

VALIDATION

SOFTWARE TESTING AND VALIDATION

CA420

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UNIT TEST PLAN

- Unit tests will be run on JavaScript code.
- The QUnit framework will be used.
- Blanket.js will be used to measure QUnit code coverage.
- Rather than naively aiming for 100% code coverage I will focus on producing quality tests where I am confident that I or someone else can make changes to my code without breaking anything.
- For some functional requirements this could be 10% or it could be 95% code coverage.

1.1 Test Items

The items to be tested are all of the functions with a component/functional requirement of the Community Area Alert System. A list of components/functional requirements can be found in section 3 of the functional specification.

1.2 Features to be tested

The functions described in section 1.1 should be tested to ensure they comply with their post conditions, given their precondition. Both will be based off the Use Cases of each component described in section 2.3 of the functional specification.

1.3 Test deliverables

The following items must be delivered before the testing begins:

- Functional Specification.
- Entry into the Technical Specification document for each functional requirement.
- Unit Test Case Design.

1.4 Testing tasks

The testing procedure consists of designing Test Cases which include the input values and expected output values. These will be documented in the Component Design document. It also includes writing the actual test cases

1.5 Environmental Needs

All tests should be run using QUnit straight through the browser on the device I am using to develop the phone gap application, this device will be a Windows 7 laptop in my case. QUnit will then be integrated to work with Blanket.js to test code coverage.

1.6 Test case pass/fail Criteria

A test case passes when the produced output of the test program matches the expected output values and no errors have occurred. If this does not happen the test case will fail. The actual unit tests will be run in the Unit Testing stage of the development process.

Apart from this Unit Test Plan it will not be necessary to document Unit Testing, all unit test cases will be designed using the QUnit framework and will be re-run during the project presentation.

FUNCTION REQUIREMENT TEST PLAN

- Since my development process involves adding new functional requirements to the system in increments, this stage of validation will be carried out like system acceptance testing except it will focus only on the new component/functional requirement which was added during the increment.
- Just like system testing, Function Requirement Testing will fall under the scope of black box testing.
- Function Requirement Testing will be performed across the whole component which was added during the iteration. It will test the design and behaviour against what the component was expected to do based on its design in the functional specification.
- This type of testing will be a way to validate that the component which developed meets its specification and purpose.
- Since this is an individual project I will carry out system testing myself with the help of my course mates.

Environmental Needs

- Unit tests should be complete.
- A testing environment on each system the component will function on is available.

Step 1: Create a Function Requirement Test Plan

This will be carried out in the Component Design stage. It will include the following Function Requirement Test Plan which will be a modified version of a System Test plan. The Function Requirement Test Plan will contain the following headings:

- Goals & Objectives
- Scope
- Testing Schedule
- Entry and exit criteria
- Test Environment
- Test Cases and Execution

INTEGRATION TEST PLAN

- Integration test planning is carried out during the Component Design Stage.
- Bottom up integration testing will be used to ensure each component/functional requirement which was developed during an increment has been implemented correctly with previously developed components it interacts with.
- The actual integration tests will be carried out during the Integration Testing stage of the development cycle.
- Since white box testing was carried out at unit level integration testing will consist of black box testing.
- Bottom up integration testing will be used as it is better suited to my development process due to previously developed components/functional requirements already being unit tested.
- Since the Community Area Alert system is being developed in increments the test harness for performing bottom up integration testing will contain all of the components previously developed, unit tested and passed functional requirement testing.
- This way development and testing can be done together, leading to a more efficient and improved development process which will lead to higher quality software being produced.
- At the Component Design stage it will be determined which other components the component being developed interacts with.

The Integration Testing stage on the Community Area Alert app will therefore follow a black box testing approach using bottom up integration. The integration testing for an individual increment will follow 5 steps:

Step 1: Create a Test Plan

This will be carried out in the Component Design stage.

Step 2: Integrate New Component

This will be carried out in the Code stage.

Step 3: Create Test Cases and Test Data

This will be carried out in the Integration Testing phase.

Step 4: Execute Test Cases

This will be carried out in the Integration Testing phase. If the Test Case meets the defined “pass” criteria continue to the next Test Case or continue the next stage of the development process. Otherwise continue to step 5.

Step 5: Fix Bugs and Retest

This will be carried out in the Integration Testing phase. If the test case fails to meet its pass criteria fix errors in the code and restart the Test Case until it meets its pass criteria.

SYSTEM TEST PLAN

- System Testing will be carried out after the final increment of the development process has been complete. It will be carried out a lot like Function Requirement Testing except all functionality will be implemented at this stage so it will cover the whole system.
- System testing will ensure the system is not only checked for errors but also to ensure the system functions as intended.
- Since the unit and integration validation phases will have been done successfully at this stage most of the test plan and test cases would already have been covered and simple testing would only have to be done in order to ensure there are no bugs since this is the final product.
- System Testing should cover all of the functional, no functional, technical and UI requirements of the whole system in ever environment using black box testing.
- System Testing will focus on the following:
 - o Installation
 - o Usability Testing
 - o Recovery Testing
 - o Migration Testing
 - o Functional Completeness Testing

ACCEPTANCE TEST PLAN

Acceptance testing will be used to determine if the Community Area Alert System meets all of its requirements set out in the functional specification. The goal of acceptance testing is find faults or defects which may not have been picked up by this stage. Acceptance testing will cover the whole complete system. It will be less technical than the other stages of validation, at this stage it will be expected each function has been developed and tested correctly. Acceptance testing will therefore involve installing the Community Area Alert system in each environment and using the system like it would be used in the real world. Any faults which are found will then require a new iteration of the development process to begin to address the issue.

