

The West Midlands Rail Freight Interchange Order 201X
Technical Appendix 11.5 - Remediation Safeguarding Report
Regulation 5(2)(a)
Ramboll - July 2018

WEST MIDLANDS INTERCHANGE – REMEDIATION SAFEGUARDING

1. This document comprises a summary of safeguarding measures proposed in order to ensure the effective continuation of on-going groundwater remediation works within the south-west of the wider West Midlands Interchange site which is currently owned by SI Group (the 'SIG Land'), as illustrated in the figure included as Appendix 1. The remediation works are being undertaken by SI Group. The remediation works relate to the SIG Land (part of the proposed West Midlands Interchange site) and the current SI Group facility (to the east of the SIG Land, the 'SIG Facility' as illustrated in the figure included as Appendix 1). This summary solely considers the SIG Land, whilst noting that the SIG Facility is up hydraulic groundwater gradient of the SIG Land and hence relevant.

Background

2. To provide general context for this document, a brief summary of the Environment Agency (EA) agreed remediation works is outlined in this section.

Site Sensitivity

3. The SIG Land is considered to be situated in an area of high sensitivity with respect to groundwater resources due to the underlying principal aquifer (Triassic Sherwood Sandstone Group). Somerford public water supply well (PWS), is located approximately 1.8km to the west, down-hydraulic gradient of the SIG Land.
4. The SIG Land is considered to be situated in an area of moderate to high sensitivity with respect to surface water resources due to the location of the Staffordshire & Worcestershire Canal to the east of SIG Land. Although the canal this is likely to be a 'sealed' hydrological unit and hence unlikely to be in continuity with the on-site groundwater body.
5. The SIG Land currently comprises arable farmland and according to historical maps has previously been in agricultural use.

Identified Soil Contamination

6. An organic chemical works (SIG Facility) is situated to the east of the SIG Land. It is understood that the SIG Facility was constructed in the 1950's and prior to this, the land was agricultural in use. It is also understood from a review of historical ordnance survey maps, that a chemical works was previously operated on land immediately to the south of the SIG Facility since the 1920s (it is uncertain when these works ceased operations). This historical chemical works was located on land that now currently forms the industrial estate to the south of the SIG Facility. No potentially significant primary sources of soil or groundwater contamination have been identified within the SIG Land (i.e. no current or historic tanks / bulk storage).
7. There is no identified soil contamination within the unsaturated zone of the SIG Land and this is supported by intrusive site investigation undertaken by Ramboll Environ. Therefore, the identified groundwater contamination (outlined in the section below) is considered to solely relate to the off-site SI Group facility (i.e. not originating from the SIG Land), which has migrated towards the SIG Land.

Identified Groundwater Contamination

8. Historical intrusive investigations across the SIG Facility and the SIG Land identified notable concentrations of contaminants in groundwater, comprising dissolved phase phenolic compounds

estimated to be present within the underlying aquifer. *Potential Risks to Controlled Waters*

9. The groundwater contaminant plumes were identified migrating from the SIG Facility and beneath the SIG Land, in the direction of the Somerford PWS borehole located approximately 1.8km to the west, down-hydraulic gradient of the SIG Land. Further plume expansion would pose a potentially significant risk to down hydraulic groundwater resources within the principal aquifer and Somerford PWS; hence remediation works were considered necessary.

Potential Risks to Human Health

10. According to soil data obtained by Ramboll (Environmental Statement Technical Appendix 11.3) no exceedance of human health soil screening criteria was noted within the SIG Land. From the same assessment, out of nine groundwater monitoring wells within the SIG Land there was one location with exceedances of groundwater human health volatilisation screening criteria. No human health risk assessment has been undertaken to assess potential risks that might be posed to human health after the proposed West Midlands Interchange development has been completed (i.e. future site occupants). These potential risks have been considered further in Table 1 of this document.

Remediation Works

11. The developed remedial strategy to address the identified phenolic groundwater contamination received regulatory approval and was implemented comprising a combined groundwater pump & treat and monitored natural attenuation (MNA) scheme that was designed to protect the Somerford PWS, through:
 - the removal a significant proportion of the contaminated groundwater mass over an estimated minimum 12 to 20 year time frame (although the actual timescale may vary dependent on how the remediation works progress);
 - hydraulically contain the contaminant plumes; and
 - long-term (post abstraction) monitoring to confirm the ability of natural attenuation to control residual levels of phenolics remaining after pumping ceases.
12. The remedial system currently comprises a series of multiple linked abstraction wells (on both the SIG Facility and the SIG Land), which were designed to pump contaminated groundwater and treatment, before discharge to sewer via an off-site wastewater treatment plant located at the SIG Facility.
13. The pump and treat scheme was designed to capture groundwater with a total phenol concentration above the agreed remedial target, but was considered likely to also capture groundwater at lower concentrations. The remedial target is based on research undertaken by Sheffield University that indicated active biodegradation occurred at plume fringes where concentrations were below the target level.
14. The remedial scheme also includes for a programme of longer term groundwater monitoring to assess the rate of natural attenuation and the extent of the plumes over time (known as monitored natural attenuation 'MNA'). The MNA element of the strategy is based on the proviso that remaining total phenolic compounds below the remedial target will show consistent decline (naturally attenuate) and hence result in shrinking plumes. Such behaviour would be in compliance with EA guidance¹. Such MNA monitoring would be undertaken over an extended

¹ Environment Agency (2000) Guidance on the assessment and monitoring of natural contaminants in groundwater.. Environment Agency R&D Publication 95. Prepared by Carey, M.A., Finnermore, J.R., Morrey, M.J., Marsland, P.A., Aspinwall & Company.

period of time to confirm such trends.

15. The approved remedial strategy also sets out the need for contingency measures in the event that natural attenuation is found to provide insufficient protection to Somerford PWS or groundwater quality in down gradient areas of the principal aquifer. MNA monitoring may indicate the persistence of phenolic compounds after pumping has ceased (i.e. stable or rising rather than declining concentrations). Stable or rising concentrations at, or below the remedial target will indicate that MNA is not capable of controlling phenolic compound concentrations and in the absence of pumping plume expansion will occur. In such an event, the strategy will not be compliant with EA guidance and down gradient quality of the principal aquifer will be threatened. In such a situation, the strategy needs to be flexible to enable contingency measures to be implemented to control the plumes. Such measures are not yet defined and if required will be based on available information and appropriate cost-effective technologies at the time. At this stage, contingency measures could potentially include:
- extension of the pumping period to further reduce concentrations in the core areas;
 - alteration of the current pumping regime to adapt the capture characteristics;
 - installation of new pumping wells in alternative locations to optimise remediation;
 - injection of electron acceptors into the aquifer in the fringe zone to accelerate the degradation rates; and
 - consideration of the suitability of alternate techniques that may arise in the future and the flexibility to implement these.
16. A key element of the strategy is the flexibility to adapt the scheme at any time or implement additional contingency measures. Without careful consideration, the West Midlands Interchange (WMI) development without appropriate measures could impact - the successful completion of remedial works. Measures to mitigate these risks are outlined in Table 1 of this document.
17. During discussions with Ramboll in 2008, the EA verbally confirmed the remedial strategy had been approved.
18. The remediation works commenced in 2010. According to the EA it is anticipated that the groundwater pump and treat system is likely to remain active until at least between 2022 and 2028, although pumping in certain areas may be completed sooner. Subsequent MNA monitoring and the potential need for contingences will still remain, however.

