

**GOVERNMENT OF INDIA
BHABHA ATOMIC RESEARCH CENTRE
HEALTH PHYSICS DIVISION**

Ref : BARC/HPD/RPS(NF)/RAL/2017/1127 a

Oct. 31, 2017


**Sub.: Fabrication of barcode system and associated software for
Environmental Sample Inventory System**

Sealed quotations are hereby invited for the aforementioned work for which detailed specifications / descriptions are given in Annexure-1. You are requested to submit your sealed quotation by 27.11.2017 before 13.00 hrs. The same will be opened on the same day at 15.30 hrs. Please note that the standard terms and conditions of the contract applicable to the work should be acceptable and no deviation will be allowed. The time allowed for completion of the above work is 3 months from the issue of the work order.

The quotation in sealed envelop should be addressed to :

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Thanking you,


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Encl.: As above

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Technical Specifications of the Fabrication of barcode system and associated software for Environmental Sample Inventory System

1. Technical Specifications of the server – 1 no.

The proposed server will come with redundancy for power supply, Raid 1 preconfigured for data security. This server has been custom designed keeping in mind the compatibility of the Software, Barcode Printer, Barcode Reader and Future Expansion. The server will take back up of the every week and save the file in the second hard disk.

1. Dual Socket Capable Tower Server
2. 1 x Intel Xeon E5-2620v3 (2.4GHz/6-core/15MB/85W)
3. 1 x 16GB DDR4 RAM (Upto 12 DIMMS)
4. 2 x 1TB Hot Plug HDD 2.5" 10k RPM
5. RAID 0,1,5 (H330)
6. DVD Writer
7. 2 x RPS 495W
8. Keyboard, Mouse, Monitor of 23 inch
9. Windows 10 Operating System and Adobe Professional Writer

2. Technical Specifications Barcode Printer – 2 nos.

1. Processor : 2.26 GHz Qualcomm Snapdragon 801
2. Max Ribbon Diameter : 68 mm
3. Ribbon width : 25.4mm - 102.9mm
4. Print Resolution : 203 DPI
5. Communication : USB , RS232 and Optional Ethernet
6. Supports Barcode and QR Code for Future Expansion

3. Technical Specifications Hand Held Barcode Reader – 2 nos.

1. Scanning Type : Single scan line
2. Scan Angle Horizontal: 30°
3. Print Contrast: 20% minimum reflectance difference
4. Decode Capabilities Reads standard 1D and GS1 Data Bar symbologies

4. Technical Specifications Wireless Hand Held Reader – 2 nos.

This handheld reader will be used to read barcodes attached to samples when sample repository is not near the server. Once all the barcodes are recorded in the reader the reader will then be connected to the server and the stored barcodes will be retrieved from the reader.

1. Inbuilt Battery
2. Inbuilt Storage - Store 5000 records
3. Scanning Type : Single scan line
4. Scan Angle Horizontal: 30°
5. Print Contrast: 20% minimum reflectance difference
6. Decode Capabilities Reads standard 1D and GS1 Data Bar symbologies

5. Barcode Roll required : 10 rolls

6. Technical Specifications of the Database Management System

The key functionality of the software shall be

- Sample inventory system and data management
- Role based (Admin / User) access to various pages within the application
- Files upload provision for on-field sample collectors to submit certain forms
- Ability to save partial information and complete data
- Search for test results on the basis of various criteria
- Reports on the basis of various filters that can be exported to PDF or MS Excel

7. Networking

Networking infrastructure will be in the scope of the service provider

Framework:

The framework will consist of a browser based java content delivery system. This will comprise of the user interface (UI) and basic formatting of the content.

The Server Side tools have been chosen keeping in mind the following factors

- Ease of Use
- Lightweight Deployment for improved speed and performance
- High Availability (support many concurrent users)
- Modular Design to incorporate future changes
- High security and confidentiality(encrypted coding)
- Zero Licensing cost for development and deployment environments

An Android app based on Java will be provided to store sampling location and photograph of the sample while collection. This data will be synchronized with the server by physically connecting the android phone to the server.

