

Aggregate from Inert Waste: Resource Framework

Unbound Recycled Aggregate Pipe Bedding

Guidance & Testing Requirements
Specification for Highway Works (SHW) 2025
Clause CC 500
(formerly SHW Series 500)





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CC 500 Explained

CC 500 is the part of the 2025 Specification for Highway Works (SHW) that covers highway drainage and service ducts. It replaces SHW Series 500: Drainage and Service Ducts with a clearer, modernised structure.

CC 500 sets the rules for how drainage pipes, culverts, filter drains, backfill, testing, and connections are designed, installed, and proven to work on highway schemes.

What CC 500 is responsible for

CC 500 governs all piped drainage systems associated with highways, including:

- Surface water drainage pipes
- Carrier pipes and culverts (typically up to 900 mm diameter)
- Filter drains and land drains
- Bedding, surround and backfill materials
- Pipe connections and junctions
- Testing, cleaning, and documentation
- Service ducts running alongside drainage systems

Where CC 500 fits in the SHW

Within the 2025 SHW structure:

- **CC 201–207** covers pavements and foundations
- **CC 500** covers drainage systems

Drainage is no longer treated as a loosely connected earthworks activity; it is a **stand-alone, accountable system with defined verification requirements**.



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How CC 500 differs from SHW Series 500

Series 500 approach

- Long, clause-heavy specification
- Mix of guidance and requirements
- Heavy reliance on historic installation practice

CC 500 approach (2025)

- Requirements written clearly as obligations
- Product, installation, testing, and documentation separated
- Stronger emphasis on **verification and traceability**
- Designed to integrate with modern contracts and digital records

Summary:

CC 500 doesn't just say how to put pipes in the ground; it sets out how to prove the drainage system will work and last.

Aspects of CC 500 (high-level)

1. Drainage pipes (materials and products)

CC 500 defines acceptable requirements for:

- Concrete pipes
- Vitrified clay pipes
- GRP pipes
- Cast and ductile iron pipes
- Thermoplastic pipes (solid wall, structured wall, land drains, filter drains)
- Corrugated steel pipes



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2. Excavation, bedding, surround and backfill

CC 500 gives clear requirements for:

- Trench excavation
- **Bedding and surround materials**
- **Backfill materials** and placement
- Geotextiles where required
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These are critical to long-term pipe performance, not just construction convenience.

3. Installation and connection

4. Testing and verification of installed system

5. Documentation and records

CC 500 places emphasis on:

- Product documentation
- Installation records
- Test results
- Evidence of cleaning and connection works

If it isn't documented, it isn't accepted.

CC 500 and Recycled Aggregates

CC 500 allows recycled aggregates in drainage works, but only in supporting roles where performance, durability, and cleanliness can be demonstrated.

Recycled aggregates **are not treated as interchangeable** with primary materials, and they **cannot be used everywhere**.



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Where recycled aggregates are used under CC 500

Recycled aggregates under CC 500 are typically used in materials around the pipe, not in the pipe itself.

Common acceptable uses

Recycled aggregates may be used for:

- **Backfill to drainage trenches**
- **Some bedding and surround materials** (where permitted)
- Fill around drainage structures away from critical load paths

The key condition is that the recycled aggregate:

- Supports the pipe properly
- Does not damage the pipe
- Does not compromise long-term performance

Where recycled aggregates are NOT normally used

Under CC 500, recycled aggregates are **not normally acceptable** for:

- The pipe material itself
- Locations where:
 - Pipe support is critical
 - Long-term settlement risk is high
 - Clean drainage flow could be compromised

Why:

Drainage systems must remain functional for decades, and CC 500 prioritises durability and reliability over material flexibility.



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What CC 500 expects from recycled aggregates

Using recycled aggregates is **allowed**, but **not assumed acceptable**.

CC 500 expects that recycled aggregates used in drainage works are:

1. Suitable for the specific role

- Fit for backfill or surround
- Compatible with the pipe type
- Not harmful to joints or pipe integrity

2. Consistent and controlled

- Source is known
- Processing is controlled
- Variability is managed

3. Free from harmful contamination

- No materials that could:
 - Damage pipes
 - Block drainage
 - Cause long-term degradation

Summary:

Drainage is not easily repaired or replaced once installed. If recycled material introduces risk, it isn't accepted.



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Testing and evidence (critical)

Unlike SHW Series 500 practice, **CC 500 places direct onus on evidence.**

For recycled aggregates, this usually means:

- Material testing appropriate to use
- Documentation showing:
 - What the material is
 - Where it came from
 - Where it is used
- Clear separation from unsuitable materials

Passing basic earthworks tests alone is **not enough** if the use could affect drainage performance.

How acceptance works with recycled aggregates

Acceptance happens when:

- Correct location of use is demonstrated
- Installation meets CC 500 requirements
- Drainage pipes pass:
 - Air testing
 - Water testing (where specified)
- Backfill and surround are shown to support the pipe correctly
- Documentation is complete

Recycled aggregate use is rejected if:

- It causes pipe distortion
- It leads to failed tests
- It introduces contamination
- Evidence is missing

Important:

Even if recycled material **passes material tests**, it may still be rejected if **the drainage system fails testing**.



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What this means for recycled aggregate producers

CC 500:

- Does **not** exclude recycled aggregates
- Offers a **clear, but cautious** route to use
- Does **not** accept recycled aggregates by precedent alone

Producers who succeed under CC 500 usually:

- Supply clearly defined products
- Understand exactly where they are suitable
- Provide straightforward evidence
- Avoid “one-size-fits-all” claims

Material Classification

1. Material classification and suitability

Test

Particle Size Distribution (PSD)

Fines content

Standard

BS EN 933-1

BS EN 933-1

Please note that for **filter drain** material additional **Plasticity Index** and **Permeability** testing will be required as per table 1.103 in CC500.

2. Aggregates compliance

Test

Resistance to fragmentation (LA test)

Standard

BS EN 1097-2

3. Chemical Testing (Critical for Recycled Aggregates)

Always required for recycled aggregates under CC 500.

Test

Water soluble sulphate (%)

Water soluble sulphate (mg/l)

Total sulphur

Oxidisable sulphide content (OS) (%SO₄) and TPS

Standard

BS EN 1744-1

BS EN 1744-1

BS EN 1744-1

BS EN 1744-1



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4. Constituent Content (Recycled Aggregate Quality)

Required to confirm acceptable recycled material composition.

Test	Standard
Constituents of coarse recycled aggregate (concrete, masonry, asphalt, etc.)	BS EN 933-11

Purpose:

- Quantifies % concrete, masonry, asphalt, glass, wood, plastics

Explicit CC 500 Restrictions on Recycled Aggregates

Recycled aggregates **must NOT** contain:

- Wood, gypsum, insulation, bituminous lumps (unless allowed)
- Excess brick/masonry beyond declared limits
- Contaminants causing high sulphate or organic content

Failure in chemical tests = **automatic rejection**, it is not subject to discretionary acceptance.

Summary

CC 500 allows recycled aggregates in drainage works where they support, but do not compromise, drainage performance and only where suitability can be clearly evidenced.



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