



USAID



Software Development Report for Asset Management System Software - MSDP

(LGSA)

Jointly Submitted by



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Submitted to



**Program Management Unit (PMU)
Municipal Services Delivery Program
(MSDP)
Planning and Development Board
Govt. of Sindh**

Address: MSDP Office, D-18, Block-2 Kehkashan Clifton,
Karachi Pakistan

5th July, 2021

To,

The Program Director

Program Management Unit (PMU) – Sindh MSDP
Planning & Development Department
Government of Sindh, Karachi
D-18 Block 2, Kehkashan, Clifton, Karachi

**SUBJECT: SUBMISSION OF SOFTWARE DEVELOPMENT REPORT, TESTING MATRIX AND
EVALUATION REPORT FOR ASSET MANAGEMENT SYSTEM FINAL
DEVELOPED UNDER LGSA PROJECT, MSDP.**

Dear Sir,

We are thankful for your approval of Software Development Report, Testing Matrix and evaluation report for Asset Management System during the Quality Assurance Committee (QAC) meeting held on June 25, 2021.

We are pleased to submit final version of this report for your record

We will be glad to provide any additional information if required.

Looking forward to cooperating with you.

With Best Regards,



Avais Ahmed Memon

Chief Operating Officer
Management & Development Center (MDC)
Focal Person (LGSA), MSDP

Cc to:

- Director General (Works), PMU-Sindh MSDP, Karachi.
- Director (Reforms), PMU-Sindh MSDP, Karachi.
- Deputy Director (Reforms), PSU- Sindh MSDP, Jacobabad
- Assistant Director (Reforms), PSU-Sindh MSDP, Jacobabad.
- Office Record.

Issue and Revision Record

Revision	Report Submission Date	Originator	Checker & Approver	Description
0	March 2020	Mr Tariq Hafeez	Mr Zeeshan Abro	-

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
Chapter-1 Project Background	2
1.1 Problem Statement	2
1.2 Project Objectives	2
1.2.1 AMS The Objective of the MIS Project Component	3
1.3 Project Components.....	5
1.4 Implementation.....	7
Chapter-2 Technical Approach and Methodology of Assets Management Software.....	8
2.1 Users of the Software.....	8
2.2 Software Application Tiers	9
2.3 Software Programming Language.....	10
2.4 Database Engine.....	10
2.5 Reporting	10
2.6 System Security	11
2.7 Data Security	12
2.8 System Risk Analysis.....	13
Chapter-3 Development of Assets Management Software	14
3.1 Support & Maintenance	16
3.2 System Flow Diagram	16
3.3 Use Case Diagram.....	18
Chapter-4 User Guide for Assets Management System.....	19
ANNEXURE–A –	20
ASSET MANAGEMENT SYSTEM TESTING MATRIX –.....	21
AMS SOFTWARE EVALUATION REPORT.....	23

ABBREVIATIONS

AEN	Assistant Executive Engineer
AIT	Asian Institute of Training
AMS	Asset Management System
BMS	Bill Management System
CMO	Chief Municipal Officer
CMS	Complaint Management System
CNIC	Computerized National Identity Card
DG	Director General
DPI	Dots Per inch
FGD	Focus Group Discussion
GB	Gigabyte
Ghz	Gigahertz
GIS	Geographic Information System
GPS	Global Positioning System
HR	Human Resources
HRD	Human Resource Development
HRM	Human Resource Management
IT	Information Technology
LGD	Local Government Department
LGSA	Local Government Strengthening Activity
M&E	Monitoring & Evaluation
MC-J	Municipal Committee Jacobabad
MDC	Management & Development Center
MIS	Management Information System
MSDP	Municipal Services Delivery Program
PHED	Public Health Engineering Department
PMU	Project Management Unit
PPP	Public Private Partnership
PSC	Project Steering Committee
PSU	Program Support Unit
RAM	Random Access Memory
RoBs	Rules of Businesses
SLGA	Sindh Local Government Act
SMS	Short Message Service
SOP	Standard Operating Procedure
SSL	Secure Sockets Layer
TA	Technical Assistance
TNA	Training Needs Assessment
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

Government of Sindh is implementing Local Government Strengthening Activity (LGSA) project, with the financial assistance of the USAID for Municipal Committee of Jacobabad and five other municipal committees.

During the period (October 2019– October, 2020), besides other tasks, M&E consultants, under the “MIS for Municipal Committee Jacobabad, Initial Phase, MIS Software development”, is responsible to develop Assets Management Software for Municipal Committee Jacobabad to record assets of MC-J and provide comprehensive report to management for further decisions.

The Assets Management system has been developed based on the specific requirement for the project in consultation with the stakeholders. The main purpose of the software is to add/view/display the assets with different stages, current MC-J staff is working manually on papers to add / update assets. Accordingly, this report, comprising the development phase of the software, is presented to the Project Monitoring Unit (PMU).

Immediately after signing of the contract agreement, the software development team gathered a requirement of the software from different officials of Municipal Committee Jacobabad, and Project Monitoring Unit (PMU).

Consultation meetings were convened with the stakeholders to gather their requirements for AMS. Several designs were made and shared with relevant officials at MCJ, PSU, and PMU. Based on their feedback/suggestions, the AMS was finalized with the web application.

After the development of AMS, the M&E Consultants are planning to organize training or capacity building sessions to specifically train relevant staff of MC-J in the implementation of software by using Web-Based Application in consultation with PMU. The training is aimed to equip the concerned staff of the implementing AMS for recording the assets data directly through the web-based application and its subsequent available on the server for online access by concerned authorities. During the training, relevant material such as a manual for the training will also be provided. The training will be conducted on an interactive experiential training method.

