

CASE STUDY

Boston's Beta Blocks



CIVIC SMART CITY
APRIL 2020



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RECOMMENDED REFERENCE

Gordon, E., Harlow, J., Teng, M., & Christoforetti, E. (2020). *Beta Blocks Case Study: Civic Smart City Series*. Engagement Lab. Boston, MA. elabhome.blob.core.windows.net/elabpublication/betablocks.pdf.

About the Team



ENGAGE L
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elab.emerson.edu

The Engagement Lab is an applied research and design lab at Emerson College that focuses on how media and technology are reshaping civic life. From municipalities to newspapers, the Engagement Lab seeks to build the capacity of civic institutions to effectively engage their publics in thoughtful digital transformation. Lab faculty, staff, and students do participatory research and design, working with partners to co-design processes for collective storytelling, collaborative learning, and impactful civic engagement as a means of creating a more equitable and purposeful civic life.

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Supernormal is an architecture, urban strategy, and research firm. Supernormal designs buildings, blocks, and sometimes software—because designing processes and places together helps us ask bigger questions, to reach more people and more communities in our rapidly changing world.

THE MAYOR'S OFFICE OF
**NEW URBAN
MECHANICS**

boston.gov

Formed in 2010 as the Mayor's civic research and design team, the Mayor's Office of New Urban Mechanics explores and tackles experiments and prototypes that cover a range of topics. This includes everything from the future of mobility to City infrastructure to collective well-being.

Executive Summary



Data and analytics from sensors, cameras, drones, autonomous vehicles and kiosks are already reshaping cities and government processes around the world. Decisions about how this new urban data infrastructure is emerging are being made largely through negotiations between municipal governments and technology companies. Looking to the future, it is no longer a question that communities—especially marginalized communities most subject to control mechanisms and data bias—must be meaningfully brought into these decision making processes.

This report documents a prototype of a community-centered smart city process in Boston, MA, in which urban technologies are temporarily installed in cities for the purpose of public questioning and reflection. The prototype was designed and implemented in 2018-19 in three of Boston's neighborhoods: Chinatown, Codman Square and Lower Allston. The prototype...

- Formed a multi-sector project **organization team**, choosing project leads with existing community relationships and skills in facilitation and translation;
- Created ~4-square-block "**Exploration Zones**" in Boston's Chinatown, Codman Square, and Lower Allston neighborhoods where the City relaxed permitting to facilitate temporary technology installations for community-based testing and feedback;

- Experimented with mechanisms to **partner with technology companies**;
- Organized Zone Advisory Groups to **govern the technologies in each Exploration Zone**, using an inquiry-based and hands-on curriculum geared towards collaboratively understanding the local "public value" of these technologies and their collected/generated data;
- Facilitated a data storytelling **youth program** to explore community relationships with the installed technologies in-depth, through qualitative data;
- Hosted a **public facing conversation** about new technologies in public spaces; and
- Designed mechanisms to document **community recommendations** in order to inform city decision-making and procurement.

We conclude with **recommendations for a data platform** that would enable cities to collect data from temporarily installed technologies while maximizing privacy and public value.

At the end of the document, in the form of appendices, we include several important resources for creating civic smart city processes. These include: a public workshop guide, a tech partner intake form, a draft MOU for technology company partnerships, an interactive board game, a draft community data policy, a youth data literacy curriculum, and more.

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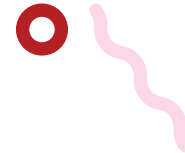
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01.

INTRODUCTION



... researchers at the Massachusetts Institute of Technology (MIT) had devised new ‘intelligent intersections’ that would enable oncoming streams of self-driving cars to merge seamlessly... But there was something missing from the mathematical models and simulations that MIT had devised: people.³

Every technological solution in public space has hidden politics. When we asked community members in Boston’s Chinatown about how they might use a digital “bulletin board” on their sidewalks, the director of a neighborhood business association asked if gambling advertisements would be permitted, using this opportunity to share that a casino had been disproportionately advertising to Chinatown’s low-wage restaurant workers. According to the company producing these bulletin boards, the moderation process for paid advertising content filtered primarily for bad language and low image quality. Without this community member’s insight, gambling ads would have almost certainly passed through the technology’s content filters, which would have opened another avenue for predatory targeting of people already at-risk for addiction.

From the outside, these digital bulletin boards are modern-looking, a source of local news, and appealing to Chinatown residents. But when content decisions and public value determinations are made without public input, then local knowledge of these hidden politics, as well as creative approaches to addressing them, are not considered.

A growing number of scholars are writing about the dangers of neglecting the hidden politics in privatized data and public-use technologies (e.g. algorithmic bias, discrimination in the technology sector, surveillance capitalism), as well as the dangers of insisting on efficiency and technological/scientific solutions to social problems.¹ What is not well understood by technology companies or governments, but is deeply understood by neighborhood residents and stakeholders, is the hyper-local context that needs to inform and make relevant technologies in public spaces.

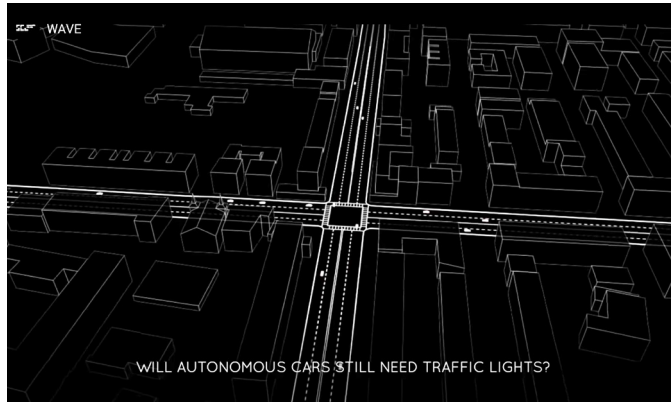


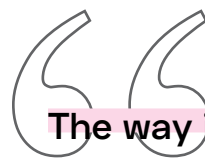
Figure 1. Screenshot from the MIT Senseable City Lab's "[DriveWAVE](#)" demo video.

Because of the novelty of introducing new technologies into public spaces, few precedents exist for processes that effectively engage the public in decision-making.² So, the question then becomes, what kind of procedures can be adopted by municipal governments to incorporate hidden politics into decision-making about "smart city" technologies? How can government, the private sector, and residents effectively collaborate on establishing a shared value proposition for those technologies in public spaces? Currently, decisions about technology procurement are largely made by city officials in negotiation with technology companies. Bringing residents and other community stakeholders into this process is deeply important and complex.

What is presented in this report is a prototype called Beta Blocks from Boston, USA. Executed in 2019, Beta Blocks is a process for creating a citizen-centered "smart city" that meaningfully invites publics into questioning and making decisions about novel technologies in the public realm. The process is informed by the understanding that the introduction of novel technologies demands more than simply holding public meetings about technology and urban infrastructure, as the issues are abstract, often difficult to understand, and on the surface, removed from most residents' everyday concerns. The goal of this process is to inform, through feedback and persua-

sion, city decision-making about new public realm technologies so as to assure that the smart city is smart for everyone. Beta Blocks is a multi-component process that seeks to build understanding, cultivate a sense of community ownership, and establish protocols for a variety of stakeholders to arrive at acceptable conclusions.

This report includes step-by-step instructions, along with reflections about how the process could improve. In the pages that follow, we explain precisely how each component was implemented, what's needed for its reproduction, and what we learned. Our hope is that this serves as an inspiration and a call for collaboration to design better processes for making technology in the city as smart and human as possible.



The way in which the problem is conceived decides what specific suggestions are entertained and which are dismissed...⁴

The Beta Blocks Prototype



To meaningfully bring Boston residents into the assessment, critique, and questioning of new technologies in public spaces, the 2019 Beta Blocks prototype:

- Formed a multi-sector project **organization team**, choosing project leads with existing community relationships and skills in facilitation and translation;
- Created ~4-square-block “**Exploration Zones**” in Boston’s Chinatown, Codman Square, and Lower Allston neighborhoods where the City relaxed permitting to facilitate temporary technology installations for community-based testing and feedback;
- Experimented with mechanisms to **partner with technology companies**;
- Organized Zone Advisory Groups to **govern the technologies** in each **Exploration Zone**, using an inquiry-based and hands-on curriculum geared towards collaboratively understanding the local “public value” of these technologies and their collected/generated data;
- Facilitated a data storytelling **youth program** to explore community relationships with the installed technologies in-depth, through qualitative data;
- Hosted a **public facing conversation** about new technologies in public spaces; and
- Designed mechanisms to document **community recommendations** in order to inform city decision-making and procurement.



Figure 2. Centering communities in the manifestation of technology in public space.

Guiding Values



Beta Blocks built on the innovative culture of Boston's Mayor's Office of New Urban Mechanics, the existence of which was crucial to facilitate tech prototyping in public spaces, as well their 2016 [Smart City Playbook](#) and 2017 [Smart City RFI](#). It also draws on a previous Engagement Lab smart city [whitepaper and toolkit](#) on civic engagement, augmenting its' "[civic smart city](#)" plays into more actionable values. The following values guided the city's work in this space:

Design for the Margins

The public value of new technology can be uneven—benefiting certain people over others. As such, it is important to explore how and why technologies are adopted, who they benefit, and who they exclude. It's an opportunity to open up technology-related decision-making and development processes with the goal of generating increased public understanding and greater potential for local relevance: surfacing marginalized perspectives, listening compassionately, and reflecting on their blind spots (e.g. that there aren't better positioned people to answer a question).

Local Expertise over Smart City

As outsiders looking to engage different communities, our fundamental value is respect for the intangible expertise born from living, working, and socializing in a place.

Pluralism over Consensus

Consensus-driven models of smart city public engagement can be reductive and prematurely conclusive. Rather, the process of sound public judgment around smart city technologies should strive for broad and in-depth discovery. The more uncertain and novel a problem is, the more effort should be built in to make room for discovery, contestation, and negotiation.

Play Towards Input

In games, players choose to observe a system of rules within a play space, or magic circle, within which they can take contained risks, or play. Games are a provocative model for structuring participation in smart city discussions because they are inefficient by definition. Game rules almost always insert inefficiency into larger systems of exchange and interaction, but they both facilitate and justify play. This method of play is a natural pairing with public processes.

02 .

PROJECT ORGANIZATION



1. Who in the city initiates and owns the project, and liaises with relevant departments?

Beta Blocks begins with a municipality that wants to involve its public in decision-making about technology deployment in public space. The municipality must be central in the work to test the potentials of permitting innovations, and align departmental resources and activities with project goals. A Neighborhoods department can help identify plausible and strategic places for Exploration Zone(s) and orient partners to community history and stakeholders. A Planning department can align this process with prior and existing planning efforts and relevant community groups. A Streets and/or Public Works department can detail the technical infrastructure in Exploration Zone(s) and ideally assist with installation and deinstallation. Ensuring representation from appropriate department(s) at Beta Blocks events makes the city a receptive collaborator by using public input in decision-making about technology deployment in public space.

KEY QUESTIONS

1. Who in the city initiates and owns the project and liaises with relevant departments?
2. What is needed to run the project?

