# NATIONAL HYDROLOGY PROJECT


## NATIONAL HYDROLOGY PROJECT
## PROJECT IMPLEMENTATION PLAN OF RIVER BASINS IN JAMMU DIVISION OF J&K

JAMMUANDKASHMIRGOVERNMENT
DEPARTMENT OF PHE/I&FC

Prepared by NIH for I & F C Department, Jammu, J&K

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## 1. Introduction

Jammu &Kashmir state is located in the northern part of the Indian subcontinent in the vicinity of the Karakoram and Western Himalayan mountain ranges. The state is bounded by Pakistan, Afghanistan and China from west to east. There is a sharp rise in altitude from 300 to 8600m amsl within the state's four degree of latitude. The foothills of the Himalaya, rising to about 600–2100 m form the outer and inner zones. The Pir Panjal Range constitutes the first (southernmost) mountain rampart associated with the Himalaya in the state and is the westernmost of the Lesser Himalayas. The climate is characterized by annual precipitation of about 750 mm, derived partially from the summer monsoon and partially from western disturbances during winter. The monsoonal rainfall varies from 39.6 mm in Ladakh to 184.3 mm in Srinagar and 860.5 mm in Jammu.This State is also gifted with ample water resources such as lakes, rivers, and glaciers besides groundwater. The main rivers that flow through the State,viz. Jhelum, Chenab, Indus and Tawi, are of Himalayan origin. There are 1230 water bodies in the State.

The following are the major river basins in the Jammuregion of J& K state:

## 2. River Basins in the Jammu Region

### Chenab River Basin

The river Chenab (or Chandra-Bhaga) is formed after the two streams Chandra and Bhaga merge with each other. Chandra and Bhaga originate from the south-west and north-west faces of Barelacha pass respectively in the Himalayan canton of Lahaul and Spiti valley in Himachal Pradesh. The Chandra initially flowing southeast for about 88 km sweeps round the base of the mid-Himalayas and joins the Bhaga at Tandi, after traversing a total length of about 125 km. The course of Bhaga upto the confluence is 80 km only, having a steep slope with an average fall of about 24 metres per kilometer. Thereafter the united stream, known as Chenab or Chandra-Bhaga, flows in a north-westerly course for about 46 km where it receives its first major tributary, Miyar Nalla on the right bank. Then it flows for another 90 km, generally in a northerly direction in Himachal Pradesh, when it crosses the Pangi valley before entering Padder area of Doda district in Jammu & Kashmir State. The river flows in a northwest direction in this reach for a distance of 56 km, when it is joined on the right by its biggest tributary, the Marusudar at Bhandalkot. Further Downstream, the river flows in a southerly direction for a distance of 34 km upto Thathri and then takes a westward course. In this reach, about 17 km downstream of Thathri, Neeru Nallah joins the Chenab on its left bank. The river Chenab thereafter flows generally in a northwest direction for another 41 km till it receives a tributary Bichleri on the right bank. Afterwards, the river traverses in a westerly direction for a distance of about 50 km. In this reach a number of small streams join in, namely Chaini, Talsuen, and Ans on the right bank and Yabu Nallah, Mandial and Painthal Khad on the left bank. Downstream of Ans river confluence the river changes its

direction and flows in a southerly course for about 45 km upto Akhnoor, where-after it enters into Sialkot district of Pakistan. Total length of the river from confluence of Chandra & Bhaga to Akhnoor is about 504 km. Ranbir and Partap canal takes off from it near Akhnoor as a result of which thousands of Kanals of agricultural land in Jammu is irrigated. Salal, Dulhasiti, Sawalkot and Baghilar Hydel power projects are located on this river.

The main tributaries in its passage upto Kishtwar are the Thirot, the Sohal, the Bhut nallah, the Liddrari and the Marusudar. The Marusudar is the biggest tributary of the Chenab and meets the Chenab at Bhandalkot. Between Kishtwar and Akhnoor, it receives the waters of the Kalnai, the Neeru, the Raghi, the Bichleri and the Ans. The Tawi and Manawar Tawi join Chenab in Pakistan.

In India, the watershed of the Chenab basin covers part of two States viz. Himachal Pradesh and Jammu and Kashmir. Upper Chenab catchment lies in Lahoul area and Pangi Tehsil of Chamba District of Himachal Pradesh. In J&K State, the Chenab basin covers the Districts of Kishtwar, Doda, Ramban, Udhampur, Jammu and Rajouri. The catchment of the Chenab is elongated and narrow. The catchment area of the Chenab upto international border is 29,050 Sq. Km. out of which an area of about 6,242 Sq. Km. is under perpetual snow. The catchment area of the river Chenab upto Akhnoor, the lower most gauge discharge site in India is 21,808 Sq. Km. A brief description of some of the important tributaries of Chenab River is given below:

**The Miyar Nalla**

The Miyar Nalla rises in Himalayas near Lopen jot at about 5100m. After traversing of about 35 km in south-east direction, it takes a big loop and turn towards south west direction.After flowing about 60 km it joins the Chenab on its right bank opposite Udaipur. Its total course upto the confluence with Chenab River is between high mountains on either side.

**The Bhut Nalla**

The Bhut Nalla is formed by two major streams near Matsel one flowing from north-west and the other from south-east. From Matsel it flows in south westdirection. After traversing a distance of about 25 km, it joins the Chenab on its right bank downstream of Gulabgarh. The total course of the river is through high mountains on either side.

**The Marusudar**

The Marusudar is the biggest right bank tributary of the Chenab River. It originates from an elevation of about 5175 m. In the beginning two streams namely Batkot and Gumbar merge to form Warwan river, which is known as the Marusudar in the lower reaches. The Marusudar flows almost the north to south direction. Its catchment is almost fan shaped. The upper reaches are covered with glaciers and the permanent snow line is considered generally to be around 4700m. The entire reach of the Marusudar is through mountainous terrain with steep slopes and sharp bends.

**The Ans**

The river is formed by two major streams. One flowing from west to east and the other from south west. The Ans after flowing for a distance of about 20 km in almost southerly direction joins the Chenab in its right bank, up stream of Salal H.E. project.

**The Niru**

The Niru originates near Bhaderwah. It flows in a north-west direction and after traversing a distance of about 30 km it joins the Chenab on its left bank near Doda. In this reach, the Niru takes a few sharp bends and also joined by two-three small nallas.

**The Tawi River**

The River Tawi, which passes through the heart of the Jammu city, is one of the major left bank tributaries of the river Chenab. It originates from outer Himalaya rangesat the Kailash Kund Spring at Soej hills in Bhaderwah at an elevation of about 4300m. Initially it flows in westerly direction for about 16km and then takes a turn towards north west direction and flows for a distance of 27 km upto Sudhmahadev. There after it flows in westerly direction for about 5 km upto Chenani and further down in a westerly course upto Udhampur after which it takes a southerly course for about 24 km. The river finally joins the Chenab a little downstream of the international border in Pakistan. The total length of the river is about 141 km. The river generally flows through steep hills on either side except the lower reach of about 35 km.

**The Ravi River**

The Ravi River drains a total catchment area of 14442 sq km in India after flowing for a length of 720 km. A major tributary that joins Ravi is Siawa near Basholi in the J & K State. Ujh River is another major tributary of Ravi and its source is

located in the Kailash Mountains at an elevation of 4298 m close to Bhaderwah Mountains of the State. After flowing for 100 km stretch, it joins Ravi at Nainkot in Pakistan. The major multipurpose project built on this river is Ranjit Sagar Dam at Thein village. The left bank of Ravi is in Punjab and the right bank is in J&K State.

**The Tributaries of Jhelum River Flowing in Poonch District**

Poonch River, a tributary of river Jhelum, is the major drainage system in the district that rises from snow covered ranges. Poonch River and its tributaries control the drainage in major part (about 75 %) of the district. The general flow of the Poonch River is westerly; the general trend of the river towards west obtained only after the confluence of Suran and Mandi River near Chandak, at Poonch town another important tributary from the north, the Betar joints the Poonch River. The Suran river is the main river of the Poonch district. It is made up of number of streams flowing from the PirPanjal and is joined by the subsequent streams from the Ratanpir. The main stream is Parnai which flows parallel to the Ratanpir and it takes its source at the bifurcation of Ratanpir from the main Pir Panjal. In the Parnai valley, in the higher reaches, there are number of lakes situated in Panjal volcanics, south-east of Girjan valley,which also debouche their surface run-off into the Parnai nallah. Of these, Nandansardrains through Kashmir Himalaya, while the remaining 7 lakes pour their run-off into Suran river through Parnai nallah. Parnai debouches its waters to Suran river below Behramgala and has a source at a height above 3700 m. The Mendhar River is another important river whose basin drains about 25% of the district toward south-western part and joins the Poonch River outside of the area.

## 3. Irrigation & Flood Control Department, Jammu

Irrigation and Flood Control Department is one of the oldest departments of Jammu & Kashmir state, and its activities have mainly been classified into design and investigation, construction and maintenance of Major-Medium, Minor Irrigation projects and Flood Management projects besides Inland Water Transport. The Department has to maintain the flood mitigation infrastructure in the river basins to safe guard the life and property of the people from the miseries of floods occurring in the region. The Irrigation and Flood Control Department of Jammu among other responsibilities is also entrusted with the task of monitoring and sharing of hydrological data of water resources through its organizational set up. Whereas four P&D Sub-Divisions monitor/record/measure the hydrological data round the year and subsequently pass on to the Data Collection Sub Division, Jammu. The Data Collection Sub Division ensures -

- The gauge data at observation sites in consolidated format on weekly basis are submitted to
  a. The Chief Engineer, I&FC Department, Jammu.

b. The Disaster Management Cell, Jammu.
c. The Superintending Engineer, Hydraulic Circle, Jammu.

- The Gauges and Discharge on various sites of River Chenab and its tributaries (*asshown in table below*) are submitted on monthly basis to -
  a. The Ministry of Water Resources, Government of India, New Delhi.
  b. The Indus Water Treaty Cell, Jammu.
  c. The Chief Engineer, I&FC Department, Jammu.

*The Central Ministry at their level share the data with their counterparts across the border to meet the commitments accruing out of the international agreement on water sharing between India and Pakistan as per the Indus Water Treaty of 1960.*

## 4. Existing Flood Forecasting & Monitoring System, and Flood Information Dissemination

Any emerging flood situation is assessed on the basis of weather forecast advisories issued by the Indian Metrological Department. Accordingly, an emergency control room is set up in the Chief Engineer's office where from necessary instructions/directions to all the stake holders are issued with regard to the anticipated flood levels, likely inundation of areas, hot spots etc. As & when the water levels cross the alarm levels at the flood monitoring sites, the Flood Control Room is established at Police Control Room, Jammu and by then all concerned perform their designated duties as per the flood duty charts at their respective beats, sectors and zones. The department communicates hourly gauges, discharges, rainfall and necessary advisories.