Other Relevant Factors

19. This Safeguarding document is based on current projections for remediation timescales that includes MNA monitoring following cessation of active pumping. As a separate exercise, if considered appropriate, evaluation of options for reducing remediation timescales will be considered. This may comprise re-configuring groundwater pumping arrangements or the installation of additional abstraction wells. If considered appropriate a standalone, separate strategy document will be issued outlining these options.

Environmental Permit / Abstraction Licence

20. The SIG Facility is regulated under the Environmental Permitting (England and Wales) Regulations 2010 as a Part A1 installation (the facility has been regulated under this and previous versions of these regulations since 2003). The facility was originally permitted based on the nature of the chemical operations undertaken.

21. The remediation works were proposed by SI Group on a voluntary basis and aren't being enforced under Part IIA of the Environmental Protection Act, the Water Resources Act 1991 or Planning requirements such as a Planning condition. As the remediation works comprise abstraction of contaminated groundwater and discharge of this water to the wastewater treatment plant at the SIG Facility this means there is a 'technical connection' between the Part A1 activities and the remediation works. Therefore, the Environment Permit (held by SI Group – UK Limited, Permit ref: EPR/BS4707IB, the 'Environmental Permit') was varied to include the remediation works. This means that the SIG Land now comprises part of the Part A1 installation covered under the Environmental Permit (as illustrated in Appendix 2). The remediation works also require a licence to abstract groundwater (licence ref: MD/028/0003/002).
22. As stated above, Ramboll understand that the remediation works are being undertaken on a voluntary basis, although the Environmental Permit and Abstraction Licence give the EA a degree of regulatory control. These powers don't necessarily enforce a remediation standard protective of the Somerford PWS, although the EA could in theory use additional powers if needed. At present the remediation works are progressing with co-operation of all relevant parties.
23. Any amendment to the remediation works which could affect the Environmental Permit or the Abstraction licence will require formal variation approved by the EA. With regards to the Environmental Permit anything other than minor changes will require the EA to undertake formal consultation with relevant stakeholders as part of the variation process. The EA (during a meeting in October 2016) has stated that an alteration to remediation abstraction wells would not be considered a minor variation and hence be subject to a full variation process.
24. Once the remediation works are complete (which would include a period of post-completion MNA monitoring to verify that remedial targets have been met) there would be an opportunity to undertake a partial surrender of the Environmental Permit which relates to the SIG Land. Based on the assumption that the WMI development proceeds as planned and that the SIG Facility is still operating as a Part A1 installation this would mean that the installation area would be reduced to the current installation boundaries, excluding the SIG Land.
25. Surrender under an Environmental Permit requires returning land back to a 'satisfactory state'; this is not a state protective of environmental receptors, however but back to the condition of the land at the time the Environmental Permit was issued. This requirement primarily relates to operational areas and ensuring site condition is not worsened during the life of the Permitted activity. In the case of the SIG Land there is baseline groundwater data (prior to commencement of remediation) and the remediation works will have resulted in betterment of current site conditions. However, any application for a partial Environmental Permit surrender will need to be supported by all necessary documentation and approved by the EA.

Liaison with the Environment Agency (EA)

Environment Agency Liaison – February 2014

26. Ramboll contacted Andrew Pearson of the Environment Agency on 26th February 2014 to ascertain the status of the remediation works. As part of the discussions the EA confirmed that the remedial works commenced (in accordance with the agreed strategy) in 2010.
27. At the time the EA also confirmed that the groundwater pump and treat system is likely to remain active until between 2022 and 2028. Furthermore, the EA stated that SI Group would be responsible for any divestiture of the SIG Facility which would require a commitment for continued operation of the remedial scheme.

28. The EA also reaffirmed their comments made to Ramboll in 2008 that the present remedial strategy is solely to address known phenolic contaminants. In the event that additional contaminants were identified on-site (i.e. within un-investigated areas) then additional risk based remedial works may be necessary.

Meeting with the Environment Agency, SI Group and Ramboll – August 2014

29. The meeting comprised an 'informal' discussion with Mark Lynskey of the EA. Furthermore, an initial draft West Midlands Interchange development masterplan was presented to the EA for discussion.

30. In summary, the EA did not fundamentally consider that development of the SIG Land would be against their regulatory position, but noted a number of key regulatory / contamination constraints:

- Any reduction of topographic levels for the proposed rail siding could be problematic; and
- Any change to the remediation work would necessitate a formal variation of the Environmental Permit.

31. Of particular note was that the EA outlined concern regarding any future redevelopment constraining future access to the SIG Land to enable amendments to the remediation works or implementation of contingency measures.

Meeting with the Environment Agency, SI Group, Geosyntec, Kilbride and Ramboll – October 2016

32. The meeting comprised discussion following Stage 1 consultation for the West Midlands Interchange project. In conclusion, the EA noted that both the East and West rail terminal options (which were both being considered at the time) were feasible in principle, providing that solutions were proposed to safeguard the remediation works. The general consensus of the meeting, from the EA's perspective, was that these solutions were possible, however the EA wanted to see further details at Stage 2 consultation. A key factor for the EA is maintaining flexibility in order to ensure unhindered and satisfactory continuation or adaption of remediation works were applicable without hindering SI Group's ability to undertake the works without a material reduction in efficiency or to optimise the system. As such the WMI development will incorporate contingency access to development areas to provide future flexibility for SIG to adapt remediation activities.

Indicative Phasing

33. The WMI project in so far as it relates to the development of the SIG Land is proposed to be phased as follows (refer to Appendix 3), the proposed phasing is illustrative and for guidance only:

- Commencement of Phase 1 – 2020;
- Commencement of Phase 2 – 2026 and
- Commencement of Phase 3 – 2029 or at a later date subject to completion of the remediation works within a given area (which includes completion of period of MNA monitoring or contingency measures once these have achieved regulatory approval). It may be that subject to MNA monitoring, parts of Phase 3 are developed from 2029 onwards.

34. A more detailed phasing plan illustrating the phasing of the Rail Terminal is included as Appendix 4.

Supporting Documentation

35. This summary is based upon and supported by the following appended documentation:

- Figure to illustrate the location of the SIG Land (Appendix 1);
- Environmental Permit installation area (Appendix 2);
- WMI indicative phasing plan (illustrative) (Appendix 3);
- Proposed remediation pipework relocation (illustrative) (Appendix 4);
- Cut and fill details for the SIG Land (illustrative) (Appendix 5); and
- Correspondence from the EA (Appendix 6) outlining approval of this document (please note the comment regarding paragraph 22 has been addressed in this version of the report).

