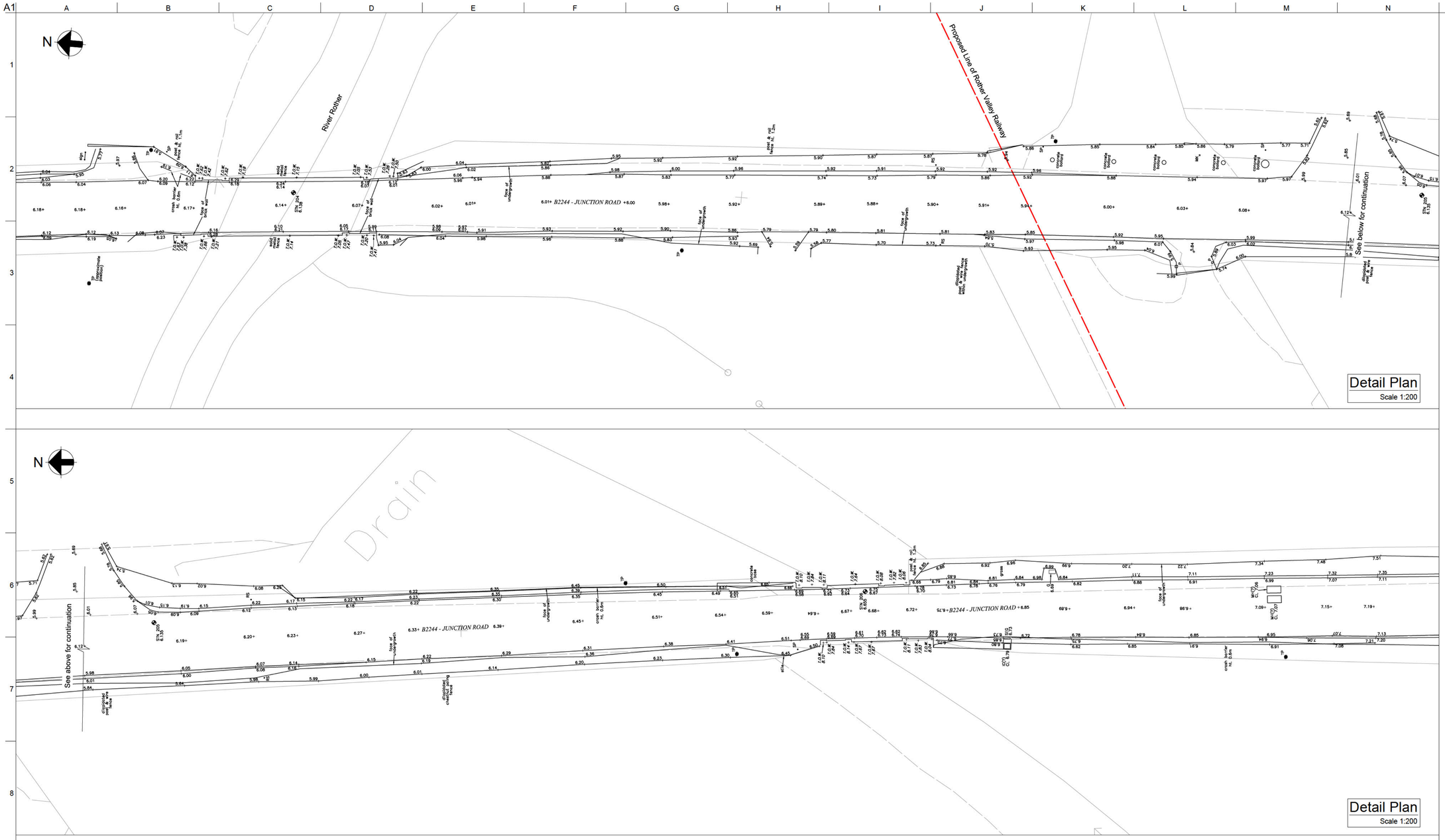

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Notes: -

1. Detail shown is an extract of the topographic survey carried out by J.C.White Geomatics Limited, October 2014
2. For details of the B2244 Junction Road Level Crossing refer to drawings C.950.G.120 to 126.

Issue	Date	By	Chkd	Appd
P1	27/02/15	IAB	DC	JP
Preliminary issue				

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Client
Rother Valley Railway Limited

Job Title
RVR Level Crossing
Highway Works

Drawing Title
B2244 Junction Road
Topographic Survey Data

Scale at A1 1:200

Discipline Civils

Job No **239025-00**

Drawing Status **For Information**

Drawing No **C.950.G.120**

Issue **P2**

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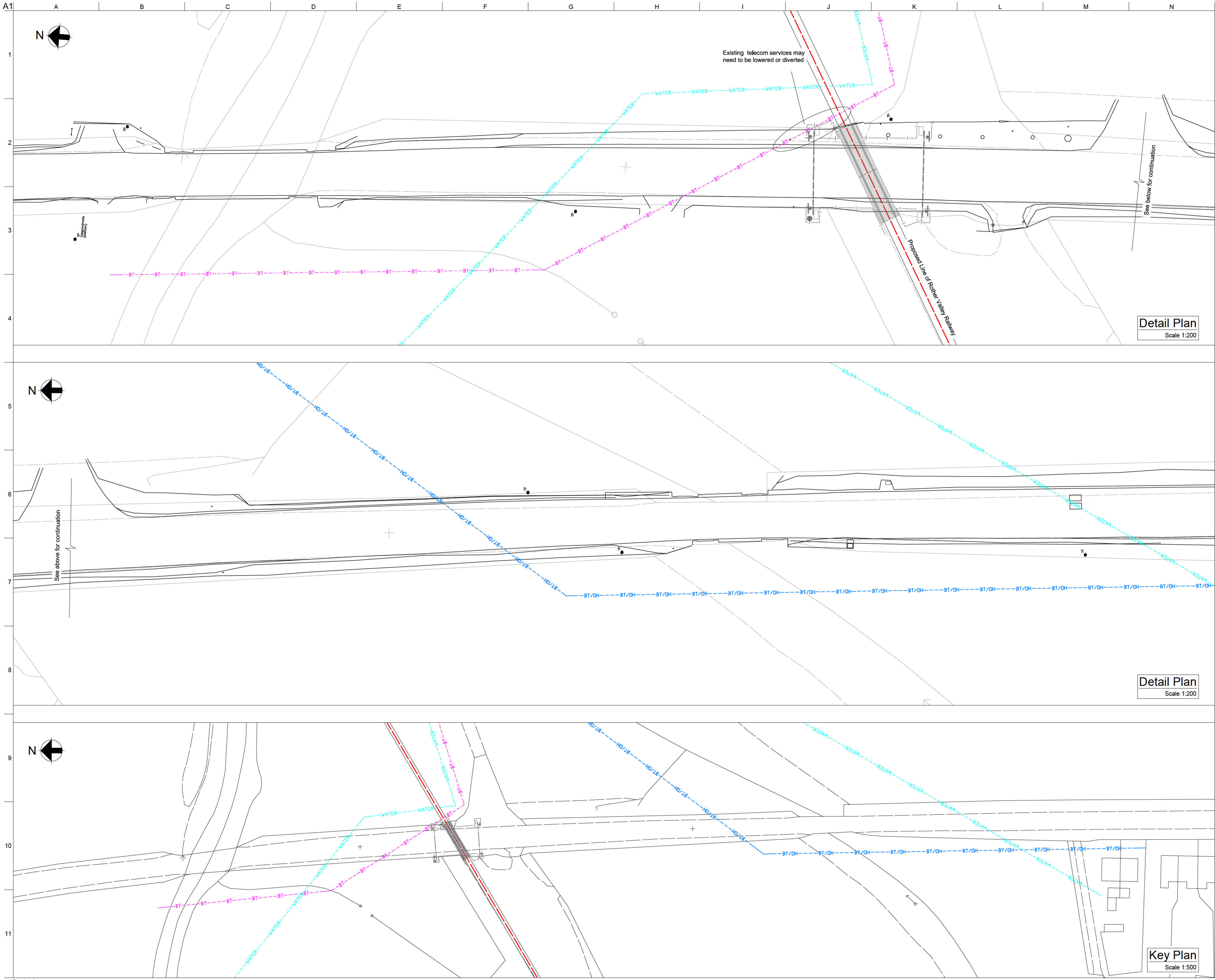

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Notes: -

1. Service information shown on this drawing is reproduced from the Statutory Authority record returns and is provided for guidance only. No warranty or guarantee is provided for its completeness or accuracy. The contractor should ensure that all services likely to be affected are identified prior to commencing works.
2. For details of the B2244 Junction Road Level Crossing refer to drawings C.950.G.120 to 126.

Legend

BT -Overhead Cabling	BT/OH
-Underground Cabling	BT
South East Water -Supply Main	WATER
Southern Water -Foul Sewer	WATER
Southern Gas Networks -Low Pressure Main	GAS L/P
-Intermediate Pressure Main	GAS I/P
UK Power Networks -Underground Cables	E/UG
Virgin Media -Network Cable	

Note: Still awaiting response from Vodafone, VTESSE and McNicholas.

Issue	Date	By	Chkd	Appd
P1	27/02/15	IAB	DC	JP
	Preliminary issue			

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Client
Rother Valley Railway Limited

Job Title
RVR Level Crossing
Highway Works

Drawing Title
B2244 Junction Road
Existing Statutory Utilities

Scale at A1: 1:500 1:200

Discipline: Civils

Job No: 239025-00

Drawing Status: For Information

Drawing No: C.950.G.121

Issue: P1

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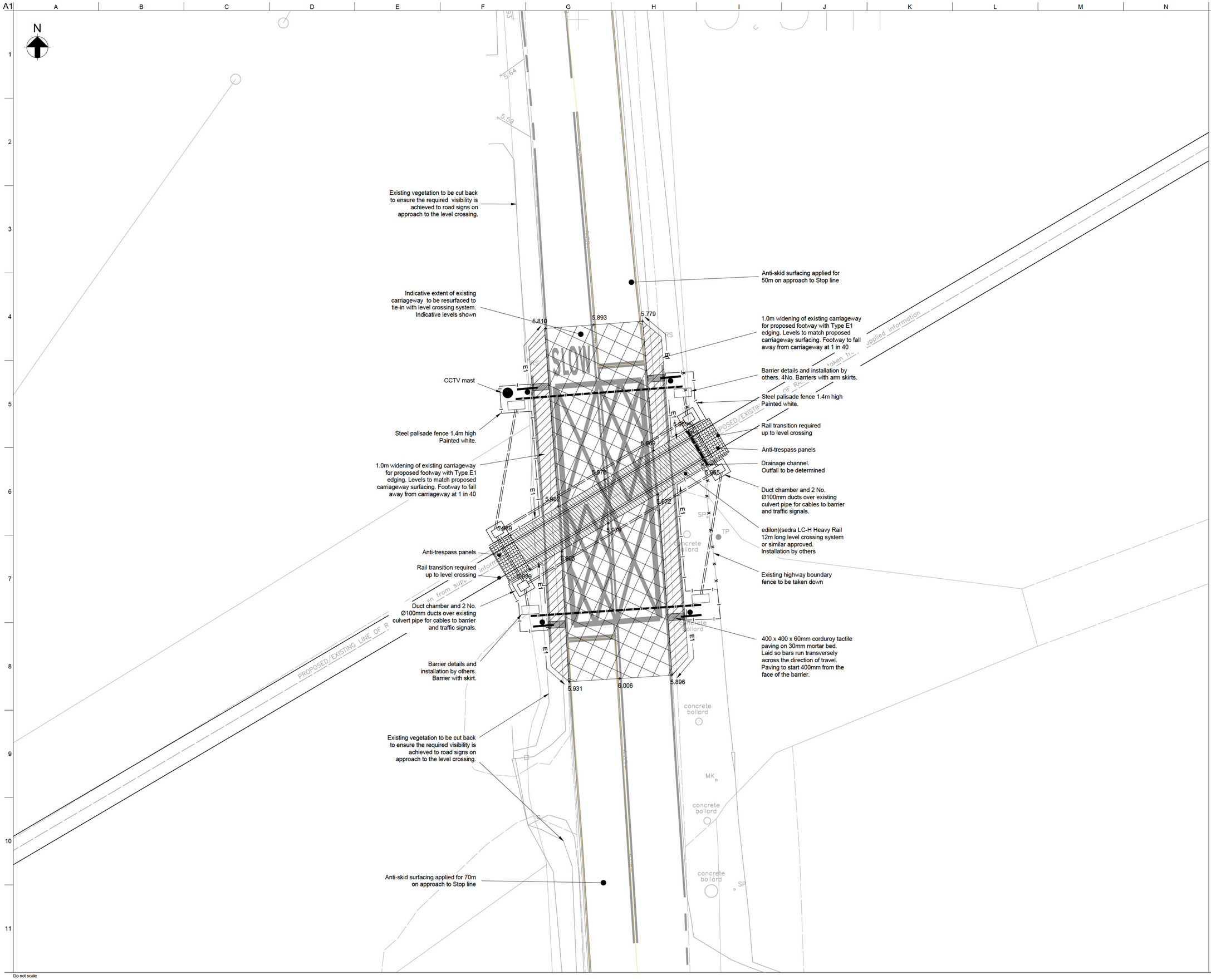

