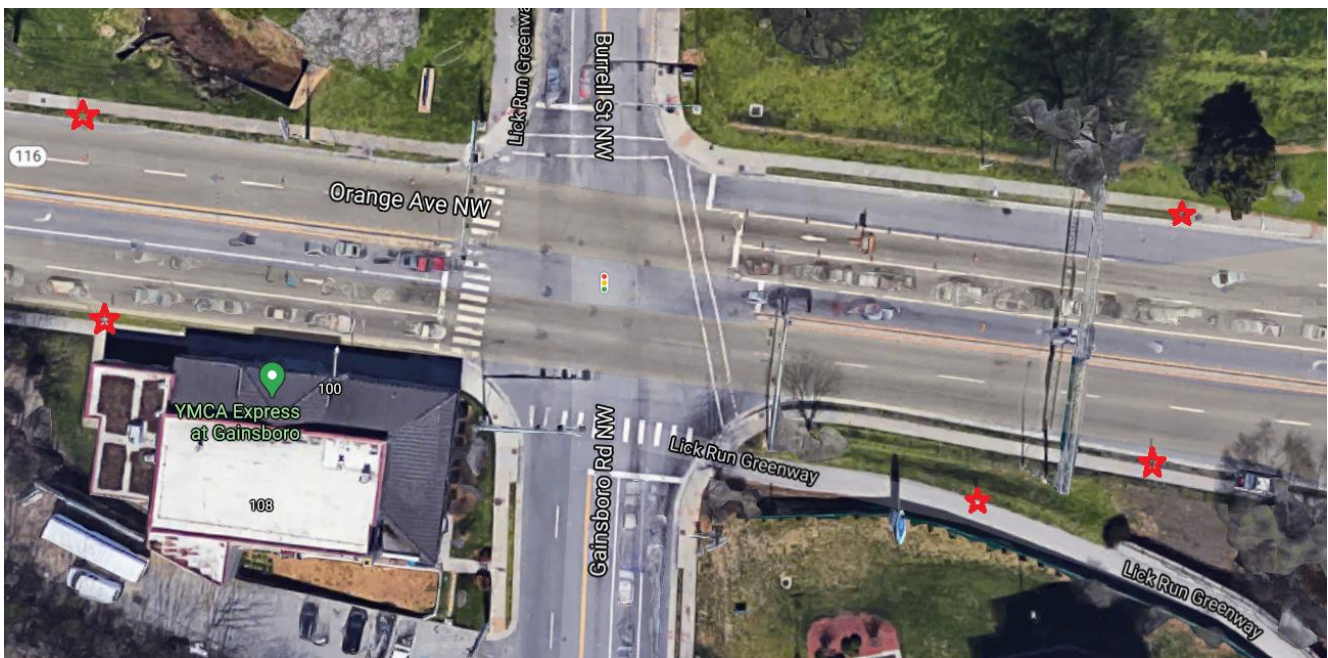


## Orange Avenue, Gainsboro Road, Burrell Street, and Lick Run Greenway Intersection

February 15, 2021

The Virginia Department of Transportation launched a statewide bike/ped count program in the fall of 2020 and provided two Eco-Vision MultiModal EcoCounters, some accessories, training, and data management to RVARC. The EcoCounters are infrared counters. RVARC has operated a greenway count program since 2010 using TRAFx infrared counters. These are permanently installed but can be moved when necessary. In July 2019, Virginia Tech professor Dr. Steve Hankey partnered with RVARC to install four EcoCounters. These generate provide reference counts to calculate average annual daily traffic from temporary count sites.

In conjunction with the RVARC greenway count program that has been operating since 2010 and uses TRAFx infrared counters, pedestrian activity was assessed at the intersection of Orange Avenue, Gainsboro Road, Burrell Street, and the Lick Run Greenway.



Intersection of Orange Avenue, Gainsboro Road, Burrell Street, and the Lick Run Greenway. Counters were placed at the red stars.

This intersection is a significant intersection for all modes of transportation, carrying 22,000 Average Annual Daily Traffic. It is very close to the I-581 interchange with Orange Avenue. Orange Avenue is part of the U.S. 460 corridor which stretches east-west across the entire urbanized area. Gainsboro Road and Burrell Street, along with Liberty Road, form a corridor that crosses three barriers to north-south travel: the railroad tracks, Orange Avenue, and I-581. The Lick Run Greenway connects downtown Roanoke to Valley View Mall, crossing this intersection from the southeast corner to the northwest corner.

