WASTE MANAGEMENT SYSTEM

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1. GENERAL INFORMATION

The Waste Management department's waste service operation is current performed in pockets by disparate unintegrated semi-automated and manual operating systems.

The department is structured around a waste management hierarchy, which is the overall approach of informing waste management in South Africa. The department, with its line of priorities has prioritised waste avoidance and reduction, re-use and recycling, treatment, and disposal as the last resort. The core functions of the department centres around the collection, the transportation, the processing and disposing of municipal and private sector solid waste.

Waste information is currently spread across Divisional and Depot functions; in various databases and formats. The Waste Department has identified the business need to access centralised and integrated waste information from a centralized source.

A Waste Operation System, is fundamental to providing a collected central source of waste service information for ensuring decision-making, measuring waste performance, supporting policy implementation and enable optimal resource utilization.

Madikana Thenga, the acting Waste Management Department Head envisages a specially designed real-time waste operating system to develop into a real-time waste management system over time, thus improving compliance reporting, resource usage efficiencies while at the same time maintaining an affordable waste service to the public.

Economic development activities, a growing population and increasing rates of industrialization and urbanization have resulted in increased volumes of waste generation. Growth puts pressure on waste management facilities especially in the metropolitan areas. The increased volumes and complexity of the waste stream directly effects management and operational enablement. The Waste Management Department requires establishing and implementing an effective and optimised waste management system.

The following Waste Operation conditions are identified:

- Planning: Efficiency. Hardcopy Area maps are fixed and cumbersome to plan and work with in real time
- Planning: Flexibility. Waste collections having a fixed plan within regular schedules over defined periods are ineffective to change in real time. For example, when vehicle breakdowns on route or delays are caused by traffic jams.
- Proactive Operation Information: waste service knowledge and information is available only after the Driver has returned to the depot and once the depot has manually processed the information.

  For example, information on the:

  - Number of bins Collected in real time
  - Number of rounds completed in real time
  - Vehicle round completion in real time
  - Vehicle route completion in real time
  - Waste volumes weighed at weighbridge in real time
  - Waste volumes disposed of in real time
  - Active work time vs Inactive work time in real time

- Vehicles returning to Depots in real time
- Vehicles available to be dispatched from any Depot, for work, in real time
- Driver and Attendant availability in real time
- Driver and Attendant performance in real time

- Service: Incidents. A functional ability is required to address a Waste collection incident and provide information, to City Councillors, the Mayor, customers and clients in real time based on the availability of information flow.
- Service: Incidents. A functional ability to keep the citizen of Ekurhuleni Metropolitan Municipality informed and the service active by responding to waste service events and incidents.

1.1. ORGANIZATION *OF THE MANUAL*

The user's manual consists of five sections: General Information, System Summary, Getting Started, Using the System, and Reporting.

- General Information section explains in general terms the system and the purpose for which it is intended.
- System Summary section provides a general overview of the system. The summary outlines the uses of the software requirements, system's configuration, user access levels and system's behaviour in case of any contingencies.
- Getting Started section explains how to get the solution set up and working the section presents briefly system menu.
- Using the System section provides a detailed description of system functions.
- Reporting section describes in what way information collected by the application are presented and how to access the information.

2. SYSEM SUMMARY

System Summary section provides a general overview of the system. The summary outlines the uses of the software requirements, system's configuration, user access levels and system's behaviour in case of any contingencies.
The main functionality of the system being to manage refuse removal within a Waste Department as efficiently as possible

2.1. SYSEM CONFIGURATION

Waste management system is a cloud-based solution which can be used on the current infrastructure that the city has. The application requires connection to Internet in order to save data to database. Data saved in database can be seen using any major Internet browser.

2.2. USER ACCESS LEVELS

The System is available for the everyone who works at the Waste department but only the selected Administrator can handle the backend part of the system.

2.3. CONTINGENCIES

In case of power outage data is not saved in internal memory of the operating device. In case there is no Internet connection, the application cannot be accessed and thus reporting cannot be logged

3. GETTING STARTED

This section describes how to use the Waste Management System

3.1. INSTALLATION AND LOGGING IN

The system is accessed by logging on the Link: http://wms.idolconsulting.co.za/

Once installed the user has to insert, they provided user credentials, in the form of employee's number, email and password.

3.2. SYSTEM USABILITY

3.2.1. THE LOGIN SCREEN

The first screen of the application is the login screen, where the user is required to login. The user can use either their employee number or email address as the user name (case sensitive), and a set password or their surname as they password (not case sensitive)

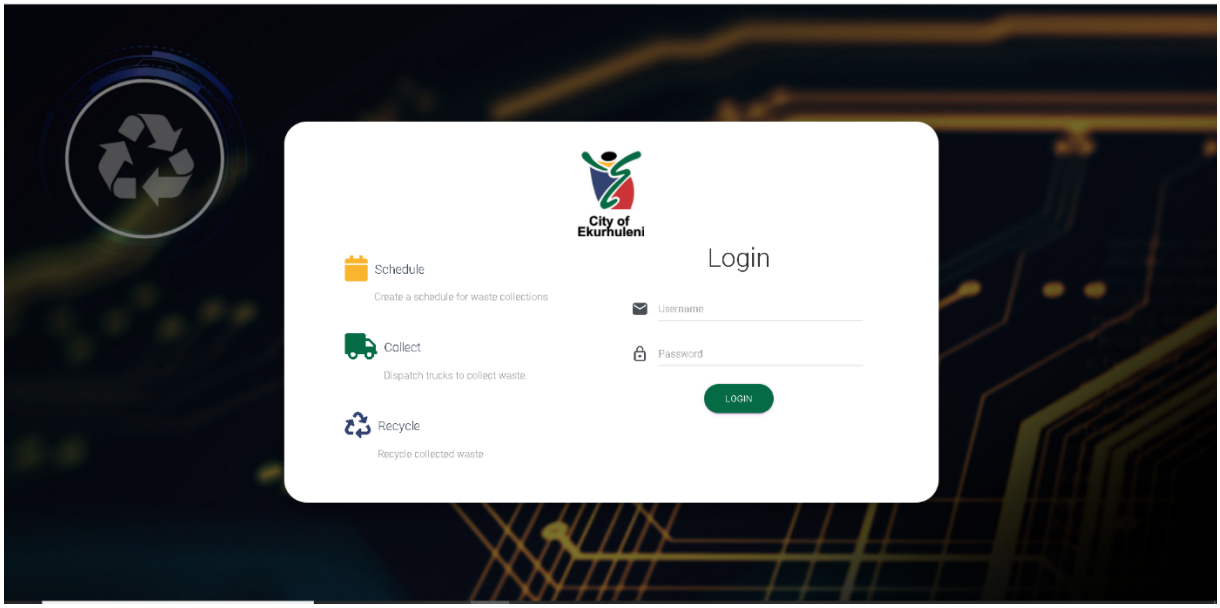

Figure 1

3.2.2. HOME SCREEN

The home screen is the welcome screen which gives an in-site of the purpose of the system, it houses a dashboard with all the functionality that they system has.

