Supplementary Information

The following information is associated with Network Rail Standard:
NR CIV/SD/540 Rev A

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CAD Drawing

- CIV/SD/540

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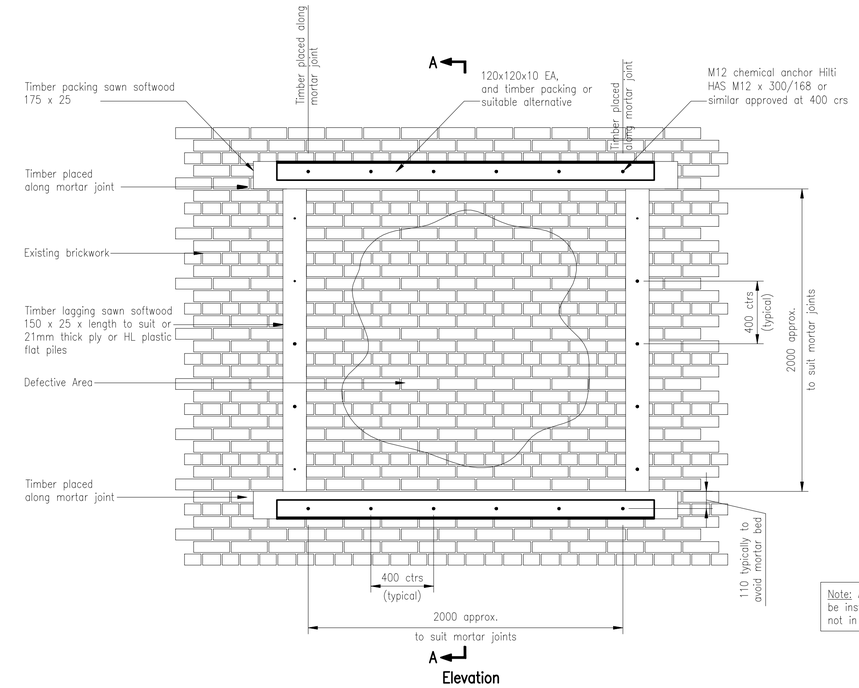
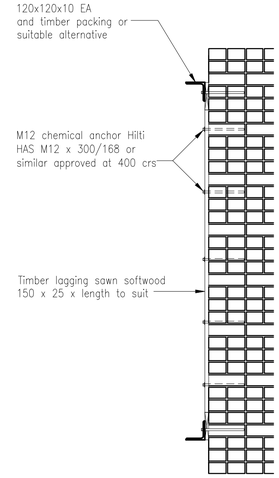
DO NOT SCALE THIS DRAWING

