Sem.1 2023/2024

SECD2523 - Database
Section # 05

Phase 2: Database Conceptual Design

IPRK System

Team: System Virtuoso

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1.0   INTRODUCTION

As we go with our project, we will be delving further into the information handling aspects of it. We aim to comprehend the ways in which various components of our system share and utilise data; picture it as sort of like untangling a bunch of cables. This knowledge journey is being mapped out with the use of charts and dictionaries. Ensuring that the Iskandar Puteri Low Carbon Calendar Competition can effectively handle its data, including the storage, processing, and reporting of information, is the primary objective here. This report functions as a kind of manual, guiding us through the challenging portions and ensuring the integrity of our data strategy.

2.0   PHYSICAL DFD TO-BE SYSTEM

This section will encompass Physical TO BE data flow diagrams including the Context Diagram, the parent diagram level-0 and detailed child diagrams for the key processes. This aims to capture the system's development ensuring the resolution of identified challenges.

2.1   CONTEXT DIAGRAM

Description:
Physical TO BE context Diagram involves the specification of abstract elements into implementable components. The entity of the user will provide details for user registration, amount of energy used and saved as input to the IPRK system and in return will receive login details and Feedback about Carbon usage from the system. On the other hand, the entity of MBIP will input current trends and details of MBIP goals to the IPRK system and in return will receive User profiles and details, progress reports, target recommendations and comprehensive insight reports based on current trends from the IPRK system.
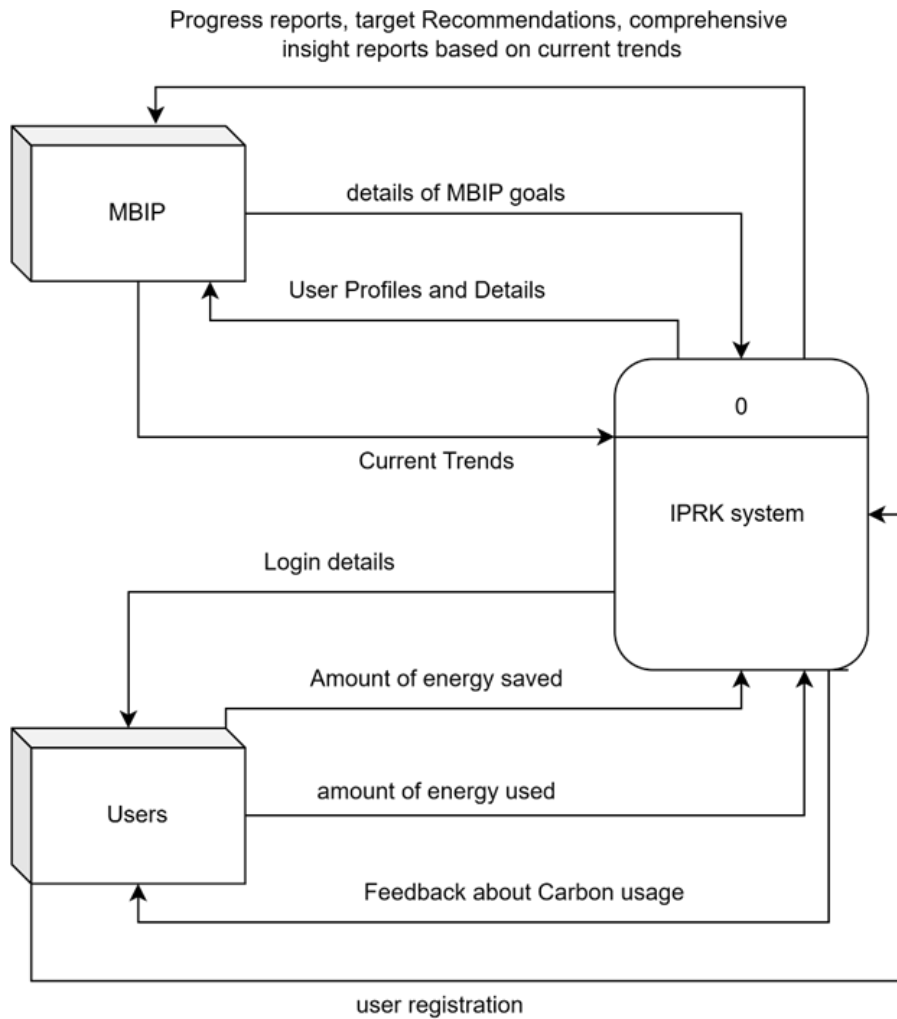
Progress reports, target Recommendations, comprehensive insight reports based on current trends

details of MBIP goals

User Profiles and Details

MBIP

0

IPRK system

Current Trends

Login details

Amount of energy saved

Users

amount of energy used

Feedback about Carbon usage

user registration

Figure 2.1 Context Diagram

2.2 PARENT DIAGRAM DFD LEVEL-0

Description:

Physical DFD represents practical implementations. The User entity will give username and password as input for the existing user to the process 1.0 which is to receive, record and view the information entered. This process will be done manually. The process will also take registration details for the new user as input. The amount of energy saved and the amount of energy used from the record file of Energy Consumption data will also act as inputs. The entity of MBIP will give MBIP goals as input for the process 1.0. The process will output login details for the new user and the user profile details for the entities of User and MBIP respectively. As the process is Receive, record and view so all the information received by the process will be recorded. The Electricity bills, water bill and waste management data will act as output of the process and will be stored in the respective record files of electricity bill, water bill and waste management.

