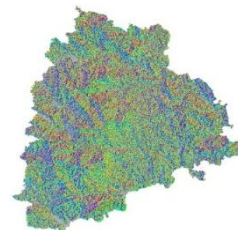
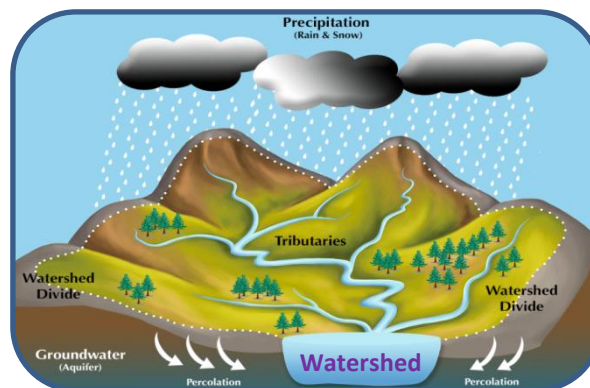


Government of Telangana – Forest Department



SITE SUITABILITY ANALYSIS FOR WATER HARVESTING STRUCTURES USING REMOTE SENSING & GIS

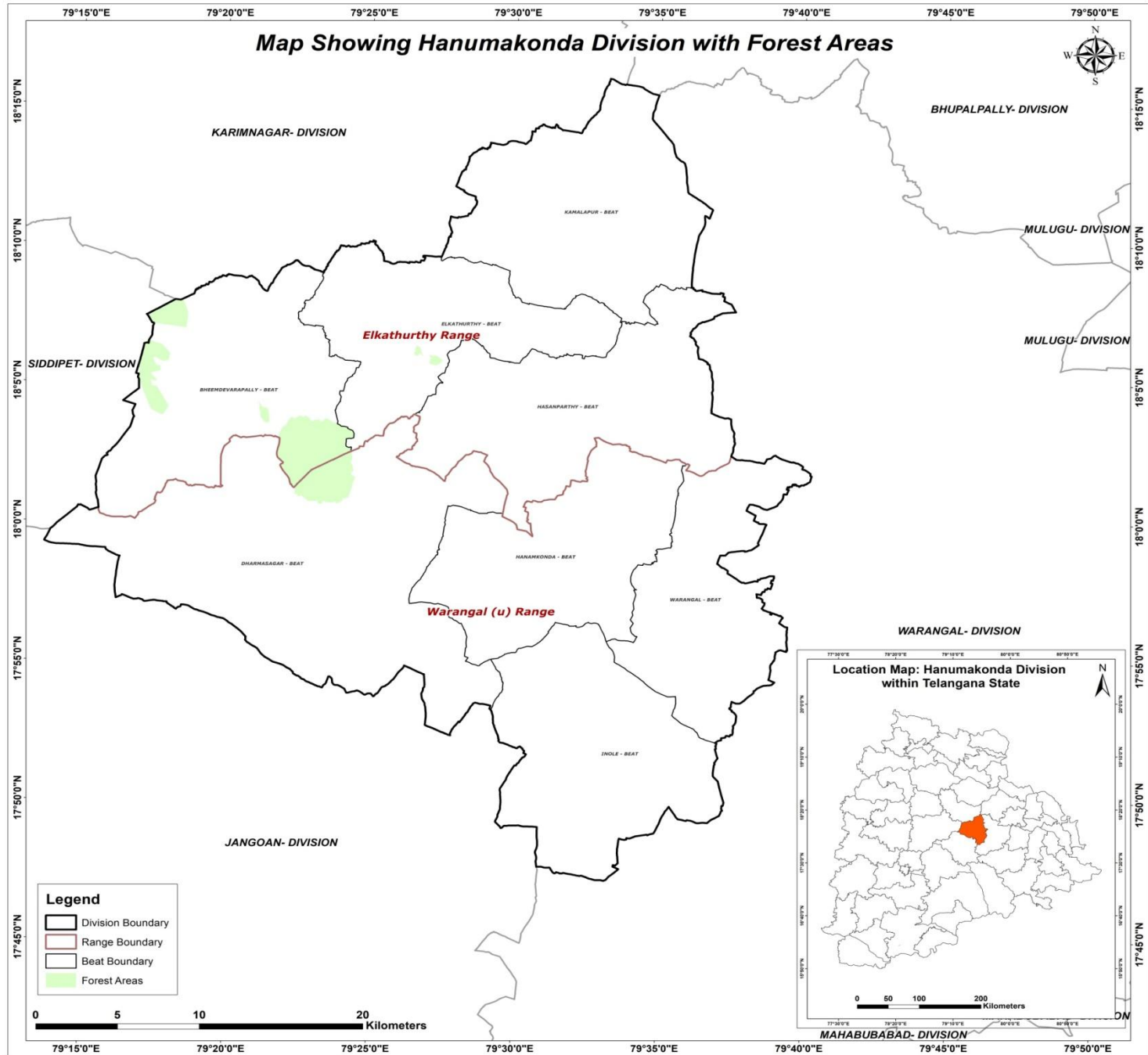


SITE SUITABILITY ANALYSIS FOR WATER HARVESTING STRUCTURES USING REMOTE SENSING & GIS

Circle: Bhadradi
District: Hanumakonda
Division: Hanumakonda

**Prepared at Geomatics Centre
O/o Prl.Chief Conservator of Forests
Aranya Bhavan, Saifabad
Hyderabad - 500004**

Map Showing Hanumakonda Division with Forest Areas



METHODOLOGY

Various methods are available to evaluate the suitability of locations for Percolation Tanks and other SMC structures using Arc GIS.

- A common approach is to use Geographic Information System (GIS) tools to decide the suitability by analysing factors like topography, vegetation density, distance to water sources, and terrain slope.
- Data was gathered from various sources, including the Raster Sentinel data obtained from the Copernicus open access hub.
- Elevation values were applied to the raster data using the SNAP software to create a Digital Elevation Model (DEM).
- Using Arc GIS, streams were mapped based on DEM, and potential percolation tank sites were identified based on stream order.
- Slope data generated from the CARTOSAT 30 m DEM (Source: Bhuvan) were also included in the analysis.
- By overlaying these spatial datasets and applying specific criteria, GIS can help identify optimal locations for building percolation tanks.
- Once the best location is identified, the catchment area is determined.
- The location is then ranked on the basis of catchment area and vegetation cover, with rankings ranging from I to V.



FLOW CHART FOR METHODOLOGY



Guidelines for building Percolation Tanks:

- Refer to the Site Suitability Map given by the GIS Cell for suitable locations
- Choose the best location for constructing a percolation tank based on the ranking priority. The priority for treatment of the watershed should be based on stream order, with primary streams taking precedence over secondary streams and secondary streams taking precedence over tertiary streams. This phased approach will ensure effective management of the watershed.
- Field conditions such as local climate, slope, vegetation and soil type must be considered when determining the location. It is important to move either upstream or downstream for a distance of about 50M, depending on the specific conditions of the site.
- It is essential to follow the priority given in the map. If no specific points are indicated, site suitability should be considered a determining factor.
- Encroached areas were not considered when demarcating points for constructing the Percolation tank.
- In the field, where streams are found at the optimal location, a percolation tank can be built if a point is missing on the map.
- The catchment area should also be considered when estimating the construction requirements like length of the bund, height of the bund, wear width etc., after verifying with the actual field conditions.
- Planting native vegetation around the tank can stabilize the soil, prevent erosion, and improve water absorption. Use plants that are well suited to the local environment.



