Didcot Garden Town Housing Infrastructure Fund (HIF1)

Design and Access Statement

Oxfordshire County Council

Project number: 60632497

September 2021

Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
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1. Introduction

1.1 Overview

1.1.1 Oxfordshire County Council (hereafter referred to as 'the Applicant') (OCC) is seeking to obtain planning permission for the Didcot Garden Town Housing Infrastructure Fund programme (herein referred to as HIF1).

1.1.2 The application is submitted to OCC as the determining local planning authority (LPA) under the Town and Country Planning Act 1990 (as amended) and the Town and Country Planning (Development Management Procedure) (England) Order 2015. The application is a Regulation 3 application as defined by the Town and Country Planning General Regulations 1992.

1.1.3 The Proposed Development is *seeking full planning permission for:*

- *the dualling of the A4130 carriageway (A4130 Widening) from the Milton Gate Junction eastwards including the construction of three roundabouts;*
- *a road bridge over the Great Western Mainline (Didcot Science Bridge) and realignment of the A4130 north east of the proposed road bridge including the relocation of a lagoon;*
- *construction of a new road between Didcot and Culham (Didcot to Culham River Crossing) including the construction of three roundabouts, a road bridge over the Appleford railway sidings and road bridge over the River Thames;*
- *construction of a new road between the B4015 and A415 (Clifton Hampden bypass) including the provision of one roundabout and associated junctions; and*
- *controlled crossings, footways and cycleways, landscaping, lighting, noise barriers and sustainable drainage systems.*

At Land in the parishes of Milton, Didcot, Harwell, Sutton Courtenay, Appleford-on-Thames, Culham and Clifton Hampden.

1.1.4 Under this programme there are four separate but interdependent highways schemes which together form the Proposed Development:

- A4130 Widening, which will dual the existing road between Milton Gate and the link to the new Didcot Science Bridge, with segregated walking and cycling facilities. Several new junctions into adjacent proposed developments are also proposed.
- Didcot Science Bridge, a new single carriageway bridge over the A4130, Great Western Railway Mainline, and Milton Road, with segregated walking and cycling facilities. A new single carriageway link road through the former Didcot A Power Station site, re-joining the A4130 Northern Perimeter Road north of the Purchas Road/Hawksworth roundabout with segregated walking and cycling facilities.

- Didcot to Culham River Crossing, providing a new road connecting the A4130 at Didcot with the A415 at Culham, including a bridge over the River Thames and another bridge over a private rail sidings, and connections to Appleford and Sutton Courtenay via the B4016 , all with segregated walking and cycling facilitates.

- Clifton Hampden Bypass, a new relief road northwest of the village, between the A415 at Culham Science Centre and the B4015 Oxford Road, north of Clifton Hampden. A new roundabout at the western end near Culham Science Centre and Culham Rail Station, and other access junctions along the Bypass. Walking and cycling facilities segregated from the carriageway are also proposed.

1.1.5 The preferred alignments for the four schemes have been informed by a multistage optioneering exercise to identify the appropriate interventions and subsequent public consultation, engineering, traffic modelling, and impact assessment work.

1.1.6 A public consultation exercise was undertaken in March/April 2020 (following an earlier November 2018 consultation) to seek the views of local people on these preferred alignments so that, where appropriate, these comments could be incorporated into the next stage of the design process.

1.2 Need for the Proposed Development

1.2.1 Didcot has experienced considerable growth in the last 30 years taking it from a small railway town to one of the biggest towns in Oxfordshire and the town is planned to grow further in the next 15-20 years as a result of the Garden Town designation.

1.2.2 Significant housing and employment growth is planned for the Science Vale area, with 20,000 new jobs, 20,000 new houses and 50,000 new residents anticipated by 2031.

1.2.3 There are, however, currently several constraints on the highway network that are hindering this growth, particularly on routes into the town from the west and north, with longstanding issues of access to the A34, severance of the railway lines and the River Thames.

1.2.4 Whilst there have been a number of transport upgrades in the surrounding area such as the construction of the Northern Perimeter Road (Stages 1-2), Milton Heights Link Road (Stages 1-2), Manor Bridge and Milton Interchange, these are not sufficient to address all of the current transport issues as standalone improvements. The development of future housing and employment allocations is likely to add to the growing pressure on the infrastructure network. This highlights the need for the Proposed Development in conjunction with the above transport upgrades, which all form part of Oxfordshire's Local Transport Plan 4 (LTP4) 'Overall Strategy' which includes a series of infrastructure improvements throughout the County.

1.2.5 As part of this, the Proposed Development will directly unlock the potential for 11,711 new homes and support the delivery of more than 17,000 new homes in total in the Didcot Garden Town area. The new homes are proposed across 12 separate site allocations in and around Didcot in South Oxfordshire District Council (SODC) and Vale of White Horse District Council (VoWHDC).

1.2.6 The Proposed Development is also essential for the economic and social prosperity of Science Vale UK, one of the first Enterprise Zones, in addition to other newer Enterprise Zones in the area. Whilst the Proposed Development is based on future growth, the Proposed Development's infrastructure will also help to ameliorate the issues resulting from historic housing and employment growth.

1.2.7 In 2019, OCC submitted the HIF Business Case to the Government, requesting £218m to deliver 9.6km of new and improved highway in the Didcot area. It identified that Didcot is a key centre of growth for enterprise locally and has been designated as a Garden Town growth area, and the bid was submitted in order to provide a strategic solution to enhance the connectivity between key housing sites and areas of employment growth. In March 2019, the Government announced that the HIF bid was successful, leading to funding being secured from government for the four highways projects which form the Proposed Development.

1.2.8 The Proposed Development aims to address the following issues and opportunities:

- **Local and regional economy**: The historic road network in Didcot and the surrounding areas is not currently fit for purpose, this will be exacerbated by planned growth. There is congestion at key points, including where new and planned developments will access the road network. The Proposed Development will unlock and support the delivery of circa 17,000 new homes in the area including affordable homes;
- **Local traffic issues**: Didcot is a centre for distribution meaning there are more Heavy Goods Vehicles (HGVs) on the transport network than in other areas, adding to congestion and delay. There is also a need to plan now for all forms of travel, including modes that are only just starting to be tested (e.g. autonomous vehicles). Transport connectivity is poor in the area with limited links making it difficult to travel between existing/planned housing and employment sites;
- **Environment**: To uphold its "Garden Town" status, developments within Didcot should positively protect and enhance the natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, providing green infrastructure, addressing issues such as flood risk, climate change and minimising waste and pollution; and
- **People and local communities**: There have been increasing traffic impacts in Didcot and the surrounding villages and their historic cores due to congestion, including an increase in noise and decrease in air quality. The location of railway lines creates physical barriers between some housing and employment sites, including areas proposed for new development because of limited crossings, which are already reaching capacity. The River Thames is also a barrier with limited bridge crossings. The Proposed Development will facilitate new movements across the Science Vale area. The Proposed Development will provide direct, safe and convenient walking and cycling infrastructure across its full length and opens up opportunities for new and improved bus routes.

1.2.9 The objectives of the Proposed Development have been defined as part of previous work detailed in the Option Assessment Report (OAR) (see Appendix A) and the successful HIF bid. The objectives of the Proposed Development are to:

- Directly unlock the delivery of 11,711 new homes in the area (approximately 4,200 will be affordable homes);
- Support the delivery of an additional 6,000 new homes;
- Unlock thousands of new jobs across existing and new employment sites in the area and release business rates from Enterprise Zones to be reinvested back into the local economy;
- Ensure the impact of additional housing on the transport network is acceptable;
- Provide for real mode choice by future proofing new infrastructure;
- Reduce congestion in the parishes surrounding Didcot to the north;
- Provide relief to the A34 by providing an alternative route for local traffic; and
- Support Didcot as a new and vibrant Garden Town.

1.3 Purpose of this Document

1.3.1 This Design and Access Statement (DAS) has been prepared in accordance with guidance entitled “Making an application” contained in the Planning Practice Guidance from the Ministry of Housing, Communities & Local Government (published 29 November 2016, last updated 22 October 2018).

1.3.2 The following structure has been adopted for this DAS setting out the purpose of this document:

- Section 2 summaries the Site and surrounding context, including relevant planning policy which has been taken into consideration.
- Section 3 explains the design principles and the policy that guides the design.
- Section 4 summaries how outcomes of the engagement process have informed the Proposed Development.
- Section 5 provides a summary of the options considered and how the design has evolved.
- Section 6 explains the Proposed Development.
- Section 7 draws together conclusions of the design and access considerations.

1.3.3 Additional information can be found on the general arrangement and other drawings which accompany the planning application. Reference should be made to the drawing register for a comprehensive list of drawings, which can be found at Appendix A in the Planning Statement.

2. Site and Context

2.1 Site Location and Surrounding Area

2.1.1 The location of the Proposed Development is illustrated in Figure 2-1. The area of land over which the Proposed Development will occupy, during construction and operation, is referred to as the 'Site'. The total site area (both temporary and permanent) for the Proposed Development is approximately 155 hectares (ha) in size. It is located within two districts; the VoWHDC and SODC. The surrounding area of Science Vale is an area centred on the settlements of Didcot and Wantage & Grove, Milton Park Business Park, Didcot Power Station and the established research areas of Culham Science Centre and Harwell Science and Innovation Campus. The red line boundary for the Site is shown on Figure 2-1.

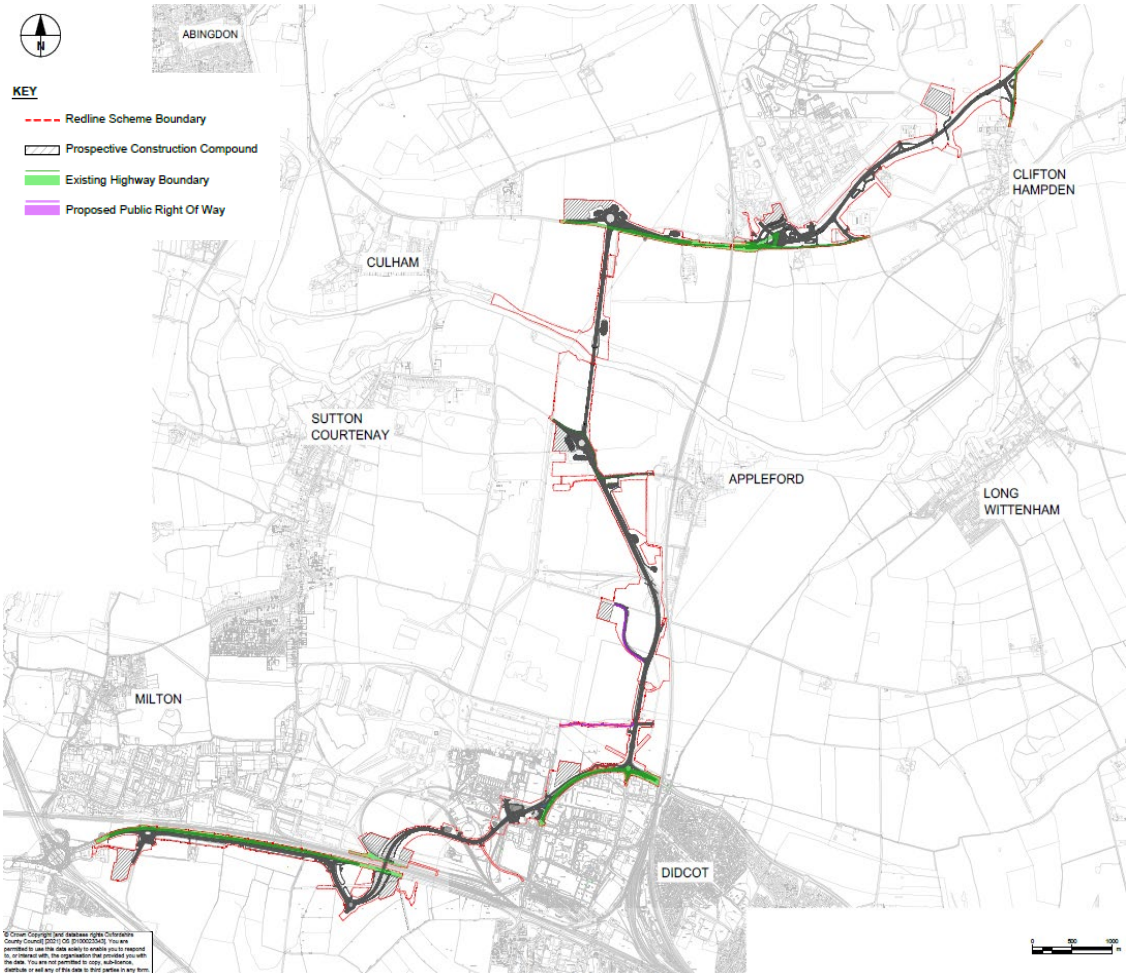

Figure 2-1: Location Plan (extract from drawing, GEN_PD ACM HGN DGT_ZZ_ZZ_ZZDR T 0040 P02)

2.1.2 The Site is linear and comprises a corridor between the A34 Milton Interchange and the B4015 north of Clifton Hampden. The Site therefore covers part of the A4130 east of the A34 Milton Interchange, it then passes between Didcot and the former Didcot A Power Station and the Great Western Mainline, and heads north where it crosses a private railway sidings and the River Thames to the west of Appleford-on-Thames before joining the A415 west of Culham Station. From the A415, the Proposed

Development passes to the south of Culham Science Centre to connect with the B4105 north of Clifton Hampden.

2.1.3 Beyond this the area is primarily characterised by small villages and is predominantly flat in the valley of the River Thames.

2.1.4 The area is served by the Great Western Mainline Railway (London to South Wales and South West England) which runs along the southern edge of the area and the Cherwell Valley Line (Didcot-Oxford railway) which cuts north from Didcot. There is a major interchange station at Didcot Parkway with more minor stations at Appleford, Culham, and further north Radley.

2.1.5 The major road in the area is the A34 Trunk Road which passes in a generally north-south direction connecting the M40 and M4 via Oxford. The Trunk Road has all movement junctions at Chilton, Milton Marcham, and a limited movement junction at Lodge Hill (Abingdon).

2.2 Environmental Designations

Landscape Designations

2.2.1 The Site is located within National Character Area 108 Upper Thames Clay Vales, described as a broad area of open and gently undulating lowland farmland.

2.2.2 The Site is not subject to any statutory landscape designations however the North Wessex Downs Area of Outstanding Natural Beauty (AONB), is approximately 2km from the nearest point.

2.2.3 The North Wessex Downs AONB includes most of the land south of the A417 but also includes a tongue of land lying between Didcot and Wallingford. It is a visibly ancient landscape of great beauty, diversity and size and includes a number of habitats.

2.2.4 The landscape designations are shown on Figures 8.8 to 8.14 within ES Volume II.

Ecology Designations

2.2.5 Statutory sites that are designated for nature conservation were identified through a review of the Multi-Agency Geographic Information for the Countryside (MAGIC) website within the study area. There are two international designated sites and four nationally designated sites within 10km and one nationally designated site with 2km of the Site as shown on Figures 9.1 and 9.2 within ES Volume II:

- Culham Brake Site of Special Scientific Interest (SSSI) which is approximately 1.4km to the north of the Didcot to Culham River Crossing.
- Little Wittenham Special Area of Conservation (SAC), SSSI which is approximately 4.4km to the east of the Didcot to Culham River Crossing.
- Cothill Fen SAC, SSSI -which is approximately 6.95km north west of the Didcot to Culham River Crossing.
- Barrow Farm Fen SSSI which is approximately 5.34km north west of the Didcot to Culham River Crossing.
- Dry Sandford Pit SSSI which is approximately 6.35km north west of the Didcot to Culham River Crossing.

2.2.6 Eight non-statutory sites designated for nature conservation were identified within 2km of the Site boundary. These sites have been designated as Local Wildlife Sites (LWS) for their biodiversity value at a county level and are known to have supporting value to a wide variety of protected and ecologically important species and/or habitats.

