



The Coal  
Authority

# Lynemouth Mine Water Treatment Scheme

## Phase I Lagoon Hydraulic Modelling

## Purpose

The Coal Authority requires tracer tests to be carried out on the Phase I Lagoons located at Lynemouth Mine Water Treatment Scheme to determine hydraulic flow characteristics.

The tracer test methodology will provide for an automated pulse injection system of a tracer into a Lagoon and monitoring/measuring of the tracer using submersible loggers which are to be provided and installed by the Consultant.

## Table of Contents

Introduction	3
Specification	3
Services to be provided by the Consultant	5
Price List	8
Appendix A - Site location plan	14
Appendix B - General arrangement Drawing (High Resolution file provided separately)	16
Appendix C - Extract from Health and Safety File	17
Appendix D - Site photographs	19
Appendix E – Health and Safety Information (Pre Works Information Form)	21
Appendix F - Water monitoring data (Microsoft Excel Workbook provided separately)	25

# **Lynemouth Phase I Lagoon Hydraulic Modelling (Tracer Test)**

## **Introduction**

The Lynemouth Phase I mine water treatment scheme (MWTS) is located on the Northumberland coast on the site of the former Ellington Colliery. Coal mine water is abstracted at a rate of circa. 115 L/s from an abandoned mine shaft, treated through two lagoons configured in series before being discharged into the sea. The treatment process is designed to reduce total iron in the mine water which presents as ochre sludge in the lagoons.

Peroxide dosing of mine water may be implemented during the course of the flow modelling.

The site is in a remote location there being no permanent welfare facilities on the site.

## **Specification**

The Employer requires tracer tests to be carried out by the Consultant on the Phase I Lagoons to determine hydraulic flow characteristics:

- Baseline tracer test Lagoon No 2; followed by
- Baseline tracer test on Lagoon No 1

The Employer may include the following requirements after the baseline tests have been completed:

- Option to undertake additional tracer test on Lagoon No 2 if the Employer undertakes a de-sludge following the baseline tracer test; and
- Option to undertake additional tracer tests in Lagoon No 1 if the Employer installs full depth, equidistantly spaced baffles across 70% width of the lagoon in a serpentine configuration for one of the following cases:
  - a) Baffle tracer test if the Employer installs 2 baffles in Lagoon No 1, or
  - b) Baffle tracer test if the Employer installs 4 baffles in Lagoon No 1 .

The purpose of the baseline tracer tests is to help evaluate the need for baffles to improve the performance of the lagoon in terms of iron removal. The results of the baseline tracer test may justify the installation of baffles; probably installed in a serpentine configuration in Lagoon No 1, each baffle being approximately 70 % of the lagoon width. The baseline tracer test output will be used to inform baffle design in order to optimise:

- mean residence time;
- longitudinal mixing characteristics;
- reaction and settlement of ochre within the lagoon.

The Consultant will undertake baseline tracer tests to determine baseline hydraulic performance having regard for the chemical composition and physical condition of the water. The water contains suspended solids including fine iron particulate and is turbid and orange in colour, particularly when entering and leaving the lagoons.

The Employer will determine whether or not to install baffles and whether or not baffle tracer tests are to be undertaken by the Consultant to quantify change in hydraulic performance compared with the baseline case. The Consultant is to provide two cost options to undertake additional tracer tests assuming either a 2 baffle system or a 4 baffle system.

The tracer test methodology will provide for an automated pulse injection system of a tracer (e.g. Rhodamine WT dye, Ultraviolet leak tracing dye) into the Lagoon and monitoring/measuring of the tracer using submersible loggers. The tracer test is to be undertaken in a manner that allows the Consultant to report that a high degree of confidence (95% confidence interval where appropriate) is achieved with respect to repeatability, accuracy and reliability of the tests.

The detailed method of dosing and monitoring is to be determined and presented by the Consultant in a proposal accompanying a quotation to undertake the work and will state how confidence values will be determined with respect to the repeatability, accuracy and reliability of the tests.

It is suggested that longitudinal concentration profiles are modelled based on Taylor's analysis:

$$c(x, t) = \frac{M}{A\sqrt{4\pi Dt}} \exp\left(-\frac{(x - ut)^2}{4Dt}\right)$$

where: c is tracer concentration; t is time; x is longitudinal distance; u is longitudinal velocity and D is the longitudinal mixing coefficient accounting for the effects of molecular and turbulent diffusion and shear dispersion; A is cross sectional area and M is the mass of tracer.

Alternative modelling and analysis proposals may be presented by the Consultant in the proposal, highlighting the benefits and risks for the Employer's consideration.

The Consultant will note that the baseline tracer report will be used by the Employer to evaluate the need to install baffles in Lagoon No 1. The Employer will determine:

- the need for baffle tracer tests in Lagoon No 1, if baffles are installed; and
- the need to undertake tracer tests in Lagoon No 2 following a de-sludge.

