ELECTRIC VEHICLE STUDY
Project Overview

• Purpose:
  • 7 potential intersections for low speed electric vehicle crossings
    • East Fowler Avenue
    • 56th Street

• Other Florida Examples:
  • Dunedin
  • Sun City

• Fowler Avenue Project
Registered Golf Carts

• Current Registrations:
  • Total: 579 from 2013 - 2019
• Registration Clusters:
  • Whiteway Dr/Druid Hills Rd & Gillette Ave
  • Temple Terrace Golf Course
• City following up with survey
Discussed Crossings

A = Temple Heights Rd at 56th St
B = Mission Hills Dr at 56th St
C = Serena Dr/Druid Hills Rd at 56th St
D = Whiteway Dr at 56th St
E = Raintree Blvd at E Fowler Ave
F = Gillette Ave at E Fowler Ave
G = Hillsborough River at E Fowler Ave
H = 122nd Ave at 56th St (Not Shown)
I = 127th Ave at 56th St (Not Shown)
## Crossing Matrix

<table>
<thead>
<tr>
<th>Full Signalized Intersection</th>
<th>Warrant A</th>
<th>Warrant B</th>
<th>Warrant C</th>
<th>Warrant D</th>
<th>Warrant E</th>
<th>Warrant G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temple Heights Rd. at 56th Street</td>
<td>✓*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Mission Hills Dr. at 56th Street</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Serena Dr./Druid Hills Rd. at 56th Street</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Whiteway Dr. at 56th Street</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Raintree Blvd. at E Fowler</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Gillette Ave at E Fowler</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hillsborough River at E. Fowler</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Note: Warrants H and I are considered in design phase and implementation. AADT data was calculated using the standard d and k values based on the FDOT Quality LOS Handbook.

Warrant Criteria from the FDOT Specialized Operational Topics Ch. 5

*Some traffic counts used for Warrant A were conducted in 2011. Updated traffic counts are recommended.

Full Signalized Intersections Criteria

To be considered for a golf cart crossing at a roadway intersection with full signal control, the location along any state road shall meet the following criteria:

**(A)** Side street maximum vehicular volume 1,500 AADT and AM/PM Peak Hour not to exceed 200 vehicles per hour single direction.

**(B)** Side street posted speed limit or 85th percentile intersection approach speed is 35 miles per hour or less.

**(C)** Maximum crossing distance equal to five (5) lanes or less not including any right turn lanes, bike lanes and crosswalks.

**(D)** Side street approaches should have at least one (1) exclusive left turn lane and at least one (1) exclusive through or shared through-right turn lane.

Other lane approach configurations will be considered on case-by-case basis.

**(E)** Side street intersection alignment shall be a 90 degrees (not more than 105 degrees) angle to the mainline tangent. Skewed or offset intersections are not recommended for golf cart crossings.

**(F)** Golf carts shall not use pedestrian crosswalks or sidewalk ramps for the purpose of crossing the mainline state road.

**(G)** Golf cart crossings are not permitted at “T” intersections.

**(H)** For existing signalized “T” intersections, a proposed forth leg approach and receiving lane for the exclusive use of golf cart crossing shall not be permitted.

**(I)** Approach traffic control signs and pavement markings shall be in accordance to MUTCD and Department’s Standard Plans, Index No. 711-001.
Temple Heights Road at 56th Street

Opportunities:
• Utilize right turn lane as a shared bicycle and golf cart lane
• Consider easement on the east of the intersection
  • Permission from Frontier & Church

Constraints:
• Sidewalks are close to the street near 56th street; pavers on sidewalk
• Drainage concerns
• Lack of a pedestrian crossing on the North side
• Eastbound and westbound travel lanes do not have exclusive left turn lanes
• Steeper grades East and West of intersection
• Church owns property on east side
**Main Crash Types for Intersection**
- Angle
- Rear End
- Pedestrian
- Sideswipe

*Crashes not shown are located outside of picture boundary*

---

**Temple Heights Road at 56th Street**

---

**Traffic Counts:**
- **AM Peak Hour 9:00 AM**
  - Eastbound: 143
  - Westbound: 14
- **PM Peak Hour 7:30 PM**
  - Eastbound: 100
  - Westbound: 7

