Appendix C - Consideration of routes

Appendix D needs to be referenced in conjunction with this route consideration, as it defines the routes of the different proposals.

The aim of this Appendix is to look at the different alternatives for providing a cycle path either through or around Abbey Fields. The routes to be considered are: -

Route 1 – Shared pedestrian/cycle path around outside of Leisure Centre
Route 2 – Dedicated cycle path crossing Finham Brook at Leisure Centre Bridge
Route 3 – Dedicated cycle path to south of Finham Brook
Route 4 – Shared pedestrian/cycle path crossing diagonally across Abbey Fields
Route 5 - Peripheral route around Abbey Fields

The methodology used a risk-based assessment of two scenarios. Initially a risk assessment for each route assuming that the option to cycle was introduced without any modifications to the existing layout. From this exercise, it was possible to identify areas, where, if left unmodified, the risks to public safety would be too high and/or unsuitable for the introduction of a cycle route. The risk assessment was then repeated assuming that practicable mitigation measures had been carried out to reduce the level of risk. From this second assessment, it was possible to identify the residual risks and make a direct comparison between route options to determine which route presented the lowest level of risk.

The following risk matrix was used in the assessment and whilst it is accepted that the scoring methodology in any risk-based assessment can be subjective, this approach enabled each route to be evaluated in a consistent manner, allowing a comparison to be made.

Risk Matrix

Likelihood	Very High	(4)	4	8	12	16
	High	(3)	3	6	9	12
	Medium	(2)	2	4	6	8
	Low	(1)	1	2	3	4
			(1)	(2)	(3)	(4)
			Low	Medium	High	Very High
	Severity					

The likelihood of a risk manifesting itself has been valued between low (where it is considered that there is a minimal chance that an incident would occur and Very High (where it is considered that the likelihood of an incident is almost certain). The severity following an incident is ranked as being between low and very high, where “low” would be considered a “near-miss” incident and “very high” where the incident is likely to incur significant injury to either party.

By assessing the likelihood and severity the results provide an overall risk score, see below

Low Risk (1 to 3)	Considered broadly acceptable if all mitigation measures are in place
Medium Risk (4 to 6)	Tolerable only if further mitigation measures are not reasonably practicable
High Risk (7 to 9)	Not acceptable – further mitigation measures required or amend design
Very High Risk (10 to 16)	Not acceptable

The risk-based approach assesses how the existing conditions compare with national design guidance and best practice.

It is accepted that meeting these standards will not be possible in some cases along the route given the various constraints. Using the national standards as a baseline will, however, identify where relaxations and departures are required and in turn the residual risks

Route 1 – Shared pedestrian/cycle path around outside of Leisure Centre

1.1 – Route Description

This route proposes to take cyclists across Abbey Fields using the route of the current path leading from the Borrowell Lane entrance in a north easterly direction towards the Leisure Centre, it would then use the existing bridge to cross the Finham Brook and go around the corner of the Leisure Centre to follow the direction of the current access road to Bridge Street.

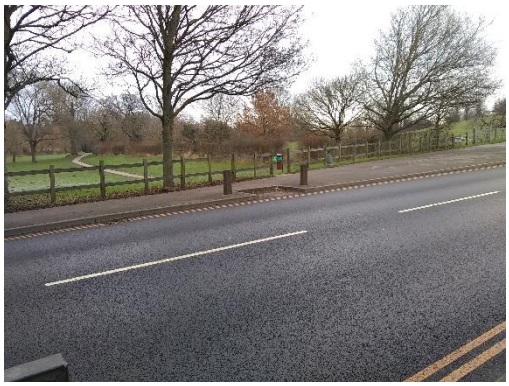
1.2 – General Comments

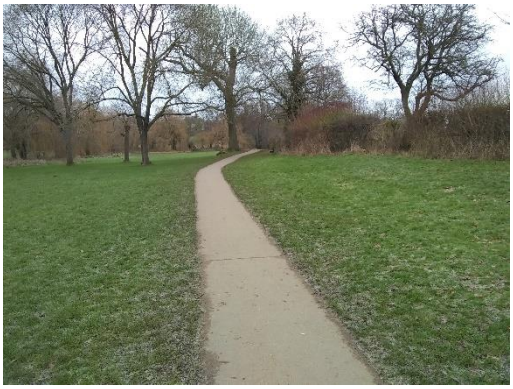
1.2.1 Borrowell Lane Road Junction

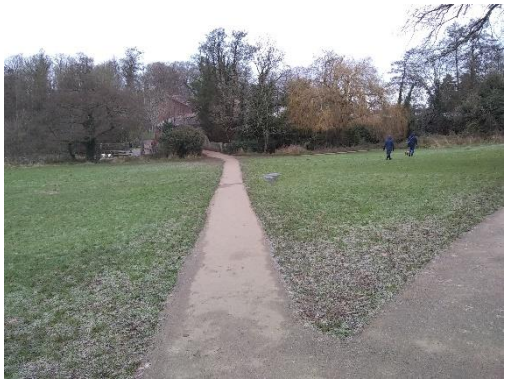
The crossing here will be relocated and upgraded

1.2.2 Section 1: Borrowell Lane to Finham Brook section

The existing path will need to be widened to 3m and appropriate signage provided to ensure that it complies with national guidance on shared pedestrian/cycle routes

