

CONFLUENCE 2013

ISOLA+IUDI

2nd March 2013

Processes of Sustainable Landscape Development

Indian Institute of Management, Udaipur

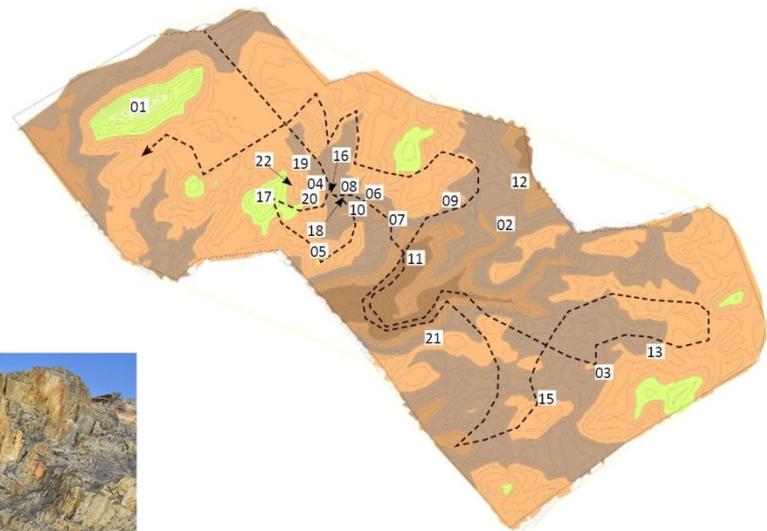


EARTHSCAPES

SITE APPRECIATION

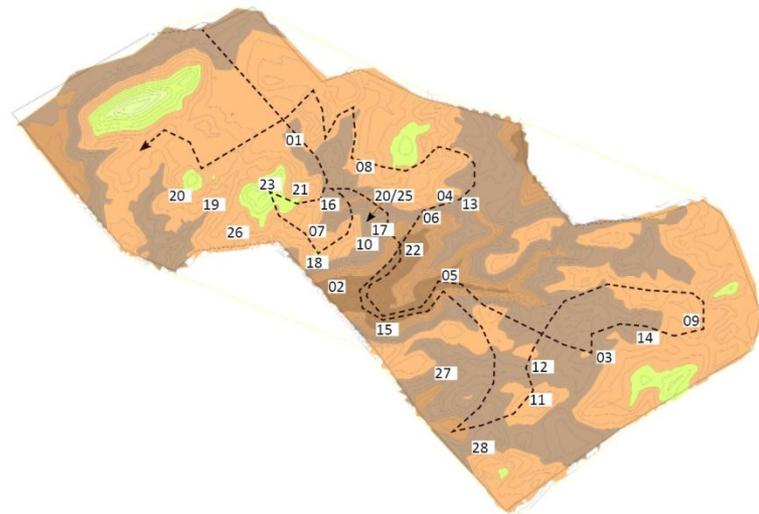
Site Mapping

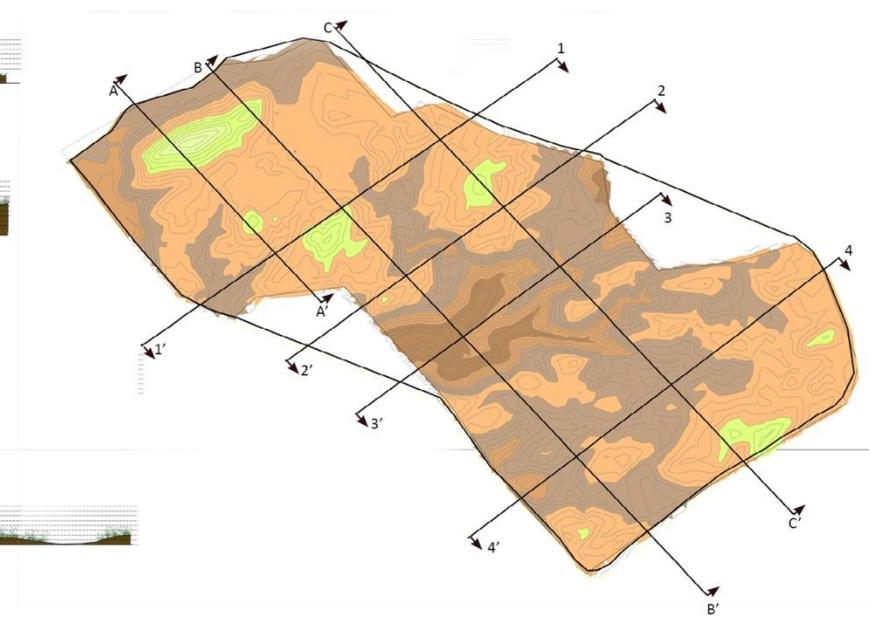
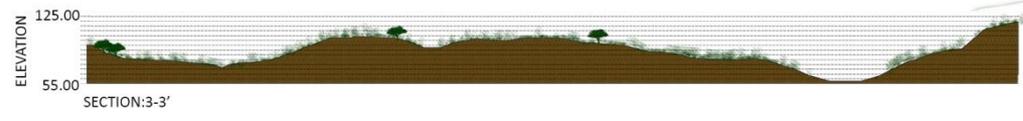
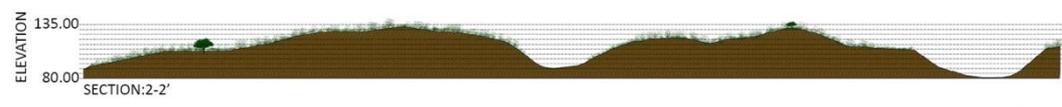
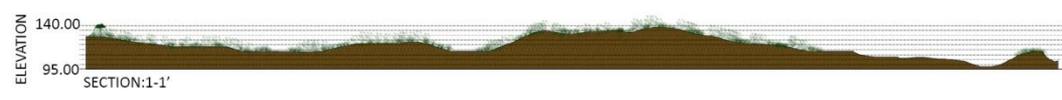
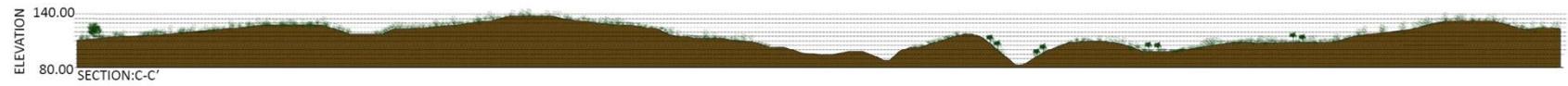
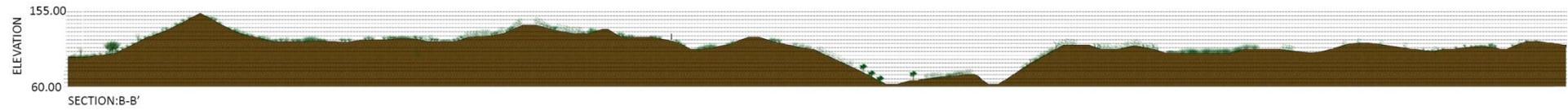
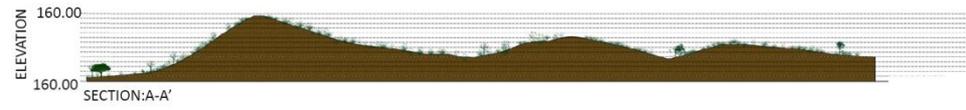
Pattern
Features
Elements



Site Mapping

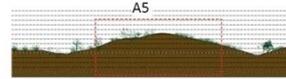
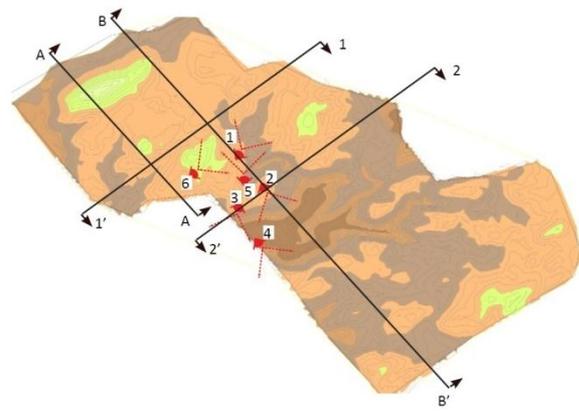
Texture
Rock
Soil





Site Mapping

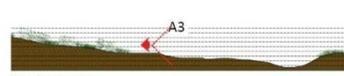
View of western campus



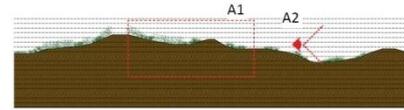
SECTION:A-A'



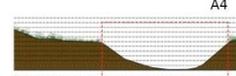
SECTION:1-1'



SECTION:1-1'



SECTION:B-B'

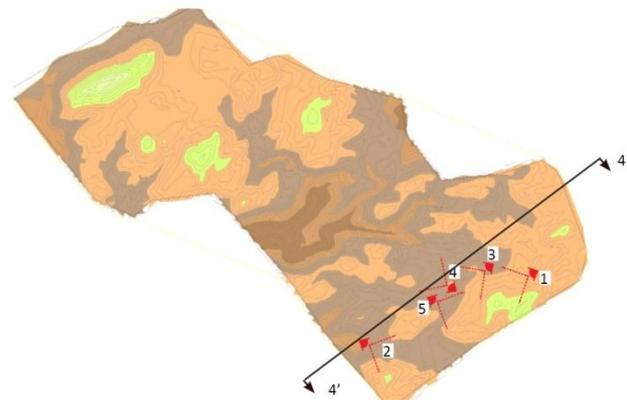


SECTION:2-2'



Site Mapping

View of eastern campus



SECTION:4-4'



SECTION:4-4'

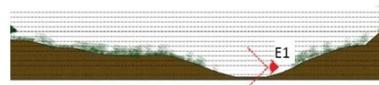
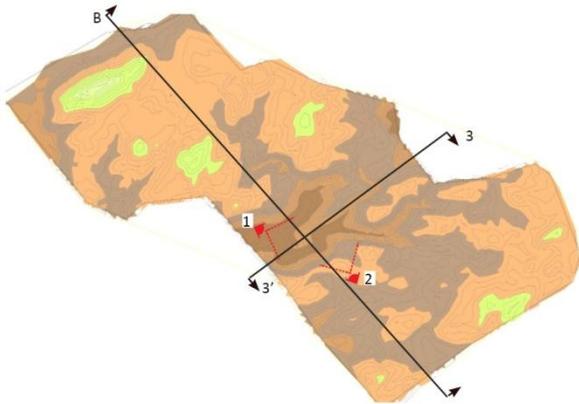


SECTION:4-4'

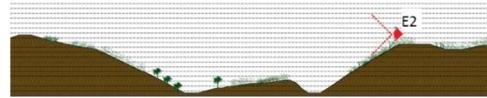


Site Mapping

View of main valley

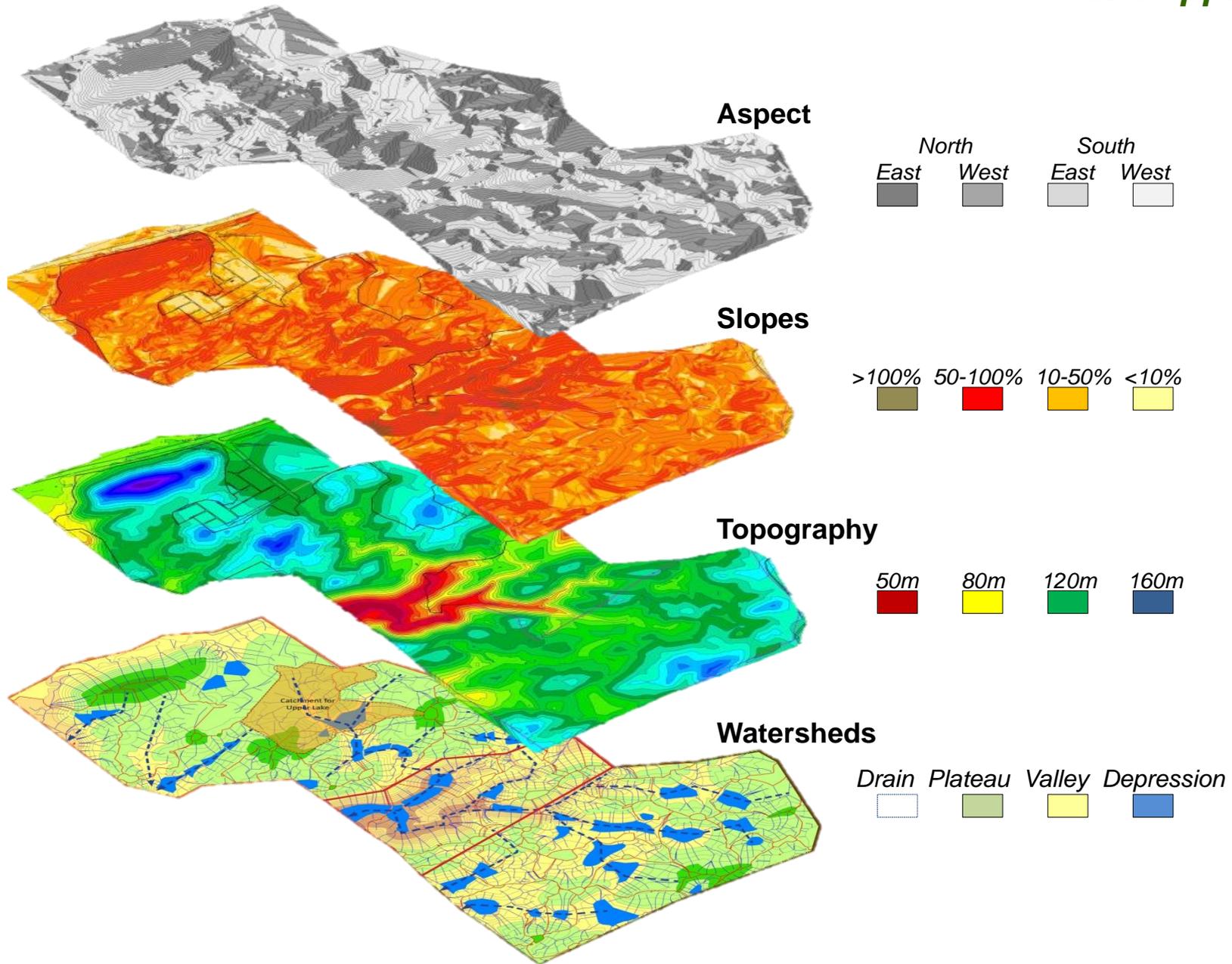


SECTION:3-3'



