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SwP015/15

Barton Lane AHB

Non-Removal of 10 Second Axle Counter Delay Timer



Background

- The scope of Nottingham Station Area Re-signalling (NSAR) project was to renew the life expired signalling equipment in the Trent PSB, and transfer control to East Midlands Control Centre(EMCC). NSAR has fringes to several areas, including Attenborough SSI.
- Barton Lane AHBC was already controlled by Attenborough SSI, which became a fringe to the new NSAR's Smartlock interlocking (Beeston Virtual Interlocking - VIXL) on the Nottingham Main lines.
- The incident was first reported on 13th January 2014, but the section was commissioned on 22nd July 2013.

Incident

- A situation occurred at Barton Lane AHB level crossing when a train arrived at the crossing less than 27 seconds after the amber lights of the crossing's road traffic light signals were initially illuminated.
- Whilst the crossing was still closed before the train arrived at the crossing, the correct time sequence had not been achieved.

Strike in arrangements

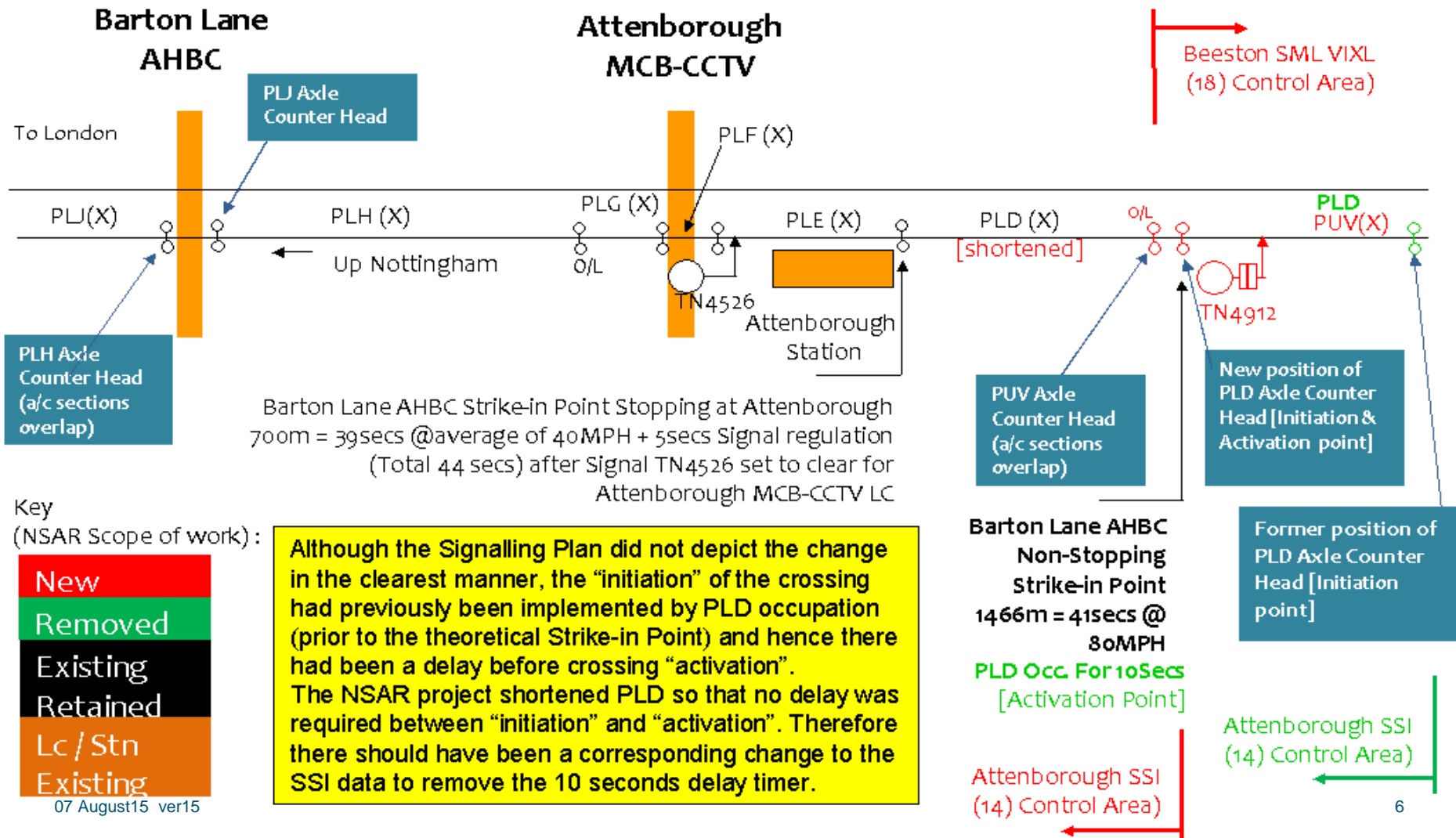
- The existing Barton Lane AHBC Strike-In functionality was provided by axle counter inputs and SSI data constructs, and **not** by relays locally.
- Under the NSAR project, 'PLD' Axle counter detection head was re-positioned closer to Barton Lane AHBC; previously it was further away from the crossing than the theoretical Strike-In Point.
- Following that move. the crossing “non-stopping” activation should therefore have commenced as soon as the track section 'PLD' became occupied (initiation).
- The Scheme Plan showed the position of the Strike-In in 'Black', albeit with some 'Green' text relating to the previous time delay. Hence it did depict the required alteration, but in a manner which was not particularly clear or obvious.

