Road Traffic Collision Analysis

COVID Measures Impact v2

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1. Aim

This document summarises an initial analysis of ATC (Automatic Traffic Count) and collision data relating to the COVID social distancing measures. It has been suggested that a significant drop in traffic flow has resulted in a higher proportion of speeding, especially extreme speeding. There is a concern that this, combined with increased levels of cycling will lead to more vulnerable casualties and higher collision severities.

This document uses ATC data for a sample of sites in Essex to provide evidence of speed and flow trends, with data from CRASH used to examine the resulting collision and casualty trends.

The data covers the period 6th January to 19th April 2020, unless stated otherwise.

2. Executive Summary

a. Key findings and inferences

1) This data shows a clear trend of decreasing speed compliance rates with decreasing flow. This fits the hypothesis that there is a relationship between reduced congestion and reductions in speed compliance.
2) Not only has the rate of speeding increased, but also the total number of vehicles breaking the speed limit. The number of vehicles breaking the limit by at least 15mph has increased by 90% (i.e. nearly doubled). This may have come about from a combination of changes in driver perception, both around the risk of facing enforcement consequences, and the risk of involvement in a collision.
3) Since the COVID measures came into place there have been a number of changes in the collision profile in Essex, including:
    a. A 77% reduction in the number of collisions, but only a 67% drop in KSI. There has been an increase in the proportion of collisions that result in the highest level of injury severity.
    b. There have been reductions in all casualty types, but proportionally an increase in cyclist and P2W casualties. These casualties are associated with a higher likelihood of serious injury, so it is likely this is part of the reason for the increase in average severity identified previously.However this has occurred at a time of year when we would normally expect an increase in travel by two-wheeled modes with a corresponding increase in these casualty types. Given cycling is one of the few activities away from the home specifically sanctioned by the government, we would expect an increase in the number of people cycling, and this is supported by anecdotal observations.
    c. The *number* of collisions involving inappropriate speed and drink/drug impairment has reduced, but the *proportion* of the total that involve these factors has increased. This indicates that the increased speeds identified in the ATC data *have* translated into collisions that could have been avoided if pre-COVID vehicle speeds had been maintained. It is also consistent with the view that people who drive impaired are less likely to heed the messages to stay at home.
    d. There has been a small temporal shift in collision times towards the middle of the day, away from peak commuting times, and also a slight shift towards the weekend.
    e. Reductions in collisions have been smallest on roads with 30-40mph limits.
    f. Any changes in the overall geographic distribution of collision is disguised by the large drop in overall numbers. A longer time period would be needed to identify if there have been any fundamental changes

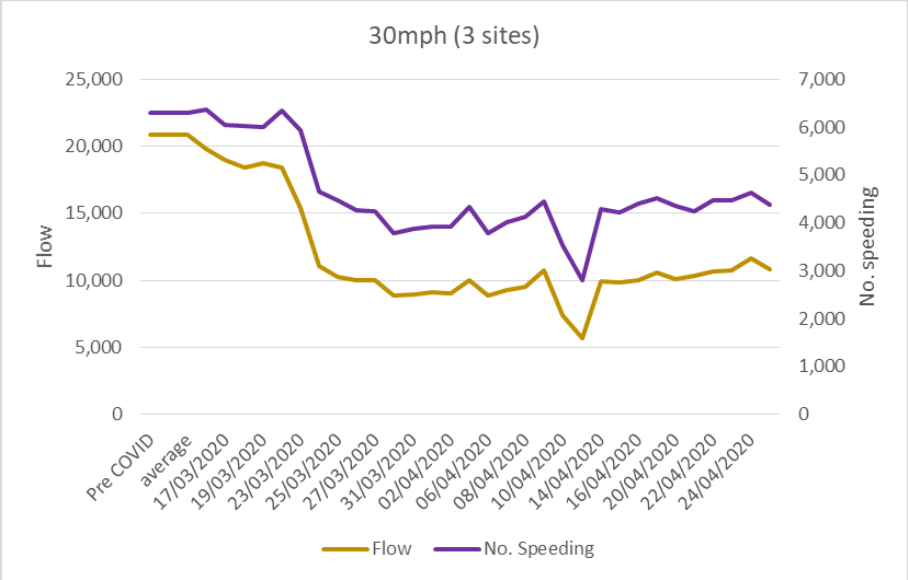
b. Recommendations

1) Safety initiatives to focus on the following messages:
   - Speed limits still apply
   - The roads are still being policed
   - Now is the time to drive more cautiously than ever to prevent further burden on the NHS
   - All cyclists, but especially those who didn't ride regularly before COVID (i.e. to compensate for their inexperience) should follow guidance from bikeability when cycling, to reduce the risk posed to them by other road users.
   - Be extra vigilant for vulnerable road users, particularly new and inexperienced cyclists

2) Proactive enforcement to focus on 30-40mph roads, with a particular focus on speed and impairment.

