

Swindon Borough Council

New Eastern Villages Island Bridge Vision

Supplementary Planning Document



June 2017

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1 Introduction

1.1 Purpose of this guide

- 1.1.1 Policy NC3 of the adopted Swindon Borough Local Plan 2026 (March 2015) identifies land to the east of A419 as strategic allocation for mixed use development. This allocation is known as the New Eastern Villages (NEV) and shall comprise a series of new inter-connected distinct villages and an expanded South Marston village, defined by the network of Green Infrastructure (GI) corridors.
- 1.1.2 South of the A420, villages correspond with higher ground within the flood plain and comprise: Great Stall West, Great Stall East, Upper Lotmead, Lotmead, Lower Lotmead, Redlands and Foxbridge. These villages will be delivered by a number of separate developers, and therefore there may be some areas of land outside of submitted application boundaries. The Council recognises that responsibility for delivering some of the southern links may have to rest with the Council. This Supplementary Planning Document (SPD) therefore sets out to provide the vision for connectivity between the southern NEV development islands. These links will comprise:
 - Infrastructure for vehicular traffic; and
 - Infrastructure within green corridors for non-motorised users.
- 1.1.3 North of the A420 and mainline railway, the expanded village of South Marston and the village of Rowborough will be delivered by a consortium of developers and all new bridges in this area are currently provided for through an existing outline planning application. These bridges are expected to be provided by the developer and are therefore not intended to be delivered through this SPD.
- 1.1.4 This document provides a vision that meets highways demands and minimises impact on flood risk and the environment. It also seeks to ensure high levels of connectivity throughout the NEV and encourages sustainable modes of transport through the delivery of pedestrian and cycle routes. This SPD also seeks to provide guidance on the design expectations for all bridges located within the NEV.
- 1.1.5 The NEV Planning Obligations SPD outlines the infrastructure required for each of the development islands within the NEV and suggests the mechanism to allow the links between the villages to be provided. The delivery of bridge infrastructure and level of contributions required from each application will be assessed on their merits.

1.2 Structure of this Guide

1.2.1 This document continues with the following six sections:

- **Section 2 - Policy** section provides an overview of the Council's policies for the NEV allocation as set out in the Local Plan;
- **Section 3 - Site Location and Characteristics** provides a description of the topography and aspirations for the village island developments;
- **Section 4 - Flood Modelling** describes the proposed approach to calculate bridge spans necessary to link development islands without impeding flood water;
- **Section 5 - Bridge Vision** identifies the indicative locations of each structure and provides a description of expected construction materials and aesthetic quality. Illustrations are provided;
- **Section 6 - Technical Approval and Adoption Process** provides developers with design and adoption guidance for structures, earthworks and highway pavement; and
- **Section 7 - Costing** section provides further detail on the whole life costing of infrastructure.
- **Appendices** - Include the Masterplan, Technical Approval and Adoption Process, Wilts & Berks Canal Trust (W&BCT) Technical Note and Flood Levels. The W&BCT Technical note is included for reference only and does not form part of the guidance document.

2 Policy

2.1 Background

- 2.1.1 Paragraph 135 of the National Planning Policy Framework (NPPF) states that “supplementary planning documents (SPDs) should be used where they can help applicants make successful applications or aid infrastructure delivery, and should not be used to add unnecessarily to the financial burdens on development”.
- 2.1.2 SPDs do not set policy in their own right; rather they add further guidance or detail to existing policy. To this end this section outlines the relevant national and local planning policy context for the NEV Island Bridge Vision SPD.

2.2 National Planning Policy Framework (NPPF)

- 2.2.1 The NPPF was adopted in March 2012. It sets out the Government’s planning policies for England and how these are expected to be applied. In terms of sustainable transport, Paragraph 35 requires development to “be located and designed where practical to:
- accommodate the efficient delivery of goods and supplies;
 - give priority to pedestrian and cycle movements, and have access to high quality public transport facilities;
 - create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians, avoiding street clutter and where appropriate establishing home zones;
 - incorporate facilities for charging plug-in and other ultra-low emission vehicles; and
 - consider the needs of people with disabilities by all modes of transport.”
- 2.2.2 The NPPF states that “good design is a key aspect of sustainable development, is indivisible from good planning, and should contribute positively to making places better for people” (paragraph 56, NPPF, 2012). Additionally Paragraph 58 states that “planning policies and decisions should aim to ensure that developments:
- will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development;
 - establish a strong sense of place, using streetscapes and buildings to create attractive and comfortable places to live, work and visit;
 - optimise the potential of the site to accommodate development, create and sustain an appropriate mix of uses (including incorporation of green and other

public space as part of developments) and support local facilities and transport networks;

- respond to local character and history, and reflect the identity of local surroundings and materials, while not preventing or discouraging appropriate innovation;
- create safe and accessible environments where crime and disorder, and the fear of crime, do not undermine quality of life or community cohesion; and
- are visually attractive as a result of good architecture and appropriate landscaping.”

2.2.3 In terms of the natural environment, the NPPF states that the planning system should contribute to and enhance the natural and local environment by “minimising impacts on biodiversity and providing net gains in biodiversity where possible, ...including by establishing coherent ecological networks that are more resilient to current and future pressures” (paragraph 109, NPPF).

2.2.4 The NPPF requires new development to be planned to avoid increased vulnerability to the range of impacts arising from climate change. Where risks are identified they should be managed through suitable adaptation measures, including through the planning of green infrastructure. At Paragraph 100, the NPPF is clear that “inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary it is made safe without increasing flood risk elsewhere.”

2.2.5 The Planning Practice Guidance (PPG) details a number of planning objectives to help achieve good design and characteristics which well-designed new or changing places should have. These include providing safe, connected and efficient streets; creating cohesive and vibrant neighbourhoods; and encouraging ease of movement.

2.2.6 Further to this, the PPG states:

“Good quality design is an integral part of sustainable development. The National Planning Policy Framework recognises that design quality matters and that planning should drive up standards across all forms of development. As a core planning principle, plan-makers and decision takers should always seek to secure high quality design.

Achieving good design is about creating places, buildings, or spaces that work well for everyone, look good, last well, and will adapt to the needs of future generations.

Good design responds in a practical and creative way to both the function and identity of a place. It puts land, water, drainage, energy, community, economic, infrastructure and other such resources to the best possible use – over the long as well as the short term.”

(Planning Practice Guidance Paragraph: 001 Reference ID: 26-001-20140306)

2.3 Swindon Borough Local Plan 2026

- 2.3.1 The Local Plan, adopted in March 2015, sets out the level of housing, employment and other development needs up to 2026, where this should be located, and the infrastructure required enabling this development to take place. This includes the identification of a number of strategic allocations at the 'new communities', including the NEV, to ensure the planned growth needs are met, and where required, the approach to the framework to secure the delivery of infrastructure requirements to ensure sustainable development is achieved.
- 2.3.2 The primary policy for the NEV is Policy NC3 – The New Eastern Villages (including Rowborough and South Marston Village Expansion). Policy NC3 allocates the NEV as a mixed-use development of inter-connected villages and an expanded South Marston village, defined by a network of green infrastructure corridors. "The development shall provide (amongst other things):
- about 6,000 dwellings (south of the A420);
 - about 1,500 dwellings (north of the A420);
 - 500 dwellings at South Marston;
 - about 40ha of employment land;
 - about 12,000m² (gross) of retail floorspace;
 - comprehensive community infrastructure including sports and leisure facilities, education provision, community facilities and a healthcare facility;
 - high quality public realm including outdoor civic public space;
 - sustainable transport links including:
 - walking and cycle network improvements that integrate with existing networks and provide good connectivity within the development and to the surrounding area;
 - a green bridge across the A419 near Covingham Drive to provide for walking, cycling and public transport; and
 - an extensive green infrastructure network that maximises opportunities for habitat connectivity and enhanced biodiversity including extending the River Cole green infrastructure corridor and connecting with Nightingale Wood."
- 2.3.3 Additionally, the development will ensure that:

- “the risk of flooding from the development is minimised, both within the development and at existing neighbouring communities in accordance with Policy EN6;
- biodiversity, including the River Cole Corridor and River Cole Meadow County Wildlife Sites, is protected, integrated and enhanced in accordance with Policy EN4; and
- the route for the Wilts & Berks Canal as set out on the Policies Map will be safeguarded from development in accordance with Policy EN11.”

2.3.4 Alongside Policy NC3, Policy RA3 - South Marston sets out the approach to delivering development at South Marston, including as part of the NEV. The policy will ensure the expansion of South Marston creates an integrated village with a distinct rural and separate identity from Swindon and other settlements.

2.3.5 Other most relevant Local Plan policies are summarised below:

- Policy DE1 – High Quality Design. This policy requires high standards of design for all types of development through assessing schemes against a series of design principles. These include reflecting the context and character of the area; layout, form and function of the development; amenity and the quality of the public realm. The bridges over the floodplain will generate views and vistas across the NEV which will influence the design of the NEV through the Development Management process.
- Policy TR1 – Sustainable Transport Networks. This policy seeks to deliver a reliable and efficient transport network, supporting economic and housing growth, reducing the need to travel, improving safety and security and enabling people to live healthy lifestyles. The Island Bridge Vision should facilitate the design of bridges to promote sustainable transport and active travel.
- Policy TR2 – Transport and Development. This policy sets detailed criteria for decision-making to ensure new development provides appropriate access arrangements, is designed to reduce the need to travel and encourages the use of sustainable transport. The policy also identifies when Transport Assessments, Transport Statements and Travel Plans will be required. The design of the bridges and their locations in the NEV will have an impact on any subsequent assessment through the Development Management process.
- Policy EN1 – Green Infrastructure Network. This policy requires development to provide Green Infrastructure to integrate with existing green corridors identified on the Policies Map, to maximise its connections and functions and ensure the sustainable maintenance and management of it. The NEV contains the River Cole Green Infrastructure Corridor as identified on the Policies Map which the Island

Bridge Vision will need to support. Additionally the Council has committed to producing a NEV Green Infrastructure Strategy SPD to support the requirements of Policies EN1 and NC3.

- Policy EN4 – Biodiversity. This policy seeks to ensure development will avoid direct and indirect negative impacts upon biodiversity and geodiversity sites, as identified on the Policies Map. It also states that all development shall protect and enhance biodiversity and provide local biodiversity gain.
- Policy EN6 – Flood Risk. This policy seeks to reduce the risk and impact of flood risk. Given the location of the villages on higher ground situated within a floodplain, the bridges will need to be designed in a manner, and sited in locations, that do not adversely affect flood risk, whilst allowing for environmental improvements along ecological corridors.
- Policy EN11 – Heritage Transport. This policy safeguards the alignment of the Wilts and Berks Canal through the NEV and its associated structures. Infrastructure development, including bridges, must not prejudice the delivery of the canal. There is also policy support for proposals designed to develop the canals recreational and nature conservation potential.
- Policy IN1 – Infrastructure Provision. This policy sets out the overarching framework for ensuring development makes a positive contribution to sustainable growth, through the delivery of appropriate infrastructure in a timely manner.