2. What is needed to run the project?

To implement Beta Blocks in your city, consider project leads that have existing relationships in the community. The lead will have to catalyze action across sectors, and unite tech partners, communities, and the City in a values-driven approach. Beta Blocks asks informed questions of data/tech partners (cut through sales talk), to translate those answers into clear insights (ux mindset + writing accessible copy), and to design participatory workshops around those insights, in which diverse stakeholders can meaningfully influence (e.g. weigh options, push back, conditionally accept, totally reject) decision-making. When selecting a lead organization, apply the above criteria and evaluate fit with the project components. A Steering Committee can bring supplemental capacity to support a lead organization covering the necessary criteria, and engage individuals trusted by communities in and around the Exploration Zone.

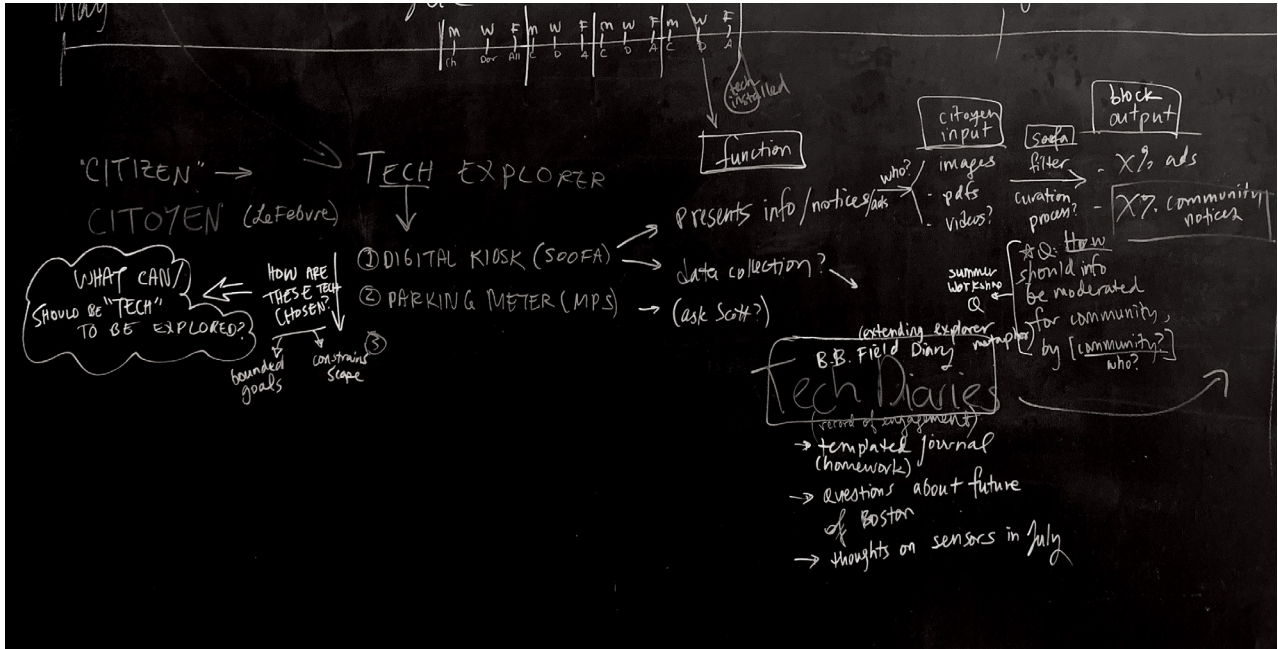


Figure 3. Early brainstorm of initial places where community members could intervene and questions about how (and why) certain parts of the technology were as they were.

We did not have a steering committee due to a variety of process-related complications but, in retrospect, appreciate that informed external input would have been a great boon to the development of Beta Blocks as an effective public-private process.

University partnerships can also offer capacity to cities, such as students to staff events, research capacity, project management, and stakeholder engagement. They can serve as trust-building intermediaries that lack the historical baggage between many communities and their cities. Of course, universities often come with their own baggage, as many have a history of extractive research relations and regressive urban policies that have historically excluded marginalized populations. They are by no means a silver bullet, but building on positive faculty and departmental relationships can be very productive. Additionally, when

universities serve as neutral third parties, they can host sensitive data that would potentially be accessible through the Freedom of Information Act if held by a city. **Data collection, storage, and analysis are university strengths, and government ownership of data comes with reasonable objections to oppression and overreach (e.g. facial recognition and predictive policing).**

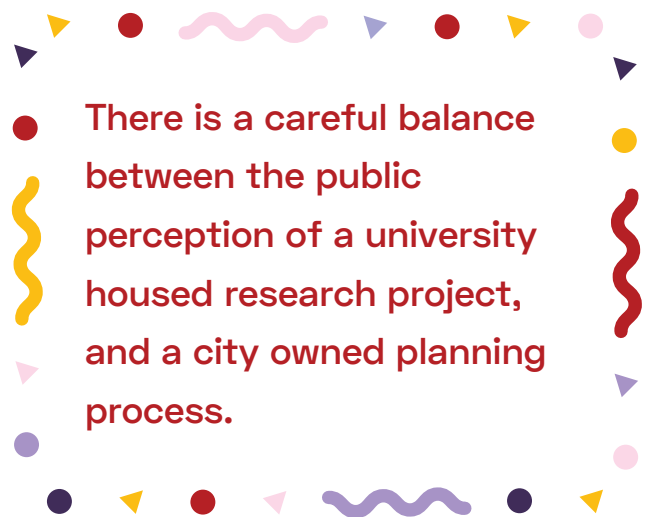
Reflections from Prototype



In Boston, Beta Blocks was conceived and developed by an innovation unit: the Mayor's Office of New Urban Mechanics (MONUM), which offered flexibility and responsiveness, but perhaps not maximum integration with the rest of the city doing the work in departments. The mayor's office provided a great top-down perspective and allowed us to think across departments more involved in implementation, but there were challenges in integrating into departmental workflows across the City's departments. The Public Realm Director, jointly housed between the Streets Department and MONUM, gave us a necessary bridge to on the ground implementation, without which we would have been unable to accomplish much. In future implementations, it would be important to **better integrate into departmental workflows prior to involving community members.**

City government can get tech partners to show up, but may have trust deficits with communities. Although we didn't convene a **Steering Committee** for the Boston pilot, bringing city-wide capacity to bear on a Beta Blocks implementation has potential benefits for building capacity and trust. The Engagement Lab @ Emerson College in Boston was brought on as the primary consultant to design engagement tools, facilitate stakeholder interactions, and translate between the City, companies, and communities. Supernormal, a design and research firm who had previously collaborated with MONUM on the relationship

between data, technology development, and design of the public realm, joined as an additional principal to provide expertise in design and data-integrated process development. There is a careful balance between the public perception of a university housed research project, and a city owned planning process. University leads can be effective at facilitation and management, but the City can be more effective in getting stakeholders to the table, particularly if the process is linked to procurement and decision-making. We struggled with how much to brand the project a City vs Engagement Lab effort. In our attempt at creating a shared brand, we might have limited brand association with any one of the partner organizations. In future implementations, it would be important to more **effectively align the project's identity with the City, and position an external project lead as a facilitation and knowledge partner.**



03 .

SETTING UP EXPLORATION ZONES



1. What makes a good Exploration Zone?

An Exploration Zone is a small area for technology deployment in which a city **temporarily relaxes permitting requirements**, where both technical infrastructure (e.g. electricity on light poles, wifi, sidewalk space) and social infrastructure (e.g. anchor institutions, prior civic engagement) are available. In Boston, exploration zones were about four-square blocks, however block sizes differ city to city, and **sizing Exploration Zones should be responsive to local context**. At a high level, an appropriately-sized Exploration Zone will be clearly identifiable as a zone with an affiliated social and physical infrastructure. **It must be big enough to host a range of technologies but small enough to be encountered as a place**. In retrospect, four blocks may have been too big and diffuse; a single block or block-length street segment may have yielded a more compact and readily-identifiable experience for technology users, residents, and neighborhood visitors.

KEY QUESTIONS

1. What makes a good Exploration Zone?
2. What are the permitting considerations for Exploration Zones?
3. How might Exploration Zones, and the technologies within them, be clearly demarcated?

Choosing the location of an Exploration Zone is important, as is the balance of systematic criteria and on-the-ground intelligence within this selection process. On one hand, a systematic method for location selection, within which criteria for selection are open and knowable to all involved, has the clear benefit of being even, editable, and replicable; on the other hand, such a method is less sensitive to the inevitable idiosyncrasies of existing processes and politics, which are a necessary aspect of public planning and which may be compromised by the presence of additional municipal involvement. It may make sense to run a process in which neighborhoods nominate themselves, but will depend on timeline and the history and context of a specific city. Choosing the first Zone allows community engagement to begin, and the process can continue there, and rotate technologies, until a new or second Exploration Zone location is determined.

2. What are the permitting considerations for Exploration Zones?

Beta Blocks requires a city partnership that affords relaxed permitting in Exploration Zone(s). Exploration Zones are small, delineated with community stakeholders, and temporary. These qualities reduce the management logistics and risks for cities to relax permitting. Securing relaxed permitting should take place before engaging potential tech partners, because it is crucial for providing value to them, and thereby a central part of pitching companies on the project and incentivizing their participation. Cities can benefit by experimenting with relaxed permitting and strategically deploying it for other projects. **A key success factor for us in Boston was that an individual, the Director of Public Realm, was able to permit temporary technology installations.** The Department of Public Works had delegated permitting authority to the Public Realm Director, and we were able to submit technology locations and pictures to him to receive smooth and rapid permitting approval via email.

3. How might Exploration Zones, and the technologies within them, be clearly demarcated?

Although we considered painting the street and sidewalk to indicate when someone was entering an Exploration Zone, logistical challenges prevented us from doing so, and this was a missed opportunity. **It might drive deeper public engagement to clearly indicate the boundaries of the Exploration Zone in a way that invites curiosity while informing the public of the project.** What we did spend time and resources doing was creating labels indicating where project technologies were temporarily installed. **Designing a format and approach for labels that key technology types**

Figure 4. Public label posted in an Exploration Zone, next to a temporarily installed digital bulletin board. These were printed on 11" x 17" white corrugated plastic.

这是一个电子公告板。

这个设备暂时安装在这里 来帮助了解它对您居住的社区的价值。

这是波士顿市政府发起的一个叫做Beta Blocks (测试区块)的项目。如果你想更多的了解这个社会,这个项目,或者给我们一些反馈,请联系我们。

This is a Digital Bulletin Board.

This device is temporarily installed here to help understand its value for your neighborhood.

It's part of a City of Boston initiative called Beta Blocks. To learn more about the device, the project, or to give feedback, please contact us.

 <https://betablocks.city/tech>
(857) 246-9071

and applications is a knowable challenge, whereas integration into specific social and physical contexts is less predictable. We had to design the labels in line with the Beta Blocks branding, draft text, and have it translated into simplified Chinese as well as Spanish for the neighborhoods in which we were working. At this point, we got design feedback from the Zone Advisory Groups, City staff, and our tech partners. The content of the labels offered two mechanisms to collect public feedback on the described technology: a phone number and a QR code to the project website's tech partner page.

However, it turned out to be very contextual and thereby challenging and labor intensive to triangulate (1) the location of a label where it would be visible and legible to people passing on the street, (2) near the location of the technology (maybe on a light pole, high in the air, unobtrusive, and surrounded by other unknown gadgets), and with (3) some indication on the label of how to visually find

the technology from where you are standing (at the bottom of a public light pole where we were allowed to hang corrugated plastic project labels). A photograph of the device, *in situ* where temporarily installed, on its label, might help members of the public understand where to see the technology, and reduce the necessity of making a different label for every installed device.

