions. Sonamthang, located near Panbang is strategically located between Sarpang-Gelephu and Nganglam-S/Jongkhar linked urban centres. It provides Sonamthang with a lot of advantages in terms of market accessibility, service delivery and other aspects.

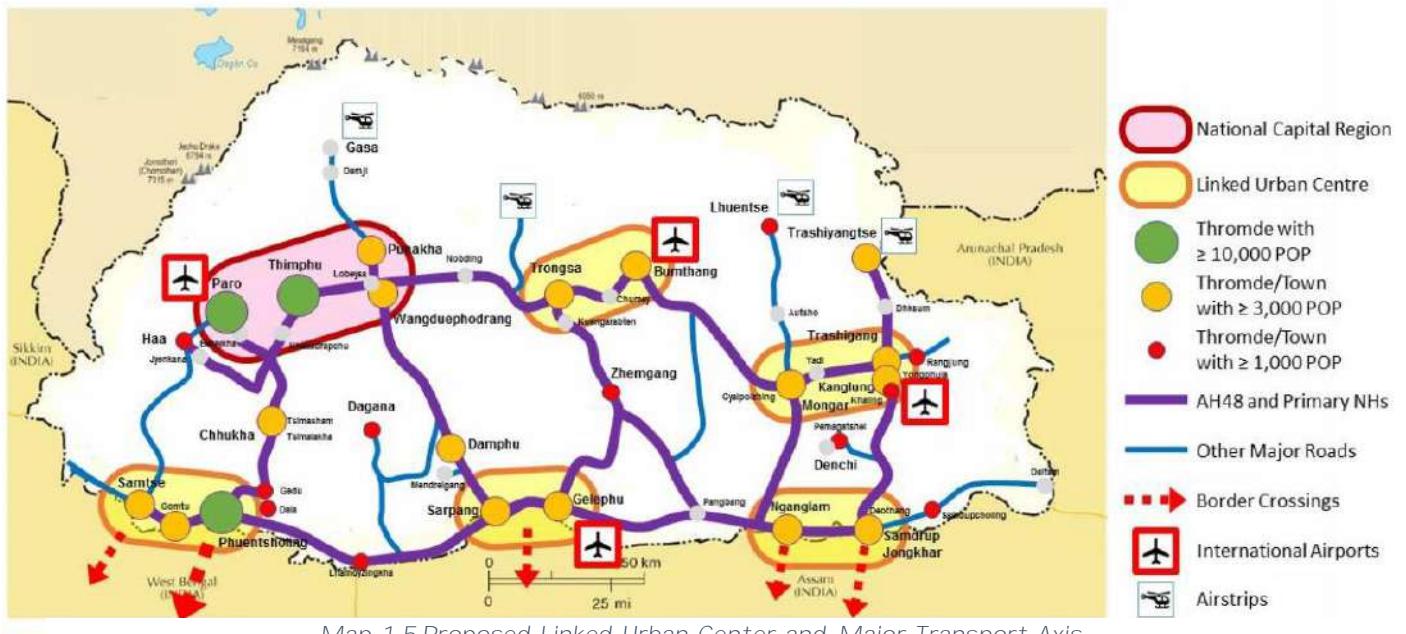


Additionally, under the creation of agricultural production area, Zhemgang has been proposed as maize and ginger production area; and as such, in terms of livestock promotion area, it has been earmarked as pork and fish production area. Zhemgang has also been proposed to focus on eco- and culture-based tourism due to its biodiversity richness and other potentiality.



Sonamthang Action Area Plan

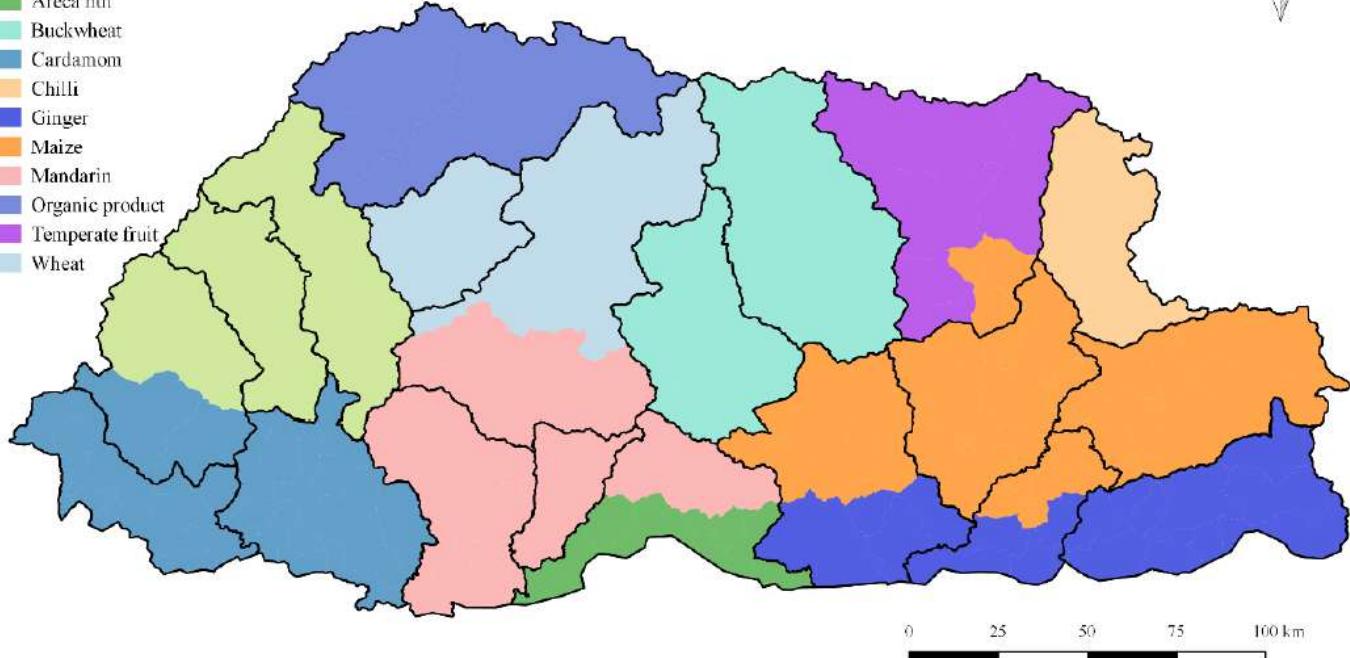
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Map 1.5 Proposed Linked Urban Center and Major Transport Axis

Legend

- Apple
- Areca nut
- Buckwheat
- Cardamom
- Chilli
- Ginger
- Maize
- Mandarin
- Organic product
- Temperate fruit
- Wheat



Map 1.4 Local Potential Product and Proposed Production Area

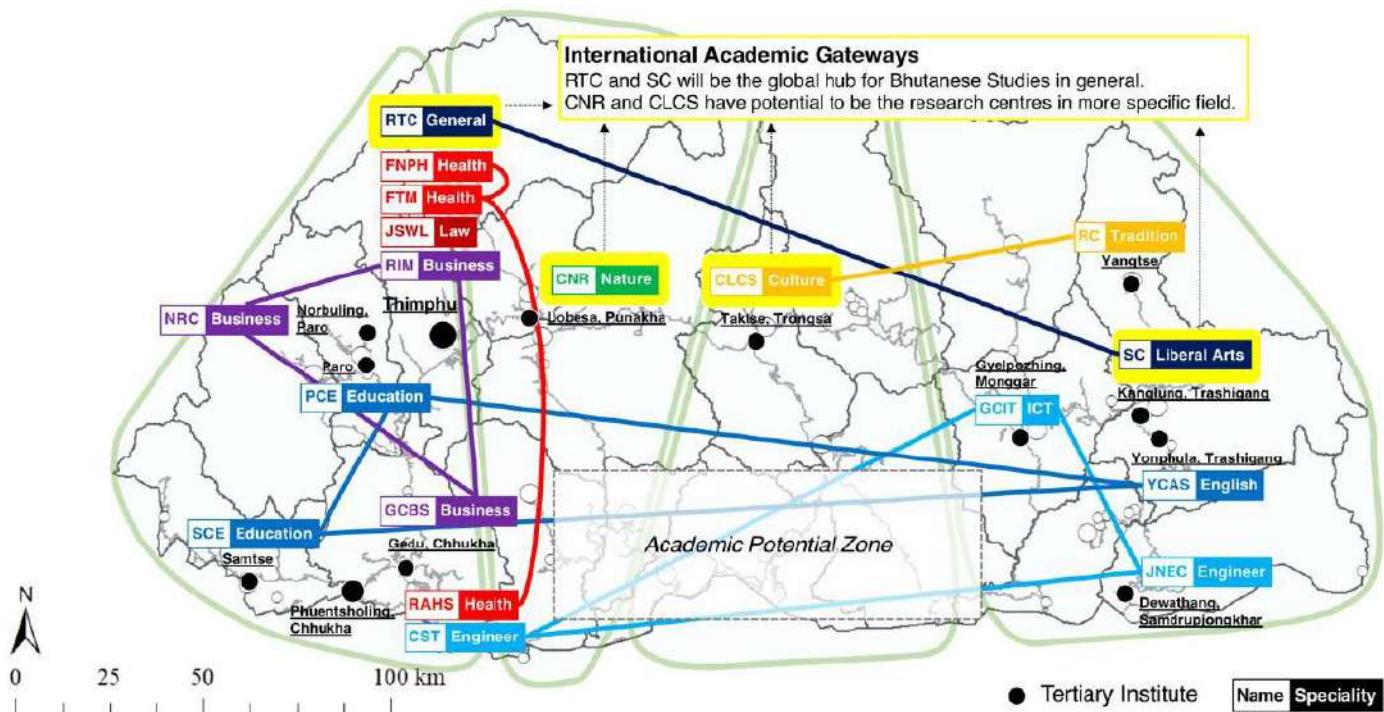
For the purpose of building a holistic service delivery system, the nationwide network of Bhutan should be premised on an effective hierarchy. Diverse services such as education, health, transport, commercial, recreation etc. should be distributed in a holistic manner for efficient service delivery. Therefore, under this proposal, Panbang has been designated as a sub-district

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station (SDS), which is a roadside station and a hub connecting Dzongkhag Centre and Gewog Centre, catering to its nearby villages. And since Sonamthang is located in the catchment area of Panbang, it has locational advantage.

With regard to educational and academic institutions, the area is identified and proposed as 'academic potential zone'; and is recommended to have research centre related to rural development based on material engineering, natural resource management, agriculture etc.



Sonamthang Action Area Plan

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CHAPTER 2

EXISTING SCENARIO



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2. EXISTING SCENARIO

Spatial planning draws its vision, principles and strategies from the analysis of the existing conditions such as the physical form of the planning area, the environmental conditions, the economic functions and social impacts. Understanding the current situation of the area including its potentials, threats and issues is key. The information were gathered from the relevant government agencies, the local governments, through elaborate consultation with the local residents of Sonamthang and from government websites and other reliable websites. This chapter will give a detailed explanation of the existing scenario of Sonamthang.

2.1 Climatic Condition

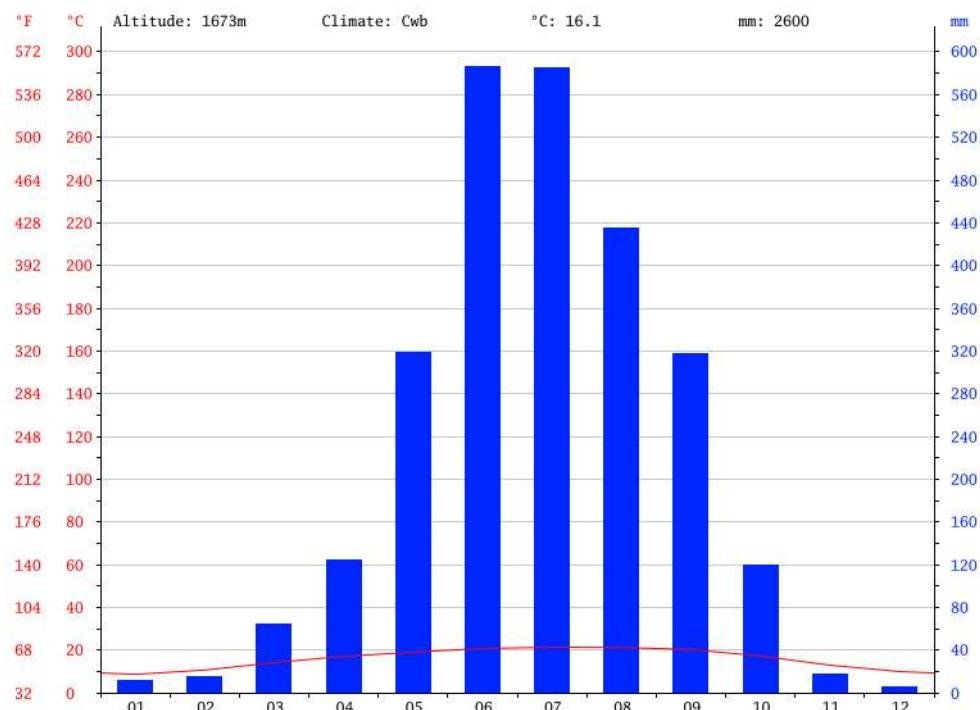


Figure 2.1 Mean monthly temperature (red line) and precipitation (blue bars).

Source: en.climate-data.org

Compared to other areas in Zhemgang, Sonamthang's climate is mild, and generally warm and temperate, with an average annual temperature of 16.1 degree Celsius. At an average temperature of 21.3 degree Celsius, July is the hottest month of the year and at 8.6 degree Celsius, January has the lowest temperature. Owing to its location in the sub-tropical belt of Bhutan, Sonamthang experiences heavy rainfall during summer. However, winter experiences much lesser rainfall than in summer. The average rainfall is 2600mm.





2.2 Site Profile

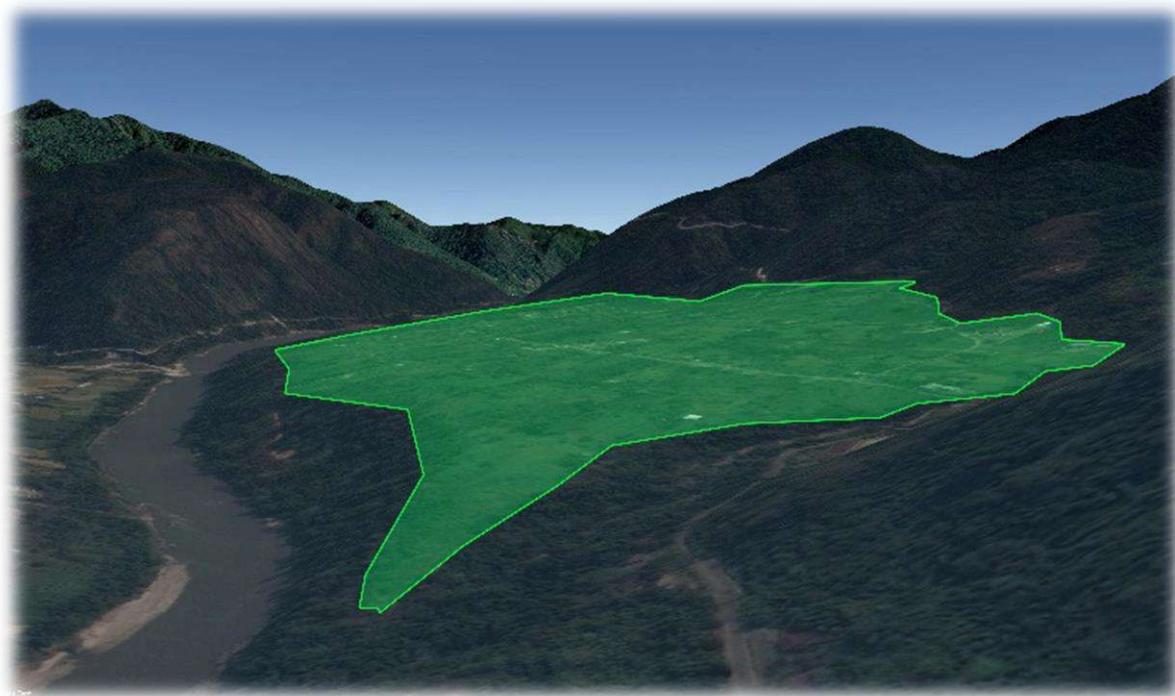


Figure 2.2 Site Profile of Sonamthang

The site profile of an area will show a cross-sectional view along a line drawn through a portion of a topographic map. In other words, if you slice through a portion of the earth, pull away one half, and look at it from the side, the surface will show undulations which depict the type of land the settlement sits on. Generally, Sonamthang sits on a relatively gentle flat surface with an average slope of 6 degrees or 11%. Section AA' that runs from Manas Hotel in the west

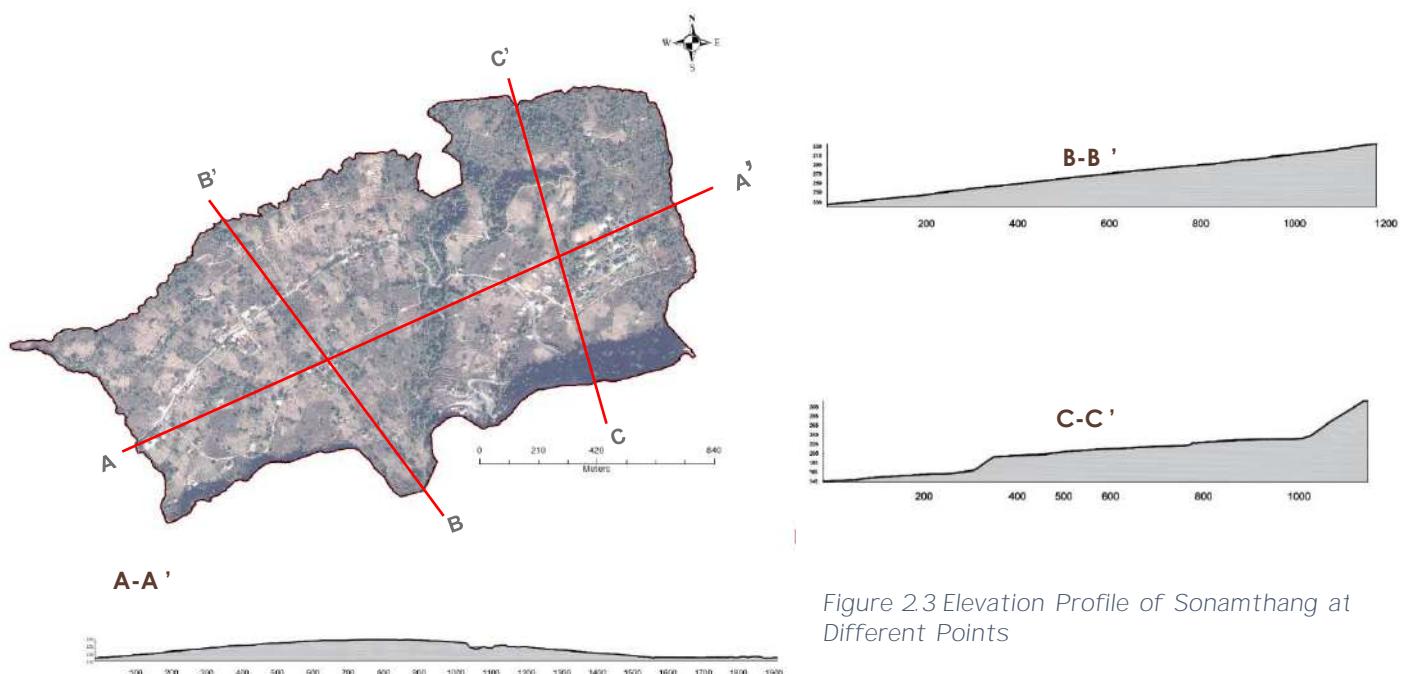


Figure 2.3 Elevation Profile of Sonamthang at Different Points





to Sonamthang Central School in the east shows gentle undulations with ridges in areas where streams pass through. Section BB' which runs through the Peling Choekhang in the south towards the Drangme Chhu in the north, shows a gentle drop, which rolls quite steeply down towards the river. Section CC' that cuts from the Nganglam-Panbang highway entering Sonamthang towards upper part of Thinleygang village depicts steep slope near the highway due to the forests and mountain, then runs generally flat till it reaches the ridge of Drangme Chhu.

2.3 Demography

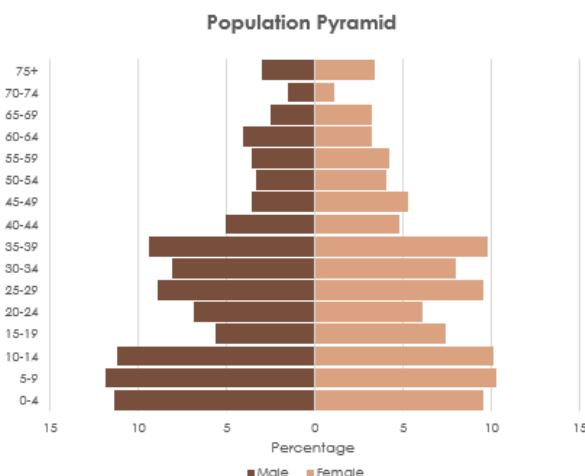
According to the socio-economic survey carried out in October, 2019, the resident population of Sonamthang was 1340 of which 50.5% were female and 49.5% were male as shown in the table below. It is inclusive of the institutions namely, Sonamthang Central School, Sonamcholing Dratshang, Yoeselcholing Nunnery and Peling Choekhang. There are a total of 200 households. As per the Population and Housing Census of Bhutan 2017 (PHCB), there are 1311 people in Sonamthang.

The population pyramid displays a distribution of various age groups and sexes. Sonamthang's population pyramid shows wider base with narrower top, which indicates that both the fertility and death rates are high. However, major extension is noticed at the age group of 0 to 15 years, which indicates that people in younger age categories or the pre-reproductive group make up a relatively large proportion of the population.

Table 2.1 Population Distribution of Sonamthang

	Excluding Institution Population	Including Institution Population
Male	394	663
Female	377	677
Total	771	1340

Figure 2.4 Population Pyramid of Sonamthang



The pattern in the population pyramid has social and economic implications as it shows requirements for more recreational and open spaces for the younger generation to play and socialize. Moreover, over the time horizon, these age group will enter the working group, therefore, Sonamthang will need to explore options to create job opportunities. Along the same line, as per the Ngangla Gewog Administration (2018), majority of the social issues in Sonamthang are associated with youth such as unemployment, drug abuse and family problems.

Majority of the population in the planning area are identified as natives of Sonamthang and Thinleygang.





2.4 Economy

Whilst framing long-term strategies for a rural area like Sonamthang, it should take into consideration the remoteness and potentials since local economy contribute majorly to sustainable livelihoods of the local community

In terms of the economic activities, about 85% of the community derive their income from agriculture as per the NGA. Adjacently, they practice subsistence farming. The farmers grow citruses, cardamom, maize, and variety of other fruits, out of which the major cash crops are cardamom and citrus. They also practice paddy cultivation. Aside from agricultural practices, very few people practice livestock farming especially poultry and piggery.



Figure 2.5 Agriculture Practices in Sonamthang

Other major economic activity of Sonamthang is tourism. As a coveted tourist's destination due to the area's rich natural and cultural heritage, it has provided job opportunities to a lot of people in the area. The Royal Manas National Park in close proximity to Sonamthang provides wildlife safaris, jungle drives, naturalist walks, and bird watching opportunities. The twin waterfall, located 13 kilometers away from Sonamthang also delivers one of the best scenic experience to the tourists. The area also provides overnight stays at eco-lodge and other resorts located in Sonamthang.

Besides the nature tourism, Sonamthang also specializes in handicrafts. A bangchung factory and a community-based cane and bamboo production centre are established in Sonamthang. This specialization in local products will accentuate the traditional aspect of Zhemgang as a whole in Bhutan.





Figure 2.6 Tourism Activities in Sonamthang

There are around 20 retail shops, a furniture house and 2 Resorts in Sonamthang, which stipulates that some people earn income through such businesses. The retail shops sell the basic daily items and cater mainly to people in and around Sonamthang and Thinleygang.

2.5 Environment

Royal Manas National Park (RMNP) located in close proximity to Sonamthang with an area of 1057 sq. km was declared as a Wildlife Sanctuary in 1966 and was upgraded to National Park in 1993. 558 species of flora, 65 mammal, 489 bird and 60 fish species can be spotted in the Park. There are more than 180 butterfly species. RMNP mainly covers three districts of Zhemgang, Sarpang and Pemagatshel and is connected by corridors to Phibsoo Wildlife Sanctuary and Jigme Singye Wangchuck National Park. The RMNP along with other protected areas are called Bhutan Conservation Complex. This pristine, unexplored, natural treasure has now been opened to tourists with the aim of promoting community-based ecotourism in the region, which forms one of the major economic activities in Sonamthang.

RMNP is significant because it is contiguous with the Manas Tiger Reserve within the Manas National Park of India. The significance of the entire Manas landscape as a single transboundary entity and as conservation complex is acknowledged globally by the UNESCO World Heritage Centre, Paris and is identified as one of the important Tiger Conservation Landscape (TCL) for long time survival of tigers in the wild.

Of note, the national park area, flora and fauna are not present in the planning boundary per se. Also, worth noting is that there is a 112.19 hectare NorzinCholing community forest located right outside the planning boundary; and 97.12 hectare Thinleygang Community Forest. However, 6.84 ha or 16.89 acres of Thinleygang Community Forest falls under the planning boundary, as seen in Map 2.1.

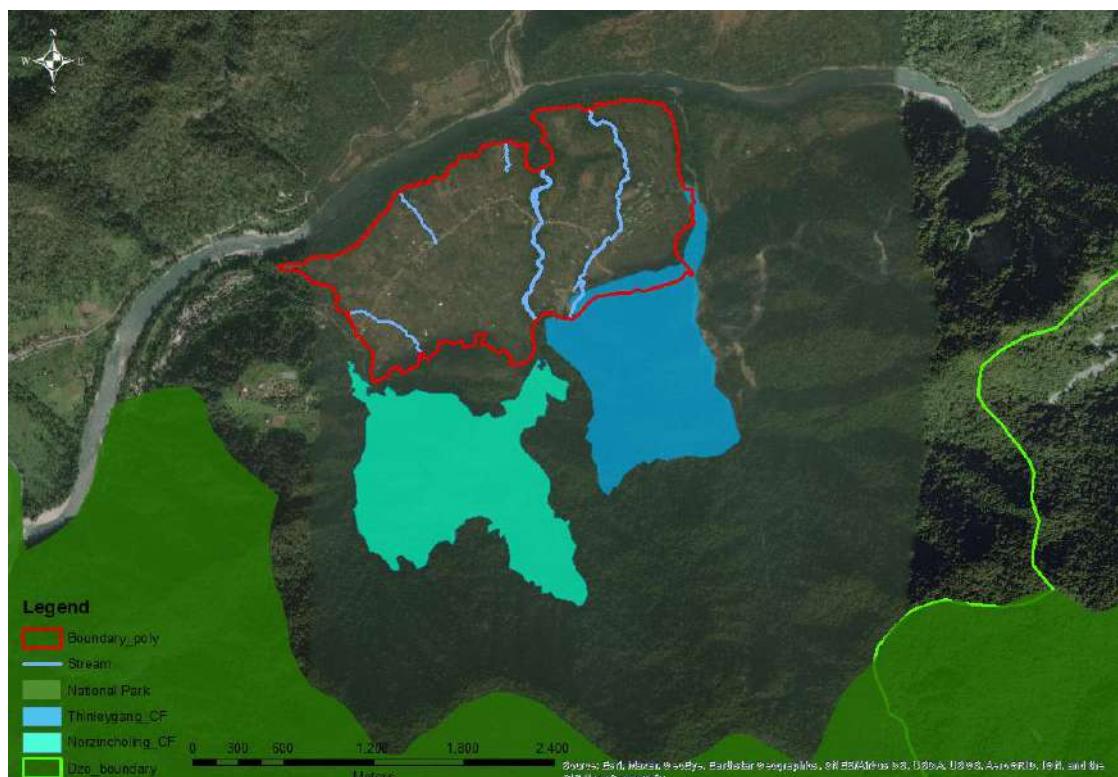


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Figure 2.7 Flora and Fauna in Manas



Map 2.1 National Park & Community Forest

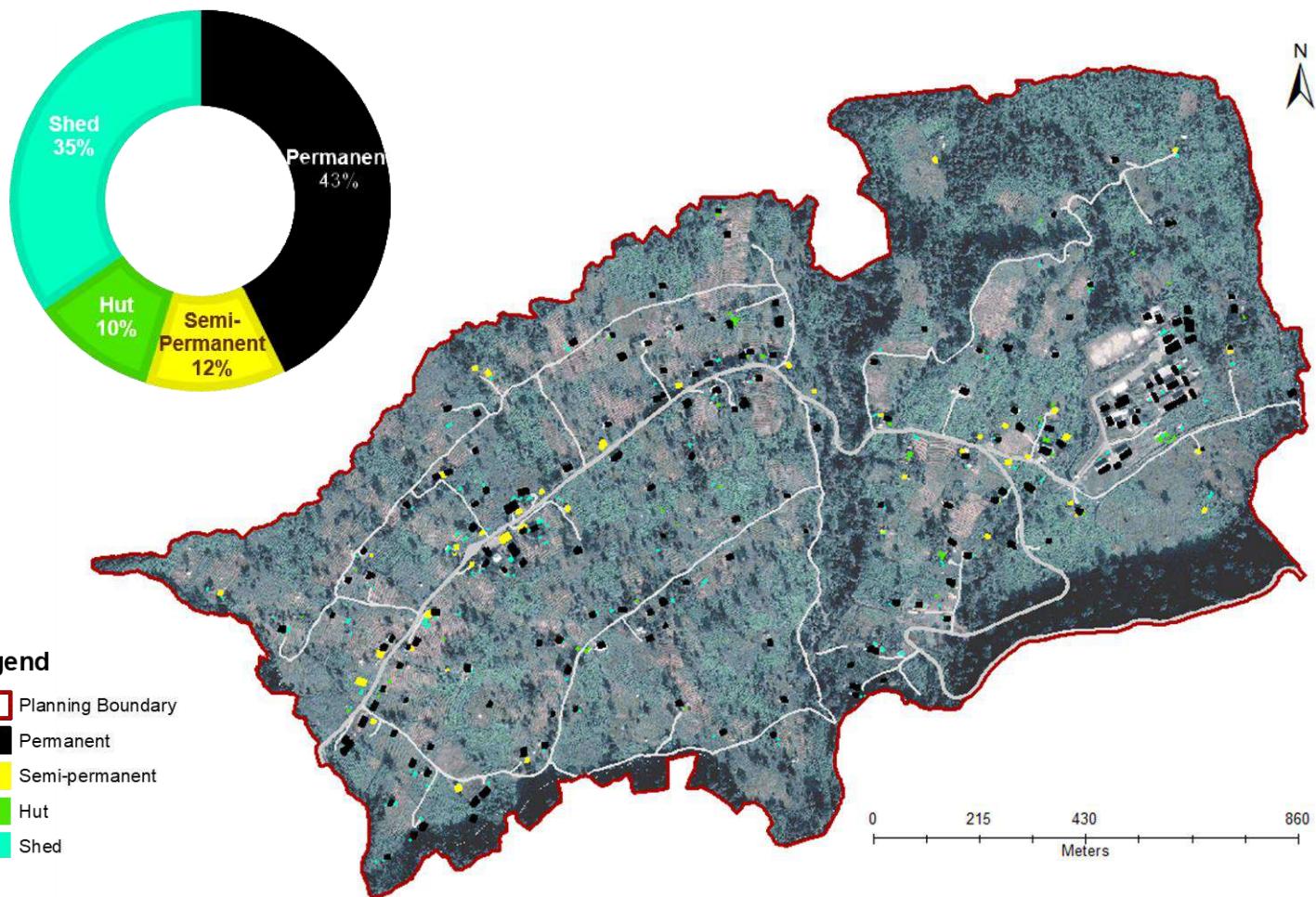
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2.6 Built Environment

2.6.1 Building Typology

Building typology is primarily classified into three categories namely permanent, semi-permanent and temporary. The huts and sheds are subsumed under temporary structures. These classifications are done to curb the problems that are liable during the planning process. Furthermore, the comprehension of the existing housing typologies in the region gives a proper insight on the existing form and appearance, allowing the planners to plan accordingly. Building typology is also studied for understanding the living standard and the quality of the life in the region. As can be observed from Map 2.1, almost half of the structures (43%) are permanent structures, followed by 12% of semi-permanent structures. Sheds used as animal shelters, agricultural product storage and for storing equipment constitute 35% of the total structures. 10% of the structures are huts which are mostly utilized as animal shelters and for storing hay.



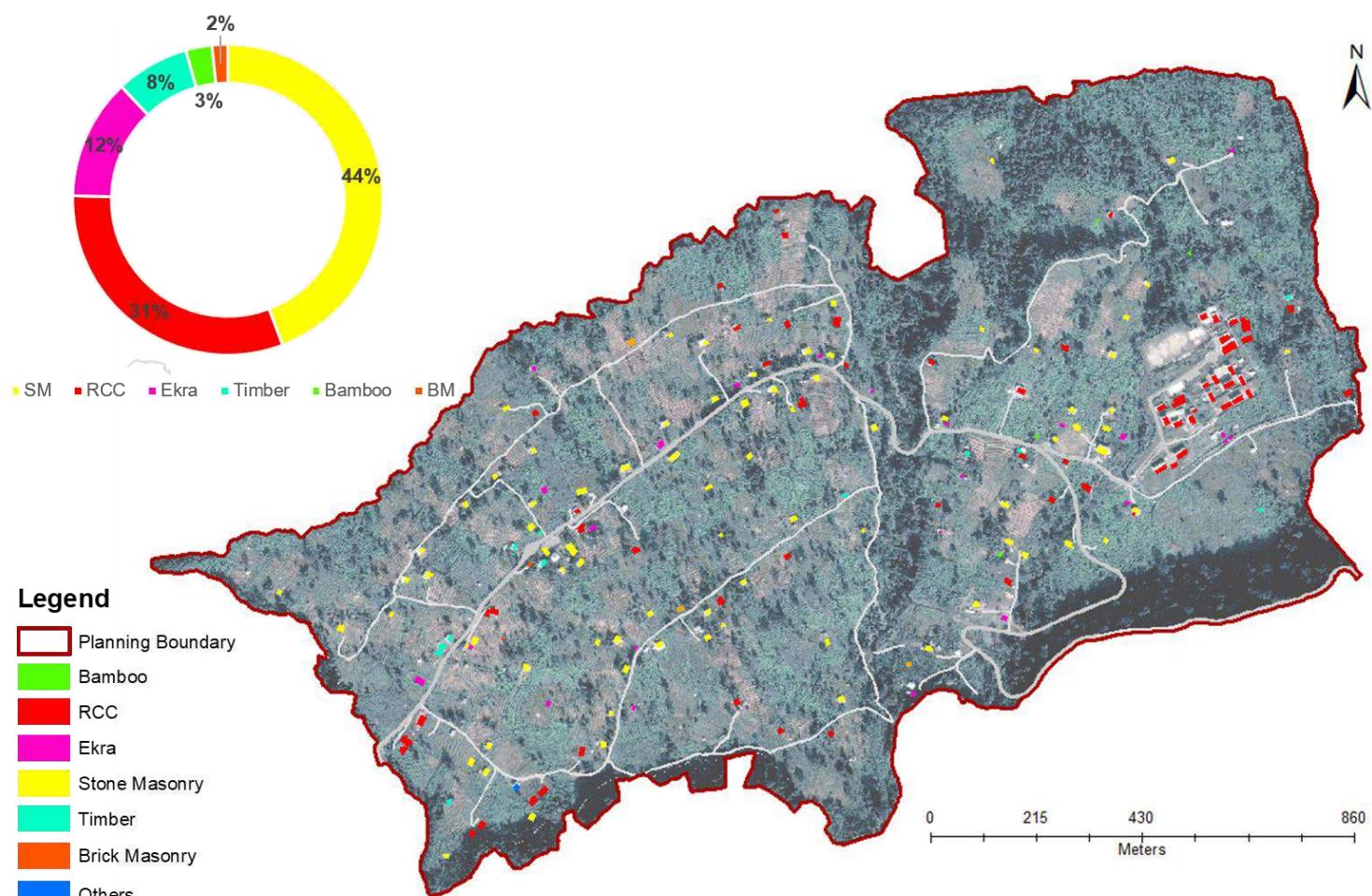
Map 2.2 Building Typology





2.6.2 Building Material

The buildings in Sonamthang are generally classified into Stone Masonry (SM), Reinforced Cement Concrete (RCC), Ekra, Timber, Bamboo and Brick Masonry (BC). Map 2.2 illustrates that majority of the structures are made up of stone masonry, which constitute 44% of the total buildings in Sonamthang. 31% of the total buildings are RCC structures, which is an emerging trend of development in Sonamthang. 12% of the structures are ekra houses and 8% are made of timber. These are mostly semi-permanent.



Map 2.3 Building Material

2.6.3 House Type

Houses are also classified according to their facades such as traditional, semi-traditional, modern and other. It is inferred from Figure 2.11 that 42.5% of total buildings in Sonamthang has traditional façade, which are majorly made of stone masonry. It is followed by semi-traditional structures, which forms 33.7% of the structures. 14.4% of the structures area modern



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forms 33.7% of the structures. 14.4% of the structures are modern buildings, which are mostly RCC structures. Rest are semi-permanent and temporary structures with unknown facades, which takes into account the bamboo and ekra houses.

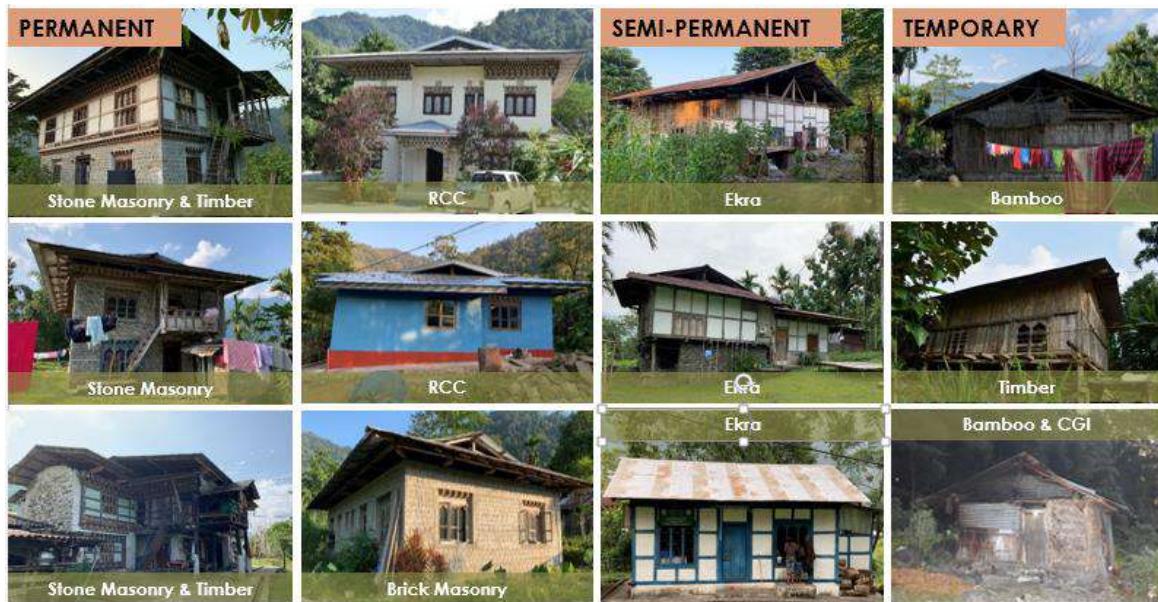
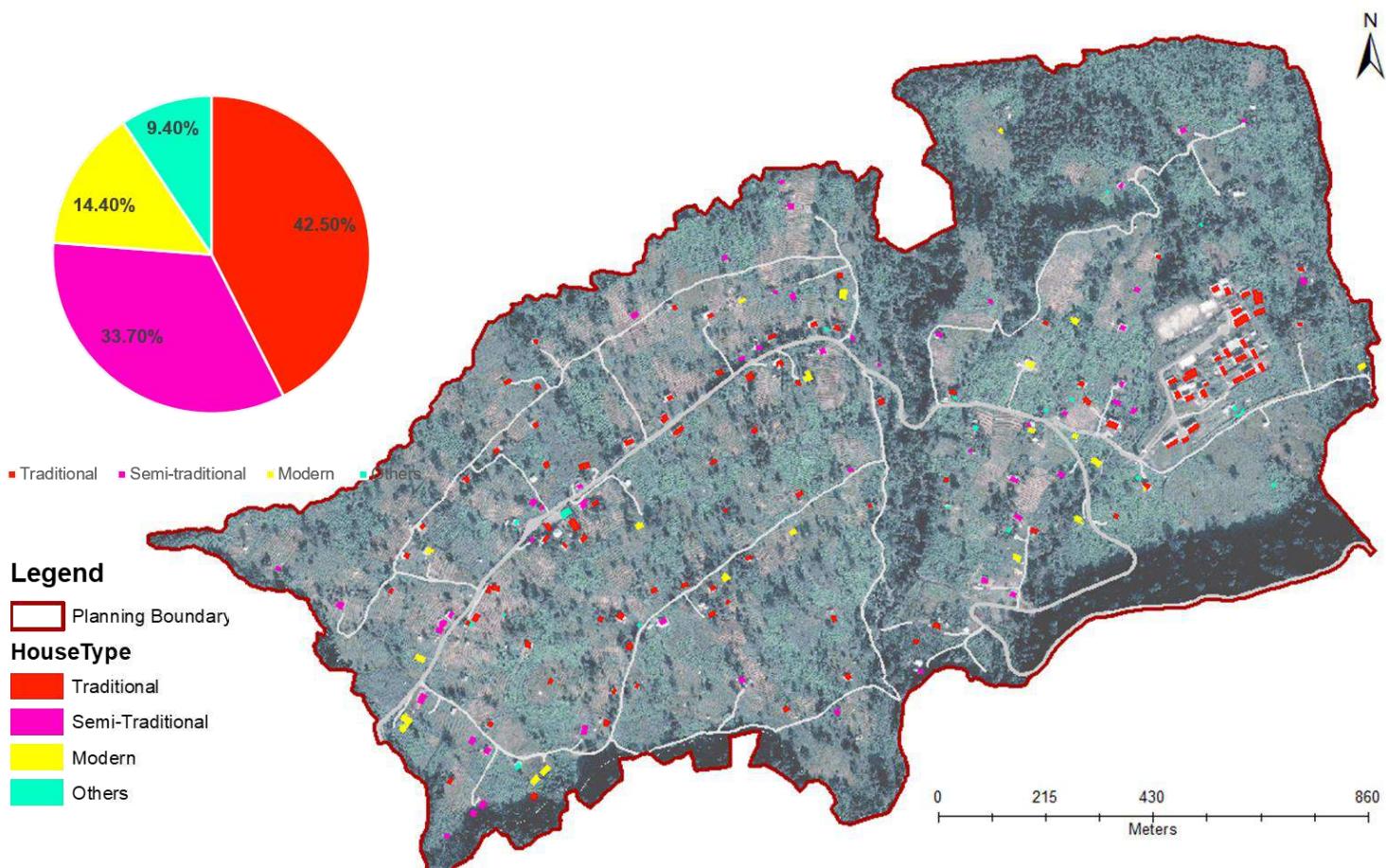


Figure 2.8 Building Typology and Material



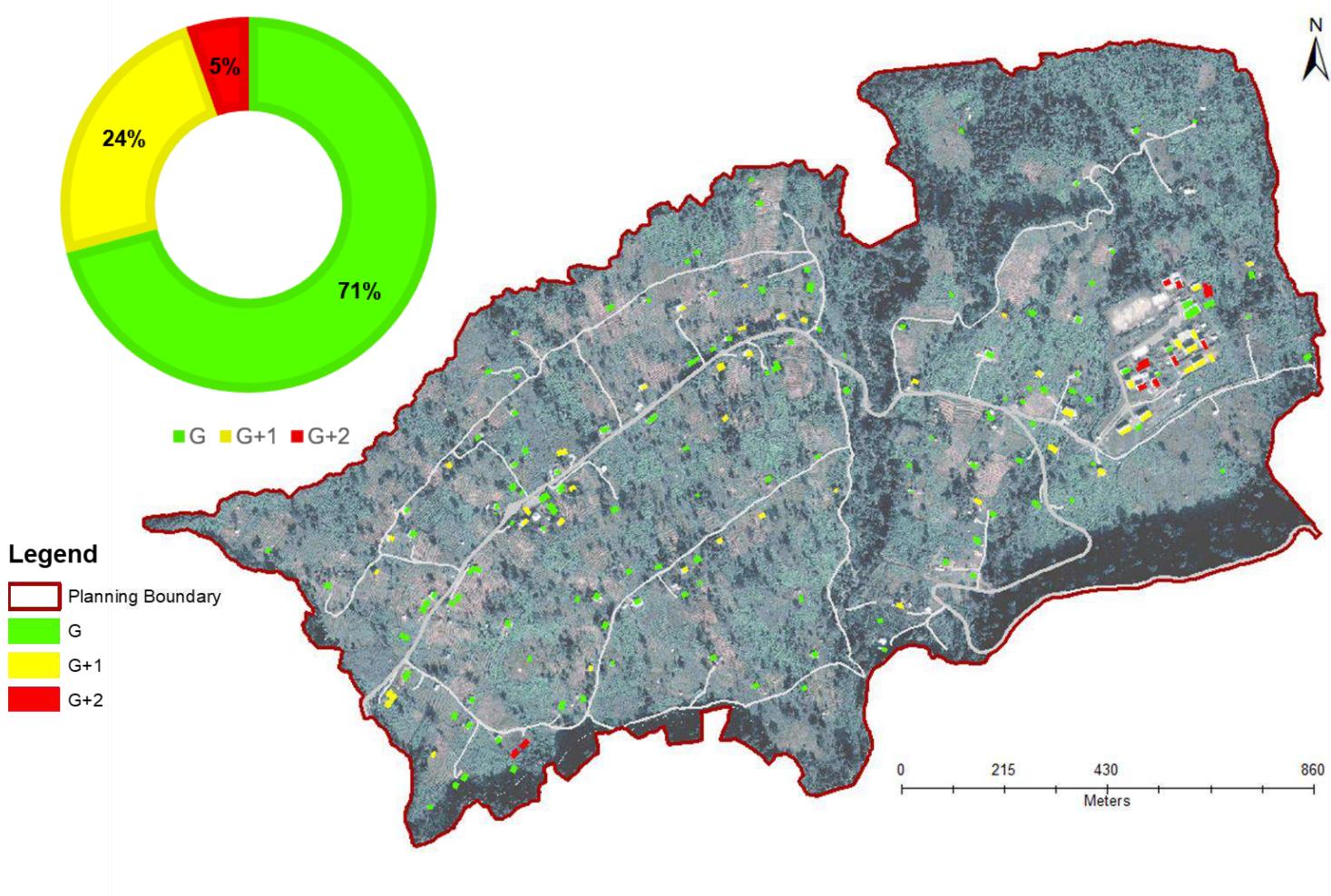
Map 2.4 House Type

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2.6.4 Building Height

The building heights can be viewed from Map 2.4, whereby it is categorized into G (ground floor/one floor), G+1 (two floors) and G+2 (three floors). The number of floors/building height is a very crucial factor in determining the character of the place and in identifying the density and intensity of an activity in an area. The character of Sonamthang as a low-rise settlement can be deduced from figure 2.12. The prevailing building height hardly exceeds one floor as evident from the chart with 71% of the buildings being one storied. 24% of the buildings are G+1 buildings and only 5% of the structures, which are mostly institutional buildings are of three-stories (G+2).



Map 2.5 Building Height

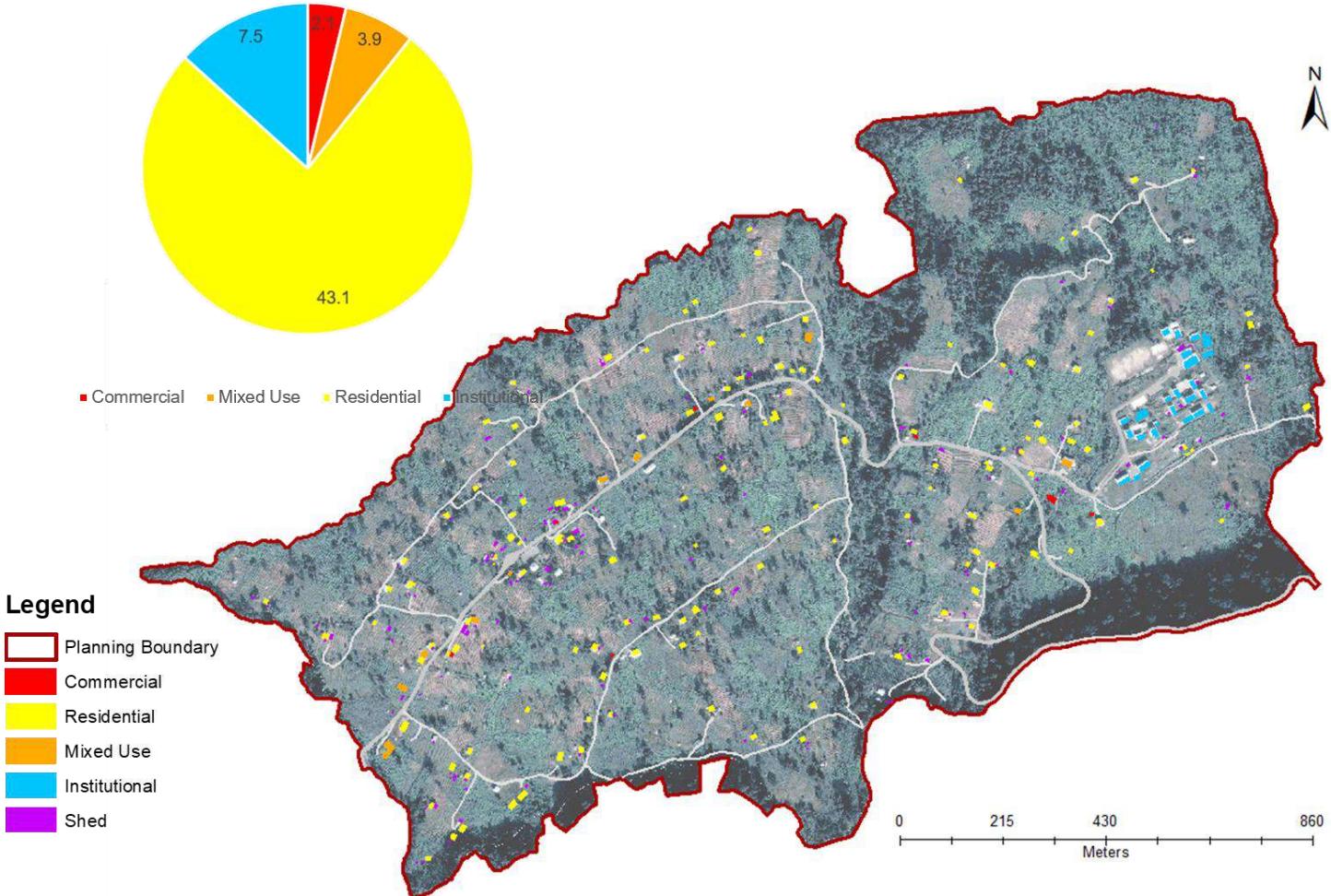
2.6.5 Building Use

The use of the buildings in Sonamthang are classified into four types namely, commercial, mixed-use, residential and institutional. Map 2.5 depicts that most buildings (43%) are used for residential purpose, followed by institutional buildings with 7.5%. Institutional buildings are the buildings located in the government, corporation and religious institutions. 3.9% of the buildings





are mix-use, which are used for both residential and commercial uses. Only 2.1 % are commercial buildings, used for retail shops and hotels. It can also be observed that there is a high level of shop occupancy along the highway.



Map 2.6 Building Use

2.6.6 Vernacular Architecture

Vernacular architecture is an architectural style that has evolved based on the local conditions and the local needs of the people. The design of the building and the construction methods are confined to availability of construction materials and reflects traditions and culture of the locality. It is the representation of most candid form of local lifestyle and needs as its form and function relies on the design skills and the craftsmanship of local builders instead of trained architects. Hence it is the simplest form of addressing human needs.





Sonamthang has a unique architecture style of its own which has sprung in response to its natural landscape and living conditions. Buildings made of stone masonry with traditional facade is typical of Sonamthang architecture, as shown in Figure 2.9.

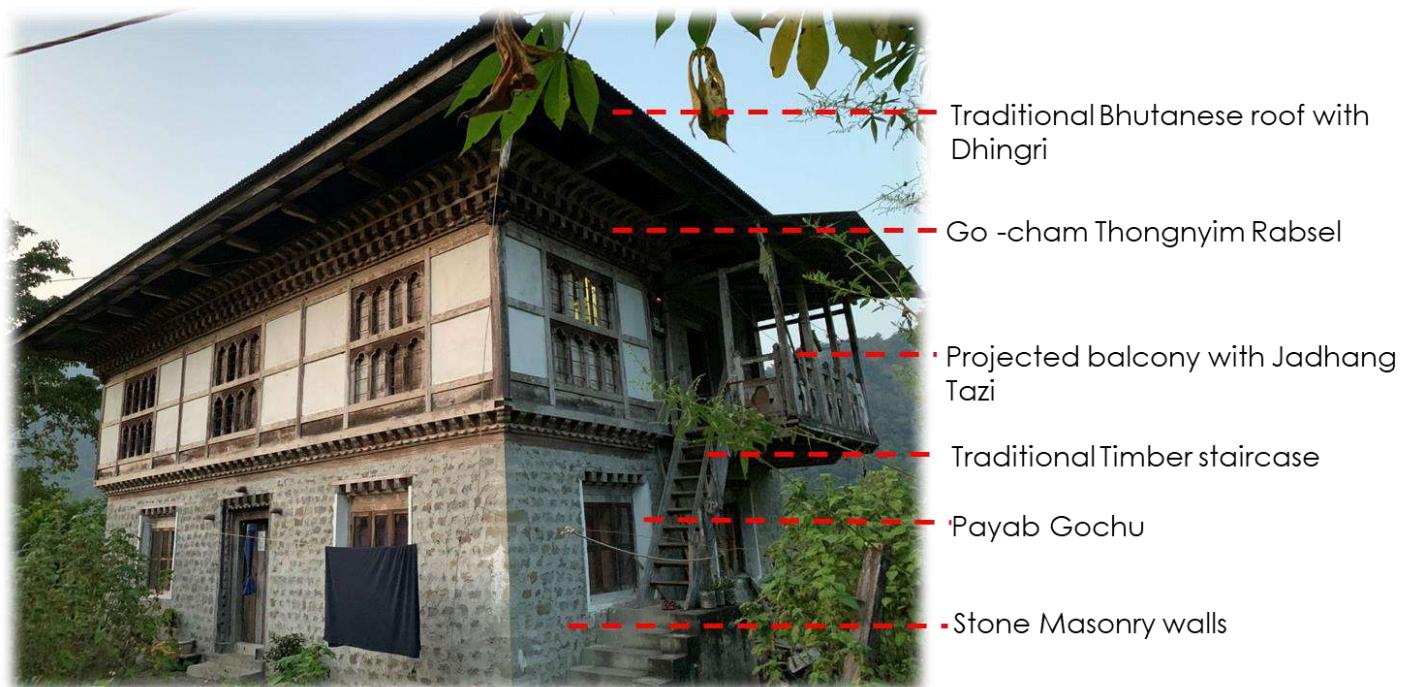


Figure 2.9 Traditional Building in Sonamthang

2.7 Institutions

The stock take of the existing community facilities and institutions were undertaken during the planning period. While some of the establishments are within the Sonamthang planning boundary, most of other institutional establishments and facilities are located in the nearby settlements of Panbang, Galabi, Tungkudempa etc., and are availed by the residents of Sonamthang as well.

2.7.1 Government Institutions

Sonamthang Central School

The Sonamthang community received its first school in 1979 at the heart of its settlement. It was a primary school then which was later upgraded to Lower Secondary School. A Middle Secondary School was the second school for the community and it was established in 2009 in Thinleygang which is approximately four kilometers away from the Panbang town.

In 2015, though two schools in the community are roughly four kilometers apart, it was merged together to become one of the first central schools in the country. Sonamthang Central School had two campuses – Upper Campus and Lower Campus from 2015 to 5th March 2019. These two campuses got segregated namely Upper Campus as Sonamthang Central School and





Lower Campus as Panbang Primary School. Sonamthang Central School is located at the far end of the Thinleygang village. School is in between Drangme Chhu to the north and Panbang – Nganglam Highway to the south. In 2019, the school was upgraded to Higher Secondary School. It now offers Arts and Commerce streams to nearly 85 students.

Sonamthang Central School today has 919 students and 60 teachers and supporting staffs.



Figure 2 10 Sonamthang Central School

Other Government Institutions

There is also an Early Childhood Care and Development located along the highway. The school also provides Non-Formal Education (NFE). In terms of health infrastructure, people of Sonamthang avail medical services from the Yipilaptsa Hospital (BHU) located in Panbang.



ECCD



Dungkhag Adm



Dungkhag Court



Royal Bhutan Police



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Figure 2.11 Institutions

Sonamthang has most of the services as outlined in the table 2.2 such as schools, commercial spaces, an ATM and few religious institutions. All other administrative offices such as the Gewog Office, Dungkhag office, the court, RNR and forest office are located in Panbang, the town located adjacent to Sonamthang. The Royal Bhutan Police and the Department of Roads offices are also located within the Panbang Planning Boundary. Although these major infrastructure and services are located outside of Sonamthang planning boundary, they are functionally related to each other, whereby, the services available in any of the areas cater to people of both the areas.

2.7.2 Financial Institutions

While there are no major bank offices in Sonamthang, there is a Bhutan Development Bank (BDBL) ATM. However, there is BDBL and Bank of Bhutan (BoB) offices located in Panbang.

2.7.3 Corporate Institutions

Natural Resources Development Corporation Limited (NRDCL), an agent responsible for sustainable harvesting, marketing and distributing natural resources is available in Sonamthang. To the south of the Sonamthang, there is Bhutan Power Corporation Limited, agent responsible for distribution of electricity.



Figure 2.12 Bhutan Power Corporation Ltd

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2.7.4 Social Institutions



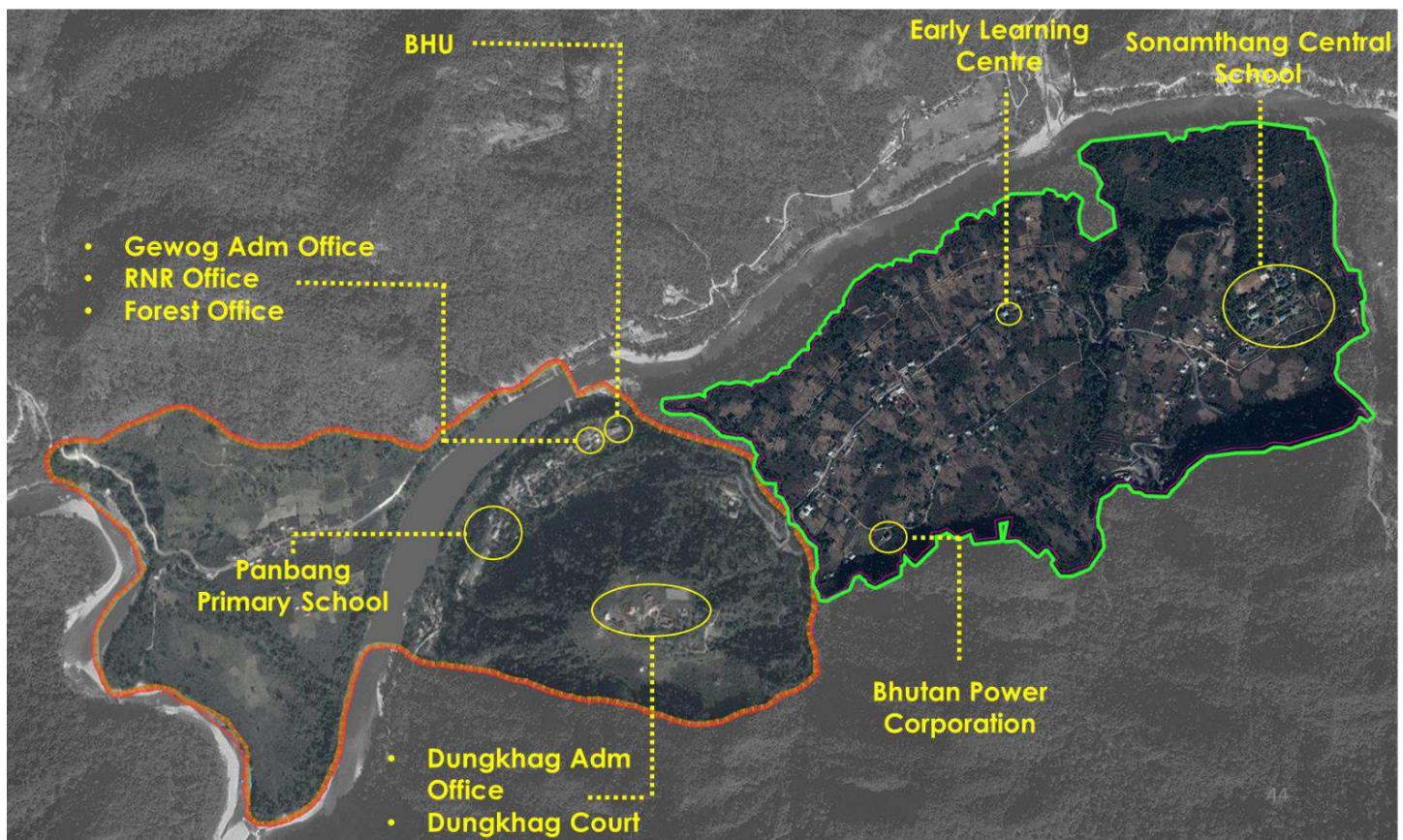
Figure 2.13 Religious Institutions in Sonamthang (Top & mid-left: Sonamcholing Dratshang; mid-right: Yoeselcholing Nunnery; bottom -left: Peling Choekhang; bottom -right: Sonamthang Chorten)





The Yoesel Choling Lhakhang, also known as the Throma Lhakhang is a nunnery that sits at the end of the Sonamthang valley and is located few meters off the Panbang-Nganglam highway. The Lhakhang was founded by late Lama Tashi Choten and was constructed in 2015 with contributions from the people. It is a teaching-learning institute. There are currently around 20 nuns who are studying ritual practices, however due to lack of fund and teachers, it is challenging for the nuns to practice the rituals.

