



# Horsham Local Plan Review

## Highways Safety Study

On behalf of **Horsham District Council**

Project Ref: 332610655 | Rev: P04 | Date: November 2023

---

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU  
Office Address: Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN  
T: +44 (0)118 950 0761 E: PBA.Reading@stantec.com

## Document Control Sheet

**Project Name:** Horsham Transport Study Update

**Project Ref:** 332610655

**Report Title:** Horsham Highways Safety Study

**Doc Ref:** 001

**Date:** November 2023

	Name	Position	Signature	Date
<b>Prepared by:</b>	M. Law	Senior Transport Planner	ML	05/10/2023
<b>Reviewed by:</b>	R. Dziurla	Principal Transport Planner	RD	05/10/2023
<b>Approved by:</b>	P. Gebbett	Senior Associate	PG	05/10/2023
<b>For and on behalf of Stantec UK Limited</b>				

Revision	Date	Description	Prepared	Reviewed	Approved
P01	06/10/2023	Draft For Comment	ML	RD	PG
P02	31/10/2023	WCSS / HDC Comment & Response	ML	RD	PG
P03	15/11/2023	HDC Comment & Response	ML	RD	PG
P04	21/11/2023	Final Comments	ML	RD	PG

This report has been prepared by Stantec UK Limited ('Stantec') on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which Stantec was appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e. parties other than the Client). Stantec accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

## Contents

- 1 Introduction..... 1**
  - 1.1 Overview..... 1
  - 1.2 Horsham District Planning Framework..... 1
- 2 PIC Assessment Methodology ..... 2**
  - 2.1 Horsham District Overview ..... 2
  - 2.2 Collision Study Areas ..... 2
  - 2.3 Collision Study Area 1 – Horsham District ..... 2
  - 2.4 Collision Study Area 2 – A23 Corridor ..... 3
- 3 Collision Summary ..... 6**
  - 3.2 Study Area 1 Collision Summary..... 7
  - 3.3 Study Area 2 Collision Summary..... 11
  - 3.4 Fatal Injury Summary ..... 13
- 4 Collision Hotspot Identification ..... 14**
  - 4.2 Junction Collision Cluster Review ..... 14
- 5 Causation Analysis ..... 18**
  - 5.2 Junction 1: A24 / A283 Washington Roundabout ..... 20
  - 5.3 Junction 2: A24 / A272 Buck Barn..... 20
  - 5.4 Junction 3: A24 Hop Oast Roundabout..... 21
  - 5.5 Junction 4: A24 Robin Hood Roundabout..... 22
  - 5.6 Junction 5: King’s Road Roundabout ..... 23
  - 5.7 Junction 6: B2195 Harwood Road / Station Road / Kings Road / Foundry Lane / Booth Way Roundabout..... 23
  - 5.8 Junction 7: B2195 Harwood Road / Redin Way / Comptons Lane Roundabout ..... 24
  - 5.9 Junction 8: A24 Great Daux Roundabout ..... 24
- 6 Impact of Local Plan..... 26**
- 7 Summary ..... 31**

## Figures

- Figure 2.1: Collision Study Area Overview..... 3
- Figure 2.2: Study Area 1 (Horsham District) ..... 4
- Figure 2.3: Study Area 2 (A23 Corridor)..... 5
- Figure 3.1: Overall Collision Summary..... 7
- Figure 3.2: Study Area 1 Collision Summary ..... 8
- Figure 3.3: Study Area 1 PIC Location Plan..... 10
- Figure 3.4: Study Area 2 Collision Summary ..... 11
- Figure 3.5: Study Area 2 PIC Location Plan..... 12
- Figure 4.1: Identified Junction Cluster Locations ..... 15
- Figure 5.1: Key Junctions Clusters..... 19

## Tables

Table 3.1: Overall Collision Summary – Horsham District & A23 Corridor ..... 6  
Table 3.2: Study Area 1 Collision Summary – Horsham District..... 8  
Table 3.3: Study Area 2 Collision Summary – A23 Corridor ..... 11  
Table 5.1: Washington Roundabout Causation Factors ..... 20  
Table 5.2: A24/A272 Causation Factors ..... 20  
Table 5.3: Hop Oast Roundabout Accident Factors..... 21  
Table 5.4: Robin Hood Roundabout Accident Factors ..... 22  
Table 5.5: King’s Road Roundabout Causation Factors ..... 23  
Table 5.6: B2195 Harwood Road/Station Road/Kings Road/Foundry Lane/Booth Way Roundabout  
Causation Factors ..... 23  
Table 5.7: B2195 Harwood Road / Redin Way / Comptons Lane Roundabout Causation Factors..... 24  
Table 5.8: Great Daux Roundabout Causation Factors ..... 24  
Table 6.1: Local Plan Impact Summary ..... 28  
Table 6.2: COBALT output – Casualty increase from Reference Case to Local Plan Scenario..... 29

## Appendices

- Appendix A Study Area 1 Collision Locations
- Appendix B Study Area 2 Collision Locations

This page is intentionally blank

# 1 Introduction

## 1.1 Overview

- 1.1.1 This report has been prepared by Stantec on behalf of Horsham District Council (HDC) to provide a review of the Personal Injury Collision (PIC) record across the Horsham District and neighbouring A23 corridor and to identify locations on the highways network where significant increases in traffic, as a result of the Local Plan development, may have an impact.
- 1.1.2 This report aims to identify the key collision clusters on the local highway network using collision data over the latest five years (August 2018–July 2023) and utilising GIS software to plot and analyse the collisions across the network.
- 1.1.3 The period reviewed included the period of lockdown during COVID-19, with accidents occurring during this time also included.
- 1.1.4 Using the initial cluster review, the identified junctions have also been assessed against the potential impacts associated with Local Plan development to understand if the known proposed and committed transport strategy improvements and any other proposed transport network changes, such as local safety schemes will mitigate the area where collision rates are high.

## 1.2 Horsham District Planning Framework

- 1.2.1 The current Horsham District Local Plan is called the Horsham District Planning Framework and was adopted in November 2015. The Plan set out an overarching framework for the future of the plan area to 2031 and to deliver the social, economic, and environmental needs of the HDPF plan area.
- 1.2.2 In 2019, Stantec (at that point known as Peter Brett Associates) was commissioned by Horsham District Council (HDC) to undertake a Horsham Transport Study to support the Regulation 19 Local Plan. A version of this was initially published in May 2021, based on a development strategy and site allocations that were at the time intended to be presented to the Council in July 2021.
- 1.2.3 Subsequent revision to the Local Plan strategy and development quanta has led to a further Transport Study Report being issued to HDC by Stantec in late 2022 that included the testing of the new Preferred Strategy scenario. However this was not published as the Local Plan had again been delayed.
- 1.2.4 The Local Plan is in Regulation 19 preparation and progressing towards a submission expected to take place in mid-2024.

## 2 PIC Assessment Methodology

### 2.1 Horsham District Overview

- 2.1.1 The Horsham District spans an area of approximately 530km<sup>2</sup> and is a local government district within West Sussex. Horsham District borders Crawley, Mid Sussex, Mole Valley, and Waverley districts (both Surrey), Chichester, Arun, and Adur.
- 2.1.2 Horsham is the main settlement within the district, other major areas of population within being Billingshurst, Storrington & Sullington, Pulborough, Henfield & Southwater, Broadbridge Heath and the Steyning/Bramber/Upper Beeding cluster of villages.
- 2.1.3 The main routes through the district are the A24 travelling north to south from the M25 to Worthing on the south coast, the A272 running through the centre of the Horsham District East to West and the A264 from the A23 to the southwest of Crawley, to the A24 to the northeast of Horsham.
- 2.1.4 To the south of Horsham is the A27, the main route for east-west traffic along the south coast and to the east of the district is the A23. This is one of the main north-south routes from the south coast (Brighton) to London and, along with the A27, forms part of the National Highways controlled Strategic Road Network (SRN).
- 2.1.5 Within Horsham itself, the A24 and A264 forms an outer ring road to the West and North. The A264 specifically accommodates traffic movement to/from Horsham and Crawley and traffic onwards to/from Horsham onto the M23.
- 2.1.6 The Horsham District is situated within the Gatwick Diamond, which is a key area of economic growth within West Sussex. Major areas of employment are located within Horsham Town centre. Outside of Horsham, Gatwick airport is a major employment area.

### 2.2 Collision Study Areas

- 2.2.1 In addition to the Horsham District area, also included within the collision study is the A23 corridor, a western section of the Mid Sussex District which lies adjacent to the eastern edge of Horsham District boundary. The inclusion of this area was suggested by West Sussex County Council (WSCC) as it is a section of the SRN and has been identified as a section of highway that could be influenced by the Local Plan applications in the Horsham District.
- 2.2.2 It is noted that neighbouring authorities, namely Surrey County Council, may request reporting of cross-boundary PIC data. Specifically, the A24 and the A281. The increase in traffic flow from the Local Plan scenario has the potential to impact the A24 corridor with respect to safety, with the first significant junction beyond Horsham being the Clark's Green Roundabout. Further PIC data outside of WSCC has not been considered within this study.
- 2.2.3 The two study areas are described below and illustrated on the following figures:
- **Figure 2.1:** Collision Study Area Overview
  - **Figure 2.2:** Horsham District Area (Study Area 1)
  - **Figure 2.3:** A23 Corridor Area (Study Area 2)

### 2.3 Collision Study Area 1 – Horsham District

- 2.3.1 Area 1 encompasses the entirety of Horsham District.



2.3.2 The major road connections within the study area are the A24 running north-south and the A272 running east-west. Also considered are the road connections within the Horsham District boundary that run towards to the A23, namely the A264 and B2110 The full extents of Study Area 1 can be seen in **Figure 2.2**.

## 2.4 Collision Study Area 2 – A23 Corridor

2.4.1 Area 2 is centred around the A23 just beyond the eastern boundary of Horsham District. The study area extends from the M23 Junction 11 at Pease Pottage in the north to the A23 junction with Cowfold Road and Bolney Road at Bolney.

2.4.2 The A23 is the major traffic corridor passing through the area linking to Brighton in the south and Crawley in the north. In the northern section of Study Area 2 the A23 becomes the M23 around Crawley towards the M25.

2.4.3 As agreed with WSCC, this study area is limited to the A23 and its associated slip roads and junction. The full extents of study area 2 can be seen in **Figure 2.3**.

