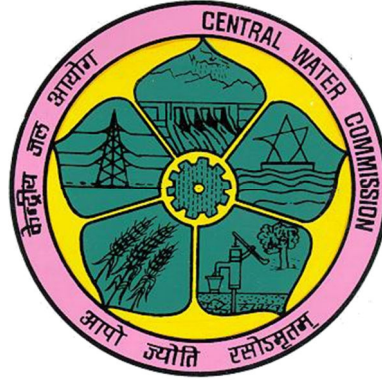

GOVERNMENT OF INDIA
CENTRAL WATER COMMISSION



Bid Document for Extension/Up-gradation of e-Surface Water Information System”

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1.0 Project Summary:

Hydrology Project-I, an Integrated Hydrological Information System for Central and participating State agencies comprising the infrastructure and human resources to collect, process, store and disseminate hydro-meteorological quantity and quality variables was implemented in the five regions of CWC in peninsular India. The project started in September, 1995 and closed on December, 2003.

The Hydrology Project-II was a follow up on Hydrology Project-I. The overall project development objective was to extend and promote the sustained and effective use of Hydrological Information System by all potential users concerned with Water Resources Planning and Management thereby contributing to improved productivity and cost effectiveness of water related investments. The project was cleared by the CCEA in October, 2005. The agreement for the project between the Govt. of India and the World Bank was signed on 19th January, 2006 and approved by the GOI in the month of May, 2006. The original completion period of HP-II was June, 2012. The project completion period was extended upto May, 2014 by the World Bank. The major components undertaken during HP-II comprise institutional strengthening and vertical extensions.

Based on the successful outcome of Hydrology Project, Government of India requested World Bank assistance for a follow on project – National Hydrology Project - Approach towards Integrated Water Resources Management'. There are a total of 47 implementing agencies (IAs) including eight central agencies, 37 state-level agencies and two river basin organizations (RBO).

During the National Hydrology Project, the Central Water Commission will like to focus on core area activities which will improve the overall efficiency. In future, it is expected that inter-state disputes will crop up more and more and pose a challenge in the field of water management aspect. CWC future plan would be ideally focused on development of good forecasting and real-time management facilities to allow the organisation to develop its ability to manage against catastrophes and to support optimum use of water resources.

The project seeks to enable improved decisions in water resources planning and operations. It posits that this requires not just improved water information products but also enhanced institutional capacity – both technical capacity and policy & planning capacity. Improved water information products (including water resources assessments, water accounts and audits, scenario analyses and option assessments, forecasts and early warnings) require improved water data and improved tools (analytical and decisions support systems) to transform data into information. The project thus spans the value chain from water resources data through to decision making capacity in water resources planning and operations. Beyond the project, this is expected to lead to improved water

resources decisions (operations and planning) generating greater economic, social and environmental benefits from the management of a limited water resource. The PDO of the project is proposed “to strengthen the institutions and water information required for integrated water resources management in India”. The key outcome envisaged during the project is as below:

- To establish National Water Information System with multi-disciplinary data from states and central agencies and data exchange amongst agencies in real time basis
- To create National information systems with generic models for improved water resources assessment
- States are able to manage flood and water resources using a river basin approach.
- Reservoirs and irrigation systems are operated more efficiently leading to water savings and improved productivity.

The project will cover all major river basins of India and will require strong collaboration among central and state levels of government. All States and Union Territories will participate in the project given their constitutional mandate for water resources management. Central agencies will be also participate given significant interstate aspects of water management (most large river basins and aquifers cross state boundaries) and the need for a consistent national water information base.

2.0 Background

The Central Water Commission is a premier Technical Organization of India in the field of Water Resources and is presently functioning as an attached office of the Ministry of Water Resources, Government of India. The Commission is entrusted with the general responsibilities of initiating, coordinating and furthering in consultation of the State Governments concerned, schemes for control, conservation and utilization of water resources throughout the country, for purpose of Flood Management, Irrigation, Navigation, Drinking Water Supply and Hydro Power Development. It also undertakes the investigations, construction and execution of any such schemes as required.

The Central Water Commission has lead responsibility for the management of India's Water Resources. It is charged with initiating, coordinating and furthering, in consultation with the State Governments concerned, schemes for the control, conservation and use of water resources throughout the country, for purpose of flood control, irrigation, navigation, drinking water supply and hydro power development.

The Central Water Commission and other Implementing Agencies are currently operate an extensive network of hydrometric and hydro-meteorological measurement stations, from which data are collected on climate, river flows, reservoir monitoring and water quality. During the HP-I project the Central Water Commission had developed the suites of software packages viz. Surface Water Data Entry System (**SWDES**), Hydrological Modelling Software (**HYMOS**) and Water Information System Data Online Management (**WISDOM**). These software is being used primarily for data entry, primary and secondary data validation, data processing, data storage

and dissemination of Hydro-meteorological data. The application software was developed in a stand-alone environment, and in the client server environment, integrating GIS, database and various systems software to provide client applications, and a limited web service. Out of these, HYMOS software is the proprietary software. To overcome the drawbacks which were encountered during the running of above software, Central Water Commission had developed Online Surface Water Information System (eSWIS) software during the Hydrology Project-II. The main objectives of the new software were to replace obsolete components, improving system architecture and adding new components. The eSWIS is focused on, using open source software, replacing the underlying database system used for central storage of hydro-meteorological data, replacing the existing system for validation and data processing, moving data entry from stand-alone systems to a web environment, and providing the web services required for data dissemination and the support of the Flood Warning functions. The online system architecture is represented by the following figure:

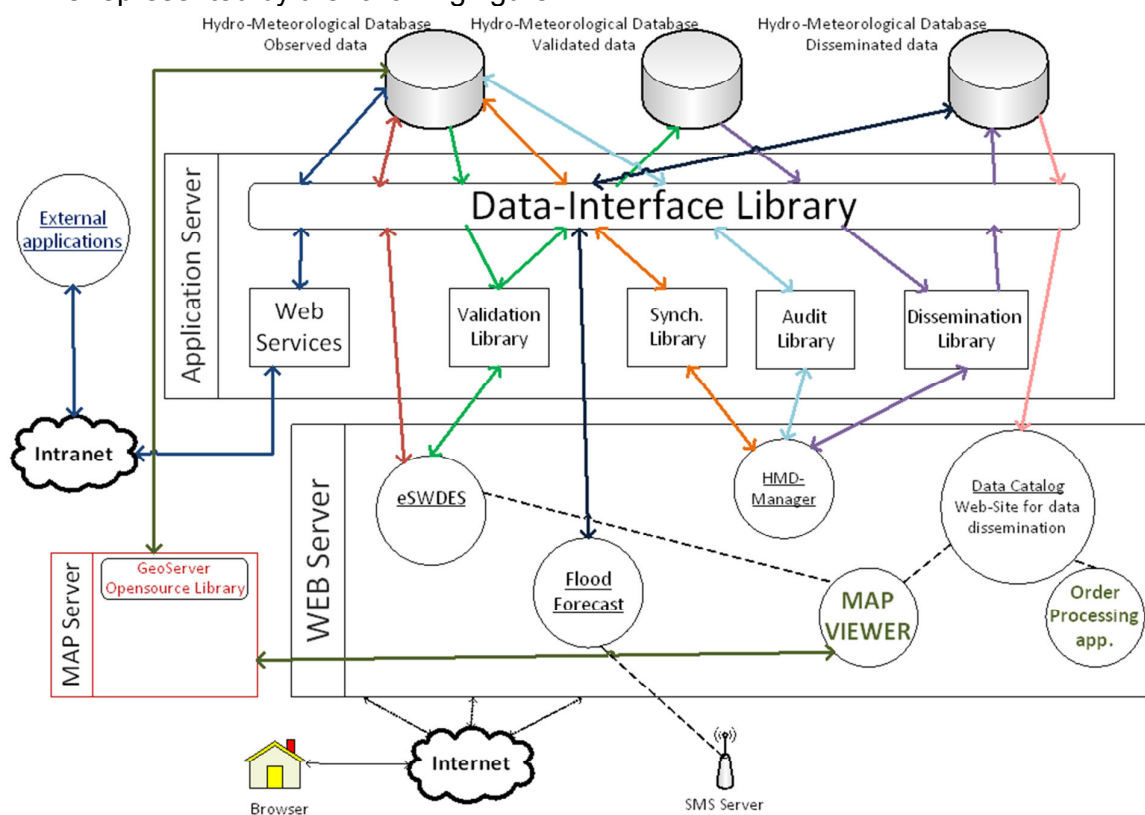


Figure 1 - Online system architecture

The online system architecture diagram consists of the following components:

- ❑ **eSWDES:** A Web-application which users will use for data-entry and for performing secondary-data validation. It is the main application for data-entry and data in-charge users from different offices, agencies, etc. When data have been saved, they pass a primary-validation automatically. A secondary-data validation will require a manual process after data have been entered
- ❑ **Hydro-meteorological database manager:** A Web-application for performing high-level operations on entered data, such as Synchronization,

