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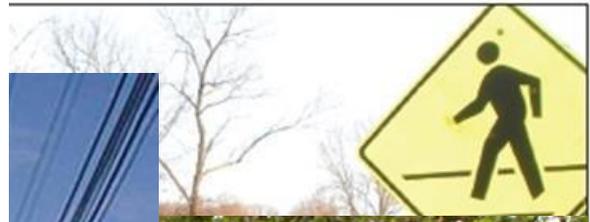
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# **Evaluation of an RRFB System at the Belmont Ridge Road and W&OD Trail Mid-Block Crosswalk**

VDOT BPAC Summer Meeting  
July 28, 2015

Lance Dougald

Solid Stand

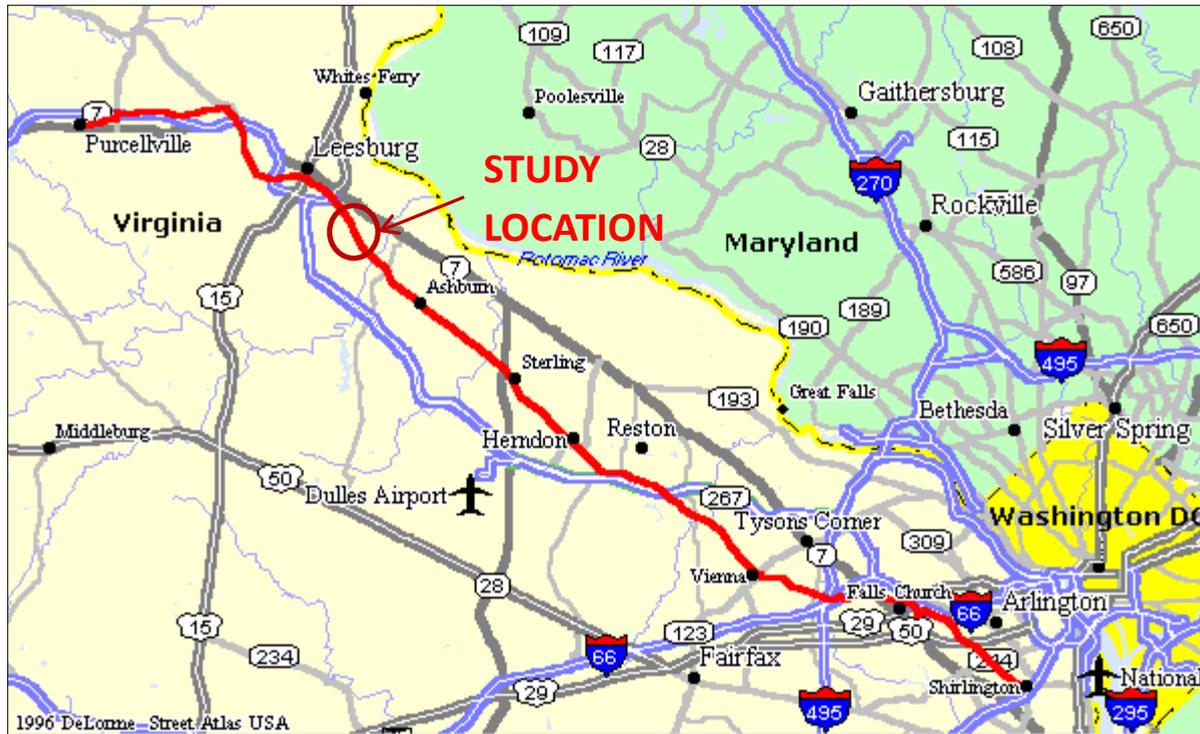


2/11/2016



# STUDY LOCATION

Intersection of Belmont Ridge Road and W&OD Trail – southeast of Leesburg



# RRFBs at Belmont Ridge Rd



# Trail View of RRFBs



Eastbound

Westbound

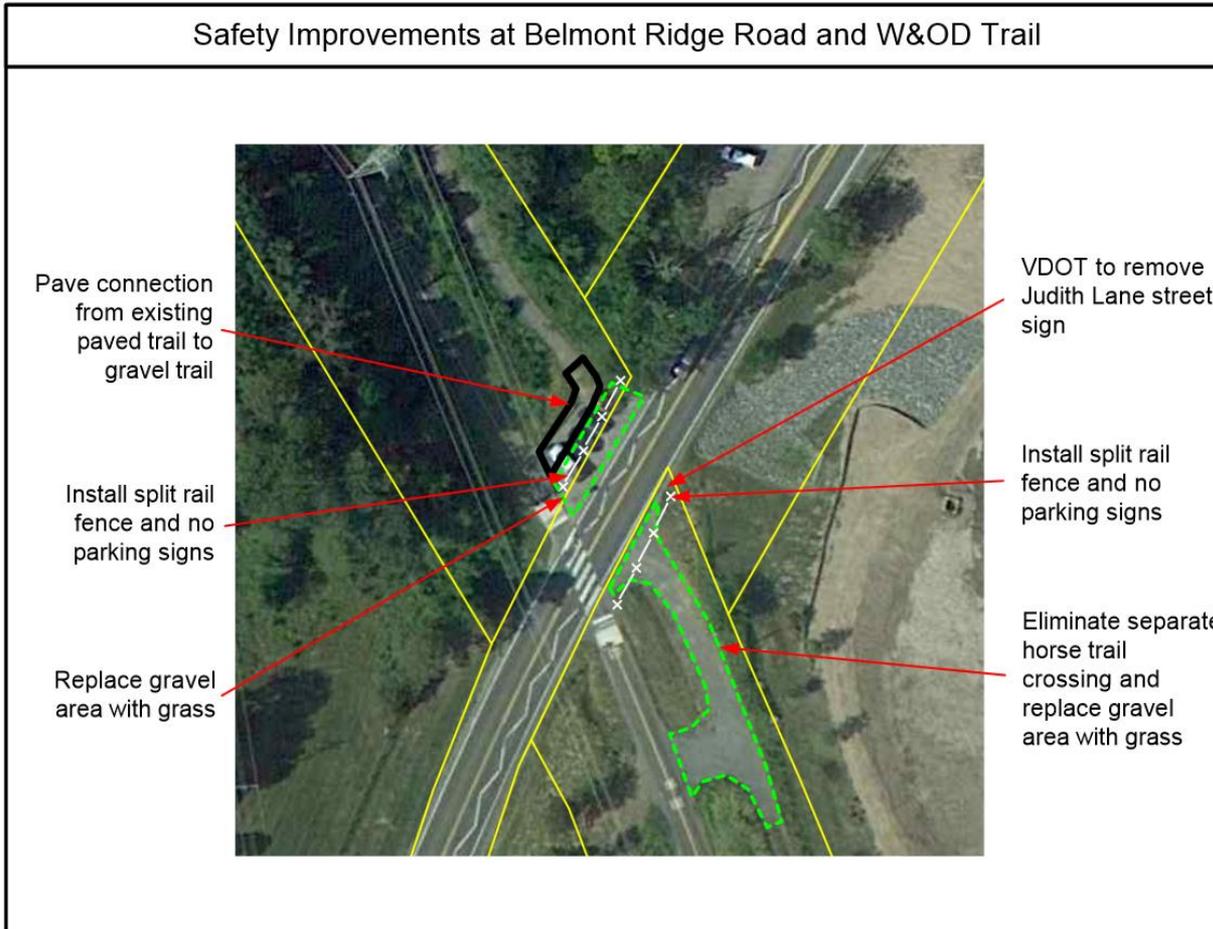


# BACKGROUND

- 2008 – FHWA interim approval
- 2009 – zig-zag pavement markings
- 2011 – VDOT RRFB RFE
- 2011 – NVRPA commissioned study
- 2012 – NVRPA Recommendations Report
- 2013 – VDOT installed RRFB at BRR
- 2014 – VCTIR evaluation of RRFB
- 2015 – VCTIR report published



# NVRPA Recommendations



**\*\*RRFB; cleared vegetation for improved sight distance**



# Study Purpose/Scope

- Evaluate the utility, effectiveness, and safety of the RRFB system
  - RRFB activation rate
  - Motorists behavior (with and without activation)
  - Trail user impressions of the system
- Scope: after installation - 1 year study period with a follow up 3 year crash analysis



# Data Collection

## 1) Trail user and motorist interactions



# Data Collection

## Trail user and motorist interactions (Video)

- 3 video data collection periods: 3 weeks, 5 months, 1 year after RRFB installation (Wed, Thur, Sat, Sun); 168 hours of video review

1. Number of trail person crossings by mode
2. Number of crossing instances defined as “potential RRFB activations”
3. RRFB activation rate
4. Traffic characteristics during potential RRFB activation events
5. Effect of RRFB activation/non-activation on motorist yield rate
6. Effect of activation/non-activation on immediate yields



