South Wales Coastal
Swansea to Bristol

dovetail GAMES

Release Version 1.0

1. Route Information

1.1 Background

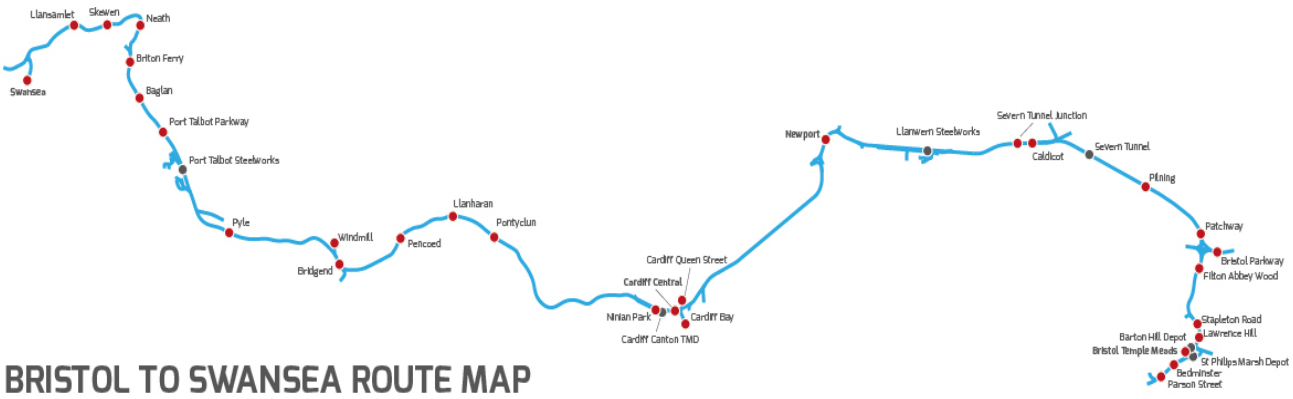
The South Wales Main Line branches off from the Great Western Main Line to allow a direct connection between London and the South of Wales. It was opened in 2 stages, the first exclusively in Wales running from Swansea to Chepstow opened in 1850, and the second being in England, branching off from Royal Wootton Bassett towards Patchway opened in 1903.

Before the Severn Tunnel was constructed, services would head north from Swindon and get to Wales via Gloucester, joining the SWML at Chepstow. The Severn Tunnel made way for a much faster route between the two countries, making the 'Great Way Round' only a backup way of crossing the Severn. If, for example, of the tunnel was closed.

With the Welsh Coal Mines running at their peak, freight traffic was, and still is today, a key part of the route, with connections to various docks on both sides of the Severn, there was always a heavy freight train running to Portishead Docks carrying coal from around the South of Wales. The South Wales Main Line was also thought to be a major role in the expansion of Fishguard Docks, the GWR's main connection to the USA.

Today the line is operated by Arriva Trains Wales and also sees Great Western Railway services originating from London Paddington into Swansea and beyond, freight is still a key part of the route, be it imported coal or steel works movements. There are plans to electrify the SWML for 2017, allowing the new Hitachi Super Express Electro-Diesel and Electric Multiple Units (Class 800 and 801) replace the HST on London – Swansea services.

