The solution that I propose for the client is a website that allows the user to view the local weather, pollen count, and air quality in just a few clicks. It will also help users connect to an employee at Health Advice Group if they have any queries. There will also be a system similar to a blog where the charity can provide more general advice that is not specific to one person or area; it can also be used to notify people of updates to the site.

The homepage for the site would show information about what Health Advice Group provides – such as personalised advice and a weather tool. This is a clear way for anyone who finds the site to understand its purpose, and provides useful links to other parts. The most recent blog post would also appear on this page to show the latest advice. At the top is a navigation bar, this will remain at the top no matter what page the user is on. On this bar would be the logo, clicking returns the user to the homepage. There would also be quick links to the blog, weather, and contact pages, and accessibility options.

The blog page would consist of each post organised newest to oldest; each post on its own row. There could be a related picture alongside the post title and a short preview of the content. Clicking the post would show the full post as a top layer to the window, with a close button to go back.

To include many requested features such as 'monitoring air quality data' and 'weather forecasting to inform health decisions', the Weather page would have a lot of functionality. It would include 3 key types of data: weather forecast, pollen forecast, and local air quality history.

1. For the weather forecast, the OpenWeather API could be used, as it can provide up to 8 days of forecasting temperatures, chances of rain, cloudiness, wind speeds and UV Index. This can be displayed across the top, with icons clearly showing which data is referring to which measurement so it is easy to understand.

2. The pollen forecast can be provided by Ambee's API. This provides forecasts of each type of pollen individually, and could be displayed in a way similar to Kleenex Pollen Pal, with a ring around the actual value coloured depending on danger levels.

3. The air quality history can be provided by DEFRA. They have nitrogen dioxide concentrations yearly as accurate as a 1km square that are free to download and use so long as you include copyright information.

See Appendix A Research below for breakdowns of Kleenex Pollen Pal and DEFRA's interactive map.

Each of these would include a section where it automatically generates some basic advice depending on the results. For example, if the UV index is high then it will suggest to put on suncream when you are going outside.

The Contact page will be where a user can go to ask a volunteer at Health Advice Group for more personalised assistance. There will be a form the user can fill out and submit with their email to send a message to the charity.

Accessibility is a big thing for the client, so they can spread their advice to as many people as possible. The ways this will be done are: an option to switch between light and dark modes; a toggle for larger font size; and the ability to turn on text-to-speech for blogs.

These settings can be accessed from the navigation bar.
Finally, there will be an admin panel that cannot be found normally on the site, and any commands are locked by a password so they cannot be accessed by some random person. Within this panel is the ability to create new blog posts, as well as change the destination email address for the contact form.

Functional requirements

Requirement	Priority /5	Reasons
Blogs can be added	5	Without being able to create blog posts they are unable to show their more general advice such as helping 'with extreme weather temperatures'.
Blogs can be viewed	5	If the user cannot see blogs as they are created then they cannot get the advice within them.
Location data gathered from device	5	Without the location data it is impossible to view any of the weather systems.
Weather and pollen forecasting works	4	These make up most of what the user is likely to want to see from the tool.
Air quality on bar graph	3	While it is useful to have, the user is less likely to be interested.
Contact form sends an email to the correct address	5	If the email is sent to the wrong address then there will not be a response. The user will wait patiently and then be disappointed.
Destination email can be changed	2	This can be useful on the charity's side but it is also possible to just use the same email consistently.

Non-functional requirements

Requirement	Priority /5	Reasons
The website is not overly slow	4	If the website takes forever to do anything it is likely to be considered unreliable and users will go elsewhere.
Accessibility features	5	These are vital for getting information out to those who need it most.
Friendly colour system	3	It is important that the users feel comforted by the site. A colour scheme that provides this is important.
Advice based on weather results	5	This is very important for providing interpretations of data for users that do not know what the numbers mean.
Admin panel is password-locked	5	This is an important security measure to ensure that the people who use the admin panel are those who are trusted with it.