Sonamthang also includes Sonamcholing Dratshang, a monastic school standing right above the Nganglam-Panbang highway. It was built as a community Lhakhang in 1994, and was converted into a monastic school in 1995. The Peling Choekhang, completed in 2019 is a Lhakhang run by the community, which sits south of Sonamthang.

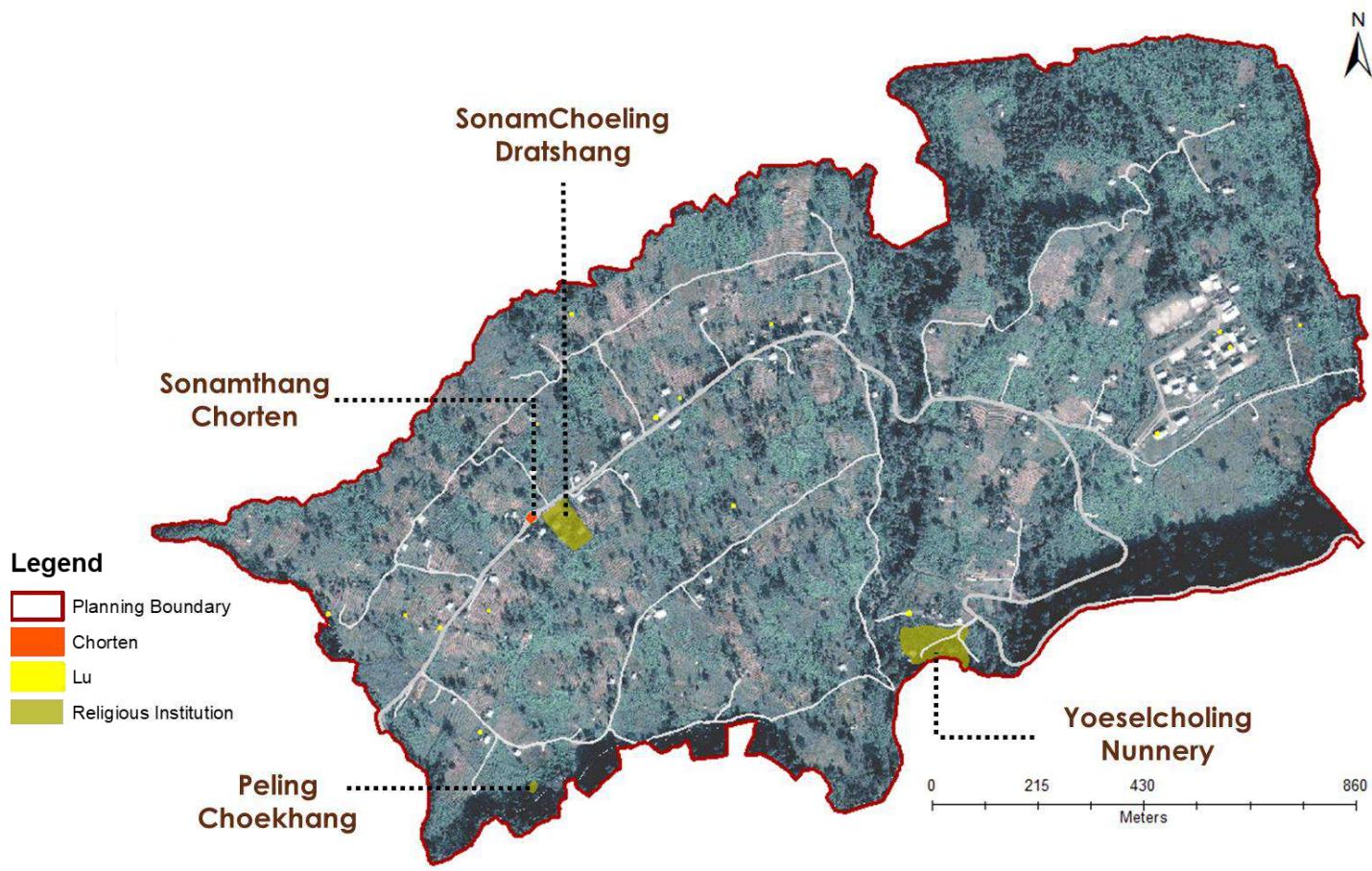


Map 2.7 Government & Corporation Institutions



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Map 2.8 Culture & Heritage

Table 2.2 Services and Facilities Distribution in Sonamthang and Panbang

Services and Facilities	Panbang	Sonamthang
Health	BHU	
Education	Panbang Primary School	SCS, ECCD, NFE
Administration and other offices	Dungkhag Administration Office, Gewog Adm Office, RNR Office, Forest Office	Bhutan Power Corporation Ltd, NRDCL
Religious		<ul style="list-style-type: none"> ” Sonamchoeling Dratshang ” Yoesel Choeling Nunnery ” Peling Lhakhang

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Legal	Dungkhag Court	
Fuel Depot	Available	
Bank		BDBL ATM
Commercial	<ul style="list-style-type: none"> “ Panbang Town “ Tungkudempa Town 	<ul style="list-style-type: none"> “ Milk processing unit “ Furniture House “ Few grocery, retail and hardware shops
Tourism		<ul style="list-style-type: none"> “ Cane & Bamboo Product Centre “ Bangchung Factory “ Hotels
Recreation and cultural		Sonamthang Tsechu
Transport	Road, Helipad	Road

2.8 Infrastructure and Amenities

2.8.1 Road and Circulation Network

During the topographic survey conducted in September 2019, all the metalled and unmetalled roads and footpaths within the planning boundary were picked up. In total, the internal roads are of 24.67km in length. Currently, there are three categories of circulation mode:



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- a) The National highway connecting Panbang with Nganglam and Zhemgang. This part of the road is metalled or black-topped, which are 5.5m wide on average, and constitutes 45% of the total roads in Sonamthang. This metalled road runs through the planning boundary and serves as an internal road. Most of the buildings have come up along this road, forming a linear pattern.



Figure 2.14 Metalled Highway



Figure 2.15 Internal Unmetalled Road

- b) The internal roads serve as the secondary road connecting the surrounding settlements to the national highway. Major portion of this road are unmetalled and consists of the rest 55% of the roads with an average width of 2.5m. There are however, few sections of roads leading to Sonamthang Central School, which are metalled.

- c) The area has very minimal footpaths connecting areas near Sonamcholing Dratshang and only within the Sonamthang Central School compound. The existing roads also lack proper designated footpaths, which limits access for those with reduced mobility; and is not perceived as safe for pedestrians, especially along the Nganglam-Panbang highway, which has high speeding light, medium and heavy vehicles passing through on a daily basis.

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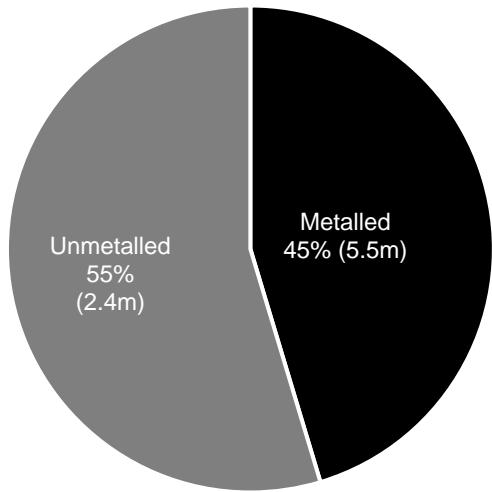
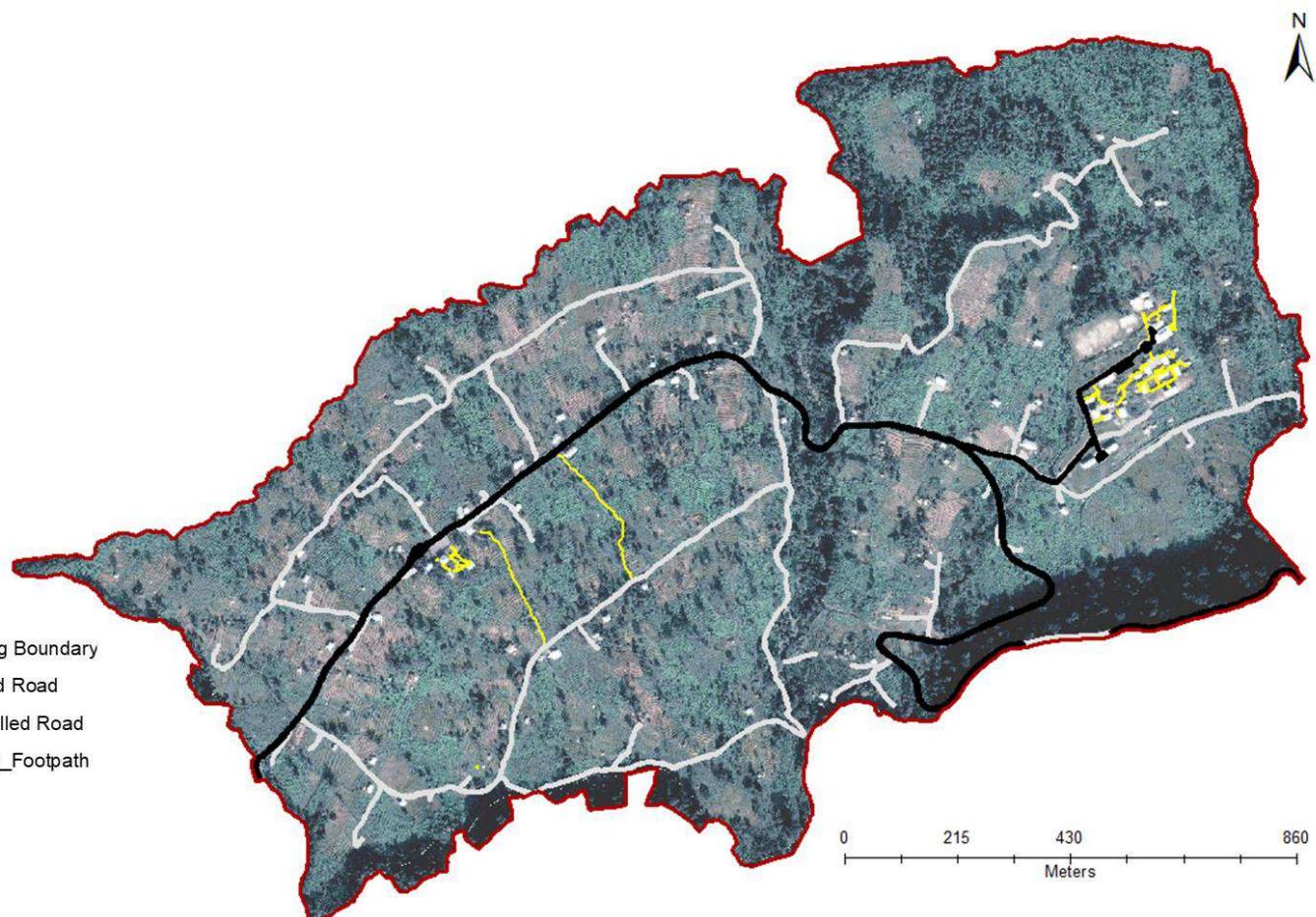


Figure 216 Internal Connectivity

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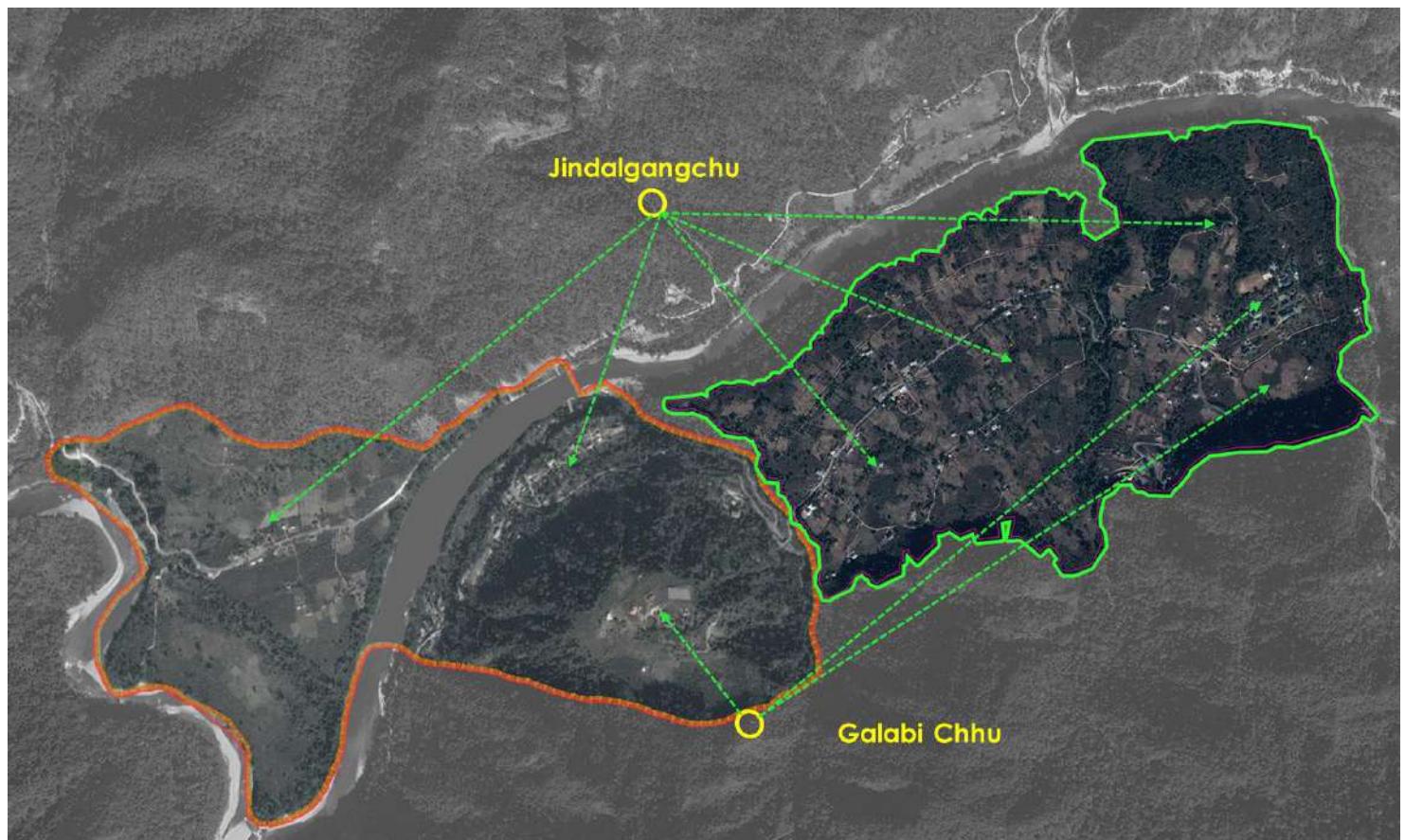
Map 2.9 Road and Circulation Network

2.8.2 Water Supply

The current residents of Sonamthang get drinking water from two water sources. Jindalgangchu which flows on the opposite side of Panbang town (on the way to Tungkudempa) caters to most of the Sonamthang areas, along with Tungkudempa and Panbang areas. The second water source, Galabi Chu, located near Galabi caters to only the Galabi residents, Sonamthang Central School and some residents of upper Thinleygang area. The drinking water is directly distributed to the households without any treatment; and some of the residents complain about the inadequacy of the water, especially during summer.

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Map 2.10 Water Source for Sonamthang

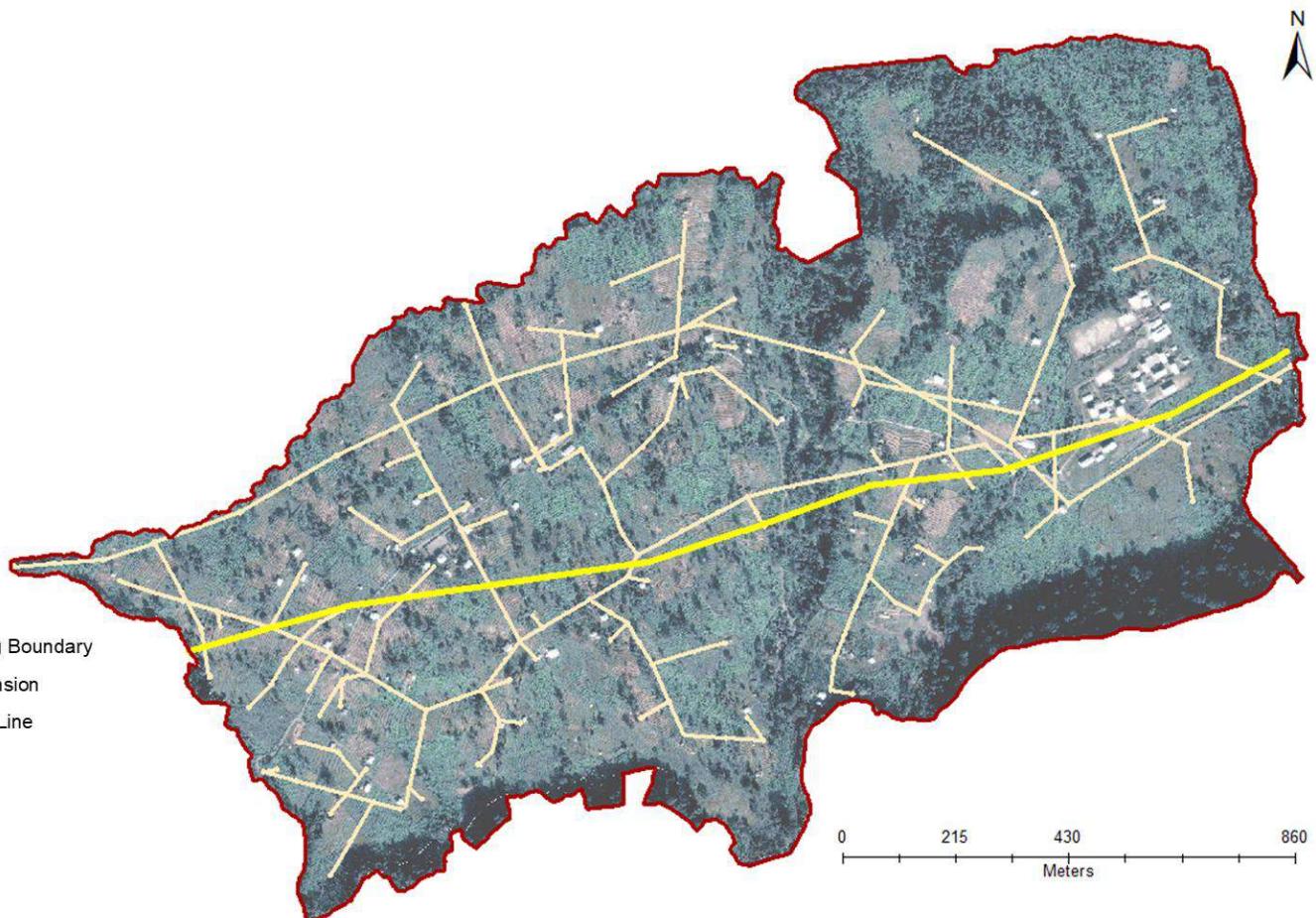
2.8.3 Power and Telecommunication Services

Since June 2012, Panbang has been connected with electricity from Kurichhu Hydropower Corporation Limited. Until 2012, the residents have either used generators or solar power for lighting purposes. Despite all the households having power connection in Panbang, frequent power cut is very common with the residents experiencing power cut for as long as seven to eight hours in summer. There is a 132kV high tension that runs through Sonamthang planning area, whereby a buffer of 27m is required to be kept.

The whole town is well connected with the telecommunication facilities such as mobile and postal services. Before mobile services became functional in 2009, people only had access to telephone facilities. Bhutan Telecom and Bhutan Post is the main service provider in the area with its branch office located in existing Panbang town. The town also has access to a private TV cable operator.

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Map 2.11 High Tension & Electric Line

2.8.4 Sewage and Solid Waste Management

Sonamthang does not have a piped sewage disposal system. Some houses have plot level septic tank and soak pit arrangement while others use the more primitive pit latrine system. Till date sewage disposal has not come out as a major issue, probably, owing to its low volume.

A solid waste disposal site for Sonamthang is located on the other side of Sonamthang, along the road leading to Yumdang and Bjoka Gewog. The waste disposal site is managed by the Panbang Dungkhag Administration. A monthly service for solid waste pickup and disposal is run by the

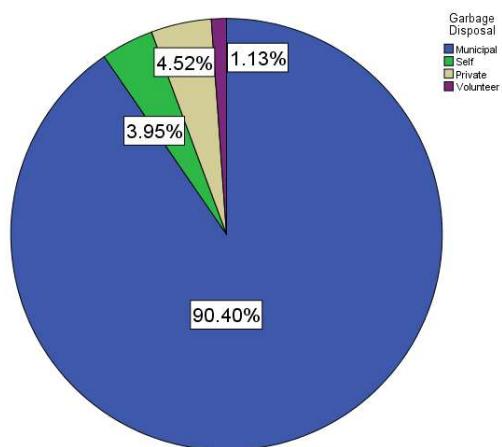


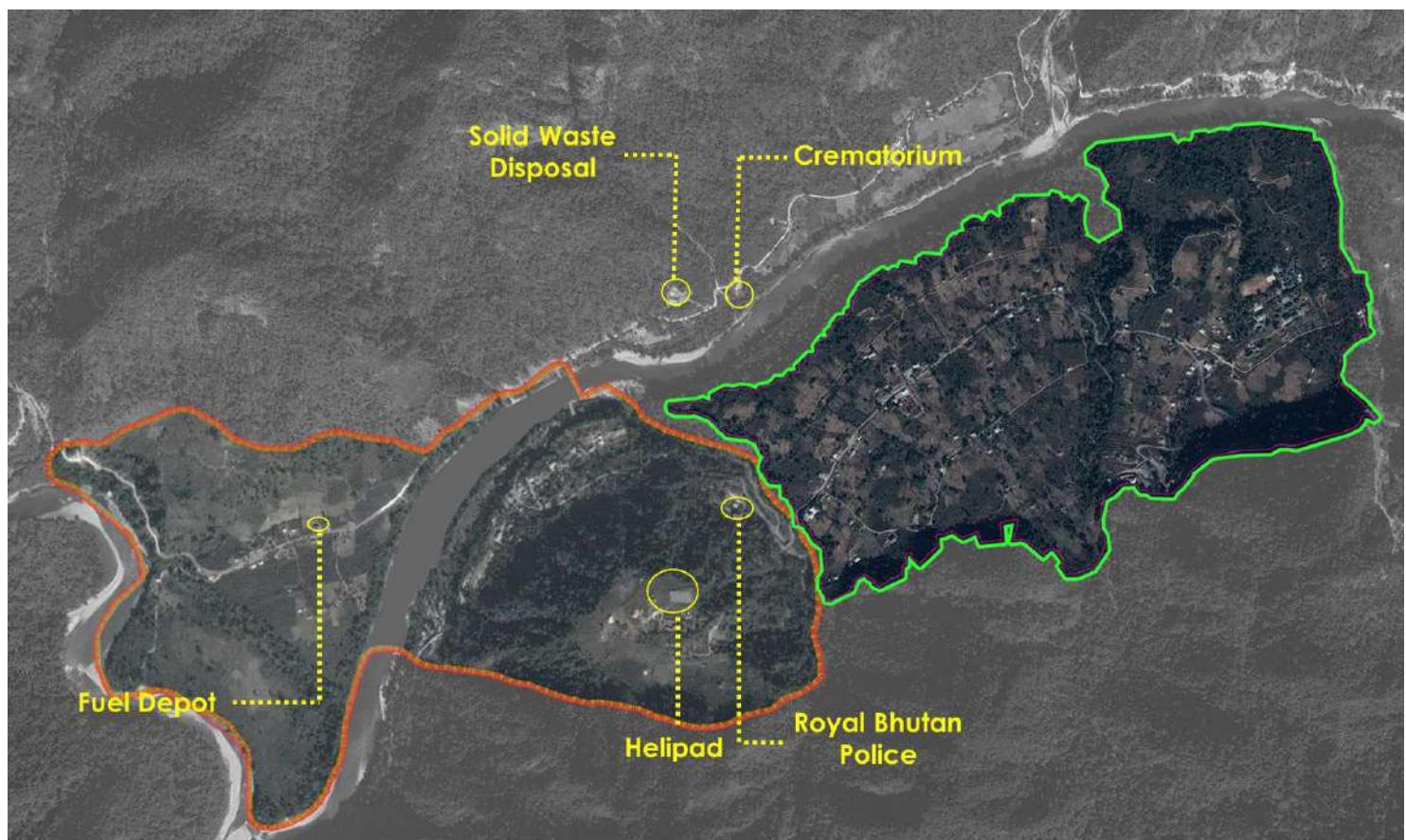
Figure 2.17 Garbage Disposal

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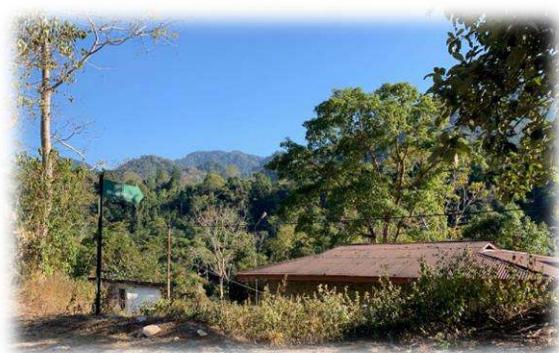
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Dungkhag, which is availed by 90% of the residents of Sonamthang. 4.5% of them goes to dispose the waste at the disposal site. About 3.95% of the residents dispose their wastes by themselves by open burning method. Rest 1% of the residents dispose their solid wastes by themselves to the dumping site.

Figure 2.18 Solid Waste Disposal Site



Map 2.12 Existing Infrastructure in Sonamthang



2.8.5 Crematorium

A crematorium run by the Panbang Dungkhag Administration is located at Marangdutt near the solid waste disposal site. It was constructed in 2005.

Figure 2.19 Crematorium

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2.8.6 Fuel Depot

A fuel depot has also been constructed in 2018 at Tungkudempa, which caters to all the Panbang Dungkhag residents and the travelers. It was inaugurated by Lyonpo Leki Dorji, the then Economic Affairs Minister.



Figure 2.20 Fuel Depot

2.8.7 Helipad



Figure 2.21 Helipad

A helipad constructed in 1999, is located at Galabi, right next to the Dungkhag Administration and Dungkhag Court offices.

2.8.8 Storm Water Drainage

Map 2.12 demonstrates that the existing drainages are only within the institutions such as Sonamthang Central School and Sonamcholing Dratshang. The total length of existing drainage is 0.717 km. There is no proper storm water drainage system beyond the immediate vicinity of individual houses. Consequently, storm water often follows the nearest road or the natural depressions making its way down to the main rivers. This is undesirable. Through the socio-economic survey conducted in October, 2019, it is identified that only 40% of the houses have storm water drainage around their houses, whereas 60% has no drainage. However, these individual drainages are not properly connected and their outlet is unclear.

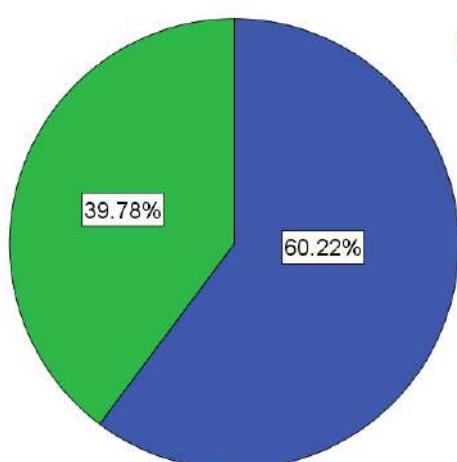
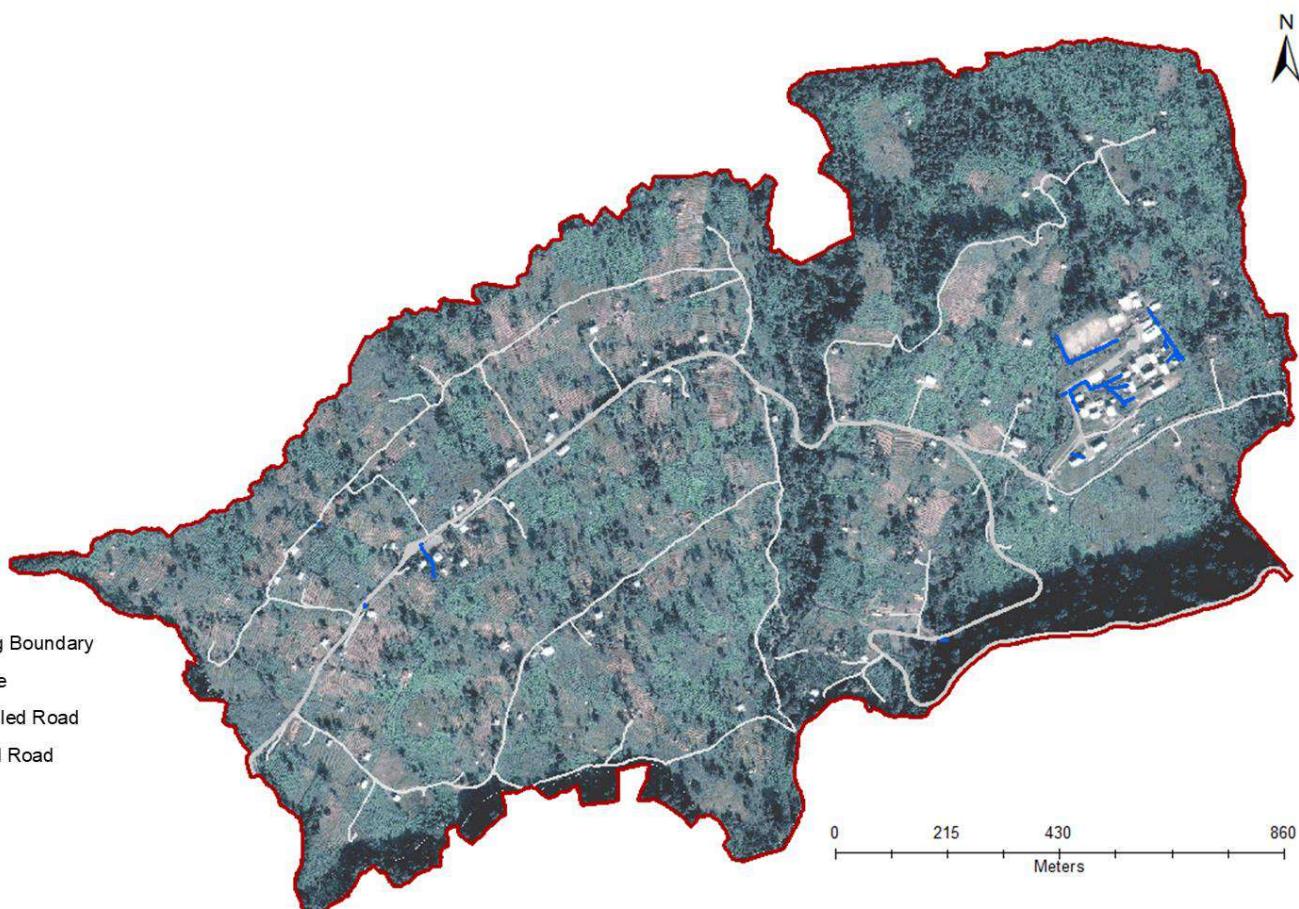


Figure 2.22 Drainage in Sonamthang



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Legend

- Planning Boundary
- Drainage
- Unmetalled Road
- Metalled Road

Map 2.13 Drainage in Sonamthang

2.8.9 Irrigation Canal

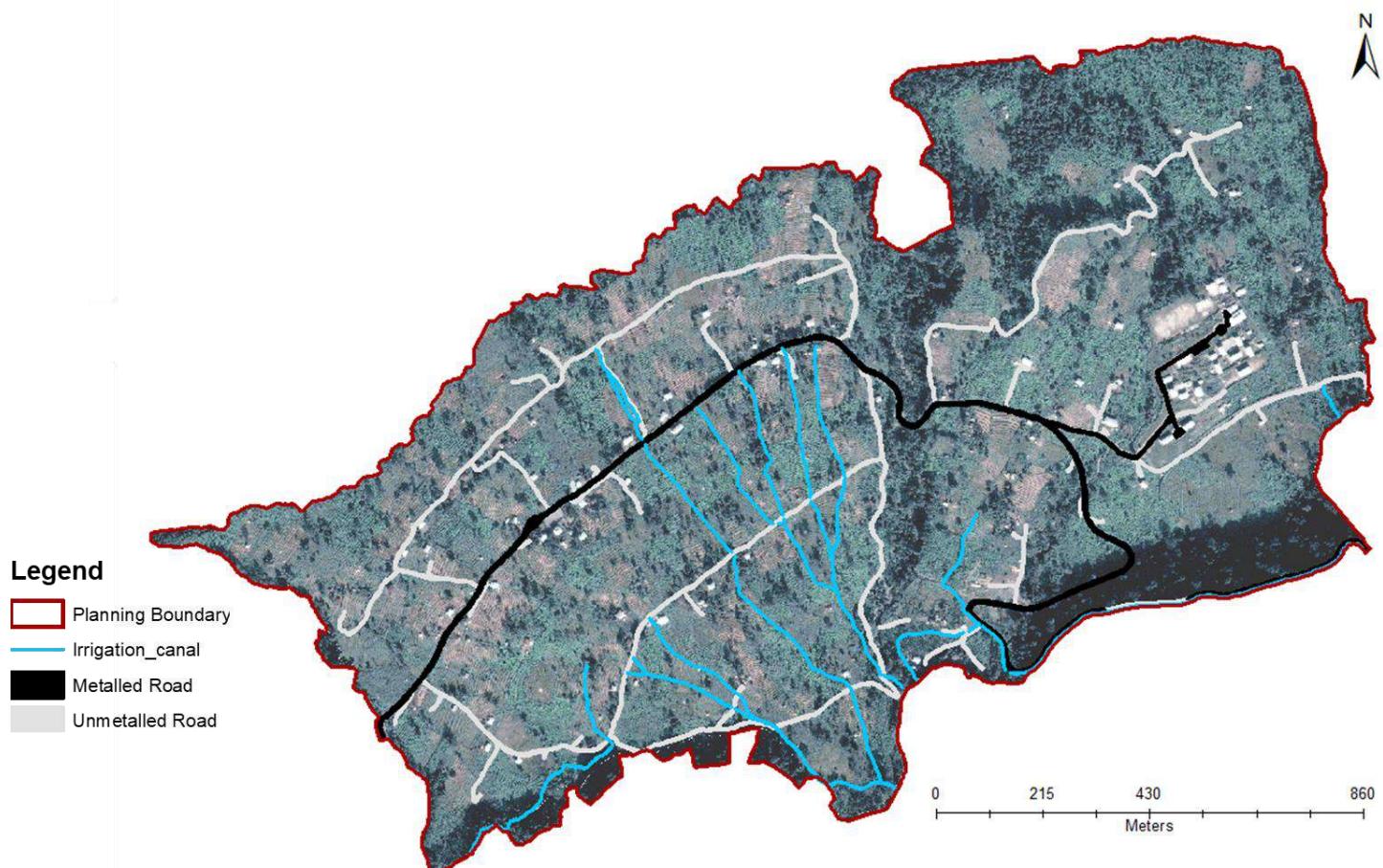
The existing irrigation canal with a length of 10.69km is illustrated in Map 2.13. As can be noted from the map and also through socio-economic survey, there are improper distribution of irrigation canal especially to lower Sonamthang and Thinleygang areas.



Figure 2.23 Irrigation Canal

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Map 2.14 Existing Irrigation Canal

2.8.10 Sewerage and Sanitation

97% of the total households have individual septic tank. Rest 3% are those households with pit latrines.

The pie chart (Figure 2.24) illustrates that 96% of the buildings in Sonamthang have regular toilets with flush system, whereas only 3% of the houses are still with pit latrine.

As for the location of toilets, 55% of the houses have toilets located outside the house, whereas 45% of the houses have toilets inside the house.

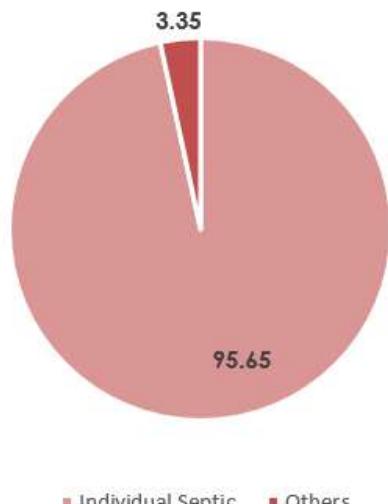


Figure 2.24 Sewerage Type

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■ Pit Latrine ■ Regular Toilet ■ Others

Figure 2.25 Sanitation Type

■ Inside ■ Outside

Figure 2.26 Location of Toilet

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CHAPTER 3

ANALYTICAL STUDY

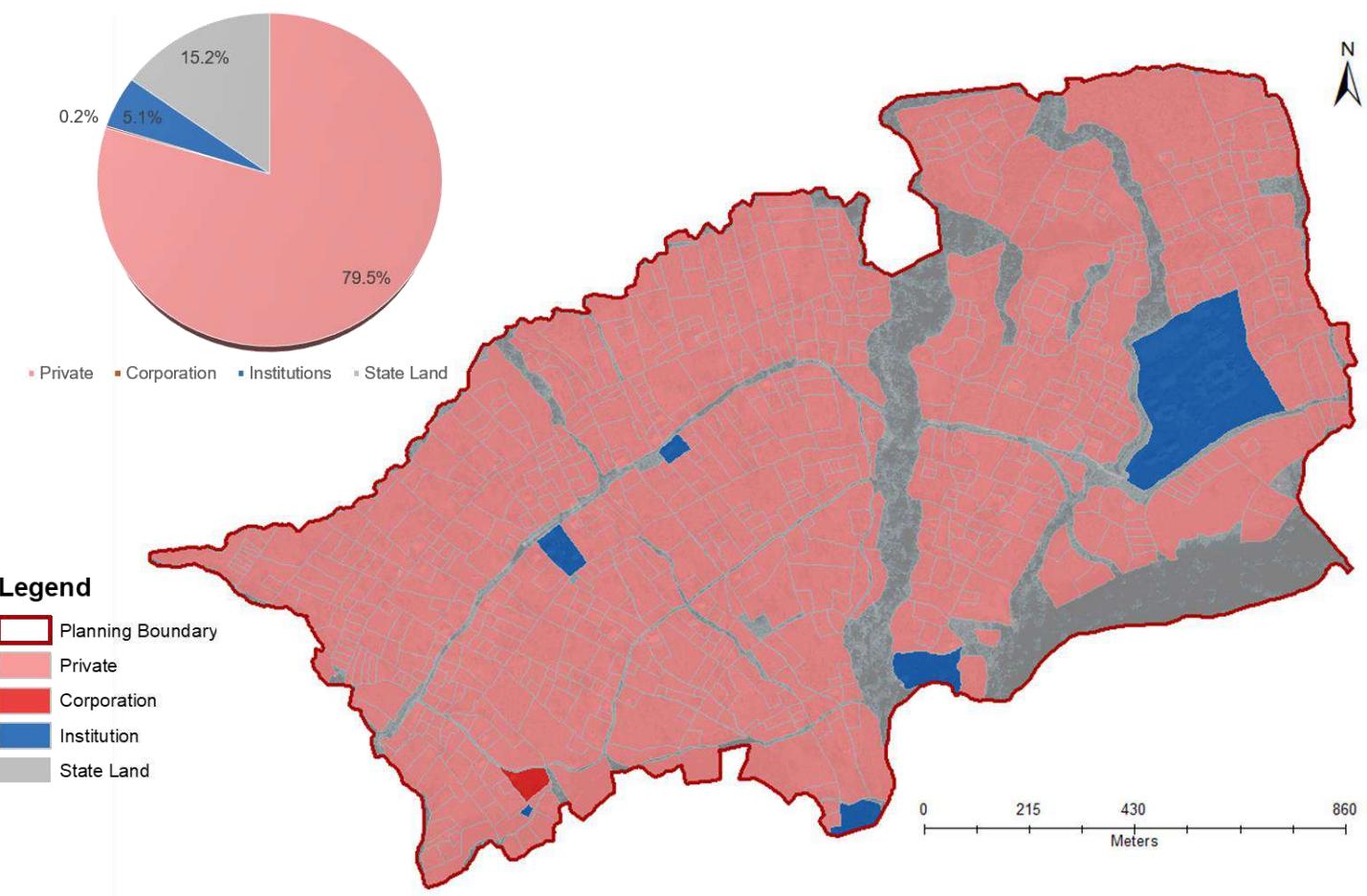


3. ANALYTICAL STUDY

Successful spatial plan is responsive to the physical opportunities and constraints of a place and the community's aspirations. The purpose of analysis is to acknowledge the existing framework of environmental, social and economic conditions and note key contextual elements. The aspirations of the community are added to the mix, leading to an overall consideration of the potential impacts on the precinct. This chapter analyzes the existing conditions and identifies key implications, which are then addressed by the goals, strategies and design guidelines in the later sections of the report.

3.1 Plot Ownership

From the total of 758 plots in Sonamthang planning area, vast portion of land are owned by private individuals, accounting up to 79.5%. Meanwhile, 5.1% of the overall land are institutions belonging to the government or religious bodies. Only 0.2% of the total plots belong to corporation i.e., Bhutan Power Corporation Limited.



Map 3.1 Plot Ownership

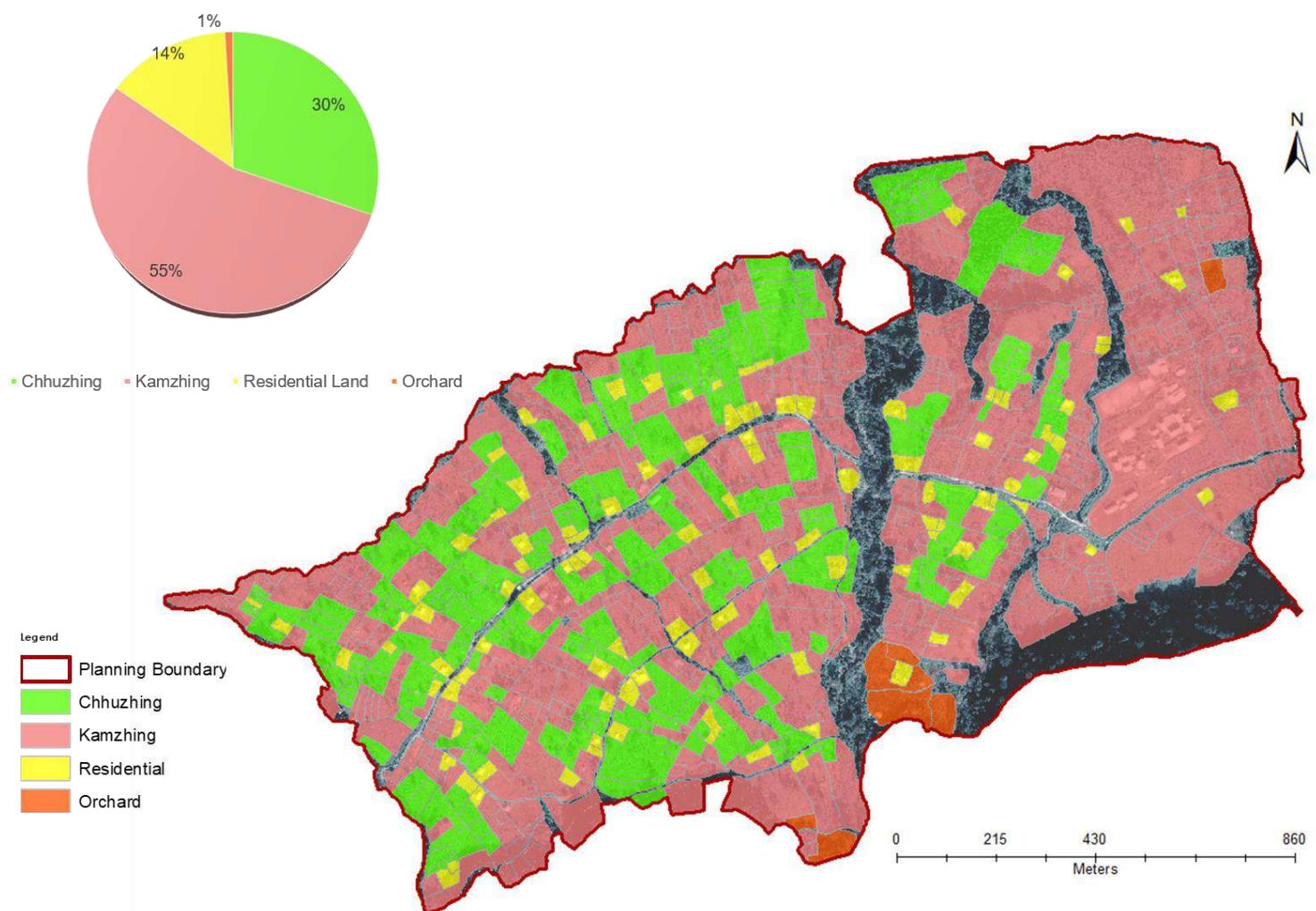




3.2 Plot Type Classification

Plot classification is mainly done based on its uses in order to protect the land such as Chhuzhings and other lands, which are to be protected as per the Land Act. This would give the basic idea on the zoning and precinct formulation which would guide the development.

There are a total of 4 land types in Sonamthang. Kamzhing (dryland) encompasses majority of the plots, which accounts 55% of the total plots. It is followed by Chhuzhing (wetland) with 30%. 14% of the plots are Khimsa (residential). Only 1% of the total plots are orchards. Map 3.2 displays the distribution of plot types in Sonamthang.



Map 3.2 Plot Type Classification





3.3 Plot Size Classification

The size of plots in Sonamthang ranges from 4.2 decimal (170.79 sq.m) to plots as big as 1797.009 decimal (72706.99 sq. m).

The plot sizes are classified into three categories, namely 'plots larger than 13 decimals', 'plots ranging between 10-13 decimals' and 'plots with less than 10 decimal'. In Sonamthang, 91% of the total plots are of area more than 13 decimals (526.091 sq. m). Plots with area between 10 decimals (404.68 sq.m) and 13 decimals constitute only 9%, leaving only 1% of the total plots with an area less than 10 decimals.

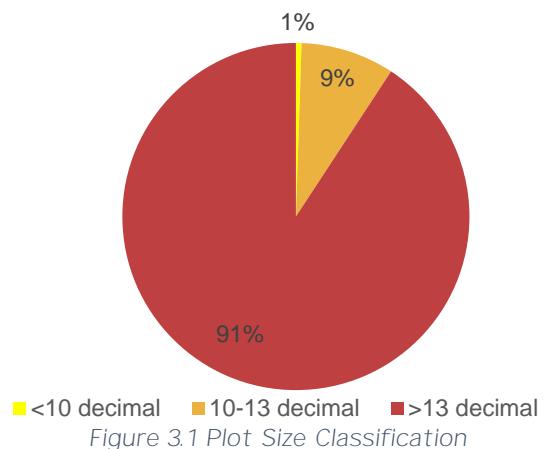
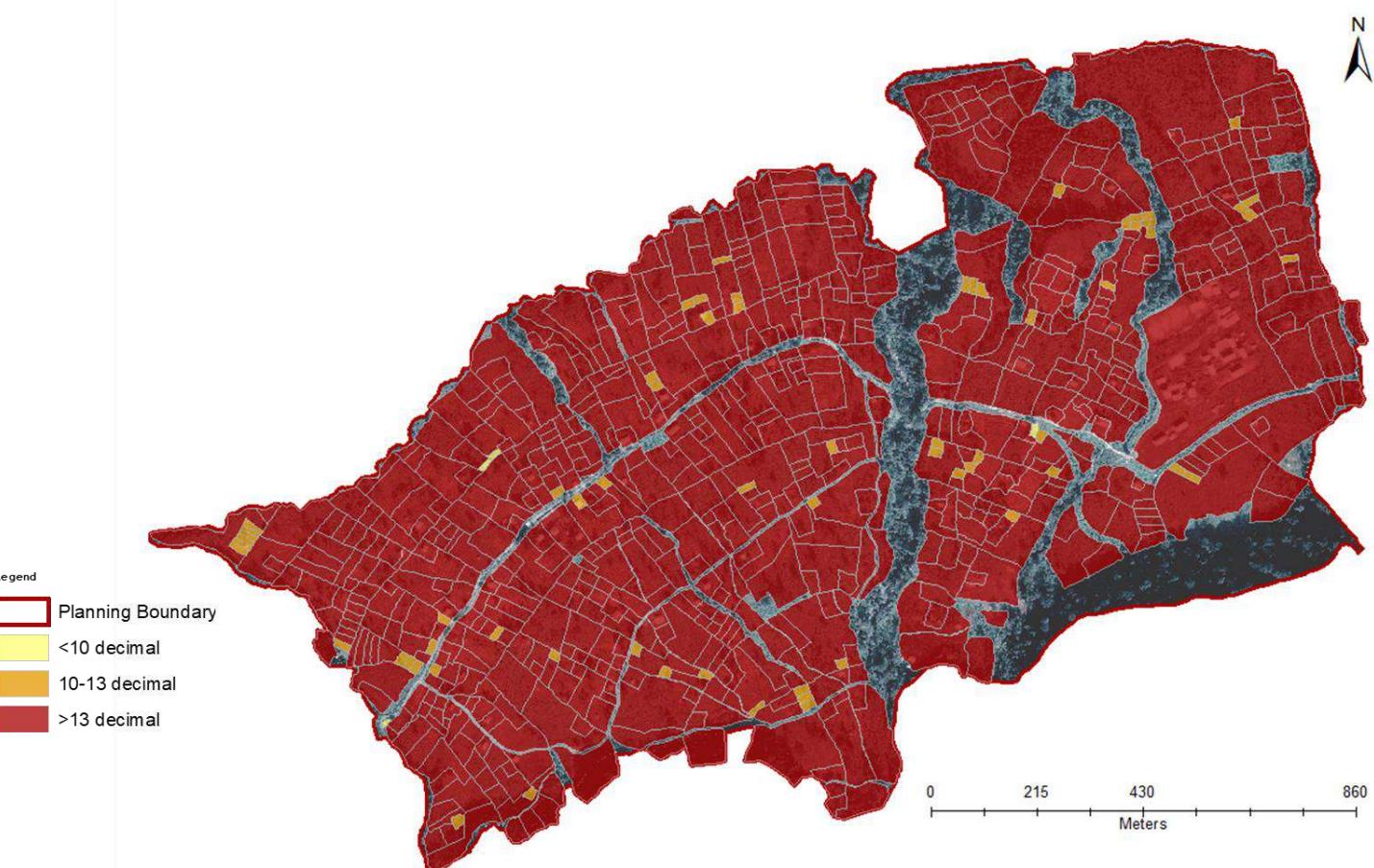


Figure 3.1 Plot Size Classification



Map 3.3 Plot-Size Classification





3.4 Development Trend

Based on the Google Maps of 2010, 2014 and 2018, the development trend of Sonamthang is studied. Over the years, Sonamthang has experienced steady growth with increase in developments as illustrated in Map 3.3. The buildings have increased from only 96 in 2010 to 120 in 2014. And in another 4 years, it has gone up to 164. The developments have come up due to the construction of the new Panbang-Nganglam Highway and also owing to the institutions that were set up; and the opportunities that agriculture and tourism has brought upon.

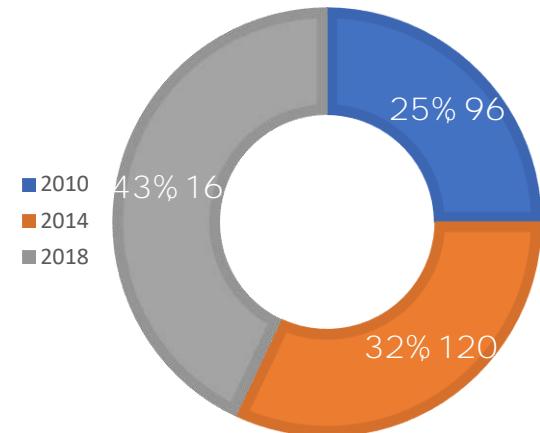
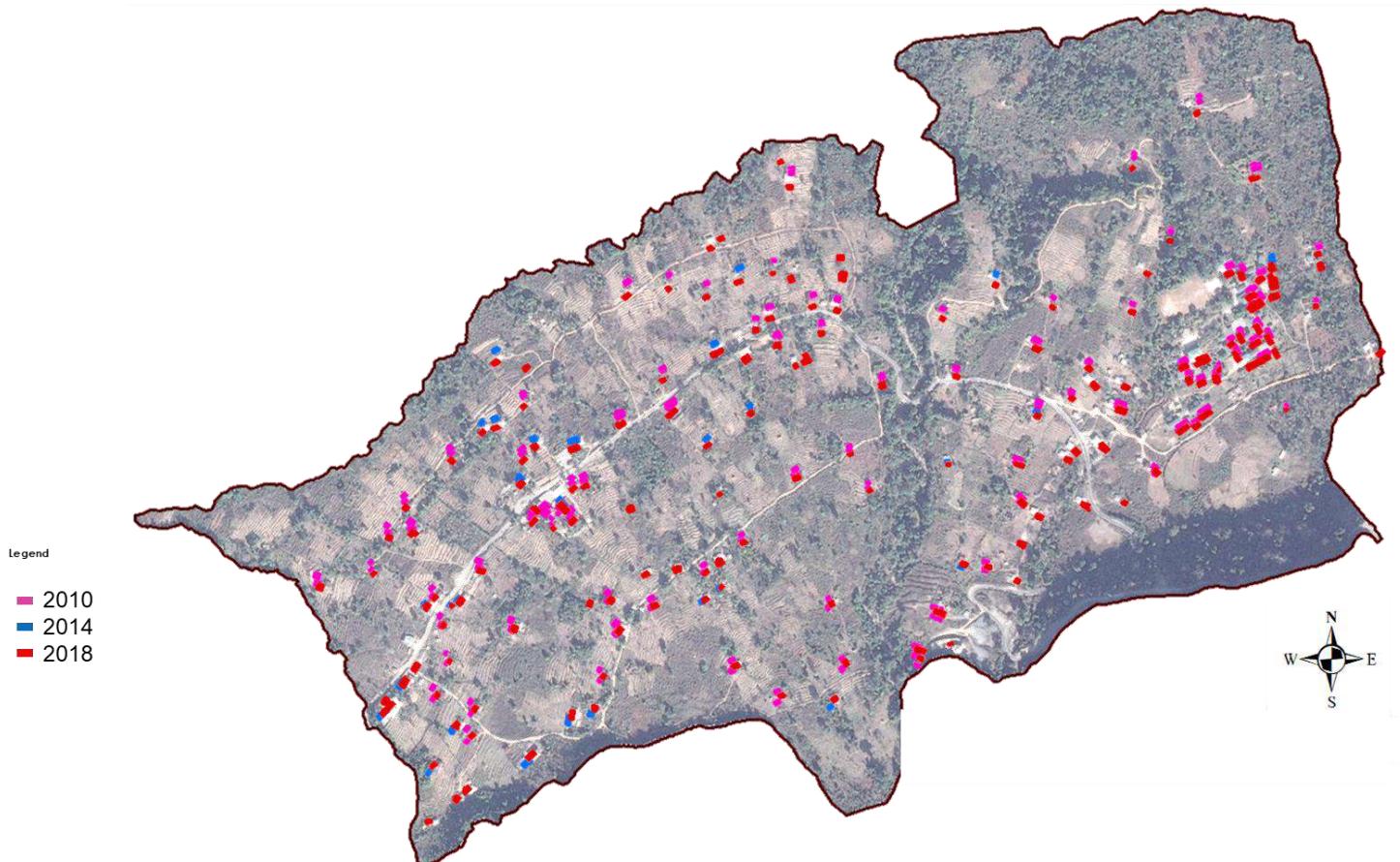


Figure 3.2 Number of Structures



Map 3.4 Development Trend in Sonamthang



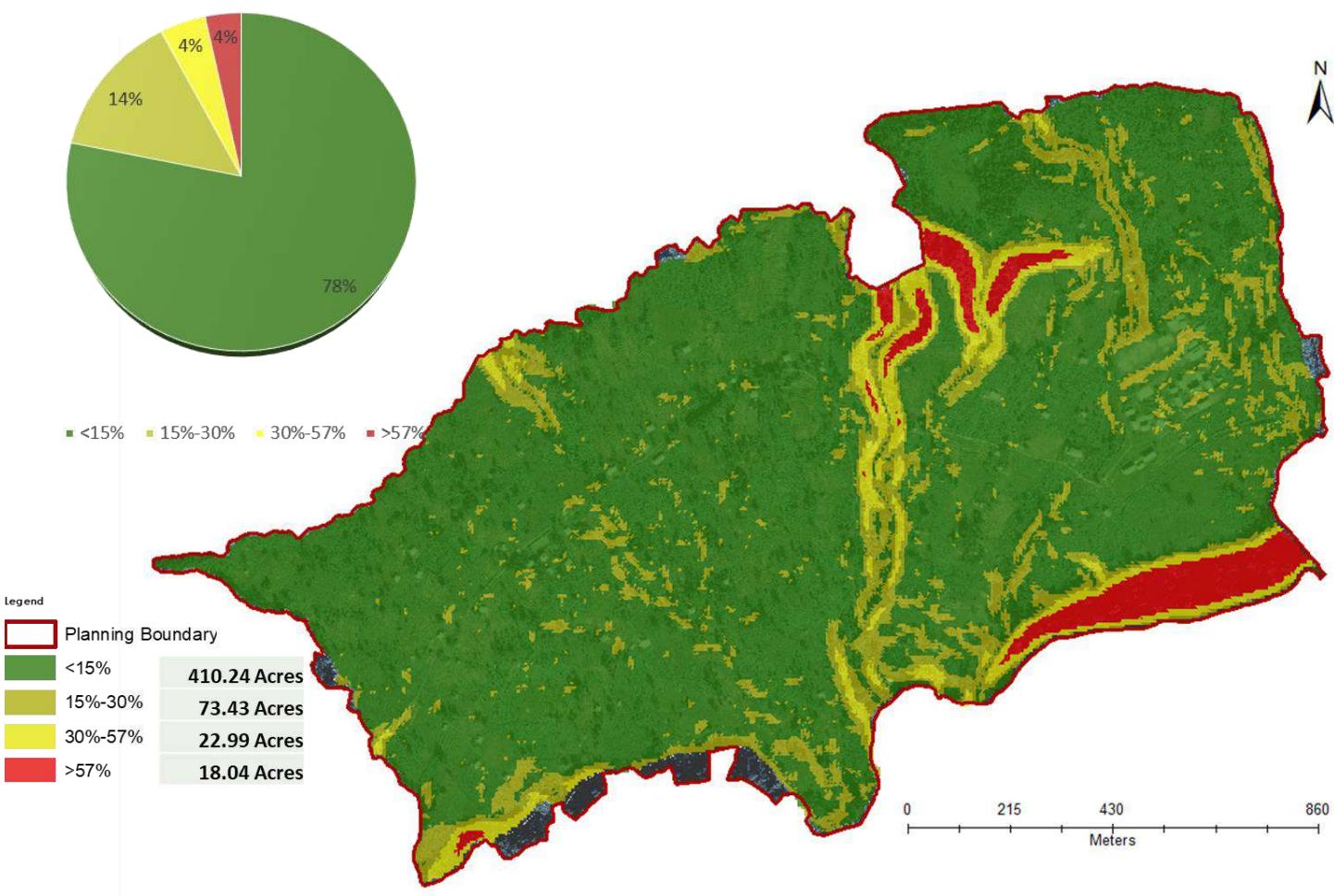


3.5 Slope Analysis

The slope analysis studies the surface of the land and groups land parcels under different slope categories. This is useful to identify areas that are suitable for various developments or more importantly to help designate appropriate land uses.

