WILSDEN ROAD SAFETY TRUST PROJECT

Harecroft: an evaluation of how to apply psychological speed reductions through a rural hamlet through incremental changes in visual deterrents over a fixed period of time

Wilsden Parish Council

September 2022

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Executive Summary:

1. This project was commissioned to reduce the speed of traffic travelling through the hamlet of Harecroft, which has approximately 60 homes located on one road.
2. The road (which had a 30 mph speed limit) carries commuter traffic to and from Bradford in excess of 7000 vehicles using the road daily.
3. By reducing traffic speed, we were anticipating reduced accidental vehicle collisions and property damage, which was rife, thus leading to an improvement in the perception of safety for local residents.
4. The road was changed to a 20 mph zone through a phased series of visual installations which it was hoped would lead to a marked psychological impact upon drivers, helping to reinforce the need to reduce speeds through the hamlet.
5. Unfortunately, although the project was eventually completed, it was not carried out to the original 6 month timetable, in fact the installations took twice as long as planned.
6. Additional incidents (vehicle damage) and machinery problems (storage capacity and downloading of speed data) led to problems in gaining continuous speed data for analysing.
7. The speed data obtained from this project has been analysed by Dr Samantha Jamson, Professor of Transport Psychology, Institute for Transport Studies, University of Leeds, and a survey of residents has been performed.
8. The results are mixed, as follows:

Positive Findings

9. Vehicle speeds reduced after each new visual speed element was installed in both directions.
10. Data also indicates that average speeds slowly reduced after each installation Westbound and for 5 of the 6 phases Eastbound.
11. These reductions are also evident in each of the six time periods that data was segregated into – covering super-peak to overnight.
12. Compared to average speeds before the project commenced, overall average speeds show a reduction of 6.20 mph Eastbound and 5.37 mph Westbound.
13. Post implementation resident questionnaire feedback reports that there has been no vehicle collisions or property damage since the 20 mph zone project commenced.
14. Based on the above, the psychological effect on drivers through the phased installation of multiple visual deterrents has been considered successful.

Remaining Concerns

15. Despite the overall speed reduction, vehicles significantly exceed the new 20 speed limit:
    a. Westbound - 89% exceed 20 mph, 41% exceed 30 mph, 5% exceed 40 mph
    b. Eastbound – 74% exceed 20 mph, 11% exceed 30 mph, .5% exceed 40 mph
16. The average speed of traffic is now:
    a. Westbound – 25 mph
    b. Eastbound - 24 mph
17. Post implementation resident questionnaire feedback reports no improvement in perceived safety.
18. Residents would like to see additional deterrents (cameras by preference and/or physical restraints) being considered.

Introduction:

Why is speed reduction needed:

1. Harecroft is a rural hamlet located on the B6144.
2. There are approximately 60 homes, mostly terraced, located alongside a 400 metre length of the road which have limited or no parking facilities on the properties.
3. The 400 metre section is winding and on a slight hill – uphill Eastbound, downhill Westbound.
4. The road width is narrow and whilst 2-way, is often restricted in width by resident parked vehicles, delivery vehicles and works vehicles.
5. The B6144 is a major commuter route to and from Bradford, carrying over 7000 vehicles per day.
6. The existing speed limit is 30 mph, but residents are convinced average speeds exceed this and late evening traffic significantly exceed this. Results from a 1-week ACT project in 2019 support this.
7. Residents have reported a high level of vehicle collisions: 26 in last 5 years, including 1 major and 2 minor casualties.
8. A large number of vehicle collisions have been linked to parked vehicles late at night. These have in the main been minor and have resulted in a high incidence of “hit and run”: 16 drivers failed to stop after causing damage.
9. Residents report significant noise and vehicle discharge pollution which they hope will be reduced if speeds fall.
10. Residents are also concerned to improve the perception of danger, enabling safer movement for pedestrians with improved liveability.

A new approach to sustained speed reduction

11. Rural communities are conscious that speeding is a major issue which is hard to effectively police.
12. Villages and hamlets are unusual. To maintain rural and historical ambience and vistas that give them country character, there is a desire to avoid lots of brightly coloured-signage or physical measures which detract from this.
13. Harecroft is unable to support normal urban methods of speed-reduction:
    a. police enforcement cameras – the road does not qualify due to a lack of fatalities/serious accidents
    b. chicanes - insufficient space
    c. speeds-humps - the B6144 is a bus, emergency vehicle and major HGV route, resulting in local authority sustainable objections.
14. It is believed that wholesale visual speed deterrents, installed simultaneously, lead to immediate speed reductions, but then a gradual rise in speed occurs as drivers become apathetic with the road and its conditions, which has led to an alternate approach to addressing driver familiarity.

Aims and objectives of the project

1. The plan is to install six visual deterrents, one per month for six months.
2. It is hoped that this approach will continually stimulate drivers about the speed limit on this particular road and prevent the usual familiarity and rise in speeds after time which appear to occur when all deterrents are installed simultaneously.
3. Base line speeds will be recorded before the first installation and throughout the project to measure the effectiveness of the phased implementation.
4. The following details the sequence of installations:
    a. Place Speed-Indicator-Devices [SIDs] in stealth-mode inside intended 20mph-zone (both directions) which will provide a pre-installation base-speed and measure each aspect of the phased installation. Add pneumatic-cable across carriageway or laser-monitor to record vehicle speeds at mid- point of 20mph-zone, running in stealth-mode throughout installation process.
    b. Reduce the speed-limit on approaching roads from 40 mph to 30 mph for a 400 metre distance ("Buffer zones")
    c. Introduce a speed zone on the B6144 to 20mph (Old Allen Road to Bents Lane) and a 100-metre approach from the side road that joins it (Old Allen Road) via the installation of prominent pole signage on both sides of each road.
    d. Convert two local public adopted 'cul-de-sac' roads, Station Road and Brown Lee Lane to 20mph
    e. Install coloured road-markings (Burgundy-resin) at entrances to 20mph-zone (3-positions)
    f. At start of each 20mph-zone, add a set of 12 x rumble-strips to both sides of carriageway
    g. Within 20mph-zone, erect 20mph repeater pole signs
    h. Within 20mph-zone, paint white roadway with 20mph-roundels at set intervals
    i. Activate SIDs (showing actual speed and smile-frown) just inside 20mph- zone in both directions
5. The pneumatic cables will be removed at the end of the project.
6. The SIDs will remain in situ as these have been purchased. Their operation will be solar panel powered in order that they operate continuously without the need for battery changes.
7. Periodic speed downloads will continue after the project has ended to verify whether speeds are maintained, fall or rise after a period of time.

Activities

1. All of the actions in the Aims and Objectives section of this project were performed in sequential order, however, they were not carried out monthly due to coronavirus limitations on resources, equipment and contractor staffing availability.
2. The project took 55 weeks to conclude as opposed to an intended 26 weeks.
3. Additionally, each installation did not have a consistent period between them, instead the time differences varied in accordance with the following table:

	Intervention	**Speed Limit**	**Data period**	**Weeks**
Baseline	None	40/30/40	23 June – 12 July 21	Week 1–3
Phase 1	20mph signs installed	30/20/30	17 July – 26 Sept 21	Week 4–18
Phase 2	Addition of Repeater Poles	30/20/30	28 Sept – 5 Dec 21	Week 19–24
Phase 3	Addition of Burgundy Tarmac	30/20/30	7 Dec 2021 – 30 Jan 22	Week 25–27
Phase 4	Addition of Repeater Roundels	30/20/30	1 Feb – 18 April 22	Week 28–43
Phase 5	Addition of Rumble Strips	30/20/30	19 April – 30 May 22	Week 44–49
Phase 6	SID Activation	30/20/30	1 June – 30 June 22	Week 50–55

4. There were also a number of incidents that have resulted in a proportion of the SID data being lost. The following data days were lost (From 386 project days = Westbound – 119 days; Eastbound – 94 days), due to the following reasons:

    a. Vehicle damage – Eastbound a short data loss from being knocked from the pole (re-hung after a week as still operational).
    b. Vehicle damage – Eastbound a long data loss from being knocked down a second time resulting in the machinery breaking. A replacement battery-operated SID was loaned to the project by CMBDC, but this took several weeks to erect.
    c. Battery running flat – Temporary Eastbound SID needed battery replacement every 2 weeks (due to traffic volume), which was not always possible.
    d. Data storage issues – The SIDS were originally set to record bi-directional speeds (2 per vehicle), which used up memory quicker than expected. New data replaced older data before machine data was downloaded. We amended the readings to approaching speed recording mid-way through the project.
    e. Downloading issues – The App for downloading recorded data is only compatible with Android equipment/phones but, the Parish Council use Apple equipment. This meant relying on CMBDC to download the data and send it to us. Resources issues meant they were not always able to do this before new data replaced older data before machines were downloaded.

5. The ACT pneumatic cables were more resilient and only 3 days of speed data was lost throughout the project.
6. Despite the SID data losses, the combination of the two x SIDs and the ACT has produced adequate data for analysis.
7. During the project period, there were also a number of other factors that lead to lower vehicle volumes and slower speeds, most notably:
    a. Coronavirus – a period of working from home, reducing commuter traffic.
    b. Road relaying – the road was reduced to Single Alternate Lane Traffic (SALT) for 3 weeks while the road was re-laid during a spell of snow. Raised ironworks slowed vehicles considerably during this process. However, a newly laid road resulted in higher speeds thereafter.
    c. Facilities – A number of cables and pipes were laid along and across the road, reducing the traffic to SALT for 2 weeks in total.
8. Subsequent data analysis indicates that these events have not skewed the results.

The method/methodology used to evaluate your project

1. A SID was erected approximately 100 metres inside the 20 mph zone in each direction.
2. The recording component of the SIDs were switched on immediately, but the visual displays were switched off (to operate in stealth mode) and red and white screen surrounding tape was covered over so that the device did not appear to be a traffic device – see picture 1

Picture 1

3. A pneumatic cable (ACT) was laid across the road at the approximate mid-point of the 20 mph zone to capture speeds well after initial signage and devices.
4. The visual deterrents were then installed as per the following table:

	Intervention	**Speed Limit**	**Data period**	**Weeks**
Baseline	None	40/30/40	23 June – 12 July 21	Week 1–3
Phase 1	20mph signs installed	30/20/30	17 July – 26 Sept 21	Week 4–18
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Phase 6	SID Activation	30/20/30	1 June – 30 June 22	Week 50–55

5. Throughout the process of installations, Traffic count data was regularly downloaded from all three devices in order that analysis could be carried out post project to determine if speeds were reducing as each installation was performed.

6. Post project completion, the traffic flow data was analysed and used to identify peaks in flow throughout the 24-hour period, for weekdays and weekends separately and in each direction.
7. Results have been generated for all traffic count which provides the mean as well as 85th%ile data derived for the Project Phases, along with the % reductions observed.
8. Subsequent data analysis indicates that the events described in 4 above have not skewed the overall results although the SID results for Phase 2 appear to produce some anomalous data. For the Phase 2 westbound results the sample size was typically only 5% to 15% of the other phases. Although the sample size for the eastbound Phase 2 results was larger it was also significantly smaller than for the other phases. For these reason care should be taken in interpreting much from the Phase 2 SID mean speeds.

EASTBOUND: WEEKDAYS AND WEEKENDS

Weekdays Eastbound	
00:00-05:00	overnight
05:00-06:00	early risers
06:00-07:00	steady peak
07:00-09:00	super peak
09:00-19:00	steady peak
19:00-24:00	evening

Weekends Eastbound	
02:00-07:00	overnight
07:00-09:00	early risers
09:00-21:00	steady peak
21:00-02:00	evening

WESTBOUND: WEEKDAYS AND WEEKENDS

Weekdays Westbound	
00:00-05:00	overnight
05:00-07:00	early risers
07:00-16:00	steady peak
16:00-18:00	super peak
18:00-20:00	steady peak
20:00-24:00	evening

Weekends Westbound	
02:00-07:00	overnight
07:00-09:00	early risers
09:00-20:00	steady peak
20:00-02:00	evening

9. Oncoming speed data was used for SID analysis, which it is acknowledged can then change as soon as the 20-mph zone has been entered.
10. By contrast, the ACT records the actual speed in the mid-point of the zone as the vehicle travels across the cables.
11. Results are available in two places – point of entry to the 20-mph zone and mid-point.
12. The final installation was the switching on the of SIDs and removal of the masking tape – revealing the red and white surrounding imagery.