The main benefit of the software is that it has the ability to provide advanced reports for the management and those reports can be exported in multiple formats including **Excel, Word, Adobe PDF and HTML**.

It is being ensured that the Cloud-based Server is up and running at all times, Web-based application modules are bug-free during their operations and the database server is up and running without any data related issues. The relevant staff of MCJ, Call Center Agents and PMU will be trained in the implementation of software by using Web-Based Application.

Chapter-1 Project Background

As described in the RFP document, water is fast becoming a diminishing resource, which is also poorly governed and managed. Per capita water availability in Pakistan has decreased from 5,260 cubic meter per person in 1,951 to 1,032 cubic meter per person in 2017. Government of Sindh in partnership with USAID is investing 4.9billion PKR in the city of Jacobabad to upgrade the water supply, sanitation and solid waste management (WSS) systems of Jacobabad city, leading to measurable improvement of governance and health outcomes. Challenges in the staff capacity and weak municipal systems, puts this investment at a higher risk of failure. To safeguard Government's investment in water and sanitation scheme of Jacobabad, a comprehensive capacity building initiative has been designed for the Municipal Committee Jacobabad. The project collaterals are also pertinent to improve the service delivery in other secondary cities of North Sindh which have similar challenges in basic municipal service delivery.

Assets Management System falls under the capacity and system development component of the project. The main objective of implementing a state-of-the-art Asset Management System in the MC-J is to:

- To Manage Assets of the MC-J on an online software;
- To Track of the Assets of MC-J;
- To manage equipment management and facility scheduling;
- To develop Inventory Management Controls;
- To manage vendors for the MC-J.

1.1 Problem Statement

Currently, MC-J is managing a manual register to keep the record of assets. There is no dedicated personnel to manage the assets. Currently, there is no reporting mechanism available or there is no monitoring mechanism available at the MC-J.

It is very difficult to get the updated data of the assets with no proper management of asset assigning to different officers.

1.2 Project Objectives

The overall goal of the LGSA is to increase the capacity of Jacobabad Municipality to provide effective, sustainable and quality municipal services, including clean drinking water supply, safe management of effluent water and solid waste disposal. In addition to these objectives, similar training will be imparted to other Northern Sindh towns that fall under the MSDP ambit. The project is primarily designed for the training of Municipal Staff of Jacobabad, Mehar, Johi, Qamber Shahdadkot, and Khairpur Nathan Shah. Municipal Committees, Local Government, Planning and Development Department officials, Civil Society Organizations, and elected representatives toward a more capacitated, accountable and efficient municipal governance tier. The project comprises of four components:

1. Policy & formative research.
2. Capacity & Systems development.
3. Civic engagement.
4. Targeted Technical Assistance to 5 Municipalities for water and sanitation sector.

The project is an integral part of ongoing GoS infrastructure interventions in the Municipal Committee limits of Jacobabad. It essentially focuses on technical training and allied systems development aspects of water & sanitation service delivery and. The project will complement the hardware interventions to sustain the investment, ensure intended health benefits and contribute to the livelihood and economic prosperity of beneficial populations.

Illustrative project outputs and deliverables are as under; Section 2- Information to Consultants – Data Sheet

Development, test run and assessment, and maintenance of three months at least of following applications:

- Municipal Complaint Management System;
- Assets Management System;
- Web-based Geographic Information System linked with Customer Database, assets, and maintenance purposes.

1.2.1 AMS The Objective of the MIS Project Component

General Objective – AMS

The main objective of this sub-component of the project is to develop an assets management system for the MCJ, bring E-Governance in MC-J and change the manual system to digitize system to web-based AMS application.

Specific Objective – AMS

To achieve the above mentioned General Object – AMS, the system addressed the following specific objectives:

- Analyzed the existing system and design a better system for the MCJ;
- Designed and develop a user-friendly system to handle data insertion, updating and retrieving on the database / AMS application front end without any IT expertise;
- Designed the interface for the system;
- Created a login page for AMS;
- Created a self-service portal for Staff of MCJ;
- Created user management for MCJ staff;
- Designed and generated reports;
- Designed and developed Assets Tagging and Bar code report;
- Developed a secured database to record and perform the decision activities.

Significance of the AMS

This sub-component of MIS project having the potential to reduce the gap between the Management and warehouse staff of MCJ and desired significance to MCJ this system also has the following significance:

- The senior management' involvement in the adoption and support of AMS application, as well as, relationships between senior management and employees; and, current change-management strategies;
- Increase speed of activity of assets management because the current system is slow;
- To get information on time;
- Improve assets available regarding the fulfillment of their requisitions;
- With regards to human resources: to evaluate senior-management involvement in the adoption of asset-management techniques; to examine the relationship between managers and employees as well as between employees; to evaluate the managers and employees' willingness to adopt new asset-management techniques using new AMS software;
- To make easy and suitable distribution of solutions and reports to management;
- Creating a better working environment for asset handling;
- Can use the information that is captured to make process improvement and develop new policies;
- To satisfy the Jacobabad community.

Beneficiaries of the AMS

The main beneficiary of this system include:

The Municipal Committee:-The Municipal Committee gets the benefit from this project because they can solve the problems that exist in the assets and there is no loss of equipment. The MCJ improves the availability of their assets in warehouse and fast requisitions.

Data Gathering methodology

The project team used observation, presentation, meeting and interviewing for data-gathering. Since there is no existing system available at MC-J to manage and maintain the record of assets; the project team relied on the one on one interviews and group discussions.

Observation: - To understand directly how the existing working the system, we used observation and this technique helps to understand problems in the existing system currently working at MCJ. We observed asset information is not available in electronic form while interaction with the Staff of MCJ.

