

Cambridge Centre
for Housing &
Planning Research

Stakeholder Engagement Plan for the West Cambridge Digital Twin Research Facility

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1. Terms of reference

This stakeholder engagement plan was commissioned by the Centre for Digital Built Britain (CDBB) to serve as a guide for its stakeholder engagement activities for the Digital Twin Research Facility (DTRF) to be set up at the West Cambridge site. The objective of the DTRF is 'to explore and demonstrate how a dynamic digital twin of existing buildings and infrastructure can be developed and to identify the opportunities and challenges' associated with it. Amongst features such as flexibility, dynamism and security, the DTRF is also expected to be 'civil'. This means that it should be acceptable to both users and the public more generally. The stakeholder engagement plan is intended to fulfil this civic obligation by ensuring that the DTRF secures the buy-in of stakeholders at the West Cambridge site whilst drawing on their feedback to improve the DTRF.

The stakeholder engagement plan has been designed to broadly align with both the timeline of the DTRF and the different work packages that must be delivered. In line with this, the plan is organised into three parts:

- Forms of engagement that need to be conducted prior to the data capture phase of the DTRF. Part one is also written with reference to the current COVID-19 restrictions on social distancing;
- Forms of engagement that need to be conducted when data capture has commenced, and alongside associated work, namely data management and the application development phases of the DTRF;
- Forms of engagement that will occur after the DTRF has been set up in order to give stakeholders the chance to engage with outputs from the DTRF.

Attention will be paid to engagement that can be conducted after the current COVID-19 restrictions on social distancing are lifted, and University buildings have been re-opened.

The plan draws insights from both primary and secondary data sources. Primary data come from face-to-face interviews with experts who have facilitated or led stakeholder engagement activities in the UK. Secondary data include existing academic, industry and grey literature, and earlier reports on stakeholder engagement produced by the research team and submitted to the CDBB.

The organisation of the stakeholder engagement plan in relation to the current timeline for the DTRF is illustrated as follows:

