



THE APPLICANT'S COMMENTS ON THE PROOF OF EVIDENCE BY THE CHIEF ENGINEER AT ANGLIAN WATER

FOR THE DEVELOPMENT CONSENT ORDER APPLICATION FOR THE ALTERATION AND CONSTRUCTION OF HAZARDOUS WASTE AND LOW LEVEL RADIOACTIVE WASTE FACILITIES AT THE EAST NORTHANTS RESOURCE MANAGEMENT FACILITY, STAMFORD ROAD, NORTHAMPTONSHIRE

PINS project reference: WS010005

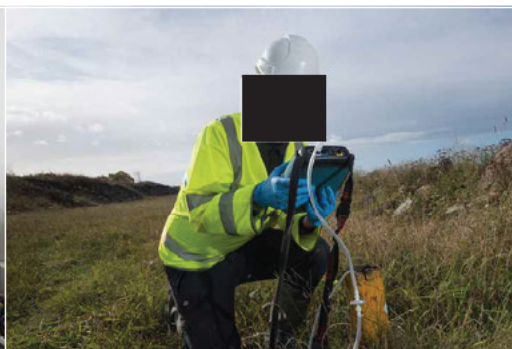
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The Applicant's response to the Proof of Evidence dated 13 April 2022 prepared by Mark Frogatt of Anglian Water (REP4-013)

Comment in the Proof of Evidence	Response from the Applicant
<p>1. I am the Chief Engineer at Anglian Water Services Limited ("Anglian Water"). I am duly authorised to make this statement on behalf of Anglian Water, who are an interested party to this application ("the Application").</p>	
<p>2. I have been employed by Anglian Water for approximately 14 years coming in as the Head of Engineering and more recently being promoted to Chief Engineer with a total of 30 years' experience in the design and delivery of major infrastructure, in addition working for BNFL as a designer of waste treatment facilities.</p>	<p>The Applicant notes that Mr Frogatt has experience of the design of waste treatment activities at BNFL. British Nuclear Fuels Ltd (BNFL) was an independent public body set up by the UK Government to manage the UK's nuclear fuel cycle centres and its Magnox nuclear power reactors. BNFL also undertook decommissioning of nuclear reactors. BNFL therefore managed radioactive materials including wastes across the whole spectrum of radioactivity from High Level Waste to Very Low Level Waste.</p> <p>The Applicant emphasises that only Low Level Radioactive Waste (LLW) will be accepted at the site. The radioactivity of the LLW that will continue to be accepted at the site is minimal. LLW comprises radioactive waste with a radioactive content not exceeding 4,000 becquerels per gram (Bq/g) of alpha activity or 12,000 Bq/g of beta or gamma activity however the waste which will continue to be disposed of at the site will be limited to that which has a level of radioactivity at the lower end of the activity scale and typically will be up to 200 Bq/g. This means that only LLW with very low levels of radioactivity will be accepted at the site which accordingly has a very low risk.</p> <p>It is proposed that Augean will continue to accept LLW for disposal from sources such as the decommissioning of nuclear facilities, manufacturing activities and research facilities and hospitals where radioactive materials are used. The proportion of LLW deposited at the site will continue to be small relative to hazardous waste deposited at the site. The wastes will also include naturally occurring radioactive material (NORM) waste from the oil and gas and mineral processing industries notably supporting the decommissioning programme for the North Sea oil and gas extraction infrastructure. The LLW waste types principally will comprise construction and demolition waste such as rubble, soils, crushed concrete, bricks and metals from the decommissioning of nuclear power plant buildings and infrastructure, small amounts of lightly contaminated miscellaneous wastes maintenance and monitoring at these facilities such as plastic and metal and wastes from</p>

