esri Canada | Education & Research

OCAD UNIVERSITY

Designing a Complete Streets Dashboard for Team iCity

Veda Adnani[1], **Iman Kewalramani**[1], Greice C. Mariano[1], Orlando Bascunan[1], Bo Wang[2], Matthew J. Roorda[2], Jeremy Bowes[1], Sara Diamond[1]

[1]Visual Analytics Lab (VAL), OCAD University

[2] Dept. Of Civil & Mineral Engineering, University of Toronto

2020 GIS in Education and Research Conference

Agenda

- Introduction
- Motivation
- Complete Streets Dashboard
  - Design
  - Implementation
- Complete Streets Dashboard & Esri Platform
- Future Work

Introduction

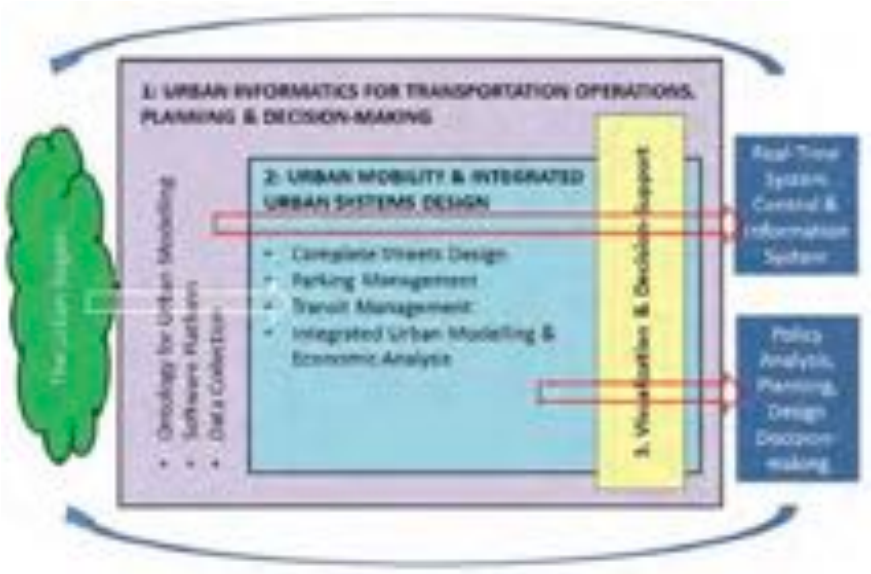
Source: City of Boulder Colorado

Motivations & Considerations

Create a tool that can act as a bridge between governance and urban design, to allow planners to focus on user needs and optimize their processes.

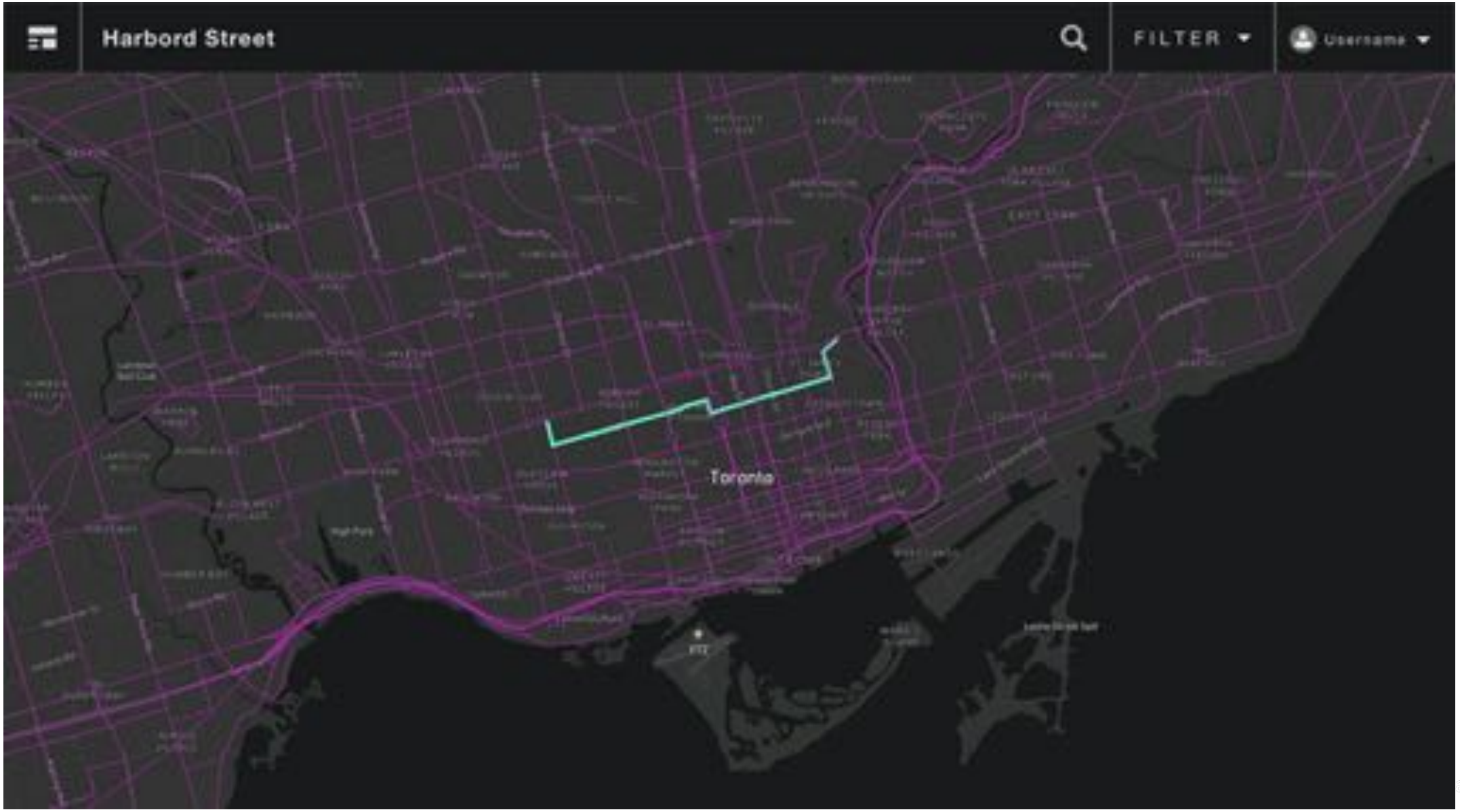
Considerations:

