APPENDIX D:
Case Study Area Summaries

Note: Each of the six following case studies is written so that it can serve as a standalone document. For this reason, some of the introductory content is repeated at the beginning of each case study.

INTRODUCTION

Purpose

Six Case Study Areas were chosen for an analysis of common pedestrian and bicycle infrastructure challenges that exist in Alexandria today. These Case Study Areas were selected because they represent typical themes or issues found throughout the City. Recommendations to mitigate issues identified in a Case Study Area may apply to similar issues found in other parts of the City. These six areas are not the only places where the City will improve pedestrian and bicycle infrastructure. Conversely, these recommendations will inform changes that could be made throughout the City.

The themes and Case Study Areas evaluated as part of this project are included in Table 1 below.

	CASE STUDY AREAS:	I-395 and Landmark Mall	Hammond Middle School Area	Duke Street Corridor	Mount Vernon Avenue/ Four Mile Run	King Street Station	Common-wealth and Braddock
THEMES	Major Barriers/Freeway Interchanges	●	●			●	
	Schools and Neighborhoods		●		●		●
	Transit Access and Integration	●		●		●	
	Neighborhood Main Streets				●		●
	Suburban Commercial Connectors	●		●			
	Trail/Roadway Transitions				●		

Table 1: Case Study Areas by Theme

Study of these diverse Case Study Areas also allows for identification of typical infrastructure issues in Alexandria. While the focus was on pedestrian infrastructure, some localized bicycle issues/improvements have also been noted. Several issues that were found to be common to all of the areas include:

- Non-compliance with ADA standards for curb ramps at intersections and driveways, both in placement and design
- Lack of consistency in type, location and function of pedestrian push buttons
- Narrow and substandard sidewalk widths (standard is five feet)

Non-compliant curb ramp in Alexandria

Fieldwork Approach

Each of the Case Study Areas was visited by a team of project consultant staff. A comprehensive walk-through of the area was conducted to assess existing issues that create an adverse walking or bicycling environment. Some recommendations for infrastructure improvements were made in the field and others were made after further synthesis of field observations.

A number of locations in each area were observed for a period of time to understand how pedestrians move through the existing environment. This allowed team members to develop recommendations that will best accommodate pedestrian travel desire lines. In many instances, further study, analysis and public input are necessary to comprehensively address the issues identified through this effort.

Fieldwork Documentation

The following summaries and maps present specific issues and recommendations for each Case Study Area. At intersections where multiple instances of the same issue exist, e.g. non-compliant curb ramps, only one indication appears on the map in order to maintain legibility.

Project field team observing pedestrian issues and opportunities

CASE STUDY 1:

I-395 / LANDMARK MALL

Theme: Major Barriers and Freeways

City of Alexandria

Case Study Area

N

0 250 500 1,000 Feet

The following section describes the I-395/Landmark Mall Case Study Area. Although this Case Study focuses on the theme of "major barriers and freeways," it is important to note that the 1-395 and Landmark Mall area also represents other themes evaluated through the Case Studies, including "transit access and integration" and "suburban commercial connectors."

The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Overview

Located in western Alexandria, the I-395 and Landmark Mall Case Study Area features mostly multifamily housing and large scale commercial development. Duke Street bisects the area and serves as a main route to I-395, Van Dorn Street, the Landmark Mall and the Plaza at Landmark shopping center. As a result, there are relatively high volumes of vehicles traveling through the area and speeding is a common concern, particularly on Duke Street where the speed limit is 35 MPH. These factors, in conjunction with the current road configuration and auto-oriented development character, contribute to an environment that is inhospitable for pedestrians and bicyclists.

The area is among the more dense neighborhoods in Alexandria and is anticipated to become more populous as future development plans for the Landmark Mall property unfold. The West End Transitway and the Duke Street Transitway, two proposed Bus Rapid Transit (BRT) corridors that are currently being planned, are envisioned to serve this area and will support improved mobility and continued revitalization. Introduction of the BRT routes will increase pedestrian and bicycle activity near stops in the area.

The Plaza at Landmark shopping center, a popular destination for both pedestrians and vehicles

Typical street segment on Duke Street

Intersection at Duke Street and South Walker Street

Goat path along Duke Street

Pedestrian crossing the middle of the on-ramp

Crosswalk lacking ADA ramps

Summary of Issues

Table 2 shows the types and frequency of issues observed during the field work in the I-395/Landmark Mall Case Study Area. As in all the Case Study Areas, sidewalk obstructions and disrepair, crosswalks, and curb ramps are the most prevalent pedestrian infrastructure issues. Sidewalks exist along most, though not all, streets and are typically five feet wide. Similarly, most --but not all-- of the sidewalks have buffers. Other notable issues in this corridor include poor lighting and poor bus stop access, as shown in Figure 1.

Within the Case Study Area, the most challenging corridor for pedestrians is along Duke Street between Beauregard Street and South Van Dorn Street. Sidewalks are missing in many locations, and where sidewalks do exist they are in disrepair or are too narrow to create a comfortable walking environment, given the surrounding context and vehicle speeds. Many pedestrians were observed along Duke Street despite the uncomfortable conditions. Worn paths in the dirt/grass were observed in most locations where the sidewalk is discontinuous, demonstrating a need for more permanent infrastructure. The City is currently completing a sidewalk project along Duke Street from Oasis Drive to Walker Lane, which is a step toward addressing the connectivity issues in this area.

The I-395 and Van Dorn Street on and off ramps are particularly challenging for pedestrians. Many people cross the ramps, often jogging across the ramps to avoid fast moving traffic, and most lack marked crosswalks. Furthermore, sight distance for drivers and pedestrians is limited in most cases, creating more potential for conflicts.

Another important issue in this Case Study Area is the limited pedestrian access to the Landmark Plaza shopping center as well as the Landmark Mall. Although there is a recently restriped crosswalk on Duke Street at South Walker Street, the connecting sidewalks are narrow or in disrepair and there is not an ADA accessible route to the Mall from the nearest bus stop on Duke Street.

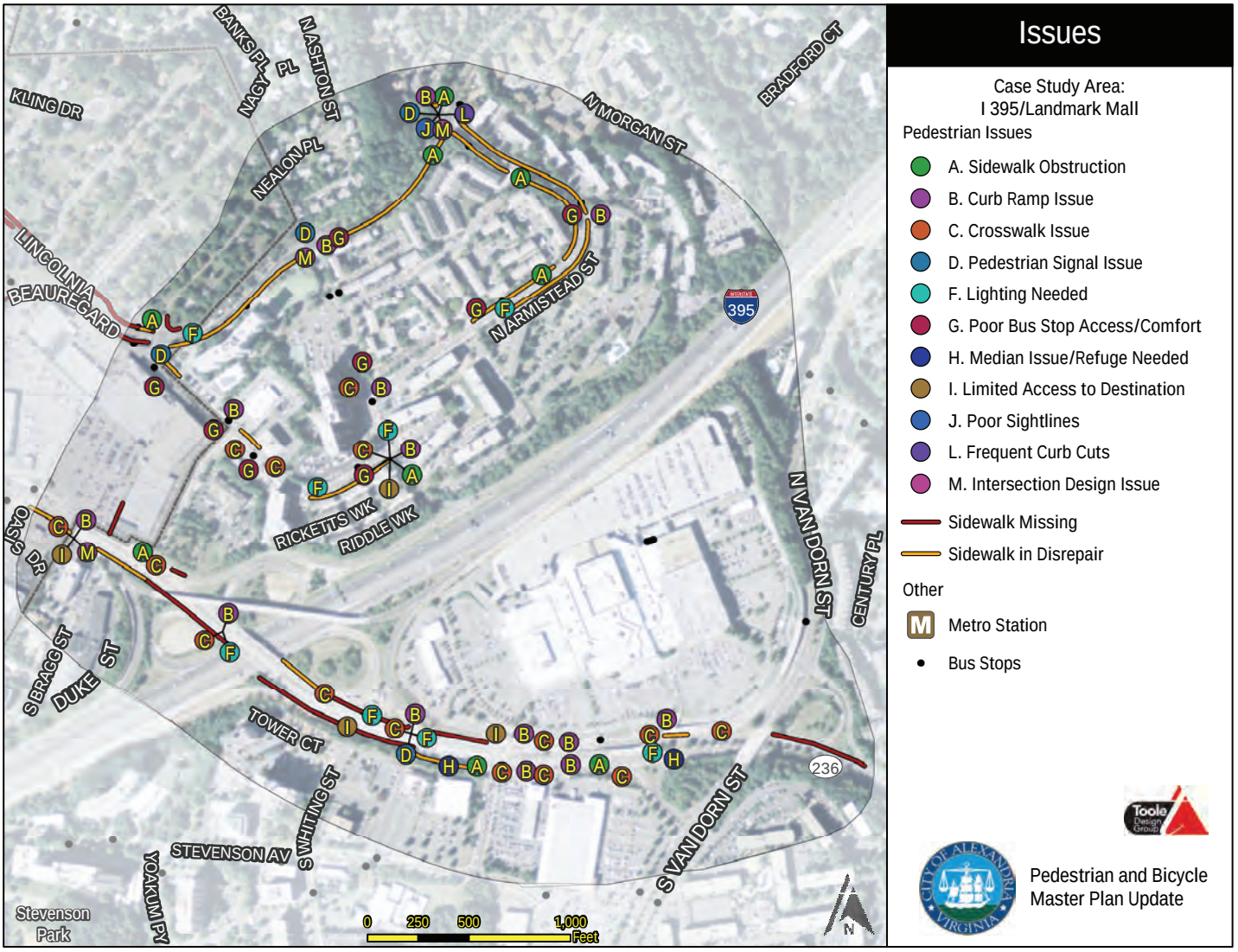


Figure 1: Map of Issues Identified

Issue	Count
Sidewalk in Disrepair	17
Crosswalk Issue	15
Curb Ramp Issue	14
Sidewalk Obstruction	9
Lighting Needed	8
Poor Bus Stop Access/Comfort	8
Sidewalk Missing	8
Pedestrian Signal Issue	4
Limited Access to Destination	4
Intersection Design Issue	3
Median Issue/Refuge Needed	2
Poor Sightlines	1
Frequent Curb Cuts	1

Table 2: Summary of Observed Issues

Crosswalk, signage and continuous sidewalk near highway on/off ramps in Washington, DC

Sidewalk in auto-centric environment

Proposed Recommendations

The I-395 and Landmark Mall area has 94 recommendations including improvements to sidewalks, curb ramps, crossings, lighting, and bus stops, among other issues. Table 3 and Figure 2 provide an overview of the recommendations.

New sidewalks and crosswalks are key to the visibility and comfort of pedestrians in this area, particularly near bus stops. Fifteen new crosswalks and eight new sidewalk segments are recommended, primarily along Duke Street. Most of these improvements are already planned for implementation in late 2015 through the Duke Street Pedestrian Improvements project.

To improve lighting, existing "cobra style" lights on Duke Street could be supplemented with pedestrian-scale street lights. Also, as part of future redevelopment in the area, it will be critical to provide improved ADA accessible routes for bicyclists and pedestrians to access and walk through the Mall site. Finally, the study team recommends continued partnership with Fairfax County to ensure that the infrastructure near the City/County border (in the western portion of this Case Study Area) provides a seamless experience for the pedestrians and bicyclists.

