

Kalinamai

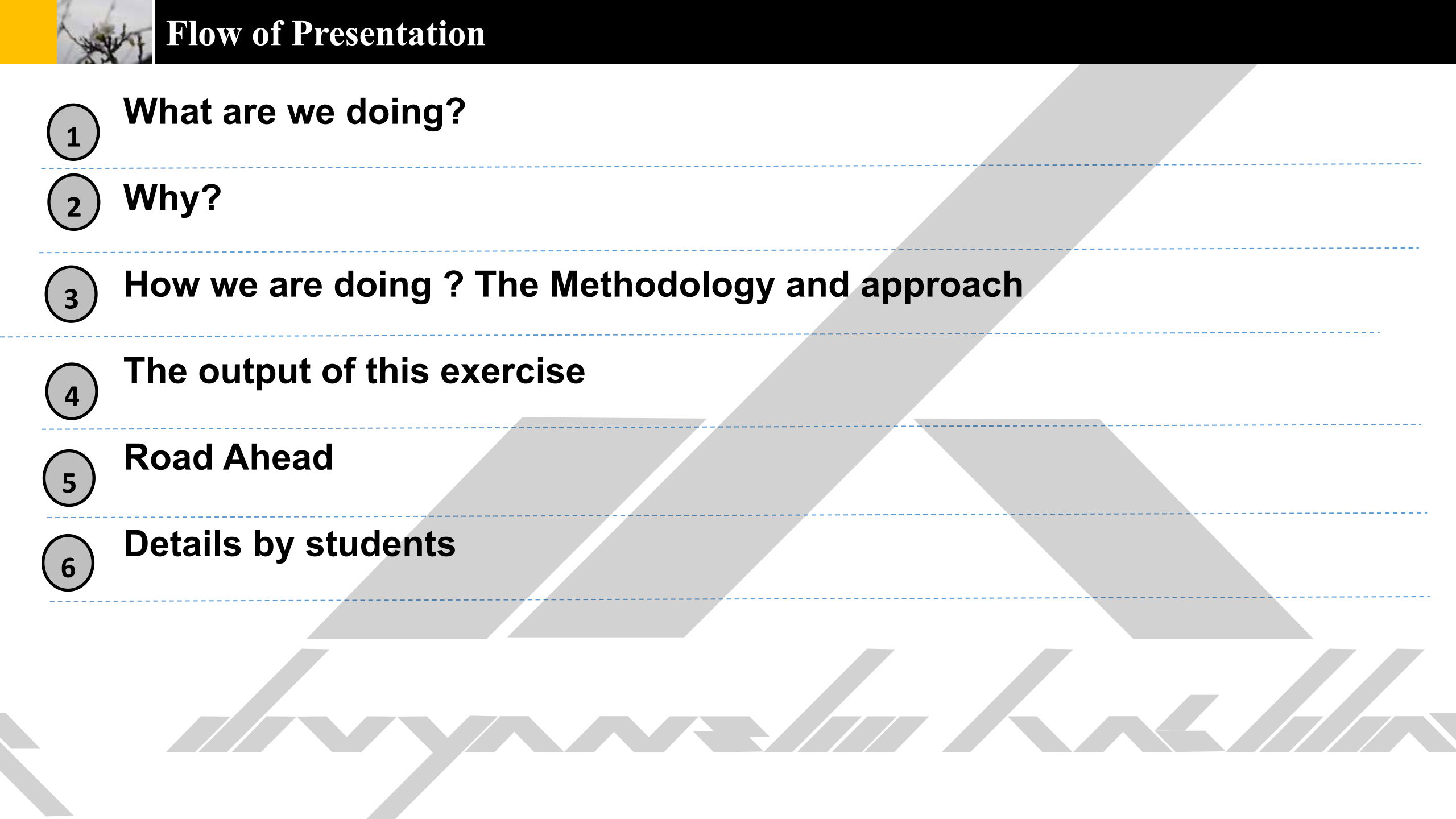
Of my dream

Indian Institute of Technology Roorkee

17 March 2018



Flow of Presentation

- ① **What are we doing?**
 - ② **Why?**
 - ③ **How we are doing ? The Methodology and approach**
 - ④ **The output of this exercise**
 - ⑤ **Road Ahead**
 - ⑥ **Details by students**
- 

What are we doing ?

Road Map to build
Kalinamai
of your dream

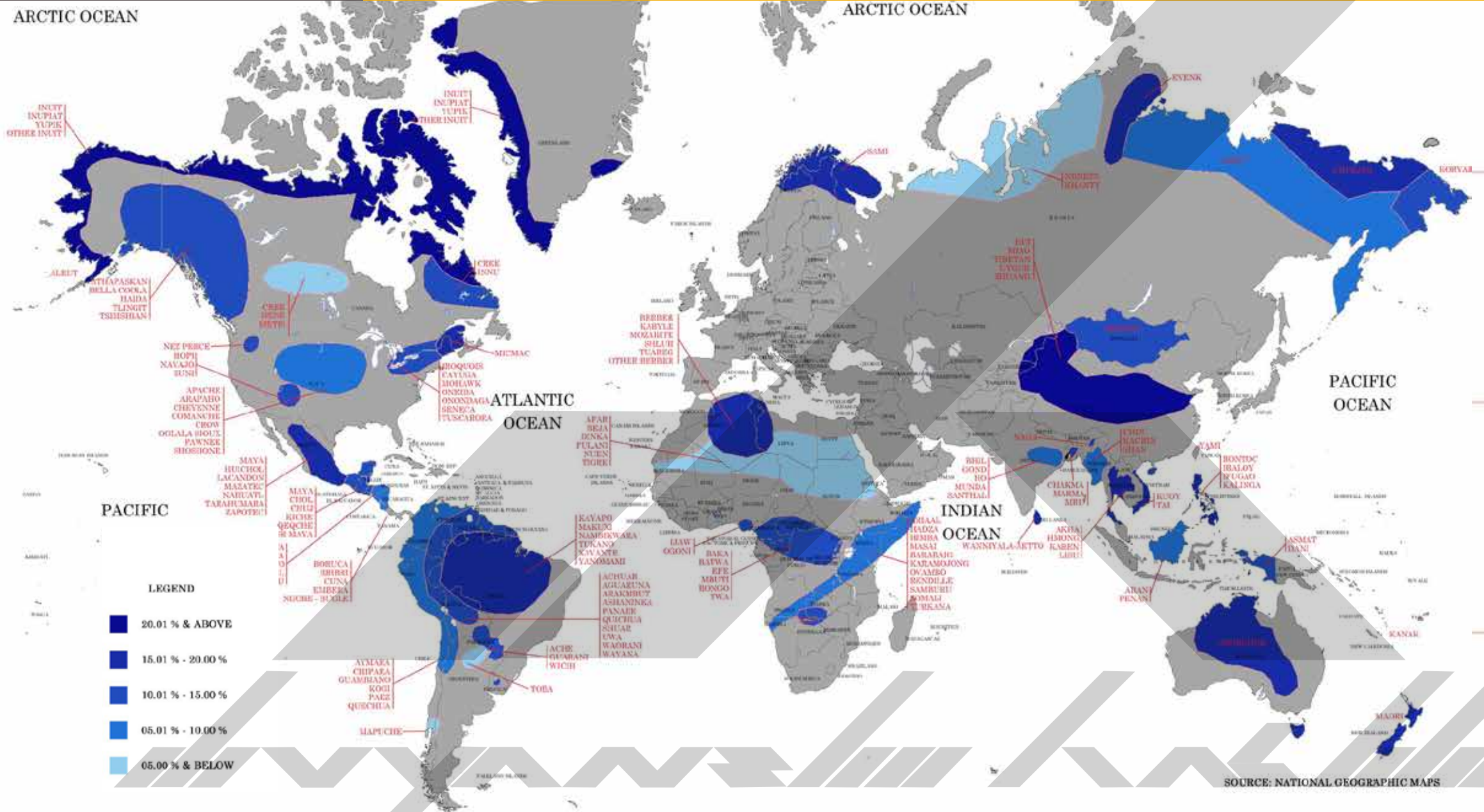
Benefit

- ① **Sustainable development – Futuristic development with your identity**
- ② **Economic development- opportunities which aligns with your values**
- ③ **Cultural continuity and your growth**

Risk

- ① **Survival – Define yourself and the path of your growth**

World's Major Indigenous Population Spread



SOURCE: NATIONAL GEOGRAPHIC MAPS

Has anything been done before ?



Methodology

Community Meeting



Walking, Talking and Mapping



Dream Session
Preserve, **A**dd, **R**emove,
Keep Out
(Men, Women, Youth)



Methodology

Preserve

Documentation

Analysis

Conservation

Cultural Development and Infrastructure Plan

Add

Site Identification

Case Studies

Planning & Designing

Tourism Development Plan

Economic Development Plan

Solid Waste Management Plan

Community Development Plan

Water Management Plan

Environmental Management Plan

Solar and Power Management Plan

Sanitation Management Plan

Methodology

Remove Understanding of the Problem Technology and Planning Intervention

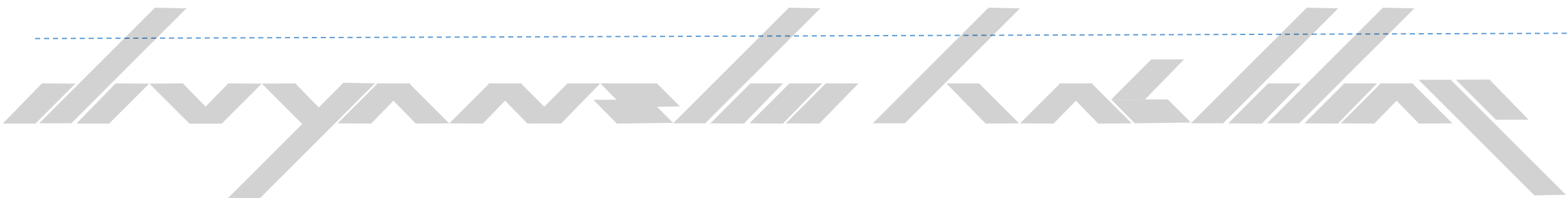
Technology Intervention Plan and Planning

Keep Out Policy Analysis Policy Intervention

Policy Guidelines

Perception of the Community Sampling Survey 56 parameters

Measurement Framework



Kalinamai of my Dream

Quality of life

Pulse of the community

Display culture and Image of the community

Wildlife & Landscape

Clean village and Green Village

Opportunity for all

Learning environment

Quality education

Informed and educated community – good parents, youth , children

Equality – economic equilibrium

Women space

Economic development

No poverty

Clean

Well connected

Preserve

- Morung
- Traditional attire and artifacts
- Traditional water sources and their stories (Solokhey)
- Flowers
- Megalith
- Monolith
- Gate
- Compost pit (Toboh)
- Sacred Grove
- Traditional play ground
- Traditional sports
- Rice beer
- Traditional community bath (Copowah)
- Newly married couple place
- Stories and folklore
- Irrigation system
- Terrace making
- Pathways
- Preserve their symbols and artifacts
- Grandmother stone
- Hunting pathway

- Drainage system
- Toilet
- Dustbins
- Traditional food / theme restaurant on NH
- Footpath
- Chulah (modern)
- Septic tank
- Pucca road
- **Learning center for farmers**
- **Famers market**
- Fruit and vegetable processing
- **Street lights**
- Student mentorship
- Bazar
- **Sanitation**
- **Road connectivity**
- **Museum**
- Classroom design
- Value to the communities commodity
- Commercial hub
- Employment
- Girls dormitory
- Boys dormitory
- Tourism
- Solar dryer / potable
- Infrastructure for youth and children
- Youth center and learning center
- Preservation and documentation
- Women places – sharing and learning
- Place to look after and sell flowers
- pig sty
- Water supply and sanitation
- Navigation / landscape / key map
- Documentation
- Improved irrigation system
- Solid waste management