Online Assets Management System

The developed Asset Management System is an online cloud based system which helps create unlimited number of users with specific rights and privileges to use the system. The system can be used from any location of the MC-J to add the record. The system will provide the current status of the

assets under the possession of MC-J and the number of assets assigned to others for any specific reasons.

The system is smart enough to provide periodic reports to the management to have a complete glance of the Assets at the MC-J. The software is also bar code enabled that lets you maintain the record in just seconds.

Here are detailed information of each module and its sub-module.

1.3 Project Components

The project comprises six main components:

- (a) Dashboard
- (b) Assets
- (c) Vendors
- (d) Settings
- (e) Reports.

These project components, are elaborated below:

Component A: Dashboard:

A business dashboard is an information management tool that is used to track KPI's and other key assets data points relevant to an owner, department, or specific process. Through the use of data visualizations, dashboards simplify complex data sets to provide users with a glance awareness of current assets management.

Dashboard consist following data facts:

- KPI
- Sub indicators
- Graphs

Component B: Assets:

Asset management is an important tool because it helps the municipality maintain and operate infrastructure in the most effective way so critical services can be provided to the community.

A service to a community or municipality. Buildings – Infrastructure that pumping station or provides shelter for any water/wastewater infrastructure or equipment, Municipal committee office.

Common types of assets include: current, non-current, physical, intangible, operating, and non-operating.

What Are the Main Types of Assets?

- Cash and cash equivalents.
- Inventory.

- Investments.
- PPE (Property, Plant, and Equipment).
- Vehicles.
- Furniture.
- Patents (intangible asset).
- Stock.

In this module the user will be add any type of asset in the system with its quantity.

Component C: Vendor

A vendor, also known as a supplier, is an individual or company that sells goods or services to the company. Vendors are a part of the supply chain: the network of all the individuals, organizations, resources, activities, and technology involved in the creation and sale of a product, from the delivery of source materials from the supplier to the manufacturer, through to its eventual delivery to the end-user.

The Asset Management System helps you manage all your suppliers/vendors record. The user will have to add a vendor record for the first time with its complete profile.

Component D: Setting:

This module consists of different components related to your organization details like organization's stations, departments, Projects, Employees, System Settings and system log, etc. the System administrator will have to define the complete the structure of their organization for the very first time. Station, Department and Currency management will also identify here for future use.

All components are label here with the configuration steps; please follow each step in the presented order.

Component E: Reports:

Reports connects with data sources, gather information and provide insights in the form of text reports and based on the input data so the user can find useful information.

The reports help in the decision-making process. Detailed insights will give you more visibility over data. Reports module presents the data in an attractive manner. By representing the data in an attractive manner, make data more readable, useful, and presentable.

The Reports menu has two options.

1. General Reports (Bar Code Generate)
2. Assets Reports
 - a. Assets
 - b. Checkout Assets
 - c. Assign Assets
 - d. Maintenance
 - e. Vendor List
 - f. Return Assets

1.4 Implementation

As mentioned the Assets Management System developed for the MC-J is based on the requirements collected at the MC- Jacobabad & PCU. The software is a cloud based, Turn-Key solution. The system has been presented to the management for their final feedback and all the feedbacks received by the project team are incorporated.

The User level Testing is also performed in the AMS and now it is ready to be implemented at the MC-J.

Chapter-2 Technical Approach and Methodology of Assets Management Software

Immediately after signing the contract agreement, the software development team gathered the requirement of the software from different officials of Municipal Committee Jacobabad, and Project Monitoring Unit (PMU).

The project team used the Agile Method of software development. The Agile method has proved to be one of the most successful methods, due to its flexibility and ability to create and respond to change. This method helps the team to evaluate and identify the scalability of the software in future needs.

The agile method of software development helps the team to execute, control and close the project by meeting the specific requirements of the client.

The approach in developing this project was purely Object Oriented. The client/server infrastructure of this system allows easy access to all the records from any remote location anytime. The user role-based approach limits access to the system to specific personnel, thus allowing the system administrator and the top-level management to take full control of who sees what inside the organization.



The team is ensuring that the user control is strictly controlled and there is a log for every activity that is performed within the software. The access control module of this software helps management to control access according to the job description and assigned roles and responsibilities of the individual. The audit log of the software is providing the information on who did what with the time and date stamp. This information is essential to monitor the activities of the software and avoid any misinformation and risk before they arise. Software can also send notifications if any sensitive information is accessed.

2.1 Users of the Software

The modern-day technology does not require a limitation of the number of users to access the software. This software is giving access to Admin User (Super Admin) to create as many users as they want and control their access according to their policy. The software is extremely user friendly so that anyone with or without computer knowledge is able to operate the software with ease and comfort. All the user needs to have is a computer with internet and domain knowledge of his assignment. The methodology that makes this software extremely user friendly is the use of standard patterns to input the data throughout its modules.

The AMS forms contain input fields, dropdowns, and dynamic information based on the requirement gathering analysis. We encourage the dynamic information to be entered so that users will be comfortable and confident while entering the data and maximum reporting and analysis can be generated using those dynamic fields.

