

TERMS OF REFERENCE

FOR

**IMPLEMENTING AND COMMISSIONING OF
DEVELOPMENT OF PUBLIC WEB SERVICE
(INTEGRATED WEB PORTAL) FOR DHM**

**CONTRACT NO:
BRCH/DHM/S/CQS-56**

May, 2018

Kathmandu, Nepal

1. Background of the assignment

This Terms of Reference (ToR) is for a Consulting firm (hereafter Consultant) to modernize the DHM web pages taking into account the needs of various customer groups.

The BRCH project, signed on April 30, 2013 between the Government of Nepal and the World Bank, aims to transition Nepal's hydro-meteorological services into a modern service-oriented system that will build resilience today as well as adaptive capacity for the future. It intends to enhance government capacity to mitigate climate related hazards by improving the accuracy and timeliness of weather and flood forecasts and warnings for climate-vulnerable communities. The project will also support agricultural management information system services (AMIS) to help farmers mitigate climate-related production risks. By strengthening hydro-meteorological data and services, the BRCH project is also likely to benefit a number of different sectors including hydropower, aviation, disaster risk management and water resources management.

The project comprises four components:

- A. Institutional strengthening, capacity building and implementation support of DHM;
- B. Modernization of observation networks and forecasting;
- C. Enhancement of the service delivery system of DHM; and
- D. Creation of an agriculture management information system (AMIS).

Communications such as displaying hydro-meteorological service products online is part of components C. and D.

In the BRCH project, a modern hydro-meteorological observation network is being established and both new meteorological and hydrological observation instruments are being purchased. A relational data base system will be established for all observation station data including automated and human Quality Control (QC). Additional observation systems include a calibration laboratory, one upper air sounding station, lightning detection network and weather radar. Also the ICT infrastructure will be enhanced to enable fast data ingest and processing increasing the resolution and decreasing the run time of the Numerical Weather Prediction (NWP) model and transfer data between the DHM HQ, data center, regional units and airports.

An important part of the BRCH project is to expand and strengthen the operative weather forecasting in DHM. Situational monitoring and forecasting services will be equipped with modern production tools such as meteorological workstations and a TV presentation system allowing daily presence of DHM in the Media (TV, Internet & Social Media). Establishment of automated product generation will allow real time update and display all information online on the DHM's web pages and various mobile devices.

2. Objective of the assignment

The objective of the assignment is to provide DHM with a modern website presenting up-to-date hydrological, weather and climate data and products, and information about DHM as an organization. The website should be lightweight and responsive i.e. adaptive to various mobile platforms with different sizes of displays and suitable for viewing under slow network connections. The web-site should take into account Nepal's local characteristics, needs of major user groups, user experience and expectations, internet and mobile service coverage and local language norms. Overall, the modernized DHM web-site is expected increase usage of DHM online services, increase DHM's visibility and provide added value to the users.

The specific objectives can be categorized in terms of the following five design principles: user expectations, high quality content, active management, efficient production and clearly identified mutual benefits for DHM and the website users.

3. Scope of Work

3.1 General requirements for the contents of the modernized DHM Web site

The website should contain static information about DHM's as an organization; its mission and functions, and more dynamic information on weather and hydrological services. The static part should contain contact details, latest news, list of projects and their descriptions, podcasts and/or other regularly updated content,

The service products contain past, present and future state of the atmosphere and rivers ready-made by the automated product generation process or as controlled by the duty DHM staff. The past-time information contains time series and statistical data on observations, shown e.g. as tables, graphs and maps. The present (situational) information contains real-time observations provided by the various observation systems such as hydrological and meteorological surface and lightning detection networks, upper-air sounding stations, weather radar and satellites. This data is also analysed by numerical models to provide situational analyses displayed over maps with different spatial scales.

The most used information of weather services are the short, medium and long-range weather forecasts, and climate outlooks. DHM also provides various weather and hydrological warnings such as flood warnings. It is common to illustrate the development of weather using animated series of weather radar fields on precipitation intensity, accumulated lightning strokes and numerically produced forecasts over a map background.