2.4 Supplementary Planning Documents (SPDs)

- 2.4.1 There are four adopted SPDs that relate to the delivery of the NEV, the NEV Planning Obligations SPD, the SuDS Vision for the NEV SPD, the NEV Framework Travel Plan SPD and the NEV Green Infrastructure (GI) SPD.
- 2.4.2 The NEV Planning Obligations SPD provides more detailed advice and guidance on the relevant policies in the Local Plan, particularly Policies IN1 (Infrastructure Provision), SD3 (Development Management), NC3 (New Eastern Villages) and RA3 (South Marston).
- 2.4.3 It provides a robust framework for securing the delivery of necessary infrastructure generated by development schemes in the NEV. It assists developers, landowners and other stakeholders in understanding the necessary infrastructure to support development proposals in the NEV, and the context of achieving comprehensive development across the whole NEV. The SPD explains the Council's adopted policy basis for seeking contributions for Infrastructure requirements for the NEV; the basis for apportioning the cost of strategic/shared infrastructure items (where appropriate); the mechanisms to secure infrastructure delivery; and updates the Council's Infrastructure Delivery Plan (IDP) with respect to the NEV (Appendix B of the SPD).

- 2.4.4 The overarching purpose of the IDP is to identify and help deliver the infrastructure required to support growth in the Borough in a sustainable manner, providing homes and jobs and creating a place where people want to live. The IDP therefore responds to and informs the policies in the Local Plan focusing on those infrastructure items which will require capital expenditure. Specific projects of relevance to the NEV Island Bridge Vision SPD include:
- Vehicular links between development islands – construction of highways to secure links throughout the NEV, providing essential infrastructure to connect villages that are separated by the flood plain.
 - Non-motorised user links between development islands – construction of non-motorised user links within green corridors to connect the villages.
- 2.4.5 The Planning Obligations SPD contains an Illustrative Masterplan at Appendix A. The Masterplan details the infrastructure requirements to facilitate the delivery of development in a timely and coordinated way and broadly sets out the form of development, including an indicative road network, bridges across the floodplain, green infrastructure corridors and strategic rights of way. It is expected that the Masterplan will evolve as development proposals are brought forward and detailed site investigations are undertaken.
- 2.4.6 The NEV Framework Travel Plan SPD sets out the principles and suggested management mechanisms that are recommended for adoption to reduce the number of single-occupancy car trips to and from the site. The SPD also outlines measures that will be considered for adoption in the specific travel plans for each site.
- 2.4.7 The NEV Framework Travel Plan SPD requires that the site layout for the NEV will be designed to promote pedestrian and cyclist permeability between development islands, with a network of green infrastructure corridors offering dedicated non-vehicular routes. The public transport network will be supported by the walking and cycling network throughout the NEV, which will also link to existing Swindon communities.
- 2.4.8 The NEV Framework Travel Plan SPD provides guidance on the routes linking the islands and principal access points as 'Primary Routes'.
- segregated cycle/pedestrian lanes to comply with the current adopted standards, to be located on both sides of the carriageway to provide dual-directional flow where possible;
 - wherever feasible (and subject to Road Safety Audits and Non-Motorised User Audits), junction design should give priority to cyclists when crossing a secondary road.
- 2.4.9 Segregated provision alongside primary roads is suitable providing compliance to Sustrans guidance, for 'acceptable minimum', for segregated cycle route provision (table H9 of Handbook for Cycle Friendly Design).

- 2.4.10 Regarding rights of way, the SPD states that strategically designed rights of way will provide attractive access to and through the GI, using both adopted and non-adopted highway routes. This will contribute towards improved health and well-being and create a place where people will want to live.
- 2.4.11 The route of the Wiltshire and Berkshire canal will further provide opportunities for increased pedestrian and cycle movements within the NEV, through the provision of tow paths interconnected with the Rights of Way Network.
- 2.4.12 The NEV GI SPD outlines a number of key GI principles to provide guidance on the GI expectations within the NEV. There is significant opportunity to deliver a well-designed network of inter-connected green spaces across the NEV, reflecting a broad range of GI typologies that are multifunctional and accessible to all. GI will play a key part in delivering sustainable transport links; mitigating impacts of the NEV on landscape character and views from the North Wessex Downs Area of Outstanding Natural Beauty (AONB); and minimising flood risk.

3 Site Location and Characteristics

3.1 Location

3.1.1 The NEV Local Plan allocation is located to the east of Swindon. The site is bisected east/west by the A420 Oxford Road and the London to Wales/Bristol railway. To the north of the A420 and main line Railway are South Marston and Rowborough. To the south of A420, the NEV will comprise the following villages:

- Great Stall West
- Great Stall East
- Upper Lotmead
- Lotmead
- Lower Lotmead
- Redlands
- Foxbridge

3.2 Great Stall West

3.2.1 With an approximate area of 78 hectares, Great Stall West is among the largest of the villages and will contain the District Centre including retail, leisure and health facilities. Immediately south of the A420 and adjacent to the A419, the District Centre will provide a focus for the New Eastern Villages communities, and will be of a suitable scale and exemplary design. Great Stall is located close to one of the key gateways in to Swindon, and as a result the design should reflect upon this.

3.2.2 The NEV can make a significant contribution towards Swindon's economy. The main employment allocation for the NEV will be within the Great Stall West development area. In line with Local Plan Policy NC3, employment land within the NEV will comprise approximately 30 ha for Class B8 uses, 7.5 ha for Class B1b/c or Class B2 and the District Centre itself will include 2.5 ha for Class B1a uses.

3.3 Great Stall East

3.3.1 Great Stall East has an approximate area of 50 hectares and will be located south of the railway and A420. The rapid transit system (RTS) will run east-west through this development area connecting the park and ride facility with the main area of Swindon, via Great Stall Bridge. It will act as a central spine connecting the length of Great Stall and the key services and facilities within the development. As such, Great Stall East will have a significant role to play within the overall NEV in providing connectivity with the wider urban area.

3.3.2 A strong built structure and high levels of connectivity will be required to connect the Education Campus, which will incorporate primary, secondary and 16-18 education facilities, with the other NEV villages. Great Stall East is located close to one of the key

gateways in to Swindon, and as a result the design should reflect upon this, as well as its rural surroundings.

- 3.3.3 The River Cole corridor should provide a central recreational feature and wildlife area for the enjoyment of the people who will live and work in the NEV, to support and promote the biodiversity of the area and for the benefit of the wider community. This important feature should play a key factor in the influence of the form and design of the development.

3.4 Upper Lotmead

- 3.4.1 Upper Lotmead is approximately 20ha and lies adjacent to the A419 and alongside the historic Roman settlement of Durocornovium; a Scheduled Monument (SM).
- 3.4.2 The village of Upper Lotmead will primarily be residential and will share links with the District Centre and the existing Swindon urban area. The village should consider the views from Upper Lotmead to the east and create a strong and distinctive architectural response, particularly along the highly visible edges, to strengthen its character and provide a strong identity for this village.

3.5 Lotmead

- 3.5.1 This development area lies between Upper Lotmead and Lower Lotmead, and will include facilities such as a village centre and a primary school. Lotmead will be well connected with strong north-south and east-west vehicle links across the surrounding green infrastructure.
- 3.5.2 To the south west of Lotmead lies Durocornovium, a SM and the historic route of the Roman Road. In addition the existing Wanborough Road, which connects Wanborough to Swindon, runs to the south.
- 3.5.3 The development structure of the village will be directed around the centrally sited and co-located primary school and village centre.

3.6 Lower Lotmead

- 3.6.1 This village will be surrounded by strategic GI, which provides a unique context and strong relationship with the natural and rural environment beyond. Development on its eastern edge will need to be carefully designed and landscaped to ensure that there is a gentle and gradual transition between the village and open countryside to the east.
- 3.6.2 The village will contain a centrally located primary school and local centre to provide for the needs of its residents. As well as road connections, footpath and cycle links to the adjacent villages need to be direct and attractive to encourage residents to walk and cycle.
- 3.6.3 Given its setting, the design must consider the surrounding landscape and rural character by incorporating development gaps and strong landscaping. As set out on the Policies

Map, the indicative route of the Wilts & Berks Canal may be located through this village and has the potential to provide a strong identity for the island and encourage greater connectivity with the neighbouring areas north and south.

3.7 Redlands

- 3.7.1 The development of Redlands Airfield will need to deliver a high quality development which is respectful of the area's character and setting. In particular, it must ensure the graduated transition from the built form to the surrounding rural area, softening the edge of the development towards the non-coalescence area, which is defined in Policy NC3 to protect the character and identity of Wanborough, Bishopstone and Bourton.
- 3.7.2 Redlands will include primary school and other amenities necessary for a sustainable community to thrive.

3.8 Foxbridge

- 3.8.1 This village signals the development edge of the NEV from the south. With an area of less than 27Ha, it is one of the smaller villages within the NEV. As set out on the Policies Map, the indicative route of the Wilts & Berks Canal may cut through this village and has the potential to provide a strong identity for the island and encourage greater connectivity with the neighbouring areas north and south.

3.9 Geography, Geology and Heritage

- 3.9.1 The site of the NEV development is currently an area of relatively low lying open fields and flood plains. The surrounding countryside is of a high quality with the North Wessex Downs Area of Outstanding Natural Beauty (AONB), a landscape of national importance and a considerable asset, located beyond the site to the south. Topographically, the site is located mainly within the Upper Thames Clay Vale Landscape Character Area (National Character Area 108), and is an open landscape with gentle undulations and a localised high point at Mount Pleasant Farm. Variations in topography across the area are subtle, enabling long views. The NEV must be sympathetically developed to retain the aesthetic and environmental value of the landscape in which it is set.
- 3.9.2 The site includes a network of river corridors, streams, brooks and tributaries including the River Cole, Liden Brook, Dorcan Stream and South Marston Brook. These river and stream routes draw meandering paths across the site forming field boundaries and influencing vegetation patterns. As a result, parts of the NEV lie within medium and high risk flood zones as defined by the Environment Agency (EA) (Flood Zones 2 and 3 respectively). The flood risk zones and river corridors provide an opportunity to extend habitats and green corridors through the site, and the potential biodiversity of these areas must be fully realised.
- 3.9.3 The river corridors running through the NEV provide important habitat for wildlife. Within the NEV, the River Cole and its tributaries are established as a County Wildlife Site. The presence of Great Crested Newts has been identified, as well as a number of other protected species including those set out in the UK Biodiversity Action Plan (BAP).