Figure 2.1: Collision Study Area Overview

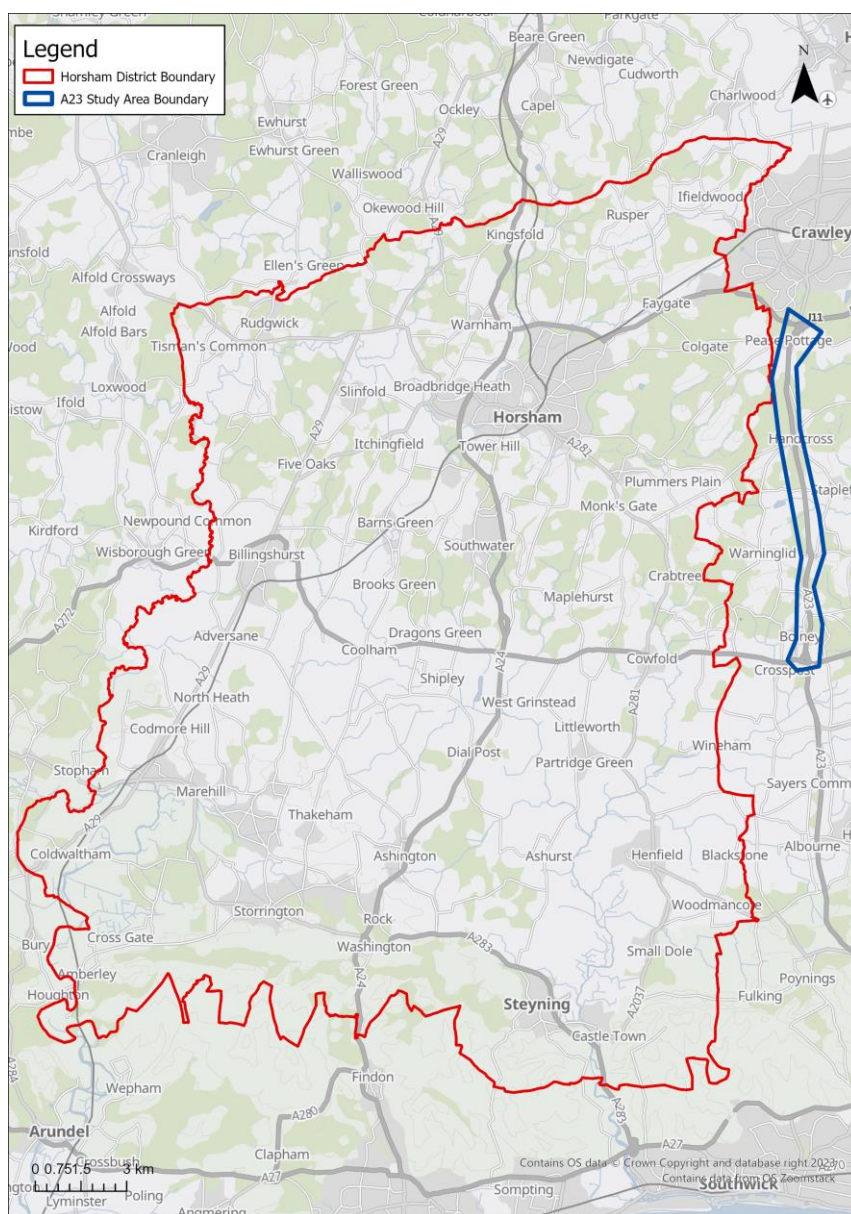




Figure 2.2: Study Area 1 (Horsham District)

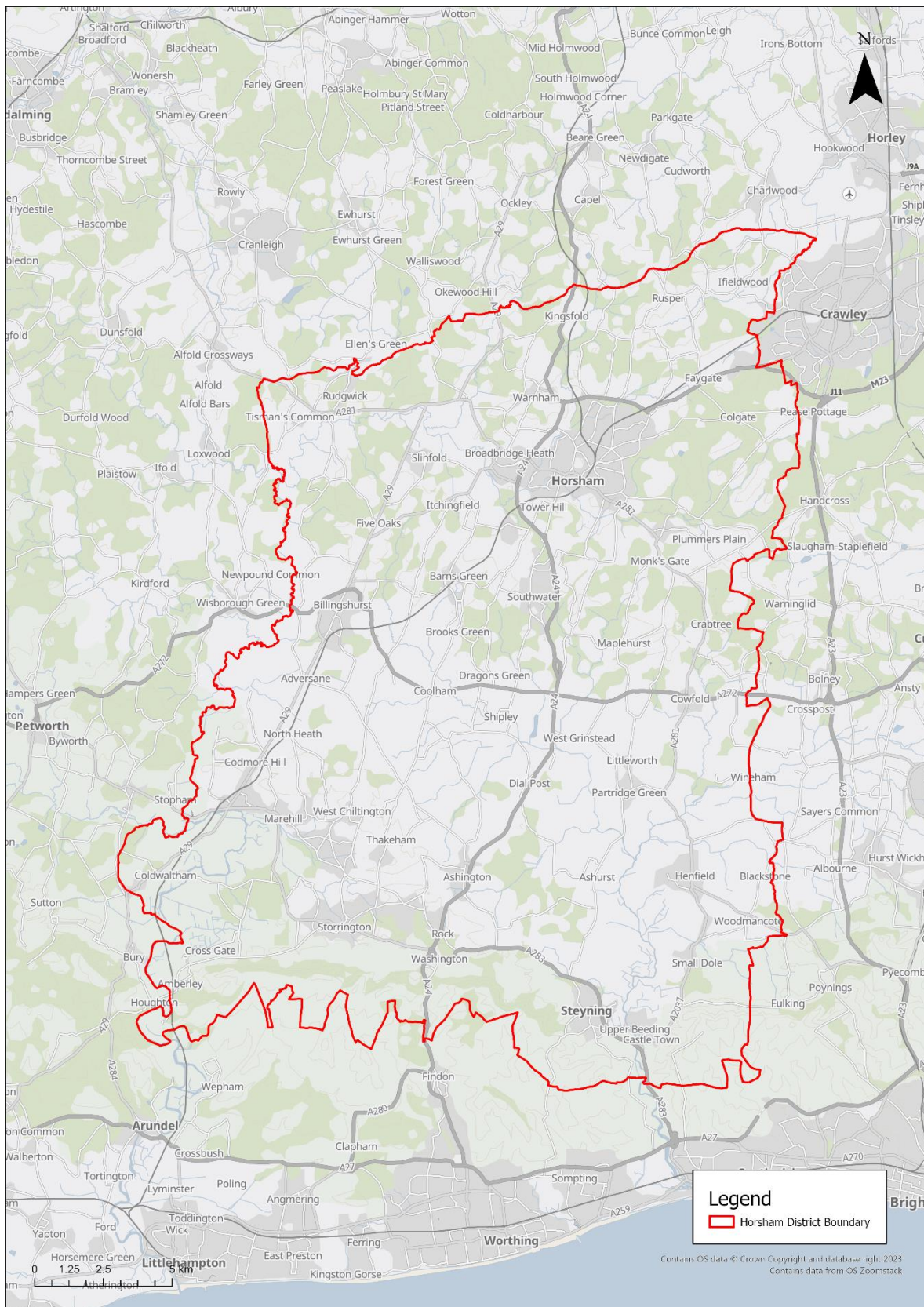
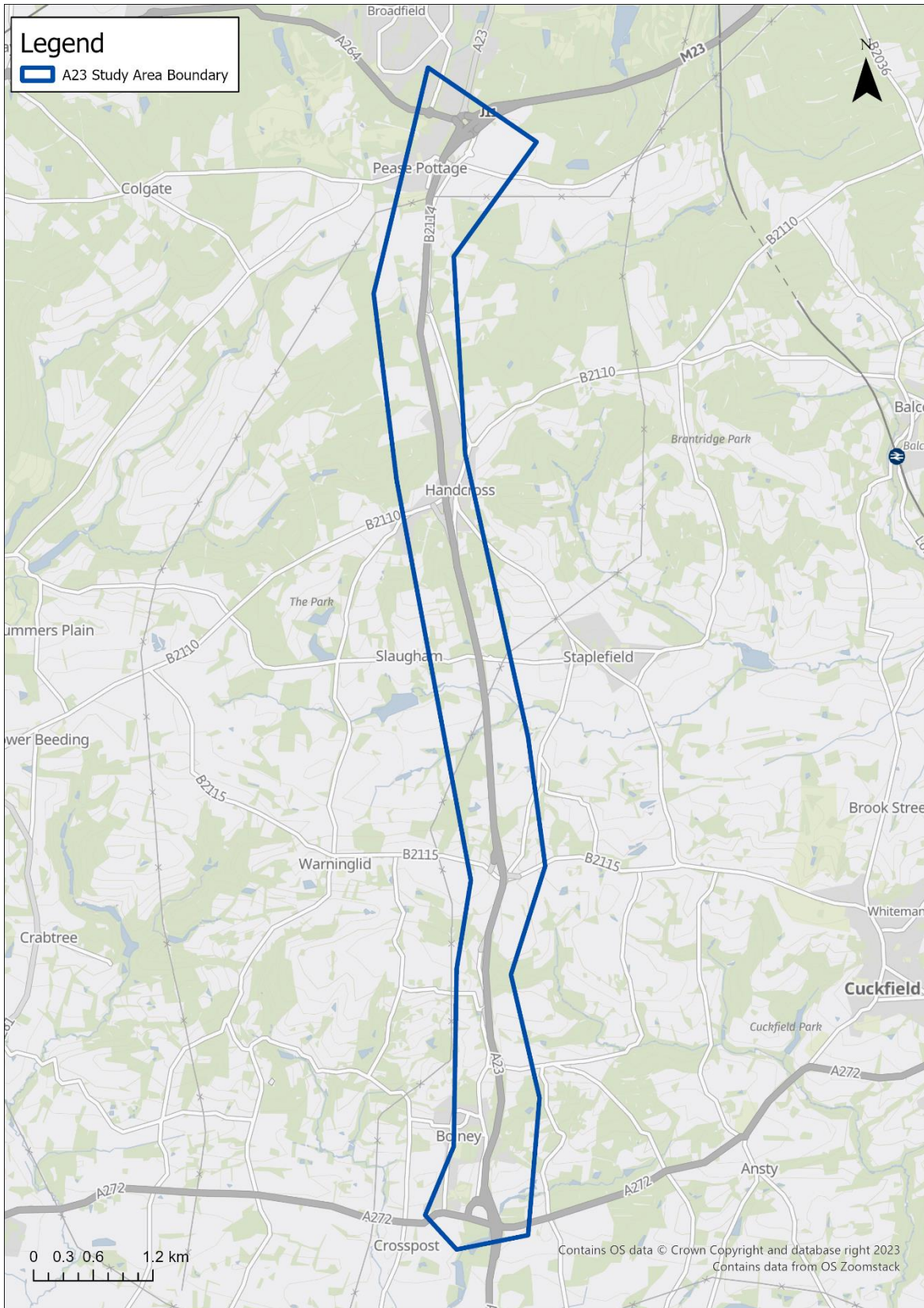




Figure 2.3: Study Area 2 (A23 Corridor)



