The design of a web application to act as a hub of services for the transgender community in Liverpool

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A person holding a flag

Description automatically generated with medium confidence

Figure A transgender flag being waved at LGBT gay pride march by ‘ink drop’ used under Standard License from Adobe

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# 1. Preparation and planning

## 1.1 Title and scope

### 1.1.1 Title

The design of a web application to act as a hub of services for the transgender community in Liverpool

### 1.1.2 Revised description

There are many vital services available to the transgender community in Liverpool, but it can be a challenge to find them. This is particularly the case for new members of the community who may be in a vulnerable situation, as the point of coming out is a huge life change that may be accompanied by mental health issues and the loss of relationships. This is compounded by transgender healthcare facing profound ignorance (and in some cases outright bigotry) from many GPs, who may attempt to block or delay attempts at medical transition, alongside extreme waiting lists for appointments at Gender Identity Clinics.

The trans community attempts to solve these issues in numerous ways, mostly informal (e.g. by word of mouth in group chats), but two more formal ways are the Liverpool Trans Wiki (TransLiverpool Wiki, 2023) which catalogues and comments on many services that are available; and the Spirit Level peer support group which invites in guests from services to explain what they offer to the community. The proposed web app will seek to build on these solutions and incorporate this specialist knowledge into it.

The web app will be usable on web browsers and on mobile devices using HTML, CSS, and JavaScript and will utilize the OpenStack Trove DBaaS, consisting of several pages. Firstly, a page that contains a map which displays services on it, which will be filterable by type (e.g. mental health or peer support) and when a service is selected more information and contact details will be provided. The map will also provide directions from the user’s location to the selected service. Another page will contain a search function for a database which will return services based on user queries. There will also be a page that will contain an events calendar. The app will be designed such that information will be one way, to protect the user’s privacy and limit the amount of sensitive data stored by the app. Ethical considerations are vital for the project, since some users may not wish to be open about their trans identity and therefore would need to conceal their use of the app. This must be at the forefront of the final product to reassure users that their identity is safe.

The requirements elicitation will also explore another feature, a map which displays the location of gender-neutral toilets at businesses such as cafes, restaurants, and pubs. However, this will be considered for further work beyond this project and will be considered out of scope to keep the amount of development to an achievable level. The scope of the project is for services in Liverpool & Merseyside due to the ability to engage with services and their users directly and due to already existing knowledge. However, if successful the app could be expanded to cover the whole of the UK, it would be a matter of gathering the data rather than any technical challenges. Also out of scope would be online only services that have no physical footprint in Liverpool & Merseyside, some of these may be included in an ‘important links’ page but not as part of the core services covered by the app. The scope of the services included is that they must offer something specific to the trans community, rather than broader services (e.g. the CMAGIC & TSS counselling services would be included, but not the general NHS counselling service offered by Talk Liverpool.)

## 1.2 Resources

The resources focused on previously involved gathering feedback from services and members of the community, and while this is very important for a full release, for the purposes of this project it has been scaled back. While feedback is important, too much time focused on it would not leave enough time for other aspects of development. This aspect of the resources list has been condensed and other essential resources added.