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Notes: -

1. All road markings and traffic signs are to be in accordance with the Traffic Signs Regulations and General Directions (2002) and the Traffic Signs Manuals.
2. For diagram numbers refer to the TSRGD.
3. For road markings refer to drawing C.950.G.123
4. For traffic signs refer to drawing C.950.G.124 and C.950.G.125.
5. For construction details refer to drawing C.950.G.126

Issue	Date	By	Chkd	Appd
P1	27/02/15	IAB	DC	JP

Preliminary issue

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Client
Rother Valley Railway Limited

Job Title
RVR Level Crossing
Highway Works

Drawing Title
B2244 Junction Road
General Arrangement

Scale at A1: 1:100

Discipline: Civils

Job No: 239025-00

Drawing Status: For Information

Drawing No: C.950.G.122

Issue: P1

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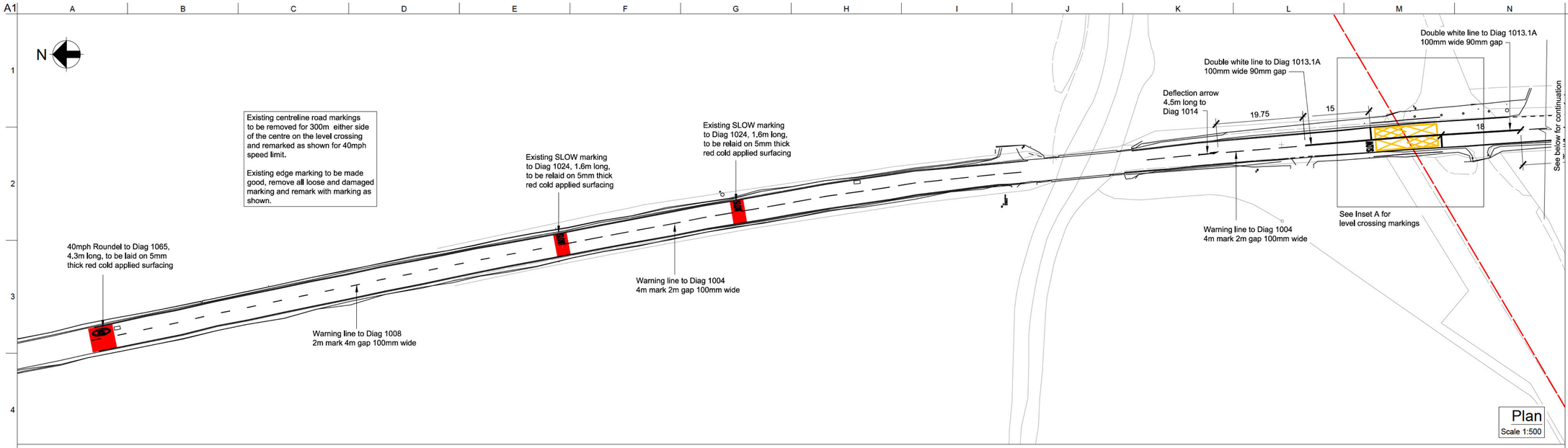

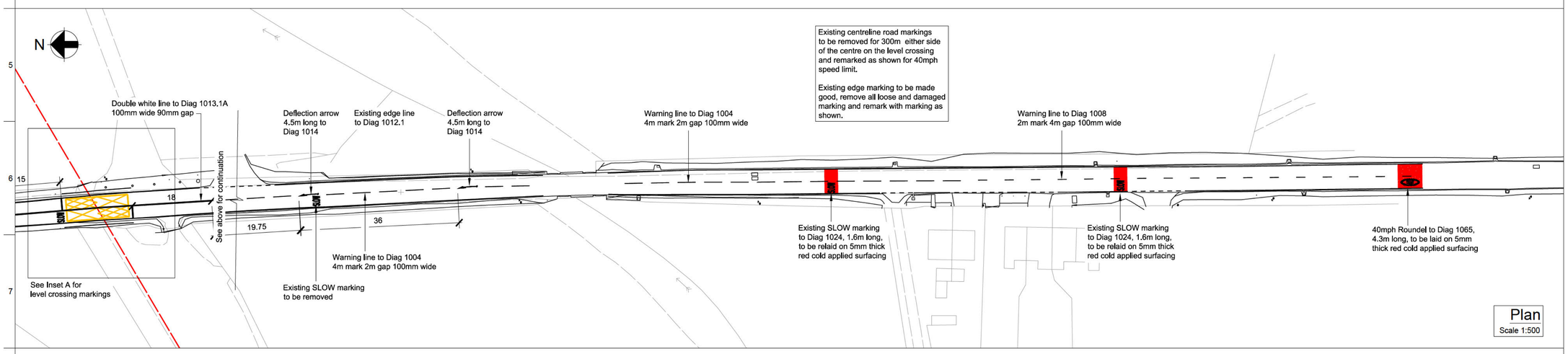

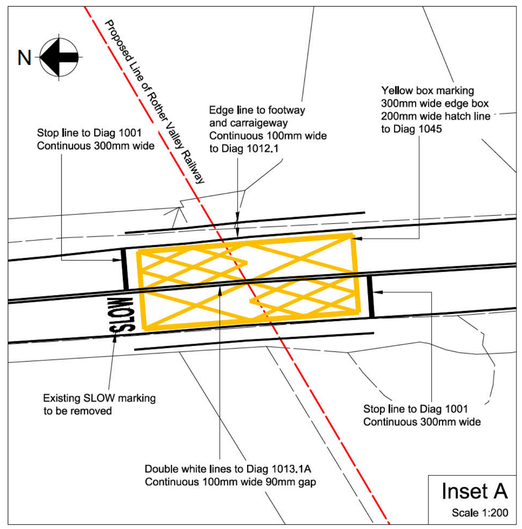

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Notes: -

1. All road markings and traffic signs are to be in accordance with the Traffic Signs Regulations and General Directions (2002) and the Traffic Signs Manuals.
2. For diagram numbers refer to the TSRGD.
3. For traffic signs refer to drawing C.950.G.124 and C.950.G.125.

Issue	Date	By	Chkd	Appd
P1	27/02/15	IAB	DC	JP
Preliminary issue				

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Client
Rother Valley Railway Limited

Job Title
RVR Level Crossing
Highway Works

Drawing Title
B2244 Junction Road
Road Markings

Scale at A1 1:500 1:200

Discipline Civils

Job No **239025-00**

Drawing Status **For Information**

Drawing No **C.950.G.123**

Issue **P1**

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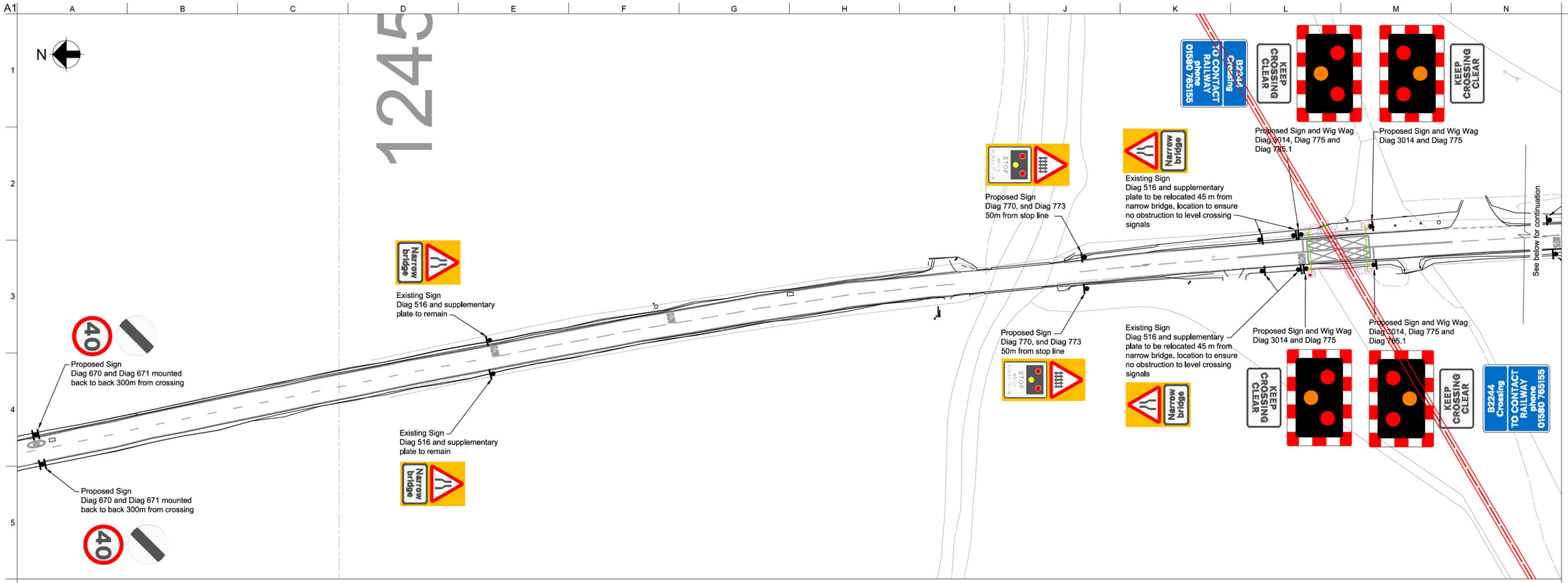

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Notes: -

1. All road markings and traffic signs are to be in accordance with the Traffic Signs Regulations and General Directions (2002) and the Traffic Signs Manuals.
2. For diagram numbers refer to the TSRGD.
3. For traffic signs refer to drawing C.950.G.124 and C.950.G.125.

Issue	Date	By	Chkd	Appd
P1	27/02/15	IAB	DC	JP
Preliminary issue				

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Client
Rother Valley Railway Limited

Job Title
RVR Level Crossing
Highway Works

Drawing Title
B2244 Junction Road
Traffic Signs

Scale at A1 1:500

Discipline Civils

Job No **239025-00**

Drawing Status **For Information**

Drawing No **C.950.G.124**

Issue **P1**

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Your ref -
Our ref 233104-00/cvl

ARUP

For the attention of The Office of the Rail Regulator
and
East Sussex County Council

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5 November 2013

Dear Sirs

Rother Valley Railway Level Crossing – B2244 Junction Road
Stage 1 Road Safety Audit

I have the pleasure of enclosing our Rother Valley Railway Level Crossing – B2244 Junction Road Stage 1 Road Safety Audit report. In addition to the enclosed report, the Audit Team noted the following points outwith the remit of the audit. I would be grateful if you would bring these issues to the attention of the Designer and/or Maintainer as appropriate.

Additional Comments

- High traffic speeds and heavy braking for the narrow bridges on Junction Road were observed on site. It is suggested that the designer considers the use of high friction surfacing on the approach to the level crossing.

IMG_3003.jpg

- It is not clear whether the existing verge width (especially on the western side of the road) is able to safely accommodate the required traffic sign infrastructure.

IMG_2999.jpg

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- The drawing provided does not show the extent of the vegetation clearance required in order to provide the appropriate visibility envelope for the level crossing as set out in Railway Principles and Guidance.