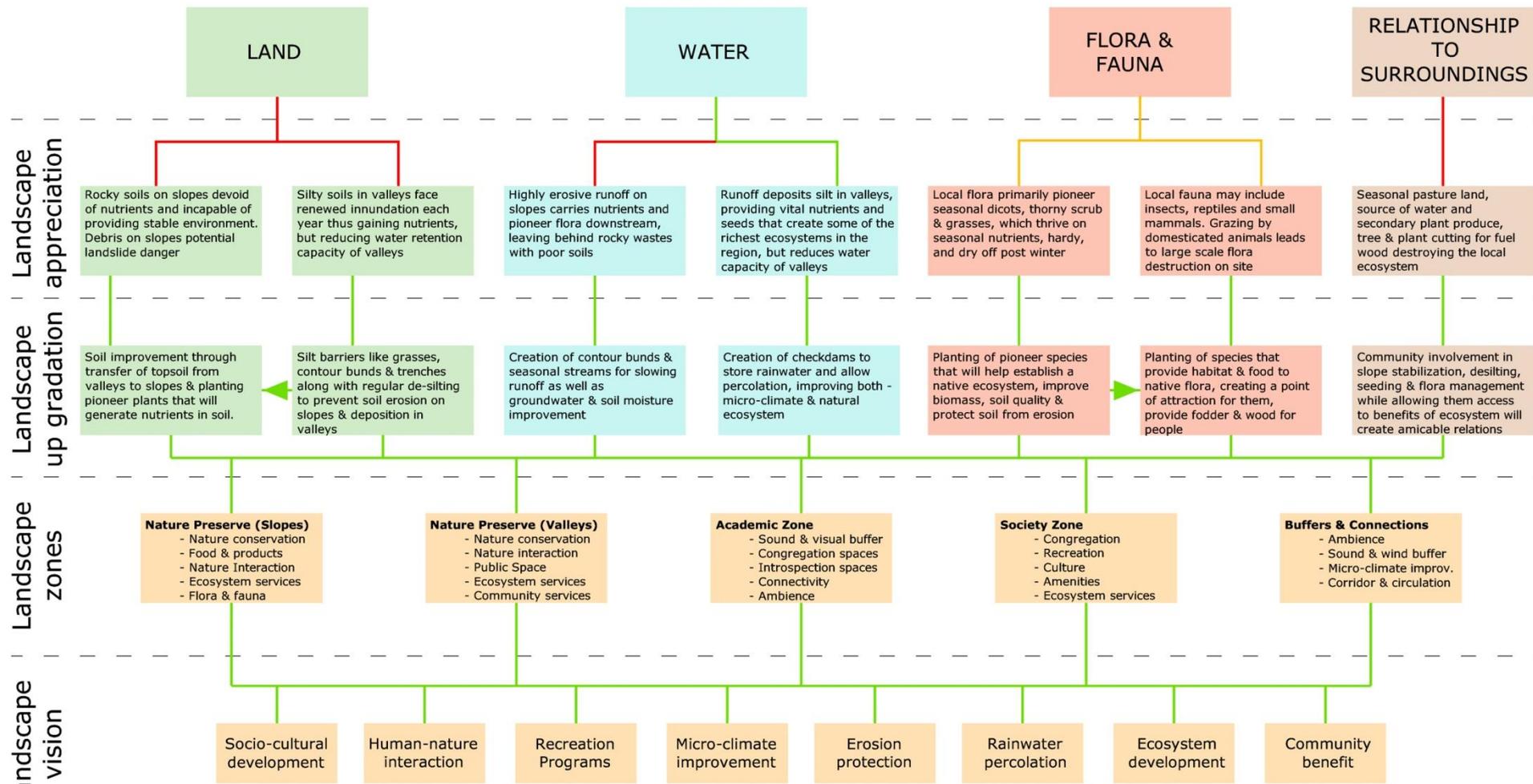
SECTION:B-B'





LANDSCAPE UPGRADATION

Landscape Upgradation Process



SUSTAINABLE LANDSCAPE DEVELOPMENT

DE-SILTING OF CHECKDAM AREAS

CONTOUR-BUNDS, CONTOUR TRENCHES

LOCAL GRASSES & MULCHES

STOPPING GRAZING

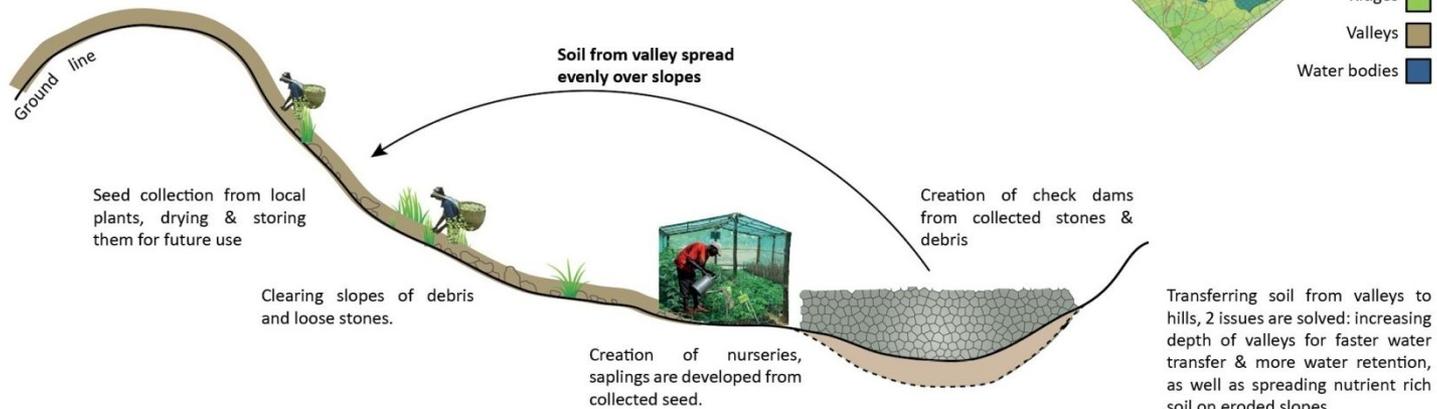
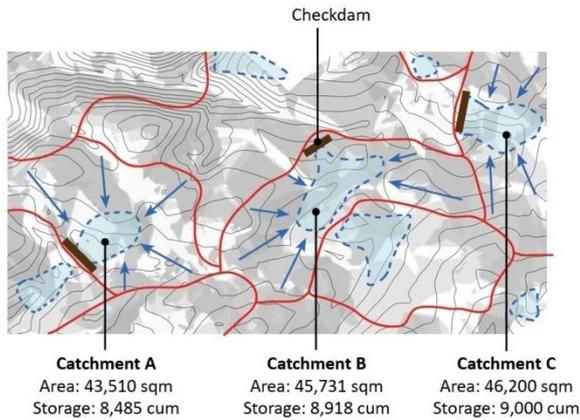
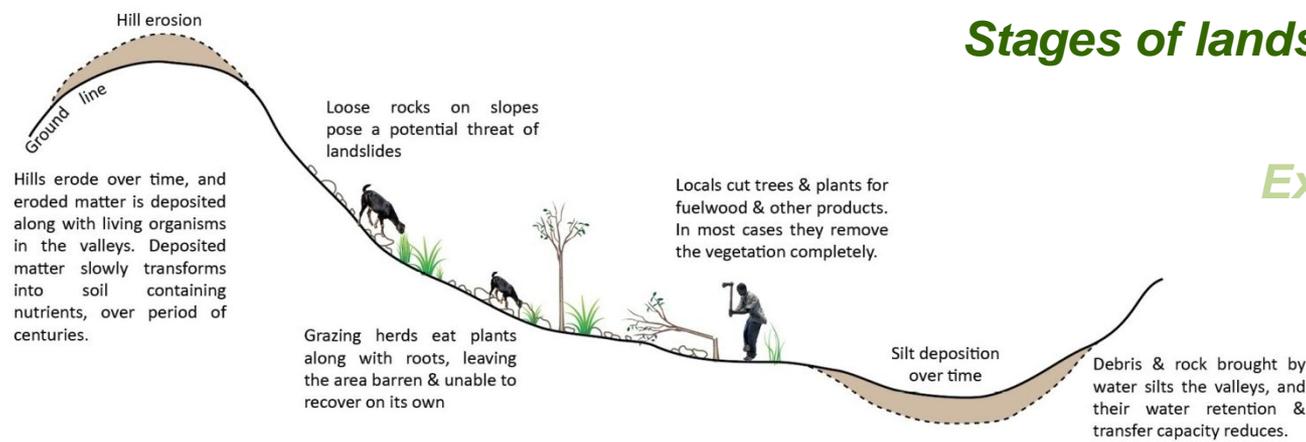
INVOLVING LOCAL PEOPLE

NATIVE SPECIES SEED COLLECTION

HARDY NATIVE PLANT SPECIES

Stages of landscape upgradation

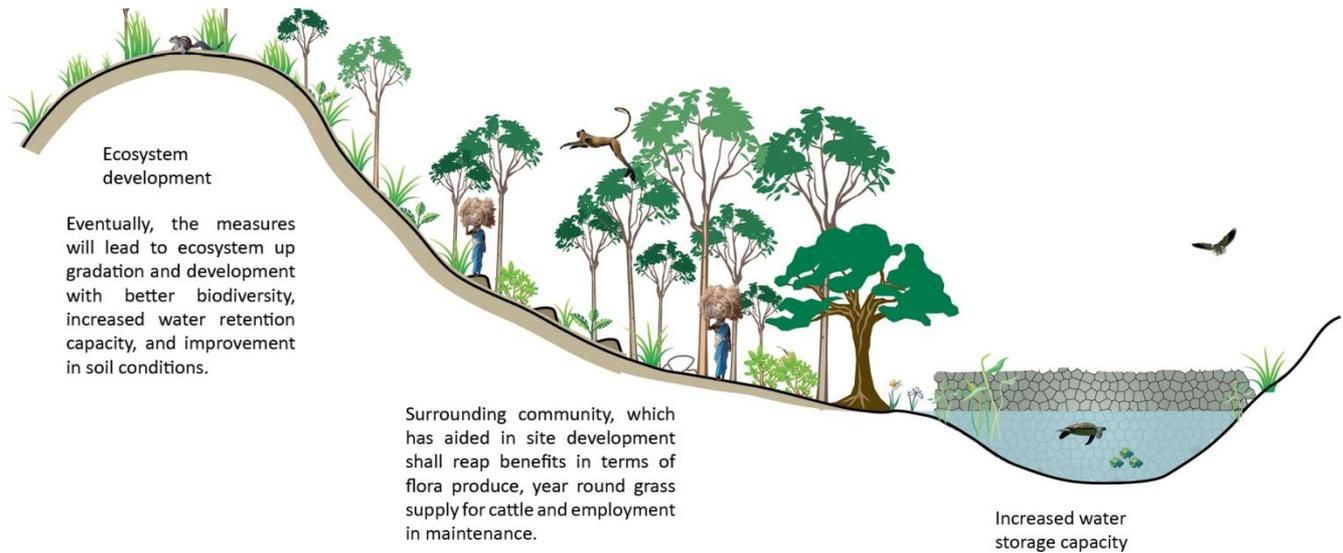
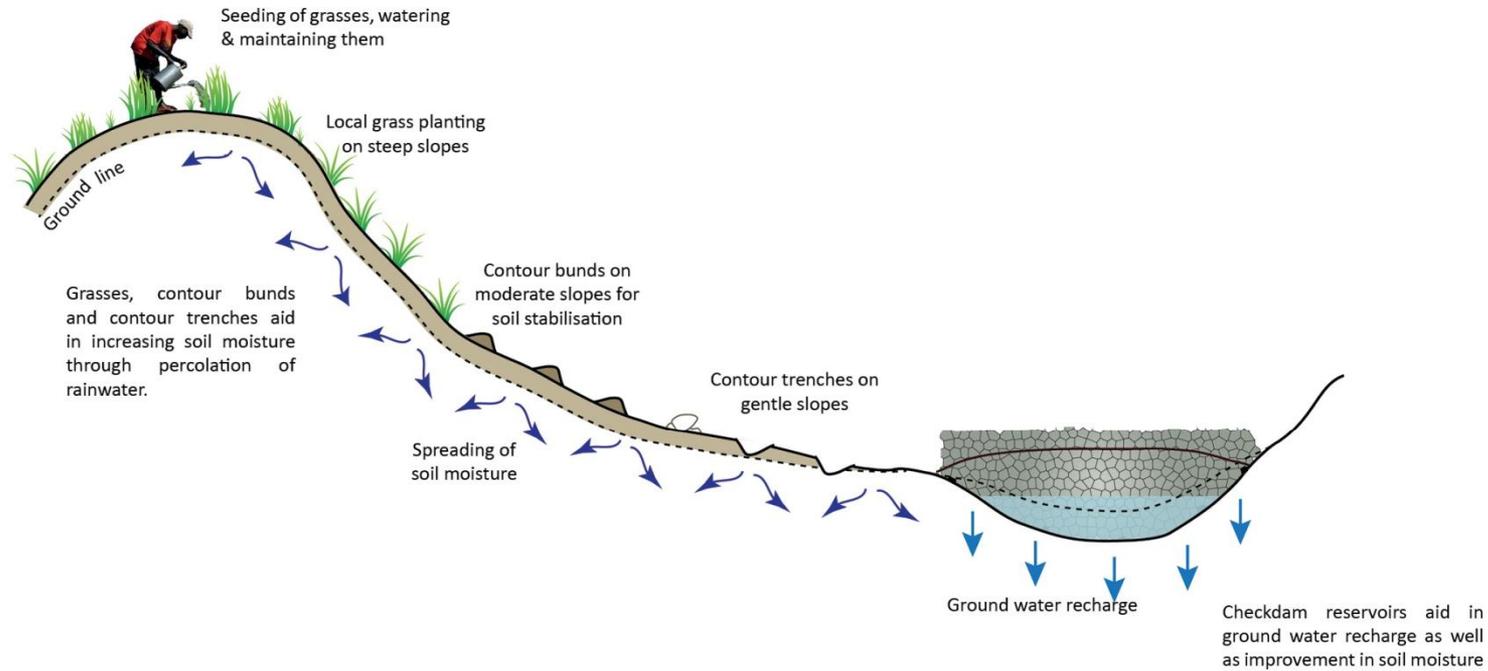
Existing Scenario



