

Crash Analysis Studio

Session 13: Carlsbad, California

Held on January 19, 2024

Session Participants:

- **Anthony Catania**, AIA, NCARB, CNU-A, Founder of AMC Architecture & Design, LLC; architect and urban designer with experience across Washington D.C. and Oklahoma City metro area; holds a Master of Architecture from the University of Notre Dame
- **Thomas LaCroix**, Schwab web developer; native of North County, California; avid Strong Towns reader; concerned local resident; transportation safety advocate
- **Pete Penseyres**, Carlsbad Traffic Safety & Mobility Commissioner; certified bicyclist instructor; former co-chair of Oceansides local Bicycle & Pedestrian Committee; concerned local resident
- **Edward Erfurt**, Director of Community Action at Strong Towns
- **Tony Harris** (moderator), Action Team Coordinator at Strong Towns

Summary of Crash Event

- The crash occurred around 5:45 p.m. Pacific Time (PT) on August 7, 2022.
 - A detailed crash report from law enforcement was unavailable; a local expert requested a copy but was denied access since their name was not listed in the report and they did not qualify as a party of interest.
 - A publicly available crash report is posted on the Statewide Integrated Traffic Records System (SWITRS).
 - The primary cause factor (PCF) was determined to be California Vehicle Code 22450A, which is a stop sign violation.
 - No other vehicle code section was noted.
- The location of the crash is the intersection of Basswood Avenue and Valley Street.
 - This is a four-way intersection with all-way stops marked with signs.
 - The posted speed limit is 25 miles per hour (mph) on both streets.
 - Each street includes two travel lanes and parallel parking on both sides of the street.
- 42-year-old motorist Lindsay Turmelle was traveling north/northeast along Basswood Avenue.
- 35-year-old Christine Hawk Embree and her 16-month-old daughter Delilah were traveling south on Valley Street on their e-bike.

- Turmelle struck Christine Hawk Embree and Delilah while they were crossing Basswood Avenue at its intersection with Valley Street.
 - Christine sustained serious injuries; she was transported to a local hospital where she died the next day.
 - Delilah was ejected off of the e-bike but survived with—to our knowledge—only minor injuries.
- Media coverage of the collision indicates the following:
 - Turmelle remained on the scene after the collision and cooperated with Carlsbad law enforcement.
 - Law enforcement determined that neither drugs or alcohol were factors in this collision.
- Media [coverage of Lindsay Turmelle's court proceedings](#)¹ indicates the following:
 - Defense attorney Eisenstein said, “Turmelle was driving home from work and glanced down for a moment while driving, leading to the fatal accident.”
 - Turmelle was reportedly delivering a large amount of cash to her boss at her boss’ home during this trip.
 - Defense attorney Eisenstein confirmed Turmelle did drive through a stop sign at the intersection when she looked down to check on the money that she was delivering.
 - After pleading guilty to misdemeanor vehicular manslaughter, Turmelle received sentencing that includes 90 days in county jail, 90 days of home detention, and community service obligations.
- Local experts indicate the following:
 - Given the severity of Embree’s injuries, Turmelle likely ran through a stop sign at the intersection; this was confirmed by Turmelle’s defense attorney.
 - Motorists often ignore stop signs at marked 4-way intersections in Carlsbad neighborhoods; this practice contributes to regular speeding.
 - Incomplete rolling stops can be frequently and regularly observed at this intersection.²

¹ Released in January 2024

² This is documented by [footage](#) from a local expert.

Primary Contributing Factors

The design of Basswood Avenue illustrates inadequate concern for the safety of cyclists, pedestrians, and non-motorists traveling outside of privately-owned and operated automobiles. The recovery zones along this roadway actually decrease safety by increasing motorists' perceptions of road width; drivers tend to travel at higher speeds along roads they perceive to be wider than the norm.

Designers acknowledge the presence of pedestrians at this location by constructing sidewalks, erecting a crossing sign, and striping crossing areas with yellow paint. Lane widths, visual clutter, and the lack of friction that typically calms traffic indicate that the usage and safety of non-motorists—including cyclists—are not priorities at this intersection.

Designers have recognized that motorists make mistakes and have provided ample margin for error for these particular road users through select design features. One primary example is the design of excessively wide travel lanes—each being 20-feet wide—that total 40 feet of pavement width. These excessively wide travel lanes include unmarked parallel parking on both sides of a street which has multiple private residential driveways. The wide lanes allow the driver to navigate parking cars and cars backing out of driveways without slowing down.

When evaluating collisions between drivers and non-motorists, designers did not elect to create a similar margin for error. There are no painted sharrows to indicate shared road usage by motorists and cyclists along both Basswood Avenue and Valley Street. Additionally, the absence of bike lanes and mid-crossing refuge areas may heighten risk for non-motorists, specifically pedestrians or cyclists with slower crossing times.