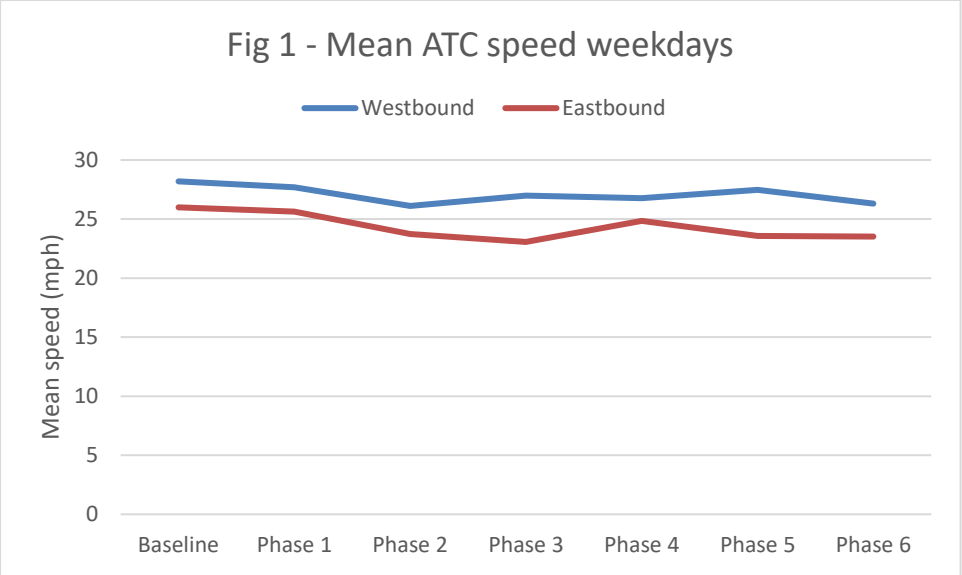
The results of the evaluation

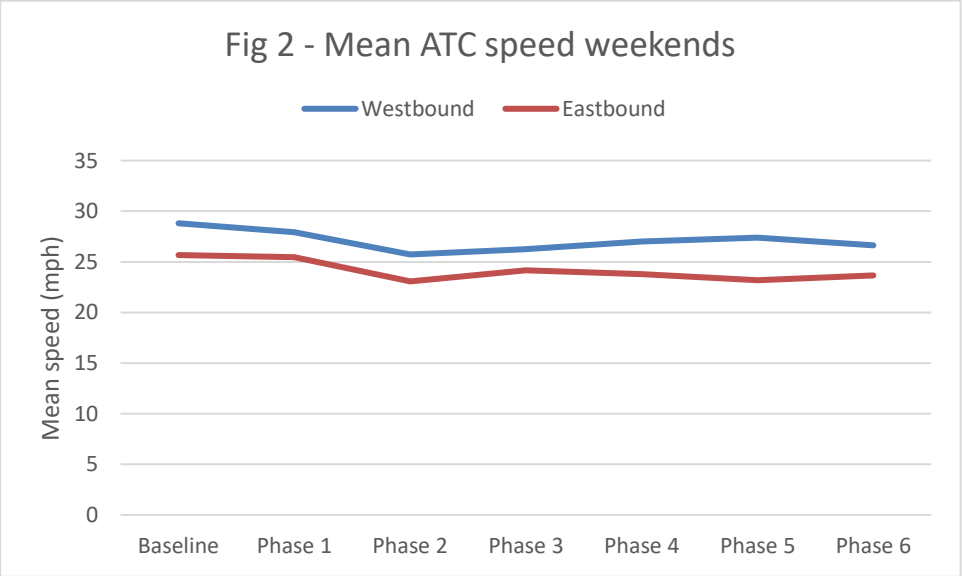
1. The overall results are mixed, with some notable successful outcomes and some remaining concerns.
2. There are two external factors that have an impact upon the results. The topography of Harecroft and traffic volumes are both significant factors to the results.
   a. Westbound the road is long, straight, and only slightly uphill to Harecroft, where it then descends slightly through the hamlet.
   b. Eastbound the road is winding and an acute narrow bridge over a small stream precedes a significant hill (14%) up to Harecroft, where the road is then slightly uphill through the hamlet.
   c. On weekdays traffic flows Westbound show a major peak between 1800 and 1900 and a minor peak at 0900. Eastbound these peaks in traffic flow are reversed indicating the pattern of commuter traffic
3. Approaching traffic Westbound has always been faster due to this topography. This can be illustrated by the calculation of the speed at or below which 85 percent of all vehicles are observed to travel from the baseline data in the centre of Harecroft. Westbound this baseline speed was 33.09 mph on weekdays and 33.99 at weekends. The corresponding baseline figures for Eastbound traffic was 30.84 on weekdays and 30.60 at weekends.
4. The following table shows the overall average SID data in each direction for each of the installation phases.

	Westbound	**Baseline**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**	**Phase 6**	**Total**
Weekday	overnight	2653	12381	810	7867	2057	1718	1704	**29190**
	early risers	1014	5032	527	833	4418	5096	5714	**22634**
	steady peak 1	47007	212360	9482	76622	64123	52873	51846	**514313**
	super peak	14150	67841	2420	29672	20283	14122	15783	**164271**
	steady peak 2	13110	64516	2361	31159	13266	8166	8871	**141449**
	evening	13131	65949	2577	30529	10683	6394	6779	**136042**
Weekend	overnight	887	4680	9	2889	1142	1241	1445	**12293**
	early risers	930	4525	3	806	2261	2719	3292	**14536**
	steady peak	20437	110654	139	45016	24378	21763	3292	**225679**
	evening	5583	29797	20	14399	4128	3013	3449	**60389**
	Total	**118902**	**577735**	**18348**	**239792**	**146739**	**117105**	**102175**	**1320796**

	Eastbound	**Baseline**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**	**Phase 6**	**Total**
Weekday	overnight	2537	10400	1962	7517	16958	7543	6971	**53888**
	early risers	531	2095	436	609	2086	1329	1456	**8542**
	steady peak 1	1776	6645	1489	1043	4553	5029	4690	**25225**
	super peak	15841	55675	12491	14887	48334	40357	35471	**223056**
	steady peak 2	64562	238059	50589	156959	297446	156754	139783	**1104152**
	evening	16847	70627	13012	41297	84524	41888	41285	**309480**
Weekend	overnight	1080	5170	480	4869	5852	3232	2834	**23517**
	early risers	1733	7697	809	2716	5753	4689	3528	**26925**
	steady peak	23571	110726	11762	87169	110993	64706	51640	**460567**
	evening	4488	20478	1827	16975	20973	11767	10255	**86763**
	Total	**132966**	**527572**	**94857**	**334041**	**597472**	**337294**	**297913**	**2322115**

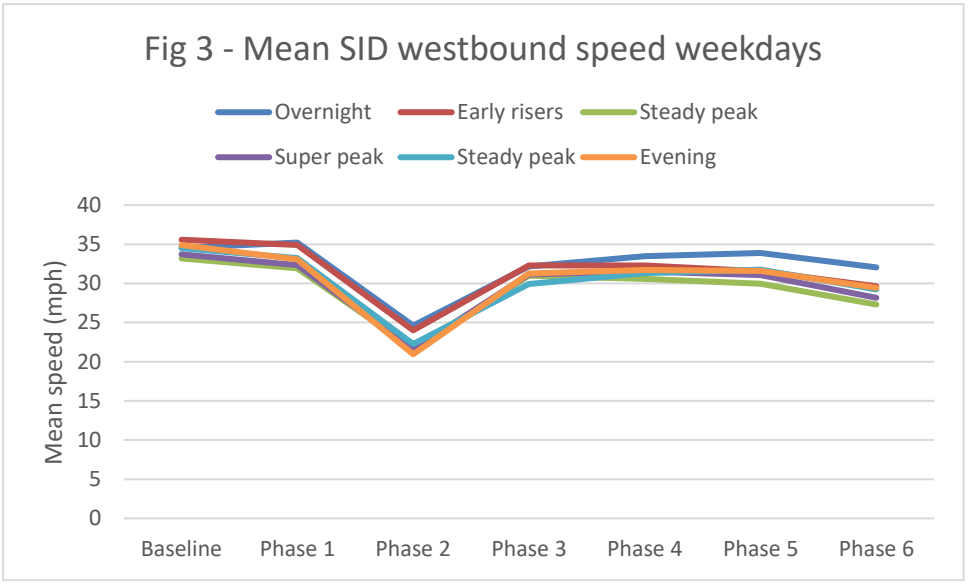
5. Figures 1 and 2 show that mean speeds measured by the ATC at the centre of Harecroft were significantly lower Eastbound than Westbound on both weekdays and weekends. There are also differences in the way that a SID and ATC processes the data that are dealt with in detail in Appendix 2 and illustrated in Fig 9 and 10 of the appendix.

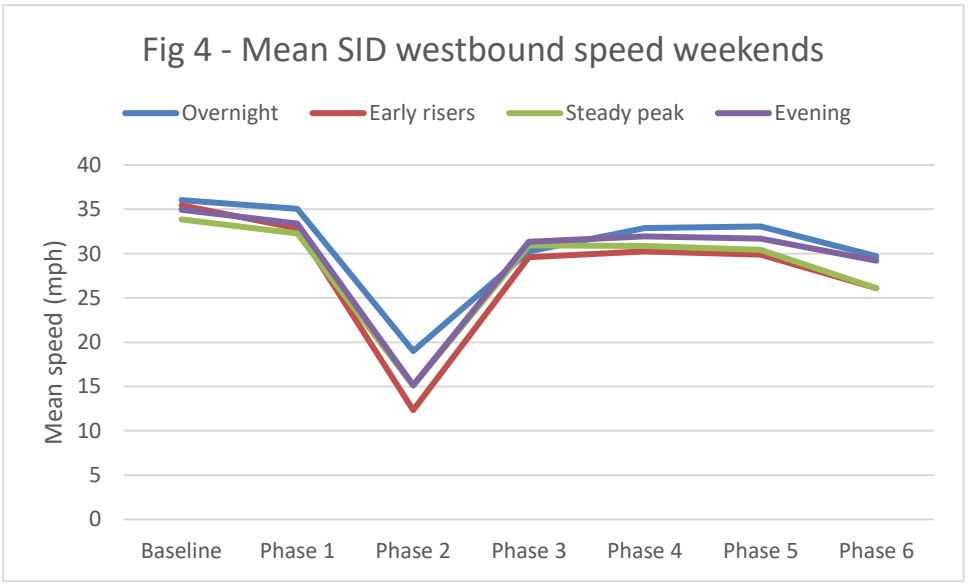




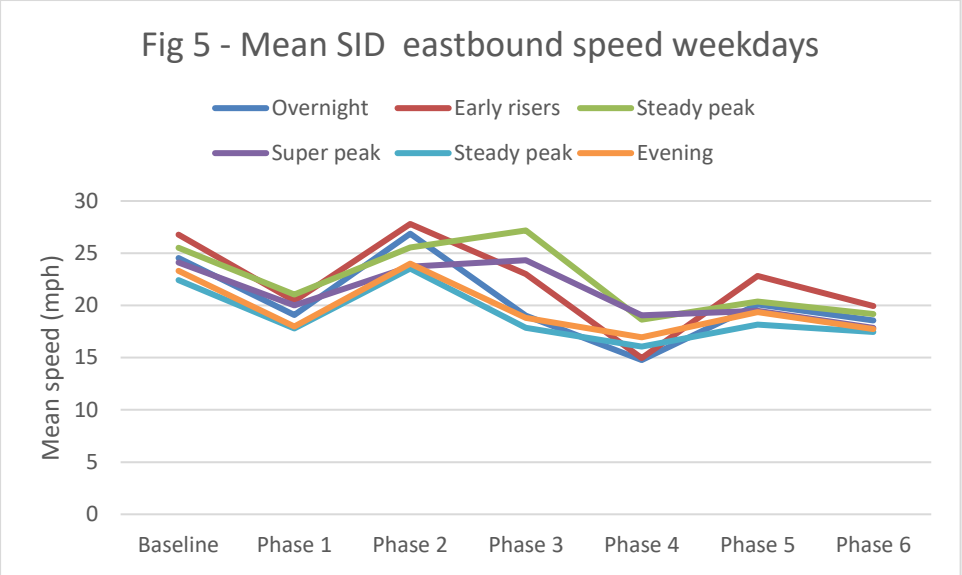
6. When ATC data in the centre of Harecroft is compared with the SID data positioned at the entry point it is observed that Westbound traffic slows down significantly between the two locations. This is illustrated in Fig 3 for weekdays with similar trends being observed for weekends. Conversely Eastbound traffic increased speed from the SID to the ATC although not to the same extent as Westbound
7. The results from the ATC, which was sited in the middle of the hamlet, show us that the current mean speeds in each direction at the end of this project were:
    a. Westbound 25 mph (3 mph lower than the SID data), indicating vehicles continued to slow after entering the 20 mph zone.
    b. Eastbound 24 mph (7 mph faster than the SID date), indicating vehicles started to speed up after entering the 20 mph zone, although some of this may be an outcome of immediate vehicle acceleration as the top of the steep hill is passed.