Cause

- Re-positioning 'PLD' axle counter detector head caused 'PLD' track section to be shortened. An existing 10 second timer in the Attenborough SSI previously required to inhibit the crossing until the actual SIP had been reached was no longer required, but that timer was **not** removed from the SSI data constructs.

Refer to Figure 1 for details of the signalling layout

Site configuration – Figure 1



Lessons Learnt

- **LL1** - Project delivery documentation did not specify a full and complete scope of work at the fringes; level crossings outside of the geographic limits of the re-signalling area were not included in the majority of the GRIP Stage 5 specifications, despite having been identified at GRIP Stage 4.
- **LL2** - 'Out of Sequence' working practices were applied without fully understanding all of the risks; initial production check & 'Set to Work' of the SSI data had been carried out using 'draft' (unchecked) copies of Control Tables and not revisited when these were subsequently amended and issued.
- **LL3** - SSI data checking & testing processes did not identify the continued existence of the now redundant data; the data checking process must always apply signalling processes.
- **LL4** - Principles testers made an incorrect assumption about the operation of the level crossing, not realising that the AHBC initiation was carried out in SSI data (an approach which is currently **not** to be implemented).

Actions taken – Recommendations (1)

- The scope of the Project's fringe interfaces between the new and existing signalling to be fully understood and appreciated before commencing detailed design and testing activities. {Refer to **LL1**}
 - Project Design Review process to focus on permanent and temporary fringes,
 - Design Managers and Testing Managers to ensure staff are aware of fringe interface requirements.
- CEMs shall be reminded that they are accountable for all design and / or construction as applicable to the specified works; specifically its ability to **integrate with all other design**, construction and existing infrastructure, and its compliance with all applicable standards, legislation, Contract requirements and specifications. {Refer to **LL1**}
- Design Managers to control and review all signalling related 'out of sequence' working and to ensure that all risks are comprehensively assessed in instances where non-sequential working is absolutely necessary. {Refer to **LL2**}
- Where Signalling Scheme Plans designs identify changes to existing layouts using red and green colouring techniques, the change should be depicted as a complete removal of the control in 'Green' and the revised control shown fully in 'Red'. This shall ensure requirements are clearly specified on the plans. {Refer to **LL3**}

Actions taken – Recommendations (2)

- Suppliers and Network Rail design offices to develop data checking courses / learning pathways. The intent is to advise data checkers about the most appropriate and effective data checking techniques. {Refer to **LL3**}
- Designers shall ensure that where controls are shown to be recovered in green on control tables, the testers attention is drawn to the alteration (which might not otherwise be apparent) on the equivalent red sheet by the application of special colouring e.g. boxing or underlining as detailed in T1148, to the remaining controls associated with that function which have not changed but are 'rearranged'. {Refer to **LL3**}
- Testers shall always raise a test log when a technical issue / query / problem has been identified. The testing process must **not** rely on e-mails and / or verbal communication to close-out any tester raised question. {Refer to **LL4**}
- Testing Managers to develop a process to cope with the removal of controls when they are specified on a Control Table's 'Green' sheet when the 'Two Sheet' colouring method is applied during principles testing. {Refer to **LL3**}
- Testing Managers to define a Principles Tester's limits of responsibility when multiple testers are involved in the testing of a single interlocking, for example when LC principles testing and signalling principles testing is carried out by different personnel. {Refer to **LL3**}