	manufacturing activities, science and research facilities and hospitals where radioactive materials are used. LLW is only accepted at the site if it is compatible with other wastes, meets the site conditions for acceptance and it has been demonstrated that disposal at the site represents the Best Available Technique for the management of the waste.
3. The facts and matters set out in this statement are within my own knowledge unless otherwise stated, and I believe them to be true. Where I refer to information supplied by others, the source of the information is identified; facts and matters derived from other sources are true to the best of my knowledge and belief.	-
4. There is now produced and shown to me a paginated bundle of true copy documents marked "MF1". All references to documents in this statement are to Exhibit MF1 unless otherwise stated.	-
Background and Initial Concerns	
5. This statement relates to Augean South Limited's ("Augean") development consent order ("DCO") application for the alteration and construction of hazardous waste and low-level radioactive waste facilities at the East Northants Resource Management Facility, Stamford Road, Northamptonshire ("the Proposed Development").	-
6. Anglian Water have two critical 800mm steel diameter transfer mains located within the area of the Proposed Development which function at a pressure of 8 bars ("the Mains"). The Mains convey wholesome water, for human consumption and supply a significant portion of Peterborough city area to be circa 80,000 customers. A plan showing the Mains in their current location can be found at page 1. This water supply (previously only one pipe) had been relocated from the black line on this plan to ultimately facility initial works on this site (phases 1-11).	The previous diversion took place as the landfill in Phases 1 to 11 (the current landfill site) was designed to fill the area in which the water pipe was formerly located as the site could not be designed in a practical way to stand away from the pipe. This diversion took place before Augean took over the operation of the facility. The Applicant notes that the diverted pipeline and the new, second pipeline which was added (to increase the level of resilience and increase capacity) are located approximately 15m to 20m to the south of the excavation boundary of the current site which is designed to the same principles and filled with the same wastes as proposed for the western extension area. A gas pipeline runs parallel to, and approximately 4m to the south of the southern water pipeline.

<p>7. Having initially been referred this matter by my colleagues within Anglian Water, I have reviewed the application for the Proposed Development. From my review I have concluded that there is no evidence that Augean has taken into consideration the risk of radioactive landfill to the Mains either at construction stage, longer term and the implications in the event of failure.</p>	<p>In all the consultation responses and discussions with Anglian Water there was no request or requirement for an assessment of risk based on the principle that the recommended standoff requested by Anglian Water (7m either side) would be implemented. Anglian Water (AW) were included in the scoping and the PEIR consultations and did not raise any concerns. Similarly no concerns were raised either in the original development for the eastern area of the current site or during the DCO application process for the western area of the current site both of which are close to the same (diverted and new) pipelines to the south.</p> <p>The reference to the site as a ‘radioactive landfill’ is potentially misleading. As explained in the application documents and above, the site accepts predominantly hazardous waste and smaller quantities of LLW at the lower end of the range of activity also will continue to be accepted. Hazardous waste and LLW is deposited in the current site and it was clear that these waste types were included in the proposals in all the consultation stages.</p>
<p>8. In view of this concern, I attended the first DCO hearing on 29 March 2022 and the site meeting shortly thereafter 5 April 2022. On both occasions I voiced my concerns (set out further below) in relation to the risk of leaving the Mains in situ.</p>	<p>We have been in discussion with AW since 2020, including with the individual identified Growth Liaison Manager for this region (John Young) identified in the “Anglian Water’s Cross Sector Infrastructure Access Statement (March 2019) [Document reference 12.2.8.1].</p> <p>The easements were discussed with AW on 15 January 2021. At AW’s request a schematic cross section was prepared to show the standoffs from the excavation and the location of the rerouted electric cable, so that they could be shown to others at AW. This was issued on 3 February 2021 and is provided at Appendix ES5.1 [APP-083]. Augean and MJCA were then copied in on an email from within AW which concluded with the comment between Ben Haycock and John Young (both of AW) saying: <i>“Hi John, From the drawing all looks to be fine. Is the electric cable high or low voltage? Thanks Ben”</i>. AW did not raise any further comments on the proposed stand offs at this stage.</p> <p>No concerns whatsoever regarding the previously agreed standoff distance were raised prior to a meeting on 1 March 2022.</p>
<p>9. Prior to my direct involvement on this matter, Anglian Water asked Augean to highlight the section of relevant Environmental Statement where consideration has been given.</p>	<p>This is a misunderstanding in communications. Information was requested by AW on where the risks to water resources have been assessed and this information was provided. AW were referring specifically to risks to the water in the pipelines whereas the Applicant understood that the risk assessment they were referring to was for the risk to</p>