In order to carry out the project successfully, the project team has undertaken the following:

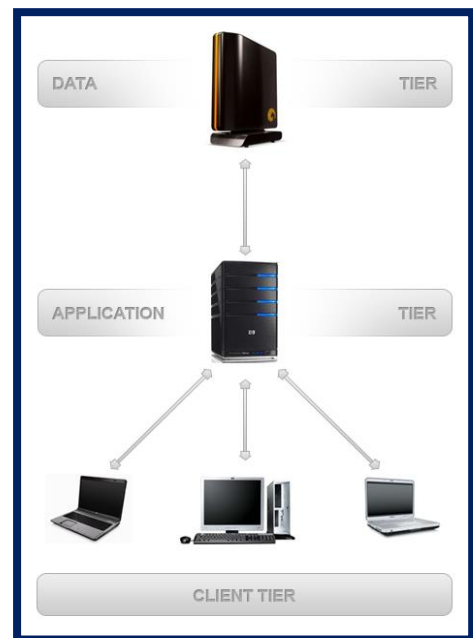
- Carried the requirement analysis through one on one meetings, reviewing currently available reporting templates, client’s current needs, client’s future expectations, and data analysis requirements, etc.
- Started mapping the information by keeping automation and validations of the assignment.
- Created the prototypes of the Assets Management Software to present it to management.
- Presented prototype to the Stakeholders in a formal presentation and the team have accepted changes to lock down the requirements.
- kept close and effective coordination with the stakeholders.

2.2 Software Application Tiers

The software is being developed based on 3-tier software architecture, where Tier-1 works as Client Tier, Tier-2 works as Application or Middle Tier and Tier-3 acts as Database Tier.

Following is the brief description of each tier involved in the software:

- **Client Tier:** This is where users interact with the application. This application is a thin-client application, meaning thereby that all user input is marshaled to the server using HTTP steam. The server processes the data/request and sends back the response which can be the next step the user has to take or the result of an operation the user requested. This process goes on and on till the user logs off.
- **Middle Tier:** Here goes the business logic. All the processing of data takes place in this tier. User input is accepted, validated and if everything is ok the requested operation takes place. When required, this tier connects to the back-end database server to fetch/stored data.
- **Database Server:** All the data storage takes place in the Relational database server. Relational databases are specialized pieces of software specially developed to store, query and manage the huge amount of raw data very efficiently.



Tier Application Diagram

2.3 Software Programming Language

The project is developed using an Open Source programming language, PHP version 7.0 . This programming language is used world-wide by very large enterprises like Google, Yahoo, etc. Using this programming language, the project guarantees the maximum support from a very large open source community on the Internet for any future development or updates. Licensing cost for the above-mentioned programming languages is \$0 under the General Public License (GPL).

2.4 Database Engine

The software is being developed using open cloud database engines MySQL version 5.6. MySQL comes in various versions, such as Community Version, Enterprise Version. Depending upon the client’s need, an appropriate version can be used for this project. MySQL database is also used in many large enterprises, such as AWS, etc. MySQL is a subsidiary of Oracle Corporation.

The application is being developed keeping in mind the vast amount of data that needs to be imported from the past several years and to make provision for at least the next 20 years. The database architecture will be expandable, where more database clusters can be added on a need basis, thus making it flexible enough to accommodate millions of documents (if required) and data entry objects. Its flexible nature will make it easy to add more database space by just adding an external hard drive to the database server and making more space for the data.



The Cloud Database architecture will give this application a very high and consistent performance, with container-based virtualization instead of traditional hardware virtualization, high-performance SAN storage, and a dedicated storage network. The proposed Cloud Database can also use APIs to dynamically create new databases on a need basis. The implementation of Cloud Database will make this application free from the fear of data loss, since Cloud Database already provides redundant storage with built-in data replication to protect the data against hardware failures.

2.5 Reporting

The software will have the provision of comprehensive reports for the management, to employ in decision making. Flexible reporting allows the management to take out reports by any of the components, data, and chronology and with other advanced options. The reporting, as a tool, would allow the Client's management to share information.



The reporting mechanism allows the management to **export the reports** in multiple formats including **Excel, Word, Adobe PDF, HTML**. These formats can not only be exchanged with external stakeholders but would also serve as a meaningful way to present the findings to bodies like the USAID, and other national and international organizations for which the data may need to be presented in a particular fashion.

2.6 System Security

Computer Software has always been vulnerable to attack. Data can be stolen or corrupted. Networks can be compromised. A website can be the gold mine to an organization - or the back door to let hackers and criminals destroy the image of the organization. When it comes to security, especially where the data is extremely critical, like in the case of a Bank, no compromises should be made in any way.

Municipal Committee Jacobabad

Home
Assets
Vendors
Reports
Settings
admin

bahzad ahmad! Wednesday, March 25, 2020 3:06 pm

Assets 15

Maintenance 20

Vendors 6

Assets Cost

Vendor	Category Name	Sub Category Name	Product Cost
Adeel Communication	Physical Assets	Office / Computer Equipment	60,000
Bahzad	Physical Assets	Office / Computer Equipment	20,000
Govt. Assets	Physical Assets	Land	0
Govt. Assets	Computers And Laptops	Laptop	120,000
Govt. Assets	Computers And Laptops	Tablet	25,000
Verge Systems	Physical Assets	Plant	0
Verge Systems	Printer & Scanner	Printer	0
Verge Systems	Electronic Equipment's & Furniture	Desk	0
Verge Systems	Smartphone & Tablet, Telephone	Smartphone	0
Verge Systems	Security Devices	Thump- Drive	0

Assets Quantity

Category	Verge Systems	Govt. Assets
Printer & Scanner	1	0
Laptops and Computers	2	0
Verge Systems	2	0
DVR	0	3
desktop, tower PC	0	2
Plant	0	0

Remaining Assets

Vendor	Category Name	Sub Category Name	Product Name	Product Cost
Adeel Communication	Physical Assets	Office / Computer Equipment	Desktop	60,000
Bahzad	Physical Assets	Office / Computer Equipment	desktop v2	20,000
Govt. Assets	Computers And Laptops	Tablet	tablet hp01	25,000
Verge Systems	Verge Systems	Laptops And Computers	camera	0
Verge Systems	Physical Assets	Plant	icidada	0
Verge Systems	Computers And Laptops	Desktop, Tower PC	desktop	0
Verge Systems	Computer Accessories	Mouse	adtech	450