IMG_2999.jpg

IMG_3000.jpg

If you have any further queries regarding this letter or the enclosed report, please do not hesitate to contact me

Yours faithfully

[redacted]

Chris van Lottum
Senior Engineer
Road Safety Audit Team Leader

Enc

cc Dave Gillett, Rother Valley Railway

Rother Valley Railway

Rother Valley Railway Level Crossing - B2244 Junction Road, Udiam

Stage 1 Road Safety Audit

RSA1.3

Rev A | 5 November 2013

This report takes into account the particular instructions and requirements of our client

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party

Job number 233104-00

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United Kingdom
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Document Verification

ARUP

Job title		Rother Valley Railway Level Crossing - B2244 Junction Road, Udiam			**Job number** 233104-00
Document title		Stage 1 Road Safety Audit			**File reference**
Document ref		RSA1.3			
Revision	**Date**	**Filename**	RP CVL RVR RSA1.3 131105 Rev A.docx		
Rev A	5 Nov 2013	**Description**	Revised document		
			Prepared by	Checked by	Approved by
		Name	Chris van Lottum	Steve Wells	Steve Wells
		Signature	[redacted]		
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
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		Name			
		Signature			
				Issue Document Verification with Document	✓

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Figures

Figure 1 Location of Recommendations

Appendices

Appendix A
Documents and Drawings

1 Introduction

Arup was appointed by the Rother Valley Railway to conduct a Stage 1 Road Safety Audit on proposals to construct a new automatic locally monitored fully gated level crossing on the B2244 Junction, East Sussex.

The agreed Audit Team consisted of:

- Mr C van Lottum MEng, MCIHT, MSoRSA
- Mr T Corke BEng, MSc, CEng, MICE, MCIHT, MSoRSA

The audit was undertaken in accordance with the brief submitted to the Audit Team on 10th October 2013. The Audit Team visited the site together on Friday 18th October 2013; weather conditions at the time of the site visit were bright and the road surface was dry.

A list of information provided to the Audit Team has been included as Appendix A to this Report.

The following information was **not** made available to the Audit Team and as such any specific influence of these details on road user safety has not been considered by this audit:

- Departures from Standard
- Road profiles
- Cross sections
- Drainage
- Landscape
- Public utilities
- Vehicle tracking
- Street lighting
- Surface finishes
- Kerbs
- Road restraint systems
- Road accident history

It is understood that no previous road safety audits have been conducted on this scheme.

This audit has been undertaken in accordance with the Terms of Reference set out in HD19/03 ‘Road Safety Audit’; and the Audit Team members meet the training and experience requirements set out therein. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria. However, to clearly explain a problem or recommendation the Audit Team may occasionally refer to design standards without engaging in technical audit.

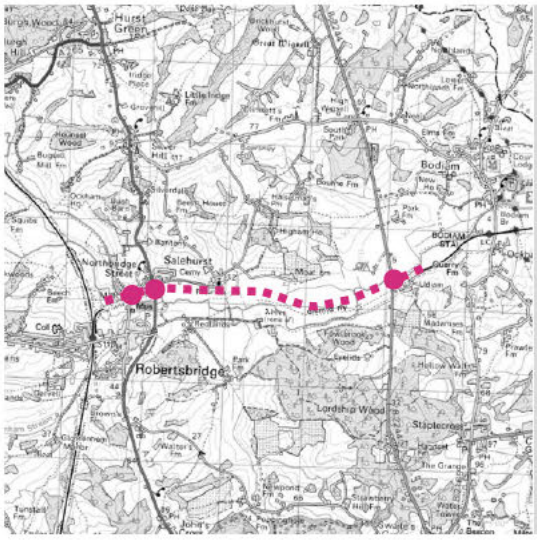
All problems and recommendations identified by this audit are referenced to the design drawings and the locations have been indicated on the attached plan.

Other issues, including safety issues identified during the Audit but excluded from this report by the Terms of Reference, which the Audit Team wishes to draw to the attention of the Audit Project Sponsor are set out in separate correspondence.

Road Safety Audit is based upon a qualitative risk assessment process and there is no measure of the success achieved by any recommendations given herein. Road

Safety Audit cannot guarantee the safe operation of the scheme under consideration in this report as accidents are rare and random events and are largely caused by factors outside the Audit Team's influence, such as driving behaviour and to a lesser extent vehicle condition.

1.1 Site Description



Project Location

The Rother Valley Railway is located between the mainline station at Robertsbridge on the London to Hastings Line and the existing Kent and East Sussex Railway which runs between Tenterden and Bodiam.

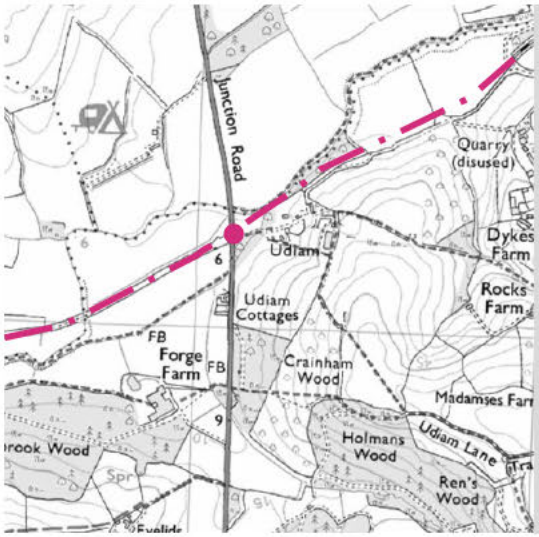
1.2 Project Description

The Rother Valley Railway will restore railway transport links between the main line railway system from Robertsbridge Junction to Bodiam and the extant Kent & East Sussex Railway and the attractions it serves.

In addition to the construction of bridges and embankments to cross the flood plain of the River Rother, the railway must incorporate appropriate arrangements for crossing;

- C18 Northbridge Street, Robertsbridge
- A21(T) Robertsbridge Bypass; and
- B2244 Junction Road, Udiam.

1.3 Scope of Audit



Scheme Location

This Road Safety Audit is concerned only with the B2244 Junction Road, Udiam Level Crossing. The other two crossings are discussed in separate reports.

No details of the vertical profile of the railway line in the vicinity of the crossing have been provided, and therefore it is not possible to assess the appropriateness of the proposed warning signs in this regard.

2 Stage 1 Road Safety Audit

The Recommendations below are numbered as follows:

STAGE . AUDIT NUMBER . RECOMMENDATION NUMBER

Location: B2244 Junction Road

Summary: Speeding vehicles pose a threat to other road users.

Description: During the site visit, high vehicle speeds were observed along with a high frequency of heavy braking on the approaches to the narrow bridges.

High risk behaviour such as high vehicle speeds and late, heavy braking will result in a higher frequency of collisions due to driver error.

S1.3.1 Recommendation: Reduce the speed limit over this length of the road.

Location: B2244 Junction Road

Summary: Adjacent features increase the risk of blocking back at the level crossing.

Description: There is a private access located close to the proposed level crossing location, in addition to the narrow bridges to the north and south.

IMG_2994.jpg

Turning traffic waiting on the carriageway by the level crossing will increase the risk of blocking back over the crossing leading to potential vehicle / train conflict.

S1.3.2 **Recommendation:** Introduce a yellow box marking to TSRGD Diagram 1045 to deter blocking back at the crossing.

Location: B2244 Junction Road, bridges

Summary: Multiple traffic signs leading to distraction, missed warnings and road user collisions.

Description: There are a number of existing traffic signs on both the northbound and southbound B2244 in the vicinity of the proposed level crossing, notably those warning drivers of the narrow bridges.

IMG_2991.jpg

IMG_2992.jpg

The proposed level crossing layout does not consider the existing traffic signing, or the effect of the proposed level crossing signing on the existing signing. This could lead to drivers missing some signs and the warnings they portray leading to a range of conflicts and/or collision types.

S1.3.3 **Recommendation:** A comprehensive review of the existing signing on the B2244 should be incorporated into the detailed design of the level crossing including visibility splays to the various signs to demonstrate there will be no masking.

Location: B2244 Junction Road, bridges

Summary: Pinch points could lead to blocking back at the level crossing.

Description: There are two narrow bridges situated either side of the proposed level crossing site.

IMG_2992.jpg

IMG_2993.jpg

		The bridges are too narrow for large vehicles to pass without forcing oncoming traffic to stop. A platoon of half a dozen vehicles could obstruct the crossing leading to potential vehicle / train conflict.
S1.3.4	**Recommendation:**	Establish priority at the narrowings for vehicles driving away from the level crossing.

End of list of problems identified and recommendations offered in this Stage 1 Road Safety Audit

3 Road Safety Audit Statement

I certify that this audit has been carried out in accordance with HD19/03.

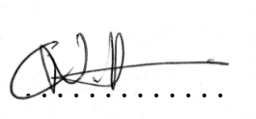
Audit Team Leader

Chris van Lottum MEng, MCIHT, MSoRSA

Senior Engineer

Arup

Central Square, Forth Street,
Newcastle upon Tyne, NE1 3PL



5 November 2013

Audit Team Member

Tom Corke BEng, MSc, CEng, MICE, MCIHT, MSoRSA

Senior Engineer

Arup

The Arup Campus, Blythe Gate, Blythe Valley Park,
Solihull, B90 8AE

Figures

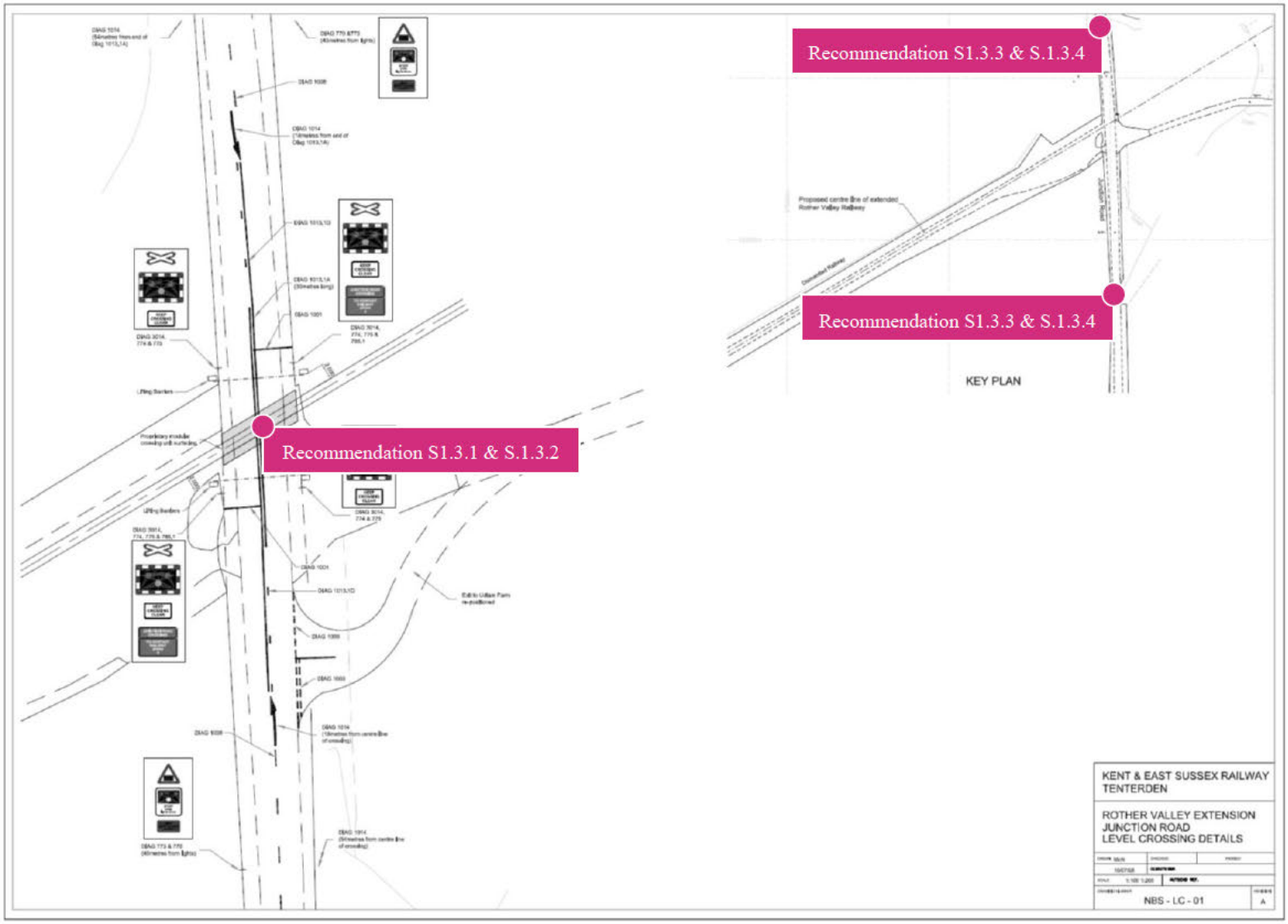


Figure 1 Location of Recommendations

Appendix A

Documents and Drawings

A1 Documents and Drawings

The following documents and drawings were supplied to the Audit Team by the Designer and have been examined in the course of conducting this audit.