1.2 The Route



BRISTOL TO SWANSEA ROUTE MAP

2. Locomotives

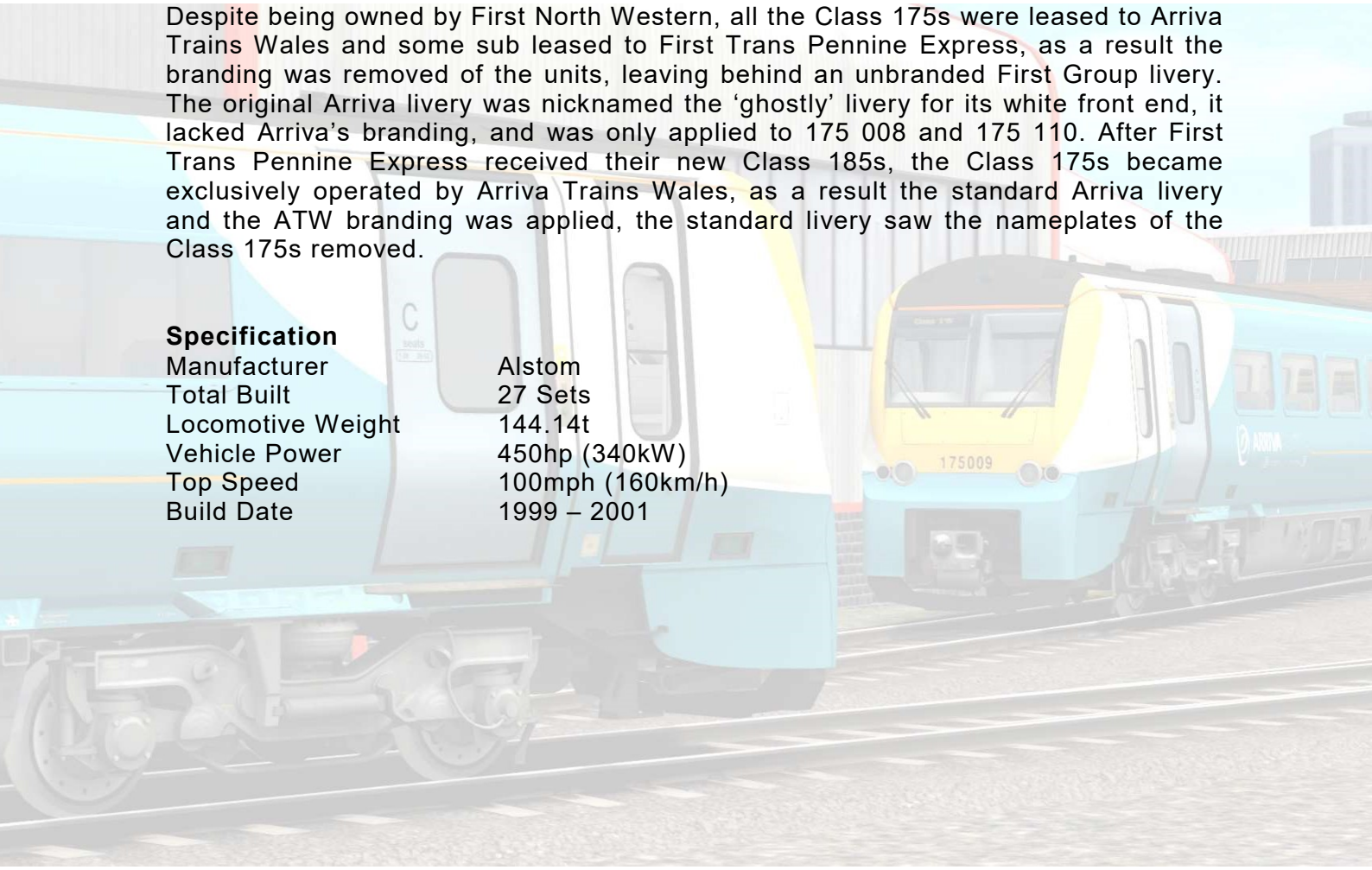
2.1 Class 175 'Coradia' Diesel Multiple Unit

Built between 1999 and 2001, the Class 175 is a Diesel Multiple unit built by Alstom as part of their Coradia family, the same as the Class 180. They were built at Washford Heath in Birmingham for First North Western, as they wanted to replace some of the older stock inherited from BRs privatisation, they are based in a purpose built depot in Chester.

In the late 90s, the initial order of Class 175 included a mix of 2 and 3 car sets, with some of the 3 car sets being capable of 125mph, the rest would be 100mph. The units with a higher top speed would be used to run services into London, however due to the agreement between Railtrack and Virgin Trains, all high speed services would be ran exclusively by Virgin, leaving the order of 125mph trains useless. The order was changed to 16 three car and 11 two car sets with a top speed of 100mph. A 125mph capable unit was eventually built as the Class 180.

The first Class 175 entered service in June 2000 operated by First North Western, however due to reliability issues with the bogies and brakes, older heritage units such as the Class 101 had to be ready at short notice in case a unit failed, these problems were eventually fixed, leaving the Class 175 with a much more acceptable reliability.

Despite being owned by First North Western, all the Class 175s were leased to Arriva Trains Wales and some sub leased to First Trans Pennine Express, as a result the branding was removed of the units, leaving behind an unbranded First Group livery. The original Arriva livery was nicknamed the ‘ghostly’ livery for its white front end, it lacked Arriva’s branding, and was only applied to 175 008 and 175 110. After First Trans Pennine Express received their new Class 185s, the Class 175s became exclusively operated by Arriva Trains Wales, as a result the standard Arriva livery and the ATW branding was applied, the standard livery saw the nameplates of the Class 175s removed.



Specification

Manufacturer	Alstom
Total Built	27 Sets
Locomotive Weight	144.14t
Vehicle Power	450hp (340kW)
Top Speed	100mph (160km/h)
Build Date	1999 – 2001

2.2 Class 175 'Coradia' Diesel Multiple Unit – Ghost White

Originally built for service with the First North Western Company, changes to franchises later meant that although all were leased by Arriva Trains Wales, sub-leasing arrangements from February 2004 meant that Chester depot, had to supply a daily allocation to three different train companies: Arriva Trains Wales, First North Western and Trans Pennine Express.

The First North Western logos were removed from the vehicles and First Group basic livery was retained, but in 2005 a start was made in applying a new "ghostly" version of Arriva's colour scheme, although without branding and logos. 175 008 and 175 110 were the only ones to carry this livery in traffic, and indeed did carry logos for a short time. It became extinct with the repainting of 175 110 in April 2009.

After delivery of new Class 185 units to Trans Pennine in 2006-7, all 27 175s became wholly dedicated to Arriva Trains Wales and all vehicles were given ATW logos.