Assets Categories

Assets Name	Assets Categories
adtech	Computer Accessories
Agriculture Land	Physical Assets
icidada	Physical Assets
camera	Verge Systems
desk	Electronic Equipment's & Furniture
desktop	Computers and Laptops
Desktop	Physical Assets
desktop v2	Physical Assets
laptop	Security Devices
laptop acer	Verge Systems

Vendors List

Vendor Name	Vendor Type	Vendor Phone Number
Adeel Communication	Communication	
Awari Computers	IT Equipments	
Bahzad	IT Equipments	
Govt. Assets	IT Equipments	
Tariq Communication	IT Equipments	
Verge Systems	IT Equipments	0333776049

Assets Dead List

Assets Name	Category Name	Sub Category Name	Assets Dead Date	Assets Dead Quantity
Adtech	Computer Accessories	Mouse	2020-03-19	1
Desktop V2	Physical Assets	Office / Computer Equipment	2020-02-25	1
Laptop Acer	Verge Systems	Laptops and Computers	2020-02-26	1

Checkout Assets List

Assets Name	Checked In	Checkout Date	Estimated Checkin Date	Checkout Time
Camera	Tariq Hafeez Lakhitar	March 19, 2020	March 19, 2020	10:49:00
Desktop	Tariq Hafeez Lakhitar	March 06, 2020	March 06, 2020	12:08:00
Laptop	Bahzad Ahmad	February 12, 2020	February 13, 2020	16:08:00
Laptop Acer	Tariq Hafeez Lakhitar	March 19, 2020	March 19, 2020	10:49:00
Recording DVR	Bahzad Ahmad	February 11, 2020	February 11, 2020	15:51:00

Assets Assign List

Assign To	Return Date	Asset Name
	June 15, 2016	recording DVR
	June 15, 2016	icidada
	June 15, 2016	laptop acer
	June 15, 2016	adtech
Bahzad Ahmad	February 11, 2020	desktop
Bahzad Ahmad	February 11, 2020	desktop
Bahzad Ahmad	February 11, 2020	desktop
Bahzad Ahmad	February 11, 2020	desktop
Bahzad Ahmad	February 11, 2020	desktop
Bahzad Ahmad	February 11, 2020	desktop
Bahzad Ahmad	February 11, 2020	desktop

Assets Maintenance List

Assign Name	Vendor	Maintenance Date	Maintenance By Employee	Item Name
Desktop	Adeel Communication	2020-03-19	bahzadahmad	Desktop machine
Printer	Govt. Assets	2020-02-13	bahzadahmad	hp
Printer	Govt. Assets	2020-02-13	bahzadahmad	epson
Printer	Govt. Assets	2020-02-13	bahzadahmad	hp
Printer	Govt. Assets	2020-02-13	bahzadahmad	epson
Printer	Govt. Assets	2020-02-13	bahzadahmad	hp
Printer	Govt. Assets	2020-02-13	bahzadahmad	epson
Printer	Govt. Assets	2020-02-13	bahzadahmad	hp
Printer	Govt. Assets	2020-02-13	bahzadahmad	epson
Printer	Govt. Assets	2020-02-13	bahzadahmad	hp

Rented Assets List

Assets Name
Digital Camera
Generator
Projector
TAT0

Sample of proposed Dashboard of Asset Management System

The security mechanism being followed is called Software Security Assurance (SSA). SSA is the process of ensuring that software is designed to operate at a level of security that is consistent with the potential harm that could result from the loss, inaccuracy, alteration, unavailability, or misuse of the data and resources that it uses, controls and protects.

SSA will ensure that:

- A security evaluation is being considered for the software.
- Security requirements are being established for the software.
- Security requirements are being established for the software development and/or operations and maintenance (O&M) process.
- Each software review, or audit, includes the evaluation of the security requirements.
- A configuration management and corrective action process is in place to provide security for the existing software and to ensure that any proposed changes do not inadvertently create security violations or vulnerabilities.
- Physical security for the software will be adequate.



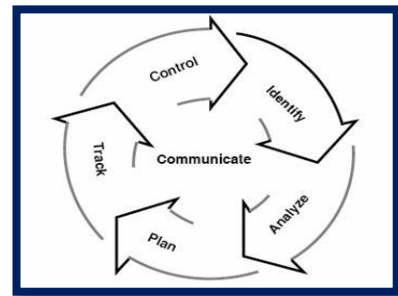
2.7 Data Security

Following are some of the measures that are taken to protect critical and sensitive data:

- **SSL Security:** The application is using 256-bit SSL encryption to protect information transferred between a user's computer and the core servers.
- **Secure Application Architecture:** The software is being designed from ground up with security in mind. Best practices in web application security to prevent all critical vulnerabilities and external attacks are being considered.
- **Strong Encryption:** All sensitive information in the application encrypted in the database using the strongest encryption algorithms.
- **Data Backups:** All application and data servers will be backed up daily/weekly to a completely different geographical location.
- **Compliant Data Centers:** Application & Database Server will be accredited to PCI DSS, ISO27001, and ISAE 3402 Type II SOC 1 standards, ensuring that the application data is secured by the best processes and technologies.

2.8 System Risk Analysis

Risk analysis and management are a series of steps that help a software team to understand and manage uncertainty. Many problems can plague a software project. A risk is a potential problem – it might happen, it might not. But, regardless of the outcome, it's always better to identify it, assess its probability of occurrence, estimate its impact and establish a contingency plan should the problem actually occur.



The strategy being followed is known as Risk Mitigation, Monitoring and Management Plan (RMMMP). RMMMP document is part of the System Analysis phase, it documents all work performed as part of risk analysis and is used by the project manager as part of the overall project plan.