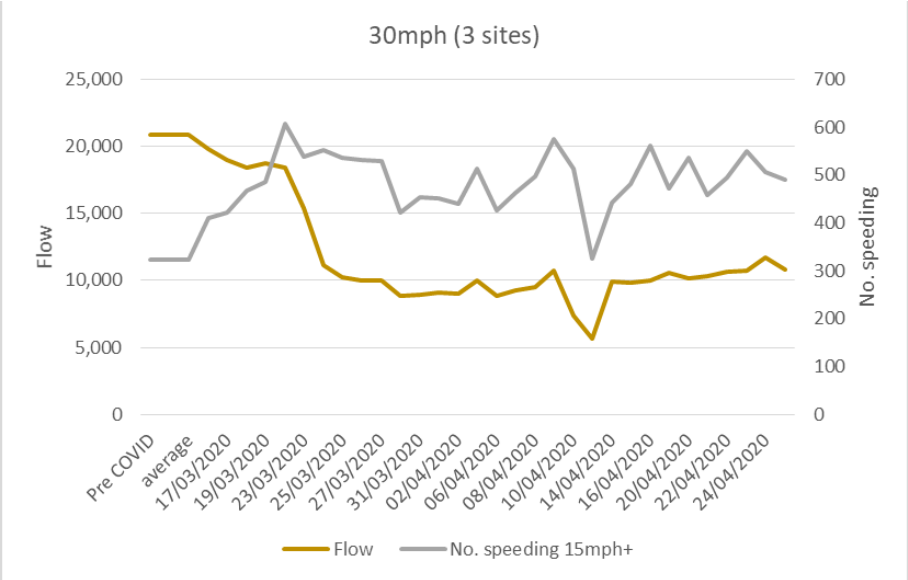
3. Speed and flow data

The following graphs show speed and flow data for a selection of sites in Essex, chosen to represent a range of road types – albeit limited to those with permanent automatic counters. Please note also that some of the signal shown in these charts results from periods where the devices were not operating for technical reasons. The charts therefore just provide an approximation of the trends that we expect are applicable across many similar major roads across Essex.



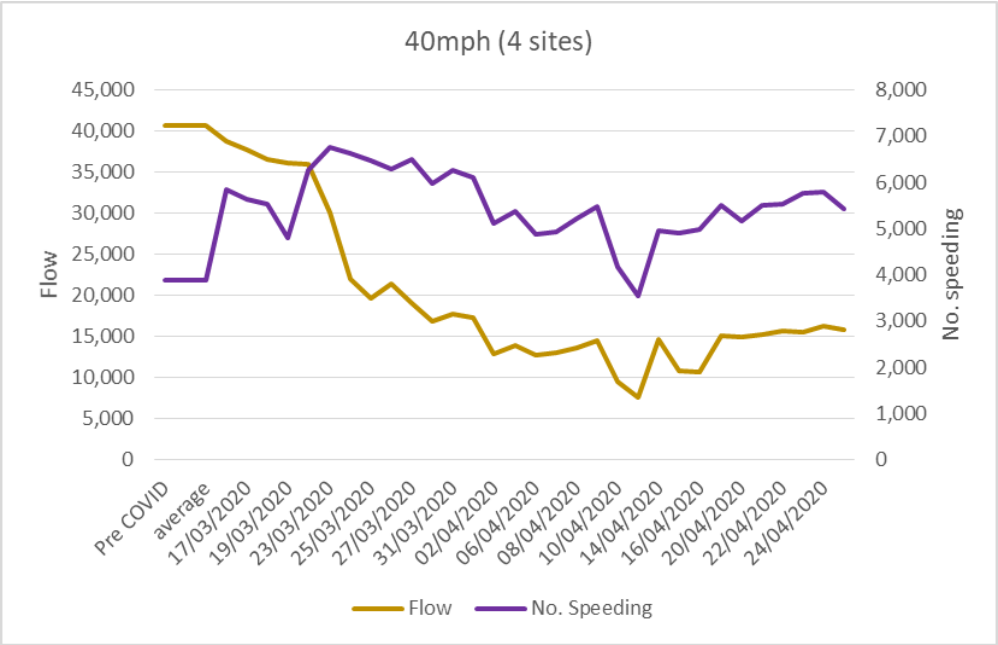
This shows a drop in traffic, along with a drop in total number of speeding vehicles. The gap between the lines widens slightly indicating am increase in the speeding rate for the vehicles that remain on the road. In other words, a higher proportion of the vehicles on the road are speeding, but the total number is smaller.

The next chart shows “extreme-speeding”, defined as vehicles exceeding the speed limit by 15mph or more.

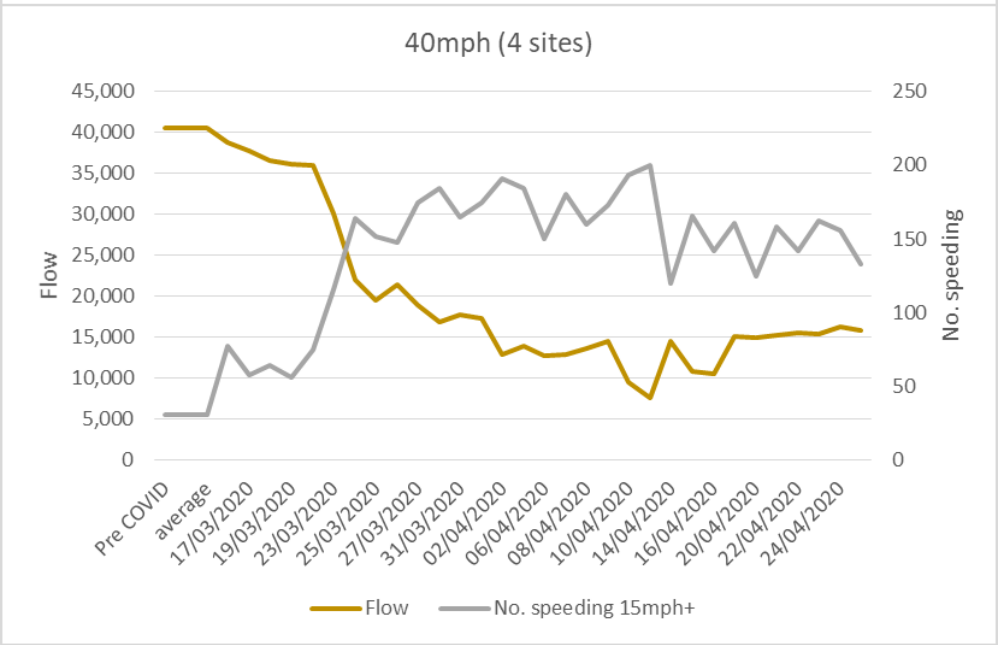


This shows that not only has the rate of extreme speeding increased, but also the total number of vehicles speeding by 15mph or more. So despite there being a drop in traffic of over 50%, there are more vehicles exceeding the limit by over 15mph.

