

TRANSPORT AND WORKS ACT 1992

TRANSPORT AND WORKS (INQUIRIES PROCEDURES) RULES 2004

NETWORK RAIL (CAMBRIDGE SOUTH INFRASTRUCTURE ENHANCEMENTS) ORDER

MAIN PROOF OF EVIDENCE ON MATTERS OF DRAINAGE

**PAUL JENKIN ON BEHALF OF
THE UNIVERSITY OF CAMBRIDGE**

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1 QUALIFICATIONS AND EXPERIENCE

- 1.1 My name is Paul Jenkin BEng (Hons), MSc, CEng, FCIWEM, C.WEM. My primary professional experience is in the field of flood risk and environmental assessment and in particular the assessment of flood risk as it relates to development and infrastructure. I have 27 years of experience in the field. I have been responsible for the production of a large number of Flood Risk Assessments and drainage strategies. I have acted as expert witness for many planning inquiries and also in legal disputes.

2 **INTRODUCTION**

Scope of Evidence

- 2.1 The purpose of evidence is to address the adequacy and impacts of those aspects of the proposed scheme ("**Scheme**") which relate to flood risk and drainage, in so far as they potentially affect the interests of the University of Cambridge ("**University**"), particularly in respect of the Anne McLaren Building ("**AMB**") and the land known as "Plot 9" on the Cambridge Biomedical Campus ("**CBC**"). The generality of these concerns would also extend to any other land or interests in land of the University in so far as drainage into Hobson's Conduit may be affected.
- 2.2 In preparing this evidence I have reviewed the information contained in the Environmental Statement ("**ES**") as well as that provided in workshops held with Network Rail and their technical experts on 2 and 3 November 2021. I have also reviewed the planning documents for AMB and Plot 9 and where possible discussed the issues with the authors of those documents.
- 2.3 I am familiar with the particulars of the original Flood Risk Assessment as relating to the property within the University's estate known as AMB and Plot 9.
- 2.4 The proposed works encompass an area of the AMB facility and Plot 9 which currently (in the case of AMB) and potentially (in the case of Plot 9) contains the infrastructure required to effectively drain surface water from the sites.
- 2.5 If this existing infrastructure is altered without acceptable mitigation, then it would increase flood risk to the AMB facility and Plot 9 and also potentially prejudice the ability for the University to meet its obligations in respect of managing flood risk upstream and downstream towards Hobson's Conduit.