* Representatives of services e.g. manager of a laser hair removal clinic
  + Can offer feedback about the events system and the ways in which users can contact their service.
  + May offer vital perspectives of how the app effects the community
  + **Risk** (medium impact, medium likelihood): They may be busy and do not wish to engage with giving feedback or may only engage in a limited way. To mitigate this, try to identify which people will be willing to provide feedback and be respectful of their time, to get as much out of any engagements as possible.
* Members of the Liverpool trans community
  + Different members of the community may have different needs regarding accessing services.
  + Could offer feedback on prototypes of the app.
  + May be a source of information about services that should be included.
  + The Liverpool Trans Wiki may an essential source of community information about the services, as it documents many of them.
  + **Risk** (medium impact, high likelihood): Feedback may be not useful or relevant. To mitigate this, care must be taken when designing questionnaires with a balance between closed and open questions.
  + **Risk** (high impact, low likelihood): They do not wish to engage with giving feedback or only engage in a limited way. To mitigate this, likely contributors will be engaged with early on. If necessary, a change to the project lifecycle could be considered.
* Programming languages
  + JavaScript – proficient enough to tackle much of the proposed features, but some learning may be required as it will likely extend beyond current knowledge.
  + HTML – reasonably proficient, significant problems are not anticipated.
  + CSS – only minimal experience, may need some time to learn and to use trial and error to achieve goals.
  + SQL – a small amount of experience that should be sufficient for a simple database, but for anything more complex some learning may be required.
  + **Risk** (medium impact, high likelihood): Attempting to code non-routine tasks may cause significant delay. To mitigate this, the schedule will be adjusted to include skills development as necessary, particularly for CSS.
* Visual Studio Code
  + A commonly used code editor that will be used throughout the project for all coding purposes.
  + **Risk** (low impact, medium likelihood): Since this is the first time using this software, there will be some adjustment time to using it. No mitigation should be required since the primary purpose of the software is very similar to other code editors, and any shortcuts learned will only speed up tasks.
* Cloud storage and version control
  + Microsoft OneDrive and GitHub can be used to backup files in the cloud and continue work between different devices. GitHub also provides version control with branching and reverting.
  + **Risk** (high impact, low likelihood): Data loss in the cloud, this could be due to several reasons including accidental deletion and server failure. This is not very likely but could be catastrophic to the project if significant amounts of work were lost. To mitigate this, copies of the data will be stored locally on multiple machines as well as in the cloud, so there is no single point of failure.
* OpenStack Trove DBaaS
  + A database solution, which is free and open source and will be used to store all the data for the services
  + **Risk** (medium impact, medium likelihood): Setup of the database taking longer than anticipated, since previous work with the database was after it had been set up. Mitigate by working on this as soon as possible to ensure there is time to work through any issues.

## 1.3 Future plan

Restate tasks/subtasks, updated and with feedback from test users

More detail on subtasks

Revisions to plan for TMA01->TMA02

Revisions for TMA02->

# 2. Project work completed

## 2.1 Literature review

### 2.1.1 Requirements

The first part of the literature review was relating to requirements including how to identify them, the differences between functional and non-functional requirements, their elicitation and analysis. This will be crucial to the project, so the goals and boundaries of it are clear, what the expected outcomes are and what characteristics it should have. The goal was to find sources that cover all these aspects of requirements, and unlike other literature reviews for this project the date when written is less crucial here, as this subject has not changed over time in the same way that a technology might.

Nilsson & Fagerström (2006) discuss the analysis of requirements once stakeholders have been consulted and how to balance their potentially competing interests to aid in the decision-making process. Furthermore, they outline a method of analysis considers different needs stakeholders might have and the extent to which requirements may meet them. They outline a method of collating all this in a ‘stakeholder and requirement matrix’ as shown in figure x. This piece of literature is a research paper that was published in the Computers in Industry journal and has been widely cited by other academics, so can be seen as a trustworthy source.

A picture containing text, crossword puzzle, receipt

Description automatically generated

Robertson & Robertson (2006) provide a detailed overview of requirements, covering topics such as what requirements are, why they are important and the process of writing them. It also covers the Volere Requirements Specification Template that was pioneered by Robertson & Robertson with others, that forms a foundation and structure for requirements specifications. This book covers important foundational concepts and informed the TM354 module on software engineering, so can be considered a trustworthy source.

These sources will provide both different, complimentary ways to consider and analyse requirements. Both the stakeholder and requirements matrix and Volere template are useful tools that can be utilised, but care must also be taken that they are used in a proportionate way for this project. Using them to their full potential would take a very significant amount of time and as previously stated, so care must be taken to use shortened versions which will still be elucidating and provide context for discussion on future. The textbook for TM354: Software Engineering Block 1 Units 1-4 From domain to requirements (The Open University, 2014) does this with the Volere Template and so will be a useful resource as an example of narrowing this down.

### 2.1.2 CSS

The second part of the literature review was on sources related to skills development for CSS, to assist in the development of the visual elements of the user interface. Previous modules such as TM352 did not cover CSS in much detail, so the goal was to learn enough basic CSS to create a simple, but functional appearance for the app. Since the CSS language is being continually updated, more recent sources were preferred, though some older sources may still be of use since the basics of the language have stayed the same.