Sonamthang is situated on a generally flat land with few gentle slopes. The average slope is 11% or 6 degree. Through this analysis, 78% of the total land falls under the slope of less than 15%, which are considered most suitable for development. However, this does not imply that all lands are available for development. Most of these areas are occupied by major institutions such as Sonamthang Central School, Dratshang and other institutions. Moreover, some portion of these lands fall under the high tension running through the planning boundary and some under Chhuzhing, where developmental activities are prohibited.

14% of the land fall under the slope category between 15% to 30%, which are also considered generally suitable for development with moderate intensity. Very minimal amount of land constituting to 4% of the total area has slope between 30% to 57%, whereby very minimal development is allowed.



Map 3.5 Slope Map





Similarly, only 4% of the total area falls under the slope greater than 57%, which are steep slopes and ridges along the streams and rivers, which has huge risk for disasters such as landslides which can cost the lives and properties of people. Developments are strictly prohibited in these area.

3.6 Geotechnical Study

Different types of hazards from different sources at the project site were thoroughly studied. The hazards included landslides, erosion, scouring, ground subsidence, steep topography, weak geology, rock fall, natural/manmade slope failure, floods (river/stream/flashflood), marshy area, seepage/sinking area, faults, regional seismicity etc. From the detailed geotechnical assessment, it was found that Sonamthang is likely to experience flooding in the nearby stream during rainy seasons. The watershed diagram is illustrated in Map 3.6.

The steep slopes of rocks and debris slopes along the river/stream banks are classified as high hazard area. Although, only 5.77% of the land within the study area is on steep slope of 30 degree or more, these slopes would experience much lower seismic resistance than gentler slopes during earthquakes (as per the Geotechnical Study). Earthquake hazard is also prevalent in the current study area.

It has been concluded that 80.99% of the total area in Sonamthang falls under low hazard area, which consists of 432.05 acres. Meanwhile, 6.89% with an area of 36.76 acres are assessed as medium hazard; and only 12.12% as high hazard. The details on hazard levels and criteria can be found in Table 3.

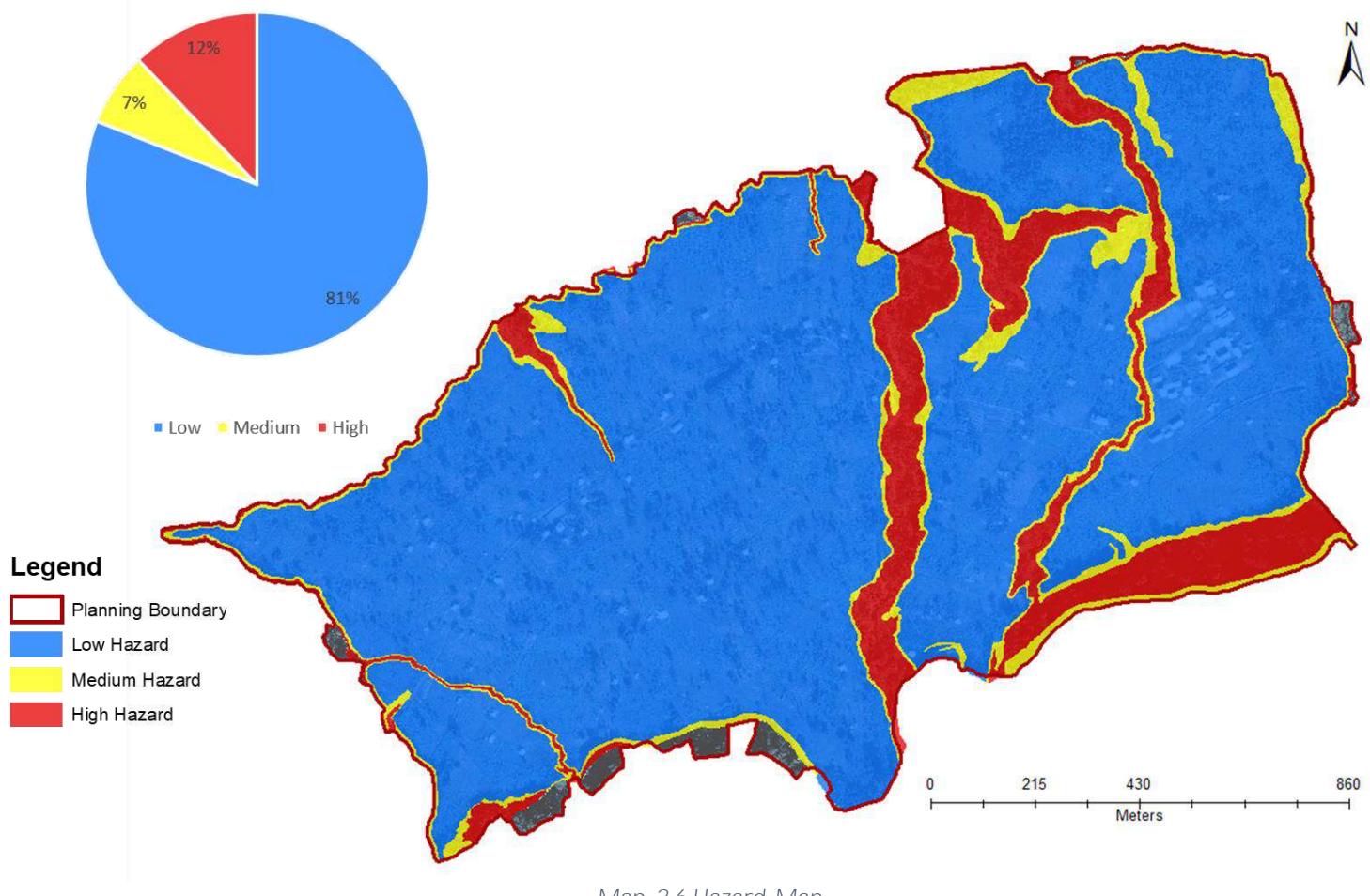
Table 3 Hazard Criteria for Sonamthang

#	Hazard Level	Hazard Criteria	Area		
			(km ²)	(Acre)	(%)
1	Low Hazard	Gentle slope (slope angle ranging from 0-20°). Nominal geological hazard.	1.75	432.05	80.99%
2	Medium Hazard	Slope angle between 20-30°; minor ground depression. This type of hazard can be controlled by mitigation measures or other engineering solutions.	0.15	36.76	6.89%
3	High Hazard	Slope angle above 30°; Areas within the stream flood corridor.	0.26	64.64	12.12%



Sonamthang Action Area Plan

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Map 3.6 Hazard Map

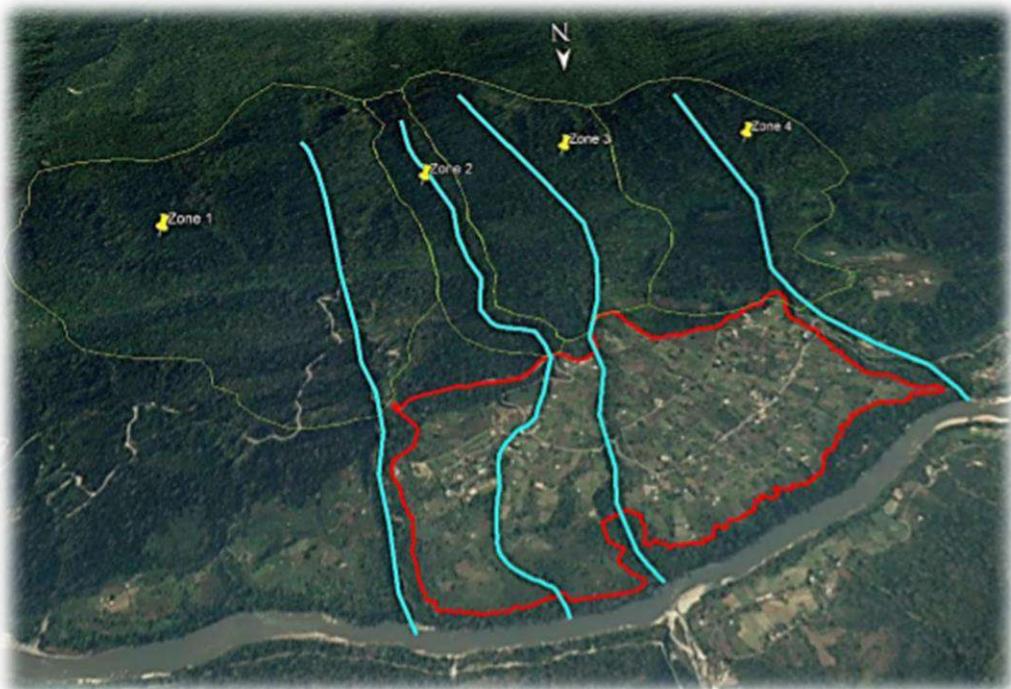


Figure 3.3 Watershed (green polygons) & Streams (bluelines) affecting the study area

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Figure 3.4 Main fault lines of Himalayas (thick yellow lines) & local faults/contacts (thin yellow lines) at and around Sonam thang

3.7 Demographic Projection

The base population of Sonamthang is 1340 as per the socio-economic household survey carried out by the planning team in October, 2019. It is inclusive of the boarding students, staffs and institutions. Population projection is carried out to study the scenario of population growth in future, which is critical in gradual growth and development of Sonamthang. The Ngangla Gewog's annual growth rate of 0.99 is considered for projection instead of the Dzongkhag's growth rate which is -0.39.

The projection is calculated based on four scenarios, Scenario-I without institution population and the floating population. Scenario-II is calculated without institution population, however, with floating population of 20% of the total population. Floating population considers people who reside in a given area for a certain amount of time for various reasons such as tourism, migrant labour etc., who are not generally considered part of the official census count.

Scenario-III is calculated including the institution population but without the floating population. On the other hand, Scenario-IV is calculated inclusive of institution as well as the floating population.

For Scenario-IV, over the period of 20 years, in 2039, the population is projected at 1920, from 1608 in 2019, which is inclusive of the floating population.

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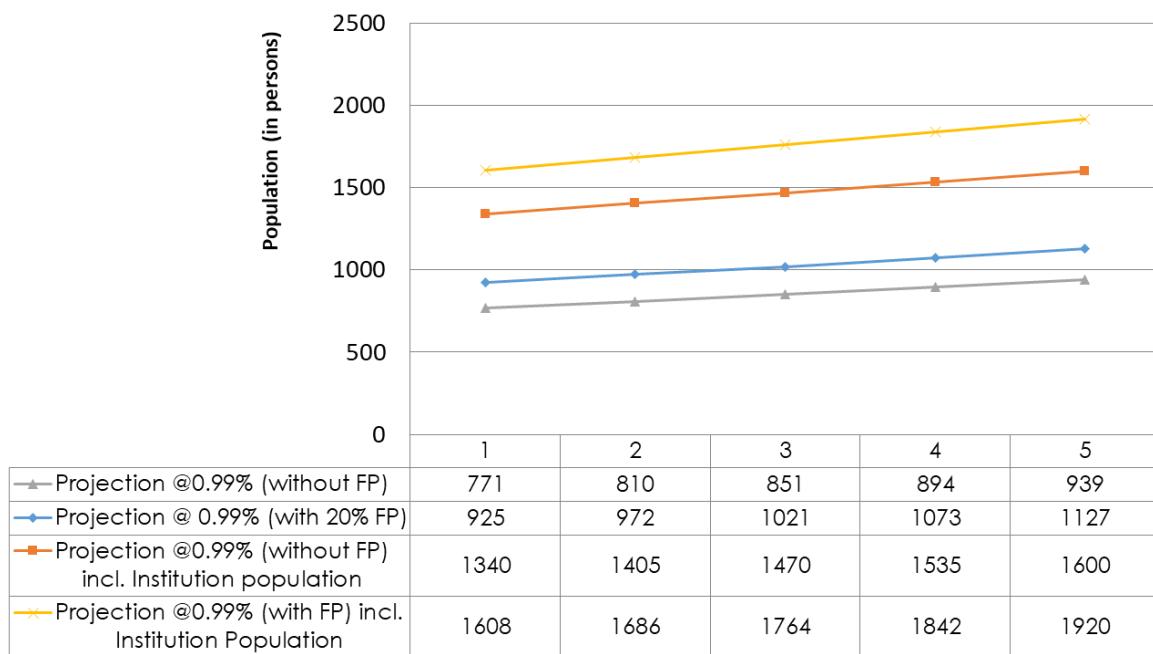


Figure 3.5. Demographic Projection of Sonamthang for four scenarios

3.8 Carrying Capacity

Carrying capacity is defined as the maximum population that can be supported by a particular habitat indefinitely without damaging the productivity of the habitat. It enables us to calculate the ultimate population the land can carry and helps us to guide the development.

Table 4 Total Land Available for Development

SI #	Deduction	Area	
		Sqm	Acre
1	Chhuzhing	532368.855	131.495
2	Environment Conservation E-1	345061.363	85.230
3	Metalled Road	22205.000	5.485
4	Unmetalled Road	26963.375	6.660
5	Government Institution	83821.540	20.704
6	Religious Institution	15293.345	3.777
Total Undevelopable Area		1025713.477	253.351
Total Planning Area		2185388.601	539.791
Total Developable Area		1159675.124	286.440





Based on the calculations for the total developable area in Table 4, the carrying capacity is calculated as 9277 people within the developable area (282.763 acres) in planning boundary while the projected population is only 1920. It can be inferred that the planning area is enough for the projected population for the projected duration.

3.9 Housing Stock Analysis

Table 5 shows the current housing need analysis for the staffs of the institutions in Sonamthang. The analysis considered the total number of staffs, the staff quarters provided by the institutions and the future proposals for staff quarters. The gap is analyzed using the aforementioned parameters. After the analysis, 39 gaps are identified. There is however, 45 households, who reside outside the institution premises, and are on rental units. It can therefore be assumed that there are enough houses. However, through the household survey, the quality of houses is of huge concern, which is perceived as lack of housing.

Table 5 Housing Stock Analysis

Sl #	Institutions	Total Staffs	No. of Staff Quarters	No. of Staffs accommodated in quarters	12 th FYP Proposals	Gap
1	Sonamthang Central School	51	5 blocks (13 units)	14		37
2	Sonamchoeling Dratshang	24	3 buildings	24		0
3	Peling Choekhang	11	1	11		0
4	Yoeselcholing Nunnery	21	2	21		0
5	Bhutan Power Corporation	9 (5 staffs of Transmission & Maintenance Division)	1 (3 units)	3	New building under construction (4 units for staffs)	2
Total						39

3.10 Land Requirement

Taking into consideration the socio-economic household survey population of 2019 as 771, the 187 households, standard plot size of 13 decimals and building height as G+2, the 187 households have been accommodated in 62 structures. This takes up an average area of 8.06 acres.





Based on this, considering the 2039 projected population of 939, the projected number of households is 235. This will occupy 91 structures and an area of 11.83 acres. Therefore, the additional required land for 2039 is **3.77 acres**.

3.11 Water Requirement

Regarding water supply in Sonamthang, it is just enough for the current residents, which is 234500 litre per day for the current resident population. However, it may not be enough in the near future where the water requirement is at 322350 lpd for the projected population, which is 87850 litres more per day. Moreover, Jindalgangchu is located in a landslide prone area and it may not be reliable for future purpose. The tentative water source is located 8-9 km away from Sonamthang, as per the local government. As per the discussions held on December 4, 2018 (MoM annexed herewith), the Zhemgang Dzongkhag Administration is to get support from Department of Engineering Services, MoWHS for further study.

Table 6 Water Requirement Calculation

Population	Domestic water requirement 2019 (@ 175 LPCD)	Domestic water requirement 2039 (@ 175 LPCD)
Sonamthang	234500 LPD	322350 LPD

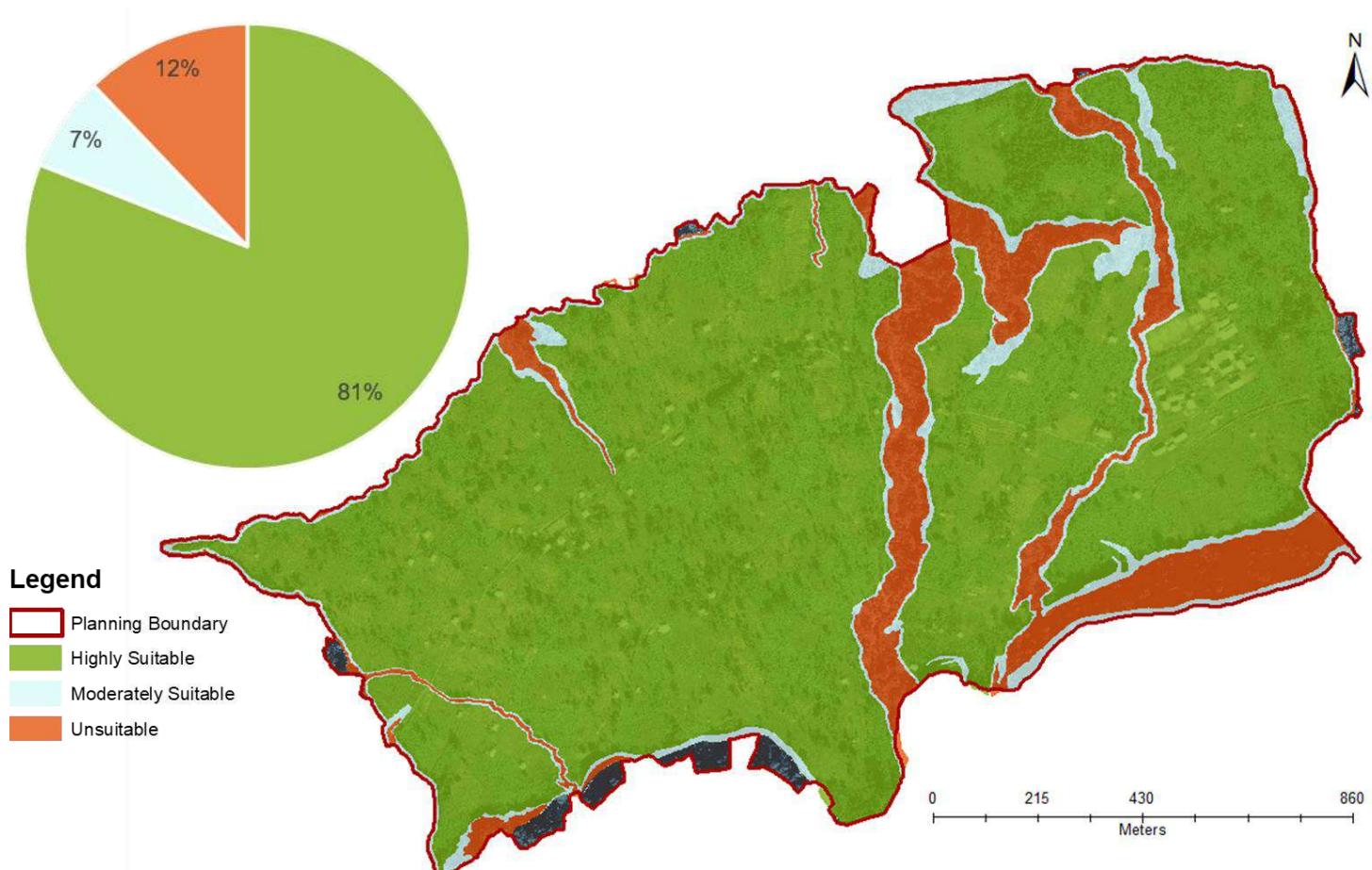
3.12 Suitability Analysis

Land suitability analysis is carried out to identify areas suitable for development within the planning boundary. Generally, Sonamthang is flat with an average slope of 11%. There are however pockets of areas with steep slopes and ridges along the river and streams, which may impact local development. It is critical to identify the hazardous sites within planning area, which are undevelopable and unsuitable. Slope is one of the crucial factors in determining the nature of landscape and stability.

The area with steep slopes are identified as not feasible and moderate slopes as moderately feasible with conditions applied for development. A total of 12.12% (64.64 acres) of area falls within unsuitable area. The suitability analysis is based on several factors including topography, geology (surficial geology in terms of soil types on a regional and local basis and bedrock geology including major structural features such as faults), hydrology or climatic conditions which influence soil development, groundwater occurrence and fluctuations, risk for flooding and landslides, slope failures, regional seismicity, earthquake history and land use.

432.05 acres (80.99%) of the total area is suitable and 36.76 acres, i.e. 6.89% is moderately suitable.





3.13 Develop-ability

From the suitability analysis, around 87% of the total planning area is identified to be suitable for development. This analysis is based on the geotechnical studies. However, not all suitable land is available for development. In Sonamthang, only 55% of the total area is identified as actual areas that are developable. Chhuzhings are excluded from the developable area due to its conservational importance. Additionally, no development shall be permitted within the 15 meter of the vicinity of the streams. Development in this buffer area will increase its vulnerability to disasters.

Other areas such as those falling below and around the high tension wires are not developable due to the electromagnetic field created by it, which has negative impact on the health and structures. Accordingly, 27m for the 132kV high tension electric lines is maintained as per the O&M Manual for Transmission Lines, Bhutan Power Corporation Limited, 2017.

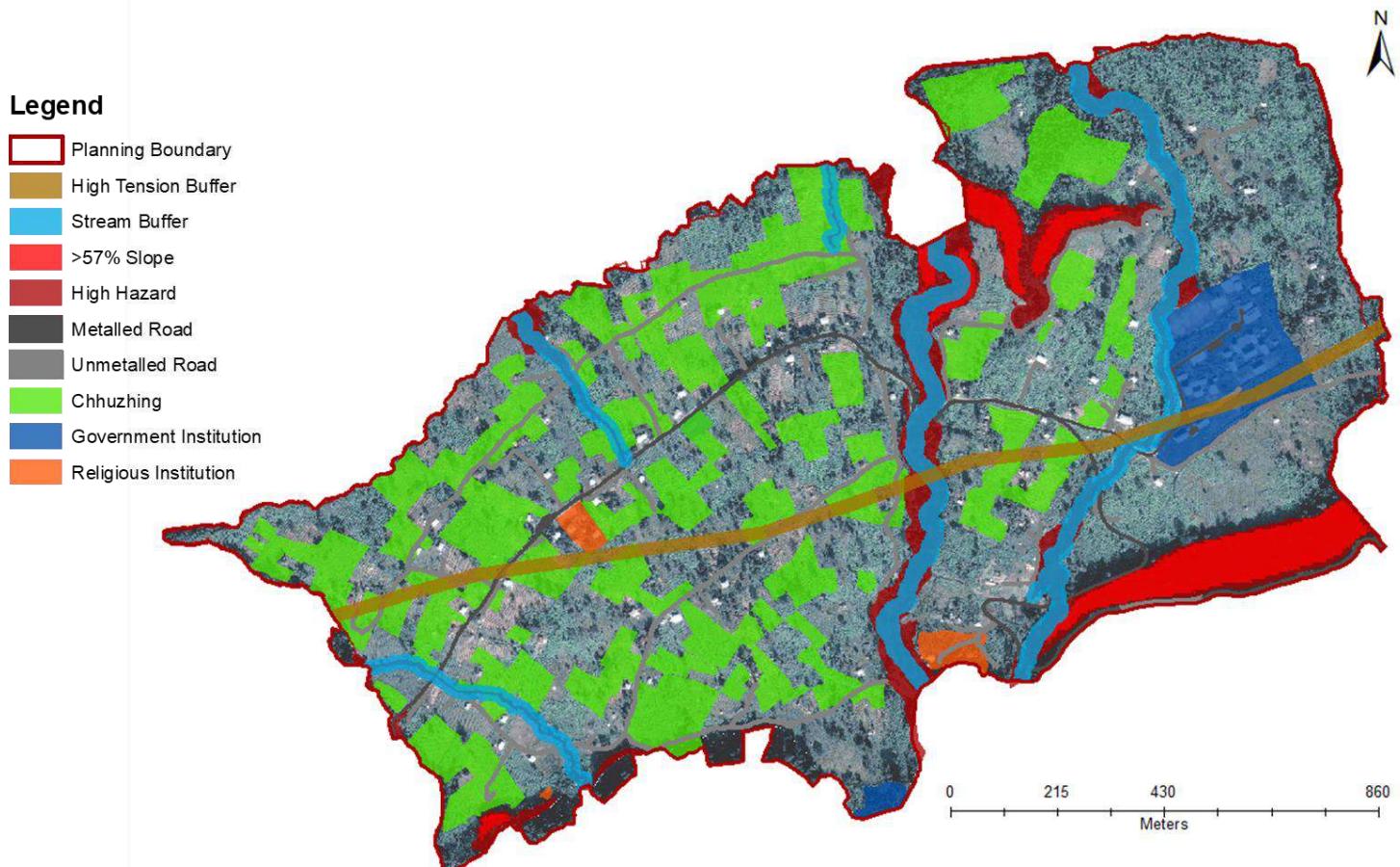
Moreover, the areas falling within the Right of Way of the proposed roads are considered undevelopable and unbuildable. The institutional lands and the existing structures are excluded from the total suitable area, in order to derive the actual total area for development.



Sonamthang Action Area Plan

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The developable area has flat terrain and existing land uses are also compatible for future development. The plots in developable area are registered as kamzhing, residential and other developable types. The developable area comes to about 55% of the total area.



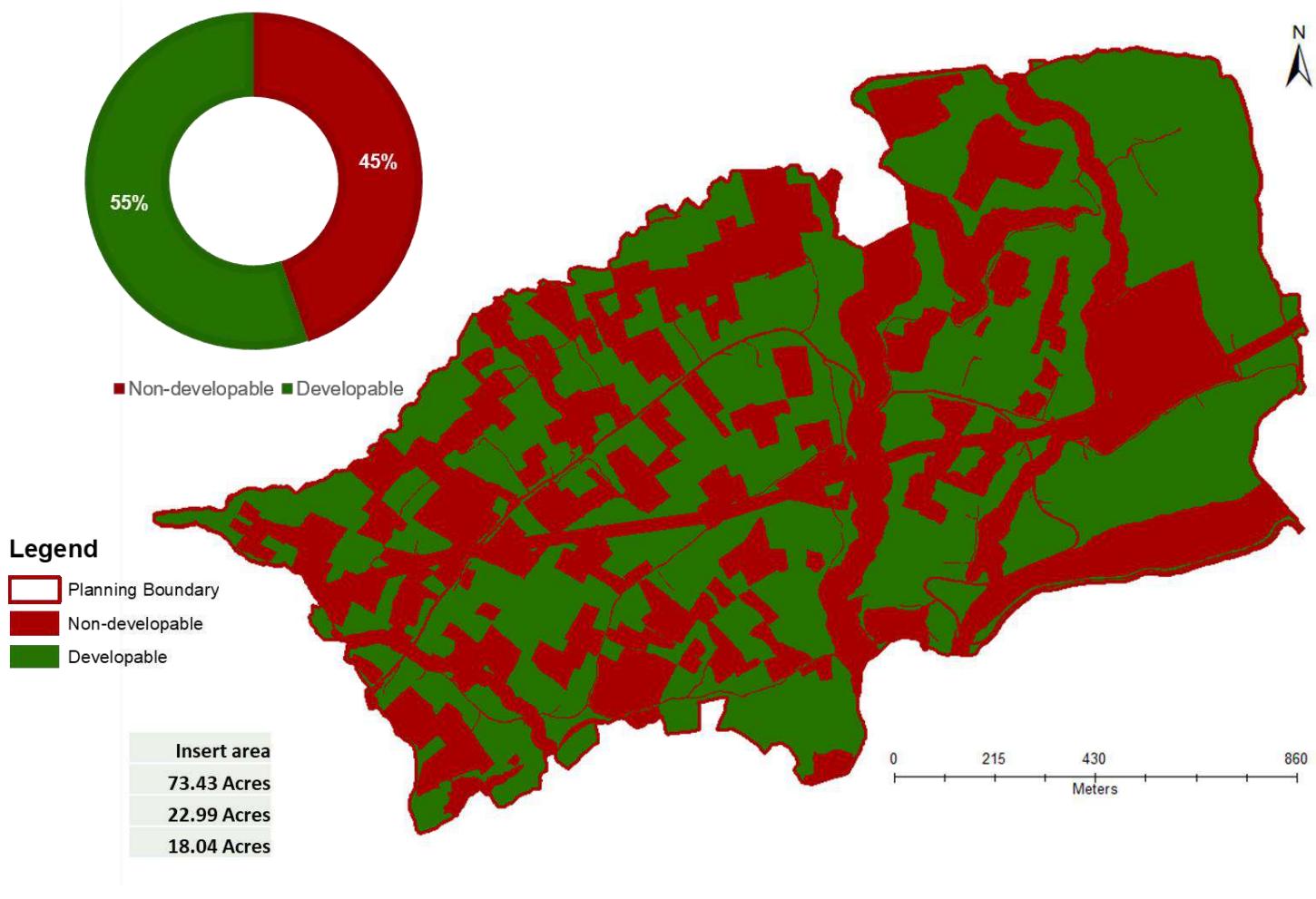
Map 3.8 Develop -ability Parameters

Table 7 Undevelopable Area

Sl #	Deduction	Area	
		Sqm	Acre
1	Chhuzhing	532368.855	131.495
2	Environment Conservation E-1	359948.242	88.907
3	Metalled Road	22205.000	5.485
4	Unmetalled Road	26963.375	6.660
5	Government Institution	83821.540	20.704
6	Religious Institution	15293.345	3.777
Total Undevelopable Area		1040600.356	257.028
Total Planning Area		2185388.601	539.791

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3.14 Socio-Economic Analysis

Planning team from Department of Human Settlement along with the local government officials conducted a socio-economic household survey in October, 2019. The survey covered a total of 200 households accounting to 1340 persons with 677 females and 663 males. Almost 100% of the total households in the Sonamthang planning area were covered. The survey questionnaire consisted of three parts, the household information, socio-economic section and a section for gathering peoples' aspirations for Sonamthang, which was kept as open-ended. A sample questionnaire can be found in the Annexure.

3.14.1 Stakeholder Analysis

Stakeholder analysis is an important tool to identify and analyze the needs of the people, organization and agencies that have major or minor influence on the project. Sonamthang

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Sonamthang Action Area Plan

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Action Area Plan will have major influence on the local people residing within the planning boundary, the local governments (Ngangla Gewog, Panbang Dungkhag and Zhemgang Dzongkhag Administrations), the private sectors; and the government and religious institutions established within the area. The forest office, the River Guides of Panbang, Milk Processing Unit run by ex-army and the Youth-In-Progress group will also be affected by the Plan.

The Sonamthang Action Area Plan was prepared in partnership with the stakeholders and the community. The planning team worked with the community to discuss their aspirations for Sonamthang.



Figure 3.6 Socio-Economic Survey



Figure 3.7 Stakeholders of Sonamthang

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3.14.2 Demographic Analysis

According to the socio-economic survey carried out in October, 2019, the resident population of Sonamthang was 1340 of which 50.5% were female and 49.5% were male. It is inclusive of the institutions namely, Sonamthang Central School, Sonamcholing Dratshang, Yoeselcholing Nunnery and Peling Choekhang. There are a total of 200 households.

- Occupation of Residents

According to the survey, 21.19% of the total residents are farmers and 22.7% are students, who attend the ECCD, Panbang Primary School and Sonamthang Central School. 10% of the residents are civil servants and very few are private employee. There are huge proportion of unemployed people (38%), whereby the housewives are also subsumed under this category.

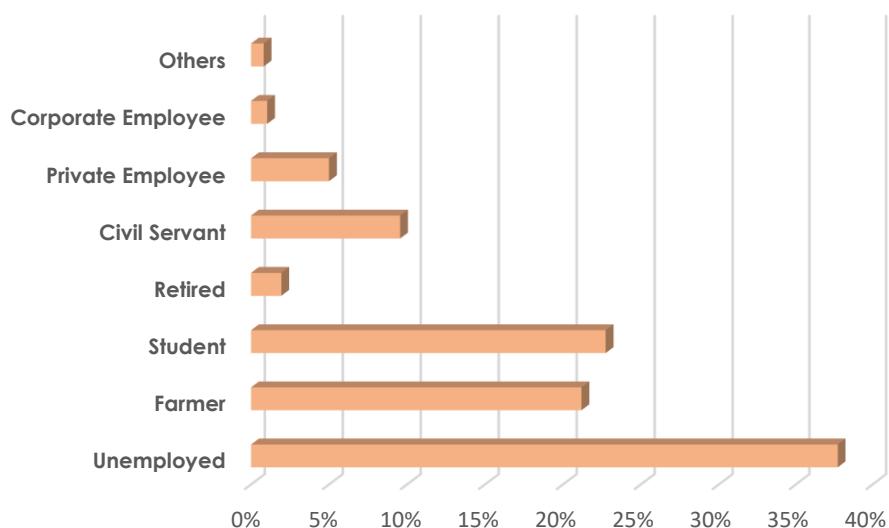


Figure 3.8 Occupation of Residents

- Qualification

Major portion of the residents in Sonamthang are illiterate, consisting of 48%. 23% has attained secondary education and 21% has availed primary education. Very few have attended university for diploma and degree certificate.

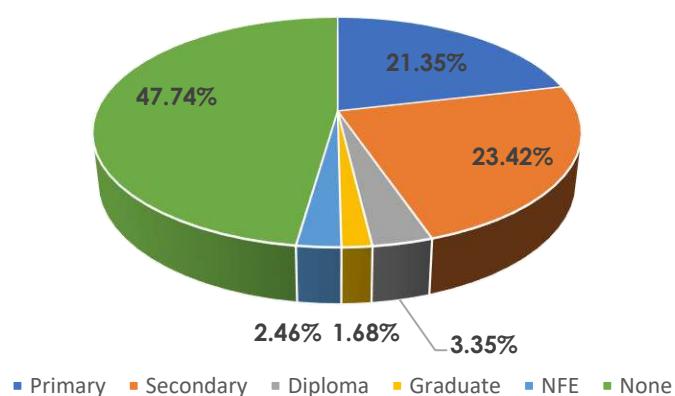


Figure 3.9 Qualification





- Literacy Rate

According to this survey, individuals were considered literate if they are able to read and write either in Dzongkha or English. For the purpose of this analysis, individuals 6 years and over enrolled in schools are also considered literate. Of the surveyed, 52% of the residents are educated, whereas rest 48% are illiterate.

The cross-tabular analysis in Table shows that most farmers (74% of the total farmers) did not attend school. Whereas majority of the students are attending primary and secondary schools.

Table 8. Occupation -Education Cross-Tabular Analysis

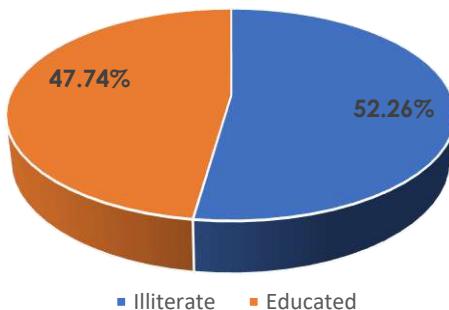
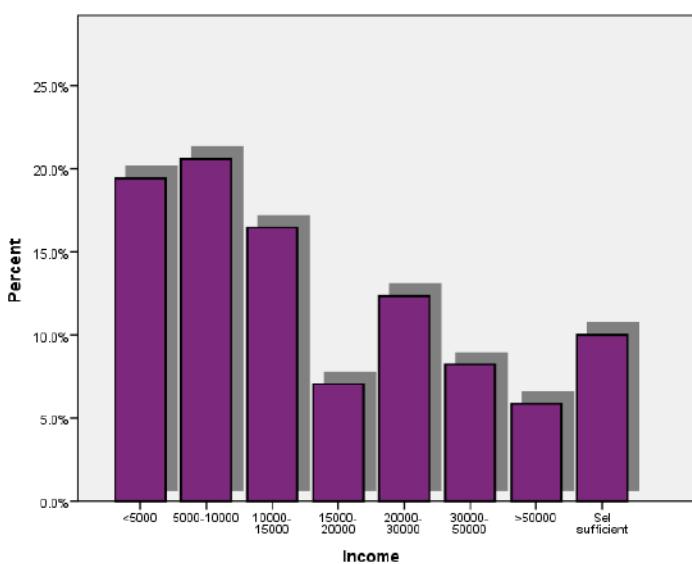


Figure 3.10 Literacy Rate

		Occupation								
		Unemployed	Farmer	Student	Retired	Civil Servant	Private Employee	Others	Corporate Employee	Total
Education	None	71.5%	73.8%	1.7%	80.0%	17.6%	25.0%			47.7%
	Primary	6.9%	8.5%	61.9%	13.3%	14.9%		25.0%		21.3%
	NFE	2.7%	3.7%			4.1%	25.0%		25.0%	2.5%
	Secondary	17.5%	14.0%	35.2%	6.7%	25.7%	50.0%	50.0%		23.4%
	Graduate	1.4%		0.6%		21.6%		25.0%	50.0%	3.4%
	Diploma			0.6%		16.2%			25.0%	1.7%
	Total	100.0%	100.0 %	100.0 %	100.0 %	100.0%	100.0%	100%	100%	100%

3.14.3 Economic Analysis

- Household Income



As observed from the graph (Figure 3.11), majority of the households earn up to Nu.15000 per month. It can also be explained that most of the farmers practice subsistence farming, thereby, the category of 'self-sufficient' has also been introduced.

Figure 3.11 Household Income



Sonamthang Action Area Plan



- *Vehicle Ownership*

Only around 30% of the residents of Sonamthang own vehicles, whereas the rest 70% does not. This figure portrays the high walkability within Sonamthang.

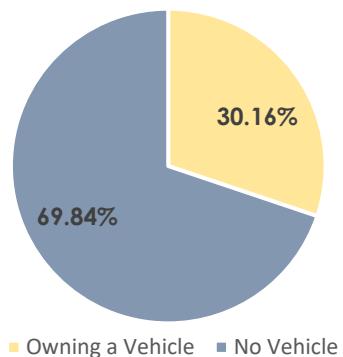


Figure 3.12 Vehicle Ownership

■ Owning a Vehicle ■ No Vehicle

- *Agricultural Production*

Since agricultural practices is a major economic base for Sonamthang, the socio-economic survey included asking questions pertaining to the increase or decrease of the agricultural production over the years. Through the survey, it was recorded that 63% of the people (mostly the farmers) responded that the agricultural production has increased over the past few years. As analyzed in Table 9, the improvement in its production was mainly due to the government support in terms of distribution of seeds, followed by the road connectivity and the effort that the farmers put in. 15% of the respondents answered that the production has decreased owing to the labour shortage and wildlife conflicts. This correlates to the outmigration that the Dzongkhag has experienced.

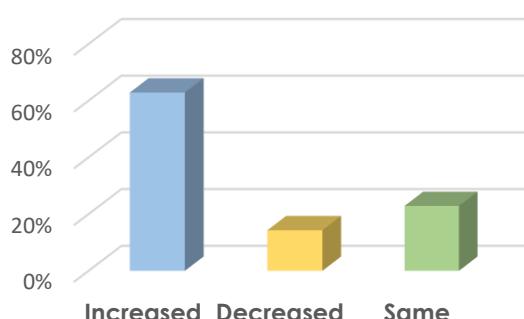


Figure 3.13 Change in Agricultural Production

Table 9 Reasons for Change in Agricultural Production

		Agricultural production			Total
		Increased	Decreased	Same	
Reasons	Road Connectivity	18.4%			13.8%
	Irrigation	8.2%			6.2%
	Heavy Rain	2.0%	8.3%	25.0%	4.6%
	Wild Life	2.0%	33.3%	75.0%	12.3%
	More Effort	14.3%			10.8%
	Labour Shortage		50.0%		9.2%
	Government Support	55.1%	8.3%		43.1%
Total		100.0%	100.0%	100.0%	100.0%





3.14.4 Social Analysis

- Recreational Activities

There are a range of informal public open spaces located within the planning area, however, they are within the institutional and private premises. When inquired about the recreational activities that the local people take up, majority (44%) responded that they use the school grounds to play football, however, due to the school activities, they often do not get to use the ground. They also use other open grounds, which are privately owned. It is important for the plan to provide clear links to the existing established open spaces.

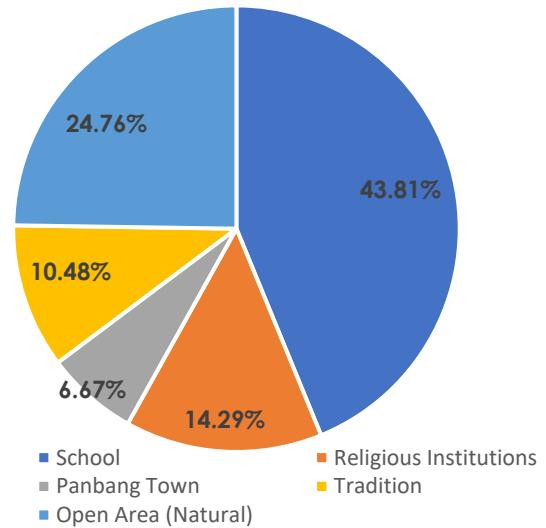
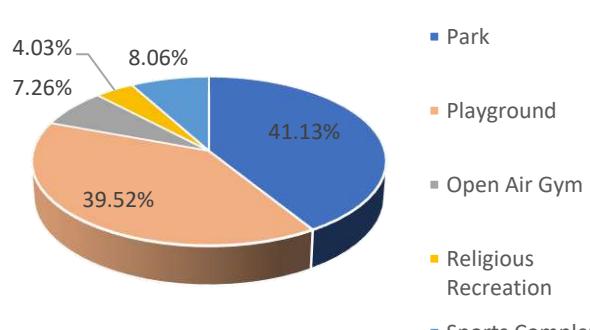


Figure 3.14 Recreational Activities



Figure 3.15 Community Sports Tournament at Panbang Primary School



- Requirement for Recreational Facilities

41% of the respondents voiced requirement for parks, which will cater to all age groups, followed by playgrounds for children. 8% raised requirement for sports complex and 7% for open air gym.

Figure 3.16 Requirement for Recreational Spaces





3.14.5 Structure Analysis

- Frame Type

In the construction industry, the term 'frame' typically refers to a rigid structure that supports a building. In Sonamthang, 68% of the structures has load bearing frame, whereby the loads get transferred from slabs to the foundations through walls. Meanwhile, 23% are structurally framed, which means that the loads from slabs get transferred to beams, beams to columns and finally from columns to the foundation. Through the house type and frame type cross tabular analysis, majority of the framed structures are modern, which implies that these structures are RCC buildings. It can also be inferred that majority of the load bearing structures are traditional and semi-traditional houses.

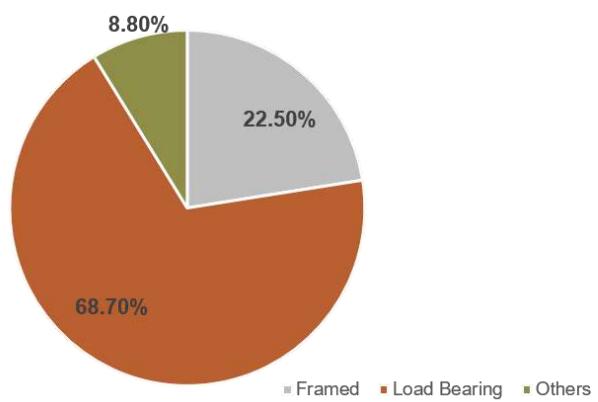


Figure 3.17 Structural Frame Type

Table 10 House Type - Frame Type Cross Tabular Analysis

		House Type				Total
		Traditional	Semi-traditional	Moder n	Others	
Frame Type	Framed	7.8%	21.3%	76.9%	11.8%	22.7%
	Load Bearing	90.9%	73.8%	23.1%	17.6%	68.5%
	Others	1.3%	4.9%		70.6%	8.8%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

- Building Structure Matrix

From Table 11 and 12, it can be inferred that majority of the traditional houses are made of stone masonry and are of more than 10 years old. Several years back, the buildings are built with traditional façade, whereas this is changing as buildings constructed using concrete are now added to the mix in the recent years. There are other buildings, which are constructed using bamboo and ekra; and very few are constructed using brick masonry and timber.





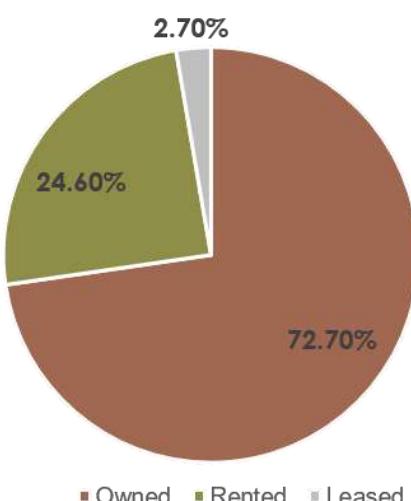
Table 11 House Type - Material Type CrossTabulation

		House Type				Total
		Traditional	Semi traditional	Moder n	Others	
Material Type	Concrete	14.3%	39.3%	80.8%		30.9%
	Bamboo				29.4%	2.8%
	Ekra	7.8%	11.5%	3.8%	52.9%	12.7%
	Brick Masonry	2.6%	1.6%			1.7%
	Stone Masonry	72.7%	34.4%	15.4%		44.8%
	Timber	2.6%	13.1%		17.6%	7.2%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Table 12 Building Age - Material Type CrossTabulation

		Building Age			Total
		<10 Years	10-13 Years	13-25 Years	
Material Type	Concrete	41.6%	11.4%	21.1%	31.8%
	Bamboo	3.5%	2.3%		2.8%
	Ekra	14.2%	4.5%	15.8%	11.9%
	Brick Masonry	2.7%			1.7%
	Stone Masonry	31.0%	75.0%	63.2%	45.5%
	Timber	7.1%	6.8%		6.2%
Total		100.0%	100.0%	100.0%	100.0%

- Housing Ownership



Sonamthang has high house ownership rate, whereby, 73% of the total respondents own a house in the planning area. On the other hand, 25% of the respondents are living in rental units; and 3% are living on leased lands. It is also analyzed that majority of the rented units are located in buildings, which are less than 10 years old.

Figure 3.18 House Ownership





Table 13 Ownership - Building Age Cross-Tabulation

		% within ownership			
		Ownership			Total
		Owned	Rented	Leased	
Building Age	<10 Years	58.8%	81.0%	80.0%	64.6%
	10-13 Years	28.2%	14.3%	20.0%	24.7%
	13-25 Years	13.0%	4.8%		10.7%
Total		100.0%	100.0%	100.0%	100.0%

- Housing Ownership -Income

From the table below, it can be inferred that 100% of the respondents who earn less than Nu.5000 per month have their own building in Sonamthang. Those earning more than Nu.15000 per month are civil servants, business owners and staffs of other institutions, who live in rental units.

Table 14 Income - Ownership CrossTabulation

		Income								
		<5000	5000-10000	10000-15000	15000-20000	20000-30000	30000-50000	>50000	Self sufficient	Total
Ownership	Owned	100.0%	85.7%	67.9%	58.3%	38.1%	28.6%	30.0%	94.1%	70.6%
	Rented		14.3%	17.9%	41.7%	61.9%	71.4%	60.0%	5.9%	26.5%
	Leased			14.3%				10.0%		2.9%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

3.14.6 Perceptions and Aspirations

- Physical Infrastructure Requirements

From the analysis, the most required infrastructure in Sonamthang is identified to be metaled roads, followed by streetlights and water supply. Recreational spaces are also required, which will provide space for the children and adults to play and relax during free time.



Sonamthang Action Area Plan

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Table 15 Descriptive Statistics for Infrastructure Requirements

Descriptive Statistics		
	N	Mean
Roads (Metalled)	102	2.09
Streetlight	118	2.36
Water Supply	87	2.97
Recreational	108	3.08
Footpath	96	3.13
Bus Stop	85	3.19
Solid Waste	80	3.21
Others	6	3.33
Drainage	96	3.39
Sewerage	57	3.68

Figure 3.19 Word Cloud Illustration for Infrastructure Requirement

- Best Features of Sonamthang

Upon asking the local residents about the best features of Sonamthang, most (52%) responded that it is due to their sense of belonging for having been brought up in Sonamthang or due to having stayed there for a long period of time. Meanwhile, 15% responded that the best feature of Sonamthang is its peacefulness and 10% answered that it is owing to the rich natural landscape.

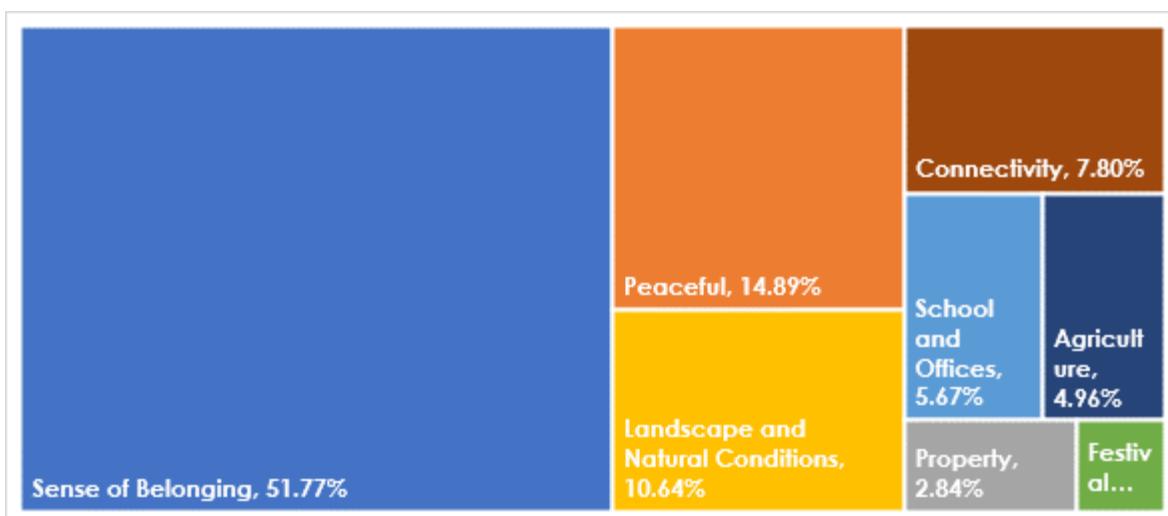
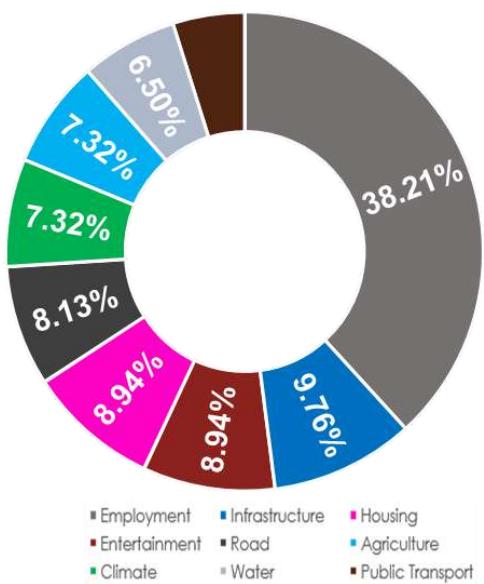


Figure 3.20 Best Features of Sonamthang

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- Critical Issues in Sonamthang

Unemployment amongst youth is cited as the most critical issue in Sonamthang, which is in line with the data submitted by the Ngangla Gewog Administration. The next issue is pertaining to the lack of quality infrastructure, followed by lack of entertainment and housing.

Figure 3.21 Critical Issues

- Major Problems

The major problem in Sonamthang is identified as transport, which was described by the respondents as lack of public transportation for intra- and inter-mobility. The next problem stated is agriculture especially in terms of difficulty to address wildlife issue; and lack of quality housing.



Figure 3.22 Word Cloud for Major Problems

Table 16 Descriptive Statistics for Major Problems

Rank Wise Major Problems	Mean
Major Problems-Transport	1.82
Major Problems-Agri	1.93
Major Problems-Housing	2.05
Major Problems-Infrastructure	2.28
Major Problems-Industry	2.39
Major Problems-Utility service	2.49
Major Problems-others	2.59
Major Problems-Health	2.74
Major Problems-Education	2.90



- Improvement of Quality of Life

Over the years, 93% of the respondents mentioned that the quality of life has improved. While analyzing the reasons, the major reason for the improvement is due to the construction of infrastructure such as electricity and road. These infrastructures have made their lives easier and more convenient as compared to the past. The emerging trend of development, especially in terms of constructions of buildings is another major reason for the improvement in the quality of life in Sonamthang.

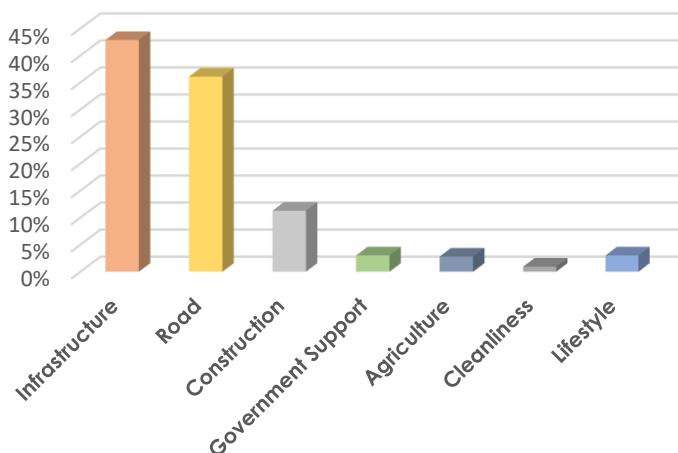


Table 17 Frequency Table for Quality of Life

Quality of Life Over Past Years	Frequency	Valid Percent
Declined	1	.7
Stayed Same	11	7.2
Improved	141	92.2
Total	153	100.0

Figure 3.23 Improvement of Quality of Life

- Potential for Economic Development

Socio-economic data displays that there is huge potential for Sonamthang to develop as an agriculture and tourism based settlement. There is also an opportunity for industry development such as for bamboo and cane based crafts; and others such as livestock.



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Figure 3.24 Potential for Economic Development

- Aspirations

Majority of the people residing in Sonamthang aspires for town development, which was described as having town infrastructure and services. They also aspire for Sonamthang to have designated recreational spaces, where people of all age groups can play. They also expressed that any future development of these areas should positively contribute to their economic and social well-being.



Figure 3.25 Word Cloud for Aspirations

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3.15 SWOT Analysis

STRENGTH

30% of the total plots in Sonamthang are Chhuzhing, which will enhance people's vision for Sonamthang to be developed as agriculture-based area. Moreover, 91% of the plots are more than 13 decimal in size, which is feasible for construction of houses. Sonamthang is accessible to Nganglam via Nganglam-Panbang highway, which has additional benefit for Sonamthang in terms of bringing it closer to the market. Its proximity to RMNP and twin waterfall adds huge potential to Sonamthang for enhancing tourism and providing job opportunities to the people. There are two resorts in Sonamthang to cater to the tourists. The average slope of 11% and 81% of the land falling under low hazard make Sonamthang favorable for development.



Figure 3.26 Agriculture Field (left) and Twin Waterfall (right)

WEAKNESS

Sonamthang has unfavorable summer with an average temperature of 21 degree Celsius and high rainfall. There are no designated recreational areas in Sonamthang for people of all ages. Sonamthang lacks quality infrastructure and housing. The negative growth rate of Dzongkhag i.e., -0.39% implies that there is outmigration.

OPPORTUNITY

Touristic activities such as rafting, bird watching, hiking and trekking trails in the region provides ecotourism opportunities for Sonamthang. There is also an opportunity to develop and enhance the handicraft tourism specializing in local bamboo and cane products. If the 1100MW Manas hydroelectric project comes up, it will provide economic opportunities to Sonamthang.



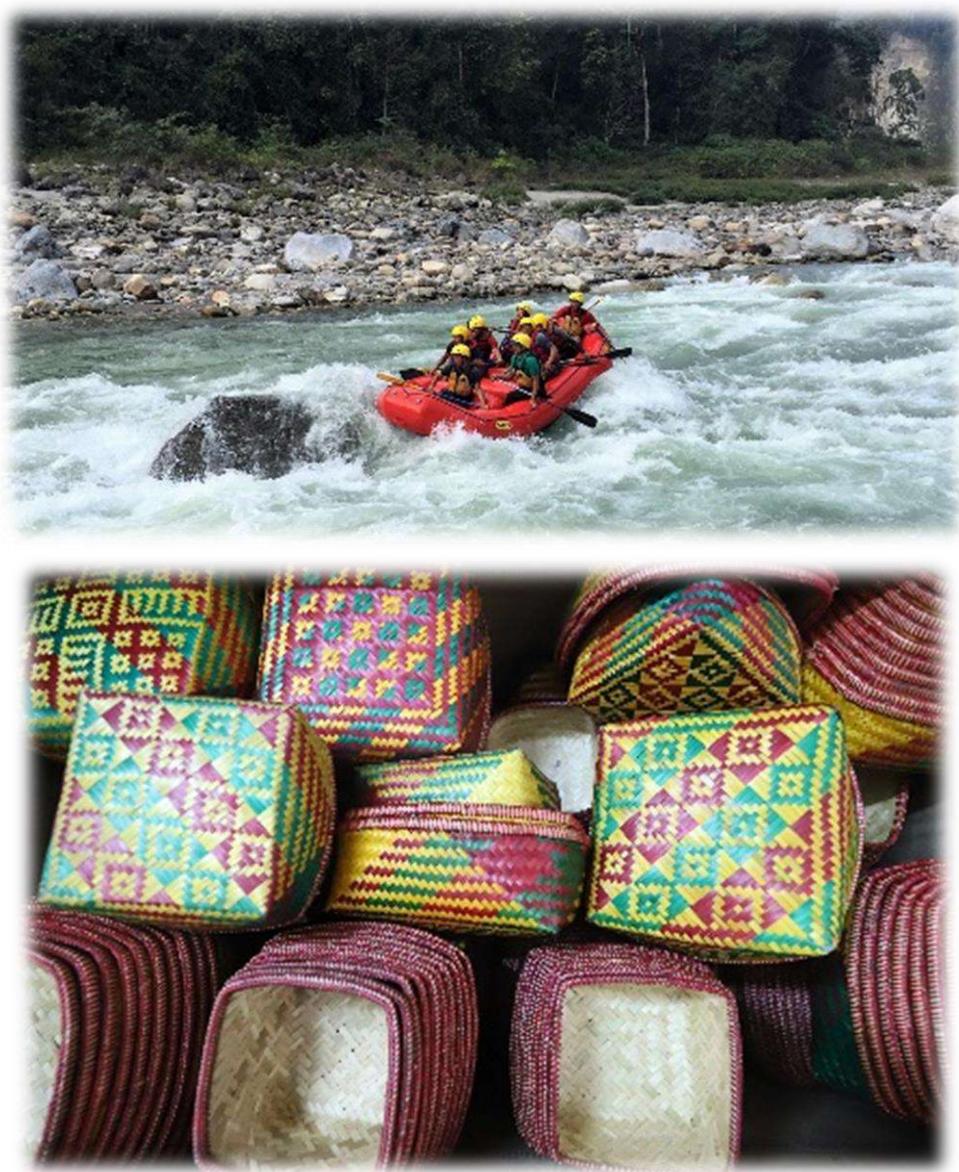


Figure 3.27 River Rafting (top) and Bangchung (bottom)

THREAT

The unplanned development in Sonamthang may deteriorate the natural and cultural landscape of Sonamthang. If proper intervention is not proposed, there will be risk of losing agricultural land to development. Through socio-economic household survey, it was raised that there is wildlife affecting agriculture. And as per the Geotechnical study, there is risk of flooding from nearby streams during rainy season and risk of seismic shaking, as the planning area is located very close to Main Boundary Thrust and Main Frontal Thrust.



Sonamthang Action Area Plan

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Figure 3.28 Unplanned Development (left) and Flashflood (right)

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CHAPTER 4

PLANNING PROPOSAL





4. PROPOSAL

4.1 Vision

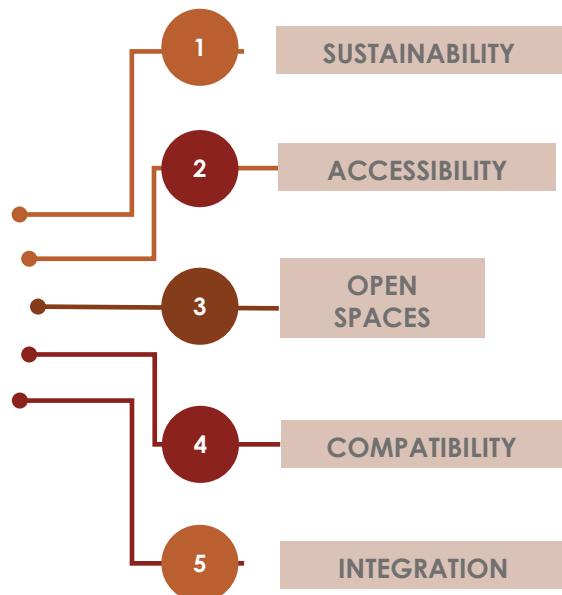
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Sonamthang is envisioned to be developed as an agriculture, nature and craft based settlement in harmony with its surrounding. The vision involves a collective reflection of the whole community and their aspirations for Sonamthang for the future. The Plan will build on Sonamthang's attributes and opportunities to achieve the vision.

4.2 Guiding Principles

The guiding principles consists of five defining elements that embody the foundation of Sonamthang Action Area Plan's goals, policies, standards, guidelines and action items. These principles will facilitate and guide the integrated development of Sonamthang in order to realize the vision.

FIVE PRINCIPLES



1. **Sustainability:** to ensure environment, social and economic sustainability.
2. **Accessibility:** to provide adequate travel corridors and mobility for all.





