A358 Taunton to Southfields Dualling Scheme

Preliminary Environmental Information Report - Appendix 13.1
PEIR Flood Risk Assessment

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1 Introduction

1.1 Purpose of this document

1.1.1 This report is an appendix to the main Preliminary Environmental Information (PEI) Report for the A358 Taunton to Southfields Dualling Scheme (the 'proposed scheme'). It provides detailed technical information related to flood risk from all sources and reports the findings of a preliminary Flood Risk Assessment (FRA). The scope and content of this report are outlined in Section 2, while the detailed project specific information is outlined in Section 3.

2 Scope and content of the Flood Risk Assessment

2.1.1 Flood risk assessments (FRA) are required to support planning applications for all development in excess of 1 hectare (ha). The function of an FRA is to:

- examine the suitability of the location of the development in terms of its vulnerability to flooding (Sequential Test)
- ensure development is safe from inundation from all sources of flooding taking the proposed design standard for the development into account, the design life of the development and climate change allowances as per the Environment Agency guidance
- determine if the development has the potential to change the probability or the impact of flooding to the surrounding area
- develop mitigation or compensation measures to offset any changes to ensure land adjacent to the development or further afield is not adversely affected by flooding as a result of the development, either directly or indirectly

2.1.2 The sources of flooding that need to be considered are:

- sea
- rivers and streams
- groundwater
- surface water
- infrastructure failure

2.2 Flooding from the sea

2.2.1 Risk of flooding from the sea is not considered applicable to the proposed scheme due to inland nature of the area. However, if there are tidal influences imparted on existing rivers and streams these will be taken account of in the assessment of rivers and streams.

Rivers and streams

2.2.2 The construction of the proposed scheme includes extending sections of existing highway (including in embankment, cutting or at grade) as well as the construction of new sections of highway embankment, cutting and at grade, where the proposed scheme deviates from the route of the existing A358.

2.2.3 These works interact with watercourses that are spanned by the existing A358. The structures crossing these watercourses would be extended in length in order to accommodate the additional carriageways required by the proposed scheme. The extension of these structures has the potential of acting as a barrier to flow and occupying land that currently acts as flood water storage at times when the

channel capacity is exceeded, leading to an increase in flood risk upstream and downstream of the watercourse crossing. The proposed scheme and associated watercourse crossings have the potential for similar impacts to the existing Black Brook flooding regime.

2.2.4 Therefore, an assessment is required to determine the capacity of the existing channel, the capacity of the existing structures, the water level generated during different annual probability events and the volume and the level of floodplain impingement caused by the proposed scheme at each crossing point.

2.2.5 This information can then be used to determine appropriate sizing of the structure extensions, the new structures, the level of the highway and the volume of any replacement flood storage (floodplain compensation) that is required.

2.3 Groundwater

2.3.1 Areas where groundwater is close to the surface have to be assessed in order to determine the probability of groundwater reaching the surface and potentially flooding areas of ground. This is dependent on understanding local groundwater levels in relation to local geology and topography. This will dictate the ability for water to reach the surface, accumulate on the ground or exploit overland flow routes.

2.4 Surface water

2.4.1 During the assessment and design process it is necessary to understand the existing flow routes exploited by water across the ground. These are the physical network of natural and semi natural flow paths that convey water to existing rivers, stream, ditches and artificial pipe drainage systems. As well as understanding this physical network it is also necessary to determine the catchment areas drained and likely volumes and rates of water generated by these flow paths during rainfall events.

2.4.2 This baseline understanding can then be used to ensure that the proposed scheme does not impede existing flow paths or create new ones. In addition, this informs the design of the surface water management system (drainage design). This system will be designed to collect and store surface water generated by the additional hardstanding areas and only allow discharge of surface water to the receiving watercourse at a rate that matches existing greenfield runoff conditions.

2.5 Infrastructure failure

2.5.1 Potential flooding generated by the failure of existing infrastructure that conveys or retains water needs to be understood. This can be related to infrastructure for water supply and sewerage collection, but also features such as canal embankments, reservoirs dams and even informal features such as road or railway embankments that span a floodplain and currently hold back flood waters when the local watercourses are in flood.

3 Preliminary flood risk information

3.1 Introduction

3.1.1 This section provides the following information:

- How flood risk has been considered in the route option selection process, acknowledging the National Planning Policy Frameworks (NPPF) sequential and exception tests.
- Baseline information on flood risk from all sources.
- Potential flood risk impacts caused by the proposed scheme.
- Potential measures required to mitigate these impacts and a description of the further analytical and design work required in advance of the final application for the Development Consent Order (DCO).

3.2 Sequential and exception tests

Sequential test

3.2.1 The sequential test is a process whereby the promoters of a development demonstrate that the areas of lowest flood risk available have preferentially been considered for development. The primary measure of flood risk is the Environment Agency's Flood Zone mapping. The Flood Zones are described below:

- Flood Zone 1 - Land assessed as having a less than 1 in 1000 (0.1) annual probability of river flooding.
- Flood Zone 2 - Land assessed as having between a 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of river flooding.
- Flood Zone 3 - Land assessed as having a 1 in 100 (1%) or greater annual probability of river flooding.

3.2.2 The sequential test explores how a development has avoided Flood Zone 3 in preference for the lower risk zone 2, and Flood Zone 2 in preference for Flood Zone 1. However, as flood zone mapping does not account for all watercourses, other data sets that have more universal coverage such as the Environment Agency's Risk of Flooding from Surface Water (RoFSW) should also be taken into account if flood zone information isn't available. The RoFSW flooding categories are described below:

- High – Area that has an annual chance of flooding greater than 3.3%.
- Medium – Area that has an annual chance of flooding between 1% and 3.3%.
- Low – Area that has an annual chance of flooding between 0.1% and 1%.
- Very low – Area that has an annual chance of flooding of less than 0.1%.

3.2.3 The risk of other sources of flooding (groundwater and infrastructure failure) should also be factored into the sequential test if there is evidence of flood risk from these sources that could adversely affect either the proposed scheme or adjacent land.

3.2.4 Below is an account of how the optioneering process has taken flood risk into account. It describes how options have been considered, discounted and how the preferred option has been selected.

3.2.5 Highways England commissioned Mott McDonald to undertake an options assessment study working to a preferred route announcement for the proposed scheme and transfer of the road to Highways England's Strategic Road Network. This was part of stage 2 in Highways England major projects Project Control Framework (PCF).

3.2.6 A total of 26 route options/route option variants were identified during the option identification stage, which were subject to a sifting process. Following the sift and a further value for money exercise, four routes were selected to be taken forward for further assessment. These were:

- Option 1/1B + NFS (north facing slips)
- Option 2A/2B
- Option 8/8B + J25
- Option 8/8B + NFS

3.2.7 All these options are similar in that from the area around West Hatch to Southfields roundabout, all the options maximise the use of the existing A358 route alignment. This means that the existing carriageway and associated features (structure, embankment or cutting) are extended with only small lengths where the second carriageway is created offline (but still in close proximity to the existing A358). Therefore, the southern section of the proposed alignment, for all options considered, interacts with Flood Zones 2 and 3 at the following locations:

- Meare Stream;
- Fivehead Rivers Main Channel 1
- Fiverhead Rivers Main Channel 2
- Venners Water
- River Ding and Back Stream

3.2.8 Furthermore, the existing A358 from West Hatch to Southfields roundabout crosses significant areas mapped as at risk from flooding based on RoFSW data set. The locations that are not also identified by Flood Zones are identified below:

- in the vicinity of Caplands
- in the vicinity of Fivehead River Tributary 5
- to the east of Ashill
- in the vicinity of Cad Brook

3.2.9 To the north of West Hatch existing constraints meant that all the options deviated from the existing A358 route alignment. All the route alignment options had to cross the extensive area of Flood Zone 2 and 3 related to the Black Brook and Broughton Brook as well as the RoFSW area along Thornwater Stream, in order to link in with the M5. Therefore, it has not been possible to identify a route alignment that is able to avoid Flood Zones 2 and 3 or the significant areas of surface water flooding identified by the RoFSW data set.

Exceptions test

3.2.10 Due to the placement of new sections of embankment within the Flood Zones associated with the Black Brook, Back Stream and River Ding, as well as the extension of existing embankments in Flood Zones and areas at high risk of surface water flooding associated with West Sedgemoor Main drain, Fivehead River, Venner's Water and Cad Brook, it is necessary to complete and satisfy the exception test.

3.2.11 This involves demonstrating the following:

- that the proposed scheme is safe for its lifetime without increasing flood risk elsewhere and where possible reduce flood risk overall.

- that the sustainability benefits to the community generated by the proposed scheme outweigh flood risk.

3.2.12 The demonstration that the proposed scheme is safe, and that flood risk is not increased elsewhere, will be provided in the FRA supporting the Environmental Statement (ES). This Preliminary FRA outlines the relevant information that is available at this time and documents information that will be available for the final FRA.

3.2.13 The sustainability benefits to the community generated by the proposed scheme are:

- improved connectivity between the South-East and South-West of England.
- a potential for an increase in local economic prosperity.
- reduced local congestion leading to a reduction in air pollution along the A358.
- a reduction in overall traffic through the Blackdown Hills Area of Outstanding Natural Beauty (AONB), as traffic preferentially uses the A358 to gain access to and leave the M5 motorway.

3.3 Baseline conditions

Flood risk from rivers and streams

3.3.1 The proposed scheme interacts with the rivers and streams identified in Table 3-9 and shown on Figure 13.1 Surface water courses and flood risk. These watercourses are described in detail in the following sections.

3.3.2 The initial tool to understand the baseline flood risk from rivers and streams is the Environment Agency's Flood Zoning. Where this does not exist RoFSW mapping, can be used as a proxy to determine potential fluvial flooding extents. This information is also shown in Figure 13.1 Surface water courses and flood risk and summarised in the descriptions below.

Broughton Brook/Black Brook

3.3.3 The Broughton Brook is a tributary of the River Tone located to the east of Taunton. The total catchment area is approximately 16 square kilometres (km^2) based on information obtained from the Flood Estimation Handbook (FEH) WebViewer. The main channel of the Broughton Brook is the Water Framework Directive (WFD) waterbody for GB108052015420 Broughton Brook (South and West Somerset).

3.3.4 The Broughton Brook's source is located at Staple Hill, on the northern edge of the Blackdown Hills, from a series of springs and flows northwards. The upper reaches of the catchment (up to the area around Shoreditch) is an area dominated by undeveloped agricultural land, although it is crossed by the B1370 and five small lanes and there are a number of small hamlets and farms within the upper reaches of the catchment such as Corfe, Orchard Portman and Shoreditch.

3.3.5 North of Shoreditch the nature of the catchment changes and it becomes more urbanised as it drains the south-eastern section of Taunton and includes a length of approximately 2.5km of the M5. The channel flows parallel to the M5 from Haydon Lane to its confluence with the River Tone.

3.3.6 South of junction 25 of the M5, the Broughton Brook interacts with a watercourse that flows from the west, through Taunton. Ordnance Survey (OS) mapping labels

this watercourse as the Black Brook and OS mapping indicates that it flows under the M5 into the Broughton Brook. The existing A358 bridge crossing of the Broughton Brook is indicated on OS mapping to be Blackbrook Bridge although, Somerset County Council (SCC) records indicate that this structure is called Black Brook new culvert. It is also spanned by a structure constructed as part of the Nexus development. No details of this structure are currently available.

3.3.7 Black Brook new culvert over Broughton Brook has a total width of 9.25m, with a central pier located within the channel. The height from bank to soffit is 4m.

3.3.8 Another watercourse channel, flowing in a north easterly direction is also labelled as the Black Brook on OS mapping. This is the watercourse of direct relevance to the proposed scheme. This channel is fed by a number of tributaries. These have been named Black Brook Tributary 1 to 6. The most significant of these are Black Brook Tributaries 1, 2 and 3. These tributaries are not crossed by the existing A358.

3.3.9 The existing A358 structure over Black Brook is a culvert, referred to as Black Brook old culvert within SCC records, with a width of approximately 4m and a height from bed to soffit of 2.5m.

3.3.10 The sources of Black Brook Tributary 1 are issues from land drainage and/or springs in the land north of Thurlbear and in the vicinity of Stoke St Mary. It has a catchment area of approximately 3.6km^2 up to the confluence with Black Brook Tributary 3.

3.3.11 The source of Black Brook Tributary 2 is land drainage represented by Black Brook Tributaries 5 and 6. The catchment of Black Brook Tributary 2 (including 5 and 6) is approximately 0.46km^2.

3.3.12 Black Brook Tributary 3 appears to originate from an ‘issue’ in the vicinity of Stoke Wood. This issue may be a groundwater spring. It is then complimented by additional sources in the vicinity of Henlade (issues from land drainage and potentially other groundwater sources). The catchment of Black Brook Tributary 3 is approximately 0.76km^2 up to the confluence with Black Brook Tributary 2.

3.3.13 The overall catchment area of all the Black Brook Tributaries, up to the proposed A358 is 5.01km^2.

3.3.14 There does not appear to be any link between the Broughton Brook and the Black Brook. The catchment directly feeding the Black Brook East (not including Black Brook Tributaries) is approximately 1.4km^2.

3.3.15 The WFD waterbody for GB108052015420 Broughton Brook (South and West Somerset) catchment includes the Broughton Brook channel from its source to the Tone, Black Brook West and Black Brook Tributaries 1 to 6. This accounts for a catchment of 27.29km^2 as indicated by the Environment Agency’s Catchment Data Explorer.

3.3.16 The channel labelled as the Black Brook from the A358 to the Tone is part of the WFD waterbody Tone Ds Taunton waterbody (GB108052015482).

3.3.17 The existing Flood Zone 2 extent associated with the Black Brook/Broughton Brook indicates a potential extensive flood plain along the eastern side of the M5 motorway up to the existing A358. The Flood Zone extends out approximately 300m in places from the M5.

3.3.18 The Flood Zone 2 extent associated with Black Brook Tributaries 1-6 is represented by an extensive area of potential flooding that extends out approximately 100m to the south of Black Brook Tributary 3. This extends to where the flood extent associated with the Black Brook tributaries meets the Black Brook/Broughton Brook flood extent.

3.3.19 The receptors identified within Flood Zone 2, within 1 km of the proposed route, associated with each individual watercourse within the Black Brook/Broughton Brook flooding cell are identified in Table 3.7. The existing A358 is identified as Essential Infrastructure, based on its existing classification and importance in a transport sense. However, following implementation of the proposed scheme the existing A358 will be reclassified and so its importance, at this location will be lowered to less vulnerable.

Thornwater Stream

3.3.20 Thornwater Stream is a watercourse located in the vicinity of Thornfalcon. It is unnamed on OS mapping but the name Thornwater Stream is indicated on local records. This watercourse is a tributary of the River Tone with its source in the vicinity of West Hatch from either land drainage or groundwater sources. It has a catchment area of approximately 2km^2 up to the existing A358 and a total catchment area of approximately 5.3km^2 up to the confluence with the River Tone located in the between Creech St Michael and Ham.

3.3.21 Thornwater Stream is part of the WFD waterbody, Tone Ds Taunton (GB108052015482).

3.3.22 The Thornwater Stream is conveyed under the existing A358 within a culvert. SCC records identify this structure as Thornwater culvert, with a width of 1.82m and a height of 1.2m.

3.3.23 There is no Flood Zone associated with Thornwater Stream. The RoFSW data set indicates that the stream's floodplain may extend out approximately 50m either side of the channel, south of the A358. In the vicinity of the A358 and downstream the extent of flooding is far more extensive. However, the distribution of the flooding indicates that this is related to surface water flowing towards the Thornwater Stream, not flood water escaping from the Thornwater Stream.

3.3.24 The receptors identified within the RoFSW mapped flood extent, associated with the Thornwater Stream, within 1 km of the proposed route , are identified in Table 3.7. The existing A358 is identified as essential infrastructure, based on its existing classification and importance in a transport sense. However, following implementation of the proposed scheme the existing A358 will be reclassified and so its importance, at this location will be lowered to less vulnerable.

Meare Stream

3.3.25 Meare Stream is the main channel from the south that feeds West Sedgemoor Main Drain and is identified as the waterbody within WFD catchment of the same name (GB108052015450). The West Sedgemoor Main Drain ultimately discharges into the River Parrett in between Stathe and Oathe.

3.3.26 This watercourse has a catchment area of approximately 3.3km^2 up to the existing A358.

3.3.27 The Meare Stream is conveyed under the existing A358 within a culvert, referred to as Culvert 1928 within SCC records. It is 1.5m diameter brick arch structure at the upstream extent. This has been extended by installing a 1.5m diameter concrete circular culvert.

3.3.28 The potential flooding extent, generated by the Meare Stream immediately upstream of the existing A358, as represented by Flood Zone 2, is approximately 200m either side of the channel. Downstream the extent of Flood Zone 2 far more constrained extending approximately 50m either side of the channel.

3.3.29 The receptors identified within Flood Zone 2, associated with Meare Stream, within 1 km of the proposed route, are identified in Table 3.7.

3.3.30 The Meare Stream is fed into by a tributary watercourse (Meare Stream Tributary 1) that is crossed by the A358 at Griffin Road overbridge. This is elevated above the watercourse by approximately 7m. This watercourse has a catchment area of approximately 1.2km^2 up to the existing A358.

3.3.31 There is no Flood Zone associated with Meare Stream Tributary 1. The RoFSW data set indicates that water stays contained within the channel at even the most extreme flood events in the vicinity of the existing A358 over bridge. However, downstream of the A358, the RoFSW extent increases significantly as the watercourse is crossed by Village Road.

3.3.32 The receptors identified within the RoFSW extent, associated with Meare Stream Tributary 1, within 1km of the proposed route, are identified in Table 3.7.

