GROUP PROJECT COVER PAGE

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ASSIGNMENT TITLE : PROJECT PHASE 2 - DATABASE CONCEPTUAL DESIGN (ERD)

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1.0 Introduction

Based on the case study, MBIP has faced some challenges in their current way of collecting data for the Iskandar Puteri Calendar Competition. To address these issues, we have proposed a design that has a number of features that provides MBIP an efficient and reliable platform. The proposed system seeks to address the challenges through the integration of efficient carbon footprint calculations, registration and login processes, and monitoring dashboards. Emphasizing inclusivity, the system aims to provide user-friendly interfaces to encourage participation from individuals of all age groups. This document unfolds with detailed visual representations, including an Entity Relationship Diagram (ERD), an Enhanced Entity Relationship Diagram (EERD), and a Data Flow Diagram (DFD), illustrating the envisioned architecture and functionalities of our proposed system. These graphical representations serve as key tools in understanding the relationships, dependencies, and flow of data within the proposed system, marking a significant stride towards a sustainable and eco-conscious community.

2.0 Data Flow Diagram (To-Be)

2.1 Context Diagram

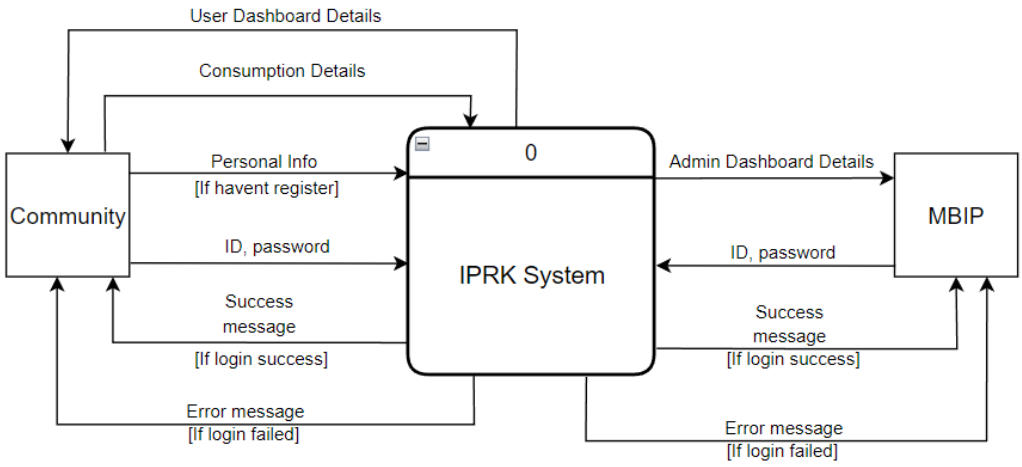

Figure 1: Context Diagram

2.2 Level 0 Diagram

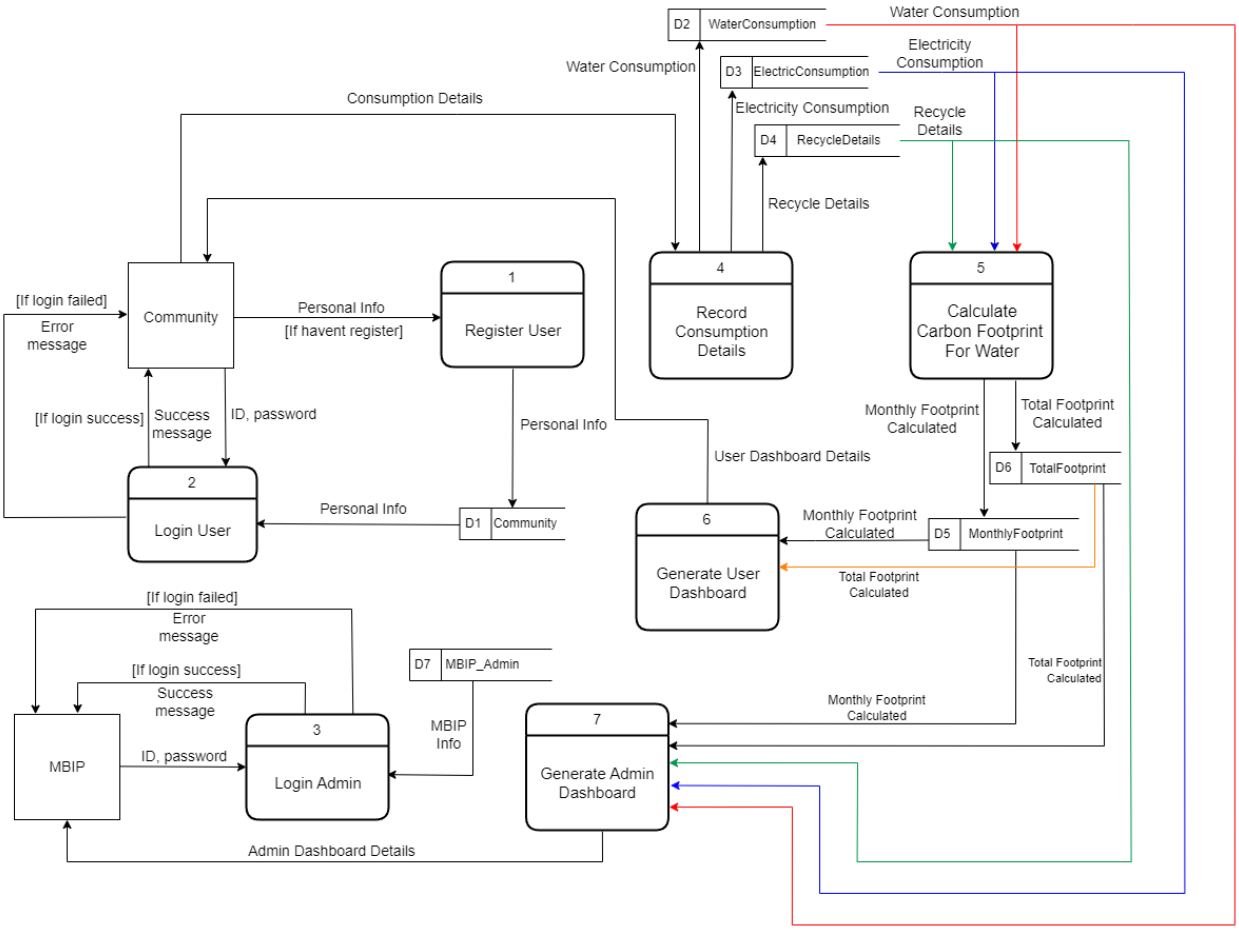

Figure 2: Level 0 Diagram

3.0 Data & Transaction requirement

3.1 Proposed Business Rules

- Each community can submit one recycle detail.