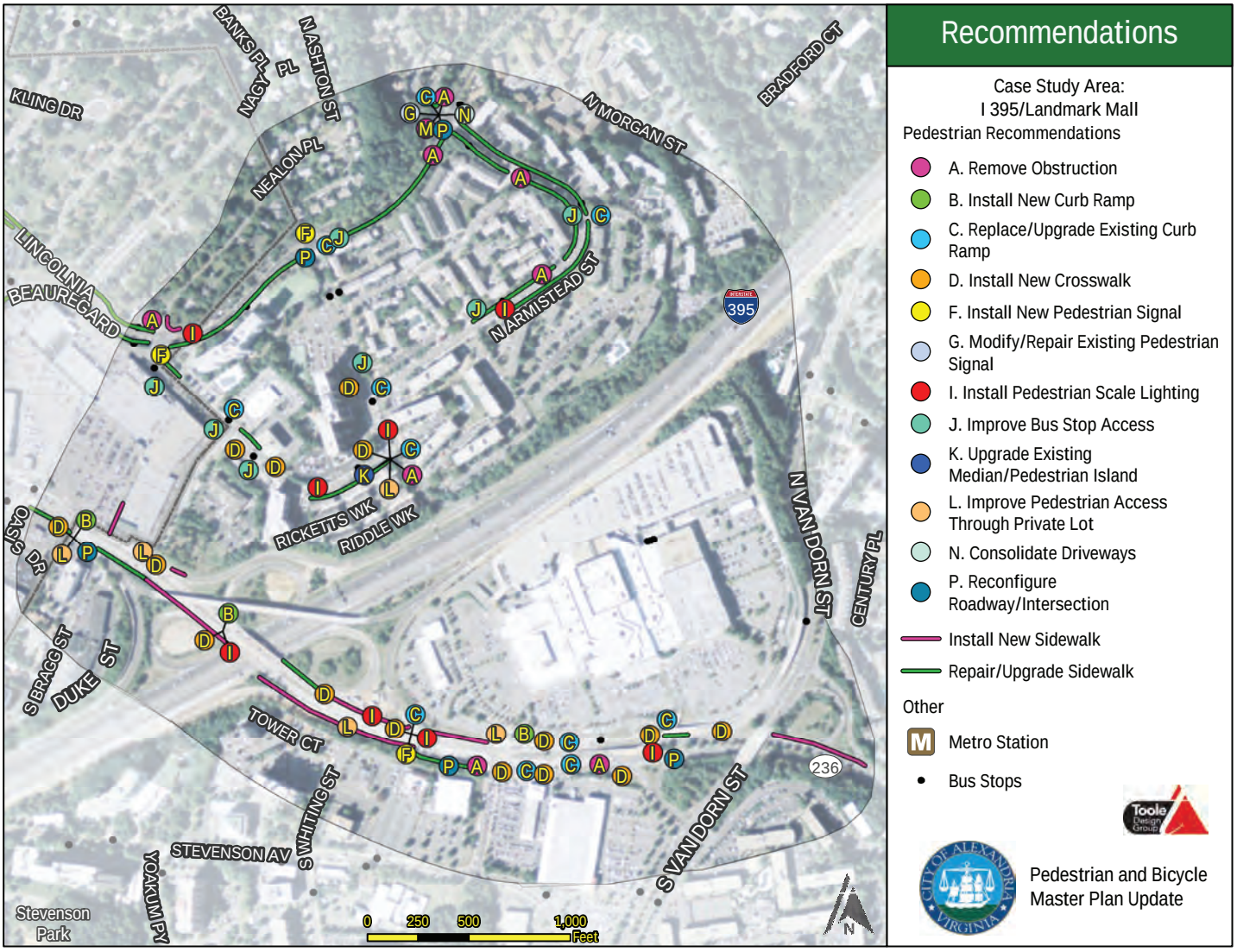


Figure 2: Map of Recommendations

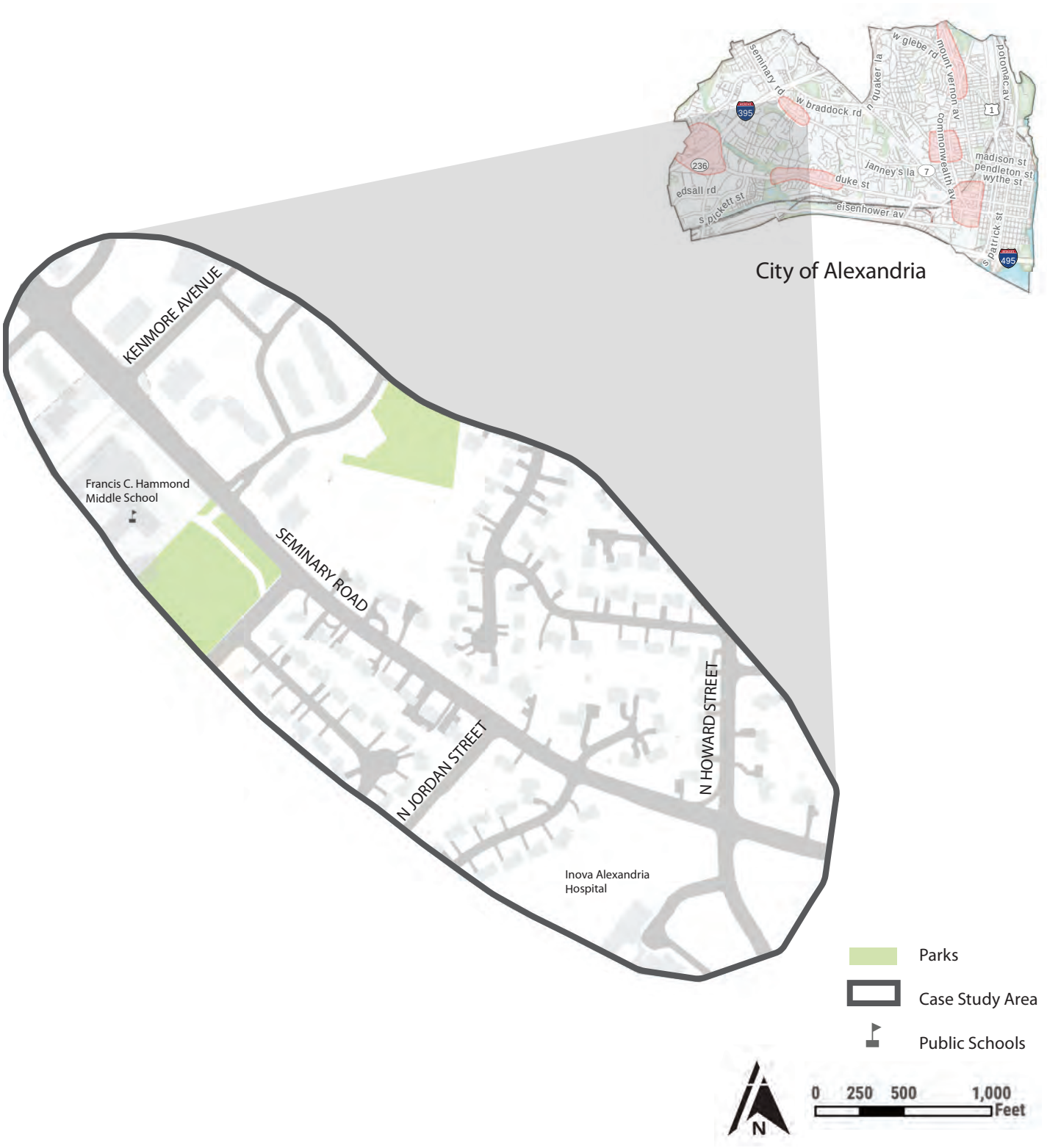
Recommendation	Count
Repair/Upgrade Sidewalk	17
Install New Crosswalk	15
Replace/Upgrade Existing Curb Ramp	11
Install New Sidewalk	8
Remove Obstruction	8
Install Pedestrian Scale Lighting	8
Improve Bus Stop Access	7
Improve Pedestrian Access Through Private Lot	5
Reconfigure Roadway/Intersection	5
Install New Curb Ramp	3
Install New Pedestrian Signal	3
Modify/Repair Existing Pedestrian Signal	1
Upgrade Existing Median/Pedestrian Island	1
Adjust Parking to Improve Sightlines	1
Consolidate Driveways	1

Table 3: Summary of Recommendations

CASE STUDY 2:

SEMINARY ROAD / HAMMOND MIDDLE SCHOOL

Theme: Schools and Neighborhoods



The following section describes a sub-area of Alexandria that has characteristics similar to many other places in the City. The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Although this Case Study focuses on the theme of "schools and neighborhoods," it is important to note that the Seminary Road/Hammond Middle School area also represents other themes evaluated through the case studies, including "major barriers/freeway interchanges" and "transit access and integration."

Overview

The Seminary Road Case Study Area features a combination of single-family detached housing, multifamily housing, and some commercial development to the north. Seminary Road serves as a major, cross-city route that connects to Hammond Middle School, Inova Hospital, I-395, and Bailey's Crossroads in Fairfax. There is a significant amount of pedestrian traffic near the middle school and hospital, with many people crossing Seminary Road at both signalized and unsignalized locations. There are popular WMATA and DASH bus routes along Seminary Road, leading to increased pedestrian activity.

Hammond Middle School entrance

Residential section of Seminary Road

Crosswalk on Seminary Road at Kenmore Avenue near Hammond Middle School

Student crossing mid-block on Seminary Road at Kenmore Avenue near I-395 entrance

Traffic outside Hammond Middle School blocking the fire station

Edge of street conditions on Seminary Road

Summary of Issues

As in all the Case Study Areas, curb ramps, sidewalk obstruction/disrepair, missing or narrow sidewalks, and crosswalks are key issues in the Seminary Road/Hammond Middle School area. Sidewalks exist on both sides of the streets and vary in width from four and six feet. Sidewalk buffers of between four and six feet exist on some segments of Seminary Road and nearby local streets, but in some instances buffers are narrow given the speed and volume of traffic. Additionally, many sidewalks and curb ramps are not ADA compliant, and several intersections lack marked crosswalks. Other issues in this corridor include poor bus stop access and inaccessible or broken pedestrian signals, as shown in Table 4 and Figure 3.

Within the Case Study Area, one of the most challenging locations for pedestrians is the Seminary Road crossing at Kenmore Avenue. During the project field work, numerous pedestrians were observed crossing mid-block on Seminary Road to access the bus stop and shopping centers on Kenmore Avenue and Library Lane. This condition likely results from the concentration of higher density housing to the south of Seminary Road, the commercial development and bus stops to the north, and the long distances between marked crossings in this area.

Walkability and pedestrian safety in this Case Study Area is particularly important due to the presence of Hammond Middle School. Alexandria has an active Safe Routes to School program that aims to support increased walking and bicycling to school. Several curb ramps and crosswalks in front of the school need improvement, and the field work team noted a lack of visible signage alerting parents to the school zone, especially at the west end of the school zone. Another challenge in this area is that vehicles back up on Seminary Road in front of Hammond Middle School as parents wait to drop off/pick up their children. This situation blocks the sidewalks and creates the potential for conflicts between the queuing vehicles and other traffic.