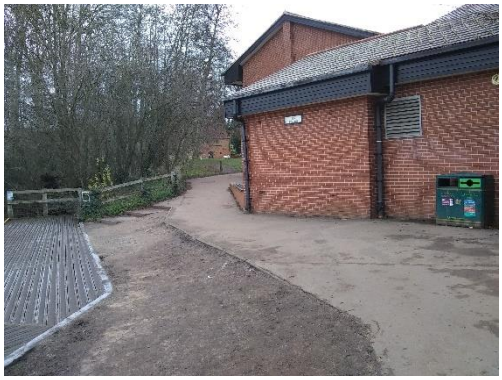


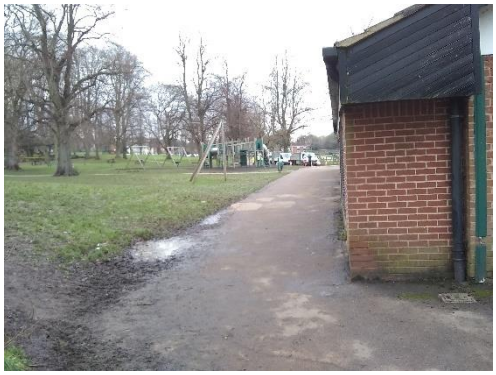




1.2.3 Section 2: Finham Brook around Leisure Centre

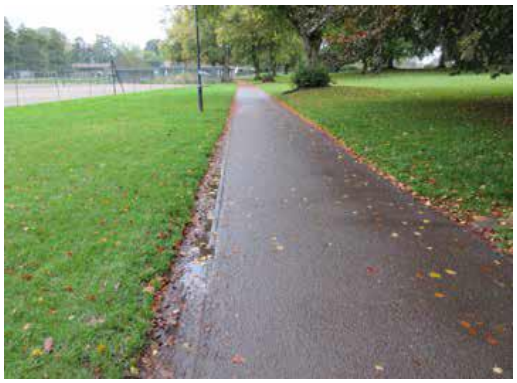
The current pedestrian bridge is currently meeting the standards to allow shared pedestrian/cycle access across the watercourse. The proposed new Leisure Centre has the same “footprint” as the original building and the path will need to be widened around the building’s corner.

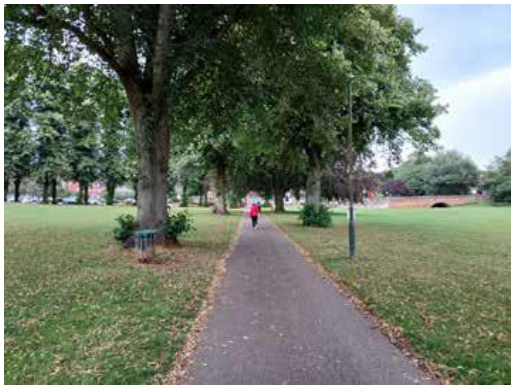




1.2.4 Section 3: Leisure Centre to Bridge Street

The route would follow the existing access route from the Leisure Centre to Bridge Street, with appropriate consideration needed to minimise conflict between different park users





1.2.5 Bridge Street

The bus stop will be relocated, and an upgraded crossing provided on Bridge Street

1.3 Required Mitigation

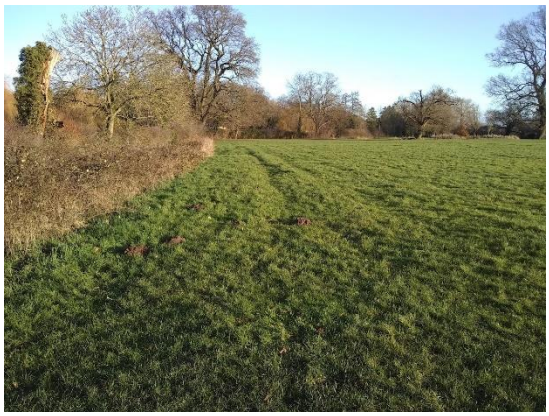
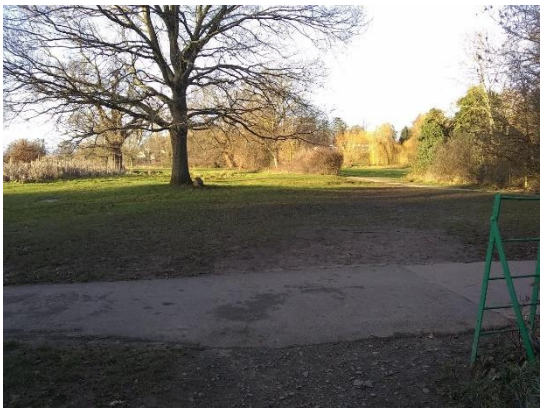
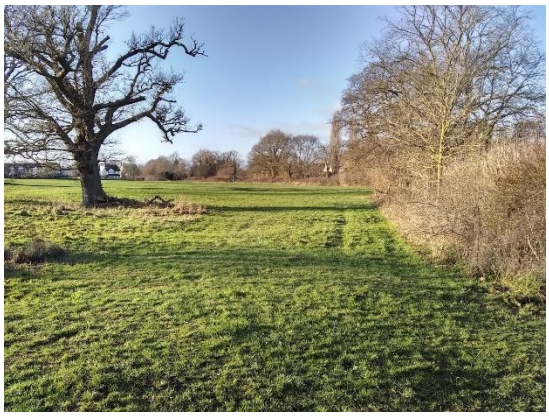
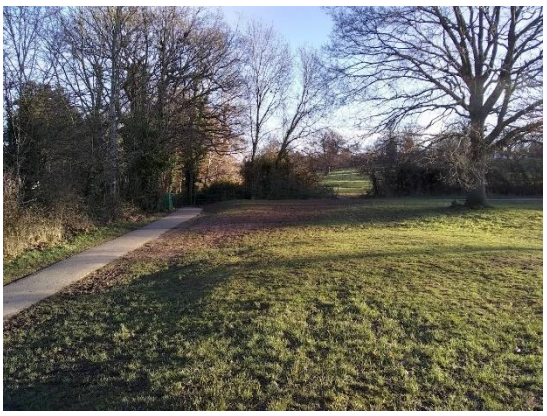
Location	Required Mitigation
Section 1	- The path will need to be widened to 3m ensure compliance with national standards for shared/pedestrian cycle path - Appropriate signage required.
Section 2	- Existing path widened in compliance with national standards - Higher balustrades on existing bridge across watercourse - Physical barrier i.e., low wall, to separate wildfowl feeding platform from shared pedestrian cycle path - Path widened around corner of Leisure Centre - Appropriate signage for different park users
Section 3	- Path widened to 4m around the entrance to public toilets - Yellow hatching outside Service Doors of Leisure Centre - Mitigation measures need to be designed around the entrance of Leisure Centre/children's play areas - Appropriate signage through this section

