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| Ref:             | NR/L2/SIG/10028  |
| Issue:           | 7                |
| Date:            | 05 December 2015 |
| Compliance date: | 05 March 2016    |

## Level 2

# Supervisory Inspection of Signalling Assets

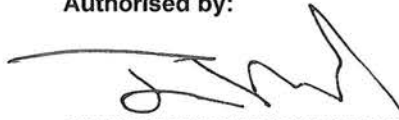
### Endorsement and Authorisation

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Accepted for issue by:



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## User information

This Network Rail standard contains colour-coding according to the following Red–Amber–Green classification.

### **Red requirements – no variations permitted**

- Red requirements are to be complied with and achieved at all times.
- Red requirements are presented in a red box.
- Red requirements are monitored for compliance.
- Non-compliances will be investigated and corrective actions enforced.

### **Amber requirements – variations permitted subject to approved risk analysis and mitigation**

- Amber requirements are to be complied with unless an approved variation is in place.
- Amber requirements are presented with an amber sidebar.
- Amber requirements are monitored for compliance.
- Variations can only be approved through the national non-compliance process.
- Non-approved variations will be investigated and corrective actions enforced.

### **Green guidance – to be used unless alternative solutions are followed**

- Guidance should be followed unless an alternative solution produces a better result.
- Guidance is presented with a dotted green sidebar.
- Guidance is not monitored for compliance.
- Alternative solutions should be documented to demonstrate effective control.

## Amendment marks

- First document amendments are presented with a single black line to the right of the affected text.
- Second document amendments are presented with a double black line to the right of the affected text.

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## Issue record

| Issue | Date          | Comments                                                                              |
|-------|---------------|---------------------------------------------------------------------------------------|
| E3    | April 2004    | Rapid Response issue – to take account of the transfer in of maintenance activities   |
| 4     | June 2008     | Reissued to reflect Phase 2A/Engineering reorganisation responsibility change         |
| 5     | June 2010     | Updated to include additional point system checks                                     |
| 6     | Sept 2011     | Maintenance of document, no change to requirements<br>(CCMS document number 61364850) |
| 7     | December 2015 | Amended content to reflect devolution and align with business critical rules          |

## Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 03 March 2016.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

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## 1 Purpose

The business process for inspection of signalling assets:

- provides assurance that assets are being maintained to the correct standard
- verifies the asset condition is as expected for the current maintenance regime and the age of installation
- provides verification of ellipse data against the asset information specification for a sample the assets inspected.

Failure to follow this process could result in a reduction in safety and reliability.

## 2 Scope

The business process is limited to the planning, implementation and review of signalling supervisory asset inspections.

It applies to inspection of signalling assets under the control of the Signal and Telecoms Maintenance Engineer (S&TME).

This process does not cover SICA inspections or Engineering Verifications which are detailed as part of other business processes.

## 3 Terms and abbreviations

3.1.1 Terms and abbreviations used in this document are described in the tables below.

| Term       | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inspection | A visual examination, including measurements and tests of signalling assets.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Site       | <p>The 'site' concept is shown on the diagram in Appendix A. It illustrates a logical grouping of equipment that constitutes a cluster of assets. Examples of 'sites' are as follows:</p> <ul style="list-style-type: none"> <li>• A signal box or control centre</li> <li>• A relay room or REB installation</li> <li>• A level crossing installation</li> <li>• A junction area or ground frame</li> <li>• A plain line area (for example, an auto-section, a plain line with axle counters and treadles).</li> </ul> |

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| Term                    | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sample                  | A selection of the main assets which fall within an inspection site. This should include assets such as, signals, train detection systems, train protection systems, equipment housings, point operating equipment, and level crossing equipment.<br><br>One or two signals, axle counters or location cases may be suitable if the area is in good condition and relatively new; however, it will be necessary to inspect a larger number of assets if the site is in poor condition. |
| Reliability Improvement | Works that mainly drives an improvement in performance and is not driven by asset life or condition                                                                                                                                                                                                                                                                                                                                                                                    |