Auditing and Dissemination data. Application for special users who will in charge of this kind of special operations over data

- ❑ **Web based data catalogue:** Web-site where disseminated-data can be consulted for everyone. This website is available for all people without login. It allows querying and searching all alphanumeric and geographical information available
- ❑ **Independent facility for the order processing of data requests:** Web application join to web based data catalogue where the user can order some data
- ❑ **Map viewer:** Web application which is able to locate geo-referenced data over a map.
- ❑ **Data interface library:** The only way to perform operations over data will be through this library. All other libraries or applications will need to call methods from this library to carry out operations over data
- ❑ **Validation library:** A library which contains all operations related to functionality of performing second-validation over data
- ❑ **Synchronization library:** A library which contains all operation related to functionality of performing data synchronization
- ❑ **Audition library:** A library which contains all operation related to functionality of performing audition of data
- ❑ **Dissemination library:** A library which contains all operation related to functionality for data dissemination
- ❑ **Hydro-meteorological database:** The data will be separated into 3 schemas depending on the kind of data which they will contain. That is, the structure of the database is the same in all three, and just data will change among them:
 - ❑ Observed data: Data recently entered that not have been approved
 - ❑ Validated data: Data which have been approved
 - ❑ Disseminated data: Data exposed publicly through Web based data catalogue
- ❑ **Web server:** Container for all web sites and web applications, known as front-end applications
- ❑ **Application server:** Container for all business-logic of applications. It contains different libraries which group common functionalities inside. The different front-end applications can access to them for performing actions sent by users
- ❑ **Map server:** Server used to publish all map services and provide some spatial functionality
- ❑ **Web services:** The way of exposing Data interface operations outside will be through Web services that allows to future third-party applications (external applications) to query and to manage data from Hydro-Meteorological database. In order to keep security of accessing, this web services will not be exposed on the internet, just they will be accessed from intranet
- ❑ **Flood-forecast web application:** Application for publishing reports of forecasts and analyses weekly data evolution where users are also able to send bulk SMS and emails for quickly informing.

- **Secondary validation:** After Primary validation user can validate the data using secondary validation tools.

3.0 Objective

a) **Integration with Earth Receiving Stations for automatic collection of data**

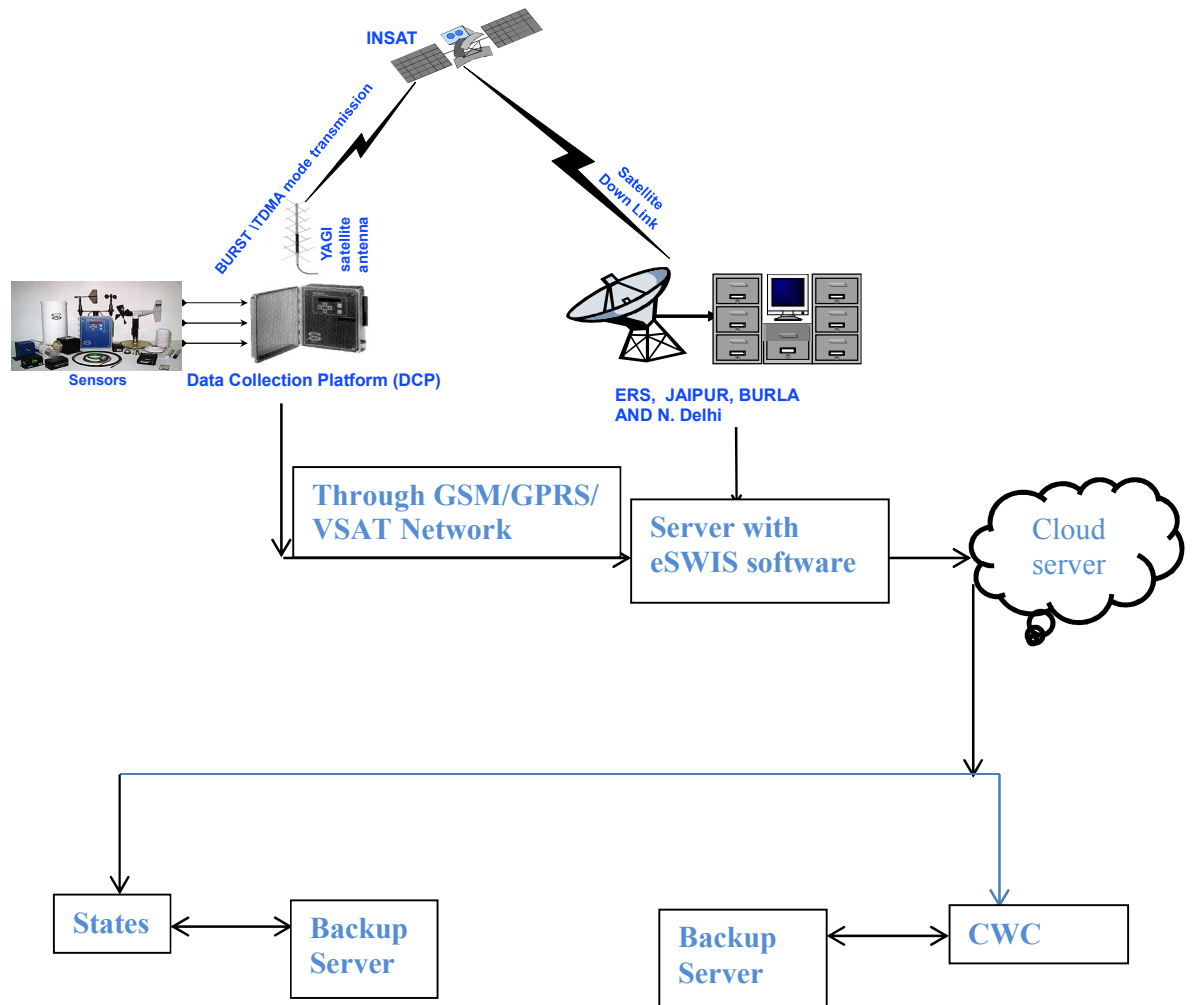
- CWC has 3 ERS. Out of these 2 ERS are on PBRS mode and one on TDMA mode communication. These ERS station can cater approximately 12000 stations. Currently, CWC is receiving data of only 445 stations installed all over the India through INSAT. Thus, CWC has sufficient capacity to cater the needs of all the states.
- It is proposed to expand its network of telemetry station by installing additional GSM/GPRS, VSat and INSAT communication based monitoring stations. These stations are proposed to be installed during the National Hydrology Project by various implementing agencies.
- Presently, the data from the 450 telemetry sites are transmitted to ERS at New Delhi and Jaipur through satellite and thereafter the data is being transferred to 23 modelling centres of CWC through dedicated V-Sat network.
- CWC have different reception and processing software at each ERS and modeling center which are proprietary in nature and there is not much scope to carry out any change in these software's. However, new sites can be added and customised in it.
- During the National Hydrology Project, it has been envisaged to developed a new module in the existing eSWIS software for reception and decoding of telemetry as well GSM/VSAT data from remote locations. After receiving the data and auto primary validation, the data can be stored in eSWIS server. Thereafter, user ID and password can be allotted to states/implementing agencies for their respective domain data for data editing, viewing, validating and approving. This software can be installed in the ERS. Since, eSWIS is online software, data can be accessed from any place.

The proposed flow diagram for data flow is given in Figures at subsequent pages.

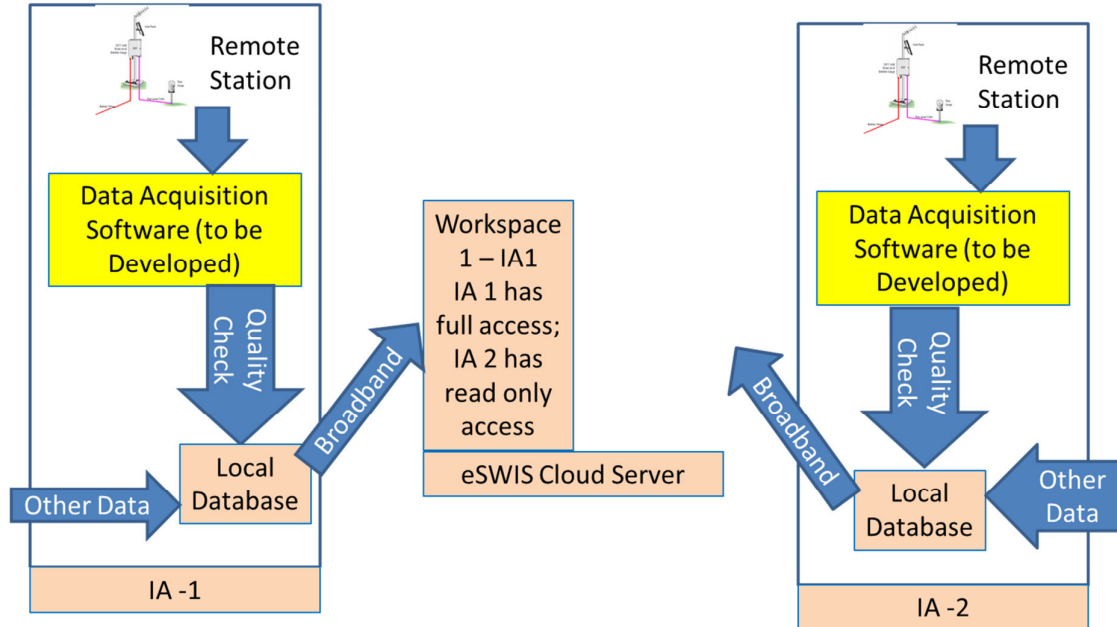
b) **Development of SMS based Applications for communication of Data including mobile app.**