Route 2 – Dedicated cycle path crossing Finham Brook at Leisure Centre Bridge

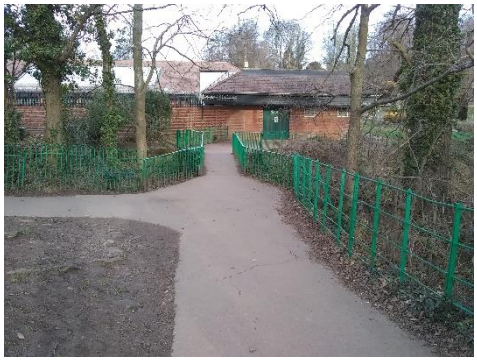
2.1 – General Description
This route starts at approximately the same point on Borrowell Lane as Route 1, but needs the construction of a new path to the SW of the existing hedge line and then utilises the existing footbridge to the south of the Leisure Centre and then requires the construction of a new cycle path running to the north of Finham Brook to Bridge Street.

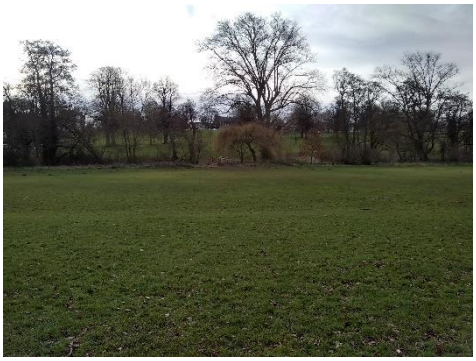
2.2 – General Comments
2.2.1 – Borrowell Lane Road Junction
The crossing here will be relocated and upgraded

2.2.2 Section 1: Borrowell Lane to Leisure Centre Bridge
A new dedicated route will run to the southwest of the existing hedge and converge with the main pedestrian path running between Abbey Hill and the Leisure Centre

2.2.3 Section 2: Leisure Centre Bridge to Bridge Street
This uses the route of the existing foot bridge over the Finham Brook on the corner of the Leisure Centre and then runs along a newly constructed cycle path running along the north bank of the watercourse. The bridge will need to be replaced as it doesn't meet the standards for a shared pedestrian/cycle path.





2.2.4 Bridge Street Junction
The crossing here will be relocated and upgraded

2.3 Required Mitigation

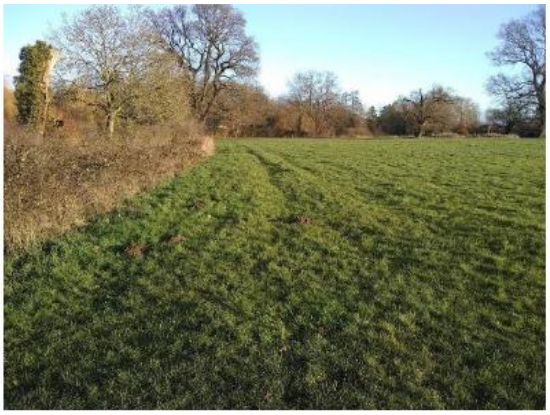
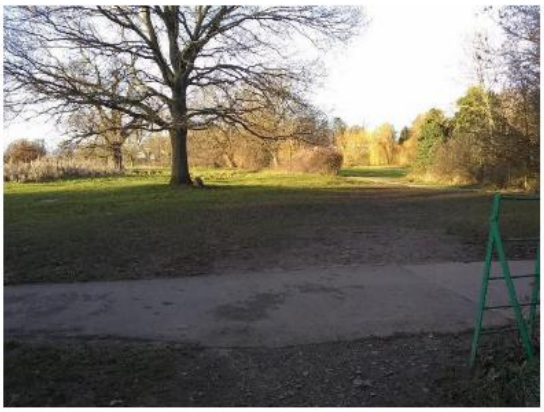
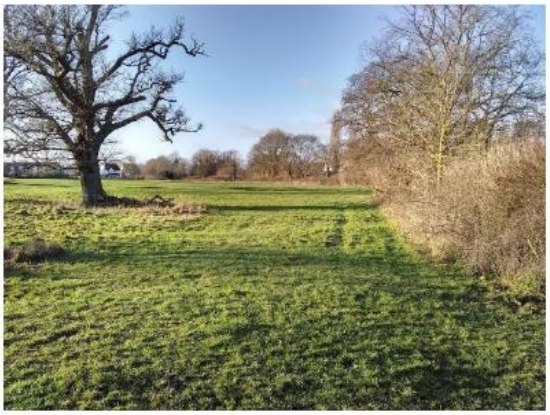
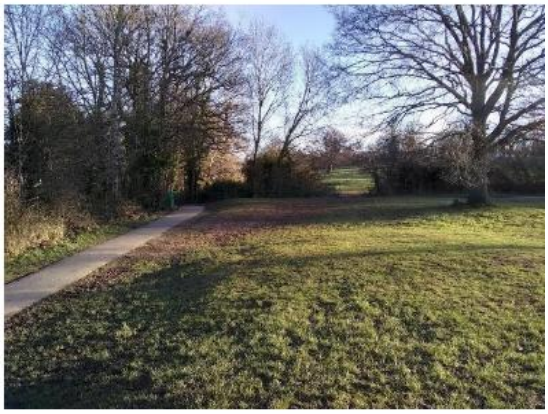
Location	Mitigation
Section 1	- A new dedicated cycle path will be constructed - Appropriate signage required at junction of new cycle path and existing footpath from Abbey End to Leisure Centre
Section 2	- The current footbridge will need to be replaced with one that meets the relevant design standards for a shared cycle pedestrian path - Relevant signage required to make different park users aware of cycle path and it is moving from dedicated to shared path - A new dedicated cycle path to be created along north bank of watercourse to Bridge Street

