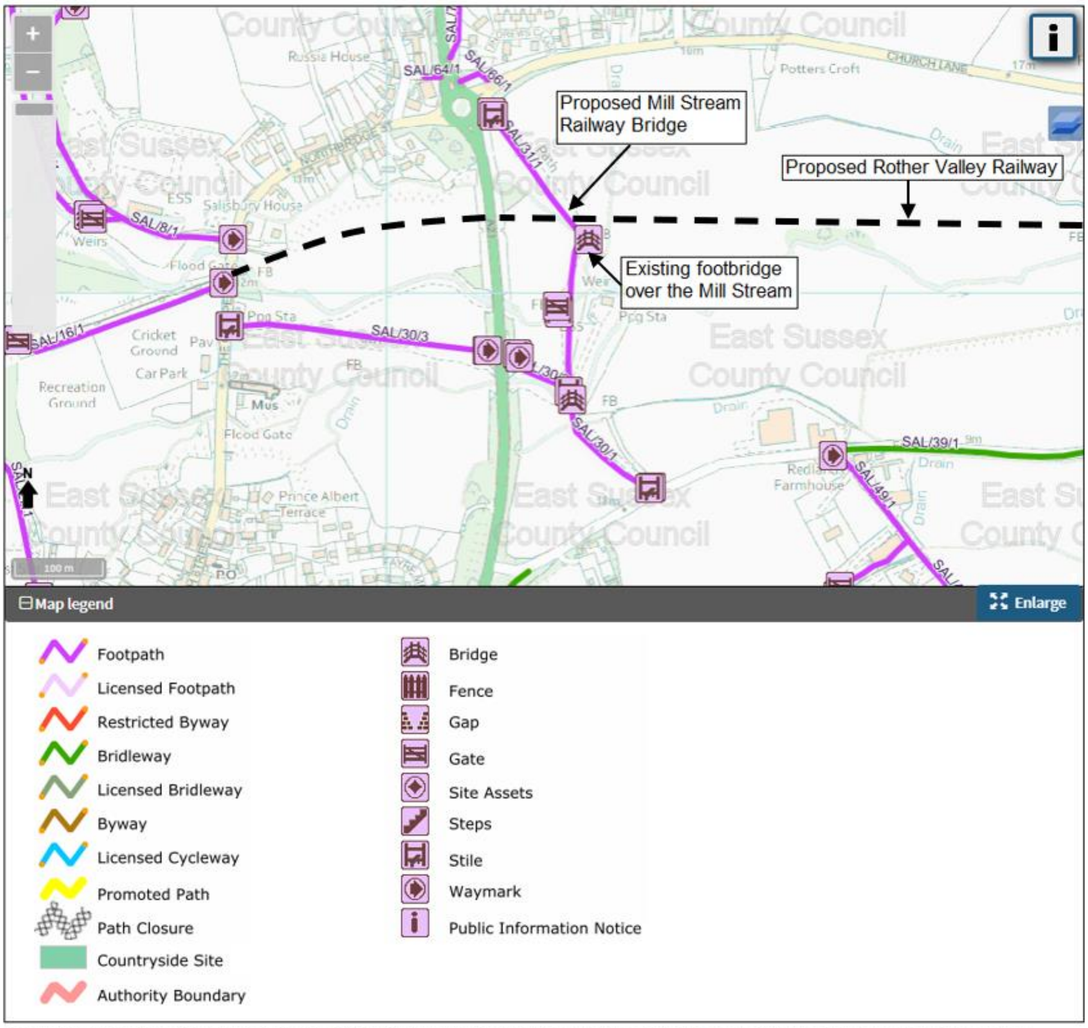
Rother Valley Railway
Technical Note: Flooding to footpath SAL/31/1 diversion

1. Introduction

1.1.1 The proposed reinstatement of the Rother Valley Railway between Robertsbridge and Udiam, includes the proposal to divert footpath S&R 31 (referred to in this note as SAL/31/1) under a new bridge (No.12) to be built across the Mill Stream downstream of the A21. The existing footpaths are shown on the Public rights of way map available on the East Sussex County Council webpage[1], which has been reproduced and annotated in **Figure *1***.

Figure 1: Location of Footpath SAL/31/1 relative to the railway and Mill Stream



[1] https://row.eastsussex.gov.uk/standardmap.aspx

1.1.2 Options for provision of the footpath have been considered by RVR and will be finalised as part of detailed design in consultation with East Sussex County Council. Consultation with the Environment Agency will also be required regarding the design of the Mill Stream bridge and footpath.

1.1.3 Options for the diversion of the footpath are outlined in the note produced by RVR (Rother Valley Railway Transport & Works Act Order, Footpath Diversion S&R 31, July 2021). A technical note prepared by Mr Sreeves (July 2021) and an updated design drawing (RVR-UB12-001c 2021-07-10) describe how the footpath can be designed with a higher, 0.85m wide ledge to enable passage on the occasions the lower path floods.

1.1.4 This technical note assesses the frequency of flooding to the existing path and to the proposed diversion of footpath SAL/31/1.

1.1.5 The frequency of flooding assessment has been based upon ground levels (LIDAR and river cross section survey, where available), results from the flood modelling and Peaks over Threshold (POT) data from the River Rother gauge at Udiam (Station ID 40004).

1.1.6 The assessment of the frequency of flooding indicates that where the existing footpath crosses the Mill Stream, it floods on average one to two times a year. With the inclusion of a dual-level footpath under the proposed railway bridge this frequency of flooding and inconvenience to users is not increased. The frequency of flooding to the raised ledge will also be on average one to two times a year.

1.1.7 The lower section of the proposed diverted footpath under the railway bridge is anticipated to flood two to three times a year on average. This is an increase in frequency of once a year on average from the current situation. However, this is mitigated by the higher section of the footpath (raised ledge with head clearance of 1.8 m). The higher section will be available to provide a route for users when the lower path is flooded, but water levels have not reached the level at which the existing footpath and raised ledge will flood. As such the inconvenience to users is not increased from the current situation.

1.1.8 The lower level path is provided to offer users a passageway that is compliant with headroom and width standards for use most of the time. The upper level ledge would only be used on average during just one single flood event per year when the lower path below the bridge is inundated but the remainder of SAL/31/1 is accessible. For that single occasion a small reduction in headroom and width can be tolerated without causing undue inconvenience, while at the same time maximising the cross section below the bridge for water flow. The reduced headroom of 1.8m, with warning signs, is not greatly different to many canal towpath bridges, and some existing well used paths have headroom considerably less than this, as outlined in the technical note prepared by Mr Sreeves (July 2021).

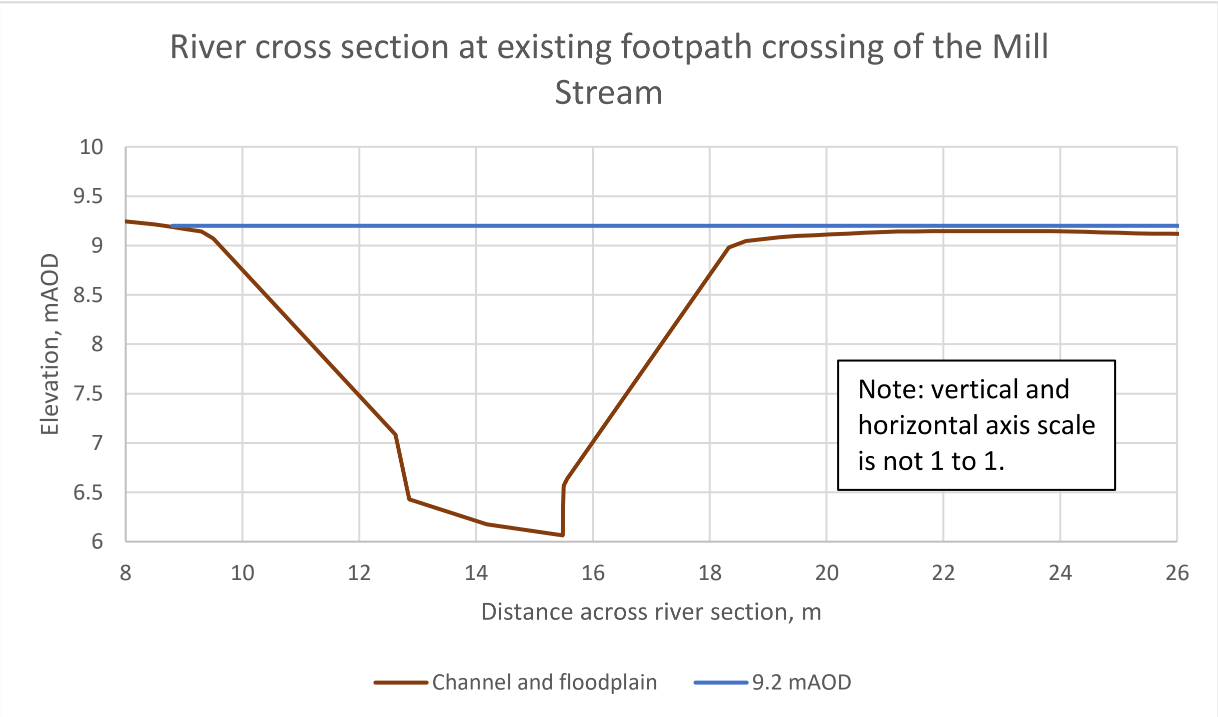
2. Assessment of frequency of flooding

2.1.1 The assessment of the frequency of flooding to footpath SAL/31/1 has been based upon ground levels (LIDAR or river cross section survey, where available), results from the flood modelling and Peaks over Threshold data from the Udiam gauge (data recorded between 1963 and 2019).

2.1.2 The water levels in the Mill Stream in the vicinity of the propose railway are influenced by the water levels and flow in the River Rother at the confluence downstream of the proposed railway bridge.

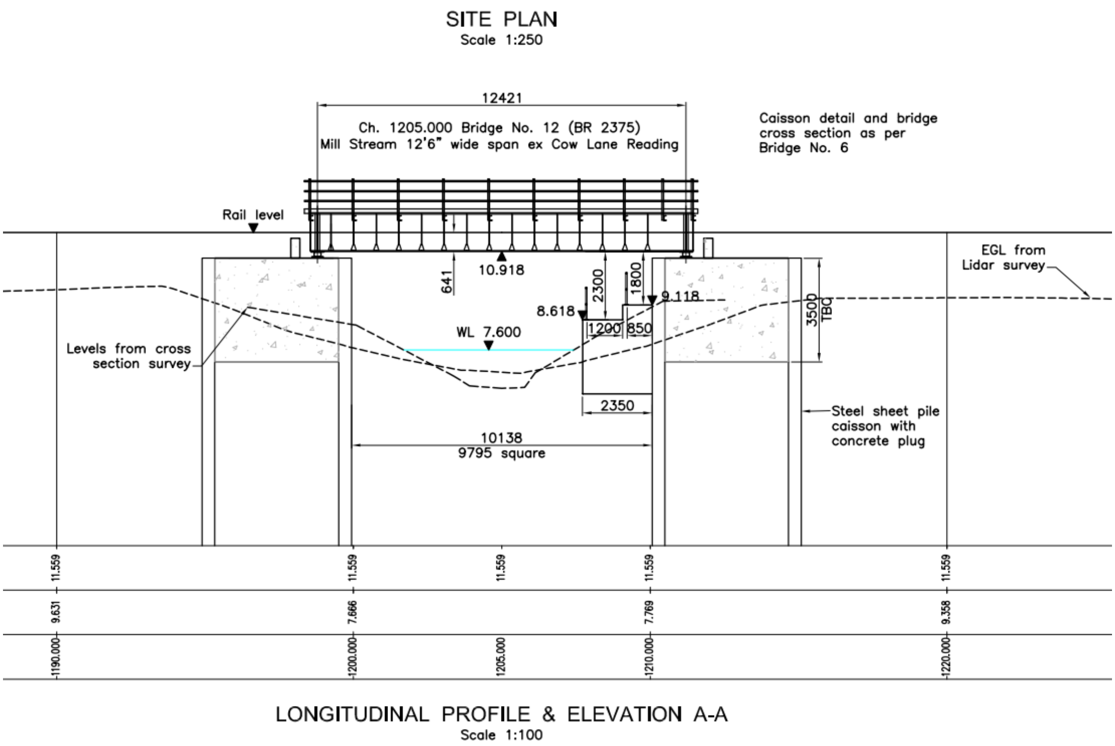
2.1.3 The river cross section in the vicinity of where the footpath SAL/31/1 currently crosses the Mill Stream is shown in **Figure *2***. Based on LIDAR it is estimated that the river bank is at a level of between 9.1 and 9.2 mAOD. Therefore, it is anticipated flooding to the existing footpath SAL/31/1 occurs once the water level reaches approximately 9.2 mAOD.