	<p>water resources (groundwater and surface water) and this is the risk assessment section in the Environmental Statement (ES APP-049] (Section 17. Water Resources) to which AW were referred.</p>
<p>10. On 17 February 2022 via email Augean’s Environmental Specialist, Sophie Serdetschniy, pointed to the Section 17 of their Environmental Statement dated September 2021.</p>	<p>As above</p>
<p>11. “Water resources is addressed in Section 17 of the Environmental Statement (https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/WS010005/WS010005-000301- 5.2%20Environmental%20Statement.pdf) It is concluded in Paragraph 17.7 that:</p> <p><i>“It is concluded that there will be no significant impact on groundwater quality or flows beneath the site or at receptors down hydraulic gradient of the site and no significant impact on surface water flows and quality including at springs and issues, in the Willow Brook, the Wittering Brook or the River Nene as a result of the development in the proposed western extension either singularly or cumulatively with the existing ENRMF. It is concluded that taking into consideration the baseline conditions and the nature of the proposed development together with the proposed mitigation measures that there will be no residual significant effects on surface water or groundwater flow or quality at or in the vicinity of the site.”</i></p> <p>A copy of this email can be found at page 2.</p>	<p>As above</p>
<p>12. The above clearly does not address the potable water supply, the risk to human health or the impact on human health in the event that the construction or operation of the Proposed Development causes a</p>	<p>The risk assessment in the ES addresses the risks to water resources including the groundwater immediately underlying the site and to the surface water to which run off from the site will drain. As explained above (in response to paragraph 7) in all the consultation responses and discussions with AW there was no request or requirement for an</p>

burst in one or both pipes.	assessment of risk to or of the pipelines based on the principle that the recommended and previously agreed standoff (7m either side) would be implemented.
13. Notwithstanding reiterating my concerns I do not believe that Augean have changed their view in relation to moving the Mains.	<p>Augean were led to believe as a result of all the consultation responses and discussions with AW that provided the recommended standoff (7m either side of the water pipes) would be implemented, Anglian Water were satisfied that there were no unacceptable risks. Accordingly the Environmental Impact Assessment was scoped and the site was designed on this basis. The potential for diversion of the pipes was not required by Anglian Water at any point.</p> <p>The Applicant believes that the appropriate response to the concerns now raised by AW is by robust risk assessment based on which any potential changes to design or extent of stand offs can be considered.</p>
Grounds of Objection	
<p>14. It is Augean's proposal to leave the Mains in situ and allow a buffer zone around the same. Initially a buffer zone of 7 meters either side of the Mains was proposed which would include within it a high voltage transmission cable within 3 meters of the Mains. Anglian Water's initial concerns were that 7 meters would not be sufficient. It was then mooted that 20 meters maybe more appropriate however on closer consideration a buffer zone of any distance in these particular circumstances would be wholly unsuitable. Primarily this is because if the Mains were to fail (i.e breach) the consequences would be extremely severe damaging both the Mains themselves (likely beyond repair) as well as the Proposed Development.</p>	<p>The statement is not consistent with observation on the ground, For example there is a buffer zone of 15m to 20m in place between the existing site and the diverted water pipes which were installed by AW in around 2000 and therefore this would have been considered acceptable at the time. These water pipes also run close to (within 4m of) the high pressure gas main the proximity to which also must have been assessed by AW as acceptable before the pipe was diverted and an additional pipe was installed. From discussion with AW on 9 May 2022 it is understood that a 20m standoff would be acceptable from an operational access perspective and, we are informed by AW, is consistent with the standoff requirement for the current Strategic Pipeline Alliance Pipeline currently being developed in the region. The applicant is considering the comparative appropriateness of this proposal within the risk assessment process.</p> <p>The Applicant accepts that there is the potential for Mains to suffer leaks and possibly catastrophic failure, as for all water pipes, and that there will be a need for access to be available so that they can be repaired on a regular basis. This is what the standoff distance is intended to allow for. The Applicant is working proactively to elucidate as precisely as possible the specific circumstances and the concerns of AW in order to carry out and present the appropriate risk assessments now requested by AW and ultimately determine the appropriate standoff.</p> <p>The reference to damage of the mains 'beyond repair' is not understood. Whether pipes leak or burst they are capable of repair, it is the extent of repair needed which will vary but we are not clear how the circumstances are different to any other development next to a</p>