Fivehead River

3.3.33 The Fivehead River, stream network is comprised of two main channels (identified for this project as Fivehead River main channel 1 and Fivehead River main channel 2) that are indicated to be the WFD waterbody of the same name (GB108052015241). This network feeds the River Parret north-east of Midelney.

3.3.34 The sources of the Fivehead River network are springs and land drainage issues along the north and eastern edge of the Blackdown Hills.

3.3.35 Fivehead River main channel 1 is crossed by the existing A358 in the vicinity of Hatch Green and has a catchment area of approximately 16km^2 up to the existing A358.

3.3.36 Fivehead River main channel 1 is conveyed under the existing A358 within a culvert, referred to as Fivehead River Bridge within SCC records. It is a total width of 12m. Within that the channel has been channelised in concrete with a width at the top of bank of approximately 8m and a width at the bed of 3m. The headroom between the top of bank and the soffit is 2.7m. An accommodation track shares the bridge and occupies the left hand bank looking downstream. The accommodation track is approximately 3m wide from top of channel bank to the bridge abutment.

3.3.37 Fivehead River main channel 1 is fed by a number of tributaries. However, none of them interact directly with the existing A358 nor are they affected by the proposed scheme.

3.3.38 The potential flooding extent, generated by Fivehead River main channel 1, as represented by Flood Zone 2, is approximately 50m to the north of the channel

and approximately 100m to the south of the channel. The floodplain asymmetry is shown both up and downstream of the existing A358.

3.3.39 The receptors identified within Flood Zone 2, associated with Fivehead River main channel 1, within 1km of the proposed route, are identified in Table 3.2.

3.3.40 Fivehead River main channel 2 is crossed by the existing A358 to the southeast of Capland and has a catchment area of approximately 4.5km^2 up to the existing A358.

3.3.41 Fivehead River main channel 2 is conveyed under the existing A358 within a culvert. This is referred to as High Bridge within SCC records. It has the following dimensions, 2.7m high by 2.7m wide. An accommodation track is located alongside the river and passes under the A358 in a second culvert of the same size. There is evidence that the accommodation track culvert becomes inundated by flood waters from Fivehead River main channel 2 on a regular basis.

3.3.42 The potential flooding extent, generated by Fivehead River main channel 2, as represented by Flood Zone 2, only extends approximately 30m either side of the channel up and downstream of the existing A358.

3.3.43 The receptors identified within Flood Zone 2, associated with Fivehead River main channel 2, within 1km of the proposed route, are identified in Table 3.2.

3.3.44 Fivehead River main channel 2 is fed by a number of tributaries and three of them interact directly with the existing A358. Two of these watercourses are unnamed on OS mapping sources and no local names of these watercourses have been identified. For the purposes of the proposed scheme they are referred to as Fivehead River Tributary 3 and Fivehead River Tributary 5. The other one is Venner's Water.

3.3.45 Fivehead River Tributary 3 appears to begin to the west of the A358 and is conveyed under the A358 within a 900mm (millimetres) diameter circular culvert. It is also culverted under Village Road, the dimensions of the structure are to be confirmed.

3.3.46 Fivehead River Tributary 3 has a catchment area of approximately 0.8km^2 up to the confluence with Fivehead River main channel 2.

3.3.47 There is no Flood Zone associated with Fivehead River Tributary 3. The RoFSW data set indicates significant accumulation upstream of the existing A358 and in between the existing A358 and Village Road. However, these areas of flooding are assumed to be related to surface water and not considered to be related to the performance of the existing channel.

3.3.48 Downstream of the Village Road the RoFSW indicates flood waters may extend out to a distance of approximately 100m either side of Fivehead River Tributary 3.

3.3.49 The receptors identified within the RoFSW extent, associated with Fivehead River Tributary 3, within 1km of the proposed route, are identified in Table 3.2.

3.3.50 Fivehead River Tributary 5 appears to originate from an issue located approximately 400m to the south of the junction between the existing A358 and Folly Drove. It is conveyed under the A358 through a 900mm diameter circular culvert referred to as Folly culvert in SCC records. It has a catchment area of approximately 0.3km^2 up to the confluence with Fivehead River main channel 2, located approximately 300m downstream of the existing A358.

3.3.51 There is no Flood Zone associated with Fivehead River Tributary 5. The RoFSW data set indicates a potential flood extent of approximately 30m either side of the channel. The data set also indicates the existence of a significant overland flow path along Barrington Hill Road/Folly Drove that contributes to Fivehead River Tributary 5 immediately upstream of the A358. The receptors identified within the RoFSW extent, associated with Fivehead River Tributary 5, within 1km of the proposed route, are identified in Table 3.2.

3.3.52 There are local flooding concerns with the Fivehead River stream network, specifically Fivehead River main channel 1 and Fivehead River Tributary 3. This is related to a number of the local roads that are known to become impassable during storm events. The locations of key concern are existing watercourse crossing locations of Village Road and Stocks Lane.

3.3.53 Venner's Water is the major tributary of Fivehead River main channel 2. It has a catchment area of approximately 5.2km^2 up to the existing A358.

3.3.54 Venner's Water is crossed by an existing A358 by bridge. It is referred to as Venner's Bridge within SCC records. It is 8.5m wide with a height from top of bank to soffit of 3.65m. The channel under the structure is also man made; however, the engineered material has eroded and has provided some semi natural granular material within the channel.

3.3.55 A short distance upstream of this is a culvert that conveys Venner's Water under Ashill (local road). This structure is approximately 2.5m wide with a height from the bed, which has been engineered, to the soffit of the bridge of approximately 3.5m.

3.3.56 The potential flooding extent, generated by Venner's Water, as represented by Flood Zone 2, is indicated to be approximately 20m either side of the channel up to the point where a significant inflow joins the main channel. This is located approximately 300m upstream of the existing A358.

3.3.57 Downstream of this confluence, the flood extent gradually increases and reaches a maximum extent of approximately 150m upstream of the existing A358. Downstream of the existing A358 the extent is approximately 50m either side of the channel. The extent narrows to approximately 30m either side of the channel after approximately 750m and then increases to approximately 100m either side of the channel, approximately 1.6 km downstream of the existing A358.

3.3.58 The receptors identified within Flood Zone 2, associated with Venner's Water, within 1 km of the proposed route, are identified in Table 3.2.

3.3.59 There are local concerns regarding flooding in the settlement of Kenney related to Venner's Water.

Cad Brook

3.3.60 Cad Brook is a watercourse that crosses the existing A358 by Bridge to the north of the Cad Lane/A358 junction. The structure over the brook is referred to as Cad Bridge within SCC records. It has a width of 6.5m and a height from top of bank to soffit of 2.27m. The channel has been pushed to the right hand side of the channel and the bankside are on the left hand side is used as an access for livestock. Therefore, the channel is only approximately 2.5m wide and the right hand side abutment has replaced the bank on this side.

3.3.61 In the vicinity of this crossing, the Cad Brook is fed into by a network of drains. The exact interaction between the drainage network and the main channel of the Cad Brook is not currently fully understood. It is not known if the drainage network is conveyed under the A358 within a culvert or whether the drains feed into Cad Brook upstream of the existing Cad Brook crossing. This will be confirmed, the baseline updated and taken account of in the Final FRA and ES. At this stage the contribution of flow from this network into Cad Brook has been taken into account.

3.3.62 Cad Brook (and the associated drainage network) is part of the River Ding WFD waterbody (GB108052015180). This network joins the River Ding channel in the vicinity of Ilton, although it appears to retain the name Cad Brook (as shown on OS mapping). The watercourse then feeds the River Isle in the vicinity of South Brandon Farm, located approximately 2km to the north-east of the confluence between Cad Brook and the River Ding.

3.3.63 Cad Brook has a catchment area of approximately 2.2km^2 up to the existing A358, including the drainage network.

3.3.64 There is no Flood Zone associated with Cad Brook of the drainage network. The RoFSW data set indicates an extensive area of flooding extending approximately 100m either side of the Cad Brook channel and an equally extensive area of flooding associated with the Cad Brook drainage network. The RoFSW data set indicates that flood waters will then that funnel down to and flow over the A358 rather than using the existing bridge. The flood extent downstream of the existing A358 is indicated to be approximately 100m wide. However, there is a further surface water flow path indicated by the RoFSW data set. This conveys water along Broadway Road over the A358 on into Cad Brook. This flow path increases the extent of flooding to approximately 350m.

3.3.65 The receptors identified within Flood Zone 2, associated with Cad Brook, within 1km of the proposed route, are identified in Table 3.2.

River Ding and Back Stream

3.3.66 The source of the River Ding appears to be land drainage from the Dommet Moor area, located to the north east of Buckland St Mary. Downstream of the A358, in the vicinity of Ilton, the Cad Brook and the River Ding feed into one another. The watercourse downstream of the confluence retains the name Cad Brook on OS mapping. The watercourse then feeds the River Isle in the vicinity of South Brandon Farm, located approximately 2km to the north east of the confluence between Cad Brook and the River Ding.

3.3.67 The drainage network associated with the River Ding displays evidence of significant man made changes with a number of channels created. It is assumed that this is related to the construction of local mills and local land drainage issues.

3.3.68 Immediately upstream of the existing A358 the watercourse has been split in two.

3.3.69 A channel, referred to within the A358 project as the River Ding, passes underneath the A358 in a culvert. This structure is referred to as Ding Mill Culvert by SCC records.

3.3.70 The River Ding channel that passes through Ding Mill culvert, flows on to a confluence with Cad Brook in the vicinity of Ilton and on to the River Isle. This channel is the River Ding WFD waterbody (GB108052015180).

3.3.71 The other channel is crossed by the A358 supported on 'Ding Bridge'. This channel is indicated to be 'Back Stream' on OS mapping and so this name has been adopted within the proposed scheme. This channel flows in an arc around to the east and then the north parallel and in some locations very close to the River Isle. Eventually it flows into the Cad Brook and then almost immediately into the River Isle, in the vicinity of South Brandon Farm.

3.3.72 The Ding Mill culvert is a 1.8m diameter arched culvert, while Ding Bridge is 8.2m and has a height from bed to soffit of 5.25m.

3.3.73 When local catchment extents are examined using the FEH webviewer it indicates that the A358 crossing is the upstream extent of the Back Stream. This is despite the clear linkage between the River Ding and the Back Stream. This indicates how the natural interaction of the watercourses have been changed over time. However, the evolution of these changes cannot be tracked as the oldest historical map available (1887) indicates that the channel configuration shown now was already in place at that time.

3.3.74 The Back Stream downstream of the A358 crossing is part of a completely different WFD waterbody and is located within the Isle – Upper to conf Cad Bk waterbody (GB108052015190).

3.3.75 The catchment of the River Ding/Back Stream up to the A358 is approximately 11.4km^2. Based on the relative sizing of the structures it is thought that the majority of the water is diverted through Ding Bridge.

3.3.76 The potential flooding extent, generated by the River Ding/Back Stream, as represented by Flood Zone 2, indicates a very extensive area at risk of flooding up to approximately 400m in width extending across the network of channels upstream of the existing A358.

3.3.77 Downstream of the existing A358 the Flood Zone 2 extent indicates that all flood flows are directed down the Back Stream and it is slightly greater than upstream of the existing A358. In addition, there is an indication that the Back Stream flood extent combines with flooding generated by the River Isle.

3.3.78 The RoFSW data set has also been interrogated in terms of flooding along the River Ding downstream of Ding Mill culvert. This data set indicates that water is generally contained within in the channel although there is an area where flooding may be experienced approximately 200m downstream of the existing A358.

3.3.79 The receptors identified within Flood Zone 2, associated with River Ding/Back Stream, within 1 km of the proposed route, are identified in Table 3-2.

Flood risk from groundwater

3.3.80 The locations where there is potential for groundwater flooding have been identified based on the British Geological Surveys (BGS) groundwater flooding maps and records of historical flooding attributed to groundwater as reported in the Local Flood Risk Management Strategy, the Preliminary Flood Risk Assessment and Strategic Flood Risk Assessments of relevance.

3.3.81 The BGS groundwater flood mapping identifies the following risk categories:

- A = potential for groundwater to occur at the surface
- B = potential for groundwater flooding of property below ground level
- C = Limited potential for groundwater flooding to occur

3.3.82 The groundwater flood risk categories along the proposed scheme alignment (and associated infrastructure) have been identified by the proposed scheme chainage in Table 3-1 and are shown in Figure 13.2 Groundwater flooding susceptibility.

Table 3-1 Groundwater flood risk: baseline flood risk

Chainage (Ch) (from – to)	BGS flood risk category	Receptor and vulnerability
0+000 – 2+138	None	None
2+140 – 2245	C	Agricultural land (less vulnerable) A358 (essential infrastructure)
2+245 – 2+900	B	Stoke Road (less vulnerable) Residential properties along Stoke Road (more vulnerable) Agricultural land (less vulnerable) A358 (essential infrastructure)
2+900 – 3+950	C	Greenway Lane (less vulnerable) Agricultural land (less vulnerable) Glebe Cottages access road
3+950 – 4+160	B & C	Glebe Cottages access road (less vulnerable) Agricultural land (less vulnerable)
4+100 – 4+400	None and A	A358 and A378 (Langport Lane) (essential infrastructure)
4+400 – 4+560	None	None
4+560 – 5+820	C	A358 (essential infrastructure) Village Road (less vulnerable) West Hatch Lane (less vulnerable)
5+820 – 6+030	B	Agricultural land (less vulnerable) A358 (essential infrastructure)
6+030 - 6140	None	None
6140 – 6+500	A	A358 (essential infrastructure) Agricultural land (less vulnerable)
6+500 – 6+550	C	Griffin Lane (less vulnerable) A358 (essential infrastructure) Agricultural land (less vulnerable)
6+550 – 6+600	B	A358 (essential infrastructure) Agricultural land (less vulnerable)
6+600 – 6+900	A	A358 (essential infrastructure) Agricultural land (less vulnerable)
6+900 – 7+180	B	A358 (essential infrastructure)
7+180 – 7+980	A	A358 (essential infrastructure) Bickenhall Lane (less vulnerable)
7+980 – 8+200	C	A358 (essential infrastructure)
8+200 – 82+50	A	A358 (essential infrastructure)
8+250 – 8+400	C	A358 (essential infrastructure)
8+400 – 9+470	A (and C)	Village Road (less vulnerable) Staple Fitzpaine Road (less vulnerable) Capland Lane (less vulnerable) A358 (essential infrastructure)

Chainage (Ch) (from – to)	BGS flood risk category	Receptor and vulnerability
		Properties immediately adjacent to the A358(more vulnerable).
9+470 – 9+750	C	A358 (essential infrastructure) Folly Drove (less vulnerable)
9+750 – 9+900	B	A358 (essential infrastructure)
9+900 – 10+550	None	None
10+550 – 10+800	C (and small area of B)	Agricultural land (less vulnerable) A358 (essential infrastructure) Kenney Lane (less vulnerable)
10+800 – 12+260	None	None
12+260 – 12+820	C	Agricultural land (less vulnerable) A358 (essential infrastructure) Rapps Lane (less vulnerable) Thickthorn Lane (less vulnerable)
12+820 – 13+030	None	None
13+030 – 13+130	C	Agricultural land (less vulnerable) A358 (essential infrastructure)
13+130 – 13+640	B	Agricultural land (less vulnerable) A358 (essential infrastructure) Broadway Street (less vulnerable) Cad Road (less vulnerable) Road/track between A358 and Cad Road (less vulnerable)
13+640 – 13+730	C	Agricultural land (less vulnerable) A358 (essential infrastructure) Road/track between Horton Cross and A358 (less vulnerable)
13+730 – 14+400	None	None
14+400 – 14+634	B&C	Agricultural land (less vulnerable) A358 (essential infrastructure)

3.3.83 Table 3-1 shows that there is increased potential for groundwater flooding to occur between Ch2+245 – 2+900, Ch3+950 – 4+160 and Ch5+820 – 9+500, although this is interspersed with areas of lower potential risk. The receptors at risk are the existing A358, agricultural land and some residential and agricultural properties accessed from the A358 in the vicinity of Capland.

3.3.84 No definitive historical groundwater flooding incidents are described in the joint district councils' level 1 SFRA or SCC's PFRA.

Flood risk from surface water

3.3.85 The existing flood risk posed by surface water is characterised by the RoFSW mapping shown in Figure 13.1 Surface water courses and flood risk.

3.3.86 This highlights that the majority of the areas at risk of surface water flooding are associated with watercourses. Where the RoFSW extent is related to a watercourse the receptors affected are identified in Table 3-99.

3.3.87 However, the following locations are identified as at specific risk of surface water flooding. This accounts for areas identified by the RoFSW data set despite the

absence of a watercourse channel or areas where the RoFSW extent is significantly greater than the Flood Zone 2 extent:

1. In the vicinity of the existing Staple Fitzpaine Road/A358 junction and the Village Road/A358. Significant accumulation of surface water shown on south western side of the A358.
2. Across the A358 in an easterly direction from the area in vicinity of Park Barn Lane.

3.3.88 The locations in the list above have been determined to be areas of flooding generated by surface water only and the receptors are listed below.

