

Pasakha Industrial Estate LAP Review

(པ་ས་ཁ་ཁ་ཐོག་གི་རྒྱུ་འབྲེལ་

སྒྲིག་སྒྲུབ་ལ་འཕྲོད་ཆུང་གི་ཞིབ་འཇུག་ལྟུང་འཕྲོད་ལོ་ལྟོས།)

Draft Stage Public Consultation

22nd January, 2024



Urban Planning Division
Phuentsholing Thromde

Presentation Outline (Content)

LAP Overview

LAP Overview &
objective of the LAP
Review

01

Existing Scenario

Existing ground
conditions, development
status

02

Draft LAP 2015

PSP & Draft LAP

03

04 Analysis & Findings

Geotechnical Studies &
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05 Proposals

Infrastructure & Amenities

06 Land Mobilization: Land Pooling

Land Pooling requirement
& Calculations



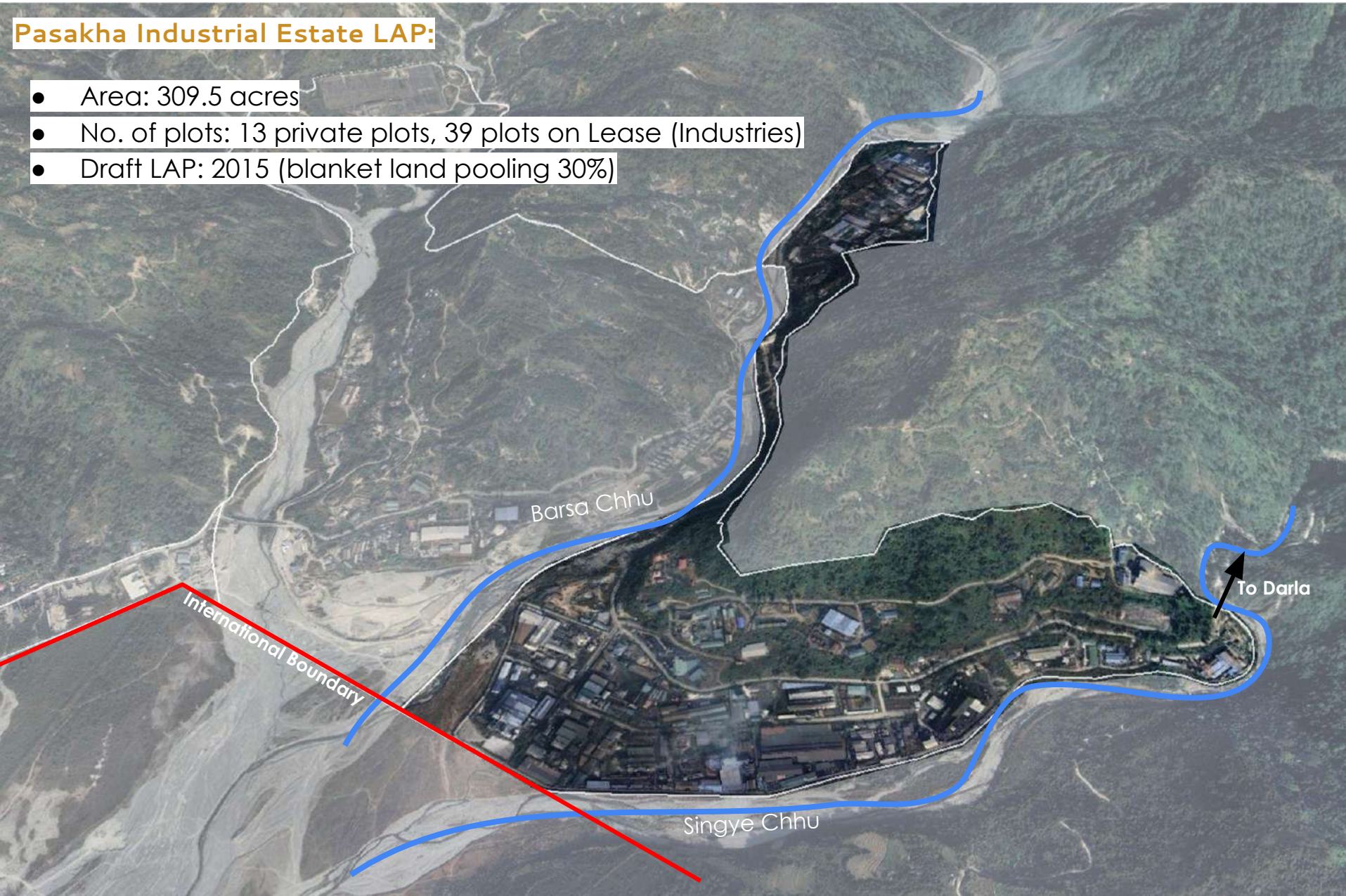


1. Overview & Objectives of the LAP Review

Overview of the LAP

Pasakha Industrial Estate LAP:

- Area: 309.5 acres
- No. of plots: 13 private plots, 39 plots on Lease (Industries)
- Draft LAP: 2015 (blanket land pooling 30%)



Objectives of the LAP Review

- To finalize the draft LAP prepared in 2015-2018
- To revisit the existing infrastructure and services in the LAP and prepare master plans for holistic development.
- To adapt the findings of Geotechnical Investigation and Slope Stability Assessment study.

2. Existing Scenario



As per CHCPT, 2021

Table 3.1 Population Categorised by LAP and Sex

LAP	Male	Percent	Female	Percent	Total
Ahlay	94	53.7	81	46.3	175
Amochhu	2054	49.2	2117	50.8	4171
Core	4664	50.1	4640	49.9	9304
Dhamdara	638	49.3	657	50.7	1295
Kabreytar	983	49.8	990	50.2	1973
Khareyphu	52	53.1	46	46.9	98
Pasakha	1448	54.1	1229	45.9	2677
Pasakha IE	430	66.6	216	33.4	646
Pekarzhing	286	54.8	236	45.2	522
Peri-urban P	411	51.6	386	48.4	797
Peri-urban S	230	53.4	210	46.6	431
Rinchending	646	49.5	660	50.5	1306
Toorsatar	23	54.8	19	45.2	42
Total	11959	51.0	11478	49.0	23437

*Excludes institutional, industrial, mini/mega dry port, and population of self-containment zones

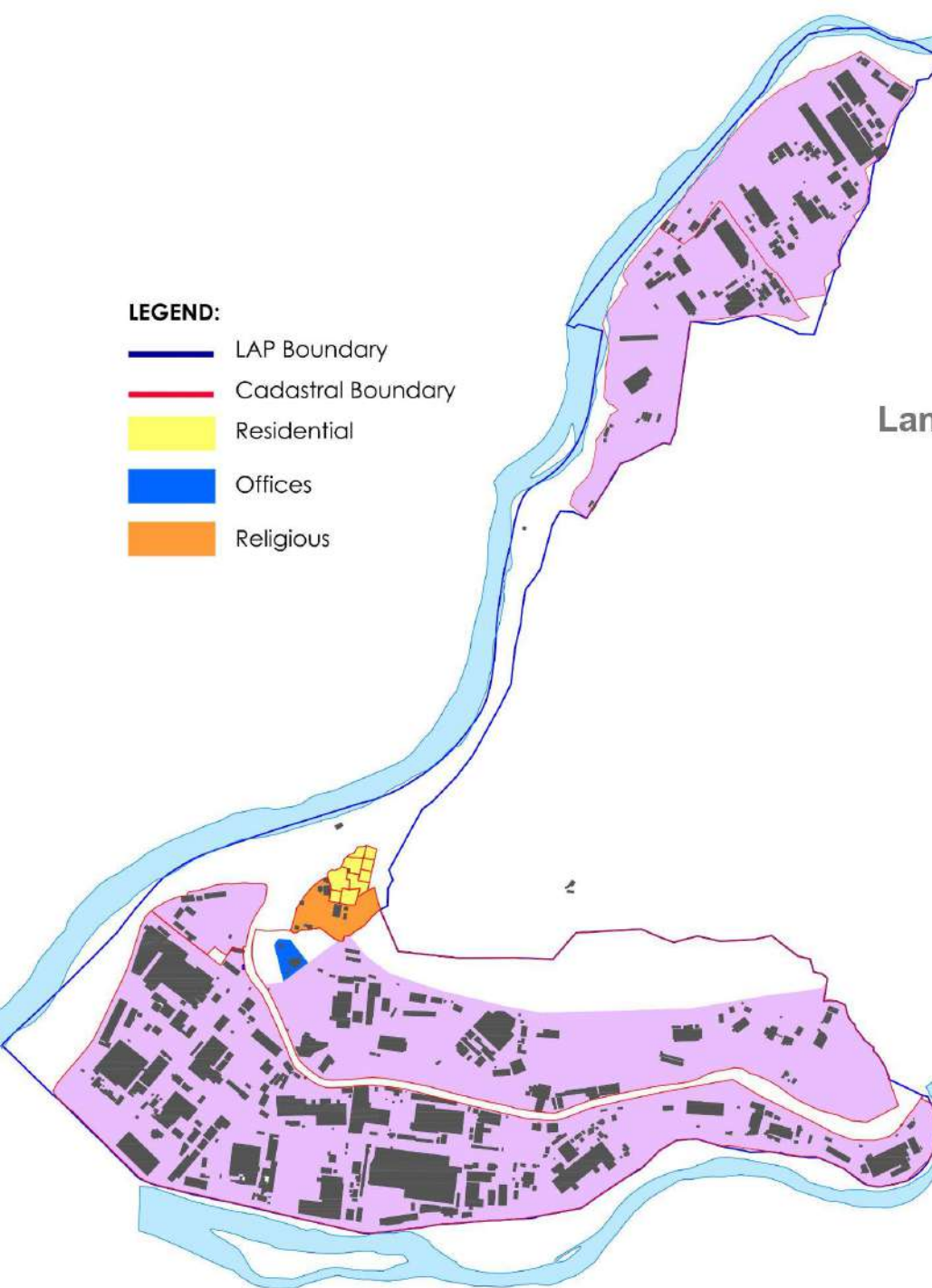
Table 6-7: Population accommodation within proposed Urban villages

