

# Smart Motorways Programme

## M4 Junctions 3 to 12 Smart Motorway

Non-Material Change  
Oldway Lane Overbridge  
Technical Note

Document Number: HA514451-CHHJ-GEN-SZ\_ZZZZZZZZ\_Z-TN-KK-0080

April 2022



# Contents

---

1	Introduction .....	1
2	Background .....	2
3	2015 DCO Design .....	3
4	2021 NMC Design .....	4
5	Safety .....	7
6	Environmental Impact.....	8
7	Conclusion.....	28

# 1 Introduction

---

When the Development Consent Order (DCO) was granted for the M4 Junctions 3 to 12 Smart Motorway scheme (the scheme) in September 2016, a 0.5m limit of deviation with respect to vertical movement was set to allow for changes to structures.

However, following work to the detailed design, Oldway Lane overbridge has reduced by 1.51m in elevation, i.e. 1.1m more than the limit of deviation set in the DCO and has removed the requirement for reinforced earth retaining solutions on the approach to the bridge. This change is therefore being brought forward as part of a Non-Material Change (NMC) Application.

This technical note provides a summary of the changes made to the design of Oldway Lane overbridge, why these changes have been made and an appraisal of the impacts compared to those assessed for the DCO design.

## 2 Background

---

The M4 is a strategic part of both the English and Welsh road network, connecting London to South Wales. The scheme is located on 32 miles of the M4, between junction 3 and junction 12. It comprises of 28 miles of three-lane motorway and four miles of four-lane motorway between junction 4 and 4b. The scheme includes the M4 to M25 interchange; the junction for Heathrow Airport and; passes by several key regional centres including Slough, Windsor, Maidenhead, Wokingham and Reading.

Oldway Lane overbridge carries an accommodation access track, carrying only the occasional motorised vehicle, over the M4. It operates mainly as a bridleway, connecting to another track parallel to the westbound carriageway. The surrounding land use is primarily rural with the exception of the area to the north-east corner which has residential properties within 100m. The structure has four spans supported by buried abutments in the verge embankments and piers to the verges and central reserve. The verge piers force discontinuities in the M4 hard shoulder, meaning a longer span replacement bridge is required at this location.

## 3 2015 DCO Design

---

The existing bridge will be demolished and a new structure (as shown in Figure 1) built in its place. The existing structure, although originally constructed as a highway bridge, has carried pedestrian and equestrian traffic only for several decades. Following the principle of like-for-like replacement, the new structure will be a Non-Motorised User (NMU) bridge, rather than a vehicular bridge. The level of the finished route over the proposed bridge was proposed to be approximately 1.3m higher than the existing overbridge, due to the change in form and span of the proposed structure. The track or bridleway width was to be approximately 0.5m narrower than the existing bridge.

There is an environmental bund to the eastbound verge located between Oldway Lane overbridge and the next structure, Wood Lane overbridge. The bund has a length of approximately 1,100m. This bund will be retained unaltered.

## 4 2021 NMC Design

---

### 4.1 Structural and Side Road Design Changes

The proposed replacement structure is a single-span truss bridgeway overbridge. The drawings for the bridge included in the 2015 Engineering and Design Report stated that the top surface of the top chord (the curved uppermost member of the truss bridge) would be 4.75m above the bridgeway surface at the bridge midspan, implying that the overall structural depth of the truss at midspan would be approximately 5.1m.

During detailed design, the maximum overall depth of the truss was reduced to 4.05m in order to facilitate road transportation of the truss in two segments with a series of simple bolted connections at the midspan. A truss depth in excess of 4.1m would have required the main structural members to be transported separately from the deck plates and transverse members. This would have requiring extensive on-site assembly of the bridge components increasing construction cost and duration of the works and introducing exposing the workforce to additional risks due to the on-site welding work required. Under the proposed design, the distance at midspan from the bridgeway surface to the top of the top chord is reduced to 3.737m.

In addition, the overall vertical profile for the side road has been lowered by up to 0.5m, such that the proposed bridgeway is now approximately 0.8m higher than the existing structure. This change has facilitated the removal of significant lengths of retaining walls on both approaches to the overbridge.

The combined effect of the lowered side road profile and the reduction in truss depth means that the top of the bridge top chord is a total of 1.51m lower than the levels shown in the engineering sections and drawings

New earthworks, that will largely be constructed within the footprint of the existing earthworks, will be required to locally raise the side road alignment to tie into the new reduced height bridge (refer to section 4.4 for further details). Furthermore, the southern tie in of the proposed works has been curtailed on the south side of the M4 to ensure it fits within Local Authority land.

The proposed footpath links in the northeast and southwest corners have been subject to minor re-alignments to reflect the updated design. These changes are shown in Figure 2 and will have no impact on the routes or connectivity to the bridgeway/footpath network in the area.