Remediation Safeguarding Measures

The proposed safeguarding measures are summarised in the table below.

Table 1 – Summary of proposed safeguarding measures

Issue	Details	Comment
Pre-construction Phase		
Access	The Environmental Permit Holder (SIG) would retain access rights for the SIG Land, but would provide access to the Applicant (FAL) to undertake survey work (outlined below).	This access wouldn't restrict potential operation and maintenance of the remediation works.
Survey work for WMI project	Any above-ground survey works (ecology / archaeology for example) would not affect the remediation works. Any below ground survey works could be undertaken in a manner similar to site investigation works undertaken by Ramboll in 2015 which had the consent of the Environmental Permit holder, which avoided all remediation underground pipework and was designed not to affect the groundwater plumes.	It is considered unlikely that any survey works (if managed properly, with appropriate exclusion zones dependent on the nature of the survey work to be undertaken) would affect operation of the remediation works.
Environmental Permit	Prior to commencement of construction works (although not applicable for survey work) it will be necessary to liaise with the EA and formally apply for a variation to the Environmental Permit. Anything beyond small changes to the Permitted works will require a formal substantial variation. It is likely to be the case that Phase 1 of the construction works (outlined below) will comprise a substantial variation. Therefore, in order to allow sufficient time to progress the variation (including a contingency period) the Permit Holder (SI Group) should apply for the variation at least 9-12 months prior to commencement of construction works. This would mean starting the application process in 2019 according to current project timescales. The permit variation application would require the Applicant and SI Group to work together. The Applicant providing sufficient project information for the application process and SI Group (or agent acting on their behalf) formally submitting the variation application the EA.	The EA during a meeting has in principle stated that variation to the Environmental Permit is possible providing that the application provides sufficient detail and demonstrates how remediation works will be safeguarded.
Construction (Design and	As a general note applicable for all phases of construction works, details about remediation pipework, telemetry, culvert crossing beneath the WCML and	It is considered that risks to construction workers could be

<p>Management) Regulations 2015</p>	<p>contamination will be passed onto the Principal Contractor as part of the pre-commencement Health and Safety file. All construction workers would be aware of baseline site conditions and associated hazards and therefore risk assessments can be appropriately implemented dependent on the specific construction activity and location.</p>	<p>suitably managed by appropriate use of personal protective equipment (PPE).</p>
<p>Construction Phase – Rail Terminal (Phase 1)</p>		
<p>Remediation Abstraction Wells / Pipework / Monitoring Wells</p>	<p>Phase 1 of the rail terminal will affect a proportion of the SIG Land, including (refer to Appendix 4):</p> <ul style="list-style-type: none"> • Pipework to various abstraction boreholes; • BH-159; and • 4 monitoring wells. <p>Construction of the Phase 1 roadways will be designed to limit the effects on the operation of the remediation works or the groundwater contamination plumes but will limit access in certain areas.</p> <p>In appreciation of the complexity and difficulty of remediation, it is proposed to maintain all abstraction boreholes located outside of Phase 1 and 2 terminal areas, however replace and divert remediation pipework in accordance with the attached figure in Appendix 4. The remediation abstraction wells would operate as previously, with relatively little 'down time' for remediation whilst the pipework was reconfigured (the new pipework would be installed with remediation works on-going prior to 'switch over' at the appropriate time). The remediation pipework would be buried (to avoid accidental damage), however would be placed in a gravel trench and so would be accessible in case maintenance was required. The only section of the remediation pipework which would be buried with limited accessibility would be a short section of the pipework underlying the Phase 1 trackway. This section of the remediation pipework would comprise an upgraded specification and be laid in a protective concrete duct (or suitable protective alternative) that will contain sufficient redundancy to provide flexibility to add new pipelines lines for contingency measures. This section of pipework would tie into the existing arrangements where the abstracted groundwater is piped across the West Coast Mainline. If 'clogging' or biofouling of the pipework section underlying the Phase 1 trackway were to occur, given the relatively short distance of pipework which would be a ducted, this section could be routinely maintained (if necessary) by 'flushing out' any biofouling from the accessible pipework to the west of this particular section. However, emergency access to the protective ducting within the rail terminal area will be available via designated access chambers and be large enough (or retain additional capacity) to enable:</p>	

	<ul style="list-style-type: none"> • Removal & replacement of blocked lines that cannot be remotely cleaned; • Laying of additional pipe lines / telemetry / electrical cables if additional pumping or if contingency measures are required; and • Access to culvert beneath the WCML (where pipelines cross to SIG Facility) will also need to be ensured. <p>The pipework alteration would likely require moving of the manifold house to the west of the Phase 1 trackway (so that the manifold house would not be located between the Phase 1 trackway and the WCML) and hence readily accessible.</p> <p>The benefit of the proposed alteration to the remediation pipework is that the changes consider future WMI phases and no further alterations to remediation pipework is considered necessary (apart from the need for spare capacity (redundancy) to allow increased abstractions or for any contingency works). The proposed location of the remediation pipework is outside of areas which will be subject to HGV / rail traffic (other than the small section proposed to underlie the Phase 1 trackway).</p> <p>As part of Phase 1 works abstraction well BH-159 would be 'lost'. However, a replacement abstraction well would be installed within the Accessible Area (as shown in Appendix 4) as close as feasible to the location of BH-159, most likely to the west of BH-159. This replacement abstraction well would mimic BH-159 in terms of depth and construction in order to target the full thickness of plume at this new location. The existing well would be decommissioned in accordance with EA guidance (to avoid short-circuiting of pumping activities). The replacement abstraction well would be configured into remediation pipework as necessary.</p> <p>The proposed Phase 1 works comprise a limited impact on existing monitoring wells. Of the 36 monitoring wells only 4 will be impacted by the proposed Phase 1 works (BH-59, BH-62, BH-45 and BH-46). Replacement monitoring wells will be installed in an appropriate location/depth to ensure that a 'like for like' purpose is maintained given that concentrations can vary significantly over relatively short distances and depths. The replacement monitoring wells will be installed in the Accessible Area as shown in Appendix 4.</p> <p>During Phase 1 the only landscaping in the general remediation area will comprise an earth bund to the south of the remediation area and an acoustic fence (as shown in Appendix 3). Remediation pipework can be located underlying the acoustic fence. All existing abstraction / monitoring wells (other than those stated above) will be protected as necessary during Phase 1 works. Where plant / machinery will be used in</p>	
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	<p>close proximity of existing wells, these wells will be 'cordoned off'. In the unlikely event of additional wells being affected (i.e. beyond those already stated) the relevant well would be replaced as close as possible to the original location.</p> <p>The rail areas would be demarcated and restrict access by appropriated fencing. Access to all remediation and monitoring wells (other than wells noted to be 'lost') would be readily available, whereby the remediation area would be separated from the rail operations and in the absence of contingency measures, there would be no need for monitoring personnel to cross rail lines or the rail terminal area to undertake regular monitoring / maintenance. Access to designated areas in the terminal will be available for the implementation of contingency measures when required. However, as noted above, access to the protective ducting within the demarcated portion of the rail terminal area will be available.</p> <p>The Accessible Area as shown in Appendix 4 illustrates the entire area available for contingency works, however it is not intended that access to this entire area will be available at the same time, otherwise this will constrain proposed rail operations. Instead this plan indicates potential areas within which access is feasible to select locations.</p>	
<p>Potential preferential pathways / temporary de-watering required during construction</p>	<p>Construction of Phase 1 of the rail terminal will not intercept the underlying groundwater (as shown by figures included as Appendix 5. The Phase 1 trackway will be elevated above the water table. Also trenches associated with drainage pipework for the Phase 1 roadways and the Phase 1 reachstacker apron will be above the water table.</p>	<p>No preferential pathways will be created and no de-watering of excavations will be required during the Phase 1 of development.</p>
<p>Operation of Rail Terminal (Phase 1)</p>		
<p>Monitoring / Maintenance / Potential Contingency Works</p>	<p>As outlined above, access to the majority of abstraction and monitoring wells would be readily possible without needing to access the rail terminal. Access to replacement wells for BH-159, BH-59, BH-62, BH-45 and BH-46 will be available via arrangement with the rail terminal operator. These replacement wells would be located in the Accessible Area as shown in Appendix 4. These areas are within proposed container storage locations so would be made available by moving containers as necessary. For sensitive infrastructure such as abstraction wells and pipelines etc, rapid access will be available. The vast majority of the remediation pipework would be accessible (in a gravel trench), apart from a short section underlying the Phase 1 trackway (which could be maintained if necessary by 'flushing out' from an adjacent area and also allow emergency access for essential repairs or modification for contingencies). Following liaison with the EA it is noted that</p>	<p>Phase 1 of the WMI development would still enable access to the remediation works for ongoing monitoring and maintenance for areas located outside of Phase 1 development. Additionally, restricted access to areas of the plume located within Phase 1 will be available if applicable for contingency</p>

