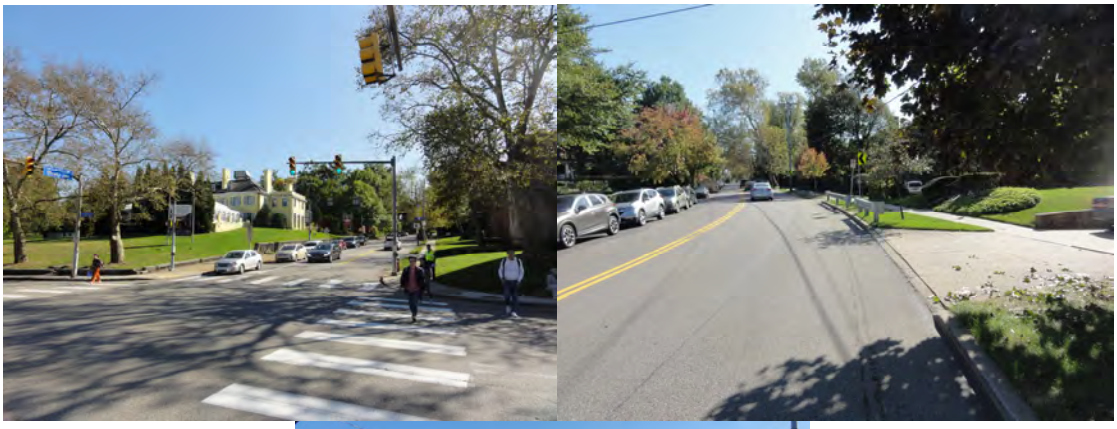
Southwestern Pennsylvania Commission
Shady Avenue from Penn Avenue to Monitor Street
Road Safety Audit



Shady Avenue from Penn Avenue to Monitor Street
Allegheny County
City of Pittsburgh

Road Safety Audit Conducted October 2019

Southwestern Pennsylvania Commission

2019

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Shady Avenue from Penn Avenue to Monitor Street Road Safety Audit

Shady Avenue from Penn Avenue
to Monitor Street

City of Pittsburgh

Allegheny County

October 2019

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In accordance with PA Consolidated Statutes Title 75-Vehicles (Vehicle Code) Section 3754 and 23U.S.C. Section 409, this safety study is confidential and is only provided to official agencies with official duties/responsibilities in the project development.

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- **RSA Guidelines**
- **Maps**
- **Traffic Data**
- **Previous Studies**
- **Prompt Lists**

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1. BACKGROUND

A Road Safety Audit (RSA) is a formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users. The aim of an RSA is to answer the following questions:

- What elements of the road may present a safety concern: to what extent, to which road users, and under what circumstances?
- What opportunities exist to eliminate or mitigate identified safety concerns?

SPC's Long Range Plan, *SmartMoves for a Changing Region* includes the regional goal of having a "world class, safe, and well maintained integrated transportation system that provides mobility for all." This plan also emphasizes that the region must continue to focus on a Vision Zero safety goal for all transportation users. SPC's Road Safety Audit program advances this policy goal as a proactive process that provides prioritized suggestions that can be implemented in stages as time and resources permit. As a service to its Planning Partners, the Southwestern Pennsylvania Commission (SPC) has developed an RSA program as part of its Transportation Operations & Safety planning efforts. The methodology for this program is summarized below and is based on the 8-step RSA process developed by the Federal Highway Administration.

This document represents the final report for the Road Safety Audit conducted along the Shady Avenue corridor from Penn Avenue to Monitor Street in the City of Pittsburgh, in Allegheny County, on October 15-18, 2019.

2. AUDIT PROCESS

The standard steps involved in a Road Safety Audit are:

1) Identify the Project

Candidates for Road Safety Audits are submitted to SPC by local municipalities, Counties, and PennDOT Districts. Candidates may include projects that are already in the design stage or may be in-service roads where safety is a concern. SPC reviews RSA candidate proposals and proceeds with setting up RSA's as resources allow. Roadway owners must commit to documenting a formal response (see Step 7) prior to initiation of an RSA.

2) Select the RSA Team

SPC works with the roadway owner(s) to identify potential members for the independent, multi-disciplinary team. RSA teams typically consist of 5-7 members, with outside specialists consulted as needed. Team make-up typically includes 1-2 consultant

members, 2-3 SPC staff, and 1-2 PennDOT staff (usually from outside the District where the project is located).

3) Conduct a Start-up Meeting

The RSA team conducts a start-up meeting with the roadway owner(s) in order to identify the steps to be taken, review the schedule, and discuss any opportunities and/or constraints identified by the roadway owner(s). This is also the time for the roadway owner(s) to share any background information with the RSA team. Desirable information to be provided to the RSA team includes anecdotal crash history such as first responder experiences, potential changes in land use or travel patterns in the project area, public sentiment regarding the study location, and any known constraints.

4) Perform Field Reviews

The RSA team reviews the information provided by the roadway owner(s) and conducts multiple field views of the site (typically during AM and PM peak hours, an off-peak hour, and at night in order to see the site under different conditions). The RSA team drives and walks the site in order to identify geometric, operational, roadway user/human factors, and environmental issues.

5) Conduct RSA Analysis

Based on its field views, the information provided, consultation with specialists (if needed), and research into applicable design guidelines, the RSA team identifies and prioritizes safety issues within the project area and develops suggestions for enhancing safety.

6) Present RSA Findings to Roadway Owner

Once the RSA team has completed its analysis, it presents the findings to the roadway owner(s) in two phases:

- Preliminary Presentation – The RSA team conducts a meeting with the roadway owner(s) and presents its findings. This meeting is an opportunity to constructively discuss the issues and suggestions identified, and for the roadway owner(s) to provide feedback.
- Written Report – Following the preliminary presentation, the RSA team prepares a written report, incorporating roadway owner feedback as appropriate.

7) Prepare Formal Response

Upon receipt and review of the written report, the roadway owner(s) prepare a formal response (to the project file) documenting plans to address identified issues and reasons for not addressing other issues.

8) Incorporate Findings

The roadway owner(s) implements improvements as outlined in the formal response.

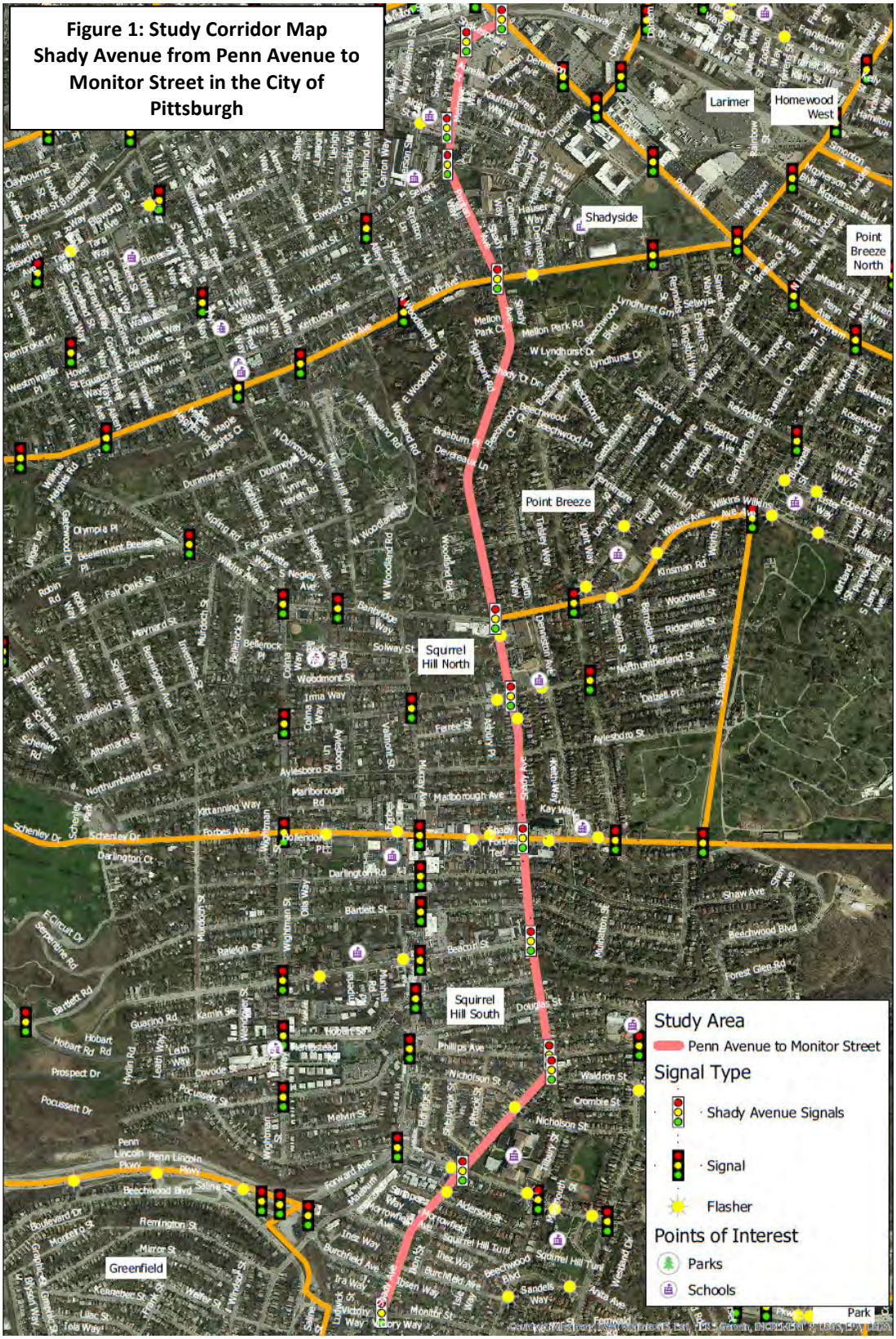
3. AUDIT PROGRAM

Roadway Owner Agency	Roadway Owner Representatives	
City of Pittsburgh	Amanda Purcell	City Traffic Engineer
	Katy Sawyer	Staff Engineer

RSA Team Members	Agency	Role
Leann Chaney, AICP	Southwestern PA Commission	Active Transportation Planner
Kensey Craig	French Engineering	Transportation Engineer
Domenic D'Andrea, PE, PTOE	Southwestern PA Commission	Manager Operations and Safety
Brad DiCola, P.E., PTOE	Gannett Fleming	Senior Engineer
Steven Palmer, P.E.	Gannett Fleming	Senior Engineer
Bill Rankin	PennDOT District 10-0	Safety Engineer
Evan Schoss	Southwestern PA Commission	Transportation Planner
Joshua Spano	Southwestern PA Commission	Transportation Planner

Schedule	Date and Time	Location
Start-up Meeting	Tuesday, October 15, 2019, 10:00 am	Carnegie Library of Pittsburgh, East Liberty
Key Person Interviews	Tuesday, October 15, 2019, 11:00 am	
Field Views	Tuesday, October 15, 2019, 12:00 pm – 4:30 pm Wednesday, October 16, 2019, 5:00 am – 4:30 pm Thursday, October 17, 2019, 6:00 am – 10:00 am	Shady Avenue
Preliminary Presentation	Friday, October 18, 2019, 2:30 pm	Carnegie Library of Pittsburgh, East Liberty

Figure 1: Study Corridor Map
Shady Avenue from Penn Avenue to Monitor Street in the City of Pittsburgh



Key Person Interviews	Agency/Affiliation
Amanda Purcell	City of Pittsburgh
Katy Sawyer	City of Pittsburgh
Caroline West	Franklin West
Holly Rubinoff	Franklin West
Todd Derr	Bike/Ped Advocate
Peter Rubinsky	Shadyside
Megan Patton	Pittsburgh Public Schools
Jerry Potts	The Children's Institute
Anna Tang	BikePGH
Jonathan Jensen	Calvary Episcopal Church
Alan Hausman	City of Pittsburgh/Tree of Life
Commander Dan Herrmann	Pittsburgh Police
Cindy Tilson	Citizen
Lynda Wrenn	Pittsburgh Public Schools
Rich Feder	Squirrel Hill Urban Coalition

4. OVERVIEW OF THE STUDY AREA

As shown in Figure 1, the study area for this RSA consists of Shady Avenue between Penn Avenue and Monitor Street in the City of Pittsburgh. The corridor varies in land use from its northern to southern limits. The northern end has a shopping center with primary access from an intersection with Shady Avenue. South of this point, multiple churches, synagogues, schools, and smaller commercial businesses as well as small restaurants are located along the corridor. The entire corridor is also high density residential, with many houses being older and larger in size. It should be noted that there are major schools and children services facilities on or in close proximity to Shady Avenue including:

- Sacred Heart Elementary School
- Depaul School for Hearing and Speech
- Pittsburgh Linden K-5
- The Children's Institute
- Yeshiva School
- Beth Shalom Early Learning Center; and
- Taylor Allderdice High School

The land is fully developed, however there are plans to replace the shopping center at the northern end of the corridor with a mix of apartment buildings and commercial buildings.