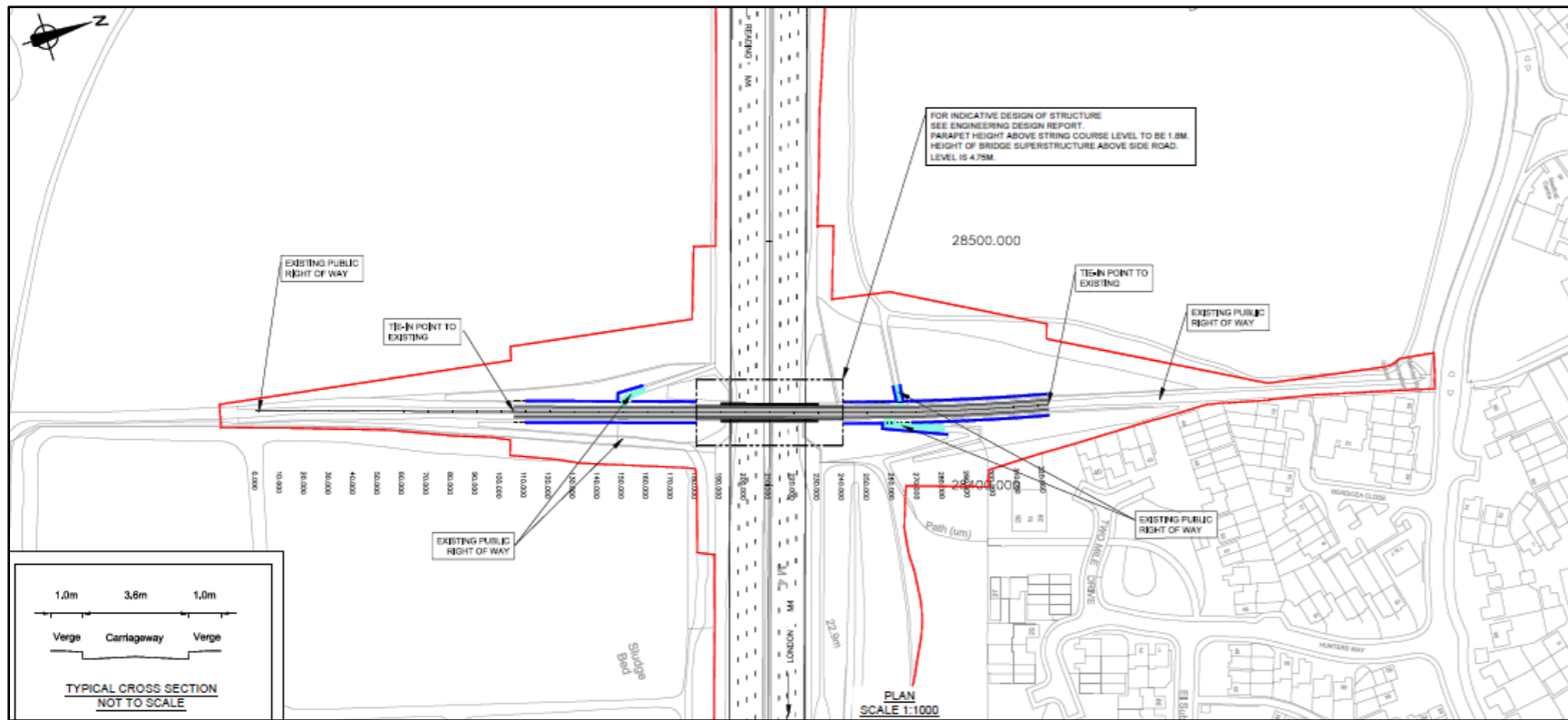


Figure 1 2015 DCO Design of Oldway Lane overbridge

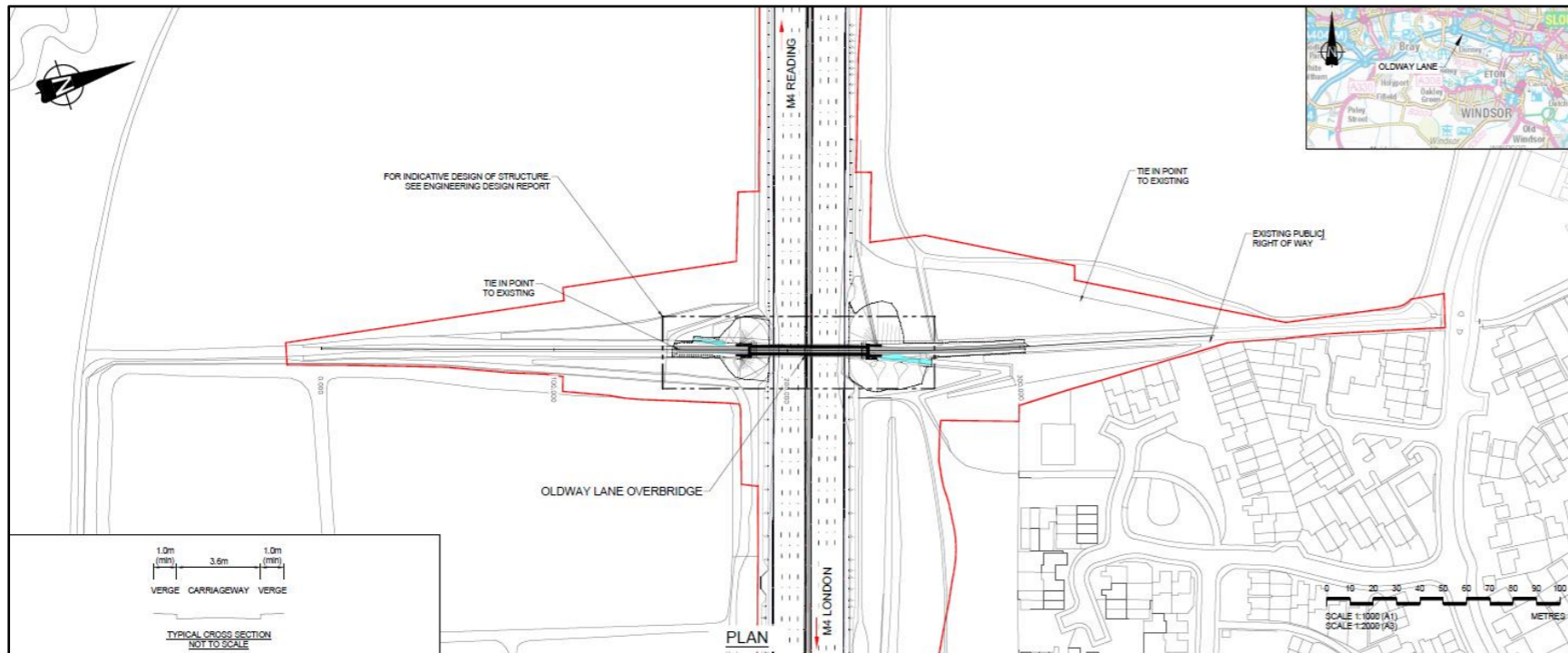


Figure 2 2021 NMC Design of Oldway Lane overbridge



## 4.2 Drainage changes

As the changes at Oldway Lane are related to a structure and its side road, there has been no significant impact of these changes to the drainage proposals.

## 4.3 Earthworks changes

### 4.3.1 2015 DCO Design

The 2015 DCO Design called for significant lengths (70-80m) of vertical to steeply sloping, reinforced soil retaining solutions on the approaches to the bridge. This requirement reflected the increased height of the proposed bridge relative to the existing and thus the additional height of fill that needed to be placed onto the existing embankments. The retaining solutions on the northern approach would have placed significant additional loads onto existing buried services crossing beneath (Thames Water clean and foul mains); hence a diversion of one or both of these services would have been required.

### 4.3.2 2018 DCO Discharged Design ([Requirement 6](#))

Design changes in 2018 sought to slightly reduce the overall extents of the retaining solutions (each wall 20-30m shorter), thus replacing the reinforced soil solutions with vertical, L-shaped reinforced concrete walls, the principle being to address concerns regarding the long-term stability of the existing embankment slopes under additional loading. The change to L-shaped walls was also of benefit (via the use of light-weight backfill materials) as it reduced the additional loadings onto the water mains crossing beneath the northern approach. The change from reinforced earth to reinforced concrete removed the opportunity to provide a soft (i.e. greening) finish to the retaining solutions.

### 4.3.3 2021 NMC Design

Following the 2018 DCO requirement discharge, further scheme value engineering reduced the height of the bridge structure by 0.5m, thus also reducing the height of filling required at the interface between the approach earthworks and the bridge abutments. This reduction in filling height has allowed the L-shaped retaining walls to be deleted and conventional (i.e. unreinforced) earthworks employed instead to tie-in the earthworks approaches to the lowered bridge.

The plan footprint and side slopes of the new earthworks have been blended into the existing approach embankments over a minimum feasible distance, so shortening the works extents overall. This has been achieved via full-height embankment reconstruction immediately behind the existing abutments, in order that the side slopes of the new embankments can be locally steepened to match, and thus blend rapidly into, the existing approach side slopes.

It is noted that the removal of the retaining solutions and the reduction in the plan extents and height of the required earthworks, has removed any requirement to divert the water mains under-crossing the northern approach to the bridge.

### 4.3.4 Change Summary

In summary, the key changes between the 2015 DCO Design and the 2021 NMC Design are that the reduction in height of the re-designed overbridge structure has permitted the deletion of reinforced earth retaining solutions on either side of the bridge approaches and their replacement by conventional greening earthworks that will blend seamlessly into the existing approach earthworks.

