

## Lab I

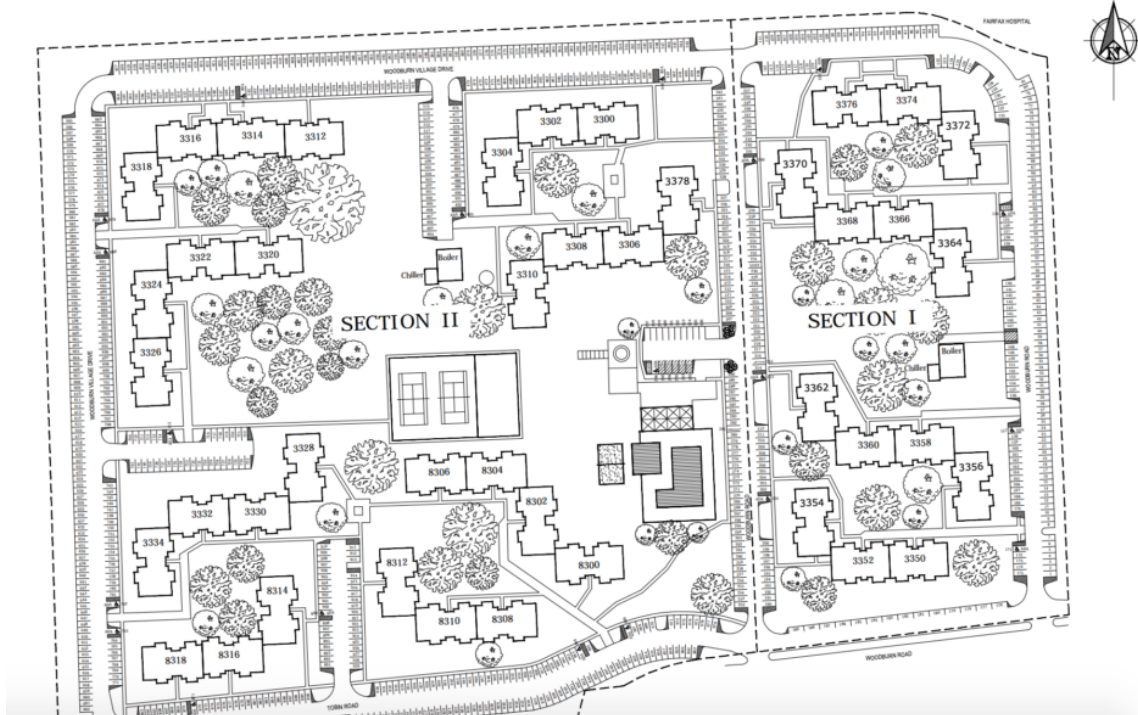
### Accessible Pedestrian Infrastructure Deficiencies: Woodburn Village Condominiums

7 November 2022

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#### 1. Introduction

Pedestrian traffic is by nature a necessary mode of transportation from one's condo/apartment dwelling to surrounding pedestrian systems, mass transit systems, or even their vehicle within the unit's parking lot. Woodburn Village in Annandale, VA is a large multi-family condo community consisting of over 600 units throughout 43 buildings and a wide range of residents of all ages and backgrounds. The property is an attractive housing option for many families, elders, as well as young individuals due to not only its typical affordability for the area and pleasant tree lined grounds, but also its proximity to medical treatment facilities, community and commercial centers, county resources, and DC metro bus and rail transit systems.



**Figure 1.** Site Map of Woodburn Village Condominiums

In 1988, design and construction requirements were added to the Fair Housing Act, requiring all new multi-family housing (built after March 13, 1991) to be designed with certain

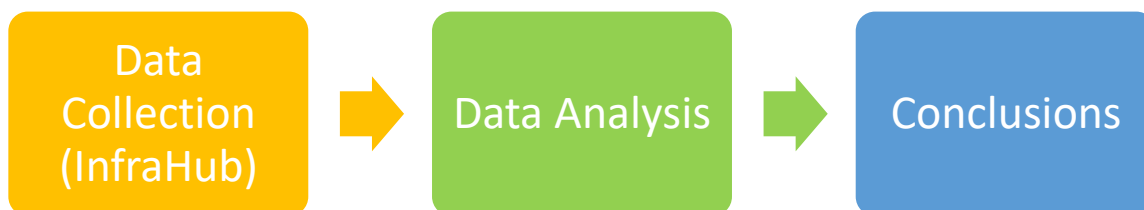
accessible features. Although built in 1969 prior to these requirements, the Condominiums at Woodburn a.k.a. Woodburn Village could benefit from upgrading its pedestrian infrastructure to adhere more closely with the design and construction requirements for accessibility features. By making the grounds more accessible, this would not only make daily living conditions for disabled residents less burdensome, but also potentially attract a broader pool of potential lessees or buyers of available units. The objective of this report is to identify potential accessibility issues with the pedestrian infrastructure in and surrounding the Woodburn Village condominiums.