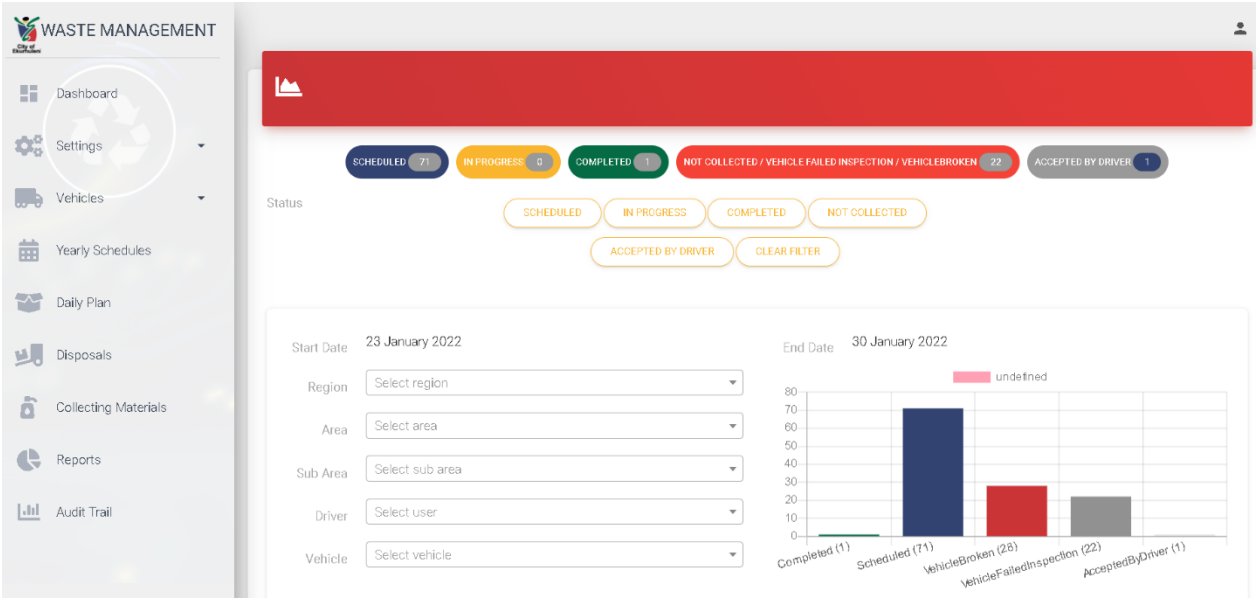

Figure 2

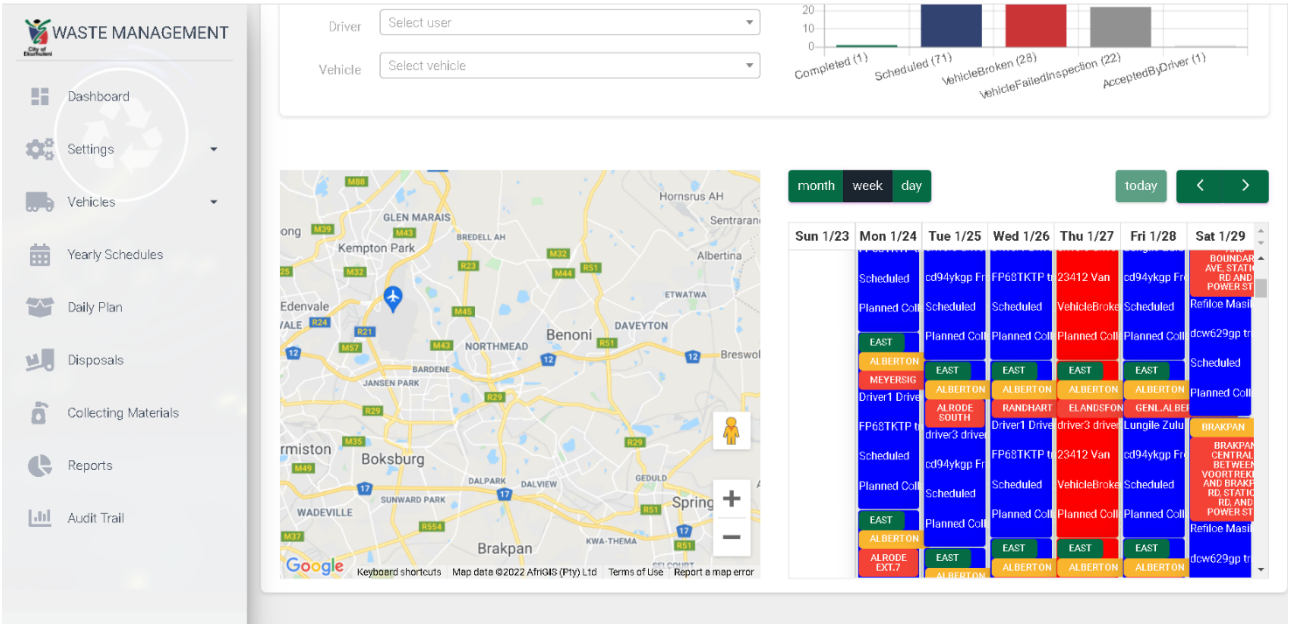

Figure 3

3.2.3. SETTINGS

USER MANAGEMENT

Allows the user to add, amend and delete the users that have access to the system, it is divided into three roles which include, Admin, Driver, Manager, Assistant, Scheduler, Deport Operator. Which each user has certain roles that they can access and certain functionalities they can action within the system.

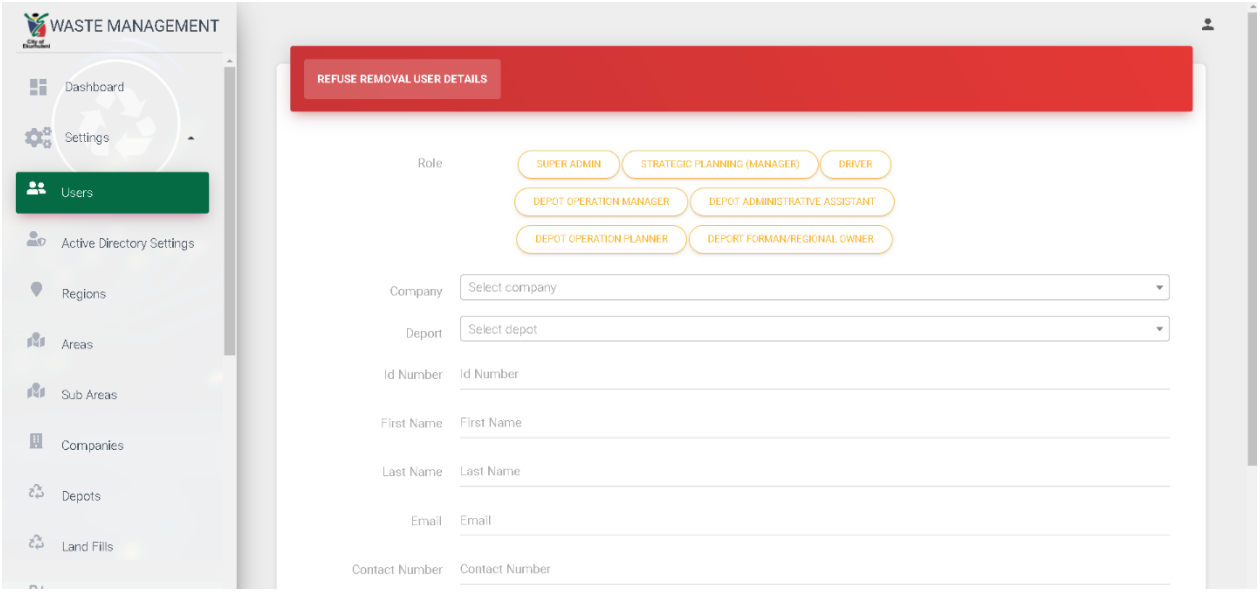

Figure 4

ACTIVE DIRECTORY SETTINGS

The system allows user to Add, Delete and Amend active directory.