Testing will be documented in the Validation document under the name and version number of the increment where it was carried out.

FUNCTIONAL REQUIREMENT TESTING

1.1 USER ACCOUNT CREATION

1.1 Goals and Objectives

This iteration will test that the User Account Creation functional requirement works as required and validates that the correct functionality has been delivered.

1.1 Scope

Everything in scope for functional requirement testing at this stage is documented under “User Account Creation” in the Functional Specification. Specifically it will involve:

- User input.
- Google Maps integration.

Every other functional requirement documented in section 3 of the Functional Specification will be considered out of scope.

1.1 Testing Schedule

The test cases should be executed and validated once the “Unit Testing” phase of the development cycle is complete for this particular iteration of the development cycle.

1.1 Entry and Exit Criteria

Once each test case passes its acceptance criteria an unknown user should be able to sign up and have a registered account on the Community Area Alert app or on the Community Area Alert desktop application.

1.1 Test Environment

Test Cases will be executed in an android environment, it will be my role and responsibility to ensure they are executed correctly.

1.1 Test Cases and Execution

Test Case Identifier: TC_1.1_01 Invalid Input

Step	Test Step	Test Data	Expected Result
1	Select the “Sign Up” option.	Perform touch screen press.	System displays a page with a heading “Step 1 of 3” containing 3 input fields.
2	Select the “Next” option.	Perform touch screen press.	Error message displayed “Please enter a username and password.”

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_1.1_02 Valid Input

Step	Test Step	Test Data	Expected Result
1	Select the “Sign Up” option.	Perform touch screen press.	System displays a page with a heading “Step 1 of 3” containing 3 input fields.
2	Enter “testing” into “Username” text field.	Perform touch screen press and enter text.	“testing” is displayed in the Username field.
3	Enter “1234” into the text field labelled “Password”.	Perform touch screen press and enter text.	“*****” is displayed in the Username field.
4	Enter “1234” into the text field labelled “ReType-Password”.	Perform touch screen press and enter text.	“*****” is displayed in the Username field.
5	Select the “Next” option.	Perform touch screen press.	System displays a page with a heading “Step 2 of 3” containing 3 input fields.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_1.1_03 Invalid Date of Birth (Mobile App Only)

Step	Test Step	Test Data	Expected Result
1	Enter “28 7 1993” into “Date of Birth” text field.	Perform touch screen press and enter text.	“28 7 1993” is displayed in the “Date of Birth” field.
2	Select the “Next” option.	Perform touch screen press.	Error message displayed “Please enter a Date of Birth of the form DD/MM/YYYY”

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_1.1_04 Valid Date of Birth (Mobile App Only)

Step	Test Step	Test Data	Expected Result
1	Enter “28/07/1993” into “Date of Birth” text field.	Perform touch screen press and enter text.	“28/07/1993” is displayed in the “Date of Birth” field.
2	Select the “Next” option.	Perform touch screen press.	System displays a page with a heading “Step 3 of 3” containing a Google Map canvas.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_1.1_05 Google Maps

Step	Test Step	Test Data	Expected Result
1	Move marker on map canvas.	Perform touch screen press on the red marker and drag the marker to new location.	The marker moves until the user releases their press.
2	Select the “Confirm Address” option.	Perform touch screen press.	Message “User Account Created” is displayed.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

1.2 USER ADDRESS VERIFICATION

1.2 Goals and Objectives

This iteration will test that the User Address Verification functional requirement works as required and validates that the correct functionality has been delivered.

1.2 Scope

Everything in scope for functional requirement testing at this stage is documented under “User Account Verification” in the Functional Specification. Specifically it will involve:

- Camera functionality.
- Email generation.

Every other functional requirement documented in section 3 of the Functional Specification will be considered out of scope.

1.2 Testing Schedule

The test cases should be executed and validated once the “Unit Testing” phase of the development cycle is complete for this particular iteration of the development cycle.

1.2 Entry and Exit Criteria

Once each test case passes its acceptance criteria a user who has signed up to the Community Area Alert mobile application should be automatically able to send a verification email and attempt to sign in.

1.2 Test Environment

Test Cases will be executed in an android environment, it will be my role and responsibility as the developer and tester to ensure they are executed correctly.

1.2 Test Cases and Execution

Test Case Identifier: TC_1.2_01 Cancel Image

Step	Test Step	Test Data	Expected Result
1	Select the “Take Picture” option.	Perform touch screen press.	The built in camera application on the device is opened.
2	Select the “Cancel” option.	Perform touch screen press.	The “User Verification” page re-opens.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_1.2_02 Capture Image

Step	Test Step	Test Data	Expected Result
1	Select the “Take Picture” option.	Perform touch screen press.	The built in camera application on the device is opened.
2	Select the Capture button.	Perform touch screen press.	The captured image is displayed with an option to “Retake” or “Continue”.
3	Select the “Continue” option.	Perform touch screen press.	The “User Verification” page re-opens with a thumbnail of the captured image displayed and a new button labelled “Send Verification Email”.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_1.2_03 Send Verification Email

Step	Test Step	Test Data	Expected Result
1	Select the “Take Picture” option.	Perform touch screen press.	The built in camera application on the device is opened.
2	Select the Capture button.	Perform touch screen press.	The captured image is displayed with an option to “Retake” or “Continue”.
3	Select the “Continue” option.	Perform touch screen press.	The “User Verification” page re-opens with a thumbnail of the captured image displayed and a new button labelled “Send Verification Email”.
4	Select the “Send Verification Email” option.	Perform touch screen press.	A message is displayed titled “Verification Email Sent”.

