

Adran yr Economi a'r Seilwaith
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Llywodraeth Cymru
Welsh Government

**THE CHESTER TO BANGOR TRUNK ROAD (A55) (JUNCTIONS 16 AND 16A
IMPROVEMENT REALIGNMENT AND SLIP ROADS) ORDER 202-**

**THE CHESTER TO BANGOR TRUNK ROAD (A55) (JUNCTIONS 16 AND 16A
IMPROVEMENT REALIGNMENT AND SLIP ROADS) (SIDE ROADS) ORDER 202-**

**THE WELSH MINISTERS (THE CHESTER TO BANGOR TRUNK ROAD (A55)
(JUNCTIONS 16 AND 16A IMPROVEMENT REALIGNMENT AND SLIP ROADS))
COMPULSORY PURCHASE ORDER 202-**

PROOF OF EVIDENCE

Dr Philip George Studds MCIWEM, CEng, CEnv, SiLC

WELSH GOVERNMENT, CONTAMINATED LAND

DOCUMENT REFERENCE: WG 1.12.02

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1. Author

- 1.1 I am Philip George Studds. I am a Director within the contaminated land practice at Ramboll UK Limited, an international multidisciplinary consultancy. I am a Member of the Chartered Institution of Water and Environmental Management (MCIWEM), a Chartered Engineer (CEng), a Chartered Environmentalist (CEnv) and a Specialist in Land Condition (SiLC). I have a BSc Hons in Biology from York University, an MSc in Environmental Technology from Imperial College and a PhD in Environmental Geotechnics from Leeds University.
- 1.2 I have over 25 years of experience specialising as an environmental engineer in both the consulting industry and academic research. Environmental engineering is a branch of engineering concerned with the application of scientific and engineering principles for the protection of human populations from the effects of adverse environmental factors. It concerns the protection of environments, both local and global, from the potentially deleterious effects of natural and human activities and is focused on improvement of environmental quality.
- 1.3 Within Ramboll I have worked as an environmental engineer and scientist within the contaminated land assessment practice (assessment of impacts to soil and controlled waters) and have managed numerous projects with a contaminated land focus. In these roles, I have gained experience of how to consider all aspects of contaminated land condition, including their interaction with and effects on surface and groundwater quality.
- 1.4 As a result of my professional qualifications and experience, I am suitably qualified to provide expert evidence in respect of the geology and soils issues arising in respect of the A55 Junctions 15 and 16 development with which this inquiry is concerned.
- 1.5 My relevant highways and contaminated land experience include the following projects:
- a) Mersey Gateway - £2.5M remediation scheme of ex-ICI Experimental Works prior to construction of Mersey Gateway bridge and road network. Historic contaminated land issues associated with an ex-ICI Experimental Site located in Runcorn, could have prevented the development of the new crossing of the River Mersey (Mersey Gateway project) from progressing. The site was impacted by a cocktail of hydrocarbon contaminants which posed a significant risk to human health and the environment. I managed a £2.5M clean-up operation which sufficiently de-risked the site to the satisfaction of the Regulator.
 - b) HS2 Phase 2b – I was Land Quality lead for the Birmingham to Leeds route and was Lead Author of nine Land Quality chapters for the HS2

Phase 2b Birmingham to Leeds Environmental Statement. I managed a team of 30 engineers to develop contaminated land conceptual site models (CSM) for the 120 km route. Key issues were landfill sites, former colliery sites and some chemical works. I liaised with the Waste and Materials team and Geotechnical teams to aid them in the development of the engineering design process. I produced reports for peer review by the Parliamentary Agents.

- c) Huddersfield Gasworks, Huddersfield - Site Investigation, Detailed Quantitative Risk Assessment (DQRA), Validation of Remediation Works, Resident Engineer - Value of £2M. I managed site investigation works and developed a DQRA to derive remediation criteria. I subsequently had a resident engineer role including contamination delineation works, design and implementation of validation regimes, scheduling of chemical analysis, attendance at progress meetings, boundary monitoring, contractor liaison and advisory role on verification of costs against weekly critical activity reports.