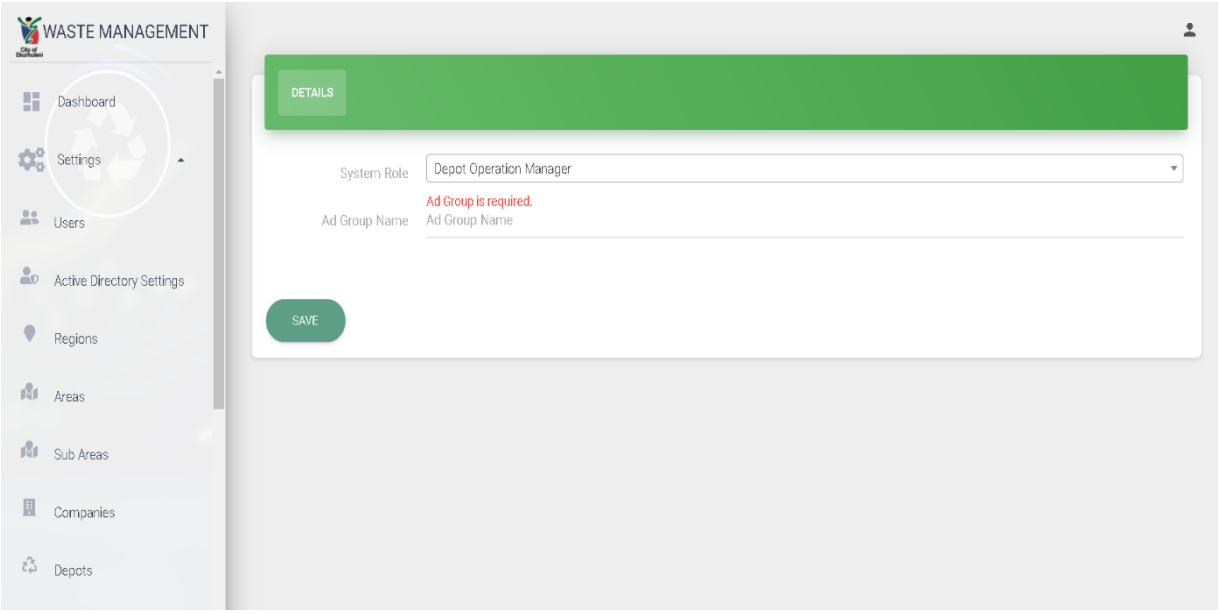

Figure 5

REGION

The system allows user to Add, Delete and Amend all Ekurhuleni regions. User can colour code to indicate the region that they are adding to the system.

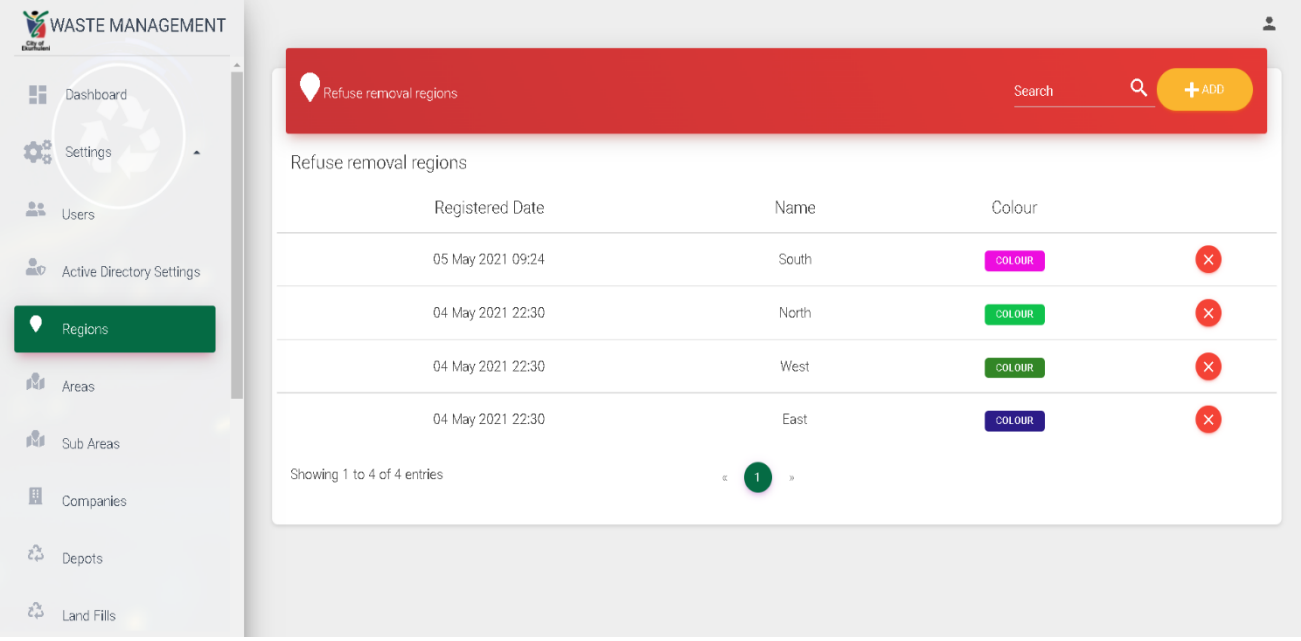

Figure 6

AREAS

The system allows user to Add, Delete and Amend Areas for each region

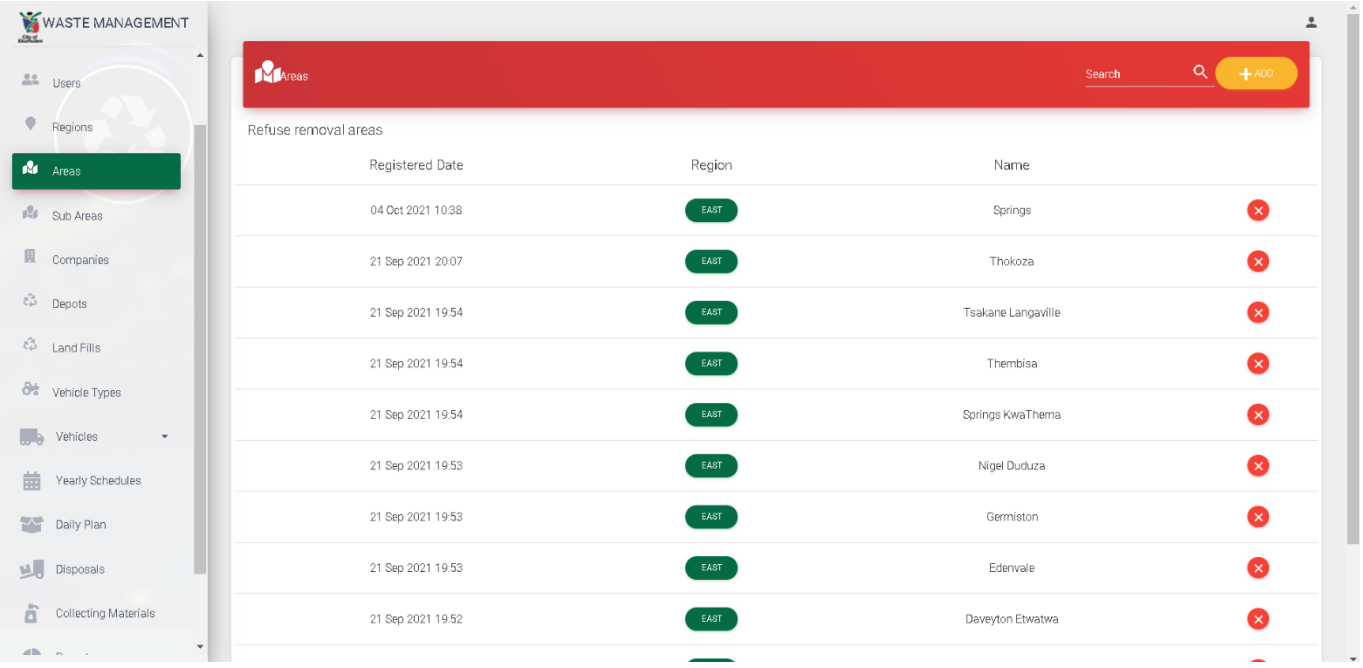

Figure 7

SUB AREAS

The system allows user to Add, Update, and Delete Sub areas based on the specific Area

