DEPARTMENT OF ROADS AND TRANSPORT



KDS LAB Management System

USER REQUIREMENTS SPECIFICATION

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# **acronyms**

GPG Gauteng Provincial Government

GDF Gauteng Department of Finance

CIO Chief Information Officer

DRT Department of Roads and Transport

ASP Active Server Page

SQL Structured Query Language

URS User Requirements Specifications

ASD Assistant Director

KDS Koedoespoort

Ms Microsoft

DBMS Database Management System

SDLC System Development Life Cycle

LAB Laboratory

1. **Introduction**

This document describes User Requirements Specification to Construction Standards and Quality Assurance directorate for the LAB testing methods System. It also describes the purpose, deliverables, entities, and system boundaries, functional and technical requirements of the system.

## Purpose

This document is intended to document all system requirements specification as agreed upon with the user and to guide with the development of LAB System. The requirements have been derived from the following source:

* Construction standards and quality assurance(LAB)

The following fact-finding techniques were used:

* Interviews

## Current Environment

Construction Standards and Quality Assurance directorate is currently using excel spreadsheet that was developed 20 years back. The spreadsheet can perform calculations; however, it is not the proper way of keeping record as it resides on the network drive and can only be accessed by one user at a time.

Currently the technician/ Chief Auxiliary (requester) go to site to collect samples and bring it to the laboratory for testing. The sample is then being registered manually on the separate spreadsheet from the one that performs calculations, based on the type of the test to be performed and manually assigned to the relevant tester for testing. Chief auxiliary performs testing and capturing then sends test result to technician for verification. Chief auxiliary/ technician and Lab manager make a decision based on the test results and decide whether the test should be repeated or send test report to LAB Manager for sign off. Registration has to manually check if everything that is required on the test is performed correctly then goes back to the requester. The technician/ Chief Auxiliary (requester) sends final test results to the project site.

1. **GAP Analysis**

The TMH1 testing method is on the process of being phased out and new method of testing the will be introduced which is SANS 3001. These two methods of testing (TMH1 and SANS 3001) are slightly different.

There is no proper storage for record keeping and that make it difficult for directorate to track records. Data is backed up on disk. The current system (spreadsheet) is not compatible to the latest technology. Introducing this system will improve turnaround time and be able to track information of an existing record. The process will be quicker and the records will be stored on a central location.

## Business Requirements

Construction Standards and Quality Assurance directorate is responsible for testing the following: Soil, Aggregate and concrete, Bitumen and Asphalt and Paint for all departmental roads in Gauteng using TMH1 as a testing methods.

They want a system that will perform testing calculations correctly according to the industries measurement specification method. TMH1 is in the process of being phased out of the industry, however THM1 will still be utilized to test material on current projects. While TMH1 is being phased out SANS 3001 will be phased in as new testing method for future projects. They want a system that will be centralized, reliable and user friendly. There is no proper system hence there is a need to build the system so that it can be utilised by the Construction Standards and Quality Assurance directorate.

## Assumptions and Constraints

### Assumptions

* The development of this system is aligned to the current business rules and will also be able to comply with the new rules and regulations of the department.
* All the required softwares to implement and execute this project are available.
* The developers will be able to carry out the development, testing, deployment and maintenance of the system.
* All the resources will be available to help us in carrying out and completing the project within a specified timeframe.
* The system analyst will monitor and report back on the status report of the project from the beginning until the end.

### Constraints

* The system cannot operate offline, since it is a web-based application, as per user specification.
* The system can only be used by an authorized user.

# Functional Requirements/ Business rules

* The system should be able to capture , update and upload all the testing processes
* The system should be able to store and update information that was uploaded into the database for future reference.
* The system should be able to show all section and test methods that was performed per sample request
* The system should allow the users to enter the number of days it will take for each test.
* The system should allow for a comment box where necessary (if number of days to perform a test was exceeded). If a re-test is required then a comment is a required field
* The system should be able to record the road numbers and the region in which the sample was collected
* For each reference number the system should list all sample(s) requested of a specific road number with their sample numbers -calculations
* The system should show the sample position, Pavement Layer, lane and material description, etc.
* The system should show all the forms per test section selected e.g Aggregate- all the forms that has to do this test section must appear on the system. The system must allow the user to choose any type of form they require-calculations
* The **Job form** should appear to all the test sections
* The system should allow currently assessed (within three years) competent testers to perform different tests.
* The system should allow uploading of training records of personnel
* The system should check if the person is qualified to perform a test or not. It should continuously check in a cycle of 3 years to assure the adherence with the rules and regulations of the department by email notification.
* **Urgent status** testing must be performed immediately.
* **Normal** status will follow proper process as stated by the sub-directorate
* **Preference status(special arrangement)**
* Competency date cannot be before than assessment date