- Each recycle detail can be submitted by one community.

- Each community can have one or many monthly footprints.
- Each monthly footprint can be shared by one community.

- Each community can have one total footprint.
- Each total footprint can be shared by one community.

- Each community can submit one or many consumption.
- Each consumption can be submitted by one community.

3.2 Proposed Data & Transactional

Data

Entity: **User**
Attributes:
1. userID {PK}
2. userIC
3. fullName
4. password

Entity: **WaterConsumption**
Attributes:
1. WprorateFactor
2. waterConsumptionM3
3. waterConsumptionRM

Entity: **ElectricConsumption**
Attributes:
1. EprorateFactor
2. electricConsumptionkWh
3. electricConsumptionRM

Entity: **Community**
Attributes:
1. phoneNo

2. workStatus
3. workSector
4. address
5. category
6. occupants

Entity: **TotalFootprint**
Attributes:
1. userID {FK}
2. totalWaterFootprint
3. totalElectricFootprint
4. totalRecycleFootprint
5. totalFootprint

Entity: **MonthlyFootprint**
Attributes:
1. userID {FK}
2. month
3. waterFootprint
4. electricFootprint
5. recycleFootprint
6. monthlyTotalFootprint

Entity: **RecycleDetails**
Attributes:
1. userID {FK}
2. oilKG
3. oilRM
4. wasteKG
5. wasteRM

Entity: **MBIP_Admin**
Attributes:
1. division

Entity: **Consumption**
Attributes:
1. userID {FK}
2. Month
3. NumDays

Transaction

Data Entry

Insert user data such as userID, userIC, fullName and password into the User table to complete the registration of a user for the competition. Only one insert statement is required for one user from one house/institution/company/school.