	<p>flexibility for contingency measures are important and as a result access to designated areas (Accessible Area as shown in Appendix 4) in the terminal will be available for the implementation of contingency measures when required. Looking at the actual area covered by the Phase 1 development this would still enable access to a significant amount of the groundwater plume areas and if the remediation wasn't progressing as planned additional remediation abstraction wells could be installed. It is noted that areas of the groundwater plumes would be underlying existing, unsurfaced ground (arable land).</p>	works.
<p>Stormwater Drainage & Infiltration</p>	<p>As part of Phase 1 of the rail terminal a temporary stormwater drainage lagoon will be constructed in adjacent Phase 2 land (to take stormwater drainage from the Phase 1 terminal). The lagoon will comprise a geosynthetic liner and comprise approximately 3,200m².</p> <p>The Phase 1 terminal (and subsequent phases) are elevated in topographic level when compared to the West Coast Mainline. In addition, the proposed WMI development will comprise increasing the impermeable area in the SIG Land (concrete hardstanding) and hence reducing infiltration rates, with storm water discharged via a pipe network, with no infiltration based sustainable drainage systems (SuDS) proposed in the SIG Land. Although a large area of the SIG Land is proposed to remain in agricultural use during Phase 1 and 2, with infiltration rates within the agricultural land as per the existing situation.</p> <p>On the SIG Land the rail lines which connect the terminal to the existing West Coast Mainline are notionally flat and the drainage systems for these rail lines is designed such that no run-off will enter the West Coast Mainline drainage system, which is understood to be an interconnected system that drains the whole length of the railway cutting, with flows monitored.</p> <p>Due to the relatively small area of the terminal over the plumes, the reduced infiltration and replacement of agricultural land with hardstanding and earth bunds in Phase 1 is considered to not adversely affect the supply of nutrients for MNA such as dissolved oxygen and nitrate etc. Future monitoring will confirm nutrient (e.g. electron acceptors/donors) levels and how this could potentially (if at all) affect timescales for the natural attenuation of the plumes.</p>	<p>Given the relatively small area of the lagoon and that it will be lined it is not considered it will affect underlying groundwater behavior and hence not affect the remediation works.</p>
Construction of Rail Terminal (Phase 2)		
Remediation Abstraction	Phase 2 works would comprise extension of the rail terminal, trackway and roadways. Considering the safeguarding measures proposed as part of Phase 1, Phase 2 works	Phase 2 of the rail terminal construction would not affect

<p>Wells / Pipework / Monitoring Wells</p>	<p>would not result in any additional loss of remediation abstraction wells. The new development (Phase 2) would not affect any of the remediation pipework re-configured as part of Phase 1 works. Access to designated areas (as per the Accessible Area shown in Appendix 4) in the Phase 2 development will be available for the implementation of contingency measures when required.</p> <p>The proposed Phase 2 works comprise a limited impact on existing monitoring wells. Of the 36 monitoring wells only 2 will be impacted by the proposed works (BH-L and BH-36). Replacement monitoring wells will be installed in an appropriate location/depth to ensure that a 'like for like' purpose is maintained given that concentrations can vary significantly over relatively short distances and depths. The replacement monitoring wells will be installed in the Accessible Area as shown in Appendix 4.</p> <p>During Phase 2 the only landscaping within the SIG Land will comprise a small section of earth bund (as shown in Appendix 3). The earth bund will not constrain access to the remediation pipework. If necessary (i.e. for contingency works) additional wells can be excavated within the bund area. All existing abstraction / monitoring wells (other than those stated above) will be protected as necessary during Phase 2 works. Where plant / machinery will be used in close proximity of existing wells, these wells will be 'cordoned off'. In the unlikely event of additional wells being affected (i.e. beyond those already stated) the relevant well would be replaced as close as possible to the original location.</p>	<p>the remediation works and should ensure continued satisfactory operation of the remediation.</p>
<p>Potential preferential pathways / temporary de-watering required during construction</p>	<p>Construction of Phase 2 of the rail trackway will not intercept the underlying groundwater (as shown by figures included as Appendix 5). The Phase 2 trackway will be elevated above the water table. Trenches associated with drainage pipework for the Phase 2 rail parking and the northern and the central sections of the Phase 2 roadways and container storage will be above the water table. Trenches associated with drainage pipework for the southern sections of the Phase 2 roadways and container storage may potentially intercept the upper sections of the water table (however these works potentially may not intercept the water table as it is marginal, it would be dependent on the seasonal variation of the water table at the time). If the water table is intercepted then precautionary measures of addressing groundwater would be required, however based on Ramboll's analytical data from monitoring wells representative of this location (BH220 and BH224) no detectable concentrations of phenol, petroleum hydrocarbons and volatile organic compounds were identified in shallow groundwater samples (as the primary contaminants are within the 'deeper' groundwater plume).</p>	<p>No significant preferential pathways will be created during the Phase 2 of development.</p> <p>Excavations associated with drainage pipework in the southern areas of the Phase 2 of development may require temporary de-watering during the construction phase only. Any dewatering will be designed to minimise the volume of groundwater to be abstracted. However, assessment data does not</p>