Execution 1: Defect found on “Step 4”.

Actual Result: No message was displayed and the “User Verification” page remained open.

Attempted Fix: Apply check to display error message when device is not connected to the internet.
Connected the testing environment to the internet.

Execution 2: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

1.3 SIGN IN

1.3 Goals and Objectives

This iteration will test that the User Address Verification functional requirement works as required and validates that the correct functionality has been delivered.

1.3 Scope

Everything in scope for functional requirement testing at this stage is documented under "Sign In" in the Functional Specification. Specifically it will involve:

- Database querying.

Every other functional requirement documented in section 3 of the Functional Specification will be considered out of scope.

1.3 Testing Schedule

The test cases should be executed and validated once the "Unit Testing" phase of the development cycle is complete for this particular iteration of the development cycle.

1.3 Entry and Exit Criteria

Once each test case passes its acceptance criteria a user who has signed up to the Community Area Alert system should be able to sign in to their account.

1.3 Test Environment

Test Cases will be executed in an android environment, it will be my role and responsibility as the developer and tester to ensure they are executed correctly.

1.3 Test Cases and Execution

Test Case Identifier: TC_1.3_01 Sign In Error

Step	Test Step	Test Data	Expected Result
1	Select the "Sign In" option.	Perform touch screen press.	System displays the Sign In page containing 2 input fields.
2	Enter the unregistered username "blank" into the field marked "Username".	Perform touch screen press and enter text.	"blank" is displayed in the "Username" field.

3	Enter “1234” into the “Password” field.	Perform touch screen press and enter text.	“1234 is displayed in the “password” field.
4	Select the “Sign In” button	Perform touch screen press.	Error message displayed “Unknown Username and/or Password”

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_1.3_02 Sign In Complete

Step	Test Step	Test Data	Expected Result
1	Select the “Sign In” option.	Perform touch screen press.	System displays the Sign In page containing 2 input fields.
2	Enter the registered username “testing” into the field marked “Username”.	Perform touch screen press and enter text.	“blank” is displayed in the “Username” field.
3	Enter “1234” into the “Password” field.	Perform touch screen press and enter text.	“1234 is displayed in the “password” field.
4	Select the “Sign In” button	Perform touch screen press.	The user account homepage opens.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

1.4 CREATE NEW REPORT

1.4 Goals and Objectives

This iteration will test that the Create New Report functional requirement works as required and validates that the correct functionality has been delivered.

1.4 Scope

Everything in scope for functional requirement testing at this stage is documented under “Create New Report” in the Functional Specification. Specifically it will involve:

- Google Maps integration.
- Form creation and submission.

Every other functional requirement documented in section 3 of the Functional Specification will be considered out of scope.

1.4 Testing Schedule

The test cases should be executed and validated once the “Unit Testing” phase of the development cycle is complete for this particular iteration of the development cycle.

1.4 Entry and Exit Criteria

Once each test case passes its acceptance criteria an admin who has signed in to the Community Area Alert desktop application should be able to create a new report.

1.4 Test Environment

Test Cases will be executed in desktop web browser, it will be my role and responsibility as the developer and tester to ensure they are executed correctly.

1.4 Test Cases and Execution

Test Case Identifier: TC_1.4_01 Invalid Input

Step	Test Step	Test Data	Expected Result
1	Select the “Create New Report” option.	Perform mouse click.	System displays the Create New Report page containing a Google Maps Canvas and 2 input fields.
2	Enter “Report Title 1” into the field marked “Report Title”.	Perform mouse click and enter text input.	“Report Title 1” is displayed in the field marked “Report Title”
3	Click on the button marked “Create New Report”.	Perform mouse click.	Error message is displayed “Must enter a report Title and Description.”

Execution 1: Defect found

Actual Result: Message is displayed stating “New Report Created”. Function was added to check the length of the text input in the “Title” and “Description” fields.

Execution 2: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_1.4_02 Report Created

Step	Test Step	Test Data	Expected Result
1	Select the “Create New Report” option.	Perform mouse click.	System displays the Create New Report page containing a Google Maps Canvas and 2 input fields.
2	Enter “Report Title 1” into the field marked “Report Title”.	Perform mouse click and enter text input.	“Report Title 1” is displayed in the field marked “Report Title”
3	Enter “This is the report description” into the field marked “Report Description”.	Perform mouse click and enter text input.	“This is the report description” is displayed in the field marked “Report Description”

4	Move marker on map canvas.	Perform touch screen press on the red marker and drag the marker to new location.	The marker moves until the user releases their press.
5	Click on the button marked "Create New Report".	Perform mouse click.	Message is displayed stating "New Report Created."

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

1.5 NOTIFICATION

1.5 Goals and Objectives

This iteration will test that the Notification functional requirement works as required and validates that the correct functionality has been delivered.

