



# FOSSEE Semester-Long Internship Report

On

**Development of Life Cycle Cost Assessment(LCCA)  
of bridges, Desktop Application for Osdag**

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# Chapter 1

## Introduction

### 1.1 National Mission in Education through ICT

The National Mission on Education through ICT (NMEICT) is a scheme under the Department of Higher Education, Ministry of Education, Government of India. It aims to leverage the potential of ICT to enhance teaching and learning in Higher Education Institutions in an anytime-anywhere mode.

The mission aligns with the three cardinal principles of the Education Policy—**access, equity, and quality**—by:

- Providing connectivity and affordable access devices for learners and institutions.
- Generating high-quality e-content free of cost.

NMEICT seeks to bridge the digital divide by empowering learners and teachers in urban and rural areas, fostering inclusivity in the knowledge economy. Key focus areas include:

- Development of e-learning pedagogies and virtual laboratories.
- Online testing, certification, and mentorship through accessible platforms like EduSAT and DTH.
- Training and empowering teachers to adopt ICT-based teaching methods.

For further details, visit the official website: [www.nmeict.ac.in](http://www.nmeict.ac.in).

### 1.1.1 ICT Initiatives of MoE

The Ministry of Education (MoE) has launched several ICT initiatives aimed at students, researchers, and institutions. The table below summarizes the key details:

No.	Resource	For Students/Researchers	For Institutions
<b>Audio-Video e-content</b>			
1	SWAYAM	Earn credit via online courses	Develop and host courses; accept credits
2	SWAYAMPRAHBA	Access 24x7 TV programs	Enable SWAYAMPRAHBA viewing facilities
<b>Digital Content Access</b>			
3	National Digital Library	Access e-content in multiple disciplines	List e-content; form NDL Clubs
4	e-PG Pathshala	Access free books and e-content	Host e-books
5	Shodhganga	Access Indian research theses	List institutional theses
6	e-ShodhSindhu	Access full-text e-resources	Access e-resources for institutions
<b>Hands-on Learning</b>			
7	e-Yantra	Hands-on embedded systems training	Create e-Yantra labs with IIT Bombay
8	FOSSEE	Volunteer for open-source software	Run labs with open-source software
9	Spoken Tutorial	Learn IT skills via tutorials	Provide self-learning IT content
10	Virtual Labs	Perform online experiments	Develop curriculum-based experiments
<b>E-Governance</b>			
11	SAMARTH ERP	Manage student lifecycle digitally	Enable institutional e-governance
<b>Tracking and Research Tools</b>			
12	VIDWAN	Register and access experts	Monitor faculty research outcomes
13	Shodh Shuddhi	Ensure plagiarism-free work	Improve research quality and reputation
14	Academic Bank of Credits	Store and transfer credits	Facilitate credit redemption

Table 1.1: Summary of ICT Initiatives by the Ministry of Education

## 1.2 FOSSEE Project

The FOSSEE (Free/Libre and Open Source Software for Education) project promotes the use of FLOSS tools in academia and research. It is part of the National Mission on Education through Information and Communication Technology (NMEICT), Ministry of Education (MoE), Government of India.

### 1.2.1 Projects and Activities

The FOSSEE Project supports the use of various FLOSS tools to enhance education and research. Key activities include:

- **Textbook Companion:** Porting solved examples from textbooks using FLOSS.
- **Lab Migration:** Facilitating the migration of proprietary labs to FLOSS alternatives.
- **Niche Software Activities:** Specialized activities to promote niche software tools.
- **Forums:** Providing a collaborative space for users.
- **Workshops and Conferences:** Organizing events to train and inform users.

### 1.2.2 Fellowships

FOSSEE offers various internship and fellowship opportunities for students:

- Winter Internship
- Summer Fellowship
- Semester-Long Internship

Students from any degree and academic stage can apply for these internships. Selection is based on the completion of screening tasks involving programming, scientific computing, or data collection that benefit the FLOSS community. These tasks are designed to be completed within a week.

For more details, visit the official FOSSEE website.



Figure 1.1: FOSSEE Projects and Activities

### 1.3 Osdag Software

Osdag (Open steel design and graphics) is a cross-platform, free/libre and open-source software designed for the detailing and design of steel structures based on the Indian Standard IS 800:2007. It allows users to design steel connections, members, and systems through an interactive graphical user interface (GUI) and provides 3D visualizations of designed components. The software enables easy export of CAD models to drafting tools for construction/fabrication drawings, with optimized designs following industry best practices [1, 2, 3]. Built on Python and several Python-based FLOSS tools (e.g., PyQt and PythonOCC), Osdag is licensed under the GNU Lesser General Public License (LGPL) Version 3.

### 1.3.1 Osdag GUI

The Osdag GUI is designed to be user-friendly and interactive. It consists of

- **Input Dock:** Collects and validates user inputs.
- **Output Dock:** Displays design results after validation.
- **CAD Window:** Displays the 3D CAD model, where users can pan, zoom, and rotate the design.
- **Message Log:** Shows errors, warnings, and suggestions based on design checks.

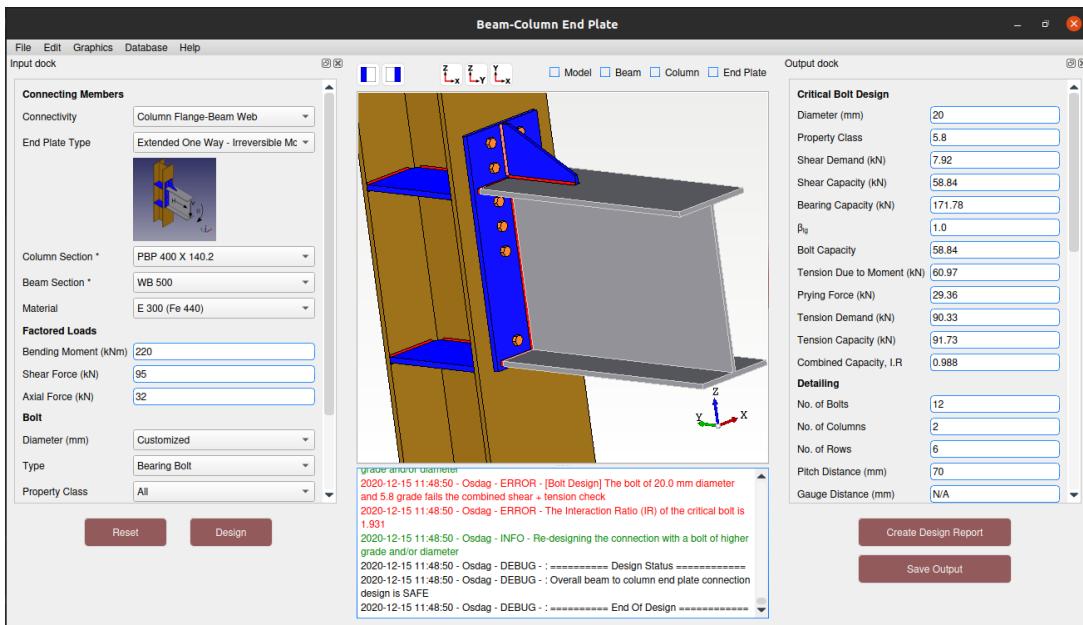


Figure 1.2: Osdag GUI

### 1.3.2 Features

- **CAD Model:** The 3D CAD model is color-coded and can be saved in multiple formats such as IGS, STL, and STEP.
- **Design Preferences:** Customizes the design process, with advanced users able to set preferences for bolts, welds, and detailing.
- **Design Report:** Creates a detailed report in PDF format, summarizing all checks, calculations, and design details, including any discrepancies.

For more details, visit the official Osdag website.

# Chapter 2

## Screening Task

### 2.1 Problem Statement

Steel vs. Concrete Bridge Cost Comparison with SQLite

### 2.2 Tasks Done

#### 2.2.1 Assumptions:-

During, the development of this project (Osdag Bridge LCCA) application, I had assumed several, conditions so, that design, implementation, and functionality of the system is up-to the mark. These assumptions ensure smooth operation while addressing potential user behaviors and data integrity concerns. The key assumptions are as follows:

##### 1. Initial Data Entry

It has been assumed that the users will input the pricing information into the database before using the application's comparison part. The system relies on the existence of pre-inputted cost data for proper comparison. If no data exists, then the application will prompt the user to add the required into the database before it continues.

##### 2. Database Handling of Non-Numeric Data

Since the entry of the data in the database is the user's responsibility, there is a possibility that non-numerical values, are inserted into the database. So, to prevent that the application has a mechanism to validate the entries so that, no errors occur when there are needed during calculations. If in any condition non-numerical values are found,

an error message will appear to the user.

### 3. Processing Non-Numerical Inputs in the Left Input Panel

It has been assumed that some users may input non-numerical data. So, to handle that type of error, the system will validate the inputs from users and display an error message in case of non-numerical values.

### 4. Data Updating and Truncation

It is assumed that the pricing data in the database will be periodically updated. When updates occur, the system will truncate (delete) old pricing data to prevent inconsistencies and ensure that only the most recent values are used in cost comparisons.

## 2.2.2 Database structure:-

The database consists of a single table, called rates with the following structure:

Table's Field Name	Description
id	Unique identifier for each entry (automatically added by SQLite)
steel_base_rate	Base rate for steel bridges (INR/m <sup>2</sup> )
steel_maintenance_rate	Maintenance rate for steel bridges (INR/m <sup>2</sup> /year)
steel_repair_rate	Repair cost for steel bridges (INR/m <sup>2</sup> )
steel_demolition_rate	Demolition cost for steel bridges (INR/m <sup>2</sup> )
steel_environmental_factor	Environmental impact cost for steel bridges (INR/m <sup>2</sup> )
steel_social_factor	Social impact cost for steel bridges (INR/vehicle/year)
steel_delay_factor	Delay impact cost for steel bridges (INR/vehicle/year)
concrete_base_rate	Base rate for concrete bridges (INR/m <sup>2</sup> )
concrete_maintenance_rate	Maintenance rate for concrete bridges (INR/m <sup>2</sup> /year)
concrete_social_factor	Social impact cost for concrete bridges (INR/vehicle/year)
concrete_delay_factor	Delay impact cost for concrete bridges (INR/vehicle/year)

Table 2.1: Table fields and their descriptions for bridge cost analysis

## 2.2.3 Implementation details:-

The project(Steel vs. Concrete Bridge Cost Comparison) is implemented using Python with PyQt5 for the graphical user interface (GUI), SQLite for database management, and Matplotlib for data visualization. The project is structured into multiple modules.

### 1. Module Segmentation

To enhance code organization, the project is divided into four key modules:

	cid	name	type	notnull	dflt_value	pk
1	0	id	INTEGER	0	NULL	1
2	1	steel_base_rate	REAL	0	NULL	0
3	2	steel_maintenance_rate	REAL	0	NULL	0
4	3	steel_repair_rate	REAL	0	NULL	0
5	4	steel_demolition_rate	REAL	0	NULL	0
6	5	steel_environmental_factor	REAL	0	NULL	0
7	6	steel_social_factor	REAL	0	NULL	0
8	7	steel_delay_factor	REAL	0	NULL	0
9	8	concrete_base_rate	REAL	0	NULL	0
10	9	concrete_maintenance_rate	REAL	0	NULL	0
11	10	concrete_repair_rate	REAL	0	NULL	0
12	11	concrete_demolition_rate	REAL	0	NULL	0
13	12	concrete_environmental_factor	REAL	0	NULL	0
14	13	concrete_social_factor	REAL	0	NULL	0
15	14	concrete_delay_factor	REAL	0	NULL	0

Figure 2.1: Database Structure

- a) gui.py (Graphical User Interface)
  - o Manages the main user interface using PyQt5.
  - o Provides input fields for span length, width, traffic volume, and design life.
  - o Displays results in a QTableWidget and generates plots using Matplotlib.
  - o Includes buttons for cost calculation, database updates, and exporting plots.
- b) calculations.py (Cost Calculations)
  - o Retrieves cost data from an SQLite database.
  - o Computes different cost components for both steel and concrete bridges, including:
    - Construction Cost
    - Maintenance Cost
    - Repair Cost
    - Demolition Cost
    - Environmental Cost
    - Social Cost
    - User Cost
    - Total Cost
  - o Ensures modularized and reusable cost computation functions.
- c) plot.py (Data Visualization)
  - o Generates comparative bar charts for steel and concrete bridge costs.
  - o Uses Matplotlib to create an intuitive cost distribution graph.

- o Allows users to visually compare cost components.
- d) database.py (SQLite Handling)
  - o Inserts data to table in the database.
  - o Only the latest data is stored by truncating old entries.
  - o Numeric validation prevents incorrect input.
  - o Error messages notify users of invalid entries.
- e) main.py
  - o Initializes the PyQt5 application.
  - o Launches the BridgeCostApp GUI.
  - o Ensures proper application startup and event handling.

## **2. User Interaction and Workflow**

- a) The user enters span length, width, traffic volume, and design life into the input fields.
- b) Clicking "Calculate Costs" triggers calculations using data from SQLite.
- c) The results are displayed in a tabular format, and a comparative bar chart is generated.
- d) The user can export the plot as an image.
- e) The database update option allows modifications to cost rates.

## **3. Export Functionality**

- Users can save the generated cost comparison graph as a PNG file for reporting and analysis.
  - The export feature is implemented using Tkinter's file dialog for file name selection.

## **4. Error Handling**

- Implements input validation to prevent incorrect entries.
  - Displays appropriate error messages via QMessageBox when invalid values are entered.

### **2.2.4 Screenshots of the GUI and Bar plots:-**

Click Here! The video of the full project

Steel vs. Concrete Bridge Cost Comparison

Span Length (m):	<input type="text"/>
Width (m):	<input type="text"/>
Traffic Volume (vehicles/day):	<input type="text"/>
Design Life (years):	<input type="text"/>
<input type="button" value="Calculate Costs"/>	
<input type="button" value="Update Database"/>	
<input type="button" value="Export Plot"/>	

Calculated Costs:

Cost Component	Steel(₹)	Concrete(₹)
1		
2		
3		
4		
5		
6		
7		
8		

Figure 2.2: GUI

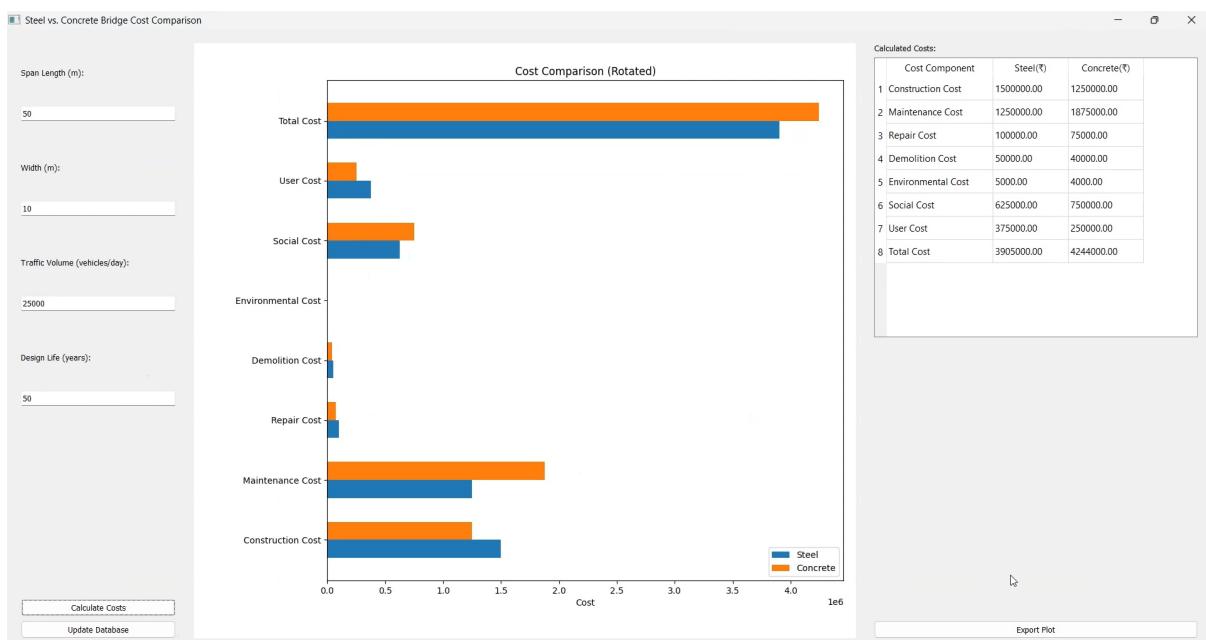


Figure 2.3: Bar Plot

# **Chapter 3**

## **Documentation on Beam to Beam End Plate**

### **3.1 Task 1: Problem Statement**

Analyzing the Beam to Beam End Plate feature of Osdag Desktop Application

### **3.2 Task 1: Tasks Done**

A detailed documentation was prepared by going through the Osdag repo.

### **3.3 Task 1: Document**

Here is the documentation report - [Click here for the Report/Documentation pdf](#)

# **Chapter 4**

## **Database Creation at LCCA**

### **4.1 Task 2: Problem Statement**

To create a database in SQLite3 for storing data of different material's details and costing.

Each material will have different tables to store details and costing.

### **4.2 Task 2: Tasks Done**

The methodologies, processes and implementations used to figure out the problem is explained below.

#### **4.2.1 Methodologies:**

##### **a. Modular Design Approach**

Code is separated into functional components and these python files are in directory [codes/Database]:

configuration (config.py),  
data models (models.py),  
database interface (database.py), and  
application entry point (main.py).

### **b. Object-Relational Mapping (ORM)**

- SQLAlchemy is used for mapping Python classes to database tables, facilitating easy and abstract interaction with the database.

### **c. Reusability and Maintainability**

- Uses Base class from SQLAlchemy to define all data models, which improves scalability and reusability.
- All config and database parameters are centralized for easy updates and management.

## **4.2.2 Processes**

### **a. Database Initialization Process**

1. The main script runs `init_database()` from `database.py`.
2. `init_database()` calls `Base.metadata.create_all(bind=engine)`, creating all defined tables in the database if they don't already exist.

### **b. Session Lifecycle Process**

1. `get_db()` yields a new database session.
2. After the use of the session (in API calls or background jobs), it is closed properly via `finally`.

### **c. Data Storage and Access**

- When user analyses or environmental/material data are input via an interface (not shown here but likely part of a web interface or CLI), they're persisted via ORM operations using the models defined.

### 4.2.3 Implementations

#### a. config.py

- Defines the base directory and database connection URL using environment variables or fallback defaults.
- Ensures that the data directory exists to store the SQLite database.
- Contains DB\_CONFIG dict to specify SQLAlchemy connection pool settings (like pool-size, max-overflow, etc.) for performance tuning.

#### b. models.py

- Implements various SQLAlchemy ORM models:
  - MaterialRate, ScrapValue, EnvironmentalImpact, SocialCostOfCarbon, TransportEmissionFactor, VehicleOperationCost, and UserAnalysis.
- Each model:
  - Uses tablename to define the database table name.
  - Has defined columns with types, constraints (like nullable=False), and default timestamps.
- A utility function init\_db() allows standalone database initialization given a URL.

#### c. database.py

- Configures a SQLAlchemy engine using the URL and config from config.py.
- Uses QueuePool for efficient connection pooling.
- SessionLocal is a session factory used to interact with the DB in a thread-safe manner.
- Provides:
  - get\_db() – dependency-style session generator for use in frameworks like FastAPI.
  - init\_database() – creates all tables defined in models.py.

#### d. main.py

- Simply imports and calls init\_database() to initialize the database when the application starts.

## 4.3 Task 2: Python Code

This section presents a Python script for setting up a structured backend system for a Life Cycle Cost Analysis (LCCA) tool. config.py defines the base directory, database URL, and connection pool settings. models.py defines the database schema using SQLAlchemy ORM, covering materials, environmental impacts, transport factors, vehicle costs, and user analyses. database.py handles database engine creation, session management, and table initialization based on these models. Finally, main.py serves as the entry point, calling the init\_database() function to ensure all tables are created at startup. Together, these files establish a scalable, maintainable backend for storing and managing project-related data.

### 4.3.1 Description of the Script (models.py)

The script defines the structure of the database using SQLAlchemy ORM. It begins by setting up a base class (Base) with declarative\_base(), which is used to create all table models. Each class in the file corresponds to a table:

- MaterialRate: Stores material names, regions, units, rates, and currency.
- ScrapValue: Holds data about recyclable materials, including scrap value and recyclability percentage.
- EnvironmentalImpact: Contains environmental data like carbon emissions, energy and water consumption from Environmental Product Declarations (EPDs).
- SocialCostOfCarbon: Records country-specific carbon costs by year.
- TransportEmissionFactor: Stores Carbon Dioxide emissions per km for different vehicle types.

- VehicleOperationCost: Captures costs per km for fuel, maintenance, and yearly insurance for vehicles.
- UserAnalysis: Saves users' analysis sessions and data in JSON format with timestamps.

### 4.3.2 Coding

The Python script is shown below. Each section is commented for clarity.

Listing 4.1: Beam-to-Column Connection Design in Osdag

```

1 %-----begin code-----
2
3 from sqlalchemy import create_engine, Column, Integer, Float, String,
4     ForeignKey, DateTime, JSON
5 from sqlalchemy.ext.declarative import declarative_base
6 from sqlalchemy.orm import relationship
7 from datetime import datetime, UTC
8
9 Base = declarative_base()
10
11 class MaterialRate(Base):
12     """Regional schedule of rates for materials"""
13     __tablename__ = 'material_rates'
14
15     id = Column(Integer, primary_key=True)
16     material_name = Column(String(100), nullable=False)
17     region = Column(String(50), nullable=False)
18     unit = Column(String(20), nullable=False)
19     rate = Column(Float, nullable=False)
20     currency = Column(String, nullable=False)
21     last_updated = Column(DateTime, default=lambda: datetime.now(UTC))
22
23 class ScrapValue(Base):
24     """Scrap values and recyclability percentages"""
25     __tablename__ = 'scrap_values'
26
27     id = Column(Integer, primary_key=True)
28     material_name = Column(String(100), nullable=False)

```

```

28     scrap_value = Column(Float, nullable=False)
29     recyclability_percentage = Column(Float, nullable=False)
30     currency = Column(String, nullable=False)
31     last_updated = Column(DateTime, default=lambda: datetime.now(UTC))
32
33 class EnvironmentalImpact(Base):
34     """Environmental impact data from EPDs"""
35     __tablename__ = 'environmental_impacts'
36
37     id = Column(Integer, primary_key=True)
38     material_name = Column(String(100), nullable=False)
39     epd_id = Column(String(50), nullable=False)
40     global_warming_potential = Column(Float, nullable=False) # kg CO2
41         eq
42     water_consumption = Column(Float) # m^3
43     energy_consumption = Column(Float) # MJ
44     waste_generation = Column(Float) # kg
45     last_updated = Column(DateTime, default=lambda: datetime.now(UTC))
46
47 class SocialCostOfCarbon(Base):
48     """Country-specific social cost of carbon"""
49     __tablename__ = 'social_cost_of_carbon'
50
51     id = Column(Integer, primary_key=True)
52     country = Column(String(50), nullable=False)
53     year = Column(Integer, nullable=False)
54     cost_per_ton = Column(Float, nullable=False) # USD per ton CO2
55     currency = Column(String, nullable=False)
56     last_updated = Column(DateTime, default=lambda: datetime.now(UTC))
57
58 class TransportEmissionFactor(Base):
59     """Road transport carbon emission factors"""
60     __tablename__ = 'transport_emission_factors'
61
62     id = Column(Integer, primary_key=True)
63     vehicle_type = Column(String(50), nullable=False)
64     emission_factor = Column(Float, nullable=False) # kg CO2 per km
65     load_factor = Column(Float) # Average load factor
66     last_updated = Column(DateTime, default=lambda: datetime.now(UTC))

```

```

66
67 class VehicleOperationCost(Base):
68     """Vehicle operation costs"""
69     __tablename__ = 'vehicle_operation_costs'
70
71     id = Column(Integer, primary_key=True)
72     vehicle_type = Column(String(50), nullable=False)
73     fuel_cost_per_km = Column(Float, nullable=False)
74     maintenance_cost_per_km = Column(Float, nullable=False)
75     insurance_cost_per_year = Column(Float, nullable=False)
76     currency = Column(String(3), nullable=False)
77     last_updated = Column(DateTime, default=lambda: datetime.now(UTC))
78
79 class UserAnalysis(Base):
80     """User analyses storage"""
81     __tablename__ = 'user_analyses'
82
83     id = Column(Integer, primary_key=True)
84     user_id = Column(String(50), nullable=False)
85     analysis_name = Column(String(100), nullable=False)
86     analysis_data = Column(JSON, nullable=False)
87     created_at = Column(DateTime, default=lambda: datetime.now(UTC))
88     updated_at = Column(DateTime, default=lambda: datetime.now(UTC),
89                         onupdate=lambda: datetime.now(UTC))
90
91     def init_db(db_url):
92         """Initialize the database"""
93         engine = create_engine(db_url)
94         Base.metadata.create_all(engine)
95         return engine
96
97 %----- end code -----

```

### 4.3.3 Explanation of the Code

- Line 3-5: Imports sqlalchemy library with the needful functions only, for the efficiency.

- Line 6: importing date and time
- Line 10-20: A class to create table "material rates".
- Line 22-88: Similarly classes for "scrap values", "environmental impacts", "social cost of carbon", "transport emission factors", "vehicle operation costs" and "user analyses".
- Line 90-94: A function initilisation of database.

#### 4.3.4 Description of the Script (database.py)

The script initializes the database engine, manages session creation, and sets up tables.

Details:

- Imports the DATABASE\_URL and DB\_CONFIG from config.py.
- Uses SQLAlchemy's create\_engine() with QueuePool to establish a pooled DB connection.
- SessionLocal: A factory for creating database sessions (autocommit=False, autoflush=False).
- get\_db(): Generator function that creates a session, yields it, and ensures proper closing-designed for safe integration in frameworks like FastAPI.
- init\_database(): Calls Base.metadata.create\_all() to create all tables defined in models.py.

#### 4.3.5 Coding

The Python script is shown below. Each section is commented for clarity.

```
import os
from sqlalchemy import create_engine
from sqlalchemy.orm import sessionmaker
from sqlalchemy.pool import QueuePool
from .models import Base
from .config import DATABASE_URL, DB_CONFIG
```

```

# Create engine with connection pooling
engine = create_engine(
    DATABASE_URL,
    poolclass=QueuePool,
    **DB_CONFIG
)

# Create session factory
SessionLocal = sessionmaker(autocommit=False, autoflush=False,
    bind=engine)

def get_db():
    """Get database session"""
    db = SessionLocal()
    try:
        yield db
    finally:
        db.close()

def init_database():
    """Initialize database tables"""
    Base.metadata.create_all(bind=engine)

```

#### 4.3.6 Description of the Script (config.py) and (main.py)

##### config.py

The script provides centralized settings for file paths and database connectivity.

Details:

- Sets BASE\_DIR as the root directory of the project using Python's Pathlib.
- Creates a data folder (if it doesn't exist) to store the SQLite database.

- Defines the DATABASE\_URL using an environment variable or defaults to a local SQLite path.
- Configures DB\_CONFIG, a dictionary of settings for SQLAlchemy's connection pool (e.g., pool size, timeout, and recycling). These help manage multiple DB connections efficiently.

### main.py

The script triggers database setup when the application starts.

Details:

- Imports init\_database() from database.py.
- Calls init\_database() immediately, ensuring all defined tables are created in the connected database if not already present.

#### 4.3.7 Coding

The Python script is shown below. Each section is commented for clarity.

### config.py

```
# Placeholder for app configuration

import os
from pathlib import Path

# Base directory of the project
BASE_DIR = Path(__file__).resolve().parent.parent.parent

# Database configuration
DATABASE_URL = os.getenv('DATABASE_URL', f'sqlite:///{BASE_DIR}/
    data/lcca.db')

# Create data directory if it doesn't exist
DATA_DIR = BASE_DIR / 'data'
```

```
DATA_DIR.mkdir(exist_ok=True)

# Database configuration options

DB_CONFIG = {

    'pool_size': 5,
    'max_overflow': 10,
    'pool_timeout': 30,
    'pool_recycle': 1800
}
```

## main.py

```
from osbridgelcca.backend.database import init_database

init_database()
```

## 4.4 Task 2: Documentation

### 4.4.1 Directory Structure

```
OsBridgeLCCA
├── cicd
├── docs
├── local_config
├── scripts
└── src
    ├── osbridgelcca
    │   ├── backend
    │   │   ├── api
    │   │   ├── __init__.py
    │   │   ├── config.py
    │   │   ├── database.py
    │   │   ├── main.py
    │   │   └── models.py
    │   ├── core
    │   ├── data
    │   ├── desktop_app
    │   ├── examples
    │   ├── web_app
    │   └── __init__.py
    └── __init__.py
└── tests
```

# Chapter 5

## Development of GUI

### 5.1 Task 3: Problem Statement

To create a desktop application of LCCA using PyQt5 library of Python.

### 5.2 Task 2: Tasks Done

The methodologies, processes and implementations used to figure out the problem is explained below.

#### 5.2.1 Methodologies

##### 1. Modular Design:

- Each project detail (e.g., foundation, traffic, carbon emissions) is encapsulated in its own PyQt window (Ui\_\*\_Dialog), enabling independent development and maintenance.

##### 2. Model-View-Controller-like Structure (MVC-inspired):

- The GUI is handled by .py files converted from .ui forms using pyuic5.
- Logic and state transitions (e.g., switching between dialogs) are handled in the main BICCAStudio class (app.py).

## **Reusability via PyQt Widgets and Dialogs:**

- Common patterns such as opening dialogs, setting up forms, and managing layouts are reused across all modules.

### **5.2.2 Processes**

#### **1. Application Launch & GUI Initialization:**

- The application starts by running BICCAStudio(QMainWindow) from app.py which initializes the window, menus, toolbar, status bar, and tutorial pages.

#### **2. User Interaction Flow:**

- Menu actions and buttons open corresponding windows (e.g., openBridgeTrafficWindow(), openFoundationWindow()) that load the respective UI class.

#### **3. Input Form Management:**

- General information (e.g., project name, year, client) is saved via save\_general\_info() to a JSON file for persistence.

#### **4. Data Entry in Dialogs:**

- Each window (like ProjectDetails\_CarbonEmissionData\_Window) provides forms with QLineEdit, QComboBox, etc., where users input project-specific data (e.g., emissions values, foundation material).

#### **5. Dialog Controls:**

- QDialogButtonBox in each module enables "Save" or "Close" operations. However, the backend logic for data saving (e.g., where values go) may need further implementation or is external.

### **5.2.3 Implementations**

#### **1. UI Generation:**

- All ProjectDetails\_\*.py files are generated from Qt Designer .ui files using pyuic5. This allows a clean separation between design and logic.

#### **2. Navigation Between Dialogs:**

- Each dialog class (Ui\_\*\_Dialog) contains functions to open other related dialogs, enhancing cross-navigation and cohesion (e.g., open the Financial window from Carbon Emission window).

#### **3. Tutorial Pages:**

- A built-in tutorial mechanism is included in the BICCAStudio constructor, guiding users through four setup and usage steps. The tutorial uses a QVBoxLayout with changing content based on the current page.

#### **4. Resource Handling:**

- Icons are loaded from a specified assets directory. Menus and buttons use these icons for better UX (e.g., save, export, print actions).

#### **5. Widget Organization:**

- Layouts like QVBoxLayout, QFormLayout, QScrollArea, and grouping widgets ensure clean UI structuring.

#### **6. Data Persistence (partial):**

- Only general info is saved explicitly (via JSON); others likely require similar functions for full data management (not fully implemented in provided files).

## **5.3 Task 3: Python Code**

The uploaded files collectively form a PyQt5-based desktop application named BICCA Studio, designed for managing infrastructure project data. The app.py file serves as the

main entry point, initializing the main window, tutorial interface, menu bar, and launching various project-specific data entry dialogs. Each ProjectDetails\_\*.py file represents a separate form window (e.g., foundation, carbon emissions, financials, super structure, sub structure, miscellaneous, maintenance and repair, and bridge and traffic) allowing users to input and navigate detailed data related to construction projects. The input\_form.py file handles saving general project information in JSON format. The application uses modular, UI-generated classes for maintainability, with seamless navigation between forms, making it a centralized tool for organizing and analyzing engineering project data.

### 5.3.1 Description of the Script (app.py)

The app.py script is the main controller for the BICCA Studio application, built using the PyQt5 framework. It defines the BICCAStudio class, which inherits from QMainWindow and initializes the core user interface of the application. This includes setting up the main window dimensions, layout, styling, menu bar, toolbars, status bar, and a multi-page interactive tutorial to guide users through the software. The script provides functions to open various data entry windows—such as bridge traffic, foundation, carbon emissions, financial data, and more—each represented by a dialog imported from modular UI files. The structure allows for smooth navigation and modular integration of different project data forms. The app.py file essentially orchestrates the user experience, serving as the entry point and central hub for managing project components and workflows within the BICCA Studio platform.

### 5.3.2 Coding

The Python script is shown below. Each section is commented for clarity.

```
1 import sys
2 import csv
3 import json
4 from PyQt5 import QtWidgets
5 from ui.input_form import save_general_info
6 from ui.project_details_windows.
    ProjectDetails_BridgeANDTrafficData_Window import
        Ui_BridgeTraffic_Dialog
```

```

7 from ui.project_details_windows.ProjectDetails_Foundation_Window import
8     Ui_Foundation_Dialog
9 from ui.project_details_windows.
10    ProjectDetails_CarbonEmissionData_Window import
11    Ui_CarbonEmission_Dialog
12 from ui.project_details_windows.
13    ProjectDetails_DemolitionANDRecyclingData_Window import
14    Ui_Demolition_Dialog
15 from ui.project_details_windows.
16    ProjectDetails_MaintenanceANDRepairData_Window import
17    Ui_Maintenance_Dialog
18 from ui.project_details_windows.ProjectDetails_Miscellaneous_Window
19     import Ui_Miscellaneous_Dialog
20 from ui.project_details_windows.ProjectDetails_SubStructure_Window
21     import Ui_SubStructure_Dialog
22 from ui.project_details_windows.ProjectDetails_SuperStructure_Window
23     import Ui_SuperStructure_Dialog
24 from PyQt5.QtWidgets import (QApplication, QMainWindow, QWidget,
25     QVBoxLayout,
26         QHBoxLayout, QPushButton, QLabel,
27     QTreeWidget,
28         QTreeWidgetItem, QTabBar, QFrame, QSplitter
29     ,
30         QToolBar, QAction, QGroupBox, QMenu,
31     QLineEdit,
32         QComboBox, QMessageBox, QGridLayout)
33 from PyQt5.QtGui import QIcon, QFont
34 from PyQt5.QtCore import Qt, QSize
35
36
37 class BICCAStudio(QMainWindow):
38
39     def openBridgeTrafficWindow(self):
40
41         self.window = QtWidgets.QDialog()
42         self.ui = Ui_BridgeTraffic_Dialog()
43         self.ui.setupUi(self.window)
44         self.window.show()
45
46
47     def openFoundationWindow(self):

```

```
31     self.window = QtWidgets.QDialog()
32     self.ui = Ui_Foundation_Dialog()
33     self.ui.setupUi(self.window)
34     self.window.show()
35
36 def openCarbonEmissionWindow(self):
37     self.window = QtWidgets.QDialog()
38     self.ui = Ui_CarbonEmission_Dialog()
39     self.ui.setupUi(self.window)
40     self.window.show()
41
42 def openDemolitionWindow(self):
43     self.window = QtWidgets.QDialog()
44     self.ui = Ui_Demolition_Dialog()
45     self.ui.setupUi(self.window)
46     self.window.show()
47
48 def openFinancialWindow(self):
49     self.window = QtWidgets.QDialog()
50     self.ui = Ui_FinancialData_Dialog()
51     self.ui.setupUi(self.window)
52     self.window.show()
53
54 def openMaintenanceWindow(self):
55     self.window = QtWidgets.QDialog()
56     self.ui = Ui_Maintenance_Dialog()
57     self.ui.setupUi(self.window)
58     self.window.show()
59
60 def openMiscellaneousWindow(self):
61     self.window = QtWidgets.QDialog()
62     self.ui = Ui_Miscellaneous_Dialog()
63     self.ui.setupUi(self.window)
64     self.window.show()
65
66 def openSubStructureWindow(self):
67     self.window = QtWidgets.QDialog()
68     self.ui = Ui_SubStructure_Dialog()
69     self.ui.setupUi(self.window)
```

```

70         self.window.show()

71

72     def openSuperStructureWindow(self):
73
74         self.window = QtWidgets.QDialog()
75
76         self.ui = Ui_SuperStructure_Dialog()
77
78         self.ui.setupUi(self.window)
79
80         self.window.show()

81

82     def __init__(self):
83
84         super().__init__()
85
86         self.setWindowTitle("<untitled draft> - BICCA Studio 1.0.0")
87
88         self.setGeometry(100, 40, 1440, 900)
89
90         self.setStyleSheet("background-color: #f5f5f5;")

91

92     # Initialize tutorial page counter
93
94     self.current_tutorial_page = 1
95
96     self.total_tutorial_pages = 4

97

98     # Tutorial content
99
100    self.tutorial_pages = [
101
102        {
103
104            "page_number": "1/4",
105
106            "title": "Welcome to\nBICCA Studio",
107
108            "content": """
109
110                BICCA Studio has a lot of features to offer. In the
111
112                next few minutes, you'll learn how to use BICCA Studio efficiently,
113
114                from setting up and managing projects, to navigating the user
115
116                interface. This tutorial will guide you through essential features,
117
118                including customization options, shortcuts, and export capabilities,
119
120                ensuring a seamless workflow. Whether you're a beginner or an
121
122                advanced user, this guide will help you unlock the full potential of
123
124                BICCA Studio and enhance your productivity.
125
126                """
127
128        },
129
130        {
131
132            "page_number": "2/4",
133
134            "title": "Welcome to\nBICCA Studio",
135
136            "content": """
137
138                The Project General Information page is the foundation

```

of your project setup, allowing you to input essential details for accurate documentation and streamlined management. Here, you will provide key information starting with the Company Name, which represents the organization behind the project. Next is the Project Title, a concise name that defines the scope of work. The Project Description further elaborates on the objectives and purpose of the project. Additionally, you will need to enter the Name of the Valuer responsible for the valuation, along with the Job Number for easy reference. The Client field identifies the primary stakeholder of the project, while the Country specifies the project's geographical location. Finally, the Base Year establishes a reference period for analysis and reports.

```
102     """
103
104     },
105
106     {
107         "page_number": "3/4",
108         "title": "Understanding\nInput Parameters",
109         "content": """
110             Input Parameters are crucial for accurate analysis and
111             results. This section allows you to define various technical
112             specifications, economic factors, and operational variables that
113             will influence your project outcomes. You can specify factors such
114             as time periods, growth rates, discount rates, and other numerical
115             inputs that the software will use for calculations. Each parameter
116             can be customized according to your specific requirements, ensuring
117             that the analysis reflects real-world conditions accurately. The
118             intuitive interface makes it easy to adjust these parameters as
119             needed, and you can save different parameter sets for future use or
120             comparisons.
121             """
122
123     },
124
125     {
126         "page_number": "4/4",
127         "title": "Working with\nOutputs",
128         "content": """
129             The Outputs section displays the results of your
130             analysis based on the information and parameters you've entered.
131             Here you can view comprehensive reports, charts, and visualizations
132             that present your data in meaningful ways. You can customize the
```

output format according to your preferences or your client's requirements. BICCA Studio allows you to export these outputs in various formats including PDF, Excel, or as image files for easy sharing and presentation. Additionally, you can compare different scenarios by adjusting your inputs and generating new outputs, providing valuable insights for decision-making processes.

```

116         """
117     }
118 ]
119
120     # Create the main layout
121
122     self.central_widget = QWidget()
123     self.setCentralWidget(self.central_widget)
124     self.main_layout = QVBoxLayout(self.central_widget)
125     self.main_layout.setContentsMargins(0, 0, 0, 0)
126     self.main_layout.setSpacing(0)
127
128     # Create menu bar with dropdown menus
129     self.create_menu_bar()
130
131     # Create toolbar
132     self.create_toolbar()
133
134     # Create window tabs
135     self.create_window_tabs()
136
137     # Create main content area
138     self.create_content_area()
139     self.show_tutorials_only()  # Show only tutorials at launch
140
141     # Add status bar with Data button
142     self.create_status_bar()
143
144     # Initially hide dropdown menus
145     self.file_menu_widget = QWidget(self)
146     self.file_menu_widget.hide()
147     self.help_menu_widget = QWidget(self)
148     self.help_menu_widget.hide()
```

```

149     # Update tutorial content to first page
150     self.update_tutorial_content()
151
152
153     def create_menu_bar(self):
154         menubar = self.menuBar()
155         menubar.setObjectName("menubar")
156         menubar.setStyleSheet("""
157             QMenuBar {
158                 background-color: #4C9141;
159                 color: white;
160             }
161             QMenuBar::item {
162                 background-color: white;
163                 color: black;
164                 padding: 5px 25px;
165             }
166             QMenuBar::item:selected {
167                 background-color: #e0e0e0;
168             }
169         """
170     )
171
172     # File menu
173     self.menuFile = QMenu("File", self)
174     self.menuFile.setObjectName("menuFile")
175     menubar.addMenu(self.menuFile)
176
177     # Home menu
178     self.menuHome = QMenu("Home", self)
179     self.menuHome.setObjectName("menuHome")
180     menubar.addMenu(self.menuHome)
181
182     # Reports menu
183     self.menuReports = QMenu("Reports", self)
184     self.menuReports.setObjectName("menuReports")
185     menubar.addMenu(self.menuReports)
186
187     # Help menu
188     self.menuHelp = QMenu("Help", self)

```

```

188     self.menuHelp.setObjectName("menuHelp")
189     menubar.addMenu(self.menuHelp)
190
191     # Actions with icons (update icon paths as needed)
192     from PyQt5.QtGui import QIcon, QPixmap
193
194     def icon(path):
195         return QIcon(QPixmap(path))
196
197     self.actionNew = QAction(icon("src/osbridgelcca/desktop_app/
198 assets/MainWindow_icons/Vector.png"), "New", self)
199     self.actionOpen = QAction(icon("src/osbridgelcca/desktop_app/
200 assets/MainWindow_icons/Vector (1).png"), "Open", self)
201     self.actionSave = QAction(icon("src/osbridgelcca/desktop_app/
202 assets/MainWindow_icons/icon_save_action_floppy_.png"), "Save"
203 , self)
204     self.actionSave_As = QAction(icon("src/osbridgelcca/desktop_app/
205 /assets/MainWindow_icons/icon_document_save_as_template_.png"),
206 "Save As...", self)
207     self.actionCreate_a_Copy = QAction(icon("src/osbridgelcca/
208 desktop_app/assets/MainWindow_icons/icon_file_copy_.png"), "Create
209 a Copy", self)
210     self.actionPrint = QAction(icon("src/osbridgelcca/desktop_app/
211 assets/MainWindow_icons/Vector (2).png"), "Print", self)
212     self.actionRename = QAction(icon("src/osbridgelcca/desktop_app/
213 assets/MainWindow_icons/Vector (3).png"), "Rename", self)
214     self.actionExport = QAction(icon("src/osbridgelcca/desktop_app/
215 assets/MainWindow_icons/Export.png"), "Export", self)
216     self.actionVersion_History = QAction(icon("src/osbridgelcca/
217 desktop_app/assets/MainWindow_icons/Vector (4).png"), "Version
218 History", self)
219     self.actionInfo = QAction(icon("src/osbridgelcca/desktop_app/
220 assets/MainWindow_icons/Alert Circle.png"), "Info", self)
221     self.actionContact_Us = QAction(icon("src/osbridgelcca/
222 desktop_app/assets/MainWindow_icons/Contact.png"), "Contact Us",
223 self)
224     self.actionFeedback = QAction(icon("src/osbridgelcca/
225 desktop_app/assets/MainWindow_icons/icon_Person_Feedback_.png"),
226 "Feedback", self)

```

```

209         self.actionVideo_Tutorials = QAction(icon("src/osbridgelcca/
desktop_app/assets/MainWindow_icons/      icon_youtube_.png"), "Video Tutorials", self)
210
211         self.actionJoin_our_Community = QAction(icon("src/osbridgelcca/
desktop_app/assets/MainWindow_icons/      icon_People_Community_.png"), "Join our Community", self)
212
213         self.actionEdit = QAction(icon("src/osbridgelcca/desktop_app/
assets/MainWindow_icons/08b7798a84ffe0528bdec7dc8efe8fb1c89f77ae.png"), "Edit", self)
214
215         self.actionFile = QAction(icon("src/osbridgelcca/desktop_app/
assets/MainWindow_icons/Icon.png"), "File", self)
216
217         self.actionOpen_File = QAction(icon("src/osbridgelcca/
desktop_app/assets/MainWindow_icons/78ff94ca74c504343b797700f5d515a40ab72143.png"), "Open File", self)
218
219
220     # Add actions to File menu
221
222     self.menuFile.addAction(self.actionNew)
223
224     self.menuFile.addAction(self.actionOpen)
225
226     self.menuFile.addAction(self.actionSave)
227
228     self.menuFile.addAction(self.actionSave_As)
229
230     self.menuFile.addAction(self.actionCreate_a_Copy)
231
232     self.menuFile.addAction(self.actionPrint)
233
234     self.menuFile.addAction(self.actionRename)
235
236     self.menuFile.addAction(self.actionExport)
237
238     self.menuFile.addAction(self.actionVersion_History)
239
240     self.menuFile.addAction(self.actionInfo)
241
242
243
244     # Add actions to Help menu
245
246     self.menuHelp.addAction(self.actionContact_Us)
247
248     self.menuHelp.addAction(self.actionFeedback)
249
250     self.menuHelp.addAction(self.actionVideo_Tutorials)
251
252     self.menuHelp.addAction(self.actionJoin_our_Community)
253
254
255     # Optionally, add actions to toolbar if you want
256
257     # self.addToolBar(Qt.LeftToolBarArea, QToolBar(self)).addAction
258     (self.actionEdit)
259
260     # self.addToolBar(Qt.LeftToolBarArea, QToolBar(self)).addAction
261     (self.actionFile)
262
263     # self.addToolBar(Qt.LeftToolBarArea, QToolBar(self)).addAction

```

```

(self.actionOpen_File)

237
238     def toggle_file_menu(self):
239         # Close help menu if it's open
240         self.help_menu_widget.hide()
241
242         # Toggle file menu
243         if self.file_menu_widget.isVisible():
244             self.file_menu_widget.hide()
245         else:
246             self.file_menu_widget.show()
247             self.file_menu_widget.raise_()
248
249     def toggle_help_menu(self):
250         # Close file menu if it's open
251         self.file_menu_widget.hide()
252
253         # Toggle help menu
254         if self.help_menu_widget.isVisible():
255             self.help_menu_widget.hide()
256         else:
257             self.help_menu_widget.show()
258             self.help_menu_widget.raise_()
259
260     def create_toolbar(self):
261         toolbar = QToolBar("Main Toolbar")
262         toolbar.setMovable(False)
263         toolbar.setIconSize(QSize(20, 20))
264         self.addToolBar(Qt.LeftToolBarArea, toolbar)
265
266         # Use the same icons as in MainWindow.py (update paths if
267         # needed)
268
269         from PyQt5.QtGui import QIcon, QPixmap
270
271         def icon(path):
272             return QIcon(QPixmap(path))
273
274         self.actionEdit = QAction(icon("src/osbridgelcca/desktop_app/
275             assets/Ma.../MainWindow_icons/08b7798a84ffe0528bdec7dc8efe8fb1c89f77ae.png"))

```

```

    " ), "Edit", self)

273     self.actionFile = QAction(icon("src/osbridgelcca/desktop_app/
assets/MainWindow_icons/Icon.png"), "File", self)
274
275     self.actionOpen_File = QAction(icon("src/osbridgelcca/
desktop_app/assets/MainWindow_icons/78
ff94ca74c504343b797700f5d515a40ab72143.png"), "Open File", self)

276     toolbar.addAction(self.actionEdit)
277     toolbar.addAction(self.actionFile)
278     toolbar.addAction(self.actionOpen_File)
279     toolbar.addSeparator()

280

281 def create_window_tabs(self):
282
283     # Create a container widget for better alignment
284     window_tabs_container = QWidget()
285     container_layout = QHBoxLayout(window_tabs_container)
286     container_layout.setContentsMargins(0, 0, 0, 0)

287     # Left spacer to push content to center
288     container_layout.addStretch(1)

289

290     # Windows label with better spacing
291     windows_label = QLabel("Windows:")
292     windows_label.setStyleSheet("padding: 5px 10px 5px 0px;")
293     container_layout.addWidget(windows_label)

294

295     # Store tab buttons for later use
296     self.tab_buttons = {}

297

298     # Create tab buttons with better spacing
299     tabs = ["Tutorials", "Project Details", "Results", "Compare"]
300
301     for i, tab_name in enumerate(tabs):
302         tab_btn = QPushButton(tab_name)
303         tab_btn.setStyleSheet("""
304             QPushButton {
305                 background-color: #EEEEEE;
306                 border: 1px solid #CCCCCC;
307                 padding: 5px 10px;
308                 margin: 0px 2px;
309             }
310         """)
311
312         container_layout.addWidget(tab_btn)

```

```

308         }
309
310         QPushbutton::pressed {
311             background-color: #DDDDDD;
312         }
313     """)

314     container_layout.addWidget(tab_btn)
315     self.tab_buttons[tab_name] = tab_btn
316
317     # Connect each tab to its handler
318     if tab_name == "Tutorials":
319         tab_btn.clicked.connect(self.show_tutorials_only)
320     elif tab_name == "Project Details":
321         tab_btn.clicked.connect(self.show_project_details)
322
323     # Results and Compare can be connected later
324
325     # Right spacer to push content to center
326     container_layout.addStretch(1)
327
328
329     window_tabs_container.setFixedHeight(40)
330     self.main_layout.addWidget(window_tabs_container)
331
332
333     def show_tutorials_only(self):
334
335         # Hide project details panel
336         self.project_panel.setVisible(False)
337
338         # Set tutorials panel max width to 771
339         self.tutorials_panel.setMaximumWidth(771)
340
341         # Center the tutorials panel in the main window
342         self.splitter.setSizes([1, 0])
343
344         # Optionally, expand tutorials to fill available space
345         self.tutorials_panel.setMinimumWidth(0)
346
347         self.tutorials_panel.setSizePolicy(QtWidgets.QSizePolicy.
348                                         Expanding, QtWidgets.QSizePolicy.Preferred)
349
350
351     def show_project_details(self):
352
353         # Show both panels
354         self.project_panel.setVisible(True)
355
356         # Restore tutorials panel max width to 244
357         self.tutorials_panel.setMaximumWidth(244)
358
359         self.tutorials_panel.setMinimumWidth(0)
360
361         self.tutorials_panel.setSizePolicy(QtWidgets.QSizePolicy.

