

READ-AHEAD MATERIALS FOR RESIDENTIAL PARKING WORKING GROUP MEETING SEVEN

At Residential Parking Working Group Meeting Six, the Working Group began discussing which parking policy strategies to include in its recommendation to the County Manager. At multiple points, the Working Group determined that it needed more data in order to make progress in making decisions.

In preparation for Meeting Seven on Wednesday, December 14th, staff have been able to compile and place in this document data that answer some of these questions. These are:

- [How the County has defined “Premium Transit Service” in its recent Transit Development Plan update as well as how that service differs from the already defined “Primary Transit Network.”](#)
- [“Bikeability” and “walkability” in the Metro Corridors.](#) The Group asked for data on the range of values in indexes of “bikeability” and “walkability” as provided by organizations such as Walk Score.
- [Barriers to off-site shared parking in Arlington policy.](#)

At earlier points, the Working Group had also requested further data on:

- [Trends in automobile ownership among Arlington households](#), specifically how much of the growth in households is made up of zero-car households.

At Meeting Seven, staff will also present on:

- The extent to which staff know whether a proposed housing development will be senior, assistive, or committed-affordable (as well as the level of subsidy) during the Site Plan process. Staff noted during Meeting Six that reductions in parking requirements for committed affordable and other special housing may be difficult to give because developers do not always have the housing type firmly decided when a Site Plan review begins.

Finally, we hope to have further data on:

- The relationship between transit access and vehicle ownership.
- The relationship between bike ownership and vehicle ownership, as well as how these ownership patterns relate to transit access.

How the County has defined “Premium Transit Service” in its recent Transit Development Plan update as well as how that service differs from the already defined “Primary Transit Network”

Arlington County has developed a typology of transit service for planning purposes through its Master Transportation Plan and the most recent update to its Transit Development Plan.

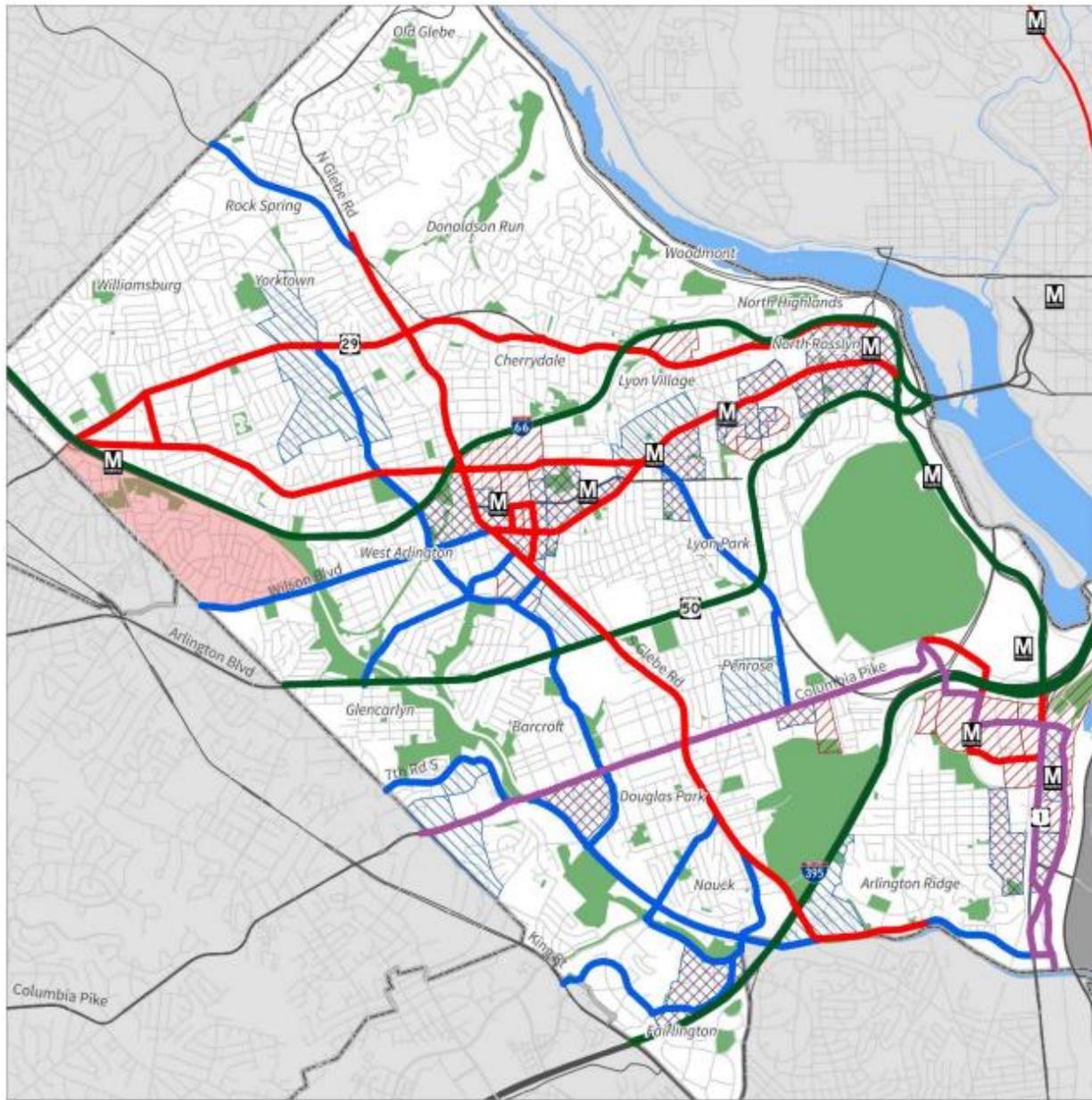
Service Standards for Arlington’s Three Categories of Transit Service¹

