

Deploying Digital Trust for Places and Routines (DTPR) in DC

Testing a Methodology for Increasing Legibility
and Enabling Public Feedback for Technology in
the Public Realm



Jason Farra and Jacqueline Lu
Helpful Places, Inc

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16. Abstract		

The Digital Trust for Places and Routines (DTPR) open-source standard was tested as part of a Pedestrian Safety Technology Pilot Sandbox project rolled out by DDOT and their consultant. The DTPR standard was an effective tool for gathering and organizing privacy and data collection related information about each technology that was deployed as part of the pilot, helping ensure that the information made available to the public was standardized from vendor to vendor and presented to the public in a consistent, visual way on both signage and online. The use of the DTPR system has allowed for DC residents to become aware of the pilot and to provide feedback on the project. Resident feedback was gathered through a combination of in-person engagement methods as well as through the online DTPR app. Resident feedback was generally positive about the Sandbox technologies whether obtained through in-person or online methods, and residents generally understood through the deployed signage that DDOT was trying something new. The deployed DTPR system was effective in answering most resident questions and the majority of residents found the information useful, but there were mixed responses on how easy the technical information was to understand.

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Project Panel Members

Stephanie Dock, Research Program Administrator and Autonomous Vehicles Program Manager, District Department of Transportation

Kelli Raboy, Intelligent Transportation Systems (ITS) Program Manager, District Department of Transportation

Patrick Morrison, Intern, District Department of Transportation

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1 Executive Summary

1.1 Achievements

Starting summer 2022, the District Department of Transportation (DDOT) deployed Digital Trust for Places and Routines (DTPR) to inform and engage with residents on the technologies being piloted as part of its Pedestrian & Cyclist Intersection Safety Sandbox, a research project testing emerging technology solutions to improve bike and pedestrian safety at various intersections around the city. DTPR is an open-source communication standard designed to increase transparency, legibility and accountability for digital technology in public places, that standardizes technical and privacy information from vendors and presents it to the public in a consistent, visual way using both physical signage and online. The use of the DTPR system has allowed for DC residents to become aware of the pilot and to provide feedback on the project.

This deployment of DTPR involved:

- Collecting the technical and data governance details needed for the DTPR standard about each of the pilot technologies - such as the data collected and associated data processing, handling and retention periods - obtained from the consultant and each technology vendor.
- Deploying a consistent method for public communication and gathering resident feedback on the pilot technologies through the deployment of DTPR signage and the associated Guide App prototype.
- Engaging with residents using qualitative user research methods, to gather feedback on both the DTPR communication system and the deployed Sandbox technologies inform future strategy and decision-making
- Participating in a series of workshops with other municipalities also deploying DTPR as part of technology projects, for shared cohort discussion and peer learning
- Released public communications and contributed to media pieces raising awareness of the technologies being piloted and their reasons for deploying DTPR in their community

1.2 Key Findings

- DTPR has utility as a methodology and framework for DDOT, providing a standardized data structure for organizing information about technologies from vendors and consultants that can then be used in consistent presentation formats designed to be shared with the public (for example, signage, web pages and handouts).
- DTPR supported public communication and engagement processes conducted by DDOT staff. Through these engagements, the majority of respondents felt positively about the Sandbox technologies, and residents generally understood through the DTPR system deployed that DDOT

was trying something new to improve pedestrian and cyclist safety in the city. Most respondents found the technical information about the technologies provided by the DTPR system helpful.

2 Introduction

2.1 About Digital Trust for Places and Routines (DTPR)

[Digital Trust for Places and Routines](#) (DTPR) is an open-source communication standard to increase transparency, legibility and accountability for digital technology in public places.

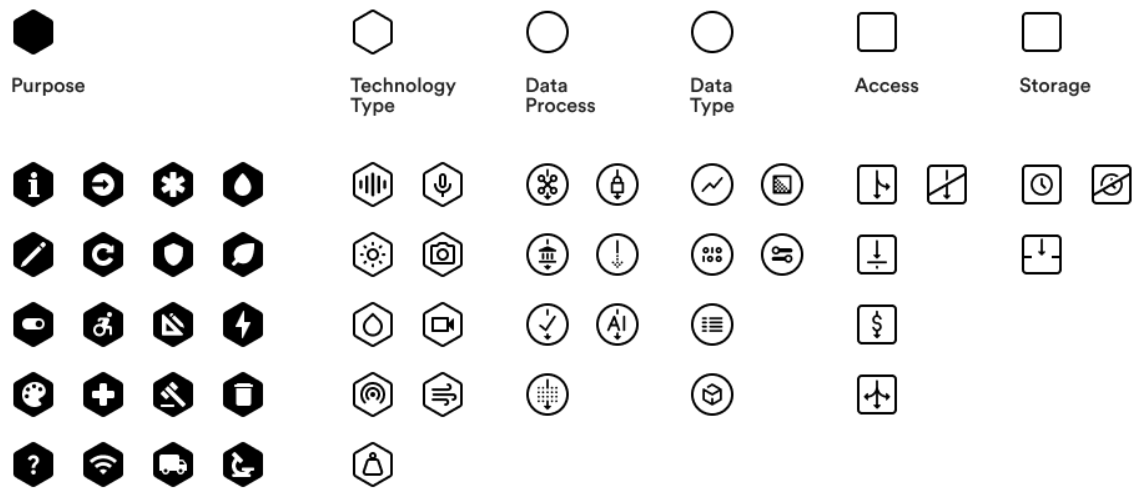
Communities use DTPR to provide visibility and legibility for what are often invisible technologies, enabling a communication and feedback pathway between someone moving through a public space that has data-collecting technology, and the technology's manager. It consists of a standardized data dictionary and structure that describe digital technology and data governance practices, and an associated set of icons and usage patterns designed to quickly and clearly communicate those concepts.

