MEMO

ARCADIS Design & Consultancy for natural and built assets

SUBJECT
Net Zero Plot – Response to (EA document reference NA/2021/115684/01-L01)

DATE
21/02/22

DEPARTMENT
Arcadis Leeds

COPIES TO
John McNicholas (Teesworks)
Lauren Carr-Duffy (Teesworks)
Rachel Dodd (Litchfields)

TO
Lucy Mo (EA)

OUR REF
10035117-AUK-XX-XX-CO-ZZ-0486-01-Net_Zero_Rem_Clarification_EA

PROJECT NUMBER
10035117

FROM
Jonathan Miles
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Net Zero Plot – Response to (EA document reference NA/2021/115684/01-L01)

Arcadis understand that the Environment Agency (EA) have objected and commented on planning application R/2021/1048/FFM. These comments were detailed in communication NA/2021/115684/01-L01 to David Pedlow (RCBC) and subsequently passed to Arcadis via STDC (Appendix A).

The EA objected to the proposed development for the following reasons:

1. *Potential for contamination and unacceptable risk to controlled waters. The applicant has provided insufficient information.*
2. *Risks to groundwater from the development are unacceptable. The applicant has not supplied adequate information to demonstrate that the risks posed to groundwater can be satisfactorily managed.*

In response STDC have submitted the following additional information to that listed in NA/2021/115684/01-L01:

- Soil and Groundwater Baseline Characterisation Study, Teesside Works, prepared by Enviros for Corus UK Ltd [Enviros 2004], comprising:
  - Volume 1 – Factual Report, Ref. Rlp250604corusteessidefactual.Doc dated 25th June 2004 and marked Final;
  - Volume 2 – Interpretive Report Ref. Mwicorusdraftinterpretivemmdv#2.Doc dated 25th June 2004 and marked Final; and,
  - Volume 3 – Summary Report dated June 2004
- SSI1 Redcar Works – Phase 1 Geo-Environmental Desk Study, 678079_SSI1_001 prepared by CH2M, dated August 2017 [CH2M 2017a].
- SSI2 Redcar Works – Phase 1 Geo-Environmental Desk Study, 678079_SSI2_001 prepared by CH2M, dated August 2017 [CH2M 2017b].
- Factual Report – Initial Trial Pitting - SSI Redcar – SSI1, prepared by CH2M and dated November 2017; [CH2M 2017c].
- Factual Report – Initial Trial Pitting - SSI Redcar – SSI2, prepared by CH2M and dated November 2017; [CH2M 2017d].
- *Former SSI Steelworks, Redcar – Initial Ground Investigation Works*, Geoenvironmental Summary, prepared by CH2M for South Tees Site Company Ltd, dated May 2018 [CH2M 2018].

- 4153 & 4154 Area A Former Steelworks Redcar Contract 1 & 2 (Area A) (Final report), prepared by Allied Exploration and Geotechnics Limited (AEG) for South Tees Site Company Ltd, dated June 2018, AEG 2018].
- The Former SSI Steelworks, Redcar: Priority Areas within SSI Landholdings Contract 1 and 2A: Site Condition Report, Redcar Steelworks-AUK-XX-XX-RP-GE-0001-02-SSI1_SSI2A_GI_SCR, prepared by Arcadis and dated August 2018, [Arcadis 2018]
- Preliminary Onshore Ground Investigation for Net Zero Teeside (NZT) – South Tees Development Corporation (STDC) 'Main Site' and Onshore CO2 Export Pipeline Corridor, prepared by AEG and dated September 2021 and marked Draft Factual Report [AEG 2021].
- Net Zero Plot, Teesworks, Detailed Quantitative Risk Assessment (DQRA), 10035117-AUK-XX-XX-RP-ZZ-0428-01-Net_Zero_DQRA, prepared by Arcadis for South Tees Development Corporation, dated January 2022 [Arcadis 2022a].

In addition Arcadis will up issue the reviewed remedial strategy to address comments within NA/2021/115684/01-L01. The new document reference will be

- Enabling Earthworks and Remediation Strategy Report for Net Zero Plot, Teesworks, Redcar. Report Ref. 10035117-AUK-XX-XX-RP-ZZ-0417-02-Rem_Strat_Net Zero. Prepared by Arcadis and dated February 2022 [Arcadis 2022b].

Arcadis also provide the following commentary which addresses specific comments from the EA pertaining to controlled waters, comments relating top CL:aire DoWCoP will be addressed separately:

EA Comment	Arcadis Response
The information submitted does not appear to follow Land Contamination Risk Management guidance and has not been accompanied by a Desk Study / Preliminary Risk Assessment, factual ground investigation undertaken on the Net Zero site and geo-environmental ground investigation interpretative report including schematic site conceptual model and risk assessment.	The additional documentation provided addresses this point. Desk studies - CH2M 2017a and CH2M 2017b Factual Ground investigation – CH2M 2017c CH2M 2017d, AEG2018, and AEG2021 Generic Quantitative Risk Assessments (GQRA) – Enviros 2004, and CH2M 2018 Detailed Quantitative Risk Assessment (DQRA) – Arcadis 2022 Arcadis 2018 [Figure 8] and 2022a [Figure 6] contain the most recent schematic site conceptual model and risk assessment.
Section 1.4 refers to previous information (2004 – 2021) which has either been prepared for or included the Net Zero plot as part of a wider Area. This information forms the basis of the proposed remediation strategy. However, factual ground investigation relevant only to the Net Zero plot has not been submitted. It is not clear what factual data has been used as a basis for assessment. It would also be	Information provided as above. Enviros 2004 is provided for completeness but is augmented by the additional ground investigation listed above. Arcadis accepts the 2004 assessment is not likely to be wholly representative of conditions at the current time in respect to controlled waters. However, given the limited changes in site layout it is still pertinent in terms of human health for some contaminants and has

EA Comment	Arcadis Response
questionable whether ground investigation data obtained from 2004 would be representative of site conditions at the current time.	been used to provide indicative groundwater conditions in areas where only limited recent data is available.
In summary, we do not fully agree with the proposed enabling earthworks and remediation strategy set out in the submitted information. At this stage we do not agree that remediation of controlled waters is not warranted. Whilst it is recognised that controlled waters may have been impacted on by historic activity, they should still be considered as a receptor and the development should aim to prevent the entry of hazardous and non hazardous substances into controlled waters. Redevelopment through the planning regime should result in an overall enhancement to the wider environment and improvement in groundwater and surface water quality (be it superficial or otherwise). This environmental betterment to controlled waters should be fully demonstrated and evidenced.	Arcadis 2022a considers controlled waters as a receptor. The document provides an Executive Summary and concludes: Off-site hydraulically down gradient pond (only one remaining) is not in hydraulic continuity with groundwater – as such, no significant risk. Theoretical risk to the aquifer (inorganics, metals, PAH and hydrocarbons), albeit this is recognised to be of low resource potential and should not drive remedial requirements. Theoretical risk to the North Sea (assuming no dilution) and its associated ecologically protected status from inorganics (thiocyanate, ammoniacal nitrogen, cyanide and sulphate) in groundwater – however this is likely a conservative view as it is not possible to readily model the mechanisms that affect their migration in the aquifer – as such, the risks are likely to be overestimated. Overall the risk to the North Sea was considered qualitatively and is considered to be low given the potential affects of dilution. As such, remediation for the protection of controlled waters is not considered warranted, particularly given that on-Site source material (slag Made Ground) extends for a significant distance off-Site to the north. However, planned remedial activities (removal of Non Aqueous Phase Liquid [NAPL]) on-Site should result in a betterment in groundwater conditions beneath the Site.
The document refers to a Detailed Quantitative Risk Assessment (DQRA) which has not been provided. It is not particularly clear why this has been undertaken rather than a Generic Quantitative Risk Assessment. In addition, it is not clear what previous ground investigation information has been reviewed as part of the risk assessment and whether this includes soil, soil leachate, groundwater and surface water testing. Furthermore, it is unclear whether underground relic structures which may be present for example existing piled foundations, existing below ground services etc have been considered as potential pollution pathways	Both GQRA and DQRA documentation is now provided. Generic Quantitative Risk Assessments (GQRA) – Enviros 2004, and CH2M 2018 Detailed Quantitative Risk Assessment (DQRA) – Arcadis 2022a

EA Comment	Arcadis Response
in the risk assessment. On this basis, it is unclear what the risks from site conditions and land contamination are to controlled waters.	
The document refers to a Controlled Waters Quantitative Risk Assessment (Section 2.14.3) which has not been included.	As above
•Section 2.1 refers to demolition activities currently occurring on site. It is not clear from the information submitted what the exact methodology is for demolition activity, particularly whether underground structures are to remain which may form potential pollution pathways.	Demolition works are not relevant to this planning application. The approach to relic structures is detailed in the provided remedial strategy Section 2.13 and Figure 1 [TSWK-STDC-NZT-ZZ-DR-C-0005 Net Zero Teesside - Remediation Zones - Rev A] in the updated remedial strategy Arcadis 2022b.
Sections 2.2 and 2.3 refers to underlying geology and hydrogeology. No scaled cross sections have been provided which would clearly demonstrate the underlying geology and the groundwater conditions prevailing at the site. Additionally, specific boreholes have been referred to and it is not clear where these are located within the site.	Cross sections are provided in Arcadis 2022a (Appendix B). Borehole Location Plans are provided in the relevant factual reports and additionally on Figures 4a-4c and 5 as presented within the DQRA (Arcadis 2022a). Factual Ground investigation – Page 3 CH2M 2017c Page 3 CH2M 2017d, Figure 1 AEG2018, and Figure 1 AEG2021
Section 2.3 refers to hydrogeological conditions. However, it is not clear what the prevailing groundwater regime at the site is, including the strata within which groundwater bodies occur, whether different groundwater bodies within different strata interact and how groundwater interacts with surface waters. It is also not clear what the tidal influence on groundwater bodies are. No factual monitoring results have been submitted to demonstrate an understanding of the hydrogeological conditions at the site including tidal influence.	This is discussed in detail most recently in Arcadis 2022a from Section 2.4, which summarises data from AEG 2018 and AEG 2021 including a discussion of: Groundwater elevation 2.4.1 Groundwater flow direction 2.4.2 Aquifer permeability 2.4.3 Aquifer salinity 2.4.4 Tidal Influence 2.4.5 Aquifer classification 2.4.5 The interaction of ground and surface water is discussed in Section 2.5
Clarification is required on the aquifer designations at the site and wider study area identified in table 1 aquifer designation. Table 1 does not refer to the correct aquifer designations for each strata type.	The table contained some errors and has been updated in Arcadis 2022b.
Section 2.5 (Data Gaps) refers to areas of the site which have not been investigated. We would welcome	Investigation was not historically possible in these areas due to existing structures and demolition