Figure 2: River section at footpath crossing Mill Stream



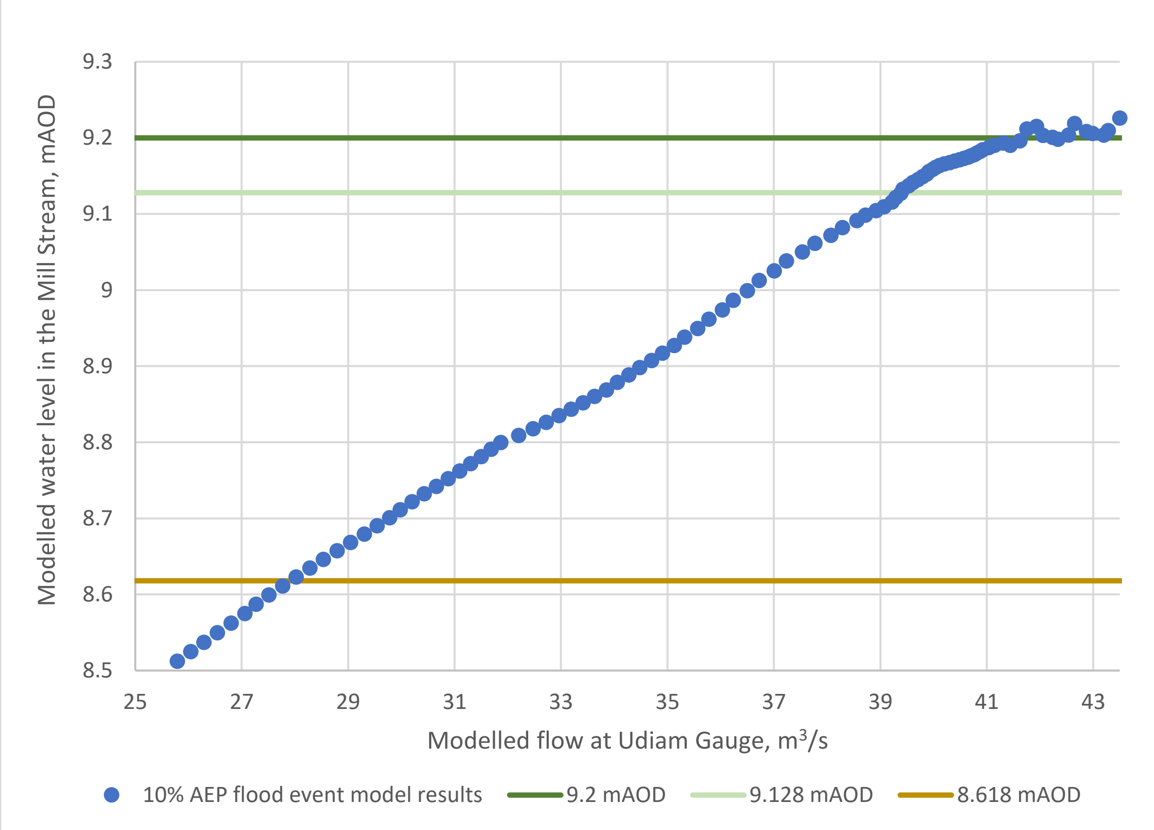
2.1.4 The current design drawings of the dual-level footpath under the proposed railway show the footpath set at a level of 8.618 mAOD (lower section of path) and 9.118 mAOD (raised ledge). This is shown in Figure 3, which has been taken from drawing RVR-UB12-001c (2021-07-10).

Figure 3: River section at footpath crossing Mill Stream



2.1.5 The frequency at which water levels exceed the existing and proposed footpath levels was assessed using peaks over threshold data from Udiam gauge. The gauge is located downstream of Junction Road (B2244). The modelled flows at Udiam were correlated with the water levels in the Mill Stream using model results as shown in Figure 4.

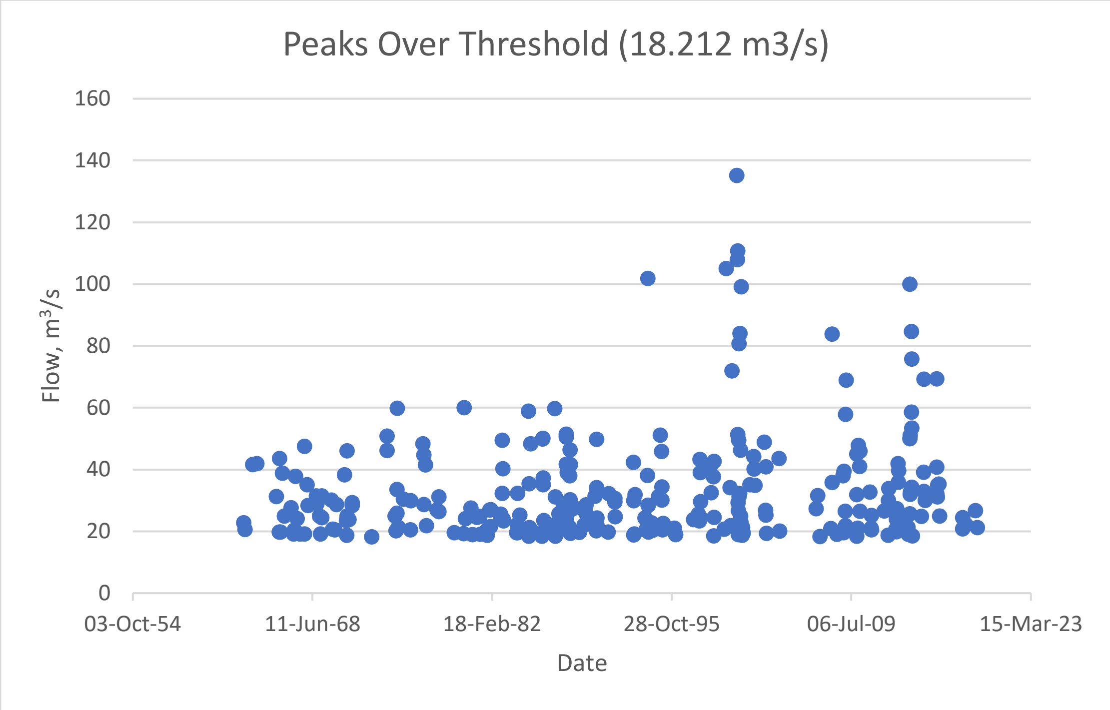
Figure 4: Relationship between modelled flows at Udiam and water levels in the Mill Stream



2.1.6 The relationship between flow at Udiam gauge and water level in the Mill Stream, was used to determine threshold flows (at Udiam) at which the water levels in the Mill Stream are expected to exceed the existing and proposed footpath levels. These are shown in Table *1*.

2.1.7 The peaks over threshold (POT) data includes recorded flows at Udiam above 18.212 mAOD between 1963 and 2019 (**Figure *5***). Due to periods of missing data between 1963 and 1977, this early part of the record was not included in the analysis.

Figure 5: Peaks over Threshold at Udiam gauge



2.1.8 The POT data was analysed to determine how many times the water levels at the Mill Stream were likely to have exceeded 8.618 mAOD (lower level of diverted footpath), 9.118 mAOD (level of raised ledge section of diverted footpath), and 9.2 mAOD (level at which the existing footpath is assumed to flood) based on recorded flows at Udiam. The threshold flow at Udiam used to assess frequency for each location/level, the results and the average frequency of flooding per year are shown in Table *1*.

Table 1 Frequency of flooding

Location	**Footpath Elevation, mAOD**	**Derived threshold flow at Udiam, m^3/s**	**Estimated number of times water levels exceeded footpath elevation since 1977**	**Average number of times footpath flooded per year[2]**
Mill Stream Railway Bridge, lower section of diverted footpath	8.618	28.0	114	Two to three
Mill Stream Railway Bridge, upper ledge section of diverted footpath	9.118	39.4	57	One to two
Existing footpath, level at which assumed to flood based on bank levels	9.2	41.6	57	One to two

[2] The frequency of flooding was sensitivity tested using flows within +/- 5% of the threshold flow specified.

2.1.9 The results demonstrate the frequency of flooding to the upper ledge section of diverted footpath will remain the same as the frequency of flooding to the existing footpath.

3. Flooding to footpath SAL/31/1

3.1.1 The current route of footpath SAL/31/1 is in a southeast direction from the A21 Northbridge Street roundabout to the footbridge where it crosses the Mill Stream. The footpath continues south crossing the River Rother. It meets with footpath SAL/30/2 (from the west) before crossing the River Rother bifurcation which carries flow from the Darwell Stream. From this location the footpath continues south as footpath SAL/30/1 to Redlands Lane. The footpaths are shown on the Public rights of way map available on the East Sussex County Council webpage[3], which has been reproduced and annotated in **Figure *1***.

3.1.2 The frequency of flooding to footpath SAL/31/1 where it crosses the Mill Stream is assessed as being one to two times per year on average based on the available information. This assumes the existing footpath will flood adjacent to the Mill Stream in the vicinity of the existing footbridge crossing once water levels in this area are approximately 9.2 mAOD.

3.1.3 The gauge data indicates that flooding along the River Rother generally occurs between September and March. The duration of flooding is dependent upon the severity and duration of the flood event. For example, based on the model results for design flood event with a 50% AEP the water levels in the Mill Stream will be above 9.1 mAOD for approximately 10 hours. Whereas in a more severe, less frequent event, such as 10% AEP deign flood event, water levels will be above this level for approximately 28 hours.

4. Frequency of flooding to proposed diversion of footpath SAL/31/1 under the proposed Mill Stream railway bridge

4.1.1 The frequency of flooding to the footpath following its diversion under the proposed railway has been assessed based on the proposed footpath levels of 8.618 mAOD (lower section of path) and 9.118 mAOD (raised ledge). These are the levels shown in design drawing RVR-UB12-001c (2021-07-10)

4.1.2 The proposed dual-level path under the railway should allow for the current usability of footpath SAL/31/1 to be maintained once it is diverted, due to the raised ledge

[3] https://row.eastsussex.gov.uk/standardmap.aspx

being at a similar level to the level at which it is anticipated the footpath currently floods adjacent to the existing Mill Stream footbridge.

4.1.3 The lower section of the diverted footpath under the railway bridge is anticipated to flood two to three times a year on average. However, the higher section of the footpath (raised ledge with reduced head clearance) will be available, such that the inconvenience to users caused by flooding is not increased from the current situation of the footpath flooding on average one to two times a year.