```

```

Preferred, QtWidgets.QSizePolicy.Preferred)

# Reset splitter sizes for normal layout
self.splitter.setSizes([200, 750])

348

349     def create_content_area(self):
350
350         def get_country_name(filename = "src//osbridgelcca//desktop_app
350 //assets//country_abbreviations.csv"):
351
351             country_names_lst = []
352
353
353             with open(filename, newline='', encoding='utf-8') as
353 csvfile:
354
354                 reader = csv.reader(csvfile)
355
355                 next(reader) # Skiping header row
356
356                 for row in reader:
357
357                     country_names_lst.append(row[1])
358
358             return country_names_lst
359
359
360         def get_base_year(filename = "src//osbridgelcca//desktop_app//
360 assets//years_2000_to_2025.csv"):
361
361             base_years_lst = []
362
363
363             with open(filename, newline='', encoding='utf-8') as
363 csvfile:
364
364                 reader = csv.reader(csvfile)
365
365                 next(reader) # Skiping header row
366
366                 for row in reader:
367
367                     base_years_lst.append(row[0])
368
368             return base_years_lst
369
370
371             self.splitter = QSplitter(Qt.Horizontal)
372
373
373             # Left side - Tutorials panel
374
374             self.tutorials_panel = QWidget()
375
375             self.tutorials_panel.setMaximumWidth(771) # Start with max 771
376
376             for launch
377
377                 tutorials_layout = QVBoxLayout(self.tutorials_panel)
378
378                 tutorials_layout.setContentsMargins(0, 0, 0, 0)

```

```

379     # Tutorial header
380
381     tutorials_header = QWidget()
382     tutorials_header.setStyleSheet("background-color: #f0e6e6;")
383     tutorials_header_layout = QHBoxLayout(tutorials_header)
384     tutorials_header_layout.setContentsMargins(5, 5, 5, 5)
385
386     tutorials_label = QLabel("Tutorials")
387     close_btn = QPushButton(" ")
388     close_btn.setFixedSize(20, 20)
389     close_btn.setStyleSheet("border: none;")
390     close_btn.clicked.connect(self.close_tutorials)
391
392     tutorials_header_layout.addWidget(tutorials_label)
393     tutorials_header_layout.addStretch()
394     tutorials_header_layout.addWidget(close_btn)
395
396     # Tutorial content with light pink background
397     self.tutorials_content = QWidget()
398     self.tutorials_content.setStyleSheet("background-color: #f9f0f0")
399
400     self.tutorials_content_layout = QVBoxLayout(self.
401 tutorials_content)
402
403     # Create labels that will be updated dynamically
404     self.page_label = QLabel()
405     self.page_label.setAlignment(Qt.AlignCenter)
406     self.page_label.setStyleSheet("font-weight: bold; padding: 5px;
407 border-bottom: 1px solid #ddd;")
408
409     self.welcome_label = QLabel()
410     self.welcome_label.setAlignment(Qt.AlignCenter)
411     self.welcome_label.setStyleSheet("font-weight: bold; padding:
412 10px; border-bottom: 1px solid #ddd;")
413
414     self.description_label = QLabel()
415     self.description_label.setWordWrap(True)
416     self.description_label.setStyleSheet("padding: 10px;")
417
418     self.tutorials_content_layout.addWidget(self.page_label)

```

```

414     self.tutorials_content_layout.addWidget(self.welcome_label)
415     self.tutorials_content_layout.addWidget(self.description_label)
416     self.tutorials_content_layout.addStretch()
417
418     # Tutorial navigation buttons
419     nav_buttons = QWidget()
420     nav_buttons.setStyleSheet("background-color: #f9f0f0;")
421     nav_layout = QHBoxLayout(nav_buttons)
422     nav_layout.setContentsMargins(10, 5, 10, 5)
423
424     back_btn = QPushButton("Back")
425     back_btn.setStyleSheet("""
426         QPushButton {
427             background-color: #f0f0f0;
428             border: 1px solid #ddd;
429             padding: 5px 15px;
430             border-radius: 3px;
431         }
432     """)
433     back_btn.clicked.connect(self.tutorial_back)
434
435     next_btn = QPushButton("Next")
436     next_btn.setStyleSheet("""
437         QPushButton {
438             background-color: #f0f0f0;
439             border: 1px solid #ddd;
440             padding: 5px 15px;
441             border-radius: 3px;
442         }
443     """)
444     next_btn.clicked.connect(self.tutorial_next)
445
446     nav_layout.addWidget(back_btn)
447     nav_layout.addWidget(next_btn)
448
449     tutorials_layout.addWidget(tutorials_header)
450     tutorials_layout.addWidget(self.tutorials_content)
451     tutorials_layout.addWidget(nav_buttons)
452

```

```

453     # Right side - Project Details panel
454
455     self.project_panel = QWidget()
456
457     self.project_panel.setMaximumWidth(771)
458
459     project_layout = QVBoxLayout(self.project_panel)
460
461     project_layout.setContentsMargins(0, 0, 0, 0)
462
463
464
465     # Project header
466
467     project_header = QWidget()
468
469     project_header.setStyleSheet("background-color: #f0f0f0;")
470
471     project_header_layout = QHBoxLayout(project_header)
472
473     project_header_layout.setContentsMargins(5, 5, 5, 5)
474
475
476     project_label = QLabel("Project Details Window")
477
478     project_close_btn = QPushButton(" ")
479
480     project_close_btn.setFixedSize(20, 20)
481
482     project_close_btn.setStyleSheet("font-weight: bold; border:
483 none;")
484
485     project_close_btn.clicked.connect(self.close_project_details)
486
487
488     project_header_layout.addWidget(project_label)
489
490     project_header_layout.addStretch()
491
492     project_header_layout.addWidget(project_close_btn)
493
494
495     # Create collapsible sections
496
497     project_content = QWidget()
498
499     project_content_layout = QVBoxLayout(project_content)
500
501     project_content_layout.setContentsMargins(10, 10, 10, 10)
502
503
504     # General Information section (collapsible)
505
506     general_info_box = QGroupBox()
507
508     general_info_box.setStyleSheet("""
509         QGroupBox {
510             background-color: #f0e6e6;
511             border-radius: 3px;
512             margin-bottom: 5px;
513         }
514     """)
515
516     general_info_layout = QVBoxLayout(general_info_box)
517
518     general_info_layout.setContentsMargins(10, 10, 10, 10)

```

```

491
492     # Collapsible header
493
494     self.general_info_btn = QPushButton("General Information")
495     self.general_info_btn.setCheckable(True)
496     self.general_info_btn.setChecked(False)
497     self.general_info_btn.setStyleSheet("font-weight: bold; text-
498 align: left; background: none; border: none;")
499     general_info_layout.addWidget(self.general_info_btn)
500
501
502     # Content widget
503
504     self.general_info_content = QWidget()
505     self.general_info_content.setStyleSheet("background-color: #
506 fff9f9;")
507
508     form_layout = QGridLayout(self.general_info_content)
509     form_layout.setSpacing(10)
510
511
512     # Company Name
513
514     company_label = QLabel("Company Name")
515     company_label.setFixedWidth(150)
516     company_label.setAlignment(Qt.AlignLeft | Qt.AlignVCenter)
517
518     company_edit = QLineEdit()
519     company_edit.setFixedWidth(483)
520     company_edit.setFixedHeight(25)
521     company_edit.setStyleSheet("background-color: #ffffff;")
522
523
524     # Project Title
525
526     title_label = QLabel("Project Title")
527     title_label.setFixedWidth(150)
528     title_label.setAlignment(Qt.AlignLeft | Qt.AlignVCenter)
529
530     title_edit = QLineEdit()
531     title_edit.setFixedWidth(483)
532     title_edit.setFixedHeight(25)
533     title_edit.setStyleSheet("background-color: #ffffff;")
534
535
536     # Project Description
537
538     desc_label = QLabel("Project Description")
539     desc_label.setFixedWidth(150)
540     desc_label.setAlignment(Qt.AlignLeft | Qt.AlignVCenter)
541
542     desc_edit = QLineEdit()

```

```

528     desc_edit.setFixedWidth(483)
529     desc_edit.setFixedHeight(125)
530     desc_edit.setStyleSheet("background-color: #ffffff;")
531
532     # Name of Valuer
533
534     valuer_label = QLabel("Name of Valuer")
535     valuer_label.setFixedWidth(150)
536     valuer_label.setAlignment(Qt.AlignLeft | Qt.AlignVCenter)
537     valuer_combo = QComboBox()
538     valuer_combo.setFixedWidth(164)
539     valuer_combo.setFixedHeight(19)
540     valuer_combo.setStyleSheet("background-color: #ffffff;")
541     for valuer in get_country_name():
542         valuer_combo.addItem(valuer)
543
544     # Job Number
545
546     job_label = QLabel("Job Number")
547     job_label.setFixedWidth(150)
548     job_label.setAlignment(Qt.AlignLeft | Qt.AlignVCenter)
549     job_edit = QLineEdit()
550     job_edit.setFixedWidth(164)
551     job_edit.setFixedHeight(19)
552     job_edit.setStyleSheet("background-color: #ffffff;")
553
554     # Client
555
556     client_label = QLabel("Client")
557     client_label.setFixedWidth(150)
558     client_label.setAlignment(Qt.AlignLeft | Qt.AlignVCenter)
559     client_edit = QLineEdit()
560     client_edit.setFixedWidth(164)
561     client_edit.setFixedHeight(19)
562     client_edit.setStyleSheet("background-color: #ffffff;")
563
564     # Country
565
566     country_label = QLabel("Country")
567     country_label.setFixedWidth(150)
568     country_label.setAlignment(Qt.AlignLeft | Qt.AlignVCenter)
569     country_combo = QComboBox()
570     country_combo.setFixedWidth(164)

```

```

567     country_combo.setFixedHeight(19)
568     country_combo.setStyleSheet("background-color: #ffffff;")
569     for country in get_country_name():
570         country_combo.addItem(country)
571
572     # Base Year
573     year_label = QLabel("Base Year")
574     year_label.setFixedWidth(150)
575     year_label.setAlignment(Qt.AlignLeft | Qt.AlignVCenter)
576     year_combo = QComboBox()
577     year_combo.setFixedWidth(164)
578     year_combo.setFixedHeight(19)
579     year_combo.setStyleSheet("background-color: #ffffff;")
580     for year in get_base_year():
581         year_combo.addItem(year)
582
583     # Add widgets to grid layout (row, column)
584     form_layout.addWidget(company_label, 0, 0)
585     form_layout.addWidget(company_edit, 0, 1)
586     form_layout.addWidget(title_label, 1, 0)
587     form_layout.addWidget(title_edit, 1, 1)
588     form_layout.addWidget(desc_label, 2, 0)
589     form_layout.addWidget(desc_edit, 2, 1)
590     form_layout.addWidget(valuer_label, 3, 0)
591     form_layout.addWidget(valuer_combo, 3, 1)
592     form_layout.addWidget(job_label, 4, 0)
593     form_layout.addWidget(job_edit, 4, 1)
594     form_layout.addWidget(client_label, 5, 0)
595     form_layout.addWidget(client_edit, 5, 1)
596     form_layout.addWidget(country_label, 6, 0)
597     form_layout.addWidget(country_combo, 6, 1)
598     form_layout.addWidget(year_label, 7, 0)
599     form_layout.addWidget(year_combo, 7, 1)
600
601     # Add Save button
602     save_btn = QPushButton("Save General Info")
603     save_btn.setStyleSheet("background-color: #4C9141; color: white
; font-weight: bold; padding: 6px 18px;")
604     form_layout.addWidget(save_btn)

```

```

605
606     # Store references to the input widgets for later access
607
608     self.company_edit = company_edit
609
610     self.title_edit = title_edit
611
612     self.desc_edit = desc_edit
613
614     self.valuer_combo = valuer_combo
615
616     self.job_edit = job_edit
617
618     self.client_edit = client_edit
619
620     self.country_combo = country_combo
621
622     self.year_combo = year_combo
623
624
625
626     # Connect the save button
627
628     save_btn.clicked.connect(self.save_general_info_data)
629
630
631     general_info_layout.addWidget(self.general_info_content)
632
633
634
635     def toggle_general_info_content(checked):
636
637         self.general_info_content.setVisible(checked)
638
639         self.general_info_btn.setText("    General Information" if
640 checked else "    General Information")
641
642         self.general_info_btn.toggled.connect(
643 toggle_general_info_content)
644
645
646         self.general_info_content.setVisible(False)
647
648
649     # Input Parameters section (collapsible)
650
651     input_params_box = QGroupBox()
652
653     input_params_box.setStyleSheet("""
654
655         QGroupBox {
656
657             background-color: #f0e6e6;
658
659             border-radius: 3px;
660
661             margin-bottom: 5px;
662
663         }
664
665     """)
666
667     input_params_layout = QVBoxLayout(input_params_box)
668
669     input_params_layout.setContentsMargins(10, 10, 10, 10)
670
671
672     self.input_params_btn = QPushButton("    Input Parameters")
673
674     self.input_params_btn.setCheckable(True)

```

```

642         self.input_params_btn.setChecked(False)
643         self.input_params_btn.setStyleSheet("font-weight: bold; text-
644 align: left; background: none; border: none;")
645         input_params_layout.addWidget(self.input_params_btn)
646
647         self.input_params_content = QWidget()
648         self.input_params_content.setStyleSheet("background-color: rgb
649 (240, 230, 230);")
650         input_params_content_layout = QVBoxLayout(self.
651 input_params_content)
652         input_params_content_layout.setSpacing(10)
653
654         # --- Begin: Copied from MainWindow.py's self.widget_5 ---
655
656         # Structure Works Data (collapsible)
657         structure_box = QGroupBox()
658         structure_box.setStyleSheet("background-color: rgb(240,230,230)
659 ; margin-bottom: 5px;")
660         structure_layout = QVBoxLayout(structure_box)
661         structure_layout.setContentsMargins(5, 5, 5, 5)
662
663         self.structure_btn = QPushButton("      Structure Works Data")
664         self.structure_btn.setCheckable(True)
665         self.structure_btn.setChecked(False)
666         self.structure_btn.setStyleSheet("text-align: left; background:
667 none; border: none;")
668         structure_layout.addWidget(self.structure_btn)
669
670         self.structure_content = QWidget()
671         structure_content_layout = QVBoxLayout(self.structure_content)
672         structure_content_layout.setSpacing(6)
673
674         # Foundation
675
676         foundation_btn = QPushButton(" Foundation")
677         foundation_btn.setIcon(QIcon("src/osbridgelcca/desktop_app/
678 assets/MMainWindow_icons/play_arrow_filled.png"))
679         foundation_btn.setStyleSheet("text-align: left;")
680         foundation_btn.clicked.connect(self.openFoundationWindow)
681         structure_content_layout.addWidget(foundation_btn)

```

```

675
676     # Super-Structure
677
678     superstructure_btn = QPushButton(" Super-Structure")
679     superstructure_btn.setIcon(QIcon("src/osbridgelcca/desktop_app/
assets/MainWindow_icons/play_arrow_filled.png"))
680     superstructure_btn.setStyleSheet("text-align: left;")
681     superstructure_btn.clicked.connect(self.
682 openSuperStructureWindow)
683
684     structure_content_layout.addWidget(superstructure_btn)
685
686     # Sub-Structure
687
688     substructure_btn = QPushButton(" Sub-Structure")
689     substructure_btn.setIcon(QIcon("src/osbridgelcca/desktop_app/
assets/MainWindow_icons/play_arrow_filled.png"))
690     substructure_btn.setStyleSheet("text-align: left;")
691     substructure_btn.clicked.connect(self.openSubStructureWindow)
692     structure_content_layout.addWidget(substructure_btn)
693
694     # Miscellaneous
695
696     misc_btn = QPushButton(" Miscellaneous")
697     misc_btn.setIcon(QIcon("src/osbridgelcca/desktop_app/assets/
MainWindow_icons/play_arrow_filled.png"))
698     misc_btn.setStyleSheet("text-align: left;")
699     misc_btn.clicked.connect(self.openMiscellaneousWindow)
700     structure_content_layout.addWidget(misc_btn)
701
702
703     self.structure_content.setVisible(False)
704     structure_layout.addWidget(self.structure_content)
705
706     def toggle_structure_content(checked):
707
708         self.structure_content.setVisible(checked)
709
710         self.structure_btn.setText("      Structure Works Data" if
711 checked else "      Structure Works Data")
712
713         self.structure_btn.toggled.connect(toggle_structure_content)
714
715
716         self.input_params_content.setVisible(False)
717         input_params_content_layout.addWidget(structure_box)
718
719
720     # Financial Data

```

```

709     financial_btn = QPushButton("      Financial Data")
710     financial_btn.setStyleSheet("text-align: left;")
711     financial_btn.clicked.connect(self.openFinancialWindow)
712     input_params_content_layout.addWidget(financial_btn)
713
714     # Carbon Emission Data (collapsible)
715     carbon_box = QGroupBox()
716     carbon_box.setStyleSheet("background-color: rgb(240,230,230);
717     margin-bottom: 5px;")
718     carbon_layout = QVBoxLayout(carbon_box)
719     carbon_layout.setContentsMargins(5, 5, 5, 5)
720
721     self.carbon_btn = QPushButton("      Carbon Emission Data")
722     self.carbon_btn.setCheckable(True)
723     self.carbon_btn.setChecked(False)
724     self.carbon_btn.setStyleSheet(" text-align: left; background:
725     none; border: none;")
726     carbon_layout.addWidget(self.carbon_btn)
727
728     self.carbon_content = QWidget()
729     carbon_content_layout = QVBoxLayout(self.carbon_content)
730     carbon_content_layout.setSpacing(6)
731
732     carbon_cost_btn = QPushButton(" Carbon Emission Cost Data")
733     carbon_cost_btn.setIcon(QIcon("src/osbridgelcca/desktop_app/
734     assets/MainWindow_icons/play_arrow_filled.png"))
735     carbon_cost_btn.setStyleSheet("text-align: left;")
736     carbon_cost_btn.clicked.connect(self.openCarbonEmissionWindow)
737     carbon_content_layout.addWidget(carbon_cost_btn)
738
739     self.carbon_content.setVisible(False)
740     carbon_layout.addWidget(self.carbon_content)
741
742     def toggle_carbon_content(checked):
743         self.carbon_content.setVisible(checked)
744         self.carbon_btn.setText("      Carbon Emission Data" if
745         checked else "      Carbon Emission Data")
746         self.carbon_btn.toggled.connect(toggle_carbon_content)
747
748

```

```

744     input_params_content_layout.addWidget(carbon_box)

745

746     # Bridge and Traffic Data
747     bridge_btn = QPushButton("      Bridge and Traffic Data")
748     bridge_btn.setStyleSheet("text-align: left;")
749     bridge_btn.clicked.connect(self.openBridgeTrafficWindow)
750     input_params_content_layout.addWidget(bridge_btn)

751

752     # Maintenance and Repair
753     maintenance_btn = QPushButton("      Maintenance and Repair")
754     maintenance_btn.setStyleSheet("text-align: left;")
755     maintenance_btn.clicked.connect(self.openMaintenanceWindow)
756     input_params_content_layout.addWidget(maintenance_btn)

757

758     # Disposal and Recycling
759     demolition_btn = QPushButton("      Disposal and Recycling")
760     demolition_btn.setStyleSheet("text-align: left;")
761     demolition_btn.clicked.connect(self.openDemolitionWindow)
762     input_params_content_layout.addWidget(demolition_btn)

763

764     self.input_params_content.setVisible(False)
765     input_params_layout.addWidget(self.input_params_content)

766

767

768     def toggle_input_params_content(self):
769         self.input_params_content.setVisible(self.isChecked())
770         self.input_params_btn.setText("      Input Parameters" if
771         self.isChecked() else "      Input Parameters")
772         self.input_params_btn.toggled.connect(
773         self.toggle_input_params_content)

774

775     # Outputs section (collapsible)
776     outputs_box = QGroupBox()
777     outputs_box.setStyleSheet("""
778         QGroupBox {
779             background-color: #f0e6e6;
780             border-radius: 3px;
781             margin-bottom: 5px;
782         }
783     """)

```

```

781     """)
782
783     outputs_layout = QVBoxLayout(outputs_box)
784     outputs_layout.setContentsMargins(10, 10, 10, 10)
785
786     self.outputs_btn = QPushButton("      Outputs")
787     self.outputs_btn.setCheckable(True)
788     self.outputs_btn.setChecked(False)
789     self.outputs_btn.setStyleSheet("font-weight: bold; text-align: left; background: none; border: none;")
790     outputs_layout.addWidget(self.outputs_btn)
791
792     self.outputs_content = QWidget()
793     outputs_content_layout = QVBoxLayout(self.outputs_content)
794     outputs_content_layout.setSpacing(10)
795     # Add your outputs widgets here, e.g.:
796     outputs_content_layout.addWidget(QLabel("Outputs fields go here ..."))
797     self.outputs_content.setVisible(False)
798     outputs_layout.addWidget(self.outputs_content)
799
800     def toggle_outputs_content(checked):
801         self.outputs_content.setVisible(checked)
802         self.outputs_btn.setText("      Outputs" if checked else "Outputs")
803         self.outputs_btn.toggled.connect(toggle_outputs_content)
804
805     # Add all sections to the project content
806     project_content_layout.addWidget(general_info_box)
807     project_content_layout.addWidget(input_params_box)
808     project_content_layout.addWidget(outputs_box)
809
810     project_layout.addWidget(project_header)
811     project_layout.addWidget(project_content)
812     project_layout.addStretch()
813
814     # Add both panels to the splitter
815     self.splitter.addWidget(self.tutorials_panel)
816     self.splitter.addWidget(self.project_panel)
817     self.main_layout.addWidget(self.splitter)

```

```

817
818     def create_status_bar(self):
819         status_bar = self.statusBar()
820
821         data_btn = QPushButton("      Data")
822         data_btn.setStyleSheet("padding: 5px 15px;")
823
824         status_bar.addPermanentWidget(data_btn)
825
826     def update_tutorial_content(self):
827         # Get current page data
828         page_data = self.tutorial_pages[self.currentTutorialPage - 1]
829
830         # Update the tutorial content
831         self.page_label.setText(page_data["page_number"])
832         self.welcome_label.setText(page_data["title"])
833         self.description_label.setText(page_data["content"])
834
835     def tutorial_next(self):
836         if self.currentTutorialPage < self.totalTutorialPages:
837             self.currentTutorialPage += 1
838             self.update_tutorial_content()
839         elif self.currentTutorialPage == self.totalTutorialPages:
840             # Simulate clicking the Project Details tab button
841             if "Project Details" in self.tabButtons:
842                 self.tabButtons["Project Details"].click()
843
844     def tutorial_back(self):
845         if self.currentTutorialPage > 1:
846             self.currentTutorialPage -= 1
847             self.update_tutorial_content()
848
849     def close_tutorials(self):
850         # Hide the tutorials panel (in a real app, you might want to
851         # remove or collapse it)
852         self.sender().parent().parent().hide()
853
854     def close_project_details(self):
855         # Hide the project details panel

```

```

855         self.sender().parent().parent().hide()
856
857     def mousePressEvent(self, event):
858         # Hide menus when clicking outside
859         if self.file_menu_widget.isVisible() and not self.
860             file_menu_widget.geometry().contains(event.pos()):
861                 self.file_menu_widget.hide()
862
863         if self.help_menu_widget.isVisible() and not self.
864             help_menu_widget.geometry().contains(event.pos()):
865                 self.help_menu_widget.hide()
866
867         super().mousePressEvent(event)
868
869     def save_general_info_data(self):
870         data = {
871             "company_name": self.company_edit.text(),
872             "project_title": self.title_edit.text(),
873             "project_description": self.desc_edit.text(),
874             "name_of_valuer": self.valuer_combo.currentText(),
875             "job_number": self.job_edit.text(),
876             "client": self.client_edit.text(),
877             "country": self.country_combo.currentText(),
878             "base_year": self.year_combo.currentText(),
879         }
880         save_general_info(data)
881         QMessageBox.information(self, "Success", "Data has been saved.")
882
883     def closeEvent(self, event):
884         # Clearing the general_info.json file
885         filename = "src//osbridgelcca//desktop_app//assets//"
886         general_info.json"
887         with open(filename, "w", encoding="utf-8") as f:
888             json.dump({}, f, indent=4)
889         super().closeEvent(event)

```

```

890 if __name__ == '__main__':
891     app = QApplication(sys.argv)
892     window = BICCAStudio()
893     window.show()
894     sys.exit(app.exec_())
895 #Sampel code for a PyQt5 desktop application given by the user
896 '''
897 from PyQt5.QtWidgets import QApplication, QMainWindow, QPushButton,
898     QVBoxLayout, QWidget
899 from desktop_app.logic.controller import Controller
900
901 class MainWindow(QMainWindow):
902     """Main application window."""
903
904     def __init__(self):
905         super().__init__()
906         self.setWindowTitle("OsBridgeLCCA - Desktop App")
907         self.setGeometry(100, 100, 800, 600)
908
909         layout = QVBoxLayout()
910         self.run_button = QPushButton("Run LCCA Analysis")
911         self.run_button.clicked.connect(self.run_analysis)
912         layout.addWidget(self.run_button)
913
914         container = QWidget()
915         container.setLayout(layout)
916         self.setCentralWidget(container)
917
918     def run_analysis(self):
919         """Trigger analysis when button is clicked."""
920         controller = Controller()
921         controller.run_calculations()
922
923
924 if __name__ == "__main__":
925     app = QApplication([])
926     window = MainWindow()
927     window.show()

```

```
928     app.exec_()
929     ...
```

### 5.3.3 Explanation of the Code

1. Line 890-894: This block runs when the script is executed directly.
  - QApplication starts the Qt event loop.
  - BICCAStudio() initializes the main GUI.
  - window.show() displays the main window.
  - sys.exit(app.exec\_()) runs the app and exits cleanly.

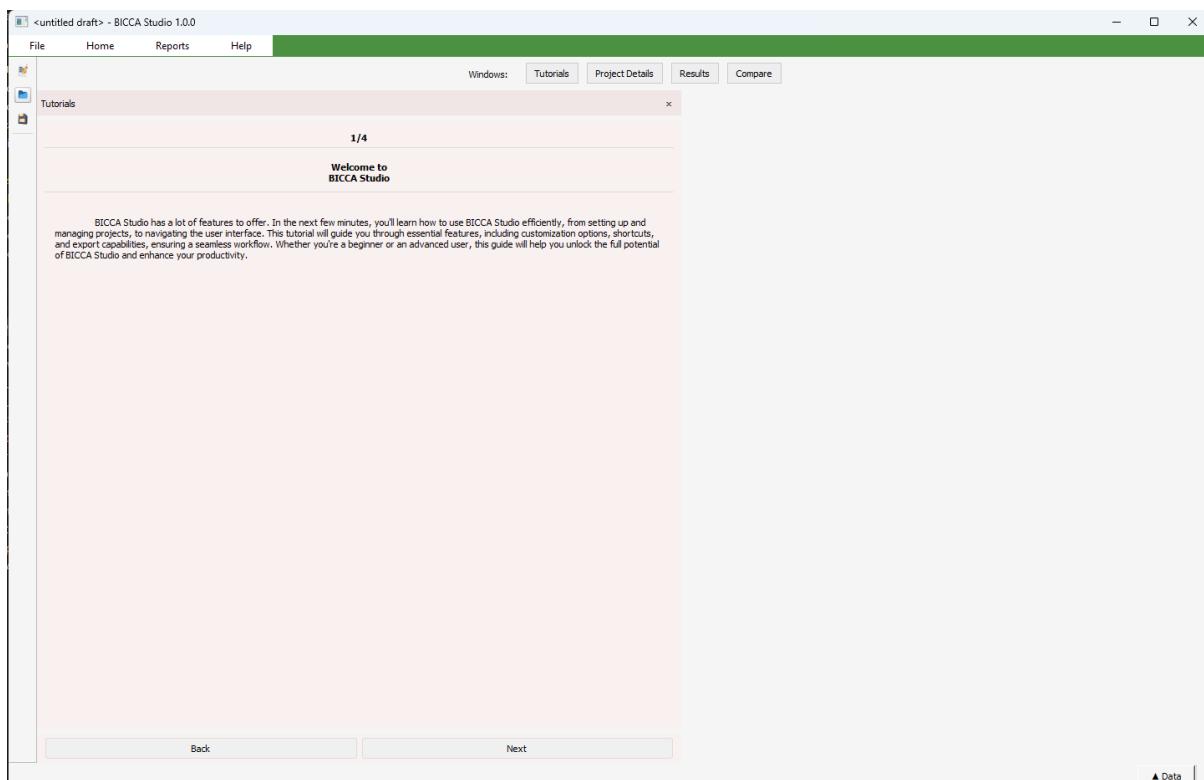


Figure 5.1: Launching Window

2. Line 867-879: Collects user-entered data from form fields.
  - Calls a function (save\_general\_info) to save it as JSON.
  - Shows a confirmation message box.
3. Line 882-887: On app close, this function clears saved general info by overwriting the file.

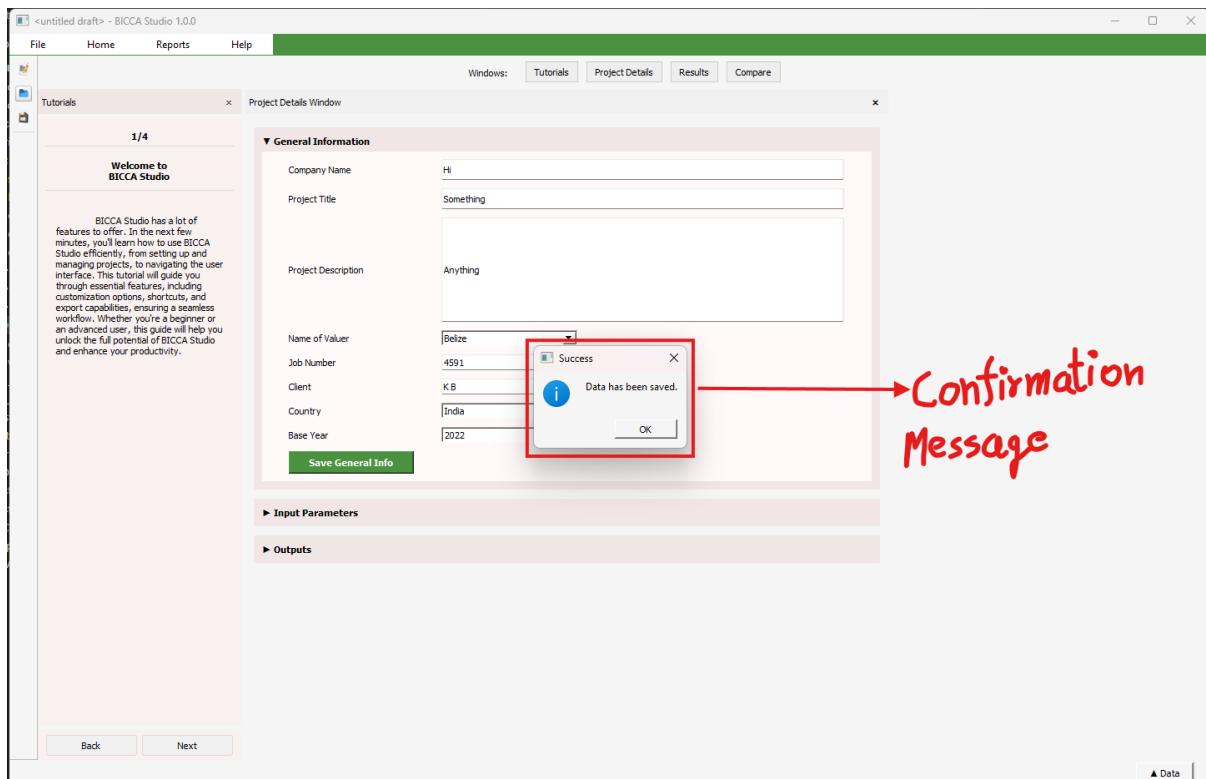


Figure 5.2: Confirmation Message Box of Saved Details

— super().closeEvent(event) ensures standard close behavior is preserved.

4. Line 826-833: Loads and displays tutorial content for the current page (number, title, description).
5. Line 835-842: Moves to the next tutorial page and updates the content.
6. Line 844-847: Moves back a page in the tutorial if not on the first page.

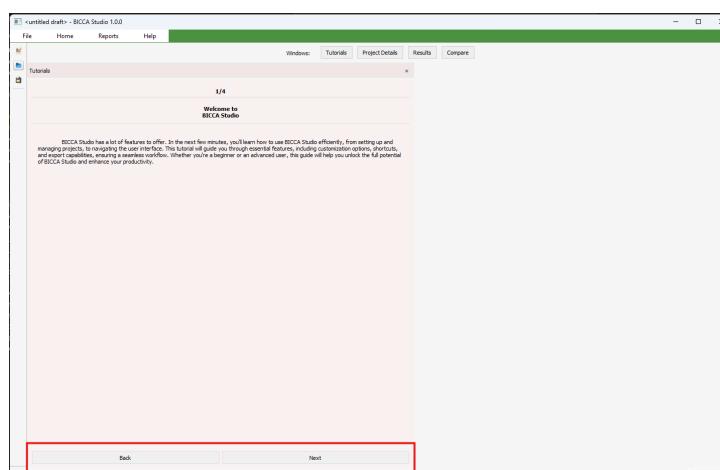


Figure 5.3: Back and Next Buttons

7. Line 849-851: Hides the "Tutorials" panel when the close button is clicked.
8. Line 853-855: Hides the "Project Details" panel when the close button is clicked.

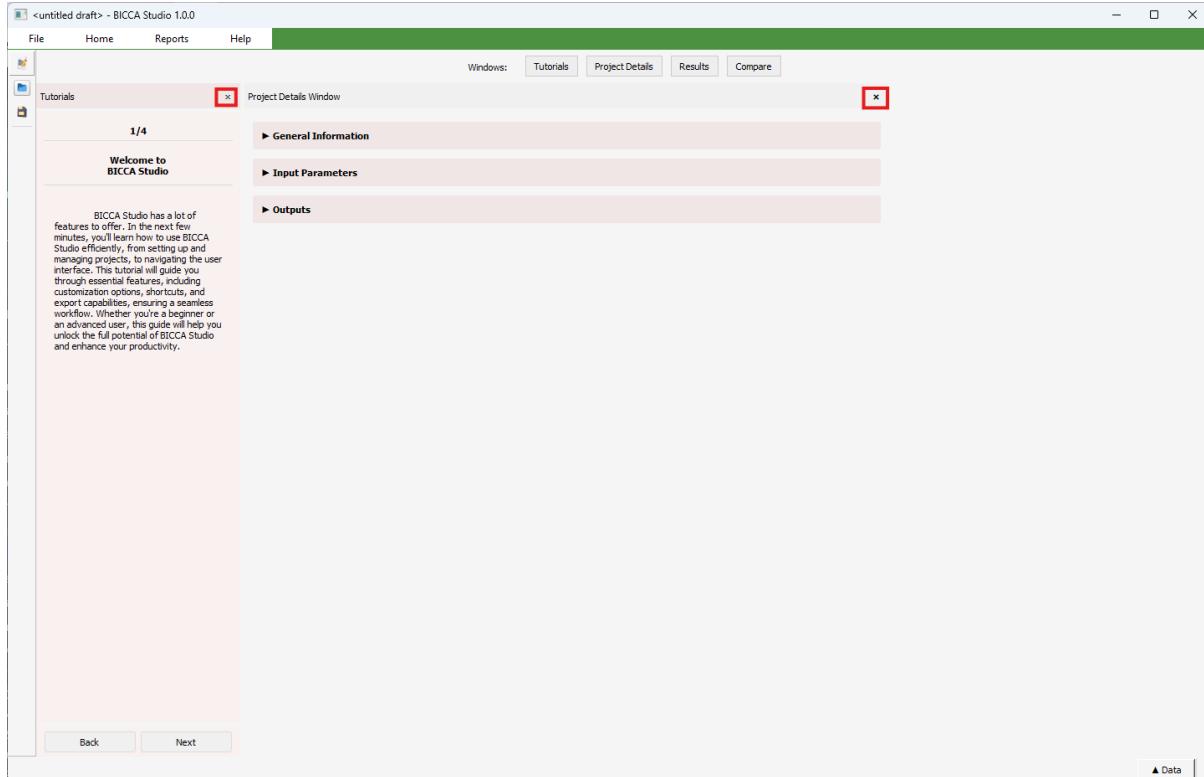


Figure 5.4: For closing the Tutorials panel or Project Details panel or both

9. Line 857-865: Closes dropdown menus when the user clicks outside of them.
10. Line 81-82: Sets the main window's dimensions and background color.
11. Line 85-86: Tracks which tutorial page is active.
12. 89-118: Defines 4 pages of text-based onboarding help with a page number, title, and content.
13. Line 121-125: Creates a central widget to hold all GUI elements.
  - Uses a vertical layout to stack widgets top to bottom.
14. Line 128 & 153-231: Calls functions that build the top navigation and definition of the function.
15. Line 131 & 260-279: Calls functions that build the tool icons and definition of the function.

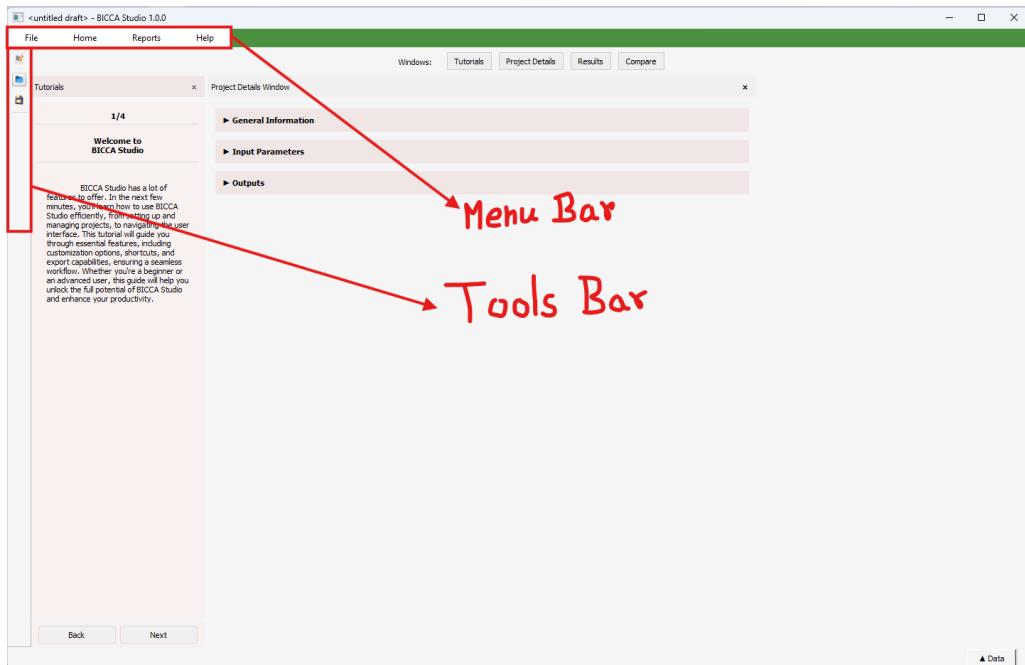


Figure 5.5: Menu Bar & Tools Bar

16. Line 134 & 181-326: Adds a row of buttons (like tabs). For now, only the "Tutorials" and "Project Details" tabs have actions connected.
17. Line 137 & 349-765: `create_content_area()` uses a `QSplitter` to make two resizable panels: one for tutorials, the other for project details.
18. Line 138 & 328-337: `show_tutorials_only()` hides the project panel initially(means when the app is launching/start).

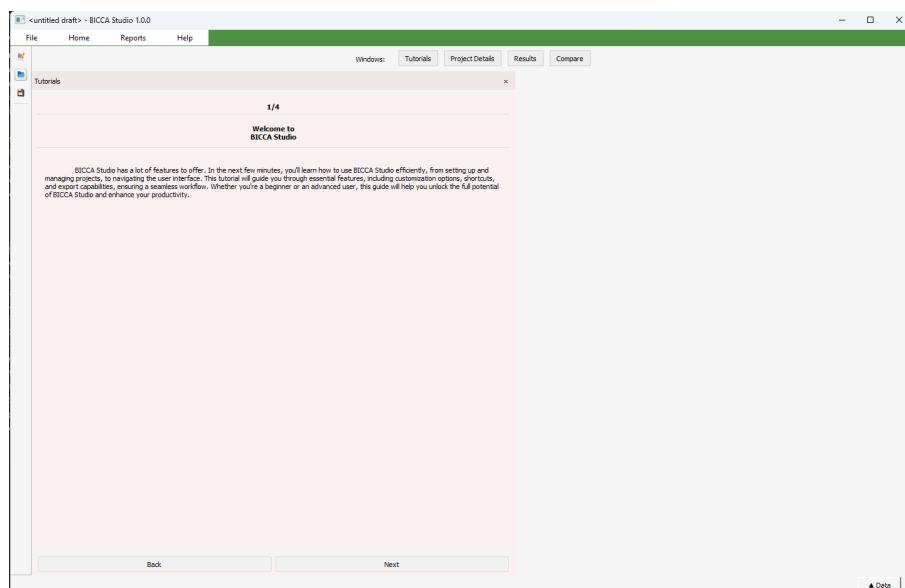


Figure 5.6: Launch Window with Tutorials panel

19. Line 141 & 818-824: Adds a small bottom bar with a "Data" button for future use.

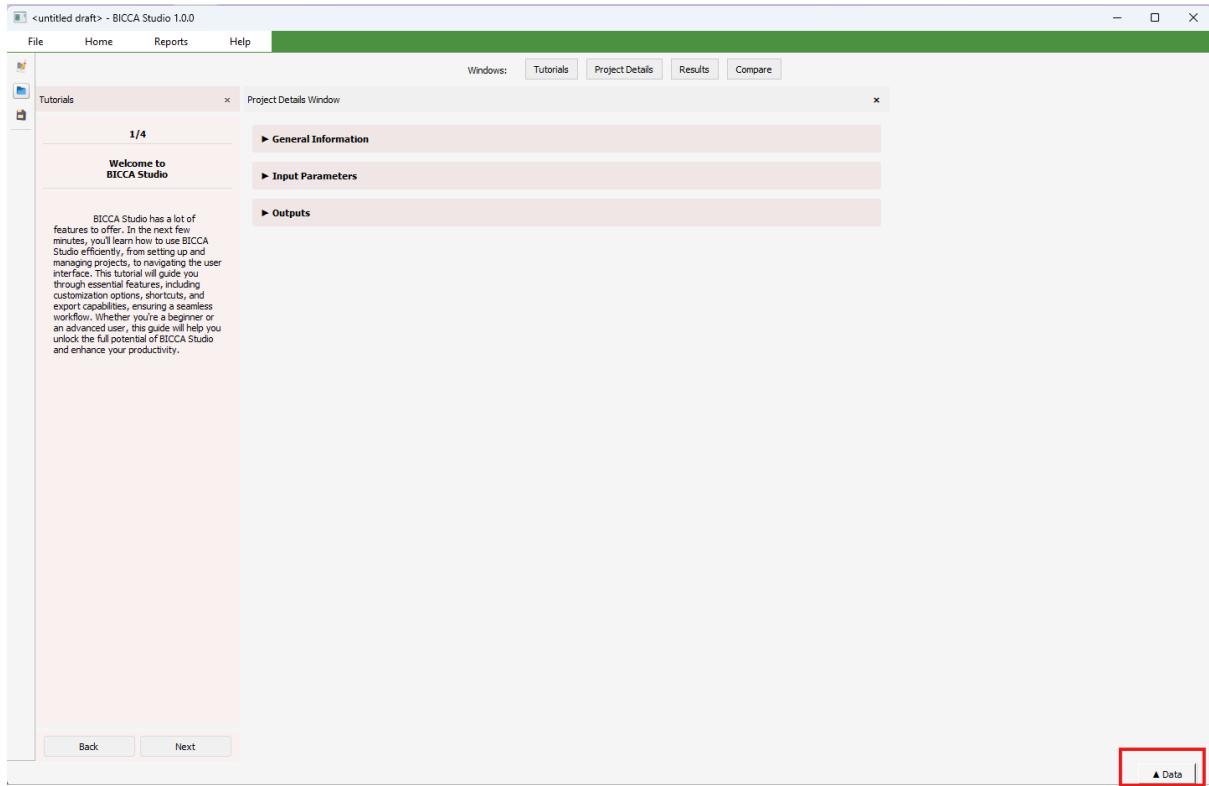


Figure 5.7: Data Button

20. Line 144-147: Prepares dropdown menus but hides them at launch.
21. Line 150 & 826-833: Loads the first tutorial page's text into the tutorial panel labels.
22. Line 371: Creates a horizontal splitter to place the tutorial panel on the left and the project panel on the right.
  - Allows users to resize the panels interactively.
23. Line 374-377: Initializes a QWidget and vertical layout for tutorials.
24. Line 380-383: Header with a label "Tutorials" and a close button to hide the panel.
25. Line 396-398: Displays the dynamic text for each tutorial step (title, page number, description).
26. Line 419-447: Allows the user to go back and forth between tutorial pages.

27. Line 460-463: Header with label "Project Details Window" and close button.
28. Line 493-497 & 621-626: General Information button expand/collapse their respective sections.

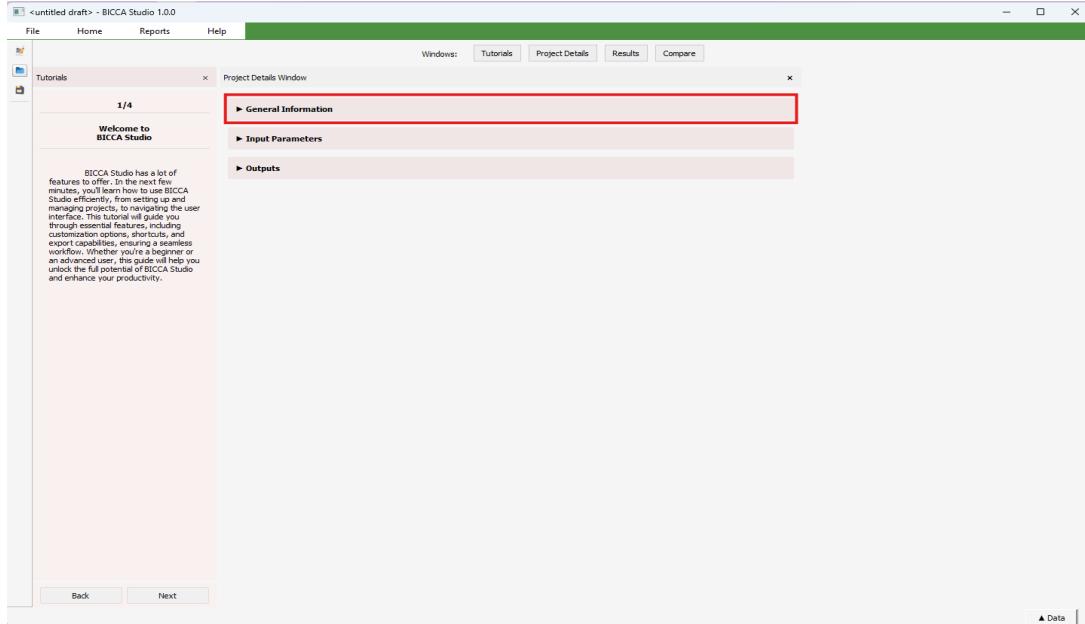


Figure 5.8: Collapsed

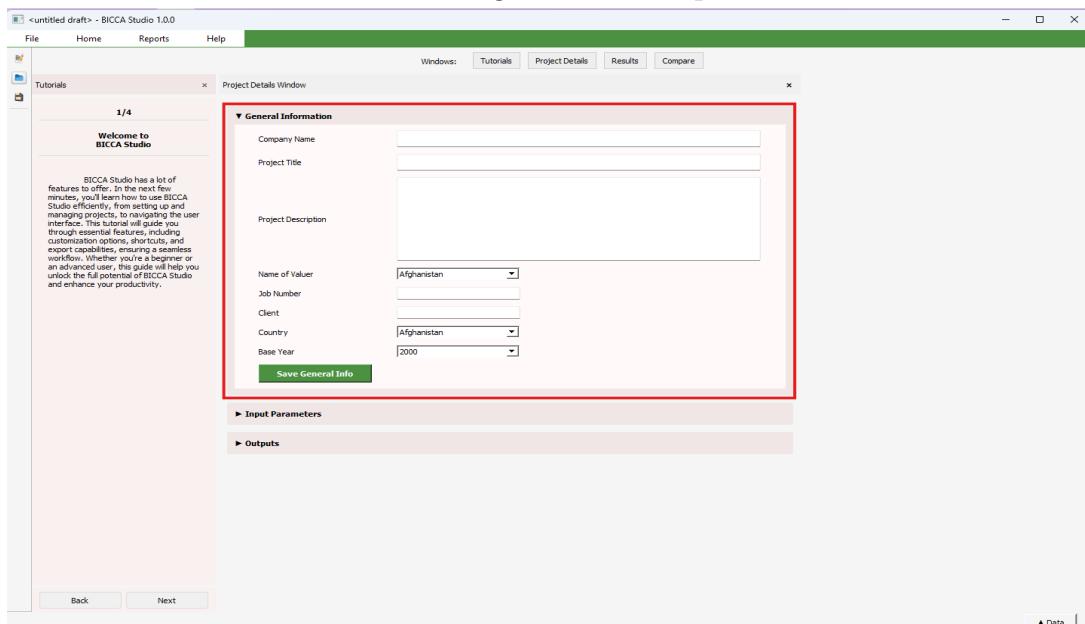


Figure 5.9: Expanded

Figure 5.10: General Information

29. Line 640-644 & 768-771: Input Parameters button expand/collapse their respective sections.

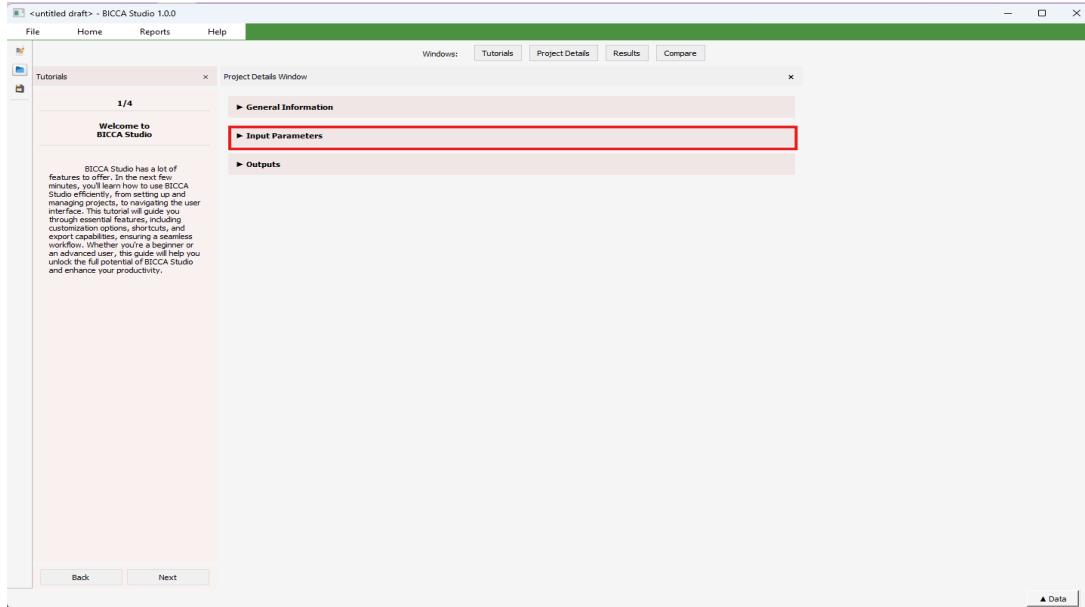


Figure 5.11: Collapsed

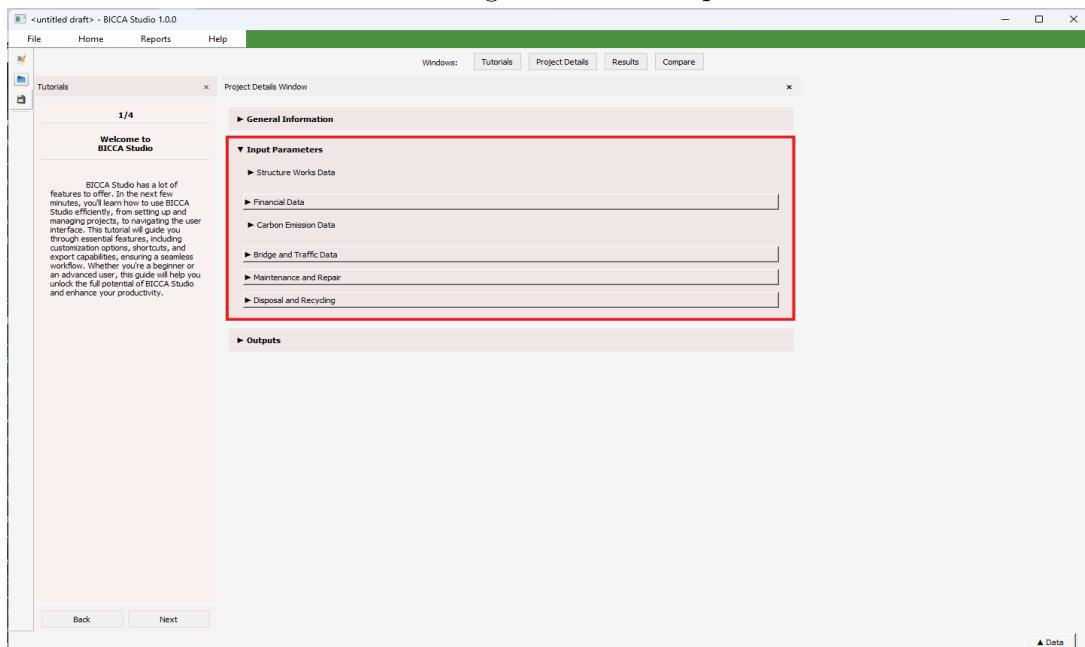


Figure 5.12: Expanded

Figure 5.13: Input Parameters

30. Line 785-789 & 799-802: Outputs button expand/collapse their respective sections.

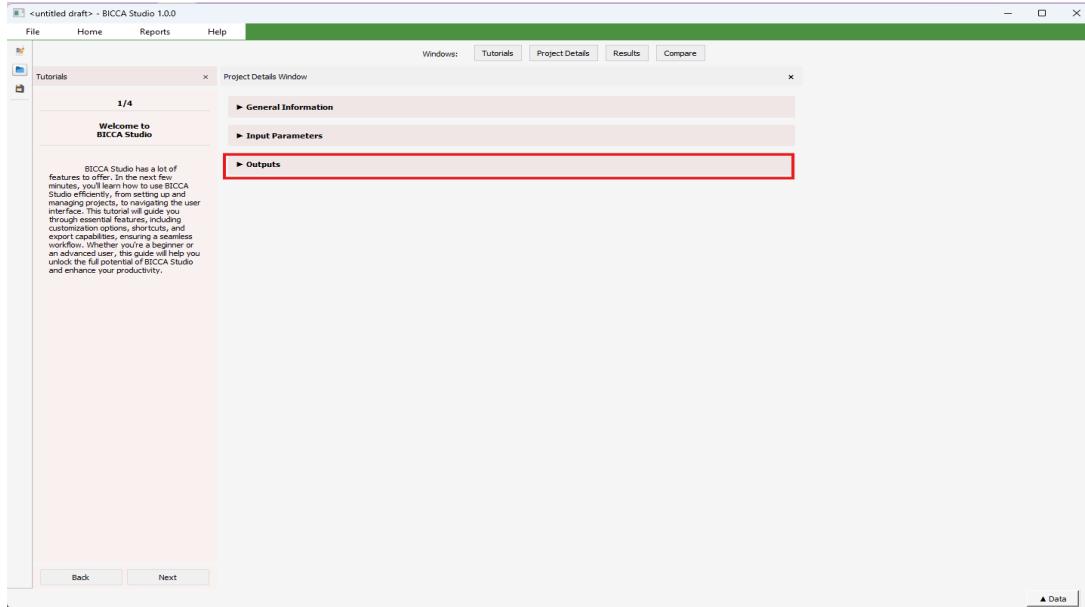


Figure 5.14: Collapsed

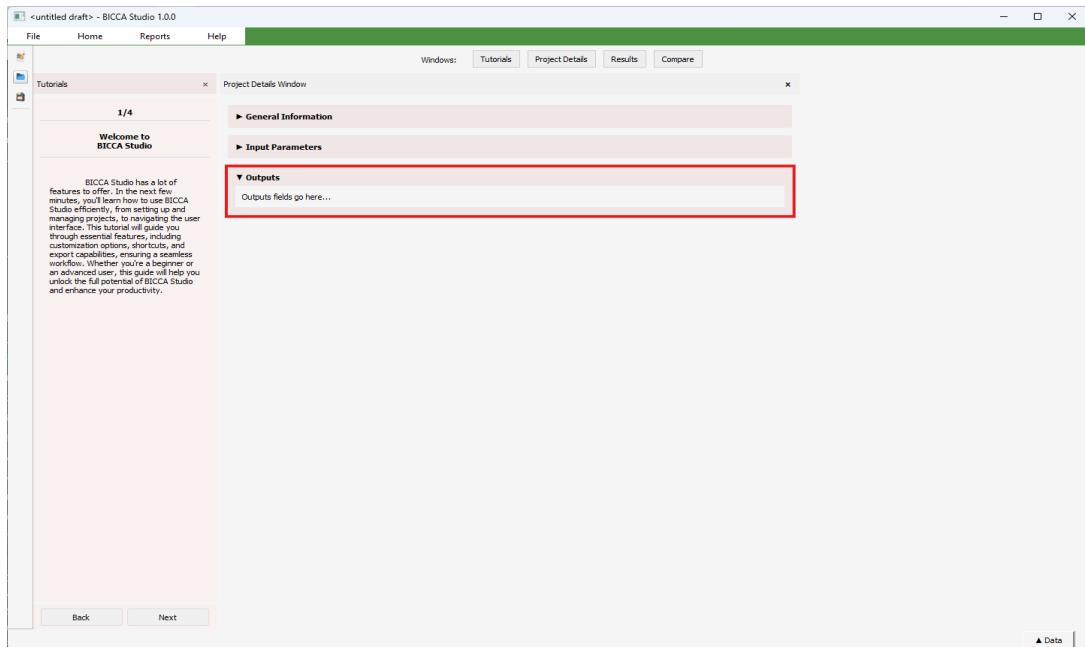


Figure 5.15: Expanded

Figure 5.16: Outputs

31. Line 659-663 & 700-705: Structure Works Data button expand/collapse their respective sections.

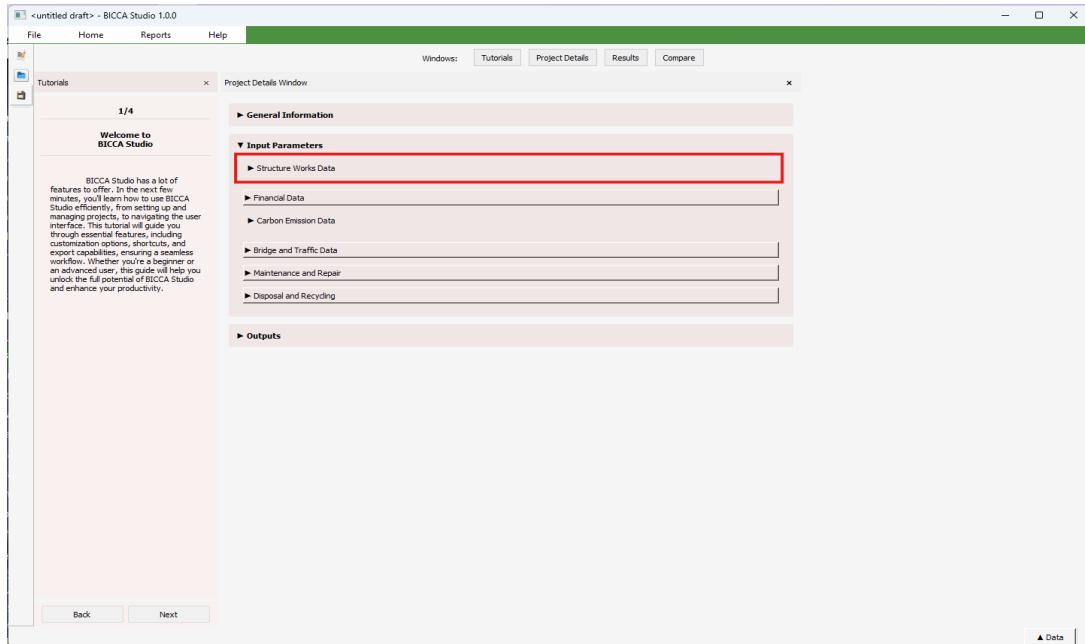


Figure 5.17: Collapsed

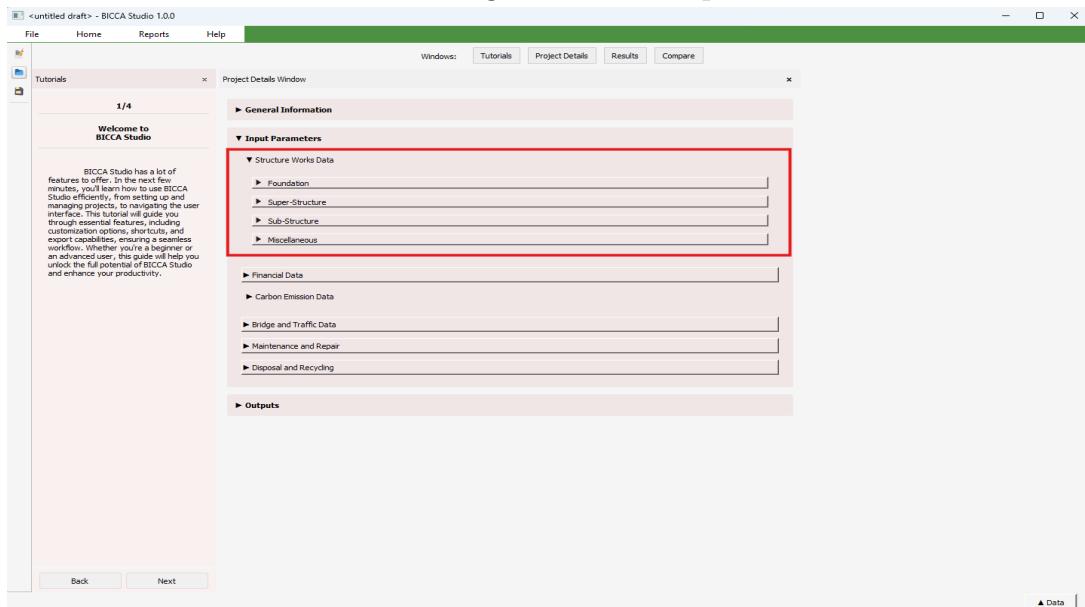


Figure 5.18: Expanded

Figure 5.19: Structure Works Data

32. Line 720-724 & 736-742: Carbon Emission Data button expand/collapse their respective sections.

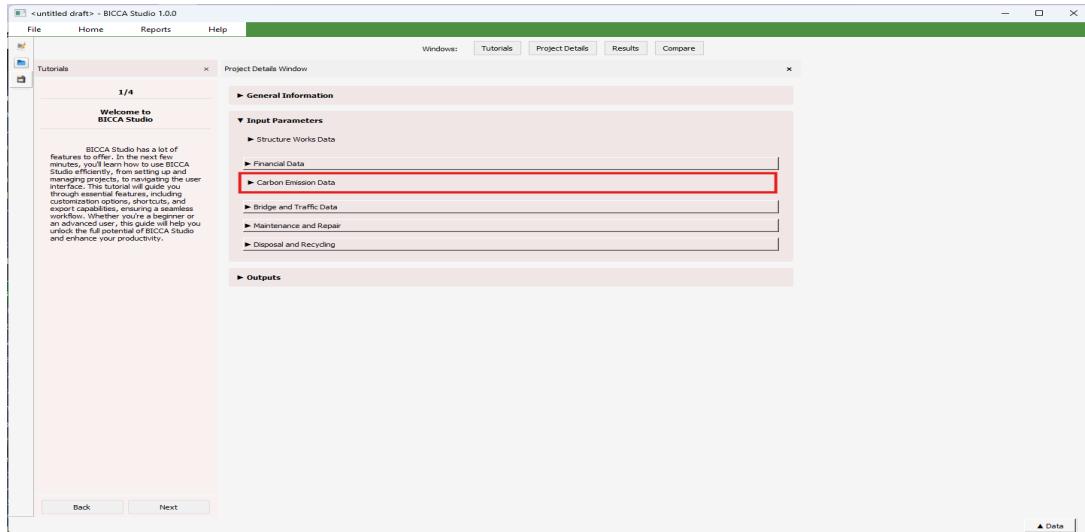


Figure 5.20: Collapsed

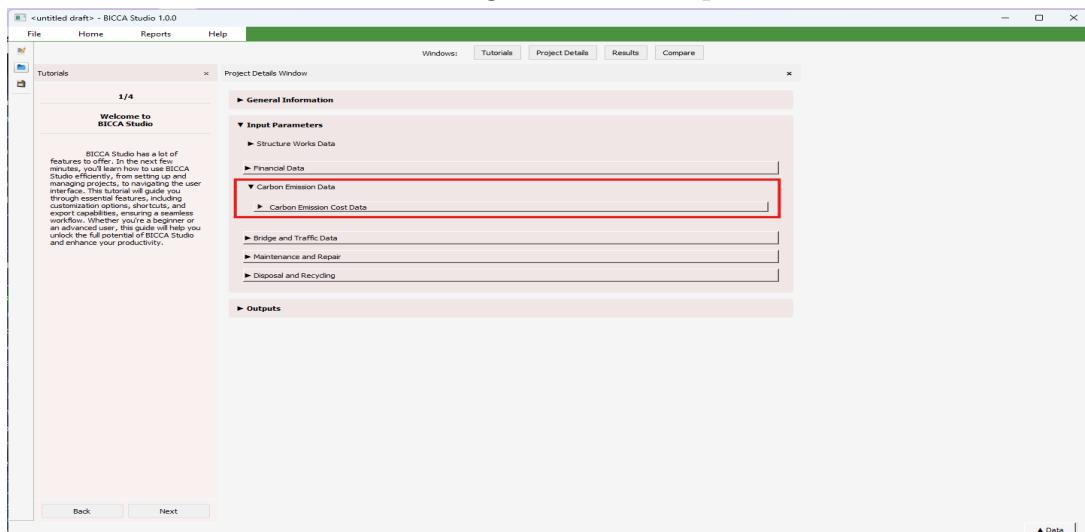


Figure 5.21: Expanded

Figure 5.22: Carbon Emission Data

33. Line 374-451: The "Tutorials" panel with all details.
34. Line 454-802: The "Project Details" panel with all input fields and data.
35. Line 814-816: Both panels are added to the main splitter and attached to the main window layout.