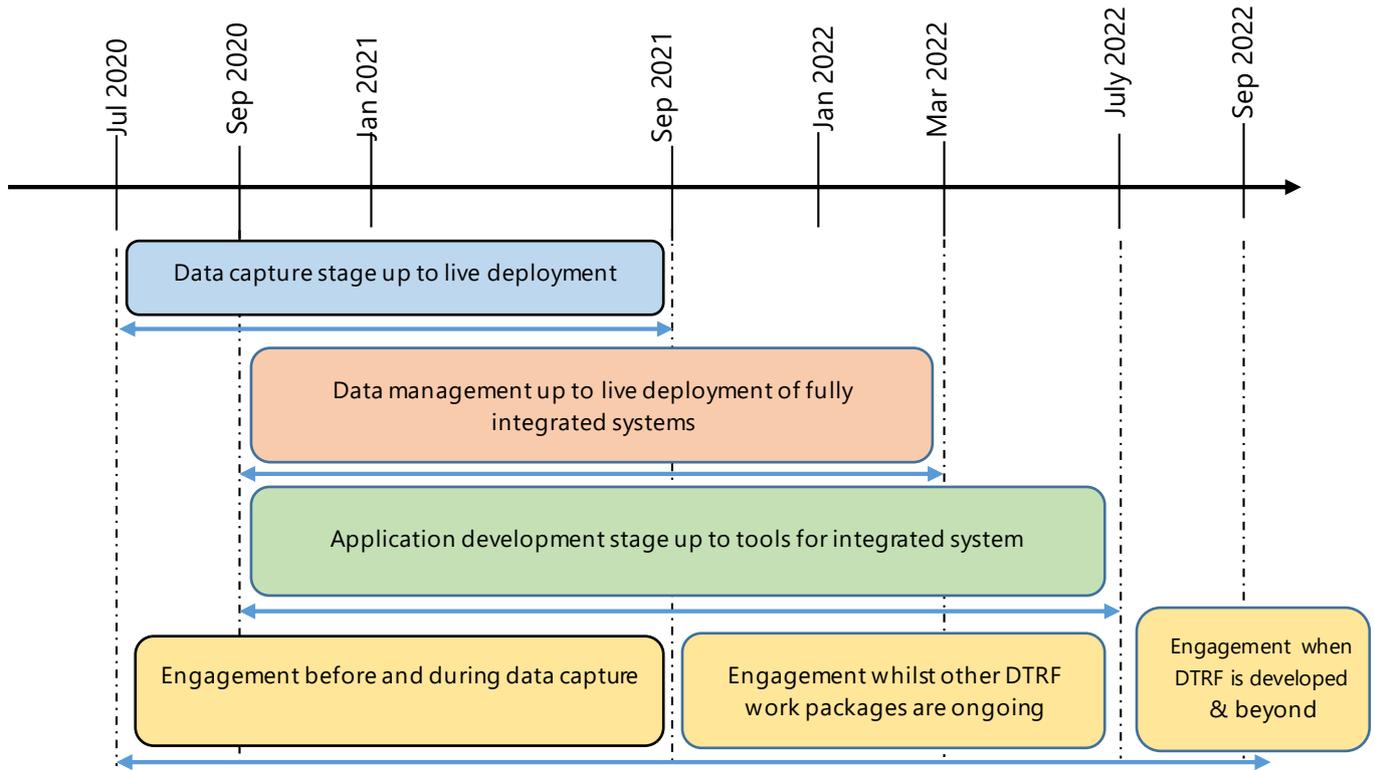


Figure 1. Timeline for the set-up of the Digital Twin Research Facility

2. Stakeholder engagement prior to data capture

2.1 Identifying and classifying stakeholders

The first step of stakeholder engagement is to identify, classify and seek the consent of stakeholders without whose help the project will not proceed. The Power-Interest/Boston Matrix (Government Communication Service, 2020; Reed et al. 2009) has been used to help with the classification of the stakeholders at the West Cambridge site, dividing them into high-power/low-interest, high-power/high-interest, low-power/low interest and low-interest/high-power stakeholders. It should be stressed that this stakeholder classification is not definitive, and hence can be empirically validated through self-reported surveys which capture the relative power and interest levels of those stakeholders who complete it.

