Cambridge Centre for Housing & Planning Research

Stakeholder Engagement for Smart Cities and Digital Infrastructure Projects: National Guidance Document

Dr Richmond Ehwi
Dr Hannah Holmes
Dr Sabina Maslova

UNIVERSITY OF CAMBRIDGE

Principal Investigator:
Dr Gemma Burgess

Research Team:
Dr Richmond Ehwi
Dr Hannah Holmes
Dr Sabina Maslova

Cambridge Centre for Housing & Planning Research
Department of Land Economy
University of Cambridge
19 Silver Street
Cambridge
CB3 9EP

glb36@cam.ac.uk

Tel 01223 33174

www.cchpr.landecon.cam.ac.uk

Cambridge Centre for Housing & Planning Research

Contents

Executive Summary

Digital transformation is taking place in the way we plan, build, maintain and use social and economic infrastructure in the UK[1] and this has given rise to a variety of Digital Infrastructure Projects catering to the needs of society.[2] Against a backdrop of issues such as an ageing population, rapid urbanisation, high levels of carbon emissions, and increasing road congestion, the ongoing digital transformation is expected to unlock several economic, social and environmental benefits in the UK[3]. At the same, this transformation is likely to have profound implications for both the lived experiences and opportunities of different stakeholders for the built environment – namely, individuals, communities, interest groups, local authorities, universities, businesses and other users of the built environment.

Unfortunately, commissioners, partners and leaders of some of these Digital Infrastructure projects, both in the UK and elsewhere, have been criticised for facilitating only limited stakeholder engagement throughout the lifecycle of these Digital Infrastructure Projects, and hence for their failure to address the specific problems facing stakeholders.[4,5,6] This is partly due to a current lack of comprehensive guidance on how to engage stakeholders throughout the lifecycle of these Digital Infrastructure projects (before, during and after deployment) in a way that is sensitive to their needs.

Engaging stakeholders effectively can ensure that public funds invested in Digital Infrastructure projects deliver outcomes that are of value to the public, whilst lending the project legitimacy and securing local stakeholder buy-in.

---

[1] Centre for Digital Built Britain (n.d) About the Centre for Digital Built Britain. Available at https://www.cdbb.cam.ac.uk/AboutCDBB. (Accessed 24/06/2020).

[2] Burgess, G, Enzer, M., Schooling, J. et al. (2020). Flourishing System. Centre for Digital Built Britain and Centre for Smart Infrastructure & Construction, Cambridge. DOI: 10.17863/CAM.52270

[3] National Infrastructure Commission (2017). Data for the public good. Available at ttps://www.nic.org.uk/wp-content/uploads/Data-for-the-Public-Good-NIC-Report.pdf%0Ahttps://www.nic.org.uk/publications/d. Accessed 24/06/2020.

[4] Cowley, R., Joss, S. & Dayot, Y. (2018). The smart city and its publics: insights from across six UK cities. *Urban Research and Practice*, 11 (1), 53 – 77.

[5] Cardullo, P. & Kitchin, R. (2019). Being a 'citizen' in the smart city: up and down the scaffold of smart citizen participation in Dublin, Ireland. *Geojournal,* 84 (1), 1 – 13.

[6] Saunders, T. & Baeck, P. (2015). Rethinking smart cities from the ground up. Nesta. Available at https://media.nesta.org.uk/documents/rethinking_smart_cities_from_the_ground_up_2015.pdf (Accessed 20/11/2020).

This national guidance document, which has been prepared by the Cambridge Centre for Housing and Planning Research (CCHPR) for the Centre for Digital Built Britain (CDBB), sets out broad principles for conducting stakeholder engagement for Digital Infrastructure Projects. It draws insights from both primary and secondary data sources. Primary data sources include face-to-face interviews with experts who have facilitated or led stakeholder engagement activities in Digital Infrastructure projects in the UK. Secondary data include guides on stakeholder engagement from government agencies, as well as existing academic, industry and grey literature.

This document discusses how to identify stakeholders; how to choose an approach to stakeholder engagement; and the methods which can be used within each approach. Following from this, the guidance document presents key recommendations proposed for achieving effective stakeholder engagement for Digital Infrastructure Projects, keeping in mind the different stages of the engagement process. The recommendations are as follows:

Prior to the stakeholder engagement process:

- **Ensure full stakeholder representation:** Ensure that the identification, mapping and analysis of stakeholders for the Digital Infrastructure Project is as representative of the different interests as possible.
- **Define what successful stakeholder engagement means, and specify metrics for its measurement:** Project commissioners should be clear about what constitutes success and how it will be measured. They should ensure that the definition of success also captures stakeholders' perspectives.
- **Adopt a holistic approach when choosing the form of stakeholder engagement:** In addition to the purpose of the engagement, regard should be given to other factors like spatial scale, project timeline, source of project funding, project development stage etc. when choosing the form of stakeholder engagement.
- **Ensure that the logistics chosen for the engagement are fit for purpose:** Project commissioners should ensure that the choice of venue (including virtual platforms), presentation style, communication and illustration materials are all sensitive to the circumstances of stakeholders.
- **Anticipate possible difficulties and plan to overcome them:** Project leaders and engagement facilitators should plan for potential issues and adopt a flexible approach, allowing for any necessary changes to scheduled engagement activities

During the stakeholder engagement process

- **Avoid privileging some stakeholders over others:** Stakeholders should be treated equally, ensuring that the number of times stakeholders are called upon to make contributions to stakeholder engagement meetings, and the length of time allowed for each contribution, are fairly distributed.

- **Maintain a neutral position as far as possible:** This can be achieved by avoiding concurring with, or selectively elaborating on, comments that only seem to support the implementation of the project.
- **Demonstrate genuine interest in what all stakeholders have to offer:** This can be achieved through effective coordination between a scribe or note-taker and the facilitator, by drawing the former's attention to all the issues raised by stakeholders so that project leaders have notes which accurately reflect stakeholders' concerns in the decision-making process.
- **Ensure that stakeholder engagement is meaningful:** Project leaders should recognise that stakeholder engagement is not simply a box-ticking exercise, and that it can in fact hold real benefits for the project itself, if efforts are made to include stakeholders. Taking the opportunity to learn from stakeholders, and to allow stakeholders to influence the project, can result in valuable improvements to the DIP, and can help to mitigate against unintended outcomes.
- **Ensure stakeholders are comfortable during stakeholder engagement activities:** Stakeholders can easily be inundated with information overload. Hence, scheduling regular comfort and refreshment breaks during engagement activities for stakeholders may be useful.