Shady Avenue is an urban roadway with one lane per direction. Sidewalks are present along both sides of the roadway along the length of the corridor. Due to the presence of the East Busway stop near the intersection of Shady Avenue and Penn Avenue, there is an increased amount of pedestrian activity at the northern part of the corridor due to the proximity of the stop. On-street parking is allowed along the majority of the corridor. Per PennDOT traffic data, the AADT volume along the roadway bidirectionally varies between 11,000 and 15,000 vehicles per day. The posted speed limit is 25 mph throughout this section of the corridor. Primary intersections use a mix of all-way stop control and signal control. There are many unsignalized intersections with smaller side streets as well.

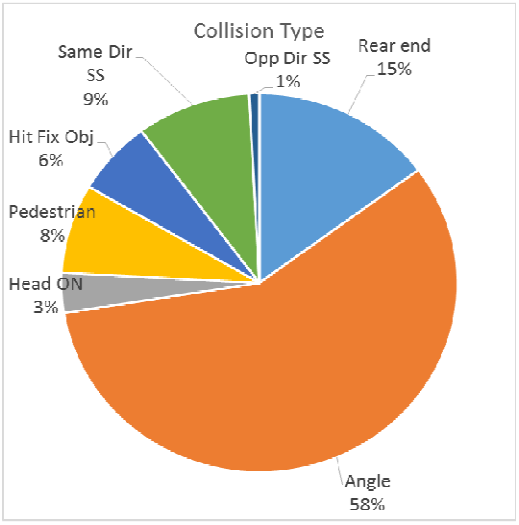
This RSA considers the long-term needs to create a sustainable, livable community while providing short-term suggestions to improve safety and mobility for all users within the study area. This study focuses specifically on safety improvements along the Shady Avenue corridor.

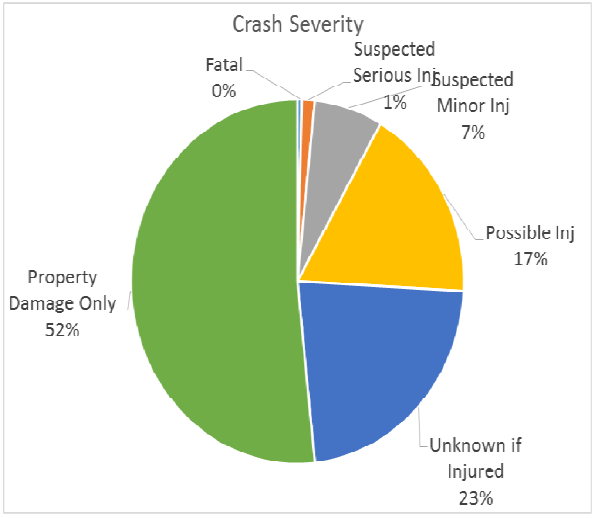
5. SAFETY HISTORY

For this study, reportable crash data was compiled using PennDOT's Public Crash Information Tool (PCIT). Reportable crashes are those that result in an injury or fatality, or where a vehicle is required to be towed from the scene. There were a total of 149 reportable crashes within the study area occurring during the 5-year period for calendar years 2013 to 2017. Specifically, 240 crashes occurred within the Shady Avenue corridor. The crash information was compiled by SPC staff.

Based on this information, the major intersections within the corridor experienced crashes as follows:

- Shady Avenue between Penn Avenue and Fifth Avenue experienced 83 of the 240 crashes.
- The intersection with 5th Avenue experienced 50 crashes.
- The section between 5th Avenue and Wilkins Avenue experienced 29 crashes.
- The intersection with Wilkins Avenue experienced 12 crashes.
- The section between Wilkins Avenue and Forbes Avenue experienced 35 crashes.
- The intersection with Forbes Avenue experienced 5 crashes.
- The section between Forbes Avenue and Phillips Avenue experienced 42 crashes.
- The section between Phillips Avenue and Monitor Street experienced 45 crashes.
- Of all crashes, 58 percent were angle style, 15 percent were rear-end, 9 percent were same direction sideswipe, 8 percent were pedestrian, and 6 percent were hit fixed object.
- There was one fatality during the five-year reporting period.





For the 240 crashes reported for the corridor, 136 were angle crashes; 35 were rear end crashes; 15 were hit fixed object, 22 were same direction sideswipe, 2 were opposite direction sideswipes, 8 were head-on, and 18 involved pedestrians. The most common crash severity resulted in property damage only, there were 124 crashes in this category. A total of 19 crashes resulted in injury; three resulted in major injuries, and one resulted in a fatality.

6. AUDIT FINDINGS

The following pages summarize the findings of the RSA team.

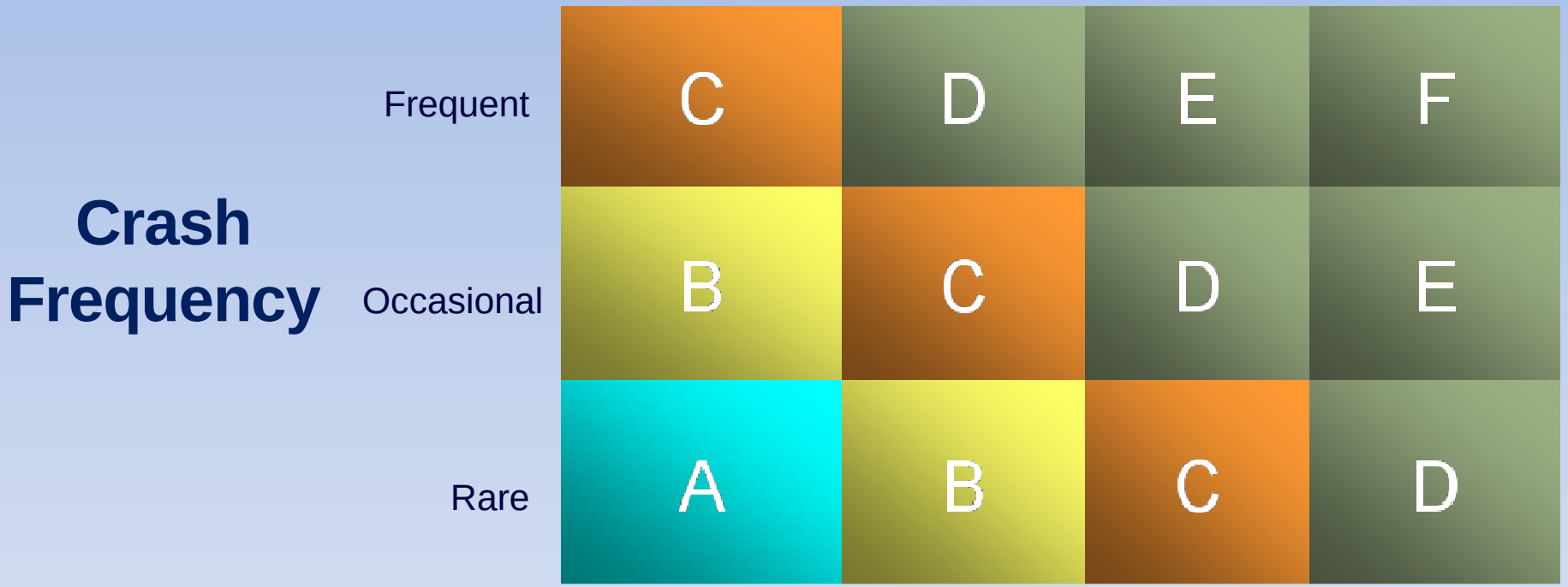
It should be noted that SPC developed a wikimap web tool that allowed corridor stakeholders and others to click and map their safety concerns along the corridor. SPC received over 240 comments on the wikimap. This feedback was considered when developing the audit suggestions. In addition, the City of Pittsburgh led two public meetings to discuss safety along this corridor. The feedback received at these meetings were also entered into the wikimap web tool.

Safety Successes

- Effective use of crossing guards / police in school zones
- Exclusive Pedestrian Phasing at Forbes Avenue
- Some Lead Pedestrian Interval (LPI)
- Continuous sidewalk on both sides of road along corridor
- Some Detectable Warning Surfaces
- Some high visibility crosswalks, bike markings
- Corridor lighting

Figure 2: Safety Successes

Evaluating Risk to Prioritize Safety Issues



RISK CATEGORY

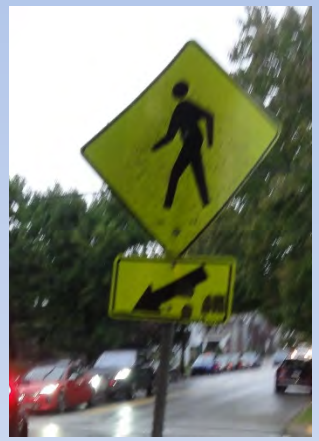
A = Lowest priority

F = Highest priority

Figure 3: Risk Rating Matrix

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Low	Moderate	C

OBSERVATIONS: Some signs in the corridor have been damaged, defaced, or are faded. Some stop signs are undersized. Many use the obsolete Type I retroreflective sheeting. Many signs are blocked by vegetation or other obstructions.



Damaged sign

Small STOP sign

Incorrectly mounted

Type I Sheeting

Obstructed Hidden Driveway Signing

SUGGESTIONS:

- Replace damaged, defaced and faded signs with new retroreflective signs.
- Replace undersized 24” by 24” STOP signs with 30” by 30” signs.
- Trim vegetation near signs.
- Utilize a separate support for each sign, ensure that nothing is blocking line of sight to signs.

Figure 4: Corridorwide: Signing

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Rare	Low	Moderate-Low	B

OBSERVATIONS: On street parking spaces are not defined. Speeding was observed in parts of the corridor where parking was not defined.

SUGGESTION:

- Consider striping parking spaces to help define parking to calm traffic.

Figure 5: Corridorwide: On-Street Parking

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Frequent	Medium	High	F

OBSERVATION: There are numerous fixed objects in close proximity to the roadway, including utility poles, trees, old poles, and posts.

Dead tree near Howe

Leaning tree near Mellon Park

SUGGESTIONS:

- Review corridor to identify potential hazards and have them removed or vegetation trimmed.
- Remove unnecessary roadside fixed objects.
- Use a 4" yellow flexible, high-intensity grade tape to wrap poles and trees.
- Use tubular delineators for other fixed objects.

Figure 6: Corridorwide: Fixed Objects

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Rare	Medium	Moderate	C

OBSERVATIONS: Some of the drainage inlets through the corridor are blocked by debris. Storm water is being diverted back into the roadway. Several of the inlet grates are not bicycle safe. The inlet on the corner at Allderdice H.S. is blocked causing the storm water to pond at the intersection of Shady Avenue and Forward Avenue.

SUGGESTIONS:

- Clean the debris from the inlets.
- Add bicycle safe inlets where needed.

Figure 7: Corridorwide: Drainage Maintenance

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Low	Moderate-Low	B

OBSERVATIONS: The sidewalk network is complete, but many sections of sidewalk along the corridor are in poor condition. Distress includes fractured concrete, surface wear, tree root upheaval, and other uneven surfaces. In addition to the examples shown below, poor sidewalk conditions were also noted at Aurelia Street, Wilkins Avenue and several other locations along the corridor.

Near Solway Street

Approaching Pittock Street

South of Nicholson Street

SUGGESTION:

- Repair or replace damaged sections of sidewalks and bring sidewalks up to ADA compliance.

Figure 8: Corridorwide: Sidewalks

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATIONS: It was observed and mentioned in the stakeholder interviews that drivers were not stopping when school buses were dropping students off. Homes, trees, and parked cars may obstruct the visibility of school bus stop locations.

SUGGESTIONS:

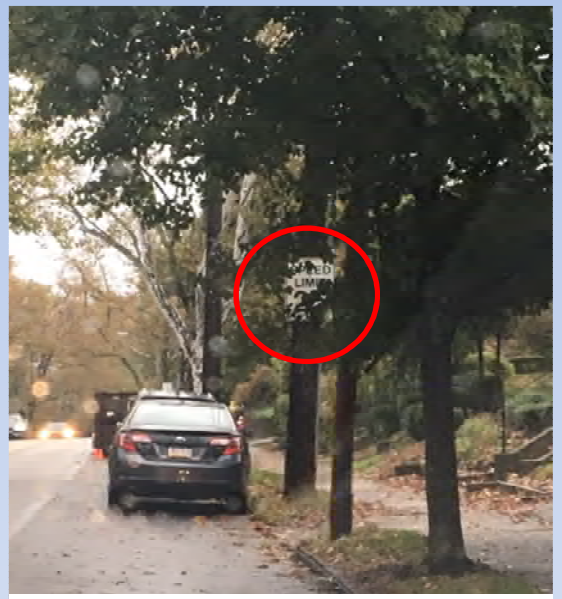
- Perform driver education campaigns.
- Work with school bus drivers to drop students off in more visible non-intersection locations.