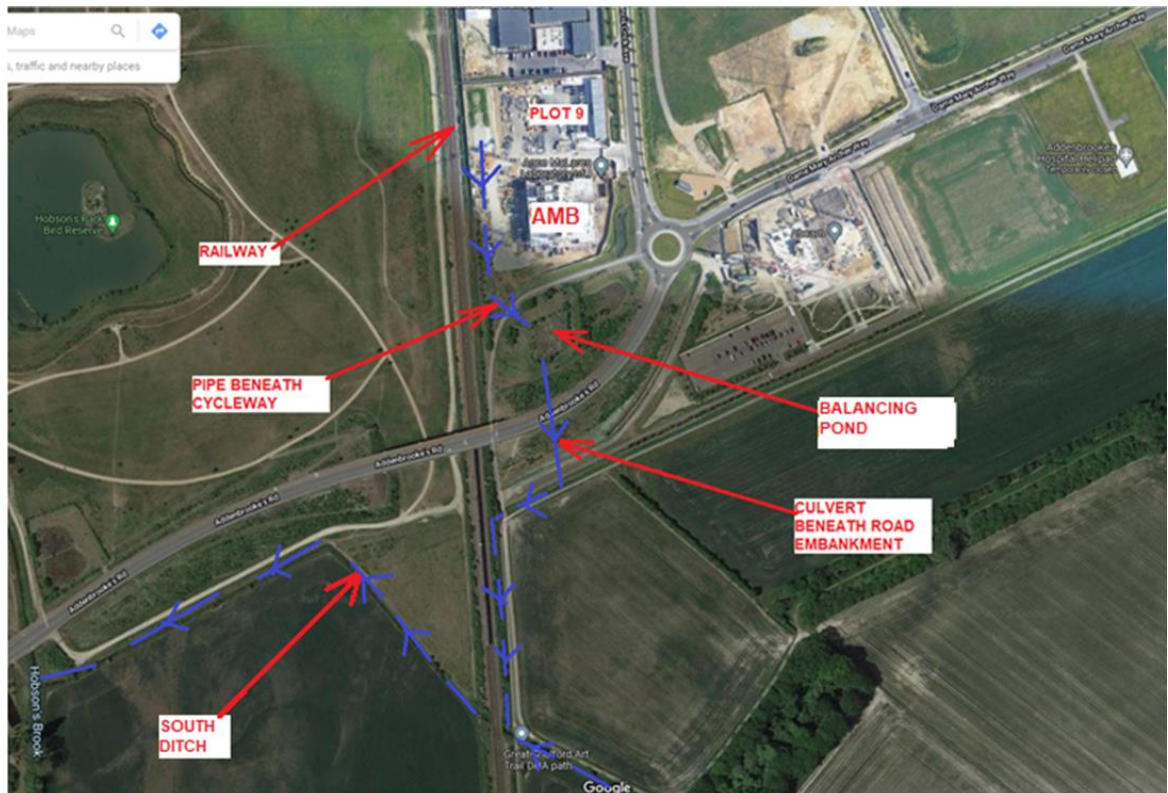
Summary of the University's Case

- 2.6 Since submission of the University's Statement of Case it has now become clearer from Network Rail's submissions at the workshops above how the proposed works could affect AMB and Plot 9. I describe below what I understand the current proposals to be, but I remain concerned with the adequacy of information and potential impacts and mitigation in respect of the proposed new balancing pond; the proposed haul road; drainage connectivity, flood storage and water connectivity. Until further information

and mitigation is provided by Network Rail, in my view there are sufficient concerns with the Scheme to justify the University maintaining its objection to the Order.

3 **CONTEXT**

- 3.1 In the figure below the blue arrows indicate the route of surface water drainage from AMB and Plot 9. Both drain to the south between the existing railway and the existing and proposed buildings via a series of connected swales. Just upstream of the point marked as the “pipe beneath the cycleway” a hydrobrake is installed to limit the rate of flow from the two plots into the balancing pond highlighted on the plan. From the balancing pond flow is conveyed via a series of pipes and ditches and ultimately discharges into the Hobson’s Conduit in the south west corner of the figure below.



- 3.2 The drainage system is designed to maintain an agreed peak discharge rate as set out in the original planning application and subsequent planning consent. Additionally there is an obligation to maintain the quality of runoff into the receiving watercourse. This is usefully summarised in the Flood Risk Assessment for the Scheme (“FRA”) which is included at Appendix 18.2 to the ES. Section 6.2 of the [TBC] states:

“The Cambridge Biomedical Campus is covered by covenants with the Hobson’s Conduit Trust regarding drainage and special arrangements are in

place to safeguard and monitor the quality of surface water entering Hobsons Brook and Hobsons Conduit. These covenants govern the right to access, for the purpose of carrying out works, the Hobsons Conduit. Discharge of surface water into Hobsons Conduit, through the North Ditch and/or the South Ditch and/or other ditches constructed through the green corridor between the Cambridge Biomedical Campus and Hobson's Conduit, must also be controlled under the covenant".

- 3.3 The covenants reflect that maximum flow rates and maximum flood flow (as set out in a previous Flood Risk Assessment and strategy report) should not be exceeded. I understand that this limits the discharge from the plots to 2 l/s/ha. Furthermore, there is also an obligation to avoid any new discharge into Hobson's Conduit without the prior approval of Hobson's Trustees.
- 3.4 The proposed Scheme could reduce the effectiveness of this system by:
- 3.4.1 altering or interfering with the alignment, maintenance of ditches;
 - 3.4.2 adding more flow into an existing network; and
 - 3.4.3 altering the effective capacity or operation of the ponds, swales or ditches.
- 3.5 The FRA deals with Surface Water Management in section 6. The section identifies the potential for impacts on the existing drainage of the CBC but provides no specific assessment of how the Campus might be affected or what mitigation might be provided. In particular there is no mention of the haul road and the potential removal of the swales to the west of AMB and Plot 9.
- 3.6 The FRA seems to be principally concerned with how the development proposals themselves would be drained.