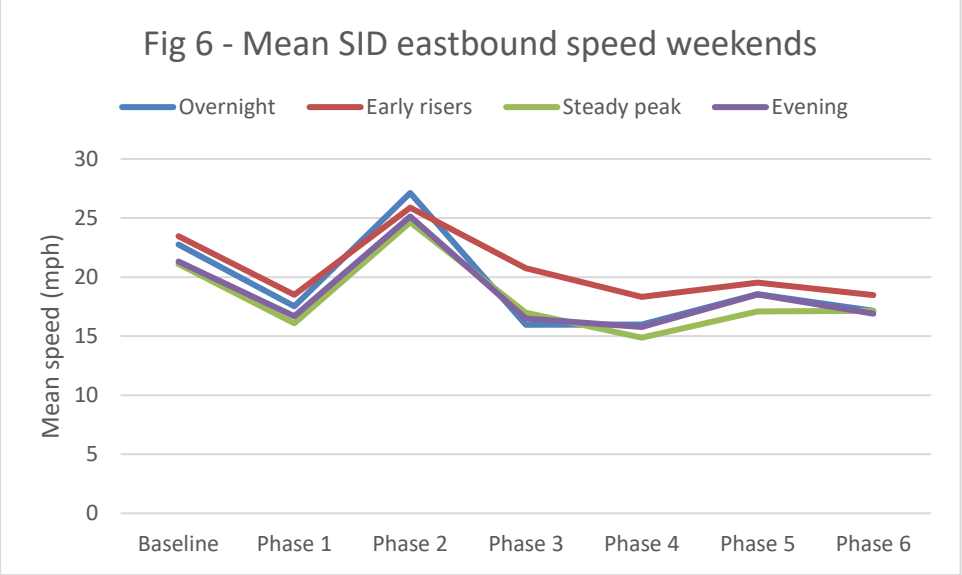
In order to establish the impact of traffic flow and the time of day the mean speed was determined for each phase and time zone. These results are shown in Fig 3 and Fig 4 for westbound traffic and Fig 5 and Fig 6 for eastbound traffic. These results are presented somewhat differently in Appendix 2 where the average speed reduction is illustrated in Fig 3 to Fig 6.





For westbound traffic the impact of time of day on the mean speed appears to be small although in all cases the highest mean speeds were observed overnight. If Phase 2 results are discounted there appears to be a steady reduction in mean speeds over the project.





For eastbound traffic the impact of the time of day and the project phase appears to be more significant, especially for weekdays, even if Phase 2 is discounted. The results for Phase 3 where the burgundy tarmac was installed appear to show this had the greatest impact on weekdays at times of lower traffic flow such as evenings and overnight. The greatest impact on mean speeds, both weekdays and weekends, was seen for Phase 4, the installation of repeater roundels.

Things that went particularly well.

1. Feedback and speed analysis suggests that switching the SIDs on – to flash speeds and smiling/frowning faces at drivers has had the biggest impact on speeds (and therefore driver consciousness).
2. During the process, the purple tarmac and 20-mph roundels painted onto the carriageway had the next most significant change to speed.
3. The project management and engagement of the City of Bradford Municipal District Council (CMBDC) Highways Department is to be recognised, even though many project issues ensued creating delays and problems. Throughout, they engaged and strived to deliver solutions to these issues.

Things that you would do differently

1. It is evident that the psychological test was impaired by the phases not being delivered in a linear pattern – i.e., strictly monthly/4 weekly.
2. By having a fixed implementation schedule, the project could have completed to its original timeline of 6 months (not the 12+ that it took)
3. It is also clear that Westbound, where traffic is faster, adding a physical element would have assisted in the impact – particularly higher rumble strips that create steering wheel vibration. CMBDC recommended this but, after resident consultation, where vehicle noise was cited as a reason to object, it was not carried out. Road painting was used in lieu of but, with less of an effect.
4. The Westbound 20 mph zone starts well outside the start of any residential properties, see picture 2below. It is believed the siting of this so far from properties has confused drivers who could not see the need for such a reduced speed and used their own judgement to drive to road surroundings. The positioning would be to advance the zone a further 100 metres to the edge of housing for driver association.

Picture 2

Conclusion and recommendations

Conclusions

1. Graphs 1, 2 and 3 (in Results of the Evaluation) show that speeds did reduce at each stage of the phased implementation process and have not, as yet, risen through familiarity.
    a. Vehicle speeds reduced after each new visual speed element was installed in both directions.
    b. Data also indicates that average speeds slowly reduced after each installation Westbound and for 5 of the 6 phases Eastbound.
    c. These reductions are also evident in each of the six time periods that data was segregated into – covering super-peak to overnight.
2. Overall, when compared to average speeds before the project commenced, overall average speeds show a reduction of 6.20 mph Eastbound and 5.37 mph Westbound.
3. Post implementation resident questionnaire feedback reports that there has been no vehicle collisions or property damage since the 20 mph zone project commenced
4. Based on the above, the psychological effect on drivers through the phased installation of multiple visual deterrents has been considered successful.
5. However, the apparent reduction in speed recorded by the SIDs, masks the speed that vehicles travel at afterwards as recorded by the ACTs, which is through the hamlet passed residents homes.
6. In what is now a 20-mph zone, vehicles significantly exceed the speed limit:
    a. Westbound - 89% exceed 20 mph, 41% exceed 30 mph, 5% exceed 40 mph
    b. Eastbound – 74% exceed 20 mph, 11% exceed 30 mph, .5% exceed 40 mph
7. The average speed of traffic at the mid-point of the hamlet is now:
    a. Westbound – 25 mph
    b. Eastbound - 24 mph
8. Post implementation resident questionnaire feedback unfortunately reports no improvement in perceived safety as vehicles are still travelling too quickly.

Recommendations

9. Phased implementation works and should be repeated with an alternate order of installations to check the best sequencing.
10. It would seem that switching the SIDs on at the start of the project (as they had the biggest impact), could yield the best outcome.
11. Including some small physical elements (such as raised rumble strips), may have a greater impact than visual elements alone (note rumble strips are easy and cheap to install). This is supported by post implementation resident feedback would like to see additional deterrents (cameras by preference and/or physical restraints) being considered.
12. SIDs must be kept in place permanently for any speed reductions to be retained.
13. SIDs should be mains or solar powered to avoid displays being temporarily suspended by batteries running out.

Hints and tips for future projects.

1. Carefully site SIDS and ACT cables where they cannot get damaged – this may include the use of H-brackets on poles.
2. Examine how speed data can be downloaded from devices and ensure you have the necessary and compatible equipment to perform this.
3. Check the road volumes and memory capacity of the recording devices to ensure a programme of period downloads so that no data losses will occur.
4. Try and gain a fixed schedule of works to avoid the project lasting longer than planned.

APPENDIX 1

WILSDEN PARISH COUNCIL
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Harecroft – Traffic speed reduction plan 2020

Background & Purpose:

Wilsden Parish Council recognises local residents' concerns about traffic flow, traffic speeds, collision damage and the risk to wellbeing.

After liaising with Bradford Council, District Councillors and the Police, a draft plan has been formulated which aims to reduce vehicle speeds thus improving resident liveability, reduce the perception of danger and allow for the easier movement of pedestrians within the hamlet. Funding for the below plan will depend on a successful bid for a research grant from a national road safety organisation that needs submission by the middle of December 2019. Wilsden Parish Council is leading the grant application and will be partially funding the plan (which is a requirement).

The plan:

Harecroft does not meet the stringent criteria for the installation of enforcement cameras or mobile units, so these are just not possible. Therefore, the primary components of the proposed plan are to install in gradual phases the following, noting how effective speed reduction has been after each;

1. A reduced speed limit through the village to 20mph
2. Prior to the 20mph zone, from all directions and side roads, install a 30 mph buffer zone
3. Install new signage at intervals for both above speed limits
4. At the start of the 20 mph zone, add rumble strips to the approaching carriageway
5. Paint the roadway with 20 mph roundels at set intervals
6. Place a bi-directional Speed Indicator Devices [SIDs] (showing actual speed and smile/frown) just inside the 20 mph zone in both directions

The intention is for the SIDs to be installed first in 'stealth' mode (without the display operational) as these devices record vehicle speeds. These will then record what speed reductions each installed component produces.

More significant physical reduction measures may be considered afterwards (such as road humps, road tables, road cushions, chicanes, etc.) depending on the effectiveness of the above measures. Should this be needed, residents will be further consulted.

Residents Consultation:

Part of the research grant submission requires us to have widespread support for the plan, which includes formally consulting local residents and seeking their support: hence the attached short questionnaire. If you are in agreement, we will proceed. If you are not in favour, we will abort this grant application. We appreciate that the above may not suit everyone, or be the perfect solution, but we hope you will agree it is a significant improvement to the present situation.

In addition to seeking your feedback to the plan, we are adding a survey of vehicle damage. Presently we only have access to Police recorded 'casualty accident' statistics as a representation of road danger through the hamlet (of which there have been 4 in the last 5 years). However, we are aware that many residents have suffered non-casualty vehicle and property damage and it will greatly aid our submission for a grant if we can present comprehensive supplementary statistics of our own.

To obtain requisite resident support and evidence, we ask that each household complete the attached questionnaire and return it to The Parish Clerk by mail or via a drop off point inside the Station Hotel by **midday SATURDAY 30th NOVEMBER.**

Harecroft – Traffic speed reduction plan 2020

Resident Questionnaire – Return by Midday 30th November 2019

1. Do you support the Wilsden Parish Council plan and application for a national grant?

Yes ☐ **No** ☐

2. If you answered 'no' to Q1, please indicate what you would prefer to see implemented

3. Has any property or vehicles owned by you, been subject to any collision damage in the last 5 years?

Yes ☐ **No** ☐

4. If you answered 'yes' to Q3, please supply details

#	Approx. Date	Denote damage to Vehicle (V) Property (P) Both (B)	Type of damage	Did anyone need hospitalisation (a 'casualty accident')?	Did driver stop and exchange insurance details?	Did you report to Police	Approx. Repair cost
Example	*April 2018*	*V*	*Broken wind mirror*	*N*	*N*	*N*	*£150*
Example	*Feb 2017*	*P*	*Front wall demolished*	*N*	*Y*	*Y*	*£3000*
1							£
2							£
3							£
4							£
5							£
6							£

The Parish Clerk
The Village Hall
Wilsden
Bradford
BD15 0HT
West Yorkshire.

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Contents

Project phases

For the purposes of the analysis, the seven project phases are detailed in Table 1.

Table 1 Project phases

	Intervention	Speed Limit	Data period	Weeks
Baseline	None	40/30/40	23 June – 12 July 21	Week 1–3
Phase 1	20mph signs installed	30/20/30	17 July – 26 Sept 21	Week 4–18
Phase 2	Addition of Repeater Poles	30/20/30	28 Sept – 5 Dec 21	Week 19–24
Phase 3	Addition of Burgundy Tarmac	30/20/30	7 Dec 2021 – 30 Jan 22	Week 25–27
Phase 4	Addition of Repeater Roundels	30/20/30	1 Feb – 18 April 22	Week 28–43
Phase 5	Addition of Rumble Strips	30/20/30	19 April – 30 May 22	Week 44–49
Phase 6	SID Activation	30/20/30	1 June – 30 June 22	Week 50–55

There was a loss of data from the SIDs between 27th Sept – 12th Dec 2021.

Traffic count data

Traffic count data were used to identify peaks in flow throughout the 24-hour period, for weekdays and weekends separately and in each direction.

Figure 1 and Figure 2 show that whilst weekends show a near normal distribution in traffic flow, peaking in the early afternoon, weekdays demonstrate a bimodal distribution, with two peaks across the course of each day. Furthermore, these peaks are of different size and occur at different times of the day depending on direction of traffic.

