
10219 Land at Valley Park, Didcot

Technical Note 37: Southern Access – Response to planning committee NMU Crossing Options

26th April 2021

1 Introduction

- 1.1 Brookbanks is appointed by Hallam Land Management (HLM), Taylor Wimpey (TW) and Persimmon Homes (PH) to provide engineering support at a large mixed-use development at Valley Park, Didcot.
- 1.2 This Technical Note responds to the recent Planning Committee response and questions raised by the Committee on the 16th of February 2021 regarding the proposed development. This note deals specifically with those questions raised by the Committee on the potential provision for non motorised users (NMU's) at the southern access 5 arm roundabout.
- 1.3 The note also addresses the correspondence received by VoWH and OCC in the period following the committee meeting. Set out below as follows:

- **Note on possibility of a pedestrian / bridleway underpass at Didcot Road / Link Road roundabout Martin Ricketts 25 February 2021** issued to Brookbanks on 3rd March 2021 (Ref **Note A** for purposes of this report and included as **Appendix A**)
- **Giles Barwell email dated 18 March 2021.**

“Dear Jason – Following deferment of the Valley Park planning application it’s good to learn that concerns are being addressed and new ideas examined to improve the design of the roundabout. As part of this, can we ask that the following possibility is also included among those options being considered. We are also writing to the Vale planning officer, asking the same.

Valley Park/B4993 roundabout – a 4-arm option Reduce the number of arms on the roundabout from 5 to 4 by removing the planned new spur road which goes into the southern area of the Valley Park development. This would make the roundabout smaller as well as reducing the number of major crossings that pedestrian and cycle users would need to make. As part of its reduction in size the roundabout should be of radial rather than tangential design thus reducing the approach speed of motorised traffic entering the roundabout making it safer to navigate.

An emergency access route, closed to non-emergency traffic, from the B4993 by the care home could be considered if access to this part of the site is deemed necessary. Traffic from the southern area of Valley Park would then access the Link Road via a new roundabout instead of the junction which is currently planned further along it.”

- 1.4 For further background on the 5-arm design and response to other points raised at the committee please refer to **Brookbanks TN 36- Southern Access Design Rationale**.
- 1.5 The paragraphs below set out the constraints at the roundabout site, confirm why the current design proposal has been progressed and why the following options are not feasible for this site:
 - Underpass.
 - Over bridge.
 - Dutch Style Roundabout; and
 - 4 arm roundabout

2 Design Options

Constraints

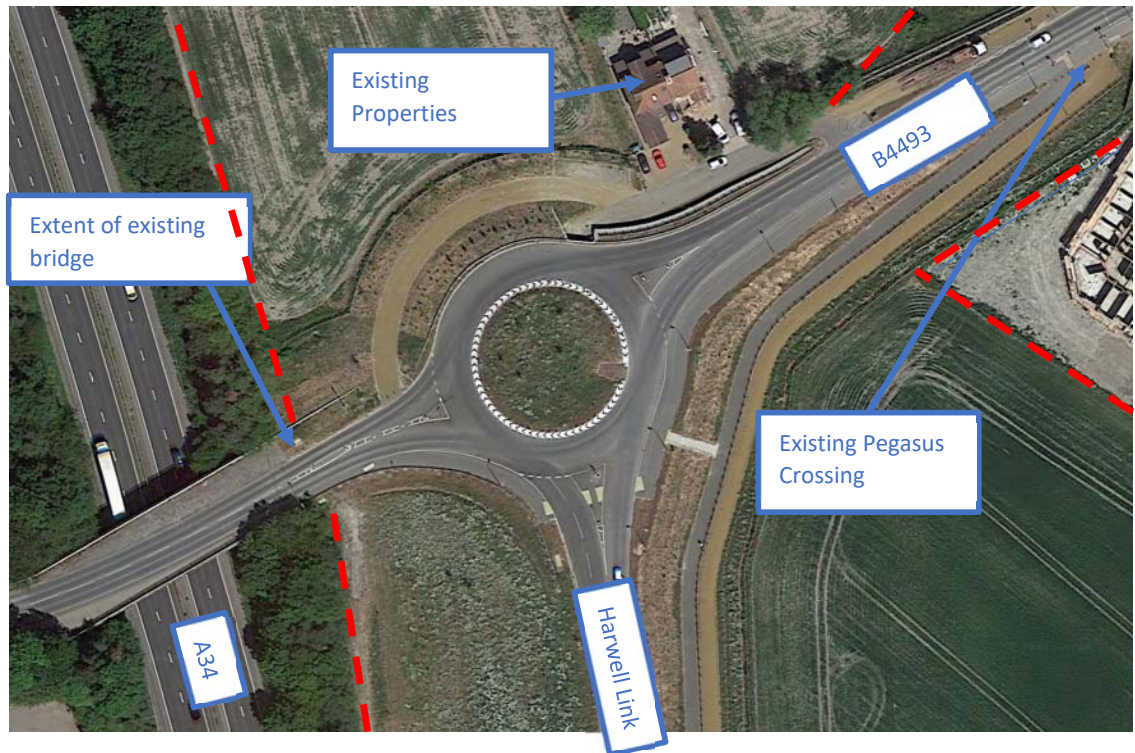


Figure 2.1- Aerial View Existing 3 arm roundabout.