Remove and Keep Out

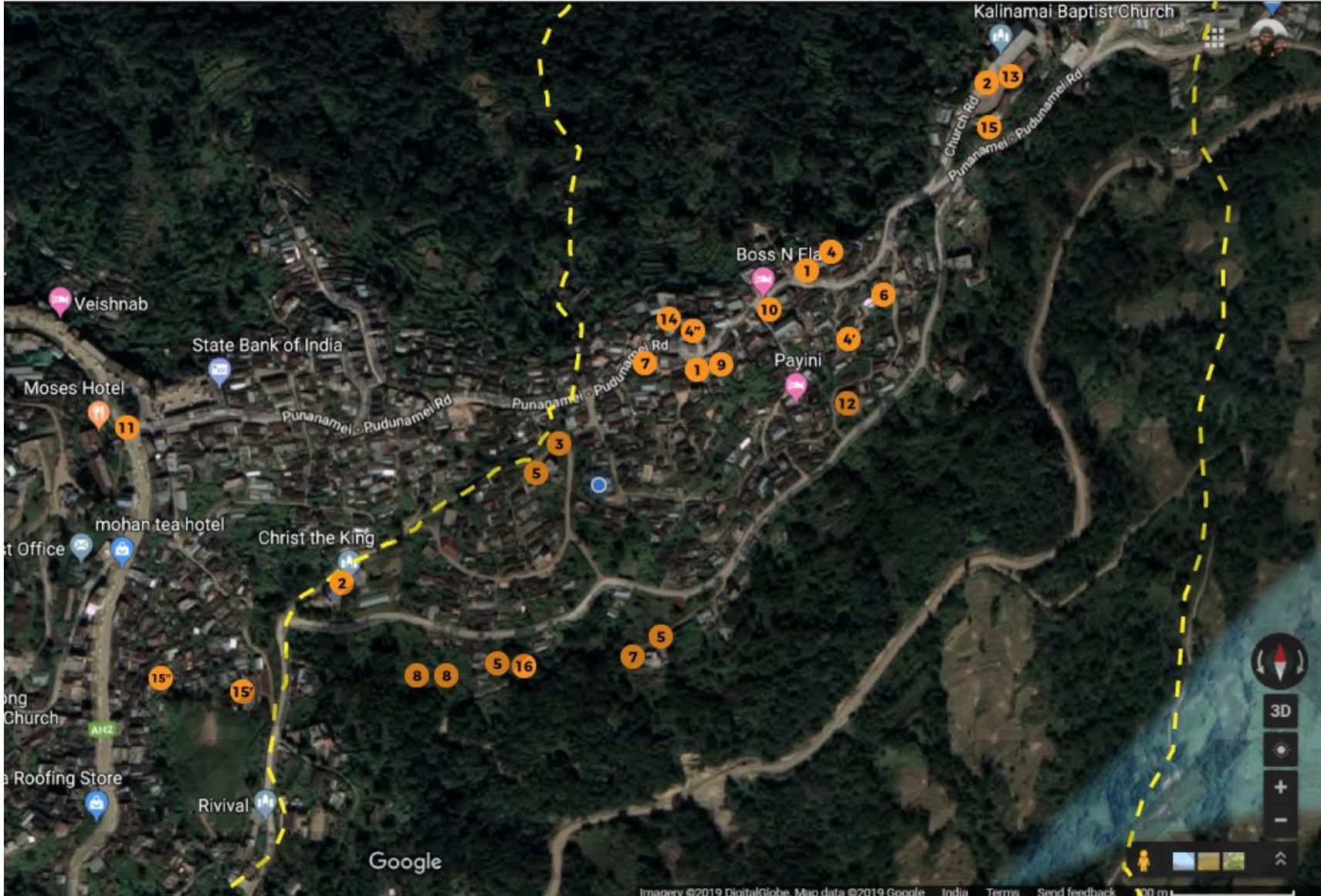
Remove

- Foreign liquor
- Piggery and poultry
- Old toilet system
- Squash / Chiao
- Landslide

Keep out

- Beggar

Elements to Preserve



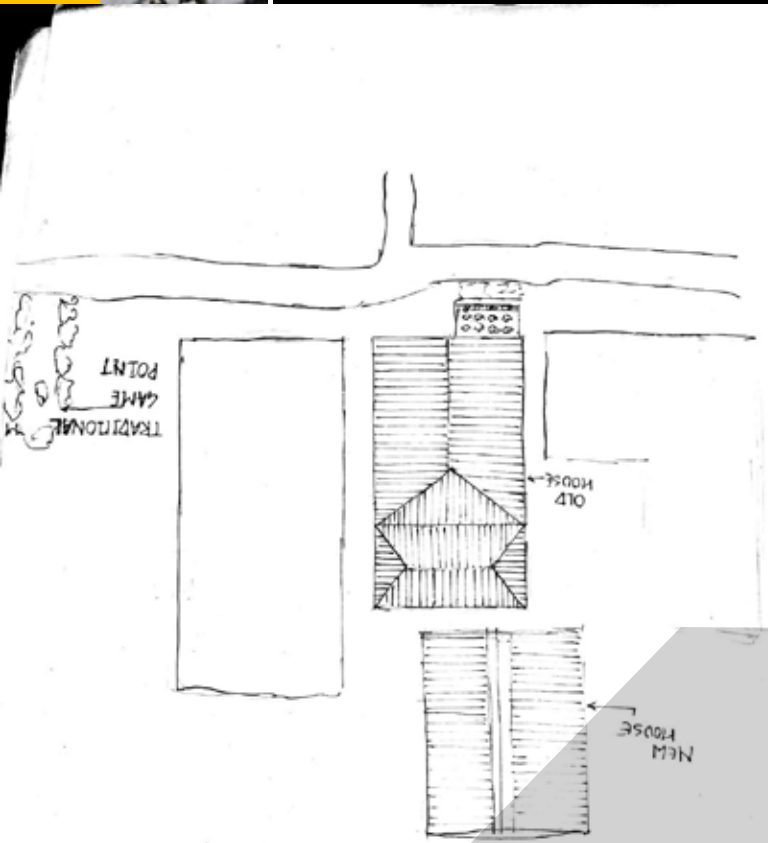
1. Dancing Ground
2. Places of Worship
3. Existing Village Gate
4. Morung (no longer used)
- 4'. Morung
- 4''. Old Community Hall
5. Megaliths
6. Natural Spring
7. Traditional Sports
8. Cemeteries
9. Assembly Point and Memorial Stones
10. Tea Stall and other shops
11. Main Bazaar
12. Traditional houses
13. Cultural learning and Dissemination Centre
14. Coaching Centre
15. Schools
16. Community Bath
17. Recreational Space, Kalinamai Football ground and Community Bath (Not shown in Map)



