

Final 2019-20 Report for

## **Assessing Neighborhood Infrastructure through an Equity Lens: Developing Methods and Partnerships for Community Infrastructure Mapping**

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### **Introduction**

In the United States, transportation infrastructure has a history of dividing neighborhoods and disrupting communities locally and across the country. For example, suburbanization of American cities and white flight facilitated by the automobile (Jackson 1985) and urban renewal projects involving urban freeway construction (Avila 2009) separated cities by income and race. Local examples in the 20<sup>th</sup> Century include construction of US 52, Business 40, and University Parkway among others. Transportation and the infrastructure and services that support it are ubiquitous in daily life as a means of accessing services, school, employment, etc. and connecting with people. The city's transportation and development history continues to enact inequities across the city; it is no longer about new construction projects but rather the legacy of decisions that separated or displaced neighborhoods and limited the choices and opportunities for some residents. There continues to be differences between neighborhoods in terms of the presence and condition of infrastructure like sidewalks, crosswalks, bus stops, storm drains, and others that contribute to a safe and healthy neighborhood and provide access to services.

The goal of this project is to capture impacts of inequitable distribution of large-scale infrastructure to or through neighborhoods and support efforts for resident-driven change. The work is guided by the following research question: ***What are physical assets and challenges at the neighborhood level in Winston-Salem and how do they compare across neighborhoods?*** The original scope of my 2019-20 fellowship work included (1) developing and testing methods for neighborhood identification and visualization of physical assets and challenges, (2) forming/maintaining relationships with neighborhood leaders, and (3) engaging Wake Forest University (WFU) and Winston-Salem State University (WSSU) students in project work. A philosophy underlying the choice of methods is that neighborhoods should collect and control their own data. Issues of power and control are important to consider upfront when universities (or other large organizations) are trying to partner with community. The methods could be used long-term by neighborhoods to identify and track changes in physical assets and challenges and communicate with other stakeholders.

### **Research Methodology**

Based on preliminary interdisciplinary work completed in 2018-19, walking interviews and place-based audits were selected as a starting point for this project because the methodologies allow for capturing residents' stories and their interactions with their neighborhood's physical environment. In the early stages, the methods will result in quantitative and qualitative baseline data that can be used by

neighborhoods for future planning and design work. An important part of this work is completing it side-by-side with neighborhood partners.

The *walking interview* finds its roots in applied geography, but has also recently been used in social science and humanistic research. The walking interview takes an “explicitly spatial approach” to ensure that the physical environment and the act of walking drive data collection (Jones, P. et al 2008). Based on a pilot test of the walking interview method, stories about transportation and physical infrastructure naturally emerge during the walk, along with broader stories about life in the neighborhood and the evolution of the city. The key is for interviewees to choose the route or locations that they would like to talk about and for conversation about the places and experiences to evolve naturally. Working with a student research group and neighborhood representatives, we developed an interview protocol that consists of a pre-interview planning session, the walking interview itself, and a brief post-interview reflection. Depending on how the sessions are scheduled (i.e., all at once or on separate occasions) and the interviewee’s chosen route, the entire protocol requires about 1-1.5 hours.

*Infrastructure and place-based audits* are a common tool in engineering and urban planning for affirming or identifying gaps in a building or area’s accessibility, walkability, or other goals. The audits are typically conducted using a checklist or survey of features or requirements. For this work, we developed a draft neighborhood audit tool (see Figure 1 for an excerpt) that residents or partners could use to identify assets and challenges.

## Neighborhood Audit Tool

*Choose one block near your home or other neighborhood destination and record your observations.*

Date: \_\_\_\_\_ Start Time: \_\_\_\_\_ End Time: \_\_\_\_\_

What street is this block on? \_\_\_\_\_

Cross-streets at the beginning of the block? \_\_\_\_\_ End of the block? \_\_\_\_\_

Current Weather: \_\_\_\_\_

(e.g., temperature, sunny/cloudy/rainy, calm/windy, etc.)