	Premium Transit Network	Primary Transit Network	Secondary Transit Network
Frequency of Service (How often does the service come?)	Peak: Every 10 minutes or less Off-Peak: Every 12 minutes or less	Every 15 minutes or less	Peak: Every 30 minutes or less Off-Peak: Every 30 minutes or less OR Flex service
Span of Service (When does the service run?)	18-hours a day, 7 days a week	18-hours a day, 7 days a week	7-hours a day, 5 days a week
Bus Stop Spacing (How far between stops?)	1,320 – 2,649 feet (1/4 to 1/2 mile)	1,320 feet (1/4 mile)	660 – 1,320 feet (1/8 to 1/4 mile)
Other Notes	Stop/Station Characteristics: <ul style="list-style-type: none"> • High quality transit stations • Near-level boarding and off-vehicle fare collection to reduce dwell times at stops • Real-time passenger information • Branded vehicles • Transit signal priority to speed travel times in the corridor Planned only for Columbia Pike, Pentagon/Crystal City at this time. TDP assumes an extension of dedicated bus lanes to Pentagon City by FY2021. ²		

¹ Developed from [Chapter 2: “Goals and Objectives”](#) of the Arlington County FY2017-2026 Transit Development Plan, p. 2-6 to 2-7.

² [Chapter 6: “Capital Improvement Plan”](#) of the Arlington County FY2017-2026 Transit Development Plan, p. 6-13 and 6-15.

Proposed Transit Service by Service Class, Arlington FY2017-2026 TDP³



Transit Corridor

- Premium Transit Network
- Definite Primary Transit Network
- Candidate Primary Transit Network
- Express Transit Network

- High All Day Propensity
- High Peak Propensity
- Metro Rail Station



³ [Chapter 2: "Goals and Objectives"](#) of the Arlington County FY2017-2026 Transit Development Plan, p. 2-8.

“Bikeability” and “Walkability” in the Metro Corridors

There are four questions related to the concepts of “bikeability” and “walkability” that staff see as relevant to the Working Group:

1. What is meant by the terms “bikeability” and “walkability?”
2. How do we measure bikeability and walkability in a way that is predictable and fair?
3. How much does bikeability and walkability differ within the Metro Corridors, which is the geographic scope of the Working Group’s charge?
4. What, if any, relationships have been seen between the bikeability and walkability of a place and the parking demand at residential buildings in those places?

Here we attempt to answer those questions.

What is meant by the terms “bikeability” and “walkability?”

Bikeability

Bikeability is a general term for the extent to which an environment is conducive to bicycling. Biking is considered to be healthy, convenient, inexpensive, and environmentally beneficial. Bikeability depends greatly on the proximity to and the extent of a complete network of comfortable bicycle routes, including not only pathways and pavement markings, but also signage, intersection crossings, and traffic control devices. Local plans and policies that enhance and encourage bicycling are also part of what determines a community’s bikeability. Further, the availability of convenient bicycle storage, as well as changing and shower rooms at places of employment, contribute to an overall bike-friendly environment.

Walkability

Walkability is a measure of how friendly an area is to walking. Walkability has health, environmental, and economic benefits. Factors influencing walkability include the presence or absence and quality of footpaths, sidewalks or other pedestrian rights-of-way, traffic and road conditions, land use patterns, building accessibility, and safety, among others. Walkability is an important concept in sustainable urban design.

One proposed definition for walkability is: “The extent to which the built environment is friendly to the presence of people living, shopping, visiting, enjoying or spending time in an area”. Factors affecting walkability include, but are not limited to:

- Street connectivity
- Land use mix
- Residential density (residential units per area of residential use)
- Presence of trees and vegetation
- Frequency and variety of buildings
- Entrances along street frontages
- Transparency, which includes amount of glass in windows and doors, orientation and proximity of homes, and buildings to watch over the street
- Plenty of places to go to near the majority of homes
- Placemaking, such as street designs that work for people, not just cars

- Retail floor area ratio

Major infrastructure factors include access to mass transit, presence and quality of footpaths, buffers to moving traffic (planter strips, on-street parking or bike lanes) and pedestrian crossings, aesthetics, nearby local destinations, air quality, shade or sun in appropriate seasons, street furniture, traffic volume and speed, and wind conditions.

How do we measure bikeability and walkability in a way that is predictable and fair?

Staff reviewed a variety of measurement systems that help the user determine how bike friendly and walk friendly a place is. Many of these systems rely on site-specific audits or inventories. Many are also qualitative in a way that would make it difficult for staff to fairly and predictably apply parking policy at different sites. However, three systems may offer ways to measure bikeability and walkability that are useful for parking policy.