Maintaining and enhancing the green infrastructure network and associated biodiversity must therefore be a key design consideration for the development. The wider GI network will include existing watercourses and their associated wetland and meadows within flood risk zones, as well as more formal open spaces and leisure facilities, woodland and biodiversity areas, both within and surrounding the villages.

- 3.9.4 Sympathetically developing the NEV to include consideration and enhancement of existing green spaces and biodiversity, and incorporating GI into the design, will help to define the edges of the individual villages. This will enhance the diversity and individuality of the component parts of the development. It is important that these open spaces also provide a sense of connectivity across the wider development, so that the NEV and their residents are connected through their relationship with and use of the GI. In addition to providing for leisure activities, connectivity and biodiversity, the large areas of informal GI space will also perform important flood alleviation and water storage functions.
- 3.9.5 The watercourses within the NEV namely the River Cole, Liden Brook, Lenta Brook, Dorcan Brook and Earls court Brook are geomorphologically stable, although there will be some erosion and deposition, especially under flood events. In this regard, the current location of the channels is not expected to change significantly; the gradient is too low and the supply of coarse bedload material is limited.
- 3.9.6 Notwithstanding the above, it should be noted that river engineering, including bridges, and in particular the cumulative impacts of a number of bridges, can impact on the natural processes at work within river systems. 'Hydromorphology' is how the flow of water helps create a diverse range of in-stream habitats by driving natural processes such as erosion and deposition.
- 3.9.7 Historic assets will also feature as integral parts of the development. All development in the NEV will need to consider the existing historic assets on the site, their setting and an assessment of their significance in line with the NPPF.
- 3.9.8 Within and neighbouring the NEV the following historic assets have been identified:
- Durocornovium (a Scheduled Monument);
 - A number of Listed Buildings;
 - South Marston Farm (medieval earthworks) and Great Moorleaze Farm; and,
 - Conservation Areas including Lower Wanborough, Upper Wanborough and Bourton.
- 3.9.9 The nationally significant former roman settlement of Durocornovium is considered a unique asset to the site and should positively contribute to the ambitions expressed in the Vision.
- 3.9.10 There must be a positive integration of the new development within the historic built and natural landscape. The development should respect the setting of individual assets such as Listed Buildings and Conservation Areas, hedgerows and ancient rights of way, and preserve archaeology in situ. As set out in the National Planning Policy Framework (NPPF)

applicants will be required to describe the significance of historic assets and the contribution of their setting.

3.10 Canal Alignment

- 3.10.1 Wiltshire and Berkshire Canal Trust (W&BCT) is working to reinstate the original canal branches as constructed in 1810. The original canal route passed through the centre of Swindon and cannot currently be reinstated. An alternative safeguarded alignment has therefore been agreed which will enable W&BCT to construct a new canal link to the south east of Swindon. The safeguarded canal alignment passes through the NEV development and is illustrated on the Masterplan (Appendix A).
- 3.10.2 Where new NEV infrastructure intersects the safeguarded canal alignment, appropriate structures will be provided such that the canal route is uncompromised. In locations where the canal route crosses existing public rights of way, Swindon Borough Council would expect any future canal planning applications to mitigate its impact on this existing infrastructure.
- 3.10.3 The indicative route on the Local Plan Policies Map (NC3) illustrates the broad alignment of the canal, however, this may need to be altered due to unknown site specific constraints which may come to light through the detailed design stage. Until this stage, sites should safeguard this indicative alignment from development.

4 Flood Modelling

4.1 Environment Agency Requirements

4.1.1 The Environment Agency (EA) has recommended the following condition for the development area north of the A420. With each application assessed on its merits, the specific elements of this condition are likely to vary for each of the developments, however it outlines the key principles which will be taken forward at crossing points throughout the NEV.

4.1.2 *“No development of any crossing points of the South Marston Brook shall take place until a detailed design of the crossing points has been submitted to and approved in writing by the local planning authority. The crossing points shall be subsequently carried out in accordance with the approved plans. The detailed design shall include the following:*

- *Detailed plans and cross sections*
- *Method statement of how the impact of any crossing has been minimised and mitigated for its impact on biodiversity*
- *Detailed designs to ensure hydraulic capacity is at least consistent with the existing watercourse and able to accept a 1 in 100 year flood flows plus an assessment for climate change (an additional 20%).*
- *The Soffit level of the bridge should be set 600mm above the maximum flood water level to allow clearance from debris and wave action, and a further 300mm to allow for changes in water level due to climate change.*
- *Detailed designs to ensure the bridge crossings do not cause flooding either at the site or upstream and downstream of the site. Afflux backwater effect should be kept to a minimum and in all cases must not exceed 75 mm.*
- *The abutments should be set back from brink of bank to allow for maintenance and improvement works and provide suitable space to allow mammals to pass.*
- *To ensure any bridge crossing points are sensitively designed and implemented so there will be no detrimental impact on the South Marston Brook in terms of flood risk and biodiversity. This condition is in accordance with Paragraph 103 and 109 of the NPPF.*
- *We advise that all bridge crossings are clear span in design with abutments set outside the 1 in 100 year plus climate change allowance extent.*

Reason: *To ensure any bridge crossing points are sensitively designed and implemented so there will be no detrimental impact on the South Marston Brook in terms of flood risk and biodiversity. This condition is in accordance with Paragraph 103 and 109 of the NPPF. We advise that all bridge crossings are clear span in design with abutments set outside the 1 in 100 year plus climate change allowance extent.”*

4.1.3 The EA in their role as a statutory consultee would expect to see an assessment made with the new climate change allowances which have been updated from 20% to 70%. They have also stated that as part of the planning process, they would expect to see a more detailed assessment demonstrating the following:

- Any loss of floodplain storage and compensation required within 1% AEP (Annual Exceedance Probability) with an allowance for climate change.
- That any structure does not impede floodwaters.
- That there will be no increase in flood risk elsewhere.

4.1.4 Regarding Biodiversity, the EA have recommended the following to ensure high quality green corridor links for wildlife are maintained:

- The consideration of biodiversity at the bridge design phase, to try and ensure that where possible foundation structures are set back from the river channel to maintain a natural riverbank below the bridge.
- Minimising the shading effect of the structures.

4.1.5 These principles have been considered to provide an indication of the minimum requirements of the structures required for the six road crossing points and will also need to be taken forward as considerations at the detailed design stage. The key principles that need to be considered at this stage are:

- *“The impact of any crossing has been minimised and mitigated for its impact on biodiversity.”* A minimum 5m shelf will need to be provided and has been considered within the minimum requirements for the structures. This is to provide biodiversity enhancement as well as ensure the structure can accommodate the required flow. Full ecological surveys will need to be carried out and the detailed design will need to mitigate against any potential impacts. It is proposed that abutments are set back from the river channel to maintain a natural channel bank below the bridge to ensure high quality green corridor links for wildlife are maintained.
- *“The hydraulic capacity of the proposed structure so it is at least consistent with the existing watercourse and able to accept a 1 in 100 year flood flows plus an assessment for climate change [EA currently require an additional 70% for the Upper Thames Catchment].”* The structure will require alterations to the watercourse to ensure the flow can pass through. The outline proposal of the minimum 5m shelf will not affect the existing flow arrangement of the watercourse in lower order events. The 5m shelf will only be underneath the structure and for a minimal length upstream and downstream so will not affect the existing watercourse flow regime. It is proposed that the cross-section area of the channel with the created shelf will take this flow to ensure it will not increase the modelled flood levels that have been provided by the EA up to and including the 1 in 100 year plus climate change event (currently 70%).
- *“The soffit level of the bridge should be set 600mm above the maximum flood water level to allow clearance from debris and wave action, and a further 300mm to allow for changes in water level due to climate change.”* The 1 in 1000 year flood levels have been used at this stage with a 600mm freeboard allowance to

provide initial bridge sizes. The exact levels will be calculated through a more detailed assessment at the detailed design stage.

- *“Detailed designs to ensure the bridge crossings do not cause flooding either at the site or upstream and downstream of the site. Afflux backwater effect should be kept to a minimum and in all cases must not exceed 75 mm.”* The outline proposal of the minimum 5m shelf will not affect the existing flow arrangement of the watercourse in lower order events. The 5m shelf will only be underneath the structure and for a minimal length upstream and downstream so will not affect the existing watercourse flow regime. To ensure flood plain water will not be held back by the new embankment, flood relief culverts will be installed at regular intervals to ensure connectivity of the flood plain is maintained. Detailed design will need to ensure that the proposed measures will not cause flooding upstream or downstream and that the afflux backwater effect is kept within the acceptable limits.
- *“The abutments should be set back from brink of bank to allow for maintenance and improvement works and provide suitable space to allow mammals to pass.”* This should be provided in the initial design and is accounted for in this SPD.
- *“All bridge crossings are clear span in design with abutments set outside the 1 in 100 year plus climate change allowance extent.”* The structure has been sized to accommodate the 1 in 100 year plus climate change flows. These structures have significantly greater capacity than the structures under the A419 upstream and the structure under the railway line downstream. Level for level compensation will be provided to mitigate for the loss of flood plain from the embankment.

4.2 Outline Fluvial Modelling

- 4.2.1 Flood levels have been calculated on current guidance from the EA and are outlined in Appendix E. The detailed design of each item of infrastructure should be informed by the current accepted EA model.
- 4.2.2 Based on these outline flow rates and flood levels, the span lengths and soffit levels for each of the bridges, with the exception of Bridge 3, have been calculated and are shown in Table 1. The 1 in 1000 year flood levels have now been used at this stage to provide more accurate Bridge soffit levels.