Chapter-3 Development of Assets Management Software

Under this task, the development of software, namely, “Assets Management Software” of Municipal Committee Jacobabad, under the MSDP, was started by the E-Government Specialist and his team of Verge Systems of MSDP(LGSA) after the signing of a contract agreement. In order to develop the software, initial specific requirements have been gathered from different stakeholders. It is reiterated that as a part of this project, a customized software of Assets Management Systems is developed on a web platform that will perform data collection tasks and present live dashboard to display the assets and various sub KPI. This software is connected to the Internet to send live data captured from the MC-J to the dashboards of Senior Management MC-J and PMU.

The software, “Assets Management System” of MC-J , was finalized with the input from different officials of the stakeholders including Municipal Committee Council, Staff and Project Monitoring Unit (PMU),. Consequently, the meetings are convened with different officials on an individual basis and also in joint meetings, from time to time:

Department	Designation
Municipal Committee, Jacobabad	1. Chairman
	2. Vice-Chairman
	3. Chief Municipal Officer (CMO) / TMO
	4. Accounts Officer
	5. Revenue Officer
	6. Taxation Officer
	7. Assistant Executive Engineer (AEN)
	8. Sub-Engineer
	9. In-charge of Water Supply Section Wing
	10. In-charge of Waste Water Section Wing
	11. In-charge of Solid Waste Management Section Wing
	12. Any Other Suggested by PSU
Community	1. City Forum
	2. Any other suggested by PSU
Program Support Unit (PSU), MSDP @ Jacobabad	1. Project Manager / Focal Person
	2. Assistant Director, Reforms
	3. Sub-Engineer
	4. Deputy Director, Design
	5. Deputy Director, Engineering
	6. Any other Suggested by PMU
Program Management Unit (PMU)- MSDP @ Karachi	1. Director General (DG) Works
	2. Deputy Director, Monitoring & Evaluation
	3. Any other Suggested by PMU

The Assets collection is being incorporated in the database developed particularly for the software. The following sub-indicators of Components of MC-J have been incorporated in the database so that these could be displayed online dashboard:

- Main Sticker
- Graph
- Tabular Data of Assets with different dimensions.

The format of baseline data of Fix Assets and other mandatory data required for the AMS application. The format of Baseline data is presented below at end of document:

All Assets are displayed visual graph/tabular format on the dashboard of AMS:

A View of Assets Management System

The screenshot displays the 'Assets Management System' interface for the 'Municipal Committee Jacobabad'. The dashboard includes several key sections:

- Assets Cost:** A table showing asset details with columns for Vendor, Category Name, Sub-Category Name, and Product Cost. It lists various assets like 'Office / Computer Equipment', 'Land', 'Laptop', and 'Printer & Scanner'.
- Assets Quantity:** A bar chart comparing the quantity of assets across different categories, with 'Verge Systems' and 'Govt. Assets' being the primary categories.
- Remaining Assets:** A table listing assets that are currently in use, including details like 'Product Name' and 'Product Cost'.
- Assets Categories:** A list of all asset categories, such as 'Computer Accessories', 'Physical Assets', and 'Verge Systems'.
- Vendors List:** A table listing the vendors of the assets, including 'Vendor Name', 'Vendor Type', and 'Vendor Phone Number'.
- Assets Dead List:** A table listing assets that are no longer active, with columns for 'Assets Name', 'Category Name', 'Sub-Category Name', 'Assets Dead Date', and 'Assets Dead Quantity'.
- Checkout Assets List:** A table showing the checkout history of assets, including 'Assets Name', 'Checkout To', 'Checkout Date', 'Estimated Check-In Date', and 'Checkout Time'.
- Assets Assign List:** A table listing the assignment of assets to users, with columns for 'Assign To', 'Return Date', and 'Asset Name'.
- Assets Maintenance List:** A table listing the maintenance schedule for assets, including 'Assets Name', 'Vendor', 'Maintenance Date', 'Maintenance By Employee', and 'Main Name'.
- Rented Assets List:** A table listing assets that have been rented, with columns for 'Assets Name' and 'Asset Name'.

3.1 Support & Maintenance

After successful completion of the development of the software, the team will make sure about its sustainability. Team will make sure that the following issues are addressed during the implementation and maintenance period:

- Cloud based Server is up and running at all time;
- Web based application modules are bug-free during their operations;
- Database server is up and running without any data related issues;
- Impart Training on Software Use to the Relevant Stakeholders.

The project team is planning to organize training or capacity building sessions to specifically, train relevant staff of Municipal Committee and PMU in the implementation of software by using Web-Based Application in consultation with PMU. The training is aimed to equip the concerned staff of the implementing AMS for managing application.

The AMS assets directly keypunch into web-based application and its show data on the server for online access by concerned authorities. During the training, relevant material such as a manual for the training will also be provided. The training will be conducted on an interactive experiential training method.

One full day extensive training will be provided to the dedicated staff of the client. The training will be aimed at developing skills in using the AMS software, its different features and generating reports. The trainer will be explaining the features of the software and the trainee will practice it by himself/herself. The application is highly user-friendly, hence we believe it will be learned by the trainees during the training.

It will be an interactive experiential training in which trainees will be given access to the application to enter sample data and check the result. They will be trained on how to effectively best use the tool. There will be two levels of training which include:

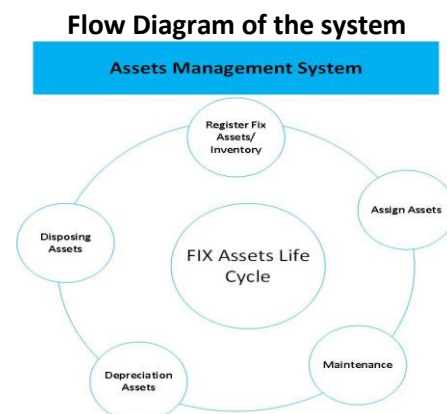
1. User Level Training.
2. Administrator Level Training.