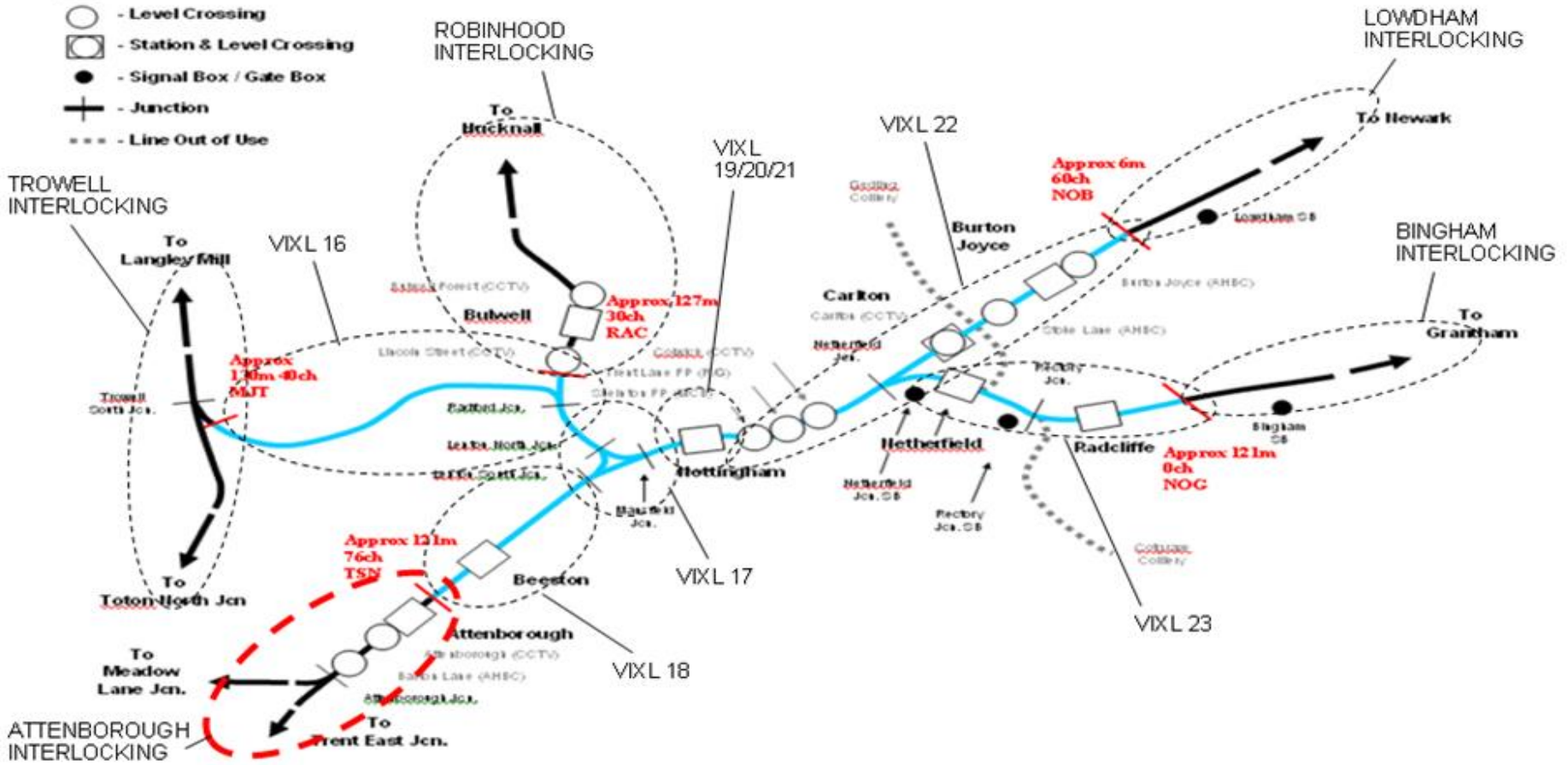
Additional Information (1)

- The following slides provide a selection of ‘technical’ design details which were referenced during SSL’s Incident Investigation. This information is the form of extracts taken from the source document covering the following:
 - Area of the work,
 - Signalling Scheme Plans,
 - Control Tables (Red and Green Sheets),
 - SSI data.