## 5 Safety

---

### 5.1 Driver and Non-Motorised user safety

The structure will no longer carry motorised vehicles, so will improve the safety of Non-Motorised Users (NMUs) using the bridge.

### 5.2 Workforce safety

The change in design to Oldway Lane overbridge has a net positive impact on workforce safety, through the minimising of on-site assembly required for the truss bridge, in particular the elimination of on-site welding. The deletion of the retaining solutions on the approaches is also beneficial, reducing the overall duration of the works as well as eliminating specific hazards such as handling of pre-cast wall units and backfilling adjacent to structures.

## 6 Environmental Impact

---

A review of the potential environmental impact resulting from the 2021 NMC Design, with cross-reference to the Environmental Statement (ES) submitted in support of the DCO application and the environmental documentation submitted in the Examination is discussed below.

The ES submitted in support of the DCO application assessed the following:

- Air Quality;
- Cultural Heritage;
- Landscape;
- Nature Conservation;
- Geology and Soils;
- Materials and Waste;
- Noise and Vibration;
- Effects on All Travellers;
- Community and Private Assets;
- Road Drainage and the Water Environment; and
- Cumulative Effects.

Following a review of the 2021 NMC Design, it has been determined that this Non-Material Change Application needs to consider the potential environmental impact on air quality, noise and vibration, biodiversity, landscape and visual, and water. These are discussed in further detail in the sections below.

It is considered that because there is no increase to construction procedures or any works outside order limits there would be no environmental impact as a result of the 2021 NMC Design on Cultural Heritage, Geology and Soils, Materials and Waste, Effects on All Travellers, or Community and Private Assets. Therefore, in relation to these topics, it is concluded that there are no changes to the assessment of residual effects presented in the ES, and therefore the assessments and conclusions presented in the ES remain valid. These topics are not considered further within this Non-Material Change Application.

Chapter 16 of the ES submitted in support of the DCO application considered combined and cumulative effects.

The former assessed the combined action of different environmental topic-specific impacts upon a single resource/receptor. Consideration of 'in-combination' effects is afforded within the topic change assessments below, where considered relevant.

The latter assessed the combined action of a number of different projects, cumulatively with the project being assessed, on a single resource/receptor. The list of developments included in the cumulative effects assessment was presented in Appendix 16.1 of the ES and was last updated in January 2015 and developments that were accounted for in the traffic model was presented in Appendix 16.2. The locations of the developments were shown on Figure 16.1 of the ES.

A review of relevant planning portals was undertaken in March/April 2021 to determine if any additional developments not in previously considered locations (built or under construction only) within 1km of the 2021 NMC Design, which did not exist within the planning system in January 2015. Such developments would not have been considered in the cumulative effects assessment or the traffic modelling undertaken in support of the DCO application, and therefore, need to be considered for this Non-Material Change Application.

This review concluded that no new committed developments, meeting the selection criteria outlined in Chapter 16 of the ES, are present within 1km of the 2021 NMC Design. Therefore, the cumulative effects assessment and conclusions presented in the ES remain valid.

It should be noted that the ES submitted in support of the DCO application was produced in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009. The Regulations were updated in 2017, in accordance with EIA Directive 2014/52/EU, and require consideration of the following additional factors/topics not cited in the 2009 Regulations:

- Climate
- Population and human health
- Major accidents and disasters
- Heat and radiation.

Regarding climate, there are two aspects to consider i) impact of the 2021 NMC Design on climate (greenhouse gas emissions); and ii) vulnerability of the 2021 NMC Design to climate change (adaptation).

The 2021 NMC Design (predominantly through its drainage design which has taken account of the appropriate climate change allowances (20%)) has been designed to address vulnerability to climate change (adaption), and therefore vulnerability of the 2021 NMC Design to climate change (adaptation) is not considered further within this Non-Material Change Application.

The scheme assessed within the 2015 DCO did not include an assessment of embodied carbon as this was not a legislative requirement at the time of submission. However, as the Application is focussed on design changes to the overall scheme and that there is therefore no baseline to compare to and given that the scheme construction footprint will be less with the proposed design changes, it is assumed that no further assessment of this matter is required to be taken forward; and it is assumed to not be a factor that will affect the materiality of the change.

The change in vertical alignment of the 2021 NMC Design does not impact traffic levels. Therefore, the impact of 2021 NMC Design on climate (greenhouse gas emissions) is not considered further within this Non-Material Change Application.

Regarding population and human health, a Health Impact Assessment was submitted at Deadline III of the DCO Examination, which was informed by the results of the air quality and noise assessments in the ES. Aspects of air quality and noise in respect of the Non-Material Change Application are considered in further detail in the sections below. As a result of the conclusions of that work, no further impacts to population and human health specifically are anticipated from the Non-Material Change Application.

Regarding major accidents and disasters, smart motorway schemes, like any major transport corridor, are considered to be potentially vulnerable to the following major man-made events:

- Industrial accidents such as the Buncefield fire affecting the M1;
- Road accidents involving the spillage of hazardous or polluting materials;
- Civil unrest or terrorist incidents; and
- Aviation accidents such as at East Midlands Airport.

In terms of natural hazards, those of relevance to a motorway relate to extreme adverse weather leading to unsafe driving conditions. Such events may lead to the spillage of fuel or other hazardous materials or those potentially damaging to the aquatic environment such as milk or other substances with a high biochemical oxygen demand.

None of the above major events would require a change to the design of a smart motorway scheme. Indeed, the very nature of a smart motorway scheme with the elevated level of motorway

surveillance would mean that the response time to any such incidents would be enhanced and the changes within the Non-Material Change Application would not affect this.

In terms of both man-made and natural major accidents, the incremental environmental risk associated with a smart motorway scheme is the pollution of water quality. However, there is a low probability of a significant impact arising from a low probability major event.

The 2021 NMC Design is not considered vulnerable to risk of major events, nor is there considered to be any consequential changes in the predicted effects of the 2021 NMC Design on environmental factors. Therefore, major accidents and disasters is not considered further within this Non-Material Change Application.

Regarding heat and radiation, the scope of the 2021 NMC Design does not involve the use of radiation. Only under controlled conditions is heat used while the road pavement is laid. Consequently, heat and radiation is not considered further within this Non-Material Change Application.

## **6.1 Air quality**

### **6.1.1 Introduction**

A qualitative change assessment has been undertaken, comparing the 2015 DCO Design with the 2021 NMC Design with reference to the air quality assessment presented in Chapter 6 of the ES submitted in support of the DCO application.

### **6.1.2 Change Assessment Findings**

#### **Construction**

The scale of the works being undertaken for the 2021 NMC Design are very similar to those in the 2015 DCO Design. Therefore, the potential for adverse effects due to fugitive emissions of dust will be similar with both designs. As such, proposed mitigation measures included within the ES submitted in support of the DCO application and the Construction Environmental Management Plan will be sufficient to mitigate adverse effects on nearby receptors during the construction phase.

#### **Operation**

As the 2021 NMC Design constitutes alterations to the NMU bridge, tie ins and earthworks, there will be no changes in traffic flows or location of traffic flows due to the proposed change to Oldway Lane Overbridge.

### **6.1.3 Conclusion**

There are no changes to the assessment of residual effects presented in the ES, and therefore the assessment and conclusions presented in the ES remain valid.