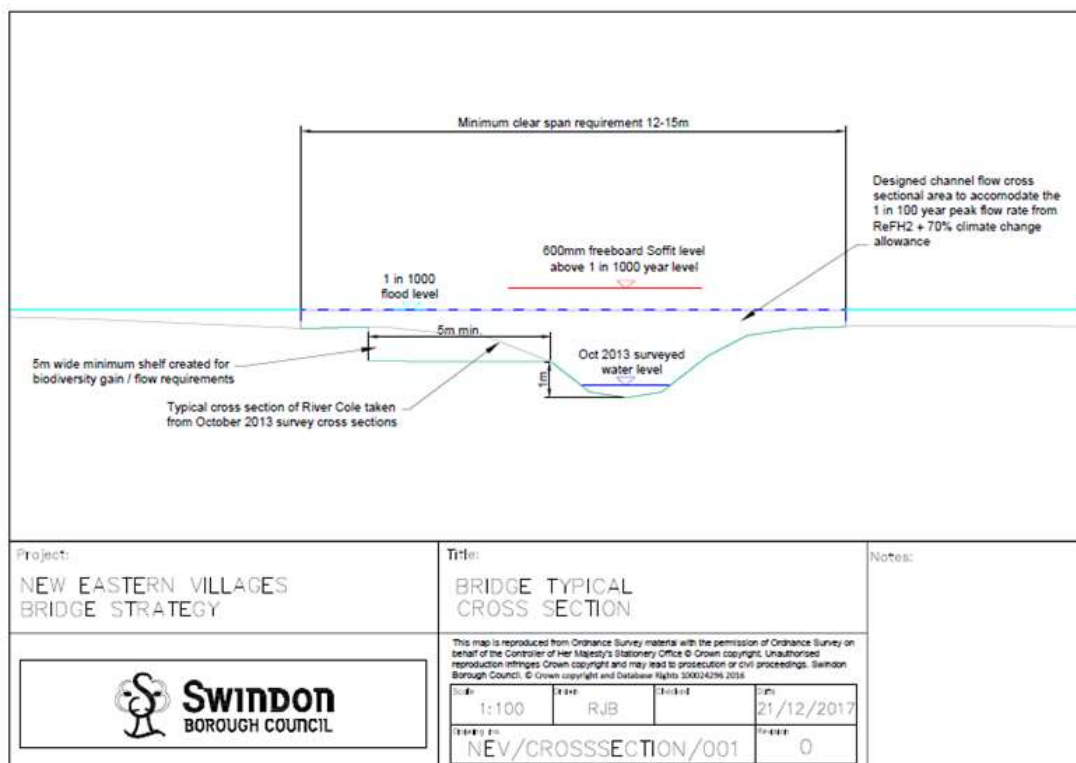
Table 1 – Flood Levels and Soffit Heights

Location	1 in 1000 year flood level	Bridge Soffit level (m AOD)	Span length (m)
Bridge 1	91.570	92.170	12
Bridge 2	91.969	92.569	12
Bridge 4	89.728	90.328	15
Bridge 5	92.141	92.641	12
Bridge 6b	92.540	93.140	12

4.2.3 It is assumed that Bridge 3 will be a 7m wide box culvert as it is located on an ordinary watercourse where the flood plain, which is proposed to be diverted as part of the Lotmead application, is shown to be within the channel.

4.2.4 An indicative cross section of the bridge crossing the watercourse is shown below, it is based on the characteristics of the location of Bridge 4; the same principles will apply to the other bridge locations.

Indicative Cross Section



5 Bridge Vision

5.1 Key Principles of the Bridge Vision

5.1.1 The Council expects NEV bridges to satisfy the following requirements:

- Hydraulic capacity of each structure must at least be consistent with the existing watercourse and able to accept 1:100 year flood flows plus an assessment for climate change (EA currently require an additional 70% for the Upper Thames Catchment), in accordance with EA guidance;
- Bridges will be viewed from footpaths and cycle routes within the GI, it is therefore important that they are designed with high aesthetic merit. The style of each bridge should be appropriate to its surroundings and reflect/complement architecture of adjoining villages;
- SBC is open to innovative design and use of new materials. The Council would welcome applications which would deliver “Gateway” feature structures;
- All structures must be affordable to maintain. The Council expects all designs to consider and discourage antisocial behaviour which may result in damage to the structure. All elements must be easily accessible for maintenance;
- All structures must be constructed with 120 year design life. If materials with shorter design lives are selected, the Council will expect sufficient commuted sums to maintain the structure for 120 years; and
- All structures must ensure high quality green corridor links for wildlife are maintained in accordance with best practice as described at:
www.gov.uk/government/news/green-bridges-safer-travel-for-wildlife.

5.2 Route Hierarchy

5.2.1 Within the NEV development, there is a hierarchy of four classifications of highway, namely:

- Primary Vehicular Through Route;
- Secondary Vehicular Through Route;
- Village Vehicular Access; and
- Pedestrian/Cycle Routes.

5.2.2 *Primary Vehicular Through Route* bridges will require a deck width of a minimum of 16.7 metres. This will allow for 7.3 metre road width and two 3.5 metre (absolute minimum) width shared cycle/footways, with necessary separation strips between carriageway and parapets.

5.2.3 *Secondary Vehicular Through Route* bridges will require a deck width of 16.15 metres. This will allow for 6.75 metre road width and two 3.5 metre (absolute minimum) width shared cycle/footways, with necessary separation strips between carriageway and parapets.

- 5.2.4 *Village Vehicular Access* bridges will require a deck width of 12.9 metres. This will allow for 6.2 metre road width with a 3.0 metre width shared cycle/footways on one side, a 2.0 metre footway on the other and necessary separation strips between carriageway and parapets.
- 5.2.5 *Pedestrian/Cycle Route* bridges are assumed to be constructed with deck widths of 3.5 to 4 metres depending upon location and planned demand.

5.3 Primary/Secondary/Access Bridge Infrastructure

- 5.3.1 To the south of the A420, the islands of Upper Lotmead; Lotmead; Lower Lotmead; Great Stall West; Great Stall East; and Redlands, will be connected by six road links.
- 5.3.2 An indicative location plan for the links is shown at Figure 5.1.
- 5.3.3 Of the six road links, four may be delivered by the Council with funding secured through Section 106 agreements, whilst the two remaining bridges are likely to be delivered by developers. The current estimated costs for the delivery of the bridges has been calculated by the Council, and are outlined within the NEV Planning Obligations SPD.

5.4 Great Stall West (District Centre) to Upper Lotmead

- 5.4.1 This link will connect the district centre with areas of residential to the south. The Council expect the design of this structure to reflect the urban environment.
- Reference: 5
 - Watercourse: River Cole
 - Expected to be delivered by: Swindon Borough Council
 - Structure Type: Clear span bridge
 - Hierarchy: Secondary Vehicular Route
 - Deck Width: 16.15 metres
 - Span: 12 metres (approximate)
 - Approach Earthworks length: 60 metres
 - Suggested materials: Reinforced concrete integral bridge
 - Suggested Finishes: Textured concrete or brick/stone cladding, steel parapets

5.5 Great Stall West (Symmetry Park) to Upper Lotmead

- 5.5.1 This link will connect the Symmetry Park employment with residential areas to the south. The Council expect the design of this structure to reflect the urban environment.
- Bridge Structure Reference: 1
 - Watercourse: River Cole
 - Expected to be delivered by: Swindon Borough Council
 - Structure Type: Clear span bridge
 - Hierarchy: Primary Vehicular Route
 - Deck Width: 16.7 metres

- Span: 12 metres (approximate)
- Approach Earthworks length: 150m
- Suggested materials: Reinforced concrete integral bridge
- Suggested Finishes: Textured concrete or brick/stone cladding, steel parapets

5.6 Great Stall East to Lower Lotmead

5.6.1 This link will connect the secondary school to the residential areas to the south. The Council expect the design of this structure to reflect or complement the architectural style of these villages.

- Bridge Structure Reference: 4
- Watercourse: River Cole
- Expected to be delivered by: Ainscough or Swindon Borough Council
- Structure Type: Clear span bridge
- Hierarchy: Primary Vehicular Route
- Deck Width: 16.7 metres
- Span: 15 metres (approximate)
- Approach Earthworks length: 290m
- Suggested materials: Reinforced concrete integral bridge
- Suggested Finishes: Textured concrete or brick/stone cladding, steel parapets

5.6.2 The increased width is required to serve the intensified pedestrian and cyclist flow associated with access to the Secondary School at Great Stall East.

5.7 Upper Lotmead to Lotmead

5.7.1 This link will connect the residential areas to the west to a primary school. The Council expect the design of this structure to reflect or complement the architectural style of these villages.

- Bridge Structure Reference: 2
- Watercourse: Dorcan Stream
- Expected to be delivered by: Swindon Borough Council
- Structure Type: Clear span bridge
- Hierarchy: Primary Vehicular Route
- Deck Width: 16.7 metres
- Span: 12 metres (approximate)
- Approach Earthworks length: 180 metres
- Suggested materials: Reinforced concrete integral bridge
- Suggested Finishes: Textured concrete or brick/stone cladding, steel parapets

5.8 Lotmead to Lower Lotmead

5.8.1 This link will connect residential areas. The Council expect the design of this structure to reflect or complement the architectural style of these villages.

- Bridge Structure Reference: 3
- Watercourse: Drainage Ditch to River Cole
- Expected to be delivered by: Ainscough
- Structure Type: Box Culvert
- Hierarchy: Primary Vehicular Route
- Deck Width: 16.7 metres
- Span: 1.2 metres (approximate)
- Approach Earthworks length: 310 metres
- Suggested materials: Reinforced concrete integral bridge
- Suggested Finishes: Textured concrete or brick/stone cladding, steel parapets

5.9 Lower Lotmead to Redlands

- 5.9.1 This highway link crosses one watercourse and the safeguarded canal alignment. As such the bridge details for each structure are given separately.
- 5.9.2 Swindon Borough Council's adopted Local Plan has a policy requirement to safeguard the alignment of a canal route through the NEV development. So as not to compromise delivery of the canal, the NEV development must provide a road bridge over the safeguarded canal route at the Redlands development. The Wilts & Berks Canal Trust technical note (Appendix C) is included only as a reference to justify the likely dimensions of this bridge, which will assist with cost estimation.
- 5.9.3 The canal bridge would be constructed with a short section of puddled earthworks. This would mitigate the risk of disturbance to the bridge structure when the canal is constructed.
- 5.9.4 The location of the canal crossing is within a proposed cutting section of the canal. This is approximately at chainage of 4,500 in Figure 10 of the W&BCT Technical Note, Flood Protection of New Eastern Villages (Appendix C).
- 5.9.5 The proposed 7m span in-situ box culvert for the canal is consistent with similar structures provided in Wichelstowe. The required canal draining works on the approaches to this bridge will be included as part of any cost estimation.
- Bridge Structure Reference: 6a
 - Watercourse: Safeguarded canal route
 - Expected to be delivered by: Swindon Borough Council
 - Structure Type: In situ box
 - Hierarchy: Tertiary Vehicular Access Route
 - Deck Width: 12.9 metres
 - Span: 7 metres (approximate)
 - Earthwork length: included within 6a (above)
 - Suggested materials: Reinforced concrete integral bridge
 - Suggested Finishes: Textured concrete or brick/stone cladding, steel parapets
 - Reference: 6b
 - Watercourse: Liden Brook

- Expected to be delivered by: Swindon Borough Council
- Structure Type: Clear span bridge
- Hierarchy: Tertiary Vehicular Access Route
- Deck Width: 12.9 metres
- Span: 12 metres (approximate)
- Earthwork length: 410m (combined)
- Suggested materials: Reinforced concrete integral bridge
- Suggested Finishes: Textured concrete or brick/stone cladding, steel parapets

5.10 Pedestrian/Cycle Infrastructure

5.10.1 The flood zones provide green wildlife corridors throughout the NEV. Within these corridors, structures will be provided where footways, off-road cycle routes and bridleways cross watercourses. Footpaths and cycleways approaching bridges within the green infrastructure will be constructed at existing ground level and may be submerged from time to time during flood events; this may however prejudice against adoption as Highway Maintainable at Public Expense. Bridges will be notionally higher in order to comply with EA clearances and therefore only require minimal approach earthworks.