## 5. Necessity to Upgrade Hydro-Meteorological Network

The low-lying areas of Jammu region are prone to floods. Upper catchments of all the tributaries of the Chenab, Tawi and Indus rivers are prone to flash floods.It can be noted that all the hilly areas of the State are prone to cloudbursts. The present hydro-meteorological network in the J & K State is practically not sufficient to handle water resources planning and management issues or to manage water related disasters (e.g. floods, flash floods, etc.). The devastating floods following the unique and unprecedented rainfall event on 3–6 September 2014 (when very heavy rainfall occurred over almost the entire state) highlighted the need for strengthening the hydro-meteorological network as well as operationalizing an advanced flood monitoring and forecast system to effectively plan for and manage water related disasters. Presently due to lack of proper flood warning system in place, a number of difficulties arise that hinder the handling of the flood situation in a timely and effective manner. Therefore, the monitoring, process modelling and forecasting of floods along with studies on flood hazards, studies on siltation and sedimentation in the ChenabRiver basin and major tributaries ofRavi and Jhelum basins as well as reservoirs/wetlands for the preparation of Comprehensive Disaster Management

Plans, setting up or upgrading of hydro-meteorological network, real-time decision support system for the surface and ground water resources for the assessment and management of surface water and ground water resources (for the preparation of Comprehensive Water Resource Management Plans) as well as setting up of State Water Information Centre in the J & K State is needed to be undertaken under National Hydrology Project.

## 6. Abstractof Existing and Proposed Hydro-Meteorological Sites in the River Basis in the Jammu Division, J&K state

| River Basin | Discharge Gaguging sites | | | Meteorological sites | | |
|---|---|---|---|---|---|---|
| | Type of gauging site | Existing | Proposed/ Upgradation | Type | Existing | Proposed/ Upgradation |
| **Tawi River (Tributary of Chenab River)** | G | 2 | 1 | AWS (Raingauge and other sensors) | 2 | 1 |
| | GD | 0 | 3 | AWS (Snowgauge and other sensors) | 0 | 1 |
| | GDS | 0 | 2 | Rain gauge(Manual) | 3 | 0 |
| | GDSQ | 1 | 2 | ARG | 0 | 5 |
| | | | | Snow Gauge | | 1 |
| | **Total** | **3** | **8** | **Total** | **5** | **8** |
| **Chenab river basin (excluding Tawi River Basin)** | G | 5 | 0 | AWS (Raingauge and other sensors) | 0 | 2 |
| | GD | 5 | 6 | AWS (Snowgauge and other sensors) | 0 | 2 |
| | GDS | 4 | 4 | Rain gauge(Manual) | 26 | 0 |
| | GDSQ | 5 | 0 | ARG | 4 | 3 |
| | | | | Snow Gauge | | 8 |
| | **Total** | **19** | **10** | **Total** | **30** | **15** |
| **Tributaries of Ravi River Basin** | G | 0 | 1 | AWS (Raingauge and other sensors) | 2 | 2 |
| | GD | 6 | 3 | AWS (Snowgauge and other sensors) | 0 | 1 |
| | GDS | 1 | 1 | Rain gauge(Manual) | 1 | 0 |
| | GDSQ | 0 | 1 | ARG | 0 | 3 |
| | | | | Snow Gauge | 0 | 0 |
| | **Total** | **7** | **6** | **Total** | **3** | **6** |
| **Tributaries of Jhelum River in Poonch district of Jammu Division** | G | 1 | 0 | AWS (Raingauge and other sensors) | 0 | 0 |
| | GD | 0 | 2 | AWS (Snowgauge and other sensors) | 0 | 1 |
| | GDS | 0 | 0 | Rain gauge(Manual) | 1 | 0 |
| | GDSQ | 0 | 0 | ARG | 0 | 3 |
| | | | | Snow Gauge | 0 | 0 |
| | **Total** | 1 | 2 | **Total** | 1 | 4 |
| **Grand Total** | | **30** | **26** | **Grand Total** | **39** | **33** |

## 7. List of Existing Gauge and Gauge cum Discharge Sites on the River Basins (Chenab River Basin and Tributaries of the Ravi and Jhelum River basins) in Jammu Division

| S. No. | Name of Site | River / Basin | District | State | Longitude | Latitude | Classification G/GD/GDS /GDSQ | Telemetry / Manual | Date of opening | Agency | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tawi River (Tributary of Chenab River)** | | | | | | | | | | | |
| 1 | Jammu Tawi (Presently at Sidara) | Tawi River/ Chenab | Jammu | J&K | 74.86207 | 32.72289 | GDSQ | Manual | Long-term | CWC | |
| 2 | Jammu (Vikram Chowk) | Tawi River/ Chenab | Jammu | J&K | 74.85806 | 32.71983 | G | Manual | Long-term | IFCD | |
| 3 | Udhampur (Salmay Bridge) | Tawi River/ Chenab | Udhampur | J&K | 75.16568 | 32.93955 | G | Manual | 06/01/1989 | IFCD | |
| **Chenab river basin (excluding Tawi River Basin)** | | | | | | | | | | | |
| 4 | Ghoushal | Chandra/ Chenab | Lahaul Spiti | HP | 76.9576 | 32.5218 | GDS | Manual | Long-term | CWC | |
| 5 | Miyar Nallah | Miyar Nala/ Chenab | Lahaul Spiti | HP | 76.6823 | 32.7026 | GD | Manual | Long-term | CWC | |
| 6 | Tandi | Bhaga /Chenab | Lahaul Spiti | HP | 76.9740 | 32.5532 | GDSQ | Manual | Long-term | CWC | |
| 7 | Udaipur | Chandra/ Chenab | Lahaul Spiti | HP | 76.6651 | 32.7215 | GDSQ | Manual | Long-term | CWC | |
| 8 | Dhamkund | Chenab | Ramban | J&K | 75.1446 | 33.2309 | GDSQ | Manual | Long-term | CWC | |
| 9 | Kidur | Chenab | Kishtwar | J&K | 76.0760 | 33.3150 | G | Manual | Long-term | CWC | |
| 10 | Sirshi | Marusudar/ Chenab | Kishtwar | J&K | 75.8529 | 33.4815 | G | Manual | Long-term | CWC | |
| 11 | Akhnoor | Chenab | Jammu | J&K | 74.7535 | 32.8984 | GDSQ | Manual | Long-term | CWC | |
| 12 | Premnagar | Chenab | Doda | J&K | 75.6543 | 33.1271 | GDSQ | Manual | Long-term | CWC | |
| 13 | Gulabgarh | Chenab | Kishtwar | J&K | 76.1600 | 33.2500 | GDS | Manual | Long-term | CWC | |
| 14 | Bhut Nallah | Bhut Nallah /Chenab | Kishtwar | J&K | 76.1667 | 33.2667 | GD | Manual | 12/1/2014 | CWC | |
| 15 | Neeru Nallah | Neeru Nallah /Chenab | Doda | J&K | 75.5996 | 33.0851 | GD | Manual | 3/3/2015 | CWC | Sites opened |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | Kalnai Nallah | Kalnai Nallah /Chenab | Doda | J&K | 75.8031 | 33.1444 | G | Manual | 11/9/2016 | CWC | so far (30/05/2017) under DWRIS & FF Scheme , Chenab Division, Jammu |
| 17 | Bari Pattan instead of Panchgrain | Manawar Tawi / Chenab | Rajouri | J&K | 74.3653 | 33.0692 | G | Manual | 1/16/2017 | CWC | |
| 18 | Chhapriyal | Manawar Tawi / Chenab | Jammu | J&K | 74.4287 | 32.8896 | GD | Manual | 1/20/2017 | CWC | |
| 19 | Dharmari | Ans river /Chenab | Reasi | J&K | 74.8333 | 33.2500 | GD | Manual | 3/27/2015 | CWC | |
| 20 | Navapachi (instead of U/s of Salal Project) | Marusudar river/ Chenab | Kishtwar | J&K | 75.7154 | 33.6493 | G | Manual | 12/5/2014 | CWC | |
| 21 | Kuriya Pul (instead of D/s of Dul Project) | Chenab river | Kishtwar | J&K | 75.7279 | 33.3671 | GDS | Manual | 2/1/2015 | CWC | |
| 22 | Shol (Tiari) {instead of Benzwar} | Chenab river | Kishtwar | J&K | 76.2493 | 33.1582 | GDS | Manual | 12/1/2014 | CWC | |
| **Tributaries of Ravi River Basin** | | | | | | | | | | | |
| 23 | Ravi / Basantar | Basantar Nallah /Ravi | Samba | J&K | 75.0630 | 32.5303 | GDS | Manual | 12/14/2016 | CWC | Under DWRIS & FF Scheme |
| 24 | Bamiyal | Ujh river /Ravi | Kathua | J&K | 74.8308 | 32.7817 | GD | Manual | 12/9/2016 | CWC | |
| 25 | Ujh Dam site | Ujh | Kathua | J&K | 75.4886 | 32.5631 | GD | Manual | 09/10/2009 | CWC | |
| 26 | Ujh Power House site | Ujh | Kathua | J&K | 75.4583 | 32.5494 | GD | Manual | 01/10/2010 | CWC | |
| 27 | Devak | Devak Nallah | Samba | J&K | 75.1143 | 32.5832 | GD | Manual | 1/1/2009 | IFCD | Seasonal |
| 28 | Tarnah | Tarnah Nallah | Samba | J&K | 75.5585 | 32.3838 | GD | Manual | 24/2/2014 | IFCD | Seasonal |
| 29 | Bein Nallah | Bein Nallah | Samba | J&K | 75.5293 | 32.3796 | GD | Manual | 24/2/2014 | IFCD | Seasonal |
| **Tributaries of Jhelum River in Poonch district of Jammu Division** | | | | | | | | | | | |
| 30 | Bainch/ Poonch | Poonch River/ Jhelum | Poonch | J&K | 74.096111 | 33.757500 | G | Telemetry | 23/01/2017 | CWC | Under DWRIS & FF Scheme |