# Data Collection

2) Vehicle speeds obtained with LIDAR gun

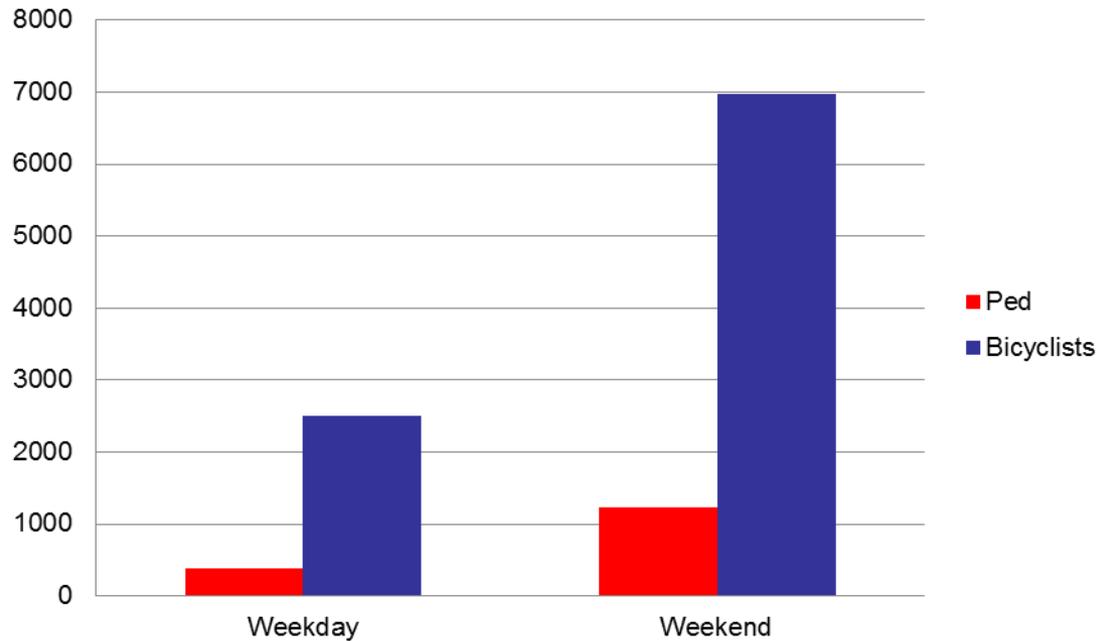


3) On-Site/On-line surveys



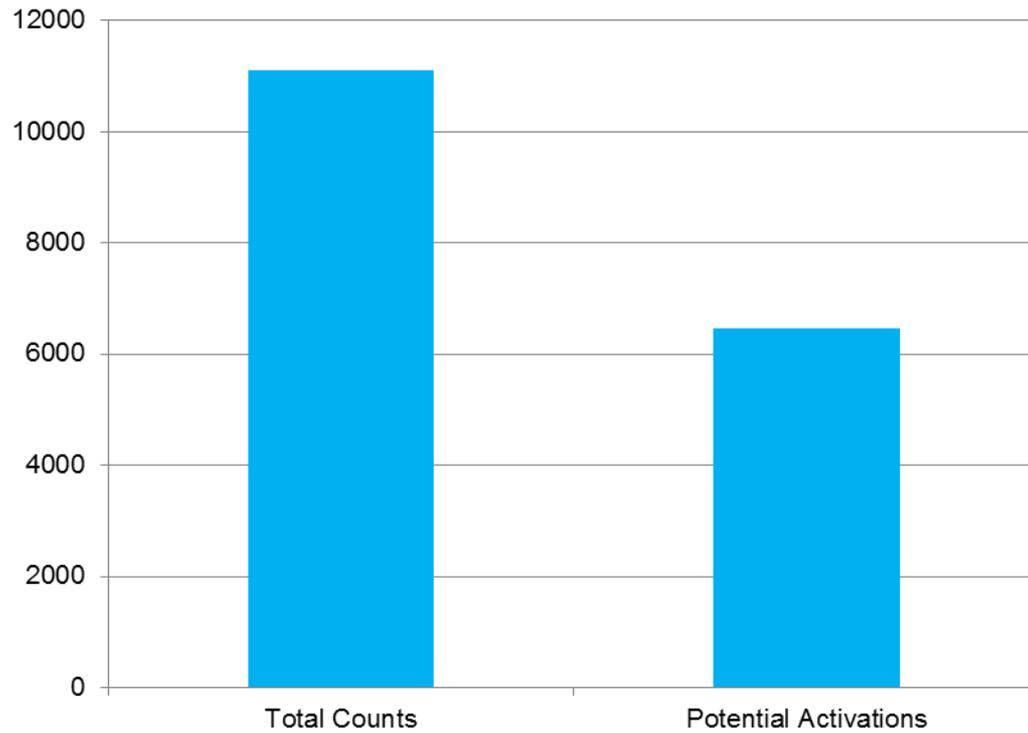