There are many destinations nearby that may draw pedestrians, such as Washington Park, Comfort Inn, the Gainsboro YMCA, three schools (Lucy Addison Middle School, Lincoln Terrace Elementary School, and Roanoke Catholic School), the Burrell Center, and several churches. There are bus stops near the intersection on both sides of three legs (Orange Avenue to the west, north and south; Burrell Street, east and west; and Gainsboro Road, east and west). Washington Park has a swimming pool that operates in the summer. There are several multi-family complexes nearby. Other destinations that could draw pedestrian traffic from the north and west through this intersection include the Berglund Center, Sheetz, McDonalds, the Hotel Roanoke, the post office, and downtown Roanoke.



Counter locations on the south side of Orange Avenue: west side of Gainsboro Road (left), east side of Gainsboro Road (right), and east side of Gainsboro Road on the Lick Run Greenway (center)



Counter locations on the north side of Orange Avenue: west side of Burrell Street (left), east side of Burrell Street (right)

The intersection has pedestrian push buttons but does not have pedestrian heads on the traffic signals. The distance for pedestrians to cross is long and pedestrians are faced with conflicting movements of left-turns on permissive green or flashing yellow and right-turns on red or green. Two legs (south and west) have zebra stripe crosswalks and the other two have continental crosswalks. All four corners have curb ramps with high-contrast tactile bump surfaces. The intersection will be upgraded to pedestrian heads on the traffic signals through Highway Safety Improvement Program funds in 2022. Travelers on the Lick Run Greenway must cross two legs of the intersection to continue their journey.

RVARC staff installed two Eco-Vision counters at four locations near the intersection (two at a time) and one TRAFx counter on the Lick Run Greenway. The 10<sup>th</sup> Street counter was selected as the reference counter because it is likely to have similar travel patterns.

Day-of-year factors were determined for the 10<sup>th</sup> Street reference counter by dividing the day's count by the average of 365 consecutive days of counts for that counter. Each day's counts on each of the temporary counters at the Orange Avenue intersection were divided by the day-of-year factor for the corresponding date. The adjusted counts were averaged to calculate the annual average daily pedestrian traffic at each counter location.

Table 1. Counter locations and dates

Location	Leg	Counter	Dates	Crosswalk
<b>Washington Park</b>	Northwest	Eco-Vision	November 20 – December 2, 2020	Orange Avenue crossing Burrell Street (north leg)
<b>Education Center</b>	Northeast	Eco-Vision	November 20 – December 2, 2020	
<b>YMCA</b>	Southwest	Eco-Vision	November 3 – November 17, 2020, December 4 – December 21, 2020	Orange Avenue crossing Gainsboro Road (south leg)
<b>Lick Run Greenway</b>	Southeast	TRAFx	November 3 – December 21, 2020	
<b>Comfort Inn</b>	Southeast	Eco-Vision	<i>Data could not be collected due to electromagnetic interference</i>	
<b>10<sup>th</sup> Street</b>	REFERENCE	Eco-Vision	December 22, 2019 – December 21, 2020	

Table 2. Average Annual Daily Pedestrian Traffic (AADT)

<b>Location</b>	<b>Leg</b>	<b>Average Raw Counts</b>	<b>AADT</b>
<b>Washington Park</b>	Northwest	23	32
<b>Education Center</b>	Northeast	24	35
<b>YMCA</b>	Southwest	14	21
<b>Lick Run Greenway</b>	Southeast	17	24
<b>Average per site</b>			28
<b>Total all sites</b>			112

## Average Annual Daily Traffic

The average annual daily pedestrian traffic ranged from 10 trips per day at the YMCA to 19 trips per day across the street at Washington Park. The average of all sites was 15 trips per day, and the total of all sites was 61 trips per day (Table 2). There was not a discernable weekday pattern,

