

Information for users

The following document:

NR/L3/CIV/005/3A
Issue 3

has had changes made to it, most recently, with effect from **23 September 2013**.

Instructions for use

It is essential that you first read and understand each letter of instruction pertaining to the standard before proceeding to use the standard. You must then apply the requirements of each letter to the standard.

NR/BS/LI/305	Issue 1	23 September 2013	Proceed to letter ►
NR/L3/CIV/005/3A	Issue 1	04 December 2010	Proceed to standard ►

For further information, please contact:

IHS Customer Support

Please click [here](#) to proceed to the Network Rail Standards' 'Support Contacts' for their latest contact details.

Reference	NR/L3/CIV/005/3A
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Railway Drainage Systems Manual

Part 3A: Inspection

Reference	NR/L3/CIV/005/3A
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1 Purpose

The purpose of this Part of the Manual is to specify the requirements for inspecting railway Drainage Systems.

2 Scope

This Part of the Manual applies to regular, additional and detailed Inspections.

This Part does not cover:

- the Initial Survey and condition assessment - this is covered in Part **4A**;
- examination of the structure of Culverts, the requirements of which are specified in [NR/L3/CIV/006/3A](#): *Handbook for the examination of Structures: Part 3A: Culverts*.

Guidance on updating records is not within the scope of this Part - it is covered in Part **4B**.

3 Inspection regime

3.1 Purpose

Inspections are undertaken to locate, identify and report on existing or potential problems in a Drainage System to enable an evaluation of the System to be completed.

3.2 Frequency of regular Inspections

A risk-based approach to Inspection shall be adopted.

The Inspection regime for a Drainage System shall be recorded in a DMP.

The Inspection regime should be based on knowledge of locations:

- a) with a history of drainage problems;
- b) known to need regular attention (for example, following heavy rain);
- c) prone to waterlogging or flooding.

The frequency of Inspection depends upon the type of the Drainage System or particular drainage components and so will vary depending upon the nature of the Drainage System and the consequences of its Failure.

If the interval has not been determined from a risk assessment, the maximum interval of Inspection of Track Drainage should be 52 weeks. A reduced

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interval for Inspection of Track Drainage can be required at locations where the track quality is poor.

For Off-track Drainage the interval should be determined following an evaluation of the condition assessment (see Part **4A**). Where an evaluation has not been carried out, the frequency of Inspection may be based on experience.

For new Drainage Systems the frequency of Inspection should be determined at the design stage.

3.3 Timing of regular Inspections

The Inspection regime should vary according to the nature of the Drainage System. For example, Ditches and open Channel Drains can become obstructed by leaf fall, and thus their Inspections should be carried out the end of leaf fall period.

Areas that are prone to flooding and/or where pipes become blocked with silt, should be inspected before and after the flood season (generally October and April) and after storms.

The timing of Inspections shall take account any restrictions as to what can be undertaken in or adjacent to a protected site.

3.4 Content of regular Inspections

An Inspection shall be sufficient to enable the condition and effectiveness of the Drainage System to be evaluated.

An Inspection should identify defects (see Appendix **A**) and include checks that:

- a) the Outfall is clear;
- b) water is flowing freely;
- c) Catchpits are not damaged; part filled with ballast, other debris or silted up.

Additional information such as the presence of defects that require observation should also be recorded.

An Inspection should take into account the possibility of damage to pipes from root penetration.

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Where a Catchpit has been covered with ballast, the covers shall be removed to permit Inspection of the Catchpit.

An Inspection of a Culvert shall include checks on;

- the presence and depth of sediment;
- the integrity and effectiveness of Trash Screens and Security Screens.

An Inspection should identify any development adjacent to Network Rail property that could alter the effectiveness of railway Drainage Systems.

An Inspection should include the water body to which the Drainage System discharges.

3.5 Additional Inspections

Additional Inspections of Drainage Systems can be required from time to time. The scope and details of such inspections should be agreed with the Drainage Engineer.

3.6 Detailed drainage Inspection of Track Drainage

A detailed Inspection of Track Drainage shall be carried out when drainage problems occur.

If the interval has not been determined from a risk assessment, the maximum interval between detailed Inspections should be five years.

