

## Problem Definition

For this project, we were tasked with performing a geospatial analysis to evaluate pedestrian and cyclist safety and comfort traveling to and from WMATA Metro stops. Our goal was to improve pedestrian and bicyclist safety around stations, as these groups account for a disproportionate share of car crash fatalities. We did this by generating a visual representation of the current state of pedestrian and bicyclist comfort and by developing an improvement plan for three stations to decrease their station area stress score.

### Methods

#### Geospatial Analysis

We used aerial photos from Google Earth and codes provided to us by our client, David Schneider, to collect data about each station.

#### Site Visits

Stations visited:

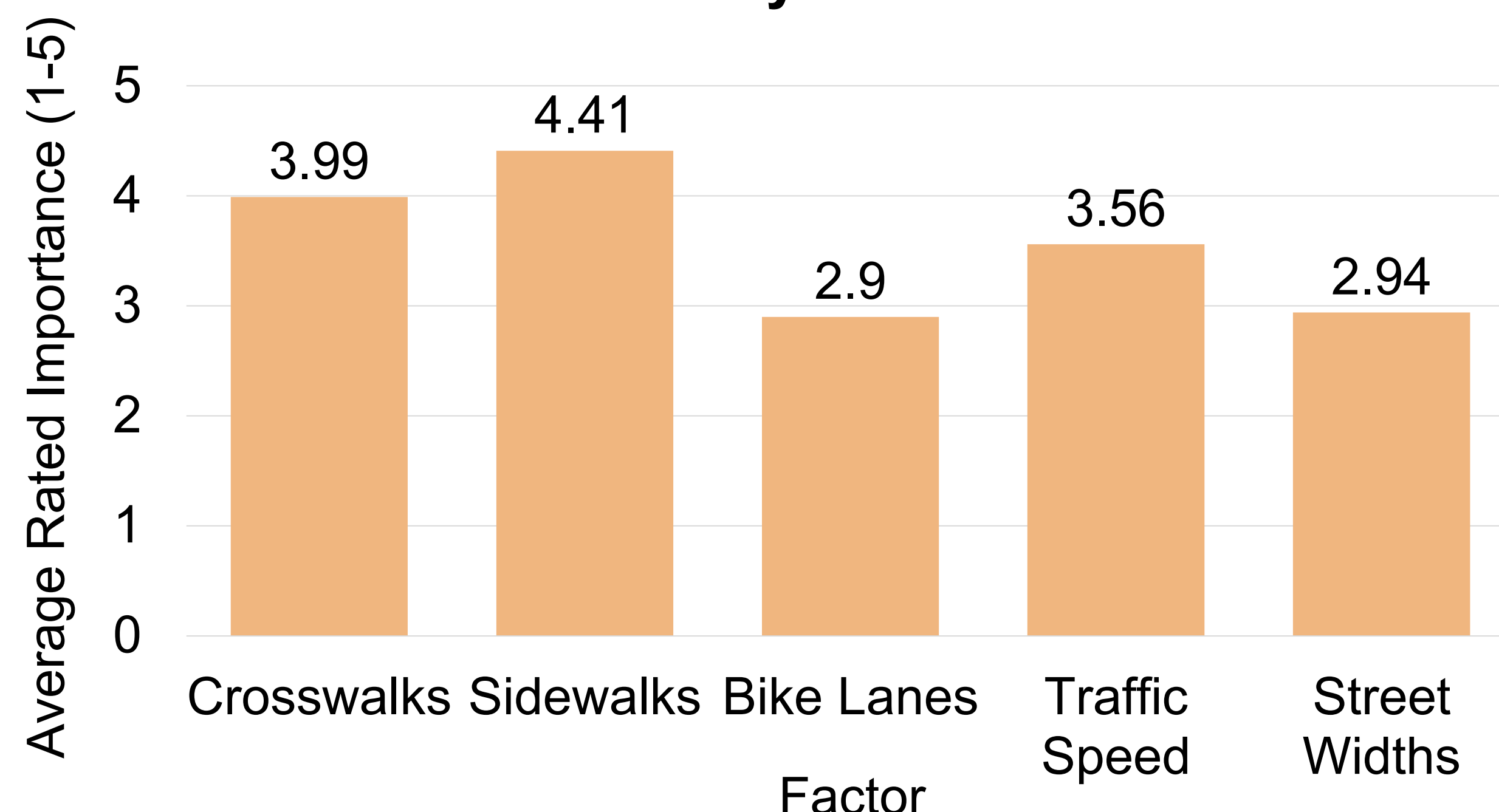
- King St – Old Town (Virginia)
- Brookland – CUA (Washington D.C.)
- Hyattsville Crossing (Maryland)

We visited each of our three sites twice, once at night and once during the day. We conducted distance-based and time-based walking tests to get a sense of the area's walkability and to assess which factors seem to have the most impact on pedestrian and bicycle comfort.