	<p>If following analysis of excavation water (if present) contaminants at concentrations of concern were identified then precautionary measures would be devised dependent on volumes of water / timescales for the excavation works. If small volumes of water required treatment this would likely comprise removal of excavation water as a waste using tankers. Larger volumes of water could be addressed by alternative methods such as discharge to foul sewer under appropriate consent (and pre-treatment if applicable using mobile plant). In any event treatment of excavation water (if present and if comprising contaminants of concern) would be a temporary short-term construction requirement.</p> <p>According to groundwater concentrations identified in Ramboll's investigation, this indicates that construction of drainage as part of Phase 2 would not create significant preferential pathways and if de-watering from construction trenches was necessary in localised areas this wouldn't be problematic in terms of contamination risk (subject to standard mitigation measures for de-watering).</p>	<p>indicate the shallow groundwater in this location to be significantly contaminated and hence standard de-watering mitigation measures would be considered appropriate (subject to further analysis at the time of the works).</p>
<p>Operation of Rail Terminal (Phase 2)</p>		
<p>Monitoring / Maintenance / Contingency Works</p>	<p>As outlined above, access to all stated remediation and monitoring wells would be readily possible without needing to access the rail terminal.</p> <p>In terms of options for contingency works (if applicable) although Phase 2 works increase the built coverage of the SIG Land, the rail terminal development is orientated in a general north-south direction and is relatively 'narrow'. Whereas the groundwater plumes are orientated perpendicular (in east-west direction) and hence still enable access to large proportions of the groundwater plumes if additional remediation abstraction wells are considered necessary Access to the rail terminal will be agreed in advance of the WMI development to enable the installation of additional wells in appropriate locations (although some areas such as key roadways / loading areas may remain restricted).</p>	<p>Phase 2 of the WMI development would still enable access to the remediation works for ongoing monitoring and maintenance and if applicable contingency works.</p>
<p>Stormwater Drainage & Infiltration</p>	<p>As part of Phase 2 of the rail terminal a stormwater drainage pond will be constructed in Phase 2 land (to take stormwater drainage from the Phase 2 terminal – as per the phasing plan in Appendix 3). The pond will primarily remain dry, apart from after heavy rainfall events. The pond will comprise a puddled clay liner and be installed as per the Canal & Rivers Trust specification. The pond will comprise a growing medium which will mitigate the clay liner drying and shrinking. On this basis and when constructed to design specifications, a typical clay liner shouldn't comprise significant leakage.</p> <p>The Phase 2 terminal are elevated in topographic level when compared to the West</p>	<p>Given the relatively small area of the pond and that it will be lined it is not considered it will affect underlying groundwater behavior and hence not affect the remediation works.</p>

	<p>Coast Mainline. In addition, the proposed WMI development will comprise increasing the impermeable area in the SIG Land (concrete hardstanding) and hence reducing infiltration rates, with storm water discharged via a pipe network, with no infiltration based sustainable drainage systems (SuDS) proposed in the SIG Land. Although a large area of the SIG Land is proposed to remain in agricultural use during Phase 1 and 2, with infiltration rates within the agricultural land as per the existing situation.</p> <p>On the SIG Land the rail lines which connect the terminal to the existing West Coast Mainline are notionally flat and the drainage systems for these rail lines is designed such that no run-off will enter the West Coast Mainline drainage system, which is understood to be an interconnected system that drains the whole length of the railway cutting, with flows monitored.</p> <p>Due to the relatively small area of the terminal over the plumes, the reduced infiltration and replacement of agricultural land with hardstanding and earth bunds in Phase 2 is considered to not adversely affect the supply of nutrients for MNA such as dissolved oxygen and nitrate etc. Future monitoring will confirm nutrient levels (e.g. electron acceptors/donors) and how this could potentially (if at all) affect timescales for the natural attenuation of the plumes.</p>	
Construction of Warehouse Buildings (Phase 3)		
General	<p>The Applicant has confirmed that construction of warehouse buildings in the relevant part of the SIG Land won't commence until the remediation works are complete (including any 'rebound' period) and the Environmental Permit varied so that the installation area no longer includes the SIG Land. Subject to EA approval and dependent on the configuration of proposed warehouse buildings, it may be possible to commence construction in certain areas in the SIG Land during the MNA phase. Providing that the buildings do not constrain MNA works or potentially required contingency works.</p> <p>The Environmental Permit holder would be responsible for appropriate decommissioning of abstraction and monitoring wells in order to not create preferential pathways to the underlying aquifer.</p> <p>As above, construction works for the warehouse buildings in the SIG Land would only commence following completion of the remediation works, including relevant MNA monitoring. It may be that subject to MNA monitoring, parts of Phase 3 are developed from 2029 onwards.</p>	Phase 3 of the WMI development (within the SIG Land) would only commence following completion of the remediation works. Unless, subject to EA approval, certain areas of the SIG Land can be constructed during the MNA phase.
Building Membranes		If applicable, residual risks could be addressed by design measures such as installation of hydrocarbon resistant membranes.