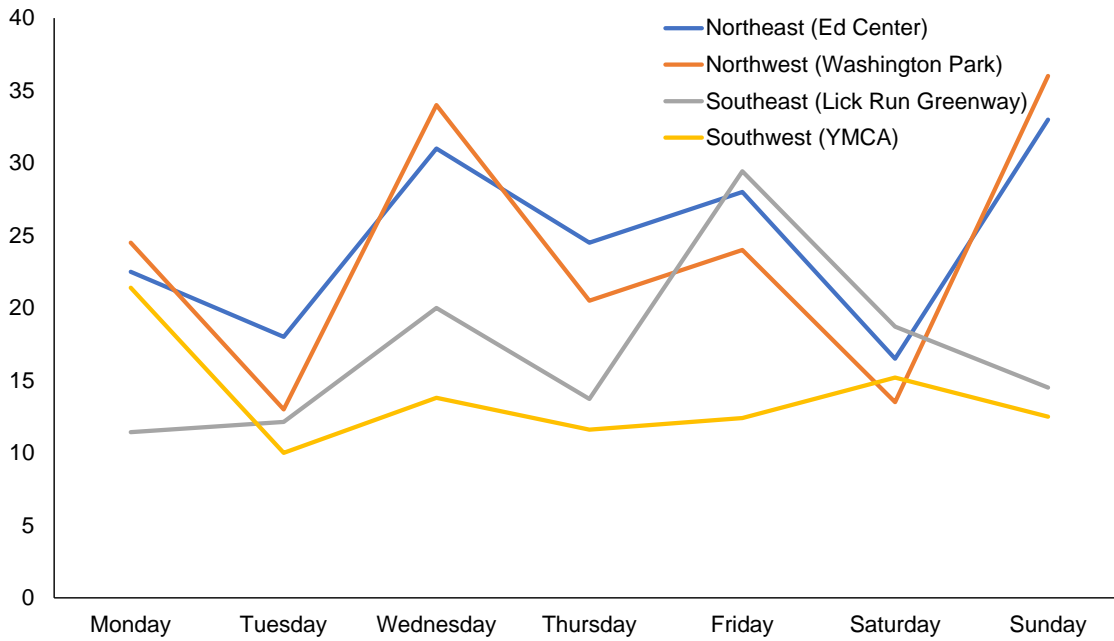


Figure 2. Average daily pedestrian activity

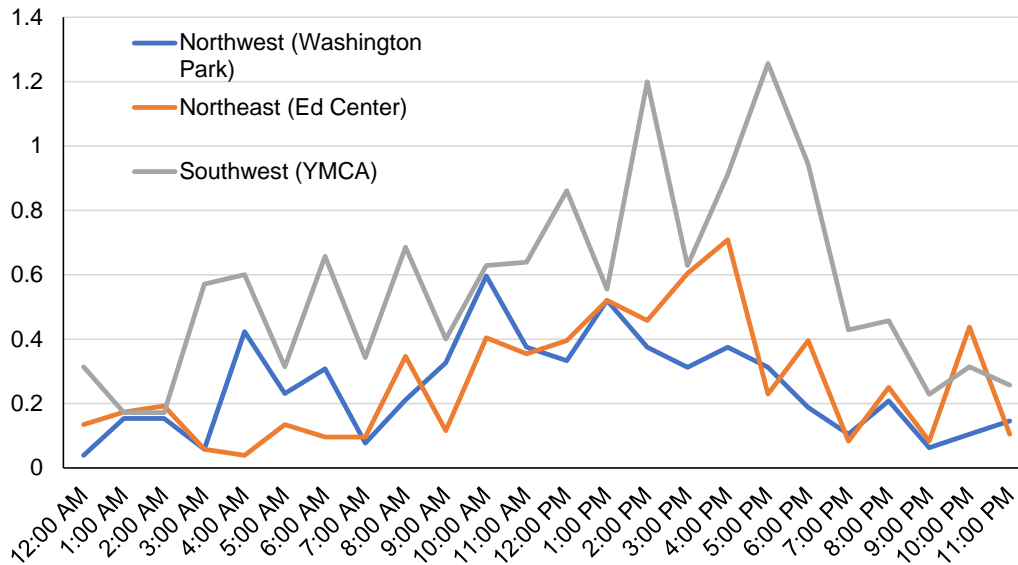


Figure 1. Average hourly pedestrian activity

likely because of the short count period (Figure 2). Pedestrian activity increased during daytime hours (Figure 2).