Finally, bicycle infrastructure is very limited in this area. Bicyclists were observed riding on both the sidewalks and on Seminary Road, though the traffic volumes are too high for most people to be comfortable riding on the street. Also, the edge of the street creates challenges for bicyclists given the prevalence of storm drain grates and unmaintained gutter seams.

Figure 3: Map of Issues Identified

Issue	Count
Curb Ramp Issue	12
Sidewalk Obstruction	10
Sidewalk in Disrepair	9
Crosswalk Issue	4
Poor Bus Stop Access/Comfort	3
Pedestrian Signal Issue	2
Median Issue/Refuge Needed	1
Intersection Design Issue	1

Table 4: Summary of Observed Issues

Example of recommended pedestrian crossing signal

Example of recommended school zone signage

Proposed Recommendations

There are 41 recommendations that relate to sidewalks, curb ramps, intersections, crossings, signage, and school zone enforcement, as shown in **Table 5** and **Figure 4**. The study team identified 12 priority locations where sidewalks should be repaired or upgraded in order to improve pedestrian safety and comfort. Curb ramps should be replaced or upgraded in 11 locations, primarily adjacent to the school and hospital, to comply with ADA regulations. The team also identified three locations for new crosswalks and one recommended upgrade to an existing crosswalk.

To help with the issue of people crossing mid-block on Seminary Road at Kenmore Avenue, a near-term recommendation is to consider relocating the bus stop on the north side of the street closer to the signalized intersection of Seminary and Library Lane. Longer term, the City could evaluate the potential for a new traffic signal or pedestrian activated signal at Seminary and Howard; however, the close proximity to the adjacent signal at Library Lane may make this infeasible.

To improve pedestrian access and safety near Hammond Middle School, additional highly-visible school zone signage is recommended. School officials should also increase enforcement of school drop off/pick up zones to minimize backups on Seminary Road.

Last, pedestrian signal timing at the intersection of Seminary Road and Howard Street at the Inova Hospital should be addressed to better accommodate all types of pedestrians, including seniors and people with disabilities. The current pedestrian crossing phase does not extend the length of the parallel automobile green phase, so it could be lengthened.

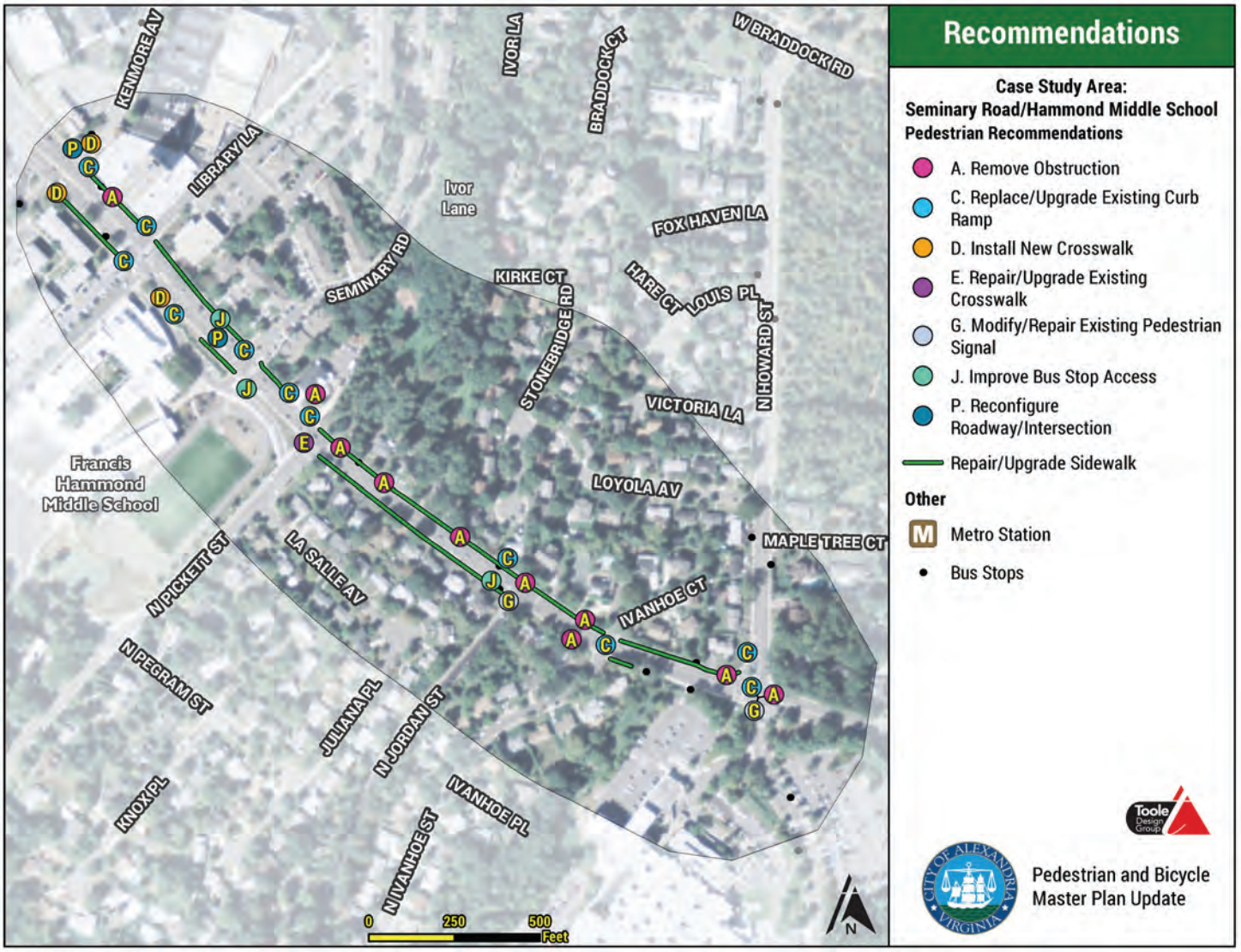


Figure 4: Map of Recommendations

Recommendation	Count
Replace/Upgrade Existing Curb Ramp	11
Remove Obstruction	10
Repair/Upgrade Sidewalk	9
Install New Crosswalk	3
Improve Bus Stop Access	3
Modify/Repair Existing Pedestrian Signal	2
Reconfigure Roadway/Intersection	2
Repair/Upgrade Existing Crosswalk	1

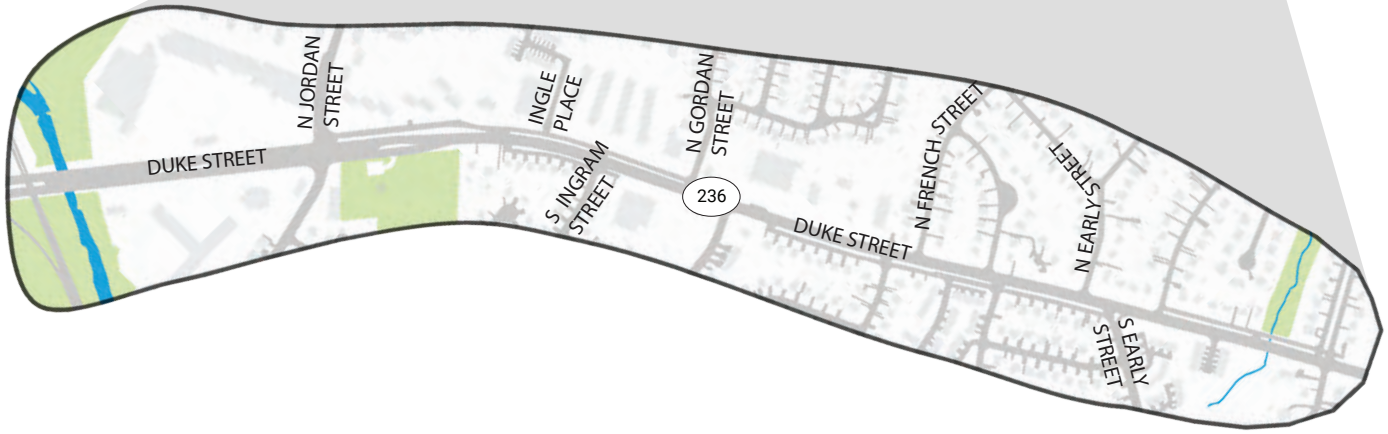
Table 5: Summary of Recommendations

CASE STUDY 3:

DUKE STREET CORRIDOR

Theme: Suburban Commercial Connectors

City of Alexandria



Parks

Case Study Area

N

0 250 500 1,000 Feet

The following section describes a sub-area of Alexandria that has characteristics similar to many other places in the City. The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Although this Case Study focuses on the theme of "suburban commercial connectors," it is important to note that the Duke Street Corridor area also represents other themes evaluated through the case studies, including "transit access and integration."

Overview

This Case Study Area is a mixed commercial and residential district centered around Duke Street, a major east-west connection within Alexandria and into Fairfax County. Duke Street carries among the highest vehicle volumes in the City, and vehicles often exceed the posted 35 MPH speed limit. The roadway includes four to six travel lanes, including center turn lanes in some locations. There are local access roads — one on the north side of Duke Street between Jordan Street and Gordon Street, and one on the south side between Gordon Street and Early Street. Duke Street features several active WMATA and DASH bus lines and is planned as a future Transitway Corridor. Furthermore, this corridor experiences some of the highest transit ridership in the City.

Local access road adjacent to Duke Street

Movement of traffic to and from local access road

Driveways along local access road

Sidewalk obstruction and curb ramp issue

Non-ADA compliant bus stop

Student crossing mid-block across Duke Street to local access road

Summary of Issues

As shown in Table 6 and similar to other Case Study Area, curb ramps, crosswalks, sidewalk obstruction/disrepair, and missing or narrow sidewalks are key issues in the Duke Street Corridor. Other issues in this corridor include poor bus stop access/comfort and poor lighting, as shown in Figure 5. Sidewalks exist on both sides of the street in some, but not all locations and vary in width between five and six feet. However, the sidewalks are not buffered from traffic in many locations, and multiple driveways and access roads create conflict points for pedestrians. Additionally, many sidewalks and curb ramps are not ADA compliant. Several bus stops lack shelter, seating, and curb ramp access from the adjacent side sidewalk.

Sidewalks on the south side of Duke Street along the access road are discontinuous and difficult to navigate for nearly the entire length from Early Street to Gordon Street. Curb ramps at all intersections and driveways in this segment are not ADA compliant.

The most problematic segment of the Case Study Area is Duke Street between Ingle Place and Gordon Street. This segment has a two-way access road on the north side of Duke Street, and the vehicle lane configuration leads to numerous potential conflict points with other vehicles, pedestrians, and bicyclists. Another issue with this segment is that there is no pedestrian accommodation at the intersection of Duke Street at Ingram Place. The nearest signal with crosswalks, pedestrian signal heads, and curb ramps is 400 feet away, making it difficult for pedestrians to safely cross in this portion of the corridor. Additionally, there is poor access to the existing bus stops in this segment due to narrow sidewalks on the south side of Duke Street.