Stage I

Stages of landscape upgradation

Stage II



Proposed Landscape

WATER SYSTEMS

SUSTAINABLE WATER REGIME

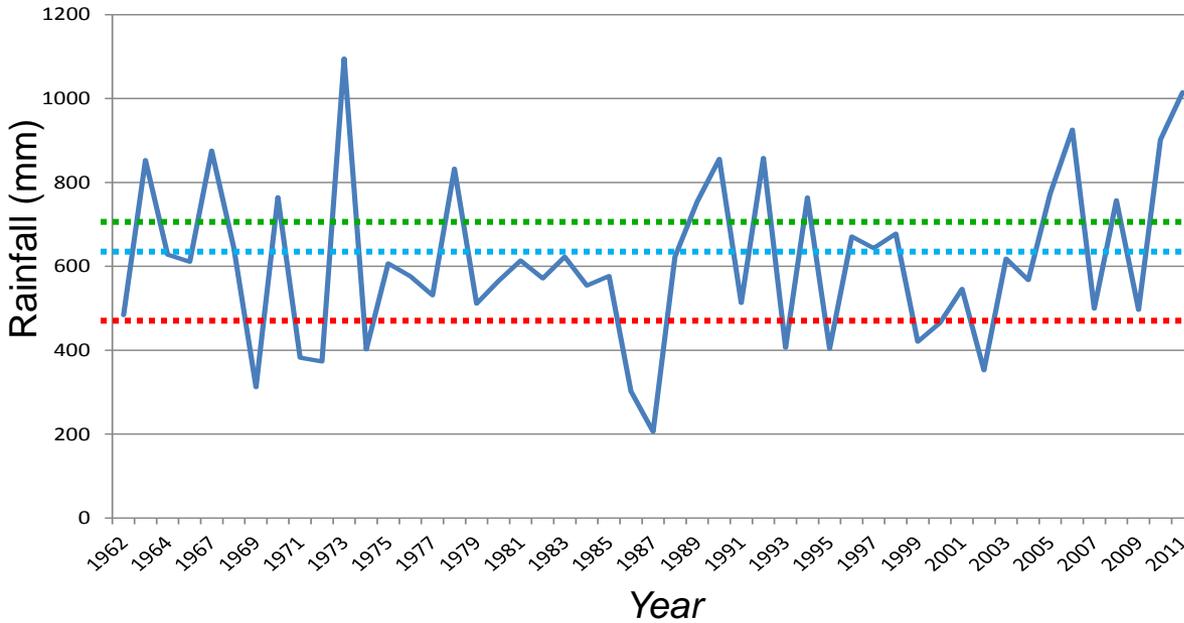
100 % RAIN WATER HARVESTING

100% WASTEWATER RECYCLING

MICRO-CLIMATE MODIFICATION

CULTURAL CONNECTIONS

50 YEAR RAINFALL DATA – 1962-2011



Month	Rainfall (mm)
June	87
July	213
August	202
Sept	104

Highest Daily Rainfall: 75mm

Annual Rainy Days: 32 days

Average Annual Rainfall (50 yr): 612mm

Rainfall <70% of normal: 10 occurrences

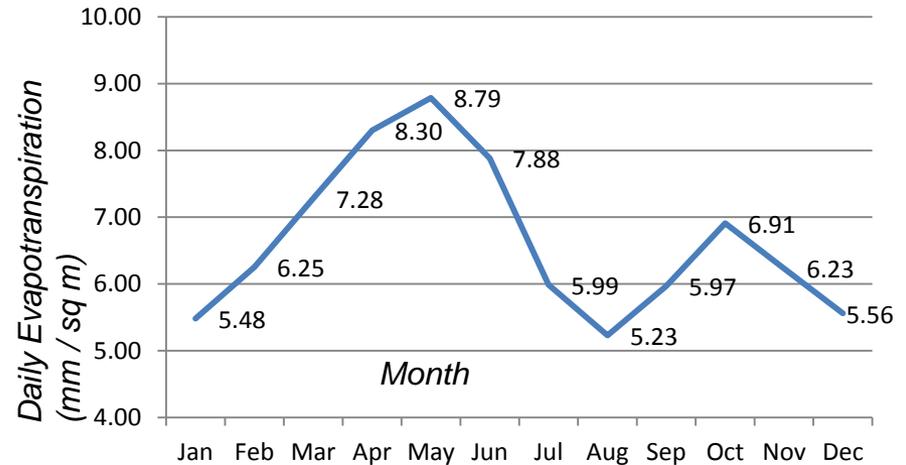
Rainfall > 20% of normal: 14 occurrences

Average Annual Evaporation (50 yr): 2428mm

Summer (Mar-Jun): 983mm

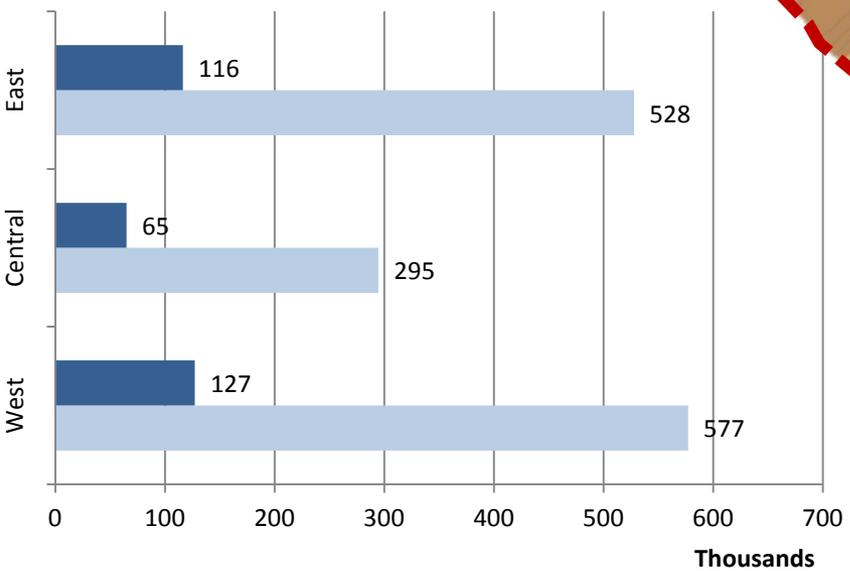
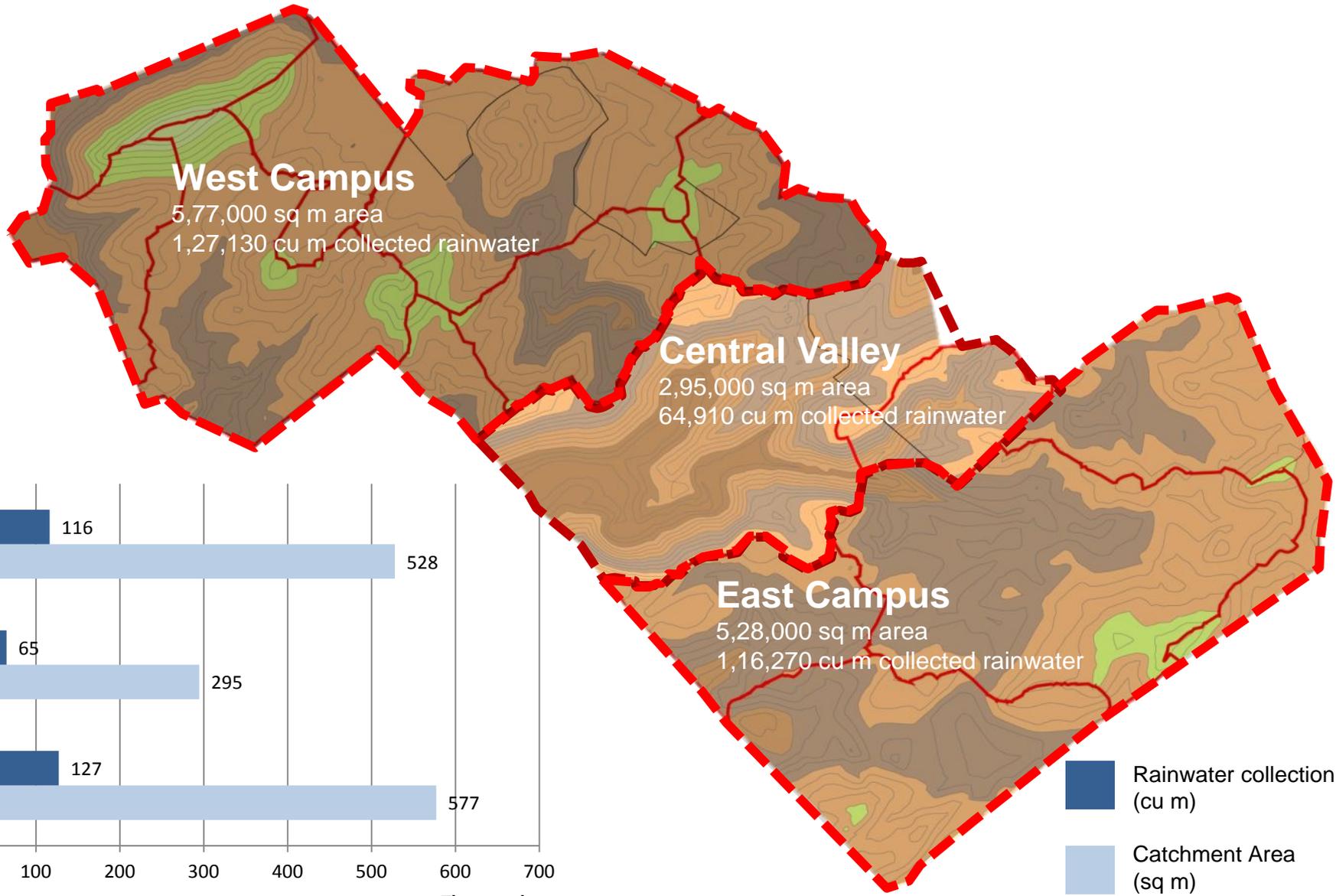
Winter (Nov-Feb): 704mm

Monsoon (Jul-Sept): 741mm



Catchment Map

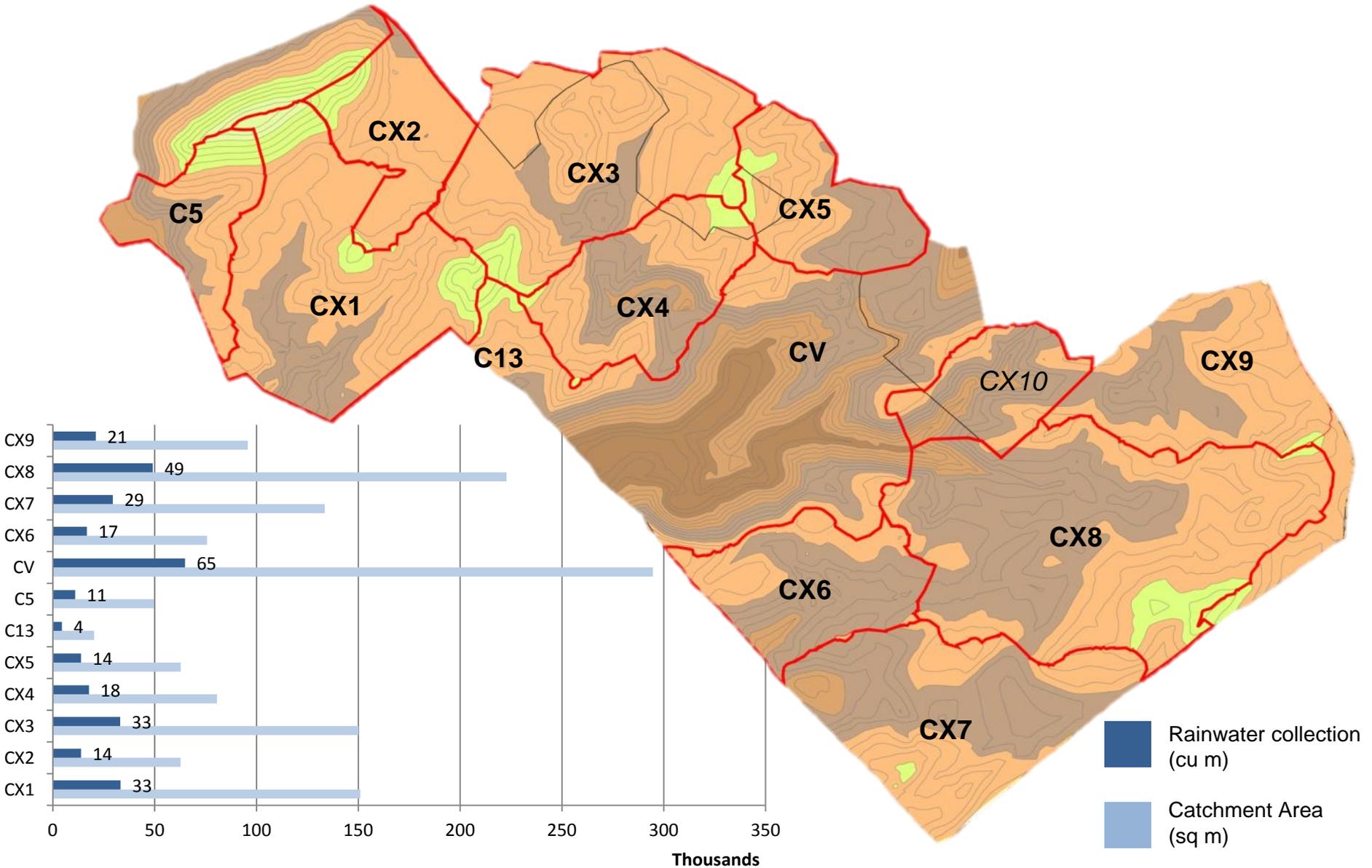
Catchment Zones



 Rainwater collection (cu m)
 Catchment Area (sq m)