How are you completing the route? (circle one)

By Foot \_\_\_\_\_ Other (specify) \_\_\_\_\_

Why did you select this route?

\_\_\_\_\_

\_\_\_\_\_

### A. Describe the area.

1. Which land uses are present along the street you’re auditing? Check all that apply.

- \_\_\_\_\_ Residential buildings/yards
- \_\_\_\_\_ Commercial or public/government buildings
- \_\_\_\_\_ School/school yards
- \_\_\_\_\_ Parking lots or garages
- \_\_\_\_\_ Park with exercise/sport/playground facilities
- \_\_\_\_\_ Vacant lot/abandoned building
- \_\_\_\_\_ Undeveloped land

### B. Accessibility

- |   | Circle one |     |    |
|---|------------|-----|----|
|   | N/A        | Yes | No |
| 1. Is there a bus stop on this block?   | N/A        | Yes | No |
| a. Is the bus stop clearly marked?  | N/A        | Yes | No |
| b. Is route information available?  | N/A        | Yes | No |
| c. Is there seating available?  | N/A        | Yes | No |
| d. Is there a shelter?  | N/A        | Yes | No |
| e. Is there a trash can nearby?   | N/A        | Yes | No |
| 2. Are there bike lanes or markings on this block?                                    | N/A        | Yes | No |
| If so, what is the condition?   | _____      |     |    |
| 3. Are there sidewalks on this block?   | N/A        | Yes | No |
| a. If “yes”, are they on both sides?  | N/A        | Yes | No |
| b. What is the condition of the sidewalk?<br>(e.g., clean, weeds, cracks, etc.) _____ | _____      |     |    |

*Figure 1 Excerpt from Neighborhood Audit Tool*

The complete audit tool is a one-page front and back checklist that also includes space for comments and a few open-ended questions. Based on preliminary work with neighborhood partners and reviews of City of Winston-Salem’s vision and planning documents, focuses on four aspects of neighborhoods: (1) Accessibility, (2) Safety, (3) Green Spaces/Parks, and (4) Beautification. Each of these categories provides insight into factors that influence a community’s physical health, social cohesion, ecological health, and mental and emotional wellness.

In addition to collecting neighborhood-level data, our goal is to communicate the information in compelling ways. The walking interviews and audits can generate a lot of information; for example, one 45-minute interview can lead to an approximately 5-page transcript. Once assets and challenges have been identified, they need to be communicated in a more effective way than spreadsheets or lists of features and locations. Simple mapping tools like Google or ESRI ArcGIS can be used to collect/enter neighborhood data, create spatial visualizations of the data, and also be an interactive platform for storing and viewing detailed descriptions, pictures, and quotes for different assets and challenges. A simple example of this visualization is shown below in Figure 2. The data was not generated by a walking interview or formal audit but is used to demonstrate how such information could be communicated.