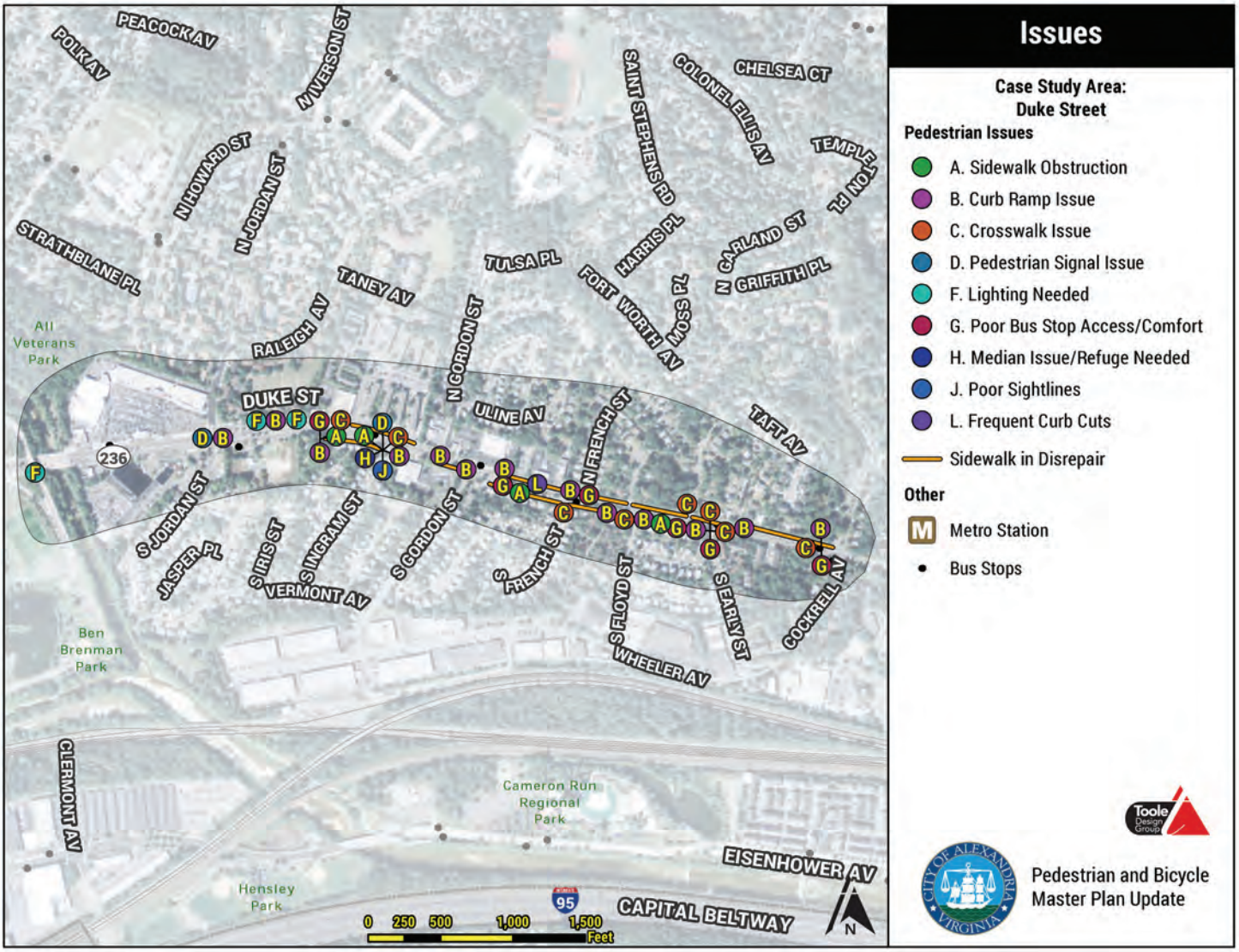


Figure 5: Map of Issues Identified

Issue	Count
Curb Ramp Issue	13
Sidewalk in Disrepair	10
Crosswalk Issue	8
Poor Bus Stop Access/Comfort	6
Sidewalk Obstruction	4
Lighting Needed	3
Pedestrian Signal Issue	2
Median Issue/Refuge Needed	1
Poor Sightlines	1
Frequent Curb Cuts	1

Table 6: Summary of Observed Issues

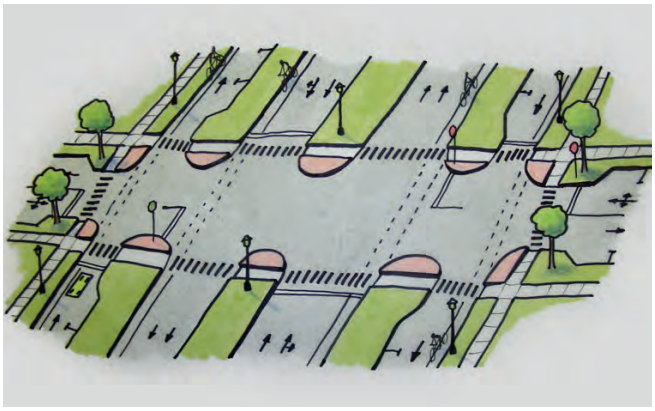


Illustration of crosswalk treatments on local access roads

Example of accessible bus stop

Proposed Recommendations

As shown in Table 7, there are 49 recommendations for this area including improvements to sidewalks, curb ramps, intersections, crossings, and the overall street configuration. Sidewalks should be upgraded at targeted points to provide pedestrians a continuous, safe, and comfortable walking environment. Similarly, curb ramps need to be replaced or upgraded in nine locations along the corridor to comply with ADA requirements. There are six locations where the study team recommended new crosswalks, and one existing crosswalk needs to be upgraded, as shown in Figure 6.

To reduce potential conflicts between modes, the portion of the access road between Ingle Place and Gordon Street should be evaluated for a possible conversion from two-way to one-way, and/or a relocation of the access road entrances and exits.

Over the longer term and in concert with the Transitway project, more significant pedestrian and bicycle improvements should be made along the entirety of Duke Street. An enhanced bicycle facility, such as a buffered bike lane, protected bicycle lane, or sidepath, would provide a low stress option for bicyclists, and wider sidewalks with buffers would improve comfort for those traveling on foot. A two foot frontage zone, six foot sidewalk, and six foot buffer are recommended minimums for a commercial corridor like Duke Street.

