



GRS STONE SUPPLIES LIMITED

DURNFORD QUARRY INERT LANDFILL

CONSTRUCTION QUALITY ASSURANCE VALIDATION REPORT

STATUS: FINAL JULY 2026
193282/CQA/VAL/R/011



AA Environmental Limited
Units 4 to 8 Cholswell Court
Shippon
Abingdon
OX13 6HX
T01235 536042
F01235 532849
info@aae-ltd.co.uk
www.aae-ltd.co.uk

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1.0 INTRODUCTION

Overview

- 1.1 This document provides a record of the Construction Quality Assurance (CQA) activities undertaken for the installation of the most recent phases of the geological barrier at Durnford Quarry, Longwood Lane, Long Ashton, Bristol, BS41 9DW. The areas which are subject to validation in this report are the southern, north-eastern and northern face areas of the quarry. This report provides verification that the works have been completed in accordance with the requirements of the Environmental Permit EPR/JB3000LY and that the standard of works are in accordance with the Site Wide CQA Strategy Plan (Ref: 193282/CQAP/R/001).

Background

- 1.2 AA Environmental Limited (AAE), have been commissioned by GRS Stone Supplies Limited (GRS) to act as the Construction Quality Assurance consultant, responsible for overseeing the quality of the construction of the landfill geological barrier works.
- 1.3 The site is located adjacent to the Ashton Court Estate approximately 5 km to the south west of Bristol, and approximately 600 m north of the village of Long Ashton. Access is provided south off Longwood Lane from the B3128.
- 1.4 The quarrying ceased in 2022. The site has exposed Clifton Down Limestone Formation, which is classified as a principal aquifer.
- 1.5 The site operates under an Inert Landfill Bespoke Permit. The primary purpose of the site is to restore a mineral works using inert waste. The restoration will be completed in a series of working phases within the landfill. The area covered by this CQA Validation Report is circa 10,750 m² and is outlined in drawing 'CQA Validation Site Investigation Plan'. This validation report follows on from the July - December 2025 Validation Report (193282/CQA/VAL/R/010).
- 1.6 The continued geological barrier construction was undertaken between February 2026 and May 2026.

CQA Plan

- 1.7 This CQA validation report should be read in conjunction with the following documents:
- CQA Validation Report (Ref: TA1044/05/01, February 2020);
 - 2020 CQA Validation Report (193282/CQA/VAL/R/001);
 - 2021 CQA Validation Report (193282/CQA/VAL/R/002);
 - 2022 Validation Report January – April (193282/CQA/VAL/R/003);
 - 2022 Validation Report May – December (193282/CQA/VAL/R/004);
 - 2023 Validation Report January – June (193282/CQA/VAL/R/005);
 - 2023 Validation Report July – January (193282/CQA/VAL/R/006);
 - 2024 Validation Report May – July (193282/CQA/VAL/R/007);
 - 2024 Validation Report August – December (193282/CQA/VAL/R/008);
 - 2025 Validation Report January – July (193282/CQA/VAL/R/009);
 - 2025 Validation Report Late July – December (193282/CQA/VAL/R/010); and
 - CQA Plan (193282/CQAP/R/001, June 2026).

Source Material

- 1.8 The silt/clay used in the construction of the geological barrier was natural, cohesive material or site derived limestone quarry discards. The continued construction of the geological barrier, which is presented in this validation report, was formed by material from the approved Epic Long Ashton source. Harry Stoke and Epic Long Ashton sources were included in the previous Validation Report. Further, trial pad assessment was undertaken in February 2026 to respond to the Environment Agency's queries relating to the approval of the previous Validation Report.

These have been include for information in Appendix A. Both sources have been subject to previous source approval, source characterisation and sulphate validation testing, as discussed further in Section 5.1.

- Source 1: Epic Long Ashton (approved as a source in 193282/CQA/VAL/R/010).
- Harry Stoke trial pad assessment records are presented in Appendix A.

1.9 In line with the requirements of the Environmental permitting: landfill sector technical guidance, material suitable for construction of a geological barrier should:

- Be of particle size < 125 mm;
- Be of permeability < 1×10^{-7} m/s;
- Have a shear strength > 50 kPa; and
- It should also be chemically inert or as a minimum the same quality or better than the surrounding geology at Durnford.

1.10 Material from all sources has been visually screened on arrival to ensure no material >125mm in size is present.

1.11 Particle size distribution curves for the approved Epic Long Ashton source show a clay/silt fraction, which is indicative of the low permeability of the source. The material descriptions and visual inspection records identify a cohesive clay material suitable for field assessment as geological barrier material. The Epic Long Ashton source characterisation data has been previously presented and approved in 193282/CQA/VAL/R/010.