#### Surveys

We also collected surveys of Metro users during our site visits to determine what factors they find most important to safety. We gathered a total of 108 survey responses about 11 factors.

Survey Results



### Stress Score

For our calculation, a higher score indicates a more stressful experience for pedestrians and bicyclists.

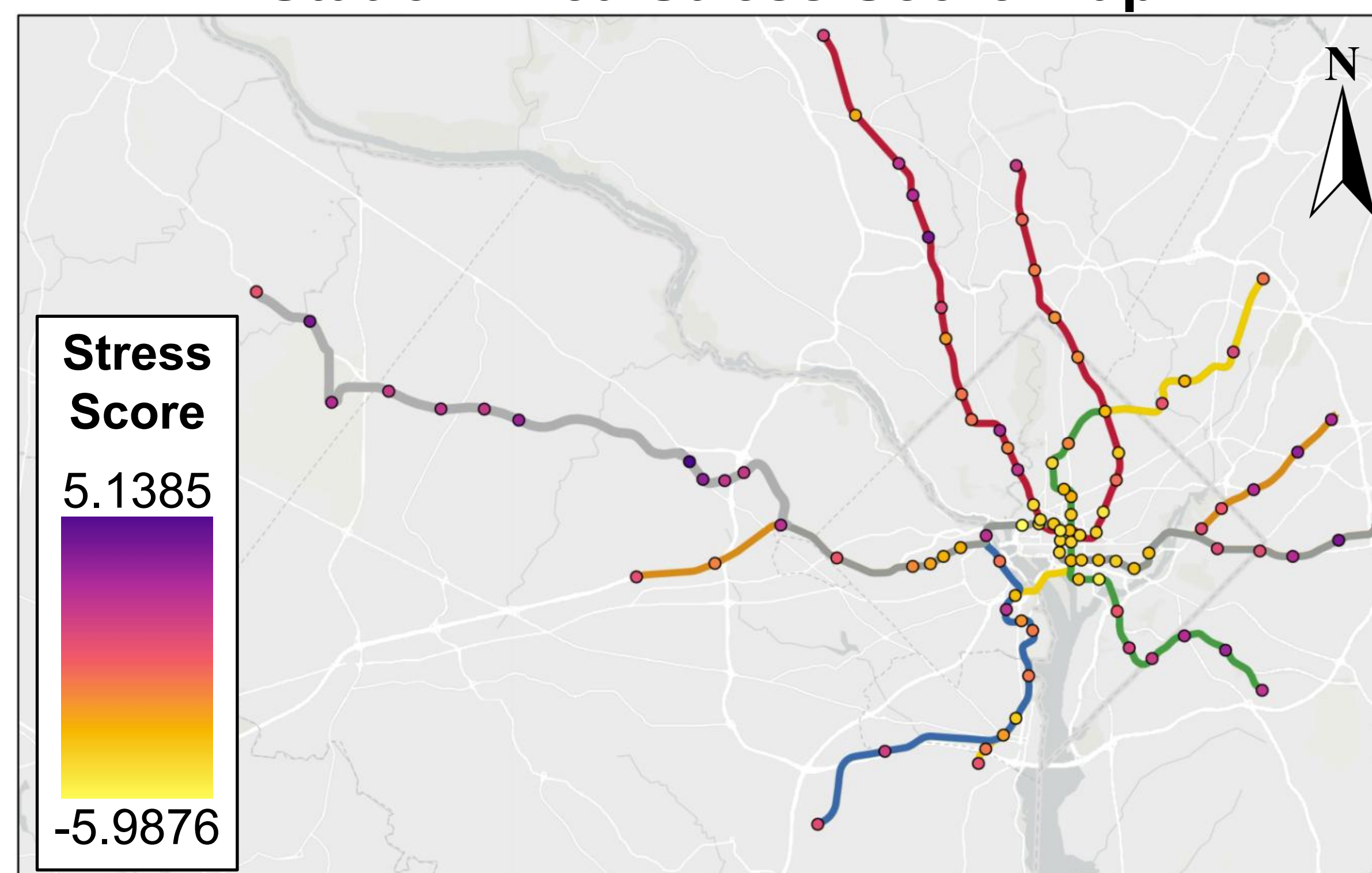
#### Factors Included

- Number of automobile-oriented destinations in the area
- Speed limits at station exits
- Number of lanes on the main streets in the area
- 15-minute walkshed area
- Sidewalk and bike lane coverage
- Number of crosswalks in the area

#### Final Equation

$$\text{Stress Score} = 4(\text{Speed Limit}) + 3(\# \text{ Lanes}) + (\# \text{ AO Destinations}) - 4(\text{Sidewalk Coverage}) - 3(\text{Bike Lane Coverage}) - 2(\# \text{ Crosswalks}) - (\text{Walkshed Area})$$

Station Area Stress Score Map



Our results indicate that pedestrian and cyclist stress is higher around the outer stations and lower in the more central parts of the city. This is likely due to the higher number of auto-oriented destinations and lower amounts of mixed-use infrastructure in more suburban areas.