- 2.1 The existing site layout is shown in the aerial image included as Figure 2.1.
- 2.2 The site consists of a 3-arm roundabout located on the B4493 with the recently constructed Harwell Link road to the south.
- 2.3 The A34 runs north south to west of the roundabout with the B4493 bridging over the existing dual carriageway.
- 2.4 Existing constraints are considered as follows:
 - Bridge deck to the east;
 - Embankment to the A34 to the east;
 - Existing properties to the west
 - Roundabout layout; and
 - Harwell Link to the south.

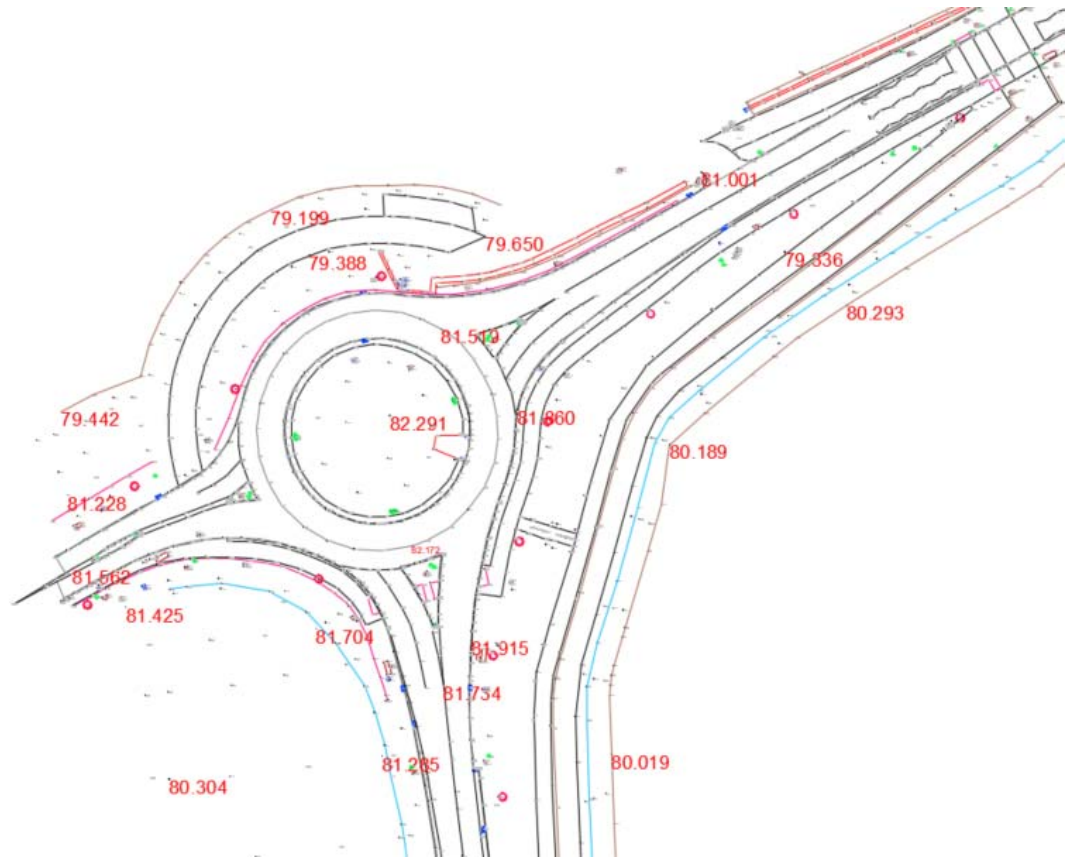


Figure 2-2: Extract from Topographical Survey dated 2018, existing levels highlighted.

- 2.5 The 3-arm roundabout has been designed around the existing site constraints. Interrogation of the topographical survey included as Figure 2-2 indicates approximate levels of 82m AOD at the roundabout circulatory and 81.7m AOD on the Harwell Link. The vertical alignment of the roundabout has been designed to tie in with the existing bridge alignment to the west and the existing B4993 to the east.
- 2.6 Further interrogation of the levels adjacent to the roundabout indicate approximately 79.5m AOD and 81.5m AOD to the south. Levels to the west of the Harwell Link are 81.2m and to the East approximately 80.0m AOD. Therefore, the level difference between the roundabout and the adjacent topography is no greater than **2.0 m** along its boundaries where underpasses would be considered.
- 2.7 The Valley Park development includes the proposal to add two arms to the existing roundabout and improve NMU facilities through the junction. Figure 2.3 shows the latest design proposals.