- User Friendly
- Scalable
- Universal
- Adaptive

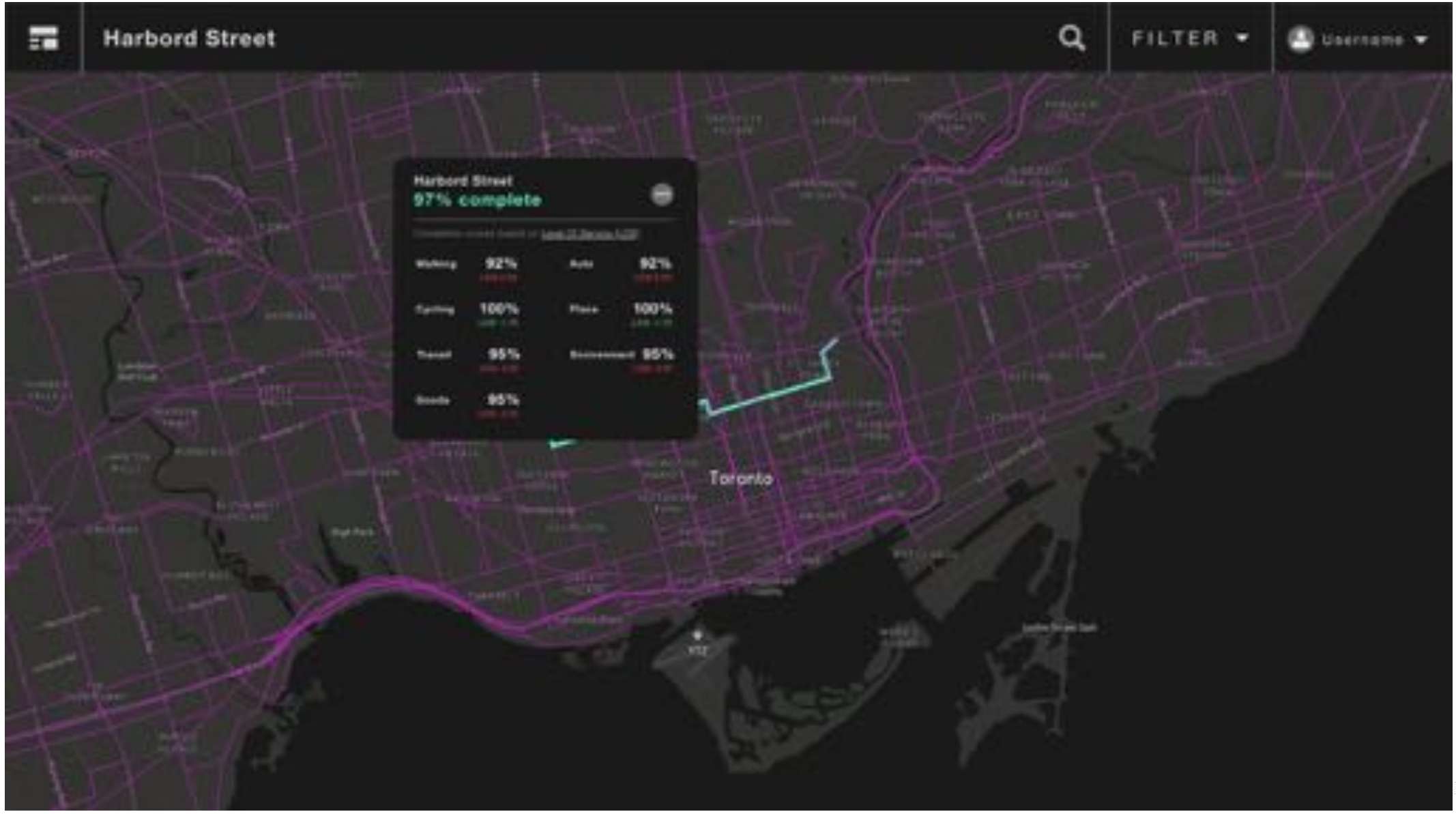


Complete Streets Dashboard

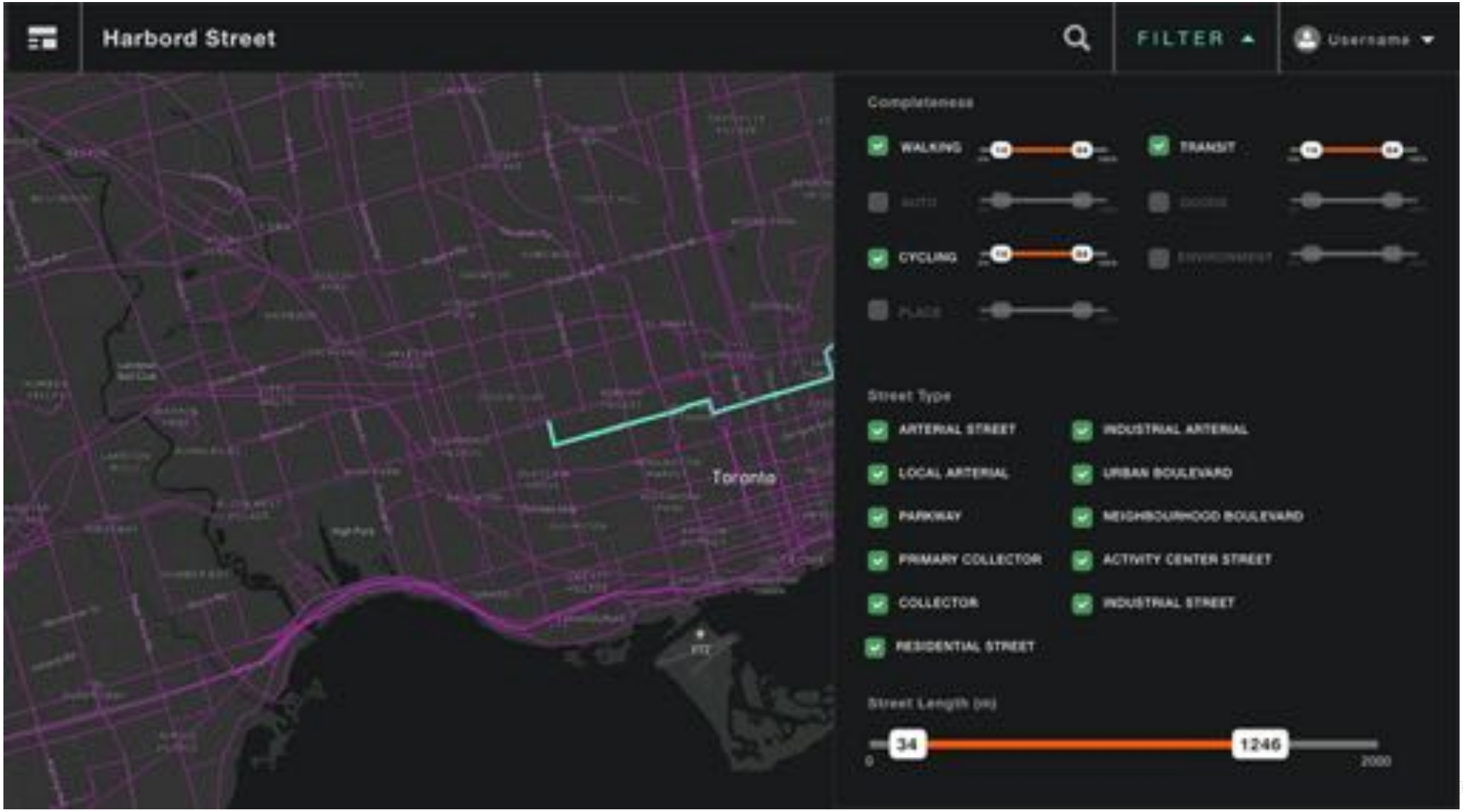
Complete Streets Map View



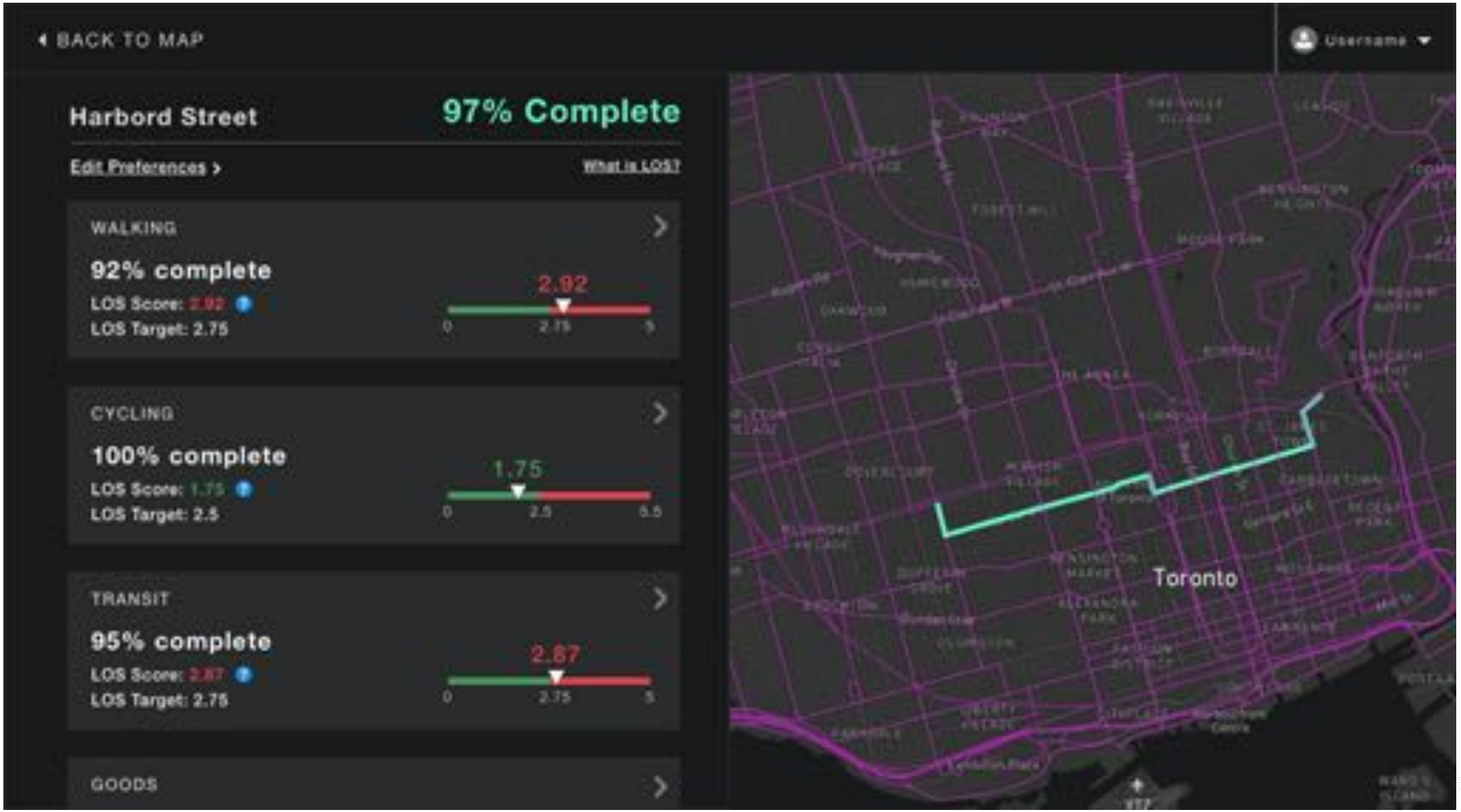
Complete Streets Map View Pop Up



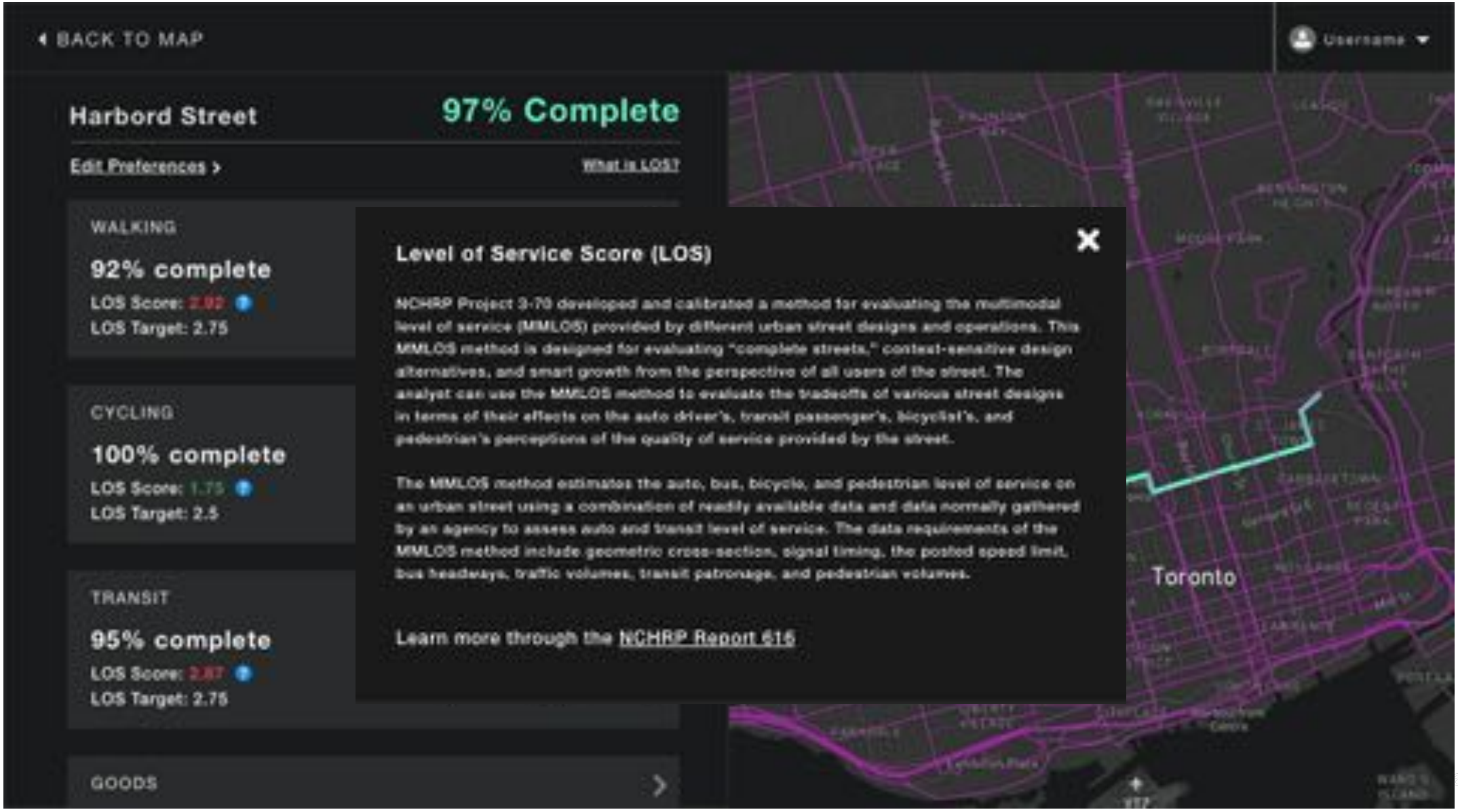
Complete Streets Map View with Filter