**Table 1 – Terms**

| Abbreviation | Description                              |
|--------------|------------------------------------------|
| FBC          | flange back contact                      |
| FPL          | facing point lock                        |
| RAM[S]       | Route Asset Manager [Signalling]         |
| SM[S]        | Section Manager [Signals]                |
| S&C          | Switches and Crossings                   |
| S&TME        | Signal and Telecoms Maintenance Engineer |

**Table 1 – Abbreviations**

## 4 Responsibilities and accountabilities

4.1.1 The responsible, accountable, consulted and informed (RACI) roles for this business process are listed in the table below.

| Process task | Resources                                |                                  |                           |                 |
|--------------|------------------------------------------|----------------------------------|---------------------------|-----------------|
|              | Signal and Telecoms Maintenance Engineer | Route Asset Manager [Signalling] | Section Manager [Signals] | Section Planner |
| 5.1          | R,A                                      |                                  | C                         |                 |
| 5.2          |                                          | R,A                              |                           |                 |
| 5.3          | A                                        |                                  |                           | R               |

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| Process task | Resources                                |                                  |                           |                 |
|--------------|------------------------------------------|----------------------------------|---------------------------|-----------------|
|              | Signal and Telecoms Maintenance Engineer | Route Asset Manager [Signalling] | Section Manager [Signals] | Section Planner |
| 5.4          | R,A                                      |                                  | R                         |                 |
| 5.5          | R,A                                      |                                  | R                         |                 |
| 5.6          | R,A                                      |                                  |                           |                 |
| 5.7          | A                                        |                                  |                           | R               |
| 5.8.1        | R,A                                      |                                  |                           |                 |
| 5.8.2        | R                                        | R,A                              |                           |                 |