2.2.7 Two non-statutory sites designated for nature conservation and relevant to freshwater ecology were identified within 5km of the Site boundary. These sites have been designated as Local Wildlife Sites (LWS) for their biodiversity value at a county level and are known to support ecologically important species and/or habitats.

Flood Risk

2.2.8 The Site is located within the River Thames catchment and crosses a number of waterways including the River Thames, Moor Ditch, Stert Brook, Cow Brook, Meadow Brook and the Clifton Hampden Brook. As a result, parts of the Site fall within both Flood Zone 2 and Flood Zone 3 as shown on Figure 2-2.

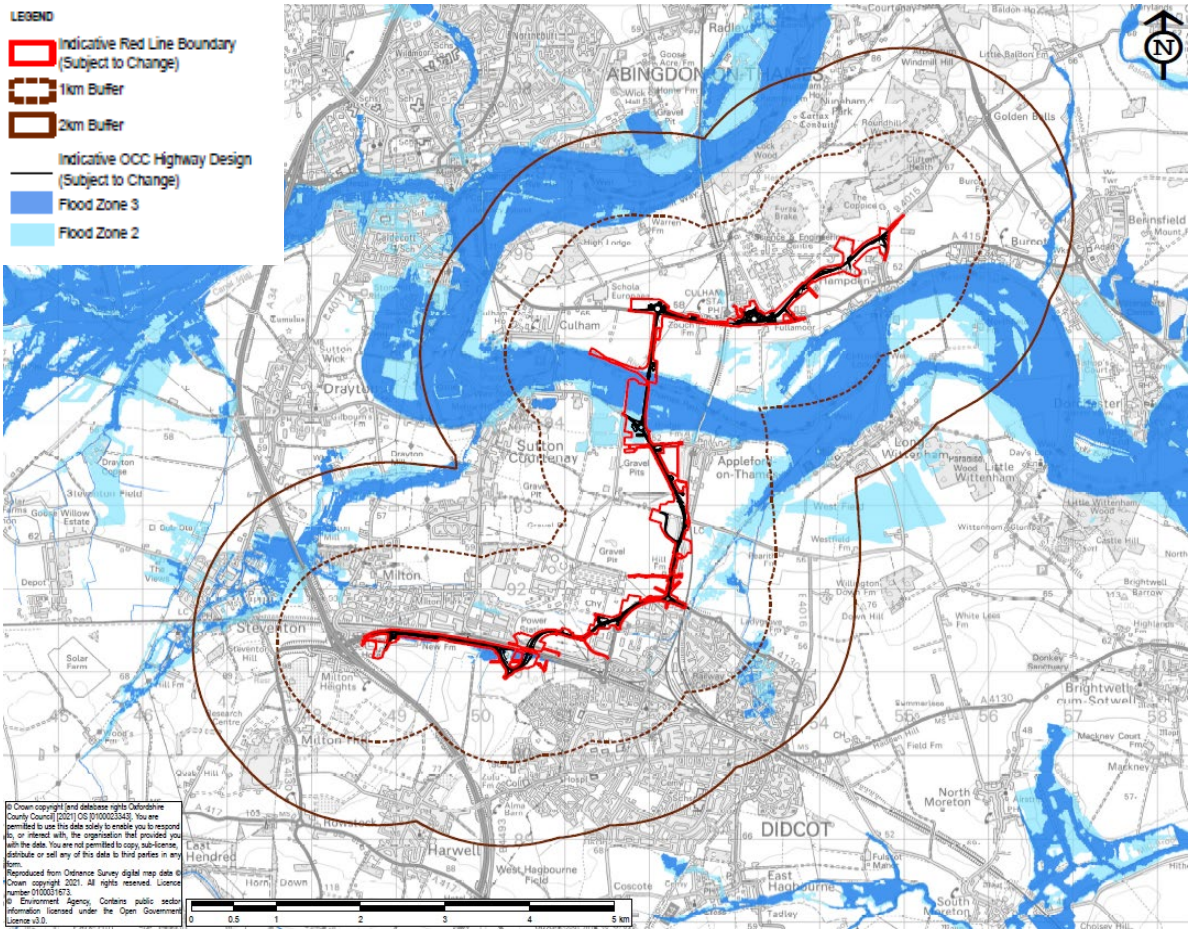

Figure 2-2: Flood Risk Map (extract from ES Chapter Figure 14.2)

Heritage

2.2.9 An assessment of heritage assets has been undertaken within a 1km study area that is outlined in the Environmental Statement (ES) Volume I Chapter 7 Cultural Heritage. This has found that there are a total of 232 previously recorded heritage assets within the study area in addition to 10 archaeological investigations. There are no designated heritage assets within the Site.

2.2.10 Part of the Grade I Registered Nuneham Courtenay landscaped park and pleasure ground lies within the study area. There are also five conservation areas within the study area at Milton, Sutton Courtenay, Culham, Clifton Hampden and Nuneham Courtenay.

2.2.11 There are 66 listed buildings, including one listed at Grade I and five listed at Grade II*. The remaining 60 buildings are Grade II listed. Listed Buildings are generally clustered in the settlement areas, such as at Milton, Sutton Courtenay, Appleford, Culham and Clifton Hampden, and within parkland at Nuneham Courtenay. Apart from Appleford, these areas are all designated as conservation areas, and Nuneham Courtenay has an additional designation as a Registered Park and Garden which covers a larger area than the conservation area.

2.2.12 In addition to this there are a small number of assets located outside these areas, generally these are associated with the Great Western Railway, such as the Grade II listed Railway Transfer Shed and Engine Shed [A65 and A66], south of Didcot railway station, and the Grade II* listed Culham Station, Ticket Office and Waiting Room [A209] and its associated Grade II listed Overbridge and Thame Lane Bridge [A160; A212], east of Culham. Further isolated buildings are the Grade II listed Fullamoor Farmhouse [A161] and the Grade II listed Schola Europea [A155], the former Diocesan training college northeast of Culham.

2.2.13 Further detail is outlined in Chapter 7 of the ES.

Public Rights of Way (PRoW)

2.2.14 There are a total of 31 PRoW routes which are made up of 65 PRoW sections within the site and surrounding area. These include 45 footpaths, 10 bridleways, eight byways with restricted traffic and two byways open to all traffic. The location of the public Rights of Way are shown on Figure 13.1 within ES Volume II.

2.3 Planning Designations

2.3.1 There are a number of planning designations affecting the Site as shown on Figures 2-3 and 2-4.

Green Belt Classification

2.3.2 The Oxford Green Belt covers the area between Oxford and Abingdon and also includes all the land on the left bank of the Thames between Abingdon and Shillingford.

2.3.3 Part of the Proposed Development will pass through Green Belt to the north of the Didcot to Culham River Crossing section and the Clifton Hampden Bypass.

Safeguarded Highway Land

2.3.4 Land has been safeguarded for strategic transport schemes in both the Vale of White Horse District Council (VoWHDC) Local Plan Part 1 (Core Policy 18), VoWHDC Local Plan Part 2 (Core Policy 18a), and South Oxfordshire District Council (SODC) Local Plan (Policy TRANS3). Land is safeguarded to support the delivery of identified transport schemes which include the Clifton Hampden Bypass, Didcot Science Bridge, A4130 Corridor improvements and a new river crossing between Culham and Didcot.

2.3.5 The areas safeguarded, as per the VoWHDC Local Plan (Core Policy 18), VoWHDC Local Plan Part 2 (Core Policy 18a) and SODC Local Plan (Policy TRANS3) are shown in green hatched on Figures 2-3 and 2-4.

Neighbourhood Plan Designations

2.3.6 There are two neighbourhood plan areas designated within the vicinity of the Site boundary – Sutton Courtenay, and Burcot and Clifton Hampden.

2.3.7 The Sutton Courtenay Neighbourhood plan is still in preparation, with assessment work to establish an evidence base for the draft policies of the Neighbourhood Plan ongoing. The neighbourhood area was formally designated on 27 January 2017.

2.3.8 The Burcot and Clifton Hampden Neighbourhood Area was formally designated on 26 September 2014. The Burcot and Clifton Hampden Neighbourhood plan is subject to a pre-submission draft that was subject to an Initial Village Consultation from 20 November to 9 December 2020, which is planned for public examination in Spring 2022. The document outlines general planning policies for the area, and sets out specific policies for the delivery of a New Surgery, New Housing and School Improvements.

2.3.9 The designated neighbourhood areas are shown on Figures 2-3 and 2-4.

Minerals and Waste Safeguarded Areas

2.3.10 The Site is located within designated areas for the safeguarding of minerals to the north east of Didcot Power Station heading towards Appleford and Culham Science Centre. The link road connecting from the north of Didcot towards Culham Science Centre passing Appleford would travel through Mineral Consultation Areas and Strategic Resource Area 5 (Thames and Lower Thames Valley – Standlake to Yarnton Sharp Sand and Gravel). Therefore, Policy M8 of the Oxfordshire Minerals and Waste Local Plan Part 1: Core Strategy for the safeguarding of minerals applies. It is also noted the Proposed Development would pass over Appleford Sidings which is a safeguarded rail depot as designated under policy M9 of the Oxfordshire Minerals and Waste Local Plan Part 1.

2.3.11 There are also four waste management facilities within the surrounding area of the Site which need to be safeguarded. These are: Hill Farm, Sutton Courtenay, Appleford Sidings and Culham No. 1.