Graphical User Interface:

Details are as follows

File Upload functionality:

The application will provide for secure upload of sample data in excel format over LAN.

Reporting:

The reports will be created as part of the web application and displayed online with print functionality, export to excel and pdf.

Data persistence:

Data persistence will be achieved by optimised database design.

Data Description

The following data will be stored and reviewed in the system proposed below

Software details

Scenario 1. The sample received at the Laboratory

- The matrix type is chosen and details like location, sample collection date, submission date, GPS coordinates of sampling location, etc. are entered.
- Duplicate copies of a barcode is generated. One of which is stuck on the sample and another is stuck on a register.
- The sample is then issued to a scientist to carry out various tests.

Scenario 2: A team is going to the field to collect the samples

- The team will take printouts of barcodes for all the samples they propose to bring back from the designated location. The matrix type and location have to be entered however GPS co-ordinates can be later input into the system
- Once at the sampling location the team can use the android app to scan the barcode they are about to use for the sample and also take a photograph of the sample.
- The physical characteristics of the sample can be entered on site using a laptop on a excel format provided by us. The barcode attached to the sample will have to be entered in the excel file along with the physical characteristics of the sample.
- Once back in the Laboratory all the data can be synced to the server using sync tools provided by us.
- The samples brought back will be assigned to scientists to test and input the results.
- Sample retesting is also possible.

Retrieving data from the system :

- The sample history can be obtained by scanning the barcode attached to the sample.

Reports:

- Reports can be generated based on complex filter criteria.
- Reports once generated can be exported to Excel and PDF.

Navigation Flow:

User Authentication

1. The user will Login using credentials assigned to him/her by the administrator
2. Depending on whether the credentials have admin rights or normal user rights the next step of the process will be decided.
3. Admin has right to permit the user to re-test the sample if the level is highly unlike.
4. All the users can view and comment on test results.

Common Features for ADMIN and NORMAL USER

The following features will be common to both admin and normal users

a) Sample Inward

This form will have the options to generate barcodes for the following scenarios

1. Sample brought to Lab
2. Samples to be collected from Field

Scenario 1 : Sample brought to lab

1. Matrix Type (Soil, Water, Air, Vegetation, Food, etc.)
2. Matrix sub type (Ore, Rock, Open Well, Pond, PM_{2.5}, etc.)
3. GPS coordinates of the location
4. State List Drop down menu
5. District List Drop Down menu
6. Name of sample collector
7. Remarks
8. Tehsil Details
9. Sampling Location Name
10. Sampling Location Description
11. Sampling date and time

Buttons

1. Save
To save the details of a sample
2. Generate Barcode
To print the barcode

Scenario 2 : Samples to be collected from Field

1. Matrix Type (Soil, Sediment, Water, Air, etc.)
2. Matrix sub type (Ore, Rock, Open Well, Pond, Vegetation, PM_{2.5}, etc.)
3. GPS coordinates of the location
4. State List Drop down menu
5. District List Drop down menu
6. Name of sample collector
7. Remarks
8. Tehsil Details
9. Sampling Location Name
10. Sampling Location Description
11. Sampling Period
12. Multiple samples can be added to and will be displayed on screen to generate many barcodes from various samples

Buttons

1. Save
To save the details of a sample
2. Generate Barcode as the format specified by the user
To print the barcode
3. Cancel

b) Issue Sample for Testing

This form will contain the following fields in order to issues a sample to a scientist for testing

This form will contain the following fields

1. Barcode (Either scanned or manually input)
2. Name of scientist who will carry out the testing.
3. Specify Radionuclide / Elements / Cations / Anions to be analysed.
4. Expected time frame for analysis.

