

## **TABLE OF CONTENTS**

### **CHAPTER 1 - INTRODUCTION**

---

<b>1.1 OVERVIEW</b>	<b>1</b>
<b>1.2 PROBLEM STATEMENT</b>	<b>2</b>
<b>1.3 OBJECTIVES</b>	<b>2</b>
<b>1.4 SCOPE</b>	<b>2</b>
<b>1.5 PROJECT SIGNIFICANCE</b>	<b>3</b>
<b>1.6 REPORT ORGANIZATION</b>	<b>4</b>

### **CHAPTER 2 – SYSTEM REVIEW**

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<b>2.1 INTRODUCTION</b>	<b>5</b>
<b>2.2 SYSTEM REVIEW 1</b>	<b>5</b>
<b>2.3 SYSTEM REVIEW 2</b>	<b>6</b>
<b>2.4 SYSTEM REVIEW 3</b>	<b>7</b>
<b>2.5 SUMMARY</b>	<b>8</b>

### **CHAPTER 3 – METHODOLOGY**

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<b>3.1 INTRODUCTION</b>	<b>9</b>
<b>3.2 REVIEW ON THREE METHODOLOGIES</b>	<b>9</b>
<b>3.3 ANALYSIS DIFFERENTIATE ON REVIEWED METHODOLOGIES</b>	<b>12</b>
<b>3.4 JUSTIFY CHOSEN METHODOLOGY</b>	<b>13</b>
<b>3.5 SYSTEM REQUIREMENT ANALYSIS</b>	<b>14</b>
<b>3.6 CONCLUSION</b>	<b>14</b>

### **CHAPTER 4 – SYSTEM ANALYSIS, RESULTS AND DISCUSSIONS**

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<b>4.1 INTRODUCTION</b>	<b>15</b>
<b>4.2 REQUIREMENT</b>	<b>15</b>
<b>4.3 SYSTEM ARCHITECTURE</b>	<b>18</b>
<b>4.4 UNIT TESTING</b>	<b>23</b>
<b>4.5 CONCLUSION</b>	<b>24</b>

### **CHAPTER 5– CONCLUSION**

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<b>5.1 CONCLUDING REMARKS</b>	<b>25</b>
<b>5.2 CONTRIBUTION</b>	<b>25</b>
<b>5.3 LIMITATION OF THE SYSTEM</b>	<b>25</b>
<b>5.4 SUGGESTION OF FUTURE WORK</b>	<b>26</b>
<b>5.5 SUMMARY</b>	<b>26</b>

## **1 - Introduction**

### **1.1 - Overview**

The title of this project will be Complaint Management System for the Municipal Council inspired by the current system which the Kuantan Municipal Council (MPK) uses. A municipal council have many departments where each division have their own specific role on how to serve the public better or enforce law and order.

For example, the financial department and the enforcement department. The financial department's role would be to manage the council financially and handle the collection of revenue, expenditure, and budget. The enforcement department's role is quite heavy which is to plan, coordinate and enforce laws prudently, effectively and continuously. This department is responsible for controlling and taking enforcement actions on faulty offenses in public places, public roads, construction sites and public housing areas. In addition to that, this department is also responsible for assisting the Housing Management Department in implementing enforcement actions.

The enforcement department can also be divided into many units for example the compound unit and complaint unit. The e-complaint unit also exist under the law and enforcement department. This particular unit is responsible for receiving complaints online, investigating those complaints and provide the public with a satisfying feedback.

This unit will also be assisted by some officers from the financial department in managing the e-compound payment system. This unit will also have an appointed leader, who assigns complains to the staffs, and monitor revenue from compound collection. The staff will then investigate the complaints and try to solve them with the resources provided by the enforcement department and request assistance from other departments in the council if necessary.

So, this project will be designed to cover only the self-service portal features which includes e-compound and e-complaint feature for the public. It will also include an interface for the staff to view their assigned complaint and provide report back to the public. As for the administrator, a small scale employee management system and an interface to monitor revenue from compound payment will be included.

## **1.2 - Problem Statement**

Currently, the public will usually have to go to municipal council to enquire about the compound they received, pay their fine and sometimes to issue a complaint. As it is possible to do all this online, some of the citizen actually prefer to go the municipal office. This proves that the existing system is not user friendly, does not have all the options located in one place and it does not handle the citizens' complaints responsively. As for the staff, the current system proves difficult for them to accept and respond to complaints with their existing workload. The existing system also do not have a module for the administrator where they can manage the compound payments manage their staff and divide the workload effectively between their staffs.

## **1.3 - Objectives**

- i. To develop a system that enables the public to issue a complaint and pay their compound payments online.
- ii. To develop a system that enables the staff to receive complaint from the administrator and respond to the complainant easily.
- iii. To develop a system that enables the administrator to accept and assign complaints, manage the staff and compound payment easily.

## **1.4 – Scope**

- Staff
  - ✓ View assigned complaints
  - ✓ Provide updates to complainants
  - ✓ View and change profile information
  - ✓ Apply leave and view result
  - ✓ Receive notice on overdue complaints
- Public
  - ✓ Issue a complaint online
  - ✓ View feedback from the complaint issued
  - ✓ Check and pay compounds.
  - ✓ Edit profile information

- Administrator
  - ✓ Receive complaints from public
  - ✓ Assign complaints to staff
  - ✓ Give notice to staff on overdue complaints
  - ✓ View and edit profile information.
  - ✓ Get current update
  - ✓ View complaint and revenue statistics
  - ✓ View and manage compound payments
  - ✓ View and manage staff information
  - ✓ Prevent staff on leave from logging in
  - ✓ View and manage leave applications
  
- What the proposed system cannot do:
  - ✗ Perform budgeting
  - ✗ Manage assets
  - ✗ License and permit issuance
  - ✗ Inventory Management

### **1.5 – Project significance**

This project will most definitely benefit the public, staff and the administrator of the municipal council. The public will be able to experience a simple and better way of settling their compounds without leaving the comfort of their home. In addition, the public can also issue a complaint online and they will be able to get updates easily from the staffs. As for staffs, their workloads will be equalized and they can directly inform the complainant of any progress or any actions taken against their complaint. The administrators should be able to view report of the solved complaints and revenue from compound payments by the public to monitor their council's efficiency. They should also be able to assign complaints to their staff and manage their staff's records easily.

## **1.6 - Report organization**

As a conclusion to this chapter, the title of my project was Municipality Management System. This goal of this project is to make the public experience the services the council has to offer in a convenient manner while offering task efficiency for the staff and the administrator as well. As for the next activities, it would be to conduct a system review to figure out three similar features that are included in three different systems and making sure that they are included in my system.

## 2 - System Review

### 2.1 - Introduction

In order to obtain some crucial information regarding Municipal Management System a system review must be conducted. The objective here is to include at least three features that the other system have into my system and add other unique features of my own. To proceed with the system review, I have selected TownSuite Municipal, Zuercher Suite and MyGov.

### 2.2 - System Review 1

#### Townsuite Municipal

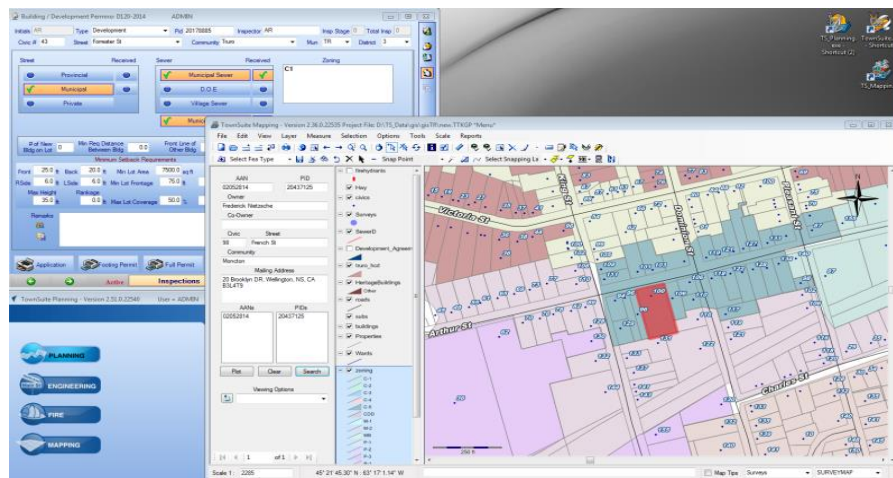


Figure 2.2.1 – Townsuite Municipal

TownSuite have a subsystem to manage different departments and roles. They are all disconnected, but share one purpose that is to make smarter decisions faster. It's intuitive, real time and a customer-centric software designed with the municipality in mind.

Pros:

- ✓ Manage inventory
- ✓ Issue permit
- ✓ Have Self Service Portal
- ✓ Pay taxes
- ✓ Pay utility bill
- ✓ Manage employee workload

Cons:

- ✗ Cannot issue license online

## 2.3 - System Review 2

### Zuercher Suite

The screenshot displays the Zuercher Suite software interface. The main window is titled 'CFS D12-00014 - VANDAL'. It features a sidebar on the left with navigation options like 'Dashboard', 'CFS Log', 'Cases', 'Civil Processes', 'Property / Evidence', 'Current Innates', 'Reports', and 'System Admin'. The main area contains a form for incident details, including fields for 'Street' (5345 North Fork), 'City' (Ashton), 'Mod' (In Progress), 'Priority' (2), 'Call Taker' (J51 - Smith, Jane), 'Call Time' (4/13/2012 15:46), 'Use Caution' (Yes), 'Disposition', 'Beat' (E - East), and 'Initial Reporter' (Global, JOHNSON, MARY SARA). Below the form is a 'Command Log' table with columns for 'Filter', 'All Commands', 'Unit', 'Names', 'Vehicles', 'Location Notes', 'Incident SOP', and 'NCIC'. The table shows three entries for the incident. On the right side, there are sections for 'Responders' (107 Primary, Harville PD), 'Response Times' (Assigned: 4/13/12 15:56:32, Enroute: 4/13/12 15:56:32, On Scene: Completed), 'Forms' (Add Form), 'IR / External Dept. Numbers' (Harville PD12-00010, Linked CFS: Add Link), and '911 Information' (Latitude, Longitude, ESN, Class of Service, Uncertainty). At the bottom, there is a 'Map Information' section and an 'Officer Addenda' field. The status bar at the bottom shows the time '16:00:59' and the user 'janesmith'.