1.5 Scope

Everything in scope for functional requirement testing at this stage is documented under "Notification" in the Functional Specification. Specifically it will involve:

- Receiving push notification from Push Mobi.

Every other functional requirement documented in section 3 of the Functional Specification will be considered out of scope.

1.5 Testing Schedule

The test cases should be executed and validated once the "Unit Testing" phase of the development cycle is complete for this particular iteration of the development cycle.

1.5 Entry and Exit Criteria

Once each test case passes its acceptance criteria a user who has signed up to the Community Area Alert mobile application should receive a push notification once a new relevant report is added to the database.

1.5 Test Environment

Test Cases will be executed in an android environment, it will be my role and responsibility as the developer and tester to ensure they are executed correctly.

1.5 Pre-Condition

- A new report should be manually added to the collection called "reports" in the "communitAlert" database hosted on MongoLab. The report should have an entries and values:

```
_id = 1
title = "Report Title"
reportDescription = "Report Description"
lat = 50
```

```

    lng = -6
    dateTime = "22/04/2015 16:14:08"
    stationName = "Kells Garda Station"
    stationPhoneNum = "9293423"

```

- The entry on the user's document called "reports" should be updated to the value "1".

1.5 Test Cases and Execution

Test Case Identifier: TC_1.5_01 Receive Notification

Step	Test Step	Test Data	Expected Result
1	Restart the device which the Community Area Alert application is installed on.	Perform device restart.	The mobile device restarts.
2	Execute the pre-conditions described above.		
3	Check device for notification	Database update.	A notification should be displayed indicating that a new update is available on the Community Area Alert application.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

1.6 VIEW REPORTS

1.6 Goals and Objectives

This iteration will test that the View Reports functional requirement works as required and validates that the correct functionality has been delivered.

1.6 Scope

Everything in scope for functional requirement testing at this stage is documented under "View Reports" in the Functional Specification. Specifically it will involve:

- Database querying.

Every other functional requirement documented in section 3 of the Functional Specification will be considered out of scope.

1.6 Testing Schedule

The test cases should be executed and validated once the "Unit Testing" phase of the development cycle is complete for this particular iteration of the development cycle.

1.6 Entry and Exit Criteria

Once each test case passes its acceptance criteria a user who has signed up to the Community Area Alert mobile or desktop application should be able to sign in and view reports which are relevant to their account.

1.6 Test Environment

Test Cases will be executed in an android environment and desktop web browser, it will be my role and responsibility as the developer and tester to ensure they are executed correctly.

1.6 Pre-Condition

Add a document to the “reports” collection in the “communityAlert” database.

```
_id = 1  
title = "Report Title"  
reportDescription = "Report Description"  
lat = 50  
lng = -6  
dateTime = "22/04/2015 16:14:08"  
stationName = "Kells Garda Station"  
stationPhoneNum = "9293423"
```

Add a document to the “users” collection in the “communityAlert” database.

```
_id = mccannc9  
password = 1234  
dob = 28/07/1993  
lat = 53.703287959114  
lng = -6.912095029296893  
formattedAddress = Barfordstown, Co. Meath, Ireland  
gpsRadius = 5  
notifications = true  
reports = "1"  
verified = true  
reportTracker = 1
```

Add a document to the “stations” collection in the “communityAlert” database.

```
_id = Kells Garda Station  
Password = 1234  
phoneNum = 9293423  
lat = 53.72858319967284  
lng = -6.8818397116089045  
reports = 1
```

- Sign into an account on the Community Area Alert mobile application:
 - Username = mccannc9
 - Password = 1234
- Sign into an account on the Community Area Alert desktop application:
 - Username = Kells Garda Station
 - Password = 1234

1.6 Test Cases and Execution

Test Case Identifier: TC_1.6_01 User View Reports

Step	Test Step	Test Data	Expected Result
1	Go to the account homepage on the Community Area Alert Mobile Application.	Perform touch screen press.	The account homepage for the user will display with a refresh reports button in the top right corner.
2	Press the refresh reports button in the top right corner.	Perform touch screen press.	A loading symbol should be displayed followed by a new box appearing on the page. The new box should contain "22/04/2015 16:14:08 Report Title" and an expand symbol.
3	Press the expand symbol for the report with the title "Report Title".	Perform touch screen press.	The report description, station name and station number should be displayed in an expanded container.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_1.6_02 Admin View Reports

Step	Test Step	Test Data	Expected Result
1	Go to the "Edit Report" page on the Community Area Alert desktop application.	Perform mouse click.	The "Edit Report" page will display with a button labelled "Download Reports".
2	Press the "Download Reports" button.	Perform mouse click.	A loading symbol should be displayed followed by a new box appearing on the page. The new box should contain "22/04/2015 16:14:08 Report Title" and an edit button.
3	Press the edit button for the report with the title "Report Title".	Perform mouse click.	The report description should be displayed.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

1.7 EDIT PREFERENCES

1.7 Goals and Objectives

This iteration will test that the Edit Preferences functional requirement works as required and validates that the correct functionality has been delivered.

1.7 Scope

Everything in scope for functional requirement testing at this stage is documented under “Edit Preferences” in the Functional Specification. Specifically it will involve:

- Database updating.

Every other functional requirement documented in section 3 of the Functional Specification will be considered out of scope.

1.7 Testing Schedule

The test cases should be executed and validated once the “Unit Testing” phase of the development cycle is complete for this particular iteration of the development cycle.