1.12 All sources are from greenfield sites. The data for the silt/clay and mudstone shows low levels of chemical determinands and compliance with inert criteria. This has been tested at source and/or at initial import to the site.

1.13 The shear strength of all sources has been tested on a regular basis with a hand shear vane (HSV) after placement and compaction and results show values >50 kPa. The HSV test results can be seen in the CQA Inspector Records presented in Appendices A and B and the Combined Daily Log presented in Appendix C. Furthermore, all the Site Team's daily tests have been converted and consolidated in Appendix D.

1.14 The moisture content reading within the source stockpiles are subject to daily testing, immediately prior to use in geological barrier construction. This is to confirm acceptable values (15 % - 26 %) as per Table 2.1 of the CQA Plan.

Principal Parties

1.15 The following organisations are the principal parties associated with the site, the design and the construction works.

Table 1.1 Principal Parties	
Principal Party	Description of Role
GRS Stone Supplies Limited	Site Operator and Construction Contractor
	Brian Jeynes – CQA Inspector
AA Environmental Limited (AAe)	Provision of CQA site personnel and geo-environmental testing: Key people in AAe undertaking these works are as follows: Matthew Lawman – Project Director Helen McDonnell (Associate to AAe) – CQA Manager Ed Brown – CQA Engineer Steven Pauli – CQA Inspector Steve Philp – CQA Inspector

Surveys

- 1.16 The comparisons in levels are presented within the VGL Trimble drawings. The surveys were conducted by handheld GPS or by drone survey, to confirm depth of geological barrier construction works undertaken.

2.0 COMPLETED CONSTRUCTION WORK

Extent of Work

- 2.1 Between February 2026 and May 2026, construction of the geological barrier involved side wall extension works within the south-eastern extents of the quarry, encompassing the southern, north-eastern and northern margins of the landfill. The works comprised sequential lift construction to the southern and northern faces during February 2026, with further recorded works to the northern face in April and May 2026. The southern face works included recorded testing of Lifts 1 to 9 between approximately 300 m and 500 m from the eastern face, while the northern face works included recorded testing of Lifts 1 to 5 between approximately 10 m and 270 m from the eastern face.

- 2.2 Geological barrier construction work was undertaken as per Table 2.1 below.

Table 2.1 2026 Validation Works		
Date Period	Section	Works undertaken
2 nd February 2026	Southern and northern faces	Lining works using Epic Long Ashton material. Sequential lift construction and testing undertaken to South Face Lifts 1 to 3 and North Face Lifts 1 to 2. Source moisture content testing, 3 mm sausage test and HSV testing undertaken by CQAI.
4 th February 2026	Southern and northern faces	Continued lining works using Epic Long Ashton material. Sequential lift construction and testing undertaken to South Face Lifts 4 to 6 and North Face Lifts 3 to 4. Source moisture content testing, 3 mm sausage test and HSV testing undertaken by CQAI.
16 th February 2026	Southern and northern faces	Continued lining works using Epic Long Ashton material. Sequential lift construction and testing undertaken to North Face Lift 5 and South Face Lifts 7 to 8. Source moisture content testing, 3 mm sausage test and HSV testing undertaken by CQAI.
18 th February 2026	Southern face	Continued lining works using Epic Long Ashton material. Sequential lift construction and testing undertaken to South Face Lift 9. Source moisture content testing, 3 mm sausage test and HSV testing undertaken by CQAI.
25 th February 2026	Southern and north-eastern sidewalls	Placement of liner material along southern and north-eastern extents using Epic Long Ashton material. Site inspection, 3 mm sausage test and geotechnical field testing by HSV. No Made Ground observed. Site inspection and geotechnical field testing by CQAI.
	Southern edge and north-eastern extent	Inspection of placed Epic Long Ashton material. Evidence of 1 m lift on southern edge and 1 m stepped lifts to north-eastern extent. Site inspection and topographical survey via drone by CQAI.
16 th April 2026	North Face	Continued lining works using Epic Long Ashton material. Sequential lift construction and testing undertaken to North Face Lifts 1 to 5. Source moisture content testing, 3 mm sausage test and HSV testing undertaken by CQAI. Visual inspection confirmed a geological barrier thickness of at least 1 m.
29 th May 2026	North Face	Laying of geological barrier to the North Face using Epic Long Ashton material. Source moisture content testing, 3 mm sausage test and HSV testing. Site inspection and geotechnical field testing by CQAI.