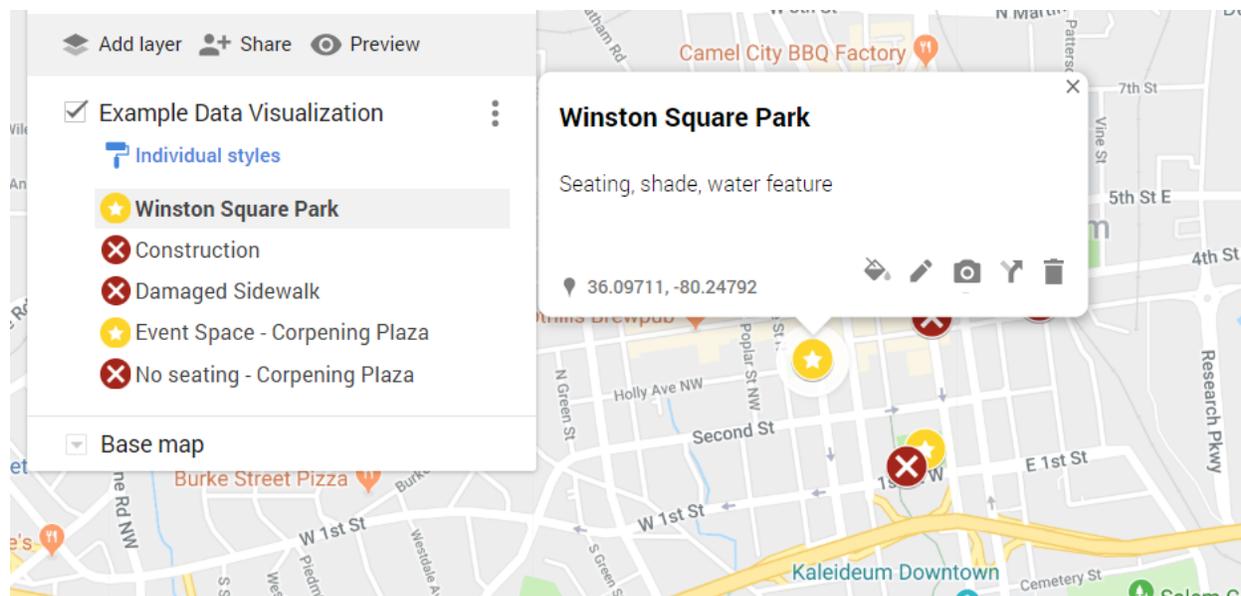


Figure 2 Example community mapping of interview and audit data. (Notes: does not represent data from a formal interview or audit. Generated using Google MyMaps.)

Pilot data from one walking interview was mapped in this way during summer 2019 and the community partners were able to brainstorm numerous ways that the map could be used to communicate with different stakeholders. For example, mappings of overgrown trees could be used to communicate with the city and power company for maintenance purposes. Mappings of speeding or unsafe walking/biking conditions could support applications for traffic calming interventions. The maps could also be used to identify assets that should be highlighted by the neighborhood and city, such as parks and recreation areas, examples of safe intersections, or historic information. Individual

walking interviews or audits could be mapped as separate layers so that data could be visualized in different ways and updated over time.

A goal for this fellowship year was to build upon prior work by piloting the data collection and analysis methods with one or more neighborhood partners. While the Walking Interview protocol has been tested and revised, multiple interviews need to be conducted in order to refine data processing and visualization approaches. The “walking” interview approach may need to be adapted for interviewees with different abilities and preferences. For example, we may need to develop new protocols for an interview in a car, on a bus, or from someone’s front porch. It is also necessary to test how the interview and audit data can be integrated and to choose the best technology for collecting and storing the data. Another goal for this year was to engage students and faculty from other institutions in this work so that we can leverage our areas of expertise and create a team that can work together beyond this year.

### **Accomplishments during 2019-2020**

Over Fall 2019, WFU undergraduate research assistants prepared a presentation summarizing their project goals and accomplishments, including background on the walking interview and audit tool methods. The presentation provides a starting point for training sessions with other students, neighborhood residents, and volunteers. In addition, the walking interview protocol and the audit tool were revised based on new stakeholder feedback that we solicited.

Another accomplishment was meeting with MapForsyth staff for consultation on streamlined methods for collecting the raw data from both the walking interviews and audit tool. MapForsyth confirmed that ArcGIS online would provide the best tools for collecting and presenting the neighborhood data, which will include different layers of point, line, and polygon features. In order to streamline the data collection and processing, a combination of the Collector app and Survey123. The goal is to create data collection tools that can be easily used with hand-held mobile devices that may not have WiFi connection. If data collection can be improved, we will be able to assist neighborhoods with a large volume of interviews and audits in a much shorter time period and allow neighborhoods to curate and update their data in the future. We also discussed data management and quality control measures, which are still a work in progress. Early on, it is important to strike a balance between neighborhood access to and control of the data with collecting and displaying accurate data that can be updated over time. Also, during development, access to the data may need to be limited to neighborhood leaders and residents who are helping test and iterate the tools rather than the broader public.