1.7 Entry and Exit Criteria

Once each test case passes its acceptance criteria a user who has signed up to the Community Area Alert mobile application should be able to edit their account preferences.

1.7 Test Environment

Test Cases will be executed in an android environment, it will be my role and responsibility as the developer and tester to ensure they are executed correctly.

1.7 Test Cases and Execution

Test Case Identifier: TC_1.7_01 Adjust Notifications

Step	Test Step	Test Data	Expected Result
1	Go to the “Settings” page on the Community Area Alert Mobile Application.	Perform touch screen press.	The “Settings” for the user will display with a heading labelled “Notifications” and a related “On/Off” switch.
2	Slide the switch related to the “Notifications” heading into the “Off” position.	Perform touch screen drag.	The bar on the switch should move from left to right with the background colour of the switch changing from green to red.

3	Select the “Green” thumb in the right top corner of the “Settings” page.	Perform touch screen press.	A message should be displayed stating “User settings have been updated.”
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Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_1.7_02 GPS Radius

Step	Test Step	Test Data	Expected Result
1	Go to the “Preferneces” page on the Community Area Alert Mobile Application.	Perform touch screen press.	The “Preferences” for the user will display with a heading labelled “GPS Radius” and a related seek bar set to the value of 1.
2	Slide the seek bar from the position “1” to the far right at postion “5”.	Perform touch screen drag.	The bar on the switch should move from left to right with the number relating to the value of the bar changing from “1” to “5”.
3	Select the “Green” thumb in the right top corner of the “Preferences” page.	Perform touch screen press.	A message should be displayed stating “User settings have been updated.”

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

1.8 UPDATE REPORT

1.8 Goals and Objectives

This iteration will test that the Update Report functional requirement works as required and validates that the correct functionality has been delivered.

1.8 Scope

Everything in scope for functional requirement testing at this stage is documented under “Update Report” in the Functional Specification. Specifically it will involve:

- Database querying.

Every other functional requirement documented in section 3 of the Functional Specification will be considered out of scope.

1.8 Testing Schedule

The test cases should be executed and validated once the “Unit Testing” phase of the development cycle is complete for this particular iteration of the development cycle.

1.8 Entry and Exit Criteria

Once each test case passes its acceptance criteria an admin who has signed up to the Community Area Alert desktop application should be able to edit their account preferences.

1.8 Test Environment

Test Cases will be executed in an desktop browser, it will be my role and responsibility as the developer and tester to ensure they are executed correctly.

1.8 Pre-Conditions

Add a document to the “reports” collection in the “communityAlert” database.

```
_id = 1  
title = "Report Title"  
reportDescription = "Report Description"  
lat = 50  
long = -6  
dateTime = "22/04/2015 16:14:08"  
stationName = "Kells Garda Station"  
stationPhoneNum = "9293423"
```

Add a document to the “stations” collection in the “communityAlert” database.

```
_id = Kells Garda Station  
Password = 1234  
phoneNum = 9293423  
lat = 53.72858319967284  
long = -6.8818397116089045  
reports = 1
```

1.8 Test Cases and Execution

Test Case Identifier: TC_1.8_01 Update Report

Step	Test Step	Test Data	Expected Result
1	Go to the “Edit Report” page on the Community Area Alert desktop application.	Perform mouse click.	The “Edit Report” page will display with a button labelled “Download Reports”.
2	Press the “Download Reports” button.	Perform mouse click.	A loading symbol should be displayed followed by a new box appearing on the page. The new box should contain “22/04/2015 16:14:08 Report Title” and an edit symbol.

3	Press the edit symbol for the report with the title “Report Title”.	Perform mouse click.	The report description should be displayed as “Report Description”.
4	Type “This is a new update.”	Text input.	The report description should be displayed as “Report Description. This is a new update”.
5	Select the option “Update Report”	Perform mouse click.	A message is displayed saying “Report Updated”.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

1.9 DELETE REPORT

1.9 Goals and Objectives

This iteration will test that the Delete Report functional requirement works as required and validates that the correct functionality has been delivered.

1.9 Scope

Everything in scope for functional requirement testing at this stage is documented under “Delete Report” in the Functional Specification. Specifically it will involve:

- Database querying.
- Database deletion.

Every other functional requirement documented in section 3 of the Functional Specification will be considered out of scope.

1.9 Testing Schedule

The test cases should be executed and validated once the “Unit Testing” phase of the development cycle is complete for this particular iteration of the development cycle.

1.9 Entry and Exit Criteria

Once each test case passes its acceptance criteria an admin who has signed in to the Community Area Alert desktop application should be able to delete a report which was previously created by their station.

1.9 Test Environment

Test Cases will be executed in an android environment, it will be my role and responsibility as the developer and tester to ensure they are executed correctly.

1.9 Pre-Condition

Add a document to the “reports” collection in the “communityAlert” database.

```
_id = 1  
title = "Report Title"  
reportDescription = "Report Description"  
lat = 50  
long = -6  
dateTime = "22/04/2015 16:14:08"  
stationName = "Kells Garda Station"  
stationPhoneNum = "9293423"
```

Add a document to the “stations” collection in the “communityAlert” database.

```
_id = Kells Garda Station  
Password = 1234  
phoneNum = 9293423  
lat = 53.72858319967284  
long = -6.8818397116089045  
reports = 1
```

1.9 Test Cases and Execution

Test Case Identifier: TC_1.9_01 Delete Report

Step	Test Step	Test Data	Expected Result
1	Go to the “Edit Report” page on the Community Area Alert desktop application.	Perform mouse click.	The “Edit Report” page will display with a button labelled “Download Reports”.
2	Press the “Download Reports” button.	Perform mouse click.	A loading symbol should be displayed followed by a new box appearing on the page. The new box should contain “22/04/2015 16:14:08 Report Title” and a delete symbol.
3	Press the Delete symbol related to the report with the title “Report Title”.	Perform mouse click.	A message should be displayed stating “Report deleted successfully.”

