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Submitted via portal

APPLICATION BY NATIONAL HIGHWAYS FOR AN ORDER GRANTING DEVELOPMENT CONSENT FOR THE A12 CHELMSFORD TO A120 WIDENING

Environment Agency – Written Representation Summary

Please find below the Environment Agency further Written Representation in response to the Development Consent Order application for the proposed works.

Our Written Representation provides further information and updates in respect of previously made comments addressing biodiversity & ecology, flood risk, contaminated land, groundwater resources, surface water (water resources & water quality), the draft DCO, and environmental permitting.

We have significant concerns in respect of the proposed main river crossings and the impact on ecology from habitat loss and fragmentation. We do not believe that it has been demonstrated that these impacts have been adequately assessed or mitigated.

In respect of flood risk, we are broadly satisfied, and we are engaging with the Applicant on any outstanding issues. We have provided detailed comments in this response on flood risk from non-main rivers, additional to the comments on main river flooding in our Relevant Representation.

For all other issues, we are broadly satisfied subject to a further review at the detailed design stage. However, we are not currently satisfied that the draft DCO and proposed Requirements enable that review.

1 Biodiversity & Ecology

1.1 Main River Crossings

1.1.1 The proposed scheme requires six new and extended crossings of main rivers. Flood Risk Activity Permits (FRAPs) will be required from the Environment Agency for these structures. We have substantial concerns that the nature of some of these crossings as proposed has the potential to significantly and adversely affect both the upstream and downstream ecology of those catchments. Of particular concern are the proposed 46 metre culvert crossing of Rivenhall Brook and the 60m Domsey Brook culvert. Our Relevant Representation (Ref: RR-011, Section 1) outlines the basis of those concerns and is not repeated here. We have provided additional detail below on our key issues and on the specifics of each of the main river crossings.

1.1.2 We note that the Applicant, in response to our Relevant Representation (REP1-002, RR-011-004), has stated that "the mitigation hierarchy has been followed to, where practicable, modify the design to avoid impacts to these features" (namely protected species and priority habitats). As we have previously highlighted, the Environment Agency has a long-standing policy opposing the use of culverts due to likely impacts on biodiversity and hydromorphology, and also flood risk blockage concerns. We look to see open span bridges used wherever possible instead of culverts, unless it is demonstrated that culverting is both necessary and the only reasonable and practicable alternative. Considering the culverts proposed for new crossings of Rivenhall Brook and Domsey Brook, in each case it is not clear why a culvert has been proposed rather than an open-span bridge. We can only assume that this is for cost reasons. We note that the Design and Access Statement (APP-268) does not provide justification for the approach of using culverts or provide any discussion on the consideration of alternatives such as bridges. The use of alternatives to these culverts does not appear to have been considered.

1.1.3 We would emphasize that in order for there to be no significant effects on ecology, all new and extended main river crossings must not introduce further barriers to eel, fish, or mammal passage/transit. The new main river crossings should include open river bank and riparian habitat as buffer zones throughout to enable wildlife to continue to use the river corridors naturally, safely and without hindrance. Failure on fish passage (or in respect of geomorphological processes, sediment transport etc.) will result in a catchment scale deterioration in the Water Environment (Water Framework Directive) Regulations 2017 (WER) (formerly the Water Framework Directive (WFD)), which would be unacceptable.

1.1.4 The long dark culverts proposed for Rivenhall Brook and Domsey Brook (east crossing) create significant breaks in connectivity and cause fragmentation of habitats. They will also create a break in continuous geomorphological river processes and sediment transport. We have serious concerns regarding the long-term impacts of these crossings on species that need connectivity. The culvert options do not appear to take the long-term damaging environmental impacts into proper account. Where a culverted crossing is proposed as the only reasonable and practicable option, it must also be demonstrated that it will not result in an unacceptable impact on habitats and species present. For a FRAP to be granted for

works within 8 of a main river, we must be satisfied that mitigation and compensation measures will be put in place to reduce or nullify any impacts to our satisfaction

1.1.5 Sections 9.11.120 and 9.11.119 of the Environmental statement (APP-076) conclude that despite the crossings resulting in an outright loss of 230 metres of river habitat, the impact on rivers will be neutral i.e., not significant. It is stated that the loss of habitat would be offset by the beneficial impacts of the proposed realignments of the Roman River and Domsey Brook.

1.1.6 We do not believe that the stated loss of 230 metres of river habitat has been adequately mitigated. We do not believe that it is possible to offset losses across wider river systems by providing enhancements on the Roman River and Domsey Brook, which are separate watercourses with, in some cases, no possible habitat connection. Additionally, the measures do not mitigate for the loss of the currently open river habitat. The affected 230 metres of shaded channel will create a virtual 'dead zone' devoid of aquatic plants, natural habitat, and natural bank vegetation. There has been no explanation as to why less intrusive designs which could avoid some of the damaging impacts have not been included.

1.1.7 Contrary to section 5 of the National Networks National Policy Statement (NNNPS) (2014), we do not currently believe that the Applicant has shown that they have adequately assessed the likely significant effects of the proposed scheme on protected species and habitats or taken sufficient steps to conserve and enhance biodiversity conservation interests.

1.1.8 We also note that the Applicant, in response to our Relevant Representation (REP1-002, RR-011-004) and our concerns regarding the impact of culverts on biodiversity, has suggested that the scheme will provide significant flood risk benefits. Table 14.19 from the Environmental Statement (APP-081) summarises these benefits as being associated with flood mitigation measures proposed at Ordinary watercourses 21 and 26, and flood storage at Inworth Road, rather than due to the use of culverts for main river crossings. While we acknowledge that there will be reductions in flood risk at certain locations, our Relevant Representation highlighted that there will also be some increases in water levels associated with the new culverts on Rivenhall Brook and Domsey Brook, although mitigation is proposed (see section 2.1.5 below for further comments). Our expectation is that the use of clear span bridges would provide at least an equivalent reduction in flood risk and be less likely to cause biodiversity harm. The Applicant has not demonstrated that the use of culverts provides any flood risk or ecological benefits over and above those that would be expected to be provided by a bridge solution.

1.1.9 Discussions with the Applicant on this issue remain ongoing.

1.2 Fish and eels

1.2.1 Migratory fish such as the European eel (Anguilla anguilla), which are protected under the Eel Regulations 2009, and brown trout (Salmo trutta) are found within the rivers affected by the scheme. The length of proposed culverts crossing Rivenhall Brook and Domsey Brook in particular are very significant, and it is not

clear that all species will use these dark unnatural tunnels. The continuity of habitat is vital, and the river systems are reliant on fish (and mammal) passage being effective and not hindered in any way. The Applicant should provide evidence that all main river crossings (new and extended) will work effectively and not be a barrier to species which require natural passage to maintain viable healthy populations.

1.2.2 East Anglian rivers contribute a critically important proportion of the adult female eels in the UK. European eels in the Blackwater catchment have been recorded and studied for more than two decades by Environment Agency staff. The eel population is monitored annually, with the Environment Agency and others working over several years to remove barriers to fish migration.

1.2.3 If the scheme introduces structures which act as hindrances or obstacles, the ability for eels to migrate upstream from the Blackwater estuary into the freshwater river system, or to travel downstream to breed in the Atlantic would be affected. Sea trout similarly could be prevented from reaching the headwaters of the catchments to breed. Coarse fish species also travel up and downstream to feed and breed, and at various times use the entire river catchment habitat.

1.2.4 During their migrations fish use the complex habitats of natural channels to feed, rest and recuperate. The Environmental Statement (APP-076) refers to the need to incorporate natural substrates in the proposed culverts to offset any negative impact on fish (paragraph 9.11.361) and invertebrates (paragraph 9.11.368). However, there is no mitigation proposed for the loss of light and river macrophytes caused by the culverts, which will have a clear impact on habitat quality and which species the rivers are able to support in these sections.