# Results

## 1) Number of trail person crossings by mode



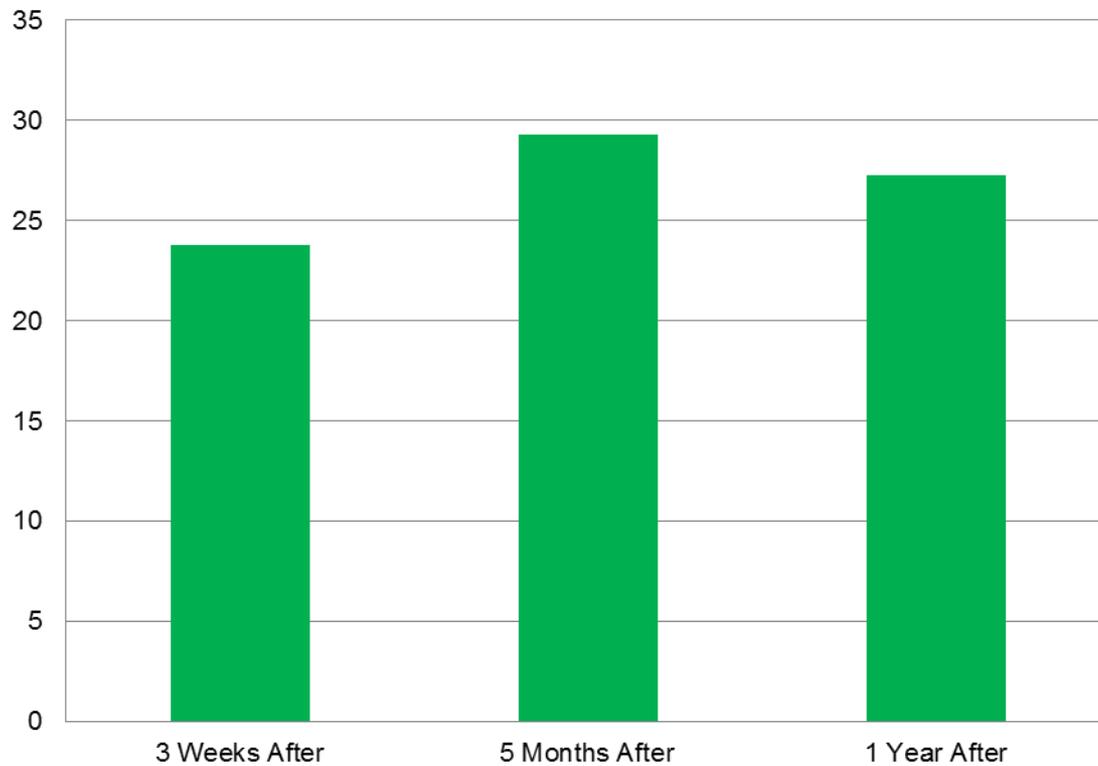
# Results

## 2) Potential RRFB activations



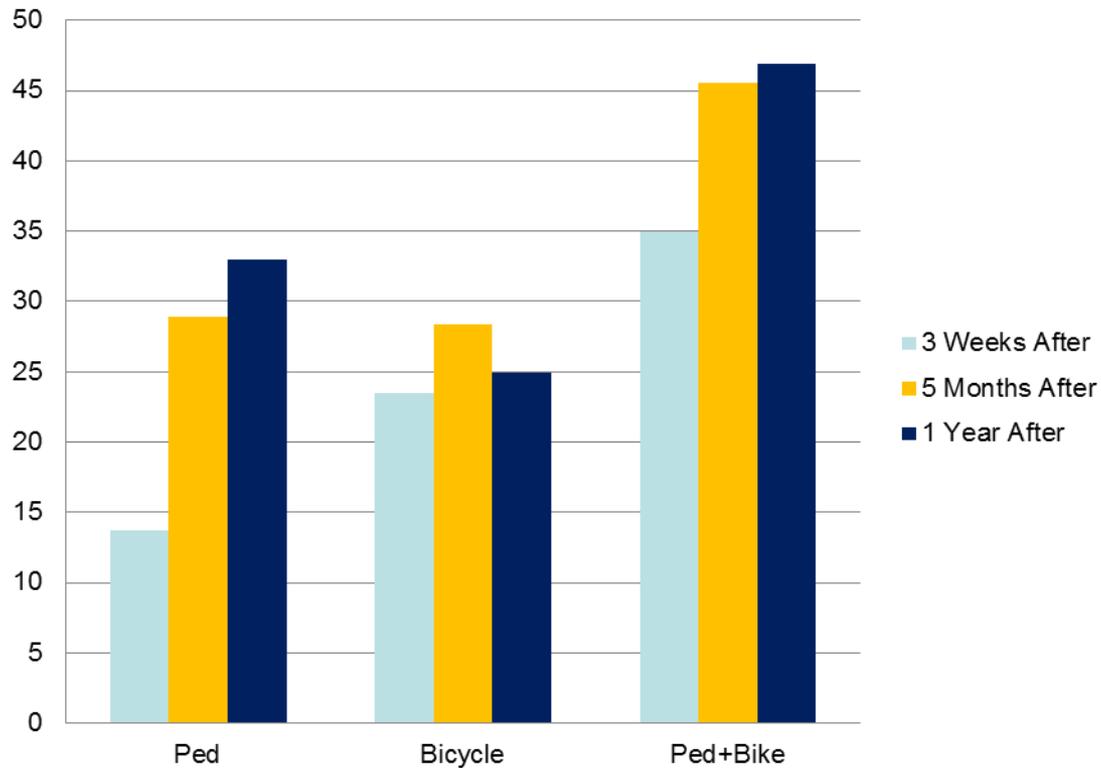
