

Geographic Coverage Analysis and Location Optimization for Vaccine Providers

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Vaccine Data Analytics

Department of Immunization

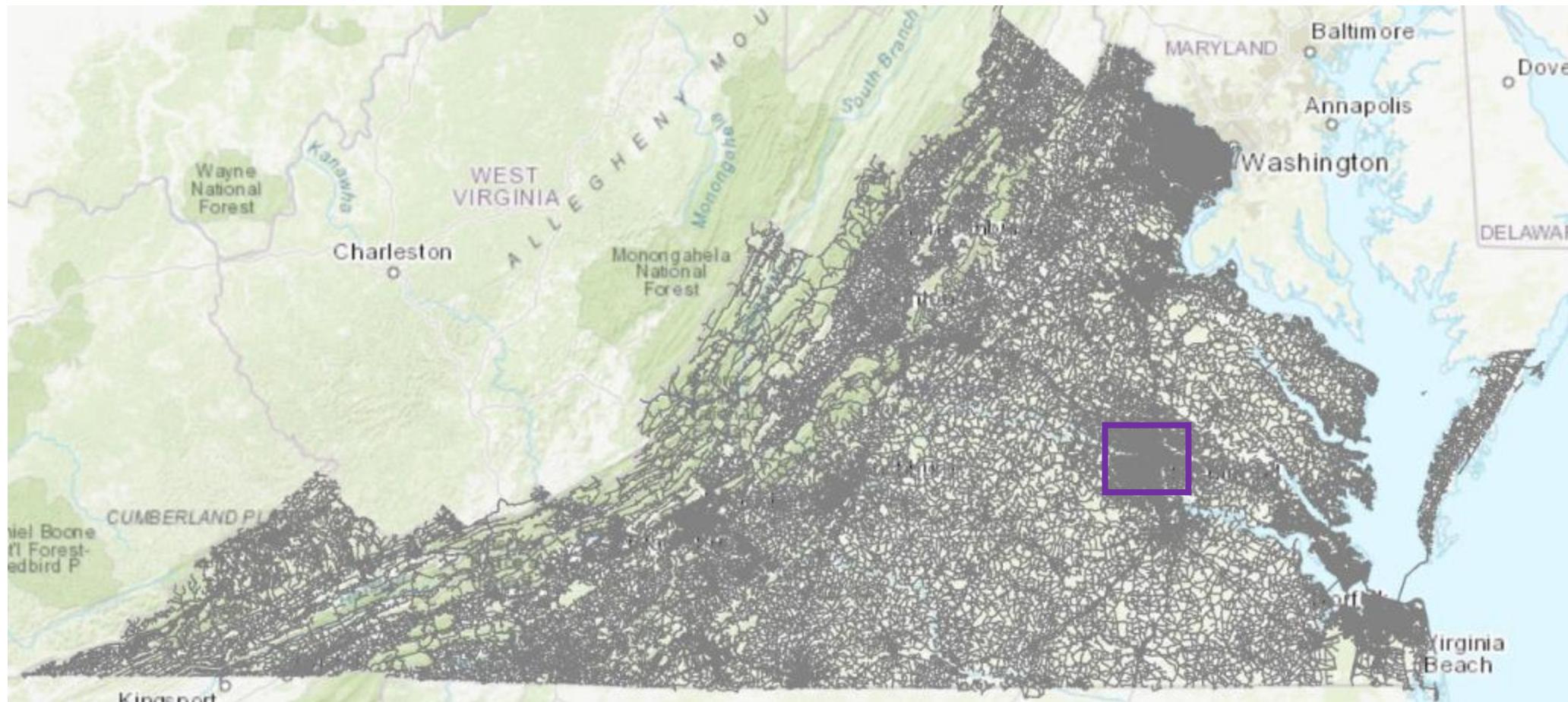
Virginia Department of Health

Background

- The Vaccines for Children (VFC) and CDC Bridge Access Program were the subjects of our Geographic Coverage Analysis and Location Optimization Project
- We gathered input data from various sources, located gaps in coverage, and optimized potential new locations using geographic analysis



- The Virginia Geographic Information Network (VGIN) manages the Road Centerline (RCL) geospatial database which includes addresses, roads and routing elements, and other geographic information which we use for our routing, and drive and walk time coverage analysis

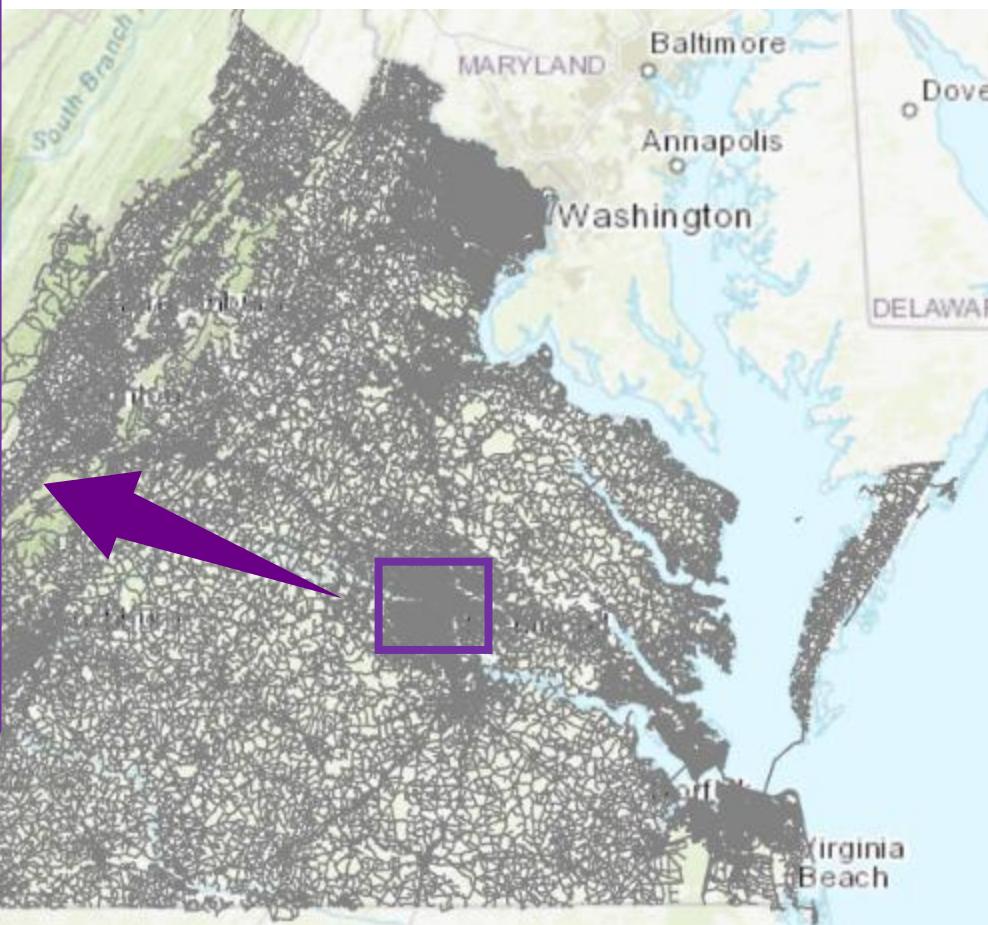
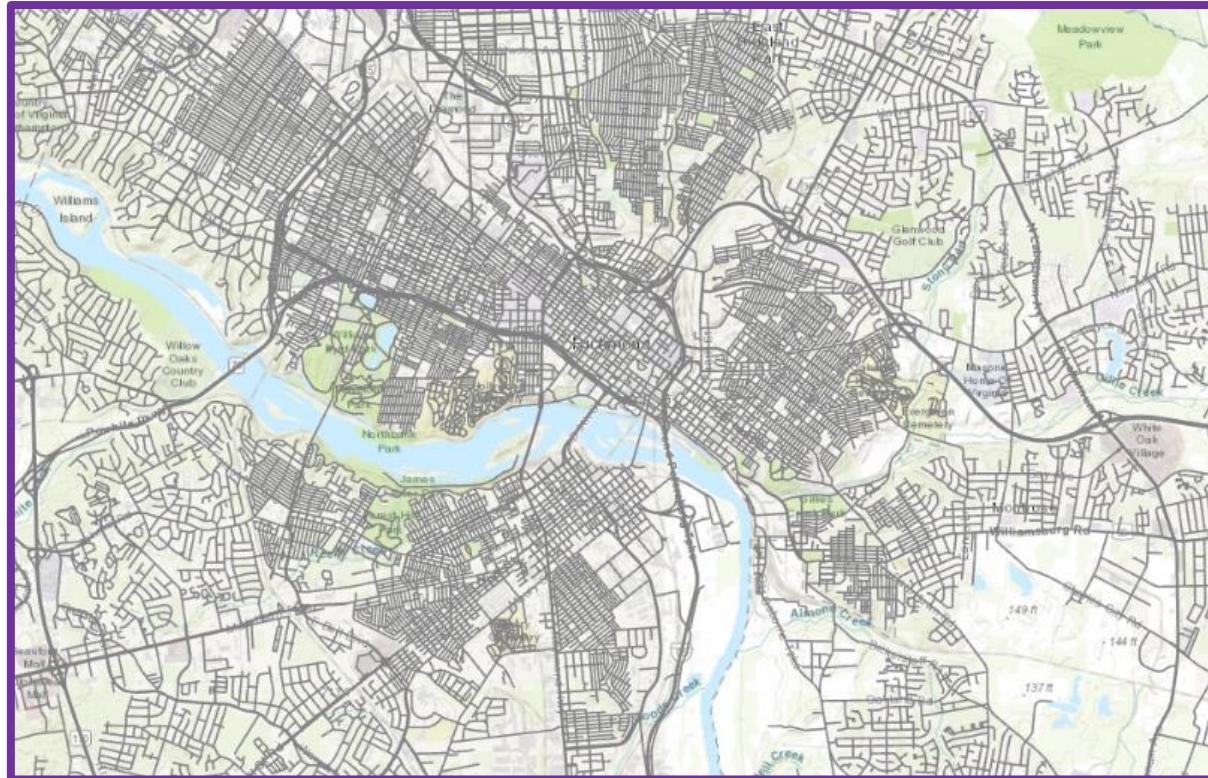


Input Data: VGIN Road Data for Analyzing Geographic Coverage

Updated 3/26/24



- The Virginia Geographic Information Network (VGIN) manages the Road Centerline (RCL) geospatial database which includes addresses, roads and routing elements, and other geographic information which we use for our routing, and drive and walk time coverage analysis



- **Social Vulnerability** refers to the potential negative effects on communities caused by external stresses on human health.
- The **VDH Office of Health Equity (OHE)** developed a Virginia specific SVI Index Geospatial Database by Census Tract for all of these factors, which underlaid the mapping analysis

Socioeconomic Status

Below 150% poverty,
Unemployed, Housing
cost burden, No high
school diploma, No
health insurance

Household Characteristics

65+, Aged 17 or
younger, Civilian with a
disability, Single-parent
households, English
language proficiency

Racial and ethnic minority status

Hispanic or Latino;
Black and African
American, Asian and
Pacific Islander, etc.