1.2.5 The new and extended crossings have the potential to act as barriers to fish movement and so fragment the available habitat, with species upstream becoming separate populations to those downstream of the A12.

1.2.6 The Applicant has not demonstrated that the proposed main river crossings will not introduce a barrier to the movement of fish and eels. If this cannot be demonstrated, a revision of the culverts and road bridge extensions will be required to ensure uninterrupted river habitat throughout the area to protect and enhance fish populations.

1.3 Otters and other mammals

1.3.1 The proposed use of new culverts and the design of certain extensions has the potential to significantly impact populations of otters (Lutra lutra) and other mammals including water voles (Arvicola terrestris). Otters and water voles are protected under the 1981 Wildlife and Countryside Act and can be found throughout the affected river systems. Both species are known to be reluctant to enter long dark tunnels, even where ledges are provided.

1.3.2 Otter fencing is proposed as mitigation to prevent animals from entering the road, and to encourage the use of mammal ledges as routes through the culverts and under bridges. However, fencing is only effective if it remains intact along its

entire length throughout the operational lifetime of the road. In practice, once wildlife finds a gap through fencing it is often unable to safely exit the road. This situation is exacerbated where rigid concrete barriers, rather than permeable barriers are used within the central reservation. It is not clear which type of barriers are proposed, but in this context permeable central reservation barriers would be preferred.

1.3.3 We are aware that the existing A12 in this area acts as a significant barrier to movement and the road is responsible for a notable number of otter deaths. The Applicant is proposing to install fencing where otters are known to cross the A12, and mammal ledges in culverts on the Rivenhall Brook, Domsey Brook (west), Domsey Brook (east), and Roman River. The Environment Statement Chapter 9 Biodiversity (APP-076) states at paragraphs 9.11.332 and 9.11.333 that these measures are likely to provide a benefit.

1.3.4 As highlighted above, observed patterns of behaviour (Wilkinson and Chadwick Otter road casualties in South Wales: Recommendations for mitigation Cardiff University otter project 2012) suggest that the installation of mammal ledges, through long sections of culvert and bridges, and the use of fencing will not be effective in improving this situation, and will not compensate for the additional number and length of crossings. The Applicant should provide evidence to demonstrates that such measures can be effective.

1.3.5 Over the last 2 decades the Environment Agency has collected and collated otter road traffic deaths across Essex, Norfolk, and Suffolk. Where clean span bridges incorporate natural sloping banks that rise out of the floodplain otters are rarely killed. Where dark long culverts have been used the otter deaths increase significantly. The more natural the habitat retained, the more likely the crossing is to be used. Box and portal culverts leave little scope for river habitat continuity or for continuous sediment transfer and morphological processes to continue uninterrupted.

1.3.6 With Climate Change and the biodiversity emergency, continuity of habitats is key for species to survive. Large road and transport engineering schemes can present major obstacles for river ecosystems. Large open structures are important for mammals to travel across their territories. Smaller darker culverts are less used by mammals and present a risk to species survival on a territorial scale and also to public road user safety. Studies focussing on deer movements (Olbrich (1984) and Reed et al (1975)) have shown that structures that incorporate natural vegetation, are tall and with a wide degree of openness are more likely to be used by a full range of mammals.

1.3.6 The principles of natural spacious crossings being better for all species is repeatedly recognised in research literature and anecdotal experience. It should also be recognised that all species have wider territorial behaviour than usually considered and will try to travel widely across human barriers. It is prudent to design and build resilience into the landscape scale to avoid problems.

1.3.8 Water vole have been almost driven to extinction in Essex by alien invasive mink, but populations are recovering and there is an advanced mink eradication programme throughout East Anglia. It is likely that water voles will spread back

across their previous range where habitat allows. The proposed long crossings, in particular the culverts proposed on Rivenhall Brook and Domsey Brook, are likely to hinder this recolonisation and do not provide natural banks for shelter or food. More open, wider crossings with natural light and natural habitat would help prevent populations of this protected species becoming irrevocably fragmented.

1.3.9 The hard concrete and steel revetment which is proposed on much of the natural river banks around the crossings will have a direct negative result in removing water vole habitat permanently. This does not appear to have been fully accounted for, nor is adequate mitigation proposed.

1.3.10 Our current view is that it is more appropriate to use design measures to avoid impacts and ensure that a more natural route to crossing the proposed road is available. This is in accordance with the hierarchical approach required by the Design Manual for Roads and Bridges (DMRB) LD118 Biodiversity (March 2020), and will more effectively prevent fragmentation of species populations, loss of connectivity and barriers to movement. Paragraph 5.36 of the NNNPS includes a similar requirement for applicants to demonstrate that: *"developments will be designed and landscaped to provide green corridors and minimise habitat fragmentation"* Clear span open bridge structures with natural vegetated banks on either side make mammal transit under the proposed new road far more likely.

1.3.11 The proposed **ordinary watercourse crossings** will subsume many ditch and small watercourses under the new widened road. Even ditches and small watercourses can provide connective habitat for water voles and otters. Inadequate consideration appears to have been given for mammal passage through the ordinary watercourse crossings. This must be addressed for protected species legislation and agreed with the Lead Local Flood Authority.

1.3.12 Ordinary watercourse crossings can often be responsible for otter road traffic deaths where adequate consideration is not given to safe mammal passage.

1.3.13 We note that large circular pipes (600mm and upwards) are proposed for ordinary watercourses. These are unsuitable for otter passage in long dark crossings where there are high water flows. Alternative solutions will need to be provided so that otters can use crossings where any high flows are periodically expected.

1.4 Aquatic Ecology

1.4.1 The aquatic ecology of the rivers and watercourses will be permanently damaged by the long dark crossings proposed on the Rivenhall Brook and Domsey Brook. Research has shown that invertebrates such as water breeding insects will not enter or use long culverts, and that insect populations are adversely affected on rivers that are bisected by them (Blakely, Harding, Mcintosh et al 2006 and Mainas and Kriska 2011). Many terrestrial invertebrates rely on flowing freshwater habitats at stages in their development so impacts will not be limited to wholly aquatic species. The Environmental Statement (APP-076 paragraph 9.11.251) states that there will be a permanent beneficial impact from additional macroinvertebrate habitat being created, but this does not take into account the damaging impact of having

permanent long ‘dead zones’ within a contiguous habitat corridor where culverts will be built or lengthened.

1.4.2 Freshwater macrophytes will be lost completely throughout the lengths of culverts, although this is described overall as a neutral impact in the Environmental Statement (APP-076 Summary of construction/operational effects on biodiversity receptors Table 9.26/9.31). It is proposed that the losses are mitigated for elsewhere, despite the importance of continuous habitat being vital for conserving an intact river ecosystem. No adequate explanation or justification for the loss of natural river habitat on these sections has been provided, with no adequate mitigation. Clear span bridges would better serve to allow light and natural water life to continue through the crossings, providing multiple benefits with fewer impacts.

1.5 Proposed Crossings

River Brain

1.5.1 It is proposed to upgrade the existing highway to 3 lanes per carriageway at this crossing, which will require the widening of the existing embankment on both sides by up to 14m. There will be an extension to the existing bridge by approximately 7m on the east side and 5m on the west. The bridge spans a distance of approximately 10m.

1.5.2 The watercourse at the existing crossing currently includes a concrete bed with a high sill, and a further raised lower trackway and raised upper trackway. This has the effect of forming an unnatural, hard, flat riverbed which holds up the upstream water level, resulting in a silty, shallow, slow flowing ponded section over a concrete bed which almost completely dries out in summer.

1.5.3 The unnatural bed exposes any fish or invertebrate species to easy predation. For endangered species such as European eel, the migrating young eels and elvers are particularly vulnerable at this location. We have long term concerns over this existing structure, specifically the hard unnatural base of the river.