3. **Open Spaces:** to create open and green spaces for all while preserving watersheds and other natural features for healthy, resilient and sustainable environment.
4. **Compatibility:** to ensure that the building character and scale should reflect the needs, capacity, local and cultural characteristics of the area.
5. **Integration:** to develop Sonamthang in harmony with its town and villages.

4.2.1 Sustainability

ENVIRONMENTAL SUSTAINABILITY

1. To provide a clear delineation between settlement and non-settlement areas. The very first and foremost step to develop Sonamthang as an agriculture- and tourism-based village is to protect the existing natural features and to adopt and enhance the economic activities related to it. In pursuance of this, the agricultural lands, forests and steep slopes need to be conserved and developments shall be prohibited in these areas.
2. A priority is also to preserve the area's sensitive and ecologically fragile environment and forest area by designating it under conservation precincts. Moreover, provision of buffer will be kept for streams as per the Forest and Nature Conservation Rules of Bhutan 2006.
3. To ensure environmental sustainability, adoption of sustainable and climate-resilient infrastructure will be promoted.
4. The mitigation measure for risk reduction is proposed.

SOCIAL SUSTAINABILITY

1. To protect the existing cultural sites such as lhakhangs, chortens etc.
2. To propose for open recreational spaces for all segments of the community.
3. To propose for a community hall, which will provide both the facility and activities for the wellbeing of people living in the area.
4. To create a place where people of all ages and gender can enjoy walking, shopping, seeing and meeting others, developing their social networks.

ECONOMIC SUSTAINABILITY

1. Agricultural products outlets such as farmer's market and sheds shall be provided for easy and accessible market for the farmers.





2. Furthermore, to support and enrich the agricultural practices, proper layout for irrigation canal shall be implemented.
3. Facilitate community-based Tourism Activities.
4. River transport through integration of Drangme Chhu and Mangde Chhu with Sonamthang, Panbang and Tungkudempa is proposed. These areas will be connected by the river through boat and rafting, which will also attract tourists.

4.2.2 Accessibility

1. Propose for widening of the existing primary and secondary roads; and for new roads forming a network of three hierarchies of roads.
2. In order to facilitate better pedestrian connectivity and open space permeability, on-street and off-street footpaths are proposed. Safe, well-connected footpath will also provide high amenity linkages between localized activities and surrounding areas. The plan will also promote safe movement of vehicular and pedestrian traffic.
3. Provision of a loop of bicycle tracks to promote healthy and active living. It is also to enhance Sonamthang's economic activities as tourist-based area.
4. Provision of inclusive, safe and sustainable infrastructure along the roads and footpaths such as wheelchair access, street furniture, soft landscaping, bus stops, street signages, etc.

4.2.3 Open Spaces

The objective of the Plan is to build environments that encourage more people to be physically active more often. By doing so, we can create spaces that contribute to important health, wellbeing and social benefits to people and their communities. This is a central ingredient to building vibrant and prosperous communities. The strategies under this principle are to create:

- “ diverse and interconnected open spaces for all age groups.
- “ open spaces with climate-resilient infrastructure.
- “ a network of open spaces.
- “ Stream Development to provide recreational space for the people of Sonamthang; and also to complement different tourist activities of Sonamthang.





4.2.4 Compatibility

- “ Buildings will need to respond to the topography and natural features; and need to be constructed with all the required features set in the Bhutanese Architecture Guidelines 2014 respecting the local architecture.

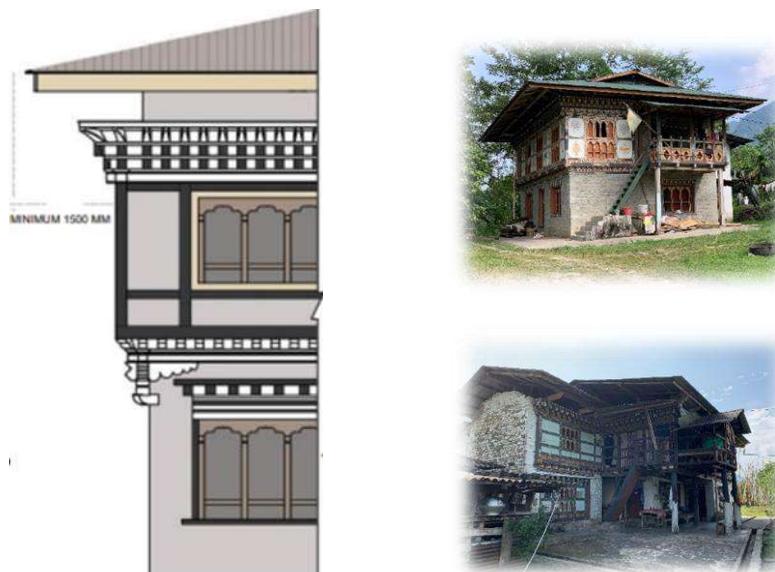


Figure 4.1 Traditional Building Facade

- “ Ensure that new developments are of appropriate scale and form by respecting the prevailing built form and character of Panbang. The new development and existing building renovations should reflect the integrity of the traditional architecture. Otherwise, Sonamthang’s built-form scale and character that reflects their identity, will be on the cusp of forever being transformed.
- “ Ensure that the uses of the land are compatible.

4.2.5 Integration

- “ The Plan focuses on enhancing and integrating different uses such as commercial, residential, institutional etc., to provide the residents of Sonamthang with the most basic amenities and services, for day-to-day functioning of their lives.
- “ Based on the development plans of Tungkudempa and Panbang, Sonamthang will act as a transitory settlement between the towns and the nature. The plan is basically to adopt the Transect Model. New development should incorporate elements that reduce impacts and make the transition from one precinct to another gradually rather than abruptly.
- “ While the Commercial activity is intense in Panbang town, Sonamthang will focus on agricultural activities and will be developed as a resort based village.





4.3 Proposed Precinct Plan

The Precinct Plan is a vital blueprint for an area which defines and guides development in an area through mix of permissible uses. The Precinct Plan ensures that all the available land for development are optimally utilized in a sustainable manner. The entire area is divided into following precinct categories: Urban Village-1, Urban Village-2, Institutional-1, Recreational-2, Cultural-2, Agriculture-2, Environmental, Service-1, and Transport-1. The buffer areas and the Unsurveyed Areas are provided as an overlay. The precincts have been designated after a careful consideration of the existing scenario in terms of terrain and topography, physical infrastructure, scope for future development, geotechnical study, road connectivity, current land uses; and based on the residents' aspiration for Sonamthang. It provides a clear direction for conservation and protection of environmental, cultural and social assets of an area; and focuses on addressing population growth, housing, and other issues.

Other factors such as riparian corridors, high tension power lines and Chhuzhing are also taken into account. Another defining factor for the precinct designation is the "transect model", as illustrated in figure 4.2. Transect model is an urban planning tool that defines a series of zones that transition from dense urban core to sparse rural settlement. It is also a method which decreases the necessity for long-distance travel by any means. The applicability of transect model for Sonamthang Action Area Plan connote that while Tungkudempa and Panbang are proposed as Urban Core-1 and Urban Core-2 in Panbang Structure Plan 2018, Sonamthang will be developed as a less dense settlement with major focus on agriculture for the residents' livelihood.

- 1** **Urban Village 2 (Periphery) & UV-3 (Enclave):** predominantly medium density buildings.
- 2** **Urban Core-1:** predominantly high density buildings with major commercial activities.
- 3** **Urban Core-2:** predominantly high density buildings with mixed activities.
- 4** **Institutional:** predominantly medium density buildings and land use are mostly institutions.
- 5** **Suburban (Urban Village-1):** predominantly medium density buildings and mixed use.
- 6** **Rural (Urban Village-2):** predominantly open and agricultural practices; low density.
- 7** **Natural (Environmental Precinct):** predominantly land in wilderness conditions.

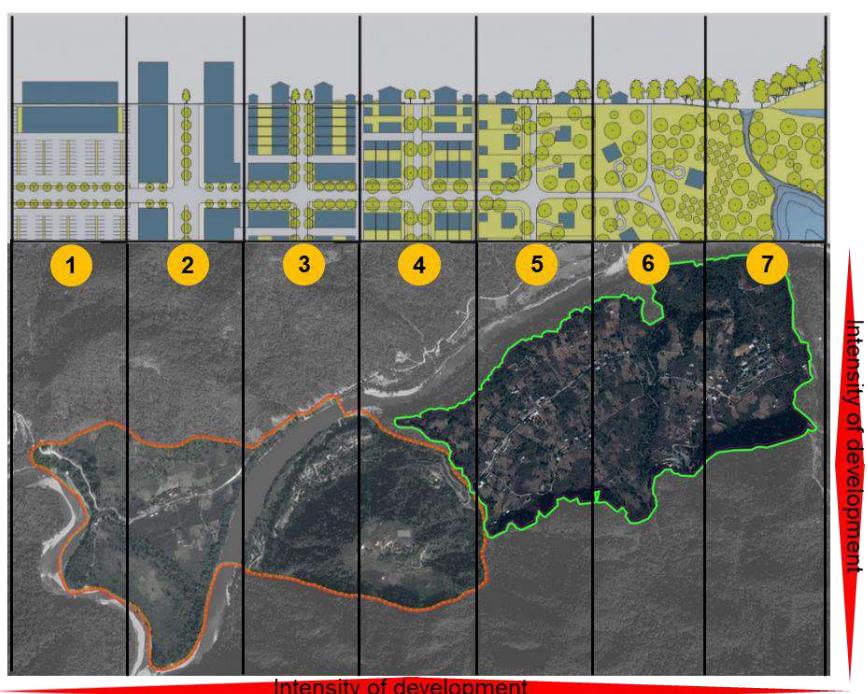


Figure 4.2 Conceptual Illustration of Transect Model for Sonamthang





4.3.1 Urban Village-1 (UV-1)

UV-1 is a precinct that promotes mixed use activities with some intensity of commercial activity. Since the two commercial cores are already proposed in Tungkudempa and Panbang, which are located in close proximity to Sonamthang, UV-1 is proposed, where the current commercial activities are located. It is located along the highway that runs through the middle of Sonamthang. This location not only has a gentler slope amenable to intensive development but is also easily accessible from all parts of the town. This reinforces the prime objective of locating all urban amenities and facilities within walking distances. Major commercial and retail activities for Sonamthang are proposed to be confined within this precinct.

4.3.2 Urban Village-2 (UV-2)

UV-2 is designated for residential development. Since the topography of Sonamthang is flat throughout the settlement, UV-2 is ideal for residential development. They may have neighborhood level retail shops to meet the basic needs of the people. It will reduce vehicle count on the main road.

4.3.3 Institutional Precinct 1 (I-1)

The existing institutions, namely the Sonamthang Central School, ECCD and Bhutan Power Corporation Ltd are retained in their originality. This is because they are not only already established in their respective areas but also provide important public services. This precinct is maintained as it is without any physical intervention, however, under avoidable circumstances, minimal adjustments are made for the holistic benefit of the community.

4.3.4 Recreational Precinct 2 (R-2)

The Recreational Precinct is another land use proposed in order to enhance the quality of life and living environment. A requirement for a sports complex came out strongly from the socio-economic survey, however, since a regional-level sports complex has already been proposed in Panbang Structure Plan, only neighborhood level recreational spaces are proposed in Sonamthang. These neighborhood level parks can be developed as open-air gym. Vegetation and plantation of trees in these areas will also help to beautify the area and make the local climate more pleasant especially during the hot summer months.

4.3.5 Cultural Precinct 2 (C-2)

According to the planning practices, the Dzongs, Ihakhangs, sacred sites and historic sites are designated as Cultural Precinct. The Sonamcholing Dratshang, Yoeselcholing Anim Dratshang and Peling Choekhang, within the Sonamthang planning premises have been marked as cultural precinct. These places play a vital role as a space for the community to gather and socialize.





4.3.6 Agriculture Precinct 2 (A-2)

Chhuzhings are designated as Agriculture Precinct, which are to be conserved for food self-sufficiency and also to maintain the cultural landscape. Conservation of the 230 chhuzhing plots in Sonamthang is critical in order to realize the vision of Sonamthang as an agriculture-based settlement. Development is prohibited in this precinct.

4.3.7 Environmental Precinct (E)

A network of protected spaces is proposed within the SAAP. This has been done to ensure the natural environment and the terrain and topography of the area are preserved. Areas under these precincts include environmentally fragile areas prone to landslide, flooding and other risks. Steep slopes and the community forests are also marked under this precinct. About 16.89 acres of Thinleygang Community Forest falls under the Sonamthang planning boundary.

4.3.8 Service Precinct 1 (S-1)

The essential public amenities, facilities and services have been grouped under the Service Precinct. It includes community hall and a farmer's market. These amenities are proposed based on the requirement of Sonamthang.

4.3.9 Transport Precinct 1 (T-1)

Besides the essential services proposed in Sonamthang, a taxi stand is also proposed, which is designated as Transport Precinct.

4.3.10 Buffer Zone

These include buffer along rivers and streams; around heritage structures and sites; along international boundary; and under HT lines. For Sonamthang, a buffer of 27m is maintained for the 132Kv high tension power line, as per the O&M Manual for Transmission Lines 201¹. The streams within the planning boundary are also provided 15m buffer from the bank or edge, according to the Forest and Nature Conservation Rules of Bhutan 200². These buffer has been maintained under Environmental Precinct.

4.3.11 No Data Area

The areas which were included within the planning boundary, however, were not surveyed are put under this precinct. These plots or areas were included within the planning boundary since there were no immediate human settlement beyond these plots.



Legend

- Planning Boundary
- Primary Road
- Secondary Road
- Tertiary Road
- Bicycle Track
- Footpath
- Environment Conservation
- Agricultural 2
- Cultural 2
- Recreational 2
- Institutional 1
- Service 1
- Transport 1
- Urban Village 1 UV-1
- Urban Village 2 UV-2
- No Data



Map 4.1 Proposed Precinct Plan of Sonamthang

**SONAMTHANG****ACTION AREA PLAN****PRECINCT PLAN**

Regional and Rural Planning Division
Department of Human Settlement
Ministry of Works and Human Settlement

SCALE: NTS



May 2021

Chief Urban Planner,
RRPD, DHS, MoWHSDirector,
DHS, MoWHSHon'ble Secretary,
MoWHSHon'ble Lyonpo,
MoWHS



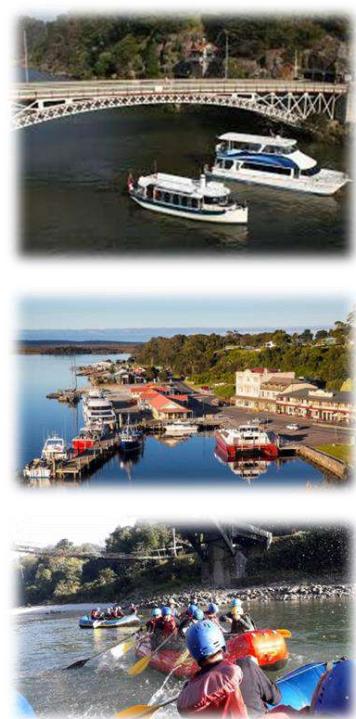
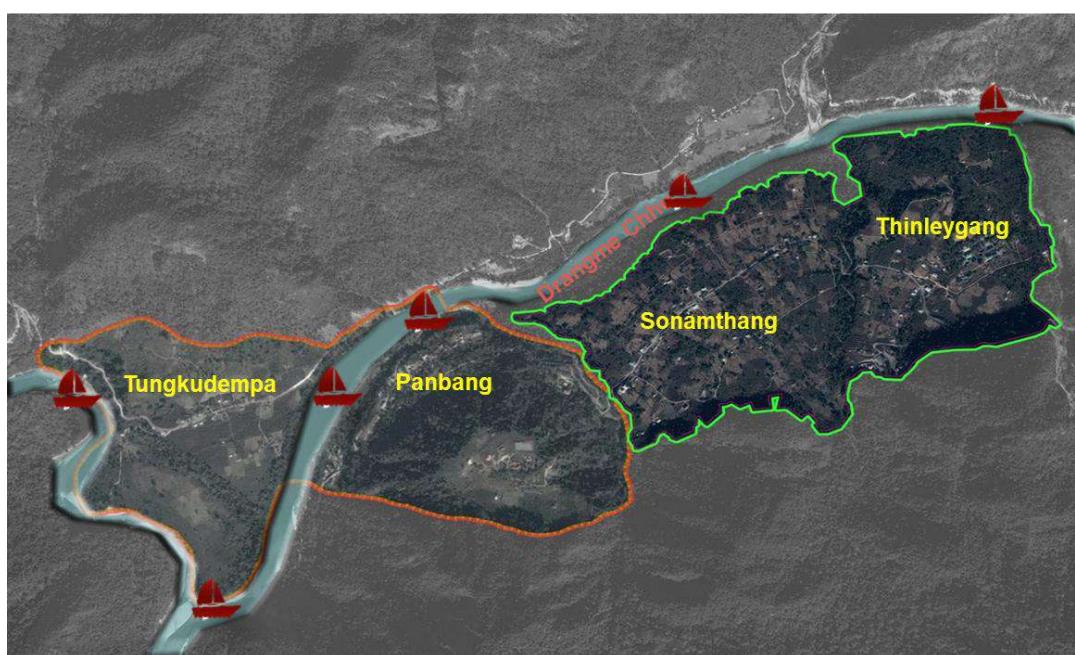
4.4 Proposal for Economic Development

As elicited from the development potential of Sonamthang, the Plan proposes for Sonamthang to focus on agriculture and tourism for its economic development.

In order to promote sustainable economic development, the economic activities should be profitable and economically viable. At the household level, the direct economic benefits for the households can be through involvement in agricultural production. It will benefit the households through self-employment, income from sales of surplus products, and savings on food expenditures. Through the plan, proper irrigation canal and farmer's market is also proposed, which will support the agricultural practices in Sonamthang. Additionally, fish and poultry farming is also encouraged by the Plan.

To further Sonamthang's growth as a tourism-based settlement, the Plan encourages utilization of available advantages. The Plan will foster a range of tourism opportunities for Sonamthang that complements with the well-recognized attractions of the region; and based on the utilization of their comparative advantages. Community based tourism activities such as river rafting, bird watching, wildlife safaris etc. is promoted.

The Plan also promotes the infusion of the rivers into the already available tourism spots that complement and reinforce Sonamthang's unique character, thereby transforming it into a truly memorable place and destination. The River transport through integration of Drangme Chhu and Mangde Chhu with Sonamthang, Panbang and Tungkudempa is proposed. These areas will be connected by the river through boat and rafting, which will also attract tourists.



Map 4.2 Proposed River Transport in Sonamthang



Sonamthang Action Area Plan

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Figure 4.3 Promotion of Bamboo and Cane for Craft-based Tourism

Moreover, there is also an opportunity to weave local crafts into the area in order to promote handicrafts. For that, cultivation of bamboo and cane should be encouraged. It will be further supported by the proposed craft bazaar in Tungkudempa town centre. To further support the growth of tourism, proper and adequate infrastructure and services shall be provided.

The unique landscape of Sonamthang is an added bonus, which has a potential to truly transform the area into a resort-village, whereby the planned community can also focus on the use of four seasons for tourist commercial, recreational resort and related activities.



Map 4.3 Existing Resorts in Sonamthang and Panbang

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Figure 4.4 Eco -Resorts

4.5 Proposed Connectivity

Sonamthang Action Area Plan proposes an integrated road network that achieves high level permeability and access for vehicles, pedestrians and cyclists. Further, to cater to the needs of multiple users, in an act to promote an integrated circulation network, better pedestrian connectivity will need to be facilitated. Emphasis is also given on integrating not only the automobile network but also to connect to the open spaces through provision of on-street and off-street footpaths to encourage healthy living.

4.5.1 Widening of Existing Roads & Provision of New Roads

While the Plan maintains the existing roads, it proposes for widening of the existing primary and secondary roads as specified in Table 18. It also proposes for network of three hierarchies of roads as follows:

- Primary Road: is proposed to have a ROW of 10m. It is part of the Panbang-Nganglam highway and is the main spine for the planning area.
- Secondary Road: is proposed to have a ROW of 7m. It connects all upper and lower parts of both Sonamthang and Thinleygang to the primary road. The activities along the secondary road is less traffic oriented.
- Tertiary Road: is proposed to have a ROW of 5.5m. This traffic is limited to household level. The street elements such as plantation, street light, median, drain, service duct, railing, crash barrier, retaining wall, CCTV, sign post, etc. are very important to make the streets viable and safe.

Table 18 Widths of Proposed Roads

Road Type	Existing width	Proposed width
Primary	5.6m	10m
Secondary	2.6m	7m
Tertiary		5.5m

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4.5.2 Provision of On-street & Off-street Footpath

In order to facilitate better pedestrian connectivity and open space permeability, on-street and off-street footpaths are proposed. 1.5 m footpath on both sides of Proposed Primary Road, 1m on one side of Proposed Secondary Road and 1.5 m on one side of the Proposed Tertiary Road is proposed. 2.2m off-street footpath is also proposed to ensure accessibility for all. It also serves as short routes connecting certain activities.



Map 4.4 Proposed Connectivity

4.5.3 Provision of Bicycle Tracks

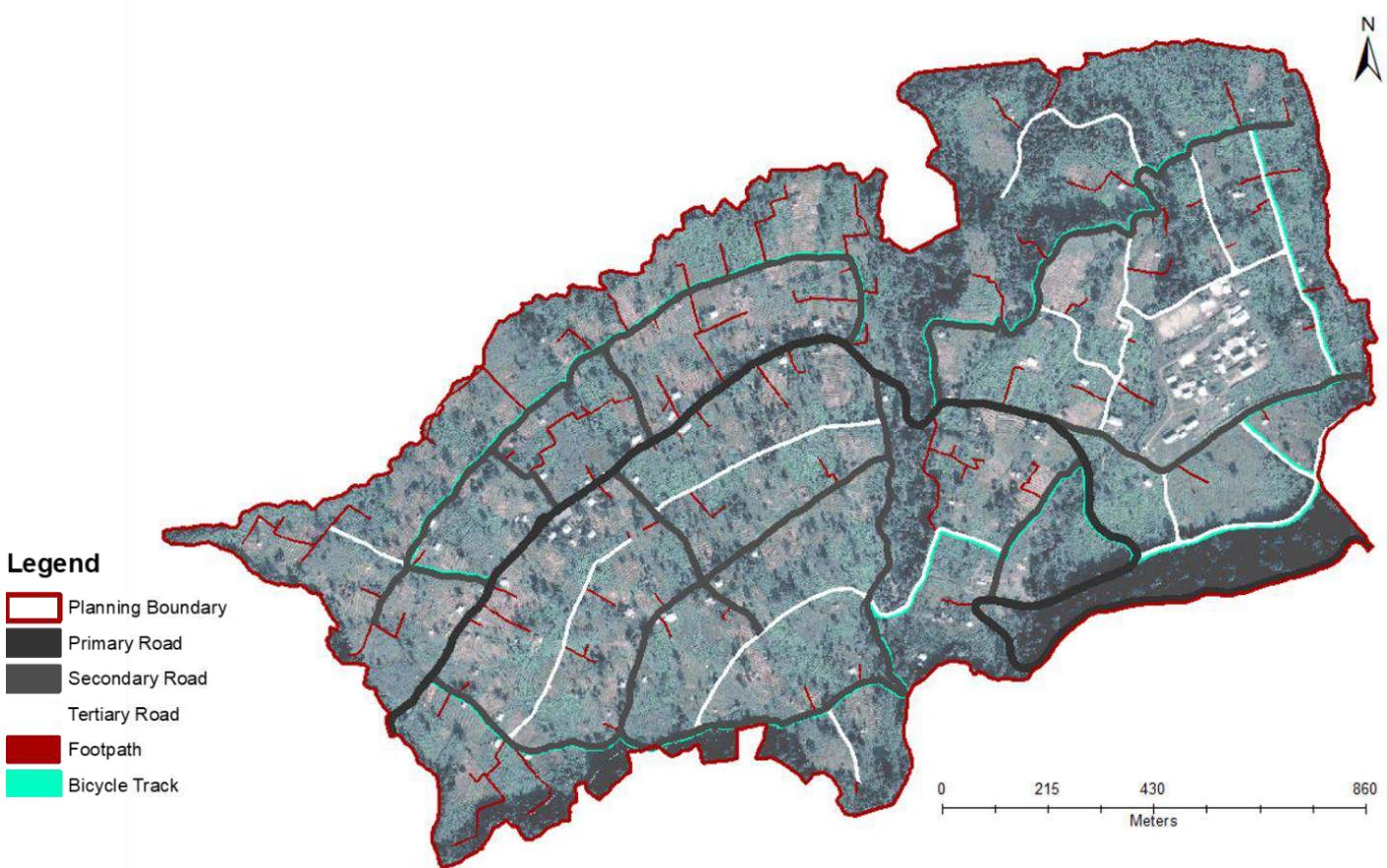
A loop of 1.5 m of space is provided along the road as bicycle track to promote healthy and active living, as seen in Map 4.5. It is also to enhance Sonamthang's economic activities as tourist-based area.





4.5.4 Provision of Sustainable Infrastructure

The plan also integrates enhanced pedestrian amenities such as sidewalks, street furniture, street lighting, incorporation of street trees, differently-abled friendly facilities, soft landscaping, bus stops, street signage, etc. These amenities will need to respect the inclusiveness and climate-resilient aspects.



Map 4.5 Proposed Footpath and Bicycle Track



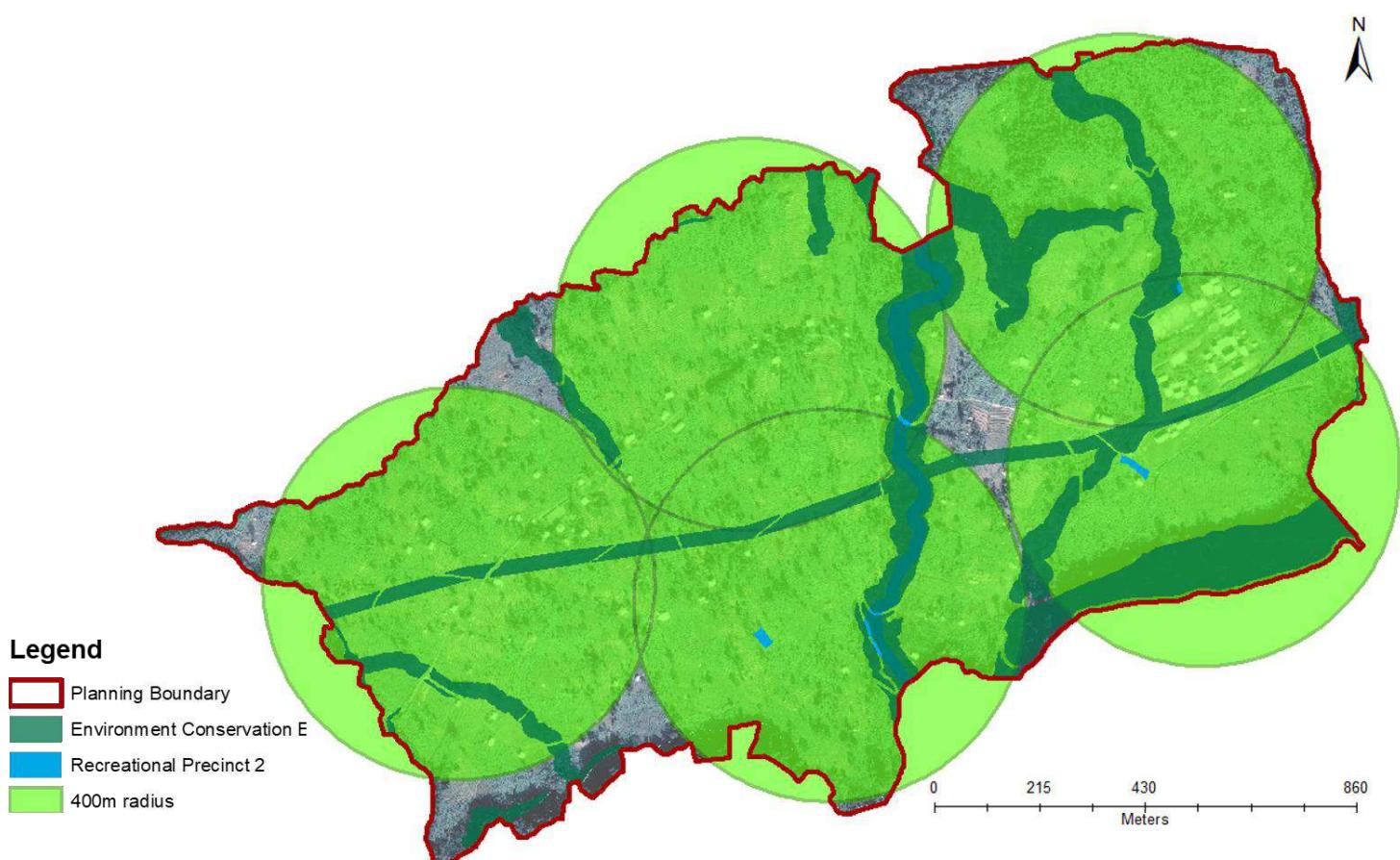


4.6 Proposed Open Space

There are myriad of different benefits that can be accrued from open spaces and recreational spaces in a neighborhood ranging from individual benefit to environmental, economic and community benefits. It will also promote healthier lifestyles. It can also greatly contribute to the positive identity, visual character and appeal of the settlement. Moreover, the people of Sonamthang have expressed strong interest in recreational spaces where they can play and socialize.

4.6.1 Recreational Space

The open space system in Sonamthang is proposed at local level. The Plan will facilitate creation of livable neighborhood local parks, small gardens and children playgrounds. For people to avail these open spaces at a comfortable biking and walking distance from where they live, these spaces will need to be provided in 400m from a given point, which is a 5 minutes' walk, as illustrated in Map 4.6. These open spaces will provide much needed opportunities for community recreation and social interaction.



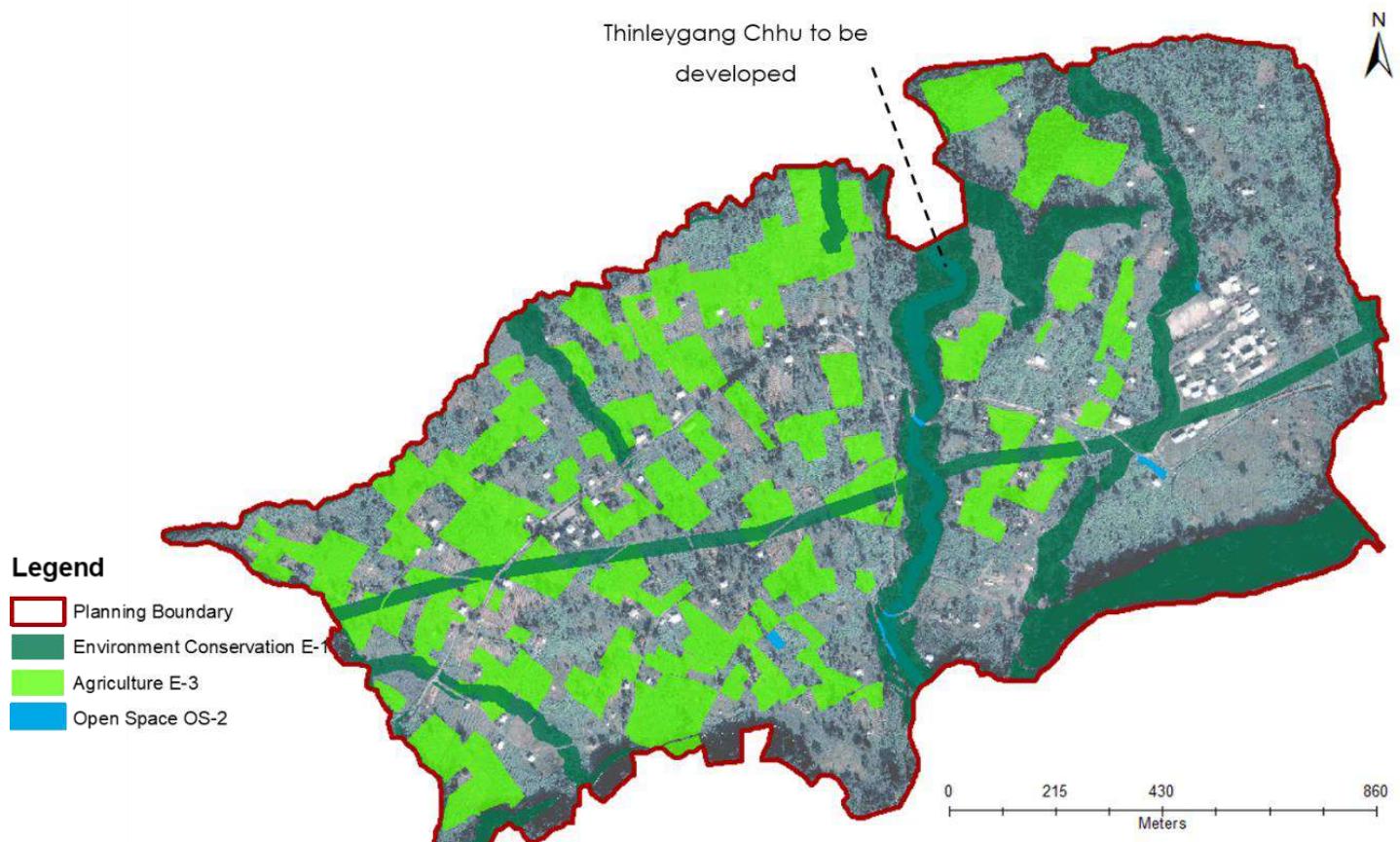


A total of three local parks are provided in the plan area, which equates to a total of 2282.537 sq.m. Based on the 400m principle, the parks and open spaces have been evenly distributed to provide recreational space for all segments of the community. Moreover, proposal for two parks in Thinleygang area is of strategic importance given the site location proximate to the school site.

The open spaces will be proposed to adopt soft landscaping such as permeable ground, evergreen trees and shrubs suitable for Sonamthang's climate. On the other hand, appropriate and necessary hard landscaping such as pergolas and shelters, fountains, playgrounds, children and adult play equipment, footpaths and cycling tracks will be proposed.

4.6.2 Stream Development

In addition, the Thinleygang stream indicated in Map 4.7 offers an opportunity to be developed as a recreational space for people to spend their leisure time.



Map 4.7 Thinleygang Chhu



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Figure 4.5 Stream Development (Cheongyecheon Stream in South Korea)

4.6.3 Network of Open Spaces

The proposed open spaces can take several different forms such as the protected areas viz., Environment precinct (E), Agriculture A-2 and the Right of Way maintained for the high tension power line. Together with its preservation, these will form a network of open spaces along with the proposed recreational areas; and will provide passive open space. It will act as open vegetated area. The network is illustrated in Map 4.8.



Map 4.8 Network of Open Spaces

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4.7 Proposed Infrastructure

4.7.1 Storm water Drainage System

The drainage gradients throughout most of the catchment are relatively flat and the proposed storm water drainage network will need to accommodate the surface water hydrology from the developments. The following strategies are proposed for storm water drainage:

1. Temporary ponding or passing the water through graded surfaces to reduce the speed and filter out litter and pollutants. The storm water network proposed for Sonamthang runs both along the roads and the existing natural drainage paths.
2. Use water permeable paving surfaces in parking lots and other paved areas to increase natural percolation and onsite drainage of storm water.
3. Design and use natural drainage such as bio-retention in on-site pocket parks and other landscaped areas to filter surface water run-off.



Map 4.9 Schematic Representation of Proposed Storm Water Drainage System



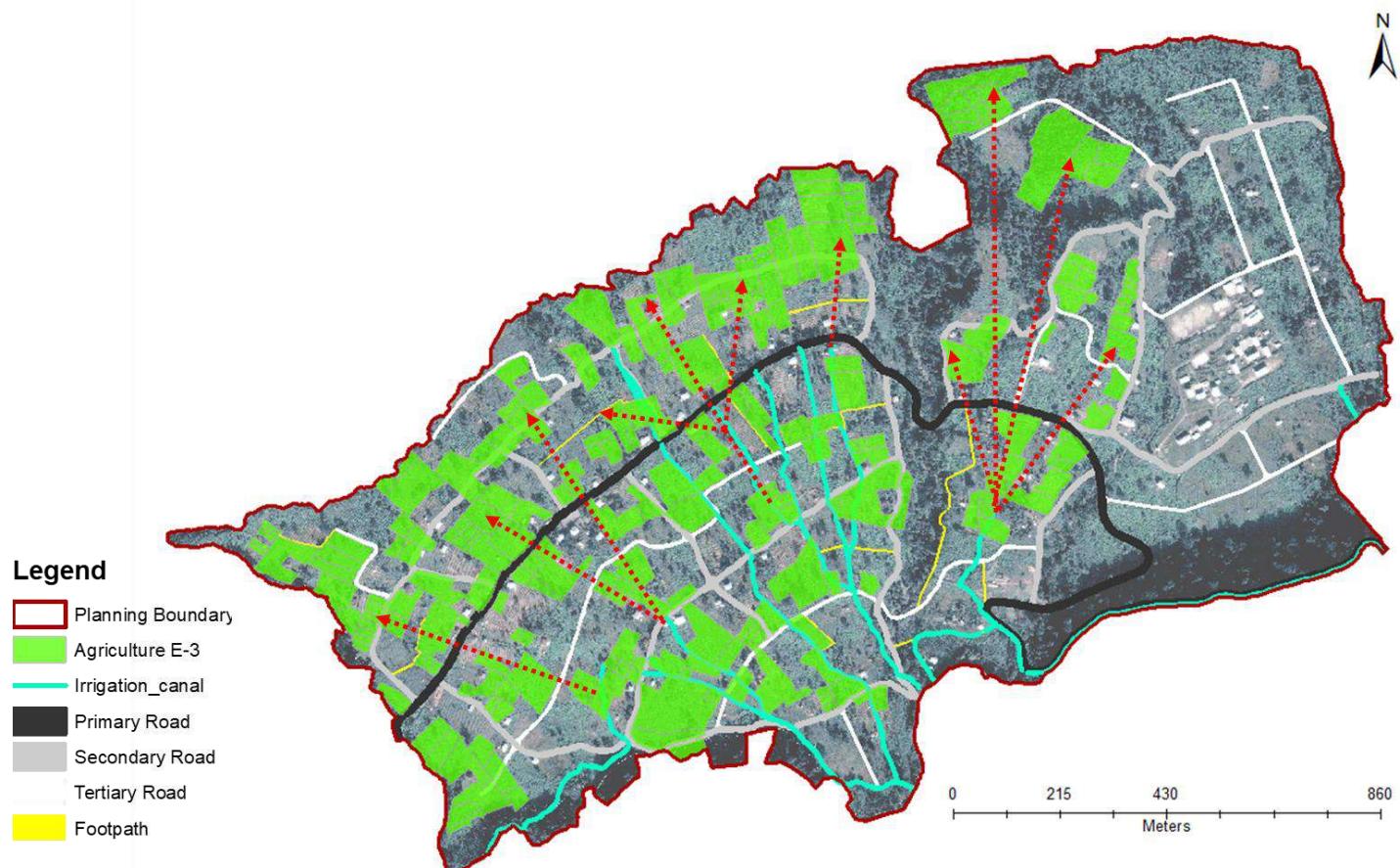


4.7.2 Irrigation Canal

Since the irrigation water is poorly distributed especially at the lower Sonamthang and lower Thinleygang area, a need for proper distribution is recognized. Therefore, a schematic layout for irrigation canal is provided in Map 4.10. It will require further consultation and assistance from irrigation channel experts of Ministry of Agriculture and Forests, for detailed design and implementation.



Figure 4.6 Irrigation Canal



Map 4.10 Schematic Representation of Proposed Irrigation Channel



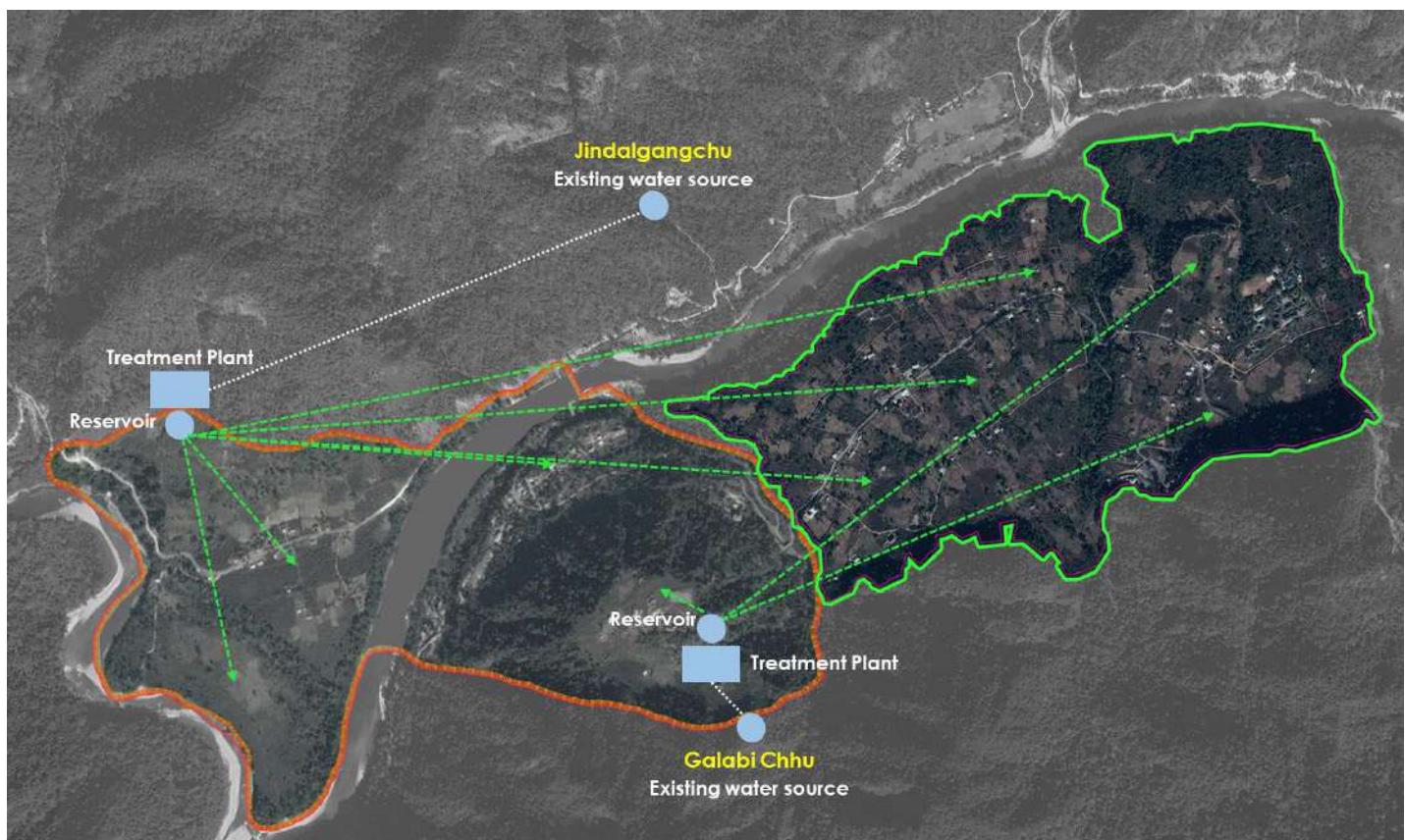


4.7.3 Water Supply

While a new source will be identified by the local government in consultation with the Department of Engineering Services, MoWHS, the existing water sources need to be maintained and managed properly. The proposed water supply will be treated at a water treatment plant before being distributed to the individual households. The proposed schematic water supply diagram is given in Map 4.11.

For sustainable use of water resources, following methods are suggested for the settlement:

- Ø Water saving devices for the buildings.
- Ø Water metering for all the residential buildings.
- Ø Rain water harvesting methods to be encouraged in residential areas.
- Ø Waste water reuse system.
- Ø Rainwater harvesting for toilets and gardens.



Map 4.11 Schematic Diagram of Water Supply

4.7.4 Sewerage System

Taking into consideration the current practice and the dispersed kind of settlement within the planning boundary, the Plan proposes for individual septic tank (plot-level).



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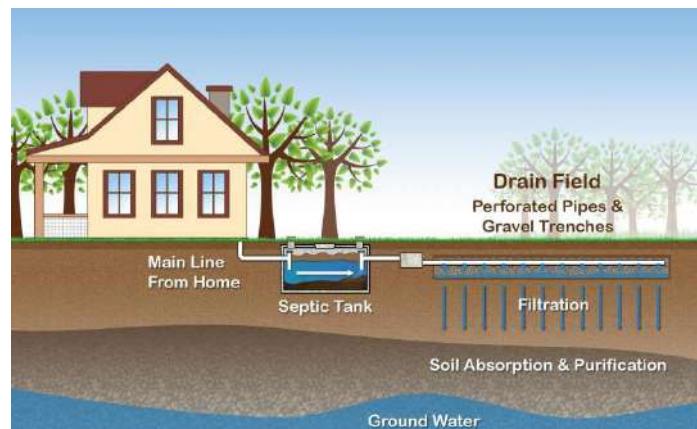


Figure 4.7 Individual Septic System

4.7.5 Solid Waste Management

Following strategies need to be adopted for proper waste management system:

- Ø The frequency of the garbage truck should be increased from once per month to at least once every week. At least a single compactor truck is required to collect the wastes.
- Ø Segregation at the source of collection into recyclable and non-recyclable wastes, and degradable and non-degradable should be promoted.
- Ø A compost pit for kitchen wastes should be encouraged.



Figure 4.8 Integrated Solid Waste Management System (Source:<https://wasteadvantagemag.com/>)

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4.7.6 Car Park

As per Bhutan Building Regulations 2018, the parking requirements are as follows:

'Provision of parking spaces is mandatory for any construction serviced by a vehicular road or which will generate parking requirements.'

'Parking spaces shall not be constructed within the road right of way.'

'If a construction which is not directly serviced by a vehicular road, the requirement for provision of parking spaces shall be met by suitable parking arrangements.'

Table 19 Minimum Parking Requirements for Various Uses

Description	Minimum Requirement
Housing	1 car parking space per dwelling unit
Hotel	0.5 car parking space per hotel room
Office	1 car parking space per 50 sqm of GFA
Commerce	1 car parking space per 25 sqm of commercial GFA
CSI	1 car parking space per 80 sqm of GFA
Industry	1 car parking space per 80 sqm of GF
Warehouse	1 car parking space per 200 sqm of GFA
Education	1 car parking space per 15 children/students in urban areas, 1 car parking space per 20 children/students in rural areas
Theatres, cinemas, concert halls, dance halls and similar	1 car parking space per 10 fixed seats
Indoor/outdoor sport grounds	1 car parking space per 10 fixed seats
Public open space	4 car parking spaces per hectare
Any other public service	1 car parking space per 50 sqm of GFA

4.7.7 Power

Due to the health risks of the people living near the electromagnetic field created by the high tension; and risks of electrocution accidents, it is recommended that the 132Kv high tension line be shifted to another appropriate location. Some researches show that the power lines electric field adds a stress factor to nervous system activity (Milutinov, Juhas, & Prsa, 2009). It is also believed that airborne particles such as aerosols in the proximity of the high tension line become polarized, which then becomes stickier; and they are more likely to adhere to skin or to lung tissue causing various diseases.





As for the street lighting system, there is no existing street lights in Sonamthang. Therefore, an adequate street lighting system is proposed along the road network. Appropriate and adequate lighting will also be provided along off-street footpaths. The standard for provision of the street lights is provided in the Spatial Planning Standard 2017.

4.7.8 Climate Resilient Infrastructure

The planning and implementation of Sonamthang AAP should anticipate, prepare for, and adapt to the changing climate conditions. Infrastructure for Sonamthang should withstand, respond to, and recover rapidly from disruptions caused by the harsh climatic conditions. Therefore, the Plan advocates the adoption of climate resilient infrastructure.

1. Some of the climate-resilient infrastructure proposed are LED lights for street lighting, pervious pavement for footpaths and parking; and adoption of green transport for both private and public transportation.
2. Rainwater harvest is also being promoted, so that rainwater can be collected for toilet flushing and garden irrigation.
3. Impacts to natural resources can be minimized with energy conserving building design, recycled building materials, reduced water use, storm water management, and through other measures such as adoption of green roofs, rain gardens, shade trees, and reduced service surface parking areas that will improve local environment directly and immediately, reducing urban heat island effects.
4. During disaster period, the proposed ‘Community Hall’ will operate as an evacuation center for people residing in Sonamthang.

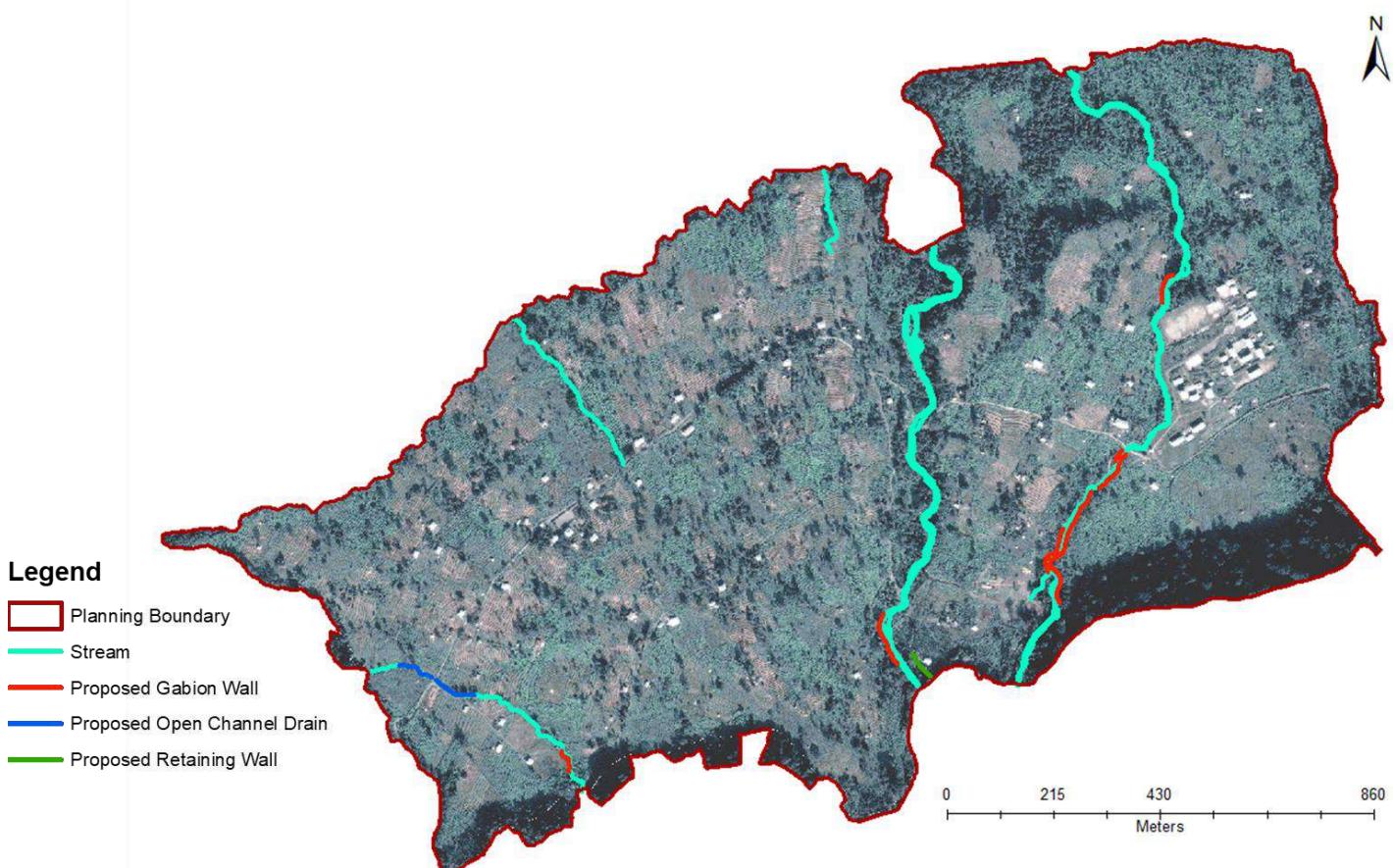


Figure 4.9 Climate Resilient Infrastructure





Moreover, mitigation measures for risk reduction is proposed. It is based on the geotechnical study, whereby the physical models of the subsurface is identified, previously unknown conditions are defined, recurring physical patterns are established, and the physical and chemical causes of the phenomena are determined. After having completed all the fieldwork and lab tests and hazard maps, mitigation plans and recommendations are proposed. Therefore, gabion walls, open channel drains and retaining walls are proposed in Sonamthang, in areas where there are high risks of flooding and landslides (Map 4.12). The mitigation structures to protect from flashfloods comprises of Gabion Walls of 721.5m in length. 170.2m of open drains and 60m retaining walls. The design details are provided in the Design Guidelines.



Map 4.12 Mitigation Measures for Flooding and Landslides





4.8 Proposed Services

To encourage the provision of a range of social and community services meeting the needs of current and future populations of Sonamthang, relative to their respective sizes and with regard to the services provided in the neighboring settlements of Panbang, Tungkudempa and Galabi, the following services are proposed. It is in consistence with the requirement of the community and based on the Spatial Planning Standards 2017.

4.8.1 Farmer's Market

Of particular importance and requirement to the emerging community of Sonamthang is the farmer's market as an outlet for vegetables and other farm produce. An area of 3416.1204 sq. m is proposed for Farmer's Market, on a state land in upper Thinleygang area. This area is inclusive of the car parking area for the customers.

4.8.2 Community Hall

A community hall on a state land with an area of 2000 sq. m is proposed in upper Sonamthang area. This community hall will have multi-functions, whereby, during disasters, it will function as an evacuation center for Sonamthang.



Map 4.13 Proposed Community Services





Figure 4.10 Evacuation Center

4.8.3 Taxi Stand

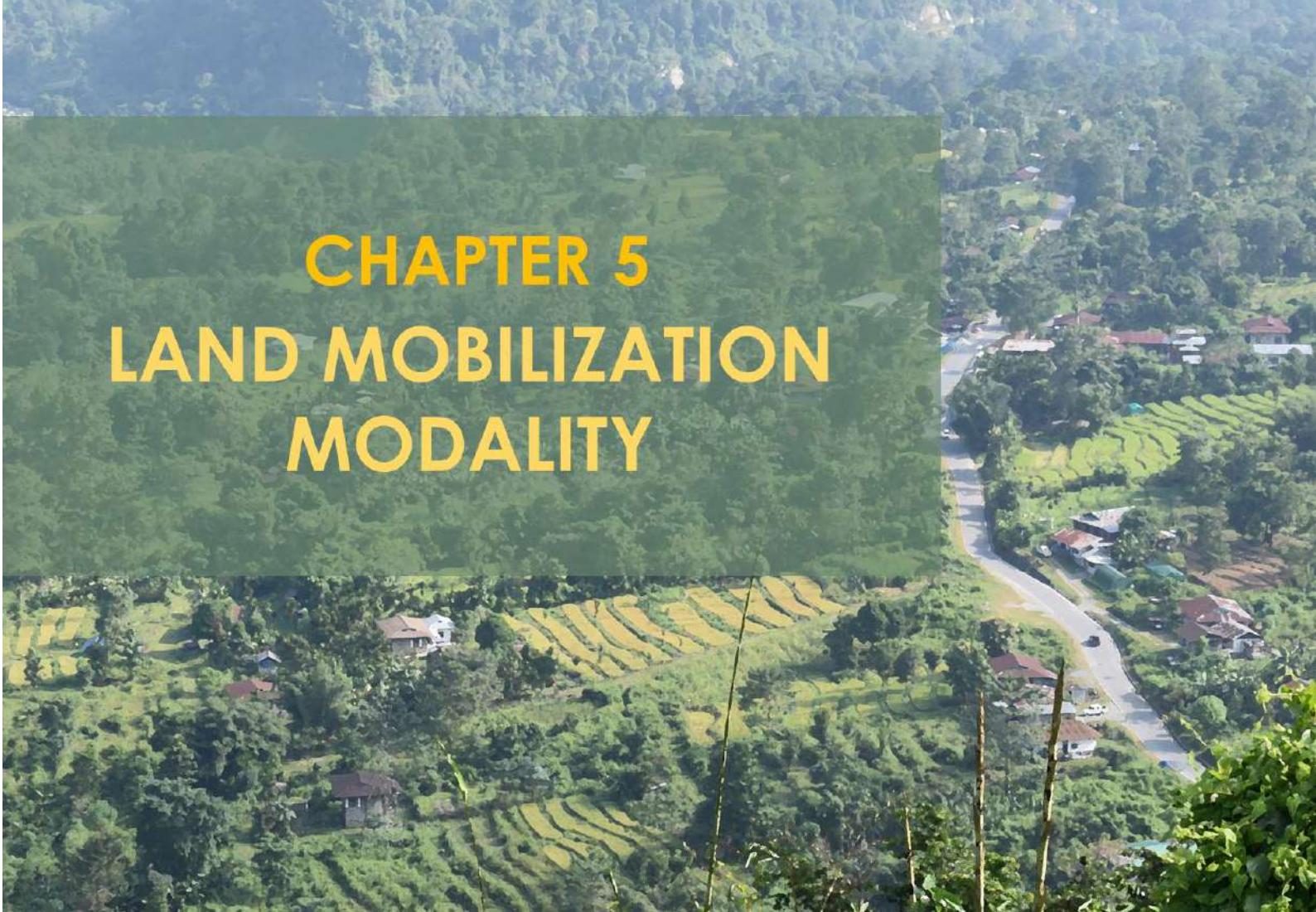
Located proximate to the Urban Village-1 precinct along the highway, 950 sq. m of land is proposed as taxi stand.

In total, an area of 7366.1205 sq. m (1.82 acres) is proposed for community services. Since these services are proposed on a state land, it will not have any implication on the private land owners.

Table 20 Areas of Proposed Infrastructure and Services

Sl #	Facility	Proposals	Area in sqm	Area in acres
1	Infrastructure	Primary	18771.288	4.637
		Secondary	35525.799	8.775
		Tertiary	31037.721	7.666
		Proposed Footpath	15285.747	3.776
		Proposed Bicycle Track	11406.094	2.817
2	Transport	Taxi Stand	950.000	0.235
3	Community Facilities	Farmers Market	2190.699	0.541
4		Community Hall	2000.000	0.494
5	Public Space	Parks, small gardens and children's park	2282.537	0.564
TOTAL			119449.885	29.504





CHAPTER 5

LAND MOBILIZATION MODALITY

5. LAND MOBILIZATION MODALITY

5.1 Background

There are various land mobilization techniques adopted in Bhutan and internationally in an effort to implement the plans. In the past, 'land acquisition' has been widely used whereby, the land for urban development is mobilized through acquisition, serviced with infrastructure and allotted to business license holders. This has been practiced in Khuruthang in Punakha, Bajothang in Wangdue Phodrang, and Tshongdu in Paro.

'Land Pooling' technique has gained popularity in recent times, whereby, every landowner contributes certain percentage of their land for provision of common facilities and infrastructure services and retain the remaining portions. The basic principle is that while the plot areas are reduced, the overall value remains equal or is increased after the land pooling scheme is implemented. This has been applied in most of the human settlement plans in Bhutan such as Panbang in Zhemgang, Thimphu, Gelephu, etc.

A 'combined model' is also used in which both the land acquisition and pooling mechanisms, especially where the contribution ratio exceeds the 30% permitted by the Land Pooling and Readjustment Regulations 2018. It has been applied in the case of Denchi in Pema Gatshel and Duksum in Trashigang.



Uniquely, in the case of Sonamthang, the **Guided Land Development (GLD)** is proposed since the nature of the settlement is very different from most settlements. Sonamthang is an agriculture-based settlement with unique cultural landscape. Moreover, most of the Chhuzhing are dispersed throughout the settlement, making it difficult for the application of land pooling scheme. Also, the Dzongkhag Administration, Panbang Dungkhag Administration, Ngangla Gewog Administrations and the stakeholder had extensive discussions on the mode of land mobilization for Sonamthang; and subsequently settled for 'GLD' model. Therefore, based on the deliberations and also in order to retain Sonamthang's natural landscape, GLD is identified as the most suitable land mobilization modality.

Since the plots are benefitting through direct access and better services, the plots directly benefitting with access will have to contribute the land, which falls under the proposed infrastructure and amenities.

5.2 Definition

Guided land development uses the provision of infrastructure as a mechanism to guide development. It is done in partnership with landowners who pay for the cost of servicing their land through donation of land for public infrastructure. This has been applied in Tagtse Action Area Plan.

5.3 International Practices

The concept of Guided Land Development has originally emerged in response to adhoc, uncontrolled urban development with no regard to infrastructure services (Rasheed & Parambath, 2014). It has been used to secure a limited availability of urban land for low income families to ensure provision of serviced plots at affordable prices. The government invites landowners or private developers to participate in allocating certain percent of their land for the provision of low income shelter by guaranteeing fair return on investments. This has been applied in Chennai.

GLD has also been used for road-widening and extension programmes (Karki, 2004). Within such programmes, roads are developed along adjoining landowners' property boundary lines, to ensure an equal land contribution from either side. The landowners have to agree to open up the proposed guided land development roads, whereby the local and central government facilitates funding and technical support for road development, such as surface-grading, graveling, shifting of compound walls, etc.

