

Suburban Glasgow Northwest Springburn to Helensburgh



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1 Route Information

1.1 History

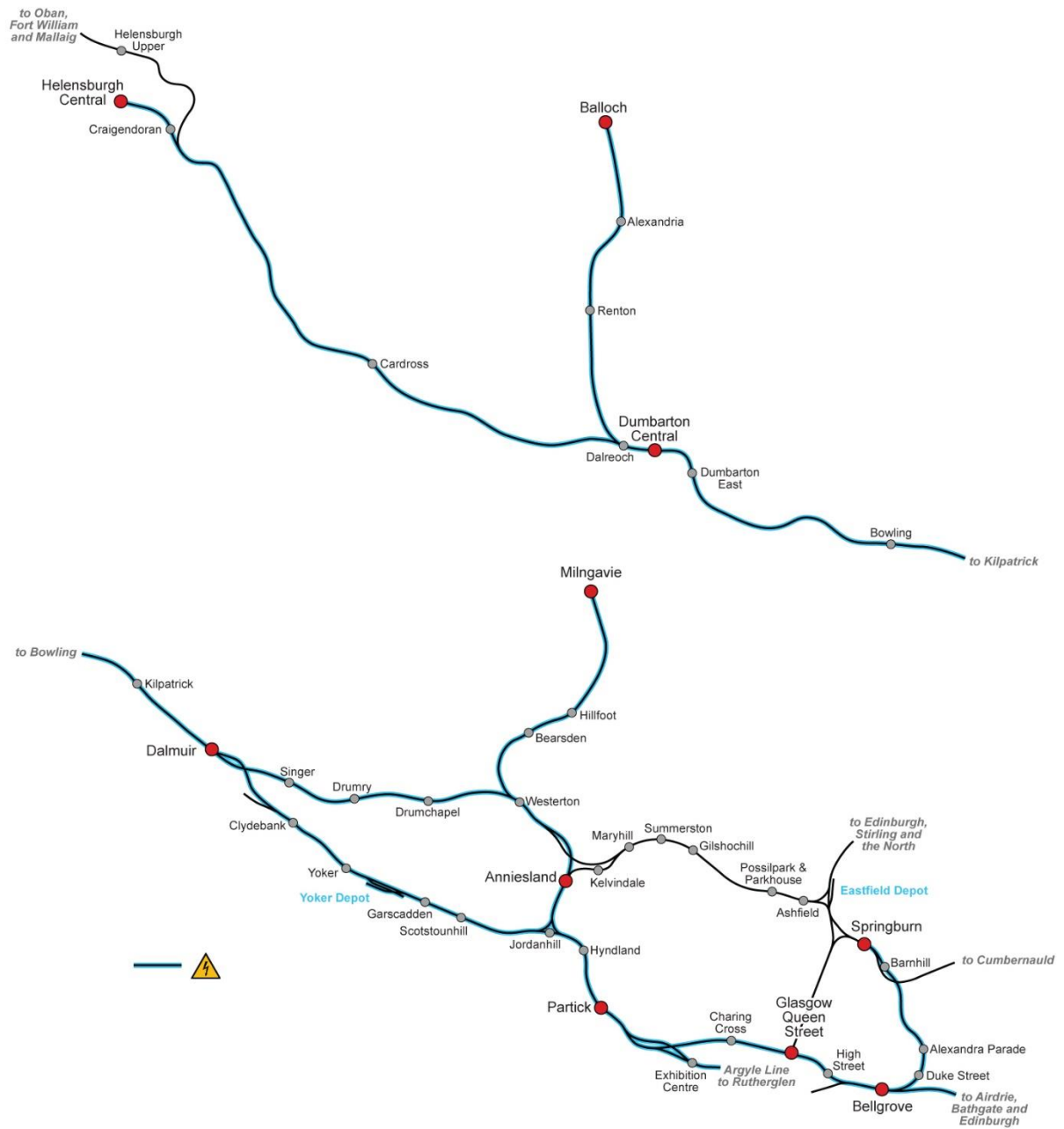
Formed in 1960 as an amalgamation of various railways in the Glasgow area, the current North Clyde Line runs from Edinburgh Waverley to Helensburgh Central, with branches to Springburn, Balloch and Milngavie. Originally home to the venerable Class 303, or "blue trains", the current iteration of the route showcases a wide variety of stock, including many specials - often steam hauled - heading for the West Highland Line.

West of Glasgow, the line splits, with one route taking a northerly course through the Glasgow suburbs of Anniesland and Knightswood, before merging with the southerly line in the Clydebank district of Dalmuir. The southerly course passes through the traditional industrial heartland of the Clyde Valley. After Clydebank the route becomes distinctly rural, before ending in the foothills of the Highlands at Helensburgh.

1.2 Route Features

- Approx. 45 miles of route network
- Class 320 3-car Electric Multiple Unit
- Class 158 2-car Diesel Multiple Unit
- Route fully configured for Quick Drive
- 6 Career scenarios
- 43 Stations
- Extensive scenery
- Detailed catenary

1.3 Route Map



2 The Class 320/3 Electric Multiple Unit

2.1 Train Overview

The Class 320 EMU is a three-car derivative of the Class 321 trains operated in England. Twenty two sets were built in 1990 by British Rail Engineering Limited to supersede the 30 year old Class 303 and Class 311 trains.



The units run on 25 kV AC overhead line supply and use four Brush TM2141B traction motors. Initially the Class 320 units lacked toilets and also began life with a lower top speed of (75 mph or 121 km/h) due to being designed for much shorter passenger journeys on the North Clyde route. During 2010, yaw dampers were fitted across the class increasing their maximum speed to 90 mph (145 km/h). This meant that the units could be used on the sections of the Argyle Line route shared with the West Coast Main Line.

All Class 320s were refurbished by Wabtec Doncaster between February 2011 and October 2013. The refurbishment work included internal refurbishment, fitting of toilets, underframe work and re-livery into ScotRail Saltire livery.

2.2 Design & Specification

TOPS Number Range	Class 320301 - 320322
Formation	3-Car DTSO(A)+MSO+DTSO(B)
Weight (Total 3-Car)	114.5 tonnes
Train Length	195ft 5½in (59.58m)
Width	9ft 3in (2.82m)
Power Collection	25kV AC Overhead
Horsepower	1,438hp (1,072kW)
Max Speed	90mph (145km/h)
Brake Type	Air

2.3 Cabin Controls



1	Reverser	11	Headlights Selector
2	Throttle	12	Train Length Reminder
3	Train Brake	13	Brake Gauges
4	Left Wiper Switch	14	Speedometer
5	Right Wiper Switch	15	Emergency Brake Demand Lamp
6	AWS Reset	16	Cab Lights
7	AWS Indicator	17	Instrument Dimmer
8	Warning Horn	18	Guard Signal Button
9	Sander	19	Pantograph Up
10	DRA	20	Pantograph Down

2.4 Additional Keyboard Controls

L – Toggle Cabin Lights
J – Toggle DRA (Driver's Reminder Appliance)
I – Toggle Instrument Dimmer
C – Guard Signal Button
SHIFT+V – Toggle Right Wipers
V – Toggle Wipers

2.5 Automatic Warning System Self-test (AWS)

When the reverser has been moved from OFF to Forward or Reverse for the first time, the automatic warning system self-test will commence. This is an audible continuous horn which is cancelled by pressing the AWS Reset button or “Q” on the keyboard.

2.6 DRA (Driver's Reminder Appliance)

When the DRA switch is set to the on position (indicated by the switch illuminating red) traction power cannot be obtained.

This is designed to help mitigate against the risk of signals being passed at danger after station stops where last signal passed was displaying a caution aspect. To obtain traction power again the driver must switch off the DRA.



2.7 Destination Displays

If you wish to make use of the Class 320 in your own scenarios, it is possible to customise the destination displays for both AI and player services. In order to pre-configure a specific destination, the correct running number must be entered into the vehicle properties window for the driving coaches. This number consists of a 12-digit value containing both numbers and a letter. This is arranged like so: **UUUUUUCCCCD** - for example: **32030177921g**

UUUUUU = the Multiple Unit Number – in this example **320301**

CCCCC = the Coach Number - in this example **77921**

D = the Destination Display – in this example **Helensburgh Central via Yoker**

a	Blank	A	Springburn Limited Stop
b	Not in Service	B	Airdrie
c	Balloch	C	Airdrie via Yoker
d	Balloch via Yoker	D	Airdrie via Singer
e	Balloch via Singer	E	Edinburgh Waverley
f	Helensburgh Central	F	Edinburgh Waverley via Yoker
g	Helensburgh Central via Yoker	G	Edinburgh Waverley via Singer
h	Helensburgh Central via Singer	H	Edinburgh Waverley Limited Stop
i	Helensburgh Central Limited Stop	I	Motherwell
j	Dumbarton Central	J	Motherwell via Yoker
k	Dumbarton Central via Yoker	K	Motherwell via Singer
l	Dumbarton Central via Singer	L	Motherwell Limited Stop
m	Dumbarton Central Limited Stop	M	Cumbernauld
n	Dalmuir	N	Neilston
o	Dalmuir via Yoker	O	Cathcart
p	Dalmuir via Singer	P	Gourock
q	Milngavie	Q	Lanark
r	Garscadden	R	Lanark Limited Stop
s	Yoker	S	Special
t	Bathgate	T	Glasgow Queen Street
u	High Street	U	Partick
v	High Street via Yoker	V	Whifflet
w	High Street via Singer	W	Larkhall
x	Springburn	X	Newton
y	Springburn via Yoker	Y	Glasgow Central
z	Springburn via Singer	Z	Wemyss Bay

3 The Class 158 Diesel Multiple Unit

3.1 Train Overview

Classified Class 158, the trains began to appear in 1989. Called Sprinter Express, the name was based on British Rails wish to advertise the new acceleration ability the units had over older aging heritage DMU fleets. Their introduction saw a massive fall in journey times in the areas operated, with timetables quickly being updated to take advantage of these new trains.



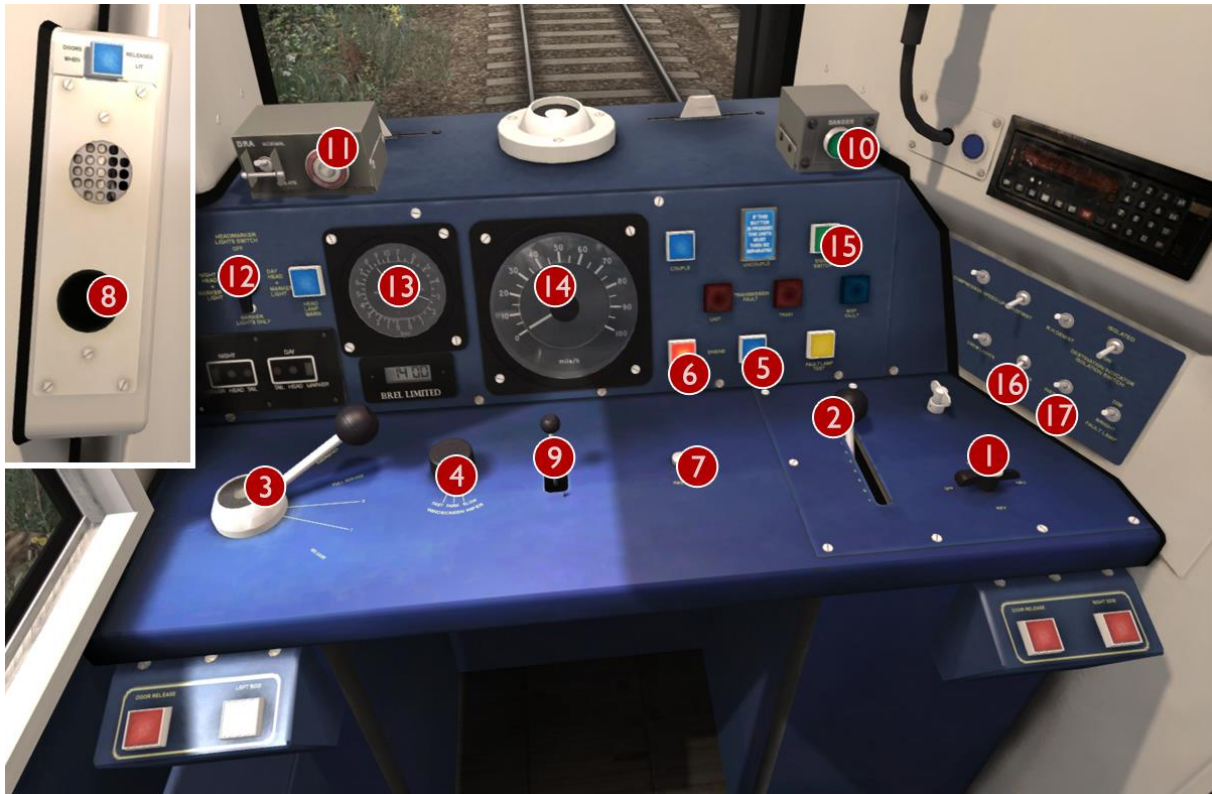
The Class 158 soon became common place across the UK, operating short distance domestic services as well as long distance cross country trains. With carpeting throughout, full air conditioning, and provision for a trolley service during travel, passenger comfort and relaxation was vastly improved and warmly welcomed by customers.

Today a large number of different interiors have been adopted as private operators each seek to tailor their trains to customer needs. Various qualities of first class accommodation also exist. All seating in standard class compartments is in 2+2 formation, with first class sporting 2+1.

3.2 Design & Specification

TOPS Number Range	Class 158818 - 158841
Formation	2-Car DMCL+DMSL
Weight (Total 2-Car)	77 tonnes
Train Length	152ft 6in (46.42m)
Width	8ft 10in (2.7m)
Engine Type	Diesel
Horsepower	350-400hp per vehicle
Max Speed	90mph (145km/h)
Brake Type	Air

3.3 Cabin Controls



1	Reverser	10	Sander
2	Throttle	11	DRA
3	Train Brake	12	Headlights Selector
4	Wiper Switch	13	Brake Gauges
5	Engine Start	14	Speedometer
6	Engine Stop	15	Guard Signal Button
7	AWS Reset	16	Cab Lights
8	AWS Indicator	17	Instrument Lights
9	Warning Horn		

3.4 Additional Keyboard Controls

L – Toggle Cabin Lights
J – Toggle DRA (Driver's Reminder Appliance)
I – Toggle Instrument Dimmer
C – Guard Signal Button
V – Toggle Wipers

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When the reverser has been moved from OFF to Forward or Reverse for the first time, the automatic warning system self-test will commence. This is an audible continuous horn which is cancelled by pressing the AWS Reset button or “Q” on the keyboard.

3.6 DRA (Driver’s Reminder Appliance)

When the DRA switch is set to the on position (indicated by the switch illuminating red) traction power cannot be obtained.

This is designed to help mitigate against the risk of signals being passed at danger after station stops where last signal passed was displaying a caution aspect. To obtain traction power again the driver must switch off the DRA.



3.7 Destination Displays

If you wish to make use of the Class 158 in your own scenarios, it is possible to customise the destination displays for both AI and player services. In order to pre-configure a specific destination, the correct running number must be entered into the vehicle properties window. This number consists of a 10-digit value containing both numbers and a letter. This is arranged like so: **DUUUUCCCCC** - for example: **32030177921g**

D	= the Destination Display – in this example Oban
UUUU	= the Multiple Unit Number – in this example (15)8818
CCCCC	= the Coach Number - in this example 57818

a	Glasgow International Airport	A	Blank
b	Oban	B	Not In Service
c	Fort William	C	Glasgow Queen Street
d	Mallaig via Fort William	D	Glasgow Queen Street via Falkirk High
e	Kyle of Lochalsh	E	Glasgow Queen Street via Falkirk Grahamston
f	Wick and Thurso	F	Edinburgh Waverley
g	Whifflet	G	Edinburgh Waverley via Falkirk High
h	Paisley Canal	H	Edinburgh Waverley via Falkirk Grahamston
i	Kirkcaldy	I	Falkirk Grahamston
j	Kilmarnock	J	Edinburgh Haymarket
k	Cumbernauld	K	Dalmeny
l	Anniesland	L	Larbert
m	Stranraer	M	Stirling
n	Special	N	Dunblane
o	Check Station Screens	O	Alloa
		P	Aberdeen
		Q	Dundee
		R	Perth
		S	Inverness
		T	Inverness via Dundee
		U	Inverness via Perth
		V	North Berwick
		W	Bathgate
		X	Dunfermline Town
		Y	Glasgow Central
		Z	Paisley Gilmour Street

4 Signals

4.1 Main Signal Head Aspects



Colour light signals are used for controlling running movements. They display aspects by means of red, yellow and green coloured lights.

Signal Aspect	Description	Instruction to Driver
Red light	Danger	Stop.
Single yellow light	Caution	Proceed: be prepared to stop at the next signal.
Double yellow lights	Preliminary caution	Proceed: be prepared to find the next signal displaying one yellow light.
One flashing yellow light	Preliminary caution for a diverging route	Proceed: Be prepared to find the next signal displaying one yellow light with feather junction indicator for diverging route(s).
Double flashing yellow lights	Indication of diverging route ahead of the next but one signal	Proceed: Be prepared to find the next signal displaying one flashing yellow light.
Green light	Clear	Proceed: The next signal is displaying a proceed aspect.

4.2 Theatre Type Signals

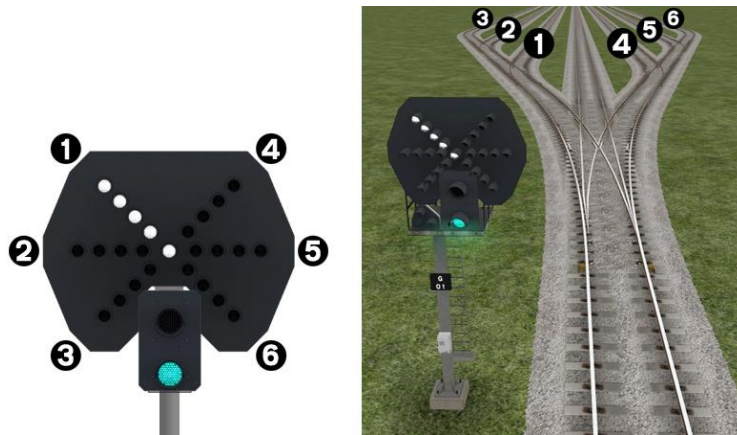


A Theatre alphanumeric route indicator indicates the route to be taken using numbers or letters (or a combination of numbers and letters).

A Theatre indicator is often used to show the arrival platform number for a service.

4.3 Feather Type Signals

A Feather junction indicator indicates a diverging route to be taken by the angle at which a line of five white lights is displayed. (Position 1 shown)



Feather Indication	Instruction to Driver
No Feather Indication	Obey main aspect, straight-ahead route is set
Position 1 indication	Obey main aspect, expect divergence to left
Position 2 indication	Obey main aspect, expect divergence to left more extreme than that for position 1
Position 3 indication	Obey main aspect, expect divergence to left more extreme than that for position 2
Position 4 indication	Obey main aspect, expect divergence to right
Position 5 indication	Obey main aspect, expect divergence to right more extreme than that for position 4
Position 6 indication	Obey main aspect, expect divergence to right more extreme than that for position 5

4.4 Ground Signals and Position Light Signals



Ground Signals and Position Light Signals (PLS) display their aspects by means of the position and colour of lights. Ground Signals are always illuminated and can have miniature theatre indicators attached whereas PLS only illuminate to allow a train to pass in to an occupied section of line and are mounted as an addition to a main signal head.

Signal Aspect	Description	Instruction to Driver
Two red lights	Danger	Stop.
No aspect (where associated with a main aspect)		Obey main aspect.
Two white lights	Caution	The line ahead may be occupied. Proceed cautiously towards the next stop signal, stop board or buffer stops. Be prepared to stop short of any obstruction. The associated main aspect (where provided) may be passed at danger

4.5 Entering an Occupied Section of Track

During a scenario your train may be scheduled to enter a platform or section of track that is already occupied by another train or rolling stock. In this situation you should stop at the red signal protecting this section of track as normal. Once your train has stopped press the TAB key on your keyboard to request permission from the signalling centre to enter the occupied section of track. When your train movement is approved the signal will illuminate the two white lights on the position light signal if it has one.

4.6 Repeater Signals and Primary Route Indicators



Standard banner repeater signals indicate whether the signal ahead is displaying a proceed aspect or is at danger. Modern fibre optic banner repeating signals, as shown above, consist of a rectangular unlit black background displaying a white circle with a black bar.

Repeater signals are intended to provide a driver with advance information of a signal that may be obscured on approach. A train does not need to stop at a repeater signal, only at the related signal if it is at danger.



Signal Display	Instruction to Driver
Horizontal arm	Be prepared to find the next signal at danger
White arm at an upper quadrant angle of 45°	Next signal is exhibiting a proceed aspect

5 Speed Signs

5.1 Permissible Speed Indicators



These signs display the permissible speed in miles per hour applicable to the section of line beyond the sign up to the commencement of any subsequent permissible speed section.

Remember to wait for the complete length of your train to pass these signs before accelerating if the permissible line speed is increasing. If the permissible line speed is decreasing then you must reduce your speed before passing these signs.

If there is an arrow provided in conjunction with the main sign then the permissible speed only applies to the diverting line indicated by the arrow.

5.2 Permissible Speed Warning Indicators



These signs provide advance warning of a reduction in permissible speed ahead. Permanent AWS Ramps (Automatic Warning System) are often installed in conjunction with these signs. In these cases the driver must cancel the AWS warning when triggered on approach to these signs. See safety systems section of this manual.

If there is an arrow provided in conjunction with the sign then the permissible speed warning only applies to the diverting line indicated by the arrow.

6 Safety Systems

6.1 AWS (Automatic Warning System)



AWS is provided to give train drivers in-cab warnings on the approach to signals, reductions in permissible speed and temporary/emergency speed restrictions, and to apply the brakes in the event that a driver does not acknowledge cautionary warnings given by the system.

As a train approaches a signal or track sign, it passes over AWS track equipment (magnets) which are fixed to the sleepers between the running rails. The magnets are sensed by a receiver mounted under the leading end of the train.

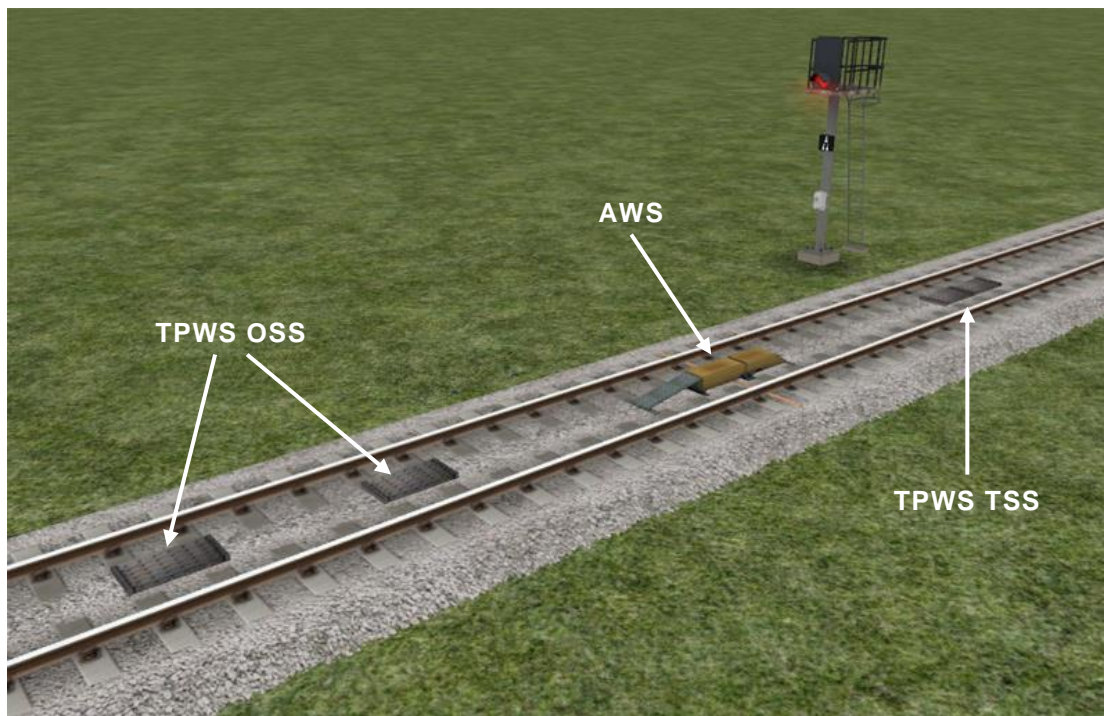
If the signal ahead is displaying a clear aspect (green), a bell (or an electronic ping) sounds in the driver's cab, and the AWS Sunflower indicator displays "all black". No action in respect of the AWS is required of the driver.

If the signal is displaying a caution or danger aspect (yellow, double yellow or red), a horn sounds in the driver's cab and the display shows "all black". The driver has to acknowledge the warning by pressing the "AWS Acknowledgement" (AWS Reset) push button. When the driver operates the push button, the horn is silenced and the AWS Sunflower changes to a segmented yellow and black circular display. If the driver fails to acknowledge the warning horn within a set time period, the emergency brakes are applied automatically.

Where permanent warning AWS equipment is provided on the approach to reductions in permissible speed, fixed warning boards and speed restrictions, the cab equipment always operates in a manner equivalent to the approach to a signal displaying a caution or stop aspect. The driver receives a warning and has to respond to it accordingly; otherwise the emergency brakes are applied automatically.

6.2 TPWS (Train Protection and Warning System)

The primary purpose of TPWS is to minimise the consequence of a train passing a TPWS fitted signal at danger and a train speeding on approach to a TPWS fitted signal at danger. TPWS track equipment is only active when the signal that they are protecting is displaying a danger aspect (red).



There are two pairs of grids mounted between the running rails. Both pairs consist of an 'arming' and a 'trigger' grid. The first pair, the Overspeed Sensor (OSS), are positioned on approach to the protected signal. The other pair of grids are mounted back to back at the signal location, and these form the Train Stop Sensor (TSS).

The emergency train brakes are automatically applied if a train passes over an active Overspeed Sensor faster than a predetermined speed for that location. The brakes are also applied if a train passes over an active Train Stop Sensor at any speed, as the signal it is protecting must be at danger.

After passing a signal displaying a caution aspect (single yellow) it is advisable to reduce your train speed to anticipate the approach to the next signal. It may be at danger and therefore the TPWS Overspeed Sensor will be active and will trip an emergency stop if your train speed is greater than the predetermined approach speed when you pass over it.

Many platforms with buffer stops are protected by Mini-Overspeed Sensors (usually set with a trigger speed of around 12mph). It is advisable to enter these platforms no faster than 10mph.

7 Other Information

This document is provided as a guide to Rivet Games' Suburban Glasgow Northwest add-on route for Train Simulator, a product provided for entertainment purposes.

There is more information on this route at <http://www.rivet-games.com>

If you do notice errors in this document, please let us know at support@rivet-games.com

Please give feedback on the Rivet Games forums: forums.rivet-games.com, as well as leave a review on the Steam store to help others decide whether they would enjoy this route.

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8 Acknowledgements

This route was conceived and developed by Iain Mackay. Rivet Games provided additional assets and assistance in order to make it available commercially.

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