Unlock: York

Final Testing and Integration Plan

Version 2.0

25th May 2018

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Document Control

Version	Date	Sections changed	What was changed
1.0	16/03/18	-	-
2.0	25/05/18	1.6.1	Redefined unit testing as sub-story testing
		6	Removed contract testing such that this document only concerns code generated for our products
		2, 3, 4	Removed irrelevant tests, moved some shared tests to be just mobile or kiosk, added new tests based on fucntional spec.

Contents

1 Introduction

1.1 Purpose

This Testing and Integration Plan for *Unlock*'s pilot product *Unlock:York* is created to outline the overall testing methodology and necessary tests to be carried out to ensure the quality and functionality of the final product. This document only gives outline tests for modules and classes, the actual tests will be written and carried out by team members during development.

1.2 Terminology

Point of Interest (POI)	A significant tourist attraction within a city
Sub-Point of Interest (sPOI)	An interesting feature or location within the Point of Interest
Project-Wide Specification XML (PWS XML)	A common XML-based file-format between multiple organisations which allows loading of multimedia into the application

1.3 Unlock:York

Unlock: York is an application allowing users to interact with and explore the city of York in a new, rewarding way. Users can discover new locations, find out about local attractions upon discovery, and receive awards for visiting the attractions. At major attractions, there is the opportunity for kiosks running the *Unlock:York* application to be installed, to give further, more detailed information on the specific point of interest. Hence, there are two applications to be tested:

- An Android mobile app for users – built using Java in Android Studio.
- A desktop-based application to run on the kiosks – built in the IntelliJ IDEA IDE.

There will be overlap for some areas of testing for the two applications, however the functionality is not exactly the same, so there will be some tests only applicable to one or the other. Therefore a testing and integration plan for each application is to be produced.

1.4 Development Methodology

As set out in the Quality Assurance Manual, the approach *Unlock* takes to software development is the Agile Software Development Methodology.

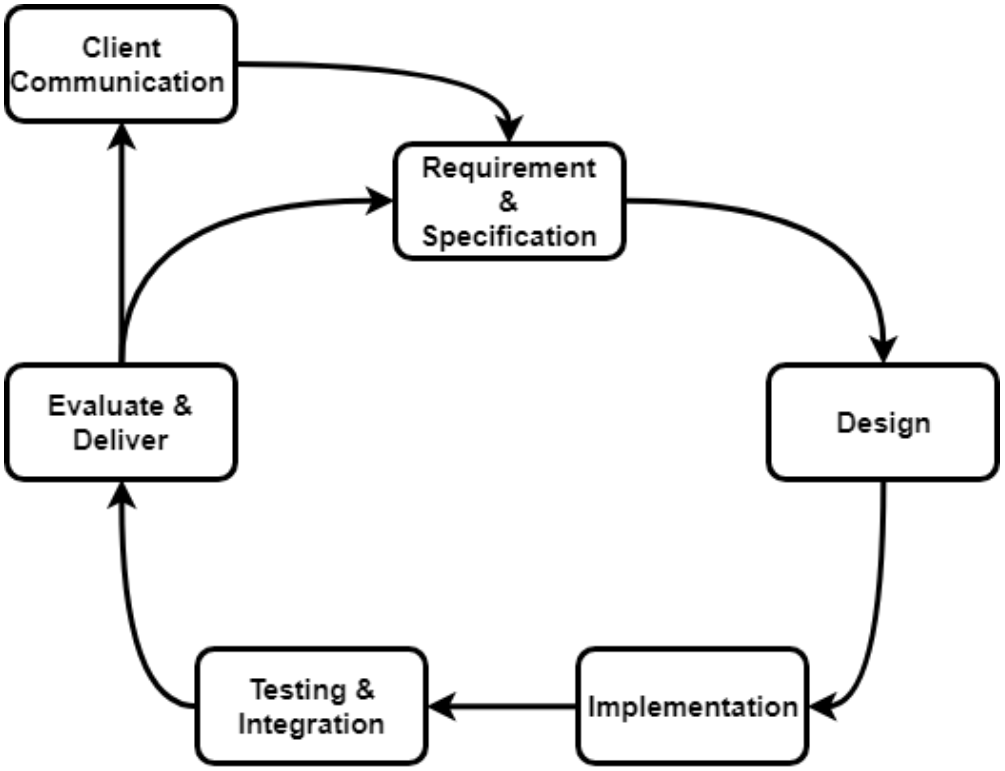

Figure 1 – *Unlock*'s Agile Development Methodology

Using this approach has certain ramifications for the Testing and Integration stage of the lifecycle. Using an Agile approach implies that the implementation will be carried out on a Test Driven Development (TDD) basis. The process will be as follows:

- Programmers given user stories (as defined in the Functional Specification) to implement.
- Test cases based on user stories are generated, with the positive test outcomes being based on the acceptance criteria outlined in the Functional Specification.
- Code is then written to pass the test and thus fulfil the acceptance criteria for the user story.
- Code can then be refactored to ensure quality and efficiency of code.

1.5 Testing Process and Documentation

1.5.1 White Box and Black Box Testing

The tests carried out on applications and modules will take one of two forms; Black Box Tests or White Box Tests. These can be characterised as follows:

- White Box Test – Uses knowledge of internal structure of the program for testing, so is testing the inner workings of the software itself.
- Black Box Test – Focuses purely on the functionality of an application or module. The test does not concern the inner workings of the software, but is more concerned with getting the

correct inputs and outputs. Black Box Testing is testing from the point of view of a user of the application.

1.5.2 Test Procedure and Documentation

The tests performed and test outcomes will be recorded on Test Report Forms (see QA Manual). The procedure for testing is as follows:

- Write unit tests or test procedures based on the test outlines in the Testing and Integration Plan.
- Carry out tests.
- Record outcome, and edit code if needed, recording what has been changed.
- Ensure the test is passed with correct result.
- Hand in Test Report to Testing and Integration Manager.

Once all tests have been completed and handed to the Testing and Integration Manager, the Manager will then collate and document all tests in a Final Testing and Integration Report.

1.6 The Testing Stages

The approach defined in the section above can be used during the implementation stage to get the individual units working to specification, however, for the product to function as a complete entity, further testing must be carried out. At *Unlock* we have 3 stages of rigorous testing which will ensure that the product will function as intended when individual units are integrated together, and when the whole application is put together preceding final release.

1.6.1 Sub-Story Testing

This first stage of testing is the most basic level, testing individual classes and units to ensure that they meet the acceptance criteria for the user sub-story being implemented. The process for this is outlined above in section 1.3. These tests will either take the form of visual or JUnit tests where appropriate (for the Kiosk), or visual or Android Instrumentation tests(for Android). Whether or not a sub-story is tested visually or using JUnit and Instrumentation test will be decided by the developer implementing the story. Hence the sub-story testing stage will be a mixture of White and Black Box testing.

1.6.2 Integrated Testing

After individual sub-stories and classes have been tested and are verified to be working as intended, they can then be integrated together to form iterations. Integration tests need to be written to ensure that all modules and classes interact with each other as intended and verify that the acceptance criteria are still met. The testing for this stage will be a mixture of White and Black Box Testing.

1.6.3 Overall System Testing

Once the integration testing stage is complete, and all modules have been successfully integrated, the System Testing stage can begin. This will take the form of Black Box testing, allowing the overall application to be tested from the point of view of a user. This stage will verify that the whole application works as intended.

1.7 Note on the Ongoing Agile Process and Testing

As an Agile approach to software development is used at *Unlock*, user stories are likely to be updated and change slightly at points throughout development, therefore the tests outlined on this document may also change. The Functional Specification will first be updated with any new/altered user stories and then this document will be also be updated.

1.8 User Story Summaries

A summary main overall user stories, full details of sub-stories can be found in the Functional Specification.