EA Comment	Arcadis Response
further detail on the extent of the scope of works alongside justification	activities. However we do not consider the data gaps are significant as the substantial ground investigation works undertaken surrounding the potential areas of concern (data gaps) would have identified significant sources posing a risk to controlled waters, should they be present on site. Notwithstanding this localised small scale point sources are considered to be potentially present (eg. individual transformers). However, given the size and complexity of the site the ground investigation strategy has not been to investigate all potential individual point sources but provide sufficient coverage to allow the development of a robust CSM. Arcadis believe the current data set demonstrates this. Small scale additional sources will be addressed during the site remediation phase of work.
Section 2.6.1 (Environmental) refers to an assumption that remediation of controlled waters is not required. We would not agree with this assumption as no factual information (soil leachate, groundwater / surface water quality) has been submitted to demonstrate that remediation of controlled waters is not required. It is not clear whether visual or olfactory evidence of contamination has been observed within controlled water bodies. Furthermore it is stated in section 2.7.2 that evidence of non-aqueous phase liquids (NAPL) and tar have been identified within made ground. The impact of NAPL and tar on controlled waters quality has not been considered.	Factual data is presented in AEG 2018 and AEG2021. Fate and transport modelling is undertaken within the DQRA (Arcadis, 2022a) to assesses the risks to controlled waters within Section 6, following a detailed review of the conceptual site model in Section 5. The impact of NAPL and tar is considered in Section 4.4 and 5.2.7 within the DQRA (Arcadis, 2022a)
Section 4.3.4.2 (Use of Slag under the DoWCoP) refers to the reuse of slag within the permanent works. No information has been presented within the report to confirm the chemical nature of the slag or its impact on quality of controlled waters.	The chemical nature of the slag is assessed by soil and soil leachate testing in CH2M 2017c CH2M 2017d, AEG2018, and AEG2021. The DQRA (Arcadis, 2022a) incorporates fate and transport modelling to assess the risks to controlled waters, including from slag deposits.
The Contaminants of Concern referred to in Section 2.7 (Requirement for Remediation) and Section 4.1 (Aim) do not concur.	This has been updated in Arcadis 2022b.
Section 4.3.5 (Soil Sampling) refers to further information on the proposed sampling strategy, including sample frequency and testing within an Earthworks Specification and Materials Management Plan. These have not been included.	These documents are not required for planning purposes.

EA Comment	Arcadis Response
In the absence of factual data with respect to groundwater quality and the presence or absence of hydrocarbon contamination, we do not agree with the proposals set out in section 4.3.7.1 with respect to removal of NAPL on groundwater. Additionally, no details have been provided on how dissolved concentrations of hydrocarbons associated with NAPL will be addressed.	Arcadis are unsure what this comment is requesting, and considers a discussion the best way forward. Arcadis note that AEG2018 and AEG2021 demonstrate no NAPL has been identified on groundwater and no dissolved concentrations of hydrocarbons are present which require remedial intervention. Further Arcadis note the approach detailed in 4.3.7.1 is expected to be used to address perched groundwater within relic structures as groundwater itself is unlikely to be intercepted in significant quantities during the proposed works. NAPL is considered as part of the DQRA (Arcadis 2022a) which notes in section 5.2.7 that "*dissolved phase concentrations indicate that NAPL is not presenting a significant risk to water resources or ecological receptors*."
Section 4.3.8 (Remediation Criteria) and Appendix C refers to derivation of remediation criteria developed and protective of human health. It is indicated that all reused soils will be tested for this criteria prior to incorporation into the permanent works. However, no remediation criteria has been derived which is protective of risk to controlled waters.	Soil remediation criteria protective of controlled waters were not derived as part of the DQRA (Arcadis 2022a) based on the rationale that steady state conditions were likely between soil and groundwater. As such, groundwater concentrations were considered most appropriate to assess risk to controlled waters, albeit distribution of contaminants in soil was also reviewed given the extensive spatial coverage of the site that this data provided.
Section 4.3.8.1 (Compliance Sampling Frequency) refers to importation and testing of soils for the remediation criteria. The proposed remediation criteria would not be appropriate for importation of soils and as previous there is no criteria which is protective of risk to controlled waters.	Materials to be imported (if required) under DoWCoP would be clean and naturally occurring materials following visual assessment and chemical testing. Based on the natural nature of these soils, no additional criteria are considered to be warranted.
Section 4.3.9 (Management of Contaminated Soils) refers to the placement of protective cover layers in areas where contaminants in soils are identified above the reuse criteria as highlighted in Appendix C. However, it has mentioned previously that unacceptable soils not complying with the remediation criteria will not be incorporated into the permanent works. We therefore, do not agree with this approach.	The criteria under discussion are human health criteria and consider the pathway of exposure. Therefore, where the exposure risk is driven by direct contact or dust inhalation (e.g. as is typical for Polycyclic Aromatic Hydrocarbons) the reuse of soils as bulk fill below a clean cover system will sever the active pathway, removing any unacceptable risk of re-using the soil in this manner. This approach is inline with standard approaches to the remediation of brownfield land. Soils where contaminants are measured above the screening criteria where the risk is driven by vapour