In Jakarta, Indonesia, the local government uses GLD for urban development. The local government selects suitable land, and plans for roads/footpaths, water supply lines and the rights-of-way in consultation with the local land owners and village heads (Marulanda & Steinberg, 1991). Subsequently, implementation and financing plan is drafted for the infrastructure provision. Landowners are not compensated for providing infrastructure. The increase in the value of their land (through the infrastructural provision) is considered to be a sufficient compensation in itself.





Through GLD, they increase the supply of serviced land to the low income households, guide the settlement's integration into urban structure, create work opportunities within the GLD area; and open up residential land markets. The ROW land is donated through GLD scheme where as compensation is provided for buildings and excessive land take. However, through the literature review, the minimum and maximum contribution, as well as the compensation amounts were not specified.

The practice is considered feasible and appropriate for Sonamthang, in order to retain its organic rural structure and to promote the area as an agriculture-based area.

5.4 Principles

In designing proposed roads, footpaths, bicycle tracks, etc., the following principles were adopted:

1. Environmentally sensitive areas, stream buffers and Chhuzhing shall not be considered for planning interventions. However, in the process of ensuring accessibility to all, and under unavoidable circumstance, proposed roads and footpaths may pass through these areas.
2. Government owned institutional plots are also considered for planning interventions.
3. To enhance the overall connectivity, roads falling within the institutional boundaries, under unavoidable circumstance shall be considered as contribution from the respective authorities.
4. Existing roads, irrespective of its location shall be widened for the long term benefit of the community.
5. While laying out the roads and footpaths, they are designed along the plot boundaries to ensure that the plots do not get subdivided. Where unavoidable, it shall be done in the most efficient manner with minimal impact.
6. Motor accessibility shall be provided where feasible.
7. Where motor accessibility is not feasible due to topographical condition or if there are trapped kamzhings in between the chhuzhings, accessibility shall be provided by footpaths.
8. For the efficiency of road layout, the temporary structures such as huts, sheds and toilets will not be considered. The local government will deal with it as deemed necessary.

5.5 Breakup of Land Area

The total area of Sonamthang planning area is 540.021 acres and the total registered area under the Sonamthang Action Area Plan boundary is 453.050 acres. The details of area under the proposed road, footpath, bicycle track, proposed services etc. are given in Table 21 and 22.





Table 21 Breakup of Land Area in Sonamthang Planning Area

Sl #	Breakup of Land	Sq.m	Acre
1	Total Project Area	2185388.601	540.02
2	Total Registered Land	1833426.270	453.05
3	Existing Road	49339.470	12.19
4	State Land	302622.861	74.78
	Total Land Under Ownership	2185388.601	540.02
Land Excluded for Development			
5	E3 Chhuzhing	532368.855	131.55
6	Government Institution	79775.050	19.71
7	Government Owned Inst	4046.488	1.00
8	Religious Institution	15293.345	3.78
9	E1, >57% Slope, HT Buffer and Stream Buffer	345061.363	85.27
10	Existing Road	49339.470	12.19
Total		1025884.571	253.50
Total Area Available for Development		1159504.030	286.52

Table 22 Proposals on State Land

Proposals on State Land			
1	Proposed Taxi Stand	950.000	0.235
2	Proposed Farmers Market	2190.699	0.541
3	Proposed Community Hall	2000.000	0.494
4	Proposed Parks, small gardens and children's playground	2282.537	0.56
Total		7423.236	1.83

5.6 Guided Land Development Contribution

Guided land development has been adopted as the land mobilization modality in order to realize the vision for Sonamthang, to develop as 'an agriculture, nature and craft based settlement in harmony with its surrounding'. GLD has been used to propose for roads, footpaths, bicycle tracks and open space.

The areas for GLD contributions for the aforementioned infrastructure and services are illustrated in Table 23. A total area of 12981.4827 sq. m (3.208 acres) falls under the GLD contribution. Out of 758 plots in total, only 532 plots fall under the GLD contribution areas.



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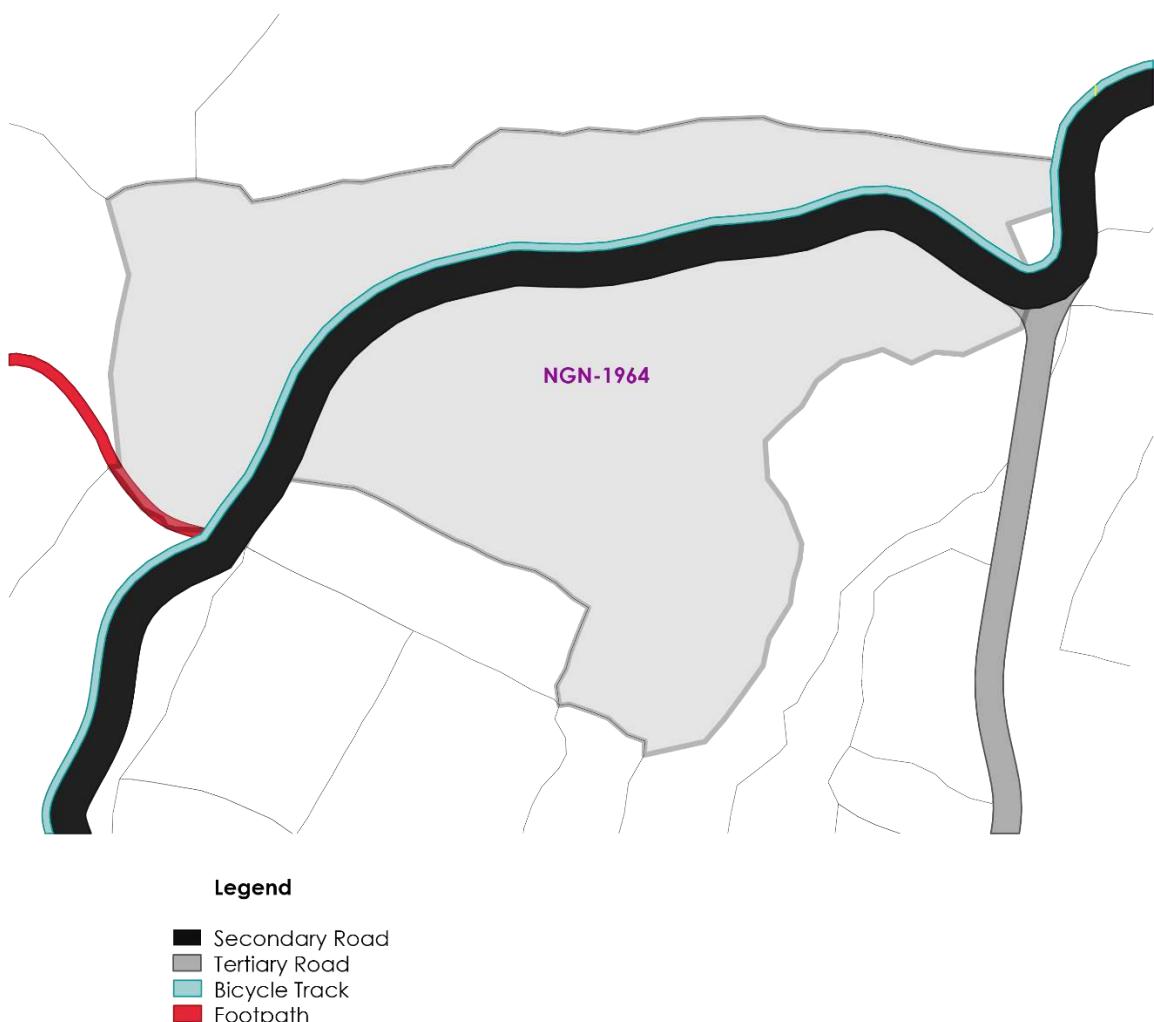


Figure 5.1 Maximum Area for Contribution

The minimum area for contribution by a landowner is 0.5057 sq. m, which falls under the proposed road and footpath and is unavoidable. The maximum area for contribution is 1668.833 sq. m (0.41 acres), which encompasses 12.74% of the total plot area. The size of the plot with the maximum GLD contribution is 13099.6729 sq.m or 3.237 acres.

However, in terms of the contribution ratio, the highest contributor contributes a total area of 1026.823 sq.m or 0.25 acres, which constitutes 55.64% of the total plot area. The total area of the plot is 1854.366 sq.m or 0.456 acres.

The average area under GLD contribution is 100.017 sq.m. There are 47 plots contributing more than 10 decimals.

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Sonamthang Action Area Plan

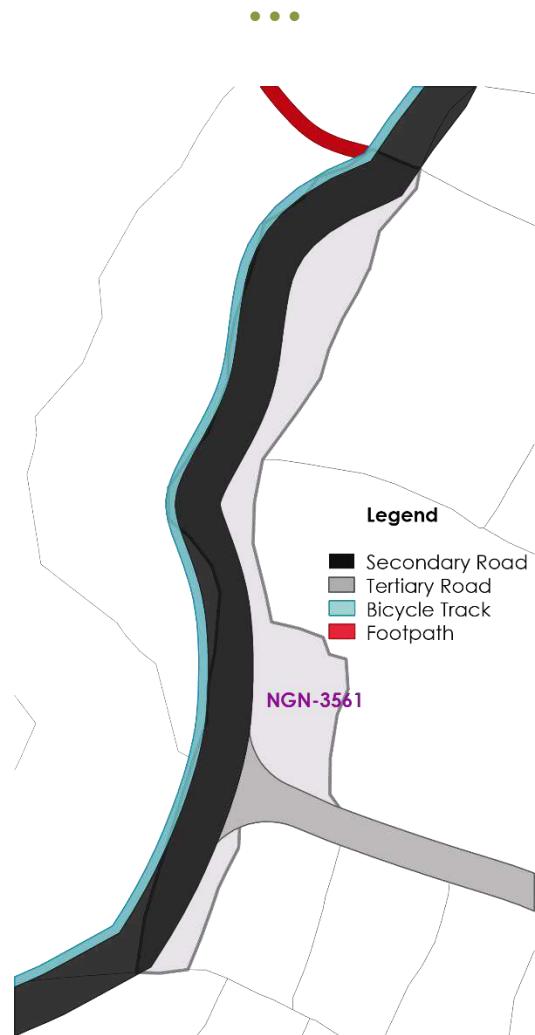
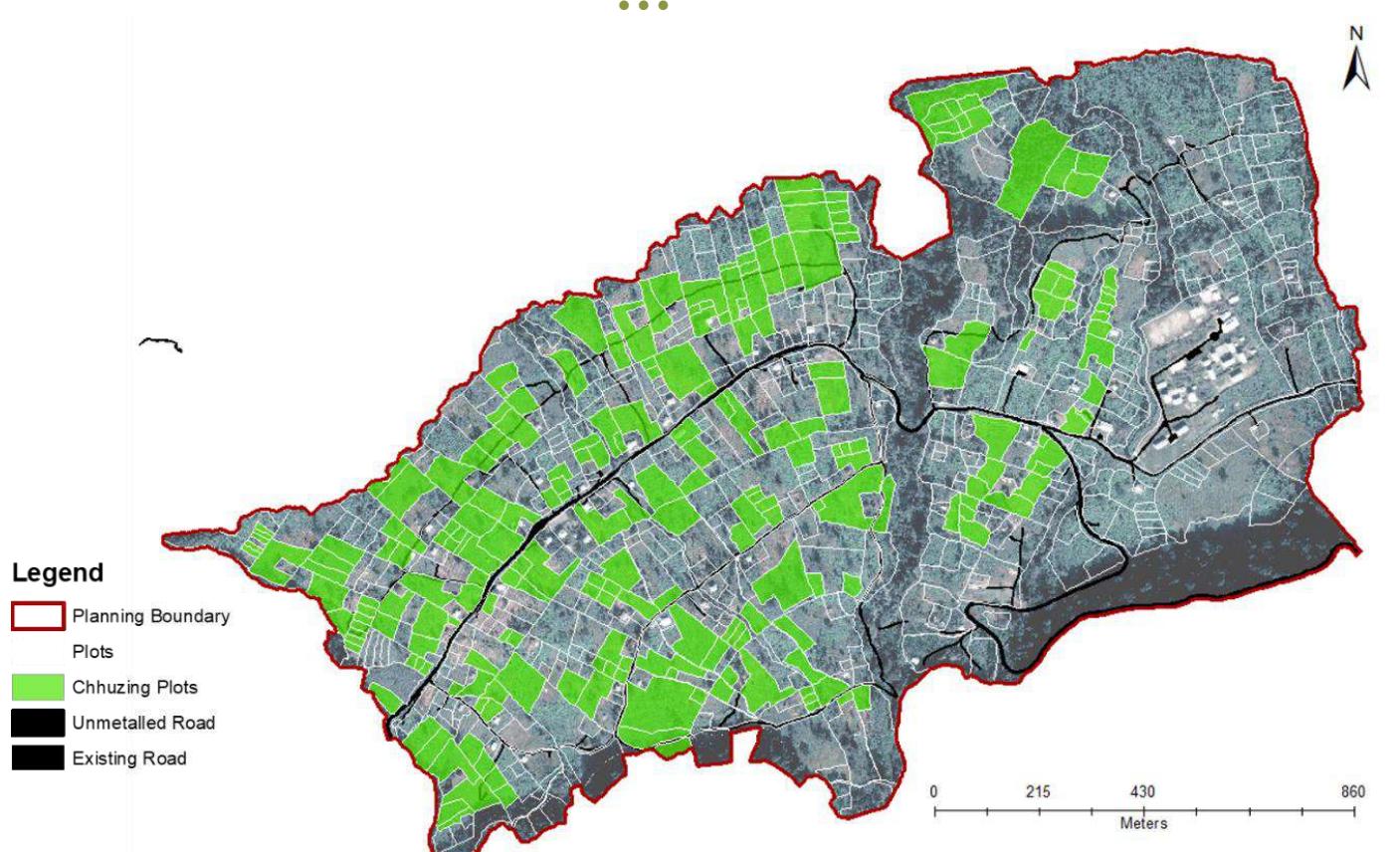


Figure 5.2 Highest Contribution Ratio

Table 23 Proposals Considered for GLD

Proposals Considered for Guided Land Development			%
1	Proposed Roads	85334.809	21.087
2	Proposed Footpath	15285.747	3.777
3	Proposed Bicycle Track	11406.094	2.819
	Total	112026.650	27.682 9.662%

Sonamthang Action Area Plan



Map 5.2 Sonamthang Before GLD



Map 5.1 Sonamthang After GLD



As per the Compensation Rates 2017 prepared by the Property Assessment and Valuation Agency (PAVA), lands within the Sonamthang planning boundary would fall under Class A under Rural land compensation, since it is located within less than or equal to 3km from the municipal boundary (Panbang Yenlag Throm). The rates are as following:

- Kamzhing : Nu. 5977.06 per decimal
- Chhuzhing : Nu. 6475.25 per decimal
- Cash Crop Land : Nu. 6374.40 per decimal

The above mentioned rates may change depending on the factors such as distance from highway, water availability, topography, soil-instability; and scenic, cultural and historical value of the land. The details are provided in the Compensation Rates 2017 document. The compensation rates for the affected fruit trees and structures are also provided in the aforementioned document.

The total approximate compensation amount for the land used for proposed infrastructure in Sonamthang is given in the following table.

Table 24 Total Compensation Amount

SI#	Land Type	Area Under Contribution (Decimal)	Compensation Amount
1	Kamzhing & Khimsa	1410.147	8428530.9
2	Chhuzhing	441.372	2857993.2
3	Cash Crop Land	21.854	139304.3
Total		1873.372	11,425,828.4





5.7 Specific Cases of GLD

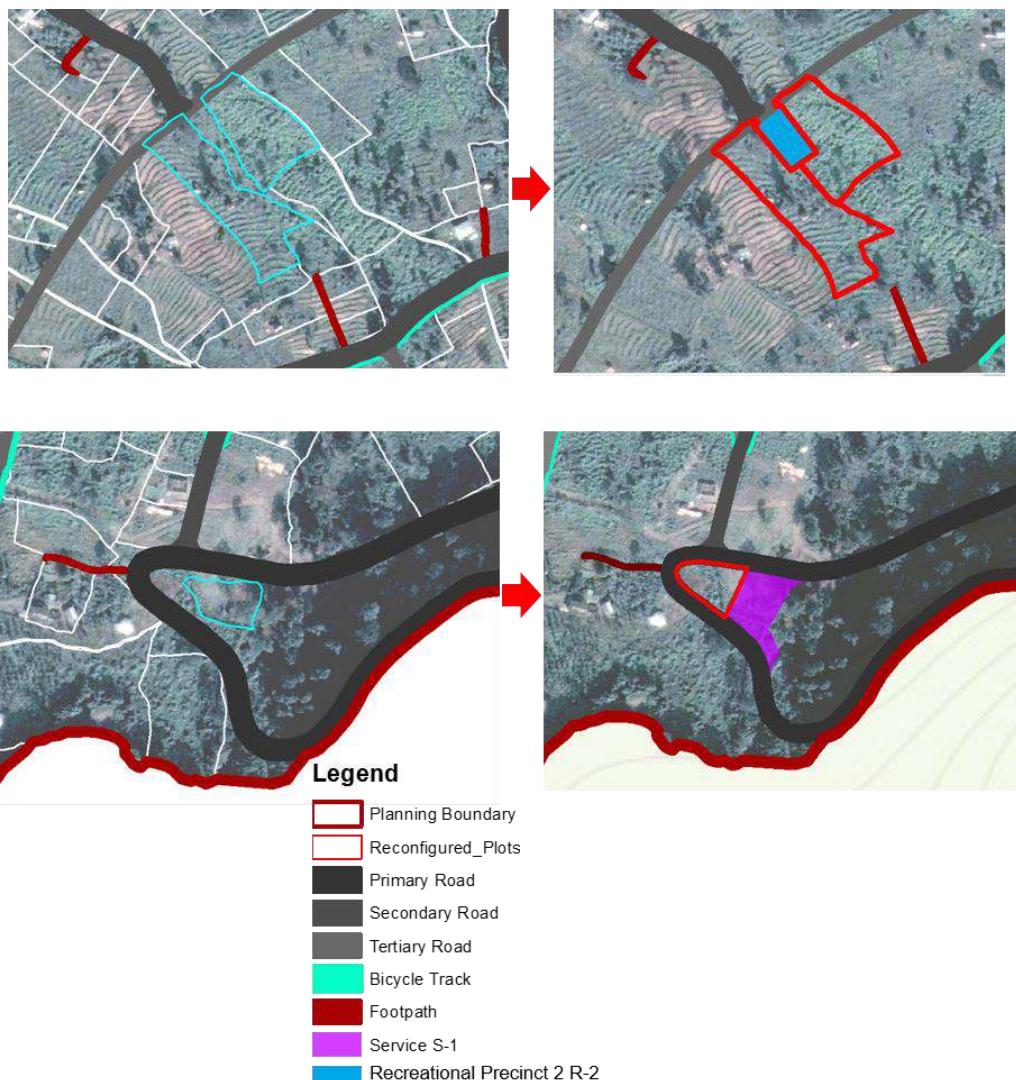
5.7.1 Case 1 Reconfiguration of Plots

- In order to propose for services such as farmer's market and to propose for open space, state land is identified. However, these identified land parcels are irregular in shape and are undevelopable. In order to create developable land to accommodate the services, the adjacent private plots are reconfigured. The remaining plot area after GLD contribution will be unaffected. The following plots are proposed for reconfiguration:

Ø NGN-2413

Ø NGN-2409

Ø NGN-4334



5.3 Plots Proposed for Reconfiguration





- During GLD reconfiguration, the undevelopable and irregular plots are also reconfigured following the principles of GLD.

5.7.2 Case 2 Proposed Infrastructure in Chhuzhings

Out of the total of 230 chhuzhings, 102 chhuzhing plots are affected by the proposed roads, footpaths and bicycle tracks. Majority of these chhuzhings are already affected by the existing roads. Rest of the chhuzhings are affected under unavoidable circumstance in order to ensure holistic benefit of the community through provision of access to all.



Figure 5.4 Affected Chhuzhings



Sonamthang Action Area Plan

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Table 25 List of Chhuzhing Affected by Proposed Infrastructure

SI#	Plot ID	Total Area (Acre)	Total Area (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID
1	NGN-1944	3.797	15365.9122	656.4996	14709.4126	14709.4126	NGN-1944
2	NGN-1963	0.318	1286.9002	14.6861	1272.2141	1272.2141	NGN-1963
3	NGN-2022	0.263	1064.3231	114.8256	949.4975	949.4975	NGN-2022
4	NGN-2026	0.501	2027.4749	139.7655	1887.7094	1887.7094	NGN-2026
5	NGN-2039	0.670	2711.3935	256.9879	2454.4056	2454.4056	NGN-2039
6	NGN-2224	1.500	6070.2840	108.1485	5962.1355	5962.1355	NGN-2224
7	NGN-2226	0.167	675.8250	60.9216	614.9034	614.9034	NGN-2226
8	NGN-2235	0.663	2683.0655	159.9441	2523.1214	2523.1214	NGN-2235
9	NGN-2237	1.638	6628.7501	625.7118	6003.0383	6003.0383	NGN-2237
10	NGN-2238	0.309	1250.4785	286.92	963.5585	963.5585	NGN-2238
11	NGN-2242	0.410	1659.2110	396.9246	1262.2864	1209.9775	NGN-2242A
	NGN-2242B					52.3089	NGN-2242B
12	NGN-2255	1.549	6268.5799	643.0508	5625.5291	4274.2579	NGN-2255A
	NGN-2255B					1351.2712	NGN-2255B
13	NGN-2259	1.005	4067.0903	486.4553	3580.6350	2060.8421	NGN-2259A
	NGN-2259B					1519.7929	NGN-2259B
14	NGN-2260	0.744	3010.8609	510.3807	2500.4802	1545.6736	NGN-2260A
	NGN-2260B					954.8066	NGN-2260B
15	NGN-2263	0.618	2500.9570	232.7877	2268.1693	2268.1693	NGN-2263
16	NGN-2274	1.276	5163.7883	631.5658	4532.2225	2179.3888	NGN-2274A
	NGN-2274B					2352.8337	NGN-2274B
17	NGN-2276	0.923	3735.2481	389.6414	3345.6067	1636.7351	NGN-2276A
	NGN-2276B					1708.8716	NGN-2276B
18	NGN-2281	1.827	7393.6059	139.5291	7254.0768	7254.0768	NGN-2281
19	NGN-2284	1.424	5762.7229	415.6852	5347.0377	2341.3670	NGN-2284A
	NGN-2284B				0	3005.6707	NGN-2284B
20	NGN-2286	0.881	3565.2801	383.713	3181.5671	1948.1722	NGN-2286A
	NGN-2286B					1233.3949	NGN-2286B
21	NGN-2294	0.655	2650.6907	27.4006	2623.2901	2623.2901	NGN-2294
22	NGN-2296	1.155	4674.1187	750.106	3924.0127	1459.1861	NGN-2296A
	NGN-2296B					2464.8266	NGN-2296B
23	NGN-2300	0.857	3468.1556	380.116	3088.0396	892.9692	NGN-2300A
	NGN-2300B					2195.0704	NGN-2300B
24	NGN-2301	0.802	3245.5785	333.773	2911.8055	2911.8055	NGN-2301
25	NGN-2304	1.084	4386.7919	348.1769	4038.6150	2324.0092	NGN-2304A
	NGN-2304B					1714.6058	NGN-2304B
26	NGN-2305	1.062	4297.7611	395.1041	3902.6570	2014.3610	NGN-2305A
	NGN-2305B					1888.2960	NGN-2305B

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SI#	Plot ID	Total Area (Acre)	Total Area (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID
27	NGN-2311	2.341	9473.6899	754.9542	8718.7357	5737.8917	NGN-2311A
	NGN-2311B					2980.8440	NGN-2311B
28	NGN-2319	1.176	4759.1027	592.1083	4166.9944	944.0917	NGN-2319A
	NGN-2319B					3222.9027	NGN-2319B
29	NGN-2320	1.434	5803.1915	130.9335	5672.2580	5672.2580	NGN-2320
30	NGN-2336	0.494	1999.1469	92.7047	1906.4422	1906.4422	NGN-2336
31	NGN-2337	0.700	2832.7992	87.9481	2744.8511	2744.8511	NGN-2337
32	NGN-2344	0.491	1987.0063	58.5205	1928.4858	1928.4858	NGN-2344
	NGN-2348	0.510	2063.8966	239.1952	1824.7014	1824.7014	NGN-2348
33	NGN-2350	1.295	5240.6785	151.4231	5089.2554	5089.2554	NGN-2350
34	NGN-2353	1.180	4775.2901	350.2627	4425.0274	4425.0274	NGN-2353
35	NGN-2354	0.540	2185.3022	315.8635	1869.4387	1869.4387	NGN-2354
36	NGN-2381	0.344	1392.1185	21.624	866.0625	866.0625	NGN-2381
	NGN-2381B					504.4320	
37	NGN-2386	0.360	1456.8682	78.7464	1378.1218	1378.1218	NGN-2386
38	NGN-2387	1.120	4532.4787	122.8705	4409.6082	4409.6080	NGN-2387
39	NGN-2391	3.514	14220.6520	347.3729	13873.2791	13873.2791	NGN-2391
40	NGN-2395	1.100	4451.5416	25.6151	4425.9265	4425.9265	NGN-2395
41	NGN-2400	1.678	6790.6244	6.1577	6784.4667	6784.4667	NGN-2400
42	NGN-2404	0.227	918.6363	60.2457	858.3906	858.3906	NGN-2404
43	NGN-2408	1.661	6721.8278	40.9432	6680.8846	6680.8846	NGN-2408
44	NGN-2411	0.610	2468.5822	123.7208	2344.8614	2344.8614	NGN-2411
45	NGN-2420	0.340	1375.9310	32.1456	1343.7854	1343.7854	NGN-2420
46	NGN-2421	2.383	9643.6578	284.7675	9358.8903	9358.8903	NGN-2421
47	NGN-2427	0.390	1578.2738	116.0884	1462.1854	1462.1854	NGN-2427
48	NGN-2429	0.158	639.4032	95.988	543.4152	543.4152	NGN-2429
49	NGN-2459	0.660	2670.9250	222.7559	2448.1691	2448.1691	NGN-2459
50	NGN-2494	0.320	1294.9939	44.0629	1250.9310	1250.9310	NGN-2494
51	NGN-2613	0.817	3306.2814	147.559	3158.7224	3158.7224	NGN-2613
52	NGN-2626	0.590	2387.6450	78.6567	2308.9883	2308.9883	NGN-2626
53	NGN-2660	0.380	1537.8053	95.0815	1442.7238	1442.7238	NGN-2660
54	NGN-2717	0.900	3642.1704	32.529	3609.6414	3609.6414	NGN-2717
55	NGN-2727	0.520	2104.3651	84.3348	2020.0303	2020.0303	NGN-2727
56	NGN-3022	0.100	404.6856	0.5113	404.1743	404.1743	NGN-3022
57	NGN-3184	0.124	501.8101	12.7271	489.0830	489.0830	NGN-3184
58	NGN-3188	0.189	764.8558	54.2789	710.5769	710.5769	NGN-3188
59	NGN-3190	0.160	647.4970	14.5811	632.9159	632.9159	NGN-3190
60	NGN-3191	0.143	578.7004	21.2402	557.4602	557.4602	NGN-3191
61	NGN-3196	0.174	704.1529	52.3734	651.7795	651.7795	NGN-3196
62	NGN-3198	0.146	590.8410	18.5954	572.2456	572.2456	NGN-3198

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SI#	Plot ID	Total Area (Acre)	Total Area (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID
63	NGN-3227	0.360	1456.8682	73.5289	1383.3393	1383.3393	NGN-3227
64	NGN-3235	0.340	1375.9310	37.5571	1338.3739	1338.3739	NGN-3235
65	NGN-3246	0.301	1218.1037	49.1784	1168.9253	1168.9253	NGN-3246
66	NGN-3303	0.156	631.3095	24.3103	606.9992	606.9992	NGN-3303
67	NGN-3326	0.602	2436.2073	285.6738	2150.5335	545.6427	NGN-3326A
	NGN-3326B					1604.8908	NGN-3326B
68	NGN-3390	0.170	687.9655	30.6613	657.3042	657.3042	NGN-3390
69	NGN-3392	0.171	692.0124	18.0894	673.9230	673.9230	NGN-3392
70	NGN-3441	0.220	890.3083	62.5044	827.8039	827.8039	NGN-3441
71	NGN-3445	0.220	890.3083	21.7605	868.5478	868.5478	NGN-3445
72	NGN-3474	0.482	1950.5846	48.0683	1902.5163	1902.5163	NGN-3474
73	NGN-3488	0.503	2035.5686	144.5769	1890.9917	1890.9917	NGN-3488A
74	NGN-3509	0.204	825.5586	19.8794	805.6792	805.6792	NGN-3509
75	NGN-3512	0.208	841.7460	30.0972	811.6488	811.6488	NGN-3512
76	NGN-3532	0.530	2144.8337	50.1914	1239.4854	1242.3616	NGN-3532
77	NGN-3536	0.150	607.0284	48.5744	167.2633	167.2633	NGN-3536A
	NGN-3536B					391.1907	NGN-3536B
78	NGN-3543	0.296	1197.8694	146.8367	1051.0327	1051.0327	NGN-3543
79	NGN-3571	0.276	1116.9323	25.9056	1091.0267	1091.0267	NGN-3571
80	NGN-3578	1.120	4532.4787	27.863	4504.6157	4504.6157	NGN-3578
81	NGN-3598	0.200	809.3712	97.1931	712.1781	712.1781	NGN-3598
82	NGN-3677	0.103	416.8262	10.7343	406.0919	406.0919	NGN-3677
83	NGN-3706	0.644	2606.1753	108.9339	2497.2414	2497.2414	NGN-3706
84	NGN-3739	0.613	2480.7227	421.4532	2059.2695	1524.7083	NGN-3739A
	NGN-3739B					534.5612	NGN-3739B
85	NGN-3745	0.152	615.1221	16.1138	336.8729	336.8729	NGN-3745
	NGN-3745B					262.1354	
86	NGN-3771	0.100	404.6856	8.5907	396.0949	396.0949	NGN-3771
87	NGN-3773	0.151	611.0753	33.3402	577.7351	577.7351	NGN-3773
88	NGN-3783	0.150	607.0284	33.9975	573.0309	573.0309	NGN-3783
89	NGN-3784	0.364	1473.0556	30.7781	1442.2775	1442.2775	NGN-3784
90	NGN-3786	0.166	671.7781	57.1617	614.6164	614.6164	NGN-3786
91	NGN-3787	0.663	2683.0655	106.9866	2576.0789	2576.0789	NGN-3787
92	NGN-3825	0.329	1331.4156	72.3348	1259.0808	1259.0808	NGN-3825
93	NGN-4013	0.200	809.3712	67.4368	741.9344	741.9344	NGN-4013
94	NGN-4030	0.804	3253.6722	250.2719	3003.4003	3003.4003	NGN-4030
95	NGN-4144	0.444	1796.8041	230.4286	1566.3755	1114.7832	NGN-4144A
	NGN-4144B					451.5923	NGN-4144B
96	NGN-44	0.375	1517.5710	98.6724	1418.8986	1418.8986	NGN-44
97	NGN-4575	0.526	2128.6463	146.4148	1982.2315	1982.2315	NGN-4575

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SI#	Plot ID	Total Area (Acre)	Total Area (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID
98	NGN-46	0.700	2832.7992	40.6024	2792.1968	2792.1968	NGN-46
99	NGN-4626	0.621	2513.0976	208.2567	2304.8409	2304.8409	NGN-4626
100	NGN-4630	0.490	1982.9594	153.7773	1829.1821	1829.1821	
101	NGN-4966	1.000	4046.8560	355.962	3690.894		NGN-4966
102	NGN-5167	0.880	3561.2333	268.6783	3292.5550	3292.5550	NGN-5167

5.7.3 Case 3 Proposed Infrastructure Falling Under Institution

Three institutions out of six are affected by the proposed road. Since these are under unavoidable circumstance, as per Principle 3, it will be considered as contribution from the respective authorities.

Table 26 List of Affected Institutional Plots

SI #	Institution	Plot_Ownership	Plot ID	Total Area (Acre)	Total Area (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)
1	Sonamthang Central School	Government Institutions	NGN-2029	17.966	72705.8149	325.9951	62896.022	50079.8039
								12816.2183
								9483.7976
2	DHI (Bhutan Power Corporation)	Corporations	NGN-3737	1.000	4046.8560	426.8105	3201.7755	3201.7755
3	Non Formal Education	Government Institutions	NGN-4575	0.526	2128.6463	146.4148	1982.2315	1982.2315

5.7.4 Case 4 Entire Plots under E1 Precinct

There are in total two plots falling entirely under the Environment Conservation (E) precinct and these areas are restricted for developmental activities as per the Plan. E areas are environmentally fragile with high risk of landslides, floods and other disasters. However, activities related to environment and protection such as agriculture are allowed on plots within the E-precinct. The list of plots under E1 precinct is given in the table below.

Table 27 List of Plots Entirely Under E Precinct

SI #	Land Type	Plot ID	Total Area (Acre)	Total Area (Sqm)	Area Under E1 (sqm)	Total Area Under Contribution (sqm)	Precinct	Plot Remarks
1	Kamzhing	NGN-2011	0.568	2298.6142	2298.614	0	E-1	Under Community Forest
2	Kamzhing	NGN-3565	0.506	2047.7091	2047.7091	182.5419	E-1	

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CHAPTER 6

SONAMTHANG DESIGN GUIDELINES





6. SONAMTHANG DESIGN GUIDELINES

6.1 Introduction

The Design Guidelines for Sonamthang is a set of broad guidelines drafted to help achieve the visions and goals of the Sonamthang Action Area Plan. The document consists of explanatory notes on the objectives and the planning and design principles to be adopted along with relevant images and diagrams.

6.2 Objectives

The Guidelines aim to help realize the vision and objectives framed for Sonamthang as ‘an agriculture, tourism, and craft based settlement in harmony with its surrounding’, in a socially, economically and environmentally sustainable approach. It aims at minimizing impacts on ecologically sensitive areas through conservation. It further aims to enhance the scenic views, respect the local building scale and architecture; and promote a livable settlement.

6.3 Built Form

The built form of Sonamthang should reflect traditional Bhutanese architecture, topography of the site, prevailing climatic condition and any features which are characteristic of the locality within the purview of the *Building Code of Bhutan 2018*. As for the form and size of the built-form, it must align with the precinct plan which will define the allowable number of floors and coverage with set of permissible and non-permissible uses.

6.3.1 Design Principles for Built-Form

6.3.1.1 Objectives

- i. To allow a barrier free and comfortable access to the buildings.
- ii. To reflect and promote the scale and essence of the local architecture.
- iii. To integrate functions of the roads with the building.
- iv. To ensure that the building defines and enhances the desired character of the roads with a high quality of architecture.
- v. To develop buildings in response to topography, natural elements and climatic condition.
- vi. To enhance a sense of place through visual containment and continuity.
- vii. To promote green architecture and sustainability.





6.3.1.2 Design Principles

- “ The building height and coverage shall be as per the DCR of Sonamthang in order to respect the local scale of building and architecture.
- “ Use of traditional building materials and construction methods is encouraged.
- “ The fenestrations and balconies should be oriented to allow daylight access, capture the scenic views of the surrounding areas and provide shade to the public spaces. The roof and its projection should be adequate to protect the pedestrians from the rain. The rain water gutters should be provided wherever necessary.
- “ The buildings should define the street with uniform setback to contribute towards desired urban form and enhance visual containment of the street.
- “ The facades of buildings should define streets with high quality of architecture reflecting the Bhutanese architecture, local character and also contribute towards the aesthetics of the street. The openings of the active spaces and habitable rooms should face the street to enhance passive surveillance.
- “ Finishes and exterior colours are to complement the scenic feature through use of muted colours and natural materials. Vibrant colours for walls and highly reflective roofs are not permitted. (Follow the building colour codes approved for Zhemgang Dzongkhag).
- “ Service pipes should be integrated into the building design. Surface mounted pipes on external walls are to be avoided. If they cannot be avoided, they are to be located on the sides of the building and will not be permitted on the front of the building.
- “ Sewer could be connected into community sewerage system in future. (Use plot level septic tank till the community sewerage network is installed).
- “ Any other built forms (other than dwellings) should also respect the traditional architecture.





6.4 Circulation

Elements of circulation namely, roads, streets, footpaths and bicycle tracks form an essential part of movement for people and vehicles. They ensure efficient connectivity and ease of accessibility within the area. For Sonamthang planning area, circulation network has been categorized into five categories, namely, Primary Road, Secondary Road, Tertiary Road, Footpath and Bicycle Tracks.

6.4.1 Street Design

There are three hierarchy of roads proposed for Sonamthang: Primary Road, Secondary and Tertiary Road. It is essential that the roads are well connected, safe and comfortable for walking.

6.4.1.1 Objectives

- i. To allow a barrier free and comfortable access to the buildings and public amenities.
- ii. To eliminate or at least reduce the conflict between pedestrian and vehicular traffic.
- iii. To encourage a development that is responsive to topography, natural elements and climatic condition.
- iv. To enhance a sense of place through visual containment and continuity.

6.4.1.2 Design Principles

- Ensure that there is proper signage with no or very minimal obstruction along and across the street to enable the people of all ages and the people with special needs to use it safely and comfortably.
- Ensure that the streets have footpaths, parking areas and travel ways clearly marked with legible lines, upright kerbs and pavements (colored and textured wherever possible) to ensure the safe passage of pedestrians and vehicles.
- For speed management, long lengths of development roads should be interrupted with the use of traffic management devices at strategic locations, such as roundabouts, speedbumps etc.
- The landscape elements such as street benches, trees and street lights to be oriented and located considering the 'scenic views', 'light and shade based on the climatic condition', 'visual continuity of the street and buildings' and 'the safety and comfort of the pedestrians'.
- The buildings defining the street should off-set or setback uniformly to enhance visual containment of the street.
- The facades of buildings defining the street should have a high quality of architecture reflecting the local character and also contributing towards the aesthetics of the street. To enhance passive surveillance, the openings of the active spaces and habitable rooms should front the street.



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- In order to encourage walking there should be speed deterrents and control mechanisms in place to reduce vehicular speed.
- Storm Water drainage should be designed along the roads.

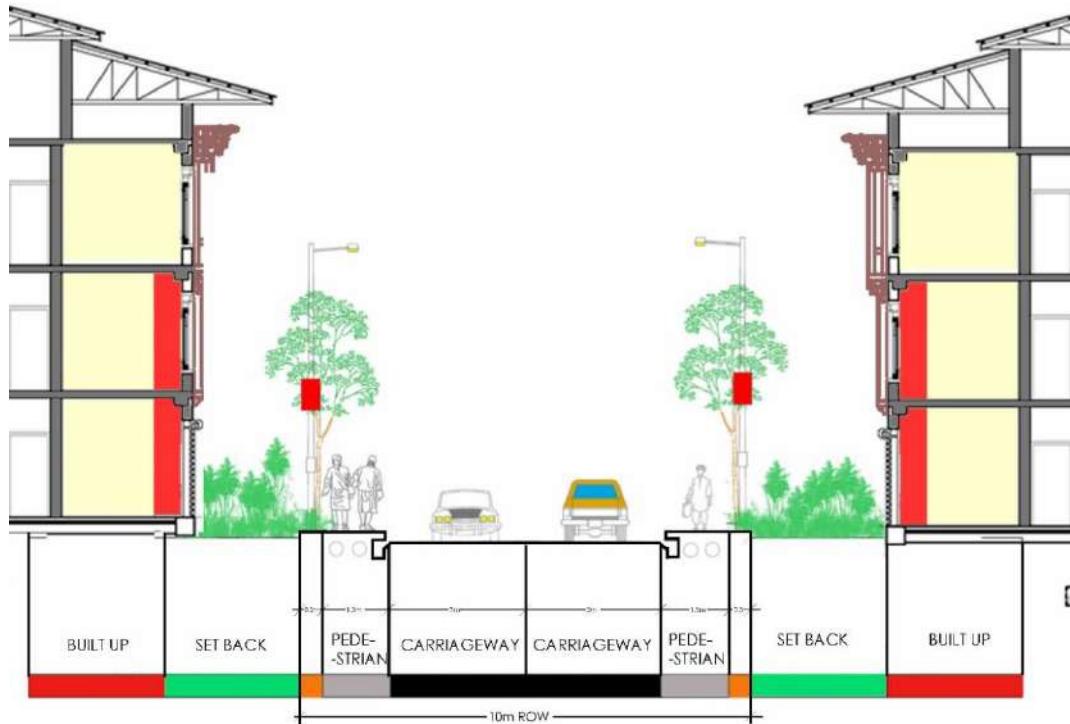


Figure 6.1 Primary Road Section

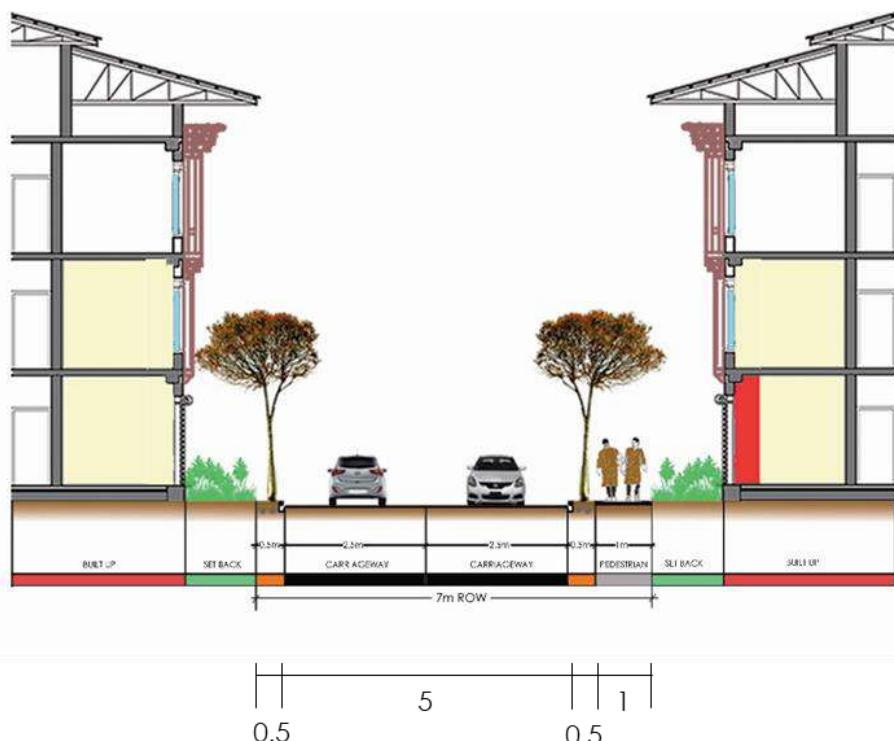


Figure 6.2 Secondary Road Section

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Figure 6.3 Tertiary Road Section



Figure 6.4 Storm Water Drainage Along the Road
(Source:

<https://tse3.mm.bing.net/th?id=OIP.J5ZOauEHu-lcpgBatznUhgHaE8&pid=Api&P=0&w=260&h=174>

6.4.2 Footpath Design

The Plan proposes for footpaths with pervious pavements, which blends with the natural setting of the area. Pervious pavements promote storm water infiltration and improve the quality of storm water runoff. Another benefit of pervious pavement is the reduction of pollutants that enter storm water runoff by reducing the amount of splash and spray that wash pollutants from the underside of vehicles. This would be considered a form of source control and a useful component of storm water compliance.





6.4.2.1 Objectives

- i. To allow a barrier free and comfortable access to the buildings, open spaces and public amenities.
- ii. To promote walkability.
- iii. To enhance a sense of place through visual containment and continuity.

6.4.2.2 Design Principles

- “ Ensure that there is proper signage with no or very minimal obstruction along and across the street to enable the people of all ages and the people with special needs to use it safely and comfortably. It should be wheel-chair friendly.
- “ Ensure that the streets have footpaths, parking areas and travel ways clearly marked with legible lines, upright kerb and pavements (coloured and textured wherever possible) to ensure the safe passage of pedestrians and vehicles.
- “ The landscape elements such as street benches, trees and street lights to be oriented and located considering the ‘scenic views’, ‘light and shade based on the climatic condition’, ‘visual continuity of street and buildings’ and ‘the safety and comfort of the pedestrians’.
- “ The buildings defining the street should off-set or setback uniformly to enhance visual containment of the street.
- “ The facades of buildings defining the street should have a high quality of architecture reflecting the local character and also contributing towards the aesthetics of the street. To enhance passive surveillance, the openings of the active spaces and habitable rooms should front the street.
- “ In order to encourage walking there should be speed deterrents and control mechanisms in place to reduce vehicular speed.
- “ The footpaths should be made of pervious pavements through which water can percolate.



Figure 6.5 Footpath Section



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Figure 6.6 Wheel-chair Friendly Footpath



Figure 6.7 Pervious Pavement for Footpaths (Source https://nacto.org/wp-content/themes/sink_nacto/views/designguides/retrofit/urbanstreetdesign-guide/images/pervious-pavement/carousel/pervious-pavement -3.jpg)

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6.5 Recreational Space

Recreational spaces play an important and integral role as a public domain, which has the potential to enhance the quality of lives of the residents and the visitors to the planning area. Neighborhood level open spaces are proposed in Sonamthang, which will provide space for all the people to relax and enjoy.

6.5.1 Design Principles

- “ The recreational parks should be made as accessible as possible to the people of all ages and the people with special needs with the provision of comfortable ramps wherever necessary.
- “ The public open spaces should be made attractive with the provision of benches, shades, proper lighting, toilets and drinking water taps.
- “ Green practices such as waste segregation at source and waste collection should be encouraged by providing waste collection bins.
- “ Locally available materials should be used for construction of parks and their associated facilities and the materials should require low maintenance cost.
- “ The open spaces should be socially conducive. They should be the place for community gathering and interaction. Design should consider discouraging vagrancy and crime.
- “ The open spaces should integrate with the streets and footpaths and should be accessible from as many points as possible.
- “ The open spaces should be landscaped with vegetation of all seasons. There should be a mix of flowering and non-flowering plants. The locally grown plants should be used not only for viability but also to attract birds and animals of the locality.



Figure 6.8 Conceptual Design of Open Air Gym





Figure 6.9 Conceptual Design for Recreational Space



Figure 6.10 Stream Development Section

6.6 Water Sensitive Urban Design

Water sensitive urban design seeks to minimize impacts on the total water cycle, enhance effective storm water management and minimize impact on stability of water table. This is done mainly by reducing storm water runoff and improving the storm water quality. The streets, buildings and other hard surfaces in a settlement account for a significant amount of impervious area causing increased storm water flows. They also account for the source of water borne pollutants such as sediments, metals and hydrocarbons affecting the quality of water.

6.6.1 Objectives

- i. To minimize the storm water runoff.
- ii. To reduce discharge of sediments and other pollutants to the storm water drainage system.





- iii. To minimize the impacts of development in Sonamthang on the health of natural waterways.
- iv. To preserve existing natural features and topography to protect the natural water course and natural system of storm water drainage.

6.6.2 Design Principles

- “ The materials used for pavements should be pervious to reduce the storm water runoff.
- “ There should be optimum amount of deep soil. Deep soil is pervious to storm water and would facilitate growth of vegetation and infiltration of storm water. For the open spaces, there should be more than 25% of deep soil.
- “ The formal drainage system should be minimized. If constructed, it should be vegetated and it should have bio-filtration trenches and subsoil collection systems.
- “ Construction of wetlands or water pollution control ponds should be initiated wherever possible.
- “ The landscape design should be integrated with the water sensitive urban design.
- “ Water Sensitive Urban Design is most effective on slopes of 1- 4 %. For the slopes exceeding 4%, bio retention street planter or flow controls such as check dams with swales and bio retention systems could be used.
- “ Bio retentions swales should be used wherever possible. Bio- swales are basically long, fairly shallow depressions in the earth that often use a curved or sinuous form to slow water, and are planted with native or non-native grasses and other vegetation. Like the other green streets facilities, bio swales treat storm water from adjacent parking lots or roads. The incorporation of bio swales around hard surfaces like roads, buildings and parking lots can promote environmental sustainability while improving the aesthetics of their surroundings.



Figure 6.11 Bio-Swales (Source:https://www.venicehauling.com/wp-content/uploads/2018/05/venice_hauling_swale.jpg)





6.7 Mitigation Structures for Flash Floods

The whole Sonamthang is a river terrace. This terrace is covered with debris-flow deposit, mainly from the streams. These streams will change course over the river terrace. Therefore, mitigation measures should be in place to protect the land from the future floods and debris flows. In the current study area, the peak discharges from streams were computed and based on which the gabion or retaining walls must be built to protect the areas' adjacent lands from the floods.

6.7.1 Design Principles

- a) Most of the mitigation structures to protect from flashfloods comprises of Gabion Walls. These walls consist of steel wire baskets filled with rock as shown in **Figure 6.12**. Mesh openings are usually about 3 inches square. Therefore, the infill should be 3 inch to 8 inch clean hard stone. The thickness of wire in the wire mesh usually ranges from 3mm to 5mm. As the wall height increases, thicker wire should be used. Gabion walls should be designed on the same principle as a gravity mass wall, no allowance being made for the strength or mass of the wire mesh.

Table 28Details of Mitigation Structures for Flashfloods

DESCRIPTIONS OF MITIGATION STRUCTURES					
No.	Mitigation Structures	Label	Details		
			Length (m)	Width (m)	Height (m)
1	Proposed Gabion Wall	GW-1	263.00	-	4.00
2		GW-2	104.00		3.50
3		GW-3	93.30		
4		GW-4	28.20		
5		GW-5	67.00		
6		GW-6	115.00		3.00
7		GW-7	51.00		
8	Proposed RCC Retaining Wall	RW	60.00	0.50m with base width of 4.75m	5.00
9	Proposed Open Channel Drain	OCD-1	90.20	1.50	1.00
10		OCD-2	80.00		

- b) Gabion baskets are a mass retaining system thus, the higher the area that needs retaining, the heavier the wall must be. The standard design for a gabion wall is a pyramid. The gabion wall design for 3 m high wall is shown in Figure 6.13. For a 3m high wall the bottom row should be 2 m deep and the top row should be 1m deep. In general, for every 1m increase in wall height, the bottom row basket depth should be





increased by half a meter. At one critical place, retaining wall was recommended. The design of this 5m high RCC Retaining Wall is shown in Figure 6.14.

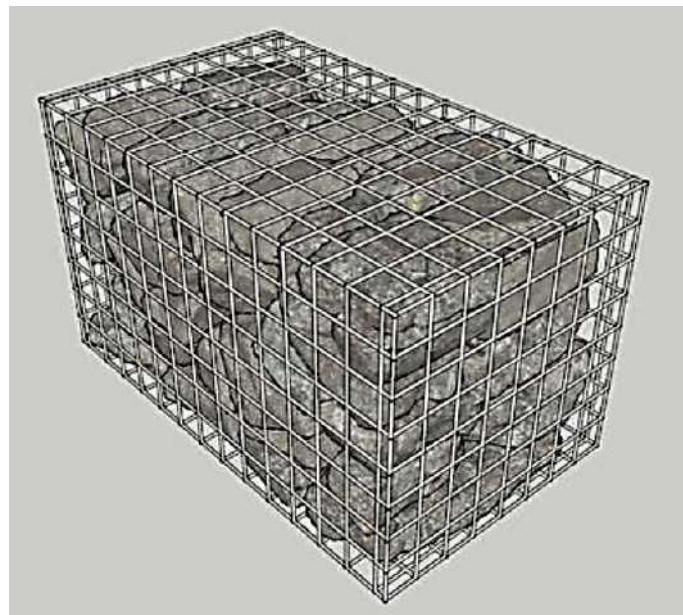


Figure 6.12 Gabion Baskets with Infill Stones

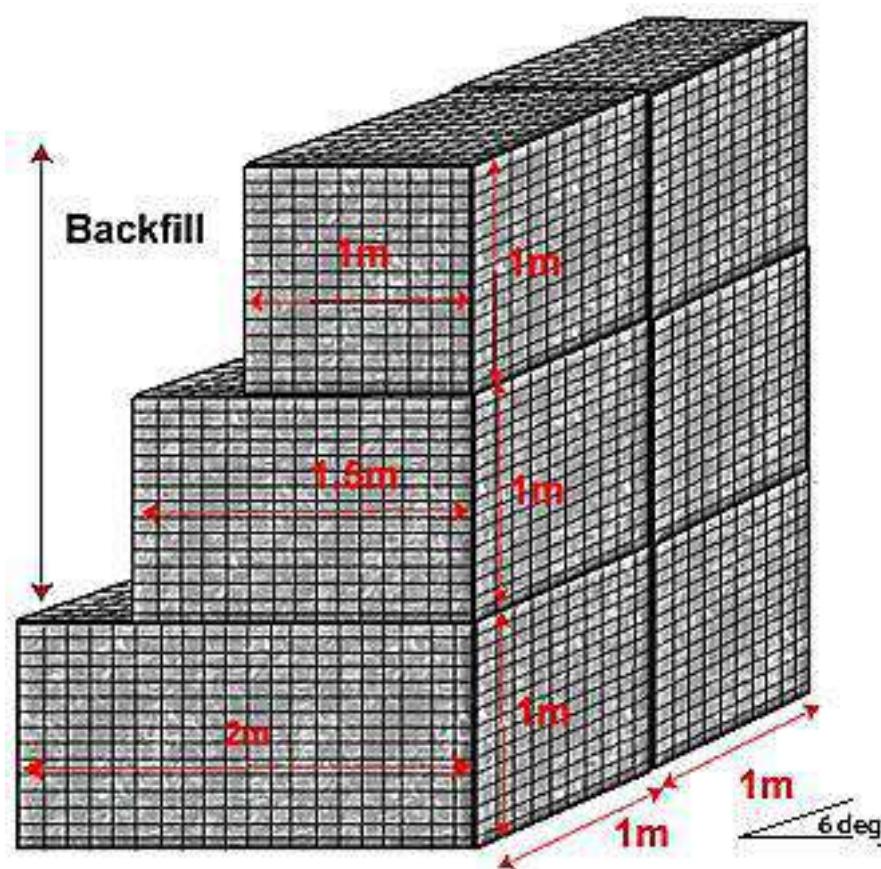


Figure 6.13 3m High Gabion Wall



Sonamthang Action Area Plan

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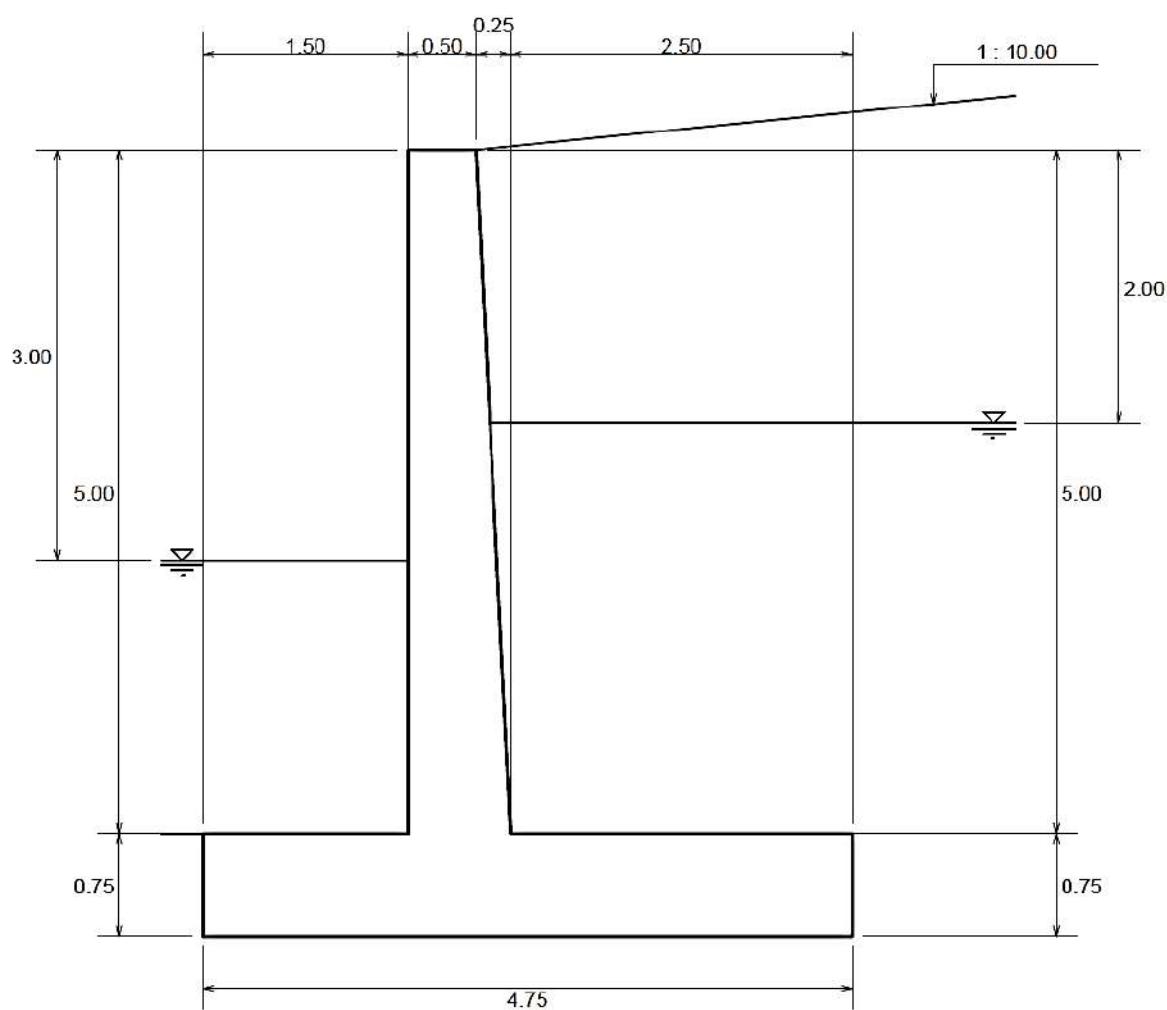


Figure 6.14 RCC Retaining Wall Design

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ANNEXURE

1. Memorandum of Understanding

Memorandum of Understanding

between

**Zhemgang Dzongkhag Administration and Department of Human
Settlement, MoWHS**

for

preparation of Action Area Plan

for

Sonamthang, Ngangla Gewog, Panbang Dungkhag, Zhemgang

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Background

As per the procedure for planning of human settlements, the Zhemgang Dzongkhag Administration and the Department of Human Settlement (DHS) under MoWHS agreed on the Memorandum of Understanding for the preparation of Action Area Plan for Sonamthang under Ngangla Gewog and Panbang Dungkhag Administration (PDA).

The decision to take up the preparation of Action Area Plan for Sonamthang has been reached following the request of Zhemgang Dzongkhag Administration conveyed vide letter no. ZhemDzong/Tshogdu(2)2017/3870 dated 21st March 2017. Subsequently the DHS carried out detailed topographical survey of the area earmarked for Sonamthang in September, 2018. Also DHS informed Dzongkhag Administration vide letter no. MoWHS/RRPD/Zhemgang/2018-19/1455 to keep the necessary budget for the preparation of the plan.

Purpose of MoU

The Memorandum of Understanding will outline roles and responsibilities of the Panbang Dungkhag Administration, Zhemgang Dzongkhag Administration and the Department of Human Settlement in the preparation of Sonamthang Action Area Plan. This is being done to facilitate efficient coordination, cooperation and collaboration. In addition, it would also ensure that there is no duplication of activities and facilitate timely actions.

However, in case issues ensue which is outside the outline, it should be dealt in proper coordination between the two.

Necessary Information

Land data is necessary for preparation of detailed plan. Therefore without an updated land data for the areas within a planning boundary, preparation of plan will not be initiated.

Roles and Responsibilities

The roles and responsibilities of PDA and DHS will be as per the table below:

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06.12.2018

Main Task	Task Details	Responsibility		Remarks
		PDA	DHS	
1.Preliminary Study	1.1 Check availability and adequacy of land & Water	X (Water)	X (Land)	DHS will provide support in the case of water. For land, DHS will do the necessary.
	1.2 Physical verification of cadastral records & demarcation of planning boundary.	X	X	DHS will take a lead role.
	1.3 Assess potential for growth and future development.		X	PDA will support.
	1.4 Topo-survey and geo-tech studies to be carried out and EIA/SEA where relevant.	X (EIA/SEA)	X (Topo-survey & Geotech)	
2.Data collection and analysis	2.1 Compilation of land records, ownership details and their verification.	X		
	2.2 Studies on demography, site, existing infrastructure, emerging development trends etc.		X	PDA will provide additional information as and when requested.
	2.3 Selection of planning technique (where plot level planning is necessary).		X	
	2.4 Presentation of preliminary study report.		X	
3.Public notification/awareness	3.1 Create public awareness of plan preparation.	X		
	3.2 Declare moratorium on land sub-division and transaction, constructions etc.	X		DHS will advise about the date.
	3.3 Form a Consultative Committee (where plot level planning is necessary)	X		DHS will advise about the date.

Dr. R. A. S.