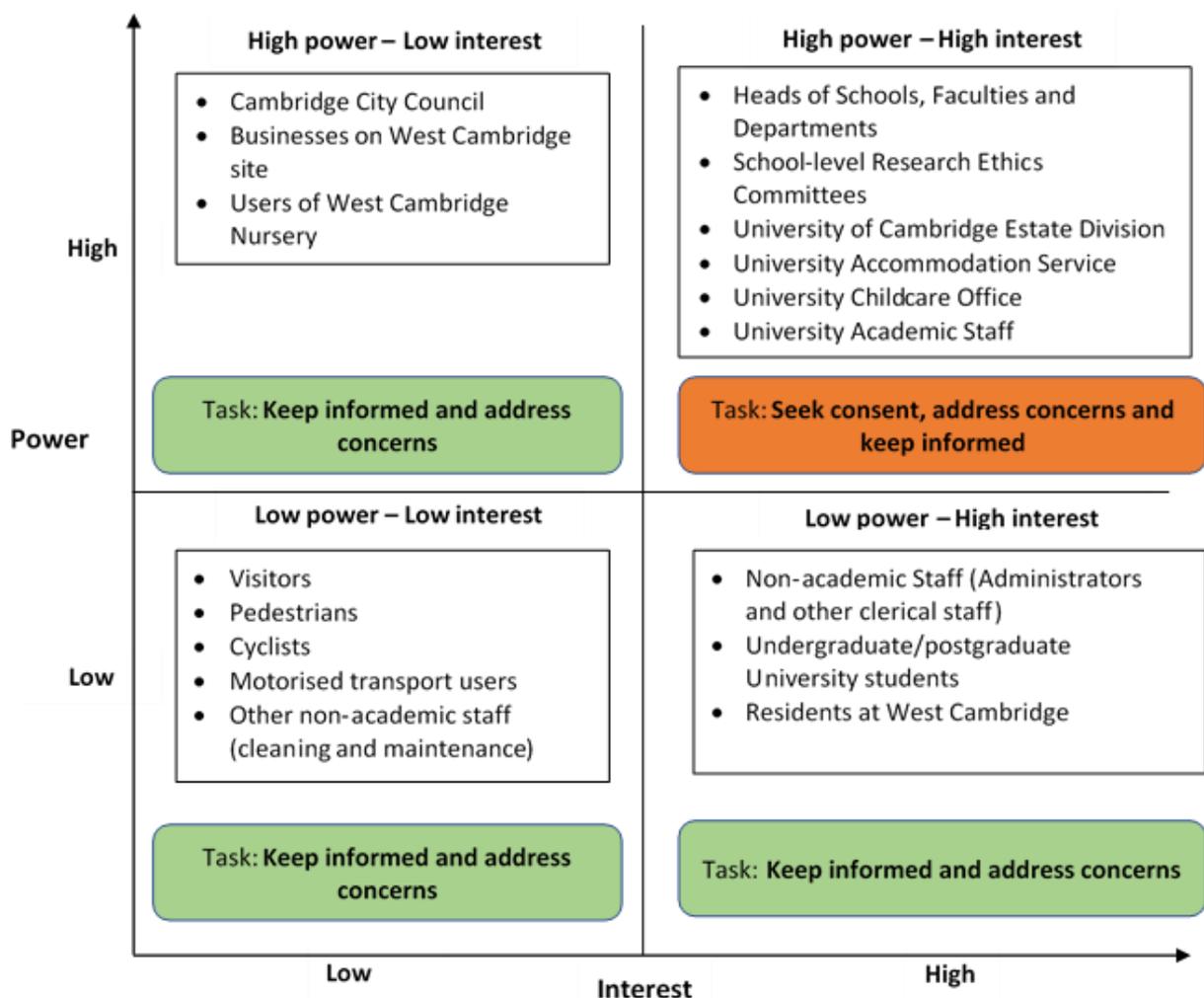


Figure 2 Stakeholder Power-Interest Matrix for West Cambridge Digital Twin Project
Source: Adapted from Government Communication Service (2020); Reed et al. (2009)

Going forward, stakeholders in the high-power/high-interest group should be prioritised for stakeholder engagement because, without their consent, the DTRF may face significant opposition.

2.2 Forms of engagement recommended for high-power/high-interest stakeholders in the immediate term

In the first instance, contacting high-power/high-interest stakeholders will require desk-based research in order to establish the most appropriate person to contact within each stakeholder organisation, and to obtain their contact details.

2.2.1. Communicating by email

Given the current circumstances, sending a formal email is likely to be the most appropriate way of contacting these stakeholders. This email should provide critical information about the West Cambridge DTRF, and the stakeholder engagement process. It should assume that the stakeholders do not have any prior knowledge of the DTRF.

Communications with these stakeholders should address the following points:

- What is a Digital Twin? A combination of text, infographics and a web link to the CDBB short video on Digital Twins can be used to clearly explain this concept.
- Why is a Digital Twin important for stakeholders, the West Cambridge site, the University, and the city as a whole?
- Where does the Digital Twin sit within the UK's Industrial Strategy and National Digital Twin Programme?
- How does the project meet the ethical requirements of the University of Cambridge or the respective School-level Ethical Committees?
- Which individual or group is leading the implementation of the West Cambridge Digital Twin Project, and what are their credentials?
- What is the timescale for the implementation of the project?
- How will stakeholders be kept informed about the progress of the implementation of the Digital Twin?
- What smart technologies will be used (sensors, cameras, etc.), where will they be positioned, and how many will be deployed?
- What type of data will the smart technologies capture?

- What will be the frequency of the data capture?
- What measures have been put in place to safeguard against capturing personal information?
- What will the data be used for, and who will have access and rights to this data?
- How and where will the data be processed and stored, and how secure is the data storage facility?
- How will other people, including the general public, be informed about the project?
- How long will the data be stored for, and what will happen to the data after this storage period?
- How will the project be decommissioned?
- Who should be contacted in case there are concerns the project or if more information is needed?

The email should also include a request for stakeholders to indicate their support for the project by signing and emailing back an attached consent form.

2.2.2. Virtual 'face-to-face' meetings

It is reasonable to assume that not all high-power/high-interest stakeholders will sign the form to state their agreement at this stage, and the option of a virtual 'face to face' conversation about the project should be offered. Some stakeholders may require further information before consenting or otherwise, and the email should therefore include contact details for one of the commissioners of the DTRF so that they can be contacted.

2.3 Forms of engagement recommended for other categories of stakeholders in the immediate term

Having secured the support of key stakeholders, attention should be directed to the other groups of stakeholders at the West Cambridge site, i.e. the users of the three buildings at the West Cambridge site identified for the instalment of both dumb and intelligent sensors to capture data for the DTRF. These stakeholders must include:

- users of specific buildings and offices; and
- users of communal areas of the buildings where the sensors will be installed.

These stakeholders should be informed about the DTRF, with an explanation that the sensors to be installed will collect:

- environmental data, such as temperature and humidity; and
- situation detection data, e.g. whether doors and windows are shut or left open, people counters, room occupancy levels and monitoring of equipment conditions.