Results for tracer tests will be presented in a format suitable for a general technical audience with the presentation of full residence time curves indicating mean and nominal residence times and key hydraulic parameters including hydraulic efficiency, effective volume and dispersive fraction.

## Services to be provided by the Consultant

For each tracer test (baseline tracer tests, baffle tracer tests and post de-sludge tracer tests), the Consultant will make sufficient allowance for the Health and Safety information provided in the Pre-Works Information Form and will:

- 1) Provide all labour, equipment and materials required to undertake the tracer tests including for:
  - a) maintenance of all health and safety documentation, and
  - b) welfare facilities, and
  - c) mobilisation, site establishment and commissioning of all plant, equipment and instrumentation;
  - d) implementing temporary modifications to the inlet and outlet flow arrangements in Lagoons; and
  - e) reinstatement and decommissioning (after the baseline test and after the baffle test)
- 2) measure and record the rate at which mine water passes through the lagoon during the course of the tracer test:
  - a) The volume of water flow will be recorded at both the inlet and outlet of the Lagoon; and
  - b) Flow measurements will be taken concurrently with water sampling.
- 3) Undertake field and laboratory samples concurrently to correlate hydraulic testing with the iron removal performance of the lagoon. Water quality sampling, testing and analysis at both the inlet and outlet of the lagoon will be as follows:
  - a) Field sampling & testing:
    - i) Basic physicochemical parameters (pH, Conductivity and Dissolved Oxygen) on both inlet and outlet twice daily, at the start and end of each working day during which the tracer test is conducted or as otherwise agreed with the Employer.
  - b) Laboratory sampling & testing:
    - i) make arrangements for the supply and delivery of all sample containers and samples to an approved UKAS accredited laboratory
    - ii) sampling and testing to include: pH, Conductivity, Total Suspended Solids, Total and Dissolved Iron (by ICP-OES) and Ferrous Iron on both inlet and outlet twice daily, taken at the start and end of each working day during which the tracer test is conducted or as otherwise agreed with the Employer.
  - c) Additional sampling may be required in the event of significant observable changes in the operation (e.g. significant change in inlet or outlet water quality by visual inspection or significant changes in flows).
    - i) where significant changes are noted, the Consultant will inform the Employer's Technical Research and Development Manager (Dr Chris Satterley, Tel: 01623 637372, Mob: 07876 651032, E-Mail [ChristopherSatterley@coal.gov.uk](mailto:ChristopherSatterley@coal.gov.uk)) and:
      - (1) discuss the need to implement any change to the sampling and testing requirements;
      - (2) detail the costs associated with any variation to the specification;
      - (3) implement changes to the testing and sampling regime as directed by the Employer's Technical Research and Development Manager.

- 4) Provide and operate appropriate meteorological instrumentation to measure and record meteorological data, in increments that facilitate changes in meteorological conditions that may impact on the hydraulic performance of the lagoon to be identified, and include as a minimum:
  - a) wind direction;
  - b) wind speed;
  - c) precipitation;
  - d) temperature; and
  - e) humidity.

recording any effect and impact on hydraulic performance in Lagoon No 1

- 5) Record any observations relating to the quantity and/or quality of water passing through the system that may impact on the outcome of the tracer test
- 6) Make allowance for the following meetings and communication:
  - i) an initial kick-off meeting to finalise and agree the scope of the work
  - ii) site meeting at or before the commencement of the field work
  - iii) regular communication with the Employer during the course of the field work to facilitate progress reports to highlight any issues that may impact the results.
  - iv) following the submission of a draft report for the Employer to review, a meeting at the Employers offices at a date to be agreed to present an updated draft report.
- 7) At the end of each period of field work (e.g. all work associated with baseline tracer test) a short site report should be submitted electronically (e.g. by email) as soon as possible and within 2 weeks of leaving site. The site report should include the following:
  - a) Brief comment on how the testing has progressed noting any changes from the planned schedule.
  - b) Note of any observed changes or conditions on site that could influence the results of the tests.
  - c) Any immediately relevant site photographs.
  - d) Any preliminary results available.
- 8) Within 4 weeks of leaving site The Consultant should produce an interim written report on the testing. This report should include:
  - a) Brief description of tracer test and water sampling methodologies, noting any changes from those planned.
  - b) Meteorological monitoring data and observations.
  - c) Note of any changes or conditions on site that could influence the results of the tests.
  - d) Results and analysis including:
    - i) Residence Time Distribution curves with mean and nominal residence times displayed.
    - ii) Key hydraulic parameters including hydraulic efficiency, effective volume and dispersive fraction
    - iii) Site photographs