After the stakeholder engagement exercise:

- **Evaluate stakeholders' experience of all forms of engagement conducted:** Project commissioners should ensure that they fully evaluate stakeholders' experience of the engagement activities conducted, drawing on both quantitative and qualitative evidence.
- **Publish reports on commitments made towards the stakeholder engagement:** Project commissioners should ensure that they publish relevant statistics, such as the amount of money committed to stakeholder engagement activities, number of stakeholders engaged in different activities, etc.
- **Share lessons learned:** Project commissioners should ensure that they publish a report that outlines the lessons learned from the engagement process to facilitate learning.

Before executing the project:

- **Debrief stakeholders as to how their feedback has shaped the project prior to deployment:** Before deploying the Digital Infrastructure Project, ensure that a (virtual) face-to-face meeting is held with all stakeholders, particularly key stakeholders, to explain how their feedback has been considered in the development of the Digital Infrastructure Project.

During the project execution and thereafter:

- **Update stakeholders at each project milestone:** The stakeholder engagement should continue during the execution of the project. Project commissioners must keep stakeholders informed on each project milestone reached and encourage further feedback from stakeholders.
- **Archive project outputs:** Project commissioners should ensure that all relevant materials from the project are archived in relevant public repositories which can be accessed by stakeholders for future reference.

1. Introduction

This document sets out best practice guidance on stakeholder engagement for policy-makers and practitioners leading Smart City initiatives or Digital Infrastructure Projects (DIPs) in the UK.

Stakeholder engagement is more than a box-ticking exercise or compilation of attendee lists. If good practice is followed, stakeholder engagement presents an opportunity to incorporate the broad perspectives of those living and working in the places where DIPs are deployed. These stakeholders can provide unique perspectives on how DIPs can be used to deliver positive local outcomes, and engaging with stakeholders at an early stage can help to directly improve the process of project delivery. Projects which successfully engage stakeholders, and which draw upon their local knowledge, can benefit from a richer understanding of the urban problems being tackled through the DIPs. Critically, ensuring that stakeholders are listened to during the development and implementation of DIPs can safeguard against unintended consequences of such projects, ensuring that they do not exacerbate inequalities, and therefore work towards creating more inclusive urban environments.

This national guidance document sets out broad principles for carrying out stakeholder engagement, and outlines suggested approaches. It sets out the key terms used in this guidance (section 2), and draws attention to the stages at which project leaders might choose to begin stakeholder engagement (section 3), before highlighting how to identify stakeholders (section 4). Guidance on how to choose an approach to stakeholder engagement (section 5) and detailed advice on things to consider while carrying out particular forms of stakeholder engagement (section 6) is also set out. Finally, the document presents key recommendations which should be followed by project leaders seeking to facilitate meaningful engagement (section 7).

2. Definition of key terms

This section outlines the key terms used in the document:

2.1 What is a stakeholder?

Stakeholders are people, groups, or institutions that have an interest in a project or an ability to influence project outcomes.[7] Stakeholders may directly or indirectly affect, and be affected, by a project. The range of potential stakeholders is diverse and may include but is not limited to: investors and shareholders; customers and potential customers; suppliers and business partners; employees; government, local authorities and regulators; the media; trade unions; NGOs and pressure groups; host communities; competitors/peers; academics, researchers and the scientific community; supranational institutions, and other special interest groups. The 'stake' that each of these different groups has in a project will vary. Stakeholders might include those who bear some risk as a result of investing human or financial resources, or something else of value, in a project (voluntary stakeholders) and those who are placed at risk due to the project's activities (involuntary stakeholders).

2.2 What is stakeholder engagement?

Stakeholder engagement refers to the range of activities and interactions with stakeholders throughout a project cycle. It starts early in project planning and spans the entire lifecycle of the project. The engagement process may involve, to varying degrees, the following elements:

- stakeholder analysis and planning;
- disclosure and dissemination of information;
- consultation and meaningful participation;
- dispute resolution and grievance redress;
- stakeholder involvement in monitoring and evaluation; and
- ongoing reporting to affected communities and other stakeholders.

[7] Freeman, E.R (1984). *Strategic Management: The Stakeholder Approach*. Boston: Pitman.

The intensity and scale of stakeholder engagement depends on the type of project, its complexity, budget and timescale, and its potential risks and impacts.

Stakeholder engagement is important for both value-based and instrumental reasons.[8] It can make projects more relevant and effective by giving project commissioners an opportunity to benefit from local insights which might not be obvious from a higher level. It also helps project commissioners to develop an understanding of their inherent biases and how their interests compare with different stakeholders' interests.

2.3 What are Digital Infrastructure/Smart City projects?

In this report, we define Digital Infrastructure projects (DIPs) as physical and cyber assets that are used in collecting, storing, processing, analysing and displaying information that are used to inform better decision-making within the built environment.

They include but are not limited to:

- technology-powered devices, e.g. drones, electric vehicle charging docks, mobile phones, smart meters, IoT sensors, smart watches, smart ticketing machines;
- location-based applications, e.g. global positioning systems (GPS), geographical information systems (GIS), digital maps;
- networked infrastructures, including Wi-Fi, long range wide area networks (LoRaWAN), bluetooth, radio frequencies; and
- information storage, management, processing, and display infrastructure, e.g. digital twins, clouds, datastores, city dashboards.

The Smart City framework refers to activities and projects that aim to address a specific city problem by the deployment of such digital technologies.

[8] United Nations Evaluation Group (2017). *Principles for Stakeholder Engagement*. New York. UNEG

3. Stages for employing stakeholder engagement

In an ideal scenario, engagement with stakeholders should begin as early as possible. However, in reality, stakeholder engagement has tended to begin at one of two main stages in the development of a DIP:

3.1 Concept design stage

This is the ideal stage at which stakeholder engagement should begin. By involving stakeholders early in the development of a DIP, project leaders have the opportunity to gain valuable input from interested parties (including the general public) while there is still plenty of room for their voices to be heard, and for plans to be adapted accordingly. Early and iterative stakeholder engagement helps to create mutual trust and rapport with interested parties that will contribute to sustainable development outcomes beyond the lifecycle of the DIP. Engaging with high-influence stakeholders early can inform the development of the DIP by providing broader contextual understanding of issues that the DIP aims to tackle or improve.