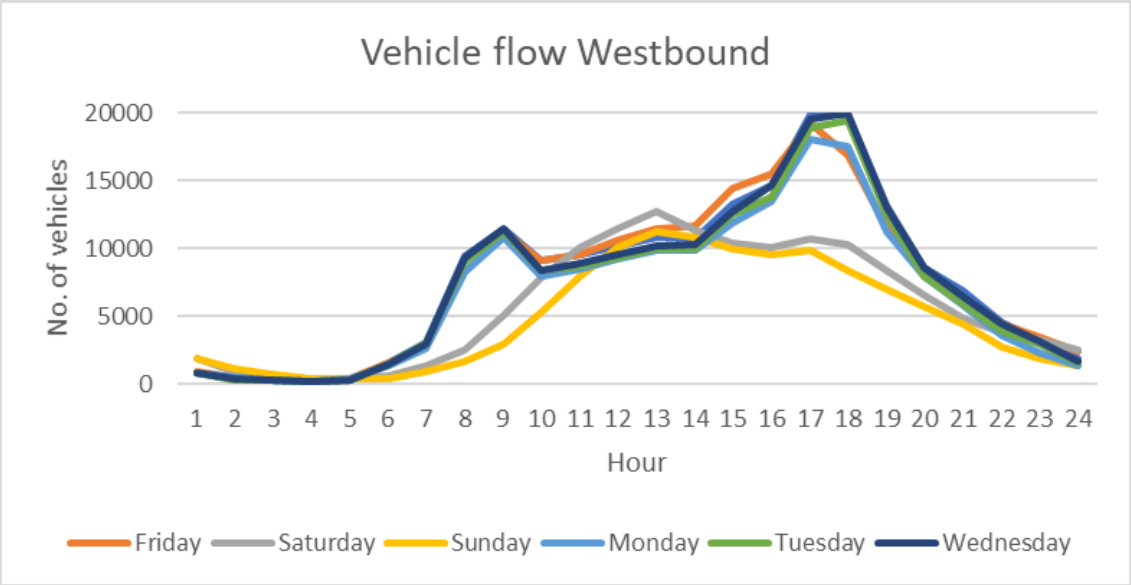

Figure 1 Vehicle flow (Westbound)

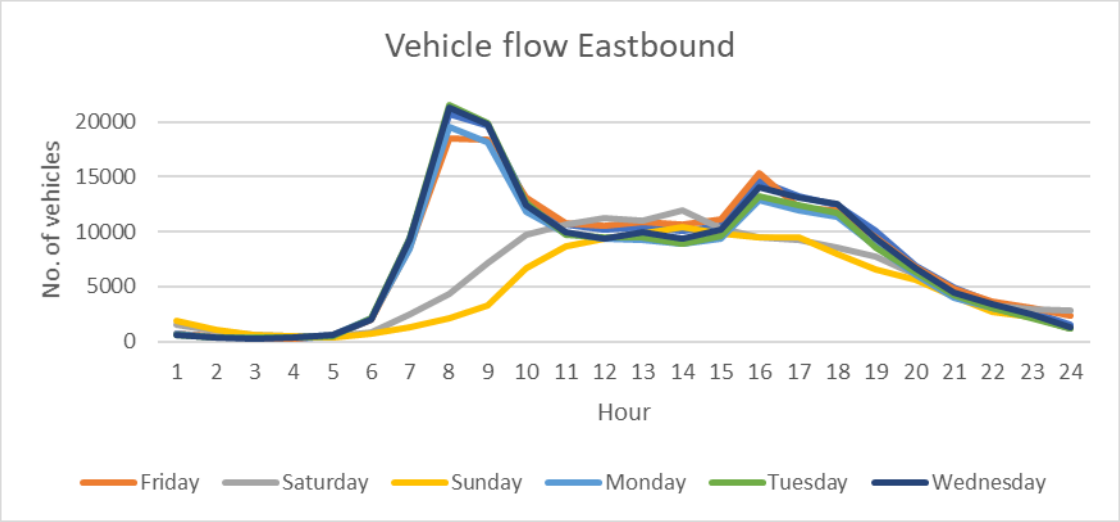

Figure 2 Vehicle flow (Eastbound)

Given these differences in flows, further partitioning of the data was undertaken to create a set of time periods which have distinct traffic flow characteristics in order to make comparisons across the different project phases. The following steps were undertaken:

[1] For each day of the week, average traffic flow was calculated, Table 2 and Table 3.
[2] Each hour was then compared to the average flow to derive proportional values, Table 4 and Table 5.
[3] Traffic flow, average and 85th%ile speeds were calculated for each of the project phases, Table 6-Table 7.
[4] Reductions in speeds were calculated within each of the time phases for each of the project phases, Figure 3 - Figure 6.

Table 2 Traffic count by day of the week (Westbound)

Hr Ending	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	816	815	850	880	939	1855	1895
2	462	347	412	402	482	896	1159
3	290	261	251	265	300	572	731
4	230	220	239	235	263	380	460
5	390	286	320	348	392	366	386
6	1347	1443	1475	1535	1538	658	453
7	2690	3046	2961	3080	2855	1330	964
8	8268	9052	9339	9481	9174	2532	1723
9	10779	11227	11429	11506	11232	5116	2985
10	8006	8337	8423	9167	9168	7813	5332
11	8508	8753	8915	9598	9556	10048	7962
12	9236	9376	9567	10206	10661	11497	10072
13	9861	9984	10221	10870	11514	12795	11263
14	9923	9963	10350	10690	11664	11367	10861
15	11889	12548	12786	13306	14429	10447	9984
16	13539	13769	14690	14681	15546	10034	9603
17	18029	18918	19507	19832	19252	10700	9910
18	17578	19453	20009	19857	16843	10343	8358
19	11304	12586	13059	13181	11527	8353	7025
20	7937	8005	8589	8644	8232	6526	5722
21	5863	5935	6479	6887	6295	4830	4494
22	3550	3889	4401	4551	4437	3854	2746
23	2371	3010	3191	3227	3449	3261	1948
24	1384	1561	1638	1873	2395	2568	1369
Average	***6844***	***7199***	***7463***	***7679***	***7589***	***5756***	***4892***

Table 3 Traffic count by day of the week (Eastbound)

Hr Ending	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	731	610	600	744	748	1472	1905
2	389	333	359	369	426	912	1095
3	302	311	258	331	362	564	622
4	369	315	325	297	288	461	433
5	597	490	538	491	551	449	374
6	2145	2062	1981	1970	2014	876	709
7	8464	9333	9295	9352	8562	2472	1338
8	19532	21555	21322	20706	18451	4343	2076
9	18085	19942	19735	19626	18343	7101	3257
10	11871	12666	12370	12844	13155	9714	6643
11	9870	9747	9939	10700	10788	10692	8658
12	9375	9446	9322	10202	10525	11232	9331
13	9203	9452	9923	10387	10860	11015	9818
14	8879	8928	9380	10054	10604	11989	10426
15	9381	9556	10146	10555	11130	10285	9791
16	12910	13224	14014	14618	15361	9463	9476
17	11924	12445	13155	13274	12182	9200	9464
18	11302	11687	12485	12431	11929	8573	8006
19	8656	8564	9364	10087	9538	7723	6596
20	6056	6283	6623	6909	6760	6044	5572
21	3937	4254	4452	4896	4781	4135	4099
22	3058	3061	3456	3549	3607	3307	2694
23	2195	2125	2406	2681	3021	2971	2226
24	1179	1122	1278	1505	2331	2851	1231
Average	***7100***	***7396***	***7614***	***7857***	***7763***	***5744***	***4827***

Table 4 Proportional traffic count by day of the week (Westbound)[1]

Hr End	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	11.92	11.32	11.39	11.46	12.37	32.23	38.74
2	6.75	4.82	5.52	5.23	6.35	15.57	23.69
3	4.24	3.63	3.36	3.45	3.95	9.94	14.94
4	3.36	3.06	3.20	3.06	3.47	6.60	9.40
5	5.70	3.97	4.29	4.53	5.17	6.36	7.89
6	19.68	20.04	19.77	19.99	20.27	11.43	9.26
7	39.31	42.31	39.68	40.11	37.62	23.11	19.71
8	120.81	125.73	125.15	123.46	120.88	43.99	35.22
9	157.50	155.94	153.15	149.83	148.00	88.88	61.02
10	116.98	115.80	112.87	119.37	120.80	135.74	109.00
11	124.32	121.58	119.46	124.99	125.91	174.57	162.76
12	134.96	130.23	128.20	132.90	140.47	199.74	205.89
13	144.09	138.68	136.96	141.55	151.71	222.29	230.24
14	144.99	138.39	138.69	139.21	153.69	197.49	222.02
15	173.72	174.29	171.34	173.27	190.12	181.50	204.09
16	197.83	191.25	196.85	191.18	204.84	174.33	196.31
17	263.44	262.77	261.40	258.25	253.67	185.90	202.58
18	256.85	270.21	268.13	258.58	221.93	179.69	170.85
19	165.17	174.82	174.99	171.64	151.89	145.12	143.61
20	115.97	111.19	115.09	112.56	108.47	113.38	116.97
21	85.67	82.44	86.82	89.68	82.95	83.91	91.87
22	51.87	54.02	58.97	59.26	58.46	66.96	56.13
23	34.64	41.81	42.76	42.02	45.45	56.66	39.82
24	20.22	21.68	21.95	24.39	31.56	44.62	27.99

Weekdays Westbound	
00:00-05:00	overnight
05:00-07:00	early risers
07:00-16:00	steady peak
16:00-18:00	super peak
18:00-20:00	steady peak
20:00-24:00	evening

Weekends Westbound	
02:00-07:00	overnight
07:00-09:00	early risers
09:00-20:00	steady peak
20:00-02:00	evening

Table 5 Proportional traffic count by day of the week (Eastbound)

Hr End	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	10.30	8.25	7.88	9.47	9.64	25.63	39.47
2	5.48	4.50	4.72	4.70	5.49	15.88	22.69
3	4.25	4.20	3.39	4.21	4.66	9.82	12.89
4	5.20	4.26	4.27	3.78	3.71	8.03	8.97
5	8.41	6.62	7.07	6.25	7.10	7.82	7.75
6	30.21	27.88	26.02	25.07	25.94	15.25	14.69
7	119.20	126.18	122.08	119.02	110.29	43.04	27.72
8	275.08	291.43	280.05	263.52	237.67	75.62	43.01
9	254.70	269.62	259.21	249.78	236.28	123.64	67.48
10	167.19	171.25	162.47	163.46	169.45	169.13	137.63
11	139.01	131.78	130.54	136.18	138.96	186.16	179.38
12	132.03	127.71	122.44	129.84	135.58	195.56	193.32
13	129.61	127.79	130.33	132.19	139.89	191.78	203.41
14	125.05	120.71	123.20	127.96	136.59	208.74	216.01
15	132.12	129.20	133.26	134.33	143.37	179.07	202.85
16	181.82	178.79	184.07	186.04	197.87	164.76	196.33
17	167.93	168.26	172.78	168.94	156.92	160.18	196.08
18	159.17	158.01	163.98	158.21	153.66	149.26	165.87
19	121.91	115.79	122.99	128.38	122.86	134.47	136.66
20	85.29	84.95	86.99	87.93	87.08	105.23	115.44
21	55.45	57.52	58.47	62.31	61.59	71.99	84.92
22	43.07	41.39	45.39	45.17	46.46	57.58	55.81
23	30.91	28.73	31.60	34.12	38.91	51.73	46.12
24	16.60	15.17	16.79	19.15	30.03	49.64	25.50

Weekdays Eastbound	
00:00-05:00	overnight
05:00-06:00	early risers
06:00-07:00	steady peak
07:00-09:00	super peak
09:00-19:00	steady peak
19:00-24:00	evening

Weekends Eastbound	
02:00-07:00	overnight
07:00-09:00	early risers
09:00-21:00	steady peak
21:00-02:00	evening

[1] There are some instances where the proportion of traffic flow is high at weekends (e.g. around lunchtime, but the absolute numbers are comparable to a peak weekday period and are thus categorised similarly.

Table 6 Average weekly traffic flow and % reduction from Baseline (Westbound)

	Baseline	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Mean							
Weekdays	3287.53	3054.57	3302.83	2603.73	3250.26	3910.73	2956.33
Weekends	2370.50	2360.10	2212.92	1449.17	2309.28	3042.50	2071.92
% reduction							
Weekdays		7.09	-0.47	20.80	1.13	-18.96	10.07
Weekends		0.44	6.65	38.87	2.58	-28.35	12.60

Table 7 Average weekly traffic flow and % reduction from Baseline (Eastbound)

	Baseline	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Mean							
Weekdays	3433.80	3021.43	3330.00	2660.53	3389.21	4090.17	3125.93
Weekends	2340.33	2273.13	2136.17	1472.50	2349.88	3039.00	2109.58
% reduction							
Weekdays		12.01	3.02	22.52	1.30	-19.11	8.97
Weekends		2.87	8.72	37.08	-0.41	-29.85	9.86

ATC speed data

Table 8 - Table 11 provide the mean and 85th%ile data derived for the Project Phases, along with the % reductions observed. These are visualised for ease in Figure 3 and Figure 4.