Repainting began in earnest at the beginning of 2008, the units being sent one at a time to Alstom at Oxley, Wolverhampton for treatment. It was decided that pale-coloured "ghostly" scheme will not be perpetuated, and instead the standard Arriva colours and branding are being applied. The first to be done was 175 008 - which thus gained its third livery - followed by 175 010. The last to be done, in July 2009, was 175 115.

Specification

Manufacturer	Alstom
Total Built	27 Sets
Locomotive Weight	144.14t
Vehicle Power	450hp (340kW)
Top Speed	100mph (160km/h)
Build Date	1999 – 2001

Class 43 'High Speed Train'

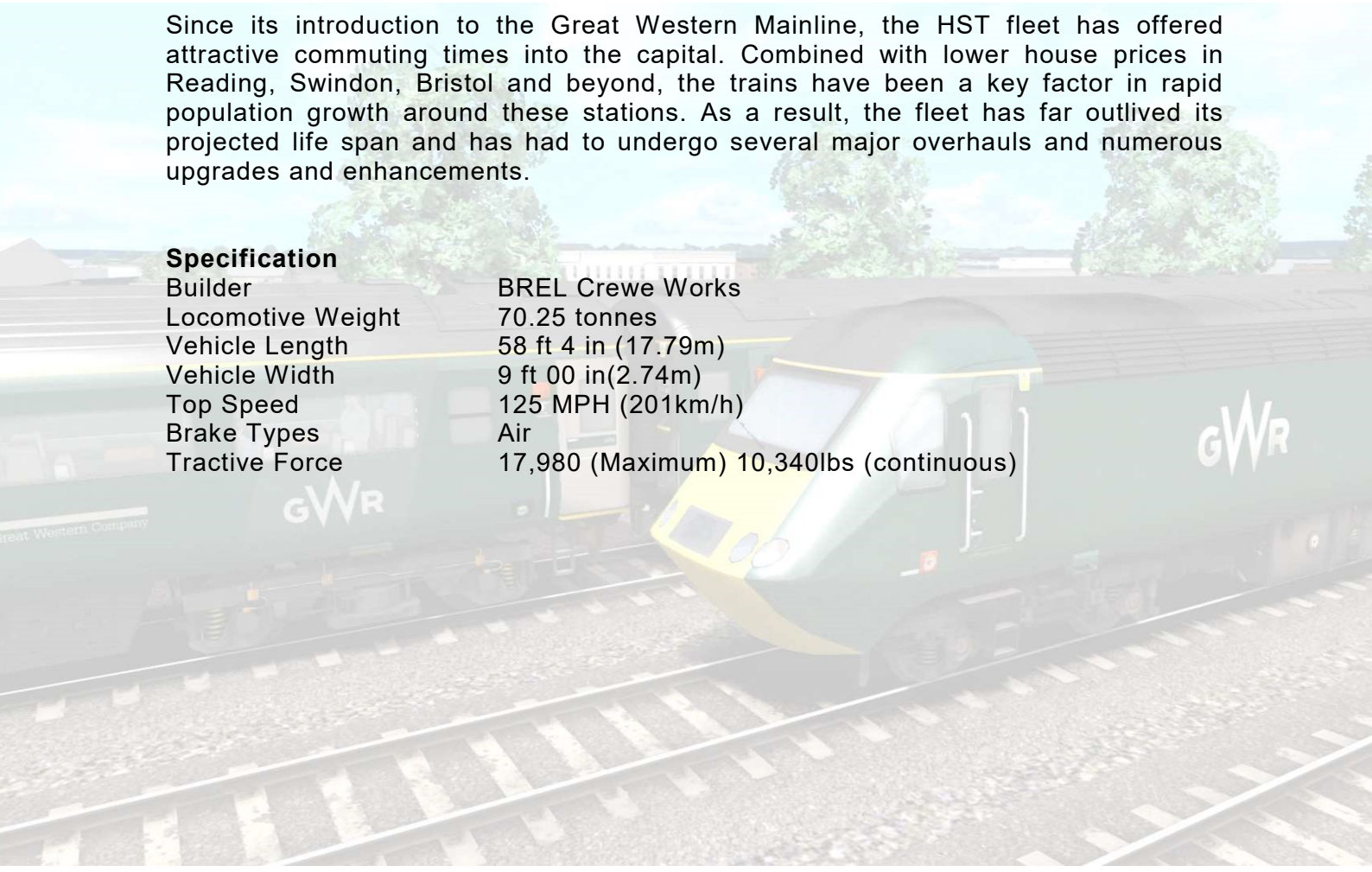
The High Speed Diesel Train (HSDT) began its life in the early 1970s as a stopgap while British Rail developed their Advanced Passenger Train (APT). However, the revolutionary design changed high-speed rail dramatically

Once work on the prototype was complete, and the name had changed to simply High Speed Train, British Rail put forward a proposal to the government for full introduction. The initial order was for between 30 and 40 full trains to be constructed each year for a 5 year period, with the intention of totally modernising all UK trunk routes. The HST was ordered in batches according to the region where they would operate. Western, Eastern, South Western and Cross Country regions, accounted for 95 sets built in total.