Figure 9: Corridorwide: School Bus Stops

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATIONS: There are 17 speed limit signs southbound and 11 northbound and all are posted at 25 mph. The majority of the signs are in good condition with sufficient retro reflectivity. However, several signs are obstructed by overgrown vegetation. Speeding was observed and was mentioned in the stakeholder interviews.

SB at Sellers Street



NB at Hastings Street

SUGGESTIONS:

- Trim vegetation around regulatory signs.
- Relocate speed limit signs if trimming vegetation is not an option.
- Add speed limit pavement markings.
- Increase speed enforcement throughout the corridor.

Figure 10: Corridorwide: Existing Speed Limit Signing

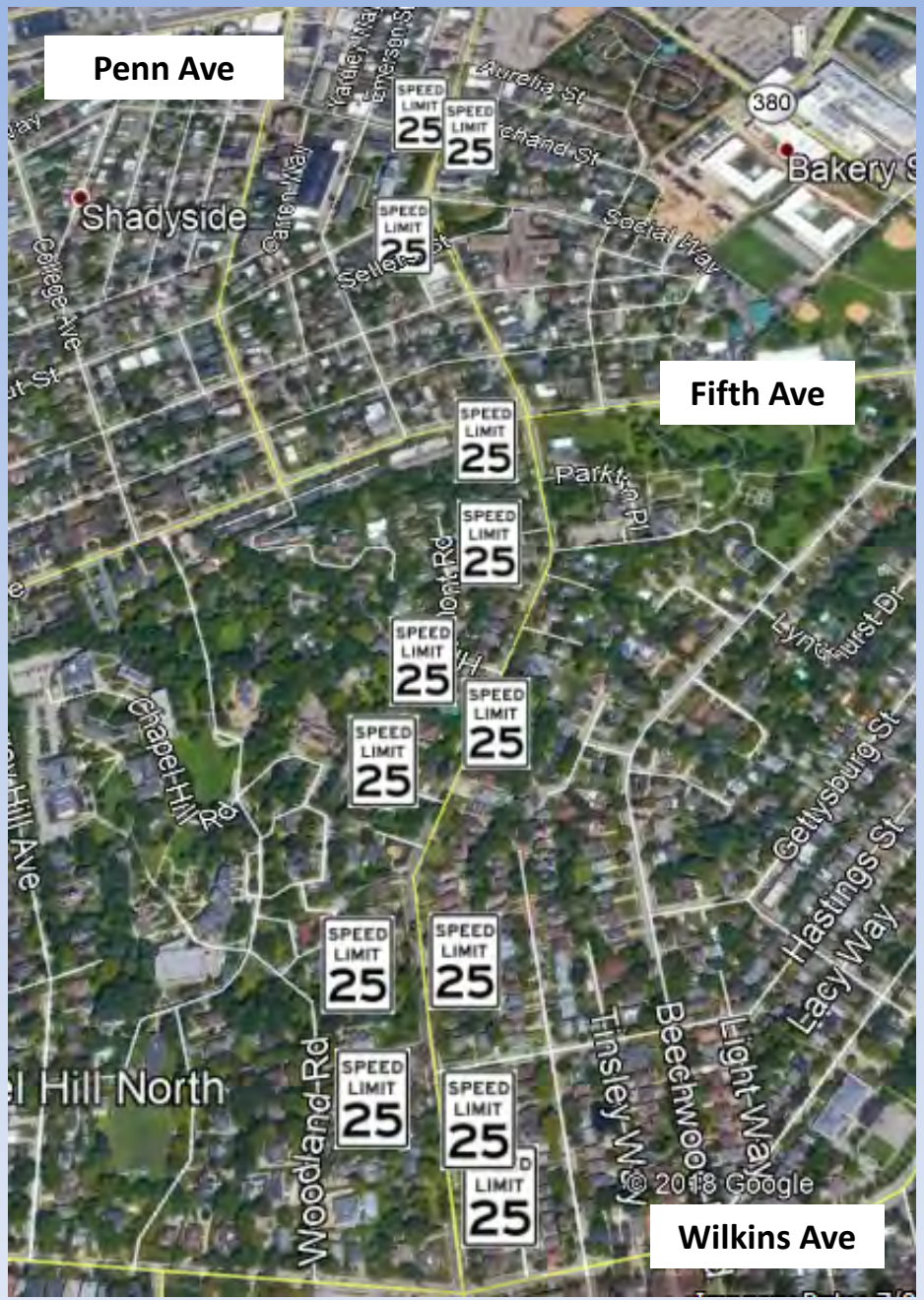
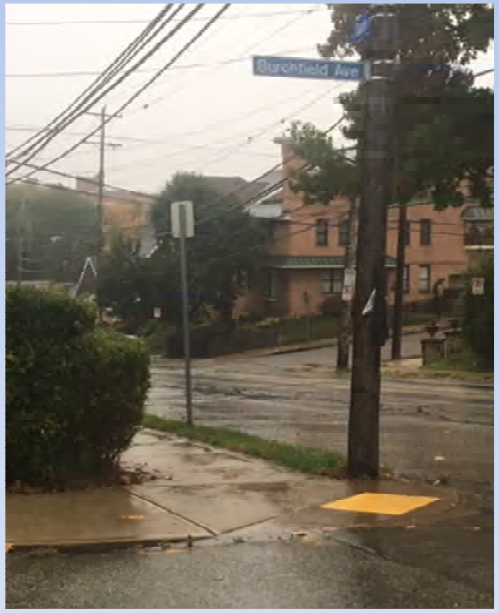
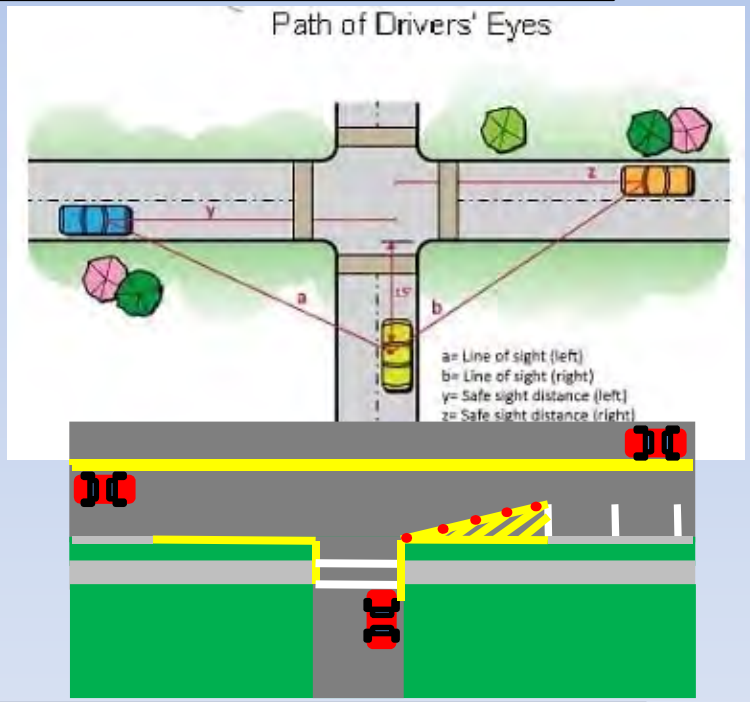


Figure 11: Corridorwide: Existing Speed Limit Signing (Continued)

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Frequent	Medium	High	E

OBSERVATIONS: Parking, trees, landscaping, and signs infringe upon the driver's sight cone at the following unsignalized intersections: Marchand Street, Alder Street, Sellers Street, Howe Street, Kentucky Avenue, Mellon Park Road, Parkton Place, Highmont Road, Braeburn Place, Devereaux Lane, Hastings Street, Marlborough Road, Darlington Road, Bartlett Street, Hobart Road, Douglas Street, Nicholson Street, Pittock Street, Sherbrook Street, Alderson Street, Burchfield Avenue. These parked vehicles also block bus stops.





SUGGESTIONS:

- Remove or relocate trees, landscaping, and signs out of the drivers sight cone.
- Restrict parking inside the drivers sight cone and enforce parking restrictions.

Figure 12: Corridorwide: Intersection Sight Distance

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D
OBSERVATIONS: Signage is not consistent for the unsignalized marked pedestrian crossings. Many lack advance signage.			

Bartlett Street example

Figure 13: Corridorwide: Unsignalized Crossings

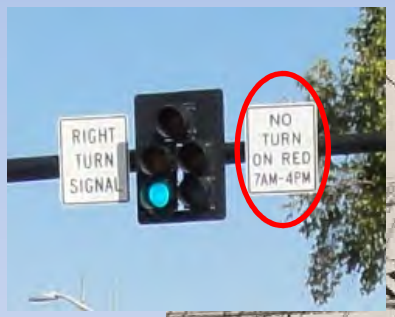
SUGGESTIONS:

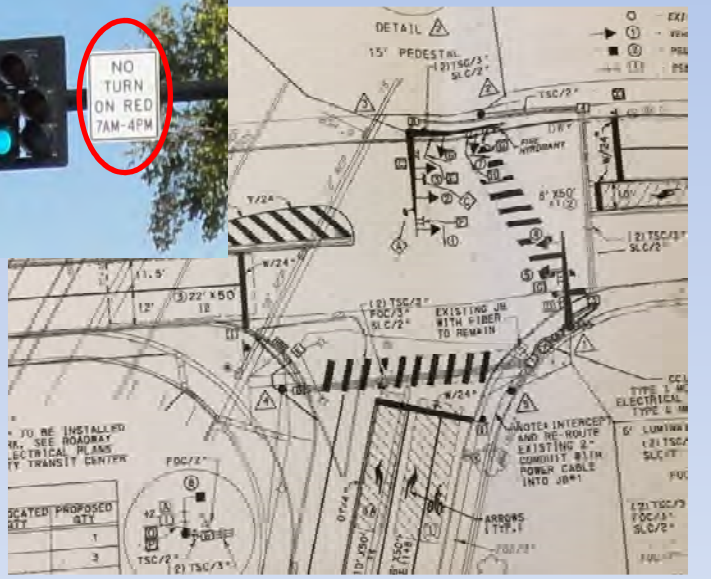
- Consider consistent signage for these marked crosswalks that includes advance signage prior to the crosswalk.
- Consider solar powered LED pedestrian signs.

Figure 14: Corridorwide: Unsignalized Crossings (Continued)

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Low	Moderate	C

OBSERVATIONS: The crosswalk spanning the east leg is at a significant skew, the pedestrian phase crossing Shady appears to come up every cycle, the timings do not seem effective, the crosswalk spanning Penn is not a high visibility style, the NO TURN ON RED restriction is in effect from 7:00 am to 4:00 pm but is violated frequently.





SUGGESTIONS:

- Reduce the skew for crosswalk spanning Penn Avenue closer to the intersection by moving the ramp in the southeast quadrant, and upgrade to piano key style crosswalk (per the signal permit).
- Verify that the pedestrian pushbuttons for crossing Shady Avenue are functioning correctly.
- Optimize intersection timings, implement a LPI interval.
- Provide a consistent NTOR restriction for the corridor (7:00 am to 10:00 pm).

Figure 15: Location Specific: Shady Avenue and Penn Avenue

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Low	Moderate	C
OBSERVATION: Pedestrians are crossing midblock from the East Busway towards the shopping center.			

SUGGESTIONS:

- Short term: Install signing to encourage pedestrians to cross at established crosswalks.
- Long term: Install railing along this section of Shady Avenue to channelize pedestrians to established crossings.

Figure 16: Location Specific: Shady Avenue between Penn Avenue and Ellsworth Avenue

Figure 17: Location Specific: Shady Avenue between Penn Avenue and Ellsworth Avenue (Continued)

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATIONS: Giant Eagle driveway is wide and not pedestrian friendly. There are no pedestrian signals. Crosswalk markings are outdated. Drivers may have difficulty seeing the northbound signals.

Figure 18: Location Specific: Shady Avenue and Ellsworth Avenue

Figure 19: Location Specific: Shady Avenue and Ellsworth Avenue (Continued)

SUGGESTIONS:

- Redesign development driveway for a more traditional pedestrian crossing.
- Install pedestrian countdown signals and high visibility crosswalks.
- For the northbound approach, install a SIGNAL AHEAD sign, install 12 inch supplemental signal head and backplates on all signals.
- Consider NO TURN ON RED restriction for all approaches.