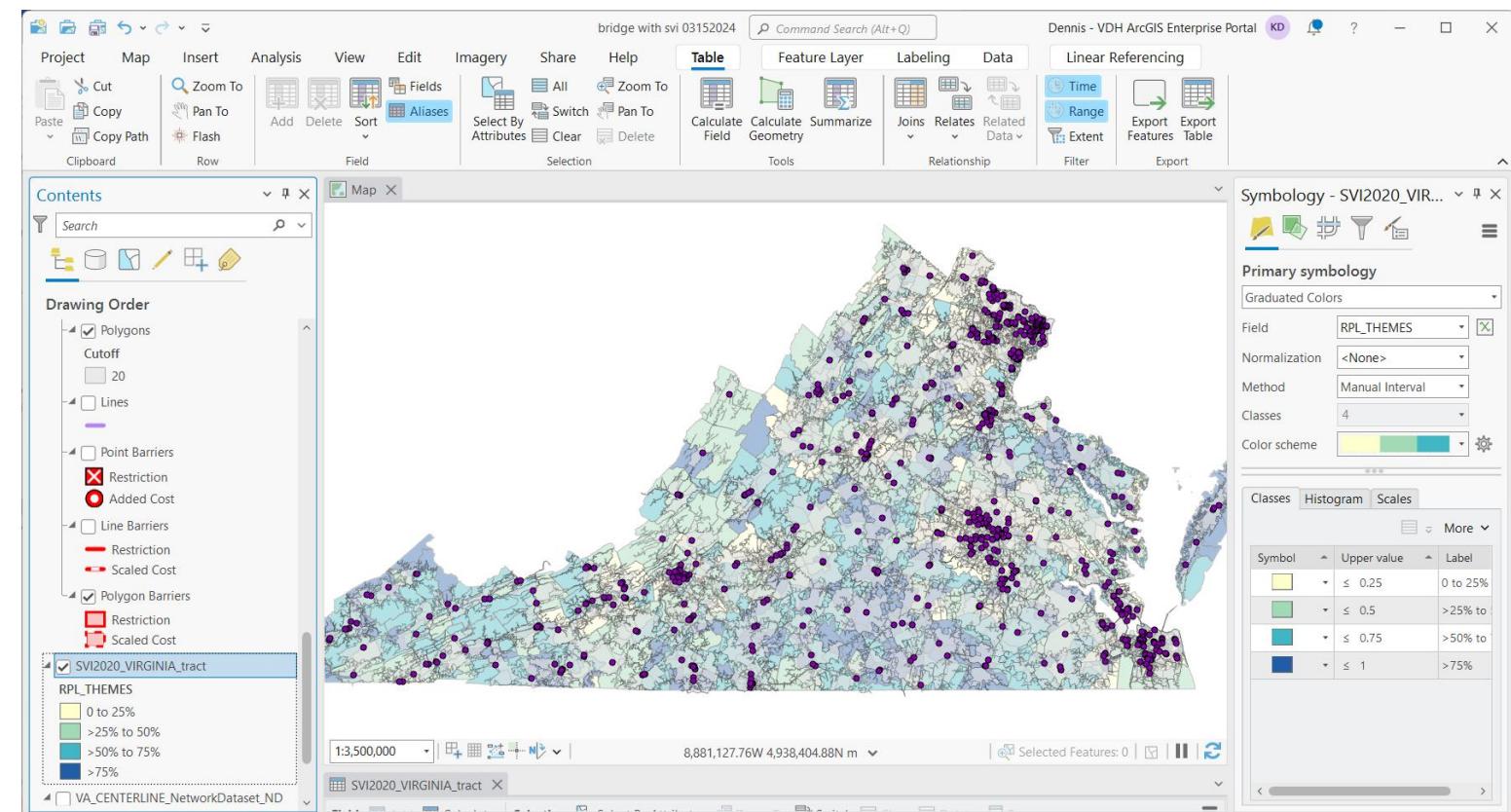
Housing type & transportation

Multi-unit structures,
Mobile homes,
Crowding, No vehicle,
Group quarters

Input Data and Tools: Utilizing VIIS Data for Geographic Analysis in ESRI ArcGIS

Updated 3/26/24

- The Virginia Immunization Information System (VIIS) is a statewide registry system which stores immunization data
- Combining Provider Level Vaccination data with VGIN road data overlaid on SVI data in ArcGIS allowed us to calculate drive times, coverage areas and areas of need for Virginia



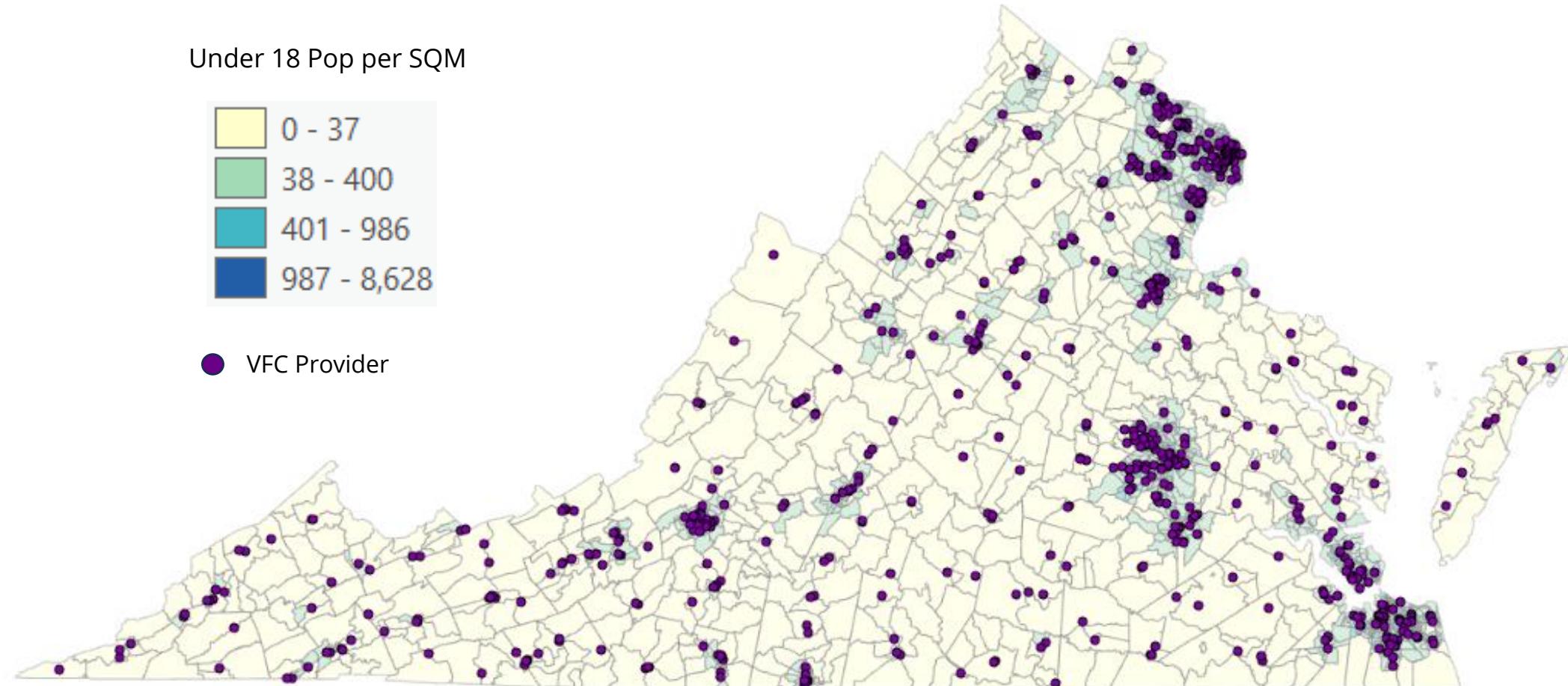
Vaccines for Children

Using Walking and Driving Coverage Areas to Identify Areas of Need

VFC Providers with the Under 18 Population per Square Mile

Updated 3/26/24

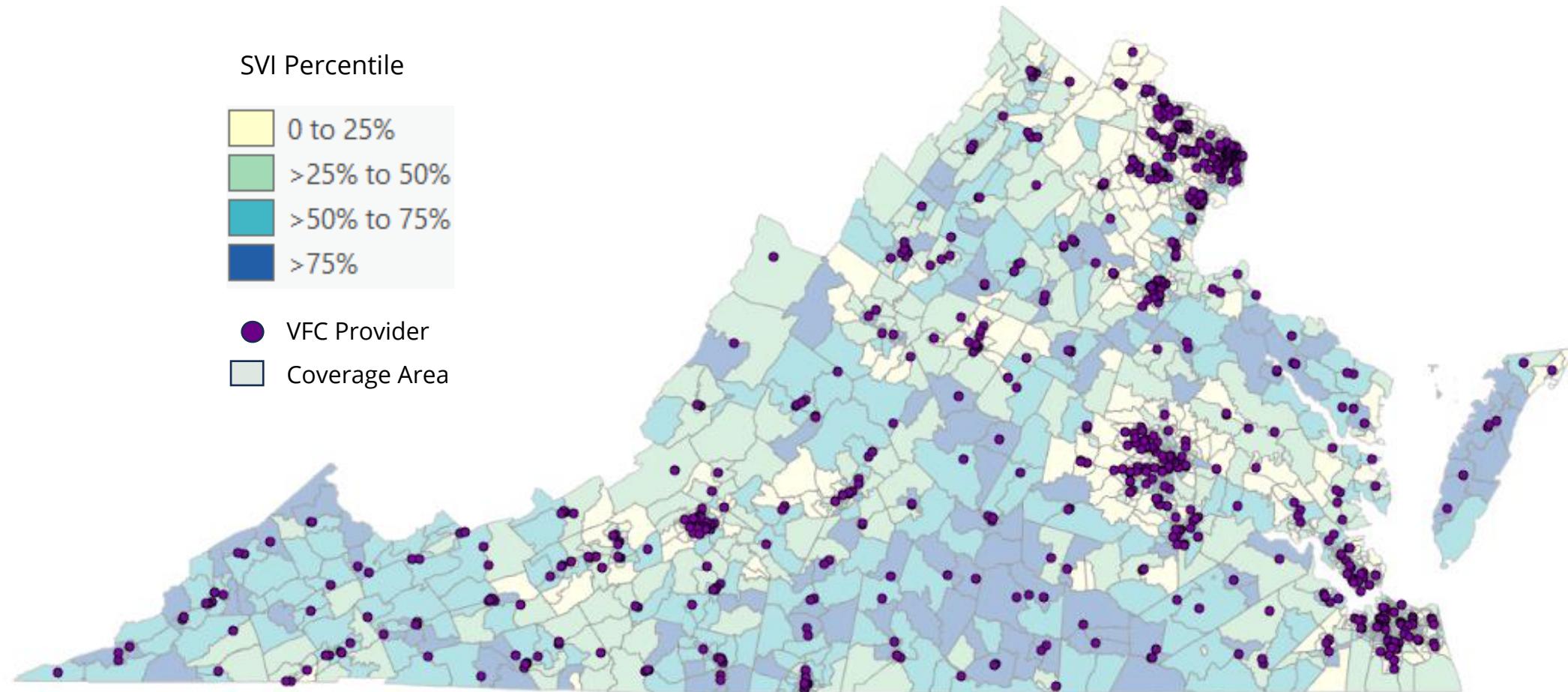
- VFC Providers are concentrated around Population Dense areas



VFC Providers with Social Vulnerability Index (SVI) Percentile

Updated 3/26/24

- There are large areas of higher Social Vulnerability across Virginia with coverage from the VFC Program