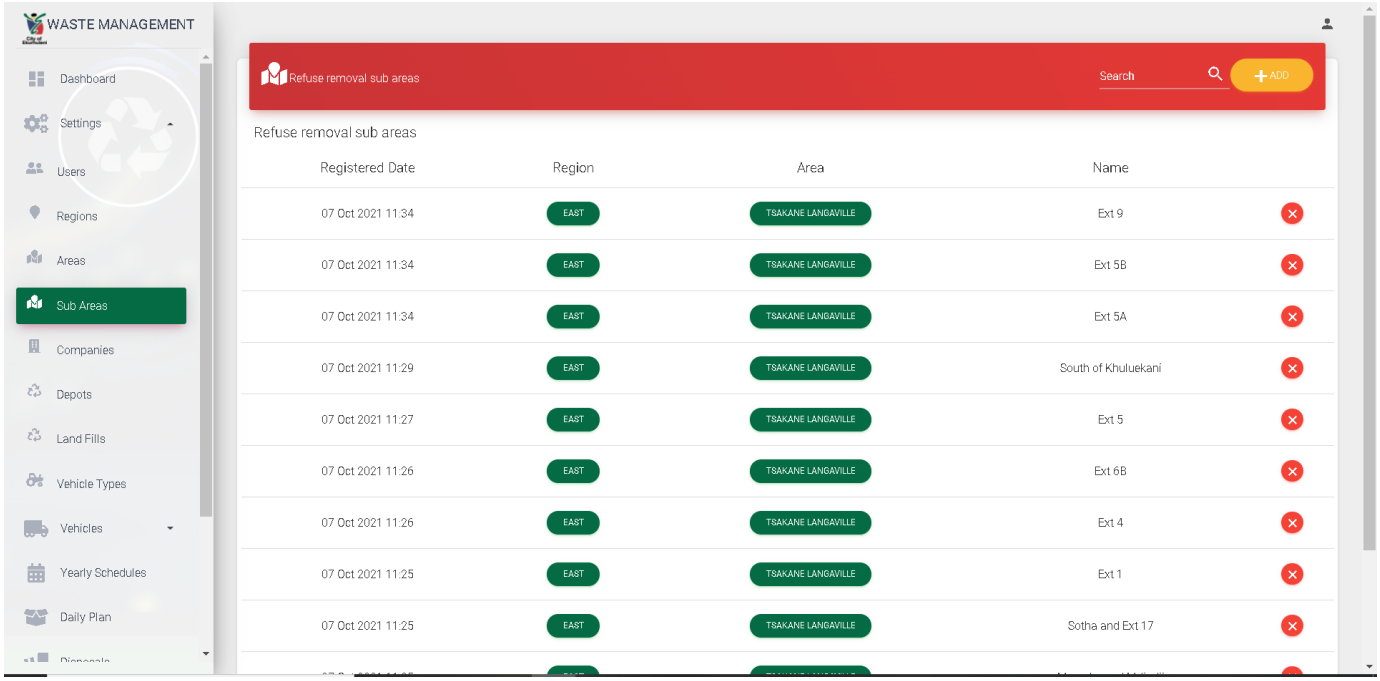

Figure 8

COMPANIES

System allow user to Add, Update, and Delete Companies that associated with Waste Department

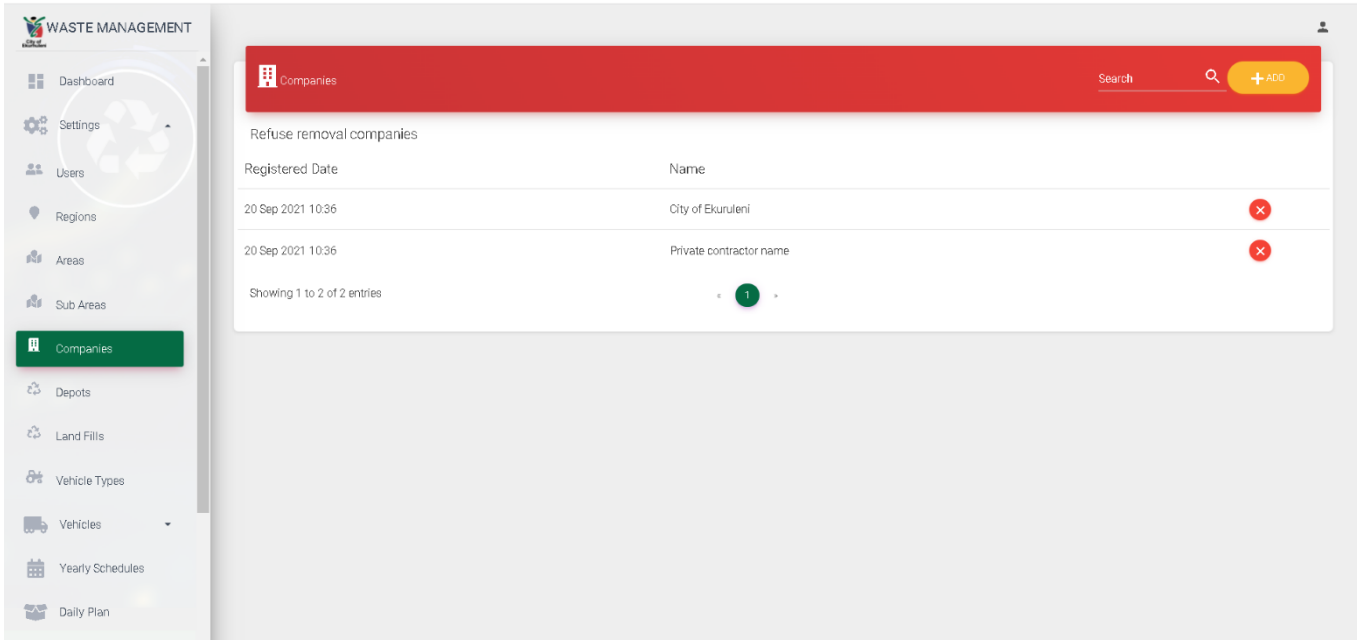

Figure 9

DEPORT

System allow user to Add, Update, and Delete Deports that associated with Waste Department