Requirement	**Priority /5**	**Reasons**
Website is designed to work for mobile	4	Users are more likely to use this service on their phones, so the site should be designed with that in mind.
All main pages are accessible on the navigation bar	4	This makes it easy for users to find their way around the site.
The newest blog post is shown on the homepage	2	While this is not required, it is a good way for users to see updates and advice without going to the blog page.
Air quality measurements take data from the area around the 1km square into account	1	This is a way to make the values better represent the whole area that the user experiences. It isn't required by any means, but leads to better results.
Asks for permission before collecting location	5	This is very important, as location data can be precise enough to escape anonymity. Make sure the user consents and knows what the data is used for.
Accessibility settings are stored locally	2	This would involve using a cookie. The purpose would be so that the user does not have to change their settings every time.
Homepage introduces the user to the site	3	Having a homepage that clearly explains what the company does can feel welcoming to the user. It is important that they find the site appealing to use and look at.
The admin panel is not on the navigation bar	3	This serves two purposes; it both adds an extra layer of security by hiding it, and stops it from confusing the user.

Relevant Regulations

Health data about a person (which could be sent in a contact email) is very strictly monitored by GDPR regulations. This means that:

- The user must know what the data is used for
- The user must be able to see all data stored about them if they ask
- The user can ask for data to be deleted – should be deleted when no longer in use

This affects how Health Advice Group can respond to these emails. If they contain any medical data, which given the feature's purpose for advice is quite likely, all emails should be deleted after the user is finished. Also, at no point should the data be shared with anyone unless the user allows it.

Location data used for the weather systems is only protected by GDPR if it could be used to identify a person. This was originally going to be solved by only collecting a vague location that couldn't be used for this purpose. However, since OpenWeather and Ambee support exact longitude and latitude, and the DEFRA data is 1km square accurate, it would be better to use an exact location. For this to be legal, the user must know exactly what the location is used for, they must consent to its use, and it mustn't be stored anywhere

permanently. This could be as simple as a small pop-up window that the user has to accept before locational services can be used.

See Appendix A Research below for details of these regulations.

Potential risks

Risk	Severity	Chance	Mitigation
Admin password is forgotten	Low	Medium	An option should be given to reset the password.
Non-admin gets access to the password	Medium	Low	The ability to reset the password will prevent the non-admin from having access to it. The new password should be sent to a staff email so that unauthorised people cannot get access.
Blog posts are entered wrong / created unintentionally / unauthorised creation	Low	High	The ability to edit blog posts or change their public visibility would allow Health Advice Group to correct typos and hide posts that could damage their status.
A packet sniffer gets access to location data as it is sent, giving them access to the data	High	Very low	In order to prevent this risk, the location would be encrypted with a key that the server sends the client before sending the location.