**Table 1 – RACI matrix**

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## 5 Procedure

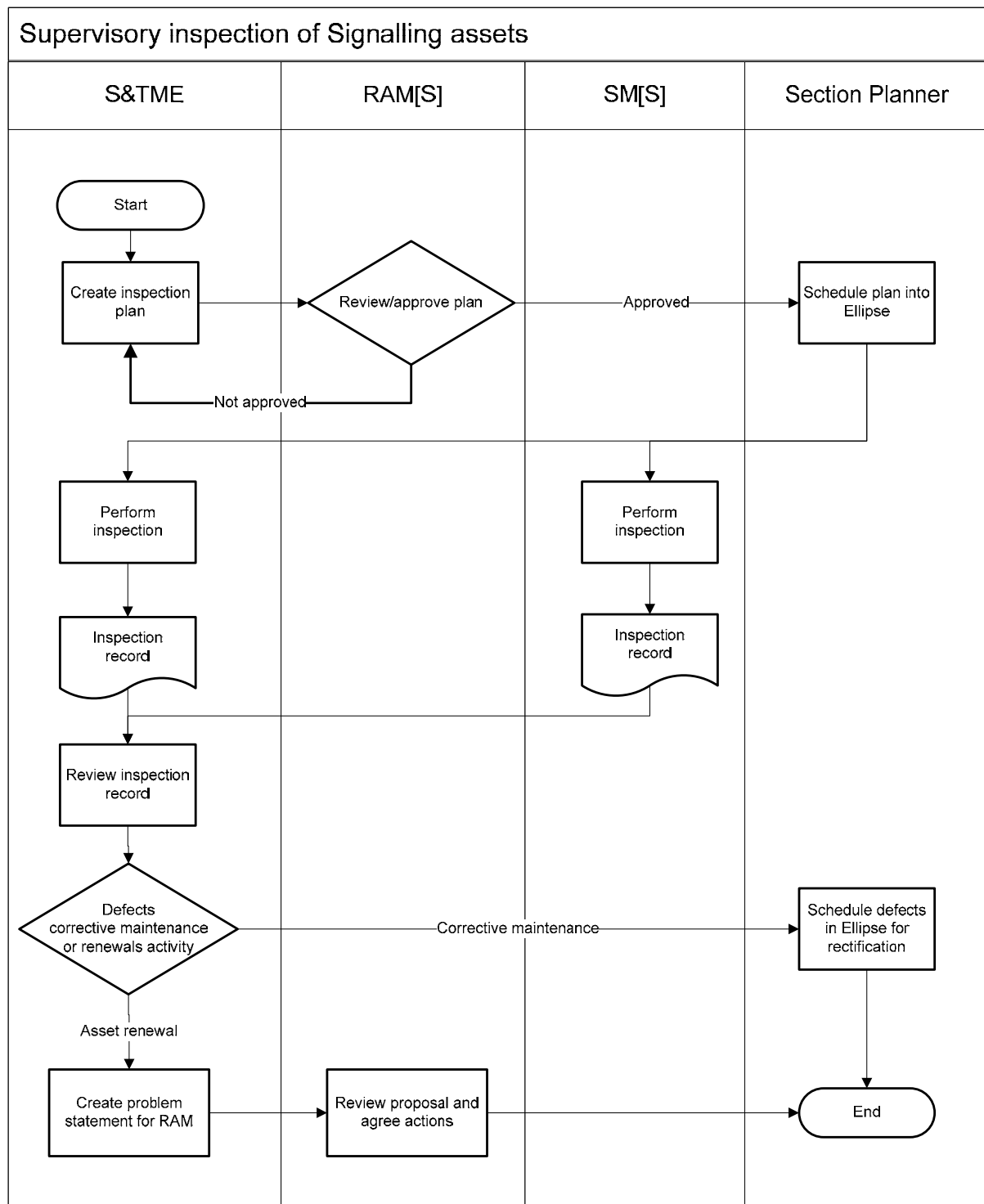


Figure 1 – Process flow for supervisory inspection

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## 5.1 Create inspection plan

### 5.1.1 The S&TME shall;

- Establish the number and extent of each site to include all assets under their control
- produce a plan to inspect every site once every 5 years

### 5.1.2 The inspection plan shall consider the following factors;

- the age of the installation
- safety risk associated with the equipment
- reliability risk associated with the equipment
- the frequency of use of the equipment
- the condition of equipment
- the level and experience of staff working on the equipment, and the quality of maintenance found in the area

### 5.1.3 The plan should include inspections by the S&TME and the SM[S] along with joint inspections. These should be detailed on the plan.

### 5.1.4 Sites which present a greater business risk should be inspected more frequently. These include critical junctions; high risk level crossings; assets which are over 20 years old.

### 5.1.5 An example of a template which may be used to document the plan is in Appendix B.

## 5.2 Approve plan

### 5.2.1 The RAM[S] shall;

- review and approve the plan
- consider the factors detailed in Section 5.1, paying particular attention to the size of the areas defined before approving the inspection plan

### 5.2.2 The RAM[S] should make arrangements to attend a proportion of inspections.

## 5.3 Schedule plan

### 5.3.1 The Section Planner shall;

- create assets in Ellipse for each of the sites defined in the plan
- Schedule work orders for each asset inspection against each site in Ellipse.

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## 5.4 Perform inspection

- 5.4.1 The inspection shall include a representative sample of the assets within the site based on risk.
- 5.4.2 Where the site contains S&C, the inspection should include checks such as FBC and FPL tests on at least one point end.
- 5.4.3 Review the quality and effectiveness of maintenance/renewal activities completed on the assets.
- 5.4.4 The inspection should include a sample verification of assets on site against Ellipse data and the asset information specification associated with the asset type.
- 5.4.5 Appendix D contains a series of checklists which may be used to assist with inspections.

## 5.5 Inspection record

- 5.5.1 The inspection record shall include;
  - the date of inspection
  - the name of the site
  - who inspected the site
  - which assets were inspected
  - which assets were verified against ellipse
  - any defects identified
  - the work orders and associated priority of the defects identified
  - any issues identified with the quality and effectiveness of current maintenance processes
- 5.5.2 Appendix C contains an example of a form which may be used to record the asset inspection.

