

# Residential Road Safety Analysis

# Background

- The City of Batavia has experienced several dangerous collisions involving cyclists, prompting the need for action to improve roadway safety.
- Immediate actions taken by the city include moving up the implementation of the Route 31 Road Diet, requesting speed studies and school zones, repainting markings, and improving landscaping to remove blind spots.
- Community feedback suggested additional actions such as increasing public education, implementing a Citizen Radar Program, and expanding safety measures to residential streets.
- The city is also adding a component of bike and pedestrian safety to its strategic plan.
- This analysis focuses on improving safety within residential areas and examines the potential effectiveness of resident ideas.

# Data

- The Bike and Pedestrian plan collected relevant data regarding traffic safety in Batavia. The report showed that between 2016 and 2020, there were:
  - 24 pedestrian collisions
  - 21 bicycle collisions
  - 4 serious pedestrian injuries
  - 3 serious bicycle injuries
- In 2021, the city had an additional 6 pedestrian collisions and 3 bicycle collisions. The most common road for collisions was Wilson Street. Other corridors with higher collision occurrences were Route 31, Randall Road, McKee Street, Kirk Road, Main Street, and Pine Street.
- Data from IDOT was also examined and found that areas along Wilson, Pine, Main, and other “cut throughs” have a higher density of incidents.

# Map of IDOT Incident Data

<https://cobil.maps.arcgis.com/apps/webappviewer/index.html?id=1b477eb9edcd462290bbe2d73c81fe98>



# Alternatives

- Maintain the Status Quo
  - City staff would continue to make periodic changes to street and sidewalk design as roads come up for repair, resealing, etc. City staff would continue to identify ways to improve safety, but they would be rolled into existing projects and programs.
- Reduce posted speed limits in all residential areas to 25mph
  - This action consists of reducing PSLs in residential neighborhoods from 30mph to 25mph. Signs would be replaced, and enforcement would continue as is normal.

# Alternatives, cont.

- Reduce Posted Speed Limits from 30mph to 25mph in selected areas.
  - This action consists of reducing PSLs in residential neighborhoods from 30mph to 25mph on selected segments of road, primarily those that are used as higher-speed cut throughs and throughfares. Signs would be replaced, and enforcement would continue as is normal.
- Institute a Neighborhood Speed Watch Program
  - This would establish a program which provides radar speed measuring devices and training to citizens so they may monitor the speeds of vehicles in residential areas. Dates, times, make, model, and license plate number are recorded and provided to the Batavia Police Department. Police staff would then run the plates and send an educational letter to the offender.

# Analysis Criteria

- When determining the effectiveness of each alternative, evaluation was based on how well each met the following criteria:
  - Minimize the number of pedestrian and/or bike crashes.
    - Logic: Fewer crashes results in fewer opportunities for injury.
  - Minimize the severity of pedestrian and/or bike crashes.
    - Logic: When crashes do happen, there is a desire to minimize harm.
  - Minimize cost to implement and maintain.
    - Logic: Programs that are less expensive are preferable to projects that are more expensive.
  - Durability and long-term viability of the policy.
    - Logic: Programs that are durable and long lasting are preferable to those that require consistent upkeep and maintenance.
  - Political viability.
    - Logic: Projects that can be completed without additional regulatory or legal changes are preferable to those that require changes.

# Policy Analysis: Maintain Status Quo

- Maintain Status Quo

- Batavia has not had a speed-aggravated collision since at least 2015. All collisions that did occur had a different primary reason for the collision, per state data.
- Because no actions are taken except for general engineering improvements over time, this is not expected to substantially reduce the number of collisions. However, NHTSA rule changes and vehicle design to incorporate automatic emergency braking may have a positive impact on the reduction in the number of collisions.
- Furthermore, because no actions are taken except for general engineering improvements over time, maintaining the status quo is not expected to reduce the severity of collisions that do occur, with the exception of any changes caused by wider adoption of AEB.
- Costs are very low.
- Durability and long-term viability are high.
- No regulatory or legal changes are required.



# Policy Analysis: Reduce Posted Speed Limits in residential areas from 30mph to 25 mph.

- Research:
  - Reducing PSLs are only effective if they reduce actual vehicle speeds.
  - Reducing PSLs does not equate to a 1:1 reduction in speed.
  - A summary of research from Islam et.al (2014) says reduction in PSLs have “a positive impact on reducing vehicle speed for low-speed urban roads.
  - When Edmonton, Alberta reduced their PSLs from 50kph to 40kph (31/25mph), they saw a reduction in average speeds of around 3.86kph (2.39mph) after 3 months, and 4.88kph (3.03mph) after 6 months. This represents a 7.7 percent and 9.7 percent reduction in average speeds. This study was coupled with education and other outreach initiatives, so it is difficult to isolate speed limit changes as the cause of the reduction.