Table 8 Mean and % reduction in speeds from Baseline (Westbound)

	Baseline	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Mean							
Weekdays	28.19	27.69	26.11	26.99	26.78	27.47	26.30
Weekends	28.81	27.92	25.73	26.26	27.02	27.39	26.62
% reduction							
Weekdays		1.79	7.38	4.27	5.02	2.54	6.69
Weekends		3.10	10.70	8.85	6.22	4.94	7.59

Table 9 85th%ile and % reduction in speeds from Baseline (Westbound)

	Baseline	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Mean							
Weekdays	33.09	32.80	31.22	31.95	31.92	33.04	31.57
Weekends	33.99	33.15	30.95	31.34	32.35	33.08	32.17
% reduction							
Weekdays		0.85	5.65	3.45	3.52	0.15	4.58
Weekends		2.48	8.97	7.81	4.83	2.69	5.37

Table 10 Mean and % reduction in speeds from Baseline (Eastbound)

	Baseline	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Mean							
Weekdays	25.99	25.63	23.74	23.06	24.83	23.57	23.52
Weekends	25.67	25.46	23.07	24.16	23.80	23.19	23.65
% reduction							
Weekdays		1.37	8.64	11.24	4.46	9.31	9.50
Weekends		0.81	10.13	5.86	7.28	9.64	7.86

Table 11 85th%ile and % reduction in speeds from Baseline (Eastbound)

	Baseline	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Mean							
Weekdays	30.84	30.57	28.60	27.46	29.75	28.55	28.55
Weekends	30.60	30.71	27.97	28.84	28.74	28.52	28.66
% reduction							
Weekdays		0.86	7.24	10.96	3.53	7.41	7.41
Weekends		-0.35	8.61	5.76	6.07	6.81	6.34

Table 12 Number of vehicles in each speed category (Westbound)

	0-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-60	60-70	70+
Baseline	146	617	2497	14273	30531	12803	2188	370	82	27	2	0
Phase 6	487	2328	10975	40829	43386	13140	1982	331	77	16	1	1

Table 13 Number of vehicles in each speed category (Eastbound)

	0-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-60	60-70	70+
Baseline	425	1216	3558	18236	29678	10237	1706	360	79	45	6	3
Phase 6	805	2914	20000	49663	34200	8968	1886	435	117	61	19	25

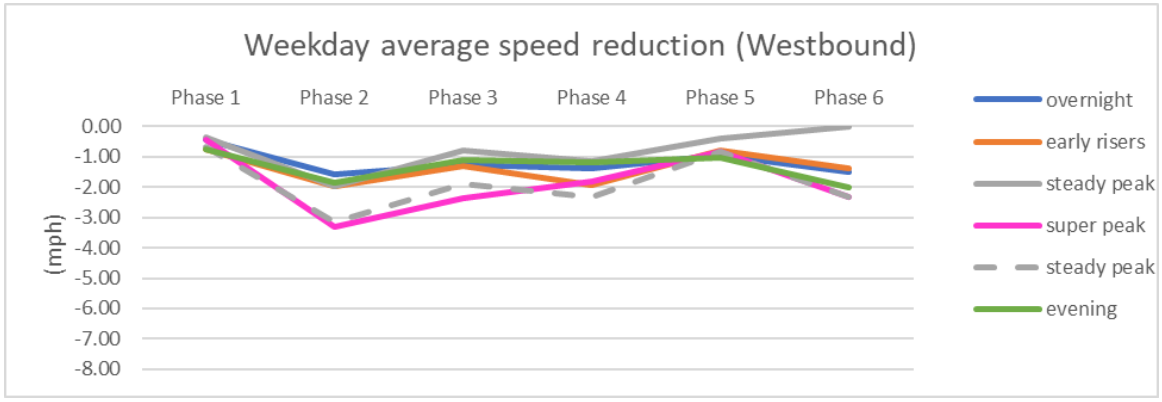

Figure 3 Weekday average speed reduction by time and project phase (Westbound)

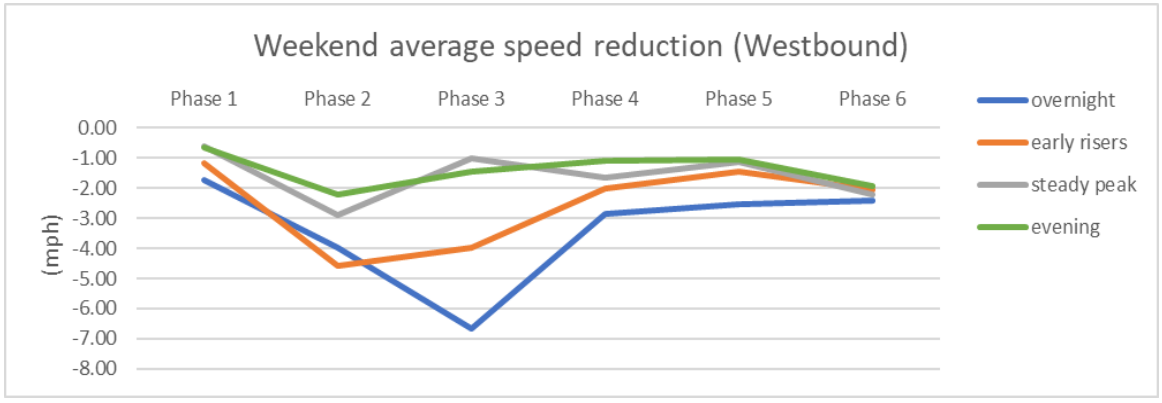

Figure 4 Weekend average speed reduction by time and project phase (Westbound)

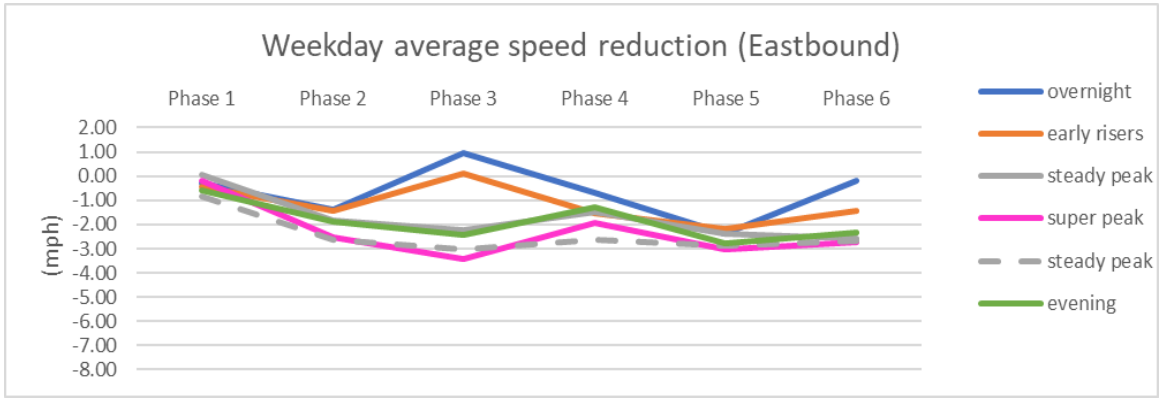

Figure 5 Weekday average speed reduction by time and project phase (Eastbound)

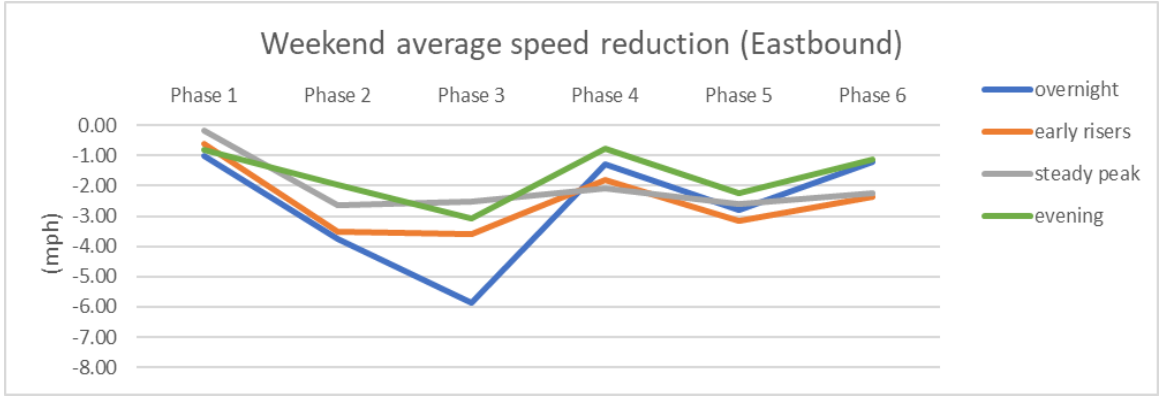

Figure 6 Weekend average speed reduction by time and project phase (Eastbound)

The effect of interventions on speed and speed limit compliance

The data captured by the SIDs were analysed using the time phases for Weekdays and Weekends as described above, across the 7 Phases of the project. Only the data from the arriving traffic was used in the analysis, as per advice given by Wilsden Parish Council.

Westbound to Cullingworth

As seen in Table 14 due to the different lengths of the project phases, likely seasonal effects and equipment failure, the number of vehicles (N) captured by the SID varied, with over 500,000 captured in Phase 1 and less than 20,000 in Phase 2.

Table 14 Speed Dataset – SID Westbound

		Baseline	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Total
Weekday	overnight	2653	12381	810	7867	2057	1718	1704	**29190**
	early risers	1014	5032	527	833	4418	5096	5714	**22634**
	steady peak 1	47007	212360	9482	76622	64123	52873	51846	**514313**
	super peak	14150	67841	2420	29672	20283	14122	15783	**164271**
	steady peak 2	13110	64516	2361	31159	13266	8166	8871	**141449**
	evening	13131	65949	2577	30529	10683	6394	6779	**136042**
Weekend	overnight	887	4680	9	2889	1142	1241	1445	**12293**
	early risers	930	4525	3	806	2261	2719	3292	**14536**
	steady peak	20437	110654	139	45016	24378	21763	3292	**225679**
	evening	5583	29797	20	14399	4128	3013	3449	**60389**
	Total	**118902**	**577735**	**18348**	**239792**	**146739**	**117105**	**102175**	**1320796**

The mean speed data extracted for the Time and Project phases is shown in Table 15 and speed compliance levels in Table 16 - Table 19.

Table 15 Mean speed - Westbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	↓
Weekday	overnight	34.54		35.21	24.61	32.18	33.47	33.87	32.04	**2.5**
	early risers	35.59		34.92	24.01	32.28	32.31	31.56	29.64	**5.95**
	steady peak 1	33.19		31.91	21.67	30.97	30.59	29.98	27.29	**5.9**
	super peak	33.71		32.34	21.56	31.15	31.51	31.08	28.15	**5.56**
	steady peak 2	34.50		33.25	22.26	29.92	31.29	31.74	29.22	**5.28**
	evening	34.90		33.07	20.95	31.25	31.72	31.61	29.43	**5.47**
Mean		***34.41***		***33.45***	***22.51***	***31.29***	***31.82***	***31.64***	***29.30***	5.11
Weekend	overnight	36.04		35.04	19.00	30.26	32.89	33.08	29.72	**6.32**
	early risers	35.45		32.86	12.33	29.59	30.23	29.89	26.10	**9.35**
	steady peak	33.86		32.27	15.08	30.94	30.85	30.43	26.10	**7.76**
	evening	34.95		33.40	15.15	31.34	31.95	31.70	29.19	**5.76**
Mean		***35.08***		***33.39***	***15.39***	***30.53***	***31.48***	***31.28***	***27.78***	7.3

At all times of the day, Phase 6 mean speeds had reduced on average by 5.11mph on weekdays and 7.3mph at weekends, compared to Baseline speeds.

Compared to Phase 1, when the 20mph speed limit signs were installed, the % of traffic exceeding the speed limit reduced from 97.88% to 89.24% in Phase 6 on weekdays. Correspondingly, at weekends it reduced from 97.35% to 83.26%.

At higher speed limit exceedences (above 30mph and 40mph) the % halved in most cases.