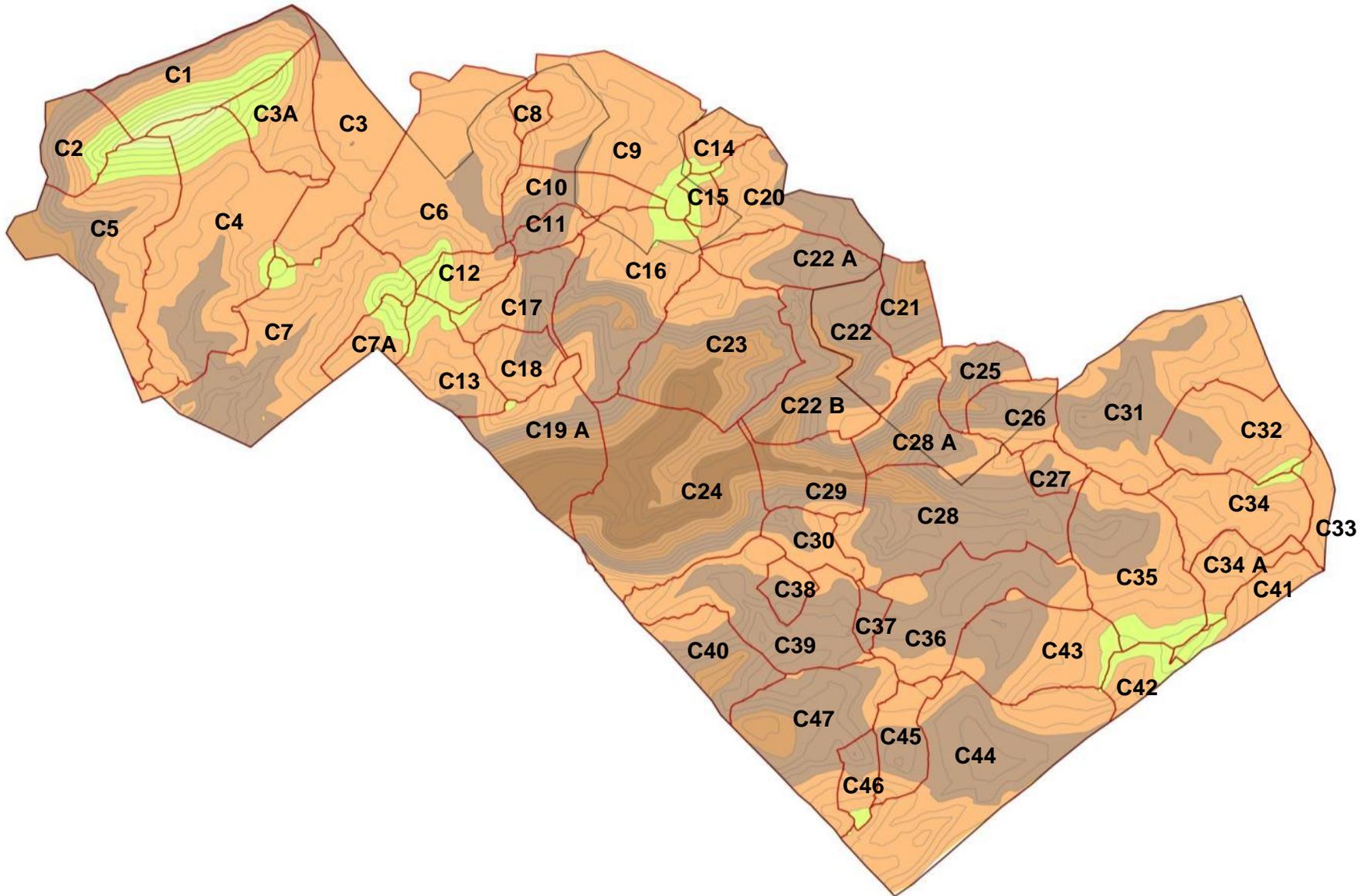
Catchment Map

Major Catchments



Catchment Map

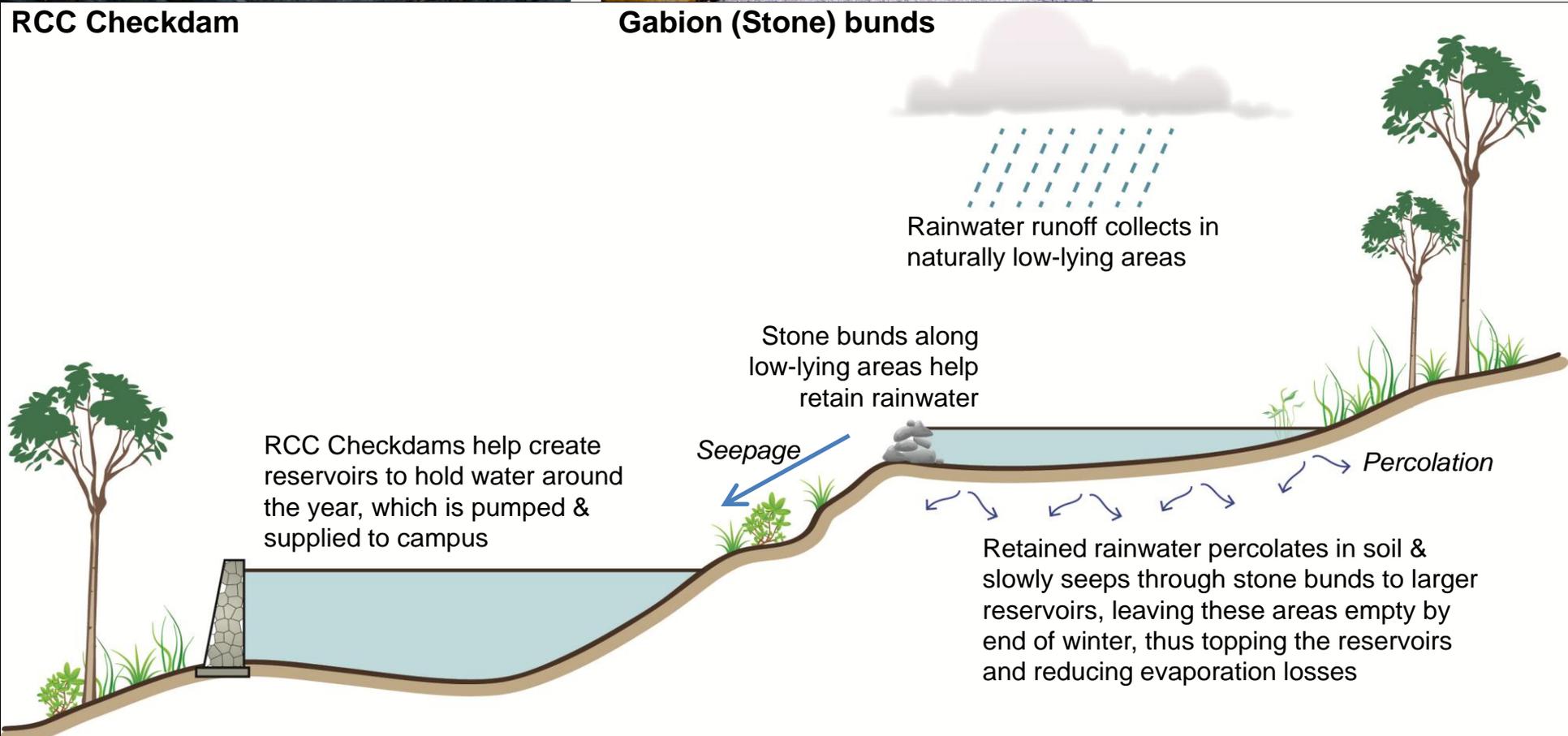
Minor Catchments





RCC Checkdam

Gabion (Stone) bunds



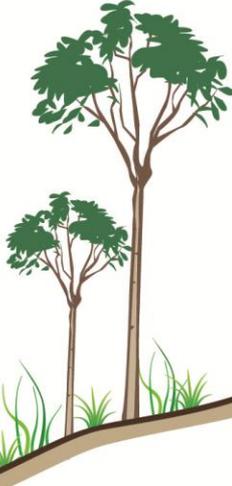
RCC Checkdams help create reservoirs to hold water around the year, which is pumped & supplied to campus

Seepage

Stone bunds along low-lying areas help retain rainwater

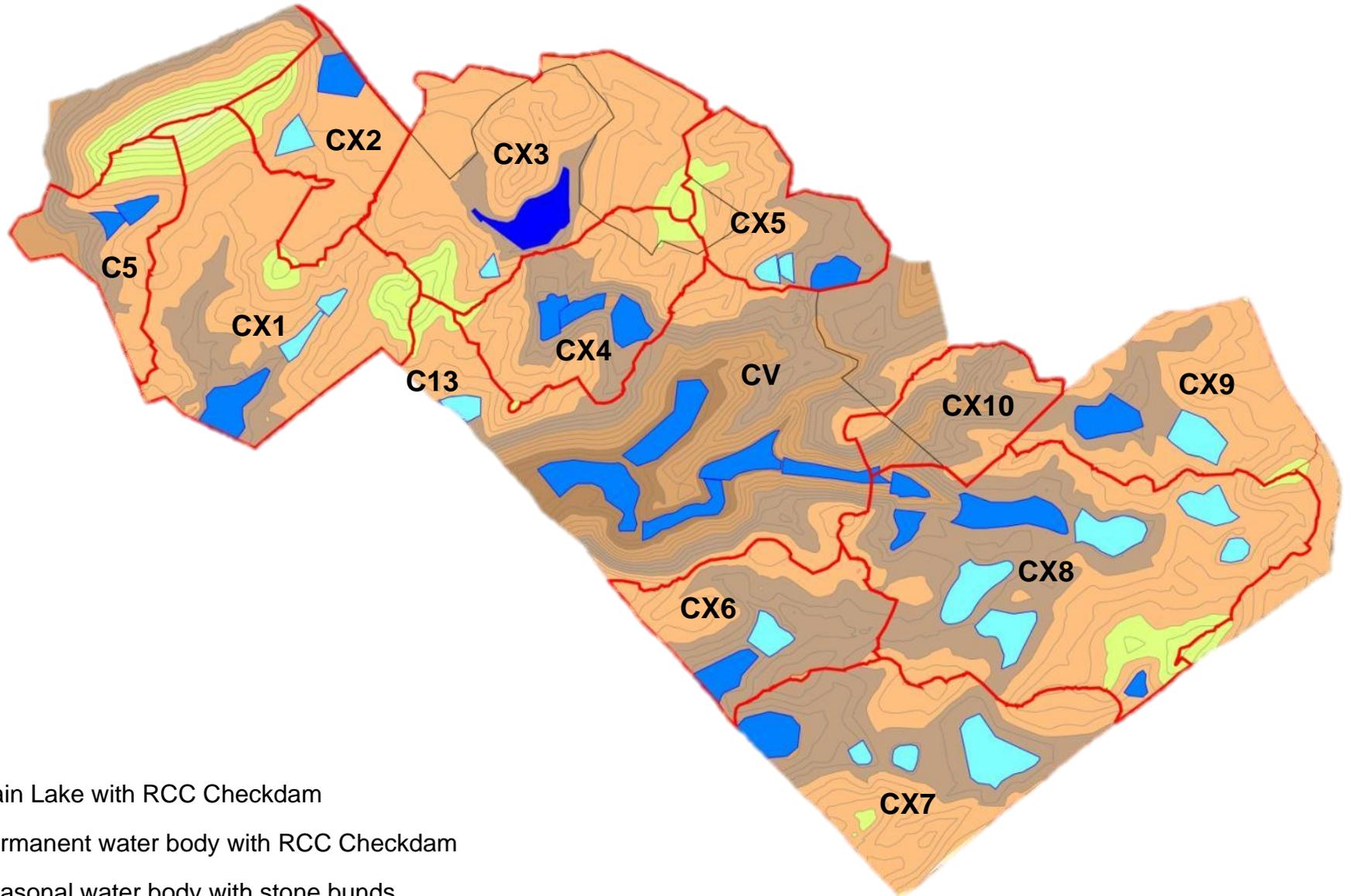
Rainwater runoff collects in naturally low-lying areas

Retained rainwater percolates in soil & slowly seeps through stone bunds to larger reservoirs, leaving these areas empty by end of winter, thus topping the reservoirs and reducing evaporation losses



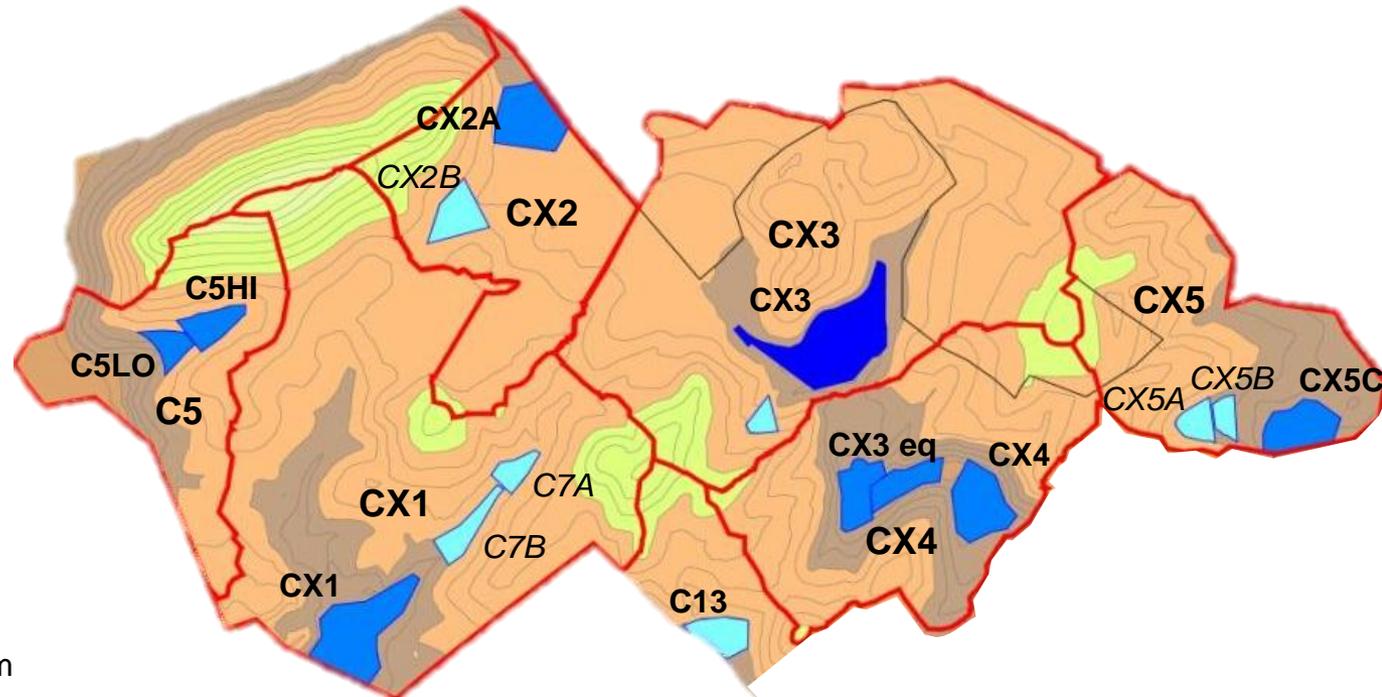
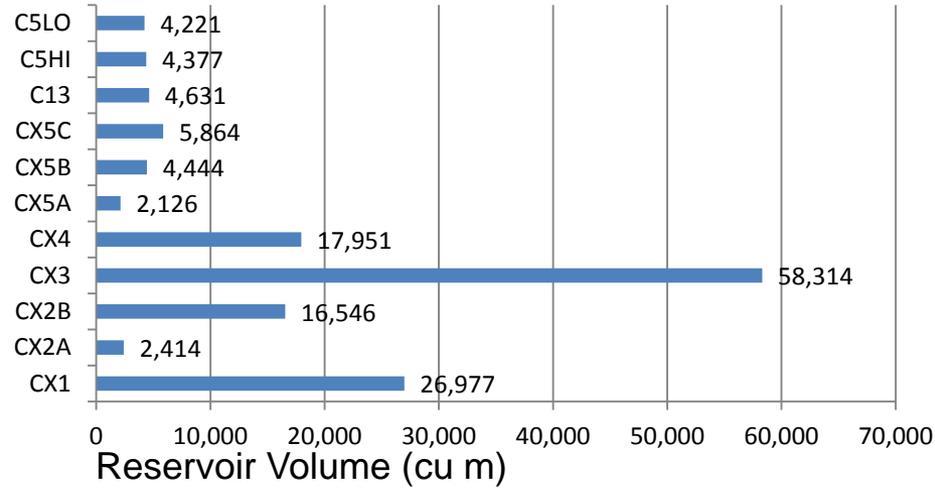
Catchment Map