# Results

## 3) Activation Rate – all modes combined



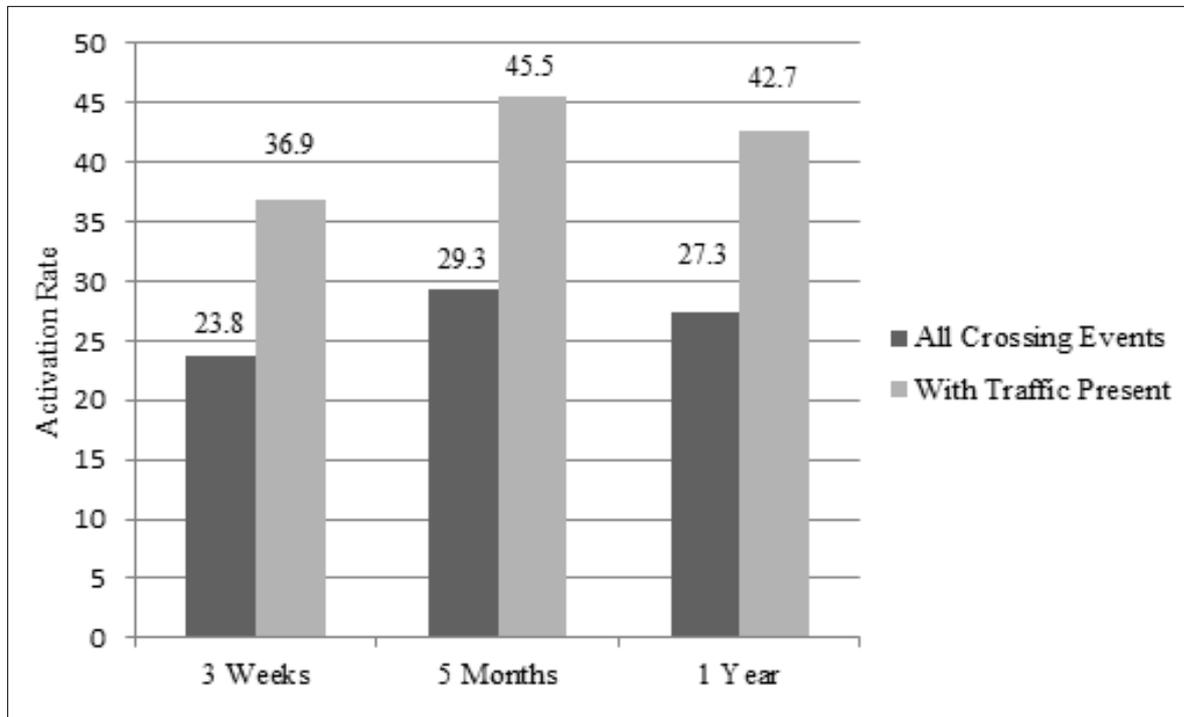
# Results

## 3) Activation Rate – by mode



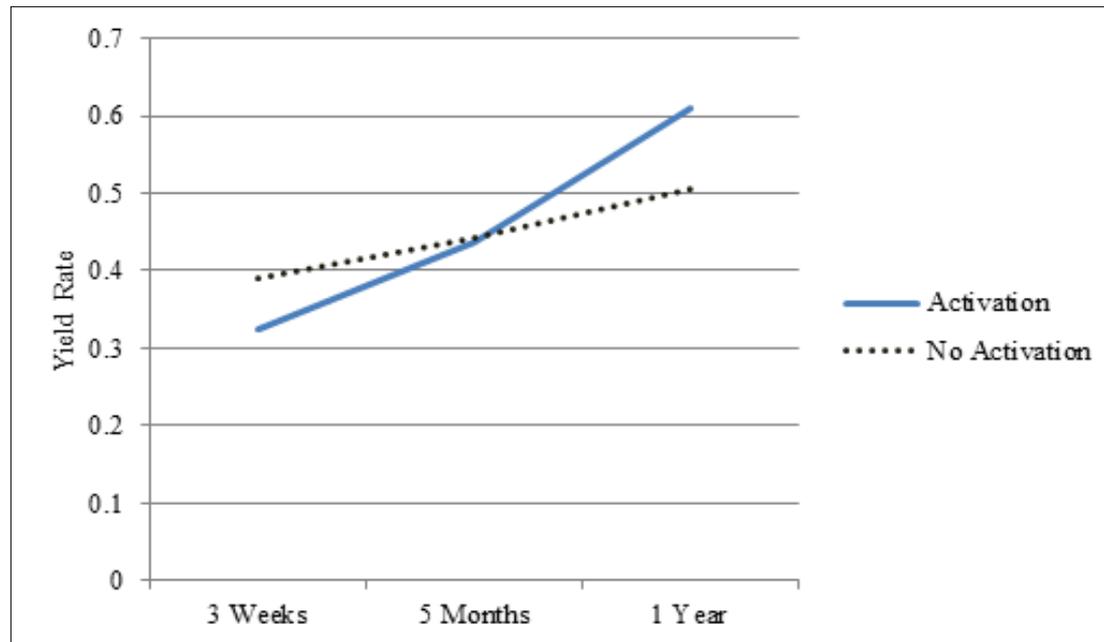
# Results

## 4) Activation Rate with