---

**Crash Data (2014 – 2018)**
- Total: 40
- Rear End: 20
- Angle: 6
- Pedestrian: 2
- Sideswipe: 3

---

**Crossing Distance**
- Crosswalk measures about 68 feet on 56th Street
- 2 thru lanes & 1 left turn lane on 56th Street

---

**Missing Warrant**
- Side streets missing exclusive left turn lane & exclusive through or shared right turn lane
Mission Hills Drive at 56th St

Opportunities:
• Good amount of right-of-way and separation of sidewalk

Challenges
• Utility conflicts at the intersection, less space with utility poles
• Westbound travel lanes does not have exclusive left turn lane
Mission Hills Drive at 56th Street

Traffic Counts:
AM Peak Hour 7:00 AM
- Eastbound: 89
- Westbound: 89
PM Peak Hour 5:00 PM
- Eastbound: 88
- Westbound: 68

Crash Data (2014 – 2018)
- Total: 28
- Rear End: 11
- Angle: 7
- Left-Turn: 5

Crossing Distance
- Crosswalk measures about 73 feet on 56th Street
- 2 thru lanes & 1 left-turn lane on 56th Street

Missing Warrant
- Side streets missing exclusive left turn lane & exclusive through or shared right turn lane
Serena Drive/Druid Hills Rd at 56th Street

Opportunities:
• Consider RRFB or HAWK for school crossing, not a golf cart crossing

Challenges:
• Would require a mid-block crossing
  • Crossing hasn’t been warranted in the past
Serena Drive/Druid Hills Road at 56th Street

Main Crash Types for Intersection
- Angle
- Rear End
- Hit Fixed Object
- Pedestrian
- Bike

*Crashes not shown are located outside of picture boundary

Traffic Counts:
- N/A

Crash Data (2014 – 2018)
- Total: 40
- Bike/Pedestrian: 4
- Angle: 20
- Rear End: 7
- Hit-Fixed Object: 4

Crossing Distance
- No traffic signal or marked crosswalk on 56th street
- Crosswalk measures about 72 feet from curb to curb
- 2 thru lanes & 1 left-turn lane in each direction on 56th street
  - 1 right-turn lane North side
Whiteway Dr at 56th Street

Opportunities:
- Decrease turn radii
- Good amount of right-of-way and separation of sidewalk
- Connects Greco Softball Complex
  - Additional coordination with the City of Tampa
- Connects to Temple Terrace Family Recreation

Challenges:
- Buffer decreases between sidewalk and roadway at Holland Ave
- Large turn radii

Traffic Counts:
- AM Peak Hour 9:00 AM
  - Eastbound: 139
  - Westbound: 150
- PM Peak Hour 7:30 PM
  - Eastbound: 148
  - Westbound: 89

Constraints:
- None
Whiteway Drive at 56th Street

Traffic Counts:
- AM Peak Hour 9:00 AM
  - Eastbound: 139
  - Westbound: 150
- PM Peak Hour 7:30 PM
  - Eastbound: 148
  - Westbound: 89

Crash Data (2014 – 2018)
- Total: 83
- Bike/Pedestrian: 5
- Angle: 34
- Rear End: 26
- Left Turn: 6

Crossing Distance
- Crosswalk measures about 144 feet on 56th Street
- 4 thru lanes & 2 turn lanes in each direction on 56th Street

Missing Warrant
- No missing warrants

Main Crash Types for Intersection
- Angle
- Rear End
- Left-Turn
- Pedestrian
- Bike

*Crashes not shown are located outside of picture boundary
122nd Ave. at 56th Street

Crossing Distance
• Crossing is 100 feet on 56th Street
• 4 thru lanes & 2 turn lanes in each direction on 56th Street

Traffic Counts:
Unavailable
*Updated traffic counts needed for full analysis
Main Crash Types for Intersection