4 **THE UNIVERSITY'S CONCERNS**

- 4.1 As set out in the workshops on 2 and 3 November 2021 the main concern for the University, with respect to flood risk and drainage, is that the proposed haul road would occupy the area which currently (in the case of AMB) and potentially (in the case of Plot 9) contains the infrastructure required to effectively drain surface water from the sites.
- 4.2 A further concern of the University is how the drainage infrastructure will be reinstated following construction depending upon the permanent boundary to be confirmed. These proposed works have the potential to increase flood risk on and off site and to impact negatively on water quality.
- 4.3 If this existing infrastructure is altered without acceptable mitigation then it would increase flood risk to the AMB facility and Plot 9 and also prejudice the ability for the University to meet its obligations in respect of managing flood risk upstream and downstream towards Hobson's Conduit.
- 4.4 The University has made submissions to the Secretary of State for Transport in their letter dated 30 July 2021 highlighting a number of issues which are of concern. In respect of drainage the University highlight the following:
- 4.4.1 *"Paragraph 27 - Any alterations to the drainage arrangements proposed by the Scheme would need to be undertaken in a manner that preserves the normal operation of the AMB facility, both temporarily and permanently. It is currently unclear what impacts there are upon the swale and attenuation pond that exist within the University's Estate, particularly given that the limits of deviation shown on the TWAO application drawings appear to straddle on site drainage infrastructure. Network Rail's Environmental Statement for the proposed Scheme does not obviously assess this. Network Rail has not committed to any mitigation measures which take into consideration the implications of the Scheme on the drainage arrangements for the AMB facility and they are therefore inadequate. As such, the Environmental Statement and the Draft Order and related suite of TWAO application documents are deficient."*
- 4.4.2 *"Paragraph 28 - The University must also understand the intended implications for the management and maintenance of drainage and*

landscape features going forward to protect future maintenance and building operations. At present, whilst the submitted Flood Risk Assessment suggests that it is Network Rail's intention to manage features within the Order Limits, there appears to be no further information provided in this regard to clarify which elements are temporary and which are permanent management issues, despite the deposited TWAO plans suggesting that some of the University's existing surface water drainage features fall within land that Network Rail is looking to compulsorily acquire."

- 4.4.3 *"Paragraph 31 - However, we would highlight that the surface water drainage outlet from AMB and Plot 9 discharges into the balancing ponds to the south of the AMB (within the control of Cambridge Medipark Limited), as illustrated within the information at Appendix 4. The University understands that the water from the balancing ponds subsequently feeds into the Hobson's Conduit via the south ditch further to the south of the AMB and Plot 9, outside of the University's demise. Furthermore, the University has given covenants to the Trust to protect the Hobson's Conduit from damage and contamination."*
- 4.4.4 *"Paragraph 32 - Given the inter-dependency between the AMB and Plot 9 drainage design and the potential impact upon the Conduit, the University requires suitable mitigation measures to be put in place to ensure the outfall drainage from the AMB and Plot 9 remains unaffected by the Scheme. Whilst we understand that there are protective provisions in place in relation to the Conduit itself, it does not appear to us that Network Rail has committed to any specific mitigation measures to protect the outfall drainage from the AMB and Plot 9. As such, the Environmental Statement and the Draft Order and related suite of TWAO application documents appear to us to be deficient."*
- 4.4.5 At the time of writing no detailed information or assessment has been presented by NR that would reduce the concerns above.