3.2 System Flow Diagram

Register Fix Asset / Inventory

Asset /Inventory of information need to input system such as Assets name, Main category, subcategory, Manufacturer, vendor, assets stock number, asset type (Inventory or Fix Asset), Location, Asset Attributes: Quantity, Color, Purchase date, etc.

Product Depreciation: Method, Depreciation Value, Salvage Value, Recovery period.



Assets Description and Additional information

An asset is anything of monetary value owned by a person or business. Assets are classed as capital/fixed, current, tangible or intangible and expressed in terms of their cash value on financial statements (See examples of assets type below.) Tangible assets include money, land, buildings, investments, inventory, cars, trucks, or other valuables. Intangibles such as goodwill are also considered to be assets.

Assigned Assets

This component will be used to assign assets to MCJ staff. Asset assignment is permanent until the asset retire / assets require any maintenance or out of order.

Asset Maintenance

This component will be used for assets maintenance of assets and how much cost will it occur and when asset needs maintenance periodically.

Depreciation

The decrease in value of assets called Depreciation. In Product Depreciation stem allows you to add depreciation values. When you select a category, the system will show you all details in which you can also create depreciation type and followed by the value in number and salvage value.

Asset Disposal

Asset disposal is the removal of the asset from the organization software AMS. The asset disposal may be a result of several events: as the asset is fully depreciated and must be disposed of. As asset is sold at a gain/loss because it is no longer useful or needed. An asset must be disposed of due to unforeseen circumstances (e.g., theft).

Software Security

Following are some of the measures that will be taken to protect critical and sensitive data:

SSL Security: 256-bit SSL encryption to protect information transferred between a user's computer and Servers.

Compliant Data Centers: Data centers are accredited to PCI DSS, ISO27001 and ISAE 3402 Type II SOC 1 standards, ensuring data is secured by the best processes and technologies.

List of those who can access AMS:

- Staff of MC Jacobabad;
- An Employee of Local Government;
- Any other suggest by PSU/ PMU.

Note: All officials/departments will have their own password-protected access to AMS. Each staff will have a role in the application.

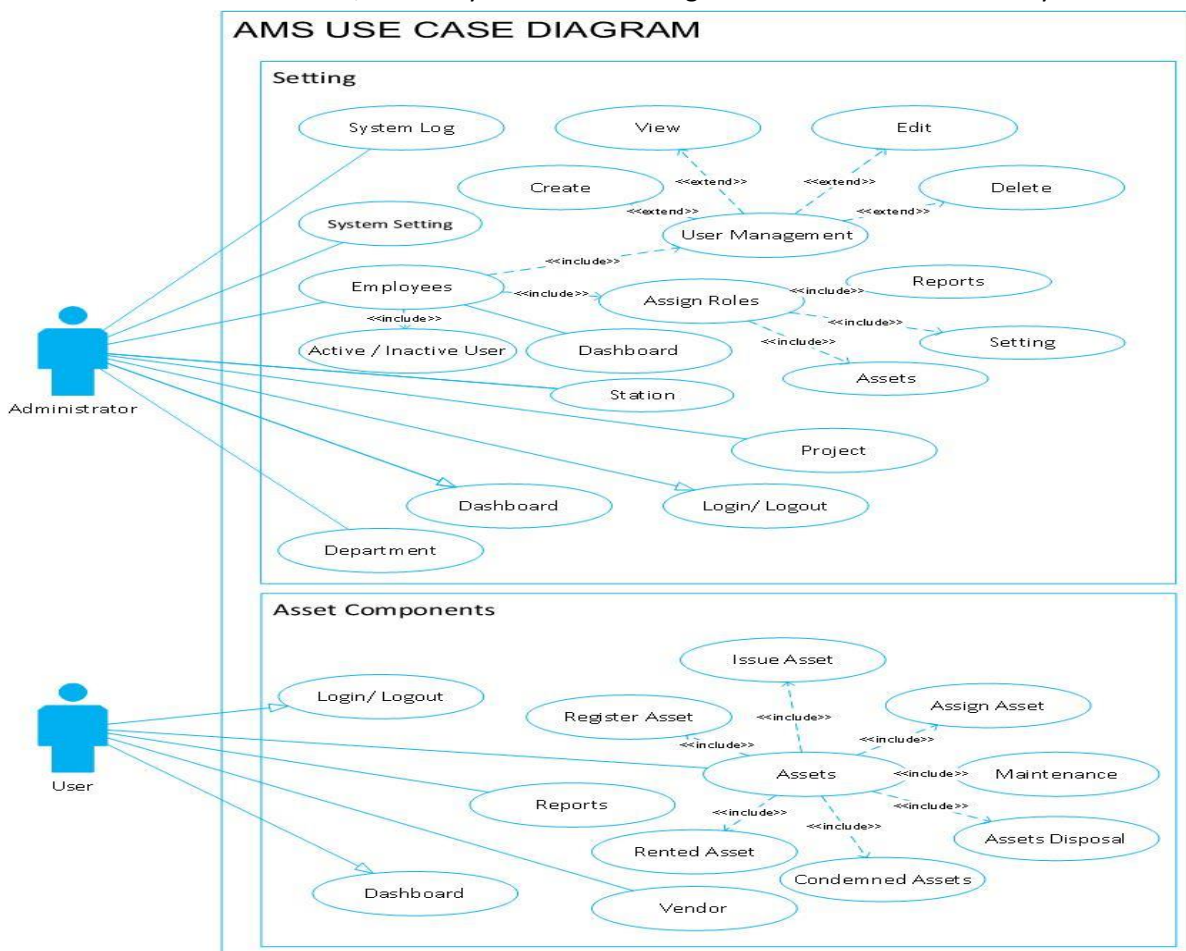
3.3 Use Case Diagram

Use case diagram shows the user functionalities perform by the administrator/user in the system. The main user is an Administrator.