- a) Inclusion of Inventories of HO & Met equipment at each site.
- b) linkage with India-WRIS
- c) Linkages with real time water quality Data
- d) Web based dissemination of various data for public such as reservoir data, HO Data etc
- e) Web based Dissemination of Water Quality data and its product
- f) Customization of eSWIS/various reports as per need of various implementation agencies

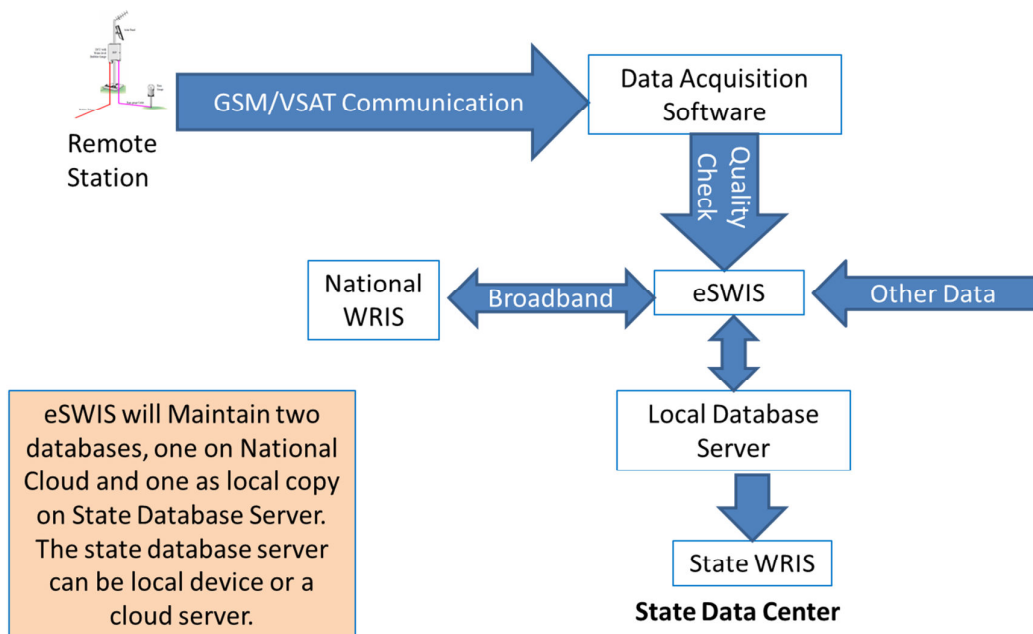
PROPOSED DATA FLOW DIAGRAM



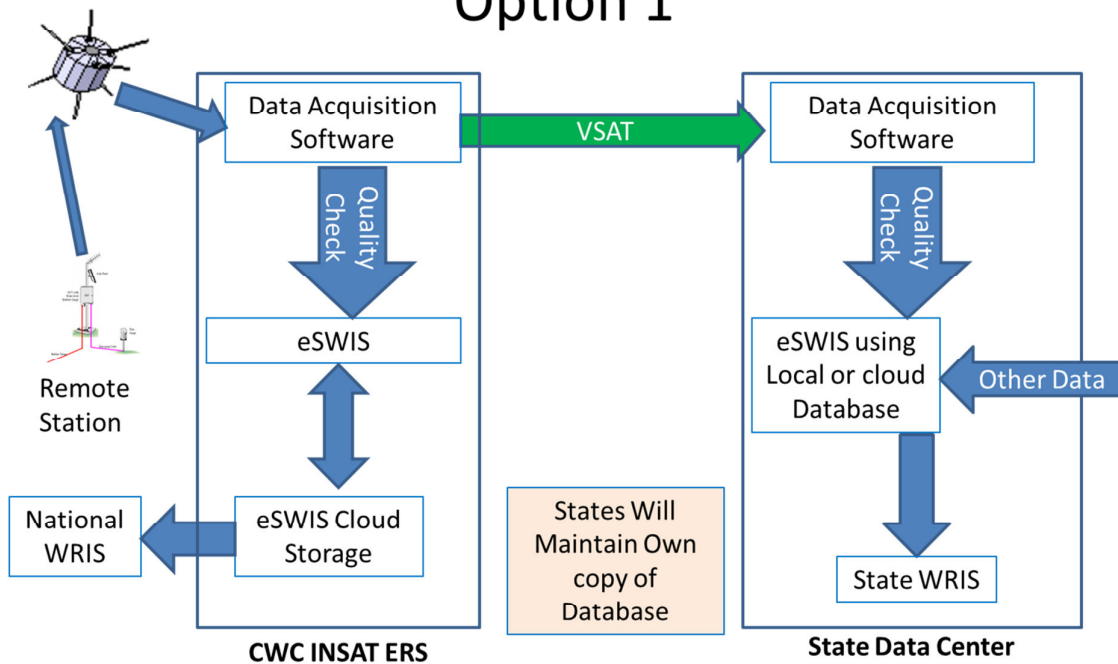
eSWIS Protocol



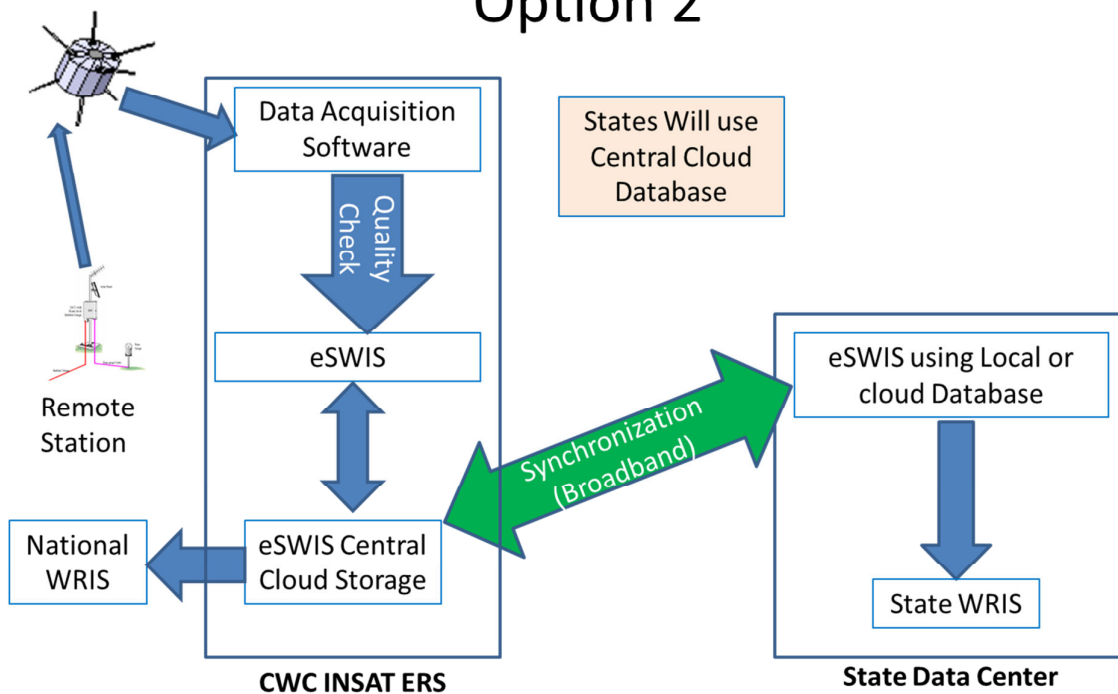
Data Flow – GSM/VSAT Communication



Data Flow – INSAT Communication – Option 1



Data Flow – INSAT Communication – Option 2



4.0 Scope of Work

A new solution in the form of up-gradation in the existing eSWIS software proposed to be developed through this procurement is intended to include automatic data collection directly from the site through GSM/GPRS/VSAT/INSAT based communication system and update the database automatically after primary validation. Procurement will consist of following