1.6 I am the Contaminated Land expert witness for the A55 Junctions Improvements scheme. My role is to consider the likely significant effects on and from contaminated land associated with the construction and operation of the Scheme. The specific tasks are to:

- a) Describe the contaminated land baseline;
- b) Describe the assessment methodology and significance criteria used in completing the impact assessment;
- c) Describe the potential effects, including direct, indirect and cumulative effects;
- d) Describe the mitigation measures proposed to address likely significant effects; and
- e) Assess the residual effects remaining following the implementation of mitigation.

1.7 The project for improvements at Junctions 15 and 16 has developed so that it encompasses Junctions 14 and 16A as well. Furthermore, the two sets of junctions, namely Junctions 14 and 15 to the west at Llanfairfechan, and Junctions 16 and 16A to the east at Dwygyfylchi and Penmaenmawr, are being treated under different sets of draft Orders and Environmental Statements. This proof of evidence addresses Junctions 16 and 16a, at Llanfairfechan, hereby referred in this proof of evidence as the 'Scheme' or the 'Junction 16 Scheme' as appropriate. I have prepared another Proof of Evidence to address contaminated land matters associated with Junctions 14 and 15.

- 1.8 My Proof of Evidence provides an overview of the Contaminated Land aspects of the Junction 16 Scheme, identifies the potential impacts and sets out the reasons for the proposed environmental mitigation.
- 1.9 The opinions expressed are my own unless I state otherwise. I have been assisted by colleagues from within the project team in the various tasks that are reported in this document. Colleagues are also presenting evidence within their specialist environmental expertise. Where a topic is covered in detail by the proof of evidence of another specialist, I provide a cross reference to the relevant proof.
- 1.10 It is not my intention to reproduce large sections of text from the Geology and Soils chapter of the Environmental Statement (ES) ¹ (Document Reference WG 3.01.01) or the supplementary information given in the A55 J16 ES Chapter 6 Geology and Soils - Additional Desk Based Review ² (Document Reference WG 4.06.23) and provided in response to the Natural Resources Wales (NRW) response letter ³ (See Appendix to Andrew Sumner Proof Document Reference WG 1.06.02) but simply to cross refer to, or highlight, key procedural and technical matters that are pertinent to the assessment of the published Scheme. Consequently, I will refer in this Proof of Evidence to supporting material contained within the ES and the ES Supplements where relevant.
- 1.11 My Proof of Evidence covers Contaminated Land and is structured in the following manner:
- Part 2 Scope and Purpose of this Proof of Evidence.
 - Part 3 Legislation, Policy and Guidance.
 - Part 4 Methodology, Baseline and Risk Assessment.
 - Part 4 Describes the methodology I have employed to assess the effects and implications of the Scheme upon the geology and land quality. In particular it identifies the guidance that I have used to carry out the contaminated land assessments.
- Also provides details of the information I have considered in preparing this Proof of Evidence. It identifies the nature and source of that information.

¹ A55 Junction 16 ES Chapter 6 Geology and Soils, Ramboll November 2020

² A55 J16 ES Chapter 6 Geology and Soils - Additional Desk-based Review, Ramboll August 2021

³ The Chester to Bangor Trunk Road (A55) (Junctions 16 and 16a Improvement Realignment and Slip Roads) Order 202, Natural Resources Wales dated 10/05/2021

Part 5 Objections to the Scheme.

Part 5 provides a summary of the matters raised in the objections that are relevant to my Proof of Evidence.

Part 6 Conclusion and Declaration.

1.12 I will rely on the following expert witnesses to cover their respective specialist fields:

Steve Cox - Water Quality and Flooding (WG 1.11)

Jonathan Baylis - Engineering Design (geotechnical element) (WG 1.05)

Donna Hall – Nature Conservation (WG 1.08)

2. Scope and Purpose of this Proof of Evidence

- 2.1 My Proof of Evidence addresses contaminated land considerations of the Scheme.
- 2.2 In particular my Proof of Evidence aims to address the objection raised by National Resources Wales in their letter dated 10 May 2021 relating to specifically to potential contaminated land issues associated with Junction 16. The NRW objection is given below in italicised text:

Chapter 6 – Geology and Soils

Appendices 6.1 – 6.3 5.