2.3 The following plant were used on site for the geological barrier works:

- 1 x 14T bulldozer;
- 1 x 30T / 360 excavator; and
- 3 x articulated dump trucks.

Nature of Work

- 2.4 The geological barrier material was transported to site and stockpiled temporarily pending suitable conditions for construction. This was inspected for oversized material on deposit. In the event the stockpile was already within the CQA area, the excavator removed any oversize prior to re-working. On delivery to the CQA area, the material was tipped and spread by bulldozer to form a partially compacted layer thickness of 250 mm. Initially, the bulldozer compacted the material with a minimum of 2 passes. Further compaction was achieved by >8 passes of the bulldozer. After each layer was installed, the surface was scarified with a bulldozer to promote good inter-bonding between layers.
- 2.5 During the February to May 2026 geological barrier construction, an estimated total of approximately 9,832 m³ of material was used to construct the side wall geological barrier, along the southern, north-eastern and northern extents of the quarry. This is based off a construction area of circa 9,832 m² with an average of 1 m raise over the construction period.

3.0 CQA PROCEDURES

Extent of QA Supervision

- 3.1 The CQAI carried out a total of 2 inspection visits covering the periods during and after construction. These visits were supplemented by Site Team daily CQA inspection records maintained during recorded construction and testing activities. A total of 7 no. Site Team daily CQA inspection record dates are included for the February to May 2026 validation period. The total number of CQAI inspection visits equates to approximately one visit per 4,916 m³ of the geological barrier. This is in excess of the requirement for sites on a principal aquifer, of 1 per 5,000 m³. The names and roles are outlined in Table 3.1 below.

Table 3.1 CQA Team	
Title	Name
CQA Manager / Technical Advisor (CQAM)	Helen McDonnell BSc MSc MCIWM C Geol FGS
CQA Engineer (CQAE)	Edward Brown BSc (Hons) MCIWM CCENM
CQA Inspector (CQAI) – visits during construction	Steve Philp BSc (Hons)
CQA Inspector (CQAI) – visits during construction and drone survey	Steven Pauli BSc MSc
Site Team CQA Inspector – on site	Brian Jeynes WAMITAB, TCP

Nature of QA Supervision

- 3.2 The CQAI visually inspected the approved geological barrier material on site before use in the lining works. The material did not have any apparent unsuitable materials and as such was approved for the lining works. The geological barrier was inspected for evidence of visual or olfactory contamination.
- 3.3 All approved geological barrier materials were inspected for unsuitable material, for which the evidence of Made Ground was negligible. Any incidental Made Ground, rubble, brick or oversize fragments were identified and removed by excavator before use within the geological barrier works. Inspections of the finished geological barrier were undertaken with any oversize or unsuitable material removed.

- 3.4 The completed CQA Inspector records are shown in Appendices A and B. The Combined Daily Log for the February to May 2026 construction period is presented in Appendix C. Daily records during construction, including source moisture content (MC), 3 mm thickness sausage testing and hand shear vane strength testing, were kept as part of the daily CQA inspection records and are summarised in Table 3.2 and Appendix D. The daily CQA records for the February to May 2026 construction period include records dated 2nd February, 4th February, 16th February, 18th February, 25th February, 16th April and 29th May 2026, covering placement and validation of Epic Long Ashton material within the southern, north-eastern and northern extents of the quarry.

Sampling

- 3.5 The specification for sampling and inspection are set out in the updated CQA Strategy Plan document. No trial pits were deemed necessary on the constructed areas. Trial pad assessments were undertaken on 25 February 2026 for the Epic Long Ashton and Harry Stoke materials as part of the source clay assessment and validation process for the previous 6-month submission. Visual inspection, source moisture content checks, 3 mm thickness sausage testing, handheld shear vane testing and survey / visual thickness verification have been undertaken in line with the updated CQA Strategy Plan document.

Sub-Grade Fill

- 3.6 There was no sub-grade fill laid on the side walls, as the areas of construction were sufficiently level to allow exclusive utilisation of geological barrier material.

General Fill

- 3.7 There was no general fill material added behind the containment bunding within the rock trap zone in February to May 2026. All material consisted of geological barrier material.

Geological Barrier

- 3.8 The compacted, placed geological barrier material was inspected and field sampled post-compaction to determine suitability, after final placement. Field testing involved logging by the CQAI, source moisture content checks, 3 mm thickness sausage testing and handheld shear vane testing within the placed geological barrier. The February and April daily records documented sequential lift testing to the southern and northern faces, while the 25th February records included inspection and testing of placed material and trial pad assessment. The 29th May records documented further hand shear vane and moisture content testing to the northern face.
- 3.9 The surface area remained consistent and no requirement for re-testing was deemed necessary. The photo logs are presented within each relevant appendix.