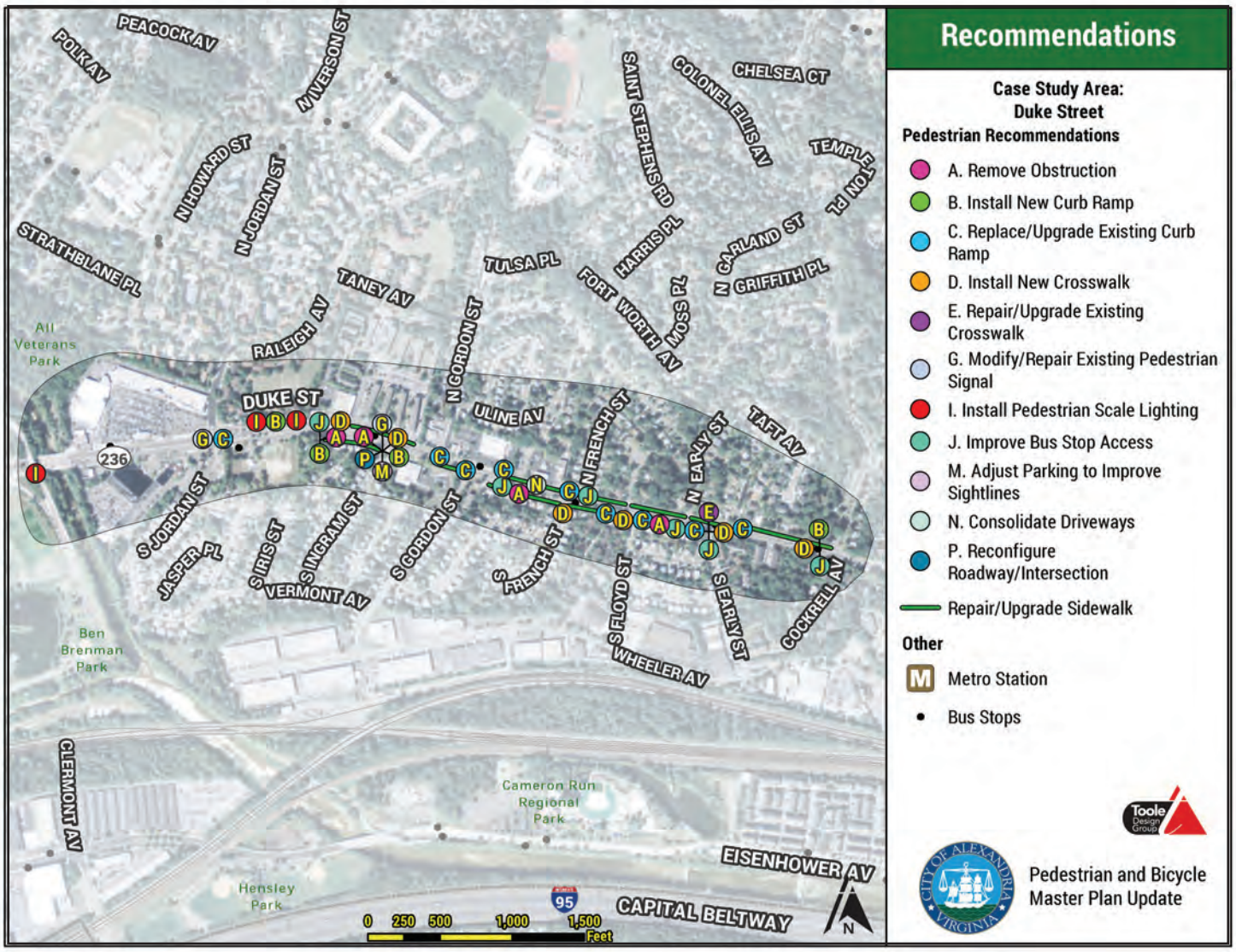


Figure 6: Map of Recommendations

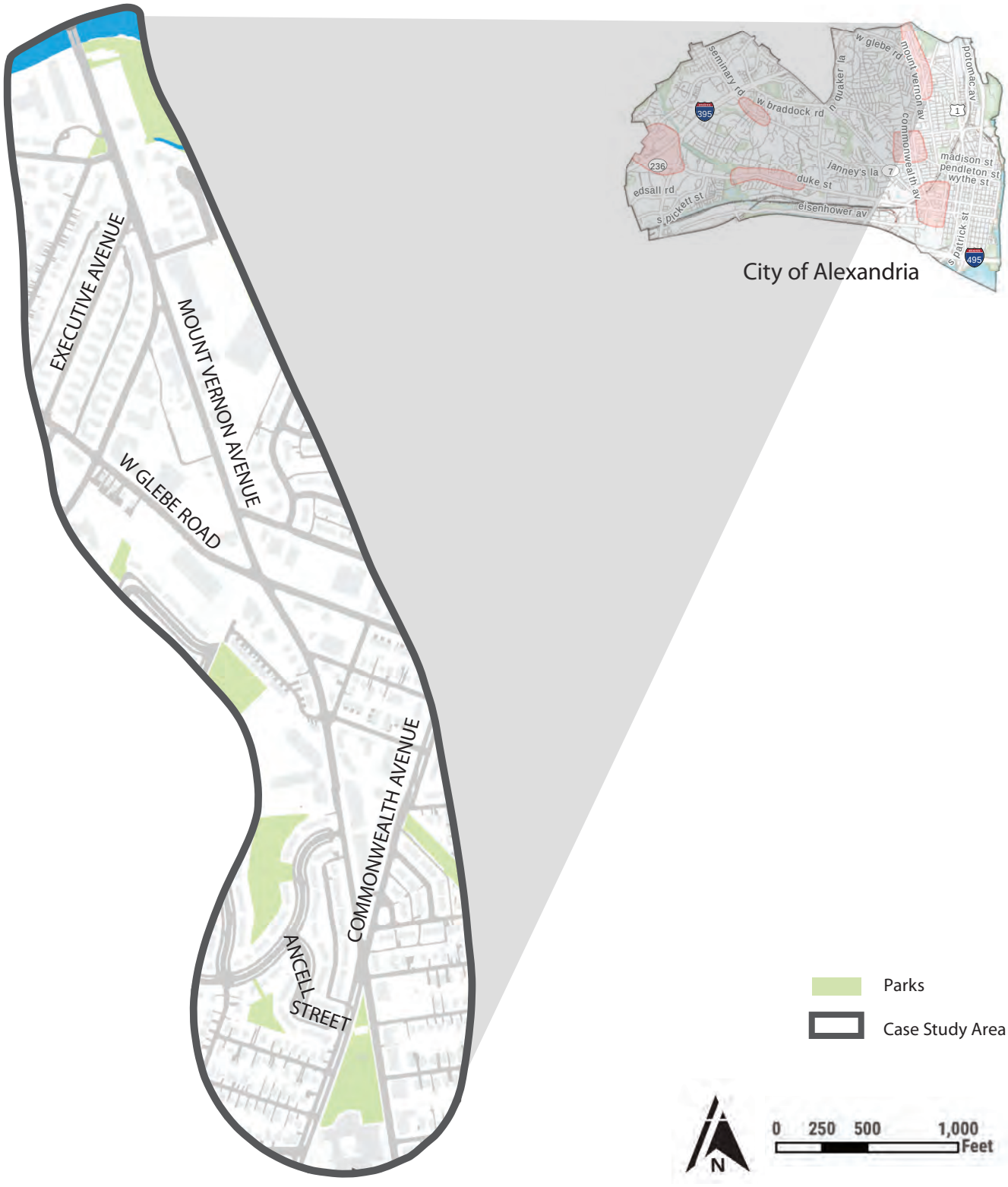
Recommendation	Count
Repair/Upgrade Sidewalk	11
Replace/Upgrade Existing Curb Ramp	9
Install New Crosswalk	6
Improve Bus Stop Access	6
Remove Obstruction	4
Install New Curb Ramp	4
Install Pedestrian Scale Lighting	3
Modify/Repair Existing Pedestrian Signal	2
Repair/Upgrade Existing Crosswalk	1
Adjust Parking to Improve Sightlines	1
Consolidate Driveways	1
Reconfigure Roadway/Intersection	1

Table 7: Summary of Recommendations

CASE STUDY 4:

MOUNT VERNON AVENUE / FOUR MILE RUN

Theme: Neighborhood Main Streets



The following section describes a sub-area of Alexandria that has characteristics similar to many other places in the City. The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Although this Case Study focuses on the theme of "neighborhood main streets," it is important to note that the Mount Vernon Avenue/Four Mile Run area also represents other themes evaluated through the case studies, including "schools and neighborhoods" and "trail/roadway transitions."

Overview

The Mount Vernon Avenue/Four Mile Run Case Study Area features mostly residential development, with more commercial development on Mount Vernon Avenue between Four Mile Run and Herbert Street. As a result, this commercial road segment is auto-oriented, especially near the intersection with West Glebe Road. The Case Study Area has relatively low traffic volumes and speeds, which makes the streets fairly comfortable for pedestrians and bicyclists. Roadway widths vary throughout the Case Study Area, with Mount Vernon Avenue dropping from four to two travel lanes south of Bruce Street. The Four Mile Run Trail intersects Mount Vernon Avenue in the northern section of this Case Study Area, emphasizing the importance of pedestrian and bicycle access along this active corridor. There are several private redevelopment projects planned in the Case Study Area, which will result in increased density and commercial activity in the corridor.

Pedestrian environment near Mount Vernon Avenue at Glebe Road

Roadway and sidewalk adjacent to Colasanto Park

Newly installed rapid flashing beacon on Mount Vernon Avenue at Herbert Street

Group of kids crossing mid-block across Commonwealth Avenue to Ancell Street

Obstructed pedestrian crossing signal button and signage on Mt. Vernon Avenue

Sidewalk obstruction on a local street near the Mt. Vernon Commercial District

Summary of Issues

While the Mount Vernon Avenue/Four Mile Run corridor is relatively pedestrian-friendly overall, there are some issues that were identified by the study team. As in all the Case Study Areas, curb ramps, sidewalk obstruction/disrepair, missing or narrow sidewalks, and crosswalks are the main issues throughout the area (see Table 8). Sidewalks exist on both sides of the street in most areas, though they are missing and/or narrow in several locations. Sidewalk widths range from five to six feet, and many segments also have a sidewalk buffer. However, many sidewalks and curb ramps are not ADA compliant. Other leading issues include inaccessible or broken pedestrian signals and lack of signage, as shown in Figure 7.

A Rectangular Rapid Flash Beacon (RRFB) crossing was recently installed on Mount Vernon Avenue at Herbert Street, which makes the frequency of marked crossings reasonable for pedestrian travel. However, access to and from Four Mile Run Trail is challenging due to insufficient wayfinding signage.

There are a few intersections in the Case Study Area that present particular challenges for pedestrians crossing the street. There is currently no crosswalk on Kennedy Street at Ancell Street, despite the fact that many families in this area frequently visit the Goat Hill Park playground on the north side of Kennedy Street, and Colasanto Park at the end of Ancell Street on Commonwealth Avenue. The Neighborhood Parks Improvement Plan included a recommended crosswalk to improve access to Goal Hill Park. Additionally, there is no crosswalk on Commonwealth Avenue at Ancell Street leading to Colesanto Park.

Mount Vernon Avenue at West Glebe Road is a wide intersection with long crossing distances, which is uncomfortable for pedestrians and bicyclists. Mount Vernon Avenue at Russell Road is less problematic, but there is a long right-turn only lane adjacent to the sidewalk, which encourages fast vehicle turning movements that can make it difficult for pedestrians to cross.

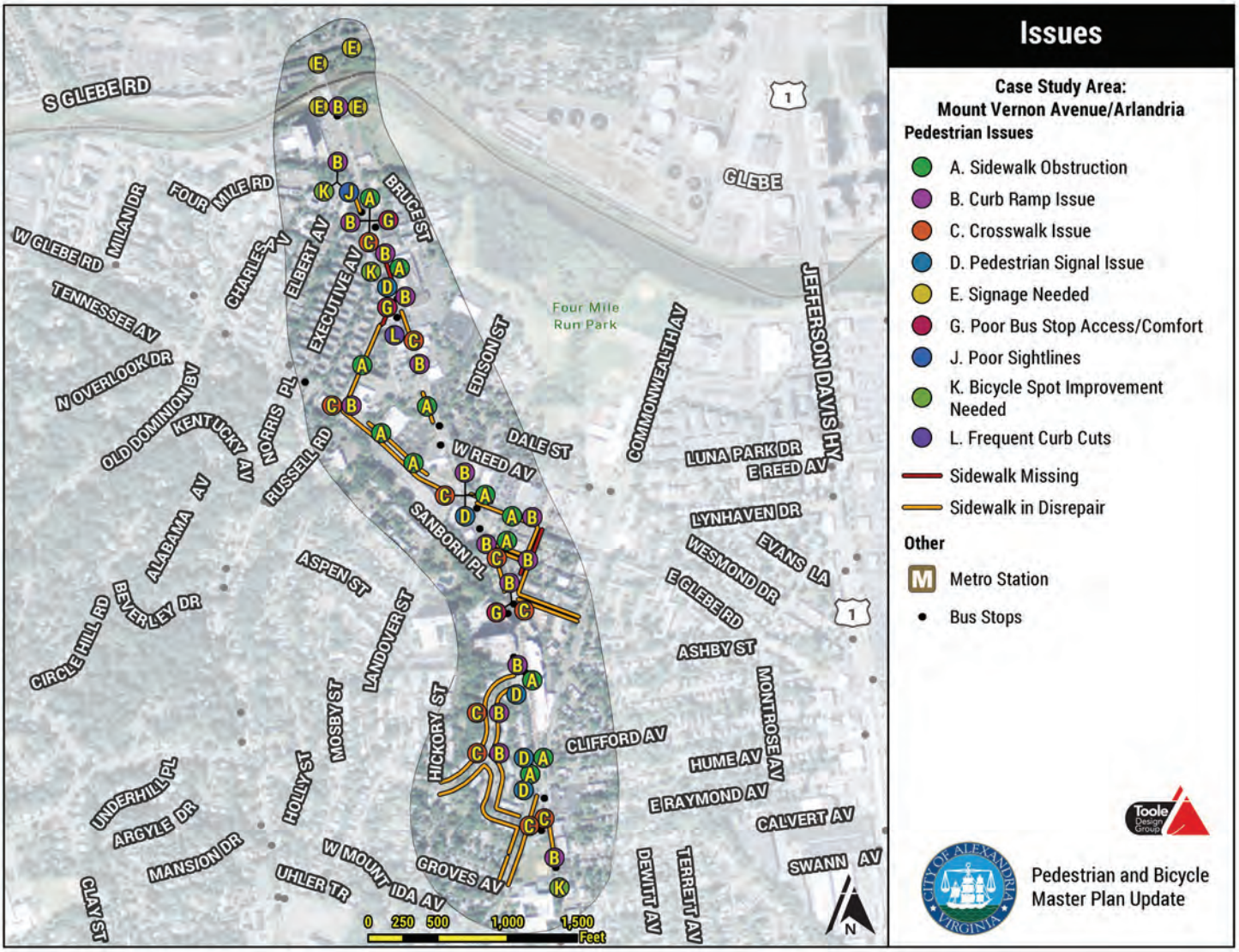


Figure 7: Map of Issues Identified

Issue	Count
Sidewalk in Disrepair	24
Curb Ramp Issue	16
Sidewalk Obstruction	12
Crosswalk Issue	10
Pedestrian Signal Issue	5
Signage Needed	4
Sidewalk Missing	4
Poor Bus Stop Access/Comfort	3
Bicycle Spot Improvement Needed	3
Poor Sightlines	1
Frequent Curb Cuts	1

Table 8: Summary of Observed Issues

Using bulb-outs to narrow an intersection

Active neighborhood commercial district with improved crossings

Proposed Recommendations

There are 79 recommendations for this Case Study Area, including improvements to sidewalks, curb ramps, intersections and crossings, and pedestrian signals (see Table 9). Recommendations focus on widening sidewalks, adding sidewalk buffers, minimizing obstructions, and making sidewalks ADA-compliant. Sidewalks should be upgraded in many locations to provide pedestrians a continuous, safe, and comfortable walking environment. New sidewalks should be built on Russell Road and Helen Street, as shown in Figure 8.

Curb ramps need to be replaced or upgraded in 13 locations in the Case Study Area to comply with ADA requirements. The study team identified five existing crosswalks that need improved, and five locations that need new crosswalks. Five locations need pedestrian signal modifications, including signal relocations for ADA access and nonfunctional signal repairs.