Proposed Water Bodies



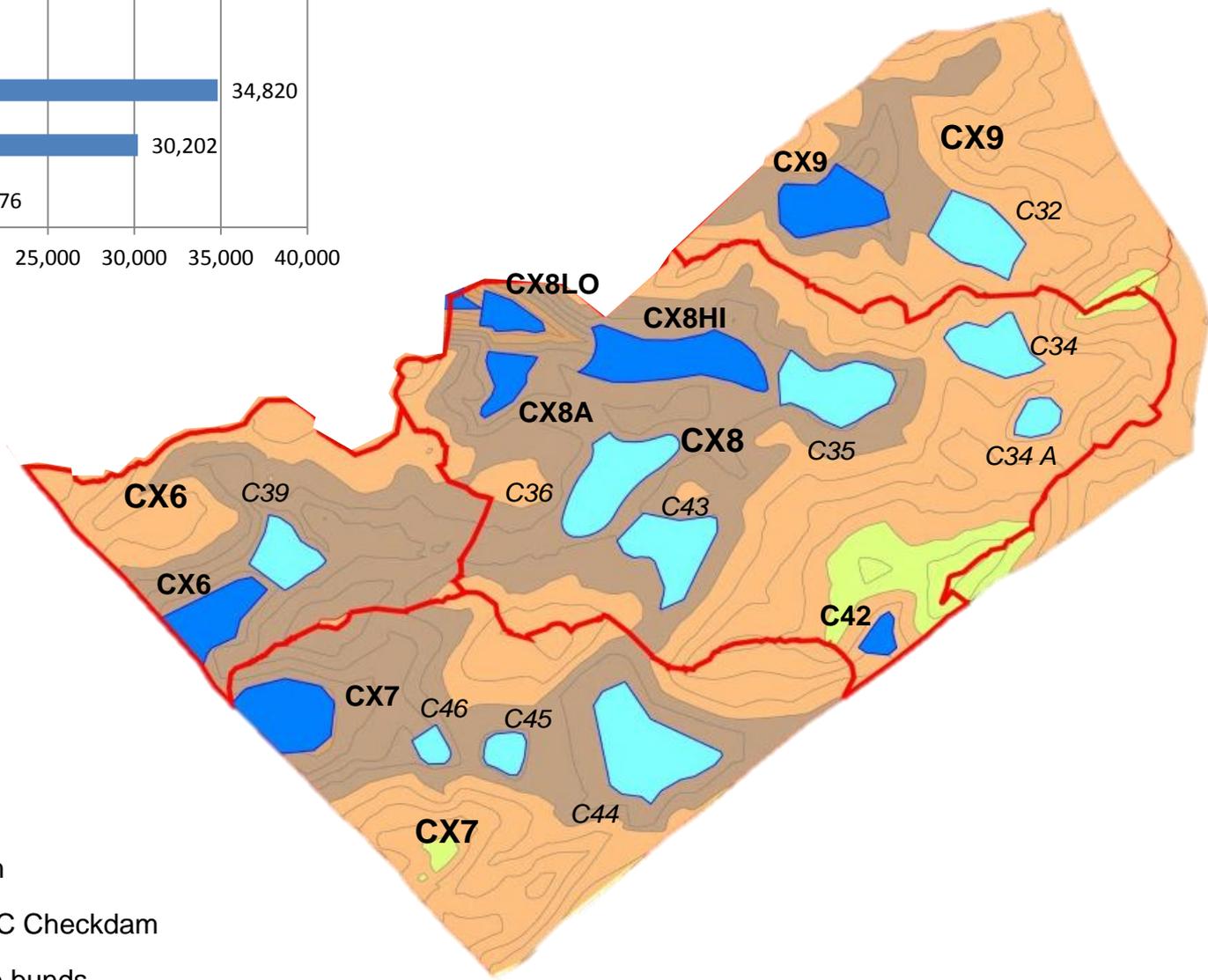
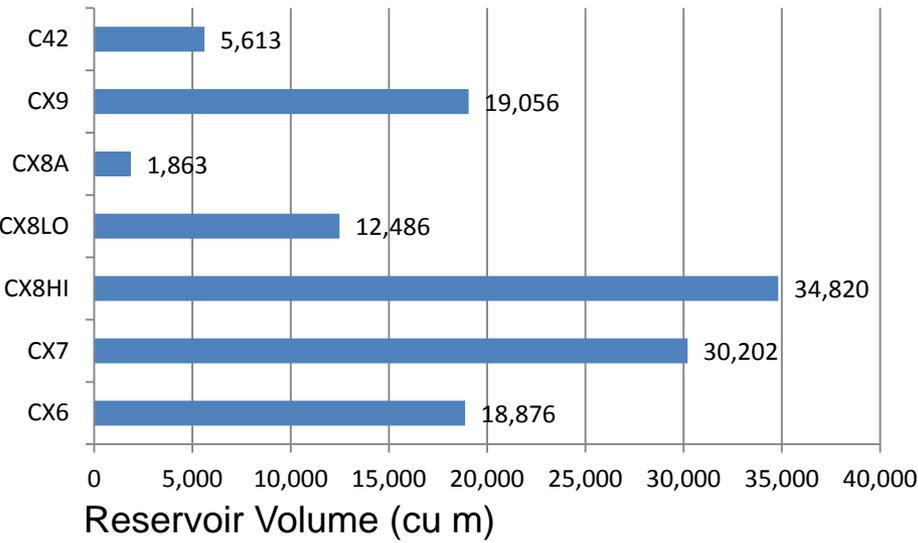
- Main Lake with RCC Checkdam
- Permanent water body with RCC Checkdam
- Seasonal water body with stone bunds

West Campus Proposed Water Bodies



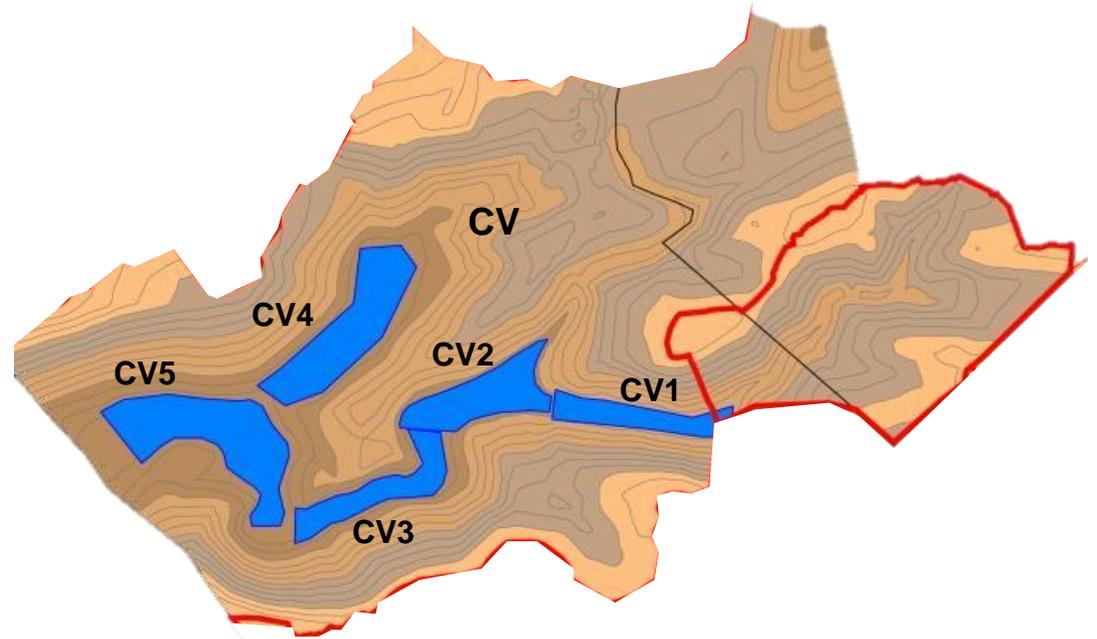
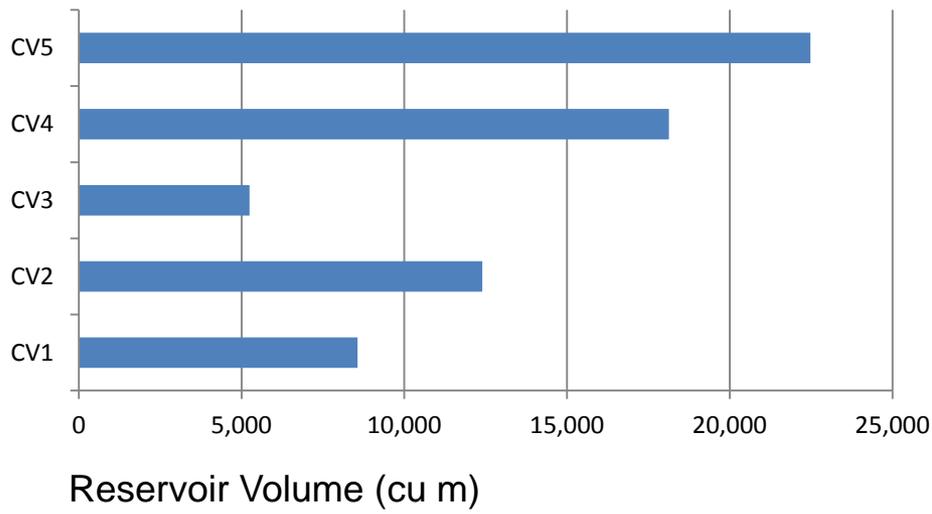
- Main Lake with RCC Checkdam
- Permanent water body with RCC Checkdam
- Seasonal water body with stone bunds

East Campus Proposed Water Bodies



- Main Lake with RCC Checkdam
- Permanent water body with RCC Checkdam
- Seasonal water body with stone bunds

Central Valley Proposed Water Bodies

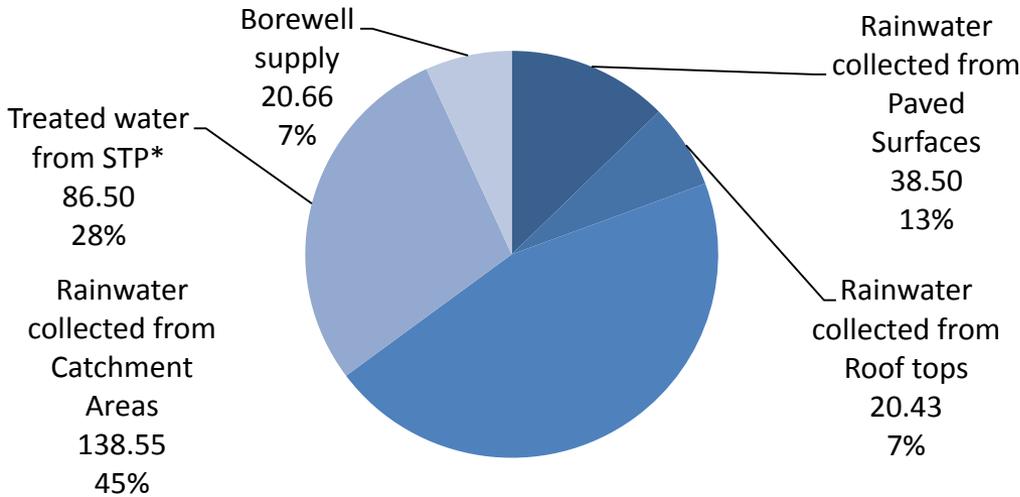


- Main Lake with RCC Checkdam
- Permanent water body with RCC Checkdam
- Seasonal water body with stone bunds