Testing

- 3.10 Field testing involved logging by the CQAI and handheld shear vane tests within the barrier. A moisture content reading was taken within the Epic Long Ashton source material, immediately prior to use in geological barrier construction. The 3 mm thickness sausage test was recorded as passed for the Epic Long Ashton material. Laboratory geotechnical testing was undertaken for the Harry Stoke sample collected on 25 February 2026. No further geotechnical laboratory testing of the placed Epic Long Ashton geological barrier was undertaken during the construction period, in accordance with the CQA Plan for the approved sources.

Geological Barrier

- 3.11 The geological barrier testing involved is shown in Table 3.2 below.

Table 3.2 Geological Barrier Testing Overview		
Date Period	Section	Testing undertaken
2 nd February 2026	Southern and northern faces	Source MC range 20.5 % to 22.0 %; 3 mm sausage test passed; 51 HSV locations across South Face Lifts 1 to 3 and North Face Lifts 1 to 2. All HSV readings acceptable, range 70 to 94 kPa.

Table 3.2 Geological Barrier Testing Overview		
Date Period	Section	Testing undertaken
4 th February 2026	Southern and northern faces	Source MC range 21.0% to 22.5%; 3 mm sausage test passed; 51 HSV locations across South Face Lifts 4 to 6 and North Face Lifts 3 to 4. All HSV readings acceptable, range 66 to 94 kPa.
16 th February 2026	Southern and northern faces	Source MC range 20.5% to 22.0%; 3 mm sausage test passed; 31 HSV locations across North Face Lift 5 and South Face Lifts 7 to 8. All HSV readings acceptable, range 68 to 96 kPa.
18 th February 2026	Southern face	Source MC range 19.0% to 20.5%; 3 mm sausage test passed; 11 HSV locations across South Face Lift 9. All HSV readings acceptable, range 70 to 94 kPa.
25 th February 2026	Southern and north-eastern extents	33 HSV, 3 mm sausage test. All HSV readings acceptable, range 54 to 84 kPa.
16 th April 2026	North Face	Source MC range 19.5% to 20.5%; 3 mm sausage test passed; 20 HSV locations across North Face Lifts 1 to 5. All HSV readings acceptable, range 108 to 120 kPa. Visual inspection confirmed ≥ 1 m thickness.
29 th May 2026	North Face	24 HSV, source MC range 19.1% to 20.7%, 3 mm sausage test. All HSV readings acceptable, range 100 to 120 kPa.

Thickness of Lining

- 3.12 Ground surveys of levels before and after construction were used to confirm thickness as a non-intrusive method. These are presented within the drawings from surveys taken during the February to May 2026 construction period. To note, in the north east corner, there is a large stockpile of geological liner waiting to be placed up the side of the quarry. The geological barrier constructed over this period comprised sequential side wall lifts, including a minimum of 1 m lift along the southern edge and 1 m stepped lifts across the north-eastern extent, with further geological barrier construction undertaken to the northern face. To note, the geological barrier constructed over this period has been in sequential lifts, applied to the side wall construction, hence the underlying layers are also comprised of geological barrier.

Drainage & Other Infrastructure

- 3.13 No drainage infrastructure was constructed between February and May 2026.

4.0 RESULTS OF CQA TESTING

- 4.1 All CQA Inspector records, combined daily logs and consolidated testing summaries are included in the appendices section of this Validation Report. The daily records include visual inspection, source moisture content checks, 3 mm thickness sausage testing and handheld shear vane testing undertaken during the February to May 2026 geological barrier construction period.
- 4.2 A summary of the geological barrier construction results is provided in Table 4.1 in line with the CQA Plan.