Main User Story Number	Phone or Kiosk	Summary
S01	K	Administrators can upload data to a kiosk.
S02	PK	Map can be loaded with POIs and can be manipulated (zooming and panning).
S03	PK	Current location on map can be displayed.
S04	P	QR codes can be scanned to unlock content at a POI.
S05	P	Viewing unlock progress – show locked and unlocked POIs, rewards and leaderboards.
S06	P	App can be successfully downloaded, and content can be unlocked by GPS location. (**NOT IMPLEMENTED, NO TESTS)**
S07	PK	POI information can be viewed in a scrollable content pane: - Opening hours - Text description. - Videos (with manipulation on interaction) - Audio (with manipulation on interaction) - Photos (with zoom)
S08	PK	sPOI information can be viewed: - Text description (with scrolling) - Videos (with manipulation on interaction) - Audio (with manipulation on interaction) - Photos (with zoom)
S09	-	Phone and Kiosk: Businesses can promote themselves if near to a POI. Phone only: User rewards are available for unlocking locations.
S10	P	Suggested routes at POIs can be viewed. (**NOT IMPLEMENTED, NO TESTS)**
S11	P	Audio will continue to play if phone is locked.
S12	P	Hidden locations can be unlocked and a notification will be displayed when a hidden location is found.
S13	P	Settings can be changed: - Audio and notification settings - Autoplay of POI content (Phone) - Leaderboards and social media settings (Phone)

2 Shared Sub-Story Tests

Some user stories are shared between both the mobile application and the kiosk; therefore the test procedures for these units will be the same.

Test ID	User Story ID	Test Procedure	Desired Outcomes
UT1.0	S02.0.0	Load map.	Local map loads onto the screen with POI icons.
UT1.1	S02.1.0	Trigger zoom in/out activity.	Correct zooming activity is triggered upon button presses.
UT1.2	S02.1.1	Scroll mouse wheel/screen zoom pinch.	Different amount of detail is displayed with zoom distance.
UT1.3	S02.2.0	Trigger movement around map with taps/clicks.	Map moves and pans with movement.
UT2.0	S03.0.0	Set GPS location/(mobile) load map	User/kiosk location is visible and correctly located.
UT3.0	S07.0.0	(a) Trigger POI icon press at a kiosk location (b) Trigger POI icon press for a different location when at a kiosk. (c) (Mobile) scan already unlocked POI/tap on already unlocked POI	(a) Zoom into location is triggered and further information set to be visible. (b) Zoom into location and display message telling user they must visit the location. (c) Presentation activity will be triggered
UT3.1	S07.1.0	Trigger a POI icon press/(mobile)scan already unlocked POI	Opening hours can be displayed.
UT3.2	S07.2.0	Trigger a POI icon press/(mobile)scan already unlocked POI	Text description displayed.
UT3.3	S07.3.0	Trigger a POI icon press/(mobile)scan already unlocked POI	Video displayed in a content pane.
UT3.4	S07.3.1	Open video	Video can be paused/stopped, played and the volume can be changed.
UT3.5	S07.4.0	Audio button pressed in content pane.	Audio plays.

UT3.6	S07.4.1	Play audio.	Audio can be played, paused and stopped and the volume can be changed.
UT3.7	S07.5.0	Trigger POI icon press/scan already unlocked POI	Photos are displayed in content pane.
UT3.8	S07.5.1	Open a photo	Photo can be zoomed in on.
UT4.0	S08.0.0	Trigger a sub-Point of Interest (sPOI) icon press/(mobile)scan already unlocked sPOI	Text description displayed.
UT4.1	S08.0.1	Scroll in a content pane.	More content becomes available.
UT4.2	S08.1.0	Trigger an sPOI icon press/(mobile)scan already unlocked POI	Video displayed in a content pane.
UT4.3	S08.1.1	Open video.	Video can be paused/stopped, played and the volume can be changed.
UT4.4	S08.2.0	Audio button pressed in content pane.	Audio plays.
UT4.5	S08.2.1	Play audio.	Audio can be played, paused and stopped and the volume can be changed.
UT4.6	S08.3.0	Trigger sPOI icon press/(mobile)scan already unlocked POI	Photos are displayed in content pane.
UT4.7	S08.3.1	Open a photo (sPOI)	Photo can be zoomed in on.