	<p>pipeline. The Applicant understands that AW are concerned also with regard to the effect of the damage to the landfill infrastructure of a catastrophic failure of the water pipe(s) and therefore has included this risk scenario in the risk assessment proposals provided to AW on 29 April 2022.</p>
<p>15. Other factors to consider would be the Mains would be on a strip through a live waste facility which causes issues over access as well as short and long term impacts on the Mains such as potential damage during the construction phase and corrosion of the Mains, respectively.</p>	<p>As above. It is unclear what issues over access are being referred to. For whatever standoff distance is identified as necessary access will be available at all times. It is not clear what additional corrosion AW consider might occur as a result of the proposed development and clarification is being sought through the risk assessment scoping proposals.</p>
<p>16. After reviewing the position further with Anglian Water's Network Managers they are extremely concerned, as am I, as to the prospect of having the Mains hemmed in by a waste storage facility. Mains of this nature need to be secured, free from external factors and above all accessible at all times.</p>	<p>As above. Mains are routinely installed in far less accessible and more constrained locations in particular along main roads and high streets or through industrial areas on a regular basis. An agreed standoff either side of the pipes will allow both access for repairs (major or minor) and protection of the pipes from any effects of the proposed development. The mains will continue to be accessible at all times.</p>
<p>17. Whilst Anglian Water maintain and manage the water supply network diligently, established mains of this size and pressure can, and do, rupture with devastating effect. Augean's current proposal to retain the Mains in their current location takes no account for this potential.</p>	<p>As the potential for rupture has only recently been raised it has not previously been considered. Following the identification of these concerns the Applicant is seeking proactively to undertake appropriate risk assessment which will determine an appropriate standoff to accommodate this scenario.</p>
<p>18. In the event of a major burst, the occurrence would be noted by monitoring equipment and alarms within Anglian Water's network and raised to the operational team. The water would not generally be turned off. As this is a gravity feed from Wing Water Treatment Works, the Works would respond to the falling reservoir levels by increasing water production accordingly. In the interim period, the operational team would start to restrict flows from the Works whilst simultaneously checking the route from delivery points backwards to locate the issue; or as often the case responding to customer feedback as to the burst location.</p>	<p>A specialist pipelines engineer has been engaged by the Applicant to provide advice and input to the proposed risk assessments including clarification of the potential effects of burst pipes. The procedures for the management of leaks and catastrophic failures of water pipes have been requested from AW to assist in this process. The Applicant also is prepared to consider undertaking leak detection monitoring in the vicinity of the pipes if this is beneficial in reducing risks of failure.</p> <p>A specialist pipelines engineer has been engaged by the Applicant to provide advice including in relation to:</p> <ol style="list-style-type: none"> 1) The risk and resultant crater from a major pipeline burst 2) The access needed for repair and maintenance of the pipeline 3) The changes on stresses imposed on the pipeline by the excavation and filling of the landfill and the resultant potential impact on the pipeline

<p>19. Due to the critical nature of the Mains, the water would not be turned off as it is unacceptable to leave circa 80,000 customers without running water. Anglian Water do not turn off water for two key reasons:</p> <p>a. Customers' supplies cannot be interrupted as, in this case, it would leave a vast swathe of the city of Peterborough containing schools, hospitals etc without water. Further there would not be sufficient supply to rezone from other areas to meet demand; and</p> <p>b. The Mains would also not be allowed to 'flatten', i.e. have no pressure within them. If the Mains were to depressurise in an uncontrolled manner, there would be a risk of external water being introduced into the Mains and contaminating them.</p>	<p>As above. The procedures for the management of leaks and catastrophic failures of water pipes have been requested from AW to assist in the risk assessment process. The potential for risks to the quality of the water in the pipes is identified in the scoping proposals for the risk assessments provided to AW on 29 April 2022.</p> <p>It is stated by AW at point (b) that where a leak of water from the pipes is identified, the response is to maintain pressure and flow in the pipes so that there is no risk of external water being introduced into the mains and contaminating them. Accordingly, even if contaminated water was present in the vicinity of the pipes there is no risk that the contaminated water present outside the pipes would enter the water inside the pipes. Notwithstanding this, leachate levels are maintained no greater than 1m above the base of the landfill site which is at least 7m below the level of the pipelines therefore there is no identified below ground pathway for the contaminants in the landfill site to migrate to the water in the pipelines. Furthermore, the standards of design and the requirements of permitting of the facility are to ensure that there is no contamination of the ground or water around the landfills.</p>
<p>20. In the event of a catastrophic failure, we believe that several scenarios could occur.</p>	<p>-</p>
<p>21. Firstly, given that the Mains runs at 8 bar pressure, the uncontrolled release of water would cause significant destruction to the adjacent area. So much so, that given the proximity of the Mains to each other, both would likely fail by undermining of the parallel pipe's foundation, further exacerbating the issue. It is also noted that the proposed diversion of the high voltage main could also be compromised following such an event.</p>	<p>As explained by AW at paragraph 6 above, the supply along this route previously comprised one pipe and a second pipe was added relatively recently. It is reasonable to assume that a risk assessment including the risks of a catastrophic failure of one pipe affecting the integrity of the nearby pipe would have been carried out and that the distance between the two pipes (understood to be approximately 5m) would have been determined based on the outcome of that risk assessment. The Applicant is seeking to understand the basis for the AW concern regarding this issue.</p> <p>National Grid Gas, the operator of the gas main, which is within 4m of the water pipeline, have not expressed concern regarding the proposed proximity to the water pipes. Western Power, the operator of the electricity cable, has not expressed concerns regarding the proposed diversion of the electricity cable.</p>
<p>22. Secondly, I do not believe the landfill basin is designed to resist this form of external impact from</p>	<p>Now that this concern has been raised, the Applicant proposes to carry out a risk assessment for this eventuality. AW has been requested to provide data and the guidance</p>