1.5.4 The proposed extended structure appears to replicate this poor design arrangement. This will further negatively affect the ecology of the watercourse by worsening fish passage at low flows and reducing natural in-channel habitat. The raised sill will, if continued at the same level, risk introducing a step into the bed of the river which is likely to hinder upstream fish and eel movement. In turn, this could lead to a direct deterioration of fish status under the WFD/WER and is therefore unacceptable. The new section should preferably include a natural bed or alternatively an engineered and designed low-flow channel. Opportunities to improve the existing poorly designed concrete bed should also be assessed as enhancement measures, in accordance with section 4.9.1 of DMRB LD118 Biodiversity Design (March 2020).

1.5.5 Our records show the presence of European eel and water vole on the River Brain upstream from the crossing, and downstream within the River Blackwater. Water vole are re-colonising Essex rivers following extermination by predatory

American mink. Mink eradication is progressing well, but river habitat improvements need to continue to accommodate water voles and other native species which are beginning to return.

Rivenhall Brook

1.5.6 A new crossing of Rivenhall Brook is proposed, located 90m south east of the existing crossing which is to be retained. The additional crossing is currently proposed as a 46m box culvert, being approximately 4.5m wide x 3.5m tall, with a natural bed. There appears to have been no consideration of more ecologically sensitive alternatives to the use of a culvert at this location.

1.5.7 The proposed use of a culvert does not appear to have taken into consideration the importance of the complex river ecosystem, and it seems to offer little scope to incorporate meaningful improvements to reduce the impact on biodiversity.

1.5.8 It has not been demonstrated that aquatic invertebrates, mammals, and fish would travel through a structure of this nature, which would result in loss of continuous habitat and lead to species population and habitat fragmentation. Therefore, it is our view that the use of a culvert for this new crossing is unacceptable. Natural banks and semi-natural riparian habitat are key components of a river ecosystem which could be provided by a better designed wider crossing such as a clear span bridge. The crossing should be as wide and light as possible and with a natural channel and natural margins. Any increase in height need not be considerable.

1.5.9 Our records show European eel and water vole upstream of the crossing, and downstream on the River Blackwater.

River Blackwater

1.5.10 The existing Ashmans bridge is a wide, open structure. It is proposed to be extended by 10m to south. Replicating the existing structure will not create a barrier to fish or mammals. Therefore, we have no objection to the proposed structure, but opportunities should be taken to retain natural banks in preference over hardened revetment.

1.5.11 Natural banks provide safe habitat for a wide range of species, and mammals such as otter use the varied terrain provided by natural sloping banks under bridges to travel upstream safely in preference to going across busy roads.

1.5.12 As highlighted, the Blackwater system forms a migratory route for the European eel, hosts brown trout, and water voles have also been recorded in the area of the crossing. This crossing provides advantages for people and wildlife and delivers the type of multiple long-term benefits which we expect from good design on a nationally significant project that will be in place for years to come.

Domsey Brook

1.5.13 For the **western crossing** of Domsey Brook, it is proposed to extend the existing arch bridge by 35m to the south east. The channel immediately upstream of the crossing will be realigned.

1.5.14 The proposed extension replicates the existing narrow arch structure and includes a flexible stone mattress base. It has not been demonstrated that the proposed extension will not introduce a further barrier to species movement and is therefore currently unacceptable. The base of the proposed extension should be lowered to provide a natural bed of gravel and loose stone and to enable a narrow, low flow channel to establish.

1.5.15 Options for widening the opening and including natural banks should be considered and assessed. Any opportunities to bring in more natural light to the existing structure should also be assessed, for example a light well in the carriageway central reservation.

1.5.16 Records show water vole present upstream and downstream of the crossing.

1.5.17 For the **eastern crossing**, a new 60m culvert is proposed, to be located approximately 100m to the south of the existing (retained) crossing.

1.5.18 Unless it can be demonstrated that the use of a culvert for this new crossing would not prevent movement of aquatic invertebrates, mammals and fish, the proposed approach is unacceptable. A clear span bridge would deliver a sustainable development solution here without the potential barriers to fish, eels, mammals, plants, and invertebrates that a long dark concrete tunnel will either exclude or deter. We wish to see a design which avoids unnecessary negative impacts on biodiversity. The crossing should be designed with biodiversity as a priority and should be as wide as possible and with a natural channel and riparian corridor along the banks.

Roman River

1.5.19 It is proposed to widen the existing A12 southbound highway embankment and extend the existing culvert by 12m. The existing culvert is approximately 40m long and 5m wide. The channel to the south of the A12 is to be realigned. Although already affected by the current A12 crossing, the Roman River is a SSSI river with key brown trout and European eel populations which have unusually free direct access from the Colne estuary into the freshwater system.

1.5.20 We acknowledge the improved sinuosity of the downstream section as an enhancement on the existing straightened section, but the Applicant must also demonstrate that the extended culvert crossing is not going to make fish and mammal passage more difficult.

1.5.21 The Applicant has not provided any assessment of the current poor culvert crossing which should be provided in accordance with DMRB LD118 Biodiversity Design March 2020 section 4.9.1: “*Environmental assessment reports should identify*

opportunities to address historic impacts from motorway and trunk roads on biodiversity resources".

1.5.22 The ability for fish, including eels and brown trout, to pass through this culvert should be fully assessed. A similar assessment regarding mammal passage should also be completed. In each case, as well as ensuring passage through the current culvert, we wish to see the biodiversity design hierarchy of mitigation applied to the new design to avoid worsening the situation. Opportunities to provide improvements should be considered, including options to increase the width and height of the crossing extension to incorporate riparian river bank habitat.

Other main river interactions

1.5.23 The scheme also proposes the widening of the existing carriageway to three lanes where the route crosses the River Ter. However, no changes are proposed to the existing bridge structure or embankments at this location and therefore we have no concerns.

1.6 Biodiversity Net Gain

1.6.1 The Environment Statement Chapter 9 Biodiversity (Ref: APP-076) includes at paragraph 9.13.1 and Table 9.32 a summary of Biodiversity Net Gain for the three habitat types following the application of the Defra 3.0 metric calculator. This shows an on-site net increase of 156.73% for 'Rivers'. However, the Biodiversity Net Gain Report (Ref: APP-138. Doc 6.3 Environmental Statement - Appendix 9.14) includes as a footnote to Table 3 a separation of the 'Rivers and Streams' habitat type into 'Rivers' and 'Ditches'. This states that the project will deliver a net gain of 293.29% for ditches, but only 0.36% for rivers.

1.6.2 Notwithstanding the likely wider impacts on fish and mammals resulting from the loss of riverine habitat causing fragmentation and barriers to movement, as highlighted above, the report therefore does not currently show a clear delivery of Biodiversity Net Gain for rivers.

1.6.3 We wish to see significant enhancements through this scheme. The damaging existing proposed crossings should be reassessed and improved to deliver a recognisable improvement in the overall situation for rivers as Biodiversity Net Gain is intended to deliver. A full review of the historic problems caused by poorly designed crossings and hard bank revetments originally constructed here (and still in place) would deliver a real opportunity for enhancements on a landscape and multi-catchment scale.

1.6.4 One reason why 'Rivers' should be separated out from ditches and other habitats in Biodiversity Net Gain calculations is due to their unique important linear connected habitats and vulnerability to fragmentation. For example, the Blackwater catchment is approximately 80 km long and the habitat relies on critical connectivity of the headwaters where brown trout spawn to the estuary where the juvenile brown trout will head out to sea. A break in the corridor can have a significant impact on the whole.