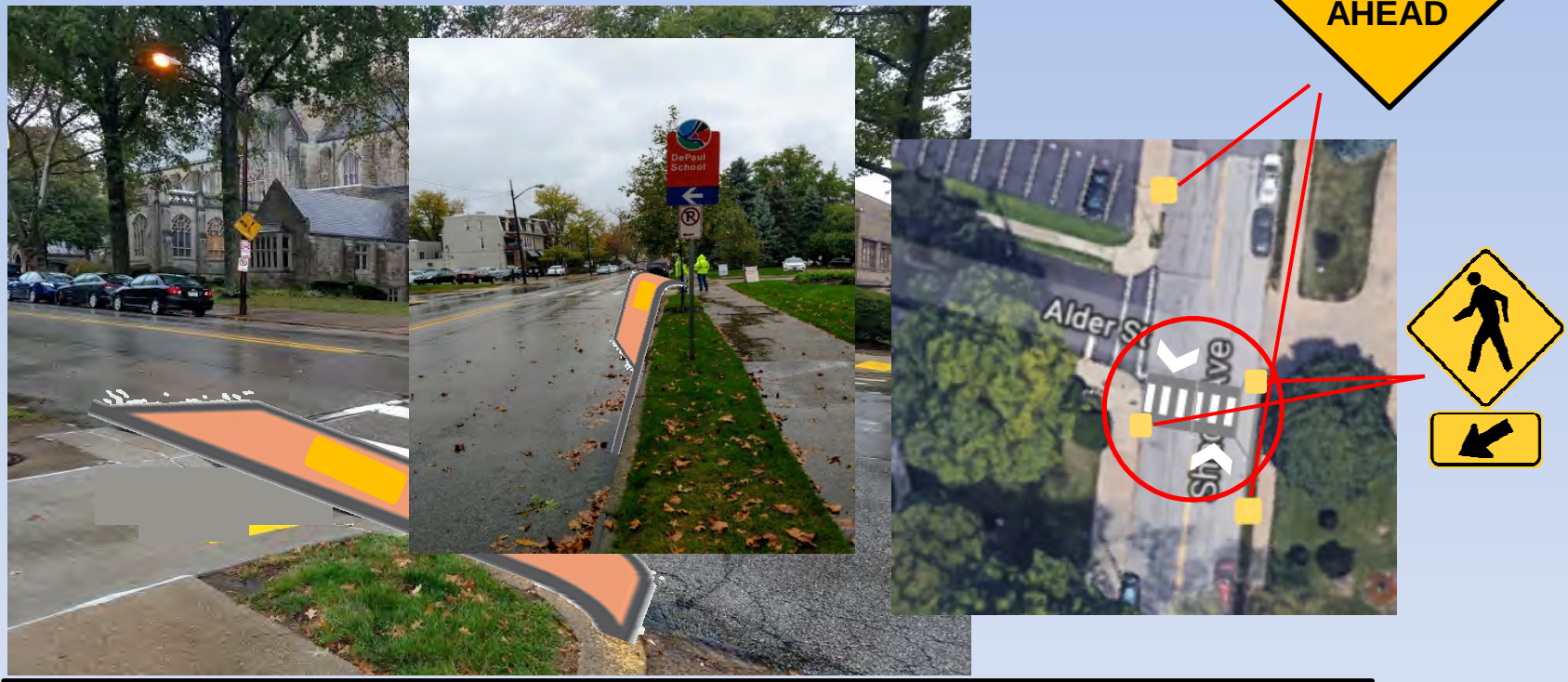
CONSIDERATIONS:

- Increased pedestrian traffic with future development.
- Truck turning requirements.

Figure 20: Location Specific: Shady Avenue and Ellsworth Avenue (Continued)

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATIONS: Several pedestrian generators are located at this intersection and a high level of pedestrian activity was observed. No controlled stop locations exist between Ellsworth Avenue and Walnut Street.



SUGGESTIONS:

- Install advance warning signing for crosswalk.
- Construct curb extension on Calvary Episcopal Church side of Shady Avenue.
- Evaluate potential installation of a raised crosswalk.

Figure 21: Location Specific: Shady Avenue and Alder Street

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Low	Moderate	C
OBSERVATIONS: The traffic signal installation at Walnut Street is outdated. NO TURN ON RED restrictions are not consistent with other intersections. Signs need replaced and moved.			

SUGGESTIONS:

- Install traffic signal equipment upgrades to include audible traffic signals.
- Replace NO TURN ON RED signing and consider using a consistent message corridorwide.
- Consider installing high visibility crosswalks and broken yellow extension markings.
- Remove the “Y” symbol sign (W2-5).
- Move the chevrons to their own sign posts.

Figure 22: Location Specific: Shady Avenue and Walnut Street

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATION: There is limited sight distance on side street approaches, no indications where the intersection is, and vehicles were observed traveling over the posted speed in the area.

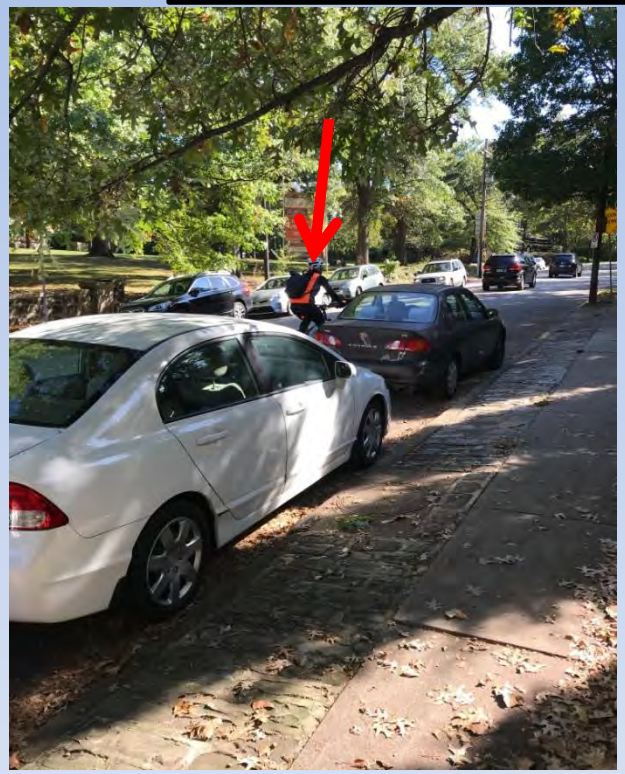
SUGGESTIONS:

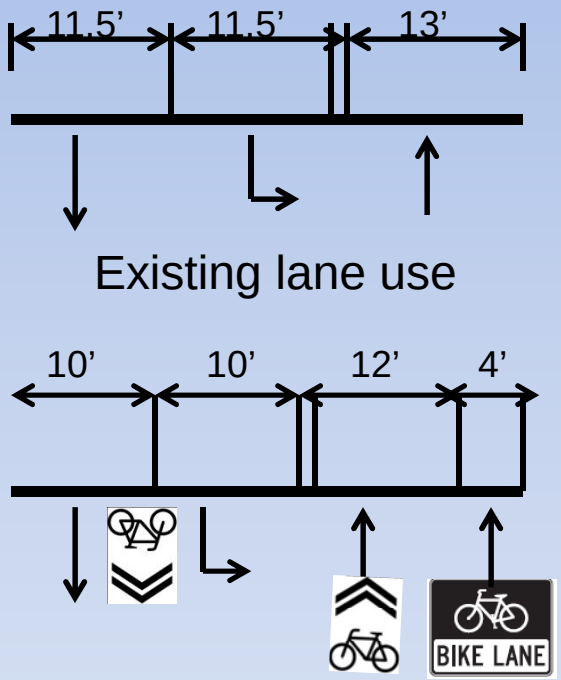
- Review parking in the area using line of sight triangle shown earlier.
- Add high visibility crosswalks for pedestrians, also it will mark the intersection.
- Use a pole mounted speed minder to assist with the speed.
- Study the need for a speed hump or raised crosswalk.

Figure 23: Location Specific: Shady Avenue and Howe Street

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	High	High	E

OBSERVATIONS: Bicyclists were observed riding on Shady Avenue near Fifth Avenue on a significant uphill grade. Drivers were growing impatient and not providing bicyclists with adequate buffer space.





SUGGESTIONS:

- Provide a southbound bike lane in this area where parking is not present.
- Provide sharrow pavement markings and BICYCLES MAY USE FULL LANE signage in other areas without bike lanes.

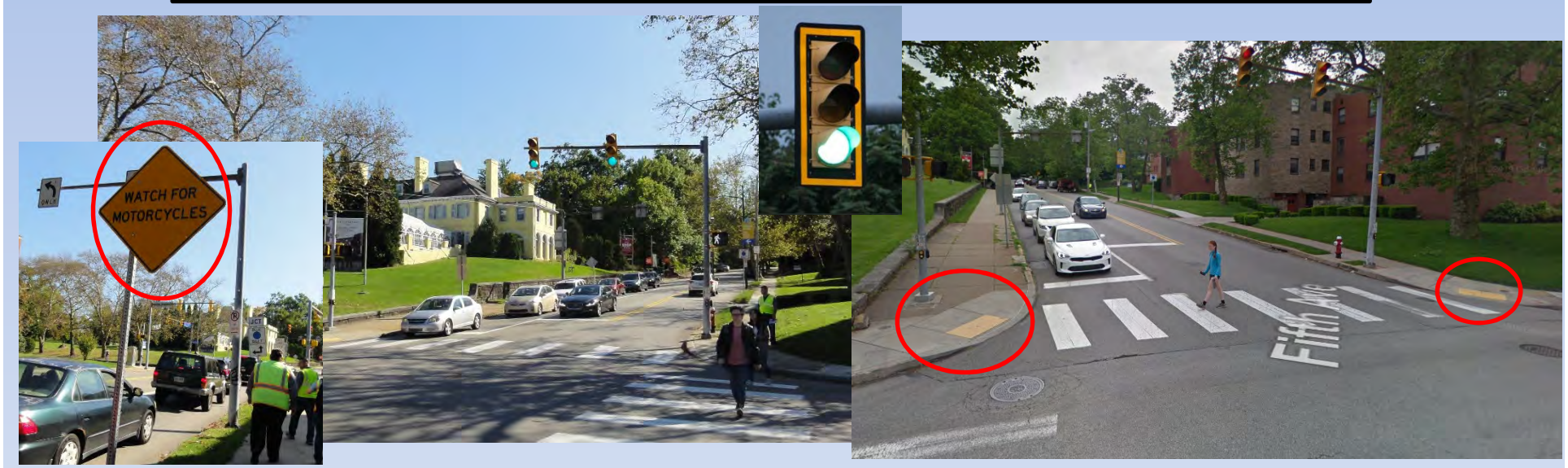
CONSIDERATIONS:

- Existing parking spaces

Figure 24: Location Specific: Shady Avenue Between Kentucky Avenue and Frick Driveway

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Low	Moderate	C

OBSERVATIONS: The signal is old and lacks detection. The lead pedestrian interval in place for the northbound and southbound crossings is too short. Only the westbound approach has left-turn phasing. Lane-use control signing is not in place for 5th Avenue. Stop bar locations may be too close for large vehicles. Unneeded signing is present. Street name signs should be on mast arms. The signal is not ADA compliant.



SUGGESTIONS:

- Upgrade signal, add detection, use 12” indications with retroreflective backplates.
- Evaluate the need for left-turn phasing for all directions, extend LPI.
- Eliminate unneeded signing, add overhead street name signs for all directions.
- Add lane-use control signing for 5th Avenue.
- Verify stop line placement with turning path simulation software.
- Upgrade detectable warning surfaces, provide ADA compliance.

Figure 25: Location Specific: Shady Avenue and 5th Avenue

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Frequent	Medium	High	E

OBSERVATIONS: Parked cars along Shady Avenue block the sight cone of vehicles wanting to make a left turns onto Shady Avenue. There are several accidents noted at this location.