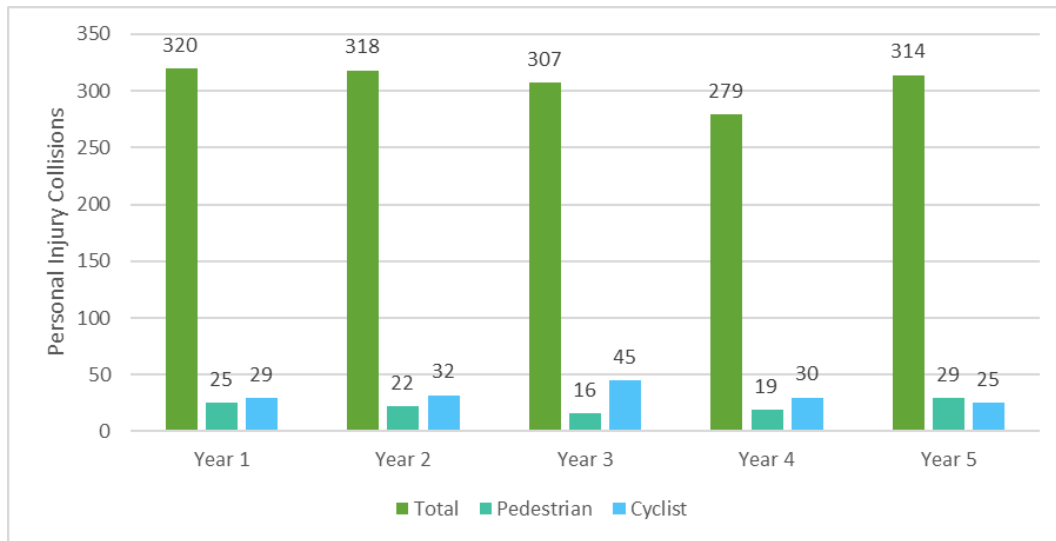
### 3 Collision Summary

- 3.1.1 Personal Injury Collision (PIC) data from within Study Areas 1 and 2 has been obtained from WSCC for the latest available 5-year period, covering 01/08/2018 – 29/07/2023. This timeframe has been used to ascertain if any pre-existing safety issues are present on the highway network within the identified study areas, and therefore have the potential to be impacted upon as a result of the forecast Local Plan development traffic.
- 3.1.2 The recorded collisions are classified into three separate categories based on severity: Slight, Serious, and Fatal. The definitions of which are as follows:
- **Slight** Injury: Injuries of a minor nature, such as sprains, bruises, or cuts not judged to be severe, or slight shock requiring only roadside attention (medical treatment is not a pre-requisite for an injury to be defined as Slight);
  - **Serious** Injury: Injuries for which a person is detained in hospital, as an in-patient, or any of the following injuries, whether a person is detained in hospital; fractures, concussion, internal injuries, severe cuts and lacerations, severe general shock requiring medical treatment and injuries which result in death 30 days after the collision. The Serious category, therefore, covers a very broad range of injuries; and
  - **Fatal** Injury: Injuries which cause death either immediately or any time up to 30 days after the collision.
- 3.1.3 The data has been reviewed in terms of the annual 12-month rolling year as outlined below.
- Year 1: 01<sup>st</sup> August 2018 to 31<sup>st</sup> July 2019
  - Year 2: 01<sup>st</sup> August 2019 to 31<sup>st</sup> July 2020
  - Year 3: 01<sup>st</sup> August 2020 to 31<sup>st</sup> July 2021
  - Year 4: 01<sup>st</sup> August 2021 to 31<sup>st</sup> July 2022
  - Year 5: 01<sup>st</sup> August 2022 to 29<sup>th</sup> July 2023

Table 3.1: Overall Collision Summary – Horsham District & A23 Corridor

Collision Type	Injury Severity	Annual Rolling 12 Months					Total
		Year 1	Year 2	Year 3	Year 4	Year 5	
Total	Fatal	5	6	8	8	3	30
	Serious	87	94	81	78	90	430
	Slight	228	218	218	193	221	1078
	<b>Total</b>	<b>320</b>	<b>318</b>	<b>307</b>	<b>279</b>	<b>314</b>	<b>1538</b>
Pedestrian	Fatal	2	1	0	1	0	4
	Serious	5	9	4	5	14	37
	Slight	18	12	12	13	15	70
	<b>Total</b>	<b>25</b>	<b>22</b>	<b>16</b>	<b>19</b>	<b>29</b>	<b>111</b>
Cyclist	Fatal	1	1	0	1	0	3
	Serious	9	12	17	7	7	52
	Slight	19	19	28	22	18	106
	<b>Total</b>	<b>29</b>	<b>32</b>	<b>45</b>	<b>30</b>	<b>25</b>	<b>161</b>

Figure 3.1: Overall Collision Summary



3.1.4 **Table 3.1** and **Figure 3.1** summarise that there was a total of 1,538 collisions recorded across the two study areas in consideration. Of these collisions 70% were of a slight severity and 28% as a serious severity. Over the 5-year study period there was a total of 30 collisions (2%) that resulted in a fatality.

3.1.5 The distribution of collisions recorded in each of the annual rolling 12-month periods is broadly consistent, fluctuating between 18% and 21% of the 5-year total. Year 4 shows a slightly lower total number of collisions than both Year 3 and Year 5, a 9.1% lower than Year 3 and 11.1% lower than Year 5. As this variation is slight and for a single year before returning to the expected level, it is not considered to be of significant concern.

3.1.6 The impact of the Covid-19 pandemic and associated lockdown periods has been considered across each 12-month period. It would be expected that data collected in Year 2 and Year 3 would reflect the restrictions on movement and travel behaviour changes during the pandemic. Despite the impacts of pandemic, the PIC data across the two study areas does not reflect these impacts and is consistent across the five 12-month periods.

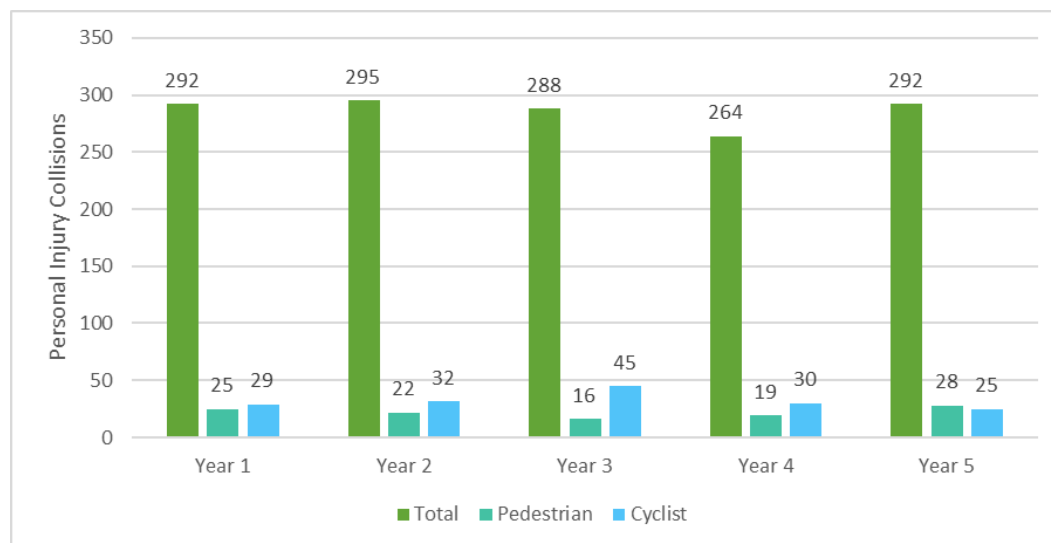
### 3.2 Study Area 1 Collision Summary

3.2.1 The recorded collisions in Study Area 1 (Horsham District) over the last 5-years have been summarised in **Table 3.2** below.

Table 3.2: Study Area 1 Collision Summary – Horsham District

Casualty	Injury Severity	Annual Rolling 12 Months					Total
		Year 1	Year 2	Year 3	Year 4	Year 5	
Total	Fatal	5	6	8	7	3	29
	Serious	78	87	80	73	86	404
	Slight	209	202	200	184	203	998
	<b>Total</b>	<b>292</b>	<b>295</b>	<b>288</b>	<b>264</b>	<b>292</b>	<b>1431</b>
Pedestrian	Fatal	2	1	0	1	0	4
	Serious	5	9	4	5	14	37
	Slight	18	12	12	13	14	69
	<b>Total</b>	<b>25</b>	<b>22</b>	<b>16</b>	<b>19</b>	<b>28</b>	<b>110</b>
Cyclist	Fatal	1	1	0	1	0	3
	Serious	9	12	17	7	7	52
	Slight	19	19	28	22	18	106
	<b>Total</b>	<b>29</b>	<b>32</b>	<b>45</b>	<b>30</b>	<b>25</b>	<b>161</b>

Figure 3.2: Study Area 1 Collision Summary



3.2.2 **Table 3.2** and **Figure 3.2** summarises that there was a total of 1431 collisions recorded over the 5-year assessment period. Of these collisions 70% were of a slight severity and 28% at a serious severity. Over the 5-year study period there was a total of 29 collisions (2%) that resulted in a fatality.

3.2.3 From the total collisions recorded in this study area, 110 collisions resulted in injury to a pedestrian. This equates to 8% of the total collisions recorded.

3.2.4 Of the collisions involving and vulnerable road users (considered as pedestrian and cyclists in the assessment) there were 7 (3%) fatalities recorded, with 89 (33%) serious and 175 (65%) slight collisions.