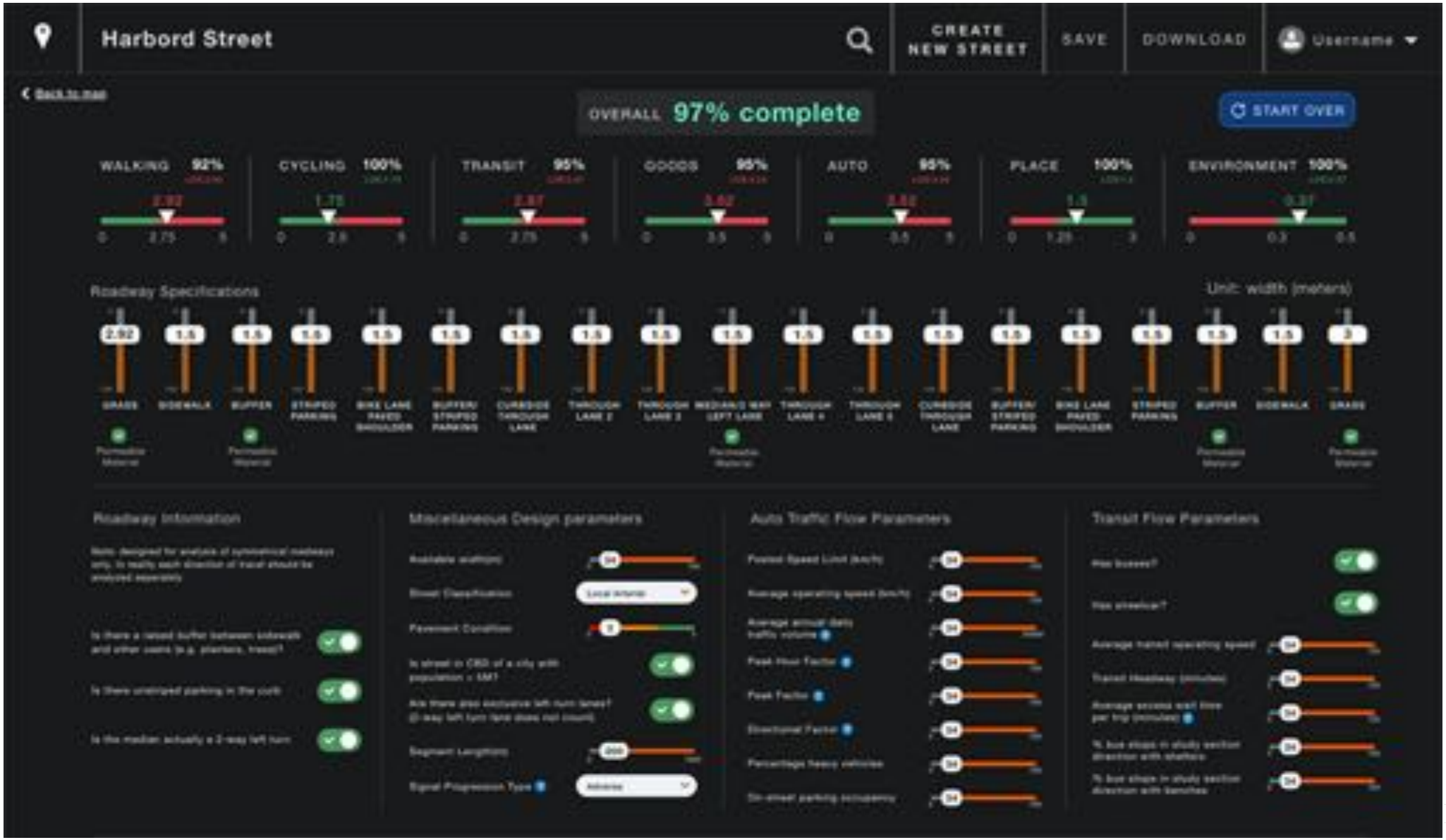
Complete Streets Detail Street View



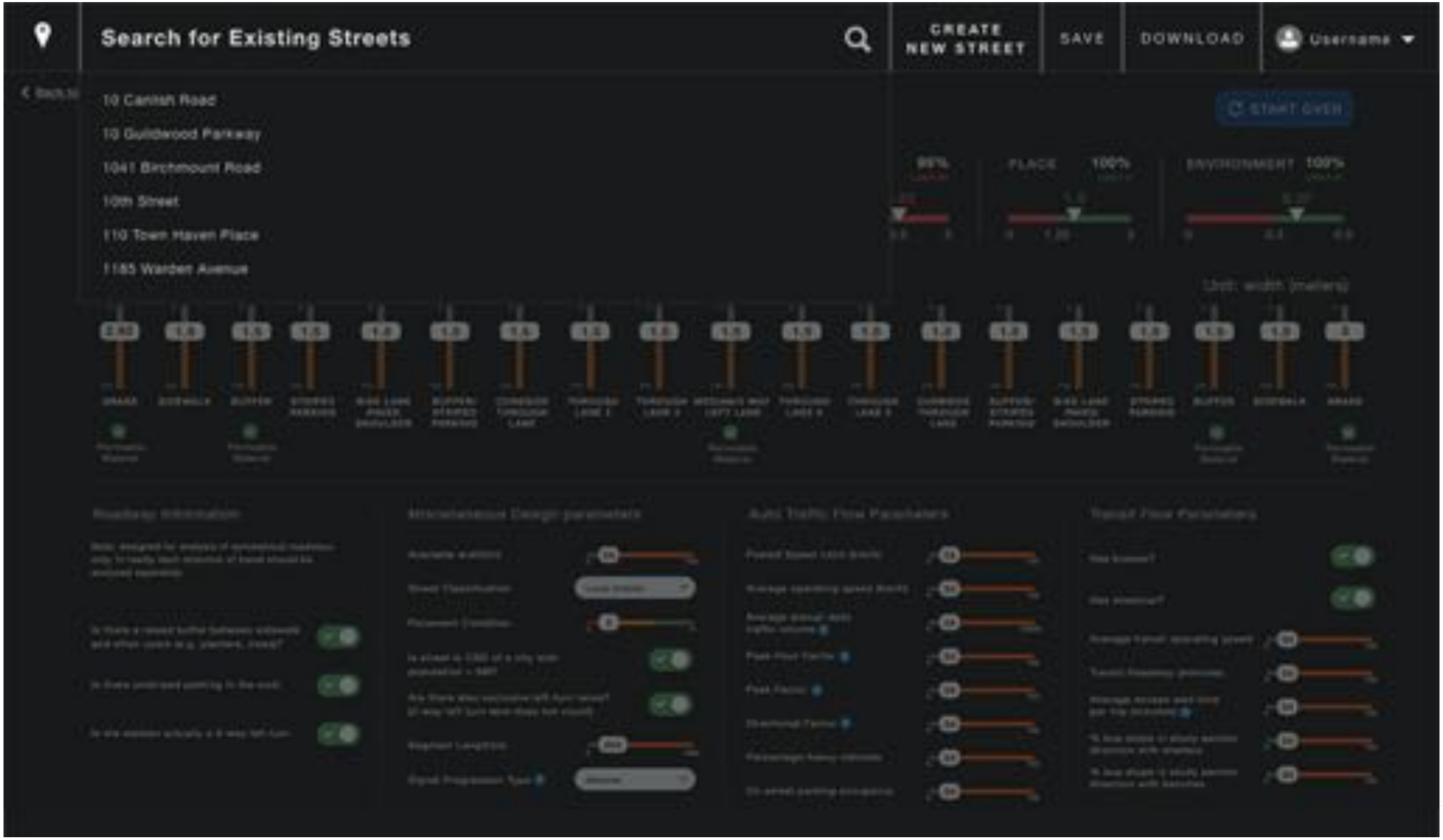
Complete Streets Detail Street View



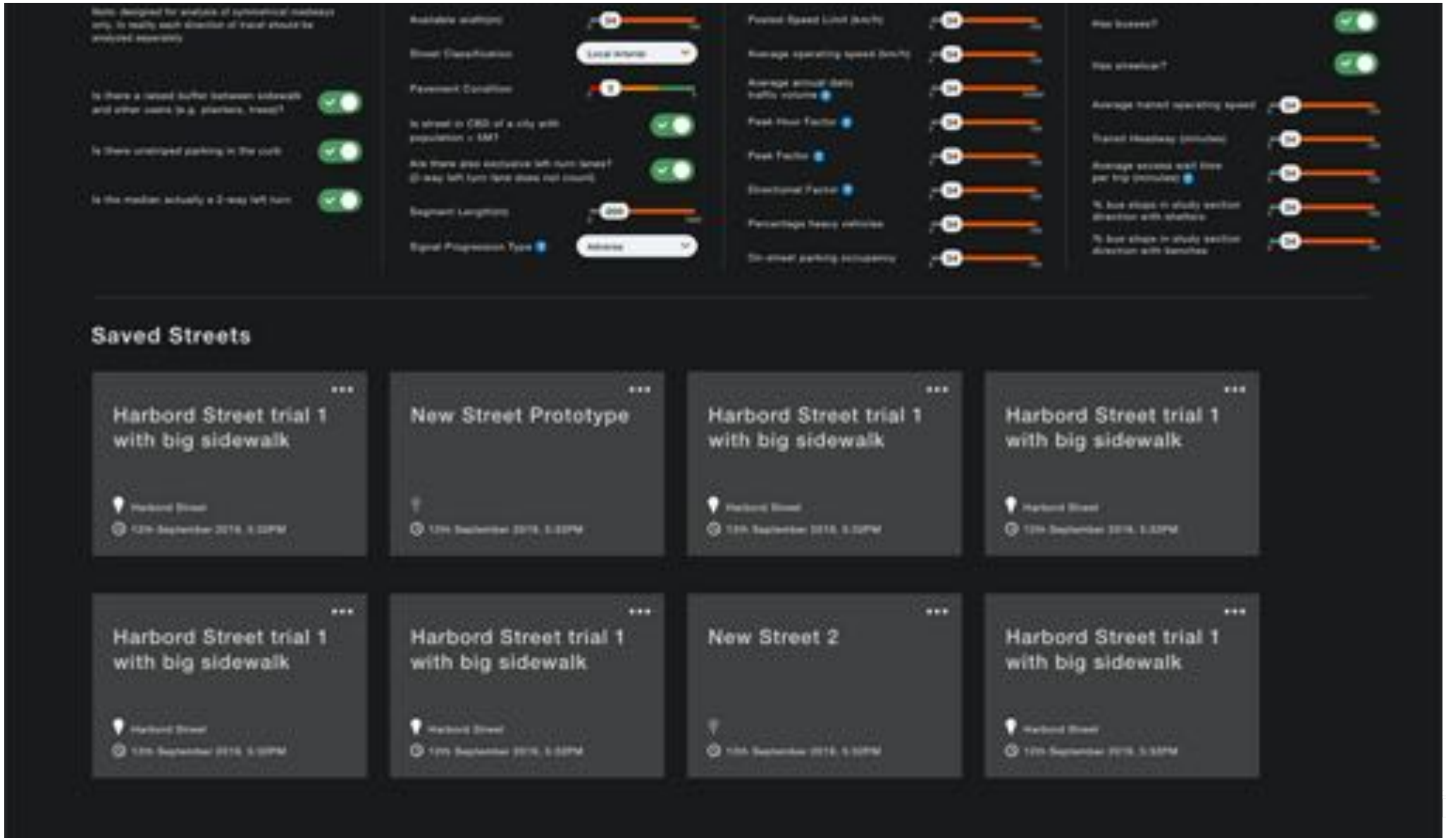
Complete Streets Dashboard Control



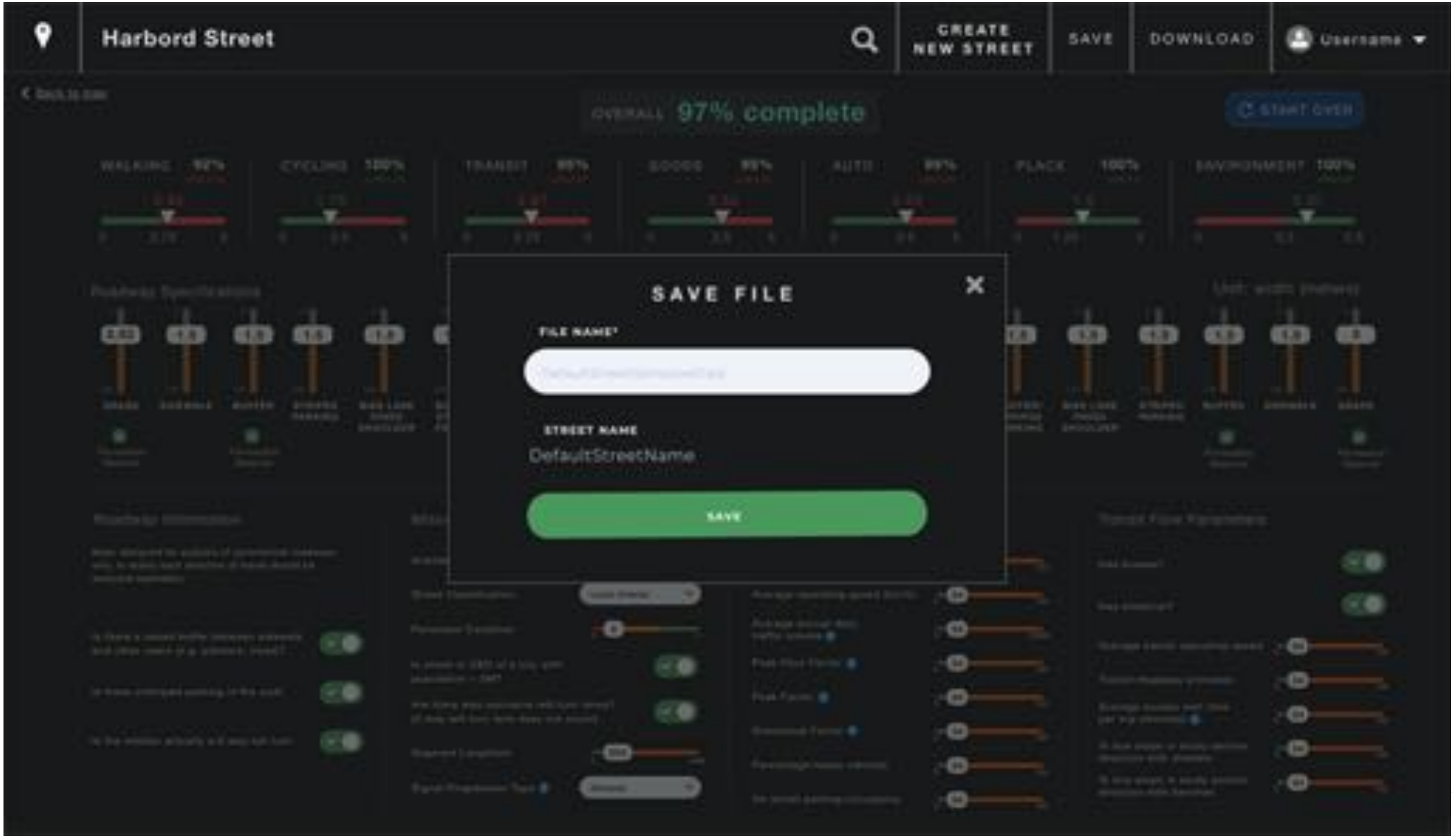
Complete Streets Dashboard Search



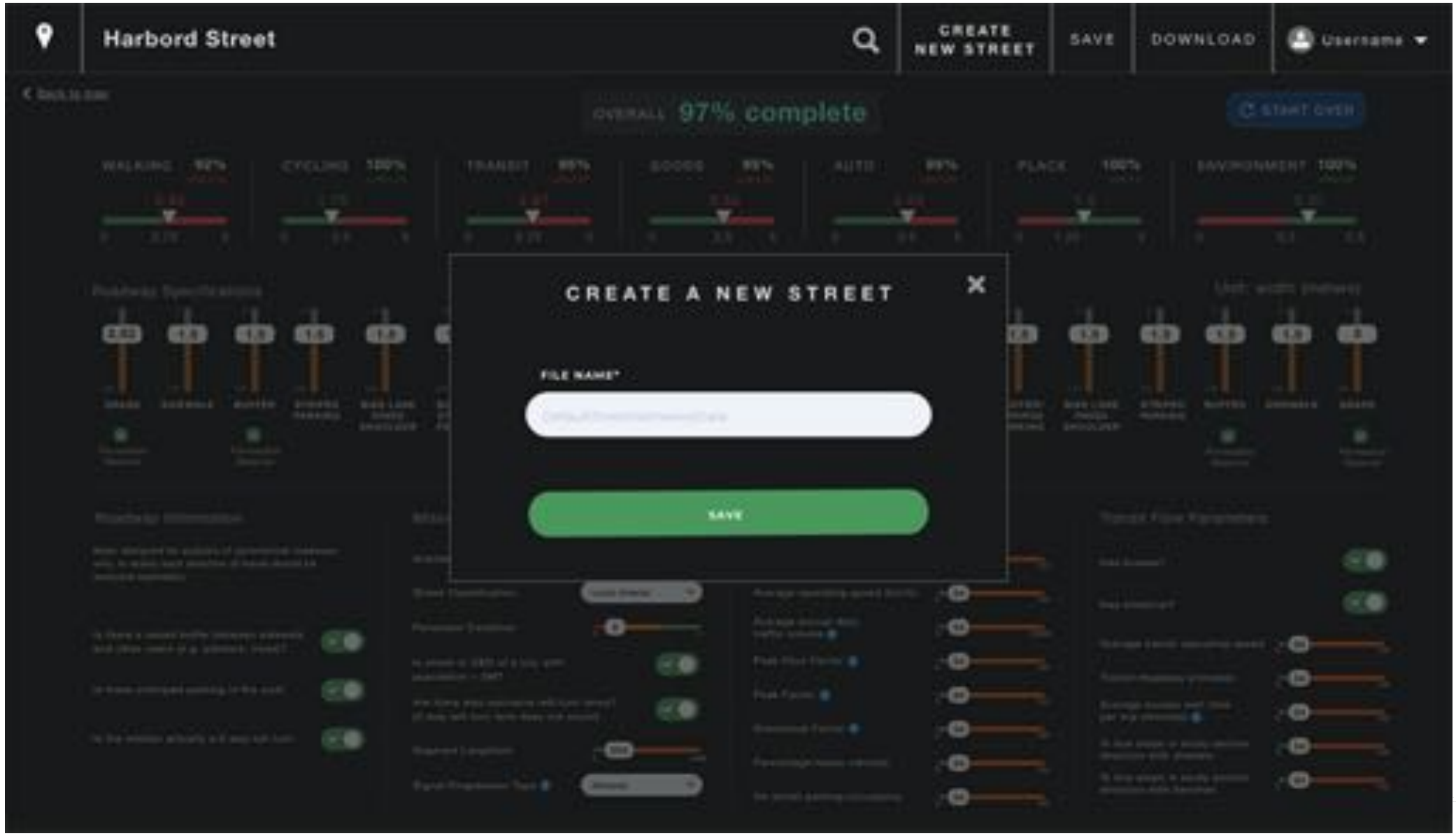
Complete Streets Dashboard Archive