Beyond labels demarcating the zone, technology products themselves may be labeled to orient community members of the project. During the prototype process, we worked with a product with ample "wall space" for decoration or community-specific branding. We did not anticipate the need to alter products physically, but we were able to work with this partner to revise their communications based on community feedback, blending their corporate branding with that of the project. **Good feedback requires shared language with technical, business, and community representatives.**



Figure 5. (Left) An annotated photo from an email exchange with our technology partner, where we manually gave feedback on the physical product's interface. (Right) Photo of the final product's interface.



Reflections from Prototype



The most successful community engagement during our prototype was in the Zone where a community-based organization was paid to support engagement efforts.

The Engagement Lab's response to the Beta Blocks RFP indicated that a specific neighborhood would be an Exploration Zone: Chinatown. Chinatown was chosen because of its proximity to Emerson College (where Engagement Lab is housed) in downtown Boston, and because of prior collaborations (e.g. [Participatory Chinatown](#)). The [Asian Community Development Corporation](#) (ACDC) was named in the proposal as an anchor institution in the neighborhood that would receive a subcontract to support community engagement efforts.

Concurrent engagement in multiple Exploration Zones requires substantial time and resources. Although engagement in the three Exploration Zones ended up being concurrent due to staff availability and other timing (weather, tech partnerships) and coordination challenges, staggered implementations were considered early in the project. Building relationships and capacity with communities is a lengthy process that we did not begin early enough. **Thereby, we recommend focusing on one Exploration Zone**, and considering a second round there or a new location only after implementation and reflection of necessary resources and capacity.

Within our process, Exploration Zones were selected based upon politics, convenience, and local community enthusiasm. Quantitative methods were hypothesized but then abandoned as it became clear that local relationships between city and community were a necessary priority for location selection within the first round of deployments. While systematic efforts to select a location were dismissed during our process for a variety of reasons, we believe that future processes should engage the possibility of better integrating quantitative and qualitative analysis to arrive at a location selection process that is both open and repeatable. MONUM's work with Supernormal on Streetcasters remains a strong precedent for future location selection methods by engaging weighted processing of data relating to demographics, urban form and access, and local physical conditions to drive decision-making around public realm improvements.

Beyond Exploration Zone location selection, there is also an opportunity to engage an integrated data analysis process to source widely-agreed-upon local challenges and match these locally-perceived issues with relevant technologies. We touched upon issue-sourcing within the Chinatown Exploration Zone by engaging analysis of public input within a recent city-wide planning process. Topic-modeling methods were utilized to assess issues expressed and

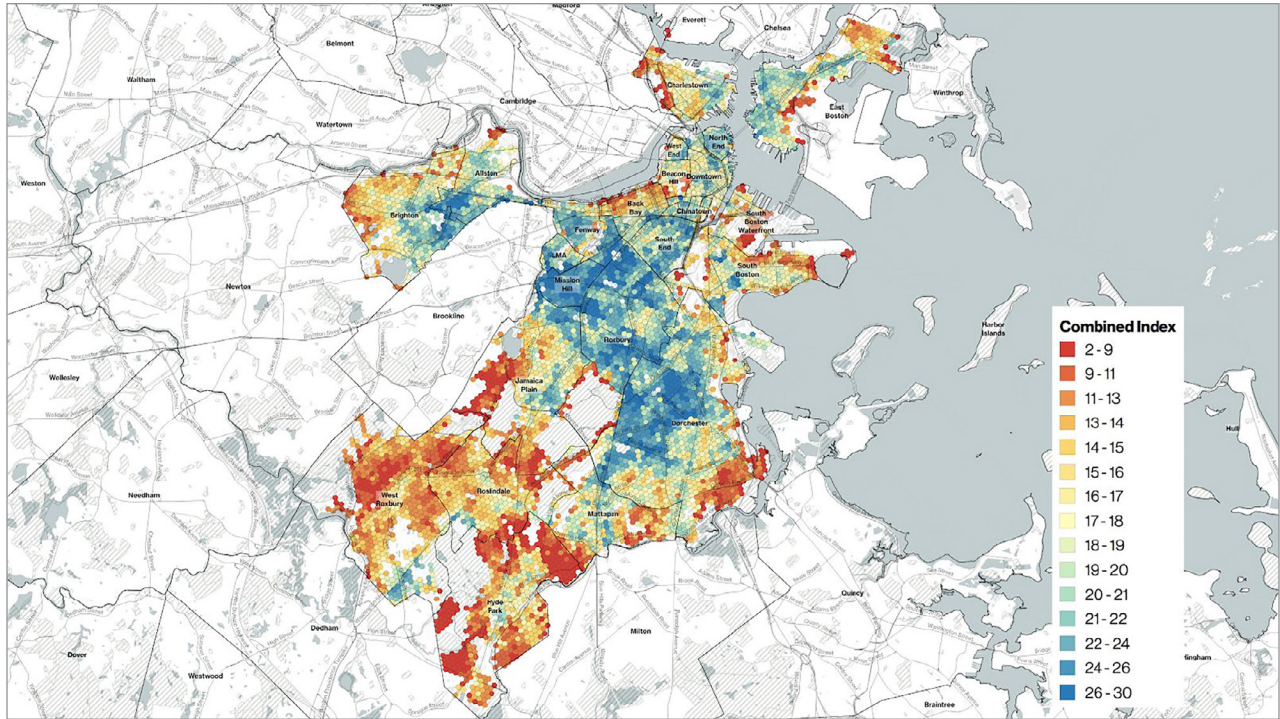


Figure 6. Along with The City of Boston Public Works Department (PWD) and City of Boston Mayor's Office of New Urban Mechanics (MONUM), Supernormal created a refined process to locate and prioritize sites for sidewalk repairs by engaging weighted processing of data relating to demographics, urban form and access, and local physical conditions. This method of systematically considering both public realm condition and social need in local decision-making points toward the future development of a Beta Blocks location selection methodology.

recorded within the Chinatown zip code 02111 during the Imagine Boston 2030. Our findings yielded clear conclusions, however the topic terms pointed to challenges that exceeded the scale of immediate deployments of public realm technologies. For example, the frequency of topics suggesting challenges related to affordable housing and private development density point to clear but complicated challenges that could not be immediately met with technologies such as sensors and digital kiosks, which were the focus of our initial Exploration Zone deployments. The Boston 311 dataset holds greater potential for issue-sourcing, as the most

detailed, granular, and consistently recorded bank of information around perception of local need and challenges across all Boston neighborhoods. Preliminary analysis of this dataset yielded relevant depictions of local need around more appropriately scaled issues such as parking, illegal dumping, and pedestrian safety. This brief exploration, which was combined with a hypothesized method for engaging large data sets in collective decision-making, can be accessed [here](#). The Beta Blocks budget did not support sustained exploration of quantitative methods but we believe that they are worthy of future exploration.

Engaging qualitative and locally-sourced data was a priority for Beta Blocks and we found that zone boundary identification is one aspect of the process that may be more intensively open sourced in the future. For example, we found that, once Exploration Zones were located, drawing maps to more precisely identify zone boundaries is best done iteratively with input from the city and community. Intuitive determinations of zone boundaries were met with some local confusion around why some areas were included and others weren't; because of political and time constraints, our zone boundaries did not optimally reflect local experience of the neighborhood. In the future, **a web-linked map, which is accessible to community members, could be useful as a tool for data collection within the participatory process.**

Technology installation has infrastructure and skill requirements that we discovered late in our process, and did not include in our zone selection process. It's all well and good to develop a partnership with a technology company, spend months going back and forth with various lawyers to develop a memorandum of understanding, receive permission from the city to temporarily install the technology, and map preferable locations with relevant stakeholders (communities, tech partners, and the City). However, if this technology (in our case the **Municipal Parking Services Sentry SafetyStick**) has technical requirements the infrastructure in a zone cannot meet, it doesn't get installed. Technologies can require electricity, internet access, cell service, sightlines, sunlight, etc. The SafetyStick needs electric power and although there was an electrified municipal light pole near our desired installation site, we were unable to access that electricity to install the device. When choosing an exploration zone, choosing one with ample and avail-

able technical infrastructure for technology deployment could make Beta Blocks much easier to implement.

The phone number on labels was through a project-specific Google Voice account and asked callers to indicate the location, technology, and feedback they wished to give. Rather than create multiple versions of labels with multiple Google Voice accounts to offer language specific telephone numbers, we had the voicemail prompt read in simplified Cantonese, then Mandarin, then Spanish, then English... which in retrospect likely meant that **most English speakers probably wouldn't wait through the message to give feedback.** The QR code on the label landed you at our tech partner page, where there were descriptions of the technologies, developed in coordination with our tech partners, and based on their responses to the project **intake form**. The bottom of the page had a form that required "location" and "feedback" fields where members of the public passing by the label could scan the QR code then enter their thoughts.

Currently there is no process or tool for the broader public to give direct, structured feedback on technology product improvements, in particular, for physical product interfaces. The prototype process helped one of our tech partners to improve their overall product design. Traditionally, this user feedback and iteration process is led by the product design team, with representational users, using wireframe tools like InVision and Zeplin or methods like focus groups and playtests. During the prototype process, this feedback was received via email, notes taken during Zone Advisory Group meetings, and notes from offhand comments.

04 .

TECH PARTNERSHIPS



1

What is the value proposition for tech partners?

Securing partnerships is time consuming, but the **value for tech partners to participate is fairly clear**. They gain access to public space and infrastructure for real-world product testing. Community groups and municipal employees give feedback about the product and business model. Relationships with relevant municipal contacts can be established. These conditions can provide a virtuous cycle of urban tech development that is community integrated for greater relevance (to community), city vetted for public value, and potentially more profitable for tech partners.

There is also a balancing act with the challenges tech partners face. Devoting staff time to project coordination and tech installation, as well as providing hardware, can outweigh potential project benefits, especially for small-

KEY QUESTIONS

1. What is the value proposition for tech partners?
2. What value must tech partners provide to the project?
3. How might tech partnerships be secured?
4. What kind of partnership agreement is necessary?
5. Who will install technologies?

er companies. Timelines might not line up, and feedback from communities and cities might ask more than tech companies can deliver under their current resource constraints. Up front conversations about scheduling and logistical complexity can help unearth and address potential challenges for tech partners.

Different companies also tend to see value differently. For a small, local start-up, the primary value might be building relationships with the City government. For large multinational corporations, the primary value might be user testing in public space. For premarket products, the value is likely user-testing and in-person feedback during community meetings. It is important to **understand what value a tech partner will see in participation, and to deliver on it (to the degree possible)**.

2. What value must tech partners provide to the project?

- Answers to our [intake form](#)
- Coordination with the project team for all communications about the project
- Staff at meetings to demonstrate and answer questions from the public about their product
- An appropriate number of units for testing if their technology is selected for implementation
- Installation, maintenance, and deinstallation of those units
- Signed agreement to the project data policy
- Access to and visualizations of collected data (if they exist)
- Minimal engineering support to accommodate unique use cases

3. How might tech partnerships be secured?

This process requires that technology companies and/or entrepreneurs are close partners. It is **important that partner selection is guided by a transparent set of values** (e.g. privacy, equity, accessibility, etc.) established locally at the project's start, ideally guided by previous planning efforts, and made accessible to the public. Early engagement should aim to communicate the values of the process (especially for data) to potential tech partners, clarify expectations for participation (from all sides), and determine all the requisite technical infrastructure for installing product(s).