	<p>Whilst the remediation would achieve the remedial targets in terms of protection of the off-site public water supply groundwater abstraction a revised Conceptual Site Model would need to be considered. Based on Ramboll data to date, given the depth of groundwater plumes it considered unlikely that significant vapour ingress of contaminants of concern into proposed buildings would occur. However, this should be verified by additional soil vapour monitoring once a finalised building layout is devised (monitoring to be as per CIRIA guidance document 682). If based on this monitoring it is deemed that there is a potential pollutant linkage then potential mitigation measures could comprise upgrading damp proof membranes to be hydrocarbon resistant; this would break any potential pathway. Any hydrocarbon resistant membrane (if required) would need to comprise a recognised supplier and be installed / verified by competent parties.</p>	
<p>Potential preferential pathways / temporary de-watering required during construction</p>	<p>The Phase 3 warehouse buildings will be elevated above the water table. Trenches associated with drainage pipework for the northern Phase 3 warehouse building and the northern section of the southern warehouse building will be above the water table. Trenches associated with drainage pipework for the southern section of the southern warehouse building will likely intercept the upper sections of the water table (however the degree to which the water table is intercepted would be dependent on the seasonal variation of the water table at the time). If the water table is intercepted then precautionary measures of addressing groundwater would be required, however based on Ramboll's analytical data from monitoring wells representative of this location (BH220, BH224, BH110 and BH119) no detectable concentrations of phenol, petroleum hydrocarbons and volatile organic compounds were identified in shallow groundwater samples (as the primary contaminants are within 'deeper' groundwater). According to analytical data this indicates that construction of drainage as part of Phase 3 would not create significant preferential pathways and if de-watering from construction trenches was necessary in localised areas this wouldn't be problematic in terms of contamination risk (subject to standard mitigation measures for de-watering).</p>	<p>No significant preferential pathways will be created during the Phase 3 of development. Excavations associated with drainage pipework in the southern areas of the Phase 3 of development may require de-watering during the construction phase only. However, assessment data does not indicate the shallow groundwater in this location to be significantly contaminated and hence standard de-watering mitigation measures would be considered appropriate.</p>
<p>Stormwater Drainage</p>	<p>The proposed stormwater drainage for the SIG Land (post development) would not comprise any infiltration based SUDs such as soakaways, with stormwater being discharged via drainage pipework. The drainage pipework would be 'sealed' and as such there is no risk of stormwater drainage becoming contaminated as a result of mixing with the underlying groundwater and impacting on surface water receptors. Any drainage for proposed warehouse buildings would not comprise soakways and whilst remediation works may or may not be complete by the time of this stage, there is no residual risk of drainage impacting groundwater plumes (although noting groundwater</p>	<p>The drainage proposals for the SIG Land would not result in increasing site sensitivity or introducing new receptors. Therefore, the completed remediation works would not be undermined by the WMI</p>

	<p>concentrations would be below remedial targets at this stage). Drainage soakaways would not be constructed in the SIG Land. Furthermore, proposed drainage ponds in the SIG Land would not intercept underlying groundwater (as shown by figures in Appendix 5) and would be clay puddle lined. Also the proposed warehouse buildings will reduce the infiltration rate when compared to the current unsurfaced condition of the SIG Land. Although the remediation works may or may not be complete, the proposed warehouse buildings will reduce the infiltration which will mitigate even further potential impacts upon the off-site potable water supply groundwater abstraction by reducing groundwater travel time and hence increasing the time available for further natural attenuation.</p>	development.
Water Supply Pipework	<p>The specification for the water supply pipework for the proposed warehouse buildings will be at the discretion of the water company. Given the remediation works which will have been completed by the construction of the proposed buildings it would be prudent to use hydrocarbon resistant water supply pipework as a standard precautionary measure.</p>	<p>If applicable, residual risks could be addressed by design measures such as installation of contamination resistant water supply pipework.</p>
Operational phase – Rail Terminal and Proposed Warehouse Buildings (Phase 3)		
General	<p>Remediation works within a given area of Phase 3 will have been completed by the time of the construction and operation of the proposed warehouse buildings.</p>	<p>At this stage remediation works will be completed.</p>

Appendix 1 - Figure to illustrate the location of the SIG Land



- Key
- SIG Land
 - SIG Facility

Title Relevant land areas referenced in remediation safeguarding report.

Site Four Ashes, Wolverhampton, WV10 7DF

Date March 2018
Scale See scale bar



Project No. 170000573

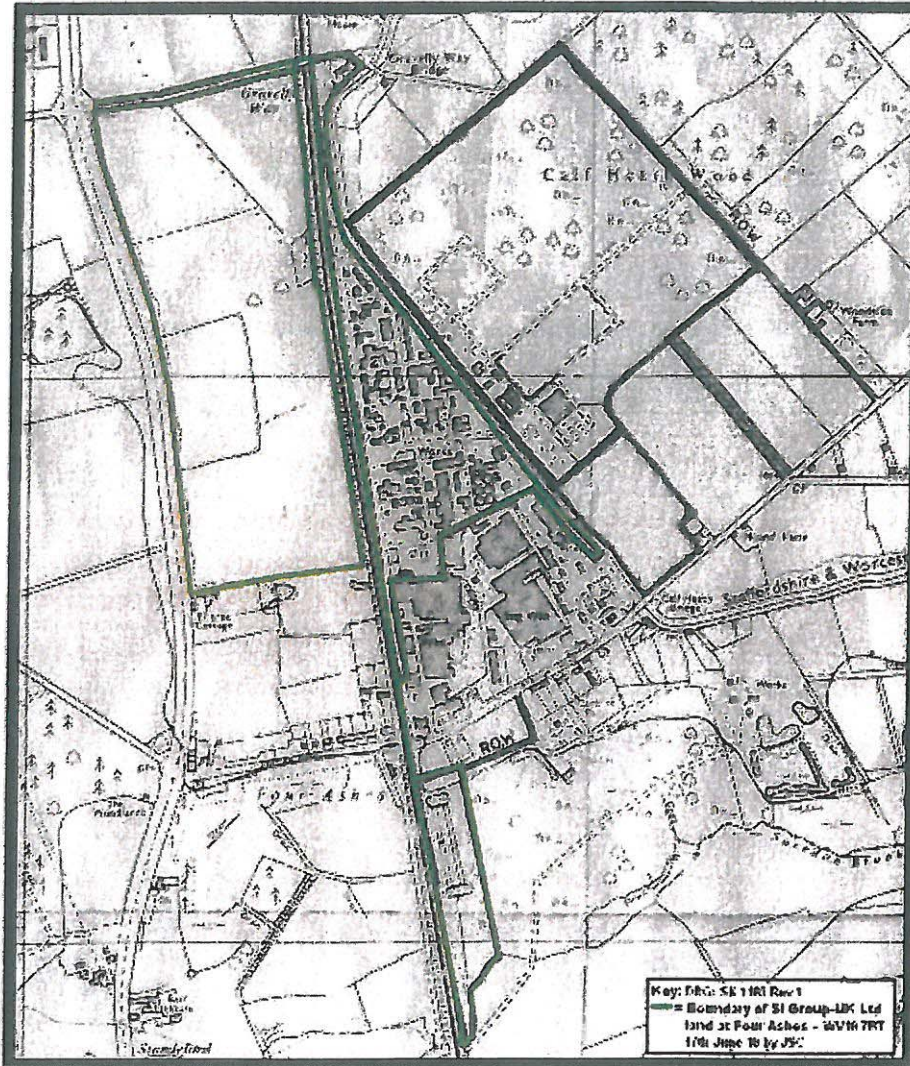
Client Four Ashes Ltd.