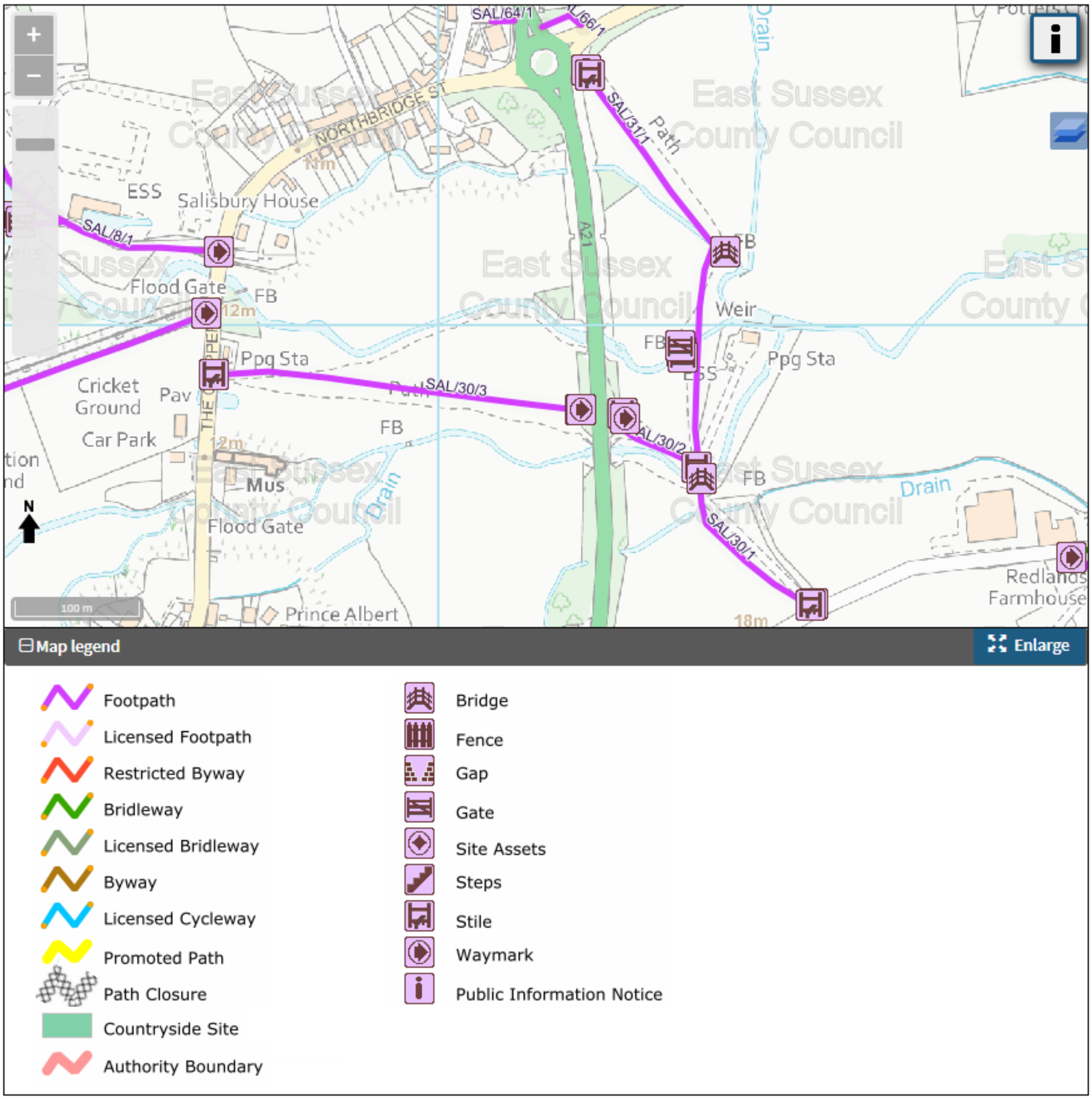
5. Alternative route options

5.1.1 The proposed dual-level path under the Mill Stream railway bridge will not increase the frequency at which footpath users will need to find an alternative route. The proposed railway does not increase the frequency or duration at which the existing footpaths in the valley will flood. The inconvenience to users by having to take longer routes during times of flood is unchanged from the present situation.

5.1.2 The frequency of flooding to the existing footpath SAL/31/1 means that on average, one to two times a year, users of the footpath currently need to find alternative routes. The alternative routes are described below. It is not guaranteed that these routes will be accessible on every occasion as some of the footpaths and bridleways are located within the River Rother floodplain.

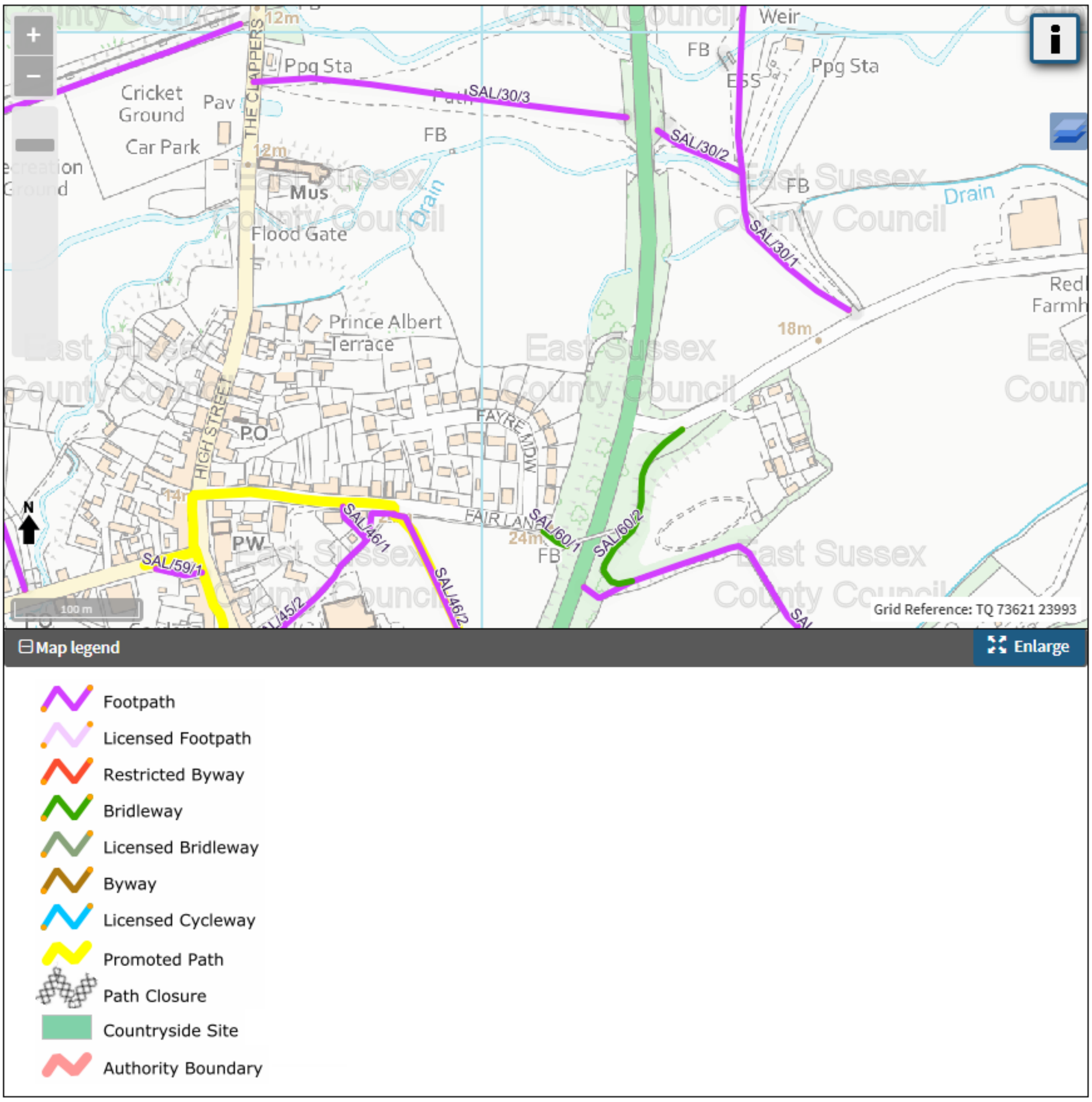
5.1.3 When SAL/31/1 is not accessible due to flooding in the vicinity of the existing footbridge, and at the diversion under the proposed railway, alternative routes are available. The shortest alternative route, and preference if traveling north from Redlands Lane, is to use footpath SAL/30/2, footpath SAL/30/3, The Clappers and Northbridge Street to reach the A21 roundabout (see Figure 6). This route is less than 900m.

Figure 6: Alternative footpaths and route to the west of SAL/31/1



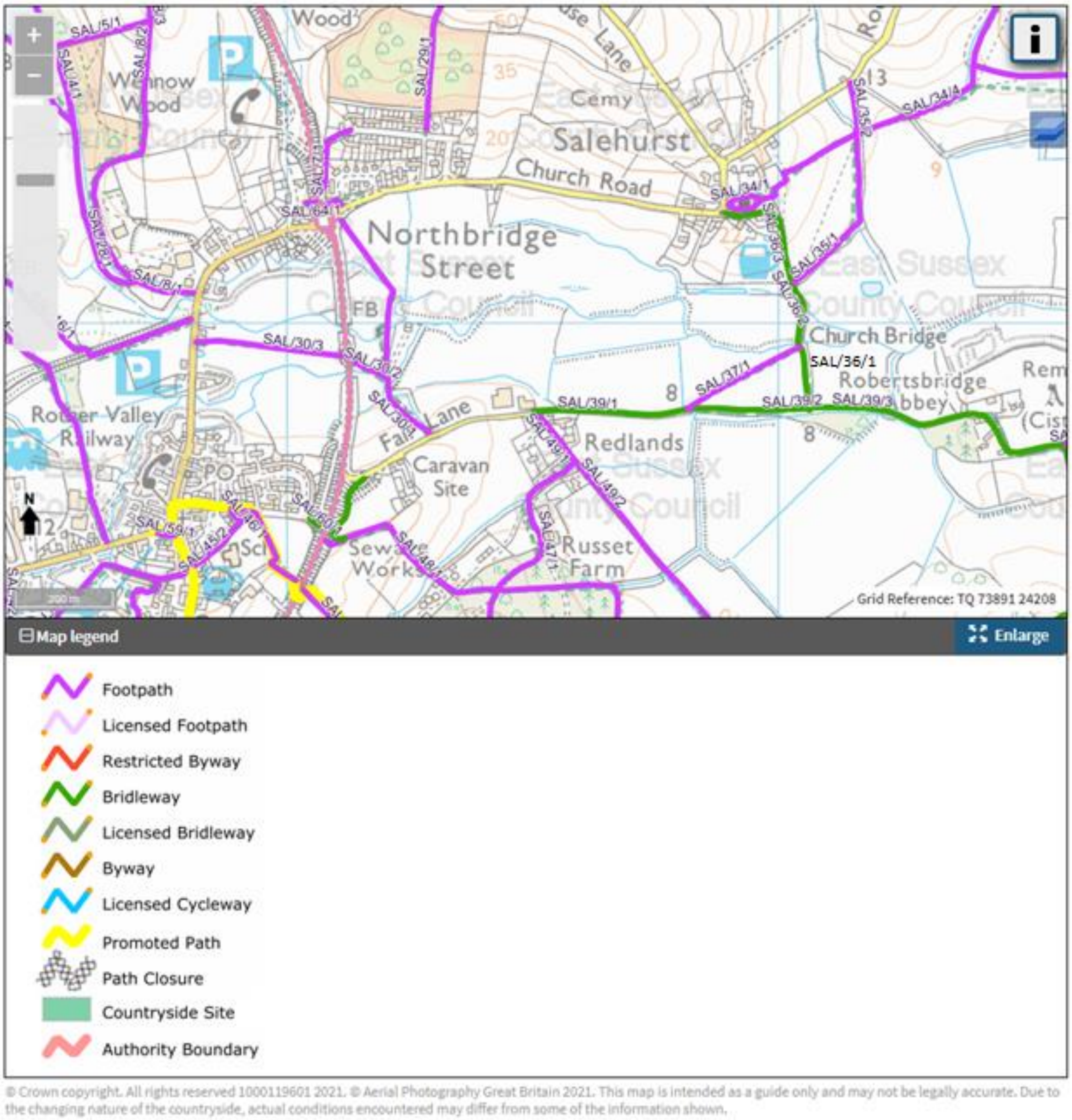
5.1.4 During larger flood events footpath SAL/30/3 is predicted to be inundated between the Clappers and the A21. In these circumstances' when users are impeded by flooding to SAL/31/1 and SAL/30/3, but SAL/30/1 remains accessible, users approaching from the south can return to Redlands Lane. Bridleway SAL/60/2 at the west end of Redlands Lane can be used to access a footbridge over the A21. Bridleway SAL/60/1 takes users to Fair Lane, from which Robertsbridge High Street can be accessed. The Clappers is located to the north of the High Street. The Clappers and Northbridge Street enable users to reach the A21 roundabout at Northbridge Street (see Figure 7). This alternative route is approximately 1.2 km longer than the direct route between the A21 roundabout and Redlands Lane (SAL/31/1 and SAL/30/1) which is approximately 0.5 km.

Figure 7: Alternative footpaths to the south when SAL/30/3 is flooded



5.1.5 An alternative route for footpath users travelling from the south and heading to a destination to the east is available via bridleway SAL/39/1 at Redlands Lane (shown as Fair Lane on the map below) and footpath SAL/37/1, which joins bridleway SAL/36/2. Bridleway SAL/36/2 crosses the River Rother and continues north towards Salehurst (see Figure 8). Flooding is predicted to bridleway SAL/36/1 and footpath SAL/37/1 in the 50% AEP design flood event between Redlands Lane and the River Rother.

Figure 8: Alternative footpaths to the east when SAL/30/3 is flooded



5.1.6 If travelling from the north along SAL/31/1 and heading to a destination to the east, there are no alternative footpaths north of the river to travel in an easterly direction, should footpath SAL/31/1 be flooded. User of the footpath would either need to take an alternative route through Northbridge Street or they may decide to use Church Lane if travelling east and join up with bridleways SAL/36/3 and SAL/36/2 to cross the River Rother.

5.1.7 During flood events the footpaths and bridleways within the River Rother floodplain are currently and will continue to be at risk of flooding. The alternative routes suggested here may not be accessible depending of the severity of any given flood event.