It is also a framework that helps organizations integrate and streamline internal processes for place-based operations, tech implementation, and community engagement – helping build organizational capacity to introduce and deploy technologies in public spaces in a transparent way.

2.2 How DTPR Works

The core component of the DTPR open-source communication standard is the [taxonomy](#), a structured way to organize and standardize the definition of key concepts and terms related to digital technology and data governance. These concepts include the type of technology, its purpose, the accountable entity, and data collected. The categories of information were identified as essential by the privacy and responsible technology experts who were part of the DTPR development process.

Figure 1. Categories and icons of the DTPR taxonomy



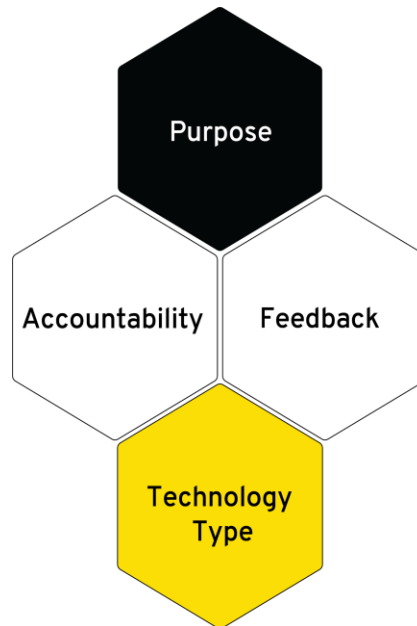
Structuring information about these smart city technologies in a consistent, vendor-agnostic way is the first step to making the information available to a variety of communication tools, such as signage or a website.

When using the DTPR taxonomy on physical signage, only a few key concepts are conveyed, using hexagons arranged together (Fig. 2):

- **Purpose** of the technology
- Logo of the **entity accountable** for the use of the technology
- **Technology type**, typically used only if the data collected can be considered personal information
- A QR code facilitating **feedback** by leading to a digital channel – the Guide App prototype – where a person can get more information about the technology, ask questions, and provide feedback

These core concepts reflect what people wanted to know about tech in the public realm, which were identified through usability testing and research conducted as part of the design and development of DTPR.

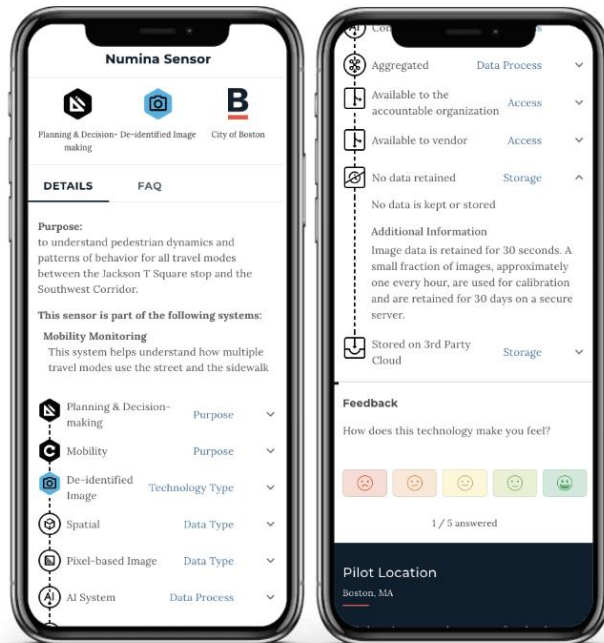
Figure 2. Design guideline for using the DTPR taxonomy on a sign



The Guide App prototype (Fig. 3) is a web page featuring more detailed information about the technology, with all the relevant items from the taxonomy organized in a consistent, linear system called the “data chain”. The data chain begins with the icons that convey purpose, accountability and technology type that are shown on the signs deployed in the physical work, and continues to cover concepts related to the data itself, how it is processed, stored and who has access to it.