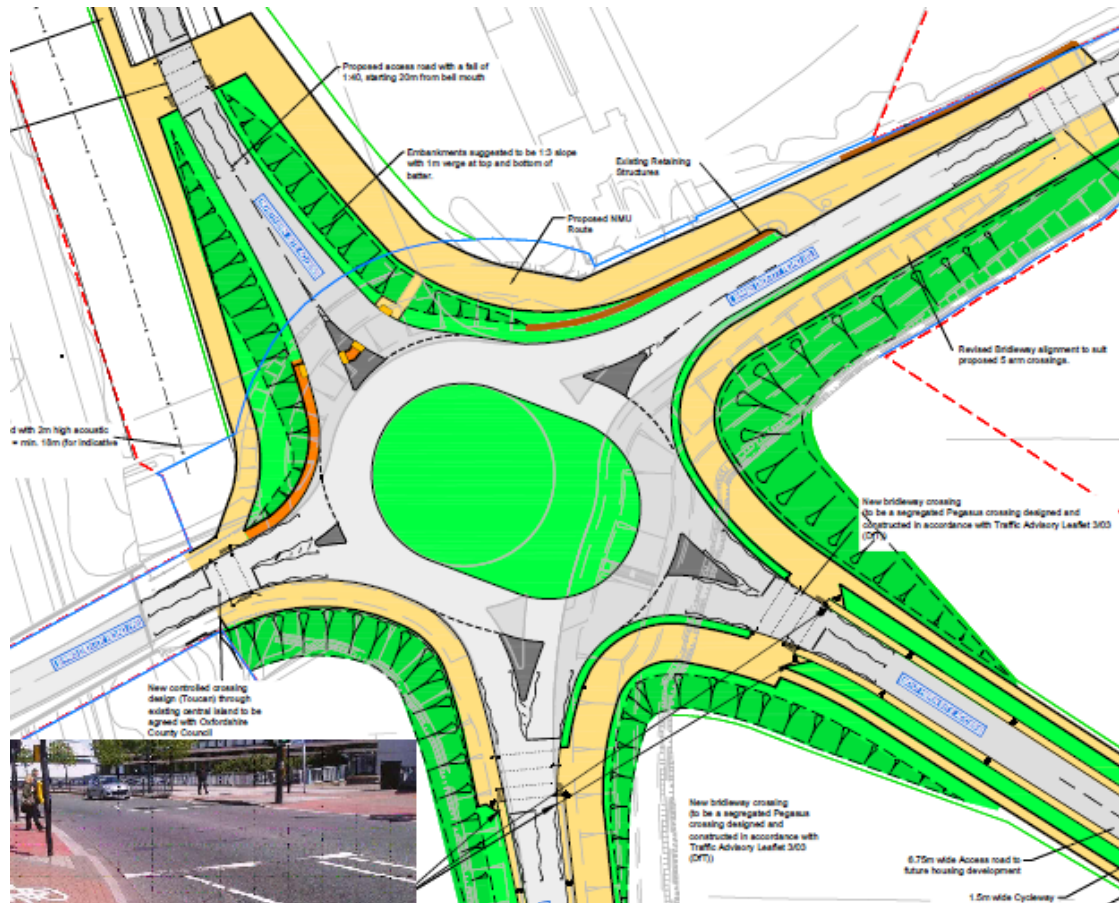


Figure 2-3- Proposed 5 arm roundabout layout (extract Brookbanks drawing ref 10219-HL-61-100-004 E)

2.8 The red line boundary extent (shown in red dashed line) and requirement to provide a noise bund to the west of the northern link road are additional constraints that require consideration in the design proposals.

Underpass

Design Criteria

2.9 To address the concerns raised at the planning committee meeting the provision of an underpass has been considered at the site. Current design guidance has been referenced as follows:

- The Design Manual for Roads and Bridges sets out the requirements for non motorised users in walking, cycling and horse riding **CD143**. The **minimum headroom** required for the underpass is **3.4m** for equestrian provision.
- Disability Discrimination Act (**DDA**) 1995 for access compliance.
- CIHT Manual for Streets 2 (**Mfs2**)

2.10 A typical culvert for the dimensions required for an underpass of this size would require 400mm thickness plus carriageway construction and service provision above therefore a minimum of 1m would be required above the minimum headroom requirement requiring a total height difference of **4.4m**.

Existing Topography

- 2.11 Although raised above the surrounding topography at most of its extremities the roundabout is not at a suitable height to accommodate the required headroom and construction for a simple underpass arrangement at existing ground level. Therefore, underpasses would have to be constructed below ground level.
- 2.12 Due to the existing topography a DMRB/DDA compliant underpass would require significant engineering works and would likely deem this element unviable. The underpass would need to be set approximately 3m below the existing ground level to the north increasing to approximately 4m below existing levels to the south. Similarly, an east west arrangement would require an underpass set 4m below existing ground at the Harwell Link with a 2.2m drop underneath the new arm to the east.
- 2.13 A DDA compliant design would require the bridleways to ramp down at 1:21 over 40-80m depending on the level reduction required resulting in extensive retaining and creating an undesirable enclosed space for NMU's. Due to the width of available land to the west (40m) a zig zag arrangement would have to be considered for the east-west route. Retaining and/or embankments would also need to be considered within this corridor. The zig zag arrangement would create an isolated area raising concerns around safety.
- 2.14 This additional routing as mentioned above would add an additional 80m to any routing from the need for ramps and landings for resting. While steps could be provided this would only cater for able bodied users on foot and not for disabled users, cyclists, and horse riders.