The HST first ran on the Great Western Mainline in 1976, operating services between London Paddington, Bristol and South Wales. As the concept of semi-permanently coupled locomotives and coaches was new to the British network, the trains were initially referred to as Class 253, with sets allocated to the East Coast Mainline which featured one extra coach being called Class 254 .

When privatisation of the railways took place, Great Western Trains was formed on 4th February 1996. The new company wanted to make an image for itself, so several Class 43 power cars quickly emerged in emerald green and ivory 'Merlin' livery in September 1996. Great Western Trains lasted only a few years before First Group bought the company and transformed it into Great Western Railway.

Since its introduction to the Great Western Mainline, the HST fleet has offered attractive commuting times into the capital. Combined with lower house prices in Reading, Swindon, Bristol and beyond, the trains have been a key factor in rapid population growth around these stations. As a result, the fleet has far outlived its projected life span and has had to undergo several major overhauls and numerous upgrades and enhancements.



Specification

Builder	BREL Crewe Works
Locomotive Weight	70.25 tonnes
Vehicle Length	58 ft 4 in (17.79m)
Vehicle Width	9 ft 00 in(2.74m)
Top Speed	125 MPH (201km/h)
Brake Types	Air
Tractive Force	17,980 (Maximum) 10,340lbs (continuous)

2.3 Class 70 Diesel Locomotive

The Class 70 diesel locomotives were ordered by Freightliner UK from General Electric in November of 2007. A total of 30 of the six axle Co-Co mainline heavy mixed freight locomotives were requested with construction taking place in GE's Erie, Pennsylvania plant.

The units were designed in collaboration between Freightliner, who required a more powerful freight locomotive, and General Electric who were looking for an entry into the European rolling stock market. Forming the GE PowerHaul class of mainline diesel-electric locomotives, consisting of three main subclasses, the class 70 is a PH37ACmi, built for the UK railways, PH37ACi for mainland Europe and elsewhere built to UIC 505-1 gauge, and PH37ACmai for 1067mm-gauge lines. With much of the input on the design of the cab being taken from drivers, the design also features heating, air conditioning, additional acoustic insulation and dial-less, electronic driving displays.

Utilising the GE PowerHaul P616 diesel engine, rated at 2,750kW (3,690hp) and revving at 1500rpm, giving a 20% increase in power to weight ratio compared to similar classes, the locomotive was ordered to match existing haulage capacity with increased fuel efficiency, and is expected to be more efficient than it's contemporaries both in general operation and under braking, where regenerative braking is used to supply energy to power auxiliary motors, resulting in increased efficiency.

Specification

Builder	General Electric
Locomotive Weight	129 tonnes
Vehicle Length	71ft 2.7in (21.71m)
Vehicle Width	8ft 8in (2.642m)
Top Speed	75 MPH (120km/h)
Brake Types	Air, Westinghouse PBL3
Tractive Force	122,296lb (Starting) 95,993lb (continuous)