Issue 1 Drawn by AK

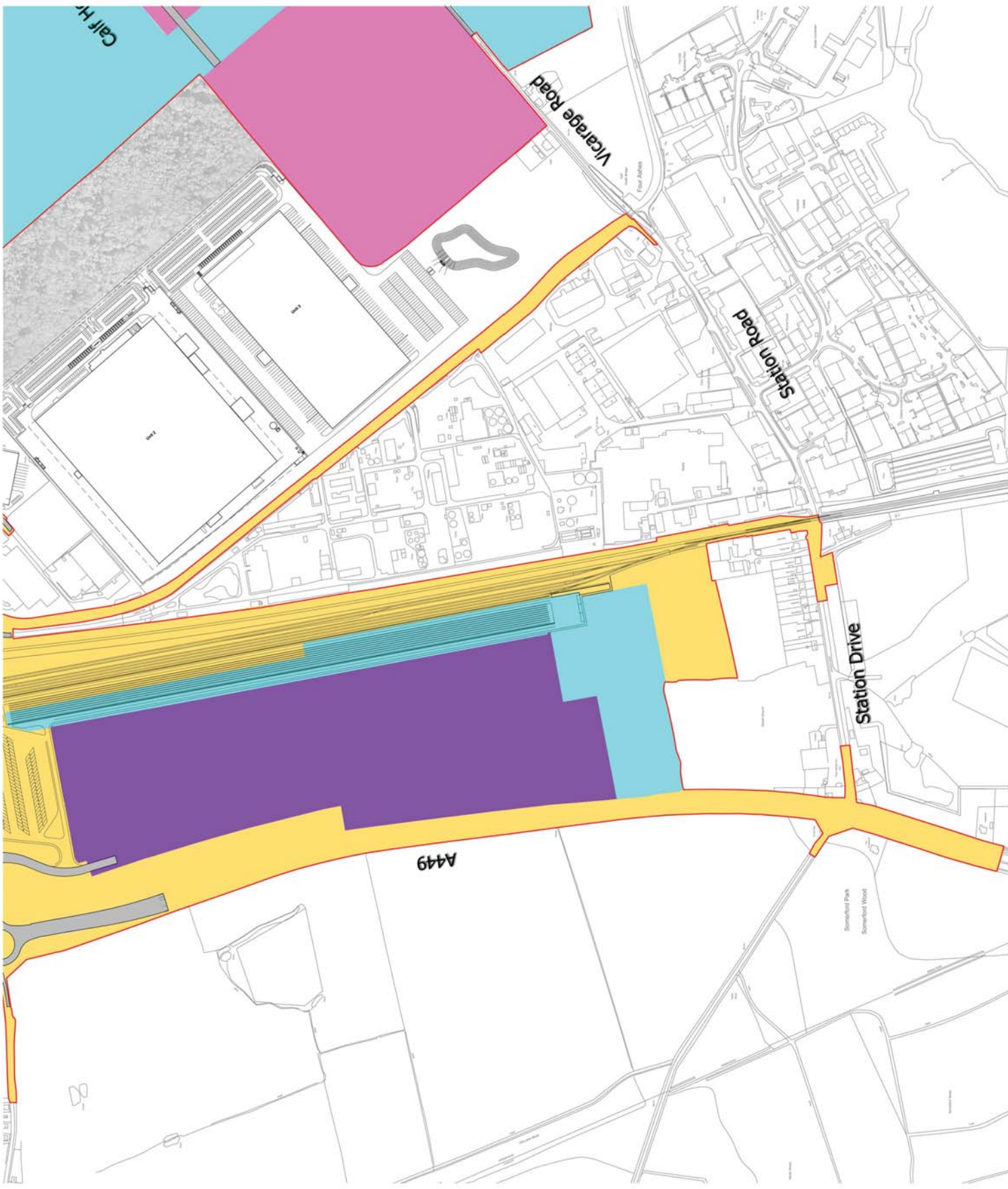
Appendix 2 - Environmental Permit installation area

Schedule 4 – amended plan

Amended plan attached below. This replaces the site plan in schedule 5 of the permit.

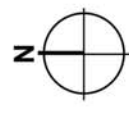


Appendix 3 – WMI indicative phasing plan (illustrative)

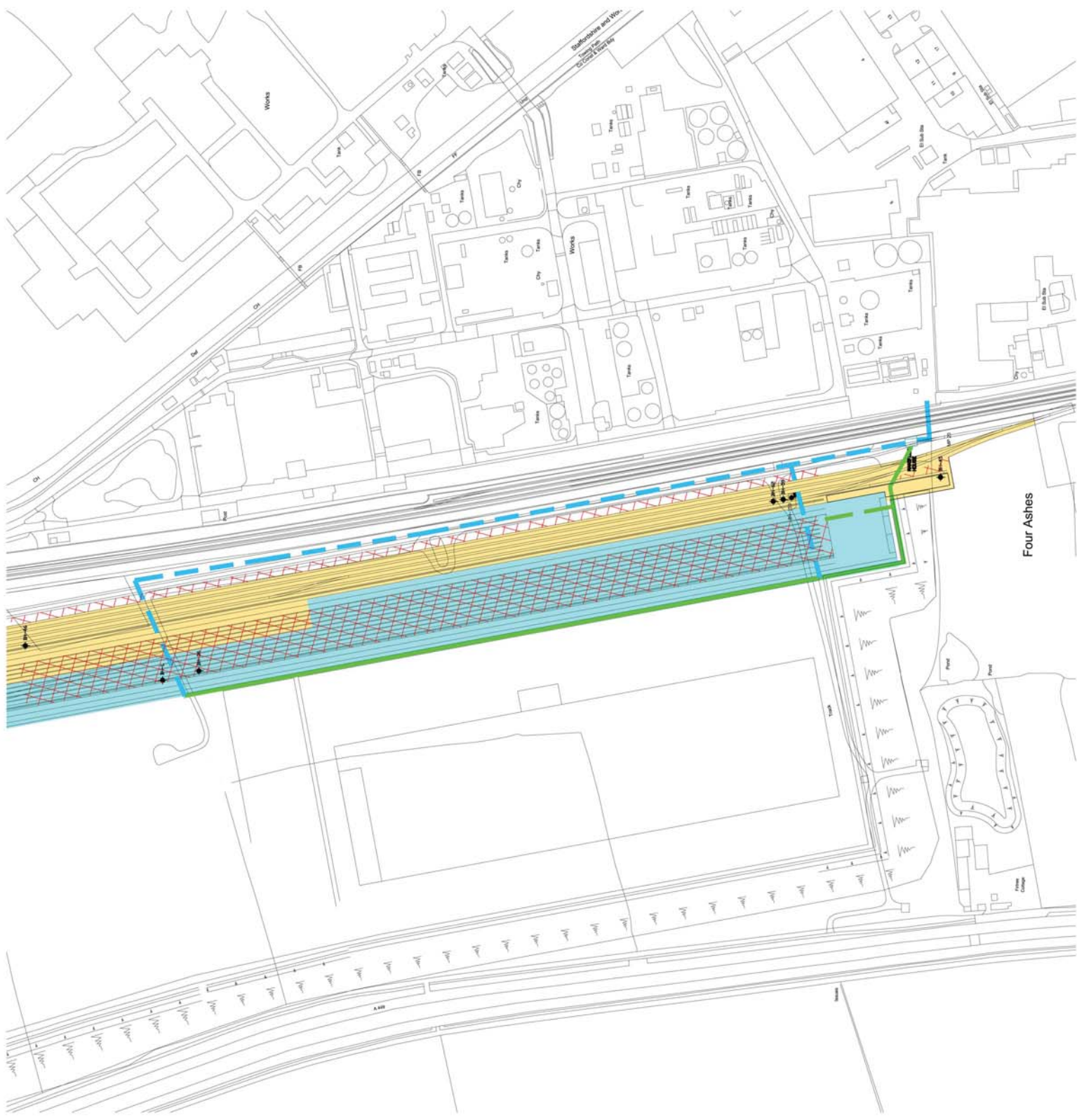


Appendix 4 – Proposed remediation pipework relocation (illustrative)