EA Comment	Arcadis Response
	inhalation will not be used as fill.
Section 4.3.9.3 (NAPL Impacted Materials) highlights that materials impacted with NAPL are likely to be excavated as part of the enabling earthworks. However, no specific remediation criteria with respect to NAPL impacted soils has been derived.	Arcadis accept this wasn't clear from the wording in the remedial strategy which has been updated [Arcadis 2022b]. The material will be assessed using visual and olfactory assessment, field screening with a photoionization detector (PID), and testing with Sudan IV NAPL testing kits. Once validated as NAPL free soils will be tested and validated as suitable for use against the remediation criteria for the site prior to use as bulk fill. Material containing visible NAPL including based on Sudan IV testing will not be reused as bulk fill on site. Arcadis do not believe any further criteria pertaining to the remediation of NAPL impacted soils are required based on Arcadis 2022a.
The submitted information does not provide a schematic site conceptual model which highlights ground and groundwater conditions and the pollution linkages which are present.	Arcadis 2018 [Figure 8] and 2022a [Figure 6] contain the most recent schematic site conceptual model and risk assessment. Scaled cross sections (produced by third parties) are also presented as Appendix B.
The document refers to an Earthworks Specification which has not been included. It is not clear from the submitted information what the methodology is for the proposed earthworks including what suitable fill (SHW classes) will be incorporated into the permanent works or how the engineered fill will be compacted.	This document is not required for planning purposes or relevant to the approach to controlled waters
Figure 1 (BP NZT Onshore Layout Construction Areas Rev 03) shows proposed remediation depths which appear to contradict Arcadis Drawing Net Zero Site Maximum Excavation Depth Plan. It is not clear how the maximum excavation depths have been derived as part of the remediation strategy.	Figure 1 (BP NZT Onshore Layout Construction Areas Rev 03) is superseded by Figure 1 [TSWK-STDC-NZT-ZZ-DR-C-0005 Net Zero Teesside - Remediation Zones - Rev A] in the updated remedial strategy Arcadis 2022b. This drawing represents the proposed remedial depth. For planning purposes STDC have applied for permission to potentially excavate deeper as shown on Drawing Net Zero Site Maximum Excavation Depth Plan. This will allow localised additional excavation to remove relic structures or hotspots of gross contamination (if encountered and requiring removal). The drawing makes assumptions that these are most likely to be in the area of current and former large structures.
Drawing No. TSWK-STDC-NZT-ZZ-DR-C-0004 (Net Zero Teesside Site Layout and BP Proposed	Drawing No. TSWK-STDC-NZT-ZZ-DR-C-0004 (Net Zero Teesside Site Layout and BP Proposed

EA Comment	Arcadis Response
Excavation Depth and Zones) shows proposed remediation depths which differ from other submitted information. It is not clear how the different options (Options 1 and 2) or volumes relate to the current submission. This also casts doubt on the certainty of use under CLAIRE	Excavation Depth and Zones) is superseded by Figure 1 [TSWK-STDC-NZT-ZZ-DR-C-0005 Net Zero Teesside - Remediation Zones - Rev A] in the updated remedial strategy Arcadis 2022b. This addresses the concern raised.
Various sections of the report refer to specific exploratory hole locations across the site. However, no exploratory hole location plan has been included to indicate where these locations are.	Borehole Location Plans are provided in the relevant factual reports and additionally on Figures 4a-4c and 5 as presented within the DQRA (Arcadis 2022a) Factual Ground investigation – Page 3 CH2M 2017c Page 3 CH2M 2017d, Figure 1 AEG2018, and Figure 1 AEG2021
Appendix C (Screening Criteria). As mentioned previously this remediation criteria only considers the risks to human health and does not consider the risks to controlled waters, particularly where NAPL impacted soils are having to be remediated.	As above
There does not appear to be an assessment criteria for materials to be reused as clean cover soils.	The remediation criteria proposed for all soils are included in Appendix C of the updated remedial strategy.