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The Process 2.0 is receiving carbon usage and saving and calculating carbon reduction. This process will be automated and will take Bill records and carbon usage respectively from the record files of Electricity Bill and water bills as input. It will also take Practice records and carbon saved as input from the waste management record file. This will output the calculated amounts of carbon reduced and store it in the record file of calculation results. The record file will output calculation results as input for the process 3.0 which is to receive, record and view the data and generate reports. This process will be automated. This process will also take details about the MBIP goals from the entity of MBIP. The process will eventually generate Carbon reduction reports which will be stored in the report record file. The file outputs the report records for the 4.0 process which is to receive the generated reports and current trends and analyse the reports. This will be automated as well. The process will also take trend records from the file of Trend records. The trend records will be stored in the respective file by the entity of MBIP. The process will output progress reports, targeted recommendations, and comprehensive insight reports based on current trends for the entity of MBIP and Feedback about carbon usage for the entity of Users.
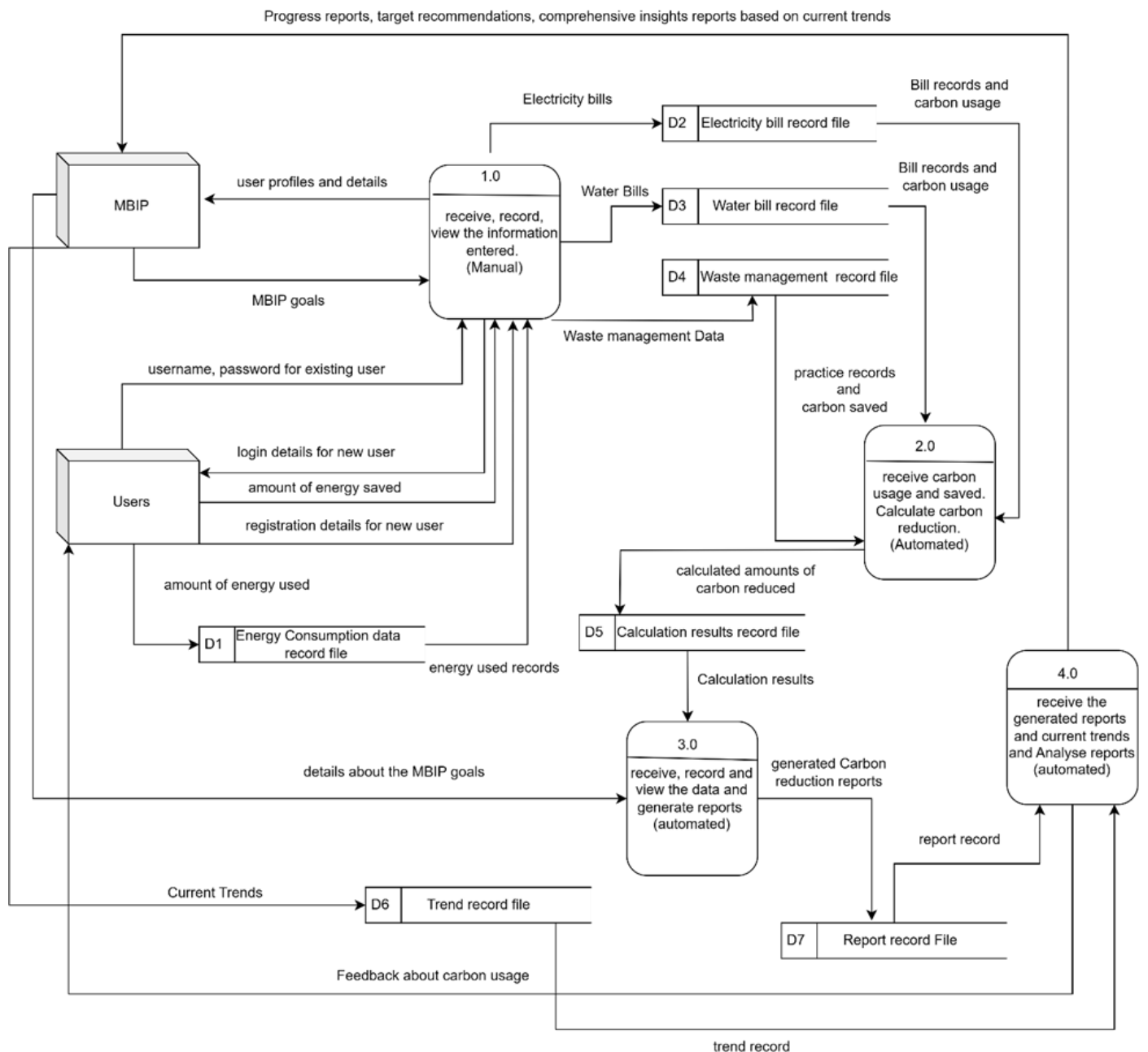
Figure 2.2 Parent Diagram DFD Level-0