5.11 Great Stall West to Upper Lotmead (District Centre)

5.11.1 This bridge will connect the District Centre with a residential area to the south.

- Bridge Structure Reference: 7
- Watercourse: River Cole
- Structure Type: Clear span bridge
- Expected to be delivered by: Swindon Borough Council
- Deck Width: 3.5 metres
- Span: 12 metres (approximate)
- Suggested materials: Concrete, timber or steel

5.12 Upper Lotmead to Lotmead

5.12.1 This bridge will connect residential areas.

- Bridge Structure Reference: 8
- Watercourse: Dorcan Stream
- Structure Type: Clear span bridge
- Expected to be delivered by: Swindon Borough Council
- Deck Width: 3.5 metres
- Span: 12 metres (approximate)
- Suggested materials: Concrete, timber or steel

5.13 Great Stall East to Lotmead

5.13.1 This bridge will connect Symmetry Park with residential areas to south of River Cole.

- Bridge Structure Reference: 9
- Watercourse: River Cole
- Structure Type: Clear span bridge
- Expected to be delivered by: Swindon Borough Council
- Deck Width: 3.5 metres
- Span: 15 metres (approximate)
- Suggested materials: Concrete, timber or steel

5.14 Great Stall East Green Infrastructure

5.14.1 This bridge will provide a Green Infrastructure crossing point of the River Cole, near to Acorn Bridge.

- Bridge Structure Reference: 10
- Watercourse: River Cole
- Structure Type: Clear span bridge
- Expected to be delivered by: Swindon Borough Council
- Deck Width: 3.5 metres
- Span: 15 metres (approximate)
- Suggested materials: Concrete, timber or steel

5.15 Lotmead/Lower Lotmead

5.15.1 This structure will provide a link across a drainage ditch, between Lotmead and Lower Lotmead.

- Bridge Structure Reference: 11
- Watercourse: Drainage Ditch
- Structure Type: Clear span bridge
- Expected to be delivered by: Swindon Borough Council
- Deck Width: 3.5 metres
- Span: 12 metres (approximate)
- Suggested materials: Concrete, timber or steel

5.16 Lotmead/Lower Lotmead

5.16.1 This structure will provide a link across a drainage ditch, between Lotmead and Lower Lotmead.

- Bridge Structure Reference: 12
- Watercourse: Drainage Ditch
- Structure Type: Clear span bridge
- Expected to be delivered by: Swindon Borough Council
- Deck Width: 3.5 metres
- Span: 12 metres (approximate)
- Suggested materials: Concrete, timber or steel

5.17 Foxbridge to Wanborough

5.17.1 This structure will replace an existing bridge on land at Marsh Farm.

- Bridge Structure Reference: 14
- Watercourse: Liden Brook
- Structure Type: Clear span bridge
- Expected to be delivered by: Swindon Borough Council
- Deck Width: 3.5 metres
- Span: 12 metres (approximate)
- Suggested materials: Concrete, timber or steel

5.18 Upper Lotmead to Lotmead

5.18.1 This structure provide a new bridge on land at Lotmead Farm.

- Bridge Structure Reference: 13
- Watercourse: Dorcan Stream
- Structure Type: Clear span bridge
- Expected to be delivered by: Swindon Borough Council
- Deck Width: 3.5 metres
- Span: 12 metres (approximate)
- Suggested materials: Concrete, timber or steel

5.19 Canal Towpath Lotmead Village

5.19.1 When the canal is constructed, this structure will form a section of towpath. At this location, the canal will sever a drainage ditch which discharges into the Liden Brook. The canal planning application will be required to provide mitigation.

- Bridge Structure Reference: 15
- Watercourse: Drainage Ditch
- Structure Type: Concrete box culvert
- Expected to be delivered by: Wiltshire & Berkshire Canal Trust
- Deck Width: 3.5 metres
- Span: Canal planning application to confirm
- Suggested materials: Concrete and consistent with TRFD requirements

5.20 Canal Towpath Foxbridge

5.20.1 The safeguarded canal alignment severs an existing public right of way. The canal planning application will be required to provide mitigation.

- Bridge Structure Reference: 16
- Watercourse: Canal
- Structure Type: Clear span bridge
- Expected to be delivered by: Wiltshire & Berkshire Canal Trust

- Deck Width: 3.5 metres
- Span: 20 metres (approximate)
- Suggested materials: Concrete, timber or steel and consistent with TRFD requirements

5.21 Canal Towpath South of Foxbridge

5.21.1 The safeguarded canal alignment severs an existing public right of way. The canal planning application will be required to provide mitigation.

- Bridge Structure Reference: 17
- Watercourse: Canal
- Structure Type: Clear span bridge
- Expected to be delivered by: Wiltshire & Berkshire Canal Trust
- Deck Width: 3.5 metres
- Span: 20 metres (approximate)
- Suggested materials: Concrete, timber or steel and consistent with TRFD requirements

5.22 Canal Cross Drainage Structure for Liden Brook

5.22.1 The safeguarded canal alignment crosses the Liden Brook. The canal planning application will be required to provide mitigation.

- Bridge Structure Reference: 18 & 19
- Watercourse: Canal/Liden Brook
- Structure Type: Cross Drainage Structure
- Expected to be delivered by: Wiltshire & Berkshire Canal Trust

5.23 Canal Culvert beneath Wanborough Road

5.23.1 The safeguarded canal alignment crosses Wanborough Road. The canal planning application will be required to provide mitigation.

- Bridge Structure Reference: 20
- Watercourse: Canal
- Structure Type: Insitu box
- Span: 7 metres (approximate)
- Expected to be delivered by: Wiltshire & Berkshire Canal Trust
- Suggested materials: Reinforced concrete integral bridge
- Suggested Finishes: Textured concrete or brick/stone cladding, steel parapets

5.24 Architectural Form

5.24.1 Throughout the NEV, primary bridge structures will be perpendicular to pedestrian routes. As such, side elevations will be visible from adjoining GI and should be of high aesthetic quality.

- 5.24.2 The Council's expectation is that the architectural form of each bridge will be distinct, complement the character of the adjacent villages and provide a sense of place.
- 5.24.3 The Council would welcome innovative design concepts which satisfy the desire to achieve high architectural quality without exacerbating maintenance liabilities.
- 5.24.4 Detailed design of all bridges must comply with flood modelling requirements as specified by the EA and will require Technical Approval by SBC.
- 5.24.5 SBC expect these environmental factors to be routinely addressed at detailed design stage. The indicative typical cross section for the watercourse crossings shown in 4.2.5 include for a minimum 5m wildlife corridor in consideration of biodiversity requirements.

5.25 Bridge Examples

- 5.25.1 Wichelstowe is a new development, located in south Swindon. Within Wichelstowe, bridge structures have been designed to reflect the style of the development architecture. Similarly, SBC expect bridge infrastructure to complement the architecture of neighbouring NEV developments. The following primary infrastructure example from Wichelstowe was designed to complement development architecture and illustrates a structure with similar span to the NEV bridges.



(Image reference: www.wichelstowe.co.uk)

- 5.25.2 Below is an example cycle/footway canal bridge at Beavan's Bridge, Swindon. A bridge of similar architectural merit could form an appropriate canal crossing within the NEV development.



(Image Reference: Wiltshire Swindon & Oxfordshire Canal Partnership www.canalpartnership.org.uk)

- 5.25.3 Cycle/footway structures will be required within a shared cycle/footway network through GI to cross water courses. These may be of similar construction to the timber and steel structures which are illustrated below.



Steel/timber pedestrian bridge, Trowbridge
(Image reference: Swindon Borough Council)



Timber/brick pedestrian/cycleway structure, Swindon
(Image reference: Swindon Borough Council)



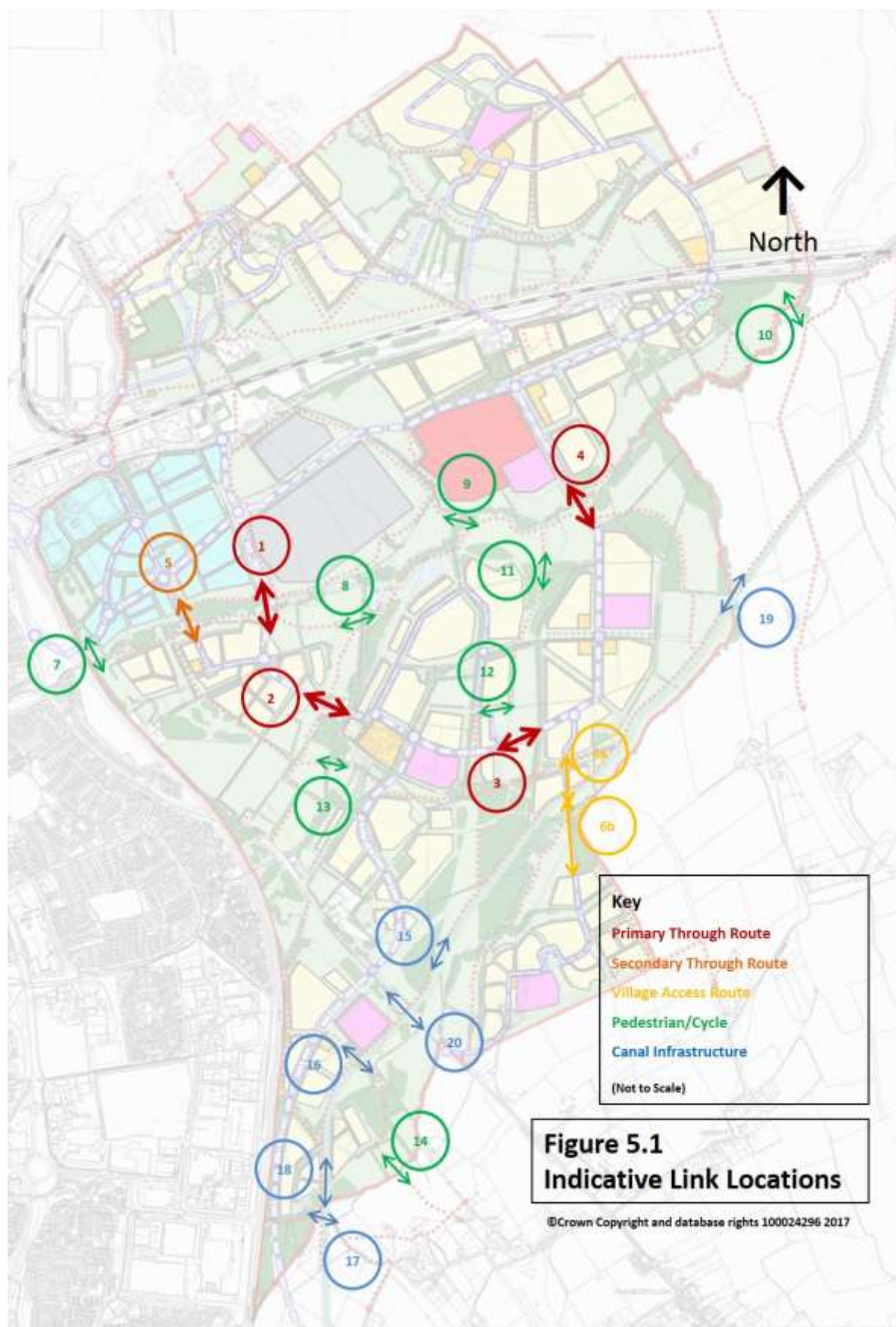
Steel pedestrian/cycleway structure, Swindon
(Image reference: Swindon Borough Council)