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Environment Agency

David Pedlow
Redcar & Cleveland Borough Council
Corporate Directorate for Growth,
Redcar & Cleveland House
Kirkleatham Street
Redcar
Redcar and Cleveland
TS10 1RT

Our ref: NA/2021/115684/01-L01
Your ref: R/2021/1048/FFM

Date: 27 January 2022

Dear David

ENGINEERING OPERATIONS ASSOCIATED WITH GROUND REMEDIATION AND PREPARATION OF THE SITE FORMER REDCAR STEELWORKS (TEESWORKS) LAND TO WEST OF WARRENBY REDCAR

Thank you for referring the above application which we received on 13 December 2021.

Environment Agency Position

We **OBJECT** to the proposed development as submitted for the following reasons:

1. **Potential for contamination and unacceptable risk to controlled waters. The applicant has provided insufficient information.**
2. **Risks to groundwater from the development are unacceptable. The applicant has not supplied adequate information to demonstrate that the risks posed to groundwater can be satisfactorily managed.**

Objection 1: Potential for contamination and unacceptable risk to controlled waters

We **OBJECT** to this development because the information submitted with the application does not demonstrate that the risk of pollution to controlled waters is acceptable / can be appropriately managed.

Reason(s)

The previous use of the proposed development site as former steelworks including sinter plant, coal blending yard, pellet plant and railway lines which presents a high risk of contamination that could be mobilised during construction to pollute controlled waters.

Controlled waters are particularly sensitive in this location because the

development site is underlain by various superficial deposits and bedrock units with varying aquifer designations. This site is located in an area where superficial groundwater body or bodies may interact with each other, surface water bodies and may be tidally influenced.

The application's Enabling Earthworks and Remediation Strategy Report does not demonstrate that the risks of pollution have been fully understood or provide adequate mitigation for these risks.

Objection 2: Risks to groundwater from the development are unacceptable. The applicant has not supplied adequate information to demonstrate that the risks posed to groundwater can be satisfactorily managed.

We **OBJECT** to the planning application, as submitted, because the risks to groundwater from the development are unacceptable. The applicant has not supplied adequate information to demonstrate that the risks posed to groundwater can be satisfactorily managed.

Reason(s)
The following documents were reviewed:

- Covering Letter for Detailed Planning Application: Engineering operations associated with ground remediation and preparation of the Net Zero Teesside site. Doc. Ref. 63262/01/AGR/rdo/20326403v2. Prepared by Litchfields and dated 30 November 2021.
- Enabling Earthworks and Remediation Strategy Report for Net Zero Plot, Teesworks, Redcar. Report Ref. 10035117-AUK-XX-XX-RP-ZZ-0417-01-Rem_Strat_Net Zero. Prepared by Arcadis and dated November 2021.
- Drawing No. SD-00.01 Site Location Plan.
- Drawing No. 10035117-AUK-XX-XX-DR-ZZ-0422-02-Net_Zero_Rem_Ex (Net Zero Site Maximum Excavation Depth Plan).

The previous use of the proposed development site as former steelworks including sinter plant, coal blending yard, pellet plant and railway lines which presents a high risk of contamination that could be mobilised during construction to pollute controlled waters.

Controlled waters are particularly sensitive in this location because the development site is underlain by various superficial deposits and bedrock units with varying aquifer designations. This site is located in an area where superficial groundwater body or bodies may interact with each other, surface water bodies and may be tidally influenced.

The Enabling Earthworks and Remediation Strategy Report does not demonstrate that the risks of pollution have been fully understood or provide adequate mitigation for these risks.

To ensure the development is sustainable, the applicant must provide adequate information to demonstrate that the risks posed by development to groundwater can be satisfactorily managed. In this instance the applicant has failed to provide this information and we consider that the proposed development may pose an unacceptable risk of causing a detrimental impact to groundwater quality.

The following issues have been identified with respect to the planning submission and / or Enabling Earthworks and Remediation Strategy Report;

- The information submitted does not appear to follow Land Contamination Risk Management guidance and has not been accompanied by a Desk Study / Preliminary Risk Assessment, factual ground investigation undertaken on the Net Zero site and geo-environmental ground investigation interpretative report including schematic site conceptual model and risk assessment.
- Section 1.4 refers to previous information (2004 – 2021) which has either been prepared for or included the Net Zero plot as part of a wider Area. This information forms the basis of the proposed remediation strategy. However, factual ground investigation relevant only to the Net Zero plot has not been submitted. It is not clear what factual data has been used as a basis for assessment. It would also be questionable whether ground investigation data obtained from 2004 would be representative of site conditions at the current time.
- In summary, we do not fully agree with the proposed enabling earthworks and remediation strategy set out in the submitted information. At this stage we do not agree that remediation of controlled waters is not warranted. Whilst it is recognised that controlled waters may have been impacted on by historic activity, they should still be considered as a receptor and the development should aim to prevent the entry of hazardous and non hazardous substances into controlled waters. Redevelopment through the planning regime should result in an overall enhancement to the wider environment and improvement in groundwater and surface water quality (be it superficial or otherwise). This environmental betterment to controlled waters should be fully demonstrated and evidenced.
- The document refers to a Detailed Quantitative Risk Assessment (DQRA) which has not been provided. It is not particularly clear why this has been undertaken rather than a Generic Quantitative Risk Assessment. In addition, it is not clear what previous ground investigation information has been reviewed as part of the risk assessment and whether this includes soil, soil leachate, groundwater and surface water testing. Furthermore, it is unclear whether underground relic structures which may be present for example existing piled foundations, existing below ground services etc have been considered as potential pollution pathways in the risk assessment. On this basis, it is unclear what the risks from site conditions and land contamination are to controlled waters.