Gray with CSS Tutorial – Full Course for Beginners (2022), produced an extensive video tutorial for freeCodeCamp on CSS starting at the very basics including fonts and colour changes. It also covers grid layout and flexbox, as well as media queries which may be useful to ensure that the app maintains the intended appearance on different devices. The tutorial also covers accessibility issues, for example mentioning how code will effect the way screen readers will read the page, so it also will be a useful resource to ensure FreeCodeCamp is a charity founded by a teacher to provide free online courses teaching coding and has other learning materials that may be useful going forward for the project, for example on JavaScript and REST APIs, if required. Gray is a lecturer and PhD student at Fort Hays State University and has produced many teaching resources on web development. This source will be a useful starting place to learn the basics of CSS and could be combined with another source such as a textbook to fill out knowledge gaps as needed.

Meiert (2015) in ‘The Little Book of HTML/CSS Coding Guidelines’ provides guidelines for coding, explaining good practise and the reasons for it. For example, naming classes/IDs so they properly reflect the purpose of an element and are ‘as short as possible but as long as necessary’. This will help ensure that the code is consistent and easy to read, both for other people but also for myself as the project goes on, the amount of code expands and there is a need to return to code written months earlier. Similarly, the W3C markup validation service (2023) will help ensure the code is valid and using proper syntax.

There are numerous books on HTML and CSS which would be suitable for skills development for this project, so there must be a degree of arbitrary choice when considering which one to use. Web Design Playground: HTML and CSS the Interactive Way (McFedries, 2019) is a more recent one, ensuring that newer updates to the language can be covered if necessary. Additionally, the author has written many other books which have sold ‘over four million copies’ on the web development and related topics, so can be considered reliable source when covering an introductory topic. The Book covers the basics of CSS and HTML including topics such as pseudo-elements and how the cascade and inheritance work.

These sources will give a solid grounding in CSS, combining audio-visual and written learning to aid in the skills development required for the project. They will also help consider accessibility issues as development continues, to ensure that the app is still pleasant to use for people who use screen readers, have colour blindness or any other potential barriers to using the app.

## 2.2 Project Work

### 2.2.1 Requirements elicitation

Some requirements were initially identified by reviewing the project description:

The system shall:

* R1: display services for the transgender community in Liverpool on a map.
* R2: provide information and contact details for each service.
* R3: have tags to show or hide the services displayed on the map.
* R4: show directions to the location of a selected service.
* R5: have a searchable database of services.
* R6: display events related to the services or for the community in a calendar.
* R7: give the user control over privacy.
* R8: display the location of businesses with gender neutral toilets on a map.

The next stage was to consult with stakeholders to see if these requirements match with their needs, and how different stakeholders might prioritise different requirements to meet them.

Nilsson & Fagerstrom (2005) suggest constructing a ‘stakeholder and requirements matrix’ which can be used to show “a rich picture of all the stakeholders” and the relative importance of their needs.

Appendix X contains a full copy of the questionnaire that was sent to stakeholders. The questions were designed to line up with each of the requirements previously identified with a feature described that would meet that requirement. The participants were asked how useful the feature would or would not be to them; to rate the importance of it; and if anything could be added to it, as shown in figure x. Some features had additional questions specific to it, for example with the events calendar participants were asked about how they would feel about ways they might interact with it (e.g. if they had to add the events themselves). The goal was to then parse needs that stakeholders might express in their answers and then line up their importance

![Table

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There were three respondents to the questionnaire and the implications of this is discussed in section 3.1. All three respondents were potential users of the application, rather than service providers, so the analysis will focus on this single stakeholder group. Some needs that were identified from the responses:

*N1: Finding a service to access for a specific purpose*

This is the core need that the app is attempting to fulfil, and all respondents rated this as of high importance to them. Some key quotes from respondents regarding this are:

* *“it would allow me to find what services are nearest rather than just what services are beat advertised”*
* *“this would be fantastic if it includes as many trans orientated or trans friendly services/events”*
* *“Some of the best support is not as well advertised”*

This justifies the premise of the project as all respondents felt that there was some difficulty for them finding and accessing the services that are available to them. R1 is primary requirement to meet this need, with some other requirements supplementing it.