A1.1 Document(s)

Title	Reference	Revision
Stage 1 and Stage 2 Road Safety Audit Brief	-	-
Rother Valley Railway A21 Robertsbridge	313090/ITD/ITQ/011	B
Non Motorised User Audit	264223/ ITD/ITQ/126	H
Rother Valley Railway Proposed level Crossings	288755/ ITD/ITW/00	E
Rother Valley Railway A21 Robertsbridge Highways and Traffic Assessment Report	313090/IDT/ITQ/0006	D

A1.2 Drawing(s)

Title	Reference	Revision
Rother Valley Extension – Junction Road – Level Crossing Details	NBS-LC-01	A

Annex D. Road Crossings. Narrative Safety Report

New Build Level Crossing Narrative Risk Analysis (NBLC-NRA)

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3) Information Sources....3

4) Level Crossing Diagrammatic Scheme....4

5) Site Visit General Observations 6

6) Junction Road Traffic Flows....9

7) The Railway 12

8) 5 X 5 risk assessment....16

1 Introduction

The Rother Valley Railway will provide a full barrier level crossing incorporating the latest technology for the operation and protective equipment. The crossing will be fully compliant with that is widely used on Network Rail infrastructure today, thus, ensuring the crossing would not require any product approvals, derogations or changes to standards. The maintenance regime would also be standard and no bespoke parts would need to be produced or stocked specifically for the crossing. For the above reasons, the crossing presents a very low reliability and risk concern and would most likely incur the lowest maintenance costs.

A level crossing does not currently exist at Junction Road, therefore a Quantitative Risk Assessment would not provide sufficient evidence to demonstrate that possible risk has been assessed and managed accordingly. However, it is important to establish possible risk from the introduction of a level crossing and possible mitigation measures at an early stage of development.

This NBLC-NRA analyses all relevant data as well as expert opinion to demonstrate that all possible risk has been addressed as well as embroidering new technology to further enhance the safety of the level crossing, for example;

- CCTV for improved safety & security,
- Evaluate the risks at the level crossing
- Early engagement with stakeholders from different sectors, local authorities, communities and 'users' associations.
- Take engineering measures and find innovative solutions
- Take educational and awareness measures and collaborate with the rail and road sectors.

The level crossing will be carefully assessed via this analysis in conjunction with the railways, and together with the road infrastructure managers, local authorities and industry experts to make it more visible and easier to cross particularly for long, heavy and oversized vehicles.

All stakeholders will be in a position to cooperate and design the best level crossing environment.

Narrative Risk Assessments currently used by Network Rail are enabling better targeting of risk reduction measures; blending quantitative modelled risk with structured observation and judgement from competent staff. The NRA process is considered as part of this analysis to encompass the whole level crossing asset system and assess wider aspects of level crossing risk.

This analysis builds upon excellent safety initiatives which were introduced for the first Automatic Full Barrier level crossing by Network Rail including the safety benefits provided, however, RVR intend to introduce additional safety measures such as the use of Red-light safety equipment (RLSE), which has currently been installed at 31 public road

level Crossings on the National Railway Network to improve user behaviour, deterring deliberate misuse. Trials have demonstrated that these Home Office Type Approved (HOTA) cameras have reduced deliberate misuse by approximately 90 per cent at some locations.

RVR have considered the installation of an object detection system at Junction Road level crossing. The objection detection system utilises laser technology to scan the crossing before allowing for trains to safely manoeuvre through. The LIDAR system detects obstacles on the ground and around the edge of the barrier lines and delivers unique small object detection protecting children and adults as well as vehicles and other large objects. RVR will review the possibility of installing the LIDAR system after the first 12 months of operation to determine if it will add any additional benefit to the safety of the level crossing.

2 Level Crossing Overview

This is a risk analysis for Junction Road level crossing. However, it should be noted that at present a level crossing does not exist, therefore, this assessment is based on the probability of risk if a level crossing was in place. It is imperative that a full Quantitative (and Narrative) Risk Assessment (QRA) is completed before any trains operate over the crossing and that the QRA is presented to the ORR.

Crossing Details	
Name	Junction Road
Type	Full Barrier at Grade LC
Crossing status	Public Highway
Overall crossing status	Design Stage
Engineers Lin Reference	N/A
OS grid reference	
Number of lines crossed	1
Line speed (mph)	10
Electrification	No
Signal box	Yes (A21 level crossing)

3 Information Sources

The table below shows the stakeholder consultation that was undertaken as part of the risk analysis.

- ORR
- K&SR
- Bakerail

- ESCC
- RVDC
- I-Transport
- ARUP

Reference sources used during the risk analysis;

- ARUP A21 Options Report
- ARUP Road Safety Audit
- Mott Macdonald road survey report
- Network Rail QRA information
- GG19 Road Safety Report
- ORR Documentation
- GPR219-IDF- Level Crossing Safety
- EU SAFER-LC Project
- Level Crossing Risk Management Tool (LXRMT).

4 Level Crossing Diagrammatic Scheme

The new level crossing to be constructed is an automatic locally monitored fully gated level crossing on B2244 Junction Road, East Sussex. The road approach speed is 40 mph. The profile of the railway line in the vicinity of the crossing has been provided (below), as well as the appropriateness of the proposed warning signs in this regard.

Rother Valley Railway

Diagram of the proposed railway Alignment

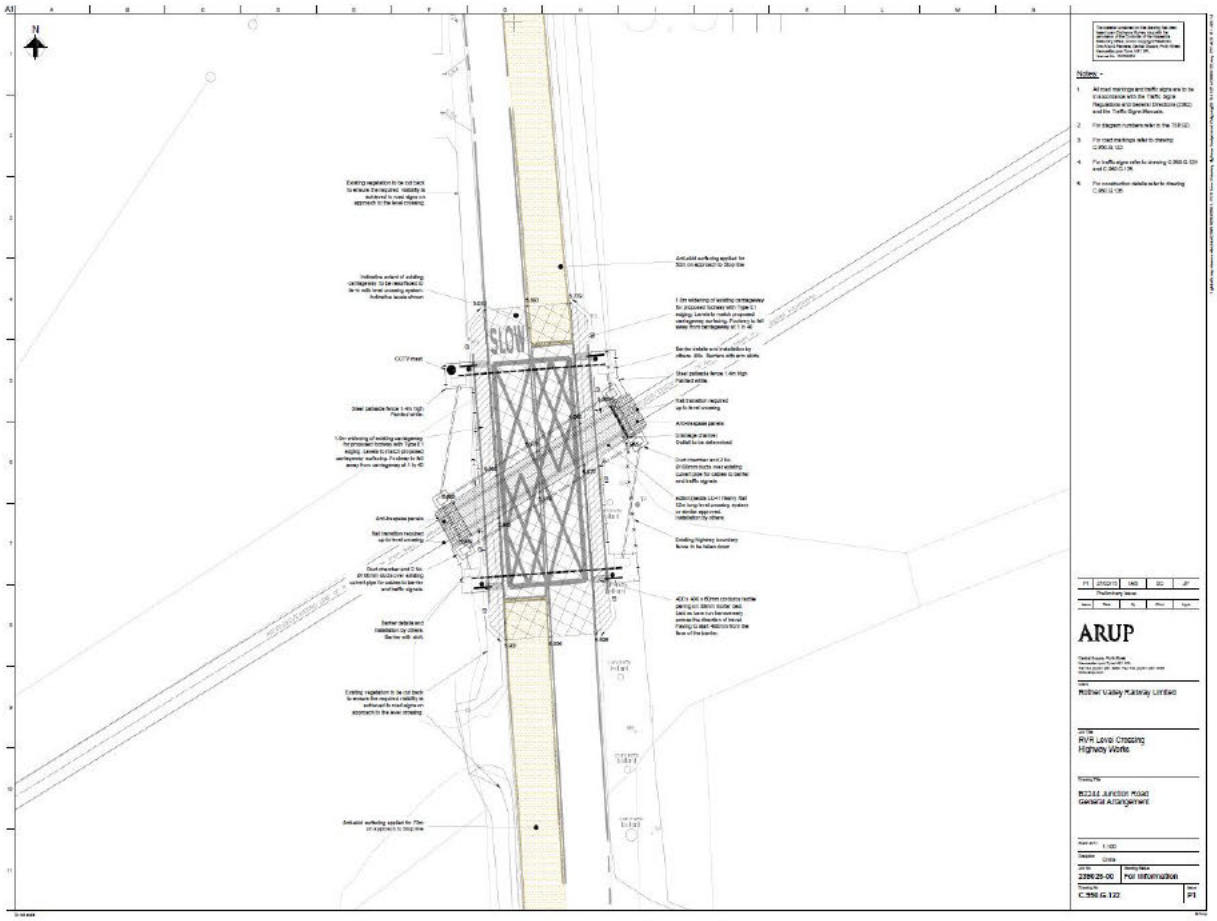
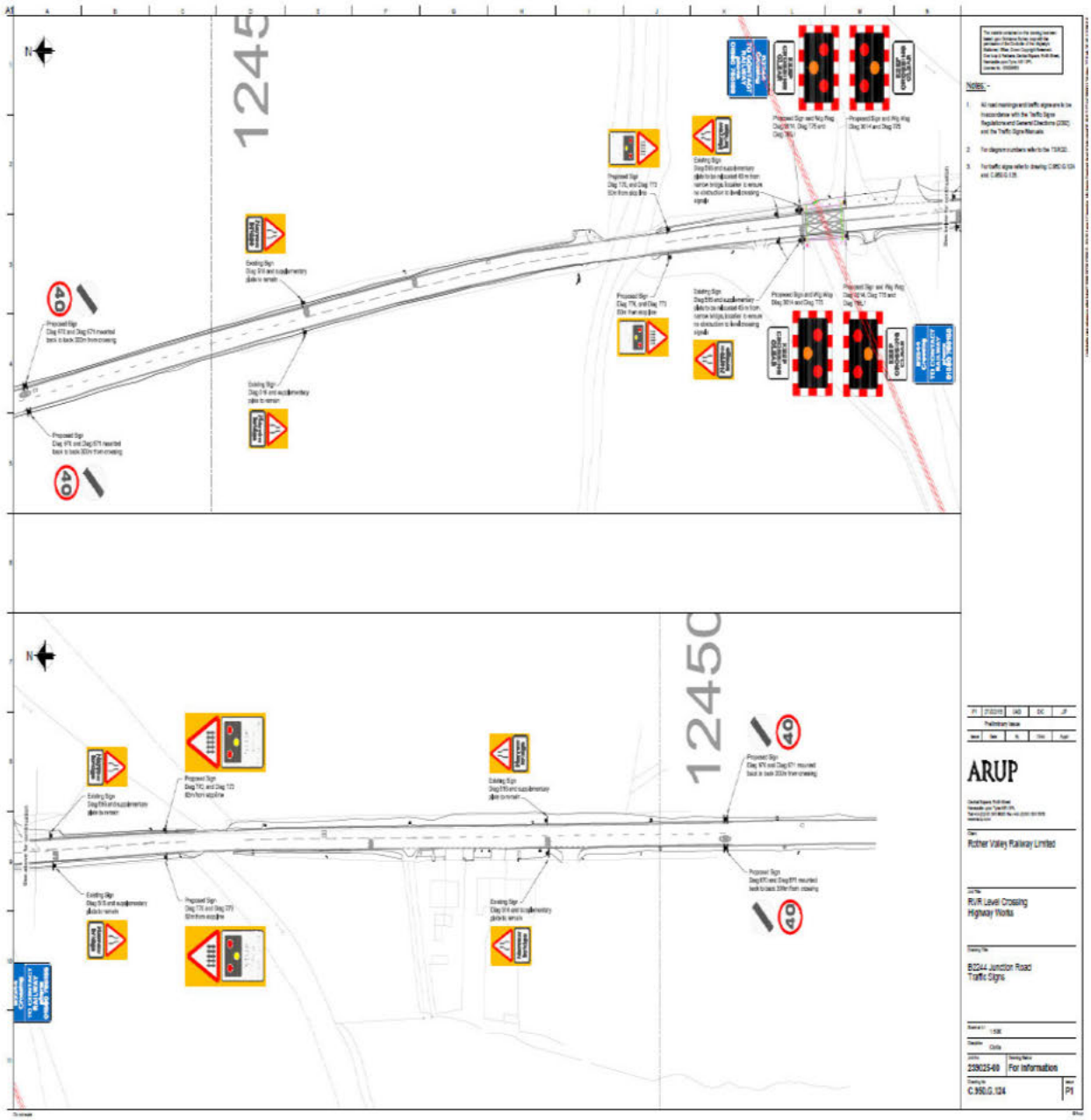


Diagram of the proposed traffic signs



5 Site Visit General Observations

The B2244 Junction Road, Udiam Stage 1 Road Safety Audit report identified possible road distractions which are considered as part of this analysis, for example,

- Speeding vehicles pose a threat to other road users along with a high frequency of heavy braking on the

approaches to the narrow bridges which could result in higher frequency of collisions due to driver error.