4. Conceptual Plan preparation	4.1 Major themes, planning and design proposals.		X	The PDA will participate in the activities.
	4.2 Broad land use zones/precincts, major road layout and circulation networks.		X	
	4.3 Preliminary development regulations and guidelines.		X	
	4.4 Identification of LAP boundaries (included in the Action Area Plan).		X	
5. Consultation Meeting	5.1 Public notification for stakeholders' consultation.	X		PDA will take part actively and it will take care of the logistics and fund necessary. If PDA has competency, it is encouraged to take up the task.
	5.2 Presentation of the concept plan for review by stakeholders.		X	
	5.3 Public display of the plan for a fixed duration for additional comments.	X		
6. Draft Plan Preparation	6.1 Detailing and further development of concept plan proposals.		X	
	6.2 Incorporation of comments and observations from the stakeholders' consultation.		X	
	6.3 Public display of rationale for inability to include some comments.	X		The DHS will provide necessary support.
7. Plan review	7.1 Presentation of the revised draft plan to the MoWHS for review and comments.		X	The PDA representative should be present.
8. Final Draft Plan	8.1 Revision of the plan to incorporate comments,			

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o
12.2.2010

Sonamthang Action Area Plan

preparation	if any, from the presentation to the MoWHS.		X	
9. Plan presentation to NCCHS	9.1 Presentation of the final draft plan to the NCCHS for approval.		X	
	9.2 Any changes necessary to be incorporated prior to release of the plan for implementation.		X	
	9.3 Public display of the approved plan at the Local Government.	X		
10. Plan implementation	10.1 Thram verification and update and demarcation of verified plots.	X		DHS will support if required.
	10.2 Infrastructure planning and design.	X		PDA to request MoWHS.
	10.3 Project preparation, resource mobilization and implementation.	X		
11. Amendment	• Initiation of amendment.	X		
	• Presentation of the amended plan to the NCCHS for approval.		X	

8/16.2018

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Focal Persons

The following officials are the focal persons for the preparation of Sonamthang Action Area Plan:

Mr. Kintu, Dzongkhag Engineer, Zhemgang Dzongkhag Administration; and

Ms. Deki Wangmo, Urban Planner, Department of Human Settlement.

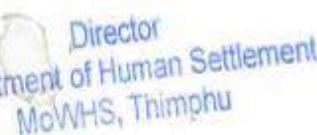
Change of the focal person shall be communicated to the respective administrations as soon as possible.

Change of Roles and Responsibilities

The roles and responsibilities particularly related to presentations, incorporating comments, and reviewing plan will change if Zhemgang Dzongkhag Administration recruits an Architect or an Urban Planner. The changes will be effected in the MoU accordingly.



Director
DHS, MoWHS



Director
Department of Human Settlement
MoWHS, Thimphu



Dzongdag
Zhemgang Dzo. Administration



DZONGDAG
Dzongkhag Administration
Zhemgang

06.12.2018.

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2. Minutes of Meetings

Draft Minutes of Meeting for Sonamthang Action Area Plan

Time : 04:00 PM

Venue : Zhemgang DYT Hall, Zhemgang Dzongkhag Administration

Date : 04-12-18

1. Opening Address by Dzongkhag Engineer

2. Opening Remarks by Dasho Dzongda

- Dasho informed that the Sonamthang Action Area Plan was deliberated upon when issues from Buli and Panbang were raised and the meeting was very much timely.
- During DYT meeting held on 3/12/18-4/12/18, one of the main topic of discussions was regarding Sonamthang AAP. The expectation out of the plan is to develop the area as an agro-based village with enhanced connectivity within the village.

3. Presentation by Ms. Deki Wangmo

The presentation was delivered on the following topics:

- a) The scope of the visit to Zhemgang Dzongkhag Administration (ZDA) and Sonamthang is to:

- Present the preliminary desk studies,
- Discuss and finalize the draft MoU between ZDA, Panbang Dungkhag Administration (PDA) and DHS;
- Gather the expectations of the stakeholders for Sonamthang;
- Conduct preliminary site visit for familiarization of Sonamthang;
- Tentatively finalize the planning boundary; and
- Identify key issues related to infrastructure, land use, Institutions, market etc.

- b) Study area and boundary:

- For the purpose of the site visit, the boundary was kept as the topography survey boundary, however, if ZDA and PDA has any issues pertaining to it, it would have to be discussed.
- The study area encomposes 2.16 sq. km, which is 533.57 acres.

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c) Population:

- As per PHCB 2017, the population of Sonamthang is 1311 and the number of households as per the Ngangla Gewog Administration (NGA) is 110. The population is however, not known whether it is inclusive of the school population; and hence, it was mentioned that it will be validated through NSB and socio-economic survey, which will be conducted in the next visit.

d) Services, infrastructure and major developments:

- Since the institutional, religious, educational and other establishments play important role in the development of the area, the local governments were requested to confirm and validate the data received from NGA, through ground verification by the planners; and topographic survey.

e) Overarching plans of Zhemgang as a whole and its influence on Sonamthang:

Bhutan National Urbanization Strategy 2008

Economic development activities and basic infrastructure were found to be lacking in Zhemgang.

11 Five Year Plan

- Construction of 56km Panbang-Nganglam highway.
- Promotion of eco-tourism and community-based tourism.
- Collaboration with agencies for promotion of indigenous products (APIC) in order to develop bamboo and cane products.
- Chamkhar Chhu Hydroelectric project to create opportunities.

National Human Settlement Strategy 2017

- Develop bird watching treks,
- Production of bamboo based handicrafts;
- Develop as centre for training and workshops especially in terms of agriculture and tourism; and

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- Chamkharchhu hydroelectric project to facilitate supply of agricultural and livestock products.

Zhemgang Urban Development Plan 2003

Zhemgang is to be developed as 'Service Centre in terms of agriculture and education' and 'Tourist base'.

Comprehensive National Development Plan for Bhutan 2030 (CNDP 2030)

- Bhutan is divided into four different vertical regions and three different horizontal regions based on different climatic, social, cultural and other conditions. This national spatial plan for Bhutan proposes for linked urban centres with linked urban functions. Sonamthang, located near Panbang is strategically located between Sarpang-Gelephu and Nganglam-S/Jongkhar linked urban centres. It provides Sonamthang with a lot of advantages in terms of market accessibility, service delivery and other aspects.
- Under creation of agricultural production area, Zhemgang has been proposed as maize and ginger production area; and in terms of livestock promotion area, it has been proposed as pork and fish production area.
- Zhemgang has also been proposed to focus on eco- and culture-based tourism.
- Under holistic service delivery system, Panbang has been proposed as sub-district station (SDS), which is a roadside station and a hub connecting Dzongkhag Centre and Gewog Centre, catering to its nearby villages. And since Sonamthang is located in the catchment area of Panbang, it has advantages related to location.
- In terms of educational and academic institutions, the area where Zhemgang falls under is identified and proposed as 'academic potential zone'; and it will have research centre related to rural development based on material engineering, natural resource management, agriculture etc.

f) Memorandum of Understanding:

- The purpose of MoU is to outline roles and responsibilities of the PDA, ZDA and DHS in preparation of Sonamthang AAP. It is to facilitate efficient coordination, cooperation and collaboration. In addition, it would also ensure that there is no duplication of activities and facilitate timely actions.
- As per letter no. MoWHS/RRPD/Zhemgang/2018-19/1455, the ZDA is to keep the necessary budget for the preparation of the plan.



4. Discussions:

Sl #	Agenda	Discussions	Actions/Decisions
1	Fund for preparation of Sonamthang AAP	<ul style="list-style-type: none"> DHS team enquired the local government if they have kept budget for plan preparation. Dasho Dzongda informed that the requirement of funds was also discussed during the Dzongkhag Tshogdu meeting and that Ngangla Gup had not kept a separate fund for the preparation of Sonamthang AAP. However, it was decided during the DT meeting that a smaller subhead will be kept aside for public consultations. 	
2	Moratorium	<ul style="list-style-type: none"> Moratorium date needs to be set as soon as possible. Dasho Dzongdag suggested that though there were not many construction proposals, construction moratorium should be imposed till the concept plan is prepared and presented to the Dzongkhag so that it does not hamper or further delay the plan preparation processes. 	<ul style="list-style-type: none"> DHS to decide about the moratorium and advise the local government accordingly.
3	Water Source	<ul style="list-style-type: none"> Dasho Dungpa informed that although water supply is enough for the current residents, it may not be enough in the near future. The current water source is not reliable and for future purpose, the tentative water source is located 8-9 km away from Sonamthang. 	<ul style="list-style-type: none"> For water related support including identification of new water source the dzongkhag will request the Dept. of Engineering

		km away from Sonamthang.	Services for necessary support.
4	Memorandum of Understanding	<ul style="list-style-type: none"> The local governments agreed to the draft MoU prepared by the DHS. 	<p>It was decided that the MoU would be signed between DHS and ZDA; and ZDA would delegate the tasks to PDA.</p>
5	Miscellaneous	<ul style="list-style-type: none"> Regarding the Chamkhar chhu hydropower project, Dasho Dzongda informed that the project was initially included in the Hydropower master plan but it is now halted. Ms. Tshering Pelden, Urban Planner, DHS clarified that the planning processes are delayed usually due to unavailability of land details and similarly for Sonamthang, the Department had not yet received the land details. It was also informed that the plan which is under the process of preparation should be referred as Sonamthang Action Area Plan. The use of term Sonamthang 'Town' Plan was discouraged as it would give wrong impression of the plan.. Mr. Jambay Ugyen, Agriculture Officer of ZDA informed that the expectations and the interests may come out more clearly during the consultative meetings with the people. He also commented that the major aspiration for Sonamthang is not to be developed as an urban area but to become an agro based 	





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DEPARTMENT OF HUMAN SETTLEMENT
THIMPHU: BHUTAN
Post Box No.129

FINAL MINUTES OF MEETING
Departmental Meeting on Sonamthang Concept Plan
October 15th, 2019

Time: 10:00 AM-12:00 PM

Venue: DHS Conference Hall, MoWHS

The Sonamthang Concept Plan was presented to the Department of Human Settlement to gather views and opinions on the proposals for Sonamthang and as a preparation for the site visit scheduled on October 17, 2019.

Presentation:

The presentation consisted of following contents:

1. Brief background on the planning site and how the need for planning came about.
2. Existing scenario of Sonamthang: Demography, economy, environment, institutions; infrastructure and services; and internal connectivity.
3. Analysis: plot ownership, plot type, plot size, building typology, slope analysis, hazard map; population projection; and SWOT analysis.
4. Concept Plan:
 - Vision: To promote Sonamthang as ‘an agriculture-, nature- and craft-based settlement in harmony with its surrounding’
 - Principles:
 - a) Sustainability: ensure environment, cultural and economic sustainability.
 - b) Accessibility: provide adequate travel corridors and mobility for all.
 - c) Open spaces: create open and green spaces for all while preserving watersheds and other natural features for healthy, resilient and sustainable environment.
 - d) Compatibility: the building character and scale should reflect the needs, capacity; and local and cultural characteristics of the area.
 - e) Integration: develop Sonamthang in harmony with the neighbouring Panbang town and its surrounding.

Issues, discussion and actions

The following were recommended for incorporation in the presentation and consideration for preparation of Sonamthang Action Area Plan:

- i. The negative growth rate of Zhemgang Dzongkhag to be included under Weakness as it indicates out-migration.
- ii. Suitability map indicating areas suitable and unsuitable for development.



- iii. Land requirement to be calculated based on G+2 alongside the projected population, as per Bhutan Building Regulations 2018.
- iv. Capture all the environment, economic and social aspects under Principle 1 on sustainability.
- v. The principle also include clear delineation between settlement and non-settlement areas since the idea is to protect the existing state of environment.
- vi. Coordinated planning and implementation should be suggested through integration of infrastructure with the associated services.
- vii. Disaster and climate resilient infrastructure should be promoted including shelter for evacuation during earthquake and flood. Energy-efficient and use of local materials should be recommended.
- viii. To promote tourism and agriculture, accessibility from other regions shall be looked into.
- ix. Creation of opportunities for people to earn shall also be looked into.
- x. Water demand shall be calculated for agriculture.
- xi. Sonamthang should be considered holistically with Panbang and Tungkudempa for provision of certain facilities.
- xii. Option for consolidation of chhuzhings shall be explored.
- xiii. The cultural and historical significance of the social institutions shall be looked into.
- xiv. Number of tourists in a year for Sonamthang should be mentioned.
- xv. The housing requirement shall be calculated.



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DEPARTMENT OF HUMAN SETLEMENT
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FINAL MINUTES OF MEETING
Stakeholders' Meeting on Sonamthang Action Area Plan
October 22nd 2019

Time: 9:30 AM-12:30 PM

Venue: Ngangla Gewog Administration, Zhemgang

Department of Human Settlement presented the Sonamthang Action Area Plan to the officials of Zhemgang Dzongkhag Administration, Panbang Dungkhag Administration and Ngangla Gewog Administration; and to the stakeholders.

A. Presentation:

The presentation consisted of following contents:

1. Brief background on the planning site and how the need for planning came about.
2. Existing scenario of Sonamthang: Demography, economy, environment, institutions; infrastructure and services; and internal connectivity.
3. Analysis: plot ownership, plot type, plot size, building typology, slope analysis, hazard map; population projection; and SWOT analysis.
4. Concept Plan:
 - Vision: To promote Sonamthang as '*an agriculture-, nature- and craft-based settlement in harmony with its surrounding*'
 - Principles:
 - a) *Sustainability*: ensure environment, cultural and economic sustainability.
Environment
 - i. Clear delineation of settlement and non-settlement areas.
 - ii. Agriculture, forests and steep slopes shall be conserved and developments shall be strictly restricted in these areas.
 - iii. Buffer along the streams shall be provided.
 - iv. Open Channel Drains, retaining walls and gabion walls are proposed along certain sections of the streams in order to mitigate risks posed by flood during the rainy season.
 - v. Provision of other mitigation measures for risk reduction.
 - vi. Provision of sustainable and climate-resilient infrastructure



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Economic and Social

- vii. To encourage agricultural practices, local agricultural product outlet such as a farmer's market will be provided.
 - viii. Provision of proper irrigation channel for agricultural lands.
 - ix. Facilitate community-based tourism activities such as river rafting, bird watching, etc.
 - x. Encourage cultivation of bamboo and cane to promote handicraft tourism, which will be supported by the proposed craft bazaar in Tungudempa and the bamboo centre in Sonamthang.
- b) *Accessibility:* provide adequate travel corridors and mobility for all.
- i. Facilitate better pedestrian connectivity through provision of on-street and off-street footpaths.
 - ii. Widening of primary and secondary roads; and provision of tertiary roads with appropriate infrastructure.
 - iii. Provision of inclusive and sustainable infrastructure along the roads and footpaths such as wheelchair access, street furniture, soft landscaping, bus stops, street signage etc.; and provision of bicycle tracks to promote healthy and active living.
 - iv. River transport through integration of DrangmeChhu with Thinleygang, Sonamthang, Panbang and Tungkudempa. These areas will be promoted for boat and rafting, which will provide attraction to tourists as well.
- c) *Open spaces:* create open and green spaces for all while preserving watersheds and other natural features for healthy, resilient and sustainable environment.
- i. Creation of local parks, small gardens and children playgrounds in 5 minutes walking distance (400m radius).
 - ii. Soft landscaping: permeable grounds, evergreen trees and shrubs.
 - iii. Appropriate hardscaping: pergolas and shelters, fountains, etc.
 - iv. Agriculture, steep slopes, forests and streams will be integrated to form the Green and Blue Network.
 - v. Thinleygang Stream is proposed to be developed as a recreational space.
- d) *Compatibility:* the building character and scale should reflect the needs, capacity; and local and cultural characteristics of the area.



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- i. Buildings will need to be constructed with all the required traditional features set in the Bhutanese Architecture Guidelines 2014.
 - ii. Buildings in the Rural Residential Cat-2 will exhibit low density and coverage with provision for kitchen gardens.
 - iii.
- c) *Integration:* develop Sonamthang in harmony with the neighbouring Panbang town and its surrounding.
- i. Sonamthang will be the transitory settlement between Panbang town and nature.
 - ii. While the commercial activity will be intense in Panbang, Sonamthang will focus on agricultural activities and will be developed as a resort based village.

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Post Box No.129



B. Issues, discussion and actions

Sl. no	Agenda/Issues	Discussion	Follow-up Actions
1	Concept for Sonamthang	<p>a. DashoDungpa raised that the public must clearly understand that Sonamthang is not a town and that the preparation of plan was requested upon observing unplanned developments.</p> <p>b. It was also informed that in order to maintain the cultural and natural landscape of S/thang, it should be developed as an agro-based settlement.</p> <p>c. Chhuzhings are to be maintained and no constructions shall be allowed.</p> <p>d. The houses shall be constructed as per the <i>Traditional Architecture Guidelines 2014</i>.</p> <p>e. Sonamthang and Thinleygang should supplement Panbang town through agriculture produce and crafts.</p>	

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2	Moratorium	<p>a. The planning team raised that they observed new buildings and that there were few ongoing constructions as well. It was informed through an official letter that moratorium needs to be imposed from the initiation of the Plan until its completion and approval. It was highlighted that henceforth, Zhemgang Dzongkhag Adm., Panbang Dungkhag Adm., and Ngangla Gewog Adm. shall strictly impose moratorium on construction of buildings and transaction and subdivision of lands. Instances were shared by DashoDungpa on how the construction without approval in Tungkudempa has encroached the proposed road and how its demolition has affected the landowner.</p> <p>b. The Forest Officer raised that 90% of the resources for construction is from the forest and enquired whether the supply of rural timber subsidy should be halted. For that, the local government clarified that rural subsidy for construction of buildings shall be halted immediately. However, it could be provided for renovation.</p>	<p>• Moratorium to be imposed by the Local Government halting the construction, transaction and subdivision of land until the approval of the Plan.</p>
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<p>3</p> <p>Land Modality</p>	<ul style="list-style-type: none"> a. The local government and the stakeholders enquired about the contribution for planning and that they wish for minimal contribution. It was clarified that the land modalities will be chosen after assessing the technical feasibility and public's consent. b. The updated land details are also to be provided to DHS for further analysis and preparation of Sonamthang Action Area Plan. 	<ul style="list-style-type: none"> • The Dzongkhag Administration to provide the latest updated land details of Sonamthang.
<p>4</p> <p>Irrigation channel</p>	<ul style="list-style-type: none"> a. It was raised that in the past, the road widening and constructions has affected the irrigation channels. Therefore, the protection of the existing irrigation channel is necessary. 	<ul style="list-style-type: none"> • The planning team to take the issue under consideration while preparing the Plan.

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ROYAL GOVERNMENT OF BHUTAN

MINISTRY OF WORKS AND HUMAN SETTLEMENT

DEPARTMENT OF HUMAN SETTLEMENT

THIMPHU : BHUTAN

"Construction Industry: Solution through innovation and improved technology"

MINUTES OF MEETING

PUBLIC CONSULTATION FOR SONAMTHANG ACTION AREA PLAN (SAAP)

Time: 9:00AM-1:00PM

Venue: Panbang Primary School, Panbang, Zhemgang

1. Background

With the preparation of draft Sonamthang Action Area Plan and after deliberations within the Department of Human Settlement, the proposals and land mobilization modalities were presented to the public and stakeholders of Sonamthang on March 6, 2020. The consultation consisted of two phases: firstly, pre-meeting was held with the local government officials to sensitize on the proposed land mobilization modality and to present the proposals. Secondly, after the pre-meeting, the public consultation was held.

2. Pre-Meeting

Following issues were deliberated during the pre-meeting:

- The proceedings of the public consultation were deliberated upon.
- The following proposals were put forward from the SAAP according to the need and requirement of the public, analyzed from the socio-economic survey:
 - Roads (Primary, Secondary and Tertiary)
 - Footpaths
 - Community hall
 - Farmer's market
 - Taxi stand
 - Service plot (Post, Communications etc.)
 - Open spaces
- The officials were informed that the community hall, farmer's market, taxi stand, service plot and one of the open spaces (out of four) are proposed on the available state land within the Sonamthang planning boundary. However, for provision of farmer's market and



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community hall, Plot NGN-4334 belonging to Mr. Karma Wangdi would have to be reconfigured to create developable state land for the proposed services.

- As for the land mobilization mechanisms, the department proposed for Guided Land Development (GLD) method as the best solution in order to maintain the landscape of Sonamthang and also to ensure full usability of Chhuzhings. The GLD uses the provision of infrastructure as a mechanism to guide development, which is done in partnership with landowners who pay for the cost of servicing their land through donation of land for public infrastructure and payment of a betterment levy. The GLD model could be combined with Acquisition if the landowners are not forthcoming with the GLD model. In such a case, the minimum land for contribution will be determined by the planning team, and rest of the area under the provision of infrastructure (road and footpath) will either be compensated or in case the area is more than 10 decimal, it was proposed that it could be substituted by the local government, however, land needs to be indicated beyond the boundary in consultation with the NLCS since there is no state land within the planning boundary for substitution.
- The stakeholders enquired about the land tax after the implementation of the plan, which was clarified that the Sonamthang area will remain 'rural' even after the plan approval and implementation.
- The Local government officials raised concerns regarding the Budget allocations for the implementation of the plan. In addition, land owners have to be compensated for the affected plots for infrastructure provision.

3. Public Consultation

• Issues, discussion and actions

Sl #	Issues	Discussions	Actions
1	Land Mobilization Scheme	<ul style="list-style-type: none">The Department of Human Settlement proposed for Guided Land Development (GLD) as the best land	The detailed analysis on the contribution required from each plot



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		<p>mobilization scheme for implementation of SAAP, in order to conserve the landscape and chhuzhing of S/thang. Since it does not entail reconfiguration of plots, the public and the local government were for the GLD mechanism.</p>	for the new road infrastructure and widening of the existing road would be worked out by the department.
2	Area infrastructure proposals	<ul style="list-style-type: none">The public enquired about the total area under the infrastructure proposal and were worried that if it falls on their only inherited plots with an area of 10 decimal, that the area rendered after the GLD might come to less than 10 decimal and be undevelopable.As for other service provisions on private lands, the landowners were not willing to contribute, in which case the proposals will be made through the plan, however, the local government will have to decide on mechanisms to mobilize the land.	
3	27m RoW for 132kV high tension electric lines	<ul style="list-style-type: none">Public asked about the possibility for relocation of plots that fall under the 27m RoW of High Tension. The local government clarified that issues pertaining to this were already discussed and the public were already sensitized about the Dos and Don'ts.	
4	Miscellaneous	<ul style="list-style-type: none">Public asked if plots which are far away from the proposed roads and roads proposed for widening could be developed. It was clarified that until the plan is finalized and moratorium lifted, it would be best that no new construction and development take place on the plots.	No developments should be entertained until the plan is finalized, approved and released for implementation.



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DZONGKHAG ADMINISTRATION ZHEMGANG “Human Settlement Sector”



ZD/ZDHS-28/2019-2020/ 9246

Date: 25/06/2020

Minutes of Meeting

1. Stakeholders Consultation Meeting on:

- a. Review of Zhemgang Structure Plan
- b. Preparation of Sonamthang Action Area Plan

Date and time: June 12, 2020, 9:00AM- 2:00PM

Venue: Dzongkhag Tshogdu hall, Zhemgang

2. Background

The consultation meeting on the ‘Review of Zhemgang Structure Plan’ and ‘Sonamthang Action Area Plan’ were supposed to be carried out to both public and stakeholders much earlier; however, it could not be conducted following the Government’s instruction to avoid large gatherings in view of the COVID-19 Pandemic. Therefore, the consultation meeting was carried out with the stakeholders only, for both the above mentioned plans.

The officials from the Department of Human Settlement presented the final draft plan followed by discussion for both Zhemgang and Sonamthang plan.

3. Review of Zhemgang Structure Plan

Following issues were deliberated during the presentation.

Sl. No.	Issues	Discussion	Action
1.	Proposed serviceprecint on Dratshang land beside the road leading to RDTC.	Dzongkhag Livestock Officer raised his concern on the proposed automobile workshop on dratshang land beside the road leading to RDTC due to its sensitive location in view of the settlements and Gyelsey Dumra immediately below the proposed site. The same concern was also shared by Dasho Dzongda and Dasho suggested that only non-polluting services may be allowed in that proposed service precinct.	The planning team will reconsider the proposal as may be appropriate.

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2.	Development Control Regulation (DCR)	Dasho Dzongrab shared his concern regarding the number of floors permitted in Urban Core (4-floors). This is because of its close proximity to the Dzong which might overshadow or affect its view. Dasho Dzongda suggested having exceptional clause on number of floors which could be less by one floor for those structures right below the round-about and near Dasho Dzongda's residence.	The planning team will revisit the proposal on permissible number of floors.
3.	Heavy vehicle parking	The Officer-in-Charge of RBP, Zhemgang inquired about the need for provision of heavy vehicle parking within the planning area, to ensure smooth traffic flow. It was clarified that the parking for heavy vehicle is tentative/ not yet finalized due to lack of suitable area, however, the plan recognizes its importance and will explore further to be included in this plan.	Joint site visit will be carried out to identify the most suitable location for heavy vehicle parking.
4.	Firefighting service in the town	The Officer-in-Charge, RBP also raised his concern about the need for provision of firefighting service both for Tingtibi and Zhemgang. In this context, he requested for possibility of allocating a plot for RBP at Tingtibi within the current town.	The planning team clarified that such facilities could be accommodated within the service precinct proposed in the plan.
5.	Communal septic tank for Trong.	Some of the participants expressed their reservation on the proposed location of communal septic tank for Trong which is claimed to be right at the center of the town. It was suggested if communal septic could be located little away from the town.	Joint site visit will be carried out to finalize on the most suitable location of communal septic tank for Trong.
6.	Master plan for large institutions	The planning team explained on the need and importance of preparing a master plan for large institutions like RDTC and School	The Dzongkhag Administration will convey this to relevant authorities.



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7.	Way forward	The presentation was concluded with several way forward actions which need to be carried out in close coordination with relevant agencies/professionals.	The Dzongkhag will arrange the presentation to the public as soon as the plan is finalized.
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After the stakeholders' consultation meeting, officials from the Department with DRO and Architect of the Dzongkhag carried out a joint site visit to identify the most suitable location for heavy vehicle parking and communal septic tank for Trong. In this regard, the team has come up with the following recommendations:

- Proposed service precinct on Dratshang land beside the road leading to RDTC

In view of the concerns raised during the discussion pertaining to the proposed service precinct, it is apparent that the proposal be reconsidered. Accordingly, after the joint site visit, it is recommended that the site for an automobile workshop along with the heavy vehicle parking and Cottage and Small Industries (CSI) be proposed at the existing automobile workshop area.

- Communal septic tank for Trong

After the joint site visit, the communal septic tank for Trong is tentatively identified on the slope below the highway (next to roundabout) towards Gelephu. However, it is to be verified further by the Dzongkhag Administration which may require another round of site visit, further down the slope. It is important to identify the site for communal septic tank for entire town as well, although it may not happen soon. Therefore, an indicative site will be identified either within or outside the municipal area in consultation with the Dzongkhag Land Record Officer.

4. Presentation on Sonamthang Action Area Plan.

Issues deliberated during the presentation.

Sl.No	Issues	Discussions	Actions
1.	Land Development Guideline (LDG) as the land	The department informed that there were more than 500 plots affected by the proposed infrastructure, out of the total of 758 plots. The stakeholders enquired about the	Zhemgang Dzongkhag Administration along with the Dungkhag



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	mobilization modality for Sonamthang	compensation for the GLD affected plots. It was clarified that the department and the local government is required to consult with the plot owners about the proposed land mobilization modality. It was also highlighted that the department proposes for GLD as a modality whereby the landowners are required to make certain contributions in return for the benefits they will reap from the proposed infrastructure. However, there are other avenues that the department can explore in consultation with the public and in coordination with the local government.	Administration and Gewog will conduct public consultation on behalf of the Department of Human Settlement; and forward their grievances to the department for further necessary action
2	Farmer's market	The stakeholders suggested if the location of the proposed vegetable market could be relocated to another suitable site. But it was explained that since it requires more area, the proposed site was chosen due to the availability of state land in that particular site. The department informed that they can allocate it to the suitable site, however, will need to further explore on the land modality such as land swap etc.	
3.	27m ROW for high tension electric line	Because of the hazardous location of the high-tension wire, the stakeholders enquired if the wire could be relocated to a safer area.	The department will recommend for shifting of the high tension line in the report.

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କେନ୍ ଦେଶ ସଦା ଶ୍ରୀମଦ୍ ପରିବାରା
Royal Government of Bhutan
Gewog Administration, Ngangla
Zhemgang Dzongkhag



ଅଧିକାରୀଙ୍କ ପତ୍ର / ୦୯/୨୦୨୦/୨୨୧

ମୁଖ୍ୟମନ୍ତ୍ରୀଙ୍କ ମୁଖ୍ୟମନ୍ତ୍ରୀଙ୍କ

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Gewog Administration - Ngangla- Zhemgang Tel. 03-742032



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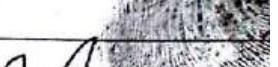
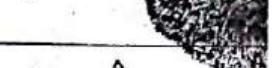
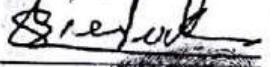
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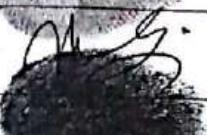
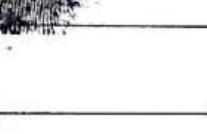
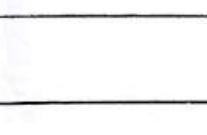
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ମୁଖ୍ୟମିଦ	ଶାର୍ତ୍ତକମିଦ	ରୈପନ୍ସାନ୍ତ୍ରମିଦ	ଲଷଣ
କୁଣ୍ଡଳୀ	କୁଣ୍ଡଳୀ	ମହାବୃଦ୍ଧି	
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"	କୁଣ୍ଡଳୀ	କୁଣ୍ଡଳୀ	

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અધીકરણ	ગર્વચક્રવીર	સર્વભાગુમીદ	અધીકરણ
કૃત્તિમની	જોડિયુદ્ધ.	કૃત્તિમની	
"	અનુભૂતિશ	અનુભૂતિશ	guy.
"	મહુલાલાલ	મહુલાલાલ	
"	ગુરુઠાત્રીનાથ	ગુરુઠાત્રીનાથ	
"	શિવાયાનાથ	શિવાયાનાથ	
"	શિવ	શિવ	
"	શિવા	શિવા	
"	શિવાના	શિવાના	
"	અનુભૂતિશ	અનુભૂતિશ	
"	અનુભૂતિશ	અનુભૂતિશ	
"	મહુલાલાલ	મહુલાલાલ	
"	ગુરુઠાત્રીનાથ	ગુરુઠાત્રીનાથ	
"	અનુભૂતિશ	અનુભૂતિશ	
"	શિવાના	શિવાના	
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၁၂	ဘန်ကြောင်း	ဘန်ကြောင်း	ကုသ.
" "	ရွှေအမျိုး	ရွှေအမျိုး	P.LK
" "	မူလွှာမြတ်	ရွှေအမျိုး	ပ.မ.မ.
" "	ဒါမာရိုခို	မူလွှာမြတ်	ပ.မ.မ.
" "	ရွှေအမျိုး	ရွှေအမျိုး	လီ
" "	စွဲမြတ်	*	
" "	မူလွှာ	ရွှေအမျိုး	
" "	ရွှေအမျိုး	ရွှေအမျိုး	
" "	မူလွှာ	ရွှေအမျိုး	
" "	ရွှေအမျိုး	*	
" "	မူလွှာ	ရွှေအမျိုး	873
" "	မူလွှာ	ရွှေအမျိုး	
" "	နှံလွှာ	*	
" "	နှံလွှာ		
" "	ဒါရာ	ရွှေအမျိုး	လီ
" "	လွှေ	ရွှေအမျိုး	
" "	ရွှေ	ရွှေ	
" "	မူလွှာမြတ်	ရွှေအမျိုး	
" "	မူလွှာမြတ်	မူလွှာမြတ်	
" "	ဒါရာ	ဒါရာ	လီ
" "	ရွှေအမျိုး	ရွှေအမျိုး	လီ
" "	၃၇၀	ဝါယာ	လီ

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ওঁ পূজা করার জন্য	বেতু নথি	৩১'৮" ৩২'	
" " "	পর্তি বিনামু	৩'৩"৮"	স্বাক্ষর
" " "	গুমাইয়া	গুমাইয়া	স্বাক্ষর
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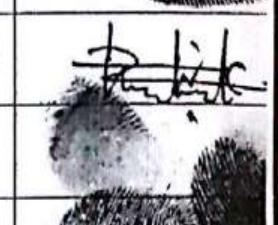
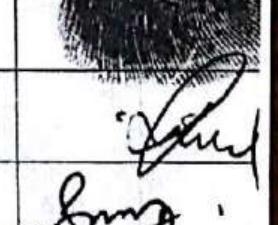
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સાંગ્રામિક પણીજા, ક્રાંતિક, પ્રદીપ એવા જીવિતનું (માટે)
 આપું ખોલી રહેશે,

અધ્યાત્મિક	શર્ક્રિયાચિકિત્સા	બ્રાહ્મણદ્વારા ઉત્પાદિત	અધ્યાત્મિક
એવી ચીजું જો તું જોઈનું	છાડી નીચાનું	છાડી	થાં
" " "	ઓર્યાન્ઝિલ્ફા	ખર્ચાંધી.	
" " "	સુવિષિત	નેત્રાંજન	
" " "	દ્વારા	દ્વારા	
" " "	જન્માંની	જન્માંની	
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" " "	શ્રીલોક	શ્રીલોક	
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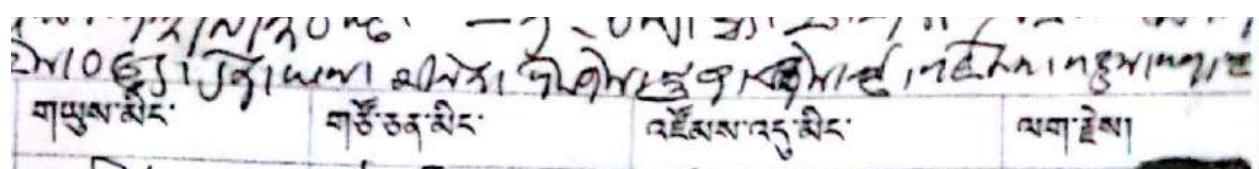
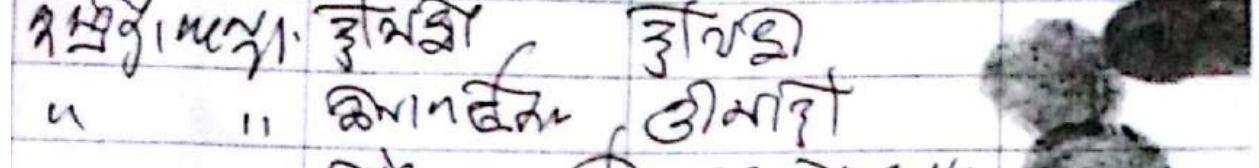
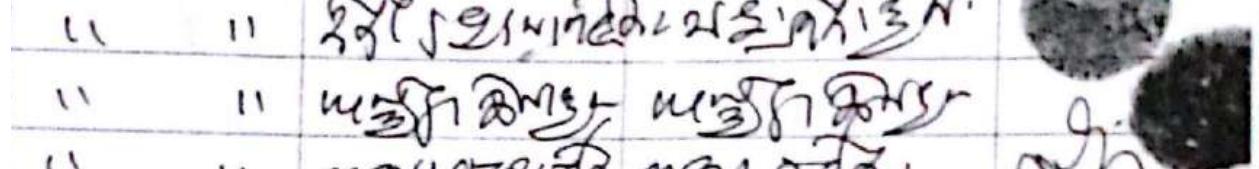
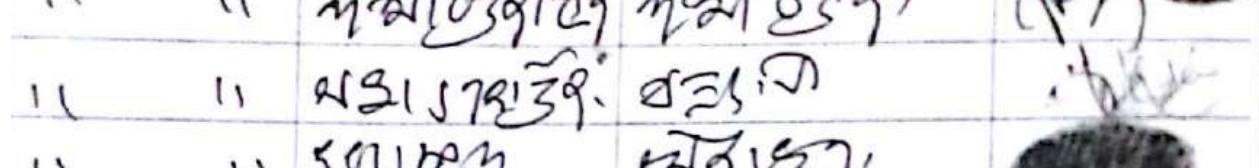
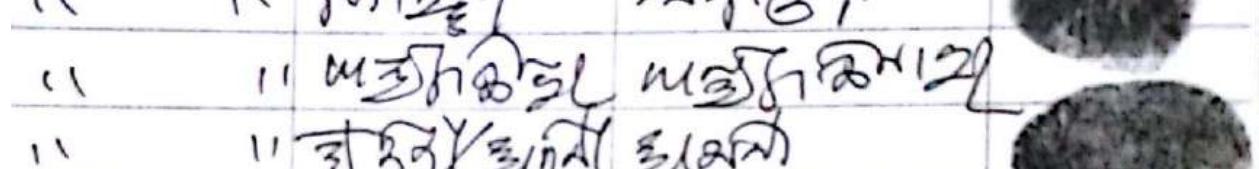
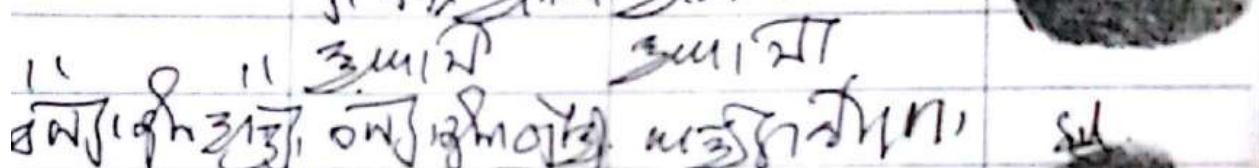
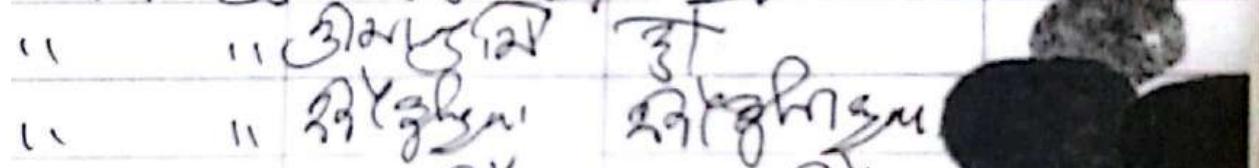
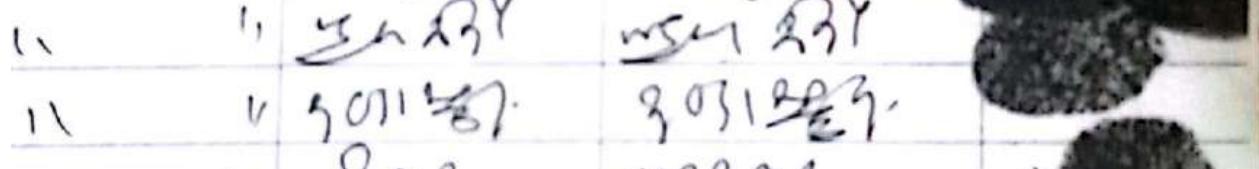
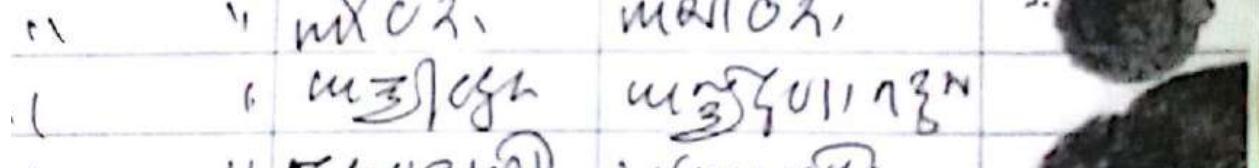
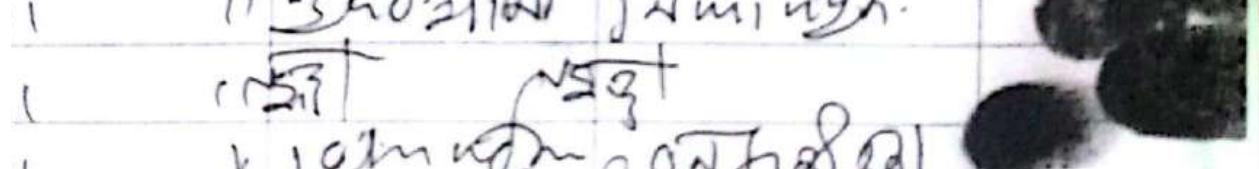
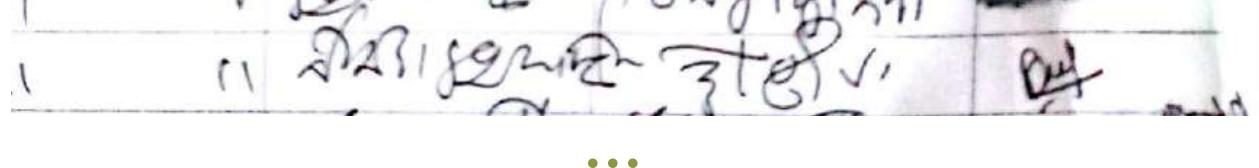
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၁၂၃၁	ကမားနွေ့ခါ	ရှုပ်သူများ	
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၁ ၁၁	မန္တရာ	ပြနဲ	
၁ " "	ဆိုဝေးခါ	ရှုပ်သူများ	
၁ " "	ဒုဇိုင်းခါ	ဒုဇိုင်းခါ	
၁ " "	မန္တရာ	ဒုဇိုင်းခါ	
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၁ " "	မန္တရာ	ဒုဇိုင်းခါ	
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Number	Tibetan Name	English Name	Image
10	རྒྱାନ୍ རྩྰୁ གླୋ	Red Rhubarb	
11	ଶ୍ରୀମଦ୍ ଗୋଟିଏ	Shrimad Gote	
12	କୁଣ୍ଡଲ ପାତା	Kundal leaf	
13	କୁଣ୍ଡଲ ଫୁଲ	Kundal flower	
14	କୁଣ୍ଡଲ ଫୁଲ	Kundal flower	
15	କୁଣ୍ଡଲ ଫୁଲ	Kundal flower	
16	କୁଣ୍ଡଲ ଫୁଲ	Kundal flower	
17	କୁଣ୍ଡଲ ଫୁଲ	Kundal flower	
18	କୁଣ୍ଡଲ ଫୁଲ	Kundal flower	
19	କୁଣ୍ଡଲ ଫୁଲ	Kundal flower	
20	କୁଣ୍ଡଲ ଫୁଲ	Kundal flower	

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१	ग्रामपालिं	पर्वतपालिं	दर्तापालिं	प्रधान
२	लोकाल्पुत्र	लोकाल्पुत्र	लोकाल्पुत्र	
३	"		लोकाल्पुत्र	
४	लोकाल्पुत्र, लोकाल्पुत्र		लोकाल्पुत्र	
५	" " लोकाल्पुत्र	लोकाल्पुत्र		
६	" " लोकाल्पुत्र	लोकाल्पुत्र	लोकाल्पुत्र	
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MINUTES OF THE MEETING
33rd Policy and Planning Coordination Meeting
2nd & 5th April 2021
Ministry of Works & Human Settlement

The 33rd PPCM was convened on Friday 2nd April 2021 from 2:00PM-5:45PM and continued on Monday 5th April 2021 from 2:00PM – 4:00PM in the Ministry's conference hall. Hon'ble Zhabtob Lyonpo chaired the meeting.

The copies of the presentations are attached with the minutes.

Friday 2nd April 2021

1. **Adoption of agenda:** The agenda was adopted as proposed.
2. **Confirmation of the Minutes of the 32nd PPCM:** The minutes of the 32nd PPCM was confirmed as final.
3. **Follow up Action Taken Report on 32nd PPCM:** PPD presented the status of the follow up actions taken on the decisions of the 32nd PPCM minutes.

Follow up action 2: Explore training to the caregiver at the creche.

Among the two trained caregivers, one had resigned and a new untrained caregiver was recruited as replacement. The PPD was instructed to follow up with NCWC to provide refreshers training to the caregivers. **ACTION: Pema Rabgay, PPD**

DoS was advised to take lead in digitizing the information/data related to MoWHS in collaboration with ICT. This activity should be reflected in DoS APA. **ACTION: Director, DoS**

4. Case review report – M/s Norzang Const. Pvt. Ltd. Vs. RO Trashigang/DoR

Mr. Karma Wangdi, Chief Engineer, DoR as the chair of the committee presented on the findings of the aforementioned case reviewed by the Committee. The following were discussed:

- i. The contractors quoted price was 38.86% below the department's estimated cost. The RO failed to obtain rate analysis for the unbalanced items. In the absence of a rate analysis and commitment letter from the contractor, it created room for different interpretations.
- ii. The contractor was allowed to work without a workplan. Additionally, the contractor was allowed to execute excavation of all types of soil, for which the quoted rate was quite high while the contractor left out all types of rocks unexecuted.
- iii. The tribunal altered the rates which were agreed between the parties and rendered the contract void. Thus, rewriting the contract and altering the terms and conditions based on which their decision was made.

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Decision:

- DoR was instructed to inquire the Chief Engineer, Project Engineer and the Project Manager at the RO Trashigang to provide justification on the aforementioned lapses and DoR to take appropriate actions accordingly. **ACTION: DoR**
- Hon'ble Zhabtog Lyonpo will personally take up the matter related to the arbitral tribunal with the concerned authority.

5. Human Settlement Plans

I. Sonamthang, Zhemgang Action Area Plan

DHS presented on the following:

- Background
- Existing scenario
- Analysis
- Proposals
- Land mobilization modality
- Development Control Regulations
- Way forward

The following were discussed and feedback provided:

1. Stakeholder consultations are vital for all human settlement plan preparations as it would directly impact the people living in those areas. The meeting was informed that a lot of importance were given to public and stakeholder consultations and it was conducted at various stages of planning. However, it was difficult to please everyone but nonetheless the plan is not finalized until at least two third of the stakeholders accepts the proposed plan. The list of stakeholder meeting attendees and record of discussion are maintained with the Department of Human Settlement (DHS).
2. Henceforth, DHS should also present on the issues/concerns raised by the stakeholders including which issues were considered and which were not considered with justifications.
3. The presentation needs to reflect how many plots are owned by private, for the PPCM members to get a better picture.
4. The action area activities proposed should be practical and implementable on the ground.
5. The determination of precincts in the plan do not have strong basis. For instance, if there already exists a small lhakhang, the vicinity of that temple is identified as cultural precinct. Thus, the precincts identified needs to be reviewed further.
6. There were twelve precincts identified which was presented in one of the previous PPCM, henceforth, the plan will be aligned within these twelve precincts.
7. The meeting was informed that the land pooling was not applicable to wetland due to the dispersed nature of Chhuzhings and public also wants least disturbances to their plot locations.
8. The Planners should identify the economic potentials of the plan area and prepare their plan focused on one key potential.

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9. There already exists a guideline for wetland and buffer zones which does not allow any development activities within these areas.
10. The common grievances received by MoWHS is on the differing number of permissible floors. Therefore, DHS needs to carefully plan the DCR.
11. The permissible coverage in UV-1 was 50% and UV-2 was 45% without any basis. The meeting was informed that the DCRs were prepared based on the projected population and the carrying capacity of the planning area, however for uniformity and consistency in application of UVs across the board, it should be further reviewed within DHS.
12. DHS was questioned as to who would be the competent authority to monitor compliance during the implementation of the approved plans. The meeting was informed that while forwarding the approved plan to the respective dzongkhags for implementation, the dzongkhag administrations are instructed to monitor compliance to the approved plan to avoid deviation.
13. In the DCR, the maximum permissible number of floors for UV-2 was 3 floors with half a floor of commercial use. DHS was questioned if every houses/buildings within UV-1 (2 floors commercial use) and UV-2 would require commercial usage which could be problematic in the future. DHS informed that this was overlooked and will further review the permissible commercial use of half a floor for UV-2. Additionally, DHS was advised to review if the small plots also require precincts.
14. The permissible coverage for UV-1 is 50% as per the DCR. DHS was suggested to propose commercial spaces along the spines of UV-1, if feasible and maintain provisions for commercial usage for UV-2 for further development in the future, if needed. DHS clarified that maintaining of commercial spaces along the spines/road within UV-1 was considered, however, after the review, it was found to be unnecessary. If required in the future, the plan can be reviewed after five years and presented back to MoWHS.
15. Although drainage is included in the roadsides, the plan must at least include the primary and secondary drains as all plots are interlinked. If this is not included in the plan, it would be difficult to include during the implementation phase.
16. As the PPCM is approving important human settlement plans that will impact the people, it was suggested to discuss/approve only one plan per PPCM so that the members could discuss thoroughly and make informed decision.

Decision:

- The aforementioned feedbacks are applicable to all the human settlement plans that were being presented in the 33rd PPCM and preparation of future plans.
- DHS was instructed to incorporate the feedbacks from PPCM and circulate the revised version to the PPCM members reflecting the changes made. If required, another PPCM will be called to discuss further.
- The proposed Action Area Plan was approved in principle with the condition to revise the plan, incorporating feedbacks received from PPCM.

ii. Lhamoizingkha Structure Plan (Review)

DHS presented on the following:

- Background

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- Existing scenario
- Analysis
- Proposal
- Issues and recommendations

The following were discussed and feedback provided:

1. The meeting was informed that the existing structure plan was not approved considering upcoming of the Sunkosh hydropower project. In addition, the ground conditions in terms of cadastral and structure details have also changed over the years. Therefore, the revised structure plan was developed taking into consideration the changes on the ground. Like Sonamthang plan, this plan was also largely driven by wetland.
2. The meeting was informed that the dzongkhag will have to prepare the Local Area Plan (LAP) aligning with the approved structure plan for implementation.
3. DHS informed that there were twelve plots of trapped kamzhing land which are either vacant or with temporary structures in chhuzhing areas. In order to create contiguous uninterrupted agricultural precinct, it was recommended that the substitute land from special zones (belonging to the state) in the plan may be provided. However, these special zones have a lot of plantations, hence NLCS approval will be sought. If NLCS does not approve, development will be allowed within those trapped kamzhing plots but these plots will be without road access.
4. DHS in collaboration with MoAFs and NLCS developed a Guideline for Conversion, Substitution and Management of Chhuzhings and protected areas which was submitted to NLCS. The NLCS has further submitted to the Office of the Gyalpoi Zimpon.
5. The meeting advised to include the requirement for separate sewerage system for industrial areas in the DCR as it cannot be linked with domestic system.
6. The permissible maximum plot coverage for institution was 30% for this DCR whereas Sonamthang was 35%. The meeting advised to change it to 35% for consistency and uniformity.

Decision: The revised Structure Plan was approved in principle with the condition to seek NLCS approval for land substitution in the special zones for those twelve plots. In the event of the NLCS failing to substitute the trapped lands, then development in such plots should be permitted as per the eligibility criteria should the owners desire to do so. However, development in such plots should not adversely affect or alter the surrounding plots.

iii. Precinct change of Tashi Commercial Land (BOD)

DHS presented on the following:

- Details of the plot
- DCR 2004 and DCR 2016
- Need for change of precinct
- Thimphu Thromde proposals

The following were discussed and feedback provided:

1. The plots owned by Tashi Real Estate Private Limited (Plot ID - Core -196 and Core - 197), the existing BOD located opposite to MLCP - II was designated as G-2 (Green Space System). As

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per the DCR 2004, the permissible coverage for G-2 is 10% with maximum permissible floor of two floors and allowed usage for parks, gardens, community level recreational and sports facilities.

2. Tashi Real Estate Private Limited (TREPL) filed a case in June 2017 upon not being permitted by Thimphu Thromde to construct on the plot (Core – 196) as the design was not permissible in keeping with DCR 2004 (for G-2). In 2020, the final judgment from Supreme court was in favour of TREPL instructing the Thromde to designate the plot as Core Precinct. Subsequently, in August 2020, enforcement order was issued by the Supreme Court instructing the Thromde to implement the judgment.
3. The following proposal was submitted by Thimphu Thromde to MoWHS seeking approval:
 - As per the existing Thimphu Structure Plan (2002-2007) there was no precinct identified as Core. Therefore, it was proposed to earmark and designate the plot as Urban Core-Sub-Precinct 1-A.
 - The Thimphu Thromde submitted Urban Design Proposal of the Core area which was prepared with the Thimphu Structure Plan 2002-2027 for review and approval by the Ministry.

Decision:

- The precinct designation for plot no 196 owned by TREPL was approved as Urban Core-Sub-Precinct 1-A as proposed by Thimphu Thromde.
- The Urban Design proposal for core area was also approved and to be implemented as part of the Thimphu Structure Plan. Further, the Department of Human Settlements and the Thimphu Thromde were instructed to assess it during the review of the Thimphu Structure Plan.

iv. Bajo Local Area Plan 2, Wangduephodrang

The Urban Planner from Wangdue Municipality presented the following:

- Introduction
- Regional connectivity
- Administrative boundary
- Delineation of LAP area
- Proposal as per Structure Plan
- Slope analysis
- Proposed precinct plan

The followings were discussed:

1. The Wangduephodrang Structure Plan was approved in 2017. In keeping with the Structure Plan, the Local Area Plan 2 (LAP2) was prepared. During the preparation of LAP2, it was observed that the entire area was earmarked as Restricted Development Precinct. The DCR restricts high density development in the area.
2. The majority of the plot owners within the Restricted Development Precinct have submitted their grievances requesting for increase in the building height and plot coverage. Besides, the plot

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owners remarked that there were existing three storied building in the area and existing regulations affects them unfairly.

3. As per the DCR, the present permissible coverage in the Restricted Development Precinct was 20% with maximum permissible of two floors.
4. In view of the request by the plot owners, a thorough plot analysis was conducted and found that the majority of the area within the LAP is within the permissible slope of 57%. Further, it was observed that the precinct system and terminology used in the erstwhile structure plan was not consistent in keeping with the common practices. Subsequently, proposals were made to change the precinct from Restricted Development Precinct to Urban Village 4 (UV-4) and Institutional Precinct as follows;
 - UV-4: coverage 40%, maximum permissible floor – 3
 - Institutional Precinct: coverage 20%, maximum permissible floor - 2
5. The meeting was informed that the steep slopes within the Restricted Development Precinct would remain status quo and not propose for conversion/construction considering its risk.

Decision:

- The Ministry approved the proposal for change in precinct from Restricted Development to Urban Village-4 Precinct (UV4) and Institutional Precinct in Local Area Plan 2.
- The Development Control Regulations for the new precincts were also approved as proposed by the Dzongkhag Administration.

The meeting was adjourned for the day and decided to continue on Monday.

Monday 5th April 2021

v. Lhuentse Structure Plan (2020-2040)

DHS presented on the following:

- Background
- Existing scenario (physical/external)
- Stakeholder, problem, potential analysis (internal)
- Concept plan
- Proposal

The followings were discussed:

1. The details on existing scenario should be shortened and proposal should be kept concise without losing its essence.
2. The existing scenario and plan proposal should be presented in one slide for the members to comprehend.
3. It was recommended that certain details such as the total area within the planning boundary, number of plots, types of ownership, plots in no development zones, etc be reflected in the presentations to bring clarity in the presentation.
4. It was advised to include waste disposal and treatment plants in the plan.

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5. DHS should not limit their plan within the dzongkhag jurisdiction and instead explore the possibility of connecting Bumthang to Lhuentse with a trail.
6. DHS was questioned how realistic their population projections were as their plan is based on population projections. It was clarified that projections by NSB and other agencies such as World Bank and ADB were generally deployed. On many instances, PHCB 2017 is used for population projections during the preparation of plans.
7. DHS reported that the master plans for most of the infrastructure were missing which is always one of the issues faced during implementation of the plans. Ideally, infrastructure master plans should be developed at the time of preparation of the human settlement plans so that allocation of space, earmarking Right of Way, appropriate design approaches and other implementation issues among others could be addressed prior to the finalization and release of the plans.
8. DHS was advised to include land usage for solid waste and wastewater in the plan.
9. Lekpangang chhu was identified as one of the flood prone areas which was not reflected in the presentation. If these risk areas could be reflected in the plan, it would be easier to plan mitigation measures. DHS assured that it was included in the plan document but missed out in the presentation. The information were provided by FEMD during the plan preparation.
10. DHS was advised to share some of the common pertinent issues and challenges raised during stakeholder consultations. DHS reported the following:
 - Most of the concerns raised during the public consultations are regarding permissibility of developments on their land and not really concerned on the vision or holistic development of the entire area, community or town. However, despite low level of interest and literacy in human settlement planning and development, initiatives are made to ensure participation by all stakeholders in particular the landowners and the residents through focused group discussions, one to one consultations, several presentations and meeting, 3-D visualizations, etc.
11. The inclusion of services such as solid waste and wastewater in the plan should be given adequate attention.
12. Henceforth, DHS was advised to include a slide reflecting pictorial/3D images of the existing scenario and the proposed plan to provide a clearer understanding for the members.
13. The issues raised during stakeholder consultations for each plans should be presented to understand how they are addressed during the plan preparation process.

Decision: The Lhuentse Structure Plan 2020-2040 and its Development Control Regulations were approved.

vi. Zhemgang Structure Plan (Review)

DHS presented on the following:

- Background
- Existing scenario and analysis
- Proposal
- DCR
- Way forward

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The following were discussed and feedback provided:

1. The Structure Plan for Trong and Tingtibi are proposed separately since the two areas are not contiguous and connected only by the road Right of Way (ROW). In this regard, DHS was asked if the plan will regulate developments along the highway connecting Tingtibi and Zhemgang. DHS clarified that there were not many private plots along the highway, even if there are, the developments along the highway and outside the planning boundary will be regulated by the provisions of Bhutan Building Rules 2018. for Trong and Tingtibi town, they were proposed separately based on the request made by the Dzongkhag.
2. The committee emphasized that importance should be given to infrastructure planning, for instance, the road should be wide enough and buildings not so close to one another like Rajo town. Planners were advised to reflect on the past mistakes and avoid making the same.
3. DHS was questioned on feasibility regarding reconfiguration of plots and access road proposals within Trong Heritage village. It was clarified that the proposal only provides for a ROW which could be used during an emergency such as fire and medical. However, no paved road was proposed within the village.
4. The Committee raised their concern about how realistic it is to integrate Trong and Tingtibi because of the fact that they are 35kms apart. Locating most of the services in Tingtibi may be cumbersome for the people of Trong town to travel all the way to Tingtibi to avail such services. The Department clarified that only large services and industries will be located at Tingtibi while the day to day services including small automobile workshops are proposed within present Trong town. It was also informed that Trong will largely focus on administrative services and Tingtibi on large scale services including industries.
5. Since Trong area was to be preserved as heritage village, DHS should also explore providing incentives to the land/house owners. DHS informed that His Majesty has granted land kidu to the plot/house owners of Trong heritage village within Zhemgang Town and separate plan along with DCR was prepared and released the Dzongkhag Administration for implementation.
6. The Committee also suggested that the Department may do away with specific proposals such as wood based industry in Zhemgang because this may hamper development proposals in the future, may be due to change in the economic potential scenarios. Hence, should be kept broad to accommodate other industries in the future.
7. The issue of unstable sub-soil can be addressed through engineering interventions as proven. Therefore, DHS was advised to study the possibility of allowing constructions in areas earmarked as high hazards through the geo-technical studies report.

Decision: The Zhemgang Structure Plan 2020-2040 (Review) and its Development Control Regulations were approved with the condition to incorporate the feedback provided by PPCM.

DHS was instructed the following for future plan approval by the PPCM:

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1. Presentation slides to be kept minimal as possible based on certain standards required for structure plans. Having such a standard would ensure consistency/uniformity and confirm that all required information is provided while leaving out non-essential details.
2. The common and major issues/concerns raised by the stakeholders during stakeholder consultations should be presented to the PPCM to give a holistic picture to the members, including which concerns were considered and which were not with justification.
3. Ensure full participation and involvement of stakeholders particularly the public to provide ownership to such plans.
4. Issues and concerns from the Planners side should also be presented and any other information that is deemed important for the PPCM members to know, to enable the members to make informed decision.
5. All the aforementioned feedbacks are applicable to the plans presented in 33rd PPCM as well as in the preparation of future plans.

Members present:

1. Hon'ble Zhabtog Lyonpo, MoWHS – Chair
2. Dacho Secretary, MoWHS
3. Tenzin, D.G, DoR
4. Karma Sonam, Director, DHS
5. Karma Dupchuk, Director, DES
6. Dhak Tshering, Director, DoS
7. Mahcsh Pradhan, Specialist, DES
8. M.N. Lamichaney, Specialist, DoR



Others present:

9. Karma Wangdi, Chief Engineer, DoR
10. Tashi Penjor, Chief Urban Planner, DHS
11. Tashi Dema, Chief Urban Planner, DHS
12. Tshering Pelden, Urban Planner, DHS
13. Yeshe Jamtsho, Sr. Urban Planner, DHS
14. Jigme Namgyel, Urban Planner, DHS
15. Deki Wangmo, Urban Planner, DHS
16. Cheki Wangchuk, Urban Planner, DHS
17. Garul Dhoj Bhujel, PPD
18. Tshering Lhamo, PPD

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3. Socio-Economic Survey Questionnaire Sample

SONAMTHANG HOUSEHOLD SURVEY

Introduction

The household survey seeks to explore the household features of the project area and the opinions of people with an aim to identify issues and potential interventions to be proposed in the Sonamthang Action Area Plan.

A. Building No.....Unit ID:.....(note census no. also if available on doors)

Enumerator:.....

Thram Number/Owner's name:.....

Name of Settlement:.....