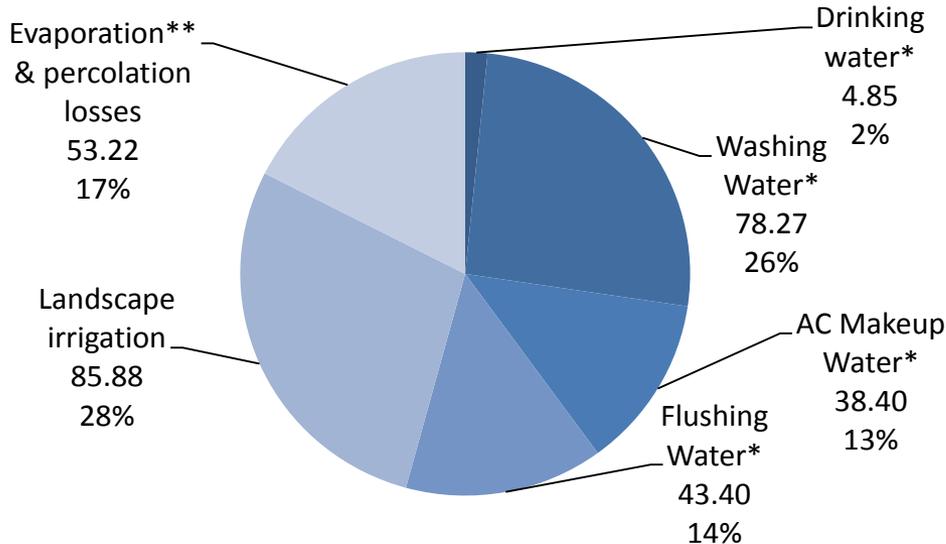
WATER BALANCE

West CAMPUS

Water Supply Distribution

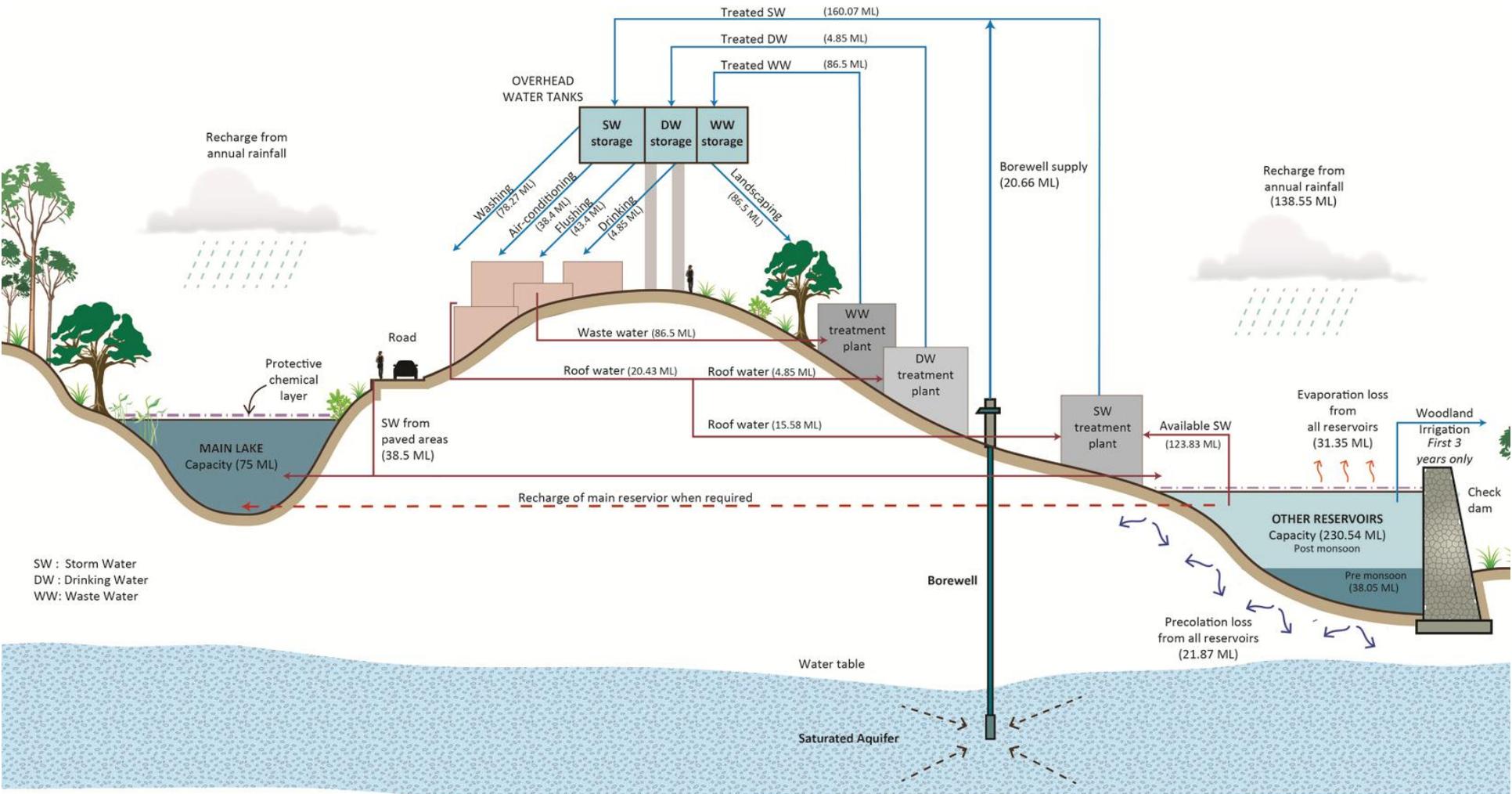


Water Demand Distribution

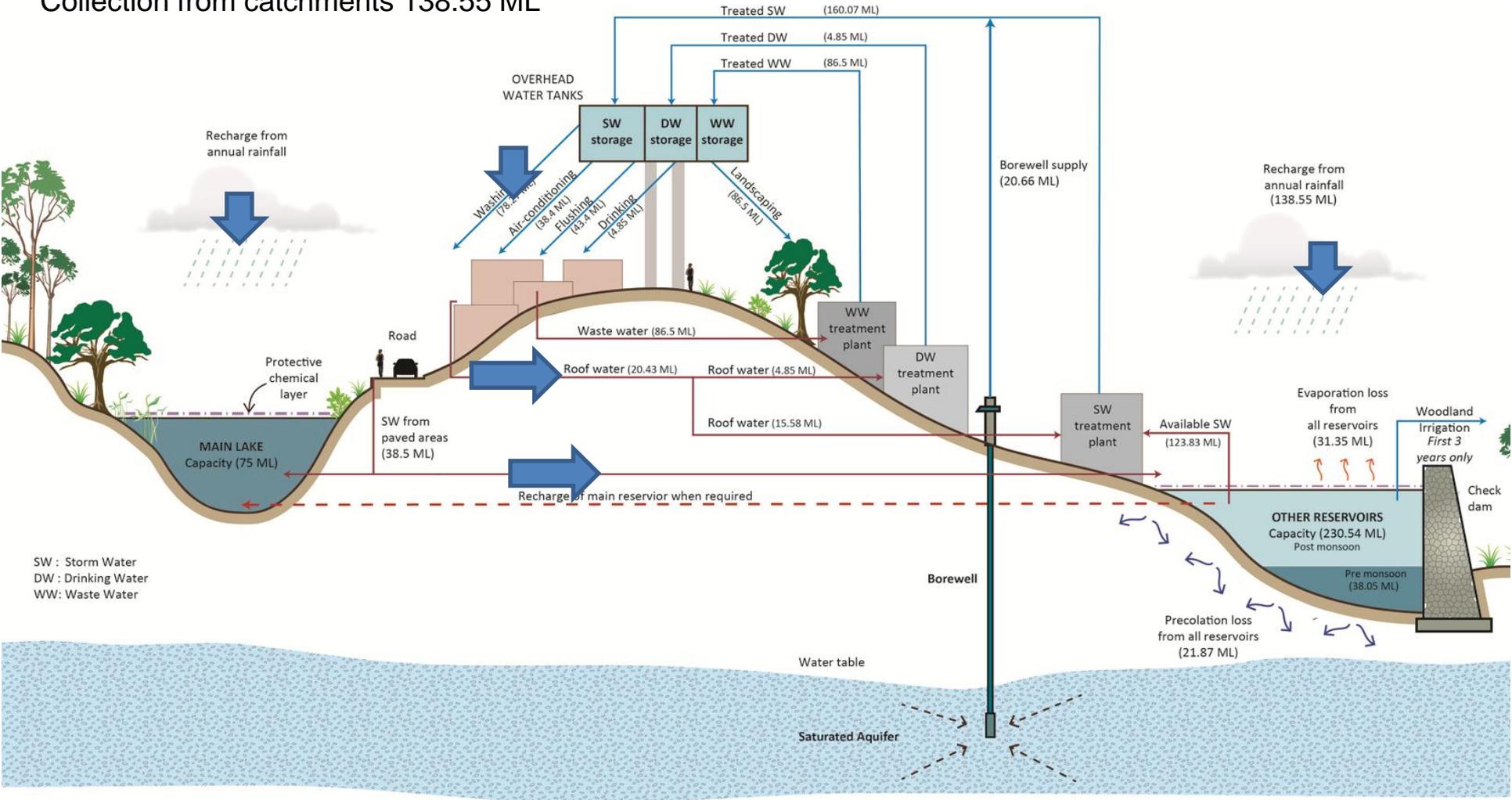


Sr	Description	Volume
		ML
A	Water Supply	
1	Rainwater collected from Paved Surfaces	38.50
2	Rainwater collected from Roof tops	20.43
3	Rainwater collected from Catchment Areas	138.55
4	Treated water from STP*	86.50
5	Borewell supply	20.66
	TOTAL	304.64
B	Water Demand	
1	Drinking water*	4.85
2	Washing Water*	78.27
3	AC Makeup Water*	38.40
4	Flushing Water*	43.40
5	Landscape irrigation	85.88
6	Evaporation** & percolation losses	53.22
	TOTAL	304.02
	Note	
	* Indicates 300 working days demand	
	** Evaporation reduction upto 50% through chemical evaporation retardant	

Water Cycle West Campus



- Rainwater runoff from catchment, roofs & paved areas is collected in reservoirs
- Collection from roof top 20.43 ML
- Collection from Paved areas 38.5 ML
- Collection from catchments 138.55 ML



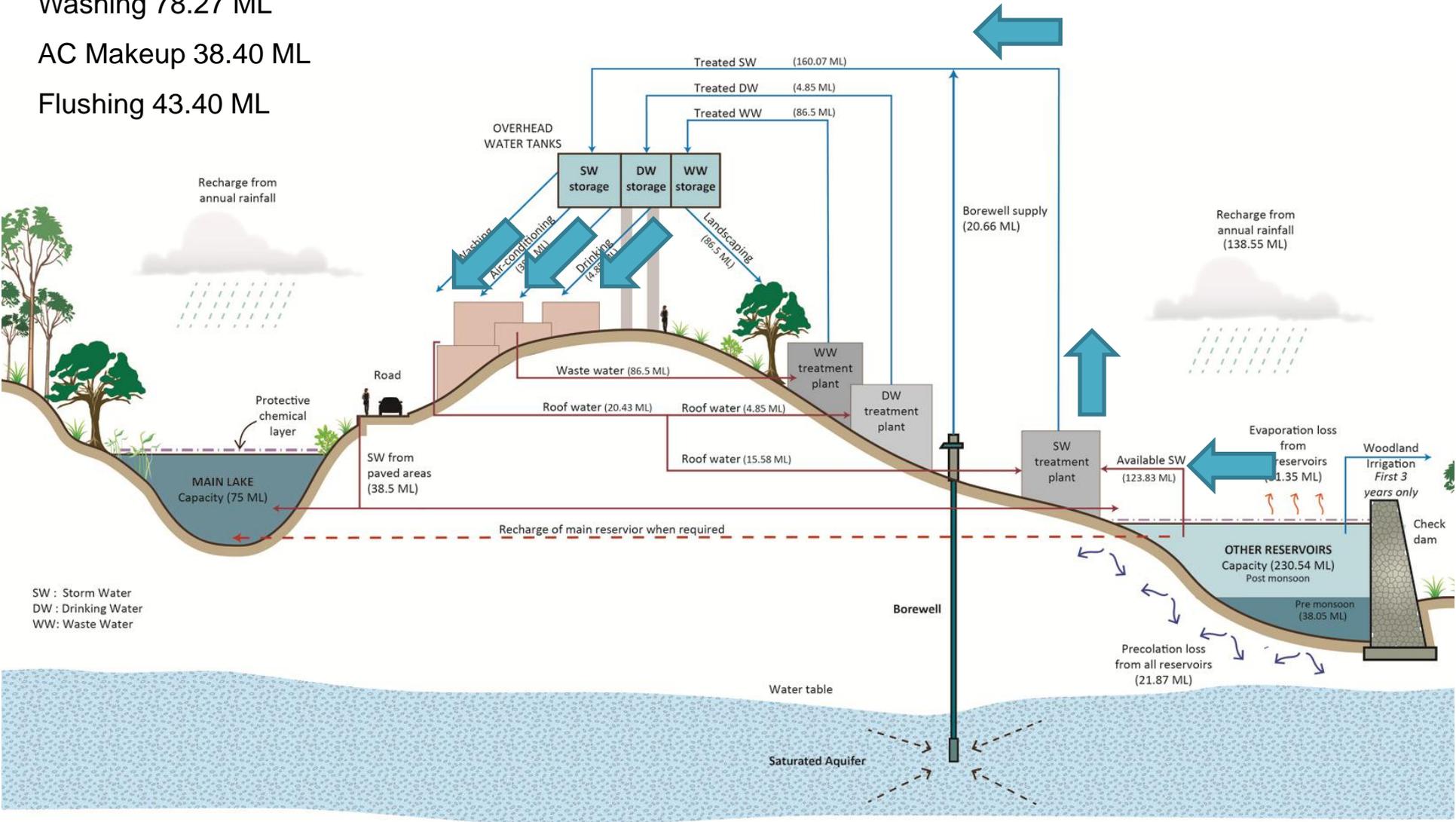
Treated rainwater is supplied for drinking, washing, flushing and air-conditioning

Drinking 4.85 ML (*roof water only*)

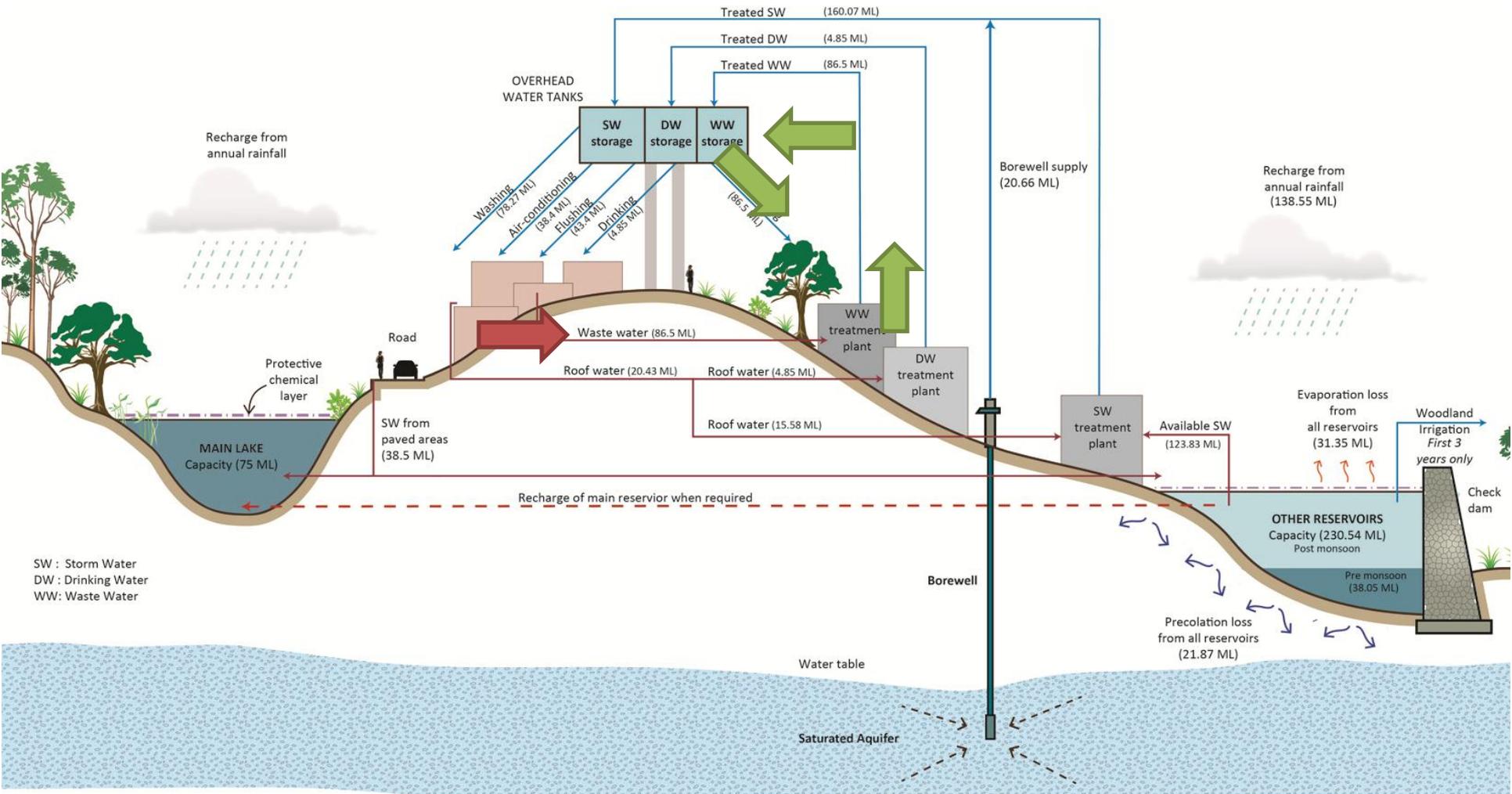
Washing 78.27 ML

AC Makeup 38.40 ML

Flushing 43.40 ML



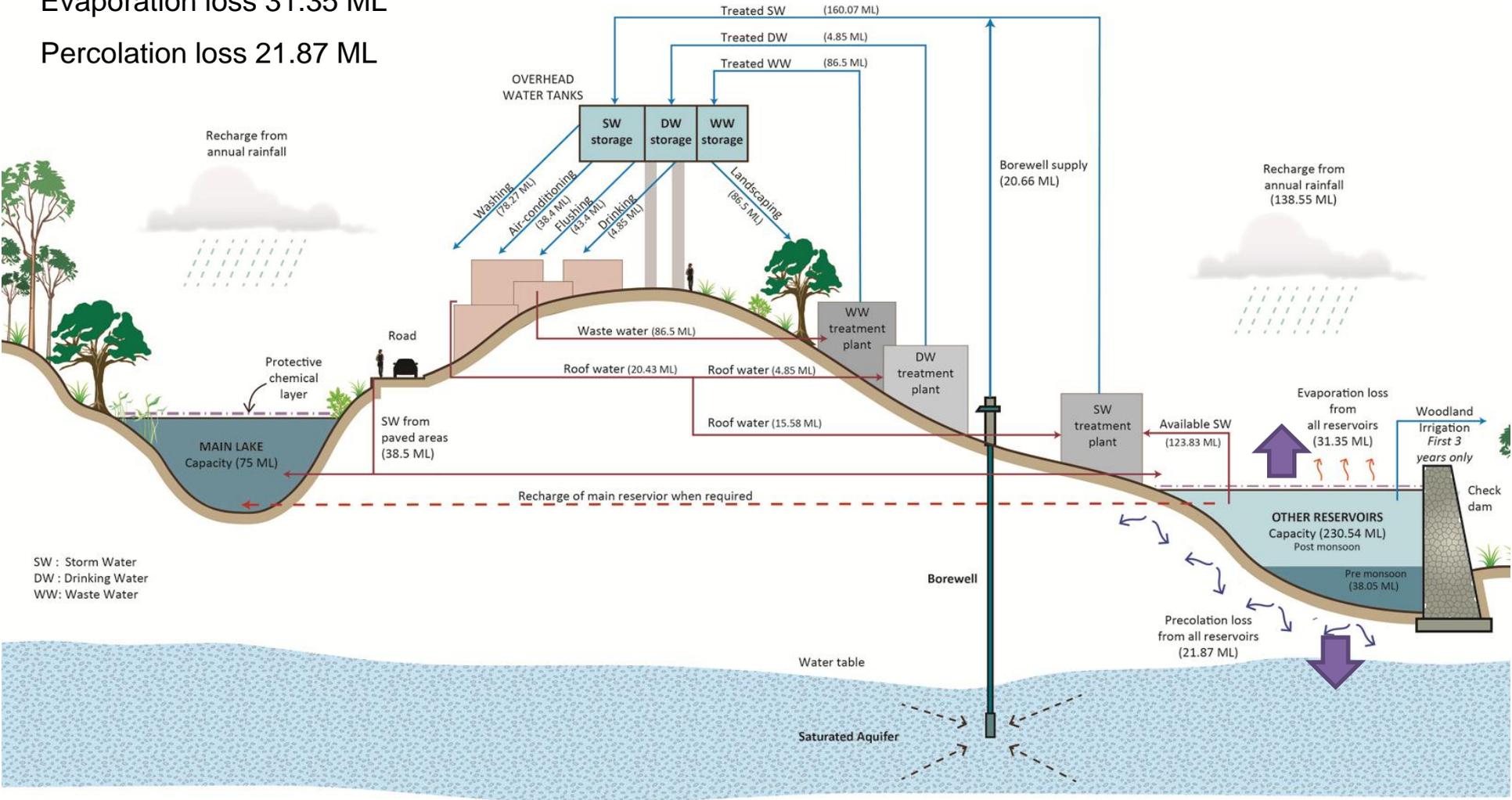
Waste water generated is treated (86.5 ML) and used for landscape irrigation