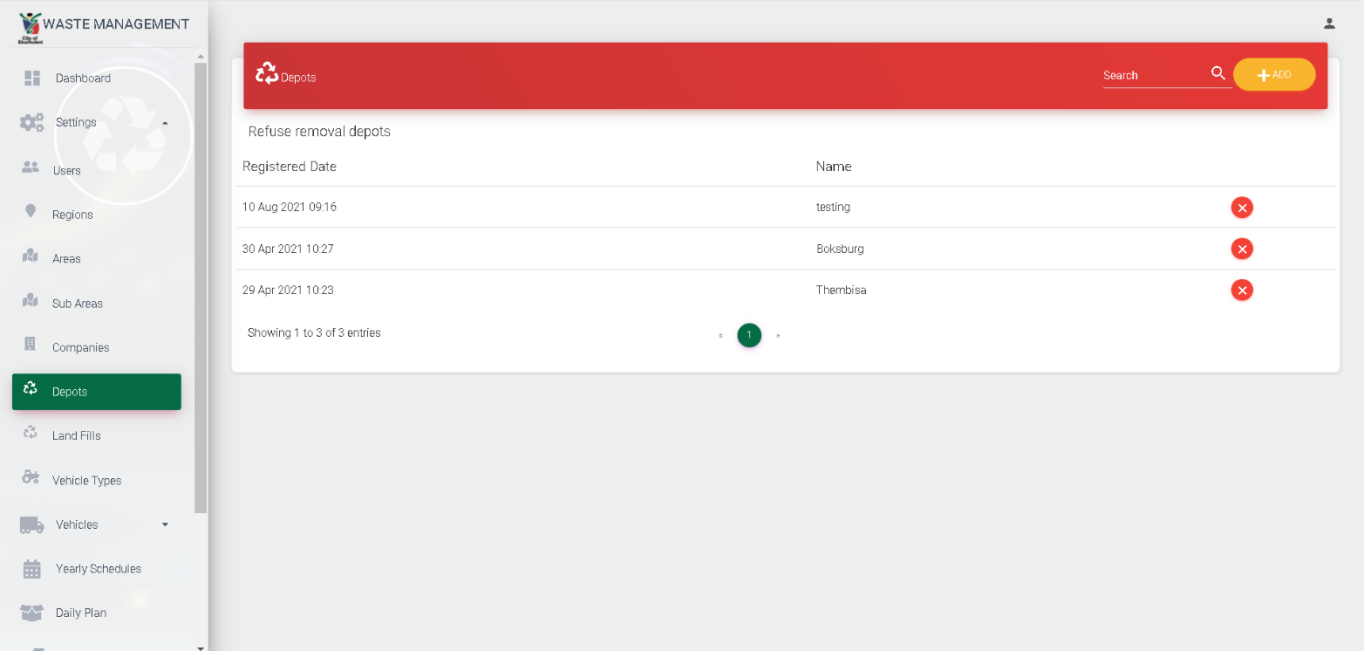

Figure 10

LANDFILL

System allows user to Update, Delete, Add the amount of waste they contain into the Capacity field

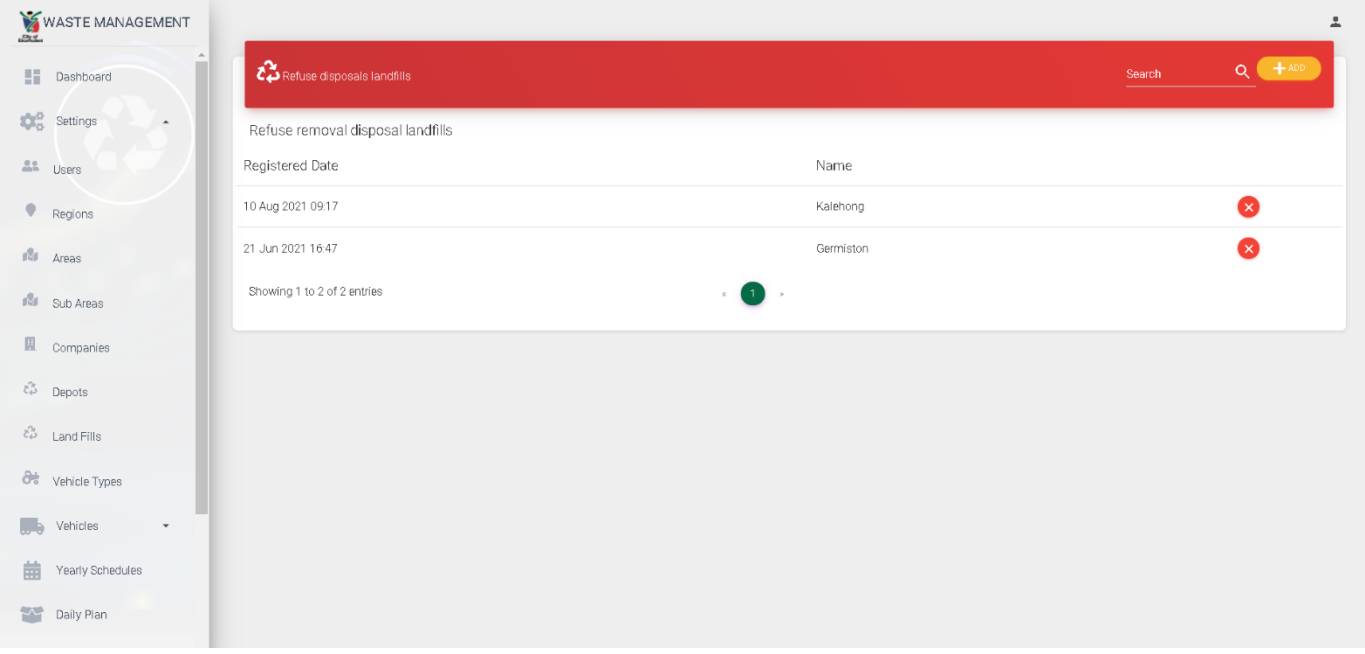

Figure 11

VEHICLE TYPES

The system allows users to Add, Update and Delete Vehicle type names

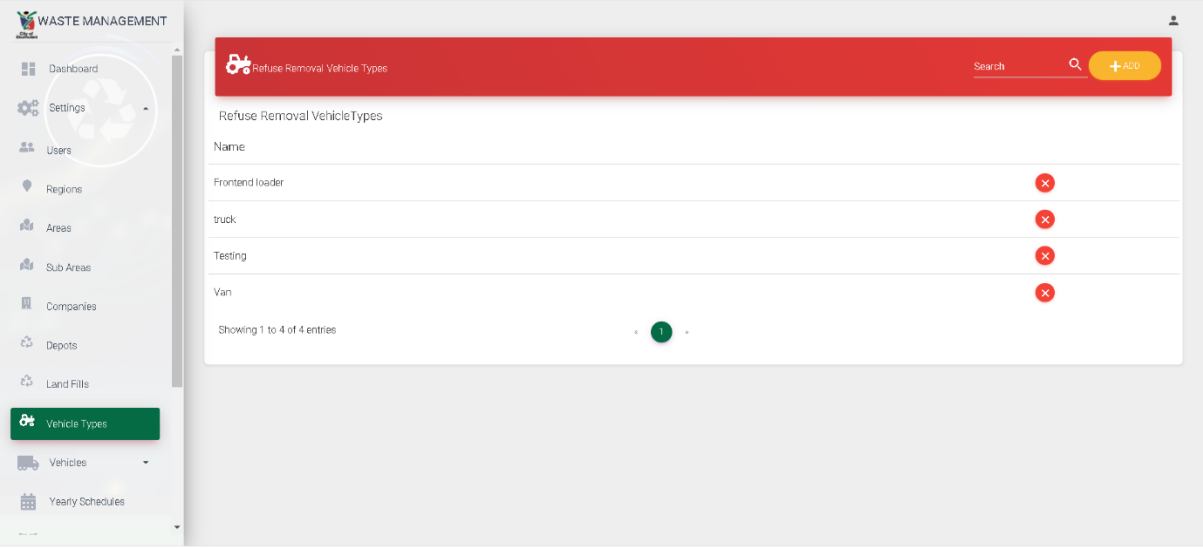

Figure 12

VEHICLES

Allows the user to add, update and delete the vehicle, it is divided into four roles which include, Available, out of stock, Broken and Enroute.