The **Walk Score and Bike Score systems** now owned by Redfin are appealing because they measure whether a location is good for biking or walking based on data from city governments, the US Geological Survey, OpenStreetMap, and the U.S. Census. These systems present scores from 0 – 100 for any address location through a web site or through a data platform subscription. The system is also appealing because the makers provide “break points” or the thresholds at which the system’s makers believe the quality of a location’s bike friendliness and walk friendliness meaningfully changes (e.g., (e.g., a place with a score of 90 and above is considered a “Walker’s Paradise” or “Biker’s Paradise”, meaning that the makers believe there is little marginal difference between a score of 90 and 95). A common criticism of these systems is that they are proprietary products with owners who do not fully disclose their scoring methodology. Documentation for the systems does not appear to call out if and when the owners change methodologies.

The US Environmental Protection Agency has developed a measurement system that it calls the **Smart Location Database**. This database scores all Census Tracts in the United States against a measurement of walkability on a scale from 1 to 20 that relies on the following variables:

- Density of intersections (a common proxy for walkability)
- Proximity to transit stops
- Employment mix (where more diversity in employment type yields a higher walkability score)
- Employment and housing mix (where a greater mix of employment and housing yields a higher walkability score)

Like the Walk Score and Bike Score systems, the results of the EPA calculations are available for easy viewing on a web site, and the EPA has provided thresholds for its 1-to-20 scale. A disadvantage to this system is the EPA does not appear to plan regular updates to this database. Also, it incorporates transit access in a measure of walkability, which would make it difficult to use as a measure for walkability alone.

The US Green Building Council’s **Leadership in Energy and Environmental Design (LEED) rating system** provides a measurement system for bike access based on the project’s bicycle facilities and the mix of destinations within 3 miles of the project and accessible by a “bicycle network” made up of bike trails and bike lanes. The City of Alexandria’s update parking requirements incorporate a “walkability” scoring

system that is based in part on the USGBC methodology for scoring access to “diverse uses” by walking. These methods do not provide a “click-of-a-button” system like Bike Score and Walk Score, but both the LEED system and the City of Alexandria provide models of what Arlington could require developers to submit for scoring against any bikeability or walkability criteria.

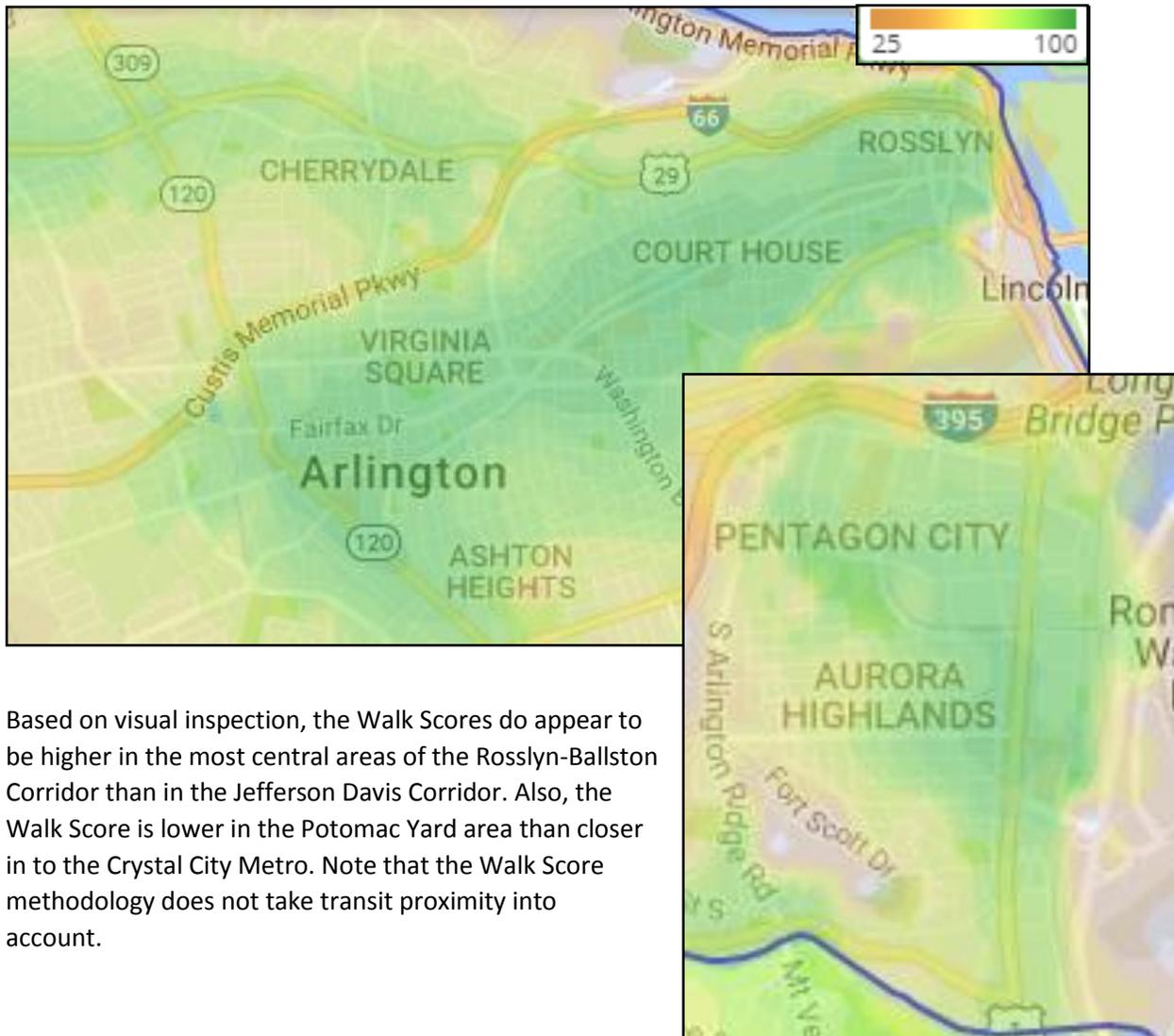
How much do bikeability and walkability differ within the Metro Corridors, which is the geographic scope of the Working Group’s charge?