1. **Process Flow**





Business Rule

NB: If sample per section is still available then perform re-test or else collect new sample data for sampling. e.g Soil, aggregate section etc.



Gen. Non Comformance (Lab)

# Technical Requirements

## Interface Requirements

**Admin capturing screen / Main Screen**

**Single log in**

|  |  |  |
| --- | --- | --- |
| **Login Screen** | | |
| **Field Name** | **Description of a field** |  |
| Username | xxxxxxxxxx | Mandatory |
| Password | xxxxxxxxxx | Mandatory |
| Register | Register your name to log in | Mandatory |
| Login | Click to Open the system | Mandatory |

**This is a form has to be filled per each sampling requested**

|  |  |  |
| --- | --- | --- |
| **Requisition form** | | |
| **Field Name** | **Description of a field** |  |
| Persal Number | User persal number. This should automatically show **name of the person capturing** and **date captured** | Mandatory |
| Rank/ Job Title | Preloaded- dropdown  Chief Auxiliary/ Technician /Registration/Lab manager | Mandatory |
| Section | (Dropdown)  Assphat, Aggregate, soil, Buitumen | Mandatory |
| Test method | Preloaded- dropdown  TMH1/ SANS 3001 | Mandatory |
| New test or Retest | Radio button  YES/No | Mandatory |
| Priority | Dropdown  Normal/ Urgent/ Preference | Mandatory |
| Division | Dropdown –Maintenance  -Special projects  -Construction  -Projects | Mandatory |
| Consultant Name | Text box- e.g.(VKE) external stakeholder | Mandatory |
| Sample requestor | Dropdown-The person collected sample from site | Mandatory |
| Sampling Date | Date sample was collected | Mandatory |
| Region | Dropdown –list to be provided |  |
| Road Number | Text box- Road Number where the sample was collected | Mandatory |
| Job/Ref No | Auto generate | Mandatory |
| Entry Date | Date captured on the system | Mandatory |
| Sample data | | |
| Assign tester | Dropdown .Name of the person who is going to conduct the test. This is a group of different person who can conduct test according to what they qualify to test on the lab | Mandatory |
| Sample No | Text box. Sample number to be captured /Preloaded | Mandatory |
| Bag/Container No | Text box. Bag/ Container number to be captured /Preloaded- must allow more than one | Mandatory |
| Sample Position | Text box. Where the sample was collected on the road( e. g km/chanage) |  |
| Lane | Text box .Which lane was the sample collected on road( e. g North /South Bound) |  |
| Pavement layer | Dropdown Type (surfacing, base, upper sub-Base, Lower sub-base, upper selected, lower selected, fill and road bed) | Mandatory |
| Description of material | Large text box (e. g G5 natural gravel) | Mandatory |
| Select test method button | | |
| Type of Test(s) requested | Check box  Type of Test method performed. Allow to select more than one( e. g B1, B2 etc- provide list) | Mandatory |
| End sample data | | |
| Environmental Condition | Dropdown  Hot/ Windy/ Wet Rain |  |
| Do you want to witness the test procedure? | Dropdown  YES / NO |  |
| Interim Report? | Dropdown  YES / NO |  |
| Customer Agreement on Test Method | Dropdown  YES / NO |  |
| Capability to perform test | Dropdown  YES / NO |  |
| Resources(equipment and personnel) | Dropdown  YES / NO |  |
| Sample Condition | Dropdown  Slight Moist/ Moist/Dry |  |
| Purpose of Test | Large textbox |  |
| Remarks/ Comments | Large textbox |  |
| Sampling Method: Colto/TGI/TMH1/ TMH 5/ SANS3001/Other | Dropdown |  |
| Other (Specify……….) | Put comments | Mandatory |
| Sample submitted by: | Dropdown.  The person who submitted the sample (Job was done on behalf of someone else) | Mandatory |
| Time sampled | Date picker | Mandatory (for A13T and A14 – soil section) for C2 Marshall ASPHALT sections |
| Time received | Date picker | Mandatory (for A13T and A14 – soil section) for C2 Marshall ASPHALT sections |
| Special packaging (external sample) | YES/ NO drop down | Mandatory |
| Comments | TextArea  When there’s a deviation on the test. | If yes is selected then textarea must be mandatory |
|  |  |  |
|  |  |  |
| Chief Auxiliary / Technician | | |
|  |  |  |
| Requisition received by | Dropdown.  Name of the person received requisition (capturer or admin) | Mandatory |
| Requisition Date received | Date picker | Mandatory |
| Requisition registered by | Dropdown.  Name of the person registered requisition (capturer or admin) | Mandatory |
| Requisition Date registered | Date picker | Mandatory |
| Requisition for testing received by | Dropdown.  Name of the person (chief auxiliary or tester ) | Mandatory |
| Requisition for testing date received by | Date picker | Mandatory |
| Requisition controlled by | Dropdown.  Name of the person/text (technician or lab manager) | Mandatory |
| Requisition controlled date | Date picker | Mandatory |
| Results received by | Dropdown.  Requester of the sample | Mandatory |
| Completion date | Date picker (the date of completion) | Mandatory |
| Date needed | Textbox.  It must add two days after the test has been conducted and completed | Mandatory |
| Test duration | Textbox  The overall number of days the test will be conducted |  |
| Findings | Dropdown- material within specification  -material not within specification | Mandatory |
| Remarks | Large Text box | Mandatory |
| Are you registered | YES/No |  |
| Registration start date |  |  |
| Registration end date |  |  |
| Is your registration still active? |  |  |
| Results Delivery method | Dropdowns (emailed or collected) |  |
| Save | The system should allow to save captured information ) | Button |
| CANCEL | Click to cancel | Button |
| SUBMIT | SUBMIT to the next activity | Mandatory |