Execution 1: Defect found on “Step 2”.

Actual Result: No report title or date was displayed.

Attempted Fix: Apply check to display error message when device is not connected to the internet.
Connected the testing environment to the internet.

Execution 2: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

INTEGRATION TESTING

ACCOUNT CREATION AND SIGN IN

Test Plan

Scope

Integration testing in this iteration of the development cycle (1.3) will involve combining and testing the individual components of “User Account Creation” (1.1) and “Sign In” (1.3).

Reference Documents

Functional Requirement Testing (1.1).

Design (1.1)

Functional Requirement Testing (1.3).

Design (1.3)

Entry Criteria

The Integration Test Plan should be completed.

Based on the relevant sections of the design document each component involved in this integration test should be developed.

Each component should be Unit Tested to meet the requirements of the unit test plan.

Functional Requirement Testing should be complete and documented for each component involved in the integration test.

Responsibilities and Schedule

As developer and tester it will be my responsibility to develop and execute test cases for this integration test. This integration test should be carried out during the integration test phase of iteration 1.3 once unit testing of the Sign In component has been completed.

Test Cases and Execution

Test Case Identifier: TC_2_01 Account Creation and Sign In (Mobile Application)

Step	Test Step	Test Data	Expected Result
1	Select the “Sign Up” option.	Perform touch screen press.	System displays a page with a heading “Step 1 of 3” containing 3 input fields.
2	Enter “testing” into “Username” text field.	Perform touch screen press and enter text.	“testing” is displayed in the Username field.

3	Enter “1234” into the text field labelled “Password”.	Perform touch screen press and enter text.	“*****” is displayed in the Username field.
4	Enter “1234” into the text field labelled “ReType-Password”.	Perform touch screen press and enter text.	“*****” is displayed in the Username field.
5	Select the “Next” option.	Perform touch screen press.	System displays a page with a heading “Step 2 of 3” containing 3 input fields.
6	Enter “28/07/1993” into “Date of Birth” text field.	Perform touch screen press and enter text.	“28/07/1993” is displayed in the “Date of Birth” field.
7	Select the “Next” option.	Perform touch screen press.	System displays a page with a heading “Step 3 of 3” containing a Google Map canvas.
8	Move marker on map canvas.	Perform touch screen press on the red marker and drag the marker to new location.	The marker moves until the user releases their press.
9	Select the “Confirm Address” option.	Perform touch screen press.	Message “User Account Created” is displayed and the “Sign In” page opens.
10	Enter the registered username “testing” into the field marked “Username”.	Perform touch screen press and enter text.	“blank” is displayed in the “Username” field.
11	Enter “1234” into the “Password” field.	Perform touch screen press and enter text.	“1234” is displayed in the “password” field.
12	Select the “Sign In” button	Perform touch screen press.	The user account homepage opens.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_2_02 Account Creation and Sign In (Desktop Application)

Step	Test Step	Test Data	Expected Result
1	Select the “Sign Up” option.	Perform touch screen press.	System displays a page with a heading “Step 1 of 3” containing 3 input fields.
2	Enter “testing” into “Username” text field.	Perform touch screen press and enter text.	“testing” is displayed in the Username field.
3	Enter “1234” into the text field labelled “Password”.	Perform touch screen press and enter text.	“*****” is displayed in the Username field.
4	Enter “1234” into the text field labelled “ReType-Password”.	Perform touch screen press and enter text.	“*****” is displayed in the Username field.

5	Select the “Next” option.	Perform touch screen press.	System displays a page with a heading “Step 2 of 3” containing 1 input field.
6	Enter “9293423” into “Phone Number” text field.	Perform touch screen press and enter text.	“9293423” is displayed in the “Phone Number” field.
7	Select the “Next” option.	Perform touch screen press.	System displays a page with a heading “Step 3 of 3” containing a Google Map canvas.
8	Move marker on map canvas.	Perform touch screen press on the red marker and drag the marker to new location.	The marker moves until the user releases their press.
9	Select the “Confirm Location” option.	Perform touch screen press.	Message “Account Created” is displayed and the “Sign In” page opens.
10	Enter the registered username “testing” into the field marked “Username”.	Perform touch screen press and enter text.	“blank” is displayed in the “Username” field.
11	Enter “1234” into the “Password” field.	Perform touch screen press and enter text.	“1234” is displayed in the “password” field.
12	Select the “Sign In” button	Perform touch screen press.	The user account homepage opens.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

CREATE REPORT AND RECEIVE NOTIFICATION

Test Plan

Scope

Integration testing in this iteration of the development cycle (1.5) will involve combining and testing the components “Create New Report” (1.4) and “Notification” (1.5).

Reference Documents

Functional Requirement Testing (1.4).
Design (1.4)

Functional Requirement Testing (1.5).
Design (1.5)

Entry Criteria

The Integration Test Plan should be completed.