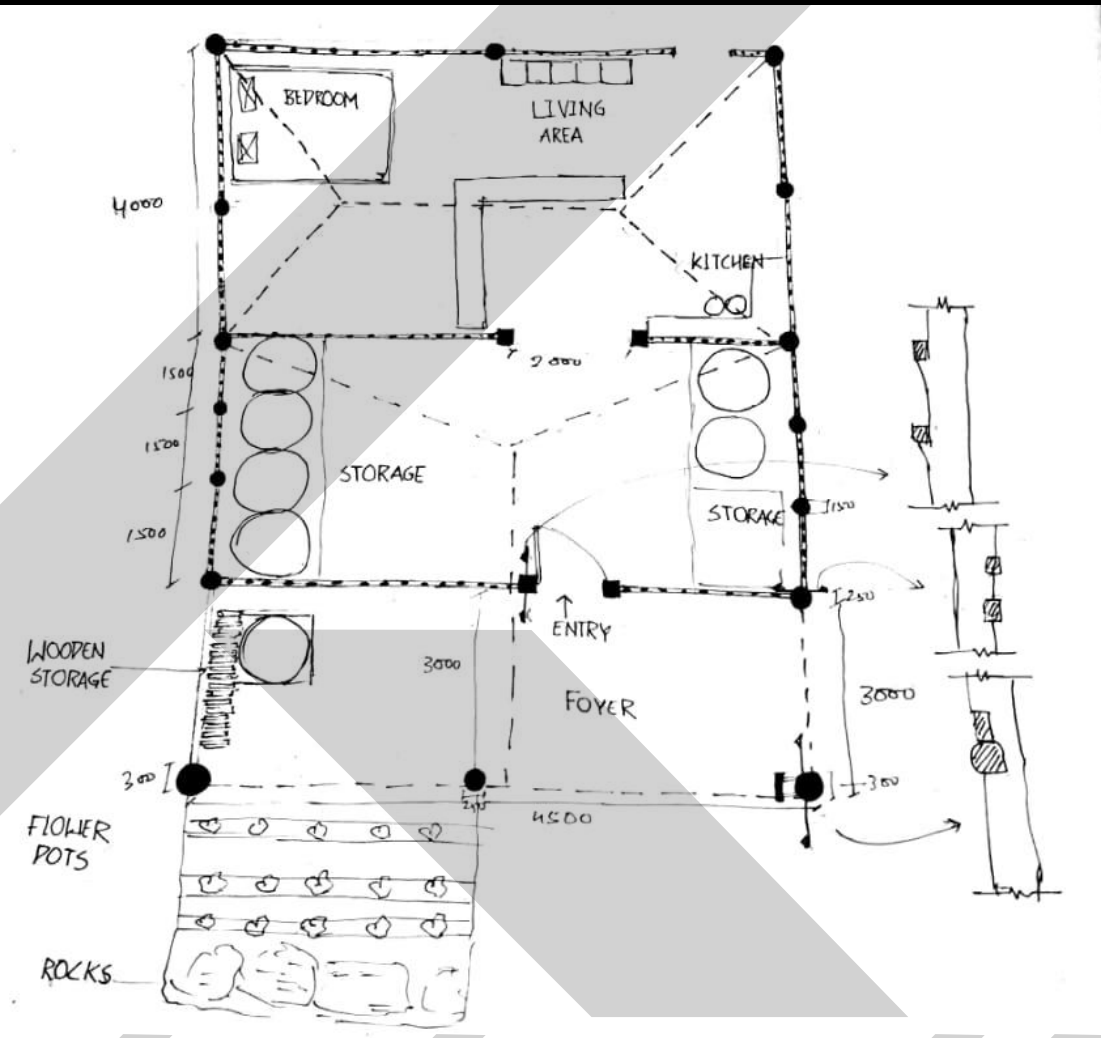
Documentation and Analysis



Traditional House

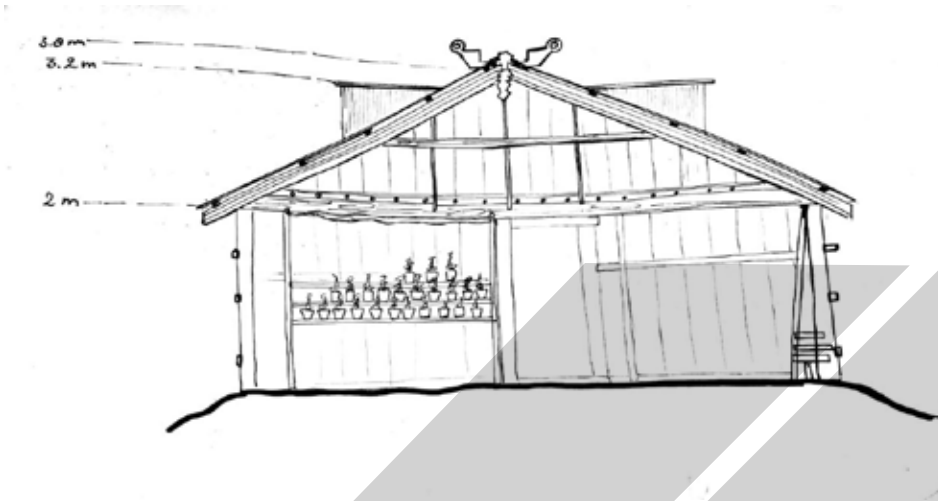


Site Plan

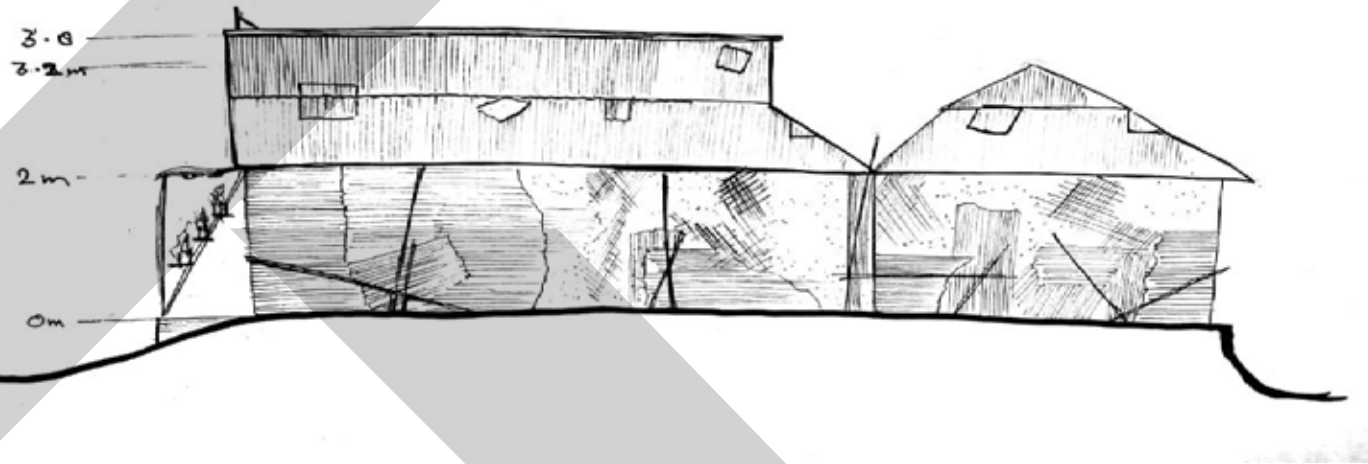


Plan of the Vernacular House

Traditional House



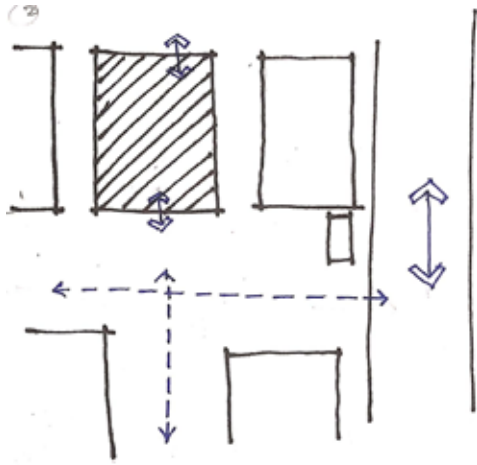
Front Elevation



Side Elevation

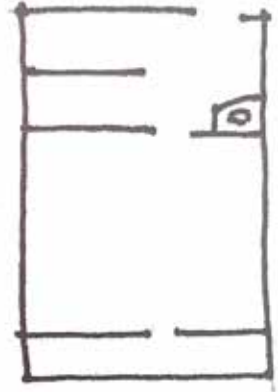
Morung

Integration with other spaces



- Well integrated

Space Provisions

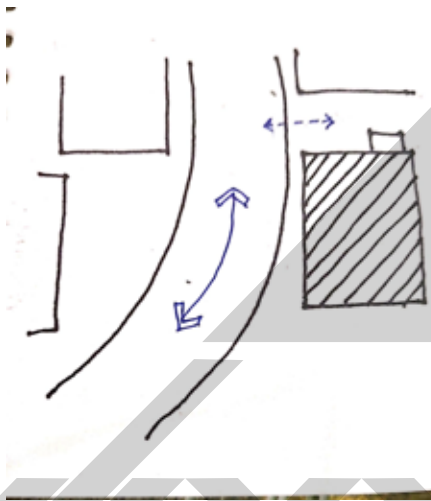
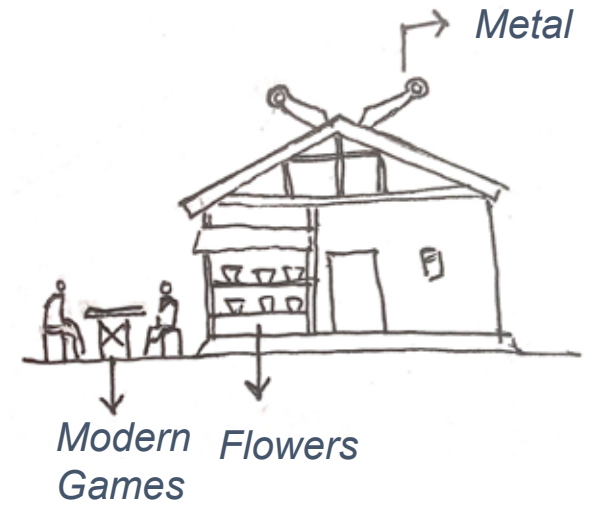


- Adequate space

Vernacular Elements

- Pitched Roof
- Mud Floor
- Stone Foundation
- Wattle and daub walls
- Wooden posts
- Traditional Furniture & artifacts

Translation of Traditional Spaces

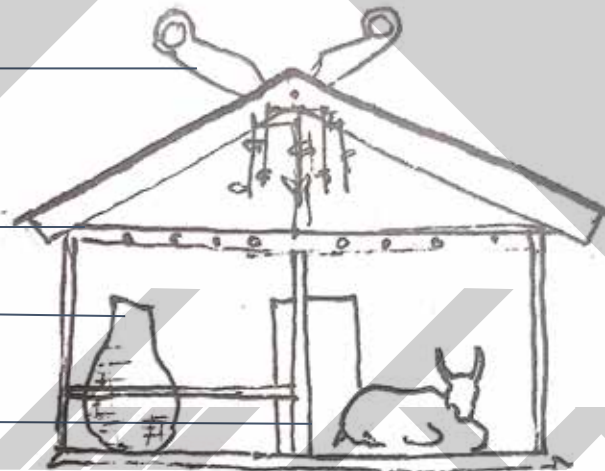


Chikaido
(strength of bull)

Loft

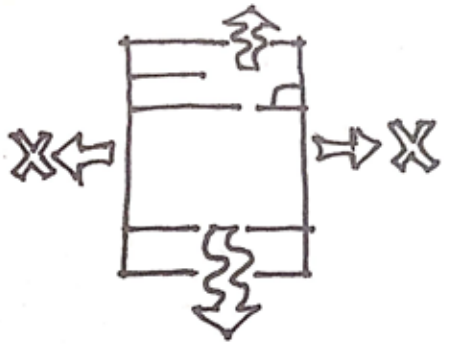
Storage

Teji



Morung

Interaction with nature

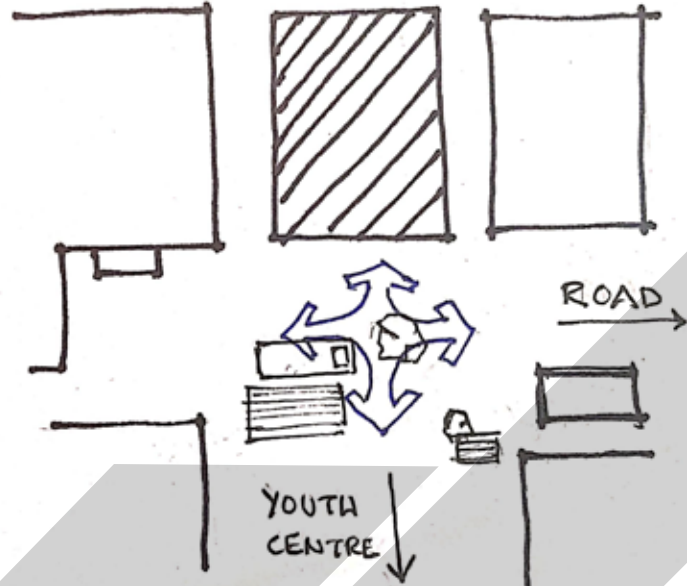


- *Openings on two sides*



- *Loft for storage and sleeping*

Collectivism achieved in layout



- Creation of node which brings people together

Functional Adaptability

- Used as private house



Maintenance

- Maintained by the family inhabiting the space

Inclusiveness of gender & age

- Inclusive of family members



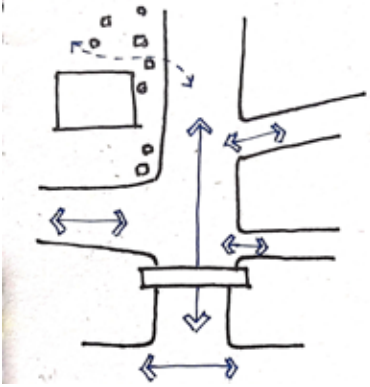
Level of basic services

- Electricity, water, etc. available

Megalith

Integration with other spaces

- *Location modified to accommodate pathways*



Interaction with nature

- *Completely located in natural setting*



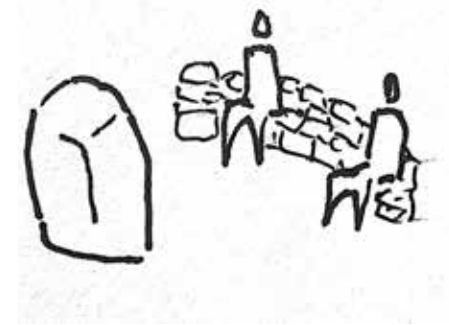
Translation of Traditional Spaces

- *Measures taken by community to protect and preserve*



Functional Adaptability

- *Used as meeting place.*



Space Provisions

- *Adequate and adaptable*

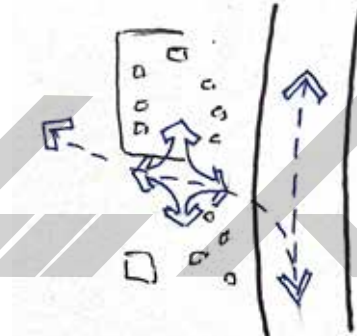


Level of basic services

Drinking water and toilet facilities are available

Collectivism achieved in layout

- *Inviting space for the community*



Inclusiveness of gender & age

Completely inclusive

Maintenance

- *Maintained by village community*

Dancing Ground

Integration with other spaces

- *Located at important village nodes.*



Interaction with nature

- *Completely open to sky*



Translation of Traditional Spaces

- *Has retained its space and character.*



Functional Adaptability

- *Used for parking and volleyball..*



Space Provisions

- *More space required to accommodate the growing population.*

Level of basic services

- *Drinking water and lights are available.*
- *Toilets are not maintained.*

Collectivism achieved in layout

- *Important gathering space specially during festivals.*

Inclusiveness of gender & age

- *Completely inclusive*



Maintenance

- *Maintained by village community*

Water Bodies

Integration with other spaces

- *Solakhe located at outskirts of village.*
- *Some can't be reached easily*



Space Provisions

- *Adequate spaces to collect water.*



Vernacular Elements

- *Monoliths are located nearby that adds value to the spaces.*



Inclusiveness of gender & age

- *Difficult to access by old people.*



Interaction with nature

- *Springs are located in completely natural setting*

Collectivism achieved in layout

- *People gather to collect water for basic services.*

Maintenance

- *Maintained by the village community.*

Level of basic services

- *Nil*



Sacred Groves

Integration with other spaces

- *Far away- Around 45 mins. Trek from village.*



Space Provisions

Freely growing in forest



Vernacular Elements

- *No man made elements present.*



Inclusiveness of gender & age

- *Only young and unmarried men are allowed.*



Interaction with nature

- *Located in forest.*

Functional Adaptability

- Nil

Maintenance

- Left to nature.

Level of basic services

- Nil

The background features a large, light gray 'X' shape formed by two intersecting diagonal bars. Below this, there are several smaller gray trapezoidal shapes, some of which are partially overlapping. At the bottom, there is a complex, layered pattern of horizontal and diagonal gray lines, resembling a stylized architectural or structural base.