## 5.6 Review output of inspections

- 5.6.1 The S&TME shall review all inspection records;
  - to confirm sufficient assets have been inspected
  - defects are being identified as expected and prioritised accordingly
  - to understand any issues that are being identified with the quality and effectiveness of current maintenance regime

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## 5.7 Schedule defects in Ellipse

5.7.1 Record all new defects in Ellipse and schedule with the appropriate priority.

5.7.2 Check any existing defects and modify priorities where required.

## 5.8 Create problem statement for RAM[S]

5.8.1 The S&TME shall identify longer term actions where work required is considered beyond reasonable maintenance or reliability improvement opportunities, and submit these to the RAM[S].

5.8.2 The RAM[S] shall review the problem statement and agree a course of action.

5.8.3 Reasonable opportunity should be considered when identifying and agreeing improvement works.

5.8.4 At regular intervals, the S&TME and RAM[S] should review existing minor renewal plans, and update with any changes which may be required due to inspection findings.

## 6 Additional information

### 6.1 Delegation

6.1.1 For the purposes of this process, the roles of the S&TME and SM[S] may be delegated.

6.1.2 A list of delegated authorities shall form part of the inspection plan that is approved by the RAM[S].

6.1.3 The RAM[S] may delegate the duties in this process; however, the RAM[S] is still accountable for the approval of the plan.

## 7 Records

7.1.1 A copy of the inspection record shall be retained by the S&TME and/or SM[S].

7.1.2 The report shall be retained in accordance with Network Rail's corporate records policy.

## 8 Means of assurance

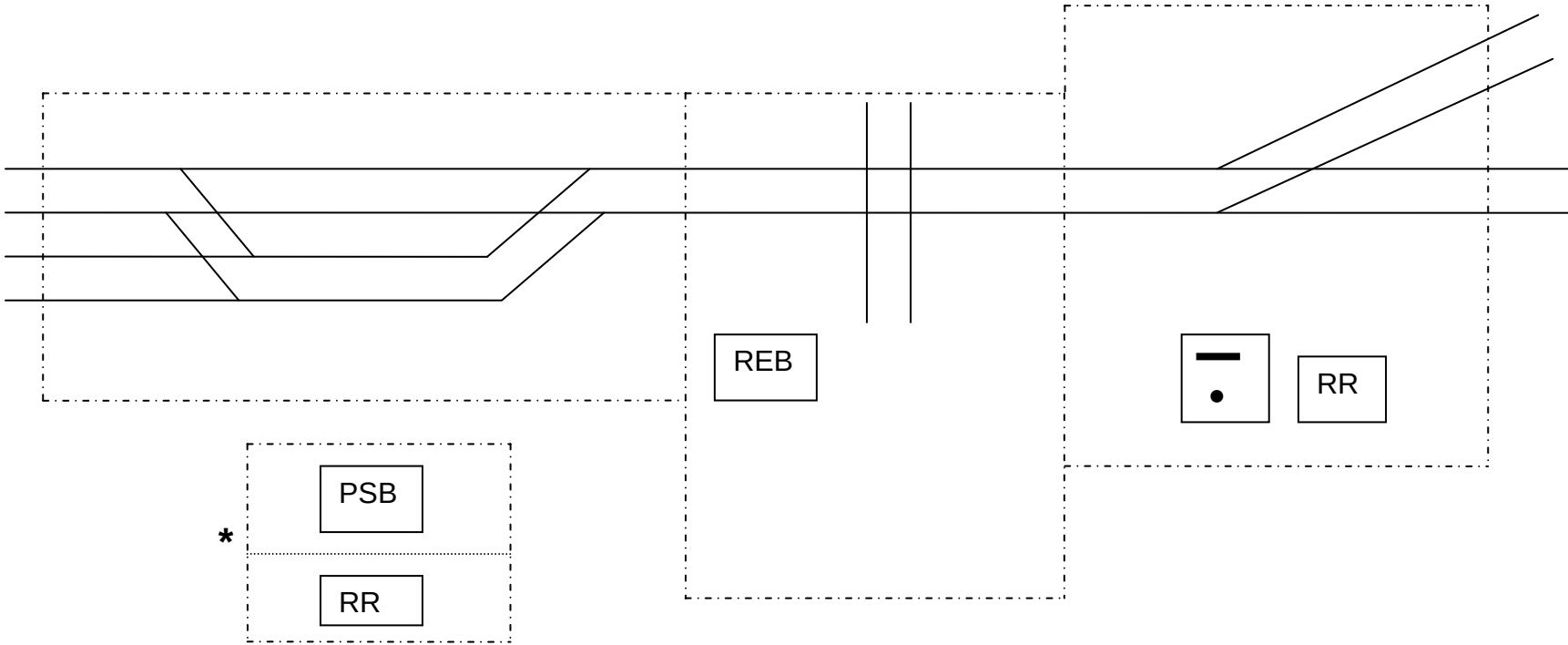
8.1.1 The S&TME and SM[S] shall review progress against the plan at 12 weekly intervals.