Table 16 % of traffic travelling above 20mph - Westbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	↓
Weekday	overnight	95.10		98.36	63.70	96.42	97.03	97.03	89.50	**5.60**
	early risers	94.48		98.91	60.15	97.36	97.31	96.23	92.72	**1.76**
	steady peak 1	98.80		97.16	54.80	95.90	95.38	94.31	85.42	**13.38**
	super peak	99.16		97.29	58.76	96.71	96.48	95.51	88.21	**10.95**
	steady peak 2	98.80		97.78	63.83	96.05	96.74	95.30	88.90	**9.90**
	evening	98.90		97.80	51.65	97.12	97.88	96.48	90.66	**8.24**
Mean		**97.54**		**97.88**	**58.82**	**96.59**	**96.80**	**95.81**	**89.24**	**8.31**
Weekend	overnight	98.42		97.59	44.44	89.10	96.50	96.05	86.57	**11.85**
	early risers	97.63		95.96	0.00	83.25	94.69	93.45	78.83	**18.80**
	steady peak	98.88		97.18	12.95	95.53	95.68	95.12	78.83	**20.05**
	evening	98.48		98.68	20.00	96.03	97.03	96.62	88.80	**9.68**
Mean		**98.35**		**97.35**	**19.35**	**90.98**	**95.98**	**95.31**	**83.26**	**15.10**

Table 17 % of traffic travelling above 30mph - Westbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	↓
Weekday	overnight	72.60		74.65	29.75	58.64	65.73	68.51	56.04	**16.56**
	early risers	80.77		77.74	29.79	59.42	62.72	56.99	44.22	**36.55**
	steady peak 1	71.22		61.85	13.57	55.13	51.83	47.17	30.81	**40.41**
	super peak	76.21		66.15	10.30	56.34	59.71	55.51	35.61	**40.60**
	steady peak 2	80.49		71.38	11.73	44.73	55.24	60.38	42.84	**37.65**
	evening	79.33		67.09	10.67	54.90	56.65	54.74	42.10	**37.23**
Mean		**76.77**		**69.81**	**17.64**	**54.86**	**58.65**	**57.22**	**41.94**	**34.83**
Weekend	overnight	77.56		75.06	0.00	54.38	62.08	68.57	45.33	**32.23**
	early risers	82.26		65.81	0.00	53.60	49.45	45.83	26.03	**56.23**
	steady peak	75.67		64.78	0.72	55.41	53.99	50.43	26.03	**49.64**
	evening	78.92		68.21	4.00	55.48	56.78	53.57	40.36	**38.56**
Mean		**78.60**		**68.47**	**1.18**	**54.72**	**55.58**	**54.60**	**34.44**	**44.17**

Table 18 % of traffic travelling above 40mph - Westbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	↓
Weekday	overnight	20.39		20.00	3.95	10.82	14.10	16.12	15.38	**5.01**
	early risers	23.87		18.00	5.88	12.36	8.35	6.50	4.24	**19.63**
	steady peak 1	7.17		5.40	0.63	4.37	3.37	3.11	1.47	**5.70**
	super peak	7.54		5.96	0.54	3.99	4.37	4.19	2.67	**4.87**
	steady peak 2	10.85		8.77	1.02	2.37	5.01	6.98	4.86	**5.99**
	evening	15.10		9.86	1.16	5.08	6.82	8.54	5.83	**9.27**
Mean		***14.15***		***11.33***	***2.20***	***6.50***	***7.00***	***7.57***	***5.74***	***8.41***
Weekend	overnight	26.27		21.35	0.00	9.03	13.84	12.65	9.20	**17.07**
	early risers	15.48		11.31	0.00	9.18	5.44	3.71	2.25	**13.23**
	steady peak	9.48		6.44	0.00	4.60	3.92	4.14	2.25	**7.23**
	evening	16.34		11.01	4.00	6.77	8.00	8.74	6.45	**9.89**
Mean		**16.89**		**12.53**	**1.00**	**7.40**	**7.80**	**7.31**	**5.04**	**11.86**

Table 19 % of traffic travelling above 60mph - Westbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Weekday	overnight	0.68		0.53	0.00	0.18	0.29	0.17	0.23
	early risers	0.89		0.16	0.00	0.00	0.02	0.00	0.05
	steady peak 1	0.02		0.02	0.00	0.01	0.00	0.01	0.01
	super peak	0.07		0.03	0.12	0.02	0.03	0.04	0.06
	steady peak 2	0.08		0.04	0.00	0.00	0.07	0.06	0.07
	evening	0.22		0.14	0.00	0.06	0.08	0.11	0.06
Mean		***0.33***		***0.15***	***0.02***	***0.05***	***0.08***	***0.07***	***0.08***
Weekend	overnight	0.11		0.49	0.00	0.17	0.35	0.08	0.07
	early risers	0.32		0.20	0.00	0.00	0.04	0.00	0.00
	steady peak	0.03		0.03	0.00	0.02	0.00	0.04	0.00
	evening	0.55		0.12	4.00	0.08	0.24	0.53	0.32
Mean		***0.25***		***0.21***	***1.00***	***0.07***	***0.16***	***0.16***	***0.10***

Table 20 85th%ile speed - Westbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Weekday	overnight	42.00		42.00	34.00	39.00	40.00	41.00	41.00
	early risers	44.00		41.00	36.00	40.00	38.00	38.00	36.00
	steady peak 1	38.00		37.00	30.00	37.00	36.00	36.00	34.00
	super peak	38.00		38.00	28.00	37.00	37.00	37.00	35.00
	steady peak 2	39.00		39.00	29.00	35.00	37.00	38.00	36.00
	evening	41.00		39.00	29.00	37.00	37.00	38.00	36.00
Weekend	overnight	44.00		42.00	26.80	38.00	40.00	40.00	38.00
	early risers	41.00		39.00	14.10	38.00	37.00	37.00	33.00
	steady peak	39.00		38.00	20.00	37.00	36.00	36.00	33.00
	evening	41.00		39.00	21.30	37.00	38.00	38.00	36.00

Table 21 95th%ile speed - Westbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Weekday	overnight	48.00		48.00	39.55	44.00	45.00	46.00	46.00
	early risers	49.00		45.00	41.00	44.00	43.00	41.00	40.00
	steady peak 1	42.00		41.00	35.00	40.00	39.00	39.00	37.00
	super peak	42.00		41.00	34.00	40.00	40.00	40.00	38.00
	steady peak 2	43.00		42.00	34.00	38.00	41.00	42.00	40.00
	evening	45.00		43.00	34.00	41.00	42.00	43.00	41.00
Weekend	overnight	51.00		48.00	27.00	44.00	44.00	44.00	43.00
	early risers	46.00		44.00	14.70	43.00	41.00	40.00	38.00
	steady peak	43.00		41.00	22.10	40.00	40.00	40.00	38.00
	evening	46.00		44.00	24.00	42.00	42.65	43.00	41.00

Table 22 97.5th%ile speed - Westbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Weekday	overnight	52.00		52.00	43.00	47.00	47.00	48.00	48.00
	early risers	53.00		49.00	44.00	46.00	45.00	44.00	42.00
	steady peak 1	44.00		43.00	37.00	42.00	41.00	41.00	39.00
	super peak	44.00		43.00	36.00	42.00	42.00	42.00	41.00
	steady peak 2	46.00		45.00	36.00	40.00	43.00	44.00	43.00
	evening	48.00		46.00	37.00	43.00	45.00	46.00	44.00
Weekend	overnight	55.00		51.00	27.00	48.00	47.00	46.00	46.00
	early risers	49.00		47.00	14.85	45.00	43.00	41.00	40.00
	steady peak	45.00		44.00	23.00	42.00	42.00	42.00	40.00
	evening	49.00		47.00	24.00	44.05	46.00	47.00	44.00

Table 23 Number of vehicles exceeding 97.5th%ile speed - Westbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Weekday	overnight	56		286	18	183	46	42	42
	early risers	25		104	13	19	100	92	132
	steady peak 1	964		4309	205	1718	1549	1135	1097
	super peak	283		1411	55	595	424	302	296
	steady peak 2	263		1228	54	740	270	190	193
	evening	299		1533	63	714	214	137	163
Weekend	overnight	17		114	0	68	26	24	35
	early risers	23		110	1	20	41	61	74
	steady peak	399		2018	3	1039	464	484	74
	evening	256		1482	2	876	219	179	92

Table 24 Maximum speeds - Westbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Weekday	overnight	79.00		86.00	60.00	75.00	72.00	69.00	72.00
	early risers	69.00		66.00	53.00	54.00	71.00	54.00	63.00
	steady peak 1	73.00		77.00	51.00	77.00	63.00	70.00	76.00
	super peak	82.00		76.00	46.00	60.00	63.00	60.00	72.00
	steady peak 2	66.00		77.00	49.00	59.00	72.00	82.00	72.00
	evening	81.00		92.00	58.00	65.00	68.00	81.00	68.00
Weekend	overnight	62.00		67.00	27.00	72.00	68.00	61.00	63.00
	early risers	77.00		66.00	15.00	54.00	61.00	50.00	56.00
	steady peak	67.00		77.00	32.00	68.00	64.00	69.00	56.00
	evening	72.00		75.00	24.00	65.00	66.00	74.00	73.00
	Max	**82.00**		**92.00**	**60.00**	**77.00**	**72.00**	**82.00**	**76.00**

Two-way analysis of variance (10 Time Phases * 6 Project Phases) was carried out, to explore significant differences in speeds. Phase 2 was excluded from the analysis due to data quality issues. As expected, there were significant differences in speeds at difference times of the day (Time Phase effect: $F(9, 1302102) = 1152.45$, $p<.001$). A significant effect can also be observed for the Project Phase factor: $F(5, 1302102) = 5029.45$, $p<.001$, see Table 24. Mean speeds are shown in Figure 7.

Table 25 Main and Interaction effects of Time and Project Phases on mean speed (Westbound)

Source	Sum Sq.	df	Mean Square	F	Sig.
Corrected Model	3397641.84	59	57587.15	1661.39	.000
Intercept	229349441.75	1	229349441.75	6616757.98	.000
Time Phase	359517.06	9	39946.34	1152.45	.000
Project Phase	871652.99	5	174330.59	5029.45	.000
Time Phase * Project Phase	209374.23	45	4652.76	134.23	.000
Error	45133336.85	1302102	34.66		
Total	1353874715.00	1302162			
Corrected Total	48530978.70	1302161			

Using planned contrasts, mean speed in each phase can be statistically compared to the phase prior, to track speed reduction as the project progressed. Apart from an increase in mean speed from Phase 3 to 4, speed consistently reduced as the project proceeded through the Phases ($p<.001$).

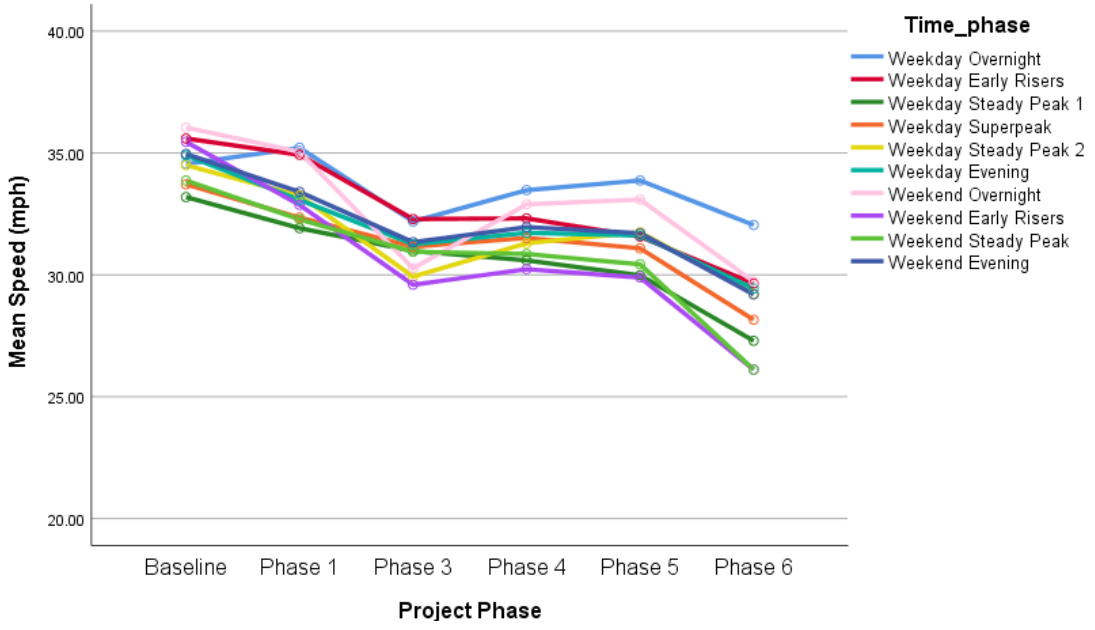

Figure 7 Mean speed by Time and Project Phases (Westbound)

From Figure 7 it can be seen that the Weekday Overnight traffic appears not to reduce speed to the same extent as the other groups.

Eastbound to Wilsden

The dataset used for the analysis is shown in Table 26; again the Phase 2 dataset is considerably smaller than in other phases. However, the mean speed recorded in Phase 2 (in contrast to the Westbound data) appears realistic and thus is retain in the analysis below.

Table 26 Speed Dataset – SID Eastbound

		Baseline	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Total
Weekday	overnight	2537	10400	1962	7517	16958	7543	6971	**53888**
	early risers	531	2095	436	609	2086	1329	1456	**8542**
	steady peak 1	1776	6645	1489	1043	4553	5029	4690	**25225**
	super peak	15841	55675	12491	14887	48334	40357	35471	**223056**
	steady peak 2	64562	238059	50589	156959	297446	156754	139783	**1104152**
	evening	16847	70627	13012	41297	84524	41888	41285	**309480**
Weekend	overnight	1080	5170	480	4869	5852	3232	2834	**23517**
	early risers	1733	7697	809	2716	5753	4689	3528	**26925**
	steady peak	23571	110726	11762	87169	110993	64706	51640	**460567**
	evening	4488	20478	1827	16975	20973	11767	10255	**86763**
	Total	**132966**	**527572**	**94857**	**334041**	**597472**	**337294**	**297913**	**2322115**

The mean speed data extracted for the Time and Project phases are shown in Table 27 and speed compliance levels in Table 28-Table 31.