Staff have been able to compile data on the variation in scores for bikeability and walkability in the Metro Corridors as provided in the Bike Score/Walk Score and Smart Location Database systems.

Bike Score and Walk Score

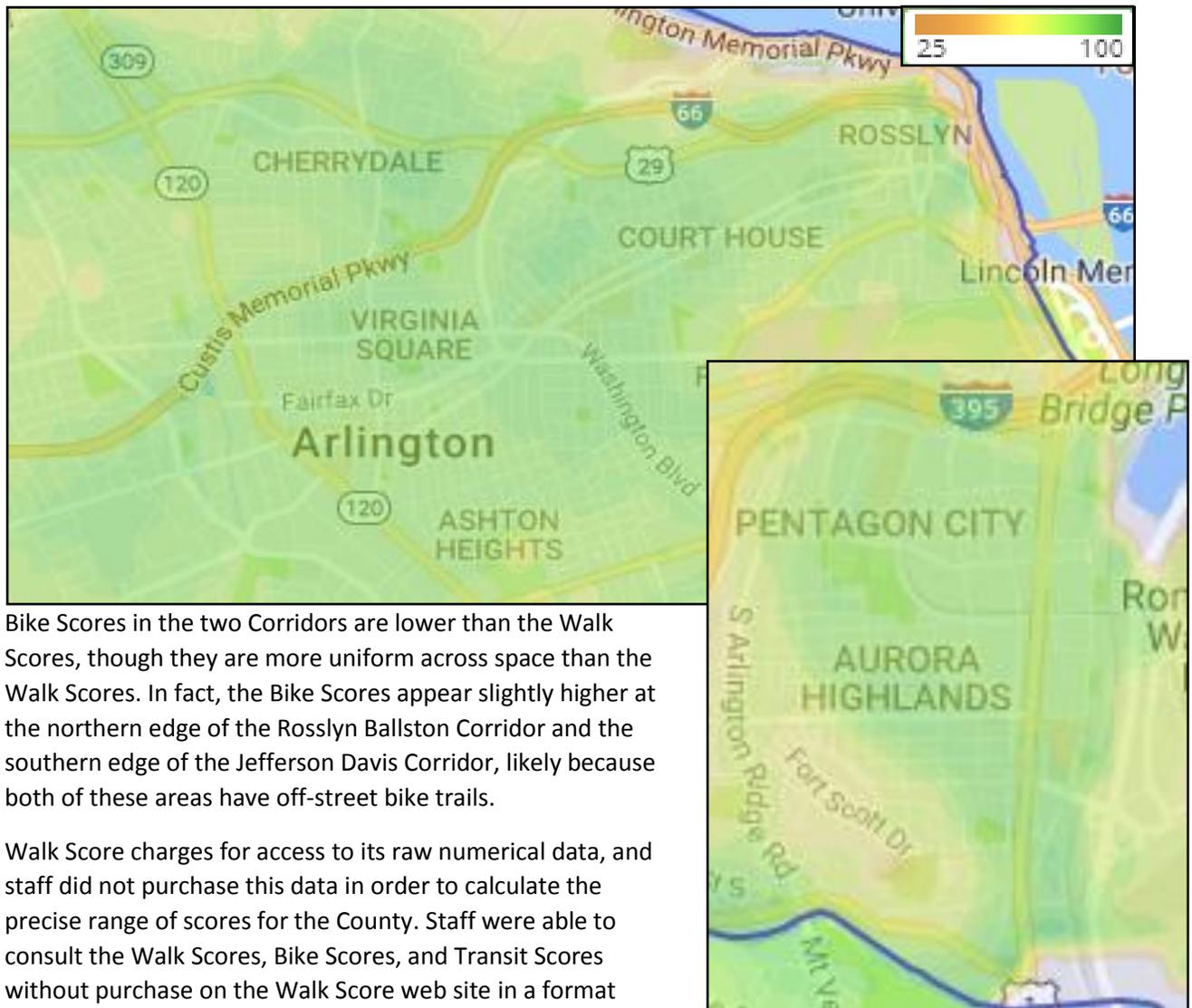
This is little variation in the Bike and Walk Scores in Arlington’s Metro Corridors. The following maps depict the variation.

Walk Scores Mapped in Arlington’s Metro Corridors



Based on visual inspection, the Walk Scores do appear to be higher in the most central areas of the Rosslyn-Ballston Corridor than in the Jefferson Davis Corridor. Also, the Walk Score is lower in the Potomac Yard area than closer in to the Crystal City Metro. Note that the Walk Score methodology does not take transit proximity into account.