- a) Review of the existing Databases, System Design and Processes.
- b) System design for data collection, data-flow, validation and storage for realtime telemetry data
- c) Recommend specifications of various database design, system up-gradation & necessary new module in the existing software etc, development of the software and maintenance thereof.
- d) Development and Implementation of the new module in the existing software, middleware and communication modules using technology fully compatible with existing e-SWIS application.
- e) Development of SMS based Applications for communication of Data including mobile app.
- f) Inclusion of Inventories of HO & Met equipment at each site.
- g) linkage with India-WRIS
- h) Linkages with real time water quality Data
- i) Web based dissemination of various data for public such as reservoir data, HO Data etc.
- j) Web based Dissemination of Water Quality data and its product
- k) Customization of eSWIS/various reports as per need of various implementation agencies.
- l) Development of site inspection forms
- m) Email/SMS alert for entry of data/validation/ site inspections norms
- n) Testing of data transfer from automated data collection devices, Primary validation tools and error reporting protocols.
- o) Creation of separate workspace for various implementing agencies in the database.
- p) Transfer of all historical data of various implementing agencies
- q) Development of module for various utilization data
- r) New customised reports such as trend analysis
- s) Training to different section of staff i.e. end user, administrator etc
- t) Development of e-training modules and e-courses.
- u) Documentation, online help, real-time help.
- v) Upgrade the existing lease line of 2mbps to 4 mbps in National Surface Water Data Centre and to provide one internet leased line, of 2Mbps (1:1) bandwidth, for both download and upload on 24X7 basis at the purchaser's office.
- w) Capacity Building of participating agencies through training of the system operation, Transfer of Technology to Trainers and end users
- x) Warranty and Maintenance of the application upto 30th November, 2024.

The new solution will consist of following new features; which are to be supplied as part of this procurement:

Sl. No	Component
1)	New web based e- Automated Surface Water Data Collection (e-ASWDC) Which is an enhancement of eSWIS functionality for automated data collection from telemetry sensors using GSM/GPRS/VSAT/INSAT communication protocol.

Sl. No	Component
2)	Real time data validation tools to check if the incoming data from automated data collection from telemetry sensors using GSM/GPRS/VSAT/INSAT communication protocol are within the acceptable range.
3)	Establishing a communication channel to ensure seamless data transfer between the data collection devices in the field to the server.
4)	Development of SMS based Applications for communication of Data including mobil app for sending and receiving data.
5)	Develop system for Inclusion of Inventories of HO & Met equipment at each site.
6)	Develop linkage of various data with India-WRIS
7)	Develop linkage of real time water quality data
8)	Development of Web based Dissemination of Water Quality data and its product
9)	Web based dissemination of various data for public such as reservoir data, HO Data etc.
10)	Development of module for various utilization data
11)	Customization of eSWIS/various reports as per need of various implementation agencies
12)	Development of site inspection forms
13)	Email/SMS alert for entry of data/validation/ site inspections norms
14)	Trainings
15)	Development of e-training modules and e-courses.
16)	New customised reports such as trend analysis
17)	Web Hoisting including enhance cloud storage
18)	Warranty and Maintenance

5.0 TECHNICAL SPECIFICATIONS

5.1 GENERAL TECHNICAL REQUIREMENTS

- a) **Language Support:** All information technologies MUST provide support for the English and Hindi language. Specifically, all display technologies and software must support the ISO character set.
- b) **DATES:** All information technologies MUST properly display, calculate, and transmit date and time data, including, but not restricted to 21st-Century date data.
- c) The new modules of eSWIS software should comply with NSDI (National Geospatial data infrastructure) and NWIC (National Water Informatics Centre) web standards/guidelines.
- d) The new modules of eSWIS software including the hydrometeorological database, required web servers and applications, must use open source software or software allowing royalty free deployment of the eSWIS to new servers and the offices of Implementing Agencies without restriction.

5.2 Computing Hardware Specifications

The supplier is not required to supply any hardware as part of this contract. Except the GSM/GPRS modem required for receiving of various data set including SIM etc all accessories. All the expenditure for purchase of modem and recurring expenditure for SIM, additional storage and hoisting etc during the project period shall be borne by the contractor. The contractor has to provide the sufficient number of GSM/GPRS modem to handle approximately 300 telemetry sites.

Supplier is required to develop the new modules of eSWIS software using his own required hardware and integrate the new modules with the existing eSWIS software and to install the new modules of eSWIS software on the required server. Supplier is required to host the new modules of eSWIS software on the existing e-SWIS web server, with option to install the software at servers of implementing agencies. The supplier is required to develop new modules of eSWIS software using open source software and host it on open source platform, the supplier MUST specify all the hardware and software required to run the application. The specifications must be sufficiently detailed to be used without change as the basis for a tendering process. However, if required capacity of existing cloud and lease line may be increased.

5.3 Software Specifications

In addition to the supply of the new modules of eSWIS software, the supplier MUST specify all the software related to the hardware, network or communications equipment required by the CWC and Implementing Agencies in order to install and run the updated eSWIS.

5.3.1 Security:

The system must be completely secured from the all types of internet threats.

5.3.2 System Integration:

The purchaser should review documents and key features of the existing systems. The new module of eSWIS must be conceived and designed as an integrated but modular and upgradeable system in which data collected by the CWC or an IA can flow smoothly and efficiently from the field to the end users. The end users may be the officers of the CWC or IA's working in any of their offices, with or without internet connections, or they may be external users including the general public who will have or have not an internet connection.

6.0 Maintenance Service:

The service provided should cover:

- a. User support for:
 - i. End users
 - ii. System administrators
 - iii. Program developers
- b. Bug fixes
- c. Upgrades due to changes/replacement in operating system, databases, hardware, supporting softwares, network and other correlated softwares and relevant softwares in use by Implementing Agencies.

d. Technical Support:

The supplier will propose and provide to the purchaser one staff/engineer/IT professional as per qualification mentioned below for the maintenance of the systems, software and data. The systems-cum-software staff will be responsible for upgrades to the new modules of eSWIS software required by changes in hardware, operating systems or proprietary software and installing and testing upgrades and new releases of the software and any proprietary software that it uses. He will also make any agreed user upgrades to the new module of eSWIS software. The data staff will be responsible for supporting users in relation to the input, validation, processing, storage, and retrieval of data.

The minimum qualification and experience of the staff/engineer/IT professional would be as follows:

I. **qualification —**

- i) B. Tech or equivalent, Or
- ii) Graduate with certification in Web Application / System / Server Administration / Web Server Administration / Server Hardware / Server operating System / Server Installation/ enterprise level RDBMS like Oracle / Postgresql or equivalent , Database Administration

II. The staff/engineer/IT professional should have minimum three years of experience in relevant field.

- e. Addition of functionalities in the softwares developed as per the requirements of the purchaser.
- f. The e-SWIS shall run on 24X7X365 basis and all the maintenance, operational support is required to maintain the services at this performance level. The new module should use best practices in memory management so that server does not require to restart frequently.
- g. An online forum should be developed and maintained for interaction among water resources users.
- h. The supplier MUST provide a maintenance service as follows:
 - i). coverage period: upto 30-11-2024 from the date of acceptance
 - ii). Response time and problem-resolution performance standards as per the existing contract for eSWIS software.
 - iii). Mode of service: on-call/self-monitoring by bidder
 - iv). Penalty for delay during maintenance shall be as per the existing contract for eSWIS software.
 - v). The terms and conditions of the service shall be same as specified in the existing contract for eSWIS software.

7.0 User support through hotline-

As per the existing contract for eSWIS software.

8.0 DOCUMENTATION REQUIREMENTS

The language used should be English.

A version control system for operating system should be put in place and all documents placed within it. If the purchaser already uses such a system and it is appropriate, it should be adopted; otherwise a system should be agreed with the purchaser.

8.1 End user documentation requirements

The supplier MUST provide the following user documentation in relation to each sub-system and the system as a whole in printed (5 copies) and electronic format

- a. **Quick reference guides.** The main facilities and capabilities of the software systems should be documented in a set of simple guidance notes. The guides should be available as an on-line web based help facility and as documents for download/printing.
- b. **User manuals.** These should be comprehensive documents covering all functionality from the user's perspective. They should provide step by step illustrated procedures for all the functionality, and should contain comprehensive cross references and indices. The user manuals should be available as an on-line web based help facility, and as a manual for download/printing (visible to validated users only).

8.2 Technical Documents:

System administration documentation requirements

The supplier MUST provide system administration documentation in relation to each sub-system and the system as a whole. The system administration manuals should be available as an on-line web based help facility, and as a manual for download/printing.

The manuals should be comprehensive documents covering the installation, operation and maintenance of individual new components of eSWIS software. They should also cover issues such as security, data backup and restoration, user rights management and management of software updates.

8.3 System documentation requirements

The supplier MUST provide system documentation in relation to each sub-system and the system as a whole.

- a. Supporting systems documentation. Full documentation of hardware and software systems purchased under this contract will be required. This documentation must include manufacturer's manuals and original digital media for all software.
- b. The Full documentation of software systems developed for the new modules of eSWIS will be required. This documentation must include documentation of the software design and commented source code for all application software developed. The source code must be provided in digital form. In addition, there must be instructions for testing the software and for its release.

The documentation must include detailed descriptions of any database designs and file formats.