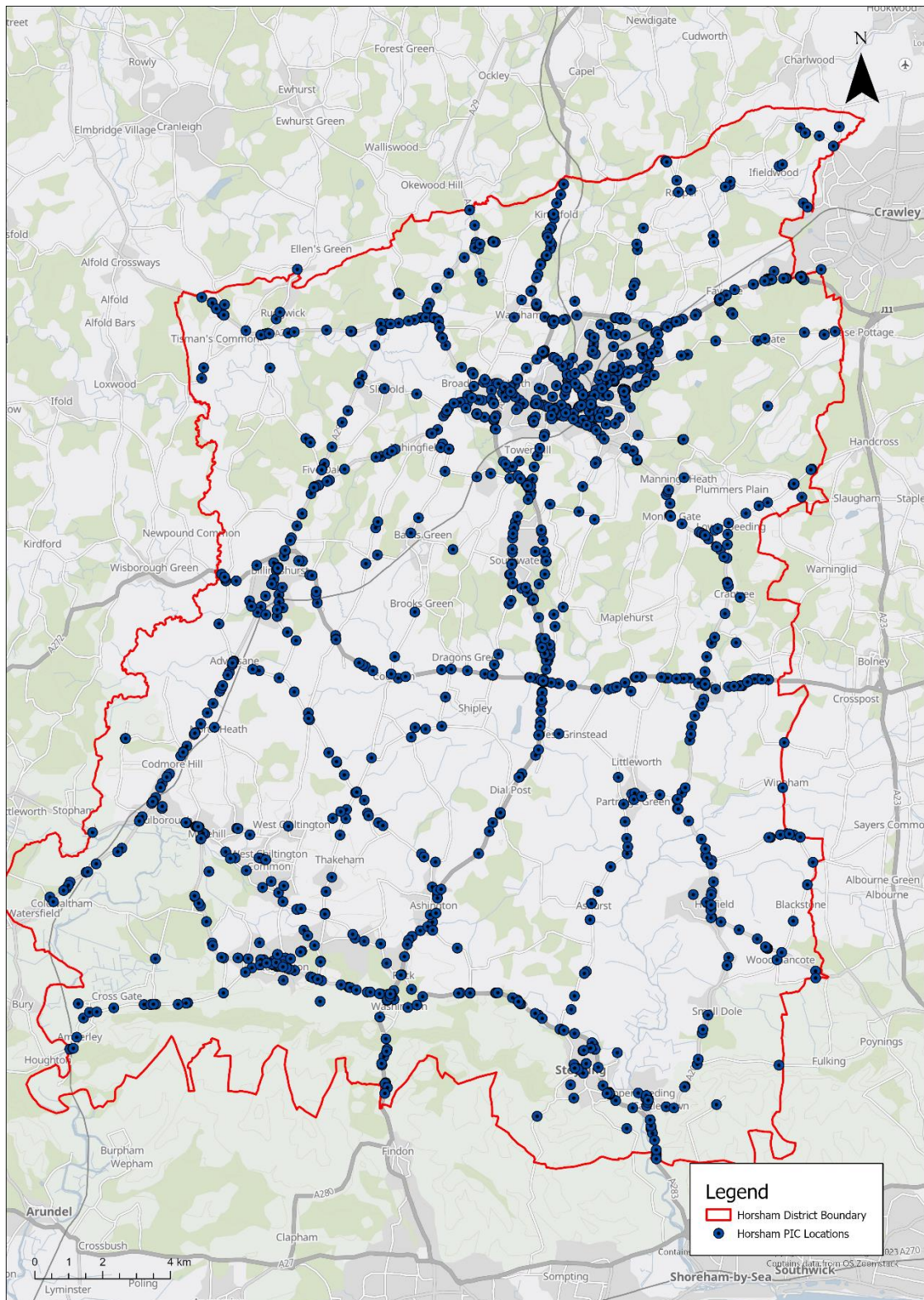
3.2.5 The proportion of cyclist collisions remained consistent across Years 1, 2, 4, and 5, ranging between 25 and 32 collisions, however it is noted that Year 3 recorded an increase in the number of collisions involving cyclists. In the Year 3 period, there was a total of 45 collisions resulting in injury to a cyclist which equated to 16% of the total collisions in that year. This

increase could be a result of an increase in the number of people cycling due to the Covid-19 pandemic.

- 3.2.6 The increase in cycling during the Covid-19 pandemic period is supported by data from the National Travel Survey (NTS). The tables within NTS0303 highlights spikes in 'average number of trips', 'average trip length', and 'average trip duration' by pedal cycle during 2020. This could have implications on the kinds of roads cyclists were travelling on and the possible increase in conflicts with vehicle traffic.
- 3.2.7 This peak in average pedal cycle kilometres from the NTS data is noted to be confined to 2020. Data post 2020 is shown to be more akin to that of pre 2020 data.
- 3.2.8 The location of the collisions recorded across Study Area 1 are illustrated in **Figure 3.3** below and provided in **Appendix A**.



Figure 3.3: Study Area 1 PIC Location Plan





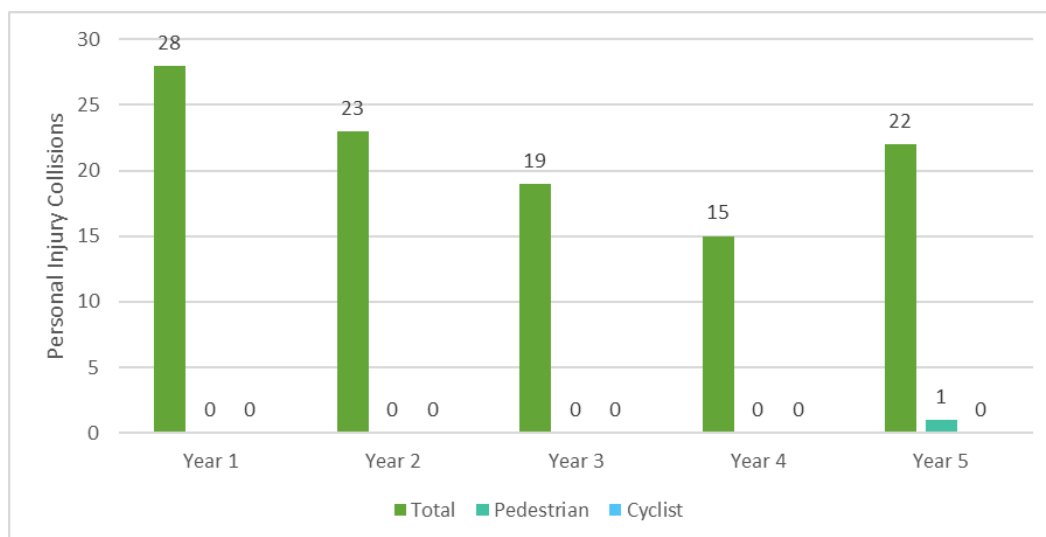
### 3.3 Study Area 2 Collision Summary

3.3.1 The recorded collisions in Study Area 2 (A23 Corridor) over the last 5-years have been summarised in **Table 3.3** below.

Table 3.3: Study Area 2 Collision Summary – A23 Corridor

Casualty	Injury Severity	Annual Rolling 12 Months					Total
		Year 1	Year 2	Year 3	Year 4	Year 5	
Total	Fatal	0	0	0	1	0	1
	Serious	9	7	1	5	4	26
	Slight	19	16	18	9	18	80
	<b>Total</b>	<b>28</b>	<b>23</b>	<b>19</b>	<b>15</b>	<b>22</b>	<b>107</b>
Pedestrian	Fatal	0	0	0	0	0	0
	Serious	0	0	0	0	0	0
	Slight	0	0	0	0	1	1
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>
Cyclist	Fatal	0	0	0	0	0	0
	Serious	0	0	0	0	0	0
	Slight	0	0	0	0	0	0
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Figure 3.4: Study Area 2 Collision Summary

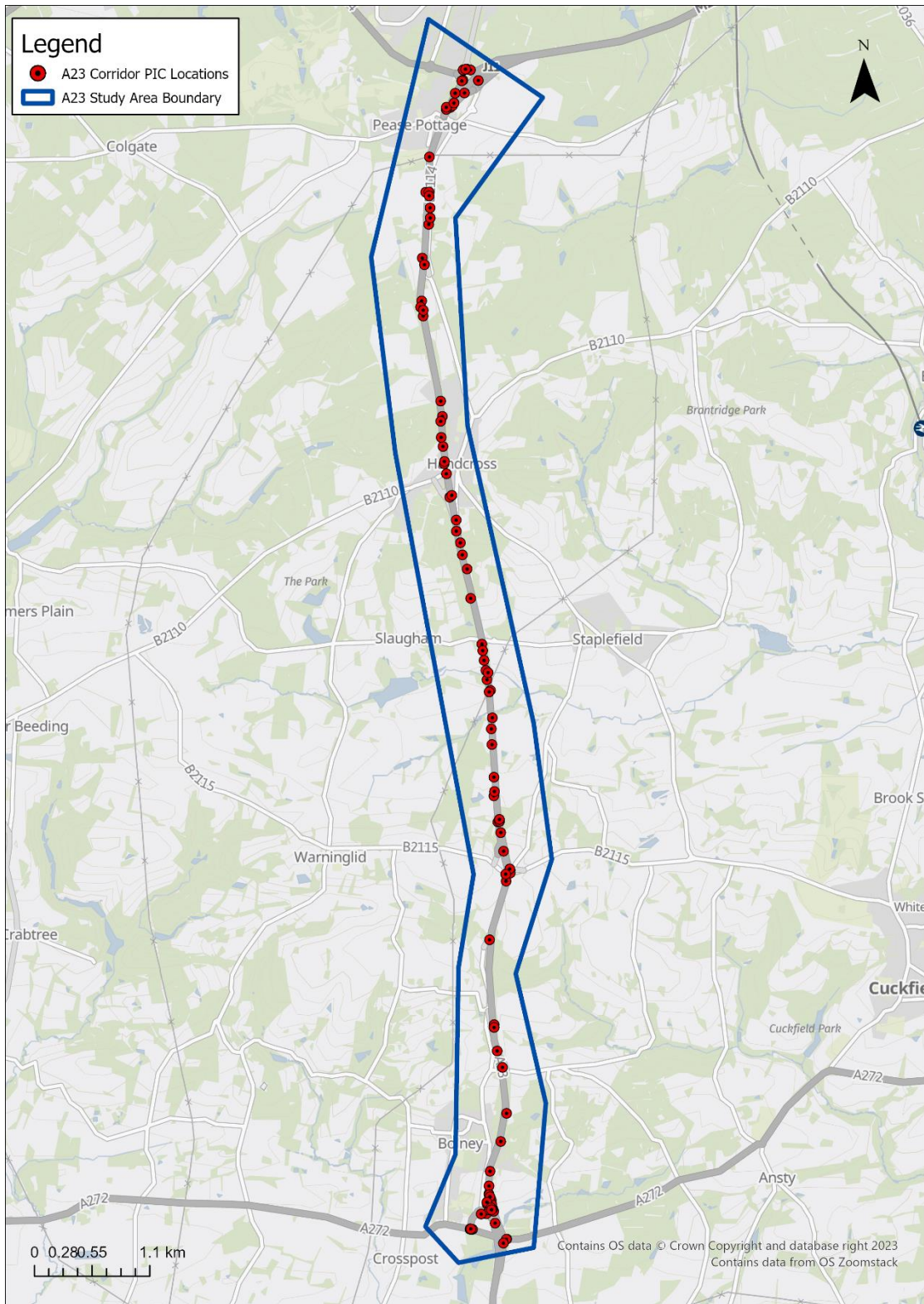


3.3.2 **Table 3.3** and **Figure 3.4** summarises that there was a total of 107 collisions recorded over the 5-year assessment period. Of these collisions 75% were of a slight severity and 24% at a serious severity. Over the 5-year study period there was one collision that resulted in a fatality.