3.3.89 The receptors associated with the RoFSW extent at the Staple Fitzpaine Road/A358 junction and the Village Road/A358 are:

- Staple Fitzpaine Road (less vulnerable)
- A358 (essential infrastructure)
- Village Road (less vulnerable)
- Residential property accessed from Village Road (more vulnerable)
- Agricultural Land (less vulnerable)

3.3.90 The receptors associated with the RoFSW extent from Park Barn Lane are:

- Park Barn Lane (less vulnerable)
- Agricultural Land (less vulnerable)
- Rapps Lane (less vulnerable)
- Copse Lane (less vulnerable)

Flood risk from infrastructure failure

3.3.91 There are no significant reservoir dams or other large, impounded water bodies that could put the proposed scheme at risk or which could be affected by the proposed scheme. However, the Flood Zone and the RoFSW shows that the extent of flooding upstream of the existing A358 is greater than the extent downstream at some of the existing watercourse crossing locations. This indicates that the existing A358 is holding flood water back at the following locations:

- Thornwater Stream
- Meare Stream
- Fivehead River Main channel 1
- Venner's Water
- Back Stream/River Ding

3.3.92 This indicates that the A358 is acting as an informal flood defence and that any changes to the existing conditions at the crossing points could have an effect on local flood risk characteristics.

3.3.93 Full details of existing A358 drainage assets and information related to water supply infrastructure located within or in proximity to the A358 will be assessed as part of the Final FRA and ES.

3.4 Scheme flood risk considerations

Flood risk from rivers and streams

3.4.1 Flood risk from rivers and stream is being considered in the design in order to ensure that the proposed scheme is safe from flooding and that the creation of the highway and any associated infrastructure will not increase flood risk elsewhere.

3.4.2 At this stage, the following analysis has been undertaken to inform the preliminary design decisions.

3.4.3 In the first instance the derived flood levels (see Column D in Table 3-99) have been applied to the design of watercourse crossing locations (existing and proposed). It has then been possible to understand how the flood levels correspond to soffits of proposed structures. This information is provided in Column H of Table 3-99.

3.4.4 The design standard for new structures spanning watercourses is for the soffit to be at least 600m above the flood level derived for the 1% AEP+CC flood level. This provides a freeboard above the design flow.

3.4.5 As the alignment of the proposed scheme is so closely linked to the alignment of the existing A358 this design standard may not be able to be achieved. Currently the design shows the following proposed structures do not achieve this design standard:

- Venner's Water
- Cad Brook
- Back Stream

3.4.6 These locations are all downstream of an existing structure which does not achieve this level of freeboard. Therefore, any build-up of debris and loss of capacity will occur at the existing structure.

3.4.7 This situation will be reviewed following the completion of the baseline fluvial modelling.

3.4.8 All the watercourses spanned or affected by the proposed scheme have been screened to determine the appropriate level of analysis required to inform the design and to ensure flood risk is adequately addressed. The screening process has been formulated to outline the level of analytical detail being undertaken for each watercourse. This is being developed in consultation with SCC acting as the Lead Local Flood Authority (LLFA).

3.4.9 The screening and approach to fluvial hydraulic modelling has used a risk based decision tree to determine which watercourses require fluvial hydraulic analysis (1D modelling). The results of the 1D analysis and the presence of high or more vulnerable receptors (as described in National Planning Policy Framework ((NPPF)) will then determine where detailed 1D/2D analysis will be undertaken.

3.4.10 The fluvial hydraulic analysis of watercourses is ongoing and will be reported in the Final FRA and ES. In advance of this information the design of the proposed scheme has progressed based on assumed and estimated information related to flood levels, the existing dimensions of the bridges and culverts and existing Flood Zone and RoFSW mapped flood extents.

3.4.11 Flood levels have been derived along the entire route based on the intersection of Flood Zone 2 extents and topographical survey data. Where Flood Zone 2 data is not available the RoFSW 1 in 1000 flood extent has been applied to topographical survey data. The derived flood levels are provided in Column D of Table 3-99.

3.4.12 For each watercourse that interacts with the proposed scheme an estimate of the flow generated for a range of annual probability floods up to an including the 1% annual exceedance probability (AEP) flood event including the appropriate allowance for climate change (1% AEP+CC) has been derived using the Revitalised Rainfall Runoff 2 (ReFH2) methodology and validated using the Flood Estimation Handbook (median annual flow rate [Qmed]) equation. The Qmed and the 1% AEP+CC flows are provided in Columns E and F of Table 3-99.

3.4.13 The sizing of the proposed structures, spanning the watercourses crossed by the proposed scheme, including extensions to existing structures has largely been based on matching the dimension of the existing structures that span the watercourses crossed by the existing A358 crossings.

3.4.14 The majority of these structures are upstream of the proposed scheme compared to the existing A358 watercourse crossing, which means the rate of water flowing downstream will be regulated by the existing structure, until the A358 is actually overtopped. Therefore, it is considered a valid sizing approach at this stage of the design and assessment process.

3.4.15 The exceptions to this are the Black Brook tributaries which are not currently spanned by the A358 and Thornwater Stream where the proposed crossing is upstream of the existing A358 culvert. The sizing of these culverts has been based on a Manning's equation to estimate a culvert capacity required to pass the full 1%+CC flow. The existing channel width and the need to provide a natural channel bed and bank and safe mammal passage has also been taken into consideration.

3.4.16 In addition, to the preliminary structure sizing process, the derived flood levels have been used to determine:

- The volume of existing Flood Zones 2 and 3 within proximity of the proposed scheme at the existing location of each proposed crossing, taking account of the levels at which flood storage is provided (see drawings HE551508-AEP-EWE-ZZ-DR-CD-000001 to 000008).
- The volume of Flood Zones 2 and 3 lost as part of the proposed scheme (construction of infrastructure within the Flood Zones, occupying land currently used as flood storage) taking, taking account of the levels at which flood storage is currently provided.
- Proposed floodplain compensation. The proposed compensation areas are currently only based on the maximum area required to fulfil the volume of storage. (see drawings HE551508-AEP-EWE-ZZ-DR-CD-000101 to 000108).

3.4.17 These two preliminary design approaches will likely prevent any changes in fluvial flood risk as a result of the proposed scheme in locations with a Flood Zone and so all watercourse crossing locations are deemed as having a negligible impact on flood risk levels, extent and hazard at this stage of the assessment process.

3.4.18 The fluvial hydraulic modelling will inform the final design of the proposed structures spanning watercourses and other infrastructure located in close

proximity to watercourses. It will also be used to determine the final area, volume and location of flood compensation.

3.4.19 Fluvial hydraulic modelling will also be used to refine the design of the proposed watercourse realignments and diversions.

3.4.20 Full details of the fluvial hydraulic modelling of the baseline and with scheme scenarios will be provided in the Final FRA and ES and this information will quantify any impacts generated by the proposed scheme in terms of flood level, flood extents and hazard.

Flood risk from groundwater

3.4.21 Flood risk from groundwater is being considered in the design in order to ensure that the proposed scheme is safe from flooding and that the creation of the highway and any associated infrastructure will not increase flood risk elsewhere.

3.4.22 At this stage, the preliminary scheme design has been compared to the BGS groundwater flood mapping categories as described in Paragraph 3.3.10.

3.4.23 This indicates two areas of where groundwater flooding characteristics have the potential to be altered by the proposed scheme due to modest extent of the cutting within areas identified as either at risk of flooding occurring at the surface (A) or to below ground structures (B); these are at the Stoke Road Cutting and at Mattock's Tree Green junction.

3.4.24 This is most likely to affect the construction stage with the potential for groundwater seepage to occur during excavation and so dewatering activities may be required to enable the works to be undertaken safely. These activities will be undertaken in accordance with the relevant environmental safeguards to ensure that this does not affect the wider environment and will be accounted for in the Final ES.

3.4.25 Seepage from cutting slopes is being taken into account in the drainage design and will be informed by the appropriate analysis.

3.4.26 At this stage of the design and assessment process, the impact of the proposed scheme on groundwater flood risk is considered to be negligible.

Flood risk from surface water

3.4.27 Flood risk from surface water is being considered in the preliminary scheme design in order to ensure that the proposed scheme is safe from flooding, that routine highway runoff does not increase in terms of rate and volume and the creation of the any infrastructure associated with the proposed scheme will not increase flood risk elsewhere, unless that is intended (flood compensation or flood storage).

3.4.28 This will include providing the following:

- A sustainable drainage system (SUDS) based drainage strategy.
- The provision of cross drainage structures to retain existing surface flow paths (this is in addition to structures related to watercourses, as discussed in Paragraphs 3.4.1 – 3.4.20).
- Features such as cut off ditches, detention basins and berms, if required, to prevent the creation of new surface water flow paths inundating areas of land

not currently affected by surface water flooding, with a specific focus on more vulnerable receptors and existing accesses.

Drainage strategy

3.4.29 The proposed drainage strategy has been developed by undertaking the following process:

- Identify existing surface water catchments their receptors;
- Providing infrastructure to collect and convey surface water runoff generated by the following:
  - hardstanding created by the proposed dualling of the A358 (mainline)
  - embankments and cutting slopes associated with the mainline
  - additional hardstanding or changes to ground level introduced as a result of other offline design features changes (including junctions, local roads and access arrangements)
- Providing infrastructure to store surface water runoff (attenuation basins and ditches).

3.4.30 Attenuation features have been sized based on determining existing rates of surface water runoff from each surface water catchment for a range of annual exceedance probability events. It is then proposed to base the rate of discharge on the calculated mean flood (Qbar). The existing discharge rates have been calculated using the UKSuds website [1], which applies the Institute of Hydrology (IH) calculation methodology developed as part of the report IH124 – Flood Estimation for Small Catchments. However, this method has been amended for use in the derivation of greenfield runoff rates where the catchments are less than 50 hectares. This calculation process has determined a scheme wide Qbar of 5.06 l/s/ha. This has been applied as the limiting runoff rates in all surface water catchments except those discharging to the River Tone. This is because the LLFA have advised that this catchment is subject to a specific risk of flooding as a result of development within the catchment. Therefore, they have imposed a limit of 2 l/s/ha.

3.4.31 When determining the of surface water runoff the hierarchy of discharge, as outlined in NPPF has been taken into consideration. This has determined that existing watercourses are the most appropriate receptors. This is because the local ground conditions are likely to limit the ability for surface water to infiltrate effectively. Infiltration testing will be undertaken to inform the final design. However, it is not proposed to prevent surface water ingress to ground from the proposed attenuation features. Therefore, long-term storage has not been considered in the preliminary scheme design, although infiltration has not been accounted for in the sizing of the attenuation features.

3.4.32 It is proposed to undertake infiltration testing along the route as part of the ground investigation. These tests will be undertaken in accordance with BRE365 and the results of these tests considered as the drainage strategy is further developed.

3.4.33 The details of the drainage strategy are provided in the following drawings: HE551508-ARP-HDG-ML A358 Z-DR-CD-000001 to 000009.

Broughton Brook catchment

3.4.34 As part of the proposed scheme, it is necessary to undertake works on the M5 at junction 25. These works increase hardstanding and so it is proposed to implement two new surface water attenuation tanks, one under the verge of the southern exit slip (60m^3) and one along the verge of the northern access slip. It is also proposed to increase the size of an existing tank located under the existing roundabout by 100m^3. This additional attenuation will ensure the existing rate of discharge from this area to the Broughton Brook is maintained.

Black Brook catchment

3.4.35 The works required within the Black Brook catchment includes:

- Reconfiguration of the existing roundabout and the associated access road that facilitates access to the Nexus 25 development.
- A new southern access road from the Nexus 25 roundabout.
- A new section of dual carriageway through the floodplain of the Black Brook and its tributaries on a shallow embankment.

3.4.36 These works require a surface water management system to ensure the rate and volume of surface water discharges to the Black Brook is maintained. This will ensure that the flood risk from surface water within the Black Brook catchment is not increased. On the drainage design general arrangement drawings this catchment is referred to as Network 1.

3.4.37 The existing areal extent of the overall Black Brook catchment and the tributary sub catchments has been identified and used to guide drainage design decisions to prevent transfer surface water between adjacent catchments.

3.4.38 The operation of the surface water management system within the Black Brook catchment is described below and within Table 3-2.

3.4.39 The additional surface water generated by the Nexus 25 roundabout will be managed by increasing the size of an existing attenuation tank located under the existing Nexus 25 roundabout.

3.4.40 Surface water generated by the new section of dual carriageway up to Ch1+350 will also be conveyed to the attenuation tank within the Nexus 25 roundabout. This tank will be increased in size by 1,250m^3. This tank will discharge into Black Brook via an existing outfall.

3.4.41 Surface water flows from the proposed scheme will be regulated to 2l/s/ha in accordance with SCC LLFA requirements for watercourses that contribute to the River Tone catchment. However, in small sub-catchments, where the resulting flow is less than 5 l/s (litres per second) flows will be restricted to a rate that can be maintained without regular blockage occurring. Therefore, the minimum flow from any sub catchment is 5 l/s.

Table 3-2 Surface water management details for the Black Brook catchment

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
N1-B1	0.419	398	5	New southern access carriageway from the Nexus 25 roundabout.

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
				Discharges to the Black Brook via an existing drainage ditch that will have to be culverted under the main carriageway.
N1-B2	1.103	1746	5	The mainline section of the proposed scheme from Ch1+350 to Ch1+750. This is discharged to the Black Brook at the confluence between Tributary 1 and 3.
N1-B3	3.729	2858	7.5	Mainline section of the proposed scheme. Discharges into the Black Brook Tributary 3 upstream of the proposed channel diversion
N1-B4	2.773	3007	5.5	Mainline section of the proposed scheme. Discharges into Black Brook Tributary 2 immediately downstream of the proposed new culvert via a drain along the toe of embankment
ST-B1	0.08	210	TBC	Discharges into existing highway drainage system. Assumed to discharge to Black Brook
ST-B2	0.1	180	TBC	Discharges into existing highway drainage system. Assumed to discharge to Black Brook

3.4.42 Small transfers of water between the tributary watercourses are enforced as a result of the proposed scheme within the Black Brook catchment. This is as a result of the diversion of Black Brook Tributary 3. However, it is proposed to retain a surface water connection into the existing Black Brook Tributary 3. This causes a very small increase in catchment contributing to Black Brook Tributary 2. The impact of this change is considered negligible in terms of flood risk on the less vulnerable flood risk receptors associated with Black Brook Tributary 2.

3.4.43 There is no transfer of surface water from Black Brook catchment into or from the adjacent catchments.

Thornwater Stream catchment

3.4.44 The works required within the Thornwater Stream catchment includes:

- A new section of dual carriageway (Approximate Ch2+950m to Ch4+250).
- The western half of the access roads off of Mattocks Tree junction.

3.4.45 These works require a surface water management system to ensure the rate and volume of surface water discharges to the Thornwater Stream is maintained. This will ensure that the flood risk from surface water within the Thornwater Stream catchment is not increased.

3.4.46 On the drainage design general arrangement drawings this catchment is referred to as Network 2.

3.4.47 The existing areal extent of the Thornwater Stream has been identified and used to ensure that proposed scheme does not transfer surface water between adjacent catchments.

3.4.48 The operation of the surface water management system within the Thornwater Stream catchment is described in Table 3-3.

Table 3-3 Surface water management details for the Thornwater Stream catchment

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
N2-B1	0.772	575	5	Mainline sub-catchment. Discharges into realigned channel downstream of proposed new culvert
N2-B2	0.313 plus the outfall rate from N2-B3	2724	5	Mainline sub-catchment. N2-B3 cascades into N2-D2 and discharges into existing, retained channel downstream of proposed new culvert
N2-B3	3.56	2724	7	(see above)
N2-B4	2.083	1832	5	Mainline sub-catchment. Discharges into ditch along toe of embankment and into realigned channel upstream of proposed new culvert.
MT-B1	2.09	1150	5	Mattock Tree Green junction sub catchment Outfalls into Thornwater Stream as it flows along edge of existing feature (abandoned railway/canal?)
MT-B2	0.75	800	5	Mattock Tree Green junction sub catchment Connects back to existing highway drainage system. Assumes to connect to Thornwater Stream
MT-B3	0.7	770	5	Mattock Tree Green junction sub catchment Connects back to existing highway drainage system. Assumes to connect to Thornwater Stream

Meare Stream catchment

3.4.49 The works required within the Thornwater Stream catchment includes:

- A new section of dual carriageway (approximate Ch4+250 to Ch7+600).
- The eastern half of the access roads off of Mattock's Tree Green junction.
- Access road to the Somerset Progressive School.
- Village Road link.
- Bickenhall Lane overbridge.

3.4.50 These works require a surface water management system to ensure the rate and volume of surface water discharges to the Meare Stream and Meare Stream Tributary 1 is maintained. This would ensure that the flood risk from surface water within the Meare Stream catchment is not increased.

3.4.51 On the preliminary scheme drainage design general arrangement drawings this catchment is referred to as Network 3.

3.4.52 The existing areal extent of the Meare Stream and Meare Stream Tributary 1 catchments has been used to ensure that the proposed scheme does not transfer surface water between adjacent catchments. This information will be provided on

the final drainage design drawings, used to support the final ES. However, within the Meare Stream catchment the existing A358 is elevated on a high viaduct over Meare Stream Tributary 1 and Griffin Lane. This means that the southern boundary of the existing highway surface water catchment contributing to Meare Stream Tributary 1 is approximately 400m further south than indicated by the natural catchment extent.

3.4.53 The proposed surface water management system has been developed based on the topography of the proposed scheme, which reflects the existing highway surface water catchments. This means there may be surface water transfer from the natural catchment of Meare Stream Tributary 1 to the Meare Stream. As flows are being strictly controlled to greenfield discharge rates the impact of this, in terms of flood risk will likely be negligible.