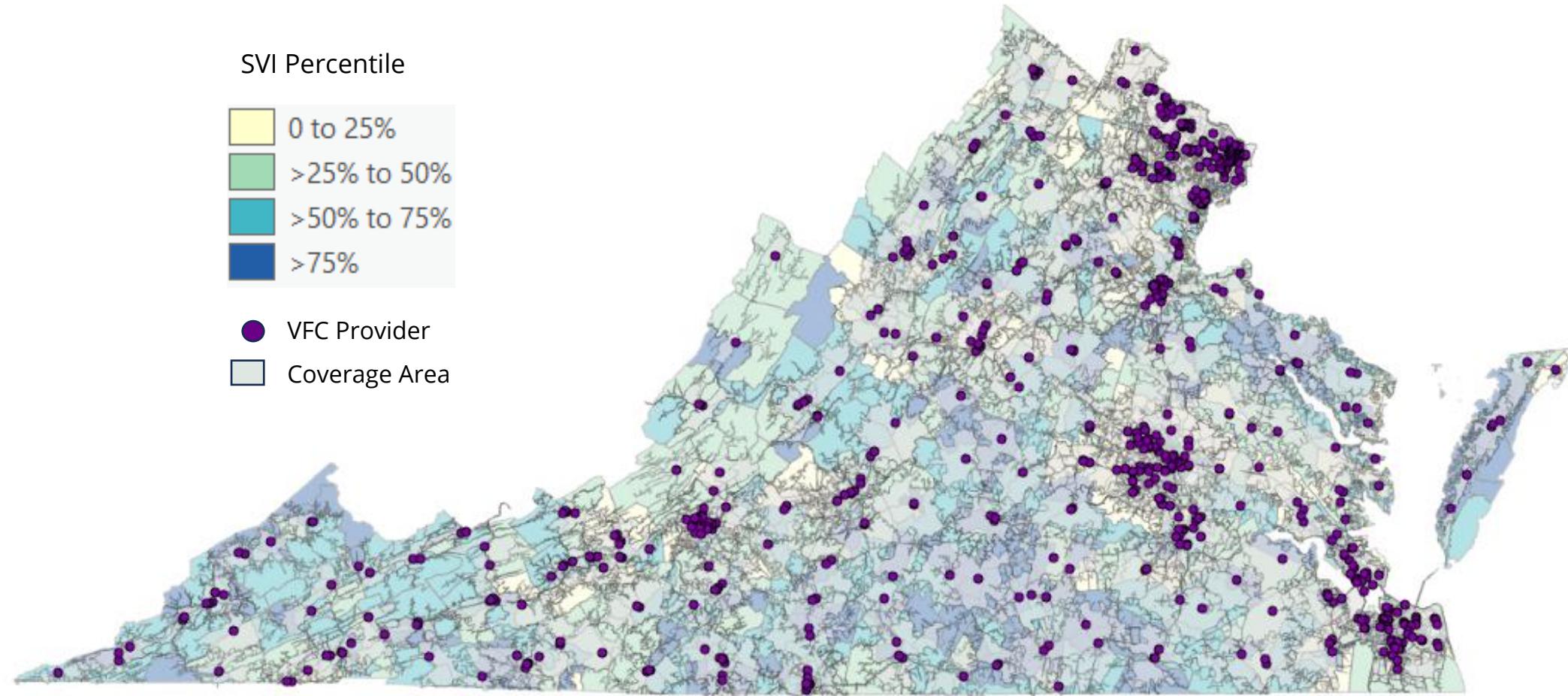


*Higher Number is more Vulnerable

VFC Providers with Social Vulnerability Index Percentile (SVI) with Drive Coverage

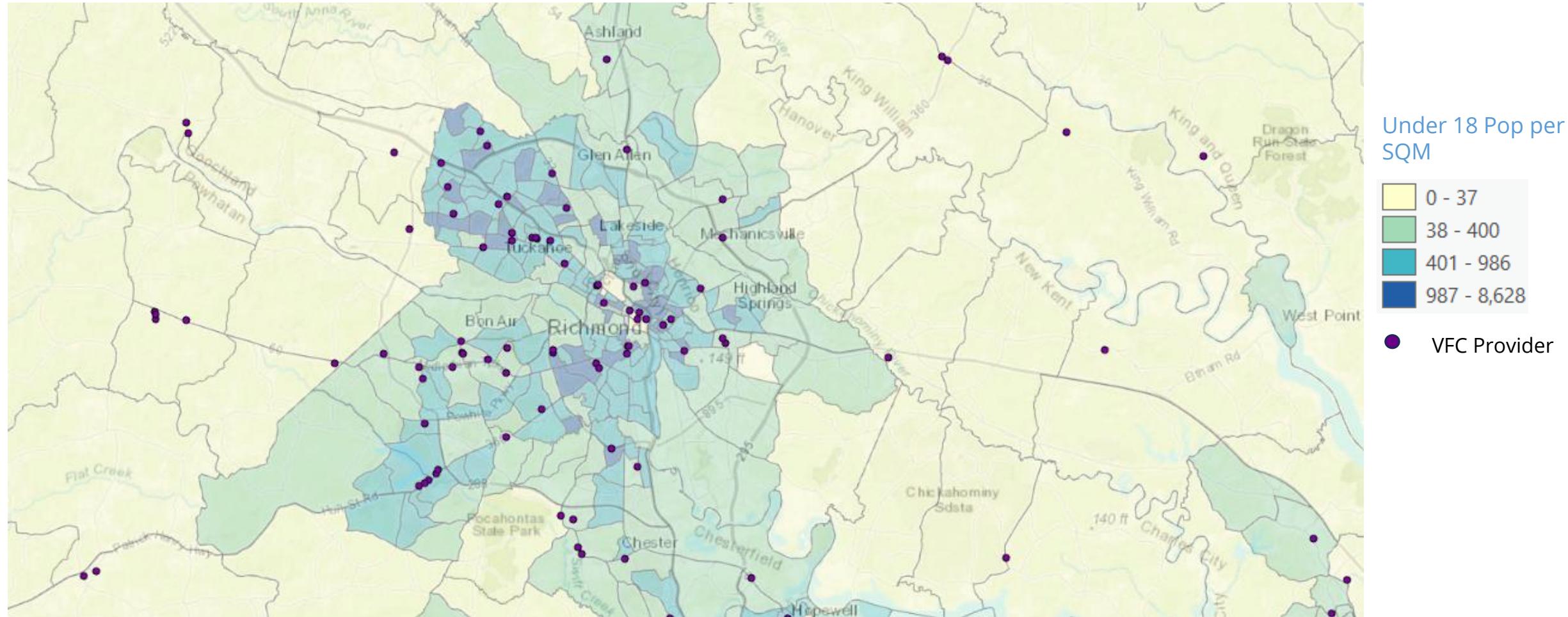
Updated 3/26/24

- The 20 minute Drive Coverage area shows that much of the state is covered by existing VFC providers

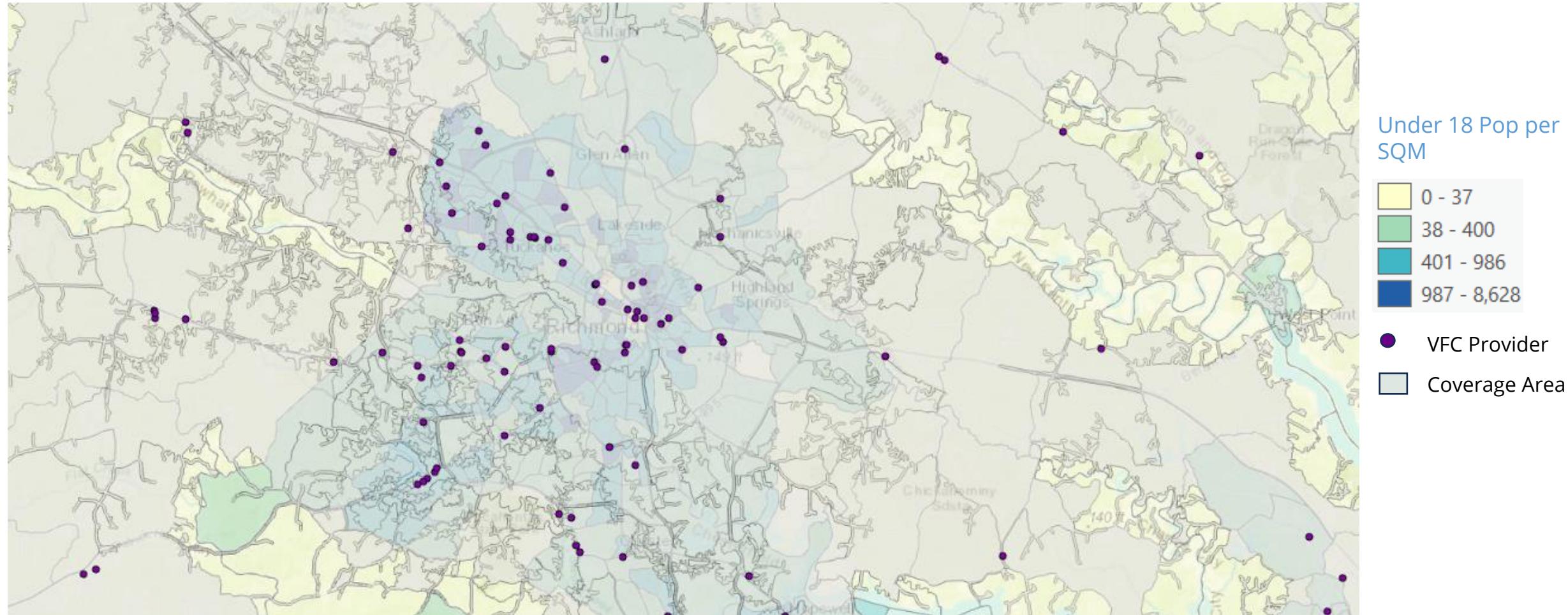


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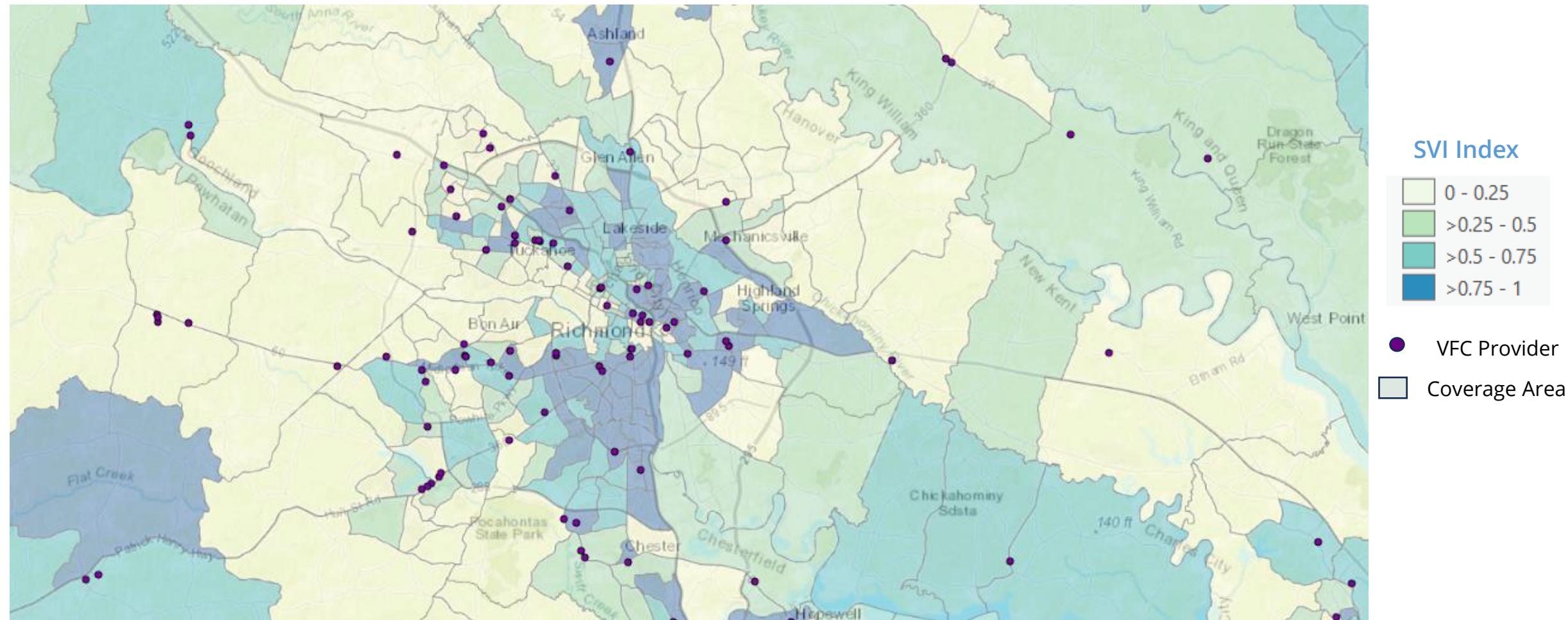
VFC Providers Coverage Area with Under 18 Population Density