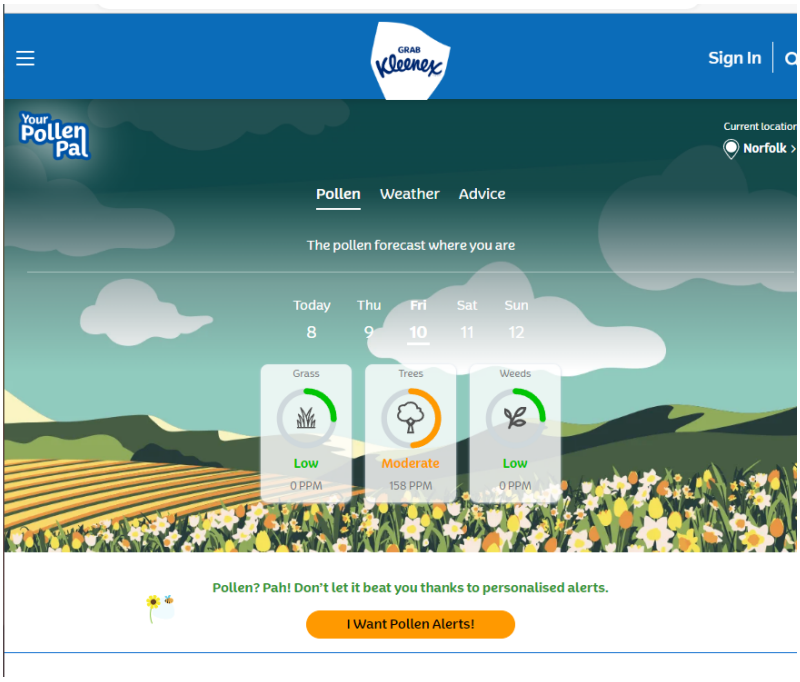
Appendix A - Research

Guidelines and Regulations

Personal data is likely to be used as part of the solution – such as personal health and location – this will need to be protected. GDPR laws state that the user has to explicitly consent to the data being collected and how it will be used. As such, the design will need in data entry sections boxes to check to say you consent to data being used. GDPR regulations only apply to location data if it could be used to specifically identify a person. This means that locations used for features such as personalised health advice should be kept to a vague area so the user cannot be identified.

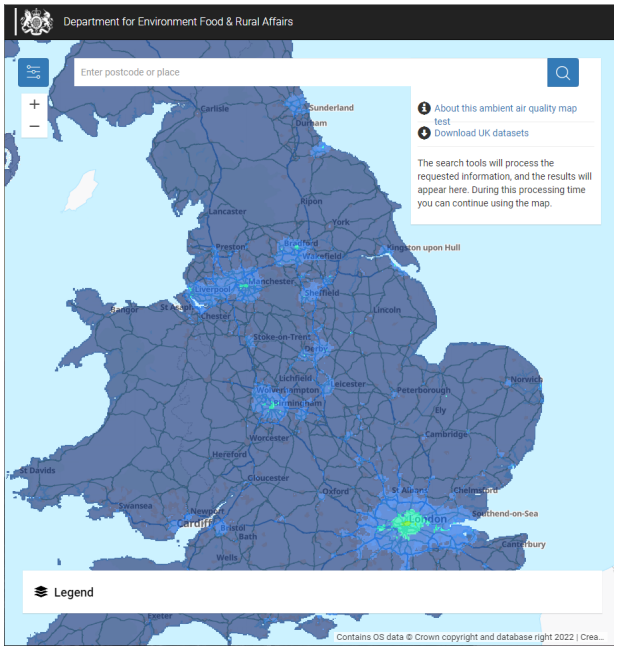
Existing Technologies

Kleenex Pollen Pal (Pollen Count – find pollen levels near me | Kleenex)



This tool, created by well-known tissue company Kleenex, is a useful way to see a five-day pollen forecast for your area. Like mentioned above, you can see the vague area (in this case Norfolk) is used for the needed anonymity. Pollen Pal also has a service where it can send you notifications regarding newer forecasts. This can be useful for when you cannot be bothered to check every few days. The UI is simple and easy to understand, with underlines showing which section is currently selected and a colour scheme that feels comforting. One downside to this service is that the circles around each type of pollen are locked to show increments of 90 degrees; while this was likely done for quick reading, it has the negative side-effects of not being completely accurate and also making 0 look like more than 0 (see picture above).

[UK Ambient Air Quality Interactive Map (defra.gov.uk)]



This map created by the UK government's Department for Environment, Food and Rural Affairs is a powerful yet quick-to-use system for viewing official air quality measurement averages each year. There are lots of features it has for ease of use; for example, you can filter by year and type of data to find what specifically is sought after. Pressing 'Legend' at the bottom shows a key for what each colour means – it is likely done this way so it doesn't get in the way of the map itself. However, there is an issue with this service, in that if someone does not understand what each measurement of air quality means there is no system that explains it or allows you to see an overall measure of air quality. Despite this, it is very useful for other tools to use as you can download the data as a CSV for every 1km square at once for a given year.