- 9) The Consultant should submit a draft report covering all testing 4 weeks following the conclusion of all site work for The Employer to review and comment upon. The Consultant will then present the report at The Coal Authority's offices in Mansfield. A final version of this report will be submitted that takes account of the Employer's review and comments during the presentation of the draft report. The final report will be submitted no later than 4 weeks following the presentation of the draft report to the Employer at the Employer's office. The reports will include:
- a) An executive summary (maximum 1 page) with highlights of the outcomes of the trial written to be clearly understood by a non-technical audience.
  - b) Tracer test methodology
  - c) Water sampling methodology
  - d) Meteorological monitoring data and observations
  - e) Results, analyses and conclusions from the tracer test including commentary and discussion relating to:
    - i) Residence Time Distribution curves produced to demonstrate test results
    - ii) Presentation of key hydraulic parameters and discussion of the performance of the lagoon.
    - iii) Repeatability, accuracy and reliability of the tracer tests and
    - iv) Comment on meteorological records and impact on the tracer test
    - v) Photographs to illustrate how the tracer test was conducted
  - f) Conclusions on the changes observed between the baseline and post-baffle installation tests in terms of the change in the hydraulic performance of Lagoon No. 1.
  - g) All raw data and test results detailing the time and location of each sample \ test result should be included as appendices to the report, presented in Excel format or as otherwise agreed with the Employer.

## Price List

Additional items may be added to the Price List by the Consultant to ensure that all costs associated with the project are accounted for.

Item	Description	Unit	Quantity	Rate	Price
1	Initial site based pre-start meeting to finalise scope of work and review of H&S arrangements	L Sum		£	£
2	Welfare facilities (inclusive of all health & safety provisions, planning and documentation)	Week			

Baseline Tracer Test Lagoon No 2					
Item	Description	Unit	Quantity	Rate	Price
3	Mobilisation and site establishment	L Sum		£	£
4	Site meeting at or before the commencement of the field work	L Sum			
5	Provide and install temporary modifications to the inlet and outlet arrangements in Lagoon	L Sum			
6	Provide, install, commission and operate dosing equipment	L Sum			
7	Provision and supply tracer material				
8	Provision and supply of field monitoring and sampling equipment	Day			
9	Routine daily activity to include all communication, recording observations and making daily measurements and records associated with: flow measurement, field sampling and testing, meteorological measurements and records inclusive of all labour, materials and other associated costs	Day			
10	Daily laboratory sampling and testing inclusive of all labour, materials and other associated costs	Day			
11	Decommission tracer test, reinstate original inlet and outlet configuration and remove all surplus equipment and waste	L Sum			
12	Provision of an site report within 2 weeks of the end of site work	L Sum			
13	Provision of an interim written report within 4 weeks of the end of site work which will include results and analysis of all sampling, testing and records, takes account of Employers feedback from the site report for the Employer to review and provide feedback	L Sum			
14					
15					
<b>Sub-Total: Lagoon 2 Baseline Tracer Test</b>					



<b>Baseline Tracer Test Lagoon No 1 (to run after the completion of Lagoon No 2 tracer test)</b>					
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Price</b>
16	Site meeting at or before the commencement of the field work	L Sum			
17	Provide and install temporary modifications to the inlet and outlet arrangements in Lagoon	L Sum			
18	Provide, install, commission and operate dosing equipment	L Sum			
19	Provision and supply tracer material				
20	Provision and supply of field monitoring and sampling equipment	Day			
21	Routine daily activity to include all communication, recording observations and making daily measurements and records associated with: flow measurement, field sampling and testing, meteorological measurements and records inclusive of all labour, materials and other associated costs	Day			
22	Daily laboratory sampling and testing inclusive of all labour, materials and other associated costs	Day			
23	Decommission tracer test, reinstate original inlet and outlet configuration and remove all surplus equipment and waste	L Sum			
24	De-mobilisation and site clearance	L Sum			
25	Provision of an interim report within 2 weeks of the end of sited work giving preliminary findings for the Employer to review and provide feedback	L Sum			
26	Provision of a draft report within 4 weeks of the end of site work which will include results and analysis of all sampling, testing and records, takes account of Employers feedback for the interim report for the Employer to review and provide feedback	L Sum			
27					
28					
29					
<b>Sub-Total: Lagoon 1 Baseline Tracer Test</b>					

<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Price</b>
30	Attendance at Coal Authority Mansfield Office to present amended Draft Report (Lagoon No 1 & Lagoon No 2 baseline tracer test reports combined) that has taken account of Employers feedback	L Sum			

The Employer will endeavour to exercise the option to undertake additional tracer tests in order that they can be completed in the current financial year, to 5 April 2020.