Below the data chain is a short feedback survey with a set of emoji responses. After completing the survey, users can fill out a longer feedback survey and/or send additional questions/comments over email.

Figure 3. Screenshots of the Guide App



2.3 2022 DTPR City Cohort

The District Department of Transportation (DDOT) was part of the 2022 DTPR City Cohort, the inaugural cohort of cities deploying DTPR. The cohort consisted of four communities: the Town of Innisfil in Canada, the Angers Loire Metropolitan Region in France, and the City of Boston and District of Columbia in the US.

Each cohort participant used DTPR to support their rollout and piloting of a new technology. The goal was to help residents understand and interact with smart technologies installed in their municipality. The deployments involved using the DTPR standard to structure technical information from each vendor about the digital technology in a legible way, installing signage where the pilot technologies are located, and conducting resident engagement.

Along the way, municipal staff also participated in workshops, trainings and learning calls over a six-month period to facilitate shared learning, surface challenges, and begin to form a community of practice as early adopters of the DTPR standard.

2.4 Deployment Use Case

The District Department of Transportation (DDOT) deployed DTPR to support its Pedestrian and Cyclist Intersection Safety Sandbox, a research project testing emerging technology solutions to improve bike and pedestrian safety at various intersections around the city.

HNTB, DDOT's consultant for the project, selected technologies from three vendors: Currux Vision, TrafficXRoads from DataFromSky, and Passage. The Currux and TrafficXRoads devices analyze footage from DDOT's existing CCTV cameras at three specific intersections, while Passage's technology records its own video to monitor speeding on two streets.

2.5 Deployment Goals

The goals of the DDOT's involvement in the 2022 DTPR City Cohort were to:

- Test the DTPR standard's utility as a tool that supports DDOT's technology pilot projects, by supporting internal information needs related to privacy and asset management, as well as providing a structure for obtaining information from vendors on how their technology works.
- Provide a standardized way for DDOT to inform and explain to residents what the various technologies that are being tested are, how they work, and what data they collect.
- Provide a mechanism for tech-specific input from pedestrians on the use cases being tested.
- Collect better data around how the technology is being perceived in the community, how residents are engaging with these enhanced safety measures, and inform how they are used in the future.

3 Achievements and Results

DDOT began working with Helpful Places to plan the DTPR deployment in March 2022, prior to the selection of the pilot technologies and their locations. The process consisted of planning internal and public communications, as well as developing the signage to be deployed alongside the technologies.

The DDOT team found the DTPR standard to be useful for supporting internal coordination and operational processes. After receiving information through the DTPR system, the majority of respondents felt positively about the Sandbox technologies.

3.1 Using the DTPR Taxonomy to Describe the Technologies

The first step in deploying DTPR involves using the taxonomy to gather information from each vendor about their technology, such as what data is being collected and how that data is used. Cohort participants found that this enables not only transparency with residents, but also for the deploying

organization to have information about public technologies in a standardized format to support internal coordination and operational needs.

Helpful Places worked with HNTB to gather and organize information about the three technologies and their use in DC into the format that is required by the DTPR taxonomy (Fig. 4).

Figure 4. Data chain for one of the Sandbox technologies



DDOT staff said that the process of using the taxonomy with vendors to describe the technology provided a useful template for asking vendors questions about how their technology works, and that it could be utilized as a checklist with other vendors to ensure that key information about privacy and data management were available for all systems used by DDOT.

3.2 Designing and Deploying Signage

Signage following the DTPR standard (Fig. 5) was designed for each technology by Helpful Places, with input from DDOT. For analytics purposes, there was a unique QR code for each technology's location.

As the Passage sensors use license plate recognition, a yellow "Identifiable Video" hexagon was used on the Passage signs. On the other hand, while Currux and TrafficXRoads use CCTV footage, the resolution is too low for faces and license plates to be identifiable. To communicate this, a "Non-Identifiable Video" taxonomy item was added to the DTPR standard and used on those signs with a white hexagon, indicating that no identifiable information was being collected.

This addition to the taxonomy is an example of DDOT's use of the DTPR standard generating feedback on how it could be updated and improved. The first draft of the signage guidelines for DTPR specified that only technologies that collect identifiable data, or de-identify data, need a hexagon representing the technology on the physical sign. However, DDOT staff felt it was important to communicate on the signage that the CCTV technology was not capable of collecting identifying information. This desire to use an icon to represent the technology, even if personal data was not collected, was expressed by other cohort participants and also reflected in the design of the signage deployed by the other municipalities.

Figure 5. One of the signs installed on 1st St NE



The signs were printed by the end of July, but delays in the installation of the technologies impacted the DTPR signage deployment and community engagement timeline. In particular, the intersections to be analyzed by the Currux and TrafficXRoads technologies were not finalized until they could be installed and tested in DDOT's Transportation Management Center.