Bikescores Mapped in Arlington’s Metro Corridors



Bike Scores in the two Corridors are lower than the Walk Scores, though they are more uniform across space than the Walk Scores. In fact, the Bike Scores appear slightly higher at the northern edge of the Rosslyn Ballston Corridor and the southern edge of the Jefferson Davis Corridor, likely because both of these areas have off-street bike trails.

Walk Score charges for access to its raw numerical data, and staff did not purchase this data in order to calculate the precise range of scores for the County. Staff were able to consult the Walk Scores, Bike Scores, and Transit Scores without purchase on the Walk Score web site in a format where the providers aggregate scores by neighborhood.

Though these neighborhoods do not conform exactly to the Metro Corridors as used in Arlington for planning purposes, staff believes that they illustrate the range of values that would be seen in a more thorough analysis of Walk Score’s raw data. The following table describes the score range

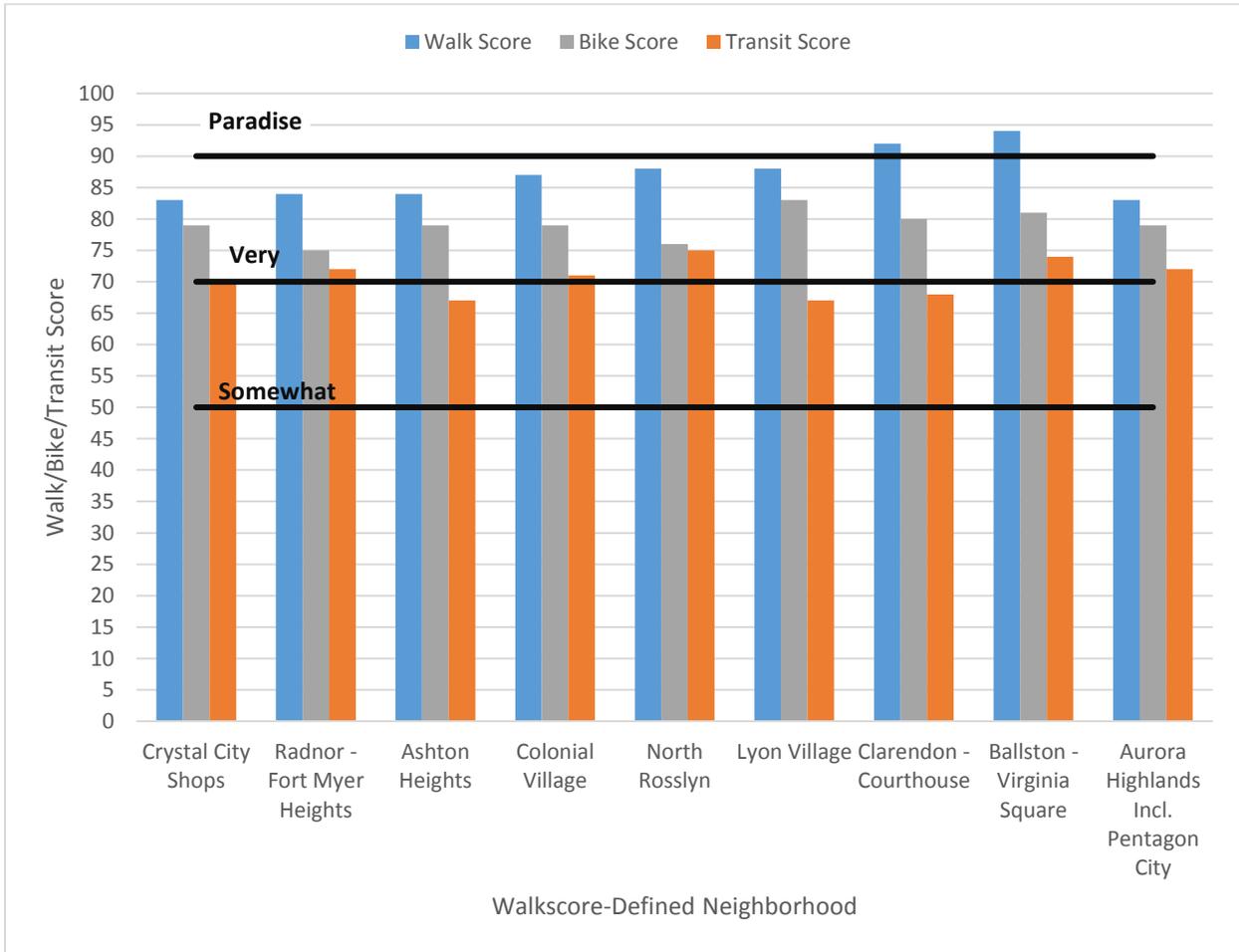
Mode Scores for the Walk-Score-Defined Neighborhoods of Arlington’s Metro Corridors

	Walk Score	Bike Score	Transit Score
Minimum	83 (“Very Walkable”)	75 (“Very Bikeable”)	67 (“Good Transit”)
Maximum	94 (“Walkers’ Paradise”)	83 (“Very Bikeable”)	75 (“Excellent Transit”)

SOURCE: WALK SCORE.

The following chart describes the variability visually.