The situational content will be made available to the web developer as ready-made charts, graphs maps, tables, meteograms, bulletins, live videos and animations, to be organized on the web site in a logical way in coordination by the with DHM .

The website should contain an option for password protected services for dedicated

customer groups such as aviation sector, hydro power companies government departments and ministries, etc. These services are envisaged to emerge gradually as DHM will establish customer liaison persons and provision of tailored products with the specialized user groups. The consultant shall coordinate with DHM and the BRCH System Integrator (SI) in terms of the content included the public part and the envisaged password protected parts of the website.

The consultant shall provide a smooth transition from the present web site to the new website by providing a link with DHM's Database Management System to display Satellite, RADAR, Radiosonde, NWP forecasts and forecasts and other products moderated by the meteorologists and hydrologists.

The consultant should also adapt the various existing DHM's web-services such as for Hydrology and Meteorological Forecast Division with the new design to produce one harmonized web portal.

The web-site should be available both in Nepalese and English language.

3.2 Quality and capacity requirements

The new website should be fast and reliable, user friendly with potential for further development. The information content related to DHM organization and its functions is static by nature and has much less demand, whereas weather and hydrological information can receive a large amount of requests e.g. during the monsoon period as well as in winter. The website should have capacity to handle large amounts of simultaneous requests which in practice requires cache deployment in various parts of the service. Special care should be taken to design the website so that it will operate smoothly with different web browsers and mobile devices. The content must be responsive i.e. adaptive to different sizes of displays, and key products should be viewable even under slow network connection.

The hydro-meteorological service products, such as observations and forecasts should give the user a conception of the weather and climate conditions in various spatial scales from regional to local and temporal scales from past to future, by following the specifications to be given by the DHM experts.

Further quality requirements for the new web-site:

- Link with DHM's Database Management System to display Satellite, RADAR, Radiosonde, NWP, forecasts and other information as required by DHM.
- Integrate various existing DHM's web-services such as for Hydrology and Meteorological Forecast Division with the new design to produce one harmonized web portal

User expectations:

- Online service is available in various technical platforms such as mobile phones,

computers, tablets, etc., preferably with “mobile first” thinking

- Upfront near the user’s entry point to the Website, the user should be able to access the DHM Facebook, Twitter, email and other social media forums as requested by DHM
- Service can be used with any reasonably new web browser (Chrome, Edge, IE, Safari, Firefox)
- Service has a sense of reliability and safety
- Service is fast and reliable and can be used even with slow internet connection
- Navigating and finding information is easy
- Links are descriptive and functional
- User interface is clear, uniform and sensible
- Content is reliable, up to date and clear

High quality content:

- Structure is organized appropriately
- Content is reliable and up to date
- Text formatted content is sensible and legible
- Active management:
- Web service supports the strategy and the goals of the organization
- Legislation concerning web service has been clarified and taken into account
- Web service is managed

Efficient production:

- User groups, user needs and operative scene are fully recognized
- Content development and production is done in an organized manner
- Development and management is controlled

Mutual benefits:

- Web service benefits the organization
- Web service provides added value to the user

3.3 The work process

The work is started by reviewing and assessing the existing DHM web-site and its sub-components to decide how much of the existing content should be retained or benefited in the design of the modernized site. The consultant will also perform a benchmark analysis on a few web-sites operated by advanced National Meteorological and Hydrological Organizations as

recommended by DHM. A third evaluation must focus on the potential ICT capacity needed for the modernized DHM web platform in terms of volume of products and expected user load.

The assessment phase is followed by a detailed requirement analysis which will provide input for a proposed technical solution. The requirement analysis shall include all the aspects of design including, but not limited to technical platform, plugins for different kind of content, cache mechanisms, browser compatibility, content categories, website layout etc. The solution shall be accepted by DHM and SI before the actual development and implementation work can begin.

The development and implementation phase includes all software components and providing input to ICT to implement suitable (virtual) hardware systems and network design. Moreover, this phase includes close collaboration with the data management team for providing layout and other design parameters for development of hydro-meteorological products such as images, texts, animations etc. to be published on the website.

