An Analysis of Need for Improved Metro Transit Access in Washington, DC

INTRODUCTION
Access to reliable public transportation is one of the most important factors in determining the equality of opportunity and its opportunities for social mobility. Despite this, the existing Metro transit network, Washington DC (Figure 7), primary method of rapid public transportation is quite inadequate in the areas it serves (Figure 2), often not reaching those neighborhoods that need it most. While there are widespread bus routes throughout the entire city, such transit is far slower, less reliable, and more expensive. Access to Metro trains offers a stark look into inequitable access to rapid transit.

Many areas have been studied in the DC region where the Metro system is in need of significant upgrades all around, and has suffered from drops in recent ridership (Patan, 2018), and that the density of the city and the surrounding suburbs has increased significantly since 1970 (Khoury, 2019). Despite this, not much emphasis has been placed on analyzing the expansion of Metro from a social justice perspective. Because of this, I will perform a suitability assessment to determine the areas in the District of Columbia most in need of improved access to metro service from a perspective of equity. I will use factors that approximate the diversity and inequity of the city. These parameters will help create a determination about where within the city is most in need of improved access to the Metro.

METHODS
Using data publicly available from OpenData DC.gov, I created a weighted suitability analysis on ArcMap 10.5, using six characteristics, all of which together help create an accurate assessment of a community’s need for improved access to public transportation. A rank of 5 to 1 was assigned to each of the following six criteria:

1. Trip to DC downtown
2. Trip to DC downtown
3. Access to freight railroad rights of way
4. Access to railway rights of way
5. Access to railroad rights of way
6. Access to railroad rights of way

The results of the analysis (Figure 9) show a clear trend that while there are areas throughout the city in need of improved Metro service, the overwhelming majority of those areas are in the eastern and southern neighborhoods of the city. While somewhat equal access to Metro stations in all directions can be seen (Figure 3), favoring just the well-connected areas.

RESULT

1. BRIGHTWOOD

Brightwood was the highest scorers need for Metro service in the western half of the city, due largely to its distance from existing Metro lines. Both the brightwood and George Mason have provided north south arteries through the neighborhood that would be well-served to connect Brightwood to the downtown area to its south.

2. BROOKLAND

Brookland scored primarily from its distance from existing Metro lines. Despite this, two Amtrak and Maryland Area Regional Commuter train lines travel the neighborhood, which would provide extremely suitable corridors for future metro expansions.

3. 3 & 4. CENTRAL AND SOUTHERN ANACOSTIA

These neighborhoods in the far southeast are in particular need of improved access to Metro due largely to the poverty and distance from existing metro lines. However, both are near existing and abandoned freight railroad rights of way, along which Metro train on streets could feasibly be built.

DATA SOURCES


REFERENCES

- Metro Stations in DC, June 2019, DCGIS Open Data
- DC Street Car Stats, June 2018, DCGIS Open Data
- Census Block, February 2020, DCGIS Open Data
- ACS 2018 Median Household Income Variables Tract, January 2020, DCGIS Open Data
- ACS 2018 Housing Costs Variables Tract, January 2020, DCGIS Open Data
- ACS 2018 Employment Status Variables Tract, January 2020, DCGIS Open Data
- ACS 2018 Poverty Status Variables Tract, March 2020, DCGIS Open Data
- Maryland State Plane NAD83 Meters

Map created by Daniel Meakem
Compiled May 5, 2020
- Introduction to GIS Projection used throughout:
  - Maryland State Plane NAD83 Meters

DISCUSSION
This analysis shows a significant skew in need for access to the Metro, with communities in the south and east of the city much more in need of improved service than the north and west. While it has been established through previous research the extent to which people of lower income are more dependent on public transportation, and that Metro must expand to meet growing demand, this analysis adds a specific insight to future Metro development that are the most socially equitable and provide access most efficiently to those who disproportionately need it. The results of this analysis are somewhat predictable given the areas with the greatest need for Metro service correspond largely to areas suffering the most from poverty in general. Though clearly visualizing these disparities makes even starker the inequity in the present system. One result I found surprising was the extent of areas with large need of Metro service in the affluent northern and western portions of the city.

THE IMPACTS OF THE DEMOGRAPHICS OF POPULATIONS AROUND THE CITY CREATE ENORMOUS DISPARITIES: SEE INCREASED METRO SERVICE FOR IMPROVED SERVICE TO PLACES WITH HIGH CONCENTRATIONS OF JOBS, AREAS THAT MUST BE CONSIDERED IN FUTURE METRO SERVICE PLANS.