Insert water consumption data such as WprorateFactor, waterConsumptionM3 and waterConsumptionRM to keep a record of water consumption by each user in a month, multiple inserts will be conducted as users submit for the remaining months.

Insert electric consumption data such as WprorateFactor, electric ConsumptionkWh and electricConsumptionRM to keep a record of electric consumption by each user in a month, multiple inserts will be conducted as users submit for the remaining months.

Insert community data such as phoneNo, workStatus, workSector, address, category, and occupants into the community table. This information will help categorize and organize the participants in the community. Each entry will represent a distinct community associated with the community.

Insert after calculating, total footprint data such as userID, totalWaterFootprint, totalElectricFootprint, totalRecycleFootprint, and totalFootprint. This will keep a comprehensive record of the environmental impact of each user, taking into account water and electric consumption as well as recycling practices.

Insert after calculating, monthly footprint data such as userID, month, waterFootprint, electricFootprint, recycleFootprint and monthlyTotalFootprint. This will allow tracking of users' environmental footprints on a monthly basis, considering both water and electric consumption as well as recycling practices.

Insert recycle details data such as userID, oilKG, oilRM, wasteKG, and wasteRM. This information will capture the recycling details of each user, providing insights into their efforts in waste management and recycling.

Insert MBIP admin data such as division attribute. This entry will help manage and categorize administrative divisions related to the competition, facilitating efficient administration and coordination.

Insert consumption data such as userID, Month, and NumDays. This entry will keep track of consumption-related data on a monthly basis, providing valuable insights into usage patterns over time.

Data Update/Delete

Update user personal information such as userID, userIC, fullName and password can be conducted if the user has previously entered the wrong details.

Update water consumption details such as WprorateFactor, waterConsumptionM3 and waterConsumptionRM can be conducted if the user entered the wrong details.

Update electric consumption details such as WprorateFactor, electric ConsumptionkWh and electricConsumptionRM can be conducted if the user entered the wrong details.

Update community information such as phoneNo, workStatus, workSector, address, category, and occupants. This allows users to correct any inaccuracies in their community details.

Update total footprint details such as totalWaterFootprint, totalElectricFootprint, totalRecycleFootprint, and totalFootprint for a specific userID. This enables the system to rectify any errors in the environmental footprint data.

Update monthly footprint details such as waterFootprint, electricFootprint, recycleFootprint and monthlyTotalFootprint for a specific userID and month. This allows the system to correct any inaccuracies in the monthly environmental footprint data.

Update recycle details such as oilKG, oilRM, wasteKG, and wasteRM for a specific userID. This allows users to correct any errors in their recycling details.

Update MBIP admin details such as division attribute. This allows for changes in administrative divisions as needed.

Update consumption details such as Month and NumDays for a specific userID. This allows users to correct any inaccuracies in their consumption data.

Deletion of water consumption, electric consumption, can be conducted upon user requests to MBIP admin.

Deletions of community records can be carried out if a community is no longer participating in the competition or upon request to the MBIP admin.

Deletion of TotalFootprint records can be executed upon user requests to the MBIP admin.

Deletion of MonthlyFootprint records can be carried out upon user requests to the MBIP admin.

Deletion of RecycleDetails records can be executed upon user requests to the MBIP admin.

Deletion of MBIP_Admin records can be carried out upon request or if the administrative division is no longer relevant.

Deletion of Consumption records can be executed upon user requests to the MBIP admin.

Data Queries

Query can be conducted by the MBIP admin to list all the records of users, providing a comprehensive overview of user details such as userID, userIC, fullName, and password.

Query can be conducted by the MBIP admin to list all the records of water consumption, enabling the MBIP admin to access information on WprorateFactor, waterConsumptionM3, and waterConsumptionRM for each user.

Query can be conducted by MBIP to identify the water consumption record with the lowest consumption volume and consumption price.

Query can be conducted by the MBIP admin to list all the records of electric consumption. This allows the MBIP admin to view details such as EprorateFactor, electric ConsumptionkWh, and electricConsumptionRM for each user.

Query can be conducted by MBIP to identify the electric consumption record with the lowest consumption kilowatt and consumption price.