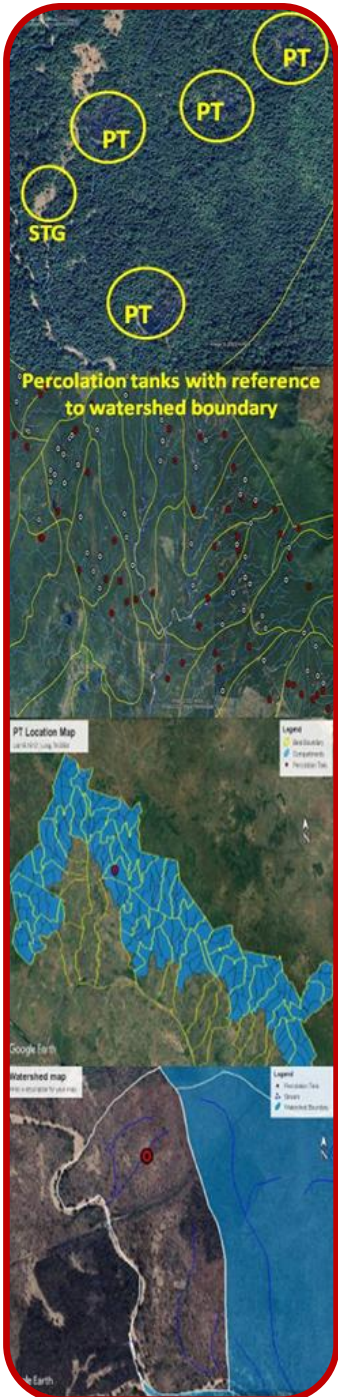
Suitability criteria for Check-Dams and Percolation Tanks (SITE SUITABILITY INDEX)

Index	Slope(Degrees)	Density Class
Highly suitable	0-5	Blank & Scrub
Moderately suitable	0-5	Open Forest
Least suitable	0-5	Dense Forest

Suitability criteria for Continuous/Staggered contour trenches

Rank	Slope classes (Degrees)	Density Classes
Highly Suitable	>5 and <= 10	Blanks
Moderately Suitable	>5 and <= 10	Scrub forest
Least suitable	>5 and <= 10	Open forest
	> 10 and < 25	Blanks & scrubs
MPTs and SGPs	>5 and <= 10	Dense Forest
	> 10 and < 25	Open and Dense forest





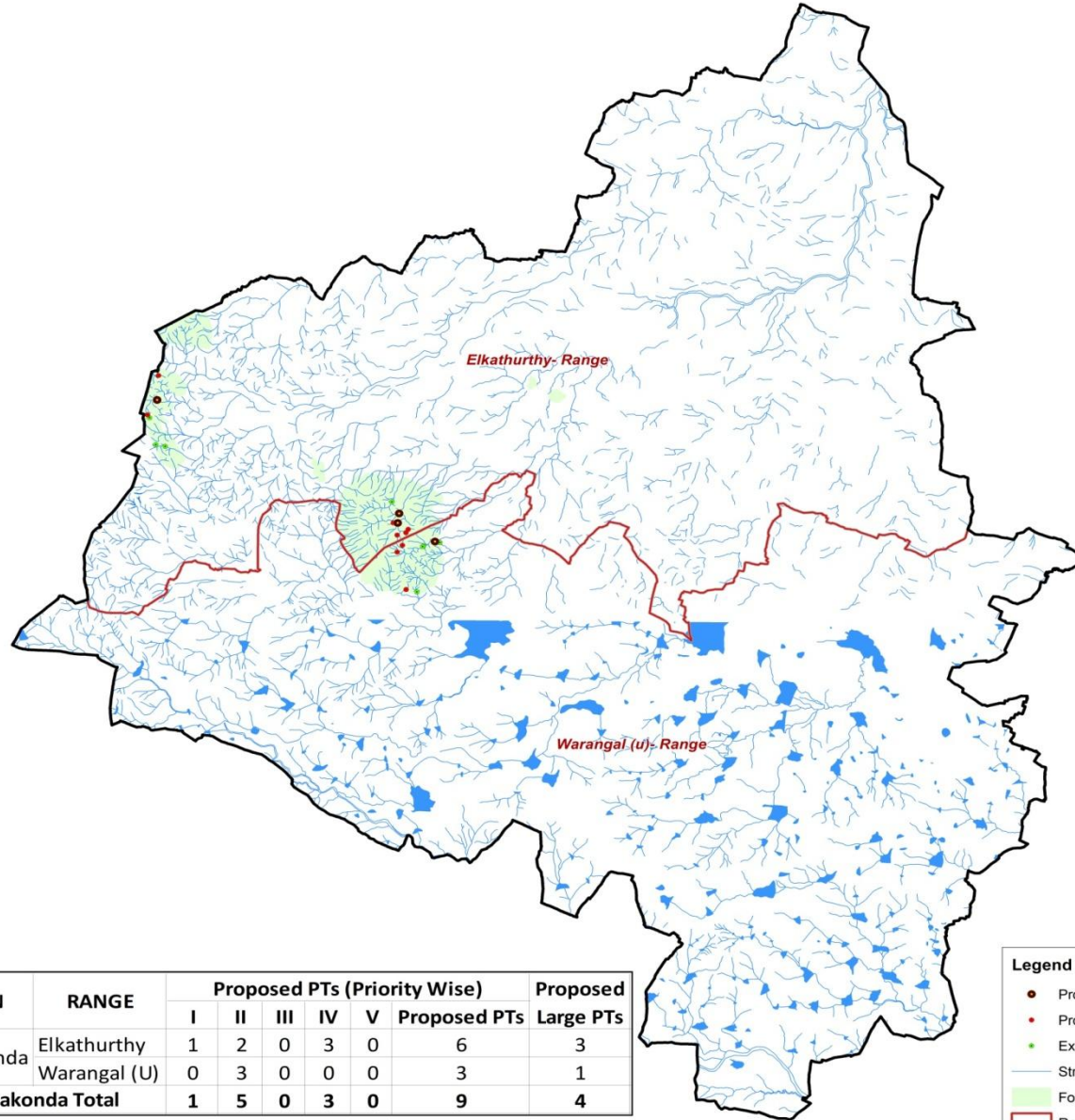
PRIORITY CLASSES FOR PERCOLATION TANK

Priority	Catchment Area(Ha)	Density Class
1	0-25 0-25	Scrub Blank
2	0-25 25-50	Open Forest Blank
3	25-50 >50	Open Forest Scrub & blank
4	0-25 >50	Dense Forest Open Forest
5	25-50 >50	Dense Forest Dense Forest