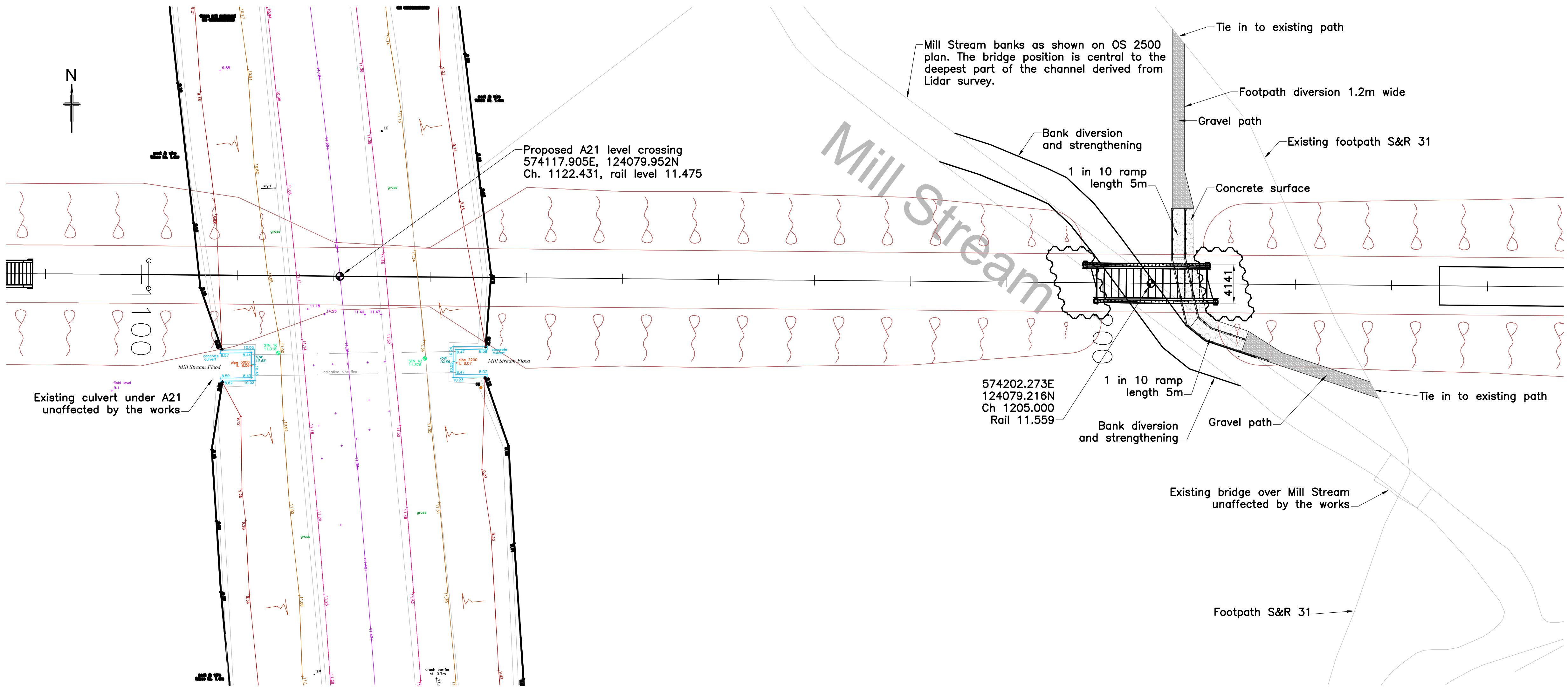
6. Conclusion

6.1.1 Design options have been considered to minimise the inconvenience to users of footpath SAL/31/1 once diverted under the proposed Mill Stream railway bridge.

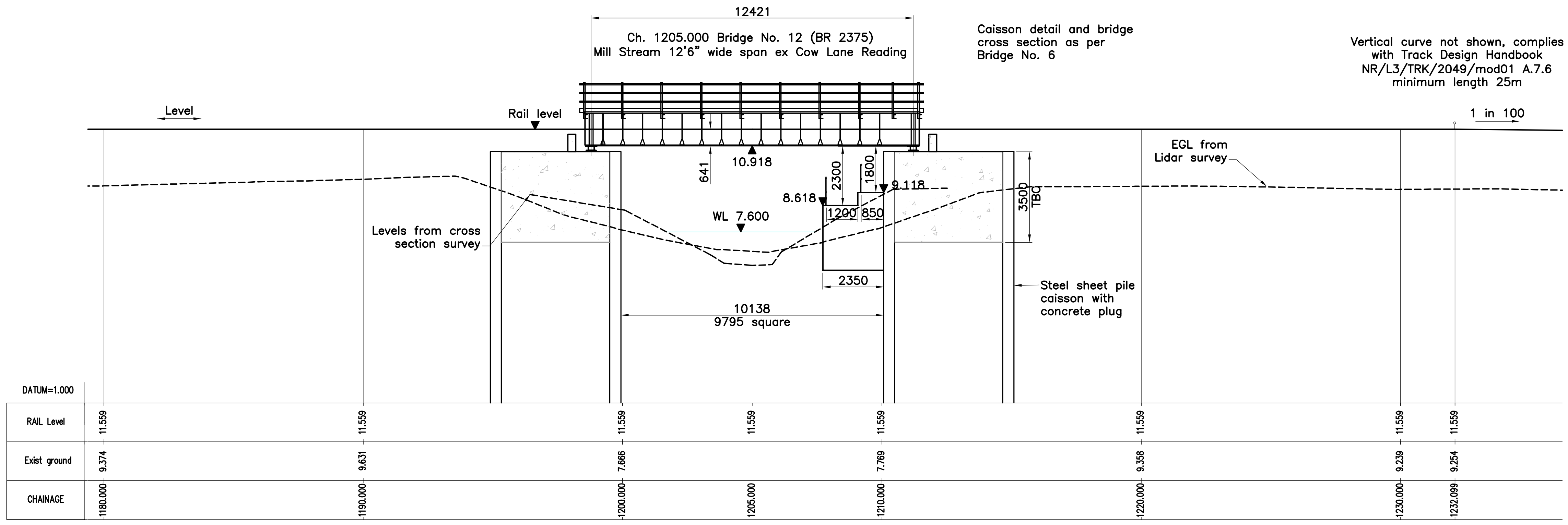
6.1.2 An assessment of the frequency of flooding indicates that the existing footpath floods on average one to two times a year. With the inclusion of a dual-level footpath under the proposed railway bridge this frequency of flooding and inconvenience to users is not increased.

6.1.3 The lower section of the diverted footpath under the railway bridge is anticipated to flood two to three times a year on average. This is an increase in frequency of once a year on average. This is mitigated by the higher section of the footpath (raised ledge with reduced head clearance). The higher (raised ledge) section will be available to provide a route when the lower path is flooded, but water levels have not reached the level at which the existing footpath and raised ledge will flood. As such the inconvenience to users is not increased from the current situation.

6.1.4 This assessment has demonstrated that there is a viable design solution that maintains the current usability of the footpath with regards to frequency of flooding.



SITE PLAN
Scale 1:250



LONGITUDINAL PROFILE & ELEVATION A-A
Scale 1:100

NOTES

1 Imperial measurements are exact and take precedence over metric.

2 .

1:250 — 5 0 5 10m
1:100 — 2 1 0 2 4m
1:50 — 1 0 1 2m

Revision	By	Checked	Approved	Date	Description
C	JCS	-	-	10.7.21	Footpath diversion under bridge

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Project
ROTHER VALLEY RAILWAY

Drawing
MILL STREAM BRIDGE
SITE PLAN

Drawn by JCS — Date: 10/07/2021
Checked by - — Date: -
Authorised by - — Date: -

Drawing No. RVR - UB12 - 001 — Revision C

Drawing Scale: 1:25, 12.5 at A1
CAD Filename: - — Plot Scale: 1:1

FILE STORAGE PATH =
XREF STORAGE PATH =
ORIGINATING DEPT = HTI - BP
PLOT DATE = 10/07/2021

Drawing file path & name : C:\Users\sreevesjc\Documents\Private\KESR\Bridge 12\ RVR-UB6-001-UB12-001 2021-07-10.dwg
User and Plot Date : SreevesJC : 11 Jul 2021 - 6:58 am

Rother Valley Railway Transport & Works Act Order
Footpath Diversion S&R 31

Approved Scheme

At planning application stage, ESCC Footpaths Officer and Ramblers Association were consulted over the impact of the proposed railway reinstatement on footpath S&R 31.

Following consultation, RVR proposed that the footpath would be diverted using a new bridge No 12 to be built *over* the Mill Stream but passing *under* the railway. This scheme was shown on drawing RVR-UB12-001 FP ("the Approved Scheme").

In its grant of planning permission Rother DC included a list of approved drawings, including RVR-UB12-001 FP (attached).

Flooding of Approved Scheme

Without the reinstatement of the railway, S&R 31 is flooded from time to time during flood events in the Rother Valley. Under the Approved Scheme there would be occasions when the footpath is subject to flooding only where it passes under the railway although, during severe flood events, other parts of the footpath would be flooded as now.

RVR has reviewed the consequences of this flooding and has identified a number of possible options for the railway crossing at this location which it is considered may be delivered without the need for further land or material modification to the proposed TWAO. These are outlined below:

Options

1. The Approved Scheme remains unchanged with the addition of depth indicator gauges each side of the bridge with a warning about flooding and indicating the alternative routes available to users.

2. Instead of the Approved Scheme, a user-worked footpath over the railway is provided between the points shown on the Order plans adjacent to proposed farm accommodation crossing – as discussed by Mr Raxton during his appearance at the Inquiry. This would require a modification of the TWAO to make the temporary diversion route of the footpath a permanent at-grade crossing.

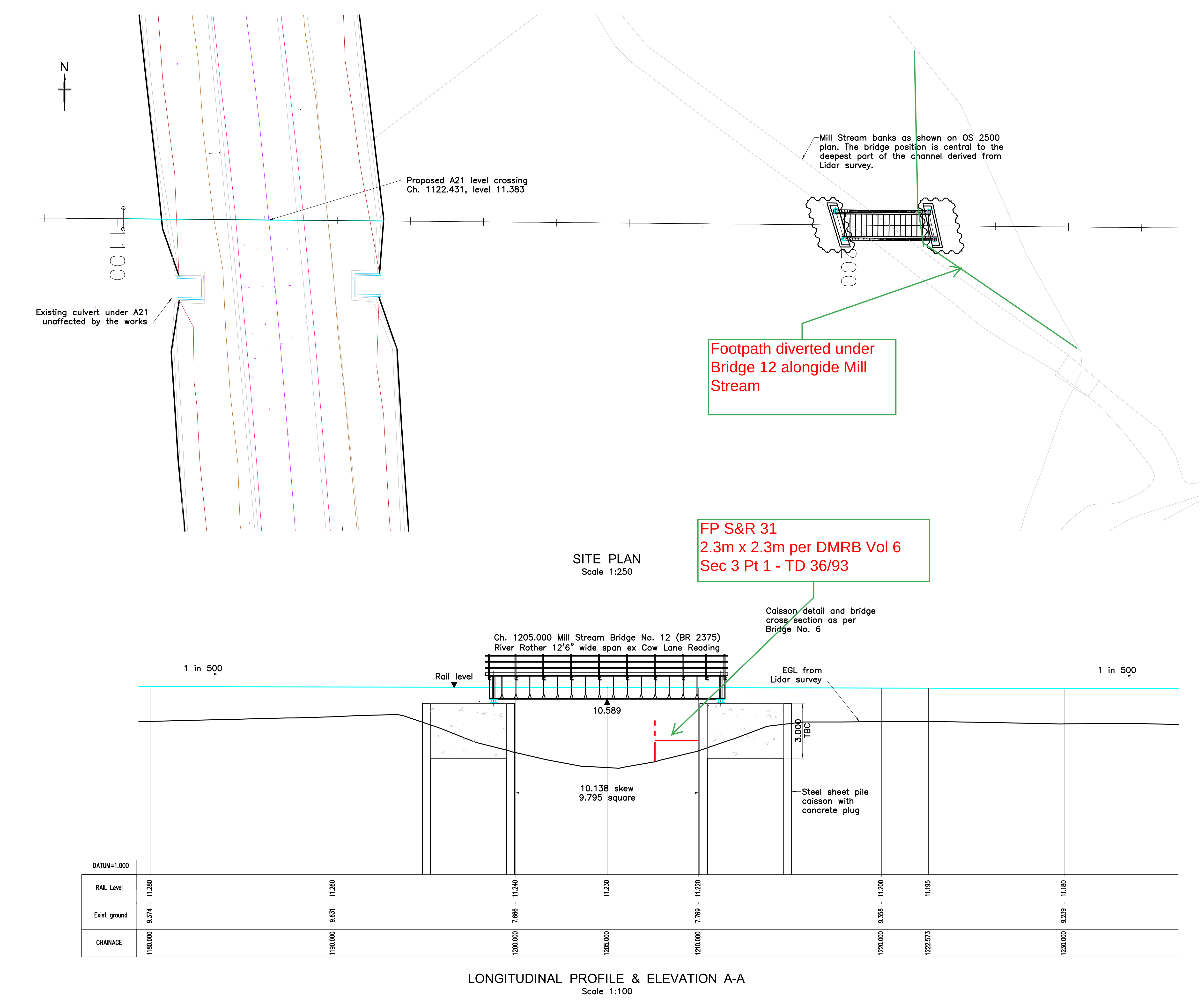
3. An additional reduced headroom footpath is provided under the railway for use when the lower level is flooded. This keeps the footpath open up to the point when it is flooded elsewhere. A headroom of 1.8m will enable users to pass under the bridge with a handrail between the upper and lower level paths.