B. Demographic Information

1. Language:

2. Migration from other Dzongkhag & Reason:.....

3. Year of Migration:.....

C. Household information

No.	Name (optional)	Gender	Age	Education	Occupation	Marital Status	Remarks

D. House Type

House Type	Traditional	Semi-Traditional	Modern	Others	Remarks/ Issue
Structure Type	Permanent	Semi-permanent	Temporary	Others	
Structure Type	Framed	Load Bearing		Others	
Material Type	Concrete	Bamboo	Ekra	Brick Masonry	
Glass fibre reinforced block	Timber (wood)	Stabilized Mud Block	Plastic	RCC	
Glass	Rammed earth	Hollow block	Stone masonry	Traditional mud block	
No. Of Floors	1	2	3	4	
No. of bedroom	1	2	3	4	
Roof material	CGI	Wooden shingle	Tiles	Others (mention)	
Occupancy	Owned	Rented	Leased	Others	
House use	Residential	Commercial	Mixed use	Others	
Building age	<10 yrs	10-19 yrs	20-49 yrs	50-70yrs	

E. Utility and Services

Sanitation type	Pit latrine	Regular toilet	Others		
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Location of toilet	Inside	Outside	Others	
Treatment	Individual septic tank	Community septic tank	Sewer	Others
Water supply	In-house tap	Community tap	Stream	Outside
Water source	Municipal supply	Rural water supply Scheme	Private line	Others
Garbage Disposal	Municipal service	Self	Private	Volunteers/Community
Drainage	Available	Unavailable		
Safety Measures	Emergency exit	Fire extinguisher	Smoke detector	None
Land Holding (in decimals)	<10	10-13	13-25	>25
Land Type	Kamzhing	Chhuzhing	Khimsa	Others
Vehicle ownership	Car	Bikes	Tractor	Truck
Communication	Landline	Mobile	Television	

F. Income Groups

Income (per month)	<5000	5000-10,000	10,000-15,000	15,000-20,000
	20,000-30,000	30,000-50,000	>50,000	

G. Employment and Transport

1. Place of Employment
 - i) Within Sonamthang
 - ii) Others
2. Mode of Transport

- i) Private (car, bike, cycle) ii) Public iii) Foot
3. Time taken to travel to place of employment (mins)

H. Education

1. Where do you send your children for schooling
 - i) Within Sonamthang ii) others
2. Mode of travel from home to school
 - i) Private ii) Public iii) School Bus iv) Foot

I. Recreation

1. What do you or your family members do for recreation/exercise/entertainment? (list down the recreation, location and distance from your home)

Type of Recreation	Location	Distance

2. What other recreational facilities are required in Sonamthang town? (specify)





J. Land use and Agriculture

1. How many parcels of land do you own/cultivate and how large are they? What crops are grown?

a. Own= _____ Acres b. Cultivate= _____ Acres

2. What happened to the agricultural production in the last 5 years?

a) Increased b) Decreased c) Did not change

Why?.....
.....

K. Quality of Life

1. What do you like most about living in Sonamthang town?

.....
.....

2. In your opinion, what does Sonamthang have to offer more than the neighbouring communities?

.....
.....

3. In your opinion, what are the fields/areas that have major problems, in S/thang? (1 = very serious, 2 = serious, 3 = not very serious)

Sl. No.	Field/Area	1	2	3	Remarks
1	Agriculture				
2	Industry				
3	Housing				
4	Traffic and Public Transport				
5	Utility Service (water distribution, sewerage, waste disposal etc.)				
6	Infrastructure (road, sewerage, streetlights etc.)				
7	Education				
8	Healthcare and social welfare				
9	Other fields that you consider as important (Sport, culture, tourism, etc.)				

4. In your opinion, in what fields could Sonamthang develop economically? (1 = most important, 2=important, 3=Neutral, 4=less important; 5 = least important)

Fields	Rating	Remarks
Agriculture		
Industry		
Trade and Services		
New/ Environmental Technologies		
Tourism		
Forestry		
Other fields		





5. How important are the following factors to the quality of life in Sonamthang town?

	Very Important	Important	Somewhat important	Not important at all	No opinion
Safe place to live					
Clean and attractive					
Retail businesses					
Adequate medical facilities					
Affordable housing					
Environmental quality of water and open spaces					
Parks, recreational facilities and open spaces					
Public services (library, police, fire fighting)					
Proximity to employment					
Transportation system and easy access throughout the city					
Walkability to services					

L. Planning

1. List of major infrastructure requirements

- i) Roads ii) Sewerage iii) Solid Waste Disposal iv) Street Lighting
- v) Bus Stop vi) Water Supply vii) Footpaths viii) Recreational center
- ix) Drainages

2. Rank three most required infrastructure (use above list)

- i)..... ii)..... iii).....

3. What would you say is the most critical issue facing S/thang today? (eg: jobs, housing, cleanliness, drug problem, activities for youth, lack of infrastructure, entertainment, hotels)

.....

4. Over the past years, do you believe S/thang's quality of life has:

- i) Improved ii) Stayed the same iii) Declined

How?

.....

5. What is your aspiration for Sonamthang?

.....

Thank you for your time!



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4. Plot Details

SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
1	941	Kamzhing	NGN-1584	0.871	3524.8116	0	295.1125	3229.6991	3229.6991	NGN-1584	UV-2
2	126	Oranges	NGN-1585	1.231	4979.9880	0	0	4979.9880	4979.9880	NGN-1585	I-1
3	299	Kamzhing	NGN-18	0.419	1695.6327	0	279.2546	1416.3781	670.0303	NGN-18A	UV-2
								746.3478	NGN-18B	UV-2	
4	272	Kamzhing	NGN-19	0.796	3221.2974	0	17.9709	3203.3265	3203.3265	NGN-19	UV-2
5	69	Kamzhing	NGN-1943	2.867	11602.3362	0	177.6864	11424.6498	11424.6498	NGN-1943	UV-2
6	186	Chhuzhing	NGN-1944	3.797	15365.9122	0	656.4996	14709.4126	14709.4126	NGN-1944	A-2
7	46	Chhuzhing	NGN-1946	0.692	2800.4244	0	0	2800.4244	2800.4244	NGN-1946	A-2
8	1051	Kamzhing	NGN-1947	1.309	5297.3345	0	390.2844	4907.0501	4907.0501	NGN-1947	UV-2
9	291	Kamzhing	NGN-1948	11.789	47708.3854	2471.1739	1407.1789	43830.0326	43418.0652	NGN-1948A	UV-2
									411.9674	NGN-1948B	ND
									219.0875	NGN-1948C	E
									2252.0864	NGN-1948D	E
10	291	Residential Land	NGN-1950	0.201	813.4181	0	71.9577	741.4604	741.4604	NGN-1950	UV-2
11	1076	Kamzhing	NGN-1951	0.358	1448.7744	0	0	1448.7744	1448.7744	NGN-1951	UV-2
12	238	Kamzhing	NGN-1952	1.644	6653.0313	0	480.9051	6172.1262	6172.1262	NGN-1952	UV-2
13	284	Kamzhing	NGN-1954	2.718	10999.3546	155.3881	0	10843.9665	NGN-1954A	UV-2	
									155.3881	NGN-1954B	E
14	988	Kamzhing	NGN-1955	1.318	5333.7562	0	49.625	5284.1312	5284.1312	NGN-1955	UV-2
15	75	Kamzhing	NGN-1957	0.390	1578.2738	0	207.2741	1370.9997	1370.9997	NGN-1957	UV-2
16	117	Kamzhing	NGN-1958	1.317	5329.7094	0	29.6036	5300.1058	5300.1058	NGN-1958	UV-2

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Sl#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
17	864	Kamzhing	NGN-1959	1.595	6454.7353	343.7509	1183.8872	4916.3442	2906.9587	NGN-1959A	UV-2
									722.7628	NGN-1959B	UV-2
									1297.3756	NGN-1959C	UV-2
									118.3732	NGN-1959D	E
									225.3777	NGN-1959E	E
18	46	Kamzhing	NGN-1960	2.862	11582.1019	4122.7384	385.8696	7073.4939	7073.4939	NGN-1960A	UV-2
									4122.7384	NGN-1960B	E
19	299	Residential Land	NGN-1962	0.137	554.4193	0	72.4658	481.9535	481.9535	NGN-1962	UV-2
20	286	Chhuzhing	NGN-1963	0.318	1286.9002	0	14.6861	1272.2141	1272.2141	NGN-1963	A-2
21	286	Kamzhing	NGN-1964	3.237	13099.6729	4553.6202	1668.8333	6873.6334	6717.0924	NGN-1964A	UV-2
									156.5410	NGN-1964B	UV-2
									4557.2062	NGN-1964C	E
22	285	Kamzhing	NGN-1966	2.529	10234.4988	592.4162	1128.7257	8513.3569	1558.7121	NGN-1966A	UV-2
									3826.1747	NGN-1966B	UV-2
									1232.5870	NGN-1966C	UV-2
									1895.8831	NGN-1966D	UV-2
									393.5252	NGN-1966E	E
									198.8910	NGN-1966F	E
23	290	Kamzhing	NGN-1967	1.759	7118.4197	222.116	394.8869	6501.4168	3812.9803	NGN-1967A	UV-2
									2688.4365	NGN-1967B	UV-2
									222.1160	NGN-1967C	E
24	208	Kamzhing	NGN-1968	0.529	2140.7868	0	0	2140.7868	2140.7868	NGN-1968	UV-2

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25	208	Residential Land	NGN-1969	0.351	1420.4465	0	5.1621	1415.2844	1415.2844	NGN-1969	UV-2
26	121	Kamzhing	NGN-1979	1.629	6592.3284	881.1518	560.5229	5150.6537	4708.4034	NGN-1979	UV-2
									442.2503	NGN-1979B	UV-2
									881.1518	NGN-1979C	E
27	204	Kamzhing	NGN-2011	0.568	2298.6142	2298.6142	0	0.0000	-254.5760	NGN-2011A	E
									254.5760	NGN-2011B	E
									631.6011	NGN-2011C	E
28	296	Kamzhing	NGN-2012	2.209	8939.5049	436.9181	555.8183	7946.7685	4333.4398	NGN-2012A	UV-2
									3613.3287	NGN-2012B	UV-2
									436.9181	NGN-2012C	E
29	296	Residential Land	NGN-2013	0.440	1780.6166	0	5.9602	1774.6564	1774.6564	NGN-2013	UV-2
30	256	Kamzhing	NGN-2014	1.203	4868.3678	46.0887	94.3001	4727.9790	4727.9790	NGN-2014A	UV-2
									46.0887	NGN-2014B	E
31	244	Kamzhing	NGN-2015	1.403	5677.7390	0	278.369	5399.3700	5399.3700	NGN-2015	UV-2
32	287	Kamzhing	NGN-2016	1.291	5224.4911	0	335.3226	4889.1685	4889.1685	NGN-2016	UV-2
33	243	Kamzhing	NGN-2017	1.110	4492.0102	0	447.7751	4044.2351	4044.2351	NGN-2017	UV-2
34	46	Kamzhing	NGN-2019	0.584	2363.3639	0	411.6069	1951.7570	1951.7570	NGN-2019	UV-2
35	285	Chhuzhing	NGN-2022	0.263	1064.3231	0	114.8256	949.4975	949.4975	NGN-2022	A-2
36	987	Kamzhing	NGN-2023	0.840	3399.3590	0	228.1698	3171.1892	3171.1892	NGN-2023	UV-2
37	164	Kamzhing	NGN-2024	1.613	6527.5787	0	123.064	6404.5147	6404.5147	NGN-2024	UV-2
38	221	Kamzhing	NGN-2025	0.443	1792.7572	0	202.5229	1590.2343	1590.2343	NGN-2025	UV-2
39	288	Chhuzhing	NGN-2026	0.501	2027.4749	0	139.7655	1887.7094	1887.7094	NGN-2026	A-2
40	288	Kamzhing	NGN-2027	0.479	1938.4440	0	208.9021	1729.5419	1729.5419	NGN-2027	UV-2

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41	288	Residential Land	NGN-2028	0.229	926.7300	0	305.6829	621.0471	621.0471	NGN-2028	UV-2
42	330	Kamzhing	NGN-2029	17.966	72705.8149	9483.7976	325.9951	62896.0222	50079.8039	NGN-2029A	I-1
									12816.2183	NGN-2029B	I-1
									9483.7976	NGN-2029C	E
43	261	Kamzhing	NGN-2030	0.938	3795.9509	1211.2681	235.1888	2349.4940	1959.2356	NGN-2030A	UV-2
									390.2584	NGN-2030B	UV-2
									1211.2681	NGN-2030C	E
44	261	Residential Land	NGN-2031	0.245	991.4797	0	0	991.4797	991.4797	NGN-2031	UV-2
45	261	Chhuzhing	NGN-2032	0.500	2023.4280	0	0	2023.428	2023.4280	NGN-2032	A-2
46	823	Chhuzhing	NGN-2033	1.392	5633.2236	255.4321	0	5633.2236	5633.2236	NGN-2033	A-2
47	578	Kamzhing	NGN-2034	0.640	2589.9878	1370.8155	12.6751	1206.4972	1149.6470	NGN-2034	UV-2
									56.8502	NGN-2034B	UV-2
									1370.8155	NGN-2034C	E
48	287	Residential Land	NGN-2035	0.331	1339.5093	0	0	1339.5093	1339.5093	NGN-2035	UV-2
49	287	Chhuzhing	NGN-2036	0.762	3083.7043	1909.8828	0	3083.7043	3083.7043	NGN-2036	A-2
50	287	Kamzhing	NGN-2037	0.399	1614.6955	1095.3397	0	519.3558	299.3044	NGN-2037A	UV-2
									220.0514	NGN-2037B	UV-2
									1095.3397	NGN-2037C	E
51	297	Kamzhing	NGN-2038	0.256	1035.9951	88.3413	123.6863	823.9675	823.9675	NGN-2038A	UV-2
									88.3413	NGN-2038B	E
52	297	Chhuzhing	NGN-2039	0.670	2711.3935	0	256.9879	2454.4056	2454.4056	NGN-2039	A-2
53	289	Chhuzhing	NGN-2040	0.559	2262.1925	862.3733	0	2262.1925	2262.1925	NGN-2040	A-2

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54	889	Kamzhing	NGN-2041	0.180	728.4341	0	42.2374	686.1967	686.1967	NGN-2041	UV-2
55	292	Residential Land	NGN-2043	0.425	1719.9138	0	189.0298	1530.8840	1530.8840	NGN-2043	UV-2
56	753	Kamzhing	NGN-2044	2.192	8870.7084	808.6973	814.3108	7247.7003	1293.2584	NGN-2044A	UV-2
									1344.8364	NGN-2044B	UV-2
									4609.6055	NGN-2044C	UV-2
									808.6973	NGN-2044D	E
57	153	Kamzhing	NGN-2045	1.116	4516.2913	0	27.5662	4488.7251	4488.7251	NGN-2045	UV-2
58	229	Kamzhing	NGN-2046	0.720	2913.7363	0	9.8549	2903.8814	2903.8814	NGN-2046	UV-2
59	250	Kamzhing	NGN-2048	5.826	23576.9831	0	677.415	22899.5681	22899.5681	NGN-2048	UV-2
60	326	Kamzhing	NGN-2049	3.949	15981.0343	0	809.4815	15171.5528	15171.5528	NGN-2049	UV-2
61	296	Kamzhing	NGN-2055	1.991	8057.2903	1797.7428	508.2959	5751.251596	2089.8839	NGN-2055	UV-2
									3661.3677	NGN-2055B	UV-2
									1797.7428	NGN-2055C	E
62	204	Kamzhing	NGN-2056	1.179	4771.2432	982.7019	399.8736	3388.6677	1904.3718	NGN-2056A	UV-2
									1484.2959	NGN-2056B	UV-2
									982.7019	NGN-2056C	E
63	289	Residential Land	NGN-2065	0.219	886.2615	343.8036	42.6103	499.8476	499.8476	NGN-2065A	UV-2
									343.8036	NGN-2065B	E
64	154	Kamzhing	NGN-2066	0.374	1513.5241	38.2592	0	1475.2649	1475.2649	NGN-2066A	UV-2
									38.2592	NGN-2066B	E
65	154	Residential Land	NGN-2067	0.210	849.8398	36.8998	0	812.9400	812.9400	NGN-2067A	UV-2
									36.8998	NGN-2067B	E
66	326	Oranges	NGN-2068	1.131	4576.9941	37.8956	0	4539.0985	4539.0985	NGN-2068A	UV-2
									38.2246	NGN-2068B	E

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67	715	Kamzhing	NGN-2146	0.270	1092.6511	160.2919	72.7194	859.6398	859.6398	NGN-2146A	UV-2
									160.2919	NGN-2146B	E
68	278	Chhuzhing	NGN-2212	0.750	3035.1420	68.7243	0	3035.142	3035.142	NGN-2212	A-2
69	1043	Kamzhing	NGN-2213	0.320	1294.9939	0	0	1294.9939	1294.9939	NGN-2213	UV-2
70	363	Chhuzhing	NGN-2214	0.510	2063.8966	0	0	2063.8966	2063.8966	NGN-2214	A-2
71	570	Kamzhing	NGN-2215	0.430	1740.1481	0	174.8407	1565.3074	1565.3074	NGN-2215	UV-2
72	257	Kamzhing	NGN-2219	2.112	8546.9599	976.4194	258.2028	7312.3377	7312.3377	NGN-2219A	UV-2
									976.4194	NGN-2219B1, B2, B3, B4, B5, B6	E
73	257	Residential Land	NGN-2220	0.100	404.6856	0	0	404.6856	404.6856	NGN-2220	UV-2
74	935	Chhuzhing	NGN-2222	0.100	404.6856	0	0	404.6856	404.6856	NGN-2222	A-2
75	235	Residential Land	NGN-2223	0.230	930.7769	0	0	930.7769	930.7769	NGN-2223	UV-2
76	235	Chhuzhing	NGN-2224	1.500	6070.2840	0	108.1485	5962.1355	5962.1355	NGN-2224	A-2
77	546	Chhuzhing	NGN-2226	0.167	675.8250	176.3979	60.9216	614.9034	614.9034	NGN-2226	A-2
78	240	Chhuzhing	NGN-2227	0.997	4034.7154	169.6186	0	4034.7154	4034.7154	NGN-2227	A-2
79	170	Kamzhing	NGN-2228	0.250	1011.7140	170.7346	91.0143	920.6997	724.0774	NGN-2228A	UV-2
									170.7346	NGN-2228B	E
									25.8877	NGN-2228C	ND
80	10	Chhuzhing	NGN-2229	0.524	2120.5525	53.7113	0	2120.5525	2120.5525	NGN-2229	A-2
81	170	Chhuzhing	NGN-2230	0.110	445.1542	240.9186	0	445.1542	445.1542	NGN-2230	A-2
82	248	Chhuzhing	NGN-2231	0.975	3945.6846	0	0	3945.6846	3945.6846	NGN-2231	A-2
83	248	Residential Land	NGN-2232	0.180	728.4341	0	0	728.4341	728.4341	NGN-2232	UV-1

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84	274	Kamzhing	NGN-2233	0.446	1804.8978	303.8542	19.1298	1481.9138	1481.9138	NGN-2233A	UV-2
									303.8542	NGN-2233B	E
85	717	Kamzhing	NGN-2234	0.110	445.1542	0	5.272	439.8822	439.8822	NGN-2234	UV-1
86	274	Chhuzhing	NGN-2235	0.663	2683.0655	1530.7958	159.9441	2523.1214	2523.1214	NGN-2235	A-2
87	274	Residential Land	NGN-2236	0.150	607.0284	159.9679	16.7185	430.3420	NGN-2236	UV-2	
									159.9679	NGN-2236	E
88	520	Chhuzhing	NGN-2237	1.638	6628.7501	1099.7998	625.7118	6003.0383	6003.0383	NGN-2237	A-2
89	578	Chhuzhing	NGN-2238	0.309	1250.4785	862.5124	286.92	963.5585	963.5585	NGN-2238	A-2
90	252	Chhuzhing	NGN-2239	0.536	2169.1148	0	0	2169.1148	2169.1148	NGN-2239	A-2
91	252	Kamzhing	NGN-2240	0.448	1812.9915	0	66.5849	1746.4066	1746.4066	NGN-2240	UV-2
92	1011	Kamzhing	NGN-2241	0.429	1736.1012	0	211.7616	1524.3396	1524.3396	NGN-2241	UV-2
93	225	Chhuzhing	NGN-2242	0.410	1659.2110	0	396.9246	1262.2864	1209.9775	NGN-2242A	A-2
									52.3089	NGN-2242B	
94	225	Residential Land	NGN-2243	0.140	566.5598	0	90.5091	476.0507	476.0507	NGN-2243	UV-2
95	291	Chhuzhing	NGN-2244	0.371	1501.3836	0	0	1501.3836	1501.3836	NGN-2244	A-2
96	291	Kamzhing	NGN-2245	0.831	3362.9373	51.7751	116.4465	3194.7157	NGN-2245A	UV-2	
									51.7751	NGN-2245B	E
97	813	Chhuzhing	NGN-2246	1.682	6806.8118	0	0	6806.8118	6806.8118	NGN-2246	A-2
98	814	Kamzhing	NGN-2247	0.254	1027.9014	0	187.4458	840.4556	840.4556	NGN-2247	UV-2
99	164	Chhuzhing	NGN-2249	1.111	4496.0570	0	0	4496.057	4496.0570	NGN-2249	A-2
100	236	Residential Land	NGN-2251	0.220	890.3083	0	0	890.3083	890.3083	NGN-2251	UV-1
101	236	Chhuzhing	NGN-2252	0.669	2707.3467	0	0	2707.3467	2707.3467	NGN-2252	A-2
102	236	Kamzhing	NGN-2253	1.155	4674.1187	0	517.8477	4156.2710	3261.5067	NGN-2253A	UV-2
									894.7643	NGN-2253B	

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103	107	Residential Land	NGN-2254	0.330	1335.4625	0	60.1379	1275.3246	1275.3246	NGN-2254	UV-2
104	107	Chhuzhing	NGN-2255	1.549	6268.5799	0	643.0508	5625.5291	4274.2579	NGN-2255A	A-2
									1351.2712	NGN-2255B	
105	107	Kamzhing	NGN-2256	0.338	1367.8373	0	0	1367.8373	1367.8373	NGN-2256	UV-2
106	228	Kamzhing	NGN-2257	0.654	2646.6438	0	28.9431	2617.7007	2617.7007	NGN-2257	UV-2
107	212	Kamzhing	NGN-2258	1.290	5220.4442	40.9199	0	5179.5243	5179.5243	NGN-2258A	UV-2
									40.9199	NGN-2258B	E
108	228	Chhuzhing	NGN-2259	1.005	4067.0903	0	486.4553	3580.6350	2060.8421	NGN-2259A	A-2
									1519.7929	NGN-2259B	
109	212	Chhuzhing	NGN-2260	0.744	3010.8609	0	510.3807	2500.4802	1545.6736	NGN-2260A	A-2
									954.8066	NGN-2260B	
110	228	Residential Land	NGN-2261	0.140	566.5598	0	0	566.5598	566.5598	NGN-2261	UV-2
111	212	Residential Land	NGN-2262	0.080	323.7485	0	27.9856	295.7629	295.7629	NGN-2262	UV-2
112	279	Chhuzhing	NGN-2263	0.618	2500.9570	0	232.7877	2268.1693	2268.1693	NGN-2263	A-2
113	279	Residential Land	NGN-2264	0.370	1497.3367	0	187.7233	1309.6134	1309.6134	NGN-2264	UV-2
114	784	Residential Land	NGN-2266	0.370	1497.3367	0	185.1479	1312.1888	1312.1888	NGN-2266	UV-2
115	226	Chhuzhing	NGN-2267	0.292	1181.6820	0	0	1181.682	1181.6820	NGN-2267	A-2
116	244	Residential Land	NGN-2268	0.210	849.8398	57.5678	16.8068	775.4652	NGN-2268A	UV-1	E
									57.5678	NGN-2268B	
117	244	Chhuzhing	NGN-2269	0.216	874.1209	0	0	874.1209	874.1209	NGN-2269	A-2
118	244	Kamzhing	NGN-2270	0.279	1129.0728	0	40.5811	1088.4917	1088.4917	NGN-2270	UV-2
119	260	Chhuzhing	NGN-2271	0.748	3027.0483	1191.7429	0	3027.0483	3027.0483	NGN-2271	A-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
120	260	Kamzhing	NGN-2272	0.303	1226.1974	220.1252	114.157	891.9152	891.9152	NGN-2272A	UV-2
									220.1252	NGN-2272B	E
121	256	Chhuzhing	NGN-2274	1.276	5163.7883	0	631.5658	4532.2225	2179.3888	NGN-2274A	A-2
									2352.8337	NGN-2274B	
122	256	Residential Land	NGN-2275	0.330	1335.4625	0	29.6778	1305.7847	1305.7847	NGN-2275	UV-2
123	269	Chhuzhing	NGN-2276	0.923	3735.2481	174.4051	389.6414	3345.6067	1636.7351	NGN-2276A	A-2
									1708.8716	NGN-2276B	
124	269	Residential Land	NGN-2277	0.230	930.7769	0	0	930.7769	930.7769	NGN-2277	UV-2
125	270	Kamzhing	NGN-2278	1.224	4953.3517	299.7807	354.3525	4299.2185	3761.1777	NGN-2278A	UV-2
									538.0408	NGN-2278B	
									238.0640	NGN-2278C	E
									61.7167	NGN-2278D	
126	269	Kamzhing	NGN-2279	0.477	1930.3503	568.2051	28.0784	1334.0668	1334.0668	NGN-2279A	UV-2
									568.2051	NGN-2279B	E
127	270	Residential Land	NGN-2280	0.273	1104.7917	0	295.7837	809.0080	809.0080	NGN-2280	UV-2
128	270	Chhuzhing	NGN-2281	1.827	7393.6059	53.1399	139.5291	7254.0768	7254.0768	NGN-2281	A-2
129	254	Kamzhing	NGN-2282	1.003	4058.9966	83.643	0	3975.3536	3975.3536	NGN-2282A	UV-2
									29.7535	NGN-2282B	E
									53.8895	NGN-2282C	
130	254	Residential Land	NGN-2283	0.341	1379.9779	0	128.9733	1251.0046	1251.0046	NGN-2283	UV-2
131	254	Chhuzhing	NGN-2284	1.424	5762.7229	0	415.6852	5347.0377	2341.3670	NGN-2284A	A-2
									3005.6707	NGN-2284B	
132	241	Kamzhing	NGN-2285	0.281	1137.1665	69.1406	11.9894	1056.0365	1056.0365	NGN-2285A	UV-2
									69.1406	NGN-2285B	E

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
133	1288	Chhuzhing	NGN-2286	0.881	3565.2801	0	383.713	3181.5671	1948.1722	NGN-2286A	A-2
									1233.3949	NGN-2286B	
134	643	Kamzhing	NGN-2287	0.305	1234.2911	0	54.7997	1179.4914	1179.4914	NGN-2287	UV-2
135	641	Residential Land	NGN-2288	0.370	1497.3367	0	274.0846	1223.2521	1223.2521	NGN-2288	UV-2
136	232	Residential Land	NGN-2291	0.296	1197.8694	0	51.2235	1146.6459	1146.6459	NGN-2291	UV-2
137	802	Kamzhing	NGN-2292	1.778	7195.3100	0	350.8866	6844.4234	6844.4234	NGN-2292	UV-2
138	216	Residential Land	NGN-2293	0.410	1659.2110	0	0	1659.211	1659.2110	NGN-2293	UV-2
139	216	Chhuzhing	NGN-2294	0.655	2650.6907	0	27.4006	2623.2901	2623.2901	NGN-2294	A-2
140	267	Residential Land	NGN-2295	0.127	513.9507	0	11.2588	502.6919	502.6919	NGN-2295	UV-2
141	623	Chhuzhing	NGN-2296	1.155	4674.1187	0	750.106	3924.0127	1459.1861	NGN-2296A	A-2
									2464.8266	NGN-2296B	
142	623	Kamzhing	NGN-2297	1.031	4172.3085	89.4563	22.5882	4060.2640	4060.2640	NGN-2297A	UV-2
									89.4563	NGN-2297B	E
143	978	Kamzhing	NGN-2298	0.558	2258.1456	0	68.2366	2189.9090	2189.9090	NGN-2298	UV-2
									3607.0775	NGN-2299A	UV-2
144	231	Kamzhing	NGN-2299	0.917	3710.9670	73.2104	30.6791	3680.2879	73.2104	NGN-2299B	E
									892.9692	NGN-2300A	A-2
145	231	Chhuzhing	NGN-2300	0.857	3468.1556	0	380.116	3088.0396	2195.0704	NGN-2300B	
									2539.0577	NGN-2302A	UV-2
146	174	Chhuzhing	NGN-2301	0.802	3245.5785	0	333.773	2911.8055	2911.8055	NGN-2301	A-2
									47.2891	NGN-2302B	E
148	951	Kamzhing	NGN-2303	0.718	2905.6426	0	78.2082	2827.4344	2827.4344	NGN-2303	UV-2

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149	153	Chhuzhing	NGN-2304	1.084	4386.7919	0	348.1769	4038.6150	2324.0092	NGN-2304A	A-2
									1714.6058	NGN-2304B	
150	229	Chhuzhing	NGN-2305	1.062	4297.7611	0	395.1041	3902.6570	2014.3610	NGN-2305A	A-2
									1888.2960	NGN-2305B	
151	229	Residential Land	NGN-2306	0.154	623.2158	0	0	623.2158	623.2158	NGN-2306	UV-2
152	153	Residential Land	NGN-2307	0.154	623.2158	0	0	623.2158	623.2158	NGN-2307	UV-2
153	616	Chhuzhing	NGN-2308	0.491	1987.0063	0	0	1987.0063	1987.0063	NGN-2308	A-2
154	617	Residential Land	NGN-2309	0.140	566.5598	0	0	566.5598	566.5598	NGN-2309	UV-2
155	1240	Kamzhing	NGN-2310	1.000	4046.8560	0	87.2522	3959.6038	3959.6038	NGN-2310	UV-2
156	670	Chhuzhing	NGN-2311	2.341	9473.6899	2440.5686	754.9542	8718.7357	5737.8917	NGN-2311A	A-2
									2980.8440	NGN-2311B	
157	115	Chhuzhing	NGN-2312	1.246	5042.3826	1842.8107	0	5042.3826	5042.3826	NGN-2312	A-2
158	112	Chhuzhing	NGN-2313	0.241	975.2923	0	0	975.2923	975.2923	NGN-2313	A-2
159	859	Kamzhing	NGN-2314	0.779	3152.5008	0	30.4098	3122.0910	3122.0910	NGN-2314	UV-2
160	69	Chhuzhing	NGN-2315	2.035	8235.3520	405.0067	0	8235.352	8235.3520	NGN-2315	A-2
161	295	Kamzhing	NGN-2317	3.158	12779.9712	6526.1671	762.744	5491.0601	2798.3035	NGN-2317	UV-2
									479.1232	NGN-2317B	
									2213.6334	NGN-2317C	
									6526.1671	NGN-2317D	E
162	295	Residential Land	NGN-2318	0.455	1841.3195	3.5703	396.5229	1444.7966	1444.7966	NGN-2318	UV-2
163	295	Chhuzhing	NGN-2319	1.176	4759.1027	0	592.1083	4166.9944	944.0917	NGN-2319A	A-2
									3222.9027	NGN-2319B	

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164	290	Chhuzhing	NGN-2320	1.434	5803.1915	0	130.9335	5672.2580	5672.2580	NGN-2320	A-2
165	290	Residential Land	NGN-2321	0.504	2039.6154	0	61.6266	1977.9888	1977.9888	NGN-2321	UV-2
166	923	Kamzhing	NGN-2322	0.418	1691.5858	0	0	1691.5858	1691.5858	NGN-2322	UV-2
167	771	Kamzhing	NGN-2323	0.110	445.1542	0	7.9616	437.1926	437.1926	NGN-2323	UV-2
168	292	Chhuzhing	NGN-2324	0.630	2549.5193	0	0	2549.5193	2549.5193	NGN-2324	A-2
169	154	Chhuzhing	NGN-2325	0.441	1784.6635	0	0	1784.6635	1784.6635	NGN-2325	A-2
170	298	Kamzhing	NGN-2326	1.165	4714.5872	0	22.9641	4691.6231	4691.6231	NGN-2326	UV-2
171	40	Chhuzhing	NGN-2327	0.240	971.2454	0	0	971.2454	971.2454	NGN-2327	A-2
172	40	Kamzhing	NGN-2328	1.110	4492.0102	0	592.5203	3899.4899	3899.4899	NGN-2328	UV-2
173	738	Residential Land	NGN-2329	0.340	1375.9310	0	95.9624	1279.9686	1279.9686	NGN-2329	UV-2
174	301	Residential Land	NGN-2330	0.480	1942.4909	323.3252	35.5916	1583.5741	1583.5741	NGN-2330A	UV-2
									323.3252	NGN-2330B	E
175	301	Chhuzhing	NGN-2331	1.170	4734.8215	0	0	4734.8215	4734.8215	NGN-2331	A-2
176	233	Kamzhing	NGN-2333	1.745	7061.7637	0	179.5696	6882.1941	6882.1941	NGN-2333	UV-2
177	677	Kamzhing	NGN-2334	0.210	849.8398	0	30.5938	819.2460	819.2460	NGN-2334	UV-2
178	233	Residential Land	NGN-2335	0.300	1214.0568	0	1.7947	1212.2621	1212.2621	NGN-2335	UV-2
179	233	Chhuzhing	NGN-2336	0.494	1999.1469	0	92.7047	1906.4422	1906.4422	NGN-2336	A-2
180	661	Chhuzhing	NGN-2337	0.700	2832.7992	0	87.9481	2744.8511	2744.8511	NGN-2337	A-2
181	661	Kamzhing	NGN-2338	1.071	4334.1828	0	102.2702	4231.9126	4231.9126	NGN-2338	UV-2
182	242	Kamzhing	NGN-2339	0.610	2468.5822	0	104.2483	2364.3339	2364.3339	NGN-2339	UV-2
183	242	Chhuzhing	NGN-2340	0.622	2517.1444	0	0	2517.1444	2517.1444	NGN-2340	A-2
184	575	Kamzhing	NGN-2341	2.362	9558.6739	0	443.7961	9114.8778	9114.8778	NGN-2341	UV-2
185	219	Residential Land	NGN-2342	0.302	1222.1505	0	40.5725	1181.5780	1181.5780	NGN-2342	UV-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
186	577	Chhuzhing	NGN-2343	0.271	1096.6980	0	0	1096.698	1096.6980	NGN-2343	A-2
187	264	Chhuzhing	NGN-2344	0.491	1987.0063	1134.674	58.5205	1928.4858	1928.4858	NGN-2344	A-2
188	264	Kamzhing	NGN-2345	1.384	5600.8487	580.9483	225.2691	4794.6313	3937.8918	NGN-2345A	UV-2
									555.4520	NGN-2345B	
									301.2875	NGN-2345C	
									580.9483	NGN-2345D	E
189	264	Residential Land	NGN-2346	0.332	1343.5562	0	7.1671	1336.3891	1336.3891	NGN-2346	UV-2
190	207	Kamzhing	NGN-2349	0.424	1715.8669	60.2674	0	1715.8669	1715.8669	NGN-2349	UV-2
191	849	Chhuzhing	NGN-2350	1.295	5240.6785	0	151.4231	5089.2554	5089.2554	NGN-2350	A-2
192	224	Kamzhing	NGN-2351	1.610	6515.4382	2093.0197	118.7157	4303.7028	1901.1000	NGN-2351A	UV-2
									2402.6028	NGN-2351B	
									2093.0197	NGN-2351C	E
193	224	Residential Land	NGN-2352	0.380	1537.8053	0	117.7511	1420.0542	1420.0542	NGN-2352	UV-2
194	224	Chhuzhing	NGN-2353	1.180	4775.2901	0	350.2627	4425.0274	4425.0274	NGN-2353	A-2
195	1008	Chhuzhing	NGN-2354	0.540	2185.3022	0	315.8635	1869.4387	1869.4387	NGN-2354	A-2
196	1008	Kamzhing	NGN-2355	0.110	445.1542	0	55.2881	389.8661		NGN-2355	UV-1
197	247	Residential Land	NGN-2356	0.190	768.9026	0	35.8845	733.0181	733.0181	NGN-2356	UV-1
198	237	Kamzhing	NGN-2357	0.291	1177.6351	20.4934	179.7356	977.4061	NGN-2357A	UV-2	E
									20.4934	NGN-2357B	
199	237	Residential Land	NGN-2358	0.261	1056.2294	0	8.0645	1048.1649	1048.1649	NGN-2358	UV-2
200	237	Chhuzhing	NGN-2359	1.080	4370.6045	1162.4122	0	4370.6045	4370.6045	NGN-2359	A-2
201	239	Kamzhing	NGN-2361	0.430	1740.1481	0	210.2864	1529.8617	1529.8617	NGN-2361	UV-2

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202	724	Residential Land	NGN-2362	0.390	1578.2738	0	0	1578.2738	1578.2738	NGN-2362	UV-2
203	221	Kamzhing	NGN-2363	0.300	1214.0568	1275.8656	0			NGN-2363	UV-2
204	221	Residential Land	NGN-2364	0.500	2023.4280	0	11.8076	2011.6204	2011.6204	NGN-2364	UV-1
205	221	Chhuzhing	NGN-2365	1.521	6155.2680	1587.3846	0	6155.268	6155.268	NGN-2365	A-2
206	253	Chhuzhing	NGN-2366	0.231	934.8237	0	0	934.823736	934.8237	NGN-2366	A-2
207	253	Residential Land	NGN-2367	0.230	930.7769	91.1353	60.3316	779.3100	779.3100	NGN-2367A	UV-1
									91.1353	NGN-2367B	E
208	253	Kamzhing	NGN-2369	0.575	2326.9422	0	155.1361	2171.8061	2171.8061	NGN-2369	UV-2
209	214	Kamzhing	NGN-2370	1.052	4257.2925	0	0	4257.2925	4247.2925	NGN-2370	UV-2
210	214	Chhuzhing	NGN-2372	0.661	2674.9718	0	0	2674.9718	2674.9718	NGN-2372	A-2
211	210	Kamzhing	NGN-2373	0.440	1780.6166	0	106.1604	1674.4562	1674.4562	NGN-2373	UV-2
212	227	Kamzhing	NGN-2374	0.300	1214.0568	0	98.1863	1115.8705	1115.8705	NGN-2374	UV-2
213	658	Kamzhing	NGN-2375	0.171	692.0124	0	11.1614	680.8510	680.8510	NGN-2375	UV-2
214	658	Residential Land	NGN-2376	0.150	607.0284	0	20.3709	586.6575	586.6575	NGN-2376	UV-2
215	676	Chhuzhing	NGN-2377	1.692	6847.2804	89.7561	0	6847.2804	6847.2804	NGN-2377	A-2
216	230	Residential Land	NGN-2378	0.331	1339.5093	0	37.0958	1302.4135	1302.4135	NGN-2378	UV-1
217	230	Chhuzhing	NGN-2379	0.460	1861.5538	0	0	1861.5538	1861.5538	NGN-2379	A-2
218	230	Kamzhing	NGN-2380	0.251	1015.7609	0	1.1346	1014.6263	1014.6263	NGN-2380	UV-1
219	920	Chhuzhing	NGN-2381	0.344	1392.1185	504.432	21.624	866.0625	866.0625	NGN-2381	A-2
									504.4320		

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220	920	Residential Land	NGN-2382	0.350	1416.3996	227.2836	41.5598	1147.5562	1147.5562	NGN-2382A	UV-2
									227.2836	NGN-2382B	E
221	920	Kamzhing	NGN-2383	0.190	768.9026	160.4836	41.7825	566.6365	566.6365	NGN-2383A	UV-2
									160.4836	NGN-2383B	E
222	570	Kamzhing	NGN-2384	0.416	1683.4921	132.7003	0	1683.4921	1683.4921	NGN-2384	ND
223	570	Chhuzhing	NGN-2386	0.360	1456.8682	0	78.7464	1378.1218	1378.1218	NGN-2386	A-2
224	266	Chhuzhing	NGN-2387	1.120	4532.4787	0	122.8705	4409.6082	4409.6080	NGN-2387	A-2
225	968	Chhuzhing	NGN-2388	0.270	1092.6511	0	0	1092.6511	1092.6511	NGN-2388	A-2
226	807	Kamzhing	NGN-2389	1.441	5829.5551	2609.7221	309.866	2885.2210	2609.7220	NGN-2389C	E
						24.746			24.7460	NGN-2389D	
									606.0884	NGN-2389A	UV-2
									2279.1326	NGN-2389B	
227	215	Kamzhing	NGN-2390	0.420	1699.6795	0	11.1207	1688.5588	1688.5588	NGN-2390	UV-2
228	234	Chhuzhing	NGN-2391	3.514	14220.6520	0	347.3729	13873.2791	13873.2791	NGN-2391	A-2
229	234	Residential Land	NGN-2392	0.350	1416.3996	0	20.0924	1396.3072	1396.3072	NGN-2392	UV-2
230	251	Kamzhing	NGN-2393	0.972	3933.5440	0	129.5024	3804.0416	3804.0416	NGN-2393	UV-2
231	794	Chhuzhing	NGN-2395	1.100	4451.5416	0	25.6151	4425.9265	4425.9265	NGN-2395	A-2
232	794	Kamzhing	NGN-2396	0.110	445.1542	0	38.3084	406.8458	406.8458	NGN-2396	UV-2
233	220	Residential Land	NGN-2397	0.470	1902.0223	0	83.6272	1818.3951	1818.3951	NGN-2397	UV-2
234	790	Kamzhing	NGN-2398	0.274	1108.8385	0	33.848	1074.9905	1074.9905	NGN-2398	UV-2
235	220	Kamzhing	NGN-2399	0.100	404.6856	0	42.1172	362.5684	362.5684	NGN-2399	UV-2
236	220	Chhuzhing	NGN-2400	1.678	6790.6244	0	6.1577	6784.4667	6784.4667	NGN-2400	A-2
237	273	Chhuzhing	NGN-2401	0.500	2023.4280	0	0	2023.428	2023.4280	NGN-2401	A-2

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238	265	Chhuzhing	NGN-2402	0.211	853.8866	0	0	853.8866	853.8866	NGN-2402	A-2
239	793	Kamzhing	NGN-2403	0.276	1116.9323	0	181.8088	935.1235	935.1235	NGN-2403	UV-2
240	262	Chhuzhing	NGN-2404	0.227	918.6363	0	60.2457	858.3906	858.3906	NGN-2404	A-2
241	262	Kamzhing	NGN-2407	0.101	408.7325	0	0	408.7325	408.7325	NGN-2407	UV-2
242	262	Chhuzhing	NGN-2408	1.661	6721.8278	0	40.9432	6680.8846	6680.8846	NGN-2408	A-2
243	262	Kamzhing	NGN-2409	0.960	3884.9818	0	130.6012	3754.3806	3754.3806	NGN-2409	UV-2
244	280	Chhuzhing	NGN-2411	0.610	2468.5822	0	123.7208	2344.8614	2344.8614	NGN-2411	A-2
245	280	Kamzhing	NGN-2412	3.240	13111.8134	0	215.9693	12895.8441	12895.8441	NGN-2412	UV-2
246	972	Kamzhing	NGN-2413	0.723	2925.8769	0	90.6642	2835.2127	2835.2127	NGN-2413	UV-2
247	280	Residential Land	NGN-2414	0.400	1618.7424	0	91.6256	1527.1168	1527.1168	NGN-2414	UV-2
248	265	Kamzhing	NGN-2415	0.200	809.3712	0	0	809.3712	809.3712	NGN-2415	UV-2
249	265	Residential Land	NGN-2416	0.420	1699.6795	0	43.2627	1656.4168	1656.4168	NGN-2416	UV-2
250	276	Kamzhing	NGN-2417	1.311	5305.4282	1030.4466	71.5769	4203.4047	NGN-2417A	UV-2	
									NGN-2417B	E	
251	276	Residential Land	NGN-2418	0.491	1987.0063	0	43.7008	1943.3055	1943.3055	NGN-2418	UV-2
252	276	Chhuzhing	NGN-2419	2.300	9307.7688	0	0	9307.7688	9307.7688	NGN-2419	A-2
253	163	Chhuzhing	NGN-2420	0.340	1375.9310	0	32.1456	1343.7854	1343.7854	NGN-2420	A-2
254	210	Chhuzhing	NGN-2421	2.383	9643.6578	2586.1412	284.7675	9358.8903	9358.8903	NGN-2421	A-2
255	210	Residential Land	NGN-2422	0.480	1942.4909	991.6675	107.9633	842.8601	NGN-2422A	UV-2	
									NGN-2422B	E	
256	250	Residential Land	NGN-2424	0.458	1853.4600	0	50.5975	1802.8625	1802.8625	NGN-2424	UV-2
257	44	Kamzhing	NGN-2426	2.542	10287.1080	0	24.3079	10262.8001	10262.8001	NGN-2426	UV-2
258	44	Chhuzhing	NGN-2427	0.390	1578.2738	0	116.0884	1462.1854	1462.1854	NGN-2427	A-2

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259	44	Residential Land	NGN-2428	0.223	902.4489	0	48.5058	853.9431	853.9431	NGN-2428	UV-2
260	209	Chhuzhing	NGN-2429	0.158	639.4032	0	95.988	543.4152	543.4152	NGN-2429	A-2
261	209	Residential Land	NGN-2430	0.270	1092.6511	0	165.2097	927.4414	927.4414	NGN-2430	UV-2
262	282	Chhuzhing	NGN-2431	0.130	526.0913	0	0	526.0913	526.0913	NGN-2431	A-2
263	282	Residential Land	NGN-2432	0.310	1254.5254	0	59.4129	1195.1125	1195.1125	NGN-2432	UV-2
264	676	Kamzhing	NGN-2440	2.681	10849.6209	423.3233	985.5845	9440.7131	NGN-2440A	UV-2	
								423.3233	NGN-2440B	E	
265	676	Residential Land	NGN-2441	0.290	1173.5882	0	11.7352	1161.8530	1161.8530	NGN-2441	UV-2
266	40	Chhuzhing	NGN-2459	0.660	2670.9250	0	222.7559	2448.1691	2448.1691	NGN-2459	A-2
267	163	Chhuzhing	NGN-2494	0.320	1294.9939	0	44.0629	1250.9310	1250.9310	NGN-2494	A-2
268	112	Kamzhing	NGN-2522	3.725	15074.5386	0	1576.4748	13498.0638	NGN-2522A	UV-2	
									2338.5856		
									1941.9933		
									681.7488		
269	107	Kamzhing	NGN-2524	0.081	327.7953	0	52.3338	275.4615	275.4615	NGN-2524	UV-2
270	917	Kamzhing	NGN-2525	1.262	5107.1323	0	11.2551	5095.8772	5095.8772	NGN-2525	UV-2
271	267	Kamzhing	NGN-2530	0.260	1052.1826	20.1102	0	1052.1826	1032.0724	NGN-2530	ND
272	282	Kamzhing	NGN-2532	4.220	17077.7323	0	551.1988	16526.5335	NGN-2532A	UV-2	
									6093.1942	NGN-2532B	ND
273	282	Oranges	NGN-2533	0.451	1825.1321	0	92.135	1732.9971	1732.9971	NGN-2533	UV-2
274	222	Chhuzhing	NGN-2534	0.384	1553.9927	851.4383	0	1553.9927	1553.9927	NGN-2534	A-2
275	222	Kamzhing	NGN-2535	0.518	2096.2714	1752.7718	155.5484	187.9512	NGN-2535A	UV-2	
									1380.8253	NGN-2535B	E
									371.9465	NGN-2535C	

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276	222	Kamzhing	NGN-2536	1.250	5058.5700	1839.1714	414.2933	2805.1053	1992.5264	NGN-2536A	UV-2
									812.5789	NGN-2536B	
									1839.1714	NGN-2536C	E
277	256	Kamzhing	NGN-2585	0.907	3670.4984	0	442.1598	3228.3386	1638.0884	NGN-2585A	UV-2
									1590.2502	NGN-2585B	
278	230	Kamzhing	NGN-2601	1.008	4079.2308	0	4.1341	4075.0967	4075.0967	NGN-2601	UV-2
279	987	Chhuzhing	NGN-2611	0.182	736.5278	0	0	736.5278	736.5278	NGN-2611	A-2
280	987	Kamzhing	NGN-2612	2.400	9712.4544	0	374.3593	9338.0951	7172.8480	NGN-2612A	UV-2
									2165.2471	NGN-2612B	
281	288	Chhuzhing	NGN-2613	0.817	3306.2814	0	147.559	3158.7224	3158.7224	NGN-2613	A-2
282	232	Chhuzhing	NGN-2614	2.009	8130.1337	0	0	8130.1337	8130.1337	NGN-2614	A-2
283	235	Kamzhing	NGN-2623	2.108	8530.7724	306.9949	484.7959	7683.2280	7683.2280	NGN-2623A	UV-2
									306.9949	NGN-2623B	E
									55.7536	NGN-2623C	ND
284	239	Chhuzhing	NGN-2626	0.590	2387.6450	0	78.6567	2308.9883	2308.9883	NGN-2626	A-2
285	240	Kamzhing	NGN-2627	0.448	1812.9915	72.7749	0	1740.2166	1740.2166	NGN-2627A	UV-2
									72.7749	NGN-2627B	E
286	240	Kamzhing	NGN-2628	0.534	2161.0211	73.2152	0	2161.0211	2161.0211	NGN-2628	ND
287	676	Kamzhing	NGN-2643	2.307	9336.0968	1865.3089	172.2715	7298.5164	2960.2682	NGN-2643A	UV-2
									1865.3089	NGN-2643B	E
									4338.2482	NGN-2643C	ND
288	247	Chhuzhing	NGN-2647	1.260	5099.0386	0	0	5099.0386	5099.0386	NGN-2647	A-2
289	247	Kamzhing	NGN-2649	0.420	1699.6795	0	479.4607	1220.2188	1220.2188	NGN-2649	UV-2
290	247	Kamzhing	NGN-2650	0.340	1375.9310	0	0	1375.9310	1375.9310	NGN-2650	UV-2

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291	520	Kamzhing	NGN-2656	0.224	906.4957	644.6319	87.5512	174.3126	174.3126	NGN-2656A	UV-2
									644.6319	NGN-2656B	E
292	578	Kamzhing	NGN-2657	1.227	4965.4923	315.3735	592.552	4372.9403	4057.5668	NGN-2657A	UV-2
									315.3735	NGN-2657B	E
293	250	Oranges	NGN-2659	1.907	7717.3544	0	377.8426	7339.5118	7339.5118	NGN-2659	UV-2
294	251	Chhuzhing	NGN-2660	0.380	1537.8053	0	95.0815	1442.7238	1442.7238	NGN-2660	A-2
295	176	Kamzhing	NGN-2674	1.641	6640.8907	0	506.4191	6134.4716	4711.8832	NGN-2674A	UV-2
									1422.5884	NGN-2674B	
296	170	Kamzhing	NGN-2675	0.042	169.9680	43.5992	0	126.3688	126.3688	NGN-2675A	UV-2
									43.5992	NGN-2675B	E
297	170	Kamzhing	NGN-2676	1.464	5924.5972	2334.5907	0	3421.5043	3421.5043	NGN-2676A	UV-2
									2334.5907	NGN-2676B	E
									168.5022	NGN-2676C	ND
298	301	Kamzhing	NGN-2677	1.124	4548.6661	0	66.7019	4481.9642	4481.9642	NGN-2677	UV-2
299	301	Kamzhing	NGN-2678	1.700	6879.6552	0	512.3524	6367.3028	6367.3028	NGN-2678	UV-2
300	297	Kamzhing	NGN-2684	0.371	1501.3836	84.2311	130.0999	1287.0526	1287.0526	NGN-2684A	UV-2
									84.2311	NGN-2684B	E
301	263	Chhuzhing	NGN-2717	0.900	3642.1704	0	32.529	3609.6414	3609.6414	NGN-2717	A-2
302	211	Chhuzhing	NGN-2719	1.000	4046.8560	0	0	4046.856	4046.856	NGN-2719	A-2
303	657	Chhuzhing	NGN-2720	0.700	2832.7992	0	0	2832.7992	2832.7992	NGN-2720	A-2
304	211	Kamzhing	NGN-2721	0.690	2792.3306	0	71.0042	2721.3264	2721.3264	NGN-2721	UV-2
305	264	Kamzhing	NGN-2724	0.140	566.5598	506.798	27.6207	538.9391	538.9391	NGN-2724	E
306	265	Chhuzhing	NGN-2727	0.520	2104.3651	0	84.3348	2020.0303	2020.0303	NGN-2727	A-2
307	266	Kamzhing	NGN-2730	0.400	1618.7424	0	0	1618.7424	1618.7424	NGN-2730	UV-2
308	272	Oranges	NGN-2739	0.804	3253.6722	0	375.9156	2877.7566	2877.7566	NGN-2739	UV-2

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309	278	Kamzhing	NGN-2750	0.237	959.1049	102.1125	107.0209	749.9715	749.9715	NGN-2750A	UV-2
									102.1125	NGN-2750B	E
310	334	Kamzhing	NGN-2759	0.522	2112.4588	0	31.3092	2081.1496	2081.1496	NGN-2759	UV-2
311	334	Chhuzhing	NGN-2760	0.600	2428.1136	0	0	2428.1136	2428.1136	NGN-2760	A-2
312	279	Kamzhing	NGN-2767	3.150	12747.5964	2862.5813	605.7624	9279.2527	2571.7638	NGN-2767A	UV-2
									6707.4889	NGN-2767B	
									2862.5744	NGN-2767C1,C2,C3	E
313	265	Kamzhing	NGN-2769	0.681	2755.9089	0	29.7684	2726.1405	2726.1405	NGN-2769	UV-2
314	465	Kamzhing	NGN-3016	0.538	2177.2085	0	0	2177.2085	2177.2085	NGN-3016	UV-2
315	467	Kamzhing	NGN-3021	0.150	607.0284	0	100.0284	507.0000	507.0000	NGN-3021	UV-2
316	467	Chhuzhing	NGN-3022	0.100	404.6856	48.5519	0.5113	404.1743	404.1743	NGN-3022	A-2
317	540	Chhuzhing	NGN-3184	0.124	501.8101	97.69	12.7271	489.0830	489.0830	NGN-3184	A-2
318	542	Chhuzhing	NGN-3188	0.189	764.8558	611.2587	54.2789	710.5769	710.5769	NGN-3188	A-2
319	543	Chhuzhing	NGN-3190	0.160	647.4970	0	14.5811	632.9159	632.9159	NGN-3190	A-2
320	544	Chhuzhing	NGN-3191	0.143	578.7004	0	21.2402	557.4602	557.4602	NGN-3191	A-2
321	545	Chhuzhing	NGN-3196	0.174	704.1529	383.1269	52.3734	651.7795	651.7795	NGN-3196	A-2
322	540	Chhuzhing	NGN-3198	0.146	590.8410	6.5293	18.5954	572.2456	572.2456	NGN-3198	A-2
323	566	Kamzhing	NGN-3218	0.602	2436.2073	0	215.2943	2220.9130	2220.9130	NGN-3218	UV-2
324	567	Kamzhing	NGN-3224	0.150	607.0284	0	64.3664	542.6620	542.6620	NGN-3224	UV-2
325	568	Chhuzhing	NGN-3227	0.360	1456.8682	0	73.5289	1383.3393	1383.3393	NGN-3227	A-2
326	568	Kamzhing	NGN-3233	0.680	2751.8621	0	88.3217	2663.5404	2663.5404	NGN-3233	UV-2
327	568	Kamzhing	NGN-3234	0.567	2294.5674	127.4715	0	2294.5674	2294.5674	NGN-3234	ND
328	569	Chhuzhing	NGN-3235	0.340	1375.9310	0	37.5571	1338.3739	1338.3739	NGN-3235	A-2

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329	569	Kamzhing	NGN-3239	0.571	2310.7548	924.9804	70.4443	1315.3301	1315.3301	NGN-3239A	UV-2
									924.9804	NGN-3239B	E
330	569	Kamzhing	NGN-3240	0.392	1586.3676	110.7521	0	1586.3676	1586.3676	NGN-3240	ND
331	571	Kamzhing	NGN-3244	0.300	1214.0568	0	88.952	1125.1048	1125.1048	NGN-3244	UV-2
332	572	Chhuzhing	NGN-3245	0.150	607.0284	0	0	607.0284	607.0284	NGN-3245	A-2
333	573	Chhuzhing	NGN-3246	0.301	1218.1037	82.6506	49.1784	1168.9253	1168.9253	NGN-3246	A-2
334	576	Chhuzhing	NGN-3248	0.110	445.1542	0	0	445.1542	445.1542	NGN-3248	A-2
335	614	Kamzhing	NGN-3295	0.677	2739.7215	0	111.0041	2628.7174	897.4314	NGN-3295A	UV-2
									1731.2860	NGN-3295B	
336	615	Kamzhing	NGN-3296	0.192	776.9964	0	30.6044	746.3920	746.3920	NGN-3296	UV-2
337	616	Residential Land	NGN-3297	0.300	1214.0568	0	0	1214.0568	1214.0568	NGN-3297	UV-2
338	619	Kamzhing	NGN-3301	0.103	416.8262	0	81.4968	335.3294	335.3294	NGN-3301	UV-2
339	622	Chhuzhing	NGN-3303	0.156	631.3095	0	24.3103	606.9992	606.9992	NGN-3303	A-2
340	628	Kamzhing	NGN-3310	0.331	1339.5093	0	117.5312	1221.9781	1221.9781	NGN-3310	UV-2
341	629	Kamzhing	NGN-3312	0.583	2359.3170	0	126.5606	2232.7564	2232.7564	NGN-3312	UV-2
342	630	Kamzhing	NGN-3315	0.583	2359.3170	0	360.622	1998.6950	1998.6950	NGN-3315	UV-2
343	637	Chhuzhing	NGN-3326	0.602	2436.2073	0	285.6738	2150.5335	545.6427	NGN-3326A	A-2
									1604.8908	NGN-3326B	
344	637	Kamzhing	NGN-3327	0.233	942.9174	0	0	942.9174	942.9174	NGN-3327	UV-2
345	639	Kamzhing	NGN-3329	0.210	849.8398	0	54.9375	794.9023	794.9023	NGN-3329	UV-2
346	640	Kamzhing	NGN-3330	0.383	1549.9458	0	5.3901	1544.5557	1544.5557	NGN-3330	UV-2
347	642	Kamzhing	NGN-3331	0.609	2464.5353	110.3246	0	2354.2107	2354.2107	NGN-3331A	UV-2
									110.3246	NGN-3331B	E
348	656	Kamzhing	NGN-3346	0.200	809.3712	0	21.9161	787.4551	787.4551	NGN-3346	UV-2

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349	657	Residential Land	NGN-3358	0.160	647.4970	0	22.7477	624.7493	624.7493	NGN-3358	UV-2
350	659	Kamzhing	NGN-3362	0.240	971.2454	0	0	971.2454	971.2454	NGN-3362	UV-2
351	661	Kamzhing	NGN-3363	0.300	1214.0568	0	7.0536	1207.0032	1207.0032	NGN-3363	UV-2
352	662	Kamzhing	NGN-3365	0.171	692.0124	0	151.3291	540.6833	540.6833	NGN-3365	UV-2
353	663	Kamzhing	NGN-3366	0.186	752.7152	0	72.3061	680.4091	680.4091	NGN-3366	UV-2
354	664	Kamzhing	NGN-3367	0.205	829.6055	0	70.8513	758.7542	758.7542	NGN-3367	UV-2
355	665	Kamzhing	NGN-3368	0.897	3630.0298	0	242.869	3387.1608	3387.1608	NGN-3368	UV-2
356	668	Chhuzhing	NGN-3373	0.620	2509.0507	929.3295	0	2509.0507	2509.0507	NGN-3373	A-2
357	669	Chhuzhing	NGN-3374	0.621	2513.0976	855.9472	0	2513.0976	2513.0976	NGN-3374	A-2
358	688	Chhuzhing	NGN-3387	0.170	687.9655	0	0	687.9655	687.9655	NGN-3387	A-2
359	689	Chhuzhing	NGN-3388	0.170	687.9655	0	0	687.9655	687.9655	NGN-3388	A-2
360	690	Kamzhing	NGN-3389	0.170	687.9655	0	65.7201	622.2454	622.2454	NGN-3389	UV-2
361	691	Chhuzhing	NGN-3390	0.170	687.9655	0	30.6613	657.3042	657.3042	NGN-3390	A-2
362	692	Kamzhing	NGN-3391	0.170	687.9655	0	66.5135	621.4520	621.4520	NGN-3391	UV-2
363	693	Chhuzhing	NGN-3392	0.171	692.0124	0	18.0894	673.9230	673.9230	NGN-3392	A-2
364	713	Kamzhing	NGN-3432	0.408	1651.1172	21.7021	52.0573	1577.3578	NGN-3432A	UV-2	
									NGN-3432B	E	
365	709	Kamzhing	NGN-3433	0.150	607.0284	0	10.1428	596.8856	596.8856	NGN-3433	UV-1
366	715	Kamzhing	NGN-3434	0.311	1258.5722	35.9495	31.9618	1190.6609	NGN-3434A	UV-2	
									NGN-3434B	E	
367	717	Chhuzhing	NGN-3437	0.536	2169.1148	0	0	2169.1148	2169.1148	NGN-3437	A-2
368	718	Kamzhing	NGN-3439	0.160	647.4970	0	31.2748	616.2222	616.2222	NGN-3439	UV-2
369	721	Chhuzhing	NGN-3441	0.220	890.3083	0	62.5044	827.8039	827.8039	NGN-3441	A-2
370	721	Kamzhing	NGN-3442	0.470	1902.0223	0	96.0986	1805.9237	1805.9237	NGN-3442	UV-2