<b>Tracer Test Lagoon No 2 (Employer's Option: following de-sludge of Lagoon No 2)</b>					
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Price</b>
31	Mobilisation and site establishment	L Sum		£	£
32	Site meeting at or before the commencement of the field work	L Sum			
33	Provide and install temporary modifications to the inlet and outlet arrangements in Lagoon	L Sum			
34	Provide, install, commission and operate dosing equipment	L Sum			
35	Provision and supply tracer material				
36	Provision and supply of field monitoring and sampling equipment	Day			
37	Routine daily activity to include all communication, recording observations and making daily measurements and records associated with: flow measurement, field sampling and testing, meteorological measurements and records inclusive of all labour, materials and other associated costs	Day			
38	Daily laboratory sampling and testing inclusive of all labour, materials and other associated costs	Day			
39	Decommission tracer test, reinstate original inlet and outlet configuration and remove all surplus equipment and waste	L Sum			
40	Provision of an interim report within 2 weeks of the end of sited work giving preliminary findings for the Employer to review and provide feedback	L Sum			
41	Provision of a draft report within 4 weeks of the end of site work which will include results and analysis of all sampling, testing and records, takes account of Employers feedback for the interim report for the Employer to review and provide feedback	L Sum			
42	If requested by the Employer, attendance at Coal Authority Mansfield Office to present amended Draft Report that has taken account of Employers feedback	L Sum			
43					
44					
45					
<b>Sub-Total: Employers option Lagoon 2 Tracer Test (following de-sludge)</b>					

The Employer will endeavour to make arrangements for the baffle tracer test to be undertaken immediately after the Lagoon 2 de-sludge tracer test has been carried out. It is anticipated that only the 2 baffle tracer test or the 4 baffle tracer test will be required.

<b>Tracer Test Lagoon No 1 (Employer's Option: following installation of 2 baffles)</b>					
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Price</b>
46	Site meeting at or before the commencement of the field work	L Sum			
47	Provide and install temporary modifications to the inlet and outlet arrangements in Lagoon	L Sum			
48	Provide, install, commission and operate dosing equipment	L Sum			
49	Provision and supply tracer material				
50	Provision and supply of field monitoring and sampling equipment	Day			
51	Routine daily activity to include all communication, recording observations and making daily measurements and records associated with: flow measurement, field sampling and testing, meteorological measurements and records inclusive of all labour, materials and other associated costs	Day			
52	Daily laboratory sampling and testing inclusive of all labour, materials and other associated costs	Day			
53	Decommission tracer test, reinstate original inlet and outlet configuration and remove all surplus equipment and waste	L Sum			
54	De-mobilisation and site clearance	L Sum			
55	Provision of an interim report within 2 weeks of the end of sited work giving preliminary findings for the Employer to review and provide feedback	L Sum			
56	Provision of a draft report within 4 weeks of the end of site work which will include results and analysis of all sampling, testing and records, takes account of Employers feedback for the interim report for the Employer to review and provide feedback	L Sum			
57	If requested by the Employer, attendance at Coal Authority Mansfield Office to present amended Draft Report that has taken account of Employers feedback	L Sum			
58					
59					
60					
<b>Sub-Total: Employers option Lagoon 1 Tracer Test (following installation of 2 baffles)</b>					

<b>Tracer Test Lagoon No 1 (Employer's Option: following installation of 4 baffles)</b>					
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Price</b>
61	Site meeting at or before the commencement of the field work	L Sum			
62	Provide and install temporary modifications to the inlet and outlet arrangements in Lagoon	L Sum			
63	Provide, install, commission and operate dosing equipment	L Sum			
64	Provision and supply tracer material				
65	Provision and supply of field monitoring and sampling equipment	Day			
66	Routine daily activity to include all communication, recording observations and making daily measurements and records associated with: flow measurement, field sampling and testing, meteorological measurements and records inclusive of all labour, materials and other associated costs	Day			
67	Daily laboratory sampling and testing inclusive of all labour, materials and other associated costs	Day			
68	Decommission tracer test, reinstate original inlet and outlet configuration and remove all surplus equipment and waste	L Sum			
69	De-mobilisation and site clearance	L Sum			
70	Provision of an interim report within 2 weeks of the end of sited work giving preliminary findings for the Employer to review and provide feedback	L Sum			
71	Provision of a draft report within 4 weeks of the end of site work which will include results and analysis of all sampling, testing and records, takes account of Employers feedback for the interim report for the Employer to review and provide feedback	L Sum			
72	If requested by the Employer, attendance at Coal Authority Mansfield Office to present amended Draft Report that has taken account of Employers feedback	L Sum			
73					
74					
75					
<b>Sub-Total: Employers option Lagoon 1 Tracer Test (following installation of 4 baffles)</b>					

<b>FINALISED REPORT</b>					
<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Rate</b>	<b>Price</b>
76	Meeting to confirm requirements of a finalised report which should capture all work undertaken during the course of the project, avoiding duplication and capture details as described in Item 9 of services to be provide by the Consultant.	L Sum			
77	Provision of a finalised report, that takes account of Employers feedback and comments during the course of the project	L Sum			
78	If requested by the Employer, attendance at Coal Authority Mansfield Office to present the Finalised Report	L Sum			
79					
80					
<b>Sub-Total: FINAL REPORT</b>					

The Employer may amend number of attendances at the Coal Authority's Mansfield Office in order to facilitate the Consultant to report on several tests during each visit and the Price list will be amended to reflect the number of attendances and costs accordingly.