### 2.3.1 – Zuercher Suite

Zuercher Suite is a public safety software system, built as one application with one database from one vendor. It is comprised of Computer-Aided Dispatch, Mapping, Records Management, Mobile CAD & RMS, Jail Management, Civil Process Tracking, Financial Records, Agency Administration, Reporting, and much more. By combining agency-wide functionality into one easy-to-use system, the software coordinates and automates the thousands of tasks performed by public safety professionals each day.

#### Pros:

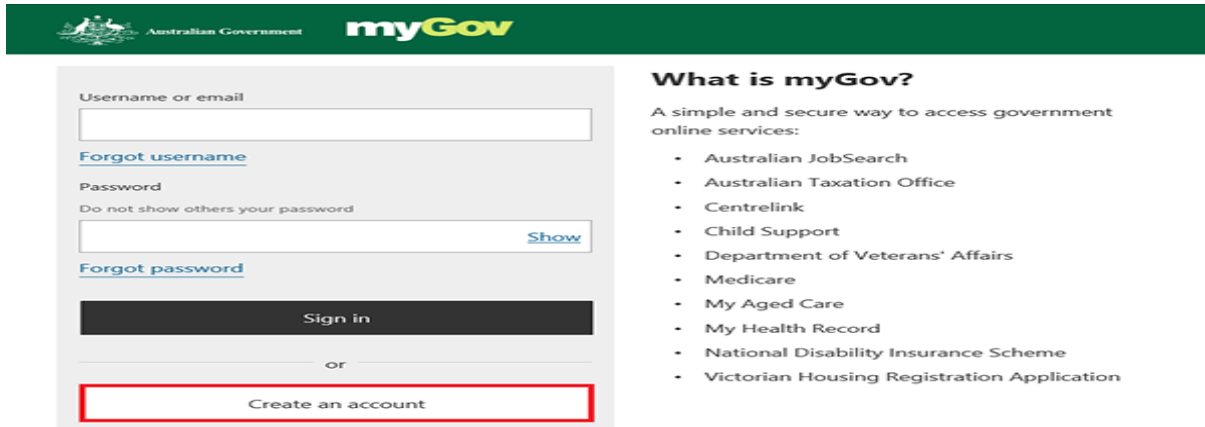
- ✓ Manage inventory
- ✓ Can pay tax
- ✓ Can issue license
- ✓ Manage employee workload
- ✓ Can pay bill

#### Cons:

- ✗ Do not have self-service portal
- ✗ Cannot manage assets
- ✗ Cannot issue permit

## 2.4 - System Review 3

### MyGov



**What is myGov?**

A simple and secure way to access government online services:

- Australian JobSearch
- Australian Taxation Office
- Centrelink
- Child Support
- Department of Veterans' Affairs
- Medicare
- My Aged Care
- My Health Record
- National Disability Insurance Scheme
- Victorian Housing Registration Application

Figure 2.4.1 – MyGov

MyGov is simple, affordable, web-based, work from anywhere, work with anyone Community Development software suite. MyGov modules are easily implemented, fully customizable and intuitive to use by you and your client.

#### Pros:

- ✓ Can issue license
- ✓ Can issue permit
- ✓ Have Self Service Portal
- ✓ Can manage staff workload
- ✓ Can perform budget calculations

#### Cons:

- ✗ Cannot manage inventory
- ✗ Cannot pay taxes
- ✗ Cannot pay utility bill



## 2.5 – Summary

Features	Townsuite	Zuercher	MyGov	My System
Self-service portal	✓	✗	✓	✓
Manage Inventory	✓	✓	✗	✗
Issue License	✗	✓	✓	✗
Manage Staff Information	✓	✗	✗	✓
Pay compound	✓	✗	✗	✓
Manage Staff Workload	✓	✓	✓	✓
Issue complaints	✗	✗	✗	✓
Receive and provide feedback to complaints	✗	✗	✗	✓
Pay taxes	✓	✓	✗	✗
Pay utility bills	✓	✓	✓	✗
Issue Permit	✓	✗	✓	✗

Figure 2.5.1 – System Feature List

### 3 - Methodology

#### 3.1 - Introduction

Sufficient planning is necessary before delving deeper into a project to avoid developing an end product that might not meet the needs and expectation required. The software development life cycle model prevents a developer from having to suffer the consequences of forgetting a step from the beginning of the project until the end of it. The objective here is to review three methodologies, analyse them and choose one that suits the project's needs. The methodologies that I have chosen are the Big Bang Model, Spiral Model and the Agile Model.

#### 3.2 - Review on Three Methodologies

##### Iterative Model

An iterative life cycle model does not attempt to start with a full specification of the requirements. Instead, development begins by specifying and implementing only part of the software, which is then reviewed to identify further requirements. This process is then repeated, producing a new version of the software at the end of each iteration of the model.

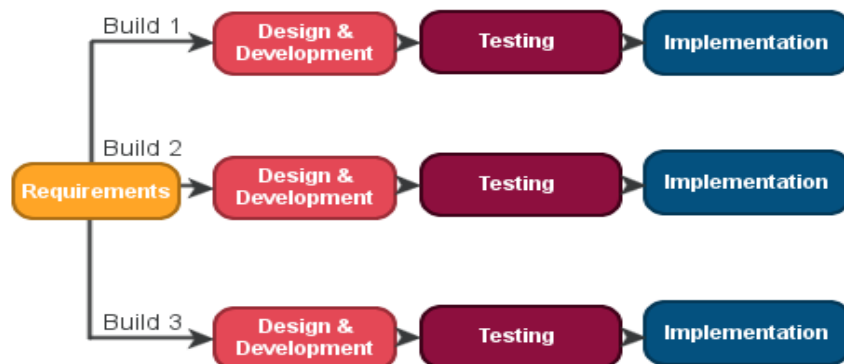


Figure 3.2.1 – Iterative & Incremental Model

Iterative process starts with a simple implementation of a subset of the software requirements and iteratively enhances the evolving versions until the full system is implemented. At each iteration, design modifications are made and new functional capabilities are added. The basic idea behind this method is to develop a system through repeated cycles (iterative) and in smaller portions at a time (incremental). This process may be described as an evolutionary acquisition or incremental build approach.

Iterative model have the following process.

1. First, the whole requirement is divided into various builds.
2. During each iteration, the development module goes through the requirements, design, implementation and testing phases.
3. Each subsequent release of the module adds function to the previous release.
4. The process continues till the complete system is ready as per the requirement.
5. As the software evolves through successive cycles, tests must be repeated and extended to verify each version of the software.

### **Spiral Model**

The spiral model combines the idea of iterative development with the systematic, controlled aspects of the waterfall model. This Spiral model is a combination of iterative development process model and sequential linear development model.

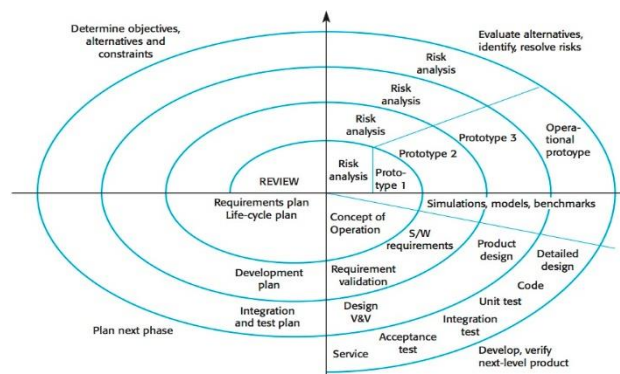


Figure 3.2.2 – Spiral Model

The spiral model has four phases:

#### **1. Identification**

This phase starts with gathering the business requirements in the baseline spiral and understanding the system requirements by continuous communication between the customer and the system analyst. At the end of the spiral, the product is deployed in the identified market.

#### **2. Design**

This phase starts with the conceptual design in the baseline spiral and involves architectural design, logical design of modules, physical product design and the final design in the subsequent spirals.

### 3. Construct or Build

The Construct phase refers to production of the actual software product at every spiral. In the baseline spiral, when the product is just thought of and the design is being developed a proof of concept is developed in this phase to get customer feedback.

### 4. Evaluation and Risk Analysis

Risk Analysis includes identifying, estimating and monitoring the technical feasibility and management risks. After testing the build, at the end of first iteration, the customer evaluates the software and provides feedback.

### Agile Model

Agile SDLC model is a combination of iterative and incremental process models with focus on process adaptability and customer satisfaction by rapid delivery of working software product. Agile Methods break the product into small incremental builds.