However, in practice, stakeholders who lack technical skills are rarely involved at this stage or may be given only limited opportunities to express their ideas,[9,10] and the benefits of meaningful early stakeholder engagement are thus lost.

3.2 End user stage

Most Digital Infrastructure or Smart City projects currently begin stakeholder engagement when the DIP has already been developed and is ready for implementation.[11] At this stage, stakeholder engagement is limited to encouraging stakeholders to learn about or experience the technologies, without giving them the opportunity to shape the planned initiative. If stakeholder engagement is left to this stage, it may not be possible to make significant changes based on stakeholders' ideas to the DIP – and the place where the project will be being implemented – for the better.

[9] Cardullo, P. & Kitchin, R. (2019) *Being a 'citizen' in the smart city: up and down scaffold of smart citizen participation in Dublin, Ireland*, GeoJournal, 84 (1), 1- 13

[10] Cowley, R., Joss, S., & Dayot, Y. (2018). *The smart city and its publics: insights from across six UK cities. Urban Research and Practice*, *11*(1), 53–77.

[11] Ehwi, R. (2019) *Engaging stakeholders in Digital Infrastructure projects*. CCHPR. Available at: https://www.cchpr.landecon.cam.ac.uk/Publications/Reports Accessed on: 24/06/2020.

4. Identifying stakeholders

Identifying all appropriate stakeholders is crucial for ensuring that all stakeholder concerns are considered, and makes stakeholder buy-in more likely.

Before beginning any engagement activity, it is essential to monitor the current context of the DIP and to identify the stakeholders that it will be crucial to engage with. The engagement process will be most effective if initial research is carried out to establish who the key stakeholders are and what, if any, engagement activity has already taken place.

The identification and analysis of stakeholders helps to assessing their interests in and potential influence over project outcomes. For the analysis of the identified stakeholders, it is important to establish each stakeholder's 'stake' (commonly understood as a material interest which can be affected by the activities of a project or which can affect a project's activities). [12] This can be done by exploring the risks that result from the (in)actions of a Smart City or Digital Infrastructure Project.

Stakeholders are classified as belonging to two main groups – primary stakeholders and secondary stakeholders.[13] Primary stakeholders include business owners, managers, employees, customers and suppliers directly involved with the project, while secondary stakeholders include those who indirectly affect and/or are affected by the project. These include governments, local communities, competitors, special interest groups, quasi-agencies, consumer advocates, environmentalists and the media. It is worth keeping in mind that based on the nature of the DIP, the composition of the stakeholders and their potential influence over the project may vary. Consideration of 'fringe stakeholders'[14] who are not affected by and cannot directly affect the project at the current stage is required. This is because the relative influence of stakeholders can change during the lifecycle of a project.

The process of stakeholder identification and analysis consists of several steps. However, project leaders can use discretion over how many of these steps to take depending on the timeframe and budgetary constraints. Here is a brief outline of the key steps involved in stakeholder identification and analysis:

[12] Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. *Academy of Management*, 22(4), 853–886.

[13] Hall, J., & Vredenburg, H. (2005). Managing stakeholder ambiguity. *MIT Sloan Management Review*, *47*(1).

[14] Hart, S. & Sharma, S (2004). Engaging stakeholders for competitive imagination. *Academy of Management Executive*, 18 (1), 7 – 18.

4.1 Drawing up a list of easily identifiable primary stakeholders

To identify the stakeholders for a DIP, it is essential to generate a preliminary list of stakeholders who are directly involved in the project. This usually comprises primary stakeholders who are easily identifiable. For this stage, a brainstorming session within the project team can be a useful tool to identify as many stakeholders as possible. This brainstorming can be aided by the Power-Interest Matrix, a graphical categorisation of stakeholders based on their relative power in and interest over a project.[15] Using four quadrants, stakeholders are grouped into:

- High-power/high-interest stakeholders, known as **key stakeholders**. These stakeholders must be engaged closely, and their consent sought;
- High-power/low-interest stakeholders, known as **context setters**. These should be kept satisfied and informed;
- Low-power/low-interest stakeholders are considered to be the **crowd**. These stakeholders should be kept informed; and
- Low-power/high interest stakeholders, known as **subjects**. These should be consulted and kept informed.

It should be noted that it is advisable to avoid categorising stakeholders as low-power/low-interest (or the crowd) within a DIP, as this can defeat the objective of broader stakeholder engagement, and lead to missed opportunities to learn from all stakeholders.

Figure 1 below provides an example of how a Power-Interest Matrix may look:

[15] Reed, M.S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., Prell, C., Quinn, C.H., & Stringer, L.C (2009). Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environment Management*, 90 (5), 1933 - 1949