*N2: Personalise the experience of finding services*

Respondents emphasised that they would want to be able to personalise their search experience, gearing it towards their specific situation. As discussed in section 3.3, there are different experiences under the ‘trans umbrella’ that the app should try to cater for, such as transfeminine, transmasculine and non-binary.

* *“The ability to either have quick toggles for multiple tags (e.g. “trans-fem, trans-masc, social, that might turn on or off multiple tags at once)”*
* *“I wondered about a tag could be selected to specify services intended for specific people ie just trans women/men like make up support”*
* *“Mental health would be good … the services are very stretched”*

The feedback about the way the tags could work is very useful and will shape their development. The ability to mix and match tags would offer very useful flexibility to users, but also their comfort and wellbeing too. For example, transfeminine people may seek to remove their body hair through laser treatment, but for transmasculine people they may wish to increase their body hair and the reminder of this on the app may cause them distress. The ability to filter this out would be beneficial to their experience with the app.

*N3: Find out about relevant events*

As with services, there are many different events that are going on for the trans community but are spread across multiple places such as Facebook groups and discord servers. As a result, finding out about these events can be a challenge.

* *“It’s hard to keep track of events, some are on Facebook, some by discord, so a central location would be lovely”*
* *“To hear about event as try stay off facey”*
* *“It can be hard to find out when and where events are on and who is running them”*

The challenge will be to not simply become ‘another place where events can be created’, which would risk exacerbating this problem rather than improving it. A better approach might be to pull events from multiple sources using APIs to populate the events calendar. The requirement R6 could be then changed to:

* R6: collate events for the community, from other sources, in a calendar.

*N4: Maintain safety and privacy*

Previously it has been stressed that maintaining privacy and safety of users is crucial to the project, both from a moral and reputational point of view. This was highlighted by safety concerns coming up unpromoted in response to the question about the filter tags:

* "not sure if this might allow terfs to find and cause problems for those services/users who attend that place?” (NB: ‘terf’ is an acronym referring to purported feminists who act in opposition to the trans community and is often used as a synonym for ‘transphobe’).

Other responses point out how important this is to them:

* “Not useful to me personally, but it would have been an important feature pre-transition … Alternatively, an ambiguous name wouldn’t be a bad idea”
* “it would help with feeling safer particularly before coming out”

These needs have been collated in a matrix with the name of the stakeholder, the needs and

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 |
| Trans community app users | N1 | H |  |  |  |  |  |  |  |
| N2 |  |  |  |  |  |  |  |  |
| N3 |  |  |  |  |  |  |  |  |
| N4 |  |  |  |  |  |  |  |  |

Another suggestion

Non-functional requirements – pg 94 tm352 bk1

Explanation of questionnaire and choices for elicitation

Refer to lit review

Analysis of results of elicitation

Volaire template

Needs/requirements matrix

Limits of elicitation and what would be needed for a full release

<https://www.sciencedirect.com/science/article/pii/S0166361505001053?via%3Dihub>

### 2.2.2 User Interface design

During the initial stages of development, Microsoft OneDrive was used as a simple form of version control, to make it easier to keep everything updated when working on the project on different devices. This was done by saving separate folders for the project code noting the date, as shown in figure x. The alternative of using GitHub was not felt necessary at that time, since the project has only a single developer and shouldn’t require much, if any, branching. However, after some several days, it started becoming difficult to keep track of which version was the most up to date as there were three places where the code was stored (PC, Laptop and OneDrive) that didn’t automatically sync up. Therefore, at this point GitHub was used instead, as it is much simpler to keep everything up to date on all devices and branching could be used to preserve specific development states, which might need to be referred to for reflection and analysis. Figure x shows the use of GitHub and some early commits.

Graphical user interface

Description automatically generated

Graphical user interface, text, application

Description automatically generated

On reflection, since CSS did not feature in TM352 and would therefore involve some learning, the schedule was changed so that some of the CSS would be tackled first to give more time to deal with any issues that might arise. Initially, the YouTube video by FreeCodeCamp (reference) provided a basis for learning some basic CSS and then referencing textbooks as needed such as xxx (reference).

The goal was to gain enough knowledge to produce a simple, but effective layout that would maximise screen space to ensure that information is legible to the user. Previously three types of designs were considered, a design similar to google maps, a design with menus that slide in from the sides and a very simplified design and the conclusion was that a balance would have to be struck between investing time on learning how to produce these designs and spending time on other critical aspects of the project.