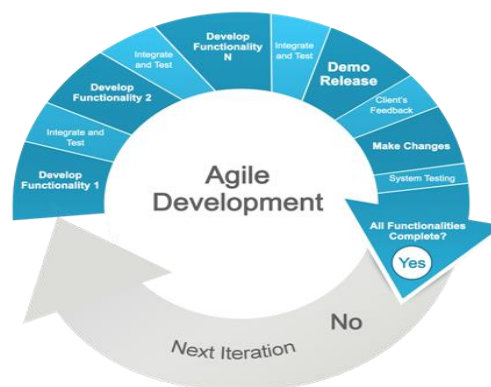


Figure 3.2.3 – Agile Model

Agile model's processes are:

1. Planning
2. Requirements Analysis
3. Design
4. Coding
5. Unit Testing and
6. Acceptance Testing

Following are the Agile Manifesto principles:

1. **Individuals and interactions** – In Agile development, self-organization and motivation are important, as are interactions like co-location and pair programming.
2. **Working software** – Demo working software is considered the best means of communication with the customers to understand their requirements, instead of just depending on documentation.
3. **Customer collaboration** – Requirements cannot be gathered completely in the beginning, so continuous customer interaction is very important to get proper product requirements.
4. **Responding to change** – Agile Development is focused on quick responses to change and continuous development.

### 3.3 - Analysis Differentiate On Reviewed Methodologies

#### Iterative Model

Advantages	Disadvantages
Supports changing requirements	Not suitable for smaller projects
Risk analysis is better	Management complexity is more
Initial operating time is less	Very expensive if project fails
Better suited for large and time-critical projects.	Projects progress is highly dependent upon the risk analysis phase
Issues and challenges is identified from each increment and fixed in the next increment.	Defining increments may require definition of the complete system
Testing and debugging during smaller iteration is easy.	More management attention is required
Less costly to change the scope or requirements	-
Results are obtained early and periodically	-

Figure 3.3.1 – Iterative Model Comparison

### Spiral Model

Advantages	Disadvantages
Allow extensive use of prototypes	Management will be complex
Users see the system early	Spiral can go on indefinitely
Requirements can be changed anytime	End of the project will not be known early
Development is divided into smaller parts	Expensive for small projects
Requirement will be more accurate	Requires excessive documentation
-	Process is complex

Figure 3.3.2 – Spiral Model Comparison

### Agile Model

Advantages	Disadvantages
Emphasis on modern techniques	Minimal Emphasis on documentation
Constant customer feedback	Difficult to make additions in an iteration
Allows for iterative development	-
Highly Adaptive	-

Figure 3.3.3 – Agile Model Comparison

### **3.4 – Justify chosen methodology**

The methodology that I will be using for this project is the Agile Model. First and foremost this model is able to respond to change and adapt to the needs that will be changing. In this project, the model will be able to adapt to the project supervisor's comments and guidelines as the project progresses with little to no problems at all. In addition, this model also values simplicity. In a nutshell, the agile model measures progress by working software and not documentations. This is beneficial not only to the developer but especially to the supervisor who would otherwise be forced to rely on a handful of documents to understand how the application is expected to function.

### **3.5 - System Requirement Analysis**

#### **3.5.1 - Hardware Requirement**

- Processor: 1 gigahertz (GHz) or faster
- RAM: 1 gigabyte (GB) (32-bit) or 2 GB (64-bit)
- Graphics card: Microsoft DirectX 9 graphics device with WDDM driver

#### **3.5.2 - Software Requirement**

- At least Windows 7, Mac OS X 10.9, Ubuntu 14.04 or Debian 8 and above
- Latest version of Firefox, Edge or Chrome

### **3.6 - Conclusion**

To summarize this chapter, I would like to state that I have chosen to go with the Agile model as it is suitable for my project as it focuses on getting the project to work instead of documentations. For web-based application the optimum requirement for this project would be a system that is capable of running a latest version of a desktop operating system and a web-browser such as Google Chrome or Mozilla Firefox. As for the next activities to be performed it would be, planning the functional and non-functional requirements as well as the system architecture of this project.

## 4 - System Analysis, Results and Discussions

### 4.1 – Introduction

In this chapter, the requirements of the system must be gathered and the system architecture must be planned in order to proceed into the development phase with less issues. First and foremost, the functional and non-functional requirements must be discovered before the system architecture can be planned. Functional Requirements are based upon the expected functioning of the product or system to be created. Functioning, typically is equated with system features for example, to identify a customer or calculate the amount due. Non-functional requirements refers to attributes including performance levels, security, usability, reliability, and so on.

### 4.2 - Requirement

#### 4.2.1 – Functional Requirement

Functional Requirement	Explanation
The system should allow <b>user</b> to login or register.	The <b>user</b> must be able to: <ul style="list-style-type: none"><li>i. Enter login credentials.</li><li>ii. Click login button and redirected to their respective dashboard.</li><li>iii. Register as a new user with all the information filled in.</li></ul>
The system should allow <b>public</b> to issue a complaint online.	The <b>public</b> must be able to: <ul style="list-style-type: none"><li>i. Click new complaint button.</li><li>ii. Fill in the complaint form and press the submit button.</li></ul>
The system should allow <b>public</b> to view feedback from the complaint issued.	The <b>public</b> must be able to: <ul style="list-style-type: none"><li>i. View previous complaints.</li><li>ii. Click more button and view the status and updates.</li></ul>
The system should allow <b>public</b> to check and pay compounds.	The <b>public</b> must be able to: <ul style="list-style-type: none"><li>i. Enter ic no and press check button.</li><li>ii. View all compound.</li><li>iii. Pay their compound.</li></ul>



The system should allow <b>staff</b> to view assigned complaints.	<p>The <b>staff</b> must be able to:</p> <ul style="list-style-type: none"> <li>i. Go to their dashboard.</li> <li>ii. View complaints assigned by admin.</li> </ul>
The system should allow <b>staff</b> to provide updates to complainants.	<p>The <b>staff</b> must be able to:</p> <ul style="list-style-type: none"> <li>i. Open up a complaint by pressing more button.</li> <li>ii. Enter the report and press the submit button.</li> </ul>
The system should allow <b>staff</b> to apply leave and view result.	<p>The <b>staff</b> must be able to:</p> <ul style="list-style-type: none"> <li>i. Press the leave tracking button.</li> <li>ii. Enter the details and press the apply button.</li> <li>iii. View the status of their application.</li> </ul>
The system should allow <b>staff</b> to receive notice on overdue complaints.	<p>The <b>staff</b> must be able to:</p> <ul style="list-style-type: none"> <li>i. Press the notice button.</li> <li>ii. View notice from admin.</li> </ul>
The system should allow <b>admin</b> to view complaints from public and assign it to staff.	<p>The <b>admin</b> must be able to:</p> <ul style="list-style-type: none"> <li>i. Press complaint button and view all complaints.</li> <li>ii. Click details button and view a list of staffs.</li> <li>iii. Click the assign button to assign the complaint to a staff.</li> </ul>
The system should allow <b>admin</b> to give notice to staff.	<p>The <b>admin</b> must be able to:</p> <ul style="list-style-type: none"> <li>i. Press the send button beside the complaint number to issue a notice.</li> </ul>
The system should allow <b>admin</b> to manage staff.	<p>The <b>admin</b> must be able to:</p> <ul style="list-style-type: none"> <li>i. Press add button to add new staff.</li> <li>ii. Press update button to update staff info.</li> </ul>
The system should allow <b>admin</b> to manage leave applications	<p>The <b>admin</b> must be able to:</p> <ul style="list-style-type: none"> <li>i. View all leave applications.</li> <li>ii. Press the approve or reject button.</li> </ul>

#### 4.2.2 – Non Functional Requirement

##### **Public**

- i. Public shall not have access to the system if not logged in.
- ii. Public should not have access to the admin or staff site.
- iii. Form should not submit if there are blank fields.
- iv. Display error if login credentials are invalid.
- v. Session should be destroy when public logs out the system.
- vi. All address field in form should limited to addresses from Kuantan only.
- vii. System should have SSL certificate.
- viii. Payment must not go through if card details are incorrect.
- ix. Display receipt and send email if a compound payment is successful.

##### **Staff**

- i. Staff should not log in if not added by the admin.
- ii. Staff should not have access to the system if on leave or retired.
- iii. Staff should not access the public or admin site.
- iv. System should be not be able submit the report form when any of the fields are blank.
- v. Staff should not apply leave on date which is before the current date.
- vi. Staff should not dismiss a notice without completing the associated complaint.

##### **Admin**

- i. Admin should not log in if credentials are invalid.
- ii. Admin should not assign complaints to staff that are retired or on leave.
- iii. Admin should not set the due date for a complaint lesser than the current date.
- iv. Admin should not set other priority to complaints other than low, high or urgent.
- v. Admin should not add new staff with the same username or staff id.
- vi. The add new form cannot be submitted if the fields are blank.