2.3.12 The location of these minerals and waste designations is shown below in Figure 2-5.

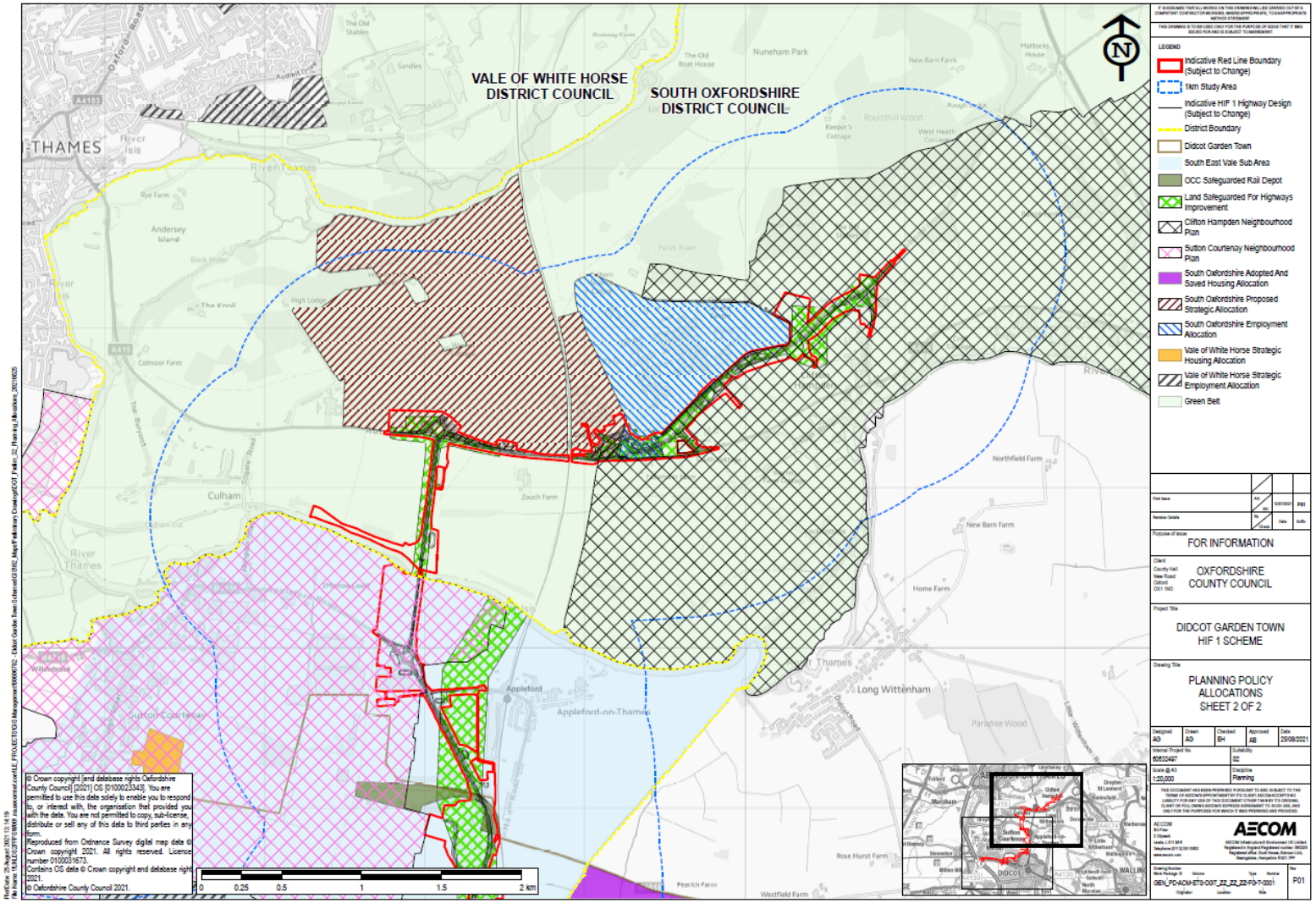

Figure 2-3: North Planning Designations Plan

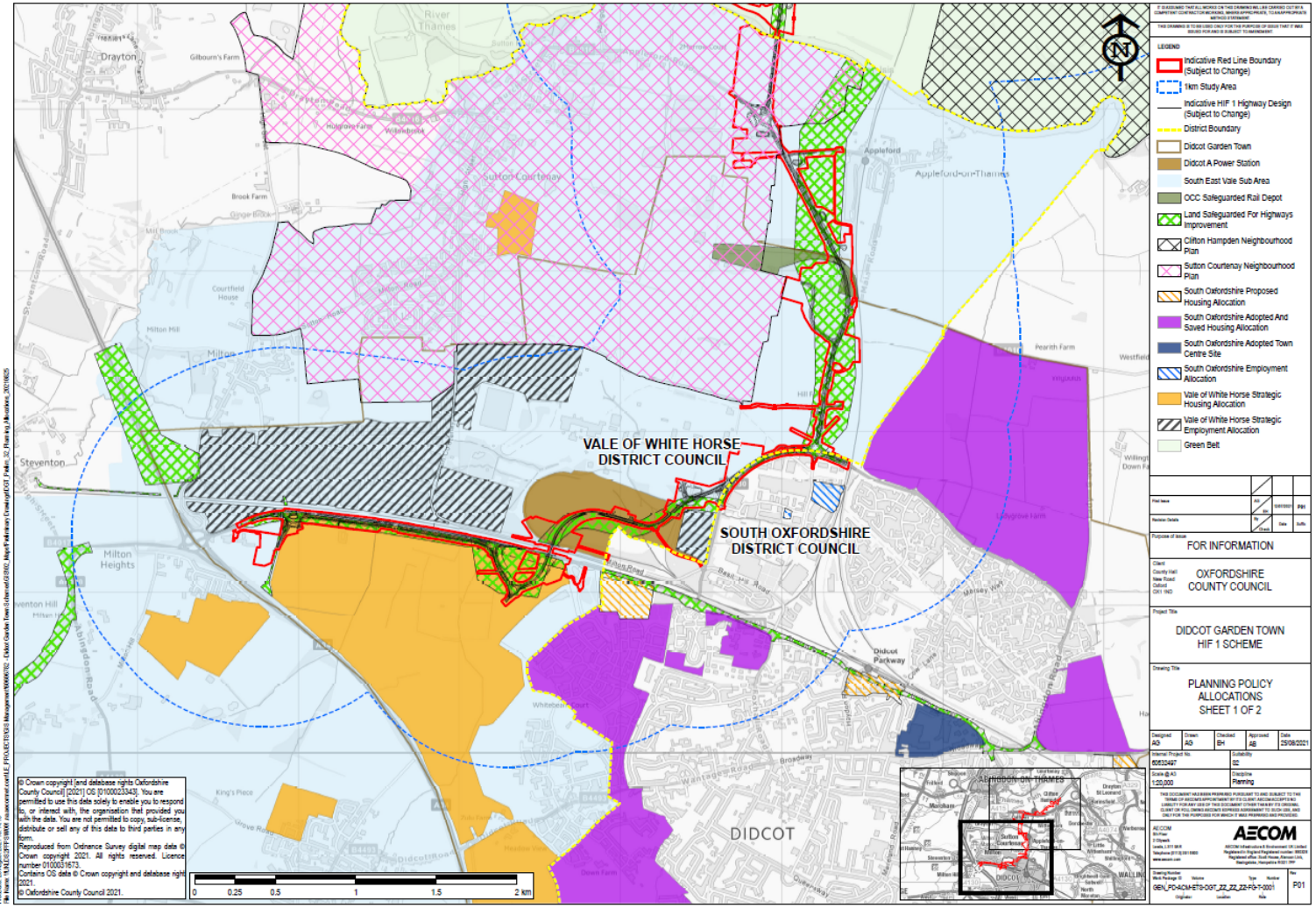

Figure 2-4: South Planning Designations Plan

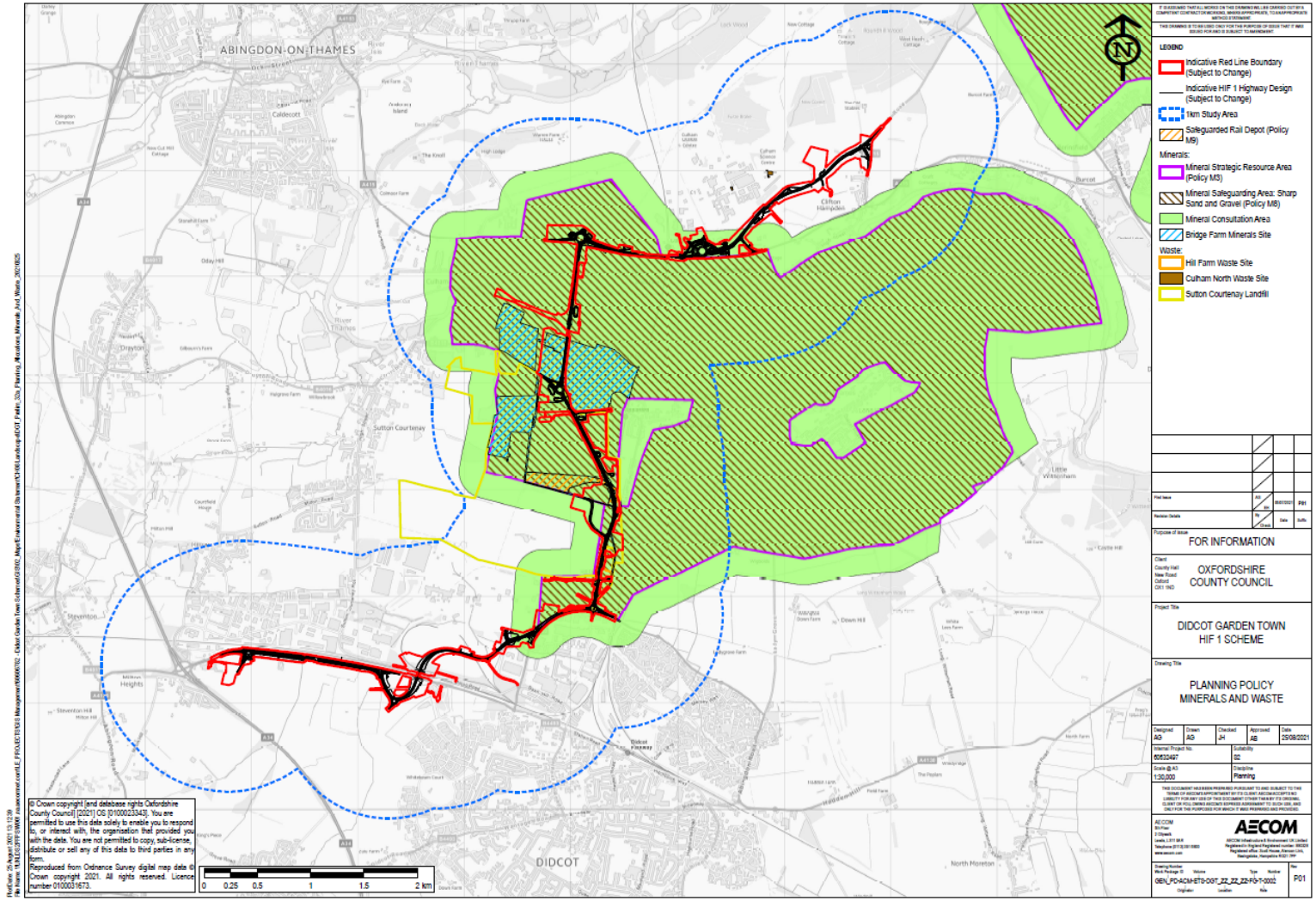

Figure 2-5: Minerals and Waste Designations

2.4 Socioeconomic Context

2.4.1 South Oxfordshire has a population of approximately 142,100 and Vale of White Horse has a population of around 136,000, representing 21% and 20% of Oxfordshire's population respectively. Both districts have higher levels of employment compared to the averages across Oxford, Oxfordshire, the South East and England. In both districts the Professional, Scientific and Technical Activities is the largest employment sector, indicating the importance of Science Vale to local employment opportunities. Therefore, infrastructure schemes such as the Proposed Development, are required to ensure accessibility to and connectivity across Science Vale and provide agglomeration benefits.

2.4.2 While the proportion of the population in both districts with qualifications at NVQ4 and above is slightly lower than the average in Oxford, it is higher than the averages in the county, the South East region and England. Weekly pay in South Oxfordshire is approximately 20% higher than the England average. In Vale of White Horse, it is 17% higher. House prices are also above average for both South Oxfordshire and Vale of White Horse.

2.4.3 Didcot has seen considerable growth, both in housing and employment over the past 30 years, which has led to a mismatch between the employment available and the highest level of qualification and work experience of the local population. This growth has also led to significant traffic growth, both within the town and related to commuting. Currently, congestion is found within Didcot town centre, on the A4130/B4493 to the A34 and on the River Thames crossings to the north of the town including through Clifton Hampden Village. In addition, whilst the Great Western Mainline brings many benefits to the town, the crossings over the railway bring about problems related to limited visibility, restricted width lanes, unidirectional tunnels and poor or non-existent non-motorised user (NMU) provisions.

2.4.4 Both housing and employment growth is set to continue throughout Didcot and the wider Science Vale area with 20,000 new jobs, 20,000 new houses and 50,000 new residents anticipated by 2031.

2.4.5 The population of both SODC and VoWHDC is expected to grow in the future. South Oxfordshire's Local Plan commits to delivering 18,600 homes between 2011 and 2035 and an additional 4,950 homes as part of Oxford's unmet housing need. Similarly, in the Vale of White Horse 20,560 homes are planned between 2011 and 2031, plus an additional 2,200 homes from Oxford's unmet housing need. Overall, the two districts have a need of 46,310 homes over the two Local Plan periods.

2.4.6 Housing areas are planned for Great Western Park (under construction), North West Valley Park and Valley Park, Ladygrove East, North East Didcot, Land adjacent to Culham Science Centre, northeast Wantage, and at other locations including Culham, Berinsfield and Dalton Barracks. The housing allocations contained within the Local Plans are shown on Figures 2-3 and 2-4.

2.4.7 There are also a number of major employment developments proposed within the area including within the two enterprise zones (Science Vale and Didcot Growth Accelerator) and elsewhere in Milton Park and Didcot Power Station. If growth continues as planned, with no additional transport mitigation, current congestion issues will be further exacerbated as stated in Section 1.2 above.

2.4.8 The Science Vale area which comprises the towns of Wantage (& Grove) together with the established research centres (Culham Science Centre and Harwell International Business Centre) and areas between these settlements, has been identified as an area which will see growth in innovative and high technology research and development. It is one of the anchors of the Oxfordshire Knowledge Spine which underpins the strategy set out in the Oxfordshire Strategic Economic Plan (SEP 2016). One of the key challenges identified is addressing congestion around Science Vale, noting that it is imperative that the road network operates safely and efficiently for the economic success of the area to be maximised.

2.5 Transport Infrastructure Context

2.5.1 Movement in Didcot and Science Vale is currently characterised by high levels of private car travel and dependence upon the car. This is outlined in the Transport Assessment which compares mode share data for the journey to work from the 2011 Census for Oxfordshire as a whole. It states that for Oxfordshire, 61.8% of journeys to work were made by car, for Didcot this went up to 66.3% The existing high levels of car use across Didcot and Science Vale will continue unabated without suitable transport interventions. There are underlying issues which cause the high use of private cars including the rural nature of Science Vale and the lack of attractive sustainable alternatives. Whilst distances travelled may be short, the private car appears to be a popular mode of travel within Didcot. In part, this is self-reinforcing as high levels of vehicular traffic makes active travel less attractive.

2.5.2 The major road in the area is the A34 Trunk Road which passes in a north-south direction connecting the M40 and M4 via Oxford. The other main roads form a loose grid across the area: A338 (Oxford-Wantage-M4); A4074 (Oxford-Reading); A415 (Witney-Abingdon-A4074) and A417/A4130 (Wantage- Didcot-Wallingford). To the north of Didcot, the road network is relatively sparse and constrained by the River Thames. The B4016 connects to the village of Appleford (via a narrow bridge over the Cherwell Valley Railway (Didcot-Oxford), adjacent to Appleford station) and beyond to Culham and the A415 via Abingdon Road-Tollgate Road. An alternative route is provided to the east via the village of Long Wittenham which connects to the A415 at Clifton Hampden, close to the Culham Science Centre. The existing river crossing at Culham Village (Sutton Bridge and Culham Cut) is a historic narrow bridge which operates under signalised shuttle-working. There is also an existing historic narrow bridge on the High Street connecting Clifton Hampden to Long Wittenham which also operates under signalised shuttle-working. To the west of Didcot, Sutton Courtenay Road/Lane-Harwell Road-High Street-Church Street connects with Sutton Courtenay as well as Abingdon Road-Tollgate Road and onwards to the A415. The road network is shown in Figure 2-6.

2.5.3 The key junctions within the Site boundary are:

- A4130/Milton Gate is a signalised priority T-junction. Milton Gate is the minor arm at this junction, providing access to several car dealerships and food retail.
- A4130/B4493/Mendip Heights roundabout has a one lane circulatory with all arms having one lane apart from the A4130 east arm that flares to two lanes at the approach.
- A4130/Milton Road/Basil Hill Road roundabout has a one lane circulatory with the A4130 south arm widening to two lanes at the approach.
- A1430/Collett junction is a four-arm roundabout with one circulatory lane.

- Culham Station access junction is a priority T-junction with single lanes at each arm.
- Culham Science Centre priority T-junction with right turn ghost island. The Culham Science Centre access widens to two lanes at the approach with a dedicated right turn lane.
- A415/High Street (Clifton Hampden) is a staggered signalised junction. The A415 west arm widens to two lanes at the junction to provide a narrow dedicated right turn lane. B4015 is the minor arm, providing access to north Clifton Hampden and the A4074.

2.5.4 Capacity assessments of the existing junctions within the study area have been undertaken for the 2020 base year. Further details can be found in the Transport Assessment submitted with this application.

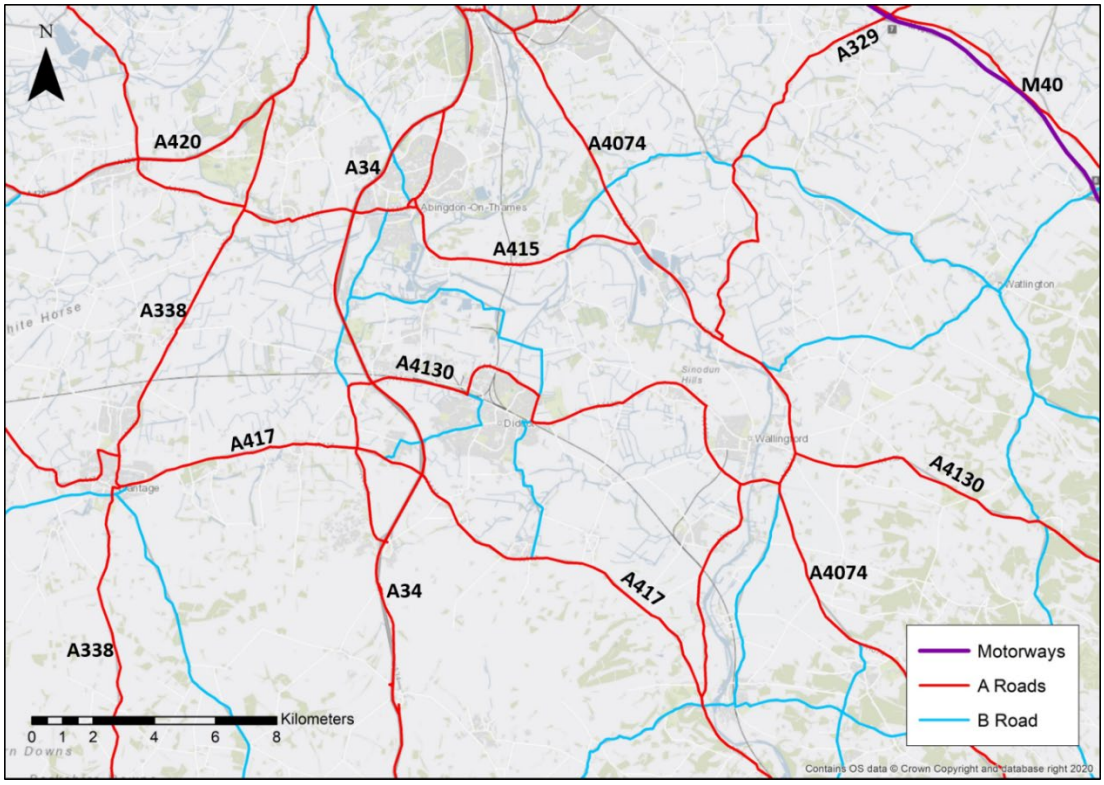

Figure 2-6: Road Network

2.5.5 In regard to public transport the area is served by the Great Western Mainline (GWML) (London to South Wales and southwest England) which runs along the southern edge of the area and the Cherwell Valley Line (Didcot-Oxford railway) which cuts north from Didcot Parkway. There is an interchange station at Didcot Parkway with more minor stations at Culham, Radley and Appleford. The low frequency of train services stopping at the more rural stations within the Science Vale limits the number of users of rail service.

2.5.6 There are 10 existing bus stops (five pairs) located along the length of the Site or within close proximity. However, the frequency of services is low and in most cases is not enough to make buses an attractive alternative to cars. Due to the severance created by the River Thames and the historic road network, there are poor opportunities for bus routes to offer good journey time reliability north-south in this area. Further details on bus routes can be found in the Transport Assessment submitted with this application.

2.5.7 Cycle infrastructure is present across Science Vale and Didcot. However, this provision is fragmented and discontinuous in places, with a lack of infrastructure in several key areas across the region. There is a concentration of cycling infrastructure in and around Didcot, notably with cycle infrastructure provided from Didcot to Milton Park, a key employment area. Further details can be found in the Transport Assessment submitted with this application.

2.5.8 In comparison to the cycle infrastructure there is a more extensive, interconnected network of public rights of ways. For example, there are footpaths connecting Didcot to Culham via Sutton Courtenay, and there are paths linking Harwell and Wantage. However, it should be noted many of these footpaths do not have a solid surface and as such are more likely to be leisure routes rather than commuting.

2.5.9 Due to the severance created by the River Thames and the historic road network, there are poor opportunities for walking and cycling north-south in this area. For example, residents of Didcot wishing to cycle to Culham Science Centre must use indirect routes, relying on the main carriageway for significant portions.