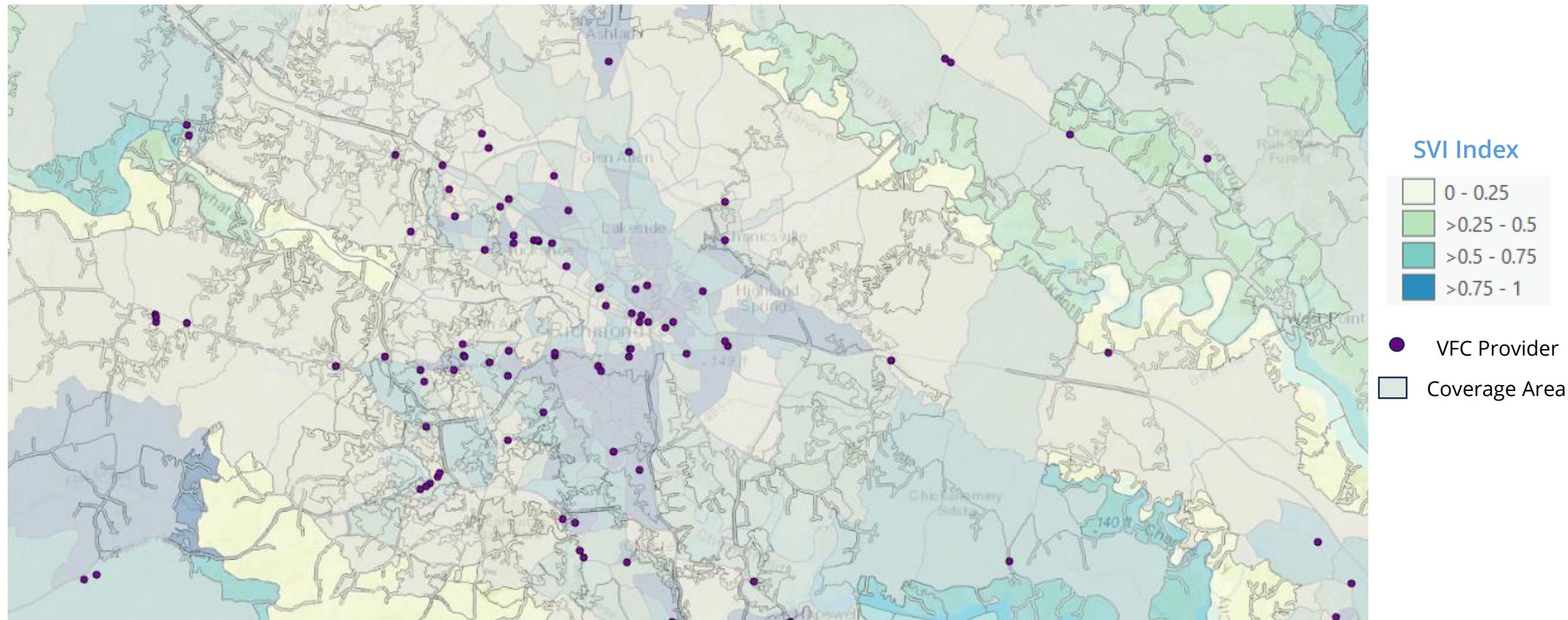
VFC Providers Coverage Area with Under 18 Population Density