The manuals should be available as an on-line web based help facility and as documents for download/printing.

8.3.1 Consumables and Other Recurrent Cost Items

The supplier MUST indicate and make provision in the bid costs for all consumables and other recurrent cost items required or arising during the development, roll out, acceptance testing and operation during the maintenance period.

8.3.2 Other non IT goods

The supplier MUST indicate and make provision in the bid costs for all other non-IT goods required or arising during the development, roll out, acceptance testing and operation during the maintenance period.

9.0 TESTING AND QUALITY ASSURANCE REQUIREMENTS

Operational Acceptance Tests

- Supplier will perform tests on the System and its Subsystems following Installation to determine whether the System and the Subsystems meet all the requirements mandated for Operational Acceptance.
- The supplier will make all the necessary arrangements for acceptance trials.
- Working with the purchaser, the supplier will provide independent test data sets representative of operational conditions that will allow the purchaser to satisfy itself that the software performs according to the specification.
- User acceptability testing must include testing on actual IA and CWC hardware in different offices. If the solution is web based, the trials must involve the use of the system across the web. All trials must involve a realistic number of simultaneous users.
- The trials must include the installation and setup of all appropriate subsystems in IA and CWC offices.
- The trials must include the initialisation of the system and the population of controlled vocabularies, etc.
- The trials must include passing data right through the system from data entry to its selection and download.
- The trials must exercise the functional capabilities of the system.
- The trials must test the usability of the GUI.
- The trials must test the acceptability of the training.
- The trials must test the acceptability of the documentation.
- The trials must test the acceptability of the system's performance.

10.0 Facilities to be made available by the purchaser

- The purchaser will make staff available in its Delhi office for technical and hydrological advice and to approve designs and documents.
- The purchaser will provide suitable data sets for testing, acceptance and training purposes.
- The purchaser will enable the supplier to access the existing systems for

the purpose of understanding their design and operation.

- The purchaser will provide access to machine rooms during installation.
- The purchaser will provide access to eSWIS server hardware.
- The purchaser will not be responsible for providing any requirement of UPS/ Inverter etc, Extension board etc. for hosting of website and uploading of new modules of eSWIS on server.
- However, Purchaser will provide Space, furniture and computers with all accessories including UPS to the Technical staff of the supplier during the period of maintenance.
- The Purchaser will designate appropriate staff for the training courses to be given by the Supplier and shall make all appropriate logistical arrangements for such training as specified in the Technical Requirements, SCC, the Agreed and Finalized Project Plan, or other parts of the Contract.

11.0 Facilities to be made available by the supplier

- The supplier MUST provide any hardware and software required for development of new module of eSWIS, Web Site and their maintenance.
- The supplier MUST provide all the software required to upgrade the e-SWIS.
- The supplier's software development team will required to be stationed in the National Surface Water Data Centre and senior core members will be expected to make regular visits for progress reporting and technical consultations to the purchaser's offices in Delhi and other cities.
- The supplier shall make arrangement for training of eSWIS software to CWC officials and implementing agencies officials as per the training schedule specified in clause 27. The sufficient number trainer shall be engaged by supplier who is well versed with the software and hydrology for the training purpose. The expanses for Travel and training kit are to be borne by the supplier while all the logistics for the training shall be arranged by the purchaser.
- Upgrade the existing 2mbps lease line to 4 mbps in National Surface Water Data Centre
- The Supplier shall conduct all activities with due care and diligence, in accordance with the Contract and with the skill and care expected of a competent provider of information technologies, information systems, support, maintenance, training, and other related services, or in accordance with best industry practices. In particular, the Supplier shall provide and employ only technical personnel who are skilled and experienced in their respective callings and supervisory staff who are competent to adequately supervise the work at hand.

12.0 Selection of software and hardware

The new module of eSWIS MUST not require the Implementing Agencies to incur licence fees, to pay royalties or where server systems have been purchased by IAs, to purchase hardware beyond that which they possess at the start of the contract in order to use the system

13.0 Overview of the key tasks

The contract is planned to be delivered as 3 distinct work packages. In brief these comprise:

- **Work package A:** Foundation (working with the purchaser)
 - Develop an overall architecture
 - Define a data/metadata interchange standard
 - Recommend specifications for hardware and any associated software
 - Develop a detailed project plan
- **Work package B:** Development and Integration
 - Analyze the requirements
 - Specify functionality and define formats and methods for Data Collection and transmission.
 - Develop new module of eSWIS software
- **Work package C:** Web hosting of new module of eSWIS software and management of web application
 - Hosting the new module of eSWIS software onto e-SWIS webserver
 - Maintenance and Management of new module of eSWIS software

Ancillary activities will include:

- Project management and planning
- Training
- Documentation
- Establishing procedures
- Release and installation
- Acceptance testing

14.0 DESCRIPTION OF MAIN WORK PACKAGES

14.1 WORK PACKAGE A – FOUNDATION

Work package A consists of a system design and planning exercise. The work package is designed to:

- Provide the supplier with the time to thoroughly understand the existing systems
- Provide the supplier with the opportunity to work with the purchaser's staff and thoroughly understand the requirements of the new module of e-SWIS and the upgrade strategy.
- Lay the foundations for the extension of the e-SWIS.

The tasks required under this work package are outlined below:

14.1.1 Review the e-SWIS database designs and supporting software

The supplier will review and document the e-SWIS database designs and the functionality of the softwares. The review should cover:

- A description of each system's conceptual data model
- A description of each system's table design
- A description of the functionality provided by each systems supporting software
- The mapping of each data item in the e-SWIS database on to the new database design to accommodate data coming from Automatic Data Loggers
- A description of the data interfaces between the existing system and any processing to achieve the mapping
- A list of business rules (implicit and explicit constraints)

14.1.2 A list of the strengths and weaknesses of each system and develop an overall architecture for the new module of eSWIS

Working closely with the purchaser, the supplier will develop and document an overall system architecture, for the upgraded e-ASWDC. The document must explain in terms clear to both hydrologists and systems analysts:

- The conceptual model of hydrological data gathering and processing upon which the system is based
- How data will flow through the system from the field to the server
- The main system components
- The data interfaces between the components
- The provision for secure on-line access
- Access control – users and user permissions
- The computing environment required to run the system.

The computing environment must take account of the user base and its likely growth over the next 10-15 years, it must not place unrealistic demands on the CWC or the IA's in terms of skills, staffing levels or the maintenance and support of equipment. It must be resilient to changes in either hardware or software. It must provide security against data loss.

14.1.3 Develop data and metadata interchange standards

Working closely with the purchaser, the supplier will develop and document standards for the interchange of data and metadata between eSWIS and new modules of eSWIS in either direction or with third parties.

The format must be capable of being used to send update instructions from a source to a target database.

The data exchange format must be able to handle all site data, observation data and controlled vocabularies. The standards should be based on the following principles:

- ASCII data serialisation formats (such as JSON, XML or YAWL)
- Where appropriate, they should follow national and/or international standards, e.g. ISO and OGC
- For metadata, they should be compatible with those being developed in parallel as listed earlier.
- NSDI data structure
- WRIS data structure, etc.

A balance will need to be struck between adopting existing standards (i.e. ISO 19115 for metadata, Water ML or Observations and Measurements ML for data exchange) and ensuring that the standard is computationally efficient, adapted to the Indian HIS and compatible with The Application .

14.1.4 Recommend specifications of hardware and software

Once the system design is approved the supplier should provide detailed information and specifications for the system components, including server hardware, operating systems, database software, and any required software components that will be required to run the new modules of eSWIS. The information and specification should also include database and system backup, failover and disaster recovery. The specification should cover power supplies, environmental conditions and LAN/WAN connectivity and security.

14.1.5 Review the remaining work packages

A detailed work plan will be prepared for the implementation of work packages B and C

14.2 WORK PACKAGE B – DEVELOPMENT AND INTEGRATION

The purpose of Work Package B is to develop and deliver new modules of eSWIS. The new modules of eSWIS will be required to communicate with the Data loggers on field to collect data automatically and integrate the data onto database after preliminary validation.

The tasks for this work package are:

14.2.1 Specify the functionality of new modules of eSWIS

Working closely with the purchaser, the supplier will specify the functionality to be provided in the e- Automated Surface Water Data Collection (e-ASWDC) and the associated system for validation.

The specification must define in detail all the validation and processing algorithms to be employed. Examples of the level of detail required may be found in the HP I / HP II documentation. Where appropriate these may be copied or referenced. If they are referenced, a copy of the relevant document must be attached to the specification.

14.2.2 Present the functional specification for review and approval

The supplier will disseminate the specification for review, amendment and approval. Following dissemination, the supplier may organise a workshop of interested parties where the results can be presented and discussed.

After the review, working with the purchaser, the supplier will make any amendments and clarifications accepted by the purchaser and required for the approval of the work.