Stakeholders need to be informed about how the data will be used. In addition to informing them about the data capture process, where appropriate, seek their consent before proceeding with any relevant activity (e.g. where data will be collected in an individual office).

As there is the prospect of deploying more sensors at other points in West Cambridge to count pedestrians, cars, buses, etc., users of thoroughfares and open spaces should at least be informed about the DTRF and the ongoing data capture exercise. It may be useful to highlight the type of data that will be captured and how they will be used.

Against this backdrop, the following forms of stakeholder engagement are recommended for these three categories of users:

Users of spaces at the West Cambridge site	Forms of engagement	Advantages
Users of specific buildings (e.g. offices)	<ul style="list-style-type: none"> • Bespoke emails to specific individuals (academic, research and clerical staff, and students), whose personal offices may be used for the data capture, informing them about the DTRF, the data capture process, and how the data will be used. Include consent forms for stakeholders to complete and return. • Request virtual 'face-to-face' meetings with such people, if possible, and use the opportunity to secure their written consent. 	<ul style="list-style-type: none"> • Emails are inexpensive, can be used to communicate to several stakeholders simultaneously. • Emails also provide an 'audit trail' of communication. • Adds a personal dimension to the engagement process.

Users of communal areas (Receptions, foyers, lecture rooms)

- Bespoke emails sent to heads and administrators of buildings where communal areas will be affected, explaining the DTRF project, the data capture process, and how the data will be used. Request for the email to be circulated to all users of such communal areas.
- Notices and posters about the digital twin and the data capture process to be displayed within and/or at the entrances to these communal areas. Include a QR code or a URL that directs users to the consent form for the project.
- Emails are inexpensive and can be used to communicate to several stakeholders simultaneously.
- Notices can be displayed anywhere outside the communal spaces to inform stakeholders about the project, even if they are not currently able to access the building.

Users of thoroughfares and open spaces

- Notices and posters about the Digital Twin and the data capture process to be affixed to lamp posts, bus stop shelters, and other areas with heavy footfall. Include a QR code or a URL that directs users to the project website.
- Can be used to reach to people who may be interested in the project but are not easily identifiable.

3. Forms of engagement after the data capture and during other work packages

Having informed other stakeholders with direct interest in the data capture process, and secured their consent, attention should be directed to other forms of engagement designed to provide information about the project and to gather feedback without requesting consent. The following forms of engagement are recommended:

Form of engagement	Benefits
A stand-alone website, or a website/pages linked to the CDBB website	<ul style="list-style-type: none"> • Can be accessed by all stakeholders simultaneously. • Enables different forms of information about the Digital Twin (e.g. text, video, infographics, 3D visualisations) to be communicated. • Can also be designed to include a 'comments' function to gather stakeholder feedback. • Can provide institutional memory to all interested parties even after the project has been decommissioned.
Posters and notices positioned in places with heavy footfall at or around the West Cambridge site	<ul style="list-style-type: none"> • Can reach stakeholders who may not access the website. • Can be used to reach specific groups of stakeholders, including pedestrians, bus users, visitors, etc. • Suitable for providing concise information about the Digital Twin, using either infographics or short texts. • Can be used to direct traffic to the website dedicated to the West Cambridge DTRF.
Social media (e.g. Twitter, Facebook, YouTube, LinkedIn, Instagram)	<ul style="list-style-type: none"> • Can be used to gather and analyse public reactions about the Digital Twin project, using metrics such as Likes, Dislikes, Comments, Shares, Retweets, etc. • Can be useful in monitoring how many people have read, watched or listened to something about the West Cambridge Digital Twin project posted on social media. • Can be used as a point of reference or as evidence of having conducted stakeholder engagement.

Digital Twin Podcasts	<ul style="list-style-type: none"> • Can be used by experts to communicate crucial aspects of the West Cambridge Digital Twin project, including the purpose and benefit of the Digital Twin, the type of data to be collected, how the data will be collected, used, protected and stored.
Focus group discussions (Can be done virtually or or after current restrictions on social gatherings are lifted and University buildings are opened)	<ul style="list-style-type: none"> • Will offer the opportunity to get bring all stakeholders together to update them on the progress made so far on the project. It could also be used to gather stakeholder concerns following the instalment of the data capture sensors. • Can help to understand how stakeholder concerns are connected, and to obtain bottom-up solutions to address such stakeholder concerns.
Workshops (if current restrictions on social gatherings are lifted and University buildings are opened)	<ul style="list-style-type: none"> • Can be used to provide stakeholders with information on progress made. • It could also be used to gather stakeholder concerns and issues. • Can be used to solicit ideas and suggestions from stakeholders regarding other areas to explore as part of the data capture, data management and application development process.