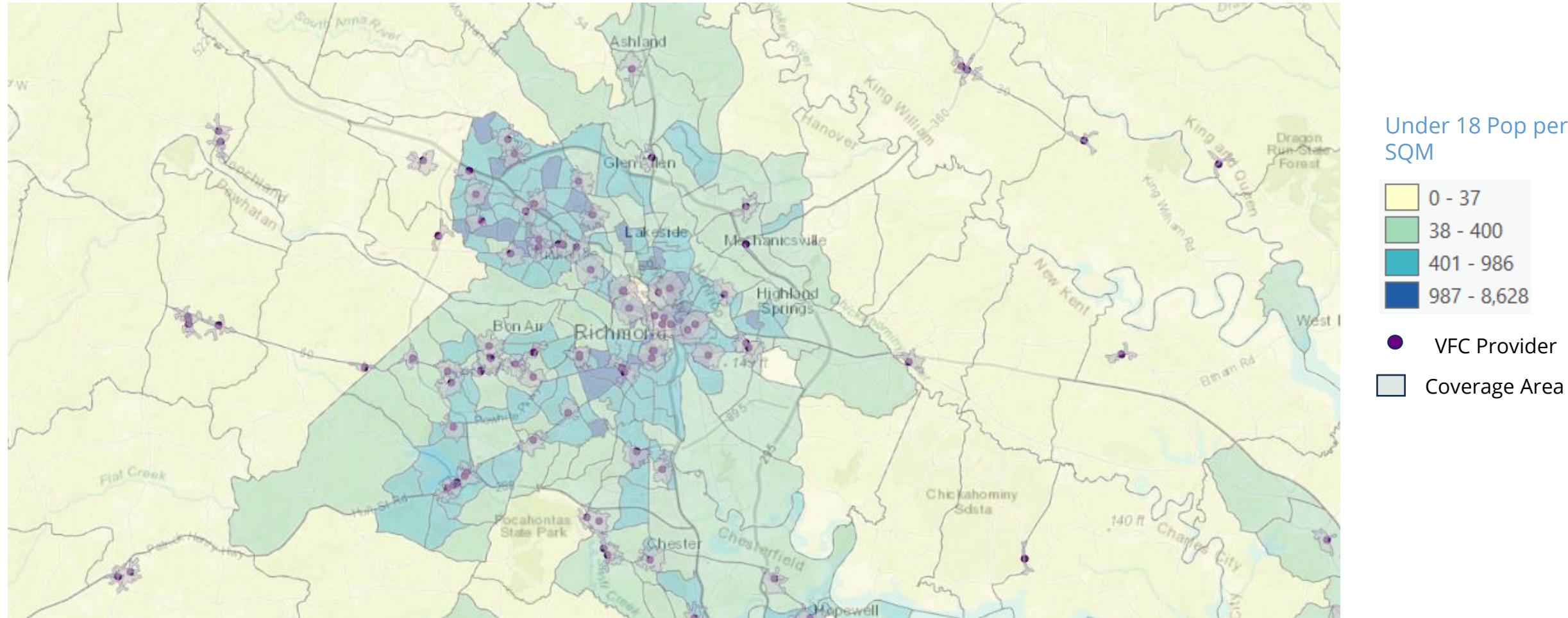
VFC Providers Coverage Area Over SVI



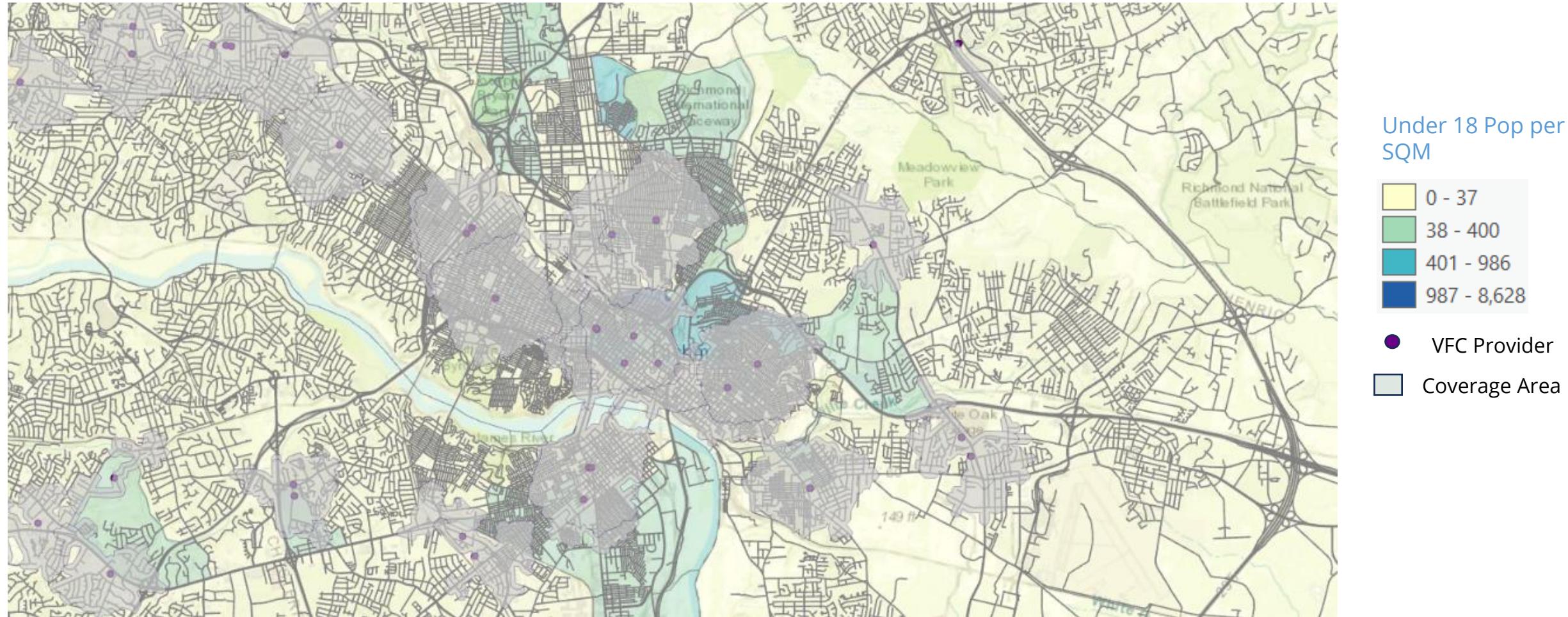
VFC Providers Coverage Area Over SVI



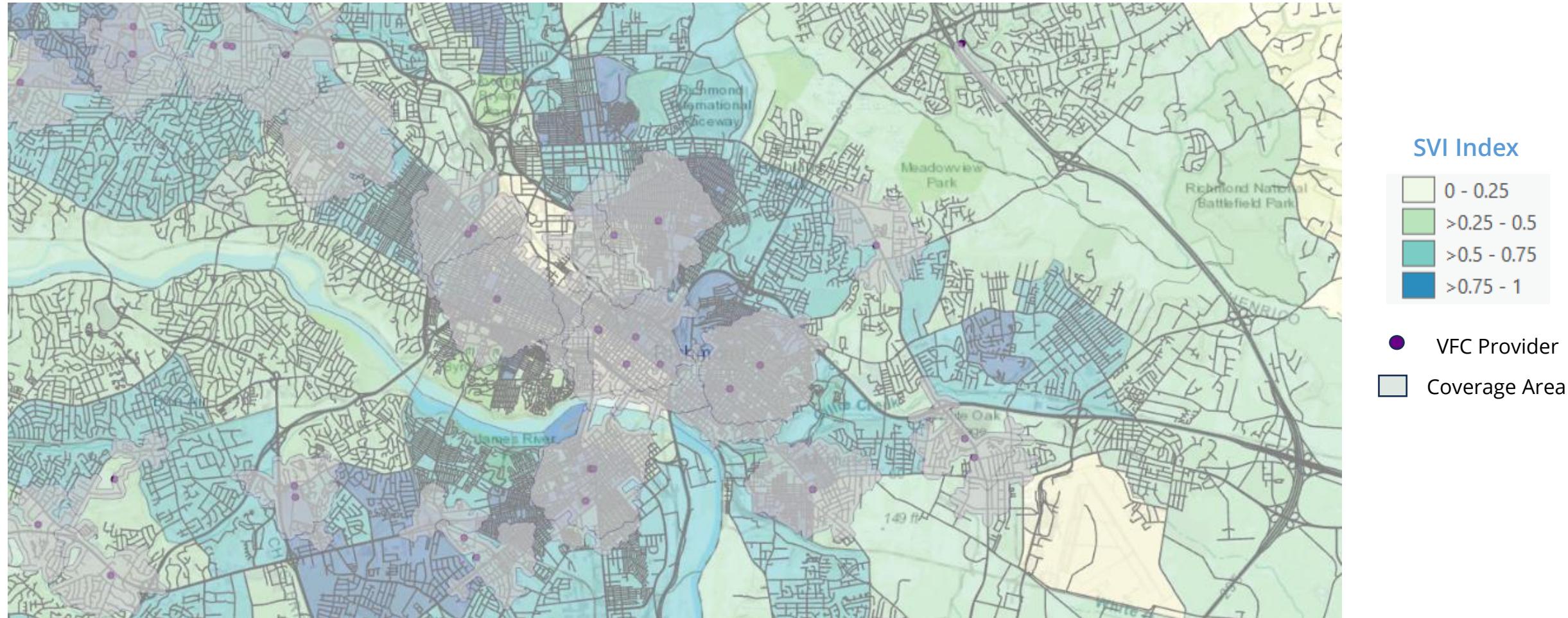
VFC Providers Coverage Area Over SVI



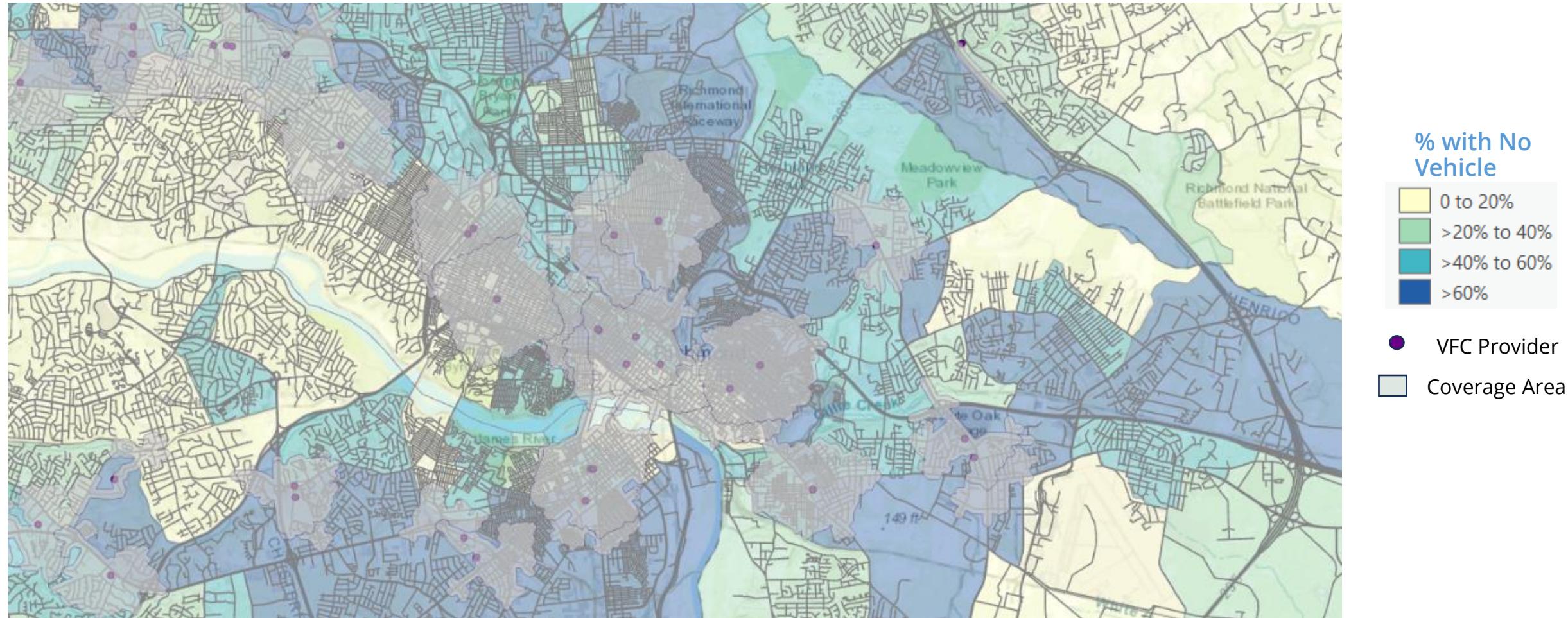
VFC Providers Walking Coverage Area with Population Density



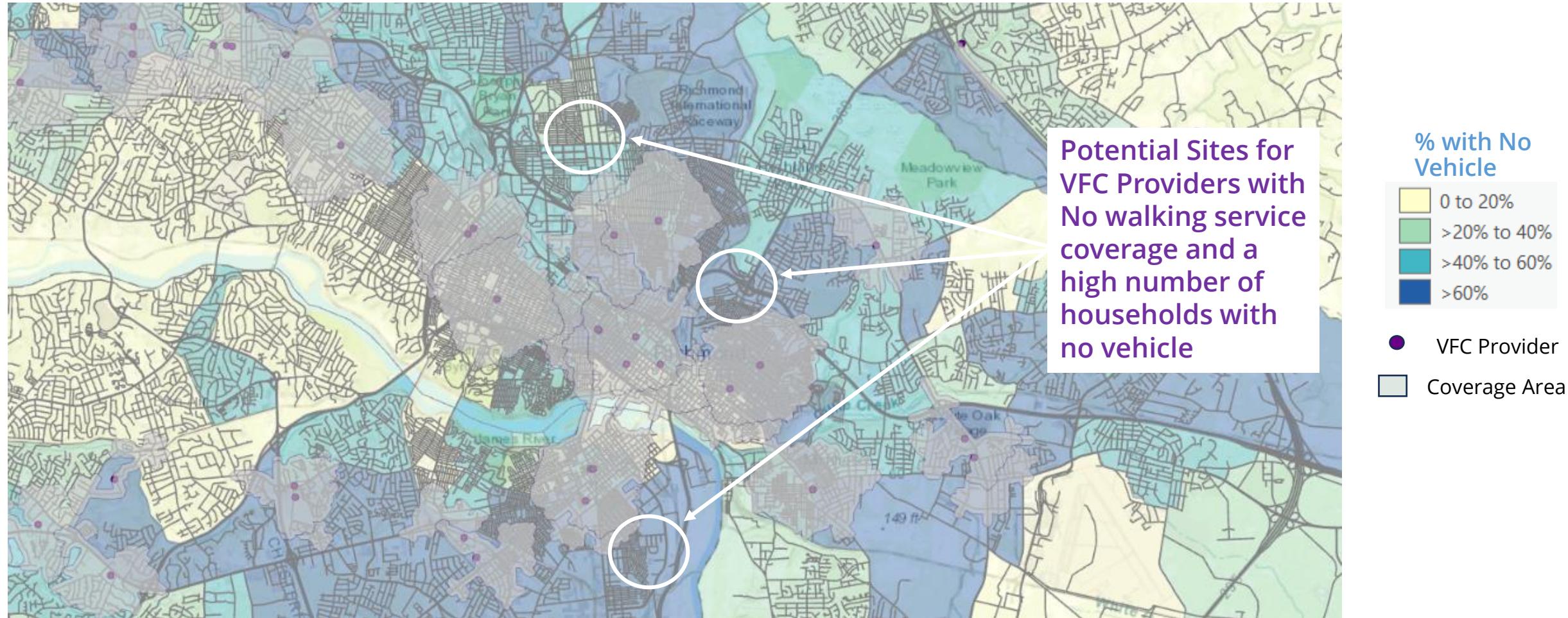
VFC Providers Walking Coverage Area with SVI



VFC Providers Walking Coverage Area with No Vehicle Rate



VFC Providers Walking Coverage Area with No Vehicle Rate



Vaccines for Children

Determining the travel time between Existing Providers and a Potential VFC Providers

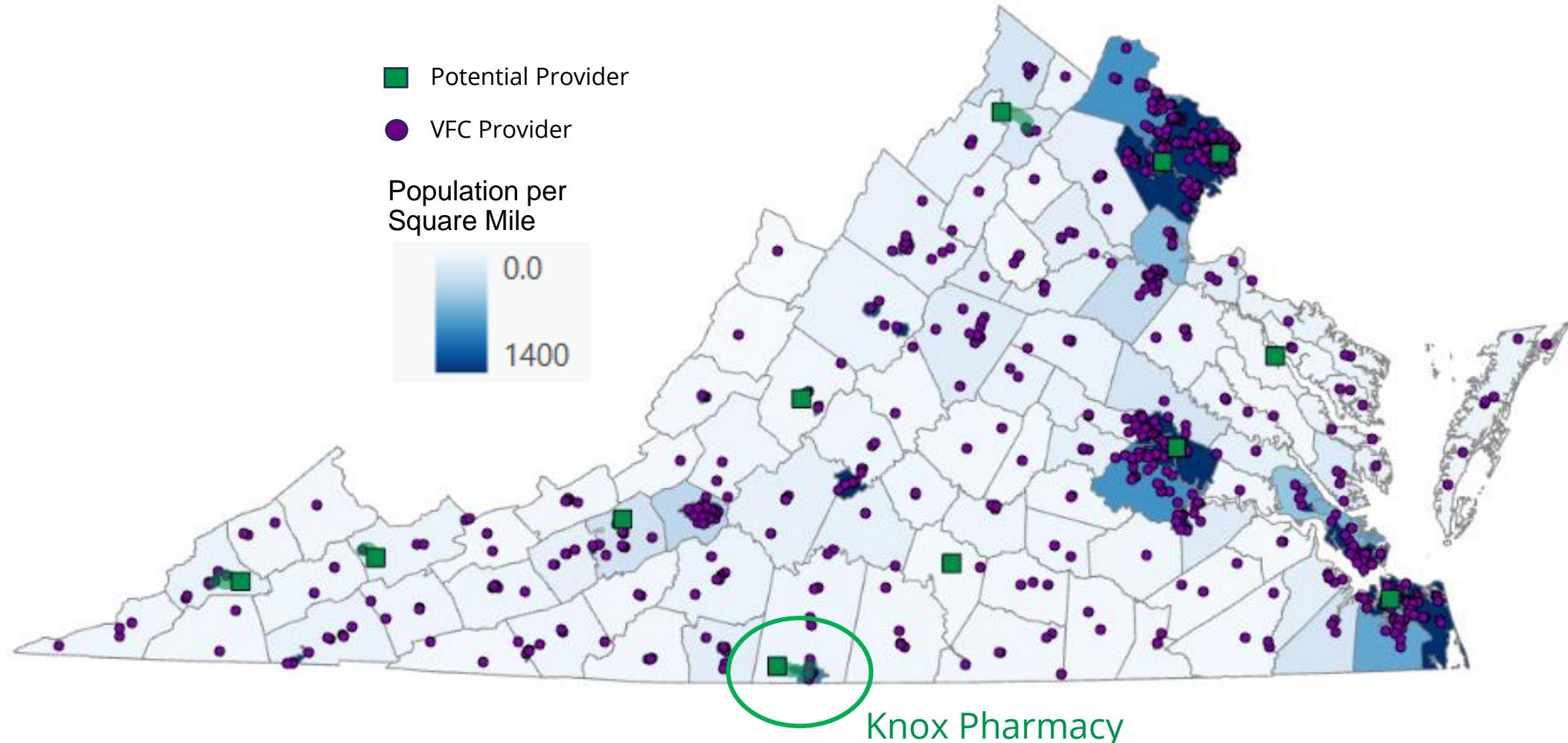
- When given a list of candidates for the VFC program, we can see the travel time to the closest existing VFC location using an ArcGIS Analysis with the VGIN Road Mapping

Candidate Pharmacy	Closest Existing VFC Locations	Travel Time (Minutes)
Knox Pharmacy	PATHS - George Washington HS	13.1
Spartan Drug & Wise Rx Pharmacies	HEALTH WAGON	8.5
ADKOA Pharmacy	UVA HEALTH PEDIATRICS MANASSAS	4.4
Blacksburg Pharmacy	NRV COMMUNITY SERVICES - BLACKSBURG	3.5
Claypool Hill Pharmacy	CLINCH VALLEY PHYSICIAN ASSOCIATES	2.5
Lexington Prescription Center	LEXINGTON - ROCKBRIDGE HD	2.1
Vandorn Pharmacy	MELINDA SEBASTIAN, M.D.	1.4
Peoples Pharmacy	TIDEWATER PEDIATRIC CONSULTANTS - NOR	0.9
Hope Pharmacy	PRACTICE OF DR. RICHARD BENNETT	0.9
Charlotte Drug Company	CHARLOTTE COUNTY HD	0.3
Tappahannock Pharmacy	LEDWITH LEWIS FREE CLINIC	0.3
Strasburg Pharmacy	Strasburg Pharmacy	0.0

