

1. Scope

This specification defines the requirements for the supply and delivery of puddle clay material suitable for use in canal lining and water-retaining structures. The material shall be naturally occurring cohesive clay capable of forming a plastic, watertight barrier when properly compacted on site by others.

2. Standards and References

All materials supplied under this contract shall comply with the following standards:

- BS 1377 – Methods of test for soils for civil engineering purposes
- BS 5930 – Code of practice for site investigations
- BS 6031 – Code of practice for earthworks
- BS EN ISO 17892 – Geotechnical investigation and testing
- TII Specification for Road Works, Series 600 – Earthworks
- EPA guidelines for materials used in water-retaining structures
- All laboratory testing shall be carried out by INAB-accredited laboratories.

3. Material Description

The puddle clay shall be:

- A natural cohesive soil of low permeability.
- Homogeneous, plastic, and workable.
- Free from stones > 50 mm, organic matter, roots, deleterious materials, and refuse.
- Suitable for puddling and compaction when near its optimum moisture content.

4. Material Property Requirements

Property	Requirement	Test Method / Standard
Soil Type	Cohesive fine-grained clay (CL, CI, or CH per BS 5930)	BS 5930
Liquid Limit (LL)	35–65	BS 1377-2
Plastic Limit (PL)	—	BS 1377-2
Plasticity Index (PI)	15–35	BS 1377-2
Moisture Content (as delivered)	Within $\pm 3\%$ of OMC	BS 1377-2
Particle Size Distribution	$\geq 70\%$ passing 425 μm sieve; $< 10\%$ retained on 2 mm sieve	BS 1377-2
Organic Content	$\leq 2\%$	BS 1377-3
Permeability (k)	$\leq 1 \times 10^{-7}$ m/s (preferably $\leq 1 \times 10^{-9}$ m/s)	BS 1377-5
Stone Size	None > 50 mm	Visual inspection

5. Testing and Certification

1. The supplier shall provide full laboratory test results from an INAB-accredited geotechnical testing facility for each distinct source or borrow pit proposed.
2. Tests required prior to supply approval include:
 - Moisture content
 - Atterberg limits (LL, PL, PI)
 - Particle size distribution
 - Organic content (Loss on Ignition)

- Permeability (constant/falling head)
- 3. Test results shall be dated within six (6) months of the tender submission date.
- 4. A representative bulk sample (minimum 20 kg) may be requested by the Employer's Representative for visual confirmation of suitability.
- 5. Each delivery shall be accompanied by a Certificate of Conformity referencing test results and material source.

6. Source and Supply Requirements

- The source location (quarry, borrow pit, or excavation) must be identified and approved before supply.
- The material shall be naturally occurring; reworked or blended materials are not acceptable unless approved in writing.
- The supplier shall state source address, available quantity, transport method, and expected moisture content as supplied.

7. Delivery and Handling

- Material shall be delivered in a moist, workable state suitable for immediate placement.
- Loads shall be protected from drying or contamination during transport.
- Each load shall be clearly traceable to its source and accompanied by a delivery docket.

8. Quality Assurance Documentation

Before commencement of deliveries, the Supplier shall provide:

- Laboratory test certificates.
- Material source data sheet.
- Health & Safety Data Sheet (if applicable).
- Method of loading and moisture protection.
- Name and accreditation of the testing laboratory.

9. Acceptance Criteria

Material will be accepted if:

- All test results meet or exceed the specified requirements;
- Visual inspection confirms compliance;

- Delivery condition is consistent with approved sample and test certificates.
- Non-conforming material will be rejected and removed at the Supplier's expense.

10. Environmental and Regulatory Compliance

- The supplier shall comply with EPA and local authority regulations concerning excavation, transport, and reuse of natural materials.
- All materials shall be non-polluting and free from waste.
- Documentation for material origin and traceability must be retained for minimum 5 years.

11. Tender Submission Requirements

Tenderers must provide:

- Completed Tender Response Form with rates per tonne delivered.
- Laboratory test certificates demonstrating compliance.
- Details of INAB-accredited laboratory used.
- Statement of available stock and delivery capacity.
- Details of proposed haulage routes and environmental controls.