Urban Village	Area for Development and Population accommodated										Total Popln.
	UV-01		UV-02 (High Density)		UV-02 (Low Density)		SE-04 (Non-polluting)		E-4		
	Area (Ha)	Popln.	Area (Ha)	Popln.	Area (Ha)	Popln.	Area (Ha)	Popln.	Area (Ha)	Popln.	
Toorsa Tar	4.76	430	41.20	14,900	0.00	0	0.00	0	4.75	290	15620
Ammo Chhu- 01	58.73	5,310	51.60	18,661	5.34	543	0.00	0	18.96	1157	25671
Ammo Chhu- 02	6.51	588	0.00	0	0.00	0	24.09	2168	30.46	1858	4614
Pipaldara	0.00	0	1.05	379	0.00	0	0.00	0	6.57	401	780
Kharaley, Khareyphu, Dokhiya	0.00	0	4.33	1,566	3.44	350	0.00	0	13.76	839	2755
Rinchending	0.00	0	10.52	3797	15.35	1,561	0.00	0	36.21	2209	7567
Ahlay	0.00	0	0.00	0	5.70	579	9.07	816	17.49	1067	2462
Pekarshing (Toribari)	6.89	623	21.25	7,685	4.54	461	20.54	1,849	15.71	958	11583
Changmari and Gurungdangra	0.00	0	19.90	7,197	22.34	2,272	0.00	0	14.67	895	10364
Malbase	0.00	0	6.71	2,427	1.37	139	9.68	871	1.12	68	3505
Pasakha	0.00	0	1.94	703	1.79	182	0.00	0	2.31	141	1026
Total	76.89	6951	158.50	57315	59.87	6087	63.38	5704	162.01	9883	85947
Total Area (Hectares)	520.65										
Total Popln Accommodated	85947										

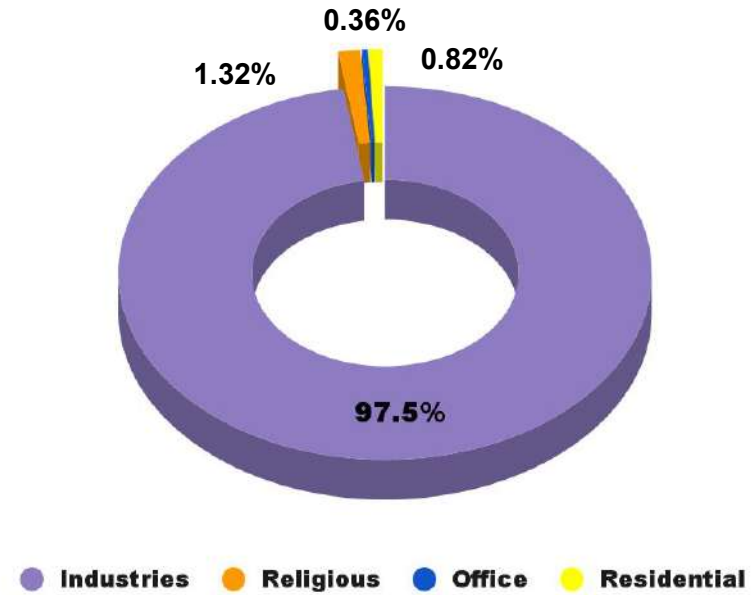
Land Use on Ground

LEGEND:

- LAP Boundary
- Cadastral Boundary
- Residential
- Offices
- Religious



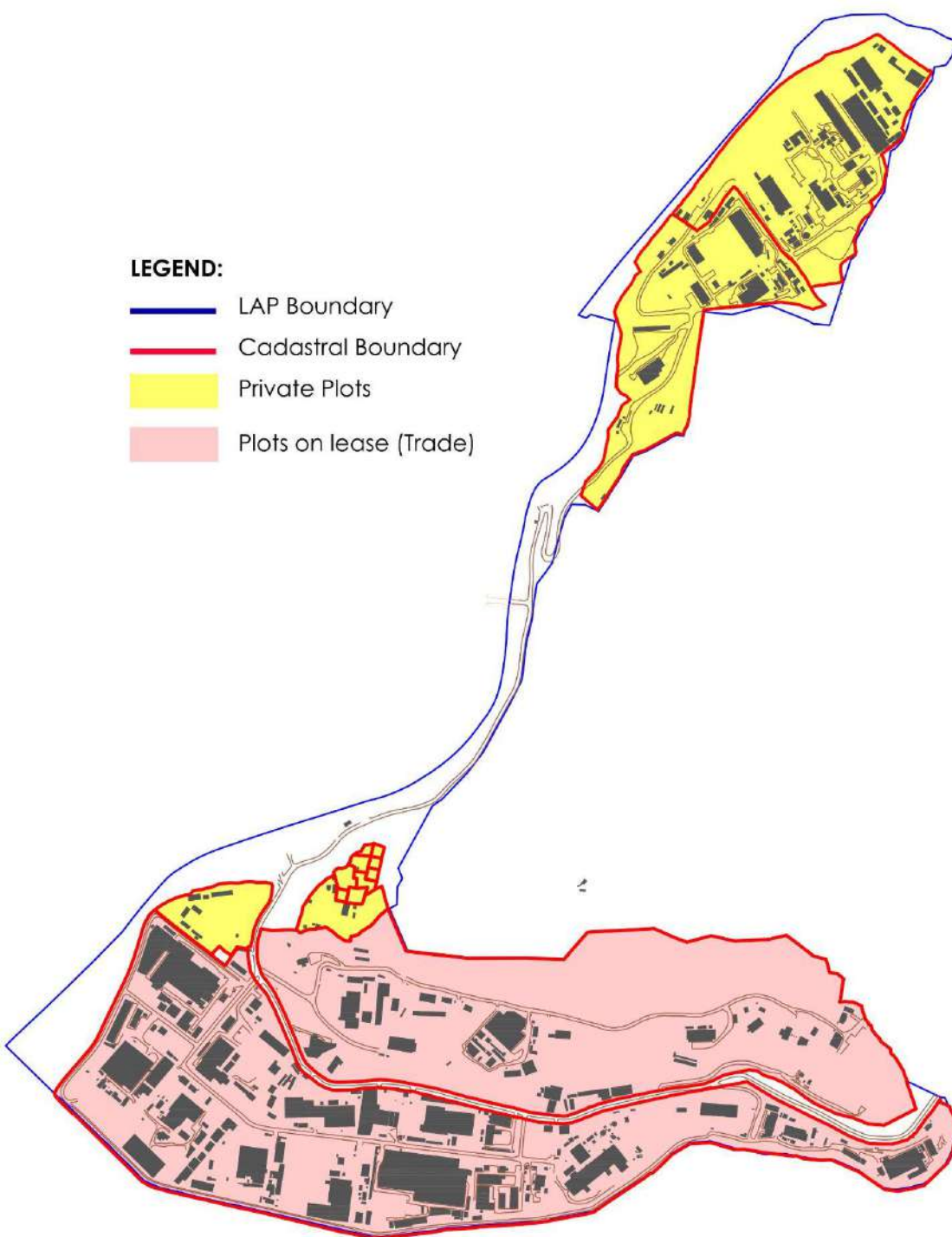
Land Use Area Distribution



Land Ownership

LEGEND:

-  LAP Boundary
-  Cadastral Boundary
-  Private Plots
-  Plots on lease (Trade)



- 13 private plots
- 39 plots on Lease (Industries)