Proposed Providers with Closest Existing Pharmacy Route

Updated 3/26/24

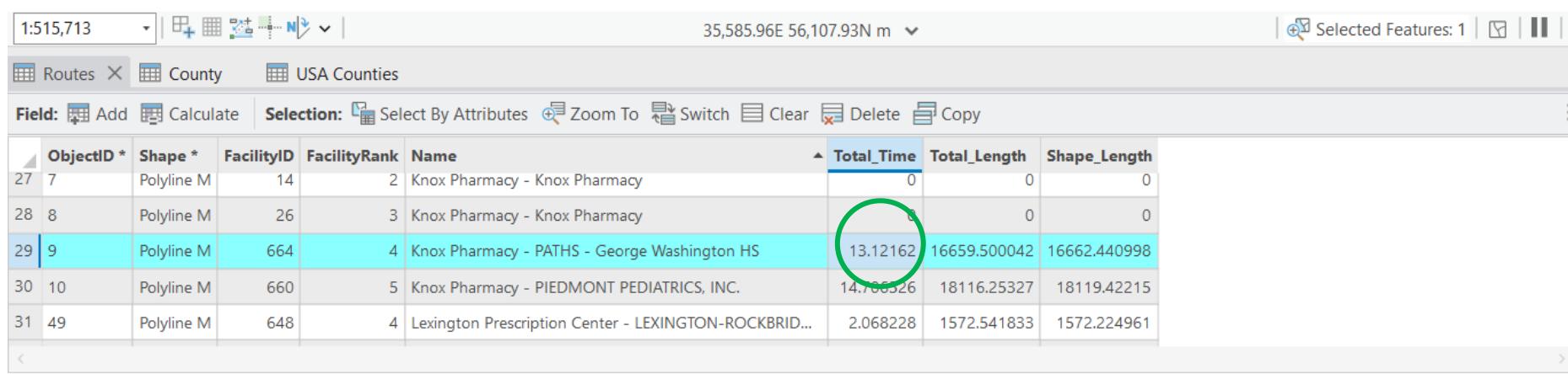
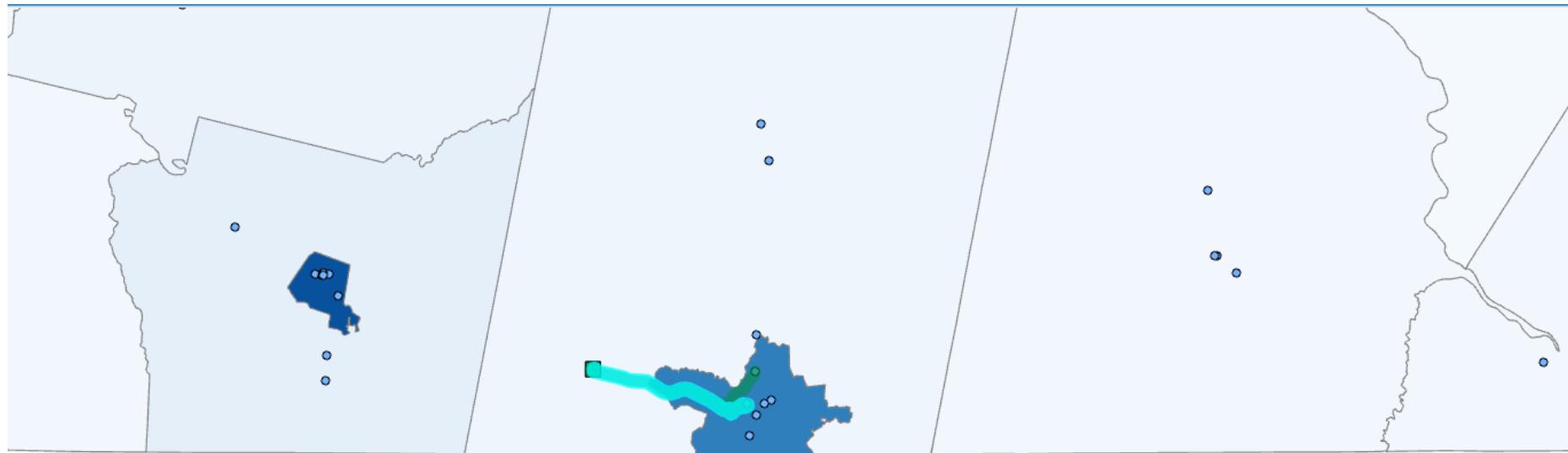
- The Proposed Providers are all within a 15 minute drive of an existing provider



VFC Location Analysis: Knox Pharmacy

Updated 3/26/24

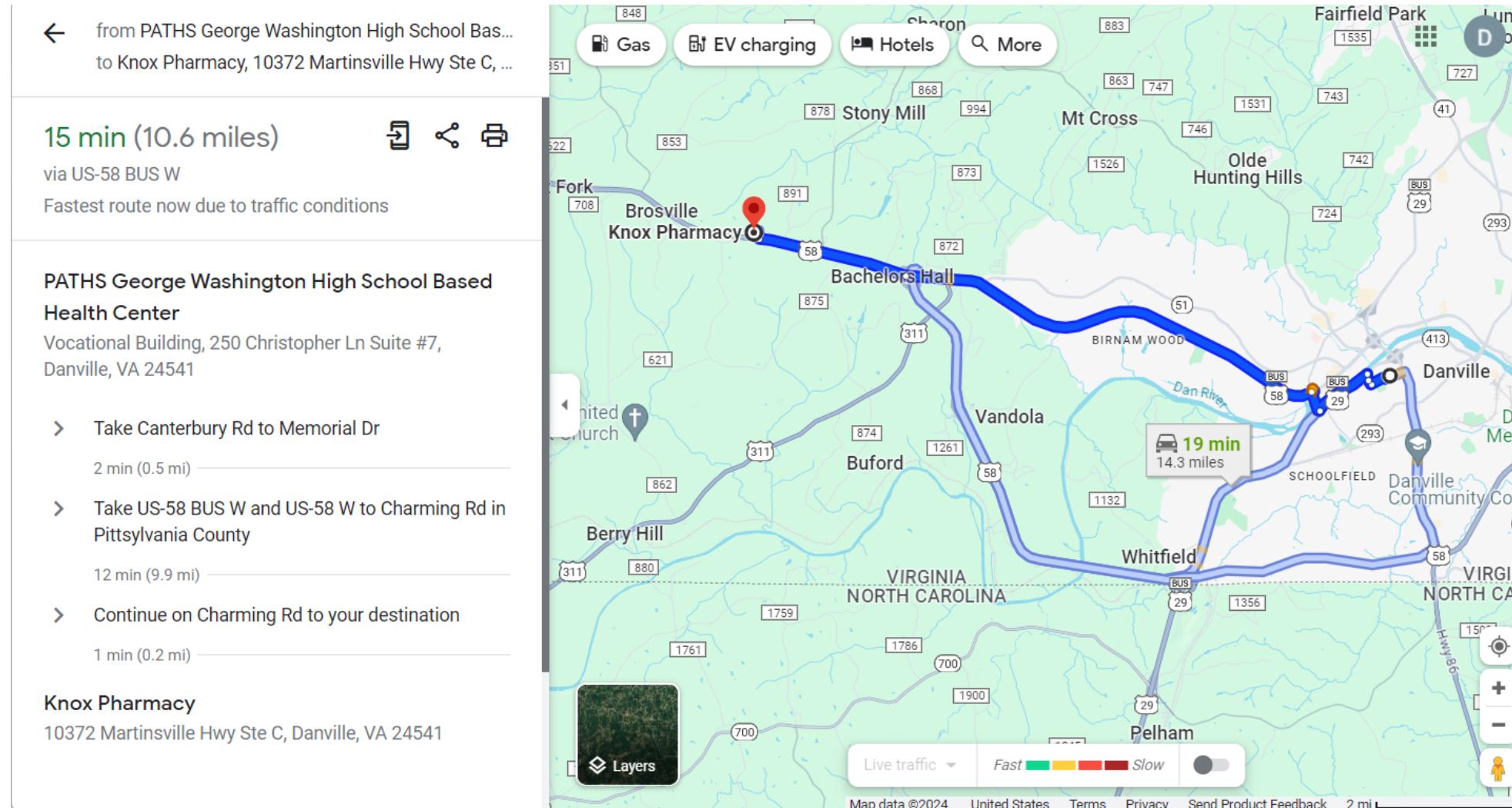
- Knox Pharmacy is the furthest from an existing provider, and the analysis and map in ArcGIS display the total time to travel



VFC Location Analysis: Knox Pharmacy Google Maps Comparison

Updated 3/26/24

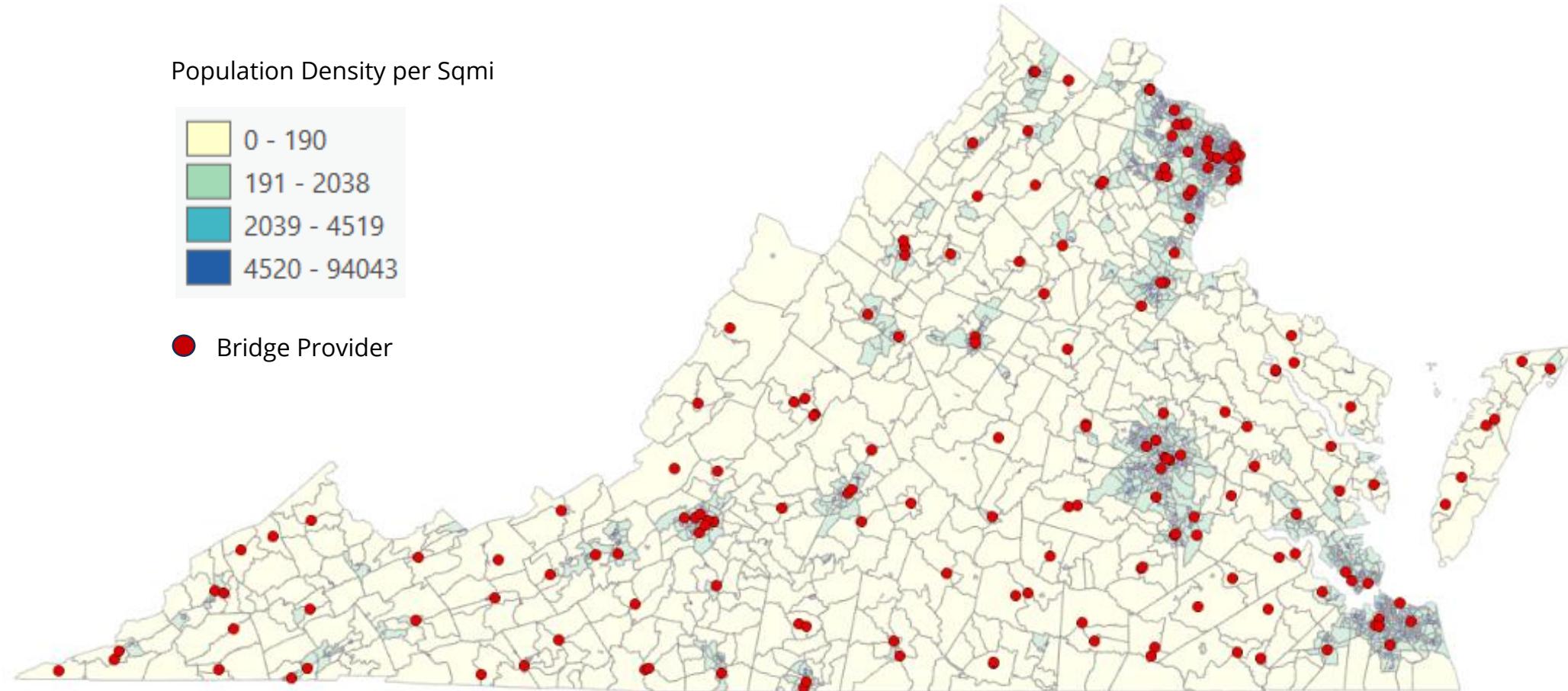
- Google Maps serves to verify the closest existing provider, but includes traffic data not available in ArcGIS