**Business rule**

3 months before theRegistration end date, the system should send an email remind to the user to re-register

|  |  |  |
| --- | --- | --- |
| **Personal details** | | |
| **Field Name** | **Description of a field** | Mandatory |
| Persal Number | Preloaded  User persal number | Mandatory |
| Persal Numner | Preloaded | Mandatory |
|  |  | Mandatory |
| Name | Preloaded  Name of the user | Mandatory |
| Surname | Preloaded  Surname of the user | Mandatory |
| Telephone number/ Cell | Preloaded  User Telephone number | Mandatory |
| Rank/ Job Title | Preloaded -Registration/Admin  -Chief Auxiliary  -Auxiliary  -Technician  -Lab Manager | Mandatory |
| Gender | dropdown -Male  -Female | Mandatory |
|  |  |  |
| Race | Dropdown-African  -Indian  -White  -Colored | Mandatory |
| Appointment date | Calendar  Date of employment | Mandatory |
| Competency Date | Calendar  Date of assessment | Mandatory |
|  |  |  |
| Cancel | Button | Mandatory |
| SUBMIT | Button Click to Save | Mandatory |

***NB: All screens will have their own maintenance screens for update. Different criteria will be used to select the information from the database***

Notes

All forms must be linked per section as follows:

**SOIL SECTION**

* FORM LT 3 (b)
* Form LT 4
* Form LT 5
* Form LT 6
* Form LT 7
* Form LT 8
* Form LT 32

NB: The system to generate the test report at the end with departmental letter head as indicated

**AGGREGATE SECTION**

* Form LT 1(f)
* Form LT 15 (b)
* Form LT 16
* Form LT 17
* Form LT 18
* Form LT 19
* Form LT 19 (b)
* Form LT 19 (c)
* Form LT 21
* Form LT 23
* Form LT 24
* Form LT 26
* Job Form

NB: The system to generate the test report at the end with departmental letter head as indicated on the report

BITUMEN SECTION

* Form LT 12 (a)
* Form LT 12 (b)
* Form LT 13
* Form LT 14 (a)
* Form LT 14 (b)
* Form LT 14 (c)