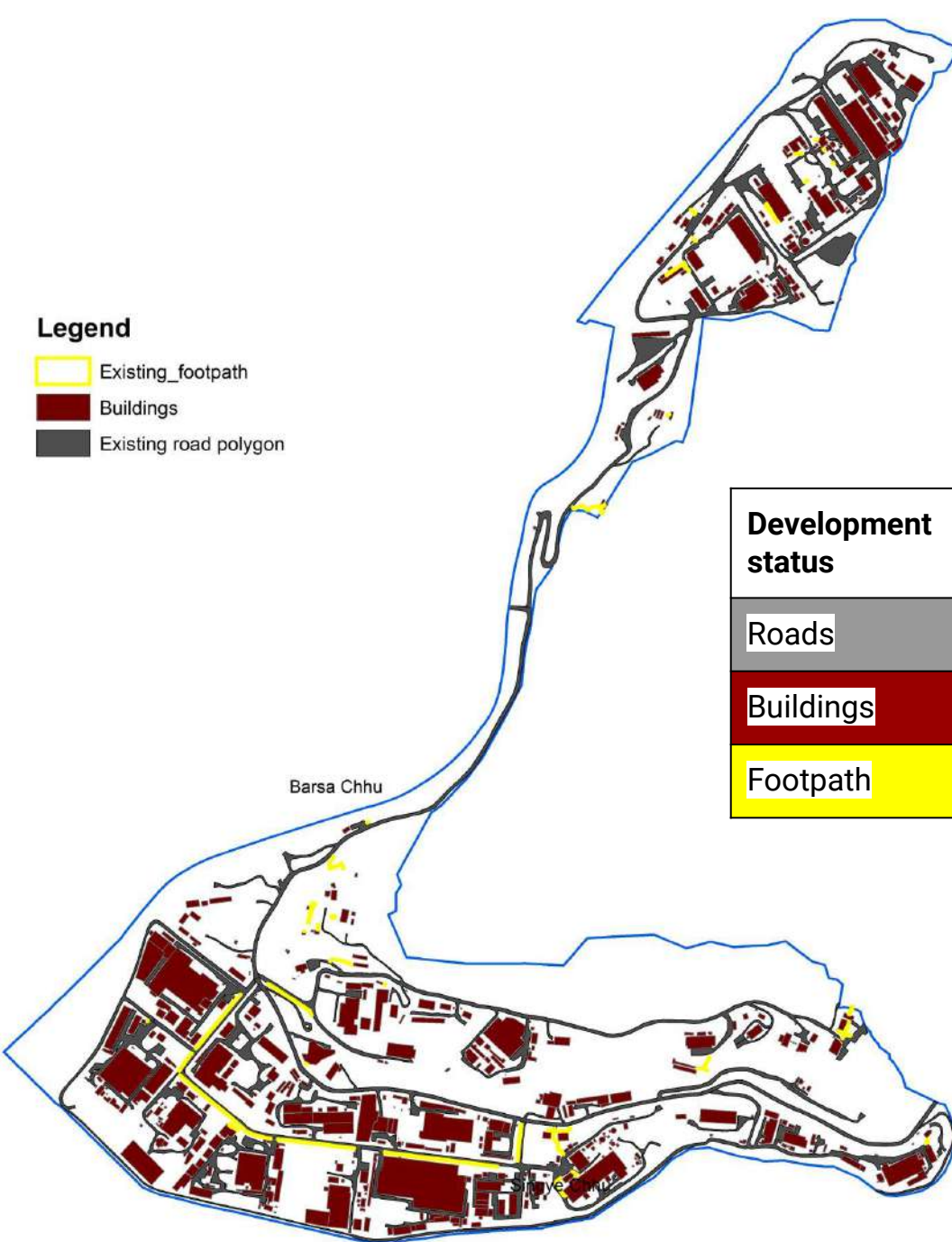
Development Status

Legend

- Existing_footpath
- Buildings
- Existing road polygon

***LAP Area = 309.5 acres**

Development status	Area (sqm)	Ares (acres)	Percentage (%)
Roads	159,694.688	39.461	12.75%
Buildings	184,086.755	45.488	14.7%
Footpath	2,902.197	0.717	0.23%



Public Infrastructure



Roads

Electricity

Footpath

Streetlight

**Hazardous
Waste**



Utility Duct

**Bus Stop
(under const)**

**Residential
Waste**

Water Reservoir



Public Amenities & Services



Community Space: Temple (private plot)