To remove this concern, it is advised to reduce the speed limit over this length of road.

- The adjacent features see in photograph 1 (below) increase the risk of blocking back at the proposed level crossing, additionally, there is a private access road located close to the proposed level crossing location as well as the narrow bridges to the north and south. Turning traffic waiting on the carriageway by the proposed level crossing will increase the risk of blocking back over the crossing leading to potential vehicle/train conflict.

To remove this concern, it is advised to introduce a yellow box marking to deter blocking back at the crossing

Photograph 1

- There are a number of existing traffic signs both north and southbound B2244 in the vicinity of the proposed level crossing, hence, multiple traffic signs could lead to distraction, missing warning signs and possible road user collision as seen in Photograph 2(a) (b) below.

A comprehensive review of the existing signing on the B2244 should be incorporated into the detailed design of the level crossing including visibility splays to the various signs to demonstrate there will be no masking.

Photograph 2(a)

Photograph 2b

- There are two narrow bridges situated either side of the proposed level crossing site. The bridges are too narrow for large vehicles to pass without forcing oncoming traffic to stop leading to the crossing being obstructed and potential vehicle/train conflict, see photographs 3(a) (b) below.

To remove this concern, it is advised to establish priority at the narrowing's for vehicles driving away from the level crossings.

Photograph 3(a)

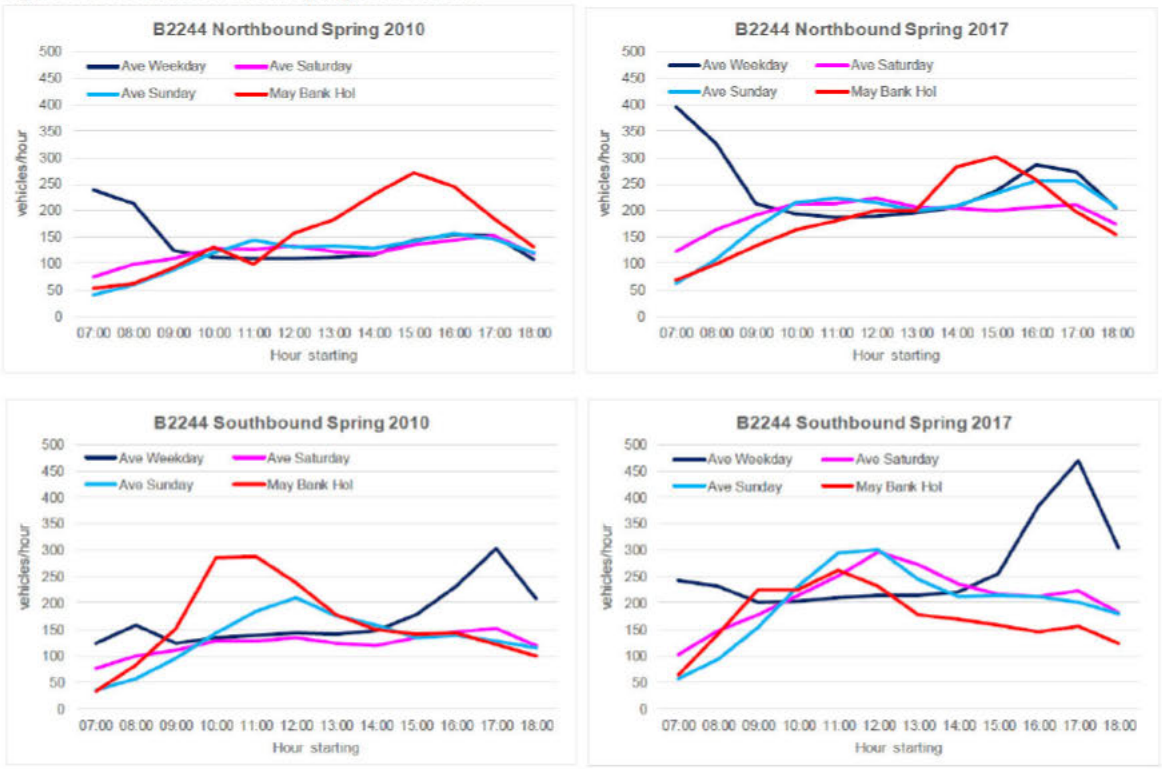
Photograph 3(b)

6 Junction Road Traffic Flows

The chart below compares traffic flows on B2244 Junction Road, for Spring and Summer months, based on ATC data provided by ESCC.

For most days and periods, there have been large proportional increases in flow, but volumes remain much lower than on the A21. Increases are highest for the weekday AM and PM peak periods (northbound 07:00-09:00 and southbound 16:00-18:00), as well as on the August Bank Holiday.

Figure 9: B2244 Traffic Flows in Spring 2010 and 2017



Source: ESCC ATC Site 021

Queuing at the level crossing has been estimated, based upon average vehicle demand per minute during the hour of each barrier closure, as well as length of time that the barrier is down. A barrier close time of 55 seconds has been assumed, with sensitivity testing with a 110-second closure.

Queue lengths have been estimated with 2018 traffic demands and predicted demand in 2021 and 2027.

Traffic Growth for future years;

Traffic forecasts have been produced for 2021 and 2027 using TEMPRO version 7.2 with National Transport Model (NTM) factors (NTM datasheet AF15). To calculate growth factors for Junction Road LC data for Rother District has been used.

For Bank Holidays, it has been assumed that growth will be the same as for Sundays.

Table 1 Traffic Growth Factors; 2017 - 2021

Road Name	Region	Road Type	Average Weekday	Average Saturday	Average Sunday	May Bank Holiday	August Bank Holiday

B2244 Junction Road	East Sussex	Rural Minor	1.063	1.061	1.061	1.061	1.061

Table 2 Traffic Growth Factors 2017 – 2027

Road Name	Region	Road Type	Average Weekday	Average Saturday	Average Sunday	May Bank Holiday	August Bank Holiday
B2244 Junction Road	East Sussex	Rural Minor	1.150	1.149	1.150	1.150	1.150

Predicted Queue Lengths;

Table 3 (below) shows the predicted queue lengths for Junction Road Level Crossing with a 55 second closure.

Table 3: Predicted Queue Lengths at Junction Road Level Crossing

	2017 Northbound		2017 Southbound		2021 Northbound		2021 Southbound		2027 Northbound		2027 Southbound	
	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average
Spring/Autumn												
Weekday	25	19	34	21	27	20	36	22	28	21	39	24
Saturday	20	18	26	21	21	19	28	23	23	21	30	25
Sunday	23	20	26	21	24	21	28	22	26	22	30	24
May BH	26	20	23	16	28	21	24	17	30	23	26	19
Summer												
Weekday	21	17	33	21	23	18	35	23	25	19	37	25
Saturday	18	17	22	20	19	18	23	21	21	19	25	23
Sunday	21	18	27	22	22	19	29	24	24	21	31	26
Aug BH	25	21	32	26	27	22	34	28	29	24	37	30

Source: Mott MacDonald analysis of existing and predicted traffic volumes, queue lengths in metres assuming 5.75m/vehicle

For the B2244, predicted maximum queue lengths are 20m-30m in 2017, increasing to around 30m-40m in 2027

Queue lengths with a 110-second closure (below) are shown as sensitivity tests. Predicted maximum queue lengths for Junction road are 40m-70m in 2017, increasing to around 40m-80m in 2017.

Table 4 Predicted Queue Lengths at Junction Road Level Crossing with 110 Second Closure

	2017 Northbound		2017 Southbound		2021 Northbound		2021 Southbound		2027 Northbound		2027 Southbound	
	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average
Spring/Autumn												
Weekday	50	37	67	42	54	39	71	44	58	43	77	48
Saturday	39	37	52	43	42	39	55	45	45	42	60	49
Sunday	45	39	53	42	48	42	56	45	52	45	61	48
May BH	53	39	46	33	56	42	49	35	61	45	53	38
Summer												
Weekday	43	33	65	43	46	35	69	46	49	38	75	49
Saturday	36	33	44	40	38	35	46	43	41	38	50	46
Sunday	41	37	55	45	44	39	56	47	48	42	63	51
Aug BH	50	42	64	52	54	44	68	55	58	48	73	60

Source: Mott MacDonald analysis of existing and predicted traffic volumes, queue lengths in metres assuming 5.75m/vehicle

Conclusion;

On the B2244, there have been large proportional increases in flow for most days and periods, however, volumes remain much lower than on the A21. Increases are highest for the weekday AM and PM peak periods (northbound 07:00-09:00 and southbound 16:00-18:00, as well as on the August Bank Holiday. Predicted maximum queue lengths are 20m-30m in 2017, increasing to around 30m-40m in 2027.

7 The Railway

The train service over Junction Road level crossing will consist of passenger trains only. There will be approximately 10 trains per day. The highest permissible line speed of trains over the crossing will be 10 mph. Trains are timetabled to run for 10 hours per day.

The RVR Level Crossing Operational Management Plan (LCOMP) sets out the strategy for operational management of the Junction Road level crossing to be installed on the Rother Valley Railway (RVR) where it interfaces with the road at level grade, so requiring control of road vehicles to enable a train to cross.

The LCOMP describes the principles of how the level crossing is to be operated under normal conditions and in the event of failure.

This shall be the basis for developing operational procedures for the railways operation when services commence to which staff shall be trained and assessed on an ongoing basis.

Compliance with Industry guidelines;

The design for the level crossings, developed from this document, shall be compliant with industry guidelines, e.g. The Office of Rail Regulation: A Guide for Managers, Designers and Operators and approved by a suitably independent person before installation.

Junction Road Level Crossing Operation;

Normal operation towards Robertsbridge

The train will approach the level crossing at a maximum speed of 10 mph, thus ensuring that the train has the ability to stop in 30m. The signalman shall initiate the closing sequence of the barriers having received an audible and visual signal from the strike in treadle enabling the signaller to manage and control the operation, two train crew members will operate the train and good sighting will always be maintained

This shall initiate a sequence of warnings to road users of klaxons, flashing yellow lights changing to flashing red lights then barrier closure, which shall be full barriers across the road, in the standard accepted sequence as adopted on the National Rail network.

There shall be a visual indicator presented to the train driver that the sequence has been initiated which will be repeated as necessary for sighting purposes, and which shall change to confirm that the closure sequence has been successfully completed.

If the level crossing is crossed under normal operating conditions the barriers will lower on the approach and rise

following the initiation by the signaller, the raising being initiated by a suitably located treadle.

There shall be an indication to the two locomotive crew that the barriers have risen correctly and this shall be checked by the train driver.

Degraded Operation
Should the closure sequence fail to initiate or change from "sequence initiated" to "sequence completed" the driver shall be required to stop the train short of the crossing to investigate why and, as necessary, manually initiate a closure sequence using a local control panel located on the approach side of the level crossing.

If the closure sequence can be initiated and completed successfully in powered mode, the driver can proceed. If it cannot but the barriers can be manually lowered then the guard of the train must be called forward to assist, this may include carrying out duties to stop road traffic and assist in manually lowering the barrier mechanism.