4. Provide a floodwall on the stream side of the footpath to keep the stream out. Provide a drainage sump under the footpath with float operated discharge to remove the water when flooded from the footpath. This is reliant on a reliable power supply and electric pump for a system that will be used very rarely.

Preferred Option

Option 3 is the preferred option and is currently being worked up for discussion with the local highway authority.

17 July 2021



NOTES

1 Imperial measurements are exact and take precedence over metric.

2 .

1:250 — 5 0 5 10m
1:100 — 2 1 0 2 4m
1:50 — 1 0 1 2m

Revision	By	Checked	Approved	Date	Description

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Project
ROTHER VALLEY RAILWAY

Drawing
MILL STREAM BRIDGE
SITE PLAN

Drawn by JCS — Date: 10/10/13
Checked by - — Date: -
Authorised by - — Date: -

Drawing No. — Revision
RVR - UB12 - 001 FP -

Drawing Scale: 1:25, 12.5 at A1
CAD Filename: - — Plot Scale: 1:1

Drawing file path & name :
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User and Plot Date :

FILE STORAGE PATH =
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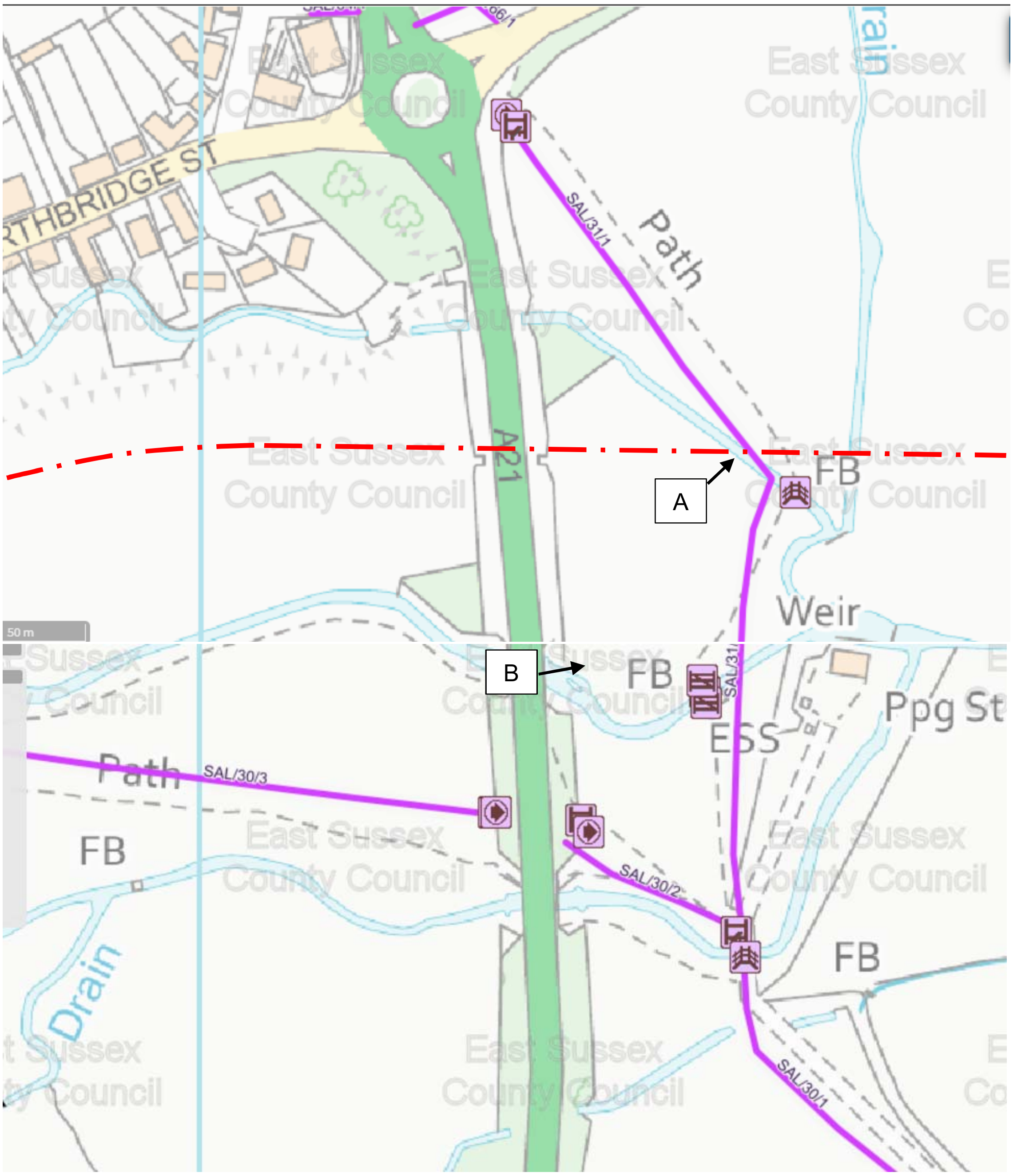
ORIGINATING DEPT = HTI – BP
PLOT DATE = 10/10/13

Rother Valley Railway Transport & Works Act Order
Footpath Diversion S&R 31

Location

Footpath reference S&R 31 (also known as SAL/31/1) runs from a point near the A21 Northbridge Street roundabout in a direction southeast, then south parallel to and east of the A21 trunk road, joining SAL/30/2 and SAL/30/1. https://row.eastsussex.gov.uk/standardmap.aspx. The alignment of the proposed Rother Valley Railway is shown by a red line. Bridge No. 12 is proposed at point A where the railway will cross a minor watercourse known as Mill Stream. The footpath crosses the same watercourse by a footbridge 34m away in a direction south east of the proposed railway bridge.



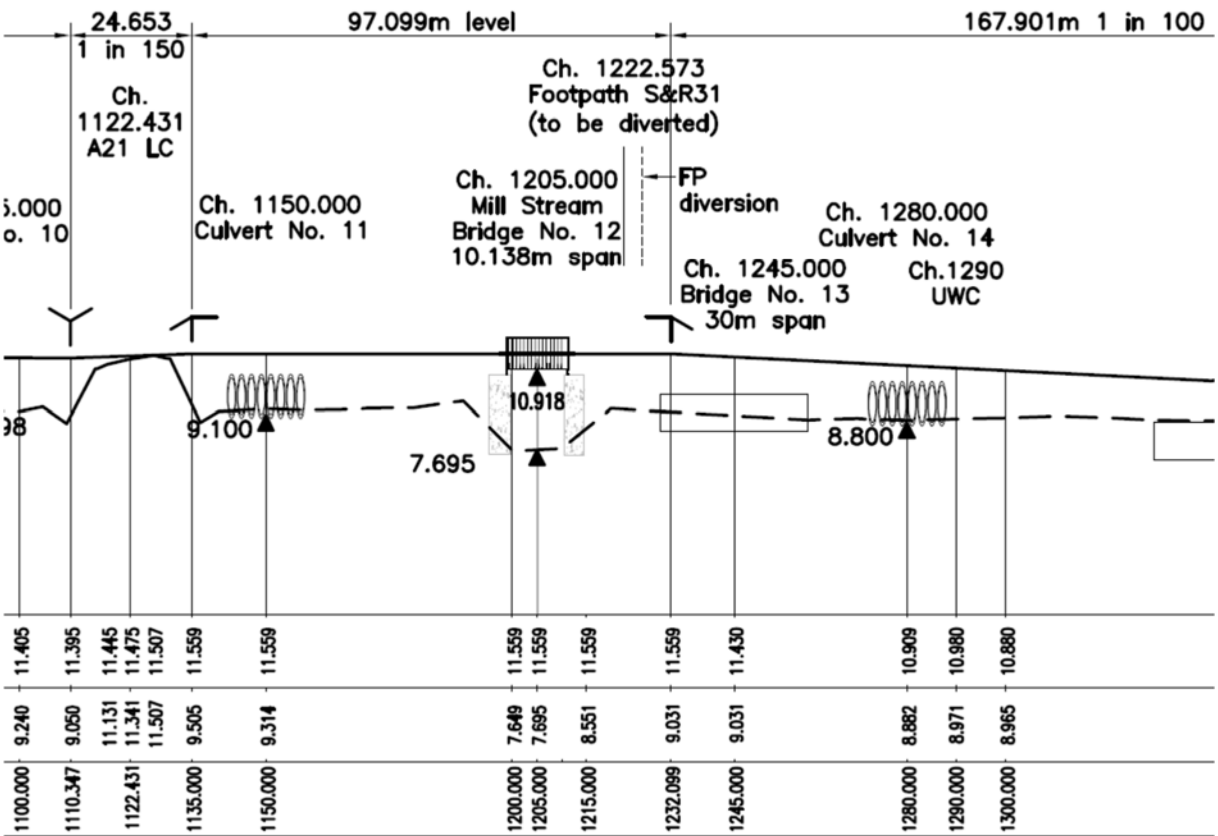
The land is flat and uncultivated with the footpath crossing several stiles and footbridges. The typical nature of the terrain can be seen below, as viewed from point B on the A21. The footbridge over the River Rother is visible, the railway will be on embankment to the left of the view.

To minimise potential conflicts between footpath users and trains, as well as avoiding the need for more gates to be negotiated by users, it is proposed to divert the footpath below the railway bridge, alongside the east bank of Mill Stream.

Railway Vertical Profile

The vertical profile of the railway is constrained by a high point at the level crossing road level at the A21, then continues eastwards on a falling gradient. The gradient profile is optimised to minimise volume of fill required and land footprint, while maintaining sufficient clearance for various flood culverts.

To maximise headroom below Bridge 12, the railway will continue level at 11.559 eastwards from the A21 before descending at 1 in 100. By this means a soffit level of +10.918 is achievable.



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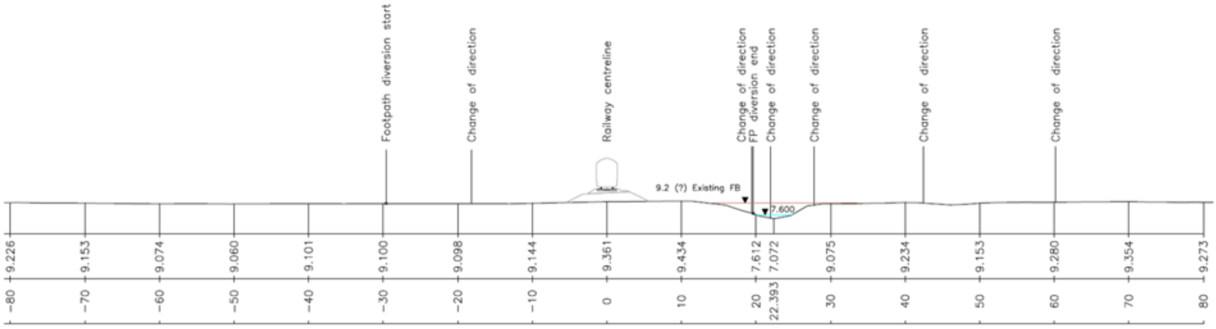
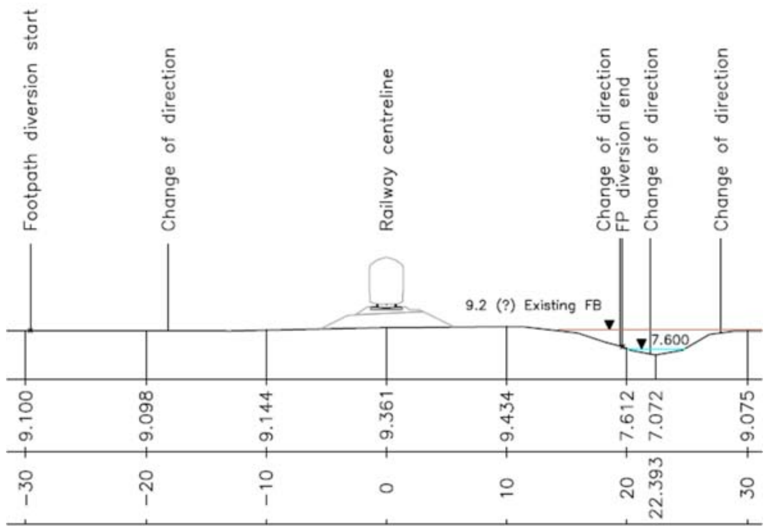
Mill Stream Bridge

The proposed bridge is a half-through steel girder bridge recovered from Reading Cow Lane. The span is 12.421m between bearing centres, with a width of 4.141m across the bottom flanges and a deck thickness of 0.641m. There is a skew of 12.4° anticlockwise as viewed in plan, somewhat less than the skew of Mill Stream, but the excess span can readily accommodate both Mill Stream and the width of the public footpath with steepening of the bank sides directly below the bridge.