3. Design Policy and Guidance Context

3.1.1 Section 38(6) of the Planning and Compulsory Purchase Act 2004 requires that development proposals shall be determined in accordance with the adopted Development Plan unless material considerations indicate otherwise. The adopted Development Plan for this area comprises:

- VoWHDC Local Plan 2031 Part 1 (December 2016);
- VoWHDC Local Plan 2031 Part 2 (October 2019);
- SODC Local Plan (December 2020); and
- OCC Minerals and Waste Core Strategy.

3.1.2 In addition to this material considerations include:

- National Planning Policy Framework (NPPF) (July 2021);
- Planning Practice Guidance;
- Oxfordshire County Council: Local Transport Plan 4 2015-2031 (2016);
- Draft Neighbourhood Plans - including the
  - Burcot and Clifton Hampden Neighbourhood Plan (2011-2034);
  - Sutton Courtenay Neighbourhood Plan;
- Oxfordshire Infrastructure Strategy (2017);
- VoWHDC Design Guide SPD (March 2015);
- VoWHDC Local Plan 2031 Part 1, Infrastructure Delivery Plan (2015);
- VoWHDC Local Plan 2031 Part 2, Infrastructure Delivery Plan (2018);
- Developer Contributions – Delivering Infrastructure to Support Development SPD (June 2017);
- SODC Didcot Town Centre SPD May 2009;
- SODC Design Guide SPD November 2016;
- SODC Landscape Assessment SPG 2003;
- SODC Infrastructure Delivery Plan (2019); and
- OCC : Local Transport Plan 4 2015-2031 (2016).

3.2 Design Guidance Documents

Design Manual for Roads and Bridges (2020 as amended)

3.2.1 The Design Manual for Roads and Bridges (DMRB) was recently amended in 2020 and is considered relevant to the Proposed Development. The DMRB is a suite of documents which contain requirements and advice relating to works on roads.

3.2.2 The DMRB was prepared jointly by the Overseeing Organisations (which includes Highways England (now National Highways), Transport Scotland, The Welsh

Government, and the Department for Infrastructure (Northern Ireland)). It embodies the collective experience of the Overseeing Organisations, their agents and designers. It provides requirements and advice resulting from research, practical experience of constructing and operating roads, and from delivering compliance to legislative requirements.

Other Design Guidance Documents

3.2.3 In addition to the DMRB, reference has also been made to the following to inform the design of the Proposed Development:

- Manual for Streets (MfS) 2007;
- Manual for Streets 2 2010;
- Local Transport Note (LTN) 1/20 – Cycle Infrastructure Design (July 2020);
- The Strategic Road Network – Planning for the Future (September 2015);
- Transport for New Developments: Transport Assessments and Travel Plans (March 2014);
- OCC Walking Design Standards (2017);
- OCC Cycling Design Standards (2017);
- The Traffic Signs Regulations and General Directions 2016;
- Traffic Signs Manual (2020);
- ILP Guidance Note 8/18 Bats and artificial lighting in the UK (2018);
- ILP PLG Lighting for Cycling Infrastructure (2020);
- BS5489-1-2020: Code of practice for the design of road lighting (2020);
- PD CENTR13201-1:2014: Road lighting Part 1: Guidelines on selection of lighting classes (2014);
- BS EN 13201-2:2015 Performance requirements (2015);
- CIE 115:2010 Lighting of Roads for Motor and Pedestrian Traffic (2010);
- BS 7671 18th Edition Requirements for Electrical Installations IET Wiring Regulations (2018);
- LA113 Road Drainage and the Water Environment (2019);
- Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire (Dated November 2018);
- CIRIA guide C753 - The SuDS Manual (2015);
- CIRIA guide C689 - Culvert design and operation guide (2012);
- Guidelines for Landscape and Visual Impact Assessment (GLVIA 3);
- Guidelines for Ecological Impact Assessment (EcIA) by the Chartered Institute of Ecology and Environmental Management (CIEEM) (September 2018);
- Tree Survey for Planning to British Standard 5837 or BS5837, (2012); and
- Defra's LAQM Technical Guidance (LAQM.TG (16)) (2016).

4. Engagement Process

4.1.1 This section provides a summary of the consultation and engagement that has informed the planning application during the pre-application stage. The details of the consultation and engagement undertaken can be found in the Statement of Community Involvement (SCI).

4.1.2 Early engagement has been carried out throughout all stages of the Proposed Development in accordance with both national and local planning policies.

4.1.3 The approach to consultation has followed the guidance set out in the OCC Statement of Community Involvement (June 2020). A number of methods were used to maximise participation from relevant stakeholders and local community. However due to the COVID-19 pandemic, some activities had to be replanned in order to adhere to national guidance.

4.2 Engagement to Date

4.2.1 There have been a number of engagement activities including the following:

- Public consultation events – the first held in 2018 via an online consultation and supplemented with two public exhibitions in November 2018 within Didcot attended by approximately 300 people. A second consultation ran in March and April 2020 for 6 weeks which comprised of a virtual exhibition and virtual stakeholder briefings. Respondents were asked to provide comments on the Proposed Development.
- A Walking, Cycling and Horse-Riding Assessment & Review – including of a questionnaire sent to 24 stakeholders representing 14 different organisations.
- Targeted Consultation – this included engagement with elected members and parish councils in person, online as well as on site. In addition, responses were made to Appleford's position paper in March 2021. Online briefings were also held with key groups in 2021 to provide update on the project and highlight any changes made as a result of the consultation.
- An Environmental Impact Assessment (EIA) Scoping Opinion request submitted in April 2020.
- Website – in spring 2021 a new dedicated project webpage was launched on the OCC website to provide stakeholders with an update on the design and progress of the planning application.

4.2.2 Further details of the engagement undertaken can be found in the SCI submitted with this planning application.

5. Design Evolution

5.1.1 This section of the DAS provides a summary of the design evolution of the Proposed Development. A detailed assessment of the design evolution and alternatives for the Proposed Development can be found in the OAR in Appendix A.

5.2 Assessment of Options

5.2.1 A robust optioneering and appraisal process has been developed to sift through a number of options that were put forward for consideration. The assessment framework has been developed in accordance with the Department for Transport's (DfT) Transport Appraisal Process (2014), Early Assessment Sifting Tool (EAST) Guidance (2017) and the HM Treasury Green Book (2020). For further details of the alternatives considered and the assessment approach please refer to the OAR (see Appendix A).

5.2.2 The options have been derived based on the assessment of current and future travel patterns, development, growth, challenges and professional judgement based on experience within Oxfordshire and elsewhere. This also includes previous and current proposals from local authorities and stakeholders.

5.2.3 A four-phase appraisal process was undertaken, as shown in Figure 5-1.

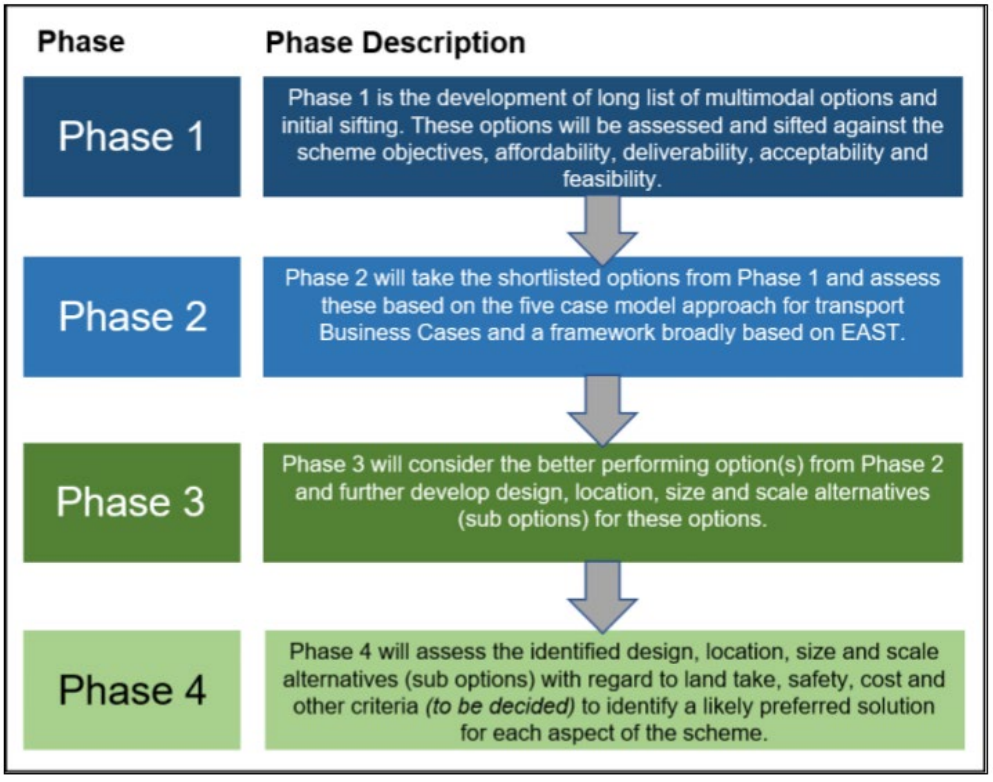

Figure 5-1: Options Identification and Appraisal Process

5.2.4 As the phases were completed chronologically, evidence gathered during the earlier phases were fed into the next phase, enriching the assessment with more specific appraisal of options. Hence, the later phases draw not only on the new evidence included as part of that phase, but also on the evidence compiled in the previous phases.

5.2.5 The options considered as part of the OAR are set out below which are also shown on Figure 5-2.

5.2.6 During Phase 1, 16 options were initially considered:

- Option 1: A4130 Widening;
- Option 2: Science Bridge;
- Option 3: Didcot to Culham River Crossing;
- Option 4: Clifton Hampden Bypass;
- Option 5: Enhanced bus network including bus lanes and bus priority signals;
- Option 6: Park and Ride in vicinity of A34;
- Option 7: Improved rail services from Didcot to Oxford and Reading;
- Option 8: Improved stations at Didcot and Culham, plus a new station at Grove;
- Option 9: Junction realignments and signalisation;
- Option 10: Upgraded and co-ordinated traffic signal control;
- Option 11: Comprehensive cycle and walking networks within Didcot;
- Option 12: Science Vale Bus Rapid Transit;
- Option 13: Science Vale Light Rail Link;
- Option 14: Demand Responsive Transport;
- Option 15: Small scale bus improvements across Science Vale; and
- Option 16: A34 Widening.

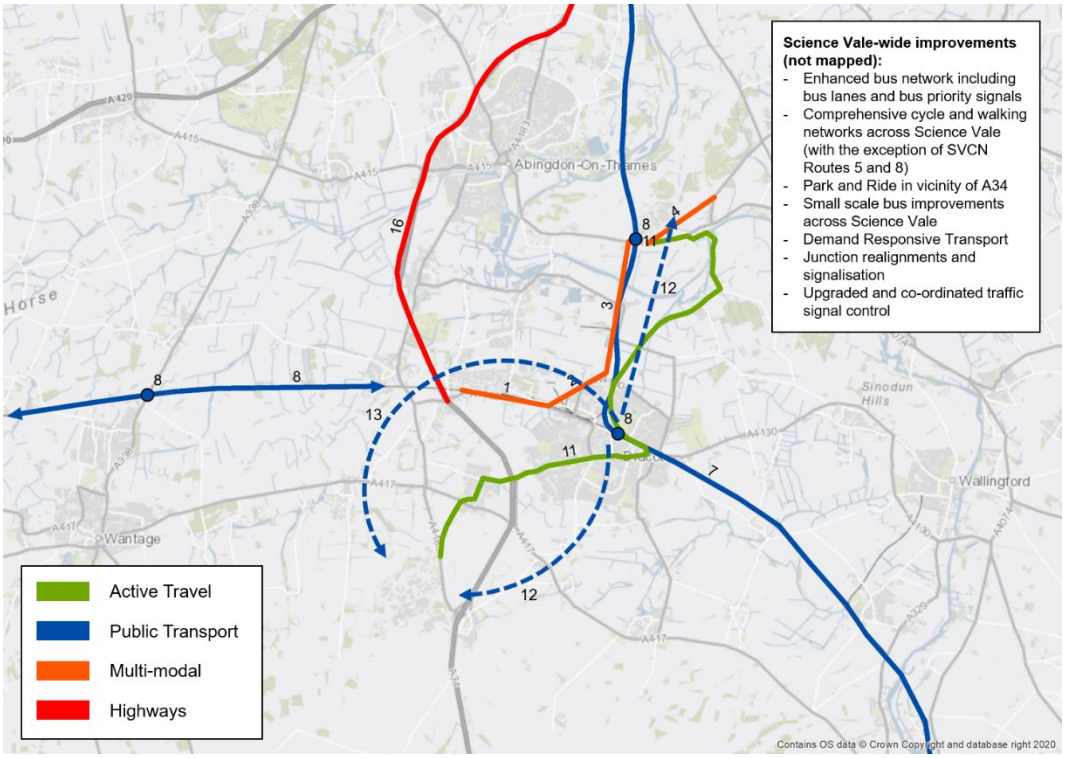

Figure 5-2: Phase 1 Assessed Options

5.2.7 Phase 1 was the initial sift of options appraised by assessing the alignment with the Proposed Development's objectives and criteria including affordability, deliverability, acceptability and feasibility.

5.2.8 Due to their high score against the metrics of affordability, deliverability, acceptability and feasibility, the following options were taken forward to Phase 2 for a more detailed appraisal:

- Option 1: A4130 Widening;
- Option 2: Science Bridge;
- Option 3: Didcot to Culham River Crossing; and
- Option 4: Clifton Hampden Bypass.

5.2.9 During Phase 2, the four options were assessed in more detail against a five-case business case approach in an adapted version of the DfT Early Assessment and Sifting Tool (EAST) methodology for reviewing the business case for major investments.

5.2.10 The Phase 2 appraisal considered how the four options performed against the five-case business case criteria of Strategic, Economic, Management, Financial and Commercial. This assessment aimed to draw out the weaknesses and strengths of each of the options, rather than quantitatively compare them on the score achieved, to understand the nuances of each of the options. The scores nevertheless provide a broad guide as to how the options compare to one another.

5.2.11 Following the assessment of the options during Phase 2, all four options were chosen to go forward for further assessment.

5.2.12 Phases 3 and 4 of the options appraisal process considered the design, location, size, and scale alternatives to the four preferred options listed above. A number of sub-options were considered to further refine and develop the option design to ensure the benefits are maximised and the negatives minimised, and ensure the preferred options taken forward are the best fit for the Proposed Development's objectives. The Phase 4 assessment also involved consideration of the benefits and challenges associated with each sub-option.

5.2.13 Some of the key sub-options for consideration are set out below.

A4130 Widening

5.2.14 As shown in Figure 5-3, consideration was given to whether the dualling should involve the removal of the existing drainage ditch and vegetation. It was concluded that retaining the drainage and vegetation was the preferred option.