### 5.3.4 Description of the Script (input\_form.py)

The input\_form.py script is a utility module designed to handle data persistence for general project information in the BICCA Studio application. It defines a single function, save\_general\_info(data, filename), which takes a Python dictionary (data) containing project details such as company name, project title, and base year, and saves it as a formatted JSON file. By default, the data is written to src//osbridgelcca//desktop\_app//assets//general\_info.json. This script is used in app.py when the user inputs and submits general project information, ensuring that the data can be stored locally and reused across sessions

### 5.3.5 Coding

The Python script is shown below. Each section is commented for clarity.

```
1 # Placeholder for input form UI
2 import json
3
4 def save_general_info(data, filename="src//osbridgelcca//desktop_app//"
5   assets//general_info.json"):
6   """Save the general information dictionary to a JSON file."""
7   with open(filename, "w", encoding="utf-8") as f:
8     json.dump(data, f, indent=4)
```

### 5.3.6 Explanation of the Code

1. Line 4: Defines a function save\_general\_info that takes:
  - data: a Python dictionary with general project information.
  - filename: the path where the data will be saved (defaults to a specific JSON file in the assets folder).
2. Line 6: Opens the specified file in write mode ("w"), using UTF-8 encoding.
  - The with statement ensures the file is properly closed after writing.
3. Line 7: Writes the data dictionary into the file in JSON format.
  - indent=4 makes the JSON human-readable with 4-space indentation.

```

src > osbridgelcca > desktop_app > assets > {} general_info.json > ...
1  {
2      "company_name": "Alias",
3      "project_title": "Something",
4      "project_description": "Anything",
5      "name_of_valuer": "United Arab Emirates",
6      "job_number": "79881",
7      "client": "Jack",
8      "country": "India",
9      "base_year": "2007"
10 }

```

Figure 5.23: General Info Json file for storing details

### 5.3.7 Description of the Script (all ProjectDetails\_\*)

The ProjectDetails\_Window.py files collectively define the graphical user interface (GUI) components for different data modules within the BICCA Studio application using PyQt5. Each script represents a separate dialog window dedicated to a specific aspect of an infrastructure project, such as bridge and traffic data, foundation, carbon emissions, financials, maintenance, demolition, etc. These files are auto-generated from .ui files created in Qt Designer and provide structured layouts containing input fields like QLineEdit, QComboBox, QLabel, and QPushButton. Each window includes a setupUi() method that constructs and styles the form, and methods to open related dialogs, enabling seamless navigation between modules. Common elements include a side navigation panel, form sections for user input, and standard buttons for saving or closing the dialog. Together, they modularize project data entry and provide a consistent user experience across different project components.

### 5.3.8 Coding

The Python script is shown below. Each section is commented for clarity.

#### 1. Bridge and Traffic Data

```

1 # -*- coding: utf-8 -*-
2

```

```

3 # Form implementation generated from reading ui file 'C:\Users\saans\
4   AppData\Local\Programs\Python\Python310\Lib\site-packages\
5   qt5_applications\Qt\bin\ProjectDetails_Bridge&TrafficData_Window.ui'
6 #
7 # Created by: PyQt5 UI code generator 5.15.9
8 #
9 # WARNING: Any manual changes made to this file will be lost when
10   pyuic5 is
11 # run again. Do not edit this file unless you know what you are doing.
12
13
14
15
16
17
18
19
20
21
22
23
24
25 class Ui_BridgeTraffic_Dialog(object):
26     def openBridgeTrafficWindow(self):
27         self.window = QtWidgets.QDialog()
28         self.ui = Ui_BridgeTraffic_Dialog()
29         self.ui.setupUi(self.window)
30         self.window.show()
31
32     def openFoundationWindow(self):
33         from ProjectDetails_Foundation_Window import
34           Ui_Foundation_Dialog
35             self.window = QtWidgets.QDialog()
36             self.ui = Ui_Foundation_Dialog()
37               self.ui.setupUi(self.window)

```

```

37         self.window.show()

38
39     def openCarbonEmissionWindow(self):
40         from ProjectDetails_CarbonEmissionData_Window import
41         Ui_CarbonEmission_Dialog
42
43         self.window = QtWidgets.QDialog()
44         self.ui = Ui_CarbonEmission_Dialog()
45         self.ui.setupUi(self.window)
46         self.window.show()

47
48     def openDemolitionWindow(self):
49         from ProjectDetails_DemolitionANDRecyclingData_Window import
50         Ui_Demolition_Dialog
51
52         self.window = QtWidgets.QDialog()
53         self.ui = Ui_Demolition_Dialog()
54         self.ui.setupUi(self.window)
55         self.window.show()

56
57     def openFinancialWindow(self):
58         from ProjectDetails_FinancialData_Window import
59         Ui_FinancialData_Dialog
60
61         self.window = QtWidgets.QDialog()
62         self.ui = Ui_FinancialData_Dialog()
63         self.ui.setupUi(self.window)
64         self.window.show()

65
66     def openMaintenanceWindow(self):
67         from ProjectDetails_MaintenanceANDRepairData_Window import
68         Ui_Maintenance_Dialog
69
70         self.window = QtWidgets.QDialog()
71         self.ui = Ui_Maintenance_Dialog()
72         self.ui.setupUi(self.window)
73         self.window.show()

74
75     def openMiscellaneousWindow(self):
76         from ProjectDetails_Miscellaneous_Window import
77         Ui_Miscellaneous_Dialog
78
79         self.window = QtWidgets.QDialog()
80         self.ui = Ui_Miscellaneous_Dialog()
81         self.ui.setupUi(self.window)
82         self.window.show()

```

```

71     self.ui.setupUi(self.window)
72     self.window.show()
73
74     def openSubStructureWindow(self):
75         from ProjectDetails_SubStructure_Window import
76         Ui_SubStructure_Dialog
77
78         self.window = QtWidgets.QDialog()
79         self.ui = Ui_SubStructure_Dialog()
80         self.ui.setupUi(self.window)
81         self.window.show()
82
83     def openSuperStructureWindow(self):
84         from ProjectDetails_SuperStructure_Window import
85         Ui_SuperStructure_Dialog
86
87         self.window = QtWidgets.QDialog()
88         self.ui = Ui_SuperStructure_Dialog()
89         self.ui.setupUi(self.window)
90         self.window.show()
91
92     def setupUi(self, BridgeTraffic_Dialog):
93         BridgeTraffic_Dialog.setObjectName("BridgeTraffic_Dialog")
94         BridgeTraffic_Dialog.resize(1440, 900)
95         BridgeTraffic_Dialog.setStyleSheet("background-color: #fafafa")
96         self.scrollArea = QtWidgets.QScrollArea(BridgeTraffic_Dialog)
97         self.scrollArea.setGeometry(QtCore.QRect(10, 50, 241, 681))
98         self.scrollArea.setAutoFillBackground(False)
99         self.scrollArea.setStyleSheet("background-color: #fff9f9")
100        self.scrollArea.setWidgetResizable(True)
101        self.scrollArea.setObjectName("scrollArea")
102        self.scrollAreaWidgetContents_3 = QtWidgets.QWidget()
103        self.scrollAreaWidgetContents_3.setGeometry(QtCore.QRect(0, 0,
104        239, 679))
105        self.scrollAreaWidgetContents_3.setObjectName("scrollAreaWidgetContents_3")
106        self.label_16 = QtWidgets.QLabel(self.
107        scrollAreaWidgetContents_3)
108        self.label_16.setGeometry(QtCore.QRect(0, 0, 221, 31))
109        font = QtGui.QFont()
110        font.setPointSize(10)

```





```

165     font.setWeight(50)
166     self.pushButton_38.setFont(font)
167     self.pushButton_38.setIcon(icon1)
168     self.pushButton_38.setObjectName("pushButton_38")
169     self.formLayout_3.setWidget(3, QtWidgets.QFormLayout.LabelRole,
170     self.pushButton_38)
171     self.verticalLayout_3.addWidget(self.widget_7)
172     self.pushButton_39 = QtWidgets.QPushButton(self.widget_3,
173     clicked=lambda: self.openFinancialWindow())
174     font = QtGui.QFont()
175     font.setPointSize(10)
176     self.pushButton_39.setFont(font)
177     self.pushButton_39.setObjectName("pushButton_39")
178     self.verticalLayout_3.addWidget(self.pushButton_39)
179     self.pushButton_40 = QtWidgets.QPushButton(self.widget_3)
180     font = QtGui.QFont()
181     font.setPointSize(10)
182     self.pushButton_40.setFont(font)
183     self.pushButton_40.setIcon(icon)
184     self.pushButton_40.setCheckable(True)
185     self.pushButton_40.setObjectName("pushButton_40")
186     self.verticalLayout_3.addWidget(self.pushButton_40)
187     self.widget_10 = QtWidgets.QWidget(self.widget_3)
188     self.widget_10.setMinimumSize(QtCore.QSize(203, 21))
189     self.widget_10.setMaximumSize(QtCore.QSize(281, 21))
190     self.widget_10.setObjectName("widget_10")
191     self.pushButton_41 = QtWidgets.QPushButton(self.widget_10,
192     clicked=lambda: self.openCarbonEmissionWindow())
193     self.pushButton_41.setGeometry(QtCore.QRect(20, 0, 183, 21))
194     font = QtGui.QFont()
195     font.setPointSize(10)
196     font.setBold(False)
197     font.setWeight(50)
198     self.pushButton_41.setFont(font)
199     self.pushButton_41.setIcon(icon1)
200     self.pushButton_41.setObjectName("pushButton_41")
201     self.verticalLayout_3.addWidget(self.widget_10)
202     self.pushButton_42 = QtWidgets.QPushButton(self.widget_3,
203     clicked=lambda: self.openBridgeTrafficWindow())

```

```

200     font = QtGui.QFont()
201     font.setPointSize(10)
202     self.pushButton_42.setFont(font)
203     self.pushButton_42.setObjectName("pushButton_42")
204     self.verticalLayout_3.addWidget(self.pushButton_42)
205     self.pushButton_43 = QtWidgets.QPushButton(self.widget_3,
206     clicked=lambda: self.openMaintenanceWindow())
206     font = QtGui.QFont()
207     font.setPointSize(10)
208     self.pushButton_43.setFont(font)
209     self.pushButton_43.setObjectName("pushButton_43")
210     self.verticalLayout_3.addWidget(self.pushButton_43)
211     self.pushButton_12 = QtWidgets.QPushButton(self.widget_3,
212     clicked=lambda: self.openDemolitionWindow())
213     font = QtGui.QFont()
214     font.setPointSize(10)
215     self.pushButton_12.setFont(font)
216     self.pushButton_12.setObjectName("pushButton_12")
217     self.verticalLayout_3.addWidget(self.pushButton_12)
218     self.label_17 = QtWidgets.QLabel(self.
219     scrollAreaWidgetContents_3)
220     self.label_17.setGeometry(QtCore.QRect(0, 387, 221, 31))
221     font = QtGui.QFont()
222     font.setPointSize(10)
223     self.label_17.setFont(font)
224     self.label_17.setStyleSheet("background-color: rgb(240,230,230")
225     ")
226     self.label_17.setAlignment(QtCore.Qt.AlignCenter)
227     self.label_17.setObjectName("label_17")
228     self.textBrowser_3 = QtWidgets.QTextBrowser(self.
229     scrollAreaWidgetContents_3)
230     self.textBrowser_3.setGeometry(QtCore.QRect(0, 418, 221, 221))
231     self.textBrowser_3.setStyleSheet("background-color: #fff9f9")
232     self.textBrowser_3.setObjectName("textBrowser_3")
233     self.verticalScrollBar_3 = QtWidgets.QScrollBar(self.
234     scrollAreaWidgetContents_3)
235     self.verticalScrollBar_3.setGeometry(QtCore.QRect(220, 0, 16,
236     641))

```

```

231     self.verticalScrollBar_3.setStyleSheet("background-color: #F0F0F0")
232
233     self.verticalScrollBar_3.setOrientation(QtCore.Qt.Vertical)
234     self.verticalScrollBar_3.setObjectName("verticalScrollBar_3")
235     self.scrollArea.setWidget(self.scrollAreaWidgetContents_3)
236     self.widget_4 = QtWidgets.QWidget(BridgeTraffic_Dialog)
237     self.widget_4.setGeometry(QtCore.QRect(350, 45, 895, 561))
238     self.widget_4.setStyleSheet("background-color: #fff9f9; border: 1px solid black;")
239
240     self.widget_4.setObjectName("widget_4")
241     self.label_18 = QtWidgets.QLabel(self.widget_4)
242     self.label_18.setGeometry(QtCore.QRect(20, 20, 141, 21))
243     font = QtGui.QFont()
244     font.setPointSize(10)
245     self.label_18.setFont(font)
246     self.label_18.setStyleSheet("border: none;")
247     self.label_18.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.AlignLeft|QtCore.Qt.AlignVCenter)
248
249     self.label_18.setObjectName("label_18")
250     self.label_19 = QtWidgets.QLabel(self.widget_4)
251     self.label_19.setGeometry(QtCore.QRect(20, 80, 161, 21))
252     font = QtGui.QFont()
253     font.setPointSize(10)
254     self.label_19.setFont(font)
255     self.label_19.setStyleSheet("border: none;")
256     self.label_19.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.AlignLeft|QtCore.Qt.AlignVCenter)
257
258     self.label_19.setObjectName("label_19")
259     self.label_20 = QtWidgets.QLabel(self.widget_4)
260     self.label_20.setGeometry(QtCore.QRect(20, 50, 201, 21))
261     font = QtGui.QFont()
262     font.setPointSize(10)
263     self.label_20.setFont(font)
264     self.label_20.setStyleSheet("border: none;")
265     self.label_20.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.AlignLeft|QtCore.Qt.AlignVCenter)
266
267     self.label_20.setObjectName("label_20")
268     self.label_29 = QtWidgets.QLabel(self.widget_4)
269     self.label_29.setGeometry(QtCore.QRect(20, 110, 151, 21))

```

```

265     font = QtGui.QFont()
266     font.setPointSize(10)
267     self.label_29.setFont(font)
268     self.label_29.setStyleSheet("border: none;")
269     self.label_29.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
270     AlignLeft|QtCore.Qt.AlignVCenter)
271     self.label_29.setObjectName("label_29")
272     self.label_30 = QtWidgets.QLabel(self.widget_4)
273     self.label_30.setGeometry(QtCore.QRect(20, 140, 221, 21))
274     font = QtGui.QFont()
275     font.setPointSize(10)
276     self.label_30.setFont(font)
277     self.label_30.setStyleSheet("border: none;")
278     self.label_30.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
279     AlignLeft|QtCore.Qt.AlignVCenter)
280     self.label_30.setObjectName("label_30")
281     self.comboBox_6 = QtWidgets.QComboBox(self.widget_4)
282     self.comboBox_6.setGeometry(QtCore.QRect(270, 80, 101, 22))
283     self.comboBox_6.setStyleSheet("border:none;")
284     self.comboBox_6.setStyleSheet("background-color: #ffffff")
285     self.comboBox_6.setObjectName("comboBox_6")
286     self.comboBox_7 = QtWidgets.QComboBox(self.widget_4)
287     self.comboBox_7.setGeometry(QtCore.QRect(270, 20, 101, 22))
288     self.comboBox_7.setStyleSheet("border:none;")
289     self.comboBox_7.setStyleSheet("background-color: #ffffff")
290     self.comboBox_7.setObjectName("comboBox_7")
291     self.lineEdit_9 = QtWidgets.QLineEdit(self.widget_4)
292     self.lineEdit_9.setGeometry(QtCore.QRect(270, 50, 101, 20))
293     self.lineEdit_9.setStyleSheet("border:none;")
294     font = QtGui.QFont()
295     font.setPointSize(10)
296     self.lineEdit_9.setFont(font)
297     self.lineEdit_9.setStyleSheet("background-color: #ffffff")
298     self.lineEdit_9.setObjectName("lineEdit_9")
299     self.lineEdit_10 = QtWidgets.QLineEdit(self.widget_4)
300     self.lineEdit_10.setGeometry(QtCore.QRect(270, 110, 101, 20))
301     self.lineEdit_10.setStyleSheet("border:none;")
302     font = QtGui.QFont()
303     font.setPointSize(10)

```

```

302     self.lineEdit_10.setFont(font)
303     self.lineEdit_10.setStyleSheet("background-color: #ffffff")
304     self.lineEdit_10.setObjectName("lineEdit_10")
305     self.buttonBox_4 = QtWidgets.QDialogButtonBox(self.widget_4)
306     self.buttonBox_4.accepted.connect(self.save_data)
307     self.buttonBox_4.setGeometry(QtCore.QRect(540, 520, 341, 32))
308     self.buttonBox_4.setStyleSheet("border: none;")
309     self.buttonBox_4.setOrientation(QtCore.Qt.Horizontal)
310     self.buttonBox_4.setStandardButtons(QtWidgets.QDialogButtonBox.
311                                         Close|QtWidgets.QDialogButtonBox.Save)
312     self.buttonBox_4.setObjectName("buttonBox_4")
313     self.label_31 = QtWidgets.QLabel(self.widget_4)
314     self.label_31.setGeometry(QtCore.QRect(390, 200, 51, 21))
315     font = QtGui.QFont()
316     font.setPointSize(10)
317     self.label_31.setFont(font)
318     self.label_31.setStyleSheet("border: none;")
319     self.label_31.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
320                               AlignLeft|QtCore.Qt.AlignVCenter)
321     self.label_31.setObjectName("label_31")
322     self.label_32 = QtWidgets.QLabel(self.widget_4)
323     self.label_32.setGeometry(QtCore.QRect(390, 50, 51, 21))
324     font = QtGui.QFont()
325     font.setPointSize(10)
326     self.label_32.setFont(font)
327     self.label_32.setStyleSheet("border: none;")
328     self.label_32.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
329                               AlignLeft|QtCore.Qt.AlignVCenter)
330     self.label_32.setObjectName("label_32")
331     self.label_33 = QtWidgets.QLabel(self.widget_4)
332     self.label_33.setGeometry(QtCore.QRect(390, 80, 61, 21))
333     font = QtGui.QFont()
334     font.setPointSize(10)
335     self.label_33.setFont(font)
336     self.label_33.setStyleSheet("border: none;")
337     self.label_33.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
338                               AlignLeft|QtCore.Qt.AlignVCenter)
339     self.label_33.setObjectName("label_33")
340     self.label_34 = QtWidgets.QLabel(self.widget_4)

```

```

337     self.label_34.setGeometry(QtCore.QRect(390, 110, 61, 21))
338     font = QtGui.QFont()
339     font.setPointSize(10)
340     self.label_34.setFont(font)
341     self.label_34.setStyleSheet("border: none;")
342     self.label_34.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
AlignLeft|QtCore.Qt.AlignVCenter)
343     self.label_34.setObjectName("label_34")
344     self.textBrowser_4 = QtWidgets.QTextBrowser(self.widget_4)
345     self.textBrowser_4.setGeometry(QtCore.QRect(20, 180, 221, 61))
346     self.textBrowser_4.setStyleSheet("border:none;")
347     self.textBrowser_4.setObjectName("textBrowser_4")
348     self.label_35 = QtWidgets.QLabel(self.widget_4)
349     self.label_35.setGeometry(QtCore.QRect(20, 260, 221, 21))
350     font = QtGui.QFont()
351     font.setPointSize(10)
352     self.label_35.setFont(font)
353     self.label_35.setStyleSheet("border: none;")
354     self.label_35.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
AlignLeft|QtCore.Qt.AlignVCenter)
355     self.label_35.setObjectName("label_35")
356     self.comboBox_8 = QtWidgets.QComboBox(self.widget_4)
357     self.comboBox_8.setGeometry(QtCore.QRect(270, 140, 101, 22))
358     self.comboBox_8.setStyleSheet("border: none;")
359     self.comboBox_8.setStyleSheet("background-color: #ffffff")
360     self.comboBox_8.setObjectName("comboBox_8")
361     self.comboBox_9 = QtWidgets.QComboBox(self.widget_4)
362     self.comboBox_9.setGeometry(QtCore.QRect(270, 200, 101, 22))
363     self.comboBox_9.setStyleSheet("border: none;")
364     self.comboBox_9.setStyleSheet("background-color: #ffffff")
365     self.comboBox_9.setObjectName("comboBox_9")
366     self.widget_11 = QtWidgets.QWidget(self.widget_4)
367     self.widget_11.setGeometry(QtCore.QRect(270, 260, 330, 216))
368     self.widget_11.setStyleSheet("border: none;")
369     self.widget_11.setStyleSheet("background-color: #ffffff")
370     self.widget_11.setObjectName("widget_11")
371     self.label_40 = QtWidgets.QLabel(self.widget_11)
372     self.label_40.setGeometry(QtCore.QRect(10, 170, 80, 21))
373     font = QtGui.QFont()

```

```

374     font.setPointSize(10)
375     self.label_40.setFont(font)
376     self.label_40.setStyleSheet("border: none;")
377     self.label_40.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
AlignLeft|QtCore.Qt.AlignVCenter)
378     self.label_40.setObjectName("label_40")
379     self.label_36 = QtWidgets.QLabel(self.widget_11)
380     self.label_36.setGeometry(QtCore.QRect(10, 10, 80, 21))
381     font = QtGui.QFont()
382     font.setPointSize(10)
383     self.label_36.setFont(font)
384     self.label_36.setStyleSheet("border: none;")
385     self.label_36.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
AlignLeft|QtCore.Qt.AlignVCenter)
386     self.label_36.setObjectName("label_36")
387     self.label_37 = QtWidgets.QLabel(self.widget_11)
388     self.label_37.setGeometry(QtCore.QRect(10, 50, 80, 21))
389     font = QtGui.QFont()
390     font.setPointSize(10)
391     self.label_37.setFont(font)
392     self.label_37.setStyleSheet("border: none;")
393     self.label_37.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
AlignLeft|QtCore.Qt.AlignVCenter)
394     self.label_37.setObjectName("label_37")
395     self.label_39 = QtWidgets.QLabel(self.widget_11)
396     self.label_39.setGeometry(QtCore.QRect(10, 90, 80, 21))
397     font = QtGui.QFont()
398     font.setPointSize(10)
399     self.label_39.setFont(font)
400     self.label_39.setStyleSheet("border: none;")
401     self.label_39.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
AlignLeft|QtCore.Qt.AlignVCenter)
402     self.label_39.setObjectName("label_39")
403     self.label_38 = QtWidgets.QLabel(self.widget_11)
404     self.label_38.setGeometry(QtCore.QRect(10, 130, 80, 21))
405     font = QtGui.QFont()
406     font.setPointSize(10)
407     self.label_38.setFont(font)
408     self.label_38.setStyleSheet("border: none;")

```

```

409         self.label_38.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
410 AlignLeft | QtCore.Qt.AlignVCenter)
411
412         self.lineEdit_11 = QtWidgets.QLineEdit(self.widget_11)
413         self.lineEdit_11.setGeometry(QtCore.QRect(110, 10, 171, 20))
414
415         font = QtGui.QFont()
416
417         font.setPointSize(10)
418
419         self.lineEdit_11.setFont(font)
420
421         self.lineEdit_11.setStyleSheet("background-color: #ffffff")
422
423         self.lineEdit_11.setObjectName("lineEdit_11")
424
425         self.lineEdit_12 = QtWidgets.QLineEdit(self.widget_11)
426         self.lineEdit_12.setGeometry(QtCore.QRect(110, 50, 171, 20))
427
428         font = QtGui.QFont()
429
430         font.setPointSize(10)
431
432         self.lineEdit_12.setFont(font)
433
434         self.lineEdit_12.setStyleSheet("background-color: #ffffff")
435
436         self.lineEdit_12.setObjectName("lineEdit_12")
437
438         self.lineEdit_15 = QtWidgets.QLineEdit(self.widget_11)
439
440         self.lineEdit_15.setGeometry(QtCore.QRect(110, 90, 171, 20))
441
442         font = QtGui.QFont()
443
444         font.setPointSize(10)
445
446         self.lineEdit_15.setFont(font)
447
448         self.lineEdit_15.setStyleSheet("background-color: #ffffff")
449
450         self.lineEdit_15.setObjectName("lineEdit_15")
451
452         self.lineEdit_16 = QtWidgets.QLineEdit(self.widget_11)
453
454         self.lineEdit_16.setGeometry(QtCore.QRect(110, 130, 171, 20))
455
456         font = QtGui.QFont()
457
458         font.setPointSize(10)
459
460         self.lineEdit_16.setFont(font)
461
462         self.lineEdit_16.setStyleSheet("background-color: #ffffff")
463
464         self.lineEdit_16.setObjectName("lineEdit_16")
465
466         self.lineEdit_17 = QtWidgets.QLineEdit(self.widget_11)
467
468         self.lineEdit_17.setGeometry(QtCore.QRect(110, 170, 171, 20))
469
470         font = QtGui.QFont()
471
472         font.setPointSize(10)
473
474         self.lineEdit_17.setFont(font)
475
476         self.lineEdit_17.setStyleSheet("background-color: #ffffff")
477
478         self.lineEdit_17.setObjectName("lineEdit_17")
479
480         self.label_41 = QtWidgets.QLabel(self.widget_4)

```



```

480
481     # Add a Save and Close button
482
483     # self.buttonBox = QtWidgets.QDialogButtonBox(
484     # BridgeTraffic_Dialog)
485
486     # self.buttonBox.setGeometry(QtCore.QRect(540, 520, 341, 32))
487     # self.buttonBox.setOrientation(QtCore.Qt.Horizontal)
488     # self.buttonBox.setStandardButtons(QtWidgets.QDialogButtonBox.
489     Close | QtWidgets.QDialogButtonBox.Save)
490
491     # self.buttonBox.setObjectName("buttonBox")
492
493
494     # # Connect the Close button to the custom close method
495     # self.buttonBox.rejected.connect(self.show_warning)
496
497
498     # Connect the Save button to the save_data method (if
499     implemented)
500
501     # self.buttonBox.accepted.connect(self.save_data)
502
503
504     self.retranslateUi(BridgeTraffic_Dialog)
505
506     self.buttonBox_4.accepted.connect(lambda: [self.save_data(),
507     BridgeTraffic_Dialog.accept()]) # type: ignore
508
509     self.buttonBox_4.rejected.connect(lambda: self.show_warning(
510     BridgeTraffic_Dialog)) # type: ignore
511
512     self.pushButton_34.toggled['bool'].connect(self.widget_7.
513     setVisible) # type: ignore
514
515     self.pushButton_40.toggled['bool'].connect(self.widget_10.
516     setVisible) # type: ignore
517
518     QtCore.QMetaObject.connectSlotsByName(BridgeTraffic_Dialog)
519
520
521 def show_warning(self, dialog):
522     """
523
524     Show a warning window when the Close button is pressed.
525
526     """
527
528     warning_box = QMessageBox()
529     warning_box.setIcon(QMessageBox.Warning)
530     warning_box.setWindowTitle("Confirm Close")
531     warning_box.setText("Are you sure you want to close without
532     saving?")
533
534     warning_box.setStandardButtons(QMessageBox.Yes | QMessageBox.No
535 )

```

```

510     warning_box.setDefaultButton(QMessageBox.No)
511
512     # Check the user's response
513     response = warning_box.exec_()
514     if response == QMessageBox.Yes:
515         dialog.reject() # Close the application
516     else:
517         pass # Do nothing, return to the dialog
518
519 def retranslateUi(self, BridgeTraffic_Dialog):
520     _translate = QtCore.QCoreApplication.translate
521     BridgeTraffic_Dialog.setWindowTitle(_translate("BridgeTraffic_Dialog", "Bridge and Traffic Data"))
522     self.label_16.setText(_translate("BridgeTraffic_Dialog", "Input Parameters"))
523     self.pushButton_34.setText(_translate("BridgeTraffic_Dialog", "Structure Works Data"))
524     self.pushButton_35.setText(_translate("BridgeTraffic_Dialog", "Foundation"))
525     self.pushButton_36.setText(_translate("BridgeTraffic_Dialog", "Super-Structure"))
526     self.pushButton_37.setText(_translate("BridgeTraffic_Dialog", "Sub-Structure"))
527     self.pushButton_38.setText(_translate("BridgeTraffic_Dialog", "Miscellaneous"))
528     self.pushButton_39.setText(_translate("BridgeTraffic_Dialog", "Financial Data"))
529     self.pushButton_40.setText(_translate("BridgeTraffic_Dialog", "Carbon Emission Data"))
530     self.pushButton_41.setText(_translate("BridgeTraffic_Dialog", "Carbon Emission Cost Data"))
531     self.pushButton_42.setText(_translate("BridgeTraffic_Dialog", "Bridge and Traffic Data"))
532     self.pushButton_43.setText(_translate("BridgeTraffic_Dialog", "Maintenance and Repair"))
533     self.pushButton_12.setText(_translate("BridgeTraffic_Dialog", "Disposal and Recycling"))
534     self.label_17.setText(_translate("BridgeTraffic_Dialog", "Output"))

```

```

535         self.textBrowser_3.setHtml(_translate("BridgeTraffic_Dialog", " "
536             <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0//EN" "http://www.w3.
537             org/TR/REC-html40/strict.dtd">\n"
538             "<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"
539                 text/css\">\n"
540             "p, li { white-space: pre-wrap; }\n"
541             "</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-
542                 size:8.25pt; font-weight:400; font-style:normal;\">\n"
543             "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
544                 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
545                 font-size:10pt; color:#aa8b8b;\">Initial Construction Cost</span></p
546             >\n"
547             "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
548                 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
549                 font-size:10pt; color:#aa8b8b;\">Initial Carbon emission Cost</span
550             ></p>\n"
551             "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
552                 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
553                 font-size:10pt; color:#aa8b8b;\">Time Cost</span></p>\n"
554             "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
555                 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
556                 font-size:10pt; color:#aa8b8b;\">Road User Cost</span></p>\n"
557             "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
558                 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
559                 font-size:10pt; color:#aa8b8b;\">Carbon Emission due to Re-Routing</
560             span></p>\n"
561             "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
562                 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
563                 font-size:10pt; color:#aa8b8b;\">Periodic Maintenance Costs</span></
564             p>\n"
565             "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
566                 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
567                 font-size:10pt; color:#aa8b8b;\">Maintenance Emission Costs</span></
568             p>\n"
569             "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
570                 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
571                 font-size:10pt; color:#aa8b8b;\">Routine Inspectection Costs</span
572             ></p>\n"

```

```

547 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Repair & Rehabilitation Costs</span></p>\n"
548 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Reconstruction Costs</span></p>\n"
549 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Demolition & Disposal Cost</span></p>\n"
550 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Recycling Cost</span></p>\n"
551 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Total Life-Cycle Cost</span></p></body></html>"))
552         self.label_18.setText(_translate("BridgeTraffic_Dialog", "Number of Lanes"))
553         self.label_19.setText(_translate("BridgeTraffic_Dialog", "Road Roughness"))
554         self.label_20.setText(_translate("BridgeTraffic_Dialog", "Additional Re-Route Distance"))
555         self.label_29.setText(_translate("BridgeTraffic_Dialog", "Road Rise and Fall (RF)"))
556         self.label_30.setText(_translate("BridgeTraffic_Dialog", "Type of Road"))
557         self.label_31.setText(_translate("BridgeTraffic_Dialog", "(%)"))
558         self.label_32.setText(_translate("BridgeTraffic_Dialog", "(km)"))
559         self.label_33.setText(_translate("BridgeTraffic_Dialog", "(mm/km)"))
560         self.label_34.setText(_translate("BridgeTraffic_Dialog", "(m/km)"))
561         self.textBrowser_4.setHtml(_translate("BridgeTraffic_Dialog", "<!DOCTYPE HTML PUBLIC \"-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.org/TR/REC-html40/strict.dtd\">\n"

```

```

562 "<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"
      text/css\">\n"
563 "p, li { white-space: pre-wrap; }\n"
564 "</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-
      size:8.25pt; font-weight:400; font-style:normal;\">\n"
565 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
      -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt;\">Annual Increase in Traffic if Re-Routing duration
      increases more than a year</span></p></body></html>"))
566         self.label_35.setText(_translate("BridgeTraffic_Dialog", " "
567             Composition of Various Vehicles"))
568         self.label_40.setText(_translate("BridgeTraffic_Dialog", "LCV : "
569             ))
570         self.label_36.setText(_translate("BridgeTraffic_Dialog", "Cars : "
571             ))
572         self.label_37.setText(_translate("BridgeTraffic_Dialog", "Buses : "
573             ))
574         self.label_39.setText(_translate("BridgeTraffic_Dialog", "HCV : "
575             ))
576         self.label_38.setText(_translate("BridgeTraffic_Dialog", "MCV : "
577             ))
578         self.label_41.setText(_translate("BridgeTraffic_Dialog", "(PCU/
D)"))
579         self.pushButton.setText(_translate("BridgeTraffic_Dialog", " "
580             Project Details Window      "))
581         self.pushButton_6.setText(_translate("BridgeTraffic_Dialog", " "
582             Bridge and Traffic Data    "))
583
584
585     def validate_data(self):
586         """Validate input data before saving"""
587         try:
588             # Check numeric fields
589             float(self.lineEdit_9.text()) # Additional re-route
590             distance
591             float(self.lineEdit_10.text()) # Road rise and fall
592
593             # Check vehicle composition percentages
594             vehicle_fields = [

```

```

586         self.lineEdit_11.text(), # Cars
587         self.lineEdit_12.text(), # Buses
588         self.lineEdit_15.text(), # HCV
589         self.lineEdit_16.text(), # MCV
590         self.lineEdit_17.text() # LCV
591     ]
592
593     total = sum(float(x) for x in vehicle_fields if x)
594     if total > 100:
595         QMessageBox.warning(
596             None,
597             "Validation Error",
598             "Vehicle composition percentages cannot exceed 100%"
599         ,
600         QMessageBox.Ok
601     )
602
603     return False
604
605
606     return True
607
608
609 except ValueError:
610     QMessageBox.warning(
611         None,
612         "Validation Error",
613         "Please enter valid numbers in all fields",
614         QMessageBox.Ok
615     )
616
617     return False
618
619
620 def save_data(self):
621     """Collect all input data and save it to a JSON file"""
622     if not self.validate_data():
623         return
624
625
626     data = {
627         # Bridge and Traffic Data
628         "number_of_lanes": self.comboBox_7.currentText(),
629         "additional_reroute_distance": self.lineEdit_9.text(),
630         "road_roughness": self.comboBox_6.currentText(),

```

```

624     "road_rise_and_fall": self.lineEdit_10.text(),
625     "type_of_road": self.comboBox_8.currentText(),
626     "annual_traffic_increase": self.comboBox_9.currentText(),
627
628     # Vehicle Composition
629     "cars": self.lineEdit_11.text(),
630     "buses": self.lineEdit_12.text(),
631     "hcv": self.lineEdit_15.text(),
632     "mcv": self.lineEdit_16.text(),
633     "lcv": self.lineEdit_17.text(),
634 }
635
636     # Save to JSON file
637
638     try:
639
640         import json
641         from datetime import datetime
642
643         # Create filename with timestamp
644         timestamp = datetime.now().strftime("%Y%m%d_%H%M%S")
645         filename = "src//osbridgeelcca//desktop_app//assets//"+f"bridge_traffic_data_{timestamp}.json"
646
647         with open(filename, 'w') as f:
648             json.dump(data, f, indent=4)
649
650         # Show success message
651         QMessageBox.information(
652             None,
653             "Success",
654             f"Data saved successfully to {filename}",
655             QMessageBox.Ok
656         )
657
658         return True
659
660     except Exception as e:
661         QMessageBox.critical(
662             None,
663             "Error",

```

```

662             f"Failed to save data: {str(e)}",
663             QMessageBox.Ok
664         )
665     return False
666
667
668 if __name__ == "__main__":
669     import sys
670     app = QtWidgets.QApplication(sys.argv)
671     BridgeTraffic_Dialog = QtWidgets.QDialog()
672     ui = Ui_BridgeTraffic_Dialog()
673     ui.setupUi(BridgeTraffic_Dialog)
674     BridgeTraffic_Dialog.show()
675     sys.exit(app.exec_())

```

## 2. Carbon Emission Data

```

1 # -*- coding: utf-8 -*-
2
3 # Form implementation generated from reading ui file 'C:\Users\saans\
4 #   AppData\Local\Programs\Python\Python310\Lib\site-packages\
5 #   qt5_applications\Qt\bin\ProjectDetails_CarbonEmissionData_Window.ui'
6 #
7 # Created by: PyQt5 UI code generator 5.15.9
8 #
9 # WARNING: Any manual changes made to this file will be lost when
10 #          pyuic5 is
11 # run again. Do not edit this file unless you know what you are doing.
12
13
14
15
16 #from ProjectDetails_CarbonEmissionData_Window import
17 #    Ui_CarbonEmission_Dialog
18

```

```

19
20
21
22
23
24
25 class Ui_CarbonEmission_Dialog(object):
26     def openBridgeTrafficWindow(self):
27         self.window = QtWidgets.QDialog()
28         from ProjectDetails_BridgeANDTrafficData_Window import
29             Ui_BridgeTraffic_Dialog
30             self.ui = Ui_BridgeTraffic_Dialog()
31             self.ui.setupUi(self.window)
32             self.window.show()
33
34     def openFoundationWindow(self):
35         from ProjectDetails_Foundation_Window import
36             Ui_Foundation_Dialog
37             self.window = QtWidgets.QDialog()
38             self.ui = Ui_Foundation_Dialog()
39             self.ui.setupUi(self.window)
40             self.window.show()
41
42     def openCarbonEmissionWindow(self):
43         self.window = QtWidgets.QDialog()
44         self.ui = Ui_CarbonEmission_Dialog()
45         self.ui.setupUi(self.window)
46         self.window.show()
47
48     def openDemolitionWindow(self):
49         from ProjectDetails_DemolitionANDRecyclingData_Window import
50             Ui_Demolition_Dialog
51             self.window = QtWidgets.QDialog()
52             self.ui = Ui_Demolition_Dialog()
53             self.ui.setupUi(self.window)
54             self.window.show()
55
56     def openFinancialWindow(self):

```

```

54         from ProjectDetails_FinancialData_Window import
55         Ui_FinancialData_Dialog
56
57         self.window = QtWidgets.QDialog()
58         self.ui = Ui_FinancialData_Dialog()
59         self.ui.setupUi(self.window)
60         self.window.show()
61
62
63     def openMaintenanceWindow(self):
64
65         from ProjectDetails_MaintenanceANDRepairData_Window import
66         Ui_Maintenance_Dialog
67
68         self.window = QtWidgets.QDialog()
69         self.ui = Ui_Maintenance_Dialog()
70         self.ui.setupUi(self.window)
71         self.window.show()
72
73
74     def openMiscellaneousWindow(self):
75
76         from ProjectDetails_Miscellaneous_Window import
77         Ui_Miscellaneous_Dialog
78
79         self.window = QtWidgets.QDialog()
80         self.ui = Ui_Miscellaneous_Dialog()
81         self.ui.setupUi(self.window)
82         self.window.show()
83
84
85     def openSubStructureWindow(self):
86
87         from ProjectDetails_SubStructure_Window import
88         Ui_SubStructure_Dialog
89
90         self.window = QtWidgets.QDialog()
91         self.ui = Ui_SubStructure_Dialog()
92         self.ui.setupUi(self.window)
93         self.window.show()
94
95
96     def openSuperStructureWindow(self):
97
98         from ProjectDetails_SuperStructure_Window import
99         Ui_SuperStructure_Dialog
100
101         self.window = QtWidgets.QDialog()
102         self.ui = Ui_SuperStructure_Dialog()
103         self.ui.setupUi(self.window)
104         self.window.show()
105
106
107

```



```

121     self.label_56 = QtWidgets.QLabel(self.widget_2)
122     self.label_56.setGeometry(QtCore.QRect(20, 10, 91, 21))
123     font = QtGui.QFont()
124     font.setPointSize(10)
125     self.label_56.setFont(font)
126     self.label_56.setObjectName("label_56")
127     self.comboBox_19 = QtWidgets.QComboBox(self.widget_2)
128     self.comboBox_19.setGeometry(QtCore.QRect(140, 10, 190, 22))
129     font = QtGui.QFont()
130     font.setPointSize(10)
131     self.comboBox_19.setFont(font)
132     self.comboBox_19.setStyleSheet("background-color: #ffffff")
133     self.comboBox_19.setObjectName("comboBox_19")
134     self.comboBox_19.addItem("")
135     self.comboBox_19.addItem("")
136     self.label_57 = QtWidgets.QLabel(self.widget_2)
137     self.label_57.setGeometry(QtCore.QRect(20, 70, 161, 21))
138     font = QtGui.QFont()
139     font.setPointSize(10)
140     self.label_57.setFont(font)
141     self.label_57.setAlignment(QtCore.Qt.AlignCenter)
142     self.label_57.setObjectName("label_57")
143     self.label_58 = QtWidgets.QLabel(self.widget_2)
144     self.label_58.setGeometry(QtCore.QRect(601, 70, 140, 21))
145     font = QtGui.QFont()
146     font.setPointSize(10)
147     self.label_58.setFont(font)
148     self.label_58.setAlignment(QtCore.Qt.AlignCenter)
149     self.label_58.setObjectName("label_58")
150     self.label_59 = QtWidgets.QLabel(self.widget_2)
151     self.label_59.setGeometry(QtCore.QRect(191, 70, 110, 21))
152     font = QtGui.QFont()
153     font.setPointSize(10)
154     self.label_59.setFont(font)
155     self.label_59.setAlignment(QtCore.Qt.AlignCenter)
156     self.label_59.setObjectName("label_59")
157     self.label_60 = QtWidgets.QLabel(self.widget_2)
158     self.label_60.setGeometry(QtCore.QRect(311, 70, 110, 21))
159     font = QtGui.QFont()

```

```

160     font.setPointSize(10)
161     self.label_60.setFont(font)
162     self.label_60.setAlignment(QtCore.Qt.AlignCenter)
163     self.label_60.setObjectName("label_60")
164     self.label_61 = QtWidgets.QLabel(self.widget_2)
165     self.label_61.setGeometry(QtCore.QRect(440, 70, 151, 21))
166     font = QtGui.QFont()
167     font.setPointSize(10)
168     self.label_61.setFont(font)
169     self.label_61.setAlignment(QtCore.Qt.AlignCenter)
170     self.label_61.setObjectName("label_61")
171     self.comboBox_20 = QtWidgets.QComboBox(self.widget_2)
172     self.comboBox_20.setGeometry(QtCore.QRect(30, 100, 140, 22))
173     self.comboBox_20.setStyleSheet("background-color: #ffffff")
174     self.comboBox_20.setObjectName("comboBox_20")
175     self.comboBox_20.addItem("")
176     self.comboBox_20.addItem("")
177     self.comboBox_21 = QtWidgets.QComboBox(self.widget_2)
178     self.comboBox_21.setGeometry(QtCore.QRect(30, 130, 140, 22))
179     self.comboBox_21.setStyleSheet("background-color: #ffffff")
180     self.comboBox_21.setObjectName("comboBox_21")
181     self.comboBox_21.addItem("")
182     self.comboBox_21.addItem("")
183     self.lineEdit_37 = QtWidgets.QLineEdit(self.widget_2)
184     self.lineEdit_37.setGeometry(QtCore.QRect(210, 100, 81, 20))
185     font = QtGui.QFont()
186     font.setPointSize(10)
187     self.lineEdit_37.setFont(font)
188     self.lineEdit_37.setStyleSheet("background-color: #ffffff")
189     self.lineEdit_37.setObjectName("lineEdit_37")
190     self.lineEdit_38 = QtWidgets.QLineEdit(self.widget_2)
191     self.lineEdit_38.setGeometry(QtCore.QRect(210, 130, 81, 20))
192     font = QtGui.QFont()
193     font.setPointSize(10)
194     self.lineEdit_38.setFont(font)
195     self.lineEdit_38.setStyleSheet("background-color: #ffffff")
196     self.lineEdit_38.setObjectName("lineEdit_38")
197     self.label_62 = QtWidgets.QLabel(self.widget_2)
198     self.label_62.setGeometry(QtCore.QRect(340, 100, 51, 20))

```

```

199     font = QtGui.QFont()
200     font.setPointSize(10)
201     self.label_62.setFont(font)
202     self.label_62.setStyleSheet("background-color: #ffffff")
203     self.label_62.setAlignment(QtCore.Qt.AlignCenter)
204     self.label_62.setObjectName("label_62")
205     self.label_63 = QtWidgets.QLabel(self.widget_2)
206     self.label_63.setGeometry(QtCore.QRect(340, 130, 51, 20))
207     font = QtGui.QFont()
208     font.setPointSize(10)
209     self.label_63.setFont(font)
210     self.label_63.setStyleSheet("background-color: #ffffff")
211     self.label_63.setAlignment(QtCore.Qt.AlignCenter)
212     self.label_63.setObjectName("label_63")
213     self.lineEdit_39 = QtWidgets.QLineEdit(self.widget_2)
214     self.lineEdit_39.setGeometry(QtCore.QRect(450, 100, 81, 20))
215     font = QtGui.QFont()
216     font.setPointSize(10)
217     self.lineEdit_39.setFont(font)
218     self.lineEdit_39.setStyleSheet("background-color: #ffffff")
219     self.lineEdit_39.setObjectName("lineEdit_39")
220     self.lineEdit_40 = QtWidgets.QLineEdit(self.widget_2)
221     self.lineEdit_40.setGeometry(QtCore.QRect(450, 130, 81, 20))
222     font = QtGui.QFont()
223     font.setPointSize(10)
224     self.lineEdit_40.setFont(font)
225     self.lineEdit_40.setStyleSheet("background-color: #ffffff")
226     self.lineEdit_40.setObjectName("lineEdit_40")
227     self.lineEdit_41 = QtWidgets.QLineEdit(self.widget_2)
228     self.lineEdit_41.setGeometry(QtCore.QRect(610, 100, 81, 20))
229     font = QtGui.QFont()
230     font.setPointSize(10)
231     self.lineEdit_41.setFont(font)
232     self.lineEdit_41.setStyleSheet("background-color: #ffffff")
233     self.lineEdit_41.setObjectName("lineEdit_41")
234     self.lineEdit_42 = QtWidgets.QLineEdit(self.widget_2)
235     self.lineEdit_42.setGeometry(QtCore.QRect(610, 130, 81, 20))
236     font = QtGui.QFont()
237     font.setPointSize(10)

```

```

238     self.lineEdit_42.setFont(font)
239     self.lineEdit_42.setStyleSheet("background-color: #ffffff")
240     self.lineEdit_42.setObjectName("lineEdit_42")
241     # self.pushButton_13 = QtWidgets.QPushButton(self.widget_2)
242     # self.pushButton_13.setGeometry(QtCore.QRect(300, 200, 190,
243     23))
244
245     # self.pushButton_13.setStyleSheet("background-color: #ffffff")
246     # self.pushButton_13.setObjectName("pushButton_13")
247     # self.pushButton_49 = QtWidgets.QPushButton(self.widget_2)
248     # self.pushButton_49.setGeometry(QtCore.QRect(310, 440, 190,
249     23))
250
251     # self.pushButton_49.setStyleSheet("background-color: #ffffff")
252     # self.pushButton_49.setObjectName("pushButton_49")
253     self.buttonBox_5 = QtWidgets.QDialogButtonBox(self.widget_2)
254     self.buttonBox_5.setGeometry(QtCore.QRect(430, 670, 341, 32))
255     self.buttonBox_5.setOrientation(QtCore.Qt.Horizontal)
256     self.buttonBox_5.setStandardButtons(QtWidgets.QDialogButtonBox.
257 Close|QtWidgets.QDialogButtonBox.Save)
258
259     self.buttonBox_5.setCenterButtons(False)
260
261     self.buttonBox_5.setObjectName("buttonBox_5")
262
263     self.line_7 = QtWidgets.QFrame(self.widget_2)
264     self.line_7.setGeometry(QtCore.QRect(10, 230, 761, 16))
265     self.line_7.setContextMenuPolicy(QtCore.Qt.DefaultContextMenu)
266     self.line_7.setFrameShadow(QtWidgets.QFrame.Sunken)
267     self.line_7.setLineWidth(2)
268     self.line_7.setMidLineWidth(2)
269     self.line_7 setFrameShape(QtWidgets.QFrame.HLine)
270     self.line_7.setObjectName("line_7")
271
272     self.line_8 = QtWidgets.QFrame(self.widget_2)
273     self.line_8.setGeometry(QtCore.QRect(10, 470, 761, 16))
274     self.line_8.setContextMenuPolicy(QtCore.Qt.DefaultContextMenu)
275     self.line_8.setFrameShadow(QtWidgets.QFrame.Sunken)
276     self.line_8.setLineWidth(2)
277     self.line_8.setMidLineWidth(2)
278     self.line_8 setFrameShape(QtWidgets.QFrame.HLine)
279     self.line_8.setObjectName("line_8")
280
281     self.label_74 = QtWidgets.QLabel(self.widget_2)
282     self.label_74.setGeometry(QtCore.QRect(540, 100, 51, 21))
283
284     font = QtGui.QFont()

```

```

274     font.setPointSize(10)
275     self.label_74.setFont(font)
276     self.label_74.setAlignment(QtCore.Qt.AlignCenter)
277     self.label_74.setObjectName("label_74")
278     self.label_75 = QtWidgets.QLabel(self.widget_2)
279     self.label_75.setGeometry(QtCore.QRect(540, 130, 51, 21))
280     font = QtGui.QFont()
281     font.setPointSize(10)
282     self.label_75.setFont(font)
283     self.label_75.setAlignment(QtCore.Qt.AlignCenter)
284     self.label_75.setObjectName("label_75")
285     self.label_76 = QtWidgets.QLabel(self.widget_2)
286     self.label_76.setGeometry(QtCore.QRect(700, 100, 71, 21))
287     font = QtGui.QFont()
288     font.setPointSize(10)
289     self.label_76.setFont(font)
290     self.label_76.setAlignment(QtCore.Qt.AlignCenter)
291     self.label_76.setObjectName("label_76")
292     self.label_77 = QtWidgets.QLabel(self.widget_2)
293     self.label_77.setGeometry(QtCore.QRect(700, 130, 71, 21))
294     font = QtGui.QFont()
295     font.setPointSize(10)
296     self.label_77.setFont(font)
297     self.label_77.setAlignment(QtCore.Qt.AlignCenter)
298     self.label_77.setObjectName("label_77")
299     self.label_78 = QtWidgets.QLabel(self.widget_2)
300     self.label_78.setGeometry(QtCore.QRect(539, 340, 51, 21))
301     font = QtGui.QFont()
302     font.setPointSize(10)
303     self.label_78.setFont(font)
304     self.label_78.setAlignment(QtCore.Qt.AlignCenter)
305     self.label_78.setObjectName("label_78")
306     self.label_79 = QtWidgets.QLabel(self.widget_2)
307     self.label_79.setGeometry(QtCore.QRect(699, 370, 71, 21))
308     font = QtGui.QFont()
309     font.setPointSize(10)
310     self.label_79.setFont(font)
311     self.label_79.setAlignment(QtCore.Qt.AlignCenter)
312     self.label_79.setObjectName("label_79")

```

```

313     self.label_64 = QtWidgets.QLabel(self.widget_2)
314     self.label_64.setGeometry(QtCore.QRect(339, 340, 51, 20))
315     font = QtGui.QFont()
316     font.setPointSize(10)
317     self.label_64.setFont(font)
318     self.label_64.setStyleSheet("background-color: #ffffff")
319     self.label_64.setAlignment(QtCore.Qt.AlignCenter)
320     self.label_64.setObjectName("label_64")
321     self.label_65 = QtWidgets.QLabel(self.widget_2)
322     self.label_65.setGeometry(QtCore.QRect(339, 370, 51, 20))
323     font = QtGui.QFont()
324     font.setPointSize(10)
325     self.label_65.setFont(font)
326     self.label_65.setStyleSheet("background-color: #ffffff")
327     self.label_65.setAlignment(QtCore.Qt.AlignCenter)
328     self.label_65.setObjectName("label_65")
329     self.lineEdit_43 = QtWidgets.QLineEdit(self.widget_2)
330     self.lineEdit_43.setGeometry(QtCore.QRect(609, 370, 81, 20))
331     font = QtGui.QFont()
332     font.setPointSize(10)
333     self.lineEdit_43.setFont(font)
334     self.lineEdit_43.setStyleSheet("background-color: #ffffff")
335     self.lineEdit_43.setObjectName("lineEdit_43")
336     self.lineEdit_44 = QtWidgets.QLineEdit(self.widget_2)
337     self.lineEdit_44.setGeometry(QtCore.QRect(209, 370, 81, 20))
338     font = QtGui.QFont()
339     font.setPointSize(10)
340     self.lineEdit_44.setFont(font)
341     self.lineEdit_44.setStyleSheet("background-color: #ffffff")
342     self.lineEdit_44.setObjectName("lineEdit_44")
343     self.label_80 = QtWidgets.QLabel(self.widget_2)
344     self.label_80.setGeometry(QtCore.QRect(699, 340, 71, 21))
345     font = QtGui.QFont()
346     font.setPointSize(10)
347     self.label_80.setFont(font)
348     self.label_80.setAlignment(QtCore.Qt.AlignCenter)
349     self.label_80.setObjectName("label_80")
350     self.label_66 = QtWidgets.QLabel(self.widget_2)
351     self.label_66.setGeometry(QtCore.QRect(19, 250, 91, 21))

```

```

352     font = QtGui.QFont()
353     font.setPointSize(10)
354     self.label_66.setFont(font)
355     self.label_66.setObjectName("label_66")
356     self.lineEdit_45 = QtWidgets.QLineEdit(self.widget_2)
357     self.lineEdit_45.setGeometry(QtCore.QRect(449, 370, 81, 20))
358     font = QtGui.QFont()
359     font.setPointSize(10)
360     self.lineEdit_45.setFont(font)
361     self.lineEdit_45.setStyleSheet("background-color: #ffffff")
362     self.lineEdit_45.setObjectName("lineEdit_45")
363     self.label_67 = QtWidgets.QLabel(self.widget_2)
364     self.label_67.setGeometry(QtCore.QRect(19, 310, 161, 21))
365     font = QtGui.QFont()
366     font.setPointSize(10)
367     self.label_67.setFont(font)
368     self.label_67.setAlignment(QtCore.Qt.AlignCenter)
369     self.label_67.setObjectName("label_67")
370     self.label_81 = QtWidgets.QLabel(self.widget_2)
371     self.label_81.setGeometry(QtCore.QRect(539, 370, 51, 21))
372     font = QtGui.QFont()
373     font.setPointSize(10)
374     self.label_81.setFont(font)
375     self.label_81.setAlignment(QtCore.Qt.AlignCenter)
376     self.label_81.setObjectName("label_81")
377     self.label_68 = QtWidgets.QLabel(self.widget_2)
378     self.label_68.setGeometry(QtCore.QRect(600, 310, 140, 21))
379     font = QtGui.QFont()
380     font.setPointSize(10)
381     self.label_68.setFont(font)
382     self.label_68.setAlignment(QtCore.Qt.AlignCenter)
383     self.label_68.setObjectName("label_68")
384     self.label_69 = QtWidgets.QLabel(self.widget_2)
385     self.label_69.setGeometry(QtCore.QRect(190, 310, 110, 21))
386     font = QtGui.QFont()
387     font.setPointSize(10)
388     self.label_69.setFont(font)
389     self.label_69.setAlignment(QtCore.Qt.AlignCenter)
390     self.label_69.setObjectName("label_69")