- **Angle**
- **Rear End**

*Crashes not shown are located outside of picture boundary

122nd Ave. at 56th Street

Traffic Counts:
Unavailable
*Updated traffic counts needed for full analysis

Crash Data (2014 – 2018)
- Total: 34
- Bike/Pedestrian: 1
- Angle: 20
- Rear End: 4
- Left Turn: 1
127th Ave at 56th Street

Crossing Distance
- Crossing is 100 feet on 56th Street
- 4 thru lanes & 2 turn lanes in each direction on 56th Street

Traffic Counts:
Unavailable
*Updated traffic counts needed for full analysis
Main Crash Types for Intersection

- Angle
- Left-Turn

*Crashes not shown are located outside of picture boundary

**127th Ave at 56th Street**

**Traffic Counts:**
Unavailable

**Crash Data (2014 – 2018)**
- Total: 23
- Bike/Pedestrian: 1
- Angle: 10
- Rear End: 2
- Left Turn: 4

**Crossing Distance**
- Crossing is 100 feet on 56th Street
- 4 thru lanes & 2 turn lanes on 56th Street
122<sup>nd</sup> Ave. and 127<sup>th</sup> Ave. Crossing Matrix

<table>
<thead>
<tr>
<th>Side Street Stop Controlled Intersection</th>
<th>Warrant A</th>
<th>Warrant B</th>
<th>Warrant C</th>
<th>Warrant D</th>
<th>Warrant E</th>
<th>Warrant F</th>
<th>Warrant G</th>
</tr>
</thead>
<tbody>
<tr>
<td>122nd Ave at 56th Street</td>
<td>Count Needed</td>
<td>85th % Speed Study Needed</td>
<td>MET</td>
<td>X</td>
<td>MET</td>
<td>Address During Construction</td>
<td>Address During Construction</td>
</tr>
<tr>
<td>127th Ave at 56th Street</td>
<td>Count Needed</td>
<td>85th % Speed Study Needed</td>
<td>MET</td>
<td>X</td>
<td>MET</td>
<td>Address During Construction</td>
<td>Address During Construction</td>
</tr>
</tbody>
</table>

Side Street Stop Controlled Intersections: To be considered for a golf cart crossing at a roadway intersection with side street stop control, the location along any state road shall meet the following criteria:

- (a) Side street maximum vehicular volume 1,200 ADT and AM/PM Peak Hour not to exceed 110 vehicles per hour single direction.
- (b) Main street posted speed limit or 85th percentile intersection approach speed is 35 miles per hour or less.
- (c) Maximum crossing distance for undivided roadways shall be equal to three (3) lanes or less not including any right turn lanes, bike lanes and crosswalks. For divided roadways of four (4) lanes or less, a minimum of twenty-two (22) feet median width is required. See Figure 5.1-4.
- (d) Side street approaches should have an exclusive left turn lane and a shared through-right turn lane. Other lane approach configurations will be considered on case-by-case basis.
- (e) Side street intersection alignment shall be a 90 degrees (not more than 105 degrees) angle to the mainline tangent. Skewed or offset intersections are not recommended for golf cart crossings.
- (f) Approach stop signs and pavement markings shall be in accordance with MUTCD and Department’s Standard Plans, Index No.711-001.
- (g) Golf Cart signs (W11-11) should be placed on the mainline approach as shown in Figure 5.1-3 and Figure 5.1-4.
Raintree Blvd and East Fowler Ave

Opportunities:
• Close to several commercial options at E Fowler Ave & 56th Street
• Potential to decrease posted speed
• Good connection to Linwood Park
  • Address missing sidewalks
• Mix golf carts with traffic (on Raintree Blvd)
  • Bicycle lane/shoulder along Raintree Blvd
  • 62nd Street – narrow sidewalks & West side gaps

Challenges:
• Discuss with FDOT ability to run golf carts on sidewalks for approximately 120’
  • Wider multi-use path to accommodate
• No crossings on west side
• AM Peak Hour exceeds 200 vehicles per hour
• Golf Cart crossings not permitted at “T” intersections
• Crossing exceeds more than 5 lanes of traffic
Raintree Blvd and East Fowler Ave