The development shall be done by applying the so called Scrum/Agile methodology¹ to ensure rapid development cycles and feedback from DHM and SI during the development phase.

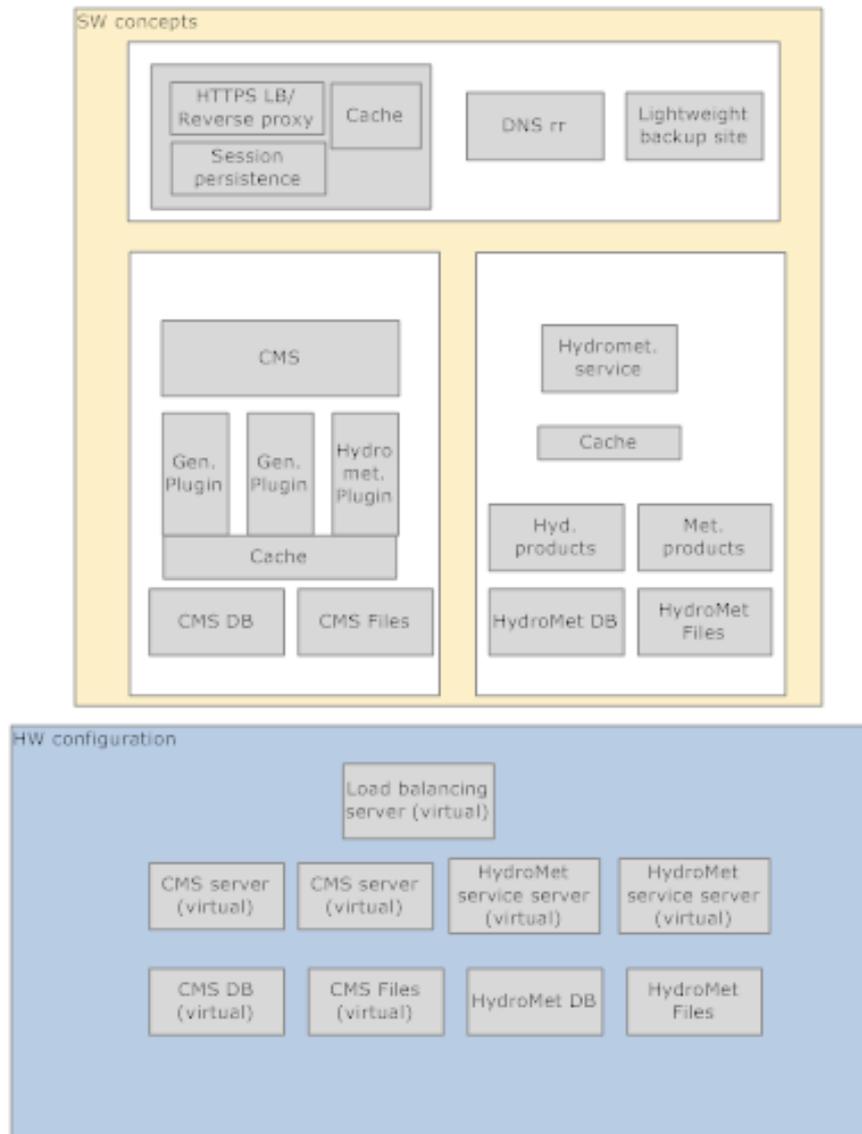
After successful acceptance of the new service, the consultant shall provide user training for DHM staff participating in the content management process. The consultant shall provide technical support for a 24 months period starting from the day of acceptance.

3.4 Technical design requirements

The website design shall follow the generic design concept presented in Figure 1 with the following main principles and components:

- The website shall follow multi-service layer approach, where load balancing (HTTP LB) is logically separated from the content management systems (CMS) and dynamic hydro-meteorological content service. For Domain Name Service (DNS) a round robin can be used where suitable. Load balancing system should have a mechanism to cache frequent requests; say radar images for at least few minutes to minimize the workload to the CMS and hydro-meteorological backend.