All the forms of engagement outlined above should provide a link or web address that directs stakeholders to the dedicated West Cambridge Digital Twin website or webpages, in case they require more detailed information about the project.

Also, for any focus group discussions and workshops, it is important to ensure that a list of stakeholders who attend the sessions, the issues that discussed and the commitments made are documented and uploaded onto the DTRF website. Additionally, it should be ensured that the following information features on the website:

- Profile of the team commissioning or leading the DTRF at the West Cambridge site;
- How the project meets the ethical research requirements of the University of Cambridge and the General Data Protection Regulation;
- A document that sets out how the data will be collected, processed, used, managed, stored and destroyed;

- Images, BIM models, maps and short videos of the IfM Digital Twin and CDBB's short video clip on the National Digital Twin should be uploaded onto the website to give stakeholders a visual appreciation of how the West Cambridge DTRF will look and operate in practice.

3.1 Evaluate stakeholder feedback from the information-oriented forms of stakeholder engagement

Stakeholders are likely to react differently to the idea of deploying data capture sensors and cameras for the West Cambridge DTRF, and it is important to gather their reactions. To do this, the following actions are recommended:

- Appoint an engagement lead to monitor and document public reactions on different media channels where information relating to the West Cambridge DTRF has been posted;
- Analyse stakeholder reactions and group them into those (a) seeking further clarification or more information about the project, (b) commending the project, (c) criticising the project, and (d) offering suggestions for further improvement to the project;
- Provide further information to stakeholders requesting it and thank all other stakeholders for their feedback.

3.2 Taking actions based on the feedback received from stakeholders

All feedback from stakeholders, whether positive or otherwise, should be considered. Where criticisms received from stakeholders appear to have merits, these should be addressed with a view to improving the implementation of the DTRF. Similarly, stakeholder suggestions should be analysed against the project's expected outcome, budget, timeline and resources, and actions taken accordingly.

4. Stakeholder engagement after the Digital Twin Research Facility has been set up

Crucially, stakeholder engagement should continue after the DTRF has been set up, because it is at this point that stakeholders have the opportunity to witness the operation of the DTRF in real time and offer their impression and comments. Furthermore, by this stage, engagement activities should be targeting all stakeholders, including the general public.

The following forms of engagement are recommended when the DTRF is set up.

Form of engagement	Elaboration on the forms of engagement outlined
Focus group discussions	<ul style="list-style-type: none"> • These should primarily target all the stakeholders at the West Cambridge site, as identified using the power-interest matrix. It should explain to stakeholders how any concerns raised in earlier focus group discussions have been considered in the final set up of the DTRF. • It should also be used to gather stakeholder experiences of the DTRF and an evaluation of the different work packages leading to the development of the DTRF.
Workshops	<ul style="list-style-type: none"> • The workshops could be used as an avenue to showcase 3D and BIM models of the site, BIM models of the specific buildings and thoroughfares used in data capture exercises, and the different assets in buildings that have been digitally tagged. • The workshop can also be used to showcase insights from the interoperability of different data, including building and asset data with environmental and pedestrian data.
Digital Twin Week¹	<ul style="list-style-type: none"> • This will involve setting aside a week where all the stakeholders at the West Cambridge site can walk into a designated building to

¹ This suggestion draws inspiration from the Glasgow's stakeholder engagement approaches for its Future City project. As part of its engagement efforts, the project team set up several engagement hubs across the city where citizens could walk in and either speak to volunteers about different smart city initiatives across the city or explore for themselves information about the different smart city projects through Interactive content elements such as videos and interactive surveys. Available at <https://futurecity.glasgow.gov.uk/engaging-the-city/> (Accessed 17/06/2020)

	<p>witness real-time illustrations of insights from the data processing and visualisation of the DTRF.</p> <ul style="list-style-type: none"> • During the week, there should be someone dedicated to gathering concerns from stakeholders and responding to questions. • The Digital Twin Week can also be used to solicit suggestions and co-creative ideas from the stakeholders attending the event, particularly their thoughts on what else can be done with digital technologies used for the DTRF. • The 'Digital Twin Week' should be widely advertised across several media platforms, including local newspapers, the DTRF website, and all social media platforms created for public engagement. Bespoke emails should be sent to stakeholders whose contact information can be accessed.
<p>Interactive Monitors²</p>	<ul style="list-style-type: none"> • Interactive Monitors (IMs) have pre-installed software programmes that provide information to the public and receive feedback. • IMs can be mounted at strategic locations at the West Cambridge site to target stakeholders who are otherwise difficult to reach directly including, but not limited to, bus users, pedestrians, visitors and residents living on the West Cambridge site. • IMs can be used to showcase insights coming from the DTRF, including CO₂ emission levels of motorised vehicles using the West Cambridge site, as well as the buildings, counts of pedestrians, cyclists, motorbikes, buses and cars that use the West Cambridge site each day and the implications for congestion and air pollutions. • The IMs should be designed in such a way that they allow stakeholders to choose which information they want to view. They should have a tab to gather stakeholder feedback and suggestions for improvement.
<p>Volunteers for one-to-one engagement</p>	<ul style="list-style-type: none"> • Volunteers could be useful in reaching out to stakeholders who may be difficult to contact via the methods previously outlined, especially people living at or working from the West Cambridge

² This suggestion derives from Bristol's 'Legible City' Information Panels installed across the city. It is an on-street pedestrian wayfinding panel with intuitive, user-friendly and multi-level city information that can be accessed by citizens and visitors. See <https://www.bristollegiblecity.info/portfolio-items/on-street-signage-system/> (Accessed 17/06/2020)

site who may be unaware of the different forms of stakeholder engagement, whether already conducted or ongoing.

- Volunteers can be stationed at entrances to communal areas and along main thoroughfares, at key times, to engage directly with stakeholders or hand out flyers about the DTRF. The flyers should provide concise information about the DTRF with along with a link to the DTRF website.

4.1 Regularly update stakeholders on the achievements of the Digital Twin

All stakeholders at the West Cambridge site, particularly the high-power/high-interest stakeholders, should be regularly updated about the insights obtained from the Digital Twin. This should be done through the DTRF website, and through other media, namely, newsletters, e-bulletins and emails.

The information should be presented in a non-technical, easy to read and understandable format. Simple graphs, percentage changes and non-academic texts should be used in communicating these insights.

4.2 Share best practice and lessons learned

The DTRF project leaders should ensure that all the lessons learned during the different stages of the stakeholder engagement process are published in a report which should be made available to stakeholders. In this report, stakeholder engagement activities that worked well, and their impacts, should be highlighted. This report should also capture best practices that made the stakeholder engagement for the West Cambridge Digital Twin successful, and any shortcomings which may have emerged in the process.

5. Conclusion

This document has set out a feasible plan for engaging stakeholders in the West Cambridge DTRF. The plan has been written with the DTRF project timeline and current COVID-19 restrictions in mind. The forms of engagement to be conducted at each stage of the project timeline are summarised as follows:

Before and during the data capture stage, the following forms of engagement activities are recommended:

- Identify stakeholders, and categorise them according to their power/interest using Power-Influence Matrix;
- Contact high-power/high-interest stakeholders by email or through virtual 'face-to-face' meetings to seek their consent for the project;
- Inform and seek consent from users of specific buildings and spaces targeted for data capture using bespoke emails, virtual 'face-to-face' meetings, notices and posters.

After completing the data capture and whilst other work packages are ongoing:

- Carry out information-oriented forms of engagement with other stakeholders, collecting feedback through websites, posters and notices, social media platforms, podcasts, focus group discussions and workshops;
- Analyse feedback, and implement any positive changes to the DTRF accordingly.

After the DTRF is set up:

- Organise focus group discussions with all stakeholders to demonstrate how their concerns so far have been considered in the DTRF, and to welcome further suggestions and concerns;
- Organise workshops to present the outputs from the DTRF, including 3D BIM models of the site and the three buildings used for the project;
- Organise a Digital Twin Week to allow stakeholders to gain insights from the DTRF and to gather further feedback;

- Install Interactive Monitors across strategic areas of the West Cambridge site to target hard to reach stakeholders and to share insight from the DTRF;
- Recruit volunteers to conduct one-to-one engagement with people who might not have heard about the Digital Twin project or the ongoing forms of stakeholder engagements;
- Regularly update stakeholders, and ensure their feedback is considered in decision-making for the Digital Twin project;
- Share best practice to inform future stakeholder engagement plans.

Following the steps set out in this plan will help to ensure that stakeholders' views are taken fully into account in the implementation of the West Cambridge Digital Twin project, and will enable improvements to be made to the project in line with the feedback received. Critically, it will also increase the likelihood of securing stakeholder buy-in.

6. References

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