## **6.2 Noise and vibration**

### **6.2.1 Introduction**

A qualitative change assessment has been undertaken, comparing the 2015 DCO Design with the 2021 NMC Design with reference to the noise and vibration assessment presented in Chapter 12 of the ES submitted in support of the DCO application and the Enhanced Noise Mitigation Study Report submitted at Deadline VII and revised at Deadline VIII of the DCO Examination.

## 6.2.2 Changes in Baseline

Subsequent changes in traffic flows on the M4 and surrounding roads since the ES was submitted in support of the DCO application would affect the Do Minimum (i.e. without the scheme) and Do Something (i.e. with the scheme) traffic flows in similar ways.

Consequently, the negligible or minor noise level reductions reported in the ES and the Enhanced Noise Mitigation Study Report would still be evident and therefore the assessment and conclusions presented in both documents remain valid.

As shown in the ES and the Enhanced Noise Mitigation Study Report, there are negligible or minor noise level reductions with the scheme in operation. Consequently, there will be no adverse significant effects on any new committed developments within the Oldway Lane overbridge study area (although none have been identified) resulting from the implementation of the 2021 NMC Design, as there are no anticipated changes in traffic flows due to the Oldway Lane overbridge design changes.

## 6.2.3 Sensitive Receptors

Figure 3, below, shows Oldway Lane overbridge and the surrounding area. There is a substantial residential area to the north east of the bridge over the M4. There are no sensitive receptors to the south of the M4 in this area.

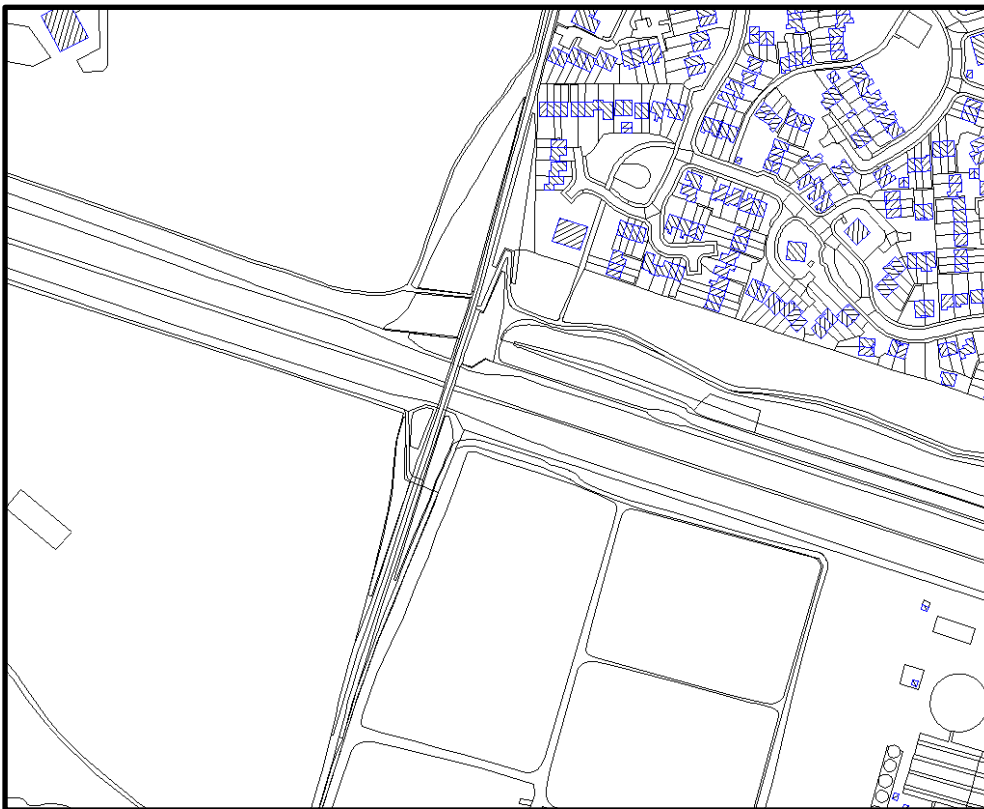


Figure 3 Oldway Lane overbridge and Surrounding Area

## 6.2.4 Change Assessment Findings

### Construction Noise and Vibration

Given the minor changes that constitute the 2021 NMC Design, construction noise and vibration levels to surrounding sensitive receptors will not be significantly different to those for the 2015 DCO Design. The replacement of reinforced earth retaining solutions with conventional greening earthworks will employ plant with comparable noise emission values.

## Operational Noise

The change assessment has identified that traffic changes are overall lower than those predicted for the ES and that changes provided by the 2021 NMC Design are negligible. Consequently, and given the minor changes that constitute the 2021 NMC Design, there will not be any significant changes to noise levels to sensitive receptors in the vicinity when compared to the 2015 DCO Design.

### 6.2.5 Conclusion

The qualitative change assessment has concluded that the 2021 NMC Design will not result in any significant construction noise and vibration level changes or operational noise level changes to surrounding receptors when compared with the 2015 DCO Design. It is therefore concluded that there are no changes to the assessment of residual effects presented in the ES, nor are there any changes to the assessment presented in the Enhanced Noise Mitigation Study Report, and therefore the assessment and conclusions presented in the ES and the Enhanced Noise Mitigation Study Report remain valid.

## 6.3 Biodiversity

### 6.3.1 Introduction

A qualitative change assessment has been undertaken, comparing the 2015 DCO Design with the 2021 NMC Design with reference to the ecology and nature conservation assessment presented in Chapter 9 of the ES submitted in support of the DCO application. The change assessment considered the potential impacts of changes to vegetation clearance on designated sites, habitats, and protected species.

Two sites of European importance to nature conservation were scoped into the impact assessment for the scheme; screening revealed no direct or indirect effects on these sites, their qualifying features, or their conservation objectives. The 2021 NMC Design changes are small scale in nature and do not materially alter the original assessments and there is no change to the conclusion of No Likely Significant Effect on these statutory designated sites. These sites have not been considered further in this assessment.

### 6.3.2 Methodology

The qualitative change assessment has been undertaken to enable direct comparison with the assessment presented in Chapter 9 of the ES.

The study area comprises the area within the Order limits around the 2021 NMC Design between chainages 28+375 and 28+500.

The change assessment has been undertaken in two stages:

- The first stage comprised a change assessment of the impacts of the 2021 NMC Design using the baseline ecological information that informed the ES, to enable a 'like for like' comparison of the effects of the 2021 NMC Design against the effects of the 2015 DCO Design.
- The second stage comprised a change assessment of the impacts of the 2021 NMC Design using the baseline ecological information that informed the ES, as well as any relevant updated ecological information collected since (up to 30 March 2021), to provide a current change assessment of the potential effects of the 2021 NMC Design.