3.4.54 The operation of the surface water management system within the Meare Stream catchment is described in Table 3-4.

Table 3-4 Surface water management details for the Meare Stream catchment

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
MT-B4	1.64	1150	8.2	Somerset Progressive School access road. Discharges to Meare Stream
N3-B1	7.07ha	597	None	Mainline sub-catchment. Unrestricted connection to N3-B2 and then into Meare Stream
N3-B2	4.47	3464	37.1	Mainline sub-catchment. Operates in conjunction with N3-B1. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha (litres per second per hectare). Discharges to Meare Stream
N3-B3	2.13	1688	10.8	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Meare Stream
N3-B4	4.87	3608	25.4	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Meare Stream
N3-B5	2.59	1932	13.1	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Meare Stream. Natural catchment information indicates that approx. 0.8ha of the catchment would naturally contribute to Meare Stream Tributary 1.
N3-B6	2.38	1539	12	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Meare Stream Tributary 1.
BL-B1	0.3	120	5	Works to Bickenhall Lane on the eastern side of the A358 as part of the realignment and overbridge. Discharges to Meare Stream Tributary 1.

Fivehead River catchment

3.4.55 The works required within the Fivehead River catchment includes:

- A new section of dual carriageway (Approximate Ch7+600 to Ch10+000).
- The western half of the Bickenhall Lane realignment and overbridge.
- Hatch Beauchamp junction and associated works to the overbridge, Village Road, Staple Fitzpaine Road and Hatch Beauchamp.

3.4.56 These works require a surface water management system to ensure the rate and volume of surface water discharges to the Fivehead River and the tributary watercourses is maintained. This will ensure that the flood risk from surface water within the Fivehead River catchment is not increased.

3.4.57 On the drainage design general arrangement drawings this catchment is referred to as Network 4.

3.4.58 The existing areal extent of the Fivehead River sub-catchments have been used to guide the preliminary scheme drainage design and try and prevent transfer between adjacent catchments.

3.4.59 This indicates that Fivehead River Main channel 2 may receive surface water inflows that currently discharge to Fivehead River Tributary 5. This is considered a negligible impact on the less vulnerable receptors associated with Fivehead River Main Channel 2 downstream of the proposed scheme. However, there is no transfer of water from the overall Fivehead River catchment to adjacent catchments

3.4.60 The operation of the surface water management system within the Fivehead River catchment is described in Table 3-5.

Table 3-5 Surface water management details for the Fivehead River sub-catchments

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
BL-B2	0.8	340	5	Outfalls to Fivehead River Main Channel 1 via ditch along toe of embankment
N4-B1	1.56	1304	7.9	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Fivehead River Main Channel 1 via short length of kerb drain.
N4-B2	2.545	1894	12.9	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Fivehead River Tributary 3. This maintains the existing sub-catchment.
HB-B1	1.0	380	5	Works to Village Road as part of Hatch Beauchamp junction. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Fivehead River Main Channel 1. This maintains the existing sub-catchment.

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
HB-B2	1.56	1180	5	Works to Hatch Beauchamp Road East as part of the junction. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Fivehead River Tributary 3.
HB-B3	0.26	120	5	Works to Staple Fitzpaine Road as part of Hatch Beauchamp junction. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Fivehead River Tributary 3. This maintains the existing sub-catchment.
N4-B3	1.57	1070	7.9	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Fivehead River Main Channel 2
N4-B4	1.59	1526	8.1	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Fivehead River Main Channel 2. Inspecting natural catchment extents indicates that this catchment may currently discharge to Fivehead River Tributary 5.

Venner's Water catchment

3.4.61 The works required within the Venner's Water catchment includes:

- A new section of dual carriageway (Approximate Ch10+000 to Ch11+500.
- Stewley link from Stewley Lane to Ch11+500.

3.4.62 These works require a surface water management system to ensure the rate and volume of surface water discharges to the Venner's Water is maintained. This will ensure that the flood risk from surface water within the Venner's Water catchment is not increased.

3.4.63 On the preliminary scheme drainage design general arrangement drawings this catchment is referred to as Network 5.

3.4.64 The existing areal extent of the Venner's Water sub-catchments have been used to ensure that the proposed scheme does not transfer surface water between adjacent catchments.

3.4.65 The operation of the surface water management system within the Venner's Water catchment is described in Table 3-6.

Table 3-6 Surface water management details for the Venner's Water sub-catchments

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
N5-B1	1.28	1030	6.4	Mainline sub-catchment.

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
				Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Venner's Water in combination with features N5-B2, SL-B1 and SL-B2 downstream of Venner's Bridge.
N5-B2	1.15	2180	6.2	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Venner's Water in combination with features N5-B1, SL-B1 and SL-B2 downstream of Venner's Bridge.
SL-B1	1.46	510	7.4	Stewley Link Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Venner's Water in combination with features N5-B1, N5-B2, and SL-B2 downstream of Venner's Bridge.
SL-B2	0.48	250	5	Stewley Link Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Venner's Water in combination with features N5-B1, N5-B2, and SL-B1 downstream of Venner's Bridge.
N5-B3	0.76	990	5	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Venner's Water approximately 1km downstream of Venner's Bridge in combination with features N5-B4 and SL-B3
N5-B4	1.32	1240	6.4	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Venner's Water, approximately 1km downstream of Venner's Bridge, in combination with N5-B3 and SL-B3.
SL-B3	0.69	350	5	Stewley Link Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Venner's Water, approximately 1km downstream of Venner's Bridge, in combination with features N5-B4 and SL-B3.

Cad Brook catchment

3.4.66 The works required within the Cad Brook catchment includes:

- A new section of dual carriageway (Approximate Ch11+500 to Ch13+500).
- Stewley link from Stewley Lane to Ch11+500.
- Ashill junction and associated local road connections.

3.4.67 These works require a surface water management system to ensure the rate and volume of surface water discharges to the Cad Brook is maintained. This will ensure that the flood risk from surface water within the Cad Brook catchment is not increased.

3.4.68 On the preliminary scheme drainage design general arrangement drawings this catchment is referred to as Network 6.

3.4.69 The existing areal extent of the Fivehead River sub-catchments have been used to guide the drainage design and try and prevent transfer between adjacent catchments.

3.4.70 The proposed surface water management system potentially diverts surface water from the River Isle drainage network catchment into the Cad Brook. This affects the mainline of the proposed scheme from Ch11+500 to Ch12+250 and accounts for approximately 1ha, which is less than 1% of the total catchment of Cad Book and so is considered negligible. However, there are more vulnerable receptors located in close proximity to Cad Brook, within 1km of the proposed scheme. Therefore, there is still a risk that this small change could increase flood risk to these properties.

3.4.71 The proposed highway alignment makes facilitating a drainage design that replicates existing surface water flow conditions very challenging. Therefore, it is assumed that the drainage design will not be able to be amended. However, the following stages of are to be informed by detailed topographical survey data. This will improve understanding of the linkage between the existing A358, the Cad Brook and River Isle catchments. This will allow a mitigation strategy to be developed to ensure that any additional volume of discharges to the Cad Brook does not result in an increase in flow rate for any given storm event and that flood risk along the Cad Brook does not increase.

3.4.72 This change in surface water catchment will also reduce the overall water balance in the upper reaches of the River Isle catchment. This is considered in the main PEI Report.

3.4.73 The operation of the surface water management system within the Cad Brook catchment is described in Table 3-7.

Table 3-7 Surface water management details for the Cad Brook sub-catchments

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
N6-B1	0.19	500	5	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Cad Brook at shared outfall with AJ-B1, N6-B1 to B5, BL-B1 to B3. Outfall located downstream of Cad Bridge
N6-B2	3.44	3320	17.2	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Cad Brook at shared outfall with AJ-B1, N6-B1 to B5, BL-B1 to B3. Outfall located downstream of Cad Bridge

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
N6-B3	3.66	2950	18.3	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Cad Brook at shared outfall with AJ-B1, N6-B1 to B5, BL-B1 to B3. Outfall located downstream of Cad Bridge
N6-B4	0.97	2040	5	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Cad Brook at shared outfall with AJ-B1, N6-B1 to B5, BL-B1 to B3. Outfall located downstream of Cad Bridge
N6-B5	1.89	2050	9.45	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Cad Brook at shared outfall with AJ-B1, N6-B1 to B5, BL-B1 to B3. Outfall located downstream of Cad Bridge
BL-B1	0.3	650	5	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Cad Brook at shared outfall with AJ-B1, N6-B1 to B5, BL-B1 to B3. Outfall located downstream of Cad Bridge
BL-B2	1.49	850	7.45	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Cad Brook at shared outfall with AJ-B1, N6-B1 to B5, BL-B1 to B3. Outfall located downstream of Cad Bridge
BL-B3	0.86	500	5	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Cad Brook at shared outfall with AJ-B1, N6-B1 to B5, BL-B1 to B3. Outfall located downstream of Cad Bridge
AJ-B1	1.066	540	5.3	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Cad Brook at shared outfall with AJ-B1, N6-B1 to B5, BL-B1 to B3. Outfall located downstream of Cad Bridge
SL-B4	0.83	520	5	Stewley link Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to River Isle drainage network at shared outfall with SL-B5 and AJ-B2
SL-B5	0.5	200	5	Stewley link Maximum flow rate based on calculated Qbar of 5.06 l/s/ha.

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
				Discharges to River Isle drainage network at shared outfall with SL-B5 and AJ-B2
AJ-B2	1.6	690	8.1	Stewley link Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to River Isle drainage network at shared outfall with SL-B5 and AJ-B2
AJ-B3	0.5	310	5	Stewley link Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to River Isle Drainage network

River Ding and Back Stream catchments

3.4.74 The works required within the River Ding and Back Stream catchment includes:

- A new section of dual carriageway (Ch13+500 to Ch14+634).
- Broadway Street link.

3.4.75 These works require a surface water management system to ensure the rate and volume of surface water discharges to the River Ding and Back Stream is maintained. This will ensure that the flood risk from surface water within the River Ding and Back Stream catchment is not increased.

3.4.76 On the preliminary scheme drainage design general arrangement drawings this catchment is referred to as Network 7.

3.4.77 The existing areal extent of the River Ding and Back Stream sub-catchments have been used to ensure that proposed scheme does not transfer surface water between adjacent catchments.

3.4.78 The operation of the surface water management system within the River Ding and Back Stream catchment is described in Table 3-8.

Table 3-8 Surface water management details for the River Ding and Back Stream sub-catchments

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
N7-B1	0.9	1810	5	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to River Ding downstream of Ding Mill culvert
N7-B2	0.29	800	5	Mainline sub-catchment. Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Back Stream via existing highway drainage network. Linked to existing basin N7-B3
N7-B4	1.96	3200	9.3	Mainline sub-catchment.

Feature reference	Catchment area (hectares)	Attenuation volume (m^3)	Runoff rate (l/s)	Comments
				Maximum flow rate based on calculated Qbar of 5.06 l/s/ha. Discharges to Back Stream via existing highway drainage network

3.4.79 The implementation of this strategy ensure that all surface water is captured, conveyed and stored in a way that prevents surface water runoff generated by the proposed scheme from causing flood risk elsewhere.

Cross drainage structures

3.4.80 All existing cross drainage structures that are less than 1.8m diameter are considered drainage infrastructure. Where these have been identified to cross under the existing A358 an equivalent structure has been provided. This ensures existing surface water flow paths are maintained along the proposed scheme.

3.4.81 However, in one within the Cad Brook catchment a significant surface water flow path has been identified that appears to flow across the existing A358 or surface water generated by this flow path is intercepted by the mainline drainage network and conveyed downstream. There is no existing cross drainage structure for this flow path.

3.4.82 This flow path is disrupted by the proposed mainline and Ashill junction. Therefore, it is proposed to collect surface water generated in this area in cut off ditches and transport it to Cad Brook. This represents an area of catchment transfer from the River Isle drainage network catchment into the Cad Brook. This has the potential to increase peak flow rates in the Cad Brook. The impact of this is considered in the assessment of the preliminary scheme drainage design within the Cad Brook catchment as it is part of the same issue.

3.4.83 Table 3-9 presents the baseline information for fluvial flood risk and with proposed scheme considerations.

Table 3-9 Fluvial flood risk: baseline information and with proposed scheme considerations

A Watercourse name	B Crossing location (chainage and NGR) Existing (E) Proposed (P)	C Catchment (km^2)	D EA Flood Zone (FZ) or RoFSW and Flood Level (mAOD)	E QMED	F Q1%+CC	G Structure name Existing (E) Proposed (P)	H Structure dimensions (existing and proposed) Width (m) Height (m) Soffit (mAOD)	L Receptors and vulnerability
Broughton Brook (Black Brook new culvert)	No Chainage as not within proposed scheme boundary E: 325617, N: 124779	16	FZ Not assessed As not in scheme proposed boundary	6.8	29.9	(E) Black Brook new culvert	(E) 9.25m 4m Soffit not available but not affected by proposed scheme (E) Nexus crossing - no details available but not affected by proposed scheme	Not identified as not in the proposed scheme boundary
Black Brook (Black Brook old culvert	No Chainage as not within proposed scheme boundary E: 325600, N: 124800	5	FZ 12.5	1.7	7.9	(E) Black Brook old culvert	(E) 4m 2.5m Soffit not available but not affected by proposed scheme	See below for receptors related to Black Brook.
Black Brook crossing at Nexus 25 roundabout	Ch0+900 E: 325772, N: 124545	5	FZ 12.5	1.7	7.9	Nexus 25 roundabout crossing of Black Brook	(E) No details available Structure to be reconfigured	Nexus 25 development (when construction complete) (less vulnerable) A358 (Essential Infrastructure) Agricultural land less vulnerable

A Watercourse name	B Crossing location (chainage and NGR) Existing (E) Proposed (P)	C Catchment (km^2)	D EA Flood Zone (FZ) or RoFSW and Flood Level (mAOD)	E QMED	F Q1%+CC	G Structure name Existing (E) Proposed (P)	H Structure dimensions (existing and proposed) Width (m) Height (m) Soffit (mAOD)	L Receptors and vulnerability
								Residential properties in Ruishton near confluence between Back Brook and River Tone (more vulnerable)
Black Brook Tributary 1	(P) Ch1+300 E: 326000, N: 124300	3.6	FZ 12.54	0.6	2.6	(P) Black Brook culvert 1	(P) 6.0m 3.5m 14.31m AOD	Haydon Lane (less vulnerable) Leisure recreation land (Swingrite golf centre) (less vulnerable Agricultural land (less vulnerable)
Black Brook Tributary 2	(P) Ch1+800 E: 326337, N: 123876	0.46	FZ 13.7	0.15	0.71	(P) Black Brook culvert 2	(P) 6.0m 3.0m 14.88m AOD	Agricultural land (less vulnerable)
Black Brook Tributary 3	(P) Ch2+000 E: 326552, N: 123769	0.76	FZ 14.2	1.3	6.01	No culvert. Channel being diverted into Black Brook Tributary 1	No structure proposed. Diversion into Black Brook Tributary 2	Properties along Stoke Road (more vulnerable) Stoke Road (less vulnerable) Agricultural land (less vulnerable)
Thornwater Stream	(E & P) Ch3+050 E: 327600, N: 123700	2	RoFSW 18.75m AOD	0.7	3.0	(E) Thornwater culvert (P) Thornwater new culvert	(E) 1.82m 1.2m (P) 4m	Residential properties accessed from Greenway Lane (more vulnerable) Greenway Lane (less vulnerable)

A Watercourse name	B Crossing location (chainage and NGR) Existing (E) Proposed (P)	C Catchment (km^2)	D EA Flood Zone (FZ) or RoFSW and Flood Level (mAOD)	E QMED	F Q1%+CC	G Structure name Existing (E) Proposed (P)	H Structure dimensions (existing and proposed) Width (m) Height (m) Soffit (mAOD)	L Receptors and vulnerability
							3m 19.35m AOD	Residential properties access from Thorn Lane (more vulnerable) Thorn Lane (less vulnerable) Agricultural land (less vulnerable) A358 (essential infrastructure)
Meare Stream	(E & P) Ch5+700 E: 329241, N: 121565	3.3	FZ 22.48	0.8	3.6	(E) Culvert 1928 (P) New Culvert 1928	(E) 1.5m brick arch (P) 1.5m brick arch Soffit to be confirmed	West Hatch Lane (less vulnerable) Agricultural land (less vulnerable) Residential properties access from West Hatch Road (more vulnerable) West Hatch Lane and junction with Village Road (less vulnerable)
Meare Stream Tributary 1	(E & P) Ch6+550 E: 329400, N: 120800	1.2	RoFSW Not determined	0.5	2.1	Griffin Lane underbridge	(E) 3-span reinforced concrete bridge River: flows under central span. Span approximately 15m wide.	Residential properties accessed from Griffin Lane near junction with Village Road (more vulnerable) Griffin Lane and Village Road (less vulnerable) Residential properties accessed from Oldway Lane (more vulnerable)

A Watercourse name	B Crossing location (chainage and NGR) Existing (E) Proposed (P)	C Catchment (km^2)	D EA Flood Zone (FZ) or RoFSW and Flood Level (mAOD)	E QMED	F Q1%+CC	G Structure name Existing (E) Proposed (P)	H Structure dimensions (existing and proposed) Width (m) Height (m) Soffit (mAOD)	L Receptors and vulnerability
							Approximately 5m above existing ground level. (P) Extension of existing structure	Oldway Lane (less vulnerable) Agricultural land (less vulnerable)
Fivehead River main channel 1	(E & P) Ch8+200 E: 329714, N: 119291	TBC	FZ 49.33	9.3	39	Fivehead river underbridge	(E) 12m wide 2.7m high 50.01m AOD (P) 12m wide 2.7m high 49.96m AOD	Residential properties accessed from New Road (more vulnerable) New Road (less vulnerable) Residential properties accessed from Village Road (more vulnerable) Village Road (less vulnerable) Agricultural land (less vulnerable) A358 (essential infrastructure)
Fivehead River Tributary 3	NA		RoFSW Flood level not determined	NA	NA	Not named	900mm diameter circular culvert to be extended	Village Road (less vulnerable) Stocks Lane (less vulnerable) Agricultural land (less vulnerable)
Fivehead River main channel 2	(E & P) Ch9+500	TBC	FZ 39.9	3.3	13.9	(E) High Bridge Underbridge	(E) 2.7m square box.	Agricultural land and buildings at Windsor Farm (less vulnerable)