¹<https://www.cprime.com/resources/what-is-agile-what-is-scrum/>



• Figure 1. Principle structure of a typical web site design.

- A light weight backup site providing minimum critical information and products should be included and it should be independent of CMS and dynamic hydro-meteorological content service. All content should fit into load-balancer cache so that operations are guaranteed with all workloads.
- Content management system should be based on a widely used open source software developed in PHP, Python or Ruby and should have a modular structure that is extensible with plugins. Examples of such CMS are Drupal and Word press. There should be a possibility to implement caching on this part of the system.
- Hydro-meteorological content that is typically graphs, images, animations, texts etc. shall be provided from another backend, typically a lightweight HTTP server such as

Nginx. This component should also have a caching mechanism to minimize load to filesystems and databases.

- The website shall also contain functionality to launch an opinion poll or questionnaire for users, feedback to express their satisfaction on DHM services. A pilot scheme for the poll will be provided and to assist the programming of the poll. The poll should process the data automatically according to specifications to be developed with DHM.
- At hardware level the website shall be based on the VMware virtualization platform procured in the BRCH project. Separate virtual servers shall be created for different components as appropriate.

3.4 Specific Tasks of the consultancy

The Tasks of the Consultant are summarized as follows:

Task 1. Technical evaluation of existing DHM public website and benchmarking a few existing sites operated by advanced NMHSs.

Task 2. Detailed requirement analysis

Task 3. Proposal of the design and technical solution

Task 4. Development and implementation of the web service based on the approved technical solution including plugins to present hydro-meteorological products.

Task 5. Comprehensive user training for DHM staff participating in the content management process planning and testing Web pages

Task 6. System performance tests.

Task 7. Technical support during 24 months for up-keeping and fine-tuning of the website and its components as found necessary.

The contents of the Tasks and associated deliverables are described as follows:

Task 1: Technical evaluation of existing DHM public website and benchmarking a few existing sites operated by advanced NMHSs

Task 1a. The work is started by reviewing and assessing the existing DHM web-site and its sub-components to decide how much of the existing content should be retained or benefited in the design of the modernized site. The technical evaluation shall be a compact, high-level analysis focusing on the strengths and weaknesses of existing DHM public websites www.dhm.gov.np, www.mfd.gov.np and www.hydrology.gov.np from the viewpoint of user experience, published content, technical feasibility for re-use of site components, ease of expansion with new content plugins, technical scalability for serving larger number of users and the CMS lifecycle phase and potential for re-use. This information will be used together with requirement analysis to produce technical solution for the new website.

Task 1b. The consultant will also perform a benchmark analysis on a few web-sites operated by advanced National Meteorological and Hydrological Organizations recommended by DHM.

Task 1c. A third evaluation must focus on the potential ICT capacity needed in terms of the expected volume of and required functionality of the contents and expected demand from user side.

Deliverable: Assessment report to be inserted as part of the 1st Intermediate report

Task 2. Detailed requirement analysis

The consultant shall produce, in consultation with DHM and SI, a multi-level requirement analysis of the new DHM public website. The analysis shall include at least (but not limited to) technical requirements, functional requirements, content and content management requirements, hydro-meteorological content requirements, and other miscellaneous requirements such as CMS lifecycle and accessibility considerations for special user groups. All requirements shall be categorized as “necessary” or “optional” depending on the priority. A preliminary list of requirements is given in Appendix 1.

Deliverable: Requirement analysis on the public web site to be inserted as part of the 1st intermediate report

Task 3. Proposal of the design and technical solution

The consultant shall propose a detailed technical solution and development plan for all mandatory requirements. The development plan for optional requirements can be limited to estimation of the required development resources. Technical solution shall include all software and hardware components required in the implementation such as CMS, off-the-shelf plugins to be used, description of the plugins to be developed, database and file share for CMS, database and file-share for hydro-meteorological products, load balancing/reverse proxy solution, server side caching mechanisms, web servers, database(s) and file-share(s). The plan shall be based on Scrum/Agile development for all components with sprint schedule and description of working methods (backlog, user stories and tasks). Access to data should be built in such way that any high load peaks in the website will not result in any kind of deterioration of service of observation databases or generic file-shares.