Route 3 – Dedicated cycle path to south of Finham Brook

3.1 – General Description
This follows the same route of a newly constructed cycle path from Borrowell Lane to the Leisure Centre as Route 2, but stays on the south bank of the watercourse and crosses using an existing bridge close to Bridge Street

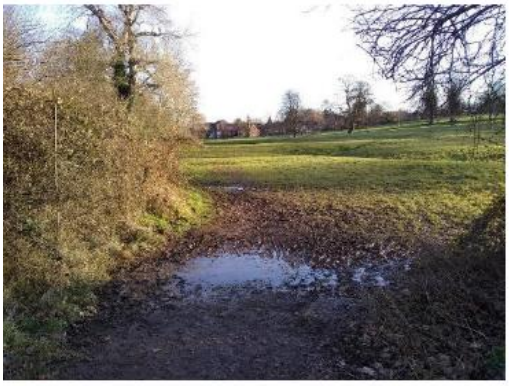
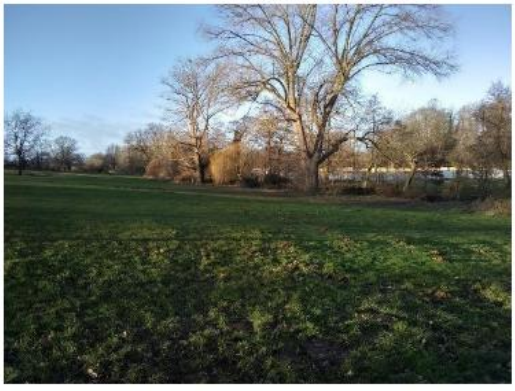
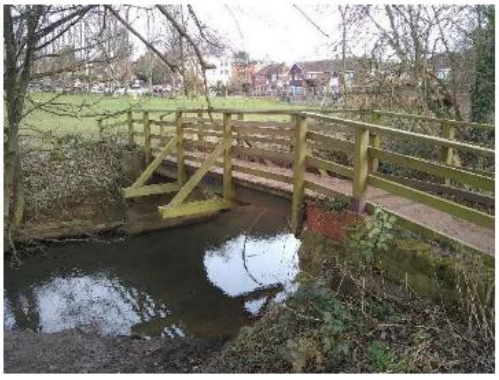
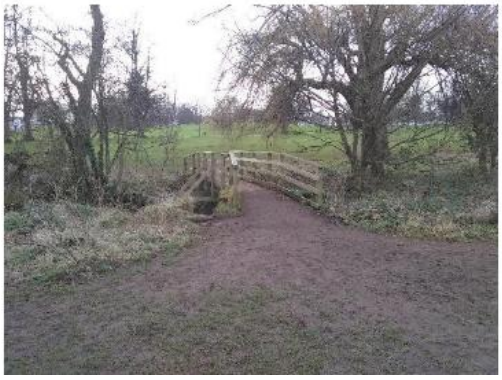
3.2 – General Comments
3.2.1 - **Borrowell Lane Road Junction**
The crossing here will be relocated and upgraded

3.2.2 Section 1: Borrowell Lane to Leisure Centre bridge
The route will run to the southwest of the existing hedge and converge with the main pedestrian path running between Abbey Hill and the Leisure Centre

3.2.3 Section 2: Leisure Centre Bridge to Bridge Street

Running to the south of Finham Brook it crosses the watercourse close to Bridge Street using the location of the existing footbridge. The current footbridge does not meet the standard for a shared pedestrian/cycle path and will need to be replaced.

3.2.4 Bridge Street Junction
The crossing here will be relocated and upgraded

3.3 **Required mitigation**

Location	Mitigation
Section 1	- A new dedicated cycle path will be constructed - Appropriate signage required at junction of new cycle path and existing footpath from Abbey End to Leisure Centre.
Section 2	- The current footbridge will need to be replaced with one that meets the relevant design standards for a shared cycle pedestrian path - Relevant signage required to make different park users aware of cycle path and it is moving from dedicated to shared path - A new dedicated cycle path to be created along south bank of watercourse to Bridge Street

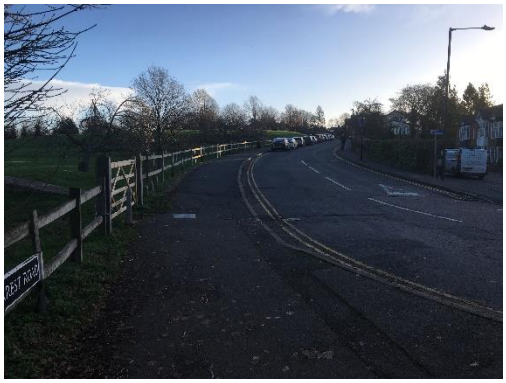
Route 4 – Shared pedestrian/cycle path crossing diagonally across Abbey Fields