The intersection of Mount Vernon Avenue at West Glebe Road is recommended for bulb outs in order to shorten crossing distances for pedestrians. Additionally, the study team recommended further study to potentially remove the right turn slip lane on Mount Vernon Avenue at Russell Road, in order to slow vehicle traffic and shorten pedestrian crossing distances.

Last, improved wayfinding and advisory signage near the Four Mile Run Trail will improve access to and visibility of the trail, which is an important community asset. The study team recommended signs alerting drivers to an increased presence of pedestrians and bicyclists in the area, as well as wayfinding signs oriented towards trail users. There are currently plans to develop a wayfinding plan for Four Mile Run Park, so it will be key to partner with the Department of Recreation, Parks and Cultrual Activities to develop and implement this plan.

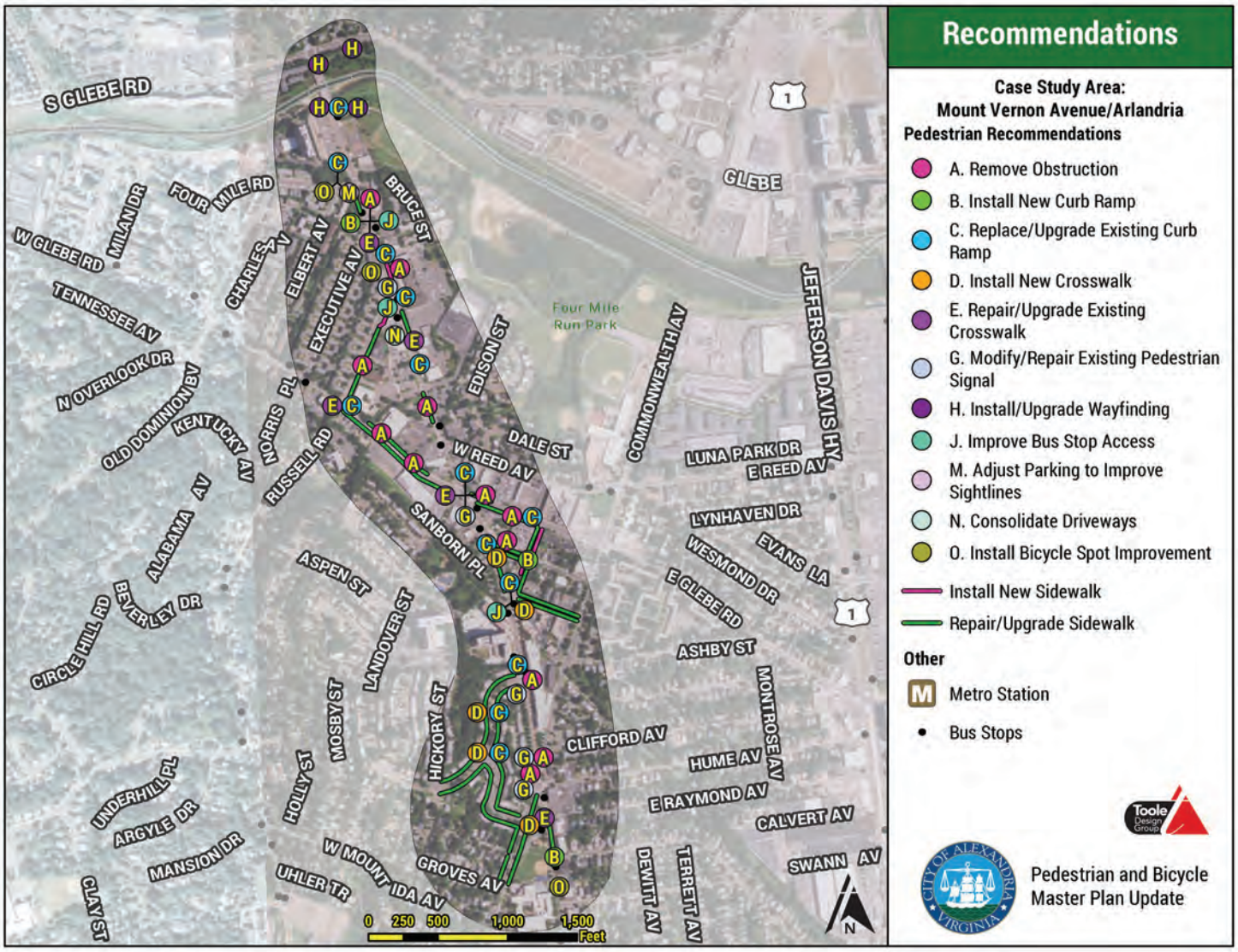


Figure 8: Map of Recommendations

Recommendation	Count
Repair/Upgrade Sidewalk	23
Replace/Upgrade Existing Curb Ramp	13
Remove Obstruction	12
Install New Crosswalk	5
Repair/Upgrade Existing Crosswalk	5
Modify/Repair Existing Pedestrian Signal	5
Install/Upgrade Wayfinding	4
Install New Sidewalk	4
Install New Curb Ramp	3
Improve Bus Stop Access	3
Install Bicycle Spot Improvement	3
Adjust Parking to Improve Sightlines	1
Consolidate Driveways	1

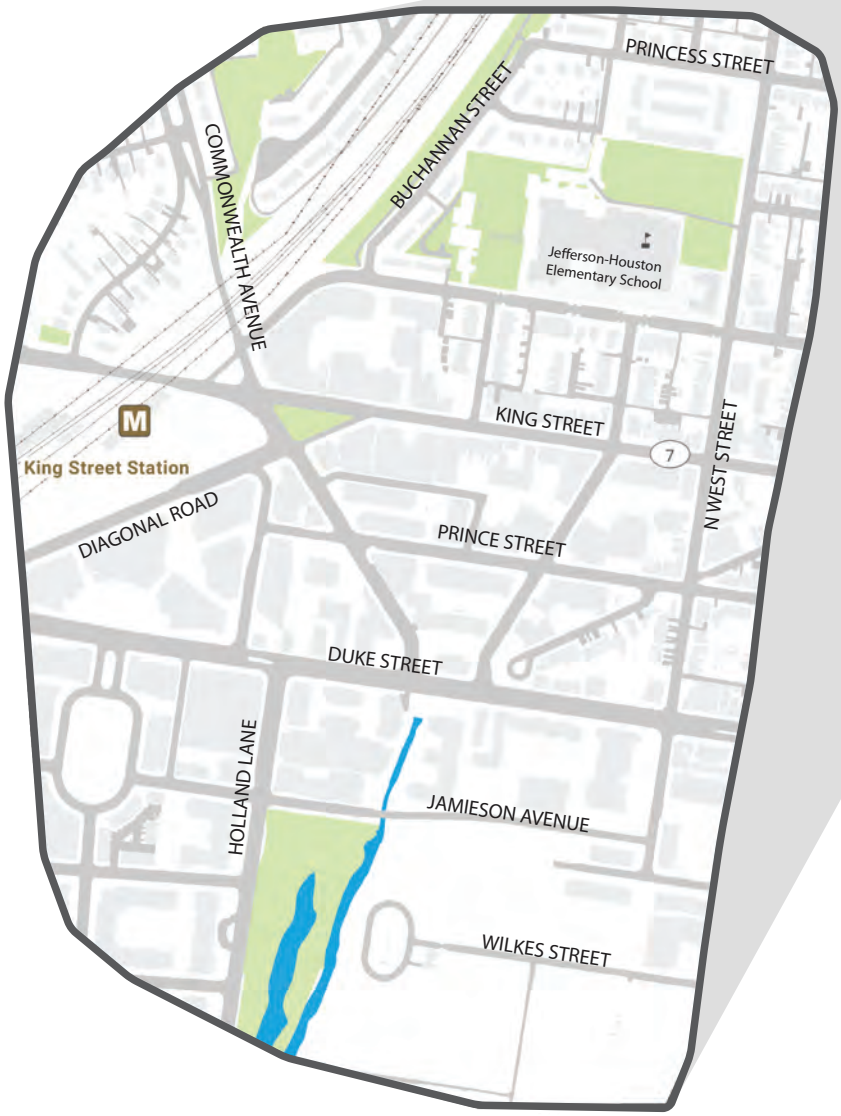
Table 9: Summary of Recommendations

CASE STUDY 5:

KING STREET STATION

Theme: Transit Access and Integration

City of Alexandria



Parks

Case Study Area

Public Schools

N

0 250 500 1,000 Feet

The following section describes a sub-area of Alexandria that has characteristics similar to many other places in the City. The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Although this Case Study focuses on the theme of "transit access and integration," it is important to note that the King Street Station area also represents other themes evaluated through the case studies, including "major barriers/freeway interchanges."

Overview

The King Street Station Case Study Area includes a variety of development types, such as retail development on King Street, office development on Duke Street, and residential development mixed in throughout. This area plays a crucial role in transit and freeway access for the surrounding area, as the King Street Metrorail station carries thousands of people daily, and Duke Street (VA-236) serves as a major east-west connector route to I-495 and VA-611 (Telegraph Road). There is also significant pedestrian traffic between Alexandria Union Station and the Metrorail station as riders transfer between rail systems. Except for King Street and Duke Street, the Case Study Area has relatively low traffic volumes and speeds, relatively wide sidewalks, and many trees, which makes the streets fairly comfortable for pedestrians. Roadway widths vary throughout the Case Study Area. King Street and Duke Street have four to five lanes, while many of the other roads are two lanes.

The City currently has a project underway to improve access and circulation at the King Street Metrorail station. While the project will include a number of pedestrian and bicycle enhancements, it is focused on the station property itself. For this reason, the field work for this project focused on improving connections to the station from surrounding areas.

King Street Metro Station

Capital Bikeshare station King Street Metro

Vehicle and bike route signage on Holland Lane at Duke Street

Missing and non-ADA compliant curb ramps

Challenging intersection near King Street Metro

Person crossing Cameron Street to access the walking path

Summary of Issues

While the neighborhood surrounding King Street Station is relatively walkable, there are still opportunities to improve the pedestrian environment. As shown in Table 10, curb ramps are a particular issue in this area. Curb ramp designs in Old Town vary greatly, and many of the existing curb ramps are not compliant with national accessibility standards. While sidewalks exist on both sides of the street in most areas, there are a few gaps and/or narrow conditions, as well as many instances of obstacles or maintenance issues on existing sidewalks (see Figure 9).

Smaller, spot issues exist throughout the Case Study Area, especially regarding the frequency and quality of crossings. Crosswalks are missing in a few key locations, such as King Street at Sunset Drive, where there is a playground, and Cameron Street near Buchanan Street, where there is an entry point to a walking path. Similarly, corridors like King Street lack pedestrian signals except for at major signalized intersections like Henry Street, Patrick Street, and near the King Street Metro Station.