With respect to the second project objective, we identified potential neighborhood leaders with interest/need for community data mapping through meetings with WFU’s Office of Civic and Community Engagement and conversation with Forsyth Futures. Our primary community partners are the Beautification & Safety Team of Boston-Thurmond Community Engagement Roundtable (BTCER). We have discussed ways to connect the audits and data mapping with their comprehensive planning efforts for the Purpose-Built Community program and youth engagement strategies.

During Spring 2020, MapForsyth delivered a mobile GIS app using the Collector tool that we intended to test in collaboration with a WSSU GIS Concepts and Techniques course. In March 2020, I was joined by Mr. David West, lead of the BTCER Beautification & Safety Committee, to introduce a

“Neighborhood Infrastructure Data Mapping Project” to the GIS class. The project description is as follows:

*GIS applications are useful tools for collecting and analyzing data concerning a number of urban development issues, including the equitable distribution and condition of neighborhood infrastructure. In Winston-Salem, there is growing interest in supporting resident-driven change and a need to better understand this research question: What are physical assets and challenges at the neighborhood level in Winston-Salem and how do they compare across neighborhoods? Collecting, analyzing, and visualizing neighborhood infrastructure data could help residents identify needs and communicate those needs to decision-makers with data backing them up. Two potential data collection methods include Walking Interviews and Neighborhood Audits, which can identify both assets and challenges like sidewalk condition, accessibility compliance, safety, and available recreation facilities. ArcGIS online applications are being developed to streamline data collection and visualization for each method. Several neighborhood leaders and organizations are interested in community data mapping, but before the GIS tools can be rolled out, they need to be tested for functionality, ease of use, and accuracy. After an introduction to Walking Interviews and Neighborhood Audits, your assignment will be to collect and display data using the ArcGIS applications Collector and/or Survey123 and provide an assessment of how well the applications work in comparison to the “paper” collection methods. Your data collection will focus on WSSU’s campus and nearby areas.*

Students were assigned to work in pairs to complete both a walking interview and the audit checklist along a route of their choosing on/near the WSSU campus. Unfortunately, soon after the class session, the semester was drastically impacted by the COVID-19 pandemic and it was not feasible to continue the project in a meaningful way.

### **Future Work**

Given the disruptions to our community this spring, the project could not be completed as planned during the fellowship year. However, as we better adapt to virtual engagement and health risks lessen, we will be continuing the project during Summer and Fall 2020. While the walking interview provides more in-depth information and rich stories, that method is on hold due to social distancing requirements and our focus will shift to refining and implementing the Neighborhood Audit Checklist and accompanying mobile app. Student volunteers will assist neighborhood partners with data entry and visualization during Summer 2020. In collaboration with the Spatial Justice Studio and BTCER, we are preparing a new project for a Fall 2020 urban geography-related course to collect and interpret data from the checklist. The exact nature of the project will depend upon course delivery requirements for the semester (i.e., in person vs. remote learning).

The methods being developed and tested during this project could be adapted for targeted data collection related to emerging or critical needs. For example, neighborhood-level data could help better understand localized impacts of the COVID-19 pandemic and relate those impacts to different health determinants that are influenced by the built environment. Table 1 provides an example of how new neighborhood-level data could be combined with existing data sources to explore the relationship between air quality and/or social cohesion and risk of COVID-19 related impacts on community health. This type of information is important for developing strategies, which may include physical changes to the built environment, to prepare for and respond to current and future health challenges.

*Table 1. Example application of neighborhood data collection methods to emerging community challenge*

COVID-19 Risk Factors	Health Determinant	Built Environment Design Factors	Data Sources
Asthma, heart disease, lung disease	<a href="#">Air quality</a> (indoor & outdoor)	Shade trees, open space, traffic, sidewalks/buffers, heat island	Existing: County GIS & EPA <a href="#">EJScreen Indices</a> New: localized air quality, temperature, infrastructure data*
PPE usage & social distancing compliance	<a href="#">Social cohesion</a>	Public/recreational space, social networks, neighborhood organization	Existing & New: Local data of neighborhood assets (e.g., schools, public spaces, churches, etc.)**

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