Based on the relevant sections of the design document each component involved in this integration test should be developed.

Each component should be Unit Tested to meet the requirements of the unit test plan.

Functional Requirement Testing should be complete and documented for each component involved in the integration test.

Responsibilities and Schedule

As developer and tester it will be my responsibility to develop and execute test cases for this integration test. This integration test should be carried out during the integration test phase of iteration 1.5 once unit testing of the Notification component has been completed.

Precondition

The Community Area Alert Application should be installed onto a mobile device and have a user account signed in.

Test Cases and Execution

Test Case Identifier: TC_2_03 Report Creation and Receiving Notification.

Step	Test Step	Test Data	Expected Result
1	Select the “Create New Report” option on the desktop application.	Perform mouse click.	System displays the Create New Report page containing a Google Maps Canvas and 2 input fields.
2	Enter “Report Title 1” into the field marked “Report Title”.	Perform mouse click and enter text input.	“Report Title 1” is displayed in the field marked “Report Title”
3	Enter “This is the report description” into the field marked “Report Description”.	Perform mouse click and enter text input.	“This is the report description” is displayed in the field marked “Report Description”
4	Move marker on map canvas.	Perform touch screen press on the red marker and drag the marker to new location.	The marker moves until the user releases their press.
5	Click on the button marked “Create New Report”.	Perform mouse click.	Message is displayed stating “New Report Created.”
6	Check device for notification	Open the device with the Community Area Alert mobile application installed.	A notification should be displayed indicating that a new update is available on the Community Area Alert application.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

CREATE AND VIEW REPORT

Test Plan

Scope

Integration testing in this iteration of the development cycle (1.6) will involve combining and testing the individual components of “Create New Report” (1.4) and “View Report” (1.6).

Reference Documents

Functional Requirement Testing (1.4).

Design (1.4)

Functional Requirement Testing (1.6).

Design (1.6)

Entry Criteria

The Integration Test Plan should be completed.

Based on the relevant sections of the design document each component involved in this integration test should be developed.

Each component should be Unit Tested to meet the requirements of the unit test plan.

Functional Requirement Testing should be complete and documented for each component involved in the integration test.

Responsibilities and Schedule

As developer and tester it will be my responsibility to develop and execute test cases for this integration test. This integration test should be carried out during the integration testing phase of iteration 1.6 once unit testing of the View Report component has been completed.

Test Cases and Execution

Test Case Identifier: TC_2_04 Creating and Viewing Report (Desktop Application).

Step	Test Step	Test Data	Expected Result
1	Select the “Create New Report” option on the desktop application.	Perform mouse click.	System displays the Create New Report page containing a Google Maps Canvas and 2 input fields.
2	Enter “Report Title 1” into the field marked “Report Title”.	Perform mouse click and enter text input.	“Report Title 1” is displayed in the field marked “Report Title”
3	Enter “This is the report description” into the field marked “Report Description”.	Perform mouse click and enter text input.	“This is the report description” is displayed in the field marked “Report Description”

4	Move marker on map canvas.	Perform touch screen press on the red marker and drag the marker to new location.	The marker moves until the user releases their press.
5	Click on the button marked “Create New Report”.	Perform mouse click.	Message is displayed stating “New Report Created.”
6	Go to the “Edit Report” page on the Community Area Alert desktop application.	Perform mouse click.	The “Edit Report” page will display with a button labelled “Download Reports”.
7	Press the “Download Reports” button.	Perform mouse click.	A loading symbol should be displayed followed by a new box appearing on the page. The new box should contain the date and time the report was created and the title “Report Title 1” and an edit symbol.
8	Press the edit symbol for the report with the title “Report Title 1”.	Perform mouse click.	The report description should be displayed.

Execution 1: Each step in the Test Case met its Expected Result and the Test Case is deemed to have passed.

Test Case Identifier: TC_2_05 Creating and Viewing Report (Mobile Application).

Step	Test Step	Test Data	Expected Result
1	Select the “Create New Report” option on the desktop application.	Perform mouse click.	System displays the Create New Report page containing a Google Maps Canvas and 2 input fields.
2	Enter “Report Title 1” into the field marked “Report Title”.	Perform mouse click and enter text input.	“Report Title 1” is displayed in the field marked “Report Title”
3	Enter “This is the report description” into the field marked “Report Description”.	Perform mouse click and enter text input.	“This is the report description” is displayed in the field marked “Report Description”
4	Move marker on map canvas.	Perform touch screen press on the red marker and drag the marker to new location.	The marker moves until the user releases their press.
5	Click on the button marked “Create New Report”.	Perform mouse click.	Message is displayed stating “New Report Created.”

6	Go to the account homepage on the Community Area Alert Mobile Application.	Perform touch screen press.	The account homepage for the user will display with a refresh reports button in the top right corner.
7	Press the refresh reports button in the top right corner.	Perform touch screen press.	A loading symbol should be displayed followed by a new box appearing on the page. The new box should contain the title and date when the report was created with the title “Report Title 1” and an expand symbol.
8	Press the expand symbol for the report with the title “Report Title 1”.	Perform touch screen press.	The report description, station name and station number should be displayed in an expanded container.

CREATE AND DELETE REPORT

Test Plan

Scope

Integration testing in this iteration of the development cycle (1.8) will involve combining and testing the individual components of “Create New Report” (1.4) and “Delete Report” (1.8).