3 Mobile Application Tests

3.1 Sub-Story Tests

Test ID	User Story ID	Test Procedure	Desired Outcomes
MUT1.0	S04.0.0	(a) Trigger QR scan of valid code. (b) Trigger QR scan of invalid code.	(a) App moves to content screen. (b) Error message “Invalid QR code” displayed.
MUT1.1	S04.1.0	(a) Trigger QR scan of valid code. (b) Trigger QR scan of invalid code.	(a) Success animation and sound plays. (b) Failure sound plays.
MUT2.0	S05.0.0	Log into app as new user	The current user is the expected user
MUT2.1	S05.1.0 S05.1.1	Unlock a POI/sPOI/hPOI	Unlock bar moves accordingly.
MUT2.2	S05.2.0	Activate leaderboard button.	Leaderboard displays all users and has correct value for current user.
MUT3.0	S08.0.0	Zoom into POI	sPOI only set to visible at a certain zoom threshold.
MUT4.0	S09.0.0	Set an example sponsored business.	Business set to appear at correct location on map and has correct content.
MUT5.0	S11.0.0	Start content and set phone to be locked.	Audio still plays.
MUT6.0	S12.0.0	Scan QR code for hidden location.	Hidden content is set to be unlocked.
MUT6.1	S12.1.0	Scan QR code for hidden location.	Animation triggered.
MUT7.0	S13.2.0	Toggle autoplay functionality.	Autoplay set to be on/off.
MUT7.1	S13.3.1	Toggle leaderboard on/off settings	Leaderboard set to true/false for user.
MUT7.2	S13.0.0	Click on settings icon	App moves to settings screen.
MUT7.3	S13.1.0	(a) Adjust audio settings (b) Adjust notification settings	(a) Audio set to be on/off. (b) Notifications set to be on/off.

3.2 Integrated Tests

Test ID	Modules Integrated	Purpose of Test(s)	Test(s)	Desired Outcomes

MIT1.0	**S04** S04.0.0 S04.1.0	Verify that the user unlocks new content and is notified of a new location via an animation upon arrival.	Trigger QR code scan of code for actual location.	Animation and sound effect notifying user of new location plays and app moves to next screen.
MIT1.1			Trigger QR code scan of invalid location.	Sound effect for incorrect code played and error message displayed.
MIT2.0	**S02** S02.0.0 S02.1.0 S02.1.1 S02.2.0	Check that the zooming works alongside the map and that the map displays correctly.	Load map, and trigger zoom buttons and move around map.	Map loads correctly, with major POIs, and zooms in/out upon zoom button activity and pans with movement.
MIT3.0	**S05** S05.0.0 S05.1.0 S05.2.0	Ensure all progress measurement interfaces work.	Trigger tapping on progress bar. Tap on leaderboard.	App moves to screen displaying all unlocked locations. Leaderboard displaying all public users is displayed
MIT4.0	**S07** S07.0.0 S07.1.0 S07.2.0 S07.2.1 S07.3.0 S07.3.1 S07.4.0 S07.4.1 S07.5.0 S07.5.1	Check that all types of content can be applied to a POI and all media types can be manipulated by the user.	Trigger a POI icon press.	All of the following are displayed on a scrollable content screen: (a) Opening Times (b) Text description. (c) Video that can be manipulated by the user. (d) Audio that can be manipulated by the user. (e) Zoomable photos.
MIT5.0	**S08** S08.0.0 S08.0.1 S08.2.0 S08.2.1 S08.3.0 S08.3.1	Check that all types of content can be applied to an sPOI and all media types can be manipulated by the user.	Trigger an sPOI/hPOI/bPOI icon press.	All of the following are displayed on a scrollable content screen: (a) Text description. (b) Video that can be manipulated by the user.