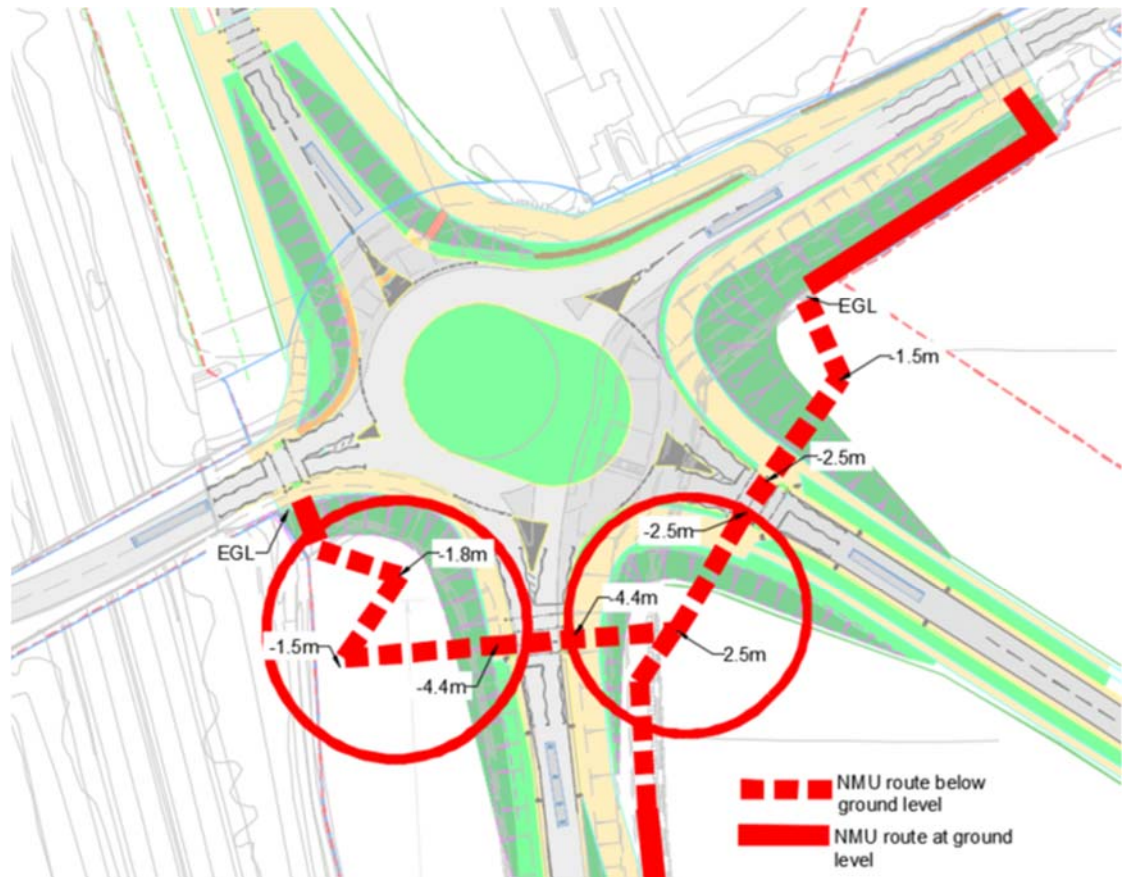


Figure 2-4 East – West Underpass Issues

- 2.15 Figure 2-4 highlights the level issues with a potential east- west underpass route arrangement designed to accommodate DDA and DMRB criteria. The dashed lines indicate where the route is set over 1m below ground level and the areas circled highlight spaces that would become enclosed by retaining due to the proposed arrangement and existing topography. The level differences highlighted are relative to existing topography.

- 2.16** Note A shows a potential arrangement, unfortunately this would not work as shown due to the reasons set out above. Further review has found the plan shown is slightly out of scale, so length of route shown does not correctly reflect the length required to ramp down. It also does not consider the land take for retaining/embankments.

Construction and Maintenance Issues

- 2.17** An underpass solution below existing ground levels would result in drainage issues at the low points up between 2 and 4m below existing ground level. Although land may slope away even if an outfall could be achieved providing long lengths of unnecessary drainage would further increase the maintenance issues for the adopting authority. Retaining structures and lighting requirements also inevitably result in maintenance issues.
- 2.18** There are existing services located along the B4493 and Harwell Link Road that would require diversion to accommodate underpasses. Utilities diversions can be costly and impact on delivery programme.
- 2.19** As designers we should consider all aspects of Health and Safety and the construction and maintenance of underpasses and design to minimise risk to operatives in terms of Health and Safety under the CDM regulations.

Current guidance & policy

- 2.20** During the committee meeting on the 16th February OCC confirmed that underpasses are not secure by design and have maintenance and drainage issues. OCC stated that they would challenge the inclusion of this design if brought forward.
- 2.21** CIHT guidance Manual for Streets 2 advises against the use of the subways beneath roundabouts as they are rarely successful in providing an alternative route for users.

Existing Underpass

- 2.22** Note A references a crossing at Chilton Village. It is recognised that there are situations where an underpass is the only or the preferred solution. This may be due to the nature of the road to be crossed, traffic flows, topography etc. It has been noted that at the Chilton underpass there have been issues with drainage and lighting reported by the public which give further endorsement to the maintenance issues raised in the paragraphs above.

Over Bridge

- 2.23** For reasons similar to those of an underpass a bridge option has been discounted. Although a bridge would be open and preferable in terms of safety, it would require extensive ramping and the layout constraints of the site would make this a difficult and complex design solution to deliver.
- 2.24** The bridge would require 5m clearance above existing highway and therefore ramping would be more extensive than the underpass solution due to the existing topography and proposed levels. A bridleway crossing would also be required as the bridge would be unsuitable for equestrian users.
- 2.25** Figure 2-5 below highlights the extensive ramping in a potential east west bridge arrangement required to achieve required headroom and remain DDA compliant. A north south route would require a similar extent of ramping.
- 2.26** NMU journey times would be increased by the extension of the route.