#### **Additional information**

- 1) Appendix A - Site location plan
- 2) Appendix B - General arrangement Drawing (High Resolution file provided separately)
- 3) Appendix C - Extract from Health and Safety File relating to cascades and settlement ponds
- 4) Appendix D - Site photographs
- 5) Appendix E – Health and Safety Information (Pre Works Information Form)
- 6) Appendix F - Water monitoring data (Microsoft Excel Workbook provided separately)

**APPENDIX A – LOCATION PLAN:** Lynemouth – Mine Water Treatment Scheme. Former Lynemouth Colliery, Lynemouth, Morpeth NE61 5XL

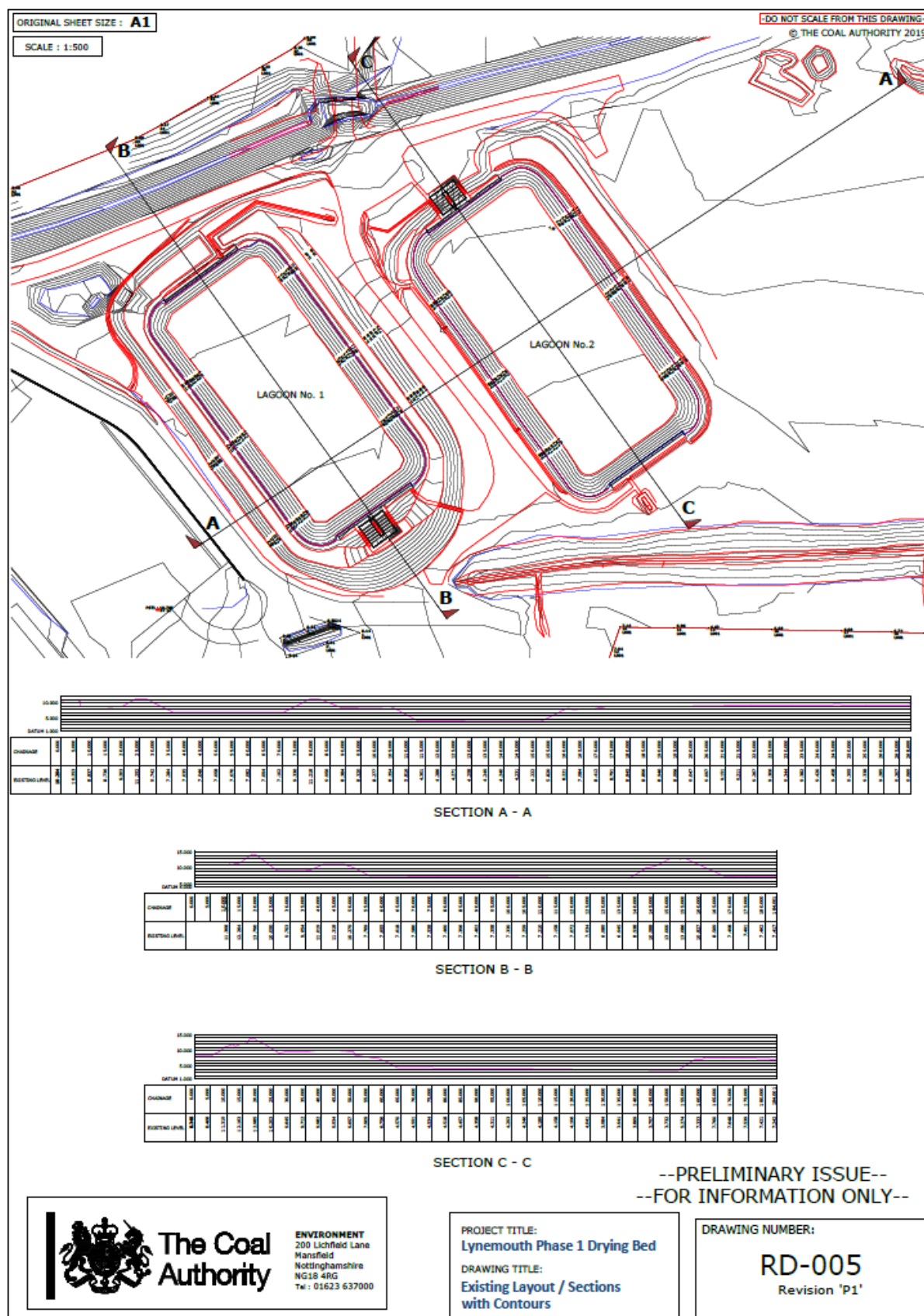




**APPENDIX A – LOCATION PLAN: Lynemouth – Mine Water Treatment Scheme. Former Lynemouth Colliery, Lynemouth, Morpeth NE61 5XL**



**APPENDIX B – General Arrangement** (High resolution copy supplied seperately)





## **APPENDIX C – Extract from Health & Safety File**

### **2.8. Aeration Cascades**

2.8.1. Segmental pre-cast reinforced concrete aeration cascades with in-situ reinforced concrete side walls are provided at the inlet end to each of the two settlement ponds, SP1 and SP2.