The following data sources have been consulted:

- Chapter 9 of the ES (and associated appendices and figures) submitted in support of the DCO application

- Ecological Constraints geodatabase (as of 30 March 2021) (A database that contains information collected pre-construction and by Ecological Clerks of Works during site clearance and construction)
- Vegetation Clearance drawings submitted at Deadline VII of the DCO Examination (514451-MUH-ML-ZZ-DR-SC-301244; Sheet 20; revision 6F 04/02/2016)
- 2021 NMC Design Vegetation Clearance Drawings (ELS-SZ\_ZZZZZZZZ\_Z-DR-LD-5320; Sheet 20, 2022 revision P01)
- 2021 NMC Design Environmental Masterplan Drawings (ELS-SZ\_ZZZZZZZZ\_Z-DR-LD-5240; Sheet 40; 2022 revision P01)

The change assessment considers impacts during construction only, as the 2021 NMC Design would not result in any significant changes to operational impacts.

The mitigation measures referred to in this change assessment are those secured through the made DCO, with consideration given as to whether any additional mitigation is required as a result of the 2021 NMC Design.

### 6.3.3 Change Assessment Findings

#### Summary of design changes in relation to biodiversity

The 2021 NMC Design would result in a negligible decrease in permanent vegetation clearance and a slight decrease in temporary vegetation clearance.

Additional areas of habitat that would be retained comprise small areas of broad-leaved plantation woodland and amenity grassland. Additional areas of habitat that would be lost comprise a very small strip of broad-leaved plantation woodland, which would be replanted with trees and shrubs.

#### Impact change assessment using DCO baseline ecological information

The ecological receptors within the study area assessed in the ES comprised designated sites, habitats and plants, reptiles, birds, and badger (*Meles meles*). Table 1 below presents a summary of the assessment of the 2015 DCO Design presented in the ES and a change assessment of the 2021 NMC Design for these receptors using the DCO baseline ecological information.

The significance of residual effects of the 2021 NMC Design on designated sites, habitats and plants, birds, and badger when assessed against the DCO baseline ecological information is **neutral**, which represents no change from the assessment of the 2015 DCO Design presented in the ES (**neutral**).

The significance of residual effects of the 2021 NMC Design on reptiles when assessed against the DCO baseline ecological information is **slight adverse**, which represents no change from the assessment of the 2015 DCO Design presented in the ES (**slight adverse**).

The 2021 NMC Design would not contribute to any change to in-combination or cumulative effects.

The mitigation as listed in Table 1 and described within the ES remains appropriate and sufficient. These mitigation measures are included within the current version of the Construction Environmental Management Plan (HA514451-BBV-EGN-GEN-MP-W-0001; 2021 revision 10).

#### Impact change assessment using current baseline ecological information

Since the submission of the ES, additional ecological information relating to reptiles and badger has been recorded within the study area. Table 1 below presents a change assessment of the 2021 NMC Design using this current baseline ecological information.

The significance of residual effects of the 2021 NMC Design on designated sites, habitats and plants, birds, and badger when assessed against the current ecological baseline is **neutral**, which



represents no change from the assessment of the 2015 DCO Design presented in the ES (**neutral**).

The significance of residual effects of the 2021 NMC Design on reptiles when assessed against the current ecological baseline is **slight adverse**, which represents no change from the assessment of the 2015 DCO Design presented in the ES (**slight adverse**).

No additional committed developments were identified with potential for cumulative effects.

The 2021 NMC Design would not contribute to any change to in-combination or cumulative effects.

The mitigation as listed in Table 1 and described within the ES remains appropriate and sufficient. These mitigation measures are included within the current version of the Construction Environmental Management Plan discharged pursuant to Requirement 8 of the DCO.

### **6.3.4 Conclusion**

The qualitative change assessment has concluded that the 2021 NMC Design will not result in any change to the significance of residual, in-combination, or cumulative effects on biodiversity receptors compared to the 2015 DCO Design, when assessed using either the DCO ecological baseline or the current ecological baseline. It is therefore concluded that there are no changes to the assessment of residual effects presented in the ES and therefore the assessment and conclusions presented in the ES remain valid.

Ecological receptor	Summary of ES assessment of '2015 DCO Design'				Summary of '2021 NMC Design' change assessment using ES baseline	Changes to ES baseline	Summary of '2021 NMC Design' change assessment using current baseline				Comments
	Value	Impact Description	Mitigation	Significance of Residual Effect	Significance of Residual Effect		Value	Impact description	Mitigation	Significance of Residual Effect	
Designated sites	Local	Pollution	Best practice pollution prevention and control	<b>Neutral</b> No residual effects	<b>Neutral</b> No residual effects (Best practice pollution control measures would remain sufficient to avoid any localised effects to Haymill Valley Local Nature Reserve (LNR) and Site of Importance for Nature Conservation (SINC) and Home Farm Stream Local Wildlife Site (LWS).)	None	Local	Pollution	Best practice pollution prevention and control	<b>Neutral</b> No residual effects (Best practice pollution control measures would remain sufficient to avoid any localised effects to Haymill Valley LNR and SINC and Home Farm Stream LWS.)	
Habitats and plants	Local	Habitat loss Pollution	Minimising works areas Replanting Best practice pollution prevention and control	<b>Neutral</b> Habitat loss	<b>Neutral</b> Habitat loss (Habitats to be lost are still considered to be of local value for nature conservation, and habitat loss is slightly reduced. Replanting in areas of temporary vegetation clearance would offset habitat loss and best practice pollution control measures would remain sufficient to avoid any other effects to surrounding retained habitats.)	None	Local	Habitat loss Pollution	Minimising works areas Replanting Best practice pollution prevention and control	<b>Neutral</b> Habitat loss (Habitats to be lost are still considered to be of local value for nature conservation, and habitat loss is slightly reduced. Replanting in areas of temporary vegetation clearance would offset habitat loss and best practice pollution control measures would remain sufficient to avoid any other effects to surrounding retained habitats.)	

Ecological receptor	Summary of ES assessment of '2015 DCO Design'				Summary of '2021 NMC Design' change assessment using ES baseline	Changes to ES baseline	Summary of '2021 NMC Design' change assessment using current baseline				Comments
	Value	Impact Description	Mitigation	Significance of Residual Effect	Significance of Residual Effect		Value	Impact description	Mitigation	Significance of Residual Effect	
Reptiles	Local	Habitat loss	Displacement	<b>Slight adverse</b> Displacement of individuals	<b>Slight adverse</b> Displacement of individuals (Phased vegetation clearance would remain sufficient to avoid direct mortality.)  (No permanent habitat loss, and temporary habitat loss is reduced.)	Suitable but sub-optimal reptile habitat recorded between: 28+375 - 28+500 on the southern embankments 28+400 - 28+425 on the north-east embankment	Local	Habitat loss	Displacement	<b>Slight adverse</b> Displacement of individuals (Phased vegetation clearance would remain sufficient to avoid direct mortality.)  (No permanent habitat loss, and temporary habitat loss is reduced.)	
Birds	Local	Habitat loss	Seasonal avoidance (or pre-construction survey) Replanting	<b>Neutral</b> No residual effects	<b>Neutral</b> No residual effects (No change to effects on birds.)	None	Local	Habitat loss	Seasonal avoidance (or pre-construction survey) Replanting	<b>Neutral</b> No residual effects (No change to effects on birds.)	
Badger	Local	Habitat loss	Replanting	<b>Neutral</b> No residual effects	<b>Neutral</b> No residual effects (Replanting would offset habitat loss.)	Sett 100, a disused outlier sett, recorded at 28+325 EB (within 50m of study area)	Local	Habitat loss	Replanting	<b>Neutral</b> No residual effects (Replanting would offset habitat loss.)	