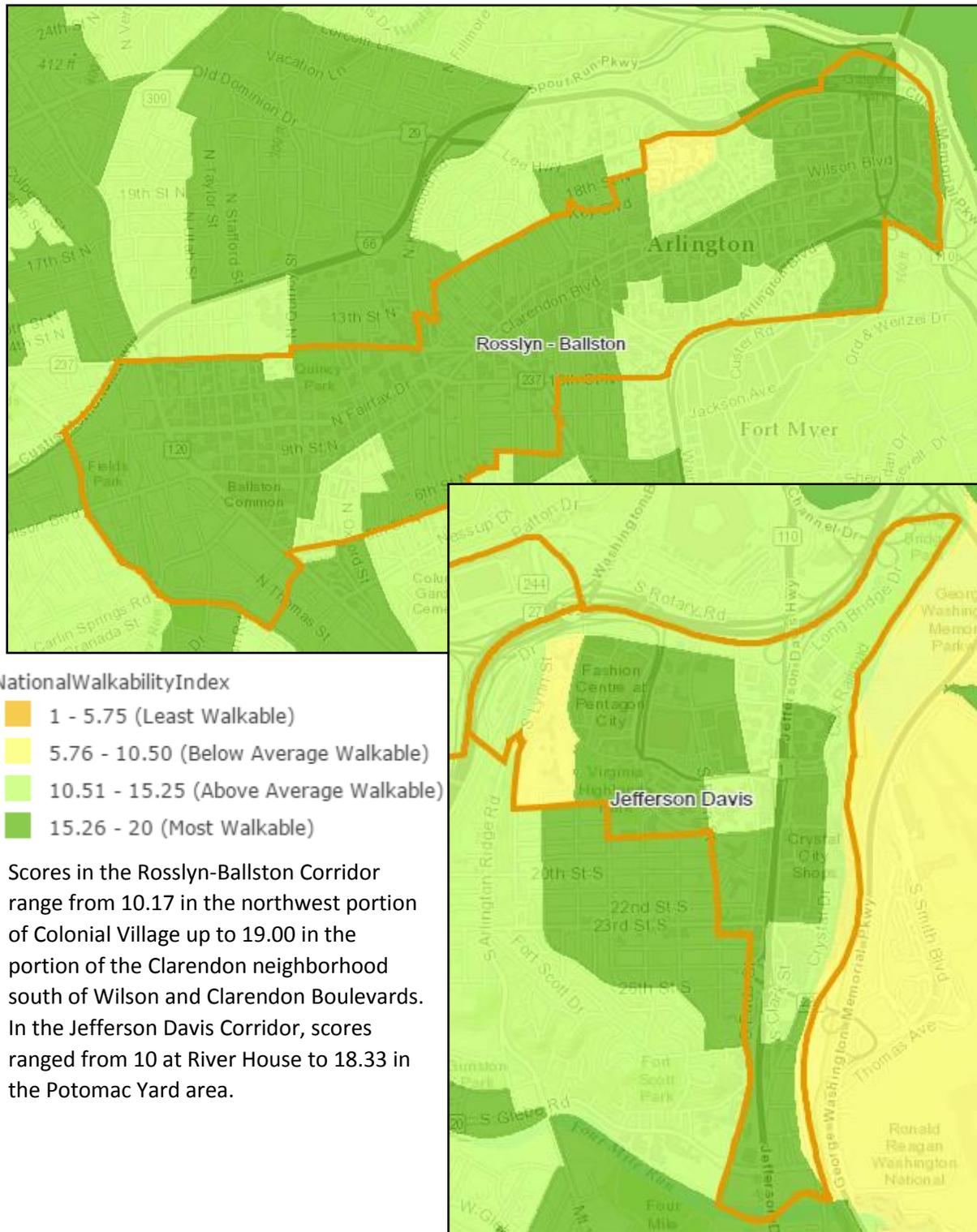
Mode Scores for Arlington Neighborhoods along the Metro Corridors with the Thresholds for Each Level of Walk, Bike, and Transit Friendliness