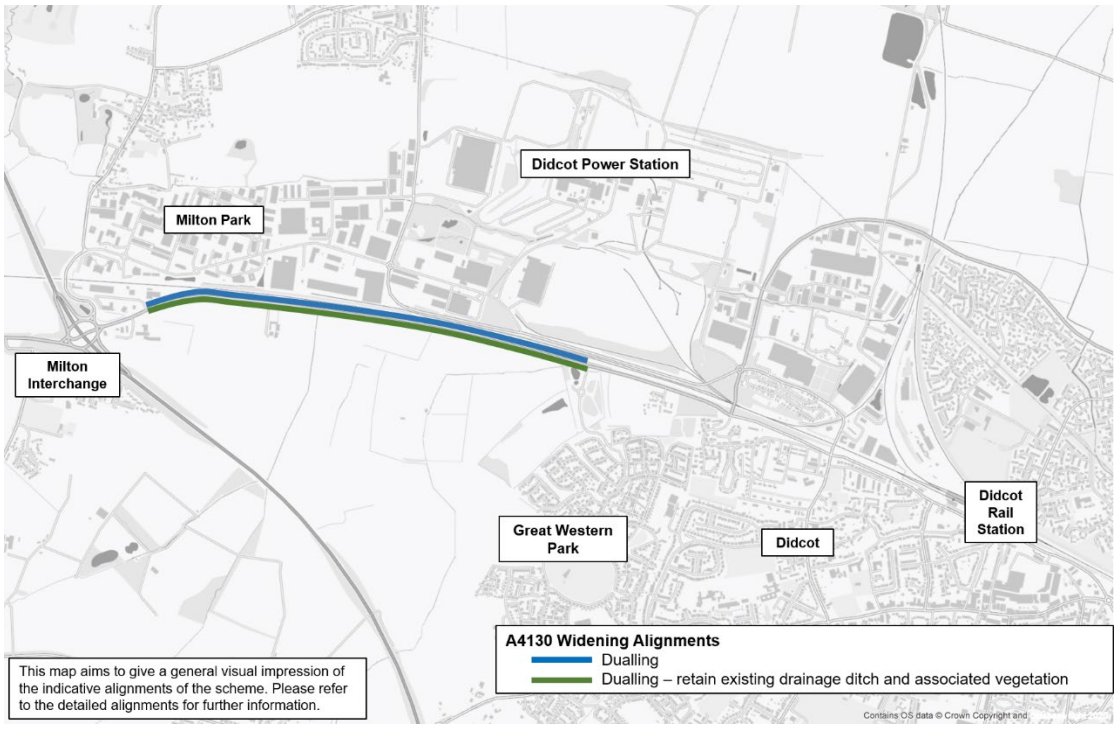

Figure 5-3: A4130 Widening Sub-options

Didcot Science Bridge

5.2.15 Three options were considered for the alignment of the bridge as shown in Figure 5-4 with sub-option 2.4 (Alignment C) being the best performer as it can be built off-line and links housing directly to employment.

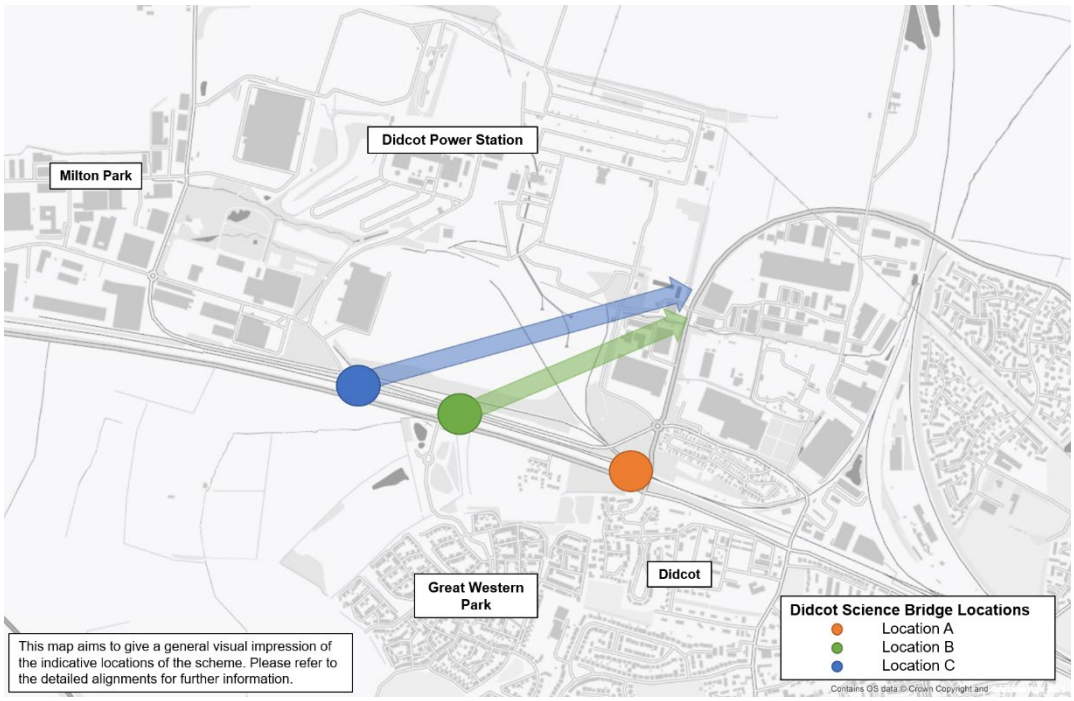

Figure 5-4: Didcot Science Bridge Sub-options

Didcot to Culham River Crossing

5.2.16 A total of six options were considered for the alignment of the River Crossing (see Figure 5-5 below). In this location there are a number of environmental and engineering constraints which had to be considered, as such Alignment 6 was identified as the preferred option, informed by consultation feedback from Appleford residents as well as the proximity to historic scheduled monuments.

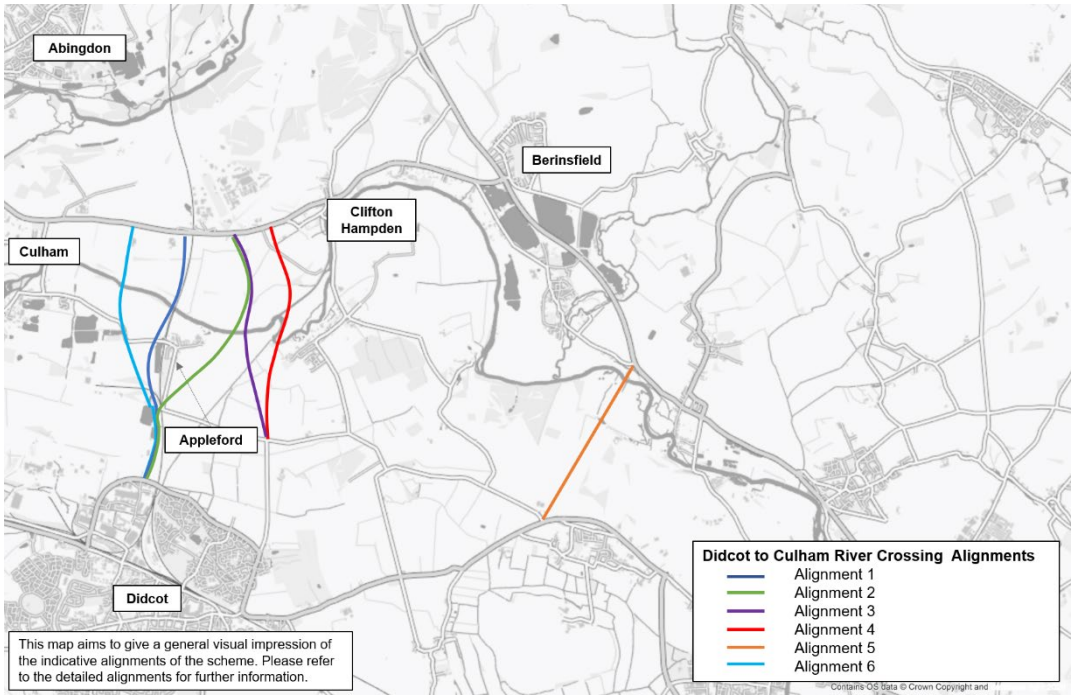

Figure 5-5: Didcot to Culham River Crossing Sub-options

Clifton Hampden Bypass

5.2.17 As shown in Figure 5-6, four options were considered for the alignment of the bypass. The preferred option was the Northern Bypass further from the village (T-junction at eastern end), which was enabled by proposing a lower speed limit as a result of public consultation. The T-junction helps to discourage the use of the Clifton Hampden village as a through route.

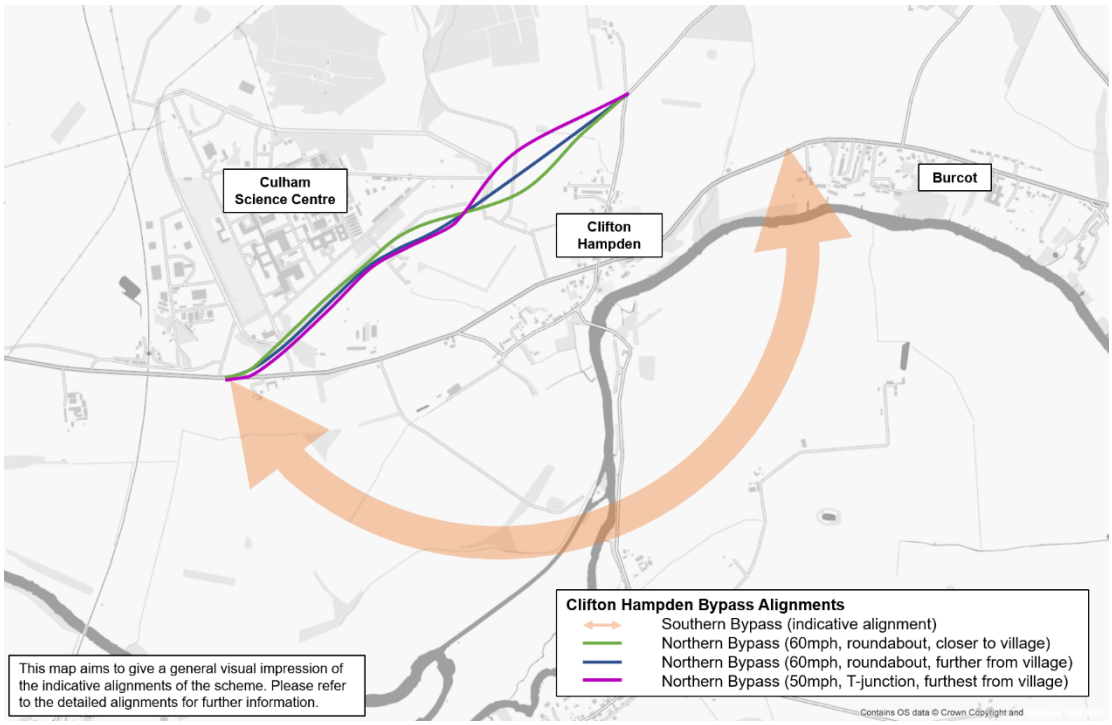

Figure 5-6: Clifton Hampden Bypass Sub-options

6. Proposed Development

6.1.1 The Proposed Development is divided into four separate but interdependent highway schemes which are dealt with in turn below. The four schemes include:

- A4130 Widening;
- Didcot Science Bridge;
- Didcot to Culham River Crossing; and
- Clifton Hampden Bypass.

6.2 Routes and Junctions

6.2.1 The design of the routes and junctions for the Proposed Development has been informed by a number of factors:

- A road safety audit was conducted to identify any safety issues which may require addressing as a result of the Proposed Development.
- Swept path analysis of vehicle turning movements was conducted for the junctions, roundabouts and private accesses throughout the Proposed Development and can be found on drawings GEN_PD-ACM-HSP-DGT_ZZ_ZZ_ZZ-DR-T-0001 to GEN_PD-ACM-HSP-DGT_ZZ_ZZ_ZZ-DR-T-0039 .
- Visibility splays can be found on drawings GEN_PD-ACM-HML-DGT_ZZ_ZZ_ZZ-DR-T-0001 to GEN_PD-ACM-HML-DGT_ZZ_ZZ_ZZ-DR-T-0019.
- A number of departures from the design standards are required in order to avoid significantly impacting existing properties, buildings, and utilities. Further details on the departures can be found in Appendix C.

A4130 Widening

Figure 6-1: A4130 Widening Location Plan

6.2.2 The A4130 Widening proposed layout is shown on General Arrangement drawings GEN_PD-ACM-GEN-DGT_ZZ_ZZ_ZZ-DR-T-0001 to GEN_PD-ACM-GEN-DGT_ZZ_ZZ_ZZ-DR-T-0003 .

6.2.3 The existing A4130 is the main access to Didcot from the strategic road network at the A34. It is dual carriageway which extends eastbound from the Milton Interchange reducing to single carriageway at the Milton Gate junction.

6.2.4 A new, at grade, four-arm roundabout (Backhill roundabout) will be created approximately 200m to the east of the Milton Gate junction. This will include two lanes on its circulatory carriageway. The two mainline A4130 entry and exits will have two lanes. Two arms will be provided on the southern part of this roundabout, and these will provide access to planned developments on land to the south-west and south-east of the roundabout. Single lane entry and exits will be provided on these arms.

6.2.5 East of the new Backhill roundabout the A4130 will be dualled to two lanes in each direction. Most of the existing single carriageway, adjacent grass verges, ditches, hedgerows, and trees will be retained. The existing single carriageway becoming the eastbound carriageway of the new dualled road. A new two-lane carriageway will be constructed south of the existing carriageway and will form the westbound carriageway of the new road. The highways infrastructure in this location will be approximately 35m wide but may vary where the width of existing ditch varies, this has been taken into account through the use of limits of deviation.

6.2.6 Further east, an access into the land subject to planning permission (Valley Park Ref: P14/V2873/O, VoWHDC) will be included. This will be a signalised junction, with a dedicated right turn lane included on the eastbound carriageway and a dedicated left turn included on the westbound carriageway. The existing ditch and hedgerow south of the existing carriageway will be removed in the vicinity of this junction, to provide a safe layout including for the required visibility. The access will have a single exit lane, and two approach lanes providing separate left turn and right turn lanes onto the new dualled A4130. Two bus lay-bys will be provided in this location, one east of the junction on the eastbound carriageway, and one to the west of the junction, on the westbound carriageway. A second roundabout (old A4130 roundabout) will be created. This will be an at grade, three-arm roundabout with two lanes on its circulatory carriageway. It will provide access to the current alignment of the A4130 towards Didcot, and to a single carriageway which will connect with a third roundabout, the Didcot Science Bridge roundabout, to the south-east. All three arms will be marked as two-lane entries, the eastern and south-eastern arms flaring from a single lane approach. The western arm will be marked as a two-lane exit, while the other two arms will provide only a single lane exit. To the east of this roundabout, two bus stops will be created in the main traffic lanes, on the alignment of the existing A4130.

6.2.7 The eastern link road section between the proposed ‘old A4130 roundabout’ and the Didcot Science Bridge roundabout is a single carriageway. The Proposed Development will be approximately 20.3m wide in this location, including NMU provision. Fencing and embankments will extend beyond.

6.2.8 The Didcot Science Bridge roundabout will be an at grade, three-arm roundabout, that will provide access between the A4130 and the Didcot Science Bridge, and to the planned development at Valley Park. All approaches will be single lanes flaring to two entry lanes, while all exits will provide only single lanes.

6.2.9 The A4130 will be subject to a reduced speed limit of 40mph from the junction with the roundabout at the A34 Milton interchange continuing along the dual and retained single carriageway sections. This reflects the future urban nature of this modified road, with the proposed development along the road and planned walking and cycling facilities.

Didcot Science Bridge

Figure 6-2: Science Bridge Scheme Location Plan

6.2.10 The Didcot Science Bridge proposed layout is shown on General Arrangement drawings GEN_PD-ACM-GEN-DGT_ZZ_ZZ_ZZ-DR-T-0004 to GEN_PD-ACM-GEN-DGT_ZZ_ZZ_ZZ-DR-T-0006.

6.2.11 The Didcot Science Bridge will consist of a single carriageway passing over the A4130, the Great Western mainline railway and Milton Road landing in the former Didcot A Power Station site. The bridge will be approximately 14.9m in width, including NMU provisions.

6.2.12 This single carriageway road will continue as the Didcot Science Bridge Link Road, extending through the allocated development areas of the former Didcot A Power Station site. This part of the Proposed Development will be approximately 18.3m in width, including NMU provision. These NMU provisions shall be continued into the Didcot to Culham River Crossing scheme. The link road ties-in with A4130 Northern Perimeter Road, north of the Hawksworth Roundabout. The northern arm of Hawksworth Roundabout (A4130 Northern Perimeter Road) connects to the link road, forming a new ghost junction with a right turn pocket provided on the new link road into the old A4130 Northern Perimeter alignment, leading to Hawksworth Roundabout. Throughout the scheme extents, there are multiple side-roads which will provide direct access points into adjacent land located to the north and south of the Proposed Development. Side roads that lie within the Clowes development shall be provided by Clowes, all other side roads shall be provided by OCC.