5. We are broadly satisfied with the conclusions and recommendations within the chapter; however, we have the following comments.

6. Section 6.2.8 refers to The Contaminated Land (England) Regulations 2006, and the DEFRA Contaminated Land Statutory Guidance, these should reference The Contaminated Land (Wales) Regulations 2006⁴ (Document Reference WG 4.01.52), and Welsh Government Contaminated Land Statutory Guidance 2021^{5, 6} (Document Reference WG 4.01.53).

7. Section 6.3.1-6.3.2 refers to CLR11 this has now been replaced by 'Land Contamination: Risk Management.

8. A number of minor EQS exceedances for leachate and groundwater samples were identified in section 6.8.65 to 6.8.77. Whilst the potential construction and operational effects have been considered, these exceedances have not been assessed further in terms of potential risks to controlled waters (i.e. as the site currently sits). Generally, we would expect that where exceedances have been identified there should be progression to the next tier of assessment within the Remedial Targets Methodology ('Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination' Environment Agency, 2006

<https://www.gov.uk/government/publications/remedial-targets-worksheet-v22a-usermanual>

⁴ The Contaminated Land (Wales) Regulations 2006 SI 2006/2989
<https://www.legislation.gov.uk/wsi/2006/2989/contents>

⁵ **Note:** it is considered that the year has been mis-typed in the NRW letter as the Welsh Government Contaminated Land Statutory Guidance is dated 2012 and not 2021

⁶ Welsh Government Contaminated Land Statutory Guidance 2012
<https://gov.wales/sites/default/files/publications/2019-08/contaminated-land-statutory-guidance-2012.pdf>

9. Furthermore, there is no qualitative assessment/statement as to whether these exceedances are posing a risk to controlled waters.

10. The contaminated land risk assessment for the Scheme has been provided in Technical Appendix 6.3. This only considered the risk in the construction and operational phase and does not assess the historical contamination.

11. A refuse tip, gasworks and tar storage were previously present on site and whilst some remediation may have occurred there is insufficient information to demonstrate that residual contamination is not present, if present residual contamination could be impacting controlled waters. In accordance with Planning Policy Wales V11 6.9.17 “the onus will remain with the developer to ensure that the development of the site will remove any unacceptable risks and the planning authority in making development management decisions will need to ensure that the land is suitable for its proposed use and would not meet the legal definition of contaminated land under Part IIA.”

3. Legislation, Policy and Guidance

- 3.1 Full details of the relevant legislation, policy and guidance used to assess the contaminated land condition of the Scheme are given in the ES Chapter 6 Geology and Soils, Sections 6.2 and 6.3 (Document Reference WG 3.01.01) and is not repeated here.
- 3.2 The key pieces of legislation, policy and guidance relating to contaminated land are:
- a) Environmental Protection Act (EPA) 1990: Part 2A Contaminated Land Statutory Guidance (Document Reference WG Document Reference WG 4.01.54);
 - b) Contaminated Land (Wales) Regulations 2006 SI 2006/2989 (Document Reference WG Document Reference WG 4.01.52);
 - c) Contaminated Land (Wales) (Amendment) Regulations 2012 SI 2012/283 (Document Reference WG Document Reference WG 4.01.52);
 - d) Welsh Government Contaminated Land Statutory Guidance 2012 (Document Reference WG 4.01.53);
 - e) Planning Policy Wales edition 11, February 2021 (Document Reference WG 4.01.51); and
 - f) Land Contamination Risk Management ⁷ (published October 2020, updated April 2021) (Document Reference WG 4.01.56).
- 3.3 The ES chapter was also developed in accordance with the Design Manual for Roads and Bridges (DMRB)⁸.