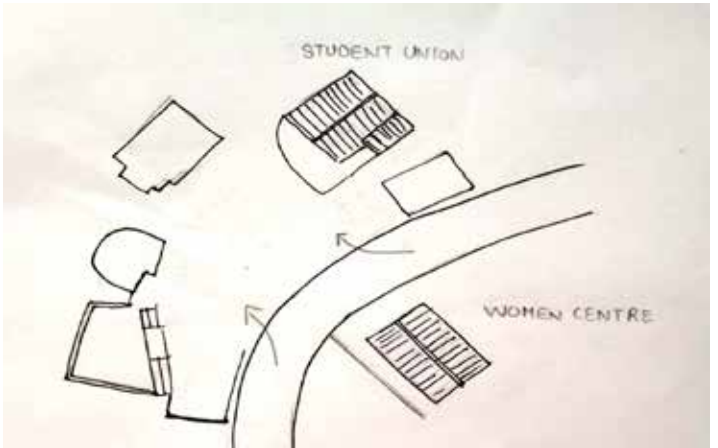
COMMON COMMUNAL SPACE

COMMON COMMUNITY CENTRE

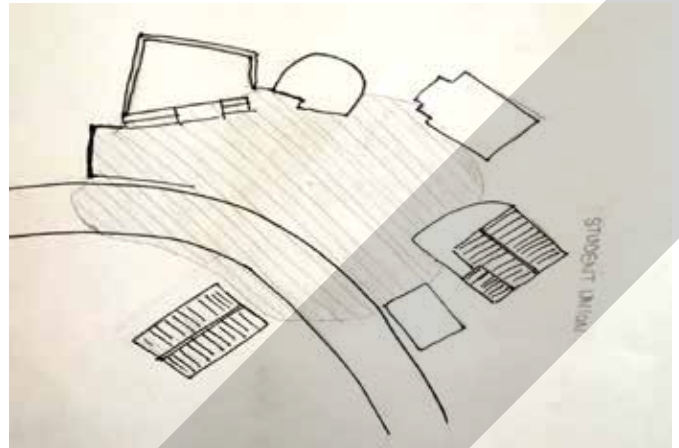


COMMON COMMUNITY LAND

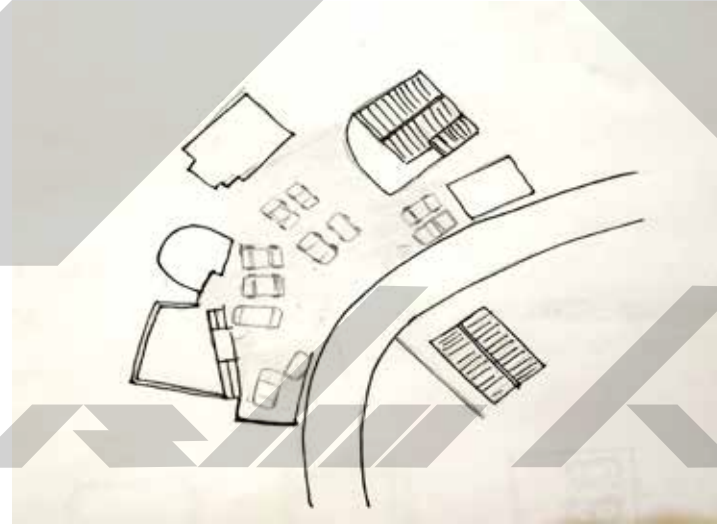
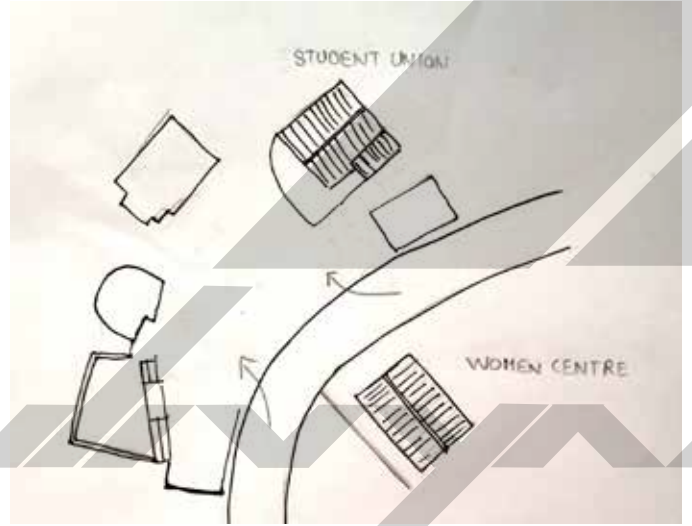
INTEGRATION WITH OTHER SPACES



SPACE PROVISION



FUNCTIONAL ADAPTABILITY



INCORPORATION OF VERNACULAR ELEMENTS

Main megalith of lower part of kalinamai village

COLLECTIVISM ACHIEVED IN LAYOUT

Yes, collectivism is achieved

INTERACTION WITH NATURE

Open spaces with some hedges and trees nearby.

LEVEL OF BASIC SERVICE

Small Dustbins are available
Less seating space available than required
No water facilities and public toilets

INCLUSIVENESS OF GENDER AND AGE GROUP

All age group and both male and female are included

MAINTENANCE

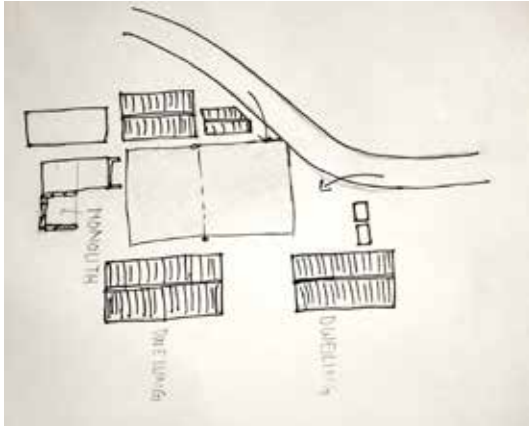
Not maintained

PLAYGROUND(VOLLEYBALL COURT)

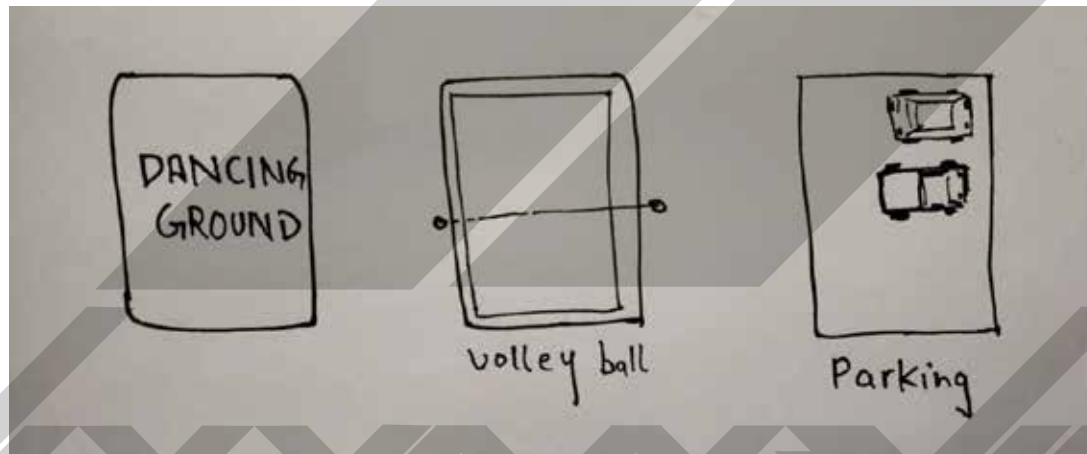


PLAYGROUND(VOLLEYBALL COURT)

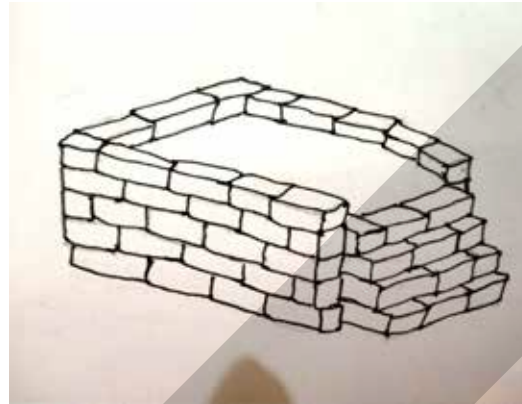
INTEGRATION WITH OTHER SPACES



FUNCTIONAL ADAPTABILITY



INCORPORATION OF VERNACULAR ELEMENTS



MEGALITHS

INCORPORATION OF VERNACULAR ELEMENTS

Main megalith of lower part of kalinamai village

COLLECTIVISM ACHIEVED IN LAYOUT

Yes, collectivism is achieved

INTERACTION WITH NATURE

Open spaces with some planters nearby. From this space, hill (view)

LEVEL OF BASIC SERVICE

No

INCLUSIVENESS OF GENDER AND AGE GROUP

All age group, both the gender
In playing aspects
Boys (age 12-19)

MAINTENANCE

Not maintained

PLAYGROUND (FOOTBALL GROUND)

INTEGRATION WITH OTHER SPACES Located far from the village

COLLECTIVISM ACHIEVED IN LAYOUT Yes, collectivism is achieved

INTERACTION WITH NATURE Open spaces with many planters nearby. From this space, hill (view)

LEVEL OF BASIC SERVICE Washrooms, drinking water, changing room

INCLUSIVENESS OF GENDER AND AGE GROUP All age group, both the gender
In playing aspects
Boys (age 12-19)

MAINTENANCE Not maintained



SPACE PROVISIONS

WORSHIP SPACE (GOD'S MOUNTAIN)

OPEN SPACES



MONOLITH



**BAMBOO STICKS ELEMENT
BELIEVES ABOUT POPULATION AND
PROSPERITY**

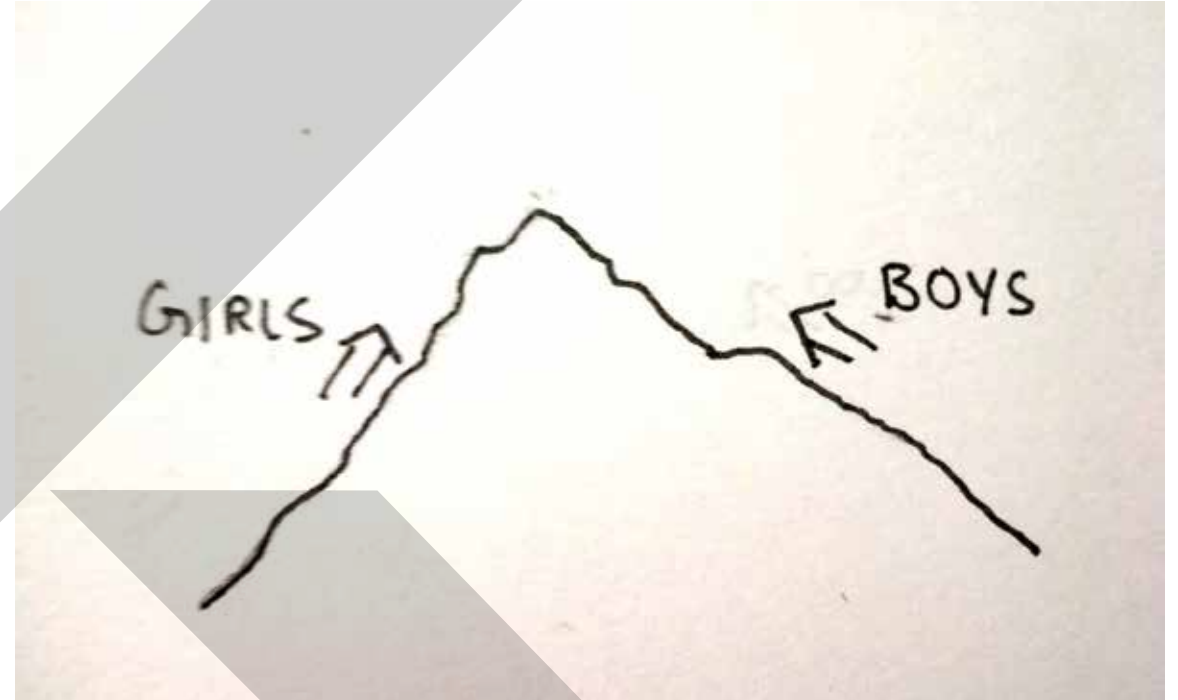
INTERACTION WITH NATURE



ROAD CONNECTIVITY



COLLECTIVISM ACHIEVED IN LAYOUT



INTEGRATION WITH OTHER SPACES

3-4 km from village, nearby places: potato farm, JNV school, army camp

SPACE PROVISIONS

Very crowded on festivals

TRANSLATION OF TRADITIONAL SPACES

Retained as it

CEMETARY

SPACIAL PROVISIONS



GRANDMOTHER'S STONE



*OFFERINGS ARE GIVEN SUCH AS (FRUITS , FISHES)
BELIEVING THAT THEY GET GOOD LUCK*

COLLECTIVISM ACHIEVED IN LAYOUT

Yes

INCLUSIVENESS OF ALL AGE GROUP AND GENDER

All age group and both the gender are included

MAINTENANCE

Not maintained

INTERACTION WITH NATURE

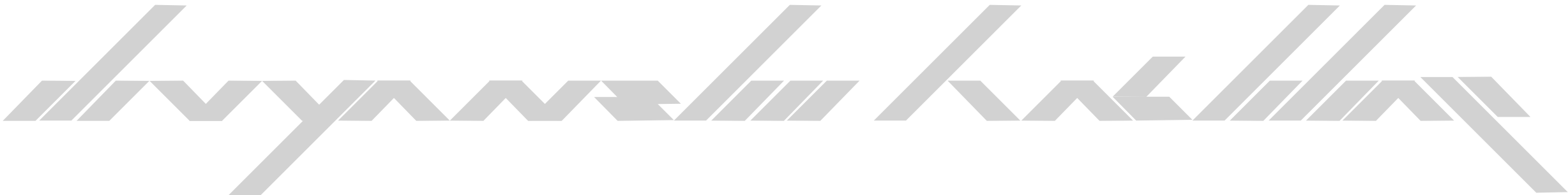
Open spaces with many planters and trees

LEVEL OF BASIC SERVICE


No pathways, dustbins and other necessary services



Bazar





Parameters	Existing Conditions	Proposed site
	<p data-bbox="825 332 1544 436">Along main road (AH-2) connecting Imphal and Nagaland</p> 	<p data-bbox="1640 332 1977 379">Provide Signage</p> 
<p data-bbox="135 725 570 1053">INTERGRATION WITH OTHER SPACE</p>	<p data-bbox="825 651 1276 698">Roads towards village</p> 	<p data-bbox="1640 651 2288 755">Paintings showing the culture of village</p> 
	<p data-bbox="825 1119 1523 1223">Connects post office, town offices, town hall through stairs</p> 	<p data-bbox="1640 1119 2040 1166">Better Landscaping</p> 