```

```

391     self.comboBox_22 = QtWidgets.QComboBox(self.widget_2)
392     self.comboBox_22.setGeometry(QtCore.QRect(29, 340, 140, 22))
393     self.comboBox_22.setStyleSheet("background-color: #ffffff")
394     self.comboBox_22.setObjectName("comboBox_22")
395     self.comboBox_22.addItem("")
396     self.comboBox_22.addItem("")
397     self.label_70 = QtWidgets.QLabel(self.widget_2)
398     self.label_70.setGeometry(QtCore.QRect(439, 310, 151, 21))
399     font = QtGui.QFont()
400     font.setPointSize(10)
401     self.label_70.setFont(font)
402     self.label_70.setAlignment(QtCore.Qt.AlignCenter)
403     self.label_70.setObjectName("label_70")
404     self.lineEdit_46 = QtWidgets.QLineEdit(self.widget_2)
405     self.lineEdit_46.setGeometry(QtCore.QRect(449, 340, 81, 20))
406     font = QtGui.QFont()
407     font.setPointSize(10)
408     self.lineEdit_46.setFont(font)
409     self.lineEdit_46.setStyleSheet("background-color: #ffffff")
410     self.lineEdit_46.setObjectName("lineEdit_46")
411     self.comboBox_23 = QtWidgets.QComboBox(self.widget_2)
412     self.comboBox_23.setGeometry(QtCore.QRect(29, 370, 140, 22))
413     self.comboBox_23.setStyleSheet("background-color: #ffffff")
414     self.comboBox_23.setObjectName("comboBox_23")
415     self.comboBox_23.addItem("")
416     self.comboBox_23.addItem("")
417     self.comboBox_24 = QtWidgets.QComboBox(self.widget_2)
418     self.comboBox_24.setGeometry(QtCore.QRect(139, 250, 190, 22))
419     font = QtGui.QFont()
420     font.setPointSize(10)
421     self.comboBox_24.setFont(font)
422     self.comboBox_24.setStyleSheet("background-color: #ffffff")
423     self.comboBox_24.setObjectName("comboBox_24")
424     self.comboBox_24.addItem("")
425     self.comboBox_24.addItem("")
426     self.lineEdit_47 = QtWidgets.QLineEdit(self.widget_2)
427     self.lineEdit_47.setGeometry(QtCore.QRect(609, 340, 81, 20))
428     font = QtGui.QFont()
429     font.setPointSize(10)

```

```

430     self.lineEdit_47.setFont(font)
431     self.lineEdit_47.setStyleSheet("background-color: #ffffff")
432     self.lineEdit_47.setObjectName("lineEdit_47")
433     self.lineEdit_48 = QtWidgets.QLineEdit(self.widget_2)
434     self.lineEdit_48.setGeometry(QtCore.QRect(209, 340, 81, 20))
435     font = QtGui.QFont()
436     font.setPointSize(10)
437     self.lineEdit_48.setFont(font)
438     self.lineEdit_48.setStyleSheet("background-color: #ffffff")
439     self.lineEdit_48.setObjectName("lineEdit_48")
440     self.label_71 = QtWidgets.QLabel(self.widget_2)
441     self.label_71.setGeometry(QtCore.QRect(310, 310, 110, 21))
442     font = QtGui.QFont()
443     font.setPointSize(10)
444     self.label_71.setFont(font)
445     self.label_71.setAlignment(QtCore.Qt.AlignCenter)
446     self.label_71.setObjectName("label_71")
447     self.label_82 = QtWidgets.QLabel(self.widget_2)
448     self.label_82.setGeometry(QtCore.QRect(539, 580, 51, 21))
449     font = QtGui.QFont()
450     font.setPointSize(10)
451     self.label_82.setFont(font)
452     self.label_82.setAlignment(QtCore.Qt.AlignCenter)
453     self.label_82.setObjectName("label_82")
454     self.label_83 = QtWidgets.QLabel(self.widget_2)
455     self.label_83.setGeometry(QtCore.QRect(699, 610, 71, 21))
456     font = QtGui.QFont()
457     font.setPointSize(10)
458     self.label_83.setFont(font)
459     self.label_83.setAlignment(QtCore.Qt.AlignCenter)
460     self.label_83.setObjectName("label_83")
461     self.label_84 = QtWidgets.QLabel(self.widget_2)
462     self.label_84.setGeometry(QtCore.QRect(339, 580, 51, 20))
463     font = QtGui.QFont()
464     font.setPointSize(10)
465     self.label_84.setFont(font)
466     self.label_84.setStyleSheet("background-color: #ffffff")
467     self.label_84.setAlignment(QtCore.Qt.AlignCenter)
468     self.label_84.setObjectName("label_84")

```

```

469     self.label_85 = QtWidgets.QLabel(self.widget_2)
470     self.label_85.setGeometry(QtCore.QRect(339, 610, 51, 20))
471     font = QtGui.QFont()
472     font.setPointSize(10)
473     self.label_85.setFont(font)
474     self.label_85.setStyleSheet("background-color: #ffffff")
475     self.label_85.setAlignment(QtCore.Qt.AlignCenter)
476     self.label_85.setObjectName("label_85")
477     self.lineEdit_49 = QtWidgets.QLineEdit(self.widget_2)
478     self.lineEdit_49.setGeometry(QtCore.QRect(609, 610, 81, 20))
479     font = QtGui.QFont()
480     font.setPointSize(10)
481     self.lineEdit_49.setFont(font)
482     self.lineEdit_49.setStyleSheet("background-color: #ffffff")
483     self.lineEdit_49.setObjectName("lineEdit_49")
484     self.lineEdit_50 = QtWidgets.QLineEdit(self.widget_2)
485     self.lineEdit_50.setGeometry(QtCore.QRect(209, 610, 81, 20))
486     font = QtGui.QFont()
487     font.setPointSize(10)
488     self.lineEdit_50.setFont(font)
489     self.lineEdit_50.setStyleSheet("background-color: #ffffff")
490     self.lineEdit_50.setObjectName("lineEdit_50")
491     self.label_86 = QtWidgets.QLabel(self.widget_2)
492     self.label_86.setGeometry(QtCore.QRect(699, 580, 71, 21))
493     font = QtGui.QFont()
494     font.setPointSize(10)
495     self.label_86.setFont(font)
496     self.label_86.setAlignment(QtCore.Qt.AlignCenter)
497     self.label_86.setObjectName("label_86")
498     self.label_87 = QtWidgets.QLabel(self.widget_2)
499     self.label_87.setGeometry(QtCore.QRect(19, 490, 91, 21))
500     font = QtGui.QFont()
501     font.setPointSize(10)
502     self.label_87.setFont(font)
503     self.label_87.setObjectName("label_87")
504     self.lineEdit_51 = QtWidgets.QLineEdit(self.widget_2)
505     self.lineEdit_51.setGeometry(QtCore.QRect(449, 610, 81, 20))
506     font = QtGui.QFont()
507     font.setPointSize(10)

```

```

508     self.lineEdit_51.setFont(font)
509     self.lineEdit_51.setStyleSheet("background-color: #ffffff")
510     self.lineEdit_51.setObjectName("lineEdit_51")
511     self.label_88 = QtWidgets.QLabel(self.widget_2)
512     self.label_88.setGeometry(QtCore.QRect(19, 550, 161, 21))
513     font = QtGui.QFont()
514     font.setPointSize(10)
515     self.label_88.setFont(font)
516     self.label_88.setAlignment(QtCore.Qt.AlignCenter)
517     self.label_88.setObjectName("label_88")
518     self.label_89 = QtWidgets.QLabel(self.widget_2)
519     self.label_89.setGeometry(QtCore.QRect(539, 610, 51, 21))
520     font = QtGui.QFont()
521     font.setPointSize(10)
522     self.label_89.setFont(font)
523     self.label_89.setAlignment(QtCore.Qt.AlignCenter)
524     self.label_89.setObjectName("label_89")
525     self.label_90 = QtWidgets.QLabel(self.widget_2)
526     self.label_90.setGeometry(QtCore.QRect(600, 550, 140, 21))
527     font = QtGui.QFont()
528     font.setPointSize(10)
529     self.label_90.setFont(font)
530     self.label_90.setAlignment(QtCore.Qt.AlignCenter)
531     self.label_90.setObjectName("label_90")
532     self.label_91 = QtWidgets.QLabel(self.widget_2)
533     self.label_91.setGeometry(QtCore.QRect(190, 550, 110, 21))
534     font = QtGui.QFont()
535     font.setPointSize(10)
536     self.label_91.setFont(font)
537     self.label_91.setAlignment(QtCore.Qt.AlignCenter)
538     self.label_91.setObjectName("label_91")
539     self.comboBox_25 = QtWidgets.QComboBox(self.widget_2)
540     self.comboBox_25.setGeometry(QtCore.QRect(29, 580, 140, 22))
541     self.comboBox_25.setStyleSheet("background-color: #ffffff")
542     self.comboBox_25.setObjectName("comboBox_25")
543     self.comboBox_25.addItem("")
544     self.comboBox_25.addItem("")
545     self.label_92 = QtWidgets.QLabel(self.widget_2)
546     self.label_92.setGeometry(QtCore.QRect(439, 550, 151, 21))

```

```

547     font = QtGui.QFont()
548     font.setPointSize(10)
549     self.label_92.setFont(font)
550     self.label_92.setAlignment(QtCore.Qt.AlignCenter)
551     self.label_92.setObjectName("label_92")
552     self.lineEdit_52 = QtWidgets.QLineEdit(self.widget_2)
553     self.lineEdit_52.setGeometry(QtCore.QRect(449, 580, 81, 20))
554     font = QtGui.QFont()
555     font.setPointSize(10)
556     self.lineEdit_52.setFont(font)
557     self.lineEdit_52.setStyleSheet("background-color: #ffffff")
558     self.lineEdit_52.setObjectName("lineEdit_52")
559     self.comboBox_26 = QtWidgets.QComboBox(self.widget_2)
560     self.comboBox_26.setGeometry(QtCore.QRect(29, 610, 140, 22))
561     self.comboBox_26.setStyleSheet("background-color: #ffffff")
562     self.comboBox_26.setObjectName("comboBox_26")
563     self.comboBox_26.addItem("")
564     self.comboBox_26.addItem("")
565     self.comboBox_27 = QtWidgets.QComboBox(self.widget_2)
566     self.comboBox_27.setGeometry(QtCore.QRect(139, 490, 190, 22))
567     font = QtGui.QFont()
568     font.setPointSize(10)
569     self.comboBox_27.setFont(font)
570     self.comboBox_27.setStyleSheet("background-color: #ffffff")
571     self.comboBox_27.setObjectName("comboBox_27")
572     self.comboBox_27.addItem("")
573     self.comboBox_27.addItem("")
574     self.lineEdit_53 = QtWidgets.QLineEdit(self.widget_2)
575     self.lineEdit_53.setGeometry(QtCore.QRect(609, 580, 81, 20))
576     font = QtGui.QFont()
577     font.setPointSize(10)
578     self.lineEdit_53.setFont(font)
579     self.lineEdit_53.setStyleSheet("background-color: #ffffff")
580     self.lineEdit_53.setObjectName("lineEdit_53")
581     self.lineEdit_54 = QtWidgets.QLineEdit(self.widget_2)
582     self.lineEdit_54.setGeometry(QtCore.QRect(209, 580, 81, 20))
583     font = QtGui.QFont()
584     font.setPointSize(10)
585     self.lineEdit_54.setFont(font)

```

```

586     self.lineEdit_54.setStyleSheet("background-color: #ffffff")
587     self.lineEdit_54.setObjectName("lineEdit_54")
588     self.label_93 = QtWidgets.QLabel(self.widget_2)
589     self.label_93.setGeometry(QtCore.QRect(310, 550, 110, 21))
590     font = QtGui.QFont()
591     font.setPointSize(10)
592     self.label_93.setFont(font)
593     self.label_93.setAlignment(QtCore.Qt.AlignCenter)
594     self.label_93.setObjectName("label_93")
595     self.pushButton_50 = QtWidgets.QPushButton(self.widget_2)
596     self.pushButton_50.setGeometry(QtCore.QRect(310, 670, 190, 23))
597     self.pushButton_50.setStyleSheet("background-color: #ffffff")
598     self.pushButton_50.setObjectName("pushButton_50")
599     self.scrollArea = QtWidgets.QScrollArea(CarbonEmission_Dialog)
600     self.scrollArea.setGeometry(QtCore.QRect(10, 65, 241, 681))
601     self.scrollArea.setAutoFillBackground(False)
602     self.scrollArea.setStyleSheet("background-color: #fff9f9")
603     self.scrollArea.setWidgetResizable(True)
604     self.scrollArea.setObjectName("scrollArea")
605     self.scrollAreaWidgetContents_4 = QtWidgets.QWidget()
606     self.scrollAreaWidgetContents_4.setGeometry(QtCore.QRect(0, 0,
607     239, 679))
608     self.scrollAreaWidgetContents_4.setObjectName("scrollAreaWidgetContents_4")
609     self.label_72 = QtWidgets.QLabel(self.
610     scrollAreaWidgetContents_4)
611     self.label_72.setGeometry(QtCore.QRect(0, 0, 221, 31))
612     font = QtGui.QFont()
613     font.setPointSize(10)
614     self.label_72.setFont(font)
615     self.label_72.setStyleSheet("background-color: rgb(240,230,230)")
616     self.label_72.setAlignment(QtCore.Qt.AlignCenter)
617     self.label_72.setObjectName("label_72")
618     self.widget_11 = QtWidgets.QWidget(self.
619     scrollAreaWidgetContents_4)
620     self.widget_11.setGeometry(QtCore.QRect(0, 30, 221, 357))
621     self.widget_11.setStyleSheet("background-color: #fff9f9")
622     self.widget_11.setObjectName("widget_11")

```



```

649         self.formLayout_4.setWidget(0, QtWidgets.QFormLayout.LabelRole,
650             self.pushButton_52)
651
652         self.pushButton_53 = QtWidgets.QPushButton(self.widget_12,
653             clicked=lambda: self.openSuperStructureWindow())
654
655         font = QtGui.QFont()
656         font.setPointSize(10)
657         font.setBold(False)
658         font.setWeight(50)
659
660         self.pushButton_53.setFont(font)
661         self.pushButton_53.setIcon(icon2)
662
663         self.pushButton_53.setObjectName("pushButton_53")
664
665         self.formLayout_4.setWidget(1, QtWidgets.QFormLayout.LabelRole,
666             self.pushButton_53)
667
668         self.pushButton_54 = QtWidgets.QPushButton(self.widget_12,
669             clicked=lambda: self.openSubStructureWindow())
670
671         font = QtGui.QFont()
672
673         font.setPointSize(10)
674         font.setBold(False)
675         font.setWeight(50)
676
677         self.pushButton_54.setFont(font)
678         self.pushButton_54.setIcon(icon2)
679
680         self.pushButton_54.setObjectName("pushButton_54")
681
682         self.formLayout_4.setWidget(2, QtWidgets.QFormLayout.LabelRole,
683             self.pushButton_54)
684
685         self.pushButton_55 = QtWidgets.QPushButton(self.widget_12,
686             clicked=lambda: self.openMiscellaneousWindow())
687
688         font = QtGui.QFont()
689
690         font.setPointSize(10)
691         font.setBold(False)
692         font.setWeight(50)
693
694         self.pushButton_55.setFont(font)
695         self.pushButton_55.setIcon(icon2)
696
697         self.pushButton_55.setObjectName("pushButton_55")
698
699         self.formLayout_4.setWidget(3, QtWidgets.QFormLayout.LabelRole,
700             self.pushButton_55)
701
702         self.verticalLayout_4.addWidget(self.widget_12)
703
704         self.pushButton_56 = QtWidgets.QPushButton(self.widget_11,
705             clicked=lambda: self.openFinancialWindow())
706
707         font = QtGui.QFont()

```

```

680     font.setPointSize(10)
681     self.pushButton_56.setFont(font)
682     self.pushButton_56.setObjectName("pushButton_56")
683     self.verticalLayout_4.addWidget(self.pushButton_56)
684     self.pushButton_57 = QtWidgets.QPushButton(self.widget_11)
685     font = QtGui.QFont()
686     font.setPointSize(10)
687     self.pushButton_57.setFont(font)
688     self.pushButton_57.setIcon(icon1)
689     self.pushButton_57.setCheckable(True)
690     self.pushButton_57.setObjectName("pushButton_57")
691     self.verticalLayout_4.addWidget(self.pushButton_57)
692     self.widget_13 = QtWidgets.QWidget(self.widget_11)
693     self.widget_13.setMinimumSize(QtCore.QSize(203, 21))
694     self.widget_13.setMaximumSize(QtCore.QSize(281, 21))
695     self.widget_13.setObjectName("widget_13")
696     self.pushButton_58 = QtWidgets.QPushButton(self.widget_13,
697     clicked=lambda: self.openCarbonEmissionWindow())
698     self.pushButton_58.setGeometry(QtCore.QRect(20, 0, 183, 21))
699     font = QtGui.QFont()
700     font.setPointSize(10)
701     font.setBold(False)
702     font.setWeight(50)
703     self.pushButton_58.setFont(font)
704     self.pushButton_58.setIcon(icon2)
705     self.pushButton_58.setObjectName("pushButton_58")
706     self.verticalLayout_4.addWidget(self.widget_13)
707     self.pushButton_59 = QtWidgets.QPushButton(self.widget_11,
708     clicked=lambda: self.openBridgeTrafficWindow())
709     font = QtGui.QFont()
710     font.setPointSize(10)
711     self.pushButton_59.setFont(font)
712     self.pushButton_59.setObjectName("pushButton_59")
713     self.verticalLayout_4.addWidget(self.pushButton_59)
714     self.pushButton_60 = QtWidgets.QPushButton(self.widget_11,
715     clicked=lambda: self.openMaintenanceWindow())
716     font = QtGui.QFont()
717     font.setPointSize(10)
718     self.pushButton_60.setFont(font)

```

```

716     self.pushButton_60.setObjectName("pushButton_60")
717     self.verticalLayout_4.addWidget(self.pushButton_60)
718     self.pushButton_61 = QtWidgets.QPushButton(self.widget_11,
719     clicked=lambda: self.openDemolitionWindow())
720     font = QtGui.QFont()
721     font.setPointSize(10)
722     self.pushButton_61.setFont(font)
723     self.pushButton_61.setObjectName("pushButton_61")
724     self.verticalLayout_4.addWidget(self.pushButton_61)
725     self.label_73 = QtWidgets.QLabel(self.
726     scrollAreaWidgetContents_4)
727     self.label_73.setGeometry(QtCore.QRect(0, 387, 221, 31))
728     font = QtGui.QFont()
729     font.setPointSize(10)
730     self.label_73.setFont(font)
731     self.label_73.setStyleSheet("background-color: rgb(240,230,230)
732     ")
733     self.label_73.setAlignment(QtCore.Qt.AlignCenter)
734     self.label_73.setObjectName("label_73")
735     self.textBrowser_4 = QtWidgets.QTextBrowser(self.
736     scrollAreaWidgetContents_4)
737     self.textBrowser_4.setGeometry(QtCore.QRect(0, 418, 221, 221))
738     self.textBrowser_4.setStyleSheet("background-color: #fff9f9")
739     self.textBrowser_4.setObjectName("textBrowser_4")
740     self.verticalScrollBar_4 = QtWidgets.QScrollBar(self.
741     scrollAreaWidgetContents_4)
742     self.verticalScrollBar_4.setGeometry(QtCore.QRect(220, 0, 16,
743     641))
744     self.verticalScrollBar_4.setStyleSheet("background-color: #
745     F0F0F0")
746     self.verticalScrollBar_4.setOrientation(QtCore.Qt.Vertical)

```

```

747     font.setWeight(75)
748     self.pushButton_62.setFont(font)
749     self.pushButton_62.setFocusPolicy(QtCore.Qt.StrongFocus)
750     self.pushButton_62.setLayoutDirection(QtCore.Qt.RightToLeft)
751     self.pushButton_62.setStyleSheet("background-color: rgb
752 (240,230,230)")
753     self.pushButton_62.setIcon(icon)
754     self.pushButton_62.setAutoRepeat(False)
755     self.pushButton_62.setObjectName("pushButton_62")
756
757     self.retranslateUi(CarbonEmission_Dialog)
758     #self.buttonBox_5.accepted.connect(CarbonEmission_Dialog.accept
759 ) # type: ignore
760     self.buttonBox_5.accepted.connect(self.handle_save)
761     self.buttonBox.rejected.connect(lambda: self.show_warning(
762 CarbonEmission_Dialog))
763     self.buttonBox_5.rejected.connect(lambda: self.show_warning(
764 CarbonEmission_Dialog)) # type: ignore
765     self.pushButton_51.toggled['bool'].connect(self.widget_12.
766 setVisible) # type: ignore
767     self.pushButton_57.toggled['bool'].connect(self.widget_13.
768 setVisible) # type: ignore
769     #self.buttonBox.rejected.connect(self.show_warning) # type:
770 ignore
771     QtCore.QMetaObject.connectSlotsByName(CarbonEmission_Dialog)
772
773 def show_warning(self, dialog):
774     """
775
776     Show a warning window when the Close button is pressed.
777
778     """
779
780     warning_box = QMessageBox()
781     warning_box.setIcon(QMessageBox.Warning)
782     warning_box.setWindowTitle("Confirm Close")
783     warning_box.setText("Are you sure you want to close without
784 saving?")
785     warning_box.setStandardButtons(QMessageBox.Yes | QMessageBox.No
786 )
787     warning_box.setDefaultButton(QMessageBox.No)

```

```

777     # Check the user's response
778
779     response = warning_box.exec_()
780
781     if response == QMessageBox.Yes:
782
783         dialog.reject() # Close the application
784
785     else:
786
787         pass # Do nothing, return to the dialog
788
789
790     def retranslateUi(self, CarbonEmission_Dialog):
791
792         _translate = QtCore.QCoreApplication.translate
793
794         CarbonEmission_Dialog.setWindowTitle(_translate("CarbonEmission_Dialog", "Carbon Emission Data"))
795
796         self.pushButton.setText(_translate("CarbonEmission_Dialog", "Project Details Window"))
797
798         self.label_56.setText(_translate("CarbonEmission_Dialog", "Component:"))
799
800         self.comboBox_19.setItemText(0, _translate("CarbonEmission_Dialog", "Earthwork"))
801
802         self.comboBox_19.setItemText(1, _translate("CarbonEmission_Dialog", "RCC in Foundation"))
803
804         self.label_57.setText(_translate("CarbonEmission_Dialog", "Material Type and Grade"))
805
806         self.label_58.setText(_translate("CarbonEmission_Dialog", "Carbon Emission Factor"))
807
808         self.label_59.setText(_translate("CarbonEmission_Dialog", "Quantity"))
809
810         self.label_60.setText(_translate("CarbonEmission_Dialog", "Unit"))
811
812         self.label_61.setText(_translate("CarbonEmission_Dialog", "Emboided Carbon Energy"))
813
814         self.comboBox_20.setItemText(0, _translate("CarbonEmission_Dialog", "Concrete"))
815
816         self.comboBox_20.setItemText(1, _translate("CarbonEmission_Dialog", "Steel"))
817
818         self.comboBox_21.setItemText(0, _translate("CarbonEmission_Dialog", "Steel"))
819
820         self.comboBox_21.setItemText(1, _translate("CarbonEmission_Dialog", "Concrete"))
821
822         self.label_62.setText(_translate("CarbonEmission_Dialog", "<html><head/><body><p><span style=\" font-size:10pt;\">m</span><span"))

```

```

        style=" font-size:10pt; vertical-align:super ;\">3</span></p></body></html>"))
801     self.label_63.setText(_translate("CarbonEmission_Dialog", "kg"))
802
803     #self.pushButton_13.setText(_translate("CarbonEmission_Dialog",
804     "+ Add Material"))
805     #self.pushButton_49.setText(_translate("CarbonEmission_Dialog",
806     "+ Add Material"))
807     self.label_74.setText(_translate("CarbonEmission_Dialog", "(MJ/
808     kg)"))
809     self.label_75.setText(_translate("CarbonEmission_Dialog", "(MJ/
810     kg)"))
811     self.label_76.setText(_translate("CarbonEmission_Dialog", "kg
812     CO2e/kg"))
813     self.label_77.setText(_translate("CarbonEmission_Dialog", "kg
814     CO2e/kg"))
815     self.label_78.setText(_translate("CarbonEmission_Dialog", "(MJ/
816     kg)"))
817     self.label_79.setText(_translate("CarbonEmission_Dialog", "kg
818     CO2e/kg"))
819     self.label_64.setText(_translate("CarbonEmission_Dialog", "<
820     html><head/><body><p><span style=" font-size:10pt;\">m</span><span
821     style=" font-size:10pt; vertical-align:super ;\">3</span></p></body>
822     </html>"))
823     self.label_65.setText(_translate("CarbonEmission_Dialog", "kg"))
824
825     self.label_80.setText(_translate("CarbonEmission_Dialog", "kg
826     CO2e/kg"))
827     self.label_66.setText(_translate("CarbonEmission_Dialog", "Component:"))
828     self.label_67.setText(_translate("CarbonEmission_Dialog", "Material Type and Grade"))
829     self.label_81.setText(_translate("CarbonEmission_Dialog", "(MJ/
830     kg)"))
831     self.label_68.setText(_translate("CarbonEmission_Dialog", "Carbon Emission Factor"))
832     self.label_69.setText(_translate("CarbonEmission_Dialog", "Quantity"))

```

```

818         self.comboBox_22.setItemText(0, _translate("CarbonEmission_Dialog", "Concrete"))
819         self.comboBox_22.setItemText(1, _translate("CarbonEmission_Dialog", "Steel"))
820         self.label_70.setText(_translate("CarbonEmission_Dialog", "Emboided Carbon Energy"))
821         self.comboBox_23.setItemText(0, _translate("CarbonEmission_Dialog", "Steel"))
822         self.comboBox_23.setItemText(1, _translate("CarbonEmission_Dialog", "Concrete"))
823         self.comboBox_24.setItemText(0, _translate("CarbonEmission_Dialog", "Earthwork"))
824         self.comboBox_24.setItemText(1, _translate("CarbonEmission_Dialog", "RCC in Foundation"))
825         self.label_71.setText(_translate("CarbonEmission_Dialog", "Unit"))
826         self.label_82.setText(_translate("CarbonEmission_Dialog", "(MJ/kg)"))
827         self.label_83.setText(_translate("CarbonEmission_Dialog", "kg CO2e/kg"))
828         self.label_84.setText(_translate("CarbonEmission_Dialog", "<html><head/><body><p><span style=\" font-size:10pt;\">m</span><span style=\" font-size:10pt; vertical-align:super;\">3</span></p></body></html>"))
829         self.label_85.setText(_translate("CarbonEmission_Dialog", "kg"))
830     )
831         self.label_86.setText(_translate("CarbonEmission_Dialog", "kg CO2e/kg"))
832         self.label_87.setText(_translate("CarbonEmission_Dialog", "Component:"))
833         self.label_88.setText(_translate("CarbonEmission_Dialog", "Material Type and Grade"))
834         self.label_89.setText(_translate("CarbonEmission_Dialog", "(MJ/kg)"))
835         self.label_90.setText(_translate("CarbonEmission_Dialog", "Carbon Emission Factor"))
836         self.label_91.setText(_translate("CarbonEmission_Dialog", "Quantity"))

```

```

836         self.comboBox_25.setItemText(0, _translate("CarbonEmission_Dialog", "Concrete"))
837         self.comboBox_25.setItemText(1, _translate("CarbonEmission_Dialog", "Steel"))
838         self.label_92.setText(_translate("CarbonEmission_Dialog", "Emboided Carbon Energy"))
839         self.comboBox_26.setItemText(0, _translate("CarbonEmission_Dialog", "Steel"))
840         self.comboBox_26.setItemText(1, _translate("CarbonEmission_Dialog", "Concrete"))
841         self.comboBox_27.setItemText(0, _translate("CarbonEmission_Dialog", "Earthwork"))
842         self.comboBox_27.setItemText(1, _translate("CarbonEmission_Dialog", "RCC in Foundation"))
843         self.label_93.setText(_translate("CarbonEmission_Dialog", "Unit"))
844
845         self.pushButton_50.setText(_translate("CarbonEmission_Dialog", "+ Add Material"))
846         self.label_72.setText(_translate("CarbonEmission_Dialog", "Input Parameters"))
847         self.pushButton_51.setText(_translate("CarbonEmission_Dialog", "Structure Works Data"))
848         self.pushButton_52.setText(_translate("CarbonEmission_Dialog", "Foundation"))
849         self.pushButton_53.setText(_translate("CarbonEmission_Dialog", "Super-Structure"))
850         self.pushButton_54.setText(_translate("CarbonEmission_Dialog", "Sub-Structure"))
851         self.pushButton_55.setText(_translate("CarbonEmission_Dialog", "Miscellaneous"))
852         self.pushButton_56.setText(_translate("CarbonEmission_Dialog", "Financial Data"))
853         self.pushButton_57.setText(_translate("CarbonEmission_Dialog", "Carbon Emission Data"))
854         self.pushButton_58.setText(_translate("CarbonEmission_Dialog", "Carbon Emission Cost Data"))
855         self.pushButton_59.setText(_translate("CarbonEmission_Dialog", "Bridge and Traffic Data"))

```

```

855         self.pushButton_60.setText(_translate("CarbonEmission_Dialog",
856 "Maintenance and Repair"))
857         self.pushButton_61.setText(_translate("CarbonEmission_Dialog",
858 "Disposal and Recycling"))
859         self.label_73.setText(_translate("CarbonEmission_Dialog", "Output"))
860         self.textBrowser_4.setHtml(_translate("CarbonEmission_Dialog",
861 "<!DOCTYPE HTML PUBLIC \"-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.
862 org/TR/REC-html40/strict.dtd\">\n"
863 "<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"
864     text/css\">\n"
865 "p, li { white-space: pre-wrap; }\n"
866 "</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-
867     size:8.25pt; font-weight:400; font-style:normal;\">\n"
868 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
869     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
870     font-size:10pt; color:#aa8b8b;\">Initial Construction Cost</span></p
871     >\n"
872 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
873     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
874     font-size:10pt; color:#aa8b8b;\">Initial Carbon emission Cost</span
875     ></p>\n"
876 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
877     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
878     font-size:10pt; color:#aa8b8b;\">Time Cost</span></p>\n"
879 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
880     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
881     font-size:10pt; color:#aa8b8b;\">Road User Cost</span></p>\n"
882 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
883     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
884     font-size:10pt; color:#aa8b8b;\">Carbon Emission due to Re-Routing</
885     span></p>\n"
886 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
887     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
888     font-size:10pt; color:#aa8b8b;\">Periodic Maintenance Costs</span></
889     p>\n"
890 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
891     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
892     font-size:10pt; color:#aa8b8b;\">Maintenance Emission Costs</span></
893     p>\n"

```

```

    p>\n"
869 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Routine Inspectection Costs</span
     ></p>\n"
870 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Repair & Rehabilitation Costs</
     span></p>\n"
871 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Reconstruction Costs</span></p>\n"
872 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Demolition & Disposal Cost</
     span></p>\n"
873 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Recycling Cost</span></p>\n"
874 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
     -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Total Life-Cycle Cost</span></p></
     body></html>"))
875         self.pushButton_62.setText(_translate("CarbonEmission_Dialog",
876 "Carbon Emission Data           "))
877
877 def validate_data(self):
878     """Validate input data before saving"""
879     try:
880         # Validate numeric fields
881         float(self.lineEdit_37.text()) if self.lineEdit_37.text()
882     else 0
882         float(self.lineEdit_38.text()) if self.lineEdit_38.text()
883     else 0
883         float(self.lineEdit_39.text()) if self.lineEdit_39.text()
884     else 0
884         float(self.lineEdit_40.text()) if self.lineEdit_40.text()
885     else 0

```

```

885         float(self.lineEdit_41.text()) if self.lineEdit_41.text()
886     else 0
887         float(self.lineEdit_42.text()) if self.lineEdit_42.text()
888     else 0
889         float(self.lineEdit_48.text()) if self.lineEdit_48.text()
890     else 0
891         float(self.lineEdit_44.text()) if self.lineEdit_44.text()
892     else 0
893         float(self.lineEdit_46.text()) if self.lineEdit_46.text()
894     else 0
895         float(self.lineEdit_47.text()) if self.lineEdit_47.text()
896     else 0
897         float(self.lineEdit_45.text()) if self.lineEdit_45.text()
898     else 0
899         float(self.lineEdit_54.text()) if self.lineEdit_54.text()
900     else 0
901         float(self.lineEdit_50.text()) if self.lineEdit_50.text()
902     else 0
903         float(self.lineEdit_52.text()) if self.lineEdit_52.text()
904     else 0
905         float(self.lineEdit_53.text()) if self.lineEdit_53.text()
906     else 0
907         float(self.lineEdit_51.text()) if self.lineEdit_51.text()
908     else 0
909         float(self.lineEdit_49.text()) if self.lineEdit_49.text()
910     else 0

899         return True

901     except ValueError:
902         QMessageBox.warning(
903             None,
904             "Validation Error",
905             "Please enter valid numbers in all numeric fields",
906             QMessageBox.Ok
907         )
908         return False

909     def save_data(self):

```

```

911     """Collect all input data and save it to a JSON file"""
912
913     if not self.validate_data():
914         return False
915
916     data = {
917
918         # First component section
919
920         "component_1": self.comboBox_19.currentText(),
921         "material_type_1": self.comboBox_20.currentText(),
922         "material_grade_1": self.comboBox_21.currentText(),
923         "quantity_1": self.lineEdit_37.text(),
924         "unit_1": self.lineEdit_38.text(),
925         "embodied_carbon_energy_1": self.lineEdit_39.text(),
926         "carbon_emission_factor_1": self.lineEdit_41.text(),
927
928
929         # Second component section
930
931         "component_2": self.comboBox_24.currentText(),
932         "material_type_2": self.comboBox_22.currentText(),
933         "material_grade_2": self.comboBox_23.currentText(),
934         "quantity_2": self.lineEdit_48.text(),
935         "unit_2": self.lineEdit_44.text(),
936         "embodied_carbon_energy_2": self.lineEdit_46.text(),
937         "carbon_emission_factor_2": self.lineEdit_47.text(),
938
939
940         # Third component section
941
942         "component_3": self.comboBox_27.currentText(),
943         "material_type_3": self.comboBox_25.currentText(),
944         "material_grade_3": self.comboBox_26.currentText(),
945         "quantity_3": self.lineEdit_54.text(),
946         "unit_3": self.lineEdit_50.text(),
947         "embodied_carbon_energy_3": self.lineEdit_52.text(),
948         "carbon_emission_factor_3": self.lineEdit_53.text(),
949     }
950
951
952     # Save to JSON file
953
954     try:
955
956         import json
957
958         from datetime import datetime
959
960
961         # Create filename with timestamp

```

```

950     timestamp = datetime.now().strftime("%Y%m%d_%H%M%S")
951     filename = f"carbon_emission_data_{timestamp}.json"
952
953     with open(filename, 'w') as f:
954         json.dump(data, f, indent=4)
955
956     # Show success message
957     QMessageBox.information(
958         None,
959         "Success",
960         f"Carbon emission data saved successfully to {filename}"
961     ,
962         QMessageBox.Ok
963     )
964
965
966     return True
967
968
969     except Exception as e:
970         QMessageBox.critical(
971             None,
972             "Error",
973             f"Failed to save data: {str(e)}",
974             QMessageBox.Ok
975         )
976
977     return False
978
979
980 def handle_save(self):
981     """Handle the save operation and close the dialog if successful"""
982
983     if self.save_data(): # Only close if save was successful
984         CarbonEmission_Dialog.accept()
985
986 if __name__ == "__main__":
987     import sys
988     app = QtWidgets.QApplication(sys.argv)
989     CarbonEmission_Dialog = QtWidgets.QDialog()
990     ui = Ui_CarbonEmission_Dialog()
991     ui.setupUi(CarbonEmission_Dialog)
992     CarbonEmission_Dialog.show()

```

```
987     sys.exit(app.exec_())
```

### 3. Demolition and Recycling Data

```
1 # -*- coding: utf-8 -*-
2
3 # Form implementation generated from reading ui file 'C:\Users\saans\
4 #   AppData\Local\Programs\Python\Python310\Lib\site-packages\
5 #   qt5_applications\Qt\bin\ProjectDetails_Demolition&
6 #   RecyclingData_Window.ui'
7 #
8 # Created by: PyQt5 UI code generator 5.15.9
9 #
10 #
11 # WARNING: Any manual changes made to this file will be lost when
12 # pyuic5 is
13 # run again. Do not edit this file unless you know what you are doing.
14 #
15 #
16 #from ProjectDetails_DemolitionANDRecyclingData_Window import
17 #    Ui_Demolition_Dialog
18 #
19 #
20 #
21 #
22 #
23 #
24 class Ui_Demolition_Dialog(object):
25     def openBridgeTrafficWindow(self):
26         from ProjectDetails_BridgeANDTrafficData_Window import
27             Ui_BridgeTraffic_Dialog
28             self.window = QtWidgets.QDialog()
29             self.ui = Ui_BridgeTraffic_Dialog()
30             self.ui.setupUi(self.window)
```

```

30         self.window.show()

31

32     def openFoundationWindow(self):
33         from ProjectDetails_Foundation_Window import
34         Ui_Foundation_Dialog
35
36         self.window = QtWidgets.QDialog()
37         self.ui = Ui_Foundation_Dialog()
38         self.ui.setupUi(self.window)
39         self.window.show()

40

41     def openCarbonEmissionWindow(self):
42         from ProjectDetails_CarbonEmissionData_Window import
43         Ui_CarbonEmission_Dialog
44
45         self.window = QtWidgets.QDialog()
46         self.ui = Ui_CarbonEmission_Dialog()
47         self.ui.setupUi(self.window)
48         self.window.show()

49

50     def openDemolitionWindow(self):
51         self.window = QtWidgets.QDialog()
52         self.ui = Ui_Demolition_Dialog()
53         self.ui.setupUi(self.window)
54         self.window.show()

55

56     def openFinancialWindow(self):
57         from ProjectDetails_FinancialData_Window import
58         Ui_FinancialData_Dialog
59
60         self.window = QtWidgets.QDialog()
61         self.ui = Ui_FinancialData_Dialog()
62         self.ui.setupUi(self.window)
63         self.window.show()

64

65     def openMaintenanceWindow(self):
66         from ProjectDetails_MaintenanceANDRepairData_Window import
67         Ui_Maintenance_Dialog
68
69         self.window = QtWidgets.QDialog()
70         self.ui = Ui_Maintenance_Dialog()
71         self.ui.setupUi(self.window)
72         self.window.show()

```

```

65
66     def openMiscellaneousWindow(self):
67
68         from ProjectDetails_Miscellaneous_Window import
69
70         Ui_Miscellaneous_Dialog
71
72         self.window = QtWidgets.QDialog()
73
74         self.ui = Ui_Miscellaneous_Dialog()
75
76         self.ui.setupUi(self.window)
77
78         self.window.show()
79
80
81     def openSubStructureWindow(self):
82
83         from ProjectDetails_SubStructure_Window import
84
85         Ui_SubStructure_Dialog
86
87         self.window = QtWidgets.QDialog()
88
89         self.ui = Ui_SubStructure_Dialog()
90
91         self.ui.setupUi(self.window)
92
93         self.window.show()
94
95
96     def openSuperStructureWindow(self):
97
98         from ProjectDetails_SuperStructure_Window import
99
100        Ui_SuperStructure_Dialog
101
102        self.window = QtWidgets.QDialog()
103
104        self.ui = Ui_SuperStructure_Dialog()
105
106        self.ui.setupUi(self.window)
107
108        self.window.show()
109
110
111    def setupUi(self, Demolition_Dialog):
112
113        Demolition_Dialog.setObjectName("Demolition_Dialog")
114
115        Demolition_Dialog.resize(1440, 900)
116
117        Demolition_Dialog.setStyleSheet("background-color: #fafafa")
118
119        self.pushButton_6 = QtWidgets.QPushButton(Demolition_Dialog)
120
121        self.pushButton_6.setGeometry(QtCore.QRect(350, 30, 261, 25))
122
123        font = QtGui.QFont()
124
125        font.setPointSize(10)
126
127        font.setBold(True)
128
129        font.setWeight(75)
130
131        self.pushButton_6.setFont(font)
132
133        self.pushButton_6.setFocusPolicy(QtCore.Qt.StrongFocus)
134
135        self.pushButton_6.setLayoutDirection(QtCore.Qt.RightToLeft)

```



```

133     self.lineEdit_5.setGeometry(QtCore.QRect(290, 30, 121, 20))
134     font = QtGui.QFont()
135     font.setPointSize(10)
136     self.lineEdit_5.setFont(font)
137     self.lineEdit_5.setStyleSheet("background-color: #ffffff")
138     self.lineEdit_5.setObjectName("lineEdit_5")
139     self.lineEdit_6 = QtWidgets.QLineEdit(self.widget_2)
140     self.lineEdit_6.setGeometry(QtCore.QRect(290, 110, 121, 20))
141     font = QtGui.QFont()
142     font.setPointSize(10)
143     self.lineEdit_6.setFont(font)
144     self.lineEdit_6.setStyleSheet("background-color: #ffffff")
145     self.lineEdit_6.setText("")
146     self.lineEdit_6.setObjectName("lineEdit_6")
147     self.buttonBox_2 = QtWidgets.QDialogButtonBox(self.widget_2)
148     self.buttonBox_2.setGeometry(QtCore.QRect(340, 170, 341, 32))
149     self.buttonBox_2.setOrientation(QtCore.Qt.Horizontal)
150     self.buttonBox_2.setStandardButtons(QtWidgets.QDialogButtonBox.
Close|QtWidgets.QDialogButtonBox.Save)
151     self.buttonBox_2.setObjectName("buttonBox_2")
152     self.lineEdit_13 = QtWidgets.QLineEdit(self.widget_2)
153     self.lineEdit_13.setGeometry(QtCore.QRect(290, 140, 121, 20))
154     font = QtGui.QFont()
155     font.setPointSize(10)
156     self.lineEdit_13.setFont(font)
157     self.lineEdit_13.setStyleSheet("background-color: #ffffff")
158     self.lineEdit_13.setObjectName("lineEdit_13")
159     self.label_21 = QtWidgets.QLabel(self.widget_2)
160     self.label_21.setGeometry(QtCore.QRect(420, 30, 51, 21))
161     font = QtGui.QFont()
162     font.setPointSize(10)
163     self.label_21.setFont(font)
164     self.label_21.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
AlignLeft|QtCore.Qt.AlignVCenter)
165     self.label_21.setObjectName("label_21")
166     self.label_23 = QtWidgets.QLabel(self.widget_2)
167     self.label_23.setGeometry(QtCore.QRect(420, 110, 71, 21))
168     font = QtGui.QFont()
169     font.setPointSize(10)

```

```

170     self.label_23.setFont(font)
171     self.label_23.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
172     AlignLeft | QtCore.Qt.AlignVCenter)
173     self.label_23.setObjectName("label_23")
174     self.textBrowser_2 = QtWidgets.QTextBrowser(self.widget_2)
175     self.textBrowser_2.setGeometry(QtCore.QRect(20, 20, 256, 51))
176     self.textBrowser_2.setObjectName("textBrowser_2")
177     self.label_22 = QtWidgets.QLabel(self.widget_2)
178     self.label_22.setGeometry(QtCore.QRect(420, 140, 51, 21))
179     font = QtGui.QFont()
180     font.setPointSize(10)
181     self.label_22.setFont(font)
182     self.label_22.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
183     AlignLeft | QtCore.Qt.AlignVCenter)
184     self.label_22.setObjectName("label_22")
185     self.pushButton = QtWidgets.QPushButton(Demolition_Dialog)
186     self.pushButton.setGeometry(QtCore.QRect(10, 30, 188, 25))
187     font = QtGui.QFont()
188     font.setPointSize(10)
189     self.pushButton.setFont(font)
190     self.pushButton.setFocusPolicy(QtCore.Qt.StrongFocus)
191     self.pushButton.setLayoutDirection(QtCore.Qt.RightToLeft)
192     self.pushButton.setStyleSheet("background-color: rgb
193 (240, 230, 230)")
194     self.pushButton.setIcon(icon)
195     self.pushButton.setAutoRepeat(False)
196     self.pushButton.setObjectName("pushButton")
197     self.scrollArea = QtWidgets.QScrollArea(Demolition_Dialog)
198     self.scrollArea.setGeometry(QtCore.QRect(10, 60, 241, 681))
199     self.scrollArea.setFillBackground(False)
200     self.scrollArea.setStyleSheet("background-color: #fff9f9")
201     self.scrollArea.setWidgetResizable(True)
202     self.scrollArea.setObjectName("scrollArea")
203     self.scrollAreaWidgetContents = QtWidgets.QWidget()
204     self.scrollAreaWidgetContents.setGeometry(QtCore.QRect(0, 0,
205     239, 679))
206     self.scrollAreaWidgetContents.setObjectName("scrollAreaWidgetContents")
207     self.label_2 = QtWidgets.QLabel(self.scrollAreaWidgetContents)

```





```

265     font.setPointSize(10)
266     font.setBold(False)
267     font.setWeight(50)
268     self.pushButton_23.setFont(font)
269     self.pushButton_23.setIcon(icon2)
270     self.pushButton_23.setObjectName("pushButton_23")
271     self.formLayout.setWidget(3, QtWidgets.QFormLayout.LabelRole,
272     self.pushButton_23)
273     self.verticalLayout.addWidget(self.widget_5)
274     self.pushButton_19 = QtWidgets.QPushButton(self.widget, clicked
275 =lambda: self.openFinancialWindow())
276     font = QtGui.QFont()
277     font.setPointSize(10)
278     self.pushButton_19.setFont(font)
279     self.pushButton_19.setObjectName("pushButton_19")
280     self.verticalLayout.addWidget(self.pushButton_19)
281     self.pushButton_16 = QtWidgets.QPushButton(self.widget)
282     font = QtGui.QFont()
283     font.setPointSize(10)
284     self.pushButton_16.setFont(font)
285     self.pushButton_16.setIcon(icon1)
286     self.pushButton_16.setCheckable(True)
287     self.pushButton_16.setObjectName("pushButton_16")
288     self.verticalLayout.addWidget(self.pushButton_16)
289     self.widget_8 = QtWidgets.QWidget(self.widget)
290     self.widget_8.setMinimumSize(QtCore.QSize(203, 21))
291     self.widget_8.setMaximumSize(QtCore.QSize(281, 21))
292     self.widget_8.setObjectName("widget_8")
293     self.pushButton_14 = QtWidgets.QPushButton(self.widget_8,
294     clicked=lambda: self.openCarbonEmissionWindow())
295     self.pushButton_14.setGeometry(QtCore.QRect(20, 0, 183, 21))
296     font = QtGui.QFont()
297     font.setPointSize(10)
298     font.setBold(False)
299     font.setWeight(50)
300     self.pushButton_14.setFont(font)

```

```

301         self.pushButton_17 = QtWidgets.QPushButton(self.widget, clicked
302 =lambda: self.openBridgeTrafficWindow())
303
304         font = QtGui.QFont()
305         font.setPointSize(10)
306         self.pushButton_17.setFont(font)
307         self.pushButton_17.setObjectName("pushButton_17")
308         self.verticalLayout.addWidget(self.pushButton_17)
309
310         self.pushButton_18 = QtWidgets.QPushButton(self.widget, clicked
311 =lambda: self.openMaintenanceWindow())
312
313         font = QtGui.QFont()
314         font.setPointSize(10)
315         self.pushButton_18.setFont(font)
316         self.pushButton_18.setObjectName("pushButton_18")
317         self.verticalLayout.addWidget(self.pushButton_18)
318
319         self.pushButton_10 = QtWidgets.QPushButton(self.widget, clicked
320 =lambda: self.openDemolitionWindow())
321
322         font = QtGui.QFont()
323         font.setPointSize(10)
324         self.pushButton_10.setFont(font)
325         self.pushButton_10.setObjectName("pushButton_10")
326         self.verticalLayout.addWidget(self.pushButton_10)
327
328         self.label_3 = QtWidgets.QLabel(self.scrollAreaWidgetContents)
329         self.label_3.setGeometry(QtCore.QRect(0, 387, 221, 31))
330
331         font = QtGui.QFont()
332         font.setPointSize(10)
333         self.label_3.setFont(font)
334         self.label_3.setStyleSheet("background-color: rgb(240,230,230)")
335
336     )
337
338         self.label_3.setAlignment(QtCore.Qt.AlignCenter)
339         self.label_3.setObjectName("label_3")
340
341         self.textBrowser = QtWidgets.QTextBrowser(self.
342             scrollAreaWidgetContents)
343
344         self.textBrowser.setGeometry(QtCore.QRect(0, 418, 221, 221))
345         self.textBrowser.setStyleSheet("background-color: #fff9f9")
346         self.textBrowser.setObjectName("textBrowser")
347
348         self.verticalScrollBar = QtWidgets.QScrollBar(self.
349             scrollAreaWidgetContents)
350
351         self.verticalScrollBar.setGeometry(QtCore.QRect(220, 0, 16,
352             641))

```

```

333         self.verticalScrollBar.setStyleSheet("background-color: #F0F0F0
334     ")
335
336     self.verticalScrollBar.setOrientation(QtCore.Qt.Vertical)
337     self.verticalScrollBar.setObjectName("verticalScrollBar")
338     self.widget.raise_()
339     self.label_2.raise_()
340     self.label_3.raise_()
341     self.textBrowser.raise_()
342     self.verticalScrollBar.raise_()
343     self.scrollArea.setWidget(self.scrollAreaWidgetContents)
344
345     self.retranslateUi(Demolition_Dialog)
346     self.buttonBox_2.accepted.connect(self.handle_save) # type:
347     ignore
348     self.buttonBox_2.rejected.connect(lambda: self.show_warning(
349         Demolition_Dialog)) # type: ignore
350     self.pushButton_15.toggled['bool'].connect(self.widget_5.
351     setVisible) # type: ignore
352     self.pushButton_16.toggled['bool'].connect(self.widget_8.
353     setVisible) # type: ignore
354     QtCore.QMetaObject.connectSlotsByName(Demolition_Dialog)
355
356
357
358
359
360
361
362
363
364

```

```

365         else:
366             pass # Do nothing, return to the dialog
367
368     def retranslateUi(self, Demolition_Dialog):
369         _translate = QtCore.QCoreApplication.translate
370         Demolition_Dialog.setWindowTitle(_translate("Demolition_Dialog",
371 , "Demolition and Recycling Data"))
372         self.pushButton_6.setText(_translate("Demolition_Dialog", "Demolition and Recycling Data"))
373         self.label_7.setText(_translate("Demolition_Dialog", "Scrap Value of Structural Steel"))
374         self.label_8.setText(_translate("Demolition_Dialog", "Structural Steel Scrap"))
375         self.label_21.setText(_translate("Demolition_Dialog", "(%")))
376         self.label_23.setText(_translate("Demolition_Dialog", "(INR/MT")))
377
378         self.textBrowser_2.setHtml(_translate("Demolition_Dialog", "<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.org/TR/REC-html40/strict.dtd\">\n<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"text/css\">\n<p, li { white-space: pre-wrap; }>\n</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-size:8.25pt; font-weight:400; font-style:normal;\">\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt;\">Demolition Cost rate as percentage to total construction cost</span></p></body></html>"))
381         self.label_22.setText(_translate("Demolition_Dialog", "(%")))
382         self.pushButton.setText(_translate("Demolition_Dialog", "Project Details Window"))
383         self.label_2.setText(_translate("Demolition_Dialog", "Input Parameters"))
384         self.pushButton_15.setText(_translate("Demolition_Dialog", "Structure Works Data"))
385         self.pushButton_20.setText(_translate("Demolition_Dialog", "Foundation"))
386         self.pushButton_21.setText(_translate("Demolition_Dialog", "Super-Structure"))

```

```

387         self.pushButton_22.setText(_translate("Demolition_Dialog", "Sub
-Structure"))
388         self.pushButton_23.setText(_translate("Demolition_Dialog", "Miscellaneous"))
389         self.pushButton_19.setText(_translate("Demolition_Dialog", "Financial Data"))
390         self.pushButton_16.setText(_translate("Demolition_Dialog", "Carbon Emission Data"))
391         self.pushButton_14.setText(_translate("Demolition_Dialog", "Carbon Emission Cost Data"))
392         self.pushButton_17.setText(_translate("Demolition_Dialog", "Bridge and Traffic Data"))
393         self.pushButton_18.setText(_translate("Demolition_Dialog", "Maintenance and Repair"))
394         self.pushButton_10.setText(_translate("Demolition_Dialog", "Disposal and Recycling"))
395         self.label_3.setText(_translate("Demolition_Dialog", "Output"))
396         self.textBrowser.setHtml(_translate("Demolition_Dialog", "<!
DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.org
/TR/REC-html40/strict.dtd\">\n"
<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"
text/css\">\n"
"p, li { white-space: pre-wrap; }\n"
</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-
size:8.25pt; font-weight:400; font-style:normal;\">\n"
<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
font-size:10pt; color:#aa8b8b;\">Initial Construction Cost</span></p
>\n"
<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
font-size:10pt; color:#aa8b8b;\">Initial Carbon emission Cost</span
></p>\n"
<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
font-size:10pt; color:#aa8b8b;\">Time Cost</span></p>\n"
<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
font-size:10pt; color:#aa8b8b;\">Road User Cost</span></p>\n"

```

```

404 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Carbon Emission due to Re-Routing</span></p>\n"
405 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Periodic Maintenance Costs</span></p>\n"
406 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Maintenance Emission Costs</span></p>\n"
407 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Routine Inspectection Costs</span></p>\n"
408 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Repair & Rehabilitation Costs</span></p>\n"
409 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Reconstruction Costs</span></p>\n"
410 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Demolition & Disposal Cost</span></p>\n"
411 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Recycling Cost</span></p>\n"
412 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Total Life-Cycle Cost</span></p></body></html>"))
413
414     def validate_data(self):
415         """Validate input data before saving"""
416         try:
417             # Validate numeric fields

```

```

418         float(self.lineEdit_5.text()) if self.lineEdit_5.text()
419     else 0
420
421         float(self.lineEdit_6.text()) if self.lineEdit_6.text()
422     else 0
423
424         float(self.lineEdit_13.text()) if self.lineEdit_13.text()
425     else 0
426
427     return True
428
429
430 except ValueError:
431
432     QMessageBox.warning(
433         None,
434         "Validation Error",
435         "Please enter valid numbers in all numeric fields",
436         QMessageBox.Ok
437     )
438
439     return False
440
441
442 def save_data(self):
443
444     """Collect all input data and save it to a JSON file"""
445
446     if not self.validate_data():
447
448         return False
449
450
451     data = {
452
453         "demolition_cost_rate": self.lineEdit_5.text(),
454
455         "scrap_value_structural_steel": self.lineEdit_6.text(),
456
457         "structural_steel_scrap": self.lineEdit_13.text(),
458     }
459
460
461
462     # Save to JSON file
463
464     try:
465
466         import json
467
468         from datetime import datetime
469
470
471         # Create filename with timestamp
472         timestamp = datetime.now().strftime("%Y%m%d_%H%M%S")
473
474         filename = f"demolition_data_{timestamp}.json"
475
476
477         with open(filename, 'w') as f:
478
479             json.dump(data, f, indent=4)

```

```

454
455     # Show success message
456     QMessageBox.information(
457         None,
458         "Success",
459         f"Demolition data saved successfully to {filename}",
460         QMessageBox.Ok
461     )
462
463     return True
464
465 except Exception as e:
466     QMessageBox.critical(
467         None,
468         "Error",
469         f"Failed to save data: {str(e)}",
470         QMessageBox.Ok
471     )
472
473     return False
474
475 def handle_save(self):
476     """Handle the save operation and close the dialog if successful
477     """
478
479     if self.save_data(): # Only close if save was successful
480         Demolition_Dialog.accept()
481
482 if __name__ == "__main__":
483     import sys
484     app = QtWidgets.QApplication(sys.argv)
485     Demolition_Dialog = QtWidgets.QDialog()
486     ui = Ui_Demolition_Dialog()
487     ui.setupUi(Demolition_Dialog)
488     Demolition_Dialog.show()
489     sys.exit(app.exec_())

```

## 4. Financial Data

```

1 # -*- coding: utf-8 -*-
2

```

```

3 # Form implementation generated from reading ui file 'C:\Users\saans\
4   AppData\Local\Programs\Python\Python310\Lib\site-packages\
5   qt5_applications\Qt\bin\ProjectDetails_FinancialData_Window.ui'
6 #
7 # Created by: PyQt5 UI code generator 5.15.9
8 #
9 # WARNING: Any manual changes made to this file will be lost when
10   pyuic5 is
11 # run again. Do not edit this file unless you know what you are doing.
12
13
14
15
16 #from ProjectDetails_FinancialData_Window import
17   Ui_FinancialData_Dialog
18
19
20
21
22
23 class Ui_FinancialData_Dialog(object):
24     def openBridgeTrafficWindow(self):
25         from ProjectDetails_BridgeANDTrafficData_Window import
26           Ui_BridgeTraffic_Dialog
27
28         self.window = QtWidgets.QDialog()
29         self.ui = Ui_BridgeTraffic_Dialog()
30         self.ui.setupUi(self.window)
31         self.window.show()
32
33     def openFoundationWindow(self):
34         from ProjectDetails_Foundation_Window import
35           Ui_Foundation_Dialog
36
37         self.window = QtWidgets.QDialog()
38         self.ui = Ui_Foundation_Dialog()
39         self.ui.setupUi(self.window)