Deliverable: Development plan and technical solutions to be inserted as part of the 1st Intermediate report

Task 4. Development and implementation of the web service based on the approved technical solution including plugins to present hydro-meteorological products

After approval of the technical solution, the consultant shall start developing all software components. Hardware components can be assumed to be provided from the project’s generic

ICT infrastructure being implemented in by another consulting team. The Consultant shall work in close collaboration with this data management system development team and other production system suppliers². These teams will provide the needed data in order to provide input for the development of hydro-meteorological products to be delivered develop suitable plugins for presenting various types of weather, climate and hydrological information.

Deliverables:

- A series of pilot web site versions converging through the agile development to ready-made, tested and approved web site.
- A detail technical report on the operations/structure/software used/languages/platforms of the website to be inserted as part of the 2nd Intermediate report

Task 5. Comprehensive user training for DHM staff participating in the content management Web pages

Task 5a. The consultant shall train those DHM staff that will be responsible for providing information/content for the web site about DHM's organizational functions; e.g. articles, news releases, blogs, intranet announcements etc. Additionally the consultant shall train the web-site administrators to operate the website and to update content.

Task 5b. A detailed training plan must be included as part of the 1st intermediate report. The training plan shall include an outline of training topics with list of target measures for the training, level of training with definition of the minimum qualification for participants and schedule of training sessions

Task 5c. The Consultant is responsible for the salaries of the training instructors and provision of all training materials stationery, media, etc. The costs of travel, transportation and per diem for the trainees shall be borne by the Purchaser. The venue for the training shall be decided mutually by the Consultant and the Purchaser and provided by the Purchaser.

Task 5d. It is expected that training will occur at the training facility at DHM, Kathmandu, Nepal or at a facility in Kathmandu designated by DHM.

Task 5e. Training material: The consultant is required to provide all training material in an appropriate electronic format (.doc, .ppt, .xls, or pdf, etc.) organized as per training topic.

² In addition to the team developing the basic data management procedures, situational web content will be made available from the meteorological workstation and TV weather presentation systems. Associated system suppliers and SI will be made available to assist in specifying the formats, volume and the use cases of these data and products.

The training sessions/presentations shall also be provided as a set of media files (Windows Media Player Compatible) as per topic of training. The media training is expected to have the complete perspective of actually attending training, including a live trainer providing the training and questions and answers. DHM shall have permission to make copies of the files on an unlimited basis.

Specification of Training courses		
The competency target for trainees is indicated below for each course.		
Topic of Training and Competency target	Trainees and number of training days	Number of repeated courses
<p>Training Course for DHM staff to insert data products and information to the static part of the public web site</p> <p>The trainees should learn how to prepare and insert information on the static part of the DHM public web-site</p>	<p>DHM staff</p> <p>1 course for max 5 days for 6 persons</p>	1
<p>Training course for web site Administrators</p> <p>The trainees should learn how to administrate the public web pages and password protected web-sites, update situational content and operate the opinion poll/satisfaction survey tool.</p>	<p>DHM web-site Administrators</p> <p>1 course for max 5 days for 6 persons</p>	1

Deliverable: Report on the results of training inserted as part of the Final report, including (but not limited to) :

- List of participant names, titles, and email address
- Evaluation of training using an inquiry template (to be provided)
- Training material(see requirements above)

Task 6. System performance tests

The consultant shall provide a comprehensive testing plan for the public web site, and the intranet with the following contents as applicable:

- Technical redundancy tests for all components so that website continues operations should another hypervisor fail.
- Performance tests for CMS and Hydro-meteorological content service with an artificial benchmark that estimates the maximum number of HTTP request that can be served from the platform. The benchmark should reflect real usage patterns of the website as closely as possible.
- Verification tests for HTTP-header modification and cache functionality closely related to the performance tests above.
- Functionality tests for all components and plugins applied.