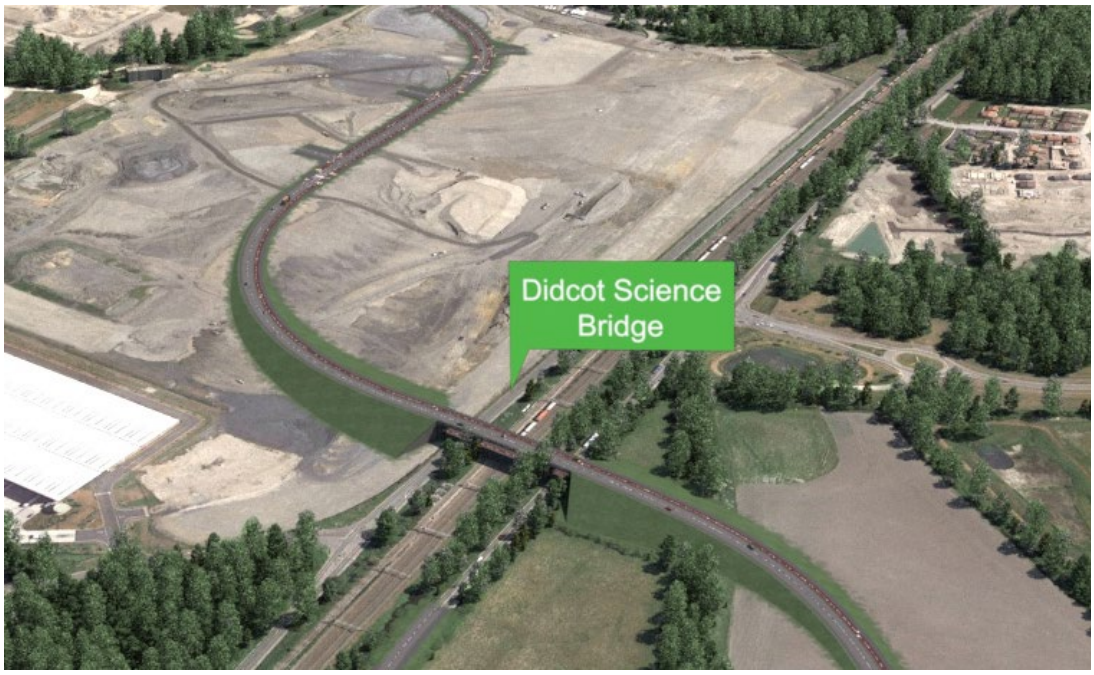

Figure 6-3: Visualisation of the proposed Science Bridge

Didcot to Culham River Crossing

Figure 6-4: River Crossing Scheme Location Plan

6.2.13 The layout of the Didcot to Culham River Crossing is shown on General Arrangement drawings GEN_PD-ACM-GEN-DGT_ZZ_ZZ_ZZ-DR-T-0007 to GEN_PD-ACM-GEN-DGT_ZZ_ZZ_ZZ-DR-T-0015.

6.2.14 The existing, at grade, four-arm roundabout (Collett roundabout) will be enlarged. It will include two lanes on its circulatory carriageway, currently there is one. All approaches to the roundabout will flare out to two lanes; all exits off the roundabout will merge from two lanes into one lane. Two bus stops will be included to the east of the roundabout, on both carriageways. The alignment continues north, along the current alignment of an access road to several private residential properties, with two offline bus stops provided opposite one another on either side of the carriageway.

6.2.15 Further north, the Proposed Development will continue as a single carriageway with two accesses; one to land located to the east of the Proposed Development and one to land located west of the Proposed Development, both serving the proposed Didcot Technology Park (D-Tech) site. The D-Tech site will not be constructed in advance of the HIF1 Scheme therefore access to J James Pallets and Wood Recycling will be maintained, thereby ensuring that the business is able to operate during the construction of the Proposed Development. There will also be private accesses to Hartwright House and Hill Farm House. The Proposed Development will be approximately 20.3 m in width, including NMU provision and verges, but this will increase where bus stops and ghost island right turn lanes are provided (for example, to enable access to Hanson and FCC operations).

6.2.16 The Proposed Development is aligned between three ponds, located to the east and west. Small sections of two of the ponds will be infilled. At this location, to the west of the main carriageway a priority T junction and an access road will be constructed to replace the existing Portway Road access road further north. The priority junction will include a ghost island right turn lane for traffic travelling from the north. The minor arm will incorporate a widened exit so that traffic turning left to the north can filter past vehicles waiting to turn right. The severed section of the Portway Road will be retained as an access for maintenance and operational purposes

6.2.17 Further north, the Proposed Development will cross Appleford railway sidings, a private railway siding for the Hanson aggregate operations and FCC Landfill Site. The Proposed Development will remain as a single carriageway and will continue through an area of historic restored landfill (known as the 90-acre field). There will be a priority junction on the B4016 to the north and west of Appleford including a dedicated ghost island right turn lane for traffic travelling north. Further north, two bus stops located opposite each other will be provided offline from the mainline of the Proposed Development. The proposed Sutton Courtenay roundabout will be an at grade, three-arm roundabout with two lanes on its circulatory carriageway. Two lanes will be included on all exits, these will merge to one lane once off the roundabout. This roundabout will provide access to the crossing over the River Thames and maintain links between Appleford and Sutton Courtenay and the surrounding areas.

6.2.18 Extending north from Sutton Courtenay roundabout, a 336m viaduct is provided to cross the River Thames floodplain with a 155m bridge over the River Thames. The bridge over the River Thames will comprise two 45-metre side spans and a 65-metre main span. The River Thames is navigable at this location so the bridge height about water level has been designed to accommodate river traffic. The crossing over the River Thames will be a single carriageway, approximately 16.9m in width including the NMU provisions.

6.2.19 To the north of the River Thames crossing, private accesses will be created to a farm property located to the east of the alignment. Where the new link road interfaces with the A415 Abingdon Road a new four-arm at grade roundabout is constructed to the north of the existing road alignment. This connects the A415 Abingdon Road, the new road and a new stub to the north for future development access.

6.2.20 The A415 Abingdon Roundabout has two lanes on its southern circulatory carriageway and three on its northern side. This will ensure three lanes are provided at the A415 eastbound access onto the roundabout. Two-lane approaches will be included on all other entries, except for the A415 westbound, which will also include a segregated left turn lane. To the east of the roundabout, the A415 will return to a single carriageway.

Clifton Hampden Bypass

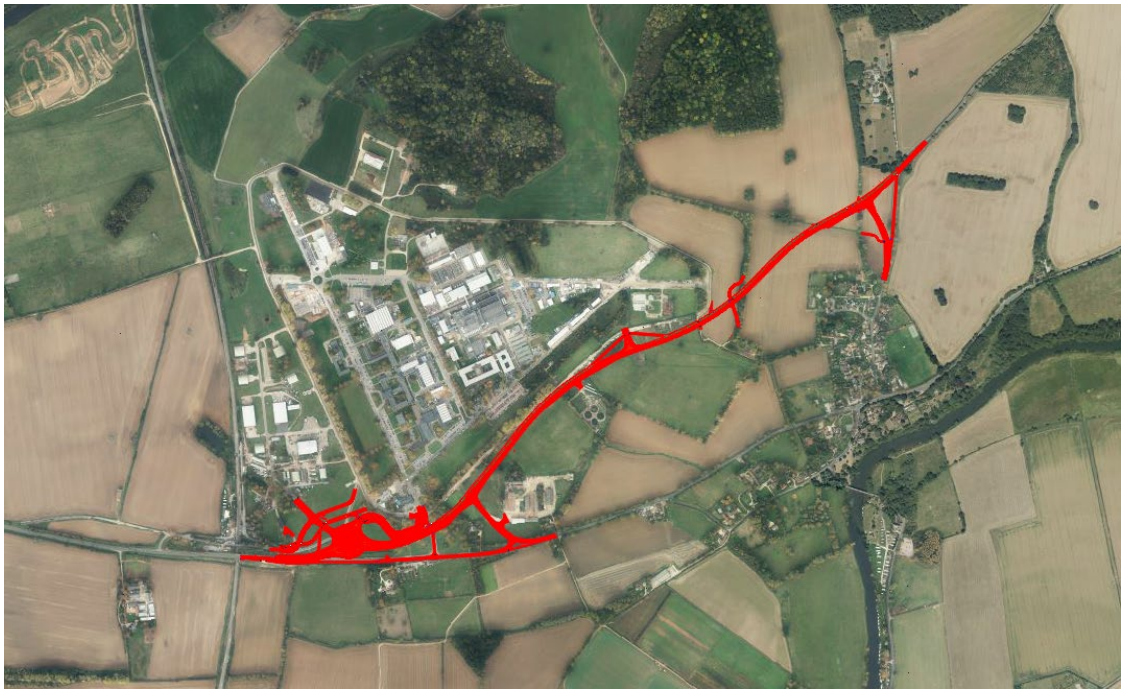

Figure 6-5: Clifton Hampden location plan

6.2.21 The Clifton Hampden Bypass proposed layout is shown on General Arrangement drawings GEN_PD-ACM-GEN-DGT_ZZ_ZZ_ZZ-DR-T-0016 to GEN_PD-ACM-GEN-DGT_ZZ_ZZ_ZZ-DR-T-0019.

6.2.22 The Clifton Hampden Bypass will re-route traffic on the A415 around the village of Clifton Hampden, which currently experiences a large amount of through traffic as people travel between the A415 to A4074.

6.2.23 The existing A415 will be realigned south of the Culham Science Centre (CSC) and a bypass will be created. The proposed works also include the construction of a large four-arm roundabout at the western end of the Proposed Development, providing access to the SODC Local Plan allocated housing site, a railway station and LEDA owned farmland / businesses north of CSC coming off the northern arm, and CSC on the northeast arm. Station Road will be realigned and will join with a new entrance to the industrial properties (Culham No.1 site) located north west of the roundabout. An existing access road into the CSC will be terminated and converted into a footway and cycleway. The other exit from the roundabout into the CSC will provide two

access points to CSC (main gate and perimeter road). The bypass will be aligned in a south-west to north-east direction and will be a single carriageway, approximately 11.3 m in width including segregation strip and hard strip, but this will increase in some cases for example, where dedicated ghost island right turn lanes are provided. There will be a dedicated, ghost island, right turn lane that will connect with a new single carriageway, which will connect with the current alignment of the A415. This will provide access to the village of Clifton Hampden.

6.2.24 Two bus stops are proposed on the bypass, outside Culham Science Centre, to link public transport to this employment centre. The westbound bus stop will be in a lay-by, while the eastbound bus stop will be on-carriageway. A second pair of bus stops are proposed near the B4015 connection junction, as a provision for future use by local bus companies to connect with Clifton Hampden Village. The westbound bus stop will be in a lay-by, while the eastbound bus stop will be on-carriageway. Both sets of bus stops will be equipped with a bus shelter and Sheffield stands.

6.3 Non-Motorised Users

6.3.1 The Proposed Development will have a positive impact on non-motorised user (NMU) travel in the area with the provision of additional and improved crossing points for all NMU modes which will help to reduce the severance caused by the proposed carriageway, connecting footways/bridleways and providing safe access to and from bus stops. The Proposed Development has been designed in line with the LTN 1/20 guidance, ensuring that priority is given to pedestrians/cyclists over side roads.

A4130 Widening

6.3.2 Along the length of this section of the Proposed Development, segregated two-way, off-road, cycling and walking facilities will be provided. East of the Milton Gate junction, the Proposed Development will include a shared use cycle and footway adjacent to the eastbound and westbound carriageways. This will link to the existing NMU only Backhill Lane Tunnel, and extend around the northern side of Backhill roundabout, where a two stage Toucan crossing (east of the roundabout) will be provided allowing users to cross both carriageways. Segregated cycling and walking facilities and raised Parallel crossings will also be included around the southern side of Backhill roundabout. The existing toucan crossing by Backhill Lane Tunnel will be replaced by a two stage Toucan crossing over the new dual carriageway. To the east of Backhill roundabout, a segregated two-way cycleway and new footway will be provided to the south of the widened and new sections of the road, up to and including the Didcot Science Bridge roundabout, and will continue over the Didcot Science Bridge and links to the Public Rights of Way and future developments located to the south of the A4130 will be provided.

6.3.3 A parallel crossing will be included at the western access to the Valley Park development. Additionally, an uncontrolled crossing will be provided east of the old A4130 roundabout, which will provide access to the eastbound bus stop (with bus shelter). A Toucan crossing will be included across the new A4130 immediately south of the old A4130 roundabout. This will provide access to the existing shared path for cyclists and pedestrians along the current alignment of the A4130 linking to Didcot.

Didcot Science Bridge

6.3.4 A segregated two-way cycleway and footway will be provided over the Didcot Science Bridge on the eastern side of the bridge.

6.3.5 East of the northern approach embankment to the Didcot Science Bridge segregated bi-directional cycleways and adjacent footways are to be provided on both sides of the road. Three parallel crossings will allow users to cross the Science Bridge Link Road, additionally one parallel crossing will allow users to cross the old A4130 leading to Purchas Road/Hawksworth Roundabout. Where the Proposed Development ties-in with the existing A4130 Northern Perimeter Road, a Toucan crossing will be provided to allow those using the north-south PRoW (and National Cycle Network route 5) to safely cross the new road on a new alignment. In this locality, a segregated two-way cycleway and adjacent footway will be located away from the carriageway to provide a continuous NMU link to the Didcot to Culham River Crossing. The existing footway on the southern side of the A4130 will be realigned to the new carriageway.

Didcot to Culham River Crossing

6.3.6 Shared-use footway/cycleways are proposed at the Collett roundabout with an inline Toucan crossing on the eastern arm, a raised parallel crossing on the southern arm plus uncontrolled crossing points on the western and northern arms. An off-road segregated footway/cycleway will be provided to the north side of the A4130 west of Collett Roundabout to connect to the same provision in the adjacent Didcot Science Bridge section of the Proposed Development.

6.3.7 North of the Collett roundabout, there will be dedicated, off-road, segregated two-way cycleways and footways either side of the highway. Two parallel crossings will be provided to facilitate the proposed D-Tech development site and bus stops. The facilities on the northbound side will cease at the parallel crossing located north of the accesses to the proposed D-Tech development site. These facilities will continue adjacent to the southbound carriageway leading up to the Abingdon roundabout.

6.3.8 A Toucan crossing will be provided for pedestrians and cyclists to cross the mainline immediately south of the FCC/Hanson access road junction. The crossing will connect to a shared-use bridleway along the west side of the Proposed Development. An additional bridleway link to connect with an existing cycle route (NCN5) west of Hill Farm could be delivered by other parties. The restricted byway through the FCC landfill and Hanson quarries area will continue along the new access road alignment where a new shared use path will be provided.

6.3.9 After the point at which the Proposed Development ties-in with the B4016 Appleford Road, the mainline cycleway and footway will continue separately from the proposed carriageway by using a section of the existing B4016 carriageway alignment. A raised parallel crossing will be provided across the B4016 arm of the junction and a shared-use footway/cycleway will be created adjacent to the eastbound lane of the B4016, to connect the Proposed Development with the village of Appleford.

6.3.10 There will be an uncontrolled crossing of the mainline immediately north of the junction with the B4016. This will connect with a shared-use pedestrian and cycleway facility, which will extend alongside the northbound lane of the Proposed Development and continue beside the westbound lane of the B4016 from the Sutton Courtenay roundabout. A shared-use facility will also be located alongside the eastbound lane of the B4016 Sutton Courtenay link, which will be accessed via a Toucan crossing located across the north arm of Sutton Courtenay Roundabout for the River Thames bridge. There will also be an uncontrolled crossing point on the west (B4016) arm of the roundabout.