3.3.3 From the total collisions recorded in this study area, one collision resulted in injury to a vulnerable road user and was classified as slight in severity.

3.3.4 The location of the 107 collisions recorded across Study Area 2 are illustrated in **Figure 3.5** below and provided in **Appendix B**.

Figure 3.5: Study Area 2 PIC Location Plan



### 3.4 Fatal Injury Summary

- 3.4.1 The collisions across the overall study area resulting in a fatal injury have been summarised further. Thirty collisions resulting in a fatal injury occurred across the study area, making up 2% of all collisions and averaging 6 fatal injuries every 12-months.
- 3.4.2 The 30 fatal collisions have all occurred separate from one another, while the majority have occurred away from any junction. 21 of the 30 collisions were classified as occurring 'Not at or within 20 metres of junction'.
- 3.4.3 Fatal collisions involving pedestrians or cyclists accounted for 7 of the 30 fatal incidents (23%).
- 3.4.4 If the significance of fatal incidents is to be assessed further, this would require a study consisting of a wider time period. The 30 fatal collisions picked up in this five-year assessment period is not sufficient data to draw any statistically significant occurrence patterns.

## 4 Collision Hotspot Identification

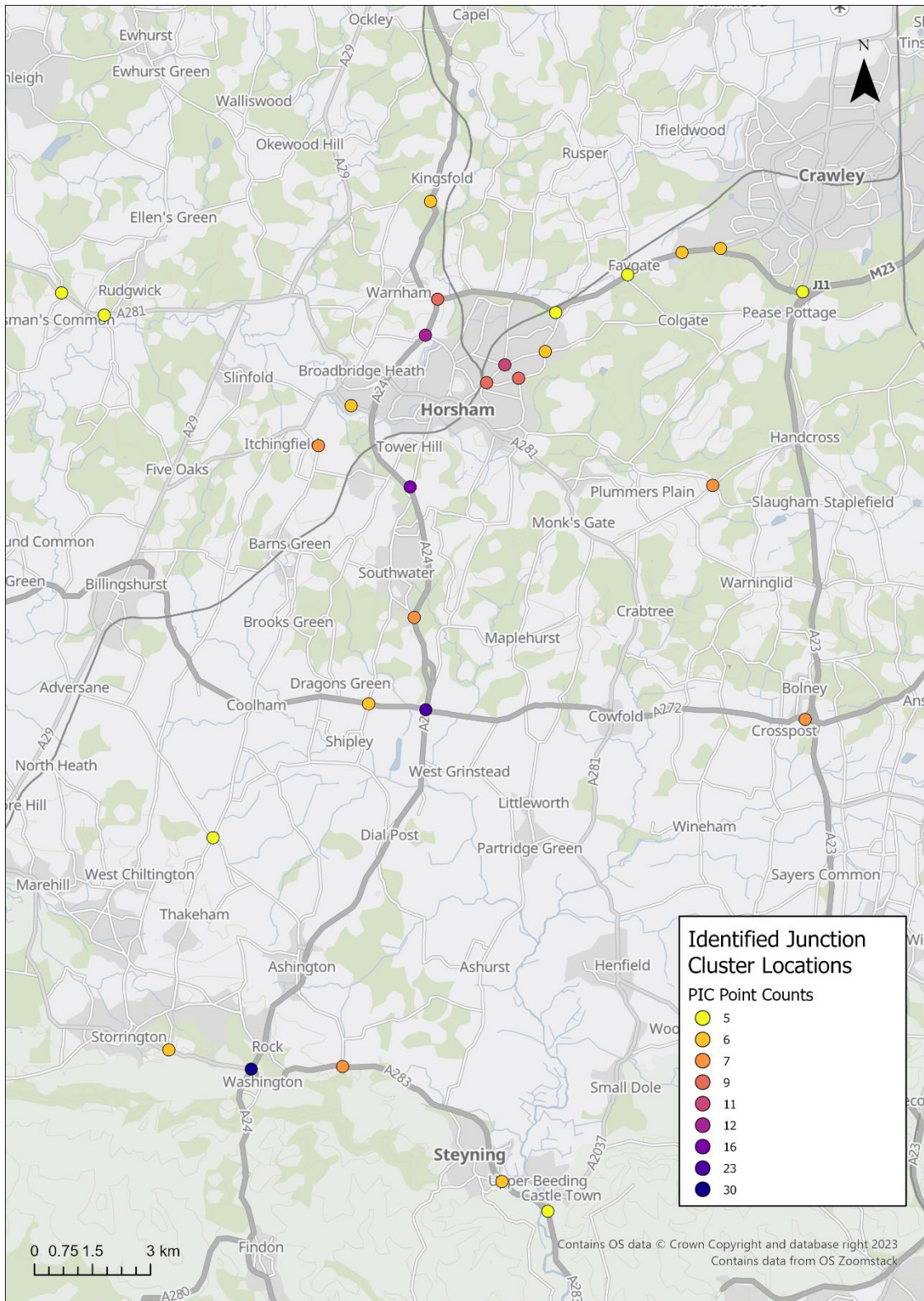
- 4.1.1 This chapter of the report identifies where there have been clusters or 'hotspots' of collisions at junctions across the 5-year study period.
- 4.1.2 A collision cluster has been determined on the basis that a junction has recorded 5 or more collisions across the 5-year period, these collisions occurring within a 50m radius of one another.
- 4.1.3 There is no universally accepted definition for an accident hotspot, with academics and road professionals continuing to investigate the most appropriate methods for hotspot identification.
- 4.1.4 The definition and investigation methodology varies globally and is dependent on the geographical scope of the study, the number of datapoints, and the local road network in question.
- 4.1.5 The 50m radius defined within this study has been utilised to capture the incidents that are related to a specific junction. A wider radius may capture incidents that have occurred unrelated to the junction, while a narrower radius may omit incidents at the larger junctions.
- 4.1.6 For the purposes of this study scope, applying a 50m radius around collisions and coalescing 5 or more collisions is deemed appropriate for the number of incidents within five-year dataset and the geographical scope of the study.
- 4.1.7 This chapter considers collision clusters at road junctions only. However, as presented previously in **Figure 3.1** and **Figure 3.2**, there are several highway corridors that are lined with collision. These corridors are generally linked to the strategic/primary roads that serve the district. **Chapter 6** of this reports provides further analysis of the identified corridor cluster.

### 4.2 Junction Collision Cluster Review

- 4.2.1 From the review of the 5-year collision data, as shown in **Figure 4.1** a total of 28 junction clusters have been identified across the two study areas. The location of these clusters is predominantly local to Horsham town or at junctions along the primary roads through the district.



Figure 4.1: Identified Junction Cluster Locations



4.2.2 The identified junctions where there has been a clustering of collision over the 5-year study period are listed below.

*Study Area 1*

- A24 / A283 Washington Roundabout
- A24 / A272 Buck Barn
- A24 Hop Oast Roundabout
- A24 Robin Hood Roundabout
- Kings Road Roundabout
- B2195 Harwood Road / Station Road / Kings Road / Foundry Lane / Booth Way Roundabout
- B2195 Harwood Road / Redin Way / Comptons Lane Roundabout
- A24 Great Daux Roundabout
- A283 Steyning Road / Water Lane / Chanctonbury Ring Road Crossroads
- A24 / Mill Straight Roundabout
- B2110 Handcross Road / Hampshire Hill / Hammerpond Road Crossroads
- Fulfords Road / Weston's Hill
- A283 Steyning By-Pass / Castle Lane / The Street / Maudlin Lane / Clays Hill Roundabout
- A283 Washington Road / Water Lane / Sullington Lane Crossroads
- A272 West Chiltington Lane / Shipley Road / Pound Lane Stagger Junction
- A264 / Buck Way / Cheesmer Way Crossroads
- B2195 Harwood Road / Forest Road / Crawley Road Crossroads
- A264 Crawley Road / Calvert Link Roundabout
- A264 Horsham Road / Sullivan Drive Roundabout
- A24 Dorking Road / Private Access
- A283 Steyning By-Pass / A2037 Roundabout
- B2139 Coolham Road / B2133 Staggered Junction
- A281 Guildford Road / Haven Road
- Moorhead Roundabout
- A281 Guildford Road / Cooks Hill / Hornshill Lane Crossroads
- Faygate Roundabout

*Study Area 2*

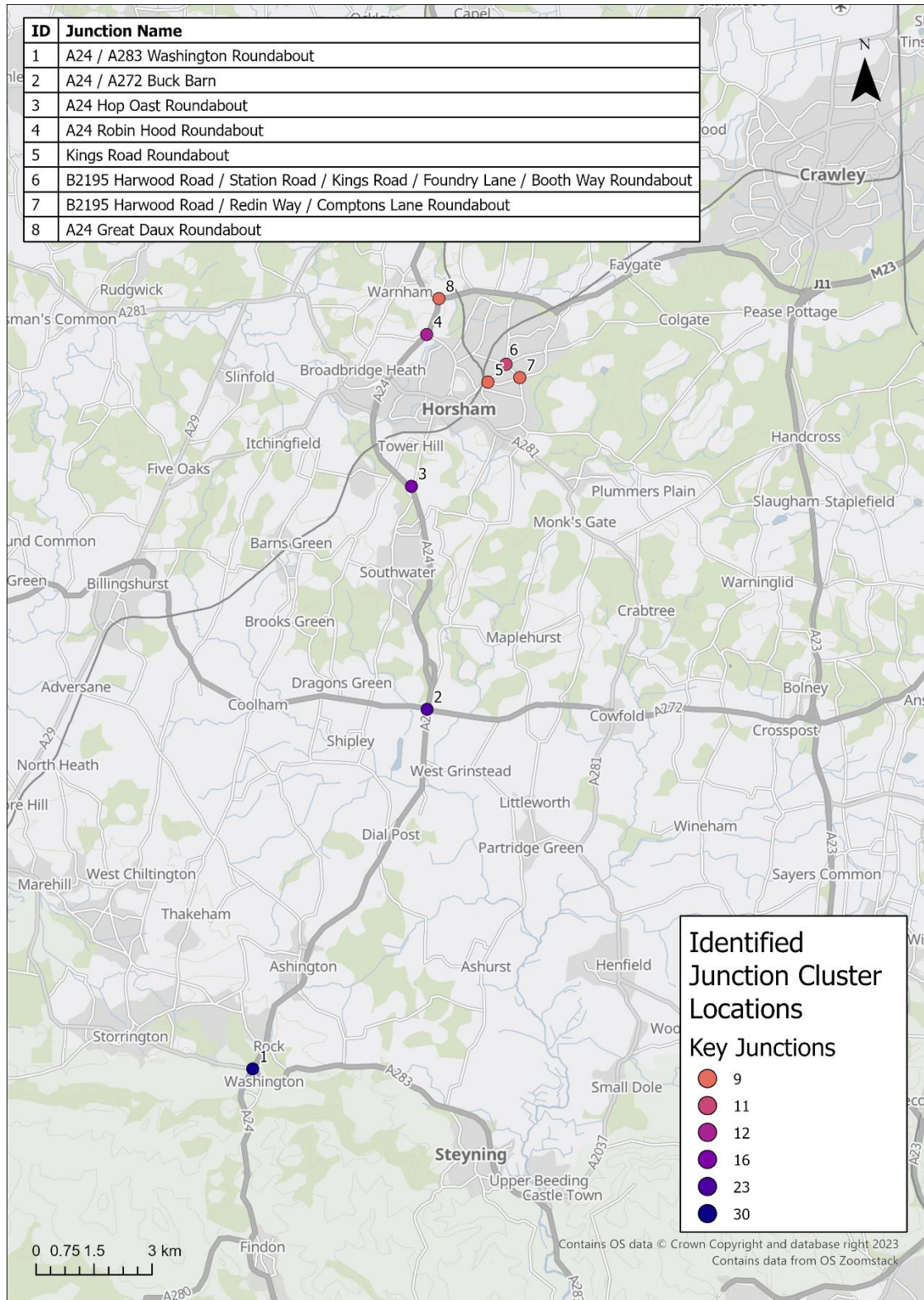
- A23 / A272 Cowfold Road
  - M23 Junction 11
- 4.2.3 Of the 28 hotspots identified, 26 of these are located within Horsham District and 2 along the A23 study corridor.
- 4.2.4 The 2 hotspots identified along the A23 corridor were hotspots consisting of 5 and 7 incidents. 5 at the M23 Junction 11, and 7 at the A23 / A272 Cowfold Road junction.
- 4.2.5 It should be noted that across all 28 hotspots, there has been one fatal injury recorded. This being at the A281 Guildford Road / Cooks Hill / Hornshill Lane crossroads junction and involved a collision between a goods vehicle and a motorcyclist.