Reference Documents

Functional Requirement Testing (1.4).
Design (1.4)

Functional Requirement Testing (1.8).
Design (1.8)

Entry Criteria

The Integration Test Plan should be completed.

Based on the relevant sections of the design document each component involved in this integration test should be developed.

Each component should be Unit Tested to meet the requirements of the unit test plan.

Functional Requirement Testing should be complete and documented for each component involved in the integration test.

Responsibilities and Schedule

As developer and tester it will be my responsibility to develop and execute test cases for this integration test. This integration test should be carried out during the integration testing phase of iteration 1.8 once unit testing of the Delete Report component has been completed.

Test Cases and Execution

Test Case Identifier: TC_2_06 Creating and Deleting Report.

Step	Test Step	Test Data	Expected Result
1	Select the “Create New Report” option on the desktop application.	Perform mouse click.	System displays the Create New Report page containing a Google Maps Canvas and 2 input fields.
2	Enter “Report Title 1” into the field marked “Report Title”.	Perform mouse click and enter text input.	“Report Title 1” is displayed in the field marked “Report Title”
3	Enter “This is the report description” into the field marked “Report Description”.	Perform mouse click and enter text input.	“This is the report description” is displayed in the field marked “Report Description”
4	Move marker on map canvas.	Perform touch screen press on the red marker and drag the marker to new location.	The marker moves until the user releases their press.
5	Click on the button marked “Create New Report”.	Perform mouse click.	Message is displayed stating “New Report Created.”
6	Go to the “Edit Report” page on the Community Area Alert desktop application.	Perform mouse click.	The “Edit Report” page will display with a button labelled “Download Reports”.
7	Press the “Download Reports” button.	Perform mouse click.	A loading symbol should be displayed followed by a new box appearing on the page. The new box should contain the date and time when the report was created, the title “Report Title 1” and a delete symbol.
8	Press the Delete symbol for the report with the title “Report Title”.	Perform mouse click.	A message should be displayed stating “Report deleted successfully.”

SYSTEM TESTING

Examination of Entry Criteria

Each functional requirement has been developed based on the functional specification. Unit testing of each individual component is complete. Components have been integrated and integration testing has been completed. The final iteration of my modified V-Shaped development process has been completed.

Installation

Community Area Alert Mobile Application: This application has been tested on each mobile operating system which it is intended to be used on. Testing involved ensuring that the Community Area Alert could be integrated with on an Android, Apple iOS or Windows Mobile OS and each of its functional requirements performed as expected and produced the desired outputs.

Community Area Alert Desktop Application: The Community Area Alert desktop application has been tested on multiple browsers including Google Chrome, Firefox and Internet Explorer from end to end in terms of the functional requirements and is deemed to have produced the desired outputs.

Usability Testing

Many design patterns and considerations were taken into account when designing the user interface. Design patterns such as Progressive Disclosure, Clear Primary Actions and Steps Left as well as clear colour schemes and tailored interfaces for both the mobile and desktop applications have brought us to deem that the both the Mobile and Desktop application satisfy the usability requirements stated on the Functional Specification. Both the desktop and mobile application are deemed to allow a user with basic experience with websites or mobile applications to complete their goal.

Recovery Testing

The Community Area Alert desktop and mobile app were deemed to be reliable and capable of recovering from crashes. The effect of crashes did not affect the integrity of the database so the desktop or mobile application could restart without any lasting effects.

Migration Testing

Migration testing was carried out through the Intel XDK emulator on the Community Area Alert mobile application. It was tested on versions of Android from 4.0 to 4.4 on multiple devices and its functional requirements were deemed to produce the desired outputs. It was tested on apple devices such as iPhone 4, 4s, 5 and 6 as well as iPad and Windows OS produced desired outputs.

Functional Completeness Testing

The functional specification was analysed to and compared to what was produced during development. No missing functions were found and no requirement was made to add additional functions.

ACCEPTANCE TESTING

Roles and Responsibilities

User Acceptance testing was carried out by myself (Tester 1) who acted as an admin on the Community Area Alert desktop application and a member of my family (Tester 2) who acted as a user of the Community Area Alert mobile application. Beta testing was used in this test environment.

Test Environment

The Community Area Alert desktop application was installed onto version 42.0.2311.90 of the Google Chrome web browser running on a Windows 7 PC. The Community Area Alert mobile application was installed onto a Jiayu G2S mobile device running Android 4.1.2.

Number	Acceptance Requirement	Critical		Result		Comments
		Yes	No	Accept	Reject	
1	Each system must execute to the end of each job.	Yes		Accept		The Community Area Alert system will not run in a production environment until this requirement is met.
2	Verified users should have access to their account.	Yes		Accept		The Community Area Alert system will not run in a production environment until this requirement is met.
3	Relevant reports must be received by Tester 2.	Yes		Accept		The Community Area Alert system will not run in a production environment until this requirement is met.
4	Tester 2 should be notified of updates to relevant reports.	Yes		Accept		The Community Area Alert system will not run in a production environment until this requirement is met.
5	Tester 2 editing preferences should lead to changes in notifications about reports.	Yes		Accept		The Community Area Alert system will not run in a production environment until this requirement is met.

The Community Area Alert mobile and desktop applications are therefore deemed as fit to carry out their purpose and the development process is complete.