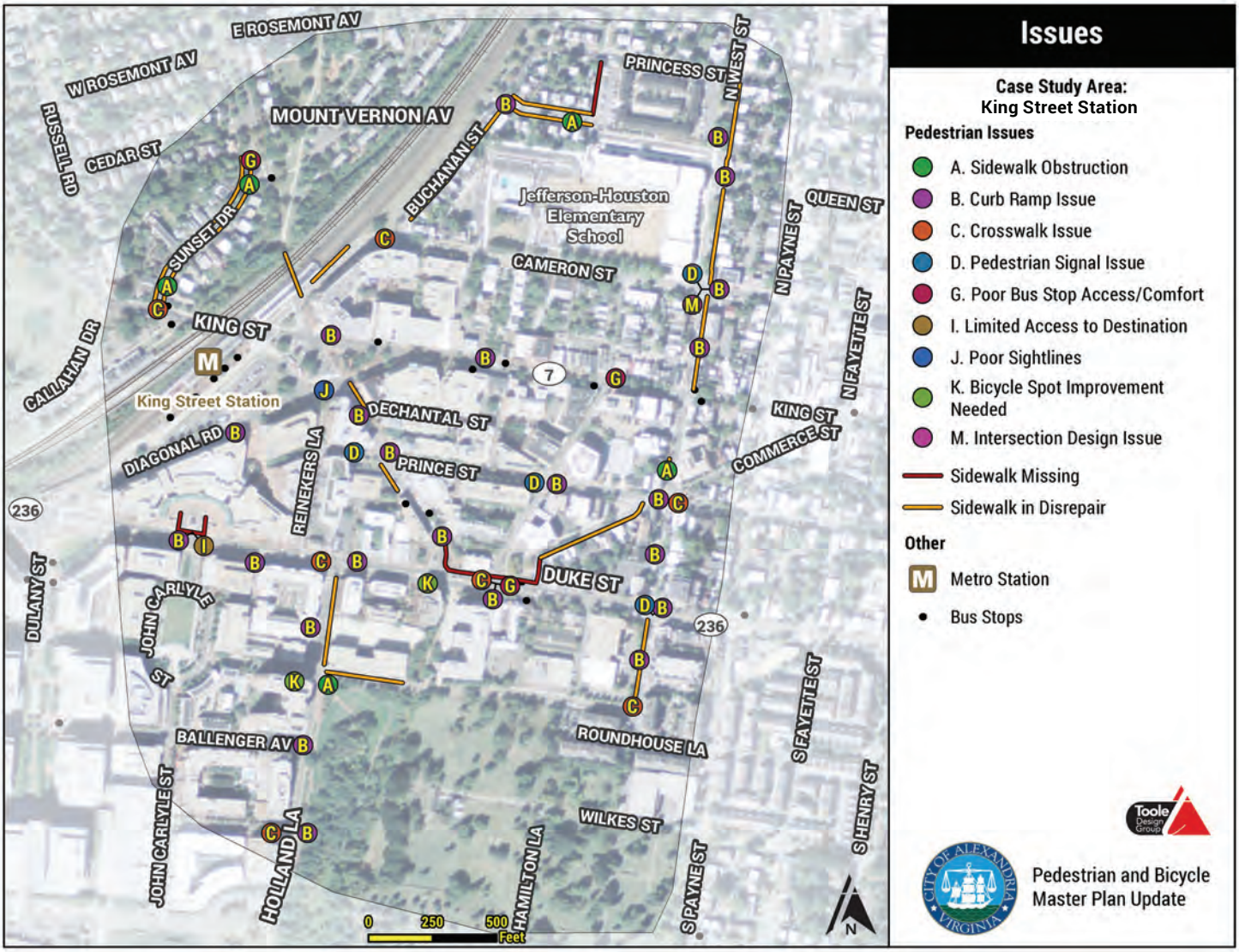


Figure 9: Map of Issues Identified

Issue	Count
Curb Ramp Issue	23
Sidewalk in Disrepair	17
Crosswalk Issue	7
Sidewalk Obstruction	5
Sidewalk Missing	5
Pedestrian Signal Issue	4
Poor Bus Stop Access/Comfort	3
Bicycle Spot Improvement Needed	2
Limited Access to Destination	1
Poor Sightlines	1
Intersection Design Issue	1

Table 10: Summary of Observed Issues

ADA compliant sidewalk/curb ramp

Example of recommended crosswalk and pedestrian signal

Proposed Recommendations

Table 11 provides an overview of the 69 recommendations that the study team made for the King Street Station Case Study Area, including improvements to sidewalks, curb ramps, crosswalks, and bus stops. Even though this area is relatively pedestrian-friendly, sidewalks should be repaired or upgraded in 17 locations to make pedestrians safer and more comfortable. Recommendations focus on widening the sidewalks, making them ADA compliant, and providing a buffer between pedestrians and vehicles. New sidewalks are recommended in five locations, as shown in **Figure 10**.

As mentioned above, curb ramps are a priority. They should be replaced or upgraded in twenty locations throughout the Case Study Area to comply with ADA regulations. New curb ramps are necessary near Duke Street at Commerce Street.

New crosswalks in five targeted locations will help reduce the frequency of people crossing mid-block and improve pedestrian safety and comfort. Additionally, pavement striping, vehicle signage, and pedestrian signals will help make pedestrians more visible, comfortable, and safe.

Last, pedestrian-oriented wayfinding is critical in the King Street Metrorail Station Area. The city is currently in the process of implementing a wayfinding plan for Old Town, which will include this area. Prominent and clear signage is needed to direct people to and from the Metro entrances, particularly around the tunnel at Dulany Street. Similarly, the area is non-intuitive to navigate for bicyclists. Shared lane markings and bike route signage will help link people from this important hub to nearby trails and other destinations.

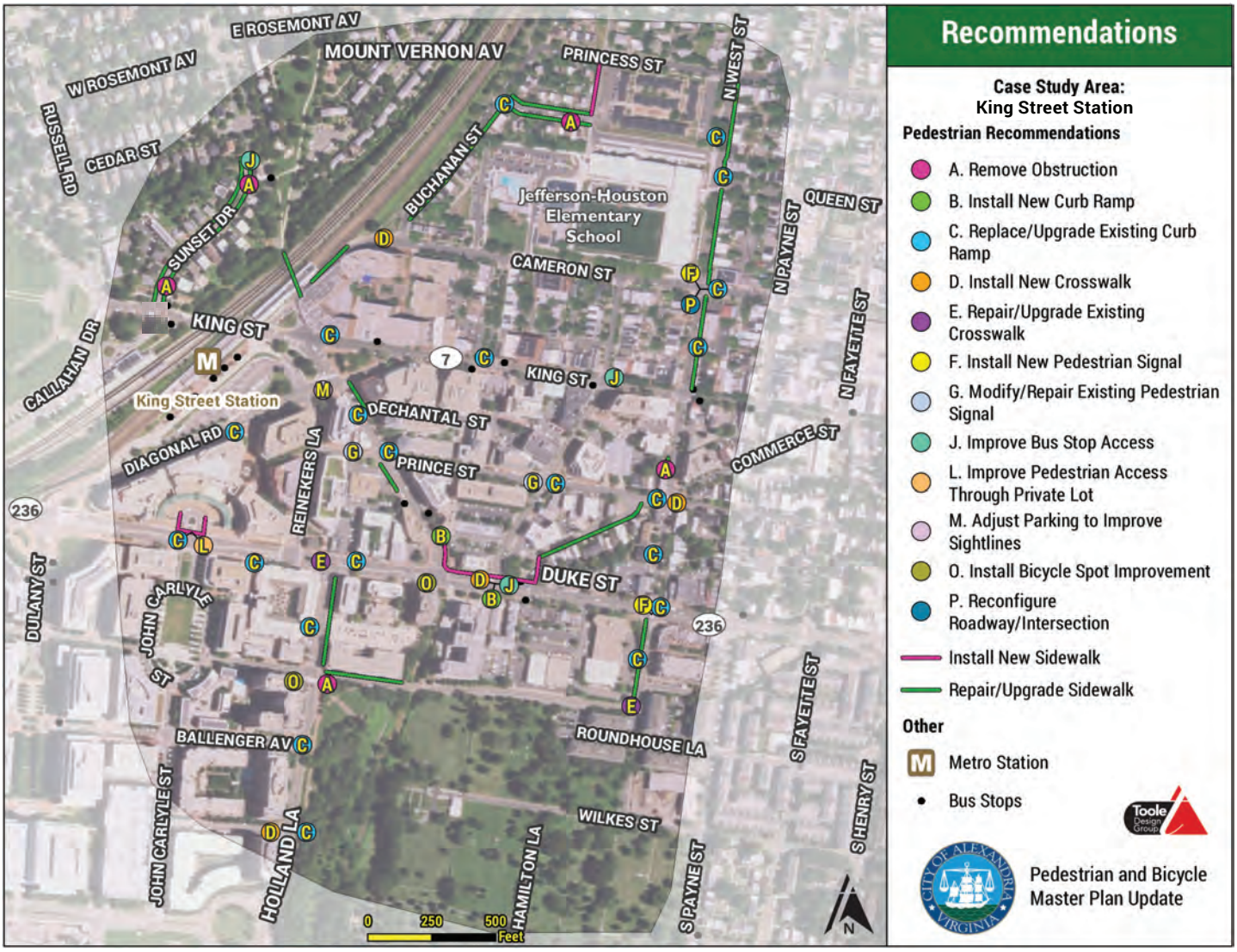


Figure 10: Map of Recommendations

Recommendation	Count
Replace/Upgrade Existing Curb Ramp	21
Repair/Upgrade Sidewalk	17
Install New Sidewalk	5
Remove Obstruction	5
Install New Crosswalk	5
Improve Bus Stop Access	3
Install New Curb Ramp	2
Repair/Upgrade Existing Crosswalk	2
Install New Pedestrian Signal	2
Modify/Repair Existing Pedestrian Signal	2
Install Bicycle Spot Improvement	2
Improve Pedestrian Access Through Private Lot	1
Adjust Parking to Improve Sightlines	1
Reconfigure Roadway/Intersection	1

Table 11: Summary of Recommendations

CASE STUDY 6:

COMMONWEALTH AVENUE/BRADDOCK ROAD

Theme: Schools and Neighborhoods

City of Alexandria

Parks

Case Study Area

N

0 250 500 1,000 Feet

The following section describes a sub-area of Alexandria that has characteristics similar to many other places in the City. The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Although this Case Study focuses on the theme of "schools and neighborhoods," it is important to note that the Commonwealth Avenue/Braddock Road area also represents other themes evaluated throughout the case studies, including "neighborhood main streets."

Overview

The Commonwealth Avenue/Braddock Road Case Study Area is a predominantly residential area, with a mix of single-family homes, townhouses, and apartments, as well as some commercial uses at the intersection of Commonwealth and East Monroe avenues. Two schools flank the study area, Maury Elementary School on Russell Road and George Washington Middle School on Mount Vernon Avenue. There are multiple churches in the study area.

The Case Study Area has low traffic volumes (based on 2014 counts, 6,300 average annual daily traffic on Monroe Street; 6,100 on Commonwealth Avenue, 7,200 on East Braddock Road ; 7,500 on Russell Road) and low traffic speeds, which makes most streets fairly comfortable for pedestrians and bicyclists.

Roadway widths vary throughout the Case Study Area. Russell Road, Braddock Road, and Commonwealth Avenue north of Oak Street each have one through lane and one parking lane in each direction. South of Oak Street, Commonwealth Avenue has one through lane and one parking lane in each direction in addition to a median with street trees. Most side streets have parking on both sides and a single traffic lane where drivers must yield to vehicles coming in the opposing direction. Both Commonwealth Avenue and Braddock Road have shared-lane markings, which direct bicyclists and drivers to share the road.