Parameters

Existing Conditions

Proposed site

Wide Roads



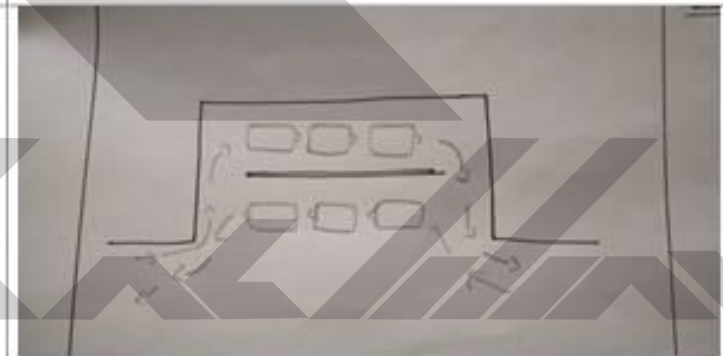
Separate space for weekly market

SPACE PROVISIONS

Wide covered drains (used as footpath and for seating)



Make proper Auto-stand





Parameters	Existing Conditions	Proposed site
TRANSLATION OF TRADITIONAL SPACE	No such changes	
COLLECTIVISM ACHIEVED IN LAYOUT	Collectivism is achieved	



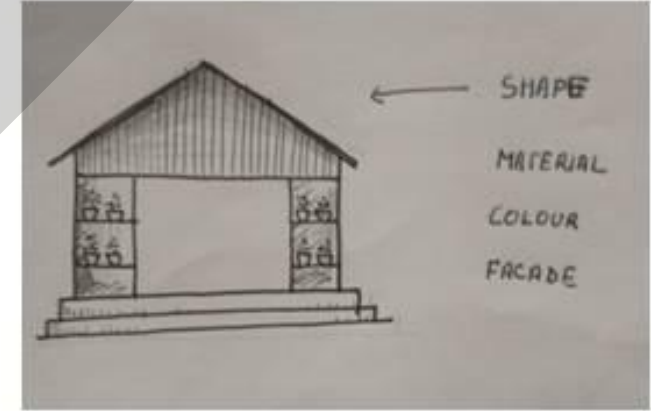
Parameters

Existing Conditions

Proposed site

SPACE

- Few of the buildings have commercial are on the ground floor and residential on the upper floors.



INCORPORATION OF VERNACULAR ELEMENT

MATERIAL

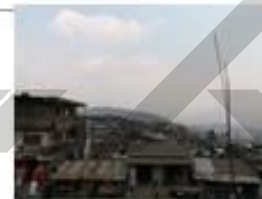
- Mainly corrugated sheet (mid vernacular) and concrete.
- 2-3 shops made of bamboo and wood.



Uniformity Of Structures

SHAPE

- Mainly sloping roof



Parameters

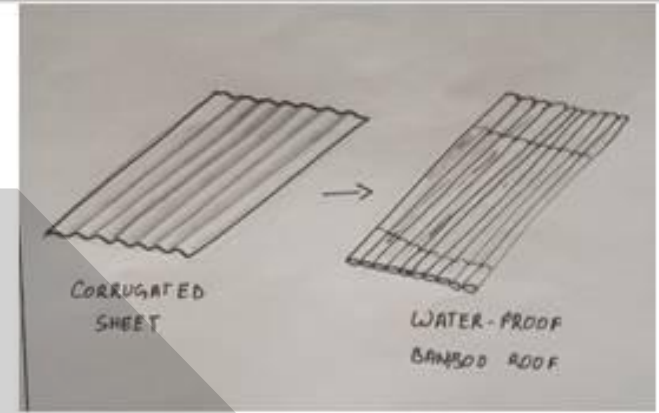
Existing Conditions

Proposed site


- The sloping roof of the shops do blend with the hilly background of the place.






INTERACTION WITH NATURE



The broad road and low height buildings give a better view and framing of the nature



Use of tin as building material do not blend with the nature

Parameters	Existing Conditions	Proposed site
	Broad road and footpath allows proper circulation	
FUNCTIONAL ADAPTABILITY	Drainage along the road 	
	Parking area present	

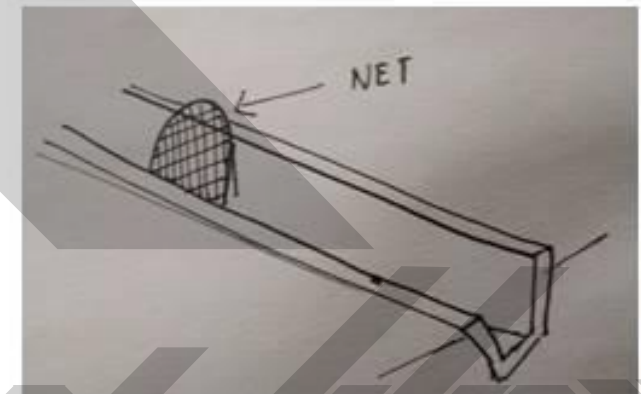
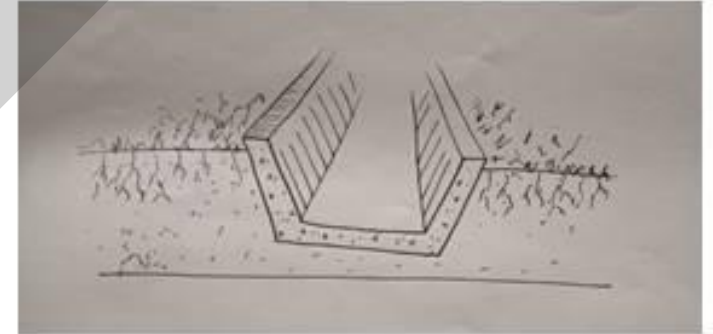
Parameters	Existing Conditions	Proposed site
	2 Toilet (gents), 1 Toilet Complex 	 <p data-bbox="2109 396 2254 492">Seating Space</p>
<p data-bbox="216 728 649 849">LEVEL OF BASIC SERVICES</p>	Public water supply 2 ATM, Pharmacy 	 <p data-bbox="2119 749 2293 792">Dust- Bin</p>
	Well landscaped and planned traffic point 	<p data-bbox="1668 1306 1898 1349">Street Lights</p>

Parameters	Existing Conditions	Proposed site
MAINTENANCE	<ul style="list-style-type: none"> - Clean road - Road broken at landslide point - plastic clogging drains 	Drainage system 
INCLUSIVENESS OF GENDER AND AGE	<ul style="list-style-type: none"> -All genders are included in the market space - The place is not friendly for specially abled and old people 	

Canal

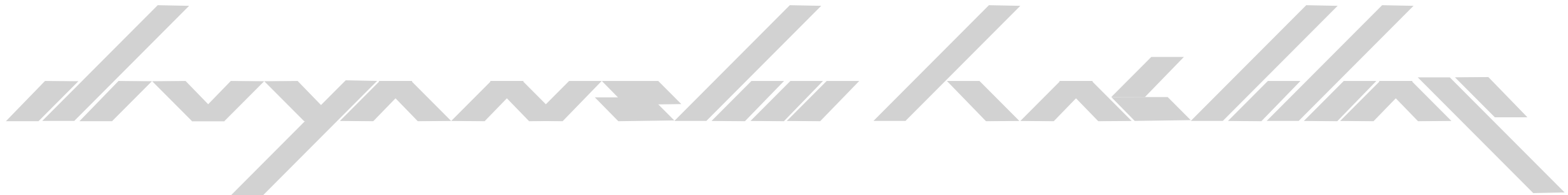
Proposed Idea

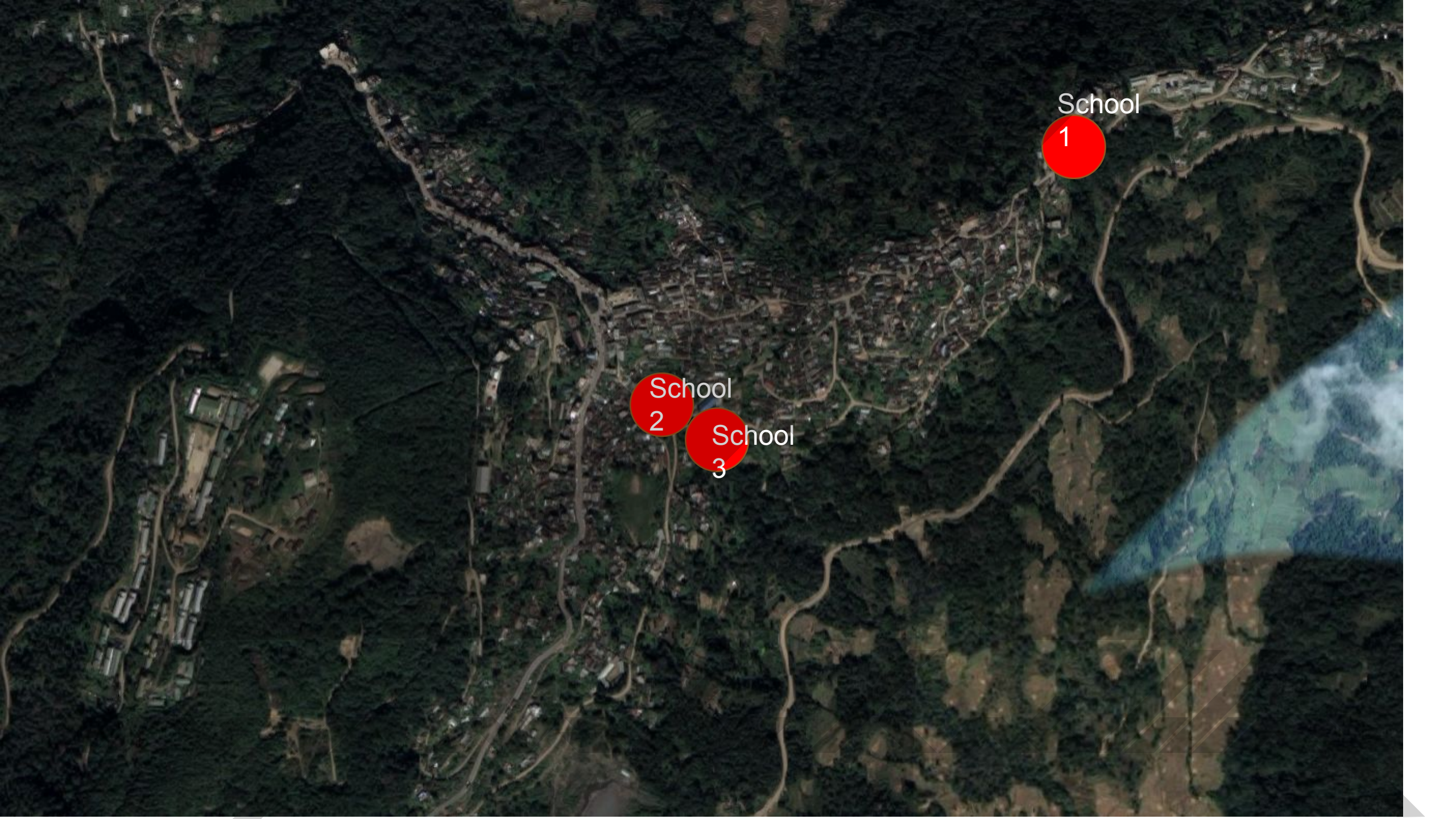
- retaining walls
- provide net at certain interval to stop garbage and waste materials entering the field