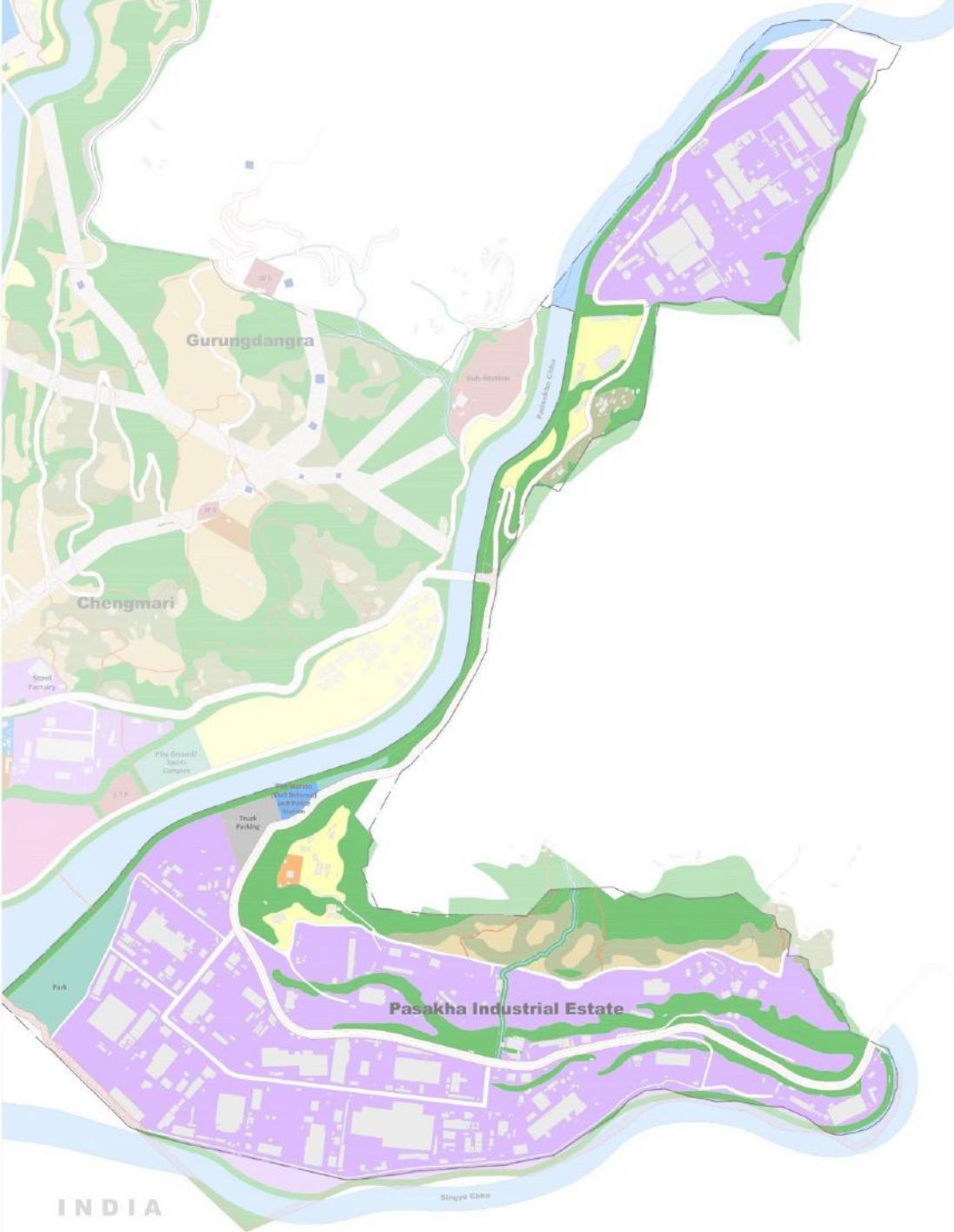
Parks/Playground

**Sports/
Recreation**

Health

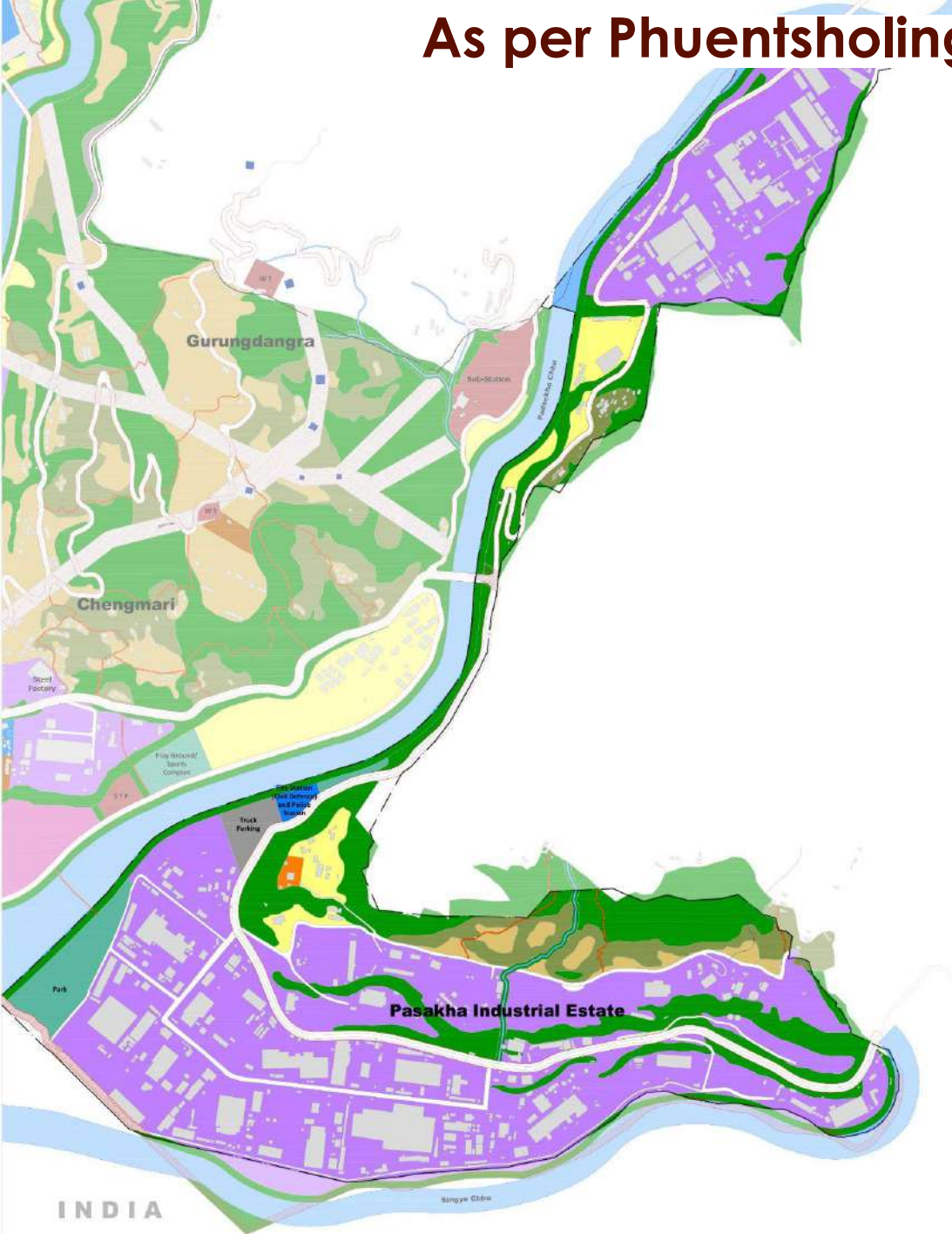
**Firefighting
Facilities**





3. As per PSP & Draft LAP

As per Phuentsholing Structure Plan, 2013-2028



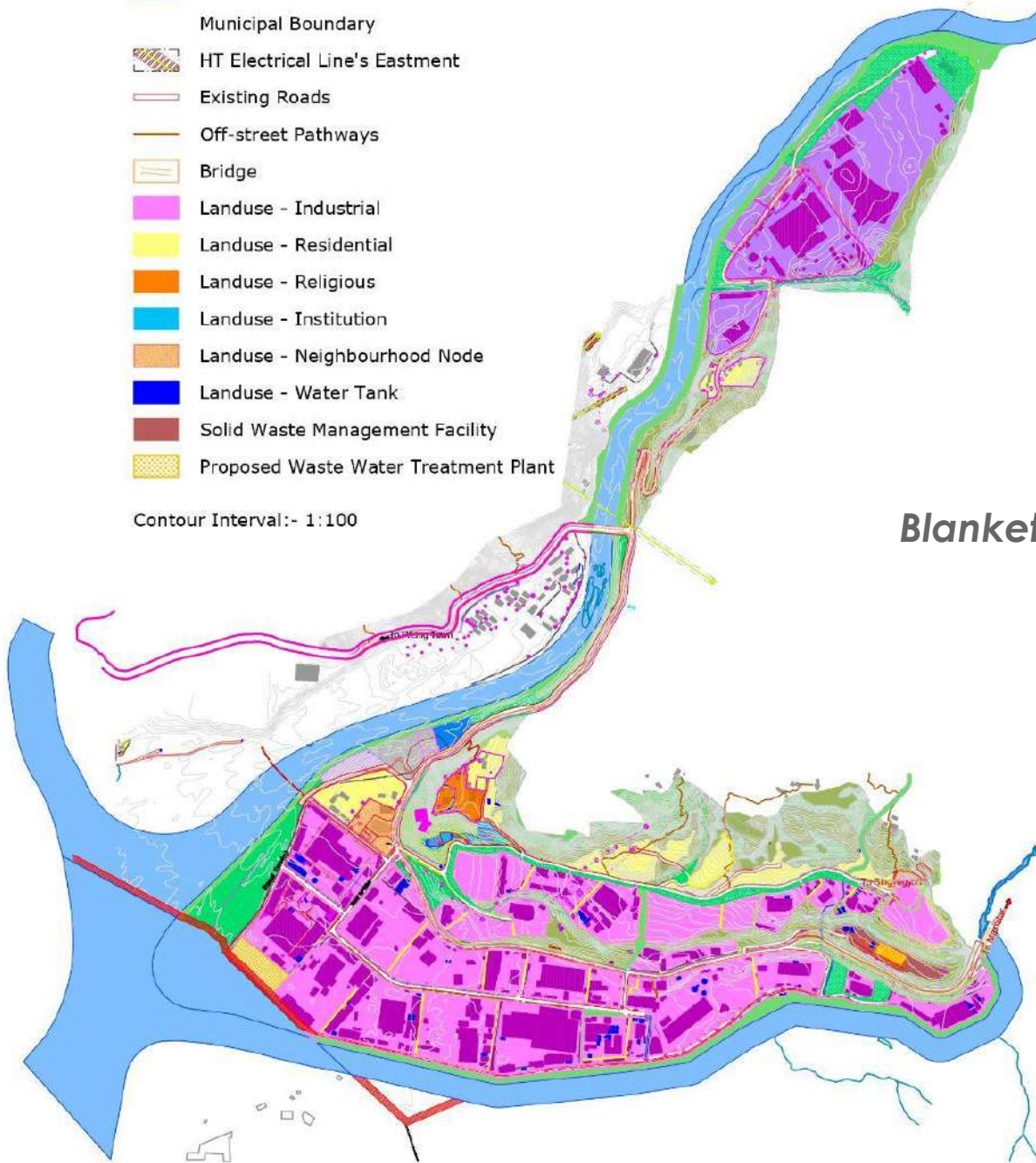
LEGEND

- UC: Urban Core
- NN: Neighborhood Node
- UV1: Urban Village Core
- UV2: Urban Village Periphery (HD)
- UV2: Urban Village Periphery (LD)
- I: Institutional
- H: Heritage
- R: Royal
- E1: Environmental Conservation Precincts
- E4: Agri-based Environments
- G1: National Importance Open Spaces
- G2: Local Green Space System
- SE2: Multi-modal Transit Hub
- SE3: Dry Port & Warehousing
- SE4: Service Centers & Industries
- SE4: Service Centers & Industries (*Non-polluting*)
- Utility
- Parking

LEGEND

-  Waterbody ie Rivers & Streams
-  Municipal Boundary
-  HT Electrical Line's Eastment
-  Existing Roads
-  Off-street Pathways
-  Bridge
-  Landuse - Industrial
-  Landuse - Residential
-  Landuse - Religious
-  Landuse - Institution
-  Landuse - Neighbourhood Node
-  Landuse - Water Tank
-  Solid Waste Management Facility
-  Proposed Waste Water Treatment Plant

Contour Interval:- 1:100



Blanket Land Pooling of 30% applied



4. Analysis & Findings

Slope Analysis

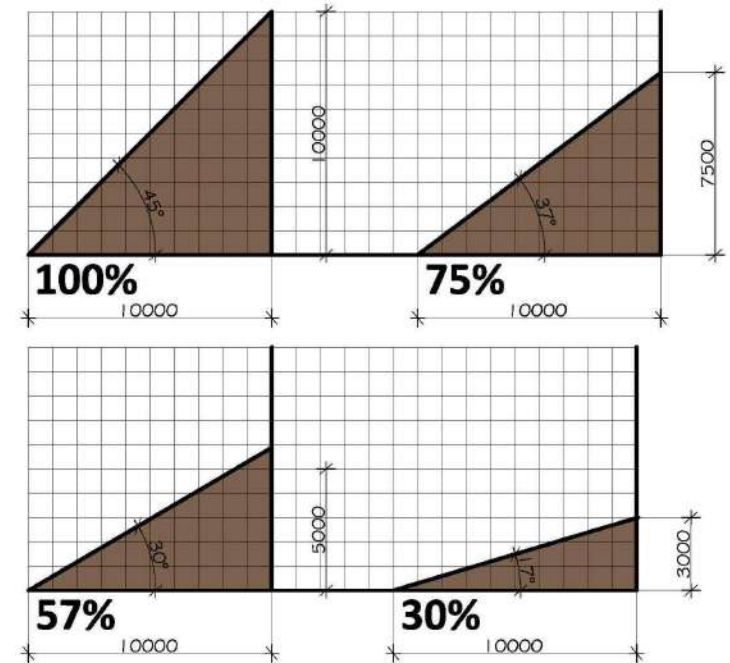
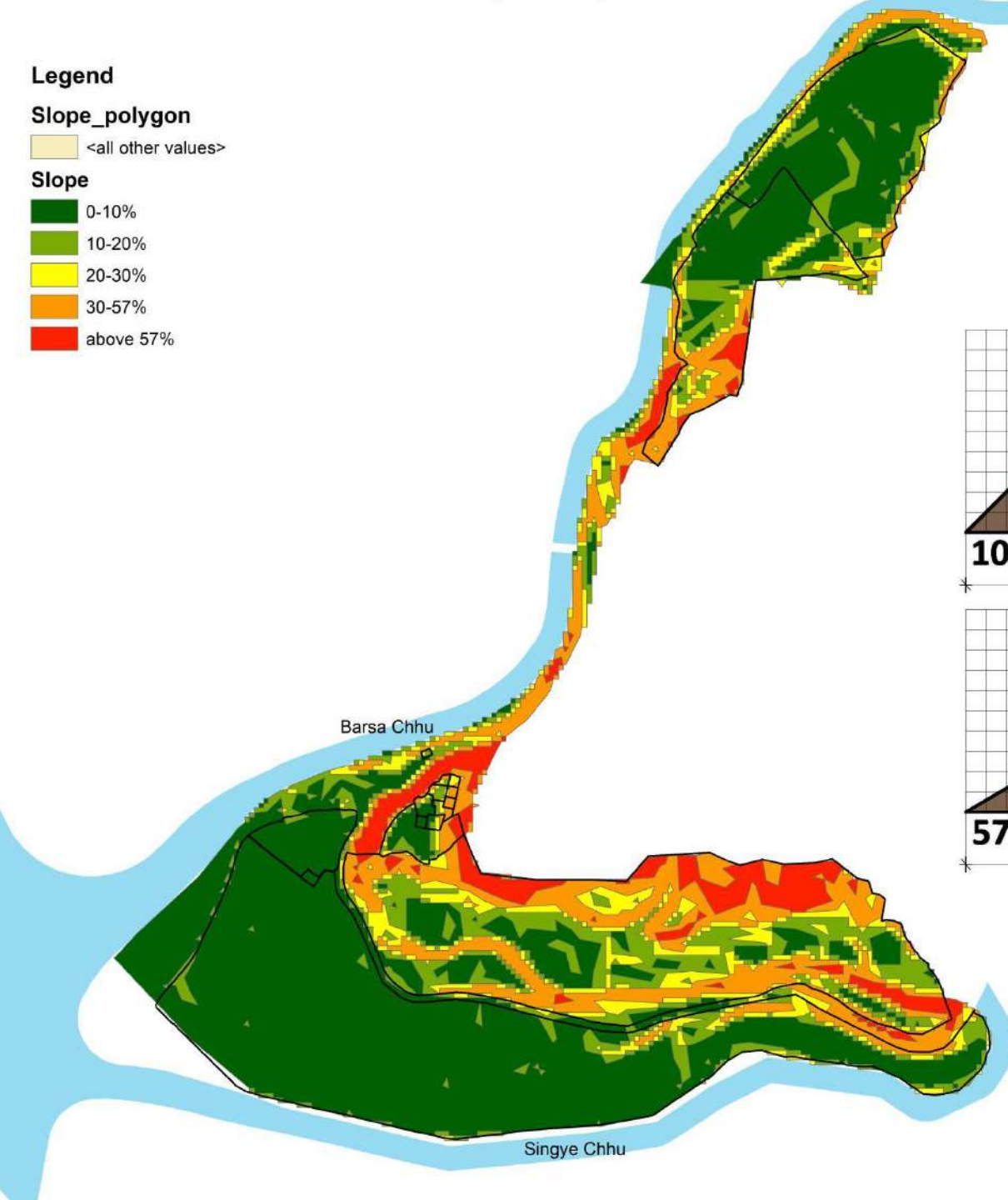
Legend

