3.4 Need Category: Need for Transit Access for Equity Emphasis Areas

Measure: Transit Access for Equity Emphasis Areas

What it Means: Areas that are identified as Equity Emphasis Areas (EEAs) that are considered transit-viable, and are underserved by public transit.

Applicable VTrans Travel Market: RN

Identification of Needs

- Data Sources:
  - U.S. Census Bureau, American Community Survey (ACS) 2018 Five-year Estimates, Census Block Group-level:
    i. Table C17002: Ratio of Income to Poverty Level;
    ii. Table B01001: Sex by Age;
    iii. Table B03002: Hispanic or Latino Origin by Race;
    iv. Table B16004: Age by Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over;
    v. Table B01003: Total Population
  - Census Bureau, American Community Survey 2018 Five-year Estimates, Census Tract-level:
    i. Table S1810: Disability Characteristics
  - U.S. Census Bureau, Cartographic Boundary Files – Shapefile. Virginia Block Groups (500k)
  - OIPI, Shapefile of RN boundaries
  - Virginia DRPT, Shapefile of transit stops in Virginia
- Year of analysis: 2017 (demographic data), 2019 (transit data)
- Period of analysis: n/a

- Calculations:

Calculate Equity Emphasis Areas (EEAs)

1. Collect resident data on income, age, race and ethnicity, English proficiency, disability, and total population.
2. Calculate from US Census ACS tables the number of residents whose income is below 150% of the poverty level, who are 75 or older, who belong to a racial minority, who are Hispanic/Latino, and who do not speak English "very well."
3. Estimate the number of residents with a disability in each Block Group by multiplying the share of residents with disabilities in the census tract by the Block Group's population.
4. Convert count of residents in each Virginia Block Group who are low-income, age 75 or older, racial minority, Hispanic/Latino, limited English proficiency (LEP), or have a disability to population shares for each by dividing by the Block Group population.
5. Join Block Group population and shares of residents in each category to the Block Group shapefile.
6. Identify the centroid of each Block Group and intersect the centroid with the RN shapefile. For each RN and each category (i.e., low-income, age 75 or older, racial minority, Hispanic/Latino, LEP, or disabled), calculate the mean concentration across the Block Groups. (This is the regional average concentration.)
7. Identify for each Block Group the RN that contains its centroid or the nearest RN if the Block Group is outside an RN.
8. Divide the Block Group's concentration for each resident category by the regional concentration to calculate the ratio of concentration (ROC).
9. Sum all six ROCs into an index, converting all ROCs above 3 to 3, low-income ROCs below 1 to 0, and ROCs for the other categories below 1.5 to 0.
10. Flag a Block Group as an EEA if the index is 2 or greater, and either the ROC for low-income or disability is at least 1.
11. **Threshold for Need for Transit Access for Equity Emphasis Areas:** An Equity Emphasis Area is defined as a Census Block Group that has a higher concentration of residents who are considered low-income, minority, LEP, disabled, or over age 75, or Hispanic/Latino than the regional average concentration.

Calculate Transit Viability

12. Calculate Block Groups' population density by dividing population by the Block Group area.
13. Identify each Block Group's centroid and add a 1/4 -mile buffer to the transit stop shapefile.
14. Intersect the centroids with the transit stops buffer.
15. Intersect the result with the RN shapefile.
16. Compare each Block Group's population density to the density of Block Groups served by transit stops. The threshold for viability for fixed-route transit in each RN is the 10th-percentile population density of the intersected Block Groups.
17. Flag Block Groups as transit viable if population density is at least as high as the relevant RN threshold.
18. **Threshold for Need for Transit Access for Equity Emphasis Areas:** Transit Viable Areas are those that have a level population density matching at least the bottom 10th percentile density of areas that are currently served by transit.

Calculate Underserved by Transit

19. Utilize transit stops in shapefile format.
20. Calculate Block Groups' area.
21. Add a 1/4-mile buffer to the transit stop shapefile to represent the transit service area.
22. Intersect the transit stops buffers with the Block Group shapefile.
23. Recalculate Block Groups' area post-intersection. If the post-intersection area (served by transit) is at least half of the pre-intersection Block Group area, flag the Block Group as being served by transit. The remaining Block Groups are considered underserved by transit.
24. **Threshold for Need for Transit Access for Equity Emphasis Areas:** Transit-viable areas that have less than half of their area within ¼-mile of a bus stop are considered underserved by transit.

Identify Final Needs

25. Designate Needs in Block Groups that are EEAs, are transit-viable, and are underserved by transit.
26. Intersect Block Group-level Needs to corresponding roadway segments.
27. **Threshold for Need for Transit Access for Equity Emphasis Areas:** Roadway segments in areas that are identified as EEAs, are considered Transit-viable, and are considered underserved by transit are identified as those with a VTrans Mid-term Need for Transit Access for Equity Emphasis Areas.

4.2.4 Prioritization within Transit Access for Equity Emphasis Areas Need Category

Applicable VTrans Travel Market: RN

Utilized for: Establishing Construction District Priority Locations

One criterion, Severity, is utilized to categorize VTrans Mid-term Needs for Transit Access for Equity Emphasis Areas (EEAs) as *Very High, High, Medium,* and *Low* in the following manner.

Severity of VTrans Mid-term Need for Transit Access to EEAs

- Source data: Census Block Groups and associated EEA Index values used to identify VTrans Mid-term Need for Transit Access for Equity Emphasis Areas
- Calculations
  - Assign Block Groups' EEA index values to the road segments within their boundaries with Need for Transit Access to EEA

Magnitude of VTrans Mid-term Need for Transit Access to EEAs

- None. EEA Index accounts for relative density in Census Block Group areas which are already controlled for population.

Prioritizing within Transit Access to EEAs Need Category

Prioritization within this VTrans Mid-term Needs Category occurs in the following manner:

- For each VDOT Construction District, sort EEA Index in descending order and assign the following values based on mileage[1] to develop VDOT Construction District-specific *Very High, High, Medium,* and *Low* categorization for VTrans Mid-term Need for Transit Access for Equity Emphasis Areas.
  - *Very High* (Score 7): Top 5% of the total mileage
  - *High* (Score 6): 5.001%–10%
  - *High* (Score 5): 10.001%–15%
  - *Medium* (Score 4): 15.001%–20%
  - *Medium* (Score 3): 20.001%–25%
  - *Low* (Score 2): 25.001%–50%
  - *Low* (Score 1): Bottom 50.001%–100%

[1] Where prioritization values do not break exactly at the percentile categories, assign all values to the higher category until there is a new prioritization value. For example, if the top 7% of roadway miles all have the same score, then 7% of miles would be classified as *Very High*.