The purpose of a detailed Inspection of Track Drainage is to view parts of the system not readily accessible or visible during regular Inspections, and to check for defects (such as partially collapsed pipes and ingress of tree roots) or anomalies (such as buried chambers and changes in pipe size) that might not otherwise be readily apparent in regular Inspections.

The use of methods such as video inspection, trial holes and sampling of filter materials can be necessary. The use of intrusive methods such as CCTV is not mandatory but it can provide evidence of the internal condition of a drain.

3.7 Review

The Inspection regime for a Drainage System should be reviewed following any incident or a substantial change that could affect the System.

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4 Report of Inspections

The date, scope and results of the Inspection, and any proposed and completed Remediation, shall be recorded and used to update the Drainage Asset Register (see Part **4B**).

When conditions outside the railway boundary are observed to affect, or likely to affect the Drainage System, the Drainage Engineer should be advised as soon as practicable so that action might be taken with the relevant Outside Party.

5 Evaluation

The report of an Inspection shall be evaluated to provide recommendations for Maintenance and Remediation.

The recommendations of an evaluation should be recorded in Ellipse.

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Appendix A: Typical warning signs of poor drainage

Track

- recurring top and line faults
- wet patches with weedgrowth
- standing water in the cess
- rapid ballast degradation
- Wet Beds

Photo 1: Wet Beds with weedgrowth



Photo 2: Saturated Track Support System from defective Track Drainage



Photo 3: Wed Beds



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Catchpits

- covers missing
- structural defects
- filled with material
- insufficient depth
- water level above invert
- lack of silt trap
- standing water



Photo 4: Damaged Catchpit with ballast and silt ingress

Culverts and pipes

- structural defects
- silting
- ponding at inlet
- scour and erosion around or behind inlet and outlet
- high debris marks from flooding
- blocked Trash Screen



Photo 5: Silt in Culvert

Earthworks

- recurring Failure
- slope movement, bulging or cracking
- discharge to / from slope surface
- rampant vegetation
- change in vegetation



Photo 7: Failure of an Earthwork

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Ditches

bank erosion and collapse
overgrown vegetation
frequent siltation
changes in gradient
ponding

Photo 8: Erosion to the bank of a Ditch



Photo 9: Vegetation growth in a Ditch



Outfalls

flow differential between inlet / outlet
headwall, apron and cascade defects
scour around or behind headwall/ apron / cascade

Other symptoms

signalling and track circuit problems
electrical plant and distribution problems
slime on underline Bridge abutments
tide marks on ballast
ballast erosion
surface erosion scars
debris marks on posts and fences

Letter of Instruction: NR/BS/LI/305

Issue date: 23rd September 2013

Compliance date: 1st October 2013

Expiry date: 31st December 2013

Contact details: Andy Jones, Professional Head [Track] (07967 668874)

Standards affected:

- NR/L2/TRK/001, Issue 6 - Inspection and Maintenance of Permanent Way
- NR/L2/TRK/2102, Issue 6 - Design and Construction of Track
- NR/L2/TRK/3038, Issue 5 - Longitudinal Timbers: Design- Installation and Maintenance
- NR/L2/TRK/0032, Issue 5 - Joining Of Rails By Aluminothermic Welding
- NR/L2/AIF/02106, Issue 4 - The Provision of Track Category and Traffic Data
- NR/L2/TRK/0132, Issue 6 - Maintenance Arc Welding of Rails, Switches and Crossings
- NR/L3/CIV/005/3A, Issue 1 – Railway Drainage Systems Manual, part 3A: Inspection
- NR/L3/CIV/005/3B, Issue 1 - Railway Drainage Systems Manual, part 3B: Maintenance
- NR/L3/TRK/3230, Issue 2 – Control of On Track Machines

1 Reason for issue

To introduce the Business Critical Rules applicable to the Business Critical Rules Programme National Trial for plain line track, Bow-Ties, Means of Control and role-based manual into the current track standards framework (given in NR/L2/EBM/STP001, Issue 5 and NR/BS/LI/304, Issue 1) for a trial period of three months.

The role-based manuals to be used during the trial period contain Business Critical Rules, Bow-Ties and Means of Control which have been based on the existing technical requirements for managing plain line track as found in NR/L2/TRK/001, Issue 6 and the other technical standards listed above.