Table 1: Biodiversity impact change assessment

## 6.4 Landscape and visual

### 6.4.1 Introduction

A qualitative landscape and visual impact change assessment comparing the change in design between the 2015 DCO Design and the 2021 NMC Design has been conducted.

The change assessment has considered the landscape and visual impacts of changes to vegetation clearance and planting proposals on sensitive receptors.

This was based on the assumption that the sensitive receptors could be most affected by changes in views of the motorway, due to additional vegetation clearance and therefore less mitigation planting and as an outcome, less visual buffer between the change and the sensitive receptor.

### 6.4.2 Methodology

The change assessment of landscape change between the 2015 DCO Design and the 2021 NMC Design has been undertaken in four stages:

#### Stage 1

Identify the landscape and visual effects of the 2015 DCO Design for this specific area using information presented in the following documents:

- Chapter 8: Landscape of the ES submitted in support of the DCO application, which provides information on the predicted temporary landscape and visual effects during construction, the predicted permanent landscape and visual effects during operation, and predicted cumulative effects.
- Appendix 8.3: Visual Effects Schedule of the ES submitted in support of the DCO application, which provides detailed information on the predicted visual effects during both construction and operation.
- Environmental Masterplan submitted at Deadline VIII of the DCO Examination (Version 11F, 29/02/2016).

#### Stage 2

Compare the 2015 DCO Design identified on the Environmental Masterplan submitted at Deadline VIII of the DCO Examination (Version 11F, 29/02/2016) with the relevant detailed landscape design shown on the ENGINEERING AND DESIGN REPORT, ENVIRONMENTAL MASTERPLAN (P01, S2, [HA514451-CHHJ-ELS-SZ\\_ZZZZZZZZ\\_Z-DR-LD-5200 to 5265, 22/04/202118/02/22](#)) and vegetation clearance shown on the NON-MATERIAL CHANGE VEGETATION CLEARANCE (P01, S2, [HA514451-CHHJ-ELS-SZ\\_ZZZZZZZZ\\_Z-DR-LD-5300 to 5331, 26/03/202118/02/22](#)) and identify any changes to vegetation clearance, landscape proposals and visual setting of sensitive visual receptors as a result of the 2021 NMC Design, using the baseline information presented in the ES.

#### Stage 3

Review the baseline information presented in the ES to determine any changes since the ES was published, focussing on the following sensitive receptors:

- Residential properties
- Business and institutional properties
- Listed Buildings
- Conservation Areas
- Scheduled Monuments
- National Character Areas (NCAs)

- Landscape Character Areas (LCAs)
- Landscape designations (e.g. AONB)
- Public rights of way (PRoW)
- National Trails.

#### Stage 4

Assess the impacts of the 2021 NMC Design against the current baseline (as of April 2021) in recognition that the baseline may have changed since the publication of the ES. Where the effects on the current baseline differ from the effects on the ES baseline (see Stage 2), provide an explanation of that change.

### 6.4.3 Change Assessment Findings

#### Stage 1

The following sensitive visual receptors, potentially impacted by the design change associated with the 2021 NMC Design, were identified in the ES and on the Environmental Masterplan submitted at Deadline VIII of the DCO Examination (Version 11F, 29/02/2016), as illustrated on Figure 4:

- Residential properties on Mercian Way and Two Mile Drive- #1
- Users of the Mercian Way Recreation Ground - #2
- PRoW (Oldway Lane Lane) - #3



Figure 4 Aerial Image of assessment area showing sensitive receptors

Figure 5 illustrates the area related to Oldway Lane overbridge on the Environmental Masterplan submitted in support of at Deadline VIII of the DCO Examination (Version 11F, 29/02/2016).



**LEGEND**

Existing Landscape Element	Environmental Objectives	Environmental Elements - Landscape	Environmental Barriers	Structures	Planning Features
Woodland	EE-4.1 - Landscape Integration Integration of the highway with the surrounding landscape character.	EE-L1.5 - Open Grassland	Existing Environmental Barrier to be reinstated/created	Proposed Gantry	Listed Building and ES Gazetted reference (see Cultural Heritage App 7.1)
Scrub	EE-2 - Visual Screening Mitigation against adverse visual impacts.	EE-L2.2 - Individual Trees	EE-N1.3 - Existing Environmental Barrier to be increased in height	Existing Gantry Retained	Scheduled Monument (SM)
Scattered Trees	EE-3 - Visual Amenity Maintain interest, safety and an acceptable visual appearance for both road users and adjacent public views.	EE-L2.3 - Linear Belts of Trees and Shrubs	EE-N1.3 - New Environmental Barrier	Existing Gantry Removed	Conservation Area
Hedges	EE-4 - Auditory Amenity Reduce the adverse noise impact of highway traffic or construction on adjacent properties or nearby.	EE-L2.5 - Scrub	Barrier Information Barrier Reference Barrier Type Barrier Height Where a barrier is on a structure Le an overbridge it will be 2.0m in height	Gantry Reference	Registered Park and Garden (RPG)
Open Grassland	EE-5 - Nature Conservation and Ecology Protect, manage and enhance the nature conservation value of the highway, including adjacent habitats and protected species.	EE-L2.6 - Shrubs	Nature and Conservation Works EE-NCL2 - Other proof fencing	ERA Reference	Area of Outstanding Natural Beauty (AONB)
Watercourses and Waterbodies	EE-6 - Enhancing the Built Environment Enhancing the landscape and built elements of the highway to reflect the townscape or community through which the highway passes.	EE-L2.7 - Shrubs with Intermittent trees		Information Location Reference Environmental Objective Environmental Element	Site of Special Scientific Interest (SSSI)
Ornamental Planting		EE-L2.9 - Woodland		Order Limits	Special Protection Area and Ramsar (SPA)
		EE-L2.10 - Woodland Edge			Local Nature Reserve (LNR)
		EE-L2.3 - Strengthened Earthworks For detailed earthworks see Application Document 2.6			Site of Local Importance
					Site of Metropolitan Importance
					Biological Notification Site
					Existing Public Right of Way (PRow)

Figure 5 Extract of Environmental Masterplan submitted in support of at Deadline VIII of the DCO Examination (Version 11F, 29/02/2016)

The following residual visual effects were reported in the ES for Oldway Lane overbridge:

*Visual amenity*

8.9.13 The main visual effects associated with this Scheme link are set out within the VES in Appendix 8.3 and are shown on the VED, Drawing 8.2 (sheets 9 to 10). The main impacts on the visual receptors within this Scheme link are:

eastbound, the site clearance and construction activities associated with the realignment of the Oldway Lane overbridge and the more visible transient traffic on the M4 in the vicinity of the bridge works (as a result of the site clearance) will have a short term moderate adverse magnitude of impact on views from residential properties on Mercian Way, Two Mile Drive (Cippenham) and users within the adjacent Mercian Way Recreation Ground, resulting in a moderate adverse significance of effect; and

westbound, the site clearance and construction activities associated with the realignment of the Oldway Lane overbridge will have a short term moderate adverse magnitude of impact on views from residential properties on Wood Lane resulting in a moderate adverse significance of effect.