2.8.2. Each aeration cascade has an operational width of 7.5m with the SP1 aeration cascade comprises six cascade steps whereas the SP2 aeration cascade comprises five cascade steps.

2.8.3. Both aeration cascades have been offset from the centreline of the settlement ponds to allow for the possible future cascade widening. To facilitate possible future widening, one side wall of each cascade header unit has been finished with a temporary GRP panel.

2.8.4. Access for routine inspection and maintenance of the cascades is provided by steps in the middle and on the left side of the cascades. If direct entry to the cascades is required this can be achieved by stepping up to the cascade from the settlement pond inlet structures.

2.8.5. Access to the deeper cascade header units will require removal of any residual water in the cascade header units. The header units can be drained by either over pumping with a temporary portable pump or by allowing water to drain back down the rising main. Once drained down, access into the header units is possible using steel step ladders fixed to the side walls of the header units.

### **2.9. Settlement Ponds**

2.9.1. Two settlement ponds, SP1 and SP2, with operational volumes of approximately 11,000m<sup>3</sup> and 12,250m<sup>3</sup> respectively (23,250m<sup>3</sup> combined) have been constructed within the treatment site area. These are connected in series by a pre-cast concrete transfer channel located at the northern end of the settlement ponds.

2.9.2. The combined storage capacity of the settlement ponds which could escape in the event of failure is below the current limit (25,000m<sup>3</sup>) at which the Reservoirs Act would apply.

2.9.3. The depth of the settlement ponds varies from approximately 2.75m at their inlets to approximately 3.5m at their outlets. The operational water levels are 10.24mAOD in SP1 and 7.07mAOD in SP2 according to the as-built survey levels provided by JN Bentley.

2.9.4. The settlement ponds have been lined with geo-synthetic 2mm thick LLDPE liner. The liner material is double textured to reduce the risk of slipping should access on the liner be required by personnel during possible future maintenance.

2.9.5. The LLDPE liner is secured by an anchor trench at the crest of the settlement pond earthworks. The liner is directly welded to the inlet and outlet structures by means of an embedded LLDPE strip which runs along the front and side walls of the inlet and outlet structures.

2.9.6. The LLDPE liners were subjected to non destructive weld testing during installation with a subsequent water retention test also undertaken following completion of the liner installation to confirm the liner integrity.

2.9.7. Flows are distributed across the width of the settlement ponds by pre-cast concrete inlet and

outlet structures. These are fitted with adjustable v-notch boards to allow the even distribution of flows across the width of the inlets and outlets to be maintained. Access to the inlet and outlet structures for maintenance is gained from footpaths which run behind the structures. The inlet and outlets are fitted with a handrail along their front face to prevent falls into the settlement ponds.

2.9.8. Both settlement ponds have been provided with overflows to prevent overtopping in the event of blockages to the outlet structures. The overflows comprise 315mm outer diameter SDR17 PE80 MDPE pipes. The overflow from SP1 is connected to SP2 with the overflow from SP2 connected to the final discharge pipe from SP2 to the scheme monitoring structure.

2.9.9. To maintain the treatment capacity of the settlement ponds it is anticipated that de-sludging will be required on rotational basis approximately every 12 to 24 months depending on operational flow rates and the iron concentration of the raw mine water.

2.9.10. If de-sludging is required during the Phase 1 pumping test temporary suspension of mine water abstraction will be required. Sludge removal will then need to be undertaken by over pumping directly from the settlement lagoons.

2.9.11. No sludge drying facilities have been constructed as part of the Phase 1 scheme. If de-sludging is required it is assumed that this would be preceded by the construction of a sludge drying bed or mobile sludge dewatering equipment utilised to limit sludge volumes requiring removal from site and disposal. Any removal of sludge from the site will require prior waste classification testing.

## APPENDIX D – Photographs

Lagoon No 1 earthworks (outfall in foreground)