6.3.11 There will be dedicated, off-road, two-way cycleway and footway facilities located adjacent to the southbound lane on the bridge across the River Thames. North of the River Thames a footpath will be provided to connect with the Thames path. The two-way cycleway and footway will continue to the Abingdon roundabout, where they will extend east adjacent to the westbound lane of the A415, linking back to the existing NMU facilities that lead into the Clifton Hampden Bypass. Access to Toucan crossing across the eastern arm of Abingdon roundabout will be provided from the cycleway and footway. This will provide access to dedicated, off-road, segregated two-way cycleway and footway facilities located adjacent to the eastbound lane of the A415. A raised parallel crossing will be provided across the northern arm of the roundabout.

6.3.12 The proposed NMU facilities on the northern arm will lead into land allocated for future development. A two-way cycle way and footway will be provided on the western arm adjacent to the east bound carriageway.

Clifton Hampden Bypass

6.3.13 A dedicated, off-road, shared use cycleway / footway will be provided adjacent to both sides of the A415, west of the roundabout.

6.3.14 There will be several shared and segregated cycleways and footways, with crossings, created around the roundabout with the CSC and Clifton Hampden Bypass. A new segregated cycleway / footway is proposed to link Culham Station and CSC. This route is designed wide enough in anticipation of heavy NMU demand between these two points. Raised parallel crossings have been provided along this route to allow priority for NMUs over vehicular traffic. The existing A415 carriageway that will no longer be required for vehicular traffic will be used as a shared-use footway / cycleway, which links up to a new shared-use footway / cycleway on the south side of the A415. This new route extends west across the existing rail bridge and into the River Crossing scheme. The existing main entrance to the CSC will be repurposed as a shared-use cycleway / footway to connect the existing A415 and the new bypass. A toucan crossing is proposed where this route meets the bypass.

6.3.15 Along the bypass, a shared-use cycleway / footway will be provided along the north side of the road. Several crossings at adjoining roads will be provided and links to existing footpaths will be provided. Additionally, two uncontrolled crossings across the bypass will be provided to maintain connectivity of local Public Rights of Way.

6.3.16 A shared-use cycleway / footway will be provided along the west side of the realigned B4015 at the northern end of the Clifton Hampden Village. The existing B4015 carriageway that will no longer be required for vehicular traffic will be used as a shared-use footway / cycleway, which links to the existing B4015 to the north.

6.4 Public Transport

6.4.1 As part of the Proposed Development a number of bus stops are proposed including:

- Four bus stops (two eastbound and two westbound) along the A4130;
- Four bus stops (two eastbound and two westbound) as part of the Didcot Science Bridge section;
- Six bus stops (a pair on the A4130 to the east of Collett Roundabout, a pair at the southern end inside the future employment site, and a pair near Appleford) as part of the River Crossing section; and

- Four bus stops (a pair at Culham Science Centre and a pair north of Clifton Hampden Village) as part of the Clifton Hampden Bypass section.

6.4.2 These additional bus stops will increase the accessibility and catchment of the existing bus services in this area, whilst also helping to cater for new or improved services in the future.

6.5 Landscaping and Biodiversity

6.5.1 The Proposed Development is set within a landscape consisting of ecological designations, geometric fields and areas of scrub and woodland. The Proposed Development includes provision for the successful establishment and future management of biodiversity and landscaping. An Outline Landscape and Biodiversity Management Plan (OLBMP) has been prepared to set out the provision for the establishment and future management of biodiversity and landscaping works for the Proposed Development.

6.5.2 The landscape design proposals have the following objectives:

- Integrate the Proposed Development into the surrounding landscape as far as practicable given the nature of the highway and landscape context;
- Reduce the Proposed Development's impact on visual amenity of residents in the village of Appleford on Thames, Clifton Hampden, Culham, Drayton, Harwell, Long and Milton Wittenham and Sutton Courtenay;
- Provide planting to screen/mitigate views of the Proposed Development, including views for recreational users on public rights of way (PRoW);
- Connect existing retained vegetation to proposed planting; and
- Increase the quality and extent of biodiversity through the provision of species rich grassland, attenuation pond planting, woodland, trees, hedgerows and provide a biodiversity net gain.

6.5.3 The Proposed Development will incorporate the following landscaping elements. All of the elements have been designed to provide a range of functions in line with DMRB standards for highways. The aim is to integrate the Proposed Development into the existing landscape and minimise the impact of disturbance. There are a range of planting elements and types specifically chosen to replicate those elements lost and include those prevalent in the existing surrounding landscape.

Amenity Grassland

6.5.4 Amenity grassland will be established mainly on highway verges, visibility splays and roundabouts using an appropriate seed mix (e.g. Emorsgate EG22).

Grassland with Bulbs

6.5.5 Grassland with bulbs will be established mainly in areas of high pedestrian use and highway verges to increase the visual amenity and enhance the sense of the gateway/ entrance while maintaining forward visibility due to their low growing nature. Grassland with bulb planting will provide seasonal interest while enhancing visual amenity and enriching biodiversity. The grass mix used for this landscape element will consist of a general-purpose meadow grass mixture (e.g. Emorsgate EG1) to provide a naturalistic backdrop to the bulb planting.

Species Rich Grassland

6.5.6 Species-rich grassland (e.g. Emorsgate EM3) will establish a diverse sward of grasses and herbs, comprising nine or more species per m^2, including species found locally.

Native Woodland

6.5.7 Woodland will make up a large proportion of the planting throughout the Proposed Development. A mix of locally found native species will be used to provide maximum benefit to biodiversity while also preserving the landscape character. Establishing woodland will help to provide landscape integration, visual screening and mitigation for the habitats and vegetation that will be lost due to the Proposed Development. In areas of existing woodland, woodland will be used to tie in the existing landscape with the Proposed Development to provide continuity and habitat connectivity.

6.5.8 Wet woodland species have been included from the planting specification for the Hanson Restoration area.

Native Woodland Edge Mix

6.5.9 Woodland edge is proposed throughout the Proposed Development as a margin to areas of woodland, and as scrub planting. The purposes of woodland edge are to integrate these areas into the surrounding landscape while also providing valuable resource for wildlife. Establishing woodland edge planting will help to provide screening, create a more naturalistic feel to the landscape and improve habitat connectivity and continuity.

Native Shrubs

6.5.10 Native shrubs will be used throughout the Proposed Development to help establish a more rural aesthetic along road corridors and help integrate these newly developed routes into the surrounding landscape. Establishing native shrub planting will help to provide screening, create a more naturalistic feel to the landscape and improve habitat connectivity and continuity.

Ornamental Shrubs

6.5.11 Ornamental shrubs are intended to provide an increase in visual amenity and enhance the sense of gateway/entrance in strategic areas across the Proposed Development. Ornamental shrubs are to be established to try to create a sense of place and add seasonal interest around these gateway areas while also enriching the biodiversity of the landscape.

Native Hedgerows

6.5.12 Hedgerows are to be established across the Proposed Development in order to maintain and improve the existing resource of hedgerows, optimise connectivity with retained hedgerows/ other habitats, integrate the Proposed Development into the surrounding landscape pattern, provide visual screening in areas of higher sensitivity and retain a balance of species reflective of adjoining woodland and other vegetation, maximising diversity for the benefit of wildlife. Due to the nature of the existing hedgerows around the Proposed Development being predominantly hawthorn, this forms the basis for the hedgerows included in the Proposed Development.

Marginal Planting

6.5.13 Marginal planting is proposed along open watercourses and drainage features and has been designed to soften the appearance of these features, integrating them into the landscape and providing seasonal interest as well as a valuable resource for the local wildlife.

Wetland Meadow

6.5.14 Wetland meadow mix (e.g. Emorsgate EM8) will establish grassland in areas where drainage is a key aspect of the landscape. Seeding areas of wetland, including ditches, swales and engineered drainage features will help to provide treatment for pollutants, prevent adverse impacts to habitats, it will deliver significant biodiversity benefits and also it will help to control the rate of discharge of runoff from the road to receiving watercourses containing habitats.

Habitat Piles

6.5.15 Habitat piles and hibernacula will be constructed throughout the Proposed Development using natural materials generated during clearance of the Site, such as logs, turf and grass strimmings. These will provide refuge and hibernation opportunities for amphibians and reptiles, as well as deadwood habitat for invertebrates, which will in turn benefit fauna such as bats and birds.

Trees

6.5.16 Most of the established trees and woodland blocks around the Site will be unaffected by the Proposed Development. Full details of necessary tree removals are contained within the Arboriculture Impact Assessment Report.

6.5.17 Trees within the Proposed Development footprint that cannot be retained will be replaced with native species (either the same as the tree that has been removed or another suitable native species).

6.5.18 In several places, trees are proposed as visual screening to mitigate the visual impacts of the Proposed Development. Heavy standard trees are proposed in several locations within hedgerows to provide more immediate visual screening. Elsewhere, smaller trees have been specified to assist establishment.

6.5.19 Approximately 500 trees of native species are proposed as part of the Proposed Development, which will comprise individual trees and hedgerows. Tables 6.1 and 6.2 below outline the native species that will be incorporated as part of the Proposed Development. Further details on tree planting can be found within the OLBMP submitted with this planning application.

Table 6-1 Native species of individual trees

Species	Common Name
Acer campestre	Field Maple
Acer monspessulanum	Montpelier Maple
Acer rubrum	Red Maple
Alnus glutinosa	Common Alder
Amelanchier arborea	Amelanchier

Betula pubescens	Common Birch
Capinus betulus	Hornbeam
Crataegus laevigata	Midland Hawthorn
Crataegus monogyna	Hawthorn
Ginkgo biloba	Ginkgo
Liquidambar syraciflua	Liquidambar
Quercus palustris	Pin Oak
Quercus robur	English Oak
Populus tremula	Aspen
Prunus cerasifera	Cherry Plum
Salix alba	White Willow
Sorbus intermedia	Whitebeam
Tilia cordata	Small leaved lime
Tilia x europaea	Common Lime
Tilia tormentosa	Silver Lime
Ulmus 'New Horizon'	Elm New Horizon

Source: OLBMP

Table 6-2 Native species of hedgerows

Species	Common Name
Acer campestre	Field Maple
Alnus glutinosa	Common Alder
Corylus avellane	Hazel
Crataegus monogyna	Hawthorn
Prunus spinosa	Blackthorn
Prunus padus	Bird Cherry
Rosa canina	Dog Rose

Source: OLBMP

6.5.20 The Proposed Development has been designed, as far as practicable, to avoid or reduce effects on biodiversity features through development design and impact avoidance. Further details are set out within the OLBMP, Ecological Mitigation Design, Biodiversity Net Gain Assessment and landscape drawings (GEN_PD-ACM-ELS-GEN_ZZ_ZZ_ZZ-DR-LV-0001 to GEN_PD-ACM-ELS-GEN_ZZ_ZZ_ZZ-DR-LV-0019 also referred to as ES Figures 8.72a to 8.72s).

6.6 Drainage and Flooding

6.6.1 A hierarchical approach to the drainage strategy has been considered for the Proposed Development in accordance with OCC's Local Standards and Guidance document. Based on this, and the possibility of a high groundwater level, the most

appropriate method of surface water drainage for the Proposed Development is to have controlled discharges to the nearest watercourse to each catchment with the exception of some surface water sewer connections in the Clifton Hampden Bypass section and some infiltration in the Didcot to Culham River Crossing section. Refer to the Drainage Strategy submitted with this application for further information which has been prepared in consultation with the Environment Agency (EA) and the Lead Local Flood Authority (LLFA) and has been designed to account for the impact of climate change on the Proposed Development, for example extreme rainfall events.

6.6.2 The drainage design aims to minimise:

- Effects on water quality using natural storage, treatment and discharge solutions where appropriate. A combination of swales and ponds are provided for large catchments.
- Changes to watercourses and ditch alignments. One existing watercourse will be diverted into proposed overland ditches, whilst another one will be realigned where it crosses beneath the realigned A415. A new culvert will be constructed at this crossing. Footbridges will be included where new footpaths cross watercourses.
- Land take within areas identified as being at risk of flooding, by directing development away from such areas where possible.

6.6.3 The attenuation features will be designed to accommodate the 1 in 100-year return period including 40% climate change allowance.

6.6.4 The surface water runoff from the impermeable area will be treated adequately to remove the pollutants and ensure there is no detrimental impact on the receiving watercourses.

A4130 Widening

6.6.5 The majority of the proposed A4130 southern carriageway is to be drained via gullies to the existing A4130 southern ditch, with catchments B and D draining to Cow Brook via a detention swale, and AEC A4130 Pond 6 via gullies and two swales respectively. A proposed parallel footway and cycleway is to be drained to a variety of swales and filter drains along the proposed A4130 southern carriageway.

6.6.6 The link road between the northern and Science Bridge roundabouts is to be drained by swales to AEC A4130 Ponds 6 and 7 - this includes the carriageway, footway, and cycleway.

6.6.7 On the Didcot Science Bridge approach, the embankments on either side of the approach are proposed to be drained via filter drains, at the foot of the embankment, to attenuation provided by AECOM. The Didcot Science Bridge southern approach is to be drained by gullies to AEC A4130 Pond 7.

6.6.8 Combined kerb drainage units have been proposed where the gully spacing is not economical to construct relative to a combined kerb drainage unit, and where levels do not suit gullies.

6.6.9 The existing eastbound (northern) A4130 carriageway is proposed to drain as existing, apart from the Valley Park western access T-junction. The carriageway runoff is to be collected by existing kerb drainage units and discharged into the

existing A4130 northern ditch, aside from the Valley Park western access T-junction, which will discharge to Cow Brook via swale 09.

Didcot Science Bridge

6.6.10 On the Didcot Science Bridge southern approach, the embankments on either side of the approach are proposed to be drained via filter drains, at the foot of the embankment, to attenuation provided by AECOM and also the Valley Park Residential Development Consortium. The Didcot Science Bridge approach is to be drained by gullies to Valley Park Basin 3.

6.6.11 On the Didcot Science Bridge northern approach, the embankments on either side of the approach are proposed to be drained via filter drains, at the foot of the embankments, to attenuation provided by a 3rd party (BWB Consulting Ltd). The Didcot Science Bridge approach highway is to be drained by gullies and a small section of kerb drains to the 3rd party Surface Water Management Area 1.

6.6.12 The section of the highway between the AECOM extents is designed by a 3rd party (BWB Consulting Ltd) but shown on AECOM plans for coordination and reference.

6.6.13 The remaining surface water drainage has been designed using gullies to drain the highway, footways, and cycleways. Combined kerb drainage units have been proposed where the gully spacing is not economical to construct relative to a combined kerb drainage unit, and where levels do not suit gullies.

Didcot to Culham River Crossing

6.6.14 There are two bridge decks within the Culham to Didcot section. The main structure being the new River Thames crossing which is extended to span over the floodplain area of the finger lakes adjacent and south of the river. A much shorter bridge crossing is required to carry the road over the Hanson rail sidings. Due to the nature of the structure and length of span, specialist combined kerb and drainage channels are used to collect and carry surface water from a high point on the road just south of the river to each abutment. Three lengths of the specialist units are required across the deck. The rail sidings crossing, proposes the same unit for consistency but will only be required in one run and of relatively short length.

6.6.15 Some toe embankment drainage may be required for lengths on road elevated above the existing topography. This will be subject to confirmation of final road levels, embankment details and geotechnical input.

6.6.16 The section of the mainline highway between chainage 50m and chainage 510m drains regularly to adjacent roadside swales which are intended to be shared by the D-Tech site development. It is understood the plot developments will each individually control their surface water discharge from their site to accord with the same principles used for the highway. The proposed swales will ultimately be maintained by the D-Tech site developer.

6.6.17 Groundwater levels taken from the Ground Investigation Report indicate that the highest groundwater level is 0.8m below existing ground level, which coincides with the proposed swale invert levels.