### 4.3.2 – Activity Diagram

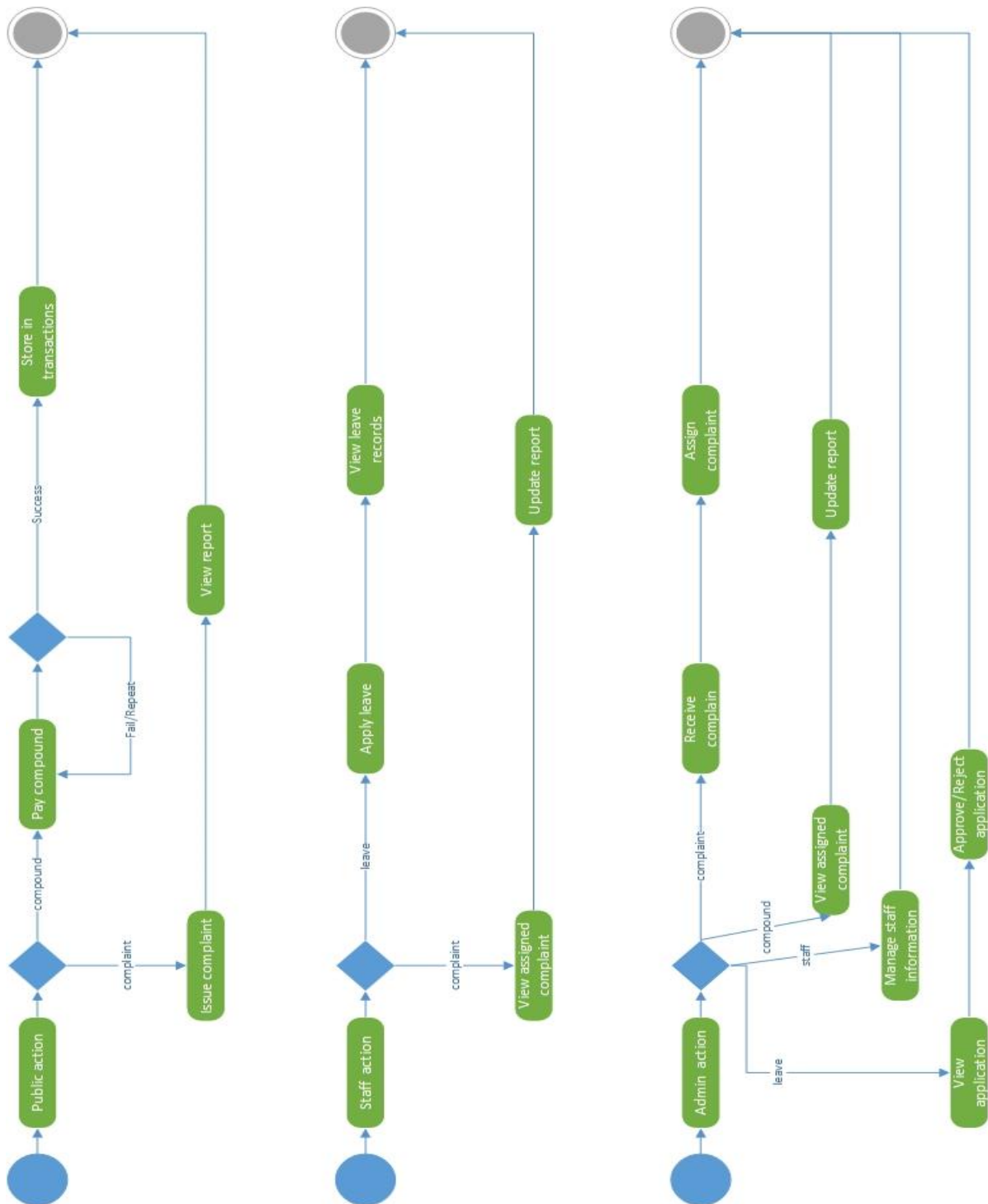


Figure 4.3.2 – Activity Diagram

#### 4.3.3 - Data Flow Diagram Level 0

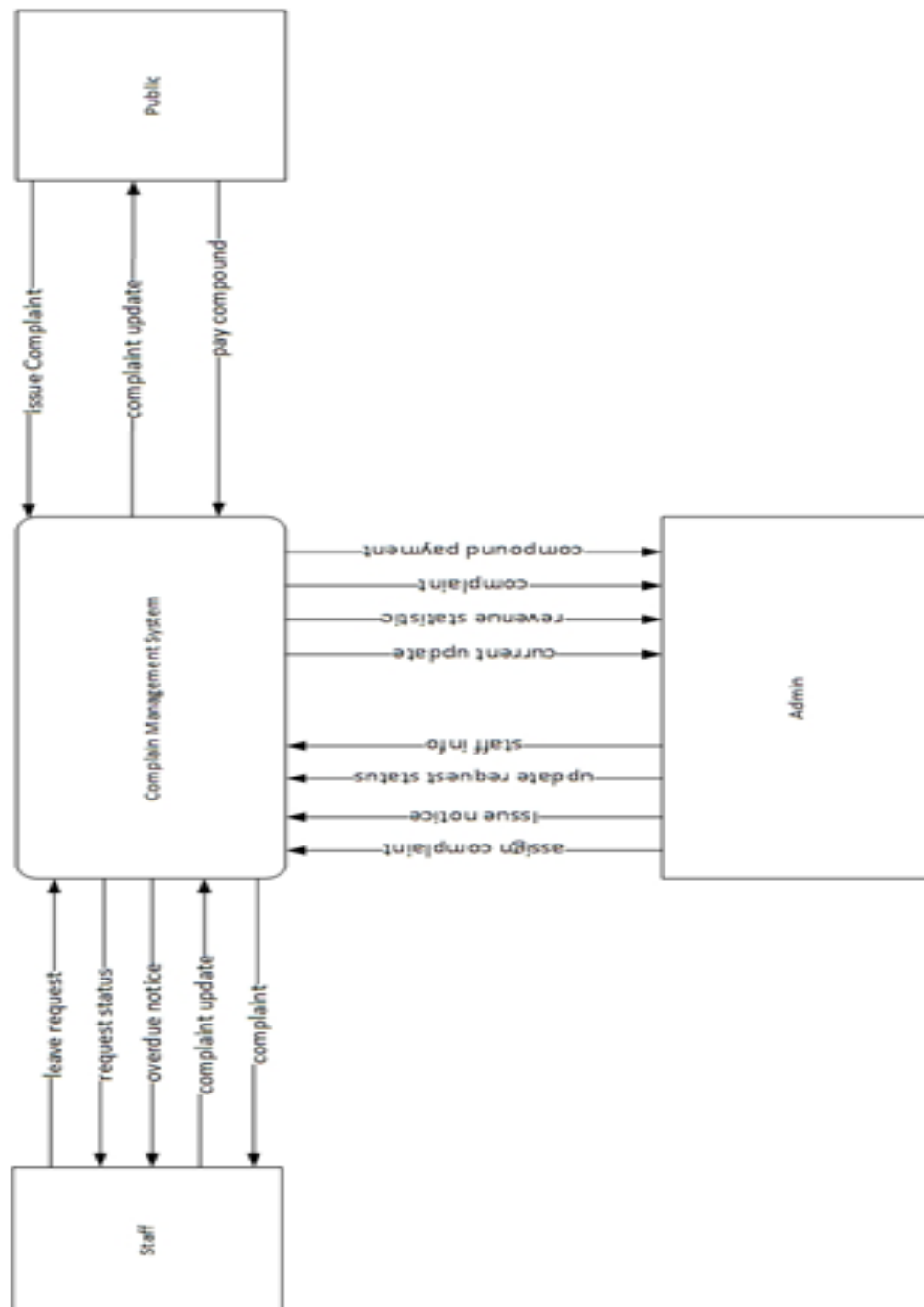


Figure 4.3.3.1 – DFD Level 0

## Entity Relationship Diagram Level 1

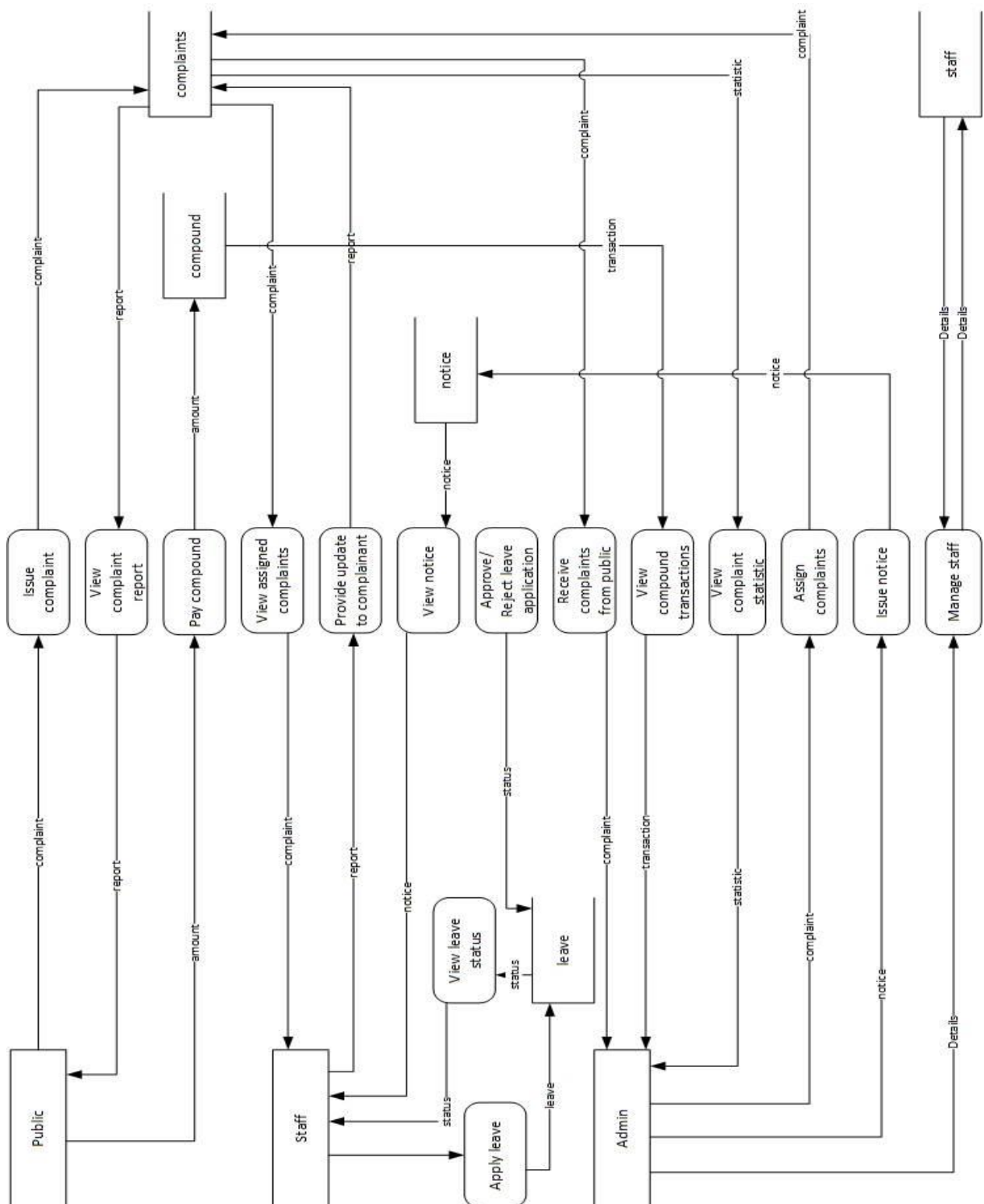


Figure 4.3.3.2 – DFD Level 1

#### 4.3.4 – Entity Relationship Diagram

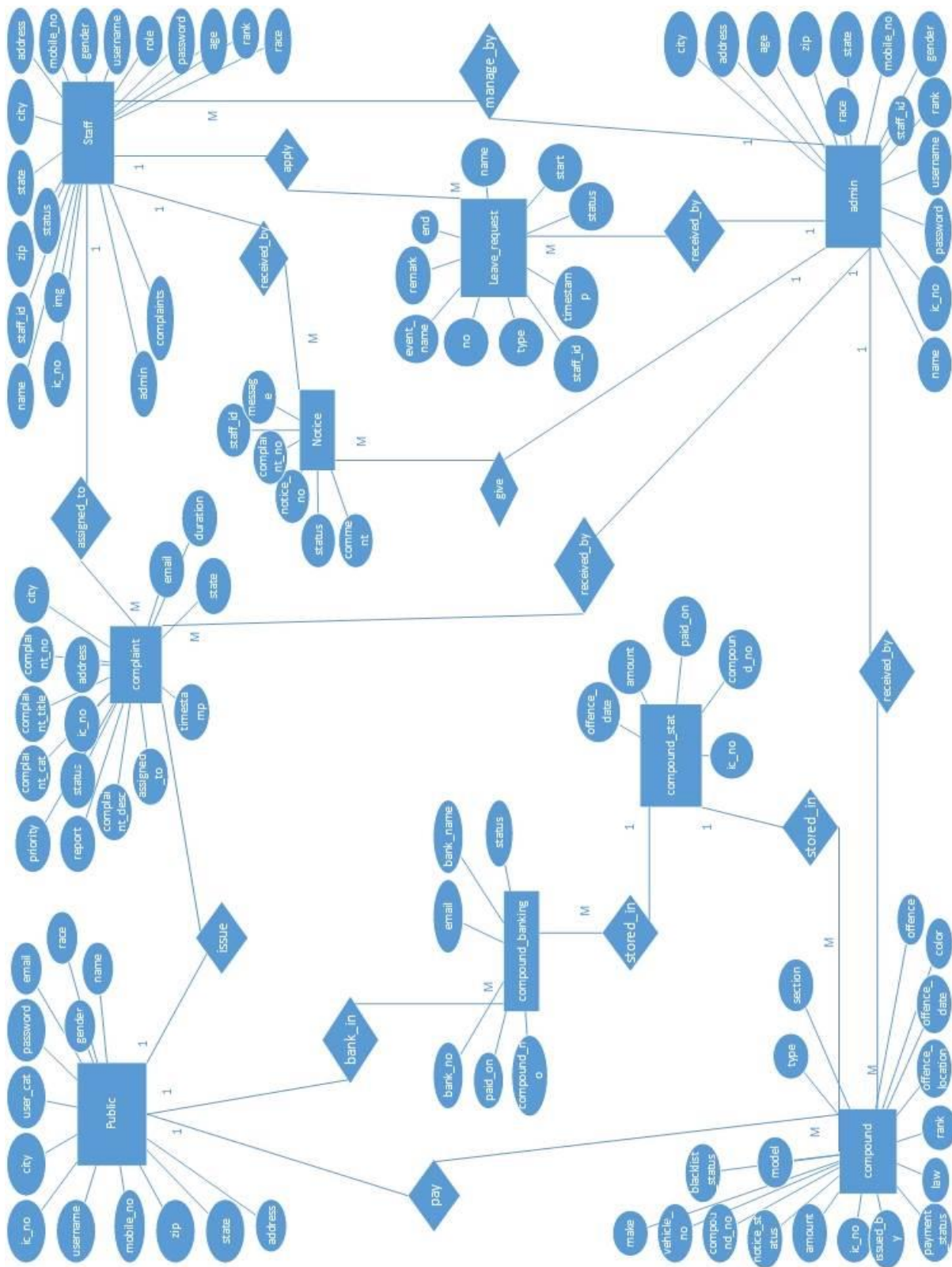


Figure 4.3.4 - ERD

## 4.4 – Unit Testing

Module: Public

No	Function	Result	Date	Remarks
1	Payment system for compound	Fail	14/12/17	Fixed after consulting Braintree Payment Gateway docs.
2	Issue new complaint	Success	14/12/17	N/A
3	Update profile	Success	14/12/17	N/A
4	View complaint history	Success	14/12/17	N/A

Module: Staff

No	Function	Result	Date	Remarks
1	View complaint by priority	Success	15/12/17	N/A
2	Leave application	Success	15/12/17	N/A
3	Get location QR code	Success	15/12/17	N/A
4	View notice from admin	Success	15/12/17	N/A
5	Send report and change status	Success	15/12/17	N/A

Module: Admin

No	Function	Result	Date	Remarks
1	Display new complaint	Success	16/12/17	N/A
2	Complaint Sorting	Success	16/12/17	N/A
3	Approve compound transactions	Success	16/12/17	N/A
4	Send notice to staff	Success	16/12/17	N/A
5	Display charts based on complaint received and compound transactions	Fail	16/12/17	Fixed after consulting Google Chats API docs.
6	Upload new staff picture	Success	17/12/17	N/A
7	Add new staff form validation	Success	17/12/17	N/A
8	Update staff rank	Success	17/12/17	N/A
9	Restrict staff access to system	Fail	17/12/17	Fixed error in SQL statement.
10	Approve leave applications	Success	17/12/17	N/A
11	Assigning complaints	Success	17/12/17	N/A



#### **4.5 – Conclusion**

As a conclusion to this chapter, I would like to report that the gathering of the system's functional and non-functional requirements have collected successfully without any problem. The system's architecture, however, have gone through several changes and evolves as requirements changes to adapt to certain situations and due to feedback from the project supervisor and project coordinator. As for the system, it has also gone through a variety of small scale changes and its finally ready and clear from all the errors that been discovered during the testing phase. For the next chapter, I will go through some of the limitations of the system and what else can be done to further refine and improve the system to keep the system running from any sort of errors.

## **5 - CONCLUSION**

### **5.1 - Concluding Remarks**

To begin, I would like to point that the construction phase of this project went very well. This is mainly due to the requirements of the system are very well defined and there is no any conflict between the requirements and the system architecture. The system is planned well with the help of my project coordinator, Ms. Azira, who constantly provides constructive feedback on how the entity relationship diagram and the data flow