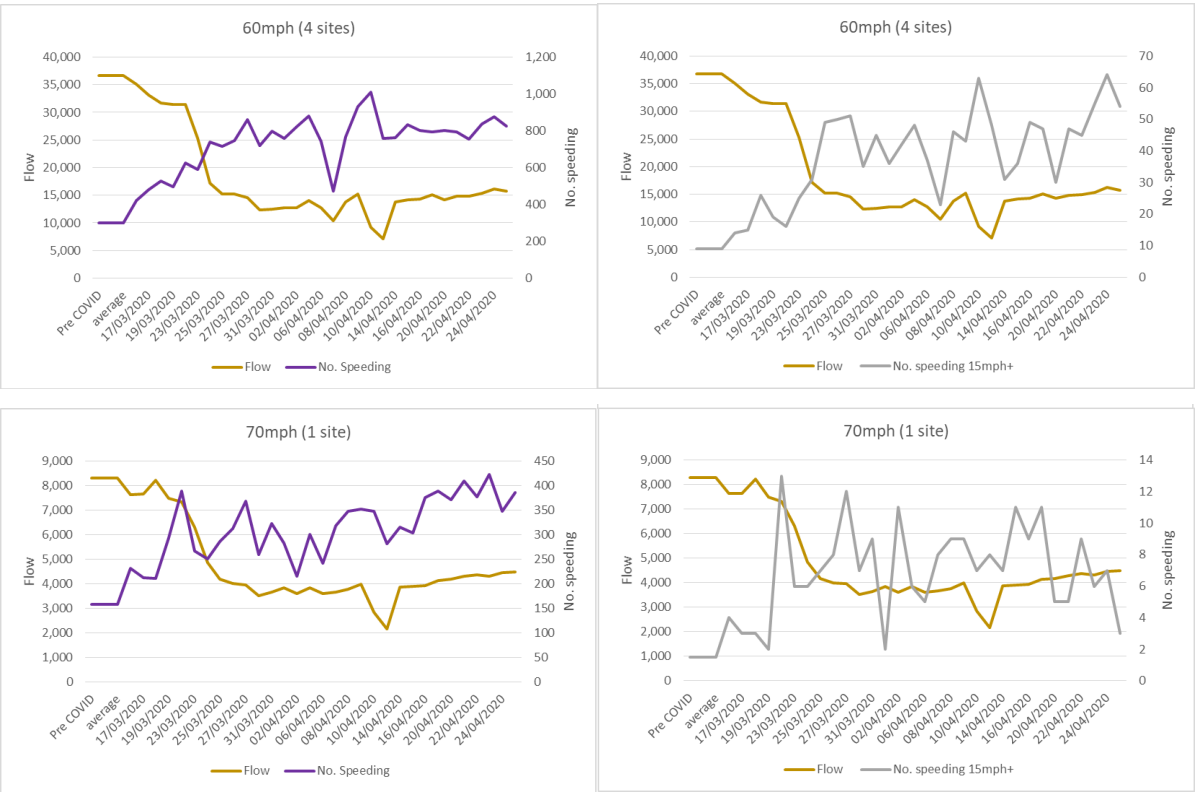
The following charts show the same data for 40mph, 60mph and 70 mph roads.



The graph above shows both the number and the rate of speeding has increased on 40mph roads. The graph below shows this is also the case with the number and rate of "extreme speeders".