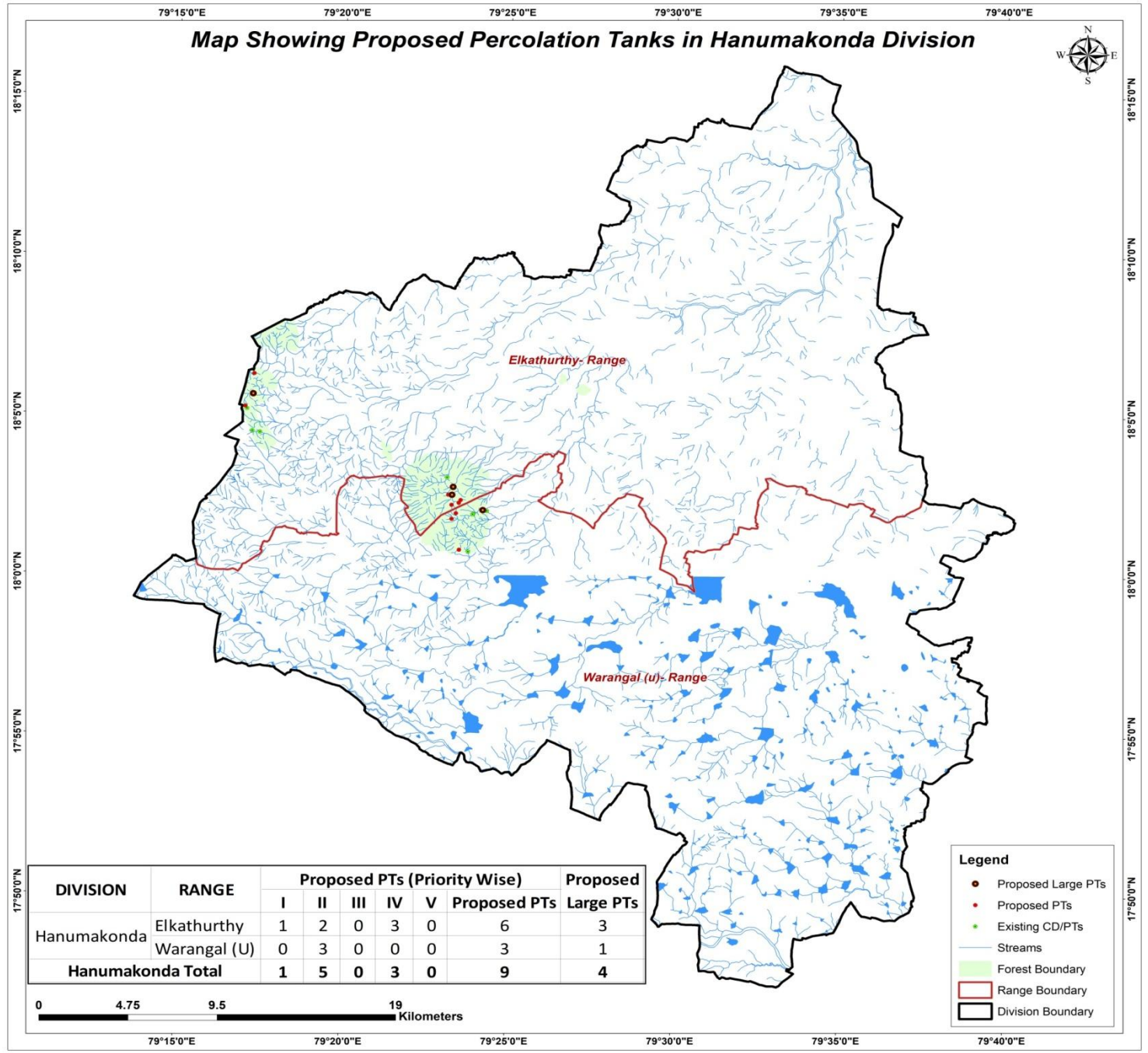


Map Showing Proposed Percolation Tanks in Hanumakonda Division

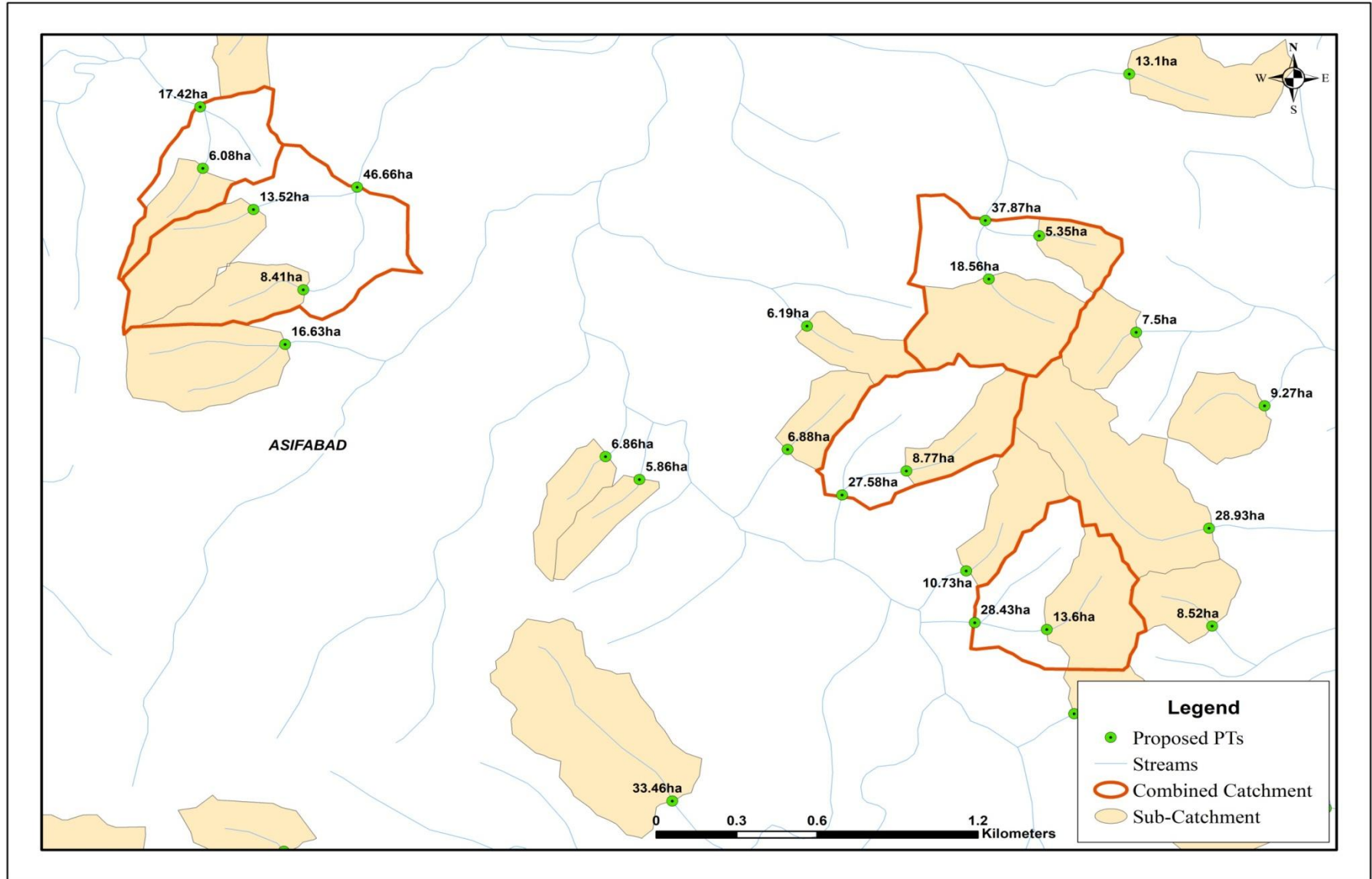


DIVISION	RANGE	Proposed PTs (Priority Wise)					Proposed PTs	Proposed Large PTs
		I	II	III	IV	V		
Hanumakonda	Elkathurthy	1	2	0	3	0	6	3
	Warangal (U)	0	3	0	0	0	3	1
Hanumakonda Total		1	5	0	3	0	9	4