Slope_polygon

<all other values>

Slope

- 0-10%
- 10-20%
- 20-30%
- 30-57%
- above 57%



Hazard Analysis

Legend

Hazard

<all other values>

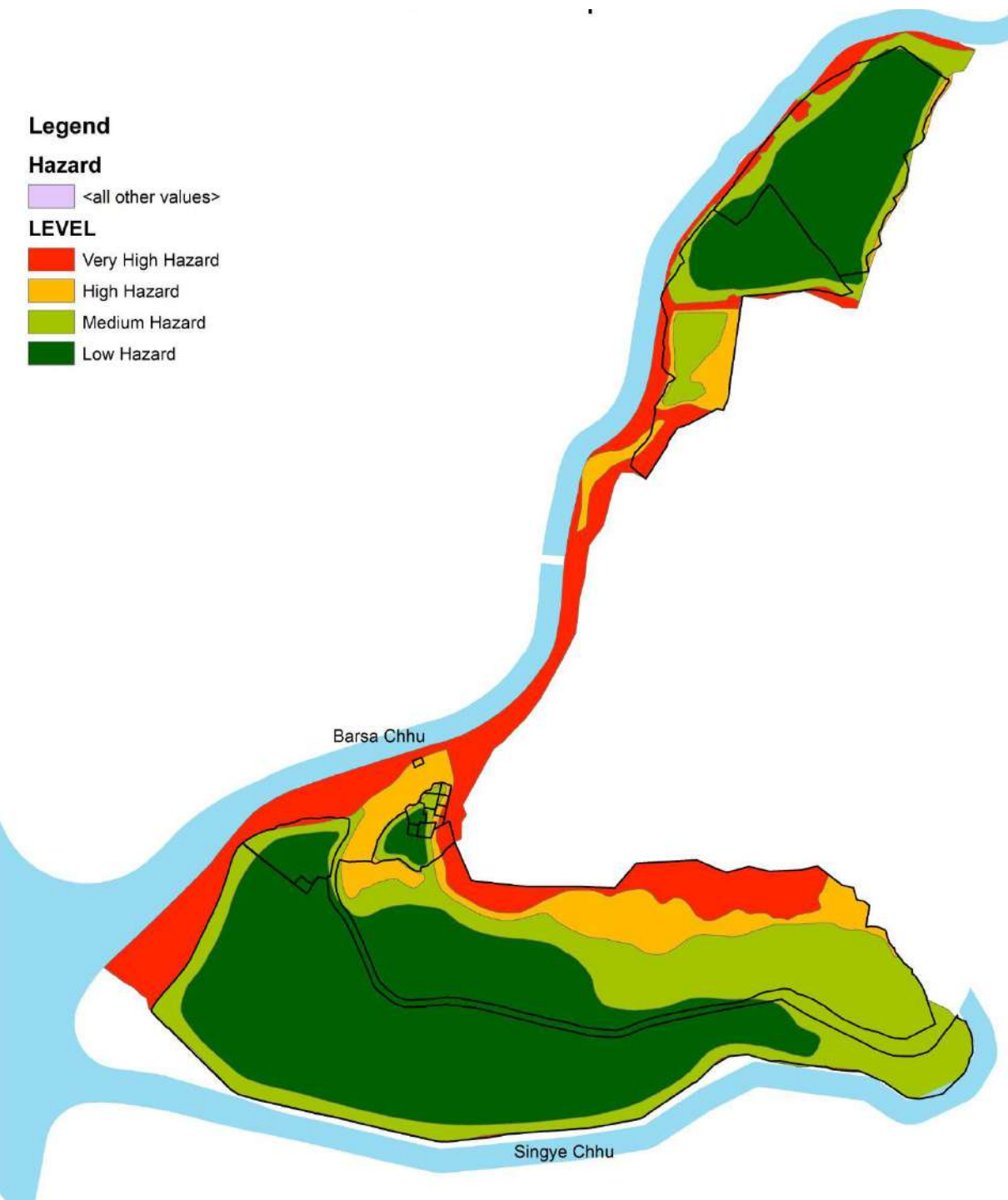
LEVEL

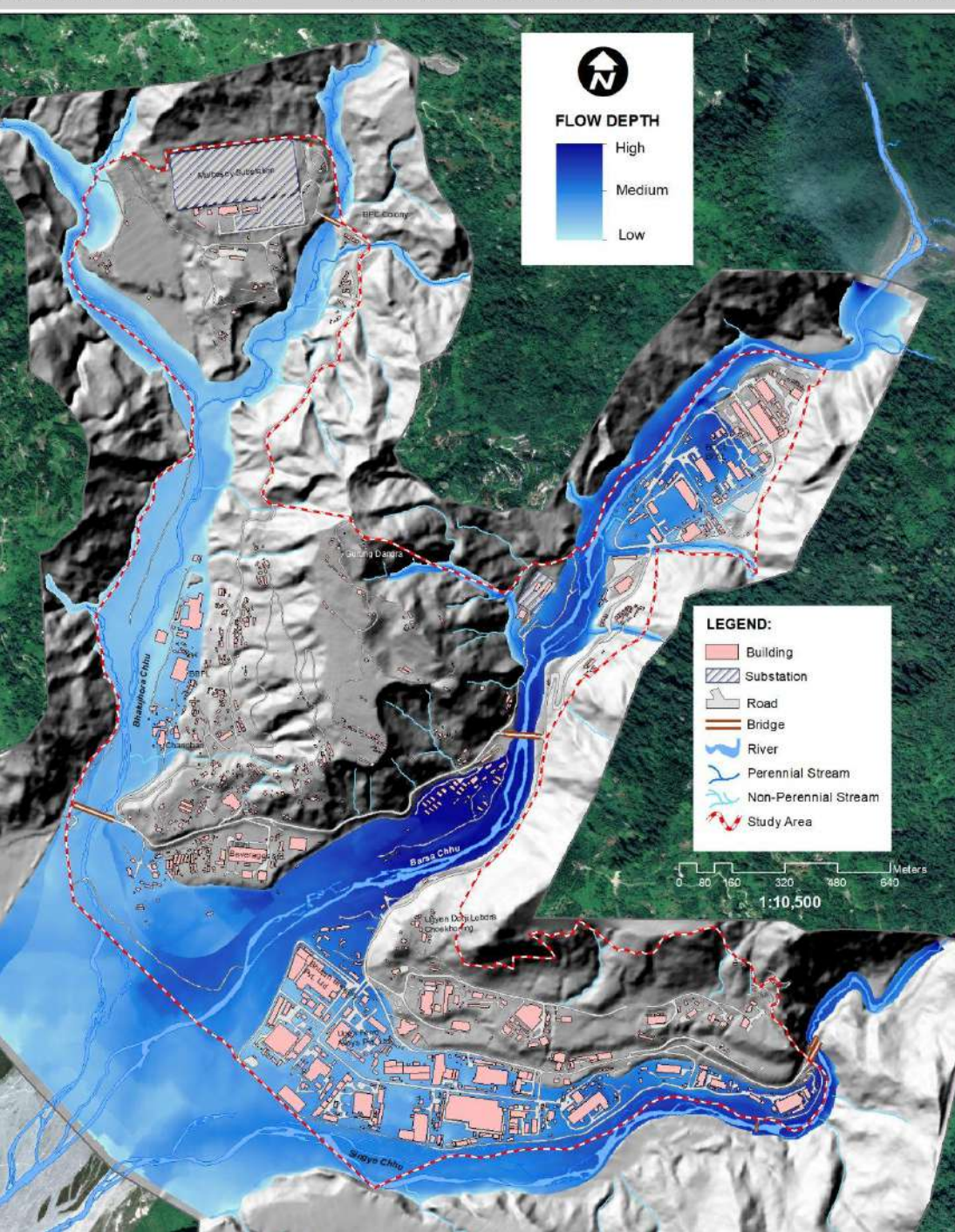
Very High Hazard

High Hazard

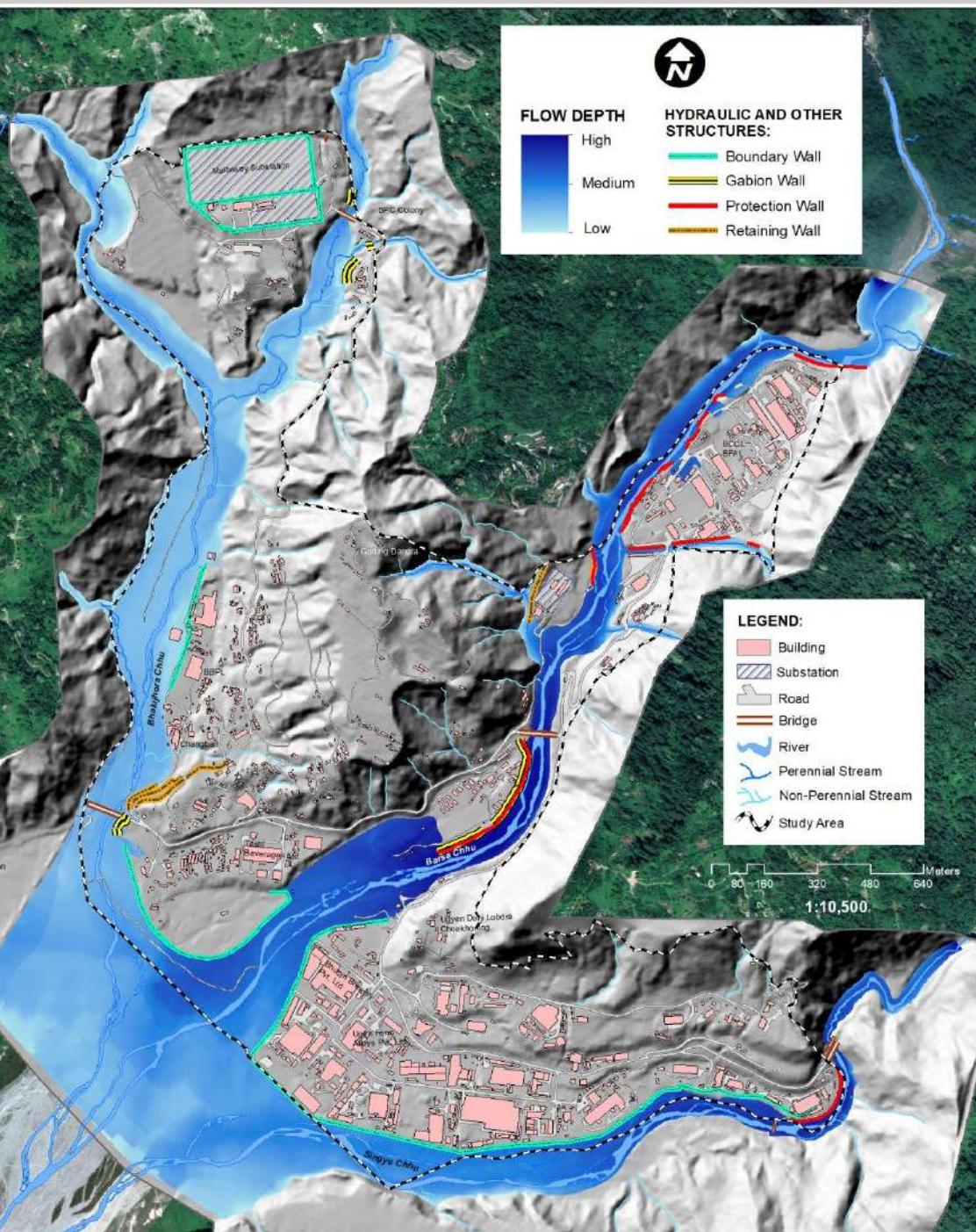
Medium Hazard

Low Hazard





Flood Map (without walls)



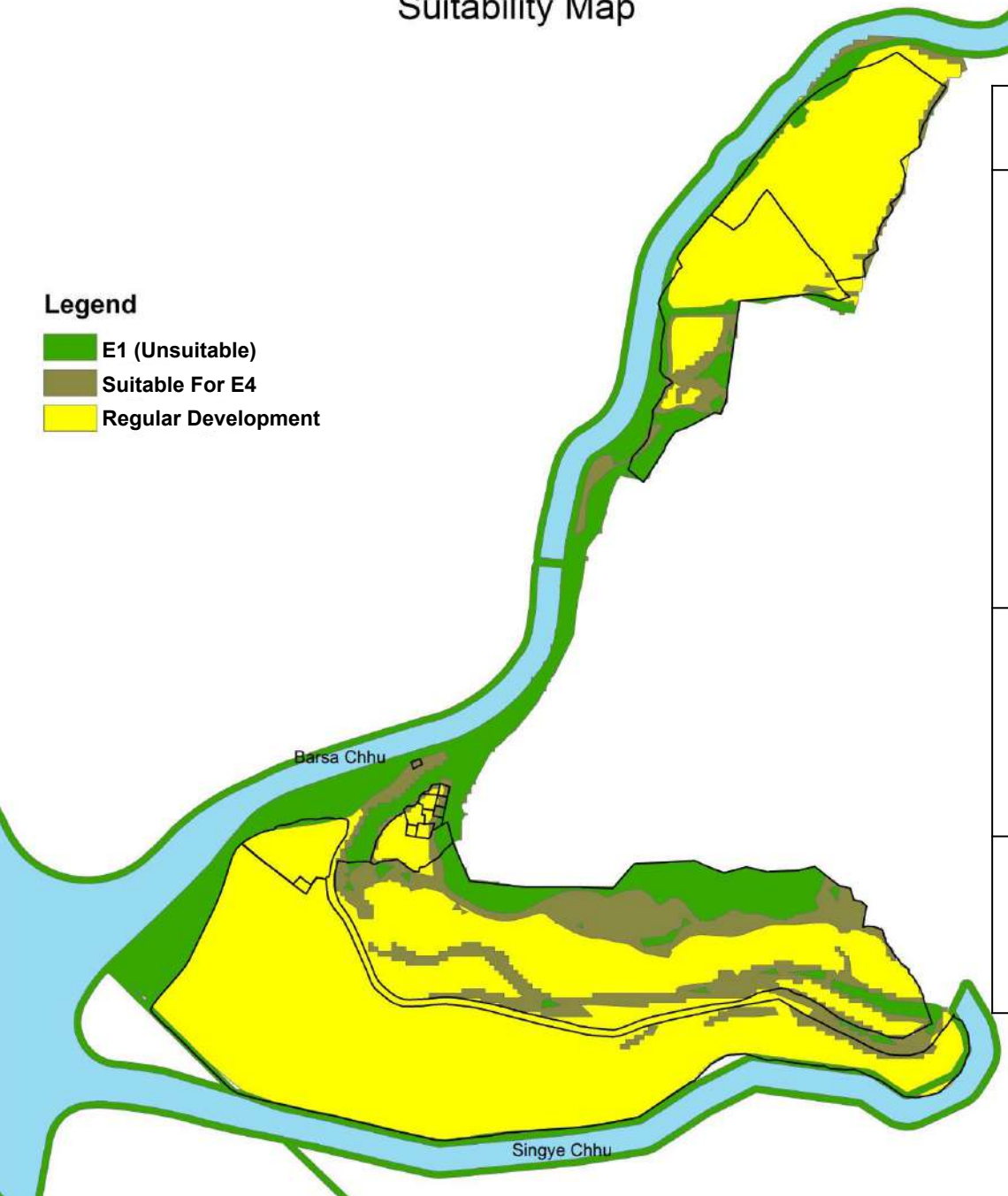
Flood Map (with walls)

Suitability Analysis

Suitability Map

Legend

- E1 (Unsuitable)
- Suitable For E4
- Regular Development






#	Suitability	Parameters
1	Unsuitable	a. 15 m buffer from River
		b. 5m buffer from minor streams
