Summary Notes of Meeting: piling mitigation options

Project:	HS2 MWCC Lot C1
Document number:	1MC05-ALJ-EV-MRC-C001-110002
Meeting Date:	12/03/2018, 11:00 – 13:00
Meeting Title:	Piling mitigation options
Location:	Room 110, Euston Square

Attendees

Name	Organisation
Reg. 13	HS2
Reg. 13	HS2
Reg. 13	Affinity Water
Reg. 13	Affinity Water
Reg. 13	Affinity Water
Reg. 13	Affinity Water
Reg. 13	Affinity Water
Reg. 13	Align
Reg. 13	Keller
Reg. 13	Align
Reg. 13	Align
Reg. 13	Align
Reg. 13	Align

Apologies

Name	Organisation
Reg. 13	Align

Distribution

Name	Organisation
Attendees + Apologies	

Notes

#	Actions and Notes	Action	Date
1.	**Introductions**		
2	**Safety Share**		
3	**Piling for temporary jetty** Reg. 12(4)(d) Affinity Water has concerns around the ability of the piles through the lake bed not to form a preferential pathway (with particular reference to the mobilisation of manganese in the superficial deposits and manganese-rich water), but depends on the amount of silt in the sand and gravel and nature of the chalk (ground investigation critical). At Reg. 12(5)(a) about 30% of supply is already from lake / sand and gravel water and any further increase needs to be avoided. The risk of a vertical pathway being created is considered lower with the greater depth of gravel. Therefore, this makes the risk likely to be highest in the deep lakes and lowest on		

#	Actions and Notes	Action	Date
	the land. But the risk still remains and depends on ground conditions. Align asked if the water could be treated to removed manganese and Affinity Water indicated that it could, only at a significant cost. Affinity Water would like to know if there is any information available on the likely degradation of the piles and how this could affect groundwater quality in the long term. The major concern is that the rusting of the pile (the aquifers contain dissolved O2) will lead to medium / longer term opening of vertical pathways and therefore lead to water quality issues from manganese, for example, from the upper aquifer. [Post meeting note – water chemistry data for lake water and chalk water would help this assessment]. Affinity Water would like to know if methods have been assessed that look at minimising the potential for collapse of any voids encountered by piling, and the potential for vibration techniques (if used) to cause void collapse. Affinity Water would like details of the ground investigation proposed and particularly the type and extent of any geophysics. Align indicated that only down hole geophysics is proposed, no surface geophysics or cross borehole geophysics will be completed. Computer modelling of groundwater pathways was discussed and it was agreed that such modelling would not be of benefit due to the heterogeneous nature of the aquifer and the limited availability of data. Possible alternatives such as solid piles or bentonite seals round the piles were mentioned as ideas that have been discussed for high risk areas.	Align Affinity Water Align Align	
4	**Piling for the viaduct** Align indicated that concerns associated with piling include: causing chalk turbidity, bentonite (or polymer) turbidity, introduction of new pathways/change in pathways and source of abstracted water, collapse of abstraction wells. If there is a significant change to where an Affinity Water source obtains its water from, it may have implications for the current conclusions/ decisions from NEP investigations. Reg. 12(4)(d) Reg. 12(4)(d) Reg. 12(4)(d)	**Align**	

#	Actions and Notes	Action	Date
	Reg. 12(4)(d) In addition, there are areas along the viaduct that will pose a risk to both Reg. 12(5)(a) and Reg. 12(5)(a)at the same time. Affinity Water confirmed that the idea of piling the high risk areas outside of peak demand periods is a good one, if that could be incorporated by Align into the schedule. Align confirmed that in addition to the piling methods discussed, piling with casing had also been considered but was unlikely to be progressed.		
5	**Piling for the embankments** Reg. 12(4)(d)		
6	**Shaft construction** Align indicated that four of the five shafts would be below the water table, whilst the fifth shaft at Chesham Road would be above the water table. Reg. 12(4)(d) Reg. 12(4)(d)		
7	**Turbidity treatment system** Reg. 12(4)(d)		

#	Actions and Notes	Action	Date
	Reg. 12(4)(d)		
8	**Monitoring data** Affinity Water confirmed that it holds data on lake levels and bathymetry and can provide this to Align. Affinity Water confirmed that it holds data on flows in the River Misbourne and these can be shared with Align. The data show that the Great Missenden to Amersham reach of the river is the most important gaining reach with outflow from the chalk. Downstream from Amersham to Chalfont St Giles, about 20% of losses occur, whilst from Chalfont St Giles to Chalfont St Peter the remaining approx. 80% of losses occur. Lining the river bed has been considered but this has been rejected as stakeholders did not like it. The EA and Affinity Water are in discussions with some local landowners regarding moving the river back to its original route as it had been diverted in the past to support mills and the diversions may have increased some of the losses.	Affinity Water	
9	**AOB** Affinity Water asked if a short paper could be provided to justify the selection of steel tube piles for the temporary jetty and what options had been ruled out. Affinity Water asked if ground investigation data could be provided to them, particularly geophysical data.	Align	
10	**Next meeting** No date set		

Attachments:

1. Draft mitigation route plan

Viaduct Permanent Piling – Mitigation Options
Mitigation already agreed
Shut down Blackford
Q: Is alternating shut down of Blackford and Northmoor viable and beneficial (NW end of viaduct)?
Water treatment at Northmoor
Q: What is maximum treatment capability for chalk turbidity ? Can any bentonite turbidity be treated ?
Proposals for further mitigation
Proposals for further assessment
Preliminary risk assessment for each pile group
Further evaluation of polymers
Review and update risk assessment following additional GI
Bentonite migration trial between drill holes
Recognise uncertainty
Locations with limited fracturing / no voids
Well fractured ground
Very well fractured ground and / or voids
Commence piling solely using water, recognise risk of piling hole collapse
Backfill hole, move and drill again
Re-drill pile hole using bentonite
Ground improvement then re-drill pile hole
Use bentonite or polymer
Local ground improvements
Grout curtain around pile group
Pile outside of peak demand period
Limit duration of piling
Scavenger wells
Abstraction wells – Ickenham ? New ?
Could result in an outage

DRAFT