Along Basswood Avenue and its intersection with Valley Street, transportation systems for motorists and non-motorists have been planned and implemented with dangerous levels of incompatibility. This tension is one underlying cause of the crash that killed Christine Hawk Embree.

Transportation and design professionals have intentionally chosen to expose non-motorists to unnecessary major risk by placing them in an atmosphere that, despite its location adjacent to Carlsbad High School, has been constructed to prioritize high-speed traffic flow. At intersections like this one, where serious traffic safety risk remains, further preventative measures and demonstrable safety improvements still need to occur. Substantive changes to Basswood Avenue and similar residential area roadways are necessary to reduce fatalities and traumatic injuries.

Session participants identified the following primary factors that contributed to this crash:

- 1. A motorist failed to stop at an intersection marked as a four-way stop.**
 - a. A motorist failed to halt at a stop sign of this marked intersection; this motorist failed to yield to cyclists riding through the intersection.

- b. The local expert who nominated this crash for review [recorded video](#) illustrating that this is a common practice among motorists at this location.

2. Both the documented travel speed and the design speed of Basswood Avenue are incompatible with cyclist and pedestrian traffic.

- a. Vehicle travel speeds on Basswood Avenue subject all users, especially cyclists and pedestrians to serious danger and risk.
- b. The current speed limit posted on Basswood Avenue is 25 mph.
 - i. A speed study conducted for this studio indicated that 93% of motorists exceeded the posted limit.
 - ii. This study stated the 85th percentile speed, or the speed which 85% of drivers were traveling at or below, to be 37 mph.
 - iii. A [pedestrian safety analysis](#) states that fatality rates climb for automobile collisions involving pedestrians at 25 mph. When automobile speeds exceed 40 mph, 45% of pedestrian collisions are found to be fatal. Though Embree and her daughter were traveling as cyclists in an area with a 25 mph posted limit, many speeds documented in this area approach—or cross fully into—lethal levels.
 - iv. Of the 242 motorists tracked during the study, 13 of them (~5%) were driving over 40 mph; three motorists were going over twice the posted limit and speeding beyond 50 mph. This data distribution may suggest that this space is communicating to drivers that excessive speeding is a low-risk behavior in this environment.

3. Basswood Avenue and its intersection with Valley Street feature pavement widths that are excessive for slow-speed residential streets.

- a. Basswood Avenue—specifically the width of its lanes—facilitates automobile travel at speeds inappropriate for a walkable and bikeable residential area.
 - i. Through travel lanes at this intersection are wide enough to make motorists comfortable traveling at a design speed higher than the posted 25 mph limit.
 - 1. With unmarked parallel parking available on both sides, each of the two through traffic lanes on Basswood Avenue are 20 feet wide.
 - 2. Even with cars parallel parked along Basswood Avenue, the lane widths still exceed typical widths found in urban environments.
 - ii. The lanes along Basswood Avenue exceed the [10 foot width deemed appropriate in most urban areas by NACTO](#)³ ; lane widths of 12 feet or more are typical on high-speed roadways and highways.
 - iii. Due to its width, motorists may feel safe and comfortable driving faster than the posted limit along Basswood Avenue; they may be more likely to treat this avenue like a high-speed roadway, especially when parallel parking is underutilized.

³ National Association of City Transportation Officials

- b. Wide intersections result in wide turn radii that enable drivers to maintain potentially dangerous speeds by turning without slowing down.
 - i. Although the curb radius may be tight, the area available for a vehicle to make a right turn is notably large.
- 4. Basswood Avenue and Valley Street lack friction and design features necessary to calm traffic and encourage automobile travel at safe speeds.**
- a. The number and frequency of residential driveways limit the use of these streets—specifically Basswood Avenue—for parallel parking.
 - b. The underutilization of parallel parking along both roadways may lead motorists to perceive this environment as an extra wide space that lacks congestion and prioritizes their usage by design.
- 5. The location, the current condition, and the use of both signage and markings at this controlled four-way intersection impact motorist behavior and driver decision-making.**
- a. The stop sign on the south side of Basswood Avenue is placed at the edge of the right of way, making it difficult for motorists to see as they approach the intersection.
 - i. The stop sign is placed on a light post that is over 28' from the centerline of the road, and at the back of the sidewalk.
 - ii. The stop sign is located at the marked crossing.
 - iii. Visibility of this sign would likely be lower with cars parked along Basswood Avenue or if cars were parked in adjacent residential driveways.
 - iv. [Best practices](#) for stop sign placement indicate this sign could be placed up to four feet before the crossing and closer to the road centerline⁴.
 - b. Photos collected by a local expert indicate the stop sign has faded and lost its reflectorization; in its current condition, this sign may not adequately capture the attention of motorists or other road users.
 - c. The crossings at the Basswood Avenue and Valley Street intersection are not distinctly marked.
 - i. In California, yellow crosswalks designate school zones; the paint used to mark these crossings is the same color as the lane lines.
 - ii. These markings may fail to capture motorists' attention in the way that high-visibility crosswalks do.
 - iii. The absence of painted stop bars at this intersection may make motorists less likely to halt before driving through designated crossings.
 - d. The markings at this intersection are not consistent with other four-way intersections with marked crosswalks in the city; inconsistent use of signage and