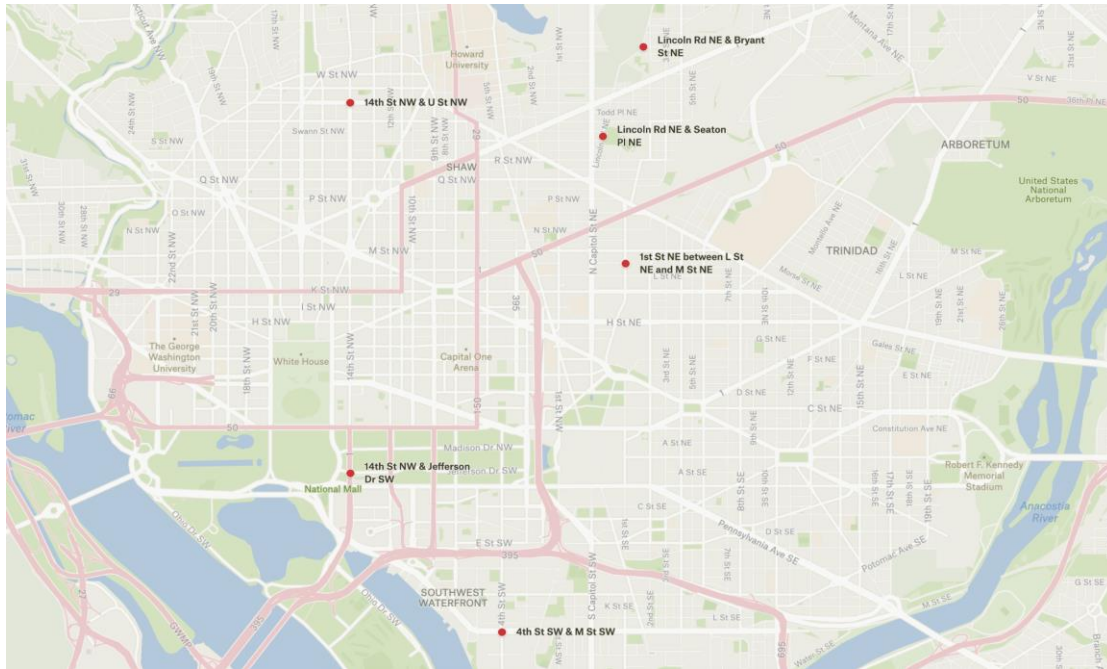
Signs for all locations (Table 1) were installed by November 18th and will stay up until spring 2023. However, one of the TrafficXRoads signs at 14th St NW & U St NW went missing around December 10-11, demonstrating the need for occasional checks for any lost or damaged signs.

Deploying Digital Trust for Places and Routines (DTPR) in DC

Table 1. List of sign locations and quantities

Location	Technology	# of Signs	Sign Installation Date
1st St NE between L St NE and M St NE	Passage	2	10/28/2022
Lincoln Rd NE & Seaton Rd NE	Passage	1	10/28/2022
14th St NW & U St NW	Currux	2	11/4/2022
14th St NW & U St NW	TrafficXRoads	2	11/4/2022
14th St NW & Jefferson Dr SW	Currux	2	11/4/2022
14th St NW & Jefferson Dr SW	TrafficXRoads	2	11/4/2022
4th St & M St SW	Currux	2	11/4/2022
4th St & M St SW	TrafficXRoads	2	11/4/2022
Lincoln Rd NE & Bryant St NE	Passage	1	11/18/2022

Figure 6. Map of technology/sign locations

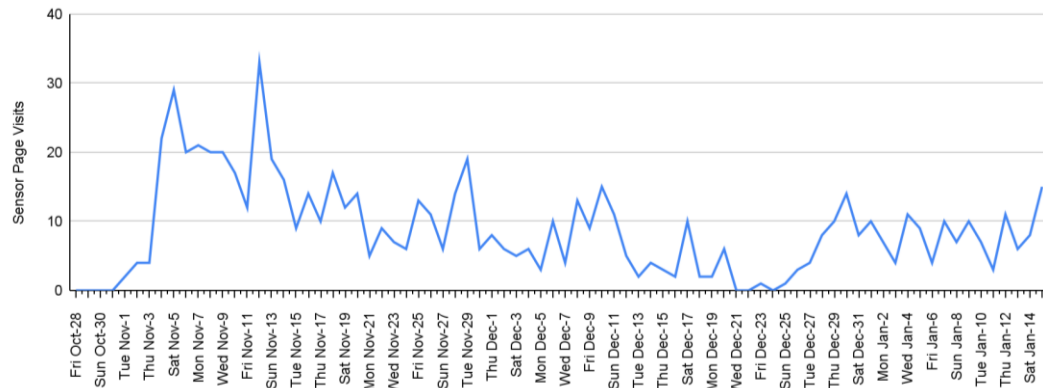


3.3 Deploying the Guide App

The Guide App deployment for DDOT – accessed via the QR code or URL on the sign – enabled the project to use web analytics to measure engagement and collect feedback from residents. These methods are described in more detail in the Appendix.