diagrams should be drawn in order to match my project requirements. She is also always available so any errors or enquiry regarding the project can be quickly fixed, which saved me a lot of time. To make my work flow easier I've separated my project into three module which are public, staff and admin. I have started developing the front end of the system first, so that the business logic that I will code can be tested immediately. Finally, I have also spent my time equally on both the front end and the back end of the project thus making the system perform as expected without any bugs while looking presentable doing it.

### **5.2 – Contribution**

This system have successfully serve all its users' needs and on top of that it has met all the project requirements. In a nutshell, I would say that this project have successfully contributed to all its users. For the public, they can now pay their compounds online reliably with little to no processing time and issue complaints that will surely be received by the administrator. Then, the public can also view their previous complaints and find the progress report there which reassures the public that their complaints will be taken seriously and be solved swiftly. As for the staff, they are experiencing low workload due to the complaints being assigned equally. Other than that, sending progress report to the public is also easier than ever. Then, they can also apply leave online, and when they are on leave the system will not allow the administrator to assign the complaint to them thus equally balancing the workload in every aspect. As for the administrator, the system offers powerful feature to ease up the administrator's job in managing the staff including their leave application and making approving compound transactions hassle free. On top of that, the administrator will also receive complaints without fail and can easily send notice to employee that are not meeting the due date of their assigned complaints.

### **5.3 - Limitation of the System**

The system does meet all the project requirements but there are still some limitations in this system.

- The staff can only take leave based on the number days but not in hours.
- There will be no QR code displayed if the address provided is not accurate.
- The system only supports the operation of a single unit in the whole law and enforcement division.
- The system can't support the payment of assessment tax online.

### **5.4 - Suggestion of Future Work**

Based on the limitations list provided above, more work can be done to further refine the system and enhance its capabilities.

- For example, making the system larger so that it could support the work flow of the entire municipal council.
- Refining the results of google maps API function call to get the best possible location lock and displaying the QR code.
- Integrating assessment tax payment.
- Expand the leave application feature so that the staff could take leave for half a day.