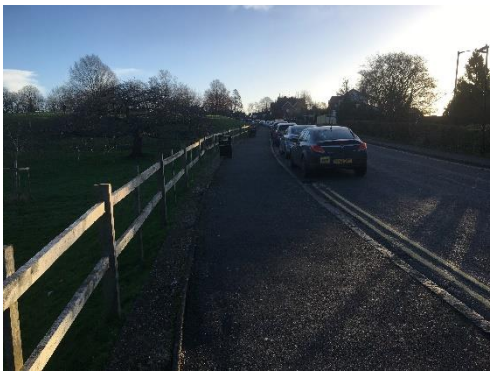
4.1 – General Description
This would initially follow the route of Forrest Road footpath in an approximate westerly direction until it reaches the junction of Abbey End and Abbey Hill, when it would use the existing footpath that heads in a north-westerly direction across Abbey Fields to Bridge Street

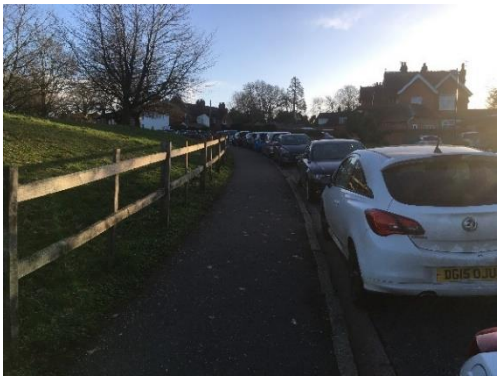
4.2 – General Comments

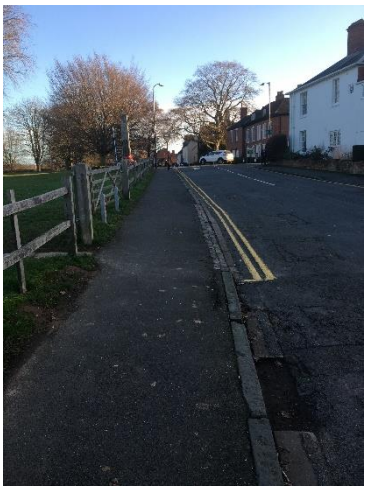
4.2.1 Borrowell Lane Junction
The crossing here will be relocated and upgraded

4.2.2 Section 1: Castle Road along Forrest Road to junction with Abbey End and Abbey Hill
This would use the current footpath that runs along Forest Road up the slight incline to Abbey End. Any footpath will have to meet minimum standards to be used as a shared pedestrian/cycle path









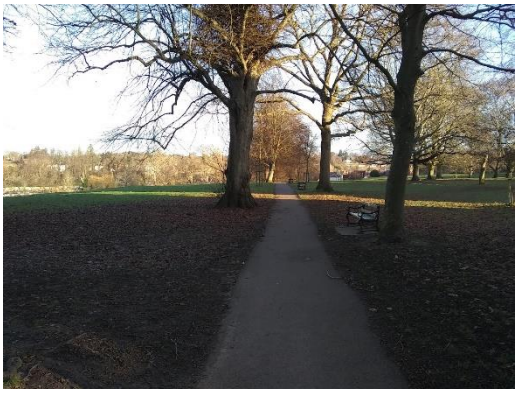
This Forest Road section runs for approximately 305 metres with an average gradient of approx. 5%. The National Cycle Infrastructure Design document LTN 1/20 (Section 5.9.7) recommends maximum lengths of different gradients, please see below, therefore this section would not comply with national standards

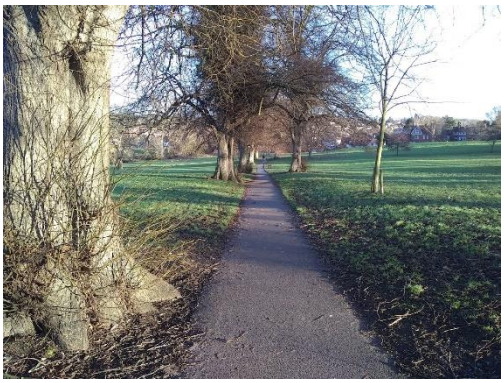
Table 5-8: Maximum length for gradients

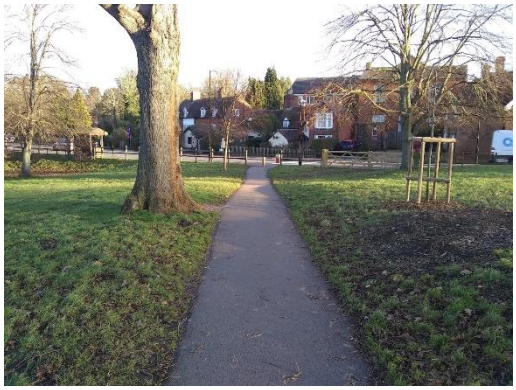
Gradient %	Desirable maximum length of gradient (m)
2.0	150
2.5	100
3.0	80
3.5	60
4.0	50
4.5	40
5.0	30

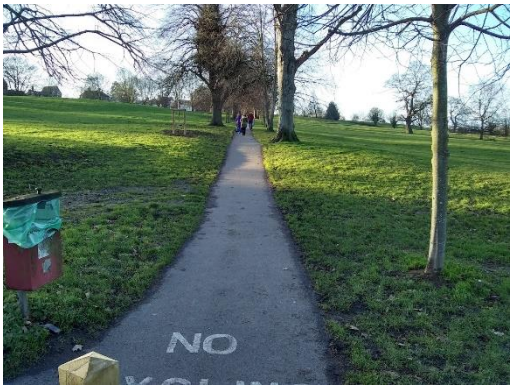
4.2.3. Section 2: Existing footpath across Abbey Fields from Abbey Hill to Bridge Street

This section uses the root of the current tree lined footpath across Abbey Fields. This path is 450m in length with an average gradient of 3%, whilst the steepest part has a gradient of 5%. This does not meet the national standards (See Section 4.2.2 above)









With the above information, to utilise this footpath, it will need to be widened to meet the standards for a shared pedestrian/cycle path and would have to “zig-zag” along the route to reduce the overall gradient.