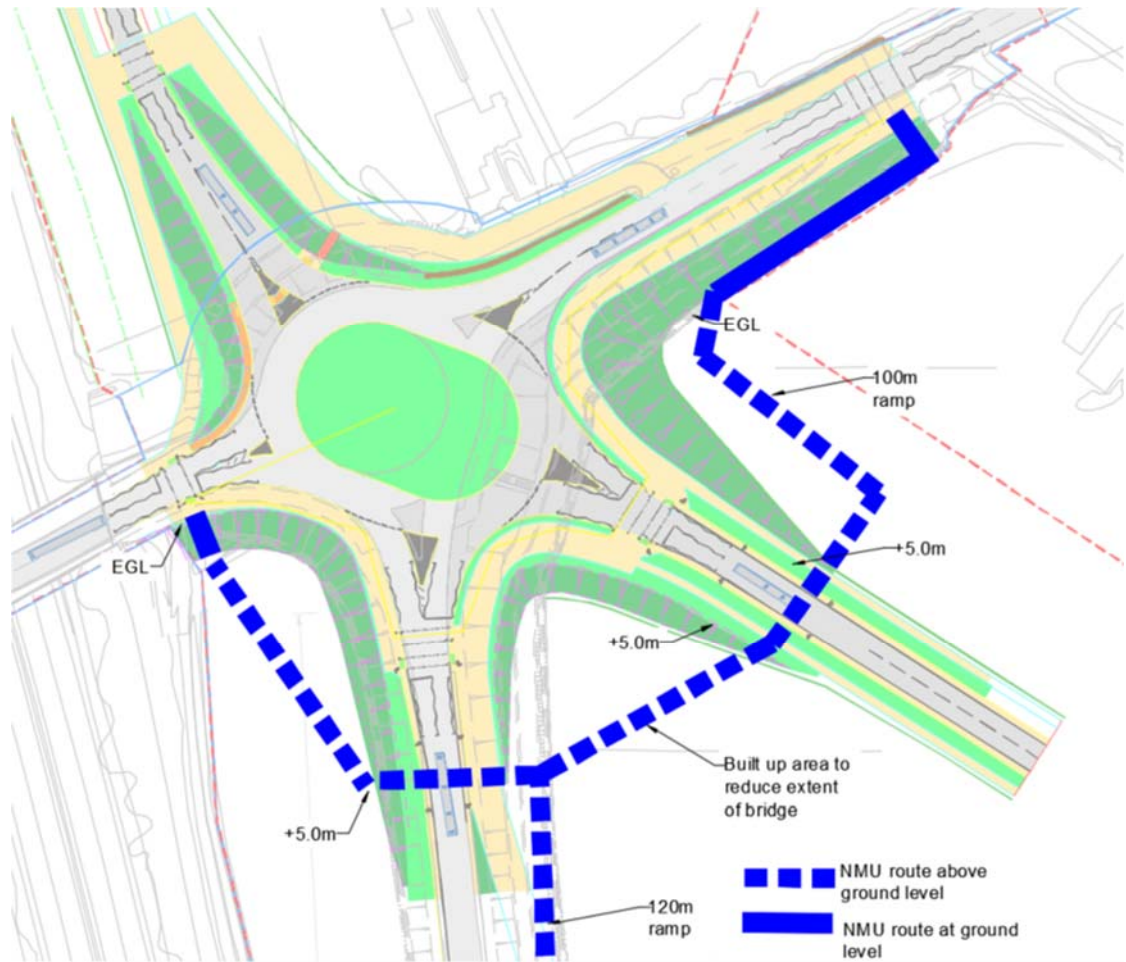


Figure 2-5 East- West Bridge Ramping Requirements

Dutch Style Roundabout

- 2.27 Dutch style roundabouts are a relatively new concept within the UK and as such remain a safety concern for users. There is often confusion over priority and visibility of users particularly cyclists as a result designs need to be carefully considered and where possible education to potential users to minimise risk.
- 2.28 A Dutch Style roundabout option is presented in Figure 2-6. The design includes a circulatory route for cyclists alongside the zebra style crossing for pedestrians. Where the route forms part of the bridleway a Pegasus crossing will be required. Space is provided between the entry and exits and crossings to accommodate waiting vehicles. This option shown is a high-level design subject to traffic modelling, therefore the extent could increase. However, it can be clearly seen with the layout shown that the footprint required to accommodate this design encroaches on areas outside of the site boundary including existing properties and therefore is not an option for the Valley Park Development.