### Improvement Plan

#### Proposed Changes

King St – Old Town

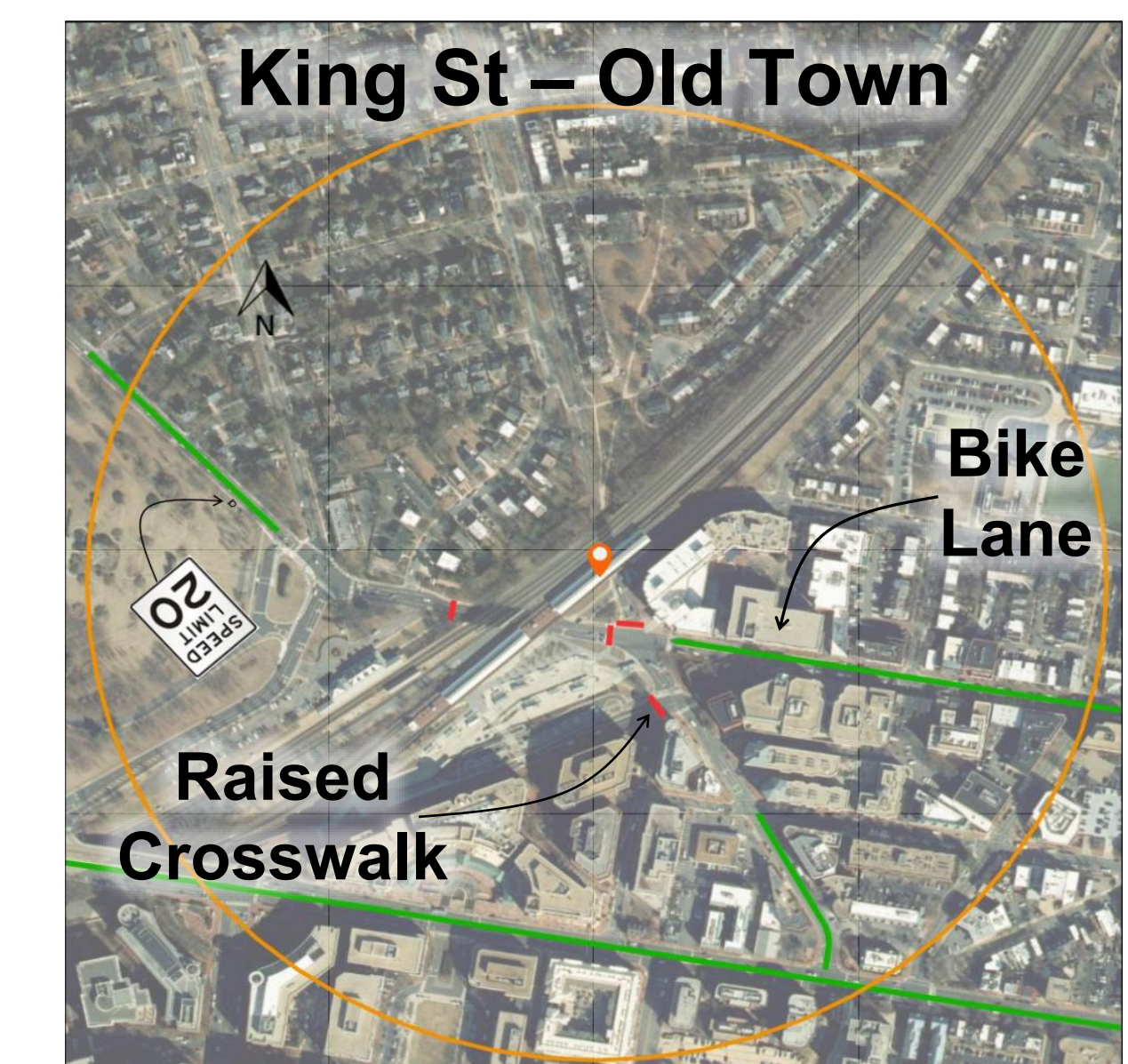
- Bike lanes
- Raised crossings

Brookland – CUA

- Bike lanes
- Raised crossings
- Mid-block crossing

Hyattsville Crossing

- Bike lanes
- Mid-block crossing



#### Resulting Stress Score

King St – Old Town

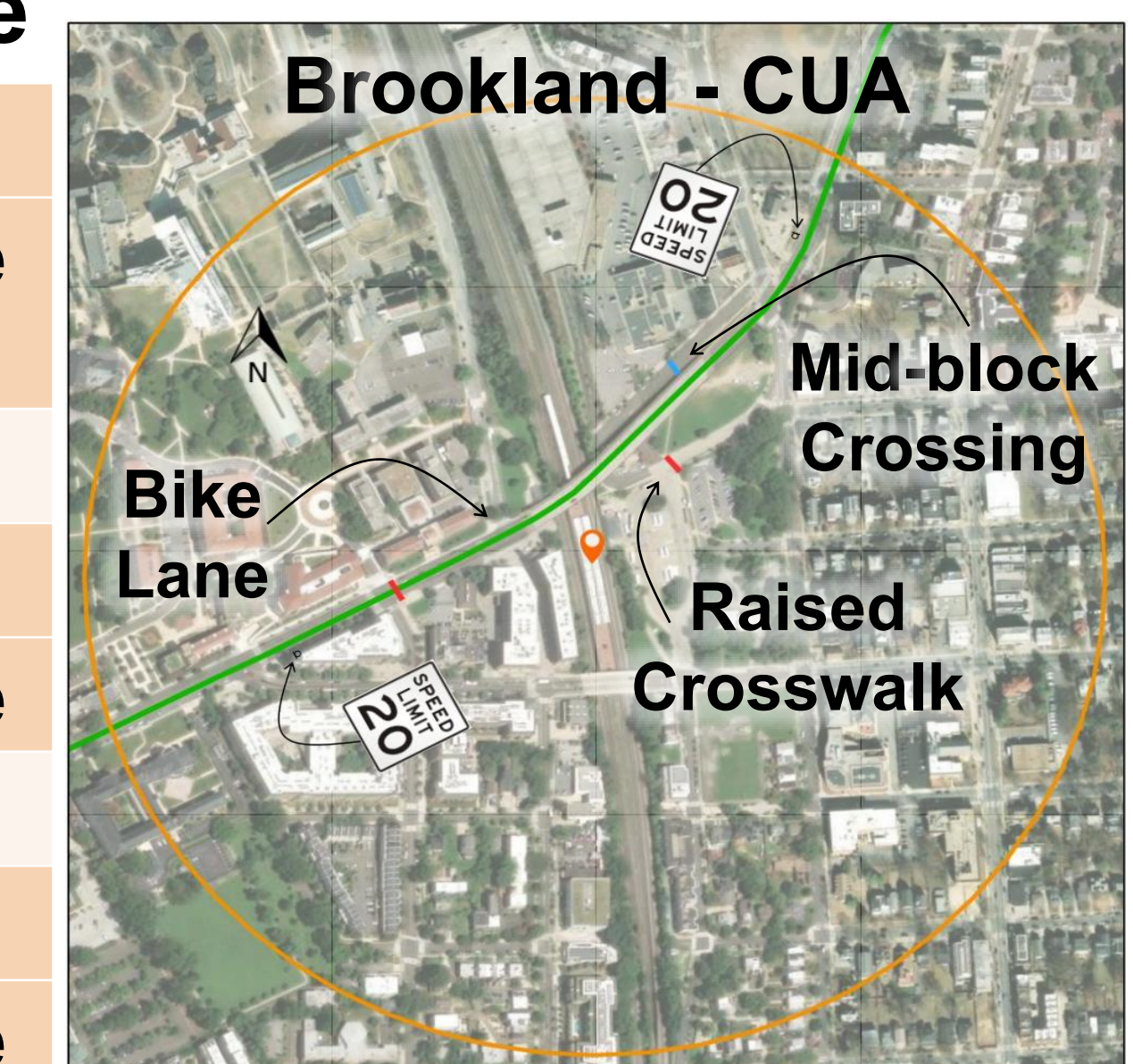
Initial Score	New Score	Change
-3.7007	-5.3627	44.91%

Brookland – CUA

Initial	New	Change
-3.7981	-5.1042	34.39%

Hyattsville Crossing

Initial	New	Change
-2.9797	-4.0261	35.12%



The most effective change was increasing the bike lane coverage. This, along with adding mid-block crossings and raising existing crosswalks to reduce vehicle speeds, helped lower each of the stations' stress scores by over 25%.