4.2.4 Bridge Street Junction

The crossing here will be relocated and upgraded

4.3 Required mitigation

Location	Mitigation
Section 1	- Existing footpath widened to meet with national standards for shared pedestrian cycle path - Appropriate signage/lines on ground to make users aware of shared use - Potential consideration of re-routing due to gradient.
Section 2	- The path will need to be widened to meet with national standards for shared pedestrian cycle path - The route will need to be altered to reduce the overall gradient on this section to meet national standards

Route 5 - Peripheral route around Abbey Fields

5.1 – General description

This follows the same route along Forest Road as Route 4 but rather than utilising the existing footpath across the park, it continues to use the highway down Abbey Hill and Bridge Street

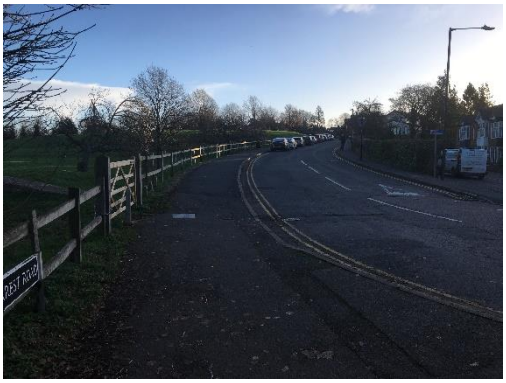
5.2 – General Comments

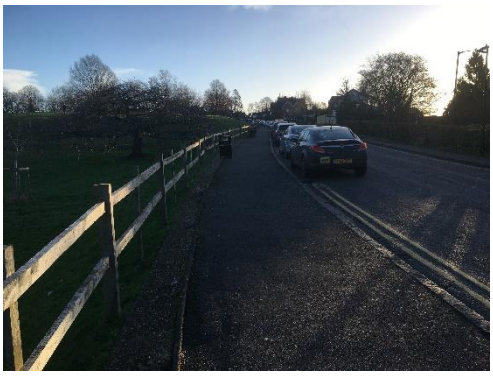
5.2.1 – Borrowell Lane Junction

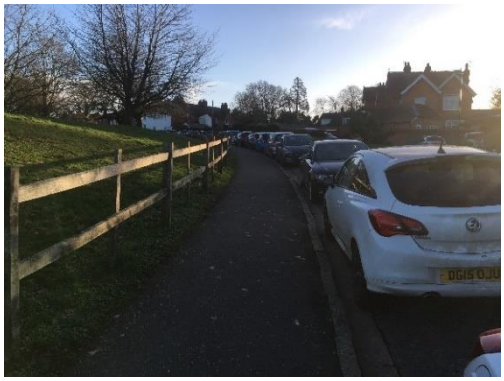
The crossing here will be relocated and upgraded

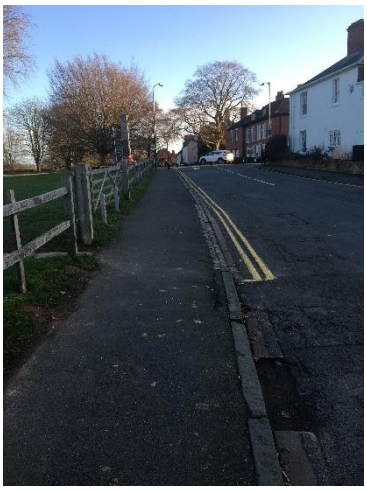
5.2.2 – Section 1: Borrowell Lane along Forrest Road to junction with Abbey End and Abbey Hill

This would use the current footpath that runs along Forest Road up the slight incline to Abbey End