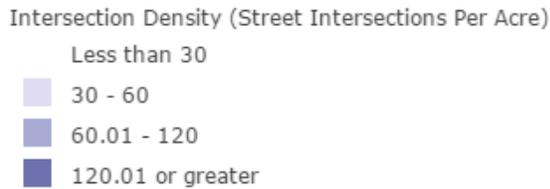
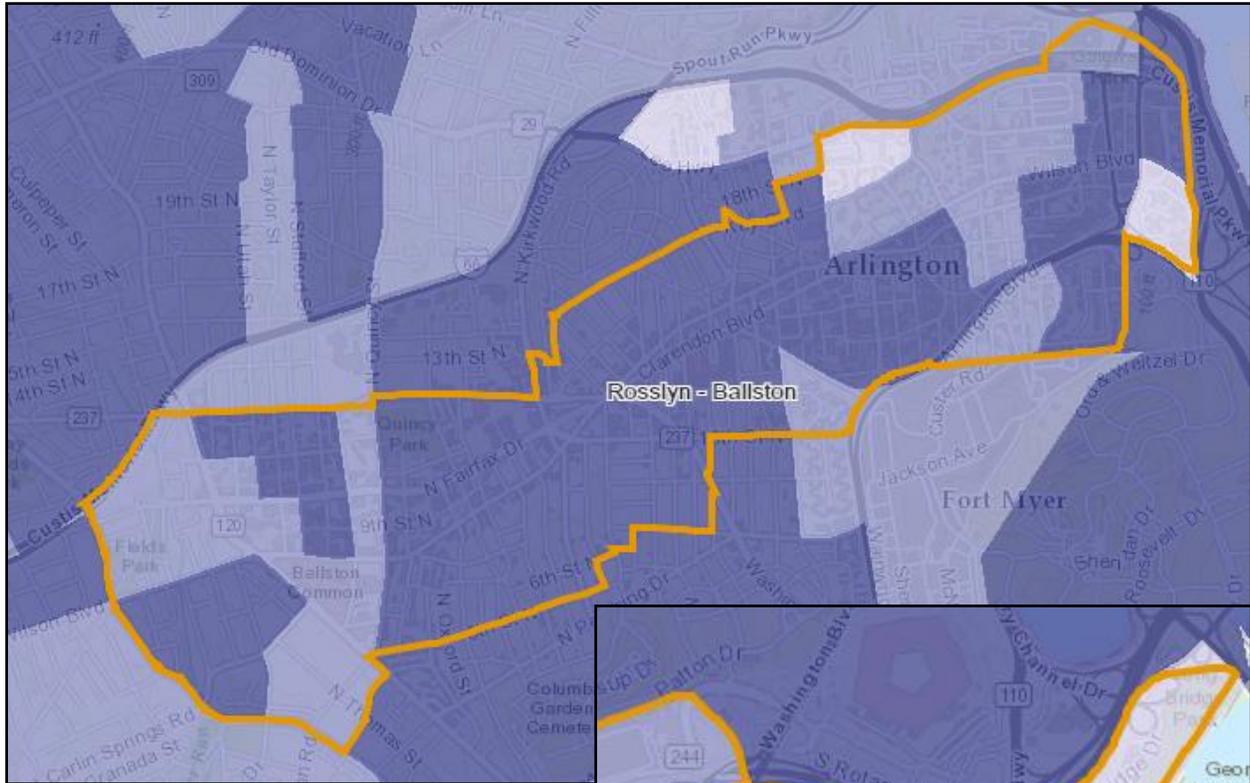


SOURCE: WALK SCORE. NOTE: NEIGHBORHOODS ARE DEFINED BY WALK SCORE AND ROUGHLY COVER ARLINGTON'S METRO CORRIDORS AS COMMONLY DEFINED FOR PLANNING PURPOSES.

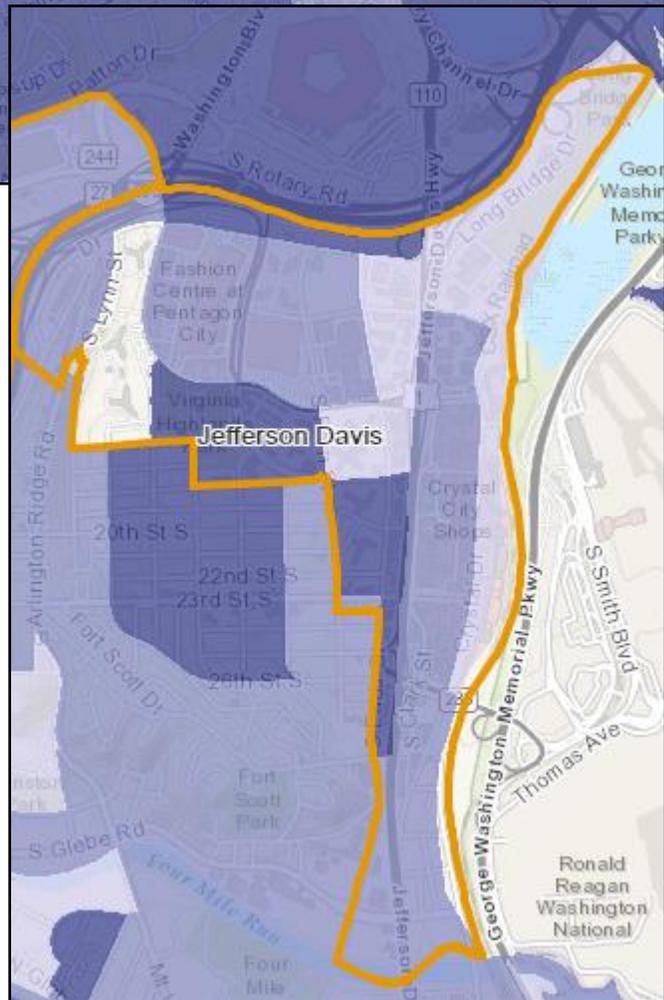
We should note that when staff entered a variety of addresses into the Walk Score web site, the site gave a range of Bike Score values between 75 and 84 in line with the range for the neighborhood-level aggregated scores shown above.