⁷ Land Contamination Risk Management Gov.UK updated April 2021
<https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

⁸ Note DMRB Volume 11 Section 3, Part 11: Geology and Soils (2001) has been updated since the ES chapter was written and replaced with DMRB Volume 11 Section 3, Part 11: Geology and Soils LA109 (Revision 0) Oct 2019 (Document Reference WG 4.01.57). It is considered that the updates given in LA109 (removal of geohazards and inclusion of agriculture in the scope of Geology and Soils chapter) do not make a material difference to the contaminated land assessment

4. Methodology, Baseline and Risk Assessment

- 4.1 Full details of the methodology used to assess the contaminated land condition of the Scheme are given in the ES Chapter 6 Geology and Soils, Section 6.5 (Document Reference WG 3.01.01), and are not repeated here.
- 4.2 The key points of the methodology relevant to the NRW objection centre on a review of the historical information (Tier 1 – see below) to identify potential sources of contamination and a qualitative assessment of the risks to groundwater from the minor exceedances of the Environmental Quality Standards (EQS) (Tier 2 – see below) recorded in some leachate and groundwater samples.
- 4.3 Thus, the methodology outlined below presents the current guidance (England and Wales) for the assessment of contaminated land (Contaminated Land Risk Management (Document Reference WG 4.01.56)) and was applied in the assessment given in ES Chapter 6:
- a) Tier 1: Preliminary Risk Assessment (PRA) – first tier of risk assessment that develops the outline conceptual site model (CSM) and establishes whether there are any potentially unacceptable risks;
 - b) Tier 2: Generic Quantitative Risk Assessment (GQRA) – carried out using generic assessment criteria and assumptions to estimate risk; and
 - c) Tier 3: Detailed Quantitative Risk Assessment (DQRA) – carried out using detailed site specific information to estimate risk.

Tier 1: Preliminary Risk Assessment

- 4.4 This stage comprised a review of published information on historical site uses and environmental conditions relating to the Scheme and was presented in Section 6.5.1 to 6.5.4 of the ES. The assessment considered:
- a) Protected geological features;
 - b) Historical land use and potentially contaminative land uses;
 - c) Geological and hydrogeological setting;
 - d) The potential for mining and implications for the Scheme;
 - e) Potential geohazards issues and the associated implications on the Scheme or potential effects arising from the Scheme;
 - f) The potential for ground gas and radon;
 - g) Environmental regulatory information relating to issues such as waste, industrially permitted sites, water abstractions and discharges; and
 - h) Potential for unexploded ordnance (UXO).

Table 1: Historical Potentially Contaminating Land Uses

Feature	Location
Area of fill	Onsite – east of the existing Puffin Petrol Station (extends beyond works area)
Former gas works and associated tar storage	Onsite – to the east of the existing roundabout, extends beneath the current A55 carriageway alignment
Railway	Earliest historical maps to present, adjacent to the northern site boundary, Penmaenmawr Station approximately 650 m to the west of the site.
Existing road network	Onsite and offsite.
Former council landfill (refuse tip)	Offsite - located between Penmaenmawr Football Club ground, Conway Road and the current alignment of the A55. Recent changes to the Scheme in this area mean that the refuse tip will not be affected.
Former incinerator	Offsite - east of the former gas works
Existing petrol station	Offsite – directly to the south of the Scheme / existing A55
Sewage treatment works and former brick field	Offsite – approximately 30 m to the north of the scheme
Electricity substations	Various within 500 m (none within site area)

4.5 In order to address *Comments 10 and 11* in the NRW letter, additional Tier 1: Preliminary Risk Assessment information was provided in the Ramboll (August 2021) A55 J16 ES Chapter 6 Geology & Soils - Additional Desk Based Review which considered:

- a) Further research into potential historical sources of contamination;
- b) Additional desk-based information;
- c) Historical maps; and
- d) Information from Welsh Government – as built records from the construction of the A55 circa 1987.