## 8. List of Existing Meteorological Sites on the River Basins (Chenab River Basin and Tributaries of the Ravi and Jhelum River basins) in Jammu Division

| S.No | Station | Longitude | Latitude | Elevation (Meter) | State | Tributary | River / Basin | Agency | Sub-Tributary | Tehsil | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tawi River (Tributary of Chenab River)** | | | | | | | | | | | |
| 1 | Jammu - OBSY.(Bantalab) | 74.5 | 32.4 | 356 | J&K | -------- | Chenab basin | IMD | -------- | Jammu | Functional |
| 2 | Chatha-Agro -AWS( Agri. Univ) | 74.8 | 32.7 | 315 | J&K | -------- | Chenab basin | IMD | -------- | Jammu | Functional |
| 3 | Kawa -AWS | 75.2 | 32.9 | 581 | J&K | -------- | Chenab basin | IMD | -------- | Udhampur | Functional |
| 4 | Udumpur – IAF | 75.6 | 34.1 | 3256 | J&K | -------- | Chenab basin | NOT AVAILABLE | -------- | Udhampur | Not Applicable |
| 5 | Udhampur (Divisional Office Complex ) | 75.1 | 32.9 | 630 | J&K | Tawi | Chenab basin | IFCD, J&K | -------- | Udhampur | Non-functional |
| **Chenab river basin (excluding Tawi River Basin)** | | | | | | | | | | | |
| 6 | Akhnoor | 74.7500 | 32.9000 | 305 | J&K | -------- | Chenab basin | IMD | -------- | Akhnoor | Functional |
| 7 | Salal | 74.8110 | 33.1437 | 610 | J&k | -------- | Chenab basin | IMD | -------- | Reasi | Functional |
| 8 | Nandan | 74.5300 | 33.3667 | 1910 | J&k | Ans. | Chenab basin | IMD | -------- | Budil | Functional |
| 9 | Mohu | 75.0800 | 33.3300 | 2440 | J&K | Bichlari | Chenab basin | IMD | -------- | Banihal | Functional |
| 10 | Banihal | 75.2000 | 33.4000 | 1625 | J&K | Bichlari | Chenab basin | IMD | -------- | Banihal | Functional |
| 11 | Gohala | 75.3333 | 33.3333 | 2400 | J&k | Bichlari | Chenab basin | IMD | -------- | Banihal | Functional |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | Dhamkund | 75.15 | 33.23 | 640 | J&K | -------- | Chenab basin | IMD | -------- | Ramban | Functional |
| 13 | Batote | 75.31 | 33.11 | 1570 | J&K | -------- | Chenab basin | IMD | -------- | Ramban | Functional |
| 14 | Rot | 75.45 | 33.03 | 1375 | J&K | -------- | Chenab basin | IMD | Raggl Nallah | Doda | Functional |
| 15 | Doda | 75.58333 | 33.16667 | 1140 | J&K | -------- | Chenab basin | IMD | -------- | Doda | Functional |
| 16 | Bhaderwah | 75.71 | 32.98 | 1830 | J&K | Neeru Nallah | Chenab basin | IMD | -------- | Bhaderwah | Functional |
| 17 | Dradshala | 75.78333 | 33.18333 | 1095 | J&K | | Chenab basin | IMD | -------- | Thatri | Functional |
| 18 | Kishtwar | 75.75 | 33.31 | 1615 | J&K | -------- | Chenab basin | IMD | -------- | Kishtwar | Functional |
| 19 | Ohli | 75.95 | 33.33 | 1585 | J&K | -------- | Chenab basin | IMD | -------- | KIshtwar | Functional |
| 20 | Udaipur | 76.66531 | 32.71171 | 2600 | J&K | -------- | Chenab basin | IMD | -------- | Kelong | Functional |
| 21 | Tandi | 76.97 | 32.55 | 3100 | HP | Bhaga | Chenab basin | IMD | -------- | Lahoul | Functional |
| 22 | Koksar | 77.28 | 32.43 | 3615 | HP | Chandra | Chenab basin | IMD | -------- | Lahoul | Functional |
| 23 | Chingaon | 75.58 | 33.47 | 1840 | J&K | Marusudar | Chenab basin | IMD | Chhatro Nallah | KIshtwar | Functional |
| 24 | Sirshi | 75.85 | 33.48 | 1675 | J&K | Marusudar | Chenab basin | IMD | -------- | KIshtwar | Functional |
| 25 | Hawal | 75.98 | 33.51 | 2745 | J&K | Marusudar | Chenab basin | IMD | -------- | KIshtwar | Functional |
| 26 | Yourod | 75.71 | 33.66 | 2165 | J&K | Marusudar | Chenab basin | IMD | -------- | KIshtwar | Functional |
| 27 | Mov | 76.25 | 33.25 | 2900 | J&K | -------- | Chenab basin | IMD | Bhut Nallah | KIshtwar | Functional |
| 28 | Damni | 74.8 | 33.33 | 885 | J&K | Ans. | Chenab basin | IMD | -------- | Reasi | Functional |
| 29 | Paoni | 74.68 | 33.08 | 600 | J&K | -------- | Chenab basin | IMD | -------- | Reasi | Functional |
| 30 | Rajouri | 74.3 | 33.4 | 917 | J&K | -------- | Chenab basin | IMD | -------- | Rajouri | Functional |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | Katra - OBSY. | 74.55 | 32.58 | 1170 | J&K | -------- | Chenab basin | IMD | -------- | Reasi | Functional |
| 32 | Yurdu - SG&M (Telemetry) | 75.71 | 33.66 | 2141 | J&K | -------- | Chenab basin | CWC | -------- | Kishtawar | Opened under DWRIS under IBO, CWC Chandigarh |
| 33 | Bunacha (Alni) - SG&M (Telemetry) | 75.94 | 32.95 | 1988 | J&K | -------- | Chenab basin | CWC | -------- | Doda | Opened under DWRIS under IBO CWC Chandigarh |
| 34 | Gohala - SG&M (Telemetry) | 75.33 | 33.36 | 2423 | J&K | -------- | Chenab basin | CWC | -------- | Ramban | Opened under DWRIS under IBO CWC Chandigarh |
| 35 | Thana - SG&M (Telemetry) | 75.5 | 33.31 | 2171 | J&K | -------- | Chenab basin | CWC | -------- | Doda | Opened under DWRIS under IBO CWC Chandigarh |
| **Tributaries of Ravi River Basin** | | | | | | | | | | | |
| 36 | Samba-AWS | 75.1 | 32.6 | 360 | J&K | -------- | Chenab basin | IMD | -------- | Samba | Functional |
| 37 | Rajhani – AWS | 75.5391 | 32.3632 | 330.5 | J&K | | Chenab basin | IMD | -------- | Kathua | Functional |
| 38 | Kathua - P/T. OBSY. | 75.5179 | 32.3786 | 380 | J&K | | Chenab basin | IMD | -------- | Kathua | Part Time |
| **Tributaries of Jhelum River in Poonch district of Jammu Division** | | | | | | | | | | | |
| 39 | Poonch | 33.41 | 74.05 | 1060 | J&K | Poonch | Jhelum basin | IMD | -------- | Poonch | Non-functional |

## 9. List of Proposed/Upgraded Gauge and Gauge cum Discharge Sites on the River Basins (Chenab River Basin and Tributaries of the Ravi and Jhelum River basins) in Jammu Division

| S. No. | Name of Site | River / Basin | District | State | Latitude | Longitude | Elevation (Meter) | Classification G/GD/GDS /GDSQ | Proposed Automation/ upgradation by installation of | | | | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | AWLR | SVR/ ADCP | Manual Recording | | |
| | | | | | | | | | | | Gauge | Discharge | |
| **Tawi River (Tributary of Chenab River)** | | | | | | | | | | | | | |
| 1 | Chenani | Tawi | Jammu | J&K | 33.0314 | 75.2793 | 1010 | GD | AWLR | SVR | Y | N | New (Telemetry) |
| 2 | Udhampur(Salmay Bridge) | Tawi | Udhampur | J&K | 32.939 | 75.1662 | 620 | GDSQ | AWLR | ADCP | Y | Y | Upgradation of existing site (Telemetry) |
| 3 | Pingar/Manwal | Tawi | Jammu | J&K | 32.7767 | 75.1444 | 441 | GD | AWLR | SVR | Y | N | New (Telemetry) |
| 4 | Tardala | Tawi | Jammu | J&K | 32.8015 | 75.0162 | 366 | GDS | AWLR | SVR | Y | N | New (Telemetry) |
| 5 | Nagrota | Chairua Nala/ Tawi | Jammu | J&K | 32.7971 | 74.9123 | 345 | GDS | AWLR | SVR | Y | Y | New (Telemetry) |
| 6 | Jammu (Gujjar Nagar) | Tawi | Jammu | J&K | 32.7248 | 74.8702 | 305 | GDSQ | AWLR | ADCP | Y | Y | Present operational site of State Government is at Jammu (Vikram Chowk) could be transferredat Gujjar Nagar to avoid backwater effect of proposed artificial lake) |
| 7 | Jammu (Nikki Tawi) | Nikki Tawi/ Tawi | Jammu | J&K | 32.72 | 74.8442 | 298 | GD | AWLR | SVR | Y | Y | New (Telemetry) |
| 8 | Jammu (Bhagwati Nagar) | Tawi | Jammu | J&K | 32.7149 | 74.8477 | 292 | G | AWLR | | Y | N | New (Telemetry) |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Chenab river basin (excluding Tawi River Basin)** | | | | | | | | | | | | | |
| 9 | Shewa | Dandal/ Chenab | Kishtwar | J&K | 33.1498 | 75.48446 | 907 | GDS | AWLR | SVR | Y | N | New (Telemetry) |
| 10 | Chanderkote | Chenab | Ramban | J&K | 33.1828 | 75.3115 | 719 | GDS | AWLR | SVR | Y | Y | New (Telemetry) |
| 11 | Digdol | BichleriRiver/ Chenab | Ramban | J&K | 33.3065 | 75.171 | 885 | GD | AWLR | SVR | Y | N | New (Telemetry) |
| 12 | Machail | u/s of Bhut Nala/ Chenab | Kishtwar | J&K | 33.4073 | 76.3796 | 2854 | GD | AWLR | SVR | Y | N | New (Telemetry) |
| 13 | Naushera | Naushera Tawi/ Chenab | Rajouri | J&K | 33.1522 | 74.2456 | 547 | GD | AWLR | SVR | Y | N | New (Telemetry) |
| 14 | Doda | Chenab | Doda | J&K | 33.1384 | 75.5532 | 839 | GD | AWLR | ADCP | Y | Y | New (Telemetry) |
| 15 | Arnas | Chenab | Doda | J&K | 33.172 | 74.8514 | 492 | GDS | AWLR | SVR | Y | Y | New (Telemetry) |
| 16 | Baddar | Ans River/ Chenab | Doda | J&K | 33.3472 | 74.8104 | 855 | GD | AWLR | SVR | Y | N | New (Telemetry) |
| 17 | Siot | Nihari Tawi/ Chenab | Jammu | J&K | 33.1114 | 74.3749 | 501 | GD | AWLR | SVR | Y | N | New (Telemetry) |
| 18 | Rajouri | Naushera Tawi/ Chenab | Rajouri | J&K | 33.3314 | 74.3276 | 848 | GDS | AWLR | SVR | Y | Y | New (Telemetry) |
| **Tributaries of Ravi River Basin** | | | | | | | | | | | | | |
| 19 | Dharor | Sewa River/ Ravi | Kathua | J&K | 32.6831 | 75.8126 | 1206 | GDS | AWLR | SVR | Y | N | New (Telemetry) |
| 20 | Dungara | Ujh River/ Ravi | Kathua | J&K | 32.5667 | 75.5031 | 533 | GDSQ | AWLR | SVR | Y | N | New (Telemetry) |
| 21 | Bandrahr | Ujh River/ Ravi | Kathua | J&K | 32.4726 | 75.4177 | 383 | G | AWLR | | Y | N | New (Telemetry) |
| 22 | Chak Dayala | Tarnali Nadi/ Ravi | Kathua | J&K | 32.4777 | 75.3177 | 382 | GD | AWLR | SVR | Y | N | New (Telemetry) |
| 23 | Basantar | Basantar/ Ravi | Samba | J&K | 32.5701 | 75.1045 | 345 | GD | AWLR | ADCP | Y | Y | Upgradation of existing site (Telemetry) |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | Devak | Devak/ Ravi | Samba | J&K | 32.6465 | 75.0651 | 394 | GD | AWLR | SVR | Y | Y | Upgradation of existing site (Telemetry) |
| **Tributaries of Jhelum River in Poonch district of Jammu Division** | | | | | | | | | | | | | |
| 25 | Mandi | Mandi/ Jhelum | Poonch | J&K | 33.7956 | 74.2538 | 1377 | GD | AWLR | SVR | Y | N | New (Telemetry) |
| 26 | Lassana | Suran/ Jhelum | Poonch | J&K | 33.6485 | 74.2693 | 1333 | GD | AWLR | SVR | Y | N | New (Telemetry) |