Deliverable: Test results summarized in the Final report

Task 7. Technical support during 24 months for up-keeping and fine-tuning of the website and its components as found necessary

After completion of the system performance tests and approval of the Web-site the consultant will continue part time to monitor web-site performance and repair found deficiencies.

Deliverable: The consultant will provide monthly statistics on the usage of the site.

4. Guidance, Supervision and Quality Assurance

Main activities and deliverables including software, designs, output visualizations and setup will be subject to supervision and quality assurance by DHM and/or the System Integrator (SI) at various stages. In all matters, the Consultant will work in close consultation with Project Management Unit (PMU), SI and DHM. The Consultant can get technical support and guidance from SI when needed during the period of implementation. In addition the Consultant will hold:

- Kick off meeting shall be organized with DHM, SI and the Consultant before start of work
- Regular consultation meetings at least every two weeks or as necessary with the DHM, PMU, and SI when available. Video conferencing can be used whenever the SI expert is available remotely.
- Progress meetings to present the intermediate and final results after submission of each associated progress report

5. Client's Commitments (Inputs)

DHM will nominate a focal person to establish coordination between the consultant, DHM, PMU and SI.

Staff of DHM/PMU will facilitate basic administrative support as well as any needed guidance in the project for the consultant. DHM will also provide office facility, as necessary and access to web and relevant DHM servers.

At the request of the Consultant, DHM will provide the following services and material:

- Needed information and data on content of the renewed website, available ICT resources any related information.
- Related administrative documents to support the activities.
- Related parts of the Project Appraisal Document (PAD), reports of missions and other relevant publications related to this consulting service.

6. Consultant's Obligation

The Consultant team shall consist of local experts from Nepal. Consultant is expected to fully complete all the tasks as mentioned in the **Scope of Work**. The Consultant is expected to be fully self-sufficient in terms of travel, transport and accommodation.

The Consultant should provide all software code, software documentation and associated scripts as well as training to DHM staff as specified. The Consultant shall execute the work in close consultation with DHM staff and System Integrator (SI) Teams.

As a result of the System Tests the Consultant shall fully assure DHM, SI and PMU that the renewed web-portal is functioning well and smoothly, and complying with the objectives of the ToR.

7. Qualification and Experience Requirements of the Consultant firm and key experts

7.1 The Consultant firm

- Company standing of at least 5 years is required; More years is considered as an advantage.
- The Company shall present at least 2 (two) references on delivering solutions similar in nature, size and complexity than described in this ToR. More references are considered as an advantage

The Consultant firm should consist at minimum of a Project Manager assisted by a Software Developer and a Graphical Designer as Key Experts. More experts can be assigned if necessary to cover the mandatory qualifications and experience.

Total effective work time allocated for the project is 14 months. The given work months can be assigned to 3 or more experts meeting the qualification requirements below.

The consulting firm must provide cumulative³ documentary evidence of having ample experience in:

- Project management;
- Developing user friendly and responsive website design;
- Developing high-performance dynamic websites;
- Tuning web-service performance, including: deployed caching mechanisms, http-header manipulations and load balancing solutions; and
- Developing Web-sites which are similar in nature, size and complexity as specified in this ToR.

All proposed experts must be fluent in both spoken and written English. At least one team member shall be fluent in Nepalese. One expert of the team shall be assigned the responsibility as a Scrum Master.

The Consulting firm must provide CVs of experts, references on assignments/projects and statements of clients' satisfaction to meet the experience and qualification requirements detailed above.