# Policy Analysis: Reduce Posted Speed Limits in residential areas from 30mph to 25 mph.

- While reducing the speed limit from 30-25 may lead to slightly lower speeds, the approximately 3mph drop in speed experienced in Edmonton is expected to have little impact on the *number* of collisions
- The *severity* of collisions may be moderately reduced by the reduction in speeds. Using a model of how speed relates to injuries developed by Elvik (2009), Edmonton estimates their reduction in speeds would lead to a 23.2 percent reduction in the chance of death, 11.5 percent reduction in injury, and 7.8 percent in property damage.
- Data from AAA also lend credence to this, showing that at 23mph, the risk of severe injury is 25%, increasing to 50% at 31mph. The risk of death for a pedestrian increase from 10 percent to 25 percent between 23mph and 32mph. Additionally, their research found that for light truck impacts, the risk of injury was equal to that of a car traveling 6.3mph faster.

# Policy Analysis: Reduce Posted Speed Limits in residential areas from 30mph to 25 mph.

- At an impact speed of 25 mph, an estimated 30% of pedestrians sustain AIS 4 or greater injury, and about 12% die. Nearly half of all pedestrians (47%) struck at 30 mph sustain AIS 4 or greater injury, and one in five (20%) die.
- Ultimately, reducing speed limits does not affect the *number* of collisions that do occur.
- Reducing speed limits may positively impact the *severity* of collisions that do occur.
- The cost of first studying, then reducing, all speed limits within the city may exceed \$100,000.
- The durability of this proposal may actually increase over time, as old and perhaps outdated speed limits would be studied sooner than they would otherwise be studied, and thus speed limits would be updated to reflect current research and best practices.
- The ability to reduce speeds is only something the City of Batavia can do on roads it has jurisdiction over. Therefore, the political viability is strong when limited to areas we directly control. If expanded outside our area of control, the political viability is extremely low.

# Policy Analysis: Reduce Posted Speed Limits from 30mph to 25 mph in selected areas

- This action would be limited to areas identified by Police and Public Works as prominent cut-throughs where speeding may be a known issue due to road design and usage.
- As explained above, a reduction of PSLs from 30 to 25mph in select areas is not expected to have a substantial impact on the number of collisions overall. However, the data the city has show that many of the collisions involving pedestrians and cyclists happen along these cut through roads.
- If roads that are currently marked 30mph frequently have higher free flow speeds (35-40), the reduction in PSLs may significantly reduce the risk of injury in a collision. As these are cut through roads, drivers may be more prone to speeding to avoid traffic elsewhere and “make up time.”

# Policy Analysis: Reduce Posted Speed Limits from 30mph to 25 mph in selected areas

- AAA data show that “at 40 mph, 79% of struck pedestrians sustain AIS 4 or greater injury and 45% die.” If the top speeds can be dropped to even 32mph, the risk of severe injury falls from 79% to 47%, and the risk of death falls from 45% to 20%. This is the largest change in outcomes from any change in speed.
- The cost to study speeds along identified corridors is appx \$23k.
- The durability of this proposal is relatively stable over time; however, it is heavily dependent on traffic patterns and routes. The reduction in speed along one cut through may just cause drivers to utilize a different route at 30mph. This would be monitored.
- Like the previous alternative, the political viability is strong when limited to areas we directly control. If expanded outside our area of control, the political viability is extremely low.

# Policy Analysis: Institute a neighborhood speed watch program.

- In researching this program, it became clear that this program, while conceptually possible of reducing incidents of speeding, is highly reliant on an engaged and committed community to implement. Several cities researched followed a trend of low to moderate engagement at the start, with engagement rapidly declining over time, to where the programs are essentially idle, and devices go weeks or months without being used.
- Due to predicted low engagement, and low usage, this is not expected to substantially improve safety based on the criteria identified.
- Additionally, the running of plates and sending of letters represents a substantial time commitment from the Batavia Police Department, one they are not currently equipped to handle. State law only allows certain staff to do this.