		c. 15 m buffer from International Boundary
		d. Slope more than 57%
		e. Areas under very high hazard
2	Suitable for E4	a. Slope between 30 to 57%
		b. Areas Under High Hazard (shall require Plot Specific Geotechnical Study for Development)
3	Suitable for regular development	a. Area under medium and low hazard
		b. Slope under 30%

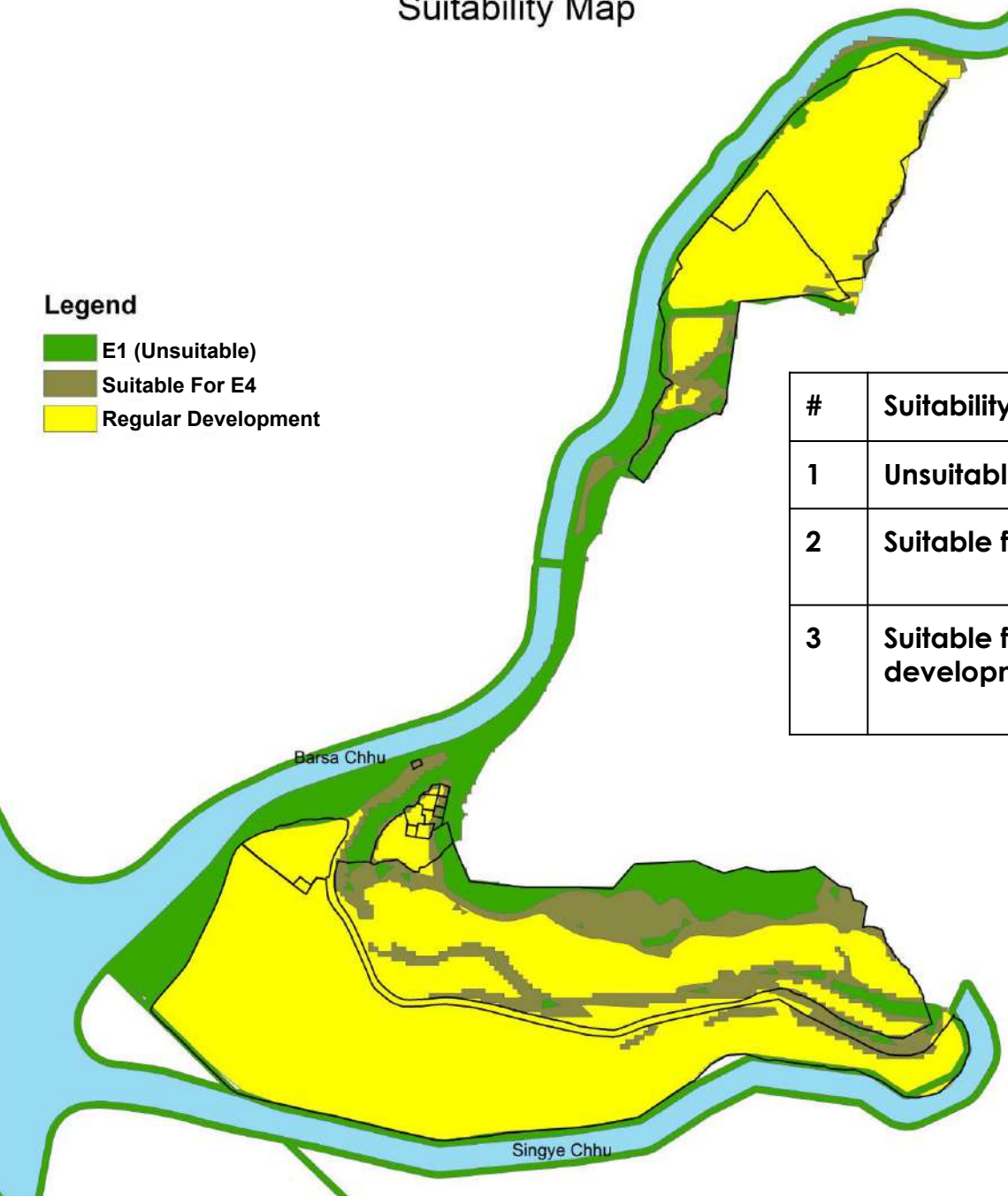
Suitability Analysis

Suitability Map

Legend

-  E1 (Unsuitable)
-  Suitable For E4
-  Regular Development

#	Suitability	Area (in acres)	Percentage
1	Unsuitable	47.893	15.470%
2	Suitable for E4	33.704	10.887%
3	Suitable for regular development	224.912	72.647%