14.2.3 Develop of new modules

The supplier will develop new module of eSWIS in following stages:

- Detailed design
- Development of new modules
- Testing of new modules and its compatibility with existing modules
- Documentation
- Acceptance trials
- Release

14.3 WORK PACKAGE C: WEB HOSTING AND MANAGEMENT OF WEB APPLICATION OF NEW MODULES OF ESWIS

Supplier is required to host the new modules on web provided by CWC and integrate the system with e-SWIS so that new modules works as an integral part of e-SWIS and seamlessly merge with e-SWIS by maintaining the look and feel and the database structure as provided in e-SWIS.

14.3.1 Hosting and maintenance of new modules on Internet

The supplier should check and validate if the farm/data center satisfies following minimum requirements-

- (i) The purchaser is free to make any upgradation / modification in the application at any stage. Free access to the server room is required only for the periodic physical uploading/updating of application/database and

maintenance of the application/database for which the envisaged frequency is once in a month.

- (ii) The supplier shall provide the reasonable security i.e., security provided by any reputed hosting agency as a standard without any extra charges, to the web site by putting it behind the firewall etc.
- (iii) Network based Intrusion Detection System having the following features:
 - The Network-based Intrusion Detection System should log all Internet traffic to/from customers'co-located servers for known exploits and vulnerability patterns.
 - The Information obtained should include reports and charts showing number of alerts / exploits, taking place from the Internet, on co-located server based on selected parameters such as hourly, daily or monthly intervals.
 - The log report should contain information of actual alert/exploit type, the time stamp for that exploit and the source address from which this attack is mounted.
 - Customization of rules should be possible to detect required pattern of attack or IP source as & when required.
 - Should provide secure authentication to view logs of application.
 - Periodic vulnerability assessment of co-located server to determine the security state of the system.
 - Automated reports of application's availability statistics and trends should be viewable based on time ranges like weekly, monthly, quarterly etc.
 - web reports containing information on number of hits, duration of hits, profile of the users etc on daily/weekly basis.
 - carry out OS hardening as and when required.
- (iv) Physical security and upkeep of the hardware/ software installed at the facility.
- (v) Any fault occurring in the Hardware/software shall be promptly notified to the purchaser.
- (vi) CWC officials or any person of the firms, who have supplied application and software for the hosting of the web site, authorised by the purchaser, shall be provided free access to the space where the application is hosted.
- (vii) Supplier shall provide minimum two internet leased line, one of at least 2Mbps (1:1) bandwidth, for both download and upload on 24X7 basis at the purchaser's office and upgrade the existing leased line from 2Mbps(1:1) bandwidth to 4 Mbps(1:1) bandwidth , for application hosted at sever farm.

14.3.2 Maintenance of Web Applications

- Maintaining of server and Web site application on 24x7x365 Basis
- Uptime requirement for Maintenance of Network and Infrastructure system will be minimum 99.0

14.3.3 Data Security

- The data to be stored in the system is property of the respective government agencies, as such the supplier will provide all necessary arrangement for keeping the data secure. All the data should be stored in encrypted format in hard disk for each IAs/States/UTs separately.

15.0 OVERVIEW OF THE KEY DELIVERABLES

Below are the Lists of the specific deliverables and reports expected from the supplier. All reports are to be delivered as digital document in office format to the purchaser's project manager for approval.

Table1
Outputs/deliverables/milestones

ITEM	Output/deliverable/milestone
1	A project implementation plan
2	Review of the e-SWIS database designs and the functionality
3	An overall system architecture
4	A detailed conceptual design
5	A detailed physical design
6	Standards for the interchange of data between Sensor devices and server.
7	Specifications / Detailed Information for the system hardware and software
8	A functional specification for the new modules
9	The new modules of eSWIS application
10	Training and operational acceptances of new modules of eSWIS.
11	Hosting and management of eSWIS on Internet
12	Training material in Hard Copy & soft copy to purchaser
13	Training
14	Developed e-ASWDC software alongwith database in CD/DVD/Hard Disc in three sets including manuals, software codes etc.
15	Hosting and management of new modules of eSWIS on Internet during AMC

16.0 Terms of Payment

- 16.1** The Supplier's request for payment shall be made to the Purchaser in writing, accompanied by an invoice describing, as appropriate, the System or Subsystem(s), Delivered, Pre-commissioned, Installed, and Operationally Accepted, and by documents submitted and upon fulfilment of other obligations stipulated in the Contract.
- 16.2** No payment made by the Purchaser herein shall be deemed to constitute acceptance by the Purchaser of the System or any Subsystem(s).
- 16.3** All payments shall be made in the Indian currency
- 16.4** **Ten percentages (10%)** of the Price of (C1) given in Cost Summary Table shall be paid against receipt of a claim accompanied by the Advance Payment Security. The advance payment shall be adjusted at the time of final payment of the Price of (C1) given in Cost Summary Table and Advance Payment Security shall be refunded.
- 16.5** **Ten percentages (10%)** of the Price of C1 after completion of Work Package-A i.e Foundation.
- 16.6** **Fifty percentages (50%)** of the Price of C1 after completion of Work Package-B and integration of complete system.
- 16.7** **Ten percentages (10%)** of the Price of C1 after completion of Work Package-C.
- 16.8** **Twenty percentages (20%)** of the Price of C1 after installation, testing and commissioning.
- 16.9** **Hundred percentage(100%)** of the Price of C2 after satisfactory completion of all the trainings. However, due to some reason if trainings could not be conducted due reason beyond the control of purchaser, the purchaser can make part payment on pro-rata basis for the number of training conducted by

the supplier.

- 16.10** The payment towards AMC i.e. C3 will be made on quarterly basis after satisfactory completion of the services, on submission and Purchaser's approval of invoices.

17.0 Performance Securities

- 17.1** The Supplier shall, within twenty-eight (28) days of the notification of Contract award, provide a security for the due performance of the Contract. The performance security shall be in Indian Rupees amounting to 10% of contract amount mentioned in Part-A and shall remain valid 3 month beyond the date acceptance of Package A, B & C.

- 17.2** The Supplier shall, within twenty-eight (28) days of the completion of Part-A, provide a security for the due performance of the Contract during the maintenance period. The performance security shall be in Indian Rupees

- 17.3** The security shall be in the form of bank guarantee in the specified format.

- 17.4** The security shall automatically become null and void once all the obligations of the Supplier under the Contract have been fulfilled, including, but not limited to, any obligations during the Maintenance Period and any extensions to the period. The security shall be returned to the Supplier no later than twenty-eight (28) days after its expiration.

18.0 Taxes and Duties

- 18.1** For Goods or Services supplied from outside the Purchaser's country, the Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside the Purchaser's country.

- 18.2** For Goods or Services supplied locally, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted Goods or Services to the Purchaser.

19.0 Intellectual Property

- 19.1** The Intellectual Property Rights in all Standard Software and Standard Materials shall remain vested in the owner of such rights.

- 19.2** The Purchaser agrees to restrict use, copying, or duplication of the Standard Software and Standard Materials, except that additional copies of Standard Materials may be made by the Purchaser for use within the scope of the project.

- 19.3** The Purchaser's contractual rights to use the Standard Software or elements of the Standard Software may not be assigned, licensed, or otherwise transferred voluntarily except in accordance with the relevant license agreement or as may be otherwise.

20.0 Confidential Information

The "Receiving Party" (either the Purchaser or the Supplier) shall keep confidential and shall not, without the written consent of the other party to this Contract ("the Disclosing Party"), divulge to any third party any documents, data, or other information of a confidential nature

("Confidential Information") connected with this Contract, and furnished directly or indirectly by the Disclosing Party prior to or during performance, or following termination, of this Contract.

21.0 IMPLEMENTATION SCHEDULE TABLE

Item No.	Subsystem / Item	Installation (weeks from Date Effective)	Acceptance (weeks from Date Effective)	Liquidated Damages Milestone
1	Start of contract			
	Commencement of work (= The Date Effective + the Period from 'Date Effective' to commencement of work))	4 weeks	1 week	No.
	Date by which the name of Project Manager must be given to the Supplier			
	Date by which the name of the Supplier's representative must be given to the Purchaser			
	Placement of software development team in National Surface Water Data Centre			
2	A Foundation Stage			
	Detailed project plan	9 weeks	13 week	No.
	Develop overall architecture and conceptual & physical design			
	Hardware and software specification recommendations Implement data interface			
3	B Development , Integration & Operationalization			
	<ul style="list-style-type: none"> • Analyze the requirements • Specify functionality and define formats and methods for Data Collection and transmission. • Develop new module of eSWIS software • Installation, commissioning and operationalization 	48 weeks	52 weeks	Yes
4	C Hosting and Maintenance	Upto 30.11-2024	Upto 30.11-2024	Yes
	Hosting of new modules on Internet			
5	Other activities			
	Training			

Note: The maintenance period of the new modules of eSWIS shall start after installation, testing, commissioning and acceptance of the system. The training will be conducted during maintenance

period.