Chapter 8 of the ES presented the assessment of the residual landscape and visual effects on a 'link by link' basis. Oldway Lane falls within the junction 7 to 6 – NCA 115 (Thames Valley) link.

Table 2 below presents the residual effects assessment for junction 7 to 6 – NCA 115 (Thames Valley), taken from Table 8.2 of the ES.

	Impact Description	Receptors Affected	Mitigation	Significance of Residual Effect
Scheme Link	Junction 7 to 6 – NCA 115 (Thames Valley)			
Temporary Impacts (Construction)	Construction impacts resulting from overbridge realignments and vegetation removal.	Landscape receptors: None affected  Visual Receptors: Residential properties on Mercian Way and Two Mile Drive  users of the Mercian Way Recreation Ground and  PRoW (Oldway Lane).	Construction best practice to minimise disruption, e.g. protection of retained existing vegetation.	Landscape Neutral Visual amenity Moderate adverse
Permanent Impacts (Operation)	Presence of realigned overbridges	Landscape receptors: None affected  Visual Receptors: Residential properties on Mercian Way and Two Mile Drive  users of the Mercian Way Recreation Ground and  PRoW (Oldway Lane).	Woodland Edge (EE L2.10), Tree and Shrub Planting (EE L2.3) and Individual Trees (EE L2.2) to replace the vegetation lost.	Landscape Neutral Visual amenity Slight adverse reducing over time to neutral
Cumulative Impact	None identified	None affected	None required	<b>Neutral</b>

Table 2: Residual effects assessment for junction 7 to 6 – NCA 115 (Thames Valley), taken from Table 8.2 of the ES

## Stage 2

The design of the 2021 NMC Design is shown in Figure 6 below:

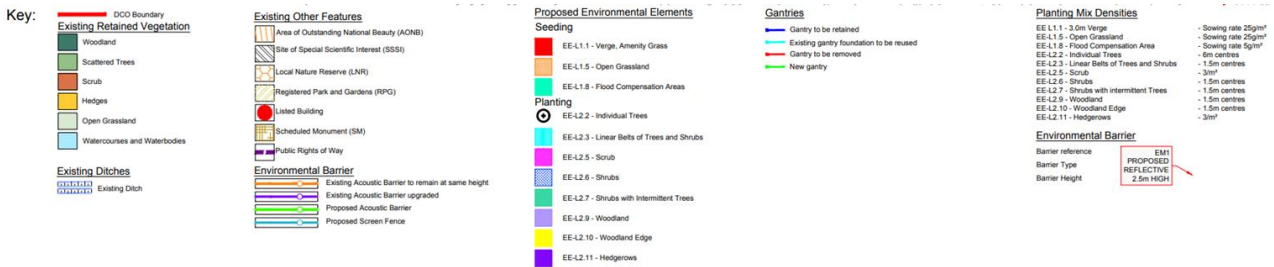
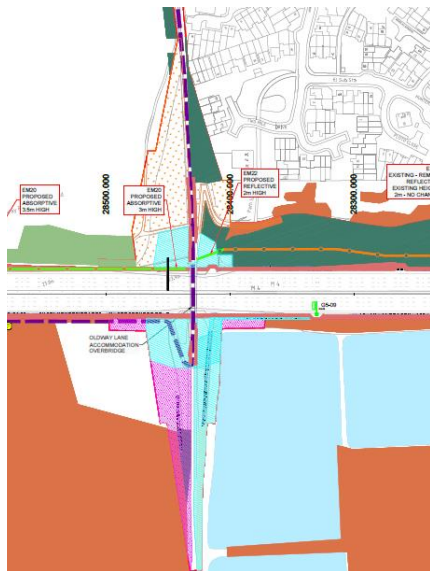


Figure 6 Extract of detailed landscape design shown on the ENGINEERING AND DESIGN REPORT, ENVIRONMENTAL MASTERPLAN (P01, S2, HA514451-CHHJ-ELS-SZ\_ZZZZZZZZ\_Z-DR-LD-5200 to 526518/02/22)

A change assessment of the residual landscape and visual effects of the 2021 NMC Design against the baseline information presented in the ES is presented in Tables 3, 4 and 5 with a summary of the changes provided below.

Change to Vegetation Clearance

No additional vegetation clearance in this area.

Changes to Landscape Proposals

No change of landscape proposals.

Changes to Bridge Structure Proposals

No change.

Changes to Sideroads approaching the over-bridges

Earthworks/Retaining Structures: no impact on planting design.

Changes to Visual Amenity

No change of the visual amenity for all sensitive receptors listed above.

**Stage 3**

After reviewing the area around Oldway Lane overbridge, no changes to the baseline information presented in the ES have been identified.

**Stage 4**



Tables 3, 4 and 5 below present:

- The findings of the assessment of residual landscape and visual effects previously reported in the ES.
- The findings of the change assessment of residual landscape and visual effects of the 2021 NMC Design against the baseline information presented in the ES.
- A summary of any changes to the baseline information presented in the ES since the ES was published.
- The findings of the change assessment of residual landscape and visual effects of the 2021 NMC Design against the current baseline (as of April 2021).
- An explanation of any differences in the change assessment of effects on the current baseline when compared to the assessment of effects on the ES baseline.

### Temporary Impacts during Construction

	Summary of ES Assessment of '2015 DCO Design'				Summary of '2021 NMC Design' change assessment using ES baseline	Changes to ES baseline	Summary of '2021 NMC Design' change assessment using current baseline			Comments
	Impact Description	Receptors Affected	Mitigation	Significance of Residual Effect	Significance of Residual Effect		Impact Description	Mitigation	Significance of Residual Effect	
Scheme Link	Junction 7 to 6 – NCA 115 (Thames Valley)									
Temporary Impacts (Construction)	Construction impacts resulting from overbridge realignments and vegetation removal.	<u>Landscape Receptors:</u> None affected. <u>Visual Receptors:</u> Residential properties on Mercian Way and on Two Mile Drive Users of the Mercian Way Recreation Ground PRow (Oldway Lane)	Construction best practice to minimise disruption, e.g. protection of retained existing vegetation	<u>Landscape</u> <b>Neutral</b> <u>Visual amenity</u> <b>Moderate adverse</b>	<u>Landscape</u> <b>Neutral</b> <u>Visual amenity</u> <b>Moderate adverse</b>	<u>Landscape</u> No additional sensitive receptors have been identified <u>Visual</u> No additional vegetation clearance	<u>Landscape</u> None identified <u>Visual</u> None identified	Not required	<u>Landscape</u> <b>Neutral</b> <u>Visual amenity</u> <b>Moderate adverse</b>	The conclusion of the ES assessment remains valid