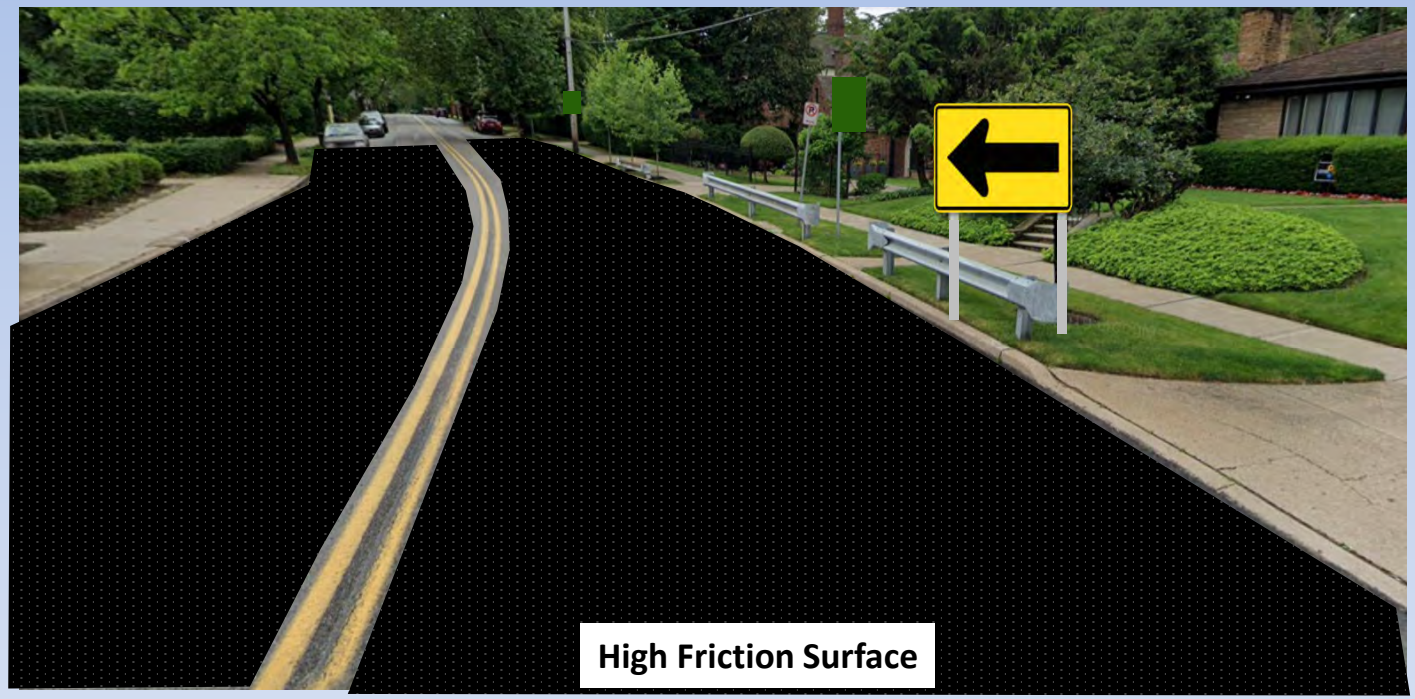
SUGGESTIONS:

- Remove two or three parking spots to allow for adequate sight lines.
- Or restrict left turns from Mellon Park Road.

Figure 26: Location Specific: Shady Avenue and Mellon Park Road

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATIONS: This area has drainage problems from debris. It is also a high speed area. Leaves covered the road in this section.



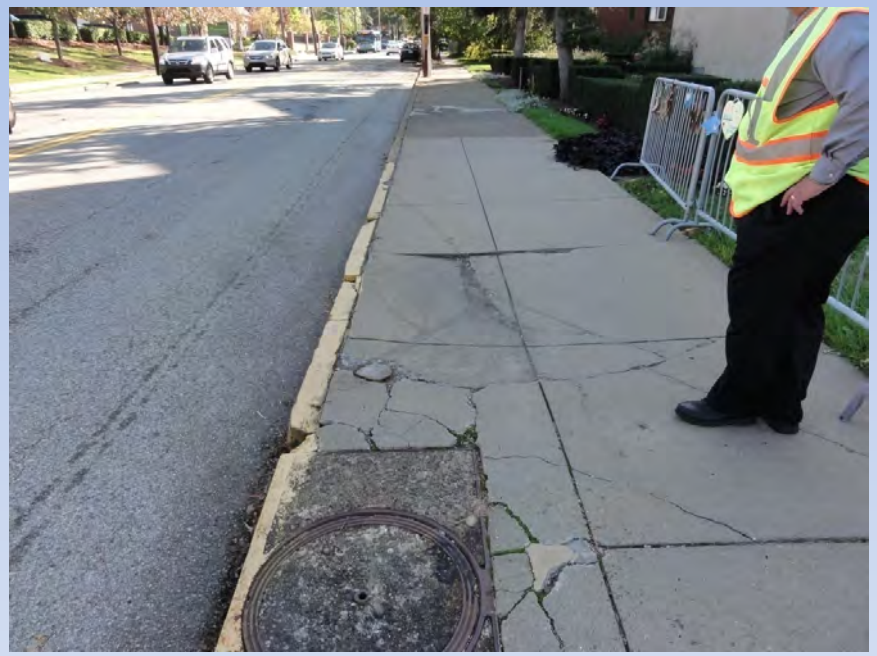
SUGGESTIONS:

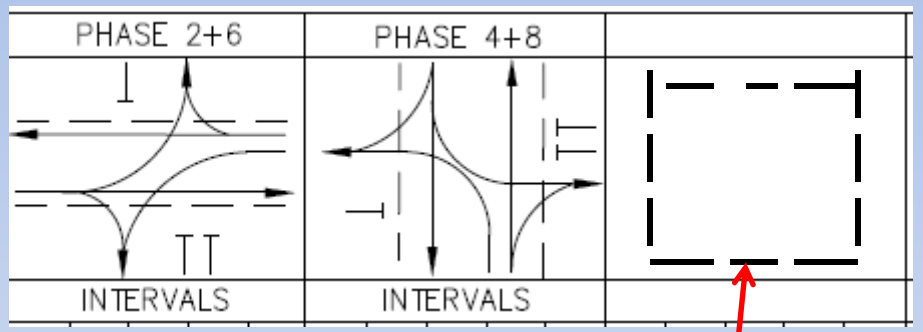
- Increase street sweeping.
- Discourage residents from blowing leaves and grass onto road.
- Consider high friction surface treatment in the curve and centerline raised pavement markers.
- Reevaluate the need for guiderail. If the guiderail is to remain, add delineation on guiderail.
- Install large arrow signs for both directions in place of the chevrons.

Figure 27: Location Specific: Shady Avenue Curve near Devereaux Lane

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Frequent	Low	Moderate-High	D

OBSERVATIONS: Pavement and sidewalk just south of the Wilkins Avenue intersection is in poor condition. This intersection has high pedestrian activity, including school children. City of Pittsburgh is planning to completely upgrade this traffic signal.





Allow pedestrians to walk when all traffic is stopped

SUGGESTIONS:

- Consider repairing the pavement and sidewalk in this area.
- Due to the high pedestrian activity, consider an exclusive pedestrian phase as part of the new signal plan.
- Incorporate new ped phase as part of cycle length (recalled every cycle)
- New signal should be ADA compliant and have new pedestrian signal heads.
- Verify marked signal pole locations versus new permit drawing.

Figure 28: Location Specific: Shady Avenue and Wilkins Avenue

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	High	High	E

OBSERVATIONS: The school zone flashers are obstructed by overgrown vegetation or parked cars. The restricted parking and wide pavement in front of The Children's Institute leads to vehicles traveling at higher speeds.

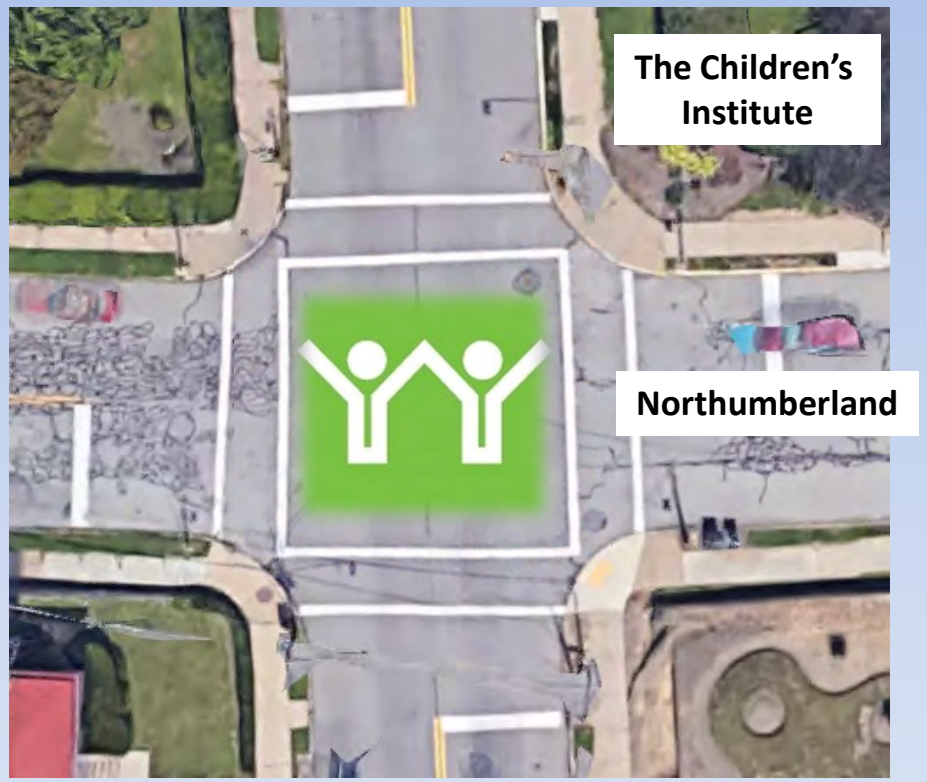
SUGGESTIONS:

- Relocate school zone flashers to an overhead mast arm.
- Hatch out the bus parking in front of The Children's Institute between Wilkins and Northumberland.

Figure 29: Location Specific: Shady Avenue near the Children's Institute

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Low	Moderate	C

OBSERVATION: The restricted parking and wide pavement in front of The Children's Institute leads to vehicles traveling at higher speeds.



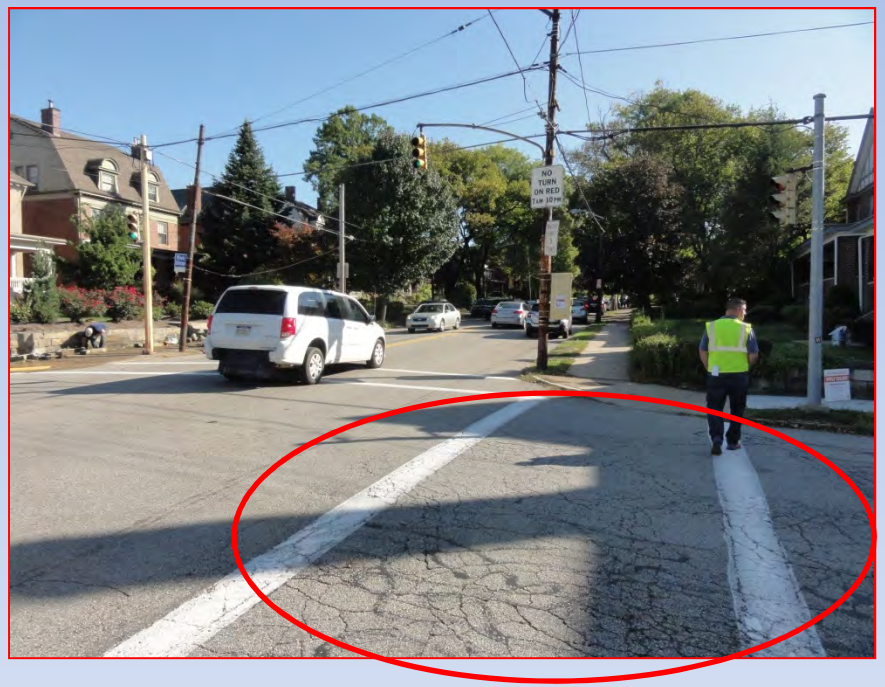
SUGGESTIONS:

- Short Term: Add street art to the Northumberland intersection to further call attention to drivers that they are entering a school zone.

Figure 30: Location Specific: Shady Avenue and Northumberland Street (Children's Institute)

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATIONS: Traffic signal is outdated and in poor condition. Pavement area in crosswalks is cracked. This area has high pedestrian activity, including school children.



SUGGESTIONS:

- Consider repairing the pavement in this area.
- Consider an exclusive pedestrian phase as part of the new signal plan.
- Incorporate new ped phase as part of cycle length (recalled every cycle).
- New signal should be ADA compliant and have new pedestrian signal heads.
- Consider bulbouts to shorten crosswalks and as a traffic calming measure.