### **5.5 – Summary**

As a conclusion, I have gained a lot experience and knowledge while doing the project. I have also learnt how important requirements are and how big of an impact they have on a project. For this project I have successfully met all the objectives that are defined in chapter 1 as well which are:

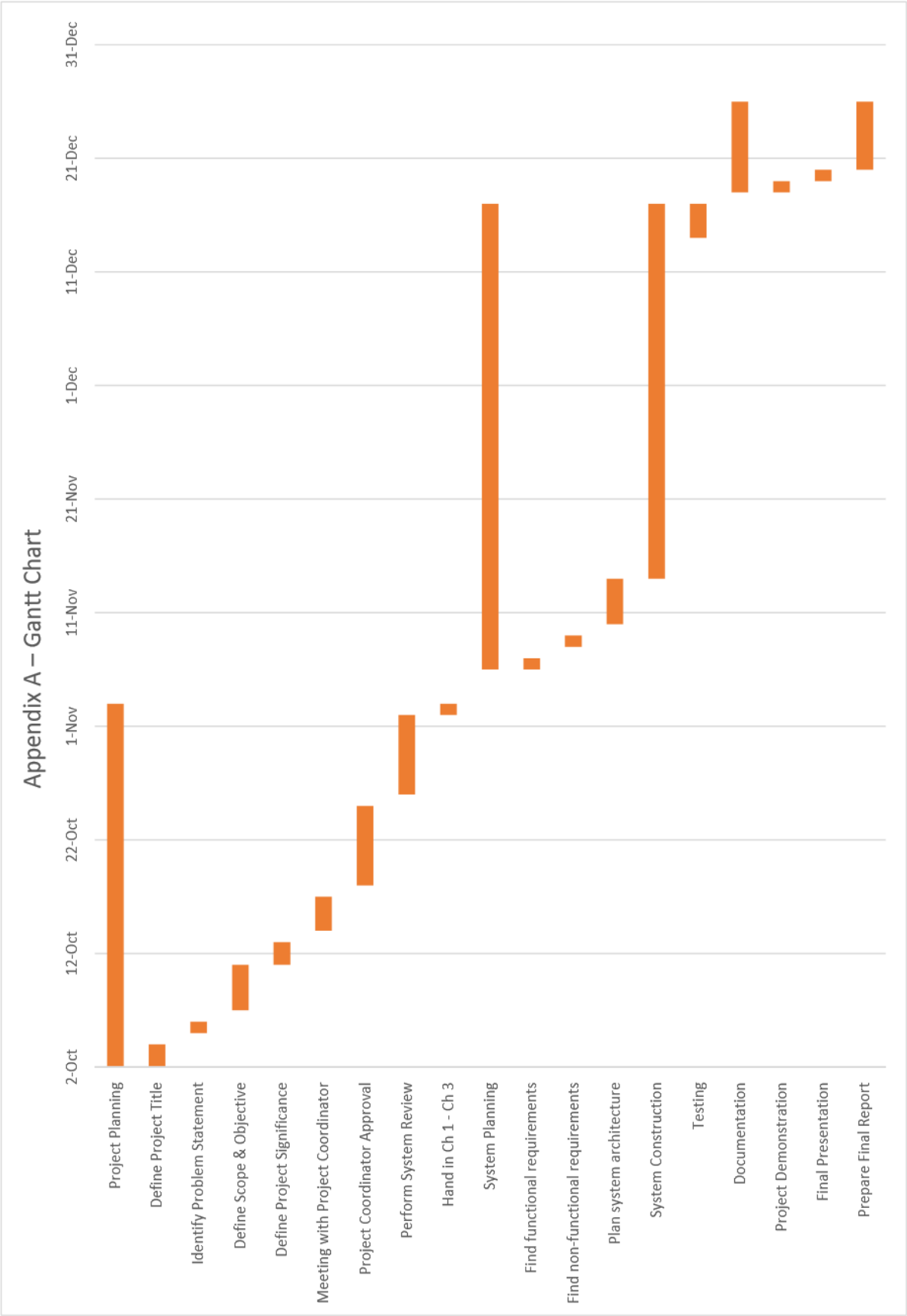
- i. To develop a system that enables the public to issue a complaint and pay their compound payments online.
  - a. This is successfully implemented by using a straight forward form for the public to issue their complaint and the usage the Braintree payment gateway to receive compound payment securely.

- ii. To develop a system that enables the staff to receive complaint from the administrator and respond to the complainant easily.
  - a. This was implemented by providing a dashboard which puts the complaints received in the spotlight. The complaint was categorized according to the priority and a form was provided for staff to submit their progress report easily.
- iii. To develop a system that enables the administrator to accept and assign complaints, manage the staff and compound payment easily.
  - a. This was implemented by helping the administrator to assign complaints equally by hiding employee that are on leave and displaying the number of complaints that the staff are handling.
  - b. An interface was also provided for the administrator to approve transactions and to add new staff, remove staff or update the staff info.

## References

- ❖ Tutorials Point – [www.tutorialspoint.com](http://www.tutorialspoint.com)
- ❖ Stack Overflow – [www.stackoverflow.com](http://www.stackoverflow.com)
- ❖ Google Images – [www.images.google.com](http://www.images.google.com)
- ❖ Airbrake – [www.airbrake.io](http://www.airbrake.io)
- ❖ Scottish Qualification Authority - [www.sqa.org.uk](http://www.sqa.org.uk)

Appendix A – Gantt Chart



## Appendix D – Real Time Compound Example

 **DEWAN BANDARAYA KUALA LUMPUR**  
JABATAN KESELAMATAN DAN PENGUATKUASAAN  
UNIT : TRAFIK No. : 

**NOTIS KESALAHAN SERTA TAWARAN KOMPAUN**

NO. KENDERAAN :  NO. CUKAI JALAN :   
JENAMA / MODEL :   
JENIS BADAN : KERETA  
TEMPAT / JALAN :   
NO. PETAK/TIANG :   
TARIKH : 19/10/2011 WAKTU : 10:38:08 AM

KEPADA PEMUNYA / PEMANDU KENDERAAN TERSEBUT DI ATAS, TUAN / PUAN DI DAPATI TELAH MELAKUKAN KESALAHAN SEPERTI BERIKUT :

PERUNTUKAN UNDANG-UNDANG:  
KAEDAH-KAEDAH LALULINTAS JALAN 1959 (L.N.166/59)

**SEKSYEN / KAEDAH :**  
**KAEDAH 12 (4)**

**KESALAHAN :**  
KEDUDUKAN ATAU KEADAAN KENDERAAN MUNGKIN ATAU MENYEBABKAN BAHAYA, HALANGAN ATAU KESUSAHAN TIDAK DIDUGA KEPADA PENGGUNA-PENGGUNA JALAN LAIN

**BUTIR-BUTIR :**

DIKELUARKAN OLEH : A 5460 SITI MASLIZA BINTI MAHMUD  
PENGUATKUASA/WARDEN LALULINTAS TARIKH : 19/10/2011

**TAWARAN KOMPAUN**

SAYA BERSEDIA MENGKOMPAUN KESALAHAN SEPERTI YANG DITETAPKAN DALAM MASA 14 HARI (TARIKH TAMAT : 02-11-11) DARI TARIKH NOTIS DICETAK. KEGAGALAN MENJELASKAN BAYARAN KOMPAUN AKAN MENYEBABKAN TINDAKAN MAHKAMAH AKAN DIAMBIL.

  
(ROHAYAH BINTI KARIM)  
JABATAN HAL EHWAL UNDANG-UNDANG  
b.p. DATUK BANDAR KUALA LUMPUR

---

 **DEWAN BANDARAYA KUALA LUMPUR**  
JABATAN KESELAMATAN DAN PENGUATKUASAAN  
UNIT : TRAFIK No. : 

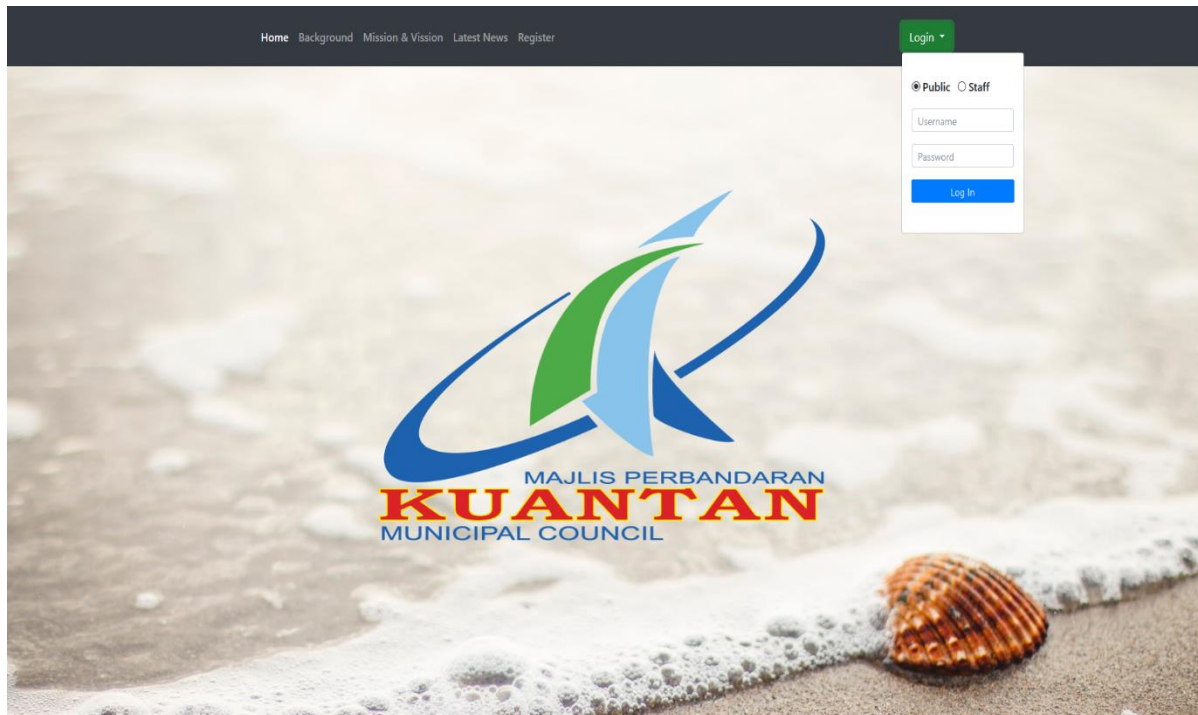
PERUNTUKAN : WP15111  
PERUNTUKAN : KAEDAH-KAEDAH LALULINTAS JALAN 1959 (L.N.166/59)  
SEKSYEN / KAEDAH : KAEDAH 12 (4)  
TARIKH : 19/10/2011