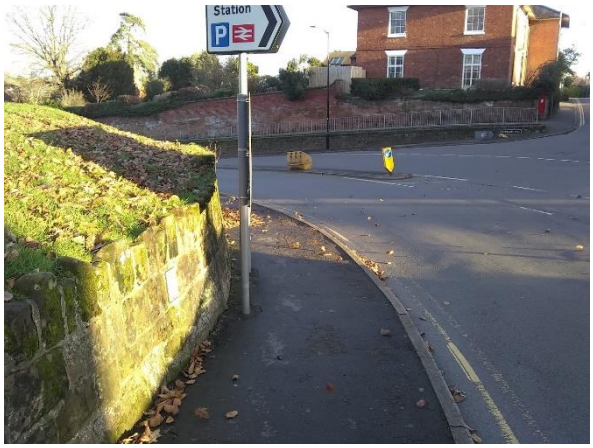


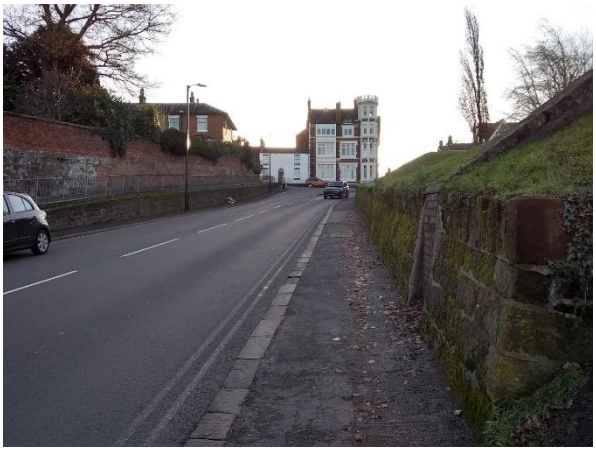


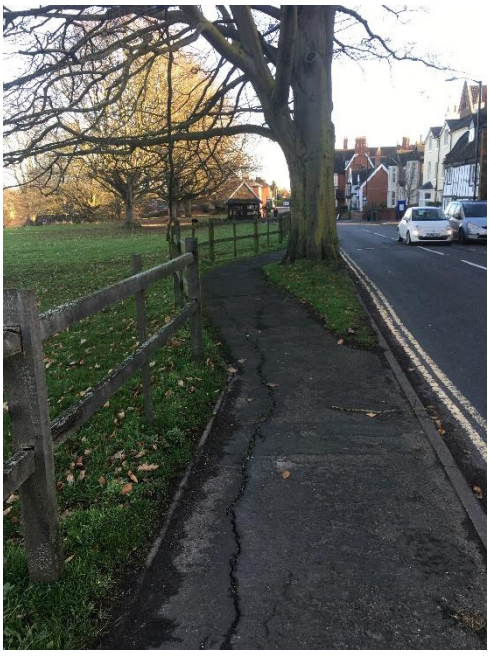
See details in Section 4.2.2 above.

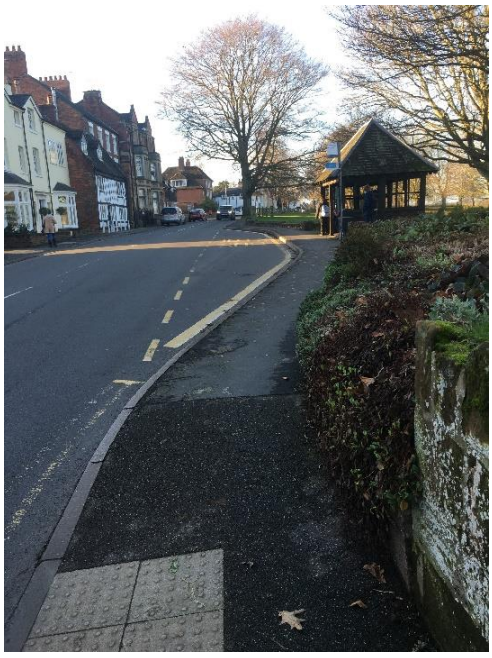
5.2.3 Section 2: Abbey Hill to Bridge Street

Follows the footpath around the outside of Abbey Fields to Bridge Street. The full length of this route from the Abbey End/Hill junction to Bridge Street is 530m has an average gradient of 3%. The steepest section along Bridge Street is 220m with an average gradient of 6%. As referenced in Route 4, there are national guidelines for the length of gradients and this section does not comply. Equally to meet guidance on a shared pedestrian/cycle path it would need to be widened with the constrictions of a walled bank on one side and a busy highway on the other









5.2.4. Bridge Street junction

The crossing here will be relocated and upgraded

5.3 Proposed mitigation

Location	Mitigation
Section 1	- Existing footpath widened to meet with national standards for shared pedestrian cycle path. - Appropriate signage/lines on ground to make users aware of shared use. - Potential consideration of re-routing due to gradient

Section 2	- Existing footpath widened to meet with national standards for shared pedestrian cycle path. - Appropriate signage/lines on ground to make users aware of shared use.

Route 1 – Shared pedestrian/cycle path around outside of Leisure Centre

No.	Hazard	Likelihood	Severity	Severity Comment	Score		Proposed mitigation measures	Likelihood	Severity	Residual Score	Comment
Section 1 – Borrowell Lane to Finham Brook											
1.	Narrow width of existing path, no street lighting, very slight gradient leading to cyclist conflict with pedestrians	3	3	Collision between cyclist and pedestrian. Loss of control	9		Widening of path to shared cycle/pedestrian national standards. Additional signage and lining	1	3	3	There is a single pinch point where tree is in line with path. This risk could be designed out.
2.	Cycling close to water	1	4	Existing bridge is sufficiently wide with side protection on it.	4		May require higher balustrades on bridge to fit with design advice	1	4	4	The bridge is short in length and the exits can be seen in both directions
Section 2 – Finham Brook around Leisure Centre											
3.	Poor forward visibility combined with narrow corridor width and pedestrian adjoining path alongside wildfowl feeding platform leading to cyclist conflict with pedestrians	3	3	This is a pinch point on this proposed route and there is the risk of collision between pedestrians and cyclists.	9		Widening of path around corner of Leisure Centre. Wildfowl feeding platform to be redesigned to include a low wall with a seat on top between the two areas, designed to discourage "grinding" by skateboarders. Additional signage	2	3	6	
Section 3 – Leisure Centre to Bridge Street											
4.	Potential conflicts between cyclists and other park users and staff within Leisure Centre	3	3	The following potential conflicts need to be considered within this section of the proposed path: - • Use of Leisure Centre Plant Room doors opening onto shared pedestrian/cycle path • Use of externally accessed public toilets within Leisure Centre building • Users of the Leisure Centre • Users of the children's play area • Vehicles using access road from Bridge Street to Leisure Centre	9		Mitigation of use of Leisure Centre Plant Room doors, is the use of yellow hatching on ground to warn cyclists that doors might open. The current path to be widened to 4 metres around the exit of the public toilets There needs to be appropriate mitigation measures around the play areas.	2	3	6	