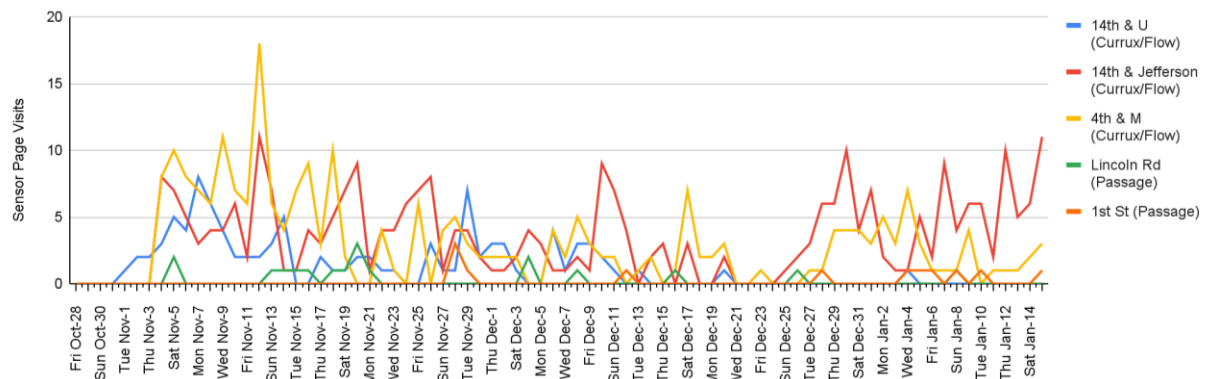
The DTPR Guide App has seen fairly consistent traffic since the start of the deployment, with a total of over 700 unique visitors since the first signs began to be installed on October 28th. While the Guide App saw a high of over 30 visitors in a single day early on in the deployment, this has since leveled off to approximately 10 visitors per day (Fig. 8).

Figure 7. Number of unique Guide App visitors - total (Oct 28 - Jan 15)



Looking at the number of visitors by location (Fig. 9), it is the intersections known to have higher levels of pedestrian traffic – 14th & Jefferson and 4th & M – that are seeing the most QR code scans.

Figure 8. Number of unique Guide App visitors - by location
(Oct 28 - Jan 15)



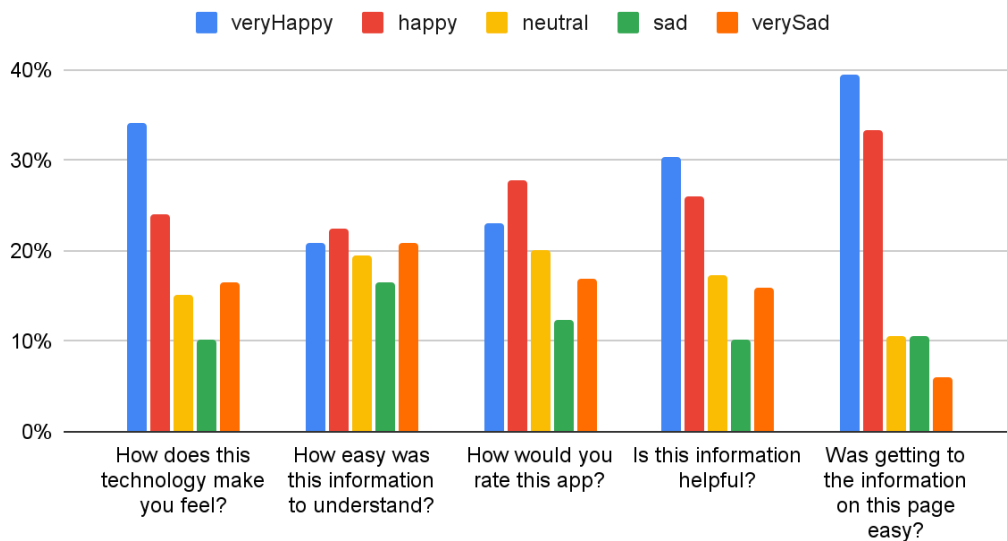
However, the number of Guide App visitors is not the best metric for measuring the utility of or engagement with the signs. The DTPR system has never been deployed before in DC, so people may not fully understand the utility of the signage. While some are scanning the QR codes to learn more and/or provide feedback, the information provided by the sign on its own may be sufficient for others to feel informed.