- The document refers to a Controlled Waters Quantitative Risk Assessment (Section 2.14.3) which has not been included.
- Section 2.1 refers to demolition activities currently occurring on site. It is not clear from the information submitted what the exact methodology is for demolition activity, particularly whether underground structures are to remain which may form potential pollution pathways.
- Sections 2.2 and 2.3 refers to underlying geology and hydrogeology. No scaled cross sections have been provided which would clearly demonstrate the underlying geology and the groundwater conditions prevailing at the site. Additionally, specific boreholes have been referred to and it is not clear where these are located within the site.
- Section 2.3 refers to hydrogeological conditions. However, it is not clear what the prevailing groundwater regime at the site is, including the strata within which groundwater bodies occur, whether different groundwater bodies within different strata interact and how groundwater interacts with surface waters. It is also not clear what the tidal influence on groundwater bodies are. No factual monitoring results have been submitted to demonstrate an understanding of the hydrogeological conditions at the site including tidal influence.
- Clarification is required on the aquifer designations at the site and wider study area identified in table 1 aquifer designation. Table 1 does not refer to the correct aquifer designations for each strata type.

Table 1 Aquifer designation - (rock classification scheme c- clay, s-silt, v- sand, z-clay)

Geology	Aquifer Classification
Blown Sands (BSA-S) Tidal Flat Deposits (TDF-XSZ - sand and silt)	Secondary A Aquifer
Tidal Flat Deposits TFD-XSZC (undifferentiated)	Secondary (Undifferentiated)
Alluvium ALV-XCZSV (undifferentiated)	Secondary A
Glaciolacustrine Deposits (GLLDD-XCZ) Glaciolacustrine Deposits (GLLD-S)	Unproductive Strata Secondary A
Glacial Till	Secondary Undifferentiated
Redcar Mudstone Formation	Secondary (Undifferentiated) Aquifer
Penarth Group	Secondary (Undifferentiated) Aquifer / Secondary B Aquifer
Mercia Mudstone	Secondary B Aquifer
Sherwood Sandstone	Principal A Aquifer

- Section 2.5 (Data Gaps) refers to areas of the site which have not been investigated. We would welcome further detail on the extent of the scope

of works alongside justification.

- Section 2.6.1 (Environmental) refers to an assumption that remediation of controlled waters is not required. We would not agree with this assumption as no factual information (soil leachate, groundwater / surface water quality) has been submitted to demonstrate that remediation of controlled waters is not required. It is not clear whether visual or olfactory evidence of contamination has been observed within controlled water bodies. Furthermore it is stated in section 2.7.2 that evidence of non-aqueous phase liquids (NAPL) and tar have been identified within made ground. The impact of NAPL and tar on controlled waters quality has not been considered.
- Section 4.3.4.2 (Use of Slag under the DoWCoP) refers to the reuse of slag within the permanent works. No information has been presented within the report to confirm the chemical nature of the slag or its impact on quality of controlled waters.
- The Contaminants of Concern referred to in Section 2.7 (Requirement for Remediation) and Section 4.1 (Aim) do not concur.
- Section 4.3.5 (Soil Sampling) refers to further information on the proposed sampling strategy, including sample frequency and testing within an Earthworks Specification and Materials Management Plan. These have not been included.
- In the absence of factual data with respect to groundwater quality and the presence or absence of hydrocarbon contamination, we do not agree with the proposals set out in section 4.3.7.1 with respect to removal of NAPL on groundwater. Additionally, no details have been provided on how dissolved concentrations of hydrocarbons associated with NAPL will be addressed.
- Section 4.3.8 (Remediation Criteria) and Appendix C refers to derivation of remediation criteria developed and protective of human health. It is indicated that all reused soils will be tested for this criteria prior to incorporation into the permanent works. However, no remediation criteria has been derived which is protective of risk to controlled waters.
- Section 4.3.8.1 (Compliance Sampling Frequency) refers to importation and testing of soils for the remediation criteria. The proposed remediation criteria would not be appropriate for importation of soils and as previous there is no criteria which is protective of risk to controlled waters.
- Section 4.3.9 (Management of Contaminated Soils) refers to the placement of protective cover layers in areas where contaminants in soils are identified above the reuse criteria as highlighted in Appendix C. However, it has mentioned previously that unacceptable soils not complying with the remediation criteria will not be incorporated into the permanent works. We therefore, do not agree with this approach.
- Section 4.3.9.3 (NAPL Impacted Materials) highlights that materials impacted with NAPL are likely to be excavated as part of the enabling earthworks. However, no specific remediation criteria with respect to NAPL impacted soils has been derived.
- The submitted information does not provide a schematic site conceptual

model which highlights ground and groundwater conditions and the pollution linkages which are present.