# Recommendations

- Generally, the data show that the status quo best meets the most criteria, however elements from several ideas also have merit.
- Recommendation 1: Diligently implement the Bike and Pedestrian Plan
  - In implementing the plan, the city will be making evidence and data-informed decisions that are proven to increase safety for bicyclists and pedestrians. Diverting any substantial funding toward unproven programs or methods could instead be used to increase funding for and speed up implementation of the Bike and Pedestrian plan.

# Recommendations

- Recommendation 2: Action 2: Evaluate speeds along Wilson Avenue, McKee Street, Pine Street.
  - The Bike and Pedestrian Plan, along with data from our Police Department and IDOT show that these streets are the ones with the most collisions, and thus actions should be evaluated that can reduce the severity of collisions that do occur on those routes.
  - After further discussion, the full list of areas to be studied are:
    - Pine Street – from Hart Rd. eastward to Kirk Rd. – currently signed at 30 mph
    - Hart Road – from Pine St. southward to Wind Energy Pass – currently signed at both 30 mph and 35 mph
    - Woodland Hills Road – from Wilson St. southward to Giese Rd. – currently signed at 30 mph
    - McKee Street – from Mill St. eastward to IL. Rte. 31 – currently signed at 30 mph
    - Western Avenue – from Fabyan Pkwy. southward to Wilson St. – currently signed at 20 mph (school zone) and 30 mph
    - Wilson Street – from Randall Rd. eastward to IL. Rte. 31 – currently signed at 20 mph (school zone) and 30 mph
    - Wilson Street – from Prairie Street eastward to Kirk Rd. – currently signed at 30 mph



# Recommendations

- If the data show that these routes tend to have higher average speeds, there is evidence suggesting a drop to 25mph could somewhat reduce speeds and therefore improve collision outcomes along those corridors. To test the effectiveness of those drops in speed, the city can then re-measure at selected intervals to determine the effectiveness of the PSL reduction.

# Recommendations

- Recommendation 3: Increase education for Drivers, Pedestrians, and Cyclists
  - The city should consider prioritizing funding for education initiatives before prioritizing spending on costly initiatives, such as wholesale speed reductions or substantial changes to road design.
  - Many collisions that did occur happened due to factors that only education can address, such as the dangers of drunk, high, and distracted driving, the effect speeding has on injuries, and safe habits. No amount of engineering changes or speed limit reductions would protect someone from a drunk driver, or a driver on their phone. Education stems the issue from the start and is likely to have long term benefits that spillover to all roads, not just low-speed residential roads.

# Recommendations

- Recommendation 4: Action 4: Continue to Prioritize Pedestrian and Bicycle Safety in Engineering Decisions
  - Lastly, the city should continue to make pedestrian and bicycle safety a core component of any engineering decisions involving streets, sidewalks, or paths. By continually embedding pro-pedestrian and pro-biking policies within city decision-making, long-term changes are expected to be fulfilled.

# To Summarize

- Reducing PSLs alone is not expected to reduce the number of collisions, however it is expected to moderately reduce the severity of collisions.
- Speed is not a common cause of a collisions, but speed is a large factor in the severity of the collision. Some of the biggest improvements in collision outcomes happen between 25-40mph.
- The best course of action that best meets the criteria is:
  - To diligently fund and implement the bike and pedestrian plan.
  - To evaluate speeds along selected corridors to determine whether speed reductions could be helpful.
  - Increase the role and prominence of education initiatives.
  - Prioritize pedestrian and bike safety in city engineering and design decisions.

# References

- Barry, B. K. (2021, December 18). Most New Cars Have Safety Technology That Prevents Crashes, Report Shows. Consumer Reports.
- City of Batavia. (2023). Bike and Pedestrian Plan. In City of Batavia.
- Elvik, R. (2009). The power model of the relationship between speed and road safety: update and new analyses.
- Impact Speed and a Pedestrian's Risk of Severe Injury or Death. (2011, September). AAA.
- Islam, T., El-Basyouny, K., & Ibrahim, S. E. (2014). The impact of lowered residential speed limits on vehicle speed behavior. *Safety Science*, 62, 483–494.
- Kamyra-Lukoda, G. (2010). Interim Evaluation of the Implementation of 20 mph Speed Limits in Portsmouth (No. 5081761).
- NHTSA. (n.d.). 1.1 Speed Limits | NHTSA.
- Proposed AEB regulation is an important step for safety. (n.d.). IIHS-HLDI Crash Testing and Highway Safety.
- Speed. (n.d.). IIHS-HLDI Crash Testing and Highway Safety.

# Questions?