3. Freight Stock

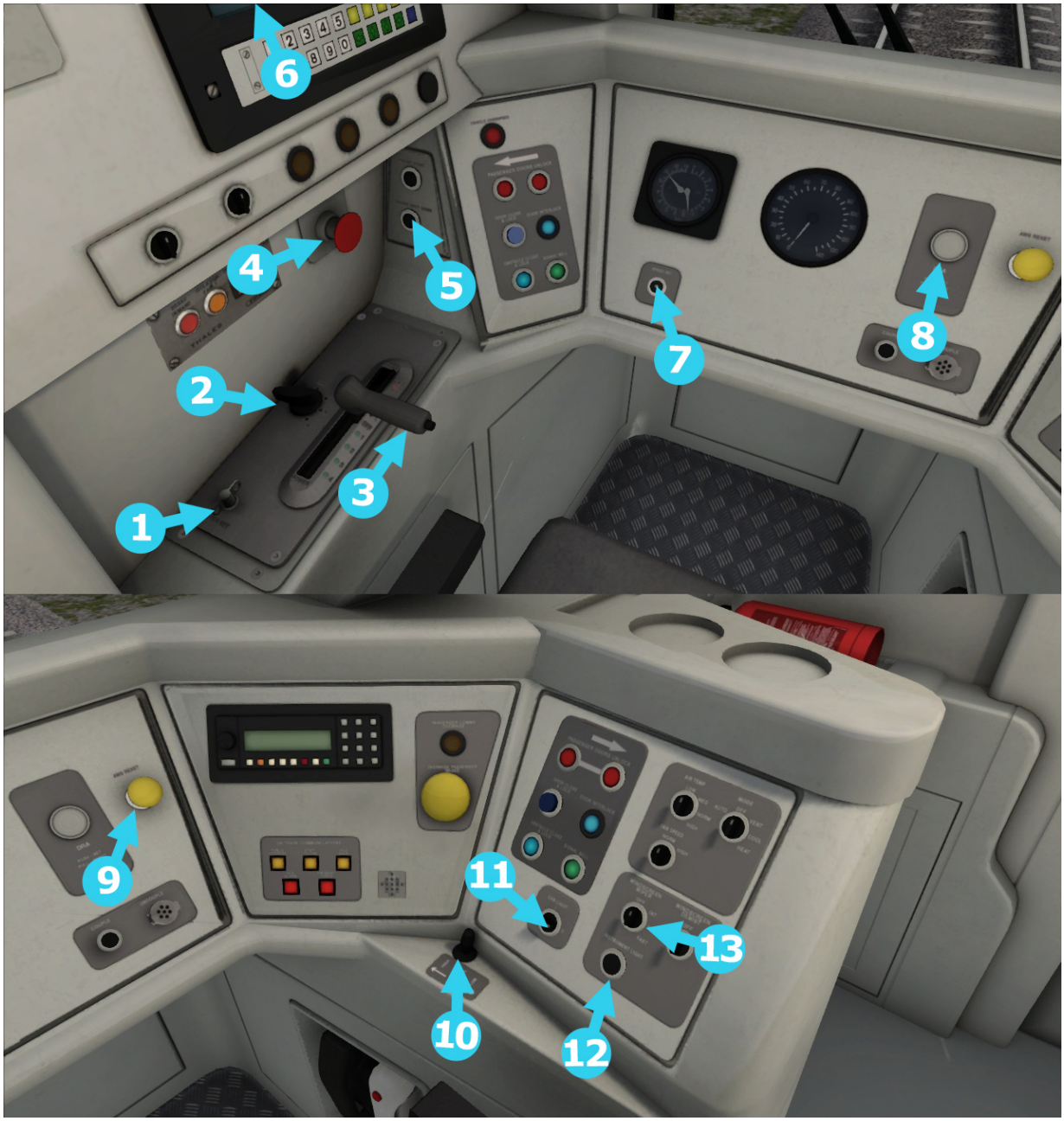
3.1 HHA Bogie Coal Hopper

3.2 FEA-B Container Twin Flat Wagons

3.3 KQA Container Pocket Wagon

4. Driving Instructions

4.1 Class 175 Diesel Multiple Unit



1	Master Key
2	Reverser (W / S)
3	Combined Power/Brake (A / D)
4	Emergency Brake (Backspace)
5	Engine Stop/Start (Z)
6	Headlight Control (H / Shift+H)
7	Speed Set
8	Driver Reminder Appliance
9	AWS Acknowledge (Q)
10	Horn (Spacebar)
11	Cab Light Switch (L)
12	Instrument Lights (I)
13	Windscreen Wipers (V)

4.2 General Controls

Key Equivalent	Action
T	Load/Unload passengers or freight.
H	Headlights. Repeatedly pressing will cycle through headlight states where appropriate.
Z	(Expert) Engine Stop/Start. By default engines will already be running at the start of a scenario. Press this button to stop and then again to restart the engine.
Q	(Expert) AWS. The AWS is a system used on some trains to ensure that the driver has seen a signal. If the AWS sounds (a black/yellow striped symbol is shown on the Driver's display), this must be acknowledged by pressing the AWS button or the emergency brakes will be applied.
X	(Expert) Sander. Causes sand to be laid on the rails next to the wheels to assist with adhesion. Press and hold to activate sander, let go to stop.
L	Cab Light. Toggle the Cab light on and off.
I	Instrument Light. Toggle the Instrument Light on and off.
Space	Horn. Sound the horn's low tone.
B	Horn. Sound the horn's high tone.
/	Handbrake. Toggle the train Handbrake on and off.
Ctrl + Shift + C	Couple manually.

4.3 Class 175 Systems

DSD

The Driver Safety Device or DSD is a vigilance system used to check the driver is present and aware when driving a locomotive. When activated and the player is travelling above 5mph an alarm will sound every sixty seconds. This must be acknowledged within five seconds or an emergency brake application will be applied.

To toggle the system, use the hotkey CTRL + D. To acknowledge the warning, press the hotkey Numpad Enter.

DRA

The Driver Reminder Appliance or DRA is a safety system which when enabled prevents the driver applying power. This can be useful when stopping at red signals to remove any chance of applying power and moving past the signal without first disabling the DRA. After disabling DRA the throttle handle must be set back to the idle position before power can be reapplied.

Manual Door Control

Manual Door Control is a system that lets players choose when they want to close the coach doors after picking up passengers. This is an optional system, the Class 175 will default to the standard passenger pickup method unless it is set to manual control.

To toggle the system, press the hotkey CTRL + SHIFT + T. When the passenger doors open they will now wait for player input before they close. Players are not able to depart with the doors open. To close the doors with manual control enabled first wait for the loading of passengers and then press CTRL + T.

Speed Set

The Speed Set button when activated will not allow the Class 175 to exceed the current speed it is travelling. It will not manually apply power or braking to maintain the speed. It utilises the throttle handles current power output, so if the handle is in idle the train will lose traction and slow down. Similarly, when travelling downhill if the

set speed is exceeded by the momentum of the train the system will not apply braking.