- 5.25.4 Should culverts be constructed with pre-cast concrete construction, textured formwork may be used to give identity and individuality. The image below illustrates an example of textured formwork which replicates a stone wall effect.



Stone wall effect, Swindon
(Image reference: Swindon Borough Council)

Figure 5.1 – Indicative Link Locations



6 Technical Approval and Adoption Process

6.1 NEV Structures

- 6.1.1 NEV links between development islands will comprise structures, earthworks, highway pavement and associated features. All of these assets will need to be constructed to adoptable standard.

6.2 NEV Approval Guidance

- 6.2.1 Technical Approval and Adoption Process guidance for structures is given at Appendix B. Alternatively, guidance should be sought from the appropriate Highways Asset Management Officer.

7 Costing

7.1 Whole Life Costing

- 7.1.1 The traditional method scheme appraisal in the construction industry focuses upon the capital works cost and does not consider the long term maintenance cost. This approach has resulted in short-term solutions that prove expensive in the longer term due to durability and maintenance problems. Whole Life Costing is therefore used to assess the financial merits of a scheme over the long term.
- 7.1.2 Whole Life Costing is used to assess maintenance needs that have more than one solution, i.e. option appraisal, and to determine the most cost effective solutions.
- 7.1.3 For guidance on assessment of maintenance costs, please refer to the Highways Agency's departmental documents BD 36/92 and BA 28/92: Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures.
- 7.1.4 Further guidance on Whole Life Costing can be found from the published National good practice guide *'Well Managed Highway Infrastructure, October 2016'*.
- 7.1.5 In accordance with National Code of Practice (ACOP) on Well Managed Highway Infrastructure and Department for Transport (DfT) standards, design proposals for all new bridges within the NEV development can be justified by an adequate Whole Life Costing assessment.
- 7.1.6 Where a design does not have the lowest Whole Life Costing, the Council will require a commuted sum in accordance with national guidance (eg. Management of Highway Structures: A Code of Practice – Roads Liaison Group) to cover future maintenance and replacement costs.

Appendix B - Technical Approval and Adoption Process

Introduction

This guide provides developers with an overview of the procedure for obtaining Technical Approval (TA) for new highway and new highway structures from the Council (as Highway Authority), highlights the essential design criteria for such structures with references to published national good practice guidance and standards, and provides supplementary design guidance. The aim is to clarify how existing processes and practices fit together with respect to TA of highway structures. It is not intended to be a technical design manual, or to replace the existing documents to which it refers.

The aim of the Council in its capacity as Highway Authority is to ensure that all highway structures are fit for purpose, meet the needs of users, are safe and serviceable, are constructed to appropriate standards and are durable with minimal future maintenance liability.

Technical Approval Procedure

The TA procedure is based on the Highways England Departmental Standard, 'BD2/12 Technical Approval of Highway Structures' (Design Manual for Roads and Bridges Volume 1, Section 1, Part 1). The Council as Highway Authority undertakes the role of the Technical Approval Authority (TAA). The TA procedure is administered by the Transport Development Management team (TDM) with detailed technical support provided by the Bridges & Structures Manager in the Highway Infrastructure Asset Management Team (HIAM).

TA will generally be required for any structure supporting the highway with a span greater than 0.9m or retained height greater than 1.5m and for structures spanning over the highway or supporting land above it. Full details of structures requiring TA are given in BD2/12 along with the four Categories into which they are classified. These categories range from Category 0 for minor structures up to Category 3 for complex structures.

The Developer/Designer is advised to discuss their concept for the proposed structure with the SBC Bridges and Structures Manager at the earliest opportunity, ideally before producing the Approval in Principle document (see below). It should be noted that Planning and Technical Approval are separate development processes. Planning Approval does not take precedence over TA requirements and design standards. Where Planning and TA design requirements are in conflict, it may be necessary to reapply for Planning Permission such that the required TA design standards can be met.

The following three stages of the TA procedure give an overview of the process:

AIP Stage

The Designer of the structure shall seek Approval in Principle (AIP) for his design from the TAA, by the formal submission of the standard AIP document including General Arrangement drawings, ground investigation reports and any further information that may be requested by the TAA (e.g. EA consents, Utility company permissions, Whole Life Cost information, Designer's preliminary risk assessment and any proposals for Departure from Standards where applicable etc.). This stage of the process usually takes up to four weeks although can take longer depending on complexity of proposal and quality of submission.

Category 0 structures do not require an AIP, however, it is recommended that Designers discuss their outline proposals with the Bridges & Structures Manager and reach informal agreement on proposals. This will help expedite TA, avoid potential disputes and abortive design work. Category 1, 2 & 3 structures require an AIP.

All structures shall be designed in accordance with current Highways England Standards contained within the Design Manual for Roads and Bridges (DMRB) and shall be constructed in accordance with the Specification for Highway Works (SHW).

Note: Attention is drawn to Interim Advice Note IAN 124/11 – ‘Use of Eurocodes for the Design of Highway Structures’ which provides additional guidance; where there is confusion or conflict between DMRB and Eurocodes requirements the advice of the Bridges & Structures Manager shall be sought.

Eurocodes must be used for the design of new highway structures (including geotechnical works). Designs to the superseded BS 5400 bridge design code or building codes, either current or withdrawn, e.g. BS8110 will not be accepted.

The Designer and the TAA shall agree the classification of the proposed structure for checking purposes.

When all design criteria and parameters have been agreed, the TAA will accept in principle the design to proceed to detailed design stage by signing the AIP document. A signed copy of the AIP will be returned to the Designer.

Detailed Design/Check Stage

With the acceptance of the AIP, detailed design of the structure may proceed. The design and check shall be carried out in accordance with the requirements of the category to which the structure has been classified in the accepted AIP.

On completion of the detailed design and the design check, the Designer shall submit to the TAA the duly signed Design/Check or Design and Check Certificates (depending on the category of the structure), including a copy of the structural design calculations with a complete set of construction drawings, specification appendices, bar bending schedules and the Designer’s risk assessment.

On receipt, the TAA will review the adequacy of the design submitted and on acceptance sign the Certificates and return copies to the Designer. This will signify the approval of the Design/Check stage of the TA procedure. Please note that it will usually take a minimum of 4 weeks for this audit review by the TAA and depending on the complexity of the structure and the quality of the Designer’s submission, it may take longer than the 4 week period.

Model Templates for AIP and Certificates are contained within BD2/12.

Construction Stage

With the acceptance of the Design / Check Certificates, construction of the structure can now commence, subject to the submission for agreement of the site phase quality plan and evidence that the Developer/Designer/Contractor have adequate control and supervision is in place. On completion of the construction of the structure, the Developer /Designer/Construction Supervisor shall submit the Construction Compliance Certificate to the TAA. On acceptance, the Construction

Compliance Certificate will be signed by the TAA and returned to the Designer/Construction Supervisor. This will signify the completion of the full Technical Approval procedure.

The Developer/Designer should note the following requirements:

The TA procedure does not in any way modify the contractual and statutory responsibilities of any party for the works carried out

The agreement of the AIP or acceptance of the Certificates by the TAA does not relieve the Designer/Checker of their responsibility for the validity and arithmetical correctness of the calculations, nor their translation into design details and drawings, specification clauses or assessed capacities.

Detailed design of the structure should not commence until the Approval in Principle (AIP) is obtained.

No construction of the structure is to proceed until the Design / Check stage of the Technical Approval procedure is completed.

The TAA (SBC) is not directly responsible for supervision and will only audit the construction phase to satisfy itself that appropriate site supervision is in place. The Developer / Contractor are required to provide evidence of appropriate quality checking, e.g. records of inspection, compliance testing etc. during the construction phase. Critical information such as concrete mix design is to be submitted to the TAA during construction for agreement 7 days in advance of placing concrete.

Adequate processes must also be in place for off-site activities – e.g. steelwork fabricator QA plan and independent checking of off-site process as appropriate.

Design Certificate and Check Certificate – model certificates may need to be ‘modified’ (or additional separate certificates provided) to include for other significant contributors to the process, e.g. where a significant element of the construction takes place off-site, e.g. precast units or steelwork fabrication. In those cases, format of certificates shall be agreed with the TAA.

Additional Requirements for Adoptable Structures

When the structure is to be adopted by the Council the following will also apply:

Drawings required for the relevant legal Highway Agreements shall be prepared and submitted.

A full set of approved structural design calculations are to be submitted to the Bridges & Structures Section of the Highway Infrastructure Asset Management Team for record purposes.

Designer’s Risk Assessments shall be provided and should give commentary and assessment of risks associated with the fundamental basis of design, in service risks, maintenance activities and decommissioning. The Designer’s RA should be supported with other relevant Risk assessments such as RRRAP, PRRSLAR and Departures from Standard.

Prior to start of construction, two sets of Construction Issue drawings are to be forwarded to the Bridges & Structures Section.