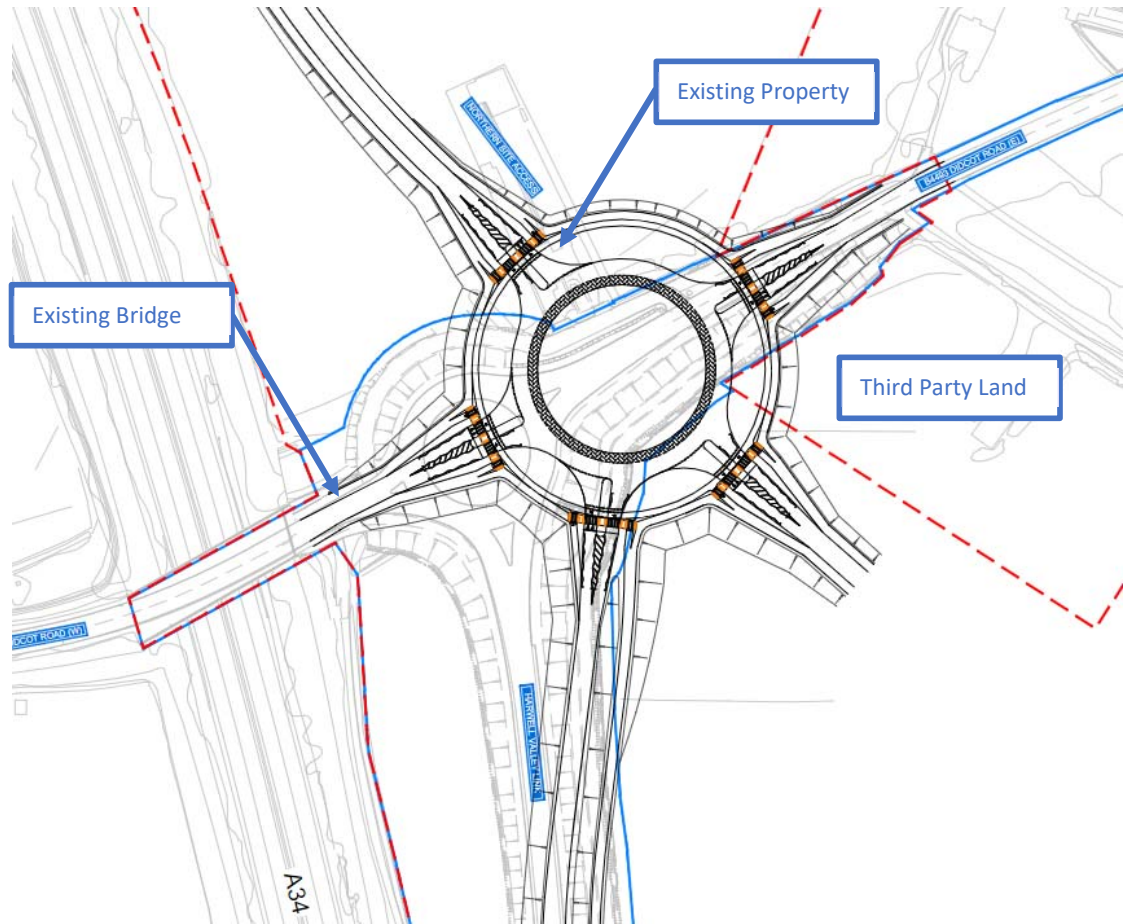


Figure 2-6 Dutch Style Roundabout Option

2.29 Moreover, to give some context around the journey time saving of the Dutch style option compared to the current 5th arm design we have measured the two routes from east to west. The measurement shows the Dutch style is only some 30m shorter in length and therefore the impact on journey time for a cyclist or other NMU is inconsequential through the junction.

4-Arm Roundabout

2.30 The final option considered in this note is the provision of a 4-arm roundabout. In terms of NMU provision the removal of the 5th arm will only serve to move the problem of an additional crossing elsewhere. If the access were moved to a new junction with the Harwell Road another crossing point is created and therefore another 'break' in the cycle route. This junction would have more vehicle movements to consider and would not benefit from a controlled crossing. If a green wave is employed at the 5-arm roundabout as proposed in TN36 it will give the users a safer and faster option to reach their destination.

2.31 The Harwell link is a strategic route for local and commuter traffic. One of its primary functions is a faster more predictable and attractive route to surrounding destinations for traffic compared to travelling through the local villages. As such, junctions on principal routes should be kept to an absolute minimum to ensure the route remains quick and attractive. Consequently, the southern site access arrangements have been designed to minimise routing directly on to the Harwell Link with its main access from the new 5 arm roundabout. There is a singular link from the new southern part of the development onto the Harwell Link, but this is designed specifically to give priority to the main road, and it is therefore anticipated that most access and egress would be taken from the 5-arm roundabout.

- 2.32** Finally, it is worth noting that Public transport through the southern section of the site would be enhanced from access from the 5-arm roundabout, as this is the main route for Public Transport generally in the area. It is accepted that maximum access and minimum diversion is the route to good public transport and therefore reducing the number of junctions to be negotiated for any public transport route should be encouraged. If access to the southern development is taken purely from the Harwell link, then this will become more of a detached route from the north south public transport corridor than the 5 arms currently offer and will also increase the number of junctions to be negotiated for that access.

Preferred Design Solution

- 2.33** As a result of the meeting and the findings of this review the designers have further considered alternative options for NMU provision at the roundabout. The resultant design is shown in Figure 2.3 and discussed in further detail in TN 36. An additional controlled crossing has been included on the Harwell Link Road and crossings have been moved closer to the roundabout to reflect desire lines. Enhanced provision has been considered for the NMU's to improve the journey through the roundabout. Based on our review the **at grade crossing solution** with enhanced crossing facilities would appear to be the preferable solution for safe passage of the NMU's.

3 Recommendations

- 3.1** The findings of this note are that the options considered are **not** suitable solutions for the proposed alterations to the existing roundabout at this location.
- 3.2** It is recommended that the solution of the 5-arm roundabout with at grade crossings is more suited to the existing site layout, please refer to **TN36** for further details.

Limitations

- 3.3** The conclusions and recommendations contained herein are limited to those given the general availability of background information and the planned usage of the site.
- 3.4** Third party information has been used in the preparation of this report, which Brookbanks, by necessity assumes is correct at the time of writing. While all reasonable checks have been made on data sources and the accuracy of data, Brookbanks accepts no liability for same.
- 3.5** The benefits of this report are provided solely to Hallam Land Management, Taylor Wimpey, and Persimmon Homes for the proposed development on the Land at Valley Park, Didcot only.
- 3.6** Brookbanks excludes third party rights for the information contained in the report.