DRAWING No. NR/CIV/SD/540

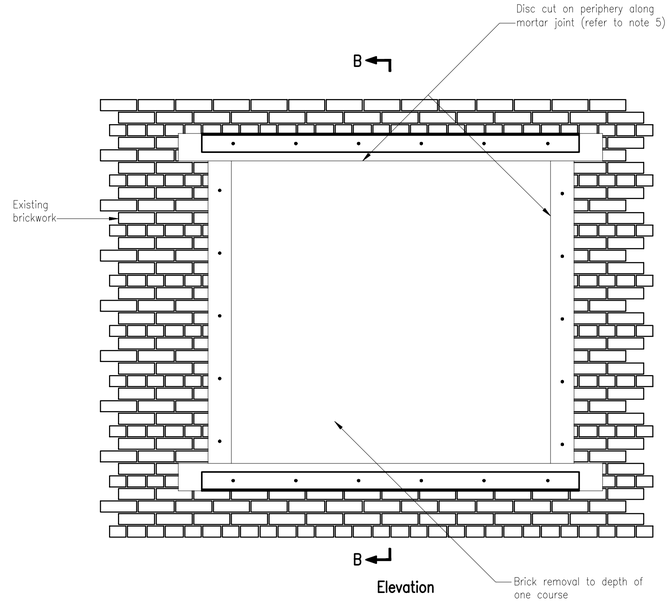


Stage 1



Section A–A

Note: Anchors for framing to be installed through brick and not in mortar joints



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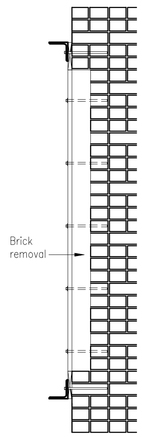
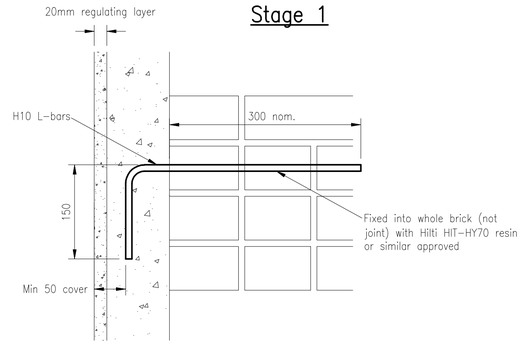
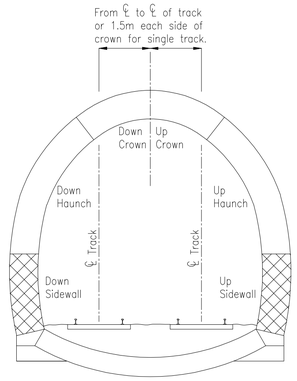


Section B–B



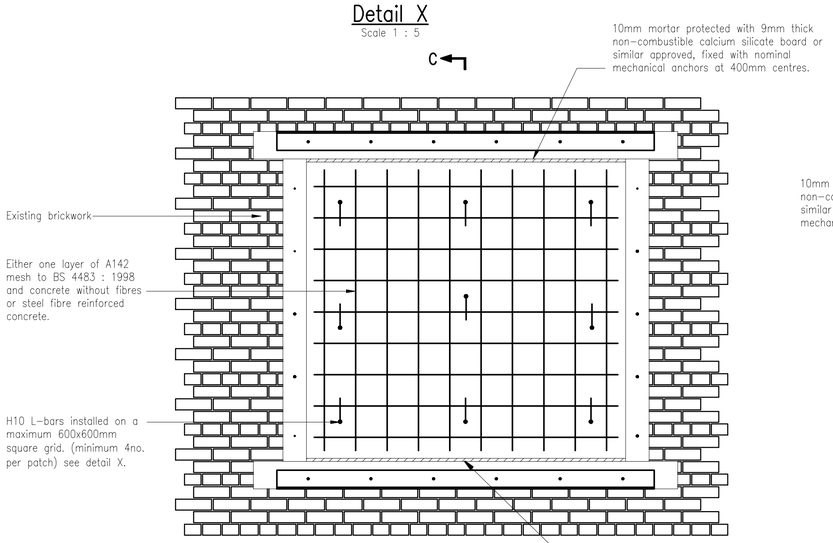
Detail X

Scale 1 : 5



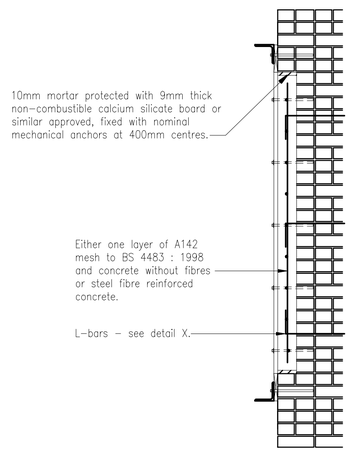
Advised Area of Repair :

Denotes area appropriate for detailed repair.