8.1.2 The RAM[S] shall review the plan with the S&TME annually.

8.1.3 This process is subject to audit via the Functional Audit Programme and reviewed during Engineering Verification.

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## Appendix A - Inspection site concept



Each grouping of equipment within the hatched line boxes above should be considered as a single site.

\* Where a control centre or relay room is involved, these may be considered as several sites.

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## Appendix B - Inspection plan template (example)

### Example of site definition

| Ref. | Site Name                                    | Section Manager Area | Ellipse Asset ID | Site Category | ELR  | From     | To       | Notes                                 | Equipment Types                  |
|------|----------------------------------------------|----------------------|------------------|---------------|------|----------|----------|---------------------------------------|----------------------------------|
| 1    | Great Bridgeford SSM Boundary - Doxey        | Stafford             | 4859012          | Auto          | LEC4 | 137m00ch | 134m00ch | SSM Boundary Including Doxey Junction | Signals , Location Cases         |
| 2    | Doxey - Stafford Station North               | Stafford             | 4859013          | Jct           | LEC4 | 134m00ch | 133m43ch | Excluding Doxey Junction              | Signals, Points , Location Cases |
| 3    | Stafford Station - Wolverhampton Road Bridge | Stafford             | 4859014          | Jct/Stn       | LEC3 | 133m43ch | 133m00ch |                                       | Signals, Points , Location Cases |
| 4    | TV Junction & SD1 RR                         | Stafford             | 4859015          | Jct/RR        | LEC3 | 133m04ch | 28m00ch  | All Points Around TV Junction         | Signals, Points , Location Cases |
| 5    | Stafford No 1 relay Room - Penkridge         | Stafford             | 4859016          | Auto          | RBS3 | 28m45ch  | 23m00ch  | Penkridge boundary to SD1             | Signals , Location Cases         |
| 6    | Wolverhampton Road Bridge - Whitehouse       | Stafford             | 4859017          | Auto          | LEC3 | 133m00ch | 131m00ch | Including Whitehouse Junction         | Signals, Points , Location Cases |
| 7    | Whitehouse - Shugborough Tunnel North        | Stafford             | 4859019          | Jct           | LEC3 | 131m00ch | 129m00ch | Including Milford Junction            | Signals, Points , Location Cases |