## 2. Method

This report is based on geo-referenced point data of deficiencies in non-motorized vehicle transportation infrastructure facilities. The data was collected with the “InfraHub” mobile app, which feeds data to a cloud database hosted by Amazon Web Services, available to Virginia Department of Transportation (VDOT). Data points were collected while traversing sidewalks along the private roads and parking spaces encompassing the complex as well as the sidewalks along the public roads adjacent to the property (Woodburn Rd and Tobin Rd).

Data was collected with efforts to positively identify and justify issues with supporting documentation such as photographs and descriptions as attributes attached to each datapoint. Additionally, efforts were made to georeference data points as closely as possible to the actual issue by submitting each issue while standing on the location of the issue with the collection device until submission confirmation was displayed.

After collection, data was analyzed to identify primary accessibility issues in and around the Woodburn Village condominiums (discussed in results). Summary statistics and proportions for each category were calculated and conclusions were drawn based on the data. The report’s method is displayed in a generalized workflow in Figure 2.



**Figure 2.** Generalized report method workflow.

## 3. Results

Seventy three (73) data points were collected on sidewalks along the private roads and parking spaces encompassing the complex as well as a few (9) on the sidewalks along the public roads adjacent to the property (Woodburn Rd and Tobin Rd). The issues with the highest

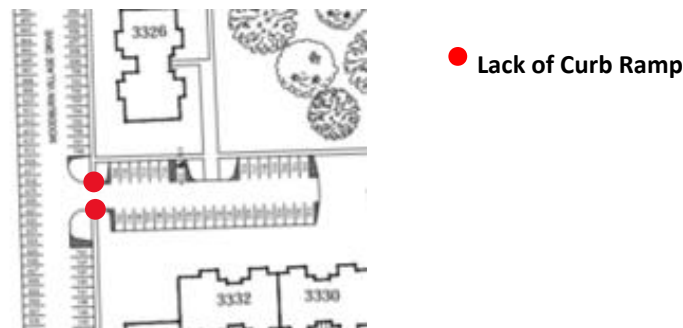
frequency and proportions were Lack of Curb Ramp (n=34; 46%) and Lack of Truncated Dome (n=16; 22%), with Unreasonable Slope (n=10; 14%) and Excessive Cracking (n=9; 12%) seen frequently as well. Frequencies and proportions for all collected issue categories are summarized in Table 1.

**Table 1.** Frequency and percentage of recorded issues by category

Issue Category	Frequency	Percentage (%)
Lack of Curb Ramp	34	46
Lack of Truncated Dome	16 *****	22
Unreasonable Slope	10	14
Excessive Cracking	9	12
Missing Section/Connection	2 **	3
Protruding Object	2 *	3
<b>Total</b>	<b>73</b>	<b>100</b>

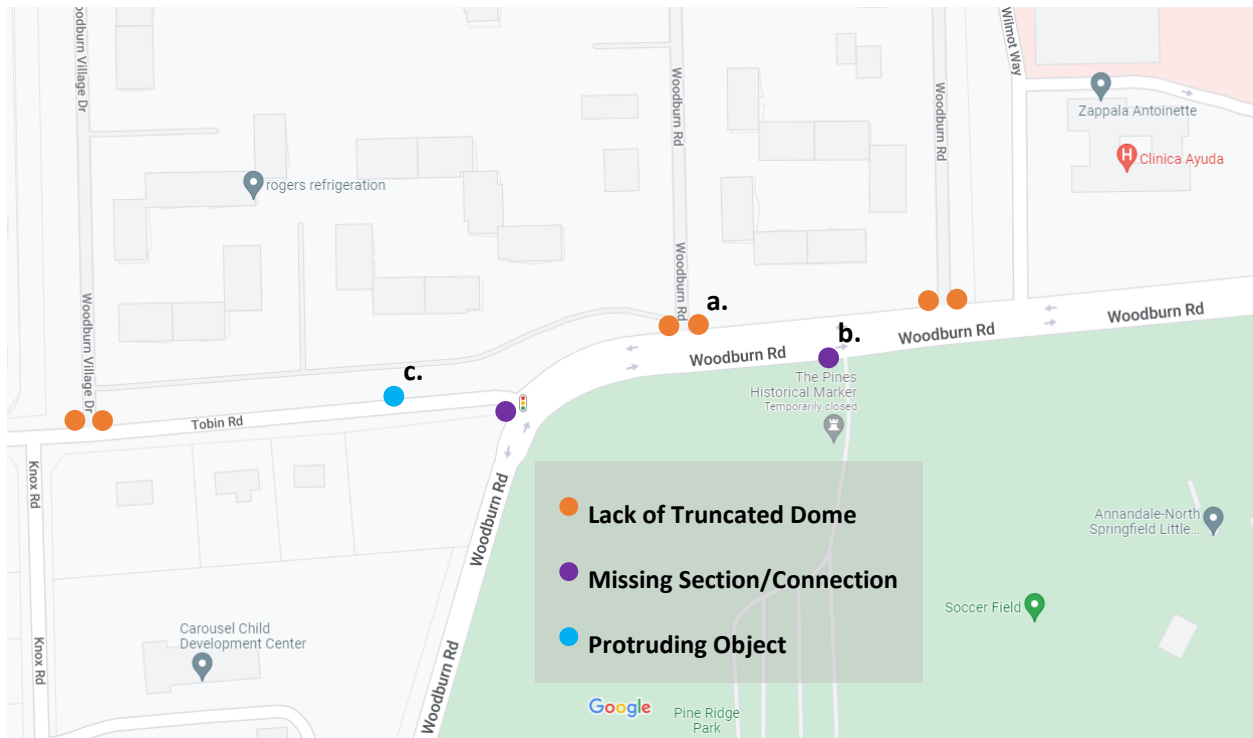
\* point collected on sidewalk along public roads