Bridge Program

Locating Areas of Need for New Bridge Program Providers

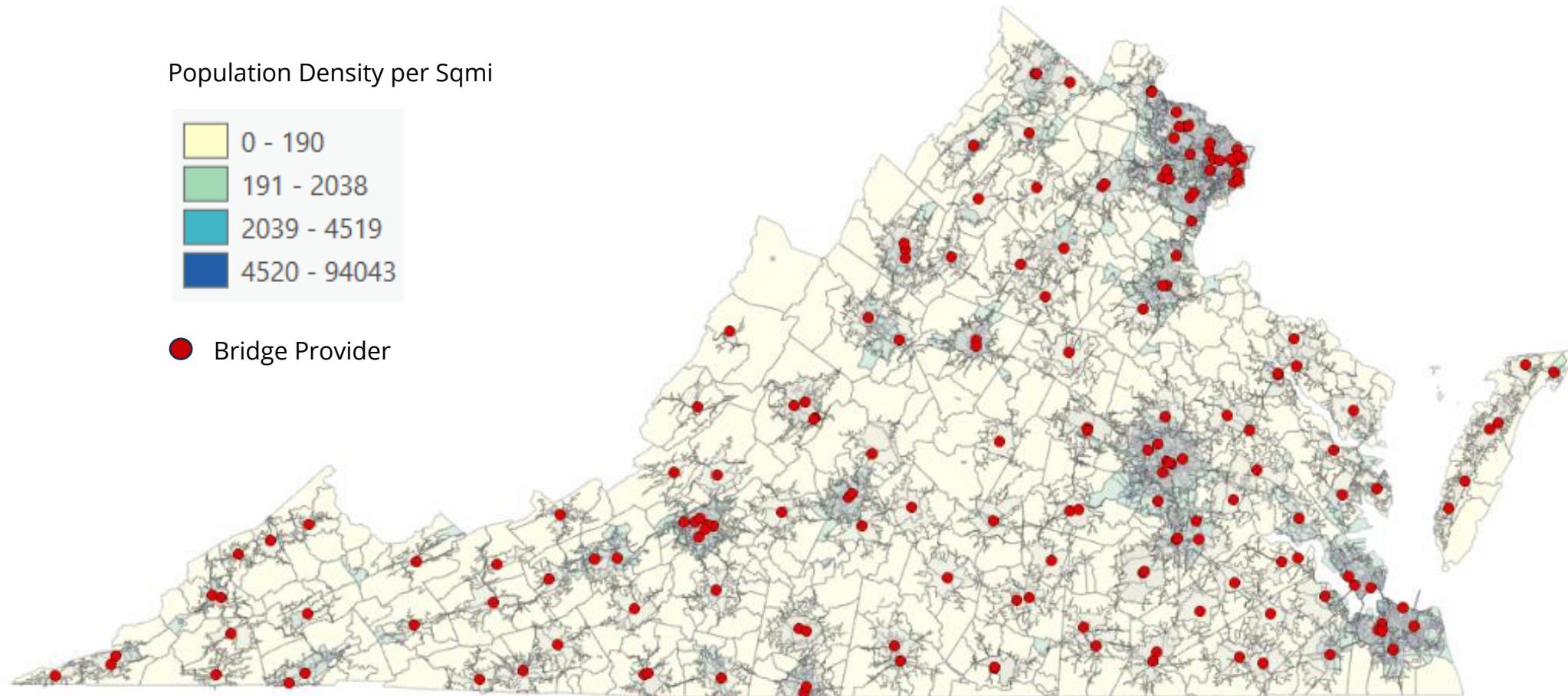
- The map details the bridge providers over a map of Population Density



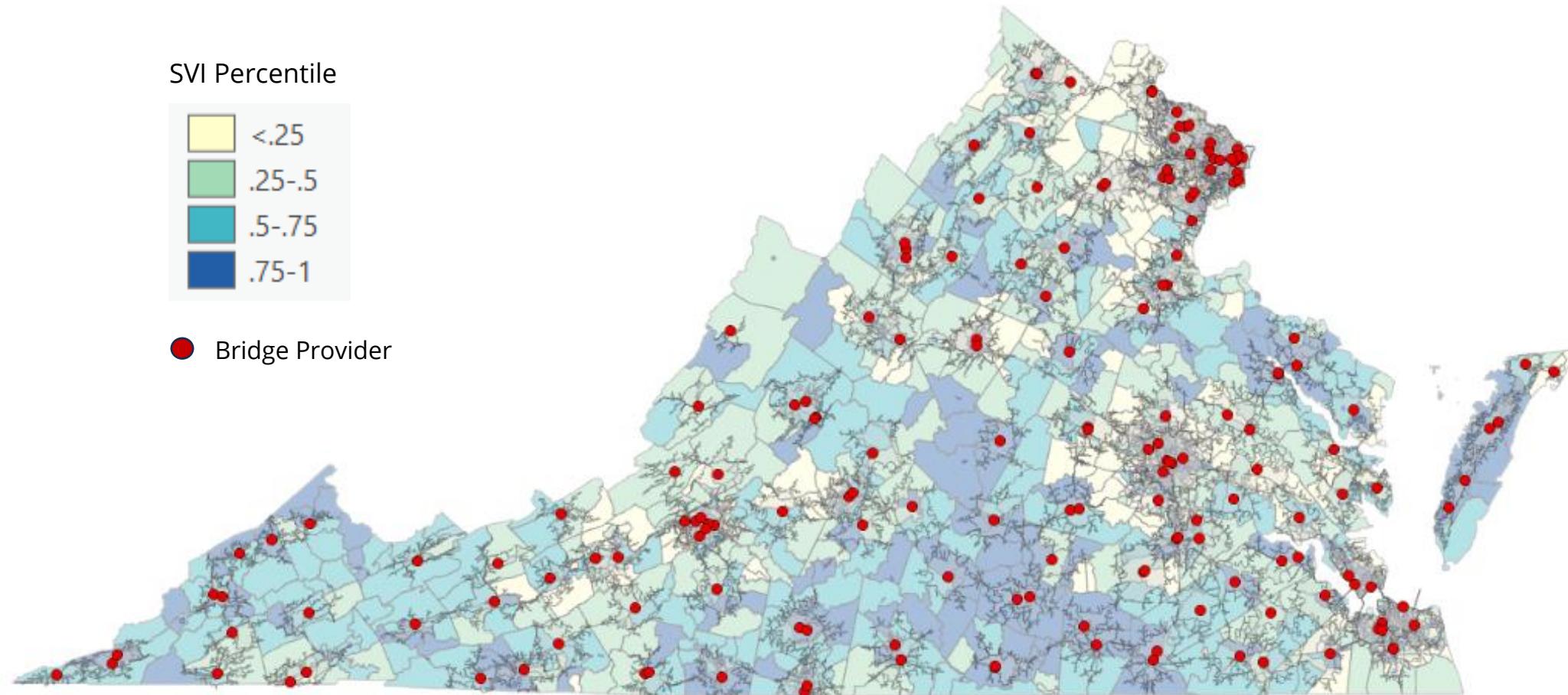
Bridge Providers with Population Density Overlay

Updated 3/26/24

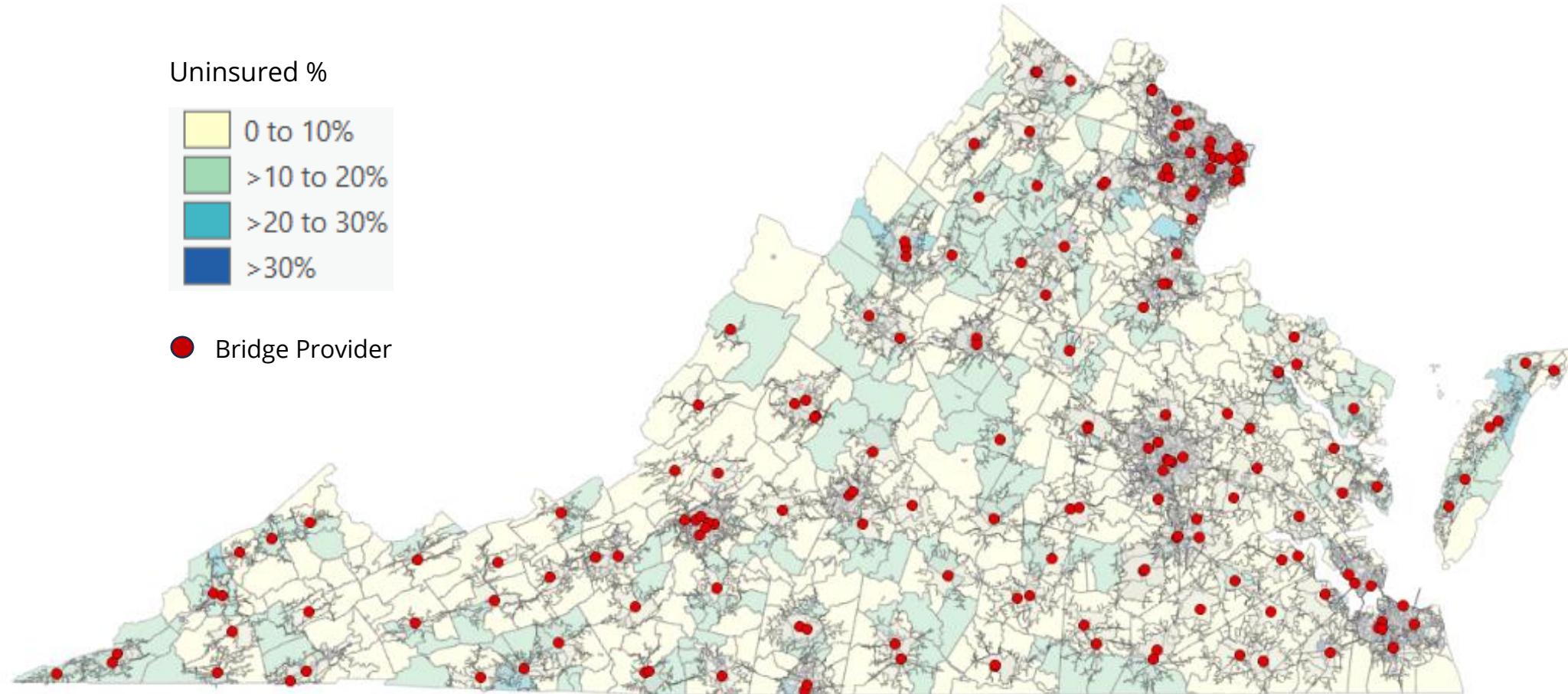
- The map details the bridge providers and their 15 minute drive time coverage over a map Population Density



- The map details the bridge providers and their coverage over a map of Social Vulnerability Index by Percentile



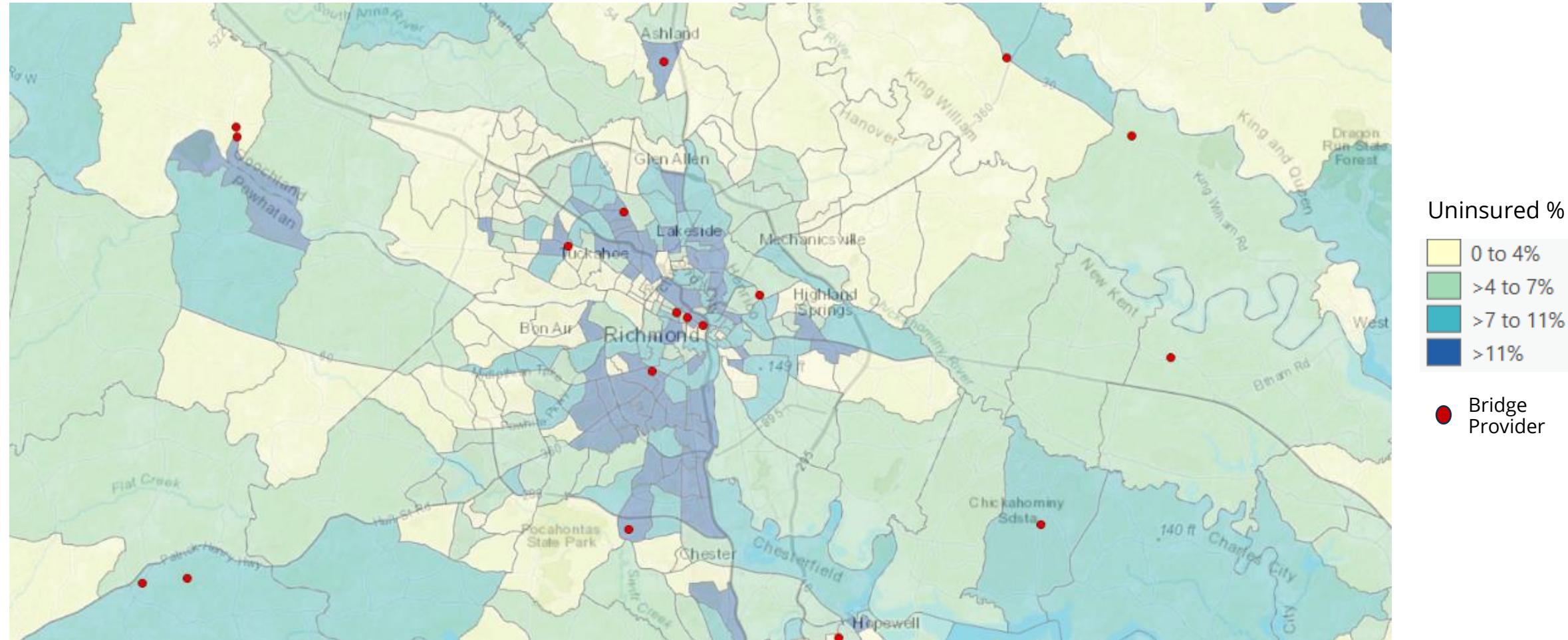
- The map details the bridge providers and their 15 minute drive time coverage over a map of uninsured rates