*__Note__: Location of the some of the proposed G&D sites is subjected to relocation following proper physical site survey.

**G – Gauge GD – Gauge and Discharge GDS –Gauge, Discharge and Sediment**
**GDSQ - Gauge, Discharge, Sediment and Water Quality AWLR – Automatic Water Level Radar**
**SVR – Surface velocity Radar (Continuous) ADCP – Acoustic Doppler Current Profiler**

## 10. List of Proposed/Upgraded Meteorological Sites on the River Basins (Chenab River Basin and Tributaries of the Ravi and Jhelum River basins) in Jammu Division

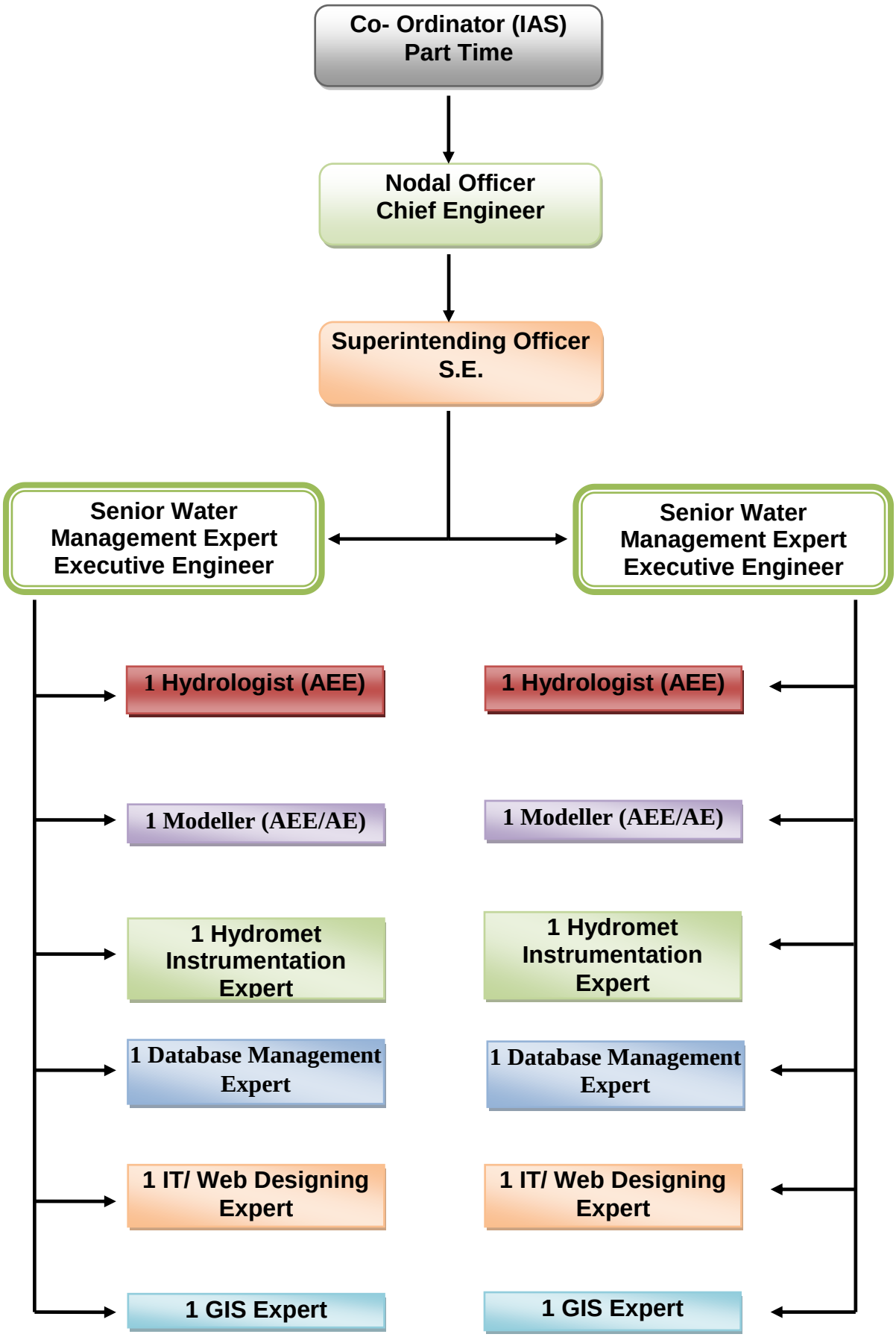
| S. No. | Name of Site | River / Basin | District | State | Latitude | Longitude | Elevation (Meter) | Classification AWS/ARG/Snow Gauge | Remark |
|---|---|---|---|---|---|---|---|---|---|
| **Tawi River (Tributary of Chenab River)** | | | | | | | | | |
| 1 | Jammu | Tawi | Jammu | J&K | 32.6991 | 74.8425 | 293 | AWS | New (Telemetry) |
| 2 | Chillah | Tawi | Jammu | J&K | 32.7683 | 74.9975 | 473 | ARG | New (Telemetry) |
| 3 | Mand | Tawi | Jammu | J&K | 32.8882 | 74.9851 | 506 | ARG | New (Telemetry) |
| 4 | Gursala | Tawi | Jammu | J&K | 32.8979 | 75.4965 | 1956 | SNOW GAUGE | New (Telemetry) |
| 5 | Udhampur (Divisional Office Complex ) | Tawi | Udhampur | J&K | 32.9 | 75.1 | 630 | ARG | Upgrade (Telemetry) |
| 6 | Ramnagar | Tawi | Udhampur | J&K | 32.805 | 75.3176 | 853 | ARG | New (Telemetry) |
| 7 | Chenani | Tawi | Udhampur | J&K | 33.0388 | 75.2868 | 1170 | ARG | New (Telemetry) |
| 8 | Dhar suej | Tawi | Udhampur | J&K | 32.8731 | 75.6198 | 3770 | AWS (SNOW GAUGE) | New (Telemetry) |
| **Chenab river basin (excluding Tawi River Basin)** | | | | | | | | | |
| 9 | Gulab Garh | Chenab | Udhampur | J&K | 33.3123 | 76.1915 | 2077 | SNOW GAUGE | New (Telemetry) |
| 10 | Thuru | Chenab | Udhampur | J&K | 33.2575 | 74.8333 | 816 | ARG | New (Telemetry) |
| 11 | Keri Narondi | Chenab | Rajouri | J&K | 33.2807 | 74.597 | 1258 | ARG | New (Telemetry) |
| 12 | Kalakot | Chenab | Rajouri | J&K | 33.1764 | 74.5098 | 920 | AWS | New (Telemetry) |
| 13 | Ghar | Chenab | Jammu | J&K | 32.9655 | 74.5472 | 506 | ARG | New (Telemetry) |
| 14 | Gharana Wetland | Chenab | Jammu | J&K | 32.5408 | 74.6907 | 262 | AWS | New (Telemetry) |
| 15 | Nandkot | Chenab | Udhampur | J&K | 33.4707 | 74.6402 | 3637 | SNOW GAUGE | New (Telemetry) |
| 16 | Naushera | Chenab | Rajouri | J&K | 33.1654 | 74.2358 | 615 | AWS | New (Telemetry) |
| 17 | Gool | Chenab | Ramban | J&K | 33.2707 | 75.0014 | 2021 | SNOW GAUGE | New (Telemetry) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 18 | Patnazi | Chenab | Kishtwar | J&K | 33.143 | 75.9568 | 2480 | SNOW GAUGE | New (Telemetry) |
| 19 | Shol | Chenab | Kishtwar | J&K | 33.1609 | 76.2517 | 1603 | SNOW GAUGE | New (Telemetry) |
| 20 | Bharansal | Chenab | Kishtwar | J&K | 33.4259 | 75.0019 | 3432 | SNOW GAUGE | New (Telemetry) |
| 21 | Gandoh Bhallesa | Chenab | Doda | J&K | 33.0316 | 75.9088 | 1637 | SNOW GAUGE | New (Telemetry) |
| 22 | Machail | Chenab | Kishtwar | J&K | 33.405 | 76.3782 | 2873 | AWS (SNOW GAUGE) | New (Telemetry) |
| 23 | Sukhnai | Chenab | Kishtwar | J&K | 33.9804 | 75.5215 | 2949 | AWS (SNOW GAUGE) | New (Telemetry) |
| 24 | Mungli | Chenab | Kishtwar | J&K | 33.8339 | 75.5485 | 2558 | SNOW GAUGE | New (Telemetry) |
| | | | | | | | | | |
| **Tributaries of Ravi River Basin** | | | | | | | | | |
| 25 | Chani Mansar | Ravi | Samba | J&K | 32.6563 | 75.1597 | 430 | ARG | New (Telemetry) |
| 26 | Ramkote | Ravi | Kathua | J&K | 32.6418 | 75.3351 | 645 | ARG | New (Telemetry) |
| 27 | Bani | Ravi | Kathua | J&K | 32.7077 | 75.8163 | 1311 | AWS | New (Telemetry) |
| 28 | Ladhra | Ravi | Udhampur | J&K | 32.7983 | 75.6156 | 2158 | AWS (SNOW GAUGE) | New (Telemetry) |
| 29 | Dharamkot | Ravi | Kathua | J&K | 32.5882 | 75.5414 | 645 | ARG | New (Telemetry) |
| 30 | Dinga Amb | Ravi | Kathua | J&K | 32.4952 | 75.3148 | 443 | ARG | New (Telemetry) |
| **Tributaries of Jhelum River in Poonch district of Jammu Division** | | | | | | | | | |
| 31 | Mandi | Jhelum | Poonch | J&K | 33.7982 | 74.2533 | 1440 | ARG | New (Telemetry) |
| 32 | Poonch | Jhelum | Poonch | J&K | 33.7647 | 74.0947 | 977 | ARG | New (Telemetry) |
| 33 | Kalar Kattal | Jhelum | Poonch | J&K | 33.6222 | 74.2936 | 1479 | ARG | New (Telemetry) |
| 34 | Poshiana | Jhelum | Poonch | J&K | 33.6351 | 74.4927 | 2989 | AWS (Snow Gauge) | New (Telemetry) |

*__Note__: Location of the some of the proposed Meteorological sites is subjected to relocation following proper physical site survey.