Outfall channel





## APPENDIX D – Photographs

### Inlet channel & Cascade



**APPENDIX E – Health and Safety Information (Pre Works Information Form)**

<b>Pre-works Information Form</b>		<b>Project Reference:</b>	<b>Date:</b>
		RD00777 (Lynemouth)	24 June 2019
<b>Project description:</b>			
Lynemouth Phase I Lagoon Flow Modelling (Tracer Test)			
<b>Key details:</b>			
<b>Property Address</b>	<b>Key Dates and Working Hours</b>	<b>Supporting Documentation</b>	
Former Lynemouth Colliery, Lynemouth, Morpeth NE61 5XL	TBC	Specification, Services to be Provided by Consultant, Price List, Site location plan, General arrangement Drawing No RD-005, Extract from Health and Safety File, Site photographs, Water monitoring data	
<b>Client</b>	<b>Project Manager</b>	<b>SHE Advisor</b>	<b>Contractor</b>
Coal Authority	Chris Satterley	TBC	TBC
<b>Description of the Works</b>			
<ul style="list-style-type: none"> <li>The Client requires tracer tests to be carried out by the Consultant on the Phase I Lagoons located at Lynemouth MWTs to determine hydraulic flow characteristics.</li> <li>The tracer test methodology will provide for an automated pulse injection system of a tracer into a Lagoon and monitoring/measuring of the tracer using submersible loggers which are to be provided and installed by the Consultant.</li> </ul>			
<b>Significant Risks</b>			
<ul style="list-style-type: none"> <li>Working near water (lagoons and sludge drying bed) is essential and will present the risk of drowning and exposure to water borne disease such as Leptospirosis (Weil's disease) when undertaking the following activities: <ul style="list-style-type: none"> <li>Modifying inlet \ outlet flow arrangements in lagoons</li> <li>Installing, commissioning and operation of tracer test dosing equipment</li> <li>Installing, commissioning and operation of flow monitoring instrumentation</li> <li>Sampling and testing mine water</li> </ul> It is a mandatory requirement for all personnel to wear life jacket when working within 2m of water.</li> <li>Working in close proximity to water in lagoons and transfer channels where the mine water may be subject to chemical dosing with peroxide and or floc blocks</li> <li>Handling tracer test dosing materials (Refer to Consultant's COSHH assessment)</li> <li>Potential shared access with other contractors <ul style="list-style-type: none"> <li>Severn Trent Services may be undertaking routine maintenance on the site</li> <li>JNB Bentley may be managing construction activity</li> <li>vehicle movements and third party heavy plant may be present</li> <li>pedestrians may be present</li> </ul> </li> <li>Access to lagoons and drying bed <ul style="list-style-type: none"> <li>Limited presence of stop blocks along edges of lagoons and sludge drying bed</li> <li>Unsurfaced access route (shale \ colliery spoil) susceptible to rutting</li> <li>Embankments are constructed from colliery spoil and may be slippery</li> </ul> </li> <li>All work activity will be undertaken outdoors on an exposed site located on the coast <ul style="list-style-type: none"> <li>Exposure to elements: strong winds, rain, sun</li> <li>No permanent welfare facilities available</li> </ul> </li> </ul>			

Client's Considerations and Management Requirements
<p><b>1. Specific issues associated with planning and managing the work</b></p> <ul style="list-style-type: none"> <li>• The Consultant will visit the site prior to the works commencing to ensure adequate planning and management provisions are put in place to execute the works. <ul style="list-style-type: none"> <li>○ A pre-start meeting will take place and include review of all Health, Safety and Environmental controls to be implemented by the Consultant</li> </ul> </li> <li>• Consultant must demonstrate that the site supervisor has sufficient knowledge, skill and experience to supervise the operations on site</li> <li>• Risk Assessments and Method Statements (RAMS) will be suitable, sufficient and proportionate <ul style="list-style-type: none"> <li>○ Submitted two weeks prior to work commencing work on site</li> <li>○ Must be communicated to those carrying out the work prior to starting</li> </ul> </li> <li>• COSSH assessments relating to materials used in the course of the works must be available for inspection on site <ul style="list-style-type: none"> <li>○ Appropriate storage and handling procedures to be implemented</li> <li>○ Assess need to undertake manual handling assessment</li> <li>○ Ensure appropriate PPE is available and utilised</li> </ul> </li> <li>• A qualified First Aider must be present during the course of the works <ul style="list-style-type: none"> <li>○ Evidence of qualification available for inspection on site.</li> </ul> </li> <li>• Emergency Planning must demonstrate: <ul style="list-style-type: none"> <li>○ Recognition and planning to deal with potential emergencies</li> <li>○ Procedures to detail action to be taken in the event of an Emergency <ul style="list-style-type: none"> <li>▪ Procedures to be adopted for contacting Emergency Services</li> </ul> </li> <li>○ Location of closest Accident &amp; Emergency Hospital</li> <li>○ Lone working procedure</li> </ul> </li> <li>• The works will be planned with the aim of eliminating risk as far as is reasonably practicable <ul style="list-style-type: none"> <li>○ Zero construction and environmental accidents/incidents are expected on this scheme.</li> <li>○ Where Personal Protective Equipment is required, it shall be available and fit for purpose</li> <li>○ Minimum PPE requirements are: lace up boots, hi-viz jacket/waistcoat (class 2), safety helmet and gloves, eye protection and life vest for work undertaken within 2m of open water.</li> <li>○ The Consultant shall monitor and record SHE observations (including positive interventions and near misses) and provide these to TCA</li> </ul> </li> <li>• The Consultant will ensure that all staff and/or visitors undertake a proportionate site induction. <ul style="list-style-type: none"> <li>○ Records of site inductions are to be made and readily available for inspection on site</li> </ul> </li> </ul>
<p><b>2. Welfare</b></p> <p>There are no welfare facilities available on the site.</p> <ul style="list-style-type: none"> <li>• If personnel are to be present on site throughout the working day on consecutive days at any point during the course of the work, provision for the following facilities is to be made available from the outset, for the duration of the work <ul style="list-style-type: none"> <li>○ A supply of clean, hot and cold water</li> <li>○ Drinking water must be provided or made available at readily accessible and suitable places</li> <li>○ Soap or other suitable means of cleaning</li> <li>○ Towels or other suitable means of drying</li> <li>○ Means of heating food</li> <li>○ Facility with seating, means of drying and keeping clothing and personal effects secure</li> </ul> </li> </ul>
<p><b>3. Security</b></p>