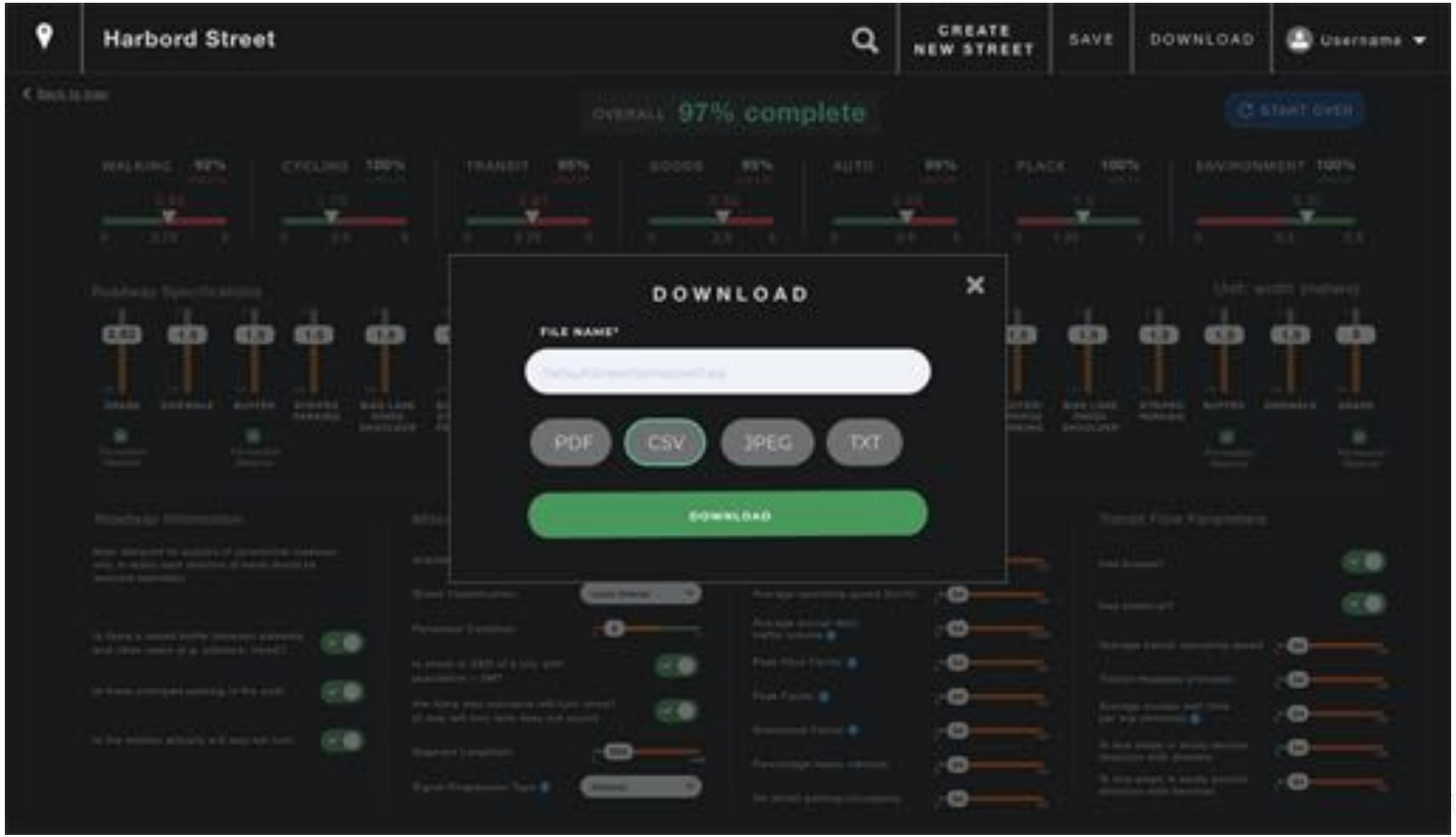
Complete Streets Save Existing Street



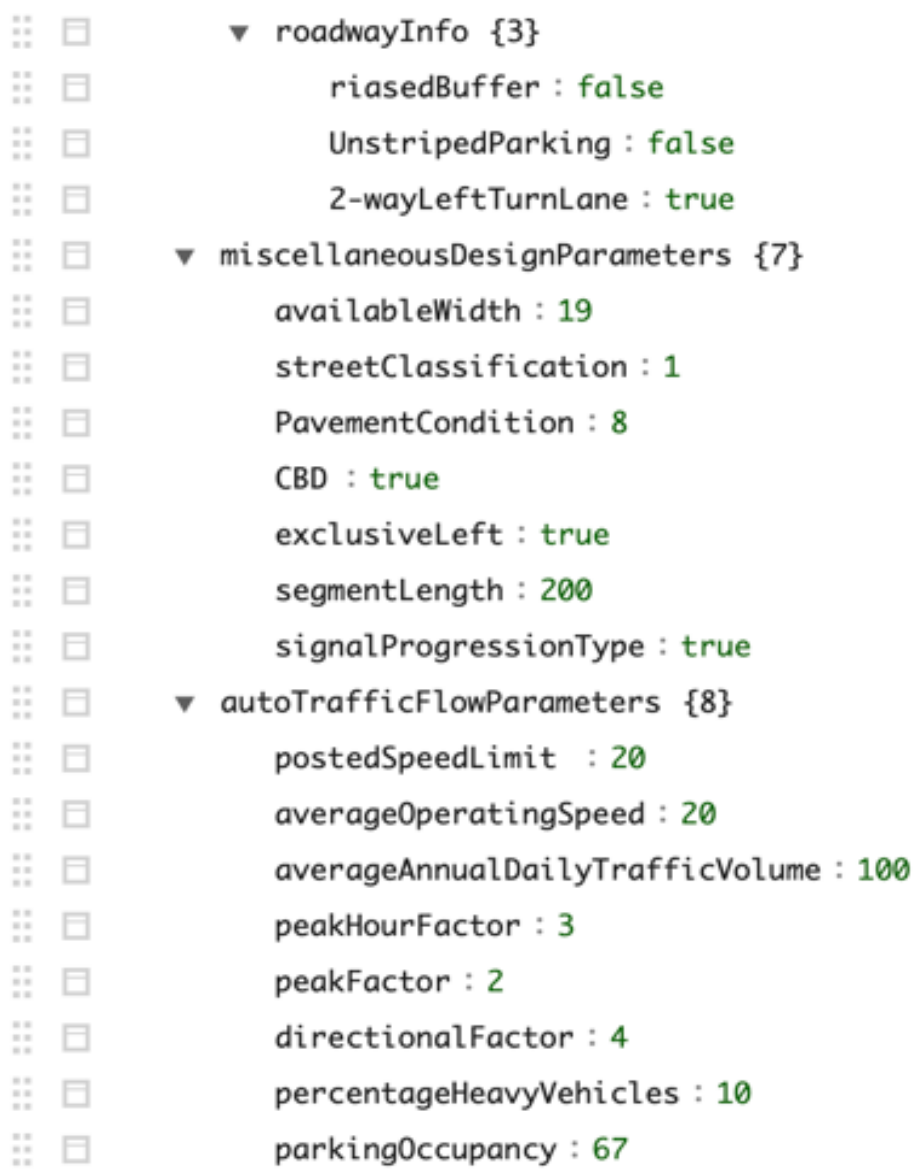
Complete Streets Save New Street



Complete Streets Download Street



Complete Streets Data Structure



OCAD UNIVERSITY

Dashboard Technologies

deck.gl

{ data visualization at scale }

Complete Streets Dashboard Tool