4 Appendices

Note A--*Note on possibility of a pedestrian / bridleway underpass at Didcot Road / Link Road roundabout Martin Ricketts 25 February 2021*

Note on possibility of a pedestrian / bridleway underpass at Didcot Road / Link Road roundabout.

Martin Ricketts 25 February 2021

The suggestion of an underpass was raised at the recent planning meeting. It was suggested there might not be room to get the required gradient on it.

It seemed worth checking, as far a lay person can, with just a laser rangefinder with height-difference measurement.

The government document on inclusive mobility specifies a gradient limit of 5% to maintain access for wheelchairs etc.

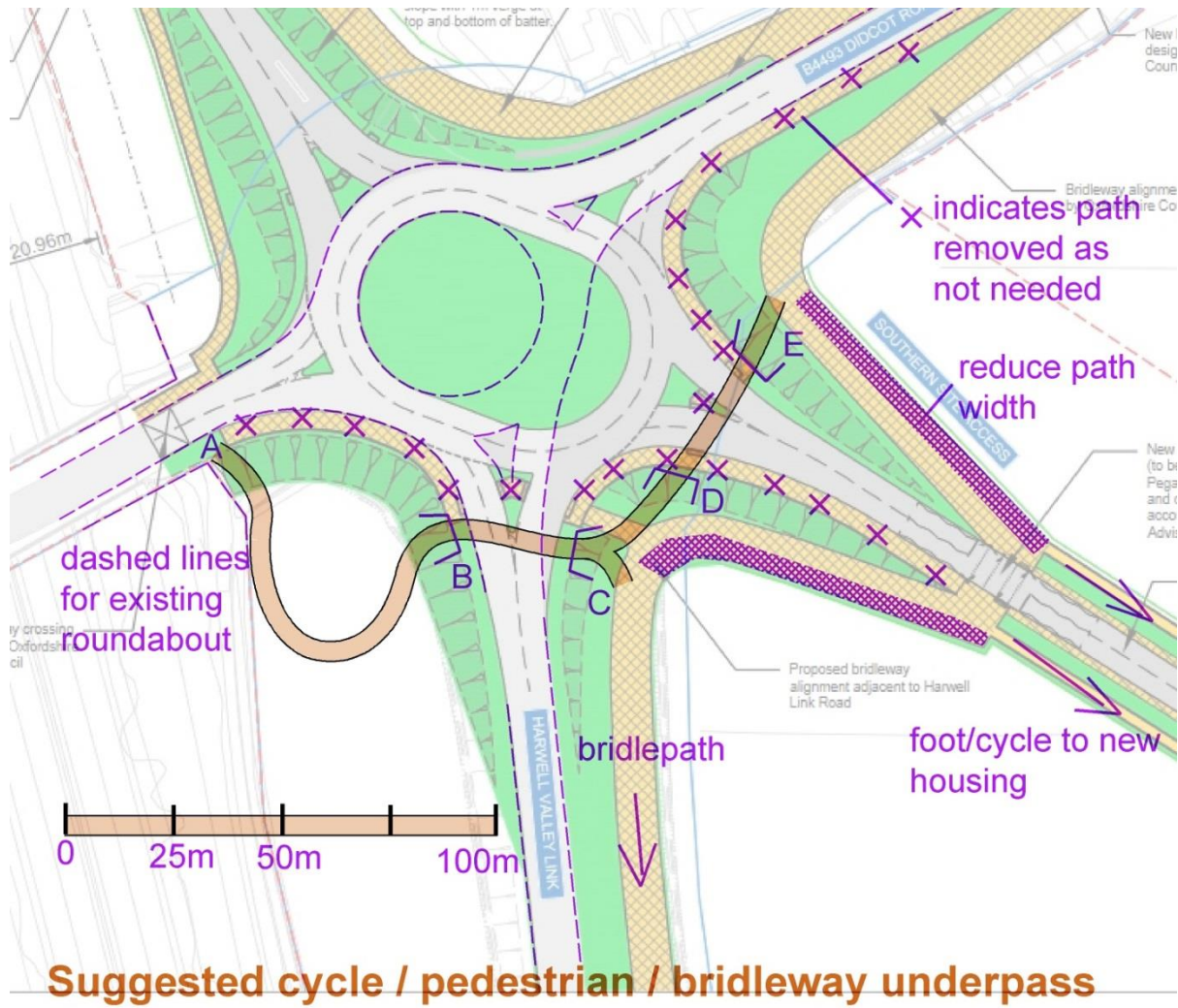
The document *CD 143 Designing for walking, cycling and horse-riding* specifies that headroom for riders shall be a minimum of 3.4 metres.

The nearest underpass to Harwell is that at Chilton, where the continuation of the Harwell Holloway goes under the A34. A visit showed that this has headroom of 4.2 metres, but was no doubt designed for agricultural vehicles to access the fields. The A34 road surface is about 4.6 m above the underpass floor, so only about 0.5m is required for the structure between underpass and road surface. The gradients of the track on either side reach 5%. Here is a view from the Chilton village side:



This indicates that for just a bridleway the surface of the underpass needs to be about 4 metres below the road level.