A Watercourse name	B Crossing location (chainage and NGR) Existing (E) Proposed (P)	C Catchment (km^2)	D EA Flood Zone (FZ) or RoFSW and Flood Level (mAOD)	E QMED	F Q1%+CC	G Structure name Existing (E) Proposed (P)	H Structure dimensions (existing and proposed) Width (m) Height (m) Soffit (mAOD)	L Receptors and vulnerability
	E: 330820, N: 118351					(P) High Bridge Underbridge North	Another culvert immediately adjacent that accommodates walkway which takes flood flows (P) 6m wide 4m high 42.09	Residential properties accessed from Stewley Lane (more vulnerable) Stewley Lane (less vulnerable) Agricultural land (less vulnerable) A358 (essential infrastructure)
Fivehead River Tributary 5	(E & P) Ch9+650 E: 330820, N: 118351	TBC	RoFSW 41.1	0.4	2.25	Folly Main culvert	900mm diameter circular culvert to be extended	Agricultural land (less vulnerable) Folly Drove (less vulnerable) A358 (essential infrastructure)
Venner's Water	(E & P) Ch10+550 E: 331600, N: 117900	5.2	FZ 42.73	4.2	17.2	(E) Venner's Bridge (P) Venner's Bridge extension Venner's Bridge Stewley link	(E & P) Channel 8.5m wide 3.65m high 41.81 (extension to match existing) 41.88 (Stewley link)	Wood Road (less vulnerable) Residential properties at Kenny (more vulnerable) A358 (essential infrastructure)
River Isle drainage network	None	1.1	RoFSW	NA	NA	NA	NA	Agricultural lane (less vulnerable)

A Watercourse name	B Crossing location (chainage and NGR) Existing (E) Proposed (P)	C Catchment (km^2)	D EA Flood Zone (FZ) or RoFSW and Flood Level (mAOD)	E QMED	F Q1%+CC	G Structure name Existing (E) Proposed (P)	H Structure dimensions (existing and proposed) Width (m) Height (m) Soffit (mAOD)	L Receptors and vulnerability
Cad Brook drainage network	(E & P) Ch12+850 E: 333184, N: 116557	Included in Cad Brook	RoFSW 40.31	Included in Cad Brook	Included in Cad Brook	Culvert under A358	Details to be confirmed by topographical survey	Residential properties accessed from Thickthorn Lane (more vulnerable) A358 (essential infrastructure) Cad Lane (less vulnerable) Lane between Cad Lane and Rapps Lane (less vulnerable) Agricultural land (less vulnerable)
Cad Brook	(E & P) Ch12+950 E: 333200, N: 116950	2.2	RoFSW 40.31	1.8	7.3	(E) Cad Brook Bridge (P) Cad Brook Bridge extension (P) Broadway Street link	(E & P) 6.5m wide 2.4m high 40.66m AOD for the Cad Bridge extension and 40.75m AOD for the Broadway Street link	Residential properties accessed from Cad Road (more vulnerable) Cad Road (less vulnerable) Residential properties accessed from Butts Lane (more vulnerable) Butts Lane (less vulnerable A358 (essential infrastructure) Agricultural land (less vulnerable)
River Ding	(E & P) Ch13+800 E: 333599, N: 115774	11.4 (up to River Ding/Back Stream split see main	FZ 40.57	6.5 (up to River Ding/Back Stream split see	25.6 (up to River Ding/Back Stream split see	(E) Ding Mill culvert (P) Ding Mill culvert extension	(E & P) 1.8m wide 2.8m high	Residential properties accessed from Suggs Lane (more vulnerable) A358 (essential infrastructure)

A Watercourse name	B Crossing location (chainage and NGR) Existing (E) Proposed (P)	C Catchment (km^2)	D EA Flood Zone (FZ) or RoFSW and Flood Level (mAOD)	E QMED	F Q1%+CC	G Structure name Existing (E) Proposed (P)	H Structure dimensions (existing and proposed) Width (m) Height (m) Soffit (mAOD)	L Receptors and vulnerability
		text for description)		main text for description)	main text for description)			Agricultural land (less vulnerable) Road/track between Horton Cross and A358 (less vulnerable) A358 (essential infrastructure)
Back Stream	(E & P) Ch14+000 E: 333700, N: 115700	11.4 (up to River Ding/Back Stream split)	FZ 40.04	See above	See above	(E) Ding Bridge eastbound (P) Ding Bridge westbound	(E) Channel 8.2m wide 5.2m High (P) 8.2m wide 5.2m High 39.4m AOD	A358 (essential infrastructure) A303 (essential infrastructure) Agricultural land (less vulnerable)
River Isle	NA		FZ	NA	NA	NA	NA	A303 (essential infrastructure) Station Road (less vulnerable) Residential properties (more vulnerable) Commercial properties (less vulnerable)

[Note: mAOD = metres Above Ordnance Datum]

3.5 Consultation

3.5.1 At the start of the project data requests and requests for consultation were circulated to Environment Agency, SCC acting as the LLFA and IDBs.

3.5.2 As the majority of the watercourses are Ordinary watercourses consultation regarding flood risk has been focused on the SCC LLFA.

3.5.3 Consultation has included two virtual meetings held on 14 April 2021 and 21 June 2021. In these meetings the following subjects have been discussed:

- Proposed scheme introduction
- Programme and timescales
- Assessment approach and methodologies, including approach to fluvial hydraulic modelling
- Surface water management and drainage design including SCC's specific design criteria
- Operation and maintenance

3.5.4 Engagement with the Environment Agency is ongoing but is primarily focused on water quality, biodiversity and geomorphology. Flood risk issues affecting 'Main Rivers' will be discussed with Environment Agency although, at this time, flood risk issues associated with the proposed scheme affecting 'Main Rivers' have not been identified.

3.5.5 The Somerset Drainage Board Consortium has been contacted and they have responded outlining that the area of the proposed scheme does not directly affect the area managed by any of the IDBs.

3.6 Summary and conclusions

3.6.1 This Preliminary FRA presents the baseline and the existing flood risk characteristics based on Environment Agency's Flood Zone, RoFSW and groundwater susceptibility mapping.

3.6.2 This information and the route selection process has been used to inform a preliminary sequential and exception test to inform the statutory consultation process.

3.6.3 The baseline information has then been compared to the design of the proposed scheme and key following flood risk considerations have been identified:

- Proposed watercourse crossings have been compared to preliminary flood levels. Soffits of the Venner's Water, Cad Brook and Back Stream are below the preliminary flood level or there is not 600mm freeboard between the soffit and the flood level. However, these structures are downstream of existing structures with soffits at the same level or lower and so these structures will not increase flood risk or lower resilience to flood risk.
- Proposed watercourse crossings have been designed to match existing upstream structures or designed to accommodate the 1%+CC flow, based on preliminary calculations. Floodplain compensation has been provided at all watercourse crossings where required. The preliminary scheme design will ensure flood risk associated with these crossings is unchanged. This will be assessed in detail at the next stage of design and assessment through fluvial hydraulic modelling.

- The surface water management strategy has been developed to maintain existing rates and volumes to existing surface water receptors. However, there are three locations where small changes in sub-catchment areas may occur. These are considered negligible impacts and can be addressed through minor changes to the design. However, a potential change in the catchment area of the Cad Brook is more difficult to address and so alternative mitigation may be required. This will involve analysis of the detailed topographical survey, provision of additional volume storage in the system and additional hydraulic analysis of the linkage between the surface water and hydraulic systems.

References

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[3] Somerset West & Taunton and South Somserset Councils, “Joint Level 1 Strategic Flood Risk Assessment,” July 2019. [Online]. Available: https://www.southsomerset.gov.uk/media/2462/joint-level-1-sfra-final.pdf.

Figures

DO NOT SCALE

Millimetres 0 10 100

SHRUBBERY FARM

JORDAN'S SHELL GROTTO

CAD ROAD

EXISTING WATERCOURSE

RIVER DING

BROADWAY ROAD

FLOOD ZONE 2

FLOOD ZONE 3

HORTON CROSS

ILMINSTER SERVICES

SOUTHFIELDS ENTERPRISE PARK

A303

FLOOD CELL 1 - RIVER DING
EXISTING FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		15663	19193
2	0.20	0.40		17321	15867
3	0.40	0.60		13961	12728
4	0.60	0.80		12200	10152
5	0.80	1.00		13153	7555
6	1.00	1.20		9023	5341
7	1.20	1.40		9262	3596
8	1.40	1.60		6548	1906
9	1.60	1.80		2289	1052
10	1.80	2.00		596	806
11	2.00	2.20		418	710
12	2.20	2.40		400	630
13	2.40	2.60		492	541
14	2.60	2.80		420	448
15	2.80	3.00		696	343
16	3.00	3.20		522	213
17	3.20	3.40		369	129
18	3.40	3.60		323	55
19	3.60	3.80		114	9
20	3.80	4.00		10	1
21	4.00	4.20		0	0

FLOOD CELL 1: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 32-41m

EXISTING FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT,
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	11/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	11/08/21	CLIENT APPROVED	HL	JR	CE	SV

AUTH10

Suitability: A3

Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI

ARUP RAMBOLL

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: FLOOD CELL 1 - RIVER DING
EXISTING FLOOD VOLUMES

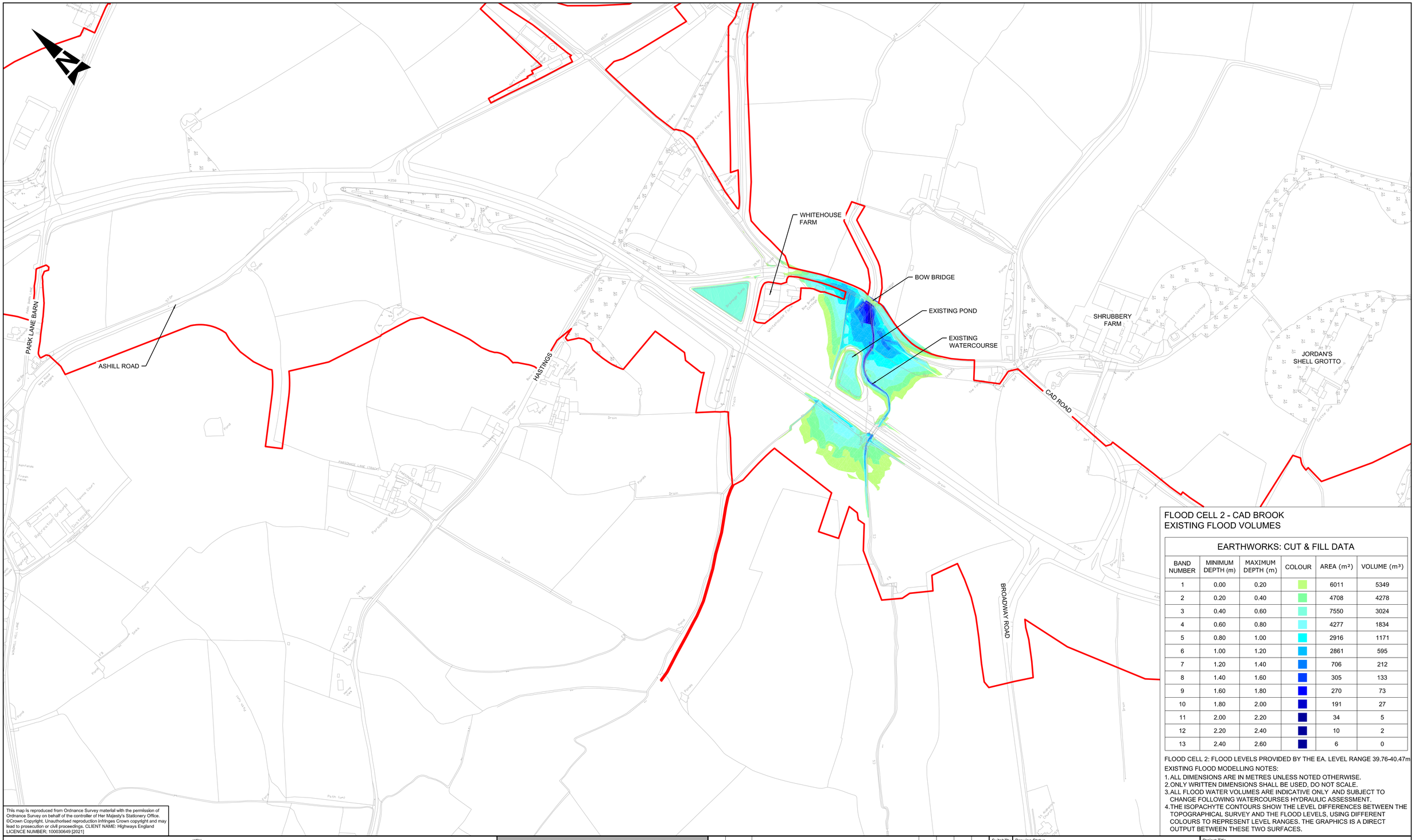
Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	**Date**	**Date**	**Date**	**Date**
A1	11/08/21	11/08/21	11/08/21	12/08/21

Drawing Number: HE551508 - ZZ | ARP - EWE - DR - CD - 000008
(Location | Originator | Volume | Type | Role | Number)

Revision: C01

DO NOT SCALE

Millimetres 0 10 100



FLOOD CELL 2 - CAD BROOK
EXISTING FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		6011	5349
2	0.20	0.40		4708	4278
3	0.40	0.60		7550	3024
4	0.60	0.80		4277	1834
5	0.80	1.00		2916	1171
6	1.00	1.20		2861	595
7	1.20	1.40		706	212
8	1.40	1.60		305	133
9	1.60	1.80		270	73
10	1.80	2.00		191	27
11	2.00	2.20		34	5
12	2.20	2.40		10	2
13	2.40	2.60		6	0

FLOOD CELL 2: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 39.76-40.47m

EXISTING FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	11/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	11/08/21	CLIENT APPROVED	HL	JR	CE	SV

AUTH10

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI
ARUP RAMBOLL

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: FLOOD CELL 2 - CAD BROOK EXISTING FLOOD VOLUMES

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	Date	Date	Date	Date
A1	11/08/21	11/08/21	11/08/21	12/08/21

Drawing Number: HE551508 - ZZ | ARP - EWE - DR - CD - 000007
(HE PIN | Originator | Volume | Location | Type | Role | Number)

Revision: C01

Millimetres 100 10 0

DO NOT SCALE

STEWLEY

STEWLEY LANE

VENNER'S WATER

EXISTING WATERCOURSE

PORTERS BARN ACCESS

VENNER'S BRIDGE

STEWLEY CROSS PARK

WOOD ROAD

FOLLY DROVE

FLOOD ZONE 2

FLOOD ZONE 3

FLOOD CELL 3 - VENNERS WATER
EXISTING FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		9707	17805
2	0.20	0.40		9366	15850
3	0.40	0.60		9277	14018
4	0.60	0.80		10913	12039
5	0.80	1.00		10344	9805
6	1.00	1.20		7253	8089
7	1.20	1.40		5810	6799
8	1.40	1.60		5622	5653
9	1.60	1.80		4526	4618
10	1.80	2.00		3978	3786
11	2.00	2.20		3475	3044
12	2.20	2.40		3116	2397
13	2.40	2.60		2734	1806
14	2.60	2.80		2254	1294
15	2.80	3.00		1924	881
16	3.00	3.20		1134	565
17	3.20	3.40		700	402
18	3.40	3.60		597	266
19	3.60	3.80		390	172
20	3.80	4.00		246	110
21	4.00	4.20		233	60
22	4.20	4.40		170	22
23	4.40	4.60		29	2

FLOOD CELL 3: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 40.85-42.79m

EXISTING FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	11/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	11/08/21	CLIENT APPROVED	HL	JR	CE	SV

AUTH10

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI
ARUP RAMBOLL

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: FLOOD CELL 3 - VENNERS WATERS EXISTING FLOOD VOLUMES

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size: A1	Date: 11/08/21	Date: 11/08/21	Date: 11/08/21	Date: 12/08/21

Drawing Number: HE PIN | Originator | Volume
HE551508 - ARP - EWE
ZZ - DR - CD - 000006
Location | Type | Role | Number

Revision: C01

DO NOT SCALE

Millimetres 0 10 100

CAPLAND LINK

CAPLAND ORCHARD

CAPLAND LANE

EXISTING POND

EXISTING WATERCOURSE

FOLLY DROVE

MEADOW VIEW

FLOOD ZONE 2

FLOOD ZONE 3

FOREST DROVE

PORTERS BARN ACCESS

STEWLEY LANE

VENNER'S WATER

VENNER'S BRIDGE

STEWLET CROSS PARK

FLOOD CELL 4 - RIVER FIVEHEAD TRIBUTARY EXISTING FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		2768	2676
2	0.20	0.40		2270	2164
3	0.40	0.60		1975	1735
4	0.60	0.80		2519	1296
5	0.80	1.00		1286	905
6	1.00	1.20		1034	676
7	1.20	1.40		1116	471
8	1.40	1.60		804	260
9	1.60	1.80		262	166
10	1.80	2.00		209	118
11	2.00	2.20		169	80
12	2.20	2.40		135	53
13	2.40	2.60		144	23
14	2.60	2.80		20	7
15	2.80	3.00		15	4
16	3.00	3.20		10	1
17	3.20	3.40		1	0

FLOOD CELL 4: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 39.8-41.1m

EXISTING FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	11/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	11/08/21	CLIENT APPROVED	HL	JR	CE	SV