CONSIDERATIONS:

- Turning radii for fire trucks (for bulbouts)
- Recall ped phase versus hours of less ped volumes

Figure 31: Location Specific: Shady Avenue and Northumberland Street (Children's Institute) (Continued)

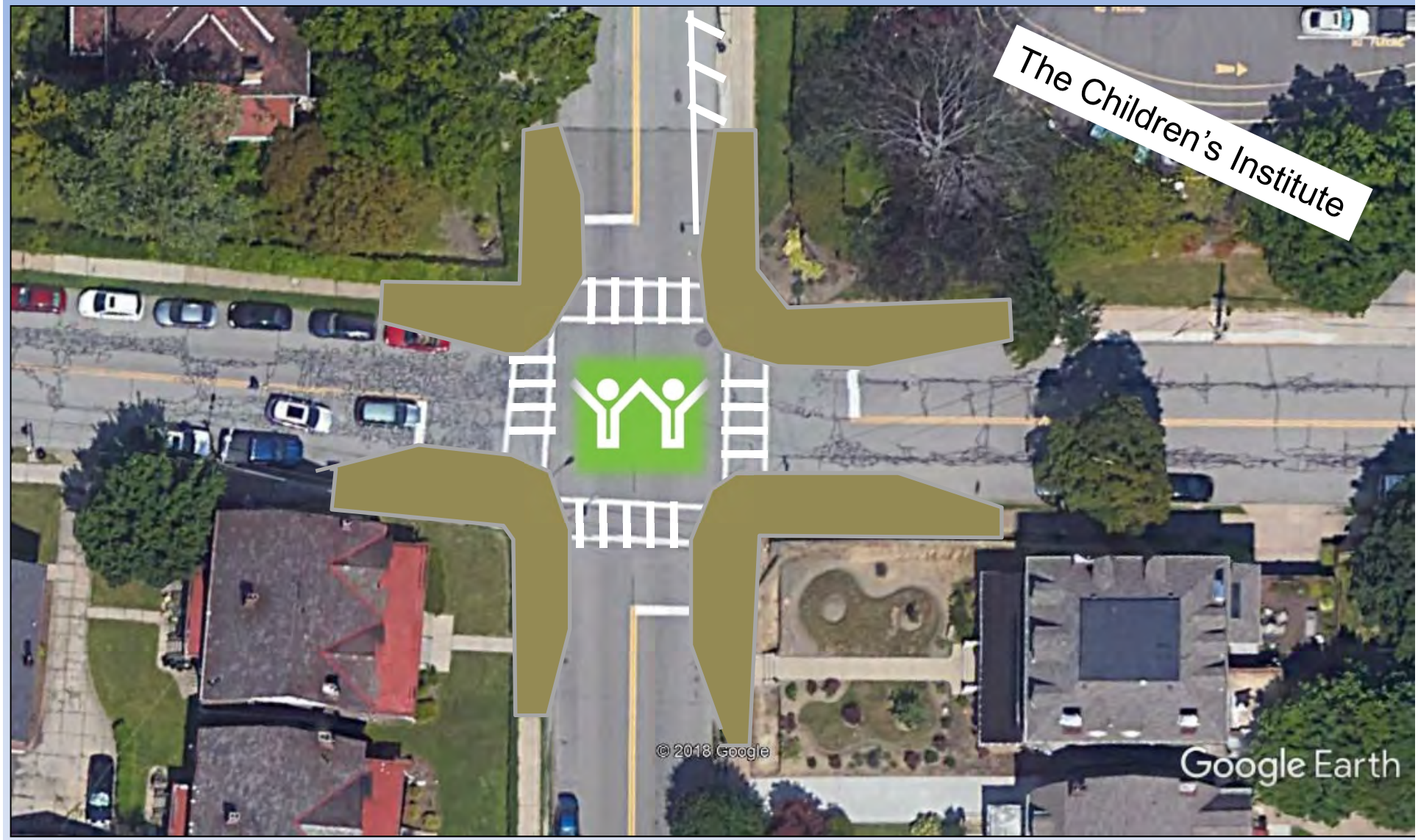


Figure 32: Location Specific: Shady Avenue and Northumberland Street (Children's Institute) (Continued)

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Frequent	Medium	Moderate-High	D

OBSERVATIONS: The Aylesboro intersection is offset with Shady Avenue with limited sight distances due to the roadway geometry. There are several reported accidents.

SUGGESTION:

- Study converting Aylesboro Avenue to One-Way street away from Shady Ave for one block.

Figure 33: Location Specific: Shady Avenue and Ayelsboro Avenue

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATIONS: The signal is old and lacks detection. Left turn lanes are present, but no phasing. The Blank-Out signs appear to be discolored. There is significant pedestrian activity here. Vehicular conflicts were observed with the close driveway to the east of the signal.

SUGGESTIONS:

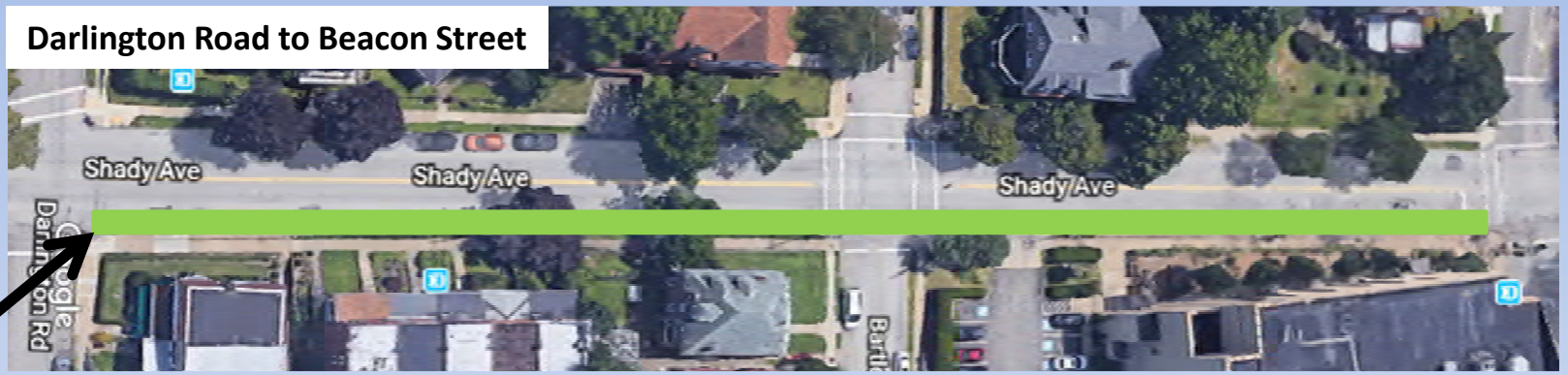
- Upgrade signal, add detection, consider adding left-turn phasing.
- Evaluate changing the exclusive pedestrian phase to a recall setting, to come up all cycles to better accommodate the significant pedestrian volumes.
- Consider making the NTOR restriction permanent, replace the blank out signs.
- Work with property owners to prohibit left-turn access to and from the driveways close to the signal.

Figure 34: Location Specific: Shady Avenue and Forbes Avenue

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Rare	Medium	Moderate	C

OBSERVATIONS: Parking throughout this section of the corridor is not as heavily utilized. Bicyclists are not able to travel uphill with the flow of traffic.

Darlington Road to Beacon Street



Beacon Street to Phillips Avenue

SUGGESTION:

- Study the possibility of eliminating parking on one side and add a bike lane on the uphill side.

Figure 35: Location Specific: Shady Avenue between Darlington Road and Phillips Avenue

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Rare	Low	Moderate-Low	B

OBSERVATION: It is difficult for drivers to see around the queue in the SB lane and make lefts out of the school parking lot.

SUGGESTION:

- Restrict lefts coming out of the Beth Shalom Parking Lot, either permanently, or for peak periods only.

Figure 36: Location Specific: Shady Avenue near Beth Shalom School

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATIONS: Traffic signal is outdated and in poor condition. Crosswalks are not high visibility type. Intersection is not ADA compliant. There is only one overhead signal head per approach crossing here.

SUGGESTIONS:

- Install high visibility piano key style crosswalk.
- Completely upgraded signal should be ADA compliant and have new pedestrian signal heads.
- Consider exclusive pedestrian phase or lead pedestrian interval as part of new signal design.
- Consider the use of a crossing guard when school children crossings are prevalent.

Figure 37: Location Specific: Shady Avenue and Beacon Street

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Frequent	Medium	High	E

OBSERVATIONS: Two intersections operate from one traffic signal controller. The signal is old and lacks detection. Shady Ave turns as it travels through the intersection with Tilbury, which lacks warning and is unexpected by unfamiliar drivers. The intersection with Tilbury lacks crosswalks across all approaches. ADA accommodations are not adequate.

SUGGESTIONS:

- Upgrade signal, add detection. Use 12” indications with retroreflective backplates.
- Short-term: Add dotted extension line through intersection to show path for Shady Ave.
- Upgrade ADA for all crosswalks.
- Use consistent NTOR time period for corridor.
- Replace southbound signal heads at Tilbury with optically programmed signals.
- Long-term: Realign the southern intersection to a traditional T-intersection. Eliminate southbound right-turn lanes.

Figure 38: Location Specific: Shady Avenue and Phillips Avenue/Tilbury Street

Short-term: Add dotted extension line and overhead mast arm with street name signing

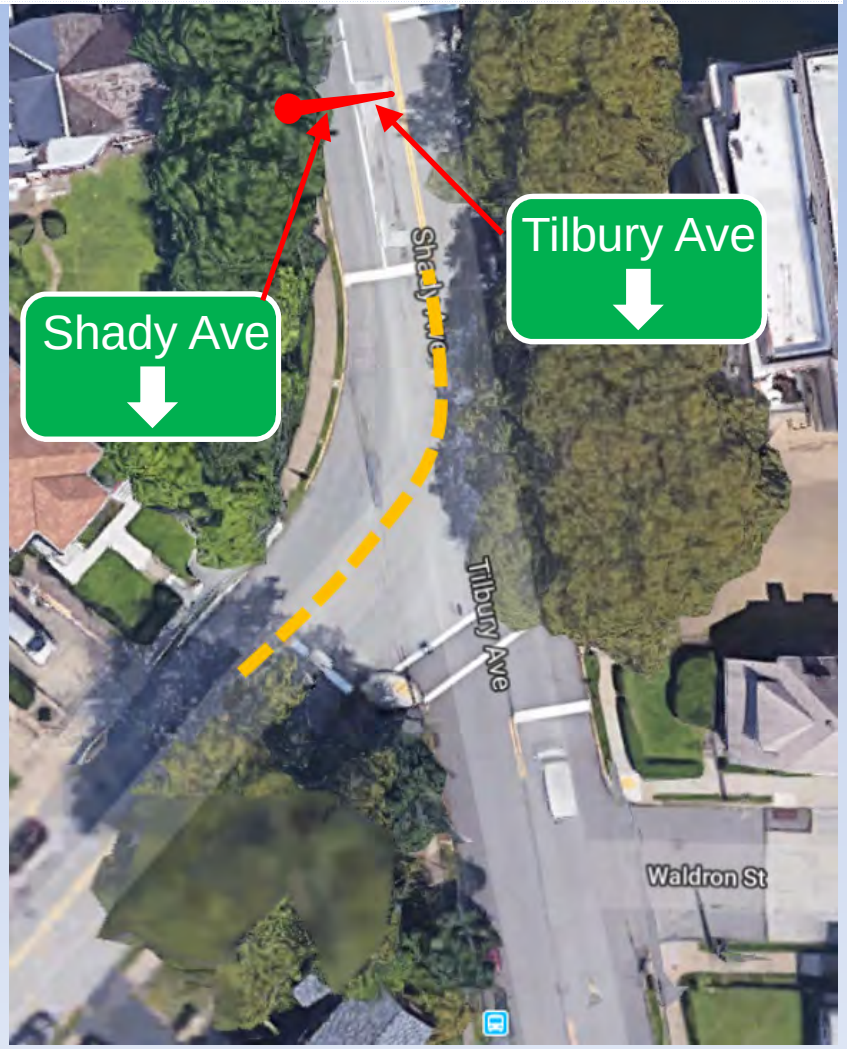
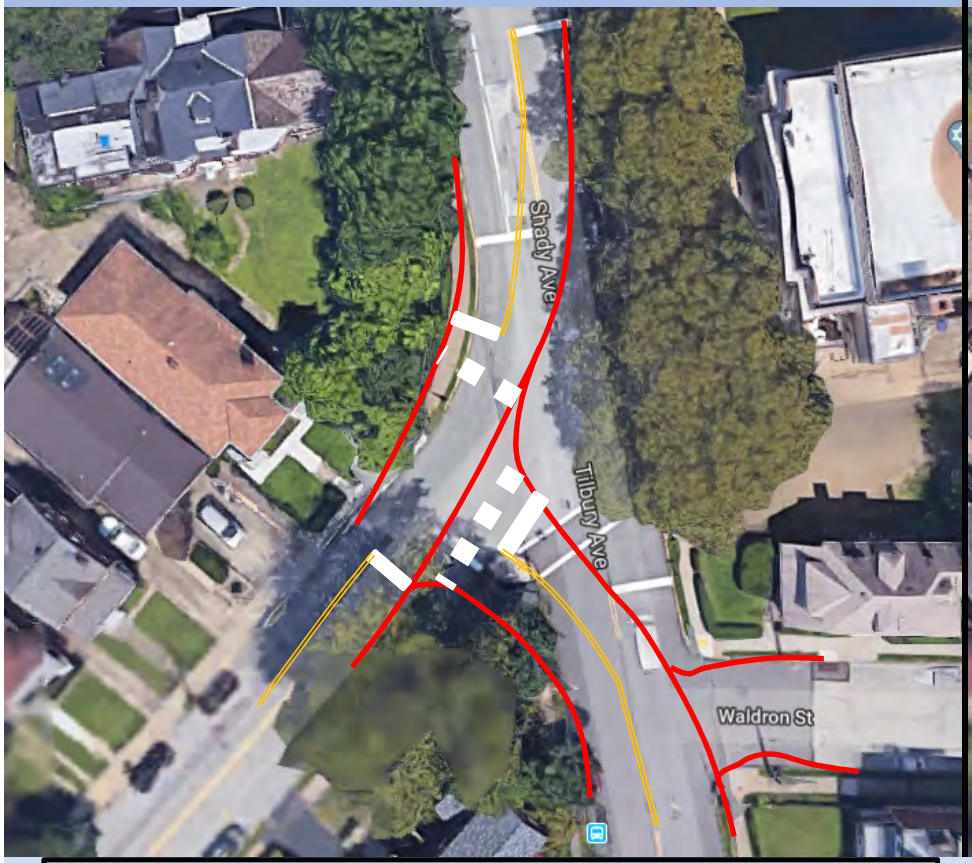


Figure 39: Location Specific: Shady Avenue and Phillips Avenue/Tilbury Street (Continued)

Long-term Option 1: Reconfigure as a T-intersection with Tilbury intersecting



- Advantages: Defines through movement, Eliminates need for right-turn lane.
- Disadvantages: Higher speeds associated with grades are not mitigated, bus stop would be in less visible location, not as accommodating to pedestrians as Option 2.