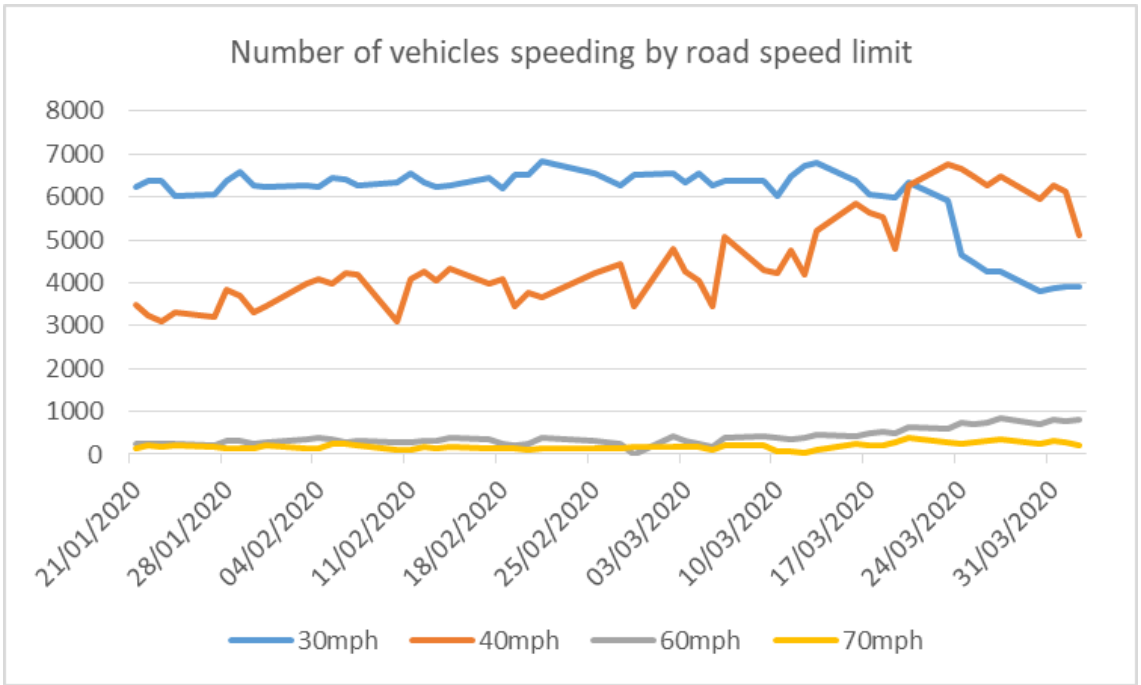


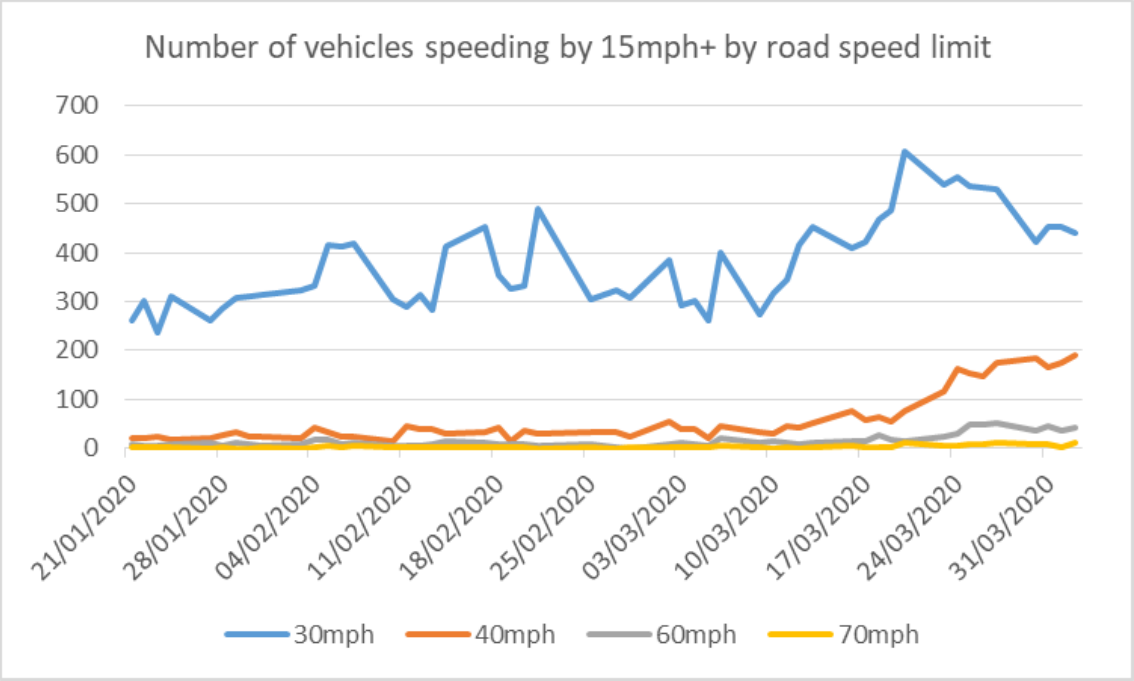
The pattern seen on 40mph is also seen on 60mph and 70mph roads, albeit to a lesser magnitude.



Previous work on an older version of this data up to the end of March is shown on the next few pages.

The next two graphs show the total number of speeding vehicles by road speed limit. This has not been updated from the previous version of this document, so only shows trends to the end of March.





This shows that despite considerable reductions in the total number of vehicles using the road, there are more drivers in total who are breaking the speed limit, both by small amounts and by 15mph or more. The only exception is the total number of speeding vehicles on 30mph roads has reduced, although the total number on 30mph roads exceeding the speed limit by 15mph or more has increased. The same data is summarised in the following table.

This table shows the *average daily number* of speeding vehicles detected at the 12 sites in the sample, split by speed limit.

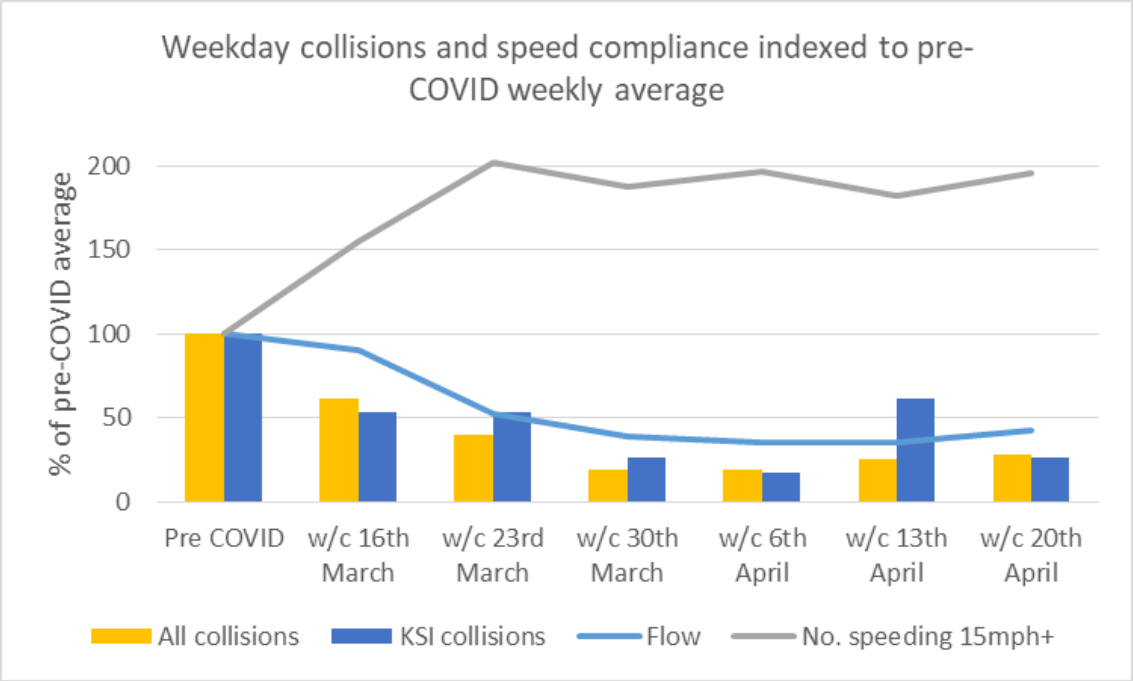
	All speeding vehicles		*Vehicles speeding by 15mph+*	
Road speed limit	**Average before 23rd March**	**Average after 23rd March**	**Average before 23rd March**	**Average after 23rd March**
30mph	6,358	4,144	353	489
40mph	4,149	6,165	36	169
60mph	326	770	10	42
70mph	166	287	2	8

This shows that across the 12 site sample there are an ***extra* 366** speeders per day, including ***308 "extreme speeders"*** at 15mph of more above the speed limit.