22.0 Liquidated damages

If the Supplier fails to supply, install, commission, and achieve Operational Acceptance of the System (or Subsystems) within the time for achieving Operational Acceptance specified in the Implementation Schedule as specified above or the Agreed and Finalized Project Plan, or any extension of the time for achieving Operational Acceptance previously granted, the Supplier shall pay to the Purchaser liquidated damages at the rate 0.5 (half) percent per week as a percentage of the Contract Price, or the relevant part of the Contract Price if a Subsystem has not achieved Operational Acceptance. The aggregate amount of such liquidated damages shall in no event exceed the 10 (ten) percent of the Contract Price, or relevant part of the Contract Price if the liquidated damages apply to a Subsystem. Once the Maximum is reached, the Purchaser may consider termination of the Contract in pursuant to clauses given in this document.

23.0 Force Majeure

23.1 "Force Majeure" shall mean any event beyond the reasonable control of the Purchaser or of the Supplier, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected and shall include, without limitation, the following

- (a) war, hostilities, or warlike operations (whether a state of war be declared or not), invasion, act of foreign enemy, and civil war;
- (b) rebellion, revolution, insurrection, mutiny, usurpation of civil or military government, conspiracy, riot, civil commotion, and terrorist acts;
- (c) confiscation, nationalization, mobilization, commandeering or requisition by or under the order of any government or de jure or de facto authority or ruler, or any other act or failure to act of any local state or national government authority;
- (d) strike, sabotage, lockout, embargo, import restriction, port congestion, lack of usual means of public transportation and communication, industrial dispute, shipwreck, shortage or restriction of power supply, epidemics, quarantine, and plague;
- (e) earthquake, landslide, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone, hurricane, storm, lightning, or other inclement weather condition, nuclear and pressure waves, or other natural or physical disaster;
- (f) failure, by the Supplier, to obtain the necessary export permit(s) from the governments of the Country(s) of Origin of the Information Technologies or other Goods, or Supplier's Equipment provided that the Supplier has made all reasonable efforts to obtain the required export permit(s), including the exercise of due diligence in determining the eligibility of the System and all of its components for receipt of the necessary export permits.

23.2 If either party is prevented, hindered, or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances of the event of Force Majeure within fourteen (14) days after the occurrence of such event.

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- 23.3** The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered, or delayed. The Time for Achieving Operational Acceptance shall be extended for such period.
- 23.4** The party or parties affected by the event of Force Majeure shall use reasonable efforts to mitigate the effect of the event of Force Majeure upon its or their performance of the Contract and to fulfill its or their obligations under the Contract, but without prejudice to either party's right to terminate the Contract.
- 23.5** No delay or non-performance by either party to this Contract caused by the occurrence of any event of Force Majeure shall:
- (a) constitute a default or breach of the Contract;
 - (b) give rise to any claim for damages or additional cost or expense occasioned by the delay or non-performance,
- if, and to the extent that, such delay or non-performance is caused by the occurrence of an event of Force Majeure.
- 24.0 Extension of Time for Achieving Operational Acceptance**
- 24.1** The time(s) for achieving Operational Acceptance specified in the Schedule of Implementation shall be extended if the Supplier is delayed or impeded in the performance of any of its obligations under the Contract by reason of any of the following:
- (a) any Change in the System as provided in scope of work or project implementation plan;
 - (b) any occurrence of Force Majeure
 - (c) default of the Purchaser; or
 - (d) any other matter specifically mentioned in the Contract;
- by such period as shall be fair and reasonable in all the circumstances and as shall fairly reflect the delay or impediment sustained by the Supplier.
- 24.2** Except where otherwise specifically provided in the Contract, the Supplier shall submit to the Project Manager a notice of a claim for an extension of the time for achieving Operational Acceptance, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Purchaser and the Supplier shall agree upon the period of such extension.
- 25.0 Termination**
- 25.1 Termination for Purchaser's Convenience**
- 25.1.1** The Purchaser may at any time terminate the Contract for any reason by giving the Supplier a notice of termination that refers to this Clause 22.1.
- 25.1.2** Upon receipt of the notice of termination under Clause 22.1.1, the Supplier shall either as soon as reasonably practical or upon the date specified in the notice of termination

- (a) cease all further work, except for such work as the Purchaser may specify in the notice of termination for the sole purpose of protecting that part of the System already executed, or any work required to leave the site in a clean and safe condition;
- (b) terminate all subcontracts, except those to be assigned to the Purchaser pursuant to Clause 22.1.2 (d) (ii) below;
- (c) remove all Supplier's Equipment from the site, repatriate the Supplier's and its Subcontractors' personnel from the site, remove from the site any wreckage, rubbish, and debris of any kind;
- (d) in addition, the Supplier, subject to the payment specified in Clause 22.1.3, shall
 - (i) deliver to the Purchaser the parts of the System executed by the Supplier up to the date of termination;
 - (ii) to the extent legally possible, assign to the Purchaser all right, title, and benefit of the Supplier to the System, or Subsystem, as at the date of termination, and, as may be required by the Purchaser, in any subcontracts concluded between the Supplier and its Subcontractors;
 - (iii) deliver to the Purchaser all non-proprietary drawings, specifications, and other documents prepared by the Supplier or its Subcontractors as of the date of termination in connection with the System

25.1.3 In the event of termination of the Contract under Clause 22.1.1, the Purchaser shall pay to the Supplier the following amounts:

- (a) the Contract Price, properly attributable to the parts of the System executed by the Supplier as of the date of termination;
- (b) the costs reasonably incurred by the Supplier in the removal of the Supplier's Equipment from the site and in the repatriation of the Supplier's and its Subcontractors' personnel;
- (c) any amount to be paid by the Supplier to its Subcontractors in connection with the termination of any subcontracts, including any cancellation charges;
- (d) costs incurred by the Supplier in protecting the System and leaving the site in a clean and safe condition pursuant to Clause 22.1.2 (a); and
- (e) the cost of satisfying all other obligations, commitments, and claims that the Supplier may in good faith have undertaken with third parties in connection with the Contract and that are not covered by Clauses 22.1.3 (a) through (d) above.

25.2 Termination for Supplier's Default

25.2.1 The Purchaser, without prejudice to any other rights or remedies it may possess, may terminate the Contract forthwith in the following circumstances by giving a notice of termination and its reasons therefore to the Supplier, referring to this Clause 22.2:

- (a) if the Supplier becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the Supplier is a

corporation, a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), a receiver is appointed over any part of its undertaking or assets, or if the Supplier takes or suffers any other analogous action in consequence of debt;

- (b) if the Supplier assigns or transfers the Contract or any right or interest therein as per clause 23; or
- (c) if the Supplier, in the judgment of the Purchaser, has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices, in competing for or in executing the Contract, including but not limited to willful misrepresentation of facts concerning ownership of Intellectual Property Rights in, or proper authorization and/or licenses from the owner to offer, the hardware, software, or materials provided under this Contract.

For the purposes of this Clause:

- (i) "corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
- (ii) "fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
- (iii) "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
- (iv) "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
- (v) "obstructive practice" is
 - (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or
 - (bb) acts intended to materially impede the exercise of the Bank's inspection and audit rights.

25.2.2 If the Supplier:

- (a) has abandoned or repudiated the Contract;
- (b) has without valid reason failed to commence work on the System promptly;
- (c) persistently fails to execute the Contract in accordance with the Contract or persistently neglects to carry out its obligations under the Contract without just cause;
- (d) refuses or is unable to provide sufficient Materials, Services, or labor to execute and complete the System in the manner specified in the Agreed and Finalized Project Plan at rates of progress that give reasonable assurance to the Purchaser that the Supplier can attain Operational Acceptance of the System by the Time for Achieving

Operational Acceptance as extended;

then the Purchaser may, without prejudice to any other rights it may possess under the Contract, give a notice to the Supplier stating the nature of the default and requiring the Supplier to remedy the same. If the Supplier fails to remedy or to take steps to remedy the same within fourteen (14) days of its receipt of such notice, then the Purchaser may terminate the Contract forthwith by giving a notice of termination to the Supplier that refers to this Clause 22.2.