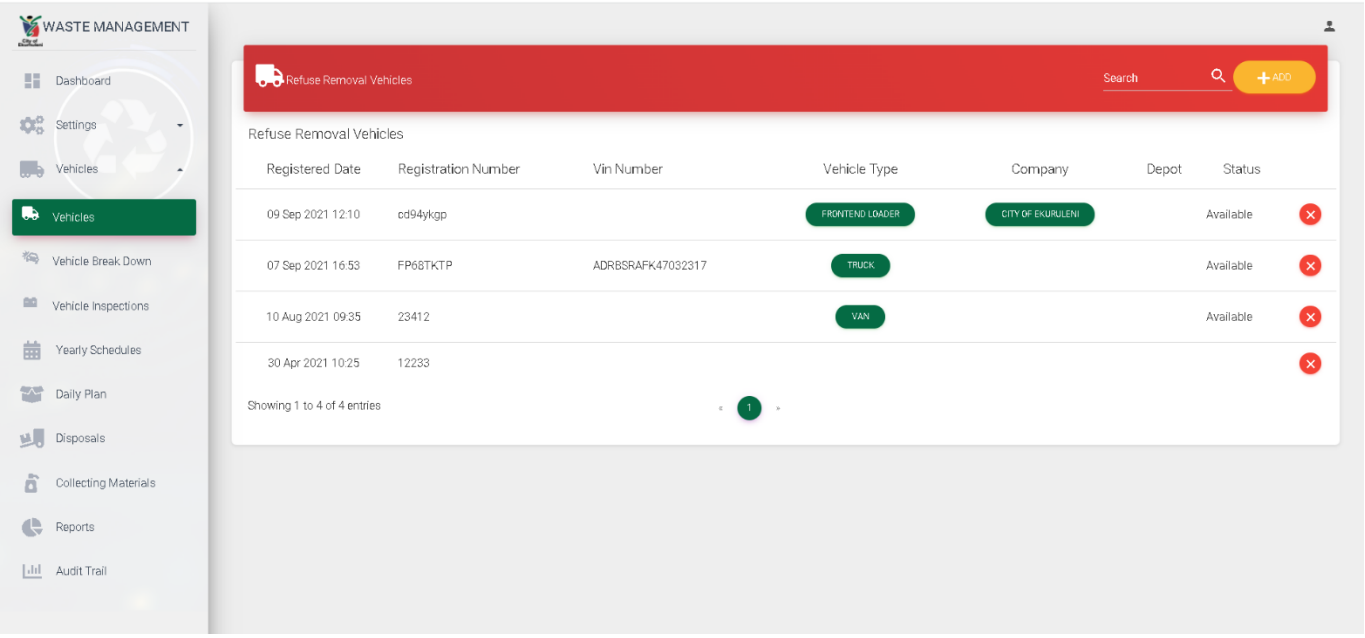

Figure 13

VEHICLE BREAK DOWN

System allows user to view or delete the vehicle breakdown that were done by on driver's mobile app

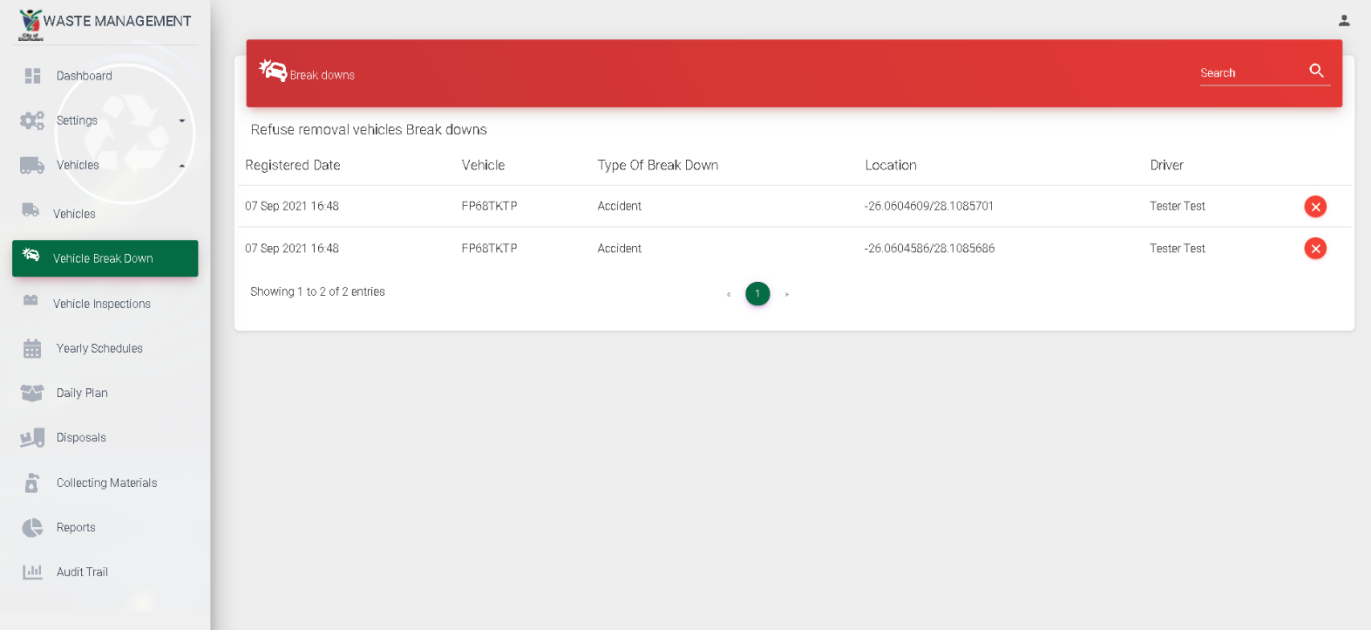

Figure 14

VEHICLE INSPECTIONS

System allows user to view or delete the vehicle inspection that were done by on driver's mobile app

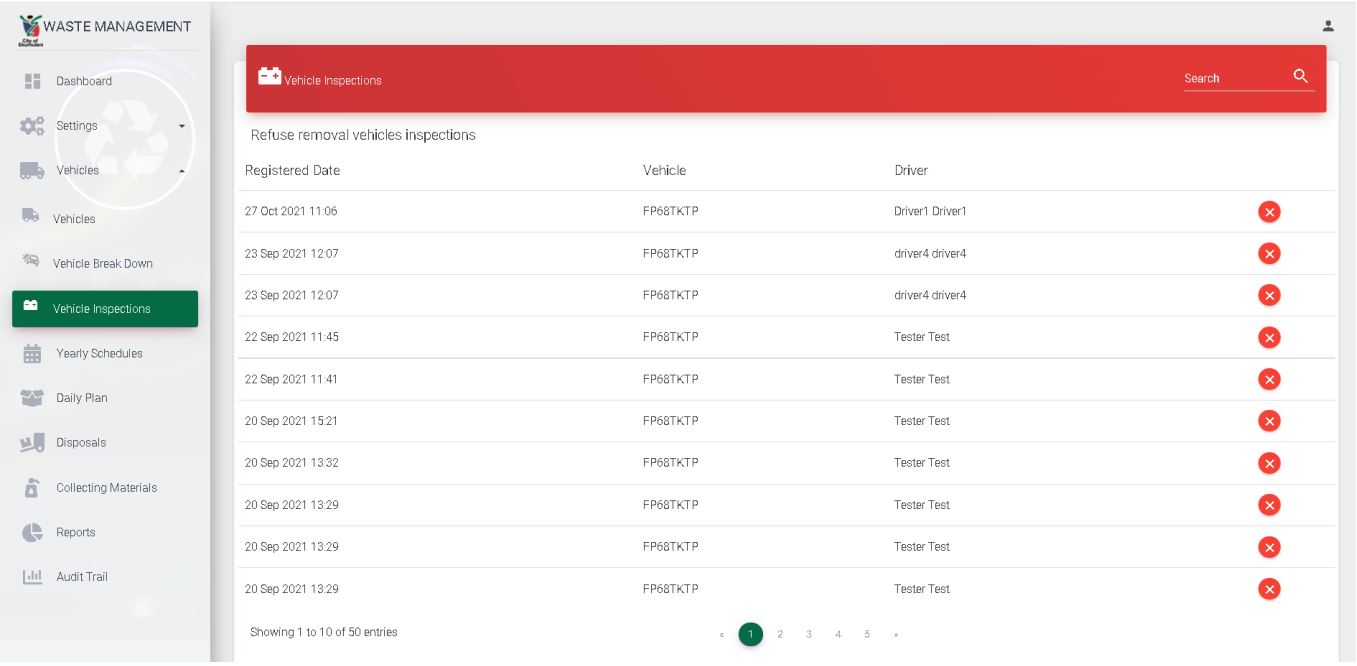

Figure 15

YEARLY SCHEDULE

System allows user to Add, Update, Delete the Yearly planned schedule and add also the driver's material. The driver can view the schedule on their mobile app. Users are able to view specific fields by filtering out either the Region, Area, Driver and Vehicle.