<p>The area is located in a remote location.</p> <ul style="list-style-type: none"> <li>• Appropriate arrangements will be implemented to ensure that equipment and materials are not tampered with, damaged or stolen.</li> </ul>	
4. Confined space	
There is no requirement to enter a confined space	
5. Emergency and rescue procedures	
<p>Adequate provision must be made for emergency situations and rescue.</p> <ul style="list-style-type: none"> <li>• The Consultant will ensure that working mobile telephones are available in the work area at all times and signal strength is adequate to call on Emergency Services <ul style="list-style-type: none"> <li>• Adequate information will be immediately available to all personnel to advise emergency service where the site is located, the means by which access will be gained and the specific location where work is being carried out within the site.</li> <li>• The main risk is that of drowning as the Consultant will work in close proximity to lagoons. <ul style="list-style-type: none"> <li>○ Where any activity presents a high risk of drowning, lone working will not be permitted.</li> <li>○ Before undertaking any activity within 2m on water, the Consultant shall ensure that all lifebelts are present, complete with throw lines.</li> <li>○ Personnel engaged in work that is within 2m of water will wear life jackets.</li> </ul> </li> </ul> </li> </ul>	
6. Environmental restrictions and existing on site risks	
<ul style="list-style-type: none"> <li>• No action will be taken that may have a detrimental impact on the quality of the consented discharge from the site</li> <li>• The Consultant will not amend or otherwise interfere with any chemical dosing of the mine water that is intended to ensure that discharge consents are achieved</li> </ul>	
7. Traffic management	
<ul style="list-style-type: none"> <li>• The Consultant will liaise with other parties working on site (potentially Severn Trent Services and J N Bentley) to ensure that Traffic Management plans are complimentary and that no conflicts occur</li> <li>• It is anticipated that minimal traffic will be required by the Consultant comprising a limited number of vans and cars</li> <li>• Designated parking areas will be established and communicated to all personnel <ul style="list-style-type: none"> <li>○ Reverse parking will be implemented</li> </ul> </li> <li>• Designated walkways will be established and communicated to all personnel</li> </ul>	
8. Access and egress	
<ul style="list-style-type: none"> <li>• The access route to the area of work in the site has been provided; the Consultant will not deviate from using the approved route.</li> <li>• No traffic will be permitted to drive along the elevated embankments of lagoons unless otherwise approved in writing</li> </ul>	
9. Falls from height	
No working at height anticipated	
10. Collapse of excavations	
No excavations	
11. Collapse of structures	
No structures	
12. Asbestos	

<ul style="list-style-type: none"> <li>Asbestos has been identified within the site and secured within a fenced off area.</li> <li>No asbestos has been identified in the work area near the lagoons             <ul style="list-style-type: none"> <li>The nature of the work is unlikely to expose personnel to asbestos</li> <li>Diligence is required should any asbestos containing materials be identified within the working area</li> <li>Identification of any suspected asbestos containing material should be reported to the client</li> </ul> </li> </ul>				
<b>13. Dust</b>				
<ul style="list-style-type: none"> <li>The tasks undertaken by the Consultant are unlikely to generate dust.</li> <li>Wind blown dust from the surrounding area is possible although the likelihood and risk of significant dust being generated are considered to be low.</li> <li>Where wind borne dust presents a risk to personnel, appropriate steps will be taken to eliminate detrimental effects to personnel</li> </ul>				
<b>14. Other dangers/considerations on site</b>				
<ul style="list-style-type: none"> <li>None evident</li> </ul>				
<b>Additional Comments</b>				
<b>NB:</b> Upon completion of this pre-works information a copy must be supplied to the Contractor(s) to enable the Risk Assessments/Method Statements to be completed. A record of the Contractor(s) receipt of the form shall be maintained within Conject/Wisdom.				
<b>Suitable Yes/No</b>	<b>Revision</b>	<b>Issue Date</b>	<b>Reviewed</b>	<b>Checked</b>
<b>NB:</b> The overall choice of risk control measures is the responsibility of the Consultant. The Coal Authority requires the Consultant to implement the hazard control measures for those areas identified in this Pre-works Information within the subsequent Risk Assessments/Method Statements and Permits to Work.				
<b>Consultant Representative Name (Print)</b>	<b>Date</b>	<b>Position</b>	<b>Signature</b>	
I accept this Pre-works Information and agree to implement the appropriate control measures within the subsequent Risk Assessments/Method Statements and Permits to Work.				



**APPENDIX F – Water monitoring data (Microsoft Excel Workbook provided separately)**