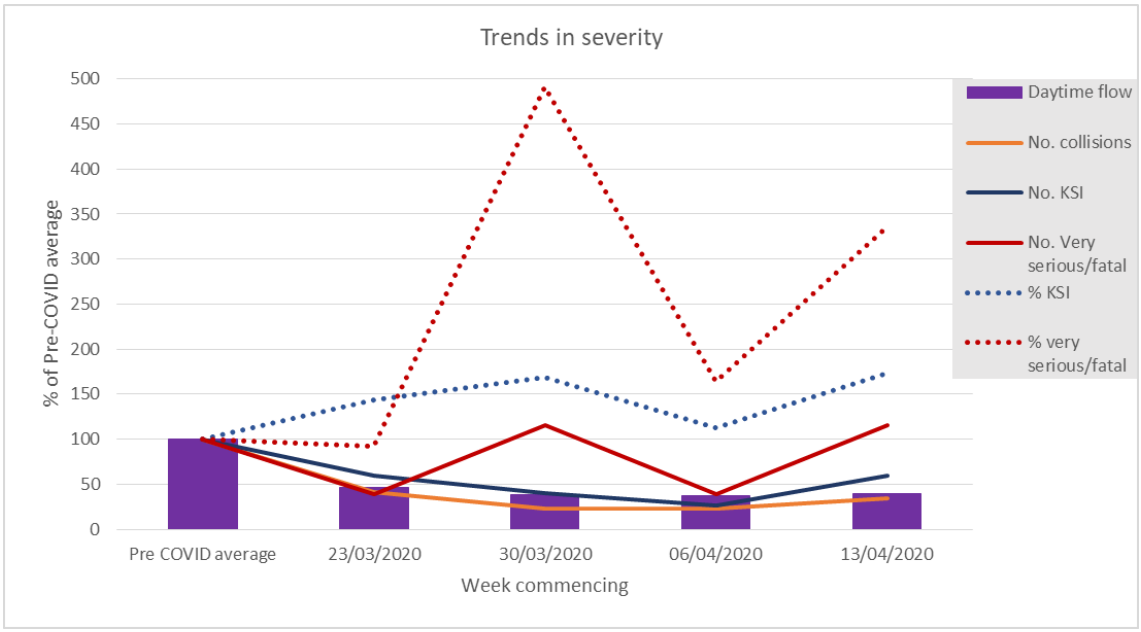
4. Collision and casualty trends

a. Number and severity of collisions

The chart below shows overall numbers of collisions with the data on flow and extreme speeding.



Severity is shown in more detail on the following chart. This shows that while the number of KSI has reduced, it has not reduced by as much as collision overall. Furthermore, the most serious of KSI collisions have reduced by a smaller amount than the less serious ones.



This data shows there has been:

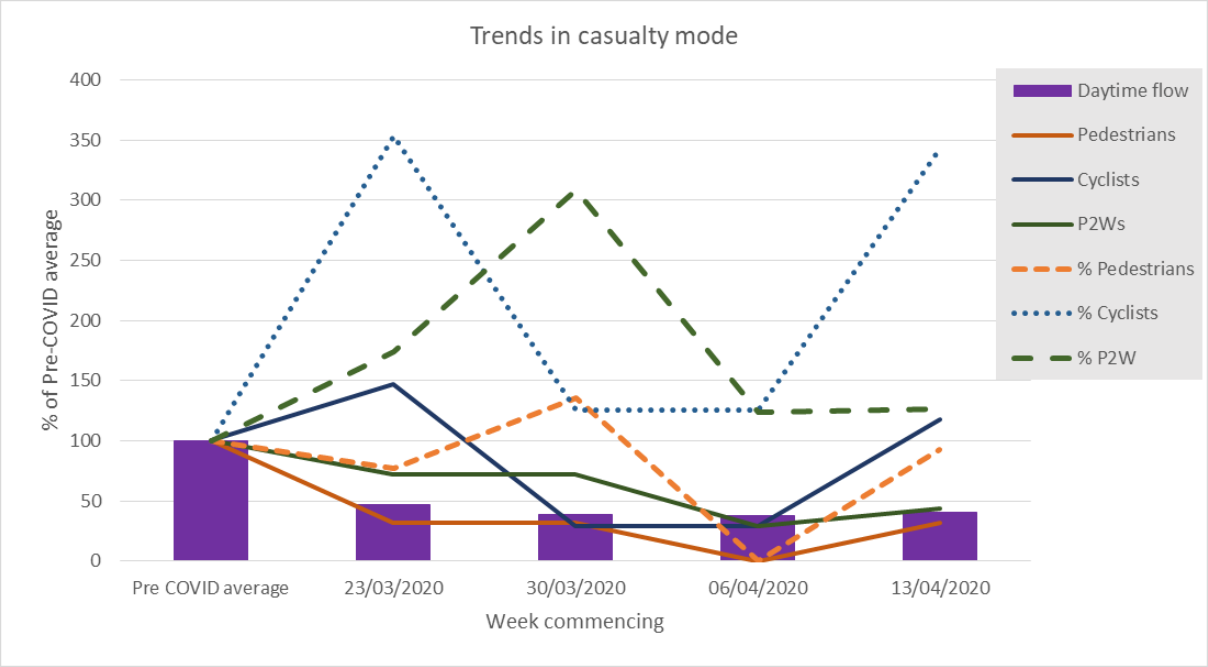
- 62% drop in traffic flow.
- 77% drop in the number of collisions.
- 67% drop in the number of KSI collisions.
- 90% increase in the number of vehicles exceeding the speed limit by 15mph or more.