1.7 Water Framework Directive

1.7.1 In respect of freshwater ecology, the Water Environment Regulations (WFD Regulations) Compliance Assessment (Ref: APP-159 Doc 6.3 Environmental Statement - Appendix 14.2) appears to give undue weighting to relatively minor pieces of mitigation (e.g., the addition of a short, realigned meandering section downstream of the A12 on the Roman River) compared to the numerous major negative impacts such as the long, dark confined narrow bridges and culverts. The new and longer crossings are likely to have a severe detrimental impact on the invertebrates, vegetation, fish, and entire biodiversity elements across the whole river catchment where they act as barriers to movement.

1.7.2 Table 6.2 Operational Impacts acknowledges that the proposed culvert on Rivenhall Brook will most likely prevent the movement of migratory fish species. This is highlighted as a negative impact, but it is concluded that there will be no risk of deterioration to the waterbody “given the localised scale of the impact”.

1.7.3 Any watercourse where barriers to migratory fish and other species are introduced will as a result be severely compromised along its whole length. Such barriers will cause serious long-term deterioration of the waterbodies and failure of the fish elements thus causing a complete deterioration of waterbody quality. This is vitally important, and the current assessment appears to be underestimating the potential impacts. The WFD/WER assessment must represent these impacts fully.

1.8 Timing of works and methodology

1.8.1 Where in-channel works are planned to take place between June and October, we would highlight that in recent years we have seen dangerously low dissolved oxygen levels in rivers during this period. Stirring up silt in periods of warm, dry weather can cause an ecological pollution incident where a plume of silt travels many miles downstream killing aquatic species and fish. These works will require careful planning for silt entrapment and avoidance of the warmest weather to carry out works safely. In high-risk conditions we recommend that works are postponed until cooler temperatures and damper weather returns in order to avoid triggering a serious environmental incident. It will be necessary to monitor the situation and reduce intrusive channel works to a minimum. We look forward to providing technical advice to the project specifically on this subject. We would highlight that fish are protected from pollutants (including silt disturbance) under the Salmon and Freshwater Fisheries Act 1975.

1.8.2 Where there is any over pumping or lowering of levels with pumps there is a requirement to protect fish and in particular juvenile eels from harm. Therefore, screening (maximum size of 2mm) will be required on all on pumps and extra, wider gauge screening further away to prevent entrapment of fish against the pumps.

1.8.3 The Applicant has stated that migratory fish will be able to travel by a flume or pipe. This will have to be carefully designed to be appropriate as eels cannot swim upstream against fast flows and any design will need to be species-specific.

1.9 Invasive Species and Biosecurity

1.9.1 The scheme carries significant biosecurity risks as it crosses and impacts on so many rivers and water courses.

1.9.2 Measures are proposed, and it will be essential to ensure that working between river catchments does not spread problem species and agents such as crayfish plague. There will need to be very rigorous adherence to the Check Clean Dry Protocol, for example, before bringing any plant in, moving between rivers and before any plant leaves for use elsewhere.

1.9.3 There should be an integrated approach to identify, record, and resolve any invasive species concerns around the working sites and robust biosecurity measures to prevent major long-term problems with pest species and diseases.

2 Flood risk

2.1 Flood Risk Assessment

2.1.2 Our Relevant Representation (RR-011) confirmed that we are broadly satisfied with the Flood Risk Assessment (FRA) (6.3 Environmental Statement – Appendix 14.5. APP-163), and associated sections concerning fluvial flood risk. This includes Annex L – Hydraulic Modelling Reports (APP-172); which we have reviewed and are satisfied that it is fit for purpose.

2.1.3 We highlighted that the proposed widening of the bridge over the River Brain could impact on the flood defence embankment located to the west. The Applicant has further surveyed the site and confirmed that there will be approximately 16m between the embankment and the extended structure (wing wall). On that basis, we can confirm that we are satisfied that the structure is capable of being extended without impacting the embankment and look forward to reviewing the detailed proposals as part of the required flood risk activity permit.

2.1.4 We also highlighted that for a number of the proposed main river crossings, there appeared to be a loss of flood storage in the 5% (1 in 20) AEP (Annual equivalent probability) event. The Applicant has explained that the volume lost has been redistributed across the wider floodplain and that there is no increased flood risk. We are satisfied on this point.

2.1.5 The FRA showed an increase in flood depths as a result of the culverted crossings of Rivenhall Brook and the eastern crossing of Domsey Brook. In our Relevant Representation we stated that it is not always clear whether the affected land will remain within the ownership of National Highways. Where that would not be the case, it should be ensured that landowners are accepting of any increased risk,

or compensatory storage should be considered. The Applicant has confirmed in the Response to Relevant Representations that for the eastern crossing of Domsey Brook the 0.07m increase in flood depths on land between the old and new A12 will be remaining in National Highways ownership (REP1-002, RR-011-016). For the 0.05m increased flood depths within the river channel downstream of the Rivenhall Brook crossing, National Highways have confirmed that the river channel is within third party ownership at this location and that they are in the process of engaging with the landowner to obtain permission for the increase in flood depths as a result of the scheme (REP1-002, RR-011-009).

2.1.6 We also highlighted that in the vicinity of Ordinary watercourse 7, the A12 is proposed to be only 0.3m above the 1% AEP event with 40% allowance for climate change flood levels, and the A12 northern slip road is proposed to be 0.22m above the same flood level. This small freeboard may mean that the roads could be at risk in an extreme 0.1% (1 in 1000) AEP flood, particularly with climate change applied. The FRA states that it is not possible to raise the road further due to the local topography. For all other A12 crossings, the road level has a significant freeboard above the 1% with climate change flood level and is therefore unlikely to be affected by the extreme 0.1% climate change event.

2.1.7 The National Networks National Policy Statement (NNNPS) states that it should be considered whether there is a need for a scheme to remain operational during a worst-case flood event over the development's lifetime. The FRA has not clearly stated if this has been deemed necessary for this scheme. It should be determined, in consultation with local authority Emergency Planners, whether the (entire) road is required to remain operational in a worst-case flood event.

2.1.8 The Applicant has confirmed that further hydraulic modelling is being carried out at the affected location. Although the 'worst-case flood over the development's lifetime' is not defined, we consider that it would constitute the extreme 0.1% flood event with the 'central' climate change allowance. This flood event should be modelled if it is deemed that the scheme should remain operational during a worst-case flood event over its lifetime. We also consider that it would be beneficial to additionally model the 'upper end' climate change allowance on the 0.1% flood event as a sensitivity test to illustrate the impacts on the proposed scheme. We are engaging with the Applicant on this issue.

2.1.9 We highlighted in our Relevant Representation that the FRA shows that some works associated with the proposed Haul roads, borrow pits and crossings/works affecting Ordinary watercourses will lead to minor increases in flood depths at some specific locations. Further detail on this is provided below:

2.2 Ordinary watercourse crossings

2.2.1 Chapter 3 of the FRA considers Ordinary watercourse crossings. Essex County Council as the Lead Local Flood Authority (LLFA) are required to consent works affecting the flow of an ordinary watercourse, including the use of culverts. Therefore, our comments on these crossings are advisory. The use of a culvert over a bridge should be justified, and it should be ensured that culverts where used are appropriately sized. Culverts should usually be the largest size that the watercourse

can accommodate, and our minimum culvert size is 600mm; with the current proposals it is not always clear that this approach has been applied.

Ordinary Watercourse 7 Crossing

2.2.2 The proposed works include a new junction, slip roads, and widening of the existing highway embankment. This will require an extension of the existing 50m long, 375mm diameter culvert by 30m under the widened embankments, and the construction of a new 450mm diameter culvert under the northern slip road. An existing farm ditch will be redirected to the north of the A12 and towards the inlet of the new culvert, and the redundant section of farm ditch will be infilled.