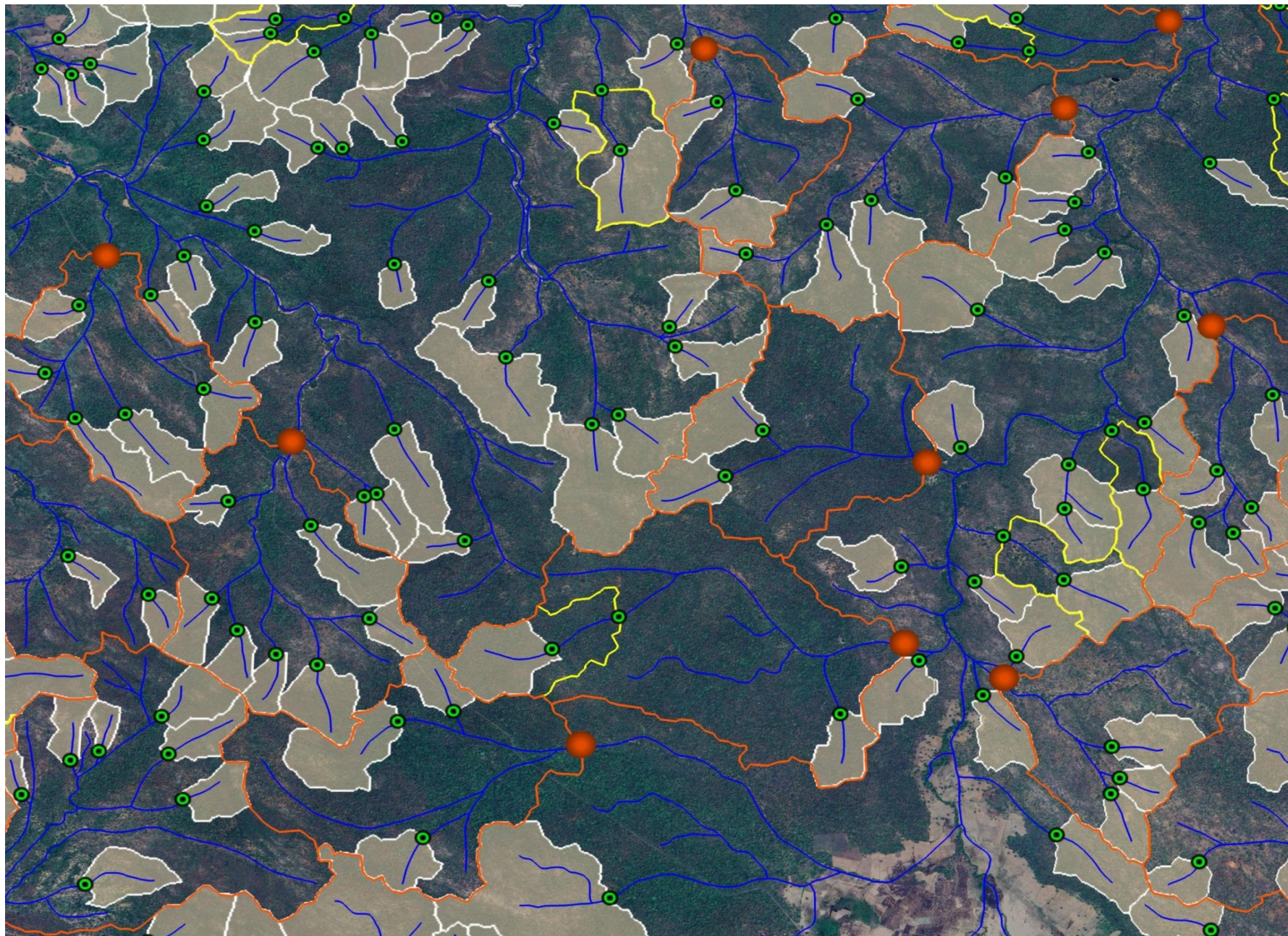
- Legend**
- Proposed Large PTs
 - Proposed PTs
 - Existing CD/PTs
 - Streams
 - Forest Boundary
 - Range Boundary
 - Division Boundary