```

```

36         self.window.show()

37
38     def openCarbonEmissionWindow(self):
39         from ProjectDetails_CarbonEmissionData_Window import
40         Ui_CarbonEmission_Dialog
41
42         self.window = QtWidgets.QDialog()
43         self.ui = Ui_CarbonEmission_Dialog()
44         self.ui.setupUi(self.window)
45         self.window.show()

46
47     def openDemolitionWindow(self):
48         from ProjectDetails_DemolitionANDRecyclingData_Window import
49         Ui_Demolition_Dialog
50
51         self.window = QtWidgets.QDialog()
52         self.ui = Ui_Demolition_Dialog()
53         self.ui.setupUi(self.window)
54         self.window.show()

55
56     def openFinancialWindow(self):
57         self.window = QtWidgets.QDialog()
58         self.ui = Ui_FinancialData_Dialog()
59         self.ui.setupUi(self.window)
60         self.window.show()

61
62     def openMaintenanceWindow(self):
63         from ProjectDetails_MaintenanceANDRepairData_Window import
64         Ui_Maintenance_Dialog
65
66         self.window = QtWidgets.QDialog()
67         self.ui = Ui_Maintenance_Dialog()
68         self.ui.setupUi(self.window)
69         self.window.show()

70
71     def openMiscellaneousWindow(self):
72         from ProjectDetails_Miscellaneous_Window import
73         Ui_Miscellaneous_Dialog
74
75         self.window = QtWidgets.QDialog()
76         self.ui = Ui_Miscellaneous_Dialog()
77         self.ui.setupUi(self.window)
78         self.window.show()

```

```

71
72     def openSubStructureWindow(self):
73         from ProjectDetails_SubStructure_Window import
74         Ui_SubStructure_Dialog
75
76         self.window = QtWidgets.QDialog()
77         self.ui = Ui_SubStructure_Dialog()
78         self.ui.setupUi(self.window)
79         self.window.show()
80
81
82     def openSuperStructureWindow(self):
83         from ProjectDetails_SuperStructure_Window import
84         Ui_SuperStructure_Dialog
85
86         self.window = QtWidgets.QDialog()
87         self.ui = Ui_SuperStructure_Dialog()
88         self.ui.setupUi(self.window)
89         self.window.show()
90
91
92     def setupUi(self, FinancialData_Dialog):
93
94         FinancialData_Dialog.setObjectName("FinancialData_Dialog")
95         FinancialData_Dialog.resize(1440, 900)
96         FinancialData_Dialog.setStyleSheet("background-color:#FAFAFA")
97
98         self.label = QtWidgets.QLabel(FinancialData_Dialog)
99         self.label.setGeometry(QtCore.QRect(10, 65, 244, 691))
100
101        font = QtGui.QFont()
102
103        font.setPointSize(10)
104
105        self.label.setFont(font)
106
107        self.label.setStyleSheet("background-color: rgb(240,230,230)")
108
109        self.label.setText("")
110
111        self.label.setObjectName("label")
112
113        self.pushButton = QtWidgets.QPushButton(FinancialData_Dialog)
114
115        self.pushButton.setGeometry(QtCore.QRect(10, 40, 188, 25))
116
117        font = QtGui.QFont()
118
119        font.setPointSize(10)
120
121        self.pushButton.setFont(font)
122
123        self.pushButton.setFocusPolicy(QtCore.Qt.StrongFocus)
124
125        self.pushButton.setLayoutDirection(QtCore.Qt.RightToLeft)
126
127        self.pushButton.setStyleSheet("background-color: rgb
128 (240,230,230)")
129
130
131        icon = QtGui.QIcon()

```



```

140     self.label_7.setFont(font)
141     self.label_7.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
142                             AlignLeft | QtCore.Qt.AlignVCenter)
143     self.label_7.setObjectName("label_7")
144     self.label_8 = QtWidgets.QLabel(self.widget_2)
145     self.label_8.setGeometry(QtCore.QRect(20, 140, 221, 21))
146     font = QtGui.QFont()
147     font.setPointSize(10)
148     self.label_8.setFont(font)
149     self.label_8.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
150                             AlignLeft | QtCore.Qt.AlignVCenter)
151     self.label_8.setObjectName("label_8")
152     self.comboBox_2 = QtWidgets.QComboBox(self.widget_2)
153     self.comboBox_2.setGeometry(QtCore.QRect(270, 80, 101, 22))
154     self.comboBox_2.setStyleSheet("background-color: #ffffff")
155     self.comboBox_2.setObjectName("comboBox_2")
156     self.comboBox_3 = QtWidgets.QComboBox(self.widget_2)
157     self.comboBox_3.setGeometry(QtCore.QRect(270, 50, 101, 22))
158     self.comboBox_3.setStyleSheet("background-color: #ffffff")
159     self.comboBox_3.setObjectName("comboBox_3")
160     self.lineEdit_5 = QtWidgets.QLineEdit(self.widget_2)
161     self.lineEdit_5.setGeometry(QtCore.QRect(270, 20, 101, 20))
162     font = QtGui.QFont()
163     font.setPointSize(10)
164     self.lineEdit_5.setFont(font)
165     self.lineEdit_5.setStyleSheet("background-color: #ffffff")
166     self.lineEdit_5.setObjectName("lineEdit_5")
167     self.lineEdit_6 = QtWidgets.QLineEdit(self.widget_2)
168     self.lineEdit_6.setGeometry(QtCore.QRect(270, 110, 101, 20))
169     font = QtGui.QFont()
170     font.setPointSize(10)
171     self.lineEdit_6.setFont(font)
172     self.lineEdit_6.setStyleSheet("background-color: #ffffff")
173     self.lineEdit_6.setObjectName("lineEdit_6")
174     self.buttonBox_2 = QtWidgets.QDialogButtonBox(self.widget_2)
175     self.buttonBox_2.setGeometry(QtCore.QRect(380, 210, 341, 32))
     self.buttonBox_2.setOrientation(QtCore.Qt.Horizontal)
     self.buttonBox_2.setStandardButtons(QtWidgets.QDialogButtonBox.
     Close | QtWidgets.QDialogButtonBox.Save)

```

```

176     self.buttonBox_2.setObjectName("buttonBox_2")
177
178     self.lineEdit_13 = QtWidgets.QLineEdit(self.widget_2)
179     self.lineEdit_13.setGeometry(QtCore.QRect(270, 140, 101, 20))
180
181     font = QtGui.QFont()
182     font.setPointSize(10)
183
184     self.lineEdit_13.setFont(font)
185     self.lineEdit_13.setStyleSheet("background-color: #ffffff")
186     self.lineEdit_13.setObjectName("lineEdit_13")
187
188     self.label_21 = QtWidgets.QLabel(self.widget_2)
189     self.label_21.setGeometry(QtCore.QRect(390, 20, 51, 21))
190
191     font = QtGui.QFont()
192     font.setPointSize(10)
193
194     self.label_21.setFont(font)
195
196     self.label_21.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
AlignLeft | QtCore.Qt.AlignVCenter)
197
198     self.label_21.setObjectName("label_21")
199
200     self.label_22 = QtWidgets.QLabel(self.widget_2)
201
202     self.label_22.setGeometry(QtCore.QRect(390, 50, 51, 21))
203
204     font = QtGui.QFont()
205     font.setPointSize(10)
206
207     self.label_22.setFont(font)
208
209     self.label_22.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
AlignLeft | QtCore.Qt.AlignVCenter)
210
211     self.label_22.setObjectName("label_22")
212
213     self.label_23 = QtWidgets.QLabel(self.widget_2)
214
215     self.label_23.setGeometry(QtCore.QRect(390, 110, 51, 21))
216
217     font = QtGui.QFont()
218     font.setPointSize(10)
219
220     self.label_23.setFont(font)
221
222     self.label_23.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
AlignLeft | QtCore.Qt.AlignVCenter)
223
224     self.label_23.setObjectName("label_23")
225
226     self.label_24 = QtWidgets.QLabel(self.widget_2)
227
228     self.label_24.setGeometry(QtCore.QRect(390, 140, 51, 21))
229
230     font = QtGui.QFont()
231     font.setPointSize(10)
232
233     self.label_24.setFont(font)
234
235     self.label_24.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
AlignLeft | QtCore.Qt.AlignVCenter)

```



```

\\Qt\\bin\\../../../../../../../../Downloads/play_arrow_filled
(1).png"), QtGui.QIcon.Normal, QtGui.QIcon.On)
243    self.pushButton_15.setIcon(icon1)
244    self.pushButton_15.setCheckable(True)
245    self.pushButton_15.setAutoDefault(True)
246    self.pushButton_15.setObjectName("pushButton_15")
247    self.verticalLayout.addWidget(self.pushButton_15)
248    self.widget_5 = QtWidgets.QWidget(self.widget)
249    self.widget_5.setObjectName("widget_5")
250    self.formLayout = QtWidgets.QFormLayout(self.widget_5)
251    self.formLayout.setObjectName("formLayout")
252    self.pushButton_20 = QtWidgets.QPushButton(self.widget_5,
253                                              clicked=lambda: self.openFoundationWindow())
254    font = QtGui.QFont()
255    font.setPointSize(10)
256    font.setBold(False)
257    font.setWeight(50)
258    self.pushButton_20.setFont(font)
259    icon2 = QtGui.QIcon()
260    icon2.addPixmap(QtGui.QPixmap("C:\\Users\\saans\\AppData\\Local
261 \\\\Programs\\Python\\Python310\\Lib\\site-packages\\qt5_applications
262 \\\\Qt\\bin\\../../../../../../../../Downloads/play_arrow_filled
263 .png"), QtGui.QIcon.Normal, QtGui.QIcon.Off)
264    self.pushButton_20.setIcon(icon2)
265    self.pushButton_20.setObjectName("pushButton_20")
266    self.formLayout.setWidget(0, QtWidgets.QFormLayout.LabelRole,
267    self.pushButton_20)
268    self.pushButton_21 = QtWidgets.QPushButton(self.widget_5,
269                                              clicked=lambda: self.openSuperStructureWindow())
270    font = QtGui.QFont()
271    font.setPointSize(10)

```

```

272         self.pushButton_22 = QtWidgets.QPushButton(self.widget_5,
273     clicked=lambda: self.openSubStructureWindow())
274
275         font = QtGui.QFont()
276         font.setPointSize(10)
277         font.setBold(False)
278         font.setWeight(50)
279
280         self.pushButton_22.setFont(font)
281         self.pushButton_22.setIcon(icon2)
282         self.pushButton_22.setObjectName("pushButton_22")
283
284         self.formLayout.setWidget(2, QtWidgets.QFormLayout.LabelRole,
285     self.pushButton_22)
286
287         self.pushButton_23 = QtWidgets.QPushButton(self.widget_5,
288     clicked=lambda: self.openMiscellaneousWindow())
289
290         font = QtGui.QFont()
291         font.setPointSize(10)
292         font.setBold(False)
293         font.setWeight(50)
294
295         self.pushButton_23.setFont(font)
296         self.pushButton_23.setIcon(icon2)
297         self.pushButton_23.setObjectName("pushButton_23")
298
299         self.formLayout.setWidget(3, QtWidgets.QFormLayout.LabelRole,
300     self.pushButton_23)
301
302         self.verticalLayout.addWidget(self.widget_5)
303
304         self.pushButton_19 = QtWidgets.QPushButton(self.widget, clicked
305     =lambda: self.openFinancialWindow())
306
307         font = QtGui.QFont()
308         font.setPointSize(10)
309
310         self.pushButton_19.setFont(font)
311         self.pushButton_19.setObjectName("pushButton_19")
312
313         self.verticalLayout.addWidget(self.pushButton_19)
314
315         self.pushButton_16 = QtWidgets.QPushButton(self.widget)
316
317         font = QtGui.QFont()
318
319         font.setPointSize(10)
320
321         self.pushButton_16.setFont(font)
322         self.pushButton_16.setIcon(icon1)
323
324         self.pushButton_16.setCheckable(True)
325
326         self.pushButton_16.setObjectName("pushButton_16")
327
328         self.verticalLayout.addWidget(self.pushButton_16)
329
330         self.widget_8 = QtWidgets.QWidget(self.widget)

```

```

306     self.widget_8.setMinimumSize(QtCore.QSize(203, 21))
307     self.widget_8.setMaximumSize(QtCore.QSize(281, 21))
308     self.widget_8.setObjectName("widget_8")
309     self.pushButton_14 = QtWidgets.QPushButton(self.widget_8,
310     clicked=lambda: self.openCarbonEmissionWindow())
311     self.pushButton_14.setGeometry(QtCore.QRect(20, 0, 183, 21))
312     font = QtGui.QFont()
313     font.setPointSize(10)
314     font.setBold(False)
315     font.setWeight(50)
316     self.pushButton_14.setFont(font)
317     self.pushButton_14.setIcon(icon2)
318     self.pushButton_14.setObjectName("pushButton_14")
319     self.verticalLayout.addWidget(self.widget_8)
320     self.pushButton_17 = QtWidgets.QPushButton(self.widget, clicked
321 =lambda: self.openBridgeTrafficWindow())
322     font = QtGui.QFont()
323     font.setPointSize(10)
324     self.pushButton_17.setFont(font)
325     self.pushButton_17.setObjectName("pushButton_17")
326     self.verticalLayout.addWidget(self.pushButton_17)
327     self.pushButton_18 = QtWidgets.QPushButton(self.widget, clicked
328 =lambda: self.openMaintenanceWindow())
329     font = QtGui.QFont()
330     font.setPointSize(10)
331     self.pushButton_18.setFont(font)
332     self.pushButton_18.setObjectName("pushButton_18")
333     self.verticalLayout.addWidget(self.pushButton_18)
334     self.pushButton_10 = QtWidgets.QPushButton(self.widget, clicked
335 =lambda: self.openDemolitionWindow())
336     font = QtGui.QFont()
337     font.setPointSize(10)
338     self.pushButton_10.setFont(font)
339     self.pushButton_10.setObjectName("pushButton_10")
340     self.verticalLayout.addWidget(self.pushButton_10)
341     self.label_3 = QtWidgets.QLabel(self.scrollAreaWidgetContents)
342     self.label_3.setGeometry(QtCore.QRect(0, 387, 221, 31))
343     font = QtGui.QFont()
344     font.setPointSize(10)

```

```

341         self.label_3.setFont(font)
342         self.label_3.setStyleSheet("background-color: rgb(240,230,230)")
343     )
344
345     self.label_3.setAlignment(QtCore.Qt.AlignCenter)
346     self.label_3.setObjectName("label_3")
347
348     self.textBrowser = QtWidgets.QTextBrowser(self.
349     scrollAreaWidgetContents)
350
351     self.textBrowser.setGeometry(QtCore.QRect(0, 418, 221, 221))
352     self.textBrowser.setStyleSheet("background-color: #ffff9f9")
353     self.textBrowser.setObjectName("textBrowser")
354
355     self.verticalScrollBar = QtWidgets.QScrollBar(self.
356     scrollAreaWidgetContents)
357
358     self.verticalScrollBar.setGeometry(QtCore.QRect(220, 0, 16,
359     641))
360
361     self.verticalScrollBar.setStyleSheet("background-color: #F0F0F0")
362
363     self.verticalScrollBar.setOrientation(QtCore.Qt.Vertical)
364     self.verticalScrollBar.setObjectName("verticalScrollBar")
365
366     self.widget.raise_()
367
368     self.label_2.raise_()
369
370     self.label_3.raise_()
371
372     self.textBrowser.raise_()
373
374     self.verticalScrollBar.raise_()
375
376     self.scrollArea.setWidget(self.scrollAreaWidgetContents)
377
378     self.pushButton_6 = QtWidgets.QPushButton(FinancialData_Dialog)
379
380     self.pushButton_6.setGeometry(QtCore.QRect(350, 40, 188, 25))
381
382     font = QtGui.QFont()
383
384     font.setPointSize(10)
385
386     font.setBold(True)
387
388     font.setWeight(75)
389
390     self.pushButton_6.setFont(font)
391
392     self.pushButton_6.setFocusPolicy(QtCore.Qt.StrongFocus)
393
394     self.pushButton_6.setLayoutDirection(QtCore.Qt.RightToLeft)
395
396     self.pushButton_6.setStyleSheet("background-color: rgb
397     (240,230,230)")
398
399     self.pushButton_6.setIcon(icon)
400
401     self.pushButton_6.setAutoRepeat(False)
402
403     self.pushButton_6.setObjectName("pushButton_6")

```

```

374         self.retranslateUi(FinancialData_Dialog)
375
376         self.buttonBox_2.accepted.connect(self.handle_save) # type:
377         ignore
378
379         self.buttonBox_2.rejected.connect(lambda: self.show_warning(
380             FinancialData_Dialog)) # type: ignore
381
382         self.pushButton_15.toggled['bool'].connect(self.widget_5.
383             setVisible) # type: ignore
384
385         self.pushButton_16.toggled['bool'].connect(self.widget_8.
386             setVisible) # type: ignore
387
388         QtCore.QMetaObject.connectSlotsByName(FinancialData_Dialog)
389
390
391     def show_warning(self, dialog):
392
393         """
394
395             Show a warning window when the Close button is pressed.
396
397         """
398
399         warning_box = QMessageBox()
400
401         warning_box.setIcon(QMessageBox.Warning)
402
403         warning_box.setWindowTitle("Confirm Close")
404
405         warning_box.setText("Are you sure you want to close without
406             saving?")
407
408         warning_box.setStandardButtons(QMessageBox.Yes | QMessageBox.No
409 )
410
411         warning_box.setDefaultButton(QMessageBox.No)
412
413
414         # Check the user's response
415
416         response = warning_box.exec_()
417
418         if response == QMessageBox.Yes:
419
420             dialog.reject() # Close the application
421
422         else:
423
424             pass # Do nothing, return to the dialog
425
426
427     def retranslateUi(self, FinancialData_Dialog):
428
429         _translate = QtCore.QCoreApplication.translate
430
431         FinancialData_Dialog.setWindowTitle(_translate("FinancialData_Dialog", "Dialog"))
432
433         self.pushButton.setText(_translate("FinancialData_Dialog", "Project Details Window      "))
434
435         self.label_4.setText(_translate("FinancialData_Dialog", "Real
436             Discount Rate"))

```

```

404         self.label_5.setText(_translate("FinancialData_Dialog", "Investment Ratio"))
405         self.label_6.setText(_translate("FinancialData_Dialog", "Interest Rate"))
406         self.label_7.setText(_translate("FinancialData_Dialog", "Duration of Study"))
407         self.label_8.setText(_translate("FinancialData_Dialog", "Time for construction of Base Project"))
408         self.label_21.setText(_translate("FinancialData_Dialog", "(%))"))
409     )
410     self.label_22.setText(_translate("FinancialData_Dialog", "(%))"))
411 )
412     self.label_23.setText(_translate("FinancialData_Dialog", "(years)"))
413     self.label_24.setText(_translate("FinancialData_Dialog", "(years)"))
414
415     self.label_2.setText(_translate("FinancialData_Dialog", "Input Parameters"))
416
417     self.pushButton_15.setText(_translate("FinancialData_Dialog", "Structure Works Data"))
418     self.pushButton_20.setText(_translate("FinancialData_Dialog", "Foundation"))
419     self.pushButton_21.setText(_translate("FinancialData_Dialog", "Super-Structure"))
420     self.pushButton_22.setText(_translate("FinancialData_Dialog", "Sub-Structure"))
421     self.pushButton_23.setText(_translate("FinancialData_Dialog", "Miscellaneous"))
422     self.pushButton_19.setText(_translate("FinancialData_Dialog", "Financial Data"))
423     self.pushButton_16.setText(_translate("FinancialData_Dialog", "Carbon Emission Data"))
424     self.pushButton_14.setText(_translate("FinancialData_Dialog", "Carbon Emission Cost Data"))
425     self.pushButton_17.setText(_translate("FinancialData_Dialog", "Bridge and Traffic Data"))
426     self.pushButton_18.setText(_translate("FinancialData_Dialog", "Maintenance and Repair"))

```

```

423         self.pushButton_10.setText(_translate("FinancialData_Dialog", "Disposal and Recycling"))
424         self.label_3.setText(_translate("FinancialData_Dialog", "Output"))
425         self.textBrowser.setHtml(_translate("FinancialData_Dialog", "<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.org/TR/REC-html40/strict.dtd\">\n"
426 "<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"text/css\">\n"
427 "p, li { white-space: pre-wrap; }\n"
428 "</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-size:8.25pt; font-weight:400; font-style:normal;\">\n"
429 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"font-size:10pt; color:#aa8b8b;\">Initial Construction Cost</span></p>\n"
430 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"font-size:10pt; color:#aa8b8b;\">Initial Carbon emission Cost</span></p>\n"
431 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"font-size:10pt; color:#aa8b8b;\">Time Cost</span></p>\n"
432 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"font-size:10pt; color:#aa8b8b;\">Road User Cost</span></p>\n"
433 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"font-size:10pt; color:#aa8b8b;\">Carbon Emission due to Re-Routing</span></p>\n"
434 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"font-size:10pt; color:#aa8b8b;\">Periodic Maintenance Costs</span></p>\n"
435 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"font-size:10pt; color:#aa8b8b;\">Maintenance Emission Costs</span></p>\n"

```

```

436 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
437 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
438 font-size:10pt; color:#aa8b8b;\">Routine Inspectection Costs</span
439 ></p>\n"
440 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
441 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
442 font-size:10pt; color:#aa8b8b;\">Repair & Rehabilitation Costs</
443 span></p>\n"
444 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
445 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
446 font-size:10pt; color:#aa8b8b;\">Reconstruction Costs</span></p>\n"
447 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
448 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
449 font-size:10pt; color:#aa8b8b;\">Demolition & Disposal Cost</
450 span></p>\n"
451 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
452 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
453 font-size:10pt; color:#aa8b8b;\">Recycling Cost</span></p>\n"
454 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
455 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
456 font-size:10pt; color:#aa8b8b;\">Total Life-Cycle Cost</span></p></
457 body></html>"))
458
459         self.pushButton_6.setText(_translate("FinancialData_Dialog", "Financial Data"))
460
461
462     def validate_data(self):
463
464         """Validate input data before saving"""
465
466         try:
467
468             # Validate numeric fields
469
470             float(self.lineEdit_5.text()) if self.lineEdit_5.text()
471         else 0 # Real Discount Rate
472
473             float(self.comboBox_3.currentText()) if self.comboBox_3.
474         currentText() else 0 # Interest Rate
475
476             float(self.comboBox_2.currentText()) if self.comboBox_2.
477         currentText() else 0 # Investment Ratio
478
479             float(self.lineEdit_6.text()) if self.lineEdit_6.text()
480         else 0 # Duration of Study
481
482             float(self.lineEdit_13.text()) if self.lineEdit_13.text()
483         else 0 # Time for construction

```

```

453         return True
454
455     except ValueError:
456         QMessageBox.warning(
457             None,
458             "Validation Error",
459             "Please enter valid numbers in all numeric fields",
460             QMessageBox.Ok
461         )
462
463     return False
464
465 def save_data(self):
466     """Collect all input data and save it to a JSON file"""
467     if not self.validate_data():
468         return False
469
470     data = {
471         "real_discount_rate": self.lineEdit_5.text(),
472         "interest_rate": self.comboBox_3.currentText(),
473         "investment_ratio": self.comboBox_2.currentText(),
474         "duration_of_study": self.lineEdit_6.text(),
475         "construction_time_base_project": self.lineEdit_13.text(),
476     }
477
478     # Save to JSON file
479     try:
480         import json
481         from datetime import datetime
482
483         # Create filename with timestamp
484         timestamp = datetime.now().strftime("%Y%m%d_%H%M%S")
485         filename = f"financial_data_{timestamp}.json"
486
487         with open(filename, 'w') as f:
488             json.dump(data, f, indent=4)
489
490         # Show success message
491         QMessageBox.information(
492             None,

```

```

492         "Success",
493         f"Financial data saved successfully to {filename}",
494         QMessageBox.Ok
495     )
496
497     return True
498
499 except Exception as e:
500     QMessageBox.critical(
501         None,
502         "Error",
503         f"Failed to save data: {str(e)}",
504         QMessageBox.Ok
505     )
506
507     return False
508
509
510 def handle_save(self):
511     """Handle the save operation and close the dialog if successful
512     """
513
514     if self.save_data(): # Only close if save was successful
515         FinancialData_Dialog.accept()
516
517
518 if __name__ == "__main__":
519     import sys
520     app = QtWidgets.QApplication(sys.argv)
521     FinancialData_Dialog = QtWidgets.QDialog()
522     ui = Ui_FinancialData_Dialog()
523     ui.setupUi(FinancialData_Dialog)
524     FinancialData_Dialog.show()
525     sys.exit(app.exec_())

```

## 5. Foundation Data

```

1 # -*- coding: utf-8 -*-
2
3 # Form implementation generated from reading ui file 'C:\Users\saans\
4 #   AppData\Local\Programs\Python\Python310\Lib\site-packages\
#       qt5_applications\Qt\bin\ProjectDetails_Foundation_Window.ui'
# 
```

```

5 # Created by: PyQt5 UI code generator 5.15.9
6 #
7 # WARNING: Any manual changes made to this file will be lost when
8 #          pyuic5 is
9 # run again. Do not edit this file unless you know what you are doing.
10
11 from PyQt5 import QtCore, QtGui, QtWidgets
12 #from form_data_storage import save_form_data
13 from PyQt5.QtWidgets import QMessageBox
14
15 #from ProjectDetails_Foundation_Window import Ui_Foundation_Dialog
16
17
18
19
20
21
22
23
24
25 class Ui_Foundation_Dialog(object):
26     def openBridgeTrafficWindow(self):
27         from ProjectDetails_BridgeANDTrafficData_Window import
28             Ui_BridgeTraffic_Dialog
29
30             self.window = QtWidgets.QDialog()
31             self.ui = Ui_BridgeTraffic_Dialog()
32             self.ui.setupUi(self.window)
33             self.window.show()
34
35     def openFoundationWindow(self):
36
37             self.window = QtWidgets.QDialog()
38             self.ui = Ui_Foundation_Dialog()
39             self.ui.setupUi(self.window)
40             self.window.show()
41
42     def openCarbonEmissionWindow(self):
43
44             from ProjectDetails_CarbonEmissionData_Window import
45             Ui_CarbonEmission_Dialog

```

```

41     self.window = QtWidgets.QDialog()
42     self.ui = Ui_CarbonEmission_Dialog()
43     self.ui.setupUi(self.window)
44     self.window.show()

45
46     def openDemolitionWindow(self):
47         from ProjectDetails_DemolitionANDRecyclingData_Window import
48             Ui_Demolition_Dialog
49
50             self.window = QtWidgets.QDialog()
51             self.ui = Ui_Demolition_Dialog()
52             self.ui.setupUi(self.window)
53             self.window.show()

54
55     def openFinancialWindow(self):
56         from ProjectDetails_FinancialData_Window import
57             Ui_FinancialData_Dialog
58
59             self.window = QtWidgets.QDialog()
60             self.ui = Ui_FinancialData_Dialog()
61             self.ui.setupUi(self.window)
62             self.window.show()

63
64     def openMaintenanceWindow(self):
65         from ProjectDetails_MaintenanceANDRepairData_Window import
66             Ui_Maintenance_Dialog
67
68             self.window = QtWidgets.QDialog()
69             self.ui = Ui_Maintenance_Dialog()
70             self.ui.setupUi(self.window)
71             self.window.show()

72
73     def openMiscellaneousWindow(self):
74         from ProjectDetails_Miscellaneous_Window import
75             Ui_Miscellaneous_Dialog
76
77             self.window = QtWidgets.QDialog()
78             self.ui = Ui_Miscellaneous_Dialog()
79             self.ui.setupUi(self.window)
80             self.window.show()

81
82     def openSubStructureWindow(self):

```

```

75         from ProjectDetails_SubStructure_Window import
76         Ui_SubStructure_Dialog
77
78         self.window = QtWidgets.QDialog()
79         self.ui = Ui_SubStructure_Dialog()
80         self.ui.setupUi(self.window)
81         self.window.show()
82
83
84     def openSuperStructureWindow(self):
85
86         from ProjectDetails_SuperStructure_Window import
87         Ui_SuperStructure_Dialog
88
89         self.window = QtWidgets.QDialog()
90         self.ui = Ui_SuperStructure_Dialog()
91         self.ui.setupUi(self.window)
92         self.window.show()
93
94
95     def setupUi(self, Foundation_Dialog):
96
97         Foundation_Dialog.setObjectName("Foundation_Dialog")
98         Foundation_Dialog.resize(1440, 900)
99         Foundation_Dialog.setAutoFillBackground(False)
100        Foundation_Dialog.setStyleSheet("background-color:#FAFAFA")
101        self.label = QtWidgets.QLabel(Foundation_Dialog)
102        self.label.setGeometry(QtCore.QRect(10, 50, 244, 691))
103        font = QtGui.QFont()
104        font.setPointSize(10)
105        self.label.setFont(font)
106        self.label.setStyleSheet("background-color: rgb(240,230,230)")
107        self.label.setText("")
108        self.label.setObjectName("label")
109        self.pushButton = QtWidgets.QPushButton(Foundation_Dialog)
110        self.pushButton.setGeometry(QtCore.QRect(10, 25, 188, 25))
111        font = QtGui.QFont()
112        font.setPointSize(10)
113        self.pushButton.setFont(font)
114        self.pushButton.setFocusPolicy(QtCore.Qt.StrongFocus)
115        self.pushButton.setLayoutDirection(QtCore.Qt.RightToLeft)
116        self.pushButton.setStyleSheet("background-color: rgb
117                                     (240,230,230)")
118
119        icon = QtGui.QIcon()

```





```

170     self.pushButton_21.setFont(font)
171     self.pushButton_21.setIcon(icon2)
172     self.pushButton_21.setObjectName("pushButton_21")
173     self.formLayout.setWidget(1, QtWidgets.QFormLayout.LabelRole,
174     self.pushButton_21)
175     self.pushButton_22 = QtWidgets.QPushButton(self.widget_5,
176     clicked=lambda: self.openSubStructureWindow())
177     font = QtGui.QFont()
178     font.setPointSize(10)
179     font.setBold(False)
180     font.setWeight(50)
181     self.pushButton_22.setFont(font)
182     self.pushButton_22.setIcon(icon2)
183     self.pushButton_22.setObjectName("pushButton_22")
184     self.formLayout.setWidget(2, QtWidgets.QFormLayout.LabelRole,
185     self.pushButton_22)
186     self.pushButton_23 = QtWidgets.QPushButton(self.widget_5,
187     clicked=lambda: self.openMiscellaneousWindow())
188     font = QtGui.QFont()
189     font.setPointSize(10)
190     font.setBold(False)
191     font.setWeight(50)
192     self.pushButton_23.setFont(font)
193     self.pushButton_23.setIcon(icon2)
194     self.pushButton_23.setObjectName("pushButton_23")
195     self.formLayout.setWidget(3, QtWidgets.QFormLayout.LabelRole,
196     self.pushButton_23)
197     self.verticalLayout.addWidget(self.widget_5)
198     self.pushButton_19 = QtWidgets.QPushButton(self.widget, clicked
199     =lambda: self.openFinancialWindow())
200     font = QtGui.QFont()
201     font.setPointSize(10)
202     self.pushButton_19.setFont(font)

```

```

203     self.pushButton_16.setIcon(icon1)
204     self.pushButton_16.setCheckable(True)
205     self.pushButton_16.setObjectName("pushButton_16")
206     self.verticalLayout.addWidget(self.pushButton_16)
207     self.widget_8 = QtWidgets.QWidget(self.widget)
208     self.widget_8.setMinimumSize(QtCore.QSize(203, 21))
209     self.widget_8.setMaximumSize(QtCore.QSize(281, 21))
210     self.widget_8.setObjectName("widget_8")
211     self.pushButton_14 = QtWidgets.QPushButton(self.widget_8,
212                                              clicked=lambda: self.openCarbonEmissionWindow())
213
214     self.pushButton_14.setGeometry(QtCore.QRect(20, 0, 183, 21))
215     font = QtGui.QFont()
216     font.setPointSize(10)
217     font.setBold(False)
218     font.setWeight(50)
219     self.pushButton_14.setFont(font)
220     self.pushButton_14.setIcon(icon2)
221     self.pushButton_14.setObjectName("pushButton_14")
222     self.verticalLayout.addWidget(self.widget_8)
223     self.pushButton_17 = QtWidgets.QPushButton(self.widget, clicked
224 =lambda: self.openBridgeTrafficWindow())
225
226     font = QtGui.QFont()
227     font.setPointSize(10)
228     self.pushButton_17.setFont(font)
229     self.pushButton_17.setObjectName("pushButton_17")
230     self.verticalLayout.addWidget(self.pushButton_17)
231     self.pushButton_18 = QtWidgets.QPushButton(self.widget, clicked
232 =lambda: self.openMaintenanceWindow())
233
234     font = QtGui.QFont()
235     font.setPointSize(10)
236     self.pushButton_18.setFont(font)
237     self.pushButton_18.setObjectName("pushButton_18")
238     self.verticalLayout.addWidget(self.pushButton_18)
239     self.pushButton_10 = QtWidgets.QPushButton(self.widget, clicked
240 =lambda: self.openDemolitionWindow())
241
242     font = QtGui.QFont()
243     font.setPointSize(10)
244     self.pushButton_10.setFont(font)
245     self.pushButton_10.setObjectName("pushButton_10")

```

```

238     self.verticalLayout.addWidget(self.pushButton_10)
239
240     self.label_3 = QtWidgets.QLabel(self.scrollAreaWidgetContents)
241     self.label_3.setGeometry(QtCore.QRect(0, 387, 221, 31))
242     font = QtGui.QFont()
243     font.setPointSize(10)
244     self.label_3.setFont(font)
245     self.label_3.setStyleSheet("background-color: rgb(240,230,230)")
246 )
247
248     self.label_3.setAlignment(QtCore.Qt.AlignCenter)
249     self.label_3.setObjectName("label_3")
250
251     self.textBrowser = QtWidgets.QTextBrowser(self.
252 scrollAreaWidgetContents)
253     self.textBrowser.setGeometry(QtCore.QRect(0, 418, 221, 221))
254     self.textBrowser.setStyleSheet("background-color: #fff9f9")
255     self.textBrowser.setObjectName("textBrowser")
256
257     self.verticalScrollBar = QtWidgets.QScrollBar(self.
258 scrollAreaWidgetContents)
259     self.verticalScrollBar.setGeometry(QtCore.QRect(220, 0, 16,
260 641))
261
262     self.verticalScrollBar.setStyleSheet("background-color: #F0F0F0")
263
264     self.verticalScrollBar.setOrientation(QtCore.Qt.Vertical)
265     self.verticalScrollBar.setObjectName("verticalScrollBar")
266
267     self.widget.raise_()
268
269     self.label_2.raise_()
270
271     self.label_3.raise_()
272
273     self.textBrowser.raise_()
274
275     self.verticalScrollBar.raise_()
276
277     self.scrollArea.setWidget(self.scrollAreaWidgetContents)
278
279     self.widget_2 = QtWidgets.QWidget(Foundation_Dialog)
280
281     self.widget_2.setGeometry(QtCore.QRect(350, 50, 778, 624))
282
283     self.widget_2.setStyleSheet("background-color: #fff9f9")
284
285     self.widget_2.setObjectName("widget_2")
286
287     self.label_4 = QtWidgets.QLabel(self.widget_2)
288
289     self.label_4.setGeometry(QtCore.QRect(20, 10, 91, 21))
290
291     font = QtGui.QFont()
292
293     font.setPointSize(10)
294
295     self.label_4.setFont(font)
296
297     self.label_4.setObjectName("label_4")

```

```

272     self.comboBox = QtWidgets.QComboBox(self.widget_2)
273     self.comboBox.setGeometry(QtCore.QRect(140, 10, 190, 22))
274     font = QtGui.QFont()
275     font.setPointSize(10)
276     self.comboBox.setFont(font)
277     self.comboBox.setStyleSheet("background-color: #ffffff")
278     self.comboBox.setObjectName("comboBox")
279     self.comboBox.addItem("")
280     self.comboBox.addItem("")
281     self.pushButton_2 = QtWidgets.QPushButton(self.widget_2)
282     self.pushButton_2.setGeometry(QtCore.QRect(350, 10, 190, 23))
283     self.pushButton_2.setStyleSheet("background-color: #ffffff")
284     self.pushButton_2.setObjectName("pushButton_2")
285     self.label_5 = QtWidgets.QLabel(self.widget_2)
286     self.label_5.setGeometry(QtCore.QRect(20, 70, 161, 21))
287     font = QtGui.QFont()
288     font.setPointSize(10)
289     self.label_5.setFont(font)
290     self.label_5.setAlignment(QtCore.Qt.AlignCenter)
291     self.label_5.setObjectName("label_5")
292     self.label_6 = QtWidgets.QLabel(self.widget_2)
293     self.label_6.setGeometry(QtCore.QRect(551, 70, 140, 21))
294     font = QtGui.QFont()
295     font.setPointSize(10)
296     self.label_6.setFont(font)
297     self.label_6.setAlignment(QtCore.Qt.AlignCenter)
298     self.label_6.setObjectName("label_6")
299     self.label_7 = QtWidgets.QLabel(self.widget_2)
300     self.label_7.setGeometry(QtCore.QRect(191, 70, 110, 21))
301     font = QtGui.QFont()
302     font.setPointSize(10)
303     self.label_7.setFont(font)
304     self.label_7.setAlignment(QtCore.Qt.AlignCenter)
305     self.label_7.setObjectName("label_7")
306     self.label_8 = QtWidgets.QLabel(self.widget_2)
307     self.label_8.setGeometry(QtCore.QRect(311, 70, 110, 21))
308     font = QtGui.QFont()
309     font.setPointSize(10)
310     self.label_8.setFont(font)

```

```

311     self.label_8.setAlignment(QtCore.Qt.AlignCenter)
312     self.label_8.setObjectName("label_8")
313     self.label_9 = QtWidgets.QLabel(self.widget_2)
314     self.label_9.setGeometry(QtCore.QRect(431, 70, 110, 21))
315     font = QtGui.QFont()
316     font.setPointSize(10)
317     self.label_9.setFont(font)
318     self.label_9.setAlignment(QtCore.Qt.AlignCenter)
319     self.label_9.setObjectName("label_9")
320     self.comboBox_2 = QtWidgets.QComboBox(self.widget_2)
321     self.comboBox_2.setGeometry(QtCore.QRect(30, 100, 140, 22))
322     self.comboBox_2.setStyleSheet("background-color: #ffffff")
323     self.comboBox_2.setObjectName("comboBox_2")
324     self.comboBox_3 = QtWidgets.QComboBox(self.widget_2)
325     self.comboBox_3.setGeometry(QtCore.QRect(30, 130, 140, 22))
326     self.comboBox_3.setStyleSheet("background-color: #ffffff")
327     self.comboBox_3.setObjectName("comboBox_3")
328     self.lineEdit = QtWidgets.QLineEdit(self.widget_2)
329     self.lineEdit.setGeometry(QtCore.QRect(210, 100, 81, 20))
330     font = QtGui.QFont()
331     font.setPointSize(10)
332     self.lineEdit.setFont(font)
333     self.lineEdit.setStyleSheet("background-color: #ffffff")
334     self.lineEdit.setObjectName("lineEdit")
335     self.lineEdit_2 = QtWidgets.QLineEdit(self.widget_2)
336     self.lineEdit_2.setGeometry(QtCore.QRect(210, 130, 81, 20))
337     font = QtGui.QFont()
338     font.setPointSize(10)
339     self.lineEdit_2.setFont(font)
340     self.lineEdit_2.setStyleSheet("background-color: #ffffff")
341     self.lineEdit_2.setObjectName("lineEdit_2")
342     self.label_10 = QtWidgets.QLabel(self.widget_2)
343     self.label_10.setGeometry(QtCore.QRect(340, 100, 51, 20))
344     font = QtGui.QFont()
345     font.setPointSize(10)
346     self.label_10.setFont(font)
347     self.label_10.setStyleSheet("background-color: #ffffff")
348     self.label_10.setAlignment(QtCore.Qt.AlignCenter)
349     self.label_10.setObjectName("label_10")

```

```

350     self.label_11 = QtWidgets.QLabel(self.widget_2)
351     self.label_11.setGeometry(QtCore.QRect(340, 130, 51, 20))
352     font = QtGui.QFont()
353     font.setPointSize(10)
354     self.label_11.setFont(font)
355     self.label_11.setStyleSheet("background-color: #ffffff")
356     self.label_11.setAlignment(QtCore.Qt.AlignCenter)
357     self.label_11.setObjectName("label_11")
358     self.lineEdit_3 = QtWidgets.QLineEdit(self.widget_2)
359     self.lineEdit_3.setGeometry(QtCore.QRect(450, 100, 81, 20))
360     font = QtGui.QFont()
361     font.setPointSize(10)
362     self.lineEdit_3.setFont(font)
363     self.lineEdit_3.setStyleSheet("background-color: #ffffff")
364     self.lineEdit_3.setObjectName("lineEdit_3")
365     self.lineEdit_4 = QtWidgets.QLineEdit(self.widget_2)
366     self.lineEdit_4.setGeometry(QtCore.QRect(450, 130, 81, 20))
367     font = QtGui.QFont()
368     font.setPointSize(10)
369     self.lineEdit_4.setFont(font)
370     self.lineEdit_4.setStyleSheet("background-color: #ffffff")
371     self.lineEdit_4.setObjectName("lineEdit_4")
372     self.lineEdit_5 = QtWidgets.QLineEdit(self.widget_2)
373     self.lineEdit_5.setGeometry(QtCore.QRect(570, 100, 101, 20))
374     font = QtGui.QFont()
375     font.setPointSize(10)
376     self.lineEdit_5.setFont(font)
377     self.lineEdit_5.setStyleSheet("background-color: #ffffff")
378     self.lineEdit_5.setObjectName("lineEdit_5")
379     self.lineEdit_6 = QtWidgets.QLineEdit(self.widget_2)
380     self.lineEdit_6.setGeometry(QtCore.QRect(570, 130, 101, 20))
381     font = QtGui.QFont()
382     font.setPointSize(10)
383     self.lineEdit_6.setFont(font)
384     self.lineEdit_6.setStyleSheet("background-color: #ffffff")
385     self.lineEdit_6.setObjectName("lineEdit_6")
386     self.pushButton_3 = QtWidgets.QPushButton(self.widget_2)
387     self.pushButton_3.setGeometry(QtCore.QRect(300, 200, 190, 23))
388     self.pushButton_3.setStyleSheet("background-color: #ffffff")

```

```

389     self.pushButton_3.setObjectName("pushButton_3")
390
391     self.label_12 = QtWidgets.QLabel(self.widget_2)
392     self.label_12.setGeometry(QtCore.QRect(30, 330, 161, 21))
393
394     font = QtGui.QFont()
395     font.setPointSize(10)
396
397     self.label_12.setFont(font)
398
399     self.label_12.setAlignment(QtCore.Qt.AlignCenter)
400
401     self.label_12.setObjectName("label_12")
402
403     self.comboBox_4 = QtWidgets.QComboBox(self.widget_2)
404     self.comboBox_4.setGeometry(QtCore.QRect(150, 270, 190, 22))
405
406     font = QtGui.QFont()
407
408     font.setPointSize(10)
409
410     self.comboBox_4.setFont(font)
411
412     self.comboBox_4.setStyleSheet("background-color: #ffffff")
413
414     self.comboBox_4.setObjectName("comboBox_4")
415
416     self.comboBox_4.addItem("")
417     self.comboBox_4.addItem("")
418
419     self.label_13 = QtWidgets.QLabel(self.widget_2)
420
421     self.label_13.setGeometry(QtCore.QRect(441, 330, 110, 21))
422
423     font = QtGui.QFont()
424
425     font.setPointSize(10)
426
427     self.label_13.setFont(font)
428
429     self.label_13.setAlignment(QtCore.Qt.AlignCenter)
430
431     self.label_13.setObjectName("label_13")
432
433     self.label_14 = QtWidgets.QLabel(self.widget_2)
434
435     self.label_14.setGeometry(QtCore.QRect(350, 390, 51, 20))
436
437     font = QtGui.QFont()
438
439     font.setPointSize(10)
440
441     self.label_14.setFont(font)
442
443     self.label_14.setStyleSheet("background-color: #ffffff")
444
445     self.label_14.setAlignment(QtCore.Qt.AlignCenter)
446
447     self.label_14.setObjectName("label_14")
448
449     self.label_15 = QtWidgets.QLabel(self.widget_2)
450
451     self.label_15.setGeometry(QtCore.QRect(561, 330, 140, 21))
452
453     font = QtGui.QFont()
454
455     font.setPointSize(10)
456
457     self.label_15.setFont(font)
458
459     self.label_15.setAlignment(QtCore.Qt.AlignCenter)
460
461     self.label_15.setObjectName("label_15")

```

```

428     self.label_16 = QtWidgets.QLabel(self.widget_2)
429     self.label_16.setGeometry(QtCore.QRect(350, 360, 51, 20))
430     font = QtGui.QFont()
431     font.setPointSize(10)
432     self.label_16.setFont(font)
433     self.label_16.setStyleSheet("background-color: #ffffff")
434     self.label_16.setAlignment(QtCore.Qt.AlignCenter)
435     self.label_16.setObjectName("label_16")
436     self.label_17 = QtWidgets.QLabel(self.widget_2)
437     self.label_17.setGeometry(QtCore.QRect(321, 330, 110, 21))
438     font = QtGui.QFont()
439     font.setPointSize(10)
440     self.label_17.setFont(font)
441     self.label_17.setAlignment(QtCore.Qt.AlignCenter)
442     self.label_17.setObjectName("label_17")
443     self.lineEdit_7 = QtWidgets.QLineEdit(self.widget_2)
444     self.lineEdit_7.setGeometry(QtCore.QRect(220, 390, 81, 20))
445     font = QtGui.QFont()
446     font.setPointSize(10)
447     self.lineEdit_7.setFont(font)
448     self.lineEdit_7.setStyleSheet("background-color: #ffffff")
449     self.lineEdit_7.setObjectName("lineEdit_7")
450     self.lineEdit_8 = QtWidgets.QLineEdit(self.widget_2)
451     self.lineEdit_8.setGeometry(QtCore.QRect(580, 360, 101, 20))
452     font = QtGui.QFont()
453     font.setPointSize(10)
454     self.lineEdit_8.setFont(font)
455     self.lineEdit_8.setStyleSheet("background-color: #ffffff")
456     self.lineEdit_8.setObjectName("lineEdit_8")
457     self.label_18 = QtWidgets.QLabel(self.widget_2)
458     self.label_18.setGeometry(QtCore.QRect(201, 330, 110, 21))
459     font = QtGui.QFont()
460     font.setPointSize(10)
461     self.label_18.setFont(font)
462     self.label_18.setAlignment(QtCore.Qt.AlignCenter)
463     self.label_18.setObjectName("label_18")
464     self.pushButton_4 = QtWidgets.QPushButton(self.widget_2)
465     self.pushButton_4.setGeometry(QtCore.QRect(310, 460, 190, 23))
466     self.pushButton_4.setStyleSheet("background-color: #ffffff")

```

```

467     self.pushButton_4.setObjectName("pushButton_4")
468
469     self.lineEdit_9 = QtWidgets.QLineEdit(self.widget_2)
470
471     self.lineEdit_9.setGeometry(QtCore.QRect(220, 360, 81, 20))
472
473     font = QtGui.QFont()
474
475     font.setPointSize(10)
476
477     self.lineEdit_9.setFont(font)
478
479     self.lineEdit_9.setStyleSheet("background-color: #ffffff")
480
481     self.lineEdit_9.setObjectName("lineEdit_9")
482
483     self.lineEdit_10 = QtWidgets.QLineEdit(self.widget_2)
484
485     self.lineEdit_10.setGeometry(QtCore.QRect(460, 360, 81, 20))
486
487     font = QtGui.QFont()
488
489     font.setPointSize(10)
490
491     self.lineEdit_10.setFont(font)
492
493     self.lineEdit_10.setStyleSheet("background-color: #ffffff")
494
495     self.lineEdit_10.setObjectName("lineEdit_10")
496
497     self.lineEdit_11 = QtWidgets.QLineEdit(self.widget_2)
498
499     self.lineEdit_11.setGeometry(QtCore.QRect(460, 390, 81, 20))
500
501     font = QtGui.QFont()
502
503     font.setPointSize(10)
504
505     self.lineEdit_11.setFont(font)
506
507     self.lineEdit_11.setStyleSheet("background-color: #ffffff")
508
509     self.lineEdit_11.setObjectName("lineEdit_11")
510
511     self.pushButton_5 = QtWidgets.QPushButton(self.widget_2)
512
513     self.pushButton_5.setGeometry(QtCore.QRect(360, 270, 190, 23))
514
515     self.pushButton_5.setStyleSheet("background-color: #ffffff")
516
517     self.pushButton_5.setObjectName("pushButton_5")
518
519     self.label_19 = QtWidgets.QLabel(self.widget_2)
520
521     self.label_19.setGeometry(QtCore.QRect(30, 270, 91, 21))
522
523     font = QtGui.QFont()
524
525     font.setPointSize(10)
526
527     self.label_19.setFont(font)
528
529     self.label_19.setObjectName("label_19")
530
531     self.lineEdit_12 = QtWidgets.QLineEdit(self.widget_2)
532
533     self.lineEdit_12.setGeometry(QtCore.QRect(580, 390, 101, 20))
534
535     font = QtGui.QFont()
536
537     font.setPointSize(10)
538
539     self.lineEdit_12.setFont(font)
540
541     self.lineEdit_12.setStyleSheet("background-color: #ffffff")
542
543     self.lineEdit_12.setObjectName("lineEdit_12")

```

```

506     self.comboBox_5 = QtWidgets.QComboBox(self.widget_2)
507     self.comboBox_5.setGeometry(QtCore.QRect(40, 360, 140, 22))
508     self.comboBox_5.setStyleSheet("background-color: #ffffff")
509     self.comboBox_5.setObjectName("comboBox_5")
510     self.comboBox_5.addItem("")
511     self.comboBox_5.addItem("")
512     self.comboBox_6 = QtWidgets.QComboBox(self.widget_2)
513     self.comboBox_6.setGeometry(QtCore.QRect(40, 390, 140, 22))
514     self.comboBox_6.setStyleSheet("background-color: #ffffff")
515     self.comboBox_6.setObjectName("comboBox_6")
516     self.comboBox_6.addItem("")
517     self.comboBox_6.addItem("")
518     self.buttonBox = QtWidgets.QDialogButtonBox(self.widget_2)
519     self.buttonBox.setGeometry(QtCore.QRect(420, 580, 341, 32))
520     self.buttonBox.setOrientation(QtCore.Qt.Horizontal)
521     self.buttonBox.setStandardButtons(QtWidgets.QDialogButtonBox.
522                                         Close|QtWidgets.QDialogButtonBox.Save)
523     self.buttonBox.setCenterButtons(False)
524     self.buttonBox.setObjectName("buttonBox")
525     self.line = QtWidgets.QFrame(self.widget_2)
526     self.line.setGeometry(QtCore.QRect(10, 250, 761, 16))
527     self.line.setContextMenuPolicy(QtCore.Qt.DefaultContextMenu)
528     self.line.setFrameShadow(QtWidgets.QFrame.Sunken)
529     self.line.setLineWidth(2)
530     self.line.setMidLineWidth(2)
531     self.line.setFrameShape(QtWidgets.QFrame.HLine)
532     self.line.setObjectName("line")
533     self.line_2 = QtWidgets.QFrame(self.widget_2)
534     self.line_2.setGeometry(QtCore.QRect(10, 500, 761, 16))
535     self.line_2.setContextMenuPolicy(QtCore.Qt.DefaultContextMenu)
536     self.line_2.setFrameShadow(QtWidgets.QFrame.Sunken)
537     self.line_2.setLineWidth(2)
538     self.line_2.setMidLineWidth(2)
539     self.line_2.setFrameShape(QtWidgets.QFrame.HLine)
540     self.line_2.setObjectName("line_2")
541     self.pushButton_6 = QtWidgets.QPushButton(Foundation_Dialog)
542     self.pushButton_6.setGeometry(QtCore.QRect(350, 25, 188, 25))
543     font = QtGui.QFont()

```

```

544     font.setBold(True)
545     font.setWeight(75)
546     self.pushButton_6.setFont(font)
547     self.pushButton_6.setFocusPolicy(QtCore.Qt.StrongFocus)
548     self.pushButton_6.setLayoutDirection(QtCore.Qt.RightToLeft)
549     self.pushButton_6.setStyleSheet("background-color: rgb
550 (240, 230, 230)")
551     self.pushButton_6.setIcon(icon)
552     self.pushButton_6.setAutoRepeat(False)
553     self.pushButton_6.setObjectName("pushButton_6")
554
555     self.retranslateUi(Foundation_Dialog)
556     self.buttonBox.accepted.connect(self.handle_save) # type:
557     ignore
558     #self.buttonBox.accepted.connect(self.save_data)
559     self.buttonBox.rejected.connect(lambda: self.show_warning(
Foundation_Dialog)) # type: ignore
560     self.pushButton_15.toggled['bool'].connect(self.widget_5.
561 setVisible) # type: ignore
562     self.pushButton_16.toggled['bool'].connect(self.widget_8.
563 setVisible) # type: ignore
564
565     QtCore.QMetaObject.connectSlotsByName(Foundation_Dialog)
566
567 def show_warning(self, dialog):
568     """
569     Show a warning window when the Close button is pressed.
570     """
571     warning_box = QMessageBox()
572     warning_box.setIcon(QMessageBox.Warning)
573     warning_box.setWindowTitle("Confirm Close")
574     warning_box.setText("Are you sure you want to close without
saving?")
575     warning_box.setStandardButtons(QMessageBox.Yes | QMessageBox.No
)
576     warning_box.setDefaultButton(QMessageBox.No)
577
578     # Check the user's response
579     response = warning_box.exec_()

```

```

576     if response == QMessageBox.Yes:
577         dialog.reject() # Close the application
578     else:
579         pass # Do nothing, return to the dialog
580
581     ''
582
583     def save_data(self):
584         """
585             Collect form data and save it to the global dictionary.
586         """
587
588         data = {
589             "component": self.comboBox.currentText(),
590             "sub_component": self.comboBox_2.currentText(),
591             "quantity": self.lineEdit.text(),
592             "unit": self.label_10.text(),
593             "rate": self.lineEdit_3.text(),
594             "material_type": self.comboBox_4.currentText(),
595         }
596
597         save_form_data("Foundation_Dialog", data)'''
598
599
600     def retranslateUi(self, Foundation_Dialog):
601         _translate = QtCore.QCoreApplication.translate
602         Foundation_Dialog.setWindowTitle(_translate("Foundation_Dialog",
603             "Dialog"))
604         self.pushButton.setText(_translate("Foundation_Dialog", "Project Details Window"))
605         self.label_2.setText(_translate("Foundation_Dialog", "Input Parameters"))
606         self.pushButton_15.setText(_translate("Foundation_Dialog", "Structure Works Data"))
607         self.pushButton_20.setText(_translate("Foundation_Dialog", "Foundation"))
608         self.pushButton_21.setText(_translate("Foundation_Dialog", "Super-Structure"))
609         self.pushButton_22.setText(_translate("Foundation_Dialog", "Sub-Structure"))
610         self.pushButton_23.setText(_translate("Foundation_Dialog", "Miscellaneous"))

```

```

606         self.pushButton_19.setText(_translate("Foundation_Dialog", "Financial Data"))
607         self.pushButton_16.setText(_translate("Foundation_Dialog", "Carbon Emission Data"))
608         self.pushButton_14.setText(_translate("Foundation_Dialog", "Carbon Emission Cost Data"))
609         self.pushButton_17.setText(_translate("Foundation_Dialog", "Bridge and Traffic Data"))
610         self.pushButton_18.setText(_translate("Foundation_Dialog", "Maintenance and Repair"))
611         self.pushButton_10.setText(_translate("Foundation_Dialog", "Disposal and Recycling"))
612         self.label_3.setText(_translate("Foundation_Dialog", "Output"))
613         self.textBrowser.setHtml(_translate("Foundation_Dialog", "<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.org/TR/REC-html40/strict.dtd\">\n<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"text/css\">\n\np, li { white-space: pre-wrap; }\n</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-size:8.25pt; font-weight:400; font-style:normal;\">\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Initial Construction Cost</span></p>\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Initial Carbon emission Cost</span></p>\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Time Cost</span></p>\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Road User Cost</span></p>\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Carbon Emission due to Re-Routing</span></p>\n
```

```

622 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
         font-size:10pt; color:#aa8b8b;\">Periodic Maintenance Costs</span><
       p>\n"
623 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
         font-size:10pt; color:#aa8b8b;\">Maintenance Emission Costs</span><
       p>\n"
624 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
         font-size:10pt; color:#aa8b8b;\">Routine Inspectection Costs</span
       ></p>\n"
625 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
         font-size:10pt; color:#aa8b8b;\">Repair & Rehabilitation Costs</
       span></p>\n"
626 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
         font-size:10pt; color:#aa8b8b;\">Reconstruction Costs</span></p>\n"
627 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
         font-size:10pt; color:#aa8b8b;\">Demolition & Disposal Cost</
       span></p>\n"
628 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
         font-size:10pt; color:#aa8b8b;\">Recycling Cost</span></p>\n"
629 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
         font-size:10pt; color:#aa8b8b;\">Total Life-Cycle Cost</span></p><
       body></html>"))
630         self.label_4.setText(_translate("Foundation_Dialog", "Components:"))
631         self.comboBox.setItemText(0, _translate("Foundation_Dialog", "Earthwork"))
632         self.comboBox.setItemText(1, _translate("Foundation_Dialog", "RCC in Foundation"))
633         self.pushButton_2.setText(_translate("Foundation_Dialog", "+ Add Sub-Component"))