Buttons

1. Issue

To issue the sample to a scientist

2. Cancel

c) Enter Test Results

This form will contain the option of entering test results for samples issued to scientists for testing. Only scientists to whom the sample has been issues can input these details

The form will contain the following details

1. Barcode (Either scanned or manually input)
2. List of all the parameters which can be entered after tests have been carried out
3. Upload spectrum / any other information related to result
4. If the data is unexpected / beyond normal level, a notification will be send to user and Admin.
5. Remarks if any

Buttons

1. Save
To save the results
2. Cancel

d) Excel File Import

Physico-chemical parameters and sample details collected in the field can be input in an excel sheet to the server at the Lab. This excel file can be imported into the system once the sample is brought to the lab.

e) Reports

1. Monthly / Quarterly / Annual search of samples collected or tested
2. Report generation criteria will be based on a combination of the criteria mentioned below
 - a. Location (State / District)
 - b. Sample Type
 - c. Date of collection
 - d. Parameter / Parameter Range
 - e. Sample collected by
 - f. Sample tested by
3. Normal range of parameter values shall be displayed in the report similar to a pathology report
4. Parameter Analysis
5. Location analysis

All reports can be exported to MS Excel and PDF

Features Available to ADMIN only

a) Re-issue sample for re-testing

This form will be used if a sample has to be retested for verifying results

The form will contain the following fields

1. Barcode (Either scanned or manually input)
2. Name of the scientist who will re-test the sample.
3. Remarks as to why the retest was carried out if any

Buttons

1. Save
To save the changes

2. Cancel

b) User Profile Management

This form will contain details to add and edit user profiles and credentials

The form will contain the following fields to be input

1. Name of user
2. Username
3. Password
4. User Type (Admin /Normal)

Buttons

1. Add
To add new user
2. Edit
To Edit existing user and reset password
3. Delete
To delete existing user
4. Save
To save changes

c) Add / Edit Parameters

This form will help Add / Edit test parameters for various matrices

The form will contain the following details

1. Matrix Type
2. List of all parameters for editing
3. New Parameter Name
4. New Parameter Type (Alpha or Numeric or Alphanumeric)
5. New Parameter Length (Number of characters)

Buttons

1. Save
To save changes
2. Cancel

d) Search and Export

Search on the basis of

1. Date
2. Location (State / District /Tehsil / Location name)
3. Sample Collection Personnel
4. Sample Testing Personnel
5. Matrix Type
6. Parameter / Parameter Range
7. And any combination of the above stated filters.
8. Search Results can be exported to MS Excel and PDF

ANDROID APP

This app will have the following features

1. The app will be secured with username and password
2. The app will scan Barcode on stickers before they are attached to the sample
3. The app will record GPS data and associated it with the sample

4. The app will prompt the user to take a photograph of the sample

The above stated data will be store on the phone.

This data will be synced with the server when the samples are brought back to office. The android device will have to be connected with the server and synced.

SYNC APPLICATION

This application will run on the server and will assist in syncing data gathered on field using the android app with the server database.

DATA BACKUP

Everyday backup of the database in compulsory. The integrity and security of the data will be the responsibility of the service provider.

Terms & Conditions:

- HPD will provide technical knowledge and requirement during development of the software.
- Site wise minor changes in software including networking and deployment cost will be at an additional charge of INR 1,00,000 per site.
- NDA will be provided by the service provider on relevant stamp paper in order to ensure that there is no misuse of intellectual property belonging to HPD.
- Any suggestions / modifications shall be implemented in the software after due approval of Head, HPD.
- The software will be developed within a time frame of 3 months. The software will be tested at our end for 6 months for any malfunction or any modification. The technical issues will be taken care by the vendor without any additional charges.
- Maintenance of the software will be provided for 5 years.

Financial Details

Sl. no.	Description/ Dimension	Quantity (no.)	Cost (Rs)	Total cost (Rs)
1	Server Desktop PC	1		
2	Barcode Printer	2		
3	Handheld Barcode Reader	2		
4	Wireless Barcode Reader	2		
5	Barcode Roll	10		
6	Customized Software	1		
		Sub-Total (Rs)		
		GST		
		Grand Total (Rs)		