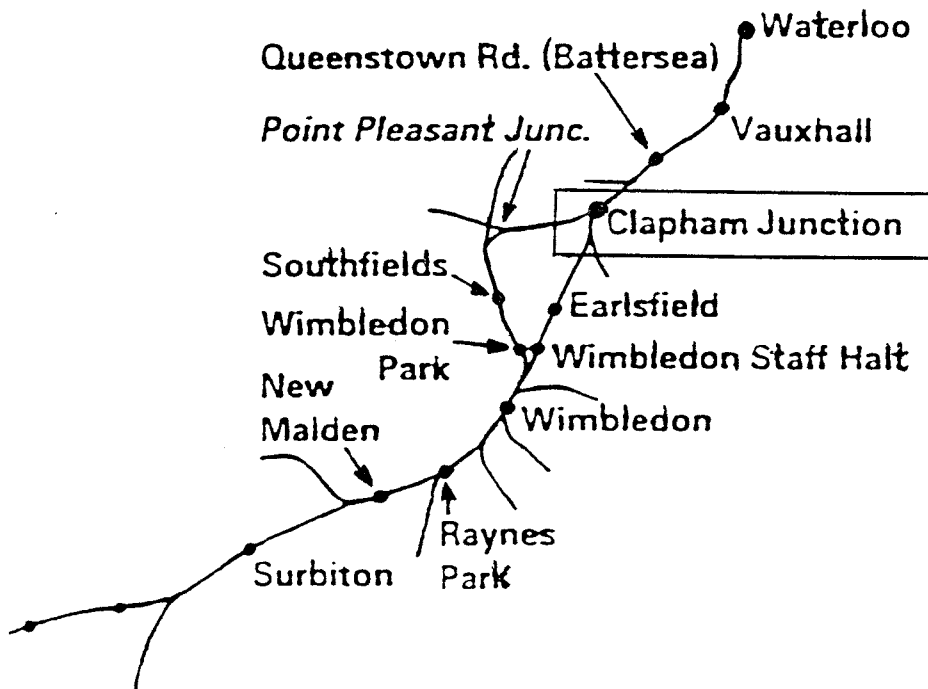


DIRECTOR OF S & T ENGINEERING.
WEST MIDLANDS PROJECTS GROUP.

*THE CLAPHAM JUNCTION
RAILWAY ACCIDENT*

The Accident

At 08.10 on Monday 12th, December 1988 a crowded commuter train (the Poole train) ran into the rear of another train (the Basingstoke train) in a cutting just south of Clapham Junction station. After that collision the Poole train veered to the right and struck a third oncoming train (the Haselmere train).



As a result of the accident 35 people died and nearly 500 were injured, 69 of them seriously.

THE CLAPHAM JUNCTION RAILWAY ACCIDENT

Introduction

On the morning of Monday 12th, December 1988 a tragic accident occurred at Clapham Junction on the Southern Region that resulted in a formal Investigation headed by Anthony Hidden QC. The findings of these investigations were presented to Parliament by the Secretary of State for Transport in November 1989.

The following notes will be of interest to you being involved in Railway Signalling but in no way should they be taken as a full account of the facts. It is your duty to read and familiarise yourself with the document "Investigation into the Clapham Junction Railway Accident" where these brief notes are derived from.

The Accident

At 08.10 on Monday 12th, December 1988 a crowded commuter train (the Poole train) ran into the rear of another train (the Basingstoke train) in a cutting just south of Clapham Junction station. After that collision the Poole train veered to the right and struck a third oncoming train (the Haselmere train).

As a result of the accident 35 people died (all were travelling in the front two coaches of the Poole train) and nearly 500 were injured, 69 of them seriously.

The site of the accident was between signals WF46/47 a controlled signal and WF 138 an automatic signal, see Fig 1. At the time of impact the Basingstoke train was stationary at signal WF 46/47 and the Haselmere train was passing the site of the accident in the opposite direction.

The events preceding the accident

Driver McClymont of the Basingstoke train approached Signal WF138 showing "green" but when he was close to the signal it changed to "red". The driver applied the brakes and stopped at WF 46/47, which was showing "red" at this time, however, before he had time to speak to the signalman this aspect had changed to "a single yellow". The signalman at Clapham Jcn "A" Signal Box was asked by the driver of the Basingstoke train "is there anything wrong with the signals", the signalman replied "nothing wrong to my knowledge". As the driver of the Basingstoke train was about to climb into his cab to proceed with his journey there was a crash and he saw his train physically pushed forward several feet. The driver immediately contacted the signalman again to tell him to alert the emergency services to what was obviously to him a major mishap.

THE CLAPHAM JUNCTION RAILWAY ACCIDENT

How did the accident occur

A knowledge of Track Circuit Block is assumed in this section of the notes and constant reference to Fig's 1, 2 & 3 will be required.

On the weekend of 26th/27th November 1988 two wiring alterations were completed at Clapham "A" Relay Room, Job No's 104 & 201 see Fig's 2 & 3. During the course of the installation work on this weekend a wire should have been recovered between DM TRR.4A and fuse R12-f107 which had the effect of introducing Track Circuit "DL" into the HR circuit of WF 138 Signal. For some reason only the wire on DM TRR.4A had been disconnected and "bent back", the fuse end remaining connected (remember in this type of installation removing the wire would have been virtually impossible as the wires are all tied into "trees" between the relay racks). The cut wire was not taped and cut back to the wiring tree as per usual practice.

Two weeks later on Sunday 11th December 1988 a relay was changed "DN TR", this relay happened to be situated adjacent to relay "DM TRR". During the changing of this relay the wires were disturbed and the wire that was originally terminated on DM TRR.4A moved back to the position it had been terminated on prior to disconnection on the weekend of 26/27th November. The effect this had on WF 138 HR was to "strap out" the "DL TRR" control in the circuit thus any train standing on DL Track Circuit would remain undetected to the control relay. Therefore the Basingstoke train when standing at WF 46/47 Signal with the signal showing at least "single yellow" would have meant that Signal WF 138 would be showing at least "double yellow" to Driver Rolls who was approaching this signal in the Poole train.

This aspect sequence had gone undetected to the previous trains running over the line but as the frequency of traffic increased the Headway time reduced (trains travelling closer together) and Driver McClymont noticed the "Green—>Red" aspect on WF 138 because he was closely following another train. In fact the train in question ahead of the Basingstoke train was just passing Signal WF 46/47.

If you consider the sketches on Figure 4 you can appreciate how the driver of the Basingstoke train saw a "Green—>Red" aspect on WF138 Signal.

The effect of the accident "cut off" the DC Traction current to the trains on the line and a Waterloo Circular train also coasted into the occupied section with WF 138 still showing a proceed aspect. Therefore with the "wrong side" failure still on, there were three trains occupying the section between WF 46/47 and WF 138 with WF 138 still exhibiting a proceed aspect, actually "single yellow", by this time the signaller had replaced WF 46/47 to red. The Technician on the ground eventually disconnected 138 HR circuit to place the signal at "red".

THE CLAPHAM JUNCTION RAILWAY ACCIDENT

The Investigation into the accident

The Investigation was held by Sir Anthony Hidden to establish lessons that must be learned and actions taken as a result of the accident. The main areas covered by the investigation were:-

- 1) Most importantly, to seek to prevent another such accident happening by addressing both the immediate and underlying causes.
- 2) To promote a better safety culture within British Rail.
- 3) To diminish the effects of any future accidents.

There were 93 recommendations made and the following text lists the first 17 that are most important to Signal Engineering Staff.

The wiring errors

1. BR shall ensure that there is rigorous implementation of the practice of cutting back redundant wires, insulating, and securing them, so that there is no risk of wires coming into contact with working circuitry. Cutting back must be done before commissioning.
2. BR at national level shall be responsible for updating and creating new standards of installation.
3. BR shall enforce tighter control on Design Office procedures for the production, issue and amendment of documents to ensure that all working drawings are complete and are an accurate representation of the system to be worked on and of the work to be done to that system.

Specific Testing

4. BR shall urgently ensure that an independent wire count is carried out as a matter of practice during testing. It shall be the responsibility of the person in overall charge of testing to ensure and to document that an independent wire count has been done. This function may be delegated to works staff who did not do the work.
5. BR shall ensure that one individual is always identified as the person in overall charge of testing.
6. BR shall ensure that a testing plan is drawn up for every commissioning.
7. BR shall ensure that sufficient numbers of suitably qualified staff are included in the testing plan.

THE CLAPHAM JUNCTION RAILWAY ACCIDENT

8. BR shall insure that full documentation is provided and later monitored in order that proper testing is carried out.

Testing General

9. BR shall introduce a national testing instruction with all speed. Such introduction shall be accompanied by a full explanation to the workforce including workshops or seminars as necessary. Implementation must be monitored and audited.
10. BR shall ensure through its system of audit that the necessary resources and authority are available to Regional Signal Engineers to implement the national testing instruction.
11. BR shall ensure that the Testing & Commissioning Engineer must be independent of the line of command between Area Signalling Engineer and new works staff, but able to call on new works staff to assist him in his testing duties.

Instructions

12. BR shall ensure that there are effective systems for distributing Departmental Instructions on a personal basis to all relevant employees and that provision is made for the situation where an employee moves to a new post.
13. BR shall ensure, as a matter of practice, that all staff understand and regularly re-read the Departmental Instructions relevant to their posts. In addition, every two years, those staff involved in an annual appraisal interview, shall sign a statement to the effect that such Instructions have been recently read and understood.

Training

14. BR shall give technical training as necessary to ensure that efficient and safe practices are carried out by all technical staff.
15. BR shall provide refresher courses for installers at intervals of not more than five years.
16. BR shall urgently progress and monitor training and certification of testers. Refresher courses shall be evolved.
17. BR shall ensure that the structure and content of courses are regularly reviewed.

THE CLAPHAM JUNCTION RAILWAY ACCIDENT

Relevant Sections of Signalling System and Track Circuits Around the Accident Scene

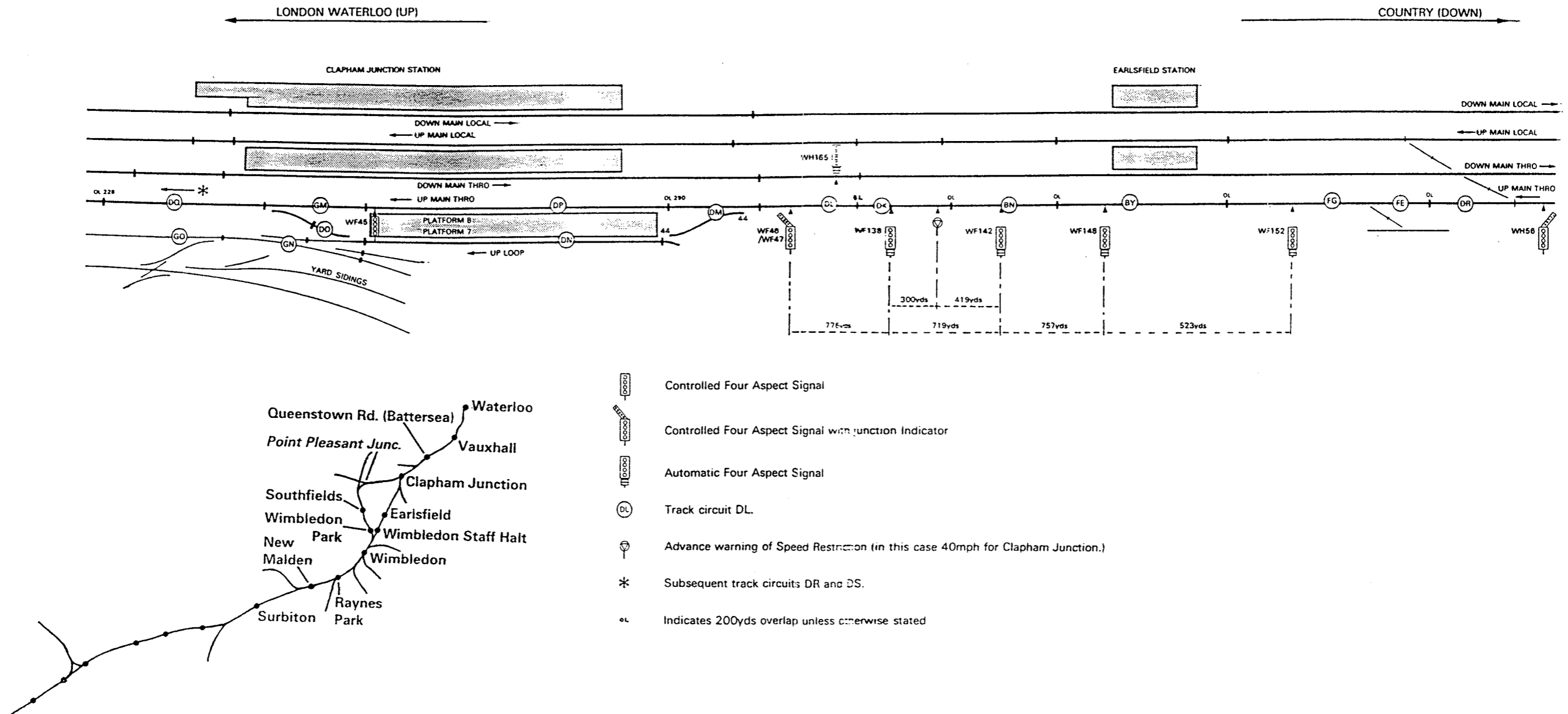


FIGURE 1.

continued

THE CLAPHAM JUNCTION RAILWAY ACCIDENT

Control Circuits for Signal WF 138

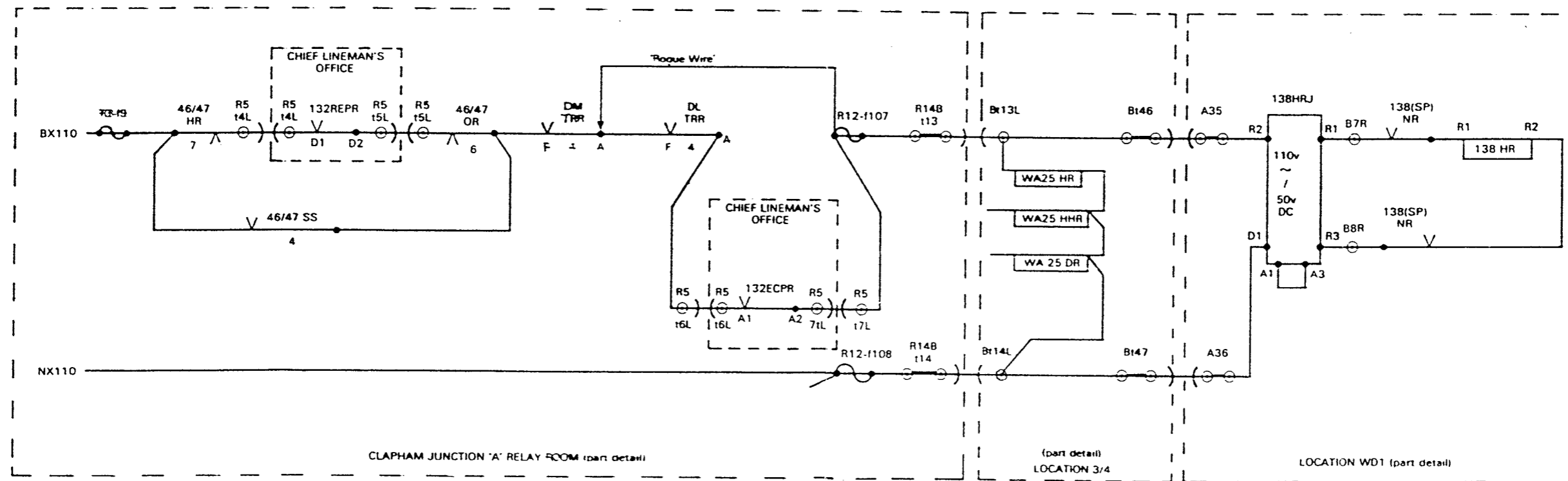
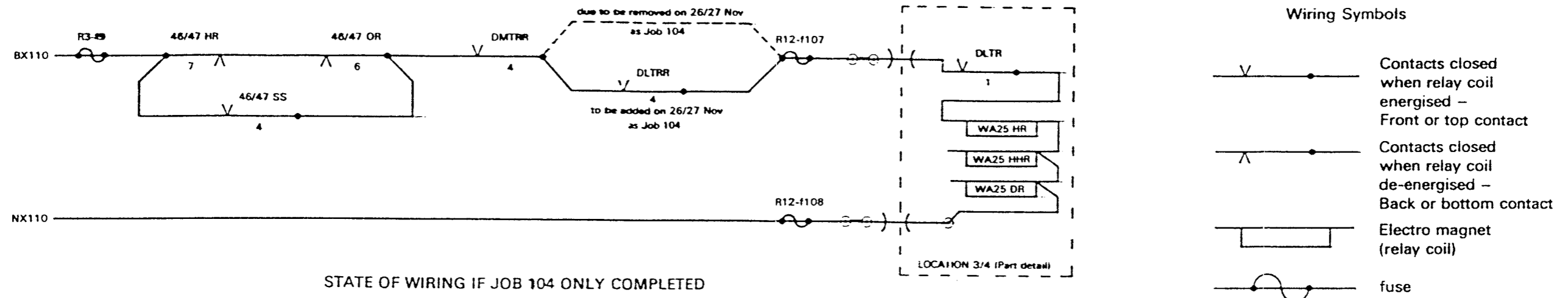


FIGURE 2.

continued

THE CLAPHAM JUNCTION RAILWAY ACCIDENT

Extract from Design Office working diagrams for JOB No's 104 & 201.

Installation Staff and Testing Staff were issued with these diagrams to work to.

JOB 201

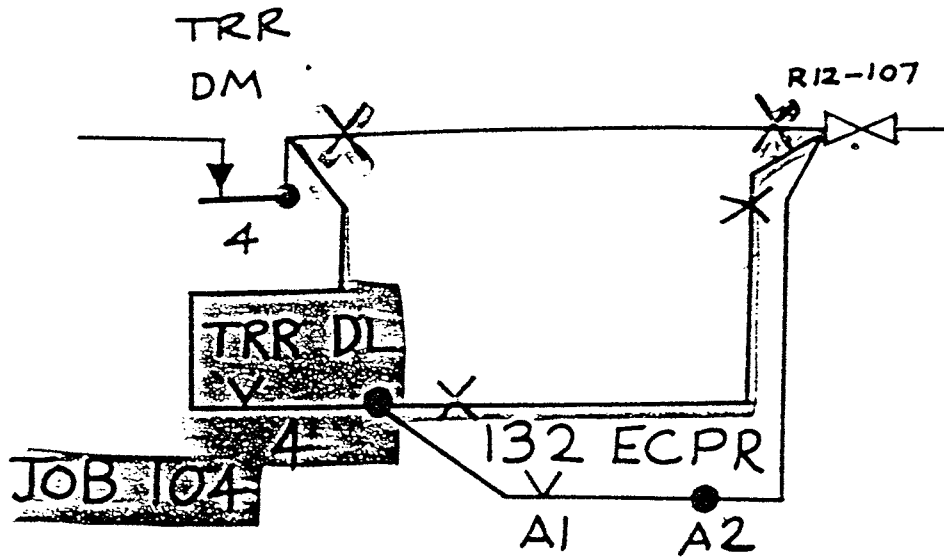


FIGURE 3. Diag JOB 201

continued

ASPECT SEQUENCE OF SIGNALS IMMEDIATELY BEFORE & AFTER THE ACCIDENT

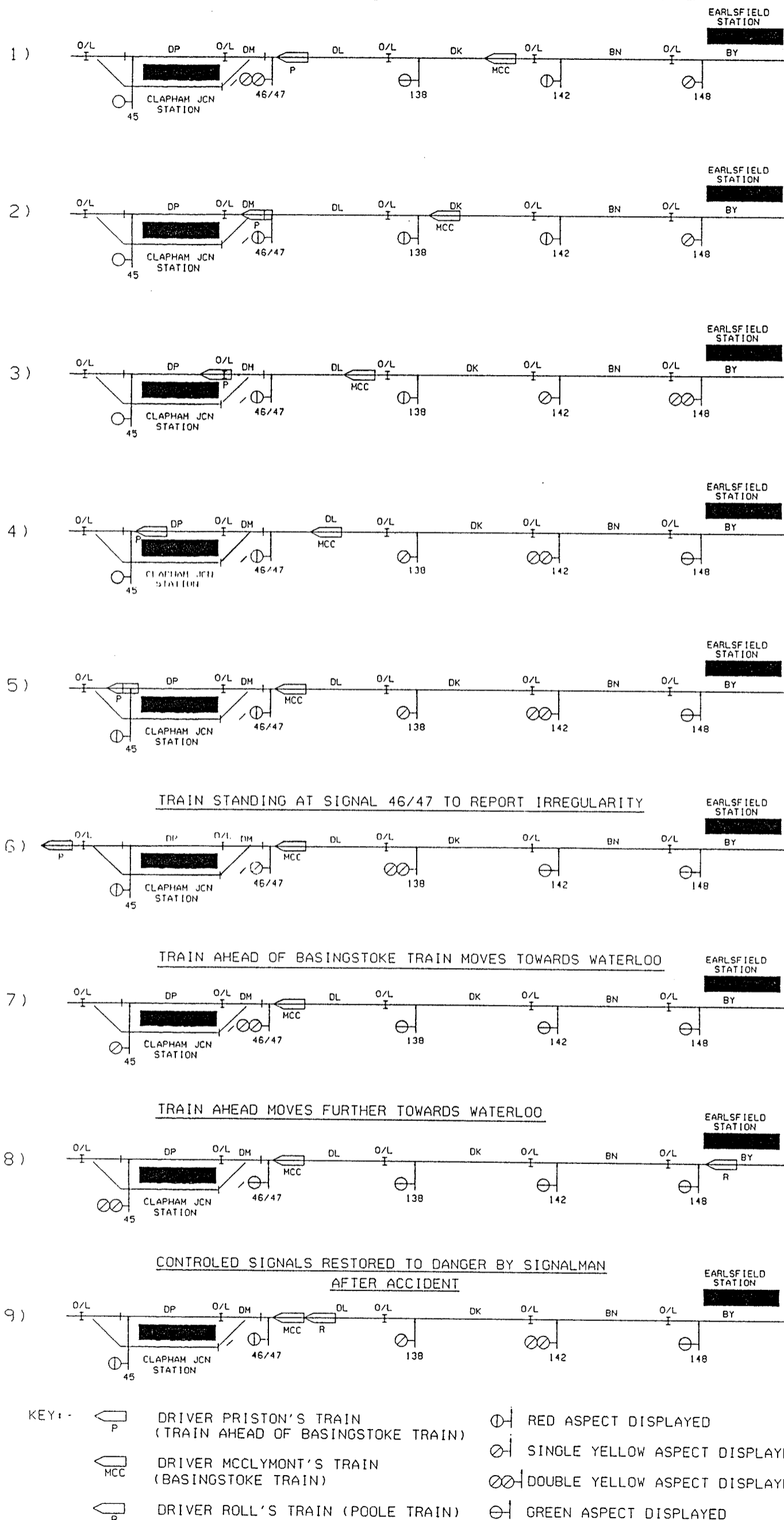


FIGURE 4.

end