<p>unrestrained water flow in either the temporary or permanent condition, and as such, the water would breach the adjacent phases and the constructed waste cell wall (north side phase 19-12, south side 18-15 – document drawing no AU/KCW/03-22/23067, a copy can be found at page 4). Such a release of water would inundate the waste cell, contaminate the released water by exposure to the radioactive stored waste and overwhelm the current system to maintain a maximum level of 1m of leachate to the cell base.</p>	<p>used by AW to enable the Applicant to estimate the size of the crater which could form in the event of a catastrophic failure. In addition, the Applicant has engaged a pipelines specialist on this matter.</p> <p>An initial estimate of the volume of water which might be released from a burst water main has been carried out based on information provided by AW at the meeting on 5 April 2022. The estimate is based on the assumption that all water released from the pipe would enter one adjacent phase of the landfill site, however in reality much of the water released would flow away from the landfill area on the surface or through the soils or pipe bedding. The Applicant is informed that water flows in the pipe at approximately 1m³ per second and that it would take approximately 4 hours for the flow to be minimised after a catastrophic failure in the pipe. This would result in the release of approximately 14,400m³ of water from one pipe. It is calculated based on the smaller of the adjacent phases (Phase 18) that this release of water, if it were to all enter Phase 18, would result in an excess depth of leachate of approximately 1.4m. In an absolute worst case scenario if both pipes were to fail and all the water entered the same phase it is calculated that this would result in an increased depth of leachate of approximately 2.8m. This increase is manageable and would be contained within the engineered containment system and does not pose an increase in the environmental risk as the excess depth of leachate would be present only for a relatively short time prior to removal. The increased depth of leachate would not represent the introduction of more contaminants, simply an increased depth of leachate with the concentration of contaminants present in the original leachate diluted by the additional water from the pipes.</p> <p>It was agreed by the Environment Agency during the Hearing on 29 March 2022 that a short term exceedance of leachate levels set in the Environmental Permit is not uncommon for landfill sites and is unlikely to result in an unacceptable environmental impact.</p>
<p>23. Thirdly, in the event of a localised pipe failure and the subsequent release of uncontrolled water which may not initially be detectable, this could develop over time leading to bank stability issues within the proposed easement area. In turn, this may lead to major catastrophic failure and difficulty in accessing with large plant and machinery needed.</p>	<p>Additional monitoring (standpipes or acoustic loggers) could provide additional detection at the site location so that early attention can be paid to any leaks. Early identification of faults would allow repairs to be carried out to reduce the risk of consequent catastrophic failure. The Applicant is willing to discuss this option further with AW.</p>