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- EXISTING PIPE
- EXISTING PIPE TO BE DEMOLISHED
- PROPOSED NEW PIPE
- PHASE 1
- PHASE 2
- ACCESSIBLE AREA
- INDICATIVE NEW PIPELINE



18.04.18 DR
 18.04.18 DR
 18.04.18 DR

PROPOSED
chertwoods
 18.04.18 DR
 18.04.18 DR
 18.04.18 DR

Project: Job Number: 0049
WEST MIDLANDS INTERCHANGE
STAFFORD
 Client: **West Midlands Interchange**
 Drawing Title: **PIPE RELOCATION PLAN**
 Drawing Code: **PHASE 1 & PHASE 2**
 Drawing No: 18.04.18
 Date: 18.04.18
 Scale: 1:1000
 Author: PMS
 Checker: 409-110
 Date: 02

Appendix 5 - Cut and fill details for the SIG Land (illustrative)

- 1. 100% final site drawing
 - 2. All dimensions are in millimeters unless stated otherwise
 - 3. All dimensions are in meters unless stated otherwise
 - 4. All proprietary items to be used in this project must be approved by the relevant manufacturer and comply with manufacturer instructions and recommendations.
- KEY**
- Denotes Finished Level
 - Denotes Formation Level
 - Denotes Proposed Rail Line (Top of Ballast)
 - Denotes Existing Ground Profile
 - Denotes Proposed Formation Level
 - Denotes Existing Rail Line
 - Denotes Groundwater Level
 - Denotes Drainage Run
 - Denotes Indicative Foundation position assuming max 1.5m foundation depth

Site Layout Based On the following Received Information:

- Chetwoods Architectural Illustrative Master Plan, Layout West Rail Option Drawing No. 449-100 Revision 33
- (Starway Rail) Rail Alignment Stationing from Station 2+000 to Station 2+300 (Down Sawy Zone)
- Terminal - TIS-DRG-FA-001003 Rev 4: (Greenhatch area) Existing Ground Topographical Survey Information

Notes:

- Finished level, slope levels, etc. based on assumed elevations. Level may be subject to change once rail topographical information is obtained.

General Protractor Note:

- Rail levels are established from an existing model. Foundation levels are relative to FFL. Foundation levels may deviate from stated FFLs as is appropriate.
- P01 1010 = -0.850m = 0.650m
- P01 1020 = -1.500m

P3 Levels amended, updated to suit 1303-218 MG
 P2 Updated to include indicative drainage 301/117 TL
 P1 Updated to include indicative drainage 301/117 TL
 P1 Proposed Drainage
 22/12/16 MG
 KSC000003

West Midlands Interchange

Project: THE WEST MIDLANDS RAIL FREIGHT INTERCHANGE ORDER 2017

Drawing Title: Preliminary
 Drawing No: Drawing S1C-A0
 Proposed Sections Through S1 Group Contaminated Land

Revision	Date	Drawn By	Scale	As Shown	Revised To
P3					

Revision: P3
 Drawing No: 1516-0425-WDK-S1-C-301-005



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Appendix 6 – Correspondence from the Environment Agency

F.A.O. Matt Royall
Four Ashes Limited
2b Chandos Street
London
City of Westminster
W1G 9DG

Our ref: UT/2017/116841/02-L01
Your ref: ENVPAC/1/WMD/50024
Date: 16 July 2018

Dear Mr Royall

**DRAFT REMEDIATION SAFEGUARDING REPORT AND LAND PHASING PLAN -
CHARGEABLE ADVICE AGREED UNDER REF: ENVPAC/1/WMD/50024 THE WEST
MIDLANDS INTERCHANGE: PROPOSED STRATEGIC RAIL FREIGHT
INTERCHANGE (INCLUDING WAREHOUSING AND ASSOCIATED HIGHWAYS
WORKS)**

**LAND WEST OF JUNCTION 12 OF THE M6, IMMEDIATELY SOUTH OF THE A5
TRUNK ROAD**

Further to our most recent meeting of 17 April 2018, we have reviewed Ramboll's Draft Remediation Safeguarding Report (R-UK15-22306_3) dated 26 June 2018 and consider that it sets out a robust way of ensuring the existing deep groundwater remediation scheme within the SIG Land will not be comprised by the forthcoming (phased) NSIP project.

Ramboll clearly recognises that the groundwater pump and treat system needs to remain unaltered and active until between 2022 and 2028 (pumping in certain areas may be completed sooner), with subsequent MNA monitoring and the potential need for access and contingency measures to remain thereafter too. The report also correctly notes that the SIG Land now comprises part of the Part A1 installation covered under the SIG Facility Environmental Permit, with the remediation works controlled by a separate groundwater abstraction licence too.

Reassuringly, the safeguarding measures outlined in Table 1 (incl. the proposed remediation pipework and abstraction / monitoring borehole relocations where necessary plus the future access, infiltration and cut & fill details for the SIG Land) appear thorough and acceptable. Further to this we have a couple of minor observations to make regarding these measures:

- 1) Environmental Permit: It is worth bearing in mind that after our recent Strategic Review of Charging which has now come in to operation that pre-permit discussions become chargeable (as is the case with the current arrangements for pre-planning advice)
- 2) It should be clear that before any modifications are made to any of the boreholes, this has been discussed and agreed with the Environment Agency and a variation of permit granted
- 3) Access to replacement wells is to be in arrangement with the rail terminal operator. This arrangement must be easily workable to allow the appropriate access.
- 4) Protection of the existing wells must be a priority. Measures in place must be robust to ensure that the wells are not damaged as there will be a lot of heavy machinery being used. Cordoning areas off may not offer full protection.

Minor note: Point 22 should read 'necessarily' rather than 'necessary'

In light of the above, we are satisfied with the mitigation proposals as detailed within this report. As such, we are happy for the project to move forward with the update to the Statement of Common Ground and final Environmental Statement in support of the DCO application as next steps.

Yours faithfully

Miss Jane Field
Planning Specialist

Direct dial 020 3025 3006

Direct fax 01543 444161

Direct e-mail swwmplanning@environment-agency.gov.uk