Updatable Destinations
The Class 175 can change its destination board during a scenario. To cycle through the possible destinations, use the hotkey CTRL + SHIFT + 6 to cycle up and CTRL + SHIFT + 5 to cycle down. This will set the destination boards throughout the train.

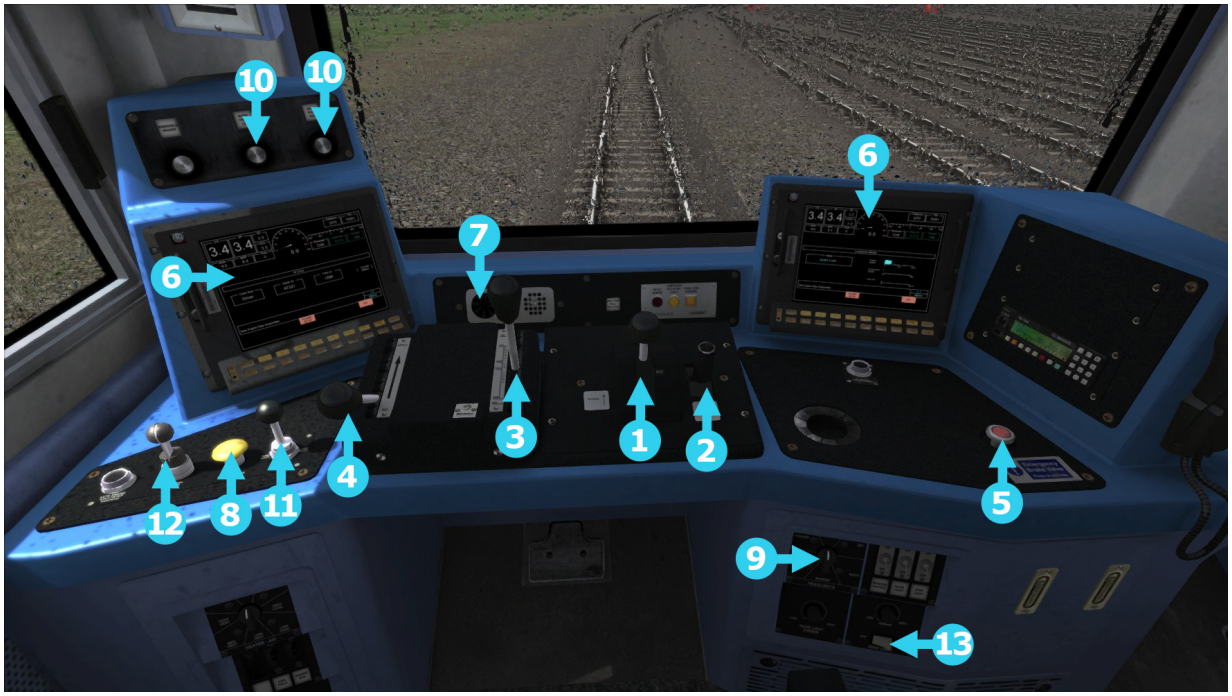
Class 175 Destination Table

a Aberystwyth
A Arriva Trains Wales
b Bristol Parkway
B Bristol Temple Meads
c Caerdydd Canolog
C Cardiff Central
d Maesteg
D Abertawe
e Swansea
E Aberdaugleddau
f Milford Haven
F Caerloyw
g Gloucester
G Caergybi
h Holyhead
H Manchester Airport
i Cyffordd Llandudno
I Llandudno Junction
j Blackpool North
J Llandudno
k Manceinion Piccadilly
K Manchester Piccadilly
l Casnewydd
L Newport
m Caer
M Chester
n Preston
N Warrington Bank Quay
o Crewe
O Cryw
p Amwythig
P Shrewsbury
q Caerfyddin
Q Carmathen
r Birmingham New Street
R Wigan North Western
s Wrecsam Canolog
S Wrexham General
t Not in Service
T Special
U Cheltenham Spa
u Class 175
v Empty to Depot
Blank