**ARG – Automatic Rain Gauge**
**Snow Gauge – Pluvio Type Snow Gauge**
**AWS – Automatic Weather Station (with rain gauge and other parameter sensors)**
**AWS (Snow Gauge) – Automatic Weather Station (with pluvio type snow gauge and other parameter sensors).**

## 11. Proposed State Organogram For State Project Management Unit (SPMU)



## 12. PIP COMPONENT A

### COMPONENT-A IMPROVING WATER RESOURCES MONITORING SYSTEM (WRMS)

| A1: WATER RESOURCES MONITORING SYSTEM | | | |
|---|---|---|---|
| Goods | | | |
| **Meteorological Monitoring** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Automatic Weather Station (with raingauge and other major sensors) with V-SAT | 15.8 | 5 | 79 |
| Automatic Weather Station (with snow gauge and other major sensors) with V-SAT | 30 | 5 | 150 |
| Automatic rain gauge bucket type (with V-SAT) | 2.43 | 14 | 34.02 |
| Existing to be Upgraded RGB+RTU2 with V-SAT | 5.47 | 1 | 5.47 |
| Automatic snow gauge P4 With V-SAT | 20.5 | 9 | 184.5 |
| Total Cost for Service & data software Database | 54 | 1 | 54 |
| | **Total** | | **491.19** |
| **Surface Water Monitoring** | **Cost per Unit** | **No** | **Total (In lacs)** |
| New AWLR With V-SAT | 9.8 | 26 | 254.8 |
| Manual Gauge plates | 0.05 | 26 | 1.3 |
| SVR with V-SAT | 22.5 | 20 | 450 |
| ADCP-With V-SAT | 45.7 | 4 | 182.8 |
| VSAT IDU System (XC Band) | 3.04 | 6 | 18.24 |
| DSL-500 With GSM | 0 | 0 | 0 |
| | **Total** | | **907.14** |
| **ADDITIONAL EQUIPMENT:** | | | |
| Current Meter pygmy type | 1.5 | 10 | 15 |
| Cost of boat with outboard engine | 3 | 6 | 18 |
| Total Station | 6 | 2 | 12 |
| Differential GPS | 30 | 2 | 60 |
| Auto Levels | 0.25 | 2 | 0.5 |
| Hand held GPS | 0.4 | 6 | 2.4 |
| | **Total** | | **107.9** |
| **Ground Water Monitoring** | **Cost per Unit** | **No** | **Total (In lacs)** |
| DWLRS | 1.6 | 20 | 32 |
| | **Total** | | **32** |
| **WATER QUALITY MONITORING** | **Cost per Unit** | **No** | **Total (In lacs)** |
| WQ Field KIT 1 | 0.44 | 20 | 8.8 |
| Lab Equipment | | | 60 |
| | **Total** | | **68.8** |
| **CIVIL WORKS:** | | | |
| **Meteorological Monitoring** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Rain/Snow Gauge housing(New)+P4 with V-SAT | 1 | 23 | 23 |
| Rain Gauge housing(Reconstruction) | 0.5 | 1 | 0.5 |
| AWS housing | 1 | 10 | 10 |
| Cost of land | 5 | 32 | 160 |
| | **Total** | | **192.5** |

| Surface Water Monitoring | Cost per Unit | No | Total (In lacs) |
|---|---|---|---|
| AWLR-Shaft Housing (New) | 3 | 26 | 78 |
| Manual Gauge Plates | 0.05 | 26 | 1.3 |
| G&D Bank Operated Cableway | 20 | 4 | 80 |
| Protection of Surface Water Monitoring Network | 0.5 | 26 | 13 |
| Cost of land | 5 | 23 | 115 |
| | **Total** | | **287.3** |
| **GROUND WATER MONITORING** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Deep Piezometers | 3 | 30 | 90 |
| | **Total** | | **90** |
| **CONSULTANCY** | | | |
| **Hydro-Meteorological Monitoring** | **Cost per Unit** | **No** | **Total (In lacs)** |
| For preparation of implementation plan, designing of the network for surface water & equipment and site specific investigations | | | 60 |
| | **Total** | | **60** |
| **WATER QUALITY MONITORING** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Lab designing the network | | | 5 |
| | **Total** | | **5** |
| **GROUND WATER MONITORING** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Lab & AQC Management & architectural services | | | 20 |
| | **Total** | | **20** |
| **OPERATION COST** | | | |
| **Meteorological Monitoring** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Annual V-SAT Subscription for AWS (5 years) | 0.5 | 10 | 25 |
| Annual V-SAT Subscription for RGB/Snow Gauge (for 5 years) | 0.1 | 24 | 12 |
| Annual GSM Subscription | | 0 | 0 |
| | **Total** | | **34.5** |
| **SURFACE WATER MONITORING** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Annual V-SAT Subscription(for New & existing network for 5 years) | 0.1 | 52 | 26 |
| | **Total** | | **26** |

| A2: DATABASE POPULATION & MAINTENANCE | | | |
|---|---|---|---|
| **Digitization & integration of paper data Maps & Docs** | | | |
| **Goods** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Computers/Work station | 0.85 | 6 | 5.1 |
| Plotter | 3 | 1 | 3 |
| Color laser printer A3 | 1.5 | 4 | 6 |
| Scanner | 10 | 4 | 40 |
| Consumables | 5 | 1 | 5 |
| | **Total** | | **59.1** |
| **COSULTANCY** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Digitization of existing maps & datum conversion | | | 25 |
| | **Total** | | **25** |

| DEVELOP SPATIAL RIVER INFORMATION SYSTEMS | | | |
|---|---|---|---|
| **Goods** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Purchase of High Resolution Spatial Data | 25 | 1 | 25 |
| Computers/Work station | 0.85 | 1 | 0.85 |
| Plotter | 3 | 1 | 3 |
| Colour laser printer A3 | 1.5 | 1 | 1.5 |
| Scanner | 0.1 | 1 | 0.1 |
| Consumable | | | 4 |
| | **Total** | | **34.45** |
| **COSULTANCY** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Creation of maps, Digitization of maps | | | 40 |
| | **Total** | | **40** |
| **TRAINING & MEETINGS:** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Training & Meetings: | | | 15 |
| | **Total** | | **15** |
| **OPERATIONAL COST:** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Annual software fee, (O&P) | | | 25 |
| | **Total** | | **25** |

| A3 TARGETED SURVEYS IN SELECTED AREAS | | | |
|---|---|---|---|
| BATHYMETIC SURVEYS IN CRITICAL RIVER SECTORS: | | | |
| GOODS: | **Cost per Unit** | **No** | **Total (In lacs)** |
| Boats, GPS Unit, Surveys Equipment | | | 10 |
| | **Total** | | **10** |
| **COSULTANCY** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Data collection & Data Processing | | | 100 |
| | **Total** | | **100** |
| **OPERATIONAL COST:** | **Cost per Unit** | **No** | **Total (In lacs)** |
| O&M of boat ,Survey Equipment, ADCP,fuel, etc | | | 15 |
| | **Total** | | **15** |

| **TOTAL COST FOR COMPONENT- "A" (IN LACS)** | **2665.18** |
|---|---|

## 13. PIP COMPONENT B

## COMPONENT -B: NATIONAL WATER INFORMATION CENTRE

| B-1 WEB-BASED WATER RESOURCES INFORMATION SYSTEMS | | | |
|---|---|---|---|
| **CREATING / STRENGTHENING STATE CHAPTER OF INDIA-WRIS** | | | |
| **GOODS:** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Procurement of IT & display equipment for india WRIS including servers, LCD, etc. | 100 | 1 | 100 |
| To create State chapter of India WRIS | 130 | 1 | 130 |
| e- library/web portal (consultancy) | 15 | 1 | 15 |
| Digitization/scanning Report document | 25 | 1 | 25 |
| Procurement of GIS/Imageries for GW exploration | 30 | 1 | 30 |
| Training & Meetings | | | 7.5 |
| | **Total** | | **307.5** |

| B-2 PROVIDE PUBLIC DOMAIN INFORMATION SERVICES | | | |
|---|---|---|---|
| **PUBLIC DOMAIN SERVICES** | | | |
| **GOODS** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Registration for web-portal for public domain info services | 8 | 1 | 8 |
| Information Product | 25 | 1 | 25 |
| Information Brochures, Atlas, etc. | 25 | 1 | 25 |
| Knowledge portals & mobiles apps | 15 | 1 | 15 |
| | **Total** | | **73** |
| **CONSULTANCY** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Systems development of web portal | 10 | 1 | 10 |
| Systems development for apps & Knowledge portals | 10 | 1 | 10 |
| | **Total** | | **20** |
| **TRAINING:** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Training regarding web-portal | 5 | 1 | 5 |
| | **Total** | | **5** |
| **OPERATIONAL COST:** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Annual Maintenance of web portal services | 5 | 1 | 5 |
| Annual Maintenance of Apps & Knowledge portals | 5 | 1 | 5 |
| | **Total** | | **10** |

| **TOTAL COST FOR COMPONENT- "B" (In Lacs)=** | **415.5** |
|---|---|

## 14. PIP COMPONENT C

### COMPONENT – C: WATER RESOURCES MANAGEMENT APPLICATIONS

| C-1 Planning, design and Decision support systems | | | |
|---|---|---|---|
| RTDSS and EFWS | **Cost per Unit** | **No** | **Total (In lacs)** |
| Real Time Decision Support System (RTDSS) | 200 | 1 | 200 |
| Flood Early Warning System or Tawi & Chenab basins | 200 | 1 | 200 |
| | **Total** | | **400** |