School , Reading Space and Library





School

1

School

2

School

3

SCHOOL, READING SPACE AND LIBRARY



GOVT.
HOSTEL



PLAYGROUND IN
SCHOOL



SEMI-GOVT
SCHOOL



COURTYA

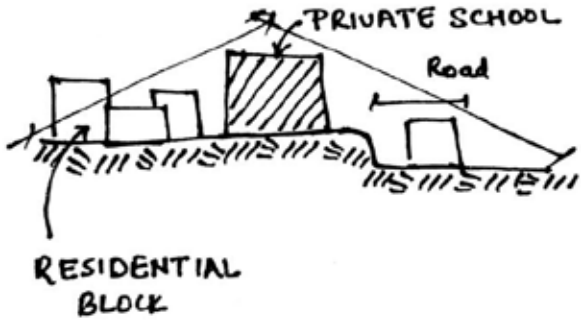


DORMITO
RY

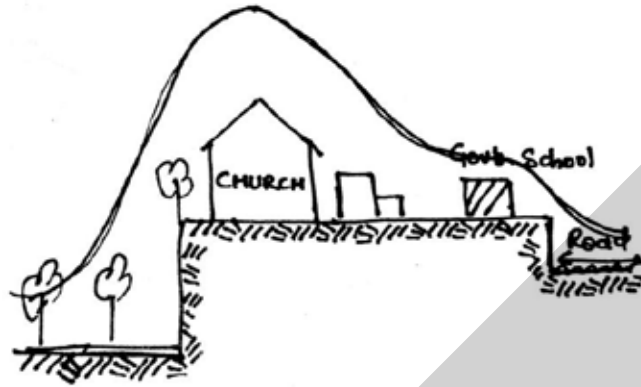


SCHOOL
TOILET

INTEGRATION WITH SPACES

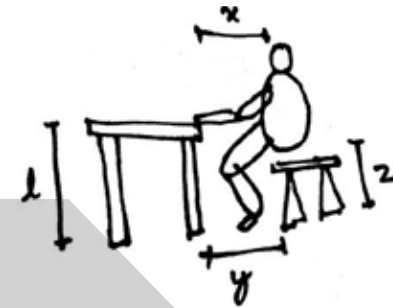
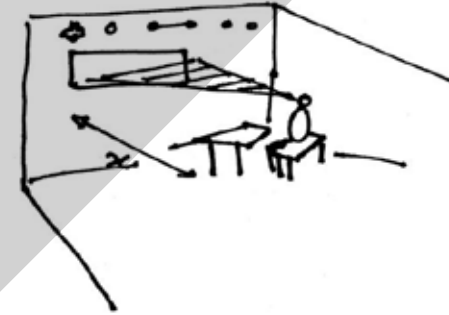


PRIVATE SCHOOL



GOVT SCHOOL

FUNCTIONAL ADAPTABILITY



CLASSROOM DESIGN SHOULD BE-
Adequate visibility
Ergonomics of Desk and Bench

PARAMETERS

SPACE PROVISION

INCORPORATION OF VERNACULAR ELEMENTS

TRANSLATION OF TRADITION SPACE

INTERACTION WITH NATURE

COLLECTIVISM ACHIEVED IN LAYOUT

LEVEL OF BASIC SERVICES

MAINTENANCE

INCLUSIVENESS OF GENDER AND AGE

EXISTING CONDITIONS

COURTYARD, CLASSROOMS, AND OFFICES

PITCHED ROOF RETAINS THE IDENTITY, COURTYARD

PATHWAY AND ENTRANCE ARE PROVIDED ACCORDING TO THE CONTOUR OF THE SITE

SURROUNDED WITH LUSH GREENERY

SPACED USED BY ALL STUDENTS OF THE VILLAGE

INSUFFICIENT TOILETS; LACK OF PRIVACY; SMALL PLAY AREA;

LOW MAINTENANCE DUE TO LACK OF FUNDING

NOT ACCESSIBLE FOR ELDERS AND SPECIALLY ABLED CHILDREN

SACRED SPACES

(places to conserve and preserve)



SACRED GROVES



FEAST OF PRIDE STONE GARDEN



RITUAL PLACE



HONEYMOON SPACE



SACRED GROVES ENTRANCE MONOLITH



FOOTPRINT OF SPIRIT



7 DAY MEGALITH



HUNTING PATHWAY

COMMUNITY CENTRE



MURAL
S

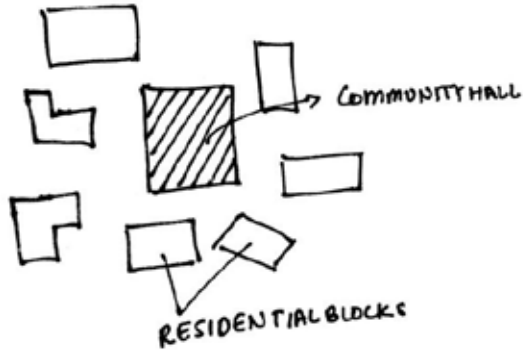


MURAL
S

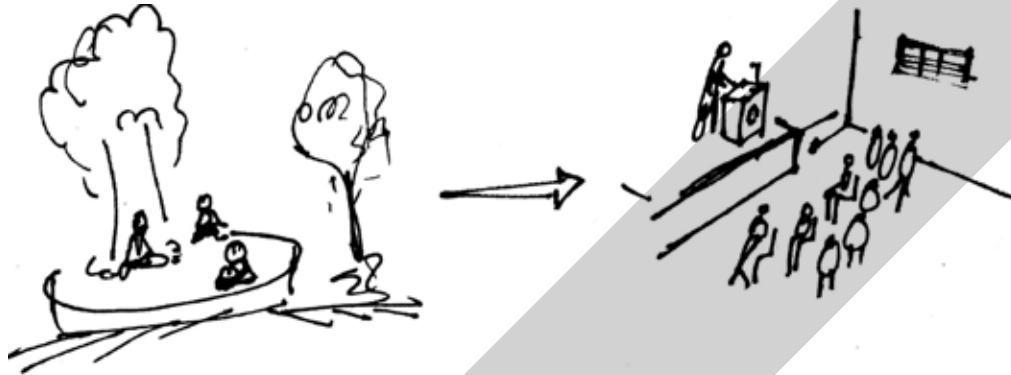


INTERIOR SPACE OF
COMMUNITY HALL

INTEGRATION WITH SPACES



FUNCTIONAL ADAPTABILITY



INCORPORATION OF VERNACULAR ELEMENT



ORGANICALLY ORIENTED

SPATIAL TRANSITION WITH TIME

BUFFALO HEAD MURAL CARVED IN SINGLE WOOD

PARAMETERS	EXISTING CONDITIONS
SPACE PROVISION	ASSEMBLY HALL,VILLAGE DEVELOPMENT COMMUNITY
INCORPORATION OF VERNACULAR ELEMENTS	PITCHED ROOF RETAINS THE IDENTITY,COURTYARD AND BUFFALO HEAD MURAL
TRANSLATION OF TRADITIONAL SPACE	NONE
INTERACTION WITH NATURE	NONE
COLLECTIVISM ACHIVED IN LAYOUT	NONE
LEVEL OF BASIC SERVICES	INSUFFICIENT TOILETS;LESS NO. OF PUBLIC TOILET
MAINTENANCE	WELL MAINTAINED BUT DUSTBIN REQUIRED
INCLUSIVENESS OF GENDER AND AGE	EASILY ACCESSIBLE FOR ALL