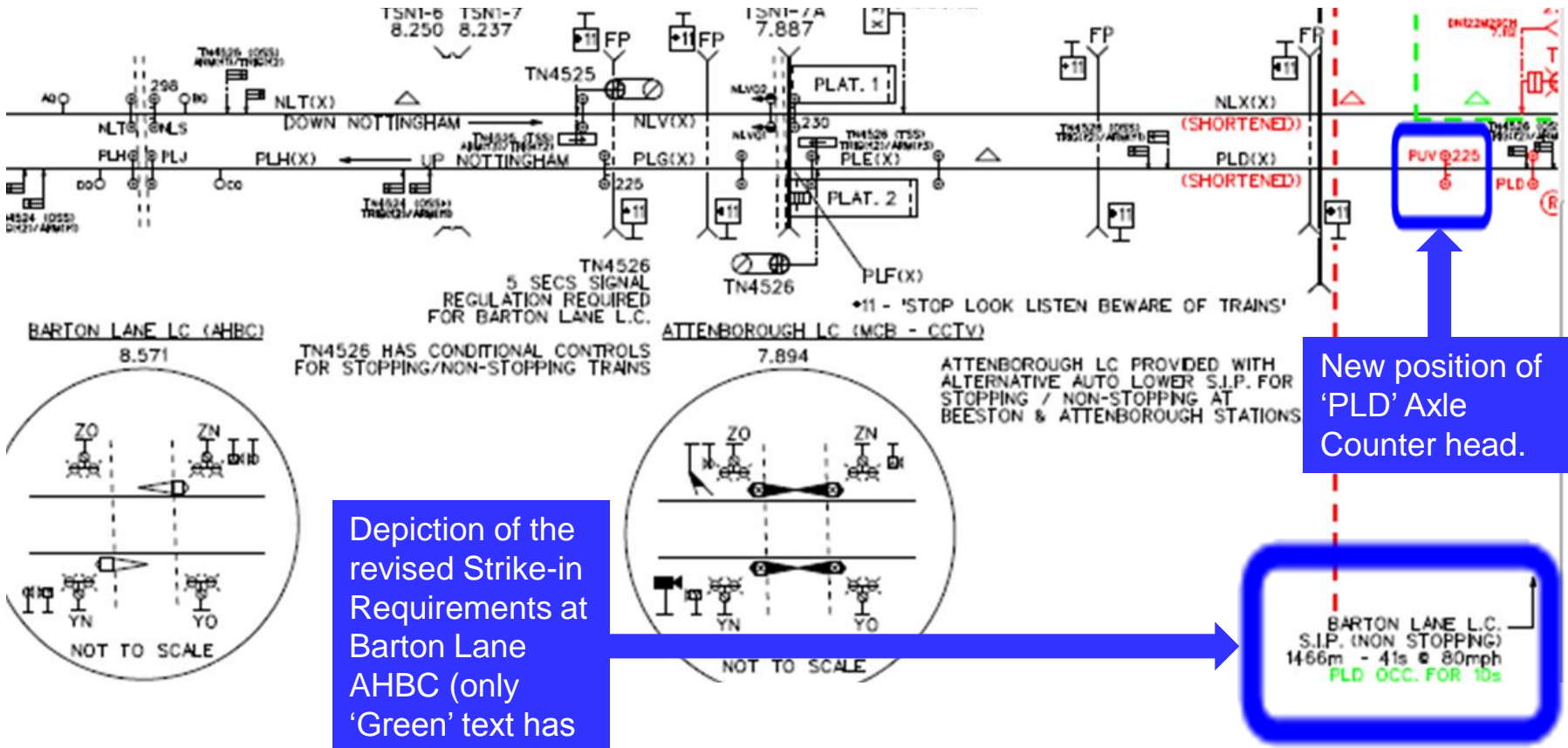
Additional Information (2) – Layout Details