5. Proposals

Proposal-Precinct Plan



Proposal-Precinct Plan

Amenities / Facilities



LEGEND:

- Road
- Drain
- SE4-P (Polluting industries)
- Residential
- E4
- E1
- Services
- Institution
- Water Reservoir
- Fire station / Police
- Waste Drop-off
- Bus stop
- Water Reservoir
- Hazardous waste disposal

Proposal-Precinct Plan

Roads

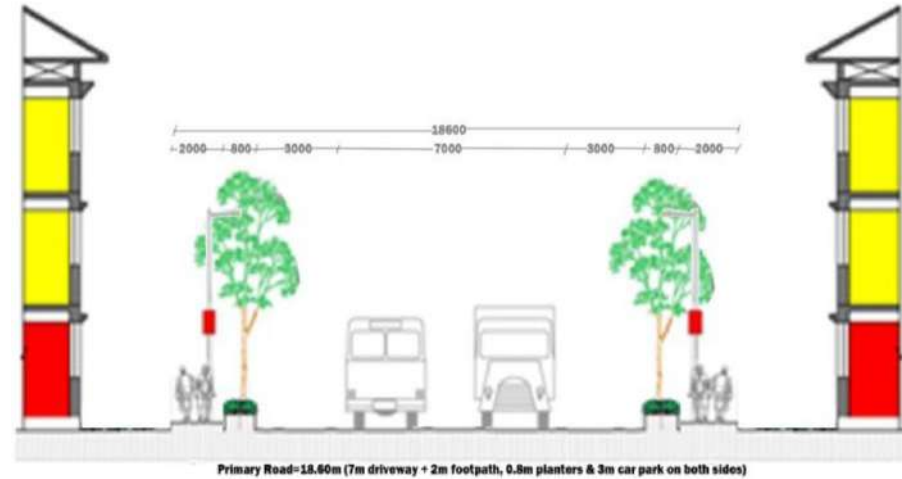
18.6m RoW

To Rinchending

Barsa Chhu

Singye Chhu

To Darla

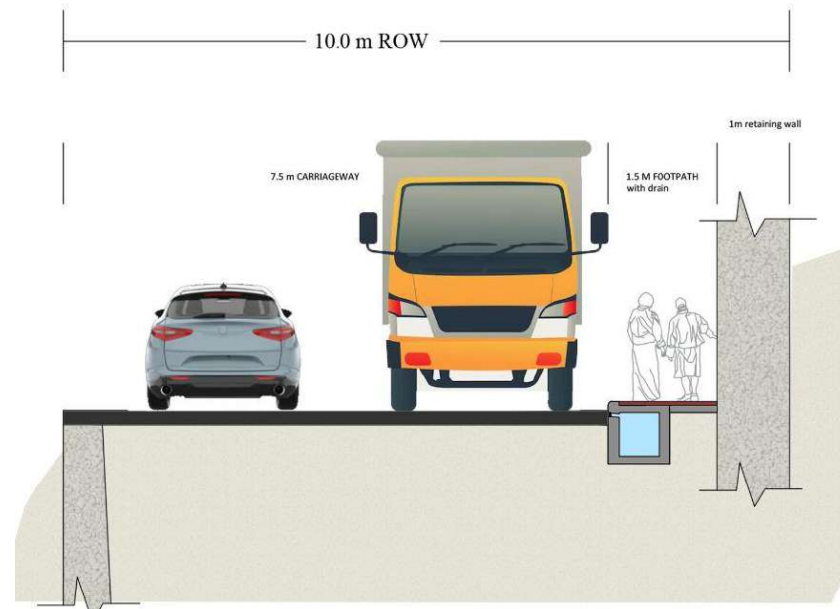


Proposal-Precinct Plan

Roads

18.6m RoW

10m RoW



Proposal-Precinct Plan

Roads

18.6m RoW

10m RoW

9m RoW

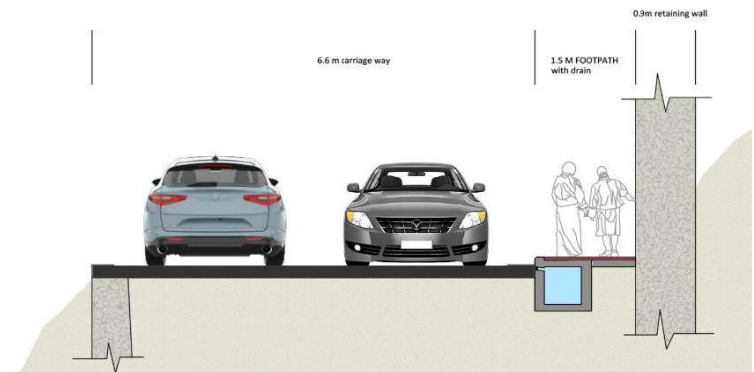
9m ROW (Industries area)

9m ROW



9m ROW (Residential area)

9m ROW

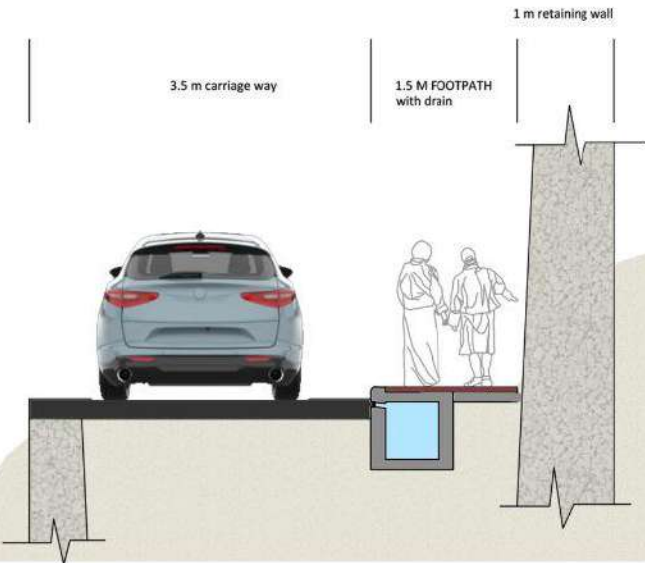


Proposal-Precinct Plan

Roads

- 18.6m RoW
- 10m RoW
- 9m RoW
- 6m RoW

6m ROW



Proposal-Precinct Plan

Roads

- 18.6m RoW
- 10m RoW
- 9m RoW
- 6m RoW
- 3.5m RoW



6. Land Pooling

$$\text{Land Pooling \%} = \frac{\text{Area required for (Infrastructure + Amenities)}}{\text{Overall Developable Area}} \times 100$$

Clusters

Cluster 1:
BCCL & BFAL area
(23.76%)

To Rinchending

Bridge

Cluster 3:
Lhakhang area (5.27%)

To Darla

Cluster 2:
Industries Area (70.79%)

Clusters			
	Area (sqm)	Area (acres)	Area Percentage (%)
Total LAP	1,252,890.439	309.596	100
Cluster 1	297,701.117	73.564	23.76
Cluster 2	889,136.758	219.711	70.79
Cluster 3	66,052.446	16.322	5.27

- **Cluster-wise approach (Differential Land pooling)**
 - Land pooling calculation differs based on the requirement of facilities in different clusters
- **Exclusion from Land Pooling:**
 - Areas falling in E1 precinct (non-developable)
 - Roads/drains through E1
 - 18.6m main road



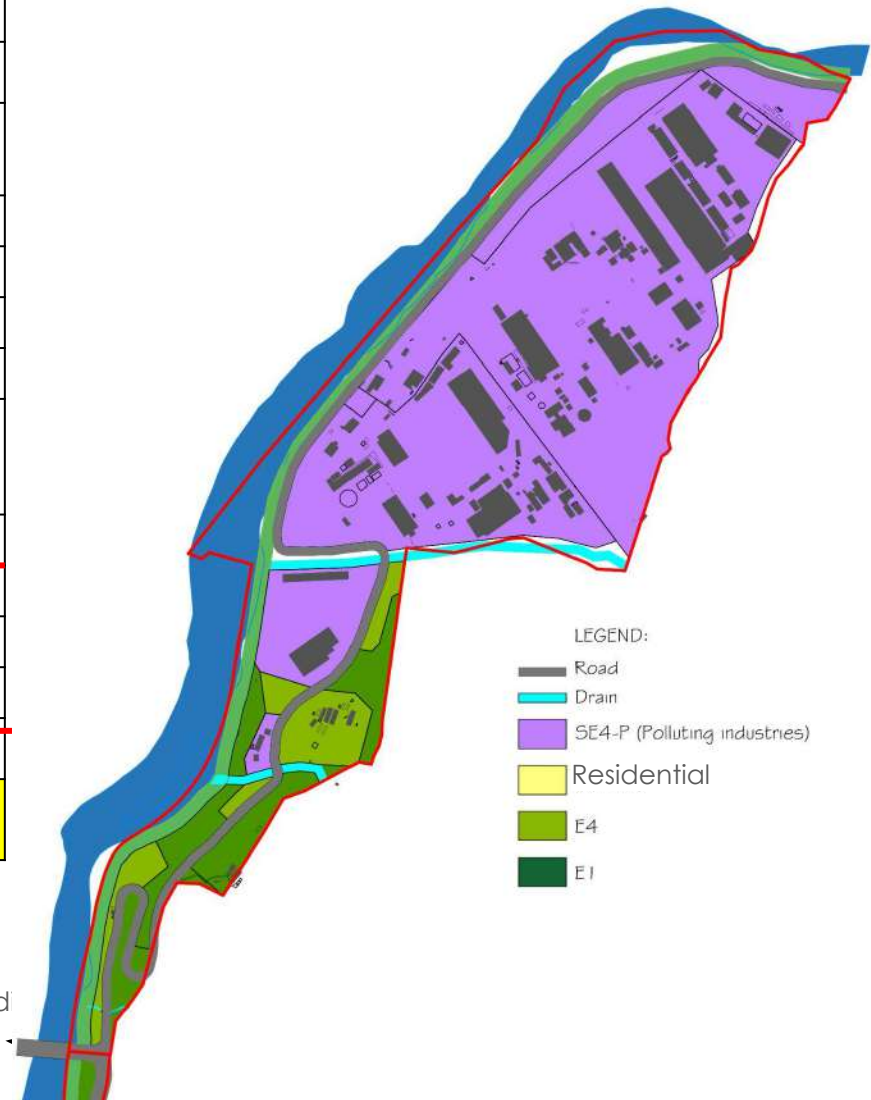
Cluster 1 **(BCCL/BFAL Area)**

Area = 73.564 acres (23.76%)