Traffic Present



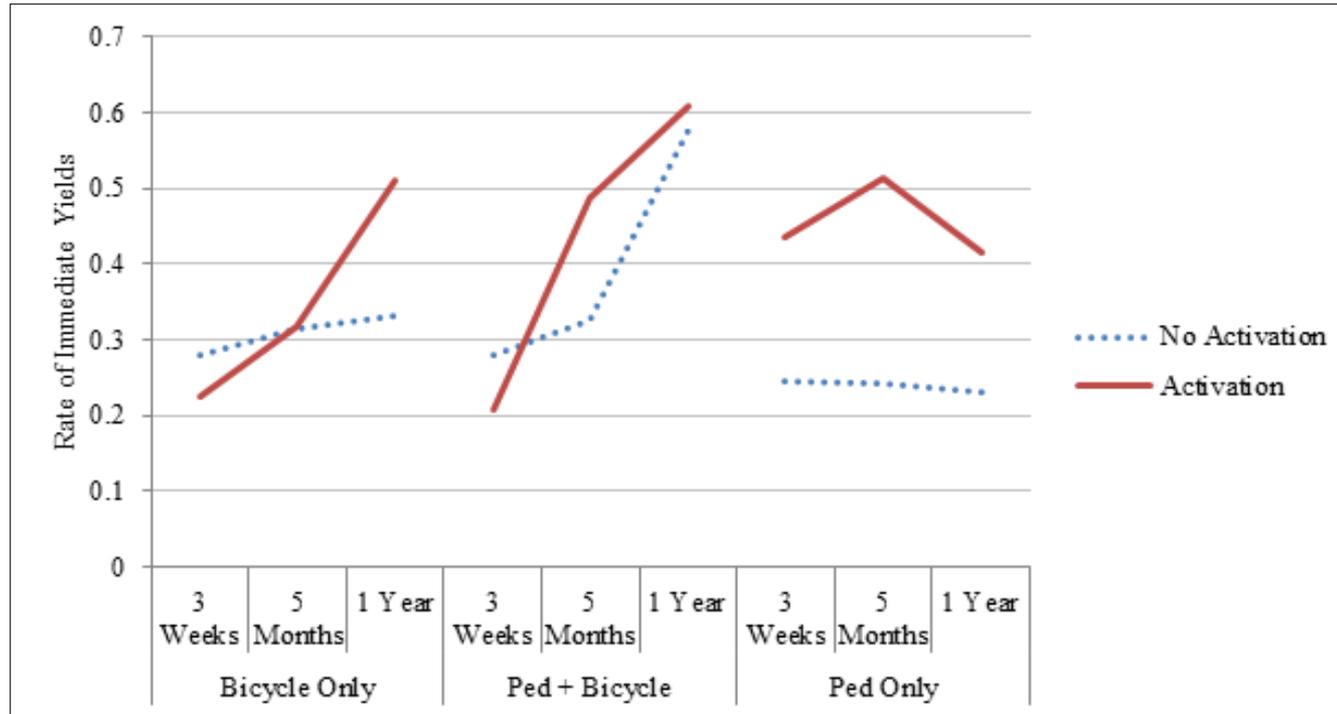
# Results

## 5) Effect of RRFB activation/non-activation on motorist yield rate

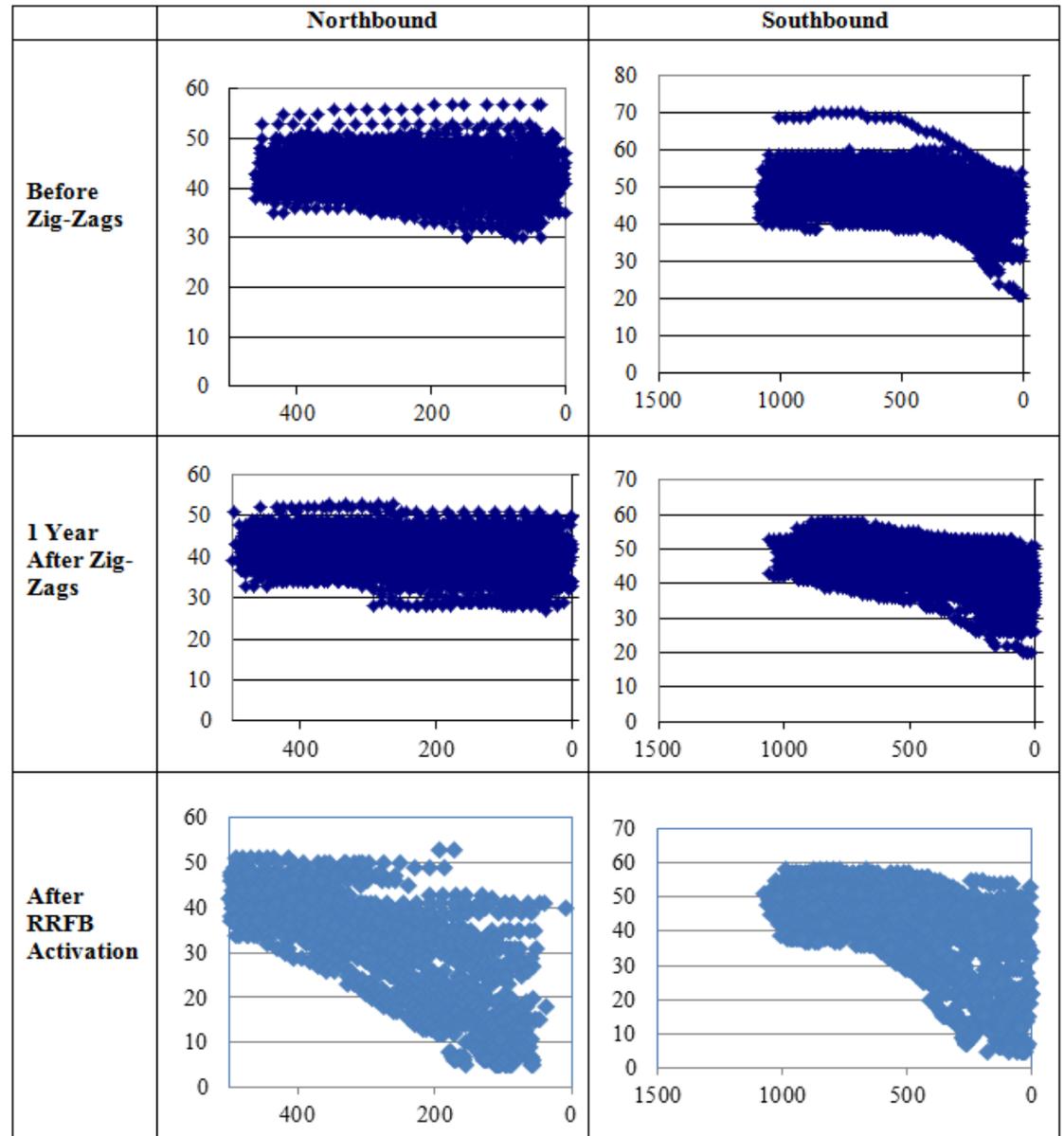