The first task was to create a simple menu bar and decided to start by using an unordered list to do this, as shown with the markup in figure x. Initially a horizontal bar was attempted, but on reflection this may have taken up unnecessarily screen real estate. So instead, this adapted into a drop down ‘hamburger’ menu utilizing a hidden checkbox as shown in figure x. While this would be adequate, it seemed relatively simple to change this to have it instead pop in from the side rather than drop down to emulate the ‘sliding menus’ design. This opens and closes by tapping/clicking the ‘hamburger’ icon, though the original concept conceived of it also opening using swipe gestures, this is something that could be added later in the project.

The same technique was used to add an info box that pops out from the other side which would contain the information and contact details about a service selected from the map. Since the scripts to implement the map and pins have not yet been implemented, a visible checkbox was placed in the header to use as a placeholder trigger for it to pop out. As with the navigation menu, the use of gestures to interact with the info box could be added later in the project.

Issues – having menus not overlap the viewport; sizing of info box and flexing of the elements.

HTML template

CSS learning and attempts at different styles

Lots of images of development

Code snippets

# 3. Review and reflection

## 3.1 Ways of working

The initial plan had put a strong emphasis on eliciting and responding to user feedback, and while this is a very positive thing and in a full release would be appropriate, it clearly presents challenges for this project. The decision was taken to scale back the nature of the feedback, due to the time and complexity of collating and analysing all the data that would be produced, to allow more time for other necessary tasks. This proved to be a correct decision, as gathering feedback proved to be very challenging and although I had 8 people agree to take part, ultimately only 3 completed it. I had made the decision to write questionnaire into a word document, thinking this would be universal and straightforward for respondents to use. However, this proved challenging to users trying to answer on mobile and to one user that struggled to make the document editable, as Word defaults to making new documents read-only for security purposes. There were also ‘real world’ challenges as one service provider stepped down from their position during the study and there wasn’t time to find a replacement. All this highlights that relying on feedback too heavily for this project would leave it vulnerable to not receiving the quantity or quality of feedback required, justifying the previous decision to reduce the focus on it. The feedback that was elicited though, did provide some very useful suggestions and feedback, and although creating a full stakeholder & requirements matrix was ultimately not possible as originally planned, the feedback allowed a demonstration of how it would be constructed with a more extensive requirements elicitation process.

There was also a rearrangement of schedule to tackle some CSS for the application first since this was a topic with which I had little to experience. Tackling something more challenging early in the project is advantageous as it allows for time to correct any issues that arise and overcome unforeseen difficulties. This proved to be important as learning a new programming language can be time consuming and challenging to find the most relevant parts to the tasks to be undertaken.

Using GitHub made working between different devices very seamless and made my approach to the project much more flexible.

Things that have gone well/badly

Effective ways of working and factors preventing progress – day planner?

Ask craig – should I discuss personal issues here? To what extent?

## 3.2 Evaluating project management

Project lifecycle

Ask craig – should I address the feedback from TMA01 on lifecycle here?

## 3.3 LSEP and EDI

While designing the questionnaire, consideration had to be taken to protect the data and anonymity (where possible) of participants.