Assuming any error in the collision data is consistent across different severities, the fact KSIs have reduced by a smaller amount than other collisions may be related to the increase in extreme speeding.

The following charts examine casualty trend data to determine if there could be other reasons for this increase in average severity.

b. Casualty trends

The first chart in the section examines trends in casualty mode, both in terms of number and how much of the total number of casualties they represent.

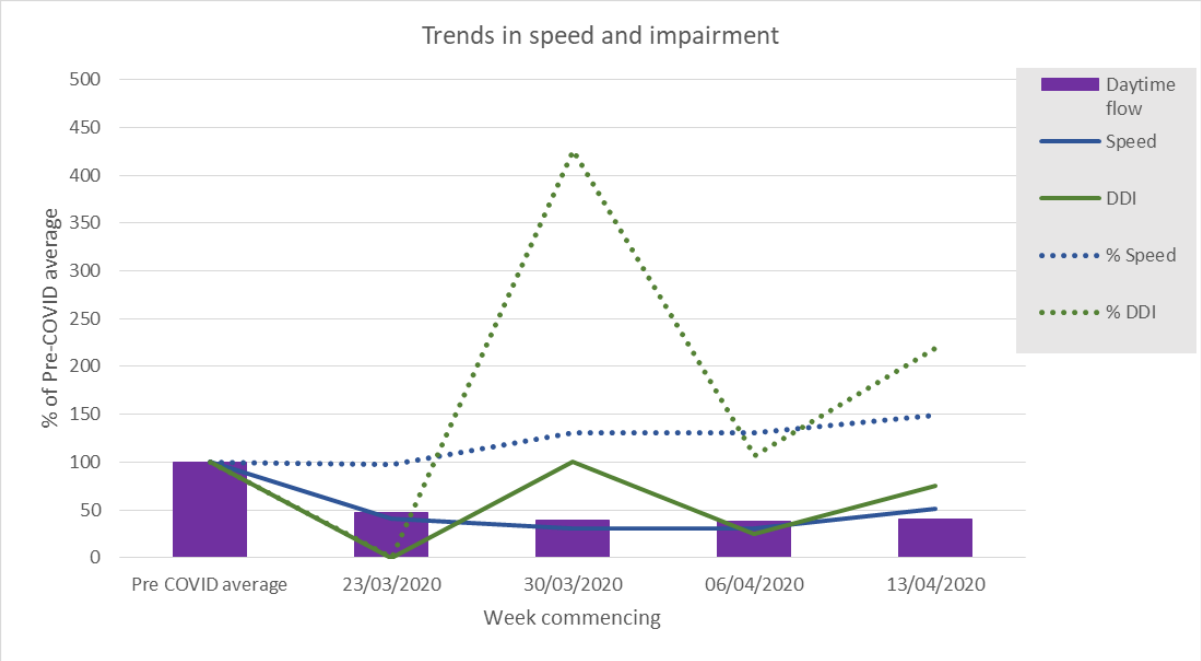


This shows consistent decreases in the numbers of pedestrians and P2W riders injured. The number of cyclist casualties has been down on the pre-COVID period on two weeks out of four and up on the other two weeks, but showing an overall reduction on average. Previous work shows cycling casualties follow a seasonal trend, highly correlated with average temperatures, so we would normally expect to see an increase in the number of cyclist casualties during this period compared to our January-March baseline.

The decrease in total casualties has been greater than the decrease in cyclist and P2W casualties, so the percentage measure for these two modes is showing an increase on the chart. In other words the number of casualties on two wheels has reduced, but not by as big a proportion as the total number of casualties.

These casualties are associated with a higher likelihood of serious injury, so it is likely this is part of the reason for the increase in average severity identified previously.

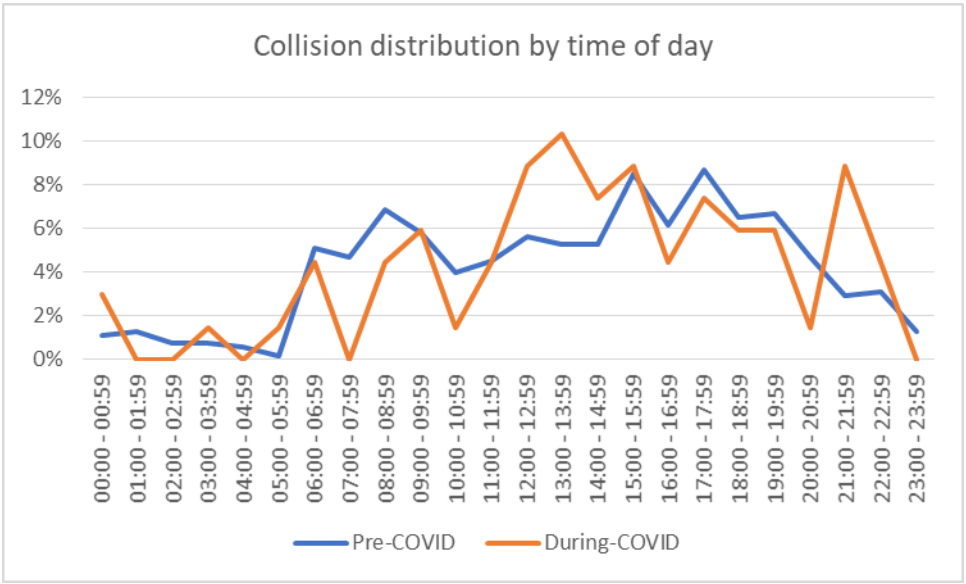
The next chart shows where speed and drink/drug impairment has been recorded as a contributory factor.