2.3 CHILD DIAGRAM DFD LEVEL-1 FOR PROCESS 1: Collecting Data
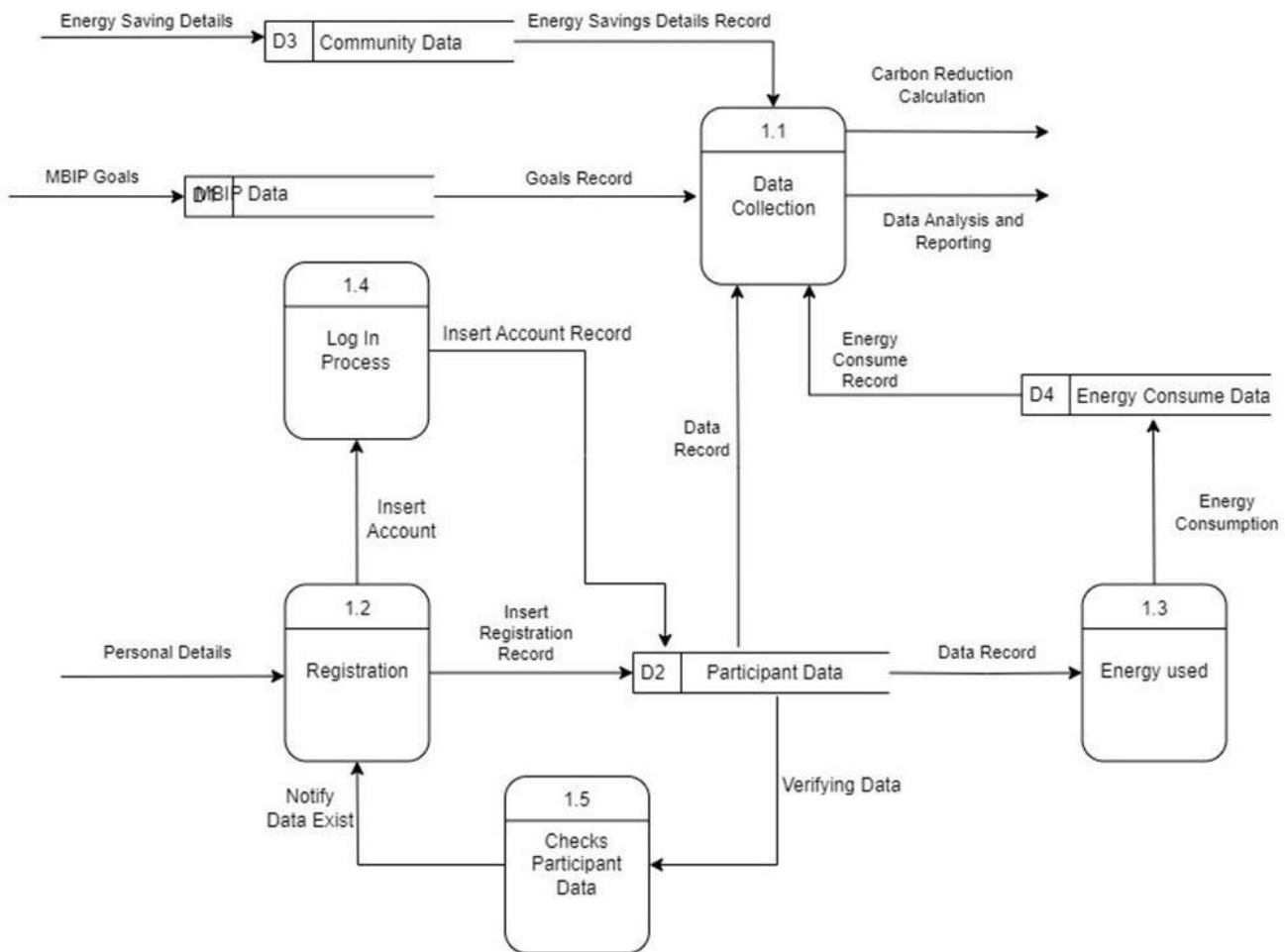
Description:

Figure 2.3 Child Diagram for Collecting Data

2.4 CHILD DIAGRAM DFD LEVEL-1 FOR PROCESS 2: Calculate Carbon Reductions

Description:

The diagram depicts how the carbon reduction calculations will be calculated automatically. The process 2.0 from the parent diagram has many subprocesses. The sub processes of 2.1, 2.2 and 2.3 are Receive and record electricity bills, water bills and waste management practices. The processes take electricity bills, water bills and data of recycling and composting habits of participants as input and store it to their respective record files. The record files further send the data to the sub processes 2.4, 2.5, 2.6 which receive and calculate carbon reduction due to electricity, water and waste management practices respectively. The processes further send the calculated amounts of carbon reduced due to electricity and water usage and amount of carbon reduced due to waste management practices for the process 2.7 which is to receive and record calculation results. The process will eventually store the calculation results in the calculation results record file.
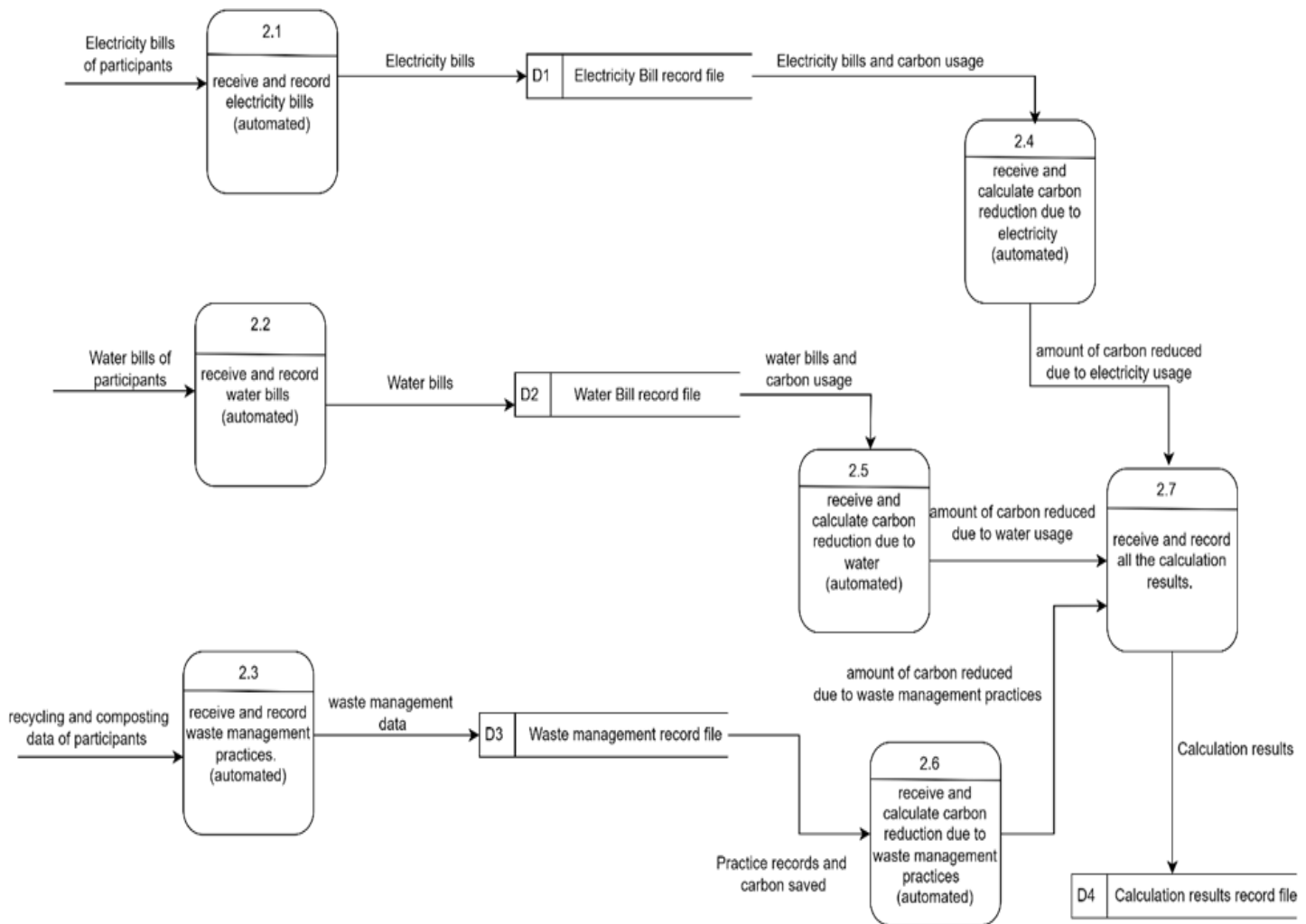
Figure 2.4 Child Diagram for process of calculate carbon reductions