6.6.18 The remaining surface water is drained using filter / sub-base drain combined. Where footway / cycleway deviates from the main carriageway, it is assumed surface water

run-off dispersal to the adjacent soft landscape is acceptable. Some form of limited French drainage may be suitable subject to confirmed level arrangements.

Clifton Hampden Bypass

6.6.19 The proposed road is a mix of balanced and superelevated carriageway. Generally, the surface water runoff from the proposed carriageway will be drained over the edge, and into a collector swale or across the verge to the main swale or ditch. Similarly, where there is sufficient separation between the footway and the mainline, a collector swale is provided.

6.6.20 The part of the circulatory carriageway that drains towards the middle of the roundabout is directed into a small swale by side entry gullies, before entering the piped drainage system.

6.6.21 Ditches will be provided at the bottom of embankments where the adjoining land falls towards the road. Where these ditches do not receive surface water runoff from the section, the flow will be discharged untreated and unattenuated directly into the receiving watercourses, matching the flow regime in the existing situation.

6.6.22 The ground investigation will determine how high the groundwater levels are. If the ground water level proves to be high, ponds and ditches may need to be lined.

6.6.23 See the Drainage Strategy Report, drainage layout drawings GEN_PD-ACM-HDG-DGT_DRG_ZZ_ZZ-DR-T-0001 to GEN_PD-ACM-HDG-DGT_DRG_ZZ_ZZ-DR-T-0019, drainage catchment plans GEN_PD-ACM-HDG-DGT_DRG_ZZ_ZZ-DR-T-0020 to GEN_PD-ACM-HDG-DGT_DRG_ZZ_ZZ-DR-T-0038 and typical detail drawings GEN_PD-ACM-HDG-DGT_DRG_ZZ_ZZ-DE-T-0001 to GEN_PD-ACM-HDG-DGT_DRG_ZZ_ZZ-DE-T-0005 for further information.

6.6.24 A Drainage Maintenance and Management Plan has also been submitted and can be found at Appendix A of the Drainage Strategy Report.

6.7 Proposed Lighting Design

6.7.1 The proposed lighting design generally consists of columns with new LED luminaires located at the back of the footway/back of shared use where possible to minimise obstructions for NMU. In areas where this would place the columns at too great a distance from the junctions the columns have been set back in verges dependant on the design speed of the road. Columns have been positioned either in an opposite arrangement where the highway is wider or in a staggered arrangement to provide the optimum light distribution. Columns have only been located on splitter islands where necessary due to highway widths and layout.

6.7.2 Lighting has also been provided along the cycleways that are adjacent to the proposed highway alignment as they are expected to be important commuter routes. To limit the impact of lighting in these areas (as much as practical) where these routes are proposed on both sides of the carriageway only one side has been lit. Columns are located at the back of the combined footway / cycleways where possible or at a minimum of 0.5m away from the cycleway.

6.7.3 The proposed lighting classes for the Proposed Development are listed below in Table 6-1.

Table 6-1 Lighting classes provided by OCC

Area	Lighting Class for A4130 Widening & River Crossing & Clifton Hampden Bypass	Lighting Class for Didcot Science Bridge
Carriageway	M4/C4	M3/C3
Junction Conflict Area	C3	C2
Pedestrian Crossings	C4	C4
NMU Routes	P3	P3

6.7.4 The agreed extents for the conflict area lighting design are as per the 5 second rule of lighting as outlined by the Institution of Lighting Professionals Professional Lighting Guide (PLG) 02: The Application of Conflict Areas on the Highway, or at a suitable point where road alignment changes do not require the removal of the existing lighting on Site. The rule is dependent on the speed limits of the routes. Within the Proposed Development the carriageway speeds varies from 30mph up to 50mph. Where there is existing lighting (such as at the Milton Gate junction at the western end of the A4130 Widening section), the extents of lighting have been taken to a point where road alignment changes do not require the removal of the existing lighting on the Site.

6.7.5 Sections of link carriageway have only been lit where junctions are close enough together to mean that it is impractical to leave these sections unlit. Examples of these areas are Milton Gate to Backhill Roundabout, the A4130 Widening Northern Roundabout to Didcot Science Bridge Roundabout and the already lit section between the Didcot Science Bridge junction with existing A4130 and the Collett roundabout. These sections are lit to comparable lighting classes.

6.7.6 All proposed luminaires utilise a correlated colour temperature (CCT) of 3000K as per OCC specification. Although warmer colour temperatures for LED light sources generally have a reduced light level output when compared to the 4000k model, 3000k are more visually appealing, environmentally sensitive and suited to areas with bat flight paths. Due to higher levels of bat activity at the junction of the A415 and B4015 within the Clifton Hampden Bypass section, 2700k luminaires have been utilised along the cycleway to further limit the potential impact of the lighting.

6.7.7 The proposed lighting design has been undertaken in the industry recognised Lighting Reality calculation software package. The desktop calculation results can be found in the Lighting and Electrical Design Report.

A4130 Widening

6.7.8 As most of the A4130 widening includes alignment along an existing highway, there are limited environmental considerations or ecological constraints.

6.7.9 Bat activity has been noted along a hedgerow by the Meadow Lane track, which intersects with the proposed link between the old A4130 and Science Bridge Roundabouts. This area also has several trees that would be suitable as bat roosts. Whilst this section of highway is being lit, the lighting is provided to the lowest practicable level.

6.7.10 Whilst lighting is required along the footway/cycleway facilities where it is remote from the junctions it has been kept to the lowest practicable level along with the use of lower mounting heights (5m).

6.7.11 There are two sections of the A4130 Widening where the junctions are close together to mean that it is impractical to leave these sections unlit (Milton Gate to Backhill Roundabout and the Northern Roundabout to Science Bridge). The former would be a section of 40m, so it has been lit to conflict area class of C3. The latter is approximately 100m so has been lit to the carriageway class of M4/C4.

Didcot Science Bridge

6.7.12 For the proposed bridge which crosses over the rail line (and the southern and northern approaches), the footway/cycleway on the eastern side of the carriageway is to be lit in its entirety. Lighting will also be required on the bridge approaches and onto the structure, although lighting equipment will not be positioned over the rail lines or over Network Rail land. This is to minimise the risk of glare to train drivers. The cycle paths are designed to lighting class P3 with the exception of the centre (rail) span of the bridge which will remain unlit to also minimise the risk of glare to train drivers.

6.7.13 Between the proposed northern bridge approach and the Moor Ditch culvert, the lighting has been designed by the OCC Street Lighting Team on behalf of BWB Consulting for the Clowes Development. These designs provide lighting for the access to the Clowes Development on the former Power Station site. The initial layout of this section (provided by OCC Street Lighting) has been included in the lighting submission for reference purposes but does not form part of this planning application.

6.7.14 The proposed shared use path to the southeast of the old A4130 junction has not been included in the conflict area extents as it is remote and located behind a large portion of grassed verge and attenuation pond. As a result, this area has been calculated separately in order to ensure it achieves the minimum required lighting class for a cycle path of P3.

6.7.15 The existing lighting on site (along the Northern Perimeter Road) is all to be upgraded as part of a 1-for-1 lantern renewal scheme being carried out by OCC. Therefore, the AECOM lighting design proposals for DSB incorporate tie in points with the new upgraded luminaires.

Didcot to Culham River Crossing

6.7.16 Lighting is primarily provided to illuminate the roundabout junctions, their immediate approaches and cycleway sections. Carriageway sections elsewhere are proposed to be largely unlit to keep lighting provision to a minimum.

6.7.17 There are two standalone parallel crossings north of the junction with the A4130 that require lighting for safety reasons plus a Toucan crossing located south of the FCC/Hanson access. Lighting is required here for safety reasons but has been kept to the lowest practicable level along with the use of lower mounting heights (6m) and G6 glare rated lanterns to minimise potential light spill. In addition, there is a parallel crossing point east of the Appleford junction on the B4016 road to Appleford where the lighting equipment proposed is the same type and height (10m) as used at the junction.

6.7.18 The older SOX existing lighting on site is all being upgraded as part of a 1-for-1 lantern renewal scheme being carried out by OCC. Therefore, AECOM lighting design proposals for the Didcot to Culham River Crossing section incorporate tie in points with the upgraded existing column position located on the A4130.

6.7.19 Lighting has been designed to provide a lit footway/cycleway route through the scheme between the A4130(W) tie-in with the Science Bridge scheme and the A415(E) tie-in with Clifton Hampden Bypass. This lighting passes through sections of unlit carriageway and is designed to class P3. The proposed footway/cycleway lighting columns are 5m high.

Clifton Hampden Bypass

6.7.20 The southern section of the bypass, from the existing rail bridge to the A415 connection junction, will be lit by 10m high lighting columns. The remainder of the bypass will be unlit.

6.7.21 The NMU route along the north edge of the bypass will be lit by 5m high lighting columns to OCC specification. The NMU crossing area is remote but is located within the lit section of the carriageway, this has been lit to the conflict area lighting class C3 to highlight the area. This grid area includes lighting to the back of the path at the crossing.

6.7.22 The performance requirements for lighting class C3 which have been used for the junction and carriageway areas respectively.

The NMU cycleway footway has been lit to lighting class P3, the cycleway/footway lighting continues through sections of unlit carriageway.

6.8 Signage and Traffic Signals

6.8.1 A signage strategy is being prepared for the Proposed Development which will be further developed during detailed design. It is proposed that appropriate highway and pedestrian/cyclist signage will be provided at numerous points along the Proposed Development. The intention is to sign users through the new route avoiding the existing villages and to use bollards with signs along the NMU route. These will be limited to roadside signage. No overhead gantries are included within the Proposed Development design.

6.8.2 Traffic signals have been proposed at several locations along the Proposed Development, most notably at proposed crossing points and at the Valley Park signalised junction. The equipment has been positioned in such a way to maximise the visibility of signals to oncoming vehicles.

6.9 Utilities

6.9.1 A Ground Penetrating Radar (GPR) Survey was undertaken to confirm the location of existing utilities. This information has been compared to the utility companies records to confirm the actual location of the apparatus in the ground.

6.9.2 The existing statutory utilities are shown on drawings GEN_PD-ACM-VUT-DGT_UTL_ZZ_ZZ-DR-T-0101 to GEN_PD-ACM-VUT-DGT_UTL_ZZ_ZZ-DR-T-0119 and diversionary works have been identified as required to facilitate the

construction of the Proposed Development. This includes works to telephone services/broadband, water (Thames Water) and electricity.

6.9.3 Initial workshops with Statutory Undertakers took place in 2020 and early 2021. Workshops have also been held with several of the adjoining landowners/developments in order to confirm their utility needs.

6.9.4 The proposed utilities are shown on drawings GEN_PD-ACM-VUT-DGT_UTL_ZZ_ZZ-DR-T-0001 to GEN_PD-ACM-VUT-DGT_UTL_ZZ_ZZ-DR-T-0019.

6.10 Construction and Phasing

6.10.1 The method and programme for construction will be determined by the Principal Contractor undertaking the works, however an indicative programme has been prepared and is included within Appendix B. The construction of the Proposed Development is anticipated to commence in 2023, subject to securing planning permission, land acquisition and the Compulsory Purchase Order (CPO). It is anticipated that the Proposed Development will become operational in 2025.

6.10.2 The indicative construction phasing of the Proposed Development is shown on drawings GEN_PD-ACM-PLS-DGT_ZZ_ZZ_ZZ-DR-T-0001 to GEN_PD-ACM-PLS-DGT_ZZ_ZZ_ZZ-DR-T-0019.

6.10.3 The construction of the Proposed Development will use typical construction techniques associated with major infrastructure projects. Earthworks, including cuttings and embankments will be required to construct the new junctions and link road. Embankments will be constructed using site won materials where possible.

6.10.4 The Proposed Development construction activities are anticipated to comprise the following:

- Construction of temporary working and material storage areas;
- Installation and use of temporary accesses and haul routes;
- Provision of site compounds;
- Demolition of existing structures and buildings;
- Vegetation clearance and soil removal;
- Ground and excavation works;
- Piling;
- Works at or near to the banks of watercourses;
- Use of large cranes required to construct bridges;
- Infrastructure construction activities; and
- Routing of services and utilities.

6.10.5 Due to the length of the Proposed Development there will be a need for several construction compounds located throughout the Site as shown on drawing GEN_PD-ACM-HGN-DGT_ZZ_ZZ_ZZ-DR-T-0040 P02 (Red Line Boundary). It is anticipated that there will be at least two main compounds with associated satellite compounds. Various stockpile areas will be required for topsoil and other materials,

so they can be stored safely until they are required for re-use within the Site. These stockpile areas will be located close to the Proposed Development highway alignment and within the Site boundary.

6.10.6 A large quantity of plant and equipment is anticipated to be required for the construction of the Proposed Development. The high volume of earth to be moved will require large excavators, dump trucks, cranes, bulldozers, compactors and stabilising plant.

6.10.7 In regard to the excavation of material, where possible this will be used to form embankments along the route of the Proposed Development and where possible excavated material will be re-used.

6.10.8 A lagoon, owned by RWE and known as the RWE Lagoon 1, will require decommissioning and removal. This will be replaced, in a different location close to the Proposed Development. In addition, small areas of existing highways infrastructure will require removal, where it will tie-in with the Proposed Development, and where it is no longer required.

6.10.9 A detailed Construction Traffic Management Plan (CTMP) will be prepared and implemented by the Principal Contractor to identify the strategy for controlling/minimising traffic related impacts of the construction. The CTMP will define measures to be used by the Principal Contractor to reduce the impacts from construction traffic, this will be required for each phase of the construction. Appropriate access routes to site compounds for people, plant and material will be evaluated and designated by the Principal Contractor, in consultation with OCC as the relevant highway and planning authorities. The routes identified will primarily be major roads (motorways and A roads) to ensure that movements are restricted to appropriate routes to minimise local disruption. Further information on the construction traffic can be found in the Transport Assessment and ES Chapter 16 Transport.

6.10.10 Traffic management will be provided throughout the construction phase in order to minimise the need for traffic to divert onto alternative routes, minimise impacts on the local community and minimise delays and disruption to existing traffic.

6.10.11 Earthworks material will be retained and re-used within the Site where practical, however, there is likely to be quantities of contaminated material that will need to be transported off site to licensed waste management facilities.

6.10.12 An Outline Environmental Management Plan (OEMP) forms part of the ES and a Construction Environmental Management Plan (CEMP) will be developed by the Principal Contractor before construction commences.

7. Conclusion

7.1.1 This DAS demonstrates that the Proposed Development's design complies with the aims of the Proposed Development. The project will deliver four separate but interdependent highways schemes which together form the Proposed Development (A4130 Widening, Didcot Science Bridge, Didcot to Culham River Crossing and Clifton Hampden Bypass).

7.1.2 The Proposed Development is essential for the economic and social prosperity of Didcot and the wider Science Vale area, and will upgrade connections that will subsequently open up access and unlock the delivery of Didcot's housing (including the Didcot Garden Town) and employment sites. The Proposed Development also both directly delivers and indirectly enables a significant number of new and/or improved walking and cycling routes in the area, along with an increase in bus routes. This helps to engender modal shift away from the private motor car, particularly for commuting purposes for employment and education, but also for important access to amenities such as retail and healthcare, and for leisure trips.

7.1.3 The Proposed Development will bring further opportunities to the area that would be difficult to deliver without the appropriate infrastructure, ensuring the impact of any additional housing on the transport network would be acceptable and any associated impacts on the transport network would be adequately mitigated.

7.1.4 Throughout design evolution consideration has been given to flood risk, heritage, landscape and ecological factors within the context of the Proposed Development.

7.1.5 Stakeholder engagement throughout the design process has formed an integral part of the design development. This DAS documents scenarios where the design has evolved as a direct result of engagement with stakeholders. In addition, an extensive multistage optioneering process was undertaken to establish the preferred option for the Proposed Development.

7.1.6 The Proposed Development is considered to be the optimum solution to address the issues resulting from historic housing and employment growth and is critical to unlocking future growth.