### Extract of a typical inspection plan

|                      |                                              | S&TME INSPECTION PLAN(2014-2016) |                                                      |    |    |    |    |    |    |    |                        |     |     |     |              |                                                       |                   |    |    |    |    |    |    |     |     |     |  |  |
|----------------------|----------------------------------------------|----------------------------------|------------------------------------------------------|----|----|----|----|----|----|----|------------------------|-----|-----|-----|--------------|-------------------------------------------------------|-------------------|----|----|----|----|----|----|-----|-----|-----|-------------------------------------------------------------------------------------|--|
|                      |                                              | 2014 to 2015                     |                                                      |    |    |    |    |    |    |    |                        |     |     |     | 2015 to 2016 |                                                       |                   |    |    |    |    |    |    |     |     |     |                                                                                     |  |
| Inspection Reference | Site Name                                    | P1                               | P2                                                   | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10                    | P11 | P12 | P13 | P1           | P2                                                    | P3                | P4 | P5 | P6 | P7 | P8 | P9 | P10 | P11 | P12 | P13                                                                                 |  |
| 1                    | Great Bridgeford SSM Boundary - Doxey        | P(a)                             |                                                      |    |    |    |    |    |    |    |                        |     |     |     |              |                                                       |                   |    |    |    |    |    |    |     |     |     |                                                                                     |  |
| 2                    | Doxey - Stafford Station North               |                                  |                                                      | P  |    |    |    |    |    |    |                        |     |     |     |              | P(Ra)                                                 |                   |    |    |    |    |    |    |     |     |     |                                                                                     |  |
| 3                    | Stafford Station - Wolverhampton Road Bridge |                                  |                                                      |    |    | P  |    |    |    |    |                        |     |     |     |              |                                                       |                   |    | P  |    |    |    |    |     |     |     |                                                                                     |  |
| 4                    | TV Junction & SD1RR                          |                                  |                                                      |    |    |    |    | P  |    |    |                        |     |     |     |              |                                                       |                   |    |    |    |    | P  |    |     |     |     |                                                                                     |  |
| 5                    | Stafford No 1 relay Room - Penkridge         |                                  |                                                      |    |    |    |    |    |    |    |                        |     |     |     |              |                                                       |                   |    |    |    |    |    |    | P   |     |     |                                                                                     |  |
| 6                    | Wolverhampton Road Bridge - Whitehouse       |                                  |                                                      |    |    |    |    |    |    |    |                        | P   |     |     |              |                                                       |                   |    |    |    |    |    |    |     |     |     |                                                                                     |  |
| 7                    | Whitehouse - Shugborough Tunnel North        |                                  |                                                      |    |    |    |    |    |    |    |                        |     |     | P   |              |                                                       |                   |    |    |    |    |    |    |     |     |     | P(a)                                                                                |  |
|                      | KEY                                          | P                                | Planned SSM (or Equivalent) Inspection               |    |    |    |    |    |    |    |                        |     |     |     | P(Ra)        | Planned RAM (or Equivalent) Inspection accompanied    |                   |    |    |    |    |    |    |     |     |     |                                                                                     |  |
|                      |                                              | P(a)                             | Planned S&TME (or Equivalent) Inspection accompanied |    |    |    |    |    |    |    |                        |     |     |     | A            | Additional SSM (or Equivalent) Unplanned Inspection   |                   |    |    |    |    |    |    |     |     |     |                                                                                     |  |
|                      |                                              | P                                | Planned S&TME ASTME or Tech support Inspection       |    |    |    |    |    |    |    |                        |     |     |     | A            | Additional S&TME (or Equivalent) Unplanned Inspection |                   |    |    |    |    |    |    |     |     |     |                                                                                     |  |
|                      |                                              |                                  | Completed Inspection                                 |    |    |    |    |    |    | R  | Rescheduled Inspection |     |     |     |              |                                                       | Missed Inspection |    |    |    |    |    |    |     |     |     |                                                                                     |  |

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## Appendix C – Asset inspection record

|                                                                                                                |  |                           |                          |
|----------------------------------------------------------------------------------------------------------------|--|---------------------------|--------------------------|
| <b>Site name</b>                                                                                               |  | <b>Inspected by</b>       |                          |
| <b>Work order number</b>                                                                                       |  | <b>Date of inspection</b> |                          |
| List all equipment inspected (e.g., train detection, level crossings, equipment housings, point numbers, etc.) |  |                           |                          |
| <b>Defect identified and overall site condition</b>                                                            |  | <b>Priority</b>           | <b>Work order number</b> |
|                                                                                                                |  |                           |                          |

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## Appendix D Signal Equipment Checklists