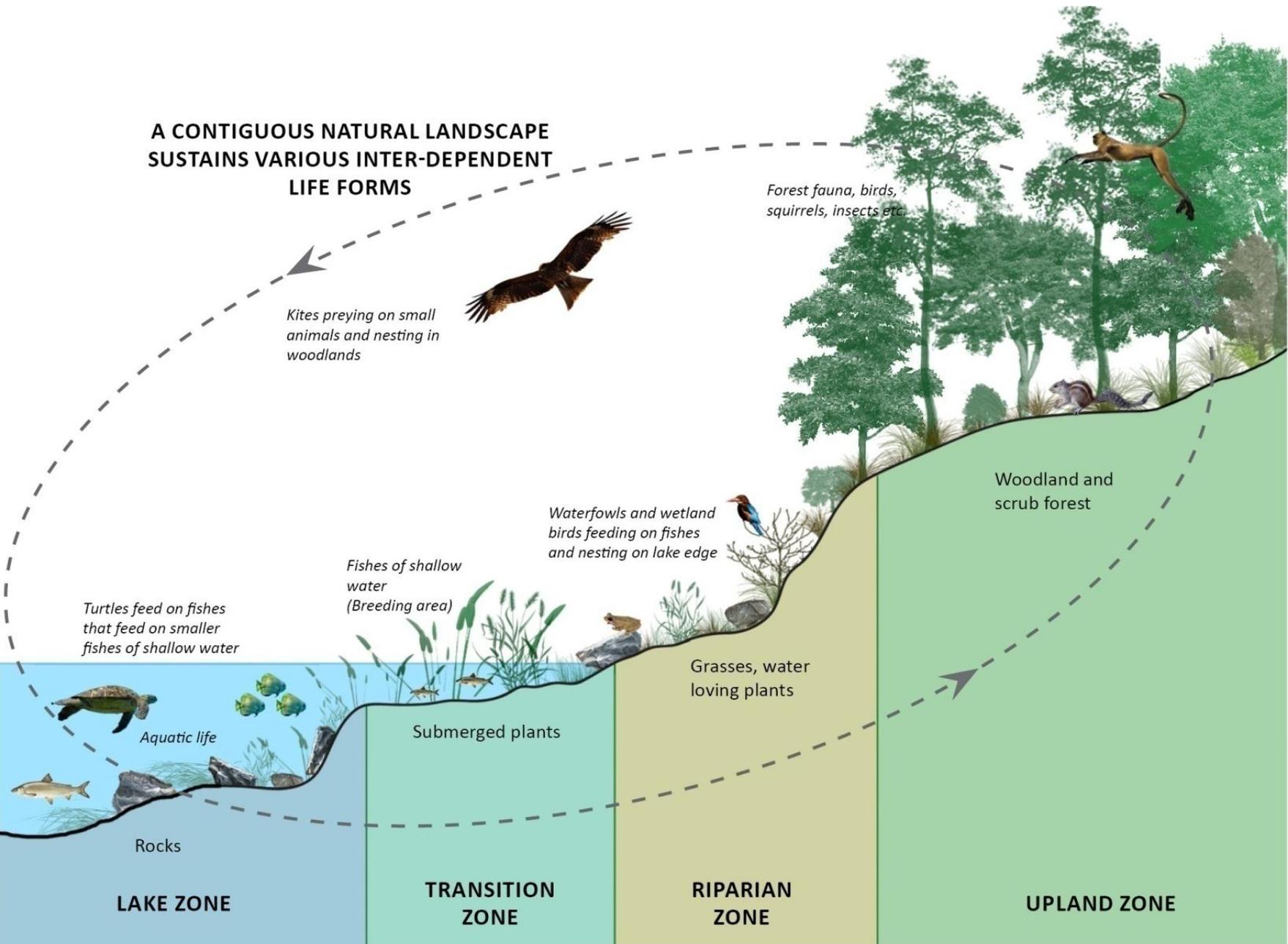


Reservoirs encounter evaporation & percolation losses throughout the year. Evaporation loss is reduced up to 50% by using bio-degradable Central Water Commission approved chemical evaporation retardant.

Evaporation loss 31.35 ML

Percolation loss 21.87 ML





PLANTING STRATEGY

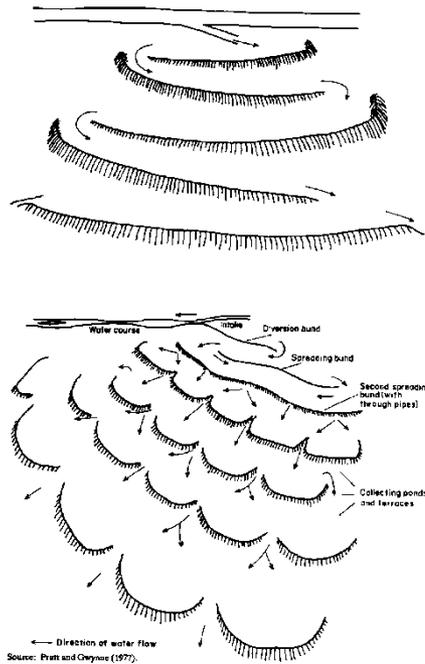
Soil improvement strategies

	Erosion Protection & Soil			Soil Transfer	
	Bunds	Trenches	Grasses	Desilt	Soil spread
Slopes					
> 100 %			Highly Suitable		
30% - 100%	Less Suitable	Highly Suitable	Highly Suitable		
< 30%	Highly Suitable	Less Suitable	Highly Suitable		
Elevation					
Ridges					Highly Suitable
Plateaus					Highly Suitable
Depressions				Highly Suitable	
Valleys				Highly Suitable	

Highly Suitable	Highly Suitable
Less Suitable	Less Suitable



Contour Bunds

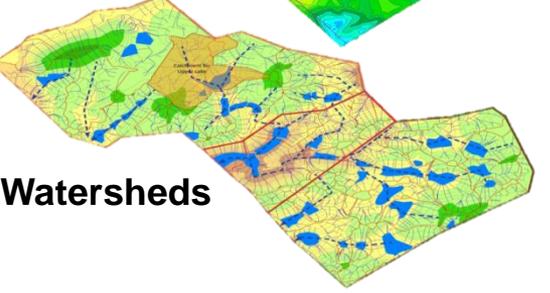
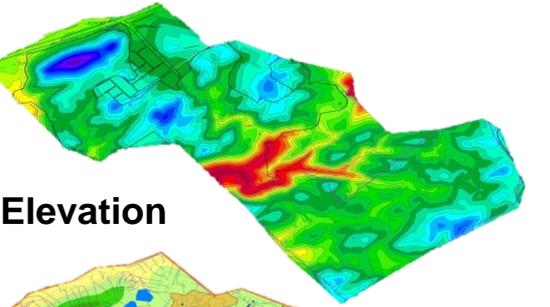
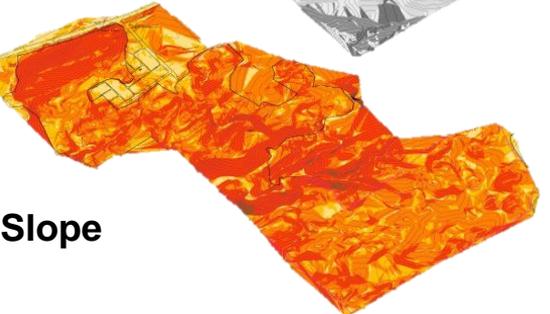
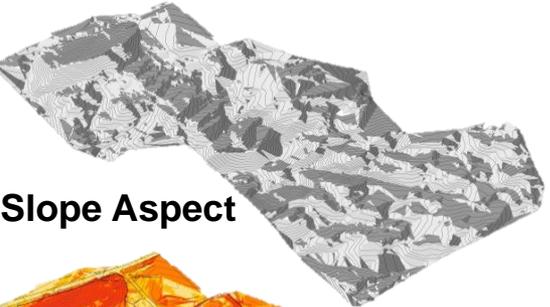


Source: Pratt and Cheryne (1977).

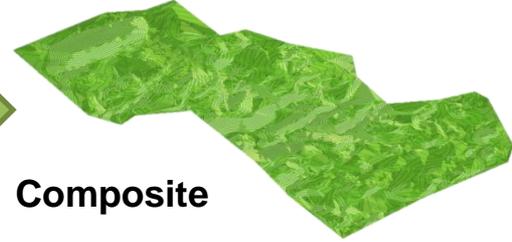
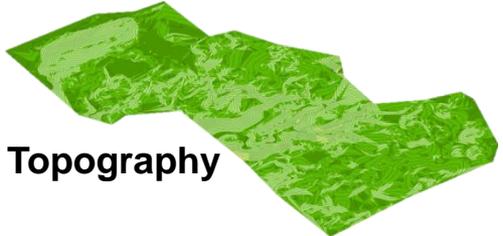
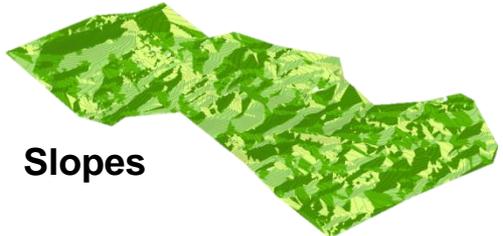
Planting strategies

	Potential Evapotranspiration		Drought Tolerance	Water logging	Sun exposure		Wind Buffer		Planting Typology		
	Low	Medium			Low	High	Hot Dry	Cold Dry	Grasses	Shrubs	Trees
Slopes											
> 100 %									Highly Suitable	Less Suitable	Highly Suitable
30% - 100%									Highly Suitable	Highly Suitable	Highly Suitable
< 30%									Less Suitable	Highly Suitable	Highly Suitable
Aspect											
South West	Highly Suitable		Highly Suitable				Highly Suitable		Highly Suitable	Less Suitable	Highly Suitable
South East	Highly Suitable		Highly Suitable				Highly Suitable		Highly Suitable	Less Suitable	Highly Suitable
North East					Highly Suitable	Less Suitable		Highly Suitable	Less Suitable	Less Suitable	Highly Suitable
North West					Highly Suitable		Highly Suitable		Highly Suitable	Less Suitable	Highly Suitable
Elevation											
Ridges	Highly Suitable		Highly Suitable				Highly Suitable		Highly Suitable	Less Suitable	Highly Suitable
Plateaus	Highly Suitable		Highly Suitable				Highly Suitable		Highly Suitable	Less Suitable	Highly Suitable
Depressions							Highly Suitable		Highly Suitable	Less Suitable	Highly Suitable
Valleys							Highly Suitable		Highly Suitable	Less Suitable	Highly Suitable