CATCHMENT AREA



Sample Catchment Map

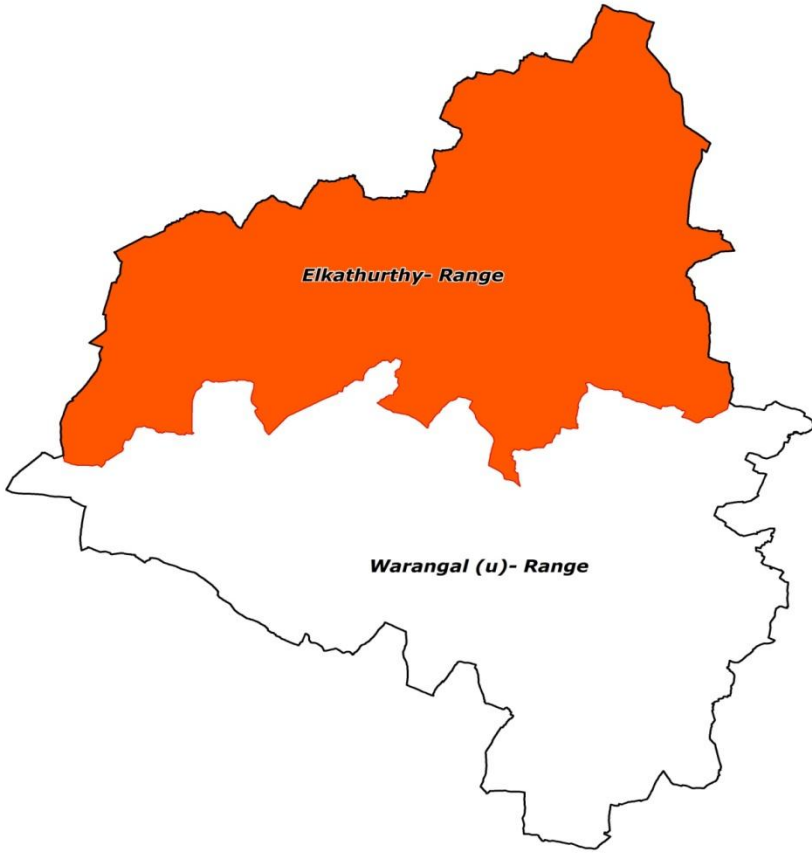


Map Showing Elkathurthy Range in Hanumakonda Division



18°18'0"N
18°9'0"N
18°0'0"N
17°51'0"N
17°42'0"N

18°18'0"N
18°9'0"N
18°0'0"N
17°51'0"N
17°42'0"N



Elkathurthy- Range

Warangal (u)- Range

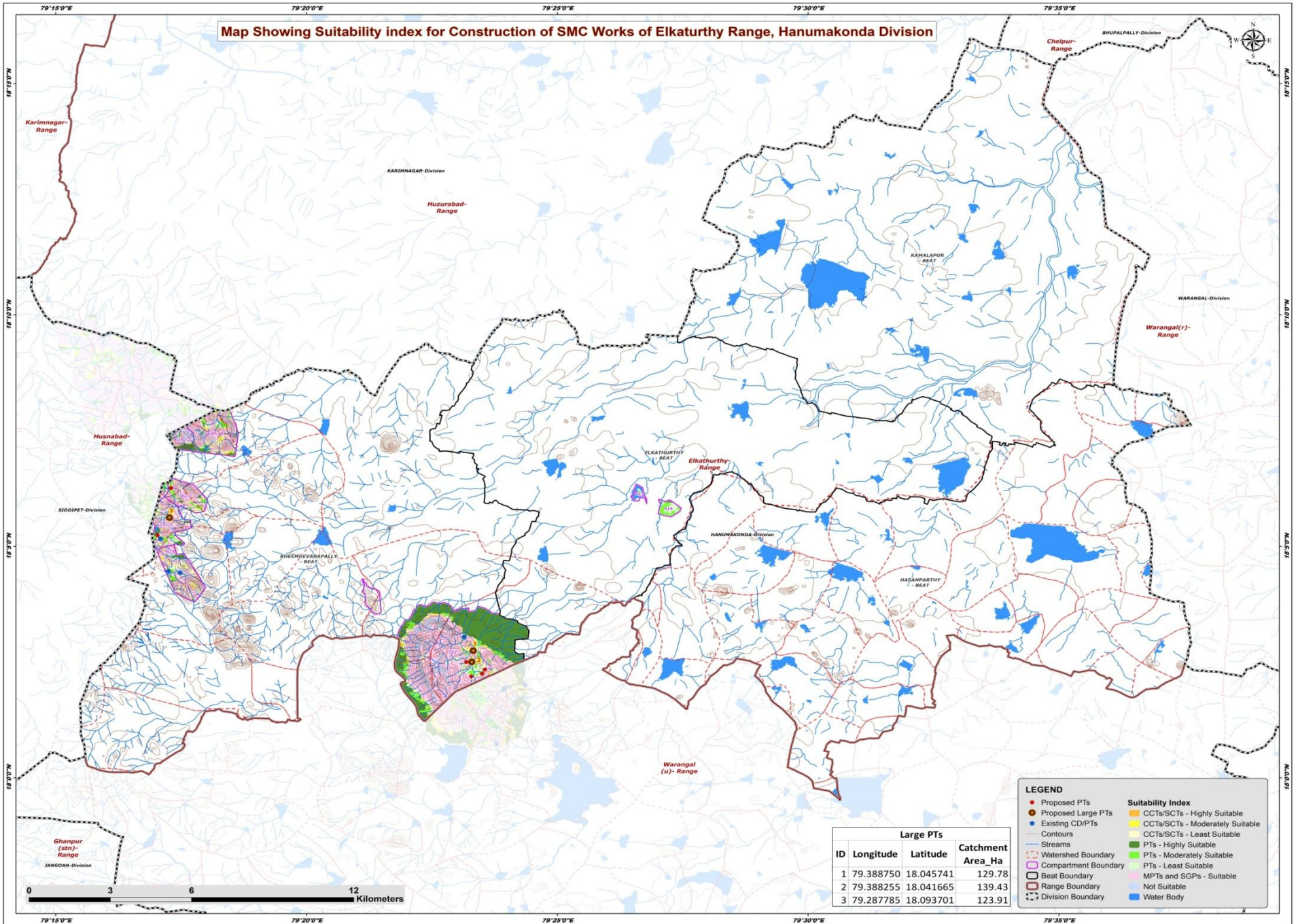


Legend

-  Division Boundary
-  Range Boundary

79°12'0"E 79°21'0"E 79°30'0"E 79°39'0"E 79°48'0"E

Map Showing Suitability index for Construction of SMC Works of Elkathurthy Range, Hanumakonda Division



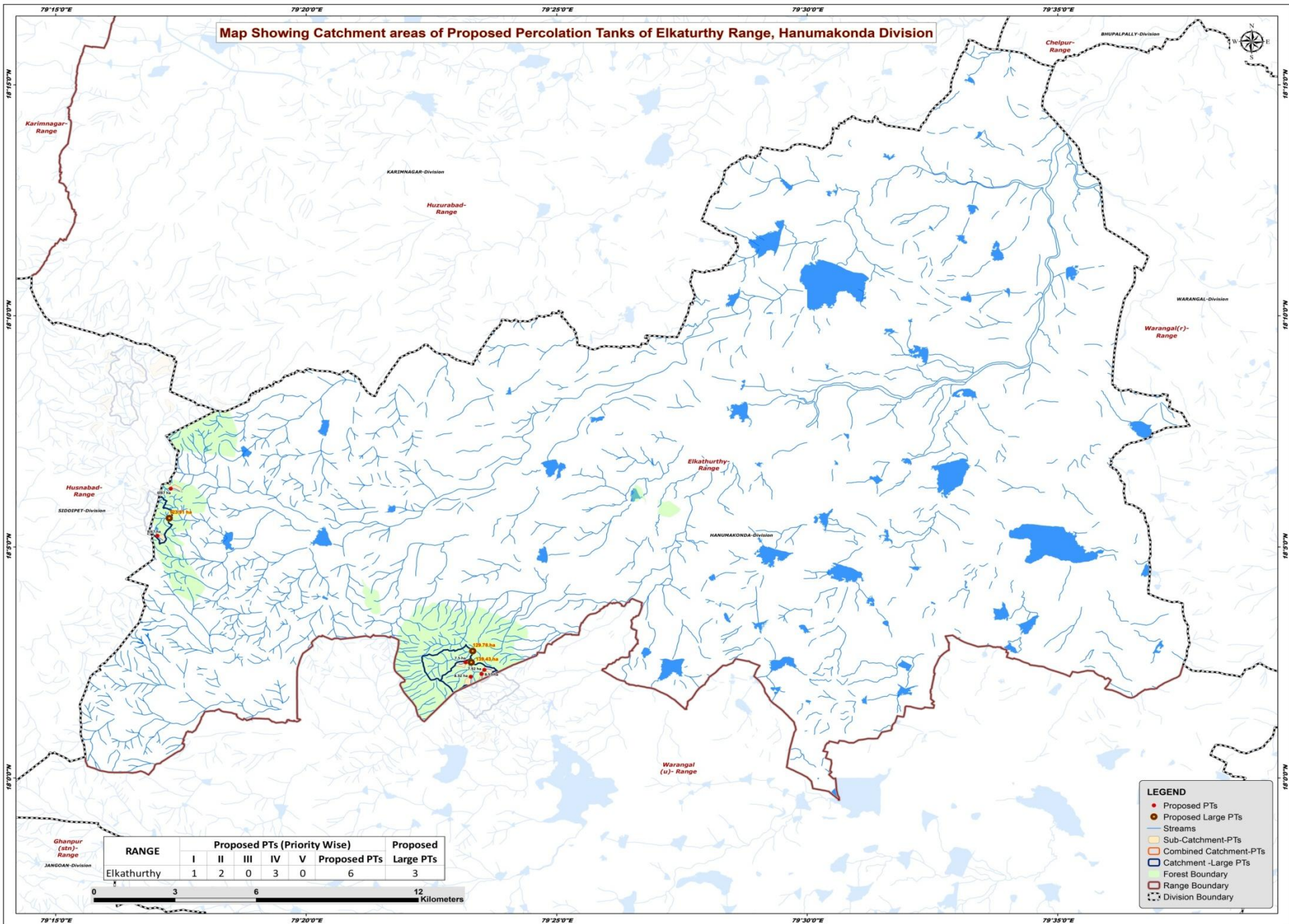
LEGEND

- Proposed PTs
- Existing CD/PTs
- Contours
- Streams
- Watershed Boundary
- Compartment Boundary
- Beat Boundary
- Range Boundary
- - - Division Boundary
- CCTs/SCTs - Highly Suitable
- CCTs/SCTs - Moderately Suitable
- CCTs/SCTs - Least Suitable
- PTs - Highly Suitable
- PTs - Moderately Suitable
- PTs - Least Suitable
- MPTs and SGPts - Suitable
- MPTs and SGPts - Not Suitable
- Water Body

Large PTs			
ID	Longitude	Latitude	Catchment Area_Ha
1	79.388750	18.045741	129.78
2	79.388255	18.041665	139.43
3	79.287785	18.093701	123.91



Map Showing Catchment areas of Proposed Percolation Tanks of Elkathurthy Range, Hanumakonda Division



LEGEND

- Proposed PTs
- Proposed Large PTs
- Streams
- Sub-Catchment-PTs
- Combined Catchment-PTs
- Catchment - Large PTs
- Forest Boundary
- Range Boundary
- - - Division Boundary