Richmond Area Bridge Providers with Uninsured Rates

Updated 3/26/24

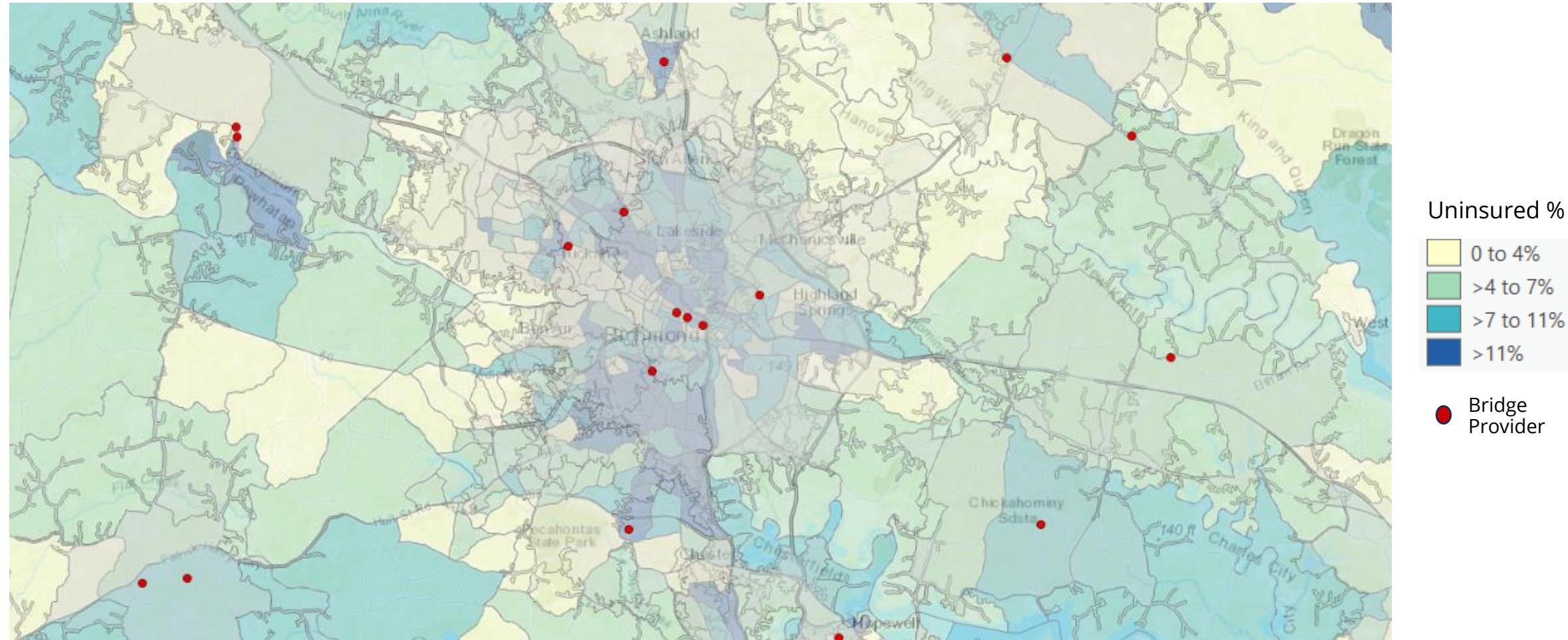
- The map details the bridge providers in the Richmond Area



Bridge Providers with Uninsured Rates

Updated 3/26/24

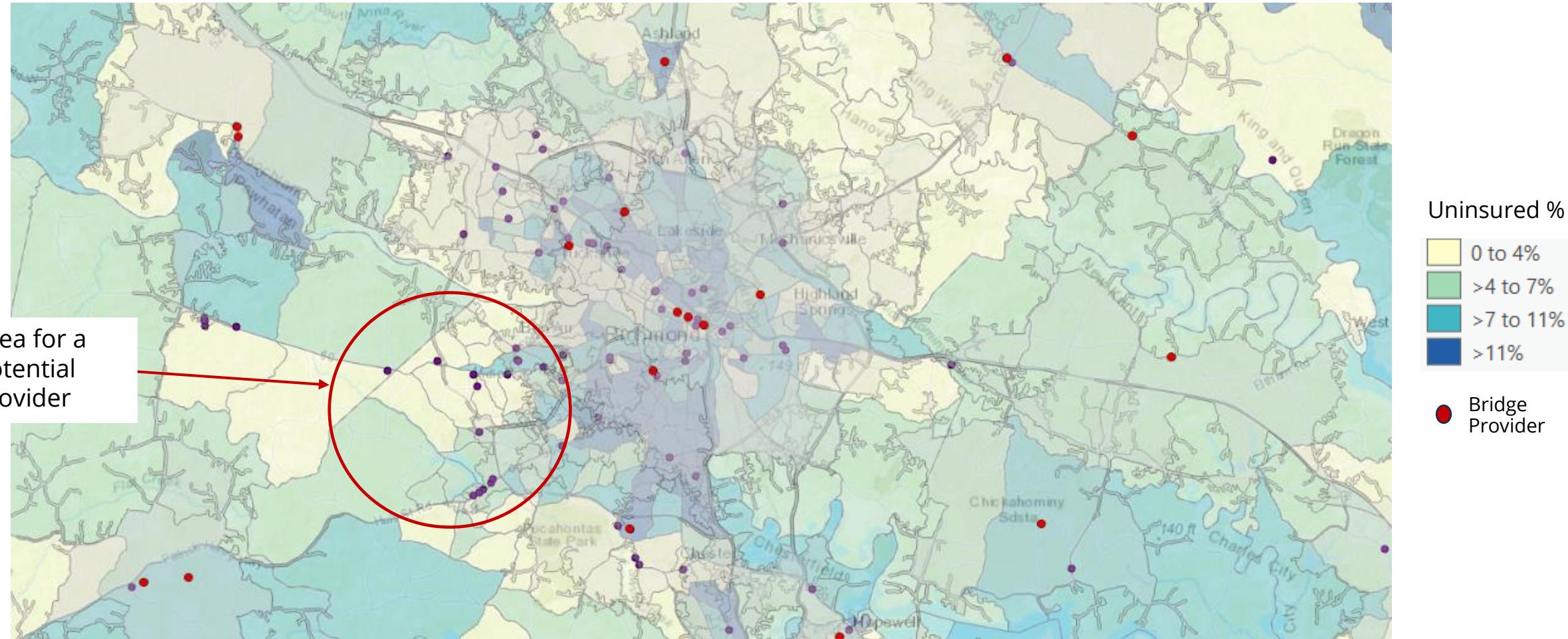
- The map details the bridge providers and their 15 minute drive time coverage over a map of Uninsured Rates



Bridge Providers with Uninsured Rates and Coverage Area

Updated 3/26/24

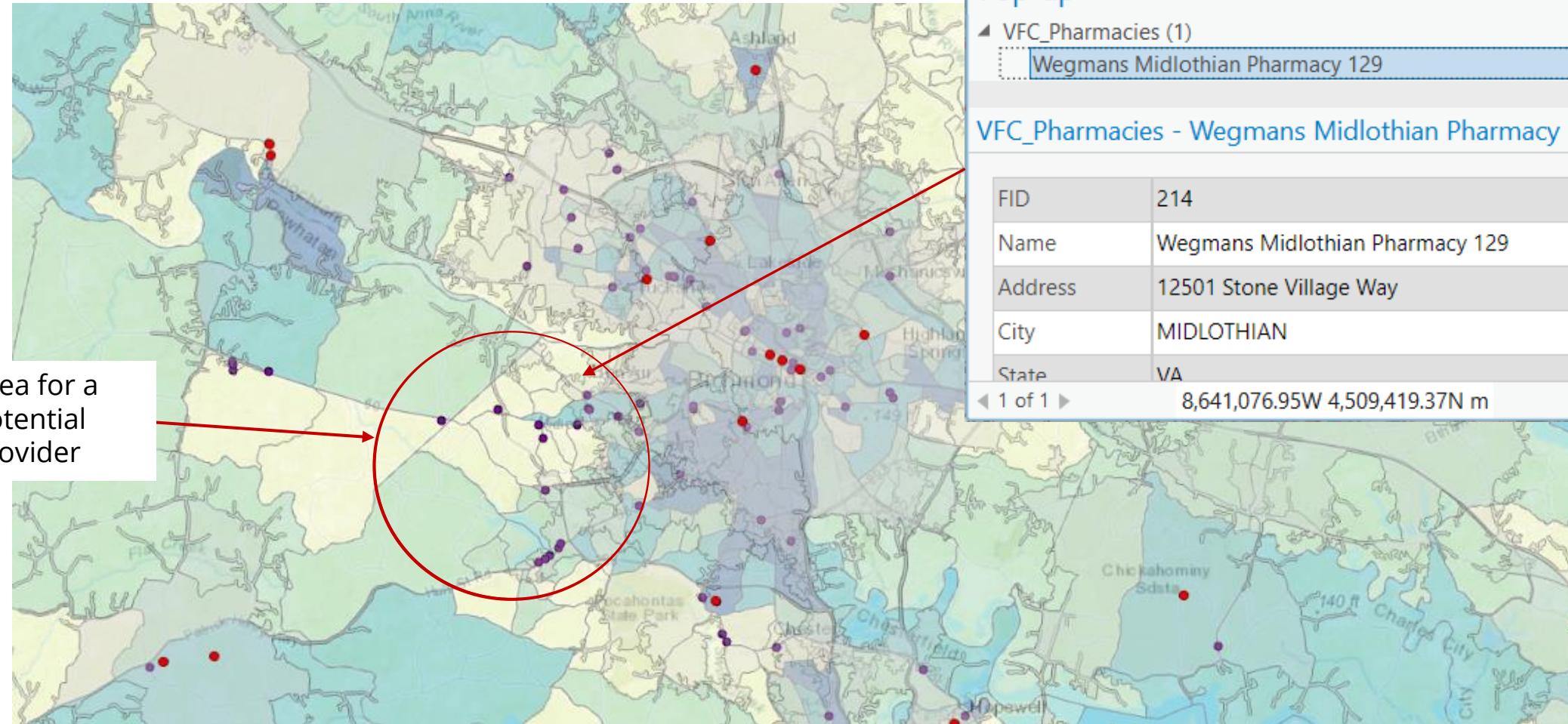
- The map details the bridge providers and their 15 minute drive time coverage over a map of Uninsured Rates with an area highlighted for a potential provider



Bridge Providers with Uninsured Rates and a Potential Provider

Updated 3/26/24

- Wegmans Midlothian would be an example of a location that would serve a location with high rate of uninsured, a high population density and an area of high social vulnerability

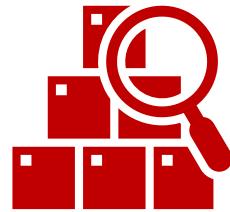


Summary



Visualization of Geographic Coverage by Vaccine Programs

Vaccines for Children
CDC Bridge Program



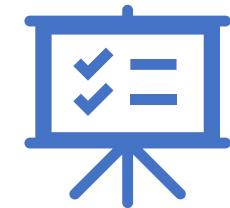
Identify Areas that Lack Coverage

15, 20 minute Drive time Coverage
15 Minute Walk time Coverage
Drive Time to Existing Providers



Highlight Areas of Need by Overlaying Coverage Area on SVI maps

High Social Vulnerability Index
High Population Density
Uninsured Populations
No Access to a Vehicle



Combine Analyses to Optimize Locations for Better Vaccine Access in Virginia

Acknowledgements

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