Despite the newness of the DTPR system, 21% of Guide App visitors have interacted with the data chain - that is, clicking one of the data chain items for more details. Over 10% of visitors have scrolled to the

bottom of the page to provide feedback via the emoji survey. Of the survey respondents, the vast majority found the process of accessing the Guide App to be easy. Over half found the information in the Guide App useful, but there were mixed responses on how easy the technical information was to understand. However, 58% of Guide App respondents said the technology made them feel “happy” or “very happy”.

While there were some responses to the extended feedback survey, there weren’t enough to infer meaning from the results. There were no emails sent to the address provided in the Guide App.

Figure 9. Results from the emoji feedback survey in the Guide App



3.4 Conducting In-Person Outreach and Engagement

In-person engagement was conducted to supplement and contextualize the data gathered through the Guide App and online surveys. Because DTPR is so new, the deployment of signage alone was not expected to be sufficient to spark resident engagement. Although the technologies had not yet been deployed by the summer, public engagement was kicked off during the summer months in order to utilize resourcing (i.e., interns and summer students) that wouldn’t be available in the fall. Additional details about the in-person methodologies are available in the appendix

Intercept surveys and observational studies were first conducted at one of the potential sensor locations (Florida Ave NW & Georgia Ave NW) on a day in early August. While this intersection had high pedestrian traffic, people were unlikely to stop and answer all the survey questions because of the heat or needing to catch a bus.

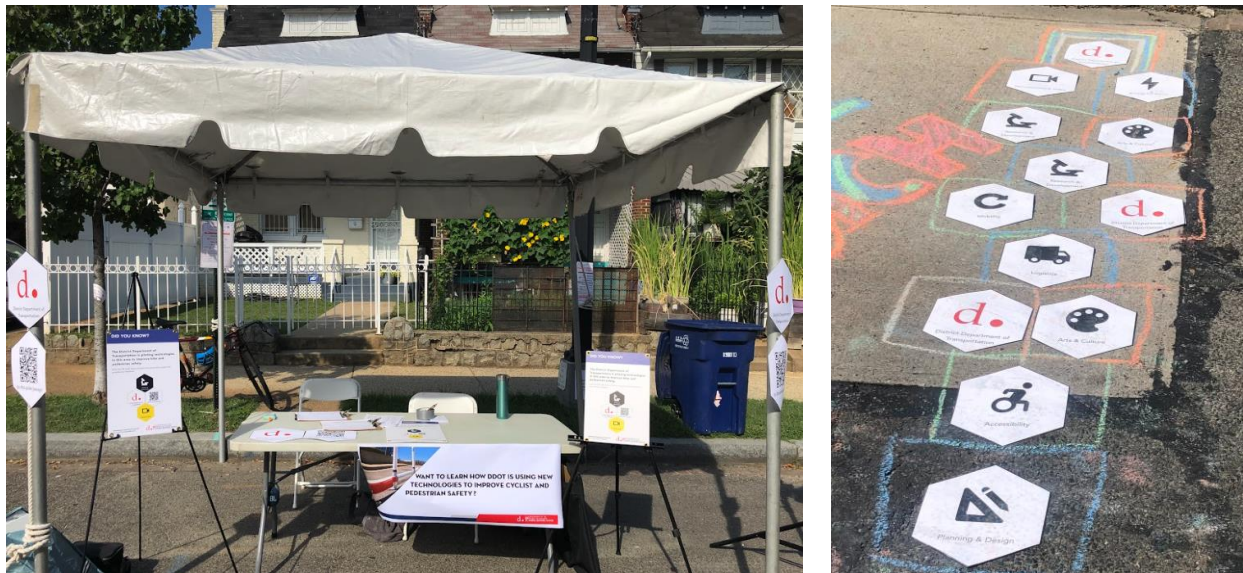
Figure 10. DDOT staff conducting the first set of surveys at Florida Ave NW & Georgia Ave NW



Another set of intercept surveys and observational studies were conducted at one of the Passage locations (1st St NE & L St NE in NoMa) on an evening in late September. This round was more successful in getting completed intercept surveys due to the time of day and because there was a beer garden event nearby that people were in line for.

DDOT staff also conducted engagement through a booth at an Open Streets event on 12th St NE (near Passage sensors) on Saturday, August 27th. While the plan was to conduct the typical intercept survey flow, because event attendees came up to the booth with questions, it was more conversational than the planned survey script. Rather than testing the ability of the DTPR system to provide information about the technology, it allowed DDOT staff to assess how people felt about the Passage technology and the Sandbox project. A staff member from Passage was also there with a sensor to answer technical questions about the technology, and there was a hopscotch game using the DTPR hexagons for children to play while their parents were talking to DDOT staff.

Figure 11. Booth at Open Streets event (L) and hopscotch activity using DTPR hexagons (R)



Engagement was planned for an additional Open Streets event in October, but there was very little attendance due to poor weather.