Should the circumstances of the failure be such that the train crew consider it unsafe to proceed then the train shall be secured and Bodiam signal box, be informed to request suitable assistance and instruction, e.g. propel back to Bodiam under the operational rules. The signal box operative shall be responsible for escalating the problem to company officials.

On crossing the driver shall ensure that the light beyond indicating that the barriers are down is illuminated. If it is not or showing an illumination, the driver shall draw up to it and stop and act as if the barriers have failed to rise, as below.

If the barriers have failed to rise, the indication beyond the train referred to above, shall show this and the driver shall be required to stop. The driver shall inform the Guard to go to the local control panel on the Robertsbridge side of the level crossing to initiate closure under powered mode. If this is unsuccessful the Guard shall inform the train driver and then proceed to raise the barrier manually, requesting assistance from the locomotive crew if necessary.

All irregular operation of the level crossing system must be reported immediately to the A21 signal box using the lineside phones that shall be located at the local control panels. The level crossing system shall also send an alarm.

The signaller at the A21 shall ensure faulting attendance to the site.

Normal Operation towards Bodiam

The train will approach the level crossing at a maximum speed of 10 mph, thus ensuring that the train has the ability to stop in 30m. The signalman shall initiate the closing sequence of the barriers having received an audible and visual signal from the strike in treadle enabling the signaller to manage and control the operation, two train crew members will operate the train and good sighting will always be maintained

This shall initiate a sequence of warnings to road users of klaxons, flashing yellow lights changing to flashing red lights then barrier closure, which shall be full barriers across the road, in the standard accepted sequence as adopted on the National Rail network.

There shall be a visual indicator presented to the train driver that the sequence has been initiated which will be repeated as necessary for sighting purposes, and which shall change to confirm that the closure sequence has been successfully completed.

If the level crossing is crossed under normal operating conditions the barriers will lower on the approach and rise following the initiation by the signaller, the raising being initiated by a suitably located treadle.

There shall be an indication to the two locomotive crew that the barriers have risen correctly and this shall be checked by the train driver.
Degraded Operation

Should the closure sequence fail to initiate or change from "sequence initiated" to "sequence completed" the driver shall be required to stop the train short of the crossing to investigate why and, as necessary, manually initiate a closure sequence using a local control panel located on the approach side of the level crossing.

If the closure sequence can be initiated and completed successfully in powered mode the driver can proceed. If it cannot but the barrier can be manually lowered then the guard must be called forward to assist, this may include carrying out duties to stop road traffic and assist in manually lowering the barrier mechanism.

Should the circumstances of the failure be such that the train crew consider it unsafe to proceed then the train shall be secured and Bodiam signal box be informed to request suitable assistance and instruction, e.g. propel back to Bodiam under the operational rules. The signal box operative shall be responsible for escalating the problem to company officials.

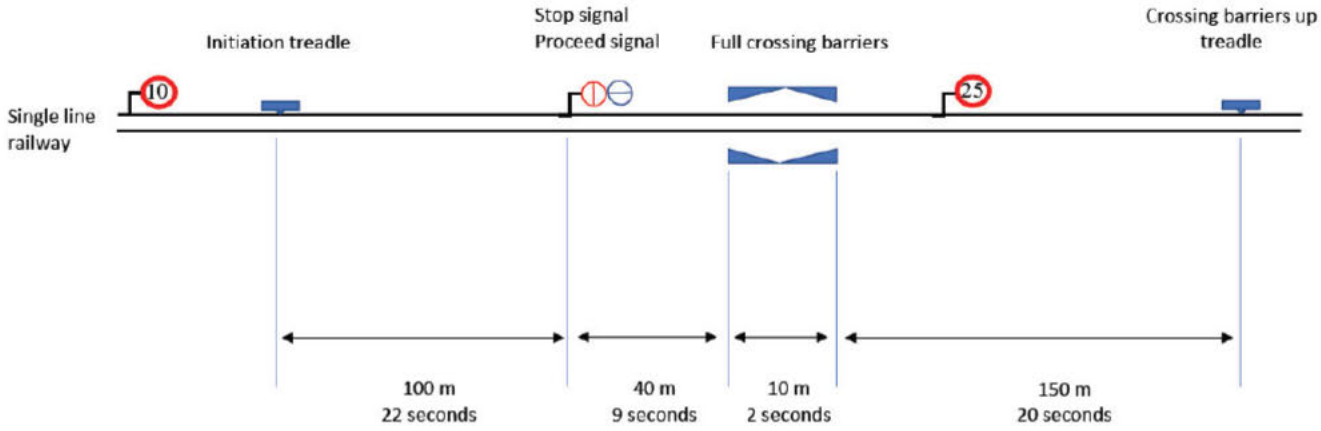
On crossing the driver shall ensure that the light beyond indicating that the barriers are down is illuminated. If it is not or showing an illumination the driver shall draw up to it and stop and act as if the barriers have failed to rise, as below.

If the barriers have failed to rise, the indication beyond the train referred to above, shall show this and the driver shall be required to stop. The driver shall inform the Guard to go to the local control panel on the Robertsbridge side of the level crossing to initiate closure under powered mode. If this is unsuccessful then the Guard shall inform the train driver and then proceed to raise the barrier manually, requesting assistance from the locomotive crew if necessary.

All irregular operation of the level crossing system must be reported immediately to the A21 signal box using the lineside phones that shall be located at the local control panels. The level crossing system shall also send an alarm.

The signaller at the A21 shall ensure faulting attendance to the site.

Level Crossing Signalling Design



Notes:

1) Equipment shown for up direction only, treadles, signals and signs replicated for down direction.
2) Initiation treadle operates an audible and visual indicator in attendants cabin adjacent to level crossing.
3) Transit times assume full line speed.

Rother Valley Railway
Level crossing signalling schematic for manually operated full barriers
Northbridge Street, A21 & Junction Road

Not to scale

Level Crossing barriers & CCTV Systems Maintenance Plan

The maintenance plan for the three-level crossings shall be based on that recommended by the supplier of the equipment. It shall comprise:

- Regular planned maintenance at the required intervals.
- Work arising from planned maintenance, within the required timescales
- Fault response, within specified timescales.
- Work arising from fault responses, within the required timescales.
- Work arising due to other parties planned work.

Road Crossing Design and Construction

The construction of the road crossings comprise concrete units designed to meet the requirements of a high friction skid resistant road surface through the crossing. This has been tested for the proposed installation and passed the test level requirement as set by The Highways Agency, reference document RD/GN/009 dated September 1989.

8 5 X 5 risk assessment

Hazards are identified, listing possible causes if appropriate and assessed for severity. These are then multiplied by the frequency or likeliness of an incident occurring if no controls were applied. This produces the risk factor; the numerical assessment table gives guidelines on how to assess severity and frequency.

This risk assessment is generic and whereas the basic principles will always apply, it is acknowledged risk can change significantly from one site to another. Generic risk assessments will always be reviewed by the appointed Project Manager and then expanded upon if required to nullify or apply the necessary controls to hazards identified during site visits (pre-works) or through information passed to them by a third party.

Numerical Assessment			
Severity (S)		**Likelihood of Occurrence (L)**	
1	No Injuries / Minor Damage	1	Remote
2	Single Minor Injury	2	Unlikely
3	Single Major Injury / Minor Pollution	3	Occasional
4	Single Fatality / Major Pollution	4	Likely
5	Multiple Fatalities	5	Highly Likely

Risk Factor

		Likelihood of Occurrence (L)				
		5	4	3	2	1
Severity	5	25	20	15	10	5
	4	20	16	12	8	4
	3	15	12	9	6	3
	2	10	8	6	4	2
	1	5	4	3	2	1

Risk Factors between 16 to 25 = Unacceptable Risk. Risk Factors > 8 will be strictly monitored.
Hazards Identified with a Severity Assessed at 3 or above will also be strictly monitored.

Hazards and possible causes identified	Potential Risk or consequences associated with the Hazard	S	L	RF	Control Measures	S	L	RF
SIGNALLING								
Relative to previous signals: Will the signal be in a different position, or does it have a different configuration?	Signal position is not consistent with the spacing between preceding signals Signal is of a different design to preceding signals Potential for, Death, Serious injury or injury	4	3	12	The KESR signalling arrangement will have consistent signal design. All staff will receive training before operation commences	3	2	6

Could the signal be confused with other signals on an adjacent line or on the same gantry	Signal is on a post and could be confused with other signals Signal has an identical profile / outline to adjacent signals Death Serious injury Injury	4	3	12	Ensure signals for all lines are visible Shield nearby signals from view Appropriate signal should be clearly associable with its line Driver training	3	2	6
Could the signal be obscured from the driver's view?	Signal reading time is inadequate. Signal is positioned round a curve and the reading angle is inadequate Signal is positioned round a curve and there is an obstruction blocking the signal's line of s Signal can be obscured by vegetation Signal can be obscured (intermittently or otherwise) by a bridge or other structure, for example station structures edge of signal back plate is less than 100 mm from edge of aspect	3	3	9	Increase backboard size (by 50%) Manage vegetation Maximum train speed is 10 mph Remove / shield potential distractions in stations Reposition signal on straight track Make signal post more conspicuous Driver training	3	2	6
TRACK								
Will the track on	Signal is located in an area which suffers from	4	3	12	Lineside fencing /	2	2	4

approach to the signal suffer from adhesion problems?	ice, frost, leaf fall, dampness or other adhesion problems Death Serious injury Injury				netting Railhead conditioning Management of lineside vegetation Low adhesion warning signs Driver training			
Is there a reduction in permissible speed on the approach to the signal?	There is a reduction in permissible speed on the approach to the signal Death Serious injury Injury	2	2	4	Permissible speed on approach to the level crossing is maximum 10 mph Driver training On site staff monitoring	2	2	4
Is there a falling gradient on approach to the signal?	There is a falling gradient on the approach to the signal	4	3	12	Countdown markers Driver training	3	2	6
COLLISION								
Road Vehicle and train collision risk	Insufficient train warning time for all vehicle types known to be exasperated by the driving position e.g. Tractor. Level crossing equipment and signage is not conspicuous or optimally positioned. Instructions for safe use may be misunderstood e.g., signage, clutter detracts from key	4	3	12	Optimising position of equipment at the design stage removing any conflicting or redundant signs. Strike in times optimised. Sighting lines enhanced.	3	2	6

	messages, conflicting information given. High volume of unfamiliar users e.g. irregular visitors, migrant workers. Known user complacency leading to high levels of indiscipline. Type of vehicle unsuitable for level crossing; - Large, low, slow, making access or egress difficult and or vehicle is too heavy for the crossing surface – risk of grounding and or severity of gradient adversely affects ability to traverse. Users experience a long waiting time.				Latest technology in place for user-based warning systems including wig-wag lights, sirens, full road barriers, RTL. Competent crossing attendant on site. Maximum train speed 10 mph implemented. Superior quality crossing surface construction material. De-vegetation programme in place			
Pedestrian and train collision risk	Ineffective whistle boards, warning inaudible, insufficient train warning time. Level crossing equipment and signage is not conspicuous or optimally positioned. Instructions for safe use may be misunderstood. Surface condition could lead to slip/trip risk.	4	3	12	Optimising position of equipment at the design stage removing any conflicting or redundant signs. Latest technology in place for user-based warning systems including wig-wag lights, sirens, full road barriers, RTL. Competent crossing attendant on site.	3	2	6

	High volume of unfamiliar users i.e. irregular visitors/ramblers/equestrian. Complacency leading to high levels of indiscipline e.g. users are known to rely on knowledge of timetable. High level of use by vulnerable people. High usage of cyclists.				Maximum train speed 10 mph implemented. Superior quality crossing surface construction material. De-vegetation programme in place. Regular engagement with stakeholders/authorised users reinforcing safe crossing protocol, legal responsibilities and promoting collaborative working. Signage to encourage users to look for approaching trains as well as providing cyclist dismount signs.			
Hazards and possible causes identified	Potential Risk or consequences associated with the Hazard	S	L	RF	Control Measures	S	L	RF
SPAD OCCURRENCE								
Train driver passes protecting signal without authority	Collision with road vehicle (see above). Collision with member of public (See above). Death Serious injury Injury	4	3	12	Treadle on protecting signal (passed at danger without authority) will activate the road crossing wig wag lights and siren to indicate to all road users that a train is coming. Barriers will not activate at this stage. The treadle will also activate a warning tone and visual sign to the local level crossing attendant	2	2	4

					that the train approaching the level crossing has passed the signal at danger without authority. The level crossing attendant will check to ensure the level crossing is clear of any traffic, pedestrians etc and activate a switch/plunger on site to operate the full barriers hence safely closing the level crossing to all road users. Driver training. Level crossing operator training. Maximum speed of train 10 mph.			