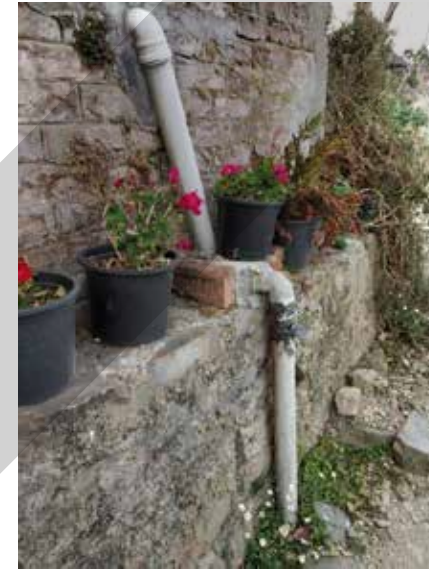
CONTEMPORARY HOUSE



CONSTRUCTION IN BRICK-CONCRETE



BRIGHT COLOUR COATING



SEWAGE PIPE SYSTEM



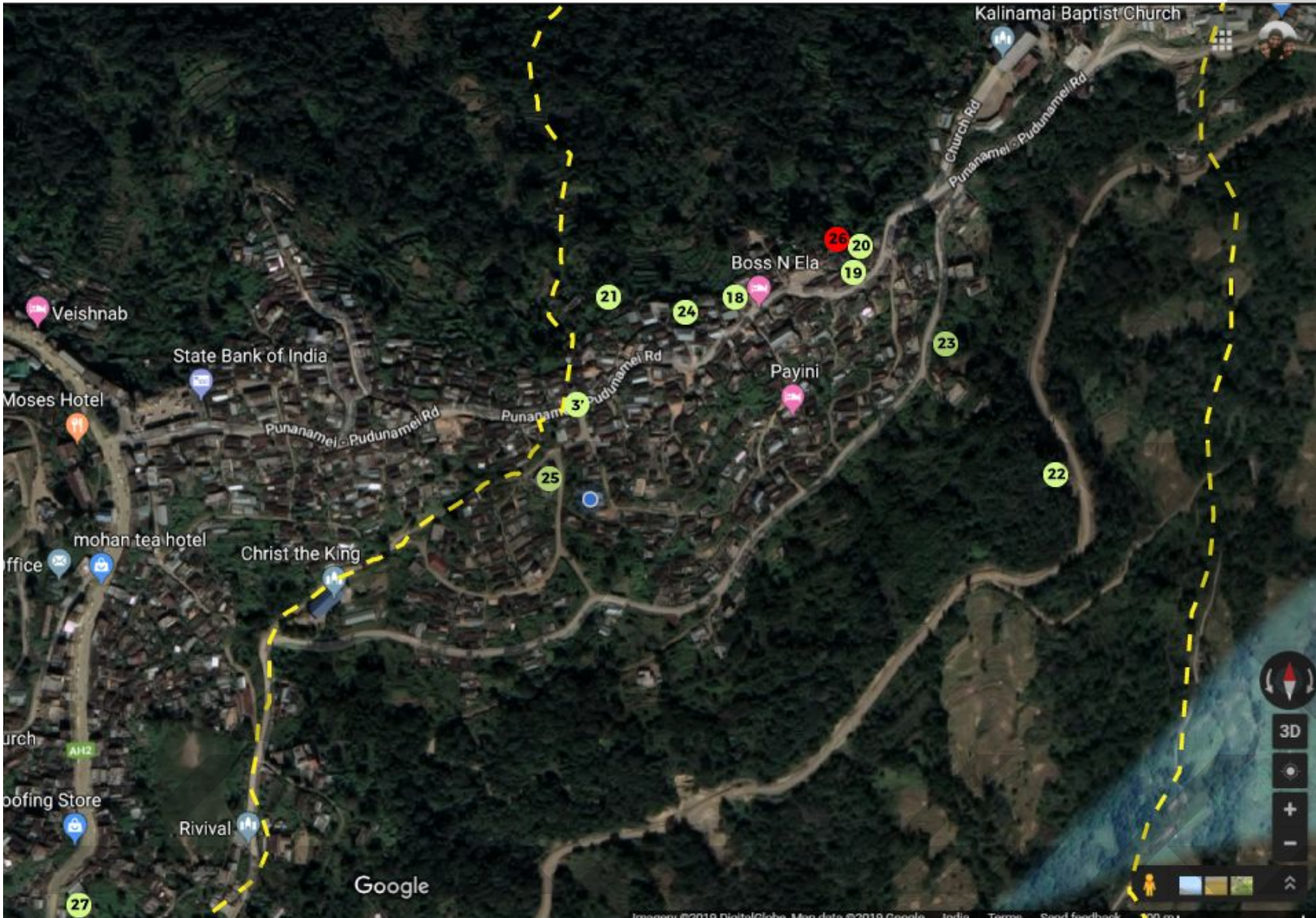
OPEN DRAIN ALONG THE ROAD



RETENTION OF

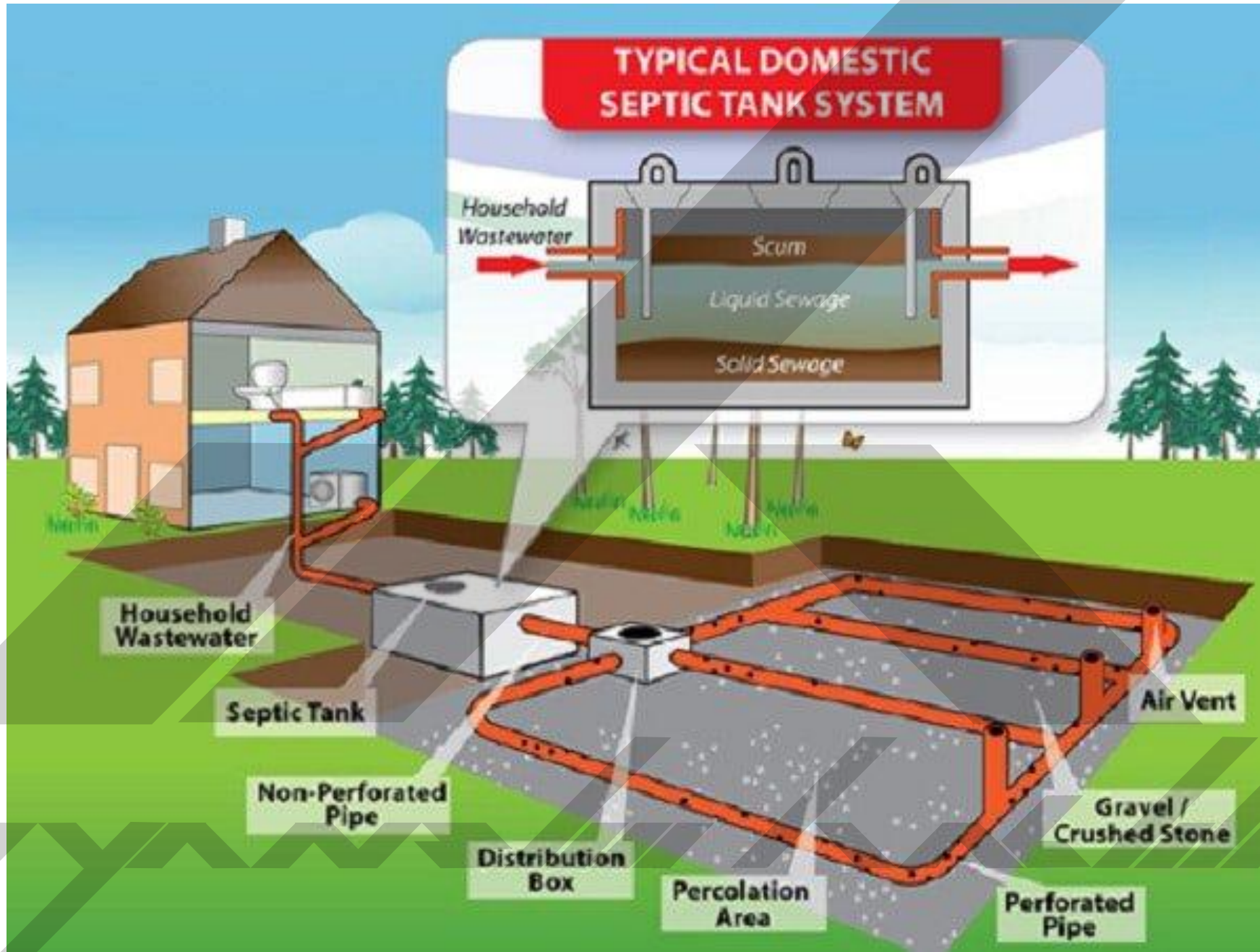
PARAMETERS	EXISTING CONDITIONS
SPACE PROVISION	STORAGE SPACE,PARKING,SEPTIC TANK
INCORPORATION OF VERNACULAR ELEMENTS	PITCHED ROOF, FLAT RCC ROOF AND BUFFALO HEAD MURAL
TRANSLATION OF TRADITIONAL SPACE	NONE
INTERACTION WITH NATURE	-
COLLECTIVISM ACHIVED IN LAYOUT	-
LEVEL OF BASIC SERVICES	SEPTIC TANK,DRAIN CONNECTED WITH OPEN STREAM ON ROAD
MAINTENANCE	WELL MAINTAINED BUT DUSTBIN REQUIRED
INCLUSIVENESS OF GENDER AND AGE	EASILY ACCESSIBLE FOR ALL

Elements to Add and Remove



- 3'. Proposed Village Gate
- 18. Proposed Park
- 19. Proposed Ladies' Morung
- 20. Proposed Public Toilet
- 21. Proposed Farmers' Development Centre
- 22. Proposed Sewage Treatment Plant (STP)
- 23. Proposed Waste Collection Point
- 24. Proposed Library & Learning Centre
- 25. Proposed Open-air Museum
- 26. Pig sty
- 27. Proposed Traditional House cum Restaurant

A Typical Septic Tank



Advantages

- *Hygienically and technically appropriate*
- *Affordable and easy to construct with locally available materials.*
- *Design and specifications can be modified to suit householder's needs and affordability.*
- *Eliminates mosquito, insect and fly breeding.*
- *Can be constructed in different physical, geological and hydrogeological conditions.*
- *Free from health hazards and does not pollute surface or ground water, if proper precautions and safeguards are taken during construction.*
- *Can be located within the premises as it is free from foul smell and fly/mosquito nuisance etc.*
- *Can be constructed on upper floors of houses.*
- *Pits are generally designed for 3-year desludging interval, but if desired, it can be designed for longer periods or it can be reduced even to two years.*
- *Maintenance is easy, simple and costs very little.*
- *Needs only 1 to 1.5 litres of water for flushing, while conventional flush toilet needs 12 to 14 litres of water.*
- *Needs less space than a septic tank toilet system.*
- *Does not need scavengers for cleaning the pits or disposal of sludge. This can be done by the householder.*
- *Makes available rich fertilizer and soil conditioner.*
- *Can be easily connected to sewers when introduced in the area.*
- *A low volume flushing cistern could be attached to avoid pour flushing.*

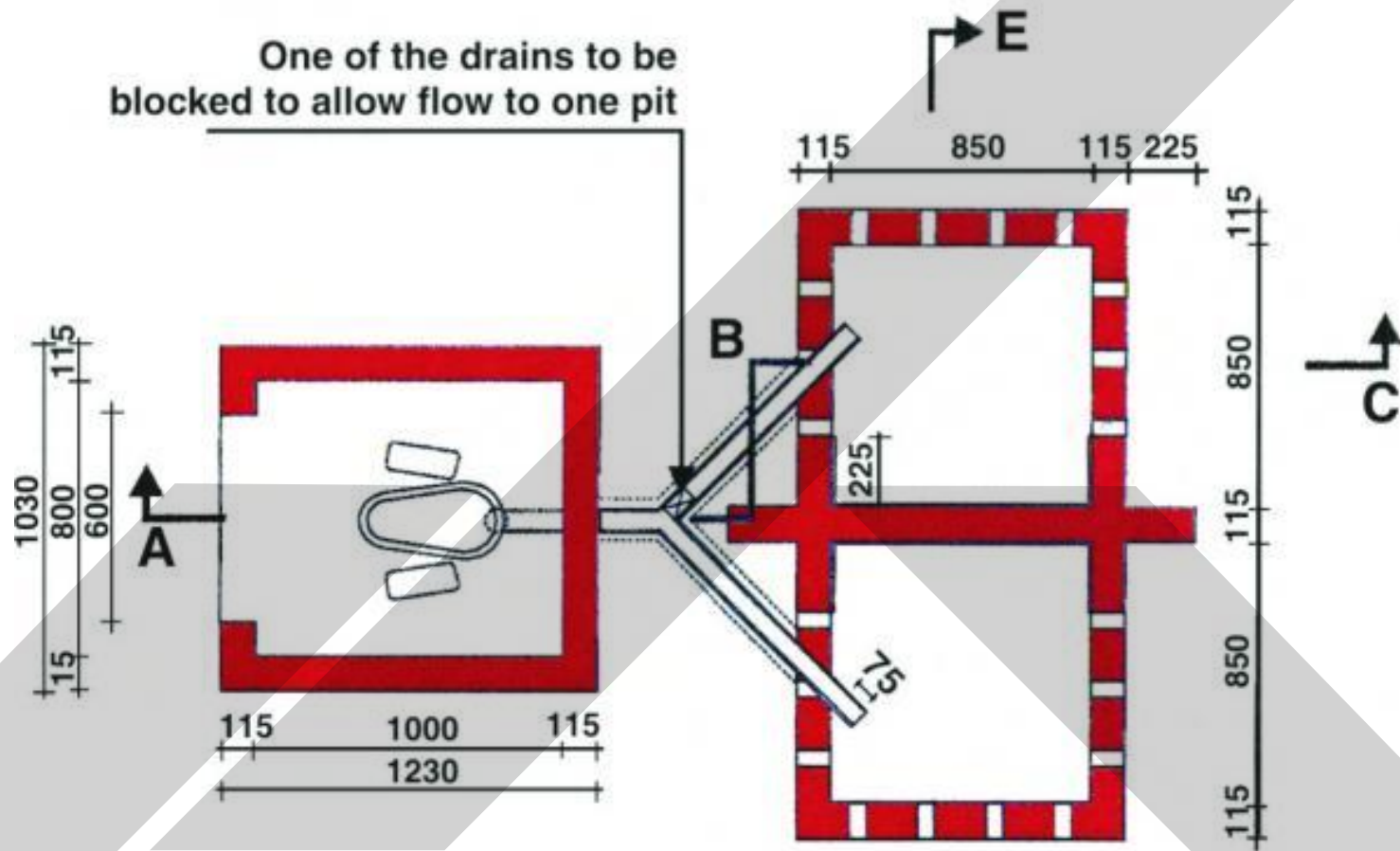
4. SOME ISSUES THAT NEED SPECIAL CONSIDERATION FOR HILLY AREA

Some of the issues that need careful consideration in design of various components of drainage system in hilly area are presented in this section. For detail design of these components standard books may be followed.

4.1 Design consideration of drainage channels, internal common drains and roadside drains

- Design of individual plot should be responsibility of individual. Though detail design may not be required to fix the size, detail planning of layout is required to ensure that water from one plot does not overflow to the nearby downstream plot. In case of difficulties, an internal common drain passing through various plots may be provided with mutual agreement of all individual owners.
- Internal common drains and roadside drains have to be designed in order to handle the peak runoff adequately. In case of a common system of waste water and storm water the drain should be planned as cover drain with cleaning provision.
- All these drain can be designed by following principle of most efficient channel section, provided property boundary does not put any constraint in adopting such efficient section. The geometric elements of most hydraulically efficient sections for different type of channels are given in a tabular form in Table 7.

TWIN-PIT TOILET SYSTEM

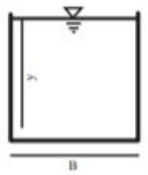
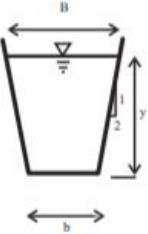
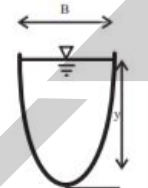


Plan



A Typical Septic Tank

Table 7: Geometric elements of most hydraulically efficient sections without freeboard

Cross-Section	Area (A)	Wetted Perimeter (P)	Hydraulic Radius (R)	Top width (B)	Hydraulic Depth (D)	$AR^{2/3}$
 <p>Rectangle</p>	$2y^2$	$4y$	$\frac{y}{2}$	$2y$	y	$(2y^8)^{1/3}$
 <p>Trapezoidal</p>	$\sqrt{3}y^2$	$2\sqrt{3}y$	$\frac{y}{2}$	$\frac{4}{3}\sqrt{3}y$	$\frac{4}{3}y$	$\sqrt{3}\left(\frac{y^8}{4}\right)^{1/3}$
 <p>Semicircle</p>	$\frac{\pi}{2}y^2$	πy	$\frac{y}{2}$	$2y$	$\frac{\pi}{4}y$	$\frac{\pi}{2}(2y^8)^{1/3}$

4.2 Choice of channel section

The primary factors that govern the selection of channel geometry are:

- Soil type (stability considerations); preferably inclined section in unstable soil conditions.
- Ease for maintenance.
- Range of seasonal variation of peak discharge and minimum discharge.
- Availability of construction material

4.3 Methodology to design the most efficient channel section:

Step 1: Computation of contributing area from delineated watersheds.

Step 2: Computation of the peak discharge using the rational method.

Step 3: Choice of channel geometry and construction material.

Step 4: Mathematical computation of the dimensions of the most efficient section.

Street Lighting

The most common reasons for inefficient street lighting systems in municipalities are:

- Selection of inefficient luminaires
- Poor design and installation
- Poor power quality
- Poor operation and maintenance practices

There is tremendous potential to improve lighting quality while reducing energy use, costs, and greenhouse gas emissions—through energy-efficient retrofits for street lighting and improved operation and maintenance (O&M) practices.