2.2.3 The proposed works will increase the flood depths upstream of the northern slip road by up to 0.42m in the 1% (1 in 100) AEP including 40% for climate change. The flood extents will remain similar to the existing extents, and the entire area of increased flood depths will remain within National Highways land, and therefore act as an informal flood storage area. Consequently, while the preference is for compensatory flood storage to mitigate increases in flood depths, this increase in flood depths can be considered acceptable, as the land will remain within National Highways ownership.

2.2.4 The FRA states that in the 1% and 1% with climate change events the pass-forward flow rates in Ordinary Watercourse 7 have been reduced slightly so provide some betterment. However, the pass-forward flows will increase by up to 0.01m^3/s in the 5% (1 in 20) AEP event, which can likely be considered to be minimal in comparison to the total flow rate of Ordinary Watercourse 7 of 0.27m^3/s and the flow rates of the downstream receiving watercourse River Blackwater of 24.89m^3/s. The FRA states that this will result in increases in flood levels downstream, but that they remain in channel. The amount of increase in flood level is not detailed; information on both the increased depths and locations of the increased depths should be provided. Landowner agreement should be obtained for the increases as even though they are within channel they could affect local outfalls etc. Alternatively, mitigation should be provided to remove the increases.

Ordinary Watercourse 21 Crossing

2.2.5 The proposed scheme is to widen the existing A12 by 2m to the north and 11m to the south, along with realigning Highfields Lane. There are three ordinary watercourses that converge to the south of the existing A12 and pass north under the A12 through culverts. The A12 was found to be at risk of flooding, and the proposed works were found to increase flood risk, including to properties, so mitigation has been included.

2.2.6 The mitigation proposal is to create a bund across the floodplain to the south of the A12 to store flows from the western tributary (Ordinary Watercourse 21) and prevent it overtopping the A12. This will then partly outfall at a restricted rate under the A12 into the River Blackwater to the north, as presently, and also outfall into a new culvert and open ditch network which will discharge to the west, into the River Blackwater further downstream than presently.

2.2.7 The flows from the eastern and middle tributaries are going to be directed into the new open channel and culverted watercourse which discharges to the west, into the River Blackwater further downstream than presently.

2.2.8 The modelling shows that the proposed mitigation prevents the A12 from flooding in all events up to the 1% with 40% climate change. The works would result in a reduction in flood levels downstream of the A12 crossing by up to 0.05m during the 1% AEP with 40% climate change and one residential property that was at risk of flooding in the baseline modelling is no longer at risk during the flood events modelled.

2.2.9 The works will not alter the volumes or rates of water entering the River Blackwater, but the water will enter it earlier, and further downstream than before. However, this is unlikely to pose a problem as the critical storm duration of Ordinary Watercourse 21 is much shorter than that of the River Blackwater, so the peaks are unlikely to coincide and the peak flows from the ordinary watercourse are much smaller than that of the Blackwater, so proportionally will not have as much of an impact.

2.2.10 The proposed works will result in an increase in flood depths of over 0.10m on an area of new flood extents adjacent to the realigned Ordinary Watercourse 21 to the west of the site near where it outfalls into the River Blackwater. The FRA states that this land is within the floodplain of the River Blackwater and that the River Blackwater model shows it to be inundated in all modelled flood events. While the land may already be at risk of flooding from the River Blackwater, as a result of the scheme it would also be at risk of flooding from Ordinary Watercourse 21, and potentially sooner than the River Blackwater would flood, or in different rainfall/flood events. The land is within the Order Limits, but it is not clear whether it will remain National Highways land. If it will not, then landowner permission will need to be sought for the increased flood risk, or flood compensation provided to offset and mitigate the increased flood risk. If this is not achieved then it should be determined whether the potential increase in flood risk to this land is acceptable, and whether the overall decrease in flood risk to the road and property outweighs this increase. The actual flood depths in this area have not been detailed, just the plan showing flood depth increase of over 100mm (0.10m). The actual flood depth increases should be provided.

Ordinary Watercourse 21a Works

2.2.11 The proposed scheme involves widening the existing A12 and a new junction and slip roads. This includes the replacement of the existing culvert with three new connected culverts, with a total length of 302m, and the regrading of the existing channel to 8m width for approximately 70m upstream and downstream. Without any further mitigation the modelling showed that this would cause the A12 to flood from the southern slip road. Mitigation has been proposed, including an excavated channel 10m wide and 2m deep upstream of the southern slip road to capture and divert the flows into the culvert, a 1.5m weir located in the diverted eastern tributary watercourse, upstream of the confluence with the western tributary to attenuate flows, and a small drain on the left floodplain of the western tributary to divert flood

water back into the channel, and a 500mm bund to prevent floodwater ponding against the new A12 embankment.

2.2.12 The modelling shows that this would ensure that the scheme does not flood in all flood events, and that the flood water remains in the eastern channel and is directed back into the western channel by the bund and new drain. There is an understandable increase in flood depths in the excavated flood mitigation channel and upstream of the proposed headwall, but a decrease in water levels in the downstream channel, and negligible impact everywhere else.

2.2.13 The LLFA should determine whether the proposed works are acceptable, as a permit would be required for the diversion of the ordinary watercourses and the installation of a weir. If there is a 1.5m high weir in the channel, this is likely to have a large impact in normal flows and is likely to raise normal water levels immediately upstream by 1.5m. It should be detailed how far upstream the increase in in-channel water level will be felt, and whether it will affect the ordinary watercourse outside of National Highway land. If so then landowner permission for this increase in water level will need to be obtained, as it can affect drainage outfalls.

2.2.14 Again, a long culvert has been proposed without exploring the option of a bridge and without justification as to why a bridge is not able to be used. This should be detailed for consideration by the LLFA.

Ordinary Watercourse 23 Crossing

2.2.15 The proposed scheme is for a new offline crossing of Ordinary Watercourse 23 for the new realigned A12 along with a new junction and associated slip roads. The crossing includes new culverts and a realigned watercourse. The works include mitigation measures to prevent an increase in flood risk west of Prested Hall, which includes a new ditch system instead of a culvert west of New Lane, an excavated flood storage area upstream of the new A12, with a culvert outlet to discharge water into the A12 culvert, and a flood bund alongside London Road.

2.2.16 The flood storage area will store a maximum of 1612m³ in the 1% with 40% climate change flood event and take approximately 35 hours to drain. The depth of flooding will be over 500mm (0.5m). National Highways will acquire the land for the purpose of the scheme, and it will remain as unused land. The remainder of the land experiences negligible, less than 0.01m, increase in flood risk. The proposed carriageways are free from flooding in all modelled events.

2.2.17 Again, a long culvert has been used without exploring the option of a bridge and without justification as to why a bridge is not able to be used.

2.2.18 The size of the proposed culverts has not been detailed. It is not clear whether they are the largest possible diameter that can fit in the watercourse, with a minimum diameter of 600mm as required to reduce the risk of blockage and maintain existing flows. The works will need to be agreed by the LLFA.

Ordinary Watercourse 26 Crossing

2.2.19 The proposed scheme will involve a new offline crossing of Ordinary Watercourse 26, which will include three new circular culverts, with diameter of 450mm and lengths of 82m, 16m and 16m respectively. The culverts will discharge into a new 2m wide ditch in the central island of the roundabout, and then discharge via an existing culvert under the existing A12.

2.2.20 The minimum culvert size that we look to see wherever possible is 600mm, and ideally as large as the upstream and downstream ditches. The proposed 450mm culvert is a large reduction on the size of the proposed 2m ditch and is likely to have an increased blockage risk. Justification should be provided as to why a larger culvert diameter is not possible, and the culvert diameter should be increased to match the size of the upstream ditch if feasible. The LLFA will be responsible for permitting the culvert and agreeing these points.