5 REVIEW OF ES

- 5.1 Surface water drainage is dealt with in Chapter 18 of the ES which is supported by the FRA. In paragraph 18.4.14 (page 18-20) it is clearly the intention that the issues of surface water drainage relating to the CBC are to be dealt with in a sustainable and sensitive manner. However, from the information provided in the ES and the FRA it is not possible to determine how the efficacy of the existing drainage system will be maintained or whether any mitigation is proposed to offset any impacts. As mentioned earlier the FRA is principally concerned with the direct runoff from the proposed development and the mitigation of any increase by the use of SUDS. As far as I can see there is no consideration of what might happen if the proposals interfere with existing infrastructure that drains existing development. This demonstrated in Appendix C of the FRA which shows the proposed layout of the drainage system.
- 5.2 Previously we had not known what works were proposed within AMB and Plot 9 and so could not assess the potential impacts. From the presentations at the workshops it was clear that the proposed haul road would occupy the area currently occupied by the western swale in AMB and the proposed swale in Plot 9. This creates a number of potential impacts which are summarised below alongside what I understand the current Network Rail strategy for mitigation to be. More information was promised following the workshops but at the time of writing none has been forthcoming. These proposals have been made subsequent to the submission of the ES and I have seen no addendum to the ES or the FRA which makes an assessment.
- 5.3 In relation to drainage connectivity, currently the surface water drainage from AMB discharges directly into the swale and a similar strategy is envisaged for Plot 9. With the swale infilled this would not be possible, and the sites could not drain effectively. Network Rail propose that a pipe or filter drain is installed beneath the haul road and that the existing drainage be connected to this. Whilst potentially feasible no detailed information has been provided to demonstrate the efficacy of these proposals.
- 5.4 In relation to flood storage, the swale also provides flood storage which allows the site to discharge at the prescribed rate without flooding the site and buildings. If this storage is removed, then flood risk would increase and/or the rate of discharge may increase through over topping. Network Rail propose that the new pipe (above) is connected to the new trackside drainage and ultimately routed to the western side of the tracks where it would be attenuated prior to discharge into the watercourse. Whilst in principle this seems possible, it relies on there being sufficient capacity within the

system and that the trackside drainage and new storage are in place before the haul road is constructed. Some detailed analysis would be required before I could be confident that this approach would be effective. Similarly, to avoid sterilising Plot 9 (if development is envisaged before the removal of the haul road), then the system would need to accommodate the proposed run off from Plot 9. Whilst potentially feasible no detailed information has been provided to demonstrate the efficacy of these proposals.

- 5.5 In relation to water quality, the swale provides a water quality benefit which cannot be replicated within a piped system, and it will be necessary for any scheme to ensure no deterioration in water quality. Whilst potentially feasible no detailed information has been provided to demonstrate the efficacy of these proposals. It is my opinion that the scope of works now apparent at AMB and Plot 9 have not been assessed in sufficient detail within the existing ES and FRA to give confidence that the impacts will not be significant. It is also not clear whether the Lead Local Flood Authority have approved the revised approach to drainage.
- 5.6 While some information on proposed haul routes was contained within the ES (see the evidence of Mr Graham Hughes), I had understood from initial discussions with NR that there would be a further proposed haul road which would sever the existing surface water drainage routes from AMB and the proposed drainage routes from Plot 9. Network Rail propose a piped interceptor drain below the proposed haul road but there is no indication of its size, gradient or capacity and whether it could convey the necessary flows without surcharging the drainage system and flooding the car parks and/or the existing buildings. However, it does not appear that this has been formally submitted. I also understand from Graham Hughes' evidence that there have been further conversations about relocating construction activity to the western side of the railway line, however, again, I have not seen any further details of any proposals. For present purposes I will comment on the potential haul road along the eastern edge of the railway line.
- 5.7 As above, failure to maintain drainage connectivity would also prejudice the ability to develop Plot 9 before the haul road was eventually removed.
- 5.8 In both these cases, I am of the opinion that to ensure that any impacts do not create an adverse impact on the University that a detailed survey of the existing drainage infrastructure is required and that this should be used to build a detailed hydraulic model to assess the proposals and determine that the concept scheme could be delivered in practice.