2.5 CHILD DIAGRAM DFD LEVEL-1 FOR PROCESS 3: Generate Reports

Description:
The third diagram is for the process of generating reports. The calculated CARBON reduction is taken as the input for the process of Collect results of calculations. The result details are further given as input to the process of Analyze Carbon Reduction data which outputs analysed reduction data as the input for the process of putting data into REPORTS. The details about MBIP goals are given as input to the process of collecting MBIP goals data which outputs goals data as input for the process of put data into REPORTS. The process of putting data into REPORTS further output carbon reduction reports which is the input of format reports according to the system's sample, and the output from it is formatted carbon reduction reports which are stored in the depository of Report Record. The depository outputs generated reports.
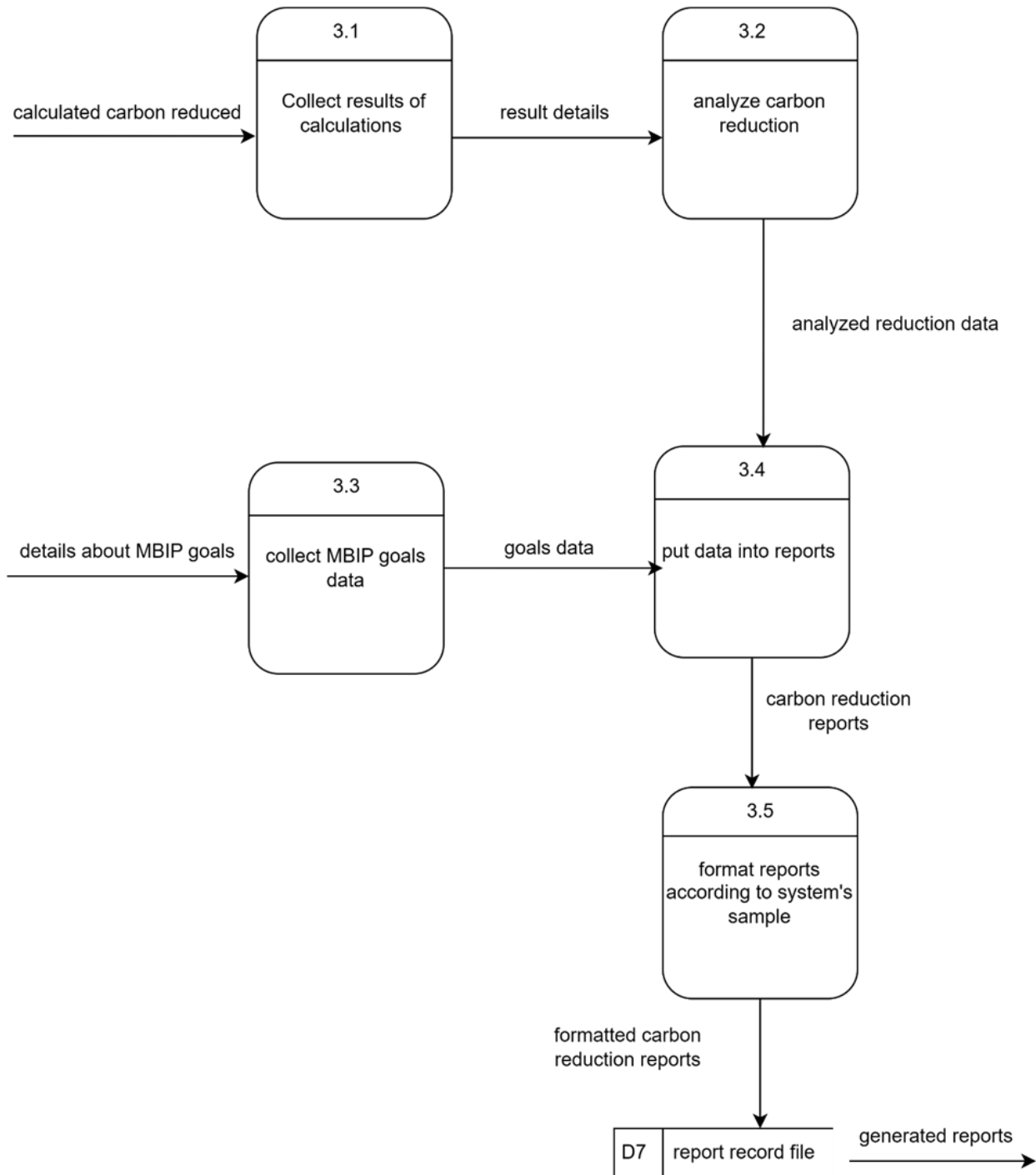
Figure 2.5 Child Diagram for process of generate reports

2.6 CHILD DIAGRAM DFD LEVEL-1 FOR PROCESS 4: Analyse Reports

The fourth diagram is for the process of Analyse Reports. The process of Collect Generated reports takes generated raw reports as input. The process of Analyse the trends and patterns take trends and patterns as input from the depository of Trend Data CSV File. These two processes respectively give formatted report for analysis and historical trend data as input for the process of