The Bridges & Structures Section will arrange to visit the site during various stages of construction and will require 48 hours (two clear working days) notice when an inspection is required. The inspection schedule listed below is indicative only and is not intended to be comprehensive as the inspection regime will be specific to the type of structure under construction:

- formation level prior to the placement of blinding concrete
- reinforcement steel in all elements, sections, components of the structure prior to pouring of concrete
- concrete immediately after striking of shutters
- application of the waterproofing system (where appropriate)
- drainage system prior to backfilling (where appropriate)
- application of any protective systems (where appropriate)

Copies of contractor approved fabrication drawings shall be submitted to the TAA (SBC) 14 days in advance of fabrication for prior agreement.

For large developments with multiple structures, a construction programme should be submitted to help assist with the planning of inspections and allocation of SBC TA resource.

On completion of construction, a hard copy and electronic format of As-built drawings are to be submitted to the Bridges & Structures Section. Drawings shall be in AutoCAD format.

To comply with the requirements of the CDM Regulations the Health and Safety File is to be passed to the Bridges & Structures Section. The format of such file should generally follow the requirements of BD62/07, As Built, Operational and Maintenance Records for Highway Structures (without HE Forms). All materials and components need to be traceable and accompanied with the appropriate test certificates. Each structure requires its own stand alone As-built records. The format and content of the As-built information should be agreed with the Bridges & structures Manager during the construction phase.

On completion of the TA procedure and on receipt of full approval, the structure will be adopted by the Council on expiry of the agreed maintenance period, subject to the necessary Part 2 Final Inspection, any necessary remedial works and payment of Commuted sums.

Consultation

The Developer is strongly advised to seek advice from the Council's Bridges and Structures Manager at the beginning of the Approval in Principle stage. Early engagement will facilitate development of the AIP and avoid potentially abortive work by the developer. This is also helpful to ensure all appropriate information is obtained prior to selection of the appropriate engineering solution.

Specific Design Criteria

General Design Criteria

Eurocodes must be used for the design of new highway structures (including geotechnical works) unless agreed otherwise at the Approval in Principle stage.

DMRB standards generally apply to motorways and trunk roads and it is therefore acknowledged that certain aspects of these standards may not always be practical or appropriate in the urban

environment. In these cases, the TAA will consider Departures from Standards providing that they are fully justified and agreed at the Approval in Principle stage. Further guidance and procedures can be found in the document 'Departures from Standards: Procedures for Local Highway Authorities' published by the UK Roads Liaison Group.

Durability is a key issue throughout the design, detailing and construction phases and the principles of whole life costing must be adopted. Examples of good detailing practice can be found in CIRIA Publication 'C543 - Bridge Detailing Guide'.

Developers should ensure that sufficient space is provided to allow future inspection and maintenance of the structure to be carried out safely. This might include provision of easement strips and/or other appropriate provisions to ensure the safety of maintenance personnel.

Details of SBC specific requirements for certain types of structure are given in the following sections. This information is provided for guidance purposes and is intended to supplement existing design standards.

Bridges

The primary purpose of bridges is to provide a safe passage for vehicles and pedestrians. However, it is also important that bridges are designed aesthetically to compliment or enhance their surroundings. Recommendations for good design are given in Advice Note 'BA41 - Guidance on the design and appearance of bridges'.

Developers and Designers are advised to consult with Planning Team and the Bridges & Structures Manager to discuss the aesthetic aspects of their outline proposals.

Consideration must be given to the overall setting of the structure and immediate environment to ensure it is in harmony with its surroundings. For example, secluded areas below large structures can be uninviting and attract anti-social behaviour if not appropriately considered. Vegetation growth in shaded areas can be restricted and alternative treatments and finishes may be necessary to ensure long term acceptability of reinstatements and low maintenance.

Bearings and expansion joints in bridge decks create significant durability and maintenance issues. Bridges with overall lengths not exceeding 60m and skews not exceeding 30 degrees should be designed as integral bridges, with abutments connected directly to the deck without movement joints and bearings for expansion and contraction of the deck. Additional guidance is given in CIRIA Document 'C543 – Bridge Detailing Guide' and SCI Publication 340.

Footbridges

Footbridges shall be designed in accordance with Design Standard 'BD29/04 - Design Criteria for Footbridges'. Aesthetic considerations are equally applicable to footbridges and the general points noted for Bridges above also apply.

Footbridges in the urban environment shall generally be constructed in reinforced concrete unless agreed otherwise with the Bridge and Structures Manager. The choice of material and structural form shall take into account future maintenance costs and whole life costing

In certain circumstances, steel or timber footbridges may be permitted in the urban environment subject to the agreement of an appropriate commuted sum to compensate for the increased maintenance costs.

The use of innovative materials is encouraged particularly where the benefits of reduced Whole life Costs can be substantiated. Proposals for the use of innovative materials will be favourable considered providing robust evidence in support of the benefits is provided.

Footbridges and their approaches shall be fully compliant in respect of the Disability Discrimination Act (DDA). Proposals for footbridges with only stepped access will not be accepted and DDA compliant ramps must also be provided.

Footbridges can be prone to various forms of damage, misuse and vandalism by users. Consideration should be given to likely vandalism at the location and the structure designed accordingly to minimise the likelihood of damage and associated repair costs.

Protection measures including security fixings, vandal resistant coatings etc. should be provided. Materials vulnerable to fire damage, graffiti and of high scrap value should be avoided at high risk locations.

Additional Requirements for Timber Footbridges

Timber elements of footbridges shall be designed and detailed to achieve a minimum design life of 30 years. Timber footbridges are less durable than other types of structure and commuted sums will be required to cover the increased maintenance and future replacement costs.

For the purpose of calculating Commuted Sums the replacement interval for timber superstructure elements, e.g. deck beams and parapets shall be 30 years. Timber decking will be assumed to need replacing at 15 year intervals due to the high wear and expected in service lifespan.

All timber including beams, decks and parapets shall be FSC Ekki hardwood from a sustainable source.

Foundations and substructures supporting timber footbridges shall be constructed in reinforced concrete to achieve a design life of 120 years.

Abutments shall be detailed to include ballast walls and bearing shelf drainage where appropriate to improve durability and prolong the life of the timber structure.

Timber footbridges in urban or residential areas shall have hardwood timber parapets with vertical infill bars at maximum 110mm spacing. Horizontal rails are not permitted.

Parapets with a minimum of three horizontal rails will usually be acceptable for timber footbridges on less formal footpaths, e.g. rural areas, subject to approval by the Bridge & Structures Manager. Developers are advised that most timber footbridge manufacturers detail three horizontal rails as standard, but timber footbridge offered to SBC for adoption shall have a minimum of four horizontal rails to reduce penetrability.

All vulnerable details including parapet infill and all accessible fixings shall be vandal resistant as far as is reasonably practicable.

Decking shall be continuous sheets of proprietary load bearing panels in preference to individual timber deck boards. Panels may be composite materials or laminated ply with an appropriate anti-slip surface.

Timber decking boards, where accepted, shall be hardwood timber with a non-slip coating to achieve a mean corrected pendulum test value of 45 units.

Footbridges carrying cycle routes shall have bonded resin/aggregate overlays to the whole deck surface. Footbridges which will only be used by pedestrians may have fully bonded or grooved timber decks with non-slip resin inserts.

In addition to the pedestrian live loading given in current design standards, timber footbridge decks shall also be designed for loading from maintenance vehicles as agreed with the Bridges & Structures Manager.

Pedestrian Subways

The minimum cross section of subways for use by pedestrians only and combined pedestrians and cyclists use shall be in accordance with Design Standard 'TD36/93 - Subways for Pedestrians and Pedal Cyclists - Layout and Dimensions' unless agreed otherwise with the planning authority.

Pedestrian subways shall generally be precast or insitu reinforced concrete box or portal frame structures. Other structural forms may be acceptable (e.g. masonry arches) subject to prior agreement with the Bridges & Structures Manager.

The finishes to internal walls and soffits of subways shall be selected to discourage graffiti and aid cleansing of surfaces. Plain concrete finishes are more likely to attract graffiti and should be avoided.

Subway headwalls and wing walls shall generally be reinforced concrete with brick facing unless agreed otherwise by the Bridges and Structures Manager.

Subway lighting shall be vandal resistant and shall not encroach into the minimum cross section described above. The design of the subway lighting shall be approved by the Street Lighting Asset Manager.

Culverts

Culverts may comprise rigid pipes, precast or insitu reinforced concrete boxes, corrugated steel or other appropriate structural forms.

The internal dimensions and hydraulic capacity shall be agreed with the Environment Agency and/or SBC's Drainage Engineer depending on the status of the watercourse carried prior to submission of the Approval in Principle.

Designers should give consideration to the future maintenance and inspection of culverts. Creation of confined spaces or the provision of soft beds within culverts shall be avoided as these can significantly increase the costs of inspection and maintenance during the life of the structure.

Culvert headwalls and wing walls shall generally be reinforced concrete with brick facing unless agreed otherwise by the Bridges and Structures Manager.

In some circumstances, brick headwalls may be acceptable for small structures. Headwalls and wing walls constructed in concrete bagwork will not usually be accepted.

Additional requirements for trash screens and/or wildlife corridors (e.g. mammal shelves) should usually be agreed with the Environment Agency and/or SBC Drainage Engineer. Details of these features should be included in the TA submission.

Flood Attenuation Cells

Flood attenuation cells (e.g. Aqua cell, storm cells, soak away crates) should be located outside of trafficked areas, areas subject to highway surcharge loading or at risk from accidental wheel loading.

Flood attenuation cells proposed to be located within the highway will require Technical Approval including calculations to demonstrate that they can carry full highway loading for the normal 120 year design life of highway structures.

Road Restraint Systems

Provision of Parapets and safety barriers shall be in accordance with DMRB requirements.

Vehicle Parapets

Vehicle parapets shall be provided on all adoptable structures which carry public roads including bridges, subways, culverts and retaining walls.

Vehicle parapets shall generally be constructed in aluminium or painted galvanised steel, as agreed with the Bridges & Structures Manager, secured to parapet edge beams using proprietary cast in anchorages with appropriate certification.

Vehicles parapets shall be designed to satisfy the containment level, impact severity level and working width appropriate to the speed of road.

Where post and rail type vehicular parapets are located adjacent to footpaths, they shall be fitted with anti-climb mesh in accordance with the manufacturer's standard details. Infill mesh shall be fabricated in stainless steel or galvanised steel and shall be vandal resistant and easy to replace.

Headwall and wing walls shall include a reinforced concrete parapet beam of sufficient width to accommodate the parapets and fixing system including appropriate edge distances.