Beat wise Abstract of Proposed PT's – Elkathurthy Range

S. No.	Beat	Proposed PT's
1	BHEEMDEVARAPALLY	6
	Total	6

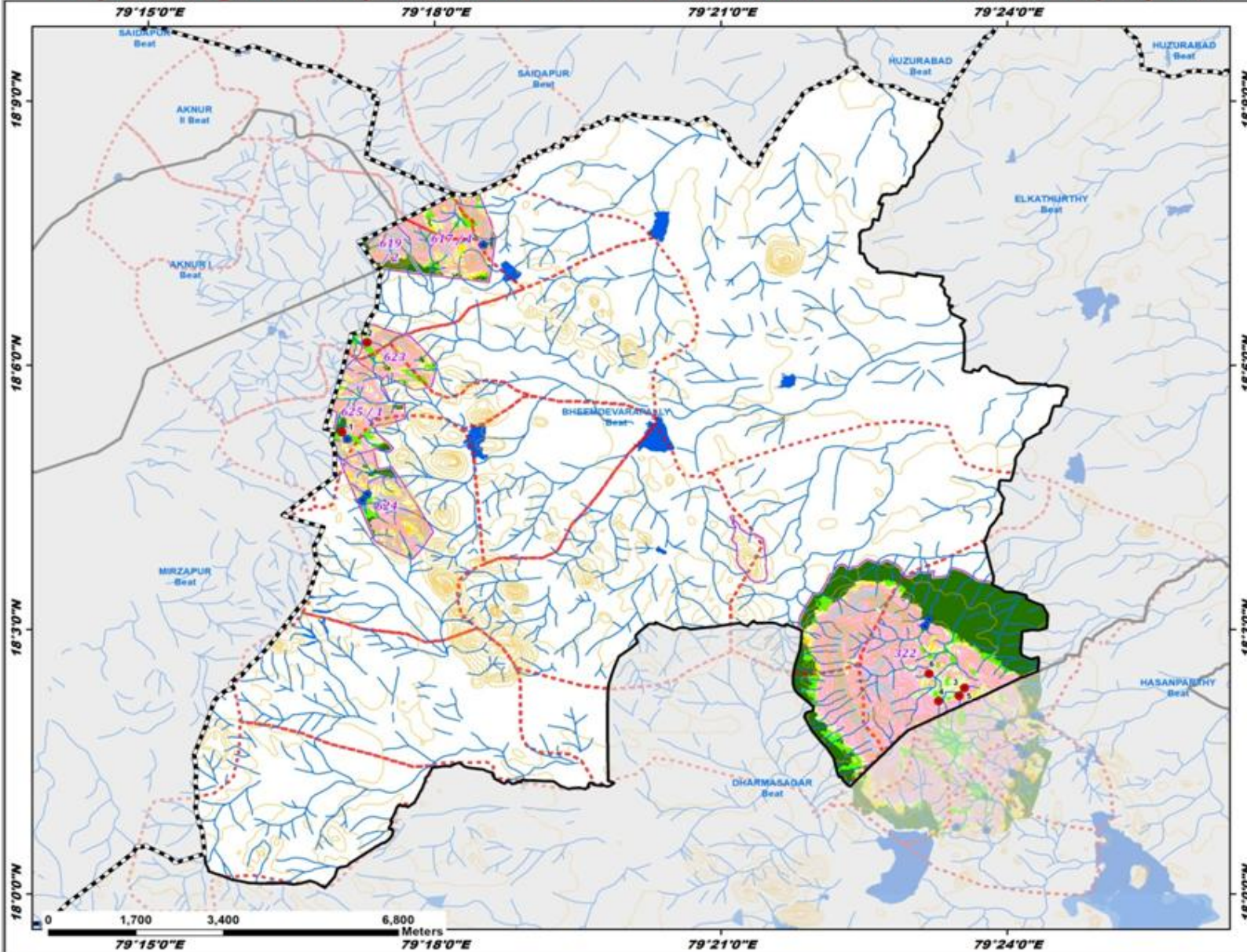
List of Proposed PTs – Elkathurthy Range

ID	Latitude	Longitude	Catchment Area_Ha	Priority	Beat
1	18.087336	79.283859	8.67	I	BHEEMDEVARAPALLY
2	18.104308	79.288285	6.87	II	BHEEMDEVARAPALLY
3	18.038983	79.392615	7.92	II	BHEEMDEVARAPALLY
4	18.036470	79.388093	8.32	IV	BHEEMDEVARAPALLY
5	18.037481	79.391677	8.57	IV	BHEEMDEVARAPALLY
6	18.041682	79.386427	7.50	IV	BHEEMDEVARAPALLY

Map Showing Suitability index for Construction of SMC Works of Bheemdevarapally Beat



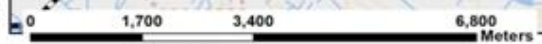
Division : Hanumakonda
Range : Elkathurthy



ID	Latitude	Longitude	Catchment Area_ha	Priority
1	18.087336	79.283859	8.67	I
2	18.104308	79.288285	6.87	II
3	18.038983	79.392615	7.92	II
4	18.036470	79.388093	8.32	IV
5	18.037481	79.391677	8.57	IV
6	18.041682	79.386427	7.50	IV

Legend

- Proposed PTs
 - Existing CD/PTs
 - Contours
 - Streams
 - - - Watershed Boundary
 - Compartment Boundary
 - Beat Boundary
 - Division Boundary
- Suitability Index**
- CCTs/SCTs - Highly Suitable
 - CCTs/SCTs - Moderately Suitable
 - CCTs/SCTs - Least Suitable
 - PTs - Highly Suitable
 - PTs - Moderately Suitable
 - PTs - Least Suitable
 - MPTs and SGPs - Suitable
 - Not Suitable
 - Water Body