7.2 Experience and Qualification requirements of the key experts

7.1.1 Project Manager (4 month)

- At least Bachelor's degree or equivalent degree in software engineering. Higher Degree is considered as an advantage
- Minimum 5 years of experience in assignments/projects on web service development; more years are considered as advantage
- At least 1 references on completion of assignments/projects similar in nature, size and complexity as specified in this ToR; more assignments are considered as an advantage

7.1.2 Software Developer (5 months)

- Completed studies in software engineering; degrees in software engineering or Academic degree(s) are considered as an advantage.
- Minimum 3 yrs. of experience in software engineering/development; more years are considered as advantage
- Reference(s) of at least 1 completion of assignment(s)/project(s,) similar in nature, size and

³ 'Cumulative' means here that clear evidence of each requirement listed is found in at least one of the CV's or other documents provided

complexity as specified in this ToR; more assignments are considered as an advantage

7.1.3 Graphical Designer (5 months)

- Completed studies in software engineering, graphical design or similar field; higher Degrees are considered as an advantage
- Minimum 3 yrs. of experience in software engineering/graphical design; more years are considered as advantage
- Reference(s) of at least 1 completion of assignment(s)/project(s,) similar in nature, size and complexity as specified in this ToR; more assignments are considered as an advantage

8. Reporting

Reporting requirements are be as follows:

Inception Report (due after 1 month from contract signing)

The report will be based on elaborated discussions with DHM, PMU and SI. The Consultant shall review and verify the content of the tasks and specifications. Specifically, the Consultant shall review the ToR to identify gaps and make specifications of services necessary for filling task and requirement gaps in implementation of Web-sites. The Consultant will also elaborate on: (i) work and staffing plans, and (ii) reporting modalities. The report must also clearly specify all risks and issues, which may negatively affect project deadlines and effective execution of project activities (See Scope of work and Tasks)

1stIntermediate Report (due after 4 months from contract signing)

The report will summarize the work done covering Tasks 1-3, i.e., cover respective deliverables and results such as benchmarking, assessment of existing web sites, requirement analyses and the development plan, technical solutions and preliminary training plan. The report identifies and justifies possible changes needed to the project plan set in the Inception report. Proposed changes will be evaluated by DHM, PMU and SI.

2nd Intermediate Report (due after 8 months from contract signing)

The report shall summarize the Web-site development (including the steps of interactive agile method applied; including deliverables of task 4) and progress of system and implementation so far, also identifying and justifying possible changes to the development plan. Possible changes will be evaluated and accepted or rejected by DHM, PMU and SI. The report shall also include a detailed plan for the last phase on monitoring of the system performance.

Final report (Due after 12 months from contract signing)

The Consultant shall submit the Draft Final report after 12 months of contract signing. The report shall consist of a concise summary of the web-site design, technical solutions including results of system tests and training.

All reports are to be submitted with 3 hard copies along with e-copies.

9. Time Schedule and Deliverables

Table 1. Tasks, schedule of assignments, effective work time and deliverables

Task #	Description of assignment	Completion in Months⁴	Effective work Months	Deliverables
	Project planning	1	4	Inception report
1	Task 1: Technical evaluation of existing DHM public website and benchmarking a few existing sites operated by advanced NMHSs	1		As required
2	Detailed requirement analysis	2		As required
3	Proposal of the design and technical solution	4		1 st Intermediate report
4	Development and implementation of the web service based on the approved technical solution including plugins to present hydro-meteorological products	8	6	2 nd Intermediate report
5a	Training Course for DHM staff to insert data and products and information to the static part of the web site	11	1	As required
5b	Training course for web site Administrators	11		As required

⁴ from contract signing

Task #	Description of assignment	Completion in Months⁴	Effective work Months	Deliverables
6	System performance tests	12	0,5	Final report
7	Technical support during 12 months after project completion for up-keeping and fine-tuning of the website and its components as found necessary.	24	2.5	As required
Total of effective work months:			14	

10. Payment

- 1) 10 percent on signing of contract as advance against a bank guarantee.
- 2) 10 percent after submission and approval of the Inception Report,
- 3) 30 percent after completion of Tasks 1-3 and approval of the 1st intermediate report.
- 4) 30 percent after completion of Task 4 and approval of the 2nd Intermediate report.
- 5) 20 percent after completion of Tasks 5-6 and approval of the Final report

11. Duration of service

The time span of the service will be in total 12 months for system development and another 12 months for system monitoring and fixing deficiencies. The time estimates are given in Ch. 8, Table 1 above.