- Video

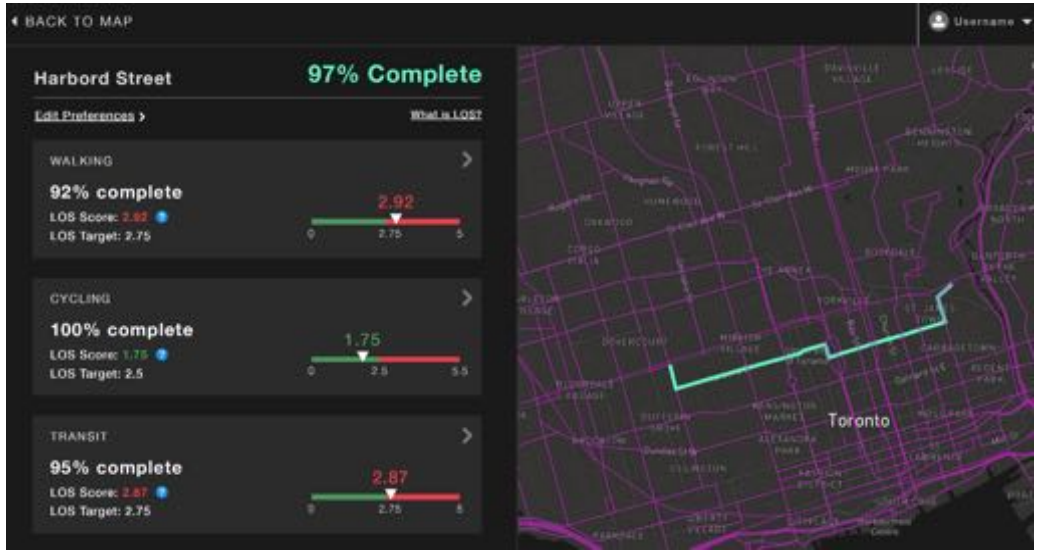
Complete Streets Dashboard & ESRI Platform

Main objectives:

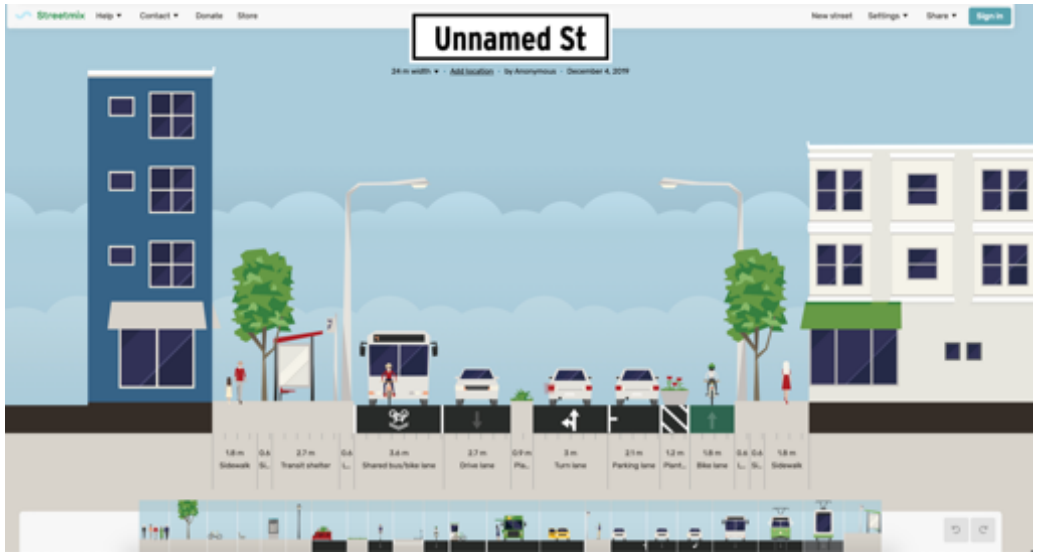
- **Convert the existing prototype to Esri feature services** and the ArcGIS API for JavaScript.
- Maintain all functionality of the existing prototype.
- Take existing street network data from a GIS database, enrich it to **contain full parametric attributes** for distinct segments (sidewalks, paving materials, rail tracks, bike lanes, car lanes, public transit lanes, building abutments, greenery, sidewalk furniture etc).
- **Develop a 2D interactive cross-section design tool** that allows users to change the constituent parts of a selected street segment, and adjust parameters (e.g., right-of-way width, boulevard width, sidewalk width, building setbacks).
- **Develop a 3D viewer** that uses the common parameter set and street segment attributes (e.g., sidewalk materials, street tree presence and species, street furniture presence and type) **to generate a 3D Web scene** from an automated set of **CityEngine** procedural rules.