Table 4.1 Summary of Geological Barrier Test Data		
Test	No. of Tests	Summary
Visual assessment	N/A	Visual inspection during routine inspections and trial pitting did not identify potentially contaminated material. No non-natural materials or granular material observed. No sandy materials or oversized materials identified during supervision. Thickness of geological barrier ≥ 1.00 m.
Environmental Analysis	30	The Epic Long Ashton material placed during the February to May 2026 validation period is supported by previous source characterisation and sulphate validation testing. The relevant source dataset includes 26 no. 2:1 water/ soil sulphate determinations associated with Mercia

Table 4.1 Summary of Geological Barrier Test Data		
Test	No. of Tests	Summary
		Mudstone/ weathered Mercia Mudstone materials, together with 4 no. 10:1 sulphate samples previously taken for Epic Long Ashton. These results are discussed further in Section 5.1.
Particle Size Distribution	2	2 x Project Epic Long Ashton, previously presented and approved in 193282/CQA/VAL/R/010.
Triaxial permeability	2	2 x Epic Long Ashton, previously presented and approved in 193282/CQA/VAL/R/010.
Particle Density	2	2 x Project Epic Long Ashton, previously presented and approved in 193282/CQA/VAL/R/010.
2.5kg Compaction	2	2 x Project Epic Long Ashton, previously presented and approved in 193282/CQA/VAL/R/010.
Shear Strength (HSV) - Geological Barrier	549	All HSV readings recorded within the placed geological barrier were compliant with the specification. Testing was undertaken during the February to May 2026 validation period across the southern, north-eastern and northern extents of the quarry. Results ranged from 54 kPa to 120 kPa, with an average of 86.1 kPa. All recorded HSV readings exceeded the minimum acceptance criterion of 50 kPa.
Moisture Content	12	Source moisture content readings recorded within the daily CQA records ranged from 19.0 % to 22.5 %, with an average of 20.7 %. These comply with the range of 15 % to 26 %, as per the CQA Plan.

5.0 COMMENTS ON CQA TEST DATA

Environmental Testing

Geological Barrier

- 5.1 The Epic Long Ashton source has been subject to further sulphate testing. The source ground investigation report details 26 x 2:1 water/ soil sulphate determinations associated with Mercia Mudstone/ weathered Mercia Mudstone materials, which are the natural clay/ mudstone strata representative of the geological barrier source. The reported 2:1 water/ soil sulphate results range from <0.01 g/l to 0.06 g/l, equivalent to <10 mg/l to 60 mg/l. In addition to the testing carried out in the source ground investigation report, 4 x solid and WAC samples were taken for Epic Long Ashton. These results are below the PTN/001 sulphate criterion of 250 mg/l, equivalent to 2,500 mg/kg. The volume of Epic Long Ashton material placed during the February to May 2026 validation period was approximately 9,832 m³, which is below the 10,000 m³ validation testing frequency set out in PTN/001. The environmental quality of the Epic Long Ashton geological barrier material is therefore considered acceptable.
- 5.2 The Epic Long Ashton clay source verification data was previously presented and approved in 193282/CQA/VAL/R/010. The CQA Inspector records and Combined Daily Log presented in Appendices A to C confirm the geological barrier materials used in this CQA are suitable and that the material is consistent with the approved source investigations. The environmental quality of the geological barrier is considered acceptable.

Geotechnical Testing

Geological Barrier

- 5.3 The geotechnical properties of the sources as geological barrier are considered acceptable. This was validated by field testing during the CQA process. Visual inspection on importation and shear vane testing after placement confirm the material's suitability.
- 5.4 Source moisture content readings were recorded for the source material prior to and during construction of the geological barrier. Please refer to the Combined Daily Log in Appendix C and the consolidated hand shear vane and moisture content data in Appendix D for detailed measurements of the source material moisture content prior to and during construction of the geological barrier.

6.0 DEVIATIONS FROM THE CQA STRATEGY

Non-conformances

Geological Barrier

- 6.1 The construction of the geological barrier was inspected in accordance with 1 visit per 5,000 m³. The ground surveys confirm the thickness is compliant. The Site Team and CQA inspection shear strength data confirms compliance to or above 50 kPa. No Non-Conformance Reports were written up and no remedial actions required.
- 6.2 Due to unforeseen circumstances, the CQAE for the project was hospitalised and was off work for 5 weeks and then followed a phased return. This included no site visits within this time period. Although, the CQAE could not attend site, suitable supervision was in place throughout construction.

7.0 SUMMARY

- 7.1 The geological barrier forming southern, north-eastern and northern side wall extensions has been subject to a representative validation process environmentally and geotechnically to determine suitability within the landfilling works.
- 7.2 The earthworks were undertaken from February 2026 to May 2026 and were inspected in accordance with the CQA Strategy Plan.
- 7.3 The geological barrier results show environmental and geotechnical compliance. The work is in accordance with the CQA Strategy Plan.

DRAWINGS

APPENDIX A

February 2026 – CQA Inspector Records

APPENDIX B

May 2026 – CQA Inspector Records

APPENDIX C

February 2026 - May 2026 – Combined Daily Log

APPENDIX D

Consolidated Hand Shear Vane and Moisture Content Data