Partnerships should be secured as early as possible, with at least a few finalized before

engaging the public. These partners might be large companies based in your city, smaller companies developing relevant technologies for public spaces, startups or research units at nearby universities, companies with whom your team has existing relationships, or companies who have been marketing their products to your city. Even though only a few technologies might be installed at the same time, we recommend building partnerships that address a variety of use cases (traffic calming, mobility, safety, information, etc.). This provides a menu of technologies that help make the idea of "temporary technology installations in public space" far more concrete and accessible to members of the public.

4. What kind of partnership agreement is necessary?

Partnerships require some contractual arrangement, which can take months to finalize. It is recommended that the primary organization create a project Memorandum of Understanding (MOU) to start the negotiation process (see our draft [MOU template](#)). While some large companies will require their own MOU template be used, it is important to establish the desired terms from the beginning. Considerations for the MOU include:

- Timeline: what window of time will technologies need to be available for installation.
- Physical installation of tech: What does it take to install technologies in public space? Who will provide the labor and resources to do it?
- Data:
 - Ownership: Who?
 - Access: Who? How?
 - Use: Who? How? For What?
 - Lifespan: What happens to data after temporary installation?

Figure 7. Community members test out an install location for a new technology in Chinatown.

5. Who will install technologies?

Will the City be responsible for hanging sensors on poles? Will there need to be a contractor? Who will pay for installation? In some cases, there are deals that exist that prohibit certain actors from installing in certain places. Perhaps there is a contract with a mobile service provider for all devices on telephone poles. Perhaps street lights are the purview of one specific contractor or department. Ideally, implementing cities will be ready with a kit-of-parts to facilitate tech installation and deinstallation. It's best to understand this complexity and include details of installation in MOUs.



Reflections from Prototype



The process takes more time than you think.

Building functional tech partnerships turns out to be a lengthy process with a variety of complications. This means that even if a neighborhood knows of a specific technology they would like to install in public space, there is no guarantee that the project lead can contact that company, build a relationship (and potentially co-develop and sign a memorandum of understanding), secure material support (labor, technology), and implement that technology in the interested neighborhood.

Technologies exist in all phases of development, which is a good thing, but means some are not ready for deployment, and others are ready for deployment while being actively developed. Boston is a rich ecosystem for technology experimentation. There is a wealth of university labs and technology start ups with opportunities for partnership. However, early market or pre-market technologies pose a unique set of problems. Technologies coming out of universities can be very limited in functionality and reliability, and may not have units or engineering time to spare. For example, they may work well in a lab, but have never been tested in varying weather. This is also true for start-ups, where technologies often go to market with very narrow functionality, and thereby may be unable to meet the needs of communities within a necessary timeframe. That said, our experience working

with a local start-up was very positive, because they were eager to build relationships with communities and the City, and were willing to invest staff time and hardware to make that happen.

Sometimes values and development timelines don't align. Prospective products might not actually offer advertised features during the project's duration. Even when provided with a list of companies that responded to Boston's [Request for Information](#) about smart cities and the internet-of-things, many of the respondents had not proffered technologies intended for use in public spaces. With large companies, **finding the right person within their bureaucracy who can make an unusual project happen is difficult.** Yes, these all happened to us.

The process is new, and grappling with its complexity was daunting. Luckily, Boston's Chief of Streets, offered the simplification of temporarily installing **available technologies** to better understand how this process might work. However, technologies require skills. While on a call with household-name level corporations (among others), we discovered that none of those corporations, or the City, employed anyone who could hang a wifi beacon on a light pole. All such work for any of our project partners was actually subcontracted to third parties, and thusly, we were unable to find a cost-effective way to access the skills needed to hang public wifi beacons that would have supported camera vision technologies to count pedestrians, bikes, and cars. At any rate, that's how we ended up on ladders ourselves, hanging Microsoft Research [prototype air quality sensors](#).

Our Partners



Our prototype had the following tech partnerships (descriptions from companies):

Soofa

soofa.co

Startup Company

“Soofa is for people with a shared stake in a special place. We create the neighborhood news feed that connects a community with screens everyone can see and anyone can use. Our Soofa Signs provide a platform for everyone in the community to have a voice with Soofa Talk.”

Microsoft

microsoft.com

Multinational Company

“At Microsoft our mission and values are to help people and businesses throughout the world realize their full potential.”

Municipal Parking Services (MPS)

municipalparkingservices.com

National Company

“EcoSmart parking re-imagined from the ground up, innovative solutions for smart cities now, and moving into the future. MPS addresses the needs of multiple constituents: City, parkers, merchants, public safety.”

SYNNEX Corporation

synnecorp.com

IT Supply Chain Company

“SYNNEX Corporation, a business process services company, provides business-to-business services that help our customers and business partners grow and enhance their customer-engagement strategies. Headquartered in Fremont, CA, and with global operations, SYNNEX is an industry leader in IT distribution and customer care outsourced services, operating in two business segments: Technology Solutions and Concentrix.”



05 .

GOVERNANCE OF EXPLORATION ZONES



1. How might communities be approached about becoming an Exploration Zone?

Spend time in any neighborhood and you'll observe an endlessly nuanced ecosystem of social connections, histories of rivalry or betrayal, and political coalitions. These are the **local politics invisible to city government and tech partner representatives, which must be acknowledged, respected, and engaged** for this cross-sector process to work. It's easier to bring people in than to phase them out, so start recruiting individuals and organizations slowly to understand the politics and positions within the ecosystem.

Once the general location(s) of Exploration Zone(s) are chosen, **public engagement** can begin. First, produce a one-page overview to communicate the project to community stakeholders. Work with your city contacts to schedule meetings with key stakeholders in your target neighborhood, and snowball those

KEY QUESTIONS

1. How might communities be approached about becoming an Exploration Zone?
2. How might the resulting process be structured?

meetings into other stakeholders, events to attend with a table of project information, and local meetings (neighborhood associations, community development corporations) where this could become an agenda item. Initial engagement efforts should include asking local community members who should be at the table. If you truly want diversity in voice, then consider what might hinder or reduce participation, especially for women, elderly and youth, non-English speakers, and people with different abilities. To understand the expected standard for inclusive and accessible meeting practices, you can ask community organizations what their practices are, and even rent or borrow their equipment.

Accessibility and inclusivity should be conscious and informed choices, not after-thoughts or checkboxes. If you want people's time, mental and physical energy, and political support, then set up meeting spaces with translators, wheelchair-accessibility, childcare, and food, as well as helping people find transportation options so that they can attend. Community members do not owe you time, attendance, or consistency. If you are asking community members to sit with you



Figure 8. Pedestrian signs for Boston’s Smart Streets project.
Photo from [MIT Technology Review](#).

(“at your table”), they need to be compensated in forms they recognize, such as food and drink, money, reciprocal support (e.g. attendance at their events), and political introductions (e.g. connections for their work).

Local community organizations should be paid for their participation. They have established trust in the community and will be able to extend invitations that are likely to be accepted. They also might be able to provide already-familiar spaces for meetings, translation services, and deep local knowledge about how the City and other groups have previously engaged with the neighborhood. These can become “anchor” partnerships, i.e. commit-

ted and mutually beneficial partnerships with community organizations or individuals. “Anchor partnerships” can take many forms: **internships** (for youth organizers, who are compensated and gain skills), **ambassadorships** (for individuals interested in interfacing with government and tech partners), and **recruiters** (for social influencers). Individuals may be interested in participating for any number of reasons (e.g. for general technology interest or a specific product; political connections; curiosity; making new friends), so it is important to understand their motivations.

At all initial meetings, explain the process and bring a map of the neighborhood for partic-

participants to draw suggested zone boundaries, or indicate relevant places or infrastructure. Once you think you can get six people together for a meeting (feel free to use our series of meeting agendas in Appendix C), host the first official Zone Advisory Group meeting in (or as close as possible to) the target Exploration Zone to introduce the project, draw the Zone boundaries, and officially establish the Zone.

2. How might the resulting process be structured?

Each Exploration Zone should have a Zone Advisory Group, consisting of residents, community organization members, local business owners, and other invested stakeholders. Zone Advisory Groups guide decision-making in the Zone and provide structured recommendations to the City after temporary technology installations. Clearly frame the call to action for potential members, which includes:

- Articulation of community values
- Assessment of business plans and data policies of tech partners
- Identification of useful technologies for their neighborhoods
- Placement of technologies
- Walking tours for giving feedback
- Evaluation of the data collected by installed technologies and how it is used
- Making structured recommendations to the City and tech partners

Assure participation from City and Tech partners. It is essential that the City and tech partners are represented at Zone Advisory Group meetings. While the City does not need to be the convener, it does need to be a listener. Likewise, the presence of representatives (either in person or virtually) from tech partners goes a long way. It demonstrates that companies are willing to listen to community input and provides opportunities for substantive and honest dialogue about the public value of the technology.

Support and grow existing knowledge. Which local players are already working on similar initiatives? Explicitly ask about this. We found out about many existing academic research- and community-based initiatives related in topic to our tech partners (e.g. air quality, publicizing local businesses, sidewalk renovation). We were recommended names of researchers and organizers to contact, and had informal interviews to learn more about their initiatives. We made a call if we had capacity and ability to build on their initiatives' work. Either way, we explicitly acknowledged that we heard these suggestions, the actions we took, and our rationale, and if applicable, the outcomes of those actions.

Start with a curriculum to guide the decision-making process. Recognizing the limited timeframe of Exploration Zones, and the time that community members are giving you, it is important to have a structured but flexible curriculum to help guide the decision-making process.



Figure 9. A six-part meeting structure we developed that can be spread over 4 to 6 meetings (see Appendix C for Zone Advisory Group meeting agendas).

Reflections from Prototype



Semantics are important for conveying nuanced understanding and building trust

One tech partner representative asked our team, “Can you introduce us to the community’s leaders?” This sounds ignorant because different groups will answer differently. When possible, and respecting individual privacy, refer to local organizations or individuals by name when talking with community members.

Technology is daunting

Very few people see themselves as technology experts, or even technology savvy. Finding ways to keep people’s minds open to even the topic of technology and data is the hardest part. If they are willing to engage, the rest is easier as they realize they can understand how technology works at an overview level, and challenge data based on their lived experience in a place. Data is abstract and technologies are complex. Public engagement on these topics needs to involve concrete experiences.

All ages welcome

Many young people are digital natives, technically savvy, immersed in the media and tools of the moment, and thinking hard about the future of technology in their lives. Retirees have time, some have resources, and a few will have a lot of technical capacity. Bringing a diversity of ages to the table in Chinatown gave us a well rounded picture of how the community perceived the technologies in question, and gave the Zone Advisory Group a well rounded suite of capacities.

Investment over stake

Zone Advisory Group members found “stakeholder” and “publics” off-putting. We heard from community members that the terms felt academic (or alienating), and uninformed about the nuances of their communities. Somewhat to our surprise, the people coming to meetings with the largest “stake” (e.g. resident or business owner), were not necessarily the most interested, active, consistent, or effective. Rather, a diversity of incentives kept people coming back because they were invested in the project for their own reasons (e.g. to learn about tech, to have the ear of the city, to try and solve a problem, etc.).

06 .

YOUTH ENGAGEMENT



How might youth be effectively engaged in conversations about technology in the city?