Analyse the reports which further output analysed reports. Process of Generate feedback takes detailed analysis trends and patterns as input and produces comprehensive analysed reports, user feedbacks about carbon usage, customised progress reports, targeted recommendation and comprehensive insight reports.
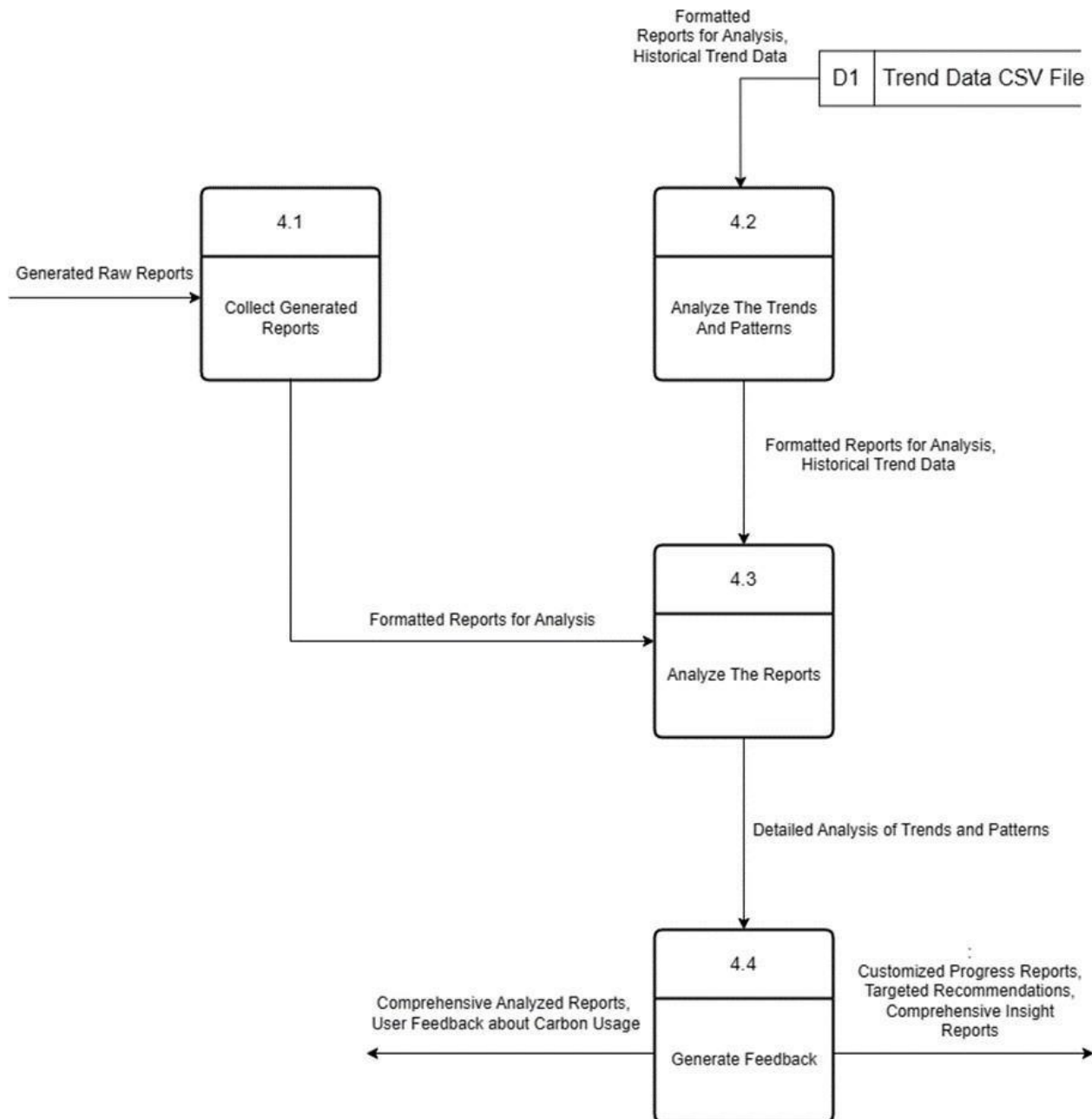

Figure 2.6 Child Diagram for process of Analyse Reports

3.0 DATA AND TRANSACTIONAL REQUIREMENTS

3.1 PROPOSED BUSINESS RULES

Privacy Issues:
- Make sure that the identity data needed for user registration is protected and complies with privacy laws.
- Users should be informed in full about how their data will be used, stored, and safeguarded.

Verification and Validation:
- Determine how eco-friendly practices and community initiatives will be verified in order to preserve the accuracy of reported data.
- To improve credibility, highlighting about including a system to audit or validate reported data on a regular basis.

Interface That's Easy to Use:
- To promote active participation, placement of special emphasis on an intuitive user interface for data entry, stock information updates, and platform navigation.

Resources for Education:
- To guarantee that educational resources effectively communicate information and engage users, it is important to clearly define their scope and format.

Participation in the Community:
- Promotion of community involvement through the incorporation of gamification features, incentives, or acknowledgement for proactive involvement in cooperative endeavours and environmentally conscious campaigns.

Constant Enhancement:
- Updating the platform frequently in response to user input and creative suggestions.

Notification Mechanism:
- To improve the user experience, users will be able to alter their notification preferences.

Adherence to the Law:
- Verification of the platform in compliance with all applicable laws and rules, particularly those that deal with privacy and environmental claims.

Availability:

- It will be guaranteed that the platform is inclusive and usable by people with varying abilities, taking accessibility features into consideration.

Calculate Your Transparent Carbon Footprint:
- To foster user trust, the carbon footprint calculation process will be made transparent.

Local Reports:
- To encourage users to enter precise and timely data, a clear explanation of the goals and advantages of the comprehensive reports will be provided.

3.2 PROPOSED DATA AND TRANSACTIONAL REQUIREMENTS:

1. **Data Entry:**
   - Enter the user data
   - Input the Carbon Friendly initiatives
   - Record Current trends
   - Record details about carbon usage
   - Record details about carbon saved

2. **Data update/delete:**
   - Update / delete Carbon initiatives based on current trends
   - Update User data
   - Modify or Update information about carbon usage and carbon saved

3. **Data Queries:**
   - Examine the extensive history of previous and current environmental initiatives and actions.
   - Demonstrate the evolution of community environmental initiatives, by arranging them chronologically.
   - Showing specific carbon reduction and initiatives' tracking details, such as dates..
   - Determine the present state of all environmental projects that have been documented, stating whether they are ongoing, finished, or in the process of being done.