- The document refers to an Earthworks Specification which has not been included. It is not clear from the submitted information what the methodology is for the proposed earthworks including what suitable fill (SHW classes) will be incorporated into the permanent works or how the engineered fill will be compacted.
- Figure 1 (BP NZT Onshore Layout Construction Areas Rev 03) shows proposed remediation depths which appear to contradict Arcadis Drawing Net Zero Site Maximum Excavation Depth Plan. It is not clear how the maximum excavation depths have been derived as part of the remediation strategy.
- Drawing No. TSWK-STDC-NZT-ZZ-DR-C-0004 (Net Zero Teesside Site Layout and BP Proposed Excavation Depth and Zones) shows proposed remediation depths which differ from other submitted information. It is not clear how the different options (Options 1 and 2) or volumes relate to the current submission. This also casts doubt on the certainty of use under CLAIRE.
- Various sections of the report refer to specific exploratory hole locations across the site. However, no exploratory hole location plan has been included to indicate where these locations are.
- Appendix C (Screening Criteria). As mentioned previously this remediation criteria only considers the risks to human health and does not consider the risks to controlled waters, particularly where NAPL impacted soils are having to be remediated.
- There does not appear to be an assessment criteria for materials to be reused as clean cover soils.

Additionally, while some of the points highlighted above may also be relevant to the adoption of CLAIRE Code of Practice at the site, we would also highlight the following;

- With regards to section 2.14 (Materials Management), materials that are unsuitable for re-use will be classed as waste and materials that require treatment prior to re-use on site will be classed as waste until a non-waste status has been reached.
- Sections 2.14.1 (Achieving Non Waste Status), 4.3.4 (Materials Management) and 4.3.4.1 (Achieving Non Waste Status) do not appear to be correct. CL: AIRE does not change the status of a material from waste to non-waste. Any unsuitable materials, excess/surplus materials or any materials that require treatment in order to render it suitable for its intended use is a waste and waste controls apply.
- Sections 2.14.3 (Materials Management Plan) and 4.3.9.5 (Management of Potentially Expansive Refractory Materias) refer to crushing materials into an aggregate under CL: AIRE DoW CoP. Some of the proposed ‘materials’ are not suitable for the re-use under CL: AIRE DoW CoP.

Concrete and brick materials from demolished buildings on the Site of Origin can be crushed and re-used under CL: AIRE DoW CoP. However, no other materials can be crushed and re-used. Any surplus crushed concrete and brick aggregate will be classified as a waste and cannot be transferred to another site for re-use unless a registered Waste Exemption or Environmental Permit is in place.

Inert materials can be crushed and re-used on site under the WRAP Quality Protocol (QP) – Aggregates from Inert Waste. Tests must be carried out to ensure there is no presence of coal tar. If coal tar is identified this must be removed and either treated or disposed of as a hazardous waste. You must ensure all measures are taken to comply with the Wrap QP – Aggregates from Inert Waste which includes having Factory Production Control (FPC) in place to comply with the quality protocol and the BS EN standard for the product you are making. FPC is a record of all your policies and methods for managing the waste material. It must include:

1. How you assess and record input waste, your method statement of production (MSP), processing techniques, product testing, and staff training – set out each step and result, and specify how long you keep these records.
2. A description of the delivery documents you give to customers.
3. Regular reviews to ensure practices and methods are up-to-date and work properly – you must keep a record of these reviews and detail any actions or changes you make.
4. A policy for managing any subcontractors.
5. A named representative responsible for the FPC and its correct use.

It should be clearly stated within the remediation strategy whether materials are to be generated under WRAP QP and what those materials are. The FPC manual should be included within the strategy.

- Section 2.14.3 (Materials Management Plan) and Section 4.3.9.4 (Management of Asbestos Containing Materials) refers to reuse of asbestos containing materials. If asbestos is found within the soil materials on site, it is possible for the re-use of some of the existing soil materials that have been impacted by asbestos. If asbestos contaminated materials are visible there is a requirement for trained specialists to oversee an asbestos watching brief and have measures in place to hand pick observable pieces of asbestos. The soil materials that do not contain visible asbestos fragments, are classified as non-hazardous and are below the asbestos hazardous waste threshold of 0.1% can be reused. It is assumed that these soil materials would be placed beneath appropriate clean cover as proposed along with a membrane. It is not acceptable for soils containing observable asbestos fragments to be incorporated into the permanent development.

- Section 4.3.8.1 (Compliance Sampling Frequency) refers to importation and testing of soils for the remediation criteria. The proposed remediation criteria would not be appropriate for importation of soils since such thresholds would be hazardous. Additionally, there is no criteria which is protective of risk to controlled waters.
- Section 4.3.9 (Management of Contaminated Soils) refers to the placement of protective cover layers in areas where contaminants in soils are identified above the reuse criteria as highlighted in Appendix C. However, it has mentioned previously that unacceptable soils not complying with the remediation criteria will not be incorporated into the permanent works. We therefore, do not agree with this approach.
- Section 4.3.13 refers to a surplus of material in the order of 32,413m^3 following completion of the earthworks. It is also mentioned within the report for importation of materials to be undertaken. It is not certain how a surplus of material is to be generated and it gives rise to uncertainty over whether Factor 3 (certainty of use) and 4 (quantity of material) have been or will be met.