Young people will inherit the cities we shape today, which means it's especially important that cities involve them in decision-making about technology. To do so, we created Tech Explorers (download the [booklet](#) or see Appendix), a teen program that culminated in data-driven recommendations about the specific technologies installed in the Exploration Zones. The curriculum was structured as follows:

1. Group introduction to data culture, smart cities, and qualitative data methods;
2. Hands-on data collection about the installed technologies through interview and observations;
3. Group synthesis and analysis of data;

KEY QUESTIONS

1. How might youth be effectively engaged in conversations about technology in the city?
2. What do youth care about?

4. Hands-on design of technology recommendations. teach data literacy and create a data-driven technology recommendation.

Rather than design, recruit for, and facilitate your own brand new youth program, partner with youth organizations and schools. These organizations already have structured curricula, experienced facilitators who can give concrete points of advice and feedback on youth engagement, and who can co-facilitate the program with you (particularly around pieces like beginning and ending reflections, getting teens to pay attention or think more deeply, and helping to translate technical pieces to digestible activities).

We also hired teens from the Exploration Zones as interns to get feedback or help co-design aspects of the program. Ideally such interns might have an interest in technology, design, civic engagement, or data, so this partnership helps to equip them with skills relevant to their career interests. Let



Figure 10. A Tech Explorers participant collects observational data.

them facilitate or co-facilitate presentations or activities, as well as educate and recruit adults into project activities.

Youth, especially youth in high school during summer time, have time to learn about and conduct time-consuming design research, such as collecting interview or observational street data during the middle of the day. Adults who are part of community organizations often apply the frame of that organization to the observations they make about the streets. Youth bring different, and potentially less baggage than adults, and have the potential to see the city in ways that adults can't.

Data isn't cool, so make it cooler with visual design. Present materials with interesting visual aesthetics. The Tech Explorers [booklet](#) was designed with this in mind, mixing in visual elements and keeping text clear and concise. Supporting youth in data collection can help them understand the power and uses of data, especially when they communicate their findings to interested representatives from tech partners and the City.

2. What do youth care about?

Teens care about being heard and being taken seriously. They don't expect either, though. Even after we insisted that their ideas would be shared with city officials, they didn't believe us. It took proof to convince them that we really wanted to help them create media that would reach influential figures of authority. For example, a tech partner representative called during a workshop, so we put them on speaker so they could speak to the teens. We were going to organize sessions where teens could interview city officials, tech partner representatives, and community members. But this was cancelled after hearing the teens had already done interviews earlier that week for a different program and wanted to switch it up. In future programs, this direct facetime with authorities can add to inspiration.

Here's an excerpt from a speech given by a Tech Explorers participant:



This is my first time getting to experience... a summer partnership like the one we had with Beta Blocks... The goal of Beta Blocks is to explore new approaches of community-led innovation in Boston's public spaces, and the Teen Program was able to be a part of that process as residents of the South End and Chinatown.

We... specifically focused on doing research and collecting data for two technologies: the Soofa display and the SafetyStick. These technologies are being implemented on the streets of Boston... We've learned that the devices have cameras that collect big data from our smartphones and other devices. They also improve vehicle and foot traffic...

My coworkers and I were very fortunate to have the opportunity to collect data for the Soofa signs and SafetySticks. It was a unique experience to be able to give feedback to big tech companies, and I think it's really important for these companies to do more work like this of asking residents how they feel about the technologies they are putting onto our streets. I'm also very excited to see how they might improve our neighborhoods and how people will react to them.


I think it's really important for these companies to do more work like this of asking residents how they feel about the technologies they are putting onto our streets.

Reflections from Prototype



Teens care about the latest technologies and privacy

Today, most teens' lives play out on digital media sharing platforms and teens are among the most active Internet users. Children and teens are among the most vulnerable to predatory online behavior, which isn't news to some teens. When we asked the Tech Explorers and Zone Advisory Group members if they knew about surveillance technologies on the streets or social media platforms, the Tech Explorers were much more knowledgeable about these contemporary socio-technical issues.

Teens care about their futures

It's important that facilitators are people who look like the teens they are working with (in our case, two people of color). Because our team was based in a communications and media school (Emerson College), we were able to give the teens a tour of the school's media production facilities and host conversations in the school library. Some teens who were more challenging to engage enjoyed this exposure, straying from the group to look into rooms and taking photos with their phones. This was powerful for them to expand their imagined possible futures and to visualize potential future day-to-day experiences.

Teens want to have fun

One teen gave us the presentation feedback: "this feels like school." School in this context means boring, repetitive, passive. If you offer youth experiences similar to what they have in school, they will feel similarly about your project as they do about school. Rather than be lumped in with summer reading lists of the classics, we used movies, games, a walking tour, and interactive activities to make Tech Explorers active, interesting, and fun.

07 .

COMMUNICATIONS



1

How might we start a public conversation about technology in the city?

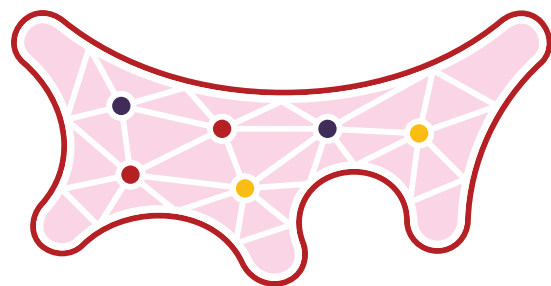
In addition to the work happening on the local level, it is useful to start wider conversations in a city about smart city technologies. People may be disinterested or intimidated by technology, so creating a welcoming environment to safely explore these issues is important. Just because urban tech interests you, doesn't mean it interests everyone. For example, people may not want to talk about sensors, but they probably want to talk about public safety or illegal parking.

Create a recognizable brand. To start a conversation on a city scale, it is important to establish something spreadable. We didn't want the visual brand to communicate new technology or sci-fi futures, but instead something organic, human and relatable. Supernormal designed and fabricated an inflatable structure

KEY QUESTIONS

1. How might we start a public conversation about technology in the city?
2. How might we make a welcoming space for learning and creativity?

(more about this below), which turned into the Beta Blocks logo and delivered a soft, organic form as a necessary counter to the typical depiction of "smart cities" as sleek or abstract. Engagement Lab and Supernormal created programming around the inflatable for a public exhibit that was playful and whimsical, designed to introduce topics of data, surveillance, privacy and convenience in a way that encouraged further interest and investigation. We positioned the project on social media as a community-led humanist endeavor into technology in the city.



Beta Bl•cks

Figure 11. The Beta Blocks logo.



Figure 12. The inflatable (which was called the “Beta Blob”) installed at the central library.

Make a campfire and gather around it. Bringing people together in real space and in real time is important for public conversations (even about technology) to flourish. Our approach in Beta Blocks was to create a curiosity that would draw people in. Supernormal designed and fabricated an inflatable object that we installed in public parks and festivals, public libraries, meeting halls, and City Hall. The object came to be known as the “Beta Blob” through an online and event-based naming contest. People would approach the Blob to satisfy their curiosity, and staff

would then encourage the conversation about technology in the city. The goal was simply to raise awareness and set the tone for the conversation. The inflatable structure was chosen for a variety of both experiential and pragmatic reasons. The soft, organic form of the inflatable was approachable and quite different from the existing slick, technical, and sometimes invisible image of the “smart city.” And, as described below, the inflatable was determined as the least expensive and easy-to-install structure for our temporary but necessarily visible and engaging use.

2. How might we make a welcoming space for learning and creativity?

Once gathered around the campfire, we wanted to create a meaningful experience for people. We created low-barrier, fun activities to encourage people to explore and learn about technology in the city.

“See” was a street scene diorama of innovative technologies from 1900 to the present, such as the modern sewer system, the subway, drones, and scooters. “See” was a conversation starter that asks: “What were old technologies like when they were new?” and “How might we think about new technologies when they become old?”



“Explore” gave people the opportunity to compare data across neighborhoods and consider how cities use data to make decisions.

Figure 13A. “See” into technology’s past (top) and “Explore” local data (bottom)...



“Reflect” invited people to record personal and insightful stories about their technological lives.

Finally, Beta Blocks: The Game ([print-at-home](#) or buy [online](#)) asks people to rapidly invent novel uses for urban technologies. The game was, by far, the most popular part of the exhibit, with people lingering for 20 or 30 minutes playing the game with friends or strangers.



Figure 13B. “Reflect” on technology’s future (top), and play “Beta Blocks: The Game” (bottom).

Reflections from Prototype



Clipboards scare people

We wanted to avoid being those people with a table, some free popsicles, and a clipboard at public events. While popsicles are delicious, and can be very successful at drawing crowds, we know that people with clipboards are not inviting. Try as we did to avoid reproducing this kind of public presence, we ended up falling into similar traps. When the Blob was placed in public spaces, people would certainly want to come by. But often, they would glance at it out of the corner of their eye, hoping not to make eye contact with a person (with a clipboard) who clearly wanted something from them. When people suspect that someone wants something of them (time or money), they are apprehensive about approaching. When we would leave the Blob unattended, it would often receive the most interaction, because it was just an object of play, without any threat of becoming work. Future iterations of the exhibit will consider programming that invites more participation.

Over-programming leads to under-utilization

We spent a lot of time and money programming every element of the Blob. We wanted it to delight and educate, and certain aspects of the programming succeeded at that, but others did not. Beta Blocks: The Game provided a clear mechanism of interaction. People understood what it meant to play a game for a few minutes. They felt comfortable with the clarity of rules and terms of engagement. But as soon as the game was over, they would often wander away without exploring other parts of the Blob. Other activities, such as the data explorer, were too open-ended, and required too much trust in a project to which participants had just been introduced. Similarly audio reflections seemed a step beyond what most people felt comfortable contributing. While each of the activities taken on its own terms was useful, together they were overpowering to the visitor. In future installations, we will **incorporate fewer activities and provide more space simply to explore and discuss.**

Temporary structures still require substantial consideration

We found the use of inflatable technology to be an ideal structure in that it could be inflated and deflated in a matter of 5 minutes and could be installed in either an interior or exterior setting. Alternative and equally visible structures such as shipping containers or mobile vehicle-based installations proved far too expensive and logistically complicated for our needs. However, any structure that is sited within the public realm is subject to logistical and public safety hurdles. While interior installations can be assembled with relative ease, the possibility of exterior wind loads requires that inflatables in exterior locations are weighted down with a substantial amount of ballast to prevent them from flying away if a sudden wind appears. We used a weighted platform to enable visitors to navigate the installation edges and affiliated programming evenly, but strapping attached to buildings, vehicles, or other heavy items could also be used. In the case of inflatable structures, interior installations are simpler than exterior installations in that they do not require weighted ballast. While the structure itself was incredibly inexpensive at less than \$10,000, several thousand dollars of structural engineering was also required. Because the inflatable was moved so frequently, labor costs affiliated with the deployment of exterior ballast were also significant.

To meet these challenges in the future, an ideal installation, while temporary, should remain in place for long enough to reduce logistical challenges affiliated with ballast coordination (if an exterior installation) and increase local presence and familiarity. Optimally, the structure—either with or without its affiliated programming—will remain in place for several weeks in a given location to call attention to the Exploration Zone and extend the possibility of local engagement and learning. The “Beta Blob” was an effective and eye-catching beacon that, if affiliated with Exploration Zones in a more intensive and long-term capacity, would have been even more effective as an engagement and data collection device.



08 .

PUBLIC VALUE



1

How might recommendations from Zone Advisory Groups be structured?