2.2.21 To prevent increased risk of flooding including to the A12, mitigation measures have been proposed, which includes an excavated floodplain compensation area 30m upstream of the culvert with area of 2200m² and depth of 2.5m, and excavated channels to divert flow from the eastern and western tributaries into the flood storage area.

2.2.22 The modelling shows that the storage area would contain 1612m³ in the 1% with 40% climate change event and would fully drain in approximately 50 hours. The usual half drain requirement, to ensure that such features can accept a further flood event, is 24 hours, so it appears that this meets that requirement.

2.2.23 The modelling shows that the mitigation measures ensure that the proposed scheme is no longer at risk of flooding in all modelled results. There would be ponding up to 200mm deep against the proposed A12 embankment at the inlet of the culvert, but the increased flood depths would be constrained to within the watercourse channel. This is within the order limits but it’s not clear if it would remain National Highways land, or if landowner approval is required.

2.2.24 Elsewhere the scheme results in reduced flood risk compared to existing; eliminating the existing flood risk from Hall Chase in all modelled flood events; and reducing the potential flood depths by up to 0.05m for the properties opposite the entrance to The Crescent.

Inworth Road

2.2.25 The works involve widening the road by between 0.25m and 1.5m. The Flood Map for Surface Water shows that the road is already at risk of flooding by up to 0.9m deep. The FRA states that flood storage areas have been designed to contain the surface water flows towards the road, and that the mitigation would protect the road from flooding in the 1% AEP including climate change. However, no plans of the location of the storage areas have been included in the FRA, or details of the volumes required, or modelling to demonstrate that it will function correctly. This should be submitted and the LLFA will need to determine whether the proposed works to mitigate surface water flooding are satisfactory.

Proposed Culverts for other ordinary watercourses – Paragraph 3.6.11 and Annex N of the FRA

2.2.26 As highlighted, the culverting of ordinary watercourses will require consent from the Lead Local Flood Authority – Essex County Council. The LLFA should determine whether the proposed approach and culvert sizes are acceptable.

2.2.27 It is stated that for culverts longer than 12m a minimum of 1.2m diameter is required, which is encouraging as the larger culvert reduces the risk of blockage and better replicates the existing open ditch, so reducing flood risk impacts upstream.

2.2.28 However, on many ordinary watercourse crossings detailed previously smaller culverts were used for long stretches, which does not seem consistent. Additionally, the largest culvert possible that can fit in the watercourse should be used for new culverts in what are currently open ditches, so culverts larger than 1.2m diameter should be used if that can fit in the watercourse.

2.2.29 It is good to see that the culvert size will be designed to convey the 1% with 40% climate change event. Although we agree that the extension of existing culverts could continue to use the existing culvert diameter, the opportunity for betterment should be taken wherever possible, and existing small culverts increased in size where feasible.

2.2.30 Culvert CL-02 for Ordinary Watercourse 2 is proposed to be an extension of the existing twin pipe 0.6m diameter pipes; however, we look to avoid twin pipes due to the blockage risk of the cross wall, so it would be preferable if they could be replaced with a box culvert.

2.2.31 Culvert CL-03A is a 0.3m diameter pipe that is proposed to be extended from 76m to 85m long. A 0.3m diameter culvert is very small and at high risk of blockage so the culvert should be increased to a 0.6m diameter culvert, if possible, to reduce the risk of blockage.

2.2.32 Culvert Cl-07 for Ordinary Watercourse 7 is the extension by 28m to a total length of 80m of a 0.375m diameter culvert. The culvert has a very small diameter, and the assessment in the FRA found it to be inadequately sized, but the use of a larger culvert is not proposed. The FRA states that the increases in flood risk upstream will not affect the A12, and they will either be within the order limits or landowner permission will be obtained for any increases. However, the first option should be to provide compensatory flood storage if possible. Also, instead of extending the inadequately sized culvert, it may be beneficial to agree any downstream increased flood risk with downstream landowners if the culvert size was increased instead of agreeing upstream flood increases with the existing sized culvert, as this way the watercourse would have a larger culvert at less risk of blockage, with betterment achieved. Modelling may be required to demonstrate where the increased flood risk would be felt if the culvert size was increased.

2.2.33 For Ordinary Watercourse 23 the existing 0.225m culvert is proposed to be retained even though the existing pipe capacity is found to be inadequate. The FRA

states that providing a larger diameter culvert would increase the flood risk downstream, so mitigation in the form of an oversized ditch is provided. We question why the opportunity to replace substandard culverts with larger culverts, with less risk of blockage, is not taken, to try to replicate the natural watercourse and flood conditions. As detailed above, the downstream flood risk could be calculated or modelled and compensation provided if required, but with a better sized culvert with less blockage risk installed, rather than providing compensation for maintaining the inadequately sized culvert.

2.2.34 Culvert CL-IWR-9 for Ordinary Watercourse 34b is 0.3m in diameter and will be extended by 10m to 68m. The FRA states that the existing hydraulic capacity is assumed to be adequate. However, we would expect the largest culvert possible, to replicate the size of the ditch, wherever possible, and it is unlikely that a very small 0.3m culvert could provide sufficient hydraulic capacity. This should be used as an opportunity to increase the culvert size, to at least 0.6m diameter, which will reduce the blockage risk. We note that there are houses at risk of flooding upstream of the culvert.

2.2.35 CL-IWR-4 for Ordinary Watercourse 34c is a 0.9m diameter, 243m long culvert which is proposed to be retained, but which currently receives the flows for a significantly large natural catchment as well as highway drainage conveyance. The FRA states that "*The flows from the natural catchment would need to be restricted at upstream end of this culvert, and proposed mitigation measures would be required in the form of flood storage. The details of proposed flood storage (attenuation volume, size, location, etc.) would be confirmed through hydraulic modelling at subsequent design stage"*. We question whether this detail should instead be provided now.

2.2.36 N/1/2 states that new culverts on Ordinary Watercourses and drainage culverts with length over 12m will be 1.2m diameter as a minimum except where the new culvert is proposed in a line of existing smaller size culverts, and then a 450mm culvert would be proposed as a minimum with appropriate mitigation measures. However existing small inadequately sized culverts should not be used to justify a small new culvert upstream or downstream. The LLFA will need to determine if this is acceptable when consent is obtained.

Blockage Risk of Culverts – Paragraph 3.6.15 and Annex P of the FRA

2.2.37 The FRA states *"An initial assessment of the blockage risk for watercourse crossings has been undertaken in accordance with CIRIA (2019) C786 and is presented in Annex P. Where further assessment identifies the need for a trash or security screen to reduce risks, these would be included at the detailed design stage."* Annex P provides details of which culverts, whether they are being retained or extended, have been assessed as having a medium risk for which the next steps are to "*do something (which may include detailed assessment)".*

2.2.38 Ideally culverts should be large enough for debris to pass through without requiring a trash screen, as the use of trash screens can cause debris to become trapped on them and can potentially increase flood risk upstream compared to an open culvert. They also require regular maintenance and cleaning. A permit will be required from the LLFA for the installation of trash screens on ordinary watercourses.

2.3 Reservoir flooding

2.3.1 Section 6.3 of the FRA considers reservoir flooding. Part of the scheme lies in an area at risk of reservoir flooding. Reservoir flooding is extremely unlikely to happen providing the reservoir is appropriately managed and maintained. All large, raised reservoirs designated as 'high-risk' and those where the risk is still to be determined must be inspected and supervised by reservoir panel engineers. The Environment Agency are the enforcement authority for the Reservoirs Act 1975 and under this Act it is a requirement that reservoirs are inspected regularly, and essential safety work is carried out. All four reservoirs in question are already designated as high-risk reservoirs so will already need to have on-site and off-site plans and a reservoir panel engineer to manage the reservoir and the risk of flooding. However, the failure of a reservoir has the potential to cause catastrophic damage due to the sudden release of large volumes of water with little or no warning. The FRA states that it could potentially alter reservoir flood flow paths in the event of a breach of the reservoir banks. The local planning authority, who are responsible for the reservoir offsite plans, will need to evaluate the potential damage to buildings or loss of life in the event of dam failure, compared to other risks, when considering development downstream of a reservoir. They should request further details on the potential depths of flooding, and diversion of flows if required.