This planning application has therefore failed to meet the requirements of paragraphs 174 and 183 of the National Planning Policy Framework.

Overcoming our objections
The applicant should provide information to demonstrate to the local planning authority that the hydrogeological conditions prevailing at the site and risk to controlled waters has been fully understood and can be addressed through appropriate measures.

Additional information is required in the form of a) a Desk Study and b) Appropriate risk assessment informed by appropriate factual data relevant only to the site in question. Where other documentation is referred to within the Remediation Strategy such as DQRA, Earthworks Specification and MMP this should also be provided. Any further submitted information including an updated Remediation Strategy should take into consideration the comments highlighted above.

Separate to the above objections, we also have the following comments to offer and/or require further clarification:

Surface Water, Foul and Trade Effluent
Section 4.3.3 of the Enabling Earthworks and Remediation Strategy Report states that all accumulated, perched or groundwater encountered in the made ground will be stored in a tank / lagoon before treatment and discharge to either foul sewer with trade effluent consent, or surface water with discharge permit. The application states that the proposal does not involve the need to dispose of trade effluents or trade waste. However the above statement suggests that foul and trade effluent are still being considered. We therefore require clarity on this

matter. We require confirmation regarding the disposal route as discharges would not be permitted until an appropriate agreement was in place. The disposal route will need to dictate the infrastructure needed and level of sampling and treatment required.

Section 4.3.7 of the Enabling Earthworks and Remediation Strategy Report indicates groundwater and accumulated water will be stored, sampled, treated and discharged to foul drainage under consent, or tankered off site. Is this referring to public sewer? We would welcome clarity on this. Any new addition to an existing discharge would need agreement prior to commencement, this would include dewatering from excavations.

In addition, the supporting documents states an intention that surface water from the site of the proposed works will be discharged to soakaway. This surface water discharge to soakaway has the potential to be contaminated. We would welcome further information regarding the soakaway, where it will be located and how surface water will be treated.

Pollution Prevention
Section 4.3.9.4 of the Enabling Earthworks and Remediation Strategy Report states that stockpiles of any asbestos containing materials will be covered to control dust generation. The applicant must ensure that stockpiles of contaminated soils waiting for treatment / removal should be managed to prevent run-off impacting the water environment.

Requirement for Surface Water Management Plan & Construction Phase Environmental Management Plan
Section 4.3.14.1 of the Enabling Earthworks and Remediation Strategy Report states that a Surface Water Management Plan will be implemented as part of the Construction Phase Environmental Management Plan (CEMP) to manage, monitor, treat and dispose of surface water and other waters generated as part of the works. These documents have not been submitted as part of the planning application and require reviewing.

Model Procedures and good practice - Advice to Applicant
We recommend that developers should:

- Follow the risk management framework for dealing with land contamination detailed in Land Contamination Risk Management which is found on Gov.uk and which now supercedes CLR 11, Model Procedures for the Management of Land Contamination.
- Refer to our Guiding principles for land contamination for the type of information that we require in order to assess risks to controlled waters from the site - the local authority can advise on risk to other receptors, such as human health
- Consider using the National Quality Mark Scheme for Land Contamination Management which involves the use of competent persons to ensure that

land contamination risks are appropriately managed

Refer to the contaminated land pages on gov.uk for more information

Requirement for an Environmental Permit - Advice to Applicant
The discharge of groundwater from remediation activities or dewatering purposes, associated with this development will require an environmental permit under the Environmental Permitting (England & Wales) Regulations 2016, from the Environment Agency, unless an exemption applies. The applicant is advised to contact the Environment Agency on 03708 506 506 for further advice and to discuss the issues likely to be raised. You should be aware that there is no guarantee that a permit will be granted. Additional 'Environmental Permitting Guidance' can be found at: https://www.gov.uk/environmental-permit-check-if-you-need-one.

The Environment Agency's approach to groundwater protection' (pre-application) - Advice to Applicant
We would like to refer the applicant/enquirer to our groundwater position statements in 'The Environment Agency's approach to groundwater protection', available from gov.uk. This publication sets out our position for a wide range of activities and developments, including:

- Waste management
- Discharge of liquid effluents especially the latter positions on polluted groundwater
- Land contamination
- Ground source heat pumps
- Cemetery developments
- Drainage
- Groundwater resources
- Groundwater flooding

Mobile Plant Permit - Advice to Applicant
The remediation strategy details that the treatment of unsuitable materials will be dealt with via the deployment of a mobile plant permit. This approach is appropriate and further advice can be provided on this by the Environment Agency.

Please do not hesitate to contact me if you have any questions regarding this letter.

Yours sincerely

creating a better place

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