Route 2 – Dedicated cycle path crossing Finham Brook at Leisure Centre Bridge

No.	Hazard	Likelihood	Severity	Severity Comment	Score		Proposed mitigation measures	Likelihood	Severity	Residual Score	Comment
Section 1: Borrowell Road to Leisure Centre bridge											
1.	This would be a newly installed cycle path, there would be the potential of non-cyclists using the path resulting in potential conflict between pedestrians and cyclists	2	3	Collision between pedestrians and cyclists, loss of control	6		Provision of signing to warn pedestrians of cyclists' present	1	3	3	
2.	Confluence of cycle path and existing footpath running between Abbey Hill and Leisure Centre	3	3	Collision between pedestrians and cyclists, loss of control	9		Appropriate signage on both cyclist and pedestrian paths	2	3	6	Line of sight for both pedestrians and cyclists need to be mitigated
3.	The current pedestrian bridge is unsuitable as a shared pedestrian/cyclist's route and could lead to potential conflict between users	3	3	Collision between pedestrians and cyclists, loss of control	9		The present footbridge does not meet the standard to be used as a shared pedestrian/cyclist route. It will need to be replaced Provision of signing to warn pedestrians of cyclists' present	2	3	6	
Section 2: Leisure Centre Bridge to Bridge Street											
3.	This would be a newly installed cycle path, there would be the potential of non-cyclists using the path resulting in potential conflict between pedestrians and cyclists	2	3	Collision between pedestrians and cyclists, loss of control	6		Provision of signing to warn pedestrians of cyclists' present	1	3	3	

Route 3 – Dedicated cycle path to south of Finham Brook

No.	Hazard	Likelihood	Severity	Severity Comment	Score		Proposed mitigation measures	Likelihood	Severity	Residual Score	Comment
Section 1: Borrowell Road to Leisure Centre bridge											
1.	This would be a newly installed cycle path, there would be the potential of non-cyclists using the path resulting in potential conflict between pedestrians and cyclists	2	3	Collision between pedestrians and cyclists, loss of control	6		Provision of signing to warn pedestrians of cyclists' present	1	3	3	
2.	Confluence of cycle path and existing footpath running between Abbey Hill and Leisure Centre	3	3	Collision between pedestrians and cyclists, loss of control	9		Appropriate signage on both cyclist and pedestrian paths	2	3	6	
Section 2: Leisure Centre Bridge to Bridge Street											
3.	This would be a newly installed cycle path, there would be the potential of non-cyclists using the path resulting in potential conflict between pedestrians and cyclists	2	3	Collision between pedestrians and cyclists, loss of control	6		Provision of signing to warn pedestrians of cyclists' present	1	3	3	
4.	The current pedestrian bridge is unsuitable as a shared pedestrian/cyclist's route and could lead to potential conflict between users	3	3	Collision between pedestrians and cyclists, loss of control	9		The present footbridge does not meet the standard to be used as a shared pedestrian/cyclist route. It will need to be replaced Provision of signing to warn pedestrians of cyclists' present	2	3	6	

Route 4 – Shared pedestrian/cycle path crossing diagonally across Abbey Fields

No.	Hazard	Likelihood	Severity	Severity Comment	Score		Proposed mitigation measures	Likelihood	Severity	Residual Score	Comment
Section 1: Borrowell Lane along Forrest Road to junction with Abbey End and Abbey Hill											
1.	Current footpath needs to meet national standards for it to be used as a shared pedestrian/cycle path	2	3	Potential collision between cyclists and pedestrians	6		Path widened with appropriate signage and lines	1	3	3	
2.	Convergence of cycle path and Abbey Fields Footpath at Abbey End/Hill junction	2	3	Potential collision between cyclists and pedestrians	6		Path widened with appropriate signage and lines	1	3	3	
Section 2: Existing footpath across Abbey Fields from Abbey Hill to Bridge Street											
1.	Steep gradient with narrow path with adjacent benches and trees	3	3	Potential high cyclists' speeds with potential loss of control and conflict with pedestrians, street furniture and trees	9		Path will need to be widened and "zig-zagged" to reduce the gradient	2	3	6	

Route 5 - Peripheral route around Abbey Fields

No.	Hazard	Likelihood	Severity	Severity Comment	Score		Proposed mitigation measures	Likelihood	Severity	Residual Score	Comment
Section 1: Borrowell Lane along Forrest Road to junction with Abbey End and Abbey Hill											
1.	Current footpath needs to meet national standards for it to be used as a shared pedestrian/cycle path	2	3	Potential collision between cyclists and pedestrians	6		Path widened with appropriate signage and lines	1	3	3	
2.	Convergence of cycle path and Abbey Fields Footpath at Abbey End/Hill junction	2	3	Potential collision between cyclists and pedestrians	6		Path widened with appropriate signage and lines	1	3	3	
Section 2: Abbey Hill to Bridge Street											
3.	Steep gradient with narrow footway and busy road to one side and stone wall to the other	3	4	Potential collision between cyclists, pedestrians, and motorists	12		Any potential mitigation is difficult due to gradient and lack of space to accommodate all highway users	3	4	12	
4.	Bus stop located between highway and footpath, with potential conflict between pedestrians, cyclists, and bus users	3	3	Potential collision between cyclists, pedestrians, bus users and motorists	9		There is the potential to reduce depth of bus-stop and widen the path at this point alongside potential use of appropriate signage	1	3	3	