⁴ See also - [California Manual on Uniform Traffic Control Devices \(CA MUTCD\): Section 2B Regulatory Signs, Barricades, and Gates, Function and Purpose of Signs](#)

markings at intersections creates additional confusion for drivers.

6. Poor visibility and competing visual cues along Basswood Avenue and at its intersection with Valley Street impact motorist behavior and driver decision-making.

- a. The intersection lacks enclosure and features elements like streetlights, fencing, and an incline along Basswood Avenue that may draw motorist attention upward and away from the driving environment.
- b. The design of this intersection limits both motorist and cyclist sight distance enough to heighten the likelihood of collisions.
 - i. A motorist traveling at 40 mph would need to make a decision on whether to slow down approximately 140 feet from the intersection.
 - ii. Even if a cyclist or pedestrian is adequately visible from that distance, a distracted motorist may not register their presence and begin slowing down early enough to avoid a collision.
- c. Motorists traveling in either direction along Basswood Avenue must navigate an incline that may heighten the risk of collisions.
 - i. Those traveling northeast along Basswood encounter an uphill incline that may decrease their visibility enough to require decreased speed.
 - ii. Those traveling southwest along Basswood encounter a downhill slope that may decrease the likelihood of them coming to a full stop at the intersection.
- d. Topography, landscaping, and parked cars, create visual obstructions to the sight distances at this intersection.
 - i. The location of the crosswalks and “stop” markings on Valley Street are obstructed from view of motorists traveling north on Basswood Avenue.
 - ii. Streetlights, the upward incline, and residential fencing may also draw northbound motorists’ gaze upward and away from the road itself.

7. The Basswood Avenue and Valley Street intersection is designed with dimensions and features that demand road users operate with unreasonably slim margins of error at all times.

- a. The geometric dimensions of the intersection require motorists, cyclists, and pedestrians to navigate oblique angles, particularly along the northeast side of Basswood Avenue and the southern side of Valley Street.
 - i. These oblique angles may create additional confusion for motorists about where to stop, especially given the absence of stop bars in advance of the marked crosswalk.
 - ii. The angles may also result in pedestrians walking outside the marked crosswalk and cars stopping in the cross walks
 - iii. These angles increase crossing distances for pedestrians and increase crossing time for pedestrians.

- b. The approaches to the intersection, as well as the intersection itself, are over-engineered for speed. The current design compensates for that over-engineering, and tries to improve safety, by having stop signs to slow traffic.
 - i. Those stop signs are only tacitly acknowledged by drivers because they conflict so dramatically with the rest of the overall design. Most drivers roll through them without coming to a complete stop.
 - ii. Stop signs are not traffic calming devices and should not be treated as if they are⁵; the Carlsbad Traffic Engineer has stated on multiple occasions that traffic calming must provide horizontal or vertical deflection.
 - iii. Instead of engaging drivers in the surroundings, making them aware of potential safety concerns, the over-engineered design creates a false sense of security. It signals to drivers that they can and should drive through this area at speed, that the only obstacles they need to consider are other vehicles at the intersection. Without another vehicle present, rolling through the stop sign is perceived as safe.

Recommendations

City leadership and technical staff should agree upon the desired road user behavior along both Basswood Avenue and Valley Street as the first step toward improving safety for all road users traveling through or nearby the intersection of these roadways.

To make adequate provisions for the safety of people cycling and walking along Basswood Avenue and Valley Street, policy-level decisions that establish the intent of the area need to be made and reviewed. The crash location's proximity to multiple schools and placement within residential neighborhoods requires the space to be secure and accessible for all road users. Elected officials need to continue to provide direction on treating Basswood Avenue and Valley Street as neighborhood roadways that prioritize user safety over all other design objectives.

Following a policy decision, all city departments should coordinate with the clear objective to take the necessary actions within the scope of each department, with the resources available, to undertake immediate improvements. City departments need to be aligned to execute short-term actions and plan for long-term change. Municipal staff should be empowered to attend to intersection upkeep items, such as maintaining and replacing crucial street signage, to help prevent any further serious injuries or fatalities at intersections like this one.