AUTH10

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI
ARUP RAMBOLL

Client: highways england

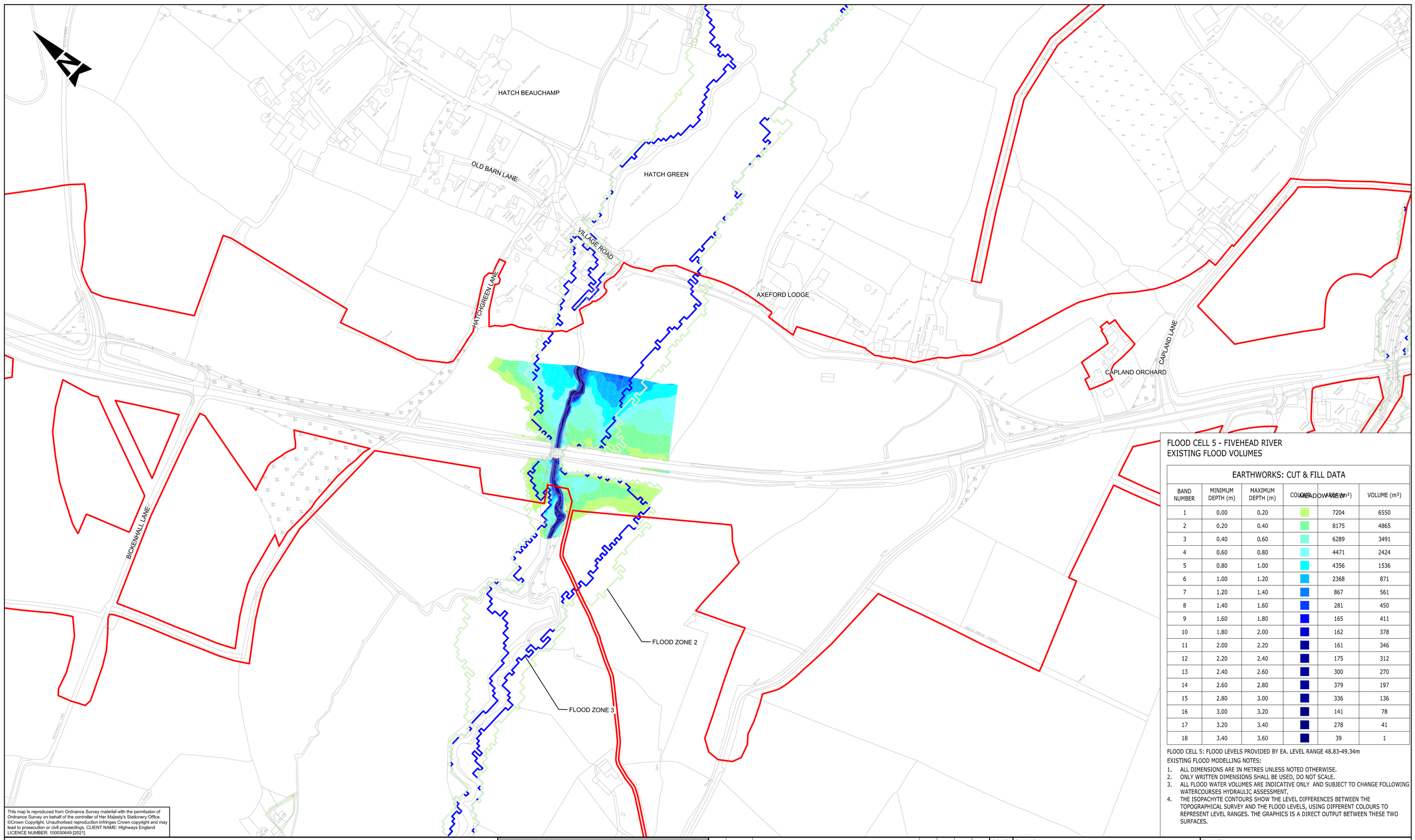
Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: EXISTING FLOOD CELL 4 FIVEHEAD TRIBUTARY

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	Date	Date	Date	Date
A1	11/08/21	11/08/21	11/08/21	12/08/21

Drawing Number: HE PIN HE551508 - Originator ARP - Volume EWE - Location ZZ - Type DR - Role CD - Number 000005

Revision: C01



NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	11/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	11/08/21	CLIENT APPROVED	HL	JR	CE	SV

FLOOD CELL 5 - FIVEHEAD RIVER
EXISTING FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		7204	6550
2	0.20	0.40		8175	4865
3	0.40	0.60		6289	3491
4	0.60	0.80		4471	2424
5	0.80	1.00		4356	1536
6	1.00	1.20		2368	871
7	1.20	1.40		867	561
8	1.40	1.60		281	450
9	1.60	1.80		165	411
10	1.80	2.00		162	378
11	2.00	2.20		161	346
12	2.20	2.40		175	312
13	2.40	2.60		300	270
14	2.60	2.80		379	197
15	2.80	3.00		336	136
16	3.00	3.20		141	78
17	3.20	3.40		278	41
18	3.40	3.60		39	1

FLOOD CELL 5: FLOOD LEVELS PROVIDED BY EA. LEVEL RANGE 48.83-49.34m

EXISTING FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: EXISTING FLOOD CELL 5
FIVEHEAD RIVER

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	Date	Date	Date	Date
A1	11/08/21	11/08/21	11/08/21	12/08/21

Drawing Number: HE551508 - ZZ - ARP - EWE - DR - CD - 000004
(HE PIN | Originator | Volume | Location | Type | Role | Number)

Revision: C01

DO NOT SCALE

Millimetres 0 10 100

MEARE GREEN

MEARE COURT FARM

MEARE ELM FARM

VILLAGE ROAD

DISMANTLED RAILWAY

SOMERSET PROGRESSIVE SCHOOL

NIGHTINGALE FARM

WEST HATCH LANE

FLOOD ZONE 3

FLOOD ZONE 2

HURFORD'S PLANTATION

FLOOD CELL 6 - SEDGEMOORE MAIN DRAIN
EXISTING FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		10496	24092
2	0.20	0.40		11563	21929
3	0.40	0.60		14802	19229
4	0.60	0.80		12553	16510
5	0.80	1.00		10818	14153
6	1.00	1.20		10303	12058
7	1.20	1.40		7826	10144
8	1.40	1.60		5505	8899
9	1.60	1.80		6186	7694
10	1.80	2.00		6864	6471
11	2.00	2.20		7270	5017
12	2.20	2.40		8820	3433
13	2.40	2.60		5313	1971
14	2.60	2.80		3407	1121
15	2.80	3.00		2016	575
16	3.00	3.20		836	280
17	3.20	3.40		288	189
18	3.40	3.60		220	140
19	3.60	3.80		206	94
20	3.80	4.00		232	59
21	4.00	4.20		127	15
22	4.20	4.40		18	0

FLOOD CELL 6: FLOOD LEVELS PROVIDED BY EA. LEVEL RANGE 20.6-22.5m

EXISTING FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT,
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	11/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	11/08/21	CLIENT APPROVED	HL	JR	CE	SV

AUTH10

Suitability: A3

Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI

ARUP RAMBOLL

Client: highways england

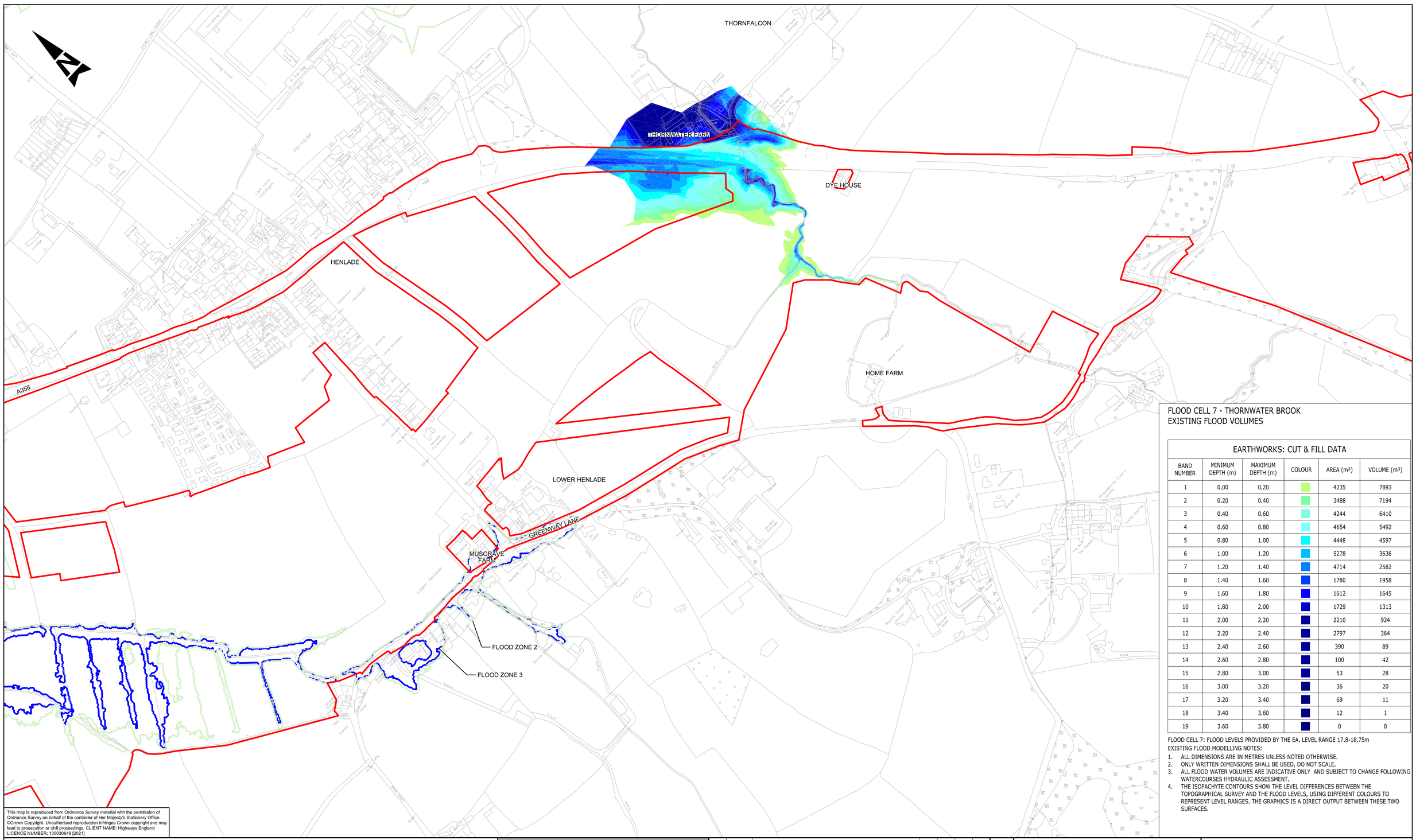
Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: EXISTING FLOOD CELL 6 SEDGEMOORE MAIN DRAIN

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	**Date**	**Date**	**Date**	**Date**
A1	11/08/21	11/08/21	11/08/21	12/08/21

Drawing Number: HE551508 - ZZ | ARP - EWE - DR - CD - 000003 (Location | Originator | Volume | Type | Role | Number)

Revision: C01



FLOOD CELL 7 - THORNWATER BROOK
EXISTING FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		4235	7893
2	0.20	0.40		3488	7194
3	0.40	0.60		4244	6410
4	0.60	0.80		4654	5492
5	0.80	1.00		4448	4597
6	1.00	1.20		5278	3636
7	1.20	1.40		4714	2582
8	1.40	1.60		1780	1958
9	1.60	1.80		1612	1645
10	1.80	2.00		1729	1313
11	2.00	2.20		2210	924
12	2.20	2.40		2797	364
13	2.40	2.60		390	89
14	2.60	2.80		100	42
15	2.80	3.00		53	28
16	3.00	3.20		36	20
17	3.20	3.40		69	11
18	3.40	3.60		12	1
19	3.60	3.80		0	0

FLOOD CELL 7: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 17.8-18.75m
EXISTING FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENTS
- FLOOD ZONE 2 EXTENTS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	11/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	11/08/21	CLIENT APPROVED	HL	JR	CE	SV

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: EXISTING FLOOD CELL 7 THORNWATER BROOK

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	Date	Date	Date	Date
A1	11/08/21	11/08/21	11/08/21	12/08/21

Drawing Number: HE551508 - ZZ - ARP - DR - EWE - CD - 000002
(Location | Originator | Type | Volume | Role | Number)

Revision: C01

DO NOT SCALE

Millimetres 0 10 100

RUISHTON

WOODLANDS CASTLE

BROOKFIELD FARM

RUISHTON LANE

A358

TAUNTON GATEWAY
PARK AND ROUTE

CAMBRIA FARM

M5 MOTORWAY

A358 TONEWAY

BROUGHTTON BROOK

FLOOD ZONE 2

FLOOD ZONE 3

FLOOD CELL 8 - BLACK BROOK
EXISTING FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		70595	43466
2	0.20	0.40		100291	26831
3	0.40	0.60		42610	10734
4	0.60	0.80		16142	5808
5	0.80	1.00		8560	3217
6	1.00	1.20		3136	2234
7	1.20	1.40		2649	1626
8	1.40	1.60		1330	1257
9	1.60	1.80		1032	1017
10	1.80	2.00		1195	785
11	2.00	2.20		750	606
12	2.20	2.40		808	452
13	2.40	2.60		1205	227
14	2.60	2.80		128	117
15	2.80	3.00		146	88
16	3.00	3.20		119	68
17	3.20	3.40		97	43
18	3.40	3.60		127	15
19	3.60	3.80		38	1

FLOOD CELL 8: FLOOD LEVELS PROVIDED BY EA. LEVEL RANGE 11.8-14.2m

EXISTING FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	11/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	11/08/21	CLIENT APPROVED	HL	JR	CE	SV

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI
ARUP RAMBOLL

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: EXISTING FLOOD CELL 8 BLACK BROOK

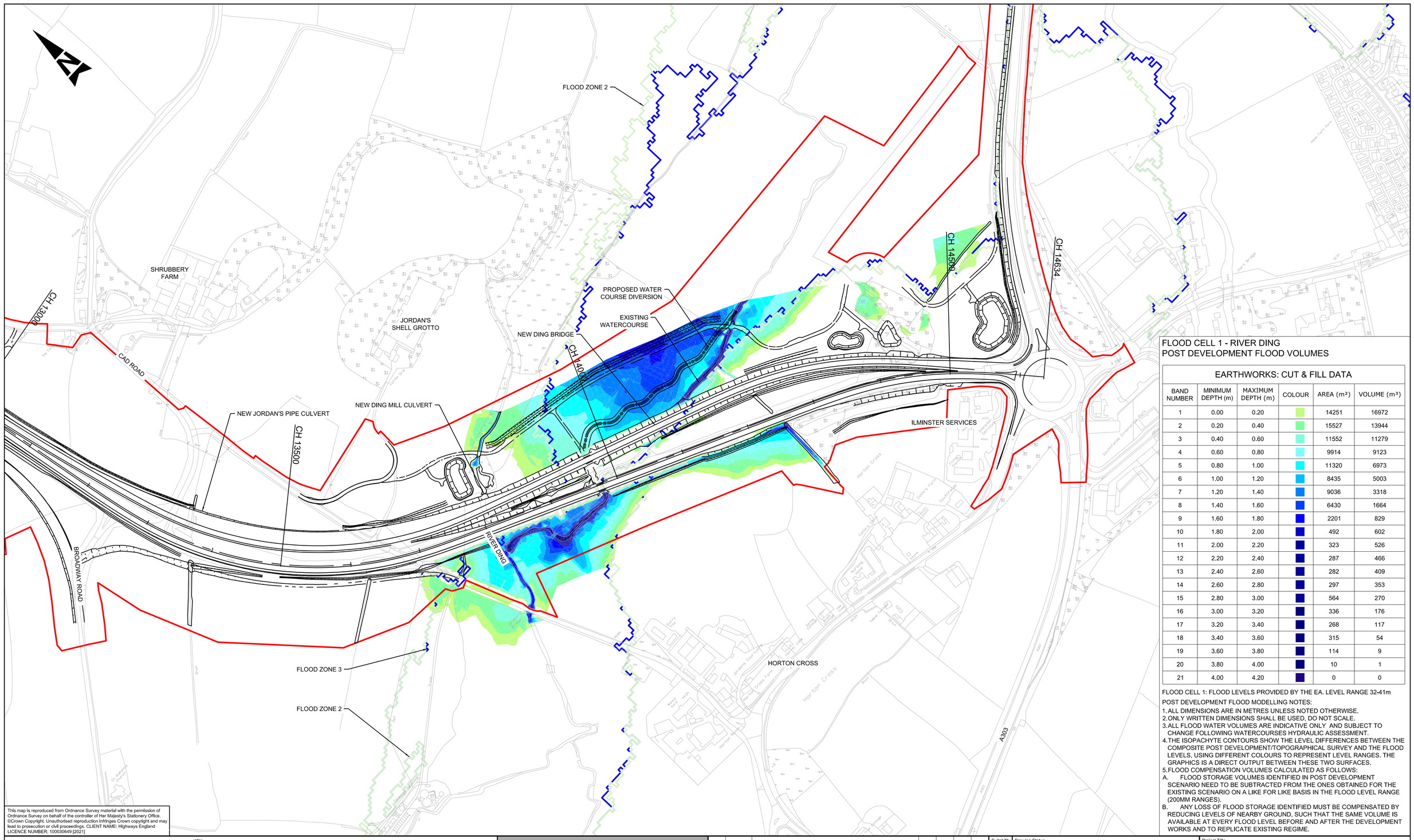
Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	**Date**	**Date**	**Date**	**Date**
A1	11/08/21	11/08/21	11/08/21	12/08/21