| C-2 WATER KNOWLEDGE PRODUCTS | | | |
|---|---|---|---|
| **1. Purpose Driven studies (PDS)** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Sediment study and sediment planning in Tawi basin | | | 50 |
| Hydrological modelling of Tawi & Chenab basins under climate change | | | 50 |
| Web-GIS based inventory of springs (Chashma) in Tawi basin | | | 50 |
| Water quality assessment for rejuvenation of surface water bodies in Jammu region | | | 50 |
| Forecast and conservation system for selected wetlands | | | 50 |
| Training for PDS/DSS system for MIS | Consultancy | | 20 |
| | **Total** | | **270** |

| **TOTAL COST FOR COMPONENT- "C" (In Lacs)=** | **670** |
|---|---|

## 15. PIP COMPONENT D

| COMPONENT- D : IMPROVING INSTITUTIONS & CAPACITY BUILDING D1 DATA INFORMATICS CENTRE | | | |
|---|---|---|---|
| **Establishment & Operational Cost** | | | |
| **Goods** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Furnishing of data centre water quality lab&Non -ITC eqiupment | 50 | 1 | 50 |
| | **Total** | | **50** |
| **CIVIL WORKS** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Constructing Data information centre | 350 | 1 | 350 |
| | **Total** | | **350** |
| | | | |
| **CONSULTANCY:** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Technical support for establishing data centre | 20 | 1 | 20 |
| | **Total** | | **20** |
| | | | |
| **TRAINING & MEETINGS** | **Cost of meetings/training** | **No. of meetings/training** | **Total (In lacs)** |
| | 10 | 1 | 10 |
| | **Total** | | **10** |
| **OPERATIONAL COST** | **cost per month** | **No. of months** | **Total (In lacs)** |
| O&M cost including hiring of vehicle, travel cost for data centre | 0.5 | 60 | 30 |
| | **Total** | | **30** |

| D2-UPGRADING REGIONAL & (SUB)- DIVISIONAL OFFICES & VEHICLES | | | |
|---|---|---|---|
| **Goods** | **Cost per Unit** | **No** | **Total (In lacs)** |
| a) Furnishing Regional centre/Non-ITC equipment | 17.5 | 3 | 52.5 |
| b)Furnishing Divisional centre/ Non -ITC equipment | 10 | 9 | 90 |
| | **Total** | | **142.5** |
| **CIVIL WORKS:** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Upgrading Regional Centre | 10 | 3 | 30 |
| Upgrading Divisional Centre | 10 | 9 | 90 |
| | **Total** | | **120** |
| **CONSULTANCY:** | **Cost per Unit** | **No** | **Total (In lacs)** |
| For Regional Centre | 1 | 1 | 1 |
| For Divisional Centre | 2.5 | 1 | 2.5 |
| | **Total** | | **3.5** |

| OPERATIONAL COST: | cost per month | No. of Vehicles | Total (In lacs) |
|---|---|---|---|
| a) O&M cost including hiring of vehicle (Type-1), travel cost for Regional centre | 0.45 | 3 | 81 |
| b) O&M cost including hiring of vehicle (Type-1), travel cost for Divisional centre | 0.45 | 3 | 81 |
| b) O&M cost including hiring of vehicle (Type-2 with crane), travel cost for Divisional centre | 0.55 | 3 | 99 |
| | **Total** | | **261** |

| D3-INSTITUTIONAL MODERNAZATION SUPPORT | | | |
|---|---|---|---|
| **Goods** | | | |
| **a) ITC EQUIPMENT** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Servers | 25 | 1 | 25 |
| Laptops | 0.8 | 20 | 16 |
| Computers | 0.8 | 20 | 16 |
| Printers+ Scanner | 0.4 | 20 | 8 |
| Printer A3 Colour laser | 1.5 | 4 | 6 |
| Plotters | 6 | 1 | 6 |
| Training equipment | 15 | 1 | 15 |
| Video Conferencing equipment | 50 | 1 | 50 |
| | **Total** | | **142** |
| **b) SOFTWARE PRODUCTS:** | **Cost per Unit** | **No** | **Total (In lacs)** |
| ARCGIS, ERDAS, Surface water modelling, etc. | 80 | 1 | 80 |
| | **Total** | | **80** |
| **OPERATIONAL COST:** | | | |
| **a**) ITC EQUIPMENT: | **Cost per Unit** | **No** | **Total (In lacs)** |
| Internet Connectivity | 35 | 1 | 35 |
| | **Total** | | **35** |
| b) SOFTWARE PRODUCTS: | **Cost per Unit** | **No** | **Total (In lacs)** |
| AMC | 30 | 1 | 30 |
| | **Total** | | **30** |

| D4-WATER RESOURES CAPACITY- BUILDING | | | |
|---|---|---|---|
| **POLICY AND DATA QUALITY SUPPORT** | **Cost per Unit** | **No** | **Total (In lacs)** |
| POLICY SUPPORT | 20 | 1 | 20 |
| Data quality Support | 20 | 1 | 20 |
| | **Total** | | **40** |

| STRENGTHENING PARTNERSHIP & STUDY SUPPORT | Cost per Unit | No | Total (In lacs) |
|---|---|---|---|
| Domestic and overseas study tours | 72 | 1 | 72 |
| partnership and exchange programs | 52 | 1 | 52 |
| Internship and MSc Program | 48 | 1 | 48 |
| | **Total** | | **172** |

| D5. TRAINING/ MEETINGS & OUTREACH: | | | |
|---|---|---|---|
| **ANNUAL WATER RESOURCES KNOWLEDGE FORUMS** | | | |
| | **Cost per Unit** | **No** | **Total (In lacs)** |
| Internationa/national conferences, symposiums, workshops and training programs, scientific forums, etc. | 150 | 1 | 150 |
| | **Total** | | **150** |
| | | | |
| **CLASS ROOM TRAINING/ MEETINGS & MULTI-MEDIA DISTANCE LEARNING** | | | |
| | **Cost per Unit** | **No** | **Total (In lacs)** |
| Curriculum development & regular training | 140 | 1 | 140 |
| e- learning and webinars | 30 | 1 | 30 |
| Documentaries and promotion HIS awareness | 25 | 1 | 25 |
| | **Total** | | **195** |

| D6. PROJECT MANAGEMENT AND TECHNICAL ASSISTANCE | | | |
|---|---|---|---|
| **STATE PROJECT MANAGEMENT UNIT** | | | |
| | **Cost per Unit** | **No** | **Total (In lacs)** |
| Establishment of SPMU | 50 | 1 | 50 |
| Procurement of Vehicles for SPMU | 10 | 1 | 10 |
| Outsourcing of vehicle | 200 | 1 | 200 |
| O&M of SPMU, TA & DA, Stationery charges, etc. | 225 | 1 | 225 |
| O&M of 1 vehicle | 15 | 1 | 15 |
| | **Total** | | **500** |

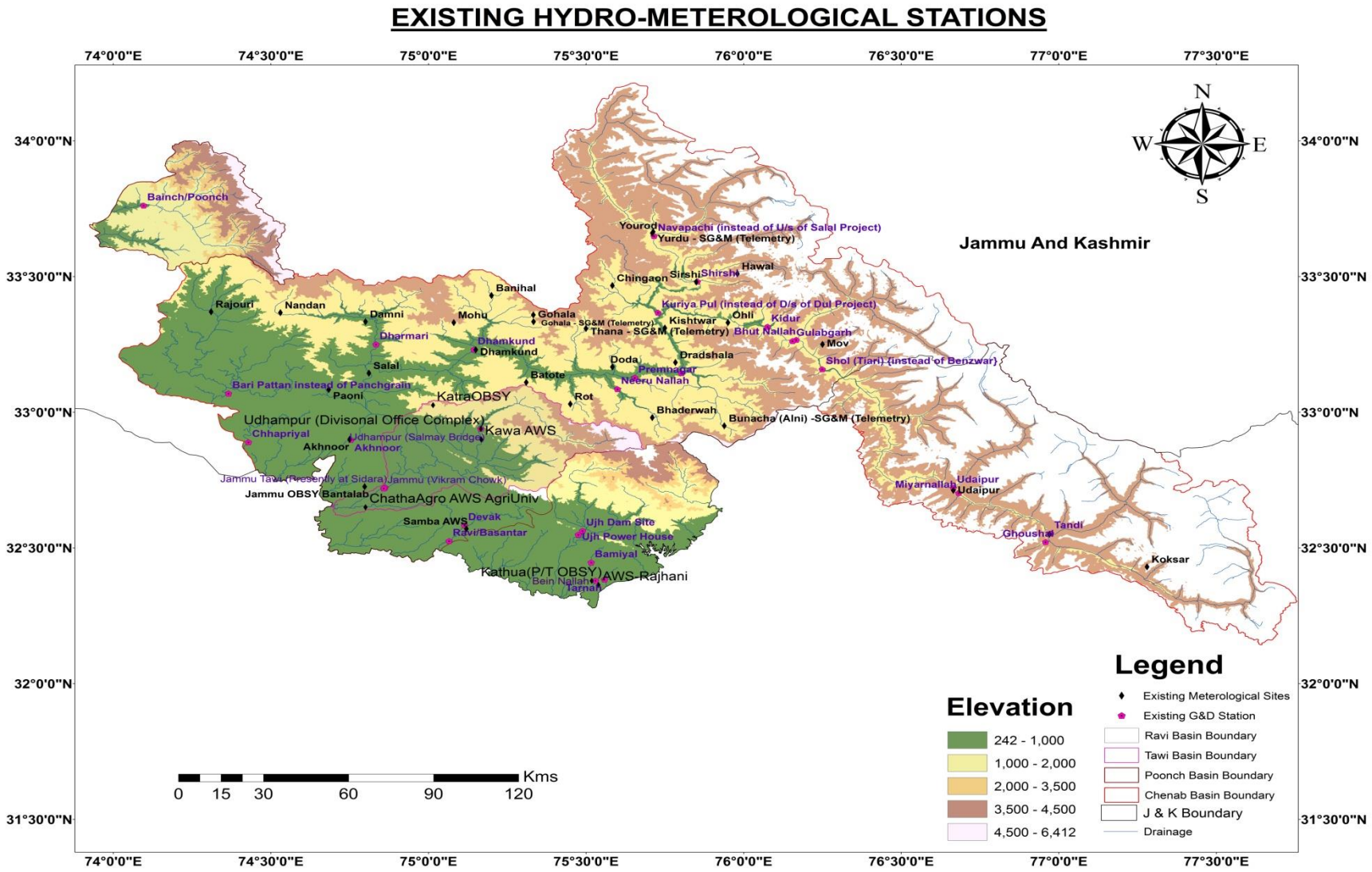
| TECHNICAL ASSISTANCE AND MANAGEMENT CONSULTANCY | | | |
|---|---|---|---|
| **CONSULTANCY:** | **Cost per Unit** | **No** | **Total (In lacs)** |
| Technical Assistance at state level | 72 | 1 | 72 |
| | **Total** | | **72** |
| **D7 INCREMENTAL STAFF COST** | | | |
| **INCREMENTAL STAFF COST** | | | |
| **OPERATION COST** | **Cost per Unit** | **No** | **Total (In lacs)** |
| SPECIALISTS: IT specialists hydrologist, WQ expert, chief Chemist, GIS /RS expert/ Chemist, lab Assistance | 235 | 1 | 235 |
| OTHER STAFF: Computer/data entry operator | 35 | 1 | 35 |
| Hiring of staff for administrative & financial assistance | 50 | 1 | 50 |
| | **Total** | | **320** |