4.6 This additional information noted above focussed on three potential contamination sources from historical land uses (two of which were specifically referenced in the referenced in the NRW objection):

- a) Gas Works and former tar storage - located to east of Junction 16 below the eastbound carriageway of the A55 and cycleway to the north;
- b) Former Council Landfill (refuse tip) – located to the south-west of Junction 16; and

- c) Former incinerator - located to east of Junction 16 (east of the gas works) below the eastbound carriageway of the A55 and cycleway to the north.

4.7 In summary, the additional Tier 1: Preliminary Risk Assessment information (historical information) confirmed:

- a) The gas works was shown on historical maps dating from the 1880s and was observed to be a small local facility. None of the historical maps/plans reviewed specially reference a tar well however, it is assumed that as the gas works expanded one of the gas holders was used as a tar well. Information from the early 1980s indicates the tar well (which was formerly a gas holder / gasometer) had a concrete cap and was infilled with rubble with standing water present inside.
- b) The refuse tip is shown on historical OS maps from the 1960 and 1970s. Fill was shown in this area on a 1983 ground investigation plan although this was not as extensive as indicated on the OS maps or in Envirocheck™ Report obtained for the ES chapter.
- c) Information provided dating from 1983 indicates a council incinerator was located immediately east of the gas works which was used to incinerate domestic refuse and operated until the early 1970s. Waste residues which were remaining after incineration were disposed of onto the adjacent land. Other than two structures associated with a 'works' shown on the 1966 OS map, the incinerator and adjacent area of disposal was not shown on historical maps.
- d) The gas works and incinerator extended beneath the eastbound carriageway of existing A55 footprint and also extended beneath the existing cycleway to the north.
- e) An existing sea wall along with sloping masonry is shown beyond the railway lines to the north of the former gas works, which is shown on OS maps from early 1990s, the existing sea wall extends to the west of Junction 16.

Tier 2: Generic Quantitative Risk Assessment (GQRA)

4.8 This stage of the assessment involves ground investigation. Three historic ground investigations were carried out between 1983 and 1985 and a more recent ground investigation specifically for the A55 Scheme was carried out in 2019. All these investigations and are referenced in Sections 6.5.5 and 6.5.8 to 6.5.18 of the ES. Also, the results of the GQRA assessment are presented in Sections 6.8.47 to 6.8.63.

Soil Contamination Results

- 4.9 Within ES Chapter 6 Section 6.8.48, risks to human health have been assessed by comparing soil concentrations against both commercial end use criteria and public open space criteria.
- 4.10 A review of the chemical testing results for the soil samples identified:
- a) None of samples tested for metals or cyanide (contaminants indicative of gas works) exceeded the assessment criteria;
 - b) One sample exceeded the public open space land use assessment criteria for specific polycyclic aromatic hydrocarbon compounds (PAHs) and one sample exceeded the commercial assessment criteria value for specific PAHs. Both of these samples were taken from exploratory hole referenced WS202⁹ which is located in the area of the former gas works; and
 - c) None the samples tested for volatile organic contaminants (VOCs) and semi-volatile organic contaminants (SVOCs) (contaminants indicative of gas works) exceeded the assessment criteria where derived.
- 4.11 No asbestos was identified within the samples tested by the laboratory.
- 4.12 It should be noted that no objection has been raised by the Contaminated Land Officer, the statutory regulator that deals with human health issues.
- 4.13 Given the above, it is considered that, given the proposed development, there was a low risk with regards to human health.

Soil Leachate Contamination Results

- 4.14 Minor exceedances of zinc and PAHs were observed in leach tests carried out on site soils (exceedances recorded from the soil sampled from borehole referenced WS202).

Groundwater Contamination Results

- 4.15 A number of exceedances relating to zinc concentrations in groundwater samples¹⁰ were recorded.
- 4.16 The majority of PAHs were at or below the lower detection limits. In the ones that were detected, none of the results exceeded the Environmental Quality Standards (EQS) or drinking water standards.

⁹ A 'slight hydrocarbon odour' was encountered within arisings from 3.00 m bgl- 3.50 m bgl (base of hole) in WS202 during the ground investigation.