Residential character of the study area

Existing sidewalk on Alexandria Avenue and Russell Road

Missing crosswalks and curb ramps on residential areas

Installing “No Turn on Red” signs


Missing crosswalk at intersection of Russell Road and Braddock Road


Utility post obstructing existing sidewalk

Summary of Issues

The Study Team identified a number of barriers to walkability in the Commonwealth Avenue/Braddock Road Case Study Area As in the other Case Study Areas, the primary issues include curb ramps, sidewalks with obstructions or in disrepair, missing or narrow sidewalks, and unmarked crosswalks. Sidewalks are present on both sides of the street in most areas, though they are typically substandard width. Sidewalk widths range from four to six feet, and many segments also have a sidewalk buffer. However, many sidewalks and curb ramps are not ADA compliant. In addition, many crosswalks are unmarked, and several that are marked lack high-visibility striping. Many bus stops in the area lack shade or seating for riders.

Some intersections in the Case Study Area present major challenges for pedestrians crossing the street. There are no marked crosswalks across Commonwealth Avenue between the signalized intersections at Braddock Road and Monroe Avenue. Additionally, there are no marked crosswalks on Braddock Road between Russell Road and Commonwealth Avenue, a major pedestrian route to the Braddock Road Metrorail station, or at Russell Road and Nelson Avenue.

Following a pedestrian fatality at this intersection in 2015, the City made a number of changes that aim to improve safety in the area. The City installed “No Turn on Red” signs and a leading pedestrian interval at the signal, which will allow pedestrians to start crossing before vehicles enter the intersection.

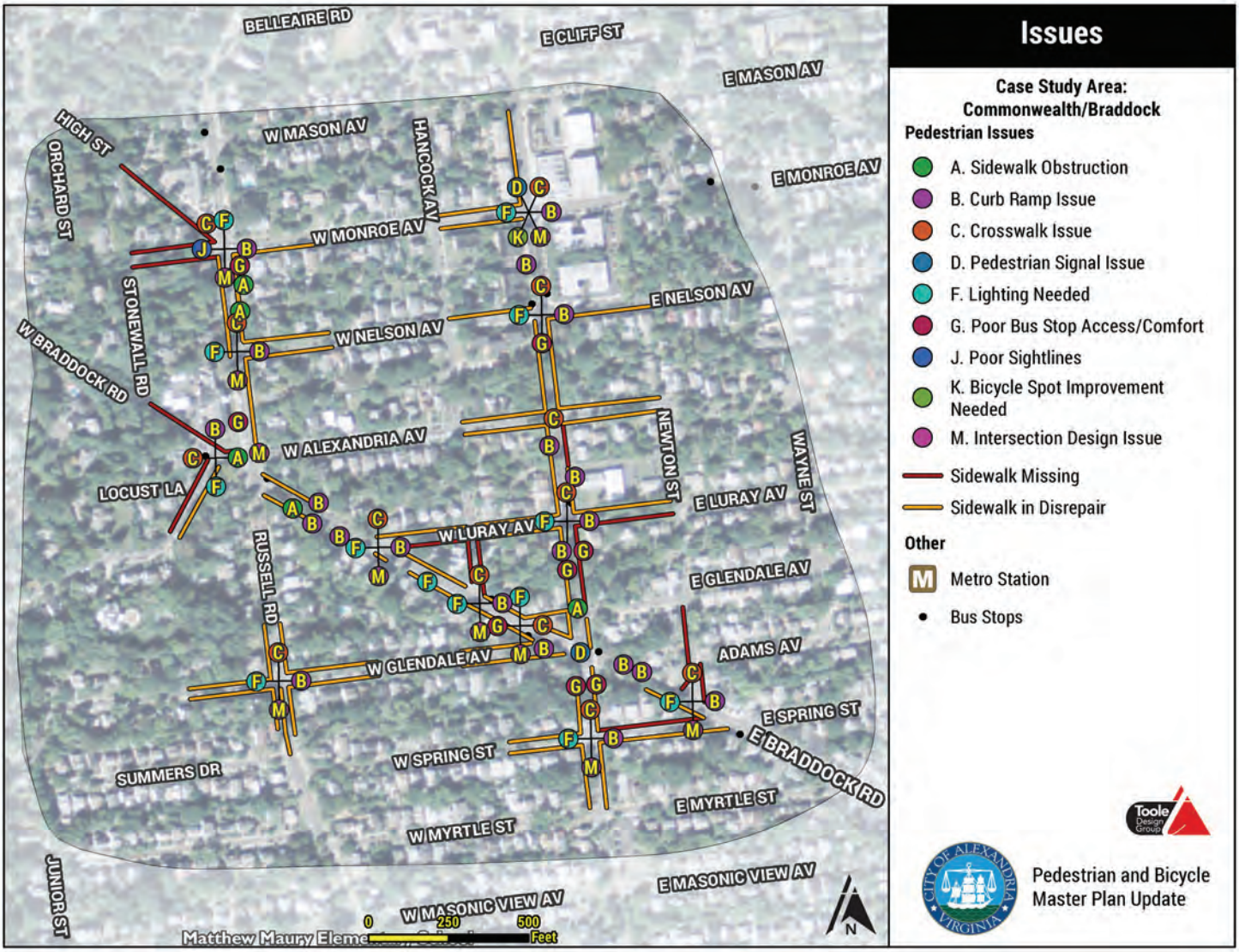


Figure 11: Map of Issues Identified

Issue	Count
Sidewalk in Disrepair	53
Curb Ramp Issue	21
Sidewalk Missing	16
Lighting Needed	13
Crosswalk Issue	12
Intersection Design Issue	11
Poor Bus Stop Access/Comfort	8
Sidewalk Obstruction	5
Pedestrian Signal Issue	2
Poor Sightlines	1
Bicycle Spot Improvement Needed	1

Table 12: Summary of Observed Issues

Missing sidewalk near Commonwealth Avenue and Glendale Avenue

Example of recommended crosswalk and pedestrian signal

Proposed Recommendations

Table 13 provides an overview of the recommendations that the study team made for the Commonwealth and Braddock Case Study Area. There are 167 recommendations for this Case Study Area, including improvements to sidewalks, lighting, curb ramps, and crosswalks. Recommendations focus on widening sidewalks, installing pedestrian-scale lighting, reinstalling curb ramps that are ADA accessible and aligned with the intersection, and minimizing obstructions. In many locations, sidewalks should be upgraded to provide pedestrians a safe and comfortable walking environment. New sidewalks are recommended in 16 locations, including sections of Commonwealth Avenue and on side streets including Luray Avenue and Monroe Avenue.

At unsignalized locations where a marked crosswalk is recommended, an engineering study should be performed to evaluate the appropriateness of a marked crosswalk and the potential need for additional crossing enhancements, such as a pedestrian crossing island.

Curb ramps are recommended for upgrade or replacement in eight intersections to comply with ADA requirements. Forty eight crosswalks that need to be improved or striped were identified. Driveways are recommended to be made ADA compliant in 23 locations, while vegetation maintenance is needed on sidewalks in numerous locations.

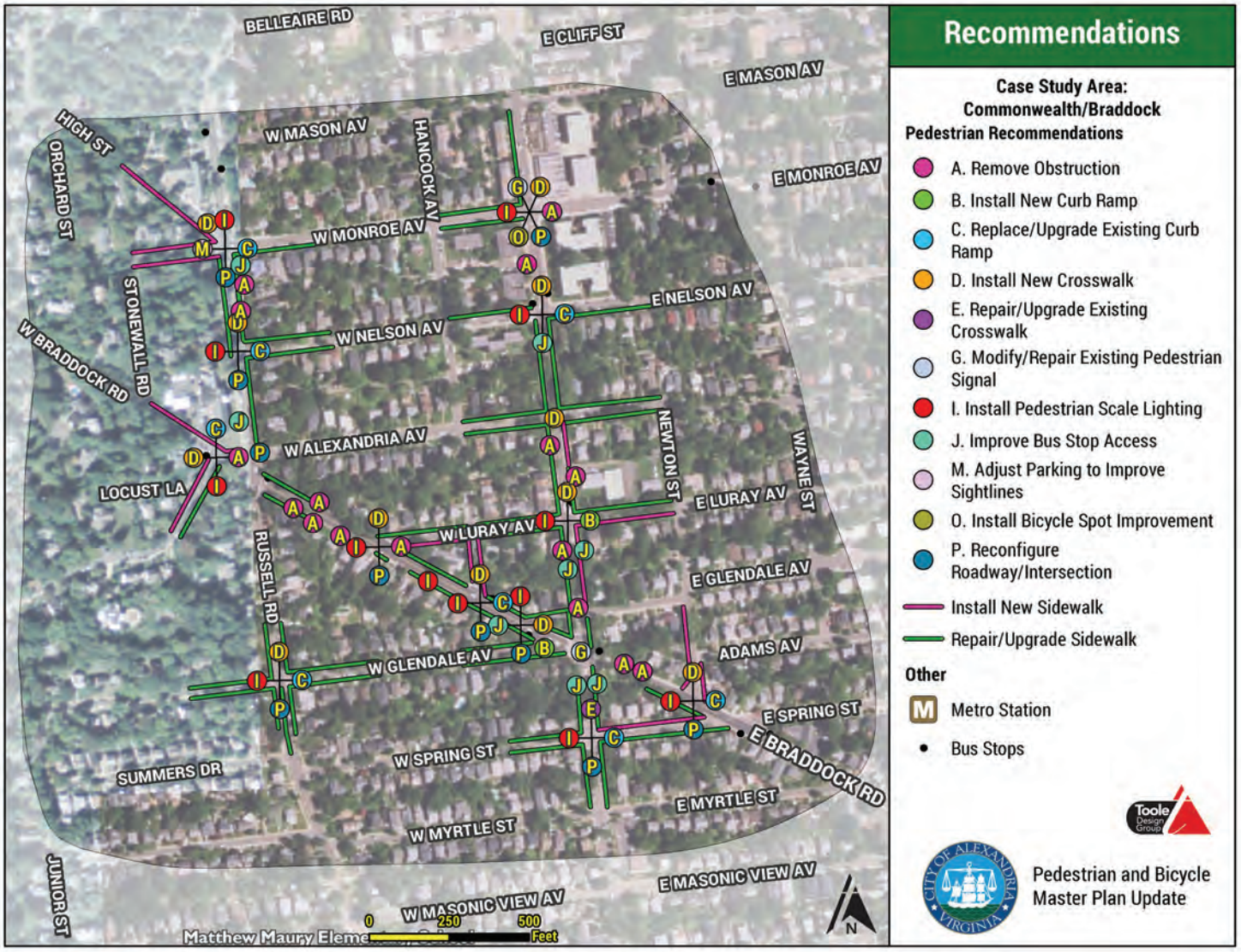


Figure 12: Map of Recommendations

Recommendation	Count
Repair/Upgrade Sidewalk	48
Consolidate Driveways	23
Remove Obstruction	16
Install New Sidewalk	16
Install Pedestrian Scale Lighting	13
Install New Crosswalk	12
Reconfigure Roadway/Intersection	10
Replace/Upgrade Existing Curb Ramp	8

Recommendation	Count
Improve Bus Stop Access	8
Upgrade Existing Median/Pedestrian Island	6
Modify/Repair Existing Pedestrian Signal	2
Install New Curb Ramp	2
Repair/Upgrade Existing Crosswalk	1
Install Bicycle Spot Improvement	1
Adjust Parking to Improve Sightlines	1

Table 13: Summary of Recommendations