<p>24. As outlined previously if the now contaminated flooded area were to be exposed to the Mains, even in a controlled close-down, there remains a real risk of contaminating the Mains risking recovery in which case the Mains would have to be completely replaced as we are unsure as to the nature of contamination risk as it is not fully considered in the initial report.</p>	<p>The Applicant is seeking clarification from AW to understand the mechanism through which the mains could become ‘contaminated’ during repair. This will allow a risk assessment to be carried out based on the risk of contamination entering the mains during repair works. As stated in response to paragraph 19 above, leachate levels are maintained in the landfill site no greater than 1m above the base of the landfill which is at least 7m below the level of the pipelines and therefore there is no identified below ground pathway for the contaminants in the leachate in the landfill site to migrate to the ground around the pipelines. Furthermore, as stated in the response to paragraph 22, any water inflow into the landfill site would be captured in the leachate system and would result in a, temporarily, higher leachate level within the landfill site but this leachate level would still be well below the level of the pipeline. Therefore, there will be no contaminated flooded area in the proximity of the mains.</p>
<p>25. In relation to the integrity of the Mains themselves, the Proposed Development poses an undefined risk such as increased external corrosion and I am made aware by our network team that there has been a recent issue of corrosion and leakage on a part of this local network relatively recently.</p>	<p>It is understood that AW may be concerned that surface water run-off from the landfill will result in increased inundation of the pipe bedding around the pipeline resulting in increased corrosion. However, surface water run-off from the landfill while the phases are operational will be collected and contained within the active landfill phases. Following site restoration clean surface water run-off will be collected and directed away from the route of the pipelines. It is more likely that there will be less water infiltrating the pipe bedding rather than more. Nevertheless it is understood that it is possible to monitor the level of water around the pipeline and the Applicant is prepared to offer to monitor the water levels around the bedding in the 10 years prior to landfilling near to the pipeline and following landfilling so that if additional drainage measures are identified as necessary they can be implemented.</p>
<p>26. Public perception is also an important factor here. In this regard, there is also a very strong argument as to our customers’ perception to allow their wholesome supply of water to be potentially compromised by allowing radioactive waste to be stored in such close proximity.</p>	<p>Augean are very aware of the importance of sharing facts with the public and addressing perception of risk. For this reason we wish to move swiftly away from the assertions in this document to identify as precisely as possible the concerns in order to carry out and present the appropriate risk assessments now requested by AW. The scenarios and pathways for potential contamination are the same regardless of whether the contaminants arise from hazardous waste or LLW.</p>
<p>27. Other factors which we do not believe Augean have considered in relation to the Proposed Development site include:</p>	<p>a. The Applicant is carrying out further assessment of these stability issues now that AW have identified them as potential concerns. The slopes are monitored during the period that they are open as this is a requirement of the Stability Risk Assessment (SRA) for the landfill site (annual monitoring is referenced in paragraph 7.1 of the SRA [REP2-010]).</p>