BERKESALAHAN KESALAHAN LALULINTAS ANTARA DBKL, PJ DAN FORM MULA 1 MAC 2011

KERTAKAN UNTUK CATATAN PEMBAYARAN  
TERMINAL KASIH No. : AO61107952

## Appendix E – User Interface

### Homepage and login form for public and staff



### Register form for new user

The image shows the 'New Registration' form on the Kuantan Municipal Council website. The form is set against a blue gradient background. It contains the following fields and controls:

- Username** and **Password**: Text input fields.
- Mobile Number** and **E-mail**: Text input fields.
- Name** and **IC Number**: Text input fields.
- Race**: Dropdown menu with 'Malay' selected.
- Gender**: Dropdown menu with 'Male' selected.
- User Category**: Dropdown menu with 'Individual' selected.
- Address**: Text input field.
- City**: Dropdown menu with 'Kuantan' selected.
- State**: Dropdown menu with 'Pahang' selected.
- Zipcode**: Text input field.
- Register**: A large green button at the bottom.




## Public Dashboard

[Home](#) [Dashboard](#) [Profile](#) [New Complaint](#) [Compound Payment](#)

Logged in as, serena [Log out](#)

# Greetings, serena

Date: Sunday, 24th December 2017 | Time: 4:10:56 PM



### Complaint Status



### Complaints

#	Title	Category	Timestamp	Status	View
1	Barking Disturbance	Disturbance	2017-12-19 03:02:06	Received	<a href="#">View</a>
2	Bad Road	Environment	2017-12-19 02:56:45	Received	<a href="#">View</a>
3	Leftover Building Material	Premise	2017-12-19 02:49:33	Received	<a href="#">View</a>
4	Air Pollution	Environment	2017-12-19 02:44:31	Received	<a href="#">View</a>
5	Abandoned Flags	Others	2017-12-18 07:44:12	In progress	<a href="#">View</a>
6	Damaged Playground Equipment	Vandalisme	2017-12-11 08:08:33	In progress	<a href="#">View</a>
7	Open Burning	Environment	2017-12-11 03:27:08	In progress	<a href="#">View</a>
8	Road	Damaged Roads	2017-12-07 22:38:34	Solved	<a href="#">View</a>
9	Vandalisme	Poster Installation	2017-12-01 10:18:25	Solved	<a href="#">View</a>

## Edit Profile

Home Dashboard

serena Log out

**Profile** X

Username Password

serena

Leave it blank if not changing the password.

Mobile Number E-mail

0124578944 serena79@gmail.com

Address

11, 10, Lorong IM 8/29, Taman Polo

City Zipcode

Kuantan 252014

State

Pahang

Close Update

Complaints

Received 4

## Form to issue new complaint

Home Dashboard

serena Log out

**New Complaint Form** X

Title

Category

Environment

Location

City Zipcode State

Kuantan Pahang

Description

Close Send

Complaints

Received 4

## Check Compound

[Home](#) [Dashboard](#) [Compound Payment](#) Logged in as, serena [Log out](#)

### Check Compound

IC Number:

  
[Check](#)

Copyright © 2016 Kuantan Municipal Council

Last Updated: Tuesday, 31 October 2017 - 9:08am

## Compound Details

[Home](#) [Dashboard](#) [Compound Payment](#) Logged in as, serena [Log out](#)

### You have a

#	Compound Number
1	6542184

[Back](#)  
[Details](#)  
[More](#)

#### Compound Details

**Compound Number:** 6542184

**Date & Time:** 2017-11-20 02:24:45

**Location:**  
Berjaya Megamall, Jalan Tun Ismail, Sri Dagangan, Kuantan, 25000, Pahang

**Vehicle Number:** CAG4221

<b>Make:</b> Honda	<b>Model:</b> City	<b>Color:</b> Black	<b>Type:</b> Car
--------------------	--------------------	---------------------	------------------

**Section:** 46(1)g      **Law:** ACT 133 - STREET, DRAINAGE AND BUILDING ACT 1974

**Offence:**  
CAUSING OBSTRUCTION BY ALLOWING ANY VEHICLE TO REST ON ANY FOOT WAY OR PUBLIC PLACES

**Notice Status:** reminder      **Payment Status:** unpaid      **Amount:** 50.00

**Issued By:** Sergeant Mazlan

[Close](#)

#### Payment

Payment Methods

[Pay with Paypal or credit card](#) [Banking](#) [Postage](#)

The service is provided by the Kuantan Municipal Council.

## Compound Payment Options

### Payment Form

Payment Methods

[Pay with Paypal or credit card](#) [Banking](#) [Postage](#)

Processing duration: Instant

Select Compound No:

6542184

IC Number:

791119061132

Name:

Serena Patrick

RM:

50.00

Email Address

serena79@gmail.com

Your email will not be shared with anyone else.


[PayPal](#)

Card Number

Expiration Date

Submit


## Compound Receipt

 kuantanmunicipalcouncil@gmail.com

to me

Dec 19 (5 days ago)

Kuantan Municipal Council



Dear, Serena Patrick


We have received your compound payment.

Compound Number: 6542184

IC Number: 791119061132

Amount: RM 50.00

Date: 19-12-2017



Thank you

## Compound Paid Success

Payment Successful

Kindly check your inbox for the payment receipt.

[Back](#)[Print Invoice](#)

### Invoice

Serena Patrick  
791119061132  
serena79@gmail.com



#### Recipient

Kuantan Municipal Council

Compound #	6542184
Date	24-12-2017
Amount Due	RM 50.00

No	Description	Amount
1	Payment for compound number: 6542184	RM 50.00

Total	RM 50.00
Amount Paid	RM 50.00

# Staff Dashboard

HomeDashboardProfileLeave TrackingNotice

Logged in as, rahimahLog out

Greetings, Corporal

Date: Sunday, 24th December 2017 | Time: 4:25:11 PM



Task Priority	
Urgent	1
High	0
Low	1
Solved	2

Complaint Status

Pending2

Solved2

### Urgent Complaints

Complaint No: 35110

Title: Open Burning

Category: Environment

Issued On: 2017-12-11 03:27:08

Complete By: 2018-01-01

View

### High Priority Complaints

Nothing to show

### Low Priority Complaints

Complaint No: 35109

Title: Damaged Playground Equipment

Category: Vandalisme

Issued On: 2017-12-11 08:08:33

Complete By: 2017-12-18

View

### Solved Complaints

Complaint No: 35107

Title: Road

Category: Damaged Roads

Complainant Name: Serena Patrick

Complainant Mobile No: 0124578944

Timestamp: 2017-12-07 22:38:34

Address: Jalan IM 13/1, Bukit Kuln Satu, Kuantan 25200 Pahang

Description: There a lot of pot holes in the road. They are particularly dangerous for motorcyclist as they can't see it during heavy rain and will certainly cause accidents.

Report: This issue has been reported to the parties concerned and the repairs will be carried out soon.

Complaint No: 35108

Title: Vandalisme

Category: Poster Installation

Complainant Name: Serena Patrick

Complainant Mobile No: 0124578944

Timestamp: 2017-12-01 10:18:25

Address: 16-18, Jalan Tok Sira 70 Taman Jaya Kuantan 25200 Pahang

Description: The poster is blocking the drivers view. Kindly do something about this situation.

Report: The issue has been investigated and because the poster installation was authorized it will take some time to relocate it.

## Complaint Update Form

Complainant Name

Serena Patrick

Complainant Mobile No

0124578944

Complain Category

Environment

Timestamp

2017-12-11 03:27:08

Priority

urgent

Address

11, 10, Lorong IM 8/29, Taman Polo Kuantan 25200 Pahang

Description

At the field beside my house, some people often throw and burn the rubbish during the night. As I'm close by, my house is often surrounded by the thick smoke which makes me feel sick and annoying. Please take some actions to prevent this from happening.

Report

Status

In progress

Google Maps

Close

Update

## Location QR Code

Report



Google Maps

Close

Update

## Leave Form

### Leave Tracking

Leave Request From

Status Record

Staff ID

RF/6253

Name:

Corporal Rahimah

Start Date

mm / dd / yyyy

End Date

mm / dd / yyyy

Type

Sick Leave

Remark

Submit

## Leave Record

### Leave Tracking

Leave Request From

Status Record

#	Staff ID	Name	Start Date	End Date	Leave Type	Application Status
1	RF/6253	Corporal Rahimah	2018-01-03	2018-01-04	Medical	Approved
2	RF/6253	Corporal Rahimah	2017-12-27	2017-12-29	Personal	Received
3	RF/6253	Corporal Rahimah	2017-12-24	2017-12-24	Personal	Rejected

## Notice

## Notice

Complaint No: 35109

Kindly solve this complaint as soon as possible.

Please do not hesitate to consult me if you are facing any difficulties in solving this complaint.