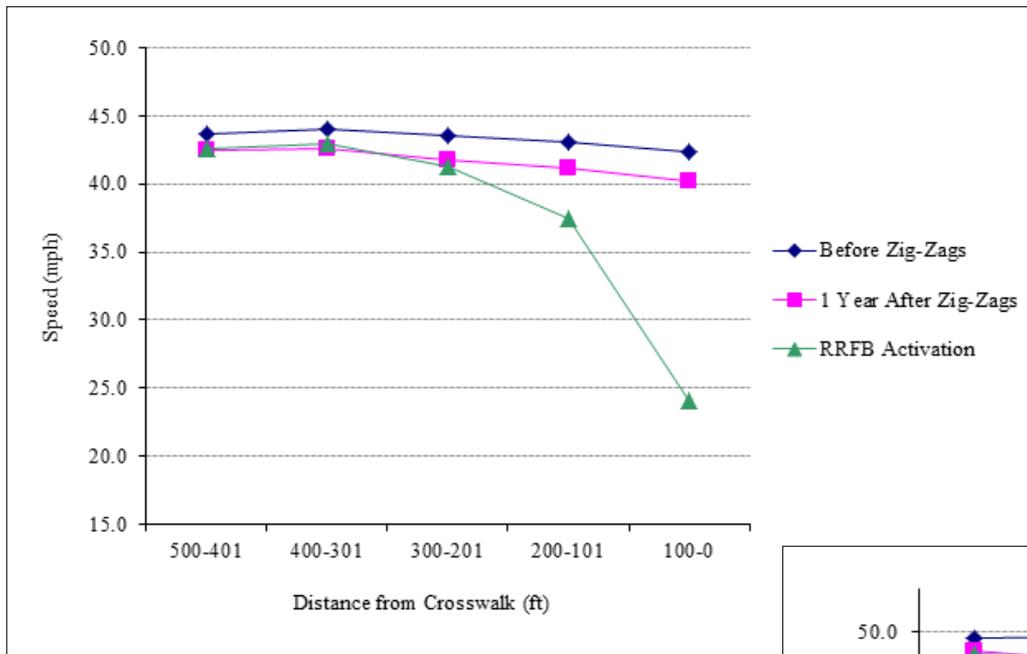
# Results

## 6) Effect of activation/non-activation on immediate yields



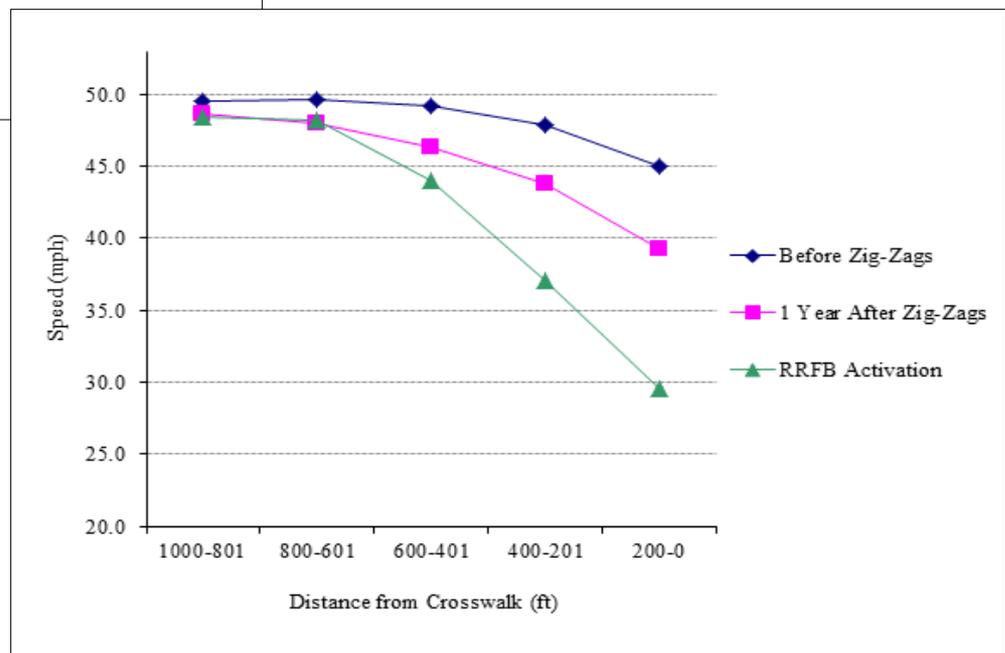
# Vehicle speeds obtained with LIDAR Gun