Drawing Number: HE PIN | Originator | Volume
HE551508 - ARP - EWE
ZZ - DR - CD - 000001
Location | Type | Role | Number

Revision: C01

DO NOT SCALE

Millimetres 0 10 100



FLOOD CELL 1 - RIVER DING
POST DEVELOPMENT FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		14251	16972
2	0.20	0.40		15527	13944
3	0.40	0.60		11552	11279
4	0.60	0.80		9914	9123
5	0.80	1.00		11320	6973
6	1.00	1.20		8435	5003
7	1.20	1.40		9036	3318
8	1.40	1.60		6430	1664
9	1.60	1.80		2201	829
10	1.80	2.00		492	602
11	2.00	2.20		323	526
12	2.20	2.40		287	466
13	2.40	2.60		282	409
14	2.60	2.80		297	353
15	2.80	3.00		564	270
16	3.00	3.20		336	176
17	3.20	3.40		268	117
18	3.40	3.60		315	54
19	3.60	3.80		114	9
20	3.80	4.00		10	1
21	4.00	4.20		0	0

FLOOD CELL 1: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 32-41m

POST DEVELOPMENT FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE COMPOSITE POST DEVELOPMENT/TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.
5. FLOOD COMPENSATION VOLUMES CALCULATED AS FOLLOWS:
   A. FLOOD STORAGE VOLUMES IDENTIFIED IN POST DEVELOPMENT SCENARIO NEED TO BE SUBTRACTED FROM THE ONES OBTAINED FOR THE EXISTING SCENARIO ON A LIKE FOR LIKE BASIS IN THE FLOOD LEVEL RANGE (200MM RANGES).
   B. ANY LOSS OF FLOOD STORAGE IDENTIFIED MUST BE COMPENSATED BY REDUCING LEVELS OF NEARBY GROUND, SUCH THAT THE SAME VOLUME IS AVAILABLE AT EVERY FLOOD LEVEL BEFORE AND AFTER THE DEVELOPMENT WORKS AND TO REPLICATE EXISTING REGIME.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	12/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	12/08/21	CLIENT APPROVED	HL	JR	CE	SV

AUTH10

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI
ARUP RAMBOLL

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: FLOOD CELL 1 - RIVER DING
POST DEVELOPMENT FLOOD VOLUMES

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	Date	Date	Date	Date
A1	12/08/21	12/08/21	12/08/21	12/08/21

Drawing Number: HE PIN | Originator | Volume
HE551508 - ARP - EWE - DR - CD - 000108
Location | Type | Role | Number

Revision: C01

DO NOT SCALE

Millimetres 0 10 100

CH 12000

CB-EXISTING POND 4
RELOCATED, SAME DEPTH AND VOLUME AS EXISTING. PONDS IS FOR HIGHWAYS DRAINAGE ONLY. (NOT FLOOD COMPENSATION)
NOTE: POST DEVELOPMENT CONTOURS DO NOT INCLUDE NEW POND LEVELS, SO IS INDICATIVE ONLY IN THIS LOCATION)

WHITEHOUSE FARM

BOW BRIDGE

SHRUBBERY FARM

CH 13000

EXISTING WATERCOURSE

CAD ROAD

BROADWAY ROAD

CB-AREA1
AREA 3683m²

PARK LANE BARN

ASHILL JUNCTION OVERBRIDGE

ASHILL ROAD

HASTINGS

FLOOD CELL 2 - CAD BROOK
POST DEVELOPMENT FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		5440	4630
2	0.20	0.40		3666	3720
3	0.40	0.60		5787	2782
4	0.60	0.80		3991	1785
5	0.80	1.00		2825	1146
6	1.00	1.20		2814	586
7	1.20	1.40		680	209
8	1.40	1.60		303	133
9	1.60	1.80		270	73
10	1.80	2.00		191	27
11	2.00	2.20		34	5
12	2.20	2.40		10	2
13	2.40	2.60		6	0

FLOOD CELL 2: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 39.76-40.47m

POST DEVELOPMENT FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE COMPOSITE POST DEVELOPMENT/TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.
5. FLOOD COMPENSATION VOLUMES CALCULATED AS FOLLOWS:

A. FLOOD STORAGE VOLUMES IDENTIFIED IN POST DEVELOPMENT SCENARIO NEED TO BE SUBTRACTED FROM THE ONES OBTAINED FOR THE EXISTING SCENARIO ON A LIKE FOR LIKE BASIS IN THE FLOOD LEVEL RANGE (200MM RANGES).

B. ANY LOSS OF FLOOD STORAGE IDENTIFIED MUST BE COMPENSATED BY REDUCING LEVELS OF NEARBY GROUND, SUCH THAT THE SAME VOLUME IS AVAILABLE AT EVERY FLOOD LEVEL BEFORE AND AFTER THE DEVELOPMENT WORKS AND TO REPLICATE EXISTING REGIME.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT,
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	---
P02	12/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	12/08/21	CLIENT APPROVED	HL	JR	CE	SV

AUTH10

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI
ARUP RAMBOLL

Client: highways england

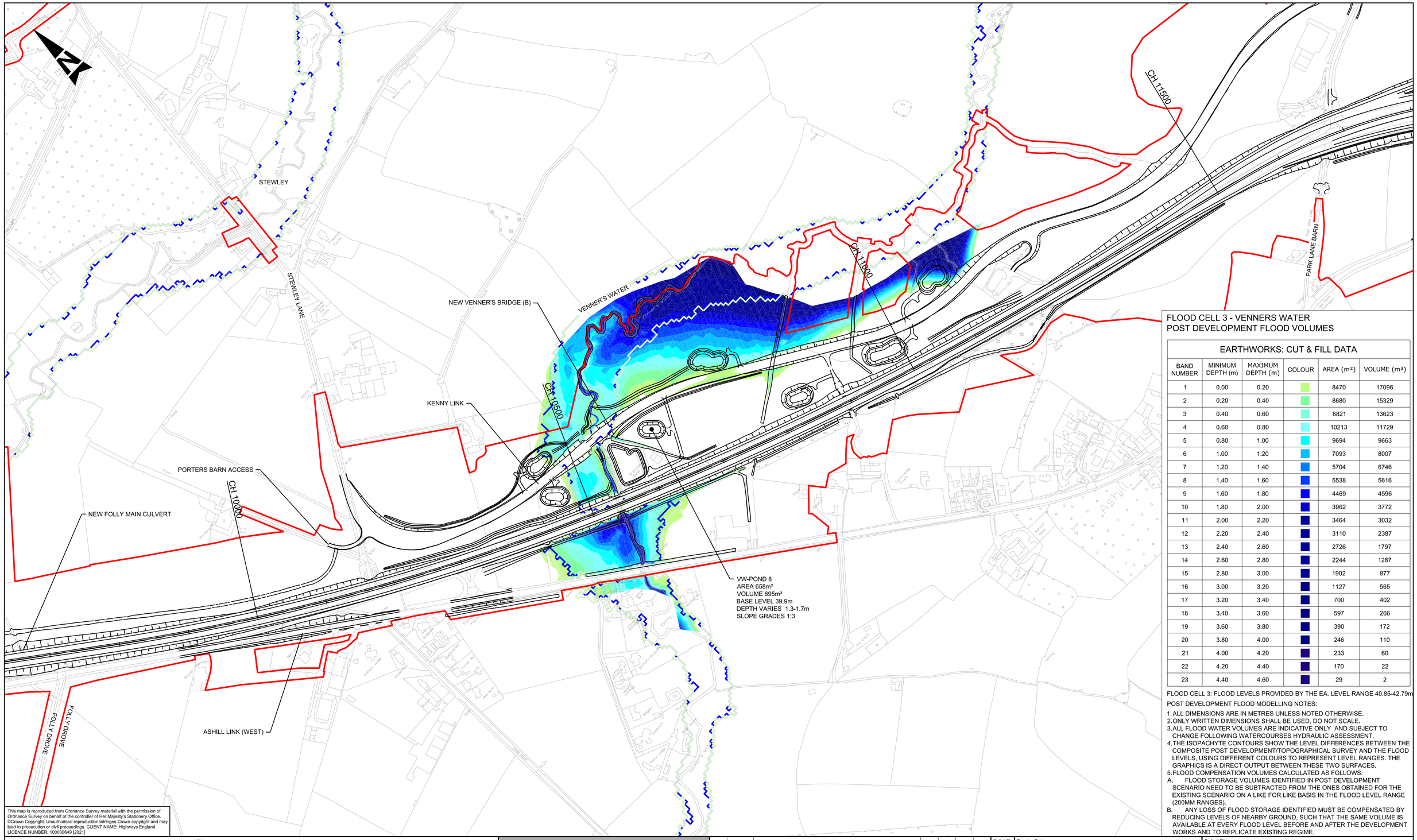
Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: FLOOD CELL 2 - CAD BROOK POST DEVELOPMENT FLOOD VOLUMES

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	Date	Date	Date	Date
A1	12/08/21	12/08/21	12/08/21	12/08/21

Drawing Number: HE551508 - ZZ (Location) - ARP (Originator) - EWE (Volume) - DR - CD - 000107 (Type - Role - Number)

Revision: C01



FLOOD CELL 3 - VENNERS WATER
POST DEVELOPMENT FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		8470	17096
2	0.20	0.40		8680	15329
3	0.40	0.60		8821	13623
4	0.60	0.80		10213	11729
5	0.80	1.00		9694	9663
6	1.00	1.20		7093	8007
7	1.20	1.40		5704	6746
8	1.40	1.60		5538	5616
9	1.60	1.80		4469	4596
10	1.80	2.00		3962	3772
11	2.00	2.20		3464	3032
12	2.20	2.40		3110	2387
13	2.40	2.60		2726	1797
14	2.60	2.80		2244	1287
15	2.80	3.00		1902	877
16	3.00	3.20		1127	565
17	3.20	3.40		700	402
18	3.40	3.60		597	266
19	3.60	3.80		390	172
20	3.80	4.00		246	110
21	4.00	4.20		233	60
22	4.20	4.40		170	22
23	4.40	4.60		29	2

FLOOD CELL 3: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 40.85-42.79m

POST DEVELOPMENT FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE COMPOSITE POST DEVELOPMENT/TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.
5. FLOOD COMPENSATION VOLUMES CALCULATED AS FOLLOWS:

A. FLOOD STORAGE VOLUMES IDENTIFIED IN POST DEVELOPMENT SCENARIO NEED TO BE SUBTRACTED FROM THE ONES OBTAINED FOR THE EXISTING SCENARIO ON A LIKE FOR LIKE BASIS IN THE FLOOD LEVEL RANGE (200MM RANGES).

B. ANY LOSS OF FLOOD STORAGE IDENTIFIED MUST BE COMPENSATED BY REDUCING LEVELS OF NEARBY GROUND, SUCH THAT THE SAME VOLUME IS AVAILABLE AT EVERY FLOOD LEVEL BEFORE AND AFTER THE DEVELOPMENT WORKS AND TO REPLICATE EXISTING REGIME.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	12/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	12/08/21	CLIENT APPROVED	HL	JR	CE	SV

AUTH10

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI
ARUP RAMBOLL

Client: highways england

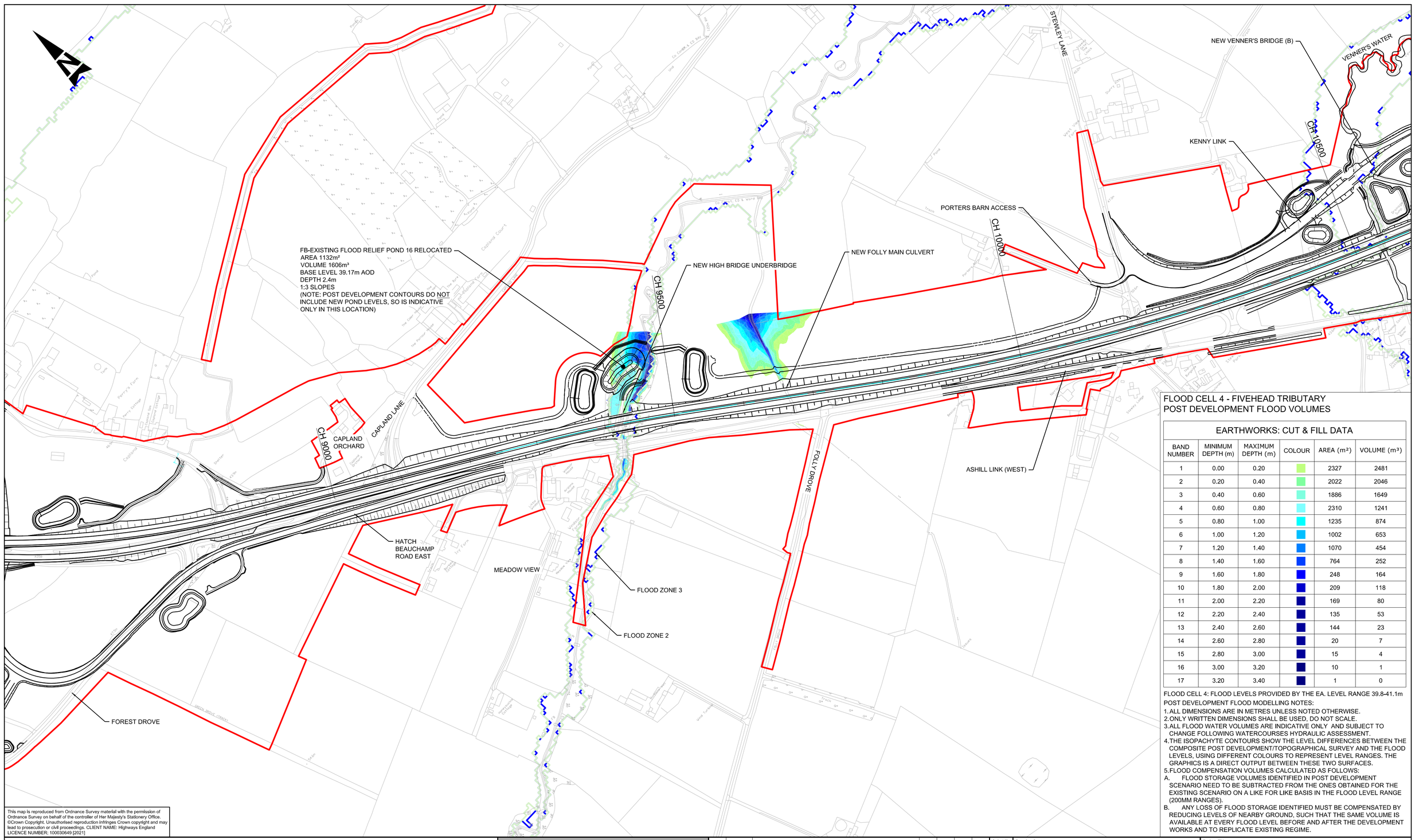
Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: FLOOD CELL 3 - VENNERS WATER POST DEVELOPMENT FLOOD VOLUMES

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size: A1	Date: 12/08/21	Date: 12/08/21	Date: 12/08/21	Date: 12/08/21

Drawing Number: HE551508 - ZZ - ARP - DR - CD - EWE - 000106
(HE PIN | Originator | Volume | Location | Type | Role | Number)

Revision: C01



FLOOD CELL 4 - FIVEHEAD TRIBUTARY
POST DEVELOPMENT FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		2327	2481
2	0.20	0.40		2022	2046
3	0.40	0.60		1886	1649
4	0.60	0.80		2310	1241
5	0.80	1.00		1235	874
6	1.00	1.20		1002	653
7	1.20	1.40		1070	454
8	1.40	1.60		764	252
9	1.60	1.80		248	164
10	1.80	2.00		209	118
11	2.00	2.20		169	80
12	2.20	2.40		135	53
13	2.40	2.60		144	23
14	2.60	2.80		20	7
15	2.80	3.00		15	4
16	3.00	3.20		10	1
17	3.20	3.40		1	0

FLOOD CELL 4: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 39.8-41.1m

POST DEVELOPMENT FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE COMPOSITE POST DEVELOPMENT/TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.
5. FLOOD COMPENSATION VOLUMES CALCULATED AS FOLLOWS:
   A. FLOOD STORAGE VOLUMES IDENTIFIED IN POST DEVELOPMENT SCENARIO NEED TO BE SUBTRACTED FROM THE ONES OBTAINED FOR THE EXISTING SCENARIO ON A LIKE FOR LIKE BASIS IN THE FLOOD LEVEL RANGE (200MM RANGES).
   B. ANY LOSS OF FLOOD STORAGE IDENTIFIED MUST BE COMPENSATED BY REDUCING LEVELS OF NEARBY GROUND, SUCH THAT THE SAME VOLUME IS AVAILABLE AT EVERY FLOOD LEVEL BEFORE AND AFTER THE DEVELOPMENT WORKS AND TO REPLICATE EXISTING REGIME.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	---
P02	12/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	12/08/21	CLIENT APPROVED	HL	JR	CE	SV

AUTH10

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI
ARUP RAMBOLL

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: FLOOD CELL 4 FIVEHEAD TRIBUTARY POST DEVELOPMENT FLOOD VOLUMES

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	**Date**	**Date**	**Date**	**Date**
A1	12/08/21	12/08/21	12/08/21	12/08/21

Drawing Number: HE PIN HE551508 - Location ZZ | Originator ARP | Volume EWE | Type DR | Role CD | Number 000105
Revision: C01

DO NOT SCALE

Millimetres 0 10 100

HATCH BEAUCHAMP

OLD BARN LANE

HATCH GREEN

VILLAGE ROAD

HATCH GREEN LANE

FR-DITCH 22
AREA 169m²
VOLUME 48m³
LENGTH 48m
LEVEL AT START 48.4m
LEVEL AT END 47.8m

FR-DITCH 23
AREA 174m²
VOLUME 53m³
LENGTH 44m
LEVEL AT START 48.1m
LEVEL AT END 48.0m

FB-EXISTING FLOOD RELIEF POND 16 RELOCATED
AREA 1132m²
VOLUME 1606m³
BASE LEVEL 39.17m AOD
DEPTH 2.4m
1:3 SLOPES
(NOTE: POST DEVELOPMENT CONTOURS DO NOT INCLUDE NEW POND LEVELS, SO IS INDICATIVE ONLY IN THIS LOCATION)

AXEFORD LODGE

CAPLAND ORCHARD

CAPLAND LANE

CH 7500

CH 8000

CH 8500

CH 9000

BICKENHALL LANE

FLOOD ZONE 2

FLOOD ZONE 3

FLOOD CELL 5 - FIVEHEAD RIVER
POST DEVELOPMENT FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		6147	6103
2	0.20	0.40		7221	4708
3	0.40	0.60		6118	3402
4	0.60	0.80		4407	2354
5	0.80	1.00		4303	1479
6	1.00	1.20		2339	822
7	1.20	1.40		852	516
8	1.40	1.60		269	408
9	1.60	1.80		151	371
10	1.80	2.00		147	341
11	2.00	2.20		146	312
12	2.20	2.40		159	281
13	2.40	2.60		282	243
14	2.60	2.80		303	178
15	2.80	3.00		329	126
16	3.00	3.20		133	69
17	3.20	3.40		240	41
18	3.40	3.60		39	1

FLOOD CELL 5: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 48.83-49.34m

POST DEVELOPMENT FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE COMPOSITE POST DEVELOPMENT/TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.
5. FLOOD COMPENSATION VOLUMES CALCULATED AS FOLLOWS:

A. FLOOD STORAGE VOLUMES IDENTIFIED IN POST DEVELOPMENT SCENARIO NEED TO BE SUBTRACTED FROM THE ONES OBTAINED FOR THE EXISTING SCENARIO ON A LIKE FOR LIKE BASIS IN THE FLOOD LEVEL RANGE (200MM RANGES).