Query can be conducted by MBIP to list water consumption and electric consumption based on certain criteria such as consumption price more than RM 500.

Query can be conducted by MBIP admin to list users according to categories such as A1 and A2.

Query can be conducted by MBIP admin to list users according to sector such as Sektor Awam and Sektor Swasta.

Query can be conducted by the MBIP admin to list information about the total environmental footprint of users, including totalWaterFootprint, totalElectricFootprint, totalRecycleFootprint, and totalFootprint.

Query can be conducted by the MBIP admin to list users' environmental footprints based on specific criteria such as carbon footprint exceeding 300 kgCo2 monthly. This allows the MBIP to identify users with higher environmental impacts, as well as to also identify the winner of the competition.

Query can be conducted by the MBIP admin to list information about recycling details for each user, including oilKG, oilRM, wasteKG, and wasteRM.

Query can be conducted by the MBIP admin to list information about administrative divisions, facilitating efficient management and coordination.

Query can be performed by the MBIP to identify consumption records with the lowest consumption volume and consumption price, assisting in the analysis of user consumption patterns.

4.0 Database Conceptual Design

4.1 Conceptual ERD

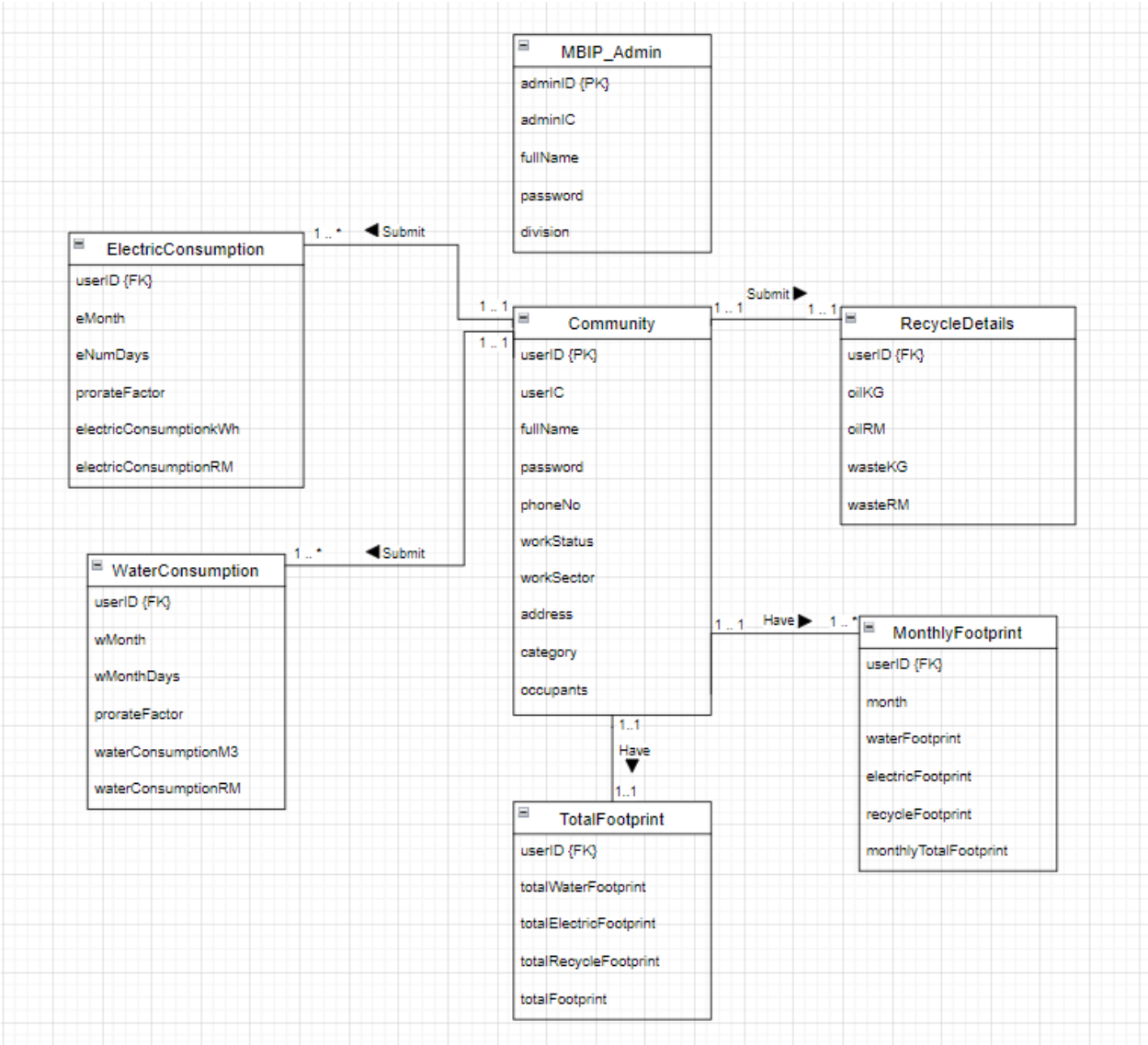

Figure 3: Conceptual ERD

4.2 Enhanced ERD

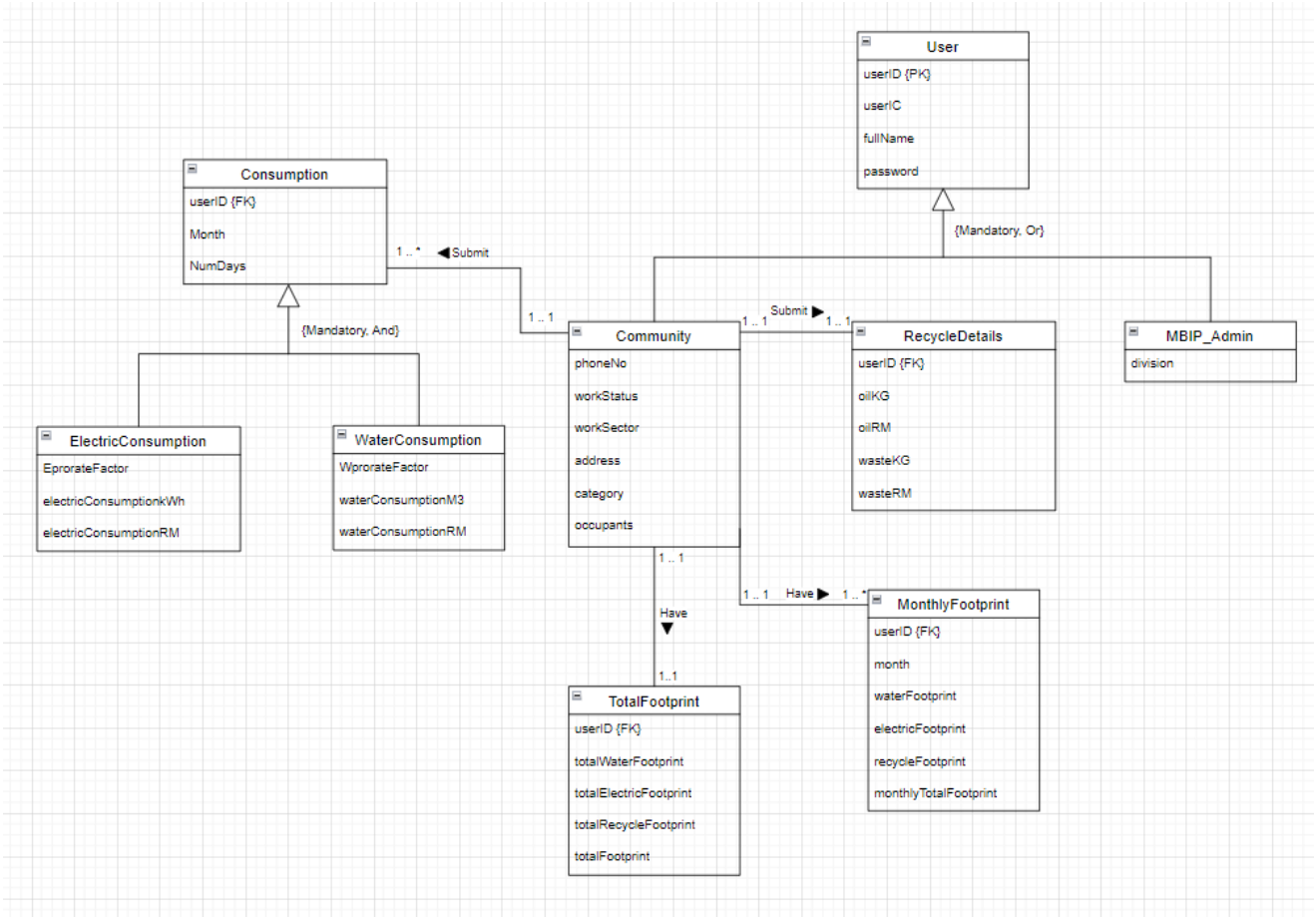

Figure 4: Enhanced ERD

5.0 Data dictionary