Existing Public Footpath Profile

The profile below shows the existing footpath surface 80m either side the railway, derived from the Lidar survey. The path surface varies between +9.060m and +9.434m. These levels are interpolated from a 2m grid so any isolated high and low points may be missed (the second image is an enlargement).





The normal water level in Mill Stream is 7.60m. When the flood water rises to above +9.1m, parts of the footpath become impassable. Therefore, there is no necessity to provide a diversion path below the bridge that is higher than the level at which the path leading to it becomes impassable.

Design Standards for Footpath Diversion

To avoid unnecessary over-design and urbanisation it is suggested that the guidelines issued by Fieldfare Trust are followed. These allow for disabled access.
https://www.pathsforall.org.uk/mediaLibrary/other/english/countryside-for-all-guide.pdf

For the diversion, the third category is appropriate, defined as 'Rural and working landscapes; for example, farmland and woodland with public rights of way'. The design standards are shown in the table on the following page:

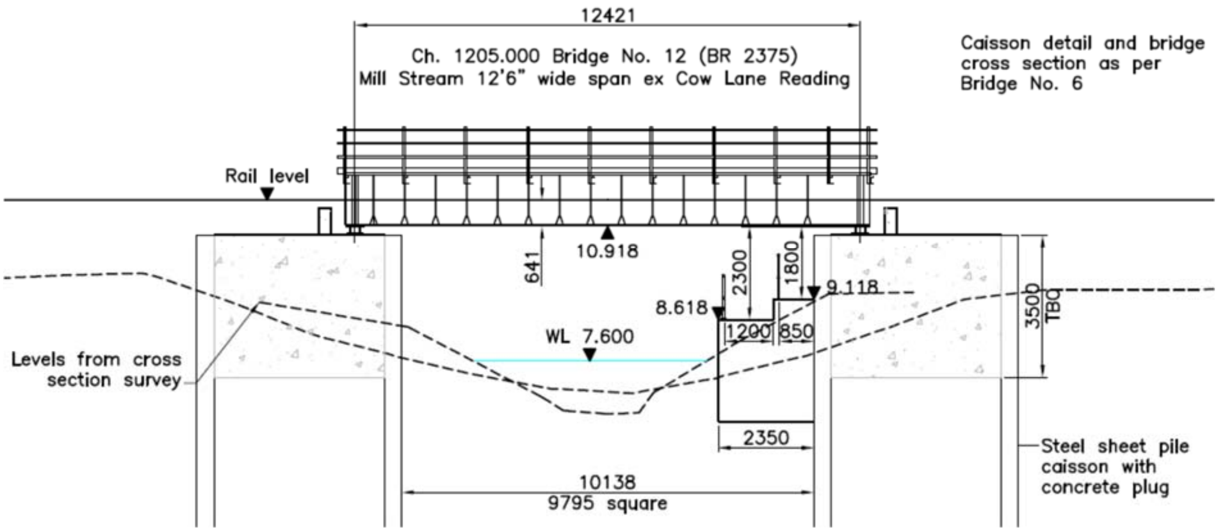
Table 1 BT Countryside for All Accessibility Standards

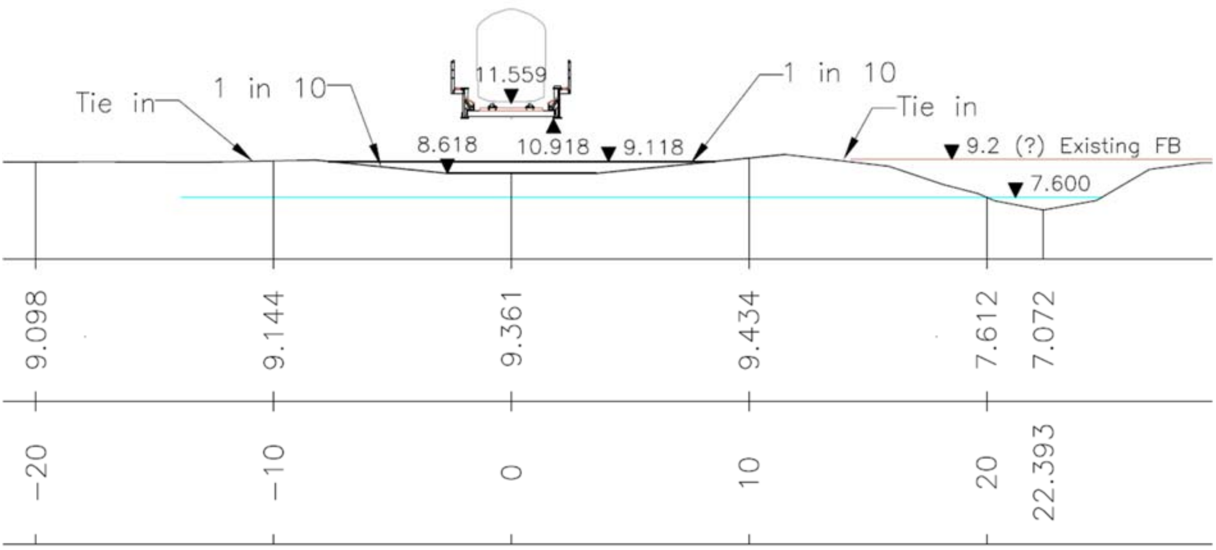
	Path Surfaces (see note 1)	Path Widths (see note 2)	Width restrictions (see note 3)	Barriers (see note 4)	Maximum distances between passing places (see note 5)	Maximum distances between rest areas (see note 6)	Maximum steepness of ramps (see note 7)	Maximum height rise between landings on ramps steeper than 1:20 (see note 8)	Maximum slope across a path (see note 9)	Maximum step levels (see note 10)	Surface breaks (grills, board-walks) (see note 11)	Clear walking tunnels (see note 12)
Urban and formal Landscapes For example countryside areas with a lot of man-made features	Hard, firm and smooth surface with very few loose stones and none bigger than 5mm	1200 millimetres (millennium Miles)	At least 815mm for no more than 300mm along the path 1,000mm for no more than 1,600mm along the path		50 metres (m)	100m	1 in 12 (for example for every 12 metres you travel you can rise one metre)	750mm (for example landings should be every 9m along ramps of 1 in 12)	1 in 50	5mm		1,200mm wide x 2,100mm high
Urban fringe and managed landscapes For example, countryside areas near towns or managed recreation sites	Hard and firm surface with very few loose stones and none bigger than 10mm	1,200mm	At least 815mm for no more than 300mm along the path 1,000mm for no more than 1600mm along the path	There should be no steps, stiles, and no fences, hedges or walls to restrict access	100m	200m	1 in 12	830mm	1 in 45	10mm	The largest break in the surface of the path should be no more than 12mm measured along the line of the path	1,200mm wide x 2,100mm high
Rural and working landscapes For example, farmland and woodland with public rights of way	Hard and firm with some loose stones and chippings not covering the whole surface. The stones should be no bigger than 10mm	1,000mm	At least 815mm for no more than 300mm along the path 1,000mm for no more than 1,600mm along the path		150m	300m	1 in 10	950mm	1 in 35	15mm		1,000mm wide x 2,100mm high
Open Country, semi-wild and wild For example, mountains, moorlands and remote countryside	People expect to make their own way, not to have this environment changed to provide access. If paths and trails are provided in this setting, they should meet the standard for the rural and working landscapes setting (as shown in the row above).											

The minimum headroom required to comply with the standard for ‘walking tunnels’ is 2.1m (6’ 10⅝”). However, an increase to 2.3m may be desirable to be less claustrophobic over the skew distance of 4.24m. The minimum headroom for urban underpasses is also 2.3m, which are often longer and darker.

Footpath Levels

To provide 2.3m headroom, the diverted footpath level below the bridge has to be +8.618m. There is a possibility that after a moderate rainfall event, rising water level in Mill Stream could flood the footpath below the bridge in advance the path approaches, thus severing the through route for walkers. To overcome this difficulty, a smaller high-level ledge is proposed next to the bridge abutment for occasional use when the water level is too high under the bridge to enable the main path to be used. A headroom of 1.8m is suggested as a compromise between enabling users to pass under the bridge with caution and not being too uncomfortable for use. This gives a level comparable with the footpath approaches. Handrails are provided for guidance on both high- and low-level paths, as surfaces can become muddy and slippery.





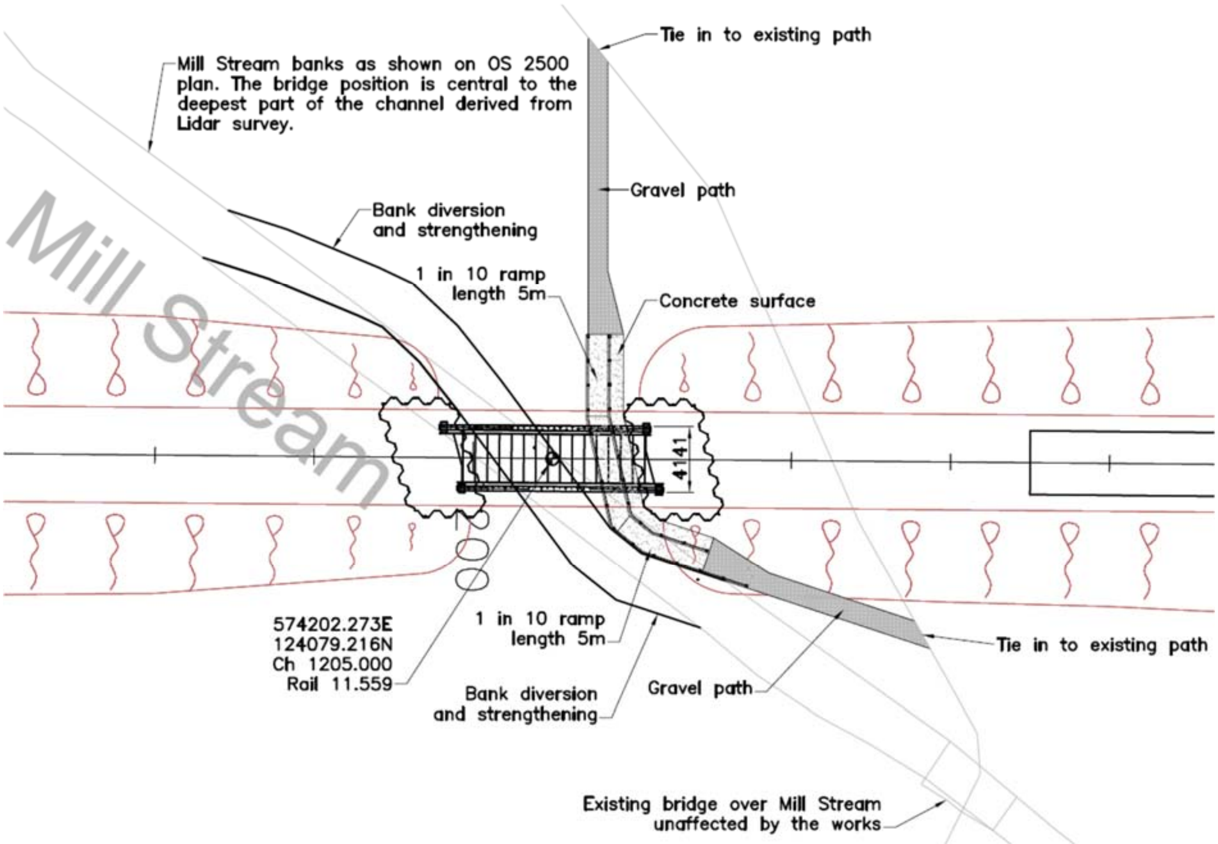
A precedent exists for a low headroom footpath in the centre of Bedford. This is an intensively used urban footpath and cycleway along the River Ouse in the centre of Bedford that has a headroom signposted as **1.4m (4’9”).** Cyclists dismount to pass under the double track railway bridge.

Another example of low headroom bridge under a railway is found on the West Highland Way, 1.2m, requiring users to remove their rucksacks. This illustrates some extreme limits that are possible.