## Admin Dashboard

[Home](#) [Dashboard](#) [Profile](#) [Complaint](#) [Compound](#) [Staff](#)

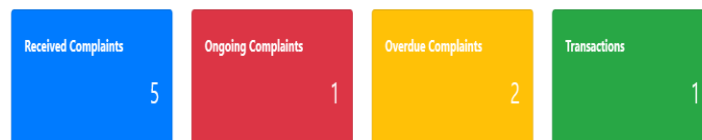
Logged in as, admin [Log out](#)

# Greetings, Administrator

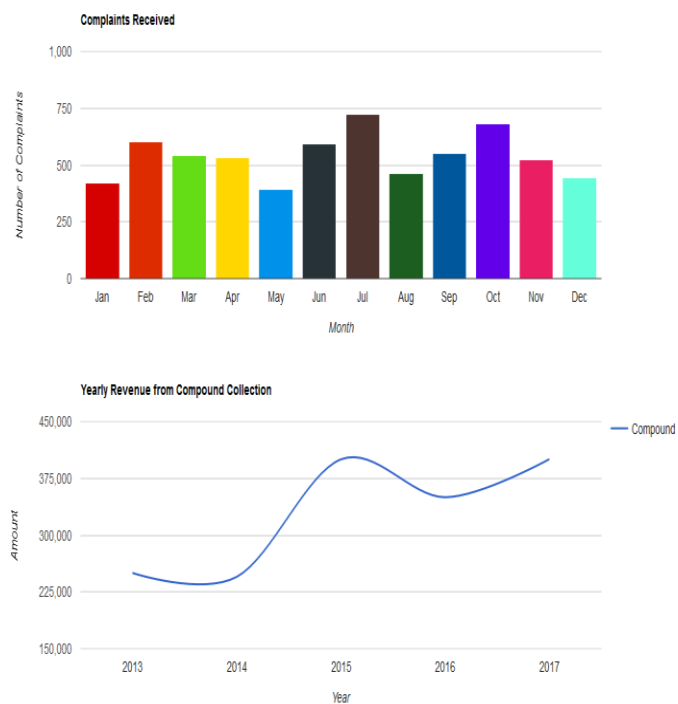
Date: Sunday, 24th December 2017 | Time: 4:42:45 PM



### Current Updates



### Statistics



## Admin Profile

### Profile



Rank	Username	Password
Assistant Superintendent	admin	*****
Name	IC Number	Mobile Number
Azman bin Rahman	751030065221	0147489961
Race	Gender	Age
Malay	Male	42
Address		
Lorong Kubang Buaya 7 Taman Suria		
City	State	Zipcode
Kuantan	Pahang	25250
Update		

## New Complaint

### New Complaint

Complaint No	Title	Category	Date/Time	Details	Assign
35113	Abandoned Lorries	Others	2017-12-18 08:00:28	More	Assign
35114	Air Pollution	Environment	2017-12-19 02:44:31	More	Assign
35115	Leftover Building Material	Premise	2017-12-19 02:49:33	More	Assign
35116	Bad Road	Environment	2017-12-19 02:56:45	More	Assign
35117	Barking Disturbance	Disturbance	2017-12-19 03:02:06	More	Assign

1

## Assign Complaint

Assign complaint 35113 to:



Set priority:

Low



Duration

mm / dd / yyyy

Staff ID	Rank	Name	Complaints	Assign
RF/6256	Lans Corporal	Anas	0	Assign
RF/6258	Lans Corporal	Tay	0	Assign
RF/6259	Sub Inspector	Olivia	0	Assign
RF/6261	Sergeant	Siti	0	Assign
RF/6262	Inspector	Husna	0	Assign
RF/6263	Chief Inspector	Liyana	0	Assign
RF/6254	Corporal	Mazlan	1	Assign
RF/6253	Corporal	Rahimah	2	Assign

Close

## All Compound

### All Compound

Status: All Date/Time: Current Sort

#	Compound Number	Offence Date	Notice Status	Amount	Payment Status	Details
1	6542188	2017-12-15 12:24:45	reminder	RM 100.00	unpaid	More
2	6542186	2017-12-08 21:32:16	reminder	RM 60.00	paid	More
3	6542184	2017-11-20 02:24:45	reminder	RM 50.00	paid	More
4	6542185	2017-11-20 02:24:45	reminder	RM 100.00	paid	More

## Compound paid via banking

### Banking Transactions

Date: Current Sort

#	Compound Number	Paid On	Bank Account No	Bank	Details	Approve/Decline
1	6542185	2017-12-19	8321-2356-15	Maybank	More	Approve Decline

## Compound paid via postage

### Postage Transaction

Enter Compound Number Search

Result

Compound Details
<b>Compound No:</b> 6542186
<b>IC No:</b> 791119061132
<b>Offence Date:</b> 2017-12-08 21:32:16
<b>Location:</b> 11, 10, Lorong JM 8/29, Taman Polo, Kuantan, 25000, Pahang
<b>Section:</b> 47(1)a
<b>Law:</b> ACT 133 - STREET, DRAINAGE AND BUILDING ACT 1974
<b>Offence:</b> LAYING OR DUMPING RUBBISH IN PUBLIC PLACES
<b>Payment Status:</b> unpaid <b>Amount:</b> RM 60.00
<b>Issued By:</b> Sergeant Mazlan

Approve Payment

## Transaction History

### Transaction History

Search

#### Result

Transaction Details	Compound Details
<b>Compound No:</b> 6542184	<b>Location:</b> Berjaya Megamall, Jalan Tun Ismail, Sri Dagangan, Kuantan, 25000, Pahang
<b>IC No:</b> 791119061132	<b>Vehicle Number:</b> CAG4221
<b>Offence Date:</b> 2017-11-20 02:24:45	<b>Make:</b> Honda <b>Model:</b> City
<b>Amount:</b> RM 50.00	<b>Color:</b> Black <b>Type:</b> Car
<b>Payment Received:</b> 2017-12-24 16:19:26	<b>Section:</b> 46(1)g
	<b>Law:</b> ACT 133 - STREET, DRAINAGE AND BUILDING ACT 1974
	<b>Offence:</b> CAUSING OBSTRUCTION BY ALLOWING ANY VEHICLE TO REST ON ANY FOOT WAY OR PUBLIC PLACES
	<b>Payment Status:</b> paid
	<b>Issued By:</b> Sergeant Mazlan

## All Staff

### All Staff

Staff Name:  Rank:  Status:

#	Staff ID	Name	Role	Rank	Status	Details
1	RF/6253	Rahimah binti Adnan	Permit Enforcement Unit	Corporal	Active	<input type="button" value="More"/>
2	RF/6254	Mazlan bin Abdul Razak	Enforcer - Law	Corporal	Active	<input type="button" value="More"/>
3	RF/6255	Rahman bin Yaakob	Traffic	Sergeant	Retired	<input type="button" value="More"/>
4	RF/6256	Anas bin Md Sharif	Complaint Management	Lans Corporal	Active	<input type="button" value="More"/>
5	RF/6258	Tay Bon Tong	Patrol	Lans Corporal	Active	<input type="button" value="More"/>
6	RF/6259	Olivia John	Special Ops	Sub Inspector	Active	<input type="button" value="More"/>
7	RF/6261	Siti binti Fitri	Traffic	Sergeant	Active	<input type="button" value="More"/>
8	RF/6262	Husna binti Ariffur	Patrol	Inspector	Active	<input type="button" value="More"/>
9	RF/6263	Liyana binti Hassibul	Special Ops	Chief Inspector	Active	<input type="button" value="More"/>
10	RG/5744	Azman bin Rahman	Administrator	Assistant Superintendent	Active	<input type="button" value="More"/>

## Add Staff Form


### Add New Staff

Username		Password	
<input type="text"/>		<input type="password"/>	
Name		IC Number	
<input type="text"/>		<input type="text"/>	
Race	Gender	Age	
<input type="text" value="Malay"/>	<input type="text" value="Male"/>	<input type="text"/>	
Address			
<input type="text"/>			
City	State	Zipcode	
<input type="text" value="Kuantan"/>	<input type="text" value="Pahang"/>	<input type="text"/>	
Mobile Number	Staff Picture		
<input type="text"/>	<input type="button" value="Browse..."/> No file selected.		
Staff ID	Role	Rank	
<input type="text"/>	<input type="text"/>	<input type="text"/>	

Add

## Update Staff Info

### Update Staff Information



Staff ID: RF/6254

Name: Corporal Mazlan

Full Name: Mazlan bin Abdul Razak

Status

Role

Rank

## Search Leave

### Leave Tracking

Search Application

All Application

RF/6253

Search

#	Staff ID	Name	Start Date	End Date	Leave Type	Remark	Application Status	Cancel
1	RF/6253	Corporal Rahimah	2018-01-03	2018-01-04	Medical	N/A	Approved	<button>Cancel</button>
2	RF/6253	Corporal Rahimah	2017-12-27	2017-12-29	Personal	N/A	Received	N/A
3	RF/6253	Corporal Rahimah	2017-12-24	2017-12-24	Personal	N/A	Rejected	N/A

## All Leave Application

### Leave Tracking

Search Application

All Application

#### Received

#	Staff ID	Name	Start Date	End Date	Leave Type	Remark	Application Status	Approve/Reject
1	RF/6253	Corporal Rahimah	2017-12-27	2017-12-29	Personal	N/A	Received	<button>Approve</button> <button>Reject</button>

#### Rejected

#	Staff ID	Name	Start Date	End Date	Leave Type	Remark	Application Status
1	RF/6253	Corporal Rahimah	2017-12-24	2017-12-24	Personal	N/A	Rejected

#### Approved

#	Staff ID	Name	Start Date	End Date	Leave Type	Remark	Application Status
1	RF/6253	Corporal Rahimah	2018-01-03	2018-01-04	Medical	N/A	Approved