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371	722	Chhuzhing	NGN-3443	0.220	890.3083	0	0	890.3083	890.3083	NGN-3443	A-2
372	722	Kamzhing	NGN-3444	0.454	1837.2726	0	30.8478	1806.4248	1806.4248	NGN-3444	UV-2
373	723	Chhuzhing	NGN-3445	0.220	890.3083	0	21.7605	868.5478	868.5478	NGN-3445	A-2
374	723	Kamzhing	NGN-3446	0.410	1659.2110	121.6034	190.9411	1346.6665	NGN-3446A	UV-2	
									NGN-3446B	E	
375	724	Chhuzhing	NGN-3447	0.220	890.3083	0	0	890.3083	890.3083	NGN-3447	A-2
376	724	Kamzhing	NGN-3448	0.230	930.7769	0	59.5357	871.2412	871.2412	NGN-3448	UV-2
377	732	Kamzhing	NGN-3462	0.185	748.6684	0	16.9313	731.7371	731.7371	NGN-3462	UV-2
378	735	Kamzhing	NGN-3465	0.155	627.2627	0	23.3712	603.8915	603.8915	NGN-3465	UV-2
379	736	Chhuzhing	NGN-3467	0.131	530.1381	0	0	530.1381	530.1381	NGN-3467	A-2
380	736	Kamzhing	NGN-3469	0.629	2545.4724	0	48.8862	2496.5862	2496.5862	NGN-3469	UV-2
381	737	Chhuzhing	NGN-3470	0.120	485.6227	0	0	485.6227	485.6227	NGN-3470	A-2
382	737	Kamzhing	NGN-3472	0.440	1780.6166	0	76.0613	1704.5553	1704.5553	NGN-3472	UV-2
383	738	Chhuzhing	NGN-3474	0.482	1950.5846	0	48.0683	1902.5163	1902.5163	NGN-3474	A-2
384	750	Chhuzhing	NGN-3488	0.503	2035.5686	0.8743	144.5769	1890.9917	1890.9917	NGN-3488A	A-2
385	750	Kamzhing	NGN-3489	0.369	1493.2899	0	105.1027	1388.1872	1388.1872	NGN-3489	UV-2
386	752	Kamzhing	NGN-3500	0.169	683.9187	0	109.9905	573.9282	573.9282	NGN-3500	UV-2
387	753	Kamzhing	NGN-3502	0.172	696.0592	0	55.922	640.1372	640.1372	NGN-3502	UV-2
388	755	Kamzhing	NGN-3503	0.175	708.1998	69.2237	10.0652	628.9109	NGN-3503A	UV-2	
									NGN-3503B	E	
389	759	Chhuzhing	NGN-3509	0.204	825.5586	0	19.8794	805.6792	805.6792	NGN-3509	A-2
390	761	Chhuzhing	NGN-3512	0.208	841.7460	0	30.0972	811.6488	811.6488	NGN-3512	A-2
391	763	Kamzhing	NGN-3513	0.150	607.0284	0	0	607.0284	607.0284	NGN-3513	UV-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
392	764	Kamzhing	NGN-3514	1.340	5422.7870	1150.184	4.1162	4268.4868	4053.6666	NGN-3514A	UV-2
									214.8202	NGN-3514B	
									1150.1840	NGN-3514C	E
393	1162	Kamzhing	NGN-3515	0.116	469.4353	9.291	58.7089	401.4354	401.4354	NGN-3515A	UV-2
									9.2910	NGN-3515B	
394	766	Kamzhing	NGN-3517	0.148	598.9347	0	19.4102	579.5245	579.5245	NGN-3517	UV-2
395	767	Kamzhing	NGN-3519	1.447	5855.8006	2629.173	180.6894	3045.9382	642.5702	NGN-3519A	UV-2
									899.7286	NGN-3519B	
									653.0569	NGN-3519C	
									850.5825	NGN-3519D	
									639.1966	NGN-3519E	E
									1989.9764	NGN-3519F	
396	768	Residential Land	NGN-3520	0.105	424.9199	327.4289	5.8174	91.6736	91.6736	NGN-3520A	UV-2
									327.4289	NGN-3520B	
397	769	Chhuzhing	NGN-3521	0.427	1728.0075	0	0	1728.0075	1728.0075	NGN-3521	A-2
398	769	Residential Land	NGN-3522	0.101	408.7325	232.2232	42.2872	134.2221	134.2221	NGN-3522A	UV-2
									232.2232	NGN-3522B	
399	770	Kamzhing	NGN-3523	0.115	465.3884	0	71.0703	394.3181	394.3181	NGN-3523	UV-2
400	772	Kamzhing	NGN-3524	0.173	700.1061	0	31.4057	668.7004	668.7004	NGN-3524	UV-2
401	773	Kamzhing	NGN-3525	0.150	607.0284	0	0	607.0284	607.0284	NGN-3525	UV-2
402	1285	Kamzhing	NGN-3526	0.308	1246.4316	0	39.5587	1206.8729	1206.8729	NGN-3526	UV-1
403	775	Kamzhing	NGN-3531	0.192	776.9964	0	6.6019	770.3945	770.3945	NGN-3531	UV-1
404	776	Chhuzhing	NGN-3532	0.530	2144.8337	855.1569	50.1914	1239.4854	1242.3616	NGN-3532	A-2
									855.1569		
405	776	Kamzhing	NGN-3534	0.330	1335.4625	0	6.6458	1328.8167	1328.8167	NGN-3534	UV-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
406	779	Chhuzhing	NGN-3536	0.150	607.0284	391.1907	48.5744	167.2633	167.2633	NGN-3536A	A-2
									391.1907	NGN-3536B	
407	780	Kamzhing	NGN-3538	0.200	809.3712	562.6642	42.5994	204.1076	NGN-3538A	UV-2	
									562.6642	NGN-3538B	
408	781	Kamzhing	NGN-3539	0.154	623.2158	0	14.2163	608.9995	608.9995	NGN-3539	UV-2
409	783	Kamzhing	NGN-3542	0.145	586.7941	0	2.2397	584.5544	584.5544	NGN-3542	UV-2
410	784	Chhuzhing	NGN-3543	0.296	1197.8694	0	146.8367	1051.0327	1051.0327	NGN-3543	A-2
411	786	Chhuzhing	NGN-3547	0.232	938.8706	0	0	938.8706	938.8706	NGN-3547	A-2
412	787	Kamzhing	NGN-3549	0.307	1242.3848	0	169.1987	1073.1861	1073.1861	NGN-3549	UV-2
413	788	Chhuzhing	NGN-3551	0.612	2476.6759	0	0	2476.6759	2476.6759	NGN-3551	A-2
414	789	Kamzhing	NGN-3552	0.300	1214.0568	0	0	1214.0568	1214.0568	NGN-3552	UV-2
415	791	Kamzhing	NGN-3553	0.400	1618.7424	0	94.1877	1524.5547	1524.5547	NGN-3553	UV-2
416	791	Chhuzhing	NGN-3554	0.110	445.1542	0	0	445.1542	445.1542	NGN-3554	A-2
417	792	Kamzhing	NGN-3555	0.200	809.3712	0	0	809.3712	809.3712	NGN-3555	UV-2
418	796	Chhuzhing	NGN-3557	0.132	534.1850	0	0	534.185	534.1850	NGN-3557	A-2
419	796	Kamzhing	NGN-3558	0.172	696.0592	0	15.5045	680.5547	680.5547	NGN-3558	UV-2
420	525	Kamzhing	NGN-3559	0.173	700.1061	0	88.1757	611.9304	611.9304	NGN-3559	UV-2
421	798	Chhuzhing	NGN-3560	0.401	1622.7893	0	0	1622.7893	1622.7893	NGN-3560	A-2
422	798	Kamzhing	NGN-3561	0.456	1845.3663	0	1026.8229	818.5434	471.5132	NGN-3561A	UV-2
									347.0302	NGN-3561B	
423	798	Residential Land	NGN-3562	0.156	631.3095	0	76.8986	554.4109	554.4109	NGN-3562	UV-2
424	799	Chhuzhing	NGN-3564	0.417	1687.5390	0	0	1687.539	1687.5390	NGN-3564	A-2
425	799	Kamzhing	NGN-3565	0.506	2047.7091	1865.0882	182.5419	0.0790	1865.0882	NGN-3565	E
426	799	Residential Land	NGN-3566	0.121	489.6696	0	66.2022	423.4674	423.4674	NGN-3566	UV-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
427	800	Kamzhing	NGN-3567	1.051	4253.2457	1213.5756	0	3039.6701	1346.6808	NGN-3567A	UV-2
									1692.9893	NGN-3567B	
									1213.5756	NGN-3567C	E
428	801	Kamzhing	NGN-3568	0.165	667.7312	0	0	667.7312	667.7312	NGN-3568	UV-2
429	804	Chhuzhing	NGN-3571	0.276	1116.9323	0	25.9056	1091.0267	1091.0267	NGN-3571	A-2
430	804	Kamzhing	NGN-3574	0.348	1408.3059	0	33.1342	1375.1717	1375.1717	NGN-3574	UV-2
431	805	Kamzhing	NGN-3576	0.331	1339.5093	0	76.8471	1262.6622	1262.6622	NGN-3576	UV-2
432	807	Chhuzhing	NGN-3578	1.120	4532.4787	0	27.863	4504.6157	4504.6157	NGN-3578	A-2
433	810	Kamzhing	NGN-3587	0.257	1040.0420	0	0	1040.042	1040.0420	NGN-3587	UV-2
434	677	Kamzhing	NGN-3589	0.306	1238.3379	160.2198	85.0727	993.0454	993.0454	NGN-3589A	UV-2
									160.2198	NGN-3589B	E
435	811	Chhuzhing	NGN-3590	0.144	582.7473	0	0	582.7473	582.7473	NGN-3590	A-2
436	811	Kamzhing	NGN-3591	0.148	598.9347	0	58.3517	540.5830	540.5830	NGN-3591	UV-2
437	813	Kamzhing	NGN-3593	1.339	5418.7402	0	488.441	4930.2992	4420.4047	NGN-3593A	UV-2
									509.8945	NGN-3593B	
438	817	Chhuzhing	NGN-3598	0.200	809.3712	0	97.1931	712.1781	712.1781	NGN-3598	A-2
439	820	Kamzhing	NGN-3601	0.150	607.0284	215.5718	106.2138	285.2428	NGN-3601A	UV-2	E
									215.5718	NGN-3601B	
440	821	Kamzhing	NGN-3603	0.150	607.0284	433.3464	113.8574	59.8246	59.8246	NGN-3603A	UV-2
									433.3464	NGN-3603B	E
441	822	Kamzhing	NGN-3604	0.150	607.0284	172.8915	99.2617	334.8752	334.8752	NGN-3604A	UV-2
									172.8915	NGN-3604B	E
442	829	Kamzhing	NGN-3611	0.134	542.2787	0	36.9784	505.3003	505.3003	NGN-3611	UV-2
443	830	Kamzhing	NGN-3613	0.102	412.7793	0	11.8539	400.9254	400.9254	NGN-3613	UV-2
444	831	Kamzhing	NGN-3614	0.100	404.6856	0	36.245	368.4406	368.4406	NGN-3614	UV-2

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445	832	Kamzhing	NGN-3615	0.127	513.9507	0	52.5303	461.4204	461.4204	NGN-3615	UV-2
446	833	Kamzhing	NGN-3616	0.149	602.9815	0	97.9375	505.0440	505.0440	NGN-3616	UV-2
447	834	Kamzhing	NGN-3617	0.126	509.9039	0	12.2293	497.6746	497.6746	NGN-3617	UV-2
448	835	Kamzhing	NGN-3618	1.117	4520.3382	229.2853	314.2911	3976.7618	NGN-3618A	UV-2	
									NGN-3618B	E	
449	160	Kamzhing	NGN-3619	0.201	813.4181	0	116.7474	696.6707	696.6707	NGN-3619	UV-2
450	836	Kamzhing	NGN-3620	0.125	505.8570	0	16.7259	489.1311	489.1311	NGN-3620	UV-2
451	837	Kamzhing	NGN-3621	0.113	457.2947	0	23.04	434.2547	434.2547	NGN-3621	UV-2
452	838	Kamzhing	NGN-3623	0.354	1432.5870	0	38.2768	1394.3102	1374.7832	NGN-3623	UV-2
453	849	Kamzhing	NGN-3627	0.296	1197.8694	0	53.3938	1144.4756	1144.4756	NGN-3627	UV-2
454	664	Kamzhing	NGN-3633	0.154	623.2158	0	0	623.2158	623.2158	NGN-3633	UV-2
455	850	Kamzhing	NGN-3636	0.309	1250.4785	0	0.5057	1249.9728	1249.9728	NGN-3636	UV-2
456	855	Chhuzhing	NGN-3643	0.232	938.8706	21.5931	0	938.8706	938.8706	NGN-3643	A-2
457	856	Chhuzhing	NGN-3644	0.242	979.3392	0	0	979.3392	979.3392	NGN-3644	A-2
458	857	Chhuzhing	NGN-3647	0.232	938.8706	0	0	938.8706	938.8706	NGN-3647	A-2
459	858	Chhuzhing	NGN-3648	0.232	938.8706	0	0	938.8706	938.8706	NGN-3648	A-2
460	865	Chhuzhing	NGN-3657	0.210	849.8398	52.3102	0	849.8398		NGN-3657	A-2
461	866	Chhuzhing	NGN-3660	0.101	408.7325	0	0	408.7325	408.7325	NGN-3660	A-2
462	866	Residential Land	NGN-3661	0.099	400.6387	0	3.8395	396.7992	396.7992	NGN-3661	UV-2
463	868	Kamzhing	NGN-3662	0.215	870.0740	169.2551	0	700.8189	NGN-3662A	UV-2	
									100.9104	NGN-3662B	E
									68.3447	NGN-3662C	
464	873	Kamzhing	NGN-3667	0.250	1011.7140	0	40.7811	970.9329	970.9329	NGN-3667	UV-2
465	876	Kamzhing	NGN-3670	0.341	1379.9779	0	170.0323	1209.9456	1209.9456	NGN-3670	UV-2

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466	877	Kamzhing	NGN-3672	0.344	1392.1185	0	153.5608	1238.5577	1238.5577	NGN-3672	UV-2
467	878	Kamzhing	NGN-3674	0.300	1214.0568	0	238.508	975.5488	975.5488	NGN-3674	UV-2
468	880	Chhuzhing	NGN-3677	0.103	416.8262	0	10.7343	406.0919	406.0919	NGN-3677	A-2
469	885	Kamzhing	NGN-3688	0.173	700.1061	0	29.9565	670.1496	670.1496	NGN-3688	UV-2
470	886	Kamzhing	NGN-3689	0.118	477.5290	0	28.4186	449.1104	449.1104	NGN-3689	UV-2
471	887	Chhuzhing	NGN-3690	0.200	809.3712	0	0	809.3712	809.3712	NGN-3690	A-2
472	887	Kamzhing	NGN-3691	0.170	687.9655	0	32.8236	655.1419	655.1419	NGN-3691	UV-2
473	888	Kamzhing	NGN-3692	0.169	683.9187	0	22.8216	661.0971	661.0971	NGN-3692	UV-2
474	889	Chhuzhing	NGN-3693	0.224	906.4957	0	0	906.4957	906.4957	NGN-3693	A-2
475	837	Kamzhing	NGN-3694	0.217	878.1678	0	96.0245	782.1433	782.1433	NGN-3694	UV-2
476	890	Kamzhing	NGN-3695	0.202	817.4649	0	7.2271	810.2378	810.2378	NGN-3695	UV-2
477	891	Kamzhing	NGN-3696	0.275	1112.8854	0	48.203	1064.6824	1064.6824	NGN-3696	UV-2
478	892	Kamzhing	NGN-3697	0.109	441.1073	0	30.7397	410.3676	410.3676	NGN-3697	UV-2
479	893	Kamzhing	NGN-3698	0.232	938.8706	0	72.4202	866.4504	866.4504	NGN-3698	UV-2
480	899	Kamzhing	NGN-3703	0.610	2468.5822	0	106.2415	2362.3407	2362.3407	NGN-3703	UV-2
481	900	Kamzhing	NGN-3704	0.371	1501.3836	0	86.3975	1414.9861	857.5835	NGN-3704A	UV-2
									557.4026	NGN-3704B	
482	695	Chhuzhing	NGN-3706	0.644	2606.1753	0	108.9339	2497.2414	2497.2414	NGN-3706	A-2
483	912	Chhuzhing	NGN-3716	0.636	2573.8004	0	0	2573.8004	2573.8004	NGN-3716	A-2
484	912	Kamzhing	NGN-3720	0.448	1812.9915	0	425.8669	1387.1246	1387.1246	NGN-3720	UV-2
485	913	Chhuzhing	NGN-3723	0.711	2877.3146	0	0	2877.3146	2877.3146	NGN-3723	A-2
486	913	Kamzhing	NGN-3726	0.485	1962.7252	0	206.5585	1756.1667	1756.1667	NGN-3726	UV-2
487	914	Kamzhing	NGN-3729	0.315	1274.7596	54.3392	226.8267	993.5937	993.5937	NGN-3729A	UV-2
									54.3392	NGN-3729B	E

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
488	915	Chhuzhing	NGN-3730	0.776	3140.3603	164.3094	0	3140.3603	3140.3603	NGN-3730	A-2
489	915	Kamzhing	NGN-3733	0.431	1744.1949	0	74.7829	1669.4120	1669.4120	NGN-3733	UV-2
490	916	Kamzhing	NGN-3737	1.000	4046.8560	418.27	426.8105	3201.7755	3201.7755	NGN-3737A	I-1
									418.2700	NGN-3737B	E
491	917	Chhuzhing	NGN-3739	0.613	2480.7227	0	421.4532	2059.2695	1524.7083	NGN-3739A	A-2
									534.5612	NGN-3739B	
492	918	Chhuzhing	NGN-3745	0.152	615.1221	262.1354	16.1138	336.8729	336.8729	NGN-3745	A-2
									262.1354		
493	827	Kamzhing	NGN-3755	0.664	2687.1124	0	0	2687.1124	2687.1124	NGN-3755	UV-2
494	921	Kamzhing	NGN-3756	0.405	1638.9767	0	0	1638.9767	1638.9767	NGN-3756	UV-2
495	451	Chhuzhing	NGN-3757	0.757	3063.4700	0	0	3063.47	3063.4700	NGN-3757	A-2
496	451	Kamzhing	NGN-3760	0.535	2165.0680	0	184.2896	1980.7784	1980.7784	NGN-3760	UV-2
497	926	Kamzhing	NGN-3765	0.441	1784.6635	708.1317	166.009	910.5228	910.5228	NGN-3765A	UV-2
									708.1317	NGN-3765B	E
498	927	Kamzhing	NGN-3766	0.440	1780.6166	776.0383	25.281	979.2973	768.1035	NGN-3766A	UV-2
									211.1938	NGN-3766B	
									776.0383	NGN-3766C	E
499	928	Kamzhing	NGN-3767	0.160	647.4970	0	43.3095	604.1875	604.1875	NGN-3767	UV-2
500	795	Kamzhing	NGN-3770	0.887	3589.5613	100.4859	42.1084	3446.9670	3446.9670	NGN-3770A	UV-2
									100.4859	NGN-3770B	E
501	929	Chhuzhing	NGN-3771	0.100	404.6856	0	8.5907	396.0949	396.0949	NGN-3771	A-2
502	930	Kamzhing	NGN-3772	0.246	995.5266	524.7498	2.3426	468.4342	468.4342	NGN-3772A	UV-2
									524.7498	NGN-3772B	E
503	677	Chhuzhing	NGN-3773	0.151	611.0753	0	33.3402	577.7351	577.7351	NGN-3773	A-2
504	931	Chhuzhing	NGN-3774	0.120	485.6227	0	0	485.6227	485.6227	NGN-3774	A-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
505	931	Kamzhing	NGN-3776	0.207	837.6992	142.7287	13.6783	681.2922	681.2922	NGN-3776A	UV-2
									142.7287	NGN-3776B	E
506	932	Chhuzhing	NGN-3778	0.100	404.6856	0	0	404.6856	404.6856	NGN-3778	A-2
507	933	Chhuzhing	NGN-3779	0.100	404.6856	0	0	404.6856	404.6856	NGN-3779	A-2
508	934	Chhuzhing	NGN-3780	0.100	404.6856	0	0	404.6856	404.6856	NGN-3780	A-2
509	571	Chhuzhing	NGN-3783	0.150	607.0284	0	33.9975	573.0309	573.0309	NGN-3783	A-2
510	936	Chhuzhing	NGN-3784	0.364	1473.0556	0	30.7781	1442.2775	1442.2775	NGN-3784	A-2
511	937	Chhuzhing	NGN-3786	0.166	671.7781	0	57.1617	614.6164	614.6164	NGN-3786	A-2
512	938	Chhuzhing	NGN-3787	0.663	2683.0655	0	106.9866	2576.0789	2576.0789	NGN-3787	A-2
513	939	Kamzhing	NGN-3796	2.041	8259.6331	0	72.9548	8186.6783	8186.6783	NGN-3796	UV-2
514	940	Kamzhing	NGN-3798	1.530	6191.6897	365.747	0	5825.9427	5825.9427	NGN-3798A	UV-2
									158.5284	NGN-3798B	E
									207.2185	NGN-3798C	
515	950	Chhuzhing	NGN-3820	0.168	679.8718	0	0	679.8718	679.8718	NGN-3820	A-2
516	950	Kamzhing	NGN-3823	0.452	1829.1789	293.8605	0	1535.3184	1535.3184	NGN-3823A	UV-2
									293.8605	NGN-3823B	E
517	951	Chhuzhing	NGN-3825	0.329	1331.4156	0	72.3348	1259.0808	1259.0808	NGN-3825	A-2
518	951	Kamzhing	NGN-3826	1.933	7822.5726	428.4063	1.6337	7392.532648	7392.5326	NGN-3826A	UV-2
									428.4063	NGN-3826B	E
519	952	Kamzhing	NGN-3827	0.564	2282.4268	678.15	1.7665	1602.5103	1602.5103	NGN-3827A	UV-2
									678.1500	NGN-3827B	E
520	953	Kamzhing	NGN-3833	0.150	607.0284	0	49.8457	557.1827	557.1827	NGN-3833	UV-2
521	954	Kamzhing	NGN-3837	0.150	607.0284	0	61.9682	545.0602	545.0602	NGN-3837	UV-2
522	955	Kamzhing	NGN-3841	0.150	607.0284	0	10.416	596.6124	596.6124	NGN-3841	UV-2
523	956	Kamzhing	NGN-3845	0.150	607.0284	0	1.9295	605.0989	605.0989	NGN-3845	UV-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
524	957	Chhuzhing	NGN-3848	0.834	3375.0779	209.2277	0	3375.0779	3375.0779	NGN-3848	A-2
525	961	Chhuzhing	NGN-3862	0.908	3674.5452	0	0	3674.5452	3674.5452	NGN-3862	A-2
526	961	Kamzhing	NGN-3864	1.636	6620.6564	0	79.9962	6540.6602	6540.6602	NGN-3864	UV-2
527	968	Chhuzhing	NGN-3877	0.450	1821.0852	0	0	1821.0852		NGN-3877	A-2
528	275	Chhuzhing	NGN-3878	0.202	817.4649	0	0	817.4649	817.4649	NGN-3878	A-2
529	275	Kamzhing	NGN-3883	0.170	687.9655	0	15.5441	672.4214	672.4214	NGN-3883	UV-2
530	966	Chhuzhing	NGN-3884	0.103	416.8262	0	0	416.8262	416.8262	NGN-3884	A-2
531	966	Kamzhing	NGN-3885	0.200	809.3712	0	12.9798	796.3914	796.3914	NGN-3885	UV-2
532	973	Chhuzhing	NGN-3889	0.301	1218.1037	725.2934	0	1218.1037	1218.1037	NGN-3889	A-2
533	973	Kamzhing	NGN-3892	0.424	1715.8669	0	9.2389	1706.6280	1706.6280	NGN-3892	UV-2
534	974	Chhuzhing	NGN-3894	0.311	1258.5722	1.634	0	1258.5722	1258.5722	NGN-3894	A-2
535	974	Kamzhing	NGN-3897	0.574	2322.8953	0	20.5047	2302.3906	2302.3906	NGN-3897	UV-2
536	975	Chhuzhing	NGN-3898	0.106	428.9667	0	0	428.9667	428.9667	NGN-3898	A-2
537	976	Kamzhing	NGN-3901	0.508	2055.8028	71.2468	0	1984.5560	1984.5560	NGN-3901A	UV-2
									71.2468	NGN-3901B	E
538	977	Chhuzhing	NGN-3903	0.100	404.6856	0	0	404.6856	404.6856	NGN-3903	A-2
539	347	Residential Land	NGN-3908	0.205	829.6055	0	85.7406	743.8649	743.8649	NGN-3908	UV-2
540	981	Kamzhing	NGN-3911	0.211	853.8866	0	31.4289	822.4577	822.4577	NGN-3911	UV-2
541	982	Kamzhing	NGN-3912	0.170	687.9655	0	26.5936	661.3719	661.3719	NGN-3912	UV-2
542	983	Kamzhing	NGN-3913	0.206	833.6523	182.1006	13.7078	637.8439	637.8439	NGN-3913A	UV-2
									182.1006	NGN-3913B	E
543	984	Kamzhing	NGN-3914	0.235	951.0112	0	103.7596	847.2516	847.2516	NGN-3914	UV-2
544	985	Kamzhing	NGN-3915	0.407	1647.0704	0	401.788	1245.2824	1245.2824	NGN-3915	UV-2
545	986	Kamzhing	NGN-3916	0.204	825.5586	0	30.7282	794.8304	794.8304	NGN-3916	UV-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
546	715	Kamzhing	NGN-3917	0.402	1626.8361	452.5516	53.4745	1120.8100	1120.8100	NGN-3917A	UV-2
									452.5516	NGN-3917B	E
547	762	Kamzhing	NGN-3923	0.155	627.2627	0	14.8016	612.4611	612.4611	NGN-3923	UV-2
548	1001	Chhuzhing	NGN-3943	0.257	1040.0420	0	0	1040.042	1040.0420	NGN-3943	A-2
549	1001	Kamzhing	NGN-3944	0.449	1817.0383	0	38.7148	1778.3235	1778.3235	NGN-3944	UV-2
550	1002	Chhuzhing	NGN-3950	0.151	611.0753	0	0	611.0753	611.0753	NGN-3950	A-2
551	1002	Kamzhing	NGN-3951	0.114	461.3416	0	22.6302	438.7114	438.7114	NGN-3951	UV-2
552	1003	Chhuzhing	NGN-3953	0.151	611.0753	0	0	611.0753	611.0753	NGN-3953	A-2
553	1003	Kamzhing	NGN-3954	0.116	469.4353	0	22.8218	446.6135	446.6135	NGN-3954	UV-2
554	1008	Residential Land	NGN-3960	0.180	728.4341	0	39.2835	689.1506	689.1506	NGN-3960	UV-1
555	505	Kamzhing	NGN-3987	0.202	817.4649	0	19.6291	797.8358	797.8358	NGN-3987	UV-2
556	343	Kamzhing	NGN-3988	0.206	833.6523	0	21.6916	811.9607	811.9607	NGN-3988	UV-2
557	1018	Kamzhing	NGN-3989	0.206	833.6523	0	19.861	813.7913	813.7913	NGN-3989	UV-2
558	160	Kamzhing	NGN-3990	0.202	817.4649	0	15.2412	802.2237	802.2237	NGN-3990	UV-2
559	1020	Kamzhing	NGN-3991	0.451	1825.1321	57.0857	8.7615	1816.3706	1759.2849	NGN-3991A	UV-2
									57.0857	NGN-3991B	E
560	1020	Kamzhing	NGN-3992	1.124	4548.6661	0	0	4548.6661	4548.6661	NGN-3992	UV-2
561	1022	Kamzhing	NGN-3993	0.214	866.0272	176.1009	23.1636	842.864	666.763	NGN-3993A	UV-2
									176.1009	NGN-3993B	E
562	1021	Kamzhing	NGN-3994	1.136	4597.2284	0	0	4597.2284	4597.2284	NGN-3994	UV-2
563	1023	Chhuzhing	NGN-3995	0.110	445.1542	234.9343	0	445.1542	445.1542	NGN-3995	A-2
564	1023	Kamzhing	NGN-3996	0.216	874.1209	199.8771	25.2711	848.849	648.9727	NGN-3996A	UV-2
									199.8771	NGN-3996B	E

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565	1025	Kamzhing	NGN-3997	0.311	1258.5722	195.4312	27.9854	1230.5868	1035.1556	NGN-3997A	UV-2
									195.4312	NGN-3997B	E
566	1024	Chhuzhing	NGN-3998	0.122	493.7164	294.6382	0	493.7164	493.7164	NGN-3998	A-2
567	1024	Kamzhing	NGN-3999	0.401	1622.7893	430.2393	23.4899	1169.0601	NGN-3999A	UV-2	
									430.2393	NGN-3999B	E
568	1029	Kamzhing	NGN-4004	0.165	667.7312	0	34.0952	633.6360	633.6360	NGN-4004	UV-2
569	1019	Kamzhing	NGN-4005	0.381	1541.8521	0	31.3569	1510.4952	1510.4952	NGN-4005	UV-2
570	1030	Kamzhing	NGN-4006	0.160	647.4970	0	6.8797	640.6173	640.6173	NGN-4006	UV-2
571	1031	Kamzhing	NGN-4010	0.220	890.3083	0	12.3554	877.9529	877.9529	NGN-4010	UV-2
572	1032	Chhuzhing	NGN-4011	0.200	809.3712	0	0	809.3712	809.3712	NGN-4011	A-2
573	1032	Kamzhing	NGN-4012	0.220	890.3083	0	32.9309	857.3774	857.3774	NGN-4012	UV-2
574	162	Chhuzhing	NGN-4013	0.200	809.3712	0	67.4368	741.9344	741.9344	NGN-4013	A-2
575	162	Kamzhing	NGN-4018	0.131	530.1381	0	4.7833	525.3548	525.3548	NGN-4018	UV-2
576	782	Kamzhing	NGN-4019	0.100	404.6856	0	0	404.6856	404.6856	NGN-4019	UV-1
577	1035	Chhuzhing	NGN-4024	0.120	485.6227	0	0	485.6227	485.6227	NGN-4024	A-2
578	1036	Kamzhing	NGN-4025	0.163	659.6375	56.4417	102.7045	500.4913	NGN-4025	UV-2	
									56.4417	NGN-4025B	E
579	1037	Chhuzhing	NGN-4026	0.120	485.6227	0	0	485.6227	485.6227	NGN-4026	A-2
580	1039	Chhuzhing	NGN-4030	0.804	3253.6722	0	250.2719	3003.4003	3003.4003	NGN-4030	A-2
581	1039	Kamzhing	NGN-4032	0.598	2420.0199	214.3349	254.9068	1950.7782	NGN-4032A	UV-2	
									214.3349	NGN-4032B	E
582	1007	Kamzhing	NGN-4035	1.379	5580.6144	NA	0	5580.6144	5580.6144	NGN-4035	C-2
583	1044	Chhuzhing	NGN-4042	0.750	3035.1420	85.7338	0	3035.142	3035.142	NGN-4042	A-2
584	1045	Kamzhing	NGN-4047	0.350	1416.3996	0	7.4683	1408.9313	1408.9313	NGN-4047	UV-2
585	1046	Chhuzhing	NGN-4048	0.270	1092.6511	629.242	0	1092.6511	1092.6511	NGN-4048	A-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
586	1009	Kamzhing	NGN-4076	0.277	1120.9791	0	52.2988	1068.6803	1068.6803	NGN-4076	UV-2
587	867	Kamzhing	NGN-4080	0.351	1420.4465	0	150.8315	1269.6150	1269.6150	NGN-4080	UV-2
588	1010	Kamzhing	NGN-4084	0.336	1359.7436	0	153.1333	1206.6103	1206.6103	NGN-4084	UV-2
589	1012	Chhuzhing	NGN-4089	0.281	1137.1665	0	0	1137.1665	1137.1665	NGN-4089	A-2
590	267	Chhuzhing	NGN-41	0.534	2161.0211	0	0	2161.0211	2161.0211	NGN-41	A-2
591	158	Kamzhing	NGN-4100	0.262	1060.2763	0	87.1993	973.0770	973.0770	NGN-4100	UV-2
592	1050	Kamzhing	NGN-4101	0.153	619.1690	0	7.0143	612.1547	612.1547	NGN-4101	UV-2
593	1051	Chhuzhing	NGN-4103	0.684	2768.0495	0	0	2768.0495	2768.0495	NGN-4103	A-2
594	1051	Kamzhing	NGN-4104	0.129	522.0444	0	43.1426	478.9018	478.9018	NGN-4104	UV-2
595	1052	Chhuzhing	NGN-4105	0.898	3634.0767	0	0	3634.0767	3634.0767	NGN-4105	A-2
596	1052	Kamzhing	NGN-4106	1.016	4111.6057	721.1552	4.0666	3386.3839	3386.3839	NGN-4106A	UV-2
									721.1552	NGN-4106B	E
597	1070	Chhuzhing	NGN-4126	0.336	1359.7436	0	0	1359.7436	1359.7436	NGN-4126	A-2
598	1070	Kamzhing	NGN-4127	0.839	3395.3122	48.4691	48.0114	3298.8317	3298.8317	NGN-4127A	UV-2
									48.4691	NGN-4127B	E
599	1071	Chhuzhing	NGN-4129	0.281	1137.1665	0	0	1137.1665	1137.1665	NGN-4129	A-2
600	1071	Kamzhing	NGN-4130	0.492	1991.0532	0	31.0186	1960.0346	1960.0346	NGN-4130	UV-2
601	1072	Chhuzhing	NGN-4132	0.190	768.9026	0	0	768.9026	768.9026	NGN-4132	A-2
602	1072	Kamzhing	NGN-4133	0.619	2505.0039	0	191.2637	2313.7402	2313.7402	NGN-4133	UV-2
603	1073	Chhuzhing	NGN-4135	0.465	1881.7880	0	0	1881.788	1881.7880	NGN-4135	A-2
604	1073	Kamzhing	NGN-4136	0.846	3423.6402	0	145.5044	3278.1358	3278.1358	NGN-4136	UV-2
605	1074	Chhuzhing	NGN-4138	0.226	914.5895	0	0	914.5895	914.5895	NGN-4138	A-2
606	1074	Kamzhing	NGN-4139	0.755	3055.3763	0	184.3889	2870.9874	2870.9874	NGN-4139	UV-2
607	1075	Chhuzhing	NGN-4141	0.309	1250.4785	0	0	1250.4785	1250.4785	NGN-4141	A-2

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608	1075	Kamzhing	NGN-4142	0.591	2391.6919	167.1541	0	2145.0711	2145.0711	NGN-4142A	UV-2
									79.4667	NGN-4142B	ND
									167.1541	NGN-4142C	E
609	1077	Chhuzhing	NGN-4144	0.444	1796.8041	0	230.4286	1566.3755	1114.7832	NGN-4144A	A-2
									451.5923	NGN-4144B	
610	1077	Kamzhing	NGN-4145	0.343	1388.0716	0	0	1388.0716	1388.0716	NGN-4145	UV-2
611	1083	Kamzhing	NGN-4156	0.529	2140.7868	0	239.9163	1900.8705	1900.8705	NGN-4156	UV-2
612	1088	Oranges	NGN-4164	2.294	9285.3028	0	0	9285.3028	9285.3028	NGN-4164	C-2
613	695	Kamzhing	NGN-4165	0.553	2237.9114	0	132.3845	2105.5269	2105.5269	NGN-4165	UV-2
614	1090	Kamzhing	NGN-4168	1.065	4309.9016	0	0	4309.9016	4309.9016	NGN-4168	UV-2
615	1091	Kamzhing	NGN-4170	1.125	4552.7130	0	327.1771	4225.5359	4225.5359	NGN-4170	UV-2
616	780	Kamzhing	NGN-4173	0.203	821.5118	0	101.7561	719.7557	719.7557	NGN-4173	UV-2
617	774	Residential Land	NGN-4175	0.183	740.5746	0	6.242	734.3326	734.3326	NGN-4175	UV-2
618	1094	Chhuzhing	NGN-4176	0.285	1153.3540	213.4322	0	939.9218	939.9218	NGN-4176A	A-2
									213.4322	NGN-4176B	
619	1094	Kamzhing	NGN-4177	0.178	720.3404	493.2707	47.0541	180.0156	180.0156	NGN-4177A	UV-2
									493.2707	NGN-4177B	E
620	993	Chhuzhing	NGN-4178	0.406	1643.0235	566.2031	0	1076.8204	1076.8204	NGN-4178	A-2
									566.2031	NGN-4178	
621	993	Kamzhing	NGN-4180	0.198	801.2775	327.4638	10.3202	463.4935	463.4935	NGN-4180A	UV-2
									327.4638	NGN-4180B	E
622	1021	Kamzhing	NGN-42	0.540	2185.3022	0	38.7474	2146.5548	2146.5548	NGN-42	UV-2
623	112	Residential Land	NGN-4225	0.402	1626.8361	0	131.3979	1495.4382	1495.4382	NGN-4225	UV-2

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624	614	Residential Land	NGN-4226	0.410	1659.2110	0	35.2775	1623.9335	1623.9335	NGN-4226	UV-2
625	802	Residential Land	NGN-4227	0.374	1513.5241	0	81.189	1432.3351	1432.3351	NGN-4227	UV-2
626	324	Kamzhing	NGN-43	0.150	607.0284	0	10.4462	596.5822	596.5822	NGN-43	UV-2
627	1021	Kamzhing	NGN-4331	0.398	1610.6487	0	13.1496	1597.4991	1597.4991	NGN-4331	UV-2
628	153	Residential Land	NGN-4332	0.256	1035.9951	0	0	1035.9951	1035.9951	NGN-4332	UV-2
629	753	Residential Land	NGN-4333	0.227	918.6363	0	70.202	848.4343	848.4343	NGN-4333	UV-2
630	753	Kamzhing	NGN-4334	0.348	1408.3059	0	0	1408.3059	1408.3059	NGN-4334	UV-2
631	297	Residential Land	NGN-4335	0.332	1343.5562	0	11.7866	1331.7696	1331.7696	NGN-4335	UV-2
632	827	Residential Land	NGN-4336	0.266	1076.4637	0	0	1076.4637	1076.4637	NGN-4336	UV-2
633	296	Kamzhing	NGN-4337	0.454	1837.2726	0	1.5921	1835.6805	1835.6805	NGN-4337	UV-2
634	204	Kamzhing	NGN-4338	0.269	1088.6043	0	9.4472	1079.1571	1079.1571	NGN-4338	UV-2
635	800	Kamzhing	NGN-4339	0.491	1987.0063	361.6147	0.2243	1625.3916	1323.9267	NGN-4339A	UV-2
									301.4649	NGN-4339B	ND
									361.6147	NGN-4339C	E
636	326	Residential Land	NGN-4340	0.211	853.8866	0	0	853.8866	853.8866	NGN-4340	UV-2
637	208	Kamzhing	NGN-4341	0.292	1181.6820	0	135.2928	1046.3892	1046.3892	NGN-4341	UV-2
638	208	Kamzhing	NGN-4342	0.300	1214.0568	0	140.459	1073.5978	1073.5978	NGN-4342	UV-2
639	238	Residential Land	NGN-4343	0.107	433.0136	0	82.8793	350.1343	350.1343	NGN-4343	UV-2
640	261	Kamzhing	NGN-4344	0.887	3589.5613	0	58.209	3531.3523	3531.3523	NGN-4344	UV-2
641	295	Kamzhing	NGN-4345	0.918	3715.0138	0	402.4542	3312.5596	3312.5596	NGN-4345	UV-2

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Sonamthang Action Area Plan

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
642	288	Kamzhing	NGN-4346	0.685	2772.0964	735.424	112.2708	1924.4016	1591.4313	NGN-4346A	UV-2
									332.9703	NGN-4346B	
									735.4240	NGN-4346C	E
643	1045	Residential Land	NGN-4347	0.217	878.1678	0	21.4553	856.7125	856.7125	NGN-4347	UV-2
644	795	Residential Land	NGN-4348	0.131	530.1381	0	0	530.1381	530.1381	NGN-4348	UV-2
645	285	Residential Land	NGN-4349	0.201	813.4181	0	131.1678	682.2503	682.2503	NGN-4349	UV-2
646	286	Residential Land	NGN-4350	0.139	562.5130	16.7364	0	545.7766	545.7766	NGN-4350A	UV-2
									16.7364	NGN-4350B	E
647	987	Residential Land	NGN-4351	0.273	1104.7917	0	3.4543	1101.3374	1101.3374	NGN-4351	UV-2
648	46	Residential Land	NGN-4352	0.202	817.4649	0	46.1205	771.3444	771.3444	NGN-4352	UV-2
649	1072	Residential Land	NGN-4353	0.327	1323.3219	0	51.1067	1272.2152	1272.2152	NGN-4353	UV-2
650	69	Chhuzhing	NGN-4354	0.598	2420.0199	0	0	2420.0199	2420.0199	NGN-4354	A-2
651	889	Kamzhing	NGN-4355	1.809	7320.7625	1834.0692	1057.1092	4429.5841	3754.1813	NGN-4355A	UV-2
									675.4028	NGN-4355B	
									1834.0692	NGN-4355C	E
652	764	Chhuzhing	NGN-44	0.375	1517.5710	0	98.6724	1418.8986	1418.8986	NGN-44	A-2
653	1114	Kamzhing	NGN-4465	0.300	1214.0568	0	0	1214.0568	1214.0568	NGN-4465	UV-2
654	248	Chhuzhing	NGN-4533	0.102	412.7793	0	0	412.7793	412.7793	NGN-4533	A-2
655	520	Residential Land	NGN-4534	0.310	1254.5254	0	0	1254.5254	1254.5254	NGN-4534	UV-1
656	786	Chhuzhing	NGN-4535	0.106	428.9667	0	0	428.9667	428.9667	NGN-4535	A-2
657	451	Residential Land	NGN-4536	0.175	708.1998	0	105.7486	602.4512	602.4512	NGN-4536	UV-1

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Sonamthang Action Area Plan

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
658	240	Chhuzhing	NGN-4537	0.470	1902.0223	1254.6776	0	1902.0223	1902.0223	NGN-4537	A-2
659	240	Residential Land	NGN-4538	0.299	1210.0099	320.2828	3.7644	885.9627	885.9627	NGN-4538A	UV-2
									320.2828	NGN-4538B	E
660	938	Residential Land	NGN-4539	0.194	785.0901	0	0	785.0901	785.0901	NGN-4539	UV-2
661	813	Residential Land	NGN-4542	0.383	1549.9458	0	233.8952	1316.0506	1316.0506	NGN-4542	UV-2
662	813	Chhuzhing	NGN-4543	0.465	1881.7880	111.7	0	1881.788	1881.7880	NGN-4543	A-2
663	107	Kamzhing	NGN-4544	0.209	845.7929	0	21.5515	824.2414	824.2414	NGN-4544	UV-2
664	578	Residential Land	NGN-4545	0.361	1460.9150	0	0	1460.9150	1460.9150	NGN-4545	UV-2
665	784	Kamzhing	NGN-4546	1.101	4455.5885	0	196.3324	4259.2561	2442.0225	NGN-4546A	UV-2
									1817.2336	NGN-4546B	
666	1115	Chhuzhing	NGN-4575	0.526	2128.6463	0	146.4148	1982.2315	1982.2315	NGN-4575	I-1
667	795	Kamzhing	NGN-4577	0.131	530.1381	48.3932	36.922	444.8229	444.8229	NGN-4577A	UV-2
									48.3932	NGN-4577B	E
668	865	Kamzhing	NGN-4578	0.107	433.0136	0	101.9765	331.0371	331.0371	NGN-4578	UV-2
669	428	Kamzhing	NGN-4579	0.230	930.7769	32.7084	326.9184	571.1501	571.1501	NGN-4579A	UV-2
									32.7084	NGN-4579B	E
670	879	Chhuzhing	NGN-4589	0.112	453.2479	0	0	453.2479	453.2479	NGN-4589	A-2
671	299	Chhuzhing	NGN-46	0.700	2832.7992	0	40.6024	2792.1968	2792.1968	NGN-46	A-2
672	920	Kamzhing	NGN-4612	0.531	2148.8805	378.2477	0	959.8251	959.8251	NGN-4612A	UV-2
									378.2477	NGN-4612B	E
									810.8077	NGN-4612C	ND
673	570	Residential Land	NGN-4613	0.240	971.2454	0	93.8454	877.4000	877.4000	NGN-4613	UV-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
674	968	Residential Land	NGN-4614	0.130	526.0913	0	0	526.0913	526.0913	NGN-4614	UV-2
675	363	Residential Land	NGN-4615	0.342	1384.0248	0	115.0663	1268.9585	1268.9585	NGN-4615	UV-2
676	363	Kamzhing	NGN-4616	0.415	1679.4452	0	63.4112	1616.0340	1616.0340	NGN-4616	UV-2
677	278	Residential Land	NGN-4617	0.230	930.7769	0	49.0844	881.6925	881.6925	NGN-4617	UV-2
678	776	Residential Land	NGN-4618	0.154	623.2158	0	6.1649	617.0509	617.0509	NGN-4618	UV-2
679	275	Residential Land	NGN-4619	0.240	971.2454	0	73.0304	898.2150	898.2150	NGN-4619	UV-1
680	247	Residential Land	NGN-4620	0.130	526.0913	0	0	526.0913	526.0913	NGN-4620	UV-1
681	242	Residential Land	NGN-4621	0.350	1416.3996	0	119.9489	1296.4507	1296.4507	NGN-4621	UV-2
682	242	Kamzhing	NGN-4622	1.090	4411.0730	0	58.0446	4353.0284	4353.0284	NGN-4622	UV-2
683	263	Residential Land	NGN-4623	0.272	1100.7448	0	20.0458	1080.6990	1080.6990	NGN-4623	UV-2
684	873	Residential Land	NGN-4624	0.260	1052.1826	0	12.8178	1039.3648	1039.3648	NGN-4624	UV-2
685	301	Kamzhing	NGN-4625	0.266	1076.4637	81.2019	25.0922	970.1696	970.1696	NGN-4625A	UV-2
									81.2019	NGN-4625B	E
686	210	Chhuzhing	NGN-4626	0.621	2513.0976	709.6764	208.2567	2304.8409	2304.8409	NGN-4626	A-2
687	941	Kamzhing	NGN-4627	0.960	3884.9818	867.4034	283.8051	2733.7733	2733.7733	NGN-4627A	UV-2
									867.4034	NGN-4627B	E
688	265	Kamzhing	NGN-4628	0.350	1416.3996	0	0	1416.3996	1416.3996	NGN-4628	UV-2
689	790	Residential Land	NGN-4629	0.283	1145.2602	0	51.7126	1093.5476	1093.5476	NGN-4629	UV-2
690	234	Chhuzhing	NGN-4630	0.490	1982.9594	0	153.7773	1829.1821	1829.1821	NGN-4630	A-2
691	1148	Kamzhing	NGN-4631	0.290	1173.5882	0	0	1173.5882	1173.5882	NGN-4631	UV-2

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Sonamthang Action Area Plan

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
692	251	Kamzhing	NGN-4632	1.318	5333.7562	0	194.4401	5139.3161	5139.3161	NGN-4632	ND
693	262	Residential Land	NGN-4633	0.431	1744.1949	0	97.9263	1646.2686	1646.2686	NGN-4633	UV-2
694	40	Kamzhing	NGN-4634	0.204	825.5586	0	104.8927	720.6659	720.6659	NGN-4634	UV-2
695	224	Kamzhing	NGN-4635	0.720	2913.7363	69.426	133.549	2710.7613	2710.7613	NGN-4635A	UV-2
									69.4260	NGN-4635B	E
696	214	Residential Land	NGN-4636	0.286	1157.4008	0	45.2088	1112.1920		NGN-4636	UV-2
697	209	Kamzhing	NGN-4637	2.233	9036.6294	0	449.6127	8587.0167	8587.0167	NGN-4637	UV-2
698	278	Kamzhing	NGN-4638	0.133	538.2318	356.0449	90.0329	92.1540	92.1540	NGN-4638A	UV-2
									356.0449	NGN-4638B	E
699	637	Kamzhing	NGN-4695	0.208	841.7460	0	0	841.746	841.7460	NGN-4695	UV-2
700	879	Residential Land	NGN-4697	0.100	404.6856	0	1.184	403.5016	403.5016	NGN-4697	UV-2
701	221	Kamzhing	NGN-4779	0.250	1011.7140	0	44.5116	967.2024	967.2024	NGN-4779	UV-2
702	247	Kamzhing	NGN-4784	0.298	1205.9631	0	8.9426	1197.0205	1076.1753	NGN-4784A	UV-2
									120.8452	NGN-4784B	ND
703	1137	Kamzhing	NGN-4942	0.150	607.0284	0	26.3514	580.6770	580.6770	NGN-4942	UV-2
704	960	Chhuzhing	NGN-4943	0.160	647.4970	0	0	647.497	647.497	NGN-4943	A-2
705	959	Chhuzhing	NGN-4944	0.160	647.4970	0	0	647.497	647.497	NGN-4944	A-2
706	964	Chhuzhing	NGN-4945	0.160	647.4970	0	0	647.497	647.497	NGN-4945	A-2
707	635	Chhuzhing	NGN-4946	0.160	647.4970	0	0	647.497	647.497	NGN-4946	A-2
708	963	Chhuzhing	NGN-4947	0.160	647.4970	0	0	647.497	647.4970	NGN-4947	A-2
709	1138	Kamzhing	NGN-4949	0.150	607.0284	0	62.5323	544.4961		NGN-4949	UV-2
710	1142	Kamzhing	NGN-4963	0.150	607.0284	0	79.2419	527.7865		NGN-4963	UV-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
711	1145	Kamzhing	NGN-4965	0.400	1618.7424	118.7722	29.8816	1470.0886	1470.0886	NGN-4965A	UV-2
									118.7722	NGN-4965B	E
712	1147	Chhuzhing	NGN-4966	1.000	4046.8560	0	355.962	3690.894		NGN-4966	A-2
713	786	Kamzhing	NGN-4985	0.308	1246.4316	0	34.3379	1212.0937	1212.0937	NGN-4985	UV-2
714	1157	Kamzhing	NGN-4986	0.150	607.0284	0	26.299	580.7294	580.7294	NGN-4986	UV-2
715	1158	Kamzhing	NGN-4987	0.150	607.0284	100.1888	73.4605	433.3791	NGN-4987A	UV-2	
									100.1888	NGN-4987B	E
716	118	Kamzhing	NGN-4990	0.250	1011.7140	0	0	1011.714	1011.7140	NGN-4990	UV-2
717	993	Kamzhing	NGN-4991	0.300	1214.0568	0	0	1214.0568	1214.0568	NGN-4991	UV-2
718	733	Kamzhing	NGN-4993	0.150	607.0284	0	19.5512	587.4772	587.4772	NGN-4993	UV-2
719	1044	Kamzhing	NGN-4994	0.380	1537.8053	52.886	20.1343	1464.7850	760.9852	NGN-4994A	UV-2
									703.7998	NGN-4994B	
									52.8860	NGN-4994C	E
720	1166	Kamzhing	NGN-5002	0.500	2023.4280	1074.7449	0	948.6831	NGN-5002A	UV-2	
									1074.7449	NGN-5002B	E
721	1170	Kamzhing	NGN-5010	0.200	809.3712	0	49.4612	759.9100	759.9100	NGN-5010	UV-2
722	1171	Kamzhing	NGN-5011	0.260	1052.1826	0	75.6941	976.4885	976.4885	NGN-5011	UV-2
723	660	Chhuzhing	NGN-5013	0.300	1214.0568	0	0	1214.0568	1214.0568	NGN-5013	A-2
724	215	Residential Land	NGN-5019	0.370	1497.3367	127.1551	22.4143	1347.7673	NGN-5019A	UV-2	
									127.1551	NGN-5019B	
725	1176	Kamzhing	NGN-5020	0.200	809.3712	0	0	809.3712	809.3712	NGN-5020	UV-2
726	1177	Kamzhing	NGN-5021	0.250	1011.7140	0	0	1011.714	1011.7140	NGN-5021	UV-2
727	160	Kamzhing	NGN-5024	0.150	607.0284	0	0	607.0284	607.0284	NGN-5024	UV-2

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SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
728	1186	Kamzhing	NGN-5031	0.500	2023.4280	1074.1854	13.3328	935.9098	770.6862	NGN-5031A	UV-2
									165.2236	NGN-5031B	
									1074.1854	NGN-5031C	E
729	1236	Kamzhing	NGN-5089	0.130	526.0913	0	37.5004	488.5909	488.5909	NGN-5089	UV-2
730	1237	Kamzhing	NGN-5090	0.130	526.0913	0	38.6473	487.4440	487.4440	NGN-5090	UV-2
731	1239	Kamzhing	NGN-5094	0.154	623.2158	0	0	623.2158	623.2158	NGN-5094	UV-2
732	982	Kamzhing	NGN-5102	0.150	607.0284	0	52.7712	554.2572	554.2572	NGN-5102	UV-2
733	1003	Residential Land	NGN-5106	0.150	607.0284	68.4962	33.842	504.6902	504.6902	NGN-5106A	UV-2
									68.4962	NGN-5106B	E
734	1254	Kamzhing	NGN-5114	0.100	404.6856	0	0	404.6856	404.6856	NGN-5114	C-2
735	371	Kamzhing	NGN-5115	0.100	404.6856	0	0	404.6856	404.6856	NGN-5115	UV-2
736	1257	Kamzhing	NGN-5119	0.150	607.0284	0	109.5873	497.4411	497.4411	NGN-5119	UV-2
737	1259	Kamzhing	NGN-5121	0.140	566.5598	0	63.1102	503.4496	503.4496	NGN-5121	UV-2
738	1260	Kamzhing	NGN-5122	0.150	607.0284	0	0	607.0284	607.0284	NGN-5122	UV-2
739	1261	Kamzhing	NGN-5123	1.000	4046.8560	1909.8417	0	2137.0143	1719.8312	NGN-5123A	UV-2
									417.1831	NGN-5123B	
									1909.8417	NGN-5123C	E
740	1264	Kamzhing	NGN-5131	0.150	607.0284	0	0	607.0284	607.0284	NGN-5131	UV-2
741	907	Kamzhing	NGN-5144	0.100	404.6856	0	172.1572	232.5284	232.5284	NGN-5144	UV-2
742	910	Kamzhing	NGN-5145	0.100	404.6856	0	177.7561	226.9295	226.9295	NGN-5145	UV-2
743	1265	Kamzhing	NGN-5146	0.100	404.6856	0	115.4886	289.1970	289.1970	NGN-5146	UV-2
744	905	Kamzhing	NGN-5147	0.100	404.6856	61.7978	4.4396	338.4482	338.4482	NGN-5147A	UV-2
									61.7978	NGN-5147B	E
745	904	Kamzhing	NGN-5148	0.100	404.6856	0	4.6404	400.0452	400.0452	NGN-5148	UV-2

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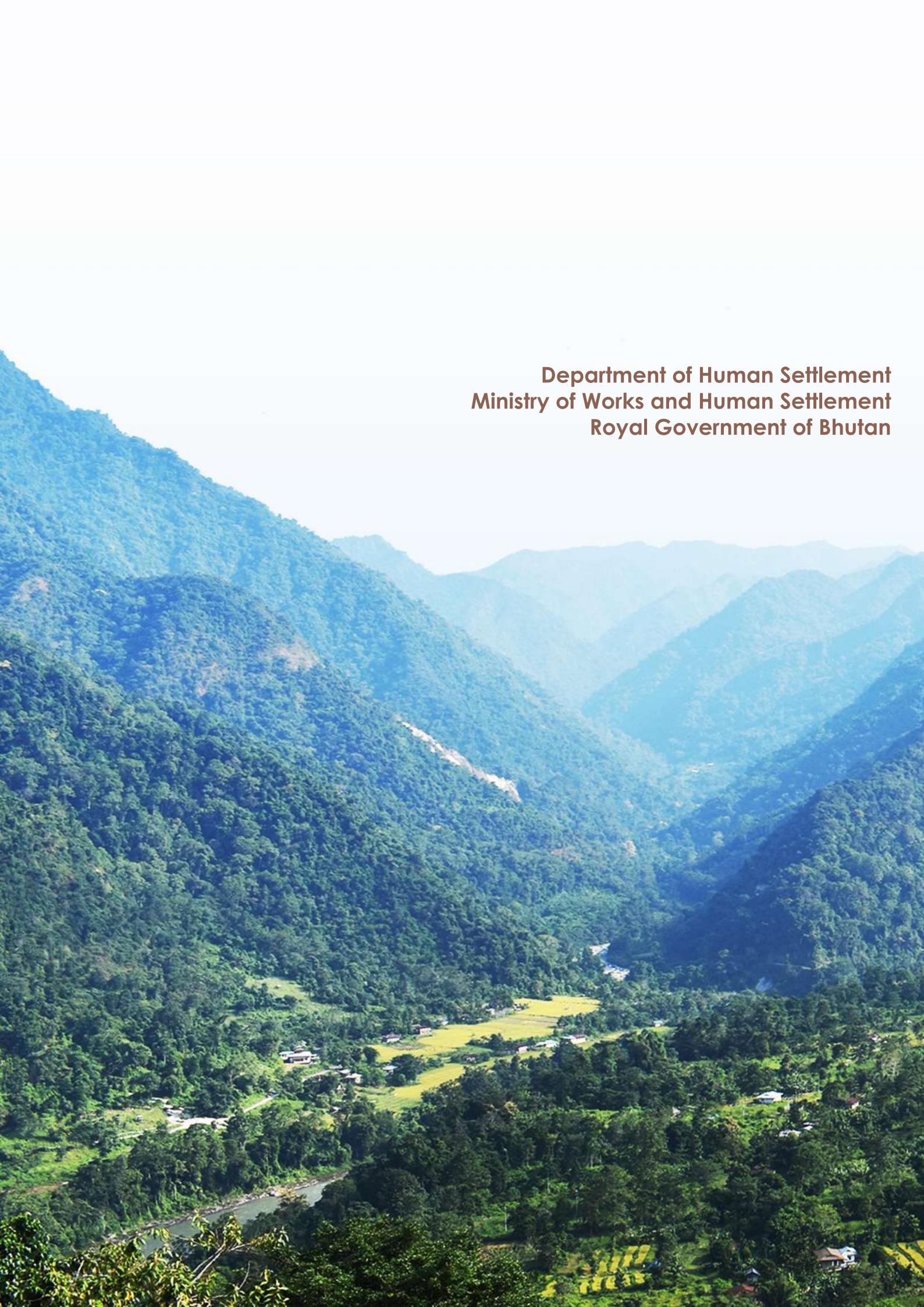
SI#	Thram	Land Type	Plot ID	Plot Area (Acre)	Plot Area (Sqm)	Area Under E1 (Sqm)	Total Area Under Contribution (Sqm)	Area Left (Sqm)	New Plot Area (Sqm)	New Plot ID	Precinct
746	906	Kamzhing	NGN-5149	0.100	404.6856	143.7431	0	260.9425	260.9425	NGN-5149A	UV-2
									143.7431	NGN-5149B	E
747	909	Kamzhing	NGN-5150	0.150	607.0284	0	32.4335	574.5949	574.5949	NGN-5150	UV-2
748	1245	Kamzhing	NGN-5153	0.150	607.0284	0	6.4344	600.5940	600.5940	NGN-5153	UV-2
749	1269	Kamzhing	NGN-5156	0.148	598.9347	0	0	598.9347	598.9347	NGN-5156	UV-2
750	1270	Kamzhing	NGN-5157	0.140	566.5598	0	0	566.5598	566.5598	NGN-5157	UV-2
751	1118	Kamzhing	NGN-4751	0.150	607.0284	0	0	607.0284	607.0284	NGN-4751	UV-2
752	1089	Oranges	NGN-4166	0.540	2185.3022	0	38.495	2146.8072	2146.8072	NGN-4166	UV-2
753	282	Kamzhing	NGN-4765	0.630	2549.5193	0	105.8805	2443.6388	2443.6388	NGN-4765	UV-2
754	116	Kamzhing	NGN-2347	0.930	3763.5761	0	0	3763.5761	3763.5761	NGN-2347	UV-2
755	116	Chhuzhing	NGN-2348	0.510	2063.8966	0	239.1952	1824.7014	1824.7014	NGN-2348	A-2
756	1304	Kamzhing	NGN-5214	0.400	1618.7424	0	40.6773	1578.0651	1578.0651	NGN-5214	UV-2
757	1286	Chhuzhing	NGN-5167	0.880	3561.2333	0	268.6783	3292.5550	3292.5550	NGN-5167	A-2
758	1315	Kamzhing	NGN-5230	0.150	607.0284	0	0	607.0284	607.0284	NGN-5230	UV-2

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**Department of Human Settlement
Ministry of Works and Human Settlement
Royal Government of Bhutan**