At the proposed Didcot Road roundabout, it looks feasible to put a pedestrian / bridle path under the link road and the new roundabout arm for the Valley Park development. Taking the plan from the proposal, the figure below has a 5-metre wide path added along line A-B-C-D-E which has 2 underpasses, B-C and D-E:



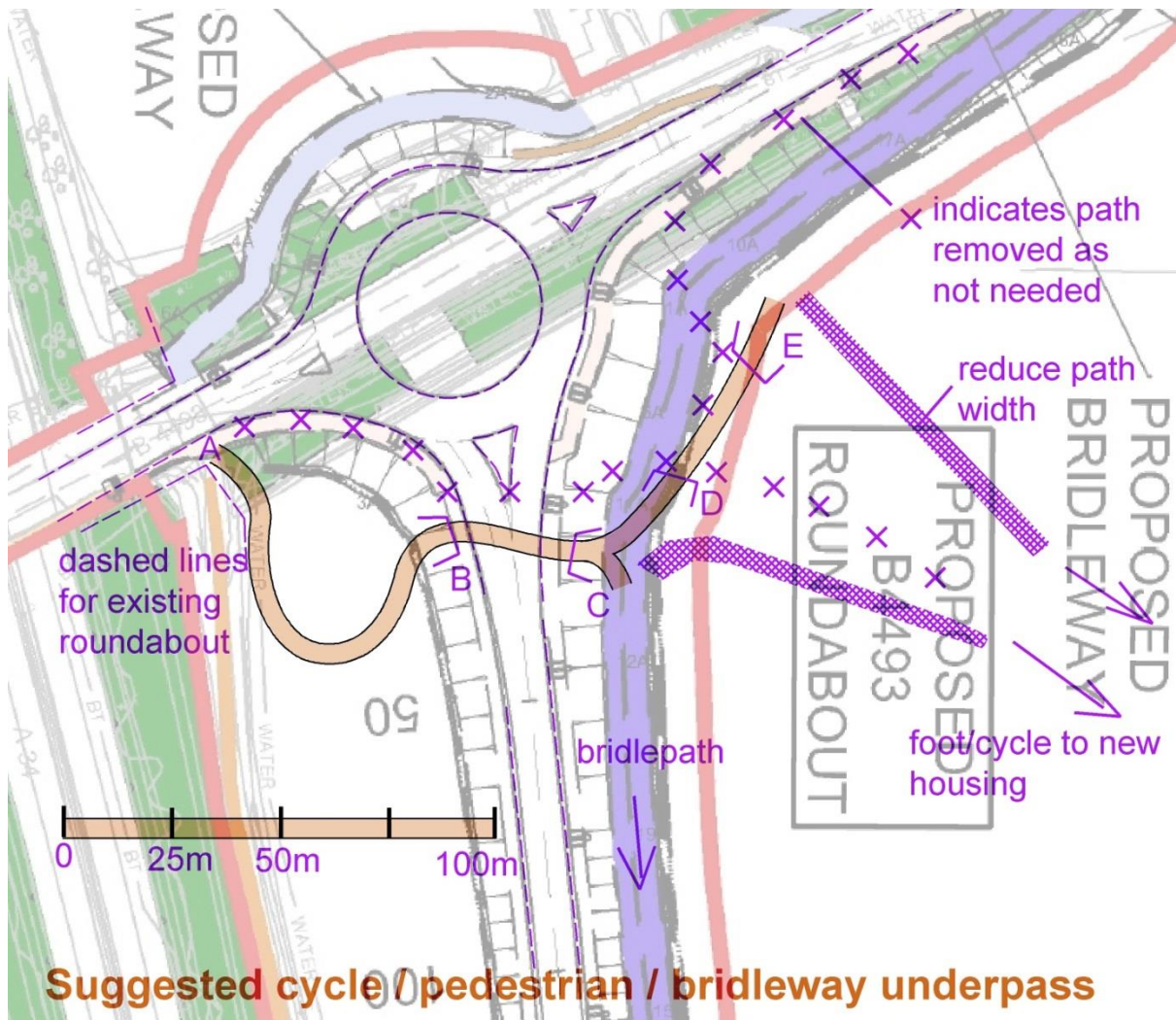
Suggested cycle / pedestrian / bridleway underpass

The link Road is hardly changed in the proposal; its underpass is B-C. The distance A to B is about 50 metres, but putting in a loop as shown can increase this to 100m. A gradient of 5% then allows the path at B to be 5 metres below the path at A, where the route joins the Didcot Road over the A34.

The verge at B is very slightly above the path at A, but assuming they are level, the path entering the underpass at B could be 5m below the road surface, which is more than enough. The bridlepath route to the Driftway could then be immediately joined without the enormous detour either current or proposed.

Sections of path adjacent to the road would no longer be needed – as shown by the purple Xs, and the paths to the new housing would be just that, not a route to a bridleway crossing.

The next figure replaces the proposal plan for one of the current roundabout. I hope the figure isn't too confusing, with the extra annotation, but you can see that the underpass B-C emerges at C onto the current cycle path / bridleway route.



Looking down on the current path and bridleway beyond the fence from by the Link Road this is the view, on the left. Where the steps currently are, not shown on the original plan above, the cycle path and bridleway are 3.0 metres below the road verge. So to accommodate the underpass they would need to be lowered by maybe upwards of a metre, which doesn't seem impossible.

Conclusion:

There appears to be adequate space between the roundabout and the A34 to fit in a curved path to an underpass under the Link Road and then under the proposed south-east arm off the roundabout to new housing. It seems so feasible that is somewhat surprising that it wasn't done for the existing scheme. There are obviously other considerations, but I believe the only other one mentioned at the planning meeting was drainage, and as the ground slopes away both to the north, south and to the A34, this would not seem an obstacle.

What would happen regarding any bridleway on the northern arm of the proposed 5-arm roundabout would be for to the developer to decide.

Martin Ricketts