While enforcing California's [recently passed intersection daylighting law](#) at the collision location may be one method to slow down traffic flow, there are additional ways to address these factors and minimize the likelihood of future collisions, fatalities, and traumatic injuries. At the intersection of Basswood Avenue and Valley Street, the following practices should be adopted:

⁵ The [Carlsbad Residential Traffic Calming Program](#) has listed stop signs alongside other traffic calming methods since 2011. The Carlsbad Traffic Safety and Mobility Commission has voted to remove stop signs from this listing, but the City Council has yet to approve the changes.

Immediate:

1. Replace the faded stop signs with new signs that include reflectorization.
 - a. Review the location of each stop sign and relocate to fall in alignment with best practices.
 - b. Utilize reflective sign posts to increase visibility of the stop sign for motorists.
2. Use bright yellow paint consistent with CA MUTCD standards for school zones to stripe highly visible crosswalks on all four legs of this intersection.
3. Use bright yellow paint consistent with CA MUTCD standards for school zones to paint stop bars behind each of the intersection crosswalks.
4. Add striping to delineate the travel lanes and the on-street parking near the intersection.
5. Use inexpensive materials like barrels and planter boxes to erect a mini traffic circle⁶ at this intersection; replace current stop signs with yield signs to maximize the traffic calming effect.
6. Utilize temporary measures such as paint and movable planter boxes to create a temporary curb extension at this intersection.
7. Introduce mid-block narrowing with temporary curb extensions using paint, bollards, or movable planter boxes where parallel parking is not possible or not utilized. This will both visually and physically narrow the street, thereby slowing vehicular traffic or alerting drivers to slower traffic speeds.
8. Following immediate modifications, temporarily increase enforcement at this intersection to educate and acclimate drivers, pedestrians, and cyclists.
9. Review the posted limits and actual travel speeds on Basswood Avenue and Valley Street. Focus on implementing temporary measures, such as ones described in this report, that through design will slow travel speeds to the posted speed limit of 25 mph.
10. Form an interdisciplinary team of city staff from multiple departments to act as rapid responders to automobile collisions. This team would be responsible for documenting contributing factors of a crash and empowered to immediately implement short term or temporary improvements to the street. For this crash, charge the team with immediate recommendations listed in this report and recommendations for long-term, permanent changes.

Near Term (within the next 12 months):

11. Make temporary interventions such as curb extensions, mid-block narrowing, or a mini traffic circle permanent by reconfiguring crosswalks and tightening up curb radii within this intersection.
12. Use any upcoming milling or resurfacing initiatives as opportunities to modify the design of this intersection that yield lower travel speeds, specifically by:
 - a. Narrowing existing lane widths closer to the ten feet [recommended by NACTO](#), as this width positively impacts street safety without negatively impacting traffic operations.
 - b. Changing the material of and raising up intersection crosswalks to recapture motorist attention and help calm traffic.

⁶ A visual example from Redwood City, CA Traffic Calming Projects page can be found [here](#).

- c. Erecting a more permanent roundabout or traffic circle if the miniature one successfully reduces motorist speed in this area.
- 13. Shift resources from speed enforcement towards physical changes to the street section that result in lower speeds by design.
- 14. Explore opportunities to reduce the posted speed limit to 20 mph on streets such as Basswood Avenue and Valley Street that are in residential neighborhoods and adjacent to schools and parks where there are higher volumes of pedestrian and bicycle traffic.

Long Term and Systematic:

- 15. Introduce a more comprehensive set of city-wide design standards that result in appropriate sized street sections; restricting motorists to a smaller area may help to systematically decrease their speeds through physical design.
- 16. Once permanent changes have been made to street sections, reduce posted speeds to 20 mph on streets that are in residential neighborhoods and adjacent to schools and parks where there are higher volumes of pedestrian and bicycle traffic.

Concluding Statement

The series of design flaws present along Basswood Avenue and at the crash location are dangerous and common, both within Carlsbad and in other locations. Design emphasis that prioritizes traffic flow at high speeds over pedestrian safety and usability has caused injuries and deaths in communities across California and in places throughout North America.

By evaluating the numerous factors that contribute to a crash, we believe that decision-makers, designers, and the general public can move beyond the current approach, which seeks only to assign blame to involved parties, to a model that helps change the way these spaces are developed and cared for. A new model needs to reflect shifts in engineering practices that help support and further validate city responses to strengthen enforcement and comprehensive traffic safety education efforts. In Carlsbad, we believe substantive changes to this intersection should prioritize cyclist and pedestrian safety; non-motorist roadway usage must be equally valued alongside motorist roadway usage.