AMS system has a major two sub-component of application.

1. **Setting:**
Setting component control by the system administrator. Further components are User Management, Dashboard, System Setting, Station, Project, Department.
2. **Assets Management:**
Assets management is the core application components which system administrator will assign to employees as per the job description/ roles. The components are Assets(Register, Issue, Assign, Maintenance, Condemned, Asset Disposal and Rented Assets), Reports(General Report, Asset reports), Vendor Management and Dashboard.

The main user is an Administrator, who has the power to log in, search, add new users, change/ verify the password, assign the rules to new/existing users and check the login errors, make the user active/inactive in case user provide the wrong password. Application users, after login, can access the dashboard & can search assets data using report module, & access all types on application own by the system administrator. They have also access to view/ edit assets, view dashboard and report using filters. User can add fix assets/inventory the record through the functionalities on the system menu.



Chapter-4 User Guide for Assets Management System

User Guide is provided in separate document.

ANNEXURE–A –

Base Data Sample Format

Station:

Station Information		Station Address									Additional Information
Sation Type	Station Name	Address	City	Province	Postal /code	Country	Phone number	Fax number	Email Address	Website	Notes

Department:

Department Information		Department Description	Additional Information
Department Name	Head of Department	Description	Notes

Project:

Project Information				Project Description	Additional Information
Project Title	Client / Sponsor Name	Project Start Date	Project End Date	Description	Notes

Employee information:

Employee Information				Employee Personal Information				Employee Address				Additional Information		
Station	Department	User Name	Status	First Name	Last Name	Designation	CNIC	Address	City	Province	Postal / Zip Code	Country	Phone / Cell number	Notes

System Setting:

Organization Details			Contact Person					Base Currency			Organization Logo	
Organization Name	Organization Starting Year	Fiscal Year Start Date	First Name	Last Name	Email Address	Country	Phone Number	Base Currency	Base Currency Sign	Number of Decimal Places	System Header Logo	Reports Header Logo

Vendor:

Vendor Information		Vendor Address								Vendor Description	Additional Information
Vendor Type	Vendor Name	Address	City	Province	Postal / Zip Code	Country	Phone Number	Email address	Tax Number	Vendor Description	Notes

ASSET MANAGEMENT SYSTEM TESTING MATRIX –

Here are the testing results of the defined parameters of the Asset Management System developed for Municipal Committee Jacobabad.

Feature and /or Function	Type	Test Case
General Settings		
Stations	-	Unit Test
Department	-	Unit Test
Projects	-	Unit Test
System Settings	-	Unit Test
Employee settings	-	Unit Test
Quick Search	-	Unit Test
Stakeholder Logo setting on AMS application	-	Unit Test
Report Setting	-	Unit Test
Define Assets Categories	-	Unit Test
in cooperate logic of Tag generate	-	Unit Test
Report Printing	-	Unit Testing
Operation on Module wise	-	Unit Testing
Software Application Features & Functions		
Main Dashboard	▪	System Testing
Key Performance Indicators	▪	System Testing
User Access Control	▪ -	System Testing
Assets Module	▪	System Testing
Report Module	▪	System Testing
Login / Logout Functionality	▪	System Testing
Retrieve Password (self-service)	-	System Testing
Active user	-	System Testing
Assign role to users	-	System Testing
Search Assets	▪	System Testing
Each KPI have data show option	▪	System Testing
Generate Assets Tags	▪	System Testing
Create User	▪	System Testing
Report Export Functionalities (Print, Email, document)	▪	System Testing
Add Vendors	▪	System Testing
Operation on Assets (Add , Issue , Assign, condemned, maintenance)	▪	System Testing
Assets Maintaince	▪	System Testing
▪ indicates software application feature and / or function which are included		
- The present position function is a capability of feature driven that has to be turned off and locked by administrator		

Pre-Configuration Management Testing

Unit Test: The developer conducts the unit test, typically on the individual modules under development. The unit test often requires the use of drivers and stubs because other modules, which are the source of input data or receive the output of the module being tested, are not ready for test.

AMS SOFTWARE EVALUATION REPORT

The Software Evaluation Report for Asset Management System presents the bugs and errors found out during the evaluation of the software. The Software went through the Alpha Testing for three times bugs, errors, and Add-On features of each activity are reported below:

Project Name: Testing: Evaluation Done by: Evaluation No: Date:	MSDP- MIS component AMS- Alpha Testing Tariq Hafeez EPAMS-001 26 TH February, 2020	
Unacceptable:	Needs Improvements	Meets Expectations
Issues with Asset adding Report generation has issues User Roles are not working Software loading (ER 001020_91)	Data Indexing needs improvements as it is taking more time to load. The Asset categories needs to be more dynamic for the analysis purpose and reporting functionality.	User Interface meets the expectation as it makes easier for the end users to operate the software.

Project Name: Testing: Evaluation Done by: Evaluation No: Date:	MSDP- MIS component AMS- Alpha Testing Tariq Hafeez EPAMS-002 22 nd March, 2020	
Unacceptable:	Needs Improvements	Meets Expectations
N/A	Software loading need to be more optimized.	Overall software functionality and validations meet software expectations.

Project Name: Testing: Evaluation Done by: Evaluation No: Date:	MSDP- MIS component AMS- Alpha Testing Tariq Hafeez EPAMS-003 2 nd April, 2020	
Unacceptable:	Needs Improvements	Meets Expectations