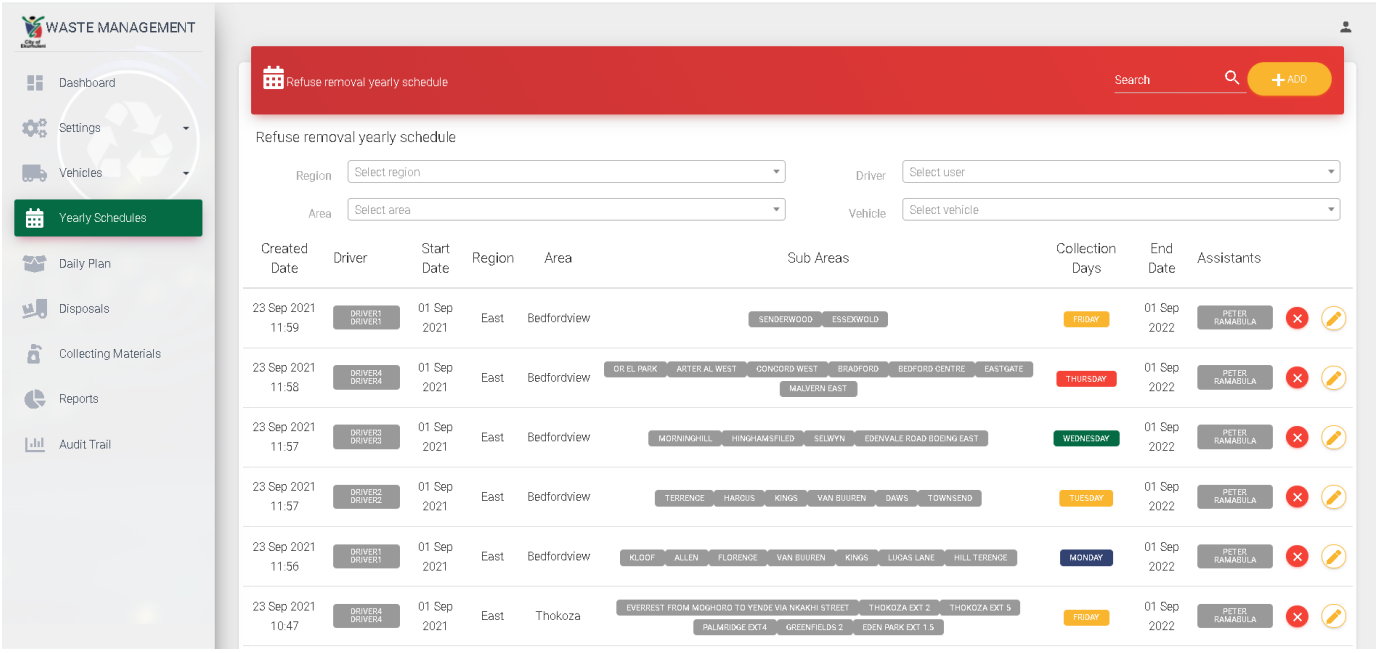

Figure 16

DAILY SCHEDULE

System allows user to Add, Update, Delete the Daily planned schedule and add also the driver's material. The driver can view the schedule on their mobile app. Users are able to view specific fields by filtering out either the Region, Area, Driver and Vehicle, Month, Week or Day.

Figure 17

DISPOSALS

System allows user to view or delete the Disposals. User receives the weight of the disposal from the weighbridge.

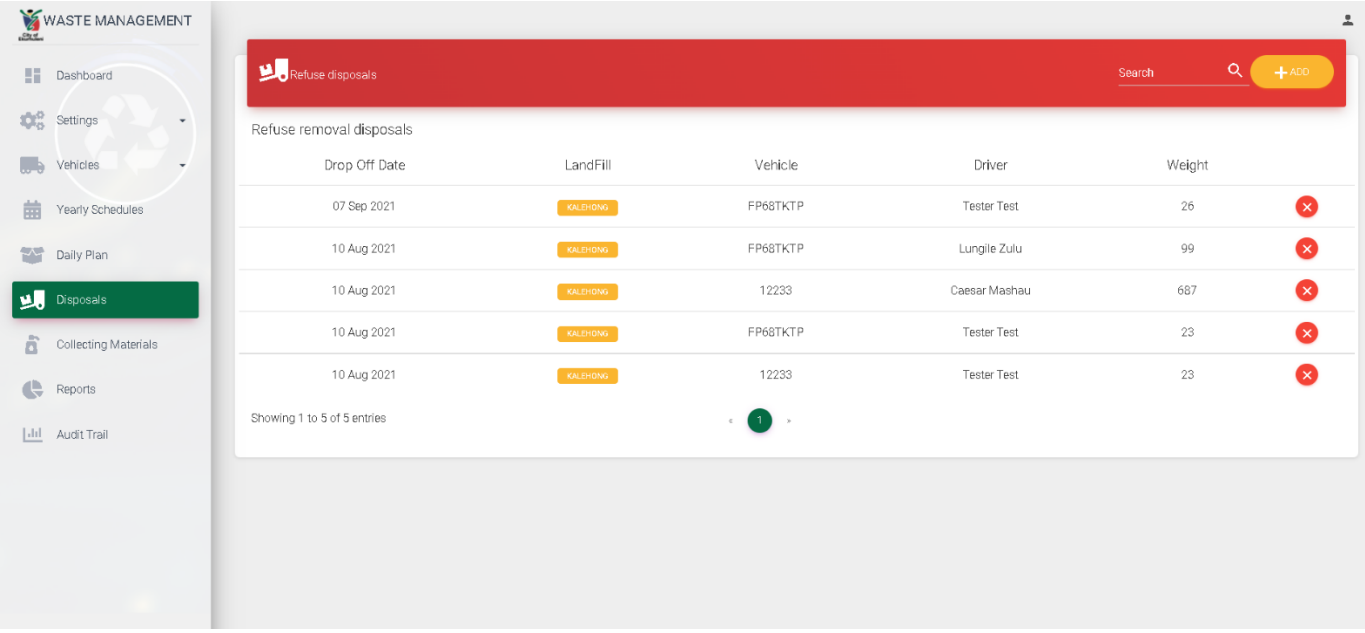

Figure 18

COLLECTING MATERIALS

System allows users to Add, Update, Delete Materials. The data is also provided in graphs in order to give the user a clearer understanding of the stock stats