<p>a. Stability concerns on long term bank exposure during the cut and re- fill of cells adjacent to the Mains.</p> <p>i. Anglian Water are not aware of the details for the transition periods considering heave and contraction of exposed highly shrinkable clays of this region and the impact of differential loading to the stability of the corridor containing the Mains. This is particularly important given the Anglian region is the driest in the country and climate change is leading to more intensive weather events.</p> <p>ii. The proposal does not contain long-term stability monitoring plans, understanding that timescales between excavation and it is noted that fill and capping may take years.</p> <p>b. External loading and frequency of loading of the Mains outside of the original design remit also significantly increases the risk of a breach. When the Mains were laid this was agricultural land with expected loading and frequency from agricultural equipment. Under Augean’s proposal, the Mains will dissect two phased working areas requiring some form of undefined crossing point over them. The Environmental Statement (September 2021) does not consider the impact of such a crossing in either loading nor frequency impact and the stability of the Mains beneath.</p> <p>c. The location of proposed adjacent surface water</p>	<p>Changes in ground pressures caused by the excavation and filling of the landfill reduce quickly as standoffs from the pipeline increase and these can be quantified based on the ground conditions, pipeline surround and nature of the pipeline. A specialist pipeline engineer has been engaged by the Applicant to provide advice in this regard and it is anticipated that these concerns can be addressed to the satisfaction of AW.</p> <p>With regard to the nature of the clay at the site, this is well known and well understood. The clay has been used at the site for decades and provides a robust engineering material with which to construct the containment systems for the landfill site. The clay is typically stiff with a very low permeability which means it is not susceptible to changes in moisture content which could allow it to shrink. The existing situation is that the current pipeline is already surrounded by these clays.</p> <p>b. The Applicant will assess these loading and associated stability issues now that AW have identified them as potential concerns.</p> <p>The design of a crossing point is a separate issue and the detail of an appropriate crossing point will be based on engineering design. It is stated at paragraph 5 of the AW submission following the Hearing [REP4-014] that <i>‘Anglian Water does not enter into crossing agreements. We have found that each site and project require specific engineer to engineer and contractor discussions to work through the specifics of the project. Anglian Water’s oral evidence on 29 March identified this as a specific risk which would require bespoke mitigation’</i>. The Applicant accepts that the design of the crossing will be bespoke and is working with AW to agree the appropriate arrangements with AW to secure this design. Crossing points will not be needed until work commences in the southern area of the proposed western extension (Phase 15).</p> <p>c. The water retention lagoons or swales will be dry for all but a short time immediately following storm events. They would not fulfil their function as attenuation basins unless they remain dry to provide the freeboard needed following rainfall events. The runoff released from the attenuation basins will follow the routes of the drains to mimic the current discharge patterns therefore the potential for an increase in flow in the bedding for the mains pipes is negligible. In practice the retention lagoons or swales will prevent surface water run off draining over the pipelines and ensure that it is discharged away</p>
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<p>run-off lagoons either side of the Mains would hinder future access and may, in the event of significant rainfall, impinge on the Mains bedding and stability.</p> <p>d. If the Mains were to remain the temporary and final corridor for access to them would only be from outside of the landfill operational area. In the event of a failure, this area would be a flooded (affectively creating a canal) impeding access and further compromising the Mains stability and integrity as well as undertaking any repair.</p>	<p>from the pipelines. The retention lagoons would not be within the standoff from the pipelines and are sufficiently shallow not to hinder access.</p> <p>d. The Applicant does not consider that there is any justification for this concern. The pipe corridor will not form a flooded canal that restricts access and compromises stability and integrity. The ends of the proposed pipe buffer area are open and there is no restriction to flow. The current falls of ground levels are generally along the line of the pipeline and fall to the north west for the majority of the pipeline area, with the south eastern third falling to the south east. Water is unlikely to pond in the area of the pipelines. In addition, ditches and/or bunds can be installed at the edges of the corridor to provide confidence regarding effective drainage if there remains any justified concern.</p>
<p>28. For context, I have attached links to some examples indicating the impact of major water main ruptures to offer some context to Anglian Water’s concerns:</p> <p>a. Report: The Impact of Environmental Factors on Leakage in the Anglian Water Region - Extract from this report page 32: “Concluding remarks “We set out to determine if regional differences played a part in Anglian Water’s good leakage performance. We found that there are, indeed, environmental differences between the Anglian Water region and the rest of the UK. However, far from being an environmentally benign part of the country, we found that the Anglian Water region has disproportionately aggressive soil conditions and extreme and variable weather patterns. Our analysis, and published research demonstrate that both aggressive soils and extreme weather are associated with higher rates of pipe failure”</p> <p>....</p>	<p>The Applicant is reviewing these references to establish the facts that can be extracted from them to assist in the risk assessment process.</p>

“We have seen that the water pipes in the Anglian Water region are already experiencing the impacts of global climate change”

b. [REDACTED]
-This shows a home which collapsed due to Tipton water main bursts

c. [REDACTED]
- Breach in Manchester of 36 inch mains burst.



- i. [REDACTED]
- ii. [REDACTED]
- iii. [REDACTED]
- iv. [REDACTED]
- v. [REDACTED]
- vi. [REDACTED]
- vii. [REDACTED]
- viii. [REDACTED]

Summary and Counter-Proposal	
29. The current proposal does not fully consider or eliminate the risks described above and I believe that if the Mains remain in situ they would present an unacceptable risk to Anglian Water and its Customers. Therefore, as has been the case previously (the Mains have already been relocated once to allow for works on this site), the Mains should again be diverted outside of the working area.	The mains will remain outside the working area, that is the purpose of the standoff.
30. In the circumstances it appears the only reasonably practical solution is for the Mains to be diverted to avoid any risk of the above situations arising and potentially 80,000 customers' water supplies being affected.	It has not been demonstrated in any justified way that the only reasonably practical solution is to divert the mains. The concerns which have been raised will be properly addressed by risk assessment based on which design decisions can be made.