| **TOTAL COST FOR COMPONENT-"D" (IN Lacs)=** | **2723** |
|---|---|

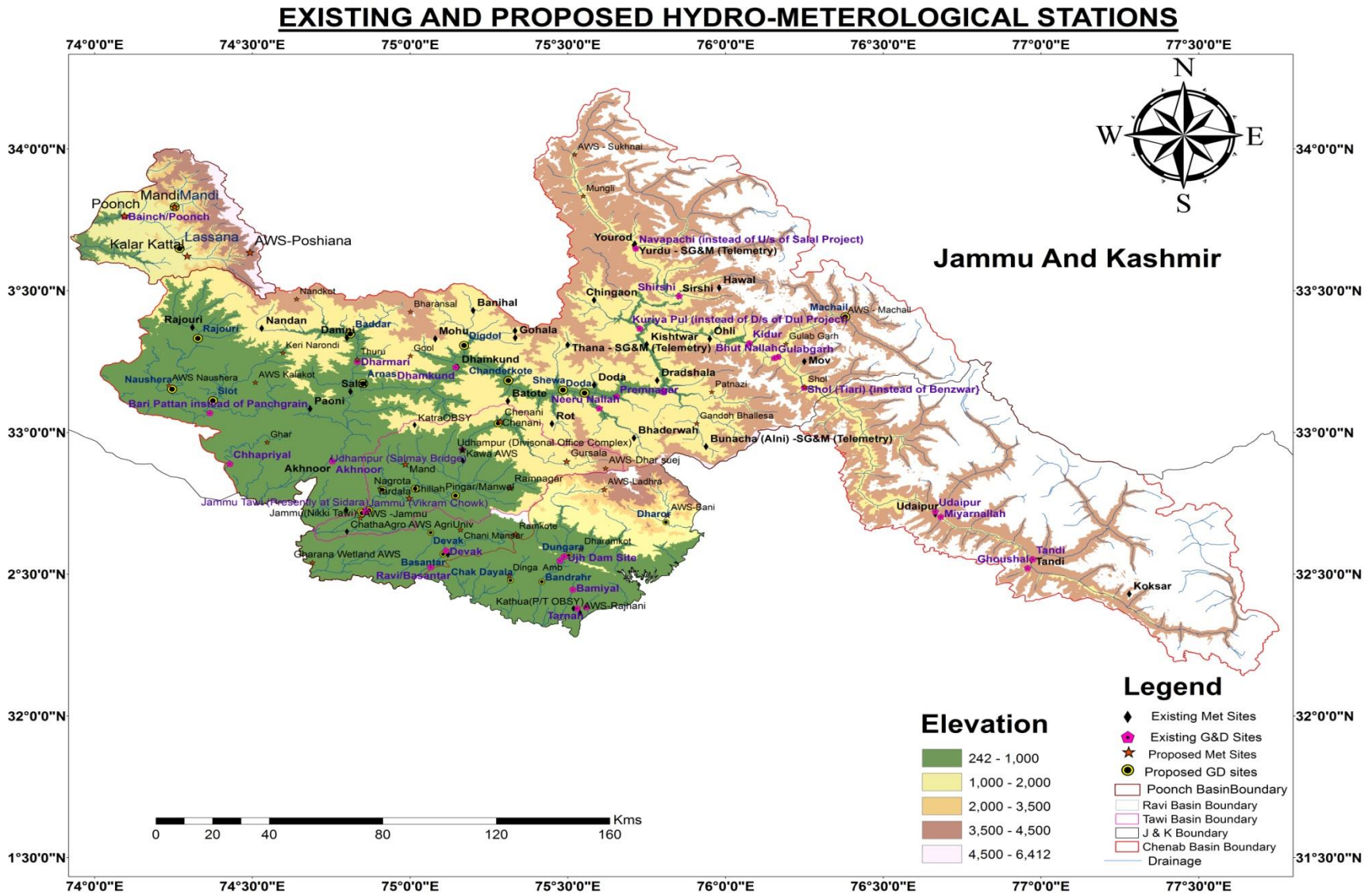
## 16. TOTAL ESTIMATED BUDGET

| Components | Amt. in Lacs |
|---|---|
| Cost of Component"A" | 2665.18 |
| Cost of Component"B" | 415.5 |
| Cost of Component"C" | 670 |
| Cost of Component"D" | 2723 |
| **Grand Total** | **6473.68** |

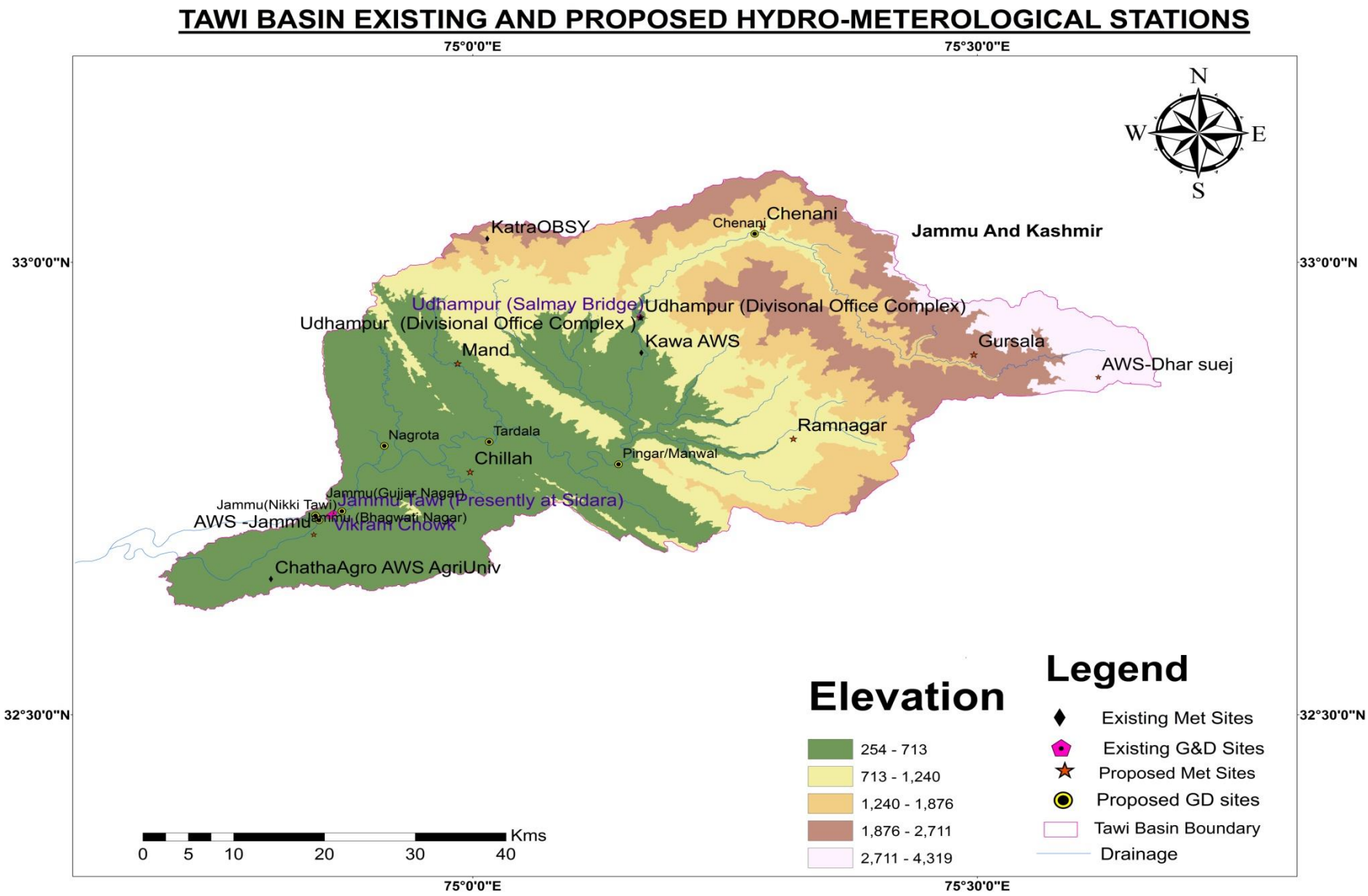
## I. Map Showing Existing Hydro-Meteorological Sites in the River Basins of the Jammu Division, J&K State