OCAD UNIVERSITY

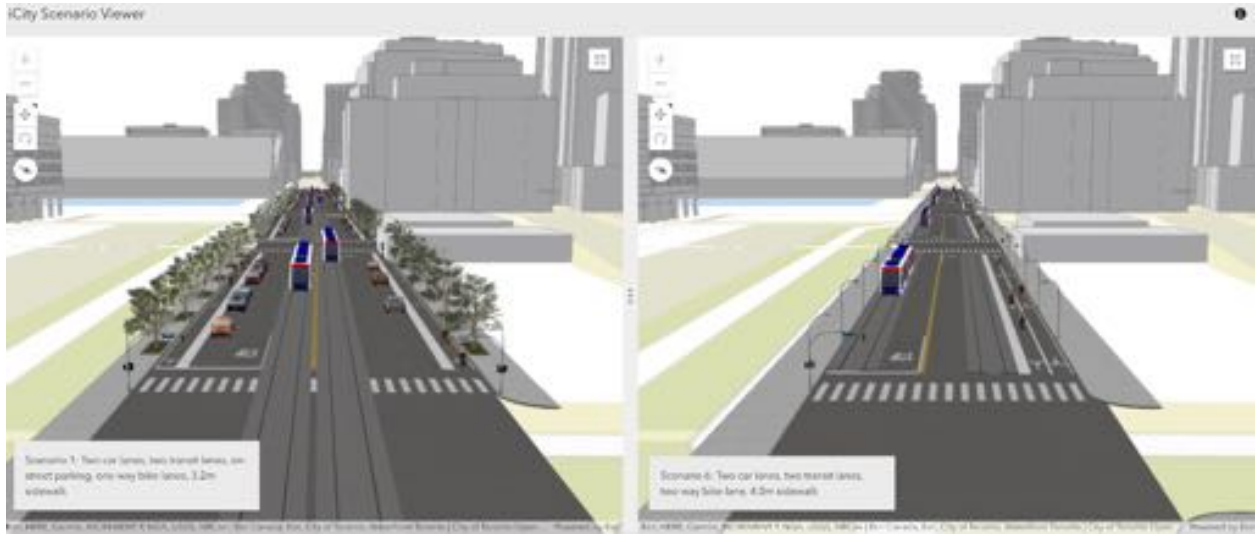
Complete Streets Dashboard & ESRI Platform



Current Prototype developed by OCAD team



Streetmix 2D cross-sectional complete streets tool



A 3D webscene of complete street options generated in CityEngine.

OCAD UNIVERSITY

esri Canada Education

Future Work

- User Testing
- Further UI development
- Explore Scalability of the tool across different geographies
- Responsiveness
- Native Applications

References

- City of Toronto Homepage, Complete Streets Guidelines by Chapter.https://www.toronto.ca/services-payments/streets-parking-transportation/enhancing-our-streets-and-public-realm/complete-streets/complete-streets-guidelines/. Last accessed 30 Jan 2020.
- Complete Streets for Canada Homepage,https://www.completestreetsforcanada.ca/locations/. Last accessed 29 Jan 20205. Complete Streets for Canada, Complete Streets Guide, https://www.completestreetsforcanada.ca/wp-content/uploads/2014/09/www.calgary.ca_Transportation_TP_Documents_CTP2010_complete-streets-guide-2014-web.pdf (2014). Last accessed 30 Jan 2020.
- Dowling, R.-G., Reinke, D.-B., Flannery, A., Ryus, P., Vandehey, M., Petritsch, T.-A., Landis, B.-W., Rouphail, N.-M., Bonneson, J.: NCHRP report 616: Multimodallevel of service analysis for urban streets. Transportation Research Board of theNational Academies, Washington, DC (2008).
- Dowling, R.-G., Reinke, D.-B.: NCHRP Web-Only Document 128: Multimodallevel of service analysis for urban streets: users guide. Transportation ResearchBoard (2008).8. Gordon, M., Diamond, S., Zheng, M., and Carnevale, M.: Compara. Encounters inTheory and History of Education,19, 163—185 (2018)9. Florida Department of Transportation, Quality Level of Service Handbook,https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/content/planning/systems/programs/sm/los/pdfs/2013_qlos_handbook.pdf?sfvrsn=22690bd2_0(2013). Last accessed 30 Jan 2020
- Hui, N., Saxe, S., Roorda, M., Hess, P., Miller, E.: Measuring the completeness ofcomplete streets. Transport Reviews.38, 1–23. (2017)11. IDEODesignThinkingHomepage,DesignThinkingToday,https://designthinking.ideo.com/#design-thinking-today. Lastaccessed 29 Jan 2020.
- Keivani, R.: A review of the main challenges to urban sustain-ability. InternationalJournal of Urban Sustainable Development1, 5–16 (2009). Laplante, J., And, P., Mccann, B.: Complete streets: We can get there from here.Institute of Transportation Engineers (ITE) Journal,78, 24—28 (2008).

References

- Lynott, J., Taylor, A., Twaddell, H., Haase, J., Nelson, K., Ulmer, J.,McCann, B., Stollof, E.-R.: Planning complete streets for an aging amer-ica,https://www.aarp.org/home-garden/livable-communities/info-08-2009/Planning_Complete_Streets_for_an_Aging_America.html(2009). Last accessed 29 Jan 2020.
- McCann, B.: Completing our streets: The transition to safe and inclusive trans-portation networks. DC: Island Press, Washington (2013)16. Nascimento, I., Silva, W., Gadelha, B., Conte, T.: Userbility: a technique for theevaluation of user experience and usability on mobile applications. In InternationalConference on Human Computer Interaction, pp. 372–383. Springer, Cham (2016).
- National Complete Streets Coalition: The best complete streets policies of 2015.(2016)18. Nielsen, J., 10 usability heuristics for user interface design,https://www.nngroup.com/articles/ten-usability-heuristics/. Nielsen Norman Group (1995). Lastaccessed 26 Jan 2020
- Nielsen, J., Usability 101: Introduction to Usability, https://www.nngroup.com/articles/usability-101-introduction-to-usability/. Nielsen Norman Group(2012). Last accessed 26 Jan 202020.
- Nusrat, S., Kobourov, S.: Task Taxonomy for Cartograms, In: Bertini,E., Kennedy, J., Puppo, E. (eds) Eurographics Conference on Visualization (EuroVis) - Short Papers. The Eurographics Association (2015). https://doi.org/10.2312/eurovisshort.2015112621.
- Reynolds, G.: Presentation Zen Design: A Simple Visual Approach to Presentingin Today's World. 2nd edn. Pearson Education. (2014).22. Rowe P.: Design Thinking. The MIT Press, Cambridge (1987)23. Rowe P.: Design Thinking in the Digital Age. Harvard University Graduate Schoolof Design, Cambridge (2017).

esri Canada | Education & Research

https://hed.esri.ca highered@esri.ca

QUESTIONS?

Click to add text

Visual Analytics Lab OCAD University

Veda Adnani, vadnani@ocadu.ca, Iman Kewalramani, ikewalramani@ocadu.ca

We gratefully acknowledge the support of University of Toronto, Canada Foundation for Innovation, the Ontario Ministry of Research & Innovation through the ORF-RE program for the iCity Urban Informatics for Sustainable Metropolitan Growth research consortium; NSERC Canada CreateDAV, and MITACS for support of graduate internships.

Thank you!