Table 3: Temporary Landscape and Visual Impacts during Construction

### Permanent Impacts during Operation

	Summary of ES Assessment of '2015 DCO Design'				Summary of '2021 NMC Design' change assessment using ES baseline	Changes to ES baseline	Summary of '2021 NMC Design' change assessment using current baseline			Comments
	Impact Description	Receptors Affected	Mitigation	Significance of Residual Effect	Significance of Residual Effect		Impact Description	Mitigation	Significance of Residual Effect	
Scheme Link	Junction 7 to 6 – NCA 115 (Thames Valley)									
Permanent Impacts (Operation)	Presence of realigned overbridges	<u>Landscape Receptors:</u> None affected. <u>Visual Receptors:</u> Residential properties on Mercian Way and on Two Mile Drive users of the Mercian Way Recreation Ground PRoW (Oldway Lane)	Woodland Edge (EE L2.10), Tree and Shrub Planting (EE L2.3) and Individual Trees (EE L2.2) to replace the vegetation lost.	<u>Landscape</u> <b>Neutral</b> <u>Visual amenity</u> <b>Slight adverse</b> reducing over time to <b>neutral</b>	<u>Landscape</u> <b>Neutral</b> <u>Visual amenity</u> <b>Slight adverse</b> reducing over time to <b>neutral</b>	<u>Landscape</u> No additional sensitive receptors have been identified <u>Visual</u> No additional vegetation clearance	<u>Landscape</u> None identified <u>Visual</u> None identified	Not required	<u>Landscape</u> <b>Neutral</b> <u>Visual amenity</u> <b>Slight adverse</b> reducing over time to <b>neutral</b>	The conclusion of the ES assessment remains valid

Table 4: Permanent Landscape and Visual Impacts during Operation

### Cumulative Impacts

	Summary of ES Assessment of '2015 DCO Design'				Summary of '2021 NMC Design' change assessment using ES baseline	Changes to ES baseline	Summary of '2021 NMC Design' change assessment using current baseline			Comments
	Impact Description	Receptors Affected	Mitigation	Significance of Residual Effect	Significance of Residual Effect		Impact Description	Mitigation	Significance of Residual Effect	
Scheme Link	Junction 7 to 6 – NCA 115 (Thames Valley)									
Cumulative Impacts	None identified	<u>Landscape Receptors:</u> None affected  <u>Visual Receptors:</u> None affected	None required	<u>Landscape</u> <b>Neutral</b>  <u>Visual amenity</u> <b>Neutral</b>	<u>Landscape</u> <b>Neutral</b>  <u>Visual amenity</u> <b>Neutral</b>	No additional sensitive receptors have been identified	<u>Landscape</u> None identified  <u>Visual</u> None identified	None required	<u>Landscape</u> <b>Neutral</b>  <u>Visual amenity</u> <b>Neutral</b>	The conclusion of the ES assessment remains valid

Table 5: Cumulative Landscape and Visual Impacts

## Summary

There are no changes to the assessment of temporary residual effects during construction presented in the ES as a result of the 2021 NMC Design when considering either the baseline information presented in the ES or the current baseline.

There are no changes to the assessment of permanent residual effects during operation presented in the ES as a result of the 2021 NMC Design when considering either the baseline information presented in the ES or the current baseline.

There are no changes to the assessment of cumulative impacts presented in the ES as a result of the 2021 NMC Design when considering either the baseline information presented in the ES or the current baseline.

### 6.4.4 Conclusion

The 2021 NMC Design has been assessed against the baseline information presented in the ES and the current baseline (as of April 2021) and has been compared against the assessment of residual effects presented in the Environmental Statement submitted in support of the DCO application.

It is concluded that there are no changes to the assessment of residual effects presented in the ES, and therefore the assessment and conclusions presented in the ES remain valid.

## 6.5 Water

### 6.5.1 Introduction

A qualitative change assessment of the 2021 NMC Design has been undertaken. Two aspects have been considered. The current water environment baseline has been appraised to identify any changes since the ES was submitted in support of the DCO application. The change assessment has also considered whether there are any changes to the residual effects reported in Chapter 15 of the ES, interpreting whether these are due to changes in the baseline status of water environment receptors or due to the 2021 NMC Design.

### 6.5.2 Methodology

The change assessment has considered the potential for the 2021 NMC Design to cause:

- Changes to flood impacts due to a change in the footprint of works within the floodplain, as defined by Environment Agency Flood Zones 2 and 3 and/or a change to a proposed watercourse crossing. The 2015 Flood Zone extents have been reviewed against current (2021) flood maps available online<sup>1</sup>.
- Changes to pollution effects from accidental spillages and routine runoff during operation because of changes to traffic flows and/or the proposed drainage design. The water quality of watercourses receiving discharges of runoff has been reviewed with reference to current (Cycle 2) Water Framework Directive data published online<sup>2</sup>.
- Changes to groundwater due to a change in the footprint of works within a Source Protection Zone (SPZ) or overlying a Principal Aquifer.

---

<sup>1</sup> Flood map for planning - GOV.UK ([flood-map-for-planning.service.gov.uk](https://flood-map-for-planning.service.gov.uk))

<sup>2</sup> Environment Agency - Catchment Data Explorer

## 6.5.3 Change Assessment Findings

### Review of Baseline Conditions

The future baseline described in the ES assumed improvements in surface and groundwater quality driven by implementation of the Water Framework Directive (WFD). However, review of the most recently available data shows that for the surface waterbody in the Oldway Lane catchment, there has been no change or a degradation in some aspects of its water quality. The WFD groundwater body (the Lower Thames Gravels) is at the same status as reported in the ES with regard to its chemical quality.

There have been no changes to the spatial extents of Flood Zones 2 (medium risk) and 3 (high risk) in the vicinity of the 2021 NMC Design.

Changes in the baseline qualities of water environment receptors local to junction 5 are therefore limited. The value/sensitivity assigned to receptors, in accordance with the criteria set out in Table 15.2 of the ES, would be the same or lower.

### Review of Design Changes

The 2021 NMC Design is located within Environment Agency Flood Zone 1, defined as having an annual probability of flooding from rivers and the sea of less than 0.1%. The 2021 NMC Design will therefore not affect any fluvial floodplains. No watercourses are crossed by the M4 at this location and the 2021 NMC Design does not alter this. The effects of the 2021 NMC Design on flood impacts are therefore neutral.

In the ES, the significance of effects on water quality due to road drainage discharges was qualitatively assessed accounting for mitigation measures to ensure no deterioration compared to the baseline. As part of detailed design, road drainage discharges have been subject to DMRB HD 45/09 assessments incorporating HAWRAT to quantify surface and groundwater pollution risks.

However, at Oldway Lane because the overbridge is part of a bridleway, the DMRB HD 45/09 assessments are not applicable. There is no potential for pollution due to traffic accidents and routine runoff from the overbridge would not be contaminated by vehicular deposits of heavy metals etc. The 2021 NMC Design would not change the assessment presented in the ES of the risk of pollution of watercourses at this location.

Oldway Lane overbridge and side road are not situated within a groundwater SPZ and the underlying geology does not support any Principal Aquifers. The 2021 NMC Design involves the removal of retaining earthworks solutions, with potential for a very minor and localised benefit to groundwater.

## 6.5.4 Conclusion

It is concluded that there are no changes to the assessment of residual effects presented in the ES, and therefore the assessment and conclusions presented in the ES remain valid.

## 7 Conclusion

---

The 2021 NMC Design provides the benefit of mitigating a 6-month delay due to the required diversion of water mains. This delay would have caused increased construction costs as well as prolonged disruption to road users and residents.

The 2021 NMC Design does not change the assessment of residual effects presented in the ES submitted in support of the DCO application and the environmental documentation submitted in the Examination. Therefore, the assessment and conclusions presented in the ES remain valid. The change in design does not impact of road user safety. Overall, the proposed design offers the most practical solution.