Table 27 Mean speeds - Eastbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	↓
Weekday	overnight	24.55		19.07	26.87	19.01	14.77	20.09	18.55	**6.00**
	early risers	26.78		20.43	27.80	23.01	14.96	22.82	19.94	**6.84**
	steady peak 1	25.51		21.04	25.55	27.18	18.64	20.38	19.19	**6.32**
	super peak	24.12		19.99	23.71	24.33	19.06	19.47	17.85	**6.27**
	steady peak 2	22.43		17.80	23.53	17.85	16.06	18.16	17.46	**4.97**
	evening	23.32		17.98	24.00	18.81	16.95	19.36	17.75	**5.57**
Mean		***24.45***		***19.39***	***25.24***	***21.70***	***16.74***	***20.05***	***18.46***	**6.00**
Weekend	overnight	22.75		17.51	27.12	15.96	15.87	18.55	17.15	**5.60**
	early risers	23.45		18.51	25.88	20.76	18.32	19.54	18.48	**4.97**
	steady peak	21.10		16.08	24.64	16.99	14.87	17.10	17.13	**3.97**
	evening	21.32		16.68	25.13	16.50	15.77	18.52	16.91	**4.41**
Mean		***22.16***		***17.20***	***25.69***	***17.55***	***16.21***	***18.43***	***17.42***	**4.74**

As an overall observation the mean recorded speeds are lower than in the Westbound direct, due to the road layout. At all times of the day, Phase 6 mean speeds had reduced on average by 6mph on weekdays and 4mph at weekends, compared to Baseline speeds.

Compared to Phase 1, when the 20mph speed limit signs were installed, the % of traffic exceeding the speed limit reduced from 88.71% to 74.70% in Phase 6 on weekdays. Correspondingly, at weekends it reduced from 88.08% to 75.55%.

At higher speed limit exceedences (above 30mph and 40mph) the % decreased, although not to the same extent as in the Westbound direction. This is likely due to the lower baseline speeds.

Table 28 % of traffic travelling above 20mph - Eastbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	↓
Weekday	overnight	89.48		89.63	90.42	84.17	81.40	88.16	77.99	**11.49**
	early risers	94.73		92.84	93.58	84.89	76.17	95.33	83.93	**10.80**
	steady peak 1	97.41		95.18	96.10	88.78	86.73	90.87	84.69	**12.72**
	super peak	88.78		90.38	79.79	88.84	85.04	83.92	70.53	**18.25**
	steady peak 2	81.53		80.52	78.55	72.14	75.13	74.38	62.14	**19.39**
	evening	86.39		83.72	77.76	77.84	79.43	81.70	68.90	**17.49**
Mean		**89.72**		**88.71**	**86.03**	**82.78**	**80.65**	**85.73**	**74.70**	**15.02**
Weekend	overnight	92.69		90.41	91.67	85.85	86.72	87.78	80.24	**12.45**
	early risers	93.54		92.43	91.22	88.81	89.64	90.21	79.82	**13.72**
	steady peak	84.73		82.42	85.49	80.54	76.25	77.90	67.93	**16.80**
	evening	88.39		87.05	85.82	82.14	82.93	85.83	74.22	**14.17**
Mean		**89.84**		**88.08**	**88.55**	**84.34**	**83.89**	**85.43**	**75.55**	**14.29**

Table 29 % of traffic travelling above 30mph - Eastbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	↓
Weekday	overnight	21.09		20.86	21.56	15.27	14.55	20.48	14.50	**6.59**
	early risers	33.33		29.55	27.75	12.81	14.96	27.31	19.02	**14.31**
	steady peak 1	27.53		23.90	20.89	28.19	20.07	23.58	22.45	**5.08**
	super peak	11.56		12.10	6.97	11.90	11.92	9.57	6.39	**5.17**
	steady peak 2	4.56		4.56	4.82	3.45	4.19	3.76	2.36	**2.20**
	evening	9.48		8.55	8.20	5.04	6.38	8.42	5.37	**4.11**
Mean		**17.93**		**16.59**	**15.03**	**12.78**	**12.01**	**15.52**	**11.68**	**6.24**
Weekend	overnight	25.19		20.21	23.96	15.59	17.96	19.46	14.93	**10.26**
	early risers	19.56		20.89	12.86	18.19	16.95	17.89	12.84	**6.72**
	steady peak	5.31		5.80	7.03	5.63	5.38	4.97	3.63	**1.68**
	evening	14.04		12.13	11.88	9.44	9.79	10.56	8.72	**5.32**
Mean		**16.03**		**14.76**	**13.93**	**12.21**	**12.52**	**13.22**	**10.03**	**6.00**

Table 30 % of traffic travelling above 40mph - Eastbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	↓
Weekday	overnight	1.58		1.80	2.85	1.22	0.70	1.63	1.46	**0.12**
	early risers	2.64		1.29	1.15	0.82	0.43	1.96	0.82	**1.82**
	steady peak 1	0.56		0.45	0.13	1.73	0.70	0.60	0.53	**0.03**
	super peak	0.08		0.12	0.03	0.21	0.12	0.07	0.07	**0.01**
	steady peak 2	0.02		0.03	0.03	0.03	0.03	0.02	0.02	**0.00**
	evening	0.28		0.34	0.27	0.10	0.15	0.28	0.21	**0.07**
Mean		**0.86**		**0.67**	**0.74**	**0.69**	**0.36**	**0.76**	**0.52**	**0.34**
Weekend	overnight	1.02		0.64	1.04	0.70	0.99	1.21	1.02	**0.00**
	early risers	0.46		0.39	0.00	0.29	0.26	0.26	0.28	**0.18**
	steady peak	0.06		0.09	0.06	0.05	0.07	0.05	0.06	**0.00**
	evening	0.74		0.55	0.60	0.48	0.49	0.58	0.53	**0.21**
Mean		**0.57**		**0.42**	**0.43**	**0.38**	**0.45**	**0.53**	**0.47**	**0.10**

Table 31 % of traffic travelling above 60mph - Eastbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	↓
Weekday	overnight	0.00		0.00	0.00	0.00	0.00	0.04	0.00	**0.00**
	early risers	0.00		0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	steady peak 1	0.00		0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	super peak	0.00		0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	steady peak 2	0.00		0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	evening	0.00		0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Mean		**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Weekend	overnight	0.00		0.00	0.00	0.00	0.00	0.00	0.07	**+0.07**
	early risers	0.00		0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	steady peak	0.00		0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	evening	0.00		0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Mean		**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.02**	***+0.02***

Table 32 85th%ile speed - Eastbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Weekday	overnight	32.00		32.00	32.00	31.00	30.00	32.00	30.00
	early risers	34.50		33.00	33.00	30.00	30.00	33.00	32.00
	steady peak 1	32.00		32.00	32.00	33.00	32.00	32.00	32.00
	super peak	30.00		30.00	29.00	30.00	30.00	29.00	28.00
	steady peak 2	28.00		28.00	28.00	27.00	28.00	27.00	27.00
	evening	29.00		29.00	29.00	28.00	28.00	29.00	28.00
Weekend	overnight	33.00		32.00	32.00	31.00	31.00	32.00	30.00
	early risers	31.00		32.00	30.00	31.00	31.00	31.00	30.00
	steady peak	28.00		28.00	29.00	28.00	28.00	28.00	27.00
	evening	30.00		30.00	30.00	29.00	29.00	29.00	29.00

Table 33 95th%ile speed - Eastbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Weekday	overnight	36.00		36.00	37.00	35.00	34.00	36.00	35.00
	early risers	39.00		37.00	37.00	33.00	34.00	37.00	36.00
	steady peak 1	36.00		35.00	35.00	37.00	35.00	35.00	35.00
	super peak	32.00		33.00	31.00	33.00	33.00	32.00	31.00
	steady peak 2	30.00		30.00	30.00	30.00	30.00	30.00	29.00
	evening	32.00		32.00	32.00	31.00	31.00	32.00	31.00
Weekend	overnight	36.05		36.00	35.00	34.00	35.00	35.00	34.35
	early risers	34.00		34.00	32.00	34.00	34.00	34.00	33.00
	steady peak	31.00		31.00	31.00	31.00	31.00	30.00	30.00
	evening	34.00		33.00	33.00	32.00	33.00	33.00	32.00

Table 34 97.5th%ile speed - Eastbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Weekday	overnight	38.00		39.00	41.00	38.00	36.08	39.00	38.00
	early risers	40.75		39.00	39.00	35.80	36.00	39.00	38.00
	steady peak 1	37.00		37.00	36.80	39.00	38.00	37.00	37.00
	super peak	34.00		34.00	33.00	35.00	34.00	33.00	33.00
	steady peak 2	32.00		32.00	32.00	31.00	31.00	31.00	30.00
	evening	34.00		34.00	34.00	32.00	33.00	34.00	33.00
Weekend	overnight	38.00		38.00	38.00	36.00	37.00	37.00	37.00
	early risers	35.00		36.00	33.00	36.00	36.00	35.00	34.00
	steady peak	32.00		32.00	33.00	32.00	32.00	32.00	31.00
	evening	36.00		35.00	36.00	35.00	35.00	35.00	35.00

Table 35 Number of vehicles exceeding 97.5th%ile speed - Eastbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Weekday	overnight	60		234	42	154	424	163	143
	early risers	14		38	6	16	45	31	29
	steady peak 1	33		129	38	25	77	95	90
	super peak	275		1407	199	251	1026	961	544
	steady peak 2	1029		3747	871	3154	7295	3413	3292
	evening	329		1417	266	923	1683	774	711
Weekend	overnight	26		79	8	111	140	74	66
	early risers	41		163	20	63	99	115	88
	steady peak	430		2414	192	1923	2347	1255	1171
	evening	98		510	37	315	427	286	200

Table 36 Maximum speeds - Eastbound

		Baseline		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Weekday	overnight	57.00		59.00	60.00	57.00	53.00	63.00	60.00
	early risers	48.00		56.00	41.00	49.00	43.00	52.00	47.00
	steady peak 1	45.00		46.00	44.00	52.00	52.00	47.00	49.00
	super peak	44.00		50.00	42.00	46.00	53.00	49.00	48.00
	steady peak 2	47.00		54.00	53.00	56.00	57.00	50.00	51.00
	evening	63.00		61.00	54.00	52.00	53.00	57.00	56.00
Weekend	overnight	48.00		52.00	48.00	55.00	57.00	58.00	62.00
	early risers	45.00		51.00	39.00	52.00	45.00	45.00	48.00
	steady peak	48.00		54.00	49.00	51.00	54.00	58.00	55.00
	evening	58.00		59.00	54.00	58.00	59.00	53.00	55.00
	Max	**63.00**		**61.00**	**60.00**	**58.00**	**59.00**	**63.00**	**62.00**

As expected, there were significant differences in speeds at difference times of the day (Time Phase effect: $F(9, 2321822) = 5837.16$, $p<.001$). A significant effect can also be observed for the Project Phase factor: $F(6, 2321822) = 1136.12$, $p<.001$, see Table 37. Mean speeds are shown in Figure 8.

Table 37 Main and Interaction effects of Time and Project Phases on mean speed (Eastbound)

Source	Sum Sq.	df	Mean Square	F	Sig.
Corrected Model	2526962.84	69	36622.65	1727.50	.000
Intercept	144702426.73	1	144702426.73	6825688.25	.000
Time Phase	1113715.13	9	123746.12	5837.16	.000
Project Phase	144513.11	6	24085.51	1136.12	.000
Time Phase * Project Phase	147398.42	54	2729.60	128.75	.000
Error	49221890.22	2321822	21.20		
Total	2526962.84	69	36622.65	1727.50	.000
Corrected Total	144702426.73	1	144702426.73	6825688.25	.000

Again, using planned contrasts, the mean speed in each phase can be statistically compared to the phase prior, to track speed reduction as the project progressed. Speed consistently reduced as the project proceeded through the Phases ($p<.001$).