				(c) Audio that can be manipulated by the user. (d) Zoomable photos.
MIT6.0	**S12** S12.0.0 S12.1.0	Verify that hidden locations can be unlocked and the user notified.	Scan hPOI.	Location set to be visible and unlocked and notification(animation) displayed.
MIT7.0	**S13** S13.0.0 S13.1.0 S13.2.0 S13.3.0 S13.3.0 S13.3.2	Ensure that user has total control over the application's settings and is able to engage with social aspects.	Enter settings menu.	(a) Social and leaderboard settings are visible. (b) Audio and notification settings are visible.
MIT7.1			Enter audio and notification settings.	(a) Audio level can be controlled. (b) Autoplay of media can be toggled. (c) Notifications can be set to on/off.
MIT7.2			Enter social and leaderboard settings.	(a) Social media options are displayed. (b) Leader board options are available (c) Username can be entered.
MIT8.0	**S02** **S03**	Assert that the location of the user is accurately displayed on the movable, zoomable map.	Load map.	The current location can be displayed on the map and map can be interacted with.
MIT9.0	**S02** **S07** **S08**	Verify that POI icons and sPOI icons are displayed on map correctly and can be interacted with.	Load map.	POI icons are visible.
			Click on a POI icon.	Map zooms into POI and sPOIs and content pane become visible.
			Click an sPOI icon.	Move to content screen.
MIT10.0	**S04** **S07**	Check that POI content can be	Trigger QR scan.	App moves to content screen and

		unlocked and accessed by scanning a QR code at a location.		all content types can be accessed.
MIT11.0	**S07** **S11**	Verify that when in a POI content pane listening to audio, the phone can be locked and the audio will carry on playing.	Play sample audio when in a POI content pane and simulate locking phone.	Ensure that audio still plays.
MIT12.0	**S04** **S07** **S12**	Display content from hidden locations.	Scan code for hPOI	App moves to content screen and all content types can be accessed.
MIT13.0	**S02** **S04** **S07**	Unlock and access the content from a POI.	Tap on unlocked icon	Current location marker is at the POI and content is set to be unlocked and the content is accessible and can be interacted with.
MIT14.0	**S02** **S03** **S04** **S07** **S12**	Check the unlocking mechanism and accessing content for a hidden location.	Scan a hPOI location QR code.	Current location marker is at the hidden and content is set to be unlocked and the content is accessible and can be interacted with.
MIT15.0	**S07** **S13**	Check that toggling autoplay in the settings has the desired effect on content.	Set autoplay to be on/off.	Content in content pane responds accordingly.
MIT16.0	**S05** **S02**	Verify that POIs status of being locked or unlocked is correctly displayed on the map.	Give one example POI that is locked and one that is unlocked.	POI's behaviour is in line with lock status.(locked POI just displays text window, unlocked POI moves to presentation screen.

3.3 System Tests

Test ID	Test	Desired Outcomes
MST1.0	Open app	App loads to home screen (map)
MST1.1	Tap settings icon	Settings screen loads.

MST1.2	Tap on unlock bar	Screen showing all reward and unlocked location is displayed.
MST1.3	Tap on leaderboard.	Leaderboard loads.
MST1.4	Press back button when in any sub-menu	App returns to home screen.
MST1.5	Close app when in a sub-menu, and then reopen it.	App reopens in sub-menu it was in.
MST1.6	Kill app when in a sub-menu and reopen.	App reopens in main menu
MST2.0	Open app and look at map.	POIs are visible and have locked/unlocked icons. Sponsored businesses are visible.
MST3.0	Scan a QR for a location.	POI icon is unlocked. Map shows current location and sPOIs when zoomed in on POI. Content becomes visible and can be played. Sound effect and animation plays.
MST 3.1	Scan QR code for hPOI.	Hidden location is unlocked. Content becomes visible and can be played. Notification of hidden location flashes up on screen. Sound effect and animation plays.
MST3.2	Turn off GPS and open map.	Error message displayed.
MST3.3	Click on any POI.	Map zooms in on this POI and, if unlocked, content is shown.
MST3.4	Click on an sPOI when zoomed in near enough to view it.	Content about the sPOI is shown.
MST4.0	Enter the settings menu and turn off notifications. Unlock a new location.	No notification is displayed.
MST4.1	Enter the settings menu and turn off sounds. Unlock a new location.	No sound effect upon unlocking.
MST4.2	Enter the settings menu and turn off autoplay. Got to a POI content screen.	Content does not play upon entering the content screen.
MST4.3	Enter the settings menu and turn off social media and leaderboards.	Social media is disabled and user does not appear in leaderboard.
MST4.4	Enter the settings menu and set a username.	Username appears on leaderboard.
MST4.5	Go to a POI content screen. Play audio content. Lock phone.	Audio keeps playing after phone is locked.