¹⁰ Note: A groundwater sample could not be obtained from WS202 as there was not enough water to sample.

- 4.17 The results for petroleum hydrocarbons, SVOCs and VOCs are below the lower analytical detection limits.
- 4.18 In order to address *Comments 8 and 9* in the NRW letter, additional Tier 2: Generic Quantitative Risk Assessment information was provided in the Ramboll (August 2021) A55 J16 ES Chapter 6 Geology & Soils - Additional Desk Based Review which focussed on the historical ground investigation information for the gas works, the incinerator and the refuse tip.
- 4.19 In summary:
- a) The made ground encountered during the 2019 investigation is different to the fill material encountered during historical ground investigations. The ground conditions encountered are considered to be consistent with the as-built drawings which indicate the former fill material was removed and replaced with engineering fill during construction of the A55. This also indicates that more of the former made ground in the area of the gas works could have been removed and replaced than was indicated on the as-built drawings; and
 - b) Results obtained from the majority of chemical testing were below the laboratory limit of detection and those that were detected were below the assessment criteria values (except those from WS202). Above background concentrations of some metals along with petroleum hydrocarbons and a number of VOCs and SVOCs were also present. Elevated concentrations of contaminants were obtained from soil leachate testing from WS202, but insufficient water was present in WS202 to obtain a groundwater sample for testing. WS202 is located on the current cycleway north of the A55 in an area that would not be excavated as part of the proposed Scheme.
 - c) Groundwater was generally encountered in small quantities and as seepages appearing to relate to the base of the made ground. One groundwater strike was encountered within the made ground from a trial pit at the eastern end of the gas works.
 - d) Two exploratory holes drilled at the former refuse tip area which identified variable fill materials including ash, clinker, brick, glass, metal, plastic, fabric and paper. One sample of fill was tested for a limited suite of analysis which showed higher concentrations of lead and zinc. No groundwater strikes were encountered within the fill material at the refuse tip.
- 4.20 NRW *Comment 8* relates to minor exceedances of the Environmental Quality Standards (EQS) thus further consideration of the potential impacts to controlled waters results has been provided in the Chapter 4 of the Ramboll

(August 2021) A55 J16 ES Chapter 6 Geology & Soils - Additional Desk Based Review. In summary:

- a) Olfactory evidence of potential contamination was only encountered during the ground investigation in made ground from 3.0 m to 3.5 m depth below ground level (bgl) in the borehole referenced WS202. WS202 is located towards the western end of the former gas works.
- b) From soil leach testing, one exceedance of the zinc water quality criteria was recorded and several minor exceedances were recorded for PAHs in samples obtained from exploratory holes in the vicinity of the former gas works and incinerator;
- c) The highest concentrations of PAHs leached were obtained from made ground in WS202 at 3.5m at the western end of the former gas works.
- d) In the groundwater samples, only limited exceedances were obtained for metals above the 'saltwater' EQS for zinc;
- e) Also, in the groundwater samples analysed, the results for petroleum hydrocarbons, SVOCs and VOCs were below the lower analytical detection limits. The majority of PAHs were at or below the lower detection limits and of those that were detected, none of the results exceeded the water quality criteria.
- f) Results from groundwater testing do not indicate that soil contaminants are having a significant or widespread impact on groundwater, although a water sample could not be obtained from monitoring well WS2020.

4.21 In conclusion, the Conceptual Site Model and Qualitative Risk Assessment provided in Chapter 5 of the Ramboll (August 2021) A55 J16 ES Chapter 6 Geology & Soils - Additional Desk Based Review show that the overall risk classification is low:

- a) Recent ground investigation undertaken for the Scheme indicates that fill materials identified during historical investigations at the incinerator, gas works and refuse tip areas has been removed (or largely removed) and replaced during construction of the A55 which is consistent with information provided on the as-built drawings;
- b) It should be noted that at the time the road was built (in the early 1980s) the 'normal' approach to dealing with contaminated land was to excavate the impacted soil and remove from site to a landfill, colloquially known as 'dig and dump'. It would have been typical for impacted soils to be consigned off site as 'contaminated' and/or 'geotechnically unsuitable' rather than retained. Removal was often a decision driven by geotechnical factors where the tendency was to remove rather than try to retain.