B. ANY LOSS OF FLOOD STORAGE IDENTIFIED MUST BE COMPENSATED BY REDUCING LEVELS OF NEARBY GROUND, SUCH THAT THE SAME VOLUME IS AVAILABLE AT EVERY FLOOD LEVEL BEFORE AND AFTER THE DEVELOPMENT WORKS AND TO REPLICATE EXISTING REGIME.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	12/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	12/08/21	CLIENT APPROVED	HL	JR	CE	SV

AUTH10

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI
ARUP RAMBOLL

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: FLOOD CELL 5 - FIVEHEAD RIVER POST DEVELOPMENT FLOOD VOLUMES

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	Date	Date	Date	Date
A1	12/08/21	12/08/21	12/08/21	12/08/21

Drawing Number: HE551508 - ZZ - DR - CD - 000104
(HE PIN | Originator | Volume | Location | Type | Role | Number)

Revision: C01

DO NOT SCALE

Millimetres 0 10 100

MEARE GREEN

MEARE COURT FARM

MEARE ELM FARM

VILLAGE ROAD

CH 5000

CH 5500

CH 6000

CH 6500

DISMANTLED RAILWAY

MS-POND 17
AREA 1548m²
VOLUME 2228m³
BASE LEVEL VARIES 20.7-21.1m AOD
DEPTH VARIES 1.8-2.3m
1:3 SLOPES

SOMERSET PROGRESSIVE SCHOOL

NIGHTINGALE FARM

WEST HATCH LANE

FLOOD ZONE 3

FLOOD ZONE 2

HURFORD'S PLANTATION

FLOOD CELL 6 - SEDGEMOORE MAIN DRAIN
POST DEVELOPMENT FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		10136	23376
2	0.20	0.40		11168	21295
3	0.40	0.60		14400	18674
4	0.60	0.80		12131	16040
5	0.80	1.00		10391	13769
6	1.00	1.20		10084	11737
7	1.20	1.40		7584	9867
8	1.40	1.60		5203	8678
9	1.60	1.80		5301	7650
10	1.80	2.00		6821	6462
11	2.00	2.20		7263	5013
12	2.20	2.40		8814	3430
13	2.40	2.60		5310	1968
14	2.60	2.80		3405	1119
15	2.80	3.00		2008	574
16	3.00	3.20		836	280
17	3.20	3.40		288	189
18	3.40	3.60		220	140
19	3.60	3.80		206	94
20	3.80	4.00		232	59
21	4.00	4.20		127	15
22	4.20	4.40		18	0

FLOOD CELL 6: FLOOD LEVELS PROVIDED THE BY EA. LEVEL RANGE 20.6-22.5m

POST DEVELOPMENT FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE COMPOSITE POST DEVELOPMENT/TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.
5. FLOOD COMPENSATION VOLUMES CALCULATED AS FOLLOWS:

A. FLOOD STORAGE VOLUMES IDENTIFIED IN POST DEVELOPMENT SCENARIO NEED TO BE SUBTRACTED FROM THE ONES OBTAINED FOR THE EXISTING SCENARIO ON A LIKE FOR LIKE BASIS IN THE FLOOD LEVEL RANGE (200MM RANGES).

B. ANY LOSS OF FLOOD STORAGE IDENTIFIED MUST BE COMPENSATED BY REDUCING LEVELS OF NEARBY GROUND, SUCH THAT THE SAME VOLUME IS AVAILABLE AT EVERY FLOOD LEVEL BEFORE AND AFTER THE DEVELOPMENT WORKS AND TO REPLICATE EXISTING REGIME.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGINIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	
P02	12/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	12/08/21	CLIENT APPROVED	HL	JR	CE	SV

AUTH10

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI
ARUP RAMBOLL

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: FLOOD CELL 6
MEARE STREAM
POST DEVELOPMENT FLOOD VOLUMES

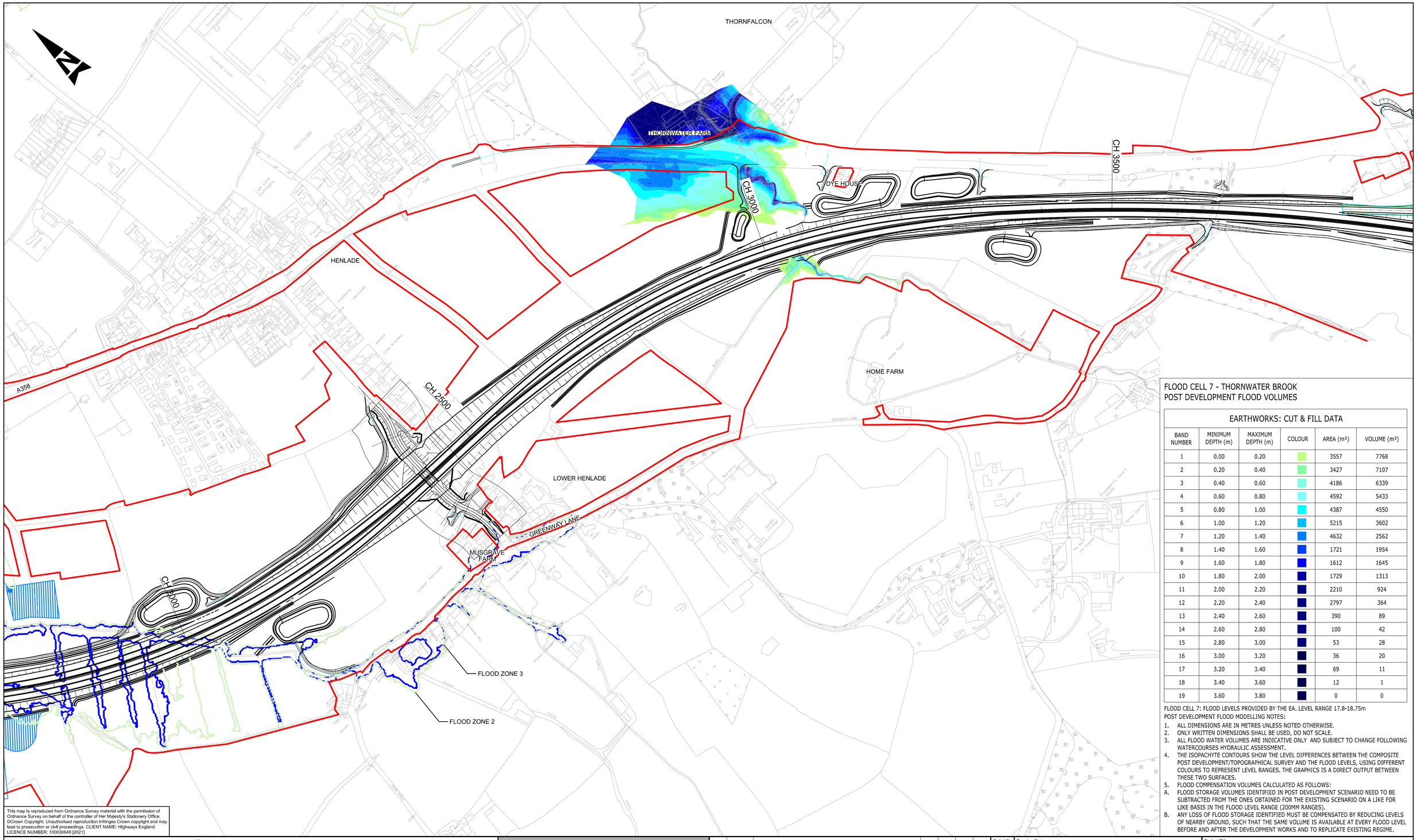
Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	Date	Date	Date	Date
A1	12/08/21	12/08/21	12/08/21	12/08/21

Drawing Number: HE PIN | Originator | Volume
HE551508 - ARP - EWE
ZZ - DR - CD - 000103
Location | Type | Role | Number

Revision: C01

Millimetres 100 10 0

DO NOT SCALE



FLOOD CELL 7 - THORNWATER BROOK
POST DEVELOPMENT FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		3557	7768
2	0.20	0.40		3427	7107
3	0.40	0.60		4186	6339
4	0.60	0.80		4592	5433
5	0.80	1.00		4387	4550
6	1.00	1.20		5215	3602
7	1.20	1.40		4632	2562
8	1.40	1.60		1721	1954
9	1.60	1.80		1612	1645
10	1.80	2.00		1729	1313
11	2.00	2.20		2210	924
12	2.20	2.40		2797	364
13	2.40	2.60		390	89
14	2.60	2.80		100	42
15	2.80	3.00		53	28
16	3.00	3.20		36	20
17	3.20	3.40		69	11
18	3.40	3.60		12	1
19	3.60	3.80		0	0

FLOOD CELL 7: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 17.8-18.75m

POST DEVELOPMENT FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE COMPOSITE POST DEVELOPMENT/TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.
5. FLOOD COMPENSATION VOLUMES CALCULATED AS FOLLOWS:

A. FLOOD STORAGE VOLUMES IDENTIFIED IN POST DEVELOPMENT SCENARIO NEED TO BE SUBTRACTED FROM THE ONES OBTAINED FOR THE EXISTING SCENARIO ON A LIKE FOR LIKE BASIS IN THE FLOOD LEVEL RANGE (200MM RANGES).

B. ANY LOSS OF FLOOD STORAGE IDENTIFIED MUST BE COMPENSATED BY REDUCING LEVELS OF NEARBY GROUND, SUCH THAT THE SAME VOLUME IS AVAILABLE AT EVERY FLOOD LEVEL BEFORE AND AFTER THE DEVELOPMENT WORKS AND TO REPLICATE EXISTING REGIME.

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE IN INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.

KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENTS
- FLOOD ZONE 2 EXTENTS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN HAZARD LOG).

CONSTRUCTION
(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

USE
(TO BE POPULATED)

DECOMMISSIONING / DEMOLITION
(TO BE POPULATED)

Rev.	Date	Description	By	Chk'd	App'd	Auth'd
P01	27/07/21	FOR INFORMATION	HL	JR	CE	AUTH10
P02	12/08/21	FOR INFORMATION	HL	JR	CE	SV
C01	12/08/21	CLIENT APPROVED	HL	JR	CE	SV

Suitability: A3
Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @VINCI
ARUP RAMBOLL

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: FLOOD CELL 7 - THORNWATER STREAM POST DEVELOPMENT FLOOD VOLUMES

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	Date	Date	Date	Date
A1	12/08/21	12/08/21	12/08/21	12/08/21

Drawing Number: HE551508 - ZZ | ARP - EWE - DR - CD - 000102
(Location | Originator | Volume | Type | Role | Number)

Revision: C01

DO NOT SCALE

Millimetres 0 10 100

RUISHTON

WOODLANDS CASTLE

BROOKFIELD FARM

RUISHTON LANE

A358

M5 MOTORWAY

TAUNTON GATEWAY
PARK AND RIDE

CAMBRIA FARM

CH 1000

CH 1500

CH 2000

BB-AREA 3
AREA 6505m²
DEPTH 0.2-0.4m

BB-AREA 4
AREA 3470m²
DEPTH 0.2-0.4m

BB-AREA 5
AREA 4045m²
DEPTH 0.2-0.4m

BB-AREA 6
AREA 3310m²
DEPTH 0.2-0.4m

BB-AREA 1
AREA 2470m²
DEPTH 0.2-0.4m

BB-AREA 2
AREA 16575m²
DEPTH 0.2-0.4m

BB-AREA 7
AREA 10085m²
DEPTH 0.2-0.4m

BB-AREA 8
AREA 4050m²
DEPTH 0.2-0.4m

FLOOD ZONE 3

FLOOD ZONE 2

BROUGHTON BROOK

FLOOD CELL 8 - BLACK BROOK
POST DEVELOPMENT FLOOD VOLUMES

EARTHWORKS: CUT & FILL DATA

BAND NUMBER	MINIMUM DEPTH (m)	MAXIMUM DEPTH (m)	COLOUR	AREA (m²)	VOLUME (m³)
1	0.00	0.20		56186	33760
2	0.20	0.40		74085	21074
3	0.40	0.60		32519	9305
4	0.60	0.80		13240	5412
5	0.80	1.00		8009	3071
6	1.00	1.20		2961	2158
7	1.20	1.40		2546	1572
8	1.40	1.60		1187	1229
9	1.60	1.80		969	1010
10	1.80	2.00		1195	785
11	2.00	2.20		750	606
12	2.20	2.40		808	452
13	2.40	2.60		1205	227
14	2.60	2.80		128	117
15	2.80	3.00		146	88
16	3.00	3.20		119	68
17	3.20	3.40		97	43
18	3.40	3.60		127	15
19	3.60	3.80		38	1

FLOOD CELL 8: FLOOD LEVELS PROVIDED BY THE EA. LEVEL RANGE 11.8-14.2m

POST DEVELOPMENT FLOOD MODELLING NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ONLY WRITTEN DIMENSIONS SHALL BE USED, DO NOT SCALE.
3. ALL FLOOD WATER VOLUMES ARE INDICATIVE ONLY AND SUBJECT TO CHANGE FOLLOWING WATERCOURSES HYDRAULIC ASSESSMENT.
4. THE ISOPACHYTE CONTOURS SHOW THE LEVEL DIFFERENCES BETWEEN THE COMPOSITE POST DEVELOPMENT/TOPOGRAPHICAL SURVEY AND THE FLOOD LEVELS, USING DIFFERENT COLOURS TO REPRESENT LEVEL RANGES. THE GRAPHICS IS A DIRECT OUTPUT BETWEEN THESE TWO SURFACES.
5. FLOOD COMPENSATION VOLUMES CALCULATED AS FOLLOWS:

A. FLOOD STORAGE VOLUMES IDENTIFIED IN POST DEVELOPMENT SCENARIO NEED TO BE SUBTRACTED FROM THE ONES OBTAINED FOR THE EXISTING SCENARIO ON A LIKE FOR LIKE BASIS IN THE FLOOD LEVEL RANGE (200MM RANGES).

B. ANY LOSS OF FLOOD STORAGE IDENTIFIED MUST BE COMPENSATED BY REDUCING LEVELS OF NEARBY GROUND, SUCH THAT THE SAME VOLUME IS AVAILABLE AT EVERY FLOOD LEVEL BEFORE AND AFTER THE DEVELOPMENT WORKS AND TO REPLICATE EXISTING REGIME.

NOTES

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KEY

- SCHEME BOUNDARY
- FLOOD ZONE 3 EXTENT
- FLOOD ZONE 2 EXTENT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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(TO BE POPULATED)

MAINTENANCE / CLEANING
(TO BE POPULATED)

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(TO BE POPULATED)

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P01	27/07/21	FOR INFORMATION	HL	JR	CE	
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C01	12/08/21	CLIENT APPROVED	HL	JR	CE	SV

Suitability: A3 — Drawing Status: AUTHORIZED AND ACCEPTED

TAYLOR WOODROW together @ VINCI
ARUP RAMBOLL

Client: highways england

Project Title: A358 TAUNTON TO SOUTHFIELDS

Drawing Title: FLOOD CELL 8 - BLACK BROOK
POST DEVELOPMENT FLOOD VOLUMES

Scale	By	Checked	Approved	Authorised
1:2500	HL	JR	CE	SV
Original Size	**Date**	**Date**	**Date**	**Date**
A1	12/08/21	12/08/21	12/08/21	12/08/21

Drawing Number: HE PIN HE551508 - Location ZZ | Originator ARP | Volume EWE | Type DR | Role CD | Number 000101

Revision: C01