- 25.2.3** Upon receipt of the notice of termination under Clauses 22.2.1 or 22.2.2, the Supplier shall, either immediately or upon such date as is specified in the notice of termination:
- (a) cease all further work, except for such work as the Purchaser may specify in the notice of termination for the sole purpose of protecting that part of the System already executed or any work required to leave the site in a clean and safe condition;
 - (b) terminate all subcontracts, except those to be assigned to the Purchaser pursuant to Clause 22.2.3 (d) below;
 - (c) deliver to the Purchaser the parts of the System executed by the Supplier up to the date of termination;
 - (d) to the extent legally possible, assign to the Purchaser all right, title and benefit of the Supplier to the System or Subsystems as at the date of termination, and, as may be required by the Purchaser, in any subcontracts concluded between the Supplier and its Subcontractors;
 - (e) deliver to the Purchaser all drawings, specifications, and other documents prepared by the Supplier or its Subcontractors as at the date of termination in connection with the System.
- 25.2.4** The Purchaser may enter upon the site, expel the Supplier, and complete the System itself or by employing any third party. Upon completion of the System or at such earlier date as the Purchaser thinks appropriate, the Purchaser shall give notice to the Supplier that such Supplier's Equipment will be returned to the Supplier at or near the site and shall return such Supplier's Equipment to the Supplier in accordance with such notice. The Supplier shall thereafter without delay and at its cost remove or arrange removal of the same from the site.
- 25.2.5** Subject to Clause 22.2.6, the Supplier shall be entitled to be paid the Contract Price attributable to the portion of the System executed as at the date of termination and the costs, if any, incurred in protecting the System and in leaving the site in a clean and safe condition pursuant to Clause 22.2.3 (a). Any sums due the Purchaser from the Supplier accruing prior to the date of termination shall be deducted from the amount to be paid to the Supplier under this Contract.
- 25.2.6** If the Purchaser completes the System, the cost of completing the System by the Purchaser shall be determined. If the sum that the Supplier is entitled to be paid, pursuant to Clause 22.2.5, plus the reasonable costs incurred by the Purchaser in completing the System, exceeds the Contract Price, the Supplier shall be liable for such excess. If such excess is greater than the sums due the Supplier under Clause 22.2.5, the Supplier shall pay the balance to the Purchaser, and if such excess is less than the sums due

the Supplier under Clause 22.2.5, the Purchaser shall pay the balance to the Supplier. The Purchaser and the Supplier shall agree, in writing, on the computation described above and the manner in which any sums shall be paid.

25.3 Termination by Supplier

25.3.1 If:

- (a) the Purchaser has failed to pay the Supplier any sum due under the Contract within the specified period, has failed to approve any invoice or supporting documents without just cause, or commits a substantial breach of the Contract, the Supplier may give a notice to the Purchaser that requires payment of such sum, with interest on this sum, requires approval of such invoice or supporting documents, or specifies the breach and requires the Purchaser to remedy the same, as the case may be. If the Purchaser fails to pay such sum together with such interest, fails to approve such invoice or supporting documents or give its reasons for withholding such approval, fails to remedy the breach or take steps to remedy the breach within fourteen (14) days after receipt of the Supplier's notice; or
- (b) the Supplier is unable to carry out any of its obligations under the Contract for any reason attributable to the Purchaser, including but not limited to the Purchaser's failure to provide possession of or access to the site or other areas or failure to obtain any governmental permit necessary for the execution and/or completion of the System;

then the Supplier may give a notice to the Purchaser of such events, and if the Purchaser has failed to pay the outstanding sum, to approve the invoice or supporting documents, to give its reasons for withholding such approval, or to remedy the breach within twenty-eight (28) days of such notice, or if the Supplier is still unable to carry out any of its obligations under the Contract for any reason attributable to the Purchaser within twenty-eight (28) days of the said notice, the Supplier may by a further notice to the Purchaser referring to this Clause 22.3.1, forthwith terminate the Contract.

25.3.2 The Supplier may terminate the Contract immediately by giving a notice to the Purchaser to that effect, referring to this Clause 22.3.2, if the Purchaser becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, being a corporation, if a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), a receiver is appointed over any part of its undertaking or assets, or if the Purchaser takes or suffers any other analogous action in consequence of debt.

25.3.3 If the Contract is terminated under Clauses 22.3.1 or 22.3.2, then the Supplier shall immediately:

- (a) cease all further work, except for such work as may be necessary for the purpose of protecting that part of the System already executed, or any work required to leave the site in a clean and safe condition;
- (b) terminate all subcontracts, except those to be assigned to the Purchaser pursuant to Clause 22.3.3 (d) (ii);
- (c) remove all Supplier's Equipment from the site and repatriate the Supplier's and its Subcontractor's personnel from the site.
- (d) In addition, the Supplier, subject to the payment specified in Clause 22.3.4, shall:
 - (i) deliver to the Purchaser the parts of the System executed by the Supplier up to the date of termination;

- (ii) to the extent legally possible, assign to the Purchaser all right, title, and benefit of the Supplier to the System, or Subsystems, as of the date of termination, and, as may be required by the Purchaser, in any subcontracts concluded between the Supplier and its Subcontractors;
- (iii) to the extent legally possible, deliver to the Purchaser all drawings, specifications, and other documents prepared by the Supplier or its Subcontractors as of the date of termination in connection with the System.

25.3.4 If the Contract is terminated under Clauses 22.3.1 or 22.3.2, the Purchaser shall pay to the Supplier all payments specified in Clause 22.1.3 and reasonable compensation for all loss, except for loss of profit, or damage sustained by the Supplier arising out of, in connection with, or in consequence of such termination.

25.3.5 Termination by the Supplier pursuant to this Clause 22.3 is without prejudice to any other rights or remedies of the Supplier that may be exercised in lieu of or in addition to rights conferred by Clause 22.3.

25.4 In this Clause 22, the expression “portion of the System executed” shall include all work executed, Services provided, and all Information Technologies, or other Goods acquired (or subject to a legally binding obligation to purchase) by the Supplier and used or intended to be used for the purpose of the System, up to and including the date of termination.

25.5 In this Clause 22, in calculating any monies due from the Purchaser to the Supplier, account shall be taken of any sum previously paid by the Purchaser to the Supplier under the Contract, including any advance payment paid pursuant to the SCC.

26.0 Assignment

Neither the Purchaser nor the Supplier shall, without the express prior written consent of the other, assign to any third party the Contract or any part thereof, or any right, benefit, obligation, or interest therein or thereunder, except that the Supplier shall be entitled to assign either absolutely or by way of charge any monies due and payable to it or that may become due and payable to it under the Contract.

27.0 Trainings

The supplier shall provide the following mandatory trainings for eSWIS software which shall include the new modules of eSWIS software

27.1 Users Training

The supplier MUST provide the 15 training courses of 5 days each for the users of Central Water Commission and other Implementation agencies of National Hydrology Project covering following aspect.

- a. Data entry applications for all the modules of eSWIS including new developed modules.
- b. Secondary validation applications
- c. Flood Forecasting Application
- d. All Web application modules
- e. System Management, security management, data backup procedures and Customization of eSWIS etc.

27.2 Training of Trainers

The supplier MUST provide the 10 Training of Trainers courses of 10 days each for the users of Central Water Commission and other Implementation agencies of National Hydrology Project covering aspect indicated in clause 27.1.

27.3 All the logistics for the trainings including class room, fooding and lodging, sufficient number of computers with internet connections shall be arranged by the purchaser/ Implementation agencies of National Hydrology Project.

27.4 For the users training the number of participant shall be 20-25, while for training of trainers the number of participant shall be 15-20.

27.5 The venue of training shall be National Surface Water Data Centre, New Delhi/National Water Academy, Pune/ Data Centres of Implementation agencies of National Hydrology Project/ NIH, Roorkee. However, at present the list of venue is tentative and shall be finalized as per requirement of various users.

27.6 The supplier MUST provide the following material for the courses, with copies as appropriate for each participant

- Lecture notes
- Worked examples for hands on sessions
- Presentation materials
- Interactive E-learning material including audio and video.

Before finalization of material for participants of training the supplier shall submit the material to purchaser for its approval.

27.7 The supplier shall develop the interactive e-learning course/modules for training purposes and shall float its web application for all the users at least 2 times a year. The supplier shall also update them time to time as per change/ upgradation in eSWIS software.

27.8 All the logistic arrangement for the supplier's personnel who are engaged for imparting training shall be borne by supplier. This shall include travel, boarding and lodging expanses.

27.9 The supplier shall also quote the per course rate for the above trainings as an option. So that during the maintenance period purchaser/ implementing agencies can opt for these courses on payment basis.

28.0 Price Schedule

S. No	Item/Description	Amount in INR In Figure	Amount in INR in Words
1	Development of new modules of eSWIS software, Creation of database for all IAs/States/UTs and its successful installation, commissioning as per scope of contract (C1)		
2	Hosting and upgrading/ providing leased internet connection & GSM/GPRS modems (C1)		
3	Cloud storage for hosting of new modules of eSWIS software (C1)		
	Total Cost of Component (C1)		
3	Trainings (Mandatory) (C2)		
a)	Users Training including TA/DA of faculty members (15 Courses)		
b)	Training of Trainers including TA/DA of faculty members (10 courses)		
	Total Training Cost (C2)		
4	Maintenance of new modules of eSWIS (C3)		
a)	Year 1		
b)	Year 2		
c)	Year 3		
d)	Year 4		
e)	Year 5		
f)	Year 6		
g)	Year 7 (upto 30-11-2024)		
	Total Maintenance Cost (C3)		
	Grand Total (to Bid Submission Form) (C1+C2+C3)		
5	Trainings (optional) (C4)		
	Users Training including TA/DA of faculty members (per Course)		
	Training of Trainers including TA/DA of faculty members (per course)		

Name of Bidder:	
Authorized Signature of Bidder:	