Hazards and possible causes identified	Potential Risk or consequences associated with the Hazard	S	L	RF	Control Measures	S	L	RF
Additional Risk Influencing factors								
Distraction								
Can the driver be distracted by something outside the cab?	Driver could be distracted by trespassers	4	3	12	Signal reminder sign	3	2	6
Could the driver be distracted by other tasks at or on approach to the signal?	There is a level crossing in the vicinity of the signal	4	3	12	Position signal where driver not distracted by other duties Driver training	3	2	6
Distractions while using the level crossing might impair the user's ability to cross quickly and safely.	If a user is distracted, there is an increased likelihood that they will not see the crossing, train, warning signs, for example; Other persons in the car (e.g. children) Thoughts on personal matters, work stresses etc. Using the telephone, Behaviour of other crossing users, In car entertainment Seasonal events (e.g. fun fairs, fireworks) Mobile phones, iPads, handheld computers etc. Signage (e.g. speed limit signs). Distractions might be more likely for users who frequently use the crossing (e.g. delivery drivers), due to them potentially having a lower	4	3	12	Provision of CCTV surveillance cameras and signage to deter misuse at a particular crossing and to capture evidence of violations when they arise. Staff training. Traffic calming measures. Train maximum speed 10 mph. New modern full barrier crossing. Education campaign.	2	2	4

	level of concentration than those who use it infrequently. A change in speed limit and the associated speed limit signs This proximity of the speed limit signs to the crossing might reduce the attention given to the crossing, or remove attention away from it completely. The signs might also draw a car driver's attention to the vehicle speedometer to check vehicle speed and away from maintaining vision out of the vehicle's windscreen. Other signs in the vicinity of a level crossing that are not related to that crossing could also have been a potential distraction.							
High vehicle approach speeds	The vehicle speed over a level crossing is a factor in vehicle driver errors. Risk factors include, the speed limit(s) in the surround areas, driver's perception and attitude to risk, visibility of warning signs and visibility of the level crossing e.g. rural winding roads. High risk behaviour such as high vehicle speeds and late, heavy braking will result in a higher frequency of collisions due to driver error.	4	3	12	Reduced road speed on approach to level crossing. Traffic calming measures. Enhanced signage. New modern full barrier crossing. Education campaign. Crossing attendant (Monitoring).	2	2	4
Large, slow and low vehicles	Drivers of large vehicles are involved in a disproportionately high number of incidents at	4	3	12	Reduced road speed on approach to level crossing.	2	2	4

	level crossings. The size of the vehicles - they have less room for error when compared to cars. They may not be responding to the activation of the crossing warning system in sufficient time. Studies have proposed that large (HGV) vehicles may attempt to traverse the crossing once the barriers have already started to descent, suggesting that it could be to do with the driver's awareness of their vehicle's poorer braking performance, and therefore considering it safer to continue. Other contributory factors might include: The slower acceleration speed of HGVs causing the total time to cross a level crossing from standstill to increase Sightlines from a higher driving position.				Traffic calming measures. Enhanced signage Yellow box marking Level crossing road surface well maintained Power operated level crossing barriers			
Ice conditions	Icy weather conditions on the approach and exit to the crossing might affect the behaviour of the crossing, for example, prevent vehicles from stopping in a position of safety at the crossing. Encourage vehicle drivers to ignore the initial warning activation when they are close to the train line because of the risk of	3	3	9	Provision of CCTV surveillance cameras. Level crossings local training plans, training and briefing signallers/attendants receive on communications skills, hazards associated with a particular crossing (icy conditions), how to check	2	2	4

	sliding forward onto the tracks. Cause pedestrians to concentrate on their footing, rather than looking for trains or observing warning signs. Result in pedestrian slips, trips and falls. This is a particular risk for elderly, or mobility impaired, users. Level crossings on 'B' roads might present a particular hazard to vehicle drivers as these roads are not normally gritted in icy conditions.				whether a crossing is clear. Level crossing attendant on site. Improved crossing surface. Regular monitoring. Tactile surfaces.			
Foliage obscuring warning signs and approaching trains	The visibility (and hence effectiveness) of information on the approach to and at the level crossing is reduced by overgrown foliage. Overgrown foliage on the approach to a level crossing can obscure signs and signals located at the crossing, and also restrict the visibility of approaching trains. This could result in the user either not seeing the sign or train (complete or partial) or the user not seeing the sign or train in time to sufficiently interpret the information and respond appropriately.	4	3	12	Cutting back vegetation and removing obstructions the sighting distances for users up and down the track and to signs / warning lights are lengthened. Staff training i.e. HRA Guidance document HGR – A0720 Control of Vegetation (Management plan). Improved sighting distances. Train speed max 10 mph. CCTV monitoring. New modern full barrier	2	2	4

	This issue can be exacerbated when the visibility of the level crossing is reduced, either due to its type or its location e.g. on the bend in a road or on a high-speed road, as the vehicle driver has even less time to respond. foliage is also applicable to train drivers. Foliage on the lineside might impact on the train driver's ability to see information, objects or people on the crossing.				crossing (Audible/visual alarms. Education campaign. Crossing attendant on site (Monitoring). Reduced road speed on approach to level crossing. Traffic calming measures. Enhanced signage.			
Crossing utilisation or traffic moment	High crossing utilisation by users is associated with a greater chance of user risk taking behaviour.	4	3	12	Provision of CCTV surveillance cameras and signage to deter misuse at a particular crossing and to capture evidence of violations when they arise. Level crossings local training plans, training and briefing signallers/attendants receive on communications skills, hazards associated with a particular crossing (icy conditions), how to check whether a crossing is clear. Level crossing attendant on site. Reducing the road approach speed to the level crossing to reduce the risk of collision between vehicles and gates / trains.	2	2	4

					New modern full barrier crossing (Audible/visual alarms. Education campaign. Crossing attendant (Monitoring). Traffic calming measures. Enhanced signage.			
Unfamiliar users or vulnerable people, for example, cyclists, horse riders, walkers etc.	Unfamiliar users or vulnerable people who may not familiar with the level crossing procedure might apply an incorrect mental model when traversing the crossing.	4	3	12	Provision of CCTV surveillance cameras and signage to deter misuse at a particular crossing and to capture evidence of violations when they arise. Level crossings local training plans, training and briefing signallers/attendants receive on communications skills, hazards associated with a particular crossing (icy conditions), how to check whether a crossing is clear. Level crossing attendant on site. Reducing the road approach speed to the level crossing to reduce the risk of collision between vehicles and gates / trains.	2	2	4

					New modern full barrier crossing (Audible/visual alarms. Education campaign. Crossing attendant (Monitoring). Traffic calming measures. Enhanced signage			
Traffic calming systems Road traffic calming systems on either side of a level crossing might increase the risk of blocking back.	Traffic calming systems, such as road width restrictions/ build-outs, positioned on either side of a level crossing might increase the risk of vehicle drivers blocking back over the crossing. When the crossing is closed to road traffic, queues form along the road. This issue might be exacerbated due to factors such as the time of day (rush hour) and 'herd mentality'. Discomfort for cyclists on the road. Potentially more noisy approach to the crossing leading to possible complaints.	3	3	9	Provision of CCTV surveillance cameras and signage to deter misuse at a particular crossing and to capture evidence of violations when they arise. Reducing the road approach speed to a level crossing to reduce the risk of collision between vehicles and gates / trains. A range of enhancements to improve conspicuity, comprehension of and user response to level crossing warning signs:	2	2	4

	If overused in conjunction with changes in speed the mitigation might lose its impact upon behaviour.							
Multiple traffic signs leading to distraction, missed warnings and road user collisions.	There are a number of existing traffic signs on both the northbound and southbound in the vicinity of the level crossing, notably those warning drivers of the narrow bridges.	3	3	9	Reducing the road approach speed to the level crossing to reduce the risk of collision between vehicles and gates / trains. New modern full barrier crossing (Audible/visual alarms. Education campaign. Crossing attendant (Monitoring). Traffic calming measures. Enhanced signage.	2	2	4
Pinch points could lead to blocking back at the level crossing.	There are two narrow bridges situated either side of the level crossing site. The bridges are too narrow for large vehicles to pass without forcing oncoming traffic to stop. A platoon of half a dozen vehicles could obstruct the crossing leading to potential vehicle / train conflict	3	3	9	Traffic calming measures. - establish priority at the narrowing's for vehicles driving away from the level crossing. Education campaign. Enhanced signage	2	2	4

Limited forward visibility. Adjacent features increase the risk of blocking back at the level crossing. private access located close to the proposed level crossing location, in addition to the narrow bridges to the north and south.	Lack of good visibility at the level crossing leading to shunt type collisions.	3	3	9	Introduce a yellow box marking. Traffic calming measures.	2	2	4
Single train line Greater risk-taking behaviour in both vehicle drivers and pedestrians is reported on single train lines. .	This user behaviour is in line with risk compensation theory - the user, perceiving there to be less of a risk to him/herself, behaves less cautiously	2	2	4	Provision of a level crossing attendant to open and close the crossing barriers for users when safe to do so. The level crossing attendant is deployed to monitor and police user behaviour ensuring barriers are operated correctly. Staff Training. Maximum train speed 10mph. Enhanced signage.	1	1	2
Farming vehicles Farm traffic might influence the speed and behaviour of other vehicles traversing the crossing.	Farm traffic tends to move at a much slower speed and, being much larger, reduce the visibility of other vehicle drivers. This can cause distraction and frustration and change other road user's behaviour; resulting in risk taking actions such as overtaking and not	4	4	16	Power operated barrier. CCTV monitoring. LC Attendant – Training/Competence. Education campaign.	2	2	4

	observing the level crossing warning signs.				Enhanced signage			
Commercial driver	Commercial drivers might have increased risk taking behaviour at level crossings. Commercial vehicle drivers, such as salespersons, work to strict timescales and therefore their driving behaviour is often influenced by having to reach destinations on time. Commercial drivers using a level crossing might be inclined to 'beat the lights' to avoid having to wait at the crossing, or they might fail to follow the correct crossing procedure at unprotected crossings.	4	4	16	A range of enhancements to improve conspicuity, comprehension of and user response to level crossing warning signs: The level crossing attendant is deployed to monitor and police user behaviour ensuring barriers are operated correctly. LC Attendant – Training/Competence. Education campaign. Enhanced signage.	2	2	4
Adverse weather impacting visual information.	The effectiveness of visual information at crossings can be impaired by adverse weather conditions (e.g. fog and snow). The ability of vehicle drivers or other crossing users to detect the presence of level crossings, hazard information, warning	3	3	9	CCTV monitoring. New modern full barrier crossing (Audible/visual alarms). Education campaign. Crossing attendant (Monitoring).	2	2	4

	lights or approaching trains might be impaired by adverse weather conditions, e.g. fog and snow. This might result in users failing to see warning information or oncoming trains, which could lead to users unintentionally adopting risky behaviour. In addition, in heavy snow users might not be able to see the tracks and inadvertently stand in a position of danger. Visibility in and around the crossing might also be impaired by banks of snow. An example where foggy conditions have been identified as a causal factor in a level crossing incident investigation is the fatality at Barratt's Lane No.1 footpath crossing.				Reduced road speed on approach to level crossing. Train speed maximum 10mph Traffic calming measures. Enhanced signage.			
Alcohol and drugs	The effects of drink and/or drugs can radically alter user behaviours. Motor and cognitive function might be impaired and users might also have a reduced perception of risk. Users under the influence of alcohol or	3	3	9	CCTV monitoring (staff training initiatives). Anti-trespass and cattle guard panels are designed to deter people or animals from crossing the track at unauthorised places. Do not trespass signs. New modern full barrier	2	2	4