```

```

634         self.label_5.setText(_translate("Foundation_Dialog", "Material
Type and Grade"))
635         self.label_6.setText(_translate("Foundation_Dialog", "Rate Data
Source"))
636         self.label_7.setText(_translate("Foundation_Dialog", "Quantity"
))
637         self.label_8.setText(_translate("Foundation_Dialog", "Unit"))
638         self.label_9.setText(_translate("Foundation_Dialog", "Rate"))
639         self.label_10.setText(_translate("Foundation_Dialog", "<html><
head/><body><p><span style=\" font-size:10pt;\">m</span><span style
= \" font-size:10pt; vertical-align:super;\">3</span></p></body></
html>"))
640         self.label_11.setText(_translate("Foundation_Dialog", "kg"))
641         self.pushButton_3.setText(_translate("Foundation_Dialog", "+

Add Material"))
642         self.label_12.setText(_translate("Foundation_Dialog", "Material
Type and Grade"))
643         self.comboBox_4.setItemText(0, _translate("Foundation_Dialog",
"RCC in Foundation"))
644         self.comboBox_4.setItemText(1, _translate("Foundation_Dialog",
"Earthwork"))
645         self.label_13.setText(_translate("Foundation_Dialog", "Rate"))
646         self.label_14.setText(_translate("Foundation_Dialog", "kg"))
647         self.label_15.setText(_translate("Foundation_Dialog", "Rate
Data Source"))
648         self.label_16.setText(_translate("Foundation_Dialog", "<html><
head/><body><p><span style=\" font-size:10pt;\">m</span><span style
= \" font-size:10pt; vertical-align:super;\">3</span></p></body></
html>"))
649         self.label_17.setText(_translate("Foundation_Dialog", "Unit"))
650         self.label_18.setText(_translate("Foundation_Dialog", "Quantity
"))
651         self.pushButton_4.setText(_translate("Foundation_Dialog", "+

Add Material"))
652         self.pushButton_5.setText(_translate("Foundation_Dialog", "+

Add Sub-Component"))
653         self.label_19.setText(_translate("Foundation_Dialog", "Components"))

```

```

654         self.comboBox_5.setItemText(0, _translate("Foundation_Dialog",
655                                         "Concrete"))
656         self.comboBox_5.setItemText(1, _translate("Foundation_Dialog",
657                                         "Steel"))
658         self.comboBox_6.setItemText(0, _translate("Foundation_Dialog",
659                                         "Steel"))
660         self.comboBox_6.setItemText(1, _translate("Foundation_Dialog",
661                                         "Concrete"))
662         self.pushButton_6.setText(_translate("Foundation_Dialog", "Foundation"))
663
664     def validate_data(self):
665         """Validate input data before saving"""
666         try:
667             # Validate numeric fields
668             float(self.lineEdit.text()) if self.lineEdit.text() else 0
669             # Quantity 1
670             float(self.lineEdit_2.text()) if self.lineEdit_2.text()
671             else 0 # Quantity 2
672             float(self.lineEdit_3.text()) if self.lineEdit_3.text()
673             else 0 # Rate 1
674             float(self.lineEdit_4.text()) if self.lineEdit_4.text()
675             else 0 # Rate 2
676             float(self.lineEdit_5.text()) if self.lineEdit_5.text()
677             else 0 # Rate Data Source 1
678             float(self.lineEdit_6.text()) if self.lineEdit_6.text()
679             else 0 # Rate Data Source 2
680             float(self.lineEdit_7.text()) if self.lineEdit_7.text()
681             else 0 # Quantity 3
682             float(self.lineEdit_8.text()) if self.lineEdit_8.text()
683             else 0 # Rate Data Source 3
684             float(self.lineEdit_9.text()) if self.lineEdit_9.text()
685             else 0 # Quantity 4
686             float(self.lineEdit_10.text()) if self.lineEdit_10.text()
687             else 0 # Rate 3
688             float(self.lineEdit_11.text()) if self.lineEdit_11.text()
689             else 0 # Rate 4
690             float(self.lineEdit_12.text()) if self.lineEdit_12.text()
691             else 0 # Rate Data Source 4

```

```

676         return True
677
678     except ValueError:
679         QMessageBox.warning(
680             None,
681             "Validation Error",
682             "Please enter valid numbers in all numeric fields",
683             QMessageBox.Ok
684         )
685
686     return False
687
688 def save_data(self):
689     """Collect all input data and save it to a JSON file"""
690     if not self.validate_data():
691         return False
692
693     data = {
694         "component_1": self.comboBox.currentText(),
695         "sub_component_1": self.comboBox_2.currentText(),
696         "material_type_1": self.comboBox_5.currentText(),
697         "material_grade_1": self.comboBox_6.currentText(),
698         "quantity_1": self.lineEdit.text(),
699         "unit_1": self.label_10.text(),
700         "rate_1": self.lineEdit_3.text(),
701         "rate_data_source_1": self.lineEdit_5.text(),
702
703         "component_2": self.comboBox_4.currentText(),
704         "sub_component_2": self.comboBox_3.currentText(),
705         "material_type_2": self.comboBox_5.currentText(),
706         "material_grade_2": self.comboBox_6.currentText(),
707         "quantity_2": self.lineEdit_2.text(),
708         "unit_2": self.label_11.text(),
709         "rate_2": self.lineEdit_4.text(),
710         "rate_data_source_2": self.lineEdit_6.text(),
711
712         "quantity_3": self.lineEdit_9.text(),
713         "unit_3": self.label_16.text(),
714         "rate_3": self.lineEdit_10.text(),
715         "quantity_4": self.lineEdit_7.text(),

```

```

715     "unit_4": self.label_14.text(),
716     "rate_4": self.lineEdit_11.text(),
717     "rate_data_source_3": self.lineEdit_8.text(),
718     "rate_data_source_4": self.lineEdit_12.text(),
719 }
720
721 # Save to JSON file
722 try:
723     import json
724     from datetime import datetime
725
726     # Create filename with timestamp
727     timestamp = datetime.now().strftime("%Y%m%d_%H%M%S")
728     filename = f"foundation_data_{timestamp}.json"
729
730     with open(filename, 'w') as f:
731         json.dump(data, f, indent=4)
732
733     # Show success message
734     QMessageBox.information(
735         None,
736         "Success",
737         f"Foundation data saved successfully to {filename}",
738         QMessageBox.Ok
739     )
740
741     return True
742
743 except Exception as e:
744     QMessageBox.critical(
745         None,
746         "Error",
747         f"Failed to save data: {str(e)}",
748         QMessageBox.Ok
749     )
750
751     return False
752
753 def handle_save(self):

```

```

753         """Handle the save operation and close the dialog if successful
754
755     """
756
757     if __name__ == "__main__":
758
759         import sys
760
761         app = QtWidgets.QApplication(sys.argv)
762         Foundation_Dialog = QtWidgets.QDialog()
763         ui = Ui_Foundation_Dialog()
764         ui.setupUi(Foundation_Dialog)
765         Foundation_Dialog.show()
766         sys.exit(app.exec_())

```

## 6. Maintenance and Repair Data

```

1 # -*- coding: utf-8 -*-
2
3 # Form implementation generated from reading ui file 'C:\Users\saans\
4 #   AppData\Local\Programs\Python\Python310\Lib\site-packages\
5 #   qt5_applications\Qt\bin\ProjectDetails_Maintenance&RepairData_Window
6 #   .ui'
7 #
8 # Created by: PyQt5 UI code generator 5.15.9
9 #
10 #
11 # WARNING: Any manual changes made to this file will be lost when
12 # pyuic5 is
13 # run again. Do not edit this file unless you know what you are doing.
14 #
15 #
16 #
17 #
18 #from ProjectDetails_MaintenanceANDRepairData_Window import
19 #    Ui_Maintenance_Dialog

```

```

19
20
21
22
23
24 class Ui_Maintenance_Dialog(object):
25     def openBridgeTrafficWindow(self):
26         from ProjectDetails_BridgeANDTrafficData_Window import
27             Ui_BridgeTraffic_Dialog
28                 self.window = QtWidgets.QDialog()
29                 self.ui = Ui_BridgeTraffic_Dialog()
30                 self.ui.setupUi(self.window)
31                 self.window.show()
32
33     def openFoundationWindow(self):
34         from ProjectDetails_Foundation_Window import
35             Ui_Foundation_Dialog
36                 self.window = QtWidgets.QDialog()
37                 self.ui = Ui_Foundation_Dialog()
38                 self.ui.setupUi(self.window)
39                 self.window.show()
40
41     def openCarbonEmissionWindow(self):
42         from ProjectDetails_CarbonEmissionData_Window import
43             Ui_CarbonEmission_Dialog
44                 self.window = QtWidgets.QDialog()
45                 self.ui = Ui_CarbonEmission_Dialog()
46                 self.ui.setupUi(self.window)
47                 self.window.show()
48
49     def openDemolitionWindow(self):
50         from ProjectDetails_DemolitionANDRecyclingData_Window import
51             Ui_Demolition_Dialog
52                 self.window = QtWidgets.QDialog()
53                 self.ui = Ui_Demolition_Dialog()
54                 self.ui.setupUi(self.window)
55                 self.window.show()
56
57     def openFinancialWindow(self):

```

```
54
55     from ProjectDetails_FinancialData_Window import
56     Ui_FinancialData_Dialog
57
58         self.window = QtWidgets.QDialog()
59         self.ui = Ui_FinancialData_Dialog()
60         self.ui.setupUi(self.window)
61         self.window.show()
62
63
64     def openMaintenanceWindow(self):
65
66         self.window = QtWidgets.QDialog()
67         self.ui = Ui_Maintenance_Dialog()
68         self.ui.setupUi(self.window)
69         self.window.show()
70
71
72     def openMiscellaneousWindow(self):
73
74         from ProjectDetails_Miscellaneous_Window import
75         Ui_Miscellaneous_Dialog
76
77         self.window = QtWidgets.QDialog()
78         self.ui = Ui_Miscellaneous_Dialog()
79         self.ui.setupUi(self.window)
80         self.window.show()
81
82
83     def openSubStructureWindow(self):
84
85         from ProjectDetails_SubStructure_Window import
86         Ui_SubStructure_Dialog
87
88         self.window = QtWidgets.QDialog()
89         self.ui = Ui_SubStructure_Dialog()
90         self.ui.setupUi(self.window)
91         self.window.show()
92
93
94     def openSuperStructureWindow(self):
95
96         from ProjectDetails_SuperStructure_Window import
97         Ui_SuperStructure_Dialog
98
99         self.window = QtWidgets.QDialog()
100        self.ui = Ui_SuperStructure_Dialog()
101        self.ui.setupUi(self.window)
102        self.window.show()
103
104
105    def setupUi(self, Maintenance_Dialog):
106
107        Maintenance_Dialog.setObjectName("Maintenance_Dialog")
```



```

123     self.label_4.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
124 AlignLeft | QtCore.Qt.AlignVCenter)
125
126     self.label_4.setObjectName("label_4")
127
128     self.label_5 = QtWidgets.QLabel(self.widget_2)
129     self.label_5.setGeometry(QtCore.QRect(600, 60, 161, 21))
130     font = QtGui.QFont()
131     font.setPointSize(10)
132     self.label_5.setFont(font)
133
134     self.label_5.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
135 AlignLeft | QtCore.Qt.AlignVCenter)
136
137     self.label_5.setObjectName("label_5")
138
139     self.label_6 = QtWidgets.QLabel(self.widget_2)
140     self.label_6.setGeometry(QtCore.QRect(600, 30, 140, 21))
141     font = QtGui.QFont()
142     font.setPointSize(10)
143     self.label_6.setFont(font)
144
145     self.label_6.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
146 AlignLeft | QtCore.Qt.AlignVCenter)
147
148     self.label_6.setObjectName("label_6")
149
150     self.label_7 = QtWidgets.QLabel(self.widget_2)
151     self.label_7.setGeometry(QtCore.QRect(600, 90, 110, 21))
152     font = QtGui.QFont()
153     font.setPointSize(10)
154     self.label_7.setFont(font)
155
156     self.label_7.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.

```

```

157     self.lineEdit_5.setFont(font)
158     self.lineEdit_5.setStyleSheet("background-color: #ffffff")
159     self.lineEdit_5.setObjectName("lineEdit_5")
160     self.buttonBox_2 = QtWidgets.QDialogButtonBox(self.widget_2)
161     self.buttonBox_2.setGeometry(QtCore.QRect(440, 270, 341, 32))
162     self.buttonBox_2.setOrientation(QtCore.Qt.Horizontal)
163     self.buttonBox_2.setStandardButtons(QtWidgets.QDialogButtonBox.
Close|QtWidgets.QDialogButtonBox.Save)
164     self.buttonBox_2.setObjectName("buttonBox_2")
165     self.label_21 = QtWidgets.QLabel(self.widget_2)
166     self.label_21.setGeometry(QtCore.QRect(470, 30, 51, 21))
167     font = QtGui.QFont()
168     font.setPointSize(10)
169     self.label_21.setFont(font)
170     self.label_21.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
AlignLeft|QtCore.Qt.AlignVCenter)
171     self.label_21.setObjectName("label_21")
172     self.label_22 = QtWidgets.QLabel(self.widget_2)
173     self.label_22.setGeometry(QtCore.QRect(470, 90, 51, 21))
174     font = QtGui.QFont()
175     font.setPointSize(10)
176     self.label_22.setFont(font)
177     self.label_22.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
AlignLeft|QtCore.Qt.AlignVCenter)
178     self.label_22.setObjectName("label_22")
179     self.label_23 = QtWidgets.QLabel(self.widget_2)
180     self.label_23.setGeometry(QtCore.QRect(470, 200, 51, 21))
181     font = QtGui.QFont()
182     font.setPointSize(10)
183     self.label_23.setFont(font)
184     self.label_23.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
AlignLeft|QtCore.Qt.AlignVCenter)
185     self.label_23.setObjectName("label_23")
186     self.label_24 = QtWidgets.QLabel(self.widget_2)
187     self.label_24.setGeometry(QtCore.QRect(470, 240, 51, 21))
188     font = QtGui.QFont()
189     font.setPointSize(10)
190     self.label_24.setFont(font)

```

```

191     self.label_24.setAlignment(QtCore.Qt.AlignLeading | QtCore.Qt.
192 AlignLeft | QtCore.Qt.AlignVCenter)
193
194     self.textBrowser_2 = QtWidgets.QTextBrowser(self.widget_2)
195     self.textBrowser_2.setGeometry(QtCore.QRect(20, 10, 231, 51))
196     self.textBrowser_2.setObjectName("textBrowser_2")
197
198     self.textBrowser_3 = QtWidgets.QTextBrowser(self.widget_2)
199     self.textBrowser_3.setGeometry(QtCore.QRect(20, 70, 231, 51))
200     self.textBrowser_3.setObjectName("textBrowser_3")
201
202     self.textBrowser_4 = QtWidgets.QTextBrowser(self.widget_2)
203     self.textBrowser_4.setGeometry(QtCore.QRect(20, 130, 231, 51))
204     self.textBrowser_4.setObjectName("textBrowser_4")
205
206     self.lineEdit_7 = QtWidgets.QLineEdit(self.widget_2)
207     self.lineEdit_7.setGeometry(QtCore.QRect(270, 90, 181, 21))
208     font = QtGui.QFont()
209
210     font.setPointSize(10)
211
212     self.lineEdit_7.setFont(font)
213
214     self.lineEdit_7.setStyleSheet("background-color: #ffffff")
215
216     self.lineEdit_7.setObjectName("lineEdit_7")
217
218     self.lineEdit_8 = QtWidgets.QLineEdit(self.widget_2)
219     self.lineEdit_8.setGeometry(QtCore.QRect(270, 150, 181, 21))
220     font = QtGui.QFont()
221
222     font.setPointSize(10)
223
224     self.lineEdit_8.setFont(font)
225
226     self.lineEdit_8.setStyleSheet("background-color: #ffffff")
227
228     self.lineEdit_8.setObjectName("lineEdit_8")
229
230     self.lineEdit_9 = QtWidgets.QLineEdit(self.widget_2)
231     self.lineEdit_9.setGeometry(QtCore.QRect(270, 200, 181, 21))
232     font = QtGui.QFont()
233
234     font.setPointSize(10)
235
236     self.lineEdit_9.setFont(font)
237
238     self.lineEdit_9.setStyleSheet("background-color: #ffffff")
239
240     self.lineEdit_9.setObjectName("lineEdit_9")
241
242     self.lineEdit_10 = QtWidgets.QLineEdit(self.widget_2)
243     self.lineEdit_10.setGeometry(QtCore.QRect(270, 240, 181, 21))
244     font = QtGui.QFont()
245
246     font.setPointSize(10)
247
248     self.lineEdit_10.setFont(font)
249
250     self.lineEdit_10.setStyleSheet("background-color: #ffffff")

```

```

229     self.lineEdit_10.setObjectName("lineEdit_10")
230
231     self.label_25 = QtWidgets.QLabel(self.widget_2)
232     self.label_25.setGeometry(QtCore.QRect(470, 150, 51, 21))
233
234     font = QtGui.QFont()
235     font.setPointSize(10)
236     self.label_25.setFont(font)
237
238     self.label_25.setAlignment(QtCore.Qt.AlignLeading|QtCore.Qt.
239     AlignLeft|QtCore.Qt.AlignVCenter)
240
241     self.label_25.setObjectName("label_25")
242
243     self.pushButton = QtWidgets.QPushButton(Maintenance_Dialog)
244     self.pushButton.setGeometry(QtCore.QRect(10, 35, 188, 25))
245
246     font = QtGui.QFont()
247     font.setPointSize(10)
248
249     self.pushButton.setFont(font)
250
251     self.pushButton.setFocusPolicy(QtCore.Qt.StrongFocus)
252
253     self.pushButton.setLayoutDirection(QtCore.Qt.RightToLeft)
254
255     self.pushButton.setStyleSheet("background-color: rgb
256     (240,230,230)")
257
258     self.pushButton.setIcon(icon)
259
260     self.pushButton.setAutoRepeat(False)
261
262     self.pushButton.setObjectName("pushButton")
263
264     self.scrollArea = QtWidgets.QScrollArea(Maintenance_Dialog)
265     self.scrollArea.setGeometry(QtCore.QRect(10, 65, 241, 681))
266
267     self.scrollArea.setFillBackground(False)
268
269     self.scrollArea.setStyleSheet("background-color: #fff9f9")
270
271     self.scrollArea.setWidgetResizable(True)
272
273     self.scrollArea.setObjectName("scrollArea")
274
275     self.scrollAreaWidgetContents = QtWidgets.QWidget()
276
277     self.scrollAreaWidgetContents.setGeometry(QtCore.QRect(0, 0,
278     239, 679))
279
280     self.scrollAreaWidgetContents.setObjectName(""
281     scrollAreaWidgetContents")
282
283     self.label_2 = QtWidgets.QLabel(self.scrollAreaWidgetContents)
284
285     self.label_2.setGeometry(QtCore.QRect(0, 0, 221, 31))
286
287     font = QtGui.QFont()
288
289     font.setPointSize(10)
290
291     self.label_2.setFont(font)
292
293     self.label_2.setStyleSheet("background-color: rgb(240,230,230) "
294     )

```



```

295         icon2.addPixmap(QtGui.QPixmap("C:\\\\Users\\\\saans\\\\AppData\\\\Local
296         \\\\Programs\\\\Python\\\\Python310\\\\Lib\\\\site-packages\\\\qt5_applications
297         \\\\Qt\\\\bin\\\\...\\\\...\\\\...\\\\...\\\\...\\\\...\\\\...\\\\...\\\\Downloads\\\\play_arrow_filled
298         .png"), QtGui.QIcon.Normal, QtGui.QIcon.Off)
299
300         self.pushButton_20.setIcon(icon2)
301
302         self.pushButton_20.setObjectName("pushButton_20")
303
304         self.formLayout.setWidget(0, QtWidgets.QFormLayout.LabelRole,
305         self.pushButton_20)
306
307         self.pushButton_21 = QtWidgets.QPushButton(self.widget_5,
308         clicked=lambda: self.openSuperStructureWindow())
309
310         font = QtGui.QFont()
311
312         font.setPointSize(10)
313
314         font.setBold(False)
315
316         font.setWeight(50)
317
318         self.pushButton_21.setFont(font)
319
320         self.pushButton_21.setIcon(icon2)
321
322         self.pushButton_21.setObjectName("pushButton_21")
323
324         self.formLayout.setWidget(1, QtWidgets.QFormLayout.LabelRole,
325         self.pushButton_21)
326
327         self.pushButton_22 = QtWidgets.QPushButton(self.widget_5,
328         clicked=lambda: self.openSubStructureWindow())
329
330         font = QtGui.QFont()
331
332         font.setPointSize(10)
333
334         font.setBold(False)
335
336         font.setWeight(50)
337
338         self.pushButton_22.setFont(font)
339
340         self.pushButton_22.setIcon(icon2)
341
342         self.pushButton_22.setObjectName("pushButton_22")
343
344         self.formLayout.setWidget(2, QtWidgets.QFormLayout.LabelRole,
345         self.pushButton_22)
346
347         self.pushButton_23 = QtWidgets.QPushButton(self.widget_5,
348         clicked=lambda: self.openMiscellaneousWindow())
349
350         font = QtGui.QFont()
351
352         font.setPointSize(10)
353
354         font.setBold(False)
355
356         font.setWeight(50)
357
358         self.pushButton_23.setFont(font)
359
360         self.pushButton_23.setIcon(icon2)
361
362         self.pushButton_23.setObjectName("pushButton_23")

```

```

325         self.formLayout.setWidget(3, QtWidgets.QFormLayout.LabelRole,
326             self.pushButton_23)
327
328         self.verticalLayout.addWidget(self.widget_5)
329
330         self.pushButton_19 = QtWidgets.QPushButton(self.widget, clicked
331 =lambda: self.openFinancialWindow())
332
333         font = QtGui.QFont()
334
335         font.setPointSize(10)
336
337         self.pushButton_19.setFont(font)
338
339         self.pushButton_19.setObjectName("pushButton_19")
340
341         self.verticalLayout.addWidget(self.pushButton_19)
342
343         self.pushButton_16 = QtWidgets.QPushButton(self.widget)
344
345         font = QtGui.QFont()
346
347         font.setPointSize(10)
348
349         self.pushButton_16.setFont(font)
350
351         self.pushButton_16.setIcon(icon1)
352
353         self.pushButton_16.setCheckable(True)
354
355         self.pushButton_16.setObjectName("pushButton_16")
356
357         self.verticalLayout.addWidget(self.pushButton_16)
358
359         self.widget_8 = QtWidgets.QWidget(self.widget)
360
361         self.widget_8.setMinimumSize(QtCore.QSize(203, 21))
362
363         self.widget_8.setMaximumSize(QtCore.QSize(281, 21))
364
365         self.widget_8.setObjectName("widget_8")
366
367         self.pushButton_14 = QtWidgets.QPushButton(self.widget_8,
368             clicked=lambda: self.openCarbonEmissionWindow())
369
370         self.pushButton_14.setGeometry(QtCore.QRect(20, 0, 183, 21))
371
372         font = QtGui.QFont()
373
374         font.setPointSize(10)
375
376         font.setBold(False)
377
378         font.setWeight(50)
379
380         self.pushButton_14.setFont(font)
381
382         self.pushButton_14.setIcon(icon2)
383
384         self.pushButton_14.setObjectName("pushButton_14")
385
386         self.verticalLayout.addWidget(self.widget_8)
387
388         self.pushButton_17 = QtWidgets.QPushButton(self.widget, clicked
389 =lambda: self.openBridgeTrafficWindow())
390
391         font = QtGui.QFont()
392
393         font.setPointSize(10)
394
395         self.pushButton_17.setFont(font)
396
397         self.pushButton_17.setObjectName("pushButton_17")

```

```

360         self.verticalLayout.addWidget(self.pushButton_17)
361         self.pushButton_18 = QtWidgets.QPushButton(self.widget, clicked
362 =lambda: self.openMaintenanceWindow())
363         font = QtGui.QFont()
364         font.setPointSize(10)
365         self.pushButton_18.setFont(font)
366         self.pushButton_18.setObjectName("pushButton_18")
367         self.verticalLayout.addWidget(self.pushButton_18)
368         self.pushButton_10 = QtWidgets.QPushButton(self.widget, clicked
369 =lambda: self.openDemolitionWindow())
370         font = QtGui.QFont()
371         font.setPointSize(10)
372         self.pushButton_10.setFont(font)
373         self.pushButton_10.setObjectName("pushButton_10")
374         self.verticalLayout.addWidget(self.pushButton_10)
375         self.label_3 = QtWidgets.QLabel(self.scrollAreaWidgetContents)
376         self.label_3.setGeometry(QtCore.QRect(0, 387, 221, 31))
377         font = QtGui.QFont()
378         font.setPointSize(10)
379         self.label_3.setFont(font)
380         self.label_3.setStyleSheet("background-color: rgb(240,230,230)")
381     )
382         self.label_3.setAlignment(QtCore.Qt.AlignCenter)
383         self.label_3.setObjectName("label_3")
384         self.textBrowser = QtWidgets.QTextBrowser(self.
385 scrollAreaWidgetContents)
386         self.textBrowser.setGeometry(QtCore.QRect(0, 418, 221, 221))
387         self.textBrowser.setStyleSheet("background-color: #fff9f9")
388         self.textBrowser.setObjectName("textBrowser")
389         self.verticalScrollBar = QtWidgets.QScrollBar(self.
390 scrollAreaWidgetContents)
391         self.verticalScrollBar.setGeometry(QtCore.QRect(220, 0, 16,
641))
392         self.verticalScrollBar.setStyleSheet("background-color: #F0F0F0")
393         self.verticalScrollBar.setOrientation(QtCore.Qt.Vertical)
394         self.verticalScrollBar.setObjectName("verticalScrollBar")
395         self.widget.raise_()
396         self.label_2.raise_()

```

```

392     self.label_3.raise_()
393     self.textBrowser.raise_()
394     self.verticalScrollBar.raise_()
395     self.scrollArea.setWidget(self.scrollAreaWidgetContents)
396
397     self.retranslateUi(Maintenance_Dialog)
398     self.buttonBox_2.accepted.connect(self.handle_save) # type:
399     ignore
400     self.buttonBox_2.rejected.connect(lambda: self.show_warning(
401         Maintenance_Dialog)) # type: ignore
402     self.pushButton_15.toggled['bool'].connect(self.widget_5.
403     setVisible) # type: ignore
404     self.pushButton_16.toggled['bool'].connect(self.widget_8.
405     setVisible) # type: ignore
406     QtCore.QMetaObject.connectSlotsByName(Maintenance_Dialog)
407
408
409
410
411
412
413
414
415
416
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```

```

424         Maintenance_Dialog.setWindowTitle(_translate("Maintenance_Dialog", "Maintenance and Repair Data"))
425         self.pushButton_6.setText(_translate("Maintenance_Dialog", "Maintenance and Repair Data"))
426         self.label_4.setText(_translate("Maintenance_Dialog", "Frequency of Routine Inspection"))
427         self.label_5.setText(_translate("Maintenance_Dialog", "Investment Ratio"))
428         self.label_6.setText(_translate("Maintenance_Dialog", "Interest Rate"))
429         self.label_7.setText(_translate("Maintenance_Dialog", "Duration of Study"))
430         self.label_8.setText(_translate("Maintenance_Dialog", "Frequency of Periodic Maintenance"))
431         self.label_21.setText(_translate("Maintenance_Dialog", "(%")))
432         self.label_22.setText(_translate("Maintenance_Dialog", "(%")))
433         self.label_23.setText(_translate("Maintenance_Dialog", "(years")))
434         self.label_24.setText(_translate("Maintenance_Dialog", "(years")))
435         self.textBrowser_2.setHtml(_translate("Maintenance_Dialog", "<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.org/TR/REC-html40/strict.dtd\">\n<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"text/css\">\n\np, li { white-space: pre-wrap; }\n</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-size:8.25pt; font-weight:400; font-style:normal;\"\>\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt;\">Periodic Maintenance Cost rate as percentage to total construction cost</span></p></body></html>"))
436         self.textBrowser_3.setHtml(_translate("Maintenance_Dialog", "<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.org/TR/REC-html40/strict.dtd\">\n<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"text/css\">\n\np, li { white-space: pre-wrap; }\n
```

```

443 "</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-
    size:8.25pt; font-weight:400; font-style:normal;\">\n"
444 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
    -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
    font-size:10pt;\">Annual Routine Inspection cost rate as percentage
    of total construction cost</span></p></body></html>"))
445     self.textBrowser_4.setHtml(_translate("Maintenance_Dialog", "!
DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0//EN" "http://www.w3.org
/TR/REC-html40/strict.dtd">\n"
446 "<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"
    text/css\">\n"
447 "p, li { white-space: pre-wrap; }\n"
448 "</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-
    size:8.25pt; font-weight:400; font-style:normal;\">\n"
449 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
    -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
    font-size:10pt;\">Repair and Rehabilitation cost rate as<br />
    percentage of total construction cost </span></p></body></html>"))
450     self.label_25.setText(_translate("Maintenance_Dialog", "(%")))
451     self.pushButton.setText(_translate("Maintenance_Dialog", " "
        Project Details Window      "))
452     self.label_2.setText(_translate("Maintenance_Dialog", "Input
        Parameters"))
453     self.pushButton_15.setText(_translate("Maintenance_Dialog", " "
        Structure Works Data"))
454     self.pushButton_20.setText(_translate("Maintenance_Dialog", " "
        Foundation"))
455     self.pushButton_21.setText(_translate("Maintenance_Dialog", " "
        Super-Structure"))
456     self.pushButton_22.setText(_translate("Maintenance_Dialog", " "
        Sub-Structure"))
457     self.pushButton_23.setText(_translate("Maintenance_Dialog", " "
        Miscellaneous"))
458     self.pushButton_19.setText(_translate("Maintenance_Dialog", " "
        Financial Data"))
459     self.pushButton_16.setText(_translate("Maintenance_Dialog", " "
        Carbon Emission Data"))
460     self.pushButton_14.setText(_translate("Maintenance_Dialog", " "
        Carbon Emission Cost Data"))

```

```

461         self.pushButton_17.setText(_translate("Maintenance_Dialog", "Bridge and Traffic Data"))
462         self.pushButton_18.setText(_translate("Maintenance_Dialog", "Maintenance and Repair"))
463         self.pushButton_10.setText(_translate("Maintenance_Dialog", "Disposal and Recycling"))
464         self.label_3.setText(_translate("Maintenance_Dialog", "Output"))
465     )
466     self.textBrowser.setHtml(_translate("Maintenance_Dialog", "<!DOCTYPE HTML PUBLIC \"-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.org/TR/REC-html40/strict.dtd\">\n<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"text/css\">\n\np, li { white-space: pre-wrap; }\n</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-size:8.25pt; font-weight:400; font-style:normal;\">\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Initial Construction Cost</span></p>\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Initial Carbon emission Cost</span></p>\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Time Cost</span></p>\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Road User Cost</span></p>\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Carbon Emission due to Re-Routing</span></p>\n<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Periodic Maintenance Costs</span></p>\n
```

```

475 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
476 -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
477 font-size:10pt; color:#aa8b8b;\">Maintenance Emission Costs</span><
478 p>\n"
479 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
480 -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
481 font-size:10pt; color:#aa8b8b;\">Routine Inspectection Costs</span
482 ></p>\n"
483 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
484 -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
485 font-size:10pt; color:#aa8b8b;\">Repair & Rehabilitation Costs</
486 span></p>\n"
487 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
488 -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
489 font-size:10pt; color:#aa8b8b;\">Reconstruction Costs</span></p>\n"
490 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
491 -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
492 font-size:10pt; color:#aa8b8b;\">Demolition & Disposal Cost</
493 span></p>\n"
494 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
495 -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
496 font-size:10pt; color:#aa8b8b;\">Recycling Cost</span></p>\n"
497 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
498 -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
499 font-size:10pt; color:#aa8b8b;\">Total Life-Cycle Cost</span></p></
500 body></html>"))
501
502     def validate_data(self):
503         """Validate input data before saving"""
504         try:
505             # Validate all numeric fields
506             float(self.lineEdit_5.text()) if self.lineEdit_5.text()
507             else 0 # Periodic Maintenance Cost Rate
508             float(self.lineEdit_7.text()) if self.lineEdit_7.text()
509             else 0 # Annual Routine Inspection Cost Rate
510             float(self.lineEdit_8.text()) if self.lineEdit_8.text()
511             else 0 # Repair Rehabilitation Cost Rate
512             float(self.lineEdit_9.text()) if self.lineEdit_9.text()
513             else 0 # Frequency of Periodic Maintenance

```

```

491         float(self.lineEdit_10.text()) if self.lineEdit_10.text()
492     else 0 # Frequency of Routine Inspection
493
494     return True
495
496 except ValueError:
497     QMessageBox.warning(
498         None,
499         "Validation Error",
500         "Please enter valid numbers in all numeric fields",
501         QMessageBox.Ok
502     )
503
504     return False
505
506
507 def save_data(self):
508     """Collect all input data and save it to a JSON file"""
509
510     if not self.validate_data():
511
512         return False
513
514
515     data = {
516
517         "periodic_maintenance": {
518
519             "cost_rate": self.lineEdit_5.text(),
520
521             "description": "Periodic Maintenance Cost rate as
522             percentage to total construction cost"
523
524         },
525
526         "routine_inspection": {
527
528             "cost_rate": self.lineEdit_7.text(),
529
530             "frequency": self.lineEdit_10.text(),
531
532             "description": "Annual Routine Inspection cost rate as
533             percentage of total construction cost"
534
535         },
536
537         "repair_rehabilitation": {
538
539             "cost_rate": self.lineEdit_8.text(),
540
541             "description": "Repair and Rehabilitation cost rate as
542             percentage of total construction cost"
543
544         },
545
546         "periodic_maintenance_frequency": self.lineEdit_9.text(),
547
548         "financial_parameters": {
549
550             "interest_rate": self.label_6.text().replace("(%)", " ")
551
552             .strip(),

```

```

525         "investment_ratio": self.label_5.text().replace("(%)",
526             "").strip(),
527             "study_duration": self.label_7.text().replace("(years)",
528             "").strip()
529     }
530
531     # Save to JSON file
532     try:
533         import json
534         from datetime import datetime
535         timestamp = datetime.now().strftime("%Y%m%d_%H%M%S")
536         filename = f"maintenance_data_{timestamp}.json"
537
538         with open(filename, 'w') as f:
539             json.dump(data, f, indent=4)
540
541         # Show success message
542         QMessageBox.information(
543             None,
544             "Success",
545             f"Maintenance data saved successfully to {filename}",
546             QMessageBox.Ok
547         )
548
549         return True
550
551     except Exception as e:
552         QMessageBox.critical(
553             None,
554             "Error",
555             f"Failed to save data: {str(e)}",
556             QMessageBox.Ok
557         )
558
559     return False
560
561
562     def handle_save(self):
563         """Handle the save operation and close the dialog if successful
564         """

```

```

561         if self.save_data(): # Only close if save was successful
562             Maintenance_Dialog.accept()
563
564 if __name__ == "__main__":
565     import sys
566     app = QtWidgets.QApplication(sys.argv)
567     Maintenance_Dialog = QtWidgets.QDialog()
568     ui = Ui_Maintenance_Dialog()
569     ui.setupUi(Maintenance_Dialog)
570     Maintenance_Dialog.show()
571     sys.exit(app.exec_())

```

## 7. Miscellaneous Data

```

1 # -*- coding: utf-8 -*-
2
3 # Form implementation generated from reading ui file 'C:\Users\saans\
4 #   AppData\Local\Programs\Python\Python310\Lib\site-packages\
5 #   qt5_applications\Qt\bin\ProjectDetails_Miscellaneous_Window.ui'
6 #
7 # Created by: PyQt5 UI code generator 5.15.9
8 #
9 #
10 # WARNING: Any manual changes made to this file will be lost when
11 # pyuic5 is
12 # run again. Do not edit this file unless you know what you are doing.
13
14
15
16
17
18
19 #from ProjectDetails_Miscellaneous_Window import
20 #    Ui_Miscellaneous_Dialog
21

```

```

22
23
24 class Ui_Miscellaneous_Dialog(object):
25     def openBridgeTrafficWindow(self):
26         from ProjectDetails_BridgeANDTrafficData_Window import
27         Ui_BridgeTraffic_Dialog
28
29         self.window = QtWidgets.QDialog()
30         self.ui = Ui_BridgeTraffic_Dialog()
31         self.ui.setupUi(self.window)
32         self.window.show()
33
34
35     def openFoundationWindow(self):
36         from ProjectDetails_Foundation_Window import
37         Ui_Foundation_Dialog
38
39         self.window = QtWidgets.QDialog()
40         self.ui = Ui_Foundation_Dialog()
41         self.ui.setupUi(self.window)
42         self.window.show()
43
44
45     def openCarbonEmissionWindow(self):
46         from ProjectDetails_CarbonEmissionData_Window import
47         Ui_CarbonEmission_Dialog
48
49         self.window = QtWidgets.QDialog()
50         self.ui = Ui_CarbonEmission_Dialog()
51         self.ui.setupUi(self.window)
52         self.window.show()
53
54
55     def openDemolitionWindow(self):
56         from ProjectDetails_DemolitionANDRecyclingData_Window import
57         Ui_Demolition_Dialog
58
59         self.window = QtWidgets.QDialog()
60         self.ui = Ui_Demolition_Dialog()
61         self.ui.setupUi(self.window)
62         self.window.show()
63
64
65     def openFinancialWindow(self):
66         from ProjectDetails_FinancialData_Window import
67         Ui_FinancialData_Dialog
68
69         self.window = QtWidgets.QDialog()

```

```

56         self.ui = Ui_FinancialData_Dialog()
57         self.ui.setupUi(self.window)
58         self.window.show()

59
60     def openMaintenanceWindow(self):
61         from ProjectDetails_MaintenanceANDRepairData_Window import
62             Ui_Maintenance_Dialog
63
64         self.window = QtWidgets.QDialog()
65         self.ui = Ui_Maintenance_Dialog()
66         self.ui.setupUi(self.window)
67         self.window.show()

68
69     def openMiscellaneousWindow(self):
70         self.window = QtWidgets.QDialog()
71         self.ui = Ui_Miscellaneous_Dialog()
72         self.ui.setupUi(self.window)
73         self.window.show()

74
75     def openSubStructureWindow(self):
76         from ProjectDetails_SubStructure_Window import
77             Ui_SubStructure_Dialog
78
79         self.window = QtWidgets.QDialog()
80         self.ui = Ui_SubStructure_Dialog()
81         self.ui.setupUi(self.window)
82         self.window.show()

83
84     def openSuperStructureWindow(self):
85         from ProjectDetails_SuperStructure_Window import
86             Ui_SuperStructure_Dialog
87
88         self.window = QtWidgets.QDialog()
89         self.ui = Ui_SuperStructure_Dialog()
90         self.ui.setupUi(self.window)
91         self.window.show()

92
93     def setupUi(self, Miscellaneous_Dialog):
94
95         Miscellaneous_Dialog.setObjectName("Miscellaneous_Dialog")
96         Miscellaneous_Dialog.resize(1440, 900)
97         Miscellaneous_Dialog.setStyleSheet("background-color:#FAFAFA")
98
99         self.pushButton = QtWidgets.QPushButton(Miscellaneous_Dialog)

```



```

127     self.label_39.setGeometry(QtCore.QRect(20, 70, 161, 21))
128     font = QtGui.QFont()
129     font.setPointSize(10)
130     self.label_39.setFont(font)
131     self.label_39.setAlignment(QtCore.Qt.AlignCenter)
132     self.label_39.setObjectName("label_39")
133     self.label_40 = QtWidgets.QLabel(self.widget_2)
134     self.label_40.setGeometry(QtCore.QRect(551, 70, 140, 21))
135     font = QtGui.QFont()
136     font.setPointSize(10)
137     self.label_40.setFont(font)
138     self.label_40.setAlignment(QtCore.Qt.AlignCenter)
139     self.label_40.setObjectName("label_40")
140     self.label_41 = QtWidgets.QLabel(self.widget_2)
141     self.label_41.setGeometry(QtCore.QRect(191, 70, 110, 21))
142     font = QtGui.QFont()
143     font.setPointSize(10)
144     self.label_41.setFont(font)
145     self.label_41.setAlignment(QtCore.Qt.AlignCenter)
146     self.label_41.setObjectName("label_41")
147     self.label_42 = QtWidgets.QLabel(self.widget_2)
148     self.label_42.setGeometry(QtCore.QRect(311, 70, 110, 21))
149     font = QtGui.QFont()
150     font.setPointSize(10)
151     self.label_42.setFont(font)
152     self.label_42.setAlignment(QtCore.Qt.AlignCenter)
153     self.label_42.setObjectName("label_42")
154     self.label_43 = QtWidgets.QLabel(self.widget_2)
155     self.label_43.setGeometry(QtCore.QRect(431, 70, 110, 21))
156     font = QtGui.QFont()
157     font.setPointSize(10)
158     self.label_43.setFont(font)
159     self.label_43.setAlignment(QtCore.Qt.AlignCenter)
160     self.label_43.setObjectName("label_43")
161     self.comboBox_14 = QtWidgets.QComboBox(self.widget_2)
162     self.comboBox_14.setGeometry(QtCore.QRect(30, 100, 140, 22))
163     self.comboBox_14.setStyleSheet("background-color: #ffffff")
164     self.comboBox_14.setObjectName("comboBox_14")
165     self.comboBox_15 = QtWidgets.QComboBox(self.widget_2)

```

```

166     self.comboBox_15.setGeometry(QtCore.QRect(30, 130, 140, 22))
167     self.comboBox_15.setStyleSheet("background-color: #ffffff")
168     self.comboBox_15.setObjectName("comboBox_15")
169     self.lineEdit_25 = QtWidgets.QLineEdit(self.widget_2)
170     self.lineEdit_25.setGeometry(QtCore.QRect(210, 100, 81, 20))
171     font = QtGui.QFont()
172     font.setPointSize(10)
173     self.lineEdit_25.setFont(font)
174     self.lineEdit_25.setStyleSheet("background-color: #ffffff")
175     self.lineEdit_25.setObjectName("lineEdit_25")
176     self.lineEdit_26 = QtWidgets.QLineEdit(self.widget_2)
177     self.lineEdit_26.setGeometry(QtCore.QRect(210, 130, 81, 20))
178     font = QtGui.QFont()
179     font.setPointSize(10)
180     self.lineEdit_26.setFont(font)
181     self.lineEdit_26.setStyleSheet("background-color: #ffffff")
182     self.lineEdit_26.setObjectName("lineEdit_26")
183     self.label_44 = QtWidgets.QLabel(self.widget_2)
184     self.label_44.setGeometry(QtCore.QRect(340, 100, 51, 20))
185     font = QtGui.QFont()
186     font.setPointSize(10)
187     self.label_44.setFont(font)
188     self.label_44.setStyleSheet("background-color: #ffffff")
189     self.label_44.setAlignment(QtCore.Qt.AlignCenter)
190     self.label_44.setObjectName("label_44")
191     self.label_45 = QtWidgets.QLabel(self.widget_2)
192     self.label_45.setGeometry(QtCore.QRect(340, 130, 51, 20))
193     font = QtGui.QFont()
194     font.setPointSize(10)
195     self.label_45.setFont(font)
196     self.label_45.setStyleSheet("background-color: #ffffff")
197     self.label_45.setAlignment(QtCore.Qt.AlignCenter)
198     self.label_45.setObjectName("label_45")
199     self.lineEdit_27 = QtWidgets.QLineEdit(self.widget_2)
200     self.lineEdit_27.setGeometry(QtCore.QRect(450, 100, 81, 20))
201     font = QtGui.QFont()
202     font.setPointSize(10)
203     self.lineEdit_27.setFont(font)
204     self.lineEdit_27.setStyleSheet("background-color: #ffffff")

```

```

205     self.lineEdit_27.setObjectName("lineEdit_27")
206
207     self.lineEdit_28 = QtWidgets.QLineEdit(self.widget_2)
208     self.lineEdit_28.setGeometry(QtCore.QRect(450, 130, 81, 20))
209
210     font = QtGui.QFont()
211
212     font.setPointSize(10)
213
214     self.lineEdit_28.setFont(font)
215
216     self.lineEdit_28.setStyleSheet("background-color: #ffffff")
217
218     self.lineEdit_28.setObjectName("lineEdit_28")
219
220     self.lineEdit_29 = QtWidgets.QLineEdit(self.widget_2)
221     self.lineEdit_29.setGeometry(QtCore.QRect(570, 100, 101, 20))
222
223     font = QtGui.QFont()
224
225     font.setPointSize(10)
226
227     self.lineEdit_29.setFont(font)
228
229     self.lineEdit_29.setStyleSheet("background-color: #ffffff")
230
231     self.lineEdit_29.setObjectName("lineEdit_29")
232
233     self.lineEdit_30 = QtWidgets.QLineEdit(self.widget_2)
234     self.lineEdit_30.setGeometry(QtCore.QRect(570, 130, 101, 20))
235
236     font = QtGui.QFont()
237
238     font.setPointSize(10)
239
240     self.lineEdit_30.setFont(font)
241
242     self.lineEdit_30.setStyleSheet("background-color: #ffffff")
243
244     self.lineEdit_30.setObjectName("lineEdit_30")
245
246     self.pushButton_13 = QtWidgets.QPushButton(self.widget_2)
247     self.pushButton_13.setGeometry(QtCore.QRect(300, 200, 190, 23))
248
249     self.pushButton_13.setStyleSheet("background-color: #ffffff")
250
251     self.pushButton_13.setObjectName("pushButton_13")
252
253     self.label_46 = QtWidgets.QLabel(self.widget_2)
254     self.label_46.setGeometry(QtCore.QRect(30, 330, 161, 21))
255
256     font = QtGui.QFont()
257
258     font.setPointSize(10)
259
260     self.label_46.setFont(font)
261
262     self.label_46.setAlignment(QtCore.Qt.AlignCenter)
263
264     self.label_46.setObjectName("label_46")
265
266     self.comboBox_16 = QtWidgets.QComboBox(self.widget_2)
267     self.comboBox_16.setGeometry(QtCore.QRect(150, 270, 190, 22))
268
269     font = QtGui.QFont()
270
271     font.setPointSize(10)
272
273     self.comboBox_16.setFont(font)
274
275     self.comboBox_16.setStyleSheet("background-color: #ffffff")

```

```

244     self.comboBox_16.setObjectName("comboBox_16")
245     self.comboBox_16.addItem("")
246     self.label_47 = QtWidgets.QLabel(self.widget_2)
247     self.label_47.setGeometry(QtCore.QRect(441, 330, 110, 21))
248     font = QtGui.QFont()
249     font.setPointSize(10)
250     self.label_47.setFont(font)
251     self.label_47.setAlignment(QtCore.Qt.AlignCenter)
252     self.label_47.setObjectName("label_47")
253     self.label_48 = QtWidgets.QLabel(self.widget_2)
254     self.label_48.setGeometry(QtCore.QRect(350, 390, 51, 20))
255     font = QtGui.QFont()
256     font.setPointSize(10)
257     self.label_48.setFont(font)
258     self.label_48.setStyleSheet("background-color: #ffffff")
259     self.label_48.setAlignment(QtCore.Qt.AlignCenter)
260     self.label_48.setObjectName("label_48")
261     self.label_49 = QtWidgets.QLabel(self.widget_2)
262     self.label_49.setGeometry(QtCore.QRect(561, 330, 140, 21))
263     font = QtGui.QFont()
264     font.setPointSize(10)
265     self.label_49.setFont(font)
266     self.label_49.setAlignment(QtCore.Qt.AlignCenter)
267     self.label_49.setObjectName("label_49")
268     self.label_50 = QtWidgets.QLabel(self.widget_2)
269     self.label_50.setGeometry(QtCore.QRect(350, 360, 51, 20))
270     font = QtGui.QFont()
271     font.setPointSize(10)
272     self.label_50.setFont(font)
273     self.label_50.setStyleSheet("background-color: #ffffff")
274     self.label_50.setAlignment(QtCore.Qt.AlignCenter)
275     self.label_50.setObjectName("label_50")
276     self.label_51 = QtWidgets.QLabel(self.widget_2)
277     self.label_51.setGeometry(QtCore.QRect(321, 330, 110, 21))
278     font = QtGui.QFont()
279     font.setPointSize(10)
280     self.label_51.setFont(font)
281     self.label_51.setAlignment(QtCore.Qt.AlignCenter)
282     self.label_51.setObjectName("label_51")

```

```

283     self.lineEdit_31 = QtWidgets.QLineEdit(self.widget_2)
284     self.lineEdit_31.setGeometry(QtCore.QRect(220, 390, 81, 20))
285     font = QtGui.QFont()
286     font.setPointSize(10)
287     self.lineEdit_31.setFont(font)
288     self.lineEdit_31.setStyleSheet("background-color: #ffffff")
289     self.lineEdit_31.setObjectName("lineEdit_31")
290     self.lineEdit_32 = QtWidgets.QLineEdit(self.widget_2)
291     self.lineEdit_32.setGeometry(QtCore.QRect(580, 360, 101, 20))
292     font = QtGui.QFont()
293     font.setPointSize(10)
294     self.lineEdit_32.setFont(font)
295     self.lineEdit_32.setStyleSheet("background-color: #ffffff")
296     self.lineEdit_32.setObjectName("lineEdit_32")
297     self.label_52 = QtWidgets.QLabel(self.widget_2)
298     self.label_52.setGeometry(QtCore.QRect(201, 330, 110, 21))
299     font = QtGui.QFont()
300     font.setPointSize(10)
301     self.label_52.setFont(font)
302     self.label_52.setAlignment(QtCore.Qt.AlignCenter)
303     self.label_52.setObjectName("label_52")
304     self.pushButton_14 = QtWidgets.QPushButton(self.widget_2)
305     self.pushButton_14.setGeometry(QtCore.QRect(310, 460, 190, 23))
306     self.pushButton_14.setStyleSheet("background-color: #ffffff")
307     self.pushButton_14.setObjectName("pushButton_14")
308     self.lineEdit_33 = QtWidgets.QLineEdit(self.widget_2)
309     self.lineEdit_33.setGeometry(QtCore.QRect(220, 360, 81, 20))
310     font = QtGui.QFont()
311     font.setPointSize(10)
312     self.lineEdit_33.setFont(font)
313     self.lineEdit_33.setStyleSheet("background-color: #ffffff")
314     self.lineEdit_33.setObjectName("lineEdit_33")
315     self.lineEdit_34 = QtWidgets.QLineEdit(self.widget_2)
316     self.lineEdit_34.setGeometry(QtCore.QRect(460, 360, 81, 20))
317     font = QtGui.QFont()
318     font.setPointSize(10)
319     self.lineEdit_34.setFont(font)
320     self.lineEdit_34.setStyleSheet("background-color: #ffffff")
321     self.lineEdit_34.setObjectName("lineEdit_34")

```

```

322     self.lineEdit_35 = QtWidgets.QLineEdit(self.widget_2)
323     self.lineEdit_35.setGeometry(QtCore.QRect(460, 390, 81, 20))
324     font = QtGui.QFont()
325     font.setPointSize(10)
326     self.lineEdit_35.setFont(font)
327     self.lineEdit_35.setStyleSheet("background-color: #ffffff")
328     self.lineEdit_35.setObjectName("lineEdit_35")
329     self.pushButton_15 = QtWidgets.QPushButton(self.widget_2)
330     self.pushButton_15.setGeometry(QtCore.QRect(360, 270, 190, 23))
331     self.pushButton_15.setStyleSheet("background-color: #ffffff")
332     self.pushButton_15.setObjectName("pushButton_15")
333     self.label_53 = QtWidgets.QLabel(self.widget_2)
334     self.label_53.setGeometry(QtCore.QRect(30, 270, 91, 21))
335     font = QtGui.QFont()
336     font.setPointSize(10)
337     self.label_53.setFont(font)
338     self.label_53.setObjectName("label_53")
339     self.lineEdit_36 = QtWidgets.QLineEdit(self.widget_2)
340     self.lineEdit_36.setGeometry(QtCore.QRect(580, 390, 101, 20))
341     font = QtGui.QFont()
342     font.setPointSize(10)
343     self.lineEdit_36.setFont(font)
344     self.lineEdit_36.setStyleSheet("background-color: #ffffff")
345     self.lineEdit_36.setObjectName("lineEdit_36")
346     self.comboBox_17 = QtWidgets.QComboBox(self.widget_2)
347     self.comboBox_17.setGeometry(QtCore.QRect(40, 360, 140, 22))
348     self.comboBox_17.setStyleSheet("background-color: #ffffff")
349     self.comboBox_17.setObjectName("comboBox_17")
350     self.comboBox_17.addItem("")
351     self.comboBox_17.addItem("")
352     self.comboBox_18 = QtWidgets.QComboBox(self.widget_2)
353     self.comboBox_18.setGeometry(QtCore.QRect(40, 390, 140, 22))
354     self.comboBox_18.setStyleSheet("background-color: #ffffff")
355     self.comboBox_18.setObjectName("comboBox_18")
356     self.comboBox_18.addItem("")
357     self.comboBox_18.addItem("")
358     self.line_5 = QtWidgets.QFrame(self.widget_2)
359     self.line_5.setGeometry(QtCore.QRect(10, 250, 761, 16))
360     self.line_5.setContextMenuPolicy(QtCore.Qt.DefaultContextMenu)

```

```

361     self.line_5.setFrameShadow(QtWidgets.QFrame.Sunken)
362     self.line_5.setLineWidth(2)
363     self.line_5.setMidLineWidth(2)
364     self.line_5.setFrameShape(QtWidgets.QFrame.HLine)
365     self.line_5.setObjectName("line_5")
366     self.line_6 = QtWidgets.QFrame(self.widget_2)
367     self.line_6.setGeometry(QtCore.QRect(10, 500, 761, 16))
368     self.line_6.setContextMenuPolicy(QtCore.Qt.DefaultContextMenu)
369     self.line_6.setFrameShadow(QtWidgets.QFrame.Sunken)
370     self.line_6.setLineWidth(2)
371     self.line_6.setMidLineWidth(2)
372     self.line_6.setFrameShape(QtWidgets.QFrame.HLine)
373     self.line_6.setObjectName("line_6")
374     self.buttonBox = QtWidgets.QDialogButtonBox(self.widget_2)
375     self.buttonBox.setGeometry(QtCore.QRect(430, 590, 341, 32))
376     self.buttonBox.setOrientation(QtCore.Qt.Horizontal)
377     self.buttonBox.setStandardButtons(QtWidgets.QDialogButtonBox.

