City of Cambridge
Executive Department

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To the Honorable, the City Council:

The City has received a request from a group of researchers at the Senseable City Laboratory at the Massachusetts Institute of Technology ("MIT"), to perform a test installation of a range of sensor technology along Massachusetts Avenue between Vassar Street and Lansdowne Street, in proximity to the MIT campus. The researchers are planning to deploy multiple sensors that are capable of observing the behavior of pedestrians, cyclists, and drivers, monitoring and reporting on parking occupancy/availability, and measuring air quality. These sensors would be mounted on City-owned street light poles. Because some of the sensors that would be deployed involve the use of both thermal and optical cameras, I wanted to provide the City Council with notice of my intent to enter into a license agreement with MIT to allow this installation to take place. I felt that this notification is particularly important given ongoing concerns about privacy and the potential for surveillance, and in acknowledgement of the desire for transparency that is a key element in the draft surveillance ordinance that has been proposed to the City Council.

Many cities around the country and around the world are pioneering innovations in the areas of smart cities, which involves the deployment of technology initiatives within cities to provide more effective, lower cost, and more ubiquitous services to residents. Cities such as New York, Chicago, Kansas City, and others are beginning to deploy these technologies in both large and small ways, testing out a range of approaches to these rapidly growing applications. The MIT Senseable City lab is a leader in this field, and I believe partnering with them on this test installation will put the City in a strong position to experience multiple benefits:

- The deployment of this type of sensor technology has the potential to directly benefit residents, business, and visitors, in areas such as transportation, public health, environmental monitoring, and public safety. Potential applications could include providing drivers with information about available parking spaces (to provide better customer service and reduce unnecessary driving from searching for parking) and identifying locations with elevated pollution levels. While this initial testing will only scratch the surface of the possible applications of this technology, by being at the forefront of deploying these types of sensors, Cambridge will have the potential to be an early beneficiary as these move from testing into more widespread use.

- By serving as an early test bed for different types of sensors, we can be involved in the research that will determine how these sensors are used, how they can benefit municipalities and their

residents, and the types of parameters that can and should be put on their use, whether in terms of privacy, aesthetics, commercialization, or liability.

- As these technologies move from research into development and more widespread use, Cambridge has the opportunity to capture some of the economic development benefits of the startup industry that is starting to form around sensors and the overall development of Internet of Things ("IoT") devices, services, and technologies, helping the City maintain its leadership in technology development.

Recognizing the privacy concerns that have been raised by some Cambridge residents, we believe that this test deployment includes a number of features that limit concerns about privacy.

- In discussions with the researchers, it is clear that the cameras to be used are relatively low resolution and are not capable of capturing individual faces and/or license plate information. In fact, the research team has made it clear that their strong desire is to minimize the resolution (and the resulting volume of data) that is captured, to minimize the complexity and expense associated with moving that data back to a central location and then storing that data for any significant length of time. Their strong preference is to develop sensor technologies that perform much of the analysis at the actual sensor location (at the edge of the network), to reduce the volume of data that is being transmitted back to any central location. For example, in the case of a camera that is counting cars, it is much preferable to analyze traffic camera feeds "at the edge" and then simply transmit the count of the number of cars, rather than attempting to transmit and store the actual raw video data centrally. In addition, they are experimenting with thermal cameras that are specifically intended to not capture any identifying information from individual people or vehicles.

- The data that is captured will be transmitted back to a central storage location that is owned by MIT, using MIT's wireless and wired networks. As a result, any raw data will never be under the City's direct control and would not be subject to a public records request.

- The research protocol has been reviewed by the Committee on the Use of Humans as Experimental Subjects, which is MIT's Institutional Review Board (IRB). This review ensures that the experimental protocol is appropriate and meets federal guidelines on human subjects research, which provides the City with additional confidence that any data that is collected will not be used in an inappropriate manner.

- The City's license agreement can be cancelled on short notice, so if we learn that there are any valid concerns about privacy or other issues as the test installation proceeds, we can pause or stop the testing at our discretion.

Considering this issue in a broader context, this test installation will provide the City with an opportunity to gain additional experience with cameras (and other sensor technology) in a controlled way, with a research group that is interested in being as cooperative as possible to ensure that any concerns are taken seriously and are addressed in a meaningful way. The City has already gained some limited experience with the use of traffic cameras to count vehicles, using systems where the video feed is either analyzed "at the edge" in real-time using machine vision, or is only stored for as long as is necessary to perform that analysis and then deleted. In these instances, we have received limited questions regarding these installations, which we have been able to answer in a satisfactory manner. It is anticipated that the additional experience with this research installation will help to inform future policies and approaches on the future deployment of sensors and cameras, in a variety of different ways.

- Can sensors and cameras be used to assist in delivering high quality services in an efficient way, while avoiding concerns regarding surveillance and privacy?

- How comfortable is the Cambridge community with this type of technology, and what type of notification and information access procedures should be in place to create the appropriate level of transparency?

- If and how we should be charging private entities for the right to attach these technologies to our infrastructure (streets lights, traffic signals, etc.)? For this research effort we are not proposing to charge the MIT group, but as these technologies mature and are commercialized, we will need to understand if it is more appropriate to charge a fee associated with the license, and how we would prioritize multiple requests for use of the same infrastructure.

- What are the potential aesthetic, structural, and other impacts of mounting these types of devices on our infrastructure?

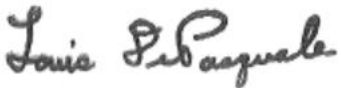
- What are the true benefits to local residents, businesses, and visitors, as opposed to the benefits to the businesses that might be attempting to commercialize and gain profits from these technologies?

- Does the deployment and use of technology create any equity, civil rights, or social justice issues that the City needs to take into consideration as we consider how these technologies should be used in the future?

- What legal structures should be in place relative to liability, insurance and indemnification, as well as ensuring that any items are removed from the City's infrastructure if they are no longer in use?

Based on all of these factors, I believe that approving this test installation and entering into a license agreement with MIT represents significant potential positive benefits in both the short- and long-term. As more and more cities begin to move in a similar direction and start to deploy an array of "smart cities" technology, I believe that it is important for Cambridge to be at the forefront of these developments, so that we can continue to delivery high quality public services in an efficient, effective, and equitable manner.

Very truly yours,



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