The most common issue, Lack of Curb Ramp, was observed along most sidewalk crossings at intersections with vehicle access to dead end parking sections (Figure 3.) as well as various points where sidewalks approached and were adjacent to curbs along parking spaces.



**Figure 3.** Example of Lack of Curb Ramps at parking lot intersections.

In addition to issues observed on the private sidewalks within Woodburn Village, notable issues were observed on the public right of way along Woodburn Rd and Tobin Rd. Such issues included Lack of Truncated Domes on all sidewalk crossings with access intersections to the Woodburn Village property, two Missing Section/Connections where sidewalks crossed the public roads to non-existent sidewalks on the other side of the road opposite of the property where a public park and place of worship exist, as well as a protruding object where an adjacent storm sewer structure was not flush with the sidewalk (Figures 4, 5).



**Figure 4.** Locations of issues along public right of ways Woodburn Rd and Tobin Rd.



**a.**

**b.**

**c.**

**Figure 5.** Examples of (a.) Lack of Truncated Dome, (b.) Missing Section/Connection, and (c.) Protruding Object along public right of ways Woodburn Rd and Tobin Rd.

#### 4. Discussions

The most frequent issue observed, Lack of Curb Ramp, is of particular concern. Although no wheelchair individuals have been observed (that is not to say none live within the community), as mentioned previously, several elderly individuals live within the community. A few of these elderly individuals have been observed to utilize walking aids such as walkers and are frequently actively mobile on their own either for recreational exercise or to access other modes of transportation (their vehicle or public transit). One such individual has been observed to traverse along the throughway of the parking lots around the complex instead of utilizing adjacent sidewalks, presumably due to the lack of curb ramps in addition to a lack of sidewalk ramps in certain areas where only stairs exist. This is concerning for these individual's safety and wellbeing within their own residential community.

The results of this study must be taken into consideration with certain limitations including a lack of comparison of the observed issues with all existing pedestrian infrastructure in the community, potential overemphasis on accessibility for all sections of pedestrian infrastructure, a lack of geolocation precision, as well as various generalizations made when categorizing issues.

This study focused solely on identifying potential issues within the Woodburn Village condominium community. Furthermore, only sidewalks along the parking lots and access roads encircling the property which feed to public right of ways were traversed, not including paths in between buildings and throughout the grounds.

Although identification of issues is important, comparisons with all existing accessible infrastructure within the community should be taken into consideration when conducting a full analysis and assessment of the conditions. Additionally, being a private multi-housing unit built prior to the Fair Housing Accessibility Guidelines of the Fair Housing Act (implemented 1991), upgrades are not necessarily required. Knowledge of the locations of specific units where physically impaired individuals live would be key to identify specifically where upgrades should be prioritized. However, general upgrades throughout all sidewalks along the parking lots and access roads encircling the property which feed to public right of ways would be a good start to enhance the community.

Despite efforts to closely georeference datapoints as precisely as possible during the collection process, limitations on cell and GPS connectivity caused the recorded location of many points within the cloud hosted database to be visibly off from the location of actual issues. This could cause issues with further geospatial analysis, particularly with attempts to correctly connect or "snap" issue points with full pedestrian infrastructure network models of the community for network or connectivity analysis.

Finally, certain generalizations were made when observing and collecting issue data points. One such generalization was the categorization of sections with lack of sidewalk ramps as "Unreasonable Slope" (Figure 6). Another was to assign the "Excessive Cracking" category to sections where settlement or upheaval of the earth didn't necessarily cause cracking within sidewalk sections between joints, rather caused entire sections to rise resulting in "cliffs" at

section joints. Finally, a number of “Lack of Truncated Dome” points were categorized as such not simply due to a lack of truncated domes, rather truncated domes which appeared to have been retrofitted and existed at some point were excessively worn to be flat and most likely ineffective.

## **5. Conclusions**

This report collected and analyzed issues with accessible pedestrian infrastructure in and around the Woodburn Village condominium community in Annandale, VA. A lack of curb ramps and truncated domes were observed to be the most prevalent issues within the community’s pedestrian infrastructure. Though not a full scale, in depth analysis of the issues within the community, this study provides an arguable starting point for further investigation on the matter to upgrade and enhance the mobility of the community for all residents.

## **6. References**

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