EPA Smart Location Database Scores in Arlington's Metro Corridors





Looking at intersection density alone (a common proxy for walkability), scores in the Rosslyn-Ballston Corridor range from 41.06 street intersections per acre in the corner occupied by the Twin Towers and River Place to a high of 277.61 south of Wilson Boulevard between Barton and Danville Streets to the East of Clarendon. Scores are generally lower in the Jefferson-Davis Corridor, most likely because of the long block lengths between streets in Pentagon City and Crystal City (pedestrian connections do not appear to be factored into this measurement). Scores range from 15.12 street intersections per acre at River House to a high of 277.61 in the area where Crystal House is located as well as the hotels between Jefferson Davis Highway and South Eads Street. The section that contains the Crystal City Metro station has a score of 87.50 street intersections per acre.



What, if any, relationships have been seen between the bikeability and walkability of a place and the parking demand at residential buildings in those places?

The 2013 Residential Building Aggregate Study did find that car ownership rates were lower in more walkable areas of Arlington. Ownership was higher in “car dependent” areas as defined in the Walk Score system, but were about the same if the area was “somewhat,” “very,” or “extremely” walkable, categories that likely describe all of the land in the Metro Corridors where multifamily Site Plan and UCMUD development could occur. Staff have not conducted further analysis of parking demand as it relates to walkability or bikeability.

Elsewhere, the ParkRight DC project found that surrounding block size (a proxy for walkability) was the most powerful “neighborhood” determinant of parking demand at residential buildings.

Finally, in formulating its zoning ordinance changes for parking, the City of Alexandria undertook a study that correlated parking demand observed at residential buildings with proximity to a diversity of land uses, such as grocery stores, schools, and other retail, service, and public facilities. Their [study](#) determined that “neighborhood walkability had the second greatest impact on parking demand” after proximity to Metrorail. The City subsequently gave 10% reduction credit for properties that have “very high” neighborhood walkability and a 5% reduction credit for properties with a “high” walkability score.

Barriers to Off-Site Shared Parking in Arlington Policy

Though off-site shared parking is endorsed throughout Arlington policy documents, staff believe that are barriers to implementing shared parking arrangements given that such arrangements are infrequently found in the County.

Some clear but limited allowances for shared parking do exist in the zoning ordinance, though they do not apply to residential uses.

- Retail uses within 1,000 feet of the Metro are exempt from any required parking for the first 5,000 square feet of gross floor area.
- Restaurants of up to 200 seats within 1,000 feet of Metro are exempt from required parking also.
- Restaurants are allowed off-site shared parking with another use within 600 feet if the primary user of the parking spaces is closed at 6:00 p.m., and the Zoning Administrator has to approve a legally binding agreement.
- The zoning ordinance does allow the Board to declare “by resolution” that parking in “business districts” has been provided “on a community rather than an individual basis” thereby lowering individual property’s parking requirements, but staff is not aware of this clause of the ordinance being invoked.
- “Religious institutions, lodges, or community swimming pools not operated primarily for commercial gain” are explicitly provided with means of creating off-site sharing parking arrangements through use permits.

Anecdotal evidence in Arlington indicates that private property owners are reticent to make shared parking arrangements because of liability concerns as well as a lack of knowledge on how to craft a shared parking arrangement. These barriers exist elsewhere. In other communities where shared parking is allowed but the jurisdiction requires written agreements for a certain length of time, reducing the amount of time required for these agreements may reduce barriers to shared parking arrangements.

Staff also identified elements of Arlington policy and law that inhibit shared parking arrangements.

- In “Residential Apartment” districts, the zoning ordinance requires that all required parking be provided on the same parcel of land or on common land in the same subdivision.
- Parking in C, C-O, RA-H, and R-C districts can be used by individuals driving to other properties, though the code does appear to limit the kind of agreements that would secure parking for individuals living or visiting another building.

Of course, the Site Plan process can modify conditions of the zoning ordinance, but an off-site shared parking arrangement with an existing Site Plan building would require that building to go through a Site Plan Amendment process.

Trends in automobile ownership among Arlington households

In [Part One](#) and [Part Two](#) of the read-ahead material for Working Group Meeting Four, staff presented data on vehicle ownership in Arlington households. Here we present additional data on how vehicle ownership has changed over time in response to a request from a member of the Working Group.

Using Census Bureau American Community Survey data, the author of a [2014 post on the Greater Greater Washington blog](#) found that 88 percent of the households added to the District of Columbia's population between 2010 and 2012, 88 percent were households that did not have a car.

In order to conduct a similar analysis for Arlington and its Metro Corridors, we must look at American Community Survey 5-year data for 2005 to 2009 and 2010 to 2014. Of the estimated 4,785 households added to the County between these two time periods, 1,506 or 24 percent were zero-car households (the number of households with four or more vehicles declined by 330 households in the same time period). In the Jefferson Davis Corridor, 17 percent of household growth came from households without vehicles, while 38 percent of household growth in the Rosslyn-Ballston Corridor came from households without vehicles.

Data from 2014 American Community Survey indicate that Arlington residents who have moved within the last year are less likely to own vehicles than those who have not moved in the past year. Countywide, 13 percent of the people who moved into Arlington from somewhere else in the United States or within Arlington between 2013 and 2014 lived in households without vehicles, while 28 percent of those who moved into Arlington from outside of the United States lived in households without vehicles; only six percent of Arlington residents who had not moved in the past year lived in households without a vehicle.

Residents who had moved within the past year were also more likely than those who had not moved to be part of households with only one vehicle. Because of the way this Census Bureau makes this data available, it is not possible to provide this analysis for the Metro Corridors separate from the rest of the county.