79°15'0"E 79°18'0"E 79°21'0"E 79°24'0"E

18°9'0"N
18°6'0"N
18°3'0"N
18°0'0"N

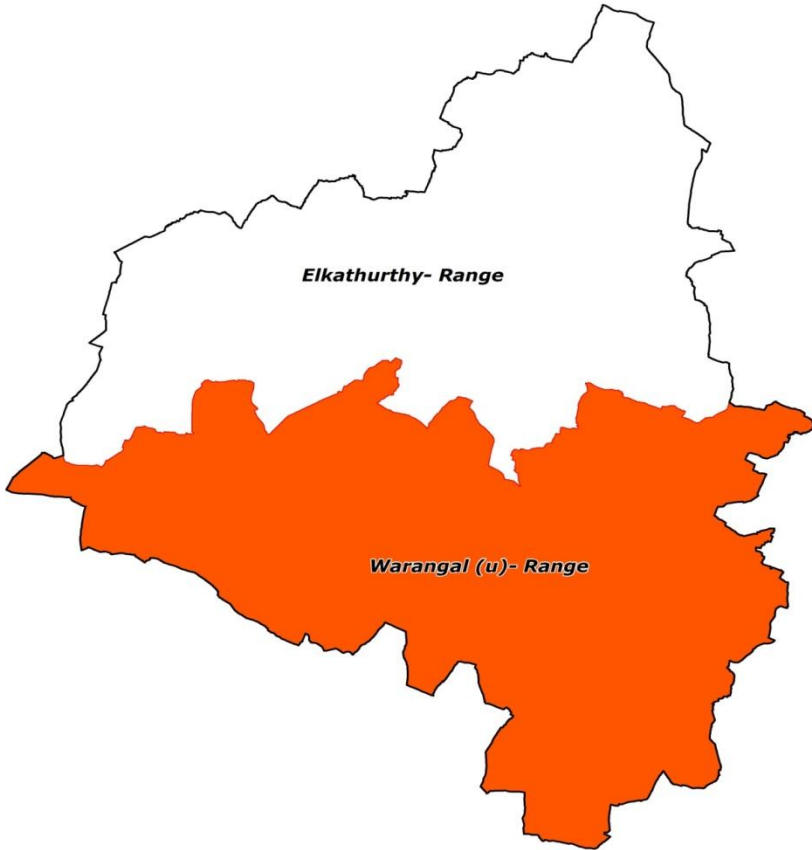
18°9'0"N
18°6'0"N
18°3'0"N
18°0'0"N

Map Showing Warangal Urban Range in Hanumakonda Division



18°18'0"N
18°9'0"N
18°0'0"N
17°51'0"N
17°42'0"N

18°18'0"N
18°9'0"N
18°0'0"N
17°51'0"N
17°42'0"N

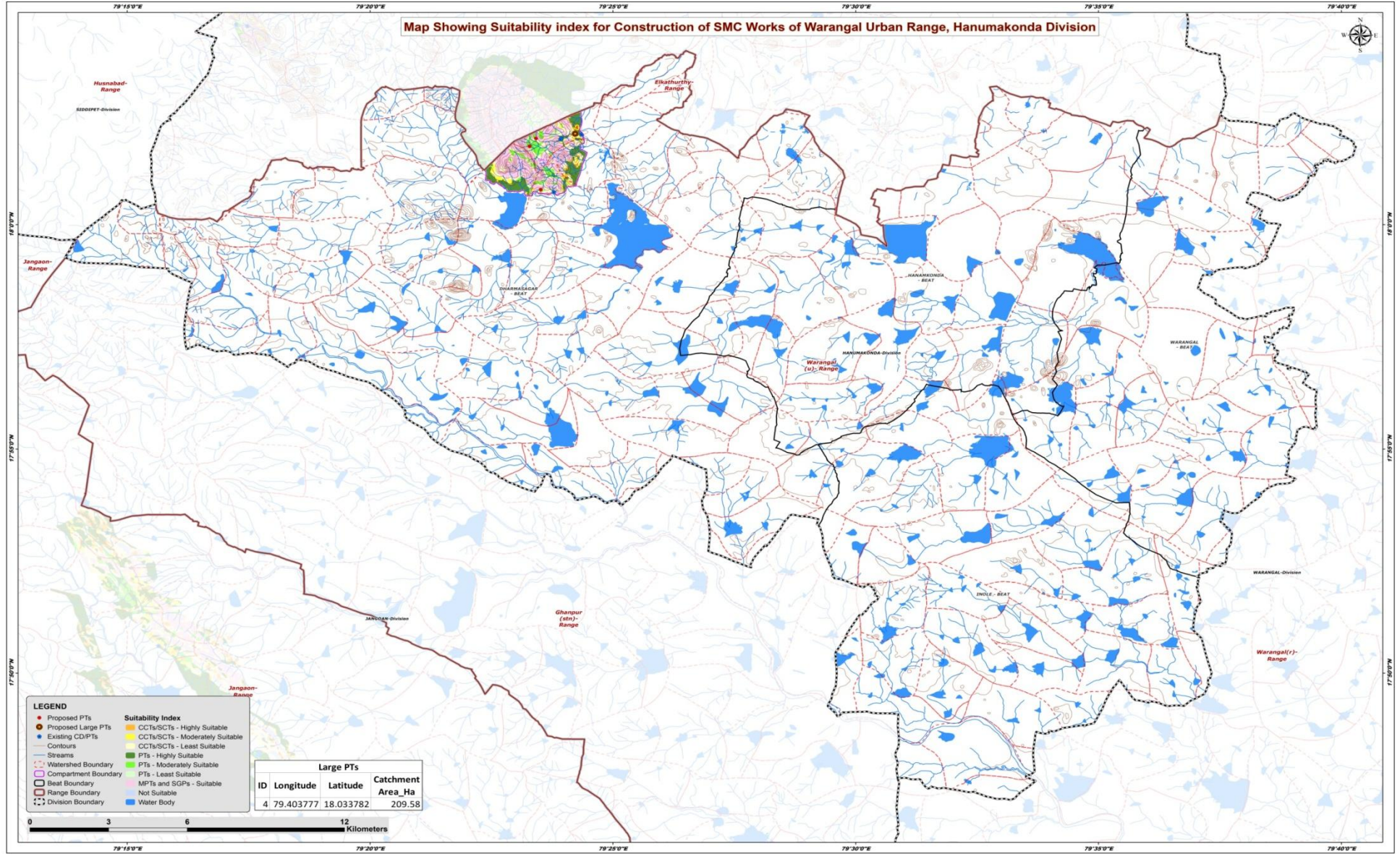


Legend

-  Division Boundary
-  Range Boundary

79°12'0"E 79°21'0"E 79°30'0"E 79°39'0"E 79°48'0"E

Map Showing Suitability index for Construction of SMC Works of Warangal Urban Range, Hanumakonda Division