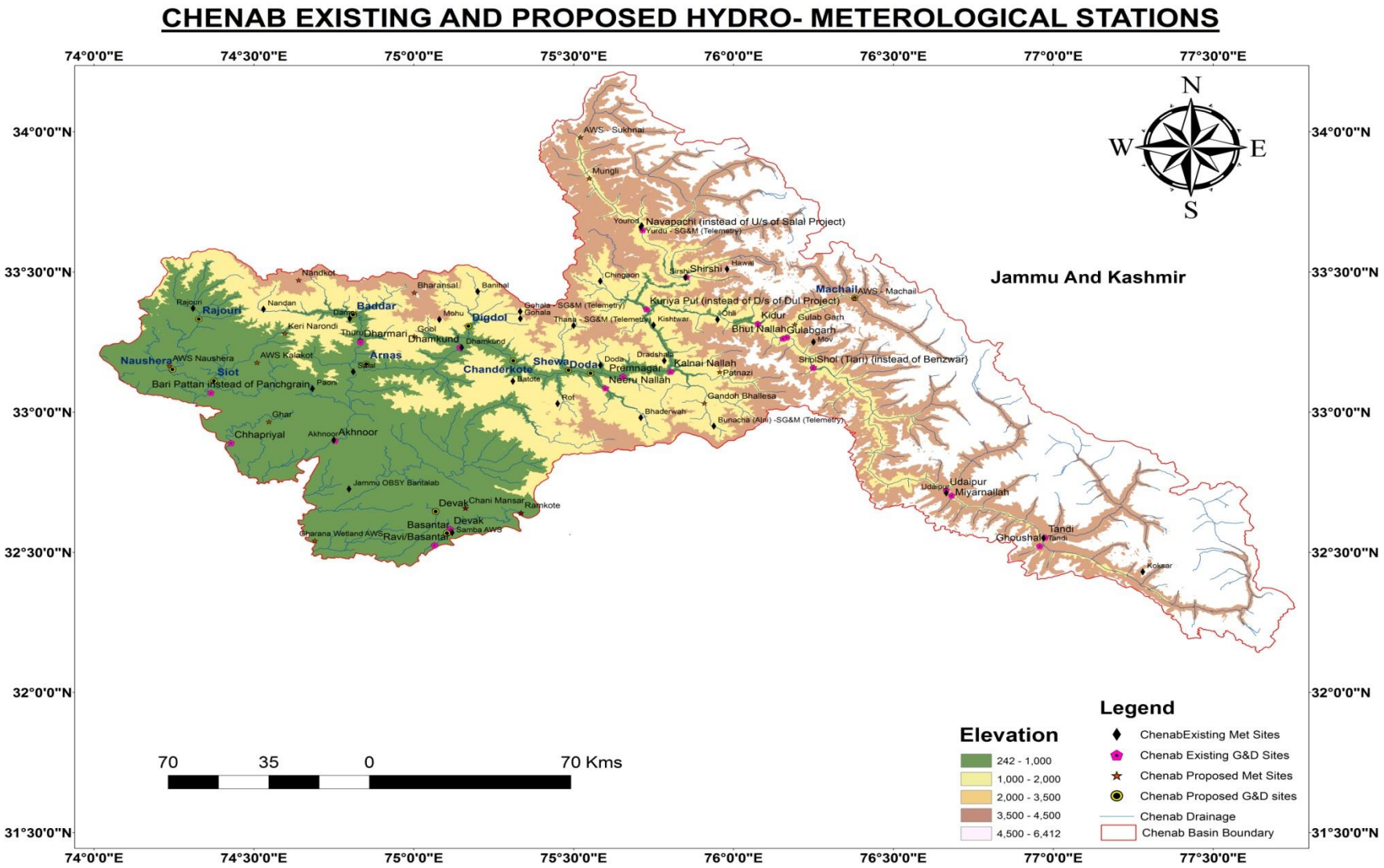
## II. Map Showing Existing and Proposed Hydro-Meteorological Sites in the River Basins of the Jammu Division, J&K State



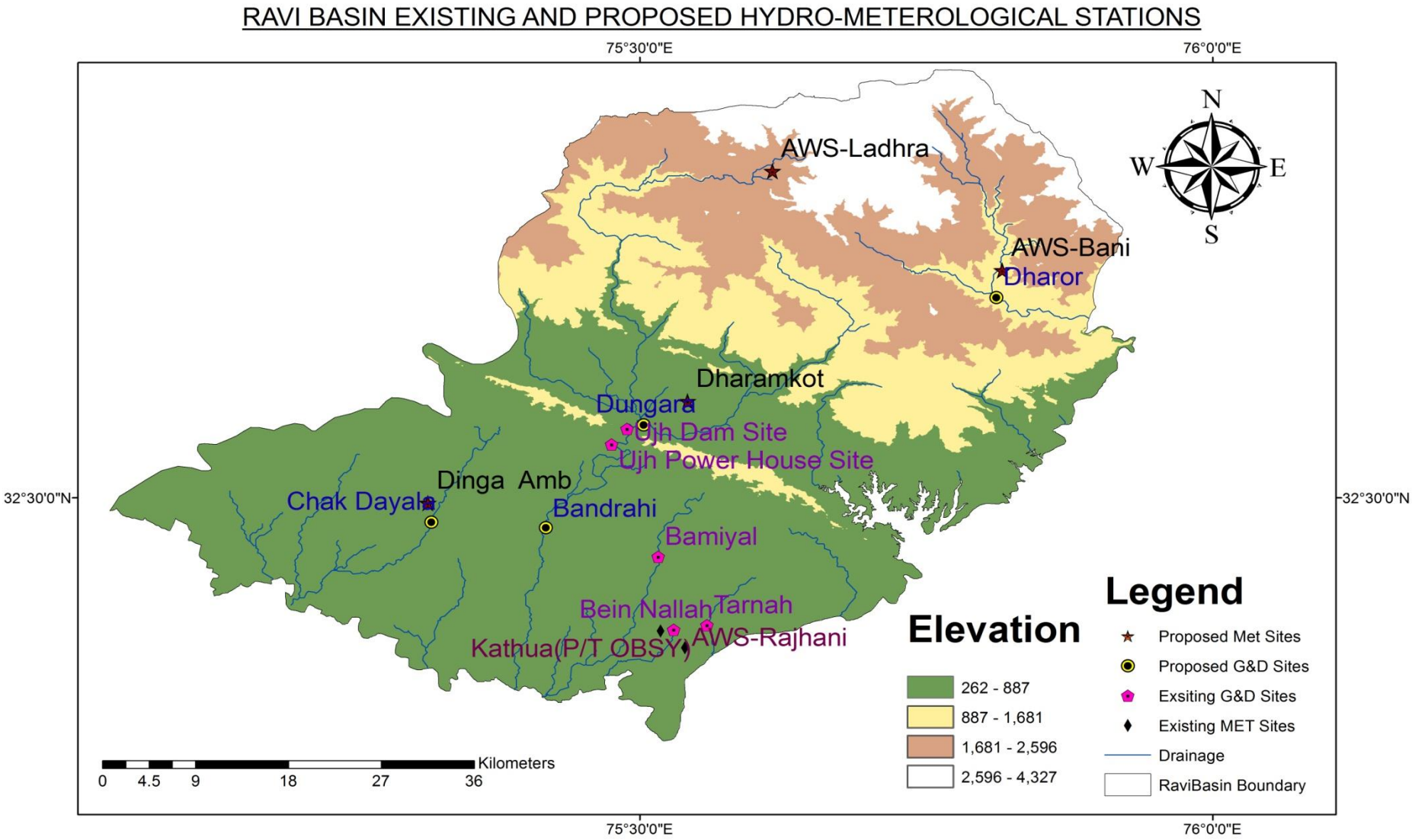
## III. Map Showing Existing and Proposed Hydro-Meteorological Sites in the Tawi River Basin in the J&K State



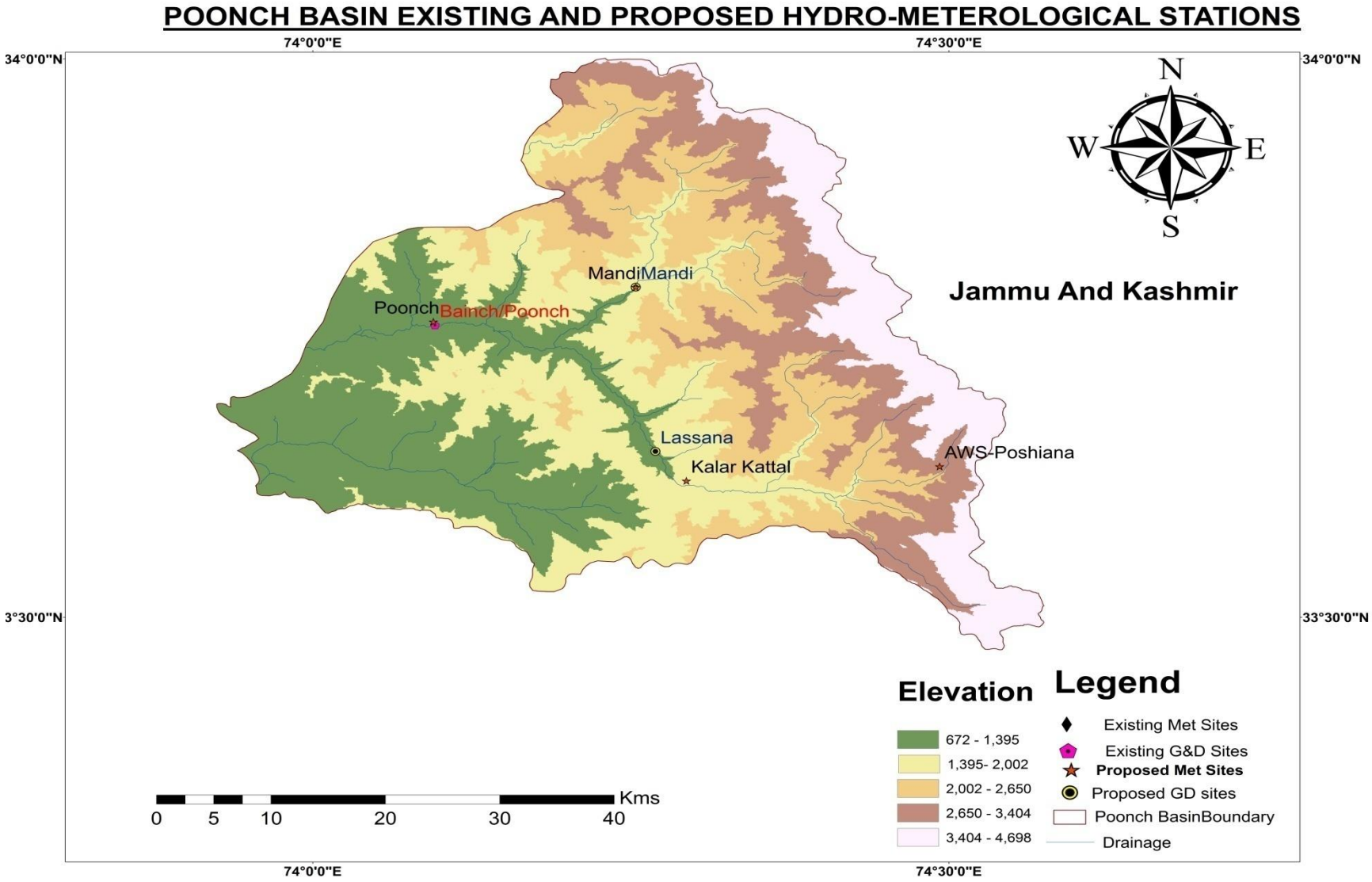
## IV. Map Showing Existing and Proposed Hydro-Meteorological Sites in the Chenab River Basin (Excluding Tawi River Basin) in the J&K State



**V. Map Showing Existing and Proposed Hydro-Meteorological Sites in the tributaries of Ravi River Basin in the J&K State**



**VI. Map Showing Existing and Proposed Hydro-Meteorological Sites in the Tributaries of Jhelum Basin, in the Poonch district, J&K State**



**Director:** **Dr. S. K. Jain**

**Head and Coordinator:** **Dr. M. K. Goel, Scientist G**

**Investigating Team from NIH:**

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3. **Dr. S. S. Rawat, Scientist D, WHRC, NIH Jammu**