Key:

- - EMSR Nottingham Station Area (Part 3)
- - Station
- - Level Crossing
- ◻ - Station & Level Crossing
- - Signal Box / Gate Box
- ⊕ - Junction
- - Line Out of Use



Additional Information (3) – Scheme Plan Layout



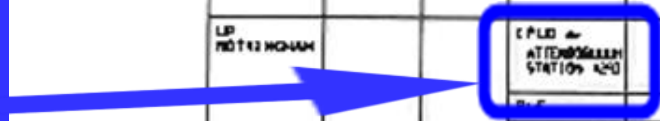
Depiction of the revised Strike-in Requirements at Barton Lane AHBC (only 'Green' text has been applied).

New position of 'PLD' Axle Counter head.

Additional Information (4) – ‘Red’ Control Table

The amendment to Barton Lane AHBC Controls was specified on both the scheme plan and the first version of signed off Attenborough Control Tables.

‘Red’ Sheet uses black text to denote the removal of the 10 seconds ‘PLD’ timer, i.e. neither red text nor a red box has been provided



Line/ Direction	WARNING SEQUENCE						
	Maintained Unless		Initiated after 10 Secs or Maintained Unless			Initiated Maintenance	
	Track Circuits Clear	Treadle not Operated	Track Circuits Clear	Treadle not Operated	Plunger not Operated	Track Circuits Clear	Track not Operated
DOWN NOTTINGHAM			MLM				
			MLJ				
			MLM				
			MLP MLR				
						MLS	
UP NOTTINGHAM			PLD on ATTENBOROUGH STATION 420				
						PLR PLC PLH	
DOWN NOTTINGHAM RELEASE DIRECTION			MLY MLT	MLY02 MLY02			
UP NOTTINGHAM DOWN ATTENBOROUGH CURVE REVERSE DIRECTION			PLM PLK PLJ	PLM01 PLM02 PLM03 PLM04			
UP ATTENBOROUGH CLAYE			PLM1 PLM2 PLM3 PLM4				

Additional Information (5) – ‘Green’ Control Table

‘Green’ Sheet shows the removal of the 10 seconds ‘PLD’ timer. Principles testers concentrated on the associated ‘red’ sheet and took little cognisance of the green Control Tables which were in a separate book.

Line/ Direction	WARNING SEQUENCE						
	Maintained Unless		Initiated after 10 Secs or Maintained Unless			Initiate Maintain	
	Track Circuits Clear	Treads not Operated	Track Circuits Clear	Treads not Operated	Punger not Operated	Track Circuits Clear	Tr Ope
DOWN NOTTINGHAM			NLH				
			NLJ				
			NLH				
			NLR NLR				
					NLE		
UP NOTTINGHAM			PLD PLD PLD ATTENBOROUGH ATTENBOROUGH				
			PLB				
					PLC PLH		
DOWN NOTTINGHAM REVERSE DIRECTION			NLY NLR	NLYG1 NLYG2			
UP NOTTINGHAM DOWN ATTENBOROUGH CURVE REVERSE DIRECTION			PLH PLJ PLJ	PLH01 PLH02 PLH03 PLH04			<div style="border: 1px solid red; padding: 2px;"> APPROVED PRODUCTS CHECKED DATE OF ISSUE </div>
UP ATTENBOROUGH CURVE			CRNJ PLJ PLJ (14 846)				

Additional Information (6) – Data Extract

Attenborough SSI data was initially written in 2009 as part of the South Erewash scheme, in accordance with the required of SSI Data Preparation Guide SSI8003 Sections'102 & 104.

ATTENBOR(14) IPT.dat (Input Data files) – Extract

```

/Address 26 - Signal Module
/-----
*I26
/Sector C1 Barton Lane
    if L(BL)C1TZS xs
    then @(BL)C1TZS(1)
    else @(BL)C1TZS(3)
    \
                                                    /C1TZS

. /end of tgm 26

*(BL)C1TZS(3)
    if ( TPLD c or TPLD o< 10 ) TPLE c
    then
    else L(BL)C1TZS xs
    \
                                                    /C1TZS(3)

```

The redundant Barton Lane Strike-in SSI data, which should have been removed before the ENMR Commissioning.

Further Information...

For any further details or information please contact:

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