At the conclusion of each technology's 60-day installation, Zone Advisory Groups are tasked with producing recommendations for the City and tech partner (see Appendix D for an example). The following question needs to be answered: **What conditions need to be met for [X technology] to be valuable for [Y neighborhood]?** The answer should include multiple conditions for data usage and sharing, business plan, location, and any content considerations. After living with a technology for two months, it is quite possible that a community decides that there is no added value and resources ought to be directed elsewhere. It's also possible that the community decides that it will be difficult to live without said technology, in which case they will strongly advocate for its permanent adoption.

KEY QUESTIONS

1. How might recommendations from Zone Advisory Groups be structured?
2. Who in city government should receive recommendations from Zone Advisory Groups?
3. How might tech partners receive recommendations from Zone Advisory Groups?
4. How might Zone Advisory Groups influence data policy?

In the Chinatown neighborhood in Boston, the Zone Advisory Group was very enthusiastic about Soofa signs (solar-powered digital bulletin boards with advertisements and community-generated content) that were installed. Though they started with concerns about data collection, advertising, and sidewalk space, by the end of the trial, people were excited to have them around and began thinking of creative ways to use them.

The following are community-given acceptance criteria that should be met for Soofa Signs to be installed in Chinatown, from the Zone Advisory Groups and the Tech Explorers Youth Program (download the [Template](#)).

Created by a subgroup of the Tech Explorers youth program, based on observational data collection on the Chinatown streets:

IF SOOFA SIGNS WERE INSTALLED IN CHINATOWN
name of tech product your neighborhood

THEN THE TECHNOLOGY WOULD NEED TO AT LEAST:

1 GLOW/BE BRIGHT EYE-LEVEL
some desired function some desired function

From observational data, we learned: From observational data, we learned:



- A lot of ppl don't notice signs @ ESSEX
- Draw attention
- Ppl don't really pay attention to signs
- Ppl were on their phones a lot

→ billboard signs specifically

3 NOT BLOCK SIDEWALKS
some desired function



From observational data, we learned:

- Enough puddles and dents in sidewalk as is
- Sidewalks are very crowded
- A lot of loitering

THIS CONNECTED TECHNOLOGY SHOULD CONTRIBUTE TO A FUTURE CHINATOWN THAT IS SAFE FOR PEDESTRIANS SO THAT THEY CAN LIVE SAFELY

your neighborhood adjective group action


If Soofa Signs were installed in Chinatown, then the technology would need to at least:

- **Glow / be bright.** From observational data, we learned that (a) a lot of ppl don't notice signs @ ESSEX [Street] ["billboard signs specifically"], (b) [signs would need to] draw attention.
- **[Be] eye-level.** From observational data, we learned that (a) ppl don't really pay attention to signs ["billboard signs specifically"], (b) people were on their phones a lot.
- **Not block sidewalks.** From observational data, we learned that (a) [there are] enough puddles and dents in sidewalks as is, (b) sidewalks are very crowded, (c) [there is] a lot of loitering.

This connected technology should contribute to a future Chinatown that is safe for pedestrians so that they can live safely.

Figure 14. Acceptance criteria for Soofa Signs created by the Tech Explorers youth program, transcribed right.

Created by a subgroup of the Zone Advisory Group, based on their existing knowledge and experiences:

If Soofa Signs were installed in Chinatown, then the technology would need to at least:

- **[Be] bilingle [sic].** For the population, different languages. English, Chinese writings
- **[Show] comercial [sic] + community service.** Information and promotion for the community and for tourists who visit. Also for community event
- **[Show] time and date.** Other things to post events, businesses to promote. Information nearby bus stop + subway.

This connected technology should contribute to a future Chinatown that is informative for residents so that they can **know about events or stay in touch with the community.**

Beyond these Acceptance Criteria for Soofa Signs, the Zone Advisory Group also developed the following recommendations for any future digital billboard-like technology products:

- Profit-sharing with, or financial contribution to, the community (e.g. fund youth literacy program)
- Display information relevant to residents (e.g. community events, job opportunities, information about local businesses)

IF Soofa Sign WERE INSTALLED IN Chinatown,
name of tech product your neighborhood

THEN THE TECHNOLOGY WOULD NEED TO AT LEAST:

1 Bilingle some desired function 2 Comercial + Community Service some desired function

From Observation data, we learned: From Observation data, we learned:

For the population, different languages English Chinese writings Information and promotion for community and for tourists who visit. Also for community event

3 time and date some desired function

From Observation data, we learned:

Other things to post events, businesses to promote. Information nearby bus stop + subway station

THIS CONNECTED TECHNOLOGY SHOULD CONTRIBUTE

TO A FUTURE Chinatown THAT IS
your neighborhood

Informative FOR Residents
adjective group

SO THAT THEY CAN Know about events or stay in touch with
action Community

Figure 15. Acceptance criteria for Soofa Signs created by the Zone Advisory Group (right), transcribed below.

- Clear and bilingual labels around Soofa Signs that facilitate people adding content (including paid advertising)
- Operate at no financial cost to the community

2

Who in city government should receive recommendations from Zone Advisory Groups?

Who is able to act on these recommendations? The appropriate office within the government will vary from municipality to municipality. In Boston, recommendations went to the Director of the Public Realm, who was able to share them with the Chief of Streets (cabinet level position capable of making some procurement decisions). These recommendations were treated as valuable inputs into the ongoing conversation in City Hall about particular technologies. However, as the technologies introduced in Beta Blocks are meant to be prototypical and not specific (e.g. the Soofa sign is a digital bulletin board), the outcomes should not necessarily lead to specific procurement actions. Instead, understanding how various communities respond to prototypical technologies should give valuable information to city officials who are deciding what kinds of technologies the public values.

3

How might tech partners receive recommendations from Zone Advisory Groups?

This will vary widely depending on the partner company. As discussed in the tech partner section, the value proposition for partnership is different for different companies. Local start-ups were very interested in community input. If the company is able to get input along the way because they attend community meetings, this final recommendation will be less valuable. But if they are not local, or have not had the opportunity to attend commu-

nity meetings, this is an opportunity for the advisory group to speak directly with the tech partner and provide input into how the technology would add value to their community.

It is difficult to make recommendations for how tech partners should consider this community feedback. However, it is useful for the project team to facilitate some form of feedback or recognition of the company having received the recommendation. Even if the recommendations are never used, it is important for the long term sustainability of the process that communities feel appreciated for their efforts.

4

How might Zone Advisory Groups influence data policy?

Zone Advisory Groups provide input into a data collection and privacy policy, which is specific to Beta Blocks, and not a universal guide for the City. An entire Zone Advisory Group meeting focuses on getting input on the data policy, by introducing principles of transparency, privacy, openness, agency, and accessibility. Physical and playful activities can make (even) conversations about data feel fun and interactive, and elicit more creative feedback. To facilitate feedback on data policy, try an activity called “vote with your feet,” in which people position themselves along a spectrum between two tradeoffs. For “transparency,” one side of the room would be “total transparency” and the other “ease of use.” Some people think everything should include an explanation of how data is being used, and others just want convenience and seamlessness. Give participants a chance to explain why they chose their spot on the spectrum, and use those discussions to inform a data policy (feel free to start with our [draft data policy](#)).

Reflections from Prototype



Determine who is listening prior to involving communities

In the prototype process, we created zones, inviting advisory groups, and recruited tech partners prior to determining precisely how recommendations would be channeled through government. Because we had the ear of the Chief of Streets, we didn't take the time to formalize the communication structure. As a result, the recommendations produced by Zone Advisory Groups didn't have the reception we had anticipated. In future implementations, it would be important to determine who will receive recommendations and what process they will go through to share and process them.

Practically speaking, however, this is difficult. There needs to be commitment from City staff to review and consider multiple, sometimes contradictory, inputs, to arrive at the best possible decisions for the city as a whole. This is also true for the data policy. We received inputs from all the Zones. And while the data policy is designed to govern only the data from temporary technology installations in the Zones, community-based inputs to smart city data policy should be of considerable interest to Chief Data Officers, or other municipal data managers.

Local data policies need to inform City-wide policy

The value of Beta Blocks is in getting very local feedback into typically city-wide efforts, such as technology procurement and data policies. The challenge of Beta Blocks is in figuring out how to use local inputs to inform city wide decisions or policies. The Chinatown Zone Advisory Group was more comfortable with certain kinds of data collection than the Codman Square Zone Advisory Group. If the City needs to make procurement decisions that would impact both neighborhoods, how should it proceed? One answer might be: the City should not be making city-wide decisions. But of course, that's not always feasible. Another answer might be, each Zone Advisory Group provides important inputs that will add important nuance to decision-making. For example, perhaps the City decides on a camera-based sensor for city-wide implementation. They understand that the people in one neighborhood are far less comfortable with that technology because of fears that images might be handed over to ICE. And while another neighborhood did not share this concern, these decisions require what MIT Planning Professor Ceasar McDowell would call "design for the margins."⁵ In other words, design for those who are most marginalized, because in most cases, that ends up serving more people.

Managing expectations is difficult

It is important to establish expectations early on for all parties involved: government, tech partners, and communities. We discussed this elsewhere as the alignment of values. But even if values are aligned, it is still possible to run into problems when stakeholders expect one thing but receive another. It is important to remind communities that while they are governing activity in the Zone, they have only consultative power over procurement and data policy. And it is important to remind tech partners that while they are contributing hardware and engineering support, there is no guarantee of future business with the City. And it is important to remind the City that while they are putting in effort to engage communities in the process of imagining technology use, they may not always get actionable ideas from them. This management of expectations is not something that just happens at the beginning and then it's done. It requires persistent attention, and ongoing conversations with all stakeholders.



09 .

LOCAL DATA



An unsolved challenge

1 □

How might data collected from temporary technology installations best be accessed and assessed?

Thus far, this report has focused on questions and reflections based on the Beta Blocks prototype process. This section turns its eye towards the future, asking: **How might data collected from temporary technology installations best be accessed and assessed?** The scope of this work did not include the design or determination of a technical solution for data collected within the Exploration Zones, however we appreciate that this is a remaining and open challenge. Future Beta Blocks deployments should take this on directly by engaging with municipal CTOs and local universities around issues of data privacy, accessibility, and structure; until then, we are able to provide a few reflections based upon our experience.

KEY QUESTIONS

1. How might data collected from temporary technology installations best be accessed and assessed?

Data is not uniformly collected and structured across technology companies. While groups like NIST are making inroads toward standardization, granular urban data collection, structuring, and reporting remains non-uniform across institutions and corporations. Typically, technology companies share data with cities (clients) in the form of monthly PDF reports and on demand (albeit infrequent) datasheet exports in common formats (e.g. .csv, .xls). **Companies are not all set up to share the relatively small, frequent, and rich “data samples” that Zone Advisory Group members may need to effectively use to evaluate technologies.** As a result, requests for Exploration Zone data samples can be expensive or complicated beyond what is viable.