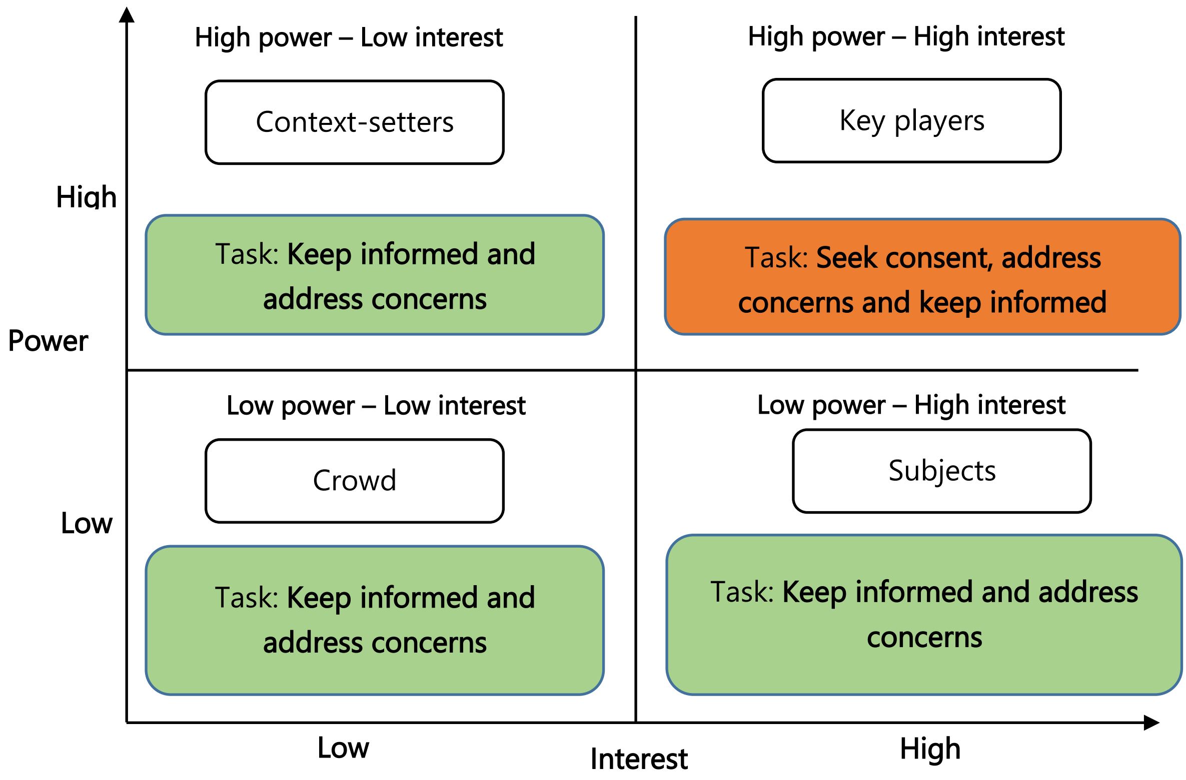

Figure 1 Example of stakeholder matrix adapted from Reed et al. (2009)

4.2 Contacting and seeking consent from high-power/high-interest stakeholders

It is important to first establish contact with the primary stakeholders to discuss the proposal for the DIP and to gather their input and feedback. Without their support, the project will not be able to proceed. These stakeholders can also be relied upon to gain more information about other potential stakeholders who might be influential but are not known to project commissioners. This may require the use of semi-structured interviews, or simply asking the primary stakeholders to list other individuals or organisations who may have (in)direct interest in the project.

4.3 Validating the list of stakeholders and their level of power-interest

Where there is sufficient time and budget, it may be useful to validate the relative power and influence of the identified stakeholders by asking them to self-report their degree of power and influence over a proposed DIP in their local area and likewise to rate other stakeholders.[16]

4.4 Mapping stakeholder relationships

It is possible to find converging or diverging interests or stakes among stakeholders. These different interests can easily lead to the formation of positive alliances or opposition groups in stakeholder engagement.[17] Hence, it is useful to study the list of stakeholders identified and map out the relationships that exist or could develop between them. Having such an insight can help prevent the engagement process being dominated by a narrow group of interests. Social Network Analysis (SNA) - an exercise involving the use of a mathematical algorithm to map relationships and information flows between people and groups within an organisation[18] - is often used to make sense of the current and potential relationships between stakeholders, and elaborate analysis of relationships can be done using the software package NetMiner.[19]

The SNA can be simply illustrated by using arrows to map existing and potential relations that can develop between stakeholders. Figure 2 below provides a visualisation of existing and potential relationship between the different stakeholders of a city Digital Infrastructure Project. The double-headed arrows indicate known reciprocal relationship between stakeholders, for example, as in the case of residents and local authorities, residents pay council taxes to the local authority, and the latter in turn provide the former with local services such as refuse collection. The single-headed arrow relates to possible relationships that could develop between stakeholders, for example where technology companies ask Universities to conduct research in order to support product design and development. Stakeholders with multiple mapping are deemed to be central stakeholders.[20] Thus, in **Error! Reference source not found.**, local residents are the most networked stakeholder group with reciprocal and potential relationship with all stakeholders.

---

[16] Zhuang, T., Qian, Q.K, Visscher, H.J (2019) The role of stakeholders and their participation networks in decision-making of urban renewal in China: The case of Chongqing, *Cities*, 47 – 58.
[17] Ielite, I., Olevsky, G., & Safiulins, T. (2016). Identification and prioritization of stakeholders in the planning process of sustainable development of the smart city. 2015 *IEEE 7th International Conference on Intelligent Computing and Information Systems*, ICICIS 2015, 251– 257. https://doi.org/10.1109/IntelCIS.2015.7397229
[18] Baugh A. (2015) stakeholder engagement: the game changer for program management. Florida, *CRC Press (Taylor & Francis Group).*
[19] See http://www.netminer.com/product/package03.do (Accessed 1/07/2020)
[20] Yang, J., Shen, G.Q., Ho, M., Drew, D.S, & Xu, X. (2011). Stakeholder management in construction: An empirical study to address research gaps in previous studies. *International Journal of Project Management*, 29 (7), 900 - 910

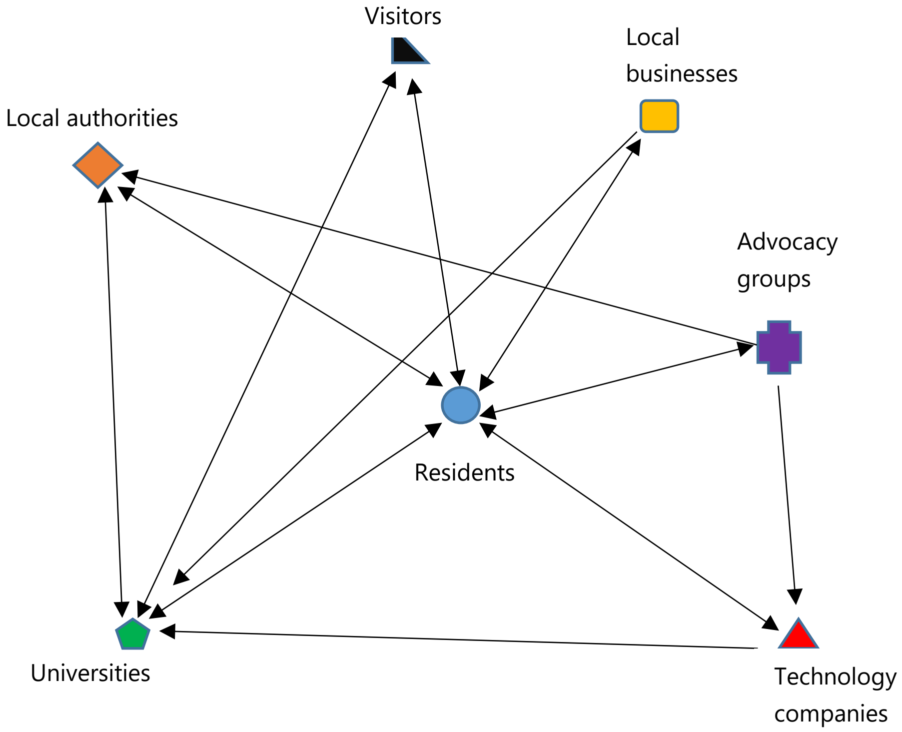

Figure 2 Sample Social Network Analysis for a city DIP

Having a clear picture of who the stakeholders in a project are and what their relationships are gives the project developer strategic information that will help them to consider, involve, mitigate and include all relevant interests and will ensure no concerns are overlooked. Having this picture will also help to define what level of relationship and engagement the project wishes to achieve and, subsequently, what communication tools would best serve this goal.