MST5.0	Go to a POI content screen. Scroll.	Content should scroll with user input.
MST5.1	Go to a POI content screen. Play the video. Pause the video. Stop the video. Change the current timestamp.	Video responds to user input as expected.
MST5.2	Go to a POI content screen. Play the audio. Pause the audio. Stop the audio. Change the current timestamp	Audio responds to user input as expected.
MST5.3	Go to a POI content screen. Zoom on a picture.	Picture responds to zooming.
MST6.0	Go to an sPOI content screen. Scroll.	Content should scroll with user input.
MST6.1	Go to an sPOI content screen. Play the video. Pause the video. Stop the video. Change the current timestamp.	Video responds to user input as expected.
MST6.2	Go to an sPOI content screen. Play the audio. Pause the audio. Stop the audio. Change the current timestamp	Audio responds to user input as expected.
MST6.3	Go to an sPOI content screen. Zoom on a picture.	Picture responds to zooming.
MST7.0	Unlock a location. Navigate to unlock progress screen.	New location appears in list of unlocked locations.

4 Kiosk Application Tests

4.1 Unit Tests

Test ID	User Story ID	Test Procedure	Desired Outcome
KUT1.0	S01.0.0	(a) Load up a sample XML document in the PWS XML format. (b) Load a document with incorrect format.	(a) Verify that the parser extracts the correct information for each field. (b) Check that an error message is displayed.
KUT1.1	S01.1.0	Load an XML.	File is in a dom structure.
KUT2.0	S02.1.2	Set zoom to value above maximum	Zoom does not exceed maximum level.
KUT2.1	S02.1.3	Zoom at different levels.	Level of detail changes.
KUT2.2	S02.1.4	Zoom to lowest level.	Street level map started.
KUT2.3	S02.3.0	Visual test – click on map at any point	Console displays coordinates.
		Click on POI icon	Console outputs “clicked on POI”
KUT3.0	S03.1.0	Find gps location of kiosk point and map this to map image	Kiosk can be be mapped to image via expected GPS coordinate
KUT3.1	S03.2.0	Find gps location of kiosk point and map this to map image	Kiosk can be be mapped to image via expected GPS coordinate
KUT3.2	S03.3.0	Kiosk stays at same point when changing between zoom level	Kiosk stays at constant point when we change zoom levels

KUT3.3	S03.4.0	Arbitrary POI can be mapped onto map image.	POI can be mapped onto map image with just GPS location to add POI.
KUT3.4	S03.5.0	GPS coordinates can be used to locate multiple POI on the map.	Multiple POI are shown on the map and their locations are not affected by the zoom level or scrolling.
KUT3.5	S03.6.0	In conjunction with other user stories, check that radius' are correct for sensible recognition of POI when clicking.	When a user selects a POI, its GPS coordinate is surrounded by a sensible clickable range.

4.2 Integrated Tests

Test ID	Modules Integrated	Purpose of Test(s)	Test(s)	Desired Outcome
KIT1.0	**S07** S07.0.0 S07.1.0 S07.2.0 S07.2.1 S07.3.0 S07.3.1 S07.4.0 S07.4.1 S07.5.0 S07.5.1	Check that all types of content can be applied to a POI and all media types can be manipulated by the user.	Trigger a POI icon press.	All of the following are displayed on a scrollable content screen: (a) Opening Times (b) Text description. (c) Video that can be manipulated by the user. (d) Audio that can be manipulated by the user. (e) Zoomable photos.
KIT2.0	**S08** S08.0.0 S08.0.1 S08.2.0 S08.2.1 S08.3.0 S08.3.1	Check that all types of content can be applied to an sPOI and all media types can be manipulated by the user.	Trigger an sPOI icon press.	All of the following are displayed on a scrollable content screen: (a) Text description. (b) Video that can be manipulated by the user. (c) Audio that can be manipulated by the user.