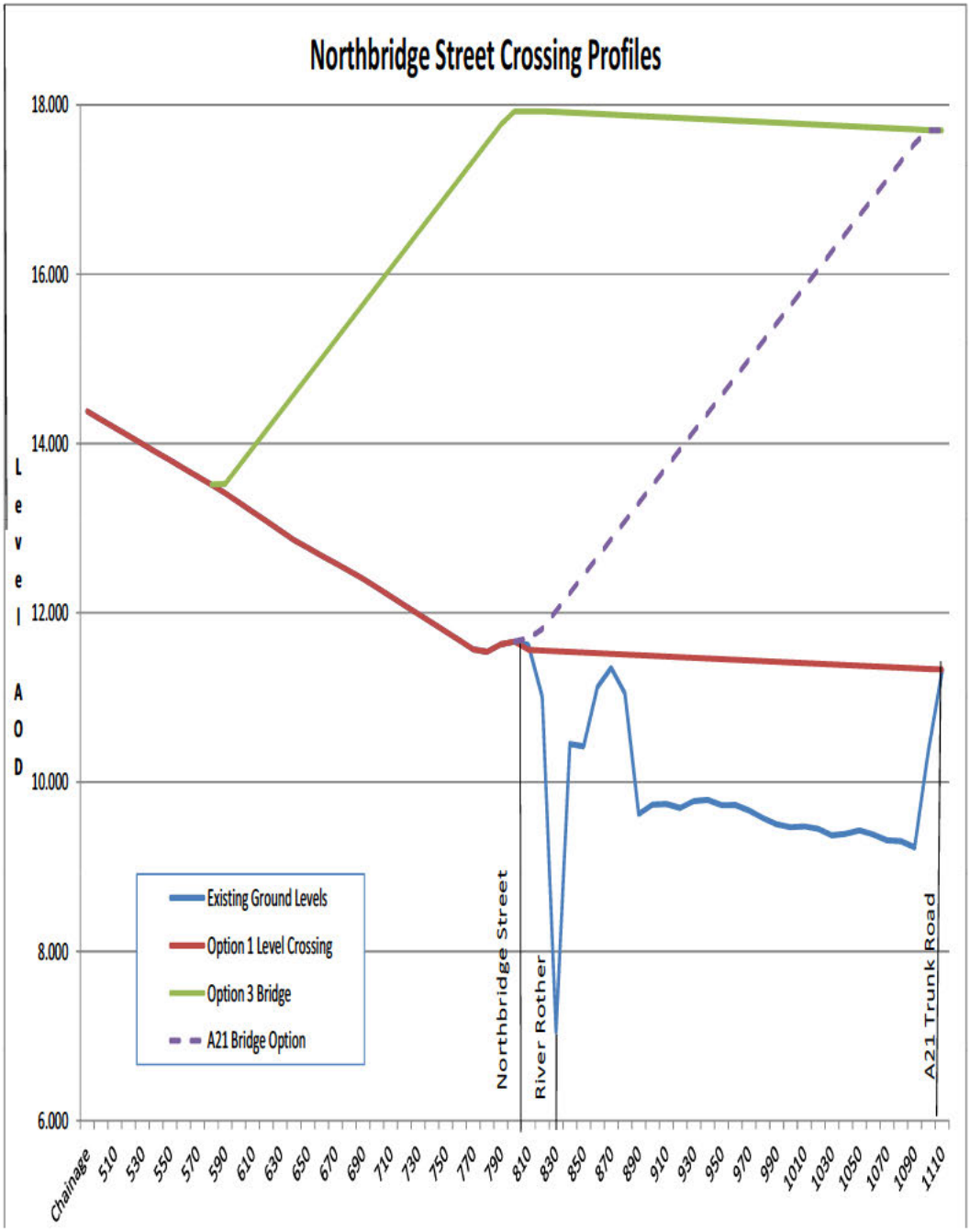
	drugs might exhibit the following behaviours: be more inclined to ignore normal crossing procedures be physically unstable and prone to slips, trips and falls be unable to focus, cognitively and visually have a lower perception of risk.				crossing (Audible/visual alarms). Education campaign. Crossing attendant (Monitoring). Traffic calming measures. Enhanced signage.			
Disabilities.	Disabilities (e.g. reduced mobility, reduced levels of vision/hearing) will influence the behaviour of users at level crossings. Visually impaired users might be unable to see warning lights and signs clearly, or scan for trains before crossing. Hearing impaired users might be unable to hear crossing alarms, train whistles, warnings from people or the sound of approaching trains. Cognitively impaired users might have difficulty understanding	3	3	9	CCTV monitoring (staff training initiatives). level crossing attendant (Monitoring) Increase the volume of the audible warning up to the maximum permitted level to make the alarm more conspicuous and potentially deter pedestrian violations. Additionally, Intelligent auditory alarm – takes account of ambient noise levels and produces alarm 5dB louder so it can always be heard clearly. Power operated barriers. Provision of flange gap filler to improve crossing	2	2	4

	and following the correct crossing procedure, or interpreting warning signs. Users with physical impairments (permanent or temporary) might encounter difficulties using level crossings of all types, but especially user worked crossings. Potential difficulties include struggling to cross within the warning time provided; being more prone to slips, trips and falls on the crossing, especially if the crossing surface is uneven or missing. Similarly, mobility scooter users might encounter problems with uneven crossing surfaces and the opening and closing gates or barriers.				surface. Provision of tactile edges (and stop lines) and clear delineation of the footway at public vehicular crossings. New modern full barrier crossing (Audible/visual alarms). Education campaign. Crossing attendant (Monitoring). Traffic calming measures. Enhanced signage.			
Incorrect mental model Incidents at level crossings could occur if the user adopts the incorrect mental model of how the crossing works.	Mental models are internal mental representations of an external reality. People develop a mental model of how to use a level crossing from their prior experience of using similar or comparable crossings (or road	3	3	9	CCTV monitoring (staff training initiatives). level crossing attendant (Monitoring) Provision of tactile edges (and stop lines) and clear delineation of the footway at public vehicular crossings.	2	2	4

	junctions), from instructions or by observing the behaviour of other users. Users familiar with the operation of one type of crossing might apply their mental model at other types of level crossing.				New modern full barrier crossing (Audible/visual alarms). Education campaign. Crossing attendant (Monitoring). Traffic calming measures. Enhanced signage.			
Fatigue	Fatigued users will be more susceptible to making errors or to taking shortcuts when crossing. Fatigue has a significant effect on human performance and the likelihood of errors. Level crossing users suffering from fatigue might miss important information (crossing warning signs, lights, etc), or be more inclined to take shortcuts in the crossing procedure (fail to use the telephone, fail to close the gates at user worked crossings, etc).	4	3	12	CCTV monitoring (staff training initiatives). level crossing attendant (Monitoring) Provision of tactile edges (and stop lines) and clear delineation of the footway at public vehicular crossings. New modern full barrier crossing (Audible/visual alarms). Education campaign. Crossing attendant (Monitoring). Traffic calming measures. Enhanced signage.	2	2	4
Signaller/CCTV Operator:	'Habit intrusion' in CCTV monitoring CCTV operatives follow	3	3	9	CCTV monitoring (staff training initiatives).	2	2	4

	habituated patterns of behaviour which might result in the entrapment or injury of crossing users at MCB and MCB-CCTV crossings. Use of level crossings is primarily covered in Local Training Plans and by the training and briefing signallers/Operators receive on communications skills. It is important local training plans cover: hazards associated with a particular crossing, how to check whether a crossing is clear. Signaller's/Operators not following the appropriate rules and protocols should be subject to additional monitoring and development plans. Inefficient CCTV scanning strategy Signaller/Operator uses an inefficient method of scanning CCTV screens. The scanning method employed by a signaller/Operator for monitoring CCTV screens will affect whether they				New modern full barrier crossing.			

	successfully identify information on the CCTV screen. Using an inefficient scanning strategy might result in the signaller/Operator taking a longer time to identify key events, or might result in them missing key events on other CCTV screens. An efficient scanning method is particularly important where there are multiple CCTV screens being monitored by one signaller/Operator, or the signaller/Operator has a high level of workload from other tasks.							
Work in or adjacent to public roadways.	Plant, equipment materials striking traffic/members of public. Traffic colliding with staff.	3	3	9	Authorised road closures and traffic management. Implement pedestrian walkways. Plant to be suitable for access to public roads. Comply with New Roads and Street Works Act and Traffic Signs Regulations.	1	1	2


Northbridge Street Crossing Profiles
18.000
16.000
14.000
12.000
10.000
8.000
6.000
Level AOD
Existing Ground Levels
Option 1 Level Crossing
Option 3 Bridge
A21 Bridge Option
Northbridge Street
River Rother
A21 Trunk Road
Chainage
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670
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710
730
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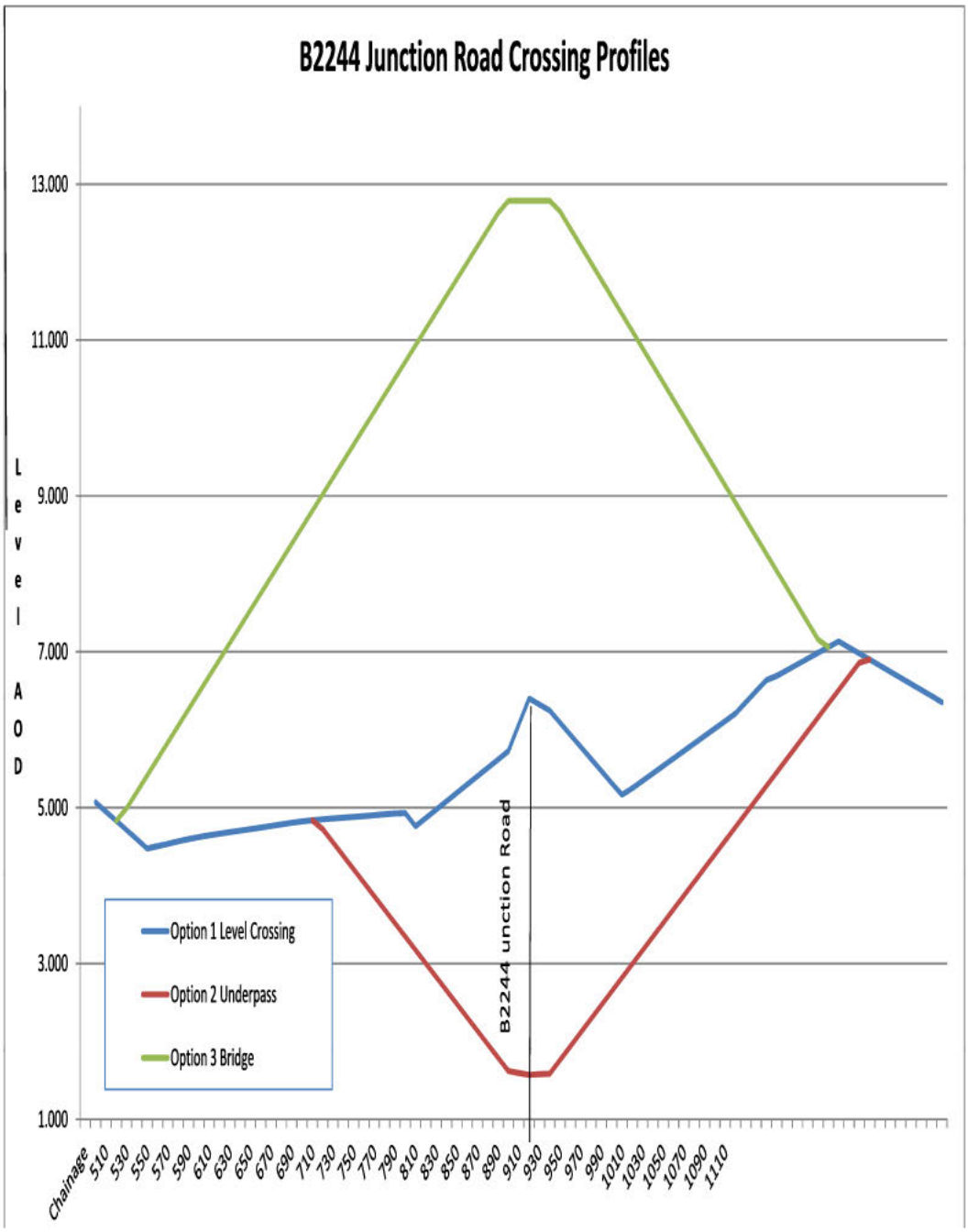
B2244 Junction Road Crossing Profiles
13.000
11.000
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7.000
5.000
3.000
1.000
Level AOD
Option 1 Level Crossing
Option 2 Underpass
Option 3 Bridge
B2244 unction Road
Chainage
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