- c) Whilst some evidence of contamination has been encountered within the made ground, in particular at the western end of the former gas works, the information obtained does not indicate the development area is likely to be having a significant impact on groundwater quality or that this would represent a risk to the sea. Results from groundwater testing indicate overall low levels of contamination;
- d) The risks identified for the baseline and operation phases are considered to be similar based on the construction proposals. A higher risk could exist to surface water from run-off during construction without mitigation, although the works proposed in areas such the gas works, incinerator and refuse tip will only be shallow; and
- e) Ground investigation indicates the gas works, incinerator and refuse tip areas are underlain by cohesive glacial deposits which is likely to have limited the potential for vertical migration. A sea wall is present to the north of the railway lines along with sections identified as sloping masonry (concrete) which extend across the areas occupied by the former gas works and refuse tip and this will reduce the potential for migration and connection between shallow groundwater and the sea.

Tier 3: Detailed Quantitative Risk Assessment (DQRA)

- 4.22 As no evidence of gross contamination to either soil or water was observed during Tier 2 assessment stage, it was considered that a Tier 3 Detailed Quantitative Risk Assessment stage was not required. Also, a sea wall is present to the north of the railway lines along with sections identified as sloping masonry (concrete) which extend across the areas occupied by the former gas works and refuse tip. This will reduce the potential for migration and connection between shallow groundwater and the sea. It should be noted that these complexities and uncertainties in the conceptual site model cannot be accurately modelled in the *Remedial Targets Methodology*¹¹ referenced in the NRW objection letter or any other commercially available hydrogeological risk assessment models.
- 4.23 It is considered that the risks to controlled waters will be similar to the existing (baseline) situation, including the former gas and incineration areas, based on the construction proposals. These areas will be covered by tarmac which will significantly reduce infiltration of rain water through any impacted soils (if present) and also the underlying clays will reduce migration of any mobile contaminants.

¹¹ *Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination*, Environment Agency, 2006:
<https://www.gov.uk/government/publications/remedial-targets-worksheet-v22a-usermanual>

- 4.24 No specific contaminated land mitigation measures are proposed. General mitigation measures to protect the general public and site workers during the works would be detailed in the Construction Environmental Management Plan (CEMP) to be prepared prior to the construction works commencing and developed to ensure full compliance with relevant and current policy, guidelines and best practice.
- 4.25 Following implementation of the mitigation measures outlined above, there are considered to be no residual significant effects during the construction or operational phase.
- 4.26 However, a contaminated land management strategy (remediation strategy) and earthworks specification will be required prior to commencement of the construction works which will include outline the proposals for the additional investigation in the area of the former gas works particularly in the area around WS202 where gas works type impacts were noted previously. The scope of the additional investigation will need to be agreed with NRW. This strategy will also include a watching brief protocol to address contamination should evidence of potential contamination be encountered during excavations and stockpiling.

5. Objections to the Scheme

5.1 Objections have been made that raise matters that fall within the scope of my proof of evidence or that of one of my colleagues. I will address each and where appropriate I will refer to the proofs of others.

5.2 Objections are in italics followed by my comments.

5.3 *Objection: Section 6.2.8 refers to The Contaminated Land (England) Regulations 2006, and the DEFRA Contaminated Land Statutory Guidance, these should reference The Contaminated Land (Wales) Regulations 2006 and Welsh Government Contaminated Land Statutory Guidance 2012.*

Response: Agreed, this should provide reference to Welsh regulations. It should be noted that there is no material difference in the two approaches, so it is considered that the assessment remains valid.

5.4 *Objection: Section 6.3.1 to 6.3.2 refers to CLR11 this has now been replaced by 'Land Contamination: Risk Management.*

Response: Agreed, CLR11 has now been replaced by Land Contamination: Risk Management guidelines. It should be noted that there is no material difference in the two approaches, so it is considered that the assessment remains valid.