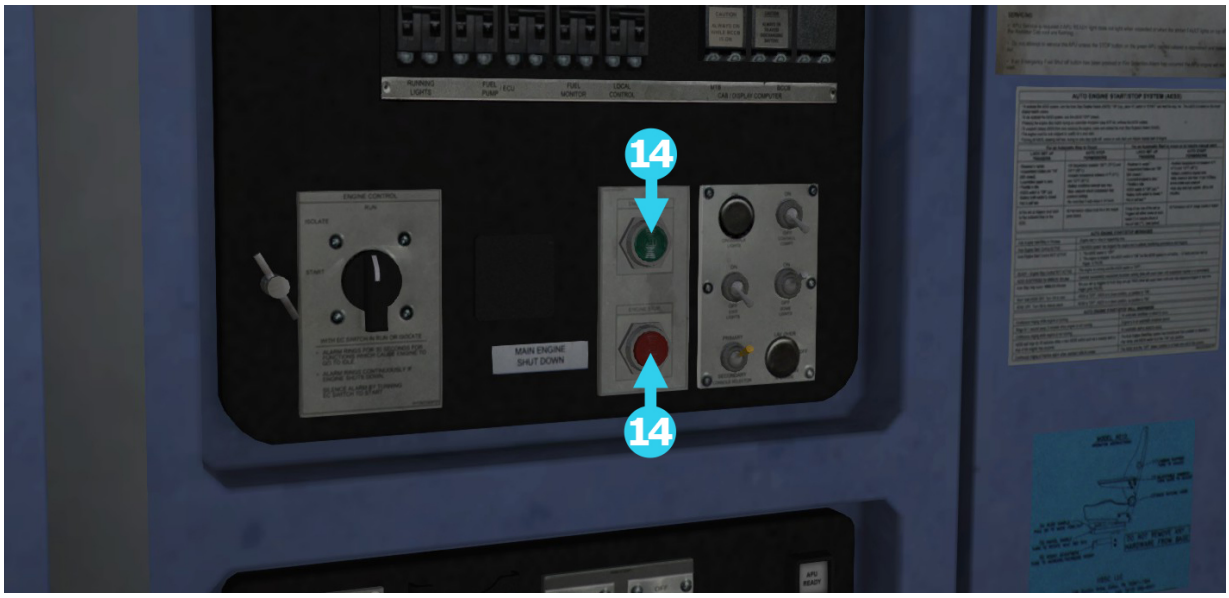
4.4 Class 43 'High Speed Train'

1	Throttle (A / D)	**6**	Headlight Selector (H / Shift+H)
2	Train Brake (; / ‘)	**7**	Windscreen Wipers (V)
3	Reverser (W / S)	**8**	Emergency Brake (Backspace)
4	Horn (Space Bar)	**9**	Handbrake (/)
5	AWS Acknowledge (Q)	**10**	Cab Light (L)

4.5 Class 70 Diesel Locomotive



1	Throttle (A / D)	**8**	AWS Acknowledgement (Q)
2	Reverser (W / S)	**9**	Headlight Selector (H / Shift+H)
3	Train Brake (; / ‘)	**10**	Wiper Controls (V)
4	Locomotive Brake ([/])	**11**	Horn (H)
5	Emergency Brake (Backspace)	**12**	Sander (X)
6	Speed and Brake Gauges	**13**	Cab Light (L)
7	AWS Flower	**14**	Engine Start/Stop (Z)



5. Scenarios

For driving tutorials, please visit the Academy from the main TS2017 menu screen

5.1 01. [175] Pt 1: 1V40 Manchester Piccadilly to Carmarthen

Kick this afternoon off with a Class 175 service from Manchester Piccadilly to Carmarthen. You'll be at the controls between Newport and Bridgend with a scheduled departure of 14:22.

Duration: 40 Minutes
Difficulty: Easy

5.2 02. [175] Pt 2: 1V40 Manchester Piccadilly to Carmarthen

Having earlier arrived at Bridgend and allowing passengers to board, you are ready to take on the second leg of this 1V40 service to Carmarthen. Finish the day by heading to Swansea for your final passenger pick up.

Duration: 35 Minutes
Difficulty: Easy

5.3 03. [175] 1W48 Carmarthen to Manchester Piccadilly

This morning, you will be operating passenger service 1W48 from Carmarthen to Manchester Piccadilly, between Port Talbot Parkway and Cardiff Central. An overnight freight service from Margam has been experiencing difficulties and you should be aware that this may cause delay.

Duration: 50 Minutes
Difficulty: Medium

5.4 04. [175] 1B41 Milford Haven to Cardiff Central

Welcome aboard this passenger service bound for Cardiff Central from Milford Haven. You will be in the driver's seat between Swansea and Bridgend.

Duration: 40 Minutes
Difficulty: Hard

5.5 05. [70] Pt 1: 6H23 Margam T.C. to Llanwern Exchange Sdgs

Time to start the day! You'll be coupling this Class 70 to a consist of loaded coal hoppers. You will then be taking this freight service to Llanwern Exchange, in this two-part scenario.

Duration: 55 Minutes
Difficulty: Easy

5.6 06. [70] Pt 2: 6H23 Margam T.C. to Llanwern Exchange Sdgs

Continue this coal run from Margam to Llanwern Exchange, at Cardiff Up Main Through. You have just been held at a red signal by a HST. Carry on this service to Llanwern Exchange, where you will take your scheduled stop.

Duration: 50 Minutes
Difficulty: Easy

5.7 07. [70] 6V05 Round Oak to Margam T.C.

Welcome aboard service 6V05! You'll be at the controls of this Class 70 at Llanwern, from where you will take a consist of empty coal hoppers to Cardiff.

Duration: 50 Minutes
Difficulty: Hard

6. Railfan Mode Scenarios

Railfan Mode provides a unique chance to observe and enjoy the operations of trains without the pressure and involvement of driving them. Railfan Mode scenarios are positioned at various key points along the route and provide camera functionality to sit back and watch the action unfold.

These scenarios are located on the Drive screen under the Career tab.

6.1 [RailfanMode] Bridgend

- **Duration** 10 Minutes

6.2 [RailfanMode] Margam T.C.

- **Duration** 10 Minutes

6.3 [RailfanMode] Port Talbot Parkway

- **Duration** 10 Minutes

7. Signalling

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.

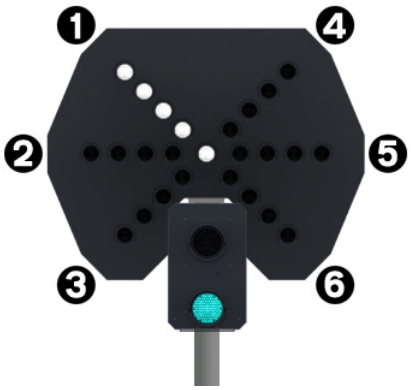
Theatre Type Signals

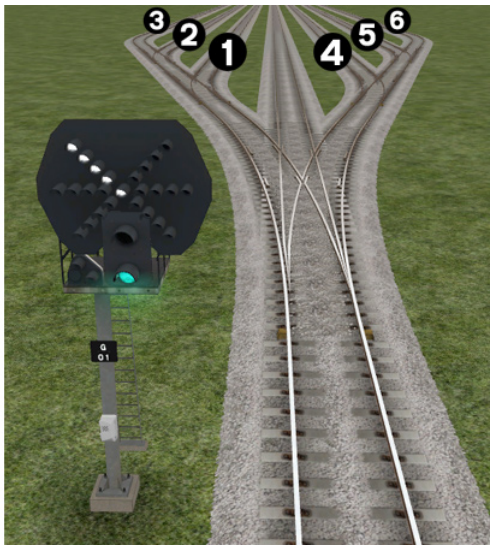
A Theatre alphanumeric route indicator indicates the route to be taken using numbers or letters (or a combination of numbers and letters).

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

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

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.

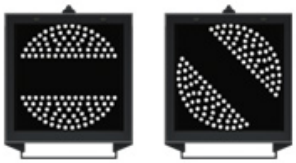
Entering an Occupied Section of Track

Signal Aspect	Description	Instruction to Driver
Two red lights	Danger	Stop.
No aspect (located on 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

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.

Repeater Signals



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

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

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.

Splitting banner signals provide two banner signal heads combined to form a splitting banner repeating signal. These are used to indicate the aspect of a signal with a feather junction indicator. If the related junction signal is displaying an illuminated feather then the lower banner head displays an arm at an upper quadrant angle of 45°. Alternatively, if the related junction signal is not displaying an illuminated feather and is indicating a straight ahead route then the higher “main” banner head displays an arm at an upper quadrant angle of 45°.

8. Speed Signs

Permissible Speed Indicators

These signs display the permissible speed in M.P.H. applicable to the section of line beyond the sign up to the commencement of any subsequent permissible speed section.

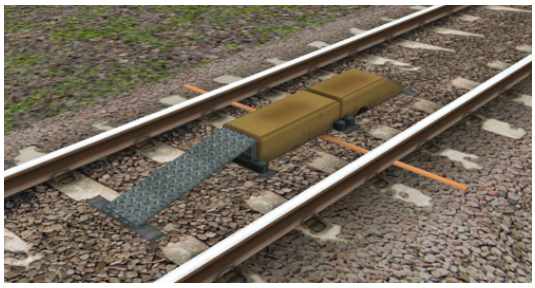
Remember to wait for the complete length of your train to pass these signs before accelerating if the permissible line speed is increasing. If the permissible line speed is decreasing then you must reduce your speed before passing these signs.

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.

9. Safety Systems

AWS (Automatic Warning System)



AWS is provided to give train drivers in-cab warnings of 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, 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.

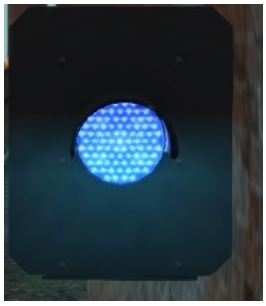
If the signal is displaying a caution or danger aspect (yellow, double yellow or red), a horn sounds in the driver's cab and the display shows "all black". The driver has to acknowledge the warning by pressing the "AWS Acknowledgement" push button. When the driver operates the push button, the horn is 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 brakes are applied automatically.

Where AWS equipment is provided on the approach to reductions in permissible speed and temporary/emergency 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 brakes are applied automatically.

10. Gradient Marker Signals

In the Severn Tunnel, there are Gradient Marker Signals. These are attached to the walls of the tunnel and have blue lights. The purpose of these is to indicate the approach of a change in gradient.

Due to the steep gradient, when descending the driver is required to release the brakes gradually, before reaching the single light, then apply power again before reaching the double lights; but only after having passed the single lights. There is a small section of level track between the signals and that is where the driver should release the brakes and re-apply power.



Start applying brakes before reaching this signal.

Re-apply power and release brakes before reaching this signal.

11. Acknowledgements

Dovetail Games would like to thank the following people for their contribution to the development of the South Wales Coastal route.

Stuart Galbraith - Route building
Jonathon Lewis – Route building

Beta Testers