Through the intercept surveys conducted, people generally understood through the signage deployed that DDOT was trying something new to improve pedestrian and cyclist safety in the city. Most of residents' questions about the technology after reading the signage were answered through the Guide App, and over half of respondents found the information in the Guide App useful. After receiving information through both the signage and the Guide App, 75% of respondents said they were supportive of the pilot technologies. Several respondents expressed that the text on the signage could be larger.

Although observational studies were conducted, they were not run frequently enough to support conclusive results.

4 Considerations for Future Deployments

Through this DTPR deployment, the project team identified several learnings that other organizations planning to deploy DTPR to support resident engagement should keep in mind.

4.1 Have a dedicated staff member for the DTPR deployment

Deploying DTPR requires dedicated capacity and resourcing, and coordination between many different teams within a municipality. Having a dedicated staff member assigned to the deployment is critical to success. Executing on a strong community engagement plan requires people power and a familiarity with existing engagement channels. Teams that are strapped for capacity will find it difficult to get the level of feedback they're looking for.

4.2 Develop a communications and engagement plan early on and utilize existing channels and relationships

Authentic engagement and relationship-building is a nuanced process. It's important to develop a communications & engagement plan early on to fully utilize municipal resources, identify existing channels that can be utilized, and plan for engagement at scale. Organizations should plan to conduct engagement even before technology locations and installation timelines are finalized, as they can shift, and gathering public feedback does not require sensors to be installed.

This deployment of DTPR relied heavily upon interns and summer students for the communications and engagement activities. While it's helpful to have junior staff to conduct in-person engagements, the planning of these activities should involve internal communications and engagement staff who can help reach a wider external audience through existing channels (e.g., social media, planned DDOT events).

Other organizations can also help with outreach, especially if there is an already existing relationship. This could involve presenting at a community group (e.g., Advisory Neighborhood Commissions) meeting or sharing information through their newsletter.

When there is limited capacity to do in-person activities, there is also the option of online engagement, such as gathering feedback through social media outreach or participating in online events.

4.3 Deploy signs before technologies are installed

The sign deployment can also be decoupled from the installation of the technology. Signage does not always have to be attached to the tech itself and can in fact be rolled out before the technology is up and running, as an advance notice to residents.

The placement of signage can be tricky – organizations deploying DTPR should consider areas where they expect the most foot traffic, but this can also be constrained by the availability of mounting locations. Depending on whether the technology collects potentially identifiable data, proximity to the sensor or its field of view might be more important. Engagement with signs is also highly contextual – while urban areas have more traffic, it’s difficult for people to notice the DTPR signs when they’re competing for attention with other signs and posters nearby.

4.4 Considerations for signage design

Printing multiple copies of the same sign and having a separate sticker with the QR code can help simplify the process and reduce costs. Signs should also have large text and a clear call to action, so it’s clear what scanning the QR code does.

4.5 Plan survey locations and times based on resident movement habits

When it comes to the engagement activities themselves, intercept surveys should be conducted when and where people are most likely to stop – i.e., during evenings and weekends, in places like parks and plazas – even if this is not near where sensors are actually installed. While bus stops may have lots of people waiting around, they’re less likely to want to answer questions. It’s also difficult to engage people in high-traffic areas during lunch or commute times, especially in poor or uncomfortable weather.

4.6 Create an engagement event kit that includes an uninstalled sign

Having an extra uninstalled sign allows people conducting engagements to be mobile and move to more effective locations. It can also be used to conduct other types of engagement, such as boothing at a community event, to talk to residents about the technology project and get their reactions and feedback in a more informal manner than a structured intercept survey.

5 Recommendations for DDOT

DDOT’s deployment of the DTPR system identified future opportunities where the framework can be used to support the rollout and testing of new technologies.

5.1 Explore the potential of DTPR to support other initiatives and processes

DTPR could be used by DDOT to support technology introduction and testing in a more systematic and repeatable manner.

DDOT staff have been working on developing an emerging technology pilot vetting process. The DTPR taxonomy could be used to gather all the necessary information about the technologies proposed by vendors in an structured, standardized way. This structured information about these technologies would provide a baseline of information about the use of technologies for both internal-facing asset and data management needs, as well as the public. DDOT staff said that the process of using the taxonomy in the Pedestrian Safety Sandbox project provided a useful template for asking vendors questions about how their technology works, and helped ensure that key information about privacy and data management for each system was available to DDOT.

One such opportunity is the Mobility Innovation District (MID) in southwest DC, designed to be a testbed for companies to test emerging mobility solutions. One of the Sandbox locations (4th & M) is in fact located in the MID. DTPR could be used to provide notice to people in the area about the technologies being tested, but as a way to also assess and collect information about the proposals submitted to the MID for consideration and deployment.

6 Conclusion

DDOT's deployment of DTPR for the Sandbox has successfully demonstrated how the system can be used to engage and get feedback from residents about technologies in the public realm. The DTPR standard was an useful tool for gathering and organizing privacy and data collection related information about the technologies deployed in the pilot, helping ensure that the information made available to the public was standardized from vendor to vendor and presented to the public in a consistent, visual way on both signage and online. The process also identified changes to the DTPR standard and improvements for future deployments.