Site characteristics

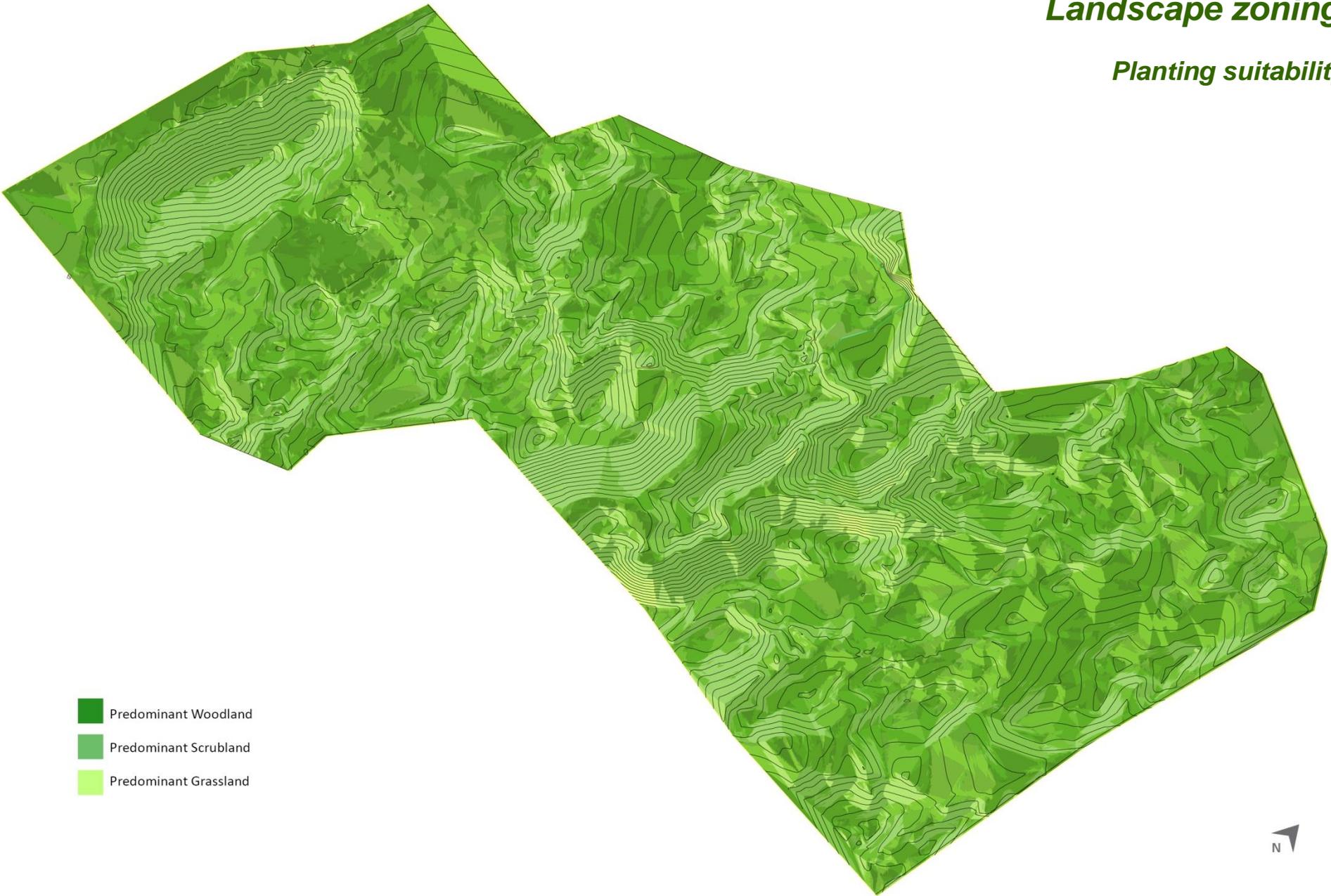


Planting strategies



Landscape zoning

Planting suitability



-  Predominant Woodland
-  Predominant Scrubland
-  Predominant Grassland



YEAR
2013

Tephrosia
purpurea



Tridax
procumbens



lantana
camara



YEAR
2016

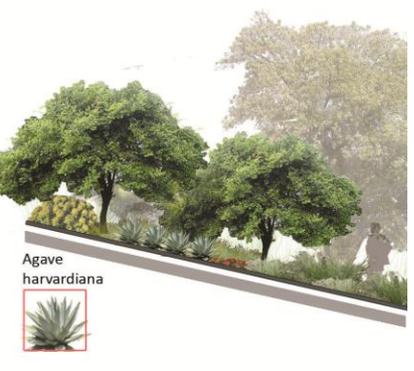
Saccharum
spontaneum



Saccharum
spontaneum



Agave
harvardiana

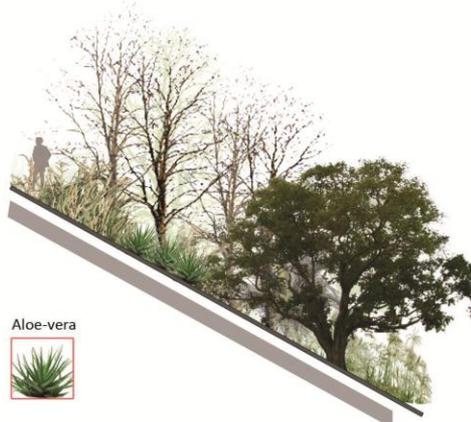


YEAR
2020

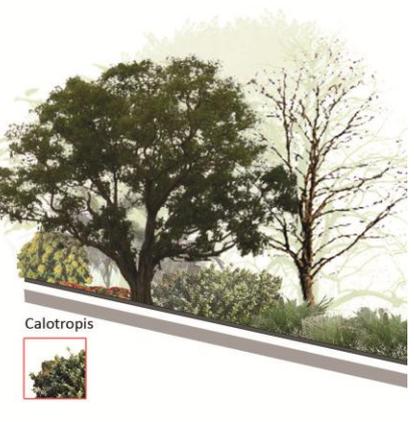
Croton
bonplandianumz



Aloe-vera



Calotropis



Chloris
gayana



Echinochloa
colonom



Heteropogon
contortus



Vetiveria
zizanioides



Heteropogon
contortus



Echinochloa
colonom



Chloris
gayana



Bothriochloa
ischaemum



Euphorbia



Saccharum
spontaneum



Chloris
gayana



Heteropogon
contortus



STEEP SLOPE

MODERATE SLOPE

GENTLE SLOPE



Legend

-  Predominant Grassland
-  Predominant Scrubland
-  Predominant Woodland
-  Predominant Riparian edge



Legend

-  Predominant Grassland
-  Predominant Scrubland
-  Predominant Woodland
-  Predominant Riparian edge



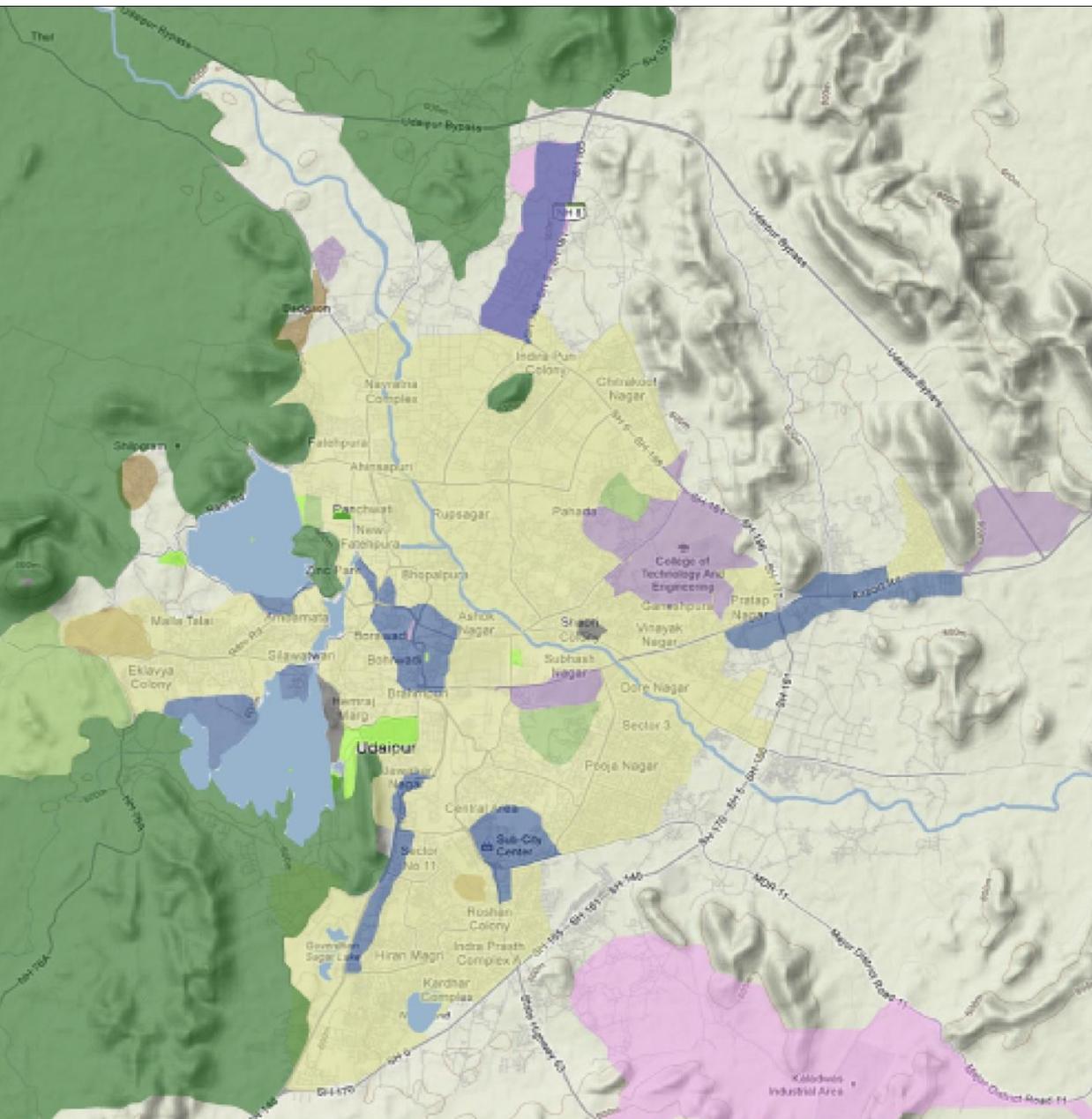
Legend

-  Predominant Grassland
-  Predominant Scrubland
-  Predominant Woodland
-  Predominant Riparian edge

DEVELOPING CULTURAL CONNECTIONS

***Landscape programs based on
spatial studies in Udaipur***

Udaipur – A lake city



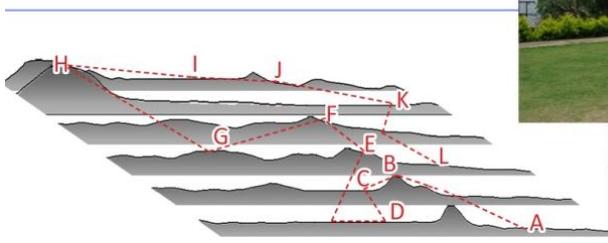
Legends

- Residential
- Commercial
- Gardens
- Historical places
- Water bodies
- Forest
- Agricultural land
- Village settlement
- Industries
- Institutions

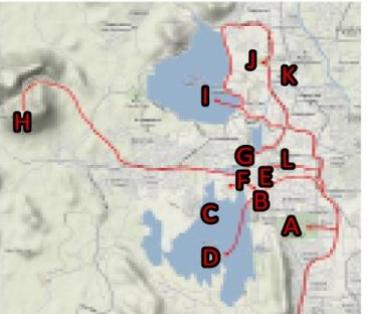


Key Plan

Traversing Udaipur



- Old city
 - New city
 - Fateh sagar lake
 - Hanuman ghat
 - Jagdish mandir
 - Lake pichola
- Sahelio ki bari
 - Sajjan garh palace
 - Gangaur ghat
 - Jag mandir
 - City palace
 - Gulab bagh



INDEX

- | | |
|-------------------|-----------------------|
| A. Gulab bagh | G. Hanuman ghat |
| B. City palace | H. Sajjan garh palace |
| C. Lake pichola | I. Fateh sagar lake |
| D. Jag mandir | J. Sahelio ki bari |
| E. Jagdish mandir | K. New city |
| F. Gangaur ghat | L. Old city |



East – West: Transect through lake Pichola and city



North – South: Transect through lakes Pichola and Fateh Sagar



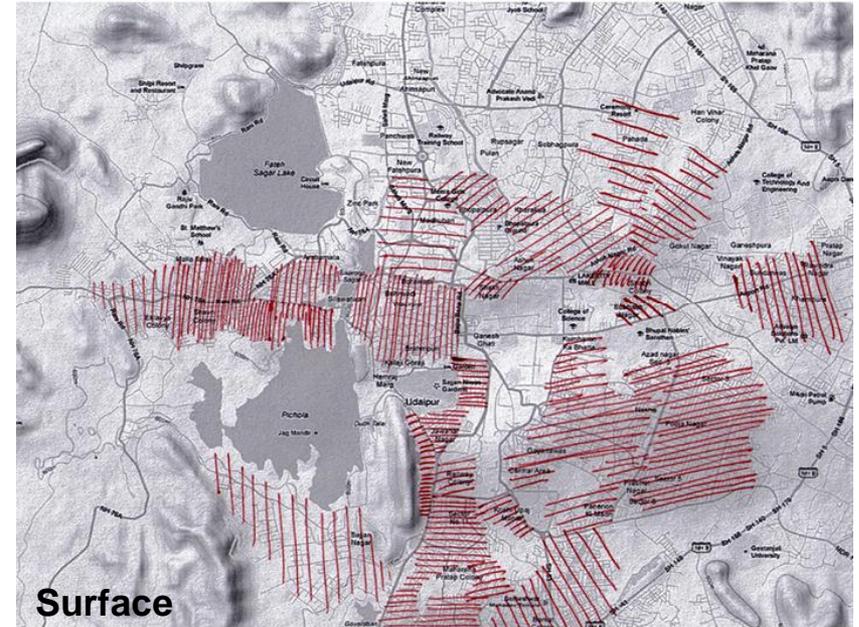
Perceptions of sky, surface and ground



Sky

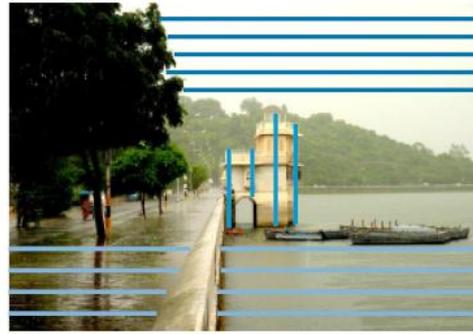


Ground



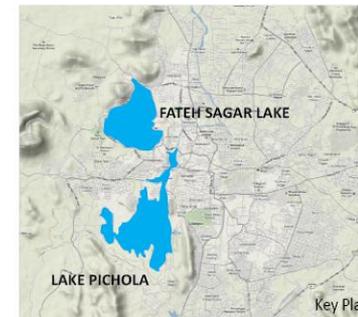
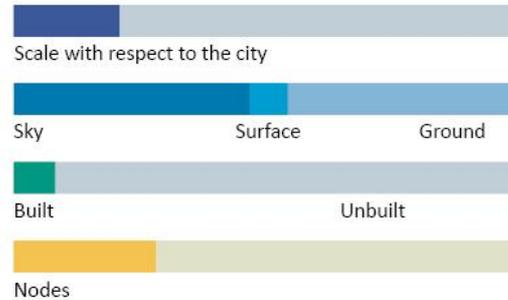
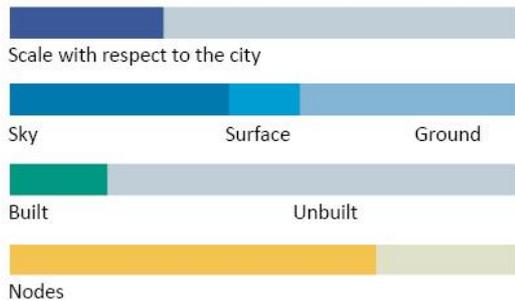
Surface

Perceived sky, surface and ground content

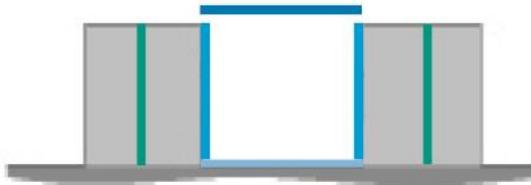


Lake pichola

Fateh sagar lake



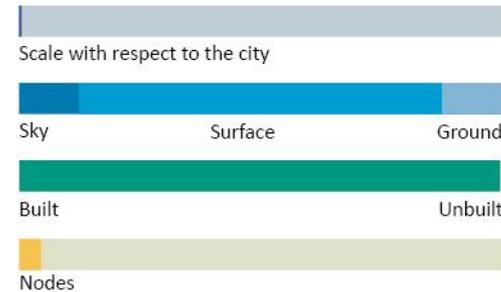
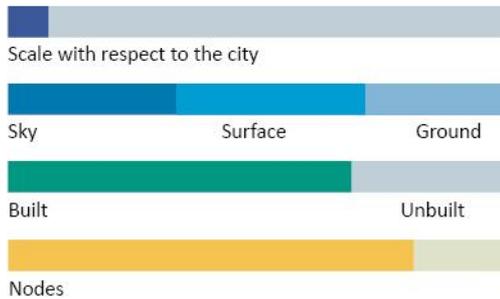
Perceived sky, surface and ground content



City palace



A typical street of old city





Experiencing the City Palace



LANDSCAPE DEVELOPMENT

Experiencing Landscape

Coherence
Legibility
Exploration
Mystery

Vision

Landscape of an educational institution campus is akin to that of a temple: a temple of learning that fosters creativity, encourages search for knowledge through introspection and discussion, accepts stewardship of nature and culture, and becomes a womb of future thought.

Concept

The landscape shall demonstrate the power of natural transformation inherent in the site, manifested through its annual cyclic process - a symbol of perseverance required for steady growth.

The landscape is visualized as a series of enveloping spaces exhibiting bold coarse forms, vibrant colours & intricate patterns that connect to nature.

Concept

Vision

CAMPUS
LANDSCAPE

Program

Sustainability

The landscape process shall strive for
Zero import and export of

Soil and Water

Program

Brief and program for the institution are generated through an analysis of proposed campus activities, spaces and lifestyle of residents and visitors.

Transformation



THANK YOU