## 5 Causation Analysis

- 5.1.1 For the identified hotspots, further analysis has been carried out to identify any common causation factors. Any common causation factors have the potential to influence mitigation strategies moving forward with the Local Plan development.
- 5.1.2 Of the 28 hotspots identified, it is considered that hotspots with greater than 7 incidents occurring at them undergo causation analysis. Those junctions identified with 7 or fewer incidents occurring across the five-year study period was not deemed significant, with an accident rate of 1.5 per year being used as the threshold.
- 5.1.3 This results in 8 key junctions across the overall study area being assessed further. The 8 key junctions considered for incident causation analysis accounted for greater than half (53%) the number of incidents occurring across the 28 hotspots.
- 5.1.4 These 8 key junctions shown in **Figure 5.1** are the following:
1. A24 / A283 Washington Roundabout
  2. A24 / A272 Buck Barn
  3. A24 Hop Oast Roundabout
  4. A24 Robin Hood Roundabout
  5. Kings Road Roundabout
  6. B2195 Harwood Road / Station Road / Kings Road / Foundry Lane / Booth Way Roundabout
  7. B2195 Harwood Road / Redin Way / Comptons Lane Roundabout
  8. A24 Great Daux Roundabout

Figure 5.1: Key Junctions Clusters



## 5.2 Junction 1: A24 / A283 Washington Roundabout

- 5.2.1 At the Washington Roundabout, 30 incidents have occurred over the 5-year study period. Of these 30 incidents, 24 were classified as slight and 6 as serious. No fatal incidents have occurred at this hotspot. Two of these incidents included a cyclist, both of which were slight in severity.
- 5.2.2 The potential causes for these incidents are shown in **Table 5.1** below.

Table 5.1: Washington Roundabout Causation Factors

Causation Factor	Frequency
Careless/ Reckless Driving (Driver/Rider - Error)	11
Failed to judge other person's path/speed (Driver/Rider - Error)	8
Failed to look properly (Driver/Rider - Error)	6
Distraction outside vehicle (Driver/Rider - Impairment)	2
Impaired by alcohol (Driver/Rider - Impairment)	2
Sudden braking (Driver/Rider - Error)	1
Nervous/Uncertain (Driver/Rider - Behaviour)	1
Junction overshoot (Driver/Rider - Error)	1
Defective brakes (Vehicle Defects)	1
Following too close (Driver/Rider - Injudicious)	1
Illness or disability, mental or physical (Driver/Rider - Impairment)	1
Failed to signal/misleading signal (Driver/Rider - Error)	1
Distraction in vehicle (Driver/Rider - Impairment)	1

*Note: Certain accidents had multiple causation factors*

- 5.2.3 This table shows that human error (careless driving, failure to judge another vehicles path/speed and failure to look properly) is the main factor for accidents at this junction.
- 5.2.4 As part of the Local Plan Transport Assessment previously prepared in support of the Local Plan review, the Washington Roundabout has been identified as requiring a physical mitigation scheme to improve capacity.
- 5.2.5 It is assumed that within a detailed design process of the mitigation, safety aspects will be considered and reviewed in detail when progressing the scheme.

## 5.3 Junction 2: A24 / A272 Buck Barn

- 5.3.1 At the A24 / A272 Buck Barn junction there were 23 incidents over the 5-year study period. Of these 23 incidents, 16 were classified as slight and 7 as serious. No fatal incidents have occurred at this hotspot. There were no pedestrians or cyclists involved in the collisions at this junction.
- 5.3.2 The potential causation factors for these accidents are shown in **Table 5.2**.

Table 5.2: A24/A272 Causation Factors

Causation Factor	Frequency
Disobeyed automatic traffic signal (Driver/Rider - Injudicious)	7
Failed to judge other person's path/speed (Driver/Rider - Error)	6
Careless/Reckless (Driver/Rider - Behaviour)	6
Failed to look properly (Driver/Rider - Error)	4

Causation Factor	Frequency
Sudden braking (Driver/Rider - Error)	3
Loss of control (Driver/Rider - Error)	2
Defective traffic signals (Road Environment Control)	2
Inexperienced or learner driver/rider (Driver/Rider - Behaviour)	1
Impaired by alcohol (Driver/Rider - Impairment)	1
Illegal turn or direction of travel (Driver/Rider - Injudicious)	1
Stalled	1
Following too close (Driver/Rider - Injudicious)	1
Junction overshoot (Driver/Rider - Error)	1
Poor turn or manoeuvre (Driver/Rider - Error)	1
Distraction in vehicle (Driver/Rider – Impairment)	1
Emergency vehicle on call (Special Codes)	1

Note: Certain accidents had multiple causation factors

- 5.3.3 The table above demonstrates that ‘Disobeyed automatic traffic signal’ and ‘Defective traffic signals’ are a potential causation factor in 9 incidents. This has the potential to indicate that the traffic signal timings are contributing to the number of accidents at this junction.
- 5.3.4 As the junction consists of multiple stop lines, no entries, traffic signals, and give-ways, it is likely the complication of the junction is contributing to the number of accidents.
- 5.3.5 Human error (such as carelessness and failing to judge paths and speed) is also a significant contributor to the number of incidents.
- 5.3.6 As part of the Local Plan Transport Assessment previously prepared in support of the Local Plan review, the A24 / A272 Buck Barn junction has been identified as requiring a physical mitigation scheme to improve capacity.
- 5.3.7 It is assumed that within a detailed design process of the mitigation, safety aspects will be considered and reviewed in detail when progressing the scheme.

## 5.4 Junction 3: A24 Hop Oast Roundabout

- 5.4.1 At the Hop Oast Roundabout, 16 incidents have occurred over the 5-year study period. Of these 16 incidents, all 16 were classified as slight. No serious or fatal incidents have occurred at this hotspot.
- 5.4.2 One of these incidents involved a pedestrian and was classified as slight, while 2 of these incidents included a cyclist, with both classified as slight in severity.
- 5.4.3 Two of these incidents included a cyclist, both of which were slight in severity.
- 5.4.4 The potential causes for these incidents are shown in **Table 5.3** below.

Table 5.3: Hop Oast Roundabout Accident Factors

Causation Factor	Frequency
Careless/ Reckless Driving	5
Failed to judge other person's path/speed (Driver/Rider - Error)	4
Failed to look properly (Driver/Rider - Error)	4
Break down causing confusion	1
Loss of control (Driver/Rider – Error)	1

Causation Factor	Frequency
Deposit on road e.g. oil, mud, chippings (Road Environmental Contributed)	1
Inexperienced or learner driver/rider (Driver/Rider – Behaviour)	1
Failed to signal/misleading signal (Driver/Rider – Error)	1
Poor turn or manoeuvre (Driver/Rider – Error)	1

*Note: Certain accidents had multiple causation factors*

5.4.5 This table shows that human error (careless driving, failure to judge another vehicles path/speed and failure to look properly) is the main factor for accidents at this junction.

5.4.6 As part of the Local Plan Transport Assessment previously prepared in support of the Local Plan review, the Hop Oast Roundabout has been identified as requiring a mitigation scheme to improve capacity.

## 5.5 Junction 4: A24 Robin Hood Roundabout

5.5.1 At the Robin Hood Roundabout, 12 incidents have occurred over the 5-year study period. Of these 12 incidents, all 12 were classified as slight. No serious or fatal incidents have occurred at this hotspot. Two of these incidents included a cyclist, both of which were slight in severity.

5.5.2 The potential causes for these incidents are shown in **Table 5.4** below.

Table 5.4: Robin Hood Roundabout Accident Factors

Causation Factor	Frequency
Failed to judge other person's path/speed (Driver/Rider - Error)	4
Failed to look properly (Driver/Rider - Error)	3
Careless/Reckless (Driver/Rider - Behaviour)	2
Deposit on road e.g. oil, mud, chippings (Road Environmental Contributed)	1
Stationary or parked vehicle(s) (Driver/Rider – Vision Affected)	1
Inexperienced or learner driver/rider (Driver/Rider - Behaviour)	1
Impaired by drugs (Driver/Rider - Impairment)	1
Vehicle blind spot (Driver/Rider – Vision Affected)	1
Travelling too fast for conditions (Driver/Rider – Injudicious)	1
Slippery road due to weather (Road Environmental Contributed)	1
Exceeding speed limit (Driver/Rider – Injudicious)	1
Impaired by alcohol (Driver/Rider – Impairment)	1
Defective brakes (Vehicle Defects)	1

*Note: Certain accidents had multiple causation factors*

5.5.3 This table shows that human error (careless driving, failure to judge another vehicles path/speed and failure to look properly) is the main factor for accidents at this junction.

5.5.4 The Robin Hood Roundabout has recently been upgraded, having an improvement scheme implemented during 2021. The main construction works at the junction started on 6 April 2021, with the traffic signals operational on 1 September 2021, and landscaping finalised in November 2021.