Entity: **User**

Attribute	Data Type	Size	Description	Multi-valued
userID	VARCHAR2	10	Uniquely identified user	No
userIC	VARCHAR2	12	User ic number	No
fullName	VARCHAR2	50	User name	No
password	VARCHAR2	20	User password	No

Entity: **Consumption**

Attribute	Data Type	Size	Description	Multi-valued
userID	VARCHAR2	10	Foreign key references User(userID)	No
Month	VARCHAR2	10	Month for consumption	No
NumDays	NUMBER	2	Number of days for consumption	No

Entity: **WaterConsumption**

Attribute	Data Type	Size	Description	Multi-valued
WprorateFactor	NUMBER	(10,5)	Prorate factor of community water bill	No
waterConsumptionM3	NUMBER	(10,2)	Total water consumption	No
waterConsumptionRM	NUMBER	(10,2)	Price for water consumption	No

Entity: **ElectricConsumption**

Attribute	Data Type	Size	Description	Multi-valued
EprorateFactor	NUMBER	(10,5)	Prorate factor of community electric bill	No
electricConsumptionkWh	NUMBER	5	Total electric consumption	No
electricConsumptionRM	NUMBER	(5,2)	Price for electric consumption	No

Entity: **MBIP_Admin**

Attribute	Data Type	Size	Description	Multi-valued
division	VARCHAR2	10	MBIP admin division	No

Entity: **Community**

Attribute	Data Type	Size	Description	Multi-valued
phoneNo	VARCHAR2	15	Community phone number	No
workStatus	VARCHAR2	10	Work status for community	No
workSector	VARCHAR2	20	Work sector for community	No
address	VARCHAR2	50	Address for community	No
category	VARCHAR2	10	Category for community	No
occupants	VARCHAR2	20	Occupants of community	No

Entity: **RecycleDetails**