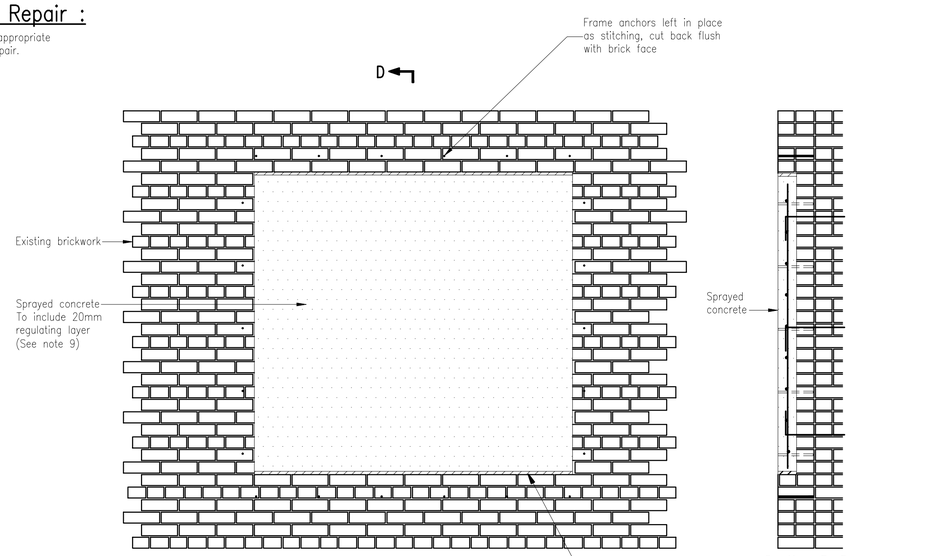


Stage 3

Scale 1 : 20



Section C–C



Stage 4

Section D–D

NOTES

1. All dimensions are in millimetres unless noted otherwise.
2. Cover to mesh to be 50mm.
3. Typical 2m x 2m patch shown. Maximum repair patch is 1No ring. Maximum repair patch is 2m longitudinally (hit & miss). For wet patches and patches greater than 2m x 2m, appropriate drainage to be considered (see technical user manual).
4. Patch to be drilled to confirm lining thickness prior to brick removal. Drilling to be at a pitch not exceeding 3m x 3m, with a minimum of 1no. drill holes per patch.
5. When saw-cutting perimeter of patch, care should be exercised to ensure cut is no deeper than one brick thickness. Any over-cut in depth or length shall be widened to a bed joint width and packed with suitable mortar immediately after removal of brickwork.
6. Anchors for framing should be capable of resisting an unfactored pull out load of 1kN. 'L' bars should be capable of resisting an unfactored pull out load of 1kN.
7. Sprayed concrete to have:
   - maximum 10mm aggregate
   - not less than 25N/mm² cube strength
   - minimum 5N/mm² cube strength after 5 hours
   - minimum bond strength of 1N/mm²
   - 30Kg/m³ steel fibres if no mesh is used.

   Steel fibres to be Dramix ZP305 or Arcelor Mittal HE55/35 or similar approved fibres with $Re_{,3}$ >0.5.
8. Steel fibre reinforced sprayed concrete to have a 20mm flash coat to finish profile with:
   - maximum 6mm aggregate
   - not less than 25N/mm² cube strength
   - minimum 5N/mm² cube after 5 hours
   - minimum bond strength 1N/mm²
   - no fibre reinforcement.
9. In structures with OLE, steel mesh is not to be used. An equivalent GFRP mesh or steel fibres should be used.
10. Testing of sprayed concrete to be in accordance with BS EN 14488-167 and BS EN 14845-142.
11. Fibres for sprayed concrete to be in accordance with BS EN 14889-1.
12. Network Rail model clauses NR/L3/CN/140 sections 80 and 83 apply.

Design Assumptions

None.

Risk Assessment

Refer to Drawing NR/CIV/SD/522.

Rev	Date	Description of revision	Design'd	C'kd
A	22.07.09	FIRST ISSUE	NLJ	PH

Network Rail

Network Rail Infrastructure Ltd, Registered office: Kings Place, 90 York Way, London N1 9AG

Approved	P.Clark	Senior Prog. Engineering Manager	PC	22.07.09
	Name	Position	Signature	Date

Master copy with original signatures held by Network Rail HQ CIVIL ENGINEERING STANDARD DESIGN

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TUNNEL LINING MAINTENANCE REPAIR – STANDARD DRAWINGS

SPRAYED CONCRETE PATCH REPAIRS TO WALLS

Scale	AS SHOWN	
Drawing Number	NR/CIV/SD/540	REV A

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