The purpose of the National Trial is to test the new approach to the provision of requirements and guidance information needed to operate and maintain a safe and efficient plain line track system.

2 Scope

The trial covers role-based manuals for the roles listed:

- Route Asset Manager [Track]
- Track Maintenance Engineer
- Rail Management Engineer
- Section Manager [Track]

The scope of the National Trial for plain line track includes:

Applicable assets

1. Plain line track
 - a. Running lines and sidings

Assets excluded:

- a. Closed lines
- b. Off-track assets (e.g. fencing, vegetation, access points, safe cress and walkways)
- c. Level crossing surface system
- d. Buffer stops
- e. Conductor rail equipment (except arc damage risk to Plain Line Track asset)

Risks covered include:

1. Broken rail
2. Track geometry faults
3. Track buckles

Risks excluded are:

1. Derailment due to flange climb
2. Derailment caused by:
 - a. structural clearances
 - b. passing clearances
3. Derailment caused by obstruction of the track (e.g. cutting slope failure, vandalism, cow on line, tree on line)
4. Risks to people who are not travelling on trains
5. Guard rails on structures

3 Changes

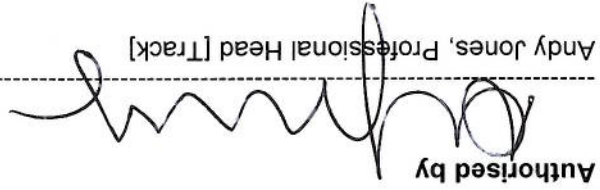
All clauses from standards relevant to the National Trial are listed in the disposition information in Appendix 2.

The disposition information indicates the clauses that are considered relevant for the purposes of this trial. These clauses are contained in the *Plain Line Track Reference Module*.

Use of the role-based manuals during the trial will provide an alternative approach to the current standards.

Authorisation of Standard Owner

Authorised by


Andy Jones, Professional Head [Track]

**Authorisation of appropriate
Delivery Function authority**

Authorised by


Mark Enright, Director, Maintenance Services

4 Recipients

Name	Post
David Webb	RAM[T] RLNW
Keith Vernon	RAM[T] RLNW
Michele Mullen	RAM[T] RSCO
Nigel Wilson	RAM[T] REAN
Colum Cavanagh	RAM[T] RSUS
Philip Jeyes	RAM[T] RKNT
Andrew Franklin	RAM[T] RWAL
Stephen Pearson	RAM[T] RWES
Peter Cushing	RAM[T] RLNE
Roger Griffiths	RAM[T] RLNE
Maria Seco	RAM[T] AWEX

5 Details of briefing or cascade communication process

The Route Asset Manager [Track] shall brief Track Maintenance Engineers, Rail Management Engineers and Section Managers [Track] in their Route.

The Director, Route Asset Management shall arrange a brief for Infrastructure Maintenance Delivery Managers and Infrastructure Maintenance Engineers in their Route.

Appendix 1

Business Critical Rules for the Business Critical Rules National Plain Line Track Trial

3.0 Asset Management	
3.2 Inspection, Maintenance and Disposal	
Objective: Work is planned and delivered to a high standard in a controlled way	
Risk: There is a significant risk to the operation of trains and to the sustainability of the assets if work is not planned and controlled to a consistently high standard	
3.2.1	NEVER operate an asset if it is currently outside the critical limits.
3.2.2	ALWAYS inspect assets at a frequency appropriate to the level of risk.
3.2.3	ALWAYS record any identified faults or defects beyond baseline limits.
3.2.4	ALWAYS assess the risk that a detected fault or defect may pose to the safe operation of trains.
3.2.5	ALWAYS take preventative or remedial action where a defect or detected fault is likely to result in an exceedance of a critical limit before the next planned inspection.
3.2.6	ALWAYS plan to take preventative or remedial action where a defect or detected fault may pose a risk to the future safe operation of trains.
3.2.7	ALWAYS manage any risks until critical corrective actions have been completed.
3.2.8	ALWAYS plan preventative maintenance proportionate to the level of risk of the asset.
3.2.9	ALWAYS maintain the approved asset registers. ALWAYS record all specified information about assets in the approved systems.
3.2.10	ALWAYS use equipment that is approved and where necessary calibrated to inspect and maintain the asset.