2.3.2 The Planning Practice Guidance states that Local planning authorities are advised to consult with their emergency planning officers as early as possible regarding any planning applications which have implications for emergency planning. Where issues affecting emergency services are identified it may be relevant to contact the local resilience forum which prepare for local incidents and catastrophic emergencies. Or in some cases, it may be appropriate for the emergency services to be consulted on specific emergency planning issues related to new developments. It is also advised to consult with the owners/operators of raised reservoirs, to establish constraints upon safe development.

2.4 Haul Roads

2.4.1 Section 7.3 of the FRA concerns construction elements, including haul roads, borrow pits, dewatering, and the construction methodology at watercourse crossings.

2.4.2 We agree with the FRA that the majority of the proposed haul roads lie in Flood Zone 1 and that the very small areas within the modelled flood zones extents would be likely to have minimal floodplain loss. Any impacts are likely to be immediately upstream and in the order limits, apart from the two locations detailed further in the FRA (see below). Haul roads that are proposed to be raised above the existing ground level and are within Flood Zones 2 and 3 will need a Flood Risk Activity Permit, so the detailed impacts could be assessed through this route.

2.4.3 There are some proposed haul roads which lie within Flood Map for Surface Water outlines, and therefore it should be ensured that either they are not raised in these locations, or that further modelling/calculations are undertaken to ensure no increase in surface water flood risk. The LLFA may comment further on this aspect.

Haul Road East Of Witham

2.4.4 The inclusion of the raised haul road to the east of Witham will temporarily remove 810m³ of floodwater from the floodplain. The volume of Functional Floodplain (Flood Zone 3b) that will be removed by the temporary haul road has not been detailed and should be assessed. In a 1% AEP flood event this reduction in flood storage volume will result in an area of lower ground on the edge of the floodplain becoming at risk of flooding, which wasn't previously, and flood to a depth of 0.37m. The FRA states that it appears that this area is an existing hollow, potentially a pond or ditch and is within an area of woodland/wetland. The haul road will be in place for a maximum of 18 months. The area is outside of the order limits and not in National Highways ownership. Because there are no vulnerable receptors no mitigation has been proposed in the FRA for the increase in flood risk. Temporary mitigation such as compensatory storage should be provided, or landowner permission obtained for the temporary increase in flood risk. If this is not achieved, then it should be determined whether the temporary increase in flood risk to an area of wet woodland is acceptable.

Haul road and piling rig south of Ashman's Bridge (within River Blackwater floodplain and channel)

2.4.5 The temporary haul road will result in an increase of flood levels of up to 0.04m depth between the haul road and the A12 in the 1% AEP event. The FRA states that this is in the National Highways land ownership, so is acceptable. However, the plan shows that there is also a large area which would have between 0.01 and 0.05m increase in flood depths to the north of the A12, which is not in the order limits, and is not mentioned in the FRA. Either temporary mitigation should be put in place, landowner agreement should be obtained for this area of temporary increased flood risk, or it should be determined whether the increase is considered acceptable.

2.5 Borrow Pits

Borrow pits E and F

2.5.1 Borrow Pit F extends into a surface water flow path so temporary ditches around the borrow pit are proposed to capture and convey flows around the borrow pit. It's not clear how the required dimensions of the ditches will be determined; this should be detailed. Borrow pit E crosses Ordinary Watercourse 7, so the FRA states that temporary ditches will go around the perimeter of the borrow pit to capture and convey flows around the borrow pit. This will equate to the realignment of Ordinary Watercourse 7, as it will be removed by the digging of the borrow pit. A permit will be required from the LLFA.

Borrow Pit I

2.5.2 Borrow pit I lies in the fluvial floodplain of Rivenhall Brook, so the borrow pit could be at risk of flooding and may require dewatering after. There would also be a risk of flooding to the people and plant within the borrow pit. A Flood Management Plan should therefore be developed to reduce the risk to people and equipment and

enable them to be evacuated from the area at risk in advance of any flooding. Alternatively, relocating the borrow pit to an area that is not at risk of flooding could be considered.

Borrow Pit J

2.5.3 Four tributaries of Ordinary Watercourses 21 and 21a will need to be temporarily realigned around the perimeter of the borrow pit. It is stated that the temporary realignment would be suitably sized to safely convey flows. Consent from the LLFA will be required for the realignment of the ordinary watercourses. To prevent the temporary realignment of the watercourses from increasing flood risk to the A12, the permanent mitigation works for Ordinary Watercourses 21 and 21a would be completed prior to the temporary realignment.

7.3.29-7.3.35 - Dewatering

2.5.4 There are two borrow pits where the rate of dewatering flows into the receiving watercourse could cause flood risk problems. For Borrow Pit K the estimated dewatering flow of 0.36m³/s is 16% of the 5% AEP flow (2.25m³/s) of the receiving watercourse Ordinary Watercourse 21. To mitigate this, the permanent mitigation works for Ordinary Watercourse 21 including the creation of a flood storage area, will be installed before the dewatering takes place.

2.5.5 For cutting W5, the estimated dewatering flow rate of 0.12m³/s is 37% of the 1% AEP flows of the receiving watercourse Ordinary Watercourse 10. The 5% flow of the receiving watercourse is unknown, but the dewatering flow is likely to be a much higher proportion of the watercourse's 5% flow. The FRA states that as the watercourse only flows through open agricultural and greenfield land with no receptors vulnerable to flooding then this would result in a negligible increase in flood risk. However, what is not clear is whether the proposed flow rate, along with the usual baseline flow rate in Ordinary Watercourse 10 would result in out of bank flows, if so, it will cause flooding on the land for however long the dewatering is in place. This is unlikely to be considered acceptable if it is on third party land and without landowner permission being obtained. If the flows are likely to remain in channel, then this might be considered to be acceptable, but landowner permission would still be required for the increase in in channel flows, particularly in regard to the impact on existing outfalls. The FRA and section N.11.21 in the Environmental Management Plan does say that the dewatering discharge could be temporarily paused during flood events to prevent any increased flood risk, if required. It would be beneficial for this to happen, and especially important for Watercourse 10, so should be stipulated in the Environmental Management Plan. Although, regardless, the flood risk during normal flows should be determined, shown on plans, and its acceptability determined.

2.6 Construction

Construction methodology at watercourse crossings

2.6.1 Proposals for the temporary over-pumping of watercourses to enable construction is described in section 7.3 of the FRA and the REAC (APP-185)

reference RDWE 14 & 15. It is stated that over-pumping pipes would be sized for the appropriate flows, and the structures will be designed to be overtopped in the 5% (1 in 20) AEP event to “have minimal impact on channel capacity during a more extreme flood event”. However, for main rivers the channel capacity is usually considered to be the 50% (1 in 2) AEP event, so the water-retaining structures may need to be much smaller, below bankfull level, to ensure that in high flows the structure overtops before the water floods out of bank, and ideally should be designed to be removed in advance of high flows. A Flood Risk Activity Permit would be required for temporary dry working areas and over-pumping in main rivers, and a consent is likely to be required from the LLFA for works in ordinary watercourses.

2.6.2 The FRA (and paragraph N.11.25 of the Water Management Plan (APP-198)) states that temporary watercourse crossings, such as culverts, are proposed to be sized for the 10% AEP event or as otherwise agreed with the Environment Agency for main rivers. It is likely that we would want a larger culvert, unless it can be demonstrated that in a larger flood event the small culvert would not increase flood risk, and that the flood flows would not be increased in depths or extent, or that the culvert can be removed in advance of high flows. Either way, a temporary Flood Risk Activity Permit would be required for the works.