### Crosswalk activity

The Eco-Counters can detect direction of travel. Staff selected sites on opposite sides of a crosswalk to approximate crosswalk activity. An eastbound count in front of the westmost counter and an eastbound count in front of the eastbound counter in the same 15-minute period could be detecting the same pedestrian at two different locations and implies a pedestrian in the crosswalk (such as the green pedestrian in Figure 3). Pedestrians turning corners might use a crosswalk but pass in front of only one counter; resulting in an undercount (such as the blue pedestrian in Figure 3). Two pedestrians at the same time counted by different counters, but neither one passing through the crosswalk, would result in an overcount (such as the green pedestrian turning and the blue pedestrian in Figure 3).

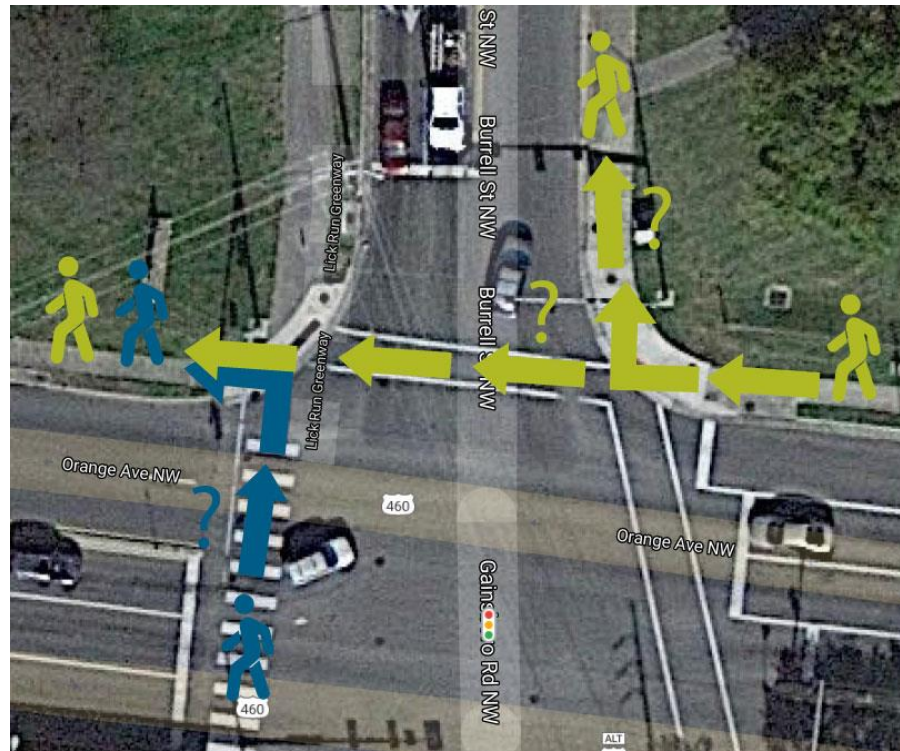


Figure 3. Approximating crosswalk activity

Pedestrians turning corners might use a crosswalk but pass in front of only one counter; resulting in an undercount (such as the blue pedestrian in Figure 3). Two pedestrians at the same time counted by different counters, but neither one passing through the crosswalk, would result in an overcount (such as the green pedestrian turning and the blue pedestrian in Figure 3).

Thus, the Washington Park and the Education Center sites together indirectly assess activity in the crosswalk on Orange Avenue crossing Burrell Street (the north leg of the intersection). The YMCA, Comfort Inn, and Lick Run Greenway sites indirectly assess activity in the crosswalk on Orange Avenue crossing Gainsboro Road (the south leg of the intersection). Pedestrians using this crosswalk could be coming from or going toward either the sidewalk to the east or the Lick Run Greenway, both of which pass in front of Comfort Inn. Because the Comfort Inn site on Orange Avenue was not viable because of electromagnetic interference, only the YMCA and the Lick Run Greenway sites could be used to indirectly assess crosswalk activity on the south leg. The TRAFx counter on the Lick Run Greenway cannot detect

Table 3. Approximated crosswalk activity

Counter locations	Leg	Activity
Washington Park and Education Center	North	12
YMCA and Lick Run Greenway	South	11

direction of travel and only gives daily counts, not 15-minute increments, so a rougher approximation was used by comparing the counts per day between the two counters and using the smaller count to approximate crosswalk activity.

The approximated crosswalk activities on the two legs examined were very similar, despite the differences in methodology (Table 3).

Given that the raw counts were 18-27% higher than the adjusted counts, crosswalk activity may be lower than what is calculated here for the study period.