12. Selection procedure and form of contract

The consultant shall be selected on the basis of Consultant's Qualification Selection (CQS) method and consistent with the World Bank's Consultant Selection Guideline, 2011, and on the basis of required qualifications and related experiences.

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Appendix 1.

<p>Example of requirements breakdown for the DHM public website To be filled in by the Consultant as part of Task 2.</p>			
Priorities			
1=Must have			
2=Optional			
TR=technical requirements			
FR=functional requirements			
CR=content and content management requirements			
MR=Hydro-meteorological product requirements			
OR=other requirements			
Id	Requirement	Priority	Notes by Consultant
TR Technical requirements			
TR1	Service level		
TR1.1			
TR1.2			
TR2	Modular Content management system (CMS)		
TR2.1	The CMS must extensible with modules/plugins/extensions		
TR2.2	The CMS must run on Linux platform		

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TR2.3	The CMS must be opensource software		
TR2.4	The CMS must be developed on PHP, Python or Ruby		
TR2.4	TheCMS must support Postgresql backend		
TR3	Hardware		
TR3.1	All the component of the website must support virtual hardware		
TR4	Dynamic content		
TR5	Technical suggestions		
TR6	ICT security		
TR6.1	All traffic to the website is with TLS (HTTPS)	1	
TR6.2	Access to website content management tool is password protected.		
TR6.3	The website must have prevention mechanisms against SQL injections deployed		
TR6.4	The website files must have minimum permissions		
FR Functional requirements			
FR1	The website must have a clear structure and easy navigation between sections		
FR1.1	The website must have a dynamically updating navigation menu	1	

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FR1.2	The navigation must be able to show page hierarchy up to three levels	1	
FR2	The website is used to publish press releases, of which the latest are shown in the front page. Press releases are archived in the website on yearly basis.		
FR2.1	Press releases must be available as RSS/Atom feeds		
FR2.2	Press releases must be integrated to social media		
FR2.3	The press release publish process must have an automated scheduling with one hour resolution		
FR3	The website must support multi-language content		
FR4	Social media integration		
FR4.1			
FR5	The website must have an advertisement banner either for DHM or commercial advertisements		
FR5.1	Automatic scheduling of advertisements		
FR6	User feedback component		
FR6.1	The feedback component must automatically recognize user http headers (f ex browser identification) and add those to the feedback		
FR7	The website search engine		

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FR7.1	The search function must be available on all pages		
FR7.2	The search must have the whole website indexed		
FR7.3	The search must support various static and dynamic contents		
FR8	Event calendar		
FR8.1	The website must have an event calendar for project meetings, public events etc.		
FR 9	Video/TV/podcast content		
FR9.1	Video/TV/podcast content as an iframe or similar from Youtube or other 3rd party service		
FR10	Fallback site		
CR Content and content management requirements			
CR1	Role-based content management		
CR1.1			
CR2	Version control		
CR3.1	Graphical design and layout		
CR3.1	Website layout independent of content		
CR3.2	Website design must be with CSS		
CR3.3	Website layout templates managed from the content management system		
CR3.4	Website management tool must support building and modifying layout		

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	templates		
CR3.5	The website must have a responsive, "mobile-first" template		
CR4	HTML and WYSIWYG		
CR4.1	The content management tool must have a 'wysiwyg' interface		
CR4.2	The content management tool must have a HTML interface		
CR4.3	The HTML interface usage is limited by roles		
CR5	Scheduling		
CR6	Versatile published content		
CR6.1	Content management tool must support : headlines, metadata, leads, text, images, video, voice, links, attachments, charts, tables, lists		
CR6.2			
CR7	Ease of content management		
MR Hydro-meteorological product requirements			
MR1	<content to be inserted as the data and products become available>		
MR2			
OR Other requirements			

Implementing and commissioning of Public Web Service for DHM

OR1	Technical documentation		
OR2	User training		
OR3	Website technical support		
OR4	Accessibility		
OR5	Website lifecycle		