Close|QtWidgets.QDialogButtonBox.Save)
378     self.buttonBox.setObjectName("buttonBox")
379     self.label = QtWidgets.QLabel(Miscellaneous_Dialog)
380     self.label.setGeometry(QtCore.QRect(10, 35, 244, 691))
381     font = QtGui.QFont()
382     font.setPointSize(10)
383     self.label.setFont(font)
384     self.label.setStyleSheet("background-color: rgb(240,230,230)")
385     self.label.setText("")
386     self.label.setObjectName("label")
387     self.pushButton_6 = QtWidgets.QPushButton(Miscellaneous_Dialog)
388     self.pushButton_6.setGeometry(QtCore.QRect(350, 10, 188, 25))
389     font = QtGui.QFont()
390     font.setPointSize(10)
391     font.setBold(True)
392     font.setWeight(75)
393     self.pushButton_6.setFont(font)
394     self.pushButton_6.setFocusPolicy(QtCore.Qt.StrongFocus)
395     self.pushButton_6.setLayoutDirection(QtCore.Qt.RightToLeft)
396     self.pushButton_6.setStyleSheet("background-color: rgb
(240,230,230)")
397     self.pushButton_6.setIcon(icon)

```





```

459         self.formLayout_3.setWidget(1, QtWidgets.QFormLayout.LabelRole,
460             self.pushButton_36)
461
462         self.pushButton_37 = QtWidgets.QPushButton(self.widget_7,
463             clicked=lambda: self.openSubStructureWindow())
464
465         font = QtGui.QFont()
466         font.setPointSize(10)
467         font.setBold(False)
468         font.setWeight(50)
469         self.pushButton_37.setFont(font)
470         self.pushButton_37.setIcon(icon2)
471         self.pushButton_37.setObjectName("pushButton_37")
472
473         self.formLayout_3.setWidget(2, QtWidgets.QFormLayout.LabelRole,
474             self.pushButton_37)
475
476         self.pushButton_38 = QtWidgets.QPushButton(self.widget_7,
477             clicked=lambda: self.openMiscellaneousWindow())
478
479         font = QtGui.QFont()
480         font.setPointSize(10)
481         font.setBold(False)
482         font.setWeight(50)
483         self.pushButton_38.setFont(font)
484         self.pushButton_38.setIcon(icon2)
485         self.pushButton_38.setObjectName("pushButton_38")
486
487         self.formLayout_3.setWidget(3, QtWidgets.QFormLayout.LabelRole,
488             self.pushButton_38)
489
490         self.verticalLayout_3.addWidget(self.widget_7)
491
492         self.pushButton_39 = QtWidgets.QPushButton(self.widget_4,
493             clicked=lambda: self.openFinancialWindow())
494
495         font = QtGui.QFont()
496         font.setPointSize(10)
497         self.pushButton_39.setFont(font)
498         self.pushButton_39.setObjectName("pushButton_39")
499
500         self.verticalLayout_3.addWidget(self.pushButton_39)
501
502         self.pushButton_40 = QtWidgets.QPushButton(self.widget_4)
503
504         font = QtGui.QFont()
505         font.setPointSize(10)
506         self.pushButton_40.setFont(font)
507         self.pushButton_40.setIcon(icon1)
508         self.pushButton_40.setCheckable(True)
509         self.pushButton_40.setObjectName("pushButton_40")

```

```

492     self.verticalLayout_3.addWidget(self.pushButton_40)
493
494     self.widget_10 = QtWidgets.QWidget(self.widget_4)
495     self.widget_10.setMinimumSize(QtCore.QSize(203, 21))
496     self.widget_10.setMaximumSize(QtCore.QSize(281, 21))
497     self.widget_10.setObjectName("widget_10")
498
499     self.pushButton_41 = QtWidgets.QPushButton(self.widget_10,
500                                         clicked=lambda: self.openCarbonEmissionWindow())
501
502     self.pushButton_41.setGeometry(QtCore.QRect(20, 0, 183, 21))
503     font = QtGui.QFont()
504     font.setPointSize(10)
505     font.setBold(False)
506     font.setWeight(50)
507
508     self.pushButton_41.setFont(font)
509     self.pushButton_41.setIcon(icon2)
510     self.pushButton_41.setObjectName("pushButton_41")
511
512     self.verticalLayout_3.addWidget(self.widget_10)
513
514     self.pushButton_42 = QtWidgets.QPushButton(self.widget_4,
515                                         clicked=lambda: self.openBridgeTrafficWindow())
516
517     font = QtGui.QFont()
518     font.setPointSize(10)
519     self.pushButton_42.setFont(font)
520     self.pushButton_42.setObjectName("pushButton_42")
521
522     self.verticalLayout_3.addWidget(self.pushButton_42)
523
524     self.pushButton_43 = QtWidgets.QPushButton(self.widget_4,
525                                         clicked=lambda: self.openMaintenanceWindow())
526
527     font = QtGui.QFont()
528     font.setPointSize(10)
529     self.pushButton_43.setFont(font)
530     self.pushButton_43.setObjectName("pushButton_43")
531
532     self.verticalLayout_3.addWidget(self.pushButton_43)
533
534     self.pushButton_16 = QtWidgets.QPushButton(self.widget_4,
535                                         clicked=lambda: self.openDemolitionWindow())
536
537     font = QtGui.QFont()
538     font.setPointSize(10)
539     self.pushButton_16.setFont(font)
540     self.pushButton_16.setObjectName("pushButton_16")
541
542     self.verticalLayout_3.addWidget(self.pushButton_16)
543
544     self.label_55 = QtWidgets.QLabel(self.
545                                     scrollAreaWidgetContents_3)

```

```

526         self.label_55.setGeometry(QtCore.QRect(0, 387, 221, 31))
527         font = QtGui.QFont()
528         font.setPointSize(10)
529         self.label_55.setFont(font)
530         self.label_55.setStyleSheet("background-color: rgb(240,230,230)
531 ")
532         self.label_55.setAlignment(QtCore.Qt.AlignCenter)
533         self.label_55.setObjectName("label_55")
534         self.textBrowser_3 = QtWidgets.QTextBrowser(self.
535 scrollAreaWidgetContents_3)
536         self.textBrowser_3.setGeometry(QtCore.QRect(0, 418, 221, 221))
537         self.textBrowser_3.setStyleSheet("background-color: #fff9f9")
538         self.textBrowser_3.setObjectName("textBrowser_3")
539         self.verticalScrollBar_3 = QtWidgets.QScrollBar(self.
540 scrollAreaWidgetContents_3)
541         self.verticalScrollBar_3.setGeometry(QtCore.QRect(220, 0, 16,
542 641))
543         self.verticalScrollBar_3.setStyleSheet("background-color: #
544 F0F0F0")
545         self.verticalScrollBar_3.setOrientation(QtCore.Qt.Vertical)
546         self.verticalScrollBar_3.setObjectName("verticalScrollBar_3")
547         self.scrollArea.setWidget(self.scrollAreaWidgetContents_3)
548
549         self.retranslateUi(Miscellaneous_Dialog)
550         self.buttonBox.accepted.connect(self.handle_save) # type:
551         ignore
552         self.buttonBox.rejected.connect(lambda: self.show_warning(
553 Miscellaneous_Dialog)) # type: ignore
554         QtCore.QMetaObject.connectSlotsByName(Miscellaneous_Dialog)
555
556     def show_warning(self, dialog):
557         """
558             Show a warning window when the Close button is pressed.
559         """
560
561         warning_box = QMessageBox()
562         warning_box.setIcon(QMessageBox.Warning)
563         warning_box.setWindowTitle("Confirm Close")
564         warning_box.setText("Are you sure you want to close without
565 saving?")

```

```

557     warning_box.setStandardButtons(QMessageBox.Yes | QMessageBox.No)
558 )
559
560     # Check the user's response
561
562     response = warning_box.exec_()
563
564     if response == QMessageBox.Yes:
565         dialog.reject() # Close the application
566
567     else:
568
569         pass # Do nothing, return to the dialog
570
571
572     def retranslateUi(self, Miscellaneous_Dialog):
573
574         _translate = QtCore.QCoreApplication.translate
575
576         Miscellaneous_Dialog.setWindowTitle(_translate("Miscellaneous_Dialog", "Dialog"))
577
578         self.pushButton.setText(_translate("Miscellaneous_Dialog", "Project Details Window"))
579
580         self.label_38.setText(_translate("Miscellaneous_Dialog", "Components:"))
581
582         self.comboBox_13.setItemText(0, _translate("Miscellaneous_Dialog", "Expansion Joint"))
583
584         self.pushButton_10.setText(_translate("Miscellaneous_Dialog", "+ Add Sub-Component"))
585
586         self.label_39.setText(_translate("Miscellaneous_Dialog", "Material Type and Grade"))
587
588         self.label_40.setText(_translate("Miscellaneous_Dialog", "Rate Data Source"))
589
590         self.label_41.setText(_translate("Miscellaneous_Dialog", "Quantity"))
591
592         self.label_42.setText(_translate("Miscellaneous_Dialog", "Unit"))
593
594         self.label_43.setText(_translate("Miscellaneous_Dialog", "Rate"))
595
596         self.label_44.setText(_translate("Miscellaneous_Dialog", "<html><head><body><p><span style=\" font-size:10pt;\">m</span><span style=\" font-size:10pt; vertical-align:super;\">3</span></p></body></html>"))
597
598         self.label_45.setText(_translate("Miscellaneous_Dialog", "kg"))

```

```

581         self.pushButton_13.setText(_translate("Miscellaneous_Dialog", " +
582 + Add Material"))
583         self.label_46.setText(_translate("Miscellaneous_Dialog", " +
584 Material Type and Grade"))
585         self.comboBox_16.setItemText(0, _translate(" +
586 Miscellaneous_Dialog", "Bearing"))
587         self.label_47.setText(_translate("Miscellaneous_Dialog", "Rate" +
588 ))
589         self.label_48.setText(_translate("Miscellaneous_Dialog", "kg"))
590         self.label_49.setText(_translate("Miscellaneous_Dialog", "Rate" +
591 Data Source"))
592         self.label_50.setText(_translate("Miscellaneous_Dialog", "<html" +
593 ><head><body><p><span style=\" font-size:10pt;\\">m</span><span" +
594 style=\" font-size:10pt; vertical-align:super;\\">3</span></p></body" +
595 ></html>"))
596         self.label_51.setText(_translate("Miscellaneous_Dialog", "Unit" +
597 ))
598         self.label_52.setText(_translate("Miscellaneous_Dialog", " +
599 Quantity"))
600         self.pushButton_14.setText(_translate("Miscellaneous_Dialog", " +
601 + Add Material"))
602         self.pushButton_15.setText(_translate("Miscellaneous_Dialog", " +
603 + Add Sub-Component"))
604         self.label_53.setText(_translate("Miscellaneous_Dialog", " +
605 Components:"))
606         self.comboBox_17.setItemText(0, _translate(" +
607 Miscellaneous_Dialog", "Concrete"))
608         self.comboBox_17.setItemText(1, _translate(" +
609 Miscellaneous_Dialog", "Steel"))
610         self.comboBox_18.setItemText(0, _translate(" +
611 Miscellaneous_Dialog", "Steel"))
612         self.comboBox_18.setItemText(1, _translate(" +
613 Miscellaneous_Dialog", "Concrete"))
614         self.pushButton_6.setText(_translate("Miscellaneous_Dialog", " +
615 Miscellaneous"))
616         self.label_54.setText(_translate("Miscellaneous_Dialog", "Input" +
617 Parameters"))
618         self.pushButton_34.setText(_translate("Miscellaneous_Dialog", " +
619 Structure Works Data"))

```

```

600         self.pushButton_35.setText(_translate("Miscellaneous_Dialog", "Foundation"))
601         self.pushButton_36.setText(_translate("Miscellaneous_Dialog", "Super-Structure"))
602         self.pushButton_37.setText(_translate("Miscellaneous_Dialog", "Sub-Structure"))
603         self.pushButton_38.setText(_translate("Miscellaneous_Dialog", "Miscellaneous"))
604         self.pushButton_39.setText(_translate("Miscellaneous_Dialog", "Financial Data"))
605         self.pushButton_40.setText(_translate("Miscellaneous_Dialog", "Carbon Emission Data"))
606         self.pushButton_41.setText(_translate("Miscellaneous_Dialog", "Carbon Emission Cost Data"))
607         self.pushButton_42.setText(_translate("Miscellaneous_Dialog", "Bridge and Traffic Data"))
608         self.pushButton_43.setText(_translate("Miscellaneous_Dialog", "Maintenance and Repair"))
609         self.pushButton_16.setText(_translate("Miscellaneous_Dialog", "Disposal and Recycling"))
610         self.label_55.setText(_translate("Miscellaneous_Dialog", "Output"))
611         self.textBrowser_3.setHtml(_translate("Miscellaneous_Dialog", "<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.org/TR/REC-html40/strict.dtd\">\n<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"text/css\">\n

```

```

617 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
   -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
   font-size:10pt; color:#aa8b8b;\">>Time Cost</span></p>\n"
618 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
   -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
   font-size:10pt; color:#aa8b8b;\">>Road User Cost</span></p>\n"
619 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
   -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
   font-size:10pt; color:#aa8b8b;\">>Carbon Emission due to Re-Routing</
   span></p>\n"
620 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
   -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
   font-size:10pt; color:#aa8b8b;\">>Periodic Maintenance Costs</span></
   p>\n"
621 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
   -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
   font-size:10pt; color:#aa8b8b;\">>Maintenance Emission Costs</span></
   p>\n"
622 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
   -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
   font-size:10pt; color:#aa8b8b;\">>Routine Inspection Costs</span
   ></p>\n"
623 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
   -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
   font-size:10pt; color:#aa8b8b;\">>Repair & Rehabilitation Costs</
   span></p>\n"
624 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
   -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
   font-size:10pt; color:#aa8b8b;\">>Reconstruction Costs</span></p>\n"
625 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
   -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
   font-size:10pt; color:#aa8b8b;\">>Demolition & Disposal Cost</
   span></p>\n"
626 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
   -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
   font-size:10pt; color:#aa8b8b;\">>Recycling Cost</span></p>\n"
627 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
   -right:0px; -qt-block-indent:0; text-indent:0px;\">><span style=\"
   font-size:10pt; color:#aa8b8b;\">>Total Life-Cycle Cost</span></p></

```

```

        body></html>"))

628
629     def validate_data(self):
630         """Validate input data before saving"""
631         try:
632             # Validate all numeric fields
633             fields_to_validate = [
634                 self.lineEdit_25, self.lineEdit_26, self.lineEdit_27,
635                 self.lineEdit_28, self.lineEdit_29, self.lineEdit_30,
636                 self.lineEdit_31, self.lineEdit_32, self.lineEdit_33,
637                 self.lineEdit_34, self.lineEdit_35, self.lineEdit_36
638             ]
639
640             for field in fields_to_validate:
641                 if field.text(): # Only validate if field is not empty
642                     float(field.text())
643
644             return True
645
646         except ValueError:
647             QMessageBox.warning(
648                 None,
649                 "Validation Error",
650                 "Please enter valid numbers in all numeric fields",
651                 QMessageBox.Ok
652             )
653
654             return False
655
656     def save_data(self):
657         """Collect all input data and save it to a JSON file"""
658         if not self.validate_data():
659             return False
660
661         data = {
662             "expansion_joint": {
663                 "component": self.comboBox_13.currentText(),
664                 "materials": [
665                     {
666                         "type_grade": self.comboBox_14.currentText(),

```

```

666         "quantity": self.lineEdit_25.text(),
667         "unit": self.label_44.text(),
668         "rate": self.lineEdit_27.text(),
669         "rate_source": self.lineEdit_29.text()
670     },
671     {
672         "type_grade": self.comboBox_15.currentText(),
673         "quantity": self.lineEdit_26.text(),
674         "unit": self.label_45.text(),
675         "rate": self.lineEdit_28.text(),
676         "rate_source": self.lineEdit_30.text()
677     }
678   ],
679 },
680 "bearing": {
681   "component": self.comboBox_16.currentText(),
682   "materials": [
683     {
684       "type_grade": self.comboBox_17.currentText(),
685       "quantity": self.lineEdit_33.text(),
686       "unit": self.label_50.text(),
687       "rate": self.lineEdit_34.text(),
688       "rate_source": self.lineEdit_32.text()
689     },
690     {
691       "type_grade": self.comboBox_18.currentText(),
692       "quantity": self.lineEdit_31.text(),
693       "unit": self.label_48.text(),
694       "rate": self.lineEdit_35.text(),
695       "rate_source": self.lineEdit_36.text()
696     }
697   ],
698 },
699 }
700
701 # Save to JSON file
702 try:
703     import json
704     from datetime import datetime

```

```

705     timestamp = datetime.now().strftime("%Y%m%d_%H%M%S")
706     filename = f"miscellaneous_data_{timestamp}.json"
707
708     with open(filename, 'w') as f:
709         json.dump(data, f, indent=4)
710
711     # Show success message
712     QMessageBox.information(
713         None,
714         "Success",
715         f"Miscellaneous data saved successfully to {filename}",
716         QMessageBox.Ok
717     )
718
719     return True
720
721 except Exception as e:
722     QMessageBox.critical(
723         None,
724         "Error",
725         f"Failed to save data: {str(e)}",
726         QMessageBox.Ok
727     )
728
729     return False
730
731 def handle_save(self):
732     """Handle the save operation and close the dialog if successful
733     """
734
735     if self.save_data(): # Only close if save was successful
736         Miscellaneous_Dialog.accept()
737
738
739 if __name__ == "__main__":
740     import sys
741     app = QtWidgets.QApplication(sys.argv)
742     Miscellaneous_Dialog = QtWidgets.QDialog()
743     ui = Ui_Miscellaneous_Dialog()
744     ui.setupUi(Miscellaneous_Dialog)
745     Miscellaneous_Dialog.show()

```

```
743     sys.exit(app.exec_())
```

## 8. Sub Structure Data

```
1 # -*- coding: utf-8 -*-
2
3 # Form implementation generated from reading ui file 'C:\Users\saans\
4 #   AppData\Local\Programs\Python\Python310\Lib\site-packages\
5 #   qt5_applications\Qt\bin\ProjectDetails_SubStructure_Window.ui'
6 #
7 # Created by: PyQt5 UI code generator 5.15.9
8 #
9 # WARNING: Any manual changes made to this file will be lost when
10 #          pyuic5 is
11 # run again. Do not edit this file unless you know what you are doing.
12
13
14
15
16
17
18
19
20
21 #from ProjectDetails_SubStructure_Window import Ui_SubStructure_Dialog
22
23
24
25 class Ui_SubStructure_Dialog(object):
26     def openBridgeTrafficWindow(self):
27         from ProjectDetails_BridgeANDTrafficData_Window import
28             Ui_BridgeTraffic_Dialog
29             self.window = QtWidgets.QDialog()
30             self.ui = Ui_BridgeTraffic_Dialog()
31             self.ui.setupUi(self.window)
32             self.window.show()
```

```

32
33     def openFoundationWindow(self):
34         from ProjectDetails_Foundation_Window import
35         Ui_Foundation_Dialog
36         self.window = QtWidgets.QDialog()
37         self.ui = Ui_Foundation_Dialog()
38         self.ui.setupUi(self.window)
39         self.window.show()
40
41
42     def openCarbonEmissionWindow(self):
43         from ProjectDetails_CarbonEmissionData_Window import
44         Ui_CarbonEmission_Dialog
45         self.window = QtWidgets.QDialog()
46         self.ui = Ui_CarbonEmission_Dialog()
47         self.ui.setupUi(self.window)
48         self.window.show()
49
50
51     def openDemolitionWindow(self):
52         from ProjectDetails_DemolitionANDRecyclingData_Window import
53         Ui_Demolition_Dialog
54         self.window = QtWidgets.QDialog()
55         self.ui = Ui_Demolition_Dialog()
56         self.ui.setupUi(self.window)
57         self.window.show()
58
59
60     def openFinancialWindow(self):
61         from ProjectDetails_FinancialData_Window import
62         Ui_FinancialData_Dialog
63         self.window = QtWidgets.QDialog()
64         self.ui = Ui_FinancialData_Dialog()
65         self.ui.setupUi(self.window)

```

```

66     self.window.show()

67

68     def openMiscellaneousWindow(self):
69         from ProjectDetails_Miscellaneous_Window import
70         Ui_Miscellaneous_Dialog
71
72         self.window = QtWidgets.QDialog()
73         self.ui = Ui_Miscellaneous_Dialog()
74         self.ui.setupUi(self.window)
75         self.window.show()

76

77     def openSubStructureWindow(self):
78         self.window = QtWidgets.QDialog()
79         self.ui = Ui_SubStructure_Dialog()
80         self.ui.setupUi(self.window)
81         self.window.show()

82

83     def openSuperStructureWindow(self):
84         from ProjectDetails_SuperStructure_Window import
85         Ui_SuperStructure_Dialog
86
87         self.window = QtWidgets.QDialog()
88         self.ui = Ui_SuperStructure_Dialog()
89         self.ui.setupUi(self.window)
90         self.window.show()

91

92     def setupUi(self, SubStructure_Dialog):
93         SubStructure_Dialog.setObjectName("SubStructure_Dialog")
94         SubStructure_Dialog.resize(1440, 900)
95         SubStructure_Dialog.setStyleSheet("background-color:#FAFAFA")
96         self.label = QtWidgets.QLabel(SubStructure_Dialog)
97         self.label.setGeometry(QtCore.QRect(10, 35, 244, 691))
98         font = QtGui.QFont()
99         font.setPointSize(10)
100        self.label.setFont(font)
101        self.label.setStyleSheet("background-color: rgb(240,230,230)")
102        self.label.setText("")
103        self.label.setObjectName("label")
104        self.pushButton = QtWidgets.QPushButton(SubStructure_Dialog)
105        self.pushButton.setGeometry(QtCore.QRect(10, 10, 188, 25))
106        font = QtGui.QFont()

```



```

138     font.setPointSize(10)
139     self.label_39.setFont(font)
140     self.label_39.setAlignment(QtCore.Qt.AlignCenter)
141     self.label_39.setObjectName("label_39")
142     self.label_40 = QtWidgets.QLabel(self.widget_2)
143     self.label_40.setGeometry(QtCore.QRect(551, 70, 140, 21))
144     font = QtGui.QFont()
145     font.setPointSize(10)
146     self.label_40.setFont(font)
147     self.label_40.setAlignment(QtCore.Qt.AlignCenter)
148     self.label_40.setObjectName("label_40")
149     self.label_41 = QtWidgets.QLabel(self.widget_2)
150     self.label_41.setGeometry(QtCore.QRect(191, 70, 110, 21))
151     font = QtGui.QFont()
152     font.setPointSize(10)
153     self.label_41.setFont(font)
154     self.label_41.setAlignment(QtCore.Qt.AlignCenter)
155     self.label_41.setObjectName("label_41")
156     self.label_42 = QtWidgets.QLabel(self.widget_2)
157     self.label_42.setGeometry(QtCore.QRect(311, 70, 110, 21))
158     font = QtGui.QFont()
159     font.setPointSize(10)
160     self.label_42.setFont(font)
161     self.label_42.setAlignment(QtCore.Qt.AlignCenter)
162     self.label_42.setObjectName("label_42")
163     self.label_43 = QtWidgets.QLabel(self.widget_2)
164     self.label_43.setGeometry(QtCore.QRect(431, 70, 110, 21))
165     font = QtGui.QFont()
166     font.setPointSize(10)
167     self.label_43.setFont(font)
168     self.label_43.setAlignment(QtCore.Qt.AlignCenter)
169     self.label_43.setObjectName("label_43")
170     self.comboBox_14 = QtWidgets.QComboBox(self.widget_2)
171     self.comboBox_14.setGeometry(QtCore.QRect(30, 100, 140, 22))
172     self.comboBox_14.setStyleSheet("background-color: #ffffff")
173     self.comboBox_14.setObjectName("comboBox_14")
174     self.comboBox_15 = QtWidgets.QComboBox(self.widget_2)
175     self.comboBox_15.setGeometry(QtCore.QRect(30, 130, 140, 22))
176     self.comboBox_15.setStyleSheet("background-color: #ffffff")

```

```

177     self.comboBox_15.setObjectName("comboBox_15")
178
179     self.lineEdit_25 = QtWidgets.QLineEdit(self.widget_2)
180
181     self.lineEdit_25.setGeometry(QtCore.QRect(210, 100, 81, 20))
182
183     font = QtGui.QFont()
184
185     font.setPointSize(10)
186
187     self.lineEdit_25.setFont(font)
188
189     self.lineEdit_25.setStyleSheet("background-color: #ffffff")
190
191     self.lineEdit_25.setObjectName("lineEdit_25")
192
193     self.lineEdit_26 = QtWidgets.QLineEdit(self.widget_2)
194
195     self.lineEdit_26.setGeometry(QtCore.QRect(210, 130, 81, 20))
196
197     font = QtGui.QFont()
198
199     font.setPointSize(10)
200
201     self.lineEdit_26.setFont(font)
202
203     self.lineEdit_26.setStyleSheet("background-color: #ffffff")
204
205     self.lineEdit_26.setObjectName("lineEdit_26")
206
207     self.label_44 = QtWidgets.QLabel(self.widget_2)
208
209     self.label_44.setGeometry(QtCore.QRect(340, 100, 51, 20))
210
211     font = QtGui.QFont()
212
213     font.setPointSize(10)
214
215     self.label_44.setFont(font)
216
217     self.label_44.setStyleSheet("background-color: #ffffff")
218
219     self.label_44.setAlignment(QtCore.Qt.AlignCenter)
220
221     self.label_44.setObjectName("label_44")
222
223     self.label_45 = QtWidgets.QLabel(self.widget_2)
224
225     self.label_45.setGeometry(QtCore.QRect(340, 130, 51, 20))
226
227     font = QtGui.QFont()
228
229     font.setPointSize(10)
230
231     self.label_45.setFont(font)
232
233     self.label_45.setStyleSheet("background-color: #ffffff")
234
235     self.label_45.setAlignment(QtCore.Qt.AlignCenter)
236
237     self.label_45.setObjectName("label_45")
238
239     self.lineEdit_27 = QtWidgets.QLineEdit(self.widget_2)
240
241     self.lineEdit_27.setGeometry(QtCore.QRect(450, 100, 81, 20))
242
243     font = QtGui.QFont()
244
245     font.setPointSize(10)
246
247     self.lineEdit_27.setFont(font)
248
249     self.lineEdit_27.setStyleSheet("background-color: #ffffff")
250
251     self.lineEdit_27.setObjectName("lineEdit_27")
252
253     self.lineEdit_28 = QtWidgets.QLineEdit(self.widget_2)

```

```

216     self.lineEdit_28.setGeometry(QtCore.QRect(450, 130, 81, 20))
217     font = QtGui.QFont()
218     font.setPointSize(10)
219     self.lineEdit_28.setFont(font)
220     self.lineEdit_28.setStyleSheet("background-color: #ffffff")
221     self.lineEdit_28.setObjectName("lineEdit_28")
222     self.lineEdit_29 = QtWidgets.QLineEdit(self.widget_2)
223     self.lineEdit_29.setGeometry(QtCore.QRect(570, 100, 101, 20))
224     font = QtGui.QFont()
225     font.setPointSize(10)
226     self.lineEdit_29.setFont(font)
227     self.lineEdit_29.setStyleSheet("background-color: #ffffff")
228     self.lineEdit_29.setObjectName("lineEdit_29")
229     self.lineEdit_30 = QtWidgets.QLineEdit(self.widget_2)
230     self.lineEdit_30.setGeometry(QtCore.QRect(570, 130, 101, 20))
231     font = QtGui.QFont()
232     font.setPointSize(10)
233     self.lineEdit_30.setFont(font)
234     self.lineEdit_30.setStyleSheet("background-color: #ffffff")
235     self.lineEdit_30.setObjectName("lineEdit_30")
236     self.pushButton_13 = QtWidgets.QPushButton(self.widget_2)
237     self.pushButton_13.setGeometry(QtCore.QRect(300, 200, 190, 23))
238     self.pushButton_13.setStyleSheet("background-color: #ffffff")
239     self.pushButton_13.setObjectName("pushButton_13")
240     self.label_46 = QtWidgets.QLabel(self.widget_2)
241     self.label_46.setGeometry(QtCore.QRect(30, 330, 161, 21))
242     font = QtGui.QFont()
243     font.setPointSize(10)
244     self.label_46.setFont(font)
245     self.label_46.setAlignment(QtCore.Qt.AlignCenter)
246     self.label_46.setObjectName("label_46")
247     self.comboBox_16 = QtWidgets.QComboBox(self.widget_2)
248     self.comboBox_16.setGeometry(QtCore.QRect(150, 270, 190, 22))
249     font = QtGui.QFont()
250     font.setPointSize(10)
251     self.comboBox_16.setFont(font)
252     self.comboBox_16.setStyleSheet("background-color: #ffffff")
253     self.comboBox_16.setObjectName("comboBox_16")
254     self.comboBox_16.addItem("")

```

```

255     self.label_47 = QtWidgets.QLabel(self.widget_2)
256     self.label_47.setGeometry(QtCore.QRect(441, 330, 110, 21))
257     font = QtGui.QFont()
258     font.setPointSize(10)
259     self.label_47.setFont(font)
260     self.label_47.setAlignment(QtCore.Qt.AlignCenter)
261     self.label_47.setObjectName("label_47")
262     self.label_48 = QtWidgets.QLabel(self.widget_2)
263     self.label_48.setGeometry(QtCore.QRect(350, 390, 51, 20))
264     font = QtGui.QFont()
265     font.setPointSize(10)
266     self.label_48.setFont(font)
267     self.label_48.setStyleSheet("background-color: #ffffff")
268     self.label_48.setAlignment(QtCore.Qt.AlignCenter)
269     self.label_48.setObjectName("label_48")
270     self.label_49 = QtWidgets.QLabel(self.widget_2)
271     self.label_49.setGeometry(QtCore.QRect(561, 330, 140, 21))
272     font = QtGui.QFont()
273     font.setPointSize(10)
274     self.label_49.setFont(font)
275     self.label_49.setAlignment(QtCore.Qt.AlignCenter)
276     self.label_49.setObjectName("label_49")
277     self.label_50 = QtWidgets.QLabel(self.widget_2)
278     self.label_50.setGeometry(QtCore.QRect(350, 360, 51, 20))
279     font = QtGui.QFont()
280     font.setPointSize(10)
281     self.label_50.setFont(font)
282     self.label_50.setStyleSheet("background-color: #ffffff")
283     self.label_50.setAlignment(QtCore.Qt.AlignCenter)
284     self.label_50.setObjectName("label_50")
285     self.label_51 = QtWidgets.QLabel(self.widget_2)
286     self.label_51.setGeometry(QtCore.QRect(321, 330, 110, 21))
287     font = QtGui.QFont()
288     font.setPointSize(10)
289     self.label_51.setFont(font)
290     self.label_51.setAlignment(QtCore.Qt.AlignCenter)
291     self.label_51.setObjectName("label_51")
292     self.lineEdit_31 = QtWidgets.QLineEdit(self.widget_2)
293     self.lineEdit_31.setGeometry(QtCore.QRect(220, 390, 81, 20))

```

```

294     font = QtGui.QFont()
295     font.setPointSize(10)
296     self.lineEdit_31.setFont(font)
297     self.lineEdit_31.setStyleSheet("background-color: #ffffff")
298     self.lineEdit_31.setObjectName("lineEdit_31")
299     self.lineEdit_32 = QtWidgets.QLineEdit(self.widget_2)
300     self.lineEdit_32.setGeometry(QtCore.QRect(580, 360, 101, 20))
301     font = QtGui.QFont()
302     font.setPointSize(10)
303     self.lineEdit_32.setFont(font)
304     self.lineEdit_32.setStyleSheet("background-color: #ffffff")
305     self.lineEdit_32.setObjectName("lineEdit_32")
306     self.label_52 = QtWidgets.QLabel(self.widget_2)
307     self.label_52.setGeometry(QtCore.QRect(201, 330, 110, 21))
308     font = QtGui.QFont()
309     font.setPointSize(10)
310     self.label_52.setFont(font)
311     self.label_52.setAlignment(QtCore.Qt.AlignCenter)
312     self.label_52.setObjectName("label_52")
313     self.pushButton_14 = QtWidgets.QPushButton(self.widget_2)
314     self.pushButton_14.setGeometry(QtCore.QRect(310, 460, 190, 23))
315     self.pushButton_14.setStyleSheet("background-color: #ffffff")
316     self.pushButton_14.setObjectName("pushButton_14")
317     self.pushButton_15 = QtWidgets.QPushButton(self.widget_2)
318     self.pushButton_15.setGeometry(QtCore.QRect(360, 270, 190, 23))
319     self.pushButton_15.setStyleSheet("background-color: #ffffff")
320     self.pushButton_15.setObjectName("pushButton_15")
321     self.label_53 = QtWidgets.QLabel(self.widget_2)
322     self.label_53.setGeometry(QtCore.QRect(30, 270, 91, 21))
323     font = QtGui.QFont()
324     font.setPointSize(10)
325     self.label_53.setFont(font)
326     self.label_53.setObjectName("label_53")
327     self.lineEdit_36 = QtWidgets.QLineEdit(self.widget_2)
328     self.lineEdit_36.setGeometry(QtCore.QRect(580, 390, 101, 20))
329     font = QtGui.QFont()
330     font.setPointSize(10)
331     self.lineEdit_36.setFont(font)
332     self.lineEdit_36.setStyleSheet("background-color: #ffffff")

```

```

333     self.lineEdit_36.setObjectName("lineEdit_36")
334
335     self.comboBox_17 = QtWidgets.QComboBox(self.widget_2)
336     self.comboBox_17.setGeometry(QtCore.QRect(40, 360, 140, 22))
337     self.comboBox_17.setStyleSheet("background-color: #ffffff")
338     self.comboBox_17.setObjectName("comboBox_17")
339
340     self.comboBox_17.addItem("")
341     self.comboBox_17.addItem("")
342
343     self.comboBox_18 = QtWidgets.QComboBox(self.widget_2)
344     self.comboBox_18.setGeometry(QtCore.QRect(40, 390, 140, 22))
345     self.comboBox_18.setStyleSheet("background-color: #ffffff")
346     self.comboBox_18.setObjectName("comboBox_18")
347
348     self.comboBox_18.addItem("")
349     self.comboBox_18.addItem("")
350
351     self.line_5 = QtWidgets.QFrame(self.widget_2)
352     self.line_5.setGeometry(QtCore.QRect(10, 250, 761, 16))
353     self.line_5.setContextMenuPolicy(QtCore.Qt.DefaultContextMenu)
354     self.line_5.setFrameShadow(QtWidgets.QFrame.Sunken)
355
356     self.line_5.setLineWidth(2)
357
358     self.line_5.setMidLineWidth(2)
359
360     self.line_5.setFrameShape(QtWidgets.QFrame.HLine)
361     self.line_5.setObjectName("line_5")
362
363     self.line_6 = QtWidgets.QFrame(self.widget_2)
364     self.line_6.setGeometry(QtCore.QRect(10, 500, 761, 16))
365
366     self.line_6.setContextMenuPolicy(QtCore.Qt.DefaultContextMenu)
367     self.line_6.setFrameShadow(QtWidgets.QFrame.Sunken)
368
369     self.line_6.setLineWidth(2)
370
371     self.line_6.setMidLineWidth(2)
372
373     self.line_6.setFrameShape(QtWidgets.QFrame.HLine)
374
375     self.line_6.setObjectName("line_6")
376
377     self.buttonBox = QtWidgets.QDialogButtonBox(self.widget_2)
378     self.buttonBox.setGeometry(QtCore.QRect(430, 590, 341, 32))
379
380     self.buttonBox.setOrientation(QtCore.Qt.Horizontal)
381
382     self.buttonBox.setStandardButtons(QtWidgets.QDialogButtonBox.
383 Close|QtWidgets.QDialogButtonBox.Save)
384
385     self.buttonBox.setObjectName("buttonBox")
386
387     self.pushButton_6 = QtWidgets.QPushButton(SubStructure_Dialog)
388     self.pushButton_6.setGeometry(QtCore.QRect(350, 10, 188, 25))
389
390     font = QtGui.QFont()
391
392     font.setPointSize(10)

```

```

371     font.setBold(True)
372     font.setWeight(75)
373     self.pushButton_6.setFont(font)
374     self.pushButton_6.setFocusPolicy(QtCore.Qt.StrongFocus)
375     self.pushButton_6.setLayoutDirection(QtCore.Qt.RightToLeft)
376     self.pushButton_6.setStyleSheet("background-color: rgb
377 (240, 230, 230)")
378     self.pushButton_6.setIcon(icon)
379     self.pushButton_6.setAutoRepeat(False)
380     self.pushButton_6.setObjectName("pushButton_6")
381     self.scrollArea = QtWidgets.QScrollArea(SubStructure_Dialog)
382     self.scrollArea.setGeometry(QtCore.QRect(10, 40, 241, 681))
383     self.scrollArea.setAutoFillBackground(False)
384     self.scrollArea.setStyleSheet("background-color: #fff9f9")
385     self.scrollArea.setWidgetResizable(True)
386     self.scrollArea.setObjectName("scrollArea")
387     self.scrollAreaWidgetContents_3 = QtWidgets.QWidget()
388     self.scrollAreaWidgetContents_3.setGeometry(QtCore.QRect(0, 0,
389 239, 679))
390     self.scrollAreaWidgetContents_3.setObjectName("scrollAreaWidgetContents_3")
391     self.label_54 = QtWidgets.QLabel(self.
392 scrollAreaWidgetContents_3)
393     self.label_54.setGeometry(QtCore.QRect(0, 0, 221, 31))
394     font = QtGui.QFont()
395     font.setPointSize(10)
396     self.label_54.setFont(font)
397     self.label_54.setStyleSheet("background-color: rgb(240, 230, 230)
398 ")
399     self.label_54.setAlignment(QtCore.Qt.AlignCenter)
400     self.label_54.setObjectName("label_54")
401     self.widget_4 = QtWidgets.QWidget(self.
402 scrollAreaWidgetContents_3)
403     self.widget_4.setGeometry(QtCore.QRect(0, 30, 221, 357))
404     self.widget_4.setStyleSheet("background-color: #fff9f9")
405     self.widget_4.setObjectName("widget_4")
406     self.verticalLayout_3 = QtWidgets.QVBoxLayout(self.widget_4)
407     self.verticalLayout_3.setContentsMargins(0, 0, 0, 0)
408     self.verticalLayout_3.setObjectName("verticalLayout_3")

```



```

431         self.pushButton_36 = QtWidgets.QPushButton(self.widget_7,
432                                         clicked=lambda: self.openSuperStructureWindow())
433
434         font = QtGui.QFont()
435         font.setPointSize(10)
436         font.setBold(False)
437         font.setWeight(50)
438
439         self.pushButton_36.setFont(font)
440         self.pushButton_36.setIcon(icon2)
441         self.pushButton_36.setObjectName("pushButton_36")
442
443         self.formLayout_3.setWidget(1, QtWidgets.QFormLayout.LabelRole,
444                                   self.pushButton_36)
445
446         self.pushButton_37 = QtWidgets.QPushButton(self.widget_7,
447                                         clicked=lambda: self.openSubStructureWindow())
448
449         font = QtGui.QFont()
450         font.setPointSize(10)
451         font.setBold(False)
452         font.setWeight(50)
453
454         self.pushButton_37.setFont(font)
455         self.pushButton_37.setIcon(icon2)
456         self.pushButton_37.setObjectName("pushButton_37")
457
458         self.formLayout_3.setWidget(2, QtWidgets.QFormLayout.LabelRole,
459                                   self.pushButton_37)
460
461         self.pushButton_38 = QtWidgets.QPushButton(self.widget_7,
462                                         clicked=lambda: self.openMiscellaneousWindow())
463
464         font = QtGui.QFont()
465         font.setPointSize(10)
466         font.setBold(False)
467         font.setWeight(50)
468
469         self.pushButton_38.setFont(font)
470         self.pushButton_38.setIcon(icon2)
471         self.pushButton_38.setObjectName("pushButton_38")
472
473         self.formLayout_3.setWidget(3, QtWidgets.QFormLayout.LabelRole,
474                                   self.pushButton_38)
475
476         self.verticalLayout_3.addWidget(self.widget_7)
477
478         self.pushButton_39 = QtWidgets.QPushButton(self.widget_4,
479                                         clicked=lambda: self.openFinancialWindow())
480
481         font = QtGui.QFont()
482         font.setPointSize(10)
483
484         self.pushButton_39.setFont(font)

```

```

463     self.pushButton_39.setObjectName("pushButton_39")
464     self.verticalLayout_3.addWidget(self.pushButton_39)
465     self.pushButton_40 = QtWidgets.QPushButton(self.widget_4)
466     font = QtGui.QFont()
467     font.setPointSize(10)
468     self.pushButton_40.setFont(font)
469     self.pushButton_40.setIcon(icon1)
470     self.pushButton_40.setCheckable(True)
471     self.pushButton_40.setObjectName("pushButton_40")
472     self.verticalLayout_3.addWidget(self.pushButton_40)
473     self.widget_10 = QtWidgets.QWidget(self.widget_4)
474     self.widget_10.setMinimumSize(QtCore.QSize(203, 21))
475     self.widget_10.setMaximumSize(QtCore.QSize(281, 21))
476     self.widget_10.setObjectName("widget_10")
477     self.pushButton_41 = QtWidgets.QPushButton(self.widget_10,
478     clicked=lambda: self.openCarbonEmissionWindow())
479         self.pushButton_41.setGeometry(QtCore.QRect(20, 0, 183, 21))
480         font = QtGui.QFont()
481         font.setPointSize(10)
482         font.setBold(False)
483         font.setWeight(50)
484         self.pushButton_41.setFont(font)
485         self.pushButton_41.setIcon(icon2)
486         self.pushButton_41.setObjectName("pushButton_41")
487         self.verticalLayout_3.addWidget(self.widget_10)
488         self.pushButton_42 = QtWidgets.QPushButton(self.widget_4,
489     clicked=lambda: self.openBridgeTrafficWindow())
490         font = QtGui.QFont()
491         font.setPointSize(10)
492         self.pushButton_42.setFont(font)
493         self.pushButton_42.setObjectName("pushButton_42")
494         self.verticalLayout_3.addWidget(self.pushButton_42)
495         self.pushButton_43 = QtWidgets.QPushButton(self.widget_4,
496     clicked=lambda: self.openMaintenanceWindow())
497         font = QtGui.QFont()
498         font.setPointSize(10)

```

```

499         self.pushButton_16 = QtWidgets.QPushButton(self.widget_4,
500                                         clicked=lambda: self.openDemolitionWindow())
501
502         font = QtGui.QFont()
503         font.setPointSize(10)
504         self.pushButton_16.setFont(font)
505         self.pushButton_16.setObjectName("pushButton_16")
506         self.verticalLayout_3.addWidget(self.pushButton_16)
507
508         self.label_55 = QtWidgets.QLabel(self.
509                                         scrollAreaWidgetContents_3)
510
511         self.label_55.setGeometry(QtCore.QRect(0, 387, 221, 31))
512
513         font = QtGui.QFont()
514         font.setPointSize(10)
515         self.label_55.setFont(font)
516
517         self.label_55.setStyleSheet("background-color: rgb(240,230,230)")
518
519         self.label_55.setAlignment(QtCore.Qt.AlignCenter)
520         self.label_55.setObjectName("label_55")
521
522         self.textBrowser_3 = QtWidgets.QTextBrowser(self.
523                                         scrollAreaWidgetContents_3)
524
525         self.textBrowser_3.setGeometry(QtCore.QRect(0, 418, 221, 221))
526
527         self.textBrowser_3.setStyleSheet("background-color: #fff9f9")
528
529         self.textBrowser_3.setObjectName("textBrowser_3")
530
531         self.verticalScrollBar_3 = QtWidgets.QScrollBar(self.
532                                         scrollAreaWidgetContents_3)
533
534         self.verticalScrollBar_3.setGeometry(QtCore.QRect(220, 0, 16,
535                                         641))
536
537         self.verticalScrollBar_3.setStyleSheet("background-color: #"
538                                         "F0F0F0")
539
540         self.verticalScrollBar_3.setOrientation(QtCore.Qt.Vertical)
541
542         self.verticalScrollBar_3.setObjectName("verticalScrollBar_3")
543
544         self.scrollArea.setWidget(self.scrollAreaWidgetContents_3)
545
546
547         self.retranslateUi(SubStructure_Dialog)
548
549         self.buttonBox.accepted.connect(self.handle_save) # type:
550 ignore# type: ignore
551
552         self.buttonBox.rejected.connect(lambda: self.show_warning(
553                                         SubStructure_Dialog)) # type: ignore
554
555         #self.buttonBox.rejected.connect(SubStructure_Dialog.reject)
556
557         QtCore.QMetaObject.connectSlotsByName(SubStructure_Dialog)

```

```

529
530     def show_warning(self, dialog):
531         """
532             Show a warning window when the Close button is pressed.
533         """
534
535         warning_box = QMessageBox()
536         warning_box.setIcon(QMessageBox.Warning)
537         warning_box.setWindowTitle("Confirm Close")
538         warning_box.setText("Are you sure you want to close without
539             saving?")
540
541         warning_box.setStandardButtons(QMessageBox.Yes | QMessageBox.No
542 )
543
544         warning_box.setDefaultButton(QMessageBox.No)
545
546
547         # Check the user's response
548         response = warning_box.exec_()
549
550         if response == QMessageBox.Yes:
551             dialog.reject()      # Close the application
552
553         else:
554             pass    # Do nothing, return to the dialog
555
556
557     def retranslateUi(self, SubStructure_Dialog):
558
559         _translate = QtCore.QCoreApplication.translate
560
561         SubStructure_Dialog.setWindowTitle(_translate("SubStructure_Dialog",
562             "Sub-Structure Dialog"))
563
564         self.pushButton.setText(_translate("SubStructure_Dialog", "Project Details Window"))
565
566         self.label_38.setText(_translate("SubStructure_Dialog", "Components:"))
567
568         self.comboBox_13.setItemText(0, _translate("SubStructure_Dialog", "Piers"))
569
570         self.pushButton_10.setText(_translate("SubStructure_Dialog", "+ Add Sub-Component"))
571
572         self.label_39.setText(_translate("SubStructure_Dialog", "Material Type and Grade"))
573
574         self.label_40.setText(_translate("SubStructure_Dialog", "Rate Data Source"))
575
576         self.label_41.setText(_translate("SubStructure_Dialog", "Quantity"))

```

```

558         self.label_42.setText(_translate("SubStructure_Dialog", "Unit"))
559     )
560
561     self.label_43.setText(_translate("SubStructure_Dialog", "Rate"))
562 )
563
564     self.label_44.setText(_translate("SubStructure_Dialog", "<html"
565 ><head/><body><p><span style=\" font-size:10pt;\">m</span><span
566 style=\" font-size:10pt; vertical-align:super;\">3</span></p></body
567 ></html>"))
568
569     self.label_45.setText(_translate("SubStructure_Dialog", "kg"))
570
571     self.pushButton_13.setText(_translate("SubStructure_Dialog", "+"
572 Add Material"))
573
574     self.label_46.setText(_translate("SubStructure_Dialog", "Material Type and Grade"))
575
576     self.comboBox_16.setItemText(0, _translate("SubStructure_Dialog",
577 "Abutment"))
578
579     self.label_47.setText(_translate("SubStructure_Dialog", "Rate"))
580 )
581
582     self.label_48.setText(_translate("SubStructure_Dialog", "kg"))
583
584     self.label_49.setText(_translate("SubStructure_Dialog", "Rate
585 Data Source"))
586
587     self.label_50.setText(_translate("SubStructure_Dialog", "<html"
588 ><head/><body><p><span style=\" font-size:10pt;\">m</span><span
589 style=\" font-size:10pt; vertical-align:super;\">3</span></p></body
590 ></html>"))
591
592     self.label_51.setText(_translate("SubStructure_Dialog", "Unit"))
593 )
594
595     self.label_52.setText(_translate("SubStructure_Dialog", "Quantity"))
596
597     self.pushButton_14.setText(_translate("SubStructure_Dialog", "+"
598 Add Material"))
599
600     self.pushButton_15.setText(_translate("SubStructure_Dialog", "+"
601 Add Sub-Component"))
602
603     self.label_53.setText(_translate("SubStructure_Dialog", "Components:"))
604
605     self.comboBox_17.setItemText(0, _translate("SubStructure_Dialog",
606 "Concrete"))
607
608     self.comboBox_17.setItemText(1, _translate("SubStructure_Dialog",
609 "Steel"))

```

```

576         self.comboBox_18.setItemText(0, _translate("SubStructure_Dialog",
577                                         "Steel"))
578         self.comboBox_18.setItemText(1, _translate("SubStructure_Dialog",
579                                         "Concrete"))
580         self.pushButton_6.setText(_translate("SubStructure_Dialog", "Sub-Structure"))
581         self.label_54.setText(_translate("SubStructure_Dialog", "Input Parameters"))
582         self.pushButton_34.setText(_translate("SubStructure_Dialog", "Structure Works Data"))
583         self.pushButton_35.setText(_translate("SubStructure_Dialog", "Foundation"))
584         self.pushButton_36.setText(_translate("SubStructure_Dialog", "Super-Structure"))
585         self.pushButton_37.setText(_translate("SubStructure_Dialog", "Sub-Structure"))
586         self.pushButton_38.setText(_translate("SubStructure_Dialog", "Miscellaneous"))
587         self.pushButton_39.setText(_translate("SubStructure_Dialog", "Financial Data"))
588         self.pushButton_40.setText(_translate("SubStructure_Dialog", "Carbon Emission Data"))
589         self.pushButton_41.setText(_translate("SubStructure_Dialog", "Carbon Emission Cost Data"))
590         self.pushButton_42.setText(_translate("SubStructure_Dialog", "Bridge and Traffic Data"))
591         self.pushButton_43.setText(_translate("SubStructure_Dialog", "Maintenance and Repair"))
592         self.pushButton_16.setText(_translate("SubStructure_Dialog", "Disposal and Recycling"))
593         self.label_55.setText(_translate("SubStructure_Dialog", "Output"))
594         self.textBrowser_3.setHtml(_translate("SubStructure_Dialog", "<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.org/TR/REC-html40/strict.dtd\">\n<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"text/css\">\n    p, li { white-space: pre-wrap; }</style>\n</head><body>\n        <h1>Sub-Structure</h1>\n        <h2>Steel</h2>\n        <h2>Concrete</h2>\n        <h2>Foundation</h2>\n        <h2>Super-Structure</h2>\n        <h2>Sub-Structure</h2>\n        <h2>Miscellaneous</h2>\n        <h2>Financial Data</h2>\n        <h2>Carbon Emission Data</h2>\n        <h2>Carbon Emission Cost Data</h2>\n        <h2>Bridge and Traffic Data</h2>\n        <h2>Maintenance and Repair</h2>\n        <h2>Disposal and Recycling</h2>\n</body>\n</html>"))

```

```

595 "</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-
      size:8.25pt; font-weight:400; font-style:normal;\">\n"
596 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
      -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Initial Construction Cost</span></p>
      \n"
597 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
      -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Initial Carbon emission Cost</span>
      </p>\n"
598 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
      -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Time Cost</span></p>\n"
599 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
      -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Road User Cost</span></p>\n"
600 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
      -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Carbon Emission due to Re-Routing</
      span></p>\n"
601 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
      -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Periodic Maintenance Costs</span></
      p>\n"
602 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
      -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Maintenance Emission Costs</span></
      p>\n"
603 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
      -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Routine Inspectection Costs</span>
      </p>\n"
604 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
      -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Repair & Rehabilitation Costs</
      span></p>\n"
605 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
      -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
      font-size:10pt; color:#aa8b8b;\">Reconstruction Costs</span></p>\n"

```

```

606 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Demolition & Disposal Cost</span></p>\n"
607 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Recycling Cost</span></p>\n"
608 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\" font-size:10pt; color:#aa8b8b;\">Total Life-Cycle Cost</span></p></body></html>"))
609
610     def validate_data(self):
611         """Validate input data before saving"""
612         try:
613             # Validate all numeric fields
614             fields_to_validate = [
615                 self.lineEdit_25, self.lineEdit_26, self.lineEdit_27,
616                 self.lineEdit_28, self.lineEdit_29, self.lineEdit_30,
617                 self.lineEdit_31, self.lineEdit_32, self.lineEdit_33,
618                 self.lineEdit_34, self.lineEdit_35, self.lineEdit_36
619             ]
620
621             for field in fields_to_validate:
622                 if field.text(): # Only validate if field is not empty
623                     float(field.text())
624
625             return True
626
627         except ValueError:
628             QMessageBox.warning(
629                 None,
630                 "Validation Error",
631                 "Please enter valid numbers in all numeric fields",
632                 QMessageBox.Ok
633             )
634             return False
635
636     def save_data(self):

```

```

637     """Collect all input data and save it to a JSON file"""
638
639     if not self.validate_data():
640         return False
641
642     data = {
643         "piers": [
644             {
645                 "component": self.comboBox_13.currentText(),
646                 "materials": [
647                     {
648                         "type_grade": self.comboBox_14.currentText(),
649                         "quantity": self.lineEdit_25.text(),
650                         "unit": self.label_44.text(),
651                         "rate": self.lineEdit_27.text(),
652                         "rate_source": self.lineEdit_29.text()
653                     },
654                     {
655                         "type_grade": self.comboBox_15.currentText(),
656                         "quantity": self.lineEdit_26.text(),
657                         "unit": self.label_45.text(),
658                         "rate": self.lineEdit_28.text(),
659                         "rate_source": self.lineEdit_30.text()
660                     }
661                 ],
662             },
663             "abutment": [
664                 {
665                     "component": self.comboBox_16.currentText(),
666                     "materials": [
667                         {
668                             "type_grade": self.comboBox_17.currentText(),
669                             "quantity": self.lineEdit_33.text(),
670                             "unit": self.label_50.text(),
671                             "rate": self.lineEdit_34.text(),
672                             "rate_source": self.lineEdit_32.text()
673                         },
674                         {
675                             "type_grade": self.comboBox_18.currentText(),
676                             "quantity": self.lineEdit_31.text(),
677                             "unit": self.label_48.text(),
678                             "rate": self.lineEdit_35.text(),
679                         }
680                     ]
681                 }
682             ]
683         }
684     }

```

```

676                         "rate_source": self.lineEdit_36.text()
677                     }
678                 ]
679             }
680         }
681
682     # Save to JSON file
683     try:
684         import json
685         from datetime import datetime
686         timestamp = datetime.now().strftime("%Y%m%d_%H%M%S")
687         filename = f"substructure_data_{timestamp}.json"
688
689         with open(filename, 'w') as f:
690             json.dump(data, f, indent=4)
691
692         # Show success message
693         QMessageBox.information(
694             None,
695             "Success",
696             f"Sub-structure data saved successfully to {filename}",
697             QMessageBox.Ok
698         )
699
700         return True
701
702     except Exception as e:
703         QMessageBox.critical(
704             None,
705             "Error",
706             f"Failed to save data: {str(e)}",
707             QMessageBox.Ok
708         )
709         return False
710
711     def handle_save(self):
712         """Handle the save operation and close the dialog if successful
713         """
714
715         if self.save_data(): # Only close if save was successful

```

```

714         SubStructure_Dialog.accept()
715
716 if __name__ == "__main__":
717     import sys
718     app = QtWidgets.QApplication(sys.argv)
719     SubStructure_Dialog = QtWidgets.QDialog()
720     ui = Ui_SubStructure_Dialog()
721     ui.setupUi(SubStructure_Dialog)
722     SubStructure_Dialog.show()
723     sys.exit(app.exec_())

```

## 9. Super Structure Data

```

1 # -*- coding: utf-8 -*-
2
3 # Form implementation generated from reading ui file 'C:\Users\saans\
4 #   AppData\Local\Programs\Python\Python310\Lib\site-packages\
5 #   qt5_applications\Qt\bin\ProjectDetails_SuperStructure_Window.ui'
6 #
7 # Created by: PyQt5 UI code generator 5.15.9
8 #
9 # WARNING: Any manual changes made to this file will be lost when
10 #          pyuic5 is
11 # run again. Do not edit this file unless you know what you are doing.
12
13
14
15
16
17
18
19
20
21 #from ProjectDetails_SuperStructure_Window import
22 #    Ui_SuperStructure_Dialog

```

```

23
24 class Ui_SuperStructure_Dialog(object):
25     def openBridgeTrafficWindow(self):
26         from ProjectDetails_BridgeANDTrafficData_Window import
27             Ui_BridgeTraffic_Dialog
28
29             self.window = QtWidgets.QDialog()
30             self.ui = Ui_BridgeTraffic_Dialog()
31             self.ui.setupUi(self.window)
32             self.window.show()
33
34
35     def openFoundationWindow(self):
36         from ProjectDetails_Foundation_Window import
37             Ui_Foundation_Dialog
38
39             self.window = QtWidgets.QDialog()
40             self.ui = Ui_Foundation_Dialog()
41             self.ui.setupUi(self.window)
42             self.window.show()
43
44
45     def openCarbonEmissionWindow(self):
46         from ProjectDetails_CarbonEmissionData_Window import
47             Ui_CarbonEmission_Dialog
48
49             self.window = QtWidgets.QDialog()
50             self.ui = Ui_CarbonEmission_Dialog()
51             self.ui.setupUi(self.window)
52             self.window.show()
53
54
55     def openDemolitionWindow(self):
56         from ProjectDetails_DemolitionANDRecyclingData_Window import
57             Ui_Demolition_Dialog
58
59             self.window = QtWidgets.QDialog()
60             self.ui = Ui_Demolition_Dialog()
61             self.ui.setupUi(self.window)
62             self.window.show()
63
64
65     def openFinancialWindow(self):
66         from ProjectDetails_FinancialData_Window import
67             Ui_FinancialData_Dialog
68
69             self.window = QtWidgets.QDialog()
70             self.ui = Ui_FinancialData_Dialog()

```

```

57     self.ui.setupUi(self.window)
58     self.window.show()
59
60     def openMaintenanceWindow(self):
61         from ProjectDetails_MaintenanceANDRepairData_Window import
62         Ui_Maintenance_Dialog
63
64         self.window = QtWidgets.QDialog()
65         self.ui = Ui_Maintenance_Dialog()
66         self.ui.setupUi(self.window)
67         self.window.show()
68
69
70     def openMiscellaneousWindow(self):
71         from ProjectDetails_Miscellaneous_Window import
72         Ui_Miscellaneous_Dialog
73
74         self.window = QtWidgets.QDialog()
75         self.ui = Ui_Miscellaneous_Dialog()
76         self.ui.setupUi(self.window)
77         self.window.show()
78
79
80     def openSubStructureWindow(self):
81         from ProjectDetails_SubStructure_Window import
82         Ui_SubStructure_Dialog
83
84         self.window = QtWidgets.QDialog()
85         self.ui = Ui_SubStructure_Dialog()
86         self.ui.setupUi(self.window)
87         self.window.show()
88
89
90     def openSuperStructureWindow(self):
91         self.window = QtWidgets.QDialog()
92         self.ui = Ui_SuperStructure_Dialog()
93         self.ui.setupUi(self.window)
94         self.window.show()
95
96
97     def setupUi(self, SuperStructure_Dialog):
98         SuperStructure_Dialog.setObjectName("SuperStructure_Dialog")
99         SuperStructure_Dialog.resize(1440, 900)
100        SuperStructure_Dialog.setStyleSheet("background-color:#FAFAFA")
101        self.label = QtWidgets.QLabel(SuperStructure_Dialog)
102        self.label.setGeometry(QtCore.QRect(10, 35, 244, 691))

```



```

127     font.setPointSize(10)
128     self.comboBox_7.setFont(font)
129     self.comboBox_7.setStyleSheet("background-color: #ffffff")
130     self.comboBox_7.setObjectName("comboBox_7")
131     self.comboBox_7.addItem("")
132     self.pushButton_7 = QtWidgets.QPushButton(self.widget_2)
133     self.pushButton_7.setGeometry(QtCore.QRect(350, 10, 190, 23))
134     self.pushButton_7.setStyleSheet("background-color: #ffffff")
135     self.pushButton_7.setObjectName("pushButton_7")
136     self.label_21 = QtWidgets.QLabel(self.widget_2)
137     self.label_21.setGeometry(QtCore.QRect(20, 70, 161, 21))
138     font = QtGui.QFont()
139     font.setPointSize(10)
140     self.label_21.setFont(font)
141     self.label_21.setAlignment(QtCore.Qt.AlignCenter)
142     self.label_21.setObjectName("label_21")
143     self.label_22 = QtWidgets.QLabel(self.widget_2)
144     self.label_22.setGeometry(QtCore.QRect(551, 70, 140, 21))
145     font = QtGui.QFont()
146     font.setPointSize(10)
147     self.label_22.setFont(font)
148     self.label_22.setAlignment(QtCore.Qt.AlignCenter)
149     self.label_22.setObjectName("label_22")
150     self.label_23 = QtWidgets.QLabel(self.widget_2)
151     self.label_23.setGeometry(QtCore.QRect(191, 70, 110, 21))
152     font = QtGui.QFont()
153     font.setPointSize(10)
154     self.label_23.setFont(font)
155     self.label_23.setAlignment(QtCore.Qt.AlignCenter)
156     self.label_23.setObjectName("label_23")
157     self.label_24 = QtWidgets.QLabel(self.widget_2)
158     self.label_24.setGeometry(QtCore.QRect(311, 70, 110, 21))
159     font = QtGui.QFont()
160     font.setPointSize(10)
161     self.label_24.setFont(font)
162     self.label_24.setAlignment(QtCore.Qt.AlignCenter)
163     self.label_24.setObjectName("label_24")
164     self.label_25 = QtWidgets.QLabel(self.widget_2)
165     self.label_25.setGeometry(QtCore.QRect(431, 70, 110, 21))

```