In a recent decision on a footpath diversion[1], an Inspector accepted a diversion of a footpath from a level crossing to a railway culvert, with a headroom of two metres and which would flood on average once a year (see para 45-54 – relevant extract of decision attached).

Footpath Plan Alignment

The except below shows indicative arrangements for the footpath below the bridge and a minor deviation of Mill Stream adjacent to the bridge. Bank strengthening works may involve steel sheet piles or gabions.



John C Sreeves
10 July 2021

[1] The Suffolk County Council (Parishes of Creeting St Mary and Needham Market) (Creeting St Mary Footpath 39 (Part) (Gipsy Lane Crossing) Rail crossing Diversion Order 2018

Order Decisions

Inquiry Opened on 4 June 2019

Site visit made on 26 September 2019

by Alan Beckett BA MSc MIPROW

an Inspector appointed by the Secretary of State for Environment, Food and Rural Affairs

Decision date: 12 November 2019

Order Ref: ROW/3207788 ('Order A')

- This Order is made under Section 119A of the Highways Act 1980 (the 1980 Act) and is known as the Suffolk County Council (Parishes of Creeting St Mary and Needham Market) (Creeting St Mary Footpath 39 (Part) (Gipsy Lane Crossing) Rail crossing Diversion Order 2018.
- The Order is dated 4 April 2018 and proposes to divert the public right of way shown on the Order plan as A – B – C and described in the Schedule to a new route shown in the order plan as C – D – E – F – G – H – I – J – K – L - M and described in the Schedule.
- There were 14 objections and one representation in support outstanding at the commencement of the inquiry.

Summary of Decision: The Order is confirmed subject to the modifications set out in the Formal Decision.

Order Ref: ROW/3207789 ('Order B')

- This Order is made under Section 118A of the 1980 Act and is known as the Suffolk County Council (Parishes of Needham Market and Creeting St Mary) (Needham Market Footpath 6 and Creeting St Mary Footpath 36 and any unrecorded public footpath rights) Rail Crossing Extinguishment Order 2018.
- The Order is dated 4 April 2018 and proposes to extinguish the public right of way shown on the Order plan as A – B – C – D – E and D – F and described in the Order Schedule.
- There were 5 objections and 1 representation in support outstanding at the commencement of the inquiry.

Summary of Decision: The Order is confirmed.

Procedural Matters

1. The inquiry opened on 4 June 2019 but was adjourned as proofs of evidence and accompanying appendices submitted by Network Rail had not been sent to the objectors. The inquiry resumed on 24 September 2019 (the earliest date which was suitable for all parties) and sat until 26 September 2019.

2. I made an unaccompanied inspection of the routes at issue on the evening of 3rd June and a final inspection on the afternoon of 26 September in the company of the parties or their representatives.

3. At the inquiry, Suffolk County Council ('the Council') requested a minor modification to Order A in relation to part 2 of the schedule and the reference to a 'staggered barrier' which was proposed to be erected at point C. The Council and Network Rail understood that the affected landowners required the erection of a fence or other barrier to the north-east of the proposed footpath

to protect their land and livestock from trespass. The erection of a fence would mean that there would be no need for a staggered barrier within the hedge at point C as livestock would be retained within the field by a fence. Consequently, the Council requested that the schedule be amended to record a gap at point C.

4. At the inquiry, Mr & Mrs Fayers questioned the need for a gap at point C as they considered it a means by which livestock could stray from the field. Given that there was confusion as to whether a fence would or would not be required by the landowners, an amended modification was sought to record a kissing gate at point C which would be the least restrictive stock-proof of barrier which would maintain access for as wide a group of users as possible. If I conclude that Order A should be confirmed, I will modify part 2 of the schedule as requested.

5. During the adjournment, attempts had been made to strike an agreement between the parties regarding the location of the proposed footpath. One possible option advanced was that the diverted path should emerge from the south-eastern portal of the culvert and run adjacent to the Network Rail boundary fence. Whilst this was said to address most of the concerns of the objectors as to the impact the footpath would have upon their land, it had not been possible to reach such an agreement. I have therefore considered Order A in relation to the statutory tests found in s119A of the 1980 Act. Only if I find that the proposal in Order A is not satisfied will I consider whether a footpath in an alternative location would satisfy those tests.

6. Mr and Mrs Fayers submitted that the description of the paths at issue in the Orders as being in the parish of Creeting St Mary is erroneous as the parish boundary with Needham Market has been at the River Gipping for many years; it is contended that the path description in the Orders could have given rise to confusion. In a similar vein, the objectors also considered the sequential description (Footpaths 1 – 7) in the proofs of evidence submitted by Network Rail's consulting engineers (WSP) also gave rise to confusion.

7. It is evident that the definitive map and statement is behind the times in that it does not acknowledge that the parish boundary between Creeting St Mary and Needham Market has moved north from the railway. Whist acknowledging the potential for parties to be confused as to which path was being referred to, the purpose of the Orders is self-evident and those reading them would be under no illusion as to what the Orders seek to achieve. Knowledge of the finer points of local administrative boundaries or definitive map procedures is not a pre-requisite to the understanding of what Network Rail seeks to achieve by these Orders.

8. Similarly, the numbering system used by WSP in their documentation is internally consistent. It is evident when reading those documents and referring to the accompanying plans which paths are being described. Whilst WSPs documentation could have referred to the footpaths at issue in accordance with the definitive map and statement instead of using its own numbering system, it is plain from that documentation that WSP were referring to the Order routes at all material times.

9. Mr and Mrs Fayers also submitted that the statutory notices of the order had been posted at heights inappropriately low, and that a notice had not been posted at point M. Schedule 6 of the 1980 Act does not prescribe the height at

which notices have to be posted, and there is no requirement under schedule 6 to post a notice of the making of the Order other than at the ends of the path which is proposed to be diverted. The evidence submitted by the Council on this matter demonstrates that the notices were posted in accordance with the requirements of Schedule 6 and would have been legible for anyone who cared to read them. Mr Kerr had seen a notice of the inquiry at point M and I saw that the notices at point M had been present in June and remained in place in September.

10. Consequently, I do not consider that the Orders or the documents generated in relation to them are likely to have given rise to confusion as to their purpose and intent.

The Main Issues

11. If I am to confirm the Orders, I need to be satisfied that it is expedient to divert part of footpath 39 and to extinguish footpaths 6 and 36, having regard to all the circumstances, and in particular to:

    a) whether it is reasonably practicable to make the crossings safe for use by the public; and

    b) what arrangements have been made for ensuring that, if the Order is confirmed, any appropriate barriers and signs are erected and maintained.

12. I consider that the salient points under these heads include the following issues:

    a) the current safety of the pedestrian railway crossings for the public;

    b) the safety of the alternative routes in comparison;

    c) the convenience and enjoyment of the alternative routes for pedestrians in comparison;

    d) whether any improvements to the pedestrian crossings, so as to make them safe, are reasonably practicable; and

    e) whether, if the Order is confirmed, adequate arrangements have been made to secure the redundant crossings.

13. In addition, matters raised which can be taken into account under the heading 'all the circumstances', include the impacts upon adjacent landowners in terms of agricultural activity; the impacts upon the landowners of flooding; the impacts upon the efficient operation of the railway; other proposals considered as an alternative to the closure of Gipsy Lane crossing and the impacts upon general amenity.

Reasons

Background

14. The railway running through Needham Market was constructed under the provisions of the Ipswich and Bury St Edmunds Railway Act 1845 which incorporated the provisions of the Railway Clauses Consolidation Act 1845. The railway currently forms part of the main line between London Liverpool Street and Norwich and carries passenger and freight trains at line speeds of up to 100mph.

15. The deposited plans for the enabling Act of 1845 show that the crossings at Willow Walk and Gipsy Lane pre-dated the construction of the railway. Willow Walk is recorded in the book of reference as a public footpath in the ownership of the Surveyor of Highways and Gipsy Lane is recorded as a 'Highway or Occupation Road' in the ownership of the Surveyor of Highways or the Earl of Ashburnham. The private vehicular rights over Gipsy Lane crossing were surrendered in around 2006, with the crossing being re-configured for pedestrian use only. It is not disputed that only a public right of way on foot subsists over the crossing at Gipsy Lane.

16. Section 61 of the Railway Clauses Consolidation Act 1845 required the railway company to make and maintain convenient ascents and descents and gates or stiles on either side of the railway being constructed. The height of the railway above ground at Willow Walk resulted in it being provided with stiles and steps on either side of the railway. To accommodate the private vehicular right of way at Gipsy Lane, raised approaches to the railway were constructed with wicket gates being provided for use by the public when crossing the railway.

Orders A and B

Assessment of risk at level crossings

17. Network Rail uses a system known a the All Level Crossing Risk Model (ALCRM) as part of its risk assessment and mitigation strategy, the main purpose of which is to provide a consistent method of assessing risk at level crossings to crossing users, train passengers and railway staff. It is acknowledged that risk will vary according to the characteristics of any given crossing, the extent of use of that crossing and the frequency, volume and speed of trains passing over the crossing; such factors are considered as part of the risk assessment.

18. ALCRM considers two levels of risk; the collective risk and individual risk for any given crossing. Collective risk (the overall risk to the network and all those using it) is expressed in a simplified numeric form ranked from 1 to 13 where 1 represents the highest risk and 13 represents nil risk. Individual risk (the risk of fatality to one individual using the crossing regularly in one year) is expressed as a letter, ranked A to M where A represents the highest risk and M nil risk. A qualitative risk assessment of each crossing is carried out by individual Level Crossing Managers which feeds into the ALCRM model and allows for the identification of features or characteristics at crossings with the same ALCRM score and informs the optioneering exercise undertaken to eliminate or mitigate the risk identified

19. The most recent risk assessment of Gipsy Lane crossing was undertaken in April 2019 with the ALCRM score being recorded as C3. Willow Walk crossing has been closed under temporary traffic regulation orders since 2011 and currently has an ALCRM score of M13; the last assessment undertaken when the crossing was available for use had resulted in an ALCRM score of C4.

20. Factors in determining risk to pedestrians at a level crossing are the 'crossing time' and 'warning time'. The estimated time taken to cross the railway (the crossing time) is calculated as the time required to walk between 'decision points'. Decision points are found on either side of the line and are the points at which guidance on crossing safely is visible and at which a decision to wait or cross in safety can be made. It is at these points that notices bearing the legend '*Stop Look Listen Beware of Trains*' are situated. For line speeds of up to

100mph, the decision point is taken to be 2 metres from the nearest running rail.

21. The walking speed of an able-bodied adult crossing the railway where crossing boards are provided is calculated as 1.2 metres per second. In calculating the crossing time, an allowance of 50% additional time is added to allow 'vulnerable' users (such as the elderly, those with mobility impairments or encumbered users such as dog walkers) sufficient time to cross the railway.

22. The critical figure in relation to the crossing time is the warning time. The warning time is calculated as the shortest possible time for trains to travel the distance to the crossing from the point at which they can first be seen by a pedestrian standing at the relevant decision point (the sighting distance). Warning times are calculated using the maximum permitted travelling speed on the line.

23. The generally accepted principle regarding at-grade crossings is that for a crossing to be deemed 'safe' (notwithstanding that there will always be an element of risk involving in crossing any live railway), the warning time should be greater than the crossing time. It was the Council's and Network Rail's case that Gipsy Lane and Willow Walk crossings did not provide users with adequate warning of the approach of trains running at line speeds.

24. Both Gipsy Lane and Willow Walk crossings are 'passive' crossings in that the public are required to 'stop, look and listen' for the approach of trains.

25. The calculations as to crossing times, warning times and sighting distances submitted by Network Rail were not contested by the objectors.

The current safety of the pedestrian railway crossing for the public

Gipsy Lane

26. A 9-day camera census of use in April 2019 demonstrated an average use of 58 pedestrians and 1 cyclist per day during the survey period including use by 'vulnerable' users and use during the hours of darkness. Gipsy Lane has a traverse distance of 9.2 metres between decision points; an able-bodied user would normally cross the railway in 7.7 seconds, however a 50% uplift to allow for vulnerable users sets the crossing time at 11.61 seconds.

27. The sighting distance required to allow enough warning time of the approach of a train at line speed would be 519 metres. For a pedestrian standing at the decision point on the up (eastern) side of the line looking towards a down direction (northbound) train there is insufficient sighting (328 metres) due to the curvature of the line. For a pedestrian standing at the down side (western) decision point looking towards a down direction (northbound) train there is also insufficient sighting (322 metres) due to the curvature of the line.

28. At current permissible line speeds, there is insufficient time for a vulnerable pedestrian to cross the rails safely from the eastern and western sides when a northbound train first comes into view. I am satisfied that the warning time for pedestrians for a train running at the maximum permissible line speed would not satisfy the current safety criteria.