5.5.5 The improvement scheme consisted of signalisation, approach lane widening, and the provision of active travel crossing facilities across the A24 (N) arm.



- 5.5.6 As the construction works and implementation of the junction improvement scheme occurred during the 5-year study period, this has been considered with the temporal distribution of accidents.
- 5.5.7 9 of the 12 incidents recorded at the Robin Hood Roundabout occurred prior to the implementation of the improvement scheme. 2 incidents occurred during the construction phase, while 1 incident has occurred at the junction since the improvement scheme was completed in November 2021.
- 5.5.8 The distribution of incidents at the junction prior to, during, and following the construction of the improvement scheme demonstrates that the scheme has provided a benefit at the junction in terms of safety as well as increasing the capacity.

## 5.6 Junction 5: King’s Road Roundabout

- 5.6.1 At the King’s Road Roundabout, 11 incidents have occurred over the 5-year study period. Of these 16 incidents, 8 were classified as slight and 3 as serious in severity. No fatal incidents have occurred at this hotspot.
- 5.6.2 One of these incidents involved a pedestrian and was classified as slight, while 5 incidents included a cyclist, with one classified as serious in severity and the remaining as slight.
- 5.6.3 The potential causes for these incidents are shown in **Table 5.5** below.

Table 5.5: King’s Road Roundabout Causation Factors

Causation Factor	Frequency
Failed to look properly (Driver/Rider – Error)	4
Careless/Reckless (Driver/Rider – Error)	2
Following too close	1
Loss of control (Driver/Rider – Error)	1
Failed to look properly (Pedestrian)	1

*Note: Certain accidents had multiple causation factors recorded*

- 5.6.4 This table shows that human error (careless driving and failure to look properly) is the main factor for accidents at this junction.

## 5.7 Junction 6: B2195 Harwood Road / Station Road / Kings Road / Foundry Lane / Booth Way Roundabout

- 5.7.1 At the B2195 Harwood Road / Station Road / Kings Road / Foundry Lane / Booth Way Roundabout, 9 incidents have occurred over the 5-year study period. Of these 9 incidents, all 9 were classified as slight. No serious or fatal incidents have occurred at this hotspot. There were no pedestrians or cyclists involved in the collisions at this junction.
- 5.7.2 The potential causes for these incidents are shown in **Table 5.6** below.

Table 5.6: B2195 Harwood Road/Station Road/Kings Road/Foundry Lane/Booth Way Roundabout Causation Factors

Causation Factor	Frequency
Failed to look properly (Driver/Rider – Error)	4
Careless/Reckless (Driver/Rider – Error)	2
Illness or disability, mental or physical (Driver/Rider – Impairment)	1
Disobeying give way or stop sign markings (Driver/Rider – Injudicious)	1

*Note: Certain accidents had multiple causation factors recorded*

5.7.3 This table shows that human error (careless driving and failure to look properly) is the main factor for accidents at this junction.

## 5.8 Junction 7: B2195 Harwood Road / Redin Way / Comptons Lane Roundabout

5.8.1 At the B2195 Harwood Road / Redin Way / Comptons Lane Roundabout, 9 incidents have occurred over the 5-year study period. Of these 9 incidents, 2 were classified as slight and 7 as serious in severity. No fatal incidents have occurred at this hotspot.

5.8.2 Of these incidents, one involved a pedestrian and was classified as serious, while 4 of these incidents included a cyclist, with 3 of these classified as serious in severity and the remaining one as slight.

5.8.3 The potential causes for these incidents are shown in **Table 5.7** below.

Table 5.7: B2195 Harwood Road / Redin Way / Comptons Lane Roundabout Causation Factors

Causation Factor	Frequency
Failed to look properly (Driver/Rider – Error)	5
Impaired by alcohol (Driver/Rider – Impairment)	2
Poor turn or manoeuvre (Driver/Rider – Error)	1
Dazzling sun (Driver/Rider – Vision Affected)	1
Failed to judge other person’s path/speed (Driver/Rider – Error)	1
Junction restart (Driver/Rider – Error)	1

*Note: Certain accidents had multiple causation factors recorded*

5.8.4 This table shows that human error (careless driving) is the main factor for accidents at this junction.

## 5.9 Junction 8: A24 Great Daux Roundabout

5.9.1 At the Great Daux Roundabout, 9 incidents have occurred over the 5-year study period. Of these 9 incidents, all 9 were classified as slight in severity. No serious or fatal incidents have occurred at this hotspot. There were no pedestrians or cyclists involved in the collisions at this junction.

5.9.2 The potential causes for these incidents are shown in **Table 5.8** below.

Table 5.8: Great Daux Roundabout Causation Factors

Causation Factor	Frequency
Failed to judge other person’s path/speed (Driver/Rider – Error)	5
Poor turn or manoeuvre (Driver/Rider – Error)	2
Failed to look properly (Driver/Rider – Error)	1
Loss of control (Driver/Rider – Error)	1
Junction overshoot (Driver/Rider – Error)	1
Junction restart (Driver/Rider – Error)	1
Careless/Reckless (Driver/Rider – Behaviour)	1
Illegal turn or direction of travel (Driver/Rider – Injudicious)	1

*Note: Certain accidents had multiple causation factors recorded*



5.9.3 This table shows that human error (failure to look judge other person's path/speed and poor turn or manoeuvre) is the main factor for accidents at this junction.

## 6 Impact of Local Plan

- 6.1.1 To identify locations where significant increases in traffic as a result of the Local Plan development may impact the identified collision clusters, the changes in traffic flows have been considered.
- 6.1.2 Increases in traffic at junctions does not inherently mean collisions will increase, however taking into consideration the statistical probability of collision occurrence simply by applying an existing accident rate of a junction to an increased traffic throughput at this junction, it can be concluded that the probability of an accident to occur will increase. This follows the methodology used within the DfT accident appraisal software COBALT.
- 6.1.3 To test the impact of the Local Plan, Average Annual Daily Traffic (AADT) flows have been extracted from the Strategic SATURN Model for the following two scenarios.
- 2039 Reference Case
  - 2039 Local Plan with Sustainable Transport Mitigation
- 6.1.4 The two scenarios provide a comparable dataset based on the road network in 2039 with and without the traffic flow changes associated with the Local Plan development sites. The outputs from the SATURN modelling consider total junction flows in (AADT).

### Traffic Flow Changes

- 6.1.5 The change in traffic flow between the reference and Local Plan scenario has been categorised and assigned a ranking for the purpose of this report.
- **GREEN** – Junctions with a change of <1,000 AADT.
  - **RED** – Junctions with a change of >1,000 AADT.
- 6.1.6 Junctions that show a higher change may require mitigation measures to reduce the potential for an increase in collision numbers if existing trends are continued.

### Highways Mitigation Requirements

- 6.1.7 To reduce the risk of increasing the frequency of collisions due to the impact of the Local Plan, mitigation measures could be developed to improve safety for all users. Some identified clusters already have existing mitigation proposals prepared as part of the Local Plan Review, while the Robin Hood Roundabout has had a mitigation scheme implemented during the study period. These proposals were focused on improving capacity at junctions currently operating over capacity. All currently proposed Local Plan highway mitigation schemes would be expected to provide safety enhancements as part of the final proposals.
- 6.1.8 If the traffic impacts of the Local Plan are not considered severe, a safety review of the junction may still be needed to mitigate the existing issues, however across the 8 key junctions identified for causation analysis, the cause of collision is more often attributed to driver error and not associated with the road network. Therefore, mitigation schemes will only offer benefits to a certain level and then are reliant on sensible and safe driving behaviours.
- 6.1.9 **Table 6.1** provides a summary of the 8 key junction hotspots and provides the predicted changes in AADT traffic flows between the 2039 Reference Case and Local Plan scenarios. In addition, the table also identifies whether the Local Plan has already considered a highway mitigation scheme which in turn could potentially offer improved safety.

- 6.1.10 Finally, **Table 6.1** recommends which junctions may require more detailed analysis to investigate the specific cause of the clustering of collisions and a potential a safety mitigation scheme.

Table 6.1: Local Plan Impact Summary

Ref	Name	Type	Slight	Serious	Fatal	Total	Ref Total Flow (AADT)	Local Plan with Sustainable Mitigation Flow (AADT)	AADT Change	Current Highway Mitigation Scheme	Further Safety Review Required
1	Washington Roundabout	Roundabout	24	6	0	30	57,578	60,666	3,088	✓	
2	A24 / A272 Buck Barn	Signalised Stagger Junction	16	7	0	23	57,804	60,665	2,861	✓	
3	Hop Oast Roundabout	Roundabout	16	0	0	16	48,623	53,798	5,176	✓	
4	Robin Hood Roundabout	Roundabout	12	0	0	12	57,344	63,091	5,747	N/A	
5	Kings Road Roundabout	Roundabout	8	3	0	11	13,742	13,999	257	✗	
6	B2195 Harwood Road / Station Road	Roundabout & Linked Priority	9	0	0	9	15,573	16,448	875	✗	
7	B2195 Harwood Road / Comptons Lane	Roundabout	2	7	0	9	19,524	20,376	852	✗	
8	Great Daux Roundabout	Roundabout	9	0	0	9	55,162	59,660	4,498	✗	✓

- 6.1.11 As outline in section 5.5, the layout of the Robin Hood Roundabout has changed following the improvement scheme as of September 2021, with 9 of the 12 incidents recorded as occurring prior to the implementation and only one incident occurring post scheme completion. As such, it is not considered applicable for a further safety review at this stage.
- 6.1.12 The accident data at the Robin Hood Roundabout should be considered once the junction has been operating under its new layout for a continuous five-year period.
- 6.1.13 The outcome of the above review highlights 1 of the 8 key junction hotspots that HDC and WSCC may want to explore in greater detail with respect to improving road safety. The Great Daux Roundabout.
- 6.1.14 The Local Plan development sites and their associated traffic have the potential to exacerbate safety issues at this identified hotspot.

### COBALT Evidence Base

- 6.1.15 The Transport Analysis Guidance (TAG) Data Book v1.21 (May 2023) produced by the Department for Transport (DfT) contains reference to COBALT Accident Parameters. The tool is able to estimate the expected number of accidents that occur across an appraisal period, with the calculation taking default accident rate estimates of specific junction types and factoring against changes in AADT traffic flow between scenarios. COBALT is based on estimated of daily average traffic totals and is not time period specific.
- 6.1.16 As such COBALT provides an evidence base of calculating estimated change in accident rates resulting from traffic flow changes of the Local Plan against the Reference Case, highlighted in **Table 6.1**. The casualty increase resulting from the Local Plan impacts as estimate through COBALT is summarised in **Table 6.2**.