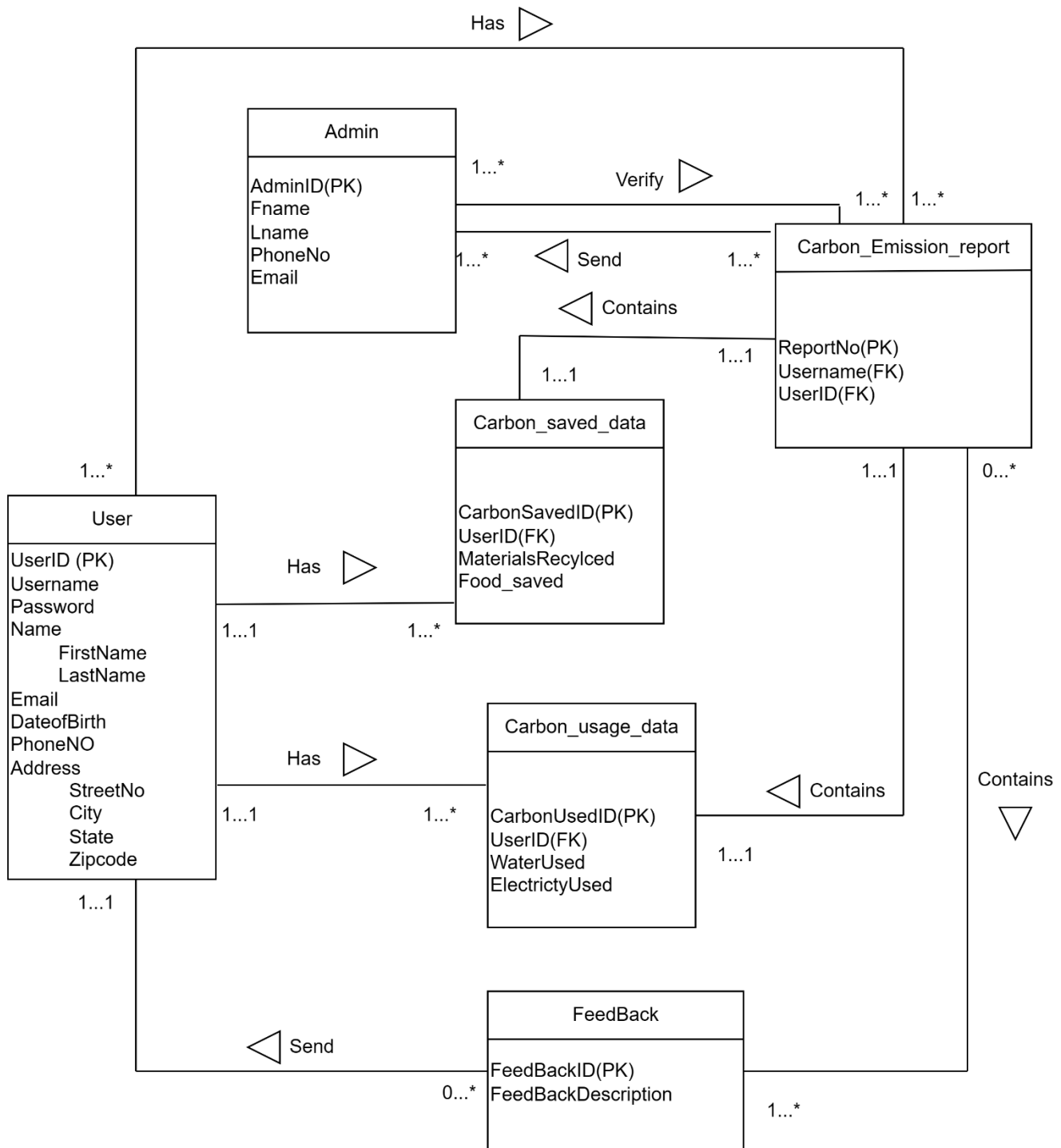# 4.0   DATABASE CONCEPTUAL DESIGN

4.1   CONCEPTUAL ERD

Figure 4.1 ERD

4.2   ENHANCED ERD (EERD)
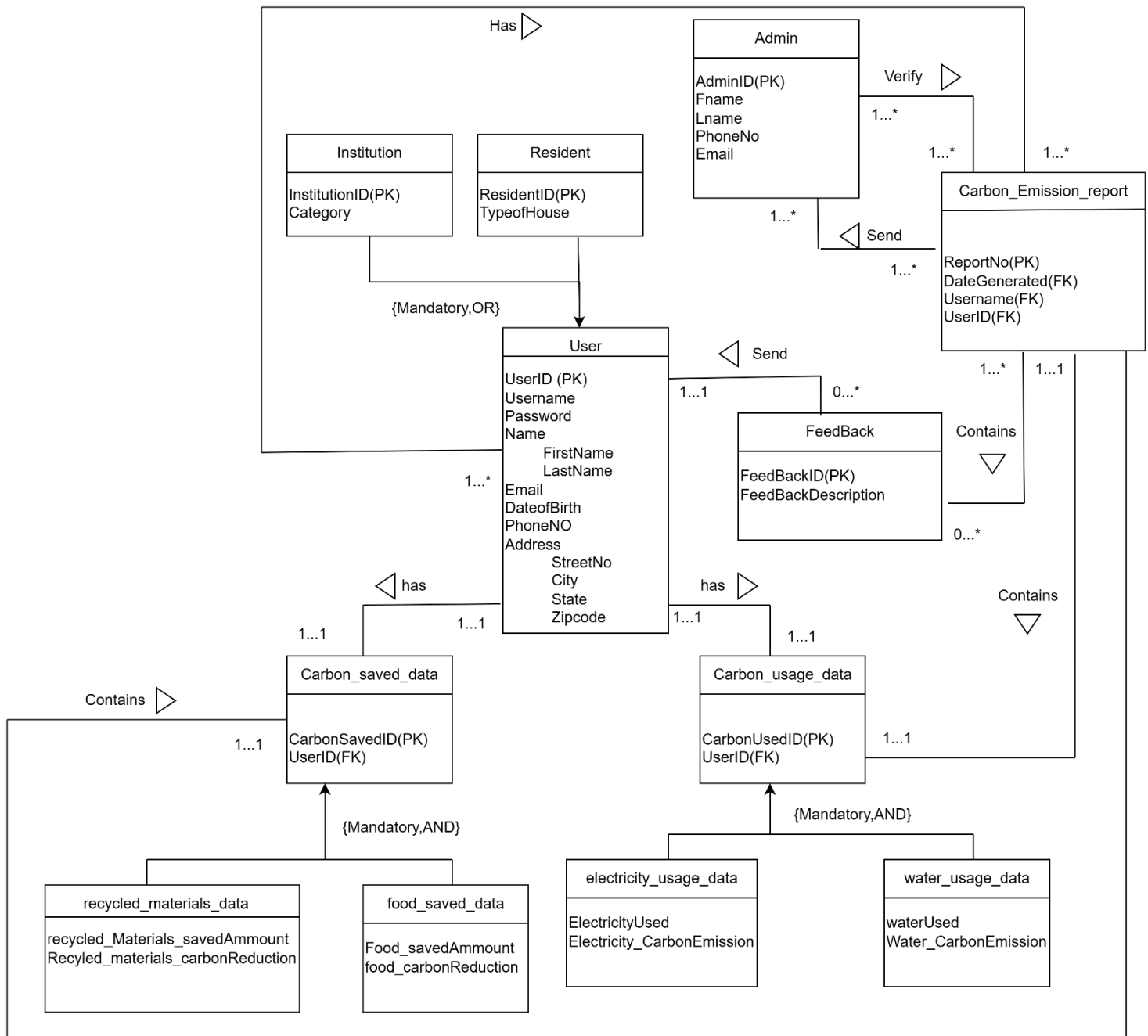
Figure 4.2 Enhanced ERD

5.0 DATA DICTIONARY

Entity	Attributes	Description	Datatype and Length	Null	Unique
Users	UserID {PK}	Unique ID of the user.	number(3)	No	Yes
	UserName	The username is used to login	varchar2(20)	No	Yes

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	Password	The password of the user. This is used for login purposes.	varchar2(20)	No	No
	Name	The name of the user	varchar2(30)	No	No
	Email	The email of the user	varchar2(30)	Yes	Yes
	DateofBirth	The birthdate of user	date	No	No
	PhoneNO	The phone number of the user	varchar2(11)	No	Yes
	Address	The Address of user	varchar2(50)	No	Yes
Admin	AdminID{PK}	Uniquely identify admins	number(3)	No	Yes
	Fname	Admin's first name	varchar2(30)	No	No
	Lname	Admin's last name	varchar2(30)	No	No
	PhoneNo	Admin's phone number	varchar2(11)	No	Yes
	Email	Admin's email	varchar2(30)	No	Yes
Carbon_Emission_report	ReportNo{PK}	The report No. It uniquely identifies the report generated	Number(3)	No	Yes
	DateGenerated	Date the report is generated	date	No	No
	UserName	Bound the data to the user. UserName references Users(UserName)	varchar2(20)	No	Yes
	UserID	Bound the data to the user. UserID references Users(UserID)	number(3)	No	Yes
Carbon_saved_data	CarbonSavedID{PK}	Uniquely identifies the carbon saved data	number(3)	No	Yes