Table 1: Classification of Roads (BIS, 1981)

Group	Description
A1	For very important routes with rapid and dense traffic where the only considerations are the safety and speed of the traffic and the comfort of drivers
A2	For main roads with considerable mixed traffic like main city streets, arterial roads, and thoroughfares
B1	For secondary roads with considerable traffic such as local traffic routes, and shopping streets
B2	For secondary roads with light traffic
C	For residential and unclassified roads not included in the previous groups
D	For bridges and flyovers
E	For towns and city centers
F	For roads with special requirements such as roads near airports, and railways

Table 2: Lamp Technology

Type of Lamp	Luminous Efficacy (lm/W)	Color Rendering Properties	Lamp life in hrs	Remarks
High Pressure Mercury Vapor (MV)	35-65 lm/W	Fair	10,000-15,000	High energy use, poor lamp life
Metal Halide (MH)	70-130 lm/W	Excellent	8,000-12,000	High luminous efficacy, poor lamp life
High Pressure Sodium Vapor (HPSV)	50-150 lm/W	Fair	15,000- 24,000	Energy-efficient, poor color rendering
Low Pressure Sodium Vapor	100-190 lm/W	Very Poor	18,000-24,000	Energy-efficient, very poor color rendering
Low Pressure Mercury Fluorescent Tubular Lamp (T12 & T8)	30-90 lm/W	Good	5,000-10,000	Poor lamp life, medium energy use, only available in low wattages
Energy-efficient Fluorescent Tubular Lamp (T5)	100-120 lm/W	Very Good	15,000-20,000	Energy-efficient, long lamp life, only available in low wattages
Light Emitting Diode (LED)	70-160 lm/W	Good	40,000- 90,000	High energy savings, low maintenance, long life, no mercury. High investment cost, nascent technology

Street Lighting

- A:** Angle of Tilt
- H:** Mounting Height
- O:** Overhang
- Or:** Outreach
- S:** Spacing
- W:** Width

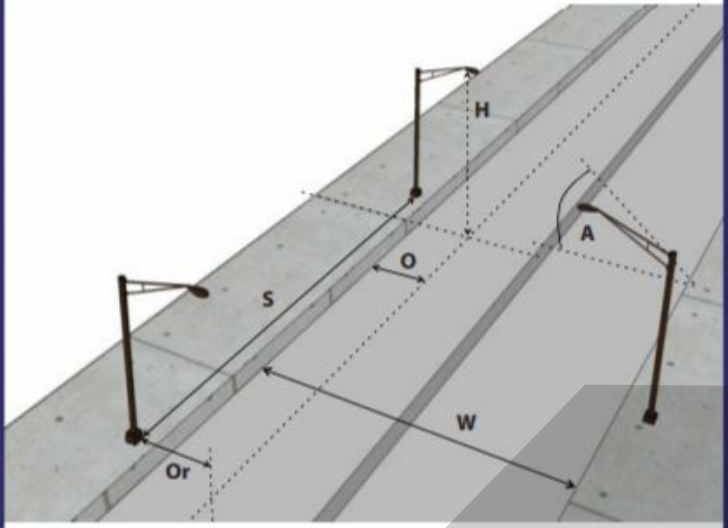


Figure 2: Street Lighting Features (BIS, 1981)

Table 8: Cost information for India – Various EE Street Lighting Technologies

Type of Lamp	Luminous Efficacy	Color Rendering Properties	Lamp Life in Hours	Remarks	Installed Cost [Only Lamp + Luminaire Supply]	Annual Energy Cost	Annual Operating Cost	Total Annualized Cost [Energy Cost + Operating Cost]
	(lm/W)				(INR)	(INR)	(INR)	(INR)
High Pressure Mercury Vapor (MV)	35-65 lm/W	Fair	5,000	High energy use, poor lamp life	465,800	805,920	43,625	849,545
Metal Halide (MH)	70-130 lm/W	Excellent	8,000	High luminous efficacy, poor lamp life	2,449,615	464,954	77,703	542,657
High Pressure Sodium Vapor (HPSV)	50-150 lm/W	Fair	15,000	Energy-efficient, poor color rendering	1,750,286	345,394	10,512	355,906
Low Pressure Sodium Vapor	100-190 lm/W	Very Poor	15,000	Energy-efficient, very poor color rendering	1,370,400	394,200	119,837	514,037
Low Pressure Mercury Fluorescent Tubular Lamp (T12 & T8)	30-90 lm/W	Good	5,000	Poor lamp life, medium energy use, only available in low wattages	390,857	550,629	36,041	586,670
Energy-efficient Fluorescent Tubular Lamp (T5)	100-120 lm/W	Very Good	5,000	High luminous efficacy, only available in low wattages	510,000	474,500	105,120	579,620
Light Emitting Diode (LED)	70-160 lm/W	Good	50,000	High energy savings, low maintenance, long life, no mercury. High investment cost, nascent technology	6,000,000	372,300	0 [inconsequential]	372,300

Source: Industry data provided by Electric Lamp and Component Manufacturers' Association (ELCOMA) of India. Assuming 7.5 m. wide, dual carriageway type, 1 km. long road

Table 5: Mounting Height of Luminaires (BIS, 1981)

Group	Recommended Mounting Height
A	9 to 10 meters
B	7.5 to 9 meters
Others (roads bordered by trees)	Less than 7.5 meters

Table 4: Specifications for Street Lighting Poles (BIS, 1981)

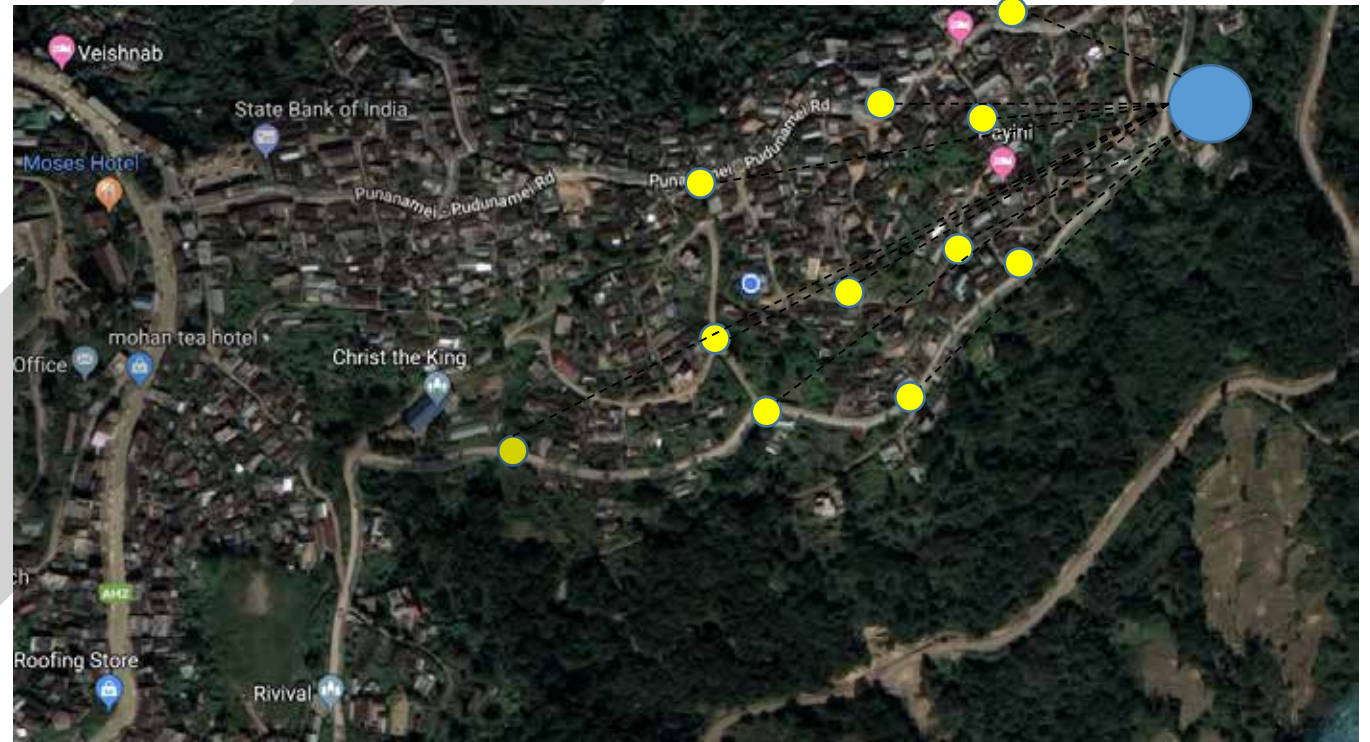
Section	Overall length 11 m + 25 mm (base plate)			Overall length 9.5 m + 25 mm (base plate)		
	Outside Dia (mm)	Thickness (mm)	Length (mm)	Outside Dia (mm)	Thickness (mm)	Length (mm)
Bottom section	139.7	4.85	5600	165.1	4.85	5000
Middle section	114.3	4.5	2700	139.7	4.5	2250
Top section	88.9	3.25	2700	114.3	3.65	2250
Planting depth	1800 mm			1800 mm		
Nominal weight of the pole	160 kg			147 kg		

Tolerance on mean weight for bulk supply is 7.5 %
Tolerance for single pole weight is 10%

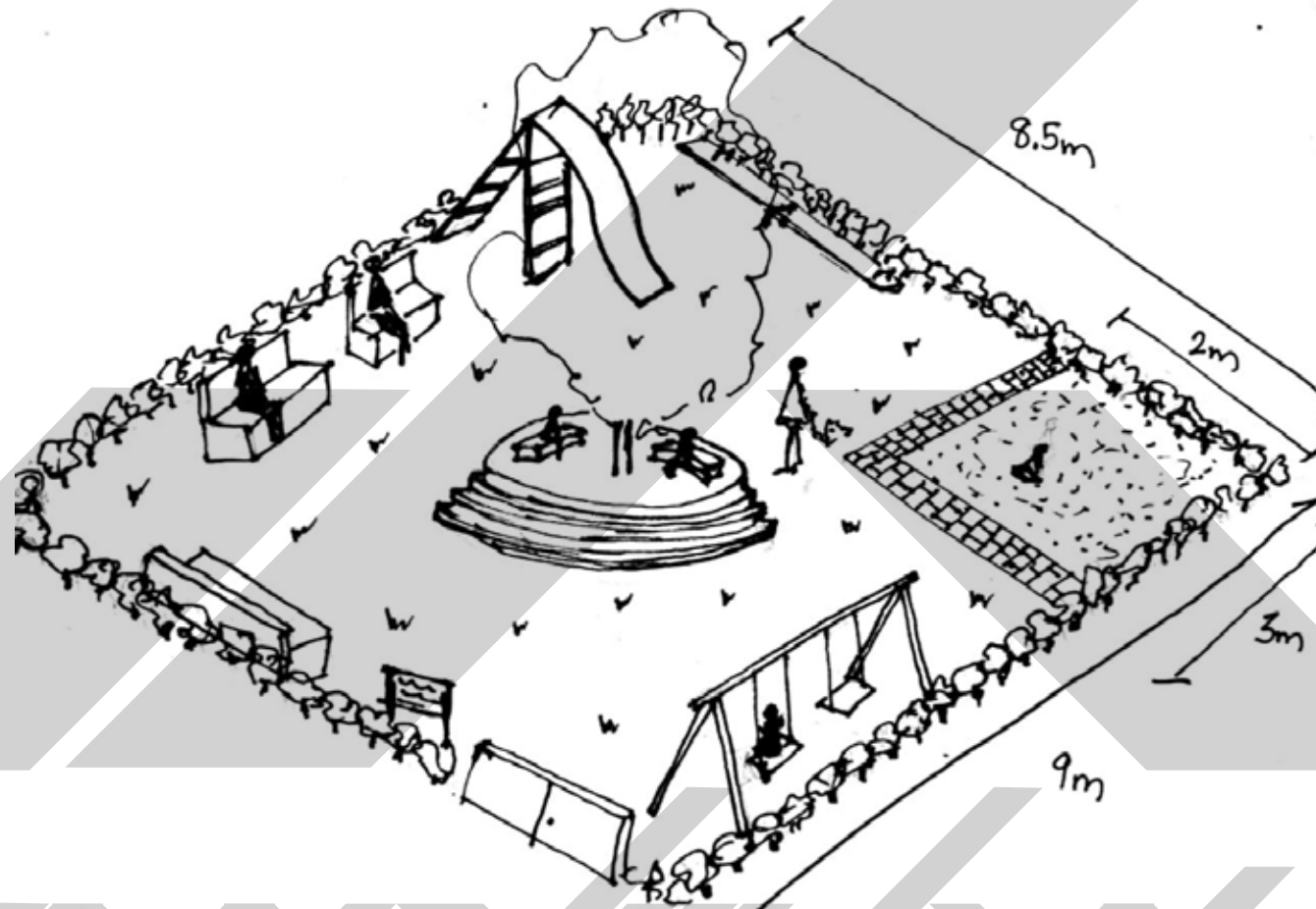
WASTE MANAGEMENT



**COLOUR CODED DUSTBINS FOR
WASTE SEGREGATION**



PARK/ INTERACTION SPACE (PROPOSED)



Perception of the community and measurement framework

Measurement Framework

Enabling Environment

Translation of Indigenous Rights

Man Nature Relationship

Community Involvement

Traditional Cultural Infrastructure Development

Economic Opportunity and Equilibrium

Education and Capacity Building

New Cultural Infrastructure Development

Perception of the community and measurement framework

Measurement Framework

Cultural Capital

Value

Vibe

Virtuosity



Perception of the community and measurement framework

Measurement Framework

Image – Dream

Economic Equilibrium

Sense of power and pride

State of community and culture

Core Value / identity of the community



THANK YOU





17-Mar-19