- 5.9 The local topography is generally flat and as such it may be difficult to divert drainage routes effectively using a gravity system.
- 5.10 Without this minimum level of assessment, I cannot see how the aspirations of the ES can be relied upon to ensure that there are not adverse impacts on AMB and Plot 9 or any resultant impact on third parties by reducing the existing flood storage capacity.
- 5.11 NR's proposed solution is also predicated on the assumption that the proposed interceptor can be connected into the proposed trackside drainage and onwards to the west of the train line. From here it is proposed that some additional storage would be provided prior to discharge into the watercourse.
- 5.12 This will be further complicated since once combined with the trackside drainage it will be difficult to demonstrate that the water originating from Plot 9 and AMB has been attenuated by the prescribed amount. It may also be necessary to alter the capacity of the existing hydrobrake at the south of AMB to ensure that overall the discharge from the two plots does not exceed that which has been prescribed.
- 5.13 This supports my opinion that to ensure that any impacts do not create an adverse impact on the University that a detailed survey of the existing drainage infrastructure is required and that this should be used to build a detailed hydraulic model to assess the proposals and determine that the concept scheme could be delivered in practice.
- 5.14 In particular it is necessary to show that overall the rate of flow into the downstream watercourses is no greater than that agreed as part of the AMB/Plot 9 designs to discharge the previous planning conditions. Failure to do this would mean that the University would not be meeting its obligations to manage flood risk to and from its buildings. The generality of these concerns would also extend to any other land or interests in land of the University in so far as drainage into Hobson's Conduit may be affected.

6 DISCUSSIONS WITH NR

- 6.1 I attended workshops held by NR and their drainage team on 2 and 3 November 2021.
- 6.2 The first was solely with University representatives and the second was with a wider group of interested parties. The substance of both workshops was the same.
- 6.3 At the end of the first workshop it was agreed that NR would provide a more detailed assessment of their proposals for the University to consider. At the time of writing this proof no further information has been forthcoming
- 6.4 Without this additional assessment of the proposed mitigation I still have concerns that the proposed approach may not deliver the required capacity or flood storage that would be required to ensure that there would be no adverse impacts on the existing drainage arrangements.
- 6.5 I have highlighted some of the practical and programming challenges which in my view could impact on the proposed mitigation.
- 6.6 I think it would be reasonable to suggest that a detailed survey be undertaken and that a detailed model be produced which demonstrates how NR will achieve the fundamental objectives of ensuring that: the flood risk is not increased to Plot 9 and AMB; and the discharge from the surface water drainage system does not exceed the value that has previously been agreed.

7 SUMMARY AND CONCLUSIONS

- 7.1 The proposed works and in particular the proposed haul road have the potential to adversely impact AMB and Plot 9 in respect of flood risk and drainage. The generality of these concerns would also extend to any other land or interests in land of the University in so far as drainage into Hobson's Conduit may be affected.
- 7.2 This aspect of the works has not been adequately assessed in the ES in my view.
- 7.3 The impacts of the haul road do not seem to have been addressed in the ES chapter covering surface water.
- 7.4 In particular the proposals to remove extensive drainage infrastructure without a detailed assessment of the impacts or mitigation give no confidence to the University that they will not be adversely impacted.
- 7.5 As a concept the scheme of mitigation suggested by NR could be feasible but it is complex, relies on a number of interconnected parts and the timing of construction activities.
- 7.6 In my opinion it is premature to conclude that there will be no adverse impacts until more detailed survey and modelling has been undertaken to demonstrate that the concept scheme can be delivered in practice.

8 WITNESS DECLARATION

8.1 I hereby declare as follows:

8.1.1 This proof of evidence includes all facts which I regard as being relevant to the opinions that I have expressed and that the inquiry's attention has been drawn to any matter which would affect the validity of that opinion.

8.1.2 I believe the facts that I have stated in this proof of evidence are true and that the opinions expressed are correct.

8.1.3 I understand my duty to the inquiry to help it with matters within my expertise and have complied with that duty.

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