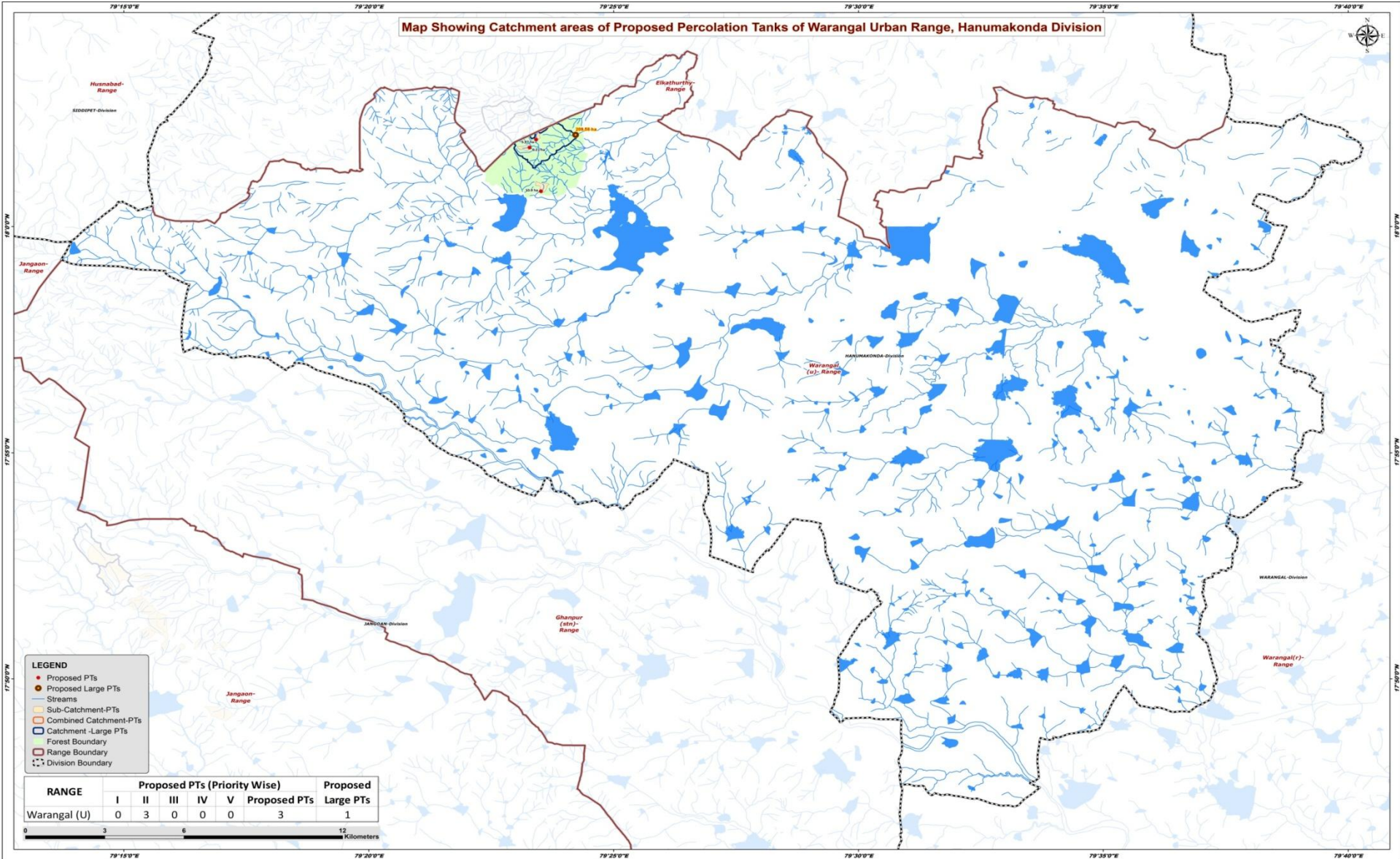


- LEGEND**
- Proposed PTs
 - Proposed Large PTs
 - Existing CD/PTs
 - Contours
 - Streams
 - Watershed Boundary
 - Compartment Boundary
 - Beat Boundary
 - Range Boundary
 - Division Boundary
- Suitability Index**
- CCTs/SCTs - Highly Suitable
 - CCTs/SCTs - Moderately Suitable
 - CCTs/SCTs - Least Suitable
 - PTs - Highly Suitable
 - PTs - Moderately Suitable
 - PTs - Least Suitable
 - MPTs and SGPs - Suitable
 - Not Suitable
 - Water Body

Large PTs		
ID	Longitude	Latitude
4	79.403777	18.033782
		Catchment Area_Ha
		209.58



Map Showing Catchment areas of Proposed Percolation Tanks of Warangal Urban Range, Hanumakonda Division



- LEGEND**
- Proposed PTs
 - Proposed Large PTs
 - Streams
 - Sub-Catchment-PTs
 - Combined Catchment-PTs
 - Catchment -Large PTs
 - Forest Boundary
 - Range Boundary
 - - - Division Boundary

RANGE	Proposed PTs (Priority Wise)					Proposed PTs	Proposed Large PTs
	I	II	III	IV	V		
Warangal (U)	0	3	0	0	0	3	1



79°15'0"E 79°20'0"E 79°25'0"E 79°30'0"E 79°35'0"E 79°40'0"E

Beat wise Abstract of Proposed PT's – Warangal(U) Range

S. No.	Beat	Proposed PT's
1	DHARMASAGAR	3
	Total	3

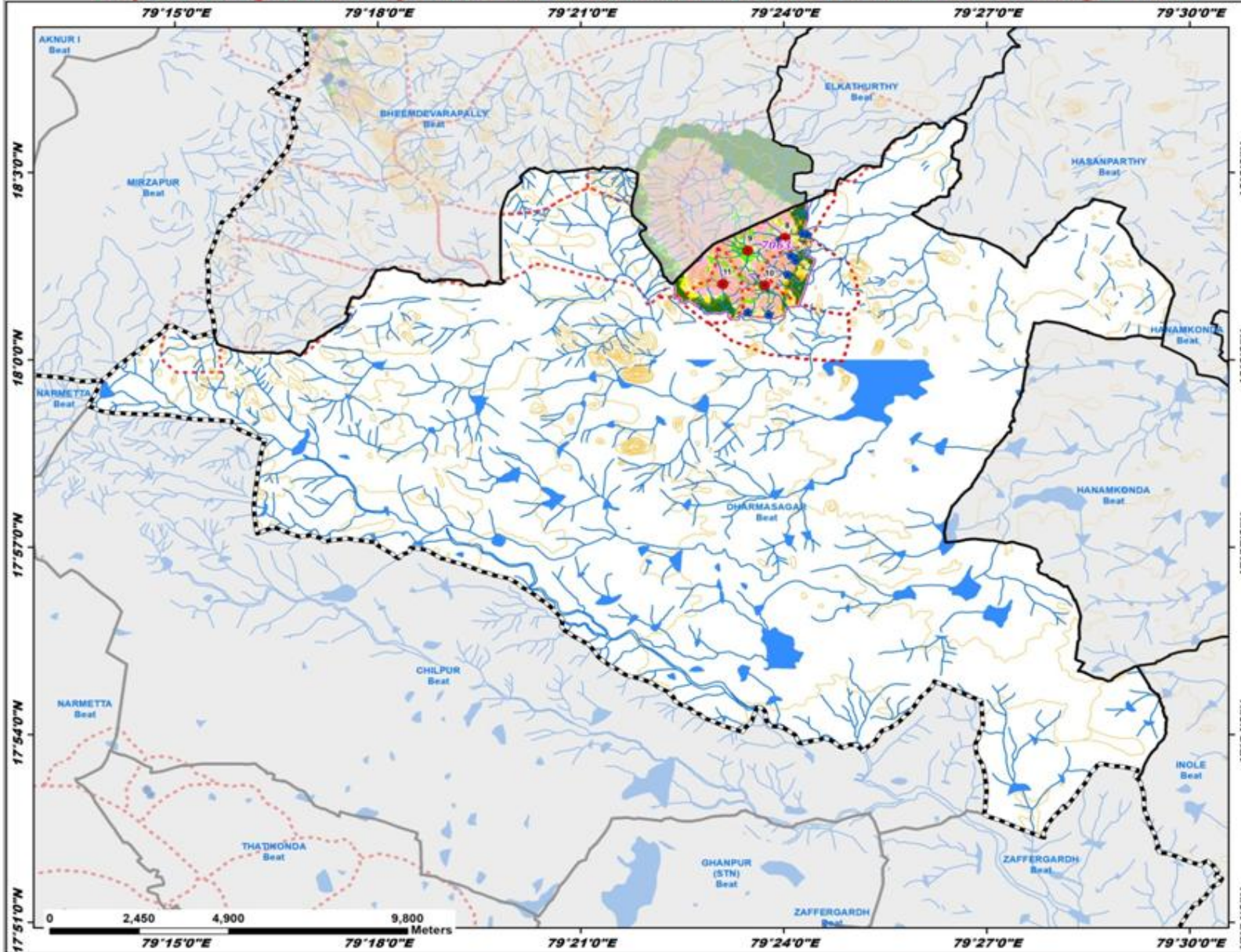
List of Proposed PTs – Warangal Urban Range

ID	Latitude	Longitude	Catchment Area_Ha	Priority	Beat
7	18.032062	79.390322	5.97	II	DHARMASAGAR
8	18.029127	79.388131	6.21	II	DHARMASAGAR
9	18.013024	79.391974	10.90	II	DHARMASAGAR

Map Showing Suitability index for Construction of SMC Works of Dharmasagar Beat



Division : Hanumakonda
Range : Warangal (U)



ID	Latitude	Longitude	Catchment Area_ha	Priority
7	18.032062	79.390322	5.97	II
8	18.029127	79.388131	6.21	II
9	18.013024	79.391974	10.90	II

Legend

- Proposed PTs
 - Existing CD/PTs
 - Contours
 - Streams
 - Watershed Boundary
 - Compartment Boundary
 - Beat Boundary
 - Division Boundary
- Suitability Index**
- CCTs/SCTs - Highly Suitable
 - CCTs/SCTs - Moderately Suitable
 - CCTs/SCTs - Least Suitable
 - PTs - Highly Suitable
 - PTs - Moderately Suitable
 - PTs - Least Suitable
 - MPTs and SGPs - Suitable
 - Not Suitable
 - Water Body