2 private plots

Land Pooling: Cluster 1

Cluster 1 (BCCL/BFAL) - 73.564 acres		
Land pooling Calculation		
	Area(sq.m)	Area(acres)
Area falling under E1 (area includes river buffer and stream)	54,783.002	13.537
River Buffer (E1)	24,110.730	5.958
Area falling in E4	16,332.686	4.036
Area falling in Regular Development	210,195.885	51.941
Overall developable area	226,528.571	55.976
Area required for road	9,643.792	2.383
Area required for drain	4,316.567	1.067
Area required for Waste Drop off	129.127	0.032
Hazardous waste	3,132.999	0.774
Area required for Police/Fire Station	860.931	0.213
Overall pooling %	7.983 %	



*land pooling for waste drop-off , fire fighting facility/ police and Hazardous waste disposal is shared proportionately among the 3 clusters



Cluster 2 ***(Industries Area)***

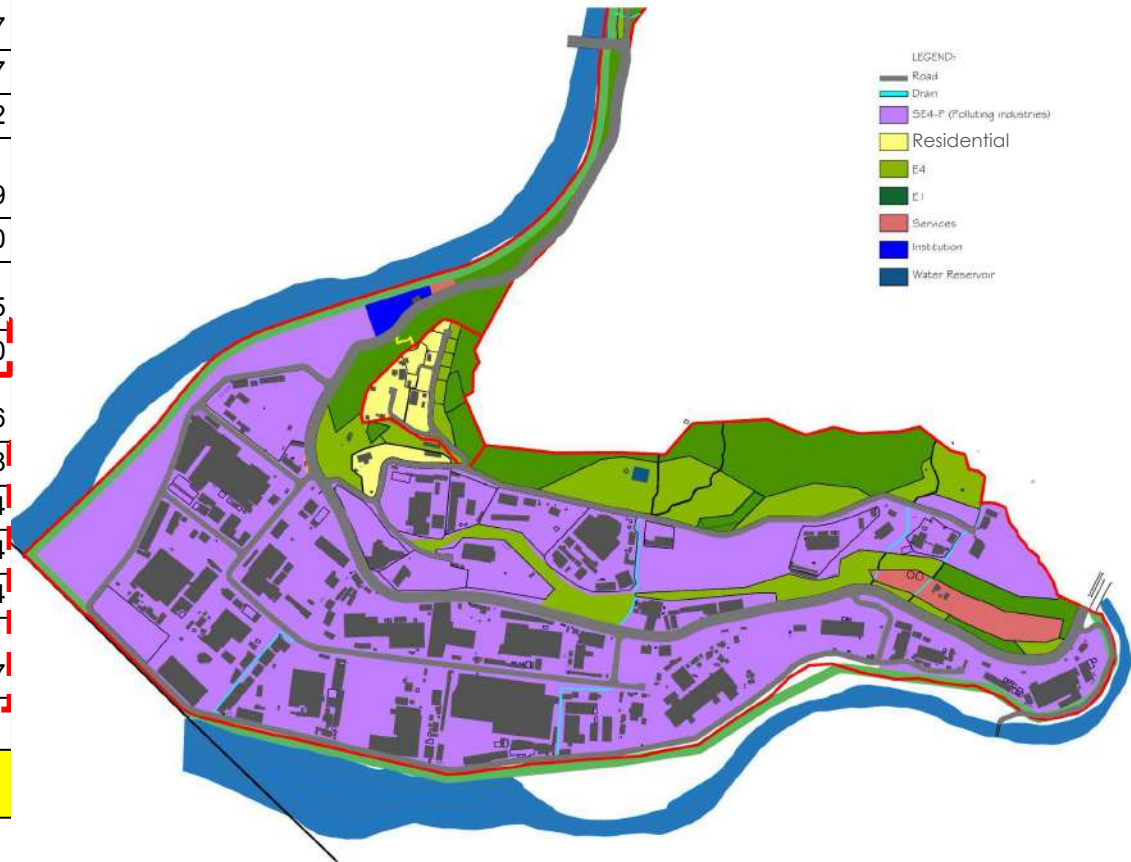
Area = 219.711 acres (70.79%)

1 private plot

39 plots on lease (Industries)

Land Pooling: Cluster 2

Cluster 2 (Industries) -219.711 acres		
Land pooling Calculation		
	Area(sq.m)	Area(acres)
Area falling under E1 (area includes river buffer and stream)	136,529.243	33.737
River Buffer (E1)	56,481.552	13.957
Area falling in E4	119,510.027	29.532
Area falling in Regular Development	686,463.372	169.629
Overall developable area	805,973.398	199.160
Area required for road	53,032.924	13.105
Area required for take-off road	2,913.853	0.720
Area required for drain	2,046.426	0.506
Area for bus stops/taxi parking	114.413	0.028
Area required for Water Reservoir	583.575	0.144
Area required for Waste Drop off	459.425	0.114
Hazardous waste	11,146.998	2.754
Area required for Police/Fire Station	3,063.133	0.757
Overall pooling %	9.102 %	



**land pooling for waste drop-off , fire fighting facility/ police, bus stop and Hazardous waste disposal is shared proportionately among the 3 clusters*



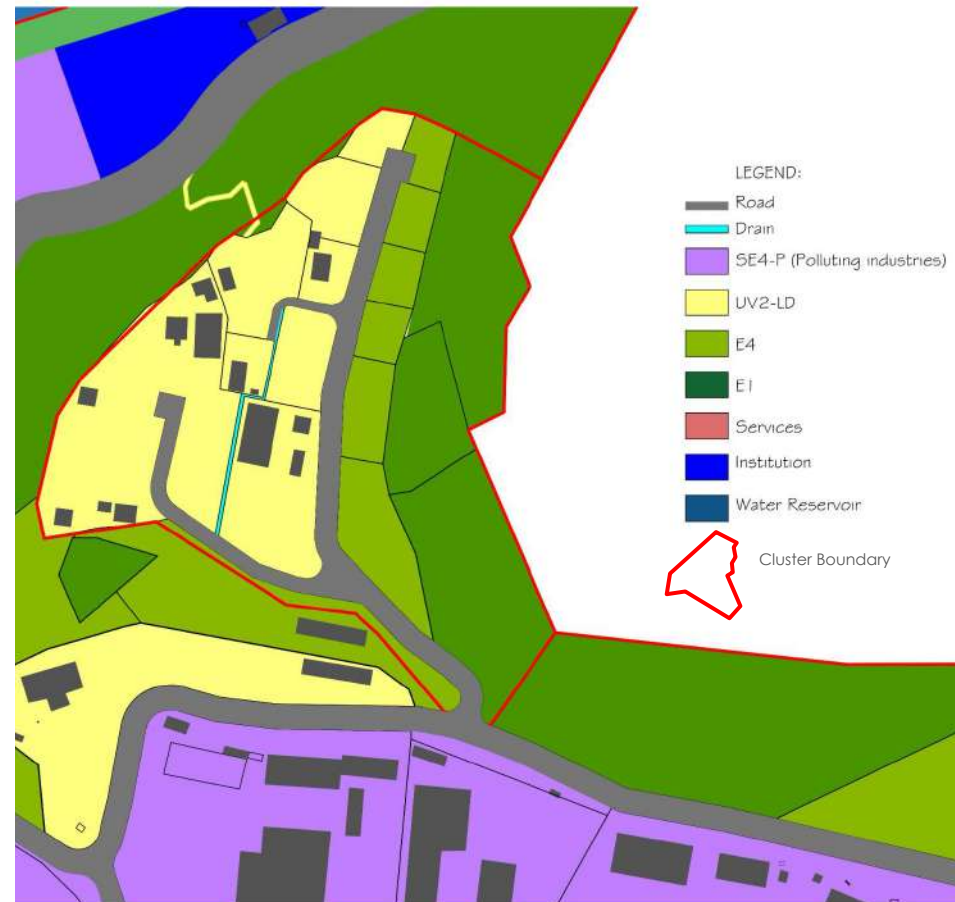
Cluster 3 (Lhakhang Area)

Area = 16.322 acres (5.27%)

10 private plots

Land Pooling: Cluster 3

Cluster 3 (Lhakhang Area) -16.322 acres		
Land pooling Calculation		
	Area(sq.m)	Area(acres)
Area falling under E1	27,120.990	6.702
Area falling in E4	16,090.799	3.976
Area falling in Regular Development	16,219.440	4.008
Overall developable area	32,310.240	7.984
Area required for road	3,841.114	0.949
Area Required for take off road	116.812	0.029
Area required for drain	174.796	0.043
Area for bus stops/taxi parking	4.587	0.001
Area required for Water Reservoir	23.395	0.006
Area required for Waste Drop off	18.418	0.005
Area required for Police/Fire Station	122.796	0.030
Overall pooling %	13.314 %	



**land pooling for waste drop-off , fire fighting facility/ police, bus stop and Hazardous waste disposal is shared proportionately among the 3 clusters*



Discussion Time!