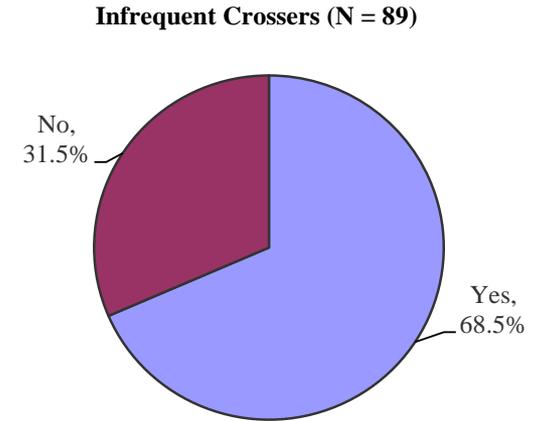
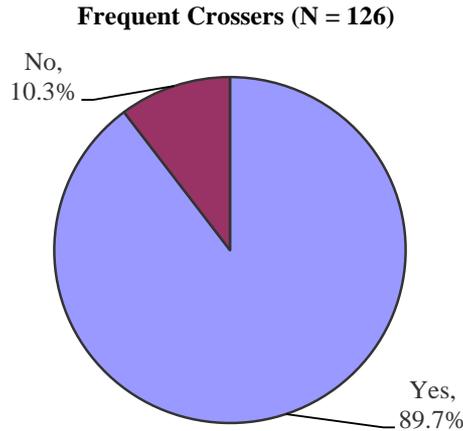
Northbound

Southbound

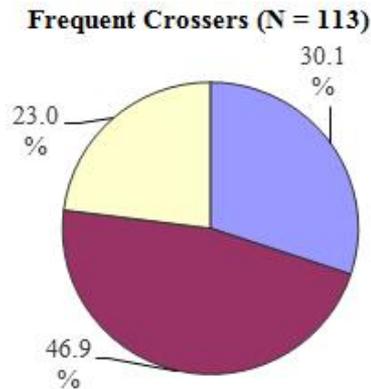


# Results - Survey

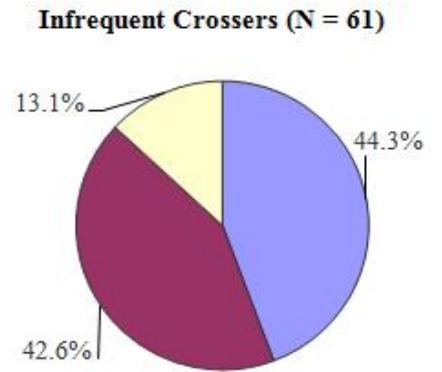
Have you ever activated the flashers?



When do you activate flashers?

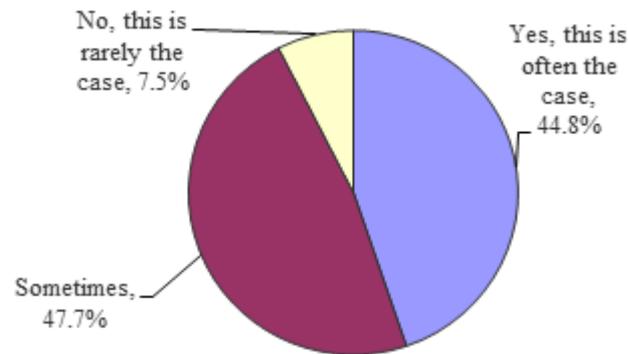


- I activate every time I attempt to cross
- I activate only when traffic is immediately present
- I activate only when the crossing wait times seem excessive due to traffic

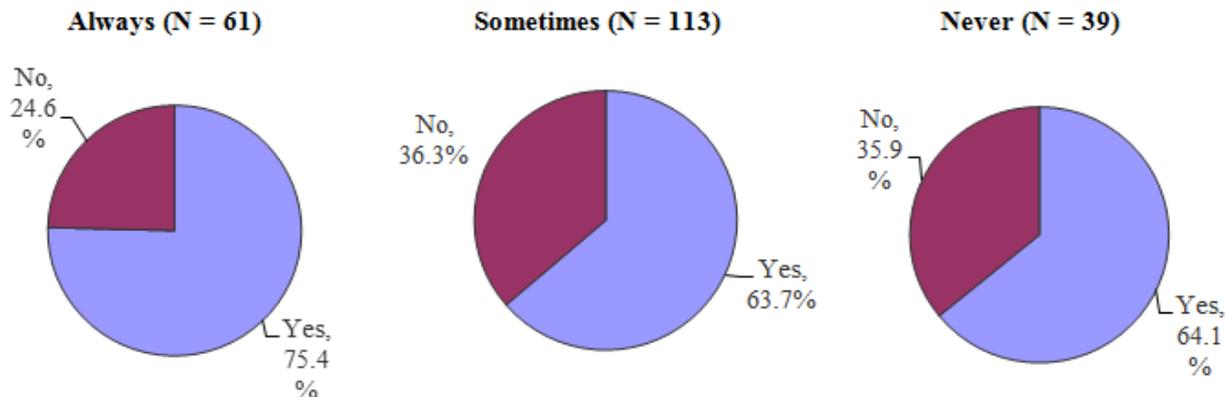


# Results - Survey

When the flashers are activated, do you feel your waiting times to cross have decreased?