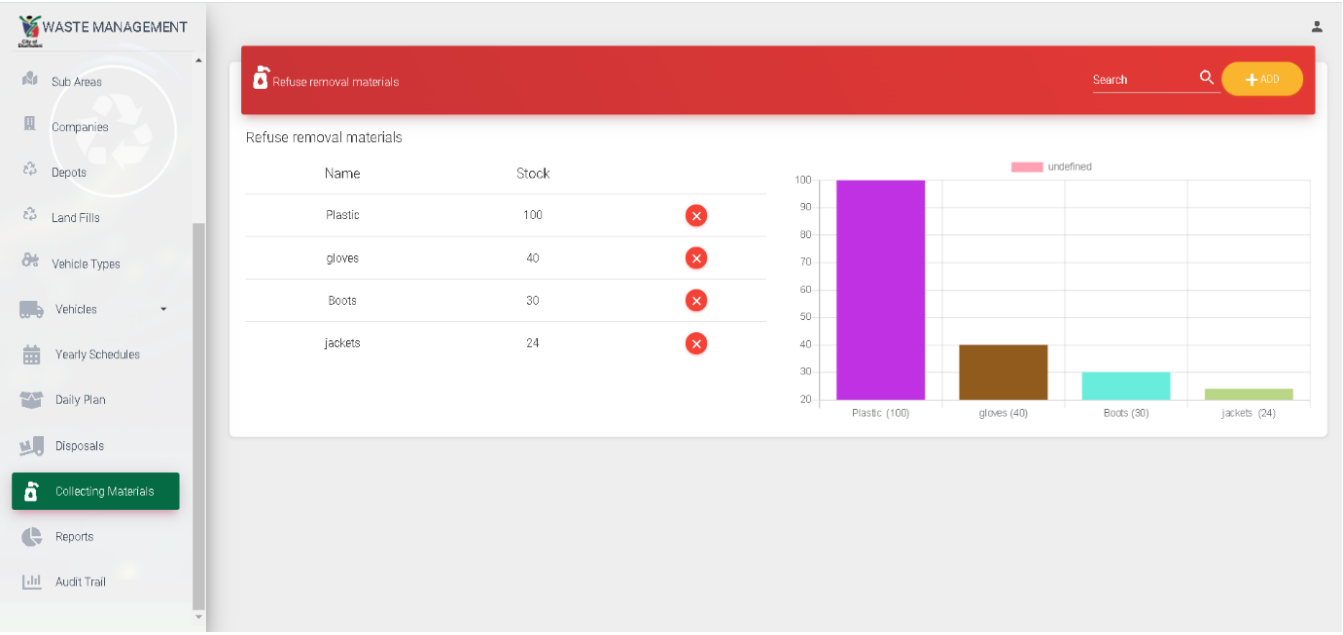

Figure 19

AUDIT TRAIL

The system allows User to view online audit trail at transaction level that contains date, time and the user who initiated, approved or amended any transaction, including workflow. User can also download the reports.

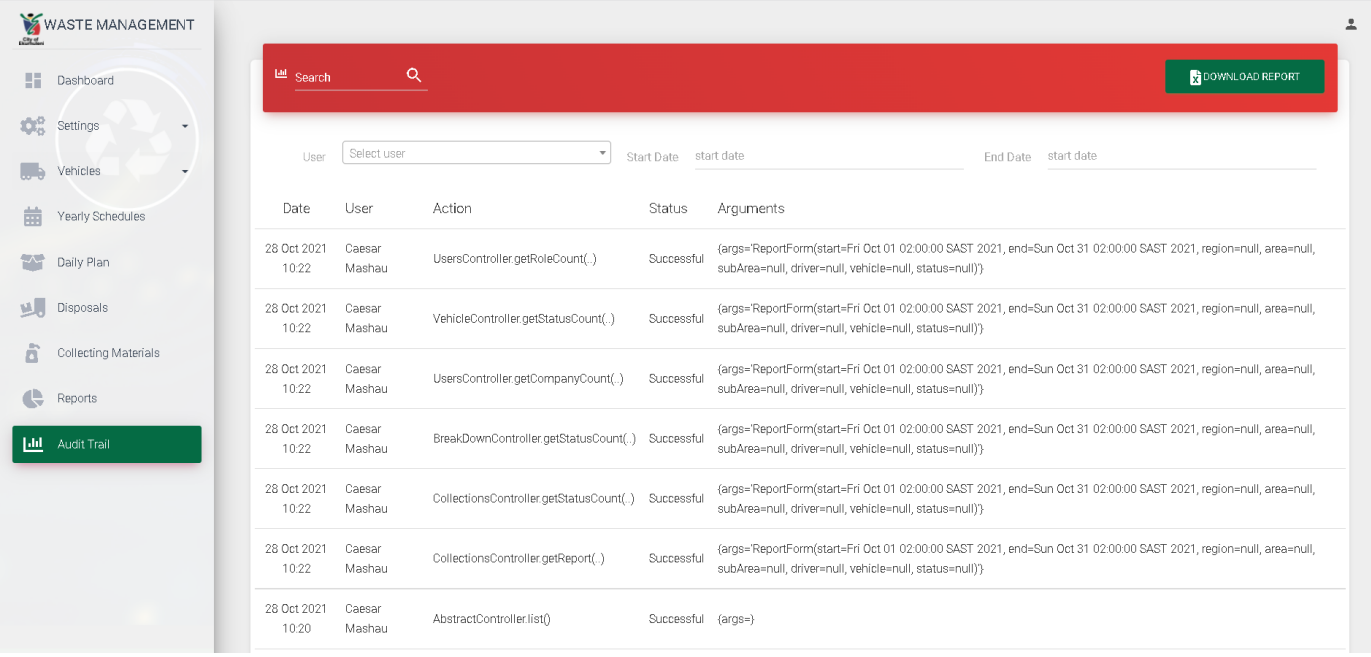

Figure 20

REPORTS

Reporting section describes in what way information collected by the system are presented and how to access the information. They system collects information in the background of all the functionalities and the performance of the system

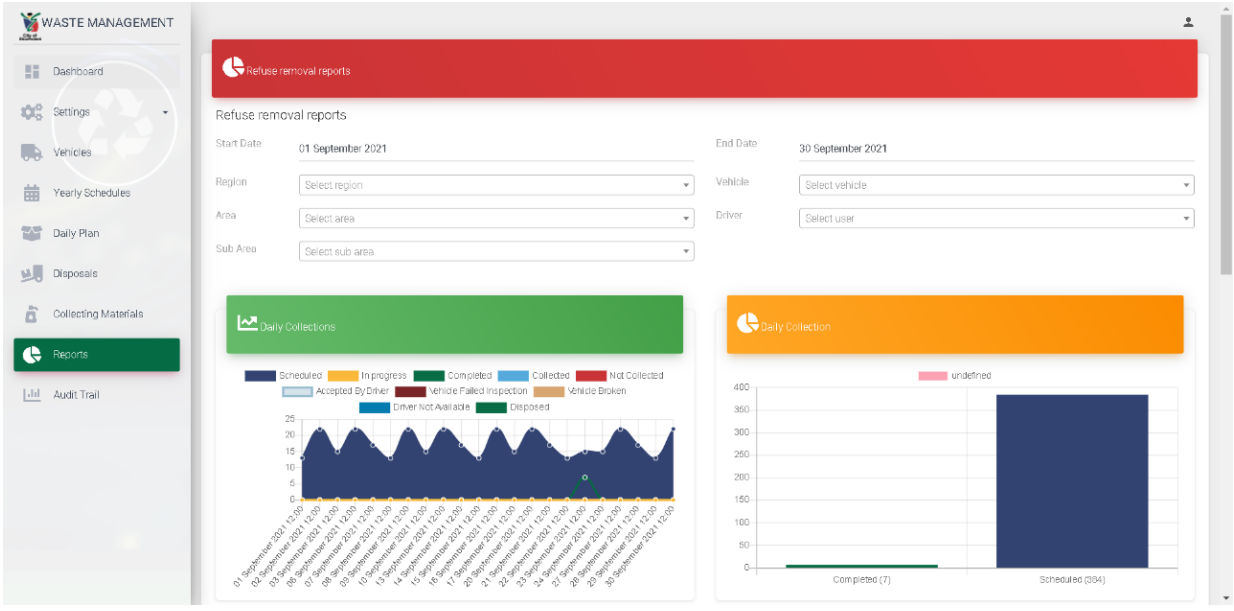

Figure 21

Figure 22

As seen in this figure, the admin can view an overview of all the captured data from a selected time range. The data is provided in graphs in order to give the user a clearer understanding of the stats that took place, where they took place and what was involved in the statistics to better know what actions need to be taken to insure there is efficiency and change within the Waste Department.

EXIT SYSTEM

The waste management system can be closed by the browser, but is it advisable to first log out on the user profile to ensure the integrity of the system and the information that it houses