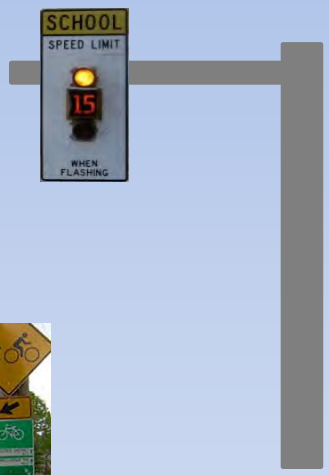
Long-term Option 2: Reconfigure as a T-intersection with south Shady intersecting

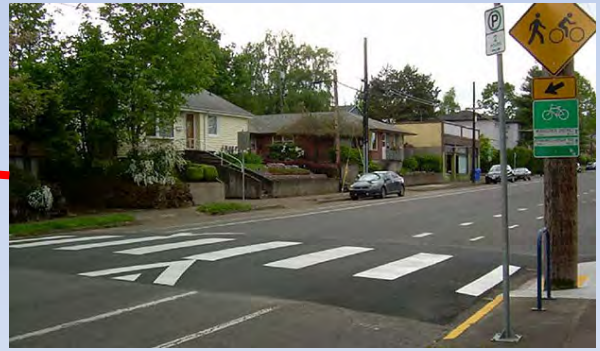
- Advantages: Traditional T-intersection, allows for crosswalks spanning all approaches, right-turn forces through traffic to slow, better for pedestrians.
- Disadvantages: Not as accommodating for through traffic on Shady.

Figure 40: Location Specific: Shady Avenue and Phillips Avenue/Tilbury Street (Continued)

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATIONS: The crossing is heavily utilized by students during dismissal. The school zone signs are side mounted, making them difficult to see. Parents park on the sidewalk near Pittock to pick students up. Drivers were observed not yielding to the students.





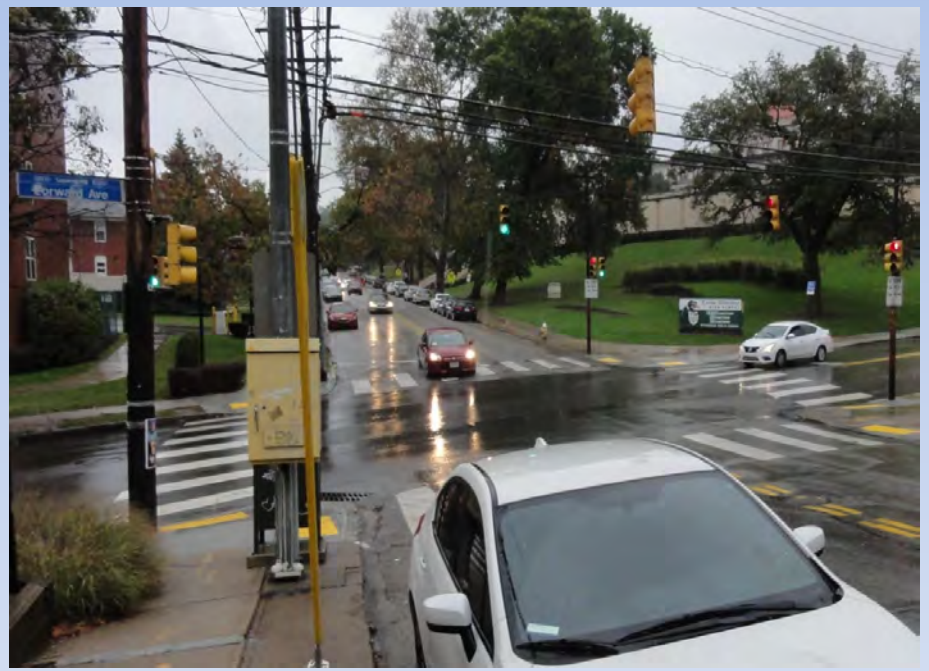
SUGGESTIONS:

- Mount school zone signs overhead.
- Add a crossing guard.
- Implement a raised crosswalk with a bulbout to shorten the crossing distance.
- Develop a school circulation plan for student pickups.
- Study the need for RRFB at Pittock and Sherbrook.

Figure 41: Location Specific: Shady Avenue and Pittock Street

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATIONS: Traffic signal is outdated. Several vehicles speeding and running red lights were observed.



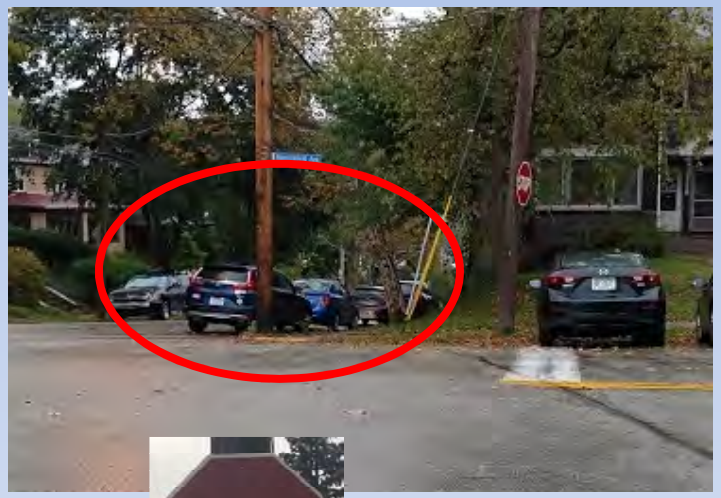
SUGGESTIONS:

- Completely upgrade the traffic signal to include ADA compliance, LED pedestrian countdown signals with LPI.
- Add artwork to intersection between crosswalks to alert drivers to the proximity of the school/pedestrian traffic.
- Potential intersection for pilot ARLE, automated red light enforcement. In the interim, increase enforcement of red-light running.

Figure 42: Location Specific: Shady Avenue and Forward Avenue

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Frequent	Low	Moderate-High	D

OBSERVATIONS: The intersection configuration is confusing for drivers. The eastbound approach sight distance is hindered due to landscaping and parked cars. Three way stop placards are obsolete per the MUTCD. The supplemental stop sign is located out of sight for drivers.

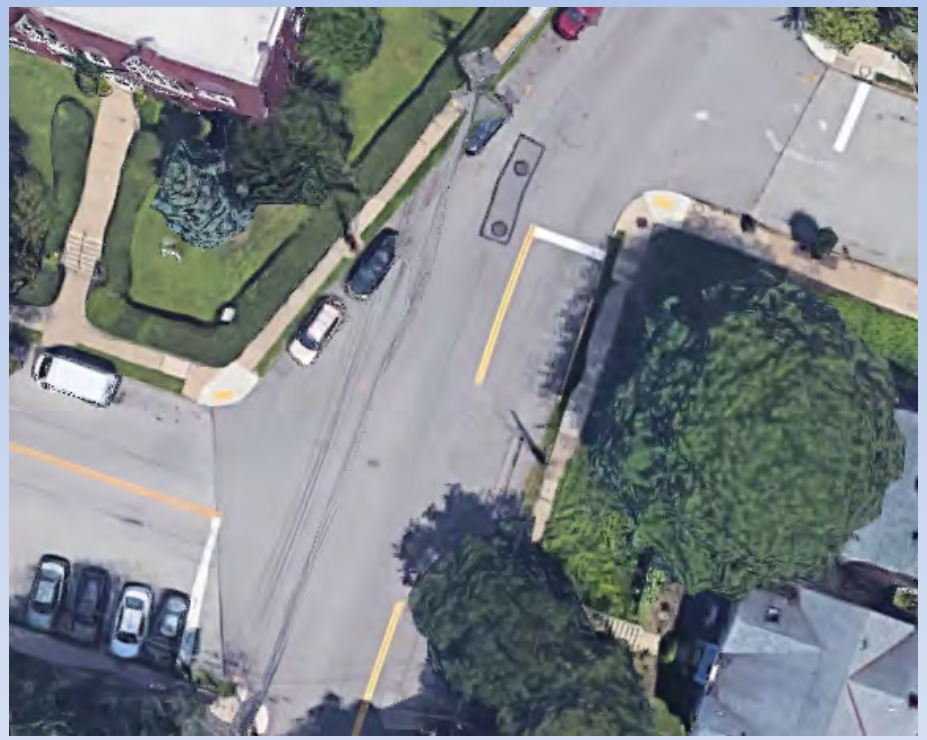


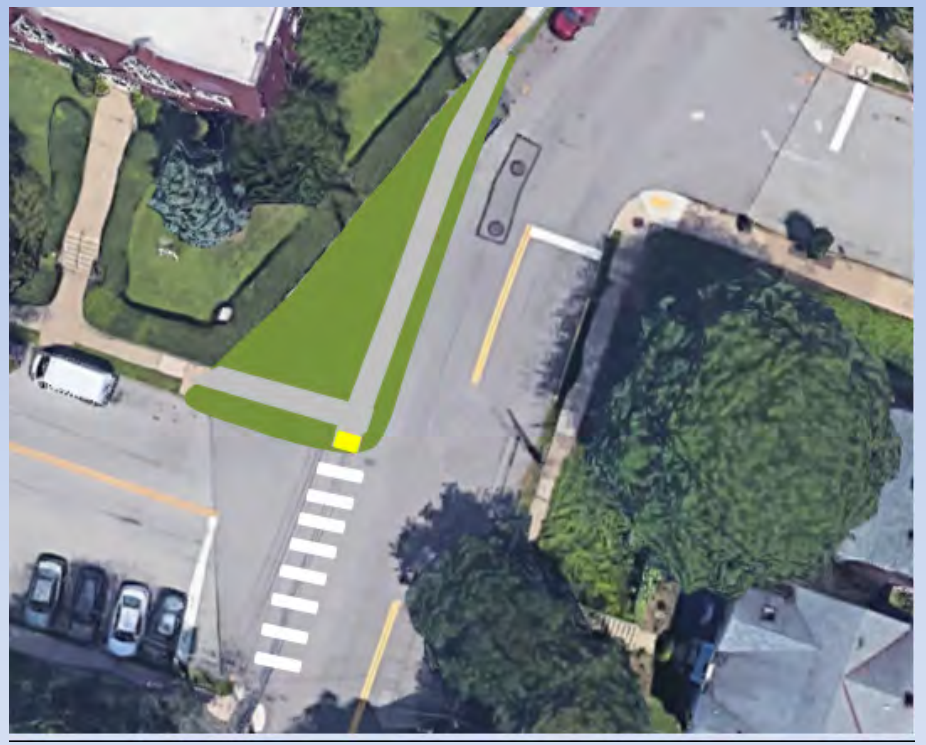
SUGGESTIONS:

- Remove/enforce parking restrictions and trim landscaping to allow for adequate sight cone.
- Replace THREE WAY with ALL WAY supplemental placards.
- Relocate supplemental stop sign for Morrowfield Ave.