Attribute	Data Type	Size	Description	Multi-valued
userID	VARCHAR2	10	Foreign key references User(userID)	No
oilKG	NUMBER	5	Total oil	No
oilRM	NUMBER	5	Price for oil	No
wasteKG	NUMBER	5	Total waste	No
wasteRM	NUMBER	5	Price for waste	No

Entity: **TotalFootprint**

Attribute	Data Type	Size	Description	Multi-valued
userID	VARCHAR2	10	Foreign key references User(userID)	No
totalWaterFootprint	NUMBER	10	Total water footprint	No
totalElectricFootprint	NUMBER	10	Total electric footprint	No
totalRecycleFootprint	NUMBER	10	Total recycle footprint	No
totalFootprint	NUMBER	50	Total footprint	No

Entity: **MonthlyFootprint**

Attribute	Data Type	Size	Description	Multi-valued
userID	VARCHAR2	10	Foreign key references User(userID)	No
month	VARCHAR2	10	Month for footprint	No
waterFootprint	NUMBER	10	Water footprint	No
electricFootprint	NUMBER	10	Electric footprint	No
recycleFootprint	NUMBER	10	Recycle footprint	No
monthlyTotalFootprint	NUMBER	50	Total footprint in a month	No

6.0 Summary

The system will provide data management, user registration, data submission, documentation, and support for multiple queries for efficient monitoring and analysis by MBIP administrators. The system data entities which are User, WaterConsumption, ElectricConsumption, Consumption, Community, RecycleDetails, MBIP_Admin, MonthlyFootprint and TotalFootprint capture the important attributes for thorough monitoring and data input. The described transactions which include data entry, update and deletion, and data queries give the MBIP administrators the ability to handle the system effectively.