This deployment was tailored for the Sandbox, but there is now an opportunity to build upon this experience to scale DTPR by integrating it into DDOT's processes rather than having additional standalone deployments. The signage and Guide App are the most visible and public-facing components of the system, but much of the value is also in using DTPR as a tool to collect and organize information about public technologies – whether pilots or permanent – in a way that can easily be shared with residents for transparency and feedback.

Appendices

○ Appendix A: Research Methodology

In-Person Methods

The in-person research methods help contextualize the data that is gathered by the Guide App, in case people don't directly engage with the signage and scan the QR code.

Intercept Surveys

Intercept surveys are a qualitative research method used to include the voices and perspectives of the communities we serve in our processes. The public input from intercept surveys can inform our initiatives, products and services. As they involve a visible presence of staff reaching out to residents where they are, they also help demonstrate that the municipality values engaging with and getting feedback from the public.

Purpose:

- Learn how well residents understand the technology and its purpose, and how they feel about it
- Understand how useful and legible the DTPR standard is in communicating information about the technology
- Gather insights on how people interact with the signage and Guide App, and how the user experience could be improved
- Surface questions/concerns that aren't being addressed through the information provided
- Visible presence of staff reaching out to residents helps demonstrate the value that the municipality places on feedback from the public

Questions:

- Can you take a look at this sign and tell me what you think it's trying to say?
- Without more information about the project, do you have any unanswered questions?
- Does this page answer the questions you had before?
- Is this level of technical information useful to you?
- Do you find the page clear about how to ask questions and provide feedback?
- With the information you've received, how do you feel about the waste bin sensors?
- How satisfied are you with the process of getting information from the sign and web page?
- Do you have any further questions or comments?

Observational Studies

Observational studies are a methodology, based on and informed by the long-running practices of Public Life Studies, that help understand how people interact with a space and the elements within it to inform operations and design.

Purpose:

- Learn if the signs are noticeable by people passing by, if/how people are interacting with the signs, and if the sign positioning/locations need to be adjusted
- Can also be used to learn about the efficacy of different sign designs and messaging

Metrics:

- Passed the sign without noticing it
- Noticed the sign, but didn't stop to read
- Stopped to look at the sign, but didn't scan QR code or type in URL
- Looked at the sign and scanned QR code or typed in URL
- Other observed behaviours

Online Methods

The Guide App (that people see when they scan a QR code on a sign) collects data in three different ways, which are described below, and are not dependent on deploying staff to actual locations. However, these metrics do rely on people engaging with the signage and scanning the QR code, or reaching the sensor page via another method (i.e., a newsletter or tweet that asks them to click through and provide feedback).

Web Analytics

Purpose

- Monitor how often people are scanning the QR codes (or typing in the URL) and if sign locations need to be adjusted
- Understand which information on the sensor pages people are most interested in, and which elements are not as useful or obvious

Emoji Feedback Survey

Lightweight method to gather quick insights on how people feel about the technology and the Guide App user experience.

Questions:

- How does this technology make you feel?

- Is this information helpful?
- How easy was this information to understand?
- Was getting to the information on this page easy?
- How would you rate this app?

Extended Feedback Survey

Gather more detailed data (qualitative and quantitative) on how well people understand the information provided by the Guide App, how useful and legible they found it, and how it could be improved.

Questions:

- In a few words, how would you describe the purpose of this technology?
- In a few words, what were your main takeaways or learnings from reading the page?
- In terms of the information presented on the page, there was:
 - Too much information
 - The right amount of information
 - Not enough information
- On a scale of 1 to 5, how useful was the information presented?
- On a scale of 1 to 5, how clearly was the technical information presented?
- After exploring the page, how did the information make you feel?
- What would make the page more interesting and engaging?
- Do you have questions? Is there anything you would like to learn more about?

Emails

Provide a mechanism for residents to send questions and feedback. Surface questions/concerns that aren't being addressed through the information provided.

Appendix B: Data Tables

Table 2. Summary of observational studies

Location	Passed the sign	Noticed the sign	Stopped to look	Accessed more information	Total People Observed
Florida & Georgia	86%	11%	3%	0%	196
Open Streets 12th St NE	63%	18%	13%	6%	120
NOMA (1st & L NE)	91%	8%	1%	0%	356

Table 3. Summary of intercept surveys

Date	Location	Day of Week	Time of Day	# of Surveys
2022-08-09	Florida & Georgia	Tuesday	Afternoon	10
2022-08-27	Open Streets 12th St NE	Saturday	Morning + afternoon	12
2022-09-23	Noma 1st and L St NE	Friday	Evening	10
			TOTAL	32