ASPHALT SECTION

* Form LT 9
* Form LT 9(b)
* Form LT 9(c)
* Form LT 10
* Form LT 11
* Form LT 11(b)
* Form LT 28
* Form LT 29

**REPORT**

* Test method Report

All section (e.g Soil section) must be able to retrieve and or allow user to view reports in graph form

### 9.2 Hardware

The technology infrastructure is comprised of the major hardware components of any IT systems. These components include

* Central server.
* desktop computers and printers
* Local Area Network(LAN)

### 9.3 Software

**DBMS**

* Name :Ms SQL Server 2008-2016
* Source: Microsoft

**Browser**

* Name : Internet explorer
* Version : 9 -11

**Application Software**

* Name: Microsoft Visual Studio (Asp.net C#)
* Version: 2005-2016
* Source: Microsoft

### 9.4 Communications Interfaces

## The system should be able to interface with the applications that run on the Server.

* The user should be able to communicate with the interface that is residing on the server

## Operational Requirements

* The health status of the system and application should be checked to ensure operations are performed within expected parameters or agreed service levels.
* Response times and resource usage of the system should be tracked and monitored
* Backing up databases and restoring data should be a priority

### Security and Privacy

* The system should allow user authentication, to prevent unlawful access to specific sections within the system sites.
* Desktop system will utilize operating systems, password standard and technologies that maximize security.
* Data stored on central servers and storage systems will be administered to ensure the highest level of information
* All the data will be protected from viruses and other destructive technology agents. Technologies will be implemented to guarantee that all the departmental desktop computers have updated antivirus software with the latest virus definitions.
* Users will be asked to change their password, the first time they use the system. This will apply to accounts that have been created by the super user.
* If the user unsuccessfully tries to logon three times, the account will be locked. The user will need to contact the super user, to unlock the account.

1. **Reliability**

The system should be able to perform and maintain its functions in routine circumstances.

### Recoverability

* In case of system failure help desk number will be provided to the users to them to log faults.
* Developers will be ready to solve any inconvenience experienced by the users on the system.
* In case of database failure, data backup will be available as we will be creating database backups.
* In case of hardware failure we have experience technician who will be responsible for fixing any problem encountered.

### System Availability

* The system should be available for use 24 hours per day 7 days a week

# General Performance

* The system is expected to respond fast as we will be using MS SQL server 2005 as our database management.
* We are going to use Asp.net as our development tool because it performs well on the server.

### Capacity

### The system should be able to cater for 30 users simultaneously

### System Testing Requirements

**Test Environment**

The following types of testing will be done**:**

* Unit testing: this is testing of individual software component or modules of the system
* Factory Acceptance Testing: in this type of testing the system is tested as per the user requirements
* User Acceptance Testing: this type of testing is done to verify if the system meets the customer specified requirements

1. **Training Requirements**

* Training manual will be provided to the users.
* Training will be done in the training laboratory.
* Users will be trained before the deployment of the system
* Users of the system are expected to attend all training scheduled

1. **User access rights**

|  |  |  |
| --- | --- | --- |
| **User Name** | **Role** | **View screen rights** |
| Phuthi Manamela  Blessing Chiloane | System Administrator | Home  Capture Data  Edit data  Reports  Change Password  Logout |
| Ata Buekes | Normal User/ Admin Official | Home  Capture data  Edit data  Change Password  Logout |
| Charles | Normal User/ Technician/ Auxiliary | Home  Capture data  Edit data  Change Password  Logout |
| Dickson Lekgodi | Manager | Home  Reports  Change Password  Logout |

1. **Acceptance Of User Requirements Specification**

The signatories on this document confirm agreement with the contents specifying user requirements for the LAB System to be developed by Information System Support directorate. The signed document will serve as the basis for further service level revision and discussions between Information System Support directorate and Construction Standards and Quality Assurance sub-directorate

**Construction Standards and Quality Assurance sub-directorate**

Name: Designation:

Signature: Date:

**Witness on behalf of** Construction Standards and Quality Assurance sub-directorate**:**

Name: Designation:

Signature: Date:

**System Analyst: Information Systems Support:**

Name: Designation:

Signature: Date:

**DD: Information Systems Support:**

Name: Designation:

Signature: Date:

**CIO: Information Systems:**

Name: Designation:

Signature: Date: