Appendix B
Typical Level Crossing Order and Maintenance Schedule, AHB

Appendix B

B.1 Typical Level Crossing Order

On the following pages the level crossing order for Balnamore level crossing on Northern Ireland Railways is reproduced by kind permission of the Controller of Her Majesty's Stationery Office, Crown Copyright.

The Order mandates what is required at the level crossing.

Figure B.1

Balnamore AHB LC, NIR, County Antrim

STATUTORY RULES OF NORTHERN IRELAND

1998 No. 143

ROAD AND RAILWAY TRANSPORT

Level Crossing (Balnamore) Order (Northern Ireland) 1998

Made . . . . . *3rd April 1998*

Coming into operation . . *15th May 1998*

WHEREAS the railway undertaking made an application to the Department in accordance with section 66(4) of the Transport Act (Northern Ireland) 1967(**a**);

AND WHEREAS before making the application the railway undertaking gave notice in accordance with section 66(5) and (6) of that Act to the council in whose district the crossing is situated;

AND WHEREAS the Department did not receive from that council any representation in respect of the said application;

NOW THEREFORE the Department of the Environment, in exercise of the powers conferred by section 66(1) and (2) of the Transport Act (Northern Ireland) 1967 and now vested in it(**b**) and of every other power enabling it in that behalf, hereby makes the following Order:

Citation, commencement and interpretation

1.—(1) This Order may be cited as the Level Crossing (Balnamore) Order (Northern Ireland) 1998 and shall come into operation on 15th May 1998.

(2) In this Order "the crossing" means the Balnamore Level Crossing in the townland of Balnamore Skein and County of Antrim whereby the road known as Taughey Road is crossed by the railway between Ballymoney and Coleraine Stations.

Suspension of statutory provisions

2. While this Order remains in force—

(*a*) section 47 of the Railways Clauses Consolidation Act 1845(**c**) (requirements as to gates);

(*b*) section 6 of the Railways Clauses Act 1863(**d**) (requirements as to lodges, etc.); and

(a) 1967 c. 37 (N.I.); section 66 was substituted by S.I. 1984/1986 (N.I. 15) Art. 15 and amended by S.I. 1990/994 (N.I. 7) Sch. 2

(b) The functions of the Ministry of Development under the Transport Act (Northern Ireland) 1967 transferred to the Department of the Environment by S.R. & O. (N.I.) 1973 No. 504 Art. 4

(c) 1845 c. 20

(d) 1863 c. 92

(*c*) any other statutory provision imposing requirements to the same or similar effect as those contained in the enactments mentioned in paragraphs (*a*) and (*b*),

shall not apply in relation to the crossing.

Provision of automatic equipment

3. The railway undertaking shall at the crossing—

(*a*) provide, maintain and operate the barriers, lights, automatic and other devices, excluding traffic signs specified in Schedule 1, and shall give notice in writing to the Department of the Environment as soon as the provision thereof is complete;

(*b*) secure the provision, maintenance and operation by that Department of the traffic signs specified in Schedule 1; and

(*c*) comply with the conditions and requirements specified in Schedule 2.

Amendment of the Level Crossings (Amendment) Order (Northern Ireland) 1982

4.—(1) Part II of the Schedule to the Level Crossings (Amendment) Order (Northern Ireland) 1982(**a**) shall be amended in accordance with paragraphs (2) and (3).

(2) In Column 1, the reference number "S.R. 1975 No. 118" shall be omitted.

(3) In Column 2, the words "Northern Ireland Railways (Balnamore Level Crossing) Order (Northern Ireland) 1975, Schedule 3, paragraph (5)" shall be omitted.

Amendment of the Northern Ireland Railways (Public Level Crossings) (Amendment) Order (Northern Ireland) 1989

5.—(1) The Schedule to the Northern Ireland Railways (Public Level Crossings) (Amendment) Order (Northern Ireland) 1989(**b**) shall be amended in accordance with paragraphs (2) and (3).

(2) In Column 1, the reference "S.R. 1975 No. 118" shall be omitted.

(3) In Column 2, the words "Northern Ireland Railways (Balnamore Level Crossing) Order (Northern Ireland) 1975, Schedule 3, paragraph (5)." shall be omitted.

Revocation

6. The Northern Ireland Railways (Balnamore Level Crossing) Order (Northern Ireland) 1975(**c**) is hereby revoked.

(**a**) S.R. 1982 No. 156
(**b**) S.R. 1989 No. 225
(**c**) S.R. 1975 No. 118

Sealed with the Official Seal of the Department of the Environment on 3rd April 1998.

(L.S.) *J. Ritchie*

Assistant Secretary

SCHEDULE 1 Article 3(*a*) and (*b*)

PARTICULARS OF THE BARRIERS, LIGHTS, TRAFFIC SIGNS AND OTHER DEVICES

1. Cattle-cum-trespass guards of standard railway design shall be provided adjacent to the ground which is made up to the level of the carriageway. The guards shall extend the full distance between the fence on each side of the railway.

2. A barrier shall be pivoted as close to the railway as practicable on the left hand side of the road on each approach to the crossing.

3. It shall be possible to raise and lower the barriers. When lowered, the barriers shall be as nearly horizontal as possible, be as nearly as possible at right angles to the centre line of the carriageway and shall extend across the left hand side of the road. The tip of each barrier shall extend to a point within 800mm of the centre of the carriageway and no closer than 150mm and a clear exit of at least 3 metres of carriageway width shall be left to the right hand edge of the carriageway.

4. When the barriers are fully lowered their uppermost surfaces shall be not less than 900mm above the road surface at the centre of the carriageway and the underclearance between the barriers and the road surface shall not exceed 1 metre.

5. When in the fully raised position the barriers shall be inclined towards the carriageway at an angle of between 5 and 10 degrees from the vertical. No part of either barrier or of any attachment thereto which is less than 5 metres above the level of the carriageway shall be horizontally displaced from the nearer edge of the carriageway by less than 450mm. No part of any barrier or any attachment thereto which in either case is less than 2 metres above the level of the footway shall normally be horizontally displaced from that edge of the footway further from the carriageway by less than 150mm.

6. The barriers shall be as light as possible but shall also be strong enough to prevent distortion or fracture likely to be caused by wind pressure. It shall be possible to raise them by hand. The barriers shall be at least 125mm deep at their mid-point and at least 75mm deep at their tip.

7. Two electric lamps, each of not less than 5 watts nominal rating and with lenses of not less than 50mm diameter, shall be fitted to each barrier, one within 150mm of its tip and the other near its centre. When illuminated, the lamps shall show a red light in each direction along the carriageway.

8. The barriers shall display on both front and rear faces alternate red and white bands each approximately 600mm long and to the full depth of the barriers. A band of red retro-reflecting material not less than 50mm deep shall be provided along the full length of each red band.

9. Suitable screening shall be provided for each barrier machine to guard against danger to persons from the operating mechanisms and moving parts of the machine.

10. A traffic light signal as prescribed by diagram 3014 of the Regulations shall be provided on the left hand side of the road on each approach to the crossing and as close as practicable to the barrier. There shall be an additional traffic signal of the same type on the right hand side of the road on each approach to the crossing so located as to be either in line with or on the railway side of the stop line mentioned

in paragraph 12. The traffic light signals on each side of the railway shall be positioned so as to face outwards from the crossing towards approaching road traffic. All the signals shall be capable of directional adjustment.

11. An audible warning device shall be provided on or adjacent to each left hand side traffic light signal post on each approach to the crossing. Facilities shall be provided to reduce the sound output of these devices and any reduced sound output of these devices shall operate between 23.30 hours and 07.00 hours approximately.

12. A reflectorised stop line of the size and type shown in diagram 1001 in the Regulations shall be provided across the left hand side of the carriageway on each approach to the crossing approximately 1 metre before the left hand side traffic light signal.

13. A reflectorised pedestrian stop line of the size and type shown in diagram 1003.2 in the Regulations shall be provided across the right hand side of the carriageway on each approach to the crossing and any made-up ground on both sides of the carriageway on both sides of the railway. The line shall be not less than 1 metre before the right hand side traffic light signal and not nearer than 2 metres to the running edge of the nearest rail and shall be as nearly possible at right angles to the centre line of the carriageway.

14. Where the road passes over the crossing, reflectorised edge of carriageway road markings of the size and type shown in diagram 1012.1 in the Regulations shall be provided along each edge of any made-up ground along each edge of the carriageway.

15. The centre line of the carriageway shall be marked on the crossing between the stop lines mentioned in paragraph 12 and for a distance of 12 metres on each side of the railway measured along the centre of the carriageway from stop lines with a reflectorised double continuous line road marking of the size and type shown in diagram 1013.1A in the Regulations. The centre line shall be continued for a distance of 32 metres on each side of the railways measured along the centre of the carriageway from the ends of the double continuous line with a reflectorised continuous line and a broken line on its right hand side of the size and type shown in diagram 1013.1D in the Regulations.

16. A traffic sign of the size, colour and type shown in diagram 775 in the Regulations shall be provided on each primary and duplicate primary road traffic light signal post and shall face outwards from the crossing towards approaching road traffic.

17. A traffic sign of the size, colour and type shown in diagram 784 in the Regulations shall be provided on the left hand side of each road approach to the crossing facing traffic approaching the crossing. Below this a traffic sign of the size, colour and type shown in diagram 786 in the Regulations shall be provided facing traffic approaching the crossing.

18. A traffic sign of the size, colour and type shown in diagram 770 in the Regulations shall be provided on the left hand side of each road approach to the crossing facing traffic approaching the crossing. Below this a traffic sign of the size, colour and type shown in diagram 773 in the Regulations shall be provided facing traffic approaching the crossing.

19. A traffic sign of the size, colour and type shown in diagram 786 in the Regulations shall be provided on the left hand side of the road on each side of the railway facing traffic leaving the crossing.

20. A telephone mounted in a weather-proof box connected to the monitoring Signal Box at Coleraine shall be provided on or adjacent to each duplicate primary road traffic light signal post. A traffic sign of the size, colour and type shown in diagram 787 in the Regulations shall be provided on the face of the telephone case.

21. Two independent power supplies shall be provided at the crossing, one of which may consist of standby batteries of sufficient capacity to operate the whole installation for 12 hours.

22. In this Schedule—

"the Regulations" means the Traffic Signs Regulations (Northern Ireland) 1997(a).

(a) S.R. 1997 No. 386

SCHEDULE 2 Article 3(*c*)

CONDITIONS AND REQUIREMENTS TO BE COMPLIED WITH BY THE RAILWAY UNDERTAKING

1. The carriageway shall be at least 6.0 metres wide at the crossing

2. The ground at the two edges of the carriageway over the crossing shall be made up to the level of the carriageway for a distance of not less than 1 metre beyond each edge.

3. The surface of the carriageway over the crossing shall be maintained in good and even condition.

4. The barriers shall be kept in the fully raised position except during the time when engines, carriages or other vehicles passing along the railway have occasion to cross the road.

5. The electric lamps on each barrier mentioned in Schedule 1 shall be lit at all times except when the barriers are in the fully raised position.

6. If the road approaches to the crossing are lit the crossing shall be lit to at least the same standard.

7. Visual indicators and an audible alarm shall be provided in the monitoring Signal Box. The indicators shall show when the barriers are raised and when the main power supply is available, and the alarm shall sound if a period of approximately 3 minutes elapses and there is no indication that the barriers are raised.

8. The barriers, the audible warning devices and the traffic light signals mentioned in Schedule 1 shall be activated automatically, as described in paragraph 9, by the approach of a train but means shall also be provided at the crossing for their manual operation and control.

9. When the train either occupies a track circuit or operates a treadle the audible warning devices and the traffic light signals shall begin to operate and the barriers shall be lowered in accordance with the following sequence—

(*a*) the amber lights shall show and the audible warning shall begin. The lights shall show for approximately 3 seconds;

(*b*) immediately the amber lights are extinguished the intermittent red lights shall begin to show;

(*c*) 4 to 8 seconds later, the barriers shall begin to descend and shall take a further 6 to 8 seconds to reach the lowered position;

(*d*) not less than 27 seconds shall elapse between the time when the amber lights first show and the time when the train reaches the crossing;

(*e*) the intermittent red lights shall continue to show and the audible warning device shall continue to sound until the barriers have begun to rise and all said lights and devices shall be switched off before the barriers have risen to an angle of 45 degrees above the horizontal. However, if the barriers have not fully risen within 7.5 seconds of having started to rise then the red road lights will be illuminated until both barriers are proved fully up.

10. Both barriers shall rise as soon as possible after the train has passed the crossing.

11. In the event of the failure of both intermittent red lights in any of the road traffic signals, when the intermittent red lights should be shown, both barriers shall descend immediately (if not already lowered) and shall remain lowered.

12. Should a total power failure occur both barriers shall descend under gravity or remain lowered as the case may be. If after the barriers have begun to lower one barrier fails to reach the fully lowered position, neither barrier shall rise until both have been fully lowered.

13. If either barrier fails to rise from the lowered position the intermittent red lights shall continue to show, provided a total power failure has not occurred.

EXPLANATORY NOTE

(This note is not part of the Order.)

This Order provides for the provision and maintenance of an updated automatic half barrier crossing at the Balnamore railway level crossing in place of the existing automatic half barrier provided under the Northern Ireland Railways (Balnamore Level Crossing) Order (Northern Ireland) 1975. Section 47 of the Railways Clauses Consolidation Act 1845 (which requires the railway undertaking to provide gates and gate-keepers), section 6 of the Railways Clauses Act 1863 (requirements as to lodges, etc.) and any other statutory provision imposing requirements to the same or similar effect, shall not apply to the crossing whilst this Order remains in force.

Schedule 1 sets out the particulars of barriers, lights, traffic signs and other devices which are to be provided at the crossing. Schedule 2 states the condition and requirements with which the railway undertaking is to comply in relation to the crossing.

This Order revokes the Northern Ireland Railways (Balnamore Level Crossing) Order (Northern Ireland) 1975 and makes consequential amendments to the Level Crossings (Amendment) Order (Northern Ireland) 1982 and the Northern Ireland Railways (Public Level Crossings) (Amendment) Order (Northern Ireland) 1989.

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B.2 Typical AHB Maintenance Schedule

On the following pages, the NIR current maintenance check list for AHB level crossings is shown and reproduced by kind permission of Northern Ireland Railways.

NORTHERN IRELAND RAILWAYS

SIGNAL AND ELECTRICAL MAINTENANCE SPECIFICATION

AHB: CHECK B

This document includes check lists with areas for recording checks and a new blank copy should be used for each inspection.

Inspection at _____

Started (date) _____

By (name) _____

Completed (date) _____

By (signature) _____

Before carrying out any checks, tests or disconnections which may have ANY impact on ANY part of the operation of the level crossing, ensure that the correct rules and procedures have been complied with, the appropriate persons advised and suitable precautions taken if required (eg flagmen, etc).

Please mark the check boxes on the form as follows:

Equipment Inspected and Passed OK:-	OK
Equipment Inspected and Failed:-	☒
Check Not Applicable:-	—

Where explanations of test failures or other facts need to be detailed, record these on the back of the appropriate sheet. Identify each note with the appropriate section no. (e.g.3b.9) and make sure you identify the particular unit to which the note applies. Don't forget to write "PTO" beside the relevant section or sections on the front of the sheet.

AHB Check B

Initial General Inspection

Visually examine the following equipment for damage, security, legibility, view, corrosion, paint finish, cleanliness etc.

	Location Case(s)	☐	
2.1.2	Battery Box(es)	☐	
2.1.3	Local Control Equipment	☐	
		Y m/c side	**Z m/c side**
2.1.4	Barrier machines.	☐	☐
2.1.5	Barrier arms.	☐	☐
2.1.6	Audible Warning Devices.	☐	☐
2.1.7.1	Advance Road Warning signs	☐	☐
2.1.7.2	"Large Vehicle" Road Warning signs.	☐	☐
2.1.7.3	Telephone signs	☐	☐
2.1.8	Telephone housing and apparatus	☐	☐
2.1.9	Road Traffic Warning Lights, mounting brackets, hoods etc.	☐	☐
2.1.10	Check for unobstructed view of all roadsigns, warning lights etc. from sightline of approaching road vehicle.	☐	☐
2.1.11	Cattle/anti-trespass grids.	☐	☐
2.1.12	Fencing.	☐	☐
2.1.13	Road markings.	☐	
2.1.14	Road surface, alignment and profile through crossing. Check for relative displacement of adjacent Bo-Mac panels. Check surface and marking of footpaths.	☐	

AHB Check B

		Y m/c side	Z m/c side
2.2	Carry out a general functional test of the equipment at the crossing by following this procedure.		
2.2.1	Use each telephone at the crossing to contact the signalman and request a ringback call to each telephone. Ask the signalman for any information relating to the recent operation of the crossing.	☐	☐
2.3	This check is to ensure that the crossing cycles correctly when triggered by an approaching train. If there is no appropriate train, simulate a train by disconnecting track links. Ensure that any necessary procedures and precautions have been taken and advise signalman.		
2.3.1	Confirm that audible device starts to sound immediately and continues to sound while all barriers are fully down.	☐	☐
2.3.2	Confirm that amber road warning lights become steadily illuminated.	☐	☐
2.3.3	After 3 seconds, confirm that amber lights are extinguished and that red lights start flashing alternately.	☐	☐
2.3.4	After a further 4-6 seconds (ie at 8 secs.), the booms should start to fall, switching on the boom warning lights.	☐	☐
2.3.5	After a further 7 seconds (ie at 15 secs), the boom should have reached the horizontal position, with all red R.T. lights still flashing and boom lamps still illuminated.	☐	☐
2.3.6	Confirm that the flash rate of the red R.T. lamps is approximately 80 flashes per minute.	☐	☐
2.3.7	Check that all R.T. lamps are evenly illuminated, correctly focused and clearly visible to approaching road traffic.	☐	☐
2.3.8	After the train has cleared the crossing, the booms should start to rise, switching off the road warning lights.	☐	☐
2.3.9	After about 8 seconds, the booms should be fully raised, switching off the boom lamps when vertical .	☐	☐

3a. Westinghouse Barrier Machine Inspection

These checks should be repeated in their entirety for each barrier machine.		Y m/c side	Zm/c side
3a.1	Check that inside of machine, internal assemblies and Electrolock are clean, secure and weathet protected.	☐	☐
3a.2	Check that gear oil level is correct.	☐	☐
3a.3	Check that controller is secure and showing no signs of excessive wear.	☐	☐
3a.4	Check that all electrical terminals and connections are tight and clear of verdigris and corrosion.	☐	☐
3a.5	De-energise lock and check that linkage drops under weight of arm.	☐	☐
3a.6	With lock de-energised, lift each arm manually to near vertical position and leave it to drop under its own weight. Check that arm can be raised reasonably easily and that it falls smoothly. Confirm that falling action is slowed at end by snubbing action. If snubbing action is not effective, check motor commutator for dirt, motor brushes for wear, all electrical connections in snubbing circuit and continuity and resistance of snubbing resistor.	☐	☐
3a.7	Confirm that shooting bolts under machine are at least 15mm away from boom when locked and cannot obstruct dropping boom.	☐	☐
3a.8	Check all locks, hinges, etc, cleaning and lubricating where necessary .	☐	☐

3b. Godwin Warren/Smiths Hydraulic Barrier Machine Inspection

These checks should be repeated in their entirety for each barrier machine.		Y m/c side	Zm/c side
3b.1	Check that inside of machine and internal assemblies are clean, secure and weather protected.	☐	☐
3b.2	Check hydraulic oil level and top up if necessary. Check that there are no signs of oil leakage.	☐	☐
3b.3	Check that condition of circuit controller.	☐	☐
3b.4	Check that all electrical terminals and connections are tight and clear of verdigris and corrosion.	☐	☐
3b.5	Check that rear door proving switch is operating correctly.	☐	☐
3b.6	Check all locks, hinges etc., cleaning and lubricating where necessary.	☐	☐
3b.7	Test crossing using local control and confirm that machines operate correctly and that barrier arm drops smoothly and is damped at end of stroke.	☐	☐

4. Barrier Arms

	These checks should be repeated in their entirety for each barrier arm.	Y m/c side	Z m/c side
4.1	Check that barrier arms are in good condition, and that reflecting strips are intact on both sides of boom. Each strip should be 600mm (2ft) long and alternatively red and white with a red strip at the tip.	☐	☐
4.2	Check that boom lamps are in good condition, correctly aligned with roadway and that lenses are clean. Check that lamps are of correct wattage and (5W) and show no signs of blackening. Check that housings are still waterproof.	☐	☐
4.3	Check that all wiring to boom lamps are neatly clipped and not hanging or at risk of snagging on parts of mechanism.	☐	☐
4.4	Check that fencing around machines is secure and vertical. Check that it cannot foul the operation of the barrier. In particular, there should be no possibility of any part of the fencing obstructing the mechanism in such a way as to prevent a boom dropping freely. Check that there are no dangerous "pinch" points" between moving and fixed parts.	☐	☐
4.5	Check that the top of the boom, measured at the tip, is vertically between 3ft and 3ft 6ins above the roadway.	☐	☐

5. Road Traffic Light Inspections

		Y m/c side	Z m/c side
	Check that the inside of lenses and reflectors are clean.	☐	☐
	Check that all bulbs are of the correct wattage. (36W)	☐	☐
5.3	Replace any bulbs that show signs of blackening or discoloration.	☐	☐

6. Rail Mounted Equipment Checks

		Y m/c side	Zm/c side
6.1	Examine all track mounted equipment, tail cables etc. on the Up approach to the crossing.		
6.1.1	Check block joints, goal posts, track circuit tail cables etc.	☐	☐
6.1.2	Check that treadles are secure, unobstructed and undamaged.	☐	☐
6.1.3	For each treadle, confirm that the horizontal distance from end of arm to rail is 10±2mm.	☐	☐
6.1.4	For each treadle, confirm the vertical distance from top of arm to highest point of rail above arm is 16±2mm.	☐	☐
6.1.5	For each treadle, confirm that treadle damping is effecting. The arm should take between 7 and 11 secs to return to the normal position after being fully depressed and released.	☐	☐
6.2	Examine all track mounted equipment, tail cables etc. at the crossing.		
6.2.1	Check block joints, goal posts, track circuit tail cables etc.	☐	☐
6.2.2	Check that treadles are secure, unobstructed and undamaged.	☐	☐
6.2.3	For each treadle, confirm that the horizontal distance from end of arm to rail is 10±2mm.	☐	☐
6.2.4	For each treadle, confirm that the vertical distance from top of arm to highest point of rail above arm is 16±2mm.	☐	☐
6.2.5	For each treadle, confirm that the treadle damping is effecting. The arm should take between 7 and 11 secs. to return to the normal position after being fully depressed and released.	☐	☐

AHB Check B

6. Rail Mounted Equipment Checks (contd)

		Y m/c side	Z m/c side
6.3	Examine all track mounted equipment, tail cables etc. on the Down approach to the crossing.		
6.3.1	Check block joints, goal posts, track circuit cables etc.	☐	☐
6.3.2	Check that treadles are secure, unobstructed and undamaged.	☐	☐
6.3.3	For each treadle, confirm that the horizontal distance from end of arm to rail is 10±2mm.	☐	☐
6.3.4	For each treadle, confirm that the vertical distance from top of arm to highest point of rail above arm is 16±2mm.	☐	☐
6.3.5	For each treadle, confirm that treadle damping is effecting. The arm should take between 7 and 11 secs. to return to the normal position after being fully depressed and released .	☐	☐

7. Location & Battery Cases.

7.1	Check all connection and terminals for tightness , verdigris and corrosion.	☐
7.2	Check surge arrestors and inspect air gaps .	☐
7.3.1	Check DC busbar voltage.	☐
7.3.2	Check 220v supply voltage.	☐
7.3.3	Check battery charging rate.	☐
7.4	Check condition of batteries.??	☐
7.5	Check track circuit voltage readings and enter on track circuit record cards.	☐

8. Manual Control Box

8.1	Confirm that the housing is still waterproof.	☐
8.2	Operate manual control using key and check that locks are tight.??	☐
8.3	Check that all wires are secure and do not show signs of chaffing.	☐

9. Final Crossing Check

9.1	Using manual controls, cycle crossing and confirm that time sequences are correct.	☐
9.2	Return crossing to automatic operation and request test by dropping track circuits and depressing treadles where applicable.	☐
9.3	Confirm with monitoring signalman that indications are responding correctly.	☐
9.4	Enter details in crossing logbook.	☐