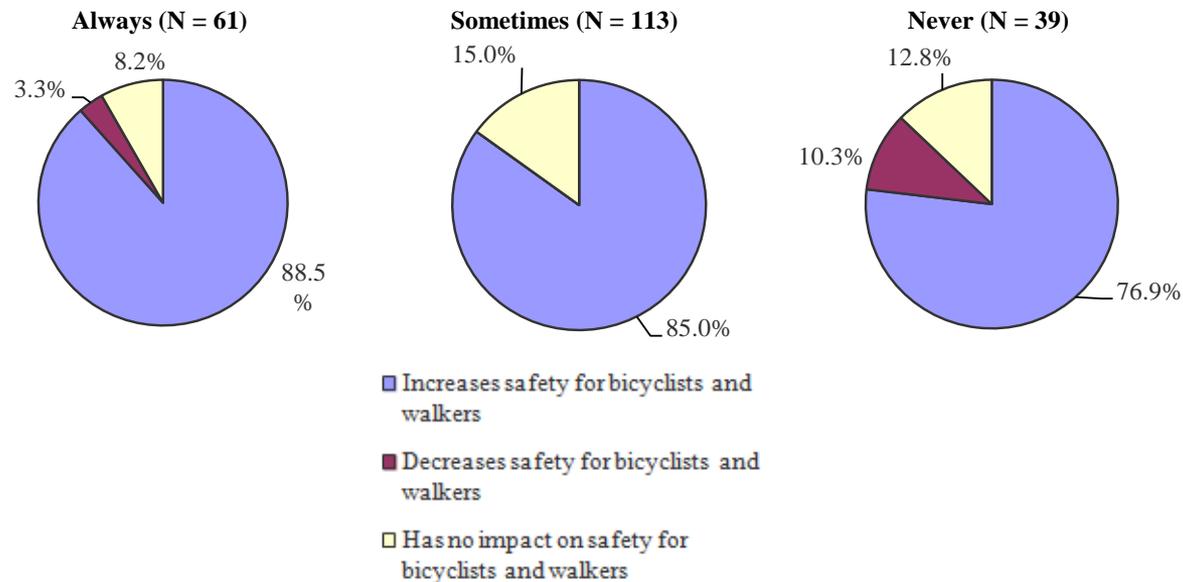


Do you expect motorists to yield when the flashers are activated?



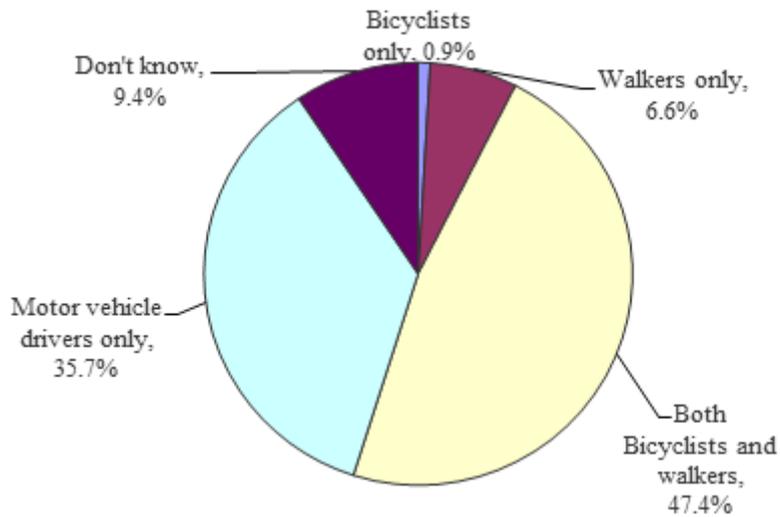
# Results - Survey

Do you feel the flashing beacon system increases, decreases, or has no impact on safety?

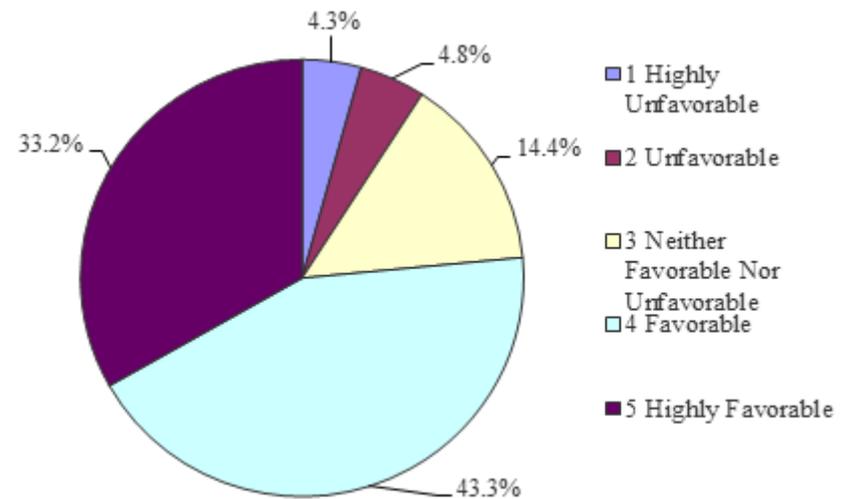


# Results - Survey

## Right of way?



## Overall Opinion?



# Conclusions

- RRFB systems have a positive effect on motorist yield rates.
- The RRFB system installed at Belmont Ridge Road had a positive effect on motorist awareness.
- The RRFB system is perceived by trail users as an enhancement to safety at the BRR crossing.
- Trail user perception of RRFB system benefits grew over time.
- There is a correlation between trail user activation of the RRFB system and the presence of traffic.
- Trail users are confused as to who has the right of way at the crossing location.



# Recommendations

1. With the support of VCTIR, VDOT's TED should develop more specific guidance for RRFB installations.
2. VDOT's TED should update its guidelines for the installation of marked crosswalks to include RRFBs as a Level 4 device.
3. VDOT's Operations Regions should continue to pursue opportunities to install and evaluate RRFB systems.
4. VCTIR should conduct a crash analysis at BRR 3 years after RRFB installation.