Reinforced concrete parapets with brick facing may be permitted in certain circumstances, subject to prior approval by the Bridge and Structures Manager, where aesthetic considerations dictate. Requirements for fixings, bed reinforcement, pointing and finishes shall be in accordance with TD19/06.

Pedestrian Parapets

Pedestrian, cycleway and/or bridleway will generally be constructed in aluminium or painted steel secured to parapet edge beams using proprietary cast in anchorages or drill and fix bolts with appropriate certification.

Metal parapets are high value items which are prone to theft. Generally, the use of aluminium parapets shall be restricted to built-up areas where there is less risk of theft and painted galvanised steel parapets should be provided in more secluded or isolated areas. Bolted fixings to rails and baseplates shall have an appropriate number of secure anti-theft fixings.

Requirements for timber parapets are discussed in paragraph 6.1.5.4.

Safety Barriers

Safety barriers shall usually be provided on the approach and departure end of vehicle parapets to prevent errant vehicles from impacting with the end of the parapet.

Safety barriers shall be designed to satisfy the containment level, impact severity level and working width appropriate to the speed of road in accordance with current standards.

For any roads where the AADT will be greater than 5000 and the speed limit is higher than 50mph, the requirements for safety barriers shall be in accordance with DMRB TD19/06 (and any subsequent amendment of TD19 current at the date of implementing the proposals).

For all other roads the need for safety barriers should be considered in accordance with the guidance provided in the UK Roads Liaison Group publication 'Design & Maintenance Guidance for Local Authority Roads – Provision of Road Restraint Systems on Local Authority Roads' (PRRSLAR), dated October 2011 (and any subsequent amendment of this document).

Developers should note that use of PRRSLAR will be treated as a departure from standard and must be agreed at the Approval in Principle stage.

Retaining Walls Supporting the Highway

Retaining walls supporting the highway with a retained height of 1.5m or greater will be subject to full Technical Approval in accordance with the requirements of BD2/12 and this document.

Retaining walls shall generally be reinforced concrete with brick facing unless agreed otherwise by the Bridges and Structures Manager.

Developers should seek advice from the Bridges and Structures Manager in order to agree the reduced Technical Approval process for small retaining walls supporting the highway with a retained height of less than 1.5m.

Developers should note that retaining walls of any height may require parapets, pedestrian guardrails or fencing appropriate to the location where the retained height results in a safety hazard.

Retaining Walls Above the Highway

Walls above the highway will not usually be considered for adoption by the Highways Authority, but in accordance with Section 167 of the Highways Act 1980, the Highway Authority will require design details and calculations for approval for any length of retaining wall whose:-

cross section is wholly or partly within 3.66m of a street, and

which is at any point of greater height than 1.37m above the level of the ground at the boundary of the street nearest that point.

Rock Filled Gabion Baskets

The use of rock filled gabion baskets will not usually be permitted in areas adjacent to footpaths or with public access, due to the risk of vandalism and anti-social behaviour.

Crib Walls

The use of crib walling will not usually be permitted in areas adjacent to footpaths or with public access, due to the risk of vandalism and anti-social behaviour.

Reinforced Earth

The use of reinforced earth structures with or without hard facing may incur additional commuted sums due to their high maintenance cost and/or shorter design life.

Basements and Cellars

Basements and cellars which form part of private buildings and which also support the public highway will not be adopted by the TAA, but will be subject to the Technical Approval process if they have a span of 0.9m or greater or a retained height of 1.5m or greater.

For the purposes of Technical Approval the basement or cellar shall be treated as a bridge, buried structure or retaining structure as appropriate to the type of construction.

Lighting Columns, Cantilever Signal Masts, CCTV Masts and Road Traffic Sign Posts

The design of lighting columns, cantilever signal masts, CCTV masts and road traffic sign posts shall be designed in accordance with the requirements of Design Standard 'BD94/07 Design of Minor Structures'.

Small Structures

Small structures which fall outside of the scope of BD2/12 will not usually require full Technical Approval by the Bridge and Structures Manager but may still require approval by the relevant Council Officer, e.g. small headwalls might not be classified as a highway structure but may still require approval by the Drainage Manager.

Examples of small structures falling outside of the scope of BD2/12 include small bridges, buried structures, pipes, culverts and any other structures supporting the highway with a clear span or internal diameter of less than 0.9m and earth retaining structures with an effective retained height of less than 1.5m.

Developers are advised to seek guidance from the Bridge and Structures Manager to agree an appropriate level of Technical Approval in order to demonstrate appropriate design and detailing for safety and durability of small structures.

Utility and Service provisions

Adequate provision shall be provided for proposed and future utility services across structures. This may take the form of dedicated service bays and/or provision of service ducts in verges/footways. Provisions for services including spare ducts shall be agreed with the Bridges & structures Manager. The proposed placement and protection of services across structures shall have due consideration for future maintenance activities such as re-waterproofing.

Construction Materials

Construction materials and testing requirements shall be in accordance with the Specification for Highway Works (SHW). Where the SHW requires testing of materials including concrete, waterproofing and backfill by the developer, the frequency and method of testing shall be agreed with the TAA. Failure to provide satisfactory test certificates may result in non-adoption of the structure or an increased commuted sum.

Choice of materials and the structural form for the bridge construction will depend on the intended function of the highway carried by the bridge, and on the long term maintenance requirements by the local Highway Authority. SBC requires that this is assessed using a whole life costing approach. Further guidance on whole life costing is provided in the following section.

The minimum criteria for typical construction materials are described in the following paragraphs.

Concrete exposure classes shall be in accordance with current standards and shall be agreed at the Approval in Principle stage.

Steel grades and finishes shall be in accordance with current standards and shall be agreed at the Approval in Principle stage.

All timber shall be FSC certified hardwood from a sustainable source.

Protective paint systems shall be in accordance with Series 1900 of the Specification for Highway Works and shall be designed for 'inland difficult access' with no maintenance for 12 years, minor maintenance after 12 years and major maintenance after 20 years. Paint colours and finishes shall be agreed with the Bridges & Structures Manager.

The use of other protective coating systems for steel such as Weathering steel, galvanising, stainless steel etc. will be evaluated with due consideration to Whole Life Cost aspects, aesthetics and maintenance considerations.

The choice of brick / masonry finishes, bond and mortar class shall be agreed with the TAA.

Reinforced concrete walls with brick facing shall be capped off with reinforced concrete copings/edge beams which are monolithic with the wall stem. The copings shall be detailed with sufficient width and depth to accommodate parapet fixing bolts and a suitable drip chase.

Requirements for anti-graffiti coatings shall be agreed with the Bridges and Structures Manager.

Bridge decks and buried concrete subway or culvert roof slabs shall receive a spray applied waterproofing membrane to extend a minimum of 300mm down the back face of abutments or sidewalls.

All other buried concrete surfaces shall receive two coats of bitumen emulsion.

Buried concrete structures shall be backfilled with Class 6N material in accordance with Series 600 and Table 6/1 of the Specification for Highway works.

Requirements for bridge deck surfacing shall be agreed with the Highway asset Manager.

Whole Life Costing

The traditional method of option/scheme appraisal in the construction industry focused solely on the capital works cost and neglected the long term maintenance requirements and cost. As a result, a cost effective solution was considered inappropriately to be the one with a low construction cost. This approach resulted in many cases in the development of many short-term solutions that proved to be expensive in the longer term due to durability and maintenance problems. Whole Life Costing (WLC) is used to assess the financial merits of a scheme over the long term, thus preventing short term expenditure from skewing decisions.

WLC should be used to assess maintenance needs that have more than one solution, i.e. option appraisal, and to determine the most cost effective schemes.

For guidance on assessment of maintenance costs, please refer to Highways England's departmental documents 'BD 36/92 and BA 28/92: Evaluation of Maintenance Costs in Comparing Alternative Designs for Highway Structures'.

Further guidance on WLC can be found from the published national good practice guide '*Well Managed Highway Infrastructure, October 2016*'. The Council, in accordance with the national ACOP on management of highway structures and the Highways England standards requires that alternative design proposals for all new bridges within the Borough shall be justified by an adequate WLC assessment in accordance with the above guidance and standards. Where a design does not have the lowest WLC, SBC will require a commuted sum in accordance with the National Code of Practice to cover future maintenance, inspection and replacement costs.

Commuted Sums

A Commuted Sum to cover the cost of inspection and maintenance over the 120 year design life of highway structures and the eventual cost of replacement will be payable by the Developer or each adoptable structure.

National Guidance on Commuted sums is as set out in:

- County Surveyors Society – Commuted Sums for Maintaining Infrastructure Assets – Guidance Document; and
- Adept National Bridges Group – Commuted Sums for the Relief of Maintained and Reconstruction of Bridges – Guidance Notes.

Appendix C –Wilts & Berks Canal Trust Technical Note

This document is available on the internet at www.swindon.gov.uk/spd

Please contact the New Eastern Villages team on 01793 466370 if you would like to request a hard copy.

Appendix D – Flood Levels

The Revitalised Flood Hydrograph Model, ReFH2, has been used to calculate existing flow rates for the 1 in 100 year and 1 in 1000 year peak summer and winter storms for each of the six locations. It also shows the peak summer 1 in 100 year flow rates including a 70% allowance for climate change. The Revitalised Flood Hydrograph Model (ReFH2) has not yet been formally evaluated and accepted by the EA, however this has now replaced the previous REFH model which is no longer available to download. Therefore, the flows shown in the table must not be used to inform any detail design as they will need to be recalculated with the latest REFH2 model, once it has been formally accepted by the EA.

			Obtained from the EA			From ReFH2				Calculated 1 in 100 summer peak storm flow rate plus Climate Change (70%) m3/s
			Flood levels (AOD)			Summer peak storm Flow rates m3/s		Winter peak storm Flow rates m3/s		
Location	Easting	Northing	1%	1% + Climate Change	0.10%	1 in 100	1 in 1000	1 in 100	1 in 1000	
Bridge 1	419523	186103	91.367	91.424	91.57	18.18	30	12.33	19.82	30.906
Bridge 2	419762	185745	91.416	91.468	91.969	10.41	17.67	7.09	11.66	17.697
Bridge 3	420397	185616	91.56	91.562	91.749	N/A	N/A	N/A	N/A	
Bridge 4	420699	186445	89.387	89.442	89.728	28.59	47.67	19.42	31.48	48.603
Bridge 5	419210	186069	91.917	91.973	92.141	18.18	30	12.33	19.82	30.906
Bridge 6b	420641	185343	92.506	92.529	92.54	6.06	10.48	4.01	6.74	10.302

This document is available on the internet at www.swindon.gov.uk/spd

It can be produced in a range of languages and formats (such as large print, Braille or other accessible formats) by contacting the customer services department.

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