5. Conducting stakeholder engagement

Successful stakeholder engagement is underpinned by a genuine willingness to invite suggestions and criticisms from stakeholders.

After stakeholders have been identified and their power-interest levels have been established, it is necessary to develop a clear stakeholder engagement plan for the DIP. This stakeholder engagement plan will direct stakeholders and project developers as to *when*, *how* and *with whom* engagement activities should be undertaken throughout the project lifecycle. The plan must draft steps for engagement in an open manner so that it allows stakeholders to freely express their needs and suggestions, provide feedback, and influence the development of the project outcomes. It is essential to avoid entering the stakeholder engagement process with a fixed set of outcomes which could prevent compromises that are sensitive to stakeholders' views.

Successful stakeholder engagement ensures that there is room for disagreement and conflicting ideas, and seeks to take stakeholders' perspectives into account when making interim and final decisions.

5.1 Choosing an approach – the Strategic Engagement Plan

Stakeholder engagement can take many forms - deciding the aims of the stakeholder engagement will determine the most appropriate type of engagement to choose.

Developing a strategic engagement plan requires a decision as to the purpose of stakeholder engagement for the DIP and the definition of what success would look like for the stakeholder engagement process.[21]

The stakeholder engagement process is likely to vary when the different features of the DIP and the purpose of the engagement are considered. The following are some features of DIPs that need to be considered before deciding on the form of engagement:

[21] Department of Environment, Land, Water and Planning (2015). Effective engagement: Building relationships with community and other stakeholders. *The State of Victoria Department of Environment, Land, Water and Planning,* The Engagement Planning Workbook. Available at https://sustainingcommunity.files.wordpress.com/2018/05/effective-engagement-book-2.pdf (Accessed 15/11/2019).

- Type of Digital Infrastructure project proposed, e.g. Digital Twins, electric vehicle (EV) charging docks, etc.;
- Source and availability of funding for the project, e.g. central/local government or other public sector, private sector or joint venture arrangements involving public and private sectors;
- Type of data to be used, e.g. personal data, city/urban data, open data etc.;
- Ownership of the project when completed, namely, publicly-owned, privately-owned, and joint public-private ownership;
- Spatial scale of the project, i.e., local, regional or national;
- Stage of project development, namely: problem-framing, ideation, proof of concept, product design, demonstration, deployment, post-deployment and maintenance;
- Level of project technicality;
- Immediate and future beneficiaries and risk-bearers, i.e. individuals, households, communities, businesses, universities, local authorities, civil societies, national governments, etc.; and
- Project timeline.

The International Association of Public Participation (IAP2)[22] categorises public participation and stakeholder engagement by placing them on a spectrum based on the extensiveness of engagement required (from least to most):

- To inform stakeholders and update them on the proposals, in order to help them understand how the proposals will affect them;
- To consult stakeholders on the proposals, inviting feedback and comments, which then shape the proposals themselves; and
- To involve stakeholders in decision making, so that developers work with stakeholders to ensure their needs are met, with stakeholders providing feedback and suggestions to produce plans which take into account their interests and ideas;

[22] EPA (n.d) Public Participation Guide: Selecting the right level of public participation. Available at https://www.epa.gov/international-cooperation/public-participation-guide-selecting-right-level-public-participation. Accessed on 24/06/2020

- To collaborate with stakeholders as partners in decision-making, inviting them to work with developers to find solutions that work, and directly seeking advice from stakeholders which shape final plans;
- To empower stakeholders to make key decisions regarding the project, which the developers then facilitate and deliver.

Error! Reference source not found. illustrates how the forms of stakeholder engagement are likely to vary when considerations are given to the following project features: (a) the stage of project development (as shown by pathways 1-7), (b) the level of project technicality, and (c) the purpose of the stakeholder engagement. Indeed, where stakeholders are engaged at an early stage (pathway 1), discussions and activities with stakeholders are generally non-technical and therefore accessible to a wide range of stakeholders who may not have specialist skills in the field of Digital Infrastructure Projects. Stakeholder engagement at this stage enables stakeholders to actively shape the project through collaboration and consultation, and can therefore be empowering for participants. By contrast, in the later stages of the project, when the Digital Infrastructure is being deployed (see pathways 6 and 7), the level of technicality is much higher, and stakeholder engagement tends to be limited to informing stakeholders about the project.