Table 6.2: COBALT output – Casualty increase from Reference Case to Local Plan Scenario

Junction	Current Highway Mitt Scheme	Number of Casualties		
		Fatal	Serious	Slight
Washington Roundabout	✓	0	-2	62
A24 / A272 Buck Barn	✓	0	4	64
Hop Oast Roundabout	✓	0	-2	11
Robin Hood Roundabout		0	3	65
Kings Road Roundabout		0	1	16
B2195 Harwood Road / Station Road		0	-1	-15
B2195 Harwood Road / Comptons Lane		0	2	39
Great Daux Roundabout		0	3	64

- 6.1.17 The above table suggests that of the 8 key hotspots identified, the 3 junctions with mitigation schemes proposed as well as the Robin Hood and Great Daux Roundabouts, are shown to result in a noticeable increase in the casualty rate.
- 6.1.18 Within COBALT, it should be noted that the proposed mitigated junction safety benefits are outweighed by the significant increase in traffic within the Local Plan scenario.
- 6.1.19 However, it is expected that Washington Roundabout, A24 / A272 Buck Barn and Hop Oast Roundabout would have improved safety features that are expected to reduce accident rates even further than COBALT would consider. For example, improved lighting, approach visibility and signage. As such, it can be assumed that the accident reduction benefits would be greater

at the location where mitigation is provided than COBALT predicts, therefore these junctions are noted as not requiring further consideration in Table 6.1.

### Possible Mitigation Solutions

- 6.1.20 Of the 8 hotspots assessed in further detail, 7 were at existing priority roundabouts. This is not an uncommon trend as roundabouts can often have some of the highest rates of collisions on the road network.
- 6.1.21 Collisions are typically rear shunt type collision on the approaches to the junction, or side on collisions at the point of entering the junction circulatory when a vehicle is pulling into the circulating traffic.
- 6.1.22 Therefore, when, for example, converting roundabouts into signalised control junctions, the signals will effectively control the priority of traffic through the junction and this in turn this would seek to remove the general issue when vehicle are required to give way at priority and roundabout junctions.
- 6.1.23 This level of mitigation requires significant remodification of junctions which in some locations will not be viable. At the junction clusters with mitigation schemes already proposed, these schemes have been developed as part of a wider Local Plan requirement rather than specifically aimed at reducing collisions, although a secondary benefit in some circumstances is that it also offers improved safety for all users.
- 6.1.24 At the junction clusters which currently have no mitigation of proposed, but the existing collision recorded and/or impacts of the Local Plan is highlight a possible area of concern, then the next steps will be to investigate the junction in further detail to understand if an appropriate mitigation scheme can be developed.
- 6.1.25 The type of safety mitigation can vary depending on several factors including, cost, location, land ownerships, the local environment etc. The follow provides list of possible measures to improve safety and could be considered for implementation at the identified junction.
- Improved lining and signing on approaches to junctions;
  - Improved street lighting at junction;
  - Increased flare lane capacities to reduce potential for queue blocking back upstream;
  - Switch junction priorities to suit the main flows and in turn reduce number of vehicles performing conflicting turning movements;
  - Improve junction sightlines through verge and hedgerow maintenance;
  - Restrict conflicting traffic movements (subject to impacts from re-distribution of trips)
  - New or improved pedestrian and cycling crossing infrastructure; and
  - Segregated cycle infrastructure to reduce interaction with vehicle on the approaches and through junctions.
- 6.1.26 At this stage, it is not considered that any of the hotspots identified, or their associated incident causations, would be classified as or approaching a 'showstopper' when it comes to Local Plan development sites coming forward. However, it is recommended that further consideration be given to potential safety mitigation requirements at the Great Daux Roundabout.

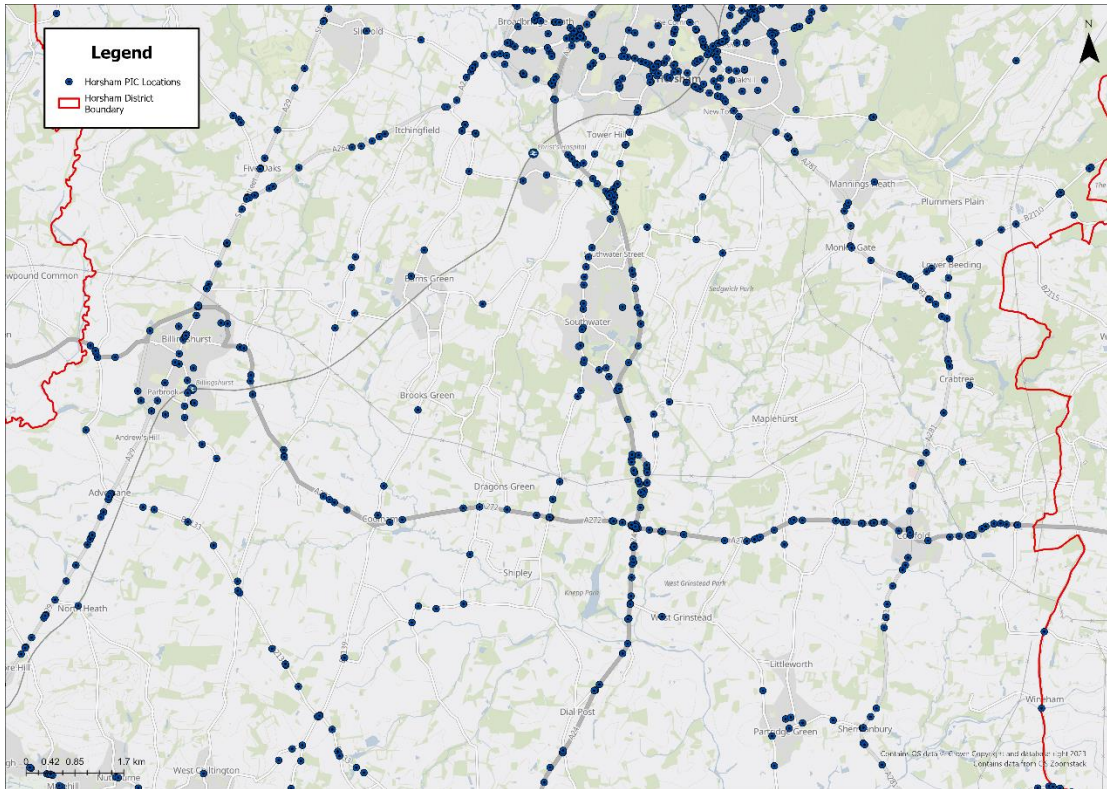
## 7 Summary

- 7.1.1 This report has been prepared to review personal injury collision data for the Horsham District area and the neighbouring A23 corridor, to identify junctions where clusters of collisions have been recorded. This review has been informed using collision data obtained from West Sussex County Council and covering the latest five years commencing in August 2018 through to July 2023.
- 7.1.2 Across both study areas there was a total of 1,538 collisions recorded. Of these collisions 70% were of a slight severity and 28% at a serious severity. Over the 5-year study period there was a total of 30 collisions (2%) that resulted in a fatality.
- 7.1.3 Vulnerable road users (pedestrian and cyclists) accounted for 272 (18%) of the recorded collision of which, 89 where of a serious severity and 7 collisions resulted in a fatality.
- 7.1.4 A review of the collision locations identified 28 junction hotspots across the Horsham District and A23 corridor. 8 of these 28 hotspots were investigated in greater detail.
- 7.1.5 A number of the junction clusters have mitigation measures already developed as part of the Local Plan review which will help to improve safety for all road users and in turn reduce the risk of a collision.
- 7.1.6 The Robin Hood Roundabout underwent physical improvement during the study period and updated accident records should be reviewed once the junction has been operational under its new layout for five-years continuously.
- 7.1.7 Therefore, of the junction hotspots where the forecast Local Plan development will have a material impact, it is recommended that only the Great Daux Roundabout need be investigated further with regards to potential mitigation measures with the aim to improve the safety.

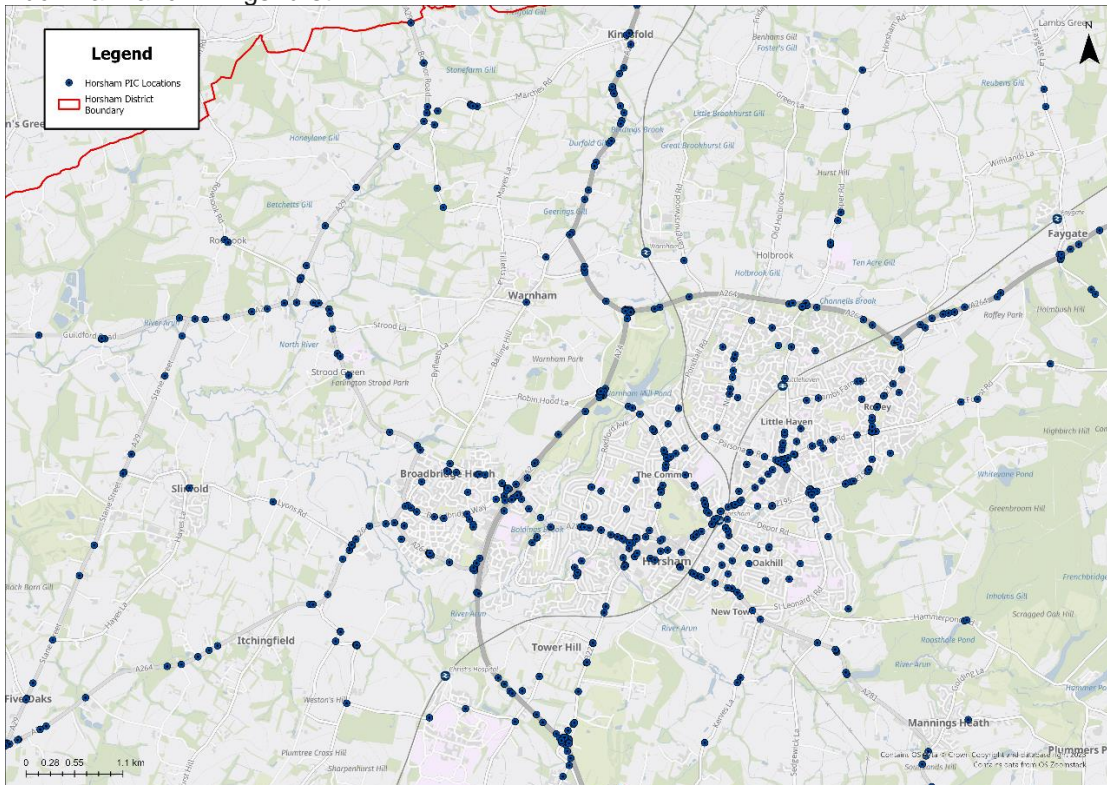


# Appendix A Study Area 1 Collision Locations

## Horsham Town Centre



## Buck Barn and Billingshurst





## Appendix B Study Area 2 Collision Locations