29. In August 2011 an accidental fatality at Gipsy Lane led to Network Rail being convicted of breaches of health and safety regulations. One of the

recommendations made by the Rail Accident Investigation Branch (RAIB) was for Network Rail to seek the closure of the crossing or if permission was not granted for the closure by the Council, then Network Rail "*should take appropriate risk-reduction measures so that pedestrians have sufficient time to cross safely and are adequately warned of the approach of trains*".

30. The risk to the public is currently mitigated at Gipsy Lane by whistle boards and by the imposition of a temporary speed restriction (TSR) of 50mph on the down line. The whistle boards are in positions to provide an audible warning of approaching trains although such warnings are not sounded during the night time quiet period (NTQP) between 23:59 and 06:00. The April 2019 census demonstrates that there was some use of the crossing during the NTQP.

31. Network Rail do not consider the imposition of a 50mph TSR to be suitable mitigation to address the RAIB's recommendation as the TSR conflicts with its licence conditions and its franchise commitment to Greater Anglia trains for a regular service between London and Norwich in 90 minutes. Network Rail submit that around £100,000 is being paid in compensation for service delays caused by the TSR.

32. Based on the current permissible line speed on the northbound line, Gipsy Lane crossing exposes users to a considerable risk of accident as the crossing time from either side of the line exceeds the warning time of the approach of a northbound train. Whilst the mitigation measures imposed since the fatal accident in 2011 have reduced the risk to the public, the reduction in line speed on the down line does not provide a permanent solution to the mitigation of that risk. I therefore accept that the crossing presents a risk of danger to the public.

Willow Walk

33. The footpath which crosses the line at Willow Walk runs between Stowmarket Road and footpaths 35 and 38 with the junction being approximately 230 metres north-west of Valley House. Footpath 36 has been the subject of successive Temporary Road Traffic Regulation Order (TTRO) closures with the first of those TTROs being granted in 2011. The crossing has not been available for the public to use for around 8 years and the infrastructure (steps, stiles, decking boards etc) necessary to facilitate use has also been removed.

34. Due to the prolonged unavailability of the crossing, there is no current usage data for Willow Walk. The last census of use was carried out in 2011 and was based on observations of use by Network Rail staff during their time on site at the crossing; the 2011 census led to an estimated 41 uses per day. Earlier censuses had produced varying estimates of use of between 1 and 108 uses per day with these results being dependent upon the observed use during a given 40-minute period. It is not disputed that when Willow Walk crossing was open it had been used by the public as a means of access to and from the Gipping valley.

35. Willow Walk had been approached by a flight of steps on either side of the railway with stiles in the railway boundary fence. The topography of the site prevented the creation of a platform of some kind at the top of the steps on which pedestrians could wait whilst determining whether to cross the railway. The 'decision point' at Willow Walk was therefore two steps below the top of the flight on either side of the railway and below the level of the nearest

running rail. In calculating the time required for an able-bodied user to cross the railway, Network rail have allowed additional time of 1 second per step for users to be able to travel between the decision points either side of the railway.

36. The crossing distance of Willow Walk was 9.9 metres with a crossing time of 12.3 seconds. At a line speed of 100mph, users would require 553 metres of sighting distance in order to have enough time to negotiate the crossing. The measured sighting distances was deficient in both directions for a pedestrian wishing to cross from the down (western) side of the railway and deficient in viewing a down-direction (northbound) train from the up (eastern) side of the railway.

37. The 50mph TSR on the down line does not provide any mitigation of the lack of sighting of a down-direction train for a pedestrian seeking to cross the railway from the up side. To provide enough advance warning, a whistle board on the up line would have to located 485 metres from the crossing. Whistle boards located more than 420 metres from a crossing are not considered to be effective.

38. Based on the current permissible line speed, Willow Walk crossing cannot be considered safe for pedestrians as the crossing time from either side of the line exceeds the warning time of the approach of a down direction train and is deficient in relation to a down direction train when viewed from the up line. Although whistle boards had been installed prior to the closure, their positioning did not provide mitigation of the risk to pedestrians seeking to cross from the up side of the railway. I therefore accept that if Willow Walk were currently available for use, the crossing would present a risk of danger to the public.

The safety and suitability of the proposed alternative routes in comparison to the existing crossings

Gipsy Lane

39. Network Rail's initial proposal to address the problems at Gipsy Lane was to construct a stepped footbridge in the vicinity of the existing crossing. This proposal was not progressed due to a hostile reaction from local residents. Consequently, a Design Panel was instigated comprising representatives of Network Rail, WSP, Needham Market Town Council, Creeting St Mary Parish Council, Mid-Suffolk DC, Suffolk CC and local residents. The Design Panel considered a number of alternatives; the construction of new infrastructure in the form of ramped footbridges, ramped underpasses and the use of existing infrastructure such as the underbridge at Hawks Mill Street, the overbridge at Badley and the culverts to the north of Gipsy Lane crossing.

40. Seven different options were considered by the Design Panel which were put forward at public consultation events held in November 2015 at which responses were invited to the various options being considered. Miss Cuthbertson's evidence was that the responses received following the public consultation events expressed a preference for an alternative footpath utilising the culverts to the north of the crossing. It was acknowledged that the culvert option had viability issues such as periodic closure due to flooding, restrictions on headroom restrictions and the length of the diversion.

41. The proposed alternative utilises the existing footway alongside Stowmarket Road which serves as a shared footway and cycleway. To reduce the length of the diversion, the proposal initially consulted on has been modified to utilise the southern of the two portals and to place a section of the diverted path in the edge of the field to the south of the River Bat.

42. It is proposed to improve the footway alongside Stowmarket Road to provide a shared surface footway and cycleway 3 metres in width which will be separated from the main carriageway by a 1.5 metre grass verge. The section of footway onto which pedestrians will be diverted remains within the posted 30mph limit; automated traffic count data showed that on this section of Stowmarket Road the 85th percentile speed of traffic heading southbound into Needham Market was 31.2 mph. Given that most of the traffic passing the proposed diversion is slowing down on the entry to the town, and that pedestrians would have a 1.5 metre separation zone between them and moving traffic, the proposal is unlikely to expose pedestrians to unacceptable risk.

43. From point M on Stowmarket Road, the proposed footpath will follow a headland and reach the culvert by means of a ramped access at a gradient of 1:20, with the new path leaving the eastern end of the culvert to reach point E via a further ramped access at the same gradient. From point E to point C the footpath would follow an existing hard surfaced track. The approaches to the culvert have been designed to be suitable for use for as wide a body of users as possible.

44. In terms of accessibility for both the able-bodied and those with physical impairments, the proposed route offers a step-free means of crossing the railway. In this respect, at gradients of 1:20, the proposed alternative path would be more accessible as the approach to Gipsy Lane crossing from the south has a gradient of 1:15. The proposed alternative also removes the risk from crossing the live rails.

45. There is an issue with available headroom in the culvert which was identified early in the development of the proposal, and an issue with periodic flooding of the footpath. In normal weather conditions, the Bat flows through one portal with the second carrying water at times of high rainfall. It is accepted by all parties that on occasion, the proposed footpath will be covered by the Bat. The proposal has been designed to maximise the available headroom within the culvert whilst minimising the frequency and duration of those occasions when the new footpath will be covered by water.

46. It is proposed to engineer a footway within the southern portal which will provide 2 metres of headroom within it. Whilst this is sub-optimal compared with the height which would be required within a new-build underpass[1], a balance has been sought between maximising available headroom whist seeking to minimise the frequency of those occasions when the footpath would be subject to flooding.

47. Greater headroom could be achieved by lowering the footpath within the culvert, but this is likely to increase the incidence of flooding. Raising the level of the footpath would have the opposite effect in terms of flooding but would

[1] Design Manual for Roads and Bridges TD36/93 requires a 'narrow' subway to have a minimum headroom of 2.3 metres

reduce the available headroom. However, headroom of 2 metres is likely to be suitable for the majority of those who may seek to use the alternative footpath.

48. A river level monitoring survey of the Bat was undertaken between April 2016 and January 2017 with the results being correlated with rainfall data for the same period. The monitored water level in the river during the initial assessment period of April to July 2016 coincided with the four largest rainfall events recorded over the whole 9 month monitoring period. Between April and July 2016, the river level rose higher than the proposed footpath on 3 occasions; two of these occasions being associated with the same storm event which was estimated to be a 1 in 5-year storm.

49. From the evidence gathered at the Bat during the summer of 2016 and an analysis of the predicted annual flow rate of the river without the extreme events observed in the summer of 2016, Mr Smith concluded that the proposed footpath would not be flooded in most years as a flood event which would overtop the footpath is predicted to occur with a frequency of less than 1 event each year. Mr Smith had calculated the average annual flood duration of the Bat and concluded that in an average year, the footpath was likely to be flooded for approximately 5.7 hours.

50. It was acknowledged that at times of extreme weather events the duration of flooding arising from each event would be greater than the predicted average, but such extreme events were not expected to occur every year, and, in some years, there would be no flooding of the path.

51. I acknowledge the predicted outcomes of the model developed by WSP for Network Rail is dependent upon the data entered into the model, and that modelling based on data collected in 2016-2017 may not reflect rainfall and localised flooding events in more recent years and that if summer and winter storms increase in frequency and severity over time, the incidence of flooding and duration of flooding may increase accordingly.

52. However, the data on which the WSP model is built did capture some severe rainfall events which give an indication of what the effect of periods of extreme rain may be on the proposed footpath. The model therefore had some extreme rainfall and river level data within it and greater confidence can be attached to the predictions made than if the model was based simply on normal flows and normal rainfall.

53. The periodic and temporary inundation of the proposed footpath may inconvenience those who may wish to use the new footpath, although such inconvenience is predicted to be of short duration and infrequent in the average year. Furthermore, in times of extreme rainfall leading to the Bat being in flood, it is highly likely that the onward paths adjacent to the Gipping would also be flooded which would similarly inconvenience recreational users of the local path network.

54. The proposed footpath would emerge from the culvert on the north-eastern side of the railway and run to the residual part of footpath 39 over a hard-surfaced track which provides access to Mr Fayers fields. The adjacent fields are used to produce a hay crop with the various process involved being undertaken by an agricultural contractor. Mr Fayers gave evidence regarding the size of machinery involved in the cultivation of the land and expressed concerns about the danger such machinery would pose to uses of the footpath.

55. The track is unfenced, and it is unclear whether Mr Fayers would require a fence to be erected to the north of the track if the Order were to be confirmed. With regard to the potential for conflict between pedestrians and agricultural machinery, it would be reasonable to expect a degree of 'give and take' in any such situation, with pedestrians being required to be aware of activities taking place on the track, and vehicular users of the track being aware of the likelihood of pedestrians being present. If a pedestrian came across agricultural machinery parked or travelling along the track, it would be a simple matter to stand to one side or walk around any temporary obstruction encountered.

56. In any event, the extent of the agricultural operations carried out on the bottom field appear to be quite limited in terms of frequency and duration. Mr Fayers' evidence suggests that he has little involvement in the cultivation of the field with the contractor providing all plant, fertiliser and herbicides required. Mr Fayers was unable to state how many days of the year the agricultural machinery would be present on the track, but from the operations described, it would appear that it would be few.

57. The processes described by Mr Fayers included fertilising the land, spraying, cutting the hay, turning and spreading, rowing up, baling and removal. The video evidence suggested that most of these processes would take place within a day although I acknowledge that many of the processes would be weather dependent. Even making allowance for the weather disrupting some processes, the plant shown in the video evidence would not be found on the track for much more than 7 – 14 days per year.

58. For most of the year it is unlikely that pedestrians would encounter large agricultural machinery on the proposed path. A more likely encounter may be with one of Network Rail's vehicles when access to the railway was required or with one of Mr Fayers domestic vehicles. With regard to his personal use, Mr Fayers could offer no estimate of the frequency with which he used the track. The level of vehicle movements which pedestrians may encounter between points G and C are likely to be no greater than those experienced on footpaths 7 and 38 which run over the main access track to Ravens Farm.

59. Although users of the proposed footpath would be exposed to some risk from agricultural and other vehicles using the access track, on the evidence before me, such usage would be limited both in absolute numbers, frequency and duration and is unlikely to present any greater exposure to risk than a pedestrian would run on other similar footpaths in the vicinity.

60. The proposed alternative footpath would be subject to limitations in terms of headroom at the culvert, temporary flooding of the path in the culvert in extreme weather and possible encounters with agricultural vehicles on the access track. Despite these limitations, the proposed alternative would be suitable for use by the public and would provide users with a safe means of crossing the railway without having to cross the rails at grade.

Willow Walk

61. The crossing at Willow Walk, the whole of footpaths 6 and 36 and any unrecorded rights on the alternative path through the woodland to the rear of