Figure 43: Location Specific: Shady Avenue and Morrowfield Avenue

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Frequent	Low	Moderate-High	D
OBSERVATIONS: The intersection configuration is confusing for drivers. The crosswalk on the western side of the intersection is very long.			





SUGGESTIONS:

- Reconfigure intersection to allow for two distinct intersections and remove parking inside the intersection.
- Shorten the crosswalk on the western side of the intersection.

Figure 44: Location Specific: Shady Avenue and Morrowfield Avenue (Continued)

EXPECTED FREQUENCY	EXPECTED SEVERITY	RISK RATING	
Occasional	Medium	Moderate-High	D

OBSERVATIONS: The signal is old and lacks detection. Not all quadrants have ADA compliant ramps, crosswalks are the style with two lines defining the crossing. No guide signing is present for the Parkway East.

SUGGESTIONS:

- Upgrade signal, add detection and pedestrian accommodations.
- Upgrade crosswalks with piano-key style markings.
- Upgrade curb ramps with detectable warning surfaces.
- Provide route shield signing to the Parkway East.

Figure 45: Location Specific: Shady Avenue and Monitor Street

7. CONCLUSION

The Road Safety Audit program is conducted to identify opportunities for improvements in safety for transportation system users. The safety suggestions identified during this audit and documented in this report, along with the outlined improvement strategies, should enhance the overall safety of the study area. The full impact of the improvement strategies will be realized when they are combined, but time and budget constraints may dictate when remedial strategies are implemented.

PennDOT and the City of Pittsburgh have already deployed various safety enhancements in the area, including an exclusive pedestrian phase at Forbes Avenue, some lead pedestrian intervals, continuous sidewalk on both sides of the corridor, some detectable warning surfaces at crosswalk ramps, some high visibility crosswalks, bike markings, and corridor lighting. There is also an effective use of crossing guards and police in school zones.

As part of the audit, the strategies shown in the following tables were identified as ways to further enhance safety.

Responsible Parties:
DOT: PennDOT
P: City of Pittsburgh

Short-Range Improvements:

Improvement	Responsible Party
Replace damaged, defaced and faded signs with new retroreflective signs throughout the corridor.	DOT, P
Replace undersized 24” by 24” STOP signs with 30” by 30” signs throughout the corridor.	P
Trim vegetation near signs throughout the corridor.	P
Utilize a separate support for each sign, ensure that nothing is blocking line of sight to signs throughout the corridor.	P
Consider striping parking spaces to help define parking to calm traffic throughout the corridor.	P
Review corridor to identify potential hazards and have them removed or vegetation trimmed.	P
Remove unnecessary roadside fixed objects throughout the corridor.	DOT, P
Use a 4" yellow flexible, high-intensity grade tape to wrap poles and trees throughout the corridor.	P

Improvement	Responsible Party
Use tubular delineators for other fixed objects throughout the corridor.	P
Clean the debris from the inlets throughout the corridor.	P
Add bicycle safe inlets where needed throughout the corridor.	P
Perform driver education campaigns regarding school bus compliance.	DOT, P
Work with school bus drivers to drop students off in more visible non-intersection locations.	P
Trim vegetation around regulatory signs throughout the corridor.	P
Relocate speed limit signs if trimming vegetation is not an option in the corridor.	P
Add speed limit pavement markings where needed within the corridor.	P
Increase speed enforcement throughout the corridor.	P
Remove or relocate trees, landscaping, and signs out of the driver's sight cone at intersections in the corridor.	P
Restrict parking inside the driver's sight cone and enforce parking restrictions along the corridor.	P
Consider consistent signage for the marked crosswalks along the corridor that includes advance signage prior to the crosswalk.	P
Consider solar powered LED pedestrian signs for crosswalks in the corridor.	P
Verify that the pedestrian pushbuttons for crossing Shady Avenue at the intersection with Penn Avenue are functioning correctly.	P
Optimize intersection timings, implement a LPI interval at Shady Avenue and Penn Avenue.	P
Provide a consistent NTOR restriction for the corridor (7:00 am to 10:00 pm).	P
Between Penn Avenue and Ellsworth Avenue, install signing to encourage pedestrians to cross at established crosswalks.	P
Install pedestrian countdown signals and high visibility crosswalks at Shady Avenue and Ellsworth Avenue.	P
For the northbound approach at Shady Avenue and Ellsworth Avenue, install a SIGNAL AHEAD sign, install 12 inch supplemental signal head and backplates on all signals.	P
Consider NO TURN ON RED restriction for all approaches at Shady Avenue and Ellsworth Avenue.	P
Install advance warning signing for crosswalk at the intersection with Adler Street.	P
Replace NO TURN ON RED signing at Shady Avenue and Walnut Street, and consider using a consistent message corridorwide.	P
Consider installing high visibility crosswalks and broken yellow extension markings at Shady Avenue and Walnut Street.	P
Remove the "Y" symbol sign (W2-5) approaching Shady Avenue and Walnut Street.	P

Improvement	Responsible Party
Move the chevrons to their own sign posts near Shady Avenue and Walnut Street.	P
Add high visibility crosswalks for pedestrians at the intersection with Shady Avenue and Howe Street. It will also mark the intersection.	P
Use a pole mounted speed minder to assist with the speed near Shady Avenue and Howe Street.	P
Provide sharrow pavement markings and BICYCLES MAY USE FULL LANE signage in other areas without bike lanes on Shady Avenue near Kentucky Avenue.	P
Upgrade signal at the intersection with Shady Avenue and 5th Avenue. Add detection, use 12" indications with retroreflective backplates.	P
Evaluate the need for left-turn phasing for all directions at Shady Avenue and 5th Avenue, and extend LPI.	P
Eliminate unneeded signing, add overhead street name signs for all directions at Shady Avenue and 5th Avenue.	P
Add lane-use control signing for 5th Avenue at Shady Avenue.	P
At Shady Avenue and 5th Avenue, verify stop line placement with turning path simulation software.	P
Remove two or three parking spots at Shady Avenue and Mellon Park Road, to allow for adequate sight lines.	P
Restrict left turns from Mellon Park Road at Shady Avenue.	P
Increase street sweeping on Shady Avenue near Devereaux Lane.	P
Discourage residents from blowing leaves and grass onto road.	P
Install large arrow signs for both directions in place of the chevrons through the curve near Devereaux Lane.	P
Consider repairing the pavement and sidewalk in the area of Shady Avenue and Wilkins Avenue.	P
Due to the high pedestrian activity, consider an exclusive pedestrian phase as part of the new signal plan at Shady Avenue and Wilkins Avenue.	P
Incorporate new pedestrian phase as part of cycle length (recalled every cycle) at Shady Avenue and Wilkins Avenue.	P
New signal at Shady Avenue and Wilkins Avenue should be ADA compliant and have new pedestrian signal heads.	P
Verify marked signal pole locations versus new permit drawing at Shady Avenue and Wilkins Avenue.	P
Relocate school zone flashers to an overhead mast arm at Shady Avenue near the Children's Institute.	P
Hatch out the bus parking in front of The Children's Institute on Shady Avenue between Wilkins Avenue and Northumberland Street.	P

Improvement	Responsible Party
Add street art to the Northumberland intersection to further call attention to drivers that they are entering a school zone at Shady Avenue and Northumberland Street.	P
Consider an exclusive pedestrian phase as part of the new signal plan at Shady Avenue and Northumberland Street.	P
New signal at Shady Avenue and Northumberland Street should be ADA compliant and have new pedestrian signal heads.	P
Study converting Aylesboro Avenue to One-Way street away from Shady Avenue for one block.	P
Evaluate changing the exclusive pedestrian phase to a recall setting, to come up all cycles to better accommodate the significant pedestrian volumes at Shady Avenue and Forbes Avenue.	P
Consider making the NTOR restriction permanent, replace the blank out signs at Shady Avenue and Forbes Avenue.	P
Work with property owners to prohibit left-turn access to and from the driveways close to the signal at Shady Avenue and Forbes Avenue.	P
Restrict lefts coming out of the Beth Shalom Parking Lot, either permanently, or for peak periods only.	P
Install high visibility piano key style crosswalk at the intersection on Shady Avenue and Beacon Street.	P
Consider the use of a crossing guard when school children crossings are prevalent at Shady Avenue and Beacon Street.	P
Add dotted extension line through intersection to show path for Shady Ave through the intersection with Tilbury Street.	P
Replace southbound signal heads at Tilbury Street with optically programmed signals at Shady Avenue and Tilbury Street.	P
Mount school zone signs overhead at Shady Avenue and Pittock Street.	P
Add a crossing guard at the intersection at Shady Avenue and Pittock Street.	P
Develop a school circulation plan for student pickups at Shady Avenue and Pittock Street.	P
Study the need for RRFB at Shady Avenue and Pittock Street.	P
Add artwork to intersection between crosswalks to alert drivers to the proximity of the school/pedestrian traffic at Shady Avenue and Forward Avenue.	P
Remove/enforce parking restrictions and trim landscaping to allow for adequate sight cone at Shady Avenue and Morrowfield Avenue.	P
Replace THREE WAY with ALL WAY supplemental placards at Shady Avenue and Morrowfield Avenue.	P
Relocate supplemental stop sign for Morrowfield Avenue at Shady Avenue.	P

Improvement	Responsible Party
Upgrade crosswalks with piano-key style markings at Shady Avenue and Monitor Street.	P
Provide route shield signing to the Parkway East from Shady Avenue near Monitor Street.	DOT
Study the need for a speed hump or raised crosswalk near Shady Avenue and Howe Street.	P
Redesign development driveway for a more traditional pedestrian crossing at Shady Avenue and Ellsworth Avenue.	P

Responsible Parties:
DOT: PennDOT
P: City of Pittsburgh

Mid- and Long-Range Improvements:

Improvement	Responsible Party
Repair or replace damaged sections of sidewalks and bring sidewalks up to ADA compliance.	P
Reduce the skew for the crosswalk spanning Penn Avenue at the intersection with Shady Avenue, closer to the intersection by moving the ramp in the southeast quadrant, and upgrade to piano key style crosswalk (per the signal permit).	P
Install railing along the section of Shady Avenue between Penn Avenue and Ellsworth Avenue to channelize pedestrians to established crossings.	P
Construct curb extension on Calvary Episcopal Church side of Shady Avenue at Adler Street.	P
Evaluate potential installation of a raised crosswalk at Shady Avenue and Adler Street.	P
Install traffic signal equipment upgrades at Shady Avenue and Walnut Street, to include audible traffic signals.	P
Provide a southbound bike lane in the area between Kentucky Avenue and Frick Driveway where parking is not present.	P
Upgrade detectable warning surfaces, provide ADA compliance at Shady Avenue and 5th Avenue.	P
Consider high friction surface treatment in the curve near Devereaux Lane, and add centerline raised pavement markers.	P
Reevaluate the need for guiderail through the curve near Devereaux Lane. If the guiderail is to remain, add delineation on guiderail.	P

Improvement	Responsible Party
Consider repairing the pavement on Shady Avenue in the area of Northumberland Street.	P
Consider bulbouts at Shady Avenue and Northumberland Street to shorten crosswalks and as a traffic calming measure.	P
Upgrade signal, add detection, and consider adding left-turn phasing at Shady Avenue and Forbes Avenue.	P
Study the possibility of eliminating parking on one side and add a bike lane on the uphill side on Shady Avenue between Darlington Road and Phillips Avenue.	P
Completely upgraded signal at Shady Avenue and Beacon Street should be ADA compliant and have new pedestrian signal heads.	P
Consider exclusive pedestrian phase or lead pedestrian interval as part of new signal design at Shady Avenue and Beacon Street.	P
Upgrade the signal at Shady Avenue and Phillips Avenue/Tilbury Street, and add detection. Use 12” indications with retroreflective backplates.	P
Upgrade ADA for all crosswalk ramps at the intersection of Shady Avenue with Phillips Avenue and Tilbury Street.	P
Realign the southern intersection to a traditional T-intersection. Eliminate southbound right-turn lanes at Shady Avenue and Tilbury Street.	P
Implement a raised crosswalk with a bulbout to shorten the crossing distance at Shady Avenue and Pittock Street.	P
Completely upgrade the traffic signal at Shady Avenue and Forward Avenue, to include ADA compliance, LED pedestrian countdown signals with LPI.	P
Shady Avenue and Forward Avenue is a potential intersection for pilot ARLE, automated red light enforcement.	P
Reconfigure intersection of Shady Avenue and Morrowfield Avenue, to allow for two distinct intersections and remove parking inside the intersection.	P
Shorten the crosswalk on the western side of the intersection of Shady Avenue and Morrowfield Avenue.	P
Upgrade signal, add detection and pedestrian accommodations at Shady Avenue and Monitor Street.	P
Upgrade curb ramps with detectable warning surfaces at Shady Avenue and Monitor Street.	P