Main Crash Types for Intersection

- Angle
- Rear End
- Bike
- Sideswipe

*Crashes not shown are located outside of picture boundary

Traffic Counts:

- AM Peak Hour 7:00 AM
  - Southbound: 256
- PM Peak Hour 4:30 PM
  - Southbound: 137

Crossing Distance

- Crosswalk measures about 137 feet across E Fowler Ave
- 4 lanes East and 5 lanes West on E Fowler Ave

Crash Data (2014 – 2018)

- Total: 67
- Bike/Pedestrian: 1
- Rear End: 39
- Sideswipe: 6
- Angle: 7

Missing Warrant

- AM/PM Peak Hour exceeds 200 vehicle per hour in Southbound direction.
- Maximum total crossing distance is greater than 5 lanes
Gillette Ave and East Fowler Ave

Opportunities:
• Consider wide sidewalks on both sides of Gillette
• Potential to decrease posted speed
• Wider crossings along Fowler
  • Extend nose on eastern side of intersection

Challenges:
• Have to cross a 6 lane state roadway
• Southbound traffic does not have exclusive left turn lane
• Crossing exceeds more than 5 lanes of traffic
• Sidewalks don’t meet the 8 foot minimum FDOT requirement
  • Narrow on the west side with columns (3’2”)
  • Slight buffer between the street and sidewalk (3’6”)

LOOKING NORTH
### Main Crash Types for Intersection
- Angle
- Rear End
- Hit Fixed Object
- Pedestrian
- Left-Turn

*Crashes not shown are located outside of picture boundary*

---

**Gillette Ave and East Fowler Ave**

---

**Traffic Counts:**

- **AM Peak Hour 7:00 AM**
  - Northbound: 192
  - Southbound: 36
- **PM Peak Hour 5:00 PM**
  - Northbound: 142
  - Southbound: 30

---

**Crossing Distance**

- Crosswalk measures about 118 feet across E Fowler Ave
- 4 lanes East and 4 lanes West on E Fowler Ave

---

**Crash Data (2014 – 2018)**

- Total: 51
- Rear End: 35
- Angle: 5

---

**Missing Warrant**

- Maximum total crossing distance is greater than 5 lanes
- Northbound side street missing exclusive left turn lane & exclusive through or shared right turn lane
Hillsborough River at Fowler Avenue

Opportunities:
- Connection to 114th Avenue
- Connection to Riverhills Drive
- Potential to decrease posted speed
- Potential underpass underneath Fowler
  - No crossings needed
  - No intersection AADT requirement

Traffic Counts:
- AM Peak Hour 7:00 AM
  - Northbound: 455
  - Southbound: 388
- PM Peak Hour 5:00 PM
  - Northbound: 584
  - Southbound: 353

Challenges:
- Coordination with the County
- Running golf carts on Gail Drive
- Riverhills Drive Connection
- Analyze feasibility of path underneath bridge
  - Grade to the south of the bridge

Missing Warrant
- AM/PM Peak Hour traffic counts exceed 200 vehicles per hour.
- Maximum total crossing distance is greater than 5 lanes
April FDOT Meeting Recap

Overall Comments:
• Review additional demand data
• City responsibility for all intersection improvements
• All registered golf carts must have a turn signal
• Hillsborough County will need to change its ordinances to allow golf carts on County Roads
• ‘After’ safety study takes place 1 year after installation of improvements.

56th Street Overall Comments:
• FDOT to review signal timing plans
• Will need standard golf cart crossing signs on the side streets only
• Propose 1 recommended 56th street crossing proposal be sent to FDOT

Fowler Avenue Overall Comments:
• More challenging to cross intersection with golf carts
• Reference the Traffic Engineering Manual for all location crossings
• FDOT would prefer a different crossing location than Raintree Boulevard
Next Steps

• Origin/destination survey
• Prepare a proposal/concept for 1 crossing on 56\textsuperscript{th} Street
• Coordinate with Hillsborough County on an Ordinance change to allow golf cart crossings (if using Hillsborough County jurisdiction roadways)
• Coordinate with FDOT on additional required City funded facilities