Moving Dutchess Forward

High-Crash Locations Analysis Methodology

For our crash analysis, we used the most recent five years of crash data (2015-2019) from NYSDOT and considered high-crash corridors, segments, and intersections. For each analysis, we considered State, County, and Local roads separately. For the overall crash analysis, we normalized the data based on traffic volume. We did not evaluate locations without volume data (thus excluding some local roads), and we did not evaluate ramps. We only included crashes within fifteen feet of a roadway.

High-Crash Corridors

We defined corridors as the entire length of a State, County, or local road in Dutchess County, with some exceptions for special cases. On State roads:

- Overlapping/co-posted Routes (22/44, 22/55, 22/343, 9G/199, 82/44, and 82/199) were treated as part of a continuous corridor (e.g., Route 22, from start to end).
- Boulevards (Route 376 in Arlington, Route 55 in LaGrange, and Route 9) were treated as one continuous corridor.
- Separated roadways (TSP, I-84, and 44/55 WB and EB) were treated separately by direction.
- Route 9 was separated into two corridors based on different characteristics (north of Poughkeepsie to the county line, and from

Crash Data

The crash data we use is from New York State's Accident Location and Information System (ALIS). This data comes from two sources: Traffic and Criminal Software, or TraCS, which most police agencies have installed in their patrol cars, and the DMV crash report forms (Form MV-104).

Because the data is based on police reports, its quality and accuracy can vary based on how the responding officer completes the report. In addition, changes in reporting methods can affect comparisons from year to year. For example, there was a recent change in how property-damage only crashes are reported. NYSDOT is currently working on a replacement to the ALIS system, which may improve some aspects of the data. However, its accuracy still relies on officers entering data completely and consistently.

Poughkeepsie/Hyde Park border south to the county line).

- The Mid-Hudson Bridge (Route 44/55) was treated as a separate corridor.

For county and local roads, we divided corridors at municipal borders, but combined segments that were discontinuous due to a City or Village in between them. We included intersection and segment crashes along each corridor.

Overall Crash Analysis

For the overall crash analysis, we focused on crashes that resulted in an injury or fatality, which we defined as "severe" crashes. We calculated a crash rate based on the number of severe crashes and the weighted average volume along the corridor. We set a minimum number of severe crashes to identify the highest-crash corridors (ten severe crashes for State and County corridors, and five severe crashes for Local corridors) and ranked the corridors from high to low based on the crash rate.

Crash rate formula: *Severe crashes/million vehicle miles = (total # of severe crashes x 1 million) / (number of years x weighted average volume x sum of lengths of segments in miles x 365)*

We calculated the weighted average volume based on annual average daily traffic (AADT) for each segment of the corridor and its length.

Weighted average volume = ((segment 1 aadt segment 1 length) + (segment 2 aadt* segment 2 length) + …(segment n aadt* segment n length)) / (sum of segment lengths)*

Pedestrian & Bicycle Crash Analysis

For the pedestrian and bicycle crash analysis, we set a lower crash threshold (3 and 2 crashes, respectively), and set a minimum corridor length of a half-mile. We did not differentiate between crash severity. We ranked the corridors based on crashes per mile.

High-Crash Segments

Our segment analysis looks at shorter pieces of roads, using the same segments we use for our traffic counts. For the segment analysis, we only included non-intersection crashes (defined as crashes more than 75 feet from an intersection), since we evaluated intersections separately.

Overall Crash Analysis

For the overall crash analysis, we set a threshold of six or more crashes (of all severities).

Since our data does not include road elevation, there were some errors in the crash counts where an elevated road has a road underneath it– in particular, elevated portions of Route 9 and the Taconic State Parkway. We reviewed top-ranking segments to check for these situations and adjusted the crash totals based on the individual crash locations to ensure accurate numbers. For the future we would like to find a way to incorporate elevation data into our roads layer.

Divided State roads (including portions of Route 9, I-84, and the Taconic State Parkway) were evaluated separately by direction.

We evaluated each segment according to three measures, calculated their ranking for each, and used the average of the three rankings for the final ranking:

1. Crashes/mile: this accounts for the length of the segment
2. Crashes/million vehicle miles (mvm): this accounts for traffic volume as well as the length of segment
3. Severe crashes/mvm: this accounts for crash severity (this rate includes only injury and fatal crashes) as well as the segment's volume and length.

Pedestrian & Bicycle Crash Analysis

For the pedestrian and bicycle crash analysis, we set a lower crash threshold (3 and 2 crashes, respectively). We did not differentiate between crash severity. We ranked the segments based on crashes per mile.

High-Crash Intersections

We defined intersection crashes as crashes within 75 feet of an intersection.

Overall Crash Analysis

For the overall crash analysis, we used the volume entering each intersection to create crash rates. Because this was a manual process, we only evaluated the fifteen highest-crash intersections for each type (State, County, and Local). This excludes some intersections that may have low crash totals, but relatively high crash rates based on the entering volume. If the crash rate calculation could be automated, we could screen all intersections to determine those with the highest crash rates.

We did not analyze intersections at the Route 9/44/55 interchange in the City of Poughkeepsie due to its complexity and because we are evaluating redesign options for the interchange as part of the Poughkeepsie 9.44.55 study.

In a few cases, we estimated volumes based on nearby or comparable segments (in almost all cases, we were only missing one of the four entering volumes, and the estimate did not change the intersection ranking significantly).

We adjusted some intersection crash totals to include or exclude crashes from an adjacent intersection, based on whether it was deemed part of the main intersection.

We evaluated each intersection according to two measures, calculated their ranking for each, and used the average of the two rankings for the final ranking:

1. Crashes/million entering vehicles (mev): this accounts for volume
2. Severe crashes/mev: this accounts for volume and crash severity

Crashes per million entering vehicles = (# of crashes x 1 million) / (number of years x (sum of entering volume on each approach) x 365)

Pedestrian & Bicycle Crash Analysis

For the pedestrian and bicycle crash analysis, we set a lower crash threshold (3 and 2 crashes, respectively). We did not differentiate between crash severity. We ranked the intersections based on total crashes.

Crash Types & Factors

The collision type typically describes two-vehicle crashes. However, many responding officers use the ‘other’ category to describe single-vehicle crash types. For that reason, we also evaluated the top sub-types in the ‘other’ category. For the charts, we show any factor that represents at least ten percent of the crashes on any given road type (all, State, County, or local).

For crash factors, we reviewed the factors for all involved vehicles and calculated each factor’s percentage of the total factors cited. We excluded ‘not entered’ and ‘not applicable.’ For the charts, we show any factor that represents at least ten percent of the crashes on any given road type (All, State, County, or local).