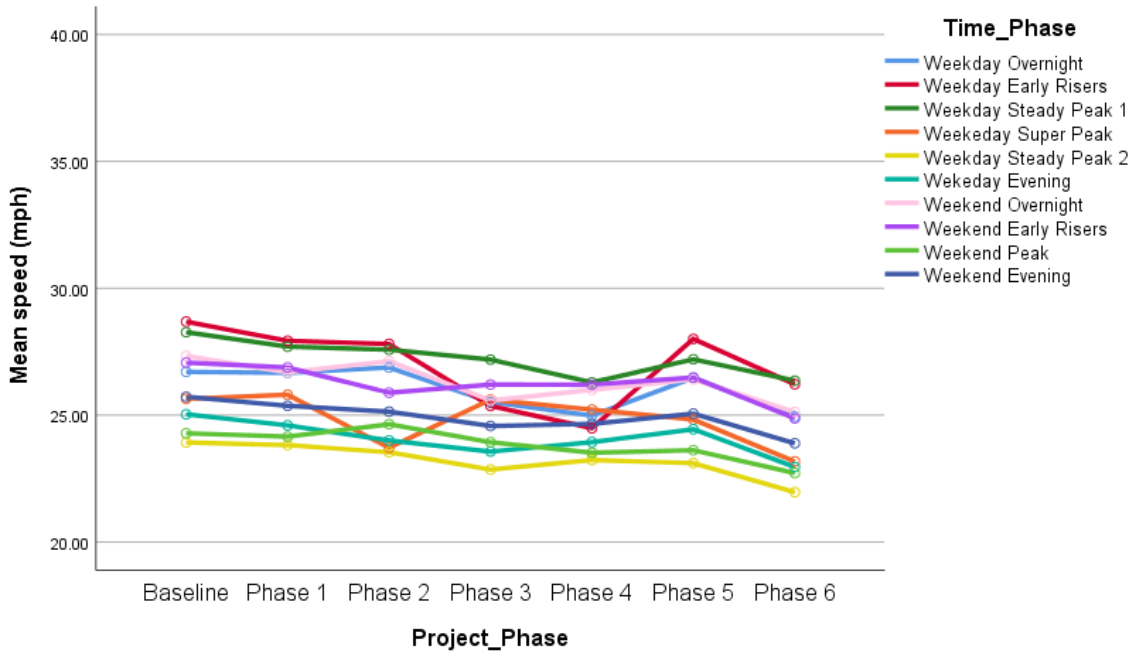

Figure 8 Mean speed by Time and Project Phases (Eastbound)

The data collapsed over time periods for each of West and Eastbound is shown in Figure 9.

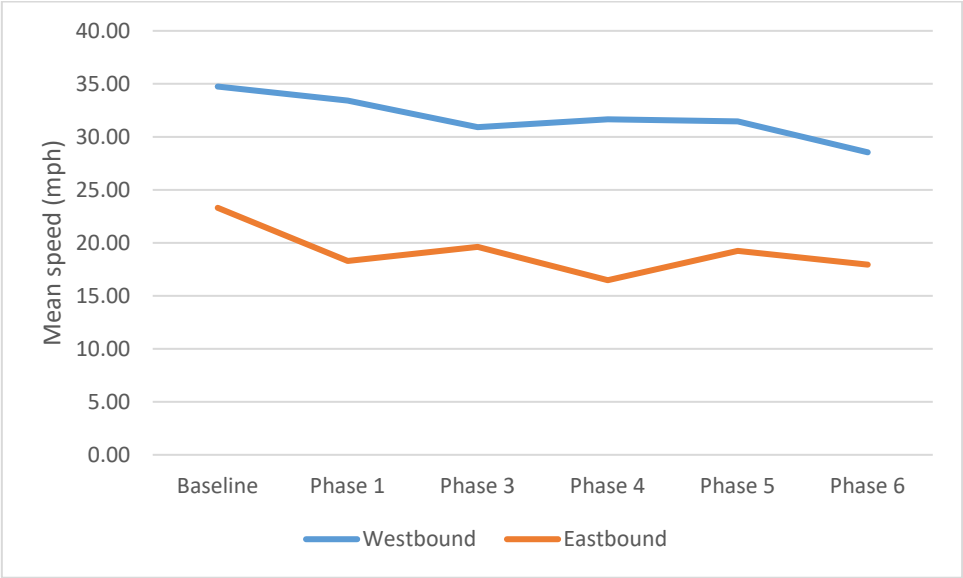

Figure 9 Mean speed by Project Phase

Comparing the SID and ATC data

The two datasets are different in nature – the SID data are raw travel speeds measures at entry to the zone of interest, whilst the ATC data are binned into 5 mph categories and measured within the zone. Some rough comparisons can be made between the two datasets using the average speeds derived[2]. Figure 10 and Figure 11 capture these data.

In the Westbound direction, mean speed are lower at the ATC data collection point compared to the SIDs, indicating that drivers are still reducing their speed within the zone, as opposed to being at their final speed as they enter the zone. In the Eastbound direction the opposite is true, with drivers entering at lower speeds and then increasing as they reach the ATC. The ATC data in each directions looks fairly stable at around 25mph however.

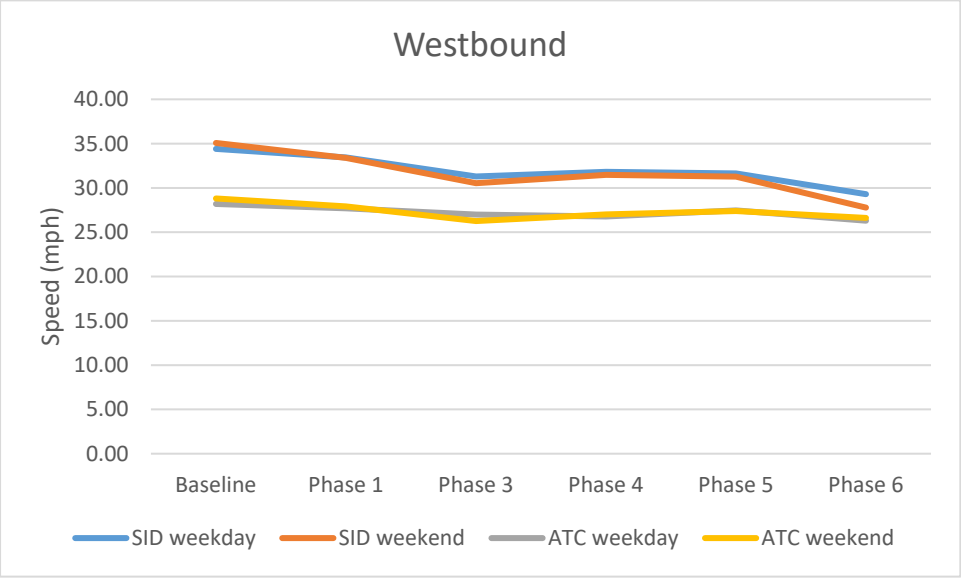

Figure 10 Comparison of ATC and SID data (Westbound)

[2] The average speeds in the ATC data were derived by the equipment provider

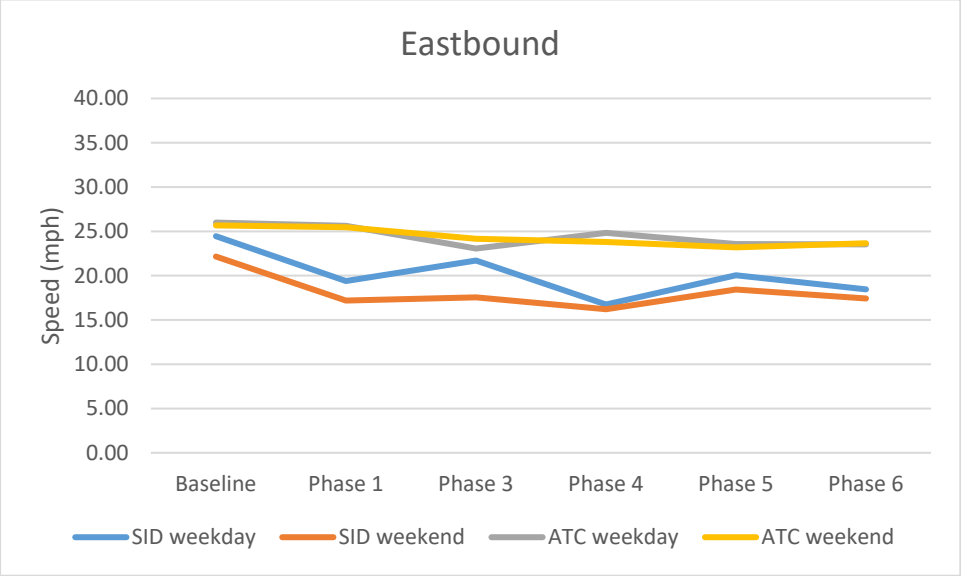

Figure 11 Comparison of ATC and SID data (Eastbound)

Conclusions

The SID data provides the most convincing pattern of data when concluding about the effects of each subsequent phase on mean speed at entry to the 20mph speed limit. There is strong evidence that, particularly in the Westbound direction where speeds are typically higher due to the road layout, that each Phase lowered mean speeds. In the Westbound direction, overall mean speeds reduced by 6.20mph and in the Eastbound by 5.37mph.

Speed reductions varied, depending on time of day. In the Westbound direction, weekday overnight speeds reduced by 2.5mph, whereas weekend early risers reduced by 9.35mph. Speed reductions in the Eastbound direction were more consistent, likely due to the lower initial speeds and lower speed variance.

The proportion of vehicles exceeding the speed limits reduced as the Project Phases were implemented, and there appears to be a particularly marked effect between Phases 5 and 6.

APPENDIX 3

WILSDEN PARISH COUNCIL
The Village Hall,
Wilsden,
Bradford,
BD15 0HT.
West Yorkshire.
www.wilsdenparishcouncil.gov.uk

Harecroft – Traffic speed reduction plan 2020-22

Current Situation:

After two and a half years in the planning, and countless delays caused by covid, extreme weather and other mitigating highways issues, the implementation of a 20 mph zone through Harecroft has now finally been completed. This installation was because Harecroft does not meet the stringent criteria for the installation of enforcement cameras or mobile units.

Wilsden Parish Council initiated this programme with support from WY Police, District Councillors and a large grant from the Road Safety Trust.

All works were performed by Bradford Council Highways Department, either directly or through contractors appointed by them.

The works carried out:

The 20 mph zone was initiated in the phases below in an attempt to constantly add new visual deterrents that may lead to a change in regular users behaviours. The Road Safety Grant required us to note how effective each new installation has been;

1. Install a 20 mph zone speed limit through the village (and on Station Road)
2. Prior to the 20mph zone, from all directions and side roads, install a 30 mph buffer zone
3. Install repeater signs at intervals through the zone
4. At the start of the 20 mph zone, add rumble strips, coloured tarmac and SLOW wording to the approaching carriageway
5. Paint the roadway with 20 mph roundels at set intervals
6. Place a Speed Indicator Devices [SIDs] (showing actual speed and smile/frown) just inside the 20 mph zone in both directions

The SIDs were operating in 'stealth' mode (without the display operational) for almost a year whilst the other installations were being assessed. They have now been switched on and will remain in place permanently.

Residents Follow-up Consultation:

The Road Safety Trust grant required us to consult residents twice - before we commenced the project – which we did and gained widespread support and now after the project has been completed.

The post implementation feedback is to assess if this reduction has been considered successful and to identify what improvements or changes could and should be made going forward.

If it has not been considered a success, the only alternative is to apply for more significant physical reduction measures (such as road humps, road tables or road cushions) that will add noise and have to be added to the highway outside many residents' homes.

Please complete the questionnaire overleaf to supply the feedback. We ask that each household complete the attached questionnaire and return it to either Councillor Amanda Belford, 103 Harecroft or The Parish Clerk by mail or hand delivery, no later than **SUNDAY 24th JULY 2022.**

Harecroft – Traffic speed reduction plan 2020-22

Resident Follow up Questionnaire – Return by 24th July 2022

1. Do you consider the speed reduction programme to have been successful in reducing traffic speeds and improving pedestrian calm and safety?

Yes ☐ **No** ☐

2. If you answered 'yes' to Q1, please enter what do you think has been the most successful element of the several installations

If you answered 'no' to Q1, please enter what or why you think it has not worked and what you would like to see changed or implemented instead

3. Has any property or vehicles owned by you, been subject to any collision damage in the last year – during the installation programme?

Yes ☐ **No** ☐

4. If you answered 'yes' to Q3, please supply details

#	Approx. Date	Denote damage to Vehicle (V) Property (P) Both (B)	Type of damage	Did anyone need hospitalisation (a 'casualty accident')?	Did driver stop and exchange insurance details?	Did you report to Police	Approx. Repair cost
Example	*April 2022*	*V*	*Broken wind mirror*	*N*	*N*	*N*	*£150*
Example	*Feb 2022*	*P*	*Front wall demolished*	*N*	*Y*	*Y*	*£3000*
1							£
2							£

Councillor Belford
103 Harecroft

or

The Parish Clerk
The Village Hall
Wilsden
Bradford
BD15 0HT
West Yorkshire.

Fold here

APPENDIX 4

Repeater signs


Eastbound & Westbound SIDs (in stealth mode)

Eastbound 20-mph zone start

Westbound 20 mph zone start