As with vulnerable road users, there has been a numerical reduction in the number of collisions involving these factors, but they have increased in prevalence among the collisions that have occurred.

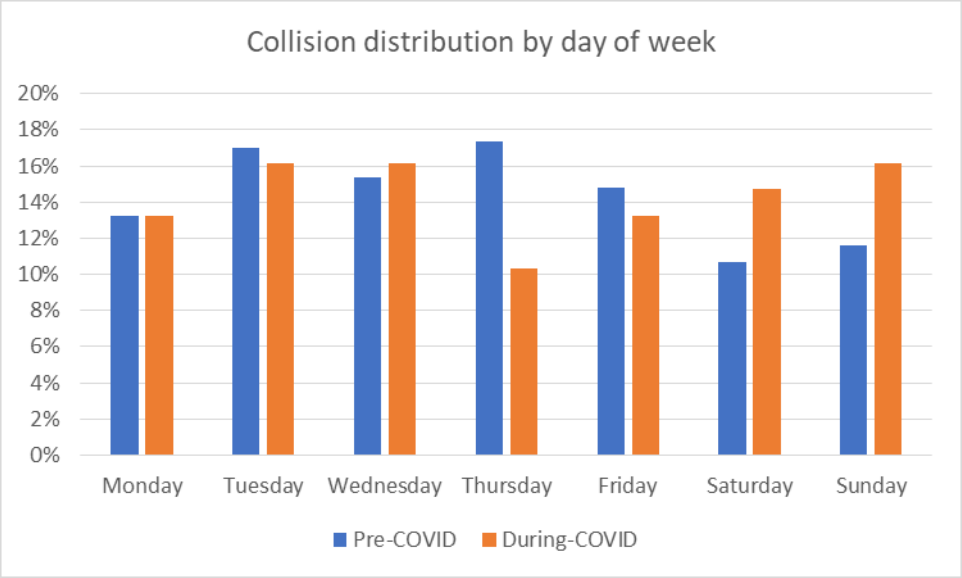
This indicates that the increased speeds identified in the previous section have translated into collisions that could have been avoided if pre-COVID speeds had been maintained. There were insufficient collision records showing distraction and cyclist-at-fault type factors to identify any trends in these types of collision.

The next two charts show changes in the time and day profile of collisions.



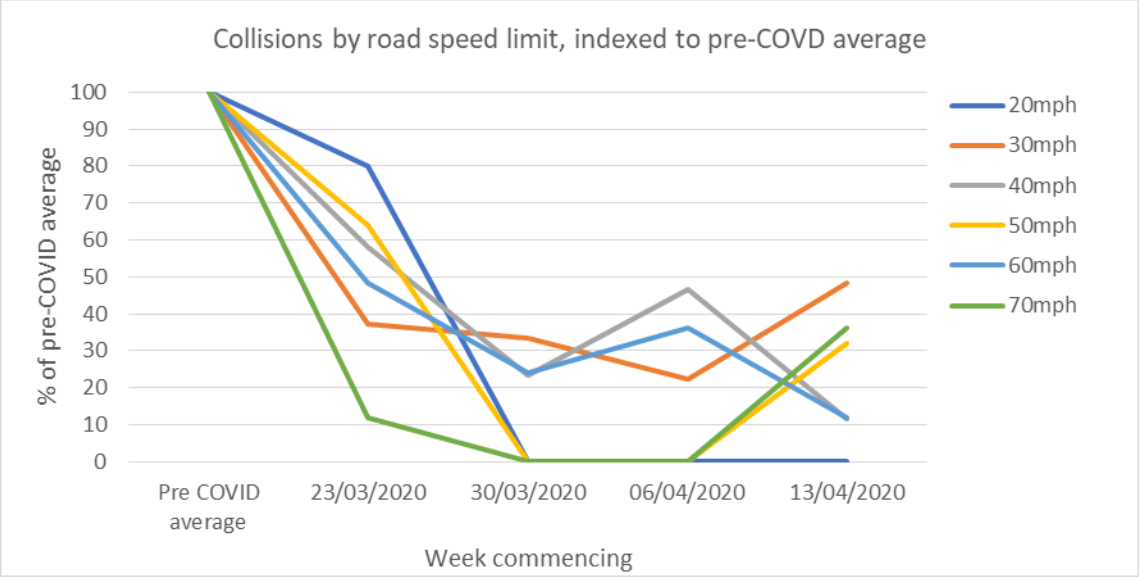
This shows a very small change in the time of day for collisions, with fewer occurring around traditional peak commuting times, with new peaks in the middle of the day and late evening.

The days collisions occur has changed slightly, with a small shift towards the weekend shown in the data below.