These signal checklists have been made available for reference. Use of these is not mandatory but may be useful as a guide.

|     |                                                                                                                                                                                               |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A1  | Point Machine Layout                                                                                                                                                                          |
| A2  | Rail Clamp Point Locks                                                                                                                                                                        |
| A3  | Mechanical Points                                                                                                                                                                             |
| A4  | Colour Light Signals                                                                                                                                                                          |
| A5  | Semaphore Signals                                                                                                                                                                             |
| A6  | Train Detection <ul style="list-style-type: none"> <li>Track Circuits</li> <li>Axle counters</li> <li>TCAID</li> <li>Silec Treadle</li> <li>Freddy Treadle</li> <li>Impedance Bond</li> </ul> |
| A7  | Equipment Housings <ul style="list-style-type: none"> <li>Trackside Apparatus Case</li> <li>REB</li> <li>WILH</li> <li>Relay Room</li> </ul>                                                  |
| A8  | Level Crossings                                                                                                                                                                               |
| A9  | Train Protection <ul style="list-style-type: none"> <li>AWS</li> <li>TPWS</li> <li>Train Stop</li> <li>Tripcock Tester</li> <li>ATP</li> </ul>                                                |
| A10 | Signal Box Under Portion                                                                                                                                                                      |
| A11 | Signal Box / Control centre Operating Floor                                                                                                                                                   |
| A12 | Rodding Run / Signal wire Run / Cable Route / Air Main System                                                                                                                                 |
| A13 | Miscellaneous Equipment <ul style="list-style-type: none"> <li>On Track Equipment</li> <li>Electronic Equipment</li> <li>Operational Telephones</li> </ul>                                    |

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## A1: Point Machines

| Elements & Activity                  |                                                                                                                                 |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Track Items                          |                                                                                                                                 |
| 1                                    | Is the area around the points adequately free from debris, fire risks, and scrap material (Operational and Occupational Risks)? |
| 2                                    | Are the switches and stock rail in acceptable condition (chipping and lipping)?                                                 |
| 3                                    | Are the rail fastenings in place and secure?                                                                                    |
| 4                                    | Are the rail base plates secure?                                                                                                |
| 5                                    | Are the stock rail bolts securely in place?                                                                                     |
| 6                                    | Are the switch rollers secure and effective?                                                                                    |
| 7                                    | Are the slide chairs lubricated / clean with even wear?                                                                         |
| 8                                    | Are the sleepers in reasonable condition?                                                                                       |
| 9                                    | Is track bed in a reasonable state?                                                                                             |
| 10                                   | Is temporary packing (if fitted) within specification?                                                                          |
| Point Machines (Internal)            |                                                                                                                                 |
| 11                                   | Are all the cable glands intact and effective?                                                                                  |
| 12                                   | Are the internal wires undamaged, free from degradation, and securely terminated?                                               |
| 13                                   | Are all terminals free from damage and has protection been applied                                                              |
| 14                                   | Are the motor and detection contacts in good condition, (i.e. no signs of excessive wear arcing or contamination)?              |
| 15                                   | Are the drainage holes clear and is machine free from water?                                                                    |
| 16                                   | Are the mechanical parts adequately lubricated?                                                                                 |
| 17                                   | Is the level of cleanliness adequate?                                                                                           |
| 18                                   | Are the internal heaters working?                                                                                               |
| Point Machines (External & Fittings) |                                                                                                                                 |
| 19                                   | Is the machine secure (check holding down bolts)?                                                                               |
| 20                                   | Are all the covers intact and free from damage?                                                                                 |
| 21                                   | Is the machine casting free from cracks?                                                                                        |
| 22                                   | Is the point drive square and free from excessive wear?                                                                         |
| 23                                   | Are the lock and detection rods free from damage and secure?                                                                    |
| 24                                   | Are the extension pieces undamaged and secure?                                                                                  |
| 25                                   | Has adequate lubrication been applied?                                                                                          |
| 26                                   | Is the level of cleanliness adequate?                                                                                           |