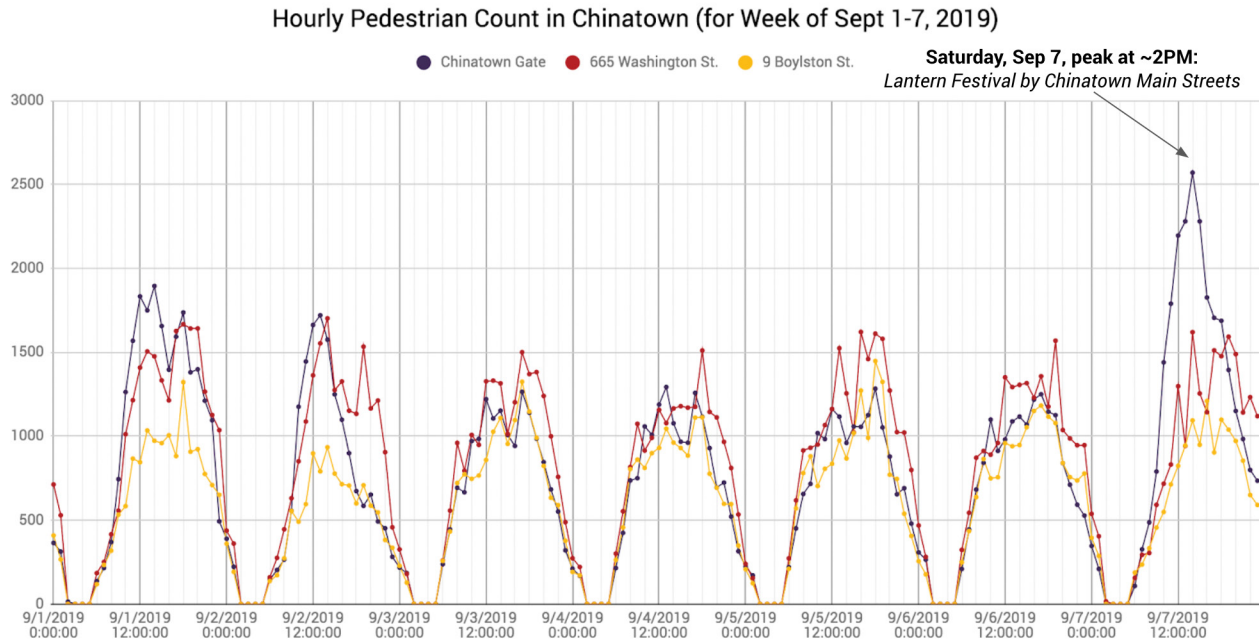


Figure 16. Visualization shared with Chinatown's Exploration Zone Advisory Group

One tech partner explained to us (emphasis added):

“While our sensors have the capability of collecting that metadata, we currently have optimized for counts of people only... we are focused on getting as accurate counts of people walking by... on foot as possible... we now are collecting tens of millions of data points per month, the cost to collect, store, and analyze metadata can exceed thousands of dollars per month. **Since we don't have a use case for those data points right now, we don't have that metadata to share.**”

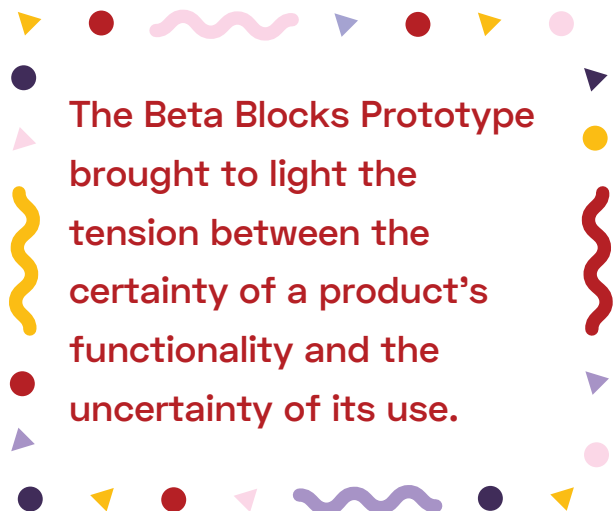
Another hurdle during the prototype process was the **technical language, time, and insistence on usability necessary to request functional data from tech partners for community members.** Our aim was to share a clean, local dataset that might represent “what the sensor sees” and be visualized in meaningful ways for community members with varying degrees of technical comfort. Through emails and phone calls, we worked with business and data science employees to understand what was possible and what was improbable. For example, the first Soofa dataset sent to our team showed aggregated counts from the entire Exploration Zone. To get the data to create a line chart of counts per sensor over time, we had to make this specific ask, understand the calibration factor, and reformat the time stamps. Then we labeled the chart with specific times of local events to help community members make better sense of the data.

10 .

CONCLUSION



Technology already permeates public space with urban sensors and data-driven decision making, and today's public servants have ample forewarning that more is on the way. Accepting this environment, we set out to collectively define the public value of smart city technologies with communities, companies, and government. The Beta Blocks prototype brought to light the tension between the certainty of a product's functionality and the uncertainty of its use. It generated an ambiguity that allowed relationships to form as people were drawn together through active questioning, without presumption of neat or simple conclusions. The prototype described in this document provides direction for building a City process for meaningfully structuring public input into decision-making about public realm technologies. The materials shared here can provide City-led ecosystems what they need to effectively engage multiple publics in dialogue towards actionable results. Our hope is that this prototype inspires other cities to take up the templates and tools we developed, remix and iterate them, and grow a learning network of smart city practitioners focused on people and public value before technologies and efficiency.



Endnotes



- 1 Green, Ben. "The Smart City: A New Era on the Horizon." In *The Smart Enough City*, Retrieved from <https://smartenoughcity.mitpress.mit.edu/pub/6l98majm>. Cambridge, MA: MIT Press, 2019.
- 2 See: Simone Browne's *Dark Matters* (2015), Cathy O'Neil's *Weapons of Math Destruction* (2016), Mar Hicks's *Programmed Inequality* (2017), Meredith Broussard's *Artificial Unintelligence* (2018), Virginia Eubanks's *Automating Inequality* (2018), Safiya Noble's *Algorithms of Oppression* (2018), Ruha Benjamin's *Race After Technology* (2019), and Eric Gordon and Gabriel Mugar's *Meaningful Inefficiencies* (2020).
- 3 Dewey, John. *Logic, the Theory of Inquiry*, 108. New York: Holt, Rinehart and Winston, 1938.
- 4 Gordon, Eric and Gabriel Mugar. *Meaningful Inefficiencies: Civic Design in an Age of Digital Expediency*. New York: Oxford University Press, 2020.
- 5 McDowell, Ceasar and Melissa Yvonne Chinchilla, "Partnering with Communities and Institutions." In *Civic Media: Technology, Design, Practice*, 461-80. Edited by Gordon, Eric and Paul Mihailidis. Cambridge, MA: MIT Press, 2016.

APPENDIX A



Origins of Beta Blocks

[The First Documented Utterance of “Beta Blocks”](#) (2015)

Explores four potential parts of a Beta Blocks legal and policy framework. For Beta Block projects “involving traffic regulation and traffic control devices,” the document defines the easiest option as projects “limited to a maximum duration of 60 days. In this situation, the project only requires experimental rule authorization from the City of Boston’s Transportation Commission or Transportation Commissioner. No FHWA [Federal Highway Administration] interaction is triggered.” If the projects lasts longer than 60 days, then MONUM will “need to determine whether the project deviates from Manual on Uniform Traffic Control Devices (MUTCD), which is complicated ([see Figure 2 diagram](#)).

[Smart City Playbook](#) (2016)

[Smart City RFI](#) (2017)

[RFI Responses](#)

[Beta Blocks RFP](#) (2018)

[Engagement Lab RFP Proposal](#) (2018)

[Draft Beta Blocks One-Pager](#) (2018)

Smart City Plays

1. Stop sending sales people
2. Solve real problems for real people
3. Don't worship efficiency
4. Better decisions, not (just) better data
5. Platforms make us go “_(ツ)_/”
6. Towards a “public” privacy policy

Figure 17. Screenshot of the Boston Smart City Playbook website (2016).

The project began as a grant-funded initiative aimed at increasing opportunities for communities to experiment with and shape civic technologies in public spaces, and to provide opportunities for civic technologists to iterate with and for their future users, the residents of Boston. Through lenses guided by Imagine Boston 2030 (the City’s first master plan in over 50 years) and Resilient Boston (the equity and resilience strategy developed by the Mayor’s Office of Resilience and Racial Equity) **Beta Blocks was originally conceived of as a civic learning and community experimentation platform**, through which communities work with the City, tech partners, researchers, and designers to explore, experiment, and evaluate new technologies and approaches to civic engagement. It aimed to “[encourage] communities to invent, adopt, and adapt urban technologies to become relevant to their lives.”

Original overall goals:

- To develop a process through which the City of Boston and its residents can continually shape an equitable, just, and productive strategy for civic technology initiatives; and to articulate this in an accessible way for residents to review and comment upon.
- To develop a self-sustaining experimentation platform and suite of policies for community-driven, civically-minded technology in the city of Boston, and to share what we learn with other cities and communities.
- To experiment with new ways to involve more people more meaningfully in processes for imagining, using, and evaluating civic technology in Boston.
- To make it easier for communities to learn about themselves—what assets they may have, what challenges they face, and what questions they'd like to answer.
- To provide tangible benefits—such as new products or community-building opportunities—to groups that participate.
- To “design for the margins”—that is, focus on partnering with organizations and residents currently least engaged by existing civic technology efforts, and help build new capacities and new pathways for participants to engage.
- To inspire local creativity, questioning, and discussion around civic technology.
- To strengthen resilient ties between residents both within and between communities.

- To provide foundational, city-wide values, infrastructure, and legal frameworks in order to maintain an equitable safety net for communities to take risks and innovate with new technologies
- To create productive and civically-oriented rules and requirements for tech companies, researchers, designers, and other who aim to test new technology in the public realm.

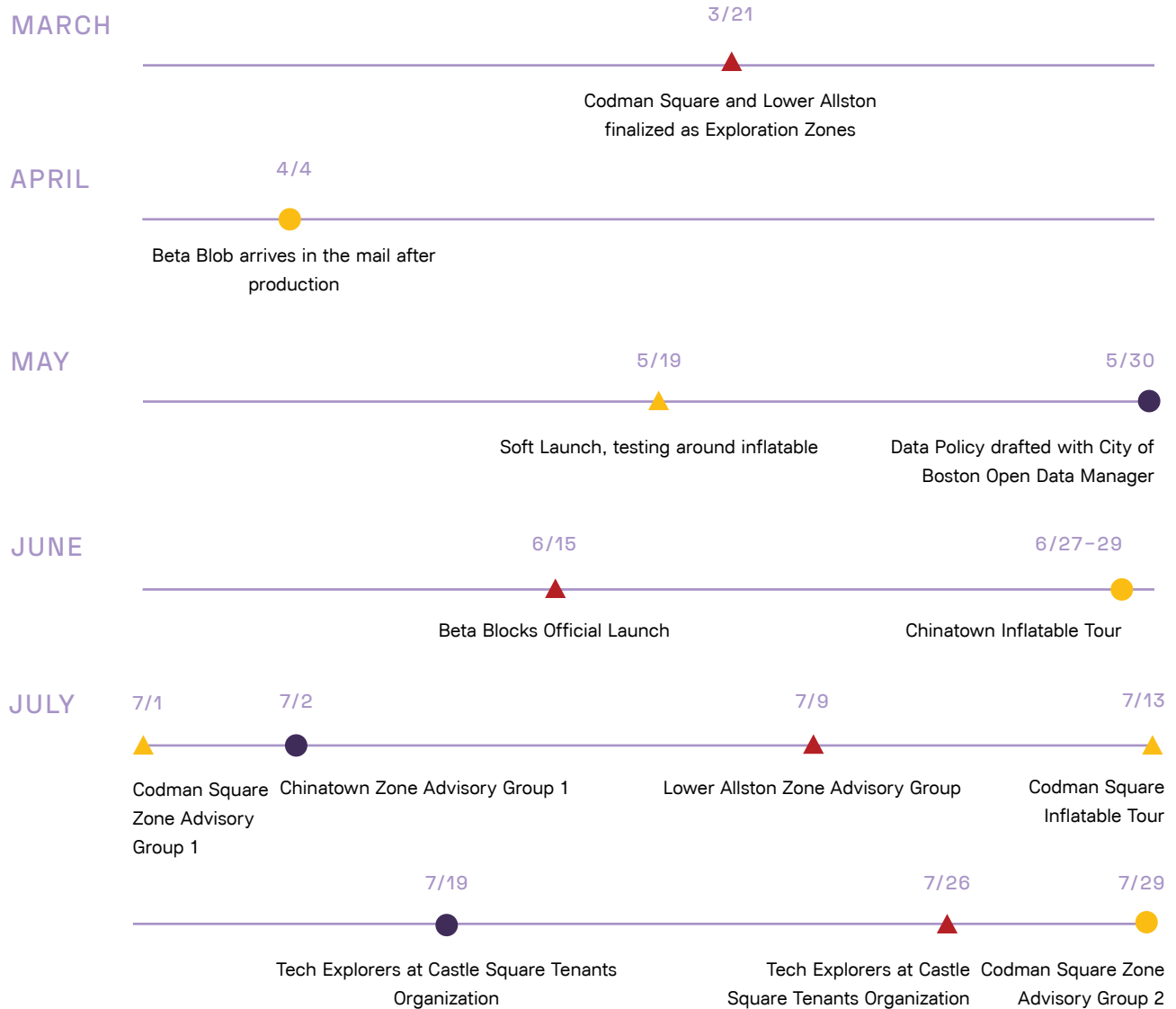
Original research questions:

- How do we define and enhance Boston's take on “smart city” technology by engaging diverse communities in discussions and experiments?
- How do we make the processes for experimenting with civic technology at a community level more equitable, creative, and open for all?
- What are the barriers preventing more communities and residents from connecting with technologists, researchers, and designers to enhance the public realm, and how could a more formalized ecosystem or platform help?
- What core civic values should undergird how civic technology is deployed in Boston, and how should we hold organizations and civic institutions accountable regarding privacy, inclusion, security, and resilience?
- How can the City support basic civic infrastructure (whether physical, social, political, or economic) that enables trust, transparency, and good-faith efforts to create new technologies of, by, and for the communities of Boston?

APPENDIX B



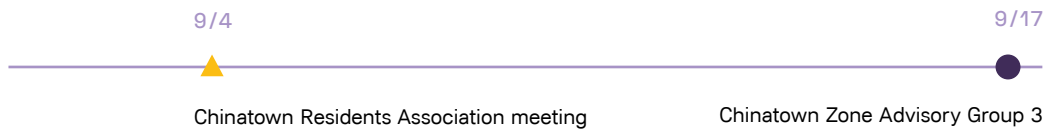
Prototype Process Timeline (2019)



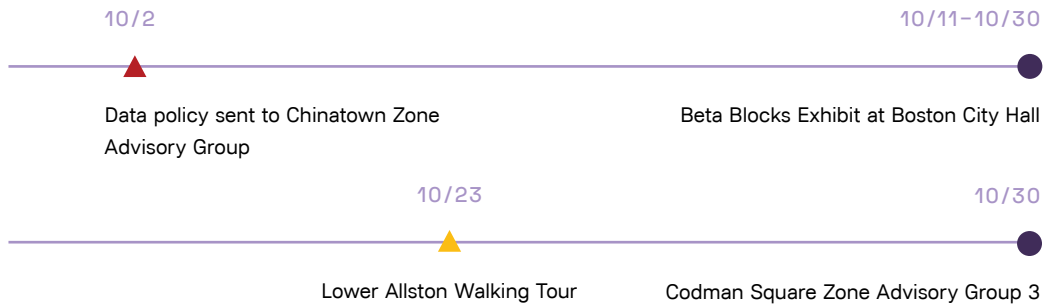
AUGUST



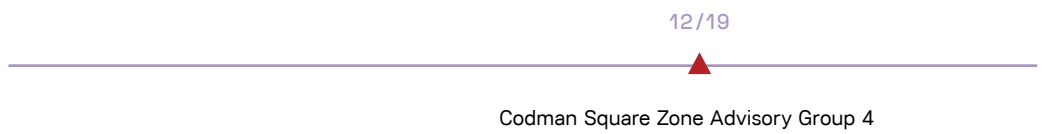
SEPTEMBER



OCTOBER



DECEMBER



APPENDIX C



Zone Advisory Group Meeting Agendas

The goal of these meeting agendas is for community members to collaboratively understand the public value of specific technologies. These meeting agendas should be deployed only if:

- The general location of an Exploration Zone has been selected
- Permitting for temporary technology installations has been secured
- Several tech partners have been recruited.
- Community members and organizations have been oriented to the project and expressed interest

1. Welcome

Present: City representative, Beta Blocks team, community members

- Start by encouraging community members to **think expansively** about what technology is and could be by playing Beta Blocks Game ([print-at-home](#) or [buy](#)).
- As a group, **define some values** this temporary exploration period should strive to uphold for. You can offer a set to start (Local Expertise over Smart City; Play over Input; Meaningful Inefficiencies; Embrace ambiguity with new tech; Pluralism over Consensus). Community organizations may offer their own set.
- Present a map of the proposed Exploration Zone to discuss, and **draw the Zone boundaries** as a group.
- Acknowledging the deep local knowledge in the room, ask the group: **Who else should be here?** This is an opportunity to broaden recruitment for the Zone Advisory Group.

2. Tech Partners

Present: City representative, Tech Partner representatives, Beta Blocks team

- Before the meeting, prepare **Technology Profiles** by interviewing (by phone or in-person) a representative of each potential product using the **Tech Partner Intake Form**. The Tech Profile is an accessible one-pager that clearly lays out the product's **physical appearance, business model, data policy, and intended use cases**.
- During the meeting, review the Technology Profiles, discuss in small groups, and **choose which technologies** (if any) to temporarily install.
- Once technologies are chosen, collectively **identify where they might be installed** on a Zone map. Community members are encouraged to use their professional and lived experiences to discuss where they believe each technology should be installed. Be transparent that preferred locations may not be possible because of required technical infrastructure (electricity, wifi, etc.).
- This activity can also be delivered as part of the **Tech Explorers** youth program.

Begin working with the City and Tech Partners to install selected technologies in preferred locations.

3. Data Policy

Present: City data representative, Beta Blocks team ([example](#))

- Begin with a short **review of what data can do and its trade-offs**.
 - the potential value of big data analytics
 - the value of “small” data in creating change (using a “Slow Streets” initiative from the local neighborhood)
 - an example of data’s hidden politics
- Run an activity to help people think about data’s trade-offs (e.g. **Vote with Your Feet** exercise about four data dimensions: **privacy, transparency, openness, and agency**).
- Discuss in smaller groups: **What do we want data to do? What don’t we need data to do?** Both should be documented for the future “Review” meeting.
- Building off of the four dimensions, begin drafting an accessible **community data policy**. This data policy can be revised over time as more is learned through the Beta Blocks process.

Technologies should now be installed in the Exploration Zones. The Tech Explorers youth program can begin observing how passersby interact with the technologies and interviewing community members on their impressions of the technologies.

4. Walking Tour

Present: City representative, Tech Partners, Beta Blocks team

- Before the meeting, map a walking route through the Exploration Zone with a Zone Advisory Group member. **Let community members lead the Walking Tour.** Tech Partners and City representatives can mainly play a listening role to learn more about local contexts and politics, and offer subject matter expertise to answer questions about permitting or product specifics.
- Print example **public labels** (see Figure 4 for an example) to hold up next to the technologies on site. Ask how the label might be changed to help passersby (1) notice the technology, (2) understand the temporary timeline for installation, and (3) share feedback via multiple options.
- For each technology on the Walking Tour, ask the group **if and how it adds value, and does it do what we want it to do?** Is it used in intended, unintended, or desirable ways? Does it address concerns raised in earlier meetings?

5. Review

Present: City representative, Beta Blocks team

- Before the meeting, work with Tech Partners to get **sample datasets** collected and/or generated by the temporarily installed technologies. Visualize the data to give community members an **accessible starting point for data interpretation.**
- At the meeting, review the **Walking Tour's key takeaways** and location-specific feedback.
- Review the data set and visualization. Ask the group:
 - Would you prefer this data not be collected? Why?
 - Are the insights from the data valuable?
 - Would they be valuable if combined with another data set?
 - How might you use this data?

6. Recommendations

Present: City representative, Tech Partners, Tech Explorers, Beta Blocks team

- Using the **Community Acceptance Criteria forms**, produce recommendations for each temporarily installed technology (see Appendix D for an example).

APPENDIX D



Example Community Recommendations

What conditions need to be met for Soofa Signs to be valuable for Chinatown?

1. Profit-sharing with the community or financially contribute to the community, i.e. fund youth literacy program;
2. Display relevant information to residents: community events, job opportunities from the City, info about local businesses;
3. Have clear and bilingual labels around the Soofa Sign to facilitate people adding more content and even being willing to pay;
4. Operate at no financial cost to the community.

Are Soofa Signs valuable for Chinatown?

- Space is an issue in Chinatown, e.g. rideshare bikes already take up a lot of space; sidewalks are already narrow. **But if local businesses could use Soofa Signs to advertise their businesses on sidewalks—given the limited storefront advertisement space—then these Signs might add value despite taking up limited sidewalk space.**

— So far, it isn't obvious who benefits from the data collected:

1. Knowledge from pedestrian count data that Chinatown is busy on weekends is mostly obvious;
2. Data about how many pieces of content was submitted isn't useful because Zone Advisory Group wants to see what content was posted.

— Soofa is making money from advertisements. So it seems that if this were truly to be valuable for Chinatown's communities, there would need to be some profit sharing of generated revenue.

— City: Would it be useful if we worked with Tech Partners that collect pedestrian count data but didn't add the digital billboard on the streets instead?

- Zone Advisory Group: No, most local businesses already know pedestrian count patterns. **Having this pedestrian count data doesn't really add much value.**

APPENDIX E



Example Tech Partner Report

[Click here](#) to download the full report. Below are Soofa's main takeaways from their Beta Blocks experience in Boston's Chinatown:

Our Chinatown Learnings

Diverse community voices are amplified. Great content has been posted by numerous organizations, individuals, and businesses in Chinatown. The following pages share specific content, its reach, and the content creators.

Language is extremely important. In partnership with the community, the vinyl decal was redesigned in Chinese characters. A majority of the digital content shared is multilingual, created directly by the community.

Community walkthroughs deliver value. Spending time in the neighborhood with community members leads to our greatest learnings; multiple visits ensure we are meeting different people each time. As residents interact and experience the technology as it is part of their daily lives, we are receiving the most meaningful and consistent product development feedback.



Beta Blocks Progress Update

Summary of Chinatown Learnings To Date

Prepared: October 7, 2019

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Soofa Beta Blocks Summary October 2019 - Chinatown

soofa

RESOURCES



- Civic Smart City [website](#) & [whitepaper/workshop guide](#)
- [Tech Partner Intake Form](#)
- [Example Technology Profiles](#)
- [Memorandum of Understanding \(MOU\) template](#)
- Beta Blocks: The Game ([print-at-home](#) or [buy](#))
- [Example Community Data Policy](#)
- [Tech Explorers Booklet](#)
- [Community Acceptance Criteria template](#)
- [Soofa Chinatown Report](#)

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