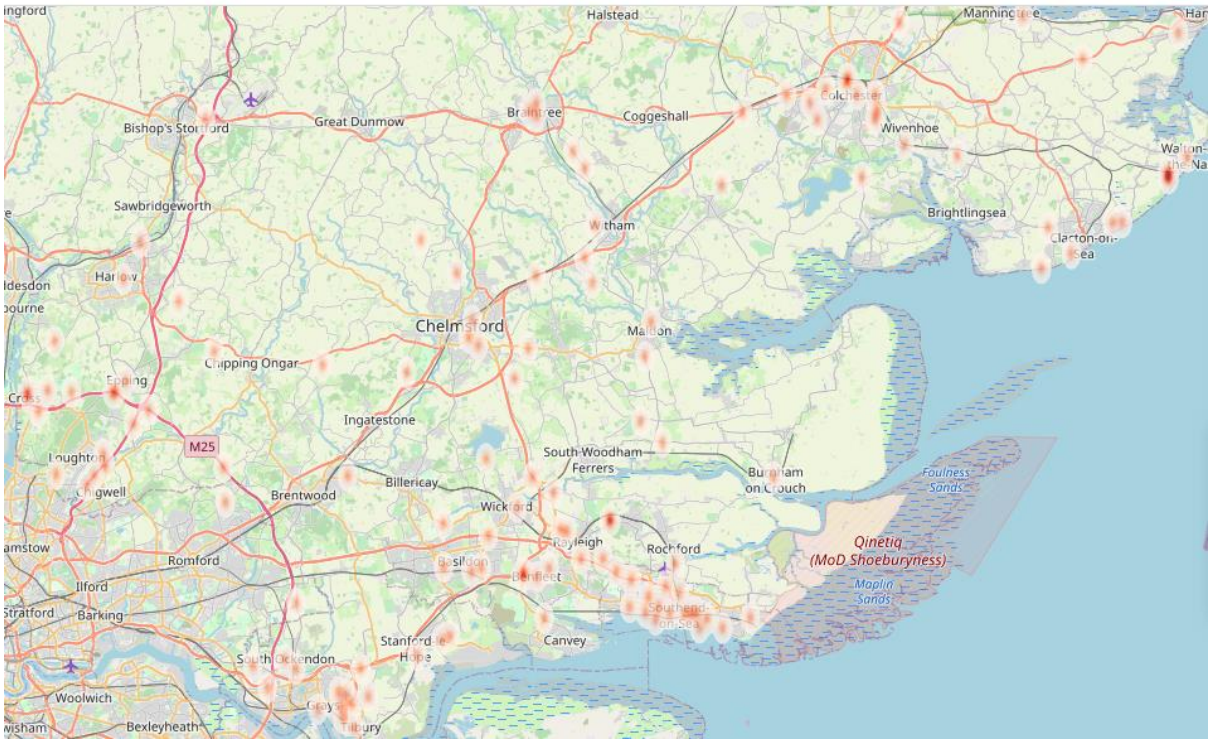
c. Road type and location

The data in the chart below shows that the number of collisions has reduced across all road types, but with the greatest reductions on 50mph and 70mph roads.



This is consistent with the lower relative safety impact of speeding by 15mph on a faster roads, compared to a 30mph road. The types of roads used by cyclists and other vulnerable road users may also influence this trend.

The following heatmap shows the relative geographic density of collision locations in Essex since 13th March.



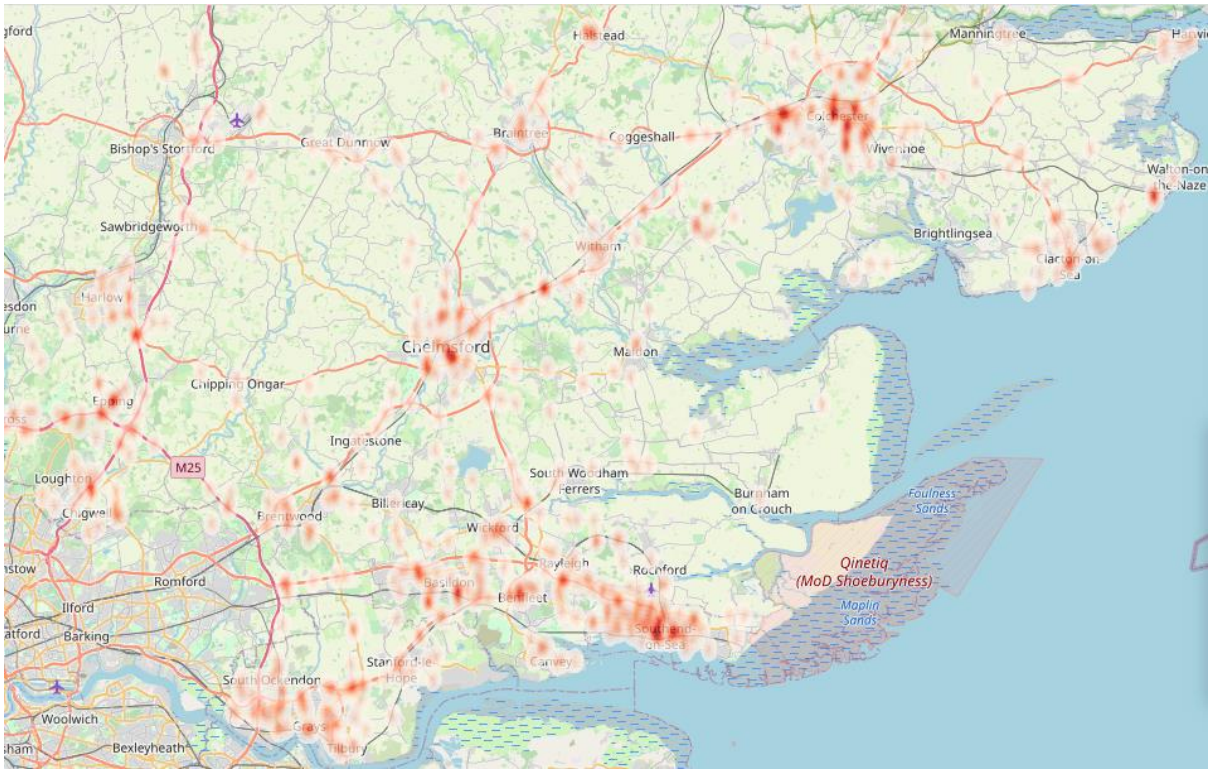
This distribution has some notable differences with the overall distribution so far in 2020 (Appendix part a) and for the January to April distribution in 2019 (Appendix part b), specifically:

- Major reductions in town centres, particularly Clacton, Chelmsford and Southend.
- Braintree and Walton-on-the-Naze have seen relatively little reduction.

However, changes in the overall geographic distribution of collisions is somewhat disguised by the large drop in overall numbers. A longer time period would be needed to identify if there have been any fundamental changes

5. Appendix

a. Collision heatmap – January to April 2020



b. Collision heatmap – January to April 2019