	UserID	Bound the data to the user. UserID references Users(UserID)	number(3)	No	Yes
	MaterialRecycled	The total of all the material recycled saved in kiloton	number(7,2)	No	Yes
	Food_composed	The total of all the food	number(7,2)	No	Yes

		composed saved in kiloton			
Carbon_usage_data	CarbonUsedID{PK}	Uniquely identifies the carbon usage data.	number(3)	No	Yes
	UserID	Bound the data to the user. UserID references Users(UserID)	number(3)	No	Yes
	WaterUsed	The data of how many water was used. Unit in kgm_3	number(7,2)	Yes	No
	EletricityUsed	The data of how many electricity was used. Unit in kWh	number(7,2)	Yes	No
FeedBack	FeedbackID{PK}	The feedback ID. Use to uniquely identify feedback.	varchar2(50)	No	Yes
	FeedbackDescription	The feedback given by users	number(3)	Yes	No

6.0 SUMMARY

In summary, this project phase has improved our understanding of how the Iskandar Puteri Low Carbon Calendar Competition handles its data requirements. It's similar to determining how to arrange your belongings most effectively at home. We have thoroughly examined the current state of data storage and have devised clever strategies to abide by the competition's regulations. Our emphasis on illustrating the flow of data between various components of the system and ensuring that it does so seamlessly is analogous to building a rapid and dependable road. This perspective is essential for addressing issues and ensuring that the competition's data is successfully managed.