2.6.3 It is stated in the FRA and REAC (APP-185 reference RDWE 3) that stockpiles and storage areas will be more than 10m from rivers and in in Flood Zone 1 where possible. If this cannot be achieved, then they will be able to be moved or bunded in receipt of a flood warning. We would be unlikely to want to see bunded stockpiles in Flood Zone 2 or 3 without calculations to show there would be no increase in flood risk elsewhere. It would be preferable to locate stockpiles in Flood Zone 1. The details of all temporary works in Flood Zones 2, 3 and within 8m of the main rivers will need to be agreed through the temporary Flood Risk Activity Permits.

FRA Annex B – Construction Elements Plans

2.6.4 It would be beneficial if the flood extents could be added to this Plan so that it is clear to see which lay down areas and temporary storage areas are proposed to be in the Flood Zones, and therefore which may require a temporary Flood Risk Activity Permit.

3 Contaminated Land

3.1 In our Relevant Representation (RR-011), we requested to review further data and assessments that were either not included within the application or will be required at a later stage to inform the detailed design. We are liaising with the Applicant on this point. The Applicant has stated that we will be provided with all relevant existing reports and source data, and that further information and assessments will be provided as they become available. However, the mechanism for consultation on this, including any required site specific Detailed Quantitative Risk Assessments, has not been confirmed.

3.2 We also raised concerns in our Relevant Representation that several of the selected borrow pit locations may remain as surface expressions of groundwater

after excavation. Any pollution affecting these waterbodies would pose an elevated risk of direct input of contamination to groundwater. The Applicant has advised that any such waterbodies would be passive waterbodies, that receive no discharge from the proposed scheme, and has highlighted the protective measures to be in place during construction.

3.3 We are satisfied on those points but request that the Applicant also confirms that measures will be included to protect any such waterbodies from external sources of pollution during the operation of the scheme. Such measures may include fencing to prevent vehicles from accessing the site to unlawfully deposit waste, and bunding to prevent excess run-off from agricultural land reaching the waterbody.

4 Groundwater Resources

4.1 Our Relevant Representation (RR-011) confirmed that we are broadly satisfied at this stage in terms of impacts on groundwater resources, and that all impacts on groundwater receptors will be assessed to the appropriate level of detail during the pre-application process for any dewatering abstraction licence(s).

4.2 We noted that the assessment of groundwater quality due to contaminated land in the Environmental Statement Appendix 14.4 – Groundwater Assessment (APP-161) was done in comparison to Environmental Quality Standards (EQS). Comparison with Drinking Water Inspectorate standards would be required for any sites where groundwater quality at groundwater abstractions could be adversely impacted during construction activities. The Applicant has accepted that this would be appropriate.

4.3 With regard to water resource availability, we highlighted in our Relevant Representation that dewatering activities may require an abstraction licence from the Environment Agency. We encouraged the Applicant to engage with us on that requirement at an early stage to ensure that the necessary permissions can be in place prior to work commencing.

4.4 We stated that consumptive licences are unlikely to be granted in this area as water availability is limited. Although dewatering is generally seen as non-consumptive, if that water is used for dust suppression, as has been suggested, we would then consider that to be a consumptive use. Securing an abstraction licence for such a use is therefore not certain. The Applicant should discuss this with us as part of the licencing pre-application process and consider alternative sources of supply.

5 Surface Water – Water resources and water quality

5.1 Our Relevant Representation (RR-011) stated we are satisfied that the outlined mitigation can reduce impacts to surface water quality to an acceptable level, and that more detail will be provided in the Second Iteration of the Environmental Management Plan (EMP).

5.2 We asked for clarification on the management of foul and surface water from construction compounds, and for detail on the management of polluting firefighting run-off, highlighting that Essex Fire and Rescue service should be consulted. In relation to emergency procedures and recording environmental incidents, we asked that the process of checking watercourses be formalised within the EMP.

5.3 Through discussions on the Statement of Common Ground, the Applicant has confirmed that these issues will also be addressed as part of the Second Iteration EMP. However, the Applicant has not yet confirmed whether the Environment Agency will be a named consultee for Requirement 3.

5.4 The Applicant has confirmed that connections to mains water supply will be a temporary measure and that discussions with the water company regarding supply are ongoing.

6 Draft Development Consent Order (DCO)

6.1 In our Relevant Representation (RR-011) we requested to be added as a named consultee, for matters within our remit, for Requirement 3 and Requirement 4 (relating to the second and third iteration EMP). This is to ensure that we can review and comment on the proposed detailed mitigation measures for the protection of the environment during the construction and operational phases. This would be in line with the approach taken with other recently approved National Highways road schemes in East Anglia. The Applicant has not confirmed that the Environment Agency is to be added as a named consultee for both Requirements.

6.2 In respect of Requirement 6, we requested that the proposed wording in part (2) be amended to include reference to consultation with the Environment Agency and to the protection of controlled waters. The Applicant has proposed an amended wording at section RR-011-048 of the Response to Relevant Representations (REP1-002). We are satisfied with the proposed wording.

6.3 Requirement 6 only addresses unsuspected contamination. Our Relevant Representation also requested an additional Requirement to detail the measures for managing contaminated land across the scheme. We are in discussion with the Applicant on the issue of land quality and the proposed approach to mitigation. The Applicant has stated that further information will be provided to us, but has not agreed to an additional Requirement and the mechanism to secure consultation has not been confirmed. If information is to be provided as part of the second iteration Environmental Management Plan (EMP), and the Environment Agency is added as a named consultee to Requirement 3, then we would agree that an additional Requirement is not necessary.

6.4 We previously asked to be included as a named consultee in Requirement 10 Detailed Design part (1)(c). We can confirm that we are satisfied with the wording as proposed.

6.5 We also asked to be added as a named consultee to part (2) of Requirement 11 concerning Surface and foul water drainage. Part (1) of R11 currently requires the

Environment Agency to be consulted on the proposals for surface and foul water disposal, including pollution control, prior to the commencement of development. We are not currently a named consultee for part (2), which concerns the approval of any proposed amendments to details agreed under part (1).

6.6 In the Response to Relevant Representations (REP1-002, section RR-011-048), the Applicant suggests that any proposed amendments would also require an Environmental Permit from the Environment Agency, removing the need for consultation. It is actually the case that such measures may not require a separate Environmental Permit and therefore we should have the opportunity to review any proposed amendments to what has been previously agreed through this Requirement. A similarly worded Requirement which includes the Environment Agency as a named consultee in part (2) has been included within the DCO for other recently approved National Highways road schemes in East Anglia.

7 Consents and Licences Position Statement (Environmental Permitting)

7.1 The Applicant is not seeking the disapplication of the majority of the environmental permits that may be required during construction and operation of the scheme, but they have stated they seek the disapplication of the requirement for Flood Risk Activity Permits (FRAP) for permanent structures; and environmental permits for the discharge of water and sediment during operation (discharge consents). The draft Development Consent Order submitted with the application (APP-039) contains a provision at Clause 3 (4) (a) providing for disapplication of these permits.

7.2 In view of our current concerns with the nature of the proposed main river crossings, we are not content to agree to the disapplication of flood risk activity permits for permanent structures. Additionally, we do not normally agree to the disapplication of the discharge consenting regime and so do not consent to this disapplication either.

7.3 The effect of Section 150 of the Planning Act 2008 is that no disapplication of legislation within the remit of the Environment Agency can take place without our consent.

7.4 We note that the Applicant has commented in response to our Relevant Representation that it would not be legitimate for the Environment Agency to withhold consent for culverted crossings (REP1-002, RR-011-049). We do not agree with that statement.