				(d) Zoomable photos.
KIT3.0	**S01** **S07** **S08**	Check that content can be loaded to the content panes using the XML parser.	Load a sample text file, video and audio file.	Correct media is displayed in content panels.
KIT4.0	**S02** **S03**	Assert that the location of the user is accurately displayed on the movable, zoomable map.	Load map.	The current location can be displayed on the map and map can be interacted with.
KIT4.1	**S02** **S03**	Current location of kiosk is added and displayed to map	Add current location	When clicking kiosk location in the map view system prints 'Kiosk Location'.
KIT4.2	**S02** **S03**	Kiosk is in the correct, expected location.	Check location against real GPS coordinates	When icon is added to Kiosk location it is in the correct position relating to GPS coordinates.
KIT5.0	**S01** **S02** **S07** **S08**	Verify that POI and sPOI icons are correctly positioned and rendered on the map.	Load map.	POI icons are visible.
			Click on current location POI icon	Map zooms into POI and sPOIs and content panes become visible.
			Click a different POI.	Map zooms into new POI and the correct content for that POI is shown
KIT6.0	**S01** **S02** **S03** **S07** **S08**	Ensure that location, POIs and sPOIs are displayed on map, and content for s/POIs can be loaded and manipulated.	Load map and click on current location POI icon.	Current location at POI is shown, and map zooms, showing all sPOIs for the location and all content.

4.3 System Tests

Test ID	Test	Desired Outcome
KST1.0	Load data for the current POI in PWS XML format to the kiosk. Click on current POI.	Content from XML file appears in content pane.
KST2.0	Start app.	Loads to main menu (map).

KST2.1	Click on settings icon.	App moves to settings menu showing admin controls and sound settings.
KST2.2	Click on POI location.	sPOIs at the location is shown.
KST2.3	Press the back button when in a sub-menu.	Return to main menu.
KST3.0	Click on current POI.	Map shows current location and sPOIs. Content is shown and can be played.
KST3.1	Click on another POI	Map zooms into POI.
KST3.2	Click on an sPOI	Content is shown and can be played.
KST3.3	POI content can be made full screen	Content can be made full screen within the kiosk.
KST5.0	View the map.	POI icons for all POIs are visible. Sponsored businesses are visible.
KST6.0	Go to current POI content screen. Scroll.	Content should scroll with user input.
KST6.1	Go to current POI content screen. Play the video. Pause the video. Stop the video. Change the current timestamp.	Video responds to user input as expected.
KST6.2	Go to current POI content screen. Play the audio. Pause the audio. Stop the audio. Change the current timestamp.	Audio responds to user input as expected.
KST6.3	Go to current POI content screen. Zoom on a picture.	Picture responds to zooming.
KST7.0	Go to an sPOI content screen. Scroll.	Content should scroll with user input.
KST7.1	Go to an sPOI content screen. Play the video. Pause the video. Stop the video. Change the current timestamp.	Video responds to user input as expected.
KST7.2	Go to an sPOI content screen. Play the audio. Pause the audio.	Audio responds to user input as expected.

	Stop the audio. Change the current timestamp	
KST7.3	Go to an sPOI content screen. Zoom on a picture.	Picture responds to zooming.

5 Pass/Fail Criteria and Progression

5.1 Sub-Story Testing

All sub-story tests must be passed before a unit can be considered to be completely built. Once a unit has passed a unit test it is then ready to be moved on to integrated testing.

5.2 Integrated Testing

All integrated tests must pass before the testing process can progress to the final system testing stage. This is to ensure that all modules will work together as intended in the final system. If an integrated test fails, then the cause of the failure muse be identified and then the unit causing the failure must be edited. When a unit is edited it must once again pass the unit test before it can be used again for the integrated test.

5.3 System Testing

Once all integrated tests have successfully passed, system testing can begin. To ensure a high-quality and fully operational final product it is imperative that the product passes these tests. If time and resources become an issue, then the final allowable percentage of tests failing at this stage is 5% and only where a sub-feature has failed. All main features must be operational. In theory 100% of tests should pass at this stage, as bugs will be found in earlier stages of testing.