LSEP in context of questionnaire, anonymity and data handling

Although the application is being developed for a minority community, this does not necessarily mean it automatically meets responsibilities for Equality, Diversity, and Inclusion. Even within the transgender community there are many different experiences that are quite different, trans masculine, trans feminine and non-binary for example. These identities often intersect with other identities such as neurodivergence (there is a statistical overlap with trans-ness – reference), race and disability. For transgender people, examining the nature of gender and how it exists in society is often part of the experience of transition and trans feminine people frequently experience what is known as transmisogyny (Julia Serano, 2007), the simultaneous experience of sexism and transphobia i.e. being dismissed as less or weak for being feminine, but also dangerous or perverted at the same time. However, as a white, neurotypical, trans feminine person there are still unconscious biases that come with this that must be examined. Indeed, even the Harvard University tests on implicit biases (reference) may themselves contain implicit biases, such as asking for political views that range from ‘very conservative’ to ‘very liberal’, embedding an explicitly pro-capitalist view of politics and society. For their test for transgender bias involves categorising images of transgender and cisgender people, something which may be uncomfortable for trans people given the implications of identifying trans people on how they look (a concept known as ‘passing’ (reference)), which can lead to violence and discrimination towards people perceived as gender non-conforming. It is also important to note that while the legal framework is important, it may be flawed such as the term ‘gender reassignment’ in the Equality Act 2010 often being considered outdated and offensive language as well as being inaccurate to describe the trans community (reference). The questionnaire for requirements elicitation resulted in respondents discussing some of these issues, making suggestions for transmasculine, non-binary people and those who are neurodivergent, such as having service tags to filter content specifically for identities e.g. transmasculine people. For a full release a consultation should explicitly elicit the views of other minority groups intersecting with the trans experience, such transgender disabled people and non-white transgender people, where possible to help counteract any implicit biases. For the purposes of this project this can only be considered in a more limited way due to time and financial constraints.

<https://learn2.open.ac.uk/mod/oucontent/view.php?id=2061269>

However, beyond content the coding of the app must also consider accessibility issues, such as users that use screen readers, those with colour blindness and users that may be using a variety of devices or browsers. Gray states in his tutorial (reference), if the font size is set to a specific pixel size then it will stay at that size regardless of what settings the user might have. This may cause issues particularly for partially sighted users, but also for any user who simply prefers to have larger font. Instead using ‘rem’ unit, so that the font size is relative to the font size of the root element and will scale accordingly. Additionally, setting fallback fonts improves accessibility by ensuring the text will always be displayed with a ‘web safe’ font lowest in order. In a situation when a browser cannot display the desired font or a character from the font, it will attempt to display the next listed font and so on. By having a ‘web safe’ font listed last i.e. a font that is ubiquitous across browsers and devices (reference?), the text should always display even if it is less aesthetically pleasing.

It was also important to consider how it would be read by a screen reader and with particular care taken when using a property such as ‘display:none’, which not only hides an element from view but also from being read by a screen reader. The pop-in side menu is triggered by toggling a checkbox (by pressing the hamburger menu symbol) and initially this was hidden from view by using ‘display:none’, which made it un-selectable by tabbing through elements. To change this, a style was added to the checkbox so that when it is in focus, the hamburger icon changes background colour as it does when hovered over and the checkbox was then hidden by setting the opacity to 0. The code snippet below shows this change.

.side-menu {

    /\* display: none; \*/

    opacity: 0;

}

.side-menu:focus +.hamburger{

    background: #85888c54;

}

Alt text?

Also <https://www.w3.org/TR/WCAG21/>

# 4. References

TransLiverpool Wiki (2023) *Trans Liverpool Wiki* [Online], 7th April 2022. Available at [www.transliverpool.com](http://www.transliverpool.com) (Accessed 29th April 2023).

Nilsson, P & Fagerström, B (2006) ‘Managing stakeholder requirements in a product modelling system’, Computers in Industry, vol. 57, no. 2, pp. 167-177 [Online]. Available at <https://www.sciencedirect.com/science/article/pii/S0166361505001053> (Accessed 29th April 2023).

Robertson, S & Robertson, J (2006), Mastering the Requirements Process, Second Edition, Boston, Addison-Wesley Professional. Available at <https://learning-oreilly-com.libezproxy.open.ac.uk/library/view/mastering-the-requirements/0321419499/title.html> (Accessed 29th April 2023).

The Open University (2014) *TM354: Software Engineering Block 1 Units 1-4 From domain to requirements*, Milton Keynes, The Open University.

CSS Tutorial – Full Course for Beginners (2022) YouTube video, added by freeCodeCamp.org [Online]. Available at <https://www.youtube.com/watch?v=OXGznpKZ_sA&t=11054s> (Accessed 29th April 2023).

Meiert, J O. (2015), *The Little Book of HTML/CSS Coding Guidelines* [Online]. O’Reilly Media Inc. Available at <https://learning-oreilly-com.libezproxy.open.ac.uk/library/view/the-little-book/9781492048459/> (Accessed 29th April 2023).

W3C (2023) Markup Validation Service [Online]. Available at <https://validator.w3.org/> (Accessed 1st May 2023).

# 5. Appendix