```

166     font = QtGui.QFont()
167     font.setPointSize(10)
168     self.label_25.setFont(font)
169     self.label_25.setAlignment(QtCore.Qt.AlignCenter)
170     self.label_25.setObjectName("label_25")
171     self.comboBox_8 = QtWidgets.QComboBox(self.widget_2)
172     self.comboBox_8.setGeometry(QtCore.QRect(30, 100, 140, 22))
173     self.comboBox_8.setStyleSheet("background-color: #ffffff")
174     self.comboBox_8.setObjectName("comboBox_8")
175     self.comboBox_9 = QtWidgets.QComboBox(self.widget_2)
176     self.comboBox_9.setGeometry(QtCore.QRect(30, 130, 140, 22))
177     self.comboBox_9.setStyleSheet("background-color: #ffffff")
178     self.comboBox_9.setObjectName("comboBox_9")
179     self.lineEdit_13 = QtWidgets.QLineEdit(self.widget_2)
180     self.lineEdit_13.setGeometry(QtCore.QRect(210, 100, 81, 20))
181     font = QtGui.QFont()
182     font.setPointSize(10)
183     self.lineEdit_13.setFont(font)
184     self.lineEdit_13.setStyleSheet("background-color: #ffffff")
185     self.lineEdit_13.setObjectName("lineEdit_13")
186     self.lineEdit_14 = QtWidgets.QLineEdit(self.widget_2)
187     self.lineEdit_14.setGeometry(QtCore.QRect(210, 130, 81, 20))
188     font = QtGui.QFont()
189     font.setPointSize(10)
190     self.lineEdit_14.setFont(font)
191     self.lineEdit_14.setStyleSheet("background-color: #ffffff")
192     self.lineEdit_14.setObjectName("lineEdit_14")
193     self.label_26 = QtWidgets.QLabel(self.widget_2)
194     self.label_26.setGeometry(QtCore.QRect(340, 100, 51, 20))
195     font = QtGui.QFont()
196     font.setPointSize(10)
197     self.label_26.setFont(font)
198     self.label_26.setStyleSheet("background-color: #ffffff")
199     self.label_26.setAlignment(QtCore.Qt.AlignCenter)
200     self.label_26.setObjectName("label_26")
201     self.label_27 = QtWidgets.QLabel(self.widget_2)
202     self.label_27.setGeometry(QtCore.QRect(340, 130, 51, 20))
203     font = QtGui.QFont()
204     font.setPointSize(10)

```

```

205     self.label_27.setFont(font)
206     self.label_27.setStyleSheet("background-color: #ffffff")
207     self.label_27.setAlignment(QtCore.Qt.AlignCenter)
208     self.label_27.setObjectName("label_27")
209     self.lineEdit_15 = QtWidgets.QLineEdit(self.widget_2)
210     self.lineEdit_15.setGeometry(QtCore.QRect(450, 100, 81, 20))
211     font = QtGui.QFont()
212     font.setPointSize(10)
213     self.lineEdit_15.setFont(font)
214     self.lineEdit_15.setStyleSheet("background-color: #ffffff")
215     self.lineEdit_15.setObjectName("lineEdit_15")
216     self.lineEdit_16 = QtWidgets.QLineEdit(self.widget_2)
217     self.lineEdit_16.setGeometry(QtCore.QRect(450, 130, 81, 20))
218     font = QtGui.QFont()
219     font.setPointSize(10)
220     self.lineEdit_16.setFont(font)
221     self.lineEdit_16.setStyleSheet("background-color: #ffffff")
222     self.lineEdit_16.setObjectName("lineEdit_16")
223     self.lineEdit_17 = QtWidgets.QLineEdit(self.widget_2)
224     self.lineEdit_17.setGeometry(QtCore.QRect(570, 100, 101, 20))
225     font = QtGui.QFont()
226     font.setPointSize(10)
227     self.lineEdit_17.setFont(font)
228     self.lineEdit_17.setStyleSheet("background-color: #ffffff")
229     self.lineEdit_17.setObjectName("lineEdit_17")
230     self.lineEdit_18 = QtWidgets.QLineEdit(self.widget_2)
231     self.lineEdit_18.setGeometry(QtCore.QRect(570, 130, 101, 20))
232     font = QtGui.QFont()
233     font.setPointSize(10)
234     self.lineEdit_18.setFont(font)
235     self.lineEdit_18.setStyleSheet("background-color: #ffffff")
236     self.lineEdit_18.setObjectName("lineEdit_18")
237     self.pushButton_8 = QtWidgets.QPushButton(self.widget_2)
238     self.pushButton_8.setGeometry(QtCore.QRect(300, 200, 190, 23))
239     self.pushButton_8.setStyleSheet("background-color: #ffffff")
240     self.pushButton_8.setObjectName("pushButton_8")
241     self.label_28 = QtWidgets.QLabel(self.widget_2)
242     self.label_28.setGeometry(QtCore.QRect(30, 330, 161, 21))
243     font = QtGui.QFont()

```

```

244     font.setPointSize(10)
245     self.label_28.setFont(font)
246     self.label_28.setAlignment(QtCore.Qt.AlignCenter)
247     self.label_28.setObjectName("label_28")
248     self.comboBox_10 = QtWidgets.QComboBox(self.widget_2)
249     self.comboBox_10.setGeometry(QtCore.QRect(150, 270, 190, 22))
250     font = QtGui.QFont()
251     font.setPointSize(10)
252     self.comboBox_10.setFont(font)
253     self.comboBox_10.setStyleSheet("background-color: #ffffff")
254     self.comboBox_10.setObjectName("comboBox_10")
255     self.comboBox_10.addItem("")
256     self.label_29 = QtWidgets.QLabel(self.widget_2)
257     self.label_29.setGeometry(QtCore.QRect(441, 330, 110, 21))
258     font = QtGui.QFont()
259     font.setPointSize(10)
260     self.label_29.setFont(font)
261     self.label_29.setAlignment(QtCore.Qt.AlignCenter)
262     self.label_29.setObjectName("label_29")
263     self.label_30 = QtWidgets.QLabel(self.widget_2)
264     self.label_30.setGeometry(QtCore.QRect(350, 390, 51, 20))
265     font = QtGui.QFont()
266     font.setPointSize(10)
267     self.label_30.setFont(font)
268     self.label_30.setStyleSheet("background-color: #ffffff")
269     self.label_30.setAlignment(QtCore.Qt.AlignCenter)
270     self.label_30.setObjectName("label_30")
271     self.label_31 = QtWidgets.QLabel(self.widget_2)
272     self.label_31.setGeometry(QtCore.QRect(561, 330, 140, 21))
273     font = QtGui.QFont()
274     font.setPointSize(10)
275     self.label_31.setFont(font)
276     self.label_31.setAlignment(QtCore.Qt.AlignCenter)
277     self.label_31.setObjectName("label_31")
278     self.label_32 = QtWidgets.QLabel(self.widget_2)
279     self.label_32.setGeometry(QtCore.QRect(350, 360, 51, 20))
280     font = QtGui.QFont()
281     font.setPointSize(10)
282     self.label_32.setFont(font)

```

```

283     self.label_32.setStyleSheet("background-color: #ffffff")
284     self.label_32.setAlignment(QtCore.Qt.AlignCenter)
285     self.label_32.setObjectName("label_32")
286     self.label_33 = QtWidgets.QLabel(self.widget_2)
287     self.label_33.setGeometry(QtCore.QRect(321, 330, 110, 21))
288     font = QtGui.QFont()
289     font.setPointSize(10)
290     self.label_33.setFont(font)
291     self.label_33.setAlignment(QtCore.Qt.AlignCenter)
292     self.label_33.setObjectName("label_33")
293     self.lineEdit_19 = QtWidgets.QLineEdit(self.widget_2)
294     self.lineEdit_19.setGeometry(QtCore.QRect(220, 390, 81, 20))
295     font = QtGui.QFont()
296     font.setPointSize(10)
297     self.lineEdit_19.setFont(font)
298     self.lineEdit_19.setStyleSheet("background-color: #ffffff")
299     self.lineEdit_19.setObjectName("lineEdit_19")
300     self.lineEdit_20 = QtWidgets.QLineEdit(self.widget_2)
301     self.lineEdit_20.setGeometry(QtCore.QRect(580, 360, 101, 20))
302     font = QtGui.QFont()
303     font.setPointSize(10)
304     self.lineEdit_20.setFont(font)
305     self.lineEdit_20.setStyleSheet("background-color: #ffffff")
306     self.lineEdit_20.setObjectName("lineEdit_20")
307     self.label_34 = QtWidgets.QLabel(self.widget_2)
308     self.label_34.setGeometry(QtCore.QRect(201, 330, 110, 21))
309     font = QtGui.QFont()
310     font.setPointSize(10)
311     self.label_34.setFont(font)
312     self.label_34.setAlignment(QtCore.Qt.AlignCenter)
313     self.label_34.setObjectName("label_34")
314     self.pushButton_9 = QtWidgets.QPushButton(self.widget_2)
315     self.pushButton_9.setGeometry(QtCore.QRect(310, 460, 190, 23))
316     self.pushButton_9.setStyleSheet("background-color: #ffffff")
317     self.pushButton_9.setObjectName("pushButton_9")
318     self.lineEdit_21 = QtWidgets.QLineEdit(self.widget_2)
319     self.lineEdit_21.setGeometry(QtCore.QRect(220, 360, 81, 20))
320     font = QtGui.QFont()
321     font.setPointSize(10)

```

```

322     self.lineEdit_21.setFont(font)
323     self.lineEdit_21.setStyleSheet("background-color: #ffffff")
324     self.lineEdit_21.setObjectName("lineEdit_21")
325     self.lineEdit_22 = QtWidgets.QLineEdit(self.widget_2)
326     self.lineEdit_22.setGeometry(QtCore.QRect(460, 360, 81, 20))
327     font = QtGui.QFont()
328     font.setPointSize(10)
329     self.lineEdit_22.setFont(font)
330     self.lineEdit_22.setStyleSheet("background-color: #ffffff")
331     self.lineEdit_22.setObjectName("lineEdit_22")
332     self.lineEdit_23 = QtWidgets.QLineEdit(self.widget_2)
333     self.lineEdit_23.setGeometry(QtCore.QRect(460, 390, 81, 20))
334     font = QtGui.QFont()
335     font.setPointSize(10)
336     self.lineEdit_23.setFont(font)
337     self.lineEdit_23.setStyleSheet("background-color: #ffffff")
338     self.lineEdit_23.setObjectName("lineEdit_23")
339     self.pushButton_11 = QtWidgets.QPushButton(self.widget_2)
340     self.pushButton_11.setGeometry(QtCore.QRect(360, 270, 190, 23))
341     self.pushButton_11.setStyleSheet("background-color: #ffffff")
342     self.pushButton_11.setObjectName("pushButton_11")
343     self.label_35 = QtWidgets.QLabel(self.widget_2)
344     self.label_35.setGeometry(QtCore.QRect(30, 270, 91, 21))
345     font = QtGui.QFont()
346     font.setPointSize(10)
347     self.label_35.setFont(font)
348     self.label_35.setObjectName("label_35")
349     self.lineEdit_24 = QtWidgets.QLineEdit(self.widget_2)
350     self.lineEdit_24.setGeometry(QtCore.QRect(580, 390, 101, 20))
351     font = QtGui.QFont()
352     font.setPointSize(10)
353     self.lineEdit_24.setFont(font)
354     self.lineEdit_24.setStyleSheet("background-color: #ffffff")
355     self.lineEdit_24.setObjectName("lineEdit_24")
356     self.comboBox_11 = QtWidgets.QComboBox(self.widget_2)
357     self.comboBox_11.setGeometry(QtCore.QRect(40, 360, 140, 22))
358     self.comboBox_11.setStyleSheet("background-color: #ffffff")
359     self.comboBox_11.setObjectName("comboBox_11")
360     self.comboBox_11.addItem("")

```

```

361     self.comboBox_11.addItem("")
362
363     self.comboBox_12 = QtWidgets.QComboBox(self.widget_2)
364     self.comboBox_12.setGeometry(QtCore.QRect(40, 390, 140, 22))
365     self.comboBox_12.setStyleSheet("background-color: #ffffff")
366     self.comboBox_12.setObjectName("comboBox_12")
367
368     self.comboBox_12.addItem("")
369     self.comboBox_12.addItem("")
370
371     self.line_3 = QtWidgets.QFrame(self.widget_2)
372     self.line_3.setGeometry(QtCore.QRect(10, 250, 761, 16))
373     self.line_3.setContextMenuPolicy(QtCore.Qt.DefaultContextMenu)
374     self.line_3.setFrameShadow(QtWidgets.QFrame.Sunken)
375     self.line_3.setLineWidth(2)
376     self.line_3.setMidLineWidth(2)
377     self.line_3.setFrameShape(QtWidgets.QFrame.HLine)
378     self.line_3.setObjectName("line_3")
379
380     self.line_4 = QtWidgets.QFrame(self.widget_2)
381     self.line_4.setGeometry(QtCore.QRect(10, 500, 761, 16))
382     self.line_4.setContextMenuPolicy(QtCore.Qt.DefaultContextMenu)
383     self.line_4.setFrameShadow(QtWidgets.QFrame.Sunken)
384     self.line_4.setLineWidth(2)
385     self.line_4.setMidLineWidth(2)
386     self.line_4.setFrameShape(QtWidgets.QFrame.HLine)
387     self.line_4.setObjectName("line_4")
388
389     self.buttonBox = QtWidgets.QDialogButtonBox(self.widget_2)
390     self.buttonBox.setGeometry(QtCore.QRect(430, 580, 341, 32))
391     self.buttonBox.setOrientation(QtCore.Qt.Horizontal)
392     self.buttonBox.setStandardButtons(QtWidgets.QDialogButtonBox.
393 Close | QtWidgets.QDialogButtonBox.Save)
394
395     self.buttonBox.setObjectName("buttonBox")
396
397     self.scrollArea = QtWidgets.QScrollArea(SuperStructure_Dialog)
398     self.scrollArea.setGeometry(QtCore.QRect(10, 40, 241, 681))
399     self.scrollArea.setAutoFillBackground(False)
400     self.scrollArea.setStyleSheet("background-color: #fff9f9")
401     self.scrollArea.setWidgetResizable(True)
402     self.scrollArea.setObjectName("scrollArea")
403
404     self.scrollAreaWidgetContents_2 = QtWidgets.QWidget()
405     self.scrollAreaWidgetContents_2.setGeometry(QtCore.QRect(0, 0,
406 239, 679))

```





```

457         self.formLayout_2.setWidget(2, QtWidgets.QFormLayout.LabelRole,
458             self.pushButton_27)
459
460             self.pushButton_28 = QtWidgets.QPushButton(self.widget_6,
461             clicked=lambda: self.openMiscellaneousWindow())
462
463             font = QtGui.QFont()
464             font.setPointSize(10)
465             font.setBold(False)
466             font.setWeight(50)
467             self.pushButton_28.setFont(font)
468             self.pushButton_28.setIcon(icon2)
469             self.pushButton_28.setObjectName("pushButton_28")
470
471             self.formLayout_2.setWidget(3, QtWidgets.QFormLayout.LabelRole,
472             self.pushButton_28)
473
474             self.verticalLayout_2.addWidget(self.widget_6)
475
476             self.pushButton_29 = QtWidgets.QPushButton(self.widget_3,
477             clicked=lambda: self.openFinancialWindow())
478
479             font = QtGui.QFont()
480             font.setPointSize(10)
481             self.pushButton_29.setFont(font)
482             self.pushButton_29.setObjectName("pushButton_29")
483
484             self.verticalLayout_2.addWidget(self.pushButton_29)
485
486             self.pushButton_30 = QtWidgets.QPushButton(self.widget_3)
487
488             font = QtGui.QFont()
489             font.setPointSize(10)
490             self.pushButton_30.setFont(font)

```

```

491     font.setWeight(50)
492     self.pushButton_31.setFont(font)
493     self.pushButton_31.setIcon(icon2)
494     self.pushButton_31.setObjectName("pushButton_31")
495     self.verticalLayout_2.addWidget(self.widget_9)
496     self.pushButton_32 = QtWidgets.QPushButton(self.widget_3,
497     clicked=lambda: self.openBridgeTrafficWindow())
498     font = QtGui.QFont()
499     font.setPointSize(10)
500     self.pushButton_32.setFont(font)
501     self.pushButton_32.setObjectName("pushButton_32")
502     self.verticalLayout_2.addWidget(self.pushButton_32)
503     self.pushButton_33 = QtWidgets.QPushButton(self.widget_3,
504     clicked=lambda: self.openMaintenanceWindow())
505     font = QtGui.QFont()
506     font.setPointSize(10)
507     self.pushButton_33.setFont(font)
508     self.pushButton_33.setObjectName("pushButton_33")
509     self.verticalLayout_2.addWidget(self.pushButton_33)
510     self.pushButton_12 = QtWidgets.QPushButton(self.widget_3,
511     clicked=lambda: self.openDemolitionWindow())
512     font = QtGui.QFont()
513     font.setPointSize(10)
514     self.pushButton_12.setFont(font)
515     self.pushButton_12.setObjectName("pushButton_12")
516     self.verticalLayout_2.addWidget(self.pushButton_12)
517     self.label_37 = QtWidgets.QLabel(self.
518     scrollAreaWidgetContents_2)
519     self.label_37.setGeometry(QtCore.QRect(0, 387, 221, 31))
520     font = QtGui.QFont()
521     font.setPointSize(10)
522     self.label_37.setFont(font)
523     self.label_37.setStyleSheet("background-color: rgb(240,230,230)
524     ")
525     self.label_37.setAlignment(QtCore.Qt.AlignCenter)
526     self.label_37.setObjectName("label_37")
527     self.textBrowser_2 = QtWidgets.QTextBrowser(self.
528     scrollAreaWidgetContents_2)
529     self.textBrowser_2.setGeometry(QtCore.QRect(0, 418, 221, 221))

```

```

524         self.textBrowser_2.setStyleSheet("background-color: #fff9f9")
525         self.textBrowser_2.setObjectName("textBrowser_2")
526         self.verticalScrollBar_2 = QtWidgets.QScrollBar(self.
527 scrollAreaWidgetContents_2)
528         self.verticalScrollBar_2.setGeometry(QtCore.QRect(220, 0, 16,
641))
529         self.verticalScrollBar_2.setStyleSheet("background-color: #
530 F0F0F0")
531         self.verticalScrollBar_2.setOrientation(QtCore.Qt.Vertical)
532         self.verticalScrollBar_2.setObjectName("verticalScrollBar_2")
533         self.scrollArea.setWidget(self.scrollAreaWidgetContents_2)
534         self.pushButton = QtWidgets.QPushButton(SuperStructure_Dialog)
535         self.pushButton.setGeometry(QtCore.QRect(10, 10, 188, 25))
536         font = QtGui.QFont()
537         font.setPointSize(10)
538         self.pushButton.setFont(font)
539         self.pushButton.setFocusPolicy(QtCore.Qt.StrongFocus)
540         self.pushButton.setLayoutDirection(QtCore.Qt.RightToLeft)
541         self.pushButton.setStyleSheet("background-color: rgb
542 (240,230,230)")
543         self.pushButton.setIcon(icon)
544         self.pushButton.setAutoRepeat(False)
545         self.pushButton.setObjectName("pushButton")
546
547         self.retranslateUi(SuperStructure_Dialog)
548         self.buttonBox.accepted.connect(self.handle_save) # type:
549 ignore
550         self.buttonBox.rejected.connect(lambda: self.show_warning(
551 SuperStructure_Dialog)) # type: ignore
552         QtCore.QMetaObject.connectSlotsByName(SuperStructure_Dialog)
553
554     def show_warning(self, dialog):
555         """
556             Show a warning window when the Close button is pressed.
557         """
558
559         warning_box = QMessageBox()
560         warning_box.setIcon(QMessageBox.Warning)
561         warning_box.setWindowTitle("Confirm Close")

```

```

556     warning_box.setText("Are you sure you want to close without
557     saving?")
558
559     warning_box.setStandardButtons(QMessageBox.Yes | QMessageBox.No)
560
561     warning_box.setDefaultButton(QMessageBox.No)
562
563     # Check the user's response
564     response = warning_box.exec_()
565     if response == QMessageBox.Yes:
566         dialog.reject() # Close the application
567     else:
568         pass # Do nothing, return to the dialog
569
570
571     def retranslateUi(self, SuperStructure_Dialog):
572         _translate = QtCore.QCoreApplication.translate
573         SuperStructure_Dialog.setWindowTitle(_translate("SuperStructure_Dialog", "Dialog"))
574         self.pushButton_6.setText(_translate("SuperStructure_Dialog", "Super-Structure"))
575         self.label_20.setText(_translate("SuperStructure_Dialog", "Components:"))
576         self.comboBox_7.setItemText(0, _translate("SuperStructure_Dialog", "Deck"))
577         self.pushButton_7.setText(_translate("SuperStructure_Dialog", "+ Add Sub-Component"))
578         self.label_21.setText(_translate("SuperStructure_Dialog", "Material Type and Grade"))
579         self.label_22.setText(_translate("SuperStructure_Dialog", "Rate Data Source"))
580         self.label_23.setText(_translate("SuperStructure_Dialog", "Quantity"))
581         self.label_24.setText(_translate("SuperStructure_Dialog", "Unit"))
582         self.label_25.setText(_translate("SuperStructure_Dialog", "Rate"))
583         self.label_26.setText(_translate("SuperStructure_Dialog", "<html><head/><body><p><span style=\" font-size:10pt;\">m</span><span style=\" font-size:10pt; vertical-align:super;\">3</span></p></body></html>"))

```

```

580         self.label_27.setText(_translate("SuperStructure_Dialog", "kg"))
581     )
582
583     self.pushButton_8.setText(_translate("SuperStructure_Dialog", "+ Add Material"))
584
585     self.label_28.setText(_translate("SuperStructure_Dialog", "Material Type and Grade"))
586
587     self.comboBox_10.setItemText(0, _translate("SuperStructure_Dialog", "Cables"))
588
589     self.label_29.setText(_translate("SuperStructure_Dialog", "Rate"))
590
591     self.label_30.setText(_translate("SuperStructure_Dialog", "kg"))
592
593     self.label_31.setText(_translate("SuperStructure_Dialog", "Rate Data Source"))
594
595     self.label_32.setText(_translate("SuperStructure_Dialog", "<html><head/><body><p><span style=\" font-size:10pt;\">m</span><span style=\" font-size:10pt; vertical-align:super;\">3</span></p></body></html>"))
596
597     self.label_33.setText(_translate("SuperStructure_Dialog", "Unit"))
598
599     self.label_34.setText(_translate("SuperStructure_Dialog", "Quantity"))
600
601     self.pushButton_9.setText(_translate("SuperStructure_Dialog", "+ Add Material"))
602
603     self.pushButton_11.setText(_translate("SuperStructure_Dialog", "+ Add Sub-Component"))
604
605     self.label_35.setText(_translate("SuperStructure_Dialog", "Components:"))
606
607     self.comboBox_11.setItemText(0, _translate("SuperStructure_Dialog", "Concrete"))
608
609     self.comboBox_11.setItemText(1, _translate("SuperStructure_Dialog", "Steel"))
610
611     self.comboBox_12.setItemText(0, _translate("SuperStructure_Dialog", "Steel"))
612
613     self.comboBox_12.setItemText(1, _translate("SuperStructure_Dialog", "Concrete"))
614
615     self.label_36.setText(_translate("SuperStructure_Dialog", "Input Parameters"))

```

```

598         self.pushButton_24.setText(_translate("SuperStructure_Dialog",
599 "Structure Works Data"))
600         self.pushButton_25.setText(_translate("SuperStructure_Dialog",
601 "Foundation"))
602         self.pushButton_26.setText(_translate("SuperStructure_Dialog",
603 "Super-Structure"))
604         self.pushButton_27.setText(_translate("SuperStructure_Dialog",
605 "Sub-Structure"))
606         self.pushButton_28.setText(_translate("SuperStructure_Dialog",
607 "Miscellaneous"))
608         self.pushButton_29.setText(_translate("SuperStructure_Dialog",
609 "Financial Data"))
610         self.pushButton_30.setText(_translate("SuperStructure_Dialog",
611 "Carbon Emission Data"))
612         self.pushButton_31.setText(_translate("SuperStructure_Dialog",
613 "Carbon Emission Cost Data"))
614         self.pushButton_32.setText(_translate("SuperStructure_Dialog",
615 "Bridge and Traffic Data"))
616         self.pushButton_33.setText(_translate("SuperStructure_Dialog",
617 "Maintenance and Repair"))
618         self.pushButton_12.setText(_translate("SuperStructure_Dialog",
619 "Disposal and Recycling"))
620         self.label_37.setText(_translate("SuperStructure_Dialog", "Output"))
621         self.textBrowser_2.setHtml(_translate("SuperStructure_Dialog",
622 "<!DOCTYPE HTML PUBLIC \"-//W3C//DTD HTML 4.0//EN\" \"http://www.w3.
623 org/TR/REC-html40/strict.dtd\">\n"
624 "<html><head><meta name=\"qrichtext\" content=\"1\" /><style type=\"
625 text/css\">\n"
626 "p, li { white-space: pre-wrap; }\n"
627 "</style></head><body style=\" font-family:\'MS Shell Dlg 2\'; font-
628 size:8.25pt; font-weight:400; font-style:normal;\">\n"
629 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
630 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
631 font-size:10pt; color:#aa8b8b;\">Initial Construction Cost</span></p
632 >\n"
633 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin-
634 -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
635 font-size:10pt; color:#aa8b8b;\">Initial Carbon emission Cost</span
636 >\n"

```

```

    "></p>\n"
616 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
         font-size:10pt; color:#aa8b8b;\">Time Cost</span></p>\n"
617 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
         font-size:10pt; color:#aa8b8b;\">Road User Cost</span></p>\n"
618 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
         font-size:10pt; color:#aa8b8b;\">Carbon Emission due to Re-Routing</
         span></p>\n"
619 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
         font-size:10pt; color:#aa8b8b;\">Periodic Maintenance Costs</span></
         p>\n"
620 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
         font-size:10pt; color:#aa8b8b;\">Maintenance Emission Costs</span></
         p>\n"
621 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
         font-size:10pt; color:#aa8b8b;\">Routine Inspectection Costs</span
         ></p>\n"
622 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
         font-size:10pt; color:#aa8b8b;\">Repair & Rehabilitation Costs</
         span></p>\n"
623 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
         font-size:10pt; color:#aa8b8b;\">Reconstruction Costs</span></p>\n"
624 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
         font-size:10pt; color:#aa8b8b;\">Demolition & Disposal Cost</
         span></p>\n"
625 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"
         font-size:10pt; color:#aa8b8b;\">Recycling Cost</span></p>\n"
626 "<p style=\" margin-top:0px; margin-bottom:0px; margin-left:0px; margin
       -right:0px; -qt-block-indent:0; text-indent:0px;\"><span style=\"

```

```

        font-size:10pt; color:#aa8b8b;">>Total Life-Cycle Cost</span></p></
body></html>"))

627     self.pushButton.setText(_translate("SuperStructure_Dialog", " "
Project Details Window      "))

628

629 def validate_data(self):
630     """Validate input data before saving"""
631     try:
632         # Validate all numeric fields
633         fields_to_validate = [
634             self.lineEdit_13, self.lineEdit_14, self.lineEdit_15,
635             self.lineEdit_16, self.lineEdit_17, self.lineEdit_18,
636             self.lineEdit_19, self.lineEdit_20, self.lineEdit_21,
637             self.lineEdit_22, self.lineEdit_23, self.lineEdit_24
638         ]
639
640         for field in fields_to_validate:
641             if field.text(): # Only validate if field is not empty
642                 float(field.text())
643
644     return True
645
646 except ValueError:
647     QMessageBox.warning(
648         None,
649         "Validation Error",
650         "Please enter valid numbers in all numeric fields",
651         QMessageBox.Ok
652     )
653
654     return False
655
656 def save_data(self):
657     """Collect all input data and save it to a JSON file"""
658     if not self.validate_data():
659         return False
660
661     data = {
662         "deck": {
663             "component": self.comboBox_7.currentText(),

```

```

663     "materials": [
664         {
665             "type_grade": self.comboBox_8.currentText(),
666             "quantity": self.lineEdit_13.text(),
667             "unit": self.label_26.text(),
668             "rate": self.lineEdit_15.text(),
669             "rate_source": self.lineEdit_17.text()
670         },
671         {
672             "type_grade": self.comboBox_9.currentText(),
673             "quantity": self.lineEdit_14.text(),
674             "unit": self.label_27.text(),
675             "rate": self.lineEdit_16.text(),
676             "rate_source": self.lineEdit_18.text()
677         }
678     ]
679 },
680 "cables": {
681     "component": self.comboBox_10.currentText(),
682     "materials": [
683         {
684             "type_grade": self.comboBox_11.currentText(),
685             "quantity": self.lineEdit_21.text(),
686             "unit": self.label_32.text(),
687             "rate": self.lineEdit_22.text(),
688             "rate_source": self.lineEdit_20.text()
689         },
690         {
691             "type_grade": self.comboBox_12.currentText(),
692             "quantity": self.lineEdit_19.text(),
693             "unit": self.label_30.text(),
694             "rate": self.lineEdit_23.text(),
695             "rate_source": self.lineEdit_24.text()
696         }
697     ]
698 }
699 }
700
701 # Save to JSON file

```

```

702     try:
703
704         import json
705
706         from datetime import datetime
707
708         timestamp = datetime.now().strftime("%Y%m%d_%H%M%S")
709         filename = f"superstructure_data_{timestamp}.json"
710
711
712         with open(filename, 'w') as f:
713             json.dump(data, f, indent=4)
714
715
716         # Show success message
717         QMessageBox.information(
718             None,
719             "Success",
720             f"Super-structure data saved successfully to {filename}"
721         ,
722             QMessageBox.Ok
723         )
724
725
726         return True
727
728
729
730     except Exception as e:
731
732         QMessageBox.critical(
733             None,
734             "Error",
735             f"Failed to save data: {str(e)}",
736             QMessageBox.Ok
737         )
738
739         return False
740
741
742
743     def handle_save(self):
744
745         """Handle the save operation and close the dialog if successful
746
747         """
748
749         if self.save_data(): # Only close if save was successful
750             SuperStructure_Dialog.accept()
751
752
753 if __name__ == "__main__":
754
755     import sys
756
757     app = QtWidgets.QApplication(sys.argv)
758
759     SuperStructure_Dialog = QtWidgets.QDialog()

```

```

739     ui = Ui_SuperStructure_Dialog()
740     ui.setupUi(SuperStructure_Dialog)
741     SuperStructure_Dialog.show()
742     sys.exit(app.exec_())

```

### 5.3.9 Explanation of the Code(all ProjectDetails\_\*\_Window

1. Part 1:

```

1 from PyQt5 import QtCore, QtGui, QtWidgets
2 from PyQt5.QtWidgets import QMessageBox

```

These imports allow access to Qt's core functionality (QtCore), GUI elements (QtGui), and widgets like dialogs, buttons, and forms (QtWidgets).

2. Part 2:

```

1 class Ui_<WindowName>_Dialog(object):

```

Each file defines a class that represents a specific dialog window (e.g., Ui\_Foundation\_Dialog, Ui\_CarbonEmission\_Dialog).

These classes contain all GUI setup and functionality for that module.

3. Part 3:

```

1 def open<OtherWindowName>Window(self):
2     from ProjectDetails_<OtherWindowName>_Window import Ui_<
3         OtherWindowName>_Dialog
4     self.window = QtWidgets.QDialog()
5     self.ui = Ui_<OtherWindowName>_Dialog()
6     self.ui.setupUi(self.window)
    self.window.show()

```

These methods allow each dialog to launch other project module dialogs (e.g., from Carbon Emission to Financial Data).

Promotes modularity and interconnectivity within the app.

4. Part 4:

```

1 def setupUi(self, <DialogName>):
2     <DialogName>.setObjectName("DialogName")
3     <DialogName>.resize(width, height)
4     ...

```

setupUi() is automatically generated from a .ui file using pyuic5.

It lays out all elements: size, labels, buttons, combo boxes, text fields, and input areas.

## 5. Part 5:

```

1 self.label = QtWidgets.QLabel(Dialog)
2 self.label.setText("Carbon Emission Data")
3 self.label.setGeometry(QtCore.QRect(x, y, width, height))

```

Creates widgets like labels, buttons, and combo boxes.

Sets their text, geometry (position and size), font, and styling.

## 6. Part 6:

```

1 self.buttonBox = QtWidgets.QDialogButtonBox(Dialog)
2 self.buttonBox.setStandardButtons(QtWidgets.QDialogButtonBox.Save |
    QtWidgets.QDialogButtonBox.Close)

```

Adds dialog-wide actions like Save or Close.

Common across all modules for consistency.

## 7. Part 7:

```

1 self.pushButton.setStyleSheet("background-color: rgb(240,230,230)")
2 self.pushButton.setIcon(QIcon("Dismiss.png"))

```

Customizes the look of widgets.

Uses icons for buttons (e.g., back, expand, close).

## 8. Part 8:

```
1 self.scrollArea = QtWidgets.QScrollArea(Dialog)  
2 self.verticalLayout = QtWidgets.QVBoxLayout(widget)
```

Many dialogs use QScrollArea for long forms and QVBoxLayout or QFormLayout for organized input.

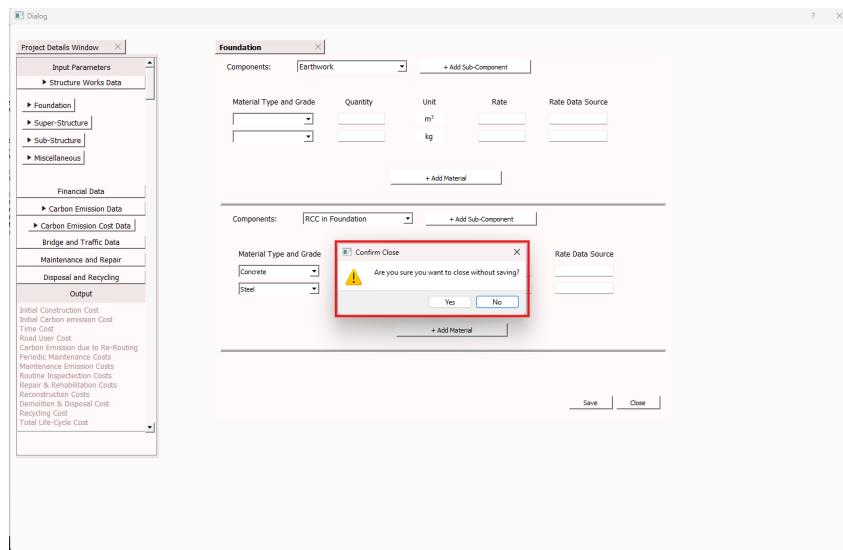


Figure 5.24: Alert Message for leaving without Saving data

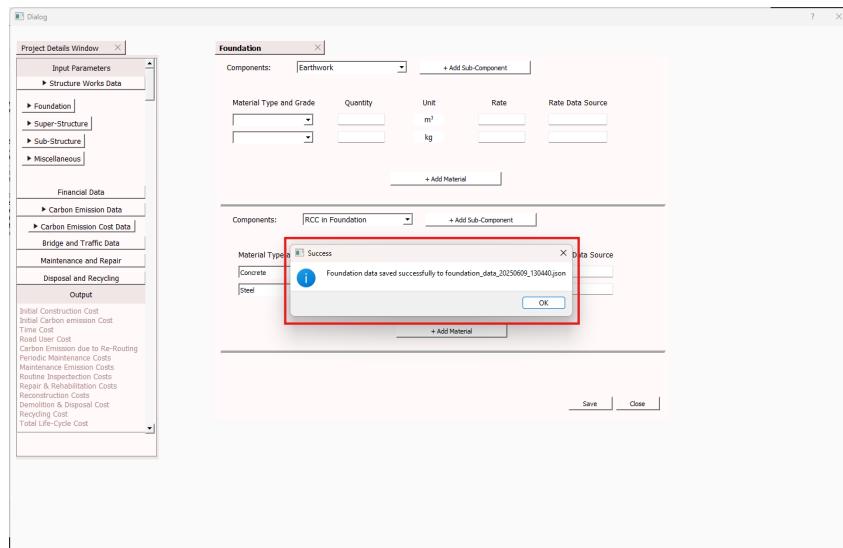


Figure 5.25: A Confirmation of Successful data saving

## 1. Bridge and Traffic Data

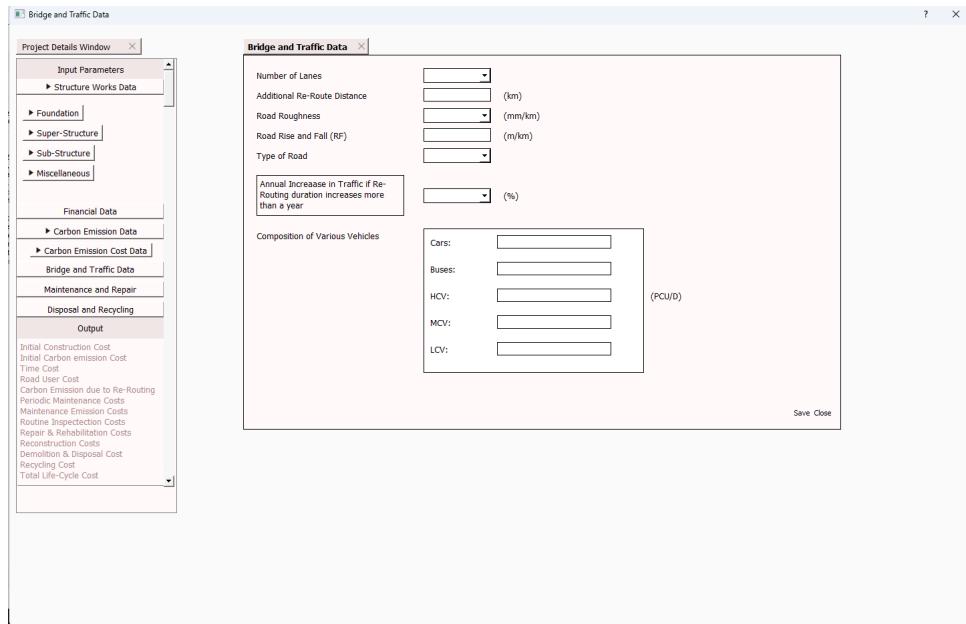


Figure 5.26: A Confirmation of Successful data saving

## 2. Carbon Emission Data

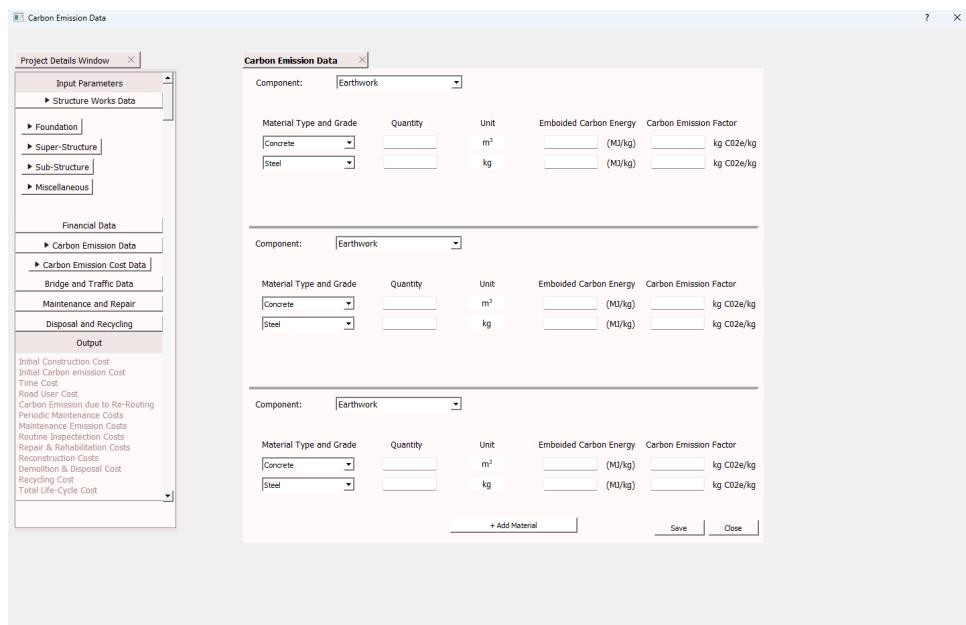


Figure 5.27: A Confirmation of Successful data saving

## 3. Demolition and Recycling Data

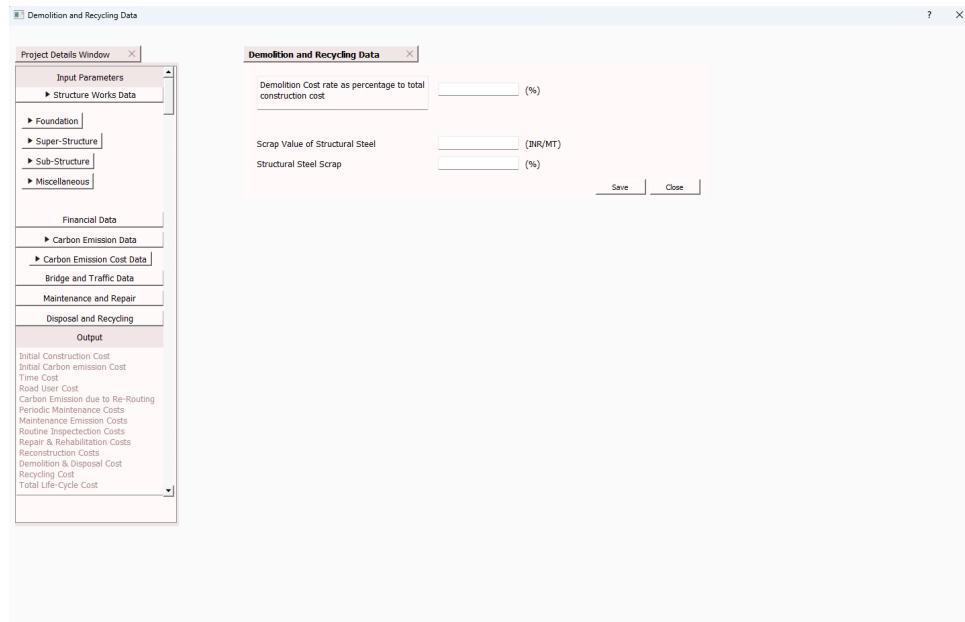


Figure 5.28: A Confirmation of Successful data saving

#### 4. Financial Data

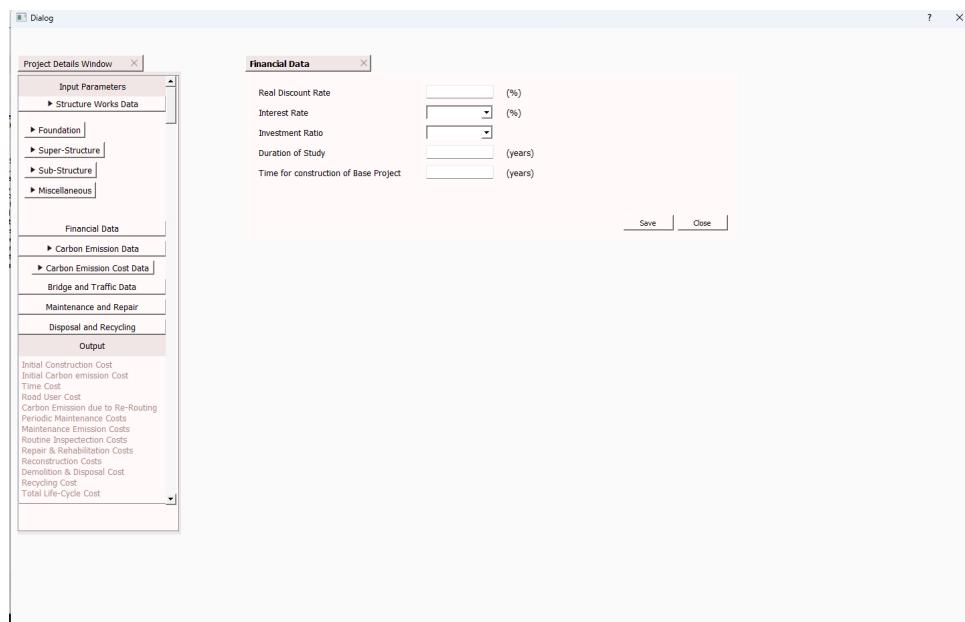


Figure 5.29: A Confirmation of Successful data saving

#### 5. Foundation Data

The screenshot shows the 'Foundation' dialog box within a larger 'Project Details Window'. The left sidebar lists categories like 'Input Parameters', 'Financial Data', and 'Output'. The main area shows two sections for 'Earthwork' and 'RCC in Foundation' with material type, quantity, unit, rate, and rate data source fields. Buttons for 'Save' and 'Close' are at the bottom.

Figure 5.30: A Confirmation of Successful data saving

## 6. Maintenance and Repair Data

The screenshot shows the 'Maintenance and Repair Data' dialog box within a larger 'Project Details Window'. The left sidebar lists categories like 'Input Parameters', 'Financial Data', and 'Output'. The main area contains fields for maintenance costs as percentages of total construction cost, interest rates, investment ratios, and duration of study, along with frequency of periodic maintenance and routine inspection. Buttons for 'Save' and 'Close' are at the bottom.

Figure 5.31: A Confirmation of Successful data saving

## 7. Miscellaneous Data

The screenshot shows the 'Miscellaneous' dialog box within a larger 'Project Details Window'. The 'Components:' dropdown is set to 'Expansion Joint'. Below it, there are two sections for material entries:

- Expansion Joint:** Material Type and Grade: Concrete; Quantity: [empty]; Unit: m<sup>3</sup>; Rate: [empty]; Rate Data Source: [empty].
- Bearing:** Material Type and Grade: Steel; Quantity: [empty]; Unit: kg; Rate: [empty]; Rate Data Source: [empty].

Buttons at the bottom include '+ Add Material', 'Save', and 'Close'.

Figure 5.32: A Confirmation of Successful data saving

## 8. Sub Structure Data

The screenshot shows the 'Sub-Structure' dialog box within a larger 'Project Details Window'. The 'Components:' dropdown is set to 'Piers'. Below it, there are two sections for material entries:

- Piers:** Material Type and Grade: Concrete; Quantity: [empty]; Unit: m<sup>3</sup>; Rate: [empty]; Rate Data Source: [empty].
- Abutment:** Material Type and Grade: Steel; Quantity: [empty]; Unit: kg; Rate: [empty]; Rate Data Source: [empty].

Buttons at the bottom include '+ Add Material', 'Save', and 'Close'.

Figure 5.33: A Confirmation of Successful data saving

## 9. Super Structure Data

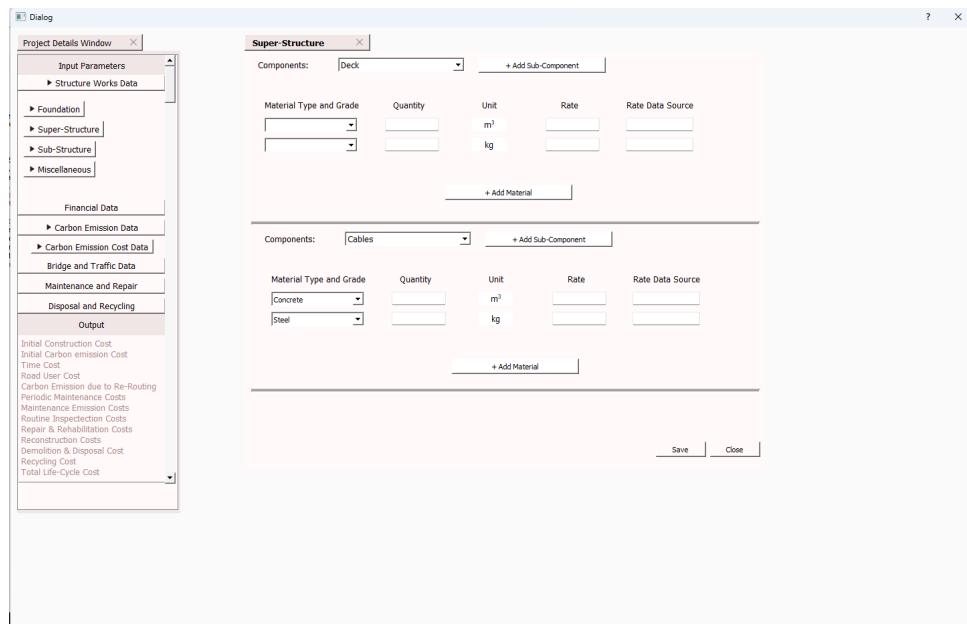
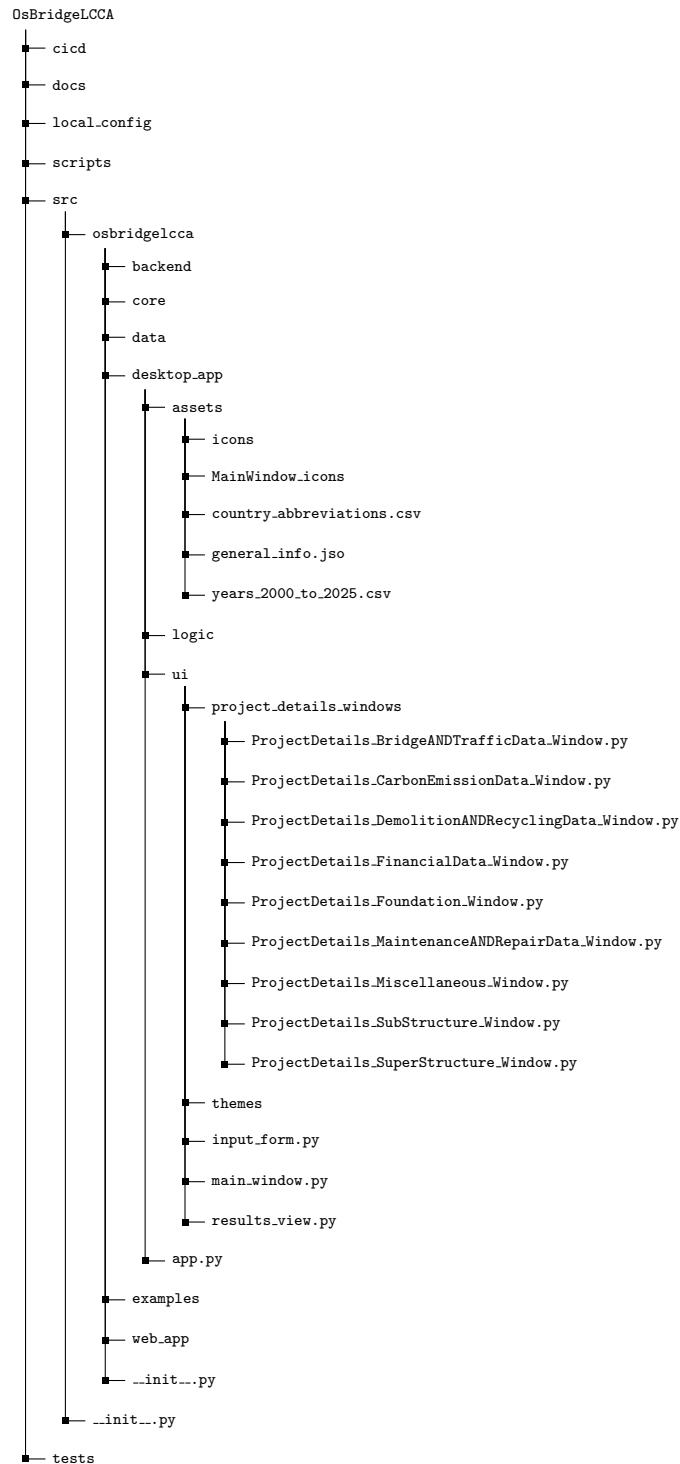


Figure 5.34: A Confirmation of Successful data saving

## 5.4 Task 3: Documentation

### 5.4.1 Directory Structure



# Chapter 6

## Conclusions

### 6.1 Tasks Accomplished

The summary is a desktop application named BICCA Studio, designed for infrastructure project assessment and analysis, built using PyQt5 for the frontend and SQLAlchemy with SQLite for the backend. The application features a modular UI, where each project component—such as bridge traffic, foundations, carbon emissions, financials, and maintenance—is handled in a dedicated dialog window. Users can input, manage, and save project data through structured forms, with persistent storage supported via a local JSON file and a relational database. The backend schema models critical data types like material rates, environmental impacts, carbon costs, and transport factors. Configuration and database connectivity are managed through ‘config.py’ and ‘database.py’, with ‘main.py’ initializing the schema. Tutorials guide users through the interface, making the app user-friendly and educational. The architecture is well-organized, enabling scalability, reusability, and data integrity. Overall, your work reflects a well-structured, interactive, and data-driven desktop solution for life-cycle cost and environmental impact analysis in civil infrastructure.

### 6.2 Skills Developed

The skills I developed through out this Internship are:

1. Desktop Application Development

Built a functional GUI using PyQt5, including dialogs, layouts, toolbars, menus, and navigation.

Designed user-friendly interfaces with collapsible panels, scroll areas, and form inputs.

## 2. Modular UI Architecture

Created separate, maintainable modules for each data entry window using a component-based design.

Integrated multiple UI components to allow smooth navigation across project sections.

## 3. Database Design & Management

Designed and implemented a relational schema with SQLAlchemy ORM.

Used SQLite as a lightweight backend and practiced schema normalization and versioning.

## 4. Configuration & Environment Management

Handled paths and environment variables using Python's os and pathlib.

Managed resource directories and fallback defaults for production readiness.

## 5. Data Persistence

Used both JSON files and SQL databases to store user input and analysis results.

## 6. Backend Integration

Developed a structured backend pipeline for initializing and managing databases (init\_database, sessions, models).

## 7. Project Structuring & Scalability

Adopted clean code practices, clear file organization, and reusable patterns to support scaling and future feature additions.

# **Chapter A**

## **Appendix**

### **A.1 Work Reports**

## Internship Work Report

Name:	Souhridya Patra		
Project:	Osdag		
Internship:	FOSSEE Semester Long Internship 2025		
DATE	DAY	TASK	Hours Worked
10-Feb-2025	Monday	Installed OSDAG on Windows 11 x64 machine and did initial testing	4
11-Feb-2025	Tuesday	Continued testing OSDAG on Windows 11 machine and explored the Application	4
12-Feb-2025	Wednesday	Gone through the LCC pdf	4
13-Feb-2025	Thursday	Going through Beam to Beam end plate repo	3.5
14-Feb-2025	Friday	Continuing with the code and started the Documentation	5
15-Feb-2025	Saturday	Continuing with the code and Documentation	5
16-Feb-2025	Sunday	Complition of Documentation and Submission of Task0	6
17-Feb-2025	Monday	Redesigning of the Documentation	7
18-Feb-2025	Tuesday	Continuation in redesigning	2
19-Feb-2025	Wednesday	Going through LCC calculations and factors	4
20-Feb-2025	Thursday	Redesigning	3
21-Feb-2025	Friday	Redesigning of documentation Finished	3
22 Feb 2025	Saturday	Going through LCC calculations and factors (Finished)	4
24 Feb 2025	Monday	Going through Osdag Main codebase	3.5
14 Mar 2025	Friday	Going through Osdag Main codebase (Finished)	4
15 Mar 2025	Saturday	LCC repo setup	2
17 Mar 2025	Monday	Going through the repo	3.5
19 Mar 2025	Wednesday	Going through the repo (Finished)	4
20 Mar 2025	Thursday	WireFrame of LCCA destop application	3
21 Mar 2025	Friday	Started coding on database	6
25 Mar 2025	Tuesday	Finished coding of database	5
26 Mar 2025	Wednesday	Started going through the documentation of GUI desktop application for LCCA	4
08 Apr 2025	Tuesday	Finished documentation of GUI desktop application for LCCA	5
09 Apr 2025	Wednesday	Started coding on the MainPage of GUI app (app.py)	6
29 Apr 2025	Tuesday	Finished coding on the MainPage	6
01 May 2025	Thursday	Worked on the <a href="#">input_form.py</a> and <a href="#">config.py</a>	4
02 May 2025	Friday	Started coding on <a href="#">ProjectDetails_Financial_Window.py</a>	7
05 May 2025	Monday	Exam Break (Started)	
08 May 2025	Thursday	Exam Break (Finished)	
10 May 2025	Saturday	Finished coding on <a href="#">ProjectDetails_Financial_Window.py</a>	7
11 May 2025	Sunday	Started coding on <a href="#">ProjectDetails_MaintenanceANDRepairData_Window.py</a>	5
13 May 2025	Tuesday	Finished coding on <a href="#">ProjectDetails_MaintenanceANDRepairData_Window.py</a>	4
14 May 2025	Wednesday	Started coding on <a href="#">ProjectDetails_BridgeANDTrafficData_Window.py</a>	6
15 May 2025	Thursday	Finished coding on <a href="#">ProjectDetails_BridgeANDTrafficData_Window.py</a>	8
16 May 2025	Friday	End Sem Exam Starts	
24 May 2025	Saturday	End Sem Exam Ends	
25 May 2025	Sunday	Started coding on <a href="#">ProjectDetails_Foundation_Window.py</a>	10
26 May 2025	Monday	Finished coding on <a href="#">ProjectDetails_Foundation_Window.py</a>	11
27 May 2025	Tuesday	Leave for Travelling	
28 May 2025	Wednesday	Leave for Travelling	
29 May 2025	Thursday	Coding on <a href="#">ProjectDetails_DemolitionANDRecyclingData_Window.py</a>	12
30 May 2025	Friday	Coding on <a href="#">ProjectDetails_SuperStructure_Window.py</a>	14
31 May 2025	Saturday	Coding on <a href="#">ProjectDetails_SubStructure_Window.py</a>	10
01 Jun 2025	Sunday	Coding on <a href="#">ProjectDetails_Miscellaneous_Window.py</a>	12
02 Jun 2025	Monday	Coding on <a href="#">ProjectDetails_CarbonEmissionData_Window.py</a>	13
03 Jun 2025	Tuesday	Solving errors and adding features	9
07 Jun 2025	Saturday	Complition of the GUI Application	11
08 Jun 2025	Sunday	Raising PR	1

# Bibliography

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- [3] FOSSEE Project. Osdag website. Accessed: 2024-12-05.