5.5 *Objection: A number of minor Environmental Quality Standards (EQS) exceedances for leachate and groundwater samples were identified in Section 6.8.65 to 6.8.77. Whilst the potential construction and operational effects have been considered, these exceedances have not been assessed further in terms of potential risks to controlled waters (i.e. as the site currently sits). Generally, we would expect that where exceedances have been identified there should be progression to the next tier of assessment within the Remedial Targets Methodology (*'Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination' Environment Agency, 2006).*

Response: As discussed above, further desk-based information has been provided in the Ramboll (August 2021) A55 J16 ES Chapter 6 Geology & Soils - Additional Desk Based Review including additional historical research coupled with a qualitative assessment of the risks from contamination for the existing situation. EQS exceedances recorded were minor suggesting that the soil is not a significant source of contamination. The data indicated that within the Scheme area the presence of shallow groundwater is quite limited and that the soils in this area do not have a significant impact on groundwater quality for the existing (baseline) situation. Considering the limited groundwater present and the sea wall reducing the potential for migration and connection between shallow groundwater and the sea it is considered that a

Tier 3 DQRA assessment would not be valid as it could not realistically represent the ground conditions and the effects of the sea wall. Given the above, it is not considered necessary to proceed to the next tier of assessment using the EA Remedial Targets Methodology.

- 5.6 *Objection: Furthermore, there is no qualitative assessment/statement as to whether these exceedances are posing a risk to controlled waters.*

Response: A qualitative assessment/statement was provided in Chapter 5 of the Ramboll (August 2021) A55 J16 ES Chapter 6 Geology & Soils - Additional Desk Based Review.

- 5.7 *Objection: The contaminated land risk assessment for the Scheme has been provided in Technical Appendix 6.3. this only considered the risk in the construction and operational phase and does not assess the historical contamination.*

A refuse tip, gasworks and tar storage were previously present on site and whilst some remediation may have occurred there is insufficient information to demonstrate that residual contamination is not present, if present residual contamination could be impacting controlled waters. In accordance with Planning Policy Wales V11 6.9.17 “the onus will remain with the developer to ensure that the development of the site will remove any unacceptable risks and the planning authority in making development management decisions will need to ensure that the land is suitable for its proposed use and would not meet the legal definition of contaminated land under Part IIA.”

Response: Assessment of historical sources of contamination from the gas works, the incinerator and the refuse tip are provided in Chapter 3 of the Ramboll (August 2021) A55 J16 ES Chapter 6 Geology & Soils - Additional Desk Based Review.

- 5.8 In conclusion the conceptual site model demonstrated that there are no significant sources of contamination on site and the proposed development works will not affect the existing risks.
- 5.9 However, a contaminated land management strategy (remediation strategy) and earthworks specification will be required prior to commencement of the construction works which will include outline the proposals for the additional investigation in the area of the former gas works. This strategy will also include a watching brief protocol to address contamination should evidence of potential contamination be encountered during excavations and stockpiling.
- 5.10 The strategy and watching brief are commitments which have been recorded in the updated Register of Environmental Actions and Commitments.

6. Conclusion and Declaration

- 6.1 My proof of evidence includes facts which I regard as being relevant to the opinions which I have expressed, and the Inquiry's attention has been drawn to any matter which would affect the validity of that opinion.
- 6.2 As a contaminated land expert I have reviewed available data and sought opinion and comment with the engineering and other environmental specialists in the team, to minimise impacts of the Scheme and to optimise the effectiveness of proposed mitigation.
- 6.3 In my opinion the Contaminated Land Assessment, has been carried out and published in accordance with legislation and professional guidance.
- 6.4 In my opinion the development of measures to mitigate the contaminated land effects of the Scheme are effective, justifiable and achievable.
- 6.5 I believe the facts I have stated in this proof of evidence are true and that the opinions expressed are correct.
- 6.6 I understand my duty to the Inquiry to assist it with matters within my expertise and believe that I have complied with that duty.