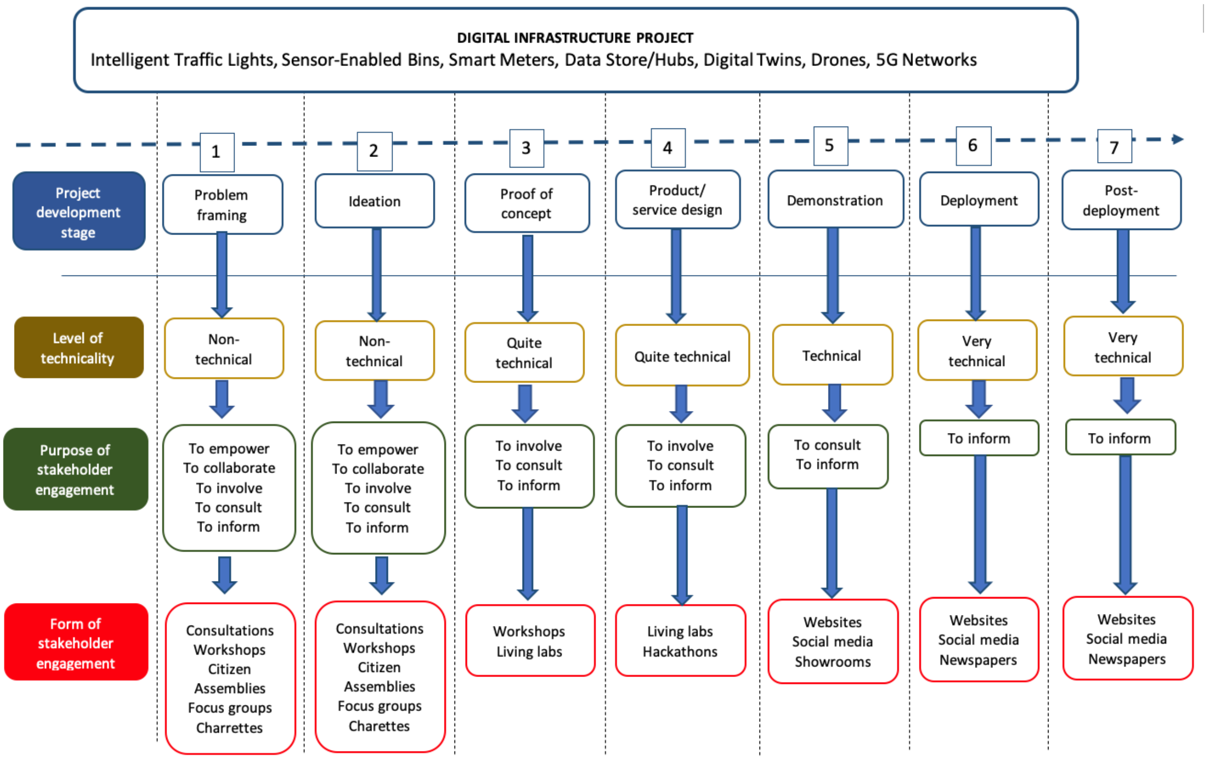

Figure 3 Pathway connections

Error! Reference source not found. also illustrates the different purposes of stakeholder engagement which may be pursued by developers, policy-makers and project leaders at the different stages of project development.

Project leaders should decide upon a strategic engagement plan based on the purpose of their stakeholder engagement process and on the level of stakeholder input desired, as well as on project timescales and budgets, allowing more time and resources for more extensive engagement. It is advisable to choose more extensive engagement wherever possible, given that stakeholder engagement can provide opportunities to improve the project, and to ensure the project genuinely benefits all stakeholders likely to be affected by the project.

Project leaders should have a clear idea of what they want to achieve from the stakeholder engagement but should allow some flexibility for changes to the project which may emerge from the engagement process.[23] Leaders should also work with high-power/high interest stakeholders in defining the key performance indicators. This will ensure that project aspirations are aligned with the interest of the high-power/high interest stakeholders without whose support the project cannot proceed.[24]

5.2 Tools for engagement – the Operational Plan

The selected methods of communication should be underpinned by both the form of stakeholder engagement outlined in the chosen engagement plan, and the characteristics of the project and stakeholder groups.

The Operational Plan focuses on the forms of engagement and suite of activities that are suitable for the particular project purpose, timeline, logistics and other available resources. It is important to keep in mind that not all the identified and mapped stakeholders will be able to attend stakeholder engagement activities, and as part of the Operational Plan, attention should be focused on those stakeholders who have confirmed that they would participate in the engagement process. For these stakeholders, it is important to gather as much information about them as possible. This information includes:

- Who these stakeholders are (e.g. businesses, advocacy groups, residents, etc.);
- Where they are located (e.g. same or different cities/towns, near or far, etc.) ;

[23] Gould, R. W. (2012). Open innovation and stakeholder engagement. *Journal of Technology Management and Innovation*, *7*(3), 1–11. https://doi.org/10.4067/s0718-27242012000300001

[24] Baugh, A. (2015) Stakeholder engagement: the game changer for programme management. Boca Raton, Taylor & Francis Group, LLC

- What role they occupy in their communities or organisations (e.g. senior or middle-level executives, junior officers, organisational members, etc.);
- Which interest they represent (e.g. equality, representation, fairness, profiteering, public welfare, etc.);
- Who they follow on social media as influencers (e.g. their work colleagues, social circles, club members, etc);
- Their main mode of communication (e.g. print or electronic media);
- How frequently they communicate on social media;
- What they are likely to accept as their minimum and maximum compromise (e.g. keeping them informed about the project at each stage or involving them in decision-making and project implementation).

For individual stakeholders, gathering demographic information about stakeholders including gender, age, ethnic origin, educational attainment, and disability will help ensure that the forms of engagement adopted, and logistics used, reflect the diversity in the stakeholder groups. This information will provide a better understanding of stakeholders and how to meet their needs.

The following forms of engagement are recommended for the six purposes outlined by the IAP2. It should be noted that whilst some tools or forms of stakeholder engagement are, by design, suitable for just one specific purpose, others can be configured to achieve multiple purposes. For example, websites have traditionally served as sources of information (textual, video etc). However, recently, they are serving multiple purposes for online app-building, design crowdsourcing, community mapping of local problems, and so on. Similarly, for example, information on printed leaflets can now include QR codes which redirect readers to online sources of information, including video or live-streams.

#	Tools and forms of engagement	Purpose of stakeholder engagement				
		Inform	Consult	Involve	Collaborate	Empower
1	Emails	✓	✓			
2	Face-to-face meetings	✓	✓	✓		
3	Key stakeholder interviews	✓	✓			
4	Focus groups	✓	✓			
5	Video interactive display	✓	✓	✓		
6	Printed information (e.g. posters, flyers)	✓	✓			
7	Public involvement volunteers	✓	✓	✓	✓	
8	Hackathons	✓	✓	✓	✓	✓
9	Printed and online surveys	✓	✓	✓		
10	Websites	✓	✓	✓	✓	
11	Workshops	✓	✓	✓	✓	✓
12	Public consultations	✓	✓	✓		
13	Debriefing sessions	✓	✓	✓		
14	Media releases	✓				
15	Charettes[25]	✓	✓	✓	✓	✓
16	Social media posts (eg. Twitter, Facebook, YouTube)	✓	✓	✓		
17	Live social media streaming	✓	✓	✓		
18	Podcasts (with a comment tab)	✓	✓			
19	Press briefings	✓				
20	Exhibitions	✓				
21	Roadshows	✓	✓			

Table 1 Tools and forms of engagement versus the purpose of engagement
Source: Adapted from Department of Land, Water and Planning, Victoria, Australia (2015)

[25] A charrette is a public meeting or workshop devoted to a concerted effort to solve a problem or plan the design of something (Oxford Dictionary). It is usually an intensely focused, multiday session that uses a collaborative approach to create realistic and achievable designs that work (See https://www.nrel.gov/docs/fy09osti/44051.pdf)
.

6. Getting the most from stakeholder engagement

Stakeholder engagement works best when all stakeholders are given a fair chance to make their views heard, and when project leaders actively take on board stakeholders' concerns.

This section provides tips on how an Operational Plan can be effectively implemented. As a minimum standard, effective stakeholder engagement requires that all stakeholders are kept informed about a project, and it is important to ensure that stakeholders are furnished with as much information about the project as is possible. Such information can include, but is not limited to:

- What is the project about and how is it funded?
- When and where is the project taking place?
- Which individuals or groups are leading the project and what are their credentials?
- How long will the project last and how will it be decommissioned?
- How is the project going to affect stakeholders (e.g. public data collection on mobility patterns, monitoring of recycling practices or consumption of energy, etc.)?
- What are the avenues for stakeholders to raise concerns and offer suggestions?
- How will stakeholders find out how their concerns and suggestions have been addressed and considered in the project implementation?
- What rights will stakeholders have over data or other outputs from the project?

For both small and large group face-to-face stakeholder engagement sessions, the following suggestions, adapted from Baugh's (2015) top five rules for running effective meetings, are important considerations for successful stakeholder engagement sessions:

- Rule 1: Always pre-send a meeting agenda with times and names of people assigned to different tasks - note that not all stakeholder engagements begin with a specific agenda or objectives, and that it is through the engagement process itself that the agenda is defined or an objective that reflects broader consensus is set.
- Rule 2: Stick to the agenda if there is one – but this does not mean you should be inflexible. Sticking to the agenda can be a way of ensuring each planned activity

receives attention: 'The fact that an item is not on the agenda does not mean it is not worth discussing' (Baugh, 2015: p.111)

- Rule 3: Establish and share reasonable and considerate ground rules. This can include highlighting; the protocols to observe when a facilitator or a stakeholder has the floor, expectations around breaks, etc.
- Rule 4: Provide appropriate equipment for planned activities. Equipment such as flip charts, projectors, podiums, coloured pens, writing pads, computers etc. should be carefully chosen, keeping in mind the activities to be undertaken and the expected outputs.
- Rule 5: Send out meeting notes with key decisions and other outputs from the engagement activity to stakeholders after the session. Stakeholder perspectives can change over time, and hence it is important to send any output from the engagement process to stakeholders immediately after the session. This can include notes or reports of proceedings, video recordings and key decisions made.

6.1 Further engagement during project implementation

At each project stage, it is useful to inform stakeholders on how their inputs so far have shaped the project's implementation. A bulleted list of "What stakeholders said' matched against "'What has been done" will suffice for this exercise. If something was agreed or promised during the stakeholder engagement sessions but could not be delivered, be sure to provide explanations and suggest alternatives for stakeholder approval. For such ongoing engagement, the following forms of engagement could be helpful:

- Sending emails with newsletters to regularly keep stakeholders up to date with what has been achieved so far, including highlighting the difficulties that have been encountered, if any, and the strategies have been adopted in order to overcome those shortcomings.
- Posting project updates such as pictures, short videos and other graphical outputs on social media platforms where most stakeholders are active. Analytics can be used to monitor and analyse metrics such as the number of times a post has been liked or disliked, shared or retweeted, been viewed or downloaded, and the number of comments that each post has generated.
- Regular podcasts: These can be used by project leaders to provide more information about a specific aspect of the project that requires technical or extensive explanation. This can also be used as an avenue to respond to

comments and suggestions that have been gathered from other social media platforms.

- Local newspapers: Local newspapers can be used to reach stakeholders who do not have access to the internet or are digitally excluded.
- Debriefing: Invite all project stakeholders to a debriefing, using the opportunity to update stakeholders on what has been achieved, what is yet to come, and what changes are anticipated. The debriefing should also be used to gather stakeholder feedback on what has been achieved so far.

6.2 Post project execution

After the project has been executed, it may be useful to publish an evaluation report on the range of stakeholder engagement activities that have been conducted for the project and the impact the activities have had on both stakeholders and the project itself. Relevant information that could be captured in this evaluation report include:

- A stakeholder engagement timeline: it may be helpful to use infographics to show the dates on which different stakeholder engagement activities took place. The timeline of the Sidewalk Toronto Public Engagement Process [26] can serve as a useful guide for this.
- What commitments were made: it may be useful to provide stakeholders with relevant statistics on how much effort has gone into the stakeholder engagement exercise. This can include but is not limited to: how much money was spent on stakeholder engagement, the variety of stakeholder engagements conducted, how long each stakeholder engagement activity lasted and how many people were recruited to assist with the engagement process.
- How many stakeholders were engaged: it is important to provide stakeholders with statistics on the following information: (1) the total number of stakeholders that were engaged on the project and which interest groups they represented; (2) a breakdown of how many stakeholders participated in each engagement activity; (3) how many project ideas and suggestions were crowdsourced from the stakeholder engagement; (4) how many times posts and videos about the project

[26] Sidewalk Toronto (n.d) Public Engagement. Available at https://storage.googleapis.com/sidewalk-toronto-ca/wp-content/uploads/2019/06/21195824/The-Public-Engagement-Process-for-Sidewalk-Toronto.pdf (Accessed on 24/06/2020)

were viewed, shared or retweeted, and liked or disliked, on different social media platforms, and how many comments were received.

- Public opinion: it may be helpful to map out some of the opinions expressed by stakeholders about the project and the engagement process, both positive and negative. It may be useful to geotag such comments against different stakeholder groups. Commonplace's case study of West Norwood, where high street opportunities for regeneration were mapped, may serve as good reference for geotagging stakeholder sentiments.[27]

6.3 Maintaining transparency and provide institutional memory

People can easily forget important events, the contexts for such events and the commitments they made with regards to them. To guard against concerns and criticisms that may later surface, project commissioners should ensure that all the outputs from the project are kept in repositories that are accessible to the general public. This institutional memory will provide a context for later justification as to why things were done in the way that they were.

[27] Commonplace (n.d) Regeneris and London Borough of Lambeth: Case Study of West Norwood. Available at https://s3-eu-west-1.amazonaws.com/commonplace-brand-assets/Case+study+-+West+Norwood.pdf (Accessed 23/06/2020)

7. Key recommendations

The following principles for conducting stakeholder engagement should be followed throughout the process in order to make the stakeholder engagement as beneficial as possible for all involved parties:

7.1 Prior to the stakeholder engagement process

7.1.1. Ensure full stakeholder representation

Just as stakeholders differ in terms of their power and influence, they also experience the built environment in different ways. Hence, project commissioners should ensure that the stakeholder identification, mapping and analysis is as representative as possible.

7.1.2. Define 'successful engagement'

As part of defining the purpose of the stakeholder engagement, project commissioners, partners and leaders should ensure that there is clarity as to what successful stakeholder engagement means and the metrics that will be used in measuring this success. It is helpful for project leaders to have different scenarios of success reflecting possible outcomes from both their perspective and those of stakeholders.

7.1.3. Adopt a holistic approach to the choice of the form of stakeholder engagement

Project commissioners should ensure that the selection of the form of stakeholder engagement is underpinned by holistic considerations of several factors besides the purpose of the project, such as the spatial scale of the project, type of data to be collected, project timeline, source of funding, level of technicality, beneficiaries of the project, etc.

7.1.4. Ensure that the logistics chosen for engagement activities are fit for purpose

Project commissioners should ensure that the selection of venue (including virtual platforms), presentation, communication and illustration materials are sensitive to the circumstances of stakeholders.

7.1.5. Anticipate potential difficulties and plan to overcome them

Stakeholder engagement is an ongoing process, and things can be expected to occasionally go wrong. Project leaders and engagement facilitators should plan for potential problem issues and be flexible, allowing for necessary changes to scheduled engagement activities. This is particularly the case with virtual stakeholder engagement. Here, engagement facilitators can compile a list of things that could go wrong during an online engagement exercise and share these, along with suggested solutions, with stakeholders.

7.2 During the stakeholder engagement exercise

7.2.1. Avoid privileging some stakeholders over others

Stakeholders should be treated equally, ensuring that the number of times stakeholders are called upon to make contributions to stakeholder engagement meetings, and the length of time allowed for each contribution, are fairly distributed.

7.2.2. Maintain a neutral position as far as possible

This can be achieved by avoiding concurring with, or selectively elaborating on, comments that only seem to support the implementation of the project.

7.2.3. Demonstrate genuine interest in what all stakeholders have to offer

This can be achieved through effective coordination between a scribe or note-taker and the facilitator, by drawing the former's attention to all the issues raised by stakeholders so that project leaders have notes which accurately reflect stakeholders' concerns in the decision-making process. Further demonstration of this genuine interest can include politely redirecting stakeholders to the agenda when they veer off the agenda but suggesting to them other avenues through which they can raise their concerns.

7.2.4. Ensure that stakeholder engagement is meaningful

Project leaders should recognise that stakeholder engagement is not simply a box-ticking exercise, and that it can in fact hold real benefits for the project itself, if efforts are made to include stakeholders. Taking the opportunity to learn from stakeholders, and to allow stakeholders to influence the project, can result in valuable improvements to the DIP, and can help to mitigate against unintended outcomes.

7.2.5. Ensure stakeholders are comfortable during stakeholder engagement activities

Stakeholders can easily be inundated with information, leading to overload and scheduling regular comfort and refreshment breaks during engagement activities for stakeholders may be useful. Supplying refreshments during breaks may also help to sustain stakeholders' interest.

7.3 After the stakeholder engagement exercise

7.3.1. Evaluate stakeholder experiences of all forms of engagement conducted

Project commissioners should make it a priority to conduct an evaluation of all stakeholder engagement activities. Such an evaluation could include quantitative and qualitative evidence, e.g. Likert Scale perception score surveys and short video interviews with selected stakeholders.

7.3.2. Publish reports on commitments made towards the stakeholder engagement

Project commissioners should ensure that they publish a document on all the different forms of stakeholder engagement activities conducted, providing relevant statistics on engagement time, funding, number of participants for each activity, feedback collected, etc.

7.3.3. Share lessons learned

Project commissioners should ensure that both favourable and unfavourable lessons from the stakeholder engagement exercise are published to promote learning.

7.4 Before executing the project

7.4.4. Debrief stakeholders as to how their feedback has shaped the project prior to deployment

Before deploying the DIP, ensure that a (virtual) face-to-face meeting takes place with all stakeholders, particularly key stakeholders, to explain how their feedback has been considered in the development of the DIP.

7.5 During project execution and thereafter

7.5.1. Update stakeholders at each project milestone

Project leaders should ensure that the stakeholder engagement process continues during the project execution stage. They should ensure stakeholders are kept up-to-date at each milestone of the project, and they should be offered avenues for input regarding how the project execution addresses their concerns and incorporates their suggestions.

7.5.2. Archive project outputs

Project commissioners should ensure that all relevant materials from the project are archived for future reference in relevant repositories which can be accessed by stakeholders.

8. Conclusion

This document has set out the key considerations which policy-makers, project commissioners and project leaders should take into account when carrying out stakeholder engagement for a Digital Infrastructure Project. It has highlighted the benefits of beginning stakeholder engagement at an early stage where possible, and of conducting extensive stakeholder engagement with a view to listening to stakeholders' perspectives to build a Digital Infrastructure solution which delivers effective, positive outcomes.

The key steps required to conduct effective stakeholder engagement, from identifying stakeholders to deciding on suitable methods for engagement, have been outlined, and advice on how to choose an appropriate plan for stakeholder engagement has been provided. It is hoped that the leaders of any Digital Infrastructure project in the UK will find this guidance useful for informing their own approach, regardless of whether their project is on a city-wide scale, or at neighbourhood level; whether its duration is a few weeks or serval years; and irrespective of whether it has a small budget or is supported by substantial funding. Indeed, this document sets out the options available to suit a range of project needs.

Whatever the circumstances of the particular Digital Infrastructure Project planned, there are some key questions which anyone planning or thinking about implementing stakeholder engagement should consider when deciding which type of stakeholder engagement they want to implement. These include:

- Who are the key stakeholders for your project, and which stakeholders are critical to the project's success?
- How might these stakeholders be best included in the project?
- What time and budgetary resources do you have available for stakeholder engagement?
- What level of stakeholder engagement would you like to achieve?

By asking these simple questions, and by engaging with the key recommendations set out in this document, project leaders can hope to deliver a Digital Infrastructure project which places due emphasis on the need to consider stakeholders' views, and to recognise the value which listening to stakeholders can bring to a project.

UNIVERSITY OF CAMBRIDGE

Cambridge Centre for Housing & Planning Research

This research forms part of Centre for Digital Built Britain's work within the Construction Innovation Hub. The funding